ComAp
The heart of smart control

InteliGen 200

Controller for parallel gen-set applications

SW version 1.3.0

1 Document information 7
2 System overview 12
3 Applications overview 20
4 Installation and wiring 22
5 Controller setup 61
6 Communication 193
7 Technical data 227
8 Appendix 229

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Global Guide

Table of contents

1 Document information 7

1.1 Clarification of notation 7

1.2 About this Global Guide 7

1.3 Legal notice 7

1.4 General warnings 9

1.4.1 Remote control and programing 9

1.4.2 SW and HW versions compatibility 9

1.4.3 Dangerous voltage 9

1.4.4 Adjust the setpoints 9

1.5 Certifications and standards 10

1.6 Document history 10

1.7 Symbols in this manual 11

2 System overview 12

2.1 General description 12

2.1.1 The key features of InteliGen 200 12

2.2 True RMS measurement 12

2.3 Configurability and monitoring 12

2.3.1 Supported configuration and monitoring tools 13

2.3.2 Configuration parts 13

2.4 PC tools 14

2.4.1 InteliConfig 14

2.4.2 WebSupervisor 14

2.4.3 WinScope 15

2.5 Plug-in modules 15

2.5.1 CM-Ethernet 15

2.5.2 CM-4G-GPS 16

2.5.3 CM-GPRS 16

2.5.4 CM-RS232-485 16

2.5.5 EM-BIO8-EFCP 17

2.6 CAN modules 17

2.6.1 Inteli AIN8 17

2.6.2 Inteli IO8/8 18

2.6.3 IGS-PTM 18

2.6.4 IGL-RA15 19

2.6.5 I-LB+ 19

3 Applications overview 20
3.1 SPtM 20
3.2 MINT 21

4 Installation and wiring 22
4.1 Package content 22
4.2 Controller installation 23
4.2.1 Dimensions 23
4.2.2 Mounting 23
4.3 Terminal Diagram 25
4.4 Recommended wiring 26
4.4.1 General 27
4.4.2 Grounding 27
4.4.3 Power supply 27
4.4.4 Measurement wiring 29
4.4.5 Magnetic pick-up 44
4.4.6 Binary inputs 45
4.4.7 Binary Outputs 46
4.4.8 E-Stop 47
4.4.9 Emergency stop 48
4.4.10 Analog inputs 48
4.4.11 CAN bus and RS485 wiring 53
4.4.12 USB 57
4.4.13 USB HOST 57
4.4.14 AVR Interface 57
4.4.15 Speed governor interface 57
4.5 Plug-in module installation 58
4.5.1 Installation 58
4.6 Maintenance 60
4.6.1 Backup battery replacement 60

5 Controller setup 61
5.1 Default configuration 61
5.1.1 Default configuration 61
5.2 Controller configuration and PC tools connection 62
5.2.1 USB 62
5.2.2 RS232/RS485 63
5.2.3 Ethernet 64
5.3 Operator Guide 69
5.3.1 Front panel elements 69

5.3.2 Display screens and pages structure 71
5.3.3 Browsing alarms 85
5.3.4 Password 86
5.3.5 Information screen 92
5.3.6 Language selection 93
5.3.7 Display contrast adjustment 94
5.4 Functions 94
5.4.1 Operating Modes 95
5.4.2 Engine start 97
5.4.3 Stabilization 101
5.4.4 Connecting to load 101
5.4.5 Multiple island operation 106
5.4.6 Parallel to mains operation - SPtM application 107
5.4.7 Parallel to mains operation - MINT application 110
5.4.8 AMF operation 110
5.4.9 Engine cool down and stop 112
5.4.10 Power management 112
5.4.11 Control groups 131
5.4.12 Distributed power management signals 132
5.4.13 Regulation loops 135
5.4.14 Speed/Load control 137
5.4.15 Voltage/PF control 140
5.4.16 Gen-set operation states 142
5.4.17 Alarm management 144
5.4.18 History log 151
5.4.19 Breaker control 152
5.4.20 Exercise timers 155
5.4.21 Rental Timers 162
5.4.22 Service timers 163
5.4.23 Analog switches 163
5.4.24 Additional running engine indications 165
5.4.25 Voltage phase sequence detection 165
5.4.26 Sensor curves 166
5.4.27 PLC 167
5.4.28 Tier 4 Final 174
5.4.29 Geo-fencing 177
5.4.30 Mains decoupling protections 177
5.4.31 Droop 178
5.4.32 Alternate configuration 181

5.4.33 USB host 182
5.4.34 E-Stop 185
5.4.35 ECU Frequency selection 186
5.4.36 Mains import measurement 186
5.4.37 Load shedding 186
5.4.38 Peak shaving 188
5.4.39 Cybernetic security 188

6 Communication **193**
6.1 PC 193
6.1.1 Direct communication 193
6.1.2 Remote communication 195
6.2 Connection to 3rd party systems 206
6.2.1 SNMP 206
6.2.2 MODBUS-RTU, MODBUS/TCP 208
6.3 Replacing InternetBridge-NT 221
6.3.1 Sites with "NT" family controllers 221
6.3.2 Sites with new controller families 223
6.3.3 Combined sites 225

7 Technical data **227**

8 Appendix **229**
8.1 Controller objects 230
8.1.1 Setpoints 231
8.1.2 Values 567
8.1.3 Logical binary inputs 625
8.1.4 Logical binary outputs 665
8.1.5 Logical analog inputs 727
8.1.6 PLC 761
8.2 Alarms 774
8.2.1 Alarms level 1 774
8.2.2 Alarms level 2 802
8.2.3 Fail sensor and other types 822
8.3 AVR interfaces 831
8.3.1 AVR interfaces alphabetically 831
8.4 Speed governor interfaces 841
8.4.1 Electronic engines interface 841
8.4.2 Controller Speed Regulator Output voltage limits 841
8.4.3 Speed governors interfaces alphabetically 841

8.5 Modules 850
8.5.1 Plug-In modules 850
8.5.2 CAN modules 865

1 Document information

1.1 Clarification of notation 7
1.2 About this Global Guide 7
1.3 Legal notice 7
1.4 General warnings 9
1.5 Certifications and standards 10
1.6 Document history 10
1.7 Symbols in this manual 11

back to Table of contents

1.1 Clarification of notation

Note: *This type of paragraph calls readers attention to a notice or related theme.*

IMPORTANT: This type of paragraph highlights a procedure, adjustment etc., which can cause a damage or improper function of the equipment if not performed correctly and may not be clear at first sight.

Example: This type of paragraph contains information that is used to illustrate how a specific function works.

1.2 About this Global Guide

This manual contains important instructions for InteliGen 200 controllers family that shall be followed during installation and maintenance of the controllers.

This manual provides general information how to install and operate InteliGen 200 controllers.

This manual is dedicated for:

- Operators
- Control panel builders
- For everybody who is concerned with installation, operation and maintenance

1.3 Legal notice

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Pay attention to the following recommendations and measures to increase the level of security of ComAp products and services.

Please note that possible cyber-attacks cannot be fully avoided by the below mentioned recommendations and set of measures already performed by ComAp, but by following them the cyber-attacks can be considerably reduced and thereby to reduce the risk of damage. ComAp does not take any responsibility for the actions of persons responsible for cyber-attacks, nor for any damage caused by the cyber-attack. However, ComAp is prepared to provide technical support to resolve problems arising from such actions, including but not limited to restoring settings prior to the cyber-attacks, backing up data, recommending other preventive measures against any further attacks.

Warning: Some forms of technical support may be provided against payment. There is no legal or factual entitlement for technical services provided in connection to resolving problems arising from cyber-attack or other unauthorized accesses to ComAp's Products or Services.

General security recommendations and set of measures

1. AccessCode

• Change the AccessCode BEFORE the device is connected to a network.

• Use a secure AccessCode – ideally a random string of 8 characters containing lowercase, uppercase letters and digits.

• For each device use a different AccessCode.

2. Password

• Change the password BEFORE the device enters a regular operation.

• Do not leave displays or PC tools unattended if an user, especially administrator, is logged in.

3. Controller Web interface

• The controller web interface at port TCP/80 is based on http, not https, and thus it is intended to be used only in closed private network infrastructures.

• Avoid exposing the port TCP/80 to the public Internet.

4. MODBUS/TCP

• The MODBUS/TCP protocol (port TCP/502) is an instrumentation protocol designed to exchange data between locally connected devices like sensors, I/O modules, controllers etc. From it's nature it does not

contain any kind of security – neither encryption nor authentication. Thus it is intended to be used only in closed private network infrastructures.

• Avoid exposing the port TCP/502 to the public Internet.

5. SNMP

• The SNMP protocol (port UDP/161) version 1,2 is not encrypted. Thus it is intended to be used only in closed private network infrastructures.

• Avoid exposing the port UDP/161 to the public Internet.

Used Open Source Software: mBed-TLS

https://www.mbed.com/en/development/software/mbed-tls/

http://www.apache.org/licenses/LICENSE-2.0

Used Font: zpix-pixel-font

WEBLINK to the license conditions: https://github.com/SolidZORO/zpix-pixel-font

Copyright (c) [2019] [Jason Fung]

1.4 General warnings

1.4.1 Remote control and programing

Controller can be remotely controlled. In the event that maintenance of gen-set has to be done, or controller has to be programmed, check the following points to ensure that the engine cannot be started or any other parts of the system cannot be effected.

To be sure:

- Disconnect remote control
- Disconnect binary outputs

1.4.2 SW and HW versions compatibility

Be aware to use proper combination of SW and HW versions.

1.4.3 Dangerous voltage

In no case touch the terminals for voltage and current measurement!

Always connect grounding terminals!

In any case do not disconnect controller CT terminals!



1.4.4 Adjust the setpoints

All parameters are adjusted to their typical values. However the setpoints has to be checked and adjusted to their real values before the first starting of the gen-set.

IMPORTANT: Wrong adjustment of setpoints can destroy the gen-set.

Note: *The controller contains a large number of configurable setpoints, because of this it is impossible to describe all of its functions. Some functions can be changed or have different behavior in different SW versions. Always check the Global guide and New feature list for SW version which is used in controller. This manual only describes the product and is not guaranteed to be set for your application.*

IMPORTANT: Be aware that the binary outputs can change state during and after software reprogramming (before the controller is used again ensure that the proper configuration and setpoint settings are set in the controller).

The following instructions are for qualified personnel only. To avoid personal injury do not perform any action not specified in related guides for product.

1.5 Certifications and standards

- EN 61000-6-2
- EN 61000-6-4
- EN 61010-1
- EN 60068-2-1 (-20 °C/16 h for std, -40 °C/16 h for LT version)
- EN 60068-2-2 (70 °C/16 h)
- EN 60068-2-6 (2÷25 Hz / ±1,6 mm; 25÷100 Hz / 4,0 g)
- EN 60068-2-27 (a=500 m/s^2; T=6 ms)
- EN 60068-2-30:2005 25/55°C, RH 95%, 48hours
- EN 60529 (front panel IP65, back side IP20)

1.6 Document history

Revision number	Related sw. version	Date	Author
5	1.3.0	4.4.2019	Martin Klíma
4	1.3.0	30.1.2019	Michal Slavata
3	1.1.0	6.8.2018	Vladimír Zubák
2	1.1.0	28.5.2018	Vladimír Zubák
1	1.0.0	28.12.2017	Michal Slavata

1.7 Symbols in this manual



3 x Phases

Active current sensor



AirGate


Alternating current


Analog modem


Battery


Binary output


Breaker contact

Breaker contact


Breaker


Breaker


Breaker


Capacitor

Coil


Connector - female


Connector - male


Contact


Contactor



Controller simplified



Module simplified


Current measuring



Current measuring


Diode


Ethernet male


Ethernet female


Fuel solenoid


Fuse


Fuse switch



Generator


Generator schematic


Grounding


GSM


GSM modem


IG-AVRi


IG-AVRi TRANS

Jumper


Load


Mains


Mains


Mobile provider

Passive current sensor


Pick - up


Relay coil


Relay coil of slow-operating

Resistor


Resistor adjustable


Resistive sensor RPTC


RS 232 male


RS 232 female


Starter


Switch - manually operated


Transformer


USB type B male


USB type B female



Voltage measuring


Wifi / WAN / LAN

back to Document information

2 System overview

2.1 General description 12
2.2 True RMS measurement 12
2.3 Configurability and monitoring 12
2.4 PC tools 14
2.5 Plug-in modules 15
2.6 CAN modules 17

back to Table of contents

2.1 General description

InteliGen 200 family controllers are comprehensive gen-set controllers for single generating sets operating in stand-by or parallel modes or for multiple gen-sets applications. A modular construction allows upgrades to different levels of complexity in order to provide the best solution for various customer applications. The controllers are equipped with a powerful graphic display showing icons, symbols and bar graphs for intuitive operation, which, together with its high level of functionality, sets new standards in Gen-set controls.

2.1.1 The key features of InteliGen 200

- Easy-to-use operation and installation. The factory default configuration covers most applications
- Various customizations are possible thanks to its configurability
- Excellent remote communication capabilities
- High level of support for EFI engines (most world producers)
- High reliability

2.2 True RMS measurement

This controller measures AC values based on True RMS principle. This principle corresponds exactly to the physical definition of alternating voltage effective values. Under normal circumstances the mains voltage should have a pure sinusoidal waveform. However some nonlinear elements connected to the mains produce harmonic waveforms with frequencies of multiplies of the basic mains frequency and this may result in deformation of the voltage waveforms. The True RMS measurement gives accurate readings of effective values not only for pure sinusoidal waveforms, but also for deformed waveforms.

Note: *The harmonic deformation causes that the Power Factor of a generator working parallel with the mains cannot reach values in a certain range around the PF 1.00. The higher the deformation, the wider the power factor dead range. If the requested power factor is adjusted inside the dead range, the controller cannot reach the requested value because of this fact.*

2.3 Configurability and monitoring

One of the key features of the controller is the system's high level of adaptability to the needs of each individual application and wide possibilities for monitoring. This can be achieved by configuring and using the powerful PC/mobile tools.

2.3.1 Supported configuration and monitoring tools

- InteliConfig - complete configuration and single gen-set monitoring
- WebSupervisor - web-based system for monitoring and controlling
  - WebSupervisor mobile - supporting application for smart-phones
- WinScope - special graphical monitoring software

Note: *Use the InteliConfig PC software to read, view and modify configuration from the controller or disk and write the new configuration to the controller or disk.*

The firmware of controller contains a large number of binary inputs and outputs needed for all necessary functions available. However, not all functions are required at the same time on the same gen-set and also the controller hardware does not have so many input and output terminals. One of the main tasks of the configuration is mapping of “logical” firmware inputs and outputs to the “physical” hardware inputs and outputs.

2.3.2 Configuration parts

- Mapping of logical binary inputs (functions) or assigning alarms to physical binary input terminals
- Mapping of logical binary outputs (functions) to physical binary output terminals
- Assigning sensor characteristics (curves) and alarms to analog inputs
- Selection of peripheral modules, which are connected to the controller, and doing the same (as mentioned above) for them
- Selection of ECU type, if an ECU is connected
- Changing the language of the controller interface

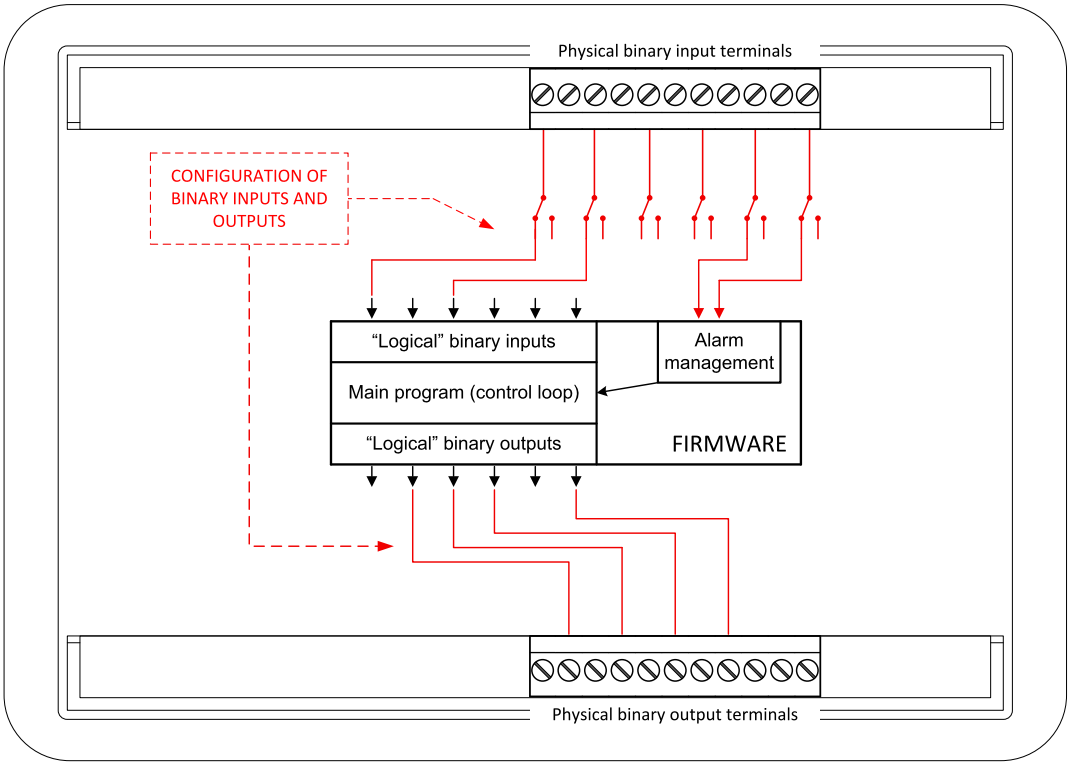


Image 2.1 Principle of binary inputs and outputs configuration

The controller is shipped with a default configuration, which should be suitable for most standard applications. This default configuration can be changed only by using a PC with the InteliConfig software. See InteliConfig documentation for details.

Once the configuration is modified, it can be saved to a file for later usage with another controller or for backup purposes. The file is called archive and has the file extension .ail3. An archive contains a full image of the controller at the time of saving (if the controller is online for the PC) except the firmware. Besides configuration it also contains current adjustment of all setpoints, all measured values, a copy of the history log and a copy of the alarm list.

The archive can be simply used for cloning controllers, i.e. preparing controllers with identical configuration and settings.

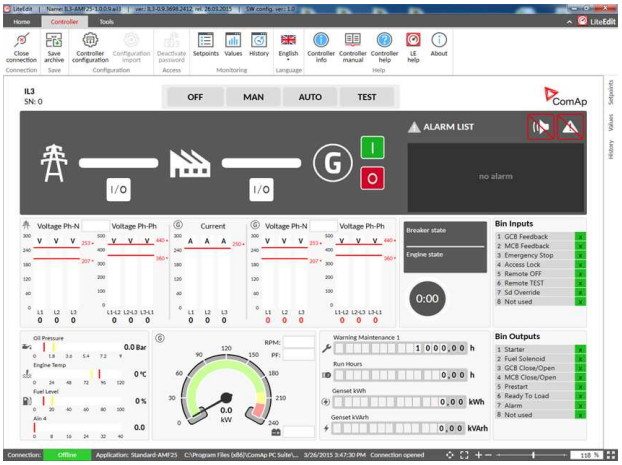
2.4 PC tools

2.4.1 InteliConfig

Configuration and monitoring tool for InteliGen controllers. See more in InteliConfig Reference Guide.

This tool provides the following functions:

- Direct or internet communication with the controller
- Offline or online controller configuration
- Controller firmware upgrade
- Reading/writing/adjustment of setpoints
- Reading of measured values
- Browsing of controller history records
- Exporting data into a XLS file
- Controller language translation

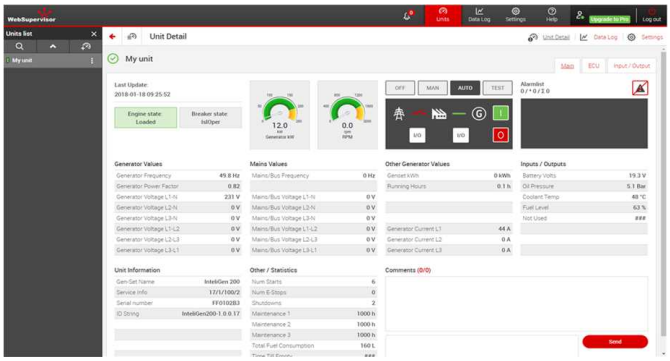


2.4.2 WebSupervisor

Web-based system for monitoring and controlling of controllers. See more at the WebSupervisor webpage.

This tool provides the following functions:

- Site and fleet monitoring
- Reading of measured values
- Browsing of controller history records
- On-line notification of alarms
- Email notification
- Also available as a smart-phone application



WebSupervisor available at: www.websupervisor.net

Demo account:

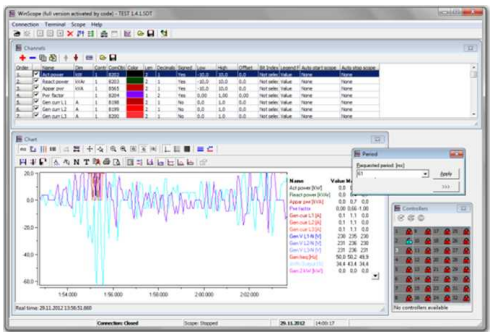
- Login: comaptest
- Password: ComAp123

2.4.3 WinScope

Special graphical controller monitoring software used mainly for commissioning and gen-set troubleshooting. See more in the WinScope Reference guide.

This tool provides the following functions:

- Monitoring and archiving of ComAp controller's parameters and values
- View of actual / historical trends in controller
- On-line change of controllers' parameters for easy regulator setup

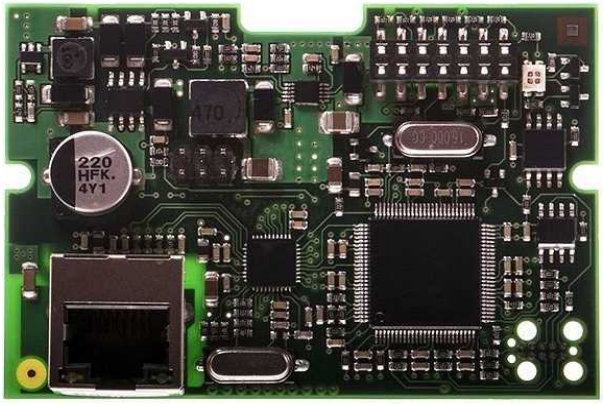


2.5 Plug-in modules

2.5.1 CM-Ethernet

Internet/Ethernet module including web server.

- 10/100 Mbit ethernet interface in RJ45 socket
- Web interface for monitoring and adjustment of the controller
- Direct IP and/or AirGate connection for remote access from InteliConfig
- MODBUS/TCP and SNMP protocols for integration of the controller into building management systems or other remote monitoring purposes
- Sending of active emails
- Simply connection via AirGate



2.5.2 CM-4G-GPS

GSM/4G Internet module and GPS locator

- Wireless integrated solution
- Quick and easy installation
- Support of WebSupervisor
- Instant alarm SMS notification
- System control over SMS
- Quad Band GPRS/EDGE modem, 850/900/1800/1900 MHz, FDD LTE: Band 1, Band 2, Band 3, Band 4, Band 5, Band 7, Band 8, Band 20, all bands with diversity, WCDMA/HSDPA/HSUPA/HSPA+: Band 1, Band 2, Band 5, Band 8, all bands with diversity
- GPRS multi-slot class 10
- TCP/IP communication over GPRS



2.5.3 CM-GPRS

GSM/GPRS Internet module

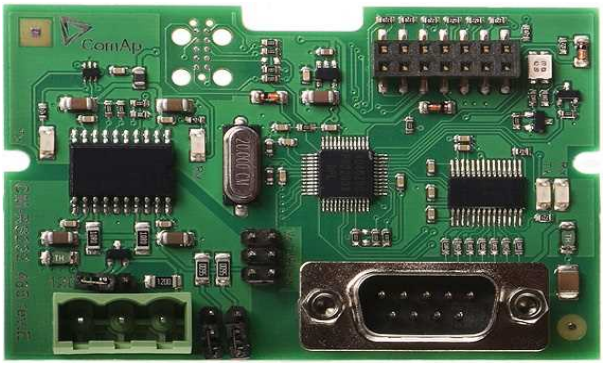
- Wireless integrated solution
- Quick and easy installation
- Support of WebSupervisor
- Instant alarm SMS notification
- System control over SMS
- Quad Band GPRS/EDGE modem, 850/900/1800/1900 MHz
- GPRS multi-slot class 10
- TCP/IP communication over GPRS



2.5.4 CM-RS232-485

Communication module with two communication ports.

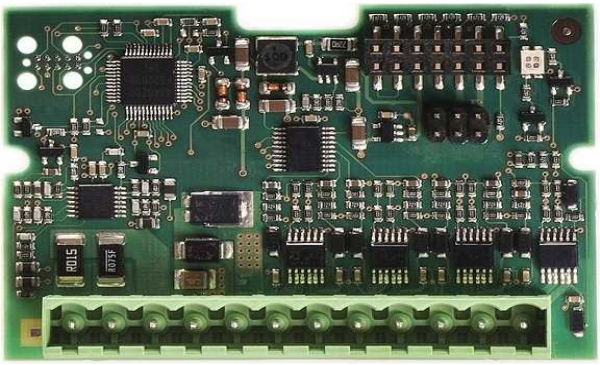
- RS232 and RS485 interface
- MODBUS
- Serial connection to InteliConfig



2.5.5 EM-BIO8-EFCP

Hybrid current input and binary input/output extension module.

- One additional AC current (CT) measuring for Earth Fault Current protection (EFCP)
- Wide range of measured current - one input for 1A and 1 input for 5A
- Up to 8 additional configurable binary inputs or outputs



2.6 CAN modules

2.6.1 Inteli AIN8

The unit offers the user the flexibility to configure the unit to have 8 analog inputs.

Supported sensors:

- Resistor 3-wire input
  - Common resistor: 0-250Ω, 0-2400Ω, 0-10kΩ
  - Temperature sensor: Pt100, Pt1000, Ni100, Ni1000
- Current (active or passive sensors)
  - ±20mA , 0-20mA, 4-20mA
- Voltage
  - ±1V, 0-2,4V, 0-5V, 0-10V
  - Lambda probes
  - Thermocouples are not supported (the measuring loop was designed for lambda probes, what caused non-support of thermocouples)



2.6.2 Inteli IO8/8

The unit offers the user the flexibility to configure the unit to have 8 binary inputs, 8 binary outputs, and 2 analog outputs, or 16 binary inputs, 0 binary outputs and 2 analog outputs via switches inside the controller.

Configuration 8/8

- 8 Binary inputs (options: pull up or pull down logic)
- 8 Binary outputs (options: Low side switch (LSS) or High side switch (HSS))
- 2 Analog outputs (options: voltage (0-10V), current (0-20mA) and PWM (5V, adjustable frequency 200Hz-2,4kHz))

Configuration 16/0

- 16 Binary inputs (options: pull up or pull down logic)
- 0 Binary outputs
- 2 Analog outputs (options: voltage (0-10V), current (0-20mA) and PWM (5V, adjustable frequency 200Hz-2,4kHz))



2.6.3 IGS-PTM

The unit offers the user the flexibility to configure the unit to have 8 binary inputs, 8 binary outputs, 4 analog inputs and 1 analog outputs.

- Configurable 8 binary and 4 analog inputs
- Configurable 8 binary and 1 analog output
- LEDs indicate the state of binary inputs/outputs
- Measures values from Pt100 and Ni100 sensors
- Analog inputs (resistance range 0-250 Ohms, voltage range 0-100mV, current range 0-20mA - selectable via jumper)
- UL certified



2.6.4 IGL-RA15

Remote annunciator.

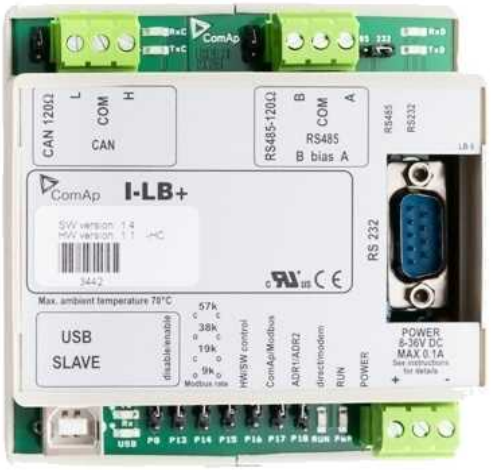
- 15 programmable LEDs with configurable colors red-green-yellow
- Lamp test function with status LED
- Customizable labels
- Local horn output
- Maximal distance 200 m from the controller
- Up to 4 units can be connected to the controller
- UL certified



2.6.5 I-LB+

Local Bridge.

- Communication bridge for sites with multiple controllers for local or remote monitoring and control
- Direct (RS232,RS485), modem, Modbus or USB connection to multiple controllers
- Communication speed up to 57600 bps (including Modbus mode)
- Analog / GSM / ISDN / CDMA modem support



back to System overview

3 Applications overview

3.1 SPtM 20
3.2 MINT 21

back to Table of contents

3.1 SPtM

The typical scheme of a single parallel to mains application is shown below. The controller controls two breakers – a mains breaker and a generator breaker. Feedback from both breakers is required.

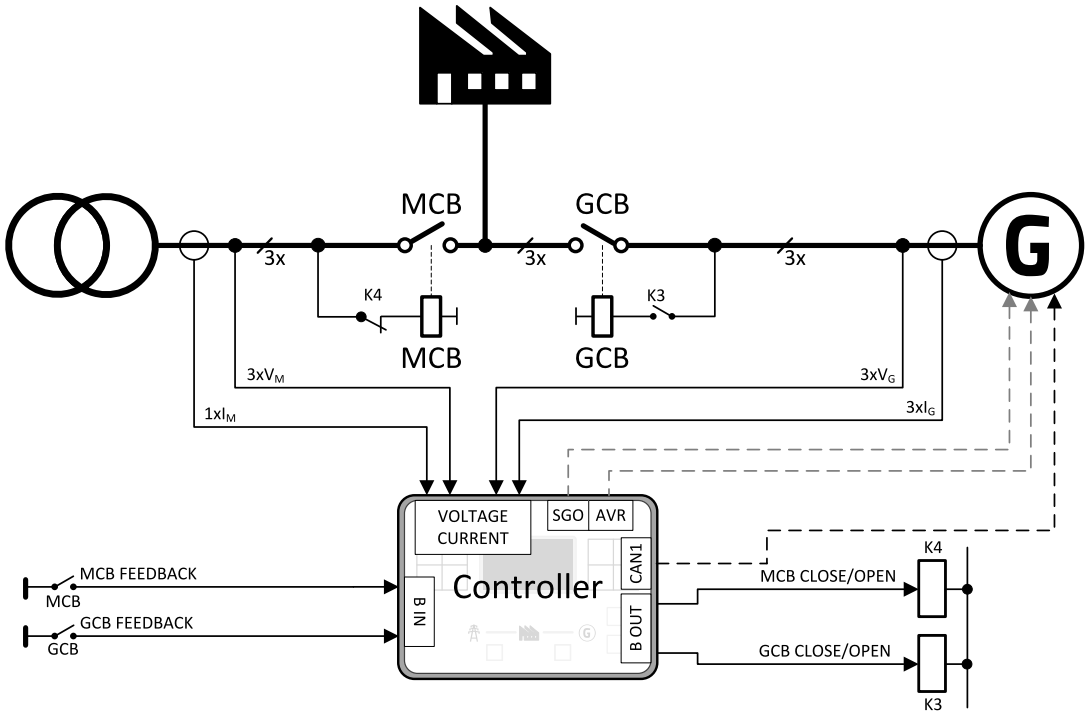


Image 3.1 Single parallel to mains application

3.2 MINT

The typical schemes of multiple island-parallel application without mains. The controller controls one breaker only, the generator breaker. Feedback from the generator breaker is required.

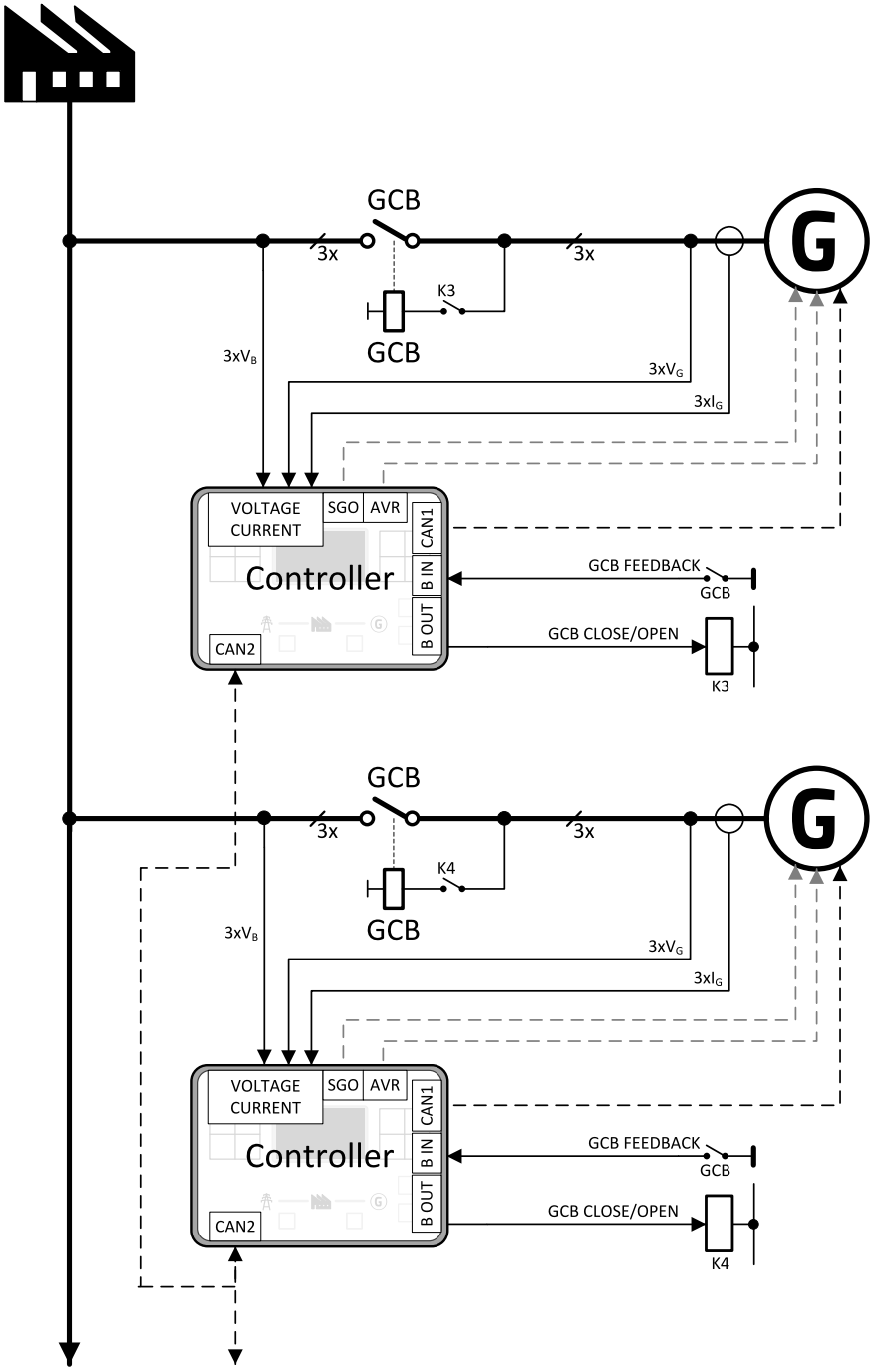


Image 3.2 Multiple island-parallel application without mains

back to Applications overview

4 Installation and wiring

4.1 Package content 22
4.2 Controller installation 23
4.3 Terminal Diagram 25
4.4 Recommended wiring 26
4.5 Plug-in module installation 58
4.6 Maintenance 60

back to Table of contents

4.1 Package content

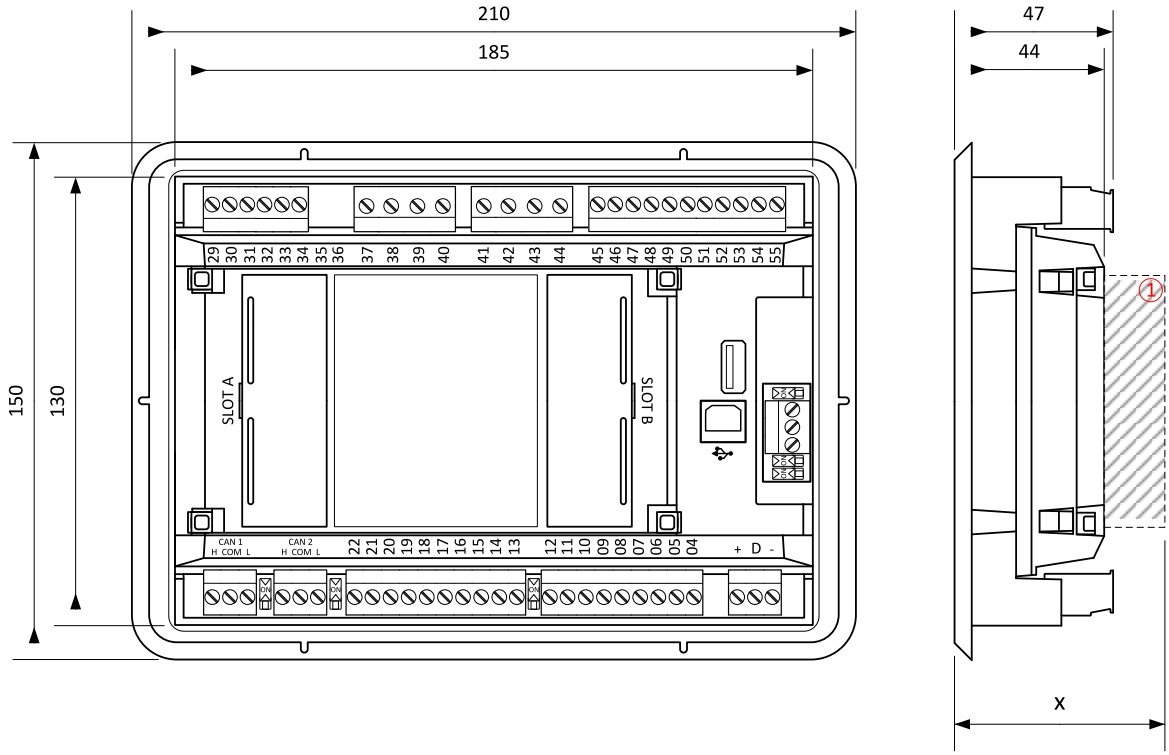
The package contains:

- Controller
- Mounting holders
- Terminal blocks

Note: *The package does not contain a communication or extension modules. The required modules should be ordered separately.*

4.2 Controller installation

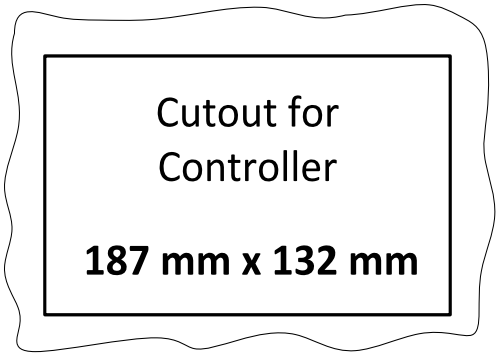
4.2.1 Dimensions



① Plug-in module

Note: *Dimension x depends on plug-in module*

Note: *Dimensions are in millimeters.*

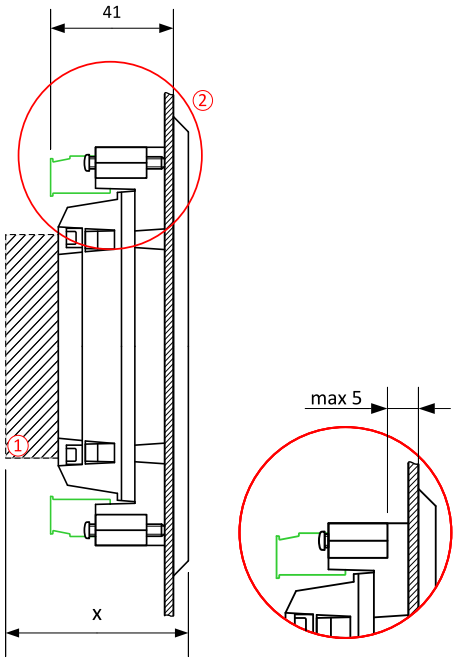


Note: *Cutout is in millimeters.*

4.2.2 Mounting

The controller is to be mounted onto the switchboard door. Requested cutout size is 187 x 132 mm. Use the screw holders delivered with the controller to fix the controller into the door as described on pictures below.Recommended torque for holders is 0.15 N·m.

Panel door mounting



Note: *The final depth of the controller depends on the selected extension module - it can vary between 41 and 56 mm. Mind also a size of connector and cables (e.g. in case of RS232 connector add about another 60 mm for standard RS232 connector and cable).*

Note: *These devices shall be mounted in a pollution degree 2 environment enclosure having adequate strength and thickness with acceptable spacings being provided.*

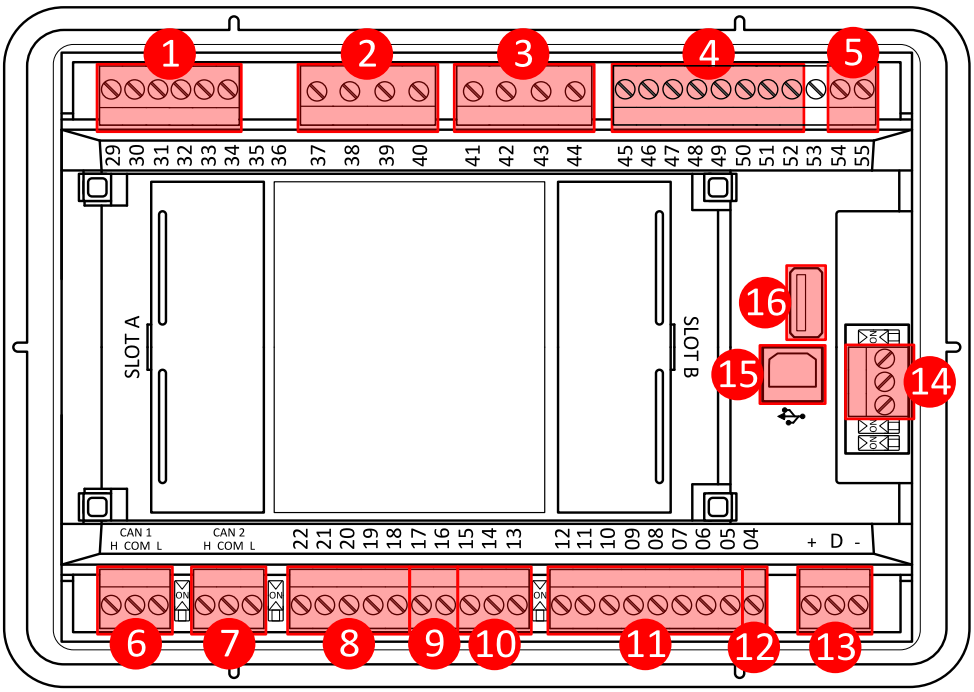
Note: *The accessibility of live parts through openings in the enclosure, reliable retention of guards or barriers for prevention of risk of electric shock, etc., shall be considered in the end product evaluation.*

Note: *These devices should be used within their electrical ratings and in an ambient temperature not exceeding 70 °C, for 4 A (BOUT 1 & 2) output or 60 °C for 5 A (BOUT 1 & 2) output.*

Note: *Voltage sensing circuits shall be connected to controlled Overvoltage Category III circuits only in the end product installation.*

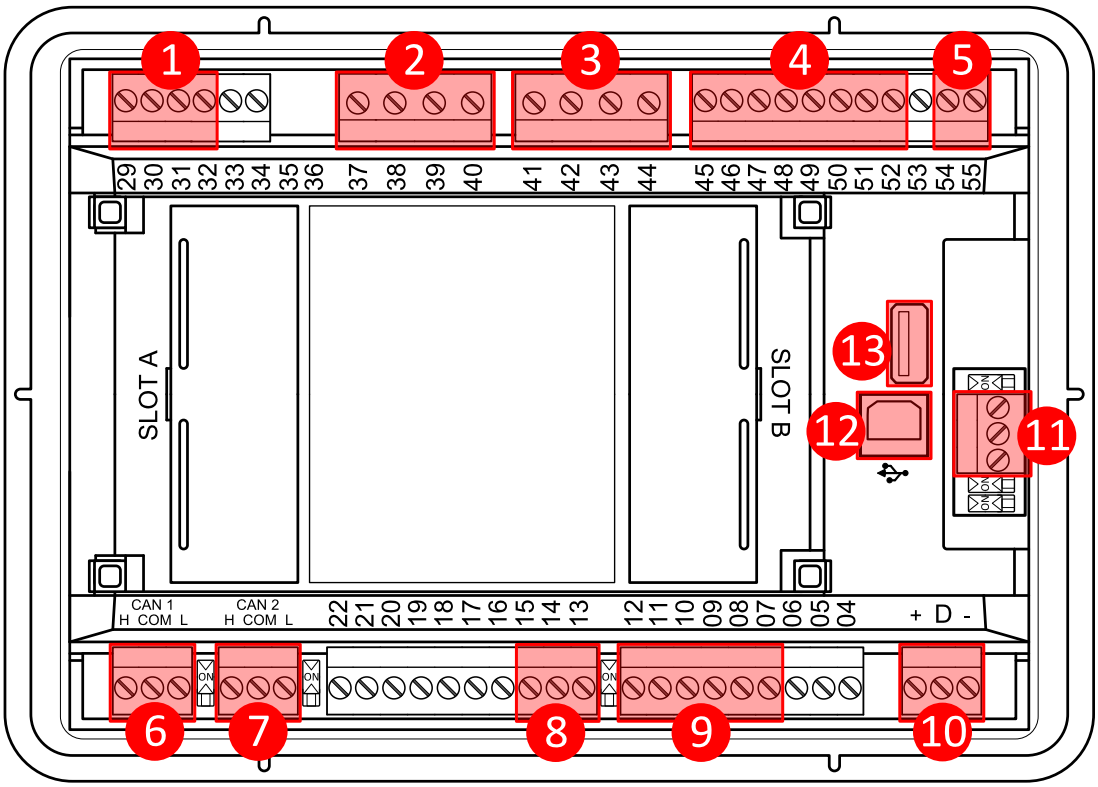
4.3 Terminal Diagram

① CURRENT MEASUREMENT		② GENERATOR VOLTAGE		③ MAINS/BUS VOLTAGE		④ BINARY INPUTS		⑤ AVR INTERFACE	
T29	COM	T37	N	T41	N	T45	BIN1	T54	COM
T30	L1	T38	L1	T42	L1	T46	BIN2	T55	OUT
T31	L2	T39	L2	T43	L2	T47	BIN3	⑥ CAN1	
T32	L3	T40	L3	T44	L3	T48	BIN4	T26	L
T33	COM					T49	BIN5	T27	COM
T34	L1					T50	BIN6	T28	H
						T51	BIN7		
						T52	BIN8		



⑦ CAN2		⑨ RPM		⑪ BINARY OUTPUTS		⑬ POWER SUPPLY, D+	
T23	L	T16	RPM GND	T05	BOUT1	T01	BATT -
T24	COM	T17	RPM IN	T06	BOUT2	T02	D+
T25	H	⑩ SPEED GOVERNOR INTERFACE		T07	BOUT3	T03	BATT +
⑧ ANALOG INPUTS		T13	COM	T08	BOUT4	⑭ RS485	
T18	A COM	T14	VOUT	T09	BOUT5	T56	B
T19	A01	T15	PWM	T10	BOUT6	T57	COM
T20	A02			T11	BOUT7	T58	A
T21	A03			T12	BOUT8		
T22	A04			⑫ E-STOP		⑮ USB	
				T04		⑯ USB HOST	

4.4 Recommended wiring



1	Current inputs	29 - 32	**Current measurement wiring (page 30)**
2	Mains voltage inputs	37 - 40	**Voltage measurement wiring - SPtM (page 32)** **Voltage measurement wiring - MINT (page 38)**
3	Bus voltage inputs	41 - 44	**Voltage measurement wiring - SPtM (page 32)** **Voltage measurement wiring - MINT (page 38)**
4	Binary inputs	45 - 52	**Binary inputs (page 45)**
5	AVR	54 - 55	**AVR Interface (page 57)**
6	CAN1	H, COM, L	**CAN bus and RS485 wiring (page 53)**
7	CAN2	H, COM, L	**CAN bus and RS485 wiring (page 53)**
8	Speed governor	13 - 15	**Speed governor interface (page 57)**
9	Binary outputs	07 - 12	**Binary Outputs (page 46)**
10	Power supply	"+" D "-"	**Power supply (page 27)**

11	RS485	A, COM, B	**CAN bus and RS485 wiring (page 53)**
12	USB	USB B	**USB (page 57)**
13	USB HOST	USB A	**USB HOST (page 57)**

4.4.1 General

To ensure proper function:

- Use grounding terminals.
- Wiring for binary inputs and analog inputs must not be run with power cables.
- Analog and binary inputs should use shielded cables, especially when the length is more than 3 m.

Tightening torque, allowable wire size and type, for the Field-Wiring Terminals:	
For Mains(Bus) Voltage, Generator Voltage and Current terminals	
	Specified tightening torque is 0,56 Nm (5,0 In-lbs)
	Use only diameter 2,0 - 0,5 mm (12 - 26 AWG) conductor, rated for 90°C minimum.
For other controller field wiring terminals	
	Specified tightening torque 0,79 nm (7,0 In-lb)
	Use only diameter 2,0 - 0,5 mm (12 - 26 AWG) conductor, rated for 75°C minimum.
	Use copper conductors only.

4.4.2 Grounding

The shortest possible length of wire should be used for controller grounding. Use cable min 2.5 mm^2.

The negative " - " battery terminal must be properly grounded.

Switchboard and engine must be grounded at common point. Use as short cable as possible to the grounding point.

4.4.3 Power supply

To ensure proper function:

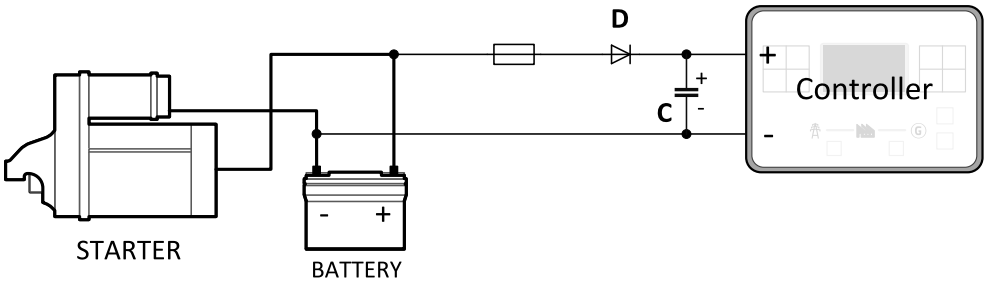
- Use power supply cable min. 1.5 mm^2

Maximum continuous DC power supply voltage is 36 V DC. The controller's power supply terminals are protected against large pulse power disturbances. When there is a potential risk of the controller being subjected to conditions outside its capabilities, an outside protection device should be used.

It is necessary to ensure that potential difference between generator current COM terminal and battery " - " terminal is maximally ± 2 V. Therefore is strongly recommended to interconnect these two terminals together.

Note: *The controller should be grounded properly in order to protect against lighting strikes. The maximum allowable current through the controller's negative terminal is 4 A (this is dependent on binary output load).*

For the connections with 12 V DC power supply, the controller includes internal capacitors that allow the controller to continue in operation during cranking if the batter voltage dip occurs. If the voltage dip goes during cranking to 0 V and after 50 ms it recovers to 4 V, the controller continues operating. This cycle can repeat several times. During this voltage dip the controller screen backlight can turn off.



Note: *Recommended fusing is 4 A fuse.*

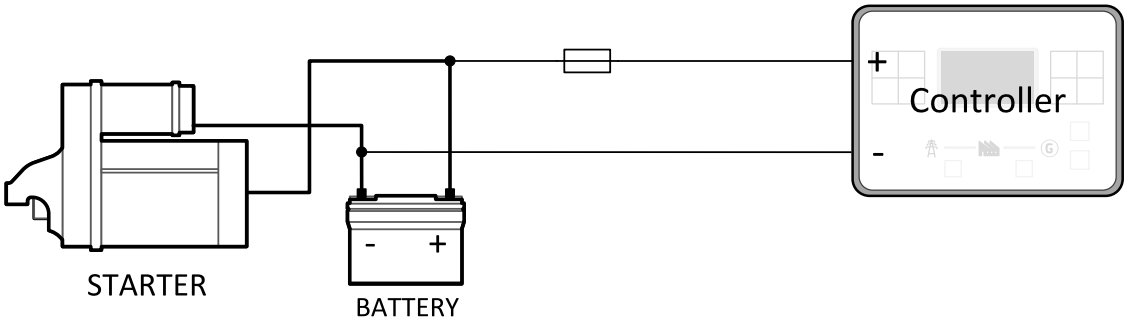
Note: *In case of the dip to 0 V the high-side binary outputs will be temporarily switched off and after recovering to 4 V back on.*

IMPORTANT: When the controller is power up only by USB and the USB is disconnected then the actual statistics can be lost.

Note: *It is also possible to further support the controller by connecting the external capacitor and separating diode. The capacitor size depends on required time. It shall be approximately thousands of µF. The capacitor size should be 5 000 µF to withstand 150 ms voltage dip under following conditions: Voltage before dip is 12 V, after 150 ms the voltage recovers to min. allowed voltage, i.e. 8 V.*

Power supply fusing

A 4 A fuse should be connected in-line with the battery positive terminal to the controller and modules. These items should never be connected directly to the starting battery. Fuse value and type depends on number of connected devices and wire length. Recommended fuse (not fast) type - T4 A. Not fast due to internal capacitors charging during power up.



Note: *Recommended fusing is 4 A fuse.*

4.4.4 Measurement wiring

Use 1.5 mm^2 cables for voltage connection and 2.5 mm^2 for current transformers connection. Adjust **Connection type (page 254)**, **Nominal Voltage Ph-N (page 256)**, **Nominal Voltage Ph-Ph (page 256)**, **Nominal Current (page 253)**, **Gen VT Ratio (page 256)** and **CT Ratio (page 254)** by appropriate setpoints in the Basic Settings group.

> **IMPORTANT: Risk of personal injury due to electric shock when manipulating voltage terminals under voltage. Be sure the terminals are not under voltage before touching them.**
> **Do not open the secondary circuit of current transformers when the primary circuit is closed. Open the primary circuit first.**

Mains measurement wiring

Connect CT according to following drawings

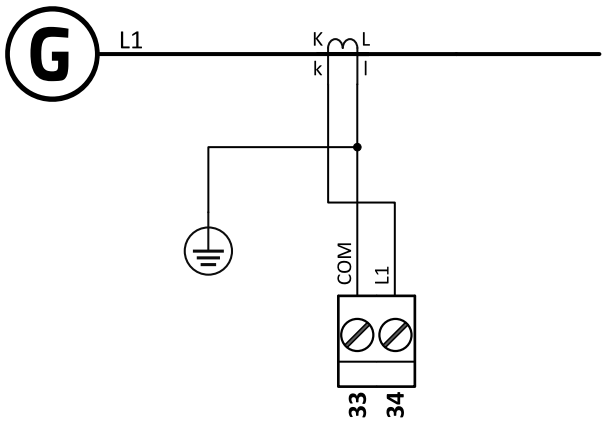


Image 4.1 Mains measurement wiring

Current measurement wiring

The number of CT's is automatically selected based on selected value of setpoint **Connection type (page 254)** [3Ph4Wire / High Leg D / 3Ph3Wire / Split Ph / Mono Ph].

Generator currents and power measurement is suppressed if current level is bellow <1 % of CT range.

To ensure proper function:

- Use cables of 2.5 mm^2
- Use transformers to 5 A
- Connect CT according to following drawings:

3 phase application:

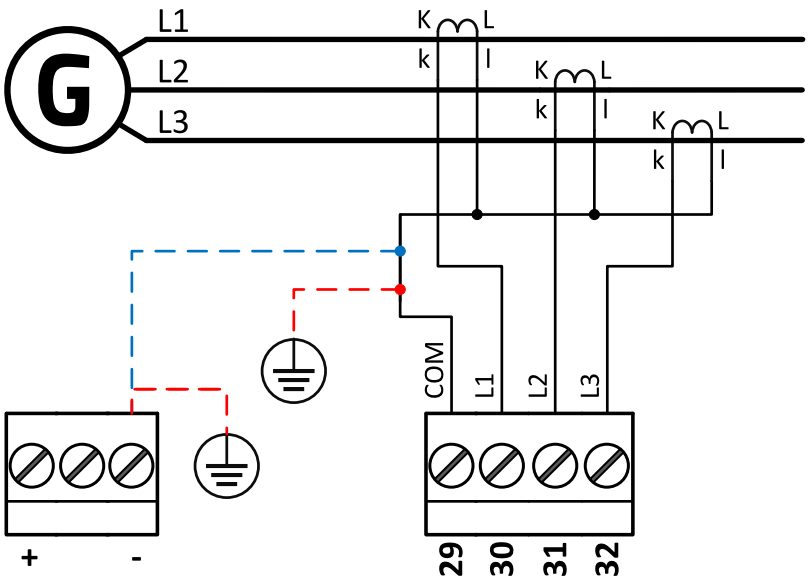


Image 4.2 3 phase application

IMPORTANT: It is necessary to ensure that potential difference between current COM terminal and power supply "-" terminal is maximally ± 2 V. There are 2 options how to ensure this:

- **"Red" option - properly ground both terminals**
- **"Blue" option - interconnect these two terminals**

Always apply only one option. Never realize both options on one installation.

Split phase application:

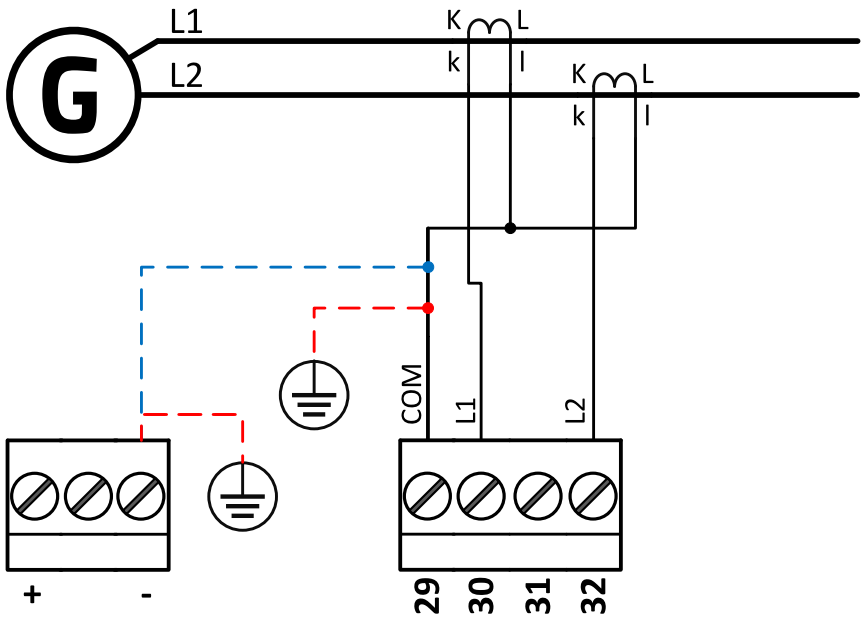


Image 4.3 Split phase application

IMPORTANT: The second phase of split phase connection is connected to the terminal, where is normally connected the third phase.

IMPORTANT: It is necessary to ensure that potential difference between current COM terminal and power supply "-" terminal is maximally ± 2 V. There are 2 options how to ensure this:

- **"Red" option - properly ground both terminals**
- **"Blue" option - interconnect these two terminals**

Always apply only one option. Never realize both options on one installation.

Mono phase application:

Connect CT according to following drawings. Terminals phase 2 and phase 3 are opened.

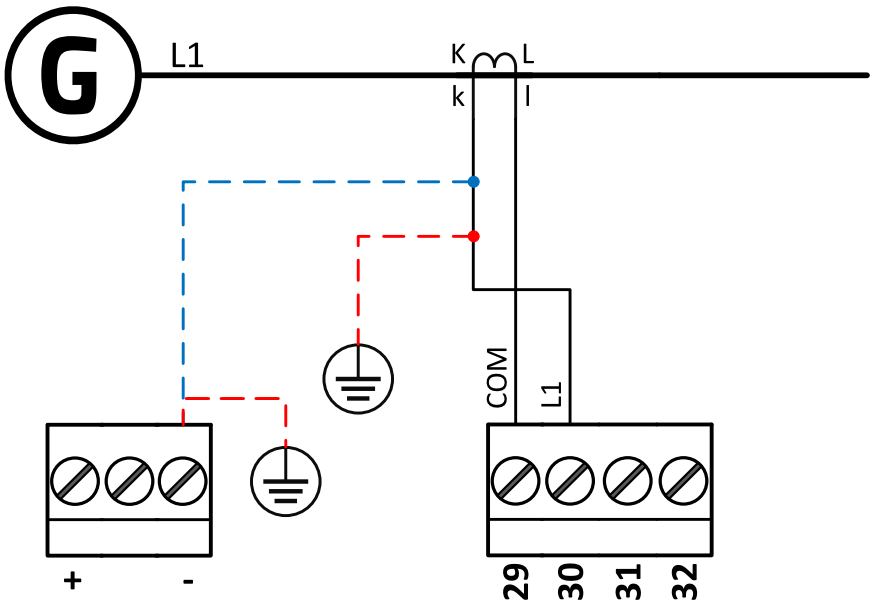


Image 4.4 Mono phase application

IMPORTANT: It is necessary to ensure that potential difference between current COM terminal and power supply "-" terminal is maximally ± 2 V. There are 2 options how to ensure this:

- **"Red" option - properly ground both terminals**
- **"Blue" option - interconnect these two terminals**

Always apply only one option. Never realize both options on one installation.

Voltage measurement wiring - SPtM

There are 4 voltage measurement Connection Type (setpoint **Connection type (page 254)** [3Ph4Wire / High Leg D / 3Ph3Wire / Split Ph / Mono Ph]) options, every type matches to corresponding generator connection type.

Note: *For fusing of voltage measurement input use T1A or T2A fuse.*

The generator protections are evaluated from different voltages based on **Connection type (page 254)** setting:

- 3Ph 4W – Ph-Ph voltage, Ph-N voltage
- 3Ph 3W – Ph-Ph voltage
- Split Ph – Ph-N voltage
- Mono Ph – Ph-N voltage

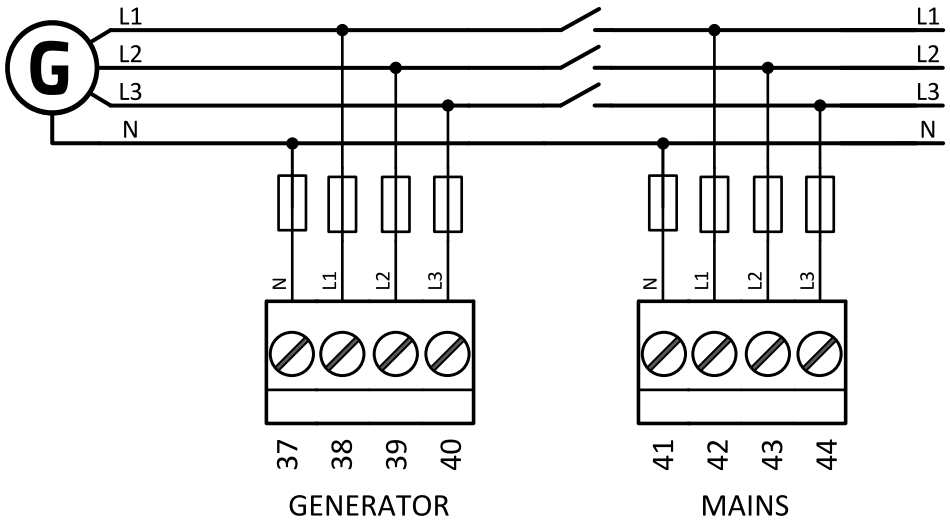


Image 4.5 3 phase application with neutral

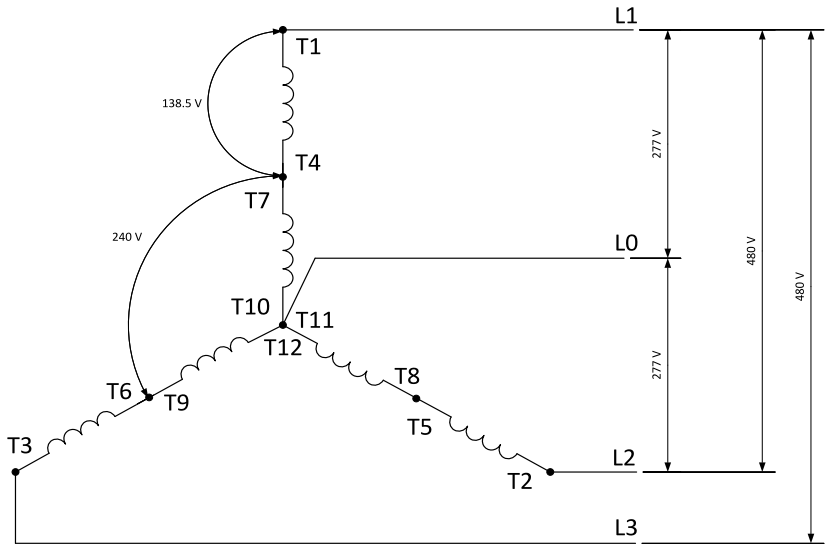


Image 4.6 Typical 3 Phase 4 Wires generator wiring

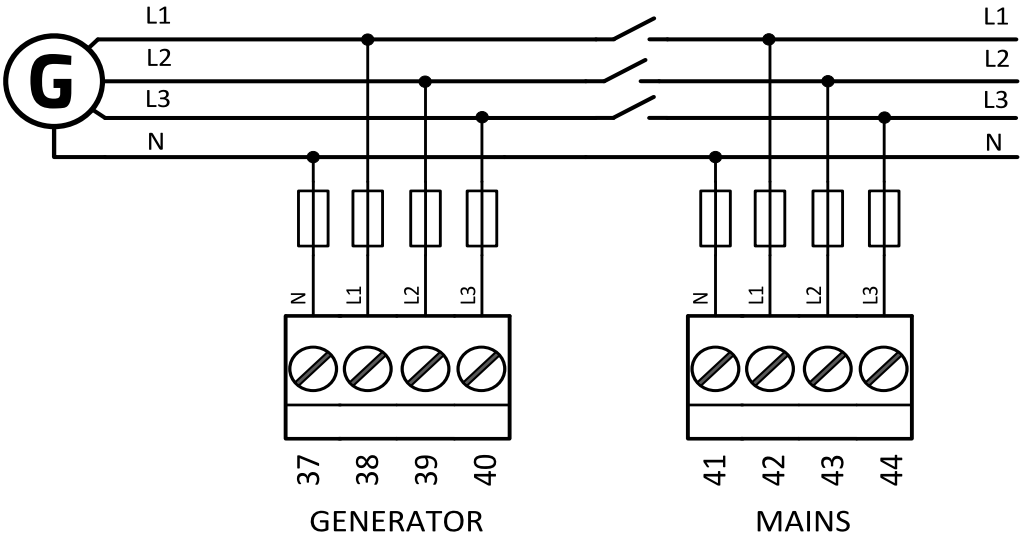


Image 4.7 High Leg Delta application

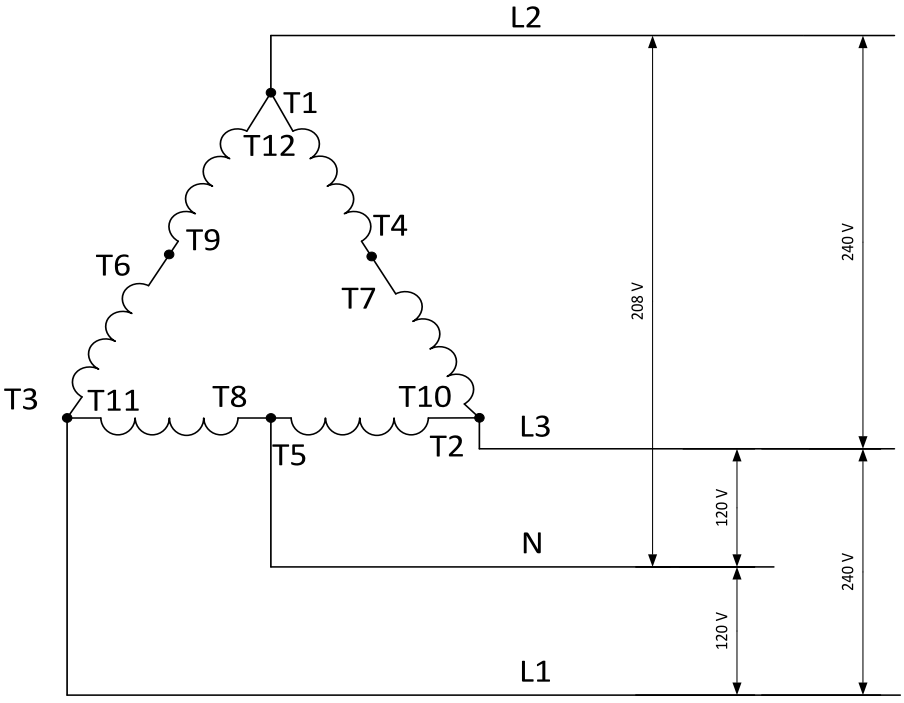


Table 4.1 Typical High Leg D generator wiring

ConnectionType: 3 Phase 3 Wires

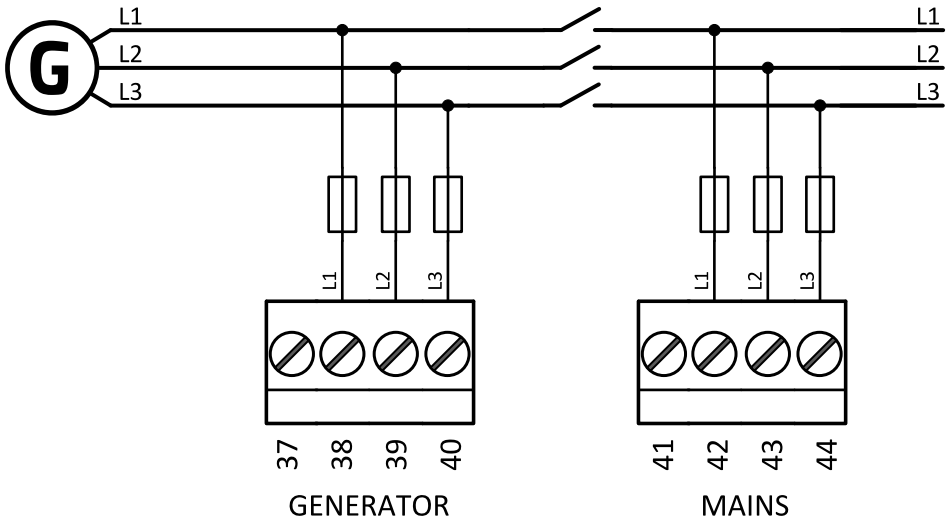


Image 4.8 3 phase application without neutral

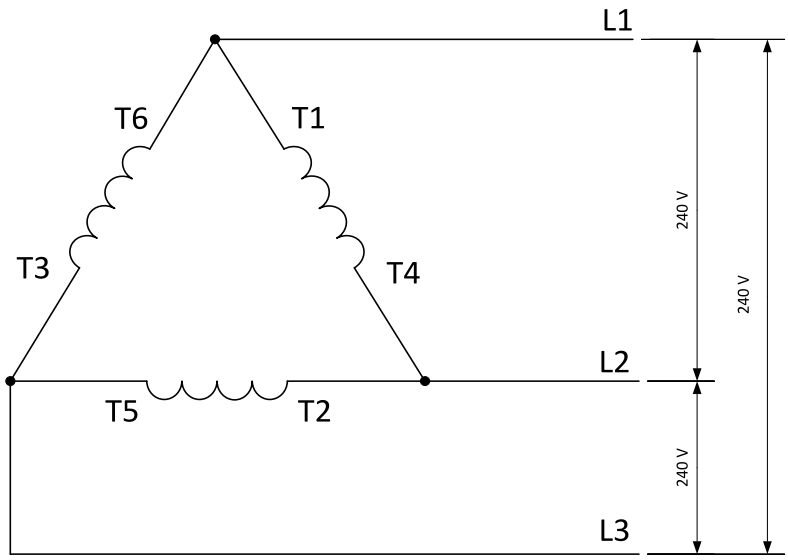


Image 4.9 Typical 3 Phase 3 Wires generator wiring

ConnectionType: Split Phase

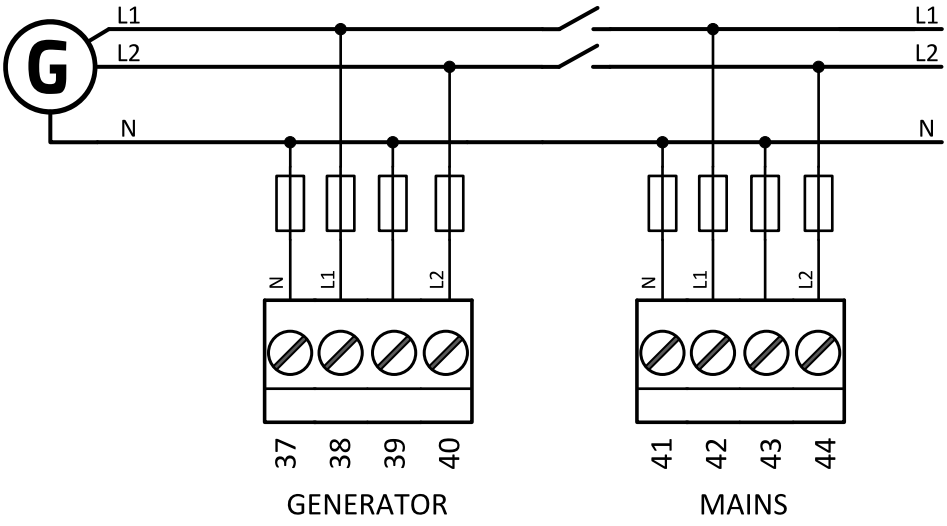
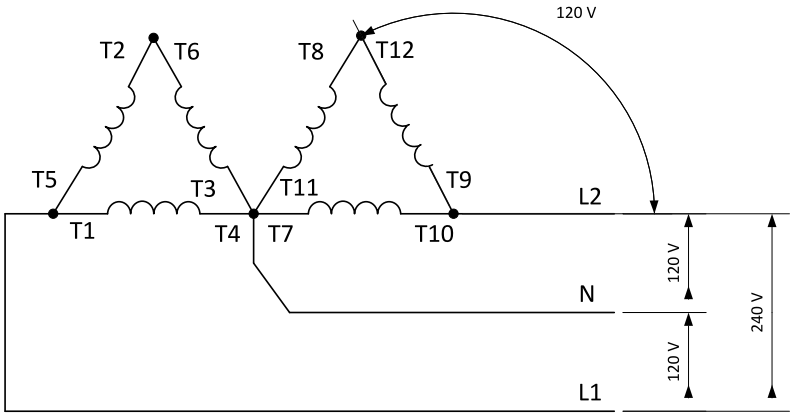


Image 4.10 Split phase application

IMPORTANT: The second phase of split phase connection is connected to the terminal, where is usually connected the third phase.

DOUBLE DELTA Connection



ZIG ZAG (DOG LEG) Connection

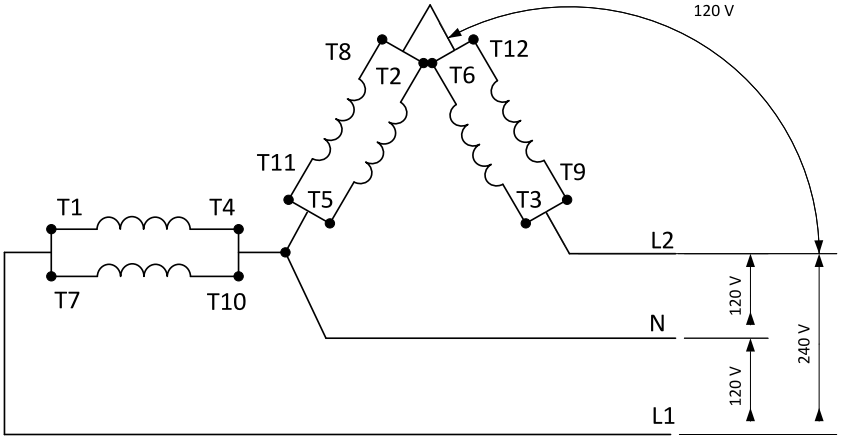


Image 4.11 Typical Split Phase generator wiring

ConnectionType: Mono Phase

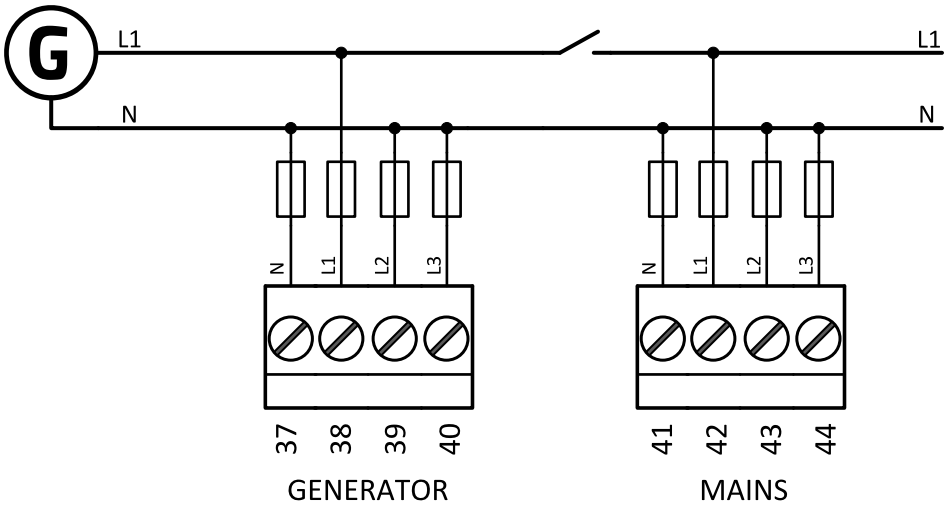


Image 4.12 Mono phase application

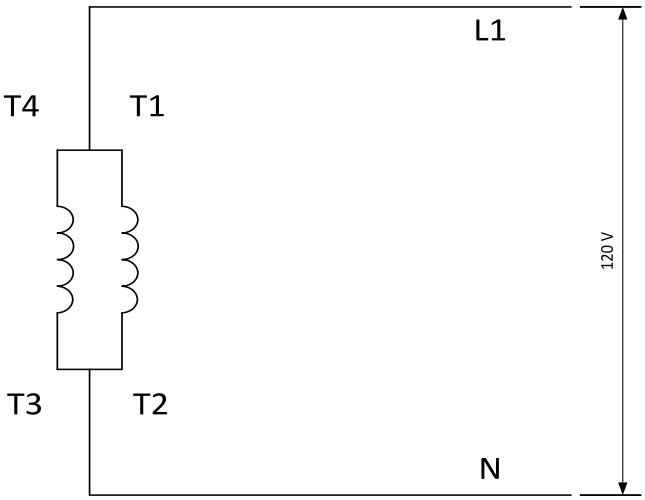


Image 4.13 Typical Mono Phase generator wiring

Voltage measurement wiring - MINT

There are 4 voltage measurement Connection Type (setpoint **Connection type (page 254)** [3Ph4Wire / High Leg D / 3Ph3Wire / Split Ph / Mono Ph]) options, every type matches to corresponding generator connection type.

Note: *For fusing of voltage measurement input use T1A or T2A fuse.*

The generator protections are evaluated from different voltages based on **Connection type (page 254)** setting:

- 3Ph 4W – Ph-Ph voltage, Ph-N voltage
- 3Ph 3W – Ph-Ph voltage
- Split Ph – Ph-N voltage
- Mono Ph – Ph-N voltage

ConnectionType: 3 Phase 4 Wires

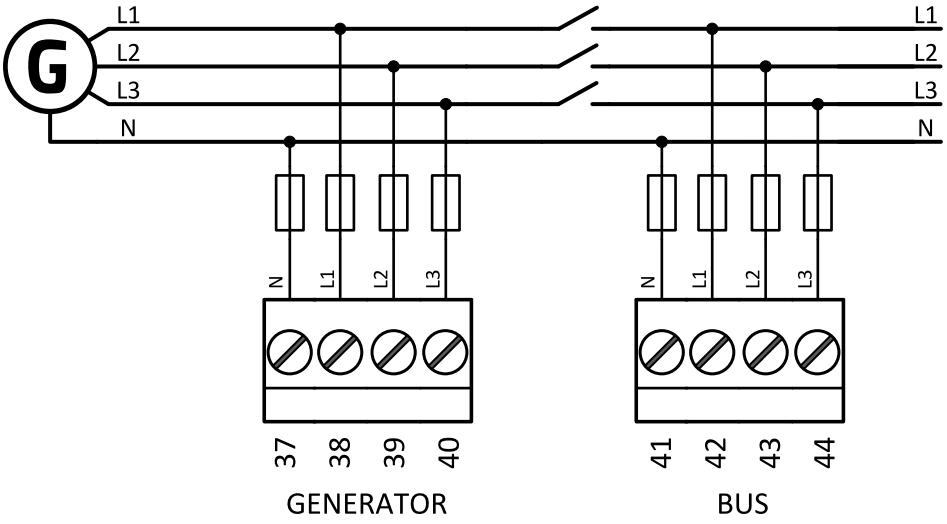


Image 4.14 3 phase application with neutral

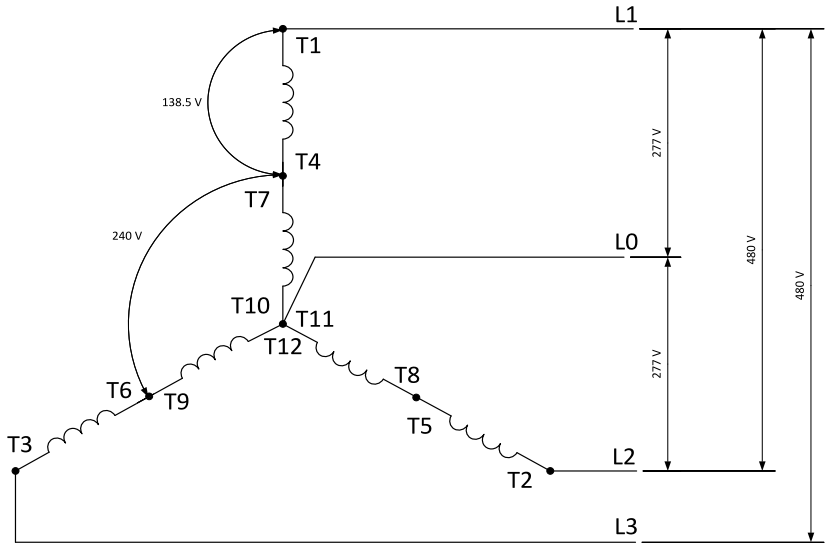


Image 4.15 Typical 3 Phase 4 Wires generator wiring

ConnectionType: High Leg D

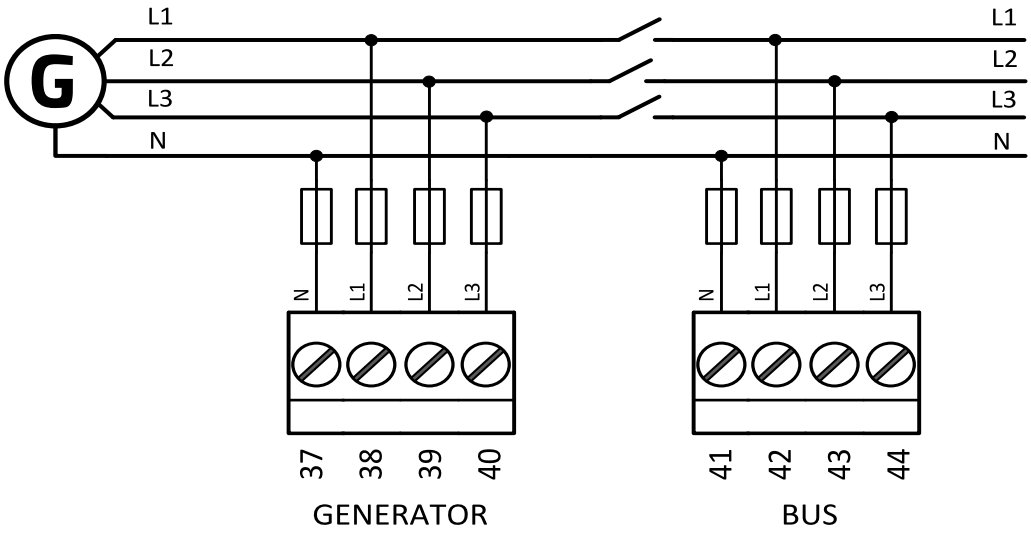


Image 4.16 High Leg Delta application

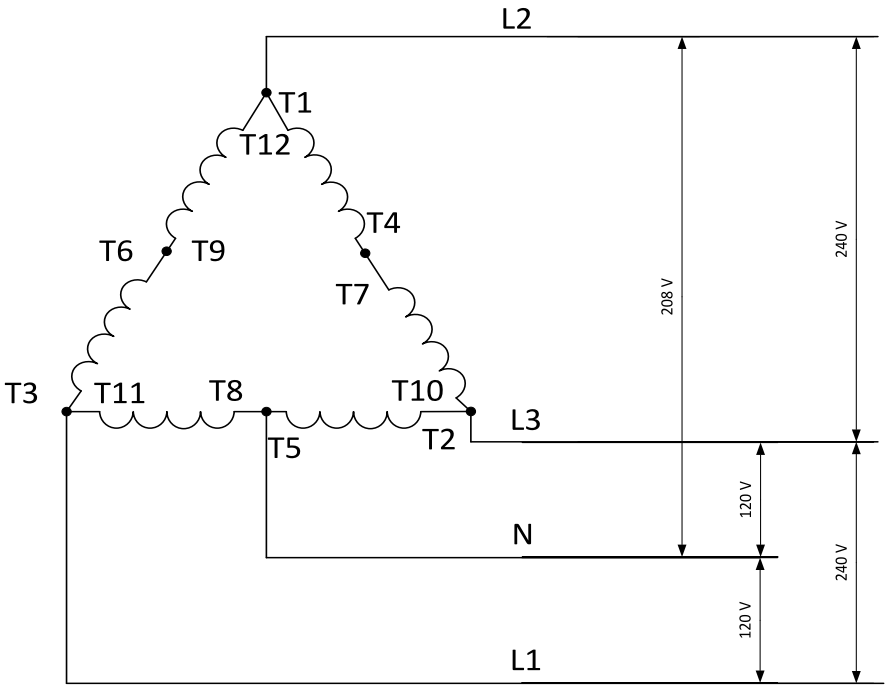


Image 4.17 Typical High Leg D generator wiring

ConnectionType: 3 Phase 3 Wires

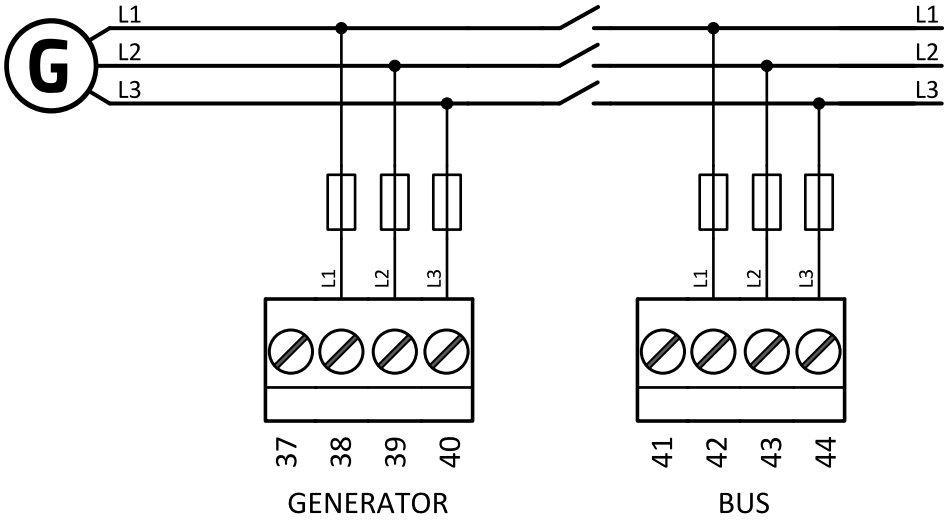


Image 4.18 3 phase application without neutral

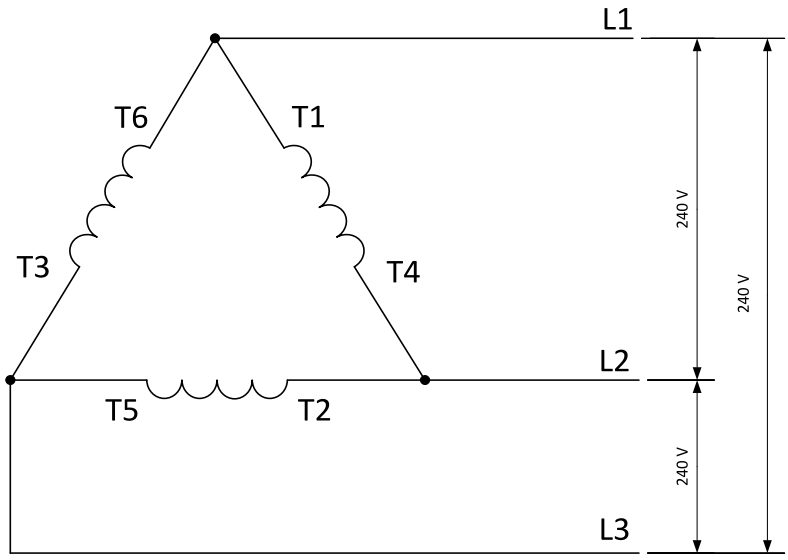


Image 4.19 Typical 3 Phase 3 Wires generator wiring

ConnectionType: Split Phase

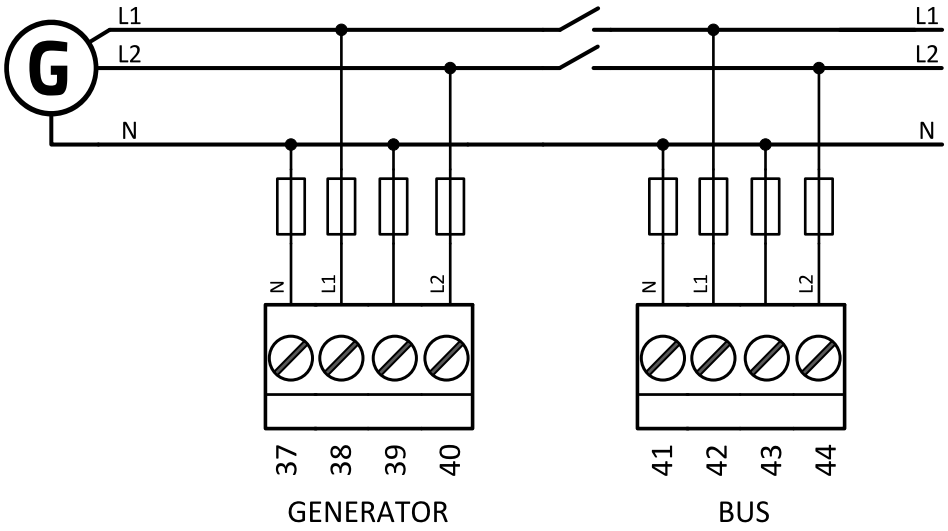
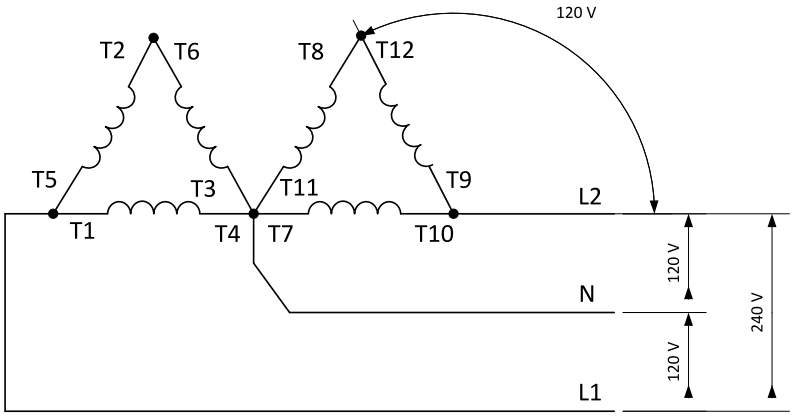


Image 4.20 Split phase application

IMPORTANT: The second phase of split phase connection is connected to the terminal, where is usually connected the third phase.

DOUBLE DELTA Connection



ZIG ZAG (DOG LEG) Connection

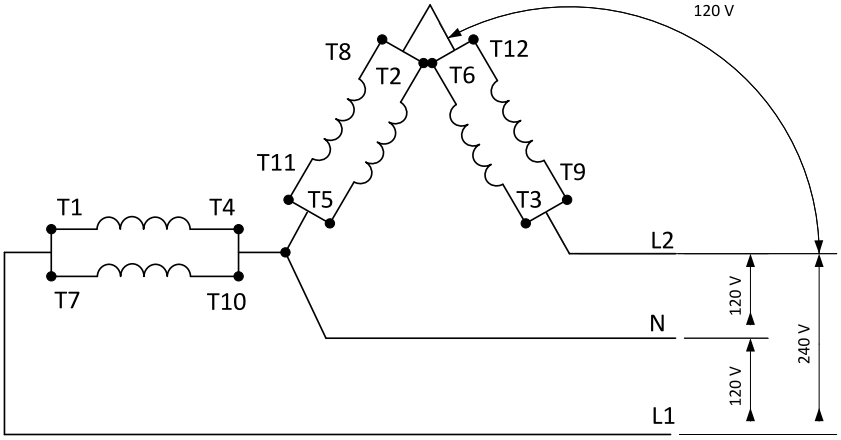


Image 4.21 Typical Split Phase generator wiring

ConnectionType: Mono Phase

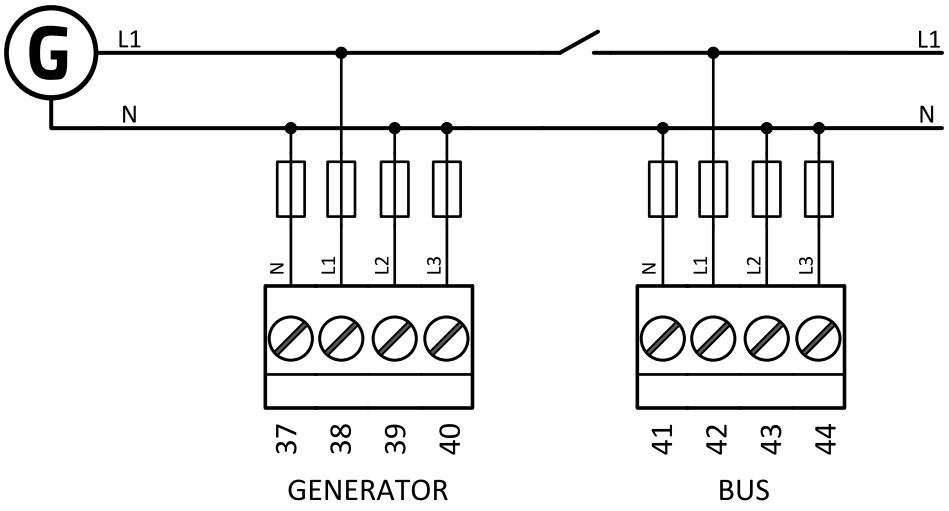


Image 4.22 Mono phase application

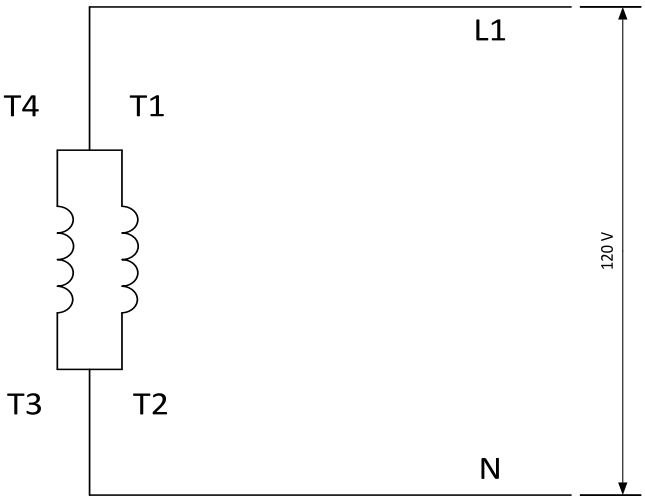


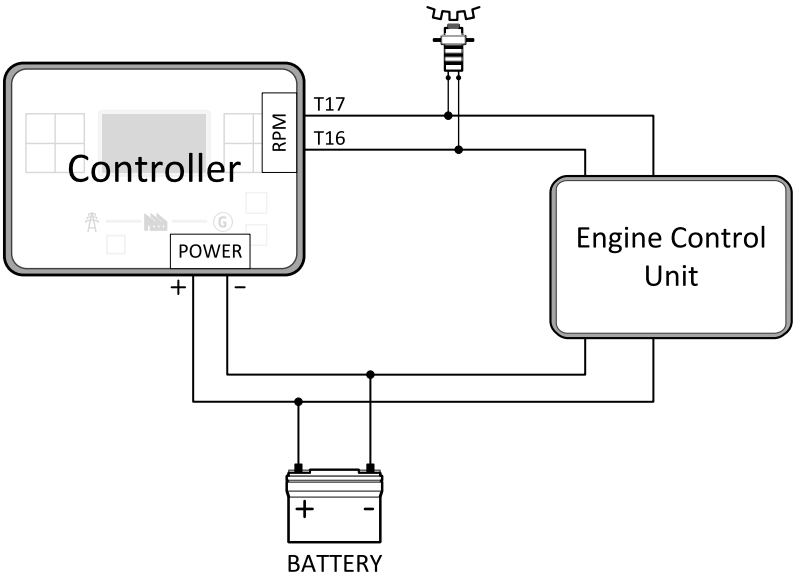
Image 4.23 Typical Mono Phase generator wiring

4.4.5 Magnetic pick-up

A magnetic speed sensor (pickup) is the most common method of engine speed measurement. To use this method, mount the pickup opposite to the engine flywheel, connect the cable to the controller as shown on the picture below and adjust the setpoint **Gear Teeth (page 258)** according to the number of teeth on the flywheel.

For the details about the pick-up input parameters **see Technical data on page 227**

IMPORTANT: To ensure proper function use a shielded cable.



If engine will not start:

- Check ground connection from pick-up to controllers, eventually disconnect ground connection to one of them.

Note: *In some cases the controller will measure a RPM value even though the gen-set is not running: RPM is measured from the generator voltage (Gear Teeth = 0). Controller is measuring some voltage value on input terminals due to open fusing. If RPM > 0 the controller will be put into a Not ready state and the engine will not be allowed to start.*

4.4.6 Binary inputs

Use minimally 1 mm^2 cables for wiring of Binary inputs.

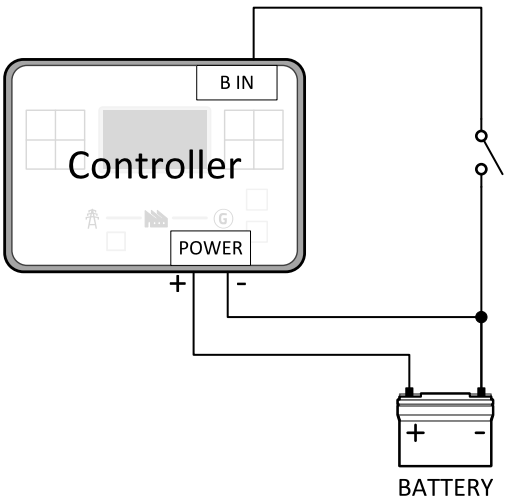


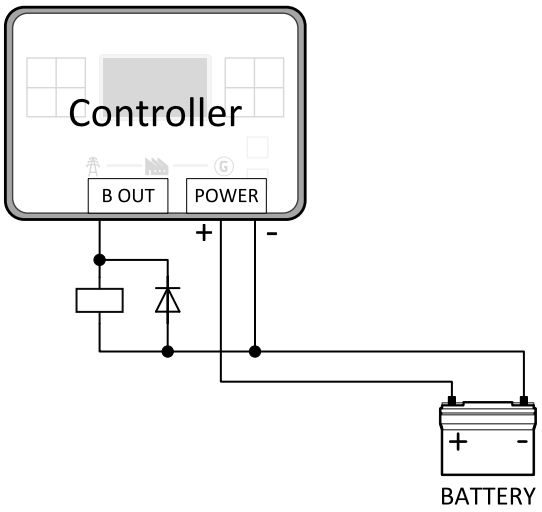
Image 4.24 Wiring binary inputs

Note: *The name and function or alarm type for each binary input have to be assigned during the configuration.*

4.4.7 Binary Outputs

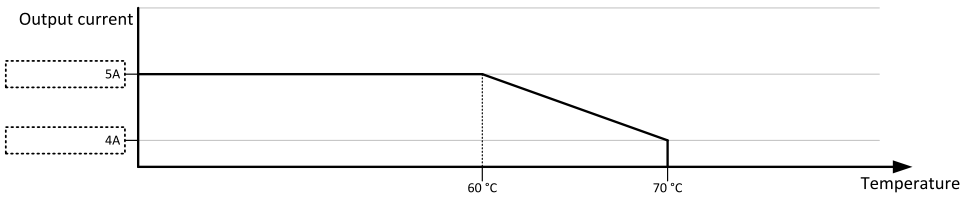
Use min. 1 mm^2 cables for wiring of binary outputs. Use external relays as indicated on the schematic below for all outputs except those where low-current loads are connected (signalization etc...).

IMPORTANT: Use suppression diodes on all relays and other inductive loads!



Note: *Every single binary output can provide up to 0,5 A of steady current.*

IMPORTANT: When operating temperature is higher than 60 °C it is strongly recommended to limit output current of high current binary outputs (terminal 5 and terminal 6) to 4 A (each).



4.4.8 E-Stop

E stop has dedicated terminal T04. Power supply of binary output 1 (terminals 5) and binary output 2 (terminals 6) is internally connected (in controller) to E-Stop terminal. It means higher security and faster disconnection of these outputs. More information about E-Stop functions **see E-Stop on page 185**.

Note: *This function has the same behavior as binary input* ***EMERGENCY STOP (PAGE 650)****.*

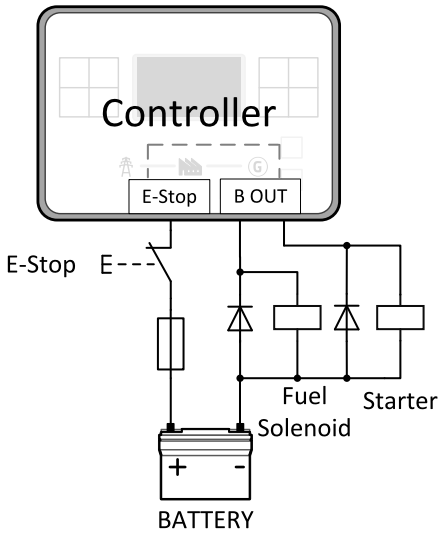


Image 4.25 E-Stop wiring

Note: *Recommended fusing is 12 A fuse.*

Note: *Grey dashed line symbolizes internal connection between E-Stop and binary outputs 1 and 2.*

Note: *For proper functionality of E-Stop, the terminal T04 must be always wired. Terminal can be connected to battery+ or to terminal T03 (BATT+)*

IMPORTANT: Suppression diodes are not indicated, but required.

4.4.9 Emergency stop

The Emergency Stop function can be made in two ways:

- Connecting a normally closed “mushroom-type” button to the binary input . This is a purely software solution.
- A hard-wired solution, where the button also disconnects the power supply from the controller outputs.

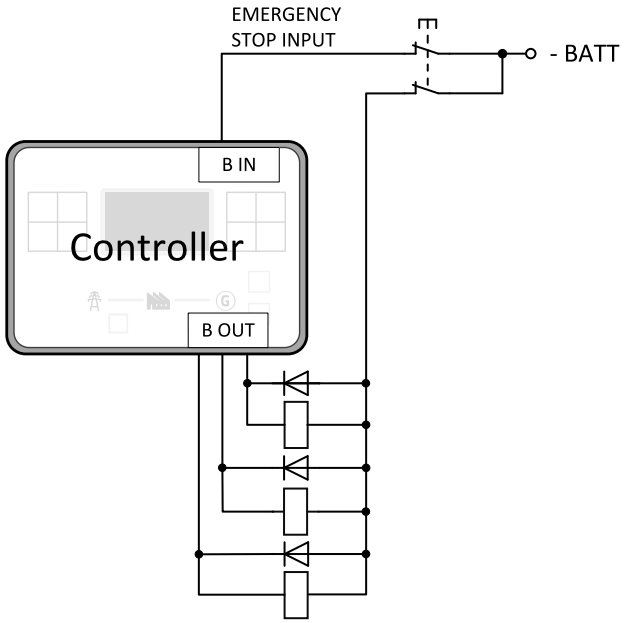


Image 4.26 Hard-wired emergency stop

IMPORTANT: Suppression diodes are not indicated, but required.

4.4.10 Analog inputs

The analog inputs are designed for resistive automotive type sensors like VDO or DATCON. The sensors are connected either by one wire (the second pole is the sensor body) or by two wires.

- In the case of grounded sensors, connect the AI COM terminal to the engine body as near to the sensors as possible.
- In the case of isolated sensors, connect the AI COM terminal to the negative power supply terminal of the controller as well as one pole of each sensor.

Analog inputs are typically used for: Oil Pressure, Coolant Temperature and Fuel Level. All of these parameters are connected with relevant protections.

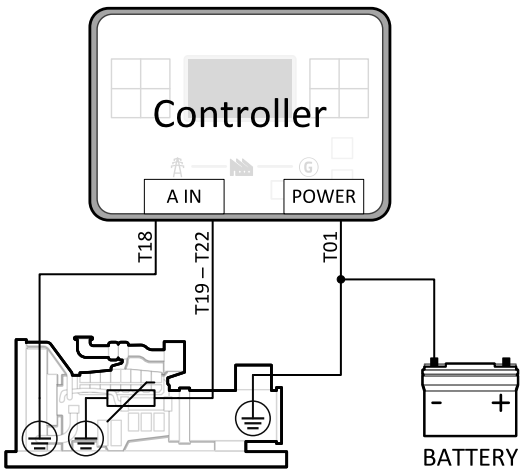


Image 4.27 Grounded sensors

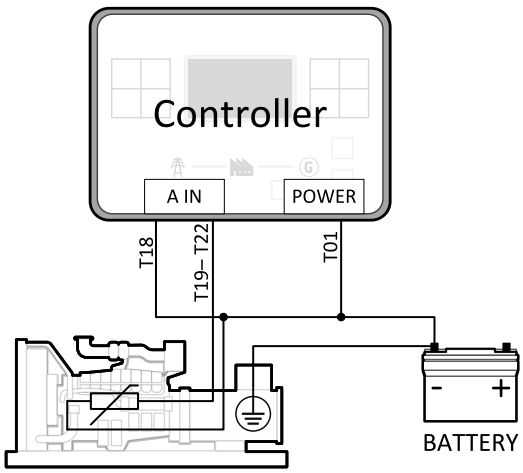


Image 4.28 Isolated sensors

Note: *Schemes show only analog input connection overview, not actual wiring.*

Note: *The name, sensor characteristic and alarm types for each analog input have to be assigned during configuration.*

Analog inputs with voltage & current sensors

On each analog input, there is a possibility to connect voltage or current output sensor instead of resistive one. Recommended wiring connection for these measurements and recommended curves are bellow.

Voltage sensors

Sensor's output range (V)	R1 (Ω)	R2 (Ω)
0 - 10	390	100
0 - 30	1500	100
0 - 70	3300	100

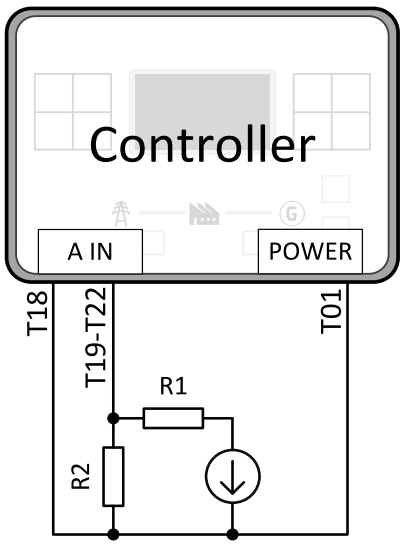


Image 4.29 Wiring of analog input with voltage sensor

0 - 10 V											
V	0	1	2	3	4	5	6	7	8	9	10
Ω	80	98	119	143	172	208	251	306	378	474	611

0 - 30 V								
V	0	2	4	6	8	10	12	14
Ω	94	105	118	131	147	163	182	202
V	16	18	20	22	24	26	28	30
Ω	226	252	282	317	358	405	463	533

0 - 70 V												
V	0	2	4	6	8	10	12	14	16	18	20	22
Ω	97	102	108	114	120	126	133	140	147	154	162	170
V	24	26	28	30	32	34	36	38	40	42	44	46
Ω	179	188	198	208	219	231	243	256	269	284	300	316
V	48	50	52	54	56	58	60	62	64	66	68	70
Ω	334	354	375	398	422	449	479	511	547	587	631	681

Note: *This is a conversion of voltage from voltage sensor to appropriate resistance value. Use resistance values in InteliConfig to create your specific curve. These values should be used in "Ohm" column.*

Current sensors

Sensor's output range (mA)	R (Ω)
0-20	100

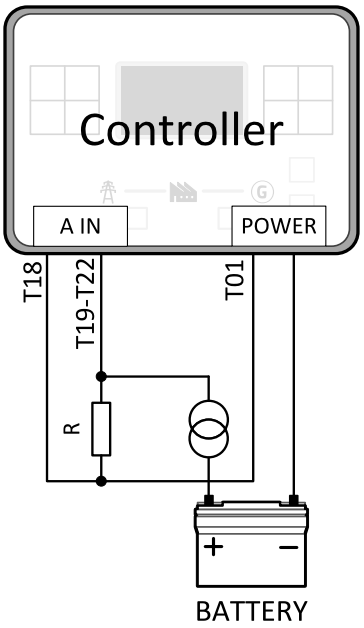


Image 4.30 Wiring of analog input with current sensor

0 - 22 mA												
mA	0	1	2	3	4	5	6	7	8	9	10	11
Ω	100	110	120	130	141	154	168	182	198	216	235	256
mA	12	13	14	15	16	17	18	19	20	21	22	
Ω	280	306	336	370	409	453	505	566	640	730	842	

Note: *This is a conversion of current from current sensor to appropriate resistance value. Use resistance values in InteliConfig to create your specific curve. These values should be used in "Ohm" column.*

Analog inputs with tristate sensors

It is possible to use tristate sensor with each analog input. Select Sensor option Tristate and use this wiring:

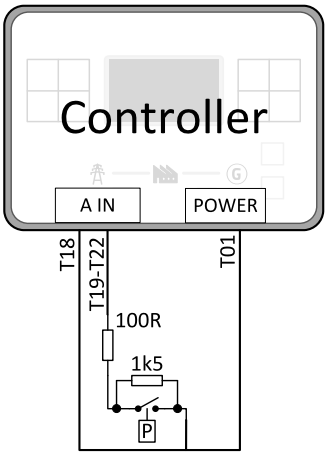


Image 4.31 Tristate sensor

Tristate sensor (binary sensor with fail detection)

- **Below 750 Ω** = Inactive
- **Between 750 Ω and 2400 Ω** = Active
- **Below 10 Ω or Over 2400 Ω** = sensor failure (wire shorted or interrupted)

Analog inputs with binary sensors

It is possible to use binary sensor with each analog input. Select Sensor option Binary and use this wiring:

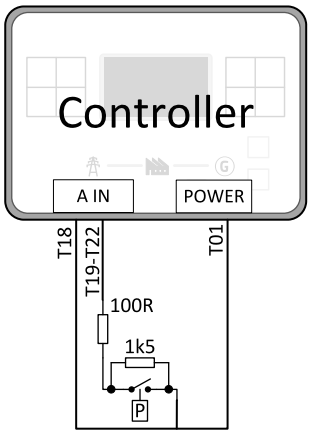


Image 4.32 Binary sensor

Binary sensor (binary sensor without fail detection)

- **Below 750 Ω** = Inactive
- **Between 750 Ω and 2400 Ω** = Active

4.4.11 CAN bus and RS485 wiring

CAN bus wiring

The wiring of the CAN bus should be provided in such a way that the following rules are observed:

- The maximum length of the CAN bus depends on the communication speed. For a speed of 250 kbps, which is used on the CAN1 bus (extension modules, ECU) and CAN2 bus, the maximum length is 200 m.
- The bus must be wired in linear form with termination resistors at both ends. No nodes are allowed except on the controller terminals.
- Shielded cable[1] has to be used, shielding has to be connected to the terminal T01 (Grounding).
- External units can be connected on the CAN bus line in any order, but keeping line arrangement (no tails, no star) is necessary.
- The CAN bus has to be terminated by 120 Ohm resistors at both ends use a cable with following parameters:

Cable type	Shielded twisted pair
Impedance	120 Ω
Propagation velocity	≥ 75% (delay ≤ 4.4 ns/m)
Wire crosscut	≥ 0.25 mm^2
Attenuation (@1MHz)	≤ 2 dB/100 m

Note: *A termination resistor at the CAN (120 Ω) is already implemented on the PCB. For connecting, close the jumper near the appropriate CAN terminal.*

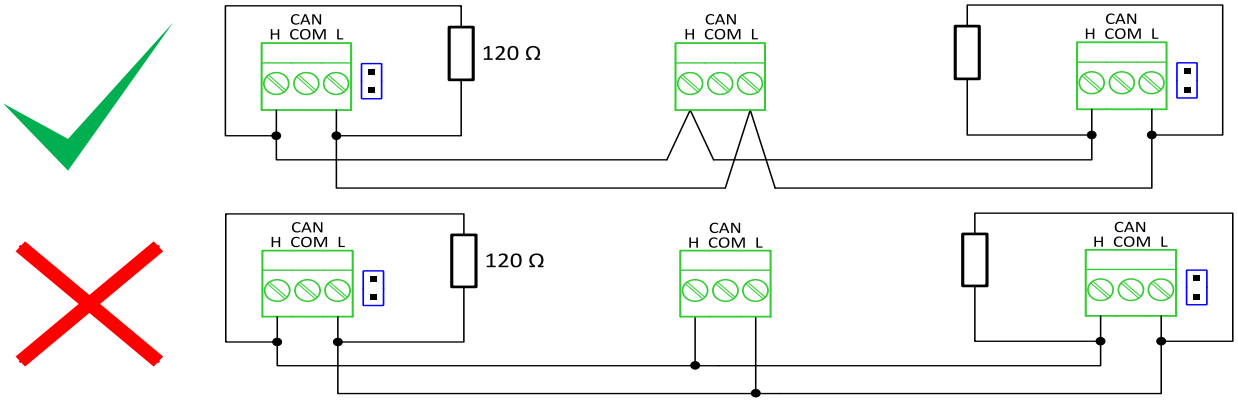


Image 4.33 CAN bus topology

[1] Recommended data cables: BELDEN (http://www.belden.com) - for shorter distances: 3105A Paired - EIA Industrial RS-485 PLTC/CM (1x2 conductors); for longer distances: 3106A Paired - EIA Industrial RS-485 PLTC/CM (1x2+1 conductors)

- For shorter distances (connection within one building)

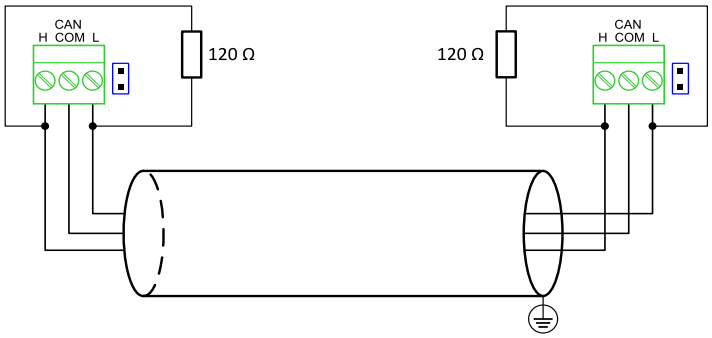


Image 4.34 CAN bus wiring for shorter distances

Note: *Shielding shall be grounded at one end only. Shielding shall not be connected to CAN COM terminal.*

- For longer distances or in case of surge hazard (connection out of building, in case of storm etc.)

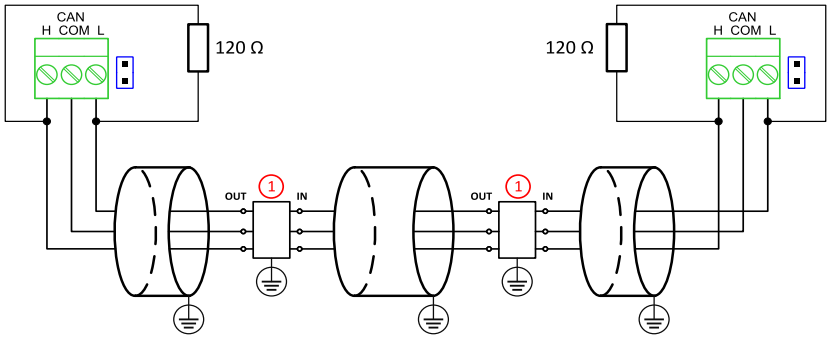


Image 4.35 CAN bus wiring for longer distances

① Recommended PT5-HF-12DC-ST[1]

RS485 wiring

The wiring of the RS485 communication should be provided in such a way that the following rules are observed:

Note: *A termination resistor at the CAN (120Ω) is already implemented on the PCB. For connecting, close the jumper near the appropriate CAN terminal.*

- Standard maximum bus length is 1000 m.
- Shielded cable[2] has to be used, shielding has to be connected to the terminal T01 (Grounding).
- External units can be connected on the RS485 line in any order, but keeping line arrangement (no tails, no star) is necessary.
- The line has to be terminated by 120 Ohm resistors at both ends.

---

[1]Protections recommended: Phoenix Contact (http://www.phoenixcontact.com): PT 5-HF-12DC-ST with PT2x2-BE (base element) or Saltek (http://www.saltek.cz): DM-012/2 R DJ

[2]Recommended data cables: BELDEN (http://www.belden.com) - for shorter distances: 3105A Paired - EIA Industrial RS-485 PLTC/CM (1x2 conductors); for longer distances: 3106A Paired - EIA Industrial RS-485 PLTC/CM (1x2+1 conductors)

- For shorter distances (connection within one building).

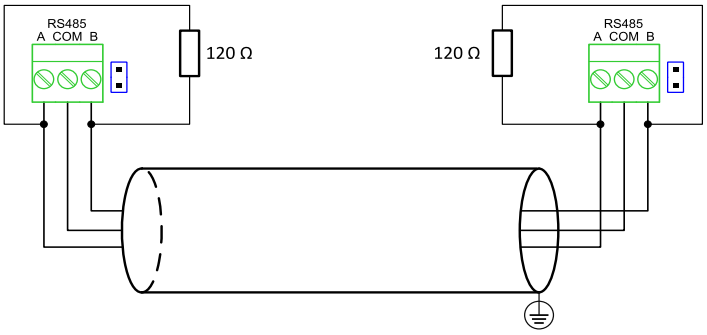


Image 4.36 RS485 wiring for shorter distances

- For longer distances or in case of surge hazard (connection out of building, in case of storm etc.)

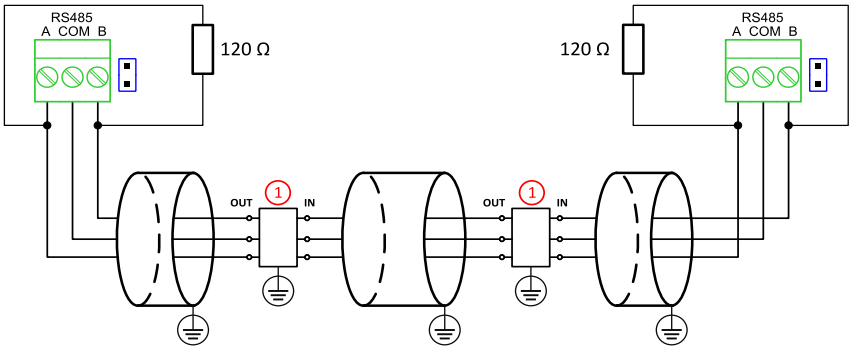


Image 4.37 RS485 wiring for longer distances

① Recommended PT5HF-5DC-ST[1]

[1]Recommended protections: Phoenix Contact (http://www.phoenixcontact.com): PT 5-HF-5DC-ST with PT2x2-BE (base element)(or MT-RS485-TTL) or Saltek (http://www.saltek.cz): DM-006/2 R DJ

Balancing resistors

The transmission bus into the RS-485 port enters an indeterminate state when it is not being transmitted to. This indeterminate state can cause the receivers to receive invalid data bits from the noise picked up on the cable. To prevent these data bits, you should force the transmission line into a known state. By installing two 620 Ohm balancing resistors at one node on the transmission line, you can create a voltage divider that forces the voltage between the differential pair to be less than 200 mili-Volts, the threshold for the receiver. You should install these resistors on only one node. The figure below shows a transmission line using bias resistors. Balancíng resistors are placed directly on the PCB of controller. Use jumpers PULL UP/PULL DOWN to connect the balancing resistors.

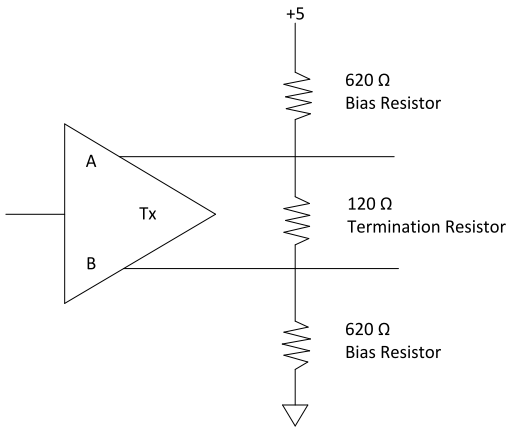


Image 4.38 Balancing resistors

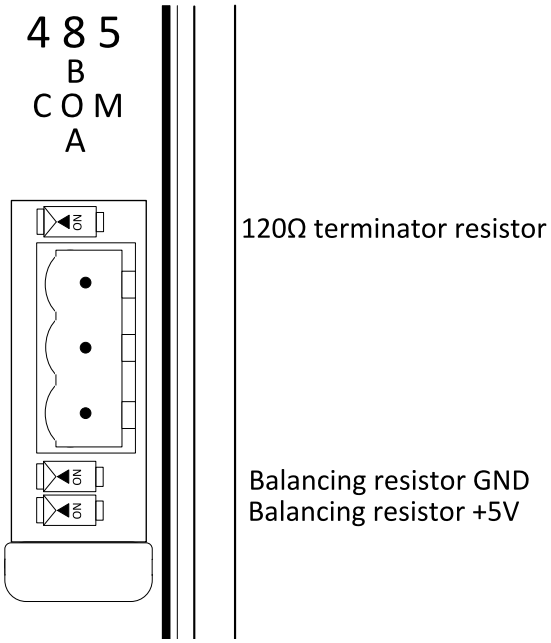


Image 4.39 RS485 on board

4.4.12 USB

This is required for computer connection. Use the shielded USB A-B cable.

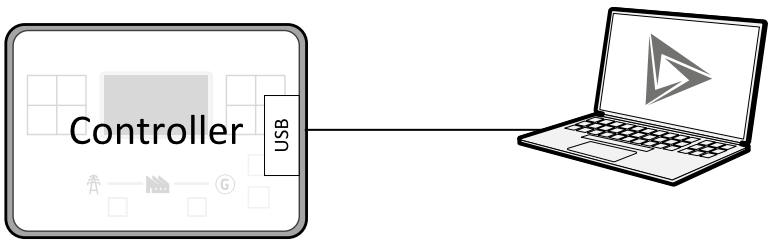


Image 4.40 USB connection

Controller can by also power by USB (only for service purpose like a uploading firmware, change of configuration etc.).

IMPORTANT: Power supply by USB is only for service purpose. Binary inputs and outputs are in logical 0. Also plug-in modules are not working.

4.4.13 USB HOST

USB Flash Drive can be connected into USB A connector.

4.4.14 AVR Interface

The output from the controller work in the following mode:

- Output type: Voltage in range of -10 V to +10 V maximum
- Maximum load current: 5 mA both sourcing and sinking.
- Precision: 1% of set value +/-100 mV.
- Resolution/minimum step: 3 mV approx.
- Step response: less then 10 ms, measured between 10% and 90%
- Output ripple: 30 mV max. at 50% of PWM
- Galvanic insulation: YES

Pleas see chapter **Voltage control outputs (page 140)** (Analog output) for more information about set-up of controller's AVR.

Note: *For the connection of individual AVRs please refer to concrete AVR manual.*

IMPORTANT: Read carefully specific AVR instructions before connecting to controller.

4.4.15 Speed governor interface

The speed governor output is used to control the speed or the power of the engine via the remote speed controlling input provided by the speed governor. The output from the controller can work in the following modes:

- voltage mode -10 to 10 V (10k output resistance can be internally connected by jumper)
  - Maximum load current: 5 mA both sourcing and sinking.
  - Precision: 1% of set value +/-100mV.
  - Resolution/minimum step: 3 mV approx.

- Step response: less then 10 ms, measured between 10% and 90%.
- Output ripple: 30 mV max. at 50% of pwm.
- Galvanic insulation: NO

▶ 5 V PWM mode

- PWM amplitude: 5 V.
- PWM frequency: 500 to 2900 Hz defined by setpoint **Speed Governor PWM Rate (page 342)**
- Maximum load current: 20 mA both sourcing and sinking.
- PWM Resolution: 14 bit.
- Galvanic insulation: NO

Pleas see chapter **Speed control outputs (page 138)** (Analog output) for more information about set-up of controller's Speed governor.

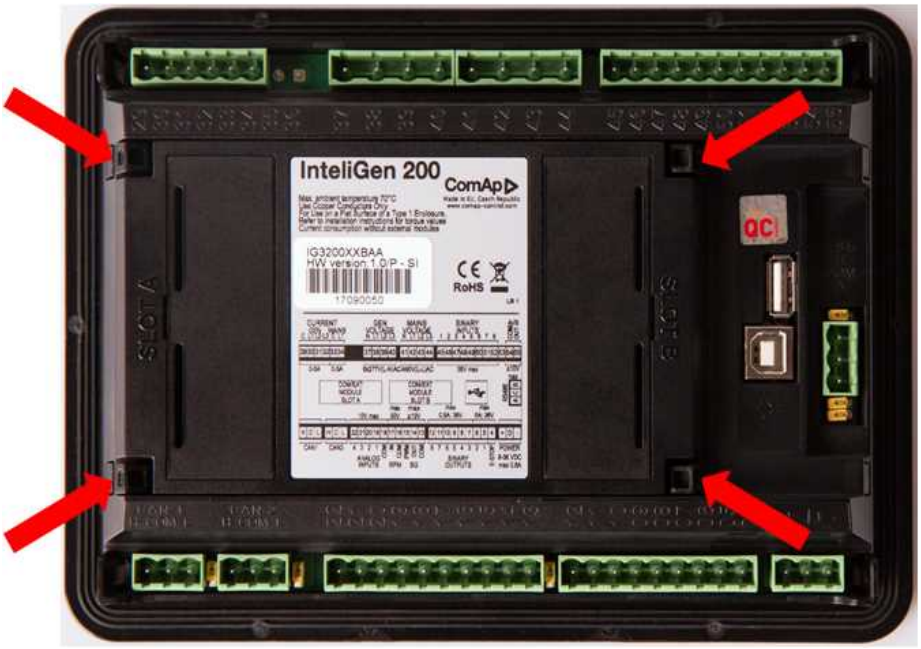
Note: *For the connection of individual speed governors please refer to concrete speed governor manual.*

IMPORTANT: Read carefully specific Speed governor instructions before connecting to controller.

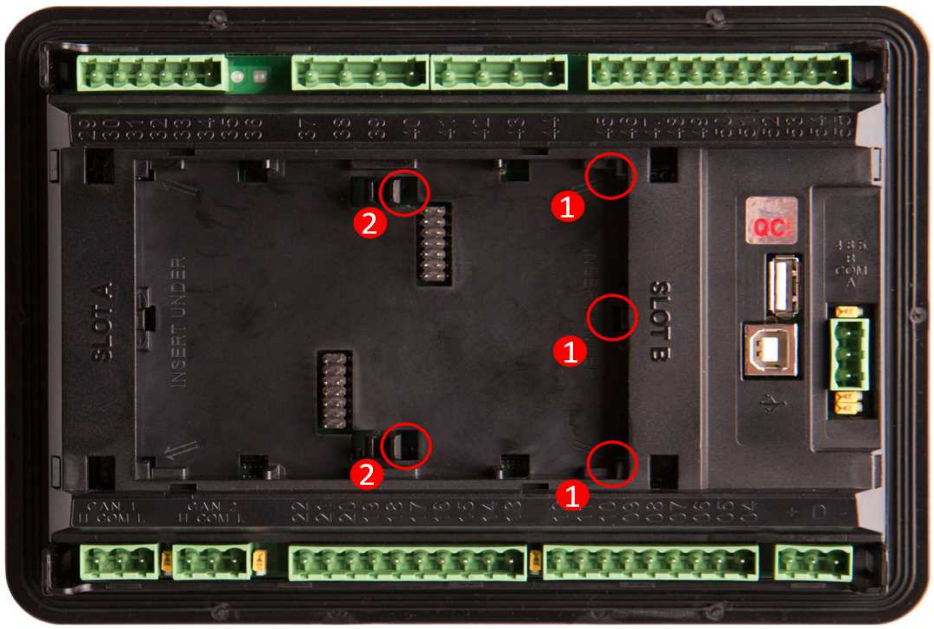
4.5 Plug-in module installation

4.5.1 Installation

Remove the back cover. To do this, press four holders which are located in corners.



After removing back cover insert the plug-in module. Plug-in module has to be inserted under holders. Start with holders marked by symbol 1. On the controller are also arrows for better navigation. After inserting plug-in module under holders 1 press it down to holders marked by symbol 2 which locks the module.



Insert the plug-in module under holders marked by symbol 1.



After locking the plug-in module into holders, place back the back cover (small cover for connectors has to be removed from back cover). Finally insert the small cover for connectors. Small covers are unique for each plug-in module.

4.6 Maintenance

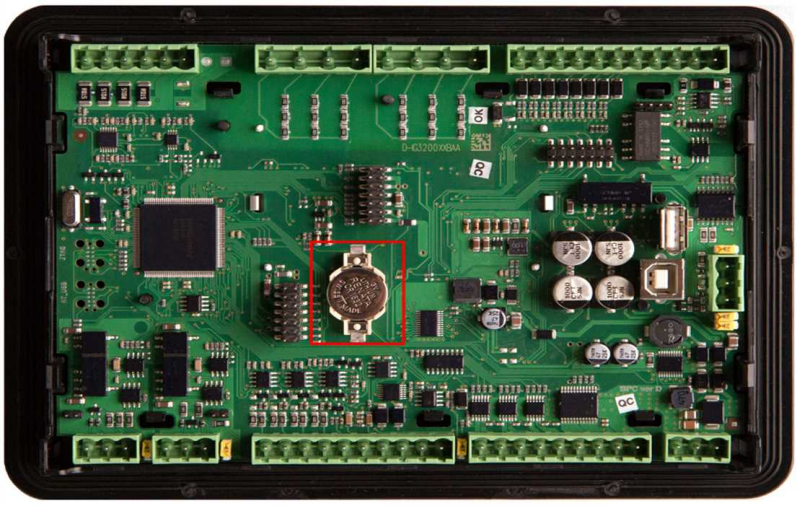
4.6.1 Backup battery replacement

The internal backup battery lifetime is approx. 6 years. If replacement of backup batter is needed, follow these instructions:

- Connect the controller to a PC and save an archive for backup purposes (not necessary but recommended).
- Disconnect all terminals from the controller and remove the controller from the switchboard.
- Remove the back cover and all plug-in modules.
- Release the rear cover using a flat screwdriver or another suitable tool.



- The battery is located in a holder on the circuit board. Remove the old battery with a small sharp screwdriver and push with a finger the new battery into the holder.



- Put the rear cover back. Use slight pressure to lock the snaps into the housing. Pay attention that the cover is in correct position and not upside down!
- Put back the plugin modules and back cover.
- Power the controller on, adjust date and time and check all setpoints.

back to Installation and wiring

5 Controller setup

5.1 Default configuration 61
5.2 Controller configuration and PC tools connection 62
5.3 Operator Guide 69
5.4 Functions 94

back to Table of contents

5.1 Default configuration

5.1.1 Default configuration

Binary inputs

Number	Description	Configured function
BIN1	Generator circuit breaker feedback	**GCB FEEDBACK (PAGE 652)**
BIN2	Mains circuit breaker feedback	**MCB FEEDBACK (PAGE 656)**
BIN3	Emergency stop button	**EMERGENCY STOP (PAGE 650)**
BIN4	Access lock keyswitch	**ACCESS LOCK (PAGE 627)**
BIN5	Switch controller to OFF mode	**REMOTE OFF (PAGE 660)**
BIN6	Switch controller to TEST mode	**REMOTE TEST (PAGE 662)**
BIN7	Suppression of alarms	**SD OVERRIDE (PAGE 664)**
BIN8	Free slot	**NOT USED (PAGE 657)**

Binary outputs

Number	Description	Function
BOUT1	Starter motor control	**STARTER (PAGE 723)**
BOUT2	Fuel solenoid valve	**FUEL SOLENOID (PAGE 699)**
BOUT3	Indication of breaker state	**GCB CLOSE/OPEN (PAGE 701)**
BOUT4	Indication of breaker state	**MCB CLOSE/OPEN (PAGE 711)**
BOUT5	Activation of any devices before start	**PRESTART (PAGE 718)**
BOUT6	Gen-set can be connected to load	**READY TO LOAD (PAGE 720)**
BOUT7	Indication of unconfirmed alarm	**ALARM (PAGE 680)**
BOUT8	Free slot	**NOT USED (PAGE 717)**

Analog inputs

Number	Configured sensor	Function
AIN1	VDO 10 Bar	**OIL PRESSURE (PAGE 759)**
AIN2	VDO40-120°C	**COOLANT TEMP (PAGE 756)**
AIN3	VDOLevel %	**FUEL LEVEL (PAGE 757)**
AIN4	None	**NOT USED (PAGE 758)**

5.2 Controller configuration and PC tools connection

5.2.1 USB 62
5.2.2 RS232/RS485 63
5.2.3 Ethernet 64

back to Controller setup

This chapter contains brief introduction into the specifics of firmware and archive upload and connection of various PC tools to the controller. If you require detailed information on each PC tool please use the included Help in those PC tools or download their Reference Guides.

5.2.1 USB

You may connect to the controller using the USB port. In this case standard USB A to B cable should be used.

Connection using InteliConfig

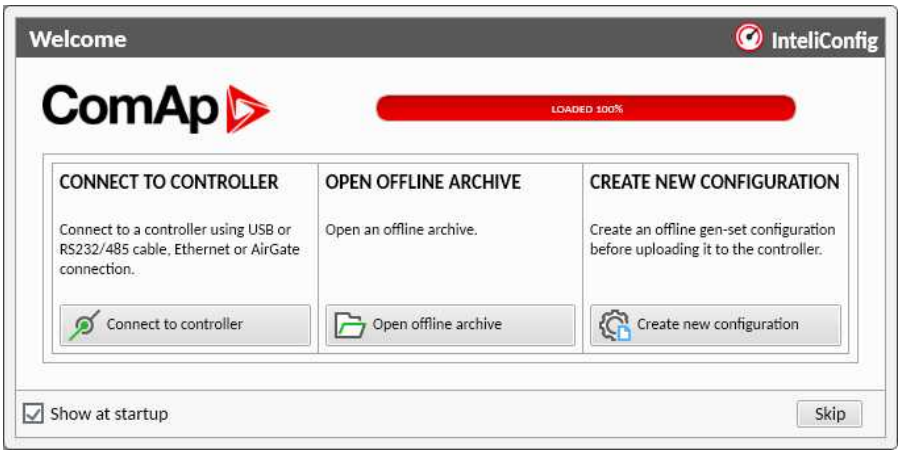


Image 5.1 First screen of InteliConfig - select connect to controller



Image 5.2 Second screen of InteliConfig - select detected controllers

Connection using WinScope

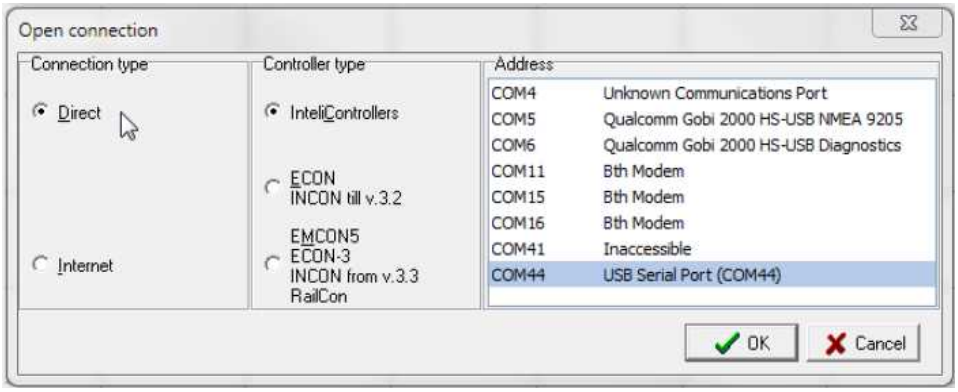


Image 5.3 WinScope screen - select direct connection

5.2.2 RS232/RS485

It is possible to connect to the controller using RS232 or RS485 direct connection (serial port or USB to RS232/RS485 converter may be used). The following settings need to be checked in the controller:

- **COM1 Mode (page 461)** = Direct
- **Controller Address (page 262)** has to be set to the same value as in the PC tool

Connection using InteliConfig

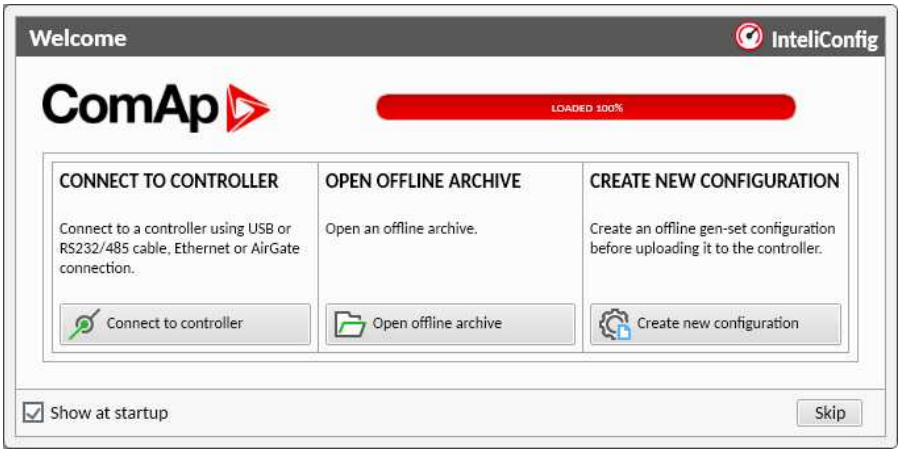


Image 5.4 First screen of InteliConfig - select connect to controller

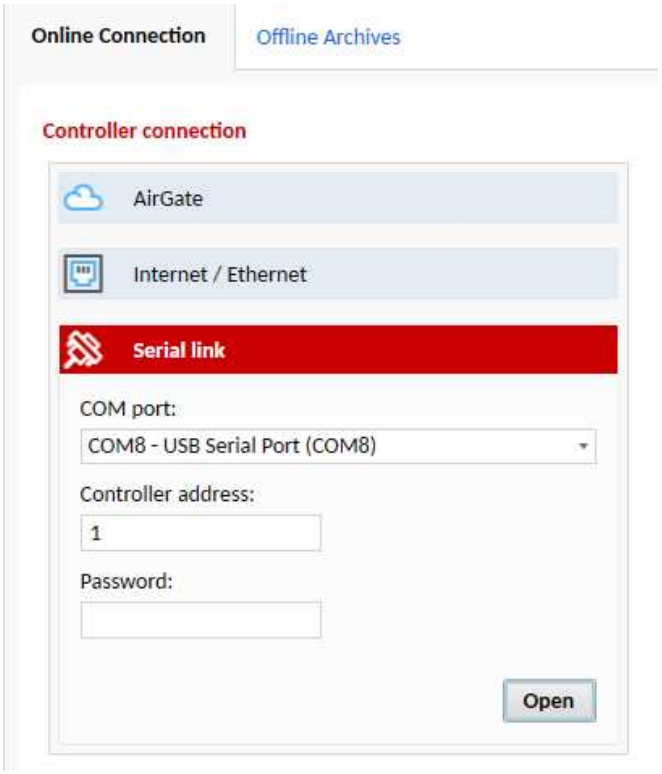


Image 5.5 Second screen of InteliConfig - select Serial link

Connection using WinScope

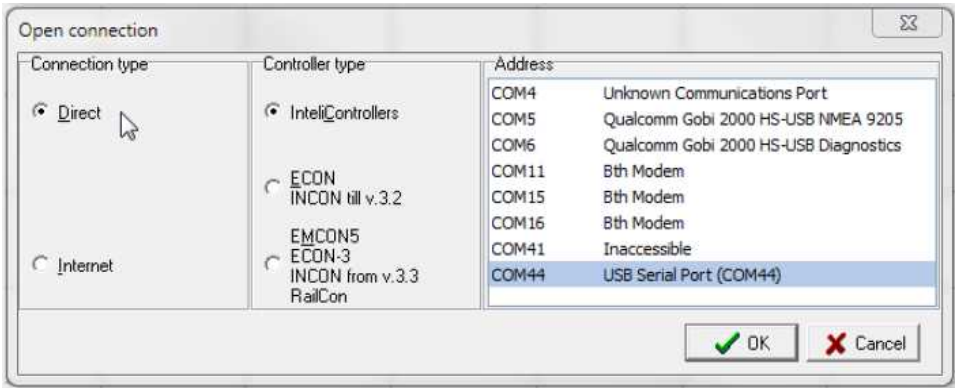


Image 5.6 WinScope screen - select direct connection

Note: *Winscope supports only 19200, 38400, 57600 speeds.*

5.2.3 Ethernet

It is possible to connect to the controller using ethernet port either directly or using ComAp's AirGate service.

Direct connection

When you use direct connection the controller needs to be reachable directly from the PC you use (i.e. one LAN or WAN without any firewalls and other points that may not allow the connection). The following settings need to be checked in the controller:

- **Controller Address (page 262)** has to be set to the same value as in the PC tool.
- **IP Address Mode (page 494)** can be set to AUTOMATIC when there is DHCP service is available. Otherwise it needs to be set to FIXED.
- **IP Address (page 494)** is either set automatically or it can be adjusted to a specific requested value.
- **Subnet Mask (page 495)** is either set automatically or it can be adjusted to a specific requested.
- **Gateway IP (page 495)** can be set here when it is used.
- **ComAp TCP Port (page 500)** number is 23. Make sure that this port is open for communication in your network.

Connection using InteliConfig

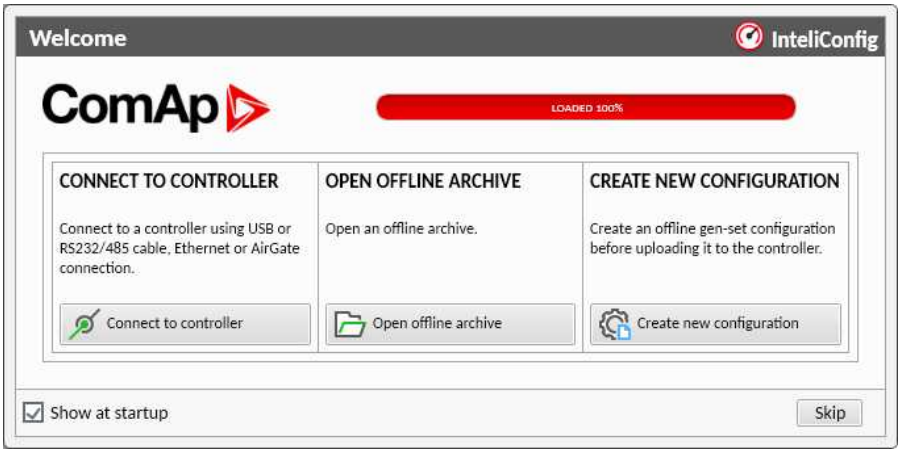


Image 5.7 First screen of InteliConfig - select connect to controller

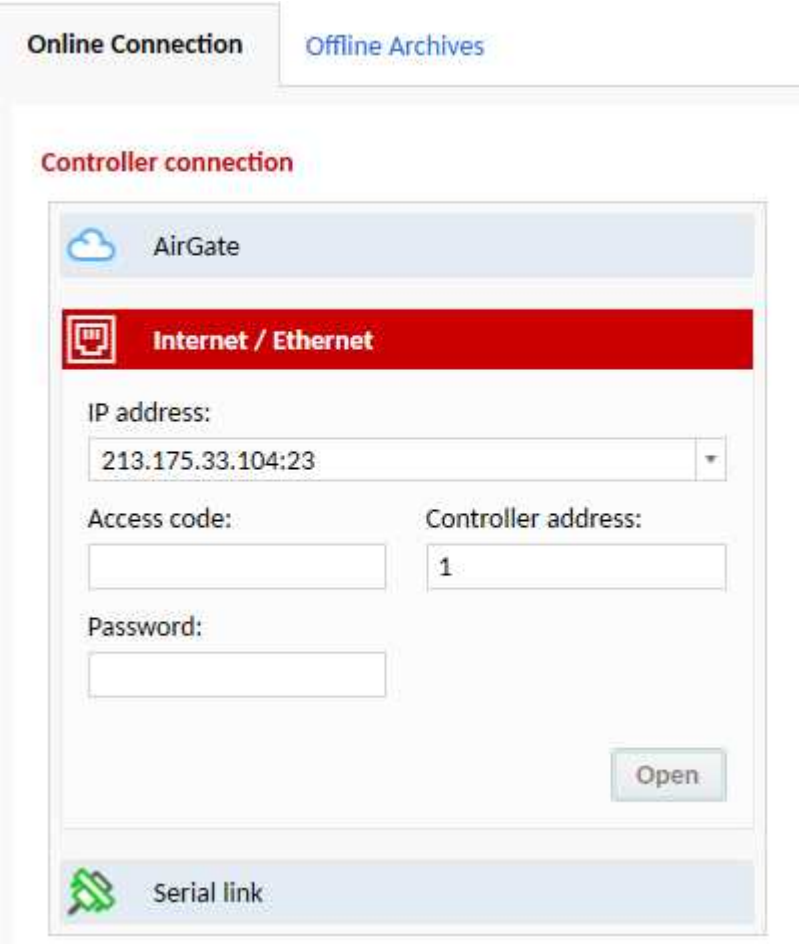


Image 5.8 Second screen of InteliConfig - select Internet/Ethernet

Connection using WinScope

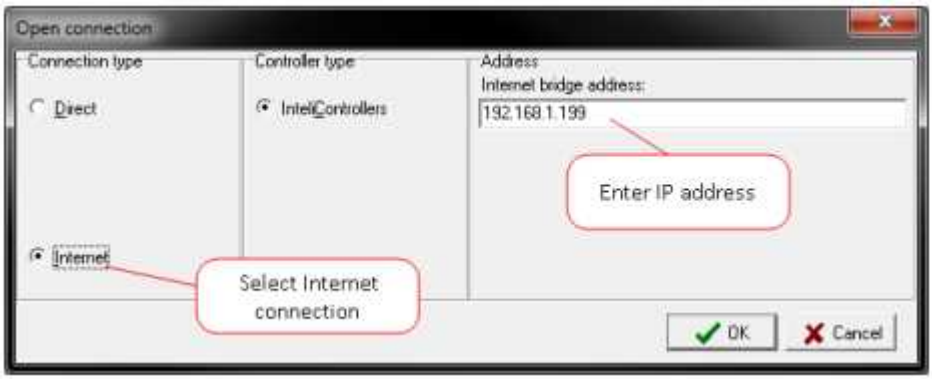


Image 5.9 WinScope screen

AirGate connection

You can use ComAp's AirGate service that allows you to connect to any controller via internet no matter what are the restrictions of the local network (if the controller can connect to the internet AirGate service will work). The following setpoints have to be adjusted:

- **Controller Address (page 262)** has to be set to the same value as in the PC tool.
- **IP Address Mode (page 494)** can be set to AUTOMATIC when there is DHCP service is available. Otherwise it needs to be set to FIXED.
- **IP Address (page 494)** is either set automatically or it can be adjusted to a specific requested value.
- **Subnet Mask (page 495)** is either set automatically or it can be adjusted to a specific requested.
- **Gateway IP (page 495)** can be set here when it is used.
- **AirGate Connection (page 499)** has to be set to Enabled.
- **AirGate Address (page 500)** currently there is one AirGate server running at URL airgate.comap.cz (enter this URL into the setpoint).

Connection using InteliConfig

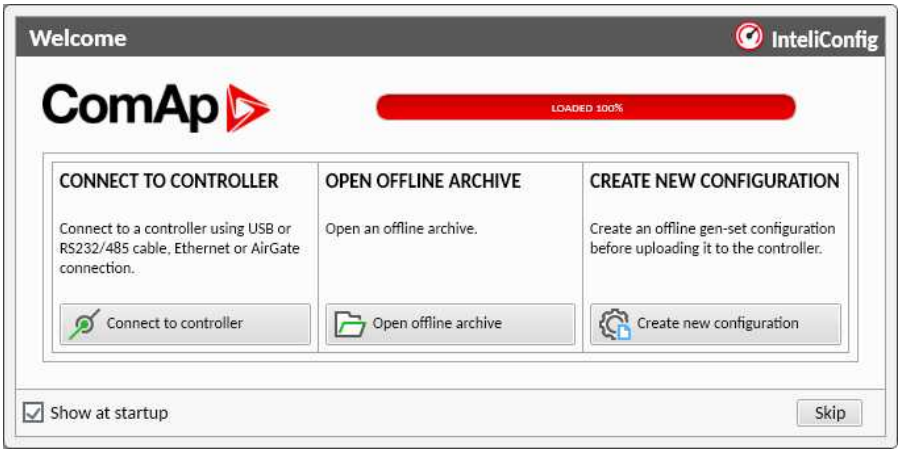


Image 5.10 First screen of InteliConfig - select connect to controller

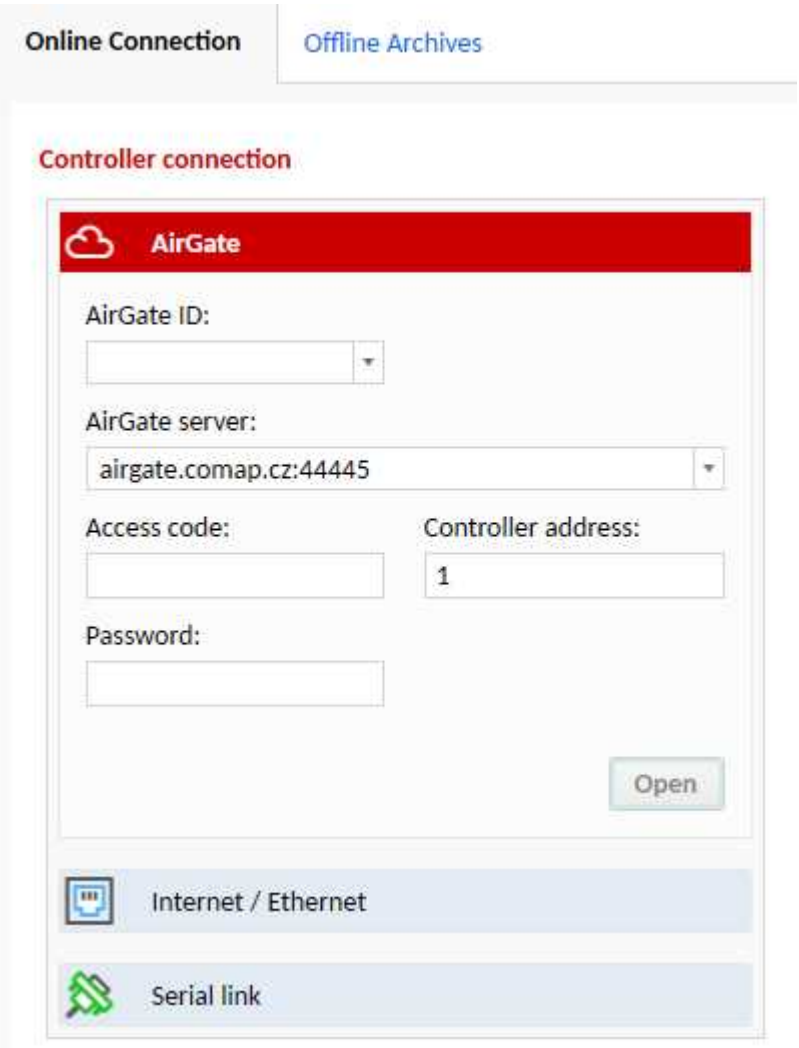


Image 5.11 Second screen of InteliConfig - select AirGate

Connection using WinScope

WinScope doesn't support connection via AirGate.

5.3 Operator Guide

5.3.1 Front panel elements 69
5.3.2 Display screens and pages structure 71
5.3.3 Browsing alarms 85
5.3.4 Password 86
5.3.5 Information screen 92
5.3.6 Language selection 93
5.3.7 Display contrast adjustment 94

5.3.1 Front panel elements

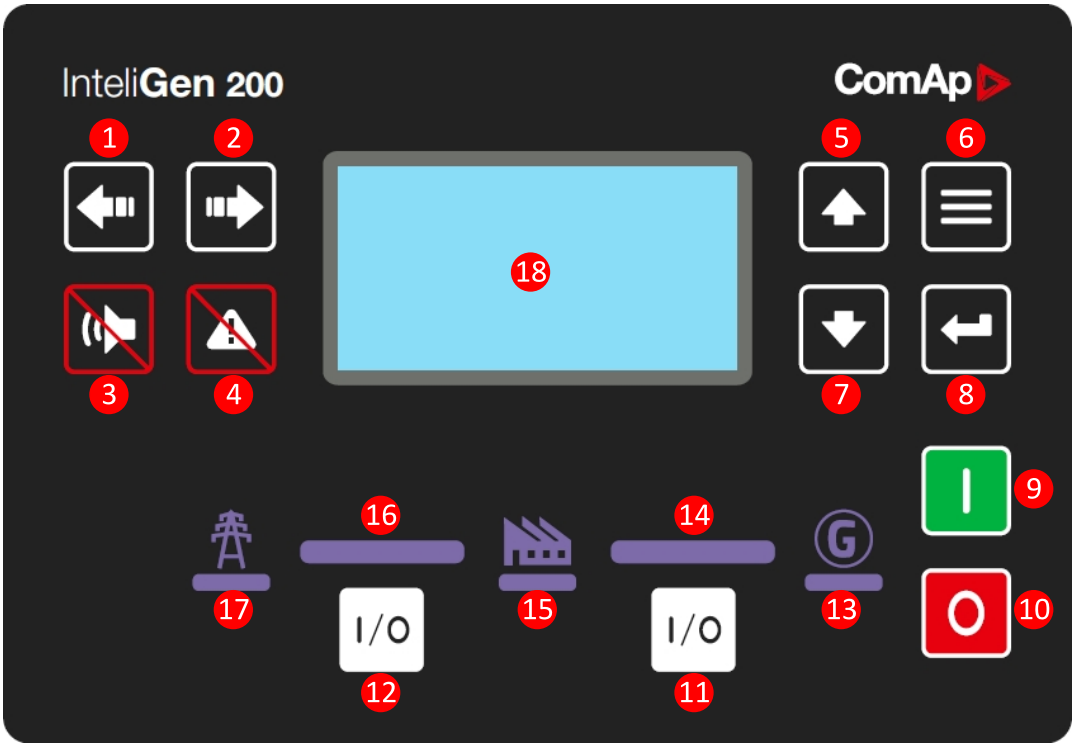


Image 5.12 Operator interface of InteliGen 200

Control buttons		
Position	**Picture**	**Description**
1		**LEFT** button. Use this button to move left or to change the mode. The button can change the mode only if the main screen with the indicator of currently selected mode is displayed. ***Note:*** *This button will not change the mode if the controller mode is forced by one of binary inputs listed in the Reference Guide – "Operating modes" chapter.*

2		**RIGHT** button. Use this button to move right or to change the mode. The button can change the mode only if the main screen with the indicator of currently selected mode is displayed. ***Note:*** *This button will not change the mode if the controller mode is forced by one of binary inputs listed in the Reference Guide – "Operating modes" chapter.*
3		**HORN RESET** button. Use this button to deactivate the horn output without acknowledging the alarms.
4		**FAULT RESET** button. Use this button to acknowledge alarms and deactivate the horn output. Inactive alarms will disappear immediately and status of active alarms will be changed to "confirmed" so they will disappear as soon as their reasons dismiss.
5		**UP** button. Use this button to move up or increase value.
6		**PAGE** button. Use this button to switch over display pages.
7		**DOWN** button. Use this button to move down or decrease value.
8		**ENTER** button. Use this button to finish editing a setpoint or moving right in the history page.
9		**START** button. Works in MAN mode only. Press this button to initiate the start sequence of the engine.
10		**STOP** button. Works in MAN mode only. Press this button to initiate the stop sequence of the gen-set. Repeated pressing of button will cancel current phase of stop sequence (like cooling) and next phase will continue.
11		**GCB** button. Works in MAN and TEST modes only. Press this button to open or close the GCB or start synchronization manually.
12		**MCB** button. Works in MAN and TEST modes only. Press this button to open or close the MCB or start the reverse synchronization manually.

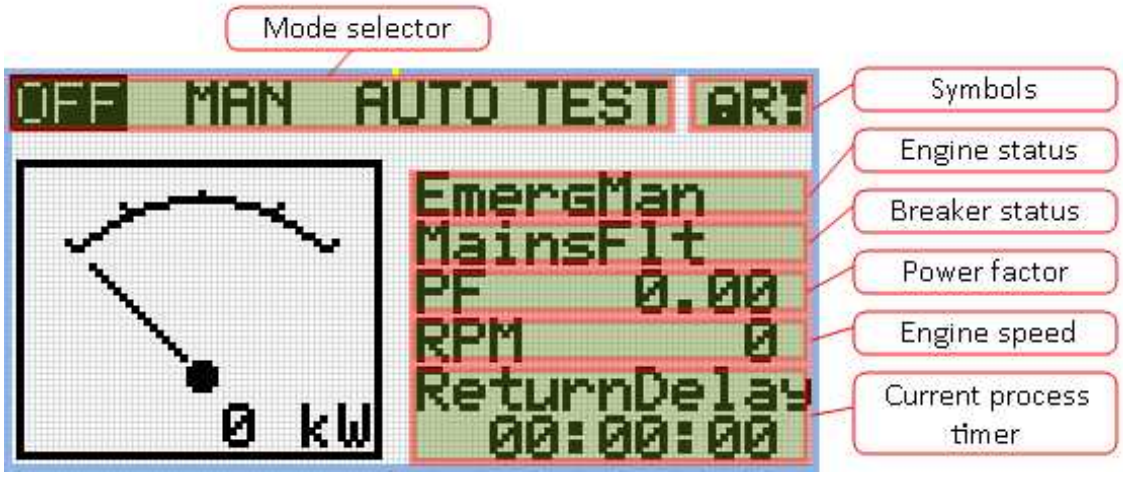
Indicators and others	
Position	**Description**
13	**GENERATOR** status indicator. There are two states - Gen-set OK (indicator is green) and Gen-set failure (indicator is red). Green LED is on if the generator voltage is present and within limits. Red LED starts flashing when gen-set failure occurs. After FAULT RESET button is pressed, goes to steady light (if an alarm is still active) or is off (if no alarm is active).
14	**GCB ON**. Green LEDs are on if GCB is closed and Gen-set is healthy. If Gen-set is not healthy and GCB is closed than middle LED is on. It is driven by GCB CLOSE/OPEN output or by GCB feedback signal.
15	**LOAD**. Green LED is ON if load is supplied by mains or by generator. It means, that Gen-set or mains is OK and proper circuit breaker is closed.
16	**MCB ON**. Green LEDs are on if MCB is closed and Mains is healthy. If Mains is not healthy and MCB is closed than middle LED is on. It is driven by MCB CLOSE/OPEN output or by MCB feedback signal.
17	**MAINS** status indicator. There are two states - Mains OK (indicator is green) and Mains failure (indicator is red). Green LED is on, if mains is present and within limits. Red LED starts blinking when the mains failure is detected and after the gen-set has started and connected to the load it lights permanently until the mains failure disappears.
18	Graphic B/W display, 132x64 pixels.

5.3.2 Display screens and pages structure

The displayed information is structured into "pages" and "screens". Use PAGE button to switch over the pages.

- The page Measurement consists of screens which display measured values like voltages, current, oil pressure etc., computed values like i.e. gen-set power, statistic data and the alarm list on the last screen.
- The page Setpoints contains all setpoints organized to groups and also a special group for entering password.
- The page History log shows the history log in the order that the last record is displayed first.

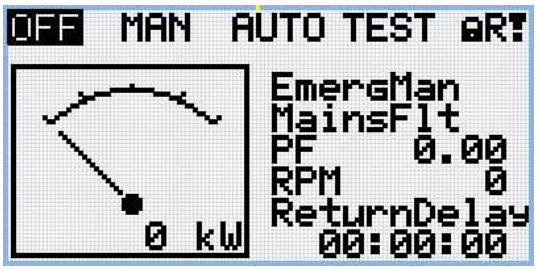
Main Screen

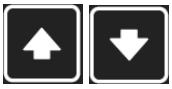


Symbols

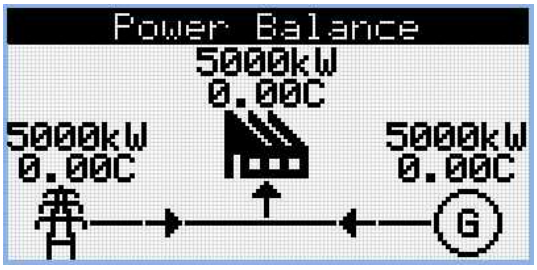
- Padlock - active when LBI ACCESS LOCK is active
- R - active when there is active remote connection to controller
- Exclamation mark - active when there is any alarm in alarmlist

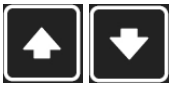
Measurement Screens





Note: *Use Up and Down button to move between measurement pages.*

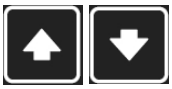




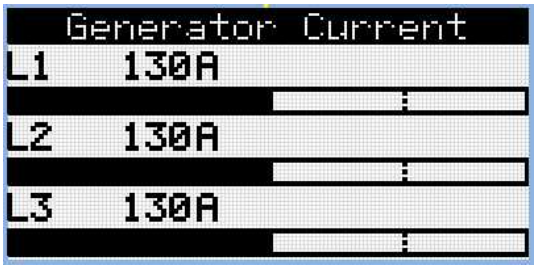
Note: *Use Up and Down button to move between measurement pages.*

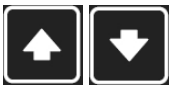
Note: *Only for SPtM application*



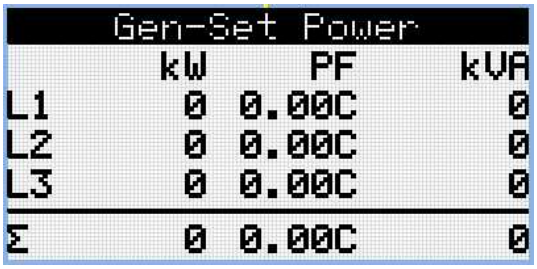


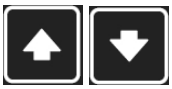
Note: *Use Up and Down button to move between measurement pages.*



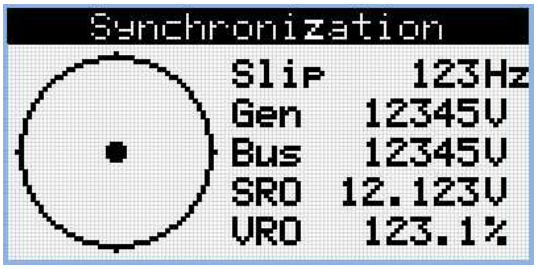


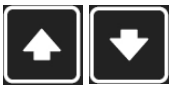
Note: *Use Up and Down button to move between measurement pages.*



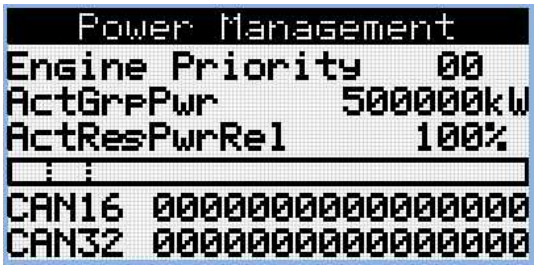


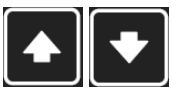
Note: *Use Up and Down button to move between measurement pages.*





Note: *Use Up and Down button to move between measurement pages.*

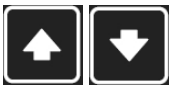




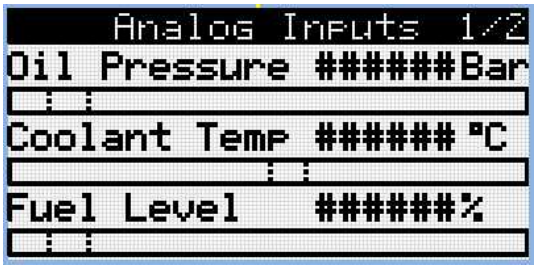
Note: *Use Up and Down button to move between measurement pages.*

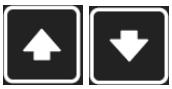
Note: *Only for MINT application*



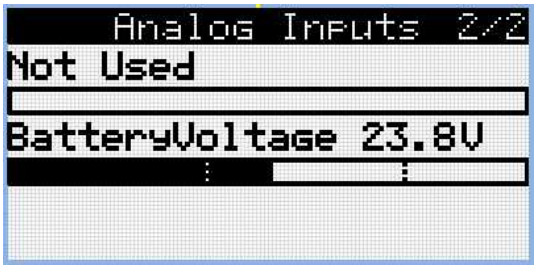


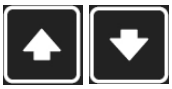
Note: *Use Up and Down button to move between measurement pages.*





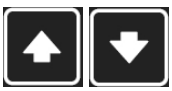
Note: *Use Up and Down button to move between measurement pages.*



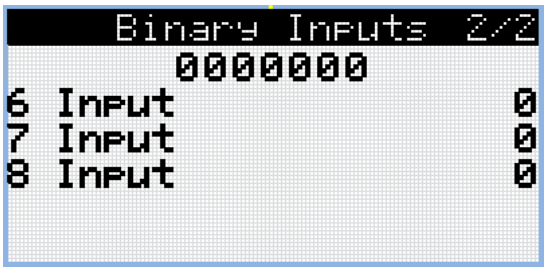


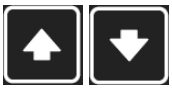
Note: *Use Up and Down button to move between measurement pages.*





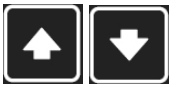
Note: *Use Up and Down button to move between measurement pages.*



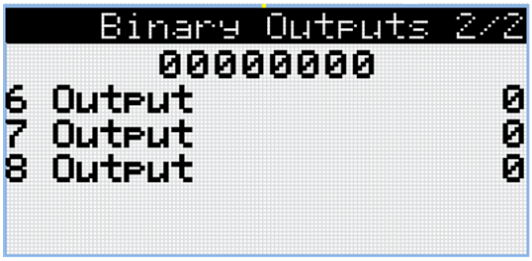


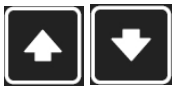
Note: *Use Up and Down button to move between measurement pages.*



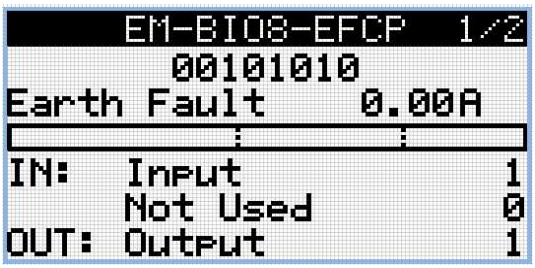


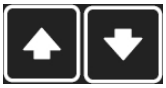
Note: *Use Up and Down button to move between measurement pages.*





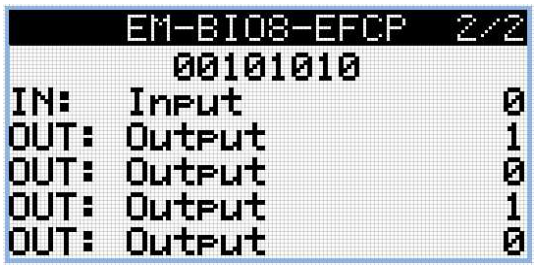
Note: *Use Up and Down button to move between measurement pages.*





Note: *Use Up and Down button to move between measurement pages.*

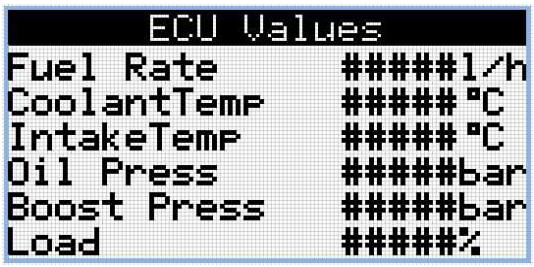
Note: *Available only with plug-in module*

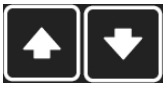




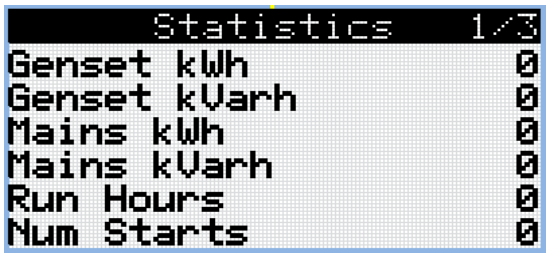
Note: *Use Up and Down button to move between measurement pages.*

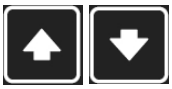
Note: *Available only with plug-in module*



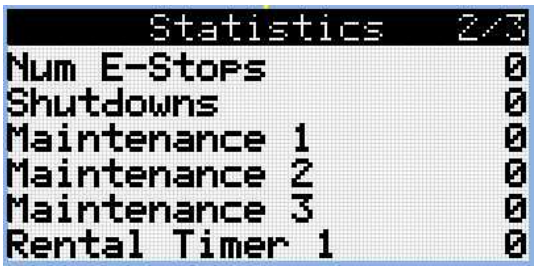


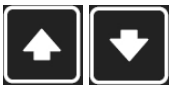
Note: *Use Up and Down button to move between measurement pages.*



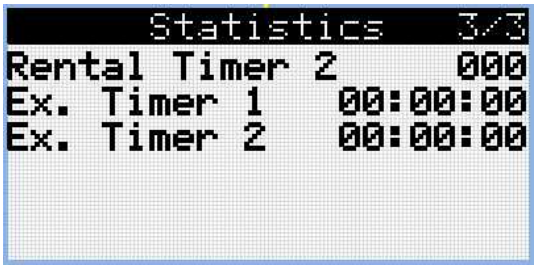


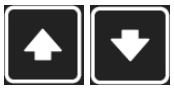
Note: *Use Up and Down button to move between measurement pages.*



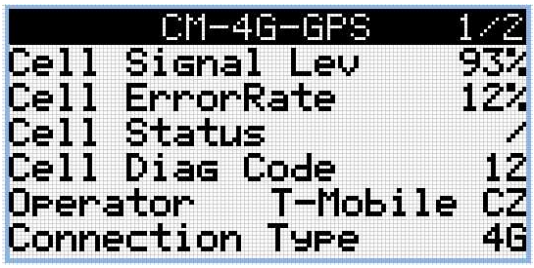


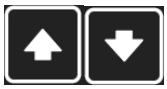
Note: *Use Up and Down button to move between measurement pages.*





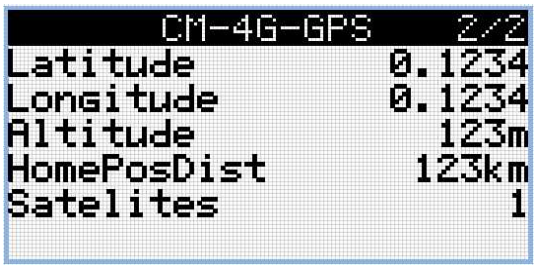
Note: *Use Up and Down button to move between measurement pages.*

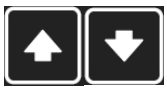




Note: *Use Up and Down button to move between measurement pages.*

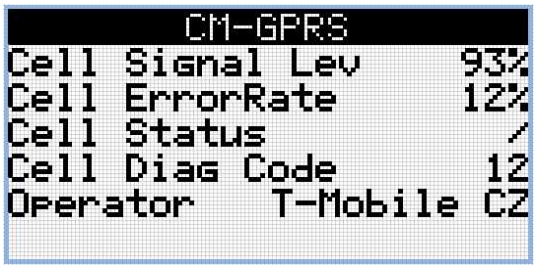
Note: *Available only with plug-in module*





Note: *Use Up and Down button to move between measurement pages.*

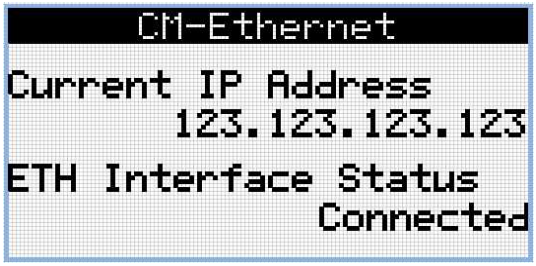
Note: *Available only with plug-in module*

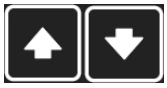




Note: *Use Up and Down button to move between measurement pages.*

Note: *Available only with plug-in module*

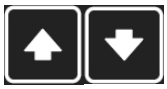




Note: *Use Up and Down button to move between measurement pages.*

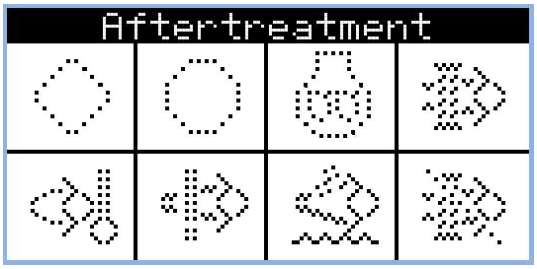
Note: *Available only with plug-in module*





Note: *Use Up and Down button to move between measurement pages.*

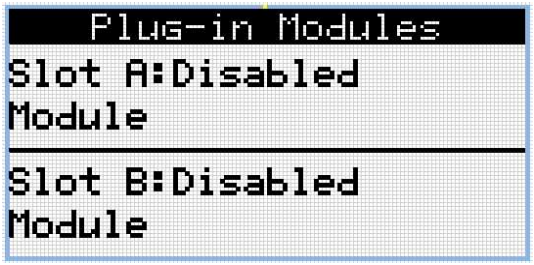
Note: *Available only with plug-in module*

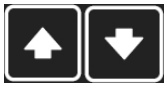




Note: *Use Up and Down button to move between measurement pages.*

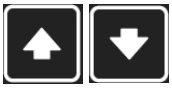
Note: *Available only with ECU supported by TIER4F*





Note: *Use Up and Down button to move between measurement pages.*



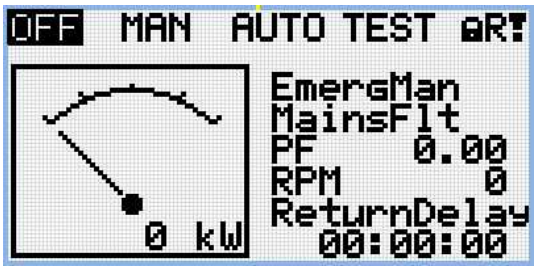


Note: *Use Up and Down button to move between measurement pages.*

Note: *From all of these pages it is possible to switch seamlessly to the setpoint group page by pressing Page button.*

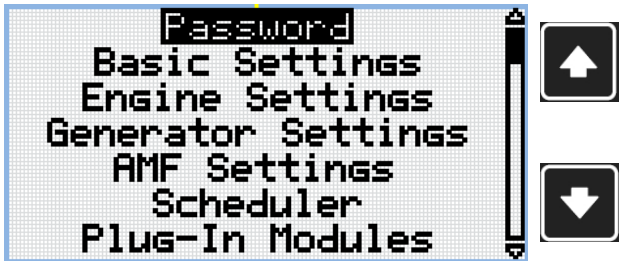
Note: *There can be some additional screens and also some screens can be hidden. Screen's visibility depends on actual configuration (usage of extension or communication modules, ECU, etc.).*

Setpoint Screens





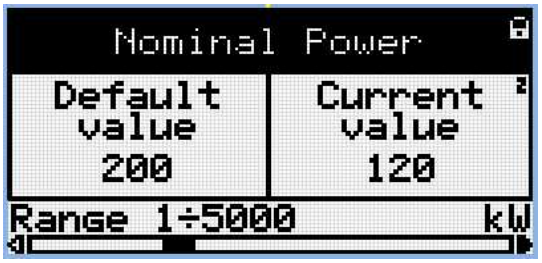
Note: *From all measurement pages we can fluently go to the setpoint group page by pressing Page button.*

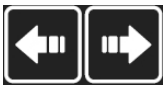


Note: *Use Up and Down button to select required setpoint group.*



Note: *Use Enter button to enter selected setpoint group.*

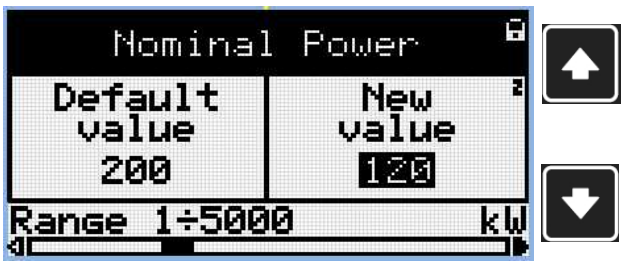




Note: *Use Left and Right button to select required setpoint.*



Note: *Use Enter button to enter selected setpoint.*



Note: *Use Up and Down button to set required value of selected setpoint.*



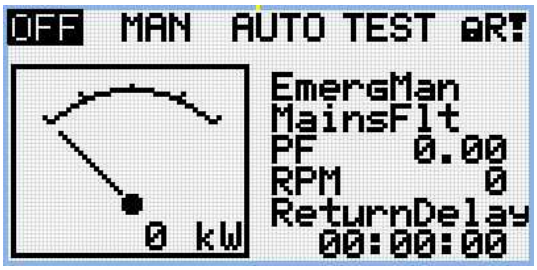
Note: *Use Enter button to confirm adjusted value of setpoint.*



Note: *Use Page button to discard changes, to set setpoint to previous value and to return to the list of setpoints of selected group.*

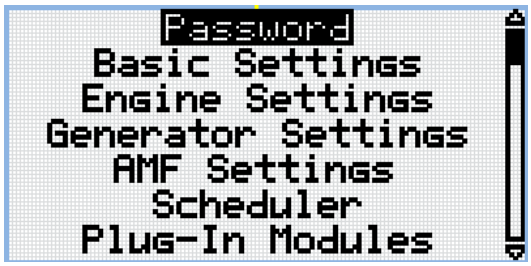
IMPORTANT: Cannot change setpoint? Setpoints marked with an padlock are password protected. Enter password as described in the chapter **Password (page 86)****.**

History Log





Note: *From all measurement pages we can fluently go to the setpoint group page by pressing Page button.*



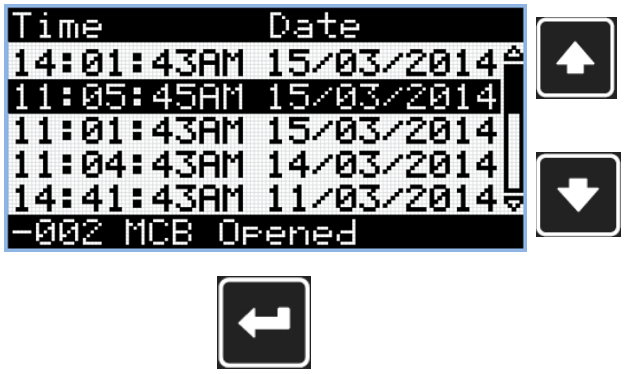


Note: *From setpoint group page we can fluently go to the history log pages by pressing Page button.*



Note: *Use Up and Down button to select required alarm reason.*

Note: *Use Enter button to move to the next page of history log.*



Note: *Use Up and Down button to select required alarm reason.*

Note: *Use Enter button to move to the next page of history log.*



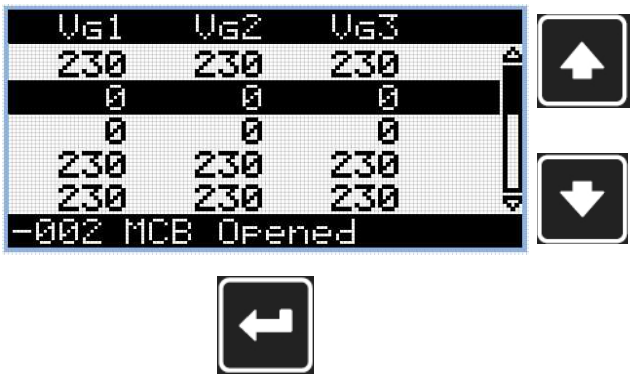
Note: *Use Up and Down button to select required alarm reason.*

Note: *Use Enter button to move to the next page of history log.*



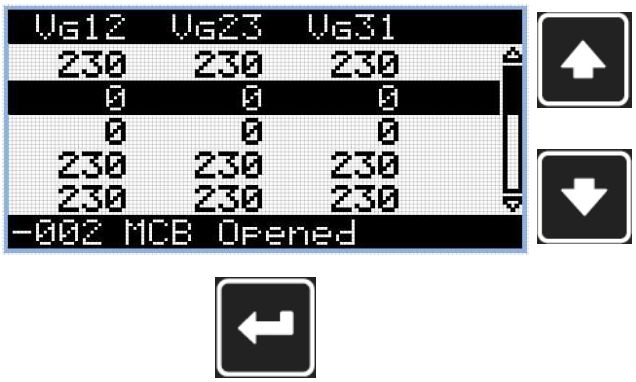
Note: *Use Up and Down button to select required alarm reason.*

Note: *Use Enter button to move to the next page of history log.*



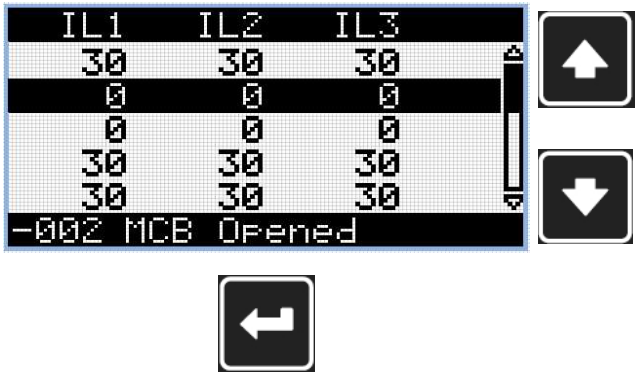
Note: *Use Up and Down button to select required alarm reason.*

Note: *Use Enter button to move to the next page of history log.*



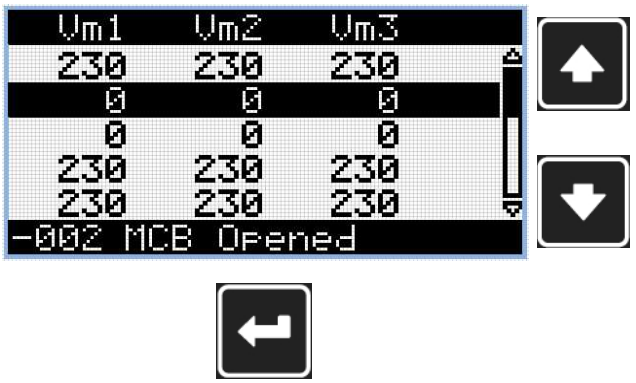
Note: *Use Up and Down button to select required alarm reason.*

Note: *Use Enter button to move to the next page of history log.*



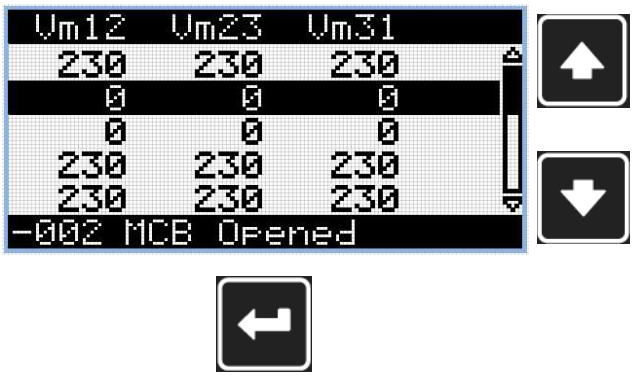
Note: *Use Up and Down button to select required alarm reason.*

Note: *Use Enter button to move to the next page of history log.*



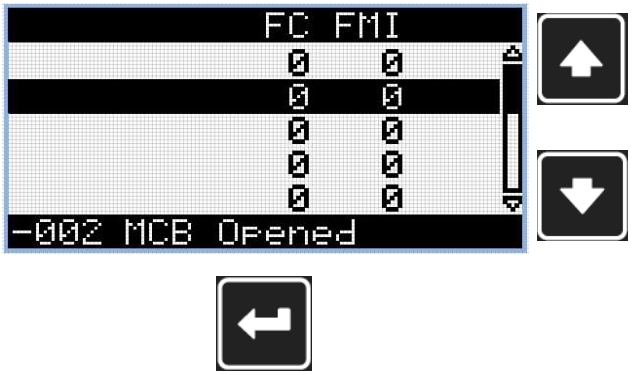
Note: *Use Up and Down button to select required alarm reason.*

Note: *Use Enter button to move to the next page of history log.*



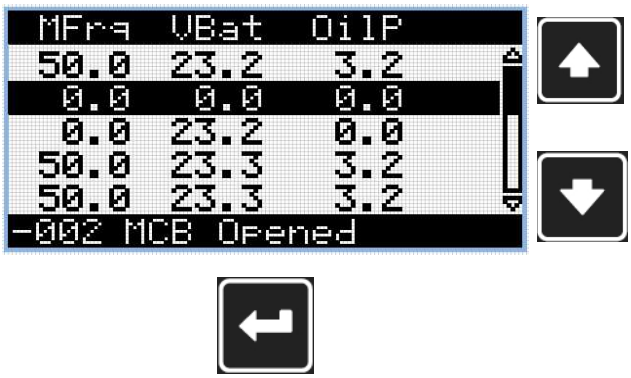
Note: *Use Up and Down button to select required alarm reason.*

Note: *Use Enter button to move to the next page of history log.*



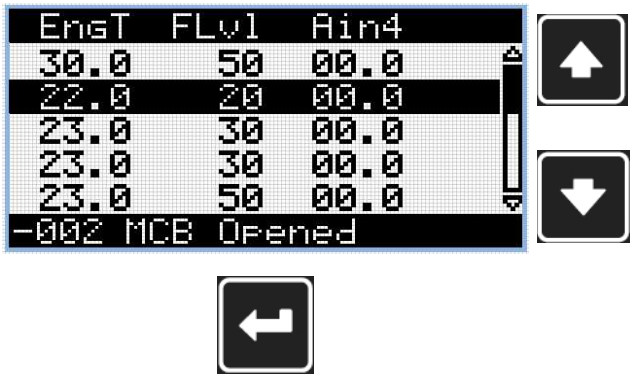
Note: *Use Up and Down button to select required alarm reason.*

Note: *Use Enter button to move to the next page of history log.*



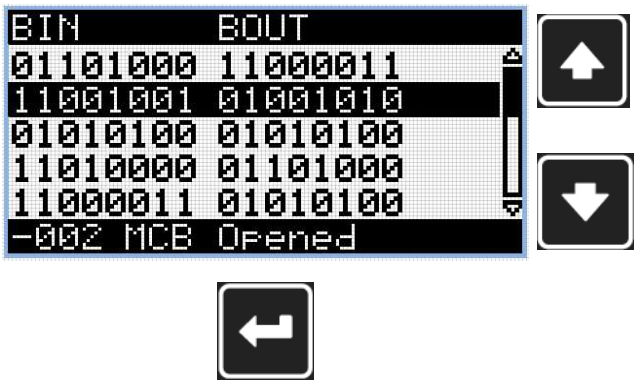
Note: *Use Up and Down button to select required alarm reason.*

Note: *Use Enter button to move to the next page of history log.*



Note: *Use Up and Down button to select required alarm reason.*

Note: *Use Enter button to move to the next page of history log.*



Note: *Use Up and Down button to select required alarm reason.*

Note: *Use Enter button to move to the next page of history log.*



Note: *Use Up and Down button to select required alarm reason.*

Note: *Use Enter button to move to the first page of history log.*

IMPORTANT: The records are numbered in reverse order, i.e. the latest (newest) record is "0" and older records have "-1", "-2" etc.

Note: *This is only basic history record. There can be some additional screens in case that in controller is extension module or ECU is configured. Also it depends on connection type.*

5.3.3 Browsing alarms



Note: *Use Up button to move to alarmlist from main measurement screen.*

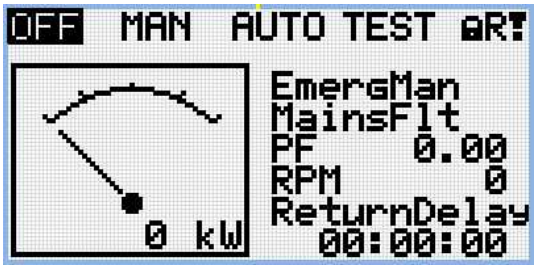


- Active alarms are displayed as white text on black background. It means the alarm is still active, i.e. the appropriate alarm conditions are still present.
- Inactive alarms are displayed as black text on white background. It means the alarm is no more active, i.e. the appropriate alarm conditions are gone.
- Not confirmed alarms are displayed with an asterisk. It means the alarm is still not acknowledged (confirmed).
- ECU alarms: SPN/FMI/OC/SC
  - SPN - Suspect parameter number
  - FMI - type of protection
  - OC - number of errors
  - SC - source of error



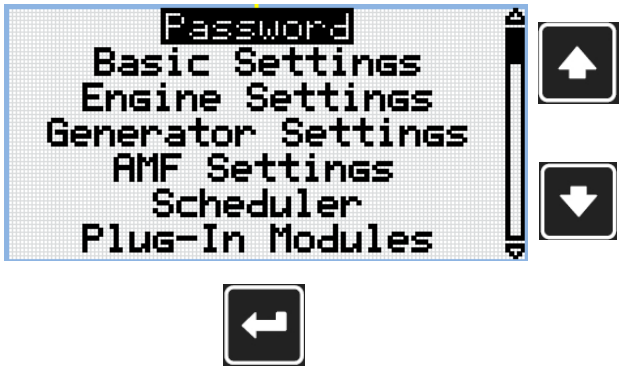
5.3.4 Password

Enter password





Note: *From all measurement pages we can fluently go to the setpoint group page by pressing Page button.*



Note: *Use Up and Down button to select setpoint group Password.*

Note: *Use Enter button to enter setpoint group Password.*



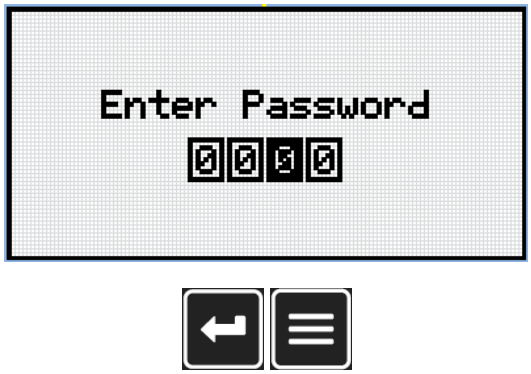
Note: *Use Up and Down button to select Enter Password.*

Note: *Use Enter button to enter selected setpoint.*



Note: *Use Up and Down button to set required value of selected setpoint.*

Note: *Use Left and Right button to move between digits.*



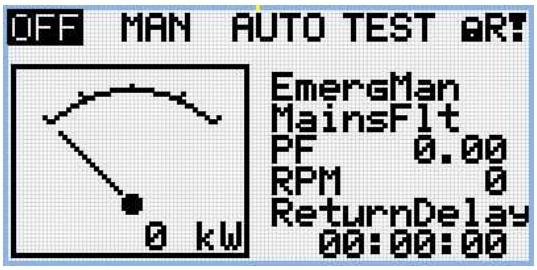
Note: *Use Enter button to confirm the password or Page button to cancel entering the password.*





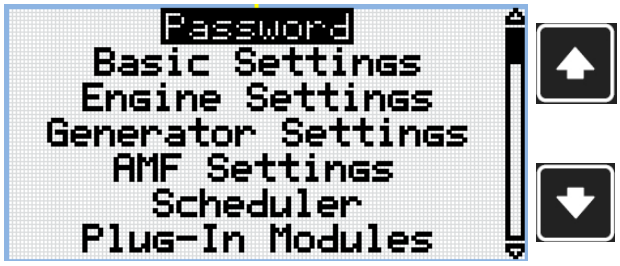
Note: *In case that invalid password is entered, the controller shows Invalid password screen. Use Page button to go back to menu.*

Change password





Note: *From all measurement pages we can fluently go to the setpoint group page by pressing Page button.*



Note: *Use Up and Down button to select setpoint group Password.*



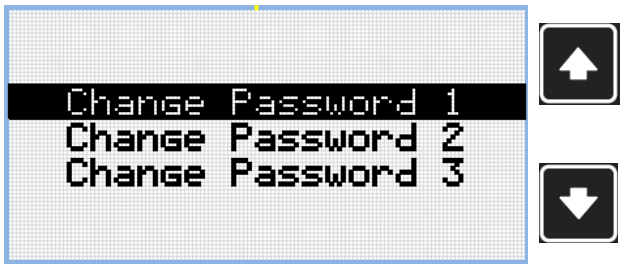
Note: *Use Enter button to enter setpoint group Password.*



Note: *Use Up and Down button to select Change Password.*



Note: *Use Enter button to enter selected setpoint.*



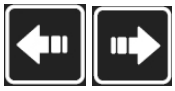
Note: *Use Up and Down button to select required level of password.*



Note: *Use Enter button to enter selected setpoint.*



Note: *Use Up and Down button to set required value of password.*



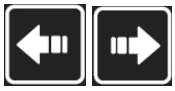
Note: *Use Left and Right button to move between digits.*



Note: *After setting new password use Enter button to confirm adjusted password.*



Note: *Use Up and Down button to set required value of password again.*



Note: *Use Left and Right button to move between digits.*

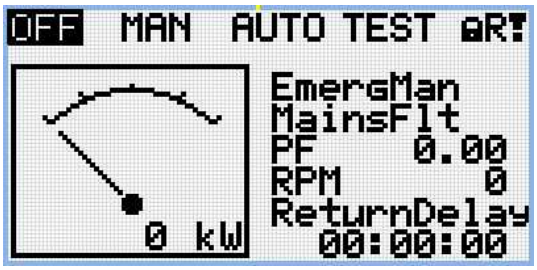


Note: *After setting new password again use Enter button to confirm adjusted password or Page button to discard changes and to cancel changing password.*



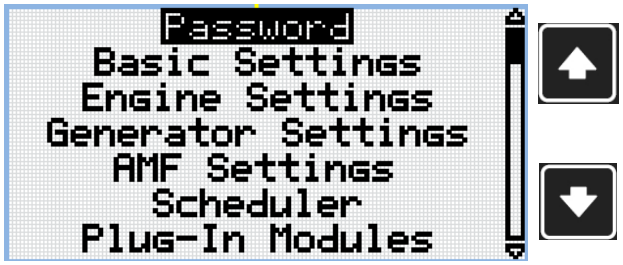
Note: *Before changing the password controller has to be unlocked. In case that controller is locked, the controller shows Password required screen. In that case the password has to be entered before changing the password.*

Log out from controller





Note: *From all measurement pages we can fluently go to the setpoint group page by pressing Page button.*



Note: *Use Up and Down button to select setpoint group Password.*



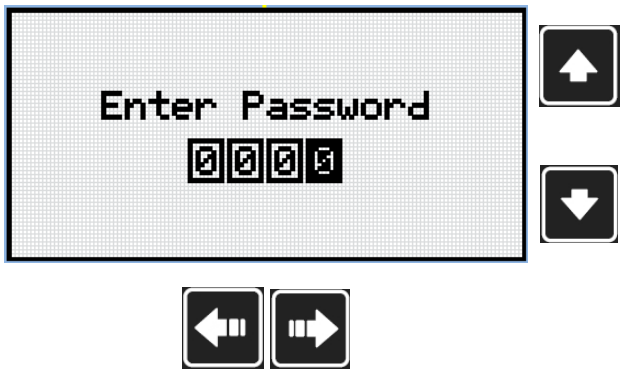
Note: *Use Enter button to enter setpoint group Password.*



Note: *Up and Down button to select Enter Password.*



Note: *Use Enter button to enter selected setpoint.*



Note: *Use Up and Down button to set required value of selected setpoint.*

Note: *Use Left and Right button to move between digits.*

Note: *Enter invalid password to log out from controller.*



Note: *In case that invalid password is entered, the controller shows Invalid password screen. Use Page button to go back to menu.*

Lost Password

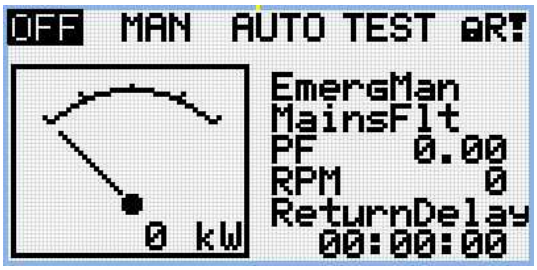
> **IMPORTANT: Display the information screen containing the serial number and password decode number as described in the chapter Information screen (page 92) and send them to your local distributor.**

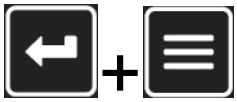
Password break protection

The controller password is protected against breaking by brute force. The protection works at every controller interface separately.

1. When an invalid password is entered 5 times after each other, independently on the time period elapsed between the attempts, the controller will be blocked after the 5th unsuccessful attempt for 1 minute at the particular interface.
2. While the controller is blocked it refuses any further attempts to enter password.
3. When unblocked again the controller accepts one attempt to enter password. If the password is incorrect again the controller will be blocked for 2 minutes.
4. Each further attempt to enter invalid password will double the blocking time, but maximum blocking time is 20 minutes.
5. When incorrect password is entered 100-times after each other the controller is blocked forever and the password reset procedure is required to unblock it.

5.3.5 Information screen





Note: *On Main measurement screen press Enter and Page button together. Enter button has to be pressed first.*



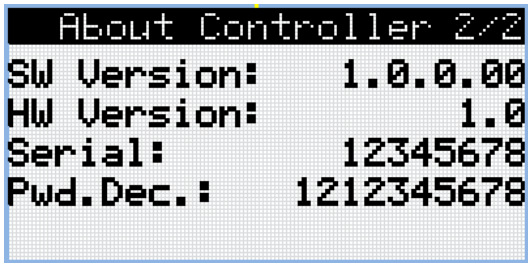


Note: *Use Page button to move to the next page.*





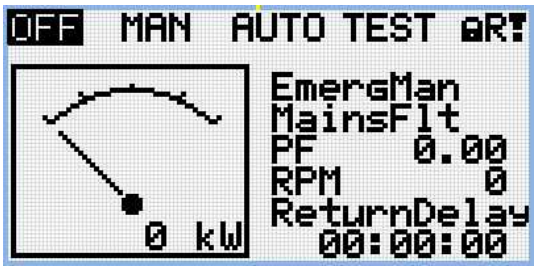
Note: *Use Page button to move to the next page.*





Note: *Use Up button to move back to main measurement screen.*

5.3.6 Language selection





Note: *On Main measurement screen press Enter and Page button together. Enter button has to be pressed first.*



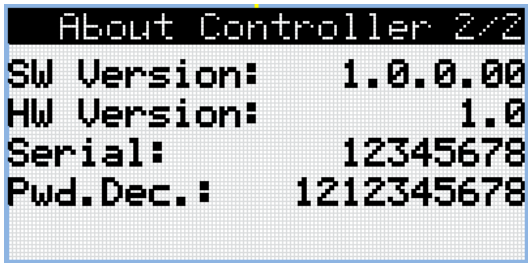


Note: *Use Page button to move to the next page.*





Note: *Use Page button to move to the next page.*





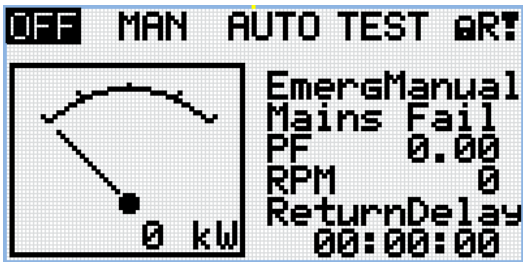
Note: *Use Page button to move to the next page.*



Note: *Use Up and down button to select required language.*

Note: *Use Enter button to confirm selected language.*

5.3.7 Display contrast adjustment

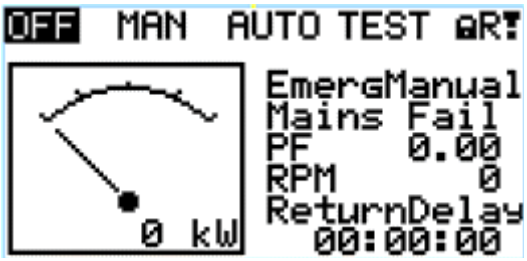


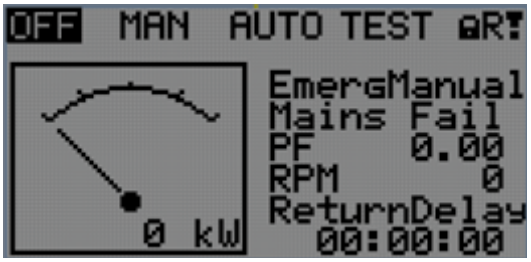


Note: *On any measurement screen press Enter and Down button together for lower contrast.*



Note: *On any measurement screen press Enter and Up button together for higher contrast.*





Note: *After setting a contrast, no another action is needed.*

back to Controller setup

5.4 Functions

5.4.1 Operating Modes 95
5.4.2 Engine start 97
5.4.3 Stabilization 101
5.4.4 Connecting to load 101
5.4.5 Multiple island operation 106

5.4.6 Parallel to mains operation - SPtM application 107
5.4.7 Parallel to mains operation - MINT application 110
5.4.8 AMF operation 110
5.4.9 Engine cool down and stop 112
5.4.10 Power management 112
5.4.11 Control groups 131
5.4.12 Distributed power management signals 132
5.4.13 Regulation loops 135
5.4.14 Speed/Load control 137
5.4.15 Voltage/PF control 140
5.4.16 Gen-set operation states 142
5.4.17 Alarm management 144
5.4.18 History log 151
5.4.19 Breaker control 152
5.4.20 Exercise timers 155
5.4.21 Rental Timers 162
5.4.22 Service timers 163
5.4.23 Analog switches 163
5.4.24 Additional running engine indications 165
5.4.25 Voltage phase sequence detection 165
5.4.26 Sensor curves 166
5.4.27 PLC 167
5.4.28 Tier 4 Final 174
5.4.29 Geo-fencing 177
5.4.30 Mains decoupling protections 177
5.4.31 Droop 178
5.4.32 Alternate configuration 181
5.4.33 USB host 182
5.4.34 E-Stop 185
5.4.35 ECU Frequency selection 186
5.4.36 Mains import measurement 186
5.4.37 Load shedding 186
5.4.38 Peak shaving 188
5.4.39 Cybernetic security 188

back to Controller setup

5.4.1 Operating Modes

Selecting the operating mode is done through Left and Right buttons on the front panel or by changing the **Controller mode (page 259)** setpoint (from the front panel or remotely).

Note: *If this setpoint is configured as password-protected, the correct password must be entered prior to attempting to change the mode.*

Note: *The mode cannot be changed if Access Lock input is active.*

The following binary inputs can be used to force one respective operating mode independent of the mode setpoint selection:

- **Remote OFF (page 660)**
- **Remote TEST (page 662)**
- **Remote MAN (page 659)**
- **Remote AUTO (page 659)**

If the respective input is active the controller will change the mode to the respective position according to the active input. If multiple inputs are active, the mode will be changed according to priorities of the inputs. The priorities match the order in the list above. If all inputs are deactivated, the mode will return to the original position given by the setpoint.

OFF

No start of the gen-set is possible. If the gen-set is running, it is not possible to switch directly to OFF mode. First you have to stop the engine. After that the controller will stay in Not ready status and cannot be started any way. The MCB is closed permanently (**MCB Opens On (page 320)** = GenRun) or is open or closed according to whether the mains is present or not (**MCB Opens On (page 320)** = MainsFail). No AMF or Power management function will be performed. The buttons MCB I/O, GCB I/O, Start I and Stop O including the appropriate binary inputs for external buttons are not active.

Note: *When engine is running, it is not possible to switch gen-set to OFF mode*

MAN

The engine can be started and stopped manually using the START and STOP buttons (or external buttons wired to the appropriate binary inputs) in MAN mode.

When the engine is running and generator parameters are in the limits, GCB can be closed to a dead bus or synchronization can be started by the GCB button.

Also MCB can be closed and opened manually using the MCB button, regardless of whether the mains are present or not.

Controller does not respond to external signals and/or conditions. The gen-set is fully in manual control; there is no automatic way to stop it (except protections). The gen-set stays running until STOP button is pressed. Controller does not take place in **Power management (page 112)** in MINT application.

AUTO

Gen-set is controlled based on external signal (**REMOTE START/STOP (PAGE 661)**) or by conditions (AMF, Power management system, …).

When one condition deactivates the engine does not stop if another condition for automatic starts is active.

The controller does not respond to buttons Start I, Stop O, MCB ON/OFF I/O and GCB ON/OFF I/O.

> **IMPORTANT: If a red alarm is present and the gen-set is in AUT mode, it can start by itself after all red alarms become inactive and are acknowledged!!! To avoid this situation, adjust the setpoint Reset To Manual (page 260) to the Enabled position.**

TEST

The behavior of the controller in TEST mode depends mainly on the setting of the setpoints and binary inputs. TEST mode can be activated via front panel of controller or via binary input **REMOTE TEST (PAGE 662)**.

The gen-set will be started when the controller is put to TEST mode and will remain running unloaded. If a mains failure occurs, the MCB will be opened and after **Open Transfer Min Break (page 345)** the GCB will be closed and the gen-set will supply the load. After the mains have recovered, the delay **Mains Return Delay (page 314)** l will count down and if it elapses and the mains is still ok, the controller will transfer the load back to the mains after **Open Transfer Min Break (page 345)** and the gen-set will remain running unloaded again until the mode is changed.

The controller does not respond to buttons Start  , Stop  , MCB ON/OFF  and GCB ON/OFF  .

Behavior of TEST mode also depends on setpoints **Transfer Gen To Mains (page 347)** and **Transfer Mains To Gen (page 346)** and on binary inputs **FORCE ISLAND (PAGE 650)** and **FORCE PARALLEL (PAGE 650)**.

5.4.2 Engine start

Diesel engine

The setpoint **Fuel Solenoid (page 264)** has to be switched to the Diesel position.

- After the command for start is issued (pressing Start button in MAN mode, auto start condition is fulfilled in AUTO mode or controller is switched to TEST mode), outputs **PRESTART (PAGE 718)** and **GLOW PLUGS (PAGE 705)** are energized for time period given by the setpoints **Prestart Time (page 266)** and **Glow Plugs Time (page 268)**.
- After **Prestart Time (page 266)** and **Glow Plugs Time (page 268)**, the output **FUEL SOLENOID (PAGE 699)** is energized and after **Fuel Solenoid Lead (page 269)** the starter of motor is activated by energizing the output **STARTER (PAGE 723)**.
- When one or more of following conditions are met, the starter output is de-energized:
  - The engine speed exceeds the value of **Starting RPM (page 266)**, or
  - One of **Additional running engine indications (page 165)** signals becomes active.
- The controller remains in the Starting phase until the engine speed exceeds the value of **Starting RPM (page 266)**, after that it is considered as started and the Idle period will follow.
- The maximum duration that the output **STARTER (PAGE 723)** is energized is determined by the setpoint **Maximum Cranking Time (page 265)**. If the engine does not start within this period, the output **STARTER (PAGE 723)** is de-energized and a pause with length determined by **Cranking Fail Pause (page 265)** will follow. **PRESTART (PAGE 718)** and **GLOW PLUGS (PAGE 705)** outputs are active during the pause. After the pause has elapsed, the next start attempt is executed. The number of start attempts is given by the setpoint **Cranking Attempts (page 265)**.
- Once the engine is started, the Idle period follows. The binary output **IDLE/NOMINAL (PAGE 708)** remains inactive (as it was during the start). The idle period duration is adjusted by the setpoint **Idle Time (page 269)**.
- After the idle period has finished, the output **IDLE/NOMINAL (PAGE 708)** is activated and the start-up sequence is finished. The **Stabilization (page 101)** phase follows.

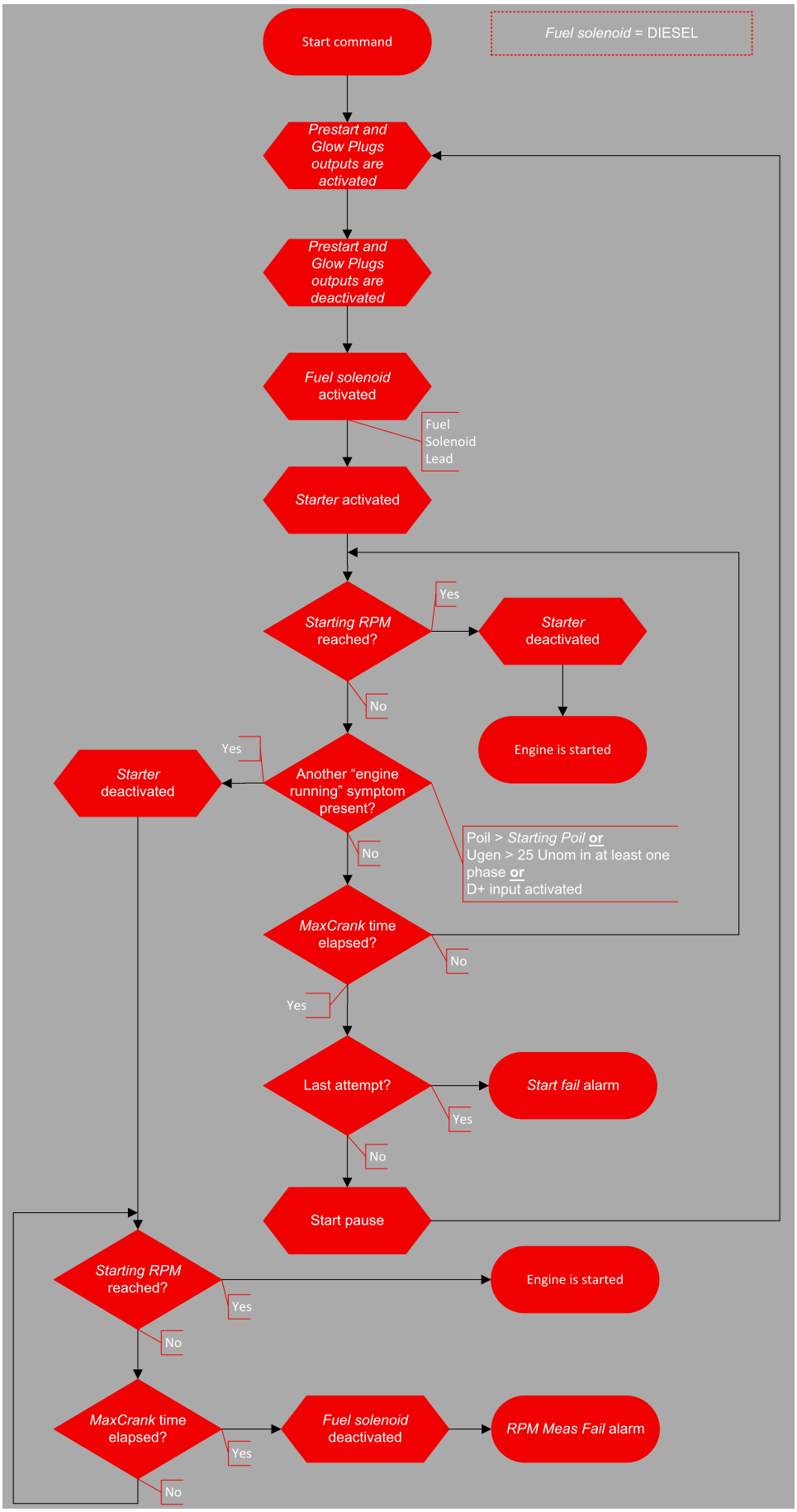


Image 5.13 Flowchart of start of diesel engine

GAS engine

The setpoint **Fuel Solenoid (page 264)** has to be switched to the Gas position.

- After the command for start is issued (pressing Start button in MAN mode, auto start condition is fulfilled in AUTO mode or controller is switched to TEST mode), outputs **PRESTART (PAGE 718)** and **GLOW PLUGS (PAGE 705)** are energized for time period given by the setpoints **Prestart Time (page 266)** and **Glow Plugs Time (page 268)**.
- After **Prestart Time (page 266)** and **Glow Plugs Time (page 268)**, starts countdown of **Sd Ventilation Time (page 273)**
- After **Sd Ventilation Time (page 273)**, the starter of engine is activated by energizing the output **STARTER (PAGE 723)**.
- When the engine speed exceeds 30RPM, the outputs **FUEL SOLENOID (PAGE 699)** and **IGNITION (PAGE 708)** are energized.
- When the engine speed exceeds value of **Starting RPM (page 266)**, the starter of engine is de-energized, the engine is considered as started and the Idle period will follow.

IMPORTANT: Additional running engine indications (page 165) signals are not evaluated during the start of a gas engine. The Pickup must be used in any case!

- The maximum duration that the output **STARTER (PAGE 723)** is energized is determined by the setpoint **Maximum Cranking Time (page 265)**. If the engine does not start within this period, outputs **STARTER (PAGE 723)** and **FUEL SOLENOID (PAGE 699)** are de-energized and a pause with length determined by **Cranking Fail Pause (page 265)** will follow. **PRESTART (PAGE 718)**, **GLOW PLUGS (PAGE 705)** and **IGNITION (PAGE 708)** outputs are active during the pause. After the pause has elapsed, the next start attempt is executed. The number of start attempts is given by the setpoint **Cranking Attempts (page 265)**.
- Once the engine is started, the Idle period follows. The binary output **IDLE/NOMINAL (PAGE 708)** remains inactive (as it was during the start). The idle period duration is adjusted by the setpoint **Idle Time (page 269)**.
- After the idle period has finished, the output **IDLE/NOMINAL (PAGE 708)** is activated and the start-up sequence is finished. The **Stabilization (page 101)** phase follows.

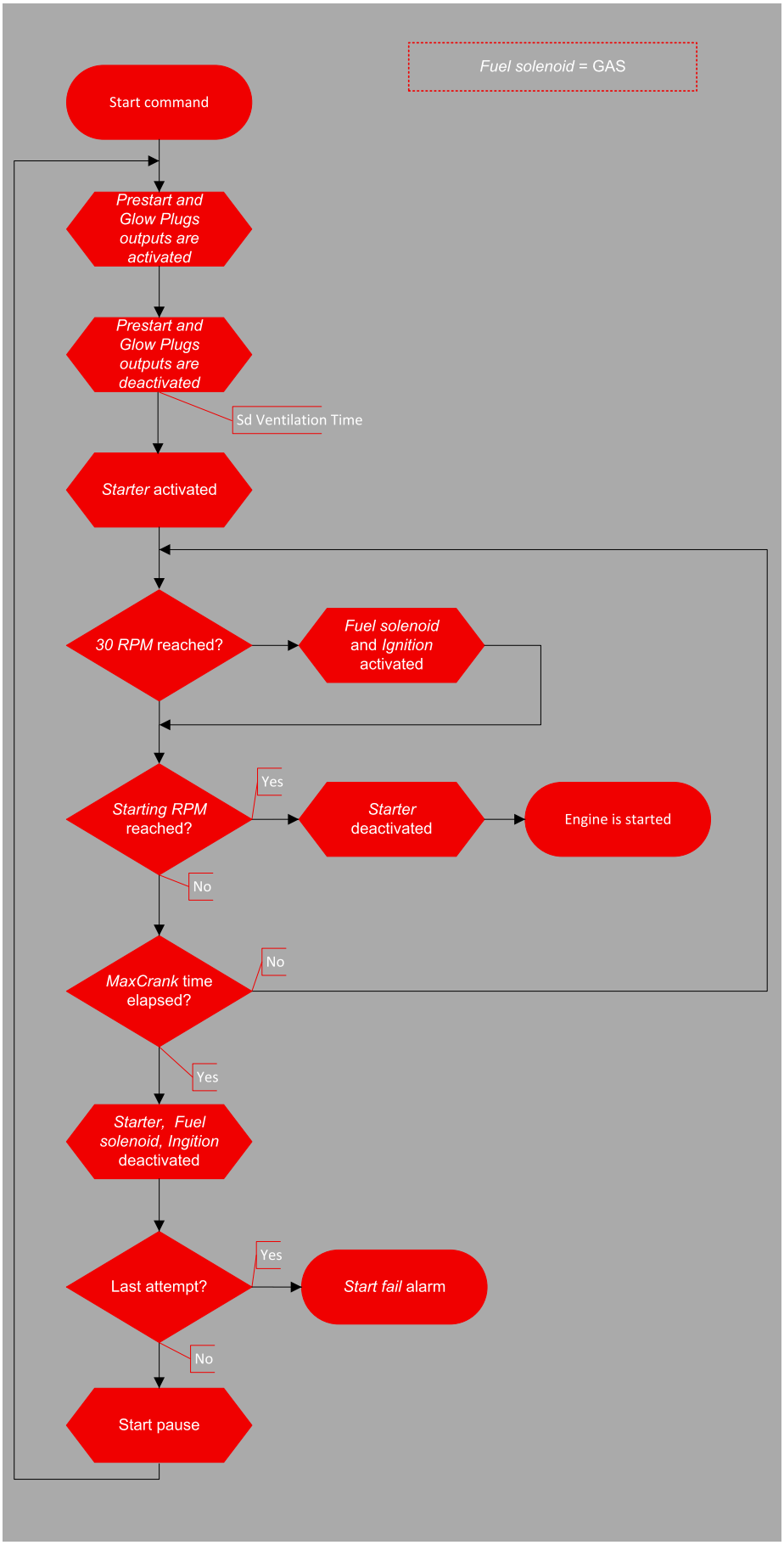


Image 5.14 Flowchart of start of gas engine

5.4.3 Stabilization

When the **Engine start (page 97)** sequence is finished, the gen-set goes into the stabilization phase. There are two timers (setpoints) in this phase:

- **Minimal Stabilization Time (page 271)** starts to count down just after the idle period has finished. Generator voltage and frequency are not checked (respective protections are not evaluated) and the GCB cannot be closed even if the generator voltage and frequency are within limits.
- **Maximal Stabilization Time (page 272)** starts to count down just after the idle period has finished. Generator voltage and frequency are not checked (respective protections are not evaluated) but, opposite to the previous timer, the GCB can be closed if generator voltage and frequency are within limits.

In situations where the GCB is closed automatically (AUTO, TEST modes), the closing of GCB or starting of synchronization will occur in the first moment when the generator voltage and frequency will get into limits and the **Minimal Stabilization Time (page 271)** has already elapsed.

In the event that the generator voltage or frequency are not within limits within the **Maximal Stabilization Time (page 272)** period, the appropriate protection(s) will be activated and the gen-set will be cooled down and stopped.

Note: *The limits for the generator voltage and frequency are given by setpoints in the **Group: Generator settings (page 298)**.*

Note: *The value of the **Minimal Stabilization Time (page 271)** setpoint has to be lower than the value of **Maximal Stabilization Time (page 272)** setpoint.*

5.4.4 Connecting to load

When the **Stabilization (page 101)** phase is finished, the gen-set can be connected to the load.

The command for connecting the gen-set to the load is issued either automatically (AUTO, TEST modes) or manually by pressing the GCB button. The following conditions must be valid:

- The gen-set is running and the **Minimal Stabilization Time (page 271)** timer has elapsed.
- The gen-set voltage and frequency are within limits.

Note: *The speed governor and AVR must be adjusted properly to achieve these limits as the controller does not perform any regulation and the regulation outputs have constant values given by the **Voltage Regulator Bias (page 349)** and **Speed Governor Bias (page 341)** setpoints.*

There are two ways to connect the gen-set to the load (bus bar). This depends on the state of **MCB FEEDBACK (PAGE 656)** and on the measured mains/bus voltage.

Connecting to dead bus

SPtM

If the MCB is open, the bus bar is considered as voltage-free and the GCB is closed without synchronization.

MINT

The measured bus voltage is also taken in account and it must be below 2% of the nominal bus voltage together with the open MCB (evaluated by **MCB Feedback (page 656)**) and also others GCB have to be open to close the GCB without synchronization.

Note: *If the group of gen-sets is activated and multiple gen-sets have to start simultaneously and connect to the empty bus bar, there is an internal logic to prevent closing of more GCBs to the bus bar at the same moment without synchronization. One of the gen-sets will close the GCB, the others will wait and then they will synchronize to the first one.*

Note: *There also is a protection of "Bus power loss sensing". The "Bus Measure Error" is detected in MINT application when the voltage on the controller's bus terminals is out of limits 20 seconds after:*

- *GCB (own) was closed in MAN or AUT mode*
- *MCB (feedback) was closed in AUT mode*
- *Any other GCB in power management group (on CAN bus) was closed.*

The alarm is activated after 20s. However, the GCB (own) closing is blocked immediately for safety reasons. This protection can avoid e.g. potential direct closing of GCB while the controller's bus conductors are unintentionally unplugged from the terminals.

Synchronization

Synchronization process

Behavior of synchronization process depends on, which breaker is used for synchronization and in which **Controller mode (page 259)** is controller switched.

Note: *When the controller starts to synchronize and the main measuring screen is displayed, it will be automatically change to the synchroscope screen for the entire duration of synchronization. After synchronization the synchroscope screen is automatically changed back to the main measuring screen. It is also possible to change screens manually (arrows up and down) after displaying the synchroscope screen. In this case there is no automatic return to the main measuring screen after synchronization is finished.*

Synchronization via GCB in AUTO mode

Gen-set synchronization to the mains (common bus bar) via GCB (available for SPtM and MINT):

- if the mains (bus) voltage or the mains (bus) frequency gets out of the limits then the synchronization continues until the mains fail is confirmed. Then:
  - In SPtM - MCB is opened and GCB is closed.
  - In MINT - Bus measurement error alarm is issued and controller goes to slow stop.
- if the gen-set voltage or frequency gets out of the limits during the synchronization the synchronization process is interrupted. The synchronization starts again when gen-set parameters gets restored. the synchronization timeout starts count down again.
- If the synchronization timeout gets elapsed the slow stop protection gets active.

Synchronization via GCB in MAN mode

Gen-set synchronization to the mains (common bus bar) via GCB (available for SPtM and MINT):

- Behavior is exactly the same as in AUTO mode - but the synchronization does not start again automatically when parameters of the gen-set gets out of limits and back. The breaker control button must be pressed again.
- When the GCB button is pressed during the synchronization, then the synchronization process is interrupted.

Synchronization via MCB in AUTO mode

Gen-set synchronization to the mains (common bus bar) via MCB (available only for SPtM):

- if the mains (bus) voltage or the Mains frequency gets out of the limits during synchronization, then the synchronization process is interrupted and can continue again when mains parameters gets restored after **Mains Return Delay (page 314)**.
- if the gen-set voltage or frequency gets out of the limits during the synchronization, the synchronization process continues until the generator parameters fail is confirmed.
- If the synchronization timeout gets elapsed the **Wrn Reverse Synchro Fail (page 795)** protection gets active and GCB stays closed. Synchronization is stopped.

Synchronization via MCB in MAN mode

Gen-set synchronization to the mains (common bus bar) via MCB (available only for SPtM):

- Behavior is exactly the same as in AUTO mode - but the synchronization does not start again automatically when parameters of the mains gets out of limits and back. The breaker control button must be pressed again.
- When the MCB button is pressed during the synchronization, then the synchronization process is interrupted.

Synchronization types

There are two types of synchronization. Type of synchronization is adjusted via setpoint **Synchronization Type (page 353)**.

Phase match

The phase match synchronization consists of voltage matching and frequency/angle matching. The maximum duration of synchronization is given by the setpoint **Synchronization Timeout (page 353)**. If the synchronization is not successful within this period of time, the **STP Synchronization Fail (page 822)** alarm will be issued.

Voltage matching

The gen-set voltage is regulated to match the mains/bus voltage with tolerance given by the setpoint **Voltage Window (page 354)**. The regulation is adjusted by the setpoints **Voltage Gain (page 351)** and **Voltage Int (page 351)**.

Frequency/angle matching

The gen-set frequency is regulated to match the mains/bus frequency first. The frequency regulation loop is active (setpoints **Frequency Gain (page 342)** and **Frequency Int (page 343)**). Once the frequency is matched, the regulation loop is switched to match the angle (setpoint **Angle Gain (page 343)**). When the angle is matched with tolerance +/- **Phase Window (page 354)** for a time given by the setpoint **Dwell Time (page 354)** and the voltage is matched too, then the GCB is closed.

Note: *The matching loops will continue to run even if the GCB close command has been already issued until the controller receives* ***GCB FEEDBACK (PAGE 652)*** *or a GCB fail alarm occurs. After the feedback has been received, the control loops are switched to load and power factor loops or load and power factor sharing respectively.*

Slip synchronization

The slip synchronizing is based on frequency/angle matching. The maximum duration of synchronizing is given by the setpoint **Synchronization Timeout (page 353)**. If the synchronizing is not successful within this period of time, the Sync Timeout alarm will be issued.

The Gen-set frequency is regulated to match the mains/bus frequency + **Slip Frequency (page 355)** value and the window is set by setpoint **Slip Frequency Window (page 355)**. When the generator frequency reaches

(Mains/Bus Frequency + Slip frequency) value regulation loop is stopped (output is frozen at the actual value). If the generator frequency remains inside the window for the time longer than setpoint **Dwell Time (page 354)** the controller will allow GCB closing. The controller calculates periodically so called preclosing angle (based on the actual value **Slip Frequency (page 582)** and CB closing delay given by the setpoint CB Latency). When the preclosing angle is reached the controller issues CB closing command. The breaker will close and CB feedback confirms that to the controller. When the breaker is closed the controller goes to parallel and activates regulation loops again (parallel to Mains regulation loop).

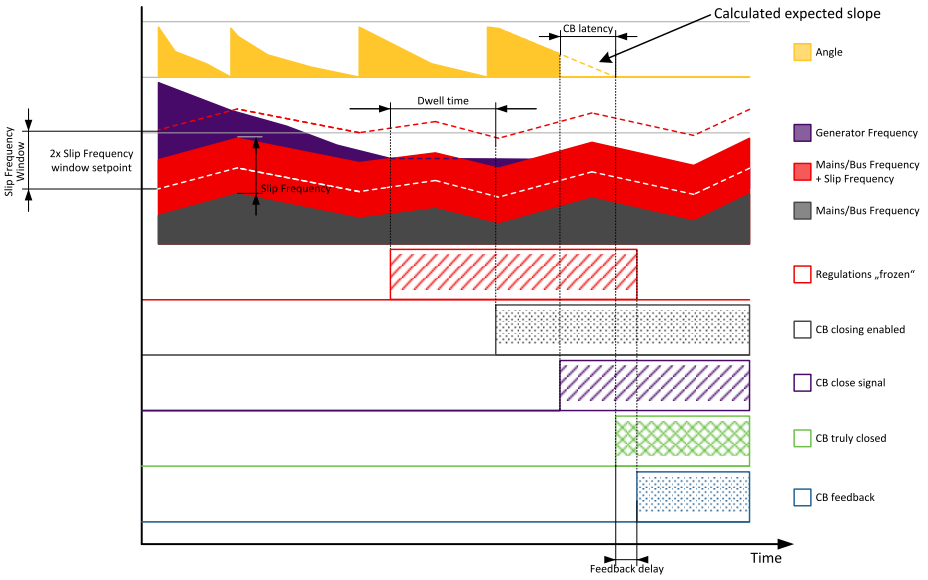


Image 5.15 Slip synchronization

If the generator frequency goes out of the window (either because generator frequency changes or Mains/Bus frequency changes or setpoint **Slip Frequency Window (page 355)** changes) the controller will reactivate regulation loop and try to reach the target value again. The sync timeout timer runs regardless of this. If the generator frequency reaches the target frequency again the regulations are frozen and if the generator frequency remains in the window for the time longer than setpoint **Dwell Time (page 354)** the controller will continue in the standard sequence as seen in the previous case. *If the sync timeout elapses the controller will immediately stop synchronization.

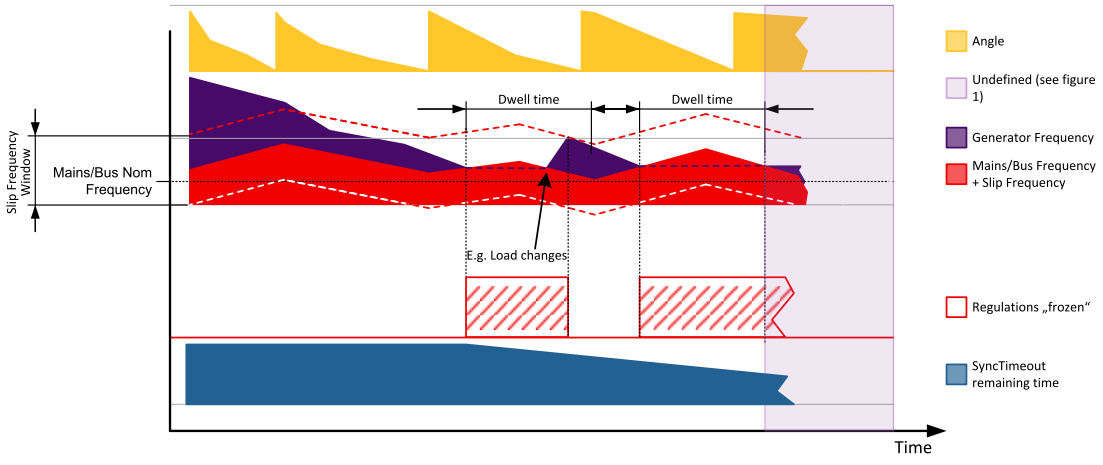


Image 5.16 Slip synchronization

The window is limited by the actual measured Mains/Bus frequency if one of the window limits is below this value (e.g. for setting where setpoint **Slip Frequency (page 582)** is set to 0.1Hz and setpoint **Slip Frequency Window (page 355)** is set to 0.5Hz).

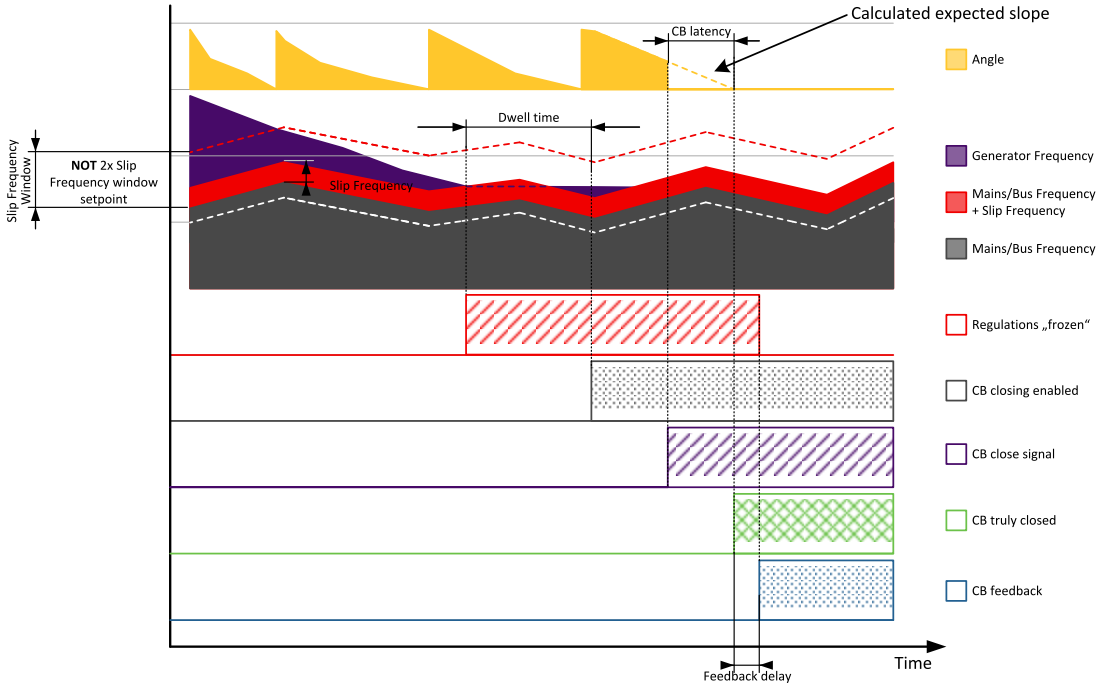


Image 5.17 Slip synchronization

Slip synchronization has a dead band. When the dead band is reached the frequency regulation is disabled. Once it is disabled it will be enabled again only when the frequency goes out of the slip frequency window. Dead band is introduced to allow the controller to detect the match.

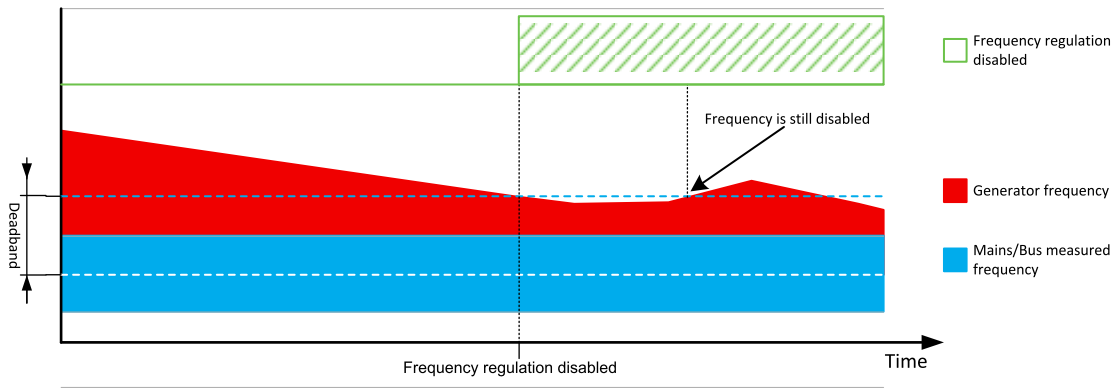
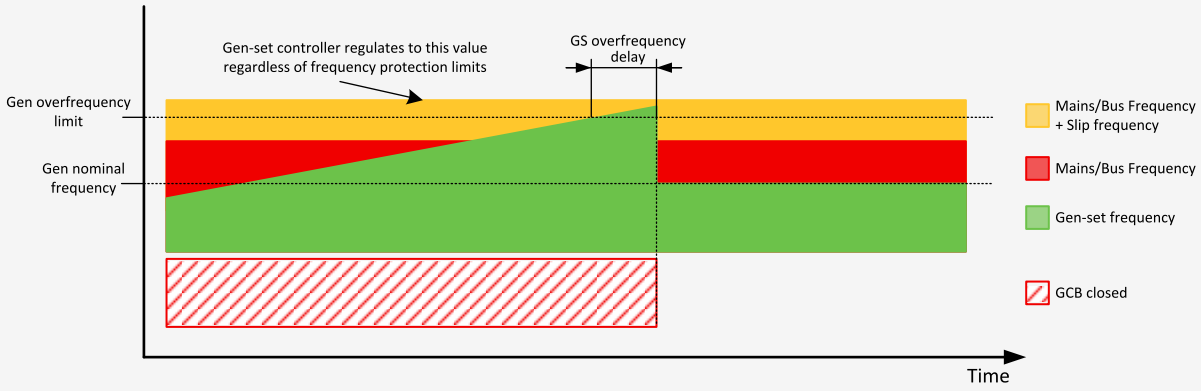


Image 5.18 Slip synchonization - deadband

Note: *Due to the nature of this function it is possible that in limit cases the gen-set controller will regulate the generator frequency outside of protection limits. Example: Mains/Bus frequency is high but within its protection limits (e.g. 50.9Hz, limit is 51Hz).* ***Slip Frequency (page 355)*** *is set to 0.5Hz. This will cause regulation loop of the gen-set controller to push the gen-set frequency to 51.4Hz and eventually the controller will issue overfrequency delay. It is recommended to set the setpoint* ***Slip Frequency (page 355)*** *as low as possible that still enables succesfull synchronization. This minimizes the risk of this problem happening. Furthermore when slip synchronization is used it is recommended to set Mains/Bus Frequency protection limits to more rigid values than the generator frequency protection limits. In this case the setpoint* ***Slip Frequency (page 355)*** *can be set to 0.1Hz and the Mains/Bus Frequency overfrequency protection limit is set to 50.9Hz instead of 51Hz. This will ensure that problematic state cannot be reached.*

Note:



5.4.5 Multiple island operation

This chapter describes the situation where multiple gen-sets are running parallel to each other but not with mains. This situation will occur either when:

- The common bus bar is dead due to opened MCB or there are no mains at all and the group of gen-sets has been activated, or
- The group was running parallel to mains and the MCB has been opened.

> **IMPORTANT: The controller in MINT application does not control the MCB! Only the MCB position is evaluated from the binary input MCB FEEDBACK (PAGE 656) and the position is the basic source of information for switching between island and parallel to mains operation.**

If the bus bar is empty, the first gen-set will close its GCB without synchronization. Following gen-sets will synchronize to the already energized bus bar. In the event that multiple gen-sets start simultaneously and the bus bar is empty, the system will prevent closing of multiple GCBs to the bus bar without synchronization. Instead of this, one of the gen-sets will close the GCB and energize the bus bar and the others will wait and then synchronize to the bus bar.

When a stop command is received, e.g. from the power management or binary input **REMOTE START/STOP (PAGE 661)** is deactivated or the STOP button is pressed, the GCB will be opened and the gen-set will go to cool down phase.

Behavior of controllers is adjusted via **Power management (page 112)** settings. Please see this chapter for more information.

5.4.6 Parallel to mains operation - SPtM application

After the gen-set has been synchronized to the mains, the parallel to mains operation follows. It consists of the following phases:

Ramping the power

Power up

The first phase of the parallel to mains operation is the ramping of the gen-set up to the desired power level. The speed of the ramp is given by the setpoint **Load Ramp (page 348)**. The setpoint adjusts the ramp time for a change from 0% to 100% of nominal power.

Power down

When a stop command is received the gen-set load is ramped down before opening the GCB. The ramp speed is given by the setpoint **Load Ramp (page 348)** and the end level is given by **Generator Unload GCB Open Level (page 347)**.

When the GCB button is pressed, the gen-set load is ramped down before opening the GCB as well. But after the GCB has been opened, the gen-set remains running until a stop command comes or the GCB is pressed again to reclose the GCB.

Load control

Load control ensures that the gen-set keep the certain load in parallel to mains operation (**MCB Feedback (page 656)** and **GCB Feedback (page 652)** = active).

There are available two modes of load control. Type of control is adjusted via setpoint **Load Control PTM (page 240)**.

Note: *In both modes, the lower level of the power is always limited by the setpoint **Minimal Power PTM (page 299)**. If the requested load (given by the active load control mode, e.g. Baseload, Import/Export) is below this limit the requested load is limited to the level adjusted by this setpoint.*

Baseload

Load Control PTM (page 240) = Baseload. Genset produces amount of the power given by setpoint **Baseload (page 243)**. The rest of power is supplied from the mains or exported to the mains (depends on proportions of load and **Baseload (page 243)** setpoint). Even in baseload control mode can be the Import/Export limited. This function can be activated by setpoint **Import/Export Limitation (page 245)** = Enabled. Then the request for the power of the genset operating in baseload can be limited to prevent the Import/Export go below the limit given by setpoint **Import Load (page 244)**.

> **Example:** Baseload = 1000 kW, load = 700 kW, Import load = 100 kW. Then the Baseload request will be limited to 600 kW to prewent the Import power go below 100 kW.

> **Example:** Baseload = 1000 kW, load = 700 kW, Import load = -100 kW. Then the Baseload request will be limited to 800 kW to prewent the Import power go below -100 kW (actually it is limitation of the export).

Import/Export

Load Control PTM (page 240) = Imp/Exp. Gen-set produces the certain amount of power to keep constant import/export from the mains regardless the demand of the load. The requested import/export is given by setpoint **Import Load (page 244)**. If the value of the setpoint is >0 the power is imported from the mains, if setpoint value is <0, then thepower is exported to the mains.

PF control

PF control ensures that the gen-set keep the certain reactive load in parallel to mains operation (**MCB Feedback (page 656)** and **GCB Feedback (page 652)** = active).

There are available two modes of PF control. Type of control is adjusted via setpoint **PF Control PTM (page 241)**.

Base PF

The power factor on the gen-set is kept on the level given by the setpoint **Base Power Factor (page 243)** regardless the load demand. The rest of demanded reactive power is supplied from the mains. Values >1 means that capacitive reactive power is supposed to be imported from mains, values <1 means that inductive reactive power is imported from the mains.

Import/Export

Gen-set produces the certain amount of reactive power to keep constant PF imported from the mains regardless the demand of the load. The requested power factor import is given by setpoint **Import PF (page 244)**. Values >1 means that the gen-set is pushing the capacitive power to the system (sytem Gen-set - Load- Mains) , values <1 means that the gen-set is pushing the inductive power to the system.

Transfers of load

Type of transfer of load between mains and gen-set and vice versa is adjusted via setpoints **Transfer Gen To Mains (page 347)** and **Transfer Mains To Gen (page 346)**.

Types of transfers

Open	Transfer of the load from generator to mains and vice versa without parallel work and synchronization (one breaker opens and second is closed - checking feedbacks). The setpoint **Open Transfer Min Break (page 345)** sets the minimal duration of break.
Close Only	Transfer of the load from generator to mains and vice versa with synchronization and parallel work. The maximal time of parallel work is given by setpoint **Close Transfer Max Duration (page 345)**. In case of synchronization fail, MCB stays close and gen-set is stopped.
Close Primarily	Transfer of the load from generator to mains and vice versa with synchronization and parallel work. The time of parallel work is given by setpoint **Close Transfer Max Duration (page 345)**. In case of synchronization fail, open transfer is done.
Soft Transfer	Transfer of the load from generator to mains and vice versa with parallel work and soft loading/unloading of the gen-set. This function is proceeded like the closed transfer, but there is time limitation of loading/unloading of the gen-set adjusted via setpoint **Load Ramp (page 348)**. The transfer is succeed only when the gen-set is fully loaded/unloaded (level of load when mains is considered as unloaded - gen-set is loaded is adjusted via setpoint **Mains Unload MCB Open Window (page 348)**), level of load when gen-set is considered as unloaded is adjusted via setpoint **Generator Unload GCB Open Level (page 347)**).

Transfer of load in MAN mode

Behavior of transfer of load in MAN mode is adjusted via setpoint **CB Control In MAN Mode (page 248)**. For details see the setpoint description.

Transfer of load in AUTO mode

Behavior of transfer of load in AUTO mode is affected by binary inputs **Force Island (page 650)**, **Force Parallel (page 650)** and **Remote Start/Stop (page 661)**.

When more binary inputs are activated at the same time, their priority is shown in the list below:

- **Force Island (page 650)** (highest priority).
- **Remote Start/Stop (page 661)**.
- **Force Parallel (page 650)** (lowest priority).

Note: *AMF function has the highest priority (if it is enabled).*

Logical binary input	AUTO mode	TEST mode
Force Island (page 650)	When activated: ▶ starts gen-set ▶ the transfer of load from mains to generator is done When deactivated: ▶ the transfer of load from generator to mains is done ▶ cooling and stopping of the gen-set	The gen-set is started anyway due to the TEST mode. When activated: ▶ the transfer of load from mains to generator is done When deactivated: ▶ the transfer of load from generator to mains is done
Remote Start/Stop (page 661)	When activated: ▶ starts gen-set ▶ if mains parameters ok - synchronize, run in parallel ▶ if mains parameters not ok - run in island When deactivated: ▶ unloading (if gen-set was in parallel), cooling and stopping of the gen-set	The gen-set is started anyway due to the TEST mode. When activated: ▶ if mains parameters ok - synchronize, run in parallel When deactivated: ▶ unloading, of the gen-set, opening GCB
Force Parallel (page 650)	When activated: ▶ check mains parameters - if not ok no action, if ok the procedure follows ▶ starts the gen-set, synchronize, parallel operation ▶ in case of mains fail - gen-set is stopped (if AMF function is disabled, otherwise it goes to island operation) When deactivated:	The gen-set is started anyway due to the TEST mode. When activated: ▶ check mains parameters - if not ok no action, if ok the procedure follows ▶ synchronize, parallel operation When deactivated: ▶ unloading, of the gen-set, opening GCB

Logical binary input	AUTO mode	TEST mode
	▶ unloading, cooling and stopping of the gen-set	

Type of transfer of load between mains and gen-set and vice versa is adjusted via setpoints **Transfer Gen To Mains (page 347)** and **Transfer Mains To Gen (page 346)**.

5.4.7 Parallel to mains operation - MINT application

If the MCB is closed (**MCB FEEDBACK (PAGE 656)** is present) and the gen-set has been synchronized to the bus bar, the parallel to mains operation will follow. It consists of the following phases:

Ramping the power

Power up

The first phase of the parallel to mains operation is the ramping of the gen-set up to the desired power level derived from the **#System BaseLoad (page 245)** or up to the load given by load sharing with other gen-sets connected to the bus bar. The speed of the ramp is given by the setpoint **Load Ramp (page 348)**. The setpoint adjusts the ramp time for a change from 0% to 100% of nominal power.

Power down

When a stop command is received the gen-set load is ramped down before opening the GCB. The ramp speed is given by the setpoint **Load Ramp (page 348)** and the end level is given by **Generator Unload GCB Open Level (page 347)**.

When the GCB button is pressed, the gen-set load is ramped down before opening the GCB as well. But after the GCB has been opened, the gen-set remains running until a stop command comes or the GCB is pressed again to reclose the GCB.

Load control

If **MCB FEEDBACK (PAGE 656)** is active (parallel to mains operation) the load of group of the gen-sets is controlled to reach the power defined by setpoint **#System BaseLoad (page 245)**. Each loaded gen-set takes equal part (relative to their nominal power) from **#System BaseLoad (page 245)** requested value. The load is regulated locally in each controller by load control regulation loop, load-sharing regulation loop is not active. The setpoint **#System BaseLoad (page 245)** is also used for determining which gen-sets have to run or not. Control is adjusted via setpoints **Load Gain (page 343)** and **Load Int (page 344)**.

PF control

If **MCB FEEDBACK (PAGE 656)** is active (parallel to mains operation) the value of PF (power factor) of group of the gen-sets is controlled to reach the PF defined by setpoint **#System Power Factor (page 246)**. The PF is regulated locally in each controller by PF control regulation loop, VAr-sharing regulation loop is not active. Control is adjusted via setpoints **PF Gain (page 351)** and **PF Int (page 352)**.

5.4.8 AMF operation

The “AMF function” represents the automatic start in the event that the mains have failed and stop after the mains have been restored. The automatic start can be enabled or disabled by binary inputs **AMF START BLOCK**

(PAGE 627) or MAINS FAIL BLOCK (PAGE 655).

Note: *The AMF function works only in AUTO mode.*

Mains failure detection

The mains are considered as faulty when one or more of the following conditions are valid:

- The mains voltage is out of the limits given by the setpoints **Mains Undervoltage (page 316)** and **Mains Overvoltage (page 315)** for a time period longer than **Mains < > Voltage Delay (page 316)**.
- The mains voltage unbalance is out of limit given by setpoint **Mains Voltage Unbalance (page 316)** for a time period longer than **Mains Voltage Unbalance Delay (page 317)**.
- The mains frequency is out of the limits given by the setpoints **Mains Underfrequency (page 317)** and **Mains Overfrequency (page 317)** for a time period longer than **Mains < > Frequency Delay (page 318)**.
- The MCB close command was not successful and the alarm **Wrn MCB Fail (page 794)** was not reset.
- Phase rotation is incorrect.

Healthy mains detection

The mains are considered to be healthy when all of following conditions are valid:

- The mains voltage is within the limits given by the setpoints **Mains Undervoltage (page 316)** and **Mains Overvoltage (page 315)**.
- The mains voltage unbalance is within the limits given by the setpoint **Mains Voltage Unbalance (page 316)**.
- The mains frequency is within the limits given by the setpoints **Mains Underfrequency (page 317)** and **Mains Overfrequency (page 317)**.
- The alarm **Wrn MCB Fail (page 794)** is not active (if MCB feedback is active). This condition is not required if MCB is open (MCB feedback is inactive).
- Phase rotation is correct.

The AMF procedure

When the mains failure is detected, the following steps are performed:

- If the setpoint **MCB Opens On (page 320)** is set to Mains Fail, the MCB is opened.
- The timer for automatic start of the gen-set **Emergency Start Delay (page 314)** begins to count down.
- After the timer has elapsed, the gen-set is started.

Note: *The automatic start of the gen-set due to AMF function can be disabled by the binary inputs AMF START BLOCK (PAGE 627) or MAINS FAIL BLOCK (PAGE 655).*

- If the setpoint **MCB Opens On (page 320)** is set to Gen Run, the MCB is opened once the generator voltage is within limits (after **Minimal Stabilization Time (page 271)** elapses).

Note: *If the mains are restored to health and the gen-set is still not connected to the load, the controller interrupts the startup process and closes back the MCB.*

- After **Open Transfer Min Break (page 345)** elapses, the GCB is closed and the gen-set begins to supply the load.
- After the mains restored to normal, the timer **Mains Return Delay (page 314)** begins to count down.

- Transition of load back to mains is adjusted via setpoint **Transfer Gen To Mains (page 347)**. Behavior of transition is also is affected by binary inputs **FORCE ISLAND (PAGE 650)**, **FORCE PARALLEL (PAGE 650)** and **REMOTE START/STOP (PAGE 661)**. See more in **Transfer of load in AUTO mode (page 109)** chapter.

IMPORTANT: Controller has this behavior only in AUTO mode!

5.4.9 Engine cool down and stop

The cool down phase follows after the stop command has been issued and the GCB has been opened.

- Duration of the cool down phase is determined by the setpoint **Cooling Time (page 274)**.
- Cooling is performed either at nominal speed (generator voltage and frequency protections are evaluated) or at idle speed (generator voltage and frequency protections are not evaluated). Selection of the speed is done by the setpoint **Cooling Speed (page 273)**.
- The cool down can be finished manually in MAN mode by pressing the STOP button.
- If a new start request comes, the cool down will be interrupted and the gen-set will go back to the stabilization phase. If the cooling was at nominal speed, the stabilization timers will not count down again so the GCB is ready to be closed (after 2 seconds delay).

When the cool down is finished, the output **FUEL SOLENOID (PAGE 699)** is de-energized and **STOP SOLENOID (PAGE 724)** is energized. The engine will stop within the time period determined by the setpoint **Stop Time (page 274)**. If the engine does not stop within this time, the alarm **Wrn Stop Fail (page 795)** will be issued.

The output **STOP SOLENOID (PAGE 724)** is energized until the engine is stopped, but at least for the duration of **Stop Time (page 274)**. If the **Stop Time (page 274)** has elapsed and the engine has still not stopped, the **STOP SOLENOID (PAGE 724)** is de-energized for 5 s and then energized again for **Stop Time (page 274)** and this repeats until the engine is stopped.

The output **Ignition (page 708)** is continuously energized until the engine is stopped.

Stopped gen-set evaluation

The gen-set is considered as stopped when all of following conditions are valid:

- The engine speed is lower than 2 RPM.
- The generator voltage in all phases is lower than 10 V.
- None of **Additional running engine indications (page 165)** signals is active.

5.4.10 Power management

IMPORTANT: Power management is relevant only for MINT application.

IMPORTANT: The gen-set will take part of the power management (= will be active) only if the controller is in AUTO mode!

The Power management function decides how many gen-sets should run and selects particular gen-sets to run. The power management is applicable in cases multiple gen-sets run in parallel to mains or in the island operation. The function is based on the load evaluation in order to provide enough of available running power. Since it allows the system to start and stop gen-sets based on the load demand, it can vastly improve the system fuel efficiency. In other words, an additional gen-set starts when the load of the system raises above certain level. The additional gen-set stops, when the load of the system drops down below a certain level. The process of determining gen-set start and stop is done in each controller; there is no "master slave" system. Therefore, the system is very robust and resistant to failures of any unit in the system. Each of the controllers

can be switched off without influencing the whole system. Except the situation the respective gen-set is not available for the power management.

The power management evaluates so called load reserve. The load reserve is calculated as difference between actual load and nominal power of running gen-sets. The reserve is calculated as absolute value (in kW / kVA) or relatively to the nominal power of gen-set(s) (in %). The setpoint **#Power Management Mode (page 328)** is used to select the absolute or relative mode.

The automatic priority swapping function focuses on efficient run of gen-set in regards to running hours and gen-set size.

IMPORTANT: The function of the controller is designed to handle the maximum sum of nominal power at 32000 kW (or 3200,0 with decimal number).

Example: There are 20 gen-sets each with 1000 kW of nominal power. The sum of the nominal power is 20000 kW. Therefore the decimal power format in 0.1 kW cannot be used because the sum exceeds 32000. Therefore power format in kW needs to be chosen.

Basic power management

The setpoint **Power Management (page 327)** enables and disables the gen-set to be active within the power management and makes automatic load dependent starts and stops. If the power management is disabled, the start and stop of the gen-set do not depend on the load of the group. If the gen-set remains in AUTO mode, the running condition depends only on the Logical binary inputs **REMOTE START/STOP (PAGE 661)**.

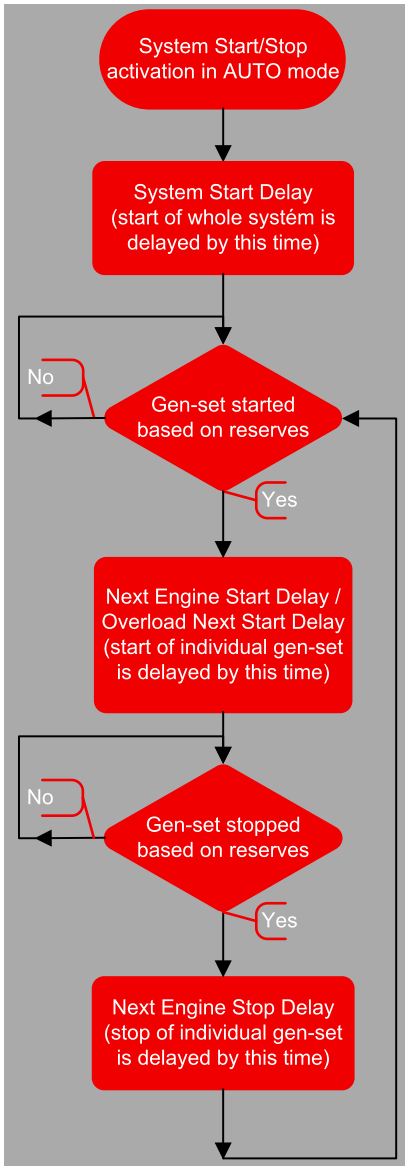
The Logical binary inputs **REMOTE START/STOP (PAGE 661)** requests the system to start or stop. If the input is not active, the system stops with delay **#System Stop Delay (page 330)** after the input has been deactivated and will not start again if in AUTO mode. If the input is activated again, the delay **#System Start Delay (page 329)** starts to count down. Once the delay elapsed, the system is activated and can be started by the power management. In other words, the power management is activated only if the Logical binary inputs **REMOTE START/STOP (PAGE 661)** is activated, the option of setpoint **Power Management (page 327)** = ENABLED and the AUTO mode is selected.

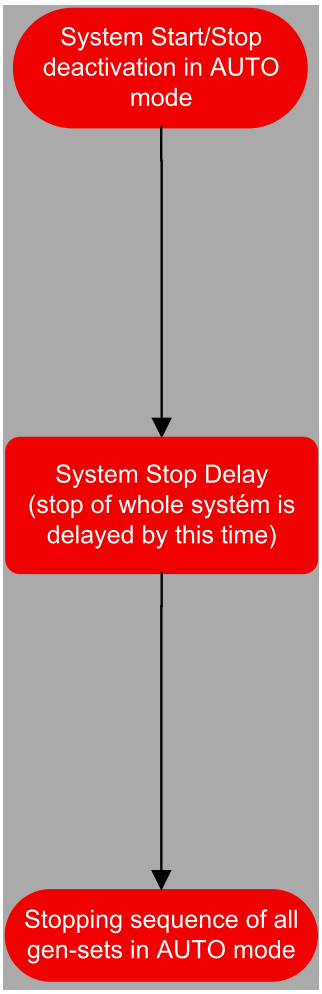
Note: *The gen-set performs load and VAR sharing whenever it is connected to the bus bar i.e. it is independent on whether the controller is in AUTO or MAN mode or whether the power management is active or not.*

Function of power management can be temporarily blocked after **REMOTE START/STOP (PAGE 661)** activation a count down of **#System Start Delay (page 329)**. The delay is given by setpoint **Power Management Delay (page 327)**. In this delay all gen-sets where power management is enabled are running. After this period elapses, only the gen-set(s) needed according to the Power Management calculation stay running and the rest is stopped.

Principle of power management

Internal conditions based on remaining load reserves and priorities are evaluated once a delay is elapsed. If the load reserve is insufficient the gen-set is started after delay given by the setpoint **#Next Engine Start Delay (page 335)** is elapsed. Once the gen-set runs the controller evaluates stopping conditions based on load reserves and priorities. If the reserve is sufficient enough to stop a particular gen-set, it is stopped after delay given by the setpoint **#Next Engine Stop Delay (page 335)** is elapsed. All the time the system stop condition – i.e. the Logical binary inputs **REMOTE START/STOP (PAGE 661)** deactivated – is evaluated as well. Once the delay given by the setpoint **#System Stop Delay (page 330)** has elapsed all gen-sets in AUTO mode are stopped. Following figure depicts the system activation and deactivation logic.





Setpoint **#Overload Next Start Delay (page 336)** is used in case that **#Overload Next Start Protection (page 336)** is enabled and gen-sets are running at **#Overload Next Start Level (page 336)** or more of their nominal power.

Load reserve

The power management is based on the load reserve concept. The load reserve is defined as a difference of the running nominal power of the group within power management and the total load of the system. There are two ways how to determine the load reserve. The absolute power management allows the system to keep the load reserve higher or equal to value in kW given by a relevant setpoint. The relative power management assures that load reserve is kept higher or equal to relative portion in % of the nominal power of group (i.e. running gen-sets active in power management) given by a relevant set-point. Depending of the situation, load reserves are calculated differently in two cases:

Case #1

This case is used in island operation.

Reserve	Actual Reserve	Start condition	Stop condition
Absolute kW	ARstrt = $\sum Pg_{Nom} - \sum Pg_{Act}$ ARstp = $\sum Pg^*_{Nom} - \sum Pg_{Act}$	ARstrt < #LoadResStrt	ARstp > #LoadResStop
Relative %	RRstrt = $[(\sum Pg_{Nom} - \sum Pg_{Act}) / \sum Pg_{Nom}].100\%$ RRstp = $[(\sum Pg^*_{Nom} - \sum Pg_{Act}) / \sum Pg^*_{Nom}].100\%$	RRstrt < #%LdResStrt	RRstp > #%LdResStop

Case #2

This case is used in parallel to mains operation.

Reserve	Actual Reserve	Start condition	Stop condition
Absolute kW	ARstrt = $\sum Pg_{Nom}$ - BaseLoad ARstp = $\sum Pg^*_{Nom}$ - BaseLoad	ARstrt < #LoadResStrt	ARstp > #LoadResStop
Relative %	RRstrt = $[(\sum Pg_{Nom}$ - BaseLoad) / $\sum Pg_{Nom}].100\%$ RRstp = $[(\sum Pg^*_{Nom}$ - BaseLoad) / $\sum Pg^*_{Nom}].100\%$	RRstrt < #%LdResStrt	RRstp > #%LdResStop

List of abbreviations:

- ARstrt .. Actual Absolute reserve in kW or kVA - for engine start calculation.
- ARstp .. Actual Absolute reserves in kW or kVA - for engine stop calculation.
- RRstrt .. Actual Relative reserve in % - for engine start calculation.
- RRstp .. Actual Relative reserves in % - for engine stop calculation.
- ΣPgNom .. Sum of Nominal power of all gen-sets on the bus.
- ΣPg*Nom .. Sum of Nominal power of all gen-sets on the bus apart of the one, which is going to be stopped.
- ΣPgAct .. Sum of Actual power of all gen-sets on the bus = system load.
- BaseLd .. Baseload is given by the setpoint **#System BaseLoad (page 245)**

Note: *System starting sequences may be very different due to their complexity (i.e. gen-sets which do not take part in power management, various nominal powers etc.). Each system should be considered individually.*

Starting sequence

As written above, the power management is based on the load evaluation in order to provide enough of available running power. An additional gen-set starts when the load of the system raises above certain level to keep the load reserve big enough. Following figure depicts the situation when an additional gen-set is requested to join the already running gen-set(s) to the bus.

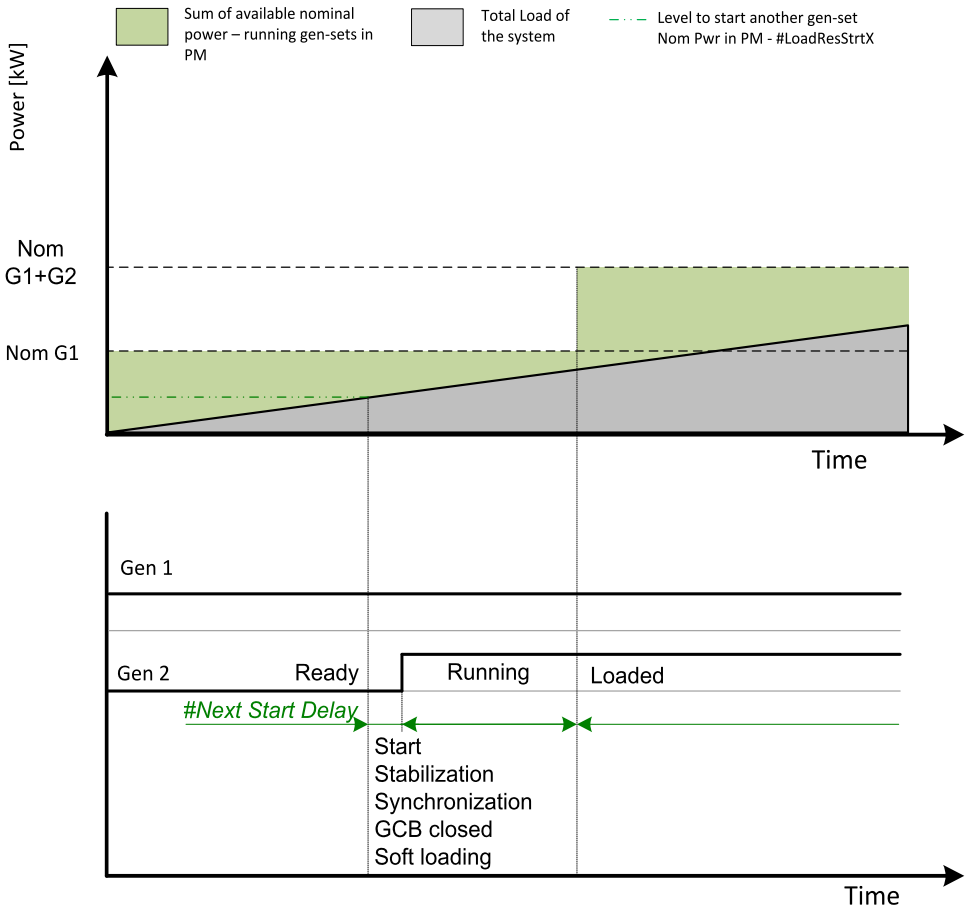


Image 5.19 Start sequence of power management

As shown above, the load of the system has increased above the level defined by the start condition – i.e. the load reserve is not sufficient as required by the appropriate setpoint. Further explanation is provided in chapters **Absolute power management (page 117)** and **Relative power management (page 120)**.

The level is illustrated by the green dashed line. If the load reserve keeps insufficient for longer time than defined by the setpoint **#Next Engine Start Delay (page 335)**, the next gen-set is actually started. The standard starting sequence follows. Once the synchronization procedure is done, the GCB breaker is closed and the gen-set power is ramping up. Once loaded, the system load reserve is raised and becomes sufficient again. Please note the sum of nominal power of all gen-sets on the bus is increased by the nominal power of the additional gen-set.

Stopping sequence

As it is written above, the power management is based on the load evaluation in order to provide enough of available running power. An additional gen-set stops when the load of the system drops below certain level to avoid inefficient run of the gen-set. Following figure depicts the situation when a gen-set is requested to stop due to the power management.

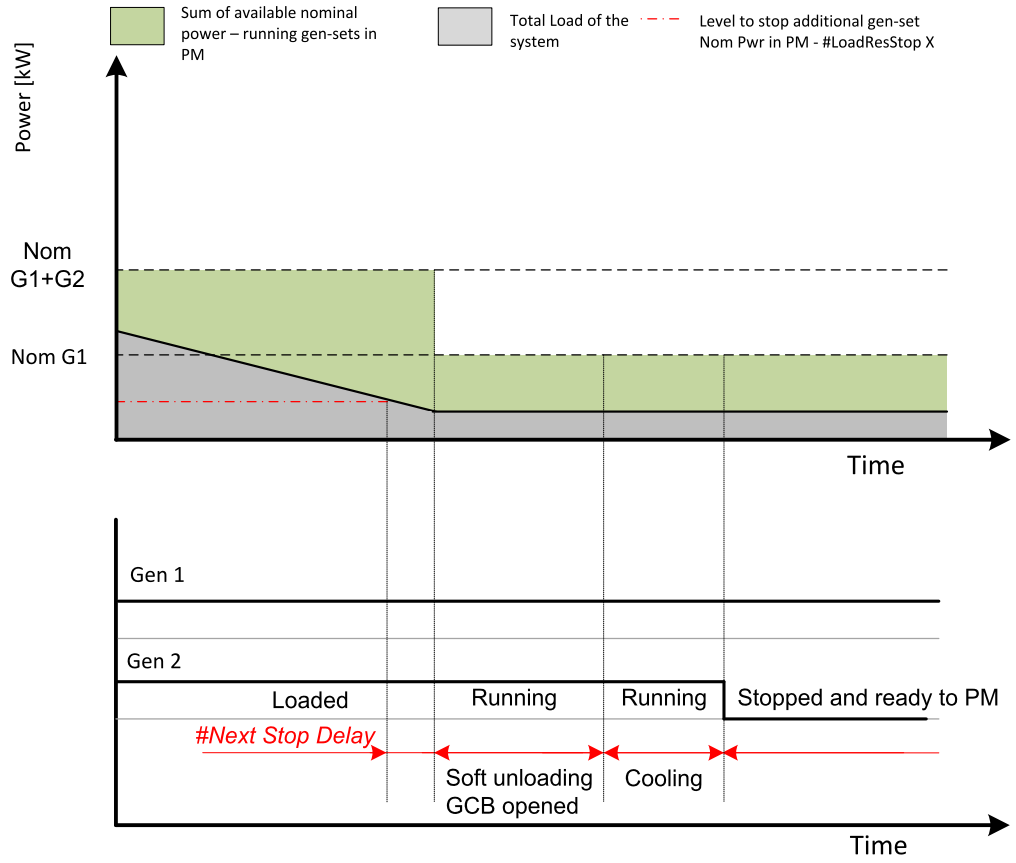


Image 5.20 Stopping sequence of power management

As shown above, the system load has decreased below the level defined by the stop condition – i.e. the load reserve is over a limit given by the appropriate setpoint. Further explanation is provided in chapters **Absolute power management (page 117)** and **Relative power management (page 120)**.

The level is illustrated by the red dashed line. If the load reserve keeps over this limit for longer time than defined by setpoint **#Next Engine Stop Delay (page 335)**, the next gen-set is actually requested to stop. Once the gen-set is unloaded, the GCB breaker is opened. Please note the sum of nominal power of all gen-sets on the bus is decreased by the nominal power of the stopped gen-set. The cooling sequence follows before the gen-set is actually stopped. The gen-set is ready to be started if the system load increases again.

Absolute power management

The power management based on absolute load reserves can be successfully used in cases the load portions are similar to the gen-set capacity or even bigger. The goal of the absolute reserve mode is to provide the same load reserve all the time independently on how many gen-sets are currently running. The mode perfectly fits for industrial plants with large loads.

The absolute power management guarantees adjustable load reserve in kW. This mode is active when **#Power Management Mode (page 328)** is set to ABS [kW] mode.

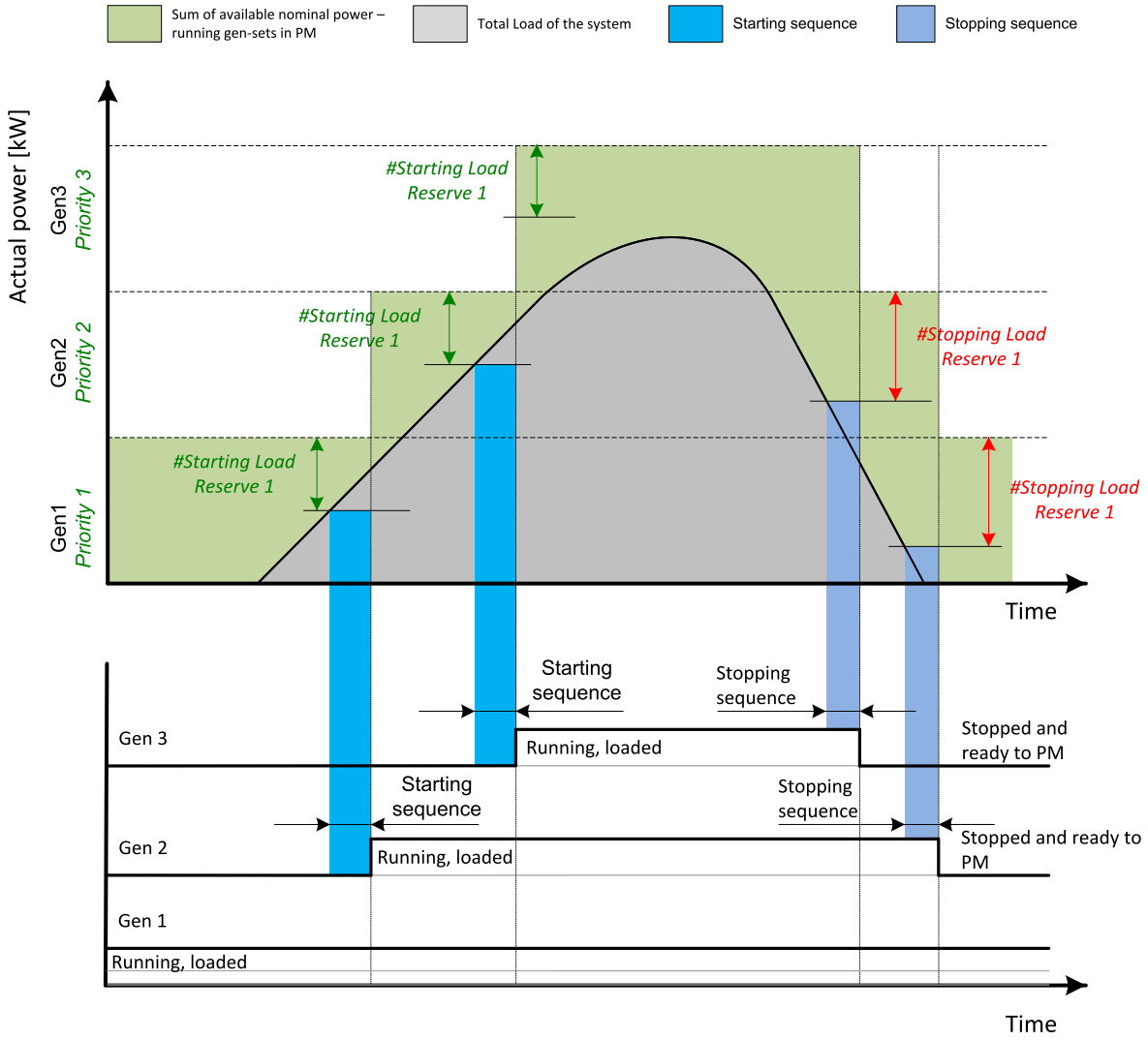


Image 5.21 Power management based on absolute load reserve

Example: An example of absolute power management is shown on the figure below. There are three gen-sets with following choice of setpoints:

Gen-set	Nominal power	Power management	#Power management mode	Priority	#Priority Auto Swap	#Starting Load Reserve X	#Stopping Load Reserve X
Gen-set #1	200 kW	ENABLED	ABS (kW)	1	DISABLED	100 kW	125 kW
Gen-set #2	500 kW	ENABLED	ABS (kW)	2	DISABLED	100 kW	125 kW
Gen-set #3	1 000 kW	ENABLED	ABS (kW)	3	DISABLED	100 kW	125 kW

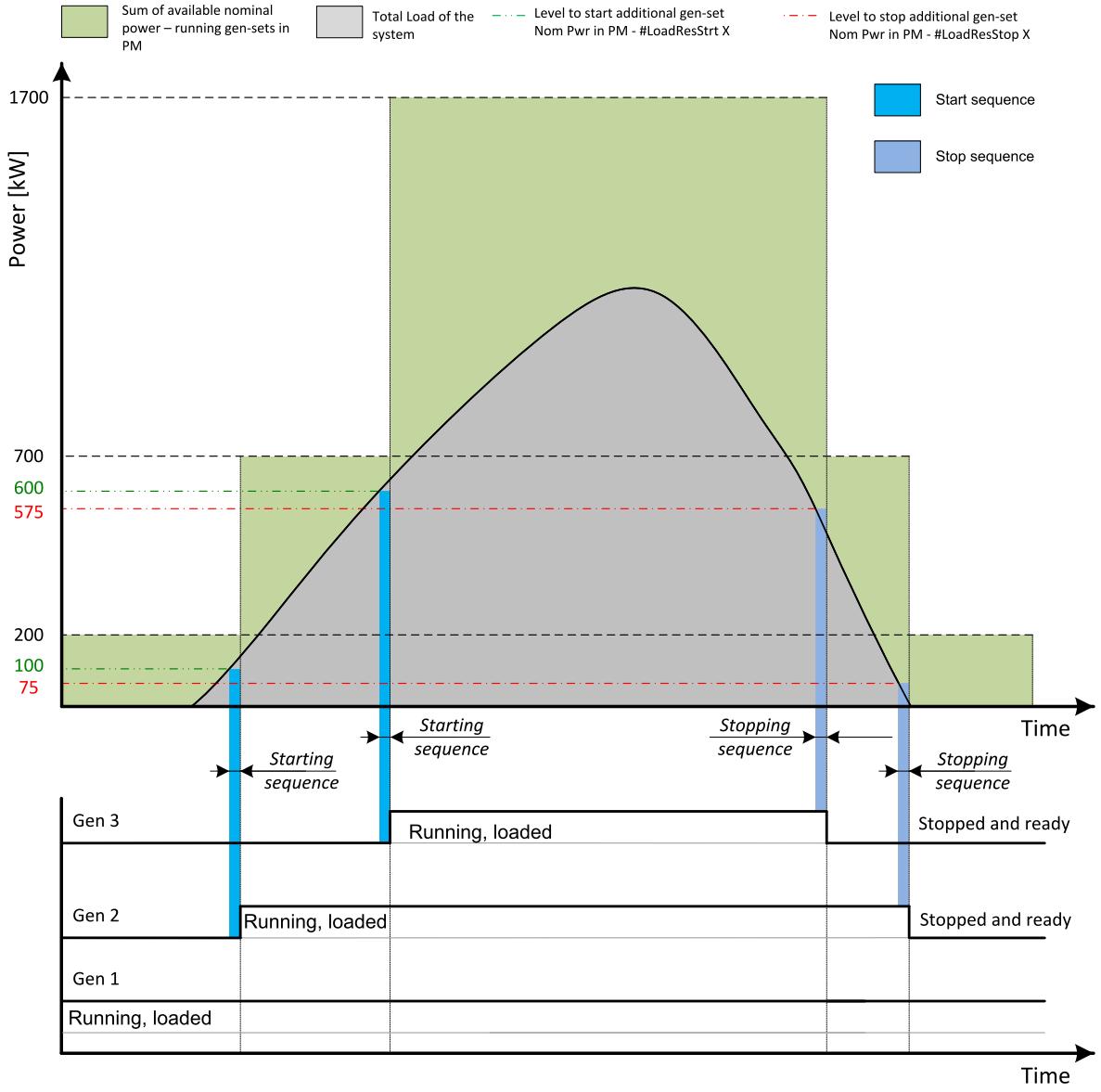


Image 5.22 Absolute power management example

As it is shown on both figures above, the additional gen-set is added once the actual load reserve is below the level given by the appropriate setpoint of load reserve. The additional gen-set is removed once the actual load reserve is above the level set by appropriate setpoint of load reserve.

The green dashed line depicts the value of load at which the additional gen-set is requested to start. This value of the load value is linked with the setpoint **#Starting Load Reserve 1 (page 330)** (or other selected reserve set) in following way:

Sum of nominal power for start - **#Starting Load Reserve 1 (page 330)** (or other selected reserve set) = value of load when additional gen-set requested to start (e.g.: 700 kW – 100 kW = 600 kW).

The red dashed line depicts the value of load at which the additional gen-set is requested to stop. This value of the load value is linked with the setpoint **#Stopping Load Reserve 1 (page 331)** (or other selected reserve set) in following way:

Sum of nominal power for stop - **#Stopping Load Reserve 1 (page 331)** (or other selected reserve set) = value of load when additional gen-set requested to stop (e.g.: 700 kW – 125 kW = 575 kW).

There are 2 sets of setpoints for starting and stopping gen-sets in absolute power management.

- **#Starting Load Reserve 1 (page 330)** and **#Stopping Load Reserve 1 (page 331)**
- **#Starting Load Reserve 2 (page 332)** and **#Stopping Load Reserve 2 (page 333)** considered if binary input **LOAD RES 2 ACTIVE (PAGE 655)** is activated

Note: *All controllers cooperating together in Power management must have the same load reserve set selected.*

Relative power management

The power management based on relative load reserves perfectly fits to those applications with such load portions connected to the group at once are much lower than the gen-set nominal power. This mode helps to achieve the maximal lifetime of the gen-sets, as they can be operated within optimal load range. The maximal size of the load connected at once depends on number of actually working gen-sets. The more gen-sets are connected to the bus bar the bigger load portion can be connected at once.

The relative power management guarantees that the engines are not continuously loaded more than to a certain level. This mode is active when **#Power Management Mode (page 328)** is set to REL [%] mode.

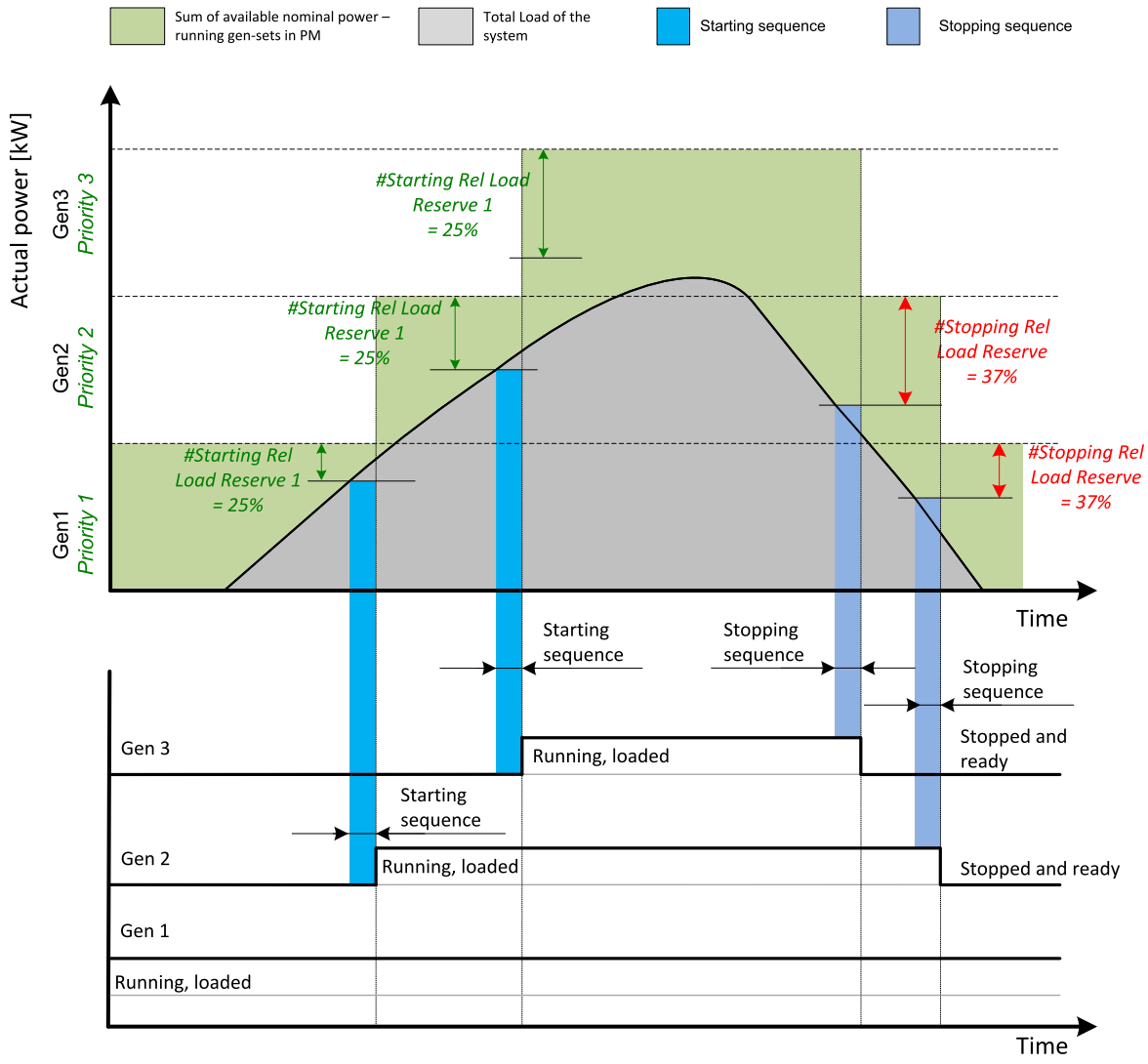


Image 5.23 Power management based on relative load reserve

Example: An example of relative power management is shown on the figure below. There are three gen-sets with following choice of setpoints:

Gen-set	Nominal power	Power management	#Power management mode	Priority	#Priority Auto Swap	#Starting Rel Load Reserve X	#Stopping Rel Load Reserve X
Gen-set #1	200 kW	ENABLED	REL (%)	1	DISABLED	35 %	40 %
Gen-set #2	500 kW	ENABLED	REL (%)	2	DISABLED	35 %	40 %
Gen-set #3	1 000 kW	ENABLED	REL (%)	3	DISABLED	35 %	40 %

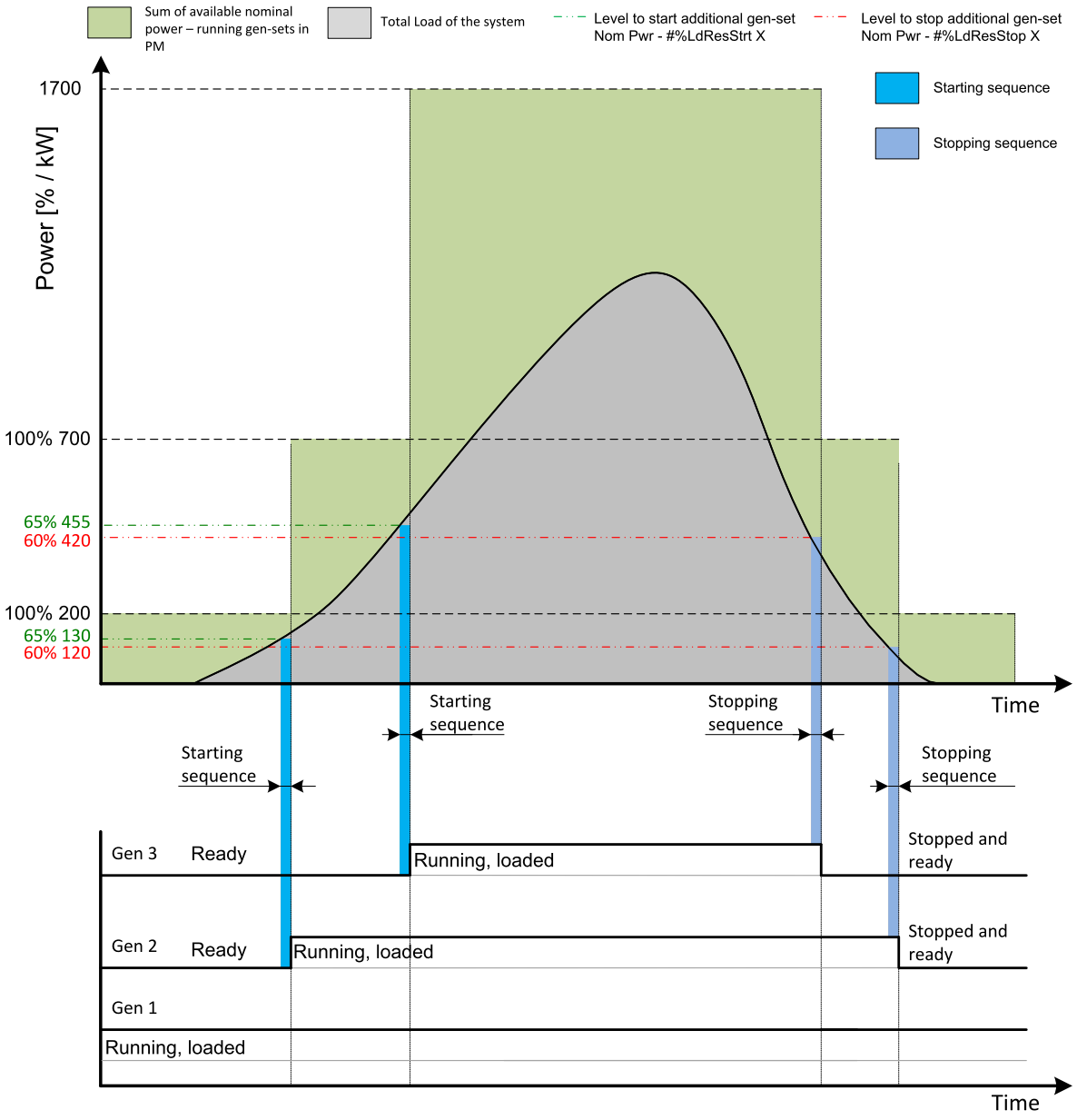


Image 5.24 Relative power management example

As it is shown on both figures above, the additional gen-set is added once the actual load reserve is below the level given by the appropriate setpoint of load reserve. The additional gen-set is removed once the actual load reserve is above the level set by appropriate setpoint of load reserve.

The green dashed line depicts the value of load at which the additional gen-set is requested to start. This value of the load value is linked with the setpoint **#Starting Rel Load Reserve 1 (page 331)** (or other selected reserve set) in following way:

(100 % - **#Starting Rel Load Reserve 1 (page 331)** (or other selected reserve set)) * Sum of Nominal power = Value of load when additional gen-set requested to start in kW (in % of nominal power), e.g.: (100 % – 35 %) * 700 kW = 455 kW (65 % of nominal power).

The red dashed line depicts the value of load at which the additional gen-set is requested to stop. This value of the load value is linked with the setpoint **#Stopping Rel Load Reserve 1 (page 332)** (or other selected reserve set) in following way:

(100 % - **#Stopping Rel Load Reserve 1 (page 332)** (or other selected reserve set)) * Sum of Nominal power = Value of load when additional gen-set requested to stop in kW (in % of nominal power), e.g.: (100 % – 40 %) * 700 kW = 420 kW (60 % of nominal power).

There are 2 sets of setpoint for starting and stopping gen-sets in relative power management.

- **#Starting Rel Load Reserve 1 (page 331)** and **#Stopping Rel Load Reserve 1 (page 332)**
- **#Starting Rel Load Reserve 2 (page 333)** and **#Stopping Rel Load Reserve 2 (page 334)** considered if binary input **LOAD RES 2 ACTIVE (PAGE 655)** is activated

Note: *All controllers cooperating together in Power management must have the same load reserve set selected.*

Priorities

The priority of the gen-set within the group is given by the setpoint **Priority (page 328)**. Lower number represents "higher" priority, i.e. a gen-set with lower number starts before another one with higher number. In other words, the setpoint **Priority (page 328)** means order in which gen-sets are started and connected to the bus. An example is shown on the figure below. There are four gen-sets with following choice of setpoints:

Gen-set	Nominal power	Power management	#Power management mode	Priority	#Priority Auto Swap	#Starting Load Reserve X	#Stopping Load Reserve X
Gen-set #1	200 kW	ENABLED	ABS (kW)	4	DISABLED	50 kW	70 kW
Gen-set #2	200 kW	ENABLED	ABS (kW)	3	DISABLED	50 kW	70 kW
Gen-set #3	200 kW	ENABLED	ABS (kW)	2	DISABLED	50 kW	70 kW
Gen-set #4	200 kW	ENABLED	ABS (kW)	1	DISABLED	50 kW	70 kW

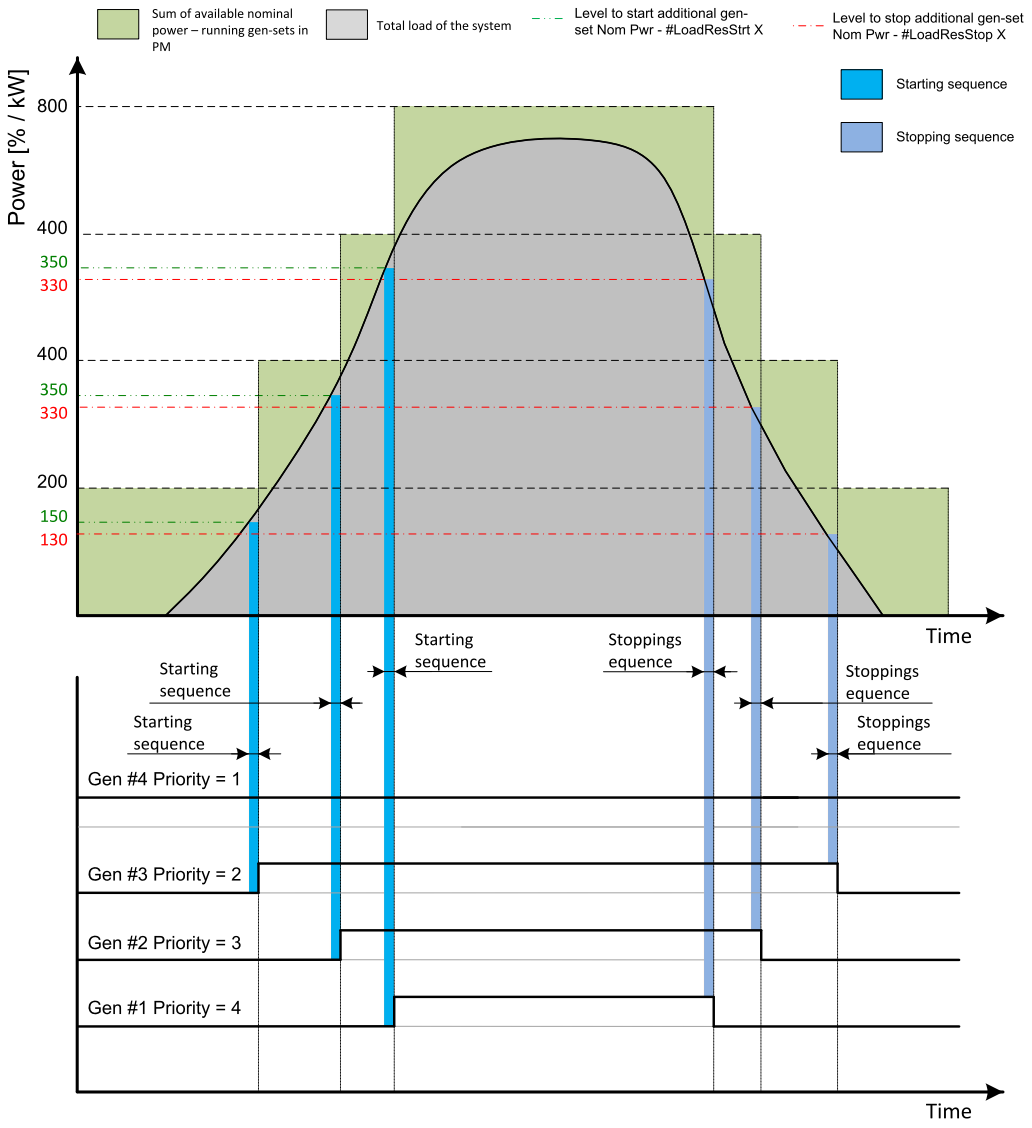


Image 5.25 Example of priorities in power management

By choosing the setpoint **Priority (page 328)** = 1, the gen-set #4 is running all the time in the example shown on the figure above (AUTO mode selected, Power management enabled and LBI **REMOTE START/STOP (PAGE 661)** activated).

The LBI **TOP PRIORITY (PAGE 664)** can be used to force priority 0 into the setpoint **Priority (page 328)**. Priority 0 is the "highest" one, which means the gen-set will be running all the time while the power management is switched on.

If more than one gen-set have the same priority, they will act as "one big" gen-set. There are methods of automatic optimization of the priorities to achieve specific behavior of the group such as equalizing engine hours of the gen-sets or selection of optimal gen-sets to run according to their size and current load demand.

Priority auto swap

As stated in the chapter **Priorities (page 122)**, the operator is able to select the order of gen-set starting. There is also the option of automatic priority selection. The controllers are sharing data concerning the running hours and all important information relevant to the actual load. Thanks to the Automatic priority swapping function the controllers choose the gen-set(s) to be running with consideration of their running hours and the actual load.

The running hours equalization function keeps a constant maximal difference of gen-set's running hours. The efficient function keeps running only the gen-sets with suitable nominal power to avoid inefficient fuel consumption or gen-set overload.

Note: *The Automatic priority swapping function does not change the setpoint* ***Priority (page 328)****. The function sets the order of gen-sets by virtual values "engine priority".*

Run hours equalization

The gen-sets engine priorities are automatically swapped to balance engine running hours. In other words, the controllers compare running hours of each gen-set and select gen-set(s) to run in order to maintain constant maximal difference of running hours. Up to 32 controllers are supported. This function is activated via setpoint **#Priority Auto Swap (page 329)** = RUN HOURS.

The value of running hours which is used in run hours equalization is calculated by following formula:

RHE = **Running Hours (page 597)** - **Run Hours Base (page 337)**

RHE is considered value for running hours equalization, **Running Hours (page 597)** is a cumulative sum of run hours available in statistic values of the controller, **Run Hours Base (page 337)** is a setpoint. This setpoint may be used in the case of gen-sets with different runs hours are intended to be set at the same initial point (e.g. a new gen-set and a used gen-set after retrofit maintenance inspection).

The Running hours equalization function compares RHE value of each controller in the group. Once the difference between RHE of individual controllers is higher than **#Run Hours Max Difference (page 337)** (i.e. **#Run Hours Max Difference (page 337)** + 1), the gen-set(s) with the lowest RHE is/are started.

Example: The system structure and its settings is shown on the figure below.

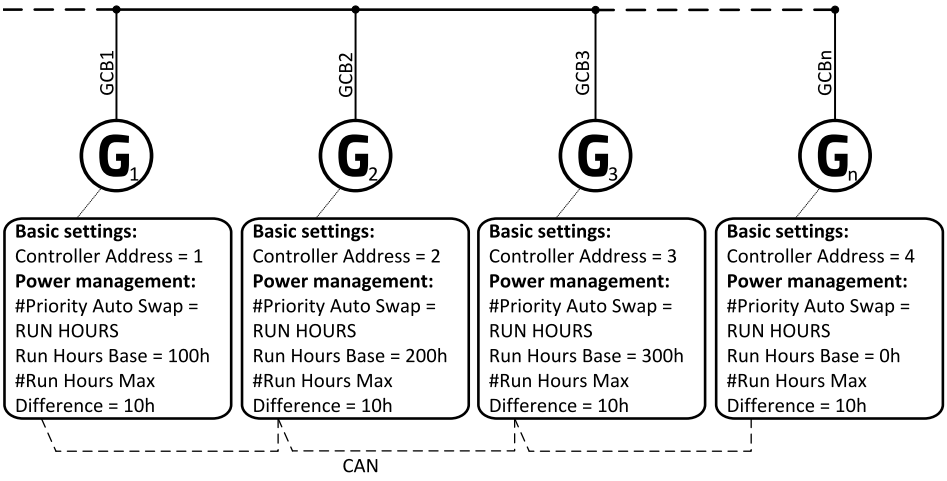


Image 5.26 Example of the system

3 cases are considered:

- Case #1: 2 gen-gets available
- Case #2: 3 gen-gets available with same initial RHE.
- Case #3: 3 gen-gets available with different initial RHE.

Case #1:

- Gen-set 1 running hours = 250 -> running hours considered in RHE = 100 (150 - **Run Hours Base (page 337)**)

- Gen-set 2 running hours = 450 -> running hours considered in RHE = 200 (250 - **Run Hours Base (page 337)**)

Both gen-sets have the same nominal power of 700 kW. Originally, priority of gen-sets was G1 = 2, G2 = 1. Load demand in this example is constant and it is 500 kW (i.e. only one engine is running at any time). In this case, the controllers set the engine priority of the gen-set 1 to 1 because it has the lowest considered RHE and the difference between RHE2 (i.e. considered RHE of gen-set 2) and RHE1 is higher than **#Run Hours Max Difference (page 337)** that is set to 10h.

	Run hours	#RunHoursBase	RHE
Gen-set #1	250	150	100
Gen-set #2	450	250	200

The gen-set 1 runs for 100 hours to equalize the RHE of both gen-sets. The gen-set 1 keeps running until the difference between RHE1 and RHE2 exceeds **#Run Hours Max Difference (page 337)** (i.e. 10h). The gen-set 1 runs 100 + **#Run Hours Max Difference (page 337)** + 1 = 100 + 10 + 1 = 111 hours. After 111 hours the gen-sets 2 has the lowest RHE and the difference between RHE1 and RHE2 is higher than **#Run Hours Max Difference (page 337)**. The gen-set 2 runs 11 hours to equalize the RHE of both gen-sets and then additional **#Run Hours Max Difference (page 337)** + 1 hours (i.e. 11 + 10 + 1 = 22 hours). The evolution of RHE1 and RHE2 is shown on the figure below.

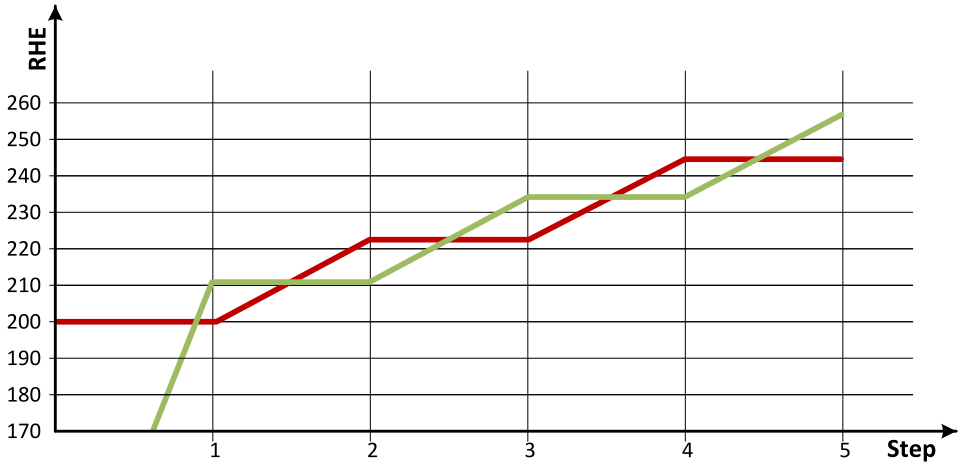


Image 5.27 Run hours equalization - case #1

Step	0	1	2	3	4	5
RHE1	100	211	211	233	233	255
RHE2	200	200	222	222	244	244
Run G1 (ΔRHE1)	0	111	0	22	0	22
Run G2 (ΔRHE2)	0	0	22	0	22	0

From the example of the case #1, it can be concluded that the gen-sets are swapped after the duration determined by following formula:

SwapTime = Second lowest considered running hours – Current lowest considered running hours + **#Run Hours Max Difference (page 337)** +1

Case #2:

- Gen-set 1 running hours = 0 -> running hours considered in RHE = 0 (0-RunHoursBase)
- Gen-set 2 running hours = 0 -> running hours considered in RHE = 0 (0-RunHoursBase)
- Gen-set 3 running hours = 0 -> running hours considered in RHE = 0 (0-RunHoursBase)

Each gen-set has the same RHE = 0 h. By applying the SwapTime formula, we get the run time of gen-set 1 before next swapping:

SwapTimeG1 = 0 – 0 + 10 + 1 = 11

Similar way, we get the run time of gen-set 2 before next swapping:

SwapTimeG2 = 11 – 11 + 10 + 1 = 11

Finally, we get the run time of gen-set 3 before next swapping:

SwapTimeG2 = 11 – 0 + 10 + 1 = 22

Please refer to figure below to understand the evolution of RHE of gen-sets in this particular case.

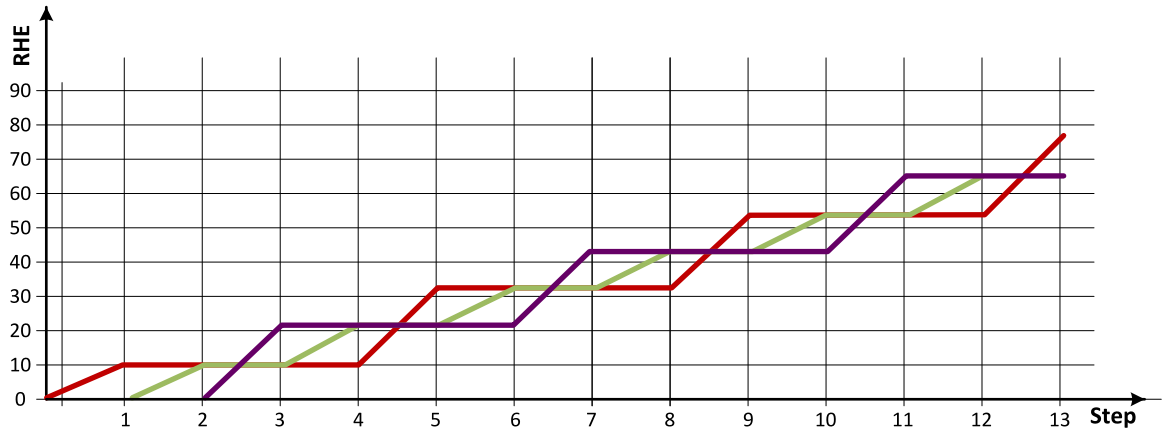


Image 5.28 Run hours equalization - case #2

step	0	1	2	3	4	5	6	7	8	9	10	11	12	13
RHE1	0	11	11	11	11	33	33	33	33	55	55	55	55	77
RHE2	0	0	11	11	22	22	33	33	44	44	55	55	66	66
RHE3	0	0	0	22	22	22	22	44	44	44	44	66	66	66
Run G1 (ΔRHE1)	0	11	0	0	0	22	0	0	0	22	0	0	0	22
Run G2 (ΔRHE2)	0	0	11	0	11	0	11	0	11	0	11	0	11	0
Run G3 (ΔRHE3)	0	0	0	22	0	0	0	22	0	0	0	22	0	0

Case #3:

- Gen-set 1 running hours = 250 -> running hours considered in RHE = 100 (150-RunHoursBase)
- Gen-set 2 running hours = 450 -> running hours considered in RHE = 200 (250-RunHoursBase)
- Gen-set 3 running hours = 750 -> running hours considered in RHE = 250 (500-RunHoursBase)

The gen-set 1 has the lowest RHE1 = 100 h. By applying the SwapTime formula, we get the run time of gen-set 2 before next swapping:

SwapTimeG1 = 200 – 100 + 10 + 1 = 111

Till the step 5, the evolution of the gen-set swapping is the same as in the case #1, just gen-set 1 and gen-set 2 involve. In the step 6 the gen-set 2 can run only 17 hours (previously 22 hours) because the gen-set 3 involves. The evolution of RHE1, RHE2 and RHE3 is shown on the figure below.

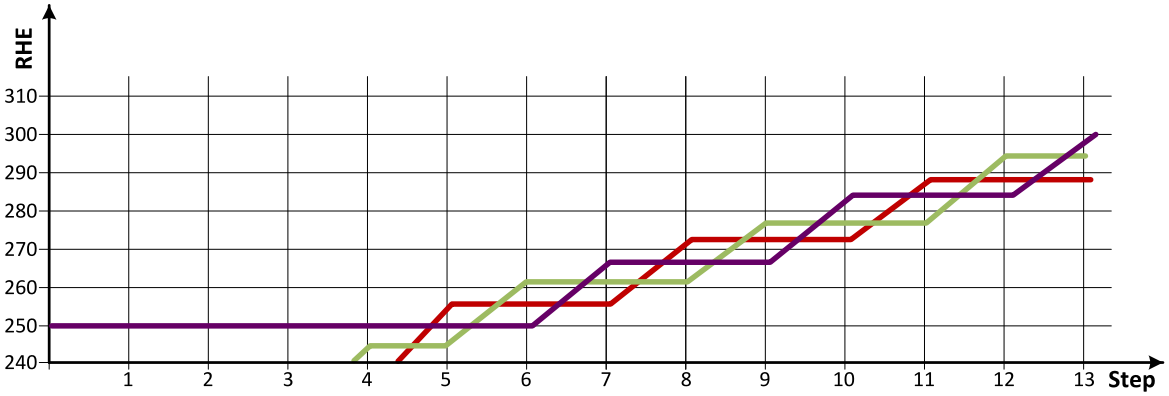


Image 5.29 Run hours equalization - case #3

step	0	1	2	3	4	5	6	7	8	9	10	11	12	13
RHE1	100	211	211	232	233	255	255	255	272	272	272	288	288	288
RHE2	200	200	222	222	244	244	261	261	261	277	277	277	294	294
RHE3	250	250	250	250	250	250	250	266	266	266	283	283	283	299
Run G1 (ΔRHE1)	0	111	0	22	0	22	0	0	17	0	0	16	0	0
Run G2 (ΔRHE2)	0	0	22	0	22	0	17	0	0	16	0	0	17	0
Run G3 (ΔRHE3)	0	0	0	0	0	0	0	16	0	0	17	0	0	16

Note: *Setting **#Run Hours Max Difference (page 337)** = 5 does not mean that gen-sets swap every 5 hours. The Swap time is determined by the formula stated above. Please read the entire chapter Running hours equalization for better understanding.*

Note: *In the case **#Run Hours Max Difference (page 337)** is set to 0 and all gen-set in the group are at the same initial point (RHE are equal), the gen-set swapping happens every hour.*

Efficiency

The gen-sets engine priorities are automatically swapped to best fit to the actual load demand (load demand swap - LDS). Also engine running hours are taken to the calculation (run hours equalization - RHE). This function is activated via setpoint **#Priority Auto Swap (page 329)** = Efficiency.

Algorithm of function:

- In the first step, the gen-sets are sorted according to their nominal power.
- In the second step, the gen-sets with the same nominal power are sorted according to their RHE
- The gen-set(s) with nominal power which fits the most actual load demand are chosen. From those with same nominal power, the gen-set(s) with lowest RHE are chosen. Selection formula:

- **#Power Management Mode (page 328)** = ABS (kW)
  - Nominal power of gen-set > actual load demand + **#Starting Load Reserve 1 (page 330)**
- **#Power Management Mode (page 328)** = REL (%)
  - Nominal power of gen-set > (actual load demand × 100)/(100 - **#Starting Rel Load Reserve 1 (page 331)**)

- If two or more gen-sets are available for taking over the load always the one with the lowest CAN address is chosen.
- If load demand is higher than nominal power of the biggest gen-set, this one is fixed and the whole process repeats from point the third bullet.

Example: The system structure and its settings is shown on the figure below.

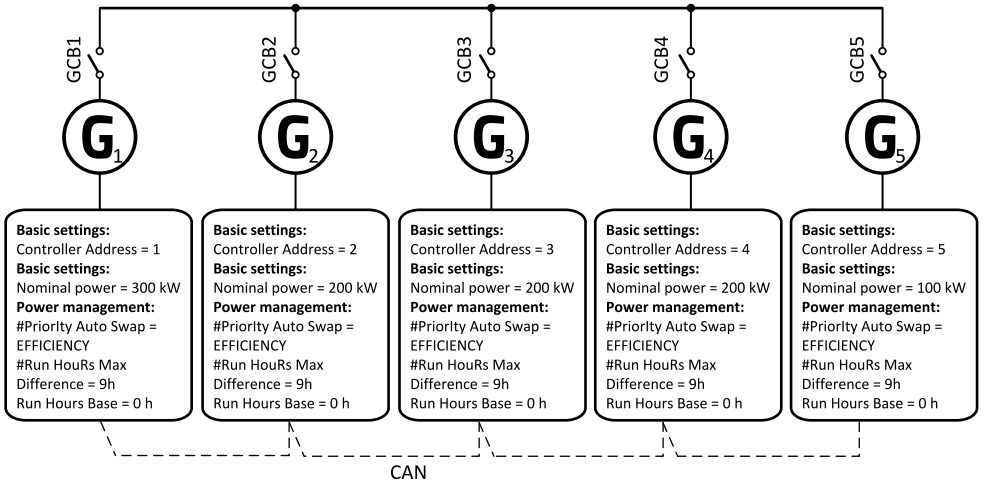


Image 5.30 Example of the system

Following table provide an example of gen-set selection in function of system load evolution. The table is an example of Efficiency priority optimization function (**#Power Management Mode (page 328)** = ABS (kW) and **#Starting Load Reserve 1 (page 330)** = 20 kW).

System Load [kW]	Running gen-sets		Description	Total Running power within PM [kW]	Relative load of gen-sets [%]
40	5			100	40
60	5			100	60
80	5 2 [0h]	2 start 5 stop	LDS Swap	300	26
100	2 [10h]			200	50
120	2 [20h]			200	60
120	2 [30h] 3 [10h]	3 start 2 stop	RHE Swap	400	30
120	3 [20h]			200	60
140	3 [30h]			200	70
180	3 [40h] 1	1 start 3 stop	LDS Swap	500	36

System Load [kW]	Running gen-sets		Description	Total Running power within PM [kW]	Relative load of gen-sets [%]
200	1			300	67
240	1			300	80
280	1 5	5 start	Gen#5 joins (LDS)	400	70
340	1 5			400	85
380	1 5 4 [20h]	4 start 5 stop	LDS + RHE Swap	600	63
400	1 4			500	80
440	1 4			500	88
480	1 4 5	5 start	Gen#5 joins (LDS)	600	80
540	1 4 5			600	90
580	1 4 5 2 [30h]	2 start 5 stop	LDS Swap	800	73
600	1 4 2			700	86
640	1 4 2			700	91
680	1 4 2 5	5 start	Gen#5 joins (LDS)	800	85
740	1 4 2 5			800	93
780	1 4 2 5	3 start 5 stop	LDS Swap	1000	78

System Load [kW]	Running gen-sets		Description	Total Running power within PM [kW]	Relative load of gen-sets [%]
	3 [40h]				
800	1 4 2 3			900	89
840	1 4 2 3			900	93
880	1 4 2 3 5	5 start	Gen#5 joins (LDS)	1000	88
940	1 4 2 3 5			1000	94

Minimal running power

Minimum Running Power function is used to adjust a minimum value of the sum of nominal power of all running gen-sets. If the function is active, then the gen-sets would not be stopped, although the reserve for stop is fulfilled. Function is activated via logical binary input **Min Run Power Active (page 657)**.

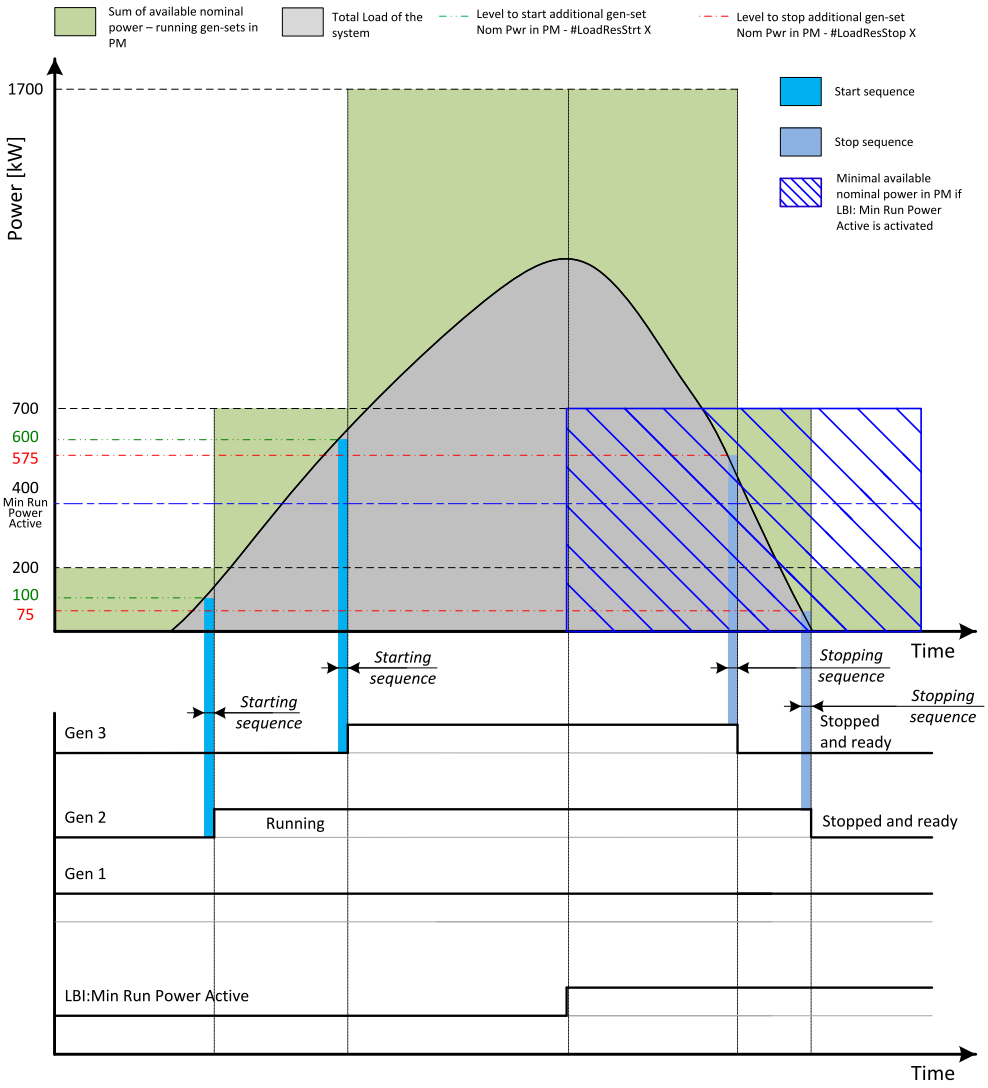


Image 5.31 Minimal running power

Setpoint **#Min Run Power (page 334)** is adjusted to 400 kW. Once the **MIN RUN POWER ACTIVE (PAGE 657)** is activated, the available nominal running power has to be equal or higher to 400 kW. Even if the load reserve is big enough to stop the gen-set #2 (nominal power 500 kW), the gen-set keeps running as at least 400 kW has to be available. The gen-set#1 (nominal power 200 kW) is not enough.

5.4.11 Control groups

The physical group of the gen-sets (i.e. the site) can be separated into smaller logical groups, which can work independently even if they are interconnected by the CAN2 bus. The logical groups are intended to reflect the real topology of the site when the site is divided into smaller gen-set groups separated from each other by bus-tie breakers. If the bus-tie breakers are closed the sub-groups have to work as one large group and if the bus-tie breakers are open, the sub-groups have to work independently.

- The group which the particular controller belongs to is adjusted by the setpoint **Control Group (page 339)**. Use the defaulf setting 1 with all controllers, if there is no bus-tie breaker.
- The information which groups are currently linked together is being distributed via the CAN. Each controller can provide information about one BTB breaker. The breaker position is detected by the input function *GroupLink* (i.e. this input is to be connected to the breaker feedback).

- The two groups which are connected together by the BTB, are defined with parameters **Group Link L (page 339)** and **Group Link R (page 340)**.
- Controller sends via CAN2 bus information that controllers from groups *Group Link L* and *Group Link R* are linked together, if the *Group link* function (signal associated with the function) is active. It sends information that the groups are separated, if the *Group link* function is not active.

Note: *The "group link" function is independent on the group, where the controller itself belongs to. The controller can provide "group link" information about any two groups and it may not belong to one of the groups.*

- All gensets/controllers in linked groups cooperate with each other and perform load sharing, VAr sharing and power management together. These functionalities are performed independently in each group, when the groups are separated.

Example:

4 gen-sets separated by a BTB breaker into two groups of 2. The BTB position is detected by the controllers 2 and 3. The reason, why there are 2 controllers used for detection of the BTB position, is to have a backup source of the group link information, if the primary source (controller) is switched off.

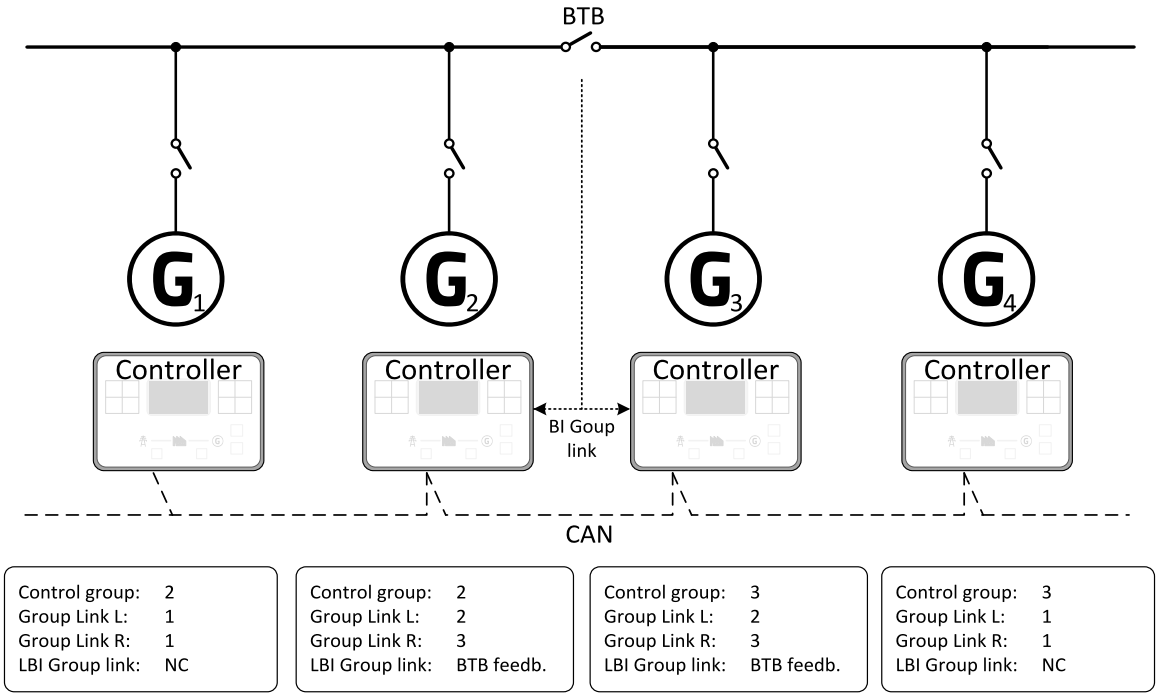


Image 5.32 Example of control groups

Once the BTB breaker is closed, the control groups 2 and 3 become new group 2+3. Power management, load sharing and VAr sharing are performed within newly established group 2+3. Merging of the groups may result with a genset stopping, if power management evaluates that available Actual Reserve is high enough to stop a genset.

5.4.12 Distributed power management signals

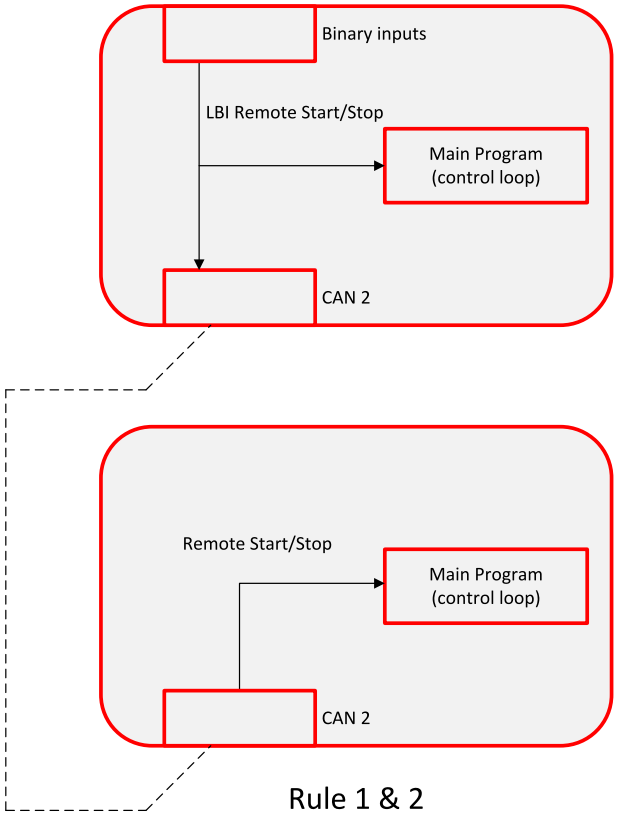
Sharing of multiple Logical Binary Input (LBI) functions is critical for power management system operation, because several power management functionality require simultaneous activation of LBI functions in controllers, which are involved in power management operation. It can be done either automatically using CAN2 bus link between controllers or using dedicated LBI functions.

These LBI functions are shared automatically:

- System Start/Stop
- Min Run Power Act
- Load Res 2 Active
- MCB Feedback

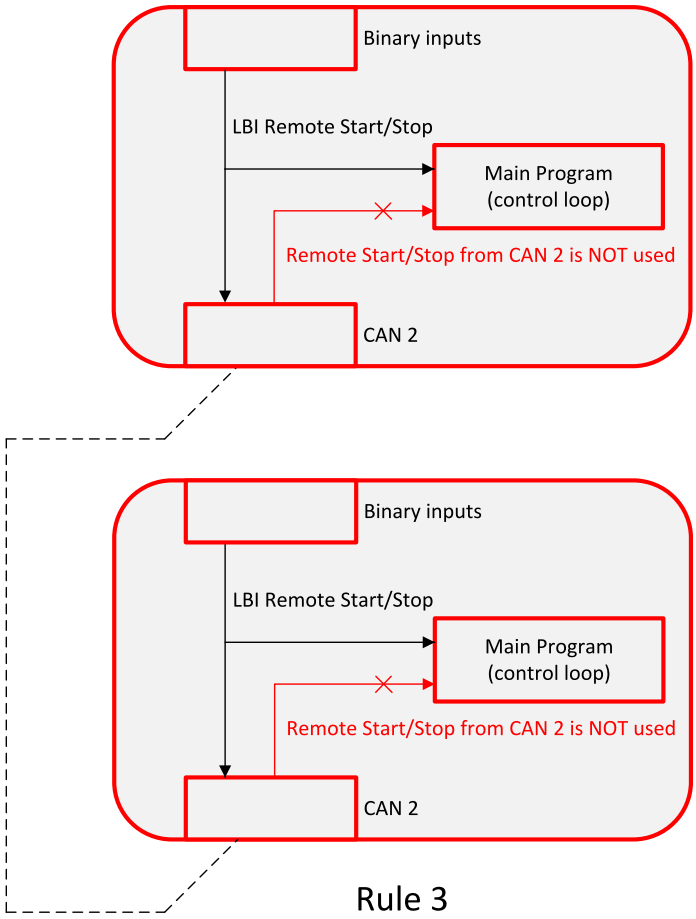
These rules applies to the automatic sharing of the selected signals:

1. LBI state is automatically shared via CAN2 bus, if corresponding LBI function is configured in a controller.
   > **Example:** Logical input Remote Start/Stop is configured with a controller. State of the signal is automatically transmitted to other controllers via CAN2 bus as System Start/Stop.
2. LBI state received from CAN2 bus is automatically used, if corresponding LBI function is not configured in a controller.
   > **Example:** LBI Remote Start/Stop is not configured with a controller, but automatically shared System Start/Stop is received from CAN2 bus. Controller follows state of the shared LBI signal then.



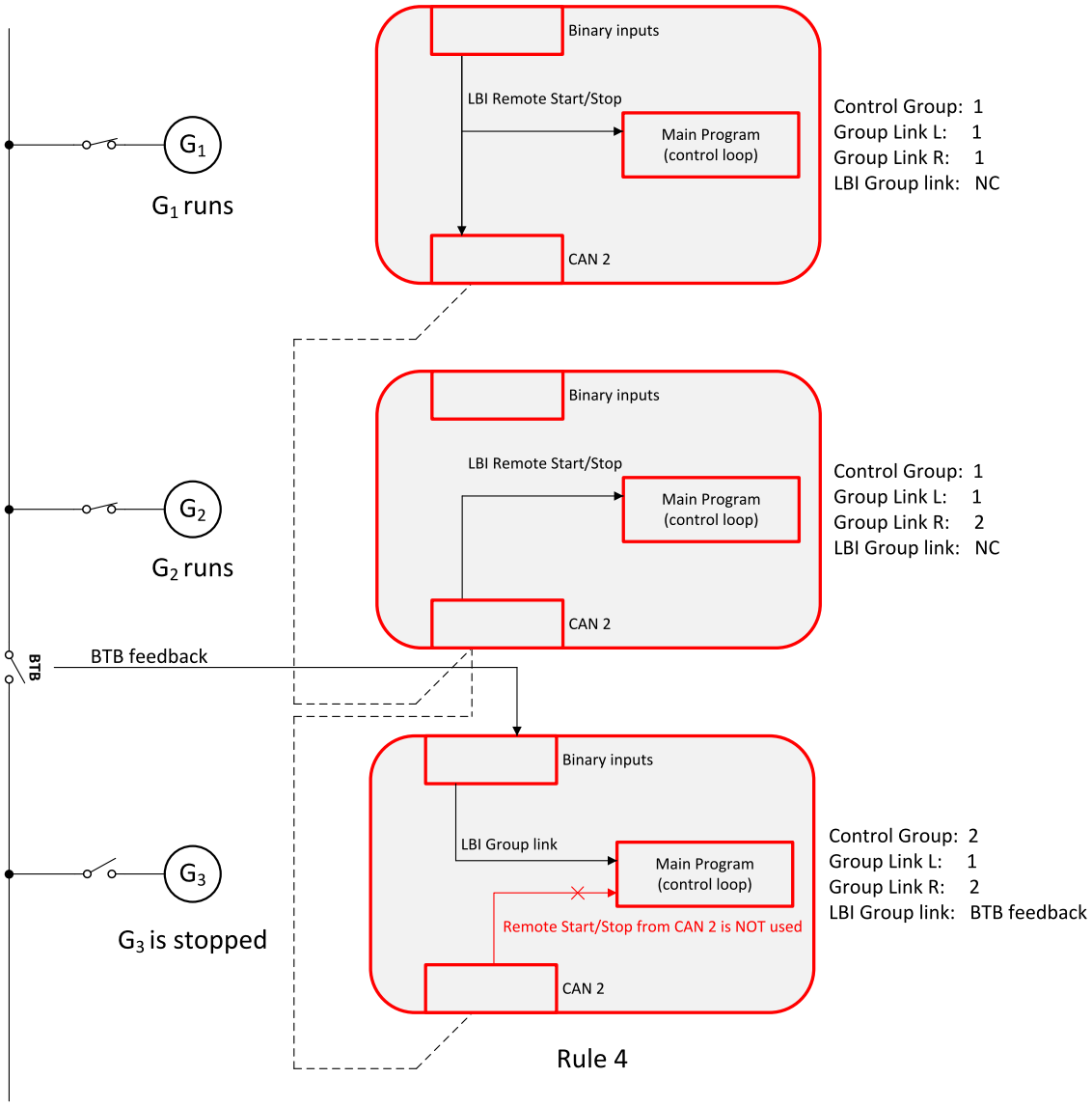
Rule 1 & 2

3. LBI state received from CAN2 bus is not used, if corresponding LBI function is configured in a controller.
   > **Example:** LBI Remote Start/Stop is configured with a controller. Controller follows only state of signal linked with the Remote Start/Stop function. The function is not activated by a shared System Start/Stop signal.



Rule 3

4. LBI function state transmitted via CAN2 bus is used only by controllers, which are in the same group as controller, which is source of the shared signal. Signal coming from controller in a different group is accepted only if the “source controller” group is linked with the “receiving controller” group.



5. LBI function can be configured with multiple controllers, which transmit through CAN2 bus state of the function. OR function applies to the function evaluation in controllers, in which the function is not configured. It means that function is activated by shared signal coming from any controller (rule 4. applies).

5.4.13 Regulation loops

Regulation loops overview

Regulation loops overview

Loop type	Related applications	Related setpoints
Frequency	MINT, SPtM, MCB, MGCB	**Frequency Gain (page 342)**, **Frequency Int (page 343)**
Load sharing	MINT	**Load Sharing Gain (page 344)**, **Load Sharing Int (page 344)**
Load	MINT, SPtM, MCB, MGCB	**Load Gain (page 343)**, **Load Int (page 344)**
Voltage	MINT, SPtM, MCB, MGCB	**Voltage Gain (page 351)**, **Voltage Int (page 351)**

Loop type	Related applications	Related setpoints
VAr sharing	MINT	**VAr Sharing Gain (page 352)**, **VAr Sharing Int (page 352)**
PF control	MINT, SPtM, MCB, MGCB	**PF Gain (page 351)**, **PF Int (page 352)**
Angle regulation	MINT, SPtM, MCB, MGCB	**Angle Gain (page 343)**

Speed, Frequency, Load sharing, Load regulation loops have one common output = Speed request. The value of this output is always composed from the contribution of each of the regulation loops.

Voltage, PF, VAr sharing have one common output = Voltage request. The value of this output is always composed from the contribution of each of the regulation loop.

Each of the regulation loops is active in some certain time during the process, which is given by the state of the automat. If no regulation loop is active the speed governor output is kept on the level given by setpoint **Speed Governor Bias (page 341)** or **Voltage Regulator Bias (page 349)** in case of voltage regulator output.

Note: *All regulation loops are PID, but only PI components are visible as setpoints.*

MINT regulation loops

Loop type	Description
Frequency	The frequency loop is active in the first phase of synchronization when the generator frequency is regulated to match the mains/bus frequency.
Load sharing	The load sharing loop is active in multiple-island operation.
Load	The load regulation loop is active when single gen-set is running in parallel with mains and during load transfers from mains to generator or vice versa. This regulation loop is also active when multiple gen-sets are running in parallel with Mains.
Voltage	The voltage regulation loop gets active after **Minimal Stabilization Time (page 271)**. The loop is deactivated at the beginning of cooling sequence.
VAr sharing	The VAr sharing loop is active in multiple-island operation.
PF control	The PF control loop is active when single gen-set is running in parallel with mains and during load transfers from mains to generator or vice versa. This regulation loop is also active when multiple gen-sets are running in parallel with Mains.
Angle regulation	The differential angle control loop is active during the synchronization when phase match type of synchronization is used.

SPtM regulation loop

Loop type	Description
Frequency	The frequency regulation loop gets active after **Minimal Stabilization Time (page 271)**. The loop is deactivated at the beginning of cooling sequence. Loop is not active in parallel operation. In parallel operation PF control loop is used.
Load	The load regulation loop is active when gen-set is running in parallel with mains and during load transfers from mains to generator or vice versa.
Voltage	The voltage regulation loop gets active after **Minimal Stabilization Time (page 271)**. The loop is deactivated at the beginning of cooling sequence. Loop is not active in parallel operation. In parallel operation PF control loop is used.
PF control	The PF control loop is active when gen-set is running in parallel with mains and during

Loop type	Description
	load transfers from mains to generator or vice versa.
Angle regulation	The differential angle control loop is active during the synchronization when phase match type of synchronization is used.

Adjustment of regulation loops

The regulation loops have two adjustable factors: P-factor and I-factor (except angle regulation loop, which has P-factor only). The P-factor (gain) influences the stability and overshoot of the regulation loop and the I-factor (int) influences the steady-state error as well as the settling time. See the picture below for typical responses of a PI regulation loop.

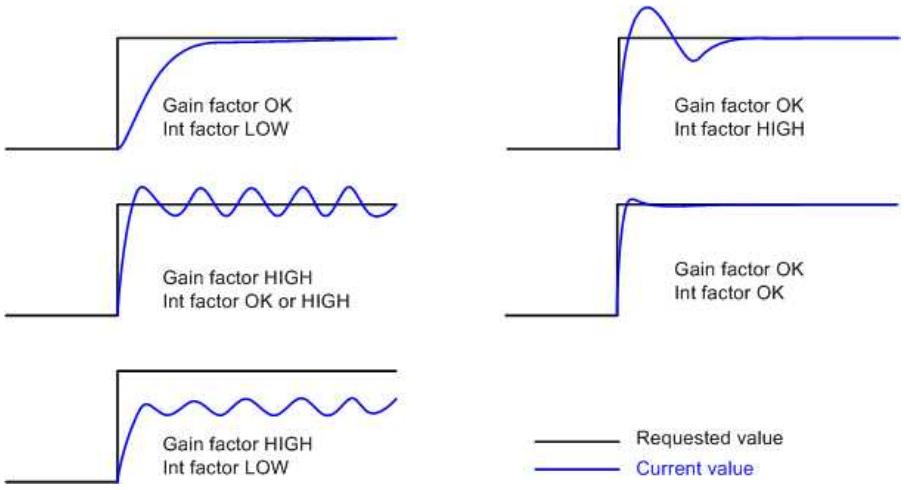


Image 5.33 Typical responses of PI regulator

For manual tuning of a control loop use following method:

- Set both the I-factor and P-factor to 0.
- Increase the P-factor slightly until the system starts to oscillate.
- Adjust the P-factor back to approx. one half of the value where the oscillations started.
- Increase the I-factor slightly to achieve optimal resulting response.

IMPORTANT: Be ready to press emergency stop button in case the regulation loop would start to behave unacceptable while it is being adjusted.

5.4.14 Speed/Load control

The speed control output is used to control the speed or the power of the engine. The frequency regulation, load regulation and load sharing are realized through the speed control. The speed request is internal value of the regulator. This value is transformed to range -10 .. 10 V based on setpoints **Speed Governor Low Limit (page 341)** and **Speed Governor High Limit (page 341)**. This value of speed request is then transformed to request which comes out of the controller. There are several ways how to send this request to gen-set:

- Analog output (speed governor output)
- ECU speed control
- Binary pulse control

Speed control outputs

Analog Output (speed governor output)

The speed regulator of the engine is controlled by the analog signal from controller. Please see the chapter **Speed governor interface (page 57)** for more information about speed governor.

The direction of speed regulation required by Speed regulator of the engine is given by the setpoint **Speed Regulator Character (page 340)**. A full range change of the speed governor output (from **Speed Governor Low Limit (page 341)** to **Speed Governor High Limit (page 341)**) should cause 5-10% change of the engine speed (**Speed Governor Low Limit (page 341)** ~ 95% **Nominal RPM (page 258)**, **Speed Governor Bias (page 341)** ~ 100% **Nominal RPM (page 258)**, **Speed Governor High Limit (page 341)** ~ 105% **Nominal RPM (page 258)**).

> **IMPORTANT: Speed governor has to be adjusted for optimum performance before Speed/Load control adjusting. Check generator phase sequence before the first GCB connection.**

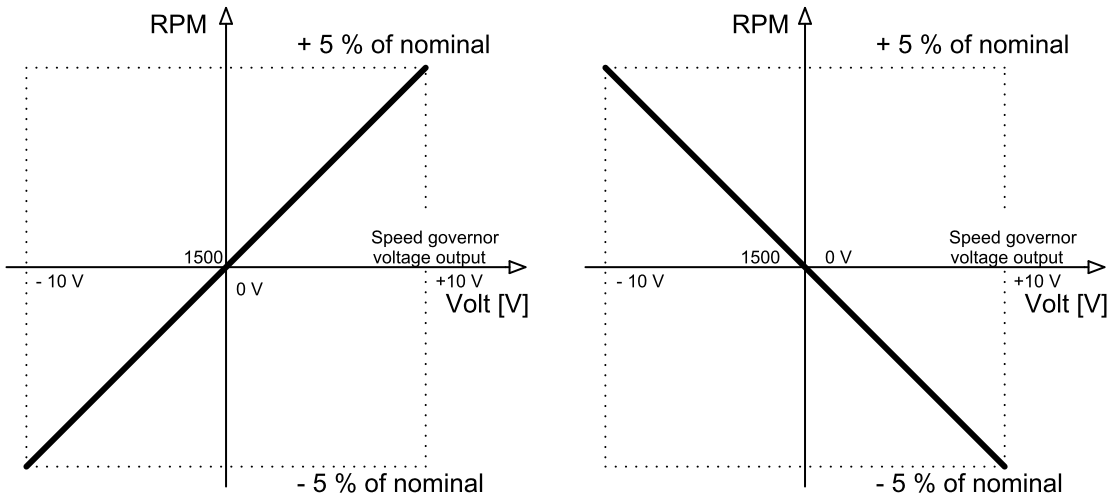


Image 5.34 Example of speed governor curve

ECU speed control

In case that ECU with speed control support is configured, then the speed is controlled via ECU.

Binary pulse control

The internal speed request is transformed to Up/Down pulse control. These pulses get out of the controller via binary outputs **SPEED UP (PAGE 722)** and **SPEED DOWN (PAGE 722)**. Length of pulses **SPEED UP (PAGE 722)** and **SPEED DOWN (PAGE 722)** depends on the difference of actual RPM and requested RPM (actual power and requested power, actual frequency and requested frequency) and on the parameter **Tau Speed Governor Actuator (page 342)**. **Tau Speed Governor Actuator (page 342)** defines the pulse duration which is needed for the speed controller to travel from minimal position to the maximal position. The Maximum length of pulses is limited to 5 s, the minimal length of pulses is limited to 150 ms and minimal length between the pulses is 200 ms.

Speed/Load control adjustment

Synchronization adjustment

- Start the engine in MAN Mode.
- Set the engine RPM by speed trim on the speed governor or by **Speed Governor Bias (page 341)**, **Speed Governor Low Limit (page 341)** and **Speed Governor High Limit (page 341)** to achieve frequency according to setpoint **Nominal Frequency (page 257)**.
- To start the synchronization press GCB ON/OFF button. GCB LED starts to flash to indicate synchronization. To stop synchronization press again GCB ON/OFF .
- Adjust **Frequency Gain (page 342)** to unstable speed control and decrease value by 30 % to insure stable performance.
- Adjust **Frequency Int (page 343)** to stable (fast and smooth) slip control. Synchroscope movement on the controller measure screen should slow down and stop (in any position, because **Angle Gain (page 343)** control is off).
- Set **Angle Gain (page 343)**. Synchroscope on the controller measure screen should move slowly and stop in “up“ position. Set **Angle Gain (page 343)** to unstable value (synchroscope swings) and decrease value by 30 % to insure stable performance.

Load control adjustment

IMPORTANT: Prior to Speed/Load control adjustment, the Voltage/PF control has to be adjusted.

MINT application

Load control loop is active in parallel to mains mode only (MCB feedback closed). Switch off other engines while adjusting.

1. Set **#System BaseLoad (page 245)** setpoint to 30 % of one gen-set.
2. Set **Load Gain (page 343)** to the same value as **Angle Gain (page 343)**. Set **Load Int (page 344)** to zero.
3. Start the gen-set in MAN Mode, press GCB ON/OFF button to synchronize and close gen-set to mains.
4. When GCB is closed, gen-set load slowly increases to **#System BaseLoad (page 245)** value. Check that gen-set power is positive (CT polarity).
5. Increase **Load Int (page 344)** to unstable load control and decrease value by 30 % to insure stable performance. When **Load Int (page 344)** factor is set to zero gen-set load can differ from required **#System BaseLoad (page 245)**.
6. To adjust and optimize **Load Int (page 344)** change **#System BaseLoad (page 245)** several times between 30 and 70 % of **Nominal Power (page 252)**. Usually setting **Load Int (page 344)** to 100 % gives optimal performance.
7. When gen-set is running under full load check if
   a. Speed governor output voltage value is not limited (it does not reach **Speed Governor Low Limit (page 341)** or **Speed Governor High Limit (page 341)**)
   b. Speed governor actuator is not mechanically limited or operates in a small section of the throttle range.

SPtM application

Load control loop is active in parallel to mains mode only (MCB feedback closed).

1. Set **Load Control PTM (page 240)** = BASELOAD, set **Baseload (page 243)** setpoint to 30 % **Nominal Power (page 252)** of gen-set.

2. Set **Load Gain (page 343)** to the same value as **Angle Gain (page 343)**. Set **Load Int (page 344)** to zero.
3. Start the gen-set in MAN Mode, press GCB ON/OFF button to synchronize and close gen-set to mains.
4. When GCB is closed, gen-set load slowly increases to **Baseload (page 243)** value. Check that gen-set power is positive (CT polarity).
5. Increase **Load Gain (page 343)** to unstable load control and decrease value by 30 % to insure stable performance. When **Load Int (page 344)** factor is set to zero gen-set load can differ from required **Baseload (page 243)**.
6. To adjust and optimize **Load Int (page 344)** change **Baseload (page 243)** several times between 30 and 70 % of **Nominal Power (page 252)**. Usually setting **Load Int (page 344)** to 100% gives optimal performance.
7. When gen-set is running under full load check if
   a. Speed governor output voltage value is not limited (it does not reach **Speed Governor Low Limit (page 341)** or **Speed Governor High Limit (page 341)**)
   b. Speed governor actuator is not mechanically limited or operates in a small section of the throttle range.

5.4.15 Voltage/PF control

The voltage control output is used to control the voltage or the power factor of the engine. The voltage regulation, PF regulation and VAr sharing are realized through the voltage control. The voltage request is internal value of the regulator. This value is transformed to range -10 .. 10 V based on setpoints **Voltage Regulator Low Limit (page 350)** limit and **Voltage Regulator High Limit (page 350)**. This value of voltage request is then transformed to request which comes out of the controller. There are several ways how to send this request to gen-set:

- Analog output (integrated AVR interface)
- Binary pulse control

Voltage control outputs

Analog output (integrated AVR interface)

The voltage regulator of the engine is controlled by the analog signal from controller. Please see the chapter **AVR Interface (page 57)** for more information about AVR.

The direction of speed regulation required by Speed regulator of the engine is given by the setpoint **Voltage Regulator Character (page 349)**. A full range change of the AVR output (from **Voltage Regulator Low Limit (page 350)** to **Voltage Regulator High Limit (page 350)**) should cause 5-10% change of the voltage (**Voltage Regulator Low Limit (page 350)** ~ 95% **Nominal Voltage Ph-N (page 256)**, **Voltage Regulator Bias (page 349)** ~ 100% **Nominal Voltage Ph-N (page 256)**, **Voltage Regulator High Limit (page 350)** ~ 105% **Nominal Voltage Ph-N (page 256)**).

Binary pulse control

The internal voltage request is transformed to Up/Down pulse control. These pulses get out of the controller via binary outputs **AVR Up (page 690)** and **AVR Down (page 690)**. Length of pulses **AVR Up (page 690)** and **AVR Down (page 690)** depends on the difference of actual voltage and requested voltage (actual reactive power and requested reacted power, actual PF and requested PF) and on the parameter **Tau Voltage Governor Actuator (page 350)**. **Tau Voltage Governor Actuator (page 350)** defines the pulse duration which is needed for the voltage controller to travel from minimal position to the maximal position. The Maximum length of pulses is limited to 5s, the minimal length of pulses is limited to 150 ms and minimal length between the pulses is 200 ms.

Voltage/PF control adjustment

Voltage adjustment

- Set **Voltage Gain (page 351)**, **Voltage Int (page 351)** to zero and **Voltage Regulator Bias (page 349)** to 50%.
- Start the gen-set in MAN Mode to without load.
- Adjust generator voltage to **Nominal Voltage Ph-N (page 256)** by change of **Voltage Regulator Bias (page 349)**.
- Change **Voltage Regulator Bias (page 349)** to 0% and 100% to check generator voltage control range (typically ± 10 % of **Nominal Voltage Ph-N (page 256)**).
- Set **Voltage Regulator Bias (page 349)** to again reach **Nominal Voltage Ph-N (page 256)** on the generator.
- When gen-set is running unloaded increase carefully **Voltage Gain (page 351)** to unstable point and then decrease value by 30 % to insure stable performance.
- Adjust **Voltage Int (page 351)** (usually setting to 100% gives optimal performance).

PF adjustment

MINT application

Power factor control loop is active in parallel to mains mode only (MCB feedback closed). Switch off other engines while adjusting.

- Set the same values to **PF Gain (page 351)** and **PF Int (page 352)** as in the chapter **Voltage adjustment (page 141)** for parameters **Voltage Gain (page 351)** and **Voltage Int (page 351)**.
- Set **#System BaseLoad (page 245)** = 30 % of **Nominal Power (page 252)** and **#System Power Factor (page 246)** = 1.0.
- Start and synchronize the gen-set in MAN Mode by pressing GCB ON/OFF.
- When running in parallel to mains loaded on 30%, increase slowly **PF Gain (page 351)** to unstable point and then decrease the value by 30 % to insure stable performance.
- Adjust **PF Int (page 352)** (usually setting to 100% gives optimal performance).

Note: *To judge optimal adjusting of the power factor induce generator power jumps by **Voltage Regulator Bias (page 349)** change or by **#System BaseLoad (page 245)** change.*

SPtM application

Power factor control loop is active in parallel to mains mode only (MCB feedback closed).

- Set the same values to **PF Gain (page 351)** and **PF Int (page 352)** as in the chapter **Voltage adjustment (page 141)** for parameters **Voltage Gain (page 351)** and **Voltage Int (page 351)**.
- Set **Baseload (page 243)** = 30 % of **Nominal Power (page 252)** and **Base Power Factor (page 243)** = 1.0.
- Start and synchronize the gen-set in MAN Mode by pressing GCB ON/OFF.
- When running in parallel to mains loaded on 30%, increase slowly **PF Gain (page 351)** to unstable point and then decrease the value by 30 % to insure stable performance.
- Adjust **PF Int (page 352)** (usually setting to 100% gives optimal performance).

Note: *To judge optimal adjusting of the power factor induce generator power jumps by **Voltage Regulator Bias (page 349)** change or by **Baseload (page 243)** change.*

5.4.16 Gen-set operation states

Engine state machine

Init	Autotest during controller power on.
Not ready	Gen-set is not ready to start. **Example:** When shutdown alarm is active or unit is in OFF mode.
Ready	Gen-set is ready to run.
Prestart	Prestart sequence in process, **PRESTART (PAGE 718)** output is closed. **Example:** Usually used for preheating or processes executed prior gen-set start.
Cranking	Engine is cranking, **STARTER (PAGE 723)** output is closed
Pause	Pause between start attempts.
Starting	Starting speed is reached and the Idle timer is running.
Running	Gen-set is running at nominal speed.
Soft load	Gen-set power is ramping up
Loaded	Gen-set is running at nominal speed and **GCB CLOSE/OPEN (PAGE 701)** is closed.
Soft unld	Gen-set power is ramping down
Cooling	Gen-set is cooling before stop.
Stop	Stop. **Example:** Automatic or manual stop command was issued, engine is stopping.
Shutdown	Shut-down alarm activated.
Ventil	Gas engine - ventilation of unburned fuel when stop command comes during cranking with gas
SDVentil	Gas engine - ventilation of unburned fuel after unsuccessful start attempt
EmergMan	**EMERGENCY MAN (PAGE 649)** gen-set operation. **Example:** Used for bypass the controller and engine manual start.

Engine started conditions

- Engine speed (RPM) > **Starting RPM (page 266)** or
- Oil pressure > **Starting Oil Pressure (page 267)** or
- Binary input **OIL PRESSURE (PAGE 658)** is in logical 0 or
- D+ terminal active (reached 80% of supply voltage) for minimum 1 s or
- Generator voltage > 25% of **Nominal Voltage Ph-N (page 256)** or **Nominal Voltage Ph-Ph (page 256)** (any phase)

Note: *Any of these condition will disconnect starter of the engine, however for transition to next state RPM needs to be higher than* ***Starting RPM (page 266)****.*

Engine running conditions

- Engine speed (RPM) > **Starting RPM (page 266)** or
- Oil pressure > **Starting Oil Pressure (page 267)** or

- Binary input **OIL PRESSURE (PAGE 658)** is in logical 0 or
- Generator voltage > 25% of **Nominal Voltage Ph-N (page 256)**

Still engine conditions

- Engine speed (RPM) < **Starting RPM (page 266)** or
- Oil pressure < **Starting Oil Pressure (page 267)** or
- Binary input **OIL PRESSURE (PAGE 658)** is in logical 1 or
- Generator voltage < 50 V (any phase)

Note: *When the engine was running before and all above conditions are fulfilled, additional 2 s delay is necessary to confirm "still engine".*

When any engine running conditions are appeared on still engine than the **Wrn Stop Fail (page 795)** is activated with following delay:

- for generator voltage from 10 V to < 50 % of nominal voltage, Wrn Stop Fail has delay 1 s
- for generator voltage > 50 % of nominal voltage, Wrn Stop Fail has delay 200 ms
- Oil pressure > **Starting Oil Pressure (page 267)**, Wrn Stop Fail has delay 1 s
- Binary input **OIL PRESSURE (PAGE 658)** is in logical 0, Wrn Stop Fail has delay 1 s
- for detected RPM, there is no delay.

Stop engine conditions

If no engine running conditions are validated than the controller will wait extra 12 s before leaving the Machine state Stop and than it will release the **STOP SOLENOID (PAGE 724)** output.

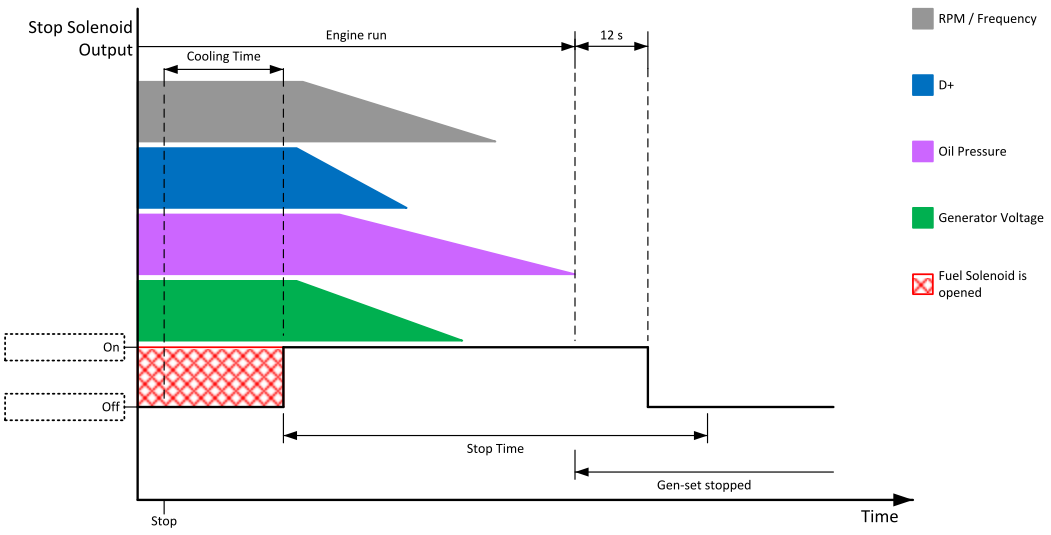


Image 5.35 Engine stops in **Stop Time (page 274)**

When the total time of stopping will exceed setpoint **Stop Time (page 274)** than the **Wrn Stop Fail (page 795)** and binary outputs are activated. The controller will continuously try to stop the engine.

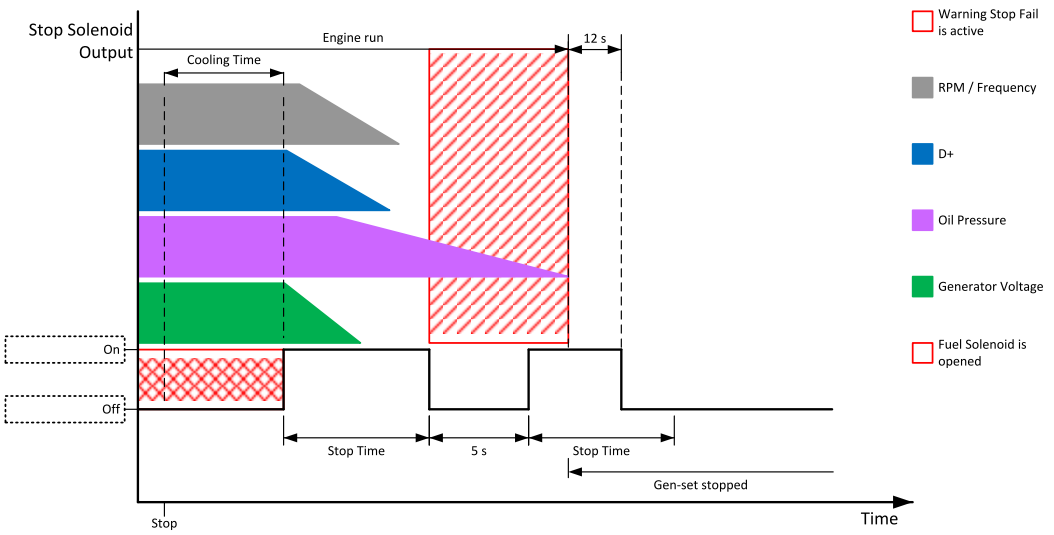


Image 5.36 Engine stops after first **Stop Time (page 274)**

Electric state machine

MainsOper	Mains is present and all its values are within limits. **Example:** MCB is closed, GCB is opened
MainsFlt	Mains fails
IslOper	Island operation **Example:** MCB is opened, GCB is closed
MainsRet	Mains recover
Synchro	Gen-set is synchronizing (MCB is closed, GCB is opened)
ParalOper	Gen-set is in parallel with mains (MCB is closed, GCB is closed)
BrksOff	GCB, MCB opened

5.4.17 Alarm management

The controller evaluates two levels of alarms. Level 1 – yellow alarm – is a pre-critical alarm that is only informative and does not take any action regarding gen-set control. Level 2 – red alarm – represents a critical situation, where an action must be taken to prevent damage of the gen-set or technology.

- One alarm of any type can be assigned to each binary input.
- Two alarms (one yellow and one red type) can be assigned to each analog input.
- There are also **Built-in alarms (page 149)** with fixed alarm types.
- Each alarm is written to the **Alarmlist (page 148)**.
- Each alarm causes a record to be written into the history log.
- Each alarm activates the Alarm and Horn output.
- Each alarm can cause sending of a SMS message or an email.

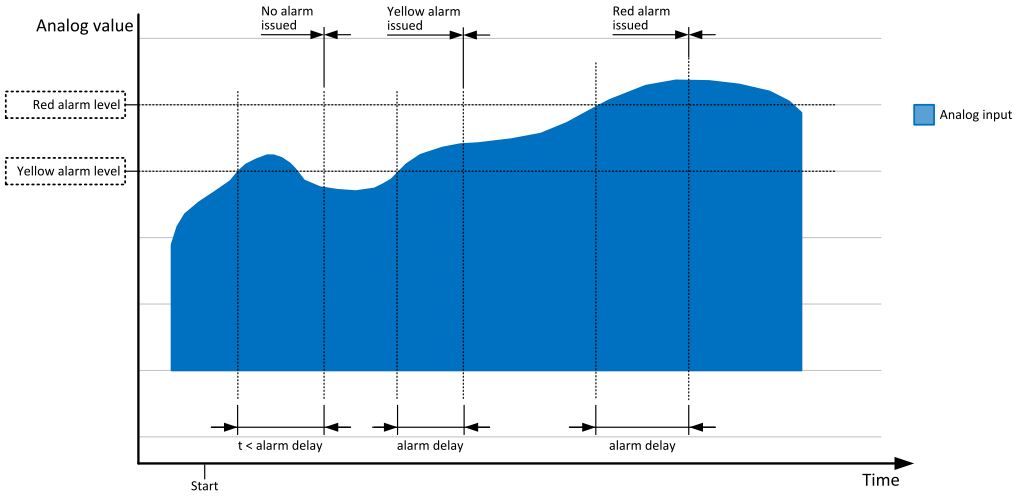


Image 5.37 Analog input alarm evaluation principle

Alarm handling

There are three different alarm categories regarding the period when the alarms are evaluated. The category is selectable for alarms assigned to binary/analog inputs and fixed for built-in alarms. The categories are the following:

- The alarm is evaluated all the time when the controller is switched on.
- The alarm is evaluated only when the engine is running. This type should be used for e.g. oil pressure. These alarms begin to be evaluated after the engine has been started with the delay given by the setpoint **Protection Hold Off (page 272)**.
- The alarm is evaluated only when the generator is excited. These alarms begin to be evaluated after the engine has been started and **Maximal Stabilization Time (page 272)** has elapsed or the GCB has been closed. They remain evaluated until cooling has finished. Only Generator under/overvoltage, Generator voltage unbalance and Generator under/overfrequency belong to this category. This category is not configurable to binary and analog input alarms.

If an alarm is being evaluated and the appropriate alarm condition is fulfilled, the delay of evaluation will start to run. The delay is adjustable by a setpoint (in the case of built-in alarms, analog input alarms) or is adjusted via configuration window in InteliConfig (in the case of binary input alarms). If the conditions persist, the alarm will activate. The alarm will not activate if the condition is dismissed while the delay is still running.

After pressing the Fault reset button or activating the binary input **Fault Reset Button (page 650)**, all active alarms change to confirmed state. Confirmed alarms will disappear from the Alarmlist as soon as the respective condition dismisses. If the condition is dismissed before acknowledging the alarm, the alarm will remain in the Alarmlist as Inactive.

Note: *The input **Sd Override (page 664)** can be used for temporary disabling of red alarms to shutdown the engine. This input may be used in situations where providing the power is extremely important – e.g. if the gen-set drives pumps for fire extinguishers (sprinklers).*

Alarm states

An alarm can have following states:

- Active alarm: the alarm condition persists, alarm delay has elapsed.
- Inactive alarm: the alarm condition has disappeared, but the alarm has not been confirmed.
- Confirmed alarm: the alarm condition persists, but the alarm has already been confirmed.



Image 5.38 Alarm List

Alarm types - Level 1

The level 1 alarm indicates that a value or parameter is out of normal limits, but has still not reached critical level. This alarm does not cause any actions regarding the gen-set control.

Warning (Wrn)

The alarm appears in the Alarmlist and is recorded into the history log. Activates the output **AL COMMON WRN (PAGE 671)** as well as the standard alarm outputs (**HORN (PAGE 707)** and **ALARM (PAGE 680)**).

Alarm indication (AL Indic)

The event is only indicated in the Alarmlist. It disappears for the alarmist automatically as soon as the cause disappears. Standard alarm outputs (**HORN (PAGE 707)** and **ALARM (PAGE 680)**) are not activated.

History record only (HistRecOnl)

The event is recorded into the history. Standard alarm outputs (**HORN (PAGE 707)** and **ALARM (PAGE 680)**) are not activated.

Alarm types - Level 2

The level 2 level alarm indicates that a critical level of the respective value or parameter has been reached.

Note: *It is not possible to start the engine if any red level protection is active or not confirmed.*

> **IMPORTANT: The gen-set can start by itself after acknowledging the alarms if there is no longer an active red alarm and the controller is in AUTO or TEST mode!**

Shutdown (Sd)

The alarm appears in the alarmlist and is recorded into the history log. It causes immediate stop of the Gen-set without unloading and cooling phase. Also GCB breaker is open. The gen-set cannot be started again while there is a shutdown alarm in the alarmlist. Activates the output **AL COMMON SD (PAGE 671)** as well as the standard alarm outputs (**HORN (PAGE 707)** and **ALARM (PAGE 680)**).

Breaker open and cool down (BOC)

The event appears in the alarmlist and is recorded into the history log. It causes immediate opening of the GCB (without unloading) and then the standard stop sequence with cooling follows. The gen-set cannot be started again while there is a BOC alarm in the alarmlist. Activates the output **AL COMMON BOC (PAGE 670)** as well as the standard alarm outputs (**HORN (PAGE 707)** and **ALARM (PAGE 680)**).

Slow stop (Stp)

The alarm appears in the alarmlist and is recorded into the history log. It causes stop of the gen-set by the standard stop sequence, i.e. including unloading and cooling phase. The gen-set cannot be started again while there is a slow stop alarm in the alarmlist. Activates the output **AL COMMON STP (PAGE 671)** as well as the standard alarm outputs (**HORN (PAGE 707)** and **ALARM (PAGE 680)**).

Sensor fail detection (FLS)

If the measured resistance on an analog input exceeds the valid range, a sensor fail will be detected and a sensor fail message will appear in the **Alarmlist (page 148)**. The valid range is defined by the most-left (RL) and most-right (RH) points of the sensor characteristic ±12.5% from RH-RL.

Note: *Sometimes there can be problem with lower limit of valid range which can be counted as negative number. In this case the lower limit is set as one half of the RL point of the sensor curve characteristic.*

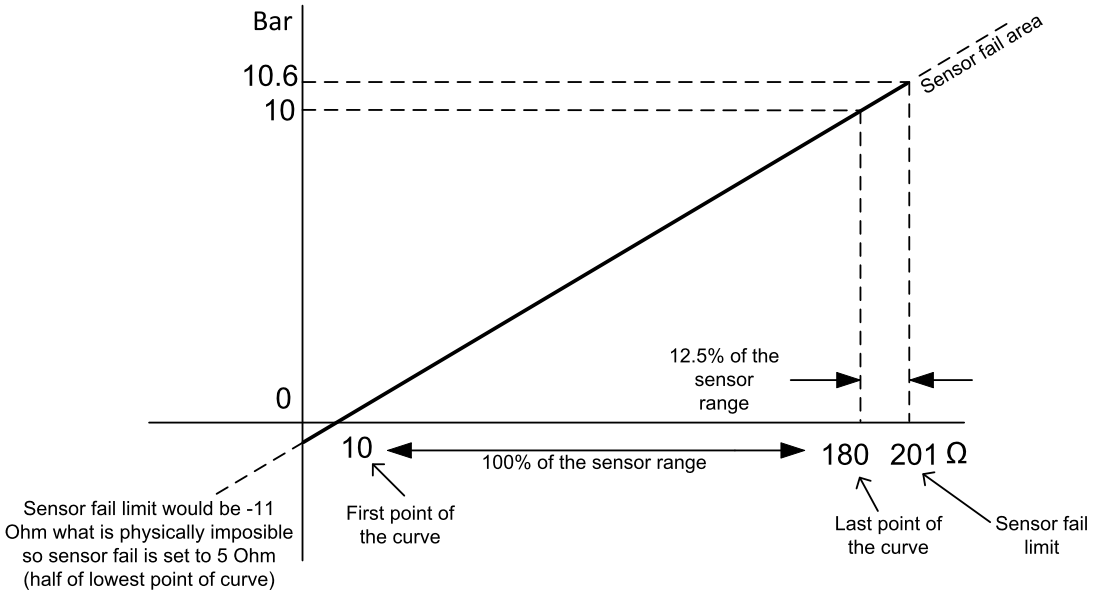


Image 5.39 Sensor fail detection principle

Remote alarm messaging

If communication plug-in module is connected to the controller, the controller can send SMS messages and emails at the moment when a new alarm appears in the **Alarmlist (page 148)** or new event is written in **History log (page 151)**. The message will contain a copy of the **Alarmlist (page 148)** or reasons from **History log (page 151)**. To enable this function, adjust setpoints **Event Message (page 490)**, **Wrn Message (page 491)**, **BOC Message (page 491)** and **Sd Messages (page 491)** to ON. Also enter a valid GSM phone number or email address to the setpoints **Telephone Number 1 (page 484)**, **Telephone Number 2 (page 484)**,

Telephone Number 3 (page 485), **Telephone Number 4 (page 485)**, **Email Address 1 (page 487) Email Address 2 (page 488)Email Address 3 (page 488)**, and **Email Address 4 (page 489)**.

The list of all supported terminals shows the table below:

Terminal	Event SMS	Warning SMS	BOC SMS	Shutdown SMS	Event email	Warning email	BOC email	Shutdown email
CM-RS232-485	no	no	no	no	no	no	no	no
CM-Ethernet	no	no	no	no	yes	yes	yes	yes
CM-GPRS	yes	yes	yes	yes	yes* yes*	yes*yes*	yes* yes*	yes*yes*
CM-4G-GPS	yes	yes	yes	yes	yes* yes*	yes*yes*	yes* yes*	yes*yes*

Note: ** Only with enabled **Mode (page 475)**.*

Alarmlist

Alarmlist is a container of active and inactive alarms. It will appear automatically on the controller display, if a new alarm occurs, or can be displayed manually from the display menu.

Active alarms are shown as inverted, not yet confirmed alarms are marked with asterisk before them.

Alarmlist contains three types of alarms:

- Controller built-in alarms
- User configured alarms on binary or analog inputs
- ECU alarms

Controller built-in alarms

An alarm message in the alarmlist begins with a prefix, which represents the alarm type (e.g. Wrn, Sd, BOC, Stp, MP, MPR). Then the alarm name follows. In some cases the prefix can be omitted.

User configured alarms

An alarm message in the alarmlist begins with a prefix, which represents the alarm type (e.g. Wrn, Sd, BOC). Alarm type is selected by user during the configuration of binary or analog input as alarm. Then the alarm name follows. Name is adjusted by user during the configuration of binary or analog input as alarm.

ECU alarms

The ECU alarms are received from the ECU. The alarms are represented by the Diagnostic Trouble Code, which contains information about the subsystem where the alarm occurred, the alarm type and the alarm occurrence counter.

The most common fault codes are translated into text form. Other fault codes are displayed as a numeric code and the engine fault codes list must be used to determine the reason.

Built-in alarms

Events specification	Protection type	Description
Analog Input 1 Wrn	WRN	Value measured on analog input 1 is </> than **Analog Protection 1 Wrn (page 361)** setpoint.
Analog Input 1 Sd	SD	Value measured on analog input 1 is </> than **Analog Protection 1 Sd (page 361)** setpoint.
Analog Input 2 Wrn	WRN	Value measured on analog input 2 is </> than **Analog Protection 2 Wrn (page 363)** setpoint.
Analog Input 2 Sd	SD	Value measured on analog input 2 is </> than **Analog Protection 2 Sd (page 364)** setpoint.
Analog Input 3 Wrn	WRN	Value measured on analog input 3 is </> than **Analog Protection 3 Wrn (page 366)** setpoint.
Analog Input 3 Sd	SD	Value measured on analog input 3 is </> than **Analog Protection 3 Sd (page 367)** setpoint.
Analog Input 4 Wrn	WRN	Value measured on analog input 4 is </> than **Analog Protection 4 Wrn (page 369)** setpoint.
Analog Input 4 Sd	SD	Value measured on analog input 4 is </> than **Analog Protection 4 Sd (page 370)** setpoint.
Wrn Battery Voltage	WRN	Battery voltage is out of limits given by **Battery Undervoltage (page 294)** and **Battery Overvoltage (page 294)** setpoints.
Binary input		Configurable Warning/BOC/Shutdown alarms on the binary inputs.
Sd Battery Flat	SD	If the controller switches off during starting sequence (**STARTER (PAGE 723)** output is active) it doesn't try to start again and activates this protection (controller assumes bad battery condition).
Sd Start Fail	SD	Gen-set start failed. All crank attempts were tried without success.
Parameters Fail	NONE	Wrong check-sum of parameters. Happens typically after downloading new firmware or changing of the parameter. The controller stays in INIT mode. Check all parameters, change value of at least one parameter.
Sd Gen Lx >V BOC Gen Lx <V (where x=1,2,3)	SD BOC	The generator voltage is out of limits given by Gen <V BOC and Gen >V Sd setpoints.
BOC Gen V Unbalance	BOC	The generator voltage is unbalanced more than the value of **Voltage Unbalance BOC (page 303)** setpoint.
BOC Gen >, <Frequency	BOC	The generator frequency is out of limits given by **Generator Overfrequency BOC (page 304)** and **Generator Underfrequency BOC (page 305)** setpoints.
BOC Current Unbalance	BOC	The generator current is unbalanced more than the value of **Current Unbalance BOC (page 301)** setpoint.
BOC Current IDMT	BOC	Generator current exceeds the limit for IDMT protection given by **Nominal Current (page 253)** and **IDMT Overcurrent Delay (page**

Events specification	Protection type	Description
		300) setpoints.
BOC Overload	BOC	The load is greater than the value given by **Overload BOC (page 298)** setpoint.
Sd Earth Fault	SD	This alarm is activated when Earth Fault value exceeds **Earth Fault Sd (page 502)** limit for at least **Earth Fault Delay (page 501)** period.
Sd Overspeed	SD	The protection comes active if the speed is greater than **Overspeed Sd (page 278)** setpoint.
Sd Underspeed	SD	During starting of the engine when the RPM reach the value of **Starting RPM (page 266)** setpoint the starter is switched off and the speed of the engine can drop under **Starting RPM (page 266)** again. Then the Underspeed protection becomes active. Protection evaluation starts 5 seconds after reaching **Starting RPM (page 266)**.
Emergency Stop	SD	If the input Emergency Stop is opened shutdown is immediately activated.
GCB Fail	SD	Failure of generator circuit breaker.
MCB Fail	WRN	Failure of mains circuit breaker.
Sd RPM Measurement Fail	SD	Failure of magnetic pick-up sensor for speed measurement. This alarm appears, if starter was disengaged for other reason than overcrossing **Starting RPM (page 266)** (like oil pressure or D+) and at the end of timer **Maximum Cranking Time (page 265)** there are no RPMs > **Starting RPM (page 266)** detected.
Wrn Stop Fail	WRN	Gen-set stop failed. See description at Gen-set Operation States chapter.
Wrn Maintenance 1	WRN	The period for servicing is set by the **Maintenance Timer 1 (page 295)** setpoint. The protection comes if counter reaches zero.
Wrn Maintenance 2	WRN	The period for servicing is set by the **Maintenance Timer 2 (page 296)** setpoint. The protection comes if counter reaches zero.
Wrn Maintenance 3	WRN	The period for servicing is set by the **Maintenance Timer 3 (page 296)** setpoint. The protection comes if counter reaches zero.
Charge Alternator Fail	WRN	Failure of alternator for charging the battery.
Sd Override	WRN	The protection is active if the output Sd Override is closed.
Mains CCW Rot	WRN	Mains voltage phases are not wired correctly. MCB closing is prohibited by controller.
Generator CCW Rot	WRN	Genset voltage phases are not wired correctly. GCB closing is prohibited by controller.
Stp Synchronization Fail	STP	If the synchronization timeout gets elapsed (forward synchronization).
Wrn Reverse synchro Fail	WRN	If the synchronization timeout gets elapsed (reverse synchronization).
BOC Reverse	BOC	The reverse power is higher than limit adjusted via setpoint **Reverse**

Events specification	Protection type	Description
Power		**Power Level (page 306)**.
BOC Excitation Loss	BOC	The reactive power is higher than limit adjusted via setpoint **Excitation Loss Level (page 306)**.
Wrn Voltage Regulation Limit	WRN	The AVR output stays close to one of the limit values for more than 2 seconds.
Wrn Speed Regulation Limit	WRN	The speed governor output stays close to one of the limit values for more than 2 seconds.

Note: *This table does not contain all alarms in controller. It is only list of the most common alarms.*

5.4.18 History log

The history log is an area in the controller's non-volatile memory that records "snapshots" of the system at moments when important events occur. The history log is important especially for diagnostics of failures and problems. When the history file is full, the oldest records are removed.

Each record has the same structure and contains:

• The event which caused the record (e.g. "Overspeed alarm" or "GCB closed")

• The date and time when it was recorded

• All important data values like RPM, kW, voltages, etc. from the moment that the event occurred.

Record structure

Name	Abbreviation	Description
Number	No.	Row number (0 corresponds to the last record, -1 to the previous one, etc.)
Reason	Reason	Reason for history record (any event or alarm related to the gen-set
Time	Time	Time
Date	Date	Date
RPM	RPM	Engine rotations per minute
Power	Pwr	Generator active power
Reactive power	Q	Generator reactive power
Power Factor	PF	Generator power factor
Load Character	LChr	Generator load character
Generator Frequency	Gfrq	Generator Frequency
Generator Voltage	Vg1	Generator voltage Ph1
Generator Voltage	Vg2	Generator voltage Ph2
Generator Voltage	Vg3	Generator voltage Ph3
Generator Voltage	Vg12	Generator voltage Ph12
Generator Voltage	Vg23	Generator voltage Ph23

Generator Voltage	Vg31	Generator voltage Ph31
Generator Current	IL1	Generator current Ph1
Generator Current	IL2	Generator current Ph2
Generator Current	IL3	Generator current Ph3
Mains Frequency	Mfrq	Mains Frequency
Mains Voltage	Vm1	Mains voltage Ph1
Mains Voltage	Vm2	Mains voltage Ph2
Mains Voltage	Vm3	Mains voltage Ph3
Mains Voltage	Vm12	Mains voltage Ph12
Mains Voltage	Vm23	Mains voltage Ph23
Mains Voltage	Vm31	Mains voltage Ph31
Voltage Battery	VBat	Voltage of battery
Analog Input 1	Ain1	Analog input 1
Analog Input 2	Ain2	Analog input 2
Analog Input 3	Ain3	Analog input 3
Analog Input 4	Ain4	Analog input 4
Binary Inputs	BIN	Controller binary inputs
Binary Outputs	BOUT	Controller binary outputs
Speed regulator	SRO	Speed regulator output
Voltage regulator	VRO	Voltage regulator output
Running nominal power	TRPN	Nominal power of all running gen-sets
Available nominal power	APN	Available nominal power of all gen-sets
Controller Mode	Mode	Controller mode

Note: *When some setpoint is changed, in history log is written its number of communication object.*

Note: *Some additional columns can be added due to actual controller configuration (ECU, modules, etc.).*

5.4.19 Breaker control

The following power switches are controlled by the controller:

- The generator circuit breaker or contactor – GCB

It is possible to use either a motorized circuit breaker or contactor. Below is a list of available control outputs that should fit all types of contactors or breakers. The following rules must be kept to when designing the wiring of power switches:

- The control outputs must be configured and wiring of the power switches must be provided in such a way, that the controller has full control over the breakers – i.e. the controller can open and close the breaker at any time.
- The breaker must respond within max. 2 seconds to a close and open command. Special attention should be paid to opening of motorized circuit breakers, as it could take more than 2 seconds on some types. In such cases it is necessary to use an undervoltage coil for fast opening.

- After opening the breaker, there is internal delay for another closing of breaker. Delay is 6 seconds - 5 seconds for OFF coil and 1 second for UV coil. After these 6 seconds, breaker can be closed again. For opening of breaker there is no delay.

Breaker control outputs

Close/Open	An output for control of a contactor. Its state represents the breaker position requested by the controller. The breaker must react within 2 seconds to a close or open command, otherwise an alarm is issued.
ON coil	An output giving a 2 second pulse in the moment the breaker has to be closed. The output is intended for control of close coils of circuit breakers.
OFF coil	An output giving a pulse in the moment the breaker has to be opened. The pulse lasts until the feedback deactivates, but at least for 2 seconds. The output is intended for control of open coils of circuit breakers.
UV coil	The GCB UV coil output is active the whole time the gen-set is running (not in idle or cooling). The output is deactivated for at least 2 seconds in the moment the breaker has to be switched off. The output is intended for control of undervoltage coils of circuit breakers.

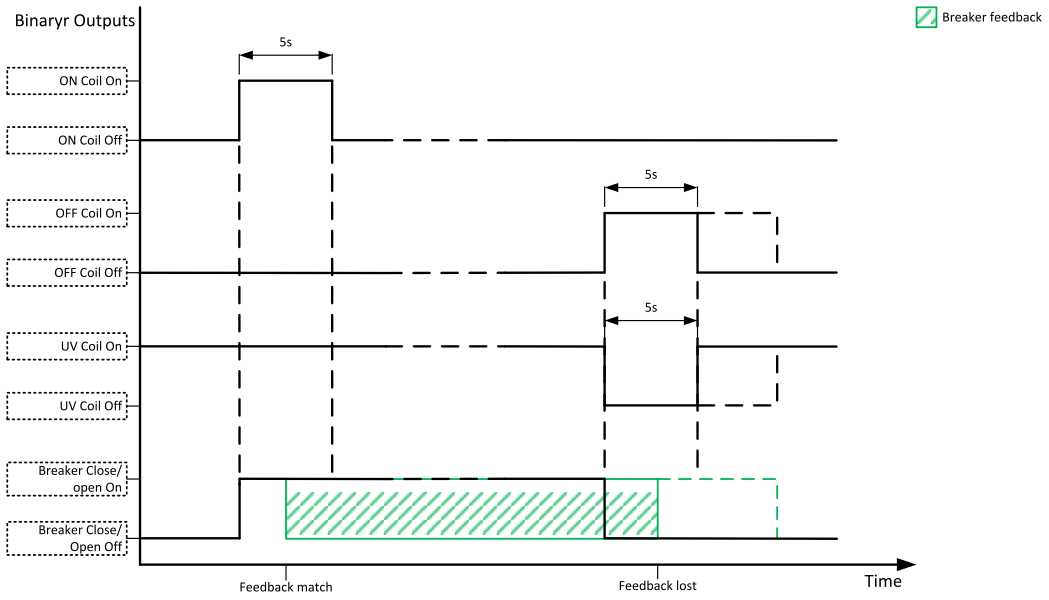


Image 5.40 Breaker control outputs

MCB special requirements

- If a contactor is used on the MCB position, it is recommended that the wiring be provided in such a way that the contactor will be normally closed and will open if the logical binary output **MCB CLOSE/OPEN (PAGE 711)** closes. This behavior is called “negative logic” and can be adjusted by the setpoint **MCB Logic (page 318)**. The negative logic will prevent accidental opening of the MCB when the controller is switched off.
- If a contactor is used on the MCB position, it will open itself immediately after the mains have failed, because it will lose power for the coil. That is why the following adjustment is necessary to prevent triggering the **Wrn MCB Fail (page 794)** alarm: **MCB Opens On (page 320)** = Mains Fail, **Mains < > Voltage Delay (page 316)** ≤ 1.

- If a 230 V motor driven circuit breaker is used on the MCB position and an undervoltage coil is not fitted, it is not possible to open the breaker after the mains have failed, because there is no power for the motor drive until the gen-set is started and providing voltage. Adjusting the setpoint **MCB Opens On (page 320)** = Gen Run will prevent triggering the **Wrn MCB Fail (page 794)** alarm.

Breaker fail detection

Breaker fail detection is based on binary output breaker close/open comparing with binary input breaker feedback.

IMPORTANT: It is necessary to configure breaker feedback to use this function.

There are three different time delays for breaker fail detection – see following diagrams.

IMPORTANT: When controller is synchronizing, there is only 2 seconds delay for breaker fail detection.

When binary output breaker close/open is in steady state and breaker feedback is changed the breaker fail is detected immediately (no delay).

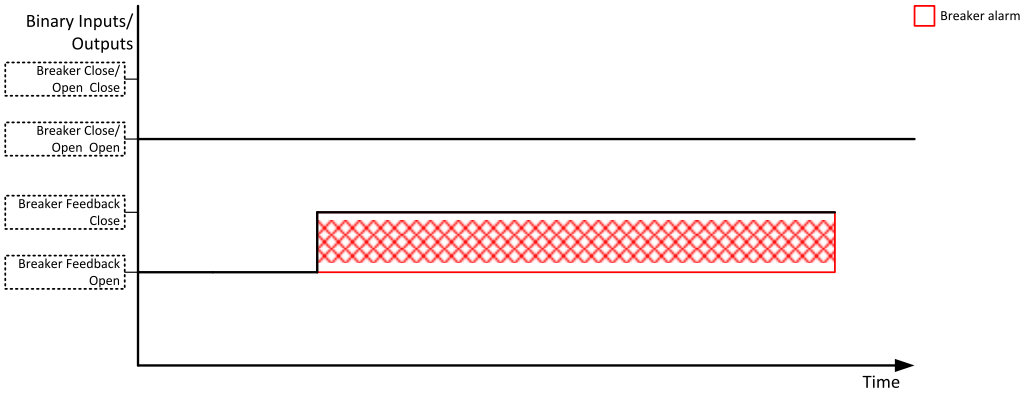


Image 5.41 Breaker fail - breaker close/open in steady position - open

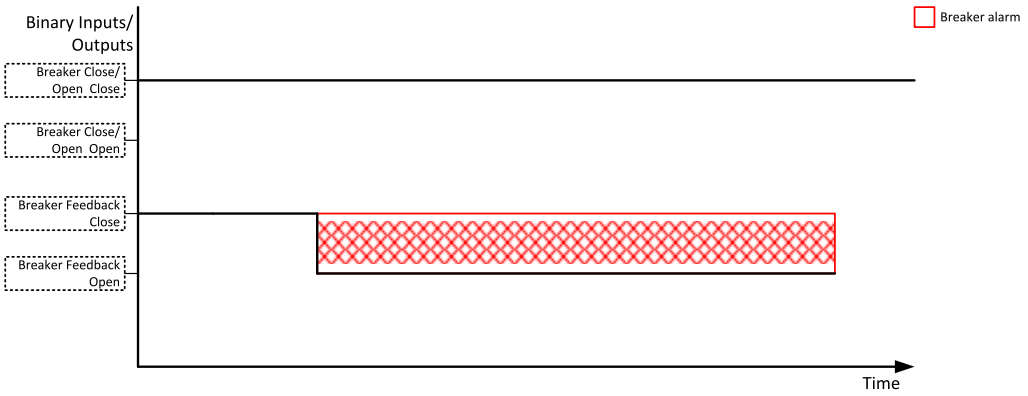


Image 5.42 Breaker fail - breaker close/open in steady position - close

When binary output breaker close/open opens there is 2 sec delay for breaker fail detection.

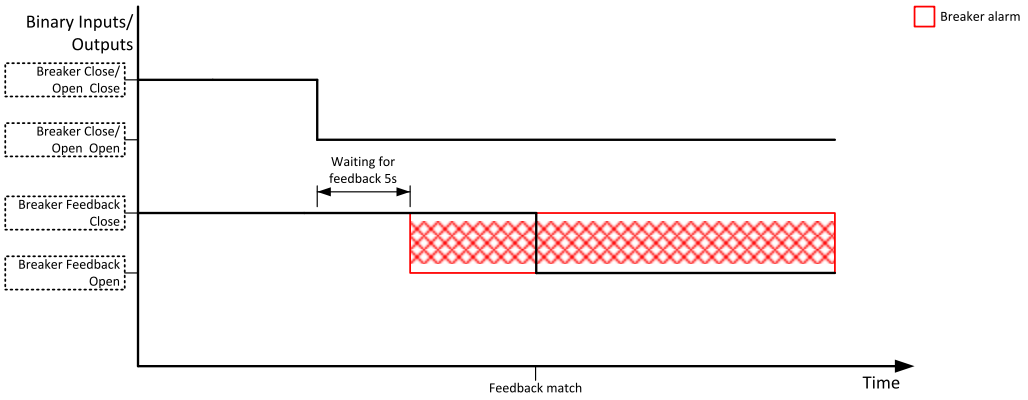


Image 5.43 Breaker fail - breaker close/open opens

When binary output breaker close/open closes there is 2 sec delay for breaker fail detection.

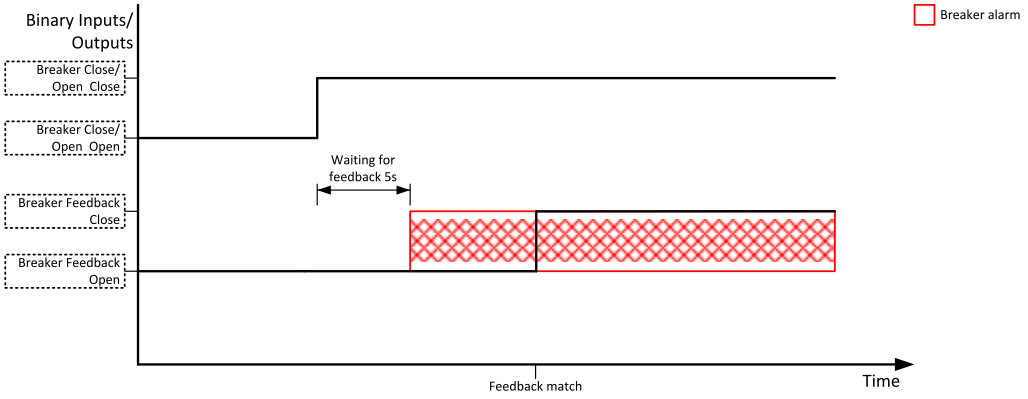


Image 5.44 Breaker fail - breaker close/open closes

5.4.20 Exercise timers

The exercise (general-purpose) timers in controller are intended for scheduling of any operations such as e.g. periodic tests of the gen-set, scheduled transfer of the load to the gen-set prior to an expected disconnection of the mains etc.

Related setpoints for timer 1 are:

- **Timer 1 Function (page 423)**
- **Timer 1 Repetition (page 424)**
- **Timer 1 First Occur. Date (page 424)**
- **Timer 1 First Occur. Time (page 424)**
- **Timer 1 Duration (page 425)**
- **Timer 1 Repeated (page 425)**
- **Timer 1 Repeat Day (page 428)**
- **Timer 1 Day (page 427)**
- **Timer 1 Repeated Day In Week (page 428)**
- **Timer 1 Repeat Day In Month (page 428)**
- **Timer 1 Repeat Week In Month (page 429)**
- **Timer 1 Refresh Period (page 426)**
- **Timer 1 Weekends (page 427)**

Related setpoints for timer 2 are:

- **Timer 2 Function (page 430)**
- **Timer 2 Repetition (page 431)**
- **Timer 2 First Occur. Date (page 431)**
- **Timer 2 First Occur. Time (page 431)**
- **Timer 2 Duration (page 432)**
- **Timer 2 Repeated (page 432)**
- **Timer 2 Repeat Day (page 435)**
- **Timer 2 Day (page 434)**
- **Timer 2 Repeated Day In Week (page 435)**
- **Timer 2 Repeat Day In Month (page 435)**
- **Timer 2 Repeat Week In Month (page 436)**
- **Timer 2 Refresh Period (page 433)**
- **Timer 2 Weekends (page 434)**

Available modes of each timer:

Once	This is a single shot mode. The timer will be activated only once at preset date/time for preset duration.
Daily	The timer is activated every "x-th" day. The day period "x" is adjustable. Weekends can be excluded. E.g. the timer can be adjusted to every 2nd day excluding Saturdays and Sundays.
Weekly	The timer is activated every "x-th" week on selected weekdays. The week period "x" is adjustable. E.g. the timer can be adjusted to every 2nd week on Monday and Friday.
Monthly	The timer is activated every "x-th" month on the selected day. The requested day can be selected either as "y-th" day in the month or as "y-th" weekday in the month. E.g. the timer can be adjusted to every 1st month on 1st Tuesday.
Short period	The timer is repeated with adjusted period (hh:mm). The timer duration is included in the period.

Once mode

Set-up via InteliConfig

To set-up timer via InteliConfig go to the setpoint ribbon, setpoint group scheduler and setpoint *Timer 1 Setup*.

Note: *First of all function of timer has to be adjusted via setpoint* ***Timer 1 Function (page 423)****.*

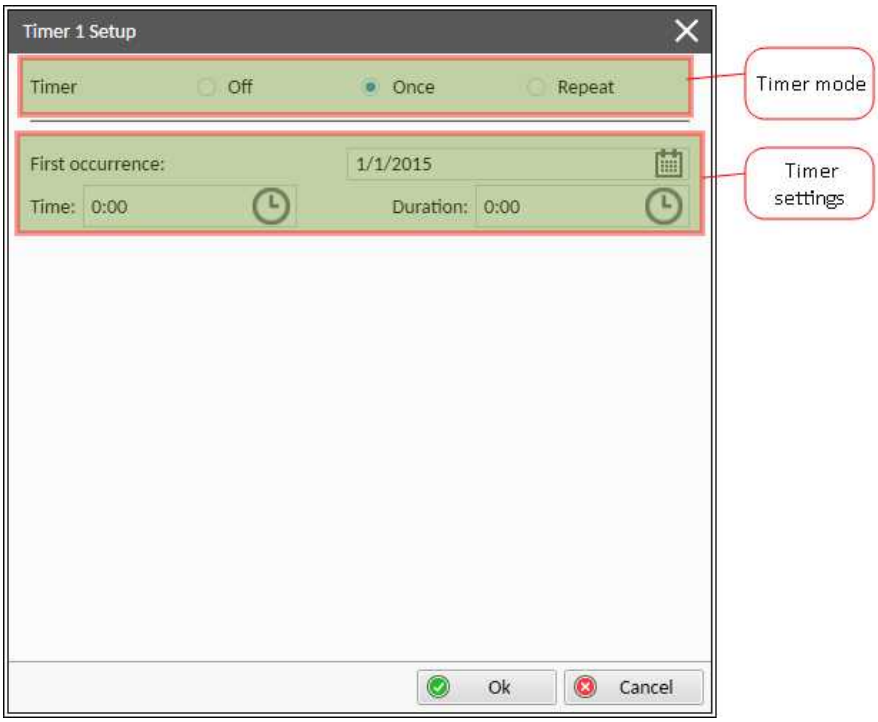


Image 5.45 Once mode - InteliConfig

In timer mode select Once. In timer settings adjust date and time of occurrence of timer. Also adjust the duration of timer.

Set-up via controller interface

In controller go to the Scheduler setpoint group. Select the function of timer via **Timer 1 Function (page 423)** setpoint. Than go to *Timer 1 Setup* and press enter button. In **Timer 1 Repetition (page 424)** setpoint select Once mode. Than adjust **Timer 1 First Occur. Date (page 424)**, **Timer 1 First Occur. Time (page 424)** and **Timer 1 Duration (page 425)**.

Note: *Use left and right buttons to move between timer setpoints.*

Daily mode

Set-up via InteliConfig

To set-up timer via InteliConfig go to the setpoint ribbon, setpoint group scheduler and setpoint *Timer 1 Setup*.

Note: *First of all function of timer has to be adjusted via setpoint **Timer 1 Function (page 423)**.*

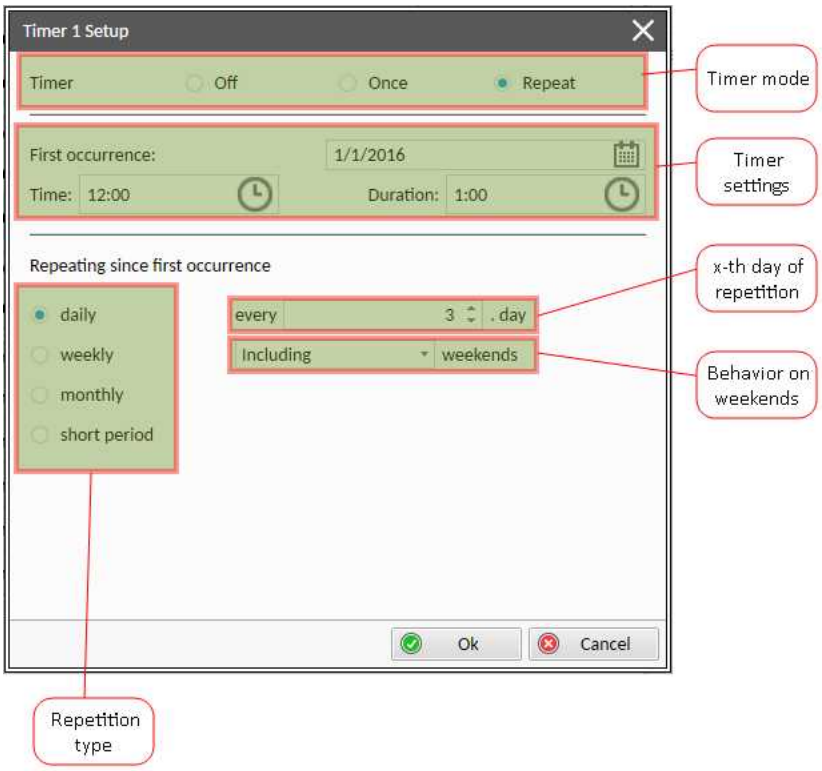


Image 5.46 Daily mode - InteliConfig

In timer mode select Repeat. In repetition type select Daily. In timer settings adjust date and time of first occurrence of timer. Also adjust the duration of each occurrence of timer. Than select the x-th day of repetition (**Timer 1 Refresh Period (page 426)**) and behavior of timer on weekends (**Timer 1 Weekends (page 427)**).

> **Example:** On image example first start of timer will be 1/1/2016 at 12:00. Duration will be 1 hour. Timer will be again activated every 3rd day at 12:00 for 1 hour including weekends.

Set-up via controller interface

In controller go to the Scheduler setpoint group. Select the function of timer via **Timer 1 Function (page 423)** setpoint. Than go to *Timer 1 Setup* and press enter button. In **Timer 1 Repetition (page 424)** setpoint select Repeated mode. Than adjust **Timer 1 First Occur. Date (page 424)**, **Timer 1 First Occur. Time (page 424)** and **Timer 1 Duration (page 425)**. In setpoint **Timer 1 Repeated (page 425)** select Daily and adjust **Timer 1 Refresh Period (page 426)** (x-th day of repetition) and **Timer 1 Weekends (page 427)** (behavior of timer on weekends).

Note: *Use left and right buttons to move between timer setpoints.*

Weekly mode

Set-up via InteliConfig

To set-up timer via InteliConfig go to the setpoint ribbon, setpoint group scheduler and setpoint *Timer 1 Setup*.

Note: *First of all function of timer has to be adjusted via setpoint **Timer 1 Function (page 423)**.*

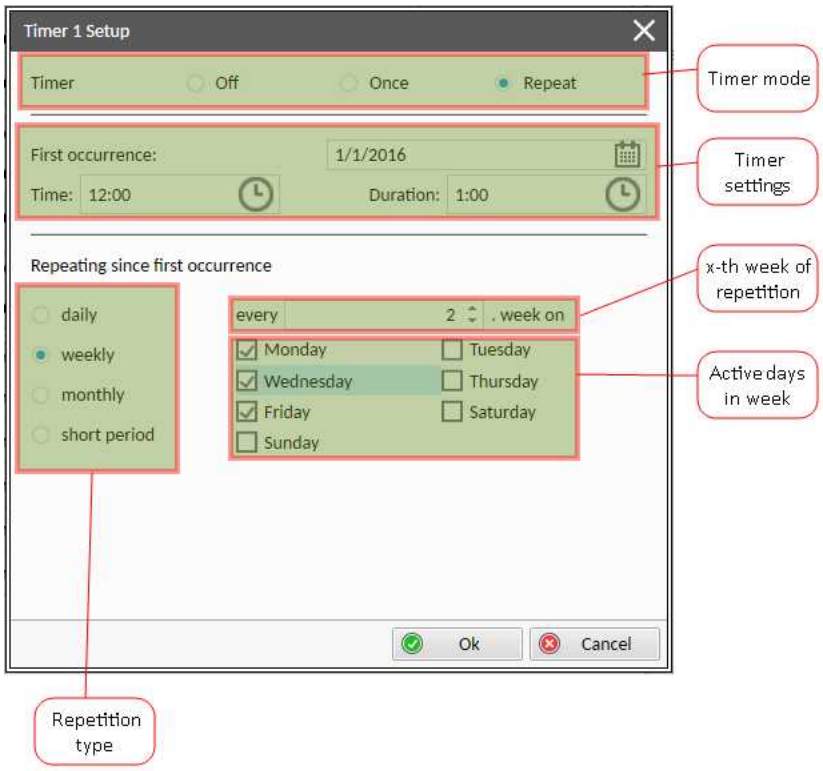


Image 5.47 Weekly mode - InteliConfig

In timer mode select Repeat. In repetition type select Weekly. In timer settings adjust date and time of first occurrence of timer. Also adjust the duration of each occurrence of timer. Than select the x-th week of repetition (**Timer 1 Refresh Period (page 426)**) and days when timer should be active (**Timer 1 Day (page 427)**).

> **Example:** On image example first start of timer will be 1/1/2016 at 12:00. Duration will be 1 hour. Timer will be again activated every 2nd week on Monday, Wednesday and Friday at 12:00 for 1 hour.

Set-up via controller interface

In controller go to the Scheduler setpoint group. Select the function of timer via **Timer 1 Function (page 423)** setpoint. Than go to *Timer 1 Setup* and press enter button. In **Timer 1 Repetition (page 424)** setpoint select Repeated mode. Than adjust **Timer 1 First Occur. Date (page 424)**, **Timer 1 First Occur. Time (page 424)** and **Timer 1 Duration (page 425)**. In setpoint **Timer 1 Repeated (page 425)** select Weekly and adjust **Timer 1 Day (page 427)** (days when timer should be active) and **Timer 1 Refresh Period (page 426)** (x-th week of repetition).

Note: *Use left and right buttons to move between timer setpoints.*

Monthly mode

Set-up via InteliConfig

To set-up timer via InteliConfig go to the setpoint ribbon, setpoint group scheduler and setpoint *Timer 1 Setup*.

Note: *First of all function of timer has to be adjusted via setpoint **Timer 1 Function (page 423)**.*

There are two types of monthly repetition. First of them is based on repeating one day in month.

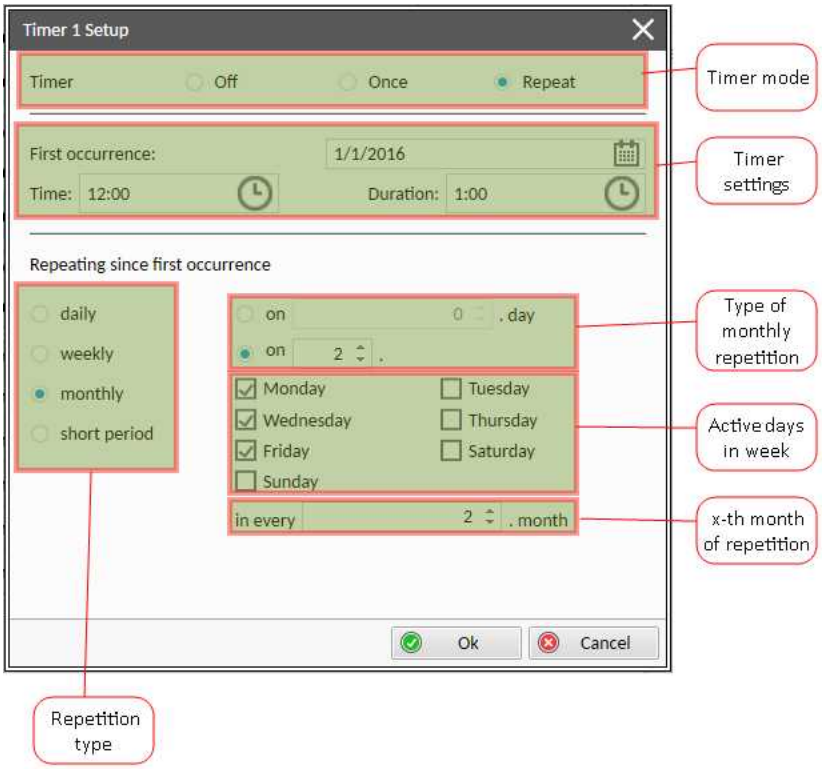


Image 5.48 Monthly mode - InteliConfig

In timer mode select Repeat. In repetition type select Monthly. In timer settings adjust date and time of first occurrence of timer. Also adjust the duration of each occurrence of timer. Than select the type of monthly repetition and the x-th day of repetition (**Timer 1 Repeat Day In Month (page 428)**). Than select the x-th month of repetition.

> **Example:** On image example first start of timer will be 1/1/2016 at 12:00. Duration will be 1 hour. Timer will be again activated every 2nd day in 2nd month at 12:00 for 1 hour.

Second type of monthly repetition is based on repeating days in week in month.

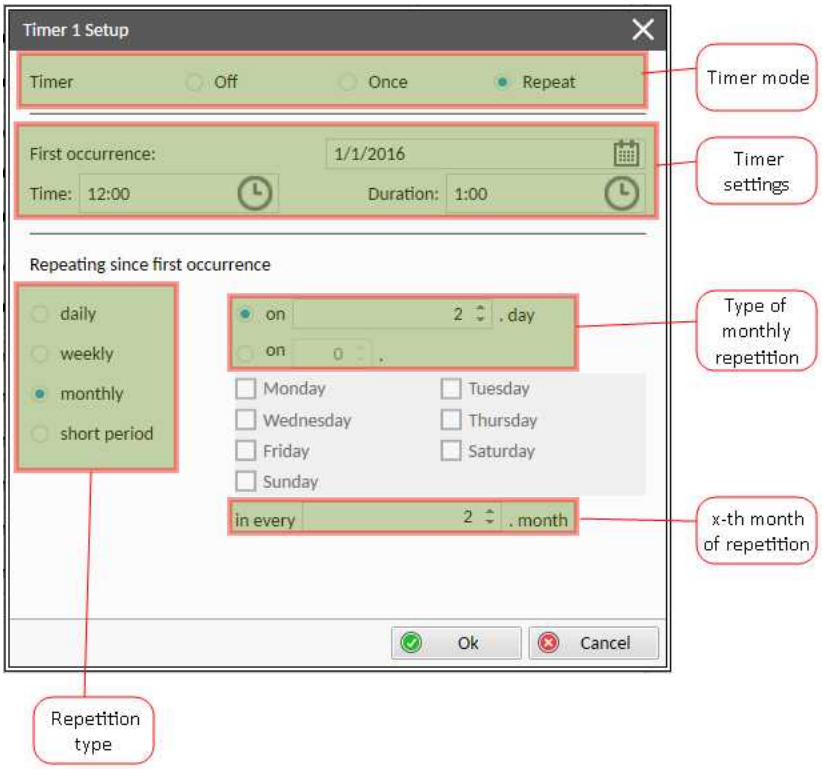


Image 5.49 Monthly mode - InteliConfig

In timer mode select Repeat. In repetition type select Monthly. In timer settings adjust date and time of first occurrence of timer. Also adjust the duration of each occurrence of timer. Than select the type of monthly repetition, the x-th week of repetition and days in week. Than select the x-th month of repetition.

> **Example:** On image example first start of timer will be 1/1/2016 at 12:00. Duration will be 1 hour. Timer will be again activated every 2nd week in 2nd month on Monday, Wednesday and Friday at 12:00 for 1 hour.

Set-up via controller interface

There are two types of monthly repetition. First of them is based on repeating one day in month.

In controller go to the Scheduler setpoint group. Select the function of timer via **Timer 1 Function (page 423)** setpoint. Than go to *Timer 1 Setup* and press enter button. In **Timer 1 Repetition (page 424)** setpoint select Repeated mode. Than adjust **Timer 1 First Occur. Date (page 424)**, **Timer 1 First Occur. Time (page 424)** and **Timer 1 Duration (page 425)**. In setpoint **Timer 1 Repeated (page 425)** select Monthly and adjust type of monthly repetition via **Timer 1 Repeat Day (page 428)**, **Timer 1 Refresh Period (page 426)** (x-th month of repetition) and **Timer 1 Repeat Day In Month (page 428)** (concrete day in repeated months).

Second type of monthly repetition is based on repeating days in week in month.

In controller go to the Scheduler setpoint group. Select the function of timer via **Timer 1 Function (page 423)** setpoint. Than go to *Timer 1 Setup* and press enter button. In **Timer 1 Repetition (page 424)** setpoint select Repeated mode. Than adjust **Timer 1 First Occur. Date (page 424)**, **Timer 1 First Occur. Time (page 424)** and **Timer 1 Duration (page 425)**. In setpoint **Timer 1 Repeated (page 425)** select Monthly and adjust type of monthly repetition via **Timer 1 Repeat Day (page 428)**, **Timer 1 Refresh Period (page 426)** (x-th month of repetition), **Timer 1 Repeated Day In Week (page 428)** (days in week when timer is active) and **Timer 1 Repeat Week In Month (page 429)** (concrete week in repeated months).

Note: *Use left and right buttons to move between timer setpoints.*

Short period mode

Set-up via InteliConfig

To set-up timer via InteliConfig go to the setpoint ribbon, setpoint group scheduler and setpoint *Timer 1 Setup*.

Note: *First of all function of timer has to be adjusted via setpoint* ***Timer 1 Function (page 423)****.*

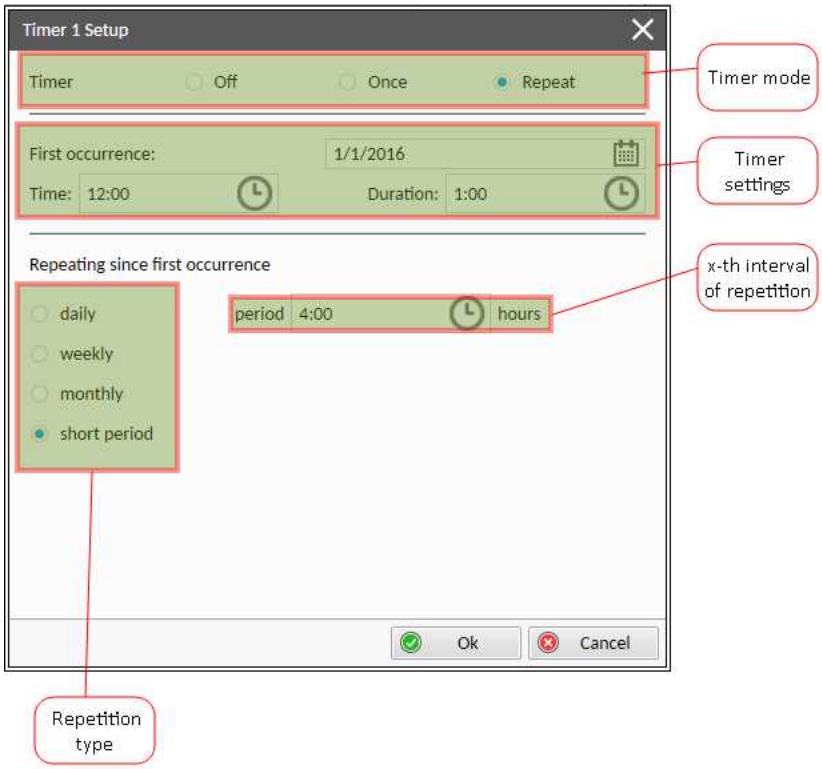


Image 5.50 Short period mode - InteliConfig

In timer mode select Repeat. In repetition type select Short period. In timer settings adjust date and time of first occurrence of timer. Also adjust the duration of each occurrence of timer. Than select the interval of repetition (shorter than 1 day).

Example: On image example first start of timer will be 1/1/2016 at 12:00. Duration will be 1 hour. Timer will be again activated every 4th hour for 1 hour.

Set-up via controller interface

In controller go to the Scheduler setpoint group. Select the function of timer via **Timer 1 Function (page 423)** setpoint. Than go to *Timer 1 Setup* and press enter button. In **Timer 1 Repetition (page 424)** setpoint select Repeated mode. Than adjust **Timer 1 First Occur. Date (page 424)**, **Timer 1 First Occur. Time (page 424)** and **Timer 1 Duration (page 425)**. In setpoint **Timer 1 Repeated (page 425)** select Short Period and adjust **Timer 1 Refresh Period (page 426)** (interval of repetition).

Note: *Use left and right buttons to move between timer setpoints.*

5.4.21 Rental Timers

In controller are two timers which are designed like rental timer. Rental timers will stop gen-set after their elapse.

How to set-up rental timer

This is a short guide for settings of rental timers. Please see following few steps how to set up rental timers:

- Choose the type of rental timer
  - **Rental Timer 1 (page 436)** (based on engine running hours)
  - **Rental Timer 2 (page 438)** (based on date)
- Adjust the length of chosen timer
- Adjust the warning for user **Rental Timer 1 Wrn (page 438)** or **Rental Timer 2 Wrn (page 440)**(warning will be displayed in alarmlist before elapsing of rental timer)
- Adjust **Rental Timer BOC (page 440)** - common for both timers (if engine is still running after rental timer counts down, this timer will starts count down and after elapse of timer the gen-set will be cooled down and stop)

5.4.22 Service timers

Running hours counters

Service timers are used as maintenance interval counters. Counters can be set by setpoints - **Maintenance Timer 1 (page 295)**, **Maintenance Timer 2 (page 296)** and **Maintenance Timer 3 (page 296)**. All of them work the same way - their values are decremented every hour when the gen-set is running.

Actual value of counters is located either as the same setpoints **Maintenance Timer 1 (page 295)**, **Maintenance Timer 2 (page 296)** and **Maintenance Timer 3 (page 296)** or as values **Maintenance 1 (page 595)**, **Maintenance 2 (page 596)** and **Maintenance 3 (page 596)**.

When the value of counter reaches 0, the alarm **Wrn Maintenance 1 (page 792)** or **Wrn Maintenance 2 (page 792)** or **Wrn Maintenance 3 (page 793)** is active until the respective counter is readjusted back to nonzero value.

Unused counter has to be adjusted to maximal value 10000 (Disabled).

Date counters

Service timers are used as maintenance interval counters. Counters can be set by setpoints - **Maintenance Timer 4 (page 296)**, **Maintenance Timer 5 (page 297)** and **Maintenance Timer 6 (page 297)**. All of them work the same way - actual date is compared with the date adjusted in counter.

Remaining value of counters is located as value **Maintenance 4 (page 596)**, **Maintenance 5 (page 596)** and **Maintenance 6 (page 596)**.

When the actual date reaches value of counter, the alarm **Wrn Maintenance 4 (page 793)** or **Wrn Maintenance 5 (page 793)** or **Wrn Maintenance 6 (page 793)** is active until the respective counter is readjusted back to different date.

Unused counter has to be adjusted to value 1/1/2015.

5.4.23 Analog switches

There are logical analog function dedicated for analog switches. Each analog switch has setpoints for level ON and level OFF and logical binary output.

Analog switch	Setpoints	Binary output
AIN Switch 01 (page 749)	Analog Switch 1 On (page 362) Analog Switch 1 Off (page 363)	AIN Switch01 (page 680)
AIN Switch 02 (page 749)	Analog Switch 2 On (page 365) Analog Switch 2 Off (page 366)	AIN Switch02 (page 681)
AIN Switch 03 (page 749)	Analog Switch 3 On (page 368) Analog Switch 3 Off (page 369)	AIN Switch03 (page 681)
AIN Switch 04 (page 750)	Analog Switch 4 On (page 371) Analog Switch 4 Off (page 372)	AIN Switch04 (page 682)
AIN Switch 05 (page 750)	Analog Switch 5 On (page 374) Analog Switch 5 Off (page 375)	AIN Switch05 (page 682)
AIN Switch 06 (page 750)	Analog Switch 6 On (page 377) Analog Switch 6 Off (page 378)	AIN Switch06 (page 683)
AIN Switch 07 (page 751)	Analog Switch 7 On (page 380) Analog Switch 7 Off (page 381)	AIN Switch07 (page 683)
AIN Switch 08 (page 751)	Analog Switch 8 On (page 383) Analog Switch 8 Off (page 384)	AIN Switch08 (page 684)
AIN Switch 09 (page 751)	Analog Switch 9 On (page 386) Analog Switch 9 Off (page 387)	AIN Switch09 (page 684)
AIN Switch 10 (page 752)	Analog Switch 10 On (page 389) Analog Switch 10 Off (page 390)	AIN Switch10 (page 685)
AIN Switch 11 (page 752)	Analog Switch 11 On (page 392) Analog Switch 11 Off (page 393)	AIN Switch11 (page 685)
AIN Switch 12 (page 752)	Analog Switch 12 On (page 395) Analog Switch 12 Off (page 396)	AIN Switch12 (page 686)
AIN Switch 13 (page 753)	Analog Switch 13 On (page 398) Analog Switch 13 Off (page 399)	AIN Switch13 (page 686)
AIN Switch 14 (page 753)	Analog Switch 14 On (page 401) Analog Switch 14 Off (page 402)	AIN Switch14 (page 687)
AIN Switch 15 (page 753)	Analog Switch 15 On (page 404) Analog Switch 15 Off (page 405)	AIN Switch15 (page 687)
AIN Switch 16 (page 754)	Analog Switch 16 On (page 407) Analog Switch 16 Off (page 408)	AIN Switch16 (page 688)
AIN Switch 17 (page 754)	Analog Switch 17 On (page 410) Analog Switch 17 Off (page 411)	AIN Switch17 (page 688)

Analog switch	Setpoints	Binary output
AIN SWITCH 18 (PAGE 754)	Analog Switch 18 On (page 413) Analog Switch 18 Off (page 414)	AIN SWITCH18 (PAGE 689)
AIN SWITCH 19 (PAGE 755)	Analog Switch 19 On (page 416) Analog Switch 19 Off (page 417)	AIN SWITCH19 (PAGE 689)
AIN SWITCH 20 (PAGE 755)	Analog Switch 20 On (page 419) Analog Switch 20 Off (page 420)	AIN SWITCH20 (PAGE 690)

The behavior of the switch depends on the adjustment of the setpoints.



Image 5.51 Principle of analog switch

5.4.24 Additional running engine indications

It is helpful to have information other than speed (RPM), whether the engine is rotating or not, especially if RPM is measured from the generator frequency instead of magnetic pickup. The generator frequency measurement can be unreliable at very low speeds and/or may have a delayed reaction to sudden and big changes (i.e. in the moment that the engine has just started…).

The following conditions are evaluated as additional running engine indication:

- Voltage on the D+ input is higher than 80% of battery voltage. Connect this input to the D+ (L) terminal of the charging alternator and enable the D+ function by the setpoint D+ Function. If D+ terminal is not available, leave the input unconnected and disable the function.
- The pickup is not used and frequency is not detected on the pickup input. Connect the pickup input to the W terminal of the charging alternator if you do not use pickup and the W terminal is available. If not, leave the input unconnected.
- Oil pressure > **Starting Oil Pressure (page 267)** setpoint. The oil pressure is evaluated from the analog input or from the ECU if an ECU is configured.
- Binary input **OIL PRESSURE (PAGE 658)** is in logical 0.
- At least one phase of generator voltage is >25% of nominal voltage.

These signals are used during start for powering down the starter motor even if still no RPM is measured and also during stop in order to evaluate if the engine is really stopped.

5.4.25 Voltage phase sequence detection

Controller detects phase sequence on both voltage terminals. This protection is important after controller installation to avoid wrong voltage phase connection. The phase sequence is adjusted via setpoint **Phase Rotation (page 262)**. When the phases are connected in different order, following alarms are detected:

- **Generator CCW Rotation (page 799)**
- **Mains CCW Rotation (page 799)**

5.4.26 Sensor curves

Background of the sensor calibration

To correct measuring error of each analog input (pressure, temperature, level, etc.) calibrating constants should be set. Calibration is made by adding the value of setpoint **Analog Input 1 CalibrationCU AIN1 Calibration (page 446)**, or **Analog Input 2 CalibrationCU AIN2 Calibration (page 447)**, or **Analog Input 3 CalibrationCU AIN3 Calibration (page 447)**, or **Analog Input 4 CalibrationCU AIN4 Calibration (page 448)** directly to the calculated value at analog input.

Note: *The calibration must be done at the operational point of the analog input (e.g. 80°C, 4.0Bar etc..)*

Default sensor curves

There are 16 default resistive curves available. The following table provides information on minimum/maximum values of respective sensors. Actual values especially of temperature curves may differ. Meaning is to prolong curve to the lower temperature values, so the cold engine will not raise alarm fail sensor.

Curve	Min [Ohm]	Max [Ohm]	Units
VDO 10 Bar 0-2400ohm	0	2400	Bar
VDO40-120°C0-2400ohm	0	2400	°C
VDOLevel%0-2400ohm	0	2400	%
General line 1	0	1000	ohm
General line 2	0	1000	ohm
General line 3	0	1000	ohm
General line 4	0	1000	ohm
General line 5	0	1000	ohm
General line 6	0	1000	ohm
General line 7	0	1000	ohm
General line 8	0	1000	ohm
General line 9	0	1000	ohm
General line 10	0	1000	ohm
General line 11	0	1000	ohm
General line 12	0	1000	ohm
General line 13	0	1000	ohm

Note: *Curves can be modified via InteliConfig. In InteliConfig are also prepared some standard curves.*

> **IMPORTANT: For right behavior of function, curve for this analog input has to be in percentage and setpoint Fuel Tank Volume (page 291) has to be adjusted correctly.**

5.4.27 PLC

PLC Editor is powerful tool which helps you to create your own PLC scheme. It has graphical interface to have user interface easy to use.

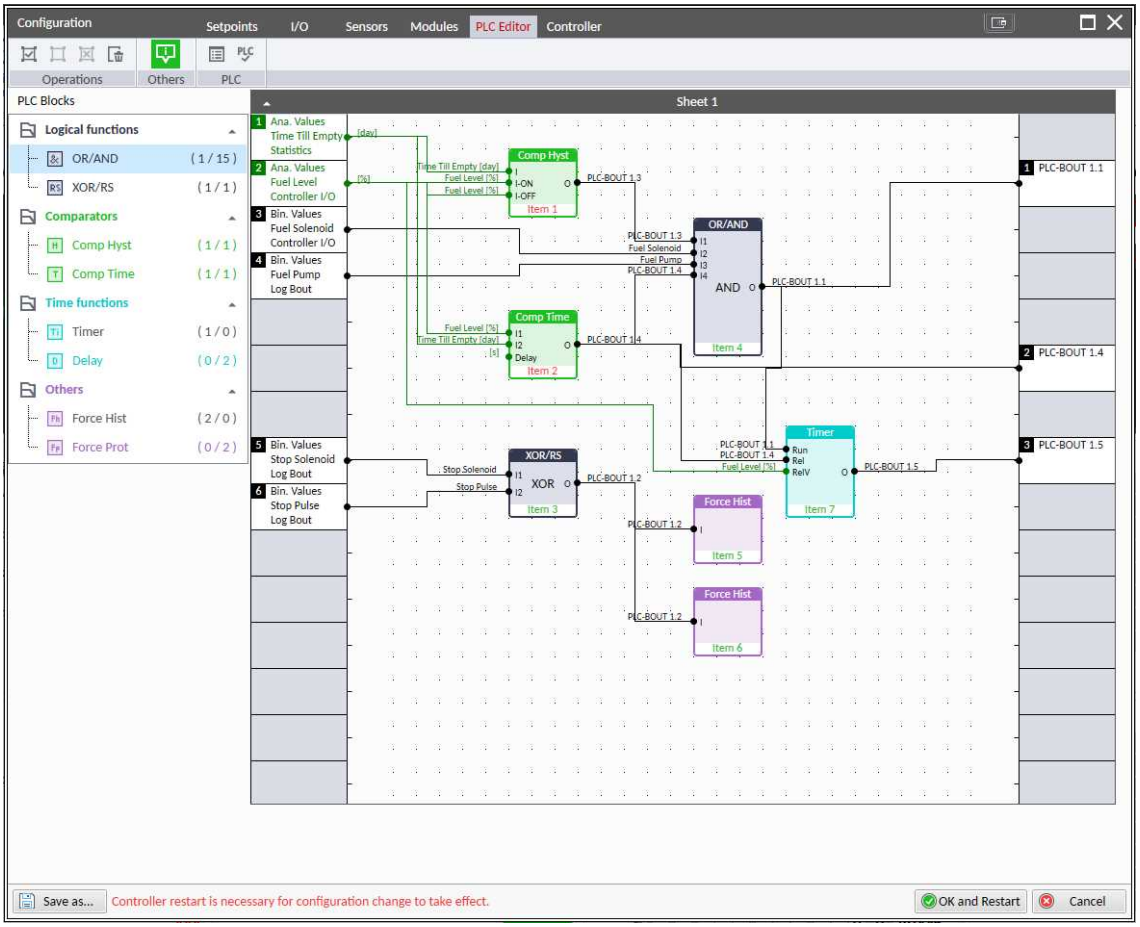


Image 5.52 PLC Editor main page

List of available PLC blocks

PLC block	Number of blocks
OR/AND	16
XOR/RS	2
Comparator with hysteresis (Comp Hyst)	2
Comparator with delay (Comp Time)	2
Timer	1
Delay	4
Force history record (Force Hist)	2
Force protection (Force Prot)	4

Working with the editor

If the currently opened archive does not contain any PLC program, then an empty drawing is created automatically when you select the PLC Editor. The procedure of creation of a PLC drawing (program) contains following essential steps:

- Adjust the sheet to your needs. See **Working with sheets (page 168)** for more information.
- Add PLC blocks into the sheets. See **Adding PLC blocks (page 168)** for more information.
- Define inputs and outputs of the PLC program. See **Define inputs and outputs (page 169)** for more information.
- Create connections between inputs, blocks and outputs. See **Creating wires (page 172)** for more information.
- Adjust properties of the blocks. See **List of PLC blocks (page 762)** for more information about blocks.

Working with sheets

Drag the sheet edges to re-size the sheet according to your needs.

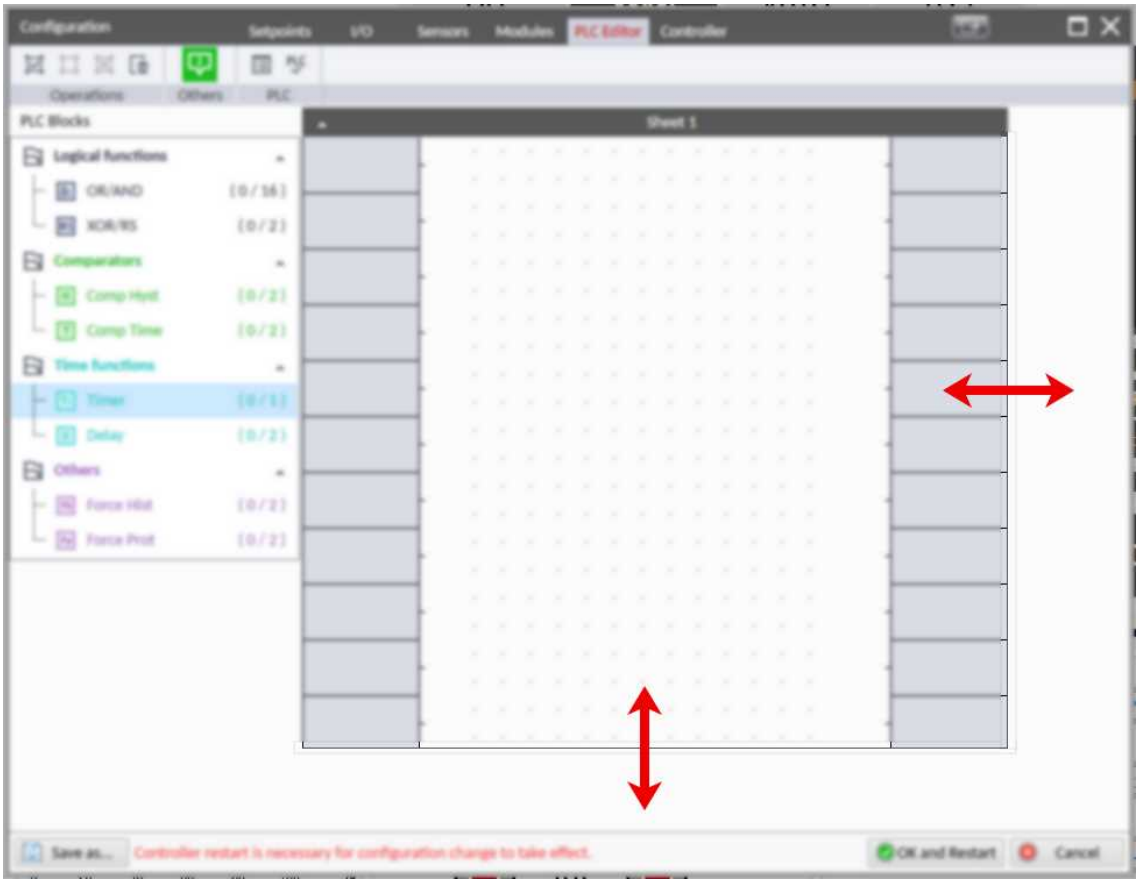


Image 5.53 Adjusting PLC sheet

Adding PLC blocks

Adding PLC block is simple and intuitive. Follow the procedure below to add PLC block.

- Select required block from the list of available PLC blocks at the left and drag it into the sheet.
- Double-click on the block and adjust properties of the block. See **List of PLC blocks (page 762)** for more information about blocks.

- Connect the block inputs and outputs by drawing wires in the sheet. See **Define inputs and outputs (page 169)** for more information. It is also possible to connected inputs and outputs via properties of selected PLC block.

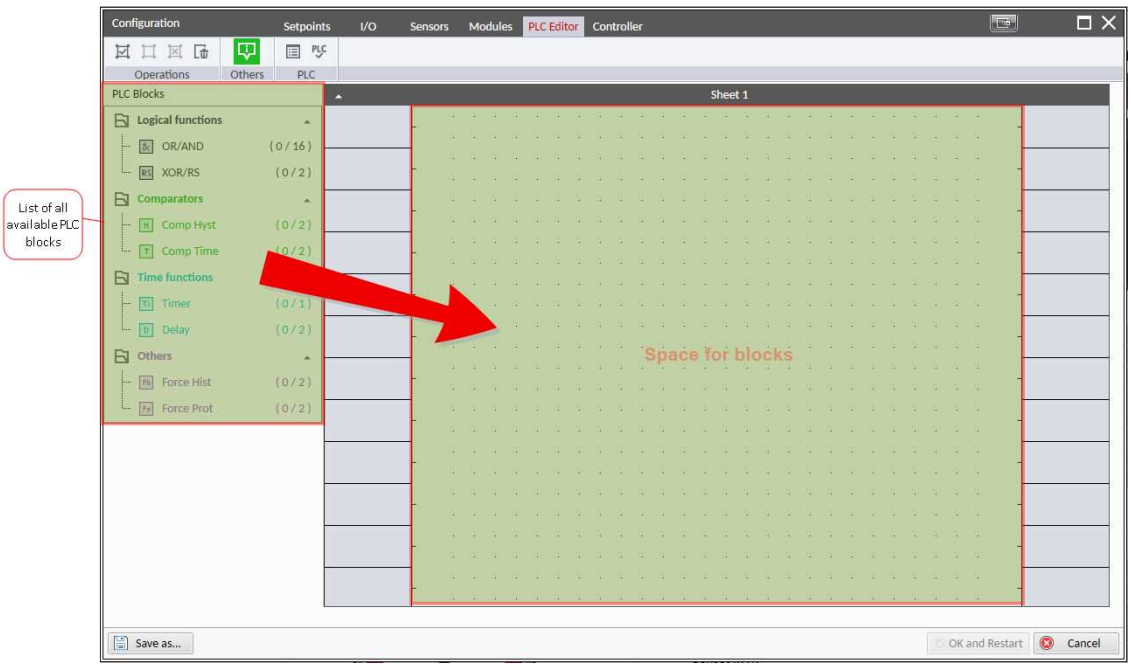


Image 5.54 Adding PLC blocks

Note: *To delete PLC block just click on it and press delete button. Also delete selection function can by used.*

Note: *To see context help for selected PLC block just press F1 button.*

Define inputs and outputs

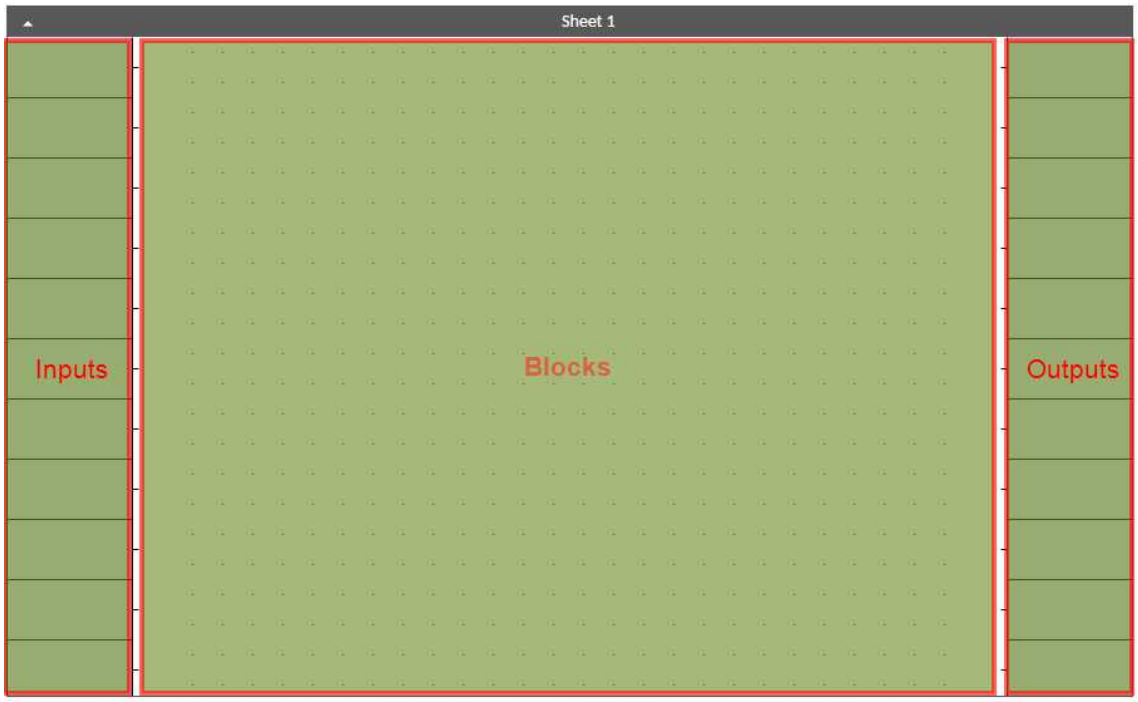
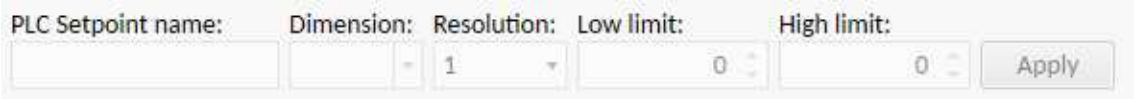


Image 5.55 Blank sheet of PLC editor

Inputs

Sheet inputs are located at the left side of a sheet. Follow the procedure below to add or edit an input.

- Double-click on a free input position or existing input to add new input or edit the existing one.
- Select the source for the input.
  - If you create a binary input, you can select a source from following categories:
    - Bin. Values - this category contains all binary values available in the controller as binary inputs, logical binary outputs etc.
    - PLC Outputs - this category contains all PLC blocks binary outputs available in the controller.
  - If you create an analog input, you can select a source from following categories:
    - Ana. Values - this category contains all analog values available in the controller as analog inputs, electrical values, values from ECU etc.
    - All Setpoints - this category contains all setpoints of the controller except the dedicated PLC setpoints. Names, resolutions and dimensions of these setpoints can not be modified.
    - PLC Setpoints - this category contains a group of setpoints which are dedicated for using in the PLC program. PLC setpoints can be renamed, their dimension, resolution and limits can be modified according to need of PLC blocks where they are used.



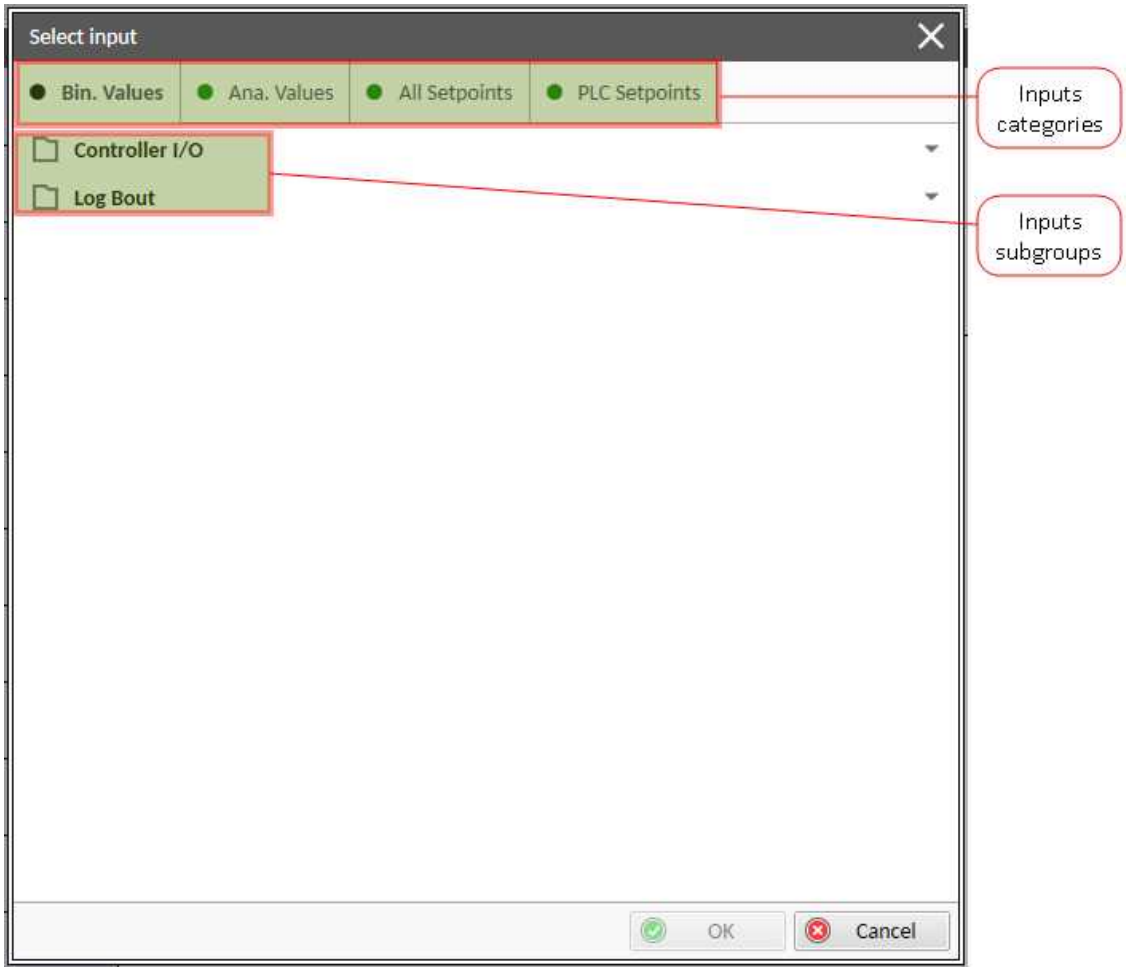


Image 5.56 PLC inputs

Outputs

Sheet outputs are located at the right side of a sheet. Follow the procedure below to add or edit an input.

- Doubleclick on a free output position to add new sheet output.
- Doubleclick on an already created output to configure the output onto a controller output terminal or a logical binary input (first of all some PLC block output has to be connected to this output to enable configuration of output).

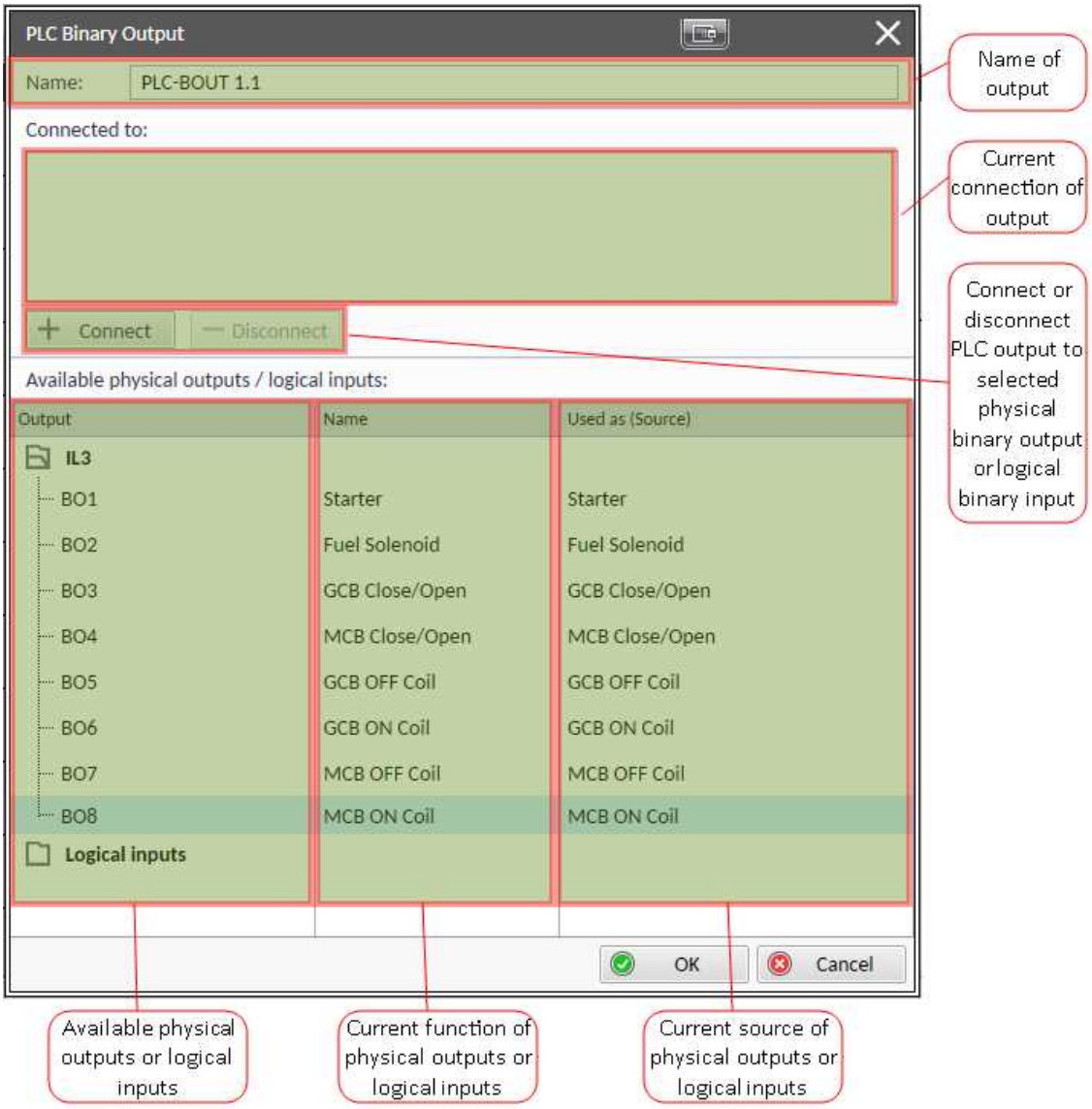


Image 5.57 PLC outputs

IMPORTANT: It is necessary to click on Connect button after selecting the output. Otherwise PLC output is not connected to output.

Creating wires

Wires can be create between PLC inputs and PLC blocks and between PLC blocks and PLC outputs.

IMPORTANT: Keep the order of starting and finishing connection points. Wires between inputs and blocks have to start from inputs. Wires between blocks and outputs have to start from blocks.

Follow the procedure below to create wire.

- Locate the mouse pointer over the starting point of the wire. If the area under the mouse pointer is a connection point, the pointer will change the color (fill of pointer will be white).
- Press and hold the left mouse button and drag the wire to the destination of required connection point. If you point over a valid connection point, the connection point will be marked with a red circle.
- Release the left mouse button to create a wire between the two points. The wire is routed automatically.

Note: *It is possible to make connection only between the outputs and inputs with the same type of value (binary or analog). Binary values are marker by black pointer, analog values are marked with green pointer.*

Note: *To delete wire just click on it and press delete button. Also delete selection function can by used.*

PLC logic execution rules

The PLC program is executed every 100 ms. The blocks are executed in order according to block numbers (item numbers), which are indicated in each block. The block numbers are assigned automatically according to position on sheet.

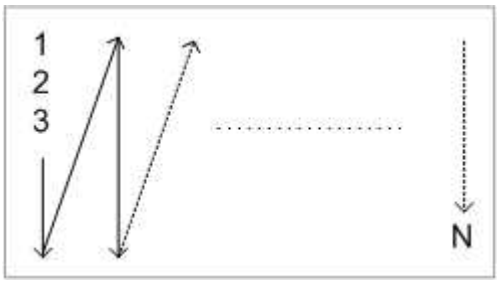
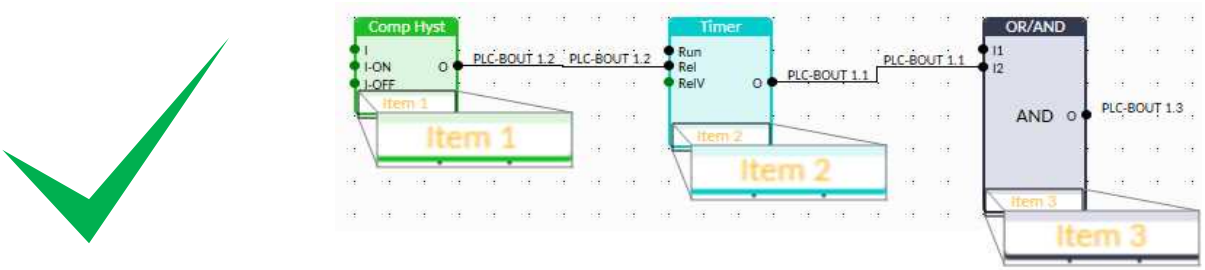
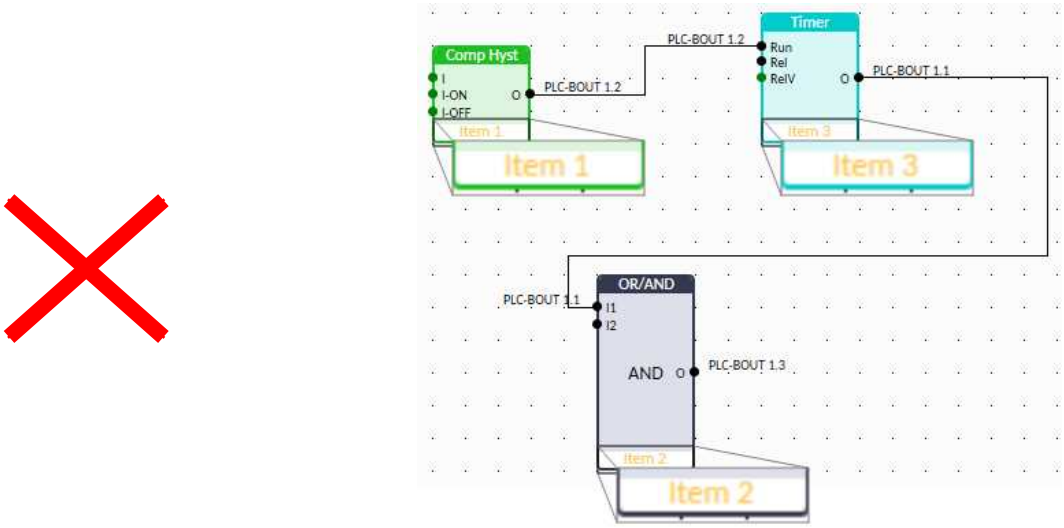


Image 5.58 PLC execution logic

IMPORTANT: Please always check that the blocks are ordered correctly, especially if you use direct feedbacks from outputs to inputs within one sheet. Wrong order may lead to incorrect results!!!





Other functions

Consistency check

Use this function to check if all inputs and outputs of PLC block are connected.

Delete whole content of sheet

Use this function to delete the whole content of sheet (including blocks, wires, inputs, outputs, etc...).

Hints

Use this function to enable or disable quick hints for blocks (controller help is not affected by this function).

PLC monitor

PLC monitor is a powerful tool for monitoring your PLC. Just click on PLC monitor button on main InteliConfig page to see you PLC. Active inputs and outputs have blue color. Also wires with active signals have blue color.

> **IMPORTANT: It is not possible to edit PLC in PLC monitor tool.**

5.4.28 Tier 4 Final

Tier 4 Final support generally provides monitoring and control of after-treatment system installed on generators engine. The requirements are defined as:

- Providing After-Treatment status information by
  - displaying universal lamps (icons)
  - displaying analog and binary values
- Control of After-Treatment regeneration function by
  - transmitting commands to the ECU

Providing Aftertreatment status information

After-Treatment screen

This screen is shown with configured ECU which supports Tier 4 Final. After-Treatment screen is automatically shown, once any of selected lamps gets active or change status. Deactivating of the lamp will not trigger showing the screen. The screen is then shown until operator switch it to another one. Alarmlist screen has lower priority so even new alarm appears, After-treatment screen is still displayed. To avoid displaying blank screen, inactive lamps are represented by "dotted" icons. For no active lamp the screen shows all dotted icons. Please see examples below:

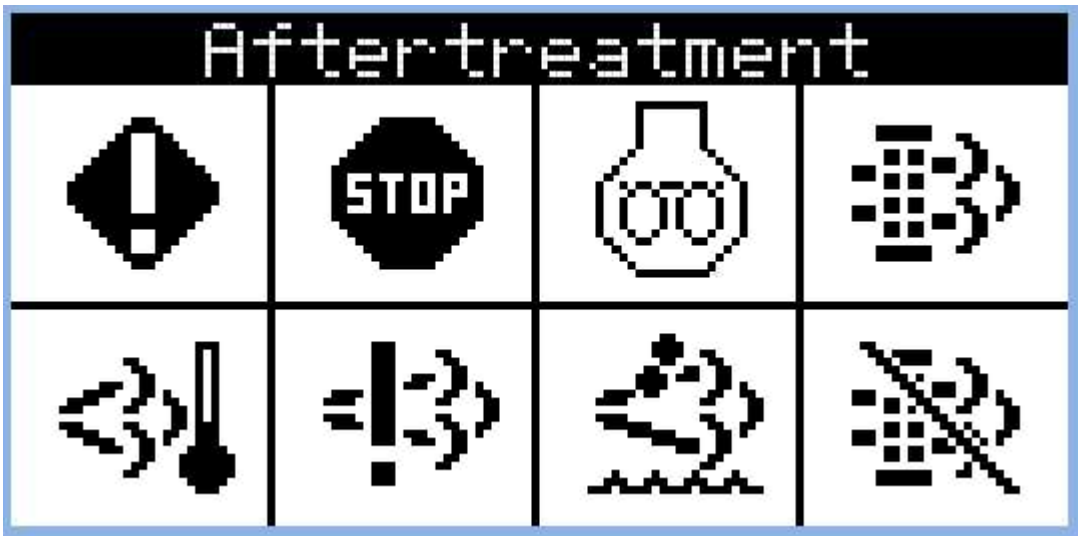


Image 5.59 Example of active Tier 4 Final screen

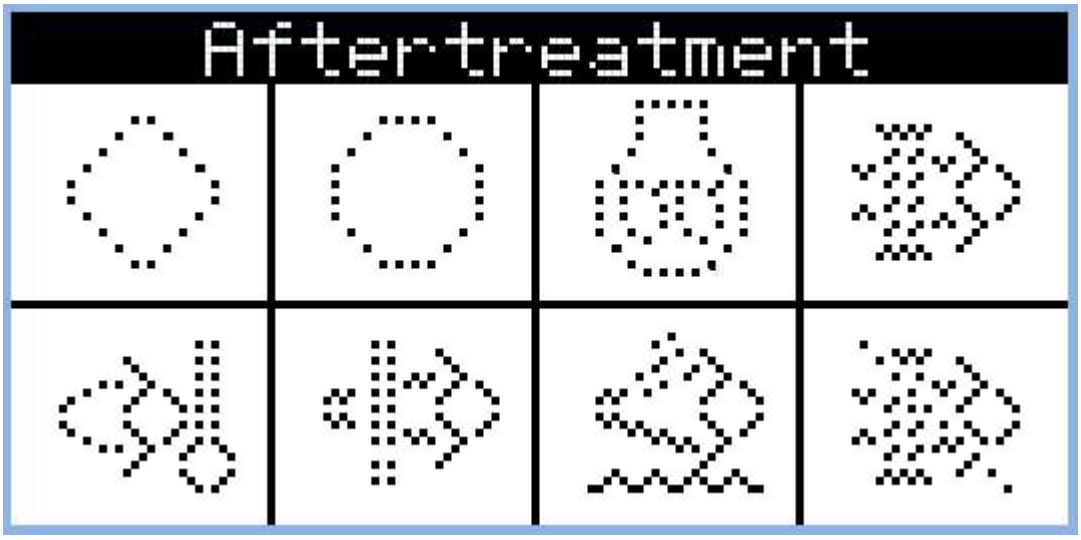


Image 5.60 Example of inactive Tier 4 Final screen

Universal lamps (icons)

Universal lamp icons are shown on the After-Treatment screen. Based on specific value read in specific frame with specific SPN is every lamp icon either:

- shown
- hidden
- blinking slow (1 Hz)
- blinking fast (2 Hz)

Note: *Lamp icon blinking is defined as displaying active lamp icon and inverse colored active lamp icon in required frequency.*

Lamp name	Active icon	Inactive icon	Notes
Amber warning lamp			***Note:*** *This value can light or blink on both frequencies.*
Red stop lamp			***Note:*** *This value can light or blink on both frequencies.*
Engine wait to start lamp			
DPF/SCR lamp command			***Note:*** *DPF = Diesel Particulate Filter; SCR = Selective Catalytic Reduction. This lamp also activates alarm* ***After-Treatment (page 796)****.*
Exhaust system high temperature lamp command			***Note:*** *This lamp also activates alarm* ***After-Treatment (page 796)****.*
Malfunction indicator lamp			***Note:*** *This value can light or blink on both frequencies. This lamp also activates alarm* ***After-Treatment (page 796)****.*
Fluid tank low level indicator			***Note:*** *This lamp also activates alarm* ***After-Treatment (page 796)****.*
DPF regeneration inhibited			***Note:*** *Indicates the state of diesel particulate filter active regeneration inhibition. This lamp also activates alarm* ***After-Treatment (page 796)****.*

Analog values

Supported analog values:

- **DPF Ash Load (page 571)**
- **DPF Soot Load (page 571)**
- **DEF Level (page 571)**

Control of After-Treatment regeneration function

User can force or inhibit regeneration process by activating appropriate binary inputs of the controller. Please see the list of binary inputs below:

- **REGENERATION FORCE (PAGE 658)**
- **REGENERATION INHIB (PAGE 658)**

5.4.29 Geo-fencing

Geo-fencing function is kind of protection that evaluates whether the actual GPS location is within predefined area and based on the evaluation takes an action (sends sms, stops engine, make history record etc.). Function is enabled by setpoint **Geo-Fencing (page 443)** or by logical binary input **GEO-FENCING ENABLED (PAGE 653)**.

Using InteliConfig, it is possible to set two concentric geo-circles within which the unit is allowed to be located. Each geo-circle is defined as circular geographic area with centre (common for both geo-circles) named Home Position adjusted via setpoints **Home Latitude (page 441)** and **Home Longitude (page 441)** and radius named Fence Radius adjusted via setpoints .**Fence Radius 1 (page 442)** and **Fence Radius 2 (page 442)**.

Protections can be different for both circles. Protection are adjusted via setpoints **Fence 1 Protection (page 444)** and **Fence 2 Protection (page 445)**.

It is also possible to see the current position of the controller in WebSupervisor map view.

5.4.30 Mains decoupling protections

Vector shift

The vector shift function is the fast protection for mains decoupling. It monitors the Load angle of the generator and if it gets changed dramatically, the protection is issued. The Vector shift is evaluated from the Mains Voltage Measurement (Phase 1).

Protection is enabled via setpoint **Vector Shift Protection (page 321)**. Limit of protection is adjusted via setpoint **Vector Shift Limit (page 321)**. When protection is activated, the breaker is opened. Which breaker is opened is adjusted via setpoint **Vector Shift CB Selector (page 323)**. Maximal value of vector shift is represented by value **Max Vector Shift (page 587)**.

Note: *VectorShift protection gets active (is unblocked) right 500 ms after the condition for activation of protection gets fulfilled = when Controller goes to parallel to mains operation (When Vector Shift Protection = PARALLEL ONLY) or when MCB gets closed (when Vector shift protection = ENABLED).*

The settings can lead to these situations:

MCB status	GCB status	Vector Shift CB Selector	Vector Shift Protection	Action
1	1	MCB or GCB	Parallel or Enabled (No influence)	Opens MCB or GCB based on setpoint Vector Shift CB Selector.
0	1	No influence	No influence	No action (GCB stays alaways closed)
1	0	No influence	Parallel	No action MCB stays closed
1	0	GCB	Enabled	No action MCB stays closed
1	0	MCB	Enabled	MCB opens

If a vector shift is detected and consequently the MCB is opened, however mains voltage and frequency remain in limits, the MCB is then closed again (synchronized) after **Mains Return Delay (page 314)** as the mains is evaluated as healthy.

If a vector shift is detected and consequently the GCB is opened, however mains voltage and frequency remain in limits, the GCB is then closed again (synchronized) immediately (no delay).

ROCOF

The Rate of Change of Frequency function is the fast protection for mains decoupling. It monitors the change of frequency and if it gets changed dramatically, the protection is issued.

Protection is enabled via setpoint **ROCOF Protection (page 322)**. Limit of protection is adjusted via setpoints **ROCOF df/dt (page 323)** and **ROCOF Windows Length (page 322)**. When protection is activated, the breaker is opened. Which breaker is opened is adjusted via setpoint **Vector Shift CB Selector (page 323)**.

5.4.31 Droop

> **IMPORTANT: Droop is relevant only for MINT application.**

The DROOP is primarily intended for Multiple parallel operation in Island to ensure the load sharing and VAr sharing when intercontroller communication fails. The Active and Reactive power is not regulated based on data communicated between the units (isochronous regulation) but the speed request and voltage request is calculated from actual voltage and actual frequency of the system (the measured Voltage and frequency of whole system is always equal). Actually the speed request is correlative to active power and the voltage request is correlative to reactive power. The correlation is the decreasing function and it creates the negative feedback of regulation.

Function is activated via setpoint **Load/Var Sharing Regulation Type (page 356)**. There are two droop modes - emergency droop and droop.

Frequency droop

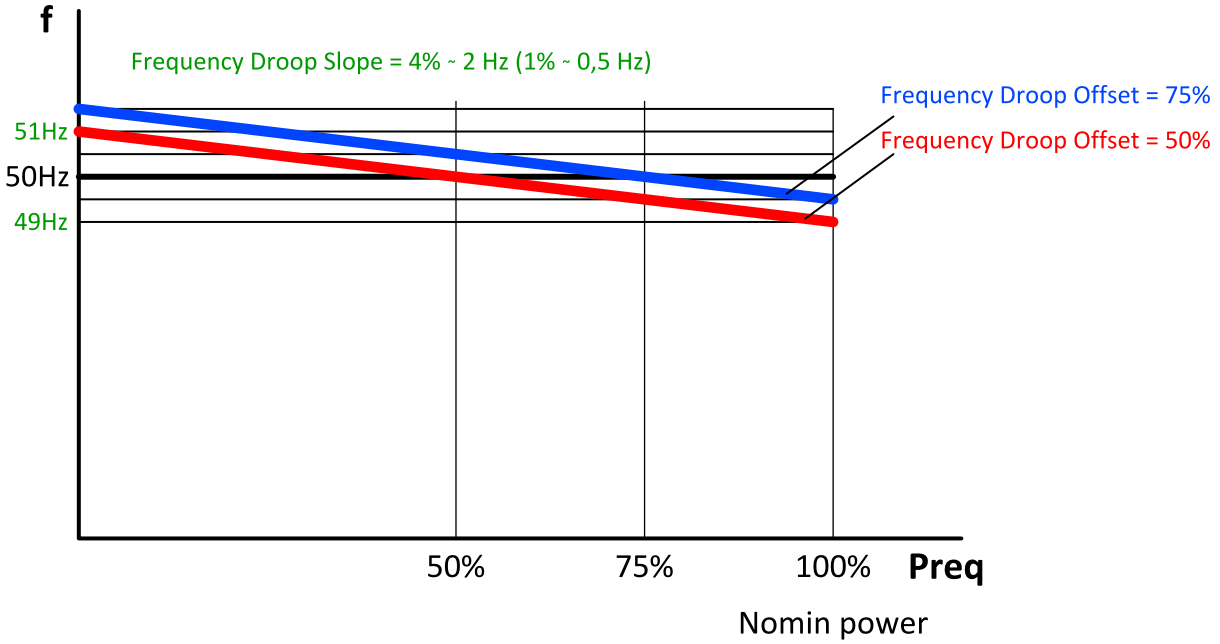


Image 5.61 Frequency droop

Equation:

Required frequency = Nominal frequency - [(Nominal frequency * **Frequency Droop Slope (page 357)** / 100) * (Active power / Nominal power - **Frequency Droop Offset (page 358)** / 100)).

Voltage droop

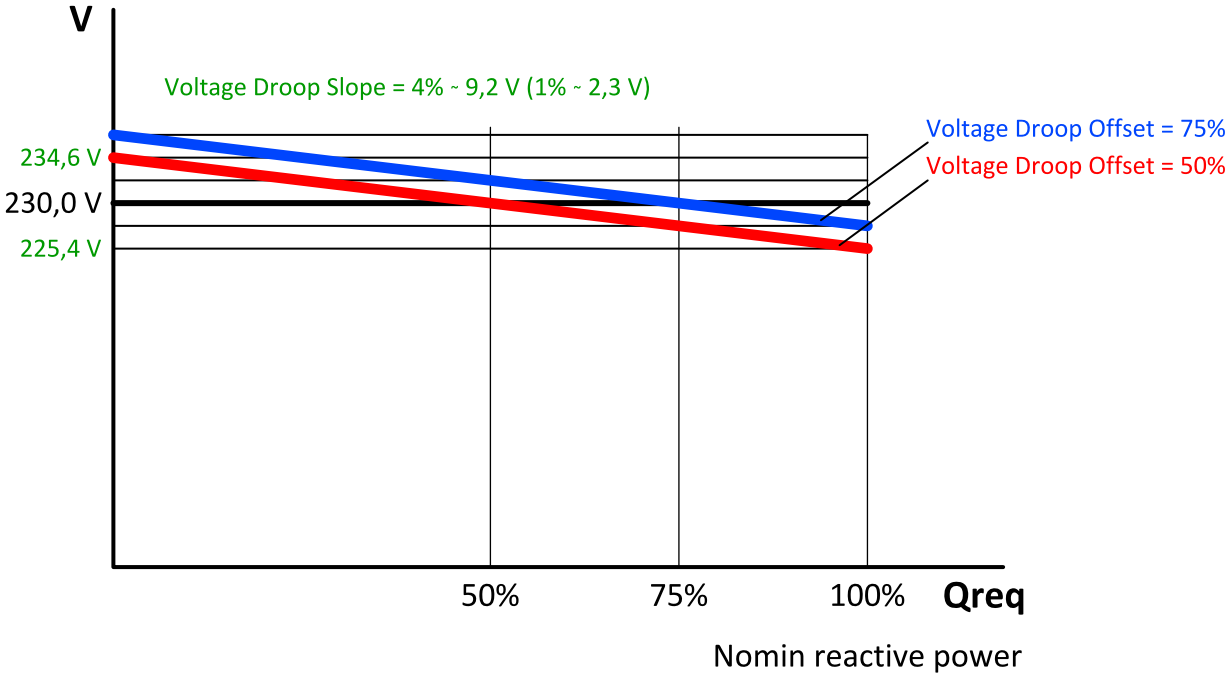


Image 5.62 Voltage droop

Equation

Required voltage = Nominal voltage - [(Nominal voltage * **Voltage Droop Slope (page 358)** / 100) * (Reactive power / Nominal reactive power - **Voltage Droop Offset (page 359)** / 100))

Note: *Nominal reactive power is not setpoint, but is calculated from Nominal power for PF = 0,8*

Principle of droop operation

Connecting of the gen-set operating in droop to the common bus bar

- Start command is received - start button in MAN mode or LBI **REMOTE START/STOP (PAGE 661)** in AUTO mode gets active
  - The gen-set operating in droop is not calculated in the load reserve.
  - LBI **REMOTE START/STOP (PAGE 661)** is not influenced by power management and gen-set starts if it gets active.
- Gen-set is starting - voltage and speed regulation are set to **Voltage Regulator Bias (page 349)** and **Speed Governor Bias (page 341)** (droop regulation is not active when GCB is opened).
- Connecting to bus
  - Dead bus - controller is prohibited to close it's GCB because of safety reasons (controller does not know about other controllers). Only controller with setpoint **Dead Bus GCB Close Master (page 357)** = ENABLED is allowed to close it's GCB to the dead bus. Otherwise it must be done manually in MAN mode.
  - Energized bus - controller starts synchronization (standard isochronous regulation).
  - GCB closes when synchronized - Now the droop regulation gets active

Disconnecting of loaded gen-set from common bus bar in droop

- Gen-set is operating in droop and is loaded. Stop command is received - stop button in MAN mode or LBI **REMOTE START/STOP (PAGE 661)** in AUTO mode gets inactive.
- Controller starts soft unload of loaded gen-set
  - Soft unload can be disabled via LBI **DROOP UNLOAD DISL (PAGE 649)** in case when there is the last gen-set on the common bus bar and it is not possible to unload it. Then the GCB is opened immediately.
- GCB opens when the active power drops under **Generator Unload GCB Open Level (page 347)**, latest when timer **Load Ramp (page 348)** elapses.

Transition from droop to iscochronous regulations

- The speed request during the transition from droop (or emergency droop) to is ochronous regulation is changed smoothly (not in step). It prevents the system against overshoot of the frequency.
- Frequency is changed by 2 Hz per **Load Ramp (page 348)**.

Forcing of the regulation to droop

- Droop regulation can be forced by LBI **FORCE DROOP OPER (PAGE 650)**.

Principle of emergency droop

When **Load/Var Sharing Regulation Type (page 356)** = Emrg Droop, Isonchronous regulation is used until the conditions for activation of emergency droop are fulfilled. After activation, emergency droop regulation is used until the conditions for deactivation are fulfilled.

Conditions for activation

- The number of controllers detected by the controller on can is lower than the number in the setpoint **#Number Of Controller On CAN (page 359)**.
- **#Emergency Droop On Delay (page 360)** has count down.

Conditions for deactivation

- The number of controllers detected by the controller on can is equal or higher than the number in the setpoint **#Number Of Controller On CAN (page 359)**.
- **#Emergency Droop Off Delay (page 360)** has count down.

5.4.32 Alternate configuration

In controller are 3 sets of configuration.

Configuration set 1	Configuration set 2	Configuration set 3
Nominal Power 1 (page 450)	Nominal Power 2 (page 454)	Nominal Power 3 (page 458)
Nominal Power Split Phase 1 (page 450)	Nominal Power Split Phase 2 (page 454)	Nominal Power Split Phase 3 (page 458)
Nominal RPM 1 (page 451)	Nominal RPM 2 (page 455)	Nominal RPM 3 (page 459)
Nominal Frequency 1 (page 451)	Nominal Frequency 2 (page 455)	Nominal Frequency 3 (page 459)
Nominal Voltage Ph-N 1 (page 452)	Nominal Voltage Ph-N 2 (page 456)	Nominal Voltage Ph-N 3 (page 460)
Nominal Voltage Ph-Ph 1 (page 452)	Nominal Voltage Ph-Ph 2 (page 456)	Nominal Voltage Ph-Ph 3 (page 460)
Nominal Current 1 (page 451)	Nominal Current 2 (page 455)	Nominal Current 3 (page 459)
Connection Type 1 (page 448)	Connection type 2 (page 452)	Connection type 3 (page 456)

Configuration sets can be changed via logical binary input **ALTERNATE CONFIG 2 (PAGE 627)** and logical binary input **ALTERNATE CONFIG 3 (PAGE 627)**.

IMPORTANT: Gen-set can not switch to the alternative setpoints when is running.

5.4.33 USB host

USB host is a function for programming of controller from USB Flash Drive. Following functions are supported:

- Firmware upload
- Configuration upload
- Firmware and configuration upload
- Configuration download

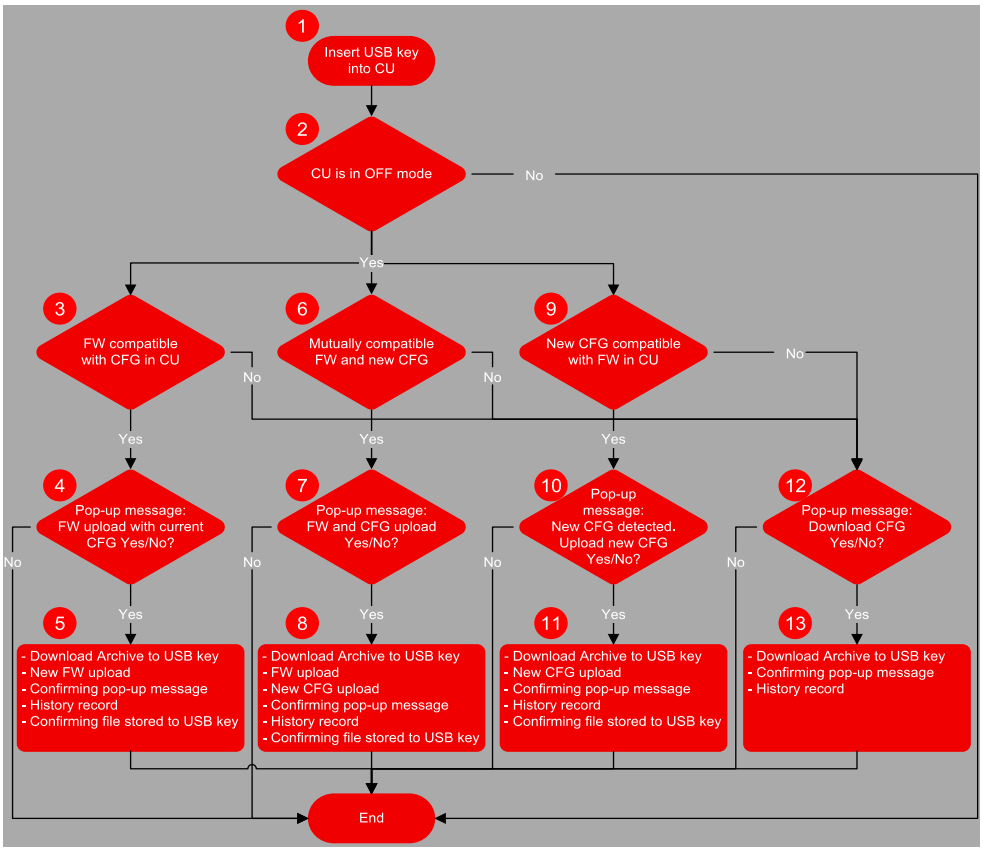


Image 5.63 USB host flowchart

Terminology:

- The Archive = the native file of InteliConfig, including the complete Configuration + History + Statistic + Values (in the time of download) + Alarm list.
- Configuration = the part of Archive, in the terms of Configuration + Setpoints + PLC + IO definitions + Languages.
- New configuration = the configuration created in InteliConfig for the purpose of uploading it into the controller using the USB memory stick. The new configuration is recognized due to it's name. The name has to contain the specific string ="InteliGen200-Genset name-M.N.P.B.aig3".
- Compatible firmware = the firmware version compatible with the configuration in the controller. The name of file including the firmware is "InteliGen200-M.N.P.B.bin".

Abbreviations:

- CU - control unit
- FW - firmware
- CFG - configuration

Firmware upload

- Point 1 - controller detects that USB Flash Drive has been inserted.
  - If the communication via USB B is running controller will not detect the USB memory key.
  - On the other hand if the USB memory key was detected, communication via USB B port is not possible.
- Point 2 - controller is in OFF mode
  - All operations with USB memory key are possible only in OFF mode
- Point 3 - Conditions for firmware upload with current configuration
  - The new firmware compatible with the version of the configuration in the controller has been detected (and there is no new configuration file).
  - Detection is based on name of firmware - required name: "InteliGen200-M.N.P.B.bin"
  - There can be stored more firmwares on the USB Flash Drive. Controller automatically select the compatible firmware with highest version.
- Point 4 - Pop-up message
  - Confirmation of firmware upload with current configuration
- Point 5 - Firmware upload
  - Current archive is download to USB Flash Drive (Name = SN_YYMMDDHHMM).
  - New firmware is uploaded into the controller without the change of the configuration
  - History record "USB Flash Drive FW upgrade" is made
  - Confirming file (.txt) on USB Flash Drive is made (Name = SN_YYMMDDHHMM)
    - Content: Serial number, Year/Date/Time, Upgrade to the FW "Name of the new FW" successful.
  - Confirmation pop-up message: "FW upgrade success"

Configuration upload

- Point 1 - controller detects that USB Flash Drive has been inserted.
  - If the communication via USB B is running controller will not detect the USB memory key.
  - On the other hand if the USB memory key was detected, communication via USB B port is not possible.
- Point 2 - controller is in OFF mode
  - All operations with USB memory key are possible only in OFF mode
- Point 9 - conditions for new configuration upload
  - The new configuration compatible with the version of the firmware in the controller has been detected (and there is no new firmware file).
  - Detection is based on name of configuration - required name: "InteliGen200-Genset name-M.N.P.B.aig3"
  - There can be only one configuration file
- Point 10 - Pop-up message
  - Confirmation of configuration upload with current firmware
- Point 11 - Configuration upload
  - Current archive is download to USB key (Name = SN_YYMMDDHHMM).
  - New configuration is uploaded into the controller without the change of the firmware

- History record "USB key CFG upload" is made
- Confirming file (.txt) on USB key is made (Name = SN_YYMMDDHHMM)
  - Content: Serial number, Year/Date/Time, Upgrade to the FW "Name of the new CFG" successful.
- Confirmation pop-up message: "CFG upgrade success"

Firmware and configuration upload

- Point 1 - controller detects that USB Flash Drive has been inserted.
  - If the communication via USB B is running controller will not detect the USB memory key.
  - On the other hand if the USB memory key was detected, communication via USB B port is not possible.
- Point 2 - controller is in OFF mode
  - All operations with USB memory key are possible only in OFF mode
- Point 6 - conditions for new firmware and configuration upload
  - The new configuration has been detected. Also there is firmware file compatible with detected new configuration
  - Detection is based on name of configuration - required name: "InteliGen200-Genset name-M.N.P.B.aig3" and on name of firmware - required name: "InteliGen200-M.N.P.B.bin"
  - There can be only one configuration file
  - There can be stored more firmwares on the USB key. Controller automatically select the compatible firmware with highest version.
- Point 7 - Pop-up message
  - Confirmation of configuration and firmware upload
- Point 8 - Configuration and firmware upload
  - Current archive is download to USB key (Name = SN_YYMMDDHHMM).
  - New firmware is uploaded into the controller
  - New configuration is uploaded into the controller
  - History record "USB key FW and CFG upload" is made
  - Confirming file (.txt) on USB key is made (Name = SN_YYMMDDHHMM)
    - Content: Serial number, Year/Date/Time, Upgrade to the FW "Name of the new FW" successful, Upgrade to the FW "Name of the new CFG" successful.
  - Confirmation pop-up message: "FW and CFG upgrade success"

Configuration download

- Point 1 - controller detects that USB Flash Drive has been inserted.
  - If the communication via USB B is running controller will not detect the USB memory key.
  - On the other hand if the USB memory key was detected, communication via USB B port is not possible.
- Point 2 - controller is in OFF mode
  - All operations with USB memory key are possible only in OFF mode
- Points 3, 6, 9 - conditions for configuration download
  - There is no firmware or configuration with required name

- Point 12 - Pop-up message
  - Confirmation of configuration download
- Point 11 - Configuration download
  - Current archive is download to USB key (Name = SN_YYMMDDHHMM).
  - History record "USB key Archive download" is made
  - Confirmation pop-up message: "Archive download successful"

5.4.34 E-Stop

Binary outputs for the control of some essential functions are internally wired as "safe", it means, that their deactivation is directly bind with the dedicated Input E-STOP (not evaluated as the LBI in the controller). This BO are fully configurable and are used e.g. for the Starter and Fuel control.

- The emergency stop circuit must be secured.
- No accidental activation on the PCB, circuit must disable the operation of the emergency stop.
- The power supply of the associated binary outputs (BIN1 and BIN2) is supplied by the E-STOP input, not by the + battery voltage.

Note: *There is no difference int the way of configuration of all binary outputs. Binary outputs BO1 (Starter), BO2 (Fuel Solenoid) are intended for these functions (not dedicated).*

There is a measuring of E-STOP input voltage analogically and setting the binary value (representing emergency stop input level) based on comparison of the measured voltage to two analog levels, which are derived from the controller supply voltage (battery voltage) perceptually.

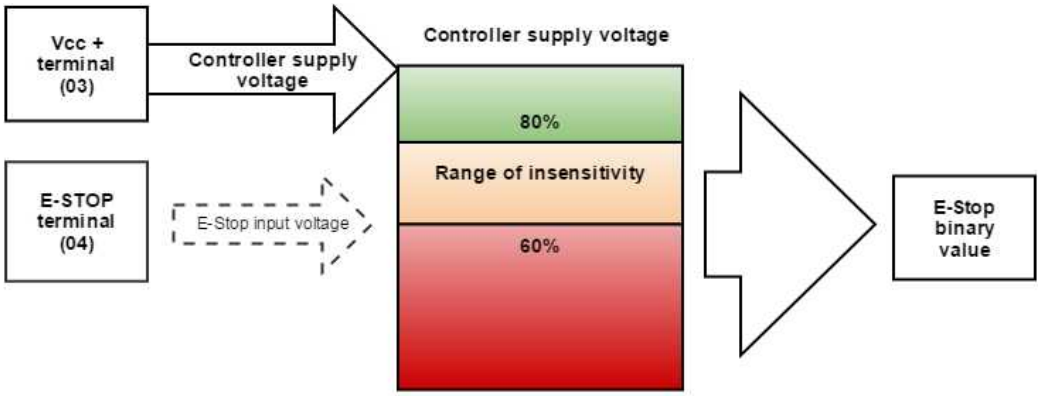


Image 5.64 SW principle of E-STOP

- If the input voltage of E-stop is higher than high comparison level (for ex. higher than 80% of the supply voltage), then E-stop is not activated.
- If the input voltage of E-stop is lower than low comparison level (for ex. lower than 60% of the supply voltage), then E-stop is activated.

If the input voltage of E-stop is located somewhere between low and high comparison levels (for ex. between 60 and 80 %of the supply voltage, then E-stop binary value will stay on its previous state (means E-stop binary value will not change).

Visualization on CU screen

- 1 - E-STOP has voltage - state is OK
- 0 - E-STOP has no voltage - protection is active

More information about connection **see E-Stop on page 47**.

5.4.35 ECU Frequency selection

Setpoint *ECU Freq Select* is no longer in use. However **ECU Frequency Select (page 574)** value was kept and the value can be calculated from **Nominal Frequency (page 257)** setpoint. Sequence for frequency change is executed automatically (engine must be in still condition and ECU is powered on – ECU Power Relay is not configured) in following 9 steps:

1. Starting of the engine is blocked (state: Not Ready)
2. Wait 100 ms
3. *ECU Stop Pulse* is set for 1000 ms (standard Stop Pulse duration)
4. Wait 3000 ms
5. Frequency selection is changed to a new value
6. Wait 2000 ms
7. *ECU Stop Pulse* is set for 1000 ms (standard Stop Pulse duration)
8. Wait 2000 ms
9. Come back from start blocking state

This sequence does not control LBO **ECU POWER RELAY (PAGE 696)** anyhow.

Note: *If LBO **ECU POWER RELAY (PAGE 696)** is used, this change can be make only in prestart phase. So prestart has to be set up for enough long time.*

5.4.36 Mains import measurement

This functionality is applicable on SPTM application. This function is for gen-sets which are not equipped by the mains import measurement. Then the soft transfer of the load in the direction Mains to Generator (**Transfer Mains To Gen (page 346)**) can´t be driven by the mains import measurement (mains unload level - **Mains Unload MCB Open Window (page 348)**), but the load transfer duration must be defines by some certain time interval (**Close Transfer Max Duration (page 345)**).

Note: *For situations when mains current is not measured by Mains CT (Mains Import Measurement = None or Analog Input), PF is limited to Base Power Factor value even though PF Control PTM = PF Imp/Exp.*

5.4.37 Load shedding

The Load shedding is controlled disconnection of less important load groups (circuits) when the object consumption is too high. There are two functions of the load shedding:

- To avoid loss of power at the fundamental loads in island mode, when the object consumption is getting near to the maximum power of the gen-sets.

All Load shedding outputs are activated (closed) to trip the unessential load when gen-set goes to island:

- When GCB is closed after mains fail and gen-set starts in AUT mode.
- When MCB opens from parallel to mains operation in AUT mode.
- Before MCB is opened in MAN mode by button.

How the Load shedding controls the Load shedding outputs

The load shedding function is active in all controller modes except OFF.

Load shedding has three steps and each step is linked with its own binary output, **LOAD SHEDDING STAGE 1 (PAGE 710)**, **LOAD SHEDDING STAGE 2 (PAGE 710)** and **LOAD SHEDDING STAGE 3 (PAGE 710)**

The Load shedding outputs can be activated one by one in the direction 1, 2, 3. The condition for activation are defined by setpoints **Load Shedding Level (page 325)** and **Load Shedding Delay (page 325)**.

The Load shedding outputs are deactivated one by one according to the conditions given by the setpoints **Load Reconnection Level (page 325)**, **Load Reconnection Delay (page 326)**, **Auto Load Reconnection (page 326)**.

For manual reconnection of the load is desired the **Auto Load Reconnection (page 326)** setpoint needs to be disabled and the **MANUAL LOAD RECONNECTION (PAGE 655)** digital input needs to be configured.

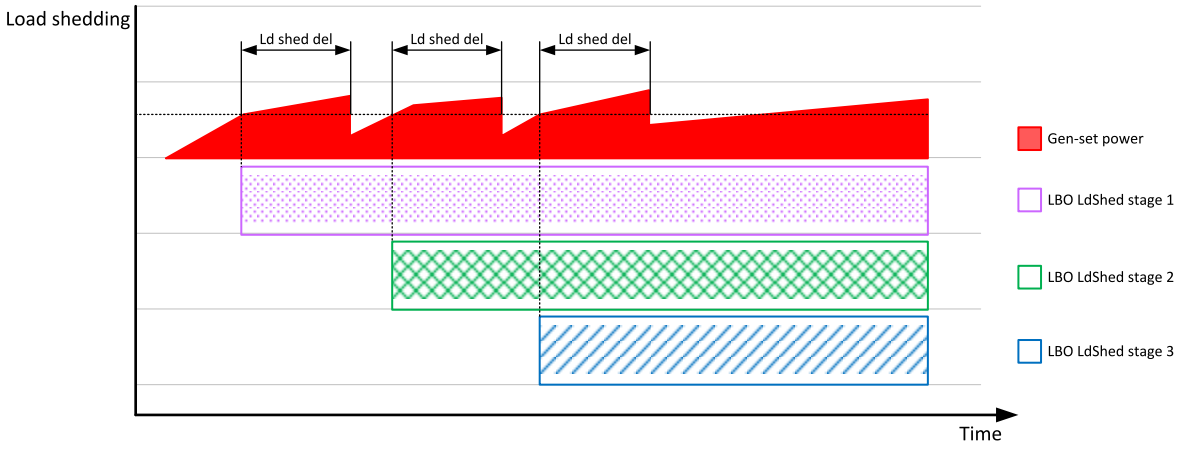


Image 5.65 Load shedding

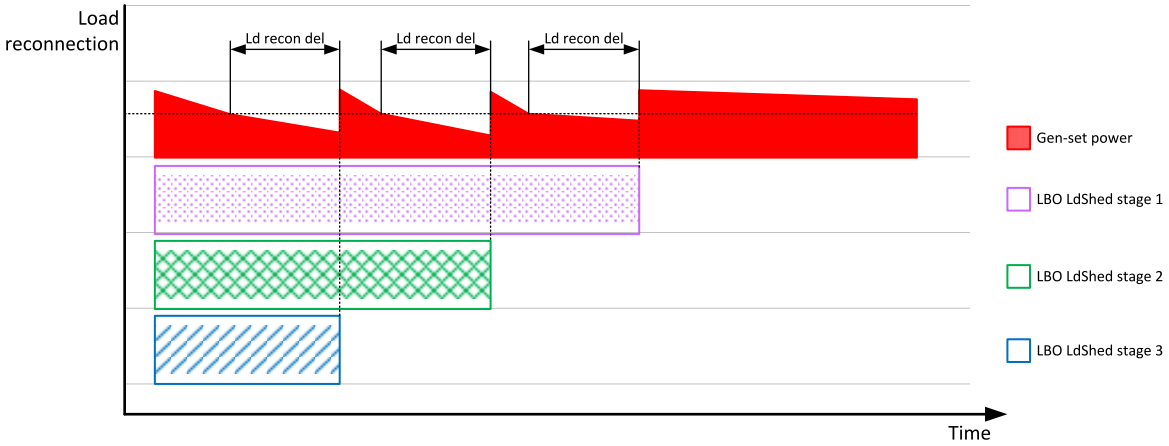


Image 5.66 Load reconnection

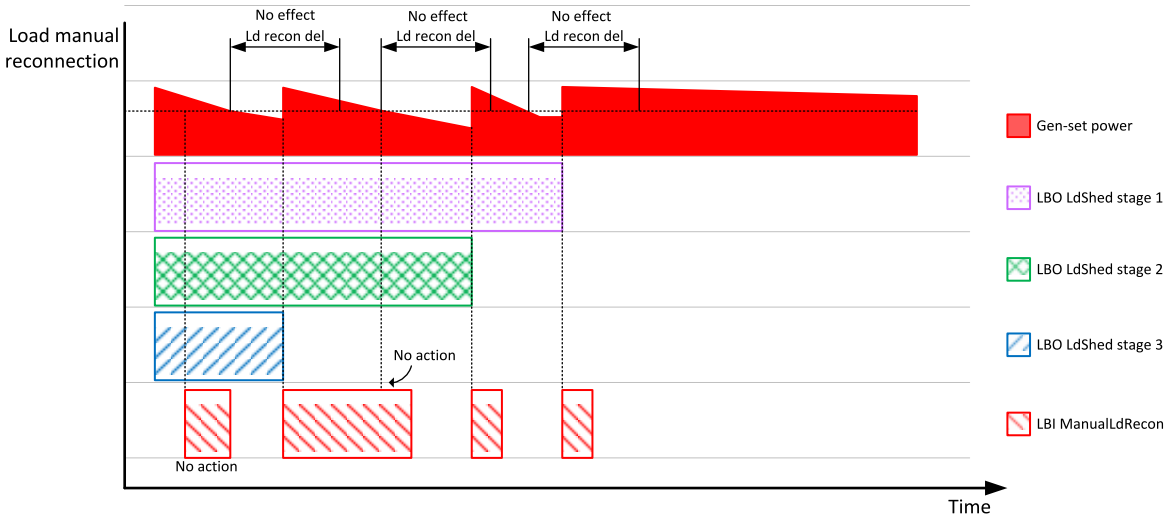


Image 5.67 Load manual reconnection

5.4.38 Peak shaving

Peak shaving is applicable on SPtM application only. The function compares the mains import with some certain limit and start the Gen-set when the load excised this limit to decrease the mains import for some certain time.

The Peak shaving function is active only in AUT mode in Parallel to Mains operation. Peak shaving is based on active power only. If load consumption increases over **Peak Shaving Start Level (page 250)** and for period longer than **Peak Shaving Start/Stop Delay (page 251)** the Gen-set is started. If load consumption decreases below **Peak Shaving Stop Level (page 250)** and period longer than**Peak Shaving Start/Stop Delay (page 251)** the Gen-set is stopped. The activation of the function is indicated by LBO:**PEAK SHAVING ACTIVE (PAGE 717)**.

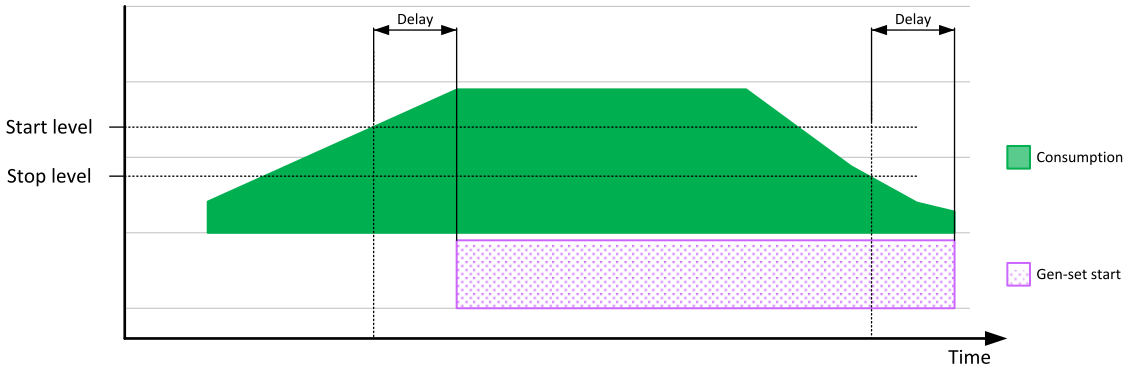


Image 5.68 Peak shaving

5.4.39 Cybernetic security

The cybernetic security is formed by:

- Hardening the storage of a credentials
- Protection against a brute-force attack to the password

- Secure method to reset the password
- A new technology of encryption of the remote communication
- Web interface can be disabled

> **IMPORTANT: Due to this, we do not recommend performing a rollback from FW 1.3.0 to FW version 1.2.1 or older.**

Hardening the storage of a credentials

The user credentials (passwords and access code) have been moved to a hardened storage to prevent the credentials to leak out of the hardware.

> **IMPORTANT: If a firmware rollback is inevitable, please keep in mind, when the firmware is first time updated to the new firmware (which uses hardened storage) a seamless transfer of the credentials into the hardened storage is performed. However, if the rollback to any previous firmware (which does not use hardened storage) is performed the credentials are NOT transferred back, so the previous firmware will not "see" any change of the credentials made through the new firmware. Moreover, as the transfer of the credentials into the hardened storage is performed only during very first update from an "old" to a "new" firmware, no change of the credentials performed in the "old" firmware after the rollback will be visible in the "new" firmware after a next update to the "new" firmware.**

Protection against the brute force attack

Protection against the brute force will take a place when an invalid password is entered repeatedly.

- If the invalid password is entered 5 times, the controller gets blocked for entering password for a while.
- Each further entering of the invalid password cause the consequent blocking time is increased.
- If the invalid password is entered repeatedly the controller gets blocked for entering the password permanently and the password must be reset to a default value as described below.

Note: *Blocking of the controller for entering the password have no influence to controller/genset operation*

Note: *Permanent blocking cannot occur accidentally, just by user mistake. It can be practically triggered only by a focused activity.*

Resetting the administrator password

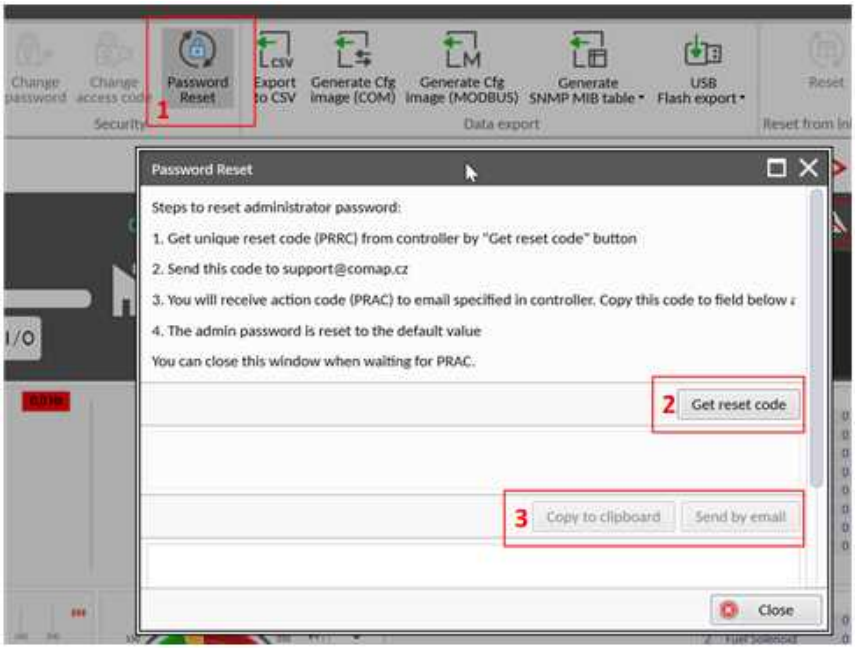
If **the administrator password is lost or controller is permanently locked** due to brute-force attack protection, proceed according to a procedure described below:

> **IMPORTANT: There is a backup e-mail address defined in the controller to which and only which ComAp will send the "password reset action code". Please be sure, that you have adjusted this e-mail address correctly. Use InteliConfig to adjust the backup e-mail address**



Reset password procedure

1. Connect InteliConfig. You may connect remotely if you know Access Code.
2. Get the password reset request code and send it via e-mail to support@comap-control.com



3. Once you receive the reply from ComAp, copy the code from the e-mail (all characters inside the box as indicated below)



Dear customer,

ComAp has received your request for resetting the password in the controller **IG500**, serial number **FF110336**. Please perform following steps to finish the action.

1) Connect your PC application to the controller
2) Copy the action code stated below to the clipboard
3) Paste the clipboard content into the appropriate field in the PC application and press the "Reset" button. Password will be reset to the default value.
4) Adjust and remember new password

Code:

```
ADgjZI2EcREqKq7Dyw/K0eyEURVNy3veXPVcsMuKZpw8hcImRqxyso7/LGec9y
QVthRMC53dZ2SLPHga50qVdpjuNuzLImdK5iDA5J13VIHZ0rW8eInUxj3+qWPa
pADf7nPC9B+t40IXChFPns6Rd4eylVeAbj+7aca9iyhGUk8cN5V0ePN7+byWND
c7nO+KPop1eoQCgRdMh8AiH60ut7ME2u+qU3FOMGl65tmqFGXESCu3cQ+FcsF3
Sxs43QAnYw3sSRPZa57JStdEB3Nk13ooNxH7Bv/gfwsUEjvII3s2WsbjQZ4x/a
XBQF+kplS9usnz0oXaY+N8RTHd1ynEbyQ=
```

Please note folowing points:
- This code can be used only in the controller from which the corresponding request was generated.
- The code has no time-limited validity
- The code becomes invalid if someone enters valid administrator password into the controller
- The code becomes invalid if someone enters another (invalid) code three-times into the controller

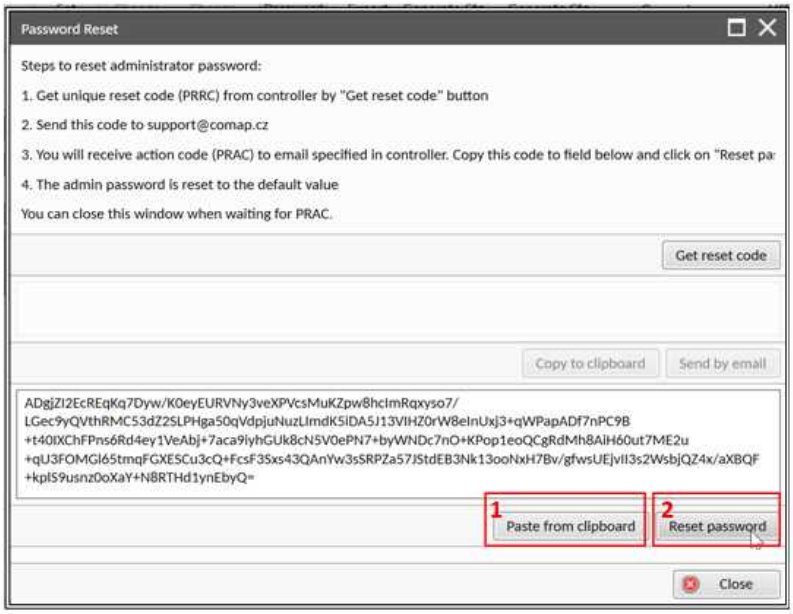
Sincerely
ComAp technical support

If you know the controller mentioned above but have not submitted any request for password reset please contact ComAp technical support support@comap.cz.
If you do not recognize this activity at all you may ignore this e-mail.

This is an automatically generated e-mail. Please do not reply.

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4. Paste the code into the password reset window



Encryption of the communication

New technology “CCS v.1” is used for an authentication and an encryption of the ComAp protocol via Internet/ethernet/AirGate. This technology is based on strong and proven cryptographic algorithms and has passed successfully penetration tests and cybersecurity audit.

Web interface can be disabled

A setpoint has been added to disable the CM-ETHERNET built-in web interface.

> **IMPORTANT: As the web interface is using HTTP protocol it is recommended to disable the web interface unless the controller is connected into a trusted secure network.**

back to Functions

6 Communication

6.1 PC 193
6.2 Connection to 3rd party systems 206
6.3 Replacing InternetBridge-NT 221

back to Table of contents

6.1 PC

6.1.1 Direct communication 193
6.1.2 Remote communication 195

6.1.1 Direct communication

A RS232, USB, RS485 or ethernet interface can be used for direct cable connection to a PC.

Connection via RS232

A plug-in communication module CM-RS232-485 is necessary for communication via RS232 connection.

The module is plugged into the slot located on the rear side of the controller. To find more information about installation of the modules **see Plug-in module installation on page 58**.

RS232 interface uses **COM1 Mode (page 461)** port of the controller. Use a cross-wired serial communication cable with DB9 female connectors and signals Rx, Tx, GND.

Note: *Also USB-RS232 convertor can be used.*

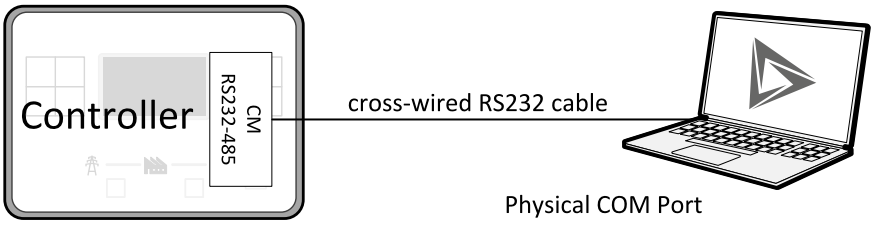


Image 6.1 Cross-wired RS232 cable is used

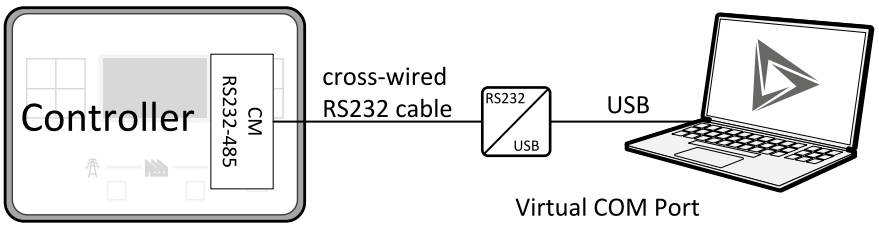


Image 6.2 Cross-wired RS232 cable and USB is used

Connection via RS485

Plug-in module CM-RS232-485 or on board RS485 connector can be used for communication via RS485 connection.

The module is plugged into the slot located on the rear side of the controller. To find more information about installation of the modules **see Plug-in module installation on page 58**.

RS485 interface uses **COM2 Mode (page 462)** port of the controller.

Note: *Also USB-RS485 convertor can be used.*

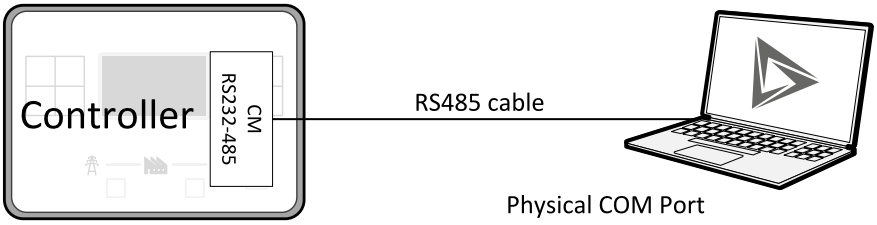


Image 6.3 Plug-in module CM RS232-485 is used

Connection via Ethernet

A plug-in communication module CM-Ethernet is necessary for ethernet connection.

The module is plugged into the slot located on the rear side of the controller. To find more information about installation of the modules **see Plug-in module installation on page 58**.

This connection type is used for communication with the controller from InteliConfig or any other PC tool. This connection can be used regardless of AirGate is switched on or off. Only three remote clients can be connected at the same time (via AirGate only two remote clients at the same time).

To connect your PC tool to the controller use the INTERNET connection type and just put the CM-Ethernet IP address into the gen-set address box in the PC tool. If you do not use the default **ComAp TCP Port (page 500)** 23, then you also have to specify the port number using a colon.

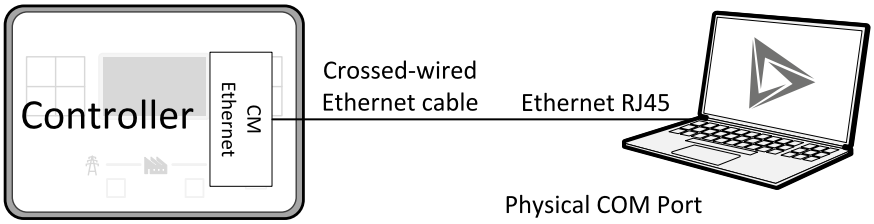


Image 6.4 Ethernet cable is used

Connection via USB

USB interface uses HID profile.

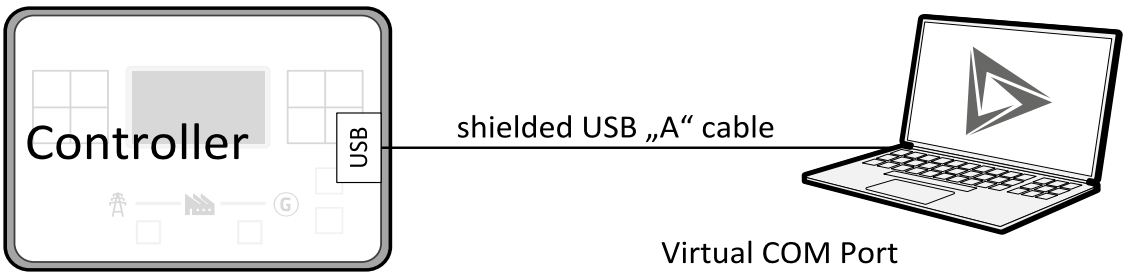


Image 6.5 Shielded USB type A cable is used

back to Communication

6.1.2 Remote communication

A PC can be connected to the controller also remotely via CM-GPRS or CM-Ethernet plug-in module.

IMPORTANT: Factory default password and access code are "0". It is highly recommended to change these parameters.

Ethernet LAN connection

Direct IP LAN connection is intended to be used if the CM-Ethernet module is reachable from the client computer by specifying the IP address at which the module can be contacted.

- If direct IP connection is to be used within a local network the CM-Ethernet must have static IP address in the respective local network.

Note: *If you have troubles with setting up static and public IP address for direct connection from Internet use AirGate connection instead.*

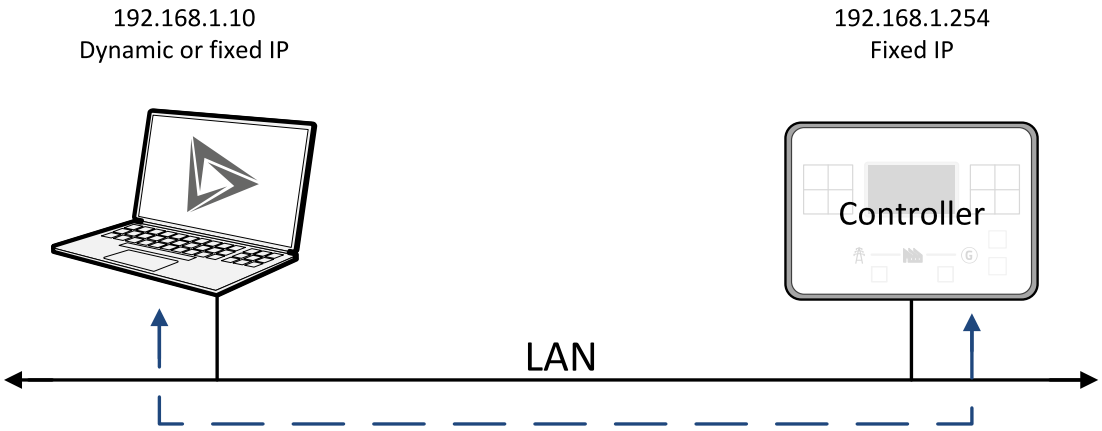


Image 6.6 Ethernet LAN connection

Setting-up static IP address

There are two basic ways to get the static IP address.

First way is to switch theCM-Ethernet to manual IP address mode. Adjust the setpoint **IP Address Mode (page 494)** to FIXED. In that case all setpoints of IP settings(**IP Address (page 494)**, **Subnet Mask (page 495)**, **Gateway IP (page 495)**, **DNS IP Address 1 (page 496)**) have to be adjusted manually. If this method is used several basic rules should be kept to avoid conflicts with the remaining network infrastructure:

- The static IP used in the controller must be selected in accordance with the local network in which CM-Ethernet is connected.
- The static IP used in the controller must be excluded from the pool of addresses which is assigned by DHCP server, which is in charge of the respective local network.
- The local infrastructure must generally allow using devices with manually assigned IP addresses.
- There must not be any other device using the same static IP address. This can be tested from a computer connected to the same network using "ping <required_ip_address>" command issued from the command line. The IP address is not occupied if there is not any response to the ping command.

Note: *The list above contains only basic rules. Other specific restrictions/rules may take place depending on the local network security policy, technology used, topology etc.*

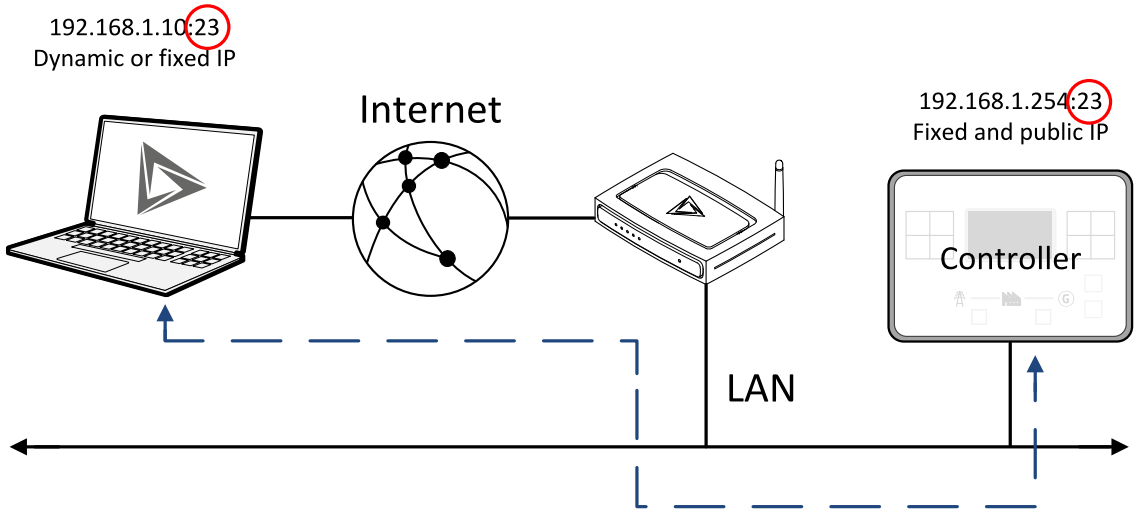
Next way is to switch the CM-Ethernet to automatic IP address mode. Adjust the setpoint **IP Address Mode (page 494)** to AUTOMATIC. In that case all IP settings are assigned by DHCP server. Then configure the DHCP server to assign always the same IP address (i.e. static IP address) to the particular CM-Ethernet according to it's MAC address.

Internet connection

Public static IP

If public static IP connection is to be used from the Internet, the IP address, which is entered into the client computer, must be static and public in scope of the Internet.

- If CM-Ethernet is connected to Internet via a local ethernet network then in most cases port forwarding must be created from the public IP address of the network gateway to the local IP address of CM-Ethernet at the port specified for ComAp protocol. Different port numbers can be used to create multiple port forwarding rules in the same local network.



AirGate

This connection type is intended for remote connection from InteliConfig,or any other ComAp PC tool over the Internet in situations, where obtaining fixed public IP address is not possible. Only two remote clients can be connected at the same time.

This connection type is active if AirGate connection is enabled. Setpoint **AirGate Address (page 500)** must contain AirGate server address. It can be entered in text form as well as numeric form. There is a public AirGate server available at address "airgate.comap.cz".

Once the controller is attached to the Internet and the AirGate server address is properly adjusted then the controller registers automatically to the server and an identification string AirGate ID is given to a controller, which is visible at the controller screen.

To connect your PC tool to the controller use the AirGate connection, put the the same AirGate address as in the controller into the AIRGATE ADDRESS field and use the AirGate ID displayed on the controller.

SMS

Event SMS

The InteliGen 200 controller equipped with the CM-GPRS or CM-4G-GPS communication module is able to send Event SMS according to the setting of setpoint:

- **Event Message (page 490)**

Note: *Firstly setpoint **Telephone Number 1 (page 484)** has to be adjusted.*

The following events can be received by mobile phone:

- Engine Start/Stop
  - Manual Start/Stop
  - Remote Start/Stop
- Load on Gen-set

Message structure:

- Genset Name (hh:mm:ss dd.mm.yyyy)
- hh:mm:ss Load on Genset

Alarm SMS

The InteliGen 200 controller equipped with the CM-GPRS or CM-4G-GPS communication module is able to send Alarm SMS according to the setting of setpoints:

- **Wrn Message (page 491)**
- **Sd Messages (page 491)**
- **BOC Message (page 491)**

Note: *Firstly setpoint **Telephone Number 1 (page 484)** has to be adjusted.*

Message structure:

- Gen-set Name
- AL=(Alarm 1, Alarm 2, Alarm x)

Note: *Asterisk means that alarm is unconfirmed and exclamation mark means that alarm is active.*

SMS commands

To control the gen-set equipped with InteliGen 200 controller and CM-GPRS or CM-4G-GPS communication module (or modem) via SMS requests, send an SMS in the structure of:

xxxx, yyyy, zzzz, etc.

SMS send to the telephone number of the SIM card in your CM-GPRS module (or modem). Where the "#" mark means the controller access code, "xxxx" means the Command 1, "yyyy" is Command 2, "zzzz" is Command 3, etc.

Note: *Access code is set up via InteliConfig.*

IMPORTANT: If wrong controller access code is set, then only help command is working.

start	Start the engine in MAN mode.
stop	Stop the engine in MAN mode.
fault reset	Acknowledging alarms and deactivating the horn output.
gcb close	Closing GCB in MAN and TEST mode.
gcb open	Opening GCB in MAN and TEST mode.
off	Switching to OFF mode.
man	Switching to MAN mode.
auto	Switching to AUTO mode.
status	Get status information from controller unit.
help	Get a list of available SMS requests.

Note: *Between commands are internal delays adjusted due to system requirements.*

Example: When the controller, in AUTO mode, with a controller name of "InteliGen 200-Test", with the CM-GPRS module and access code "0" receives the SMS:
0 man, start, gcb close, gcb open, stop, auto
Controller mode will be changed to MANUAL mode. The engine will be started and GCB will close. Then GCB will open, the engine will stop and it will go into AUTO mode again.
The controller will send back the SMS (controller will respond to SMS after every command has been finished, not sooner.):
#InteliGen 200-Test: <OK>,<OK>,<OK>, <OK>,<OK>, <OK>
The value <OK> or <ERROR> means if the command has been performed succesfuly or not.

Emails

Event Email

The InteliGen 200 controller equipped with the CM-Ethernet communication module is able to send Event Email according to the setting of setpoint:

- **Event Message (page 490)**

Note: *Firstly setpoints **Email Address 1 (page 487)** and **SMTP Sender Address (page 481)** (for CM-GPRS) or **SMTP Sender Address (page 493)** (for CM-Ethernet) have to be adjusted.*

Note: ***Summer Time Mode (page 421)** and **Time Zone (page 490)** have to be adjusted for correct time in emails.*

Message structure:

Controller

Name: XXX

Serial number: XXX

SW branch: XXX

SW version: XXX

Application: XXX

Appl. version: XXX

Date: dd/mm/yyyy

Time: hh:mm:ss

Alarm list

Alarm 1

Alarm 2

Alarm 3

Events

---

hh:mm:ss Event 1

hh:mm:ss Event 2

hh:mm:ss Event 3

Alarm Email

The InteliGen 200 controller equipped with the CM-Ethernet communication module is able to send Alarm Emails according to the setting of setpoints:

- **Wrn Message (page 491)**
- **Sd Messages (page 491)**
- **BOC Message (page 491)**

Note: *Firstly setpoints* ***Email Address 1 (page 487)*** *and* ***SMTP Sender Address (page 481)*** *(for CM-GPRS) or* ***SMTP Sender Address (page 493)*** *(for CM-Ethernet) have to be adjusted.*

Note: ***Summer Time Mode (page 421)*** *and* ***Time Zone (page 490)*** *have to be adjusted for correct time in emails.*

Message structure:

Controller

Name: XXX

Serial number: XXX

SW branch: XXX

SW version: XXX

Application: XXX

Appl. version: XXX

Date: dd/mm/yyyy

Time: hh:mm:ss

Alarm list

Alarm 1

Alarm 2

Alarm 3

History events

---

0 dd/mm/yyyy hh:mm:ss.0 Event 1

-1 dd/mm/yyyy hh:mm:ss.0 Event 2

-2 dd/mm/yyyy hh:mm:ss.0 Event 3

Note: *Asterisk means that alarm is unconfirmed and exclamation mark means that alarm is active.*

Web Server

> **IMPORTANT: The web interface is based on HTTP protocol and is intended to be used only in private networks. It is not recommended to expose the web interface to the public Internet.**

The Web Server is designed for basic monitoring and adjustment of the controller using a web browser. Just put the controller IP address into the browser to display the main controller web page like http://192.168.1.254. You will be asked for the controller access code prior to entering the web pages.

> **IMPORTANT: Do not use the browser navigation buttons as "Back", "Forward" or "Reload". Use the links and the reload button located in the toolbar instead.**

Note: *Only two remote clients can be connected to the Web Server at one moment. If you close your web browser without disconnecting from the CM-Ethernet ("Exit" button at the web pages), the connection will be blocked for next 5 minutes.*

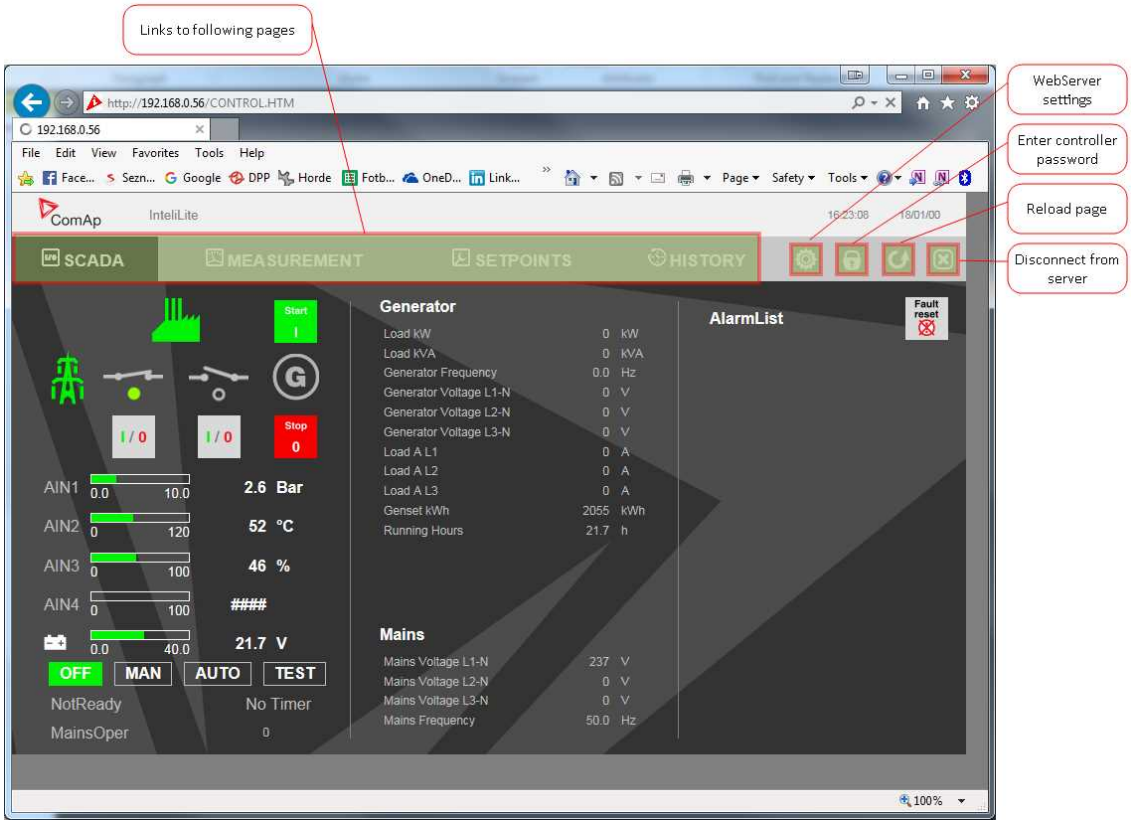


Image 6.7 Web Server main screen

Scada

Click to the SCADA link in the toolbar to display the scada page. The scada page is also the main page which is displayed by default if you just put the CM-Ethernet address into the browser (after entering the right access code).

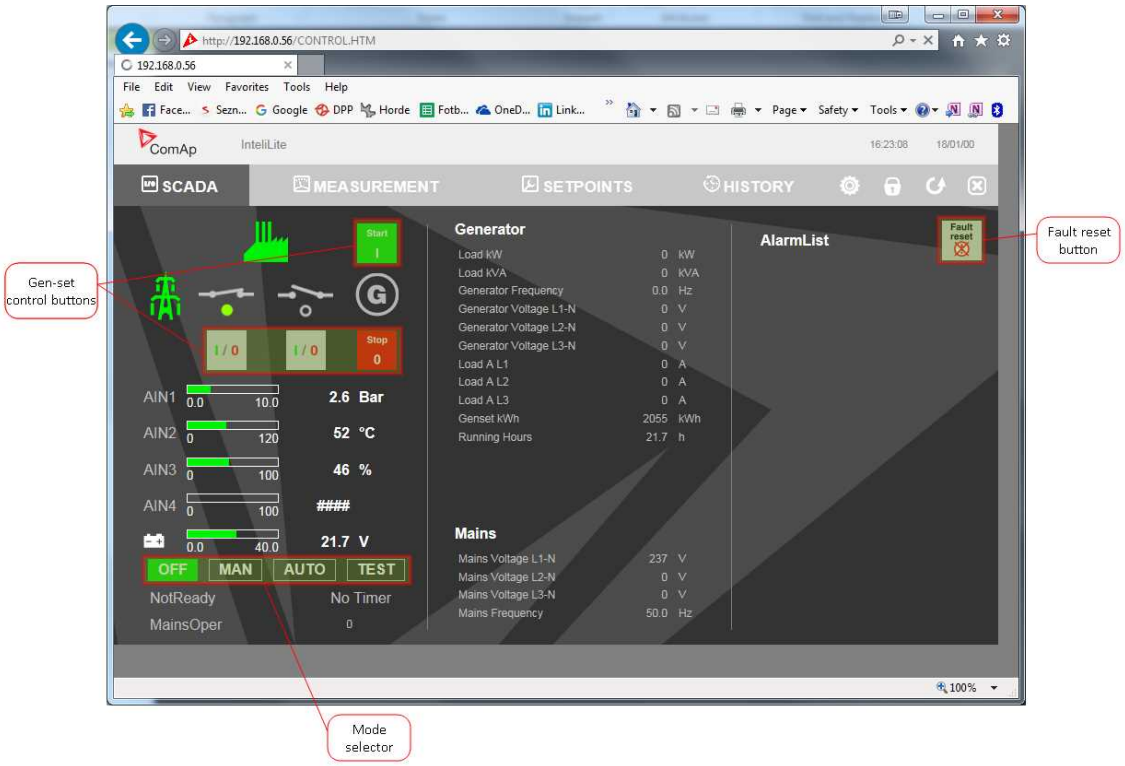


Image 6.8 Web Server - Scada screen

Measurement

Click to the MEASUREMENT link in the toolbar to display the measurement page. Then click to the required group name in the left box to display values of the group in the right box.

Note: *The measurement page is automatically refreshed every 60 seconds (this time cannot be changed).*

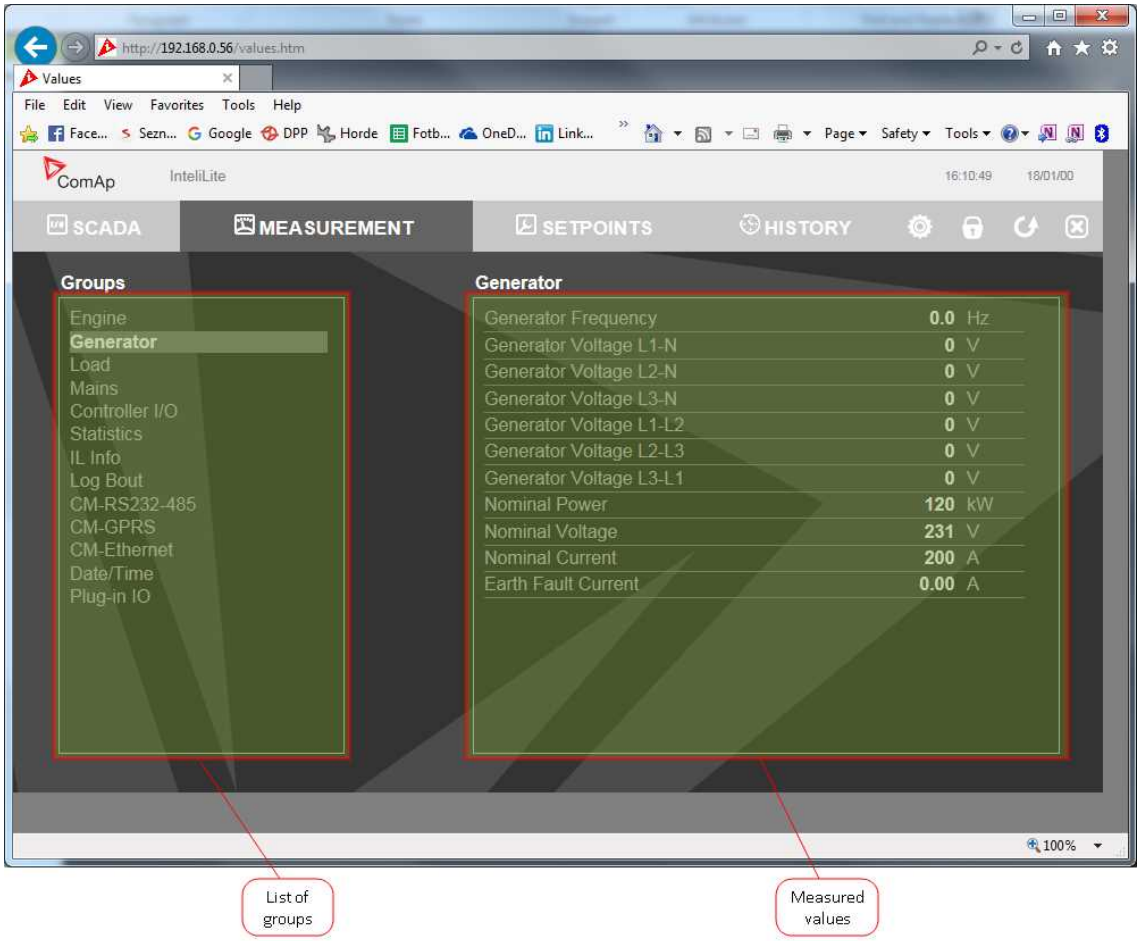


Image 6.9 Web Server - measurement screen

Setpoints

Click to the SETPOINTS link in the toolbar to display the setpoints page.

Click to the required group name in the left box to display setpoints of the group in the right box.

Click to the required setpoint name or value to change the value. If the respective setpoint is protected by password, which is indicated by a lock icon by the setpoint name, you have to click on the "Controller password" icon located in the toolbar and then enter valid password.

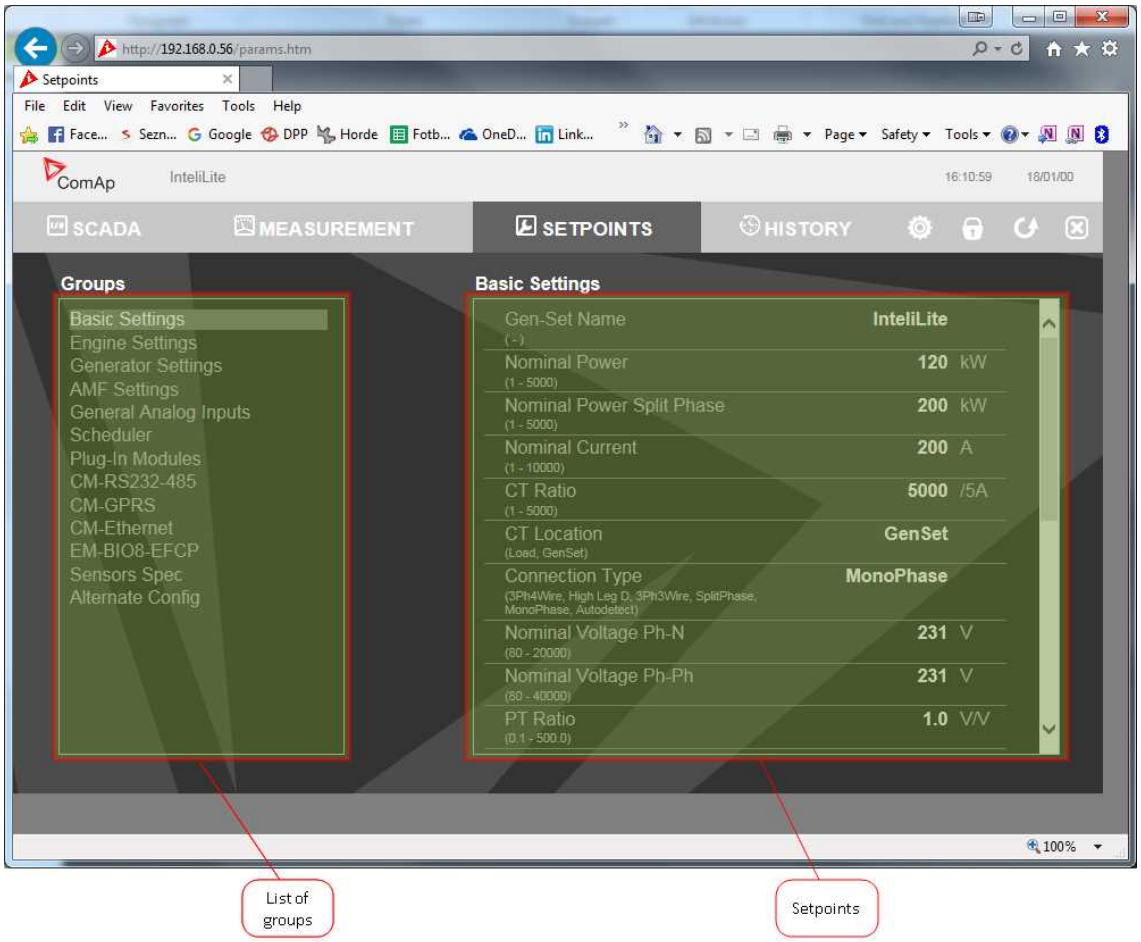


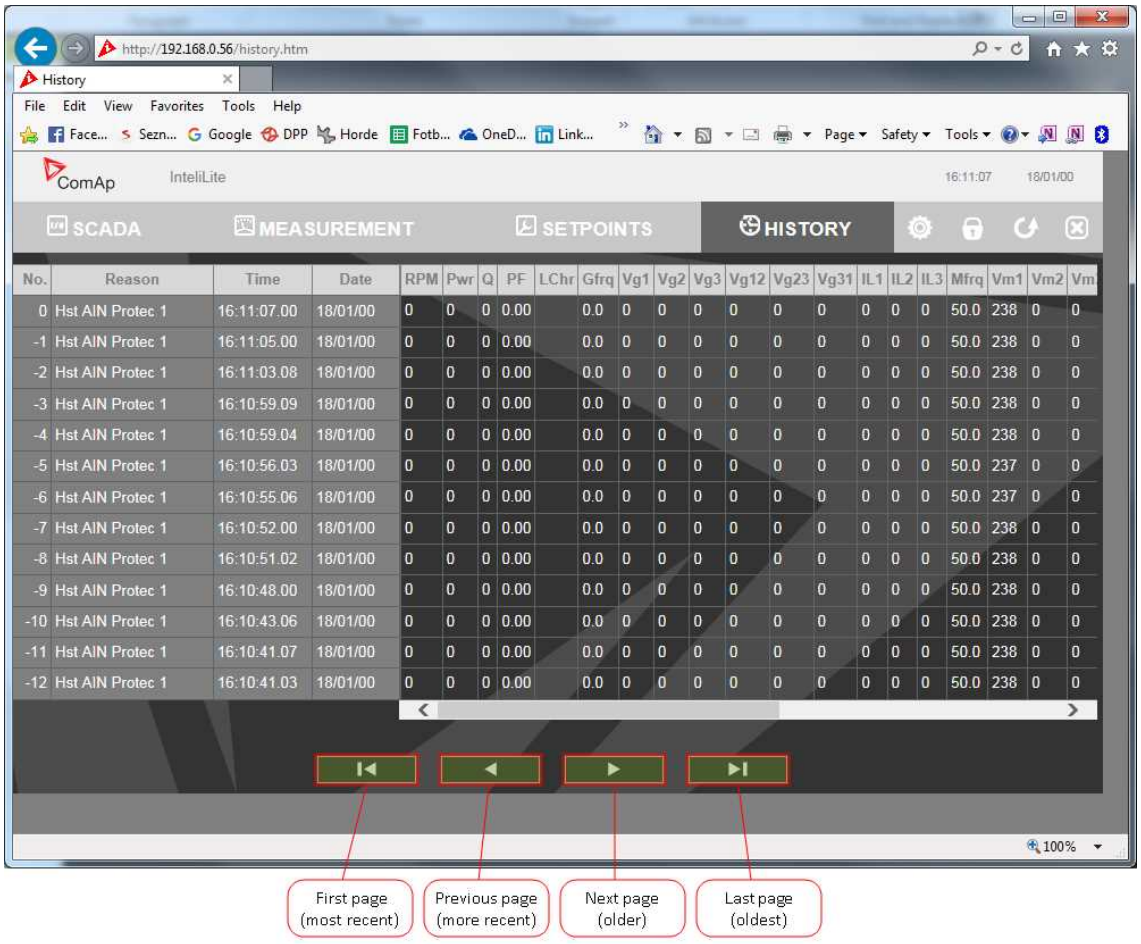
Image 6.10 Web Server - Setpoints screen

History

Click to the HISTORY link in the toolbar to display the history page.

Use the control buttons to move within the history file.

Note: *The history page is automatically refreshed every 60 seconds. If a new record appears in the controller, the web page will not show it immediately as e.g. InteliConfig.*



No.	Reason	Time	Date	RPM	Pwr	Q	PF	LChr	Gfrq	Vg1	Vg2	Vg3	Vg12	Vg23	Vg31	IL1	IL2	IL3	Mfrq	Vm1	Vm2	Vm
0	Hst AIN Protec 1	16:11:07.00	18/01/00	0	0	0	0.00		0.0	0	0	0	0	0	0	0	0	0	50.0	238	0	0
-1	Hst AIN Protec 1	16:11:05.00	18/01/00	0	0	0	0.00		0.0	0	0	0	0	0	0	0	0	0	50.0	238	0	0
-2	Hst AIN Protec 1	16:11:03.08	18/01/00	0	0	0	0.00		0.0	0	0	0	0	0	0	0	0	0	50.0	238	0	0
-3	Hst AIN Protec 1	16:10:59.09	18/01/00	0	0	0	0.00		0.0	0	0	0	0	0	0	0	0	0	50.0	238	0	0
-4	Hst AIN Protec 1	16:10:59.04	18/01/00	0	0	0	0.00		0.0	0	0	0	0	0	0	0	0	0	50.0	238	0	0
-5	Hst AIN Protec 1	16:10:56.03	18/01/00	0	0	0	0.00		0.0	0	0	0	0	0	0	0	0	0	50.0	237	0	0
-6	Hst AIN Protec 1	16:10:55.06	18/01/00	0	0	0	0.00		0.0	0	0	0	0	0	0	0	0	0	50.0	237	0	0
-7	Hst AIN Protec 1	16:10:52.00	18/01/00	0	0	0	0.00		0.0	0	0	0	0	0	0	0	0	0	50.0	238	0	0
-8	Hst AIN Protec 1	16:10:51.02	18/01/00	0	0	0	0.00		0.0	0	0	0	0	0	0	0	0	0	50.0	238	0	0
-9	Hst AIN Protec 1	16:10:48.00	18/01/00	0	0	0	0.00		0.0	0	0	0	0	0	0	0	0	0	50.0	238	0	0
-10	Hst AIN Protec 1	16:10:43.06	18/01/00	0	0	0	0.00		0.0	0	0	0	0	0	0	0	0	0	50.0	238	0	0
-11	Hst AIN Protec 1	16:10:41.07	18/01/00	0	0	0	0.00		0.0	0	0	0	0	0	0	0	0	0	50.0	238	0	0
-12	Hst AIN Protec 1	16:10:41.03	18/01/00	0	0	0	0.00		0.0	0	0	0	0	0	0	0	0	0	50.0	238	0	0

Image 6.11 Web Server - History screen

Web Server Adjustment

Click to the "Web Server settings" icon in the toolbar to display the settings page.

Select the controller language the web pages will appear in.

Select the rate of automatic refresh of the scada page.

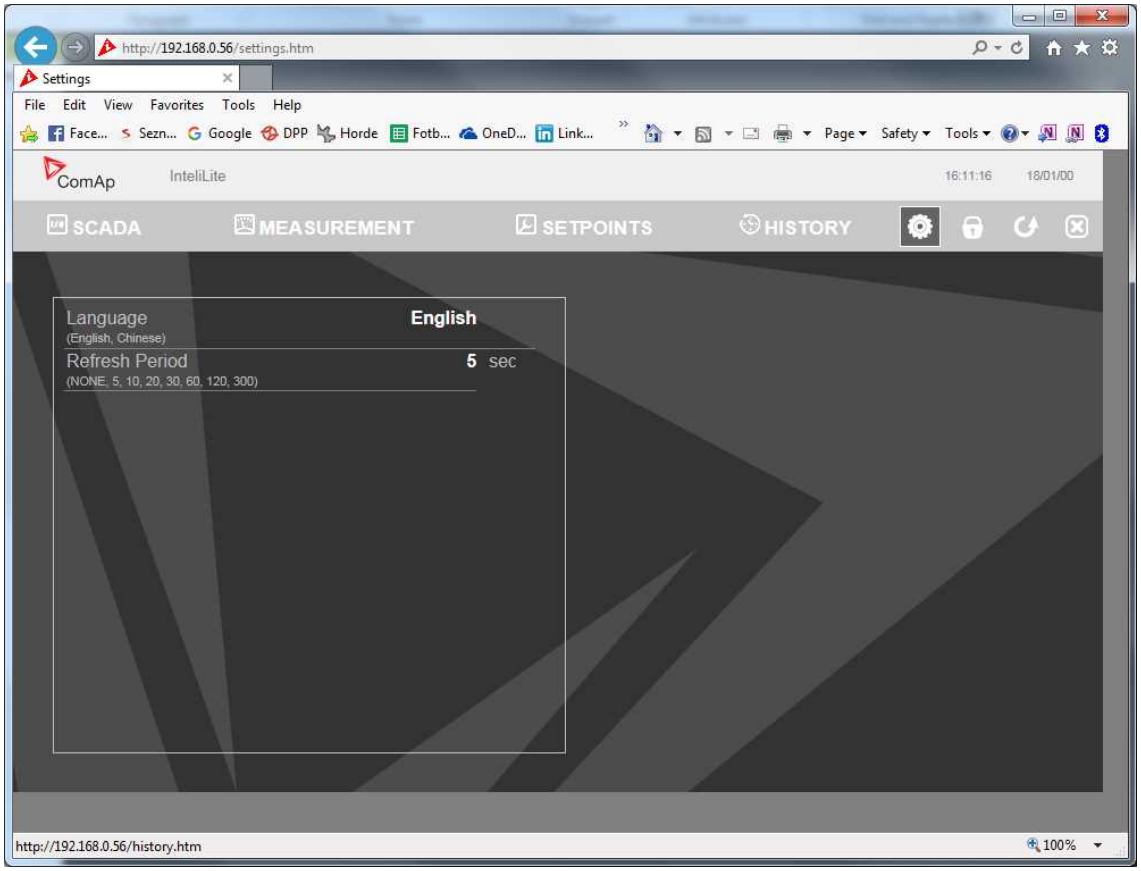


Image 6.12 Web Server - Adjustment screen

back to Communication

6.2 Connection to 3rd party systems

6.2.1 SNMP 206
6.2.2 MODBUS-RTU, MODBUS/TCP 208

back to Communication

6.2.1 SNMP

SNMP is an UDP-based client-server protocol used for providing data and events into a supervisory system (building management system). The controller plays the role of a „SNMP Agent“ while the supervisory system plays the role of a „SNMP Manager“.

- CM-Ethernet module is required for SNMP function
- Supported versions - SNMP v1 and SNMP v2c

The SNMP Agent function is to be enabled by the setpoint **SNMP Agent (page 497)** in the CM-Ethernet setpoint group. The setpoints **SNMP RD Community String (page 498)** and **SNMP WR Community String**

(page 498) in the same group can be used to customize the „community strings“ for the read and write operations which have function like „passwords“. All requests sent from the SNMP Manager have to contain community string which match with the community string adjusted in the controller otherwise the controller refuses the operation.

MIB table

The „MIB table“ (Management Information Base) is a table which gives to the Manager description of all objects provided by the Agent.

- The MIB table is specific for each controller type and configuration
- The MIB table is to be exported from the controller configuration using InteliConfig
- Controllers with identical firmware and configuration share also identical MIB table, however if the configuration and/or firmware is not identical the MIB table is different and must be exported separately for each controller.

The root node of the MIB table of InteliGen controller is enterprises.comapProjekt.il, which is 1.3.6.1.4.1.28634.14. Under this node there are following sub-nodes :

- Notifications group (SMI v2 only) contains definitions of all notification-type objects that the Agent may send to the Manager.
- GroupRdFix contains read-only objects that exist in all controller regardless of the firmware version/type and configuration.
- GroupRdCfg contains read-only objects that depend on the firmware version/type and configuration.
- GroupWrFix contains read-write objects that exist in all controller regardless of the firmware version/type and configuration.
- GroupWrCfg contains read-write objects that depend on the firmware version/type and configuration.
- GroupW contains write-only objects.
- NotificationData group contains objects that are accessible only as bindings of the notification messages.

SMI version

In InteliConfig the MIB table may be exported in two different formats – SMI v1 and SMI v2. The format which shall be used for export depends on the SNMP Manager and SMI version that it does support.

Typically, SMI v1 is used for SNMP v1 and vice versa, but it is not a rule and SMI v2 may be also used for SNMP v1.

SNMP reserved objects

Name	OID	Access	Data type	Meaning
pfActionArgument	groupWrFix.24550	read,write	Gauge32	Writing: command argument Reading: command return value
pfActionCommand	groupW.24551	write	Integer32	Command code 1)
pfPassword	groupW.24524	write	Integer32	Password

1) For list of commands, arguments and description of the procedure of invoking commands see the description of the MODBUS protocol.

SNMP notifications

Except the request-response communication model, in which the communication is controlled by the Manager, there are also messages that the Agent sends without any requests. These messages are called „Notifications“ and inform the Manager about significant events occurred in the Agent.

The controller can send notifications to two different SNMP Managers (two different IP addresses). The addresses are to be adjusted in the CM-Ethernet setpoint group by the setpoints **SNMP Traps IP Address 1 (page 498)** and **SNMP Traps IP Address 2 (page 499)**. If the Manager address is not adjusted the particular notification channel is off. The controller will send the notifications in format adjusted by the setpoint SNMP Trap Format.

- Each notification (kind of event) is identified by an unique identifier (Trap ID in SNMPv1 or Notification OID in SNMPv2). This unique identifier gives the specific meaning to the notification message, e.g. Protection 1. level - Fuel Level - alarm activated.
- All possible notifications and their identifiers are listed in the MIB table.
- The notification message also contains controller name, serial number and textual description of the event.

Operational events

This events are used for SNMP traps. See the list below:

- Start commands of gen-set
  - Start button
  - Remote start
- Stop commands of gen-set
  - Stop button
  - Remote stop
- Breaker record
  - Load on gen-set

6.2.2 MODBUS-RTU, MODBUS/TCP

MODBUS protocol is used for integration of the controller into a building management system or for remote monitoring via 3rd party monitoring tools.

- MODBUS-RTU can be used on serial interfaces (via on board RS485 connector or via CM-RS232-485 communication module). The MODBUS-RTU server must be activated by switching the setpoint **COM1 Mode (page 461)** or **COM2 Mode (page 462)** into the Modbus position. The serial speed for MODBUS-RTU communication is to be adjusted by the setpoint **COM1 MODBUS Communication Speed (page 462)** or **COM2 MODBUS Communication Speed (page 463)**.
- MODBUS/TCP can be used on the ethernet interface (CM-Ethernet module is required). Up to 2 clients can be connected simultaneously. The MODBUS/TCP server must be activated by the setpoint **MODBUS Server (page 497)**.

MODBUS, MODBUS/TCP protocol can be used simultaneously with Web connection and direct ethernet/AirGate connection.

IMPORTANT: Do not write setpoint repeatedly(e.g. power control form a PLC repeated writing of baseload setpoint via Modbus). The setpoints are stored in EEPROM memory. which can be overwritten up to 10^5 times without risk of damage or data loss, but may become damaged, when the allowed number of writing cycles is exceeded!

Note: *Modbus-RTU serial communication mode is 8-N-1 - startbit 1, 8 data bits, no parity and 1 stopbit.*

Address space

The object address space is separated into several areas as described in the table below. The actual mapping of specific controller data objects to specific MODBUS addresses, which depends on configuration, can be exported into a text file from the appropriate controller archive using InteliConfig. There are several special registers with fixed meaning (reserved registers) which are listed in a separate table in this chapter.

MODBUS address	Meaning	Access	MODICON object type	MODBUS function
0000 .. 0999	Binary objects	Read only	Discrete Inputs	Read: 01, 02
1000 .. 2999	Values	Read only	Input Registers	Read: 03, 04
3000 .. 3999	Setpoints	Read/Write	Holding Registers	Read: 03, 04 Write: 06, 16
4200 .. 7167	Reserved registers	Read/Write, depends on each specific register	Input Registers Holding Registers	Read: 03, 04 Write: 06, 16

Configurable part of the map

The contents of the configurable part of the map is specified in the configuration table. It can be changed by the customer as well as exported in a human-readable format using the configuration tool.

Discrete inputs

The discrete inputs are read-only objects located in the address range 0-999. The source ComAp objects for discrete inputs can be:

- Single bit of any value of any binary type.
- Protection (e.g. 2nd-level protection of the state "xyz"). The input is high if the protection is active regardless of if it is configured or not.

Input registers

The input registers are read-only numeric values located in the address range 1000-2999. The source ComAp objects can be:

- Any controller value of any data type. The mapping of the particular data type into registers is described in **Mapping data types to registers (page 210)**.

Holding registers

The holding registers are read-write numeric values located in the address range 3000-3999. The source ComAp objects can be:

- Any controller setpoint of a primitive data type. The mapping of the particular data type into registers is described in **Mapping data types to registers (page 210)**.

Default contents of the configurable part

The default map of MODBUS objects contain following items. This map expects the PC tool does have the function allowing the user to modify the map.

Object type	Starting object address	Controller object
Discrete inputs	0000	Physical binary inputs CU + configured* modules Logical binary outputs Protections on binary inputs CU + configured* modules Protections on analog inputs CU + configured* modules All Built-in fixed protections
Input registers	1000	All configured* visible values
Holding registers	3000	None

*Present in the default configuration.

IMPORTANT: The default map of a particular firmware branch and application must not change when a new version of the firmware is created. If new objects are added they must be added to free positions so, that the previous content is not affected.

IMPORTANT: The default map of a particular firmware branch must not contain different values in different applications at the same MODBUS address. It means if a ComAp object does not make sense in some application type the respective MODBUS address must be left unassigned.

Mapping data types to registers

As there are multiple data types in the controller but only one data type in MODBUS (the register, which is 2 byte long), a mapping table is necessary to compose and decompose the MODBUS messages correctly.

Data type	Meaning	Number of registers	Data maping
Integer8	1-byte signed integer	1	MSB = sign extension LSB = value
Unsigned8	1-byte unsigned integer	1	MSB = 0 LSB = value
Integer16	2-byte signed integer	1	MSB = value, MSB LSB = value, LSB
Unsigned16	2-byte unsigned integer	1	MSB = value, MSB LSB = value, LSB
Integer32	4-byte signed integer	2	MSB1 = value, byte 3 (MSB) LSB1 = value, byte 2 MSB2 = value, byte 1 LSB2 = value, byte 0 (LSB)
Unsigned32	4-byte unsigned integer	2	MSB1 = value, byte 3 (MSB) LSB1 = value, byte 2 MSB2 = value, byte 1

Data type	Meaning	Number of registers	Data maping
			LSB2 = value, byte 0 (LSB)
Binary8	8-bit binary value	1	MSB = 0 LSB = value, bits 0-7
Binary16	16-bit binary value	1	MSB = value, bits 8-15 LSB = value, bits 0-7
Binary32	32-bit binary value	2	MSB1 = value, bits 24-31 LSB1 = value, bits 16-23 MSB2 = value, bits 8-15 LSB2 = value, bits 0-7
Char	1-byte ASCII character	1	MSB = 0 LSB = ASCII value of the character
StrList	Index into a list of strings	1	MSB = 0 LSB = index into the list
ShortStr	Zero-terminated string of max 15 ASCII characters.	8	MSB1 = ASCII value of the 1. character LSB1 = ASCII value of the 2. character MSB2 = ASCII value of the 3. character LSB2 = ASCII value of the 4. character …
LongStr	Zero-terminated string of max 31 ASCII characters.	16	MSB1 = ASCII value of the 1. character LSB1 = ASCII value of the 2. character MSB2 = ASCII value of the 3. character LSB2 = ASCII value of the 4. character …

Data type	Meaning	Number of registers	Data maping
Date	Date (dd-mm-yy)	2	MSB1 = BCD (dd) LSB1 = BCD (mm) MSB2 = BCD (yy) LSB2 = 0
Time	Time (hh-mm-ss)	2	MSB1 = BCD (hh) LSB1 = BCD (mm) MSB2 = BCD (ss) LSB2 = 0
Alarm	An item of the Alarmlist	27	MSB1 = reserved for future use LSB1 = reserved for future use MSB2 = Alarm level *) LSB2 = Alarm status **) MSB3 = alarm string ***) LSB3 = alarm string MSB4 = alarm string LSB5 = alarm string …

*) 1 .. level 1 (yellow), 2 .. level 2 (red), 3 .. sensor fail

**) Bit0 – alarm is active, Bit1 – alarm is confirmed

***) String encoding is UTF-8

Error codes (exception codes)

Exception code is returned by the controller (server) if the query sent from the client could not be completed successfuly.

The controller responds with the error codes in as follows:

- 01 – Ilegal function is returned if an incompatible type of operation is applied for a specific object, e.g. if function 03 is applied to a binary object.
- 02 – illegal address is returned if the client tries to perform an operation with a object address that is not related to any existing object or that is located inside an object which is composed by multiple addresses (registers).
- 04 – device error is returned in all other errorneous situations. More detailed specification of the problem can be consequently obtained by reading the registers 4205 – 4206.

Reserved registers

There are several registers with specific meaning. These registers are available in all controllers regardless of the configuration.

Register addresses	Number of registers	Access	Data type	Meaning
4200 - 4201	2	read/write	Time	RTC Time in BCD code
4202 - 4203	2	read/write	Date	RTC Date in BCD code
4204	1	read/write	Unsigned8	Index of the language that is used for text data provided by MODBUS (e.g. alarmlist messages).
4205 - 4206	2	read	Unsigned32	Last application error. To be read after the device returns the exception code 04. It contains specific information about the error.
4207 - 4208	2	read/write	Unsigned32	Writing:command argument Reading: command return value
4209	1	write	Unsigned16	Command code
4010	1	-	-	Not implemented
4211	1	write	Unsigned16	Password
4212 - 4213	2	read	Unsigned32	Communication status
4214	1	read	Unsigned8	Number of items in the Alarmlist
4215 - 4241	27	read	Alarm	1. record in alarm list
4242 - 4268	27	read	Alarm	2. record in alarm list
4269 - 4295	27	read	Alarm	3. record in alarm list
4296 - 4322	27	read	Alarm	4. record in alarm list
4323 - 4349	27	read	Alarm	5. record in alarm list
4350 - 4376	27	read	Alarm	6. record in alarm list
4377 - 4403	27	read	Alarm	7. record in alarm list
4404 - 4430	27	read	Alarm	8. record in alarm list
4431 - 4457	27	read	Alarm	9. record in alarm list
4458 - 4484	27	read	Alarm	10. record in alarm list
4485 - 4511	27	read	Alarm	11. record in alarm list
4512 - 4538	27	read	Alarm	12. record in alarm list
4539 - 4565	27	read	Alarm	13. record in alarm list
4566 - 4592	27	read	Alarm	14. record in alarm list
4593 - 4619	27	read	Alarm	15. record in alarm list
4620 - 4646	27	read	Alarm	16. record in alarm list

List of commands and arguments

"Commands" are used to invoke a specific action in the controller via the communication channel. The list of available actions is in the table below. The general procedure of writing a command via MODBUS is as follows:

1. (Optional) Write required level of password into the register 44212 (register address 4211). Use function 6. If the password is required or not depends on configuration of access rules. It can be adjusted/modified by InteliConfig.

2. Write the command argument into the registers 44208-44209 (register addresses 4207-4208). Use function 16.
3. Write the command code into the register 44210 (register address 4209). Use function 6.
4. (Optional) Read the command return value from the registers 44208-44209 (register addresses 4207-4208). Use function 3.
5. If the command was executed the return value is as listed in the table. If the command was accepted but there was an error during execution the return value indicates the reason:
   a. 0x00000001 – invalid argument
   b. 0x00000002 – command refused (e.g. controller not in MAN, breaker can not be closed in the specific situation etc.)

Action	Command code	Argument	Return value
Engine start *)	0x01	0x01FE0000	0x000001FF
Engine stop *)	0x01	0x02FD0000	0x000002FE
Fault reset *)	0x01	0x08F70000	0x000008F8
Horn reset *)	0x01	0x04FB0000	0x000004FC
GCB toggle *)	0x02	0x11EE0000	0x000011EF
GCB on	0x02	0x11EF0000	0x000011F0
GCB off	0x02	0x11F00000	0x000011F1
MCB toggle *)	0x02	0x12ED0000	0x000012EE
MCB on	0x02	0x12EE0000	0x000012EF
MCB off	0x02	0x12EF0000	0x000012F0

*) This action is an equivalent of pressing the front panel button

MODBUS examples

Modbus RTU examples

- Reading of Battery voltage
  - Export table of values from InteliConfig

Table: Values									
Allowed MODBUS functions: 03, 04									
Register(s)	Com.Obj.	Name	Dimension	Type	Len	Dec	Min	Max	Group
01053	8213	**BatteryVoltage**	**V**	Integer	2	**1**	0	400	Controller I/O

Request: (Numbers in Hex)							
01	03	04	1D	00	01	15	3C
Controller address	Modbus function	Register address $041D_{hex}$ = **1053**$_{dec}$		Number of registers		CRC	

Response: (Numbers in Hex)						
01	03	02	00	F0	B8	00
Controller address	Modbus function	Length of data 02_{hex} = 2 bytes read	Data $00F0_{hex}$ = **240**$_{dec}$		CRC	

We read value 240 from register 01053. From table of modbus registers we get dimension of read value and "Dec". Dec=1 means shift one decimal place to the right. So battery voltage is **24.0 V**.

- Reading Nominal power
  - Export table of values from InteliConfig

Table: Values									
Allowed MODBUS functions: 03, 04									
Register(s)	Com.Obj.	Name	Dimension	Type	Len	Dec	Min	Max	Group
01228	9018	**Nominal Power**	**kW**	Integer	2	**0**	0	32767	Generator

Request: (Numbers in Hex)							
01	03	04	CC	00	01	45	05
Controller address	Modbus function	Register address $04CC_{hex}$ = **1228**$_{dec}$		Number of registers		CRC	

Response: (Numbers in Hex)						
01	03	02	00	C8	B9	D2
Controller address	Modbus function	Length of data 02_{hex} = 2 bytes read	Data $00C8_{hex}$ = **200**$_{dec}$		CRC	

Read nominal power is 200 kW.

- Reading all binary inputs as modbus register

Table: Values									
Allowed MODBUS functions: 03, 04									
Register(s)	Com.Obj.	Name	Dimension	Type	Len	Dec	Min	Max	Group
01068	8235	**Binary Inputs**		Binary#2	2	**0**	-	-	Controller I/O

Request: (Numbers in Hex)							
01	03	04	2C	00	01	44	F3
Controller address	Modbus function	Register address $042C_{hex}$ = **1068**$_{dec}$		Number of registers		CRC	

Response: (Numbers in Hex)						
01	03	02	00	12	38	49
Controller address	Modbus function	Length of data 02_{hex} = 2 bytes read	Data 0012_{hex} = **00010010**$_{bin}$		CRC	

Binary inputs is 00010010. It means Binary input 2 and binary input 5 are active.

Note: *You can use modbus function 4 insted of 3, rest of data remain same (CRC differs).*

- Reading binary inputs as coil status.

Table: Binaries						
Allowed MODBUS functions: 01, 02						
Addresses Modbus Addr. Prot. Addr.	Source = Value = State	C.O.# State #	Name of Value Name of State	Bit #	Bit Name Activated by protection(s):	Group
00000	Value	8235	Binary Inputs	1	GCB Feedback	Controller I/O
00001	Value	8235	Binary Inputs	2	MCB Feedback	Controller I/O
00002	Value	8235	Binary Inputs	3	Emergency Stop	Controller I/O

We will read state of MCB Feedback binary input.

Request: (Numbers in Hex)							
01	01	00	01	00	01	AC	0A
Controller address	Modbus function	Register address 0001_{hex} = **0001_{dec}**		Number of registers		CRC	

Response: (Numbers in Hex)					
01	01	01	01	90	48
Controller address	Modbus function	Length of data 01_{hex} = 1 byte read	Data 01_{hex} = active	CRC	

The readed data is 01, it means this binary input is active.

Note: *You can use modbus function 2 insted of 1, rest of data remains same (CRC differs).*

Starting the engine

Before starting engine you may need to write password. Depends on your settings in controller.

Table **Reserved registers (page 212)**

Register addresses	Number of registers	Access	Data type	Meaning
4207 - 4208	2	read/write	Unsigned32	Writing:command argument Reading: command return value
4209	1	write	Unsigned16	Command code

Table **List of commands and arguments (page 213)**

Action	Command code	Argument	Return value
Engine start	0x01	0x01FE0000	0x000001FF
Engine stop	0x01	0x02FD0000	0x000002FE

Request 1/2: (Numbers in Hex)						
01	10	10	6F	00	03	06
Controller address	Modbus function $10_{hex} = 16_{dec}$	Register address $106F_{hex} = \mathbf{4207}_{dec}$		Number of registers		Data length in bytes

Request 2/2: (Numbers in Hex)							
01	FE	00	00	00	01	68	0B
Argument				Command code		CRC	

Note: *Command and argument may be written as one "packet" (function 16) or you can split it and write argument (function 16) and after that write command code (function 6).*

Password

This password is the same as in InteliConfig or directly in controller.

Table **Reserved registers (page 212)**

Register addresses	Number of registers	Access	Data type	Meaning
4211	1	write	Unsigned16	Password

Note: *Default password is "0".*

In this example the password is "1234".

Request: (Numbers in Hex)							
01	06	10	73	04	D2	7C	D1
Controller address	Modbus function	Register address 1073_{hex} = **4211**$_{dec}$		Password $04D2_{hex}$ = **1234**$_{dec}$		CRC	

Response for success: (Numbers in Hex)							
01	06	10	73	00	00	7C	D1
Controller address	Modbus function	Register address 1073_{hex} = **4211**$_{dec}$		Allways zero.		CRC	

Response for bad password: (Numbers in Hex)				
01	86	04	43	A3
Controller address	Modbus exception for function 6.	04 – device error **see Error codes (exception codes) on page 212**	CRC	

Nominal Power – writing

Table: Setpoints									
Allowed MODBUS functions: 03, 04, 06, 16									
Register(s)	Com.Obj.	Name	Dimension	Type	Len	Dec	Min	Max	Group
03008	8276	**Nominal Power**	**kW**	Unsigned	2	**0**	1	5000	Basic Settings

Request: (Numbers in Hex)							
01	06	0B	C0	00	64	8A	39
Controller address	Modbus function	Register address $0BC0_{hex}$ = **3008**$_{dec}$		Data 0064_{hex} = **100**$_{dec}$		CRC	

Response: (Numbers in Hex)							
01	06	0B	C0	00	00	8B	D2
Controller address	Modbus function	Register address $0BC0_{hex}$ = **3008**$_{dec}$		Allways zero		CRC	

Writen setpoint nominal power is 100 kW.

CRC calculation

The check field allows the receiver to check the validity of the message. The check field value is the Cyclical Redundancy Check (CRC) based on the polynomial $x^{16}+x^{15}+x^2+1$. CRC is counted from all message bytes preceding the check field.

Online CRC calculator: http://www.lammertbies.nl/comm/info/crc-calculation.html Use CRC-16 (Modbus)

Write LSB first.

For writing nominal power 100 kW the CRC is calculated from this data: $01060BC00064_{hex}$

Modbus TCP examples

- Reading of Battery voltage
  - Export table of values from InteliConfig

Table: Values									
Allowed MODBUS functions: 03, 04									
Register(s)	Com.Obj.	Name	Dimension	Type	Len	Dec	Min	Max	Group
01053	8213	**BatteryVoltage**	**V**	Integer	2	**1**	0	400	Controller I/O

Request: (Numbers in Hex)											
00	00	00	00	00	06	01	03	04	1D	00	01
transaction identifier (usually 0)		protocol identifier (usually 0)		Length of data bytes following		Controller address	Modbus function	Register address $041D_{hex}$ = **1053**$_{dec}$		Number of registers	

Request: (Numbers in Hex)											
00	00	00	00	00	06	01	03	04	1D	00	01
transaction identifier (usually 0)		protocol identifier (usually 0)		Length of data bytes following		Controller address	Modbus function	Register address $041D_{hex}$ = **1053**$_{dec}$		Number of registers	

Response: (Numbers in Hex)										
00	00	00	00	00	05	01	03	02	00	F0
transaction identifier (usually 0)		protocol identifier (usually 0)		Length of data bytes following		Controller address	Modbus function	Length of data 02_{hex} = 2 bytes read	Data $00F0_{hex}$ = **240**$_{dec}$	

We read value 240 from register 01053. From table of modbus registers we get dimension of read value and "Dec". Dec=1 means shift one decimal place to the right. So battery voltage is **24.0 V**.

back to Connection to 3rd party systems

6.3 Replacing InternetBridge-NT

6.3.1 Sites with "NT" family controllers

The CAN module InteliBridge-NT was designed to provide ethernet or cellular connectivity for InteliGen NT, InteliSys NT, InteliSys Gas controllers and it's derivatives. The typical topology of InteliBridge-NT connection was as follows:

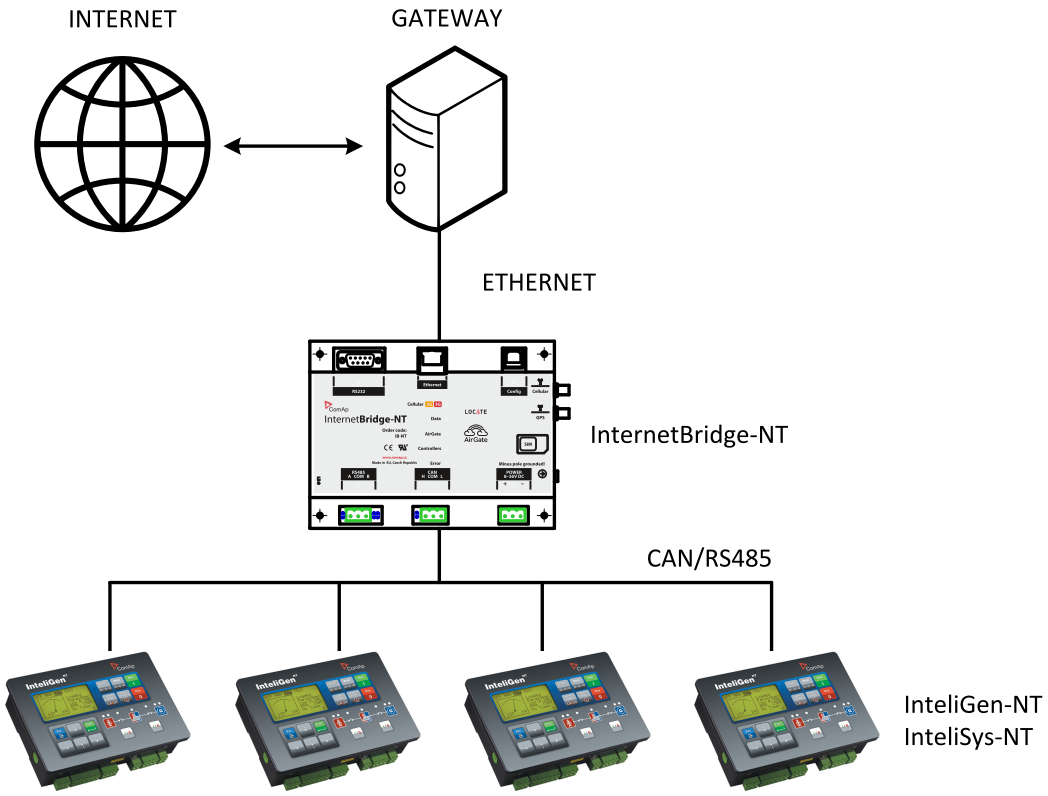


Image 6.13 InteliBridge-NT, wired internet connection

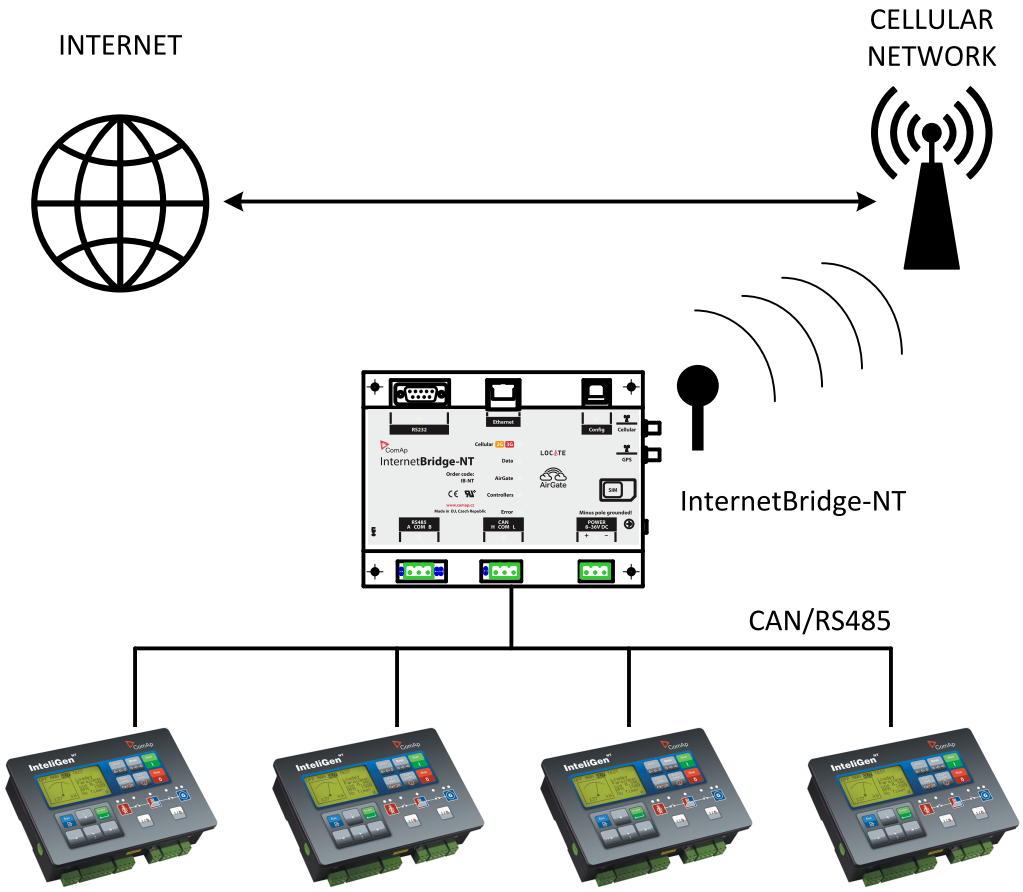


Image 6.14 InteliBridge-NT, cellular internet connection

6.3.2 Sites with new controller families

In the new controller product families the connectivity is based primarily on ethernet - a modern, fast and reliable communication technology. The communication interface has been **moved inside the controllers**, either as built-in or as plug-in modules. Thus, there is no need of external CAN module to provide the connectivity. The topology has changed as described at following pictures.

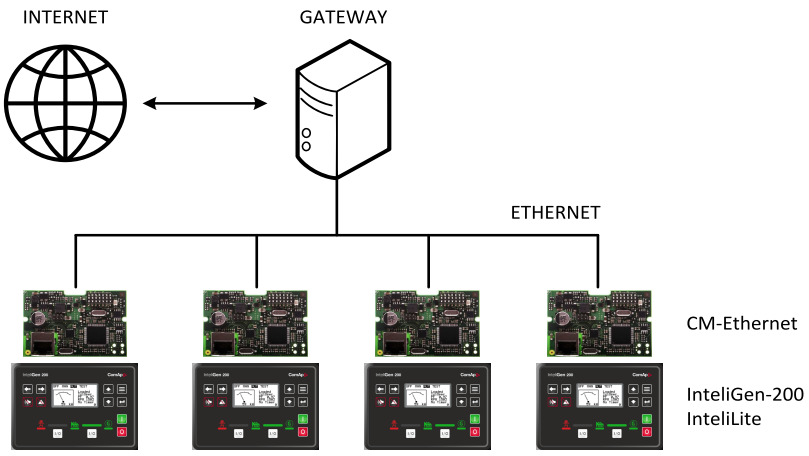


Image 6.15 InteliGen 200, wired internet connection

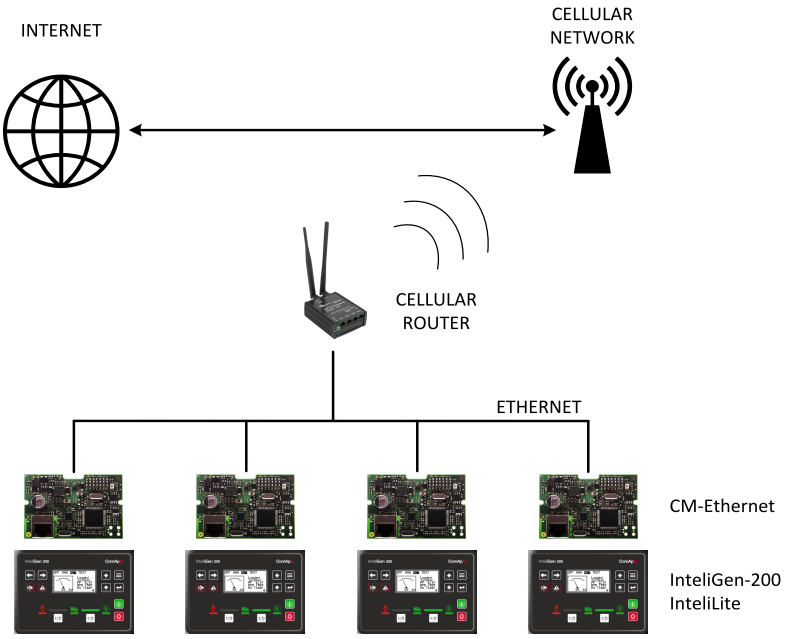


Image 6.16 InteliGen 200, cellular internet connection via cellular router

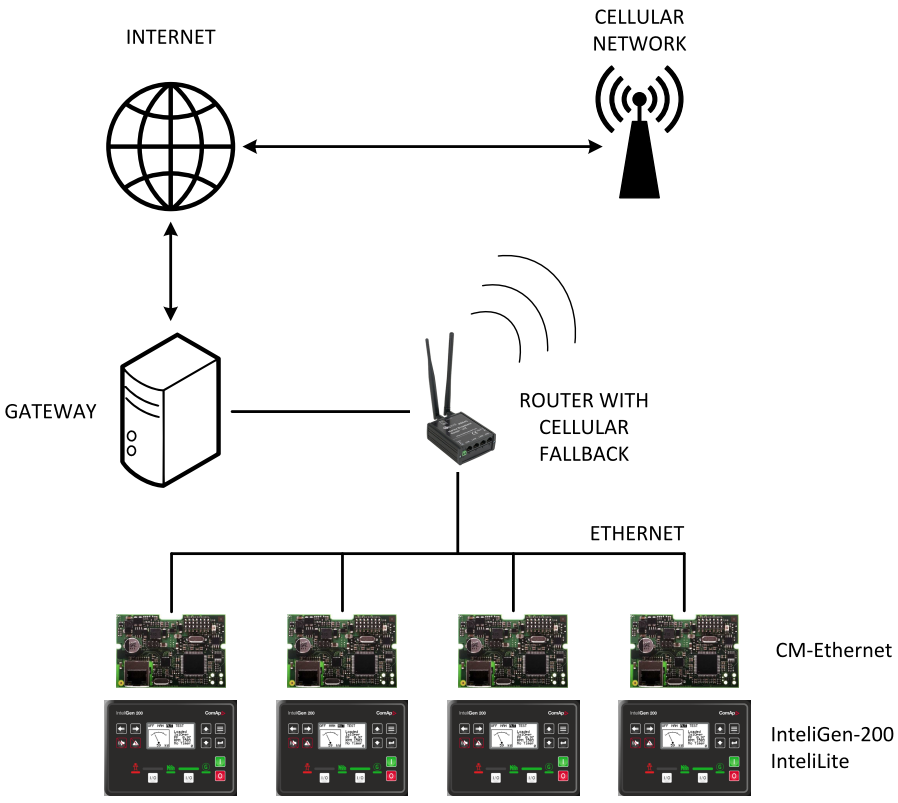


Image 6.17 InteliGen 200, wired internet connection with cellular fallback

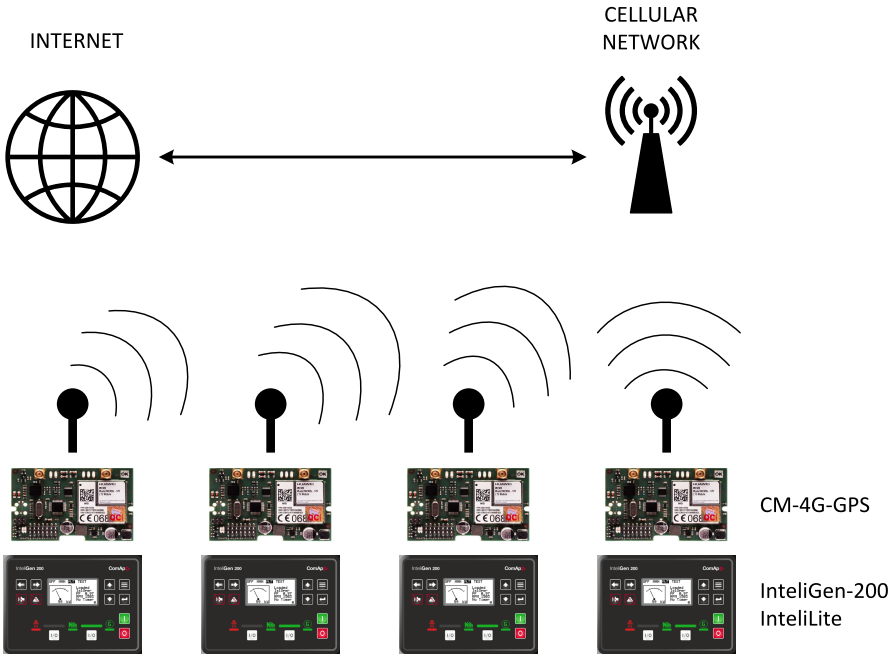


Image 6.18 InteliGen 200, cellular internet connection via separate cellular modules

6.3.3 Combined sites

There might be also sites where the "NT" controllers are used together with newly installed controllers from the new product families. In such a case the topology respects the different connectivity:

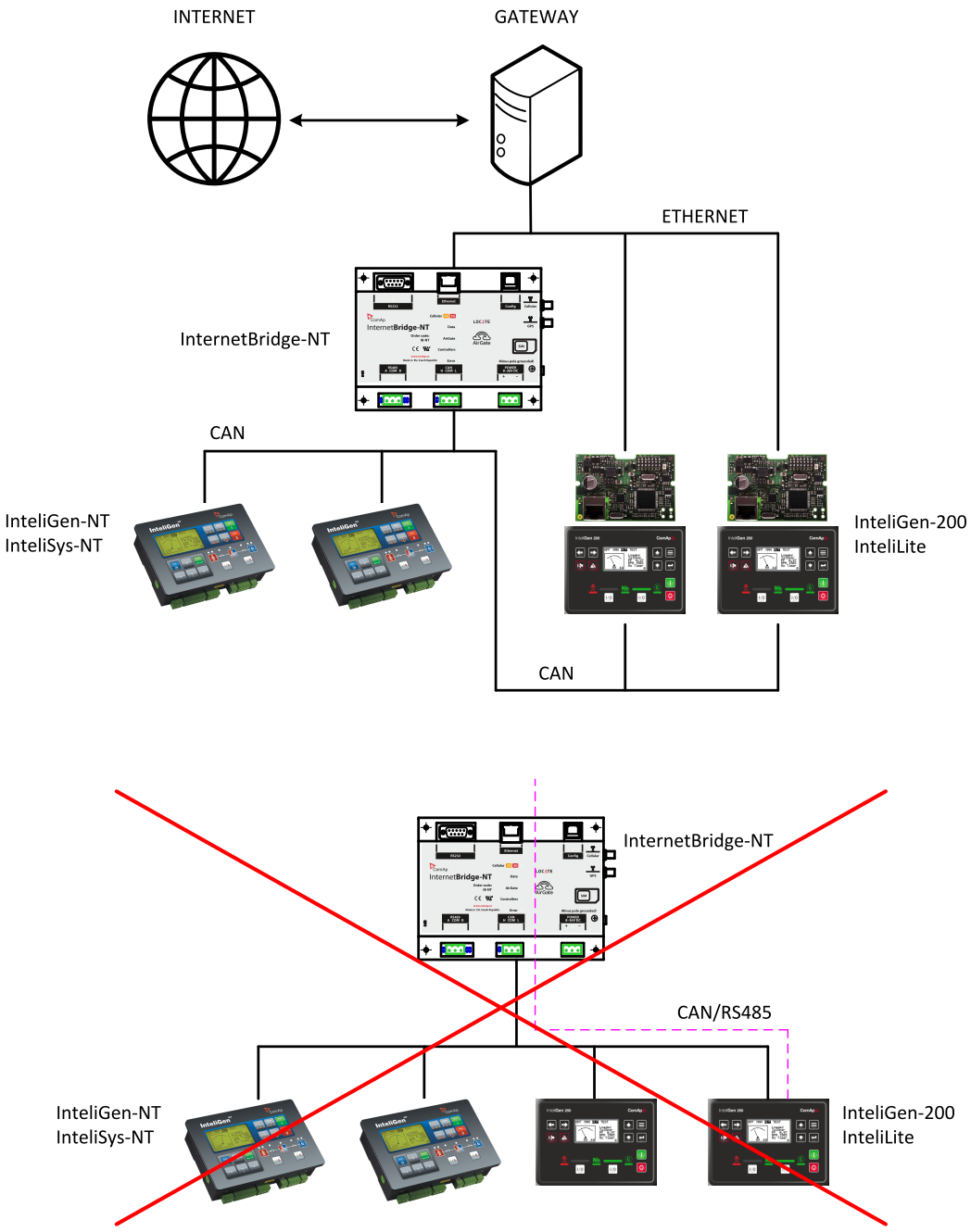


Image 6.19 Combined site, wired internet connection

Note: *The controllers from new product lines are not supported in InteliBridge-NT and thus not accessible via it.*

7 Technical data

Power supply

Power supply range	8-36 V DC
Power consumption	320 mA / 8 V DC 210 mA / 12 V DC 120 mA / 24 V DC 90 mA / 36 V DC
RTC battery	Replaceable
Fusing	Power terminal max. 4 A w/o BOUT consumption E-Stop max.12 A
Fusing E-Stop	12 A
Max. Power Dissipation	9 W

D+

Max. excitation current	250 mA
Charging fail threshold	80 % of Usupply

Operating conditions

Operating temperature	-20 °C to +70 °C
Operating temperature for Low Temp. version	-40 °C to +70 °C
Storage temperature	-30 °C to +80 °C
Protection degree (front panel)	IP 65
Operating humidity	95 % w/o condensation
Vibration	5-25 Hz, ± 1.6 mm 25-100 Hz, a = 4 g
Shocks	a = 500 m/s^2
Surrounding air temperature rating 70 °C	
Suitable for pollution degree 2	

Voltage measurement

Measurement inputs	3 ph-n Gen voltage , 3 ph-n Mains
Measurement range	277 V / 480 V AC (EU) 346 V / 600 V AC (US/Canada)
Linear measurement and protection range	381 V / 660 V
Accuracy	1 %
Frequency range	40-70 Hz (accuracy 0.1 Hz)
Input impedance	0.72 MΩ ph-ph , 0.36 MΩ ph-n

Current measurement

Measurement inputs	3ph Gen current, 1ph Mains current
Measurement range	5 A
Max. allowed current	10 A
Accuracy	±1.5 % for full temperature range (1 % from 0 °C to 50 °C)
Input impedance	<0.1 Ω

Display

Type	Build-in monochromatic 3.2"
Resolution	132 × 64 px

E-Stop

Dedicated terminal for E-Stop input
Physically disconnects binary outputs 1 & 2 from power

Binary inputs

Number	8, non-isolated
Close/Open indication	0-2 V DC close contact 6-36 V DC open contact

Binary outputs

Low current	6 low current output, non-isolated BO 3-8 = 0.5 A switching to Positive supply terminal
High current	2 high current output, non-isolated BO 1, 2 = 4 A switching to Positive supply terminal

Analog inputs

Number	4, Resistive
Type	Resistive
Resolution	0.1 Ω
Range	0-2500 Ω
Input impedance	170 Ω
Accuracy	±2 % from value in range 0-2500 Ω ±1.5 kΩ in range 2.5-15 kΩ

Voltage regulator output

Protection	Isolated
Type	max ± 10 V DC

Speed governor output

Output type	±10 VDC or 5 V @ 500 Hz PWM selectable by jumper
Protection	Non-isolated

Magnetic pickup

Voltage input range	4 Vpk-pk to 50 Vpk-pk in range 4 Hz to 1 kHz 6 Vpk-pk to 50 Vpk-pk in range 1 kHz to 5 kHz 10 Vpk-pk to 50 Vpk-pk in range 4 Hz to 10 kHz
Frequency input range	4 Hz to 10 kHz
Frequency measurement tolerance	0.2 % from range 10 kHz

Communications

USB Device	Non-isolated type B connector
USB Host	Non-isolated type A connector
RS 485	Isolated
CAN 1 + CAN 2	250 / 50 kbps, isolated, nominal impedance 120 Ω

back to Table of contents

8 Appendix

8.1 Controller objects 230
8.2 Alarms 774
8.3 AVR interfaces 831
8.4 Speed governor interfaces 841
8.5 Modules 850

back to Table of contents

8.1 Controller objects

8.1.1 Setpoints 231
8.1.2 Values 567
8.1.3 Logical binary inputs 625
8.1.4 Logical binary outputs 665
8.1.5 Logical analog inputs 727
8.1.6 PLC 761

8.1.1 Setpoints

What setpoints are:

Setpoints are analog, binary or special data objects which are used for adjusting the controller to the specific environment. Setpoints are organized into groups according to their meaning. Setpoints can be adjusted from the controller front panel, PC, MODBUS, etc.

All setpoints can be protected by a password against unauthorized changes. Password protection can be assigned to the setpoints during the configuration procedure. See the chapter **Password (page 86)** in Operator guide for instructions on how to enter and modify a password.

> **IMPORTANT: Do not write setpoints repeatedly (e.g. power control from a PLC by repeated writing of baseload setpoint via Modbus). The setpoints are stored in EEPROM memory, which can be overwritten up to 10^5 times without risk of damage or data loss, but it may become damaged, when the allowed number of writing cycles is exceeded.**

List of setpoint groups

Group: Process Control 239
Group: Basic settings 252
Group: Communication Settings 262
Group: Engine settings 264
Group: Generator settings 298
Group: Protections 307
Group: Mains settings 314
Group: Load Shedding 324
Group: Power Management 327
Group: Speed/Load Control 340
Group: Voltage/PF Control 349
Group: Synchronisation 353
Group: Droop Settings 356
Group: General Analog Inputs 361
Group: Scheduler 420
Group: Geo-Fencing 441
Group: Plug-In Modules 445
Group: Sensors Spec 446
Group: Alternate Config 448
Group: CM-RS232-485 461
Group: CM-GPRS 463
Group: CM-4G-GPS 475
Group: CM-Ethernet 487
Group: EM-BIO8-EFCP 501
Group: PLC 503

For full list of setpoints go to the chapter **List of setpoints (page 232)**.

List of setpoints

Process Control

Application Mode Select ..239
Load Control PTM 240
PF Control PTM 241
#System Load Control PTM 242
#System PF Control PTM 243
Baseload 243
Base Power Factor 243
Import Load 244
Import PF 244
Import/Export Limitation ..245
#System BaseLoad 245
#System Power Factor ...246
#Neutral Contactor Control 247
CB Control In MAN Mode 248
Mains Import Measurement 249
Peak Shaving 249
Peak Shaving Start Level .250
Peak Shaving Stop Level .250
Peak Shaving Start/Stop Delay 251
AMF Start 315

Basic settings

Gen-Set Name 252
Nominal Power 252
Nominal Power Split Phase 253
Nominal Current 253
CT Ratio 254
Mains Import CT Ratio 254
Connection type 254
Nominal Voltage Ph-N ... 256
Nominal Voltage Ph-Ph ...256
Gen VT Ratio 256
Mains/Bus VT Ratio 257
Nominal Frequency 257
Gear Teeth 258
Nominal RPM 258
Controller mode 259
Power On Mode 259
Reset To Manual 260
Backlight Timeout 260
Horn Timeout 261
Main Screen 261
Phase Rotation 262

Bus Settings

Communication Settings

Controller Address 262
RS485 Mode 263
RS485 Communication Speed 263
RS485 MODBUS Speed . 264

Engine settings

Fuel Solenoid 264
Cranking Attempts 265
Maximum Cranking Time .265
Cranking Fail Pause 265
Prestart Time 266
Starting RPM 266
Starting Oil Pressure 267
D+ Function 267
Glow Plugs Time 268
Idle RPM 268
Fuel Solenoid Lead 269
Idle Time 269
Minimal Stabilization Time 271
Maximal Stabilization 272
Time .....
Protection Hold Off 272
Sd Ventilation Time 273
Cooling Speed 273
Cooling Time 274
Stop Time 274
After Cooling Time 275
Power Switch On 275
Power Switch Off 276
Overspeed Sd 278
Starting Overspeed Sd 279
Starting Overspeed Time .280
Starting Overspeed Protection 280
Oil Pressure Wrn 280
Oil Pressure Sd 281
Oil Pressure Delay 281
ECU Oil Pressure Wrn 281
ECU Oil Pressure Sd 282
ECU Oil Pressure Delay ..282
Coolant Temperature Wrn 282
Coolant Temperature Sd ..283
Coolant Temperature Delay 283
ECU Coolant Temperature Wrn 283
ECU Coolant Temperature Sd 284
ECU Coolant Temperature Delay 284
Oil Temp Wrn 284
Oil Temp Sd 285
Oil Temp Delay 285
ECU Oil Temp Wrn 285
ECU Oil Temp Sd 286
ECU Oil Temp Delay 286
Temperature Switch On .. 287
Temperature Switch Off ..288

Coolant Temperature Low Wrn 288
Coolant Temperature Low Delay 289
Fuel Level Wrn 289
Fuel Level Sd 289
Fuel Level Delay 290
ECU Fuel Level Wrn 290
ECU Fuel Level Sd 290
ECU Fuel Level Delay 291
Fuel Tank Volume 291
Maximal Fuel Drop 291
Maximal Fuel Drop Delay 292
Fuel Pump On 292
Fuel Pump Off 293
Transfer Wrn Delay 294
Battery Undervoltage 294
Battery Overvoltage 294
Battery <> Voltage Delay 295
Battery Charger Fail Delay 295
Maintenance Timer 1 295
Maintenance Timer 2 296
Maintenance Timer 3 296
Maintenance Timer 4 296
Maintenance Timer 5 297
Maintenance Timer 6 297

Generator settings

Overload BOC 298
Overload Wrn 298
Overload Delay 298
Minimal Power PTM 299
Short Circuit BOC 299
Short Circuit BOC Delay 299
IDMT Overcurrent Delay 300
Current Unbalance BOC 301
Current Unbalance BOC Delay 301
Generator Overvoltage Sd 301
Generator Overvoltage Wrn ....
Generator Undervoltage BOC 302
Generator Undervoltage Wrn 303
Generator <> Voltage Delay 303
Voltage Unbalance BOC 303
Voltage Unbalance BOC Delay 304
Generator Overfrequency BOC 304
Generator Overfrequency Wrn 304
Generator Underfrequency BOC 305
Generator Underfrequency Wrn 305
Generator <> Frequency Delay 305
Reverse Power Level 306
Reverse Power Delay 306
Excitation Loss Level 306
Excitation Loss Delay 307
Reverse Power Protection 312
Excitation Loss Protection 313

Protections

Overload Protection 307
IDMT Overcurrent Protection 308
Current Unbalance Protection 308
Generator <> Voltage Protection 309
Voltage Unbalance Protection 309
Bus Measurement Error Protection 310
Generator Frequency Protection 311
Underspeed Protection 313

Mains settings

Emergency Start Delay 314
Mains Return Delay 314
MCB Close Delay 315
Mains Overvoltage 315
Mains Undervoltage 316
Mains < > Voltage Delay 316
Mains Voltage Unbalance 316
Mains Voltage Unbalance Delay 317
Mains Overfrequency 317
Mains Underfrequency 317
Mains < > Frequency Delay 318
MCB Logic 318
Return From Island 319
MCB Opens On 320
Vector Shift Protection 321
Vector Shift Limit 321
ROCOF Protection 322
ROCOF Windows Length 322
ROCOF df/dt 323
Vector Shift CB Selector 323

Load Shedding

Load Shedding Active 324
Load Shedding Level 325
Load Shedding Delay 325
Load Reconnection Level 325
Load Reconnection Delay 326
Auto Load Reconnection 326

Power Management

Power Management 327
Power Management Delay 327
#Power Management Mode 328
Priority 328
#Priority Auto Swap 329
#System Start Delay 329

#System Stop Delay 330
#Starting Load Reserve 1 .330
#Stopping Load Reserve 1 331
#Starting Rel Load Reserve 1 331
#Stopping Rel Load Reserve 1 332
#Starting Load Reserve 2 .332
#Stopping Load Reserve 2 333
#Starting Rel Load Reserve 2 333
#Stopping Rel Load Reserve 2 334
#Min Run Power 334
#Next Engine Start Delay 335
#Next Engine Stop Delay .335
#Slow Stop Delay 335
#Overload Next Start Protection 336
#Overload Next Start Level 336
#Overload Next Start Delay 336
Run Hours Base 337
#Run Hours Max Difference 337
#Power Band Change Up Delay 338
#Power Band Change Down Delay 338
Control Group 339
Group Link L 339
Group Link R 340

Speed/Load Control

Speed Regulator Character 340
Speed Governor Bias 341
Speed Governor Low Limit 341
Speed Governor High Limit 341
Speed Governor PWM 342
Rate .....
Tau Speed Governor Actuator 342
Frequency Gain 342
Frequency Int 343
Angle Gain 343
Load Gain 343
Load Int 344
Load Sharing Gain 344
Load Sharing Int 344
Close Transfer Max Duration 345
Open Transfer Min Break .345
Transfer Mains To Gen ...346
Transfer Gen To Mains ... 347
Generator Unload GCB Open Level 347
Mains Unload MCB Open Window 348
Load Ramp 348

Voltage/PF Control

Voltage Regulator Character 349
Voltage Regulator Bias ... 349
Voltage Regulator Low Limit 350
Voltage Regulator High Limit 350
Tau Voltage Governor Actuator 350
Voltage Gain 351
Voltage Int 351
PF Gain 351
PF Int 352
VAr Sharing Gain 352
VAr Sharing Int 352

Synchronisation

Synchronization Type 353
Synchronization Timeout .353
Voltage Window 354
Phase Window 354
Dwell Time 354
Slip Frequency 355
Slip Frequency Window .. 355
GCB Latency 355
MCB Latency 356

Droop Settings

Load/Var Sharing Regulation Type 356
Dead Bus GCB Close Master 357
Frequency Droop Slope ...357
Frequency Droop Offset ..358
Voltage Droop Slope 358
Voltage Droop Offset 359
#Number Of Controller On CAN 359
#Emergency Droop On Delay 360
#Emergency Droop Off Delay 360

General Analog Inputs

Analog Protection 1 Wrn ..361
Analog Protection 1 Sd ... 361
Analog Protection 1 Delay 362
Analog Switch 1 On 362
Analog Switch 1 Off 363
Analog Protection 2 Wrn ..363
Analog Protection 2 Sd ...364
Analog Protection 2 Delay 364
Analog Switch 2 On 365
Analog Switch 2 Off 366
Analog Protection 3 Wrn ..366
Analog Protection 3 Sd ... 367
Analog Protection 3 Delay 367
Analog Switch 3 On 368
Analog Switch 3 Off 369
Analog Protection 4 Wrn ..369

Analog Protection 4 Sd ...370
Analog Protection 4 Delay 370
Analog Switch 4 On 371
Analog Switch 4 Off 372
Analog Protection 5 Wrn ..372
Analog Protection 5 Sd ...373
Analog Protection 5 Delay 373
Analog Switch 5 On 374
Analog Switch 5 Off 375
Analog Protection 6 Wrn ..375
Analog Protection 6 Sd ...376
Analog Protection 6 Delay 376
Analog Switch 6 On 377
Analog Switch 6 Off 378
Analog Protection 7 Wrn ..378
Analog Protection 7 Sd ...379
Analog Protection 7 Delay 379
Analog Switch 7 On 380
Analog Switch 7 Off 381
Analog Protection 8 Wrn ..381
Analog Protection 8 Sd ...382
Analog Protection 8 Delay 382
Analog Switch 8 On 383
Analog Switch 8 Off 384
Analog Protection 9 Wrn ..384
Analog Protection 9 Sd ...385
Analog Protection 9 Delay 385
Analog Switch 9 On 386
Analog Switch 9 Off 387
Analog Protection 10 Wrn 387
Analog Protection 10 Sd . 388
Analog Protection 10 Delay 388
Analog Switch 10 On 389
Analog Switch 10 Off 390
Analog Protection 11 Wrn 390
Analog Protection 11 Sd . 391
Analog Protection 11 Delay 391
Analog Switch 11 On 392
Analog Switch 11 Off 393
Analog Protection 12 Wrn 393
Analog Protection 12 Sd . 394
Analog Protection 12 Delay 394
Analog Switch 12 On 395
Analog Switch 12 Off 396
Analog Protection 13 Wrn 396
Analog Protection 13 Sd . 397
Analog Protection 13 Delay 397
Analog Switch 13 On 398
Analog Switch 13 Off 399
Analog Protection 14 Wrn 399
Analog Protection 14 Sd . 400
Analog Protection 14 Delay 400
Analog Switch 14 On 401
Analog Switch 14 Off 402
Analog Protection 15 Wrn 402
Analog Protection 15 Sd . 403
Analog Protection 15 Delay 403
Analog Switch 15 On 404
Analog Switch 15 Off 405
Analog Protection 16 Wrn 405
Analog Protection 16 Sd . 406
Analog Protection 16 Delay 406
Analog Switch 16 On 407
Analog Switch 16 Off 408
Analog Protection 17 Wrn 408
Analog Protection 17 Sd . 409
Analog Protection 17 Delay 409
Analog Switch 17 On 410
Analog Switch 17 Off 411
Analog Protection 18 Wrn 411
Analog Protection 18 Sd . 412
Analog Protection 18 Delay 412
Analog Switch 18 On 413
Analog Switch 18 Off 414
Analog Protection 19 Wrn 414
Analog Protection 19 Sd . 415
Analog Protection 19 Delay 415
Analog Switch 19 On 416
Analog Switch 19 Off 417
Analog Protection 20 Wrn 417
Analog Protection 20 Sd . 418
Analog Protection 20 Delay 418
Analog Switch 20 On 419
Analog Switch 20 Off 420

Scheduler

Time 420
Date 421
Time Stamp Period 421
Summer Time Mode 421
Timer 1 Setup 422
Timer 1 Function 423
Timer 1 Repetition 424
Timer 1 First Occur. Date .424
Timer 1 First Occur. Time 424
Timer 1 Duration 425
Timer 1 Repeated 425
Timer 1 Refresh Period ...426
Timer 1 Weekends 427
Timer 1 Day 427
Timer 1 Repeat Day 428
Timer 1 Repeated Day In Week 428
Timer 1 Repeat Day In Month 428
Timer 1 Repeat Week In Month 429
Timer 2 Setup 429
Timer 2 Function 430
Timer 2 Repetition 431
Timer 2 First Occur. Date .431

Timer 2 First Occur. Time 431
Timer 2 Duration 432
Timer 2 Repeated 432
Timer 2 Refresh Period 433
Timer 2 Weekends 434
Timer 2 Day 434
Timer 2 Repeat Day 435
Timer 2 Repeated Day In Week 435
Timer 2 Repeat Day In Month 435
Timer 2 Repeat Week In Month 436
Rental Timer 1 436
Rental Timer 1 Wrn 438
Rental Timer 2 438
Rental Timer 2 Wrn 440
Rental Timer BOC 440

Geo-Fencing

Home Latitude 441
Home Longitude 441
Fence Radius 1 442
Fence Radius 2 442
Fence 1 Delay 442
Fence 2 Delay 443
Geo-Fencing 443
Fence 1 Protection 444
Fence 2 Protection 445

Plug-In Modules

Slot A 445
Slot B 446

Sensors Spec

Analog Input 1 CalibrationCU AIN1 Calibration 446
Analog Input 2 CalibrationCU AIN2 Calibration 447
Analog Input 3 CalibrationCU AIN3 Calibration 447
Analog Input 4 CalibrationCU AIN4 Calibration 448

Alternate Config

Connection Type 1 448
Nominal Power 1 450
Nominal Power Split Phase 1 450
Nominal Current 1 451
Nominal Frequency 1 451
Nominal RPM 1 451
Nominal Voltage Ph-N 1 452
Nominal Voltage Ph-Ph 1 452
Connection type 2 452
Nominal Power 2 454
Nominal Power Split Phase 2 454
Nominal Current 2 455
Nominal Frequency 2 455
Nominal RPM 2 455
Nominal Voltage Ph-N 2 456
Nominal Voltage Ph-Ph 2 456
Connection type 3 456
Nominal Power 3 458
Nominal Power Split Phase 3 458
Nominal Current 3 459
Nominal Frequency 3 459
Nominal RPM 3 459
Nominal Voltage Ph-N 3 460
Nominal Voltage Ph-Ph 3 460

Communication Modules

COM1 Mode 461
COM1 Communication Speed 461
COM1 MODBUS Communication Speed 462
COM2 Mode 462
COM2 Communication Speed 462
COM2 MODBUS Communication Speed 463
Mode 463
APN Name 464
APN User Name 464
APN User Password 464
Email Address 1 465
Email Address 2 465
Email Address 3 466
Email Address 4 466
Message Language 467
SMTP User Name 467
SMTP User Password 468
SMTP Server Address 468
SMTP Sender Address 469
Time Zone 469
Event Message 470
Wrn Message 470
BOC Message 470
Sd Messages 471
Telephone Number 1 471
Telephone Number 2 472
Telephone Number 3 472
Telephone Number 4 473
DNS IP Address 473
AirGate Connection 474
AirGate Address 474
ComAp TCP Port 475
Mode 475
Required Connection Type 476
APN Name 476
APN User Name 476
APN User Password 477
Email Address 1 477
Email Address 2 478

Email Address 3 478
Email Address 4 479
Message Language 479
SMTP User Name 480
SMTP User Password 480
SMTP Server Address 481
SMTP Sender Address ...481
Time Zone 482
Event Message 482
Wrn Message 483
BOC Message 483
Sd Messages 483
Telephone Number 1 484
Telephone Number 2 484
Telephone Number 3 485
Telephone Number 4 485
AirGate Connection 486
AirGate Address 486
ComAp TCP Port 487
Email Address 1 487
Email Address 2 488
Email Address 3 488
Email Address 4 489
Message Language 489
Time Zone 490
Event Message 490
Wrn Message 491
BOC Message 491
Sd Messages 491
SMTP UserName 492
SMTP User Password 492
SMTP Server Address 493
SMTP Sender Address ...493
IP Address Mode 494
IP Address 494
Subnet Mask 495
Gateway IP 495
DNS IP Address 1 496
DNS IP Address 2 496
MODBUS Server 497
SNMP Trap Format 497
SNMP Agent 497
SNMP RD Community String 498
SNMP WR Community String 498
SNMP Traps IP Address 1498
SNMP Traps IP Address 2499
AirGate Connection 499
AirGate Address 500
ComAp TCP Port 500

Extension Modules

Earth Fault Current Protection 501
Earth Fault Delay 501
Earth Fault CT Input Range 502
Earth Fault CT Ratio 502
Earth Fault Sd 502

PLC

PLC Setpoint 1 503
PLC Setpoint 2 504
PLC Setpoint 3 505
PLC Setpoint 4 506
PLC Setpoint 5 507
PLC Setpoint 6 508
PLC Setpoint 7 509
PLC Setpoint 8 510
PLC Setpoint 9 511
PLC Setpoint 10 512
PLC Setpoint 11 513
PLC Setpoint 12 514
PLC Setpoint 13 515
PLC Setpoint 14 516
PLC Setpoint 15 517
PLC Setpoint 16 518
PLC Setpoint 17 519
PLC Setpoint 18 520
PLC Setpoint 19 521
PLC Setpoint 20 522
PLC Setpoint 21 523
PLC Setpoint 22 524
PLC Setpoint 23 525
PLC Setpoint 24 526
PLC Setpoint 25 527
PLC Setpoint 26 528
PLC Setpoint 27 529
PLC Setpoint 28 530
PLC Setpoint 29 531
PLC Setpoint 30 532
PLC Setpoint 31 533
PLC Setpoint 32 534
PLC Setpoint 33 535
PLC Setpoint 34 536
PLC Setpoint 35 537
PLC Setpoint 36 538
PLC Setpoint 37 539
PLC Setpoint 38 540
PLC Setpoint 39 541
PLC Setpoint 40 542
PLC Setpoint 41 543
PLC Setpoint 42 544
PLC Setpoint 43 545
PLC Setpoint 44 546
PLC Setpoint 45 547
PLC Setpoint 46 548
PLC Setpoint 47 549
PLC Setpoint 48 550
PLC Setpoint 49 551
PLC Setpoint 50 552
PLC Setpoint 51 553
PLC Setpoint 52 554
PLC Setpoint 53 555
PLC Setpoint 54 556
PLC Setpoint 55 557
PLC Setpoint 56 558
PLC Setpoint 57 559
PLC Setpoint 58 560
PLC Setpoint 59 561

PLC Setpoint 60 562
PLC Setpoint 61 563
PLC Setpoint 62 564
PLC Setpoint 63 565
PLC Setpoint 64 566

Group: Process Control

Subgroup: Application Selector

Application Mode Select

Setpoint group	Process Control	**Related FW**	1.3.0
Range [units]	SPtM / MINT [-]		
Default value	MINT	**Alternative config**	NO
Step	[-]		
Comm object	12157	**Related applications**	MINT, SPtM
Config level	Advanced		
Setpoint visibility	Always		

Description

This setpoint defines the controller application.
The change of this setpoint is accepted in OFF mode only = It is not possible to change the setpoint while the controller is not set to OFF mode.

SPtM	Single parallel to mains application. The controller controls two breakers – a mains breaker and a generator breaker. Feedback from both breakers is required.
MINT	Multiple island-parallel application without mains and multiple parallel application with mains. The controller controls one breaker only, the generator breaker. Feedback from the generator breaker is required. For parallel to mains operation also mains breaker feedback is required.

back to List of setpoints

Load Control PTM

Setpoint group	Process Control	**Related FW**	1.3.0
Range [units]	Baseload / Import/Export [-]		
Default value	Baseload	**Alternative config**	NO
Step	[-]		
Comm object	8638	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Always		

Description

This setpoint adjust the type of load control.

Baseload	Gen-set produces amount of the power given by setpoint **Baseload (page 243)**. The rest of power is supplied from the mains or exported to the mains (depends on proportions of load and **Baseload (page 243)** setpoint). Even in baseload control mode can be the Import/Export limited. This function can be activated by setpoint **Import/Export Limitation (page 245)** = Enabled. Then the request for the power of the genset operating in baseload can be limited to prevent the Import/Export go below the limit given by setpoint **Import Load (page 244)**. **Example:** Baseload = 1000 kW, load = 700 kW, Import load = 100. Then the Baseload request will be limited to 600 kW to prevent the Import power go below 100 kW **Example:** Baseload = 1000 kW, load = 700 kW, Import load = -100. Then the Baseload request will be limited to 800 kW to prevent the Import power go below -100 kW (actually it is limitation of the export).
Imp/Exp	Gen-set produces the certain amount of power to keep constant import/export from the mains regardless the demand of the load. The requested import/export is given by setpoint **Import Load (page 244)**. If the value of the setpoint is >0 the power is imported from the mains, if setpoint value is <0, then the power is exported to the mains.

Note: *In both modes, the lower level of the power is always limited by the setpoint* ***Minimal Power PTM (page 299)****. If the requested load (given by the active load control mode, e.g. Baseload, Import/Export) is below this limit the requested load is limited to the level adjusted by this setpoint.*

back to List of setpoints

PF Control PTM

Setpoint group	Process Control	**Related FW**	1.3.0
Range [units]	Base PF/ PF Import/Export [-]		
Default value	Base PF	**Alternative config**	NO
Step	[-]		
Comm object	10120	**Related applications**	SPtM
Config level	Standard		
Setpoint visibility	Always		

Description

This setpoint adjust the type of power factor control.

Base PF	The power factor on the gen-set is kept on the level given by the setpoint **Base Power Factor (page 243)** regardless the load demand. The rest of demanded reactive power is supplied from the mains. Values >1 means that capacitive reactive power is supposed to be imported from mains, values <1 means that inductive reactive power is imported from the mains.
PF Imp/Exp	Gen-set produces the certain amount of reactive power to keep constant PF imported from the mains regardless the demand of the load. The requested power factor import is given by setpoint **Import PF (page 244)**. Values >1 means that the gen-set is pushing the capacitive power to the system (sytem Gen-set - Load-Mains) , values <1 means that the gen-set is pushing the inductive power to the system.

back to List of setpoints

#System Load Control PTM

Setpoint group	Process Control	**Related FW**	1.3.0
Range [units]	Baseload / Loadsharing [-]		
Default value	Baseload	**Alternative config**	NO
Step	[-]		
Comm object	8774	**Related applications**	MINT
Config level	Standard		
Setpoint visibility	Always		
Description			

Load control mode in parallel to mains operation of the whole group of gen-sets.

Baseload	The total power of the group is controlled to constant level given by the setpoint **#System BaseLoad (page 245)**. Each loaded gen-set takes equal part (relative to their nominal power) from this requested value. The load is regulated locally in each controller by Load control regulation loop, load-sharing is not active. The setpoint **#System BaseLoad (page 245)** is also used for determining which gen-sets have to run or not.
Loadsharing	Gen-sets load is controlled by InteliMains 210 controller to share the total load (given by the setpoint **#System BaseLoad (page 245)**) with other loaded gen-sets in such a way, that all loaded gen-sets will be loaded at the same level (relative to gen-set nominal power). Load-sharing regulation loop is active.

Note: *The Loadsharing mode shall be used in case a InteliMains 210 controller is present in the system. In systems without InteliMains 210 the setpoint must be in the Baseload position.*

Note: *The power factor (PF) is regulated to constant level given by the setpoint **#System PF Control PTM (page 243)** in parallel to mains operation and does not depend on active load control mode.*

back to List of setpoints

#System PF Control PTM

Setpoint group	Process Control	**Related FW**	1.3.0
Range [units]	Base PF / Var Sharing [-]		
Default value	Base PF	**Alternative config**	NO
Step	[-]		
Comm object	8779	**Related applications**	MINT
Config level	Standard		
Setpoint visibility	Always		
Description			

Power factor control mode in parallel to mains operation of the whole group of gen-sets.

Base PF	Gensets PF is controlled by their PF control loops to provide constant power factor adjusted by setpoint **#System Power Factor (page 246)**. InteliMains 210 doesn't play active role in PF control in parallel to mains operation.
Var Sharing	Gensets PF is controlled by InteliMains 210 through the VAr sharing line.

back to List of setpoints

Baseload

Setpoint group	Process Control	**Related FW**	1.3.0
Range [units]	0 .. **Nominal Power (page 252)** [kW]		
Default value	100 kW	**Alternative config**	NO
Step	1 kW		
Comm object	8639	**Related applications**	SPtM
Config level	Standard		
Setpoint visibility	Always		
Description			

Required gen-set load in parallel to mains operation.

back to List of setpoints

Base Power Factor

Setpoint group	Process Control	**Related FW**	1.3.0
Range [units]	0,60 .. 1,20 [-]		
Default value	1,00 [-]	**Alternative config**	NO
Step	0,01 [-]		
Comm object	8640	**Related applications**	SPtM
Config level	Standard		
Setpoint visibility	Always		
Description			

Required gen-set power factor when the gen-set is running in parallel to the mains.

back to List of setpoints

Import Load

Setpoint group	Process Control	**Related FW**	1.3.0
Range [units]	-32 000 .. 32 000 [kW]		
Default value	0 kW	**Alternative config**	NO
Step	1 kW		
Comm object	8641	**Related applications**	SPtM
Config level	Standard		
Setpoint visibility	Always		
Description			

Defines maximal limit of load for import/export. Behavior of setpoint depends on setpoint **Load Control PTM (page 240)**.

Baseload	Setpoint adjust the maximal value of import/export. Also **Import/Export Limitation (page 245)** setpoint has to be set to Enabled.
Import/Export	Setpoint adjust requested value of constant import/export.

If the value of the setpoint is >0 the power is imported from the mains, if the setpoint value is <0, then the power is exported to the mains.

back to List of setpoints

Import PF

Setpoint group	Process Control	**Related FW**	1.3.0
Range [units]	0,60 .. 1,20 [-]		
Default value	1,00 [-]	**Alternative config**	NO
Step	0,01 [-]		
Comm object	8642	**Related applications**	SPtM
Config level	Standard		
Setpoint visibility	Always		
Description			

Defines maximal limit of power factor for import/export. Behavior of setpoint depends on setpoint **PF Control PTM (page 241)**.

Baseload	Setpoint adjust the maximal value of import. Also **Import/Export Limitation (page 245)** setpoint has to be set to Enabled.
Import/Export	Setpoint adjust requested value of constant import.

back to List of setpoints

Import/Export Limitation

Setpoint group	Process Control	**Related FW**	1.3.0
Range [units]	ENABLED / DISABLED [-]		
Default value	Disabled	**Alternative config**	NO
Step	[-]		
Comm object	9592	**Related applications**	SPtM
Config level	Standard		
Setpoint visibility	Always		
Description			

Enable or disable limitation for import/export. If function is enabled, then the request for the power of the gen set is limited to prevent the Import/Export go below the limits. Limits are adjusted via setpoints **Import Load (page 244)** and **Import PF (page 244)**.

> **Example:** Baseload = 1000 kW, load = 700 kW, Import load = 100 kW. Then the Baseload request will be limited to 600 kW to prewent the Import power go below 100 kW.

> **Example:** Baseload = 1000 kW, load = 700 kW, Import load = -100 kW. Then the Baseload request will be limited to 800 kW to prewent the Import power go below -100 kW (actually it is limitation of the export).

back to List of setpoints

#System BaseLoad

Setpoint group	Process Control	**Related FW**	1.3.0
Range [units]	0 .. 32 000 [kW]		
Default value	1 000 kW	**Alternative config**	NO
Step	1 kW		
Comm object	8775	**Related applications**	MINT
Config level	Standard		
Setpoint visibility	Always		
Description			

Required total load of the gen-set group in parallel to mains operation in baseload mode (setpoint **#System Load Control PTM (page 242)** = Baseload).

back to List of setpoints

#System Power Factor

Setpoint group	Process Control	**Related FW**	1.3.0
Range [units]	0,60 .. 1,20 [-]		
Default value	1,00 [-]	**Alternative config**	NO
Step	0,01 [-]		
Comm object	8776	**Related applications**	MINT
Config level	Standard		
Setpoint visibility	Always		
Description			
Required gen-set power factor when the group of gen-sets is running parallel to the mains. The PF is regulated locally in each controller by PF control regulation loop, VARsharing is not active.			

back to List of setpoints

Subgroup: Neutral Contactor

#Neutral Contactor Control

Setpoint group	Process Control	**Related FW**	1.3.0
Range [units]	Each / Common [-]		
Default value	Each	**Alternative config**	NO
Step	[-]		
Comm object	9890	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Always		
Description			

Setpoint changes behavior of binary output **NCB CLOSE/OPEN (PAGE 716)** which is used for neutral contactor control.

Each	The EACH option should be used if each gen-set has it's own neutral contactor. Four-pole GCB must be used in this case. ▶ The output is always opened while the gen-set is not running ▶ The output is always opened while the MCB is closed ▶ While the gen-set is running and GCB is open, the output closes when generator voltage in at least one phase exceeds 85% of the nominal voltage. It opens when the generator voltage in all phases drops below 50% of the nominal voltage ▶ While the gen-set is running, MCB is open and GCB is closed, then the position of the output is given by an internal algorithm, which ensures, that always exactly one gen-set connected to the bus has the neutral contactor closed. It is always the gen-set with lowest CAN address
Common	The COMMON option should be used if there is one common neutral contactor for the whole site. The **NCB CLOSE/OPEN (PAGE 716)** outputs from all controllers are combined together and the combined signal is used to control the breaker. Three-pole GCB must be used in this case. ▶ The output is always opened while the gen-set is not running ▶ The output is always opened while the MCB is closed ▶ While the gen-set is running the output closes when generator voltage in at least one phase exceeds 85% of the nominal voltage. It opens when the generator voltage in all phases drops below 50% of the nominal voltage. That means if at least one gen-set in the site is running and having proper voltage, the neutral contactor is closed

Note: *Logical binary input **NCB FEEDBACK (PAGE 657)** has to be configured for proper functionality.*

back to List of setpoints

Subgroup: Process Limitation

CB Control In MAN Mode

Setpoint group	Process Control	**Related FW**	1.3.0
Range [units]	Full Ctrl / Aut Trans / Islnd Disl [-]		
Default value	Full Ctrl	**Alternative config**	NO
Step	[-]		
Comm object	14962	**Related applications**	SPtM
Config level	Standard		
Setpoint visibility	Always		

Description

The behavior of transition of load in MAN mode is adjusted via this setpoint.

Full Ctrl	No limitation of CB control in MAN mode (operator can close any breaker manually or evoke the synchronization and consequential operation in parallel to mains)
Aut Trans	Operator can control both MCB or GCB breaker. However once transition is evoked the controller performs the automatic transfer of the load (depends on adjustment of setpoints **Transfer Gen To Mains (page 347)** and **Transfer Mains To Gen (page 346)**). Controller performs synchronisation accross MCB, if GCB is closed and MCB button is pushed. Load transfer is done after synchronisation and GCB is opened automatically. Controller performs synchronisation accross GCB , if MCB is closed and GCB button is pushed. Load transfer is done after synchronisation and MCB is opened automatically. It is also possible to open currently closed breaker and keep the load non-energized. Then it is possible to close MCB or GCB to energize the load from a healthy source. ***Note:*** *Parallel operation with mains continues, if system already operates in parallel with mains and setting is changed to Aut Trans. It is necesssary to push MCB or GCB button to open a breaker.* ***Note:*** *Open transfer is performed, if the Open option is selected with **Transfer Gen To Mains (page 347)** or **Transfer Mains To Gen (page 346)***
Islnd Disl	Behaves like the full manual control but the Island operation is disabled. **Example:** When MCB opened and GCB pressed, controller don't go to island. **Example:** In parallel operation when MCB button pressed, MCB is not opened.

back to List of setpoints

Subgroup: Mains Import Measurement

Mains Import Measurement

Setpoint group	Process Control	**Related FW**	1.3.0
Range [units]	None/Mains CT/Analog Input [-]		
Default value	Mains CT	**Alternative config**	NO
Step	[-]		
Comm object	10599	**Related applications**	SPtM
Config level	Advanced		
Setpoint visibility	Visible only in SPtM mode		
Description			

Defines source value of the **Mains Import kW (page 586)**.

None	The Mains import is not measured and the duration of the load transfer in direction Mains to Generator is given exactly by the setpoint Speed/Load Control / **Close Transfer Max Duration (page 345)**.
Mains CT	The **Mains Import kW (page 586)** value is measured via Mains CTs.The load transfer in direction Mains to Generator is considered to be finished when the mains is unloaded under certain level.
Analog Input	The **Mains Import kW (page 586)** value is measured via analog input, accordingly LAI: **MAINS IMPORT MEASUREMENT (PAGE 758)**. The load transfer in direction Mains to Generator is considered to be finished when the mains is unloaded under certain level.

back to List of setpoints

Subgroup: Peak Shaving

Peak Shaving

Setpoint group	Process Control	**Related FW**	1.3.0
Range [units]	Enabled / Disabled [-]		
Default value	Disable	**Alternative config**	NO
Step	[-]		
Comm object	11601	**Related applications**	SPtM
Config level	Advanced		
Setpoint visibility	Always		
Description			

The behavior of peak shaving functions

Enabled	The Peak Shaving function is active and the start command is activated when the conditions for Peaks Shaving activation were fulfilled.
Disabled	The Peak Shaving function is BLOCKED and the start command can not be activated even the conditions for Peaks Shaving activation were fulfilled.

back to List of setpoints

Peak Shaving Start Level

Setpoint group	Process Control	**Related FW**	1.3.0
Range [units]	**Peak Shaving Stop Level (page 250)** .. 32000 [kW]		
Default value	1000 kW	**Alternative config**	NO
Step	1 kW		
Comm object	8643	**Related applications**	SPtM
Config level	Advanced		
Setpoint visibility	Visible only if **Peak Shaving (page 249)** = enabled		
Description			
This setpoint starts genset, when the value of the load consumption Load kW exceeds the value given by this setpoint for the time of**Peak Shaving Start/Stop Delay (page 251)**. The gen-set is synchronized to the Mains (kept in the parallel to the Mains) and the genset power is controlled according to the settings in the Group Process Control/Load Control. The gen-set stays running until the conditions for Peak Shaving run are active. Conditions of deactivation are given by the setpoint **Peak Shaving Stop Level (page 250)** and **Peak Shaving Start/Stop Delay (page 251)**.			

back to List of setpoints

Peak Shaving Stop Level

Setpoint group	Process Control	**Related FW**	1.3.0
Range [units]	0 .. **Peak Shaving Start Level (page 250)** [kW]		
Default value	900 kW	**Alternative config**	NO
Step	1 kW		
Comm object	8644	**Related applications**	SPtM
Config level	Advanced		
Setpoint visibility	Visible only if **Peak Shaving (page 249)** = enabled		
Description			
This setpoint stops gen-set, of the load consumption Load kW decreases under the value given by this setpoint for the time of **Peak Shaving Start/Stop Delay (page 251)**.			

back to List of setpoints

Peak Shaving Start/Stop Delay

Setpoint group	Process Control	**Related FW**	1.3.0
Range [units]	0 .. 600 [s]		
Default value	600 s	**Alternative config**	NO
Step	1 s		
Comm object	9989	**Related applications**	SPtM
Config level	Advanced		
Setpoint visibility	Visible only if **Peak Shaving (page 249)** = enabled		
Description			

Defines of the delay of activation or deactivation of the Peak Shaving. Starts when:

- The value of the load consumption Load kW exceeds the value given by the setpoint **Peak Shaving Start Level (page 250)**.
- The value of the load consumption Load kW decreases under the value given by the setpoint **Peak Shaving Stop Level (page 250)**

back to List of setpoints

Group: Basic settings

Subgroup: Name

Gen-Set Name

Setpoint group	Basic settings	**Related FW**	1.3.0
Range [units]	0 .. 15 characters [-]		
Default value	InteliGen	**Alternative config**	NO
Step	[-]		
Comm object	8637	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Always		
Description			

User defined name, used for the controller identification at remote phone or mobile connection. Gen-Set Name is maximally 15 characters long and can be entered using InteliConfig or from controller's configuration menu.

Note: *If the Gen-Set Name is "TurboRunHours", the running hours will be counted faster - 1 minute in real will represent 1 hour.*

back to List of setpoints

Subgroup: Power settings

Nominal Power

Setpoint group	Basic settings	**Related FW**	1.3.0
Range [units]	1 .. 5 000 [kW]		
Default value	200 kW	**Alternative config**	Yes
Step	1 kW		
Comm object	8276	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Always		
Description			

Nominal power of the gen-set. Generator **Overload BOC (page 298)** protection is based on this setpoint.

Note: *This setpoint is used when setpoint **Connection type (page 254)** is adjusted to Monophase or Splitphase or 3Ph3Wire or High Leg D or 3Ph4Wire or when Autodetect detects connection type as 3Ph3Wire or High Leg D or 3Ph4Wire.*

Note: *To lock this setpoint against editing you also have to lock setpoint **Nominal Power 1 (page 450)**, **Nominal Power 2 (page 454)** and **Nominal Power 3 (page 458)**.*

back to List of setpoints

Nominal Power Split Phase

Setpoint group	Basic settings	**Related FW**	1.3.0
Range [units]	1 .. 5 000 [kW]		
Default value	200 kW	**Alternative config**	Yes
Step	1 kW		
Comm object	9977	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Conditioned by the setpoint **Connection type (page 254)**		
Description			

Nominal power of the gen-set for detected split-phase or mono phase connection. Generator **Overload BOC (page 298)** protection is based on this setpoint.

Note: *This setpoint is used when setpoint* ***Connection type (page 254)*** *is adjusted to Autodetect and Autodetect detects connection type as Monophase or Splitphase.*

Note: *To lock this setpoint against editing you also have to lock setpoint* ***Nominal Power Split Phase 1 (page 450)***, ***Nominal Power Split Phase 2 (page 454)*** *and* ***Nominal Power Split Phase 3 (page 458)****.*

back to List of setpoints

Subgroup: Current settings

Nominal Current

Setpoint group	Basic settings	**Related FW**	1.3.0
Range [units]	1 .. 10 000 [A]		
Default value	350 A	**Alternative config**	YES
Step	1 A		
Comm object	8275	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Conditioned by the setpoint **Connection type (page 254)**.		
Description			

It is current limit for mains current protections and means maximal continuous mains current. Nominal Current can be different from mains rated current value.

Note: *To lock this setpoint against editing you also have to lock setpoint* ***Nominal Current 1 (page 451)***, ***Nominal Current 2 (page 455)*** *and* ***Nominal Current 3 (page 459)****.*

back to List of setpoints

CT Ratio

Setpoint group	Basic settings	**Related FW**	1.3.0
Range [units]	1 .. 5 000 [A/5A]		
Default value	2 000 A/5A	**Alternative config**	NO
Step	1 A/5A		
Comm object	8274	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Always		
Description			
Gen-set current transformers ratio. ***Note:*** *Generator currents and power measurement is suppressed if current level is below 1% of CT range.*			

back to List of setpoints

Mains Import CT Ratio

Setpoint group	Basic settings	**Related FW**	1.3.0
Range [units]	1 .. 2 000 [A/5A]		
Default value	500 A/5A	**Alternative config**	NO
Step	1 A/5A		
Comm object	8566	**Related applications**	SPtM
Config level	Standard		
Setpoint visibility	Always		
Description			
Mains current transformers ratio. ***Note:*** *Generator currents and power measurement is suppressed if current level is below 1% of CT range.*			

back to List of setpoints

Subgroup: Voltage settings

Connection type

Setpoint group	Basic settings	**Related FW**	1.3.0
Range [units]	Mono Phase / SplitPhase / 3Ph3Wire / High Leg D / 3Ph4Wire / Autodetect [-]		
Default value	3Ph4Wire	**Alternative config**	YES
Step	[-]		
Comm object	11628	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Always		
Description			
Connection type:			

Mono Phase	Single phase voltage measurement L1-N 1x CT (Current Transformer)
Split Phase	Double Delta connection Split Phase Two phase voltage measurement L1,L2 with 180° phase shift 2x CT (Current Transformer)
3Ph3Wire	Ungrounded Delta connection Open Delta Ungrounded Wye Corner-Grounded Delta Split Phase Delta Three phase voltage measurement L1,L2,L3 with 120° phase shift No neutral is available 3x CT (Current Transformer)
High Leg D	High Leg Delta connection Three phase voltage measurement L1,L2,L3 3x CT (Current Transformer)
3Ph4Wire	Grounded Star (Grounded Wye) connection – 3PY Three phase voltage measurement L1,L2,L3 with 120° phase shift 3x CT (Current Transformer)
Autodetect	High Leg Delta L1 >=100V; L1 <=140V L2 >=140V L3 >=100V; L3 <=140V or 3PH3Wire or 3Ph4Wire L1 >=100V L2 >=100V L3 >=100V or Split Phase L1 >=100V L2 <= 20V L3 >=100V or Mono Phase L1 >=100V L2 <= 20V L3 <= 20V or ***Voltage Autodetect*** shutdown

Note: *To lock this setpoint against editing you also have to lock setpoint* ***Connection Type 1 (page 448)***, ***Connection type 2 (page 452)*** *and* ***Connection type 3 (page 456)***.

back to List of setpoints

Nominal Voltage Ph-N

Setpoint group	Basic settings	**Related FW**	1.3.0
Range [units]	80 .. 20 000 [V]		
Default value	231 V	**Alternative config**	YES
Step	1 V		
Comm object	8277	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Conditioned by the setpoint **Connection type (page 254)**.		
Description			
Nominal voltage (phase to neutral). ***Note:*** *To lock this setpoint against editing you also have to lock setpoint* ***Nominal Voltage Ph-N 1 (page 452)***, ***Nominal Voltage Ph-N 2 (page 456)*** *and* ***Nominal Voltage Ph-N 3 (page 460)****.*			

back to List of setpoints

Nominal Voltage Ph-Ph

Setpoint group	Basic settings	**Related FW**	1.3.0
Range [units]	80 .. 40 000 [V]		
Default value	400 V	**Alternative config**	YES
Step	1 V		
Comm object	11657	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Conditioned by the setpoint **Connection type (page 254)**.		
Description			
Nominal system voltage (phase to phase). ***Note:*** *To lock this setpoint against editing you also have to lock setpoint* ***Nominal Voltage Ph-Ph 1 (page 452)***, ***Nominal Voltage Ph-Ph 2 (page 456)*** *and* ***Nominal Voltage Ph-Ph 3 (page 460)****.*			

back to List of setpoints

Gen VT Ratio

Setpoint group	Basic settings	**Related FW**	1.3.0
Range [units]	0,1 .. 500,0 [V/V]		
Default value	1,0 V/V	**Alternative config**	NO
Step	0,1 V/V		
Comm object	9579	**Related applications**	MINT, SPtM
Config level	Advanced		
Setpoint visibility	Always		
Description			
Generator voltage potential transformers ratio. If no PTs are used, adjust the setpoint to 1.			

back to List of setpoints

Mains/Bus VT Ratio

Setpoint group	Basic settings	**Related FW**	1.3.0
Range [units]	0,1 .. 500,0 [V/V]		
Default value	1,0 V/V	**Alternative config**	NO
Step	0,1 V/V		
Comm object	9580	**Related applications**	SPtM
Config level	Advanced		
Setpoint visibility	Conditioned by the setpoint **Application Mode Select (page 239)**		
Description			
Mains/Bus voltage potential transformers ratio. If no PTs are used, adjust the setpoint to 1.			

back to List of setpoints

Subgroup: Frequency settings

Nominal Frequency

Setpoint group	Basic settings	**Related FW**	1.3.0
Range [units]	45 .. 65 [Hz]		
Default value	50 Hz	**Alternative config**	YES
Step	1 Hz		
Comm object	8278	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Always		
Description			
Nominal system frequency (usually 50 or 60 Hz). ***Note:*** *To lock this setpoint against editing you also have to lock setpoint* ***Nominal Frequency 1 (page 451)****,* ***Nominal Frequency 2 (page 455)*** *and* ***Nominal Frequency 3 (page 459)****.*			

back to List of setpoints

Gear Teeth

Setpoint group	Basic settings	**Related FW**	1.3.0
Range [units]	FGen->RPM / 1 .. 500 [-]		
Default value	120	**Alternative config**	NO
Step	1		
Comm object	8252	**Related applications**	MINT, SPtM
Config level	Advanced		
Setpoint visibility	Always		
Description			

Number of teeth on the engine flywheel where the pick-up is installed. Set to zero if no pick-up is used and the Engine speed will be counted from the generator frequency.

> ***Note:*** *If no pickup is used, the D+ or W terminal should be used to prevent possible overcranking, which can occur if at least 25% of nominal generator voltage is not present immediately after exceeding firing speed.*

back to List of setpoints

Nominal RPM

Setpoint group	Basic settings	**Related FW**	1.3.0
Range [units]	100 .. 4 000 [RPM]		
Default value	1 500 RPM	**Alternative config**	YES
Step	1 RPM		
Comm object	8253	**Related applications**	MINT, SPtM
Config level	Advanced		
Setpoint visibility	Always		
Description			

Nominal engine speed (RPM - revolutions per minute).

> ***Note:*** *To lock this setpoint against editing you also have to lock setpoint **Nominal RPM 1 (page 451)**, **Nominal RPM 2 (page 455)** and **Nominal RPM 3 (page 459)**.*

back to List of setpoints

Subgroup: Controller settings

Controller mode

Setpoint group	Basic settings	**Related FW**	1.3.0
Range [units]	OFF / MAN / AUTO[-]		
Default value	OFF	**Alternative config**	NO
Step	[-]		
Comm object	8315	**Related applications**	MINT, SPtM
Config level	Advanced		
Setpoint visibility	Always		
Description			
This setpoint can be used for changing the Controller mode remotely, e.g. via MODBUS. Use the mode selector on the main screen for changing the mode from the front panel. Use mode selector in the control window for changing the mode from InteliConfig.			

back to List of setpoints

Power On Mode

Setpoint group	Basic settings	**Related FW**	1.3.0
Range [units]	Previous / OFF [-]		
Default value	Previous	**Alternative config**	NO
Step	[-]		
Comm object	13000	**Related applications**	MINT, SPtM
Config level	Advanced		
Setpoint visibility	Always		
Description			

This setpoint adjusts controller mode after power on of controller.

Previous	When controller is power on, than is switched into last mode before power off.
OFF	When controller is power on, than is switched into OFF mode.

Note: *Remote modes - In case that some LBI remote mode is activated during power on of controller than this LBI has higher priority than this setpoint - controller mode is forced into mode selected via LBI. After deactivation of LBI, controller is switched into value selected via setpoint Power On Mode*

back to List of setpoints

Reset To Manual

Setpoint group	Basic settings	**Related FW**	1.3.0
Range [units]	Disabled / Enabled [-]		
Default value	Disabled	**Alternative config**	NO
Step	[-]		
Comm object	9983	**Related applications**	MINT, SPtM
Config level	Advanced		
Setpoint visibility	Always		
Description			

If this function is enabled, the controller will switch automatically to MAN mode when there is a red alarm in the alarm list and fault reset button is pressed. This is a safety function that prevents the gen-set starting again automatically in specific cases when fault reset button is pressed.

> **Example:** Controller is in AUTO mode and there is red inactive unconfirmed alarm and fault reset button is pressed, controller will start automatically.

back to List of setpoints

Backlight Timeout

Setpoint group	Basic settings	**Related FW**	1.3.0
Range [units]	Disabled / 1 .. 255 [min]		
Default value	Disabled	**Alternative config**	NO
Step	1 min		
Comm object	10121	**Related applications**	MINT, SPtM
Config level	Advanced		
Setpoint visibility	Always		
Description			

The display backlight is switched off when this timer exceed. When setpoint is adjusted to disabled then the display will be backlighted all the time.

back to List of setpoints

Horn Timeout

Setpoint group	Basic settings	**Related FW**	1.3.0
Range [units]	Disabled / 1 .. 599 [s]		
Default value	10 s	**Alternative config**	NO
Step	1 s		
Comm object	8264	**Related applications**	MINT, SPtM
Config level	Advanced		
Setpoint visibility	Always		
Description			

Setting of horn behavior.

Disabled	Disabling the Horn sounding function
1 .. 599 [s]	Timeout for **HORN (PAGE 707)** binary output. The **HORN (PAGE 707)** output is opened when this timeout elapsed.

Note: *Horn timeout starts again from the beginning if a new alarm appears before previous Horn timeout has elapsed.*

back to List of setpoints

Main Screen

Setpoint group	Basic settings	**Related FW**	1.3.0
Range [units]	PwrFactor/ATT/ [-]		
Default value	PwrFactor	**Alternative config**	NO
Step	[-]		
Comm object	13346	**Related applications**	MINT, SPtM
Config level	Advanced		
Setpoint visibility	Always		
Description			

Setpoint adjust value which is shown on main screen.

PwrFactor:	Value of power factor is shown on main screen.
ATT:	This option is for Tier IV Final support. In this case value of DEF Level is shown on main screen.

back to List of setpoints

Subgroup: Phase rotation

Phase Rotation

Setpoint group	Basic settings	**Related FW**	1.3.0
Range [units]	Clockwise / CounterCCW [-]		
Default value	Clockwise	**Alternative config**	NO
Step	[-]		
Comm object	15122	**Related applications**	MINT, SPtM
Config level	Advanced		
Setpoint visibility	All the time		
Description			
This setpoint adjust the phase sequence of voltage terminals.			

back to List of setpoints

Group: Communication Settings

Subgroup: Controller CAN Address

Controller Address

Setpoint group	Communication Settings	**Related FW**	1.3.0
Range [units]	1 .. 32 [-]		
Default value	1	**Alternative config**	NO
Step	1		
Comm object	24537	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Always		
Description			
Controller identification number. It is possible to set controller address different from the default value (1) so that more controllers can be interconnected (via RS485) and accessed e.g. from MODBUS terminal. ***Note:*** *When opening connection to the controller it's address has to correspond with the setting in PC tool.*			

back to List of setpoints

Subgroup: RS485 Settings

RS485 Mode

Setpoint group	Communication Settings	**Related FW**	1.3.0
Range [units]	Direct / MODBUS [-]		
Default value	Direct	**Alternative config**	NO
Step	[-]		
Comm object	24134	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Always		
Description			

Communication protocol switch for on-board RS485.

Direct	InteliConfig communication protocol via serial cable.
MODBUS	MODBUS protocol.

back to List of setpoints

RS485 Communication Speed

Setpoint group	Communication Settings	**Related FW**	1.3.0
Range [units]	9600 / 19200 / 38400 / 57600 / 115200 [bps]		
Default value	57600 bps	**Alternative config**	NO
Step	[-]		
Comm object	24135	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Always		
Description			

If the direct mode is selected on on-board RS485, the direct communication speed of controller part of line can be adjusted here. Speed of second part of line has to be adjusted to the same value.

Note: *Winscope supports only 19200, 38400, 57600 speeds.*

back to List of setpoints

RS485 MODBUS Speed

Setpoint group	Communication Settings	**Related FW**	1.3.0
Range [units]	9600 / 19200 / 38400 / 57600 / 115200 [bps]		
Default value	9600 bps	**Alternative config**	NO
Step	[-]		
Comm object	24141	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Only if relevant module is installed + conditioned by the setpoint **COM1 Mode (page 461)**		
Description			
If the MODBUS mode is selected on COM1 channel, the MODBUS communication speed can be adjusted here.			

back to List of setpoints

Group: Engine settings

Subgroup: Starting

Fuel Solenoid

Setpoint group	Engine settings	**Related FW**	1.3.0
Range [units]	Diesel / Gas [-]		
Default value	Diesel	**Alternative config**	NO
Step	[-]		
Comm object	9100	**Related applications**	MINT, SPtM
Config level	Advanced		
Setpoint visibility	Always		
Description			

Determines behavior of the Binary output **FUEL SOLENOID (PAGE 699)**

Diesel:	Output closes before binary output **STARTER (PAGE 723)**. Lead of output is adjusted via setpoint **Fuel Solenoid Lead (page 269)**. The output opens if Emergency Stop comes or gen-set is stopped and in pause between repeated starts.
Gas: (Gaseous)	Output closes together with binary output **IGNITION (PAGE 708)** if RPM is over the 30 RPM (fixed value). Output opens after stop command or in pause between repeated start.

back to List of setpoints

Cranking Attempts

Setpoint group	Engine settings	**Related FW**	1.3.0
Range [units]	1 .. 10 [-]		
Default value	3	**Alternative config**	NO
Step	1		
Comm object	8255	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Always		
Description			
Maximal number of cranking attempts.			

back to List of setpoints

Maximum Cranking Time

Setpoint group	Engine settings	**Related FW**	1.3.0
Range [units]	1 .. 255 [s]		
Default value	5 s	**Alternative config**	NO
Step	1 s		
Comm object	8256	**Related applications**	MINT, SPtM
Config level	Advanced		
Setpoint visibility	Always		
Description			
Maximum time limit of cranking time. **IMPORTANT: There is a protection against broken pinion on starter. In case that there are no RPM after 5 seconds of starting, cranking is interrupted and cranking fail pause follows.**			

back to List of setpoints

Cranking Fail Pause

Setpoint group	Engine settings	**Related FW**	1.3.0
Range [units]	5 .. 60 [s]		
Default value	8 s	**Alternative config**	NO
Step	1 s		
Comm object	8257	**Related applications**	MINT, SPtM
Config level	Advanced		
Setpoint visibility	Always		
Description			
Pause between **Cranking Attempts (page 265)**. **PRESTART (PAGE 718)** output is active in this pause until Cranking Fail Pause elapses.			

back to List of setpoints

Prestart Time

Setpoint group	Engine settings	**Related FW**	1.3.0
Range [units]	0 .. 600 [s]		
Default value	2 s	**Alternative config**	NO
Step	1 s		
Comm object	8394	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Always		
Description			

Time of closing of the **PRESTART (PAGE 718)** output prior to the engine start. Set to zero if you want to leave the output **PRESTART (PAGE 718)** open.

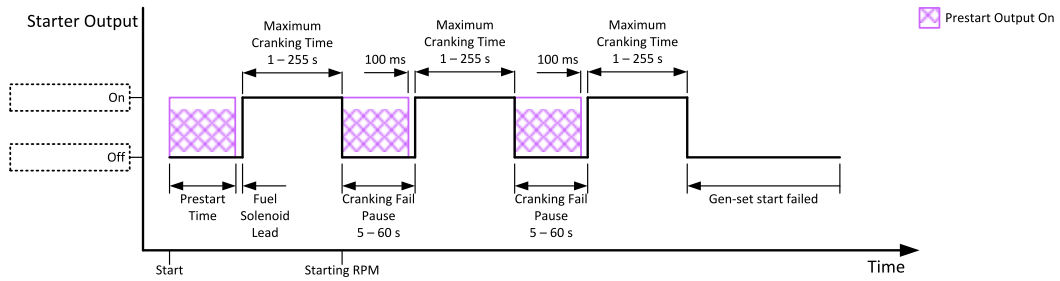


Image 8.1 Prestart Time

back to List of setpoints

Starting RPM

Setpoint group	Engine settings	**Related FW**	1.3.0
Range [units]	5 .. 50 [%]		
Default value	25%	**Alternative config**	NO
Step	1 % of **Nominal RPM (page 258)**		
Comm object	8254	**Related applications**	MINT, SPtM
Config level	Advanced		
Setpoint visibility	Always		
Description			

This setpoint defines the “firing” speed level as percent value of the **Nominal RPM (page 258)**. If this level is exceeded the engine is considered as started.

back to List of setpoints

Starting Oil Pressure

Setpoint group	Engine settings	**Related FW**	1.3.0
Range [units]	0,0 .. 10,0 [bar]		
Default value	4,5 bar	**Alternative config**	NO
Step	0,1 bar		
Comm object	9681	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Always		
Description			

Oil pressure limit for starting. The controller will stop cranking (**STARTER (PAGE 723)** goes OFF) if the oil pressure rises above this limit.

> **IMPORTANT: Value from analog input has higher priority than value from ECU.**

back to List of setpoints

D+ Function

Setpoint group	Engine settings	**Related FW**	1.3.0
Range [units]	Enabled / ChargeFail / Disabled [-]		
Default value	Disabled	**Alternative config**	NO
Step	[-]		
Comm object	9683	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Always		
Description			

Behavior of D+ terminal.

Enabled	The D+ terminal is used for both functions – “running engine” detection and charge fail detection.
ChargeFail	The D+ terminal is used for charge fail detection only
Disabled	The D+ terminal is not used.

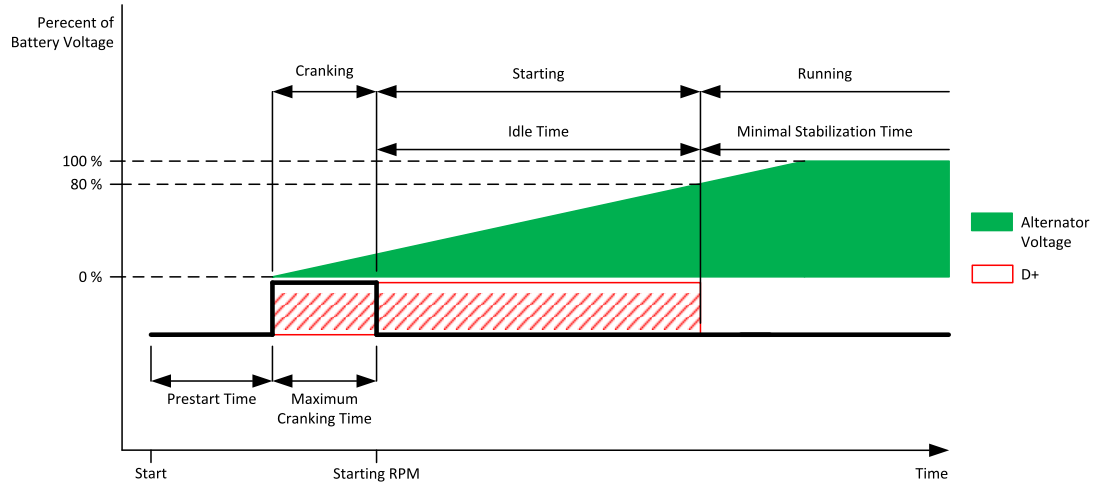


Image 8.2 D+ Function 1

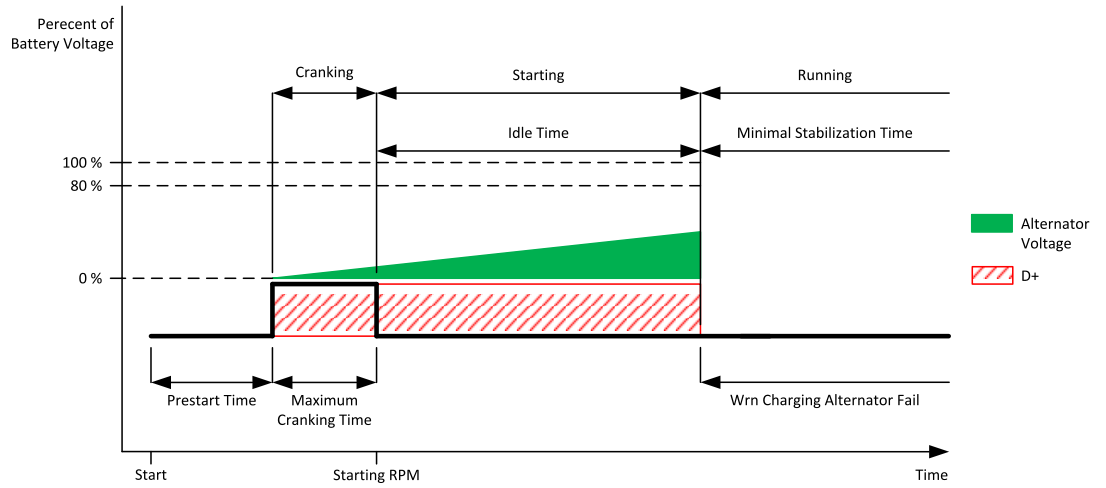


Image 8.3 D+ Function 2

back to List of setpoints

Glow Plugs Time

Setpoint group	Engine settings	**Related FW**	1.3.0
Range [units]	0 .. **Prestart Time (page 266)** [s]		
Default value	0 s	**Alternative config**	NO
Step	1 s		
Comm object	14412	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Always		
Description			
This setpoint defines the time before starting when logical binary output **GLOW PLUGS (PAGE 705)** will be close.			

back to List of setpoints

Idle RPM

Setpoint group	Engine settings	**Related FW**	1.3.0
Range [units]	100 .. 4000 [RPM]		
Default value	900 RPM	**Alternative config**	NO
Step	1 RPM		
Comm object	9946	**Related applications**	MINT, SPtM
Config level	Advanced		
Setpoint visibility	Always		
Description			
This setpoint adjusts idle speed of engine.			

back to List of setpoints

Fuel Solenoid Lead

Setpoint group	Engine settings	**Related FW**	1.3.0
Range [units]	0,0 .. 25,0 [s]		
Default value	0,5 s	**Alternative config**	NO
Step	0,1 s		
Comm object	10525	**Related applications**	MINT, SPtM
Config level	Advanced		
Setpoint visibility	Always		
Description			

Delay between **FUEL SOLENOID (PAGE 699)** and **STARTER (PAGE 723)** logical binary inputs.**FUEL SOLENOID (PAGE 699)** is closed before **STARTER (PAGE 723)**. Lead time is adjusted via this setpoint.

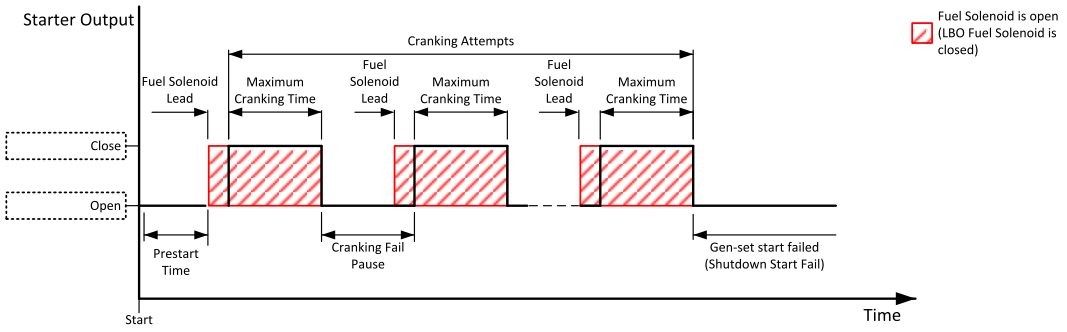


Image 8.4 Fuel Solenoid Lead

Note: *LBO **PRESTART (PAGE 718)** goes to logical zero when Fuel Solenoid Lead goes to logical one.*

Note: *This setpoint is used only for diesel **Fuel Solenoid (page 264)***

back to List of setpoints

Idle Time

Setpoint group	Engine settings	**Related FW**	1.3.0
Range [units]	0 .. 600 [s]		
Default value	12 s	**Alternative config**	NO
Step	1 s		
Comm object	9097	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Always		
Description			

Idle Time delay starts when RPM exceeds **Starting RPM (page 266)**. Start fail is detected when during Idle state RPM decreases below 2 RPM.
The output **IDLE/NOMINAL (PAGE 708)** remains inactive during the idle period. Binary output Idle/Nominal opens during Cooling period again. This output can be used for switching the governor between idle and

nominal speed.

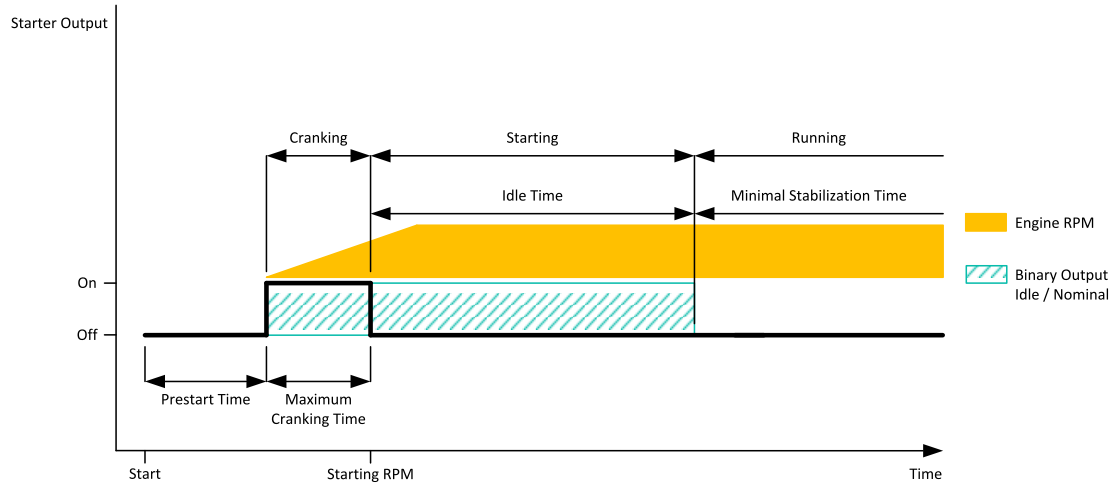


Image 8.5 Idle Time 1

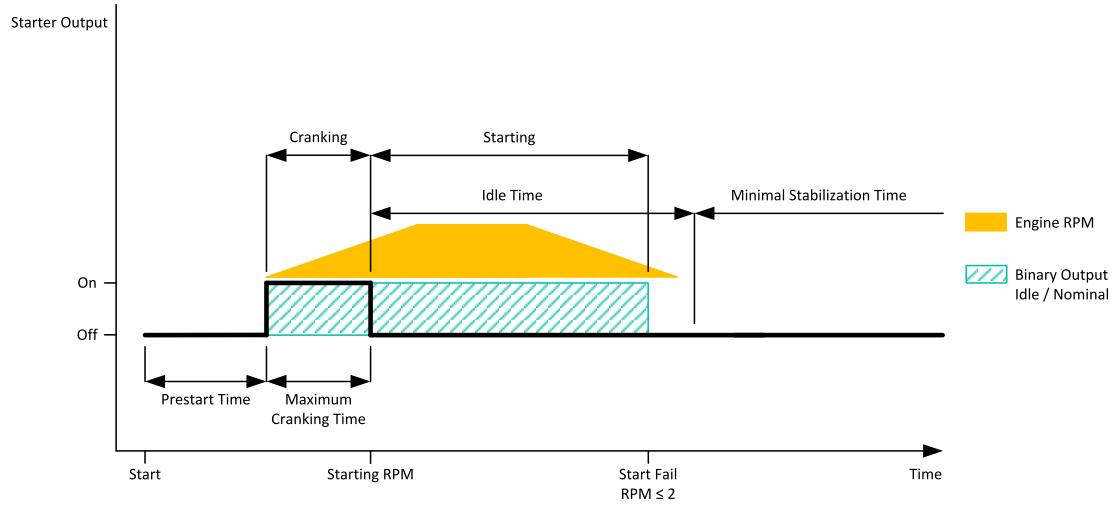


Image 8.6 Idle Time 2

back to List of setpoints

Minimal Stabilization Time

Setpoint group	Engine settings	**Related FW**	1.3.0
Range [units]	1 .. **Maximal Stabilization Time (page 272)** [s]		
Default value	2 s	**Alternative config**	NO
Step	1 s		
Comm object	8259	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Always		

Description

When the gen-set has been started and the idle timer has elapsed, the controller will wait for a period adjusted by this setpoint before closing GCB, even if the generator voltage and frequency are already in limits.

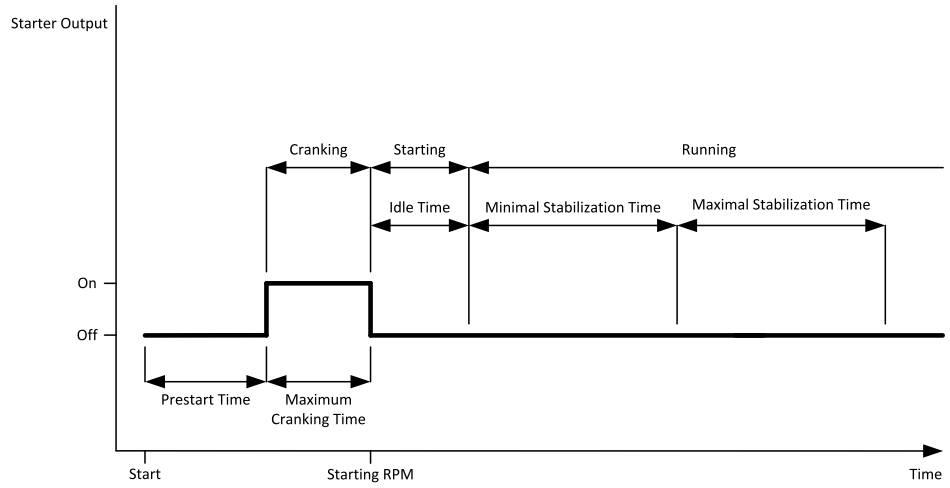


Image 8.7 Minimal Stabilization Time

back to List of setpoints

Maximal Stabilization Time

Setpoint group	Engine settings	**Related FW**	1.3.0
Range [units]	**Minimal Stabilization Time (page 271)** .. 300 [s]		
Default value	10 s	**Alternative config**	NO
Step	1 s		
Comm object	8313	**Related applications**	MINT, SPtM
Config level	Advanced		
Setpoint visibility	Always		
Description			
When the gen-set has been started and the idle timer has elapsed, the generator voltage and frequency must get within limits within this period of time, otherwise an appropriate shutdown alarm (generator voltage and/or frequency) is issued.			

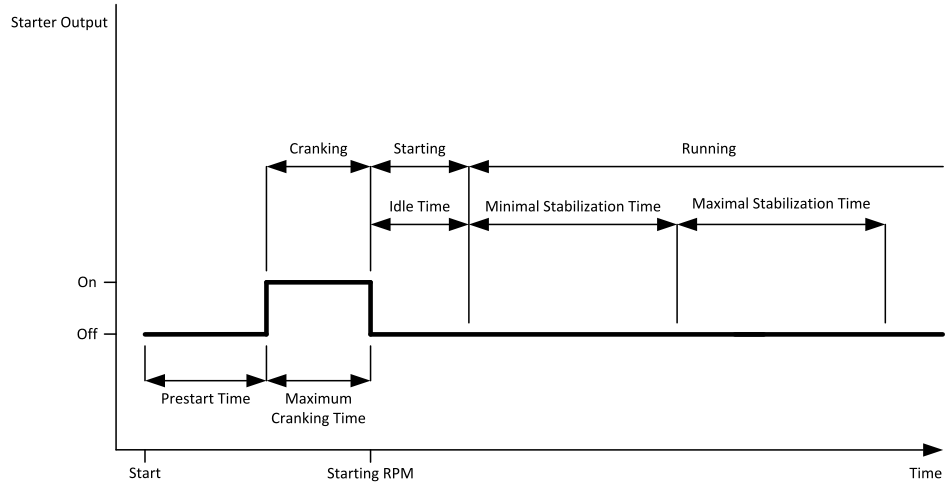


Image 8.8 Maximal Stabilization Time

back to List of setpoints

Protection Hold Off

Setpoint group	Engine settings	**Related FW**	1.3.0
Range [units]	0,0 .. 300,0 [s]		
Default value	5,0 s	**Alternative config**	YES
Step	0,1 s		
Comm object	10023	**Related applications**	MINT, SPtM
Config level	Advanced		
Setpoint visibility	Always		
Description			
During the start of the gen-set, some engine protections have to be blocked (e.g. Oil pressure). The protections are unblocked after the Protect Hold Off. The time starts after reaching Starting RPM.			

back to List of setpoints

Sd Ventilation Time

Setpoint group	Engine settings	**Related FW**	1.3.0
Range [units]	0 .. 60 [s]		
Default value	5 s	**Alternative config**	NO
Step	1 s		
Comm object	9695	**Related applications**	MINT, SPtM
Config level	Advanced		
Setpoint visibility	Always		
Description			
In case **Fuel Solenoid (page 264)** is set to GAS, the Sd Ventilation Time adjusts the time of the starter to be switched on for engine pre-ventilation in the case of a first start attempt after shutdown or controller switch-on.			

back to List of setpoints

Subgroup: Stopping

Cooling Speed

Setpoint group	Engine settings	**Related FW**	1.3.0
Range [units]	Idle / Nominal [-]		
Default value	Nominal	**Alternative config**	NO
Step	[-]		
Comm object	10046	**Related applications**	MINT, SPtM
Config level	Advanced		
Setpoint visibility	Always		
Description			

Selects the function of the binary output **IDLE/NOMINAL (PAGE 708)** during engine cooling state.

Idle	Cooling is executed at Idle speed and generator protections are switched off.
Nominal	Cooling is executed at Nominal speed and generator protections are active.

Note: *When ECU is connected the predefined value 900 RPM for Idle speed is requested.*

Note: *Binary output **IDLE/NOMINAL (PAGE 708)** must be configured and connected to speed governor. Engine Idle speed must be adjusted on speed governor.*

back to List of setpoints

Subgroup: Stopping Timers

Cooling Time

Setpoint group	Engine settings	**Related FW**	1.3.0
Range [units]	0 .. 3 600 [s]		
Default value	30 s	**Alternative config**	NO
Step	1 s		
Comm object	8258	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Always		
Description			
Runtime of the unloaded gen-set to cool the engine before stop.			

back to List of setpoints

Stop Time

Setpoint group	Engine settings	**Related FW**	1.3.0
Range [units]	0 .. 600 [s]		
Default value	60 s	**Alternative config**	NO
Step	1 s		
Comm object	9815	**Related applications**	MINT, SPtM
Config level	Advanced		
Setpoint visibility	Always		
Description			
Under normal conditions the engine must certainly stop within this period after the **FUEL SOLENOID (PAGE 699)** has been de-energized and the **STOP SOLENOID (PAGE 724)** energized. The Stop Solenoid output is deactivated 12 s after last running engine indication went off.			

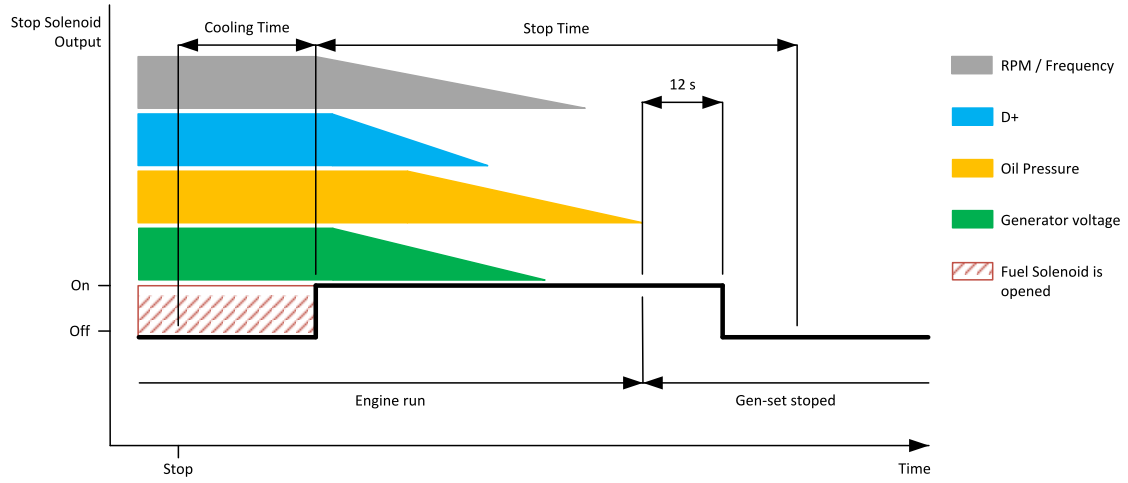


Image 8.9 Stop Time 1

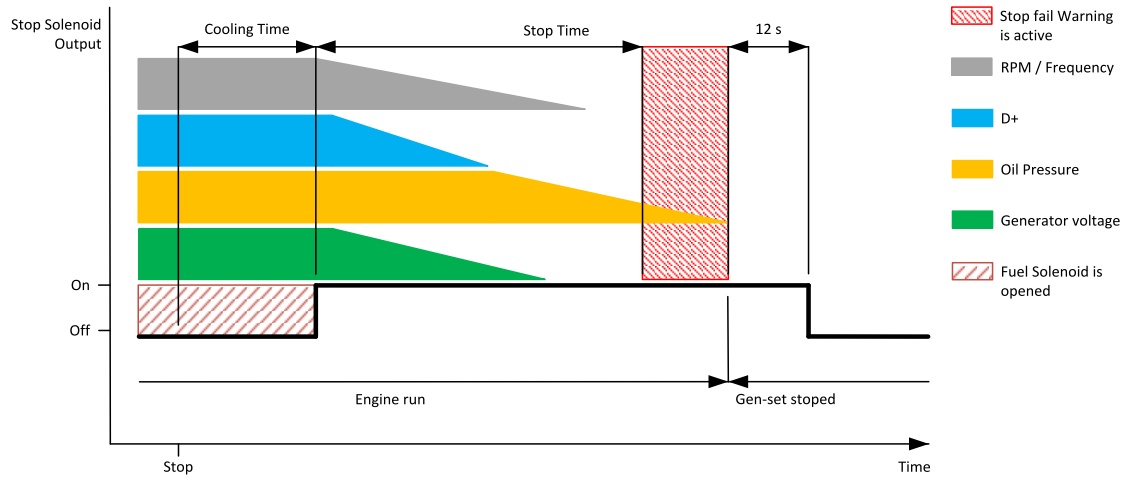


Image 8.10 Stop Time 2

back to List of setpoints

After Cooling Time

Setpoint group	Engine settings	**Related FW**	1.3.0
Range [units]	0 .. 3 600 [s]		
Default value	180 s	**Alternative config**	NO
Step	1 s		
Comm object	8662	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Always		
Description			
Runtime of engine after cooling pump. Binary output Cooling pump is closed when the engine starts and opens AfterCool time delayed after gen-set stops.			

back to List of setpoints

Subgroup: Power switch

Power Switch On

Setpoint group	Engine settings	**Related FW**	1.3.0
Range [units]	0 .. 32 000 [kW]		
Default value	100 kW	**Alternative config**	NO
Step	1 kW		
Comm object	11658	**Related applications**	MINT, SPtM
Config level	Advanced		
Setpoint visibility	Visible only if the logical binary output **POWER SWITCH (PAGE 718)** is configured.		
Description			
Threshold level for switching the binary output **POWER SWITCH (PAGE 718)** on.			

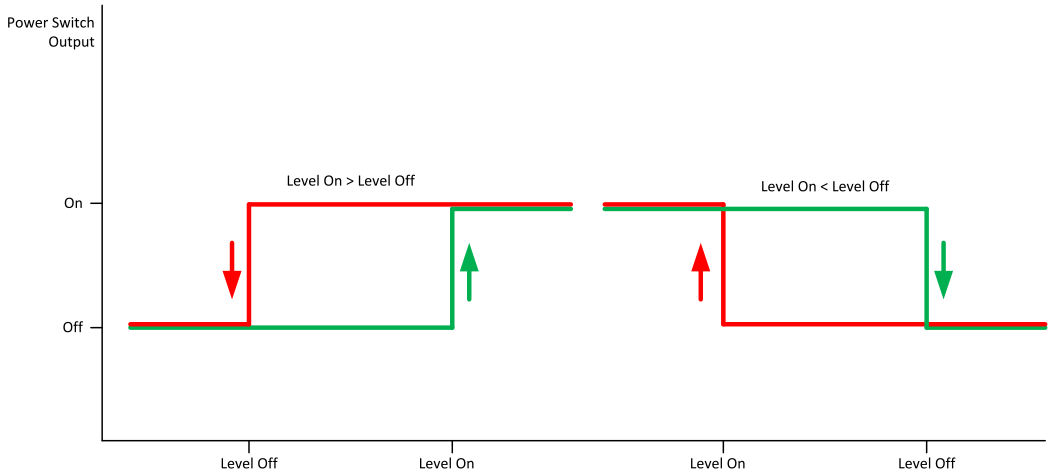


Image 8.11 Power Switch Level On < Level Off

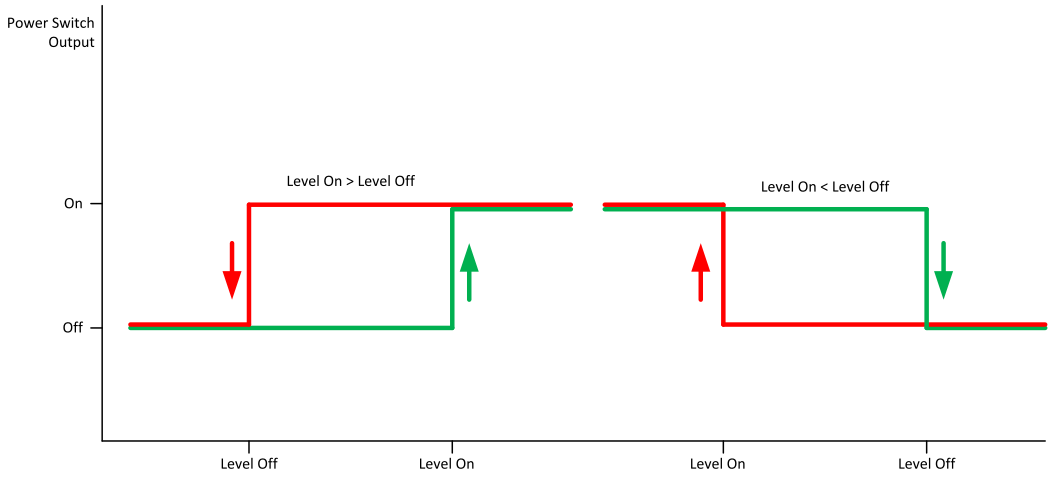


Image 8.12 Power Switch Level On > Level Off

back to List of setpoints

Power Switch Off

Setpoint group	Engine settings	**Related FW**	1.3.0
Range [units]	0 .. 32 000 [kW]		
Default value	50 kW	**Alternative config**	NO
Step	1 kW		
Comm object	11659	**Related applications**	MINT, SPtM
Config level	Advanced		
Setpoint visibility	Visible only if the logical binary output **POWER SWITCH (PAGE 718)** is configured.		

Description

Threshold level for switching the binary output **POWER SWITCH (PAGE 718)** on.

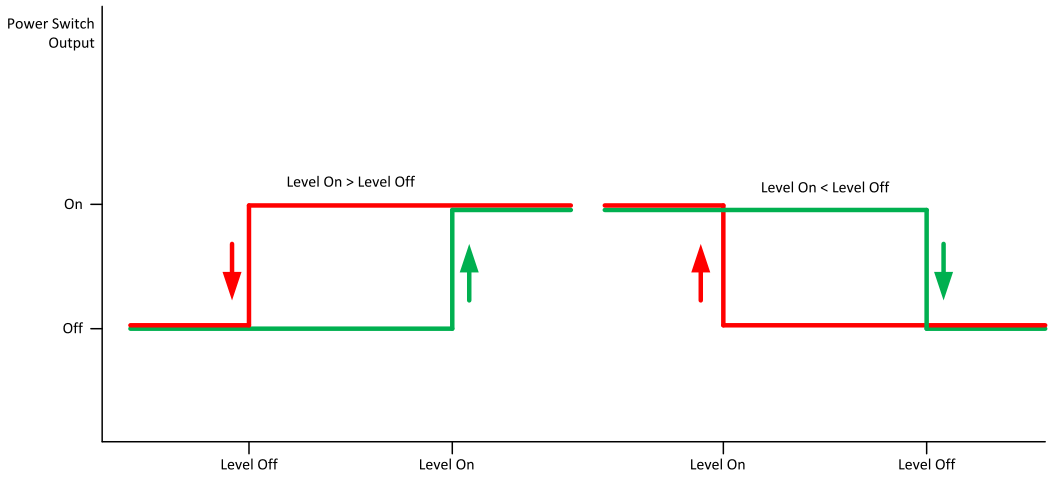


Image 8.13 Power Switch Level On < Level Off

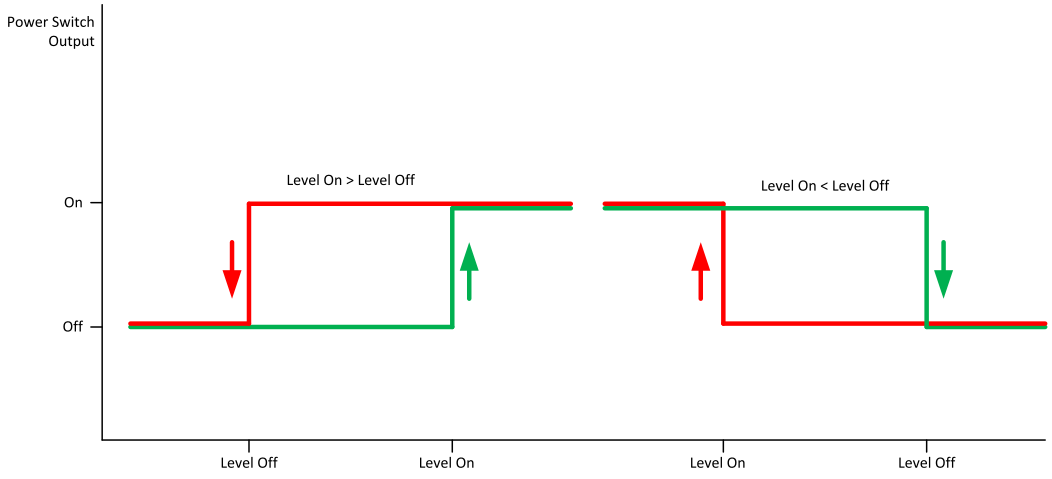


Image 8.14 Power Switch Level On > Level Off

back to List of setpoints

Subgroup: Engine Protections

Overspeed Sd

Setpoint group	Engine settings	**Related FW**	1.3.0
Range [units]	50 .. 200 [%]		
Default value	115%	**Alternative config**	NO
Step	1 % of **Nominal RPM (page 258)**		
Comm object	8263	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Always		
Description			
Threshold for over speed protection. Relative to the nominal speed.			

back to List of setpoints

Starting Overspeed Sd

Setpoint group	Engine settings	**Related FW**	1.3.0
Range [units]	100 ..200 [%]		
Default value	115 %	**Alternative config**	NO
Step	1 %		
Comm object	11033	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Always		
Description			

The rise up threshold for overspeed protection. The time for which this level is accepted is defined as **Starting Overspeed Time (page 280)**. This period starts to be counted once the RPM exceeds the value **Starting RPM (page 266)**. The threshold **Overspeed Sd (page 278)** starts to be valid once this period elapsed.

The type of reaction of the overspeed protection within the **Starting Overspeed Time (page 280)** is defined by the setpoint **Starting Overspeed Protection (page 280)**, so it is either considered as Sd Overspeed or unsuccessful start attempt. Then the next start attempt is enabled once the engine was stopped. History record Starting Overspeed should be written in this case.

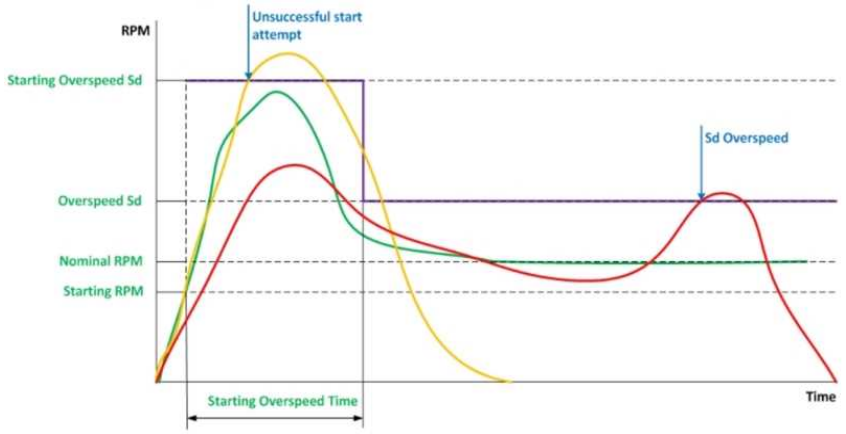


Image 8.15 Staring speed overshoot › Ovespeed Sd

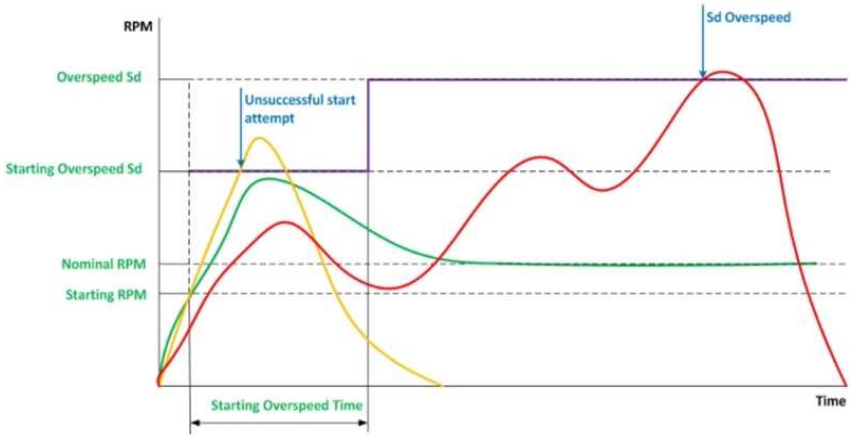


Image 8.16 Staring speed overshoot ‹ Ovespeed Sd

back to List of setpoints

Starting Overspeed Time

Setpoint group	Engine settings	**Related FW**	1.3.0
Range [units]	0 .. 255 [s]		
Default value	5 s	**Alternative config**	NO
Step	1 s		
Comm object	14108	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Always		
Description			
Time when **Starting Overspeed Sd (page 279)** level is used for overspeed protection. This time starts countdown when starting RPM are reached.			

back to List of setpoints

Starting Overspeed Protection

Setpoint group	Engine settings	**Related FW**	1.3.0
Range [units]	OverSpd Sd / NextStartAt [-]		
Default value	OverSpd Sd	**Alternative config**	NO
Step	[-]		
Comm object	15808	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Always		
Description			
Time of protection of the overspeed in **Starting Overspeed Time (page 280)**			

back to List of setpoints

Oil Pressure Wrn

Setpoint group	Engine settings	**Related FW**	1.3.0
Range [units]	the range is defined by analog sensor curve		
Default value	the value is defined by analog sensor curve	**Alternative config**	NO
Step	the step is defined by analog sensor curve		
Comm object	12895	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Visible only if the logical analog input **OIL PRESSURE (PAGE 759)** is configured		
Description			
Warning or history threshold level for **OIL PRESSURE (PAGE 759)**.			

back to List of setpoints

Oil Pressure Sd

Setpoint group	Engine settings	**Related FW**	1.3.0
Range [units]	the range is defined by analog sensor curve		
Default value	the value is defined by analog sensor curve	**Alternative config**	NO
Step	the step is defined by analog sensor curve		
Comm object	12779	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Visible only if the logical analog input **OIL PRESSURE (PAGE 759)** is configured		
Description			
Shutdown threshold level for **OIL PRESSURE (PAGE 759)**.			

back to List of setpoints

Oil Pressure Delay

Setpoint group	Engine settings	**Related FW**	1.3.0
Range [units]	0 .. 900 [s]		
Default value	3 s	**Alternative config**	NO
Step	1 s		
Comm object	14341	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Visible only if the logical analog input **OIL PRESSURE (PAGE 759)** is configured or logical binary input **OIL PRESSURE (PAGE 658)** is configured		
Description			
Delay for **OIL PRESSURE (PAGE 759)**.			

back to List of setpoints

ECU Oil Pressure Wrn

Setpoint group	Engine settings	**Related FW**	1.3.0
Range [units]	the range is defined by ECU sensor curve		
Default value	the value is defined by ECU sensor curve	**Alternative config**	YES
Step	the step is defined by ECU sensor curve		
Comm object	14426	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Visible only if ECU is configured		
Description			
Warning threshold level for Oil pressure which is send from ECU.			

back to List of setpoints

ECU Oil Pressure Sd

Setpoint group	Engine settings	**Related FW**	1.3.0
Range [units]	the range is defined by ECU sensor curve		
Default value	the value is defined by ECU sensor curve	**Alternative config**	NO
Step	the step is defined by ECU sensor curve		
Comm object	14425	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Visible only if ECU is configured		
Description			
Shutdown threshold level for Oil pressure which is send from ECU.			

back to List of setpoints

ECU Oil Pressure Delay

Setpoint group	Engine settings	**Related FW**	1.3.0
Range [units]	0 .. 900 [s]		
Default value	3 s	**Alternative config**	NO
Step	1 s		
Comm object	14427	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Visible only if ECU is configured		
Description			
Delay for Oil pressure which is send from ECU.			

back to List of setpoints

Coolant Temperature Wrn

Setpoint group	Engine settings	**Related FW**	1.3.0
Range [units]	the range is defined by analog sensor curve		
Default value	the value is defined by analog sensor curve	**Alternative config**	NO
Step	the step is defined by analog sensor curve		
Comm object	12896	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Visible only if the logical analog input **COOLANT TEMP (PAGE 756)** is configured		
Description			
Warning or history threshold level for **COOLANT TEMP (PAGE 756)**.			

back to List of setpoints

Coolant Temperature Sd

Setpoint group	Engine settings	**Related FW**	1.3.0
Range [units]	the range is defined by analog sensor curve		
Default value	the value is defined by analog sensor curve	**Alternative config**	NO
Step	the step is defined by analog sensor curve		
Comm object	12780	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Visible only if the logical analog input **COOLANT TEMP (PAGE 756)** is configured		
Description			
Shutdown or BOC threshold level for **COOLANT TEMP (PAGE 756)**.			

back to List of setpoints

Coolant Temperature Delay

Setpoint group	Engine settings	**Related FW**	1.3.0
Range [units]	0 .. 900 [s]		
Default value	5 s	**Alternative config**	NO
Step	1 s		
Comm object	14342	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Visible only if the logical analog input **COOLANT TEMP (PAGE 756)** is configured or logical binary input **COOLANT TEMP (PAGE 648)** is configured		
Description			
Delay for **COOLANT TEMP (PAGE 756)**.			

back to List of setpoints

ECU Coolant Temperature Wrn

Setpoint group	Engine settings	**Related FW**	1.3.0
Range [units]	the range is defined by ECU sensor curve		
Default value	the value is defined by ECU sensor curve	**Alternative config**	NO
Step	the step is defined by ECU sensor curve		
Comm object	14429	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Visible only if ECU is configured		
Description			
Warning threshold level for Coolant temperature which is send from ECU.			

back to List of setpoints

ECU Coolant Temperature Sd

Setpoint group	Engine settings	**Related FW**	1.3.0
Range [units]	the range is defined by ECU sensor curve		
Default value	the value is defined by ECU sensor curve	**Alternative config**	NO
Step	the step is defined by ECU sensor curve		
Comm object	14428	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Visible only if ECU is configured		
Description			
Shutdown or BOC threshold level for Coolant temperature which is send from ECU.			

back to List of setpoints

ECU Coolant Temperature Delay

Setpoint group	Engine settings	**Related FW**	1.3.0
Range [units]	0 .. 900 [s]		
Default value	5 s	**Alternative config**	NO
Step	1 s		
Comm object	14430	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Visible only if ECU is configured		
Description			
Delay for Coolant temperature which is send from ECU.			

back to List of setpoints

Oil Temp Wrn

Setpoint group	Engine settings	**Related FW**	1.3.0
Range [units]	the range is defined by analog sensor curve		
Default value	the value is defined by analog sensor curve	**Alternative config**	NO
Step	the step is defined by analog sensor curve		
Comm object	15747	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Visible only if the logical analog input **OIL TEMP (PAGE 760)** is configured		
Description			
Warning or history threshold level for **OIL TEMP (PAGE 760)**.			

back to List of setpoints

Oil Temp Sd

Setpoint group	Engine settings	**Related FW**	1.3.0
Range [units]	the range is defined by analog sensor curve		
Default value	the value is defined by analog sensor curve	**Alternative config**	NO
Step	the step is defined by analog sensor curve		
Comm object	15748	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Visible only if the logical analog input **OIL TEMP (PAGE 760)** is configured		
Description			
Shutdown threshold level for **OIL TEMP (PAGE 760)**.			

back to List of setpoints

Oil Temp Delay

Setpoint group	Engine settings	**Related FW**	1.3.0
Range [units]	0 .. 900 [s]		
Default value	3 s	**Alternative config**	NO
Step	1 s		
Comm object	15749	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Visible only if the logical analog input **OIL TEMP (PAGE 760)** is configured		
Description			
Delay for **OIL TEMP (PAGE 760)**.			

back to List of setpoints

ECU Oil Temp Wrn

Setpoint group	Engine settings	**Related FW**	1.3.0
Range [units]	the range is defined by ECU sensor curve		
Default value	the value is defined by ECU sensor curve	**Alternative config**	NO
Step	the step is defined by ECU sensor curve		
Comm object	15637	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Visible only if ECU is configured		
Description			
Warning threshold level for Oil temperature which is send from ECU.			

back to List of setpoints

ECU Oil Temp Sd

Setpoint group	Engine settings	**Related FW**	1.3.0
Range [units]	the range is defined by ECU sensor curve		
Default value	the value is defined by ECU sensor curve	**Alternative config**	NO
Step	the step is defined by ECU sensor curve		
Comm object	15636	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Visible only if ECU is configured		
Description			
Shutdown threshold level for Oil temperature which is send from ECU.			

back to List of setpoints

ECU Oil Temp Delay

Setpoint group	Engine settings	**Related FW**	1.3.0
Range [units]	0 .. 900 [s]		
Default value	3 s	**Alternative config**	NO
Step	1 s		
Comm object	15638	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Visible only if ECU is configured		
Description			
Delay for Oil temperature which is send from ECU.			

back to List of setpoints

Temperature Switch On

Setpoint group	Engine settings	**Related FW**	1.3.0
Range [units]	the range is define by sensor curve (analog or ECU)		
Default value	the value is defined by sensor curve (analog or ECU)	**Alternative config**	NO
Step	the step is defined by sensor curve (analog or ECU)		
Comm object	8688	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Visible only if the logical binary output **TEMPERATURE SWITCH (PAGE 726)** is configured.		
Description			

Threshold level for switching the binary output **TEMPERATURE SWITCH (PAGE 726)** on.

Note: *Value from analog input has higher priority than ECU.*

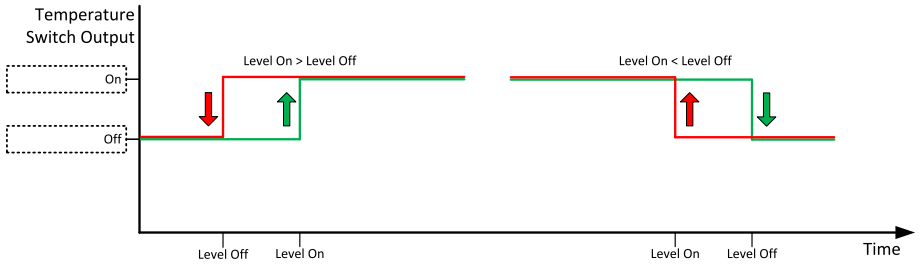


Image 8.17 Temperature Switch

back to List of setpoints

Temperature Switch Off

Setpoint group	Engine settings	**Related FW**	1.3.0
Range [units]	the range is define by sensor curve (analog or ECU)		
Default value	the value is defined by sensor curve (analog or ECU)	**Alternative config**	NO
Step	the step is defined by sensor curve (analog or ECU)		
Comm object	8689	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Visible only if the logical binary output **TEMPERATURE SWITCH (PAGE 726)** is configured.		
Description			

Threshold level for switching the binary output **TEMPERATURE SWITCH (PAGE 726)** off.

Note: *Value from analog input has higher priority than ECU.*

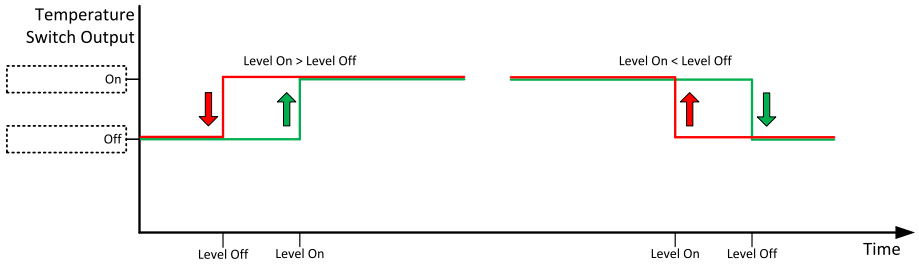


Image 8.18 Temperature Switch

back to List of setpoints

Coolant Temperature Low Wrn

Setpoint group	Engine settings	**Related FW**	1.3.0
Range [units]	the range is defined by analog sensor curve		
Default value	the value is defined by analog sensor curve	**Alternative config**	YES
Step	the step is defined by analog sensor curve		
Comm object	9684	**Related applications**	MINT, SPtM
Config level	Advanced		
Setpoint visibility	Visible only if the logical analog input **COOLANT TEMP (PAGE 756)** is configured		
Description			

Threshold level for lower limit of **COOLANT TEMP (PAGE 756)**.

back to List of setpoints

Coolant Temperature Low Delay

Setpoint group	Engine settings	**Related FW**	1.3.0
Range [units]	0 .. 900 [s]		
Default value	5 s	**Alternative config**	YES
Step	1 s		
Comm object	10270	**Related applications**	MINT, SPtM
Config level	Advanced		
Setpoint visibility	Visible only if the logical analog input **COOLANT TEMP (PAGE 756)** is configured		
Description			
Delay for **Coolant Temperature Low Wrn (page 288)**.			

back to List of setpoints

Fuel Level Wrn

Setpoint group	Engine settings	**Related FW**	1.3.0
Range [units]	the range is defined by analog sensor curve		
Default value	the value is defined by analog sensor curve	**Alternative config**	NO
Step	the step is defined by analog sensor curve		
Comm object	12897	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Visible only if the logical analog input **FUEL LEVEL (PAGE 757)** is configured		
Description			
Warning or history threshold level for **FUEL LEVEL (PAGE 757)**.			

back to List of setpoints

Fuel Level Sd

Setpoint group	Engine settings	**Related FW**	1.3.0
Range [units]	the range is defined by analog sensor curve		
Default value	the value is defined by analog sensor curve	**Alternative config**	NO
Step	the step is defined by analog sensor curve		
Comm object	12898	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Visible only if the logical analog input **FUEL LEVEL (PAGE 757)** is configured		
Description			
Shutdown or BOC threshold level for **FUEL LEVEL (PAGE 757)**.			

back to List of setpoints

Fuel Level Delay

Setpoint group	Engine settings	**Related FW**	1.3.0
Range [units]	0 .. 900 [s]		
Default value	10 s	**Alternative config**	NO
Step	1 s		
Comm object	14343	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Visible only if the logical analog input **FUEL LEVEL (PAGE 757)** is configured or logical binary input **FUEL LEVEL (PAGE 651)** is configured		
Description			
Delay for **FUEL LEVEL (PAGE 757)**.			

back to List of setpoints

ECU Fuel Level Wrn

Setpoint group	Engine settings	**Related FW**	1.3.0
Range [units]	the range is defined by ECU sensor curve		
Default value	the value is defined by ECU sensor curve	**Alternative config**	NO
Step	the step is defined by ECU sensor curve		
Comm object	14432	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Visible only if ECU is configured		
Description			
Warning threshold level for Fuel level which is send from ECU.			

back to List of setpoints

ECU Fuel Level Sd

Setpoint group	Engine settings	**Related FW**	1.3.0
Range [units]	the range is defined by ECU sensor curve		
Default value	the value is defined by ECU sensor curve	**Alternative config**	NO
Step	the step is defined by ECU sensor curve		
Comm object	14431	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Visible only if ECU is configured		
Description			
Shutdown or BOC threshold level for Fuel level which is send from ECU.			

back to List of setpoints

ECU Fuel Level Delay

Setpoint group	Engine settings	**Related FW**	1.3.0
Range [units]	0 .. 900 [s]		
Default value	10 s	**Alternative config**	NO
Step	1 s		
Comm object	14433	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Visible only if ECU is configuredd		
Description			
Delay for Fuel level which is send from ECU.			

back to List of setpoints

Fuel Tank Volume

Setpoint group	Engine settings	**Related FW**	1.3.0
Range [units]	0 .. 10 000 [l]		
Default value	200 l	**Alternative config**	YES
Step	1 l		
Comm object	11103	**Related applications**	MINT, SPtM
Config level	Advanced		
Setpoint visibility	Visible only if the logical analog input **FUEL LEVEL (PAGE 757)** is or ECU is configured		
Description			
Define a capacity of gen-set fuel tank.			

back to List of setpoints

Maximal Fuel Drop

Setpoint group	Engine settings	**Related FW**	1.3.0
Range [units]	Disabled / 1 .. 50 [%/h]		
Default value	25 %/h	**Alternative config**	NO
Step	1%/h		
Comm object	12373	**Related applications**	MINT, SPtM
Config level	Advanced		
Setpoint visibility	Always		
Description			
Setpoint indicates the maximum allowable drop of fuel in fuel tank per running hour. When the engine is not running the maximal allowed fuel drop-off is preset to 5% of total tank volume per hour.			

back to List of setpoints

Maximal Fuel Drop Delay

Setpoint group	Engine settings	**Related FW**	1.3.0
Range [units]	0 .. 600 [s]		
Default value	5 s	**Alternative config**	NO
Step	s		
Comm object	14683	**Related applications**	MINT, SPtM
Config level	Advanced		
Setpoint visibility	Always		
Description			
When the value of fuel drop per hour is higher than **Maximal Fuel Drop (page 291)** this delay stars count down. After count down of this delay alarm **Wrn Fuel Theft (page 787)** is activated.			

back to List of setpoints

Fuel Pump On

Setpoint group	Engine settings	**Related FW**	1.3.0
Range [units]	0 .. **Fuel Pump Off (page 293)** [%]		
Default value	20 %	**Alternative config**	NO
Step	1 %		
Comm object	10100	**Related applications**	MINT, SPtM
Config level	Advanced		
Setpoint visibility	Visible only if the logical binary output **FUEL PUMP (PAGE 699)** is configured and logical binary input **FUEL PUMP ON/OFF (PAGE 651)** isn't configured		
Description			
Threshold level for switching the binary output **FUEL PUMP (PAGE 699)** on.			

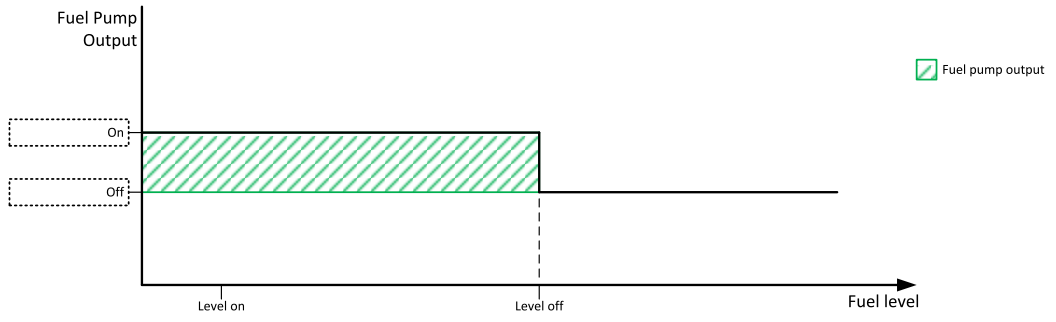


Image 8.19 Fuel Pump On

IMPORTANT: When binary input FUEL PUMP ON/OFF (PAGE 651) is configured then binary output FUEL PUMP (PAGE 699) is control by this binary input. Setpoints Fuel Pump On and Fuel Pump Off (page 293) are not evaluated!

Note: *Value from analog input has higher priority than ECU.*

Note: *This setpoint is visible only if the logical binary output FUEL PUMP (PAGE 699) is configured.*

back to List of setpoints

Fuel Pump Off

Setpoint group	Engine settings	**Related FW**	1.3.0
Range [units]	**Fuel Pump On (page 292)** .. 100 [%]		
Default value	90 %	**Alternative config**	NO
Step	1 %		
Comm object	10101	**Related applications**	MINT, SPtM
Config level	Advanced		
Setpoint visibility	Visible only if the logical binary output **FUEL PUMP (PAGE 699)** is configured and logical binary input **FUEL PUMP ON/OFF (PAGE 651)** isn't configured		

Description

Threshold level for switching the binary output **FUEL PUMP (PAGE 699)** off.

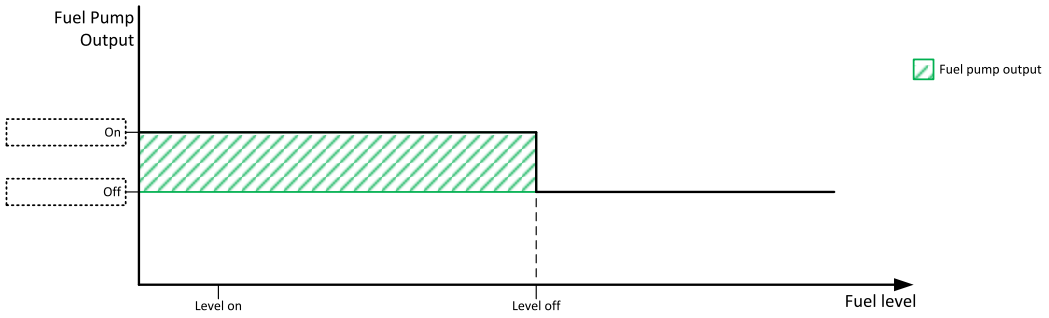


Image 8.20 Fuel Pump Off

> **IMPORTANT: When binary input FUEL PUMP ON/OFF (PAGE 651) is configured then binary output FUEL PUMP (PAGE 699) is control by this binary input. Setpoints Fuel Pump On (page 292) and Fuel Pump Off are not evaluated!**

Note: *Value from analog input has higher priority than ECU.*

Note: *This setpoint is visible only if the logical binary output FUEL PUMP (PAGE 699) is configured.*

back to List of setpoints

Transfer Wrn Delay

Setpoint group	Engine settings	**Related FW**	1.3.0
Range [units]	Disabled / 1 .. 600 [s]		
Default value	30 s	**Alternative config**	YES
Step	1 s		
Comm object	10685	**Related applications**	MINT, SPtM
Config level	Advanced		
Setpoint visibility	Visible only if the logical binary output **FUEL PUMP (PAGE 699)** is configured		
Description			
If the controller does not see the fuel increase during fuel transfer within this time alarm **Wrn Fuel Transfer Failed (page 802)** will be displayed and the **FUEL PUMP (PAGE 699)** will be turned off. Alarm **Wrn Fuel Transfer Failed (page 802)** will be displayed but this alarm becomes immediately inactive and it will be possible to delete this message by the Fault reset button. If the fault is deleted the controller will initiate the transfer again.			

back to List of setpoints

Subgroup: Battery Protections

Battery Undervoltage

Setpoint group	Engine settings	**Related FW**	1.3.0
Range [units]	8,0 V .. **Battery Overvoltage (page 294)** [V]		
Default value	18,0 V	**Alternative config**	NO
Step	0,1 V		
Comm object	8387	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Always		
Description			
Warning threshold for low battery voltage.			

back to List of setpoints

Battery Overvoltage

Setpoint group	Engine settings	**Related FW**	1.3.0
Range [units]	**Battery Undervoltage (page 294)** .. 40,0 [V]		
Default value	36,0 V	**Alternative config**	NO
Step	0,1 V		
Comm object	9587	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Always		
Description			
Warning threshold for high battery voltage.			

back to List of setpoints

Battery <> Voltage Delay

Setpoint group	Engine settings	**Related FW**	1.3.0
Range [units]	0 .. 600 [s]		
Default value	5 s	**Alternative config**	NO
Step	1 s		
Comm object	8383	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Always		
Description			
Delay for **Battery Undervoltage (page 294)** and **Battery Overvoltage (page 294)** protection.			

back to List of setpoints

Battery Charger Fail Delay

Setpoint group	Engine settings	**Related FW**	1.3.0
Range [units]	0 .. 15 [min]		
Default value	5 min	**Alternative config**	NO
Step	1 min		
Comm object	11374	**Related applications**	MINT, SPtM
Config level	Advanced		
Setpoint visibility	Conditioned with LBI **BATTERY CHARGER (PAGE 628)**		
Description			
Delay for LBI **BATTERY CHARGER (PAGE 628)**.			

back to List of setpoints

Subgroup: Maintenance

Maintenance Timer 1

Setpoint group	Engine settings	**Related FW**	1.3.0
Range [units]	-10 000 ... 9 999 [h] / Disabled		
Default value	1 000 h	**Alternative config**	NO
Step	1 h		
Comm object	10528	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Always		
Description			
Maintenance timer 1 counts down when engine is running. If reaches zero, an alarm appears, but the timer still counting down into negative values. When the value 10000 is set, than the Maintenance function is disabled and counter does not count. Counter value disappear from controllers statistics.			

back to List of setpoints

Maintenance Timer 2

Setpoint group	Engine settings	**Related FW**	1.3.0
Range [units]	-10 000 ... 9 999 [h] / Disabled		
Default value	1 000 h	**Alternative config**	NO
Step	1 h		
Comm object	10529	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Always		
Description			
Maintenance timer 2 counts down when engine is running. If reaches zero, an alarm appears, but the timer still counting down into negative values. When the value 10000 is set, than the Maintenance function is disabled and counter does not count. Counter value disappear from controllers statistics.			

back to List of setpoints

Maintenance Timer 3

Setpoint group	Engine settings	**Related FW**	1.3.0
Range [units]	-10 000 ... 9 999 [h] / Disabled		
Default value	1 000 h	**Alternative config**	NO
Step	1 h		
Comm object	10530	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Always		
Description			
Maintenance timer 3 counts down when engine is running. If reaches zero, an alarm appears, but the timer still counting down into negative values. When the value 10000 is set, than the Maintenance function is disabled and counter does not count. Counter value disappear from controllers statistics.			

back to List of setpoints

Maintenance Timer 4

Setpoint group	Engine settings	**Related FW**	1.3.0
Range [units]	[DD/MM/YYYY]		
Default value	01/01/2015	**Alternative config**	NO
Step	1 day		
Comm object	16384	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Always		
Description			
This maintenance timer is based on date. At the midnight of the last day the alarm Wrn Maintenance 4 (page 793) appears in alarmlist. **IMPORTANT: To disable this maintenance timer, set date to 01/01/2015.**			

back to List of setpoints

Maintenance Timer 5

Setpoint group	Engine settings	**Related FW**	1.3.0
Range [units]	[DD/MM/YYYY]		
Default value	01/01/2015	**Alternative config**	NO
Step	1 day		
Comm object	16385	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Always		
Description			

This maintenance timer is based on date. At the midnight of the last day the alarm **Wrn Maintenance 5** (page 793) appears in alarmlist.

> **IMPORTANT: To disable this maintenance timer, set date to 01/01/2015.**

back to List of setpoints

Maintenance Timer 6

Setpoint group	Engine settings	**Related FW**	1.3.0
Range [units]	[DD/MM/YYYY]		
Default value	01/01/2015	**Alternative config**	NO
Step	1 day		
Comm object	16386	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Always		
Description			

This maintenance timer is based on date. At the midnight of the last day the alarm **Wrn Maintenance 6** (page 793) appears in alarmlist.

> **IMPORTANT: To disable this maintenance timer, set date to 01/01/2015.**

back to List of setpoints

Group: Generator settings

Subgroup: Overload Protection

Overload BOC

Setpoint group	Generator settings	**Related FW**	1.3.0
Range [units]	**Overload Wrn (page 298)** .. 200 [%]		
Default value	120 %	**Alternative config**	NO
Step	1 % of **Nominal Power (page 252)**		
Comm object	8280	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Always		
Description			
Threshold level for generator overload (in % of Nominal power) protection. Protection is BOC (Breaker Open and gen-set Cooldown). ***Note:*** *When there is no control of breakers, the type of protection is Sd not BOC.*			

back to List of setpoints

Overload Wrn

Setpoint group	Generator settings	**Related FW**	1.3.0
Range [units]	0 .. **Overload BOC (page 298)** [%]		
Default value	120 %	**Alternative config**	NO
Step	1 % of **Nominal Power (page 252)**		
Comm object	9685	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Always		
Description			
Threshold level for generator overload (in % of Nominal power) protection. This is only warning.			

back to List of setpoints

Overload Delay

Setpoint group	Generator settings	**Related FW**	1.3.0
Range [units]	0,0 .. 600,0 [s]		
Default value	5,0 s	**Alternative config**	NO
Step	0,1 s		
Comm object	8281	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Always		
Description			
Delay for **Overload BOC (page 298)****Overload BOC (page 298)** and **Overload Wrn (page 298)** protection.			

back to List of setpoints

Subgroup: Underload Protection

Minimal Power PTM

Setpoint group	Generator settings	**Related FW**	1.3.0
Range [units]	0 .. 100 [%]		
Default value	5 %	**Alternative config**	NO
Step	1 % of **Nominal Power (page 252)**		
Comm object	9241	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Always		
Description			
Minimal power of the gen-set. Value of this setpoint is used in **Load Control PTM (page 240)**.			

back to List of setpoints

Subgroup: Current Protection

Short Circuit BOC

Setpoint group	Generator settings	**Related FW**	1.3.0
Range [units]	100 .. 500 [%]		
Default value	250 %	**Alternative config**	NO
Step	1 % of **Nominal Current (page 253)**		
Comm object	8282	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Always		
Description			
BOC occurs when generator current reaches this preset threshold. ***Note:*** *When there is no control of breakers, the type of protection is Sd not BOC.*			

back to List of setpoints

Short Circuit BOC Delay

Setpoint group	Generator settings	**Related FW**	1.3.0
Range [units]	0,00 .. 10,00 [s]		
Default value	0,04 s	**Alternative config**	YES
Step	0,01 s		
Comm object	9991	**Related applications**	MINT, SPtM
Config level	Advanced		
Setpoint visibility	Always		
Description			
Delay for **Short Circuit BOC (page 299)** protection.			

back to List of setpoints

IDMT Overcurrent Delay

Setpoint group	Generator settings	**Related FW**	1.3.0
Range [units]	1,0 .. 600,0 [s]		
Default value	4,0 s	**Alternative config**	NO
Step	0,1 s		
Comm object	8283	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Always		
Description			

IDMT curve shape selection. IDMT Overcurrent Delay is a reaction time of IDMT protection for 200% overcurrent I_{gen} =2***Nominal Current (page 253)**

IDMT is “very inverse” over current protection. Reaction time is not constant but depends on over current level according to the following formula:

$$\text{Reaction ??? time} = \frac{\text{Overcurrent IDMT ?? Delay} * \text{Nominal ?? ?? Current}}{I_{gen} \text{ ?? Nominal ?? Current}}$$

***Note:** Reaction time is limited to 3600 s = 60 minutes. IDMT protection is not active for Reaction time values longer than 60 minutes.*

I_{gen} is maximal value of all measured phases of generator current.

Table 8.1 EXAMPLE of Reaction time for different over current levels

	Overcurrent IDMT Delay	Overcurrent		
		≤ 100 %	101 %	110 %
Reaction time	0,2 s	No action	20 s	2 s
	2 s	No action	200 s	20 s
	20 s	No action	2000 s	200 s

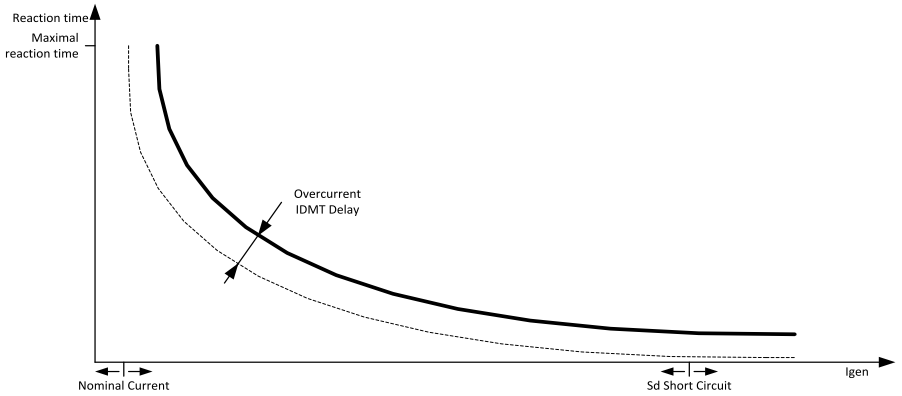


Image 8.21 IDMT Overcurrent Delay

back to List of setpoints

Current Unbalance BOC

Setpoint group	Generator settings	**Related FW**	1.3.0
Range [units]	1 .. 200 [%] of **Nominal Current (page 253)**		
Default value	50 %	**Alternative config**	NO
Step	1 % of **Nominal Current (page 253)**		
Comm object	8284	**Related applications**	MINT, SPtM
Config level	Advanced		
Setpoint visibility	Conditioned by the setpoint **Connection type (page 254)**		
Description			
Threshold for generator current asymmetry (unbalance). Protection is BOC (Breaker Open and genset Cooldown). ***Note:*** *When there is no control of breakers, the type of protection is Sd not BOC.*			

back to List of setpoints

Current Unbalance BOC Delay

Setpoint group	Generator settings	**Related FW**	1.3.0
Range [units]	0,0 .. 600,0 [s]		
Default value	5,0 s	**Alternative config**	NO
Step	0,1 s		
Comm object	8285	**Related applications**	MINT, SPtM
Config level	Advanced		
Setpoint visibility	Conditioned by the setpoint **Connection type (page 254)**		
Description			
Delay for **Current Unbalance BOC (page 301)** protection.			

back to List of setpoints

Subgroup: Voltage Protection

Generator Overvoltage Sd

Setpoint group	Generator settings	**Related FW**	1.3.0
Range [units]	**Generator Overvoltage Wrn (page 302)** .. 200 [%]		
Default value	110 %	**Alternative config**	NO
Step	1 % of **Nominal Voltage Ph-N (page 256)** or **Nominal Voltage Ph-Ph (page 256)**		
Comm object	8291	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Always		
Description			
Threshold for generator overvoltage protection. All three phases are checked. Maximum out of three is used. ***Note:*** *Phase to phase and phase to neutral voltages are used for this protection.*			

back to List of setpoints

Generator Overvoltage Wrn

Setpoint group	Generator settings	**Related FW**	1.3.0
Range [units]	**Generator Undervoltage Wrn (page 303)** .. **Generator Overvoltage Sd (page 301)** [%]		
Default value	110 %	**Alternative config**	NO
Step	1 % of **Nominal Voltage Ph-N (page 256)** or **Nominal Voltage Ph-Ph (page 256)**		
Comm object	9686	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Always		
Description			
Threshold for generator overvoltage protection. All three phases are checked. Maximum out of three is used. ***Note:*** *Phase to phase and phase to neutral voltages are used for this protection.*			

back to List of setpoints

Generator Undervoltage BOC

Setpoint group	Generator settings	**Related FW**	1.3.0
Range [units]	0 .. **Generator Undervoltage Wrn (page 303)** [%]		
Default value	70 %	**Alternative config**	NO
Step	1 % of **Nominal Voltage Ph-N (page 256)** or **Nominal Voltage Ph-Ph (page 256)**		
Comm object	8293	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Always		
Description			
Threshold for generator undervoltage protection. All three phases are checked. Minimum out of three is used. ***Note:*** *Phase to phase and phase to neutral voltages are used for this protection.* ***Note:*** *When there is no control of breakers, the type of protection is Sd not BOC.*			

back to List of setpoints

Generator Undervoltage Wrn

Setpoint group	Generator settings	**Related FW**	1.3.0
Range [units]	**Generator Undervoltage BOC (page 302)** .. **Generator Overvoltage Wrn (page 302)** [%]		
Default value	70 %	**Alternative config**	NO
Step	1 % of **Nominal Voltage Ph-N (page 256)** or **Nominal Voltage Ph-Ph (page 256)**		
Comm object	9687	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Always		
Description			
Threshold for generator undervoltage protection. All three phases are checked. Minimum out of three is used. ***Note:*** *Phase to phase and phase to neutral voltages are used for this protection.*			

back to List of setpoints

Generator <> Voltage Delay

Setpoint group	Generator settings	**Related FW**	1.3.0
Range [units]	0,0 .. 600,0 [s]		
Default value	3,0 s	**Alternative config**	NO
Step	0,1 s		
Comm object	9103	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Always		
Description			
Delay for **Generator Overvoltage Sd (page 301)**, **Generator Overvoltage Wrn (page 302)**, **Generator Undervoltage BOC (page 302)** and **Generator Undervoltage Wrn (page 303)** protection.			

back to List of setpoints

Voltage Unbalance BOC

Setpoint group	Generator settings	**Related FW**	1.3.0
Range [units]	1 .. 200 [%] of **Nominal Voltage Ph-Ph (page 256)**		
Default value	10 %	**Alternative config**	NO
Step	1 % of **Nominal Voltage Ph-Ph (page 256)**		
Comm object	8288	**Related applications**	MINT, SPtM
Config level	Advanced		
Setpoint visibility	Conditioned by the setpoint **Connection type (page 254)**		
Description			
Threshold for generator voltage unbalance alarm. ***Note:*** *When there is no control of breakers, the type of protection is Sd not BOC.*			

back to List of setpoints

Voltage Unbalance BOC Delay

Setpoint group	Generator settings	**Related FW**	1.3.0
Range [units]	0,0 .. 600,0 [s]		
Default value	3,0 s	**Alternative config**	NO
Step	0,1 s		
Comm object	8289	**Related applications**	MINT, SPtM
Config level	Advanced		
Setpoint visibility	Conditioned by the setpoint **Connection type (page 254)**		
Description			
Delay for **Voltage Unbalance BOC (page 303)** protection.			

back to List of setpoints

Subgroup: Frequency Protection

Generator Overfrequency BOC

Setpoint group	Generator settings	**Related FW**	1.3.0
Range [units]	**Generator Overfrequency Wrn (page 304)** .. 200,0 [%]		
Default value	110,0 %	**Alternative config**	NO
Step	0,1 % of **Nominal Frequency (page 257)**		
Comm object	8296	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Always		
Description			
Threshold for generator phase L1 overfrequency. ***Note:*** *When there is no control of breakers, the type of protection is Sd not BOC.*			

back to List of setpoints

Generator Overfrequency Wrn

Setpoint group	Generator settings	**Related FW**	1.3.0
Range [units]	**Generator Underfrequency Wrn (page 305)** .. **Generator Overfrequency BOC (page 304)** [%]		
Default value	110,0 %	**Alternative config**	NO
Step	0,1 % of **Nominal Frequency (page 257)**		
Comm object	9688	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Always		
Description			
Threshold for generator phase L1 overfrequency.			

back to List of setpoints

Generator Underfrequency BOC

Setpoint group	Generator settings	**Related FW**	1.3.0
Range [units]	0,0 .. **Generator Underfrequency Wrn (page 305)** [%]		
Default value	85,0 %	**Alternative config**	NO
Step	0,1 % of **Nominal Frequency (page 257)**		
Comm object	8298	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Always		
Description			
Threshold for generator phase L1 underfrequency. ***Note:*** *When there is no control of breakers, the type of protection is Sd not BOC.*			

back to List of setpoints

Generator Underfrequency Wrn

Setpoint group	Generator settings	**Related FW**	1.3.0
Range [units]	**Generator Underfrequency BOC (page 305)** .. **Generator Overfrequency Wrn (page 304)** [%]		
Default value	85,0 %	**Alternative config**	NO
Step	0,1 % of **Nominal Frequency (page 257)**		
Comm object	9689	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Always		
Description			
Threshold for generator phase L1 underfrequency.			

back to List of setpoints

Generator <> Frequency Delay

Setpoint group	Generator settings	**Related FW**	1.3.0
Range [units]	0,0 .. 600,0 [s]		
Default value	3,0 s	**Alternative config**	NO
Step	0,1 s		
Comm object	8297	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Always		
Description			
Delay for **Generator Overfrequency BOC (page 304)**, **Generator Overfrequency Wrn (page 304)**, **Generator Underfrequency Wrn (page 305)** and **Generator Underfrequency BOC (page 305)** protection.			

back to List of setpoints

Subgroup: Reverse Power Protection

Reverse Power Level

Setpoint group	Generator settings	**Related FW**	1.3.0
Range [units]	0 .. 50 [%]		
Default value	10 %	**Alternative config**	NO
Step	1 % of **Nominal Power (page 252)**		
Comm object	8486	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Conditioned by the setpoint **Reverse Power Protection (page 312)**.		
Description			
Level for generator **Reverse Power Protection (page 312)**.			

back to List of setpoints

Reverse Power Delay

Setpoint group	Generator settings	**Related FW**	1.3.0
Range [units]	0,0 .. 600 [s]		
Default value	5,0 s	**Alternative config**	NO
Step	0,1 s		
Comm object	8552	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Conditioned by the setpoint **Reverse Power Protection (page 312)**.		
Description			
Delay for generator **Reverse Power Protection (page 312)**.			

back to List of setpoints

Subgroup: Excitation Loss Protection

Excitation Loss Level

Setpoint group	Generator settings	**Related FW**	1.3.0
Range [units]	0 .. 150 [%]		
Default value	30 %	**Alternative config**	NO
Step	1 % of **Nominal Power (page 252)**		
Comm object	12486	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Conditioned by the setpoint **Excitation Loss Protection (page 313)**.		
Description			
Level for generator **Excitation Loss Protection (page 313)**.			

back to List of setpoints

Excitation Loss Delay

Setpoint group	Generator settings	**Related FW**	1.3.0
Range [units]	0,0 .. 600,0 [s]		
Default value	5,0 s	**Alternative config**	NO
Step	0,1 s		
Comm object	12487	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Conditioned by the setpoint **Excitation Loss Protection (page 313)**.		
Description			
Delay for generator **Excitation Loss Protection (page 313)**.			

back to List of setpoints

Group: Protections

Subgroup: Overload Protection

Overload Protection

Setpoint group	Protections	**Related FW**	1.3.0
Range [units]	Enabled/Disabled/ExtDisable [-]		
Default value	Enabled	**Alternative config**	NO
Step	[-]		
Comm object	15664	**Related applications**	MINT, SPtM
Config level	Advanced		
Setpoint visibility	Always		
Description			

This setpoint adjusts the behavior of generator Overload protection.

Enabled:	Protection is enabled. Behavior of protection is adjusted via setpoints **Overload BOC (page 298)**, **Overload Wrn (page 298)** and **Overload Delay (page 298)**.
Disabled:	Protection is disabled.
ExtDisable:	Protection is enabled or disabled by the state of LBI **Force Protection Disable (page 651)**

back to List of setpoints

Subgroup: Current Protection

IDMT Overcurrent Protection

Setpoint group	Protections	**Related FW**	1.3.0
Range [units]	Enabled / Disabled / ExtDisable[-]		
Default value	Enabled	**Alternative config**	NO
Step	[-]		
Comm object	15666	**Related applications**	MINT, SPtM
Config level	Advanced		
Setpoint visibility	Always		
Description			

This setpoint adjusts the behavior of generator IDMT Overcurrent protection.

Enabled:	Protection is enabled. Behavior of protection is adjusted via setpoint **IDMT Overcurrent Delay (page 300)**.
Disabled:	Protection is disabled.

back to List of setpoints

Current Unbalance Protection

Setpoint group	Protections	**Related FW**	1.3.0
Range [units]	Enabled / Disabled / ExtDisable[-]		
Default value	Enabled	**Alternative config**	NO
Step	[-]		
Comm object	15667	**Related applications**	MINT, SPtM
Config level	Advanced		
Setpoint visibility	Always		
Description			

This setpoint adjusts the behavior of generator Current Unbalance protection.

Enabled:	Protection is enabled. Behavior of protection is adjusted via setpoints **Current Unbalance BOC (page 301)** and **Current Unbalance BOC Delay (page 301)**.
Disabled:	Protection is disabled.
ExtDisable:	Protection is enabled or disabled by the state of LBI **Force Protection Disable (page 651)**

back to List of setpoints

Subgroup: Voltage Protection

Generator <> Voltage Protection

Setpoint group	Protections	**Related FW**	1.3.0
Range [units]	Enabled / Disabled / ExtDisable [-]		
Default value	Enabled	**Alternative config**	NO
Step	[-]		
Comm object	15668	**Related applications**	MINT, SPtM
Config level	Advanced		
Setpoint visibility	Always		
Description			

This setpoint adjusts the behavior of generator Generator <> Voltage protection. GCB closing is blocked, if the protection is disabled!

Enabled:	Protection is enabled. Behavior of protection is adjusted via setpoints **Generator Overvoltage Sd (page 301)**, **Generator Overvoltage Wrn (page 302)**, **Generator Undervoltage BOC (page 302)**, **Generator Undervoltage Wrn (page 303)** and **Generator <> Voltage Delay (page 303)**.
Disabled:	Protection is disabled.
ExtDisable:	Protection is enabled or disabled by the state of LBI **Force Protection Disable (page 651)**

GCB closing, generator voltage regulation and synchronization are disabled (blocked), if the parameter is set to Disabled. It is blocked as well, if the parameter is set to ExtDisable and LB I**Force Protection Disable (page 651)** is active.

back to List of setpoints

Voltage Unbalance Protection

Setpoint group	Protections	**Related FW**	1.3.0
Range [units]	Enabled / Disabled / ExtDisable [-]		
Default value	Enabled	**Alternative config**	NO
Step	[-]		
Comm object	15669	**Related applications**	MINT, SPtM
Config level	Advanced		
Setpoint visibility	Always		
Description			

This setpoint adjusts the behavior of generator Voltage Unbalance protection.

Enabled:	Protection is enabled. Behavior of protection is adjusted via setpoints **Voltage Unbalance BOC (page 303)** and **Voltage Unbalance BOC Delay (page 304)**.
Disabled:	Protection is disabled.
ExtDisable:	Protection is enabled or disabled by the state of LBI **Force Protection Disable (page 651)**

back to List of setpoints

Bus Measurement Error Protection

Setpoint group	Protections	**Related FW**	1.3.0
Range [units]	Enabled / Disabled / ExtDisable [-]		
Default value	Enabled	**Alternative config**	NO
Step	[-]		
Comm object	10558	**Related applications**	MINT,
Config level	Advanced		
Setpoint visibility	Always		

Description

This setpoint adjusts the behavior of bus measurement error protection.

Enabled:	Bus Measurement error is detected when the voltage on controller's bus terminals is out of limits 20 seconds after: ▶ GCB (own) was closed in MAN or AUTO mode. ▶ MCB (feedback) was closed in AUTO mode. ▶ Any other GCB in power management group (on CAN bus) was closed. The alarm is activated after 20s. However, the GCB (own) closing is blocked immediately for safety reasons.
Disabled:	Protection is disabled.
ExtDisable:	Protection is enabled or disabled by the state of LBI **FORCE PROTECTION DISABLE (PAGE 651)**

back to List of setpoints

Generator Frequency Protection

Setpoint group	Protections	**Related FW**	1.3.0
Range [units]	Enabled / Disabled / ExtDisable [-]		
Default value	Enabled	**Alternative config**	NO
Step	[-]		
Comm object	15670	**Related applications**	MINT, SPtM
Config level	Advanced		
Setpoint visibility	Always		
Description			

This setpoint adjusts the behavior of generator Generator Frequency protection. GCB closing is blocked, if the protection is disabled!.

Enabled:	Protection is enabled. Behavior of protection is adjusted via setpoints **Generator Overfrequency BOC (page 304)**, **Generator Overfrequency Wrn (page 304)**, **Generator Underfrequency BOC (page 305)**, **Generator Underfrequency Wrn (page 305)**, and **Generator <> Frequency Delay (page 305)**.
Disabled:	Protection is disabled.
ExtDisable:	Protection is enabled or disabled by the state of LBI **Force Protection Disable (page 651)**

GCB closing, generator frequency regulation and synchronization are disabled (blocked), if the parameter is set to Disabled. It is blocked as well, if the parameter is set to ExtDisable and LBI **Force Protection Disable (page 651)** is active.

back to List of setpoints

Subgroup: Reverse Power Protection

Reverse Power Protection

Setpoint group	Protections	**Related FW**	1.3.0
Range [units]	Enabled / Disabled / ExtDisable [-]		
Default value	Enabled	**Alternative config**	NO
Step	[-]		
Comm object	13230	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Always		
Description			

The protection of the generator against the reverse (negative) active power. Protection gets active when the level of active power [kW] gets under limit given by setpoint **Reverse Power Level (page 306)** for time longer than the value of setpoint **Reverse Power Delay (page 306)**.

This setpoint adjusts behavior of generator Reverse power protection.

Enabled:	Protection is enabled. Behavior of protection is adjusted via setpoints **Reverse Power Level (page 306)**, **Reverse Power Delay (page 306)**
Disabled:	Protection is disabled.
ExtDisable:	Protection is enabled or disabled by the state of LBI **Force Protection Disable (page 651)**

back to List of setpoints

Subgroup: Excitation Loss Protection

Excitation Loss Protection

Setpoint group	Protections	**Related FW**	1.3.0
Range [units]	Enabled / Disabled / ExtDisable [-]		
Default value	Disabled	**Alternative config**	NO
Step	[-]		
Comm object	13269	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Always		
Description			

The protection protect the generator against negative value of reactive power. Protection gets active when the level of reactive power [kVAr] gets under limit given by setpoint **Excitation Loss Level (page 306)** for time longer than the value of setpoint **Excitation Loss Delay (page 307)**.

Enabled:	Protection is enabled. Behavior of protection is adjusted via setpoints **Excitation Loss Level (page 306)**, **Excitation Loss Delay (page 307)**
Disabled:	Protection is disabled.
ExtDisable:	Protection is enabled or disabled by the state of LBI **FORCE PROTECTION DISABLE (PAGE 651)**

back to List of setpoints

Subgroup: Speed Protection

Underspeed Protection

Setpoint group	Protections	**Related FW**	1.3.0
Range [units]	Enabled / Disabled / ExtDisable [-]		
Default value	Enabled	**Alternative config**	NO
Step	[-]		
Comm object	15671	**Related applications**	MINT, SPtM
Config level	Advanced		
Setpoint visibility	Always		
Description			

This setpoint adjusts the behavior of generator Underspeed protection.

Enabled:	Protection is enabled.
Disabled:	Protection is disabled.
ExtDisable:	Protection is enabled or disabled by the state of LBI **FORCE PROTECTION DISABLE (PAGE 651)**

back to List of setpoints

Group: Mains settings

Subgroup: AMF Timers

Emergency Start Delay

Setpoint group	Mains settings	**Related FW**	1.3.0
Range [units]	0 .. 6 000 [s]		
Default value	5 s	**Alternative config**	NO
Step	1 s		
Comm object	8301	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Conditioned by the setpoint **Application Mode Select (page 239)**		
Description			
Delay after the mains failure to the start command of the gen-set.			

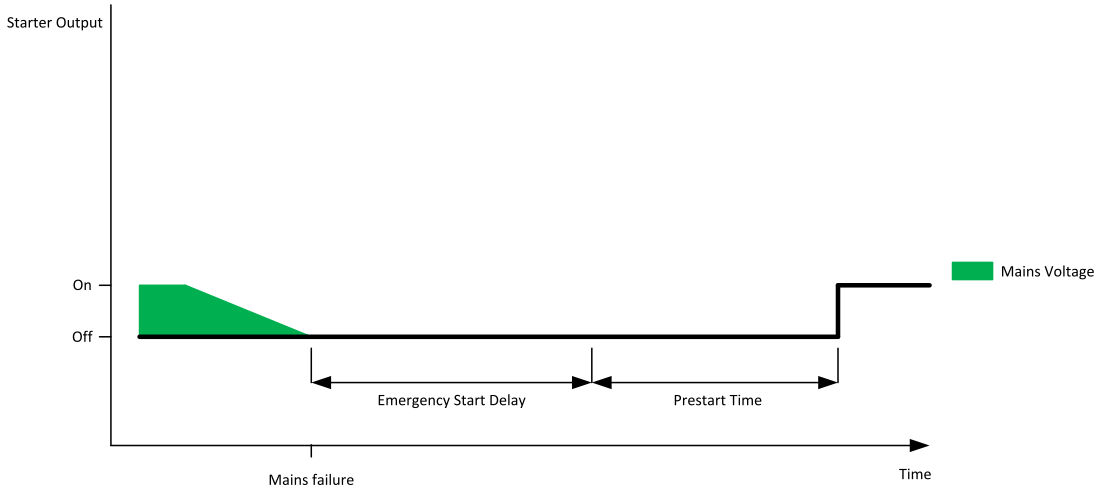


Image 8.22 Emergency Start Delay

back to List of setpoints

Mains Return Delay

Setpoint group	Mains settings	**Related FW**	1.3.0
Range [units]	1 .. 3 600 [s]		
Default value	20 s	**Alternative config**	NO
Step	1 s		
Comm object	8302	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Conditioned by the setpoint **Application Mode Select (page 239)**		
Description			
This setpoint adjust the delay, how long mains has to be returned after mains fail to start load transfer to mains.			

back to List of setpoints

MCB Close Delay

Setpoint group	Mains settings	**Related FW**	1.3.0
Range [units]	0,0 .. 600,0 [s]		
Default value	1,0 s	**Alternative config**	NO
Step	0,1 s		
Comm object	8389	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Conditioned by the setpoint **Application Mode Select (page 239)**		
Description			
Delay after mains returns to MCB closing, if the gen-set is not running(e.g. is in start-up procedure)			

back to List of setpoints

AMF Start

Setpoint group	Process ControlMains settings	**Related FW**	1.3.0
Range [units]	ENABLED / DISABLED [-]		
Default value	ENABLED	**Alternative config**	NO
Step	[-]		
Comm object	9238	**Related applications**	SPtM
Config level	Standard		
Setpoint visibility	Always		
Description			
Use this setpoint to enable or disable the **AMF operation (page 110)**.			

back to List of setpoints

Subgroup: Mains Voltage Limits

Mains Overvoltage

Setpoint group	Mains settings	**Related FW**	1.3.0
Range [units]	**Mains Undervoltage (page 316)** .. 150 [%]		
Default value	110 %	**Alternative config**	NO
Step	1 % of **Nominal Voltage Ph-Ph (page 256)**		
Comm object	8305	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Conditioned by the setpoint **Application Mode Select (page 239)**		
Description			
Threshold for mains overvoltage. All three phases are checked. Maximum out of three is used.			

back to List of setpoints

Mains Undervoltage

Setpoint group	Mains settings	**Related FW**	1.3.0
Range [units]	50 .. **Mains Overvoltage (page 315)** [%]		
Default value	60 %	**Alternative config**	YES
Step	1 % of **Nominal Voltage Ph-Ph (page 256)**		
Comm object	8307	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Conditioned by the setpoint **Application Mode Select (page 239)**		
Description			
Threshold for mains undervoltage. All three phases are checked. Minimum voltage out of three phases is used.			

back to List of setpoints

Mains < > Voltage Delay

Setpoint group	Mains settings	**Related FW**	1.3.0
Range [units]	0,0 .. 600,0 [s]		
Default value	2,0 s	**Alternative config**	YES
Step	0,1 s		
Comm object	8306	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Conditioned by the setpoint **Application Mode Select (page 239)**		
Description			
Delay for **Mains Undervoltage (page 316)** and **Mains Overvoltage (page 315)** protection.			

back to List of setpoints

Mains Voltage Unbalance

Setpoint group	Mains settings	**Related FW**	1.3.0
Range [units]	1 .. 150 [%] of **Nominal Voltage Ph-Ph (page 256)**		
Default value	10 %	**Alternative config**	NO
Step	1 % of **Nominal Voltage Ph-Ph (page 256)**		
Comm object	8446	**Related applications**	MINT, SPtM
Config level	Advanced		
Setpoint visibility	Conditioned by the setpoint **Application Mode Select (page 239)**		
Description			
Threshold for mains voltage unbalance.			

back to List of setpoints

Mains Voltage Unbalance Delay

Setpoint group	Mains settings	**Related FW**	1.3.0
Range [units]	0,0 .. 600,0 [s]		
Default value	2,0 s	**Alternative config**	NO
Step	0,1 s		
Comm object	8447	**Related applications**	MINT, SPtM
Config level	Advanced		
Setpoint visibility	Conditioned by the setpoint **Application Mode Select (page 239)**		
Description			
Delay for **Mains Voltage Unbalance (page 316)** protection.			

back to List of setpoints

Subgroup: Mains Frequency Limits

Mains Overfrequency

Setpoint group	Mains settings	**Related FW**	1.3.0
Range [units]	**Mains Underfrequency (page 317)** .. 150 [%]		
Default value	102,0 %	**Alternative config**	NO
Step	1,0 % of **Nominal Frequency (page 257)**		
Comm object	8310	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Conditioned by the setpoint **Application Mode Select (page 239)**		
Description			
Threshold for mains overfrequency.			

back to List of setpoints

Mains Underfrequency

Setpoint group	Mains settings	**Related FW**	1.3.0
Range [units]	50 .. **Mains Overfrequency (page 317)** [%]		
Default value	98,0 %	**Alternative config**	NO
Step	1,0 % of **Nominal Frequency (page 257)**		
Comm object	8312	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Conditioned by the setpoint **Application Mode Select (page 239)**		
Description			
Threshold for mains underfrequency.			

back to List of setpoints

Mains < > Frequency Delay

Setpoint group	Mains settings	**Related FW**	1.3.0
Range [units]	0,0 .. 600,0 [s]		
Default value	0,5 s	**Alternative config**	NO
Step	0,1 s		
Comm object	8311	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Conditioned by the setpoint **Application Mode Select (page 239)**		
Description			
Delay for **Mains Underfrequency (page 317)** and **Mains Overfrequency (page 317)** protection.			

back to List of setpoints

Subgroup: MCB Control

MCB Logic

Setpoint group	Mains settings	**Related FW**	1.3.0
Range [units]	Close On / Close Off [-]		
Default value	Close Off	**Alternative config**	NO
Step	[-]		
Comm object	8444	**Related applications**	MINT, SPtM
Config level	Advanced		
Setpoint visibility	Conditioned by the setpoint **Application Mode Select (page 239)**		
Description			

The set point influences the behavior of the output **MCB CLOSE/OPEN (PAGE 711)**.

Close On When the output **MCB CLOSE/OPEN (PAGE 711)** is closed – MCB should be closed.

Close Off When the output **MCB CLOSE/OPEN (PAGE 711)** is closed – MCB should be opened.

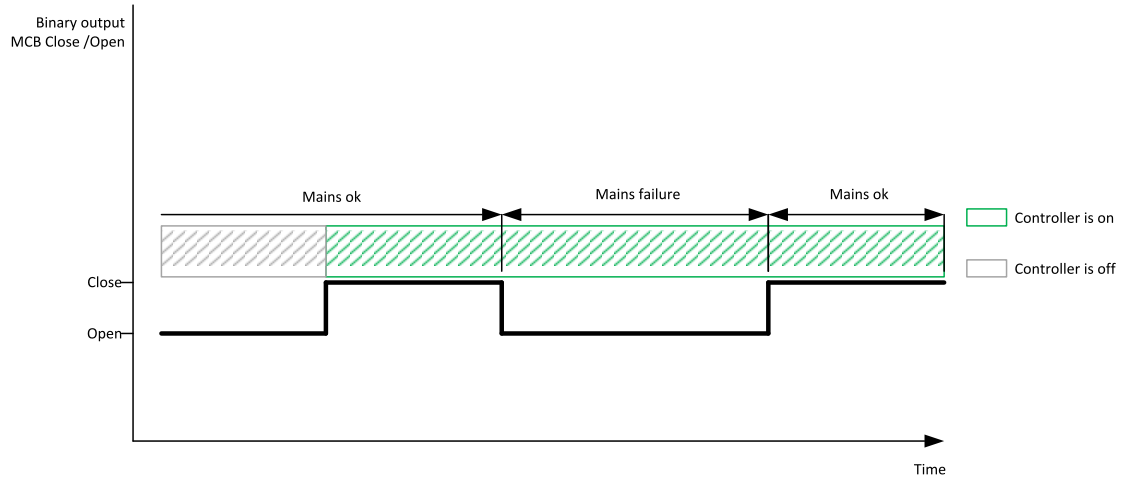


Image 8.23 MCB Logic 1

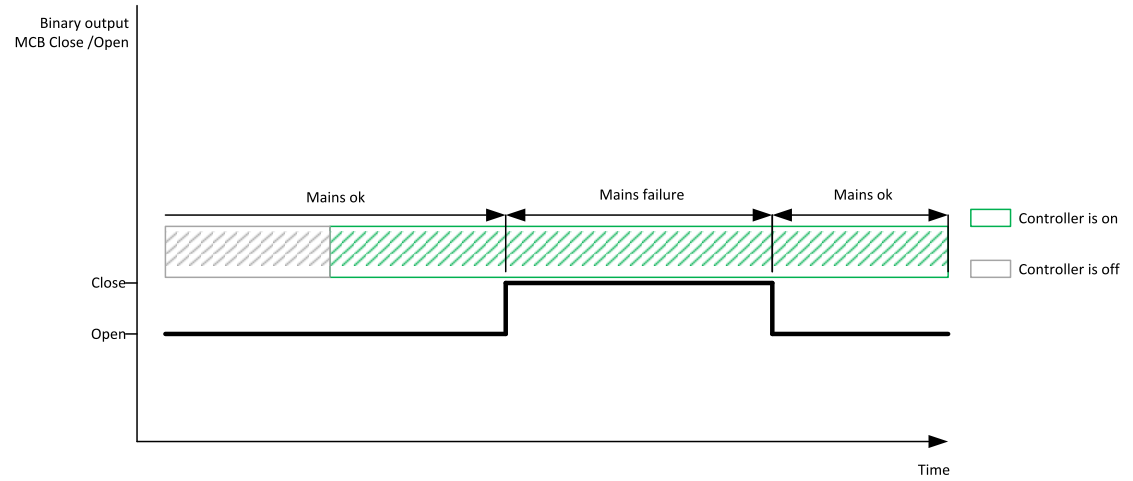


Image 8.24 MCB Logic 2

back to List of setpoints

Subgroup: AMF Settings

Return From Island

Setpoint group	Mains settings	**Related FW**	1.3.0
Range [units]	Manual / Auto [-]		
Default value	Auto	**Alternative config**	NO
Step	[-]		
Comm object	9590	**Related applications**	MINT, SPtM
Config level	Advanced		
Setpoint visibility	Conditioned by the setpoint **Application Mode Select (page 239)**		
Description			

Setpoint adjust the behavior of closing MCB when the mains returns.

Manual	Controller remains in AUT mode and the manual return to Mains is done via MCB button. **Manual Restore (page 799)** message is displayed in alarmlist to notify operator - it will disappear automatically after MCB close button is pushed. ***Note:*** *Select MANUAL in case you need to manually control the moment when the load is transferred back to the mains.*
Auto	No automatic mode change is performed.

back to List of setpoints

MCB Opens On

Setpoint group	Mains settings	**Related FW**	1.3.0
Range [units]	Mains Fail / Gen Run [-]		
Default value	Gen Run	**Alternative config**	NO
Step	[-]		
Comm object	9850	**Related applications**	MINT, SPtM
Config level	Advanced		
Setpoint visibility	Conditioned by the setpoint **Application Mode Select (page 239)**		
Description			

Setpoint adjust the behavior of opening MCB in AUTO mode when there is mains fail.

Mains Fail — The command to open the MCB is given immediately after mains fail condition is evaluated.

If the mains will return into parameters after MCB was opened and before GCB is closed, timer **MCB Close Delay (page 315)** is applied before MCB closing.

Gen Run — MCB will be opened when engine will be running and it will be possible to transfer load from Mains to gen-set (after stabilisation phase).

Note: *This option should be used for MCBs using 230V control and not equipped with the undervoltage coil.*

back to List of setpoints

Subgroup: Mains Decoupling Protection

Vector Shift Protection

Setpoint group	Mains settings	**Related FW**	1.3.0
Range [units]	Enabled / Parallel Only / Disabled [-]		
Default value	Disabled	**Alternative config**	NO
Step	[-]		
Comm object	10551	**Related applications**	SPtM
Config level	Standard		
Setpoint visibility	Always		
Description			

This setpoint selects the function of the built-in vector shift protection.

Disabled	The vector shift protection is disabled.
Parallel Only	The vector shift protection is enabled only while the gen-set is running parallel to the mains, i.e. the both MCB and GCB are closed.
Enabled	The vector shift protection is active always while the MCB is closed, regardless of the GCB position.

Note: *The vectorshift protection is recorded into the history file, however it is not indicated in the Alarm list. When it occurs the controller opens either MCB or GCB depending on the setpoint* ***Vector Shift CB Selector (page 323)****. If the MCB is not controlled in the particular application then GCB is opened.*

Note: *If a vector shift is detected and consequently the MCB is opened, however mains voltage and frequency remain in limits, the MCB is then reclosed again after* ***Mains Return Delay (page 314)****, as the mains is evaluated as healthy.*

back to List of setpoints

Vector Shift Limit

Setpoint group	Mains settings	**Related FW**	1.3.0
Range [units]	1 .. 45 [°]		
Default value	10 °	**Alternative config**	NO
Step	1 °		
Comm object	9843	**Related applications**	SPtM
Config level	Standard		
Setpoint visibility	Always		
Description			

This setpoint adjusts the threshold level for the vector shift protection.

Note: *To adjust this setpoint properly, check the value* ***Max Vector Shift (page 587)****. The value is available in InteliConfig, contains the maximal measured vector shift value since the gen-set has been synchronized to the mains and after opening of GCB or MCB it is "frozen". In normal conditions the value should not be higher than 3 ° and the most common setting of the threshold is about 7 °.*

back to List of setpoints

ROCOF Protection

Setpoint group	Mains settings	**Related FW**	1.3.0
Range [units]	Enabled / Parallel Only / Disabled [-]		
Default value	Disabled	**Alternative config**	NO
Step	[-]		
Comm object	9840	**Related applications**	SPtM
Config level	Standard		
Setpoint visibility	Always		
Description			

This setpoint selects the function of the built-in ROCOF protection.

Disabled	The ROCOF protection is disabled.
Parallel Only	The ROCOF protection is enabled only while the gen-set is running parallel to the mains, i.e. the both MCB and GCB are closed.
Enabled	The ROCOF protection is active always while the MCB is closed, regardless of the GCB position.

Note: *The ROCOF protection is recorded into the history file, however it is not indicated in the Alarm list. When it occurs the controller opens either MCB or GCB depending on the setpoint* ***Vector Shift CB Selector (page 323)****. If the MCB is not controlled in the particular application then GCB is opened.*

Note: *If a ROCOF is detected and consequently the MCB is opened, however mains voltage and frequency remain in limits, the MCB is then reclosed again after* ***Mains Return Delay (page 314)****, as the mains is evaluated as healthy.*

back to List of setpoints

ROCOF Windows Length

Setpoint group	Mains settings	**Related FW**	1.3.0
Range [units]	3 .. 30 [-]		
Default value	5	**Alternative config**	NO
Step	1 [-]		
Comm object	9990	**Related applications**	SPtM
Config level	Standard		
Setpoint visibility	Always		
Description			

This setpoint adjusts the averaging level for the **ROCOF Protection (page 322)**. It defines number of periods of the mains voltage in which the ROCOF protection is evaluated. The higher length of ROCOF window means less sensitive protection for short oscillations of the frequency to both directions from the nominal value. Also delay of evaluation is higher.

back to List of setpoints

ROCOF df/dt

Setpoint group	Mains settings	**Related FW**	1.3.0
Range [units]	0,1 .. 10,0 [Hz/s]		
Default value	1,0 Hz/s	**Alternative config**	NO
Step	0,1 Hz/s		
Comm object	9844	**Related applications**	SPtM
Config level	Standard		
Setpoint visibility	Always		
Description			
This setpoint adjusts the trip level for **ROCOF Protection (page 322)** (Rate Of Change Of Frequency).			

back to List of setpoints

Vector Shift CB Selector

Setpoint group	Mains settings	**Related FW**	1.3.0
Range [units]	MCB / GCB [-]		
Default value	MCB	**Alternative config**	NO
Step	[-]		
Comm object	10552	**Related applications**	SPtM
Config level	Standard		
Setpoint visibility	Always		
Description			
This setpoint selects which breaker will be opened when the **Vector Shift Protection (page 321)** or **ROCOF Protection (page 322)** protection is detected. ***Note:*** *If the GCB is selected and a mains failure occurs the GCB will be opened immediately when the vectorshift or ROCOF is detected, however also MCB will be opened consequently due to other mains protection as underfrequency or undervoltage.*			

back to List of setpoints

Group: Load Shedding

Load Shedding Active

Setpoint group	Load Shedding	**Related FW**	1.3.0
Range [units]	Disabled / Island only / ISL+Trip paral / All the time [-]		
Default value	Disabled	**Alternative config**	NO
Step	[-]		
Comm object	11001	**Related applications**	MINT, SPtM
Config level	Advanced		
Setpoint visibility	Visible always		
Description			

This setpoint is used for adjustment when the load shedding function is active.

Disabled	The Load shedding function is disabled. All the outputs are open.
Island only	In Island operation (e.g. MCB is open and (M)GCB is closed) Load shedding outputs are controlled by load shedding function. ▶ Load shedding outputs are activated/Deactivated one by one in island operation ▶ All Loadshedding outputs are tripped once the genset comes into the island operation from "NO LOAD" operation (MCB and (M)GCB were opened -> Genset started and (M)GCB closed).
ISL+Trip paral	This setting adjusts the same behavior as ISLAND ONLY but in addition to it all load shedding outputs are closed when gen-set group goes from parallel operation ino the island operation. ▶ Load shedding outputs are activated/Deactivated one by one in island operation. ▶ All Loadshedding outputs are tripped at once when the genset comes into the island operation from "NO LOAD" operation (MCB and (M)GCB were opened -> Genset started and (M)GCB closed). ▶ All Loadshedding outputs are tripped at once when the genset comes from Parallel operation (MCB, (M)GCB closed) to island operation (MCB opens, (M)GCB stays closed). This scenario is also valid when Test On Load is taken.
All the time	Load shedding Outputs are controlled by the load shedding function regardless of breaker positions. ▶ Loadshedding is active in island operation, in parallel operation too. ▶ All Loadshedding outputs are never tripped at once.

back to List of setpoints

Load Shedding Level

Setpoint group	Load Shedding	**Related FW**	1.3.0
Range [units]	Load Reconnection Level .. 200 [%] of **Nominal Power (page 252)**		
Default value	80 %	**Alternative config**	NO
Step	1 %		
Comm object	8884	**Related applications**	MINT, SPtM
Config level	Advanced		
Setpoint visibility	Visible only if **Load Shedding Active (page 324)** is disabled		
Description			
This setpoint is used to proceeds the next Load shedding stage.When gen-set load exceeds this level for more than **Load Shedding Delay (page 325)** time			

back to List of setpoints

Load Shedding Delay

Setpoint group	Load Shedding	**Related FW**	1.3.0
Range [units]	0,0..600,0 [s]		
Default value	10 s	**Alternative config**	NO
Step	1 s		
Comm object	8887	**Related applications**	MINT, SPtM
Config level	Advanced		
Setpoint visibility	Visible only if **Load Shedding Active (page 324)** is disabled		
Description			
This setpoint is used to proceeds the next Load shedding stage.When gen-set load exceeds this level for more than **Load Shedding Level (page 325)** time			

back to List of setpoints

Load Reconnection Level

Setpoint group	Load Shedding	**Related FW**	1.3.0
Range [units]	0 .. **Load Shedding Level (page 325)**		
Default value	20 %	**Alternative config**	NO
Step	1 %		
Comm object	8890	**Related applications**	MINT, SPtM
Config level	Advanced		
Setpoint visibility	Visible only if **Load Shedding Active (page 324)** is disabled		
Description			
This setpoint is used to proceeds the next Load shedding stage.When gen-set load exceeds this level for more than **Load Shedding Delay (page 325)** time			

back to List of setpoints

Load Reconnection Delay

Setpoint group	Load Shedding	**Related FW**	1.3.0
Range [units]	0..600 [s]		
Default value	10 s	**Alternative config**	NO
Step	1 s		
Comm object	8893	**Related applications**	MINT, SPtM
Config level	Advanced		
Setpoint visibility	Visible only if **Load Shedding Active (page 324)** is disabled		
Description			
This setpoint is used to proceeds the lower Load shedding stage. When gen-set load drops under **Load Reconnection Level (page 325)**l for more than this delay time. The binary output for higher stage is opened. Automatic load reconnection works only when **Auto Load Reconnection (page 326)** = Enabled			

back to List of setpoints

Auto Load Reconnection

Setpoint group	Load Shedding	**Related FW**	1.3.0
Range [units]	Disabled / Enabled [-]		
Default value	Enabled	**Alternative config**	NO
Step	[-]		
Comm object	9649	**Related applications**	MINT, SPtM
Config level	Advanced		
Setpoint visibility	Visible only if **Load Shedding Active (page 324)** is disabled		
Description			

Switch between manual and automatic reconnection of shedded load..

Disabled	Rising edge on binary input MANUAL LD RECON resets controller to the lower stage, but only if the load is under the **Load Reconnection Level (page 325)**. **Load Reconnection Delay (page 326)** is not taken into account in this case.
Enabled	Load reconnection is automatic depend on setpoints **Load Reconnection Level (page 325)** and **Load Reconnection Delay (page 326)**. Binary input **MANUAL LOAD RECONNECTION (PAGE 655)** has no function.

back to List of setpoints

Group: Power Management

Subgroup: Power Management Control

Power Management

Setpoint group	Power Management	**Related FW**	1.3.0
Range [units]	Enabled / Disabled [-]		
Default value	Enabled	**Alternative config**	NO
Step	[-]		
Comm object	8551	**Related applications**	MINT
Config level	Standard		
Setpoint visibility	Always		
Description			
This setpoint is used to enable or disable the **Power management (page 112)** function in the particular controller. It performs automatic load dependent starts and stops or load demand swap. If the function is disabled the gen-set's nominal power is not part of the power management calculation and the start and stop of the gen-set is performed only according to the position of the binary input **REMOTE START/STOP (PAGE 661)** i.e. if the input is active the gen-set is running and vice versa.			

back to List of setpoints

Power Management Delay

Setpoint group	Power Management	**Related FW**	1.3.0
Range [units]	0 .. 3600 [s]		
Default value	0 s	**Alternative config**	NO
Step	1 s		
Comm object	12488	**Related applications**	MINT
Config level	Standard		
Setpoint visibility	Always		
Description			

Setpoint defines delay of the **Power management (page 112)**. When **REMOTE START/STOP (PAGE 661)** signal is activated and the gen-sets should start, all the engines (where **Power Management (page 327)** is enabled) are started and stay running for time period specified by this parameter. After this period elapses, only the gen-set(s) needed according to the Power Management calculation stay running and the rest is stopped.

> **Example:** This delay is useful, when you need to start gen-sets to an unknown load. Setting for example 360s (6 minutes) and activating **REMOTE START/STOP (PAGE 661)** will force all gen-sets to start and run for 6 minutes despite of the power management setting.

Note: *By setting "0" the Power Management function is enabled immediately.*

back to List of setpoints

#Power Management Mode

Setpoint group	Power Management	**Related FW**	1.3.0
Range [units]	ABS [kW] / REL [%]		
Default value	ABS	**Alternative config**	NO
Step	[-]		
Comm object	9874	**Related applications**	MINT
Config level	Standard		
Setpoint visibility	Always		
Description			

This setpoint is used to select the **Power management (page 112)** mode.

ABS [kW]	The power management is based on actual active power and gen-set nominal power. The reserves are calculated and adjusted in kW.
Not Available	This mode of Power Management is not supported in this controller. Alarm **Wrn Unsupported PMS Mode (page 796)** is active.
REL [%]	The power management is based on the relative load, i.e. ratio active power to nominal power. The reserves are calculated and adjusted in %.

back to List of setpoints

Priority

Setpoint group	Power Management	**Related FW**	1.3.0
Range [units]	1 .. 32 [-]		
Default value	1	**Alternative config**	NO
Step	1		
Comm object	8488	**Related applications**	MINT
Config level	Standard		
Setpoint visibility	Always		
Description			

This setpoint adjusts the priority of the gen-set within the group. A lower number represents a “higher” priority, i.e. a gen-set with lower number will start before another one with higher number.

Note: *If the binary input **Top Priority (page 664)** is active, the gen-set gets the highest priority (0) independent of the setpoint setting.*

Note: *If more than one gen-set have the same priority they will act as “one big” gen-set.*

> **IMPORTANT: Value of the setpoint Priority is taken into account only for absolute mode of power management (#Power Management Mode (page 328) = ABS).**

back to List of setpoints

#Priority Auto Swap

Setpoint group	Power Management	**Related FW**	1.3.0
Range [units]	Disabled / Run Hours Equal / Efficient [-]		
Default value	Disabled	**Alternative config**	NO
Step	[-]		
Comm object	10593	**Related applications**	MINT,
Config level	Standard		
Setpoint visibility	Always		
Description			

This setpoint adjusts priority auto swapping.

Disabled	Optimalization is disabled. Priorities are given directly by the values adjusted in the setpoints **Priority (page 328)**.
Run Hours Equal	This method changes the priorities (not the setpoints itself) to equalize running hours of the gen-sets or to keep constant difference of running hours by the controller (adjusted via setpoint **#Run Hours Max Difference (page 337)**).
Not Available	This mode of Priority Auto Swap is not supported in controller.
Efficient	This method changes the priorities (not the setpoints itself) to optimize which gen-sets are running according to their capacities and actual load demand. **IMPORTANT: This priority swapping function is only for absolute mode of power management (#Power Management Mode (page 328) = ABS).** Optimal power band (number of running gen-sets) is calculated based on the nominal power of each gen-set, their Run Hours and requested Load reserve. For gen-sets with the same nominal power also run hour equalization is being performed.

IMPORTANT: Binary input Top Priority (page 664) can be used only if #Priority Auto Swap = Disabled.

back to List of setpoints

#System Start Delay

Setpoint group	Power Management	**Related FW**	1.3.0
Range [units]	0 .. 600 [-]		
Default value	5	**Alternative config**	NO
Step	1		
Comm object	8549	**Related applications**	MINT
Config level	Standard		
Setpoint visibility	Always		
Description			

This setpoint adjusts the delay of the system activation after the binary input **REMOTE START/STOP (PAGE 661)** has been activated.

back to List of setpoints

#System Stop Delay

Setpoint group	Power Management	**Related FW**	1.3.0
Range [units]	0 .. 600 [-]		
Default value	30	**Alternative config**	NO
Step	1		
Comm object	8550	**Related applications**	MINT
Config level	Standard		
Setpoint visibility	Always		
Description			
This setpoint adjusts the delay of the system deactivation after the binary input **REMOTE START/STOP (PAGE 661)** has been deactivated.			

back to List of setpoints

Subgroup: Load Reserve Set 1

#Starting Load Reserve 1

Setpoint group	Power Management	**Related FW**	1.3.0
Range [units]	0 .. **#Stopping Load Reserve 1 (page 331)** [kW]		
Default value	60 kW	**Alternative config**	NO
Step	1 kW		
Comm object	8489	**Related applications**	MINT
Config level	Standard		
Setpoint visibility	Always		
Description			

This setpoint is used to adjust the load reserve for start of next gen-set in absolute mode. i.e. **#Power Management Mode (page 328)** = ABS.

> **IMPORTANT: Logical binary input LOAD RES 2 ACTIVE (PAGE 655) has to be deactivated, otherwise setpoints of Load Reserve Set 2 are used.**

> ***Note:*** *See **Power management (page 112)** chapter for more information.*

back to List of setpoints

#Stopping Load Reserve 1

Setpoint group	Power Management	**Related FW**	1.3.0
Range [units]	**#Starting Load Reserve 1 (page 330)** .. 32 000 [kW]		
Default value	110 kW	**Alternative config**	NO
Step	1 kW		
Comm object	8491	**Related applications**	MINT
Config level	Standard		
Setpoint visibility	Always		
Description			

This setpoint is used to adjust the load reserve for stop of next gen-set in absolute mode. i.e. **#Power Management Mode (page 328)** = ABS.

> **IMPORTANT: Logical binary input LOAD RES 2 ACTIVE (PAGE 655) has to be deactivated, otherwise setpoints of Load Reserve Set 2 are used.**

Note: *See **Power management (page 112)** chapter for more information.*

back to List of setpoints

#Starting Rel Load Reserve 1

Setpoint group	Power Management	**Related FW**	1.3.0
Range [units]	0 .. **#Stopping Rel Load Reserve 1 (page 332)** [%]		
Default value	60 %	**Alternative config**	NO
Step	1 %		
Comm object	10648	**Related applications**	MINT
Config level	Standard		
Setpoint visibility	Always		
Description			

This setpoint is used to adjust the load reserve for start of next gen-set in relative mode. i.e. **#Power Management Mode (page 328)** = REL.

> **IMPORTANT: Logical binary input LOAD RES 2 ACTIVE (PAGE 655) has to be deactivated, otherwise setpoints of Load Reserve Set 2 are used.**

Note: *See **Power management (page 112)** chapter for more information.*

back to List of setpoints

#Stopping Rel Load Reserve 1

Setpoint group	Power Management	**Related FW**	1.3.0
Range [units]	**#Starting Rel Load Reserve 1 (page 331)** .. 110 [%]		
Default value	80 %	**Alternative config**	NO
Step	1 %		
Comm object	10652	**Related applications**	MINT
Config level	Standard		
Setpoint visibility	Always		
Description			

This setpoint is used to adjust the load reserve for stop of next gen-set in relative mode. i.e. **#Power Management Mode (page 328)** = REL.

> **IMPORTANT: Logical binary input LOAD RES 2 ACTIVE (PAGE 655) has to be deactivated, otherwise setpoints of Load Reserve Set 2 are used.**

Note: *See **Power management (page 112)** chapter for more information.*

back to List of setpoints

Subgroup: Load Reserve Set 2

#Starting Load Reserve 2

Setpoint group	Power Management	**Related FW**	1.3.0
Range [units]	0 .. **#Stopping Load Reserve 2 (page 333)** [kW]		
Default value	410 kW	**Alternative config**	NO
Step	1 kW		
Comm object	8490	**Related applications**	MINT
Config level	Standard		
Setpoint visibility	Always		
Description			

This setpoint is used to adjust the load reserve for start of next gen-set in absolute mode. i.e. **#Power Management Mode (page 328)** = ABS.

> **IMPORTANT: Logical binary input LOAD RES 2 ACTIVE (PAGE 655) has to be activated, otherwise setpoints of Load Reserve Set 1 are used.**

Note: *See **Power management (page 112)** chapter for more information.*

back to List of setpoints

#Stopping Load Reserve 2

Setpoint group	Power Management	**Related FW**	1.3.0
Range [units]	**#Starting Load Reserve 2 (page 332)** .. 32 000 [kW]		
Default value	460 kW	**Alternative config**	NO
Step	1 kW		
Comm object	8633	**Related applications**	MINT
Config level	Standard		
Setpoint visibility	Always		
Description			

This setpoint is used to adjust the load reserve for stop of next gen-set in absolute mode. i.e. **#Power Management Mode (page 328)** = ABS.

> **IMPORTANT: Logical binary input LOAD RES 2 ACTIVE (PAGE 655) has to be activated, otherwise setpoints of Load Reserve Set 1 are used.**

Note: *See **Power management (page 112)** chapter for more information.*

back to List of setpoints

#Starting Rel Load Reserve 2

Setpoint group	Power Management	**Related FW**	1.3.0
Range [units]	0 .. **#Stopping Rel Load Reserve 2 (page 334)** [%]		
Default value	60 %	**Alternative config**	NO
Step	1 %		
Comm object	10649	**Related applications**	MINT
Config level	Standard		
Setpoint visibility	Always		
Description			

This setpoint is used to adjust the load reserve for start of next gen-set in relative mode. i.e. **#Power Management Mode (page 328)** = REL.

> **IMPORTANT: Logical binary input LOAD RES 2 ACTIVE (PAGE 655) has to be activated, otherwise setpoints of Load Reserve Set 1 are used.**

Note: *See **Power management (page 112)** chapter for more information.*

back to List of setpoints

#Stopping Rel Load Reserve 2

Setpoint group	Power Management	**Related FW**	1.3.0
Range [units]	**#Starting Rel Load Reserve 2 (page 333)** .. 110 [%]		
Default value	80 %	**Alternative config**	NO
Step	1 %		
Comm object	10653	**Related applications**	MINT
Config level	Standard		
Setpoint visibility	Always		
Description			

This setpoint is used to adjust the load reserve for stop of next gen-set in relative mode. i.e. **#Power Management Mode (page 328)** = REL.

> **IMPORTANT: Logical binary input LOAD RES 2 ACTIVE (PAGE 655) has to be activated, otherwise setpoints of Load Reserve Set 1 are used.**

Note: *See **Power management (page 112)** chapter for more information.*

back to List of setpoints

Subgroup: Minimal Running Power

#Min Run Power

Setpoint group	Power Management	**Related FW**	1.3.0
Range [units]	0 .. 65 000 [kW]		
Default value	210 kw	**Alternative config**	NO
Step	1 kW		
Comm object	9584	**Related applications**	MINT
Config level	Standard		
Setpoint visibility	Always		
Description			

This setpoint is used to adjust certain minimum value of the sum of nominal power of all running gen-sets. If the function is active (by logical binary input **Min Run Power Active (page 657)**), then the gen-sets would not be stopped, although the reserve for stop is fulfilled, if the total remaining nominal power drops below this minimal value.

Note: *Logical binary input **Min Run Power Active (page 657))** needs to be activated on all gen-sets in the same time.*

back to List of setpoints

Subgroup: Start/Stop Timing

#Next Engine Start Delay

Setpoint group	Power Management	**Related FW**	1.3.0
Range [units]	0 .. 3 600 [s]		
Default value	5 s	**Alternative config**	NO
Step	1 s		
Comm object	8492	**Related applications**	MINT
Config level	Standard		
Setpoint visibility	Always		
Description			
This setpoint adjusts the delay for starting the next gen-set after the reserve has dropped below the reserve for start.			

back to List of setpoints

#Next Engine Stop Delay

Setpoint group	Power Management	**Related FW**	1.3.0
Range [units]	0 .. 3 600 [s]		
Default value	20 s	**Alternative config**	NO
Step	1 s		
Comm object	8494	**Related applications**	MINT
Config level	Standard		
Setpoint visibility	Always		
Description			
This setpoint adjusts the delay for stopping the gen-set after the reserve has risen above the reserve for stop.			

back to List of setpoints

#Slow Stop Delay

Setpoint group	Power Management	**Related FW**	1.3.0
Range [units]	0 .. 600 [s]		
Default value	60 s	**Alternative config**	NO
Step	1 s		
Comm object	8495	**Related applications**	MINT
Config level	Standard		
Setpoint visibility	Always		
Description			
This setpoint is used to adjust how long the particular gen-set will suppress it's own Slow stop alarm to give chance to another gen-set to start and replace the defective one. ***Note:*** *If there isn't any available gen-set to start, the alarm is not suppressed.*			

back to List of setpoints

Subgroup: Over Load Next Start Protection

#Overload Next Start Protection

Setpoint group	Power Management	**Related FW**	1.3.0
Range [units]	Enabled / Disabled [-]		
Default value	Enabled	**Alternative config**	NO
Step	[-]		
Comm object	14942	**Related applications**	MINT
Config level	Standard		
Setpoint visibility	Always		
Description			
This setpoint is intended for activation of the protection against the overloading of the system due to rapid change of the load. It makes the next gen-set (in priority order) to start when the load excises the value given by the setpoint **#Overload Next Start Level (page 336)** right after the delay **#Overload Next Start Delay (page 336)**.			

back to List of setpoints

#Overload Next Start Level

Setpoint group	Power Management	**Related FW**	1.3.0
Range [units]	0 .. 100 [%]		
Default value	80 %	**Alternative config**	NO
Step	1 %		
Comm object	14941	**Related applications**	MINT
Config level	Standard		
Setpoint visibility	Always		
Description			
Threshold level for **#Overload Next Start Protection (page 336)**.			

back to List of setpoints

#Overload Next Start Delay

Setpoint group	Power Management	**Related FW**	1.3.0
Range [units]	0 .. 5 [s]		
Default value	1 s	**Alternative config**	NO
Step	1 s		
Comm object	8493	**Related applications**	MINT
Config level	Standard		
Setpoint visibility	Always		
Description			
Delay for **#Overload Next Start Protection (page 336)**.			

back to List of setpoints

Subgroup: Run Hours Equalization

Run Hours Base

Setpoint group	Power Management	**Related FW**	1.3.0
Range [units]	0,0 .. 200000,0 [h]		
Default value	0,0 h	**Alternative config**	NO
Step	0,1 h		
Comm object	10600	**Related applications**	MINT
Config level	Standard		
Setpoint visibility	Always		
Description			

Running hours base corrects actual Running hours differences between particular gen-sets.

> **Example:**
> Gen-set 1 actual Running hours = 1000 h.
> Gen-set 2 actual Running hours = 2000 h.
> Adjust this setpoint for Gen-set 1 = 1000 h and for Gen-set 2 = 2000 h to be on the same base for Running Hours Equalization.

back to List of setpoints

#Run Hours Max Difference

Setpoint group	Power Management	**Related FW**	1.3.0
Range [units]	0 .. 65 000 [h]		
Default value	100 h	**Alternative config**	NO
Step	1 h		
Comm object	9919	**Related applications**	MINT
Config level	Standard		
Setpoint visibility	Always		
Description			

This setpoint adjusts the "dead-band" for the running hours equalization function (**#Priority Auto Swap (page 329)** = Run Hours Equal). The priorities are swapped when engine hours difference is higher than this dead-band.

Note: *The system calculates with whole hours.*

> **Example:** The difference in engine running hours has to be 11.0 hours, if #Run Hours Max Difference is set to 10. The priorities shuffling is not done with the difference just 10.1 hours.

back to List of setpoints

Subgroup: Efficient Mode

#Power Band Change Up Delay

Setpoint group	Power Management	**Related FW**	1.3.0
Range [units]	0 .. 3 600 [s]		
Default value	10 s	**Alternative config**	NO
Step	[s]		
Comm object	8896	**Related applications**	MINT
Config level	Standard		
Setpoint visibility	Always		
Description			
This setpoint is used for adjusting the delay of changing the power band if the load demand rose above the upper limit of the current power band. Setpoint is taken into account only if **#Priority Auto Swap (page 329)** = Efficient.			

back to List of setpoints

#Power Band Change Down Delay

Setpoint group	Power Management	**Related FW**	1.3.0
Range [units]	0 .. 3 600 [s]		
Default value	10 s	**Alternative config**	NO
Step	[s]		
Comm object	10795	**Related applications**	MINT
Config level	Standard		
Setpoint visibility	Always		
Description			
This setpoint is used for adjusting the delay of changing the power band if the load demand drops below the lower limit of the current power band. Setpoint is taken into account only if **#Priority Auto Swap (page 329)** = Efficient.			

back to List of setpoints

Subgroup: Group Settings

Control Group

Setpoint group	Power Management	**Related FW**	1.3.0
Range [units]	1,2 .. 32 [-]		
Default value	1 s	**Alternative config**	NO
Step	1 s		
Comm object	10589	**Related applications**	MINT
Config level	Standard		
Setpoint visibility	Always		
Description			
This setpoint selects the control group (to get more information on this function please refer to the chapter **Control groups (page 131)** to which the particular gen-set belongs. If there aren't logical groups at the site, adjust the setpoint to 1.			

back to List of setpoints

Group Link L

Setpoint group	Power Management	**Related FW**	1.3.0
Range [units]	1,2 .. 32 [-]		
Default value	1 s	**Alternative config**	NO
Step	1 s		
Comm object	10590	**Related applications**	MINT
Config level	Standard		
Setpoint visibility	Always		
Description			
If the input **GROUP LINK (PAGE 653)** of this particular controller is used to provide the "group link" information for two Control groups (to get more information refer to the chapter **Control groups (page 131)**), then this setpoint is used to select which group is located at the left side of the group link breaker (bus tie breaker). If this particular controller is not used for the group link function, adjust this setpoint to 1.			

back to List of setpoints

Group Link R

Setpoint group	Power Management	**Related FW**	1.3.0
Range [units]	1,2 .. 32 [-]		
Default value	1 s	**Alternative config**	NO
Step	1 s		
Comm object	10591	**Related applications**	MINT
Config level	Standard		
Setpoint visibility	Always		
Description			
If the input **GROUP LINK (PAGE 653)** of this particular controller is used to provide the "group link" information for two Control groups (to get more information refer to the chapter **Control groups (page 131)**), then this setpoint is used to select which group is located at the right side of the group link breaker (bus tie breaker). If this particular controller is not used for the group link function, adjust this setpoint to 1.			

back to List of setpoints

Group: Speed/Load Control

Subgroup: Speed Control

Speed Regulator Character

Setpoint group	Speed/Load Control	**Related FW**	1.3.0
Range [units]	Positive / Negative [-]		
Default value	Positive	**Alternative config**	NO
Step	[-]		
Comm object	9054	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Always		
Description			

This setpoint selects the characteristic of the speed governor output of the controller. Adjust it according to the behavior of the remote speed input of the governor.

Positive	Raising the voltage on the governor remote speed input causes engine speed to rise.
Negative	Raising the voltage on the governor remote speed input causes engine speed to go down.

back to List of setpoints

Speed Governor Bias

Setpoint group	Speed/Load Control	**Related FW**	1.3.0
Range [units]	-10,00 .. 10,00 [V]		
Default value	0,00 V	**Alternative config**	NO
Step	0,01 V		
Comm object	8656	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Always		
Description			

This setpoint adjusts the initial voltage level for the speed governor output, which is present on the output, if no speed or power regulation loop is active.

> ***Note:*** *To make a fine adjustment, start the gen-set in MAN mode, leave it running unloaded and then make fine adjustment of this setpoint to achieve nominal engine speed.*

back to List of setpoints

Speed Governor Low Limit

Setpoint group	Speed/Load Control	**Related FW**	1.3.0
Range [units]	-10,00 .. 10,00 [V]		
Default value	0,00 V	**Alternative config**	NO
Step	0,01 V		
Comm object	10115	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Always		
Description			

Lower limit of the speed governor output. Use this setpoint to adjust the governor output range according to your governor type.

back to List of setpoints

Speed Governor High Limit

Setpoint group	Speed/Load Control	**Related FW**	1.3.0
Range [units]	-10,00 .. 10,00 [V]		
Default value	0,00 V	**Alternative config**	NO
Step	0,01 V		
Comm object	10559	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Always		
Description			

Upper limit of the speed governor output. Use this setpoint to adjust the governor output range according to your governor type.

back to List of setpoints

Speed Governor PWM Rate

Setpoint group	Speed/Load Control	**Related FW**	1.3.0
Range [units]	500 .. 2 900 [Hz]		
Default value	500 Hz	**Alternative config**	NO
Step	1 Hz		
Comm object	10911	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Always		
Description			
This setpoint adjusts the frequency of the speed governor PWM output.			

back to List of setpoints

Tau Speed Governor Actuator

Setpoint group	Speed/Load Control	**Related FW**	1.3.0
Range [units]	1,0 .. 300,0 [s]		
Default value	10,0 s	**Alternative config**	NO
Step	0,1 s		
Comm object	10784	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Always		
Description			
This setpoint is used to adjust the transformation ratio of the speed governor output to the pulses at the binary outputs **SPEED UP (PAGE 722)** and **SPEED DOWN (PAGE 722)**. Adjust the setpoint to the pulse duration which is needed for the speed control device to travel from minimal position to the maximal position.			

back to List of setpoints

Subgroup: Regulation Loops

Frequency Gain

Setpoint group	Speed/Load Control	**Related FW**	1.3.0
Range [units]	0,0 .. 200,0 [%]		
Default value	10,0 %	**Alternative config**	NO
Step	0,1 %		
Comm object	8715	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Always		
Description			
This setpoint adjusts the gain factor (P-factor) of the frequency control PI loop. ***Note:*** *See the chapter **Regulation loops (page 135)** for more information.*			

back to List of setpoints

Frequency Int

Setpoint group	Speed/Load Control	**Related FW**	1.3.0
Range [units]	0 .. 100 [%]		
Default value	50 %	**Alternative config**	NO
Step	1 %		
Comm object	8716	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Always		
Description			
This setpoint adjusts the relative integration factor (I-factor) of the frequency control PI loop. ***Note:*** *See the chapter* ***Regulation loops (page 135)*** *for more information.*			

back to List of setpoints

Angle Gain

Setpoint group	Speed/Load Control	**Related FW**	1.3.0
Range [units]	0,0 .. 200,0 [%]		
Default value	10,0 %	**Alternative config**	NO
Step	0,1 %		
Comm object	8718	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Always		
Description			
This setpoint is used for adjusting of the gain factor (P-factor) of the phase angle P-control loop. ***Note:*** *During synchronization, first the frequency loop is started to match the generator frequency with the mains or bus and after that the phase angle loop is started to match the phase angle.* ***Note:*** *See the chapter* ***Regulation loops (page 135)*** *for more information.*			

back to List of setpoints

Load Gain

Setpoint group	Speed/Load Control	**Related FW**	1.3.0
Range [units]	0,0 .. 200,0 [%]		
Default value	10,0 %	**Alternative config**	NO
Step	0,1 %		
Comm object	8659	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Always		
Description			
This setpoint adjusts the gain factor (P-factor) of the load control PI loop. ***Note:*** *See the chapter* ***Regulation loops (page 135)*** *for more information.*			

back to List of setpoints

Load Int

Setpoint group	Speed/Load Control	**Related FW**	1.3.0
Range [units]	0 .. 100 [%]		
Default value	50 %	**Alternative config**	NO
Step	1 %		
Comm object	8713	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Always		
Description			
This setpoint adjusts the relative integration factor (I-factor) of the load control PI loop.			
Note: *See the chapter* ***Regulation loops (page 135)*** *for more information.*			

back to List of setpoints

Load Sharing Gain

Setpoint group	Speed/Load Control	**Related FW**	1.3.0
Range [units]	0,0 .. 200,0 [%]		
Default value	10,0 %	**Alternative config**	NO
Step	0,1 %		
Comm object	8725	**Related applications**	MINT
Config level	Standard		
Setpoint visibility	Always		
Description			
This setpoint adjusts the gain factor (P-factor) of the load sharing control PI loop.			
Note: *See the chapter* ***Regulation loops (page 135)*** *for more information.*			

back to List of setpoints

Load Sharing Int

Setpoint group	Speed/Load Control	**Related FW**	1.3.0
Range [units]	0 .. 100 [%]		
Default value	50 %	**Alternative config**	NO
Step	1 %		
Comm object	9035	**Related applications**	MINT
Config level	Standard		
Setpoint visibility	Always		
Description			
This setpoint adjusts the relative integration factor (I-factor) of the load sharing control PI loop.			
Note: *See the chapter* ***Regulation loops (page 135)*** *for more information.*			

back to List of setpoints

Subgroup: Load Transfer

Close Transfer Max Duration

Setpoint group	Speed/Load Control	**Related FW**	1.3.0
Range [units]	0,1 .. **Load Ramp (page 348)** [s]		
Default value	5,0 s	**Alternative config**	NO
Step	0,1 s		
Comm object	8661	**Related applications**	SPtM
Config level	Standard		
Setpoint visibility	Always		
Description			
The time of parallel work of gen-set and mains in close transition.			

back to List of setpoints

Open Transfer Min Break

Setpoint group	Speed/Load Control	**Related FW**	1.3.0
Range [units]	0,1 .. 600,0 [s]		
Default value	1,0 s	**Alternative config**	NO
Step	0,1 s		
Comm object	8303	**Related applications**	SPtM
Config level	Standard		
Setpoint visibility	Always		
Description			
Minimal duration of break in open transition when **Transfer Gen To Mains (page 347)** or **Transfer Mains To Gen (page 346)** is chosen as open transfer.			

back to List of setpoints

Transfer Mains To Gen

Setpoint group	Speed/Load Control	**Related FW**	1.3.0
Range [units]	Open / Close Only / Close Primarily / Soft Transfer [-]		
Default value	Soft Transfer	**Alternative config**	NO
Step	[-]		
Comm object	12969	**Related applications**	SPtM
Config level	Standard		
Setpoint visibility	Always		

Description

This setpoint defines the type of transfer of load from mains to generator .

Open	Transfer of the load from mains to generator without parallel work and synchronization (one breaker opens and second is closed - checking feedbacks). The setpoint **Open Transfer Min Break (page 345)** sets the minimal duration of break.
Close Only	Transfer of the load from mains to generator with synchronization and parallel work. The time of parallel work is given by setpoint **Close Transfer Max Duration (page 345)**. In case of synchronization fail, MCB stays close and gen-set is stopped.
Close Primarily	Transfer of the load from mains to generator with synchronization and parallel work. The time of parallel work is given by setpoint **Close Transfer Max Duration (page 345)**. In case of synchronization fail, open transfer is done.
Soft Transfer	Transfer of the load from mains to generator with parallel work and soft loading of the gen-set. This function is proceeded like the closed transfer, but there is time limitation of loading of the gen-set adjusted via setpoint **Load Ramp (page 348)**. The transfer is succeed only when the gen-set is fully loaded - mains is fully unloaded (level of load when mains is considered as unloaded is adjusted via setpoint **Mains Unload MCB Open Window (page 348)**).

Note: *Close transfer of load is also affected by setpoint **Mains Import Measurement (page 249)**.*

back to List of setpoints

Transfer Gen To Mains

Setpoint group	Speed/Load Control	**Related FW**	1.3.0
Range [units]	Open / Close Only / Close Primarily / Soft Transfer [-]		
Default value	Soft Interchange	**Alternative config**	NO
Step	[-]		
Comm object	14688	**Related applications**	SPtM
Config level	Standard		
Setpoint visibility	Always		
Description			

This setpoint defines the type of transfer of load from generator to mains.

Open	Transfer of the load from generator to mains without parallel work and synchronization (one breaker opens and second is closed - checking feedbacks). The setpoint **Open Transfer Min Break (page 345)** sets the minimal duration of break.
Close Only	Transfer of the load from generator to mains with synchronization and parallel work. The time of parallel work is given by setpoint **Close Transfer Max Duration (page 345)**. In case of synchronization fail, MCB stays close and gen-set is stopped.
Close Primarily	Transfer of the load from generator to mains with synchronization and parallel work. The time of parallel work is given by setpoint **Close Transfer Max Duration (page 345)**. In case of synchronization fail, open transfer is done.
Soft Transfer	Transfer of the load from generator to mains with parallel work and soft unloading of the gen-set. This function is proceeded like the closed transfer, but there is time limitation of unloading of the gen-set adjusted via setpoint **Load Ramp (page 348)**. The transfer is succeed only when the gen-set is fully unloaded (level of load when gen-set is considered as unloaded is adjusted via setpoint **Generator Unload GCB Open Level (page 347)**).

back to List of setpoints

Generator Unload GCB Open Level

Setpoint group	Speed/Load Control	**Related FW**	1.3.0
Range [units]	0 .. 100 [%]		
Default value	10 %	**Alternative config**	NO
Step	1 % of **Nominal Power (page 252)**		
Comm object	8547	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Always		
Description			

This setpoint adjusts the value of the power when the GCB is opened during unloading of the gen-set.

Note: *It is set usually higher than 0 to prevent the engine to go to reverse power.*

back to List of setpoints

Mains Unload MCB Open Window

Setpoint group	Speed/Load Control	**Related FW**	1.3.0
Range [units]	0 .. 100 [%]		
Default value	10 %	**Alternative config**	NO
Step	1 % of **Nominal Power (page 252)**		
Comm object	14694	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Always		
Description			
This setpoint adjusts the value which defines the level where the mains is considered as unloaded. ***Note:*** *This setpoint is window. It means that when you adjust this setpoint to 10%, there is window from -10% to +10%. The reason is import/export function.*			

back to List of setpoints

Load Ramp

Setpoint group	Speed/Load Control	**Related FW**	1.3.0
Range [units]	0 .. 600 [s]		
Default value	5 s	**Alternative config**	NO
Step	1 s		
Comm object	8658	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Always		
Description			
The max duration of soft transition(time for gen-set loading / unloading).			

back to List of setpoints

Group: Voltage/PF Control

Subgroup: Voltage Control

Voltage Regulator Character

Setpoint group	Voltage/PF Control	**Related FW**	1.3.0
Range [units]	Positive / Negative [-]		
Default value	Positive	**Alternative config**	NO
Step	[-]		
Comm object	9055	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Always		
Description			

This setpoint selects the characteristic of the voltage governor output of the controller. Adjust it according to the behavior of the remote voltage input of the governor.

Positive	Raising the voltage on the remote voltage adjustment input causes the generator voltage to raise.
Negative	Raising the voltage on the governor remote speed input causes engine speed to go down.

back to List of setpoints

Voltage Regulator Bias

Setpoint group	Voltage/PF Control	**Related FW**	1.3.0
Range [units]	-10,00 .. 10,00 [V]		
Default value	0,00 V	**Alternative config**	NO
Step	0,01 V		
Comm object	8500	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Always		
Description			

This setpoint adjusts the initial level for the voltage governor output. This level is present on the output if no regulation loop is active.

back to List of setpoints

Voltage Regulator Low Limit

Setpoint group	Voltage/PF Control	**Related FW**	1.3.0
Range [units]	-10,00 .. 10,00 [V]		
Default value	0,00 V	**Alternative config**	NO
Step	0,01 V		
Comm object	14792	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Always		
Description			
Lower limit of the voltage governor output. Use this setpoint to adjust the governor output range according to your governor type.			

back to List of setpoints

Voltage Regulator High Limit

Setpoint group	Voltage/PF Control	**Related FW**	1.3.0
Range [units]	-10,00 .. 10,00 [V]		
Default value	0,00 V	**Alternative config**	NO
Step	0,01 V		
Comm object	14793	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Always		
Description			
Upper limit of the voltage governor output. Use this setpoint to adjust the governor output range according to your governor type.			

back to List of setpoints

Tau Voltage Governor Actuator

Setpoint group	Voltage/PF Control	**Related FW**	1.3.0
Range [units]	1,0 .. 300,0 [s]		
Default value	10,0 s	**Alternative config**	NO
Step	0,1 s		
Comm object	10785	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Always		
Description			
This setpoint is used to adjust the transformation ratio of the voltage governor output to the pulses at the binary outputs **AVR Up (page 690)** and **AVR Down (page 690)**. Adjust the setpoint to the pulse duration which is needed for the voltage control device to travel from minimal position to the maximal position.			

back to List of setpoints

Subgroup: Regulation Loops

Voltage Gain

Setpoint group	Voltage/PF Control	**Related FW**	1.3.0
Range [units]	0,0 .. 200,0 [%]		
Default value	10,0 %	**Alternative config**	NO
Step	0,1 %		
Comm object	8501	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Always		
Description			
This setpoint adjusts the gain factor (P-factor) of the voltage control PI loop.			
Note: *See the chapter* ***Regulation loops (page 135)*** *for more information.*			

back to List of setpoints

Voltage Int

Setpoint group	Voltage/PF Control	**Related FW**	1.3.0
Range [units]	0 .. 100 [%]		
Default value	50 %	**Alternative config**	NO
Step	1 %		
Comm object	8720	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Always		
Description			
This setpoint adjusts the relative integration factor (I-factor) of the voltage control PI loop.			
Note: *See the chapter* ***Regulation loops (page 135)*** *for more information.*			

back to List of setpoints

PF Gain

Setpoint group	Voltage/PF Control	**Related FW**	1.3.0
Range [units]	0,0 .. 200,0 [%]		
Default value	10,0 %	**Alternative config**	NO
Step	0,1 %		
Comm object	8503	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Always		
Description			
This setpoint adjusts the gain factor (P-factor) of the PF control PI loop.			
Note: *See the chapter* ***Regulation loops (page 135)*** *for more information.*			

back to List of setpoints

PF Int

Setpoint group	Voltage/PF Control	**Related FW**	1.3.0
Range [units]	0 .. 100 [%]		
Default value	50 %	**Alternative config**	NO
Step	1 %		
Comm object	8721	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Always		
Description			

This setpoint adjusts the relative integration factor (I-factor) of the PF control PI loop.

Note: *See the chapter* ***Regulation loops (page 135)*** *for more information.*

back to List of setpoints

VAr Sharing Gain

Setpoint group	Voltage/PF Control	**Related FW**	1.3.0
Range [units]	0,0 .. 200,0 [%]		
Default value	10,0 %	**Alternative config**	NO
Step	0,1 %		
Comm object	8777	**Related applications**	MINT
Config level	Standard		
Setpoint visibility	Always		
Description			

This setpoint adjusts the gain factor (P-factor) of the VAr sharing control PI loop.

Note: *See the chapter* ***Regulation loops (page 135)*** *for more information.*

back to List of setpoints

VAr Sharing Int

Setpoint group	Voltage/PF Control	**Related FW**	1.3.0
Range [units]	0 .. 100 [%]		
Default value	50 %	**Alternative config**	NO
Step	1 %		
Comm object	9036	**Related applications**	MINT
Config level	Standard		
Setpoint visibility	Always		
Description			

This setpoint adjusts the relative integration factor (I-factor) of the VAr sharing control PI loop.

Note: *See the chapter* ***Regulation loops (page 135)*** *for more information.*

back to List of setpoints

Group: Synchronisation

Synchronization Type

Setpoint group	Synchronisation	**Related FW**	1.3.0
Range [units]	Phase Match / Slip Synchro [-]		
Default value	Phase Match	**Alternative config**	NO
Step	[-]		
Comm object	14802	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Always		
Description			

This setpoint adjusts the type of synchronization.

Phase Match	This type of synchronization is based on voltage and phase shift match. Limits are adjusted via setpoints **Voltage Window (page 354)** and **Phase Window (page 354)**. When voltage and phase shift are match, **Dwell Time (page 354)** starts countdown. After that the command for breaker closing is activated.
Slip Synchro	This type of synchronization regulates the value of frequency to the value Mains/Bus frequency + **Slip Frequency (page 355)** (Mains frequency in SPtM, Bus frequency in MINT application). When this frequency is reached, **Dwell Time (page 354)** starts countdown. After that the command for breaker closing is activated. The closing breaker command is issued in advance due to latency of breakers (adjusted via setpoints **GCB Latency (page 355)** and **MCB Latency (page 356)**). ***Note:*** *Condition of **Voltage Window (page 354)** has to be also fulfilled.*

back to List of setpoints

Synchronization Timeout

Setpoint group	Synchronisation	**Related FW**	1.3.0
Range [units]	OFF / 1 .. 1800 [s]		
Default value	60 s	**Alternative config**	NO
Step	1 s		
Comm object	8657	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Always		
Description			

This setpoint adjusts the maximum duration of synchronizing.

Note: *If this setpoint is adjusted to OFF then automatic restart of synchronization occurs every 180s. This method helps to synchronize successfully even in difficult conditions.*

back to List of setpoints

Voltage Window

Setpoint group	Synchronisation	**Related FW**	1.3.0
Range [units]	0,0 .. 100,0 [%]		
Default value	10,0 %	**Alternative config**	NO
Step	0,1 %		
Comm object	8650	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Always		
Description			
This setpoint adjusts maximum difference between generator and mains/bus voltage in respective phases for synchronization.			

back to List of setpoints

Phase Window

Setpoint group	Synchronisation	**Related FW**	1.3.0
Range [units]	0 .. 90 [°]		
Default value	10 °	**Alternative config**	NO
Step	1 °		
Comm object	8652	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Always		
Description			
This setpoint adjusts the maximum absolute value of difference between actual phase angle between the generator and mains/bus voltages for synchronization.			

back to List of setpoints

Dwell Time

Setpoint group	Synchronisation	**Related FW**	1.3.0
Range [units]	0,0 .. 25,0 [s]		
Default value	0,3 s	**Alternative config**	NO
Step	0,1 s		
Comm object	8653	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Always		
Description			
The period of time that the phase angle difference must be within **Phase Window (page 354)** and voltage difference within **Voltage Window (page 354)** before the breaker is closed.			

back to List of setpoints

Slip Frequency

Setpoint group	Synchronisation	**Related FW**	1.3.0
Range [units]	-0,50 .. 0,50 [Hz]		
Default value	-0,25 Hz	**Alternative config**	NO
Step	0,01 Hz		
Comm object	14798	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Always		
Description			
Slip frequency for slip synchronization (**Synchronization Type (page 353)** = Slip Synchro).			

back to List of setpoints

Slip Frequency Window

Setpoint group	Synchronisation	**Related FW**	1.3.0
Range [units]	0,01 .. 0,50 [Hz]		
Default value	0,15 Hz	**Alternative config**	NO
Step	0,01 Hz		
Comm object	14799	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Always		
Description			
Window of slip frequency for slip synchronization (**Synchronization Type (page 353)** = Slip Synchro).			

back to List of setpoints

GCB Latency

Setpoint group	Synchronisation	**Related FW**	1.3.0
Range [units]	20 .. 1 000 [ms]		
Default value	80 ms	**Alternative config**	NO
Step	1 ms		
Comm object	14800	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Always		
Description			
Latency of GCB . **IMPORTANT: This setpoint is enable, when Synchronization Type (page 353) has Split Synchro value**			

back to List of setpoints

MCB Latency

Setpoint group	Synchronisation	**Related FW**	1.3.0
Range [units]	20 .. 1 000 [ms]		
Default value	80 ms	**Alternative config**	NO
Step	1 ms		
Comm object	14801	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Always		
Description			

Latency of MCB.

> **IMPORTANT: This setpoint is enable, when Synchronization Type (page 353) has Split Synchro value**

back to List of setpoints

Group: Droop Settings

Subgroup: Droop Settings

Load/Var Sharing Regulation Type

Setpoint group	Droop Settings	**Related FW**	1.3.0
Range [units]	Isochronous / Droop / Emergency Droop [-]		
Default value	Isonchronous	**Alternative config**	NO
Step	[-]		
Comm object	13212	**Related applications**	MINT
Config level	Advanced		
Setpoint visibility	Visible only if ECU is configured		
Description			

This setpoint adjusts how the active and reactive power is regulated. The droop is primarily intended for multiple parallel operation in island to ensure the load sharing and VAr sharing when intercontroller communication fails.

Isochronous	The active and reactive power is regulated based on data communicated between the controller units (intercontroller communication).
Droop	The active and reactive power is not regulated based on data communicated between the units but the speed request and voltage request is calculated from actual voltage and actual frequency of the system. The speed request is correlative to active power and the voltage request is correlative to reactive power.
Emrg Droop	Regulation of active and reactive power is based on standard isochronous regulation based on intercontroller communication but it can be conditionally turned to droop

back to List of setpoints

Dead Bus GCB Close Master

Setpoint group	Droop Settings	**Related FW**	1.3.0
Range [units]	Disabled / Enabled [-]		
Default value	Disabled	**Alternative config**	NO
Step	[-]		
Comm object	13952	**Related applications**	MINT
Config level	Advanced		
Setpoint visibility	Always		
Description			

This setpoint adjusts the behavior of GCB for droop regulation in AUTO mode. If the bus values are without the limits then the controller is prohibited to close it's GCB because of safety reasons.

Disabled	If the bus values are without the limits then the controller is prohibited to close it's GCB because of safety reasons. Closing of GCB can be done manually in MAN mode.
Enabled	If the bus values are without the limits, controller is allowed to close it´s GCB to the dead bus.

back to List of setpoints

Subgroup: Frequency Droop

Frequency Droop Slope

Setpoint group	Droop Settings	**Related FW**	1.3.0
Range [units]	0,0 .. 20,0 [%]		
Default value	4,0 %	**Alternative config**	NO
Step	0,1 %		
Comm object	10032	**Related applications**	MINT
Config level	Advanced		
Setpoint visibility	Always		
Description			

This setpoint defines the slope of the load droop correlation. The slope is set as a droop of frequency in percentages of the requested system frequency (Basic settings: **Nominal Frequency (page 257)**) on the range of the requested power from 0 to 100% of Basic settings: **Nominal Power (page 252)**.

back to List of setpoints

Frequency Droop Offset

Setpoint group	Droop Settings	**Related FW**	1.3.0
Range [units]	0 .. 100 [%]		
Default value	100 %	**Alternative config**	NO
Step	1 %		
Comm object	13213	**Related applications**	MINT
Config level	Advanced		
Setpoint visibility	Always		
Description			
This setpoint defines the value of requested power on the requested system frequency (Basic settings: **Nominal Frequency (page 257)**). Allows to shift the droop correlation line up or down.			

back to List of setpoints

Subgroup: Voltage Droop

Voltage Droop Slope

Setpoint group	Droop Settings	**Related FW**	1.3.0
Range [units]	0,0 .. 20,0 [%]		
Default value	4,0 %	**Alternative config**	NO
Step	0,1 %		
Comm object	10033	**Related applications**	MINT
Config level	Advanced		
Setpoint visibility	Always		
Description			
This setpoint defines the slope of the VAr droop correlation. The slope is set as a droop of voltage in percentages of the generator nominal voltage (Basic settings: **Nominal Voltage Ph-N (page 256)**) on the range of the requested reactive power from 0 to 100% of nominal reactive power (value of nominal reactive power is not given by setpoint but it is calculated from setpoint **Nominal Power (page 252)** whilst the PF=0,8).			

back to List of setpoints

Voltage Droop Offset

Setpoint group	Droop Settings	**Related FW**	1.3.0
Range [units]	0 .. 100 [%]		
Default value	100 %	**Alternative config**	NO
Step	1 %		
Comm object	13214	**Related applications**	MINT
Config level	Advanced		
Setpoint visibility	Always		
Description			
This setpoint defines the value of requested reactive power on the nominal voltage (Basic settings: **Nominal Voltage Ph-N (page 256)**). Allows to shift the droop correlation line up or down.			

back to List of setpoints

Subgroup: Emergency Droop Settings

#Number Of Controller On CAN

Setpoint group	Droop Settings	**Related FW**	1.3.0
Range [units]	1 .. 32 [-]		
Default value	1	**Alternative config**	NO
Step	1		
Comm object	13953	**Related applications**	MINT
Config level	Advanced		
Setpoint visibility	Always		
Description			

This setpoint defines the minimum number of units supposed to be connected to CAN2. See values CAN16 and CAN32 for information about number of controllers on CAN2 bus. Controller counts itself as well, the number is always 1 or higher, it is never 0. If the number of controllers detected by the controller on CAN2 is lower than the number in this setpoint, the system falls in emergency droop, it means that regulations are switched to droop after delay defined by **#Emergency Droop On Delay (page 360)**. If the intercontroller communication recovers (the number of controllers detected on CAN2 gets equal or higher than value in this setpoint, then the system turns the regulations back to isochronous mode after delay defined by setpoint **#Emergency Droop Off Delay (page 360)**.

> ***Note:*** *This function is available only when **Load/Var Sharing Regulation Type (page 356)** = Emergency Droop.*

back to List of setpoints

#Emergency Droop On Delay

Setpoint group	Droop Settings	**Related FW**	1.3.0
Range [units]	0,0 .. 10,0 [s]		
Default value	10,0 s	**Alternative config**	NO
Step	0,1 s		
Comm object	13954	**Related applications**	MINT
Config level	Advanced		
Setpoint visibility	Always		
Description			

This setpoint adjusts the delay for switching from isochronou regulation to droop regulation when number of controller detected by the controller on CAN2 is lower than the number in the setpoint **#Number Of Controller On CAN (page 359)**.

> ***Note:*** *This function is available only when* ***Load/Var Sharing Regulation Type (page 356)*** *= Emergency Droop.*

back to List of setpoints

#Emergency Droop Off Delay

Setpoint group	Droop Settings	**Related FW**	1.3.0
Range [units]	0,0 .. 10,0 [s]		
Default value	10,0 s	**Alternative config**	NO
Step	0,1 s		
Comm object	13955	**Related applications**	MINT
Config level	Advanced		
Setpoint visibility	Always		
Description			

This setpoint adjusts the delay for switching from droop regulation to isochronous regulation when number of controller detected by the controller on CAN2 is equal or higher than the number in the setpoint **#Number Of Controller On CAN (page 359)**.

> ***Note:*** *This function is available only when* ***Load/Var Sharing Regulation Type (page 356)*** *= Emergency Droop.*

back to List of setpoints

Group: General Analog Inputs

General Analog Input 1

Analog Protection 1 Wrn

Setpoint group	General Analog Inputs	**Related FW**	1.3.0
Range [units]	the range is defined by analog sensor curve		
Default value	the value is defined by analog sensor curve	**Alternative config**	NO
Step	the step is defined by analog sensor curve		
Comm object	9259	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Visible only if the logical analog input **AIN PROT01 (PAGE 729)** is configured		
Description			
Warning or history threshold level for **AIN PROT01 (PAGE 729)**.			

Note: *These setpoints are used only if LAI **AIN PROT01 (PAGE 729)** is adjusted to required protection type. Otherwise these setpoints are useless.*

back to List of setpoints

Analog Protection 1 Sd

Setpoint group	General Analog Inputs	**Related FW**	1.3.0
Range [units]	the range is defined by analog sensor curve		
Default value	the value is defined by analog sensor curve	**Alternative config**	NO
Step	the step is defined by analog sensor curve		
Comm object	9260	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Visible only if the logical analog input **AIN PROT01 (PAGE 729)** is configured		
Description			
Shutdown or BOC threshold level for **AIN PROT01 (PAGE 729)**.			

Note: *These setpoints are used only if LAI **AIN PROT01 (PAGE 729)** is adjusted to required protection type. Otherwise these setpoints are useless.*

back to List of setpoints

Analog Protection 1 Delay

Setpoint group	General Analog Inputs	**Related FW**	1.3.0
Range [units]	0 .. 900 [s]		
Default value	0 s	**Alternative config**	NO
Step	1 s		
Comm object	9261	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Visible only if the logical analog input **AIN PROT01 (PAGE 729)** is configured		
Description			
Delay for **AIN PROT01 (PAGE 729)**. ***Note:*** *These setpoints are used only if LAI **AIN PROT01 (PAGE 729)** is adjusted to required protection type. Otherwise these setpoints are useless.*			

back to List of setpoints

Analog Switch 1 On

Setpoint group	General Analog Inputs	**Related FW**	1.3.0
Range [units]	the range is defined by analog sensor curve		
Default value	the value is defined by analog sensor curve	**Alternative config**	NO
Step	the step is defined by analog sensor curve		
Comm object	11407	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Visible only if the logical binary output **AIN SWITCH01 (PAGE 680)** is configured		
Description			
Threshold level for switching the binary output **AIN SWITCH01 (PAGE 680)** on. The value is measured from **AIN SWITCH 01 (PAGE 749)** analog input.			

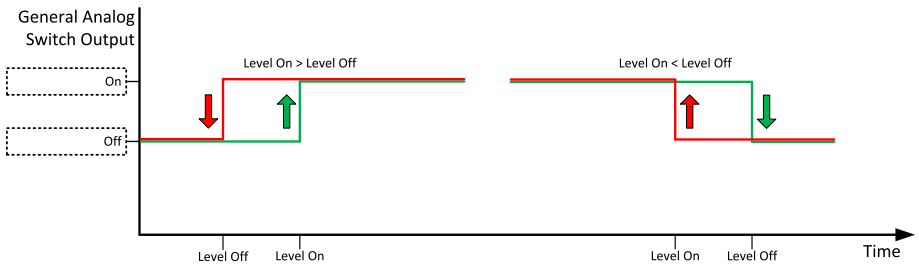


Image 8.25 General analog input 1 switch

back to List of setpoints

Analog Switch 1 Off

Setpoint group	General Analog Inputs	**Related FW**	1.3.0
Range [units]	the range is defined by analog sensor curve		
Default value	the value is defined by analog sensor curve	**Alternative config**	NO
Step	the step is defined by analog sensor curve		
Comm object	11410	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Visible only if the logical binary output **AIN SWITCH01 (PAGE 680)** is configured		
Description			

Threshold level for switching the binary output **AIN SWITCH01 (PAGE 680)** off. The value is measured from **AIN SWITCH 01 (PAGE 749)** analog input.



Image 8.26 General analog input 1 switch

back to List of setpoints

General Analog Input 2

Analog Protection 2 Wrn

Setpoint group	General Analog Inputs	**Related FW**	1.3.0
Range [units]	the range is defined by analog sensor curve		
Default value	the value is defined by analog sensor curve	**Alternative config**	NO
Step	the step is defined by analog sensor curve		
Comm object	9262	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Visible only if the logical analog input **AIN PROT02 (PAGE 730)** is configured		
Description			

Warning or history threshold level for **AIN PROT02 (PAGE 730)**.

Note: *These setpoints are used only if LAI **AIN PROT02 (PAGE 730)** is adjusted to required protection type. Otherwise these setpoints are useless.*

back to List of setpoints

Analog Protection 2 Sd

Setpoint group	General Analog Inputs	**Related FW**	1.3.0
Range [units]	the range is defined by analog sensor curve		
Default value	the value is defined by analog sensor curve	**Alternative config**	NO
Step	the step is defined by analog sensor curve		
Comm object	9263	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Visible only if the logical analog input **AIN PROT02 (PAGE 730)** is configured		
Description			
Shutdown or BOC threshold level for **AIN PROT02 (PAGE 730)**. ***Note:*** *These setpoints are used only if LAI **AIN PROT02 (PAGE 730)** is adjusted to required protection type. Otherwise these setpoints are useless.*			

back to List of setpoints

Analog Protection 2 Delay

Setpoint group	General Analog Inputs	**Related FW**	1.3.0
Range [units]	0 .. 900 [s]		
Default value	0 s	**Alternative config**	NO
Step	1 s		
Comm object	9264	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Visible only if the logical analog input **AIN PROT02 (PAGE 730)** is configured		
Description			
Delay for **AIN PROT02 (PAGE 730)**. ***Note:*** *These setpoints are used only if LAI **AIN PROT02 (PAGE 730)** is adjusted to required protection type. Otherwise these setpoints are useless.*			

back to List of setpoints

Analog Switch 2 On

Setpoint group	General Analog Inputs	**Related FW**	1.3.0
Range [units]	the range is defined by analog sensor curve		
Default value	the value is defined by analog sensor curve	**Alternative config**	NO
Step	the step is defined by analog sensor curve		
Comm object	11408	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Visible only if the logical binary output **AIN SWITCH02 (PAGE 681)** is configured		
Description			

Threshold level for switching the binary output **AIN SWITCH 02 (PAGE 749)** on. The value is measured from **AIN SWITCH 02 (PAGE 749)** analog input.



Image 8.27 General analog input 2 switch

back to List of setpoints

Analog Switch 2 Off

Setpoint group	General Analog Inputs	**Related FW**	1.3.0
Range [units]	the range is defined by analog sensor curve		
Default value	the value is defined by analog sensor curve	**Alternative config**	NO
Step	the step is defined by analog sensor curve		
Comm object	11411	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Visible only if the logical binary output **AIN SWITCH02 (PAGE 681)** is configured		
Description			

Threshold level for switching the binary output **AIN SWITCH 02 (PAGE 749)** off. The value is measured from **AIN SWITCH 02 (PAGE 749)** analog input.



Image 8.28 General analog input 2 switch

back to List of setpoints

General Analog Input 3

Analog Protection 3 Wrn

Setpoint group	General Analog Inputs	**Related FW**	1.3.0
Range [units]	the range is defined by analog sensor curve		
Default value	the value is defined by analog sensor curve	**Alternative config**	NO
Step	the step is defined by analog sensor curve		
Comm object	9265	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Visible only if the logical analog input **AIN PROT03 (PAGE 731)** is configured		
Description			

Warning or history threshold level for **AIN PROT03 (PAGE 731)**.

Note: *These setpoints are used only if LAI **AIN PROT03 (PAGE 731)** is adjusted to required protection type. Otherwise these setpoints are useless.*

back to List of setpoints

Analog Protection 3 Sd

Setpoint group	General Analog Inputs	**Related FW**	1.3.0
Range [units]	the range is defined by analog sensor curve		
Default value	the value is defined by analog sensor curve	**Alternative config**	NO
Step	the step is defined by analog sensor curve		
Comm object	9266	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Visible only if the logical analog input **AIN PROT03 (PAGE 731)** is configured		
Description			
Shutdown or BOC threshold level for **AIN PROT03 (PAGE 731)**.			

Note: *These setpoints are used only if LAI **AIN PROT03 (PAGE 731)** is adjusted to required protection type. Otherwise these setpoints are useless.*

back to List of setpoints

Analog Protection 3 Delay

Setpoint group	General Analog Inputs	**Related FW**	1.3.0
Range [units]	0 .. 900 [s]		
Default value	0 s	**Alternative config**	NO
Step	1 s		
Comm object	9267	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Visible only if the logical analog input **AIN PROT03 (PAGE 731)** is configured		
Description			
Delay for **AIN PROT03 (PAGE 731)**.			

Note: *These setpoints are used only if LAI **AIN PROT03 (PAGE 731)** is adjusted to required protection type. Otherwise these setpoints are useless.*

back to List of setpoints

Analog Switch 3 On

Setpoint group	General Analog Inputs	**Related FW**	1.3.0
Range [units]	the range is defined by analog sensor curve		
Default value	the value is defined by analog sensor curve	**Alternative config**	NO
Step	the step is defined by analog sensor curve		
Comm object	11409	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Visible only if the logical binary output **AIN SWITCH03 (PAGE 681)** is configured		
Description			

Threshold level for switching the binary output **AIN SWITCH 03 (PAGE 749)** on. The value is measured from **AIN SWITCH 03 (PAGE 749)** analog input.



Image 8.29 General analog input 3 switch

back to List of setpoints

Analog Switch 3 Off

Setpoint group	General Analog Inputs	**Related FW**	1.3.0
Range [units]	the range is defined by analog sensor curve		
Default value	the value is defined by analog sensor curve	**Alternative config**	NO
Step	the step is defined by analog sensor curve		
Comm object	11412	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Visible only if the logical binary output **AIN SWITCH03 (PAGE 681)** is configured		
Description			

Threshold level for switching the binary output **AIN SWITCH 03 (PAGE 749)** off. The value is measured from **AIN SWITCH 03 (PAGE 749)** analog input.



Image 8.30 General analog input 3 switch

back to List of setpoints

General Analog Input 4

Analog Protection 4 Wrn

Setpoint group	General Analog Inputs	**Related FW**	1.3.0
Range [units]	the range is defined by analog sensor curve		
Default value	the value is defined by analog sensor curve	**Alternative config**	NO
Step	the step is defined by analog sensor curve		
Comm object	9268	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Visible only if the logical analog input **AIN PROT04 (PAGE 732)** is configured		
Description			

Warning or history threshold level for **AIN PROT04 (PAGE 732)**.

Note: *These setpoints are used only if LAI **AIN PROT04 (PAGE 732)** is adjusted to required protection type. Otherwise these setpoints are useless.*

back to List of setpoints

Analog Protection 4 Sd

Setpoint group	General Analog Inputs	**Related FW**	1.3.0
Range [units]	the range is defined by analog sensor curve		
Default value	the value is defined by analog sensor curve	**Alternative config**	NO
Step	the step is defined by analog sensor curve		
Comm object	9269	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Visible only if the logical analog input **AIN PROT04 (PAGE 732)** is configured		
Description			
Shutdown or BOC threshold level for **AIN PROT04 (PAGE 732)**.			

Note: *These setpoints are used only if LAI **AIN PROT04 (PAGE 732)** is adjusted to required protection type. Otherwise these setpoints are useless.*

back to List of setpoints

Analog Protection 4 Delay

Setpoint group	General Analog Inputs	**Related FW**	1.3.0
Range [units]	0 .. 900 [s]		
Default value	0 s	**Alternative config**	NO
Step	1 s		
Comm object	9270	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Visible only if the logical analog input **AIN PROT04 (PAGE 732)** is configured		
Description			
Delay for **AIN PROT04 (PAGE 732)**.			

Note: *These setpoints are used only if LAI **AIN PROT04 (PAGE 732)** is adjusted to required protection type. Otherwise these setpoints are useless.*

back to List of setpoints

Analog Switch 4 On

Setpoint group	General Analog Inputs	**Related FW**	1.3.0
Range [units]	the range is defined by analog sensor curve		
Default value	the value is defined by analog sensor curve	**Alternative config**	NO
Step	the step is defined by analog sensor curve		
Comm object	14385	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Visible only if the logical binary output **AIN SWITCH04 (PAGE 682)** is configured		
Description			

Threshold level for switching the binary output **AIN SWITCH 04 (PAGE 750)** on. The value is measured from **AIN SWITCH 04 (PAGE 750)** analog input.



Image 8.31 General analog input 4 switch

back to List of setpoints

Analog Switch 4 Off

Setpoint group	General Analog Inputs	**Related FW**	1.3.0
Range [units]	the range is defined by analog sensor curve		
Default value	the value is defined by analog sensor curve	**Alternative config**	NO
Step	the step is defined by analog sensor curve		
Comm object	14386	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Visible only if the logical binary output **AIN SWITCH04 (PAGE 682)** is configured		
Description			

Threshold level for switching the binary output **AIN SWITCH 04 (PAGE 750)** off. The value is measured from **AIN SWITCH 04 (PAGE 750)** analog input.



Image 8.32 General analog input 4 switch

back to List of setpoints

General Analog Input 5

Analog Protection 5 Wrn

Setpoint group	General Analog Inputs	**Related FW**	1.3.0
Range [units]	the range is defined by analog sensor curve		
Default value	the value is defined by analog sensor curve	**Alternative config**	NO
Step	the step is defined by analog sensor curve		
Comm object	9271	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Visible only if the logical analog input **AIN PROT05 (PAGE 733)** is configured		
Description			

Warning or history threshold level for **AIN PROT05 (PAGE 733)**.

Note: *These setpoints are used only if LAI **AIN PROT05 (PAGE 733)** is adjusted to required protection type. Otherwise these setpoints are useless.*

back to List of setpoints

Analog Protection 5 Sd

Setpoint group	General Analog Inputs	**Related FW**	1.3.0
Range [units]	the range is defined by analog sensor curve		
Default value	the value is defined by analog sensor curve	**Alternative config**	NO
Step	the step is defined by analog sensor curve		
Comm object	9272	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Visible only if the logical analog input **AIN PROT05 (PAGE 733)** is configured		
Description			
Shutdown or BOC threshold level for **AIN PROT05 (PAGE 733)**.			

Note: *These setpoints are used only if LAI **AIN PROT05 (PAGE 733)** is adjusted to required protection type. Otherwise these setpoints are useless.*

back to List of setpoints

Analog Protection 5 Delay

Setpoint group	General Analog Inputs	**Related FW**	1.3.0
Range [units]	0 .. 900 [s]		
Default value	0 s	**Alternative config**	NO
Step	1 s		
Comm object	9273	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Visible only if the logical analog input **AIN PROT05 (PAGE 733)** is configured		
Description			
Delay for **AIN PROT05 (PAGE 733)**.			

Note: *These setpoints are used only if LAI **AIN PROT05 (PAGE 733)** is adjusted to required protection type. Otherwise these setpoints are useless.*

back to List of setpoints

Analog Switch 5 On

Setpoint group	General Analog Inputs	**Related FW**	1.3.0
Range [units]	the range is defined by analog sensor curve		
Default value	the value is defined by analog sensor curve	**Alternative config**	NO
Step	the step is defined by analog sensor curve		
Comm object	14963	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Visible only if the logical binary output **AIN SWITCH04 (PAGE 682)** is configured		
Description			

Threshold level for switching the binary output **AIN SWITCH 05 (PAGE 750)** on. The value is measured from **AIN SWITCH 05 (PAGE 750)** analog input.



Image 8.33 General analog input 4 switch

back to List of setpoints

Analog Switch 5 Off

Setpoint group	General Analog Inputs	**Related FW**	1.3.0
Range [units]	the range is defined by analog sensor curve		
Default value	the value is defined by analog sensor curve	**Alternative config**	NO
Step	the step is defined by analog sensor curve		
Comm object	14979	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Visible only if the logical binary output **AIN SWITCH04 (PAGE 682)** is configured		
Description			

Threshold level for switching the binary output **AIN SWITCH 05 (PAGE 750)** off. The value is measured from **AIN SWITCH 05 (PAGE 750)** analog input.



Image 8.34 General analog input 4 switch

back to List of setpoints

General Analog Input 6

Analog Protection 6 Wrn

Setpoint group	General Analog Inputs	**Related FW**	1.3.0
Range [units]	the range is defined by analog sensor curve		
Default value	the value is defined by analog sensor curve	**Alternative config**	NO
Step	the step is defined by analog sensor curve		
Comm object	9274	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Visible only if the logical analog input **AIN PROT06 (PAGE 734)** is configured		
Description			

Warning or history threshold level for **AIN PROT06 (PAGE 734)**.

Note: *These setpoints are used only if LAI **AIN PROT06 (PAGE 734)** is adjusted to required protection type. Otherwise these setpoints are useless.*

back to List of setpoints

Analog Protection 6 Sd

Setpoint group	General Analog Inputs	**Related FW**	1.3.0
Range [units]	the range is defined by analog sensor curve		
Default value	the value is defined by analog sensor curve	**Alternative config**	NO
Step	the step is defined by analog sensor curve		
Comm object	9275	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Visible only if the logical analog input **AIN PROT06 (PAGE 734)** is configured		
Description			
Shutdown or BOC threshold level for **AIN PROT06 (PAGE 734)**. ***Note:*** *These setpoints are used only if LAI **AIN PROT06 (PAGE 734)** is adjusted to required protection type. Otherwise these setpoints are useless.*			

back to List of setpoints

Analog Protection 6 Delay

Setpoint group	General Analog Inputs	**Related FW**	1.3.0
Range [units]	0 .. 900 [s]		
Default value	0 s	**Alternative config**	NO
Step	1 s		
Comm object	9276	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Visible only if the logical analog input **AIN PROT06 (PAGE 734)** is configured		
Description			
Delay for **AIN PROT06 (PAGE 734)**. ***Note:*** *These setpoints are used only if LAI **AIN PROT06 (PAGE 734)** is adjusted to required protection type. Otherwise these setpoints are useless.*			

back to List of setpoints

Analog Switch 6 On

Setpoint group	General Analog Inputs	**Related FW**	1.3.0
Range [units]	the range is defined by analog sensor curve		
Default value	the value is defined by analog sensor curve	**Alternative config**	NO
Step	the step is defined by analog sensor curve		
Comm object	14964	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Visible only if the logical binary output **AIN SWITCH04 (PAGE 682)** is configured		
Description			

Threshold level for switching the binary output **AIN SWITCH 06 (PAGE 750)** on. The value is measured from **AIN SWITCH 04 (PAGE 750)** analog input.



Image 8.35 General analog input 4 switch

back to List of setpoints

Analog Switch 6 Off

Setpoint group	General Analog Inputs	**Related FW**	1.3.0
Range [units]	the range is defined by analog sensor curve		
Default value	the value is defined by analog sensor curve	**Alternative config**	NO
Step	the step is defined by analog sensor curve		
Comm object	14980	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Visible only if the logical binary output **AIN SWITCH04 (PAGE 682)** is configured		
Description			

Threshold level for switching the binary output **AIN SWITCH 06 (PAGE 750)** off. The value is measured from **AIN SWITCH 04 (PAGE 750)** analog input.



Image 8.36 General analog input 4 switch

back to List of setpoints

General Analog Input 7

Analog Protection 7 Wrn

Setpoint group	General Analog Inputs	**Related FW**	1.3.0
Range [units]	the range is defined by analog sensor curve		
Default value	the value is defined by analog sensor curve	**Alternative config**	NO
Step	the step is defined by analog sensor curve		
Comm object	9277	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Visible only if the logical analog input **AIN PROT07 (PAGE 735)** is configured		
Description			

Warning or history threshold level for **AIN PROT07 (PAGE 735)**.

Note: *These setpoints are used only if LAI **AIN PROT07 (PAGE 735)** is adjusted to required protection type. Otherwise these setpoints are useless.*

back to List of setpoints

Analog Protection 7 Sd

Setpoint group	General Analog Inputs	**Related FW**	1.3.0
Range [units]	the range is defined by analog sensor curve		
Default value	the value is defined by analog sensor curve	**Alternative config**	NO
Step	the step is defined by analog sensor curve		
Comm object	9278	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Visible only if the logical analog input **AIN PROT07 (PAGE 735)** is configured		
Description			
Shutdown or BOC threshold level for **AIN PROT07 (PAGE 735)**.			

Note: *These setpoints are used only if LAI **AIN PROT07 (PAGE 735)** is adjusted to required protection type. Otherwise these setpoints are useless.*

back to List of setpoints

Analog Protection 7 Delay

Setpoint group	General Analog Inputs	**Related FW**	1.3.0
Range [units]	0 .. 900 [s]		
Default value	0 s	**Alternative config**	NO
Step	1 s		
Comm object	9279	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Visible only if the logical analog input **AIN PROT07 (PAGE 735)** is configured		
Description			
Delay for **AIN PROT07 (PAGE 735)**.			

Note: *These setpoints are used only if LAI **AIN PROT07 (PAGE 735)** is adjusted to required protection type. Otherwise these setpoints are useless.*

back to List of setpoints

Analog Switch 7 On

Setpoint group	General Analog Inputs	**Related FW**	1.3.0
Range [units]	the range is defined by analog sensor curve		
Default value	the value is defined by analog sensor curve	**Alternative config**	NO
Step	the step is defined by analog sensor curve		
Comm object	14965	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Visible only if the logical binary output **AIN SWITCH04 (PAGE 682)** is configured		
Description			

Threshold level for switching the binary output **AIN SWITCH 07 (PAGE 751)** on. The value is measured from **AIN SWITCH 04 (PAGE 750)** analog input.



Image 8.37 General analog input 4 switch

back to List of setpoints

Analog Switch 7 Off

Setpoint group	General Analog Inputs	**Related FW**	1.3.0
Range [units]	the range is defined by analog sensor curve		
Default value	the value is defined by analog sensor curve	**Alternative config**	NO
Step	the step is defined by analog sensor curve		
Comm object	14981	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Visible only if the logical binary output **AIN SWITCH04 (PAGE 682)** is configured		
Description			

Threshold level for switching the binary output **AIN SWITCH 07 (PAGE 751)** off. The value is measured from **AIN SWITCH 04 (PAGE 750)** analog input.



Image 8.38 General analog input 4 switch

back to List of setpoints

General Analog Input 8

Analog Protection 8 Wrn

Setpoint group	General Analog Inputs	**Related FW**	1.3.0
Range [units]	the range is defined by analog sensor curve		
Default value	the value is defined by analog sensor curve	**Alternative config**	NO
Step	the step is defined by analog sensor curve		
Comm object	9280	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Visible only if the logical analog input **AIN PROT08 (PAGE 736)** is configured		
Description			

Warning or history threshold level for **AIN PROT08 (PAGE 736)**.

Note: *These setpoints are used only if LAI **AIN PROT08 (PAGE 736)** is adjusted to required protection type. Otherwise these setpoints are useless.*

back to List of setpoints

Analog Protection 8 Sd

Setpoint group	General Analog Inputs	**Related FW**	1.3.0
Range [units]	the range is defined by analog sensor curve		
Default value	the value is defined by analog sensor curve	**Alternative config**	NO
Step	the step is defined by analog sensor curve		
Comm object	9281	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Visible only if the logical analog input **AIN PROT08 (PAGE 736)** is configured		
Description			
Shutdown or BOC threshold level for **AIN PROT08 (PAGE 736)**. ***Note:*** *These setpoints are used only if LAI **AIN PROT08 (PAGE 736)** is adjusted to required protection type. Otherwise these setpoints are useless.*			

back to List of setpoints

Analog Protection 8 Delay

Setpoint group	General Analog Inputs	**Related FW**	1.3.0
Range [units]	0 .. 900 [s]		
Default value	0 s	**Alternative config**	NO
Step	1 s		
Comm object	9282	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Visible only if the logical analog input **AIN PROT08 (PAGE 736)** is configured		
Description			
Delay for **AIN PROT08 (PAGE 736)**. ***Note:*** *These setpoints are used only if LAI **AIN PROT08 (PAGE 736)** is adjusted to required protection type. Otherwise these setpoints are useless.*			

back to List of setpoints

Analog Switch 8 On

Setpoint group	General Analog Inputs	**Related FW**	1.3.0
Range [units]	the range is defined by analog sensor curve		
Default value	the value is defined by analog sensor curve	**Alternative config**	NO
Step	the step is defined by analog sensor curve		
Comm object	14966	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Visible only if the logical binary output **AIN SWITCH04 (PAGE 682)** is configured		
Description			

Threshold level for switching the binary output **AIN SWITCH 08 (PAGE 751)** on. The value is measured from **AIN SWITCH 04 (PAGE 750)** analog input.



Image 8.39 General analog input 4 switch

back to List of setpoints

Analog Switch 8 Off

Setpoint group	General Analog Inputs	**Related FW**	1.3.0
Range [units]	the range is defined by analog sensor curve		
Default value	the value is defined by analog sensor curve	**Alternative config**	NO
Step	the step is defined by analog sensor curve		
Comm object	14982	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Visible only if the logical binary output **AIN SWITCH04 (PAGE 682)** is configured		
Description			

Threshold level for switching the binary output **AIN SWITCH 08 (PAGE 751)** off. The value is measured from **AIN SWITCH 04 (PAGE 750)** analog input.



Image 8.40 General analog input 4 switch

back to List of setpoints

General Analog Input 9

Analog Protection 9 Wrn

Setpoint group	General Analog Inputs	**Related FW**	1.3.0
Range [units]	the range is defined by analog sensor curve		
Default value	the value is defined by analog sensor curve	**Alternative config**	NO
Step	the step is defined by analog sensor curve		
Comm object	9283	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Visible only if the logical analog input **AIN PROT09 (PAGE 737)** is configured		
Description			

Warning or history threshold level for **AIN PROT09 (PAGE 737)**.

Note: *These setpoints are used only if LAI **AIN PROT09 (PAGE 737)** is adjusted to required protection type. Otherwise these setpoints are useless.*

back to List of setpoints

Analog Protection 9 Sd

Setpoint group	General Analog Inputs	**Related FW**	1.3.0
Range [units]	the range is defined by analog sensor curve		
Default value	the value is defined by analog sensor curve	**Alternative config**	NO
Step	the step is defined by analog sensor curve		
Comm object	9284	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Visible only if the logical analog input **AIN PROT09 (PAGE 737)** is configured		
Description			
Shutdown or BOC threshold level for **AIN PROT09 (PAGE 737)**. ***Note:*** *These setpoints are used only if LAI **AIN PROT09 (PAGE 737)** is adjusted to required protection type. Otherwise these setpoints are useless.*			

back to List of setpoints

Analog Protection 9 Delay

Setpoint group	General Analog Inputs	**Related FW**	1.3.0
Range [units]	0 .. 900 [s]		
Default value	0 s	**Alternative config**	NO
Step	1 s		
Comm object	9285	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Visible only if the logical analog input **AIN PROT09 (PAGE 737)** is configured		
Description			
Delay for **AIN PROT09 (PAGE 737)**. ***Note:*** *These setpoints are used only if LAI **AIN PROT09 (PAGE 737)** is adjusted to required protection type. Otherwise these setpoints are useless.*			

back to List of setpoints

Analog Switch 9 On

Setpoint group	General Analog Inputs	**Related FW**	1.3.0
Range [units]	the range is defined by analog sensor curve		
Default value	the value is defined by analog sensor curve	**Alternative config**	NO
Step	the step is defined by analog sensor curve		
Comm object	14967	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Visible only if the logical binary output **AIN SWITCH04 (PAGE 682)** is configured		
Description			

Threshold level for switching the binary output **AIN SWITCH 09 (PAGE 751)** on. The value is measured from **AIN SWITCH 04 (PAGE 750)** analog input.



Image 8.41 General analog input 4 switch

back to List of setpoints

Analog Switch 9 Off

Setpoint group	General Analog Inputs	**Related FW**	1.3.0
Range [units]	the range is defined by analog sensor curve		
Default value	the value is defined by analog sensor curve	**Alternative config**	NO
Step	the step is defined by analog sensor curve		
Comm object	14983	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Visible only if the logical binary output **AIN SWITCH04 (PAGE 682)** is configured		
Description			

Threshold level for switching the binary output **AIN SWITCH 09 (PAGE 751)** off. The value is measured from **AIN SWITCH 04 (PAGE 750)** analog input.



Image 8.42 General analog input 4 switch

back to List of setpoints

General Analog Input 10

Analog Protection 10 Wrn

Setpoint group	General Analog Inputs	**Related FW**	1.3.0
Range [units]	the range is defined by analog sensor curve		
Default value	the value is defined by analog sensor curve	**Alternative config**	NO
Step	the step is defined by analog sensor curve		
Comm object	9286	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Visible only if the logical analog input **AIN PROT10 (PAGE 738)** is configured		
Description			

Warning or history threshold level for **AIN PROT10 (PAGE 738)**.

Note: *These setpoints are used only if LAI **AIN PROT10 (PAGE 738)** is adjusted to required protection type. Otherwise these setpoints are useless.*

back to List of setpoints

Analog Protection 10 Sd

Setpoint group	General Analog Inputs	**Related FW**	1.3.0
Range [units]	the range is defined by analog sensor curve		
Default value	the value is defined by analog sensor curve	**Alternative config**	NO
Step	the step is defined by analog sensor curve		
Comm object	9287	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Visible only if the logical analog input **AIN PROT10 (PAGE 738)** is configured		
Description			
Shutdown or BOC threshold level for **AIN PROT10 (PAGE 738)**.			

Note: *These setpoints are used only if LAI **AIN PROT10 (PAGE 738)** is adjusted to required protection type. Otherwise these setpoints are useless.*

back to List of setpoints

Analog Protection 10 Delay

Setpoint group	General Analog Inputs	**Related FW**	1.3.0
Range [units]	0 .. 900 [s]		
Default value	0 s	**Alternative config**	NO
Step	1 s		
Comm object	9288	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Visible only if the logical analog input **AIN PROT10 (PAGE 738)** is configured		
Description			
Delay for **AIN PROT10 (PAGE 738)**.			

Note: *These setpoints are used only if LAI **AIN PROT10 (PAGE 738)** is adjusted to required protection type. Otherwise these setpoints are useless.*

back to List of setpoints

Analog Switch 10 On

Setpoint group	General Analog Inputs	**Related FW**	1.3.0
Range [units]	the range is defined by analog sensor curve		
Default value	the value is defined by analog sensor curve	**Alternative config**	NO
Step	the step is defined by analog sensor curve		
Comm object	14968	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Visible only if the logical binary output **AIN SWITCH04 (PAGE 682)** is configured		
Description			

Threshold level for switching the binary output **AIN SWITCH 10 (PAGE 752)** on. The value is measured from **AIN SWITCH 04 (PAGE 750)** analog input.



Image 8.43 General analog input 4 switch

back to List of setpoints

Analog Switch 10 Off

Setpoint group	General Analog Inputs	**Related FW**	1.3.0
Range [units]	the range is defined by analog sensor curve		
Default value	the value is defined by analog sensor curve	**Alternative config**	NO
Step	the step is defined by analog sensor curve		
Comm object	14984	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Visible only if the logical binary output **AIN SWITCH04 (PAGE 682)** is configured		
Description			

Threshold level for switching the binary output **AIN SWITCH 10 (PAGE 752)** off. The value is measured from **AIN SWITCH 04 (PAGE 750)** analog input.



Image 8.44 General analog input 4 switch

back to List of setpoints

General Analog Input 11

Analog Protection 11 Wrn

Setpoint group	General Analog Inputs	**Related FW**	1.3.0
Range [units]	the range is defined by analog sensor curve		
Default value	the value is defined by analog sensor curve	**Alternative config**	NO
Step	the step is defined by analog sensor curve		
Comm object	9289	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Visible only if the logical analog input **AIN PROT11 (PAGE 739)** is configured		
Description			

Warning or history threshold level for **AIN PROT11 (PAGE 739)**.

Note: *These setpoints are used only if LAI **AIN PROT11 (PAGE 739)** is adjusted to required protection type. Otherwise these setpoints are useless.*

back to List of setpoints

Analog Protection 11 Sd

Setpoint group	General Analog Inputs	**Related FW**	1.3.0
Range [units]	the range is defined by analog sensor curve		
Default value	the value is defined by analog sensor curve	**Alternative config**	NO
Step	the step is defined by analog sensor curve		
Comm object	9290	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Visible only if the logical analog input **AIN PROT11 (PAGE 739)** is configured		
Description			
Shutdown or BOC threshold level for **AIN PROT11 (PAGE 739)**.			

Note: *These setpoints are used only if LAI **AIN PROT11 (PAGE 739)** is adjusted to required protection type. Otherwise these setpoints are useless.*

back to List of setpoints

Analog Protection 11 Delay

Setpoint group	General Analog Inputs	**Related FW**	1.3.0
Range [units]	0 .. 900 [s]		
Default value	0 s	**Alternative config**	NO
Step	1 s		
Comm object	9291	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Visible only if the logical analog input **AIN PROT11 (PAGE 739)** is configured		
Description			
Delay for **AIN PROT11 (PAGE 739)**.			

Note: *These setpoints are used only if LAI **AIN PROT11 (PAGE 739)** is adjusted to required protection type. Otherwise these setpoints are useless.*

back to List of setpoints

Analog Switch 11 On

Setpoint group	General Analog Inputs	**Related FW**	1.3.0
Range [units]	the range is defined by analog sensor curve		
Default value	the value is defined by analog sensor curve	**Alternative config**	NO
Step	the step is defined by analog sensor curve		
Comm object	14969	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Visible only if the logical binary output **AIN SWITCH04 (PAGE 682)** is configured		
Description			

Threshold level for switching the binary output **AIN SWITCH 11 (PAGE 752)** on. The value is measured from **AIN SWITCH 04 (PAGE 750)** analog input.



Image 8.45 General analog input 4 switch

back to List of setpoints

Analog Switch 11 Off

Setpoint group	General Analog Inputs	**Related FW**	1.3.0
Range [units]	the range is defined by analog sensor curve		
Default value	the value is defined by analog sensor curve	**Alternative config**	NO
Step	the step is defined by analog sensor curve		
Comm object	14985	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Visible only if the logical binary output **AIN SWITCH04 (PAGE 682)** is configured		
Description			

Threshold level for switching the binary output **AIN SWITCH 11 (PAGE 752)** off. The value is measured from **AIN SWITCH 04 (PAGE 750)** analog input.



Image 8.46 General analog input 4 switch

back to List of setpoints

General Analog Input 12

Analog Protection 12 Wrn

Setpoint group	General Analog Inputs	**Related FW**	1.3.0
Range [units]	the range is defined by analog sensor curve		
Default value	the value is defined by analog sensor curve	**Alternative config**	NO
Step	the step is defined by analog sensor curve		
Comm object	9292	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Visible only if the logical analog input **AIN PROT12 (PAGE 740)** is configured		
Description			

Warning or history threshold level for **AIN PROT12 (PAGE 740)**.

Note: *These setpoints are used only if LAI **AIN PROT12 (PAGE 740)** is adjusted to required protection type. Otherwise these setpoints are useless.*

back to List of setpoints

Analog Protection 12 Sd

Setpoint group	General Analog Inputs	**Related FW**	1.3.0
Range [units]	the range is defined by analog sensor curve		
Default value	the value is defined by analog sensor curve	**Alternative config**	NO
Step	the step is defined by analog sensor curve		
Comm object	9293	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Visible only if the logical analog input **AIN PROT12 (PAGE 740)** is configured		
Description			
Shutdown or BOC threshold level for **AIN PROT12 (PAGE 740)**.			

Note: *These setpoints are used only if LAI **AIN PROT12 (PAGE 740)** is adjusted to required protection type. Otherwise these setpoints are useless.*

back to List of setpoints

Analog Protection 12 Delay

Setpoint group	General Analog Inputs	**Related FW**	1.3.0
Range [units]	0 .. 900 [s]		
Default value	0 s	**Alternative config**	NO
Step	1 s		
Comm object	9294	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Visible only if the logical analog input **AIN PROT12 (PAGE 740)** is configured		
Description			
Delay for **AIN PROT12 (PAGE 740)**.			

Note: *These setpoints are used only if LAI **AIN PROT12 (PAGE 740)** is adjusted to required protection type. Otherwise these setpoints are useless.*

back to List of setpoints

Analog Switch 12 On

Setpoint group	General Analog Inputs	**Related FW**	1.3.0
Range [units]	the range is defined by analog sensor curve		
Default value	the value is defined by analog sensor curve	**Alternative config**	NO
Step	the step is defined by analog sensor curve		
Comm object	14970	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Visible only if the logical binary output **AIN SWITCH04 (PAGE 682)** is configured		
Description			

Threshold level for switching the binary output **AIN SWITCH 12 (PAGE 752)** on. The value is measured from **AIN SWITCH 04 (PAGE 750)** analog input.



Image 8.47 General analog input 4 switch

back to List of setpoints

Analog Switch 12 Off

Setpoint group	General Analog Inputs	**Related FW**	1.3.0
Range [units]	the range is defined by analog sensor curve		
Default value	the value is defined by analog sensor curve	**Alternative config**	NO
Step	the step is defined by analog sensor curve		
Comm object	14986	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Visible only if the logical binary output **AIN SWITCH04 (PAGE 682)** is configured		
Description			

Threshold level for switching the binary output **AIN SWITCH 12 (PAGE 752)** off. The value is measured from **AIN SWITCH 04 (PAGE 750)** analog input.



Image 8.48 General analog input 4 switch

back to List of setpoints

General Analog Input 13

Analog Protection 13 Wrn

Setpoint group	General Analog Inputs	**Related FW**	1.3.0
Range [units]	the range is defined by analog sensor curve		
Default value	the value is defined by analog sensor curve	**Alternative config**	NO
Step	the step is defined by analog sensor curve		
Comm object	9295	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Visible only if the logical analog input **AIN PROT13 (PAGE 741)** is configured		
Description			

Warning or history threshold level for **AIN PROT13 (PAGE 741)**.

Note: *These setpoints are used only if LAI **AIN PROT13 (PAGE 741)** is adjusted to required protection type. Otherwise these setpoints are useless.*

back to List of setpoints

Analog Protection 13 Sd

Setpoint group	General Analog Inputs	**Related FW**	1.3.0
Range [units]	the range is defined by analog sensor curve		
Default value	the value is defined by analog sensor curve	**Alternative config**	NO
Step	the step is defined by analog sensor curve		
Comm object	9296	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Visible only if the logical analog input **AIN PROT13 (PAGE 741)** is configured		
Description			
Shutdown or BOC threshold level for **AIN PROT13 (PAGE 741)**.			

Note: *These setpoints are used only if LAI **AIN PROT13 (PAGE 741)** is adjusted to required protection type. Otherwise these setpoints are useless.*

back to List of setpoints

Analog Protection 13 Delay

Setpoint group	General Analog Inputs	**Related FW**	1.3.0
Range [units]	0 .. 900 [s]		
Default value	0 s	**Alternative config**	NO
Step	1 s		
Comm object	9297	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Visible only if the logical analog input **AIN PROT13 (PAGE 741)** is configured		
Description			
Delay for **AIN PROT13 (PAGE 741)**.			

Note: *These setpoints are used only if LAI **AIN PROT13 (PAGE 741)** is adjusted to required protection type. Otherwise these setpoints are useless.*

back to List of setpoints

Analog Switch 13 On

Setpoint group	General Analog Inputs	**Related FW**	1.3.0
Range [units]	the range is defined by analog sensor curve		
Default value	the value is defined by analog sensor curve	**Alternative config**	NO
Step	the step is defined by analog sensor curve		
Comm object	14971	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Visible only if the logical binary output **AIN SWITCH04 (PAGE 682)** is configured		
Description			

Threshold level for switching the binary output **AIN SWITCH 13 (PAGE 753)** on. The value is measured from **AIN SWITCH 04 (PAGE 750)** analog input.



Image 8.49 General analog input 4 switch

back to List of setpoints

Analog Switch 13 Off

Setpoint group	General Analog Inputs	**Related FW**	1.3.0
Range [units]	the range is defined by analog sensor curve		
Default value	the value is defined by analog sensor curve	**Alternative config**	NO
Step	the step is defined by analog sensor curve		
Comm object	14987	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Visible only if the logical binary output **AIN SWITCH04 (PAGE 682)** is configured		
Description			

Threshold level for switching the binary output **AIN SWITCH 13 (PAGE 753)** off. The value is measured from **AIN SWITCH 04 (PAGE 750)** analog input.



Image 8.50 General analog input 4 switch

back to List of setpoints

General Analog Input 14

Analog Protection 14 Wrn

Setpoint group	General Analog Inputs	**Related FW**	1.3.0
Range [units]	the range is defined by analog sensor curve		
Default value	the value is defined by analog sensor curve	**Alternative config**	NO
Step	the step is defined by analog sensor curve		
Comm object	9298	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Visible only if the logical analog input **AIN PROT14 (PAGE 742)** is configured		
Description			

Warning or history threshold level for **AIN PROT14 (PAGE 742)**.

Note: *These setpoints are used only if LAI **AIN PROT14 (PAGE 742)** is adjusted to required protection type. Otherwise these setpoints are useless.*

back to List of setpoints

Analog Protection 14 Sd

Setpoint group	General Analog Inputs	**Related FW**	1.3.0
Range [units]	the range is defined by analog sensor curve		
Default value	the value is defined by analog sensor curve	**Alternative config**	NO
Step	the step is defined by analog sensor curve		
Comm object	9299	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Visible only if the logical analog input **AIN PROT14 (PAGE 742)** is configured		
Description			
Shutdown or BOC threshold level for **AIN PROT14 (PAGE 742)**.			

Note: *These setpoints are used only if LAI **AIN PROT14 (PAGE 742)** is adjusted to required protection type. Otherwise these setpoints are useless.*

back to List of setpoints

Analog Protection 14 Delay

Setpoint group	General Analog Inputs	**Related FW**	1.3.0
Range [units]	0 .. 900 [s]		
Default value	0 s	**Alternative config**	NO
Step	1 s		
Comm object	9300	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Visible only if the logical analog input **AIN PROT14 (PAGE 742)** is configured		
Description			
Delay for **AIN PROT14 (PAGE 742)**.			

Note: *These setpoints are used only if LAI **AIN PROT14 (PAGE 742)** is adjusted to required protection type. Otherwise these setpoints are useless.*

back to List of setpoints

Analog Switch 14 On

Setpoint group	General Analog Inputs	**Related FW**	1.3.0
Range [units]	the range is defined by analog sensor curve		
Default value	the value is defined by analog sensor curve	**Alternative config**	NO
Step	the step is defined by analog sensor curve		
Comm object	14972	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Visible only if the logical binary output **AIN SWITCH04 (PAGE 682)** is configured		
Description			

Threshold level for switching the binary output **AIN SWITCH 14 (PAGE 753)** on. The value is measured from **AIN SWITCH 04 (PAGE 750)** analog input.



Image 8.51 General analog input 4 switch

back to List of setpoints

Analog Switch 14 Off

Setpoint group	General Analog Inputs	**Related FW**	1.3.0
Range [units]	the range is defined by analog sensor curve		
Default value	the value is defined by analog sensor curve	**Alternative config**	NO
Step	the step is defined by analog sensor curve		
Comm object	14988	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Visible only if the logical binary output **AIN SWITCH04 (PAGE 682)** is configured		
Description			

Threshold level for switching the binary output **AIN SWITCH 14 (PAGE 753)** off. The value is measured from **AIN SWITCH 04 (PAGE 750)** analog input.



Image 8.52 General analog input 4 switch

back to List of setpoints

General Analog Input 15

Analog Protection 15 Wrn

Setpoint group	General Analog Inputs	**Related FW**	1.3.0
Range [units]	the range is defined by analog sensor curve		
Default value	the value is defined by analog sensor curve	**Alternative config**	NO
Step	the step is defined by analog sensor curve		
Comm object	9301	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Visible only if the logical analog input **AIN PROT15 (PAGE 743)** is configured		
Description			

Warning or history threshold level for **AIN PROT15 (PAGE 743)**.

Note: *These setpoints are used only if LAI **AIN PROT15 (PAGE 743)** is adjusted to required protection type. Otherwise these setpoints are useless.*

back to List of setpoints

Analog Protection 15 Sd

Setpoint group	General Analog Inputs	**Related FW**	1.3.0
Range [units]	the range is defined by analog sensor curve		
Default value	the value is defined by analog sensor curve	**Alternative config**	NO
Step	the step is defined by analog sensor curve		
Comm object	9302	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Visible only if the logical analog input **AIN PROT15 (PAGE 743)** is configured		
Description			
Shutdown or BOC threshold level for **AIN PROT15 (PAGE 743)**.			

Note: *These setpoints are used only if LAI **AIN PROT15 (PAGE 743)** is adjusted to required protection type. Otherwise these setpoints are useless.*

back to List of setpoints

Analog Protection 15 Delay

Setpoint group	General Analog Inputs	**Related FW**	1.3.0
Range [units]	0 .. 900 [s]		
Default value	0 s	**Alternative config**	NO
Step	1 s		
Comm object	9303	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Visible only if the logical analog input **AIN PROT15 (PAGE 743)** is configured		
Description			
Delay for **AIN PROT15 (PAGE 743)**.			

Note: *These setpoints are used only if LAI **AIN PROT15 (PAGE 743)** is adjusted to required protection type. Otherwise these setpoints are useless.*

back to List of setpoints

Analog Switch 15 On

Setpoint group	General Analog Inputs	**Related FW**	1.3.0
Range [units]	the range is defined by analog sensor curve		
Default value	the value is defined by analog sensor curve	**Alternative config**	NO
Step	the step is defined by analog sensor curve		
Comm object	14973	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Visible only if the logical binary output **AIN SWITCH04 (PAGE 682)** is configured		
Description			

Threshold level for switching the binary output **AIN SWITCH 15 (PAGE 753)** on. The value is measured from **AIN SWITCH 04 (PAGE 750)** analog input.



Image 8.53 General analog input 4 switch

back to List of setpoints

Analog Switch 15 Off

Setpoint group	General Analog Inputs	**Related FW**	1.3.0
Range [units]	the range is defined by analog sensor curve		
Default value	the value is defined by analog sensor curve	**Alternative config**	NO
Step	the step is defined by analog sensor curve		
Comm object	14989	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Visible only if the logical binary output **AIN SWITCH04 (PAGE 682)** is configured		
Description			

Threshold level for switching the binary output **AIN SWITCH 15 (PAGE 753)** off. The value is measured from **AIN SWITCH 04 (PAGE 750)** analog input.



Image 8.54 General analog input 4 switch

back to List of setpoints

General Analog Input 16

Analog Protection 16 Wrn

Setpoint group	General Analog Inputs	**Related FW**	1.3.0
Range [units]	the range is defined by analog sensor curve		
Default value	the value is defined by analog sensor curve	**Alternative config**	NO
Step	the step is defined by analog sensor curve		
Comm object	9304	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Visible only if the logical analog input **AIN PROT16 (PAGE 744)** is configured		
Description			

Warning or history threshold level for **AIN PROT16 (PAGE 744)**.

Note: *These setpoints are used only if LAI **AIN PROT16 (PAGE 744)** is adjusted to required protection type. Otherwise these setpoints are useless.*

back to List of setpoints

Analog Protection 16 Sd

Setpoint group	General Analog Inputs	**Related FW**	1.3.0
Range [units]	the range is defined by analog sensor curve		
Default value	the value is defined by analog sensor curve	**Alternative config**	NO
Step	the step is defined by analog sensor curve		
Comm object	9305	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Visible only if the logical analog input **AIN PROT16 (PAGE 744)** is configured		
Description			
Shutdown or BOC threshold level for **AIN PROT16 (PAGE 744)**.			

Note: *These setpoints are used only if LAI **AIN PROT16 (PAGE 744)** is adjusted to required protection type. Otherwise these setpoints are useless.*

back to List of setpoints

Analog Protection 16 Delay

Setpoint group	General Analog Inputs	**Related FW**	1.3.0
Range [units]	0 .. 900 [s]		
Default value	0 s	**Alternative config**	NO
Step	1 s		
Comm object	9306	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Visible only if the logical analog input **AIN PROT16 (PAGE 744)** is configured		
Description			
Delay for **AIN PROT16 (PAGE 744)**.			

Note: *These setpoints are used only if LAI **AIN PROT16 (PAGE 744)** is adjusted to required protection type. Otherwise these setpoints are useless.*

back to List of setpoints

Analog Switch 16 On

Setpoint group	General Analog Inputs	**Related FW**	1.3.0
Range [units]	the range is defined by analog sensor curve		
Default value	the value is defined by analog sensor curve	**Alternative config**	NO
Step	the step is defined by analog sensor curve		
Comm object	14974	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Visible only if the logical binary output **AIN SWITCH04 (PAGE 682)** is configured		
Description			

Threshold level for switching the binary output **AIN SWITCH 16 (PAGE 754)** on. The value is measured from **AIN SWITCH 04 (PAGE 750)** analog input.



Image 8.55 General analog input 4 switch

back to List of setpoints

Analog Switch 16 Off

Setpoint group	General Analog Inputs	**Related FW**	1.3.0
Range [units]	the range is defined by analog sensor curve		
Default value	the value is defined by analog sensor curve	**Alternative config**	NO
Step	the step is defined by analog sensor curve		
Comm object	14990	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Visible only if the logical binary output **AIN SWITCH04 (PAGE 682)** is configured		
Description			

Threshold level for switching the binary output **AIN SWITCH 16 (PAGE 754)** off. The value is measured from **AIN SWITCH 04 (PAGE 750)** analog input.



Image 8.56 General analog input 4 switch

back to List of setpoints

General Analog Input 17

Analog Protection 17 Wrn

Setpoint group	General Analog Inputs	**Related FW**	1.3.0
Range [units]	the range is defined by analog sensor curve		
Default value	the value is defined by analog sensor curve	**Alternative config**	NO
Step	the step is defined by analog sensor curve		
Comm object	9307	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Visible only if the logical analog input **AIN PROT17 (PAGE 745)** is configured		
Description			

Warning or history threshold level for **AIN PROT17 (PAGE 745)**.

Note: *These setpoints are used only if LAI **AIN PROT17 (PAGE 745)** is adjusted to required protection type. Otherwise these setpoints are useless.*

back to List of setpoints

Analog Protection 17 Sd

Setpoint group	General Analog Inputs	**Related FW**	1.3.0
Range [units]	the range is defined by analog sensor curve		
Default value	the value is defined by analog sensor curve	**Alternative config**	NO
Step	the step is defined by analog sensor curve		
Comm object	9308	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Visible only if the logical analog input **AIN PROT17 (PAGE 745)** is configured		
Description			
Shutdown or BOC threshold level for **AIN PROT17 (PAGE 745)**.			

Note: *These setpoints are used only if LAI **AIN PROT17 (PAGE 745)** is adjusted to required protection type. Otherwise these setpoints are useless.*

back to List of setpoints

Analog Protection 17 Delay

Setpoint group	General Analog Inputs	**Related FW**	1.3.0
Range [units]	0 .. 900 [s]		
Default value	0 s	**Alternative config**	NO
Step	1 s		
Comm object	9309	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Visible only if the logical analog input **AIN PROT17 (PAGE 745)** is configured		
Description			
Delay for **AIN PROT17 (PAGE 745)**.			

Note: *These setpoints are used only if LAI **AIN PROT17 (PAGE 745)** is adjusted to required protection type. Otherwise these setpoints are useless.*

back to List of setpoints

Analog Switch 17 On

Setpoint group	General Analog Inputs	**Related FW**	1.3.0
Range [units]	the range is defined by analog sensor curve		
Default value	the value is defined by analog sensor curve	**Alternative config**	NO
Step	the step is defined by analog sensor curve		
Comm object	14975	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Visible only if the logical binary output **AIN SWITCH04 (PAGE 682)** is configured		
Description			

Threshold level for switching the binary output **AIN SWITCH 17 (PAGE 754)** on. The value is measured from **AIN SWITCH 04 (PAGE 750)** analog input.



Image 8.57 General analog input 4 switch

back to List of setpoints

Analog Switch 17 Off

Setpoint group	General Analog Inputs	**Related FW**	1.3.0
Range [units]	the range is defined by analog sensor curve		
Default value	the value is defined by analog sensor curve	**Alternative config**	NO
Step	the step is defined by analog sensor curve		
Comm object	14991	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Visible only if the logical binary output **AIN SWITCH04 (PAGE 682)** is configured		
Description			

Threshold level for switching the binary output **AIN SWITCH 17 (PAGE 754)** off. The value is measured from **AIN SWITCH 04 (PAGE 750)** analog input.



Image 8.58 General analog input 4 switch

back to List of setpoints

General Analog Input 18

Analog Protection 18 Wrn

Setpoint group	General Analog Inputs	**Related FW**	1.3.0
Range [units]	the range is defined by analog sensor curve		
Default value	the value is defined by analog sensor curve	**Alternative config**	NO
Step	the step is defined by analog sensor curve		
Comm object	9310	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Visible only if the logical analog input **AIN PROT18 (PAGE 746)** is configured		
Description			

Warning or history threshold level for **AIN PROT18 (PAGE 746)**.

Note: *These setpoints are used only if LAI **AIN PROT18 (PAGE 746)** is adjusted to required protection type. Otherwise these setpoints are useless.*

back to List of setpoints

Analog Protection 18 Sd

Setpoint group	General Analog Inputs	**Related FW**	1.3.0
Range [units]	the range is defined by analog sensor curve		
Default value	the value is defined by analog sensor curve	**Alternative config**	NO
Step	the step is defined by analog sensor curve		
Comm object	9311	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Visible only if the logical analog input **AIN PROT18 (PAGE 746)** is configured		
Description			
Shutdown or BOC threshold level for **AIN PROT18 (PAGE 746)**.			

Note: *These setpoints are used only if LAI **AIN PROT18 (PAGE 746)** is adjusted to required protection type. Otherwise these setpoints are useless.*

back to List of setpoints

Analog Protection 18 Delay

Setpoint group	General Analog Inputs	**Related FW**	1.3.0
Range [units]	0 .. 900 [s]		
Default value	0 s	**Alternative config**	NO
Step	1 s		
Comm object	9312	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Visible only if the logical analog input **AIN PROT18 (PAGE 746)** is configured		
Description			
Delay for **AIN PROT18 (PAGE 746)**.			

Note: *These setpoints are used only if LAI **AIN PROT18 (PAGE 746)** is adjusted to required protection type. Otherwise these setpoints are useless.*

back to List of setpoints

Analog Switch 18 On

Setpoint group	General Analog Inputs	**Related FW**	1.3.0
Range [units]	the range is defined by analog sensor curve		
Default value	the value is defined by analog sensor curve	**Alternative config**	NO
Step	the step is defined by analog sensor curve		
Comm object	14976	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Visible only if the logical binary output **AIN SWITCH04 (PAGE 682)** is configured		
Description			

Threshold level for switching the binary output **AIN SWITCH 18 (PAGE 754)** on. The value is measured from **AIN SWITCH 04 (PAGE 750)** analog input.



Image 8.59 General analog input 4 switch

back to List of setpoints

Analog Switch 18 Off

Setpoint group	General Analog Inputs	**Related FW**	1.3.0
Range [units]	the range is defined by analog sensor curve		
Default value	the value is defined by analog sensor curve	**Alternative config**	NO
Step	the step is defined by analog sensor curve		
Comm object	14992	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Visible only if the logical binary output **AIN SWITCH04 (PAGE 682)** is configured		
Description			

Threshold level for switching the binary output **AIN SWITCH 18 (PAGE 754)** off. The value is measured from **AIN SWITCH 04 (PAGE 750)** analog input.



Image 8.60 General analog input 4 switch

back to List of setpoints

General Analog Input 19

Analog Protection 19 Wrn

Setpoint group	General Analog Inputs	**Related FW**	1.3.0
Range [units]	the range is defined by analog sensor curve		
Default value	the value is defined by analog sensor curve	**Alternative config**	NO
Step	the step is defined by analog sensor curve		
Comm object	9313	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Visible only if the logical analog input **AIN PROT19 (PAGE 747)** is configured		
Description			

Warning or history threshold level for **AIN PROT19 (PAGE 747)**.

Note: *These setpoints are used only if LAI **AIN PROT19 (PAGE 747)** is adjusted to required protection type. Otherwise these setpoints are useless.*

back to List of setpoints

Analog Protection 19 Sd

Setpoint group	General Analog Inputs	**Related FW**	1.3.0
Range [units]	the range is defined by analog sensor curve		
Default value	the value is defined by analog sensor curve	**Alternative config**	NO
Step	the step is defined by analog sensor curve		
Comm object	9314	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Visible only if the logical analog input **AIN PROT19 (PAGE 747)** is configured		
Description			
Shutdown or BOC threshold level for **AIN PROT19 (PAGE 747)**.			

Note: *These setpoints are used only if LAI **AIN PROT19 (PAGE 747)** is adjusted to required protection type. Otherwise these setpoints are useless.*

back to List of setpoints

Analog Protection 19 Delay

Setpoint group	General Analog Inputs	**Related FW**	1.3.0
Range [units]	0 .. 900 [s]		
Default value	0 s	**Alternative config**	NO
Step	1 s		
Comm object	9315	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Visible only if the logical analog input **AIN PROT19 (PAGE 747)** is configured		
Description			
Delay for **AIN PROT19 (PAGE 747)**.			

Note: *These setpoints are used only if LAI **AIN PROT19 (PAGE 747)** is adjusted to required protection type. Otherwise these setpoints are useless.*

back to List of setpoints

Analog Switch 19 On

Setpoint group	General Analog Inputs	**Related FW**	1.3.0
Range [units]	the range is defined by analog sensor curve		
Default value	the value is defined by analog sensor curve	**Alternative config**	NO
Step	the step is defined by analog sensor curve		
Comm object	14977	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Visible only if the logical binary output **AIN SWITCH04 (PAGE 682)** is configured		
Description			

Threshold level for switching the binary output **AIN SWITCH 19 (PAGE 755)** on. The value is measured from **AIN SWITCH 04 (PAGE 750)** analog input.



Image 8.61 General analog input 4 switch

back to List of setpoints

Analog Switch 19 Off

Setpoint group	General Analog Inputs	**Related FW**	1.3.0
Range [units]	the range is defined by analog sensor curve		
Default value	the value is defined by analog sensor curve	**Alternative config**	NO
Step	the step is defined by analog sensor curve		
Comm object	14993	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Visible only if the logical binary output **AIN SWITCH04 (PAGE 682)** is configured		
Description			

Threshold level for switching the binary output **AIN SWITCH 19 (PAGE 755)** off. The value is measured from **AIN SWITCH 04 (PAGE 750)** analog input.



Image 8.62 General analog input 4 switch

back to List of setpoints

General Analog Input 20

Analog Protection 20 Wrn

Setpoint group	General Analog Inputs	**Related FW**	1.3.0
Range [units]	the range is defined by analog sensor curve		
Default value	the value is defined by analog sensor curve	**Alternative config**	NO
Step	the step is defined by analog sensor curve		
Comm object	9316	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Visible only if the logical analog input **AIN PROT20 (PAGE 748)** is configured		
Description			

Warning or history threshold level for **AIN PROT20 (PAGE 748)**.

Note: *These setpoints are used only if LAI **AIN PROT20 (PAGE 748)** is adjusted to required protection type. Otherwise these setpoints are useless.*

back to List of setpoints

Analog Protection 20 Sd

Setpoint group	General Analog Inputs	**Related FW**	1.3.0
Range [units]	the range is defined by analog sensor curve		
Default value	the value is defined by analog sensor curve	**Alternative config**	NO
Step	the step is defined by analog sensor curve		
Comm object	9317	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Visible only if the logical analog input **AIN PROT20 (PAGE 748)** is configured		
Description			
Shutdown or BOC threshold level for **AIN PROT20 (PAGE 748)**.			

Note: *These setpoints are used only if LAI **AIN PROT20 (PAGE 748)** is adjusted to required protection type. Otherwise these setpoints are useless.*

back to List of setpoints

Analog Protection 20 Delay

Setpoint group	General Analog Inputs	**Related FW**	1.3.0
Range [units]	0 .. 900 [s]		
Default value	0 s	**Alternative config**	NO
Step	1 s		
Comm object	9318	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Visible only if the logical analog input **AIN PROT20 (PAGE 748)** is configured		
Description			
Delay for **AIN PROT20 (PAGE 748)**.			

Note: *These setpoints are used only if LAI **AIN PROT20 (PAGE 748)** is adjusted to required protection type. Otherwise these setpoints are useless.*

back to List of setpoints

Analog Switch 20 On

Setpoint group	General Analog Inputs	**Related FW**	1.3.0
Range [units]	the range is defined by analog sensor curve		
Default value	the value is defined by analog sensor curve	**Alternative config**	NO
Step	the step is defined by analog sensor curve		
Comm object	14978	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Visible only if the logical binary output **AIN SWITCH04 (PAGE 682)** is configured		
Description			

Threshold level for switching the binary output **AIN SWITCH 20 (PAGE 755)** on. The value is measured from **AIN SWITCH 04 (PAGE 750)** analog input.



Image 8.63 General analog input 4 switch

back to List of setpoints

Analog Switch 20 Off

Setpoint group	General Analog Inputs	**Related FW**	1.3.0
Range [units]	the range is defined by analog sensor curve		
Default value	the value is defined by analog sensor curve	**Alternative config**	NO
Step	the step is defined by analog sensor curve		
Comm object	14994	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Visible only if the logical binary output **AIN SWITCH04 (PAGE 682)** is configured		
Description			

Threshold level for switching the binary output **AIN SWITCH 20 (PAGE 755)** off. The value is measured from **AIN SWITCH 04 (PAGE 750)** analog input.



Image 8.64 General analog input 4 switch

back to List of setpoints

Group: Scheduler

Subgroup: Time & Date

Time

Setpoint group	Scheduler	**Related FW**	1.3.0
Range [units]	HH:MM:SS [-]		
Default value	0:0:0	**Alternative config**	NO
Step	[-]		
Comm object	24554	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Always		
Description			

Real time clock adjustment.

back to List of setpoints

Date

Setpoint group	Scheduler	**Related FW**	1.3.0
Range [units]	DD/MM/YYYY [-]		
Default value	1.1.2015	**Alternative config**	NO
Step	[-]		
Comm object	24553	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Always		
Description			
Actual date adjustment.			

back to List of setpoints

Time Stamp Period

Setpoint group	Scheduler	**Related FW**	1.3.0
Range [units]	0 .. 240 [min]		
Default value	60 min	**Alternative config**	NO
Step	1 min		
Comm object	8979	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Always		
Description			
Time interval for periodic history records. ***Note:*** *History record is made only when engine is running.*			

back to List of setpoints

Summer Time Mode

Setpoint group	Scheduler	**Related FW**	1.3.0
Range [units]	Disabled / Winter / Summer / Winter - S / Summer - S [-]		
Default value	Disabled	**Alternative config**	NO
Step	[-]		
Comm object	8727	**Related applications**	MINT, SPtM
Config level	Advanced		
Setpoint visibility	Always		
Description			

Behavior of switching between winter and summer time.

Disable	Automatic switching between summer and wintertime is disabled.
Winter (Summer)	Automatic switching between summer and wintertime is enabled and it is set to winter (summer) season.
Winter - S (Summer - S)	Modification for southern hemisphere.

back to List of setpoints

Subgroup: Timer 1

Timer 1 Setup

Setpoint group	Scheduler	**Related FW**	1.3.0
Range [units]	[-]		
Default value	[-]	**Alternative config**	NO
Step	[-]		
Comm object	10969	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Always		
Description			

Related setpoints for timer 1 are:

- **Timer 1 Function (page 423)**
- **Timer 1 Repetition (page 424)**
- **Timer 1 First Occur. Date (page 424)**
- **Timer 1 First Occur. Time (page 424)**
- **Timer 1 Duration (page 425)**
- **Timer 1 Repeated (page 425)**
- **Timer 1 Repeat Day (page 428)**
- **Timer 1 Day (page 427)**
- **Timer 1 Repeated Day In Week (page 428)**
- **Timer 1 Repeat Day In Month (page 428)**
- **Timer 1 Repeat Week In Month (page 429)**
- **Timer 1 Refresh Period (page 426)**
- **Timer 1 Weekends (page 427)**

back to List of setpoints

Timer 1 Function

Setpoint group	Scheduler	**Related FW**	1.3.0
Range [units]	Disable / No Func / TEST / Test OnLd / MFail Blk / Mode OFF [-]		
Default value	Disable	**Alternative config**	NO
Step	[-]		
Comm object	15358	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Always		

Description

It is possible to choose from following timer functions. Binary output **EXERCISE TIMER 1 (PAGE 697)** is always activated when Timer is active regardless of chosen timer function. Timer functions require controller running in AUTO mode.

> **IMPORTANT: Binary output is activated always when timer should be activated e.g. even when controller is in different mode than AUTO.**

Controller activates timer whenever it is powered up even in period, where timer should be already running.

Disable	The Timer is disabled.
No Func	There is no any other function, only binary output of timer is activated.
Auto Run	When this option is chosen then the binary output of timer is internally connected to the **REMOTE START/STOP (PAGE 661)** binary input.
TEST	When this option is chosen then the binary output of timer is internally connected to the binary input Remote TEST.
TEST OnLd	When this option is chosen then the binary output of timer is internally connected to the Remote TEST On Load binary input.
MFail Blk	When this option is chosen then the binary output of timer is internally connected to the Mains Fail Block binary input.
Mode OFF	When this option is chosen then the binary output of timer is internally connected to the Remote OFF binary input.

back to List of setpoints

Timer 1 Repetition

Setpoint group	Scheduler	**Related FW**	1.3.0
Range [units]	Off / Once / Repeated [-]		
Default value	Off	**Alternative config**	NO
Step	[-]		
Comm object	0	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Conditioned by the setpoint **Timer 1 Function (page 423)**		
Description			

Defines repetition of **Timer 1 Function (page 423)**.

Off	**Timer 1 Function (page 423)** will not be activated.
Once	**Timer 1 Function (page 423)** will be activated only one time.
Repeated	**Timer 1 Function (page 423)** will be repeatedly activated.

back to List of setpoints

Timer 1 First Occur. Date

Setpoint group	Scheduler	**Related FW**	1.3.0
Range [units]	[DD/MM/YYYY]		
Default value	01/01/2000	**Alternative config**	NO
Step	[-]		
Comm object	0	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Conditioned by the setpoint **Timer 1 Function (page 423)**		
Description			

Date of first occurrence of **Timer 1 Function (page 423)**.

back to List of setpoints

Timer 1 First Occur. Time

Setpoint group	Scheduler	**Related FW**	1.3.0
Range [units]	[HH:MM]		
Default value	00:00	**Alternative config**	NO
Step	[-]		
Comm object	0	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Conditioned by the setpoint **Timer 1 Function (page 423)**		
Description			

Time of first occurrence of **Timer 1 Function (page 423)**.

back to List of setpoints

Timer 1 Duration

Setpoint group	Scheduler	**Related FW**	1.3.0
Range [units]	[HH:MM]		
Default value	00:00	**Alternative config**	NO
Step	[-]		
Comm object	0	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Conditioned by the setpoint **Timer 1 Function (page 423)**		
Description			
Timer 1 Function (page 423) duration time.			

back to List of setpoints

Timer 1 Repeated

Setpoint group	Scheduler	**Related FW**	1.3.0
Range [units]	Daily / Weekly / Monthly / Short Period [-]		
Default value	Daily	**Alternative config**	NO
Step	[-]		
Comm object	0	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Conditioned by the setpoint **Timer 1 Function (page 423)**		
Description			

Repeated interval of **Timer 1 Function (page 423)**.

Daily	**Timer 1 Function (page 423)** is repeated every day.
Weekly	**Timer 1 Function (page 423)** is repeated every week in chosen days.
Monthly	**Timer 1 Function (page 423)** is repeated in chosen day every month or in chosen days of chosen week of month
Short Period	**Timer 1 Function (page 423)** is repeated in adjusted period.

back to List of setpoints

Timer 1 Refresh Period

Setpoint group	Scheduler	**Related FW**	1.3.0
Range [units]	[-]		
Default value	[-]	**Alternative config**	NO
Step	[-]		
Comm object	0	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Conditioned by the setpoint **Timer 1 Function (page 423)**		

Description

Refresh period of **Timer 1 Function (page 423)**. Meaning of this setpoint depends on type of repetition adjusted in **Timer 1 Repeated (page 425)**.

Daily

Range [units]: 1 .. 1000 [day]. This setpoint adjust that every X day the timer will be activated.

> **Example:** If you have daily repetition and you set this setpoint to 2, then every second day from first occurrence of **Timer 1 Function (page 423)**, the **Timer 1 Function (page 423)** will be activated.

Weekly

Range [units]: 1 .. 60 [week]. This setpoint adjust that every X week the timer will be activated.

> **Example:** If you have weekly repetition and you set this setpoint to 2, then every second week from first occurrence of **Timer 1 Function (page 423)**, the **Timer 1 Function (page 423)** will be activated in selected days adjusted by **Timer 1 Day (page 427)**.

Monthly

Range [units]: 1 .. 12 [month]. This setpoint adjust that every X month the timer will be activated.

> **Example:** If you have monthly repetition and you set this setpoint to 2, then every second month from first occurrence of **Timer 1 Function (page 423)**, the **Timer 1 Function (page 423)** will be activated in selected day of month adjusted by **Timer 1 Repeat Day In Month (page 428)** or in selected days of week of month adjusted by **Timer 1 Day (page 427)** and **Timer 1 Repeat Week In Month (page 429)**.

Short Period

Range [units]: [HH:MM]. This setpoint adjust that every X short period the timer will be activated.

> **Example:** If you have short period repetition and you set this setpoint to 2, then every second minute from first occurrence of **Timer 1 Function (page 423)**, the **Timer 1 Function (page 423)** will be activated.

back to List of setpoints

Timer 1 Weekends

Setpoint group	Scheduler	**Related FW**	1.3.0
Range [units]	Including / Skip / Postpone [-]		
Default value	Including	**Alternative config**	NO
Step	[-]		
Comm object	0	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Conditioned by the setpoint **Timer 1 Function (page 423)**		
Description			

Behavior of **Timer 1 Function (page 423)** on weekends.

Including	**Timer 1 Function (page 423)** counter is running on the weekends and **Timer 1 Function (page 423)** can be active.
Skip	**Timer 1 Function (page 423)** counter is running on the weekends but **Timer 1 Function (page 423)** isn't active.
Postpone	**Timer 1 Function (page 423)** counter isn't running on the weekends and **Timer 1 Function (page 423)** isn't active. If the activation of timer is counted on the weekend, than timer will be activated after weekend. Another activation of timer is counted from original date of first occurrence date.

back to List of setpoints

Timer 1 Day

Setpoint group	Scheduler	**Related FW**	1.3.0
Range [units]	Monday / Tuesday / Wednesday / Thursday / Friday / Saturday/ Sunday[-]		
Default value	All OFF	**Alternative config**	NO
Step	[-]		
Comm object	0	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Conditioned by the setpoint **Timer 1 Function (page 423)**		
Description			

Use this setpoint to include or exclude individual days of week. To select the day use Up and Down buttons. To change the value of day use Enter button.

back to List of setpoints

Timer 1 Repeat Day

Setpoint group	Scheduler	**Related FW**	1.3.0
Range [units]	Repeated Day / Repeated Day In Week [-]		
Default value	Repeated Day	**Alternative config**	NO
Step	[-]		
Comm object	0	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Conditioned by the setpoint **Timer 1 Function (page 423)**		
Description			
Use this setpoint to adjust behavior of monthly repetition of the **Timer 1 Function (page 423)**.			
Repeated Day	Chose one day in month when **Timer 1 Function (page 423)** will be activated.		
Repeated Day In Week	Chose days in one week when **Timer 1 Function (page 423)** will be activated.		

back to List of setpoints

Timer 1 Repeated Day In Week

Setpoint group	Scheduler	**Related FW**	1.3.0
Range [units]	Monday / Tuesday / Wednesday / Thursday / Friday / Saturday/ Sunday[-]		
Default value	All OFF	**Alternative config**	NO
Step	[-]		
Comm object	0	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Conditioned by the setpoint **Timer 1 Function (page 423)**		
Description			
Use this setpoint to select the day of week when timer will be activated.			
Note: *More day can be selected. Timer will be activated on the day which happened like the first.*			

List of setpoints (page 232)

Timer 1 Repeat Day In Month

Setpoint group	Scheduler	**Related FW**	1.3.0
Range [units]	1..31 [day]		
Default value	0	**Alternative config**	NO
Step	[-]		
Comm object	0	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Conditioned by the setpoint **Timer 1 Function (page 423)**		
Description			
Use this setpoint to chose the day in month when the **Timer 1 Function (page 423)** will be activated.			

back to List of setpoints

Timer 1 Repeat Week In Month

Setpoint group	Scheduler	**Related FW**	1.3.0
Range [units]	1 .. 5 [week]		
Default value	1 week	**Alternative config**	NO
Step	1 week		
Comm object	0	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Conditioned by the setpoint **Timer 1 Function (page 423)**		
Description			
This setpoint adjust the week of month in which the **Timer 1 Function (page 423)** will be activated.			

back to List of setpoints

Subgroup: Timer 2

Timer 2 Setup

Setpoint group	Scheduler	**Related FW**	1.3.0
Range [units]	[-]		
Default value	[-]	**Alternative config**	NO
Step	[-]		
Comm object	10970	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Always		
Description			

Related setpoints for timer 2 are:

- **Timer 2 Function (page 430)**
- **Timer 2 Repetition (page 431)**
- **Timer 2 First Occur. Date (page 431)**
- **Timer 2 First Occur. Time (page 431)**
- **Timer 2 Duration (page 432)**
- **Timer 2 Repeated (page 432)**
- **Timer 2 Repeat Day (page 435)**
- **Timer 2 Day (page 434)**
- **Timer 2 Repeated Day In Week (page 435)**
- **Timer 2 Repeat Day In Month (page 435)**
- **Timer 2 Repeat Week In Month (page 436)**
- **Timer 2 Refresh Period (page 433)**
- **Timer 2 Weekends (page 434)**

back to List of setpoints

Timer 2 Function

Setpoint group	Scheduler	**Related FW**	1.3.0
Range [units]	Disable / No Func / TEST / Test OnLd / MFail Blk / Mode OFF [-]		
Default value	No Func	**Alternative config**	NO
Step	[-]		
Comm object	15359	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Always		

Description

It is possible to choose from following Timer functions. Binary output **EXERCISE TIMER 2 (PAGE 698)** is always activated when Timer is active regardless of chosen timer function. Timer functions require controller running in AUTO mode.

> **IMPORTANT: Binary output is activated always when timer should be activated e.g. even when controller is in different mode than AUTO.**

Timer 1 has the highest priority. Timer 8 has the lowest priority. So if Timer 1 is configured for OFF mode and Timer 8 is over the same time configured for AUTO mode, controller will work in OFF mode.

Controller activates timer whenever it is powered up even in period, where timer should be already running.

Disable	The Timer is disabled.
No Func	There is no any other function, only binary output of timer is activated.
Auto Run	When this option is chosen then the binary output of timer is internally connected to the **REMOTE START/STOP (PAGE 661)** binary input.
TEST	When this option is chosen then the binary output of timer is internally connected to the binary input Remote TEST.
TEST OnLd	When this option is chosen then the binary output of timer is internally connected to the Remote TEST On Load binary input.
MFail Blk	When this option is chosen then the binary output of timer is internally connected to the Mains Fail Block binary input.
Mode OFF	When this option is chosen then the binary output of timer is internally connected to the Remote OFF binary input.

back to List of setpoints

Timer 2 Repetition

Setpoint group	Scheduler	**Related FW**	1.3.0
Range [units]	Off / Once / Repeated [-]		
Default value	Off	**Alternative config**	NO
Step	[-]		
Comm object	0	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Conditioned by the setpoint **Timer 2 Function (page 430)**		
Description			

Defines repetition of **Timer 2 Function (page 430)**.

Off	**Timer 2 Function (page 430)** will not be activated.
Once	**Timer 2 Function (page 430)** will be activated only one time.
Repeated	**Timer 2 Function (page 430)** will be repeatedly activated.

List of setpoints (page 232)

Timer 2 First Occur. Date

Setpoint group	Scheduler	**Related FW**	1.3.0
Range [units]	[DD/MM/YYYY]		
Default value	01/01/2000	**Alternative config**	NO
Step	[-]		
Comm object	0	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Conditioned by the setpoint **Timer 2 Function (page 430)**		
Description			

Date of first occurrence of**Timer 2 Function (page 430)**.

back to List of setpoints

Timer 2 First Occur. Time

Setpoint group	Scheduler	**Related FW**	1.3.0
Range [units]	[HH:MM]		
Default value	00:00	**Alternative config**	NO
Step	[-]		
Comm object	0	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Conditioned by the setpoint **Timer 2 Function (page 430)**		
Description			

Time of first occurrence of **Timer 2 Function (page 430)**.

back to List of setpoints

Timer 2 Duration

Setpoint group	Scheduler	**Related FW**	1.3.0
Range [units]	[HH:MM]		
Default value	00:00	**Alternative config**	NO
Step	[-]		
Comm object	0	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Conditioned by the setpoint **Timer 2 Function (page 430)**		
Description			
Timer 2 Function (page 430) duration time.			

back to List of setpoints

Timer 2 Repeated

Setpoint group	Scheduler	**Related FW**	1.3.0
Range [units]	Daily / Weekly / Monthly / Short Period [-]		
Default value	Daily	**Alternative config**	NO
Step	[-]		
Comm object	0	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Conditioned by the setpoint **Timer 2 Function (page 430)**		
Description			

Repeated interval of **Timer 2 Function (page 430)**.

Daily	**Timer 2 Function (page 430)** is repeated every day.
Weekly	**Timer 2 Function (page 430)** is repeated every week in chosen days.
Monthly	**Timer 2 Function (page 430)** is repeated in chosen day every month or in chosen days of chosen week of month
Short Period	**Timer 2 Function (page 430)** is repeated in adjusted period.

List of setpoints (page 232)

Timer 2 Refresh Period

Setpoint group	Scheduler	**Related FW**	1.3.0
Range [units]	[-]		
Default value	[-]	**Alternative config**	NO
Step	[-]		
Comm object	0	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Conditioned by the setpoint **Timer 2 Function (page 430)**		

Description

Refresh period of **Timer 2 Function (page 430)**. Meaning of this setpoint depends on type of repetition adjusted in **Timer 2 Repeated (page 432)**.

Daily

Range [units]: 1 .. 1000 [day]. This setpoint adjust that every X day the timer will be activated.

> **Example:** If you have daily repetition and you set this setpoint to 2, then every second day from first occurrence of **Timer 2 Function (page 430)**, the **Timer 2 Function (page 430)** will be activated.

Weekly

Range [units]: 1 .. 60 [week]. This setpoint adjust that every X week the timer will be activated.

> **Example:** If you have weekly repetition and you set this setpoint to 2, then every second week from first occurrence of **Timer 2 Function (page 430)**, the **Timer 2 Function (page 430)** will be activated in selected days adjusted by **Timer 2 Day (page 434)**.

Monthly

Range [units]: 1 .. 12 [month]. This setpoint adjust that every X month the timer will be activated.

> **Example:** If you have monthly repetition and you set this setpoint to 2, then every second month from first occurrence of **Timer 2 Function (page 430)**, the **Timer 2 Function (page 430)** will be activated in selected day of month adjusted by **Timer 2 Repeat Day In Month (page 435)** or in selected days of week of month adjusted by **Timer 2 Day (page 434)** and **Timer 2 Repeat Week In Month (page 436)**.

Short Period

Range [units]: [HH:MM]. This setpoint adjust that every X short period the timer will be activated.

> **Example:** If you have short period repetition and you set this setpoint to 2, then every second minute from first occurrence of **Timer 2 Function (page 430)**, the **Timer 2 Function (page 430)** will be activated.

back to List of setpoints

Timer 2 Weekends

Setpoint group	Scheduler	**Related FW**	1.3.0
Range [units]	Including / Skip / Postpone [-]		
Default value	Including	**Alternative config**	NO
Step	[-]		
Comm object	0	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Conditioned by the setpoint **Timer 2 Function (page 430)**		
Description			

Behavior of **Timer 2 Function (page 430)** on weekends.

Including	**Timer 2 Function (page 430)** counter is running on the weekends and **Timer 2 Function (page 430)** can be active.
Skip	**Timer 2 Function (page 430)** counter is running on the weekends but **Timer 2 Function (page 430)** isn't active.
Postpone	**Timer 2 Function (page 430)** counter isn't running on the weekends and **Timer 2 Function (page 430)** isn't active. If the activation of timer is counted on the weekend, than timer will be activated after weekend. Another activation of timer is counted from original date of first occurrence date.

back to List of setpoints

Timer 2 Day

Setpoint group	Scheduler	**Related FW**	1.3.0
Range [units]	Monday / Tuesday / Wednesday / Thursday / Friday / Saturday/ Sunday[-]		
Default value	All OFF	**Alternative config**	NO
Step	[-]		
Comm object	0	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Conditioned by the setpoint **Timer 2 Function (page 430)**		
Description			

Use this setpoint to include or exclude individual days of week. To select the day use Up and Down buttons. To change the value of day use Enter button.

back to List of setpoints

Timer 2 Repeat Day

Setpoint group	Scheduler	**Related FW**	1.3.0
Range [units]	Repeated Day / Repeated Day In Week [-]		
Default value	Repeated Day	**Alternative config**	NO
Step	[-]		
Comm object	0	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Conditioned by the setpoint **Timer 2 Function (page 430)**		
Description			
Use this setpoint to adjust behavior of monthly repetition of the **Timer 2 Function (page 430)**.			
Repeated Day	Chose one day in month when **Timer 2 Function (page 430)** will be activated.		
Repeated Day In Week	Chose days in one week when **Timer 2 Function (page 430)** will be activated.		

back to List of setpoints

Timer 2 Repeated Day In Week

Setpoint group	Scheduler	**Related FW**	1.3.0
Range [units]	Monday / Tuesday / Wednesday / Thursday / Friday / Saturday/ Sunday[-]		
Default value	All OFF	**Alternative config**	NO
Step	[-]		
Comm object	0	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Conditioned by the setpoint **Timer 2 Function (page 430)**		
Description			
Use this setpoint to select the day of week when timer will be activated.			
Note: *More day can be selected. Timer will be activated on the day which happened like the first.*			

List of setpoints (page 232)

Timer 2 Repeat Day In Month

Setpoint group	Scheduler	**Related FW**	1.3.0
Range [units]	1..31 [day]		
Default value	0	**Alternative config**	NO
Step	[-]		
Comm object	0	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Conditioned by the setpoint **Timer 2 Function (page 430)**		
Description			
Use this setpoint to chose the day in month when the **Timer 2 Function (page 430)** will be activated.			

back to List of setpoints

Timer 2 Repeat Week In Month

Setpoint group	Scheduler	**Related FW**	1.3.0
Range [units]	1 .. 5 [week]		
Default value	1 week	**Alternative config**	NO
Step	1 week		
Comm object	0	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Conditioned by the setpoint **Timer 2 Function (page 430)**		
Description			
This setpoint adjust the week of month in which the **Timer 2 Function (page 430)** will be activated.			

back to List of setpoints

Subgroup: Rental Timers

Rental Timer 1

Setpoint group	Scheduler	**Related FW**	1.3.0
Range [units]	Disabled / 1 .. 8 760 [h]		
Default value	Disabled	**Alternative config**	NO
Step	1 h		
Comm object	14326	**Related applications**	MINT, SPtM
Config level	Advanced		
Setpoint visibility	Always		
Description			

Another engine start is not allowed when this timer elapsed. This timer is based on engine running hours. The alarm **Rental Timer 1 Elapsed (page 782)** will be recorded in alarm list and the binary output **AL RENTAL TIMER 1 (PAGE 678)** will close.

> **IMPORTANT: To reset Rental Timer 1 (page 436) we have to set up Rental Timer 1 (page 436) again. It means go to setpoint group Scheduler and to the setpoint Rental Timer 1 (page 436). Then press enter button ↵, change the value if it is necessary and press enter button ↵ again.**

When the **Rental Timer 1 (page 436)** elapsed during engine run the gen-set will not stop immediately. The adjustable **Rental Timer BOC (page 440)**timer will start in this moment. The engine will be cooled and stopped when the **Rental Timer BOC (page 440)** time elapsed.

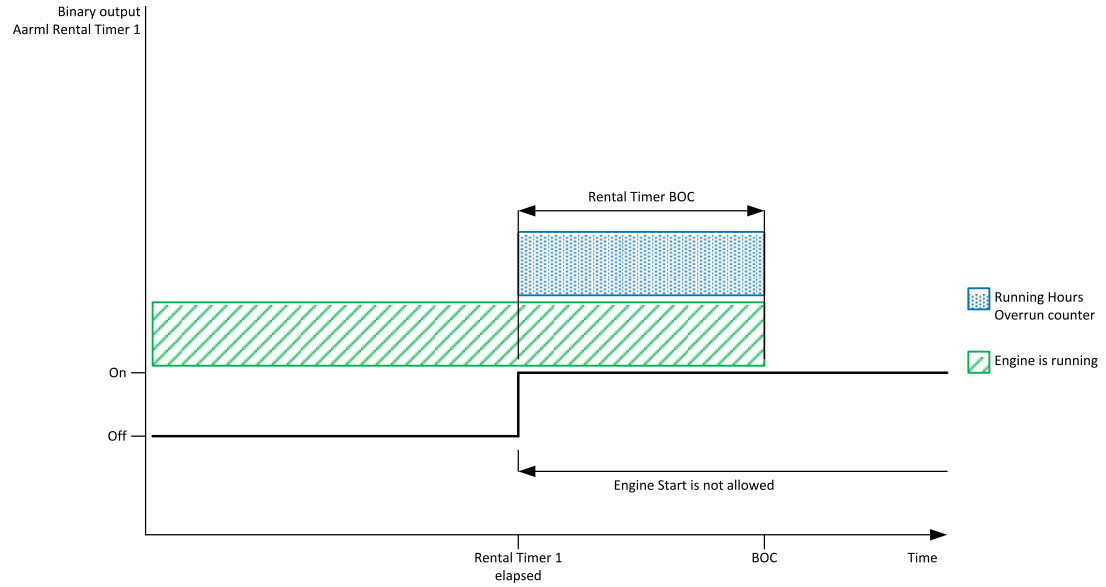


Image 8.65 Rental Timer 1

The Running Hours Overrun counter will start increment when the engine is continue running after the **Rental Timer 1 (page 436)** elapsed.

> ***Note:*** *There is no priority between Rental Timer 1 and Rental Timer 2. The sooner timer will activated the **Rental Timer BOC (page 440)** protection.*

back to List of setpoints

Rental Timer 1 Wrn

Setpoint group	Scheduler	**Related FW**	1.3.0
Range [units]	Disabled / 1.. **Rental Timer 1 (page 436)** [h]		
Default value	Disabled	**Alternative config**	NO
Step	1 h		
Comm object	14332	**Related applications**	MINT, SPtM
Config level	Advanced		
Setpoint visibility	Conditioned by the setpoint **Rental Timer 1 (page 436)**		
Description			

Alarm **Wrn Rental Timer 1 (page 795)** comes up after xx running hours from adjusting the **Rental Timer 1 (page 436)**. Hours are adjusted by this setpoint.

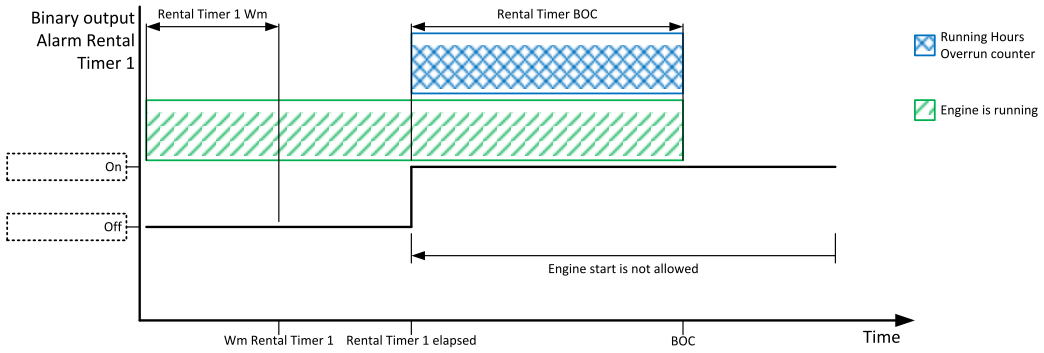


Image 8.66 Rental Timer 1 Wrn

back to List of setpoints

Rental Timer 2

Setpoint group	Scheduler	**Related FW**	1.3.0
Range [units]	[DD/MM/YYYY]		
Default value	01/01/2015	**Alternative config**	NO
Step	1 day		
Comm object	14367	**Related applications**	MINT, SPtM
Config level	Advanced		
Setpoint visibility	Always		
Description			

Another engine start is not allowed when this timer elapsed. This timer is based on date. At the midnight of the last day the alarm **Rental Timer 2 Elapsed (page 782)** will be recorded in alarm list and the binary output **AL RENTAL TIMER 2 (PAGE 679)** will close.

> **IMPORTANT: To reset Rental Timer 2 (page 438) we have to set up Rental Timer 2 (page 438) again. It means go to setpoint group Scheduler and to the setpoint Rental Timer 2 (page 438). Then press enter button ↵, change the value if it is necessary and press enter button ↵ again.**

> **IMPORTANT: To disable Rental Timer 2 (page 438) set date to 01/01/2015.**

When the **Rental Timer 2 (page 438)** elapsed during engine run the gen-set will not stop immediately. The adjustable **Rental Timer BOC (page 440)** timer will start in this moment. The engine will be cooled and stopped when the **Rental Timer BOC (page 440)** time elapsed.

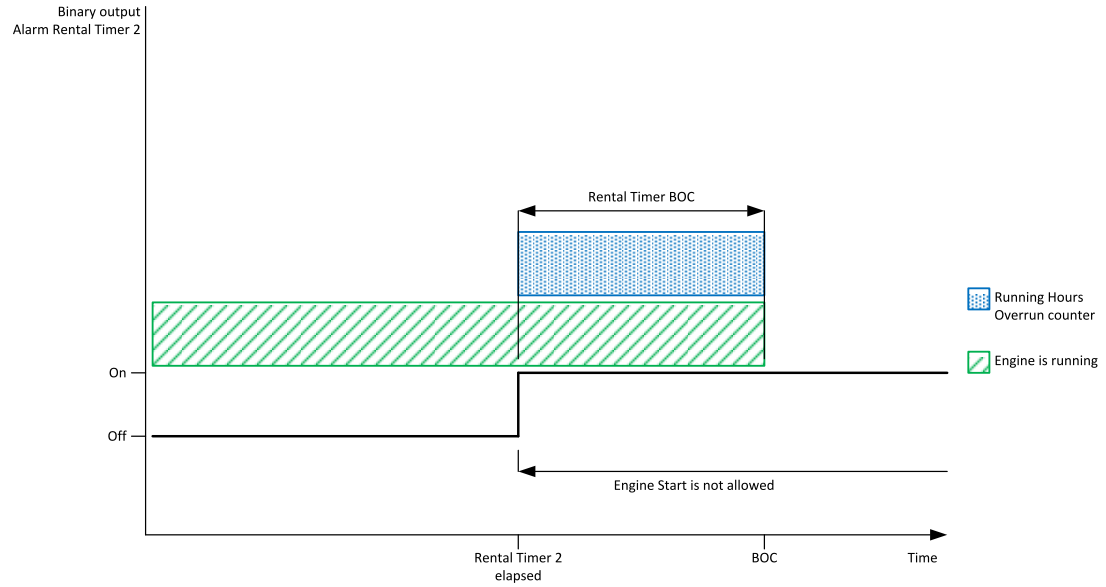


Image 8.67 Rental Timer 2

The Running Hours Overrun counter will start increment when the engine is continue running after the **Rental Timer 2 (page 438)** elapsed.

Note: *There is no priority between Rental Timer 1 and Rental Timer 2. The sooner timer will activated the* ***Rental Timer BOC (page 440)*** *protection.*

back to List of setpoints

Rental Timer 2 Wrn

Setpoint group	Scheduler	**Related FW**	1.3.0
Range [units]	Disabled / 01/01/2015 .. **Rental Timer 2 (page 438)** [DD/MM/YYYY]		
Default value	01/01/2015	**Alternative config**	NO
Step	1 day		
Comm object	14368	**Related applications**	MINT, SPtM
Config level	Advanced		
Setpoint visibility	Conditioned by the setpoint **Rental Timer 2 (page 438)**		
Description			

Alarm **Wrn Rental Timer 2 (page 795)** comes up xx days before the **Rental Timer 2 (page 438)**. Days are adjusted by this setpoint.

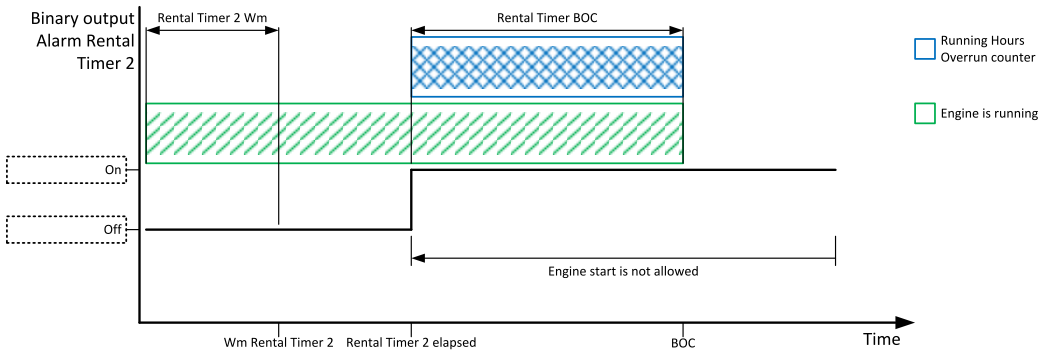


Image 8.68 Rental Timer 2 Wrn

back to List of setpoints

Rental Timer BOC

Setpoint group	Scheduler	**Related FW**	1.3.0
Range [units]	Disabled / 1 .. 210 [h]		
Default value	24 h	**Alternative config**	NO
Step	1 h		
Comm object	14334	**Related applications**	MINT, SPtM
Config level	Advanced		
Setpoint visibility	Conditioned by the setpoints **Rental Timer 1 (page 436)** and **Rental Timer 2 (page 438)**		
Description			

This timer will start after **Rental Timer 1 (page 436)** or **Rental Timer 2 (page 438)** elapsed in case that the engine is still running. When this timer elapsed the engine is cooled and stopped.

back to List of setpoints

Group: Geo-Fencing

Home Latitude

Setpoint group	Geo-Fencing	**Related FW**	1.3.0
Range [units]	-90,0000..90,0000 [°]		
Default value	0,0000 °	**Alternative config**	NO
Step	0,0001 °		
Comm object	14606	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Only if relevant module is installed		
Description			

This setpoint adjust latitude of "home" position. Home is position where gen-set should runs. Positions on north hemisphere have positive value, position on south hemisphere have negative value.

Note: *This value with* ***Home Longitude (page 441)*** *are used for counting* ***Fence Radius 1 (page 442)*** *and* ***Fence Radius 2 (page 442)****.*

Note: *This value can be also obtained automatically via logical binary input* ***GEO HOME POSITION (PAGE 653)****. In case of activation of this binary input for at least 2 seconds, setpoint will be adjusted automatically from actual coordinates from GPS signal.*

back to List of setpoints

Home Longitude

Setpoint group	Geo-Fencing	**Related FW**	1.3.0
Range [units]	-180,0000..180,0000 [°]		
Default value	0,0000 °	**Alternative config**	NO
Step	0,0001 °		
Comm object	14607	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Only if relevant module is installed		
Description			

This setpoint adjust longitude of "home" position. Home is position where gen-set should runs. Positions on east hemisphere have positive value, position on west hemisphere have negative value.

Note: *This value with* ***Home Latitude (page 441)*** *are used for counting* ***Fence Radius 1 (page 442)*** *and* ***Fence Radius 2 (page 442)****.*

Note: *This value can be also obtained automatically via logical binary input* ***GEO HOME POSITION (PAGE 653)****. In case of activation of this binary input for at least 2 seconds, setpoint will be adjusted automatically from actual coordinates from GPS signal.*

back to List of setpoints

Fence Radius 1

Setpoint group	Geo-Fencing	**Related FW**	1.3.0
Range [units]	0,0..99,9 [km]		
Default value	0,0 km	**Alternative config**	NO
Step	0,1 km		
Comm object	11677	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Only if relevant module is installed		
Description			
Radius for circle area 1. When the gen-set leaves this area, **Fence 1 Protection (page 444)** is activated after **Fence 1 Delay (page 442)**. ***Note:*** *The center of this circle area is defined by "Home" position - setpoints* ***Home Longitude (page 441)*** *and* ***Home Latitude (page 441)****.*			

back to List of setpoints

Fence Radius 2

Setpoint group	Geo-Fencing	**Related FW**	1.3.0
Range [units]	0,0..99,9 [km]		
Default value	0,0 km	**Alternative config**	NO
Step	0,1 km		
Comm object	14608	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Only if relevant module is installed		
Description			
Radius for circle area 2. When the gen-set leaves this area, **Fence 2 Protection (page 445)** is activated after **Fence 2 Delay (page 443)**. ***Note:*** *The center of this circle area is defined by "Home" position - setpoints* ***Home Longitude (page 441)*** *and* ***Home Latitude (page 441)****.*			

back to List of setpoints

Fence 1 Delay

Setpoint group	Geo-Fencing	**Related FW**	1.3.0
Range [units]	0..3600 [s]		
Default value	0 s	**Alternative config**	NO
Step	1 s		
Comm object	11682	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Only if relevant module is installed		
Description			
Delay for **Fence 1 Protection (page 444)**.			

back to List of setpoints

Fence 2 Delay

Setpoint group	Geo-Fencing	**Related FW**	1.3.0
Range [units]	0..3600 [s]		
Default value	0 s	**Alternative config**	NO
Step	1 s		
Comm object	14609	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Only if relevant module is installed		
Description			
Delay for **Fence 2 Protection (page 445)**.			

back to List of setpoints

Geo-Fencing

Setpoint group	Geo-Fencing	**Related FW**	1.3.0
Range [units]	Disabled / Enabled / LBI Enable [-]		
Default value	Disabled	**Alternative config**	NO
Step	[-]		
Comm object	11681	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Only if relevant module is installed		
Description			

This setpoint enables or disables geo-fencing function.

Disabled	**Fence 1 Protection (page 444)** and **Fence 2 Protection (page 445)** are disabled.
Enabled	**Fence 1 Protection (page 444)** and **Fence 2 Protection (page 445)** are enabled.
LBI Enable	**Fence 1 Protection (page 444)** and **Fence 2 Protection (page 445)** are enabled only when logical binary input .**GEO-FENCING ENABLED (PAGE 653)** is active.

back to List of setpoints

Fence 1 Protection

Setpoint group	Geo-Fencing	**Related FW**	1.3.0
Range [units]	HistRecOnl / Wrn / Sd / BOC[-]		
Default value	HistRecOnl	**Alternative config**	NO
Step	[-]		
Comm object	14610	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Only if relevant module is installed		
Description			

Protection type for geo-fencing 1 protection. Fence of circle area is adjusted by setpoint **Fence Radius 1 (page 442)**. Delay for protection is adjusted by setpoint **Fence 1 Delay (page 442)**.

Protection types

HistRecOnl	Position of gen-set is only measured and displayed on the LCD screen but not used for protection. History record is made if position is out of **Fence Radius 1 (page 442)**.
Wrn	Position of gen-set is used for warning protection only. Protection is activated when position of the gen-set is out of **Fence Radius 1 (page 442)**.
Sd	Position of gen-set is used for shutdown protection. Protection is activated when position of the gen-set is out of **Fence Radius 1 (page 442)**.
BOC	Position of gen-set is used for BOC (Breaker Open and Cooling) protection. Protection is activated when position of the gen-set is out of **Fence Radius 1 (page 442)**.

Note: *Protection is activated also when GPS signal is lost for* ***Fence 1 Delay (page 442)****.*

back to List of setpoints

Fence 2 Protection

Setpoint group	Geo-Fencing	**Related FW**	1.3.0
Range [units]	HistRecOnl / Wrn / Sd / BOC[-]		
Default value	HistRecOnl	**Alternative config**	NO
Step	[-]		
Comm object	14611	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Only if relevant module is installed		
Description			

Protection type for geo-fencing 2 protection. Fence of circle area is adjusted by setpoint **Fence Radius 2 (page 442)**. Delay for protection is adjusted by setpoint **Fence 2 Delay (page 443)**.

Protection types

HistRecOnl	Position of gen-set is only measured and displayed on the LCD screen but not used for protection. History record is made if position is out of **Fence Radius 2 (page 442)**.
Wrn	Position of gen-set is used for warning protection only. Protection is activated when position of the gen-set is out of **Fence Radius 2 (page 442)**.
Sd	Position of gen-set is used for shutdown protection. Protection is activated when position of the gen-set is out of **Fence Radius 2 (page 442)**.
BOC	Position of gen-set is used for BOC (Breaker Open and Cooling) protection. Protection is activated when position of the gen-set is out of **Fence Radius 2 (page 442)**.

Note: *Protection is activated also when GPS signal is lost for **Fence 2 Delay (page 443)**.*

back to List of setpoints

Group: Plug-In Modules

Slot A

Setpoint group	Plug-In Modules	**Related FW**	1.3.0
Range [units]	ENABLED / DISABLED [-]		
Default value	ENABLED	**Alternative config**	NO
Step	[-]		
Comm object	24280	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Always		
Description			

This setpoint enable or disable module in slot A.

back to List of setpoints

Slot B

Setpoint group	Plug-In Modules	**Related FW**	1.3.0
Range [units]	ENABLED / DISABLED [-]		
Default value	ENABLED	**Alternative config**	NO
Step	[-]		
Comm object	24279	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Always		
Description			
This setpoint enable or disable module in slot B.			

back to List of setpoints

Group: Sensors Spec

Subgroup: Analog Input 1

Analog Input 1 CalibrationCU AIN1 Calibration

Setpoint group	Sensors Spec	**Related FW**	1.3.0
Range [units]	the range is defined by analog sensor curve		
Default value	0 (number of decimal is given by sensor curve)	**Alternative config**	NO
Step	the step is defined by analog sensor curve		
Comm object	8431	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Always		
Description			
Calibrating constant to adjust the measured value of controller analog inputs. Physical dimension of calibrating constant is corresponding to Analog input. ***Note:*** *Unit is adjusted via InteliConfig in configuration of analog input 1.*			

back to List of setpoints

Subgroup: Analog Input 2

Analog Input 2 CalibrationCU AIN2 Calibration

Setpoint group	Sensors Spec	**Related FW**	1.3.0
Range [units]	the range is defined by analog sensor curve		
Default value	0 (number of decimal is given by sensor curve)	**Alternative config**	NO
Step	the step is defined by analog sensor curve		
Comm object	8407	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Always		
Description			
Calibrating constant to adjust the measured value of controller analog inputs. Physical dimension of calibrating constant is corresponding to Analog input. ***Note:*** *Unit is adjusted via InteliConfig in configuration of analog input 2.*			

back to List of setpoints

Subgroup: Analog Input 3

Analog Input 3 CalibrationCU AIN3 Calibration

Setpoint group	Sensors Spec	**Related FW**	1.3.0
Range [units]	the range is defined by analog sensor curve		
Default value	0 (number of decimal is given by sensor curve)	**Alternative config**	NO
Step	the step is defined by analog sensor curve		
Comm object	8467	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Always		
Description			
Calibrating constant to adjust the measured value of controller analog inputs. Physical dimension of calibrating constant is corresponding to Analog input. ***Note:*** *Unit is adjusted via InteliConfig in configuration of analog input 3.*			

back to List of setpoints

Subgroup: Analog Input 4

Analog Input 4 CalibrationCU AIN4 Calibration

Setpoint group	Sensors Spec	**Related FW**	1.3.0
Range [units]	the range is defined by analog sensor curve		
Default value	0 (number of decimal is given by sensor curve)	**Alternative config**	NO
Step	the step is defined by analog sensor curve		
Comm object	8793	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Always		
Description			
Calibrating constant to adjust the measured value of controller analog inputs. Physical dimension of calibrating constant is corresponding to Analog input. ***Note:*** *Unit is adjusted via InteliConfig in configuration of analog input 4.*			

back to List of setpoints

Group: Alternate Config

Subgroup: Basic settings

Connection Type 1

Setpoint group	Basic settings	**Related FW**	1.3.0
Range [units]	Monophase / Splitphase / 3Ph3Wire / High Leg D / 3Ph4Wire / Autodetect [-]		
Default value	3Ph4Wire	**Alternative config**	YES
Step	[-]		
Comm object	12058	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Always		
Description			

Connection type:

Mono Phase	Single phase voltage measurement L1-N 1x CT (Current Transformer)
Split Phase	Double Delta connection Split Phase Two phase voltage measurement L1,L2 with 180° phase shift 2x CT (Current Transformer)
3Ph3Wire	Ungrounded Delta connection Open Delta Ungrounded Wye Corner-Grounded Delta

	Split Phase Delta Three phase voltage measurement L1,L2,L3 with 120° phase shift No neutral is available 3x CT (Current Transformer)
High Leg D	High Leg Delta connection Three phase voltage measurement L1,L2,L3 3x CT (Current Transformer)
3Ph4Wire	Grounded Star (Grounded Wye) connection – 3PY Three phase voltage measurement L1,L2,L3 with 120° phase shift 3x CT (Current Transformer)
Autodetect	High Leg Delta L1 >=100V; L1 <=140V L2 >=140V L3 >=100V; L3 <=140V or 3PH3Wire or 3Ph4Wire L1 >=100V L2 >=100V L3 >=100V or Split Phase L1 >=100V L2 <= 20V L3 >=100V or Mono Phase L1 >=100V L2 <= 20V L3 <= 20V or ***Voltage Autodetect*** shutdown

Note: *This value is used when binary input* ***ALTERNATE CONFIG 2 (PAGE 627)*** *is active.*

back to List of setpoints

Nominal Power 1

Setpoint group	Basic settings	**Related FW**	1.3.0
Range [units]	1 .. 5 000 [kW]		
Default value	200 kW	**Alternative config**	Yes
Step	1 kW		
Comm object	12046	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Always		
Description			

Nominal power of the gen-set. Generator **Overload BOC (page 298)** protection is based on this setpoint.

Note: *This setpoint is used when setpoint* ***Connection type (page 254)*** *is adjusted to Monophase or Splitphase or 3Ph3Wire or High Leg D or 3Ph4Wire or when Autodetect detects connection type as 3Ph3Wire or High Leg D or 3Ph4Wire.*

Note: *This value is used when any other alternate configuration is not active.*

back to List of setpoints

Nominal Power Split Phase 1

Setpoint group	Basic settings	**Related FW**	1.3.0
Range [units]	1 .. 5 000 [kW]		
Default value	200 kW	**Alternative config**	Yes
Step	1 kW		
Comm object	15771	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Conditioned by the setpoint **Connection type (page 254)**		
Description			

Nominal power of the gen-set for detected split-phase or mono phase connection. Generator **Overload BOC (page 298)** protection is based on this setpoint.

Note: *This setpoint is used when setpoint* ***Connection type (page 254)*** *is adjusted to Autodetect and Autodetect detects connection type as Monophase or Splitphase.*

Note: *This value is used when any other alternate configuration is not active.*

back to List of setpoints

Nominal Current 1

Setpoint group	Basic settings	**Related FW**	1.3.0
Range [units]	1 .. 10 000 [A]		
Default value	350 A	**Alternative config**	YES
Step	1 A		
Comm object	12049	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Always		
Description			

It is current limit for generator current protections and means maximal continuous generator current. Nominal Current can be different from generator rated current value.

Note: *This value is used when any other alternate configuration is not active.*

back to List of setpoints

Nominal Frequency 1

Setpoint group	Basic settings	**Related FW**	1.3.0
Range [units]	45 .. 65 [Hz]		
Default value	50 Hz	**Alternative config**	YES
Step	1 Hz		
Comm object	9913	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Always		
Description			

Nominal system frequency (usually 50 or 60 Hz).

Note: *This value is used when any other alternate configuration is not active.*

back to List of setpoints

Nominal RPM 1

Setpoint group	Basic settings	**Related FW**	1.3.0
Range [units]	100 .. 4000 [RPM]		
Default value	1 500 RPM	**Alternative config**	YES
Step	1 RPM		
Comm object	9915	**Related applications**	MINT, SPtM
Config level	Advanced		
Setpoint visibility	Always		
Description			

Nominal engine speed (RPM - revolutions per minute).

Note: *This value is used when any other alternate configuration is not active.*

back to List of setpoints

Nominal Voltage Ph-N 1

Setpoint group	Basic settings	**Related FW**	1.3.0
Range [units]	80 .. 20000 [V]		
Default value	231 V	**Alternative config**	YES
Step	1 V		
Comm object	12052	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Conditioned by the setpoint **Connection Type 1 (page 448)**.		
Description			
Nominal system voltage (phase to neutral). ***Note:*** *This value is used when any other alternate configuration is not active.*			

back to List of setpoints

Nominal Voltage Ph-Ph 1

Setpoint group	Basic settings	**Related FW**	1.3.0
Range [units]	80 .. 40000 [V]		
Default value	400 V	**Alternative config**	YES
Step	1 V		
Comm object	12055	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Conditioned by the setpoint **Connection Type 1 (page 448)**.		
Description			
Nominal system voltage (phase to phase). ***Note:*** *This value is used when any other alternate configuration is not active.*			

back to List of setpoints

Connection type 2

Setpoint group	Basic settings	**Related FW**	1.3.0
Range [units]	Monophase / Splitphase / 3Ph3Wire / High Leg D / 3Ph4Wire / Autodetect [-]		
Default value	3Ph4Wire	**Alternative config**	YES
Step	[-]		
Comm object	12059	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Always		
Description			

Connection type:

Mono Phase	Single phase voltage measurement L1-N 1x CT (Current Transformer)
Split Phase	Double Delta connection

	Split Phase Two phase voltage measurement L1,L2 with 180° phase shift 2x CT (Current Transformer)
3Ph3Wire	Ungrounded Delta connection Open Delta Ungrounded Wye Corner-Grounded Delta Split Phase Delta Three phase voltage measurement L1,L2,L3 with 120° phase shift No neutral is available 3x CT (Current Transformer)
High Leg D	High Leg Delta connection Three phase voltage measurement L1,L2,L3 3x CT (Current Transformer)
3Ph4Wire	Grounded Star (Grounded Wye) connection – 3PY Three phase voltage measurement L1,L2,L3 with 120° phase shift 3x CT (Current Transformer)
Autodetect	High Leg Delta L1 >=100V; L1 <=140V L2 >=140V L3 >=100V; L3 <=140V or 3PH3Wire or 3Ph4Wire L1 >=100V L2 >=100V L3 >=100V or Split Phase L1 >=100V L2 <= 20V L3 >=100V or Mono Phase L1 >=100V L2 <= 20V L3 <= 20V or ***Voltage Autodetect*** shutdown

Note: *This value is used when binary input* ***ALTERNATE CONFIG 2*** *(****PAGE 627****) is active.*

back to List of setpoints

Nominal Power 2

Setpoint group	Basic settings	**Related FW**	1.3.0
Range [units]	1 .. 5 000 [kW]		
Default value	200 kW	**Alternative config**	Yes
Step	1 kW		
Comm object	12047	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Always		
Description			

Nominal power of the gen-set. Generator **Overload BOC (page 298)** protection is based on this setpoint.

Note: *This setpoint is used when setpoint **Connection type (page 254)** is adjusted to Monophase or Splitphase or 3Ph3Wire or High Leg D or 3Ph4Wire or when Autodetect detects connection type as 3Ph3Wire or High Leg D or 3Ph4Wire.*

Note: *This value is used when binary input **ALTERNATE CONFIG 2 (PAGE 627)** is active.*

back to List of setpoints

Nominal Power Split Phase 2

Setpoint group	Basic settings	**Related FW**	1.3.0
Range [units]	1 .. 5 000 [kW]		
Default value	200 kW	**Alternative config**	Yes
Step	1 kW		
Comm object	15772	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Conditioned by the setpoint **Connection type (page 254)**		
Description			

Nominal power of the gen-set for detected split-phase or mono phase connection. Generator **Overload BOC (page 298)** protection is based on this setpoint.

Note: *This setpoint is used when setpoint **Connection type (page 254)** is adjusted to Autodetect and Autodetect detects connection type as Monophase or Splitphase.*

Note: *This value is used when binary input **ALTERNATE CONFIG 2 (PAGE 627)** is active.*

back to List of setpoints

Nominal Current 2

Setpoint group	Basic settings	**Related FW**	1.3.0
Range [units]	1 .. 10000 [A]		
Default value	350 A	**Alternative config**	YES
Step	1 A		
Comm object	12050	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Always		
Description			

It is current limit for generator current protections and means maximal continuous generator current. Nominal Current can be different from generator rated current value.

Note: *This value is used when binary input* ***ALTERNATE CONFIG 2*** *(****PAGE 627****) is active.*

back to List of setpoints

Nominal Frequency 2

Setpoint group	Basic settings	**Related FW**	1.3.0
Range [units]	45 .. 65 [Hz]		
Default value	50 Hz	**Alternative config**	YES
Step	1 Hz		
Comm object	9914	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Always		
Description			

Nominal system frequency (usually 50 or 60 Hz).

Note: *This value is used when binary input* ***ALTERNATE CONFIG 2*** *(****PAGE 627****) is active.*

back to List of setpoints

Nominal RPM 2

Setpoint group	Basic settings	**Related FW**	1.3.0
Range [units]	100 .. 4000 [RPM]		
Default value	1 500 RPM	**Alternative config**	YES
Step	1 RPM		
Comm object	9916	**Related applications**	MINT, SPtM
Config level	Advanced		
Setpoint visibility	Always		
Description			

Nominal engine speed (RPM - revolutions per minute).

Note: *This value is used when binary input* ***ALTERNATE CONFIG 2*** *(****PAGE 627****) is active.*

back to List of setpoints

Nominal Voltage Ph-N 2

Setpoint group	Basic settings	**Related FW**	1.3.0
Range [units]	80 .. 20000 [V]		
Default value	231 V	**Alternative config**	YES
Step	1 V		
Comm object	12053	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Conditioned by the setpoint **Connection type 2 (page 452)**.		
Description			
Nominal system voltage (phase to neutral). ***Note:*** *This value is used when binary input* ***ALTERNATE CONFIG 2 (PAGE 627)*** *is active.*			

back to List of setpoints

Nominal Voltage Ph-Ph 2

Setpoint group	Basic settings	**Related FW**	1.3.0
Range [units]	80 .. 40000 [V]		
Default value	400 V	**Alternative config**	YES
Step	1 V		
Comm object	12056	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Conditioned by the setpoint **Connection type 2 (page 452)**.		
Description			
Nominal system voltage (phase to phase). ***Note:*** *This value is used when binary input* ***ALTERNATE CONFIG 2 (PAGE 627)*** *is active.*			

back to List of setpoints

Connection type 3

Setpoint group	Basic settings	**Related FW**	1.3.0
Range [units]	Monophase / Splitphase / 3Ph3Wire / High Leg D / 3Ph4Wire / Autodetect [-]		
Default value	3Ph4Wire	**Alternative config**	YES
Step	[-]		
Comm object	12060	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Always		
Description			
Connection type: Mono Phase: Single phase voltage measurement L1-N, 1x CT (Current Transformer) Split Phase: Double Delta connection			

	Split Phase Two phase voltage measurement L1,L2 with 180° phase shift 2x CT (Current Transformer)
3Ph3Wire	Ungrounded Delta connection Open Delta Ungrounded Wye Corner-Grounded Delta Split Phase Delta Three phase voltage measurement L1,L2,L3 with 120° phase shift No neutral is available 3x CT (Current Transformer)
High Leg D	High Leg Delta connection Three phase voltage measurement L1,L2,L3 3x CT (Current Transformer)
3Ph4Wire	Grounded Star (Grounded Wye) connection – 3PY Three phase voltage measurement L1,L2,L3 with 120° phase shift 3x CT (Current Transformer)
Autodetect	High Leg Delta L1 >=100V; L1 <=140V L2 >=140V L3 >=100V; L3 <=140V or 3PH3Wire or 3Ph4Wire L1 >=100V L2 >=100V L3 >=100V or Split Phase L1 >=100V L2 <= 20V L3 >=100V or Mono Phase L1 >=100V L2 <= 20V L3 <= 20V or ***Voltage Autodetect*** shutdown

Note: *This value is used when binary input* ***ALTERNATE CONFIG 2*** *(****PAGE 627****) is active.*

back to List of setpoints

Nominal Power 3

Setpoint group	Basic settings	**Related FW**	1.3.0
Range [units]	1 .. 5 000 [kW]		
Default value	200 kW	**Alternative config**	Yes
Step	1 kW		
Comm object	12048	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Always		
Description			

Nominal power of the gen-set. Generator **Overload BOC (page 298)** protection is based on this setpoint.

Note: *This setpoint is used when setpoint **Connection type (page 254)** is adjusted to Monophase or Splitphase or 3Ph3Wire or High Leg D or 3Ph4Wire or when Autodetect detects connection type as 3Ph3Wire or High Leg D or 3Ph4Wire.*

Note: *This value is used when binary input **ALTERNATE CONFIG 3 (PAGE 627)** is active.*

back to List of setpoints

Nominal Power Split Phase 3

Setpoint group	Basic settings	**Related FW**	1.3.0
Range [units]	1 .. 5 000 [kW]		
Default value	200 kW	**Alternative config**	Yes
Step	1 kW		
Comm object	15773	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Conditioned by the setpoint **Connection type (page 254)**		
Description			

Nominal power of the gen-set for detected split-phase or mono phase connection. Generator **Overload BOC (page 298)** protection is based on this setpoint.

Note: *This setpoint is used when setpoint **Connection type (page 254)** is adjusted to Autodetect and Autodetect detects connection type as Monophase or Splitphase.*

Note: *This value is used when binary input **ALTERNATE CONFIG 3 (PAGE 627)** is active.*

back to List of setpoints

Nominal Current 3

Setpoint group	Basic settings	**Related FW**	1.3.0
Range [units]	1 .. 10 000 [A]		
Default value	350 A	**Alternative config**	YES
Step	1 A		
Comm object	12051	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Always		
Description			

It is current limit for generator current protections and means maximal continuous generator current. Nominal Current can be different from generator rated current value.

Note: *This value is used when binary input* ***ALTERNATE CONFIG 3*** *(****PAGE 627****) is active.*

back to List of setpoints

Nominal Frequency 3

Setpoint group	Basic settings	**Related FW**	1.3.0
Range [units]	45 .. 65 [Hz]		
Default value	50 Hz	**Alternative config**	YES
Step	1 Hz		
Comm object	15197	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Always		
Description			

Nominal system frequency (usually 50 or 60 Hz).

Note: *This value is used when binary input* ***ALTERNATE CONFIG 3*** *(****PAGE 627****) is active.*

back to List of setpoints

Nominal RPM 3

Setpoint group	Basic settings	**Related FW**	1.3.0
Range [units]	100 .. 4 000 [RPM]		
Default value	1 500 RPM	**Alternative config**	YES
Step	1 RPM		
Comm object	15196	**Related applications**	MINT, SPtM
Config level	Advanced		
Setpoint visibility	Always		
Description			

Nominal engine speed (RPM - revolutions per minute).

Note: *This value is used when binary input* ***ALTERNATE CONFIG 3*** *(****PAGE 627****) is active.*

back to List of setpoints

Nominal Voltage Ph-N 3

Setpoint group	Basic settings	**Related FW**	1.3.0
Range [units]	80 .. 20 000 [V]		
Default value	231 V	**Alternative config**	YES
Step	1 V		
Comm object	12054	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Conditioned by the setpoint **Connection type 3 (page 456)**.		
Description			
Nominal system voltage (phase to neutral). ***Note:*** *This value is used when binary input* ***ALTERNATE CONFIG 3 (PAGE 627)*** *is active.*			

back to List of setpoints

Nominal Voltage Ph-Ph 3

Setpoint group	Basic settings	**Related FW**	1.3.0
Range [units]	80 .. 40 000 [V]		
Default value	400 V	**Alternative config**	YES
Step	1 V		
Comm object	12057	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Conditioned by the setpoint **Connection type 3 (page 456)**.		
Description			
Nominal system voltage (phase to phase). ***Note:*** *This value is used when binary input* ***ALTERNATE CONFIG 3 (PAGE 627)*** *is active.*			

back to List of setpoints

Group: CM-RS232-485

COM1 Mode

Setpoint group	CM-RS232-485	**Related FW**	1.3.0
Range [units]	Direct / MODBUS [-]		
Default value	Direct	**Alternative config**	NO
Step	[-]		
Comm object	24522	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Only if relevant module is installed		
Description			
Communication protocol switch for the COM1 channel. Direct — InteliConfig communication protocol via serial cable. MODBUS — MODBUS protocol.			

back to List of setpoints

COM1 Communication Speed

Setpoint group	CM-RS232-485	**Related FW**	1.3.0
Range [units]	9600 / 19200 / 38400 / 57600 / 115200[bps]		
Default value	57600 bps	**Alternative config**	NO
Step	[-]		
Comm object	24341	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Only if relevant module is installed + conditioned by the setpoint **COM1 Mode (page 461)**		
Description			
If the direct mode is selected on COM1 channel, the direct communication speed of controller part of line can be adjusted here. Speed of second part of line has to be adjusted to the same value. ***Note:*** *Winscope supports only 19200, 38400, 57600 speeds.*			

List of setpoints (page 232)

COM1 MODBUS Communication Speed

Setpoint group	CM-RS232-485	**Related FW**	1.3.0
Range [units]	9600 / 19200 / 38400 / 57600 / 115200 [bps]		
Default value	9600 bps	**Alternative config**	NO
Step	[-]		
Comm object	24477	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Only if relevant module is installed + conditioned by the setpoint **COM1 Mode (page 461)**		
Description			
If the MODBUS mode is selected on COM1 channel, the MODBUS communication speed can be adjusted here.			

List of setpoints (page 232)

COM2 Mode

Setpoint group	CM-RS232-485	**Related FW**	1.3.0
Range [units]	Direct / MODBUS [-]		
Default value	Direct	**Alternative config**	NO
Step	[-]		
Comm object	24451	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Only if relevant module is installed		
Description			
Communication protocol switch for the COM2 channel. Direct — InteliConfig communication protocol via serial cable. MODBUS — MODBUS protocol.			

back to List of setpoints

COM2 Communication Speed

Setpoint group	CM-RS232-485	**Related FW**	1.3.0
Range [units]	9600 / 19200 / 38400 / 57600 / 115200[bps]		
Default value	57600 bps	**Alternative config**	NO
Step	[-]		
Comm object	24340	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Only if relevant module is installed + conditioned by the setpoint **COM2 Mode (page 462)**		
Description			
If the direct mode is selected on COM2 channel, the direct communication speed of controller part of line can be adjusted here. Speed of second part of line has to be adjusted to the same value. ***Note:*** *Winscope supports only 19200, 38400, 57600 speeds.*			

List of setpoints (page 232)

COM2 MODBUS Communication Speed

Setpoint group	CM-RS232-485	**Related FW**	1.3.0
Range [units]	9600 / 19200 / 38400 / 57600 / 115200 [bps]		
Default value	9600 bps	**Alternative config**	NO
Step	[-]		
Comm object	24420	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Only if relevant module is installed + conditioned by the setpoint **COM2 Mode (page 462)**		
Description			
If the MODBUS mode is selected on COM2 channel, the MODBUS communication speed can be adjusted here.			

List of setpoints (page 232)

Group: CM-GPRS

Mode

Setpoint group	CM-GPRS; CM-4G-GPS	**Related FW**	1.3.0
Range [units]	Email+SMS / SMS Only [-]		
Default value	Email+SMS	**Alternative config**	NO
Step	[-]		
Comm object	24315	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Only if relevant module is installed		
Description			

This setpoint adjust the communication mode of module.

Email+SMS	Controller is connected to the Internet and is able to send e-mails as well as SMS. The controller is also accessible via AirGate. Internet-enabled SIM card must be used. Also **APN Name (page 476)** has to be adjusted.
SMS Only	Only SMS are sent. Internet-enabled SIM card is not required.

> **IMPORTANT: When this setpoint is changed the controller has to be restarted to apply changes.**

List of setpoints (page 232)

APN Name

Setpoint group	CM-GPRS; CM-4G-GPS	**Related FW**	1.3.0
Range [units]	0..31 characters [-]		
Default value	[-]	**Alternative config**	NO
Step	[-]		
Comm object	24363	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Only if relevant module is installed + conditioned by the setpoint **Mode (page 475)**		
Description			
APN (Access Point Name) of the GPRS/4G network, provided by GSM operator.			

back to List of setpoints

APN User Name

Setpoint group	CM-GPRS; CM-4G-GPS	**Related FW**	1.3.0
Range [units]	0..15 characters [-]		
Default value	[-]	**Alternative config**	NO
Step	[-]		
Comm object	24361	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Only if relevant module is installed + conditioned by the setpoint **Mode (page 475)**		
Description			
User name for the GPRS/4G Access Point if authentication is required. But mostly it is not required and should be left blank.			

back to List of setpoints

APN User Password

Setpoint group	CM-GPRS; CM-4G-GPS	**Related FW**	1.3.0
Range [units]	0..15 characters [-]		
Default value	[-]	**Alternative config**	NO
Step	[-]		
Comm object	24360	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Only if relevant module is installed + conditioned by the setpoint **Mode (page 475)**		
Description			
User password for the GPRS/4G Access Point if authentication is required. But mostly it is not required and should be left blank.			

back to List of setpoints

Email Address 1

Setpoint group	CM-GPRS; CM-4G-GPS; CM-Ethernet	**Related FW**	1.3.0
Range [units]	0..63 characters [-]		
Default value	[-]	**Alternative config**	NO
Step	[-]		
Comm object	24298	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Only if relevant module is installed + conditioned by the setpoint **Mode (page 475)** (CM-GPRS and CM-4G-GPS modules)		
Description			
Enter in this setpoint a valid e-mail address where the alarm and event e-mails shall be sent. Leave this setpoint blank if alarm and event email should not be send. ***Note:*** *This setpoint is common for CM-Ethernet, CM-GPRS and CM-4G-GPS modules.*			

back to List of setpoints

Email Address 2

Setpoint group	CM-GPRS; CM-4G-GPS; CM-Ethernet	**Related FW**	1.3.0
Range [units]	0..63 characters [-]		
Default value	[-]	**Alternative config**	NO
Step	[-]		
Comm object	24297	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Only if relevant module is installed + conditioned by the setpoint **Mode (page 475)** (CM-GPRS and CM-4G-GPS modules)		
Description			
Enter in this setpoint a valid e-mail address where the alarm and event e-mails shall be sent. Leave this setpoint blank if alarm and event email should not be send. ***Note:*** *This setpoint is common for CM-Ethernet, CM-GPRS and CM-4G-GPS modules.*			

back to List of setpoints

Email Address 3

Setpoint group	CM-GPRS; CM-4G-GPS; CM-Ethernet	**Related FW**	1.3.0
Range [units]	0..63 characters [-]		
Default value	[-]	**Alternative config**	NO
Step	[-]		
Comm object	24145	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Only if relevant module is installed + conditioned by the setpoint **Mode (page 475)** (CM-GPRS and CM-4G-GPS modules)		
Description			
Enter in this setpoint a valid e-mail address where the alarm and event e-mails shall be sent. Leave this setpoint blank if alarm and event email should not be send. ***Note:*** *This setpoint is common for CM-Ethernet, CM-GPRS and CM-4G-GPS modules.*			

back to List of setpoints

Email Address 4

Setpoint group	CM-GPRS; CM-4G-GPS; CM-Ethernet	**Related FW**	1.3.0
Range [units]	0..63 characters [-]		
Default value	[-]	**Alternative config**	NO
Step	[-]		
Comm object	24144	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Only if relevant module is installed + conditioned by the setpoint **Mode (page 475)** (CM-GPRS and CM-4G-GPS modules)		
Description			
Enter in this setpoint a valid e-mail address where the alarm and event e-mails shall be sent. Leave this setpoint blank if alarm and event email should not be send. ***Note:*** *This setpoint is common for CM-Ethernet, CM-GPRS and CM-4G-GPS modules.*			

back to List of setpoints

Message Language

Setpoint group	CM-GPRS; CM-4G-GPS; CM-Ethernet	**Related FW**	1.3.0
Range [units]	[-]		
Default value	English	**Alternative config**	NO
Step	[-]		
Comm object	24299	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Only if relevant module is installed		
Description			

Use this setpoint to set the language of SMS and e-mail.

> ***Note:*** *Numbers correspond with languages in language list. See the chapter for* ***Language selection (page 93)*** *more information.*

This setpoint is common for CM-Ethernet, CM-GPRS and CM-4G-GPS modules.

back to List of setpoints

SMTP User Name

Setpoint group	CM-GPRS; CM-4G-GPS	**Related FW**	1.3.0
Range [units]	0..31 characters [-]		
Default value	[-]	**Alternative config**	NO
Step	[-]		
Comm object	24313	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Only if relevant module is installed + conditioned by the setpoint **Mode (page 475)**		
Description			

Use this setpoint to enter the username for the SMTP server. Leave the setpoint blank if the SMTP server does not require authentication.

back to List of setpoints

SMTP User Password

Setpoint group	CM-GPRS; CM-4G-GPS	**Related FW**	1.3.0
Range [units]	0..15 characters [-]		
Default value	[-]	**Alternative config**	NO
Step	[-]		
Comm object	24312	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Only if relevant module is installed + conditioned by the setpoint **Mode (page 475)**		
Description			
Use this setpoint to enter the password for the SMTP server. Leave the setpoint blank if the SMTP server does not require authentication.			

back to List of setpoints

SMTP Server Address

Setpoint group	CM-GPRS; CM-4G-GPS	**Related FW**	1.3.0
Range [units]	0..31 characters [-]		
Default value	airgate.comap.cz:9925	**Alternative config**	NO
Step	[-]		
Comm object	24311	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Only if relevant module is installed + conditioned by the setpoint **Mode (page 475)**		
Description			

This setpoint is used for entering the domain name (e.g. smtp.yourprovider.com) or IP address (e.g. 74.125.39.109) or number of port (with colon like a first mark) of the SMTP server. Ask your internet provider or IT manager for this information.

> ***Note:*** *You may use also any public SMTP server which does not require connection over SSL/TLS channels. If the device is connected to AirGate the AirGate SMTP server at "airgate.comap.cz" may be used. Ports 25 and 9925 are supported. After controller connects to AirGate for the first time (or with new public IP address), it may not be able to send emails for first 5-10 minutes.*

back to List of setpoints

SMTP Sender Address

Setpoint group	CM-GPRS; CM-4G-GPS	**Related FW**	1.3.0
Range [units]	0..31 characters [-]		
Default value	[-]	**Alternative config**	NO
Step	[-]		
Comm object	24310	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Only if relevant module is installed + conditioned by the setpoint **Mode (page 475)** (CM-GPRS module)		
Description			

Enter an existing email address into this setpoint. This address will be used as sender address in active e-mails that will be sent from the controller.

> ***Note:*** *It is not needed to enter an existing email address, nevertheless valid email format needs to be followed.*

> **IMPORTANT: This item is obligatory when emails are configured.**

back to List of setpoints

Time Zone

Setpoint group	CM-GPRS; CM-4G-GPS; CM-Ethernet	**Related FW**	1.3.0
Range [units]	GMT-12:00 .. GMT+13:00 [hours]		
Default value	GMT+1:00 hour	**Alternative config**	NO
Step	[-]		
Comm object	24366	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Only if relevant module is installed		
Description			

This setpoint is used to select the time zone where the controller is located. See your computer time zone setting (click on the time indicator located in the rightmost position of the Windows task bar) if you are not sure about your time zone.

> ***Note:*** *If the time zone is not selected properly the active e-mails may contain incorrect information about sending time, which may result in confusion when the respective problem actually occurred.*

> ***Note:*** *This setpoint is common for CM-Ethernet, CM-GPRS and CM-4G-GPS modules.*

back to List of setpoints

Event Message

Setpoint group	CM-GPRS; CM-4G-GPS; CM-Ethernet	**Related FW**	1.3.0
Range [units]	ON / OFF [-]		
Default value	ON	**Alternative config**	NO
Step	[-]		
Comm object	10926	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Only if relevant module is installed		
Description			
This setpoint enables or disables Event Messages. This setpoint is common for CM-Ethernet, CM-GPRS and CM-4G-GPS modules.			

back to List of setpoints

Wrn Message

Setpoint group	CM-GPRS; CM-4G-GPS; CM-Ethernet	**Related FW**	1.3.0
Range [units]	ON / OFF [-]		
Default value	ON	**Alternative config**	NO
Step	[-]		
Comm object	8482	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Only if relevant module is installed		
Description			
This setpoint enables or disables Wrn Messages. This setpoint is common for CM-Ethernet, CM-GPRS and CM-4G-GPS modules.			

back to List of setpoints

BOC Message

Setpoint group	CM-GPRS; CM-4G-GPS; CM-Ethernet	**Related FW**	1.3.0
Range [units]	ON / OFF [-]		
Default value	ON	**Alternative config**	NO
Step	[-]		
Comm object	10566	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Only if relevant module is installed		
Description			
This setpoint enables or disables BOC Messages. This setpoint is common for CM-Ethernet, CM-GPRS and CM-4G-GPS modules.			

back to List of setpoints

Sd Messages

Setpoint group	CM-GPRS; CM-4G-GPS; CM-Ethernet	**Related FW**	1.3.0
Range [units]	ON / OFF [-]		
Default value	ON	**Alternative config**	NO
Step	[-]		
Comm object	8484	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Only if relevant module is installed		
Description			
This setpoint enables or disables Sd Messages. This setpoint is common for CM-Ethernet, CM-GPRS and CM-4G-GPS modules.			

back to List of setpoints

Telephone Number 1

Setpoint group	CM-GPRS; CM-4G-GPS	**Related FW**	1.3.0
Range [units]	0..31 characters [-]		
Default value	[-]	**Alternative config**	NO
Step	[-]		
Comm object	24296	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Only if relevant module is installed		
Description			
Enter in this setpoint either a valid GSM phone number where the alarm messages shall be sent. For GSM numbers use either the national format (i.e. the number you would dial if you wanted to make a local call) or the full international format beginning with a “+” character followed by the country prefix. **IMPORTANT: Telephone number has to be entered without spaces.**			

back to List of setpoints

Telephone Number 2

Setpoint group	CM-GPRS; CM-4G-GPS	**Related FW**	1.3.0
Range [units]	0..31 characters [-]		
Default value	[-]	**Alternative config**	NO
Step	[-]		
Comm object	24295	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Only if relevant module is installed		
Description			

Enter in this setpoint either a valid GSM phone number where the alarm messages shall be sent. For GSM numbers use either the national format (i.e. the number you would dial if you wanted to make a local call) or the full international format beginning with a “+” character followed by the country prefix.

> **IMPORTANT: Telephone number has to be entered without spaces.**

back to List of setpoints

Telephone Number 3

Setpoint group	CM-GPRS; CM-4G-GPS	**Related FW**	1.3.0
Range [units]	0..31 characters [-]		
Default value	[-]	**Alternative config**	NO
Step	[-]		
Comm object	24143	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Only if relevant module is installed		
Description			

Enter in this setpoint either a valid GSM phone number where the alarm messages shall be sent. For GSM numbers use either the national format (i.e. the number you would dial if you wanted to make a local call) or the full international format beginning with a “+” character followed by the country prefix.

> **IMPORTANT: Telephone number has to be entered without spaces.**

back to List of setpoints

Telephone Number 4

Setpoint group	CM-GPRS; CM-4G-GPS	**Related FW**	1.3.0
Range [units]	0..31 characters [-]		
Default value	[-]	**Alternative config**	NO
Step	[-]		
Comm object	24142	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Only if relevant module is installed		
Description			
Enter in this setpoint either a valid GSM phone number where the alarm messages shall be sent. For GSM numbers use either the national format (i.e. the number you would dial if you wanted to make a local call) or the full international format beginning with a “+” character followed by the country prefix. **IMPORTANT: Telephone number has to be entered without spaces.**			

back to List of setpoints

DNS IP Address

Setpoint group	CM-GPRS; CM-4G-GPS	**Related FW**	1.3.0
Range [units]	Valid IP address [-]		
Default value	[-]	**Alternative config**	NO
Step	[-]		
Comm object	24314	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Only if relevant module is installed + conditioned by the setpoint **Mode (page 475)**		
Description			
The setpoint is used to adjust the domain name server (DNS), which is needed to translate domain names in email addresses and server names into correct IP addresses.			

List of setpoints (page 232)

AirGate Connection

Setpoint group	CM-GPRS; CM-4G-GPS	**Related FW**	1.3.0
Range [units]	DISABLED / ENABLED [-]		
Default value	ENABLED	**Alternative config**	NO
Step	[-]		
Comm object	24273	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Only if relevant module is installed + conditioned by the setpoint **Mode (page 475)**		
Description			

This setpoint enable or disable AirGate connection via CM-GPRS or via CM-4G-GPS.

DISABLED:	Only SMS are sent. Internet-enabled SIM card is not required. AirGate is not used.
ENABLED	This mode uses the “AirGate” service. Internet-enabled SIM card must be used. The AirGate server address is adjusted by the setpoint **AirGate Address (page 500)**.

> **IMPORTANT: When this setpoint is changed the controller has to be restarted to apply changes.**

back to List of setpoints

AirGate Address

Setpoint group	CM-GPRS; CM-4G-GPS; CM-Ethernet	**Related FW**	1.3.0
Range [units]	[-]		
Default value	airgate.comap.cz	**Alternative config**	NO
Step	[-]		
Comm object	24364	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Only if relevant module is installed + conditioned by the setpoint **Mode (page 475)** (CM-GPRS module)		
Description			

This setpoint is used for entering the domain name or IP address of the AirGate server. Use the free AirGate server provided by ComAp at airgate.comap.cz.

> ***Note:*** *This setpoint is common for CM-Ethernet, CM-GPRS and CM-4G-GPS modules.*

back to List of setpoints

ComAp TCP Port

Setpoint group	CM-GPRS; CM-4G-GPS; CM-Ethernet	**Related FW**	1.3.0
Range [units]	0 .. 65 535[-]		
Default value	23	**Alternative config**	NO
Step	[-]		
Comm object	24374	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Only if relevant module is installed + conditioned by the setpoint **Mode (page 475)** (CM-GPRS module)		
Description			

This setpoint is used to adjust the port number, which is used for Ethernet connection to a PC with any of ComAp PC program (i.e. InteliConfig). This setpoint should be adjusted to 23, which is the default port used by all ComAp PC programs. A different value should be used only in special situations as e.g. sharing one public IP address among many controllers or to overcome a firewall restrictions.

> **IMPORTANT: If AirGate is used, this setpoint has to be adjusted to 23.**

> ***Note:*** *This setpoint is common for CM-Ethernet, CM-GPRS and CM-4G-GPS modules.*

back to List of setpoints

Group: CM-4G-GPS

Mode

Setpoint group	CM-GPRS; CM-4G-GPS	**Related FW**	1.3.0
Range [units]	Email+SMS / SMS Only [-]		
Default value	Email+SMS	**Alternative config**	NO
Step	[-]		
Comm object	24315	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Only if relevant module is installed		
Description			

This setpoint adjust the communication mode of module.

Email+SMS	Controller is connected to the Internet and is able to send e-mails as well as SMS. The controller is also accessible via AirGate. Internet-enabled SIM card must be used. Also **APN Name (page 476)** has to be adjusted.
SMS Only	Only SMS are sent. Internet-enabled SIM card is not required.

> **IMPORTANT: When this setpoint is changed the controller has to be restarted to apply changes.**

List of setpoints (page 232)

Required Connection Type

Setpoint group	CM-4G-GPS	**Related FW**	1.3.0
Range [units]	2G/3G/4G/Automatic [-]		
Default value	Automatic	**Alternative config**	NO
Step	[-]		
Comm object	24132	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Only if relevant module is installed		
Description			
This setpoint adjusts preferred connection type of CM-4G-GPS module.			

back to List of setpoints

APN Name

Setpoint group	CM-GPRS; CM-4G-GPS	**Related FW**	1.3.0
Range [units]	0..31 characters [-]		
Default value	[-]	**Alternative config**	NO
Step	[-]		
Comm object	24363	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Only if relevant module is installed + conditioned by the setpoint **Mode (page 475)**		
Description			
APN (Access Point Name) of the GPRS/4G network, provided by GSM operator.			

back to List of setpoints

APN User Name

Setpoint group	CM-GPRS; CM-4G-GPS	**Related FW**	1.3.0
Range [units]	0..15 characters [-]		
Default value	[-]	**Alternative config**	NO
Step	[-]		
Comm object	24361	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Only if relevant module is installed + conditioned by the setpoint **Mode (page 475)**		
Description			
User name for the GPRS/4G Access Point if authentication is required. But mostly it is not required and should be left blank.			

back to List of setpoints

APN User Password

Setpoint group	CM-GPRS; CM-4G-GPS	**Related FW**	1.3.0
Range [units]	0..15 characters [-]		
Default value	[-]	**Alternative config**	NO
Step	[-]		
Comm object	24360	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Only if relevant module is installed + conditioned by the setpoint **Mode (page 475)**		
Description			
User password for the GPRS/4G Access Point if authentication is required. But mostly it is not required and should be left blank.			

back to List of setpoints

Email Address 1

Setpoint group	CM-GPRS; CM-4G-GPS; CM-Ethernet	**Related FW**	1.3.0
Range [units]	0..63 characters [-]		
Default value	[-]	**Alternative config**	NO
Step	[-]		
Comm object	24298	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Only if relevant module is installed + conditioned by the setpoint **Mode (page 475)** (CM-GPRS and CM-4G-GPS modules)		
Description			
Enter in this setpoint a valid e-mail address where the alarm and event e-mails shall be sent. Leave this setpoint blank if alarm and event email should not be send. ***Note:*** *This setpoint is common for CM-Ethernet, CM-GPRS and CM-4G-GPS modules.*			

back to List of setpoints

Email Address 2

Setpoint group	CM-GPRS; CM-4G-GPS; CM-Ethernet	**Related FW**	1.3.0
Range [units]	0..63 characters [-]		
Default value	[-]	**Alternative config**	NO
Step	[-]		
Comm object	24297	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Only if relevant module is installed + conditioned by the setpoint **Mode (page 475)** (CM-GPRS and CM-4G-GPS modules)		
Description			
Enter in this setpoint a valid e-mail address where the alarm and event e-mails shall be sent. Leave this setpoint blank if alarm and event email should not be send. ***Note:*** *This setpoint is common for CM-Ethernet, CM-GPRS and CM-4G-GPS modules.*			

back to List of setpoints

Email Address 3

Setpoint group	CM-GPRS; CM-4G-GPS; CM-Ethernet	**Related FW**	1.3.0
Range [units]	0..63 characters [-]		
Default value	[-]	**Alternative config**	NO
Step	[-]		
Comm object	24145	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Only if relevant module is installed + conditioned by the setpoint **Mode (page 475)** (CM-GPRS and CM-4G-GPS modules)		
Description			
Enter in this setpoint a valid e-mail address where the alarm and event e-mails shall be sent. Leave this setpoint blank if alarm and event email should not be send. ***Note:*** *This setpoint is common for CM-Ethernet, CM-GPRS and CM-4G-GPS modules.*			

back to List of setpoints

Email Address 4

Setpoint group	CM-GPRS; CM-4G-GPS; CM-Ethernet	**Related FW**	1.3.0
Range [units]	0..63 characters [-]		
Default value	[-]	**Alternative config**	NO
Step	[-]		
Comm object	24144	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Only if relevant module is installed + conditioned by the setpoint **Mode (page 475)** (CM-GPRS and CM-4G-GPS modules)		
Description			
Enter in this setpoint a valid e-mail address where the alarm and event e-mails shall be sent. Leave this setpoint blank if alarm and event email should not be send. ***Note:*** *This setpoint is common for CM-Ethernet, CM-GPRS and CM-4G-GPS modules.*			

back to List of setpoints

Message Language

Setpoint group	CM-GPRS; CM-4G-GPS; CM-Ethernet	**Related FW**	1.3.0
Range [units]	[-]		
Default value	English	**Alternative config**	NO
Step	[-]		
Comm object	24299	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Only if relevant module is installed		
Description			
Use this setpoint to set the language of SMS and e-mail. ***Note:*** *Numbers correspond with languages in language list. See the chapter for* ***Language selection (page 93)*** *more information.* This setpoint is common for CM-Ethernet, CM-GPRS and CM-4G-GPS modules.			

back to List of setpoints

SMTP User Name

Setpoint group	CM-GPRS; CM-4G-GPS	**Related FW**	1.3.0
Range [units]	0..31 characters [-]		
Default value	[-]	**Alternative config**	NO
Step	[-]		
Comm object	24313	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Only if relevant module is installed + conditioned by the setpoint **Mode (page 475)**		
Description			
Use this setpoint to enter the username for the SMTP server. Leave the setpoint blank if the SMTP server does not require authentication.			

back to List of setpoints

SMTP User Password

Setpoint group	CM-GPRS; CM-4G-GPS	**Related FW**	1.3.0
Range [units]	0..15 characters [-]		
Default value	[-]	**Alternative config**	NO
Step	[-]		
Comm object	24312	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Only if relevant module is installed + conditioned by the setpoint **Mode (page 475)**		
Description			
Use this setpoint to enter the password for the SMTP server. Leave the setpoint blank if the SMTP server does not require authentication.			

back to List of setpoints

SMTP Server Address

Setpoint group	CM-GPRS; CM-4G-GPS	**Related FW**	1.3.0
Range [units]	0..31 characters [-]		
Default value	airgate.comap.cz:9925	**Alternative config**	NO
Step	[-]		
Comm object	24311	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Only if relevant module is installed + conditioned by the setpoint **Mode (page 475)**		
Description			

This setpoint is used for entering the domain name (e.g. smtp.yourprovider.com) or IP address (e.g. 74.125.39.109) or number of port (with colon like a first mark) of the SMTP server. Ask your internet provider or IT manager for this information.

> ***Note:*** *You may use also any public SMTP server which does not require connection over SSL/TLS channels. If the device is connected to AirGate the AirGate SMTP server at "airgate.comap.cz" may be used. Ports 25 and 9925 are supported. After controller connects to AirGate for the first time (or with new public IP address), it may not be able to send emails for first 5-10 minutes.*

back to List of setpoints

SMTP Sender Address

Setpoint group	CM-GPRS; CM-4G-GPS	**Related FW**	1.3.0
Range [units]	0..31 characters [-]		
Default value	[-]	**Alternative config**	NO
Step	[-]		
Comm object	24310	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Only if relevant module is installed + conditioned by the setpoint **Mode (page 475)** (CM-GPRS module)		
Description			

Enter an existing email address into this setpoint. This address will be used as sender address in active e-mails that will be sent from the controller.

> ***Note:*** *It is not needed to enter an existing email address, nevertheless valid email format needs to be followed.*

> **IMPORTANT: This item is obligatory when emails are configured.**

back to List of setpoints

Time Zone

Setpoint group	CM-GPRS; CM-4G-GPS; CM-Ethernet	**Related FW**	1.3.0
Range [units]	GMT-12:00 .. GMT+13:00 [hours]		
Default value	GMT+1:00 hour	**Alternative config**	NO
Step	[-]		
Comm object	24366	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Only if relevant module is installed		
Description			

This setpoint is used to select the time zone where the controller is located. See your computer time zone setting (click on the time indicator located in the rightmost position of the Windows task bar) if you are not sure about your time zone.

Note: *If the time zone is not selected properly the active e-mails may contain incorrect information about sending time, which may result in confusion when the respective problem actually occurred.*

Note: *This setpoint is common for CM-Ethernet, CM-GPRS and CM-4G-GPS modules.*

back to List of setpoints

Event Message

Setpoint group	CM-GPRS; CM-4G-GPS; CM-Ethernet	**Related FW**	1.3.0
Range [units]	ON / OFF [-]		
Default value	ON	**Alternative config**	NO
Step	[-]		
Comm object	10926	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Only if relevant module is installed		
Description			

This setpoint enables or disables Event Messages.

This setpoint is common for CM-Ethernet, CM-GPRS and CM-4G-GPS modules.

back to List of setpoints

Wrn Message

Setpoint group	CM-GPRS; CM-4G-GPS; CM-Ethernet	**Related FW**	1.3.0
Range [units]	ON / OFF [-]		
Default value	ON	**Alternative config**	NO
Step	[-]		
Comm object	8482	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Only if relevant module is installed		
Description			
This setpoint enables or disables Wrn Messages. This setpoint is common for CM-Ethernet, CM-GPRS and CM-4G-GPS modules.			

back to List of setpoints

BOC Message

Setpoint group	CM-GPRS; CM-4G-GPS; CM-Ethernet	**Related FW**	1.3.0
Range [units]	ON / OFF [-]		
Default value	ON	**Alternative config**	NO
Step	[-]		
Comm object	10566	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Only if relevant module is installed		
Description			
This setpoint enables or disables BOC Messages. This setpoint is common for CM-Ethernet, CM-GPRS and CM-4G-GPS modules.			

back to List of setpoints

Sd Messages

Setpoint group	CM-GPRS; CM-4G-GPS; CM-Ethernet	**Related FW**	1.3.0
Range [units]	ON / OFF [-]		
Default value	ON	**Alternative config**	NO
Step	[-]		
Comm object	8484	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Only if relevant module is installed		
Description			
This setpoint enables or disables Sd Messages. This setpoint is common for CM-Ethernet, CM-GPRS and CM-4G-GPS modules.			

back to List of setpoints

Telephone Number 1

Setpoint group	CM-GPRS; CM-4G-GPS	**Related FW**	1.3.0
Range [units]	0..31 characters [-]		
Default value	[-]	**Alternative config**	NO
Step	[-]		
Comm object	24296	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Only if relevant module is installed		
Description			

Enter in this setpoint either a valid GSM phone number where the alarm messages shall be sent. For GSM numbers use either the national format (i.e. the number you would dial if you wanted to make a local call) or the full international format beginning with a “+” character followed by the country prefix.

> **IMPORTANT: Telephone number has to be entered without spaces.**

back to List of setpoints

Telephone Number 2

Setpoint group	CM-GPRS; CM-4G-GPS	**Related FW**	1.3.0
Range [units]	0..31 characters [-]		
Default value	[-]	**Alternative config**	NO
Step	[-]		
Comm object	24295	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Only if relevant module is installed		
Description			

Enter in this setpoint either a valid GSM phone number where the alarm messages shall be sent. For GSM numbers use either the national format (i.e. the number you would dial if you wanted to make a local call) or the full international format beginning with a “+” character followed by the country prefix.

> **IMPORTANT: Telephone number has to be entered without spaces.**

back to List of setpoints

Telephone Number 3

Setpoint group	CM-GPRS; CM-4G-GPS	**Related FW**	1.3.0
Range [units]	0..31 characters [-]		
Default value	[-]	**Alternative config**	NO
Step	[-]		
Comm object	24143	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Only if relevant module is installed		
Description			

Enter in this setpoint either a valid GSM phone number where the alarm messages shall be sent. For GSM numbers use either the national format (i.e. the number you would dial if you wanted to make a local call) or the full international format beginning with a “+” character followed by the country prefix.

> **IMPORTANT: Telephone number has to be entered without spaces.**

back to List of setpoints

Telephone Number 4

Setpoint group	CM-GPRS; CM-4G-GPS	**Related FW**	1.3.0
Range [units]	0..31 characters [-]		
Default value	[-]	**Alternative config**	NO
Step	[-]		
Comm object	24142	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Only if relevant module is installed		
Description			

Enter in this setpoint either a valid GSM phone number where the alarm messages shall be sent. For GSM numbers use either the national format (i.e. the number you would dial if you wanted to make a local call) or the full international format beginning with a “+” character followed by the country prefix.

> **IMPORTANT: Telephone number has to be entered without spaces.**

back to List of setpoints

AirGate Connection

Setpoint group	CM-GPRS; CM-4G-GPS	**Related FW**	1.3.0
Range [units]	DISABLED / ENABLED [-]		
Default value	ENABLED	**Alternative config**	NO
Step	[-]		
Comm object	24273	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Only if relevant module is installed + conditioned by the setpoint **Mode (page 475)**		
Description			

This setpoint enable or disable AirGate connection via CM-GPRS or via CM-4G-GPS.

DISABLED:	Only SMS are sent. Internet-enabled SIM card is not required. AirGate is not used.
ENABLED	This mode uses the “AirGate” service. Internet-enabled SIM card must be used. The AirGate server address is adjusted by the setpoint **AirGate Address (page 500)**.

> **IMPORTANT: When this setpoint is changed the controller has to be restarted to apply changes.**

back to List of setpoints

AirGate Address

Setpoint group	CM-GPRS; CM-4G-GPS; CM-Ethernet	**Related FW**	1.3.0
Range [units]	[-]		
Default value	airgate.comap.cz	**Alternative config**	NO
Step	[-]		
Comm object	24364	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Only if relevant module is installed + conditioned by the setpoint **Mode (page 475)** (CM-GPRS module)		
Description			

This setpoint is used for entering the domain name or IP address of the AirGate server. Use the free AirGate server provided by ComAp at airgate.comap.cz.

> ***Note:*** *This setpoint is common for CM-Ethernet, CM-GPRS and CM-4G-GPS modules.*

back to List of setpoints

ComAp TCP Port

Setpoint group	CM-GPRS; CM-4G-GPS; CM-Ethernet	**Related FW**	1.3.0
Range [units]	0 .. 65 535[-]		
Default value	23	**Alternative config**	NO
Step	[-]		
Comm object	24374	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Only if relevant module is installed + conditioned by the setpoint **Mode (page 475)** (CM-GPRS module)		
Description			

This setpoint is used to adjust the port number, which is used for Ethernet connection to a PC with any of ComAp PC program (i.e. InteliConfig). This setpoint should be adjusted to 23, which is the default port used by all ComAp PC programs. A different value should be used only in special situations as e.g. sharing one public IP address among many controllers or to overcome a firewall restrictions.

> **IMPORTANT: If AirGate is used, this setpoint has to be adjusted to 23.**

Note: *This setpoint is common for CM-Ethernet, CM-GPRS and CM-4G-GPS modules.*

back to List of setpoints

Group: CM-Ethernet

Email Address 1

Setpoint group	CM-GPRS; CM-4G-GPS; CM-Ethernet	**Related FW**	1.3.0
Range [units]	0..63 characters [-]		
Default value	[-]	**Alternative config**	NO
Step	[-]		
Comm object	24298	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Only if relevant module is installed + conditioned by the setpoint **Mode (page 475)** (CM-GPRS and CM-4G-GPS modules)		
Description			

Enter in this setpoint a valid e-mail address where the alarm and event e-mails shall be sent. Leave this setpoint blank if alarm and event email should not be send.

Note: *This setpoint is common for CM-Ethernet, CM-GPRS and CM-4G-GPS modules.*

back to List of setpoints

Email Address 2

Setpoint group	CM-GPRS; CM-4G-GPS; CM-Ethernet	**Related FW**	1.3.0
Range [units]	0..63 characters [-]		
Default value	[-]	**Alternative config**	NO
Step	[-]		
Comm object	24297	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Only if relevant module is installed + conditioned by the setpoint **Mode (page 475)** (CM-GPRS and CM-4G-GPS modules)		
Description			
Enter in this setpoint a valid e-mail address where the alarm and event e-mails shall be sent. Leave this setpoint blank if alarm and event email should not be send. ***Note:*** *This setpoint is common for CM-Ethernet, CM-GPRS and CM-4G-GPS modules.*			

back to List of setpoints

Email Address 3

Setpoint group	CM-GPRS; CM-4G-GPS; CM-Ethernet	**Related FW**	1.3.0
Range [units]	0..63 characters [-]		
Default value	[-]	**Alternative config**	NO
Step	[-]		
Comm object	24145	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Only if relevant module is installed + conditioned by the setpoint **Mode (page 475)** (CM-GPRS and CM-4G-GPS modules)		
Description			
Enter in this setpoint a valid e-mail address where the alarm and event e-mails shall be sent. Leave this setpoint blank if alarm and event email should not be send. ***Note:*** *This setpoint is common for CM-Ethernet, CM-GPRS and CM-4G-GPS modules.*			

back to List of setpoints

Email Address 4

Setpoint group	CM-GPRS; CM-4G-GPS; CM-Ethernet	**Related FW**	1.3.0
Range [units]	0..63 characters [-]		
Default value	[-]	**Alternative config**	NO
Step	[-]		
Comm object	24144	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Only if relevant module is installed + conditioned by the setpoint **Mode (page 475)** (CM-GPRS and CM-4G-GPS modules)		
Description			
Enter in this setpoint a valid e-mail address where the alarm and event e-mails shall be sent. Leave this setpoint blank if alarm and event email should not be send. ***Note:*** *This setpoint is common for CM-Ethernet, CM-GPRS and CM-4G-GPS modules.*			

back to List of setpoints

Message Language

Setpoint group	CM-GPRS; CM-4G-GPS; CM-Ethernet	**Related FW**	1.3.0
Range [units]	[-]		
Default value	English	**Alternative config**	NO
Step	[-]		
Comm object	24299	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Only if relevant module is installed		
Description			
Use this setpoint to set the language of SMS and e-mail. ***Note:*** *Numbers correspond with languages in language list. See the chapter for* ***Language selection (page 93)*** *more information.* This setpoint is common for CM-Ethernet, CM-GPRS and CM-4G-GPS modules.			

back to List of setpoints

Time Zone

Setpoint group	CM-GPRS; CM-4G-GPS; CM-Ethernet	**Related FW**	1.3.0
Range [units]	GMT-12:00 .. GMT+13:00 [hours]		
Default value	GMT+1:00 hour	**Alternative config**	NO
Step	[-]		
Comm object	24366	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Only if relevant module is installed		
Description			

This setpoint is used to select the time zone where the controller is located. See your computer time zone setting (click on the time indicator located in the rightmost position of the Windows task bar) if you are not sure about your time zone.

Note: *If the time zone is not selected properly the active e-mails may contain incorrect information about sending time, which may result in confusion when the respective problem actually occurred.*

Note: *This setpoint is common for CM-Ethernet, CM-GPRS and CM-4G-GPS modules.*

back to List of setpoints

Event Message

Setpoint group	CM-GPRS; CM-4G-GPS; CM-Ethernet	**Related FW**	1.3.0
Range [units]	ON / OFF [-]		
Default value	ON	**Alternative config**	NO
Step	[-]		
Comm object	10926	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Only if relevant module is installed		
Description			

This setpoint enables or disables Event Messages.

This setpoint is common for CM-Ethernet, CM-GPRS and CM-4G-GPS modules.

back to List of setpoints

Wrn Message

Setpoint group	CM-GPRS; CM-4G-GPS; CM-Ethernet	**Related FW**	1.3.0
Range [units]	ON / OFF [-]		
Default value	ON	**Alternative config**	NO
Step	[-]		
Comm object	8482	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Only if relevant module is installed		
Description			
This setpoint enables or disables Wrn Messages. This setpoint is common for CM-Ethernet, CM-GPRS and CM-4G-GPS modules.			

back to List of setpoints

BOC Message

Setpoint group	CM-GPRS; CM-4G-GPS; CM-Ethernet	**Related FW**	1.3.0
Range [units]	ON / OFF [-]		
Default value	ON	**Alternative config**	NO
Step	[-]		
Comm object	10566	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Only if relevant module is installed		
Description			
This setpoint enables or disables BOC Messages. This setpoint is common for CM-Ethernet, CM-GPRS and CM-4G-GPS modules.			

back to List of setpoints

Sd Messages

Setpoint group	CM-GPRS; CM-4G-GPS; CM-Ethernet	**Related FW**	1.3.0
Range [units]	ON / OFF [-]		
Default value	ON	**Alternative config**	NO
Step	[-]		
Comm object	8484	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Only if relevant module is installed		
Description			
This setpoint enables or disables Sd Messages. This setpoint is common for CM-Ethernet, CM-GPRS and CM-4G-GPS modules.			

back to List of setpoints

SMTP UserName

Setpoint group	CM-Ethernet	**Related FW**	1.3.0
Range [units]	0..31 characters [-]		
Default value	[-]	**Alternative config**	NO
Step	[-]		
Comm object	24370	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Only if relevant module is installed		
Description			
Use this setpoint to enter the username for the SMTP server. Leave the setpoint blank if the SMTP server does not require authentication.			

back to List of setpoints

SMTP User Password

Setpoint group	CM-Ethernet	**Related FW**	1.3.0
Range [units]	0..15 characters [-]		
Default value	[-]	**Alternative config**	NO
Step	[-]		
Comm object	24369	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Only if relevant module is installed		
Description			
Use this setpoint to enter the password for the SMTP server. Leave the setpoint blank if the SMTP server does not require authentication.			

back to List of setpoints

SMTP Server Address

Setpoint group	CM-Ethernet	**Related FW**	1.3.0
Range [units]	0..31 characters [-]		
Default value	airgate.comap.cz:9925	**Alternative config**	NO
Step	[-]		
Comm object	24368	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Only if relevant module is installed		
Description			

This setpoint is used for entering the domain name (e.g. smtp.yourprovider.com) or IP address (e.g. 74.125.39.109) or number of port (with colon like a first mark) of the SMTP server. Ask your internet provider or IT manager for this information.

> ***Note:*** *You may use also any public SMTP server which does not require connection over SSL/TLS channels. If the device is connected to AirGate the AirGate SMTP server at "airgate.comap.cz" may be used. Ports 25 and 9925 are supported. After controller connects to AirGate for the first time (or with new public IP address), it may not be able to send emails for first 5-10 minutes.*

back to List of setpoints

SMTP Sender Address

Setpoint group	CM-Ethernet	**Related FW**	1.3.0
Range [units]	0..31 characters [-]		
Default value	[-]	**Alternative config**	NO
Step	[-]		
Comm object	24367	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Only if relevant module is installed		
Description			

Enter an existing email address into this setpoint. This address will be used as sender address in active e-mails that will be sent from the controller.

> ***Note:*** *It is not needed to enter an existing email address, nevertheless valid email format needs to be followed.*

> **IMPORTANT: This item is obligatory when emails are configured.**

back to List of setpoints

IP Address Mode

Setpoint group	CM-Ethernet	**Related FW**	1.3.0
Range [units]	FIXED / AUTOMATIC [-]		
Default value	AUTOMATIC	**Alternative config**	NO
Step	[-]		
Comm object	24259	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Only if relevant module is installed		
Description			

The setpoint is used to select the method how the ethernet connection is adjusted.

DISABLED: The Ethernet connection is fixed by means of the setpoints IP Addr, NetMask, GateIP, DNS IP Address.

This method should be used for a classic Ethernet or internet connection. When this type of connection opens, the controller is specified by its IP address. This means that it would be inconvenient if the IP address were not fixed (static).

ENABLED: The Ethernet connection setting is obtained **automatically from the DHCP server**. The obtained settings are then copied to the related setpoints. If the process of obtaining the settings from the DHCP server is not successful, the value *000.000.000.000* is copied to the setpoint IP address and the module continues to try to obtain the settings.

back to List of setpoints

IP Address

Setpoint group	CM-Ethernet	**Related FW**	1.3.0
Range [units]	Valid IP address [-]		
Default value	192.168.1.254	**Alternative config**	NO
Step	[-]		
Comm object	24376	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Only if relevant module is installed + conditioned by the setpoint **IP Address Mode (page 494)**		
Description			

The setpoint is used to set the address when you are in static mode.

If **IP Address Mode (page 494)** is FIXED this setpoint is used to adjust the IP address of the ethernet interface of the controller. Ask your IT specialist for help with this setting.

If **IP Address Mode (page 494)** is AUTOMATIC this setpoint is inactive. The IP address is assigned by the DHCP server.

back to List of setpoints

Subnet Mask

Setpoint group	CM-Ethernet	**Related FW**	1.3.0
Range [units]	Valid IP address [-]		
Default value	255.255.255.0	**Alternative config**	NO
Step	[-]		
Comm object	24375	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Only if relevant module is installed + conditioned by the setpoint **IP Address Mode (page 494)**		
Description			
The setpoint is used to select the method how the Subnet Mask is adjusted. If **IP Address Mode (page 494)** is FIXED this setpoint is used to adjust the Subnet Mask. Ask your IT specialist for help with this setting. If **IP Address Mode (page 494)** is AUTOMATIC this setpoint is inactive. The Subnet Mask is assigned by the DHCP server.			

back to List of setpoints

Gateway IP

Setpoint group	CM-Ethernet	**Related FW**	1.3.0
Range [units]	Valid IP address [-]		
Default value	192.168.1.1	**Alternative config**	NO
Step	[-]		
Comm object	24373	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Only if relevant module is installed + conditioned by the setpoint **IP Address Mode (page 494)**		
Description			
The setpoint is used to select the method how the Gateway IP is adjusted. If **IP Address Mode (page 494)** is DISABLE this setpoint is used to adjust the IP address of the gateway of the network segment where the controller is connected. If **IP Address Mode (page 494)** is ENABLED this setpoint is used to display the gateway IP address which has been assigned by the DHCP server. A gateway is a device which connects the respective segment with the other segments and/or Internet.			

back to List of setpoints

DNS IP Address 1

Setpoint group	CM-Ethernet	**Related FW**	1.3.0
Range [units]	Valid IP address [-]		
Default value	8.8.8.8	**Alternative config**	NO
Step	[-]		
Comm object	24362	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Only if relevant module is installed		
Description			
The setpoint is used to select the method how the DNS Address 1 is adjusted. If **IP Address Mode (page 494)** is FIXED this setpoint is used to adjust the domain name server (DNS), which is needed to translate domain names in email addresses and server names into correct IP addresses. If **IP Address Mode (page 494)** is AUTOMATIC this setpoint is inactive. The DNS server IP address is assigned by the DHCP server.			

back to List of setpoints

DNS IP Address 2

Setpoint group	CM-Ethernet	**Related FW**	1.3.0
Range [units]	Valid IP address [-]		
Default value	8.8.8.8	**Alternative config**	NO
Step	[-]		
Comm object	24331	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Only if relevant module is installed		
Description			
The setpoint is used to select the method how the DNS Address 2 is adjusted. If **IP Address Mode (page 494)** is FIXED this setpoint is used to adjust the domain name server (DNS), which is needed to translate domain names in email addresses and server names into correct IP addresses. If **IP Address Mode (page 494)** is AUTOMATIC this setpoint is inactive. The DNS server IP address is assigned by the DHCP server.			

back to List of setpoints

MODBUS Server

Setpoint group	CM-Ethernet	**Related FW**	1.3.0
Range [units]	DISABLED / ENABLED [-]		
Default value	Disabled	**Alternative config**	NO
Step	[-]		
Comm object	24337	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Only if relevant module is installed		
Description			
Enable or disable MODBUS communication via ethernet interface.			

back to List of setpoints

SNMP Trap Format

Setpoint group	CM-Ethernet	**Related FW**	1.3.0
Range [units]	SNMPv1 Trap / SNMPv2 Not / SNMPv2 Inf [-]		
Default value	SNMP v1 Trap	**Alternative config**	NO
Step	[-]		
Comm object	24136	**Related applications**	AMF, MRS MINT, SPtM
Config level	Standard		
Setpoint visibility	Only if relevant module is installed		
Description			
This setpoint adjusts type of SNMP traps.			

back to List of setpoints

SNMP Agent

Setpoint group	CM-Ethernet	**Related FW**	1.3.0
Range [units]	DISABLED / ENABLED [-]		
Default value	DISABLED	**Alternative config**	NO
Step	[-]		
Comm object	24336	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Only if relevant module is installed		
Description			
Enable or disable SNMP v1 Agent.			

back to List of setpoints

SNMP RD Community String

Setpoint group	CM-Ethernet	**Related FW**	1.3.0
Range [units]	0..31 characters [-]		
Default value	public	**Alternative config**	NO
Step	[-]		
Comm object	24335	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Only if relevant module is installed + conditioned by the setpoint **SNMP Agent (page 497)**		
Description			
SNMP Community String only for reading.			

back to List of setpoints

SNMP WR Community String

Setpoint group	CM-Ethernet	**Related FW**	1.3.0
Range [units]	0..31 characters [-]		
Default value	private	**Alternative config**	NO
Step	[-]		
Comm object	24334	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Only if relevant module is installed + conditioned by the setpoint **SNMP Agent (page 497)**		
Description			
SNMP Community String for writing and reading.			

back to List of setpoints

SNMP Traps IP Address 1

Setpoint group	CM-Ethernet	**Related FW**	1.3.0
Range [units]	Valid IP address [-]		
Default value	DISABLED	**Alternative config**	NO
Step	[-]		
Comm object	24294	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Only if relevant module is installed		
Description			
IP address 1 for receiving SNMP Traps. Leave this setpoint blank if SNMP traps should not be send.			

back to List of setpoints

SNMP Traps IP Address 2

Setpoint group	CM-Ethernet	**Related FW**	1.3.0
Range [units]	Valid IP address [-]		
Default value	DISABLED	**Alternative config**	NO
Step	[-]		
Comm object	24293	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Only if relevant module is installed		
Description			
IP address 2 for receiving SNMP Traps. Leave this setpoint blank if SNMP traps should not be send.			

back to List of setpoints

AirGate Connection

Setpoint group	CM-Ethernet	**Related FW**	1.3.0
Range [units]	DISABLED / ENABLED [-]		
Default value	ENABLED	**Alternative config**	NO
Step	[-]		
Comm object	24365	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Only if relevant module is installed		
Description			

This setpoint selects the Ethernet connection mode.

DISABLED:	This is a standard mode in which the controller listens to the incoming traffic and answers the TCP/IP queries addressed to it. This mode requires the controller to be accessible from the remote device (PC), i.e. it must be accessible at a public and static IP address if you want to connect to it from the internet.
ENABLED	This mode enables the AirGate service. The AirGate server address is adjusted by the setpoint **AirGate Address (page 500)**. Also the standard TCP/IP is enabled.

back to List of setpoints

AirGate Address

Setpoint group	CM-GPRS; CM-4G-GPS; CM-Ethernet	**Related FW**	1.3.0
Range [units]	[-]		
Default value	airgate.comap.cz	**Alternative config**	NO
Step	[-]		
Comm object	24364	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Only if relevant module is installed + conditioned by the setpoint **Mode (page 475)** (CM-GPRS module)		
Description			
This setpoint is used for entering the domain name or IP address of the AirGate server. Use the free AirGate server provided by ComAp at airgate.comap.cz. ***Note:*** *This setpoint is common for CM-Ethernet, CM-GPRS and CM-4G-GPS modules.*			

back to List of setpoints

ComAp TCP Port

Setpoint group	CM-GPRS; CM-4G-GPS; CM-Ethernet	**Related FW**	1.3.0
Range [units]	0 .. 65 535[-]		
Default value	23	**Alternative config**	NO
Step	[-]		
Comm object	24374	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Only if relevant module is installed + conditioned by the setpoint **Mode (page 475)** (CM-GPRS module)		
Description			
This setpoint is used to adjust the port number, which is used for Ethernet connection to a PC with any of ComAp PC program (i.e. InteliConfig). This setpoint should be adjusted to 23, which is the default port used by all ComAp PC programs. A different value should be used only in special situations as e.g. sharing one public IP address among many controllers or to overcome a firewall restrictions. **IMPORTANT: If AirGate is used, this setpoint has to be adjusted to 23.** ***Note:*** *This setpoint is common for CM-Ethernet, CM-GPRS and CM-4G-GPS modules.*			

back to List of setpoints

Group: EM-BIO8-EFCP

Earth Fault Current Protection

Setpoint group	EM-BIO8-EFCP	**Related FW**	1.3.0
Range [units]	DISABLED / ENABLED [-]		
Default value	ENABLED	**Alternative config**	NO
Step	[-]		
Comm object	11631	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Only if relevant module is installed		
Description			

This setpoint can block or allow Earth fault Current protection.

DISABLED	Earth fault current protection is blocked.
ENABLED	Earth fault current protection is allowed. Behavior of Earth fault current protection is set by these setpoints: **Earth Fault CT Input Range (page 502)**, **Earth Fault CT Ratio (page 502)**, **Earth Fault Delay (page 501)** and **Earth Fault Sd (page 502)**.

back to List of setpoints

Earth Fault Delay

Setpoint group	EM-BIO8-EFCP	**Related FW**	1.3.0
Range [units]	0,03 .. 5,00 [s]		
Default value	0,10 s	**Alternative config**	NO
Step	0,01 s		
Comm object	11633	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Only if relevant module is installed		
Description			

Delay for Earth Fault Current protection.

back to List of setpoints

Earth Fault CT Input Range

Setpoint group	EM-BIO8-EFCP	**Related FW**	1.3.0
Range [units]	1 [A] / 5 [A]		
Default value	5 A	**Alternative config**	NO
Step	[-]		
Comm object	14340	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Only if relevant module is installed		
Description			
There are 2 physical inputs for **Earth Fault Current Protection (page 501)**. Value of this setpoint has to be set on value of physical input which is presently in use.			

back to List of setpoints

Earth Fault CT Ratio

Setpoint group	EM-BIO8-EFCP	**Related FW**	1.3.0
Range [units]	1 .. 2000 [1/(1or5)A]		
Default value	500 1/(1or5)A	**Alternative config**	NO
Step	1A/1A; 1A/5A		
Comm object	14339	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Only if relevant module is installed		
Description			
Earth Fault current transformer ratio. ***Note:*** *Type of units depends on setpoint* ***Earth Fault CT Input Range (page 502)*** *which have to be set before this setpoint.*			

back to List of setpoints

Earth Fault Sd

Setpoint group	EM-BIO8-EFCP	**Related FW**	1.3.0
Range [units]	0,03 .. 5,00 [A]		
Default value	0,30 A	**Alternative config**	NO
Step	0,01 [A]		
Comm object	11632	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Only if relevant module is installed		
Description			
Limit value for Earth Fault Current protection.			

back to List of setpoints

Group: PLC

PLC Setpoint 1

Setpoint group	PLC	**Related FW**	1.3.0
Range [units]	Depends on resolution of value [-]		
Default value	Depends on resolution of value [-]	**Alternative config**	NO
Step	Depends on resolution of value [-]		
Comm object	10440	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Only if relevant setpoint is used in PLC		
Description			

Adjustable value for input in PLC logic.

Configuration of setpoint:

Configuration is made via configuration PC tool InteliConfig

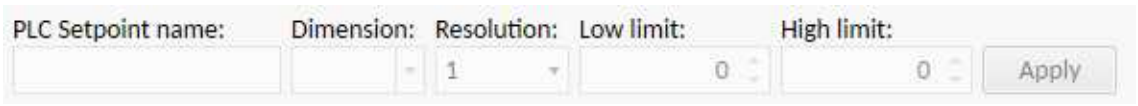


Image 8.69 Screen of configuration from InteliConfig

PLC Setpoint name	Name of the setpoint (0..32 characters)
Dimension	Dimension of value of the setpoint.
Resolution	Resolution of the value of the setpoint. Resolution adjust number of decimal places in low and high limit.
Low limit	The lowest value of setpoint. Digit place of this value can be decrease or increase by resolution of setpoint.
High limit	The highest value of setpoint. Digit place of this value can be decrease or increase by resolution of setpoint.

back to List of setpoints

PLC Setpoint 2

Setpoint group	PLC	**Related FW**	1.3.0
Range [units]	Depends on resolution of value [-]		
Default value	Depends on resolution of value [-]	**Alternative config**	NO
Step	Depends on resolution of value [-]		
Comm object	10441	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Only if relevant setpoint is used in PLC		
Description			

Adjustable value for input in PLC logic.

Configuration of setpoint:

Configuration is made via configuration PC tool InteliConfig

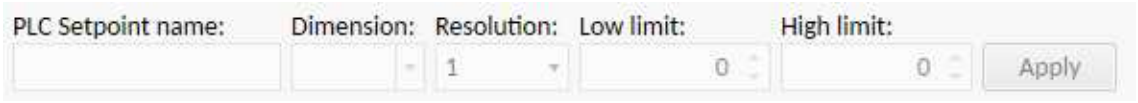


Image 8.70 Screen of configuration from InteliConfig

PLC Setpoint name	Name of the setpoint (0..32 characters)
Dimension	Dimension of value of the setpoint.
Resolution	Resolution of the value of the setpoint. Resolution adjust number of decimal places in low and high limit.
Low limit	The lowest value of setpoint. Digit place of this value can be decrease or increase by resolution of setpoint.
High limit	The highest value of setpoint. Digit place of this value can be decrease or increase by resolution of setpoint.

back to List of setpoints

PLC Setpoint 3

Setpoint group	PLC	**Related FW**	1.3.0
Range [units]	Depends on resolution of value [-]		
Default value	Depends on resolution of value [-]	**Alternative config**	NO
Step	Depends on resolution of value [-]		
Comm object	10442	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Only if relevant setpoint is used in PLC		
Description			

Adjustable value for input in PLC logic.

Configuration of setpoint:

Configuration is made via configuration PC tool InteliConfig

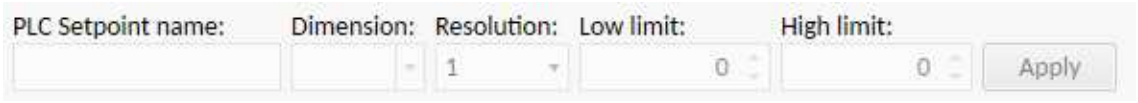


Image 8.71 Screen of configuration from InteliConfig

PLC Setpoint name	Name of the setpoint (0..32 characters)
Dimension	Dimension of value of the setpoint.
Resolution	Resolution of the value of the setpoint. Resolution adjust number of decimal places in low and high limit.
Low limit	The lowest value of setpoint. Digit place of this value can be decrease or increase by resolution of setpoint.
High limit	The highest value of setpoint. Digit place of this value can be decrease or increase by resolution of setpoint.

back to List of setpoints

PLC Setpoint 4

Setpoint group	PLC	**Related FW**	1.3.0
Range [units]	Depends on resolution of value [-]		
Default value	Depends on resolution of value [-]	**Alternative config**	NO
Step	Depends on resolution of value [-]		
Comm object	10443	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Only if relevant setpoint is used in PLC		
Description			

Adjustable value for input in PLC logic.

Configuration of setpoint:

Configuration is made via configuration PC tool InteliConfig

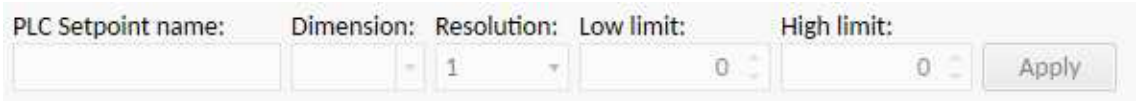


Image 8.72 Screen of configuration from InteliConfig

PLC Setpoint name	Name of the setpoint (0..32 characters)
Dimension	Dimension of value of the setpoint.
Resolution	Resolution of the value of the setpoint. Resolution adjust number of decimal places in low and high limit.
Low limit	The lowest value of setpoint. Digit place of this value can be decrease or increase by resolution of setpoint.
High limit	The highest value of setpoint. Digit place of this value can be decrease or increase by resolution of setpoint.

back to List of setpoints

PLC Setpoint 5

Setpoint group	PLC	**Related FW**	1.3.0
Range [units]	Depends on resolution of value [-]		
Default value	Depends on resolution of value [-]	**Alternative config**	NO
Step	Depends on resolution of value [-]		
Comm object	10444	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Only if relevant setpoint is used in PLC		
Description			

Adjustable value for input in PLC logic.

Configuration of setpoint:

Configuration is made via configuration PC tool InteliConfig

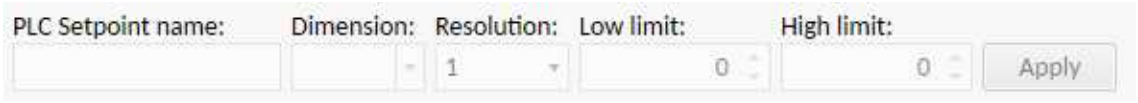


Image 8.73 Screen of configuration from InteliConfig

PLC Setpoint name	Name of the setpoint (0..32 characters)
Dimension	Dimension of value of the setpoint.
Resolution	Resolution of the value of the setpoint. Resolution adjust number of decimal places in low and high limit.
Low limit	The lowest value of setpoint. Digit place of this value can be decrease or increase by resolution of setpoint.
High limit	The highest value of setpoint. Digit place of this value can be decrease or increase by resolution of setpoint.

back to List of setpoints

PLC Setpoint 6

Setpoint group	PLC	**Related FW**	1.3.0
Range [units]	Depends on resolution of value [-]		
Default value	Depends on resolution of value [-]	**Alternative config**	NO
Step	Depends on resolution of value [-]		
Comm object	10445	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Only if relevant setpoint is used in PLC		
Description			

Adjustable value for input in PLC logic.

Configuration of setpoint:

Configuration is made via configuration PC tool InteliConfig

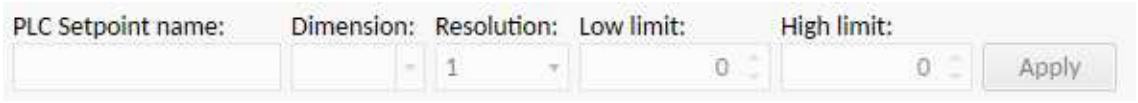


Image 8.74 Screen of configuration from InteliConfig

PLC Setpoint name	Name of the setpoint (0..32 characters)
Dimension	Dimension of value of the setpoint.
Resolution	Resolution of the value of the setpoint. Resolution adjust number of decimal places in low and high limit.
Low limit	The lowest value of setpoint. Digit place of this value can be decrease or increase by resolution of setpoint.
High limit	The highest value of setpoint. Digit place of this value can be decrease or increase by resolution of setpoint.

back to List of setpoints

PLC Setpoint 7

Setpoint group	PLC	**Related FW**	1.3.0
Range [units]	Depends on resolution of value [-]		
Default value	Depends on resolution of value [-]	**Alternative config**	NO
Step	Depends on resolution of value [-]		
Comm object	10446	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Only if relevant setpoint is used in PLC		
Description			

Adjustable value for input in PLC logic.

Configuration of setpoint:

Configuration is made via configuration PC tool InteliConfig

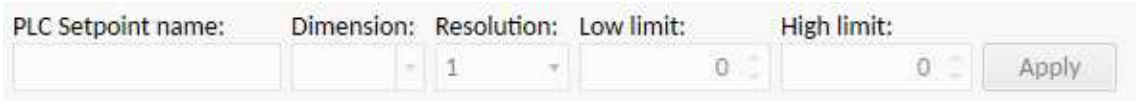


Image 8.75 Screen of configuration from InteliConfig

PLC Setpoint name	Name of the setpoint (0..32 characters)
Dimension	Dimension of value of the setpoint.
Resolution	Resolution of the value of the setpoint. Resolution adjust number of decimal places in low and high limit.
Low limit	The lowest value of setpoint. Digit place of this value can be decrease or increase by resolution of setpoint.
High limit	The highest value of setpoint. Digit place of this value can be decrease or increase by resolution of setpoint.

back to List of setpoints

PLC Setpoint 8

Setpoint group	PLC	**Related FW**	1.3.0
Range [units]	Depends on resolution of value [-]		
Default value	Depends on resolution of value [-]	**Alternative config**	NO
Step	Depends on resolution of value [-]		
Comm object	10447	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Only if relevant setpoint is used in PLC		
Description			

Adjustable value for input in PLC logic.

Configuration of setpoint:

Configuration is made via configuration PC tool InteliConfig

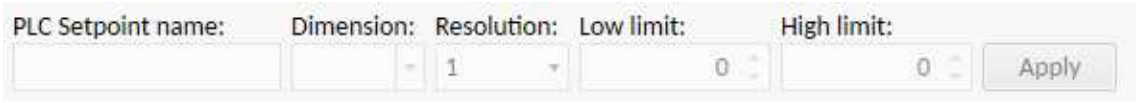


Image 8.76 Screen of configuration from InteliConfig

PLC Setpoint name	Name of the setpoint (0..32 characters)
Dimension	Dimension of value of the setpoint.
Resolution	Resolution of the value of the setpoint. Resolution adjust number of decimal places in low and high limit.
Low limit	The lowest value of setpoint. Digit place of this value can be decrease or increase by resolution of setpoint.
High limit	The highest value of setpoint. Digit place of this value can be decrease or increase by resolution of setpoint.

back to List of setpoints

PLC Setpoint 9

Setpoint group	PLC	**Related FW**	1.3.0
Range [units]	Depends on resolution of value [-]		
Default value	Depends on resolution of value [-]	**Alternative config**	NO
Step	Depends on resolution of value [-]		
Comm object	10448	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Only if relevant setpoint is used in PLC		
Description			

Adjustable value for input in PLC logic.

Configuration of setpoint:

Configuration is made via configuration PC tool InteliConfig

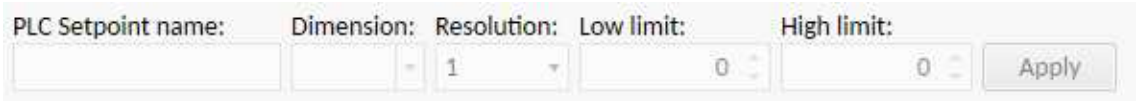


Image 8.77 Screen of configuration from InteliConfig

PLC Setpoint name	Name of the setpoint (0..32 characters)
Dimension	Dimension of value of the setpoint.
Resolution	Resolution of the value of the setpoint. Resolution adjust number of decimal places in low and high limit.
Low limit	The lowest value of setpoint. Digit place of this value can be decrease or increase by resolution of setpoint.
High limit	The highest value of setpoint. Digit place of this value can be decrease or increase by resolution of setpoint.

back to List of setpoints

PLC Setpoint 10

Setpoint group	PLC	**Related FW**	1.3.0
Range [units]	Depends on resolution of value [-]		
Default value	Depends on resolution of value [-]	**Alternative config**	NO
Step	Depends on resolution of value [-]		
Comm object	10449	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Only if relevant setpoint is used in PLC		
Description			

Adjustable value for input in PLC logic.

Configuration of setpoint:

Configuration is made via configuration PC tool InteliConfig

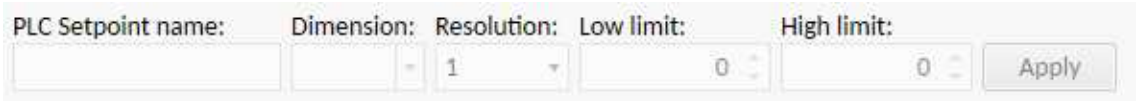


Image 8.78 Screen of configuration from InteliConfig

PLC Setpoint name	Name of the setpoint (0..32 characters)
Dimension	Dimension of value of the setpoint.
Resolution	Resolution of the value of the setpoint. Resolution adjust number of decimal places in low and high limit.
Low limit	The lowest value of setpoint. Digit place of this value can be decrease or increase by resolution of setpoint.
High limit	The highest value of setpoint. Digit place of this value can be decrease or increase by resolution of setpoint.

back to List of setpoints

PLC Setpoint 11

Setpoint group	PLC	**Related FW**	1.3.0
Range [units]	Depends on resolution of value [-]		
Default value	Depends on resolution of value [-]	**Alternative config**	NO
Step	Depends on resolution of value [-]		
Comm object	10450	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Only if relevant setpoint is used in PLC		

Description

Adjustable value for input in PLC logic.

Configuration of setpoint:

Configuration is made via configuration PC tool InteliConfig

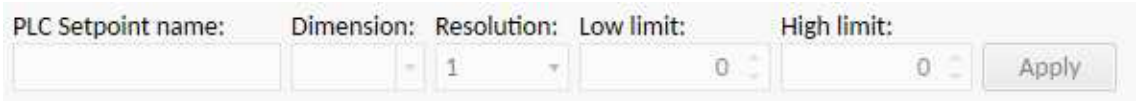


Image 8.79 Screen of configuration from InteliConfig

PLC Setpoint name	Name of the setpoint (0..32 characters)
Dimension	Dimension of value of the setpoint.
Resolution	Resolution of the value of the setpoint. Resolution adjust number of decimal places in low and high limit.
Low limit	The lowest value of setpoint. Digit place of this value can be decrease or increase by resolution of setpoint.
High limit	The highest value of setpoint. Digit place of this value can be decrease or increase by resolution of setpoint.

back to List of setpoints

PLC Setpoint 12

Setpoint group	PLC	**Related FW**	1.3.0
Range [units]	Depends on resolution of value [-]		
Default value	Depends on resolution of value [-]	**Alternative config**	NO
Step	Depends on resolution of value [-]		
Comm object	10451	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Only if relevant setpoint is used in PLC		

Description

Adjustable value for input in PLC logic.

Configuration of setpoint:

Configuration is made via configuration PC tool InteliConfig

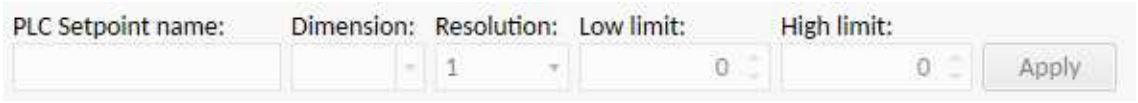


Image 8.80 Screen of configuration from InteliConfig

PLC Setpoint name	Name of the setpoint (0..32 characters)
Dimension	Dimension of value of the setpoint.
Resolution	Resolution of the value of the setpoint. Resolution adjust number of decimal places in low and high limit.
Low limit	The lowest value of setpoint. Digit place of this value can be decrease or increase by resolution of setpoint.
High limit	The highest value of setpoint. Digit place of this value can be decrease or increase by resolution of setpoint.

back to List of setpoints

PLC Setpoint 13

Setpoint group	PLC	**Related FW**	1.3.0
Range [units]	Depends on resolution of value [-]		
Default value	Depends on resolution of value [-]	**Alternative config**	NO
Step	Depends on resolution of value [-]		
Comm object	10452	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Only if relevant setpoint is used in PLC		
Description			

Adjustable value for input in PLC logic.

Configuration of setpoint:

Configuration is made via configuration PC tool InteliConfig

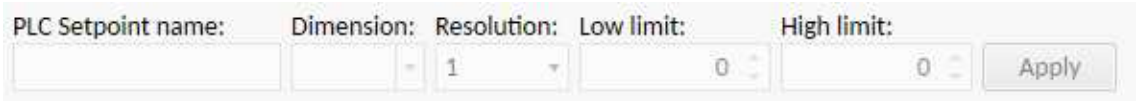


Image 8.81 Screen of configuration from InteliConfig

PLC Setpoint name	Name of the setpoint (0..32 characters)
Dimension	Dimension of value of the setpoint.
Resolution	Resolution of the value of the setpoint. Resolution adjust number of decimal places in low and high limit.
Low limit	The lowest value of setpoint. Digit place of this value can be decrease or increase by resolution of setpoint.
High limit	The highest value of setpoint. Digit place of this value can be decrease or increase by resolution of setpoint.

back to List of setpoints

PLC Setpoint 14

Setpoint group	PLC	**Related FW**	1.3.0
Range [units]	Depends on resolution of value [-]		
Default value	Depends on resolution of value [-]	**Alternative config**	NO
Step	Depends on resolution of value [-]		
Comm object	10453	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Only if relevant setpoint is used in PLC		
Description			

Adjustable value for input in PLC logic.

Configuration of setpoint:

Configuration is made via configuration PC tool InteliConfig

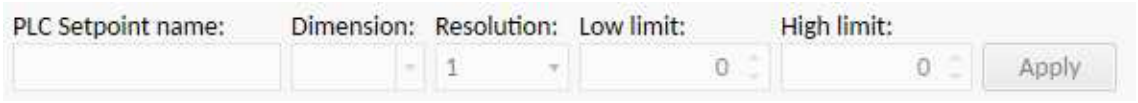


Image 8.82 Screen of configuration from InteliConfig

PLC Setpoint name	Name of the setpoint (0..32 characters)
Dimension	Dimension of value of the setpoint.
Resolution	Resolution of the value of the setpoint. Resolution adjust number of decimal places in low and high limit.
Low limit	The lowest value of setpoint. Digit place of this value can be decrease or increase by resolution of setpoint.
High limit	The highest value of setpoint. Digit place of this value can be decrease or increase by resolution of setpoint.

back to List of setpoints

PLC Setpoint 15

Setpoint group	PLC	**Related FW**	1.3.0
Range [units]	Depends on resolution of value [-]		
Default value	Depends on resolution of value [-]	**Alternative config**	NO
Step	Depends on resolution of value [-]		
Comm object	10454	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Only if relevant setpoint is used in PLC		
Description			

Adjustable value for input in PLC logic.

Configuration of setpoint:

Configuration is made via configuration PC tool InteliConfig

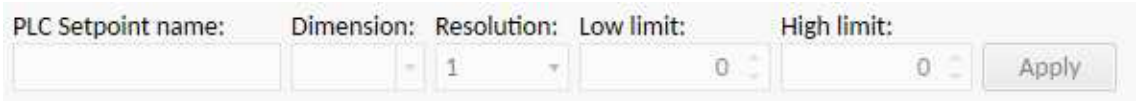


Image 8.83 Screen of configuration from InteliConfig

PLC Setpoint name	Name of the setpoint (0..32 characters)
Dimension	Dimension of value of the setpoint.
Resolution	Resolution of the value of the setpoint. Resolution adjust number of decimal places in low and high limit.
Low limit	The lowest value of setpoint. Digit place of this value can be decrease or increase by resolution of setpoint.
High limit	The highest value of setpoint. Digit place of this value can be decrease or increase by resolution of setpoint.

back to List of setpoints

PLC Setpoint 16

Setpoint group	PLC	**Related FW**	1.3.0
Range [units]	Depends on resolution of value [-]		
Default value	Depends on resolution of value [-]	**Alternative config**	NO
Step	Depends on resolution of value [-]		
Comm object	10455	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Only if relevant setpoint is used in PLC		
Description			

Adjustable value for input in PLC logic.

Configuration of setpoint:

Configuration is made via configuration PC tool InteliConfig

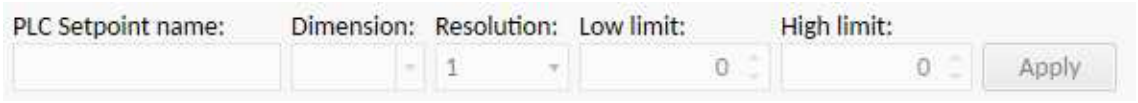


Image 8.84 Screen of configuration from InteliConfig

PLC Setpoint name	Name of the setpoint (0..32 characters)
Dimension	Dimension of value of the setpoint.
Resolution	Resolution of the value of the setpoint. Resolution adjust number of decimal places in low and high limit.
Low limit	The lowest value of setpoint. Digit place of this value can be decrease or increase by resolution of setpoint.
High limit	The highest value of setpoint. Digit place of this value can be decrease or increase by resolution of setpoint.

back to List of setpoints

PLC Setpoint 17

Setpoint group	PLC	**Related FW**	1.3.0
Range [units]	Depends on resolution of value [-]		
Default value	Depends on resolution of value [-]	**Alternative config**	NO
Step	Depends on resolution of value [-]		
Comm object	10456	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Only if relevant setpoint is used in PLC		
Description			

Adjustable value for input in PLC logic.

Configuration of setpoint:

Configuration is made via configuration PC tool InteliConfig

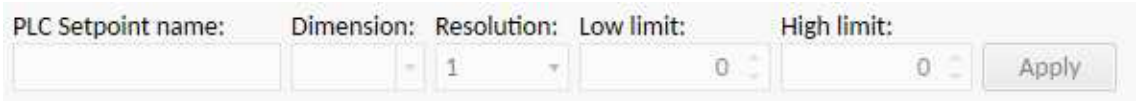


Image 8.85 Screen of configuration from InteliConfig

PLC Setpoint name	Name of the setpoint (0..32 characters)
Dimension	Dimension of value of the setpoint.
Resolution	Resolution of the value of the setpoint. Resolution adjust number of decimal places in low and high limit.
Low limit	The lowest value of setpoint. Digit place of this value can be decrease or increase by resolution of setpoint.
High limit	The highest value of setpoint. Digit place of this value can be decrease or increase by resolution of setpoint.

back to List of setpoints

PLC Setpoint 18

Setpoint group	PLC	**Related FW**	1.3.0
Range [units]	Depends on resolution of value [-]		
Default value	Depends on resolution of value [-]	**Alternative config**	NO
Step	Depends on resolution of value [-]		
Comm object	10457	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Only if relevant setpoint is used in PLC		
Description			

Adjustable value for input in PLC logic.

Configuration of setpoint:

Configuration is made via configuration PC tool InteliConfig

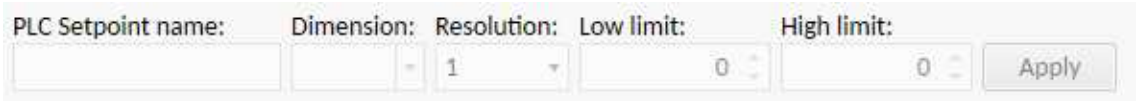


Image 8.86 Screen of configuration from InteliConfig

PLC Setpoint name	Name of the setpoint (0..32 characters)
Dimension	Dimension of value of the setpoint.
Resolution	Resolution of the value of the setpoint. Resolution adjust number of decimal places in low and high limit.
Low limit	The lowest value of setpoint. Digit place of this value can be decrease or increase by resolution of setpoint.
High limit	The highest value of setpoint. Digit place of this value can be decrease or increase by resolution of setpoint.

back to List of setpoints

PLC Setpoint 19

Setpoint group	PLC	**Related FW**	1.3.0
Range [units]	Depends on resolution of value [-]		
Default value	Depends on resolution of value [-]	**Alternative config**	NO
Step	Depends on resolution of value [-]		
Comm object	10458	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Only if relevant setpoint is used in PLC		
Description			

Adjustable value for input in PLC logic.

Configuration of setpoint:

Configuration is made via configuration PC tool InteliConfig

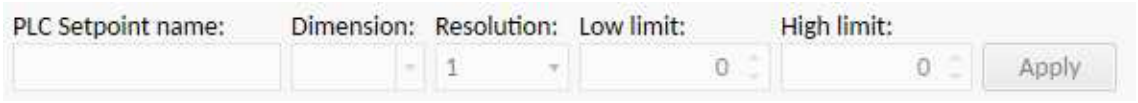


Image 8.87 Screen of configuration from InteliConfig

PLC Setpoint name	Name of the setpoint (0..32 characters)
Dimension	Dimension of value of the setpoint.
Resolution	Resolution of the value of the setpoint. Resolution adjust number of decimal places in low and high limit.
Low limit	The lowest value of setpoint. Digit place of this value can be decrease or increase by resolution of setpoint.
High limit	The highest value of setpoint. Digit place of this value can be decrease or increase by resolution of setpoint.

back to List of setpoints

PLC Setpoint 20

Setpoint group	PLC	**Related FW**	1.3.0
Range [units]	Depends on resolution of value [-]		
Default value	Depends on resolution of value [-]	**Alternative config**	NO
Step	Depends on resolution of value [-]		
Comm object	10459	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Only if relevant setpoint is used in PLC		
Description			

Adjustable value for input in PLC logic.

Configuration of setpoint:

Configuration is made via configuration PC tool InteliConfig

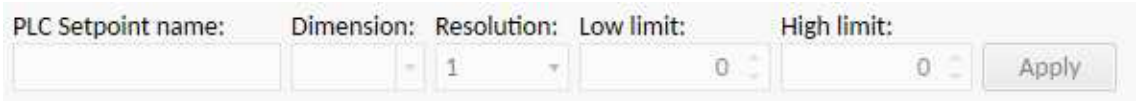


Image 8.88 Screen of configuration from InteliConfig

PLC Setpoint name	Name of the setpoint (0..32 characters)
Dimension	Dimension of value of the setpoint.
Resolution	Resolution of the value of the setpoint. Resolution adjust number of decimal places in low and high limit.
Low limit	The lowest value of setpoint. Digit place of this value can be decrease or increase by resolution of setpoint.
High limit	The highest value of setpoint. Digit place of this value can be decrease or increase by resolution of setpoint.

back to List of setpoints

PLC Setpoint 21

Setpoint group	PLC	**Related FW**	1.3.0
Range [units]	Depends on resolution of value [-]		
Default value	Depends on resolution of value [-]	**Alternative config**	NO
Step	Depends on resolution of value [-]		
Comm object	10460	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Only if relevant setpoint is used in PLC		
Description			

Adjustable value for input in PLC logic.

Configuration of setpoint:

Configuration is made via configuration PC tool InteliConfig

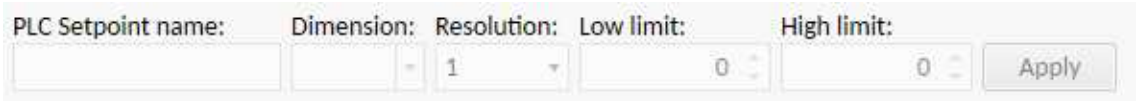


Image 8.89 Screen of configuration from InteliConfig

PLC Setpoint name	Name of the setpoint (0..32 characters)
Dimension	Dimension of value of the setpoint.
Resolution	Resolution of the value of the setpoint. Resolution adjust number of decimal places in low and high limit.
Low limit	The lowest value of setpoint. Digit place of this value can be decrease or increase by resolution of setpoint.
High limit	The highest value of setpoint. Digit place of this value can be decrease or increase by resolution of setpoint.

back to List of setpoints

PLC Setpoint 22

Setpoint group	PLC	**Related FW**	1.3.0
Range [units]	Depends on resolution of value [-]		
Default value	Depends on resolution of value [-]	**Alternative config**	NO
Step	Depends on resolution of value [-]		
Comm object	10461	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Only if relevant setpoint is used in PLC		
Description			

Adjustable value for input in PLC logic.

Configuration of setpoint:

Configuration is made via configuration PC tool InteliConfig

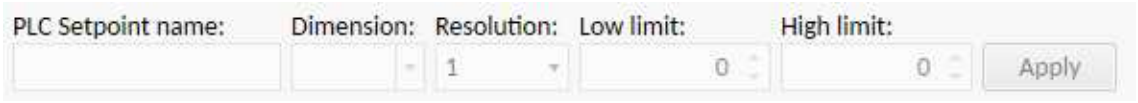


Image 8.90 Screen of configuration from InteliConfig

PLC Setpoint name	Name of the setpoint (0..32 characters)
Dimension	Dimension of value of the setpoint.
Resolution	Resolution of the value of the setpoint. Resolution adjust number of decimal places in low and high limit.
Low limit	The lowest value of setpoint. Digit place of this value can be decrease or increase by resolution of setpoint.
High limit	The highest value of setpoint. Digit place of this value can be decrease or increase by resolution of setpoint.

back to List of setpoints

PLC Setpoint 23

Setpoint group	PLC	**Related FW**	1.3.0
Range [units]	Depends on resolution of value [-]		
Default value	Depends on resolution of value [-]	**Alternative config**	NO
Step	Depends on resolution of value [-]		
Comm object	10462	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Only if relevant setpoint is used in PLC		
Description			

Adjustable value for input in PLC logic.

Configuration of setpoint:

Configuration is made via configuration PC tool InteliConfig

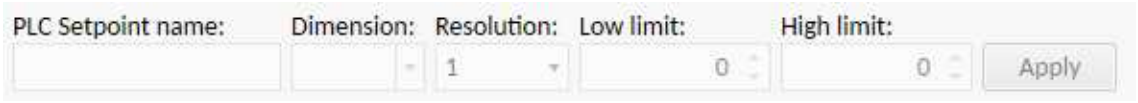


Image 8.91 Screen of configuration from InteliConfig

PLC Setpoint name	Name of the setpoint (0..32 characters)
Dimension	Dimension of value of the setpoint.
Resolution	Resolution of the value of the setpoint. Resolution adjust number of decimal places in low and high limit.
Low limit	The lowest value of setpoint. Digit place of this value can be decrease or increase by resolution of setpoint.
High limit	The highest value of setpoint. Digit place of this value can be decrease or increase by resolution of setpoint.

back to List of setpoints

PLC Setpoint 24

Setpoint group	PLC	**Related FW**	1.3.0
Range [units]	Depends on resolution of value [-]		
Default value	Depends on resolution of value [-]	**Alternative config**	NO
Step	Depends on resolution of value [-]		
Comm object	10463	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Only if relevant setpoint is used in PLC		
Description			

Adjustable value for input in PLC logic.

Configuration of setpoint:

Configuration is made via configuration PC tool InteliConfig

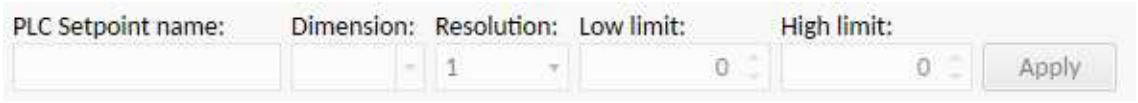


Image 8.92 Screen of configuration from InteliConfig

PLC Setpoint name	Name of the setpoint (0..32 characters)
Dimension	Dimension of value of the setpoint.
Resolution	Resolution of the value of the setpoint. Resolution adjust number of decimal places in low and high limit.
Low limit	The lowest value of setpoint. Digit place of this value can be decrease or increase by resolution of setpoint.
High limit	The highest value of setpoint. Digit place of this value can be decrease or increase by resolution of setpoint.

back to List of setpoints

PLC Setpoint 25

Setpoint group	PLC	**Related FW**	1.3.0
Range [units]	Depends on resolution of value [-]		
Default value	Depends on resolution of value [-]	**Alternative config**	NO
Step	Depends on resolution of value [-]		
Comm object	10464	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Only if relevant setpoint is used in PLC		
Description			

Adjustable value for input in PLC logic.

Configuration of setpoint:

Configuration is made via configuration PC tool InteliConfig

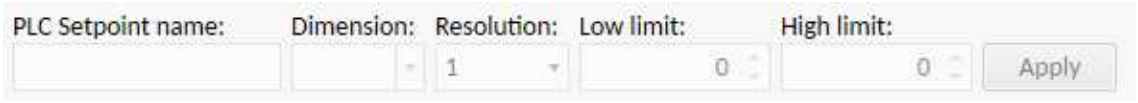


Image 8.93 Screen of configuration from InteliConfig

PLC Setpoint name	Name of the setpoint (0..32 characters)
Dimension	Dimension of value of the setpoint.
Resolution	Resolution of the value of the setpoint. Resolution adjust number of decimal places in low and high limit.
Low limit	The lowest value of setpoint. Digit place of this value can be decrease or increase by resolution of setpoint.
High limit	The highest value of setpoint. Digit place of this value can be decrease or increase by resolution of setpoint.

back to List of setpoints

PLC Setpoint 26

Setpoint group	PLC	**Related FW**	1.3.0
Range [units]	Depends on resolution of value [-]		
Default value	Depends on resolution of value [-]	**Alternative config**	NO
Step	Depends on resolution of value [-]		
Comm object	10465	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Only if relevant setpoint is used in PLC		
Description			

Adjustable value for input in PLC logic.

Configuration of setpoint:

Configuration is made via configuration PC tool InteliConfig

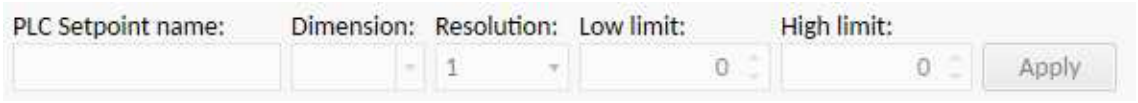


Image 8.94 Screen of configuration from InteliConfig

PLC Setpoint name	Name of the setpoint (0..32 characters)
Dimension	Dimension of value of the setpoint.
Resolution	Resolution of the value of the setpoint. Resolution adjust number of decimal places in low and high limit.
Low limit	The lowest value of setpoint. Digit place of this value can be decrease or increase by resolution of setpoint.
High limit	The highest value of setpoint. Digit place of this value can be decrease or increase by resolution of setpoint.

back to List of setpoints

PLC Setpoint 27

Setpoint group	PLC	**Related FW**	1.3.0
Range [units]	Depends on resolution of value [-]		
Default value	Depends on resolution of value [-]	**Alternative config**	NO
Step	Depends on resolution of value [-]		
Comm object	10466	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Only if relevant setpoint is used in PLC		
Description			

Adjustable value for input in PLC logic.

Configuration of setpoint:

Configuration is made via configuration PC tool InteliConfig

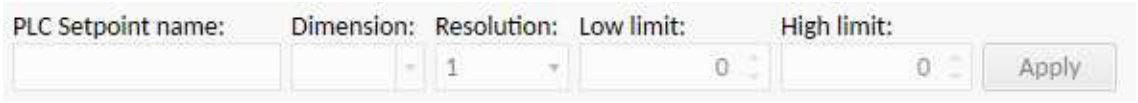


Image 8.95 Screen of configuration from InteliConfig

PLC Setpoint name	Name of the setpoint (0..32 characters)
Dimension	Dimension of value of the setpoint.
Resolution	Resolution of the value of the setpoint. Resolution adjust number of decimal places in low and high limit.
Low limit	The lowest value of setpoint. Digit place of this value can be decrease or increase by resolution of setpoint.
High limit	The highest value of setpoint. Digit place of this value can be decrease or increase by resolution of setpoint.

back to List of setpoints

PLC Setpoint 28

Setpoint group	PLC	**Related FW**	1.3.0
Range [units]	Depends on resolution of value [-]		
Default value	Depends on resolution of value [-]	**Alternative config**	NO
Step	Depends on resolution of value [-]		
Comm object	10467	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Only if relevant setpoint is used in PLC		
Description			

Adjustable value for input in PLC logic.

Configuration of setpoint:

Configuration is made via configuration PC tool InteliConfig

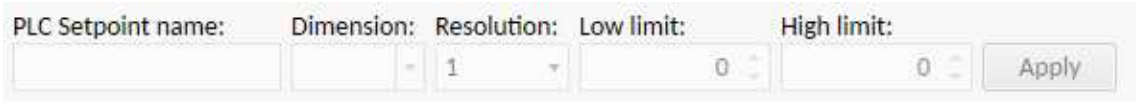


Image 8.96 Screen of configuration from InteliConfig

PLC Setpoint name	Name of the setpoint (0..32 characters)
Dimension	Dimension of value of the setpoint.
Resolution	Resolution of the value of the setpoint. Resolution adjust number of decimal places in low and high limit.
Low limit	The lowest value of setpoint. Digit place of this value can be decrease or increase by resolution of setpoint.
High limit	The highest value of setpoint. Digit place of this value can be decrease or increase by resolution of setpoint.

back to List of setpoints

PLC Setpoint 29

Setpoint group	PLC	**Related FW**	1.3.0
Range [units]	Depends on resolution of value [-]		
Default value	Depends on resolution of value [-]	**Alternative config**	NO
Step	Depends on resolution of value [-]		
Comm object	10468	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Only if relevant setpoint is used in PLC		
Description			

Adjustable value for input in PLC logic.

Configuration of setpoint:

Configuration is made via configuration PC tool InteliConfig

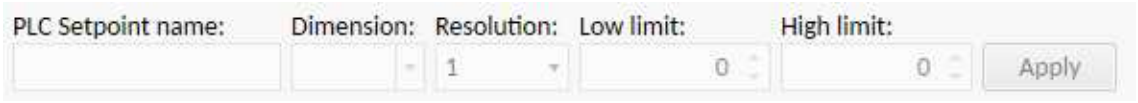


Image 8.97 Screen of configuration from InteliConfig

PLC Setpoint name	Name of the setpoint (0..32 characters)
Dimension	Dimension of value of the setpoint.
Resolution	Resolution of the value of the setpoint. Resolution adjust number of decimal places in low and high limit.
Low limit	The lowest value of setpoint. Digit place of this value can be decrease or increase by resolution of setpoint.
High limit	The highest value of setpoint. Digit place of this value can be decrease or increase by resolution of setpoint.

back to List of setpoints

PLC Setpoint 30

Setpoint group	PLC	**Related FW**	1.3.0
Range [units]	Depends on resolution of value [-]		
Default value	Depends on resolution of value [-]	**Alternative config**	NO
Step	Depends on resolution of value [-]		
Comm object	10469	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Only if relevant setpoint is used in PLC		
Description			

Adjustable value for input in PLC logic.

Configuration of setpoint:

Configuration is made via configuration PC tool InteliConfig

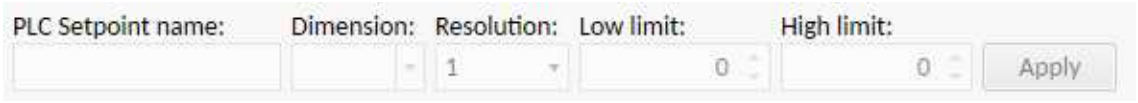


Image 8.98 Screen of configuration from InteliConfig

PLC Setpoint name	Name of the setpoint (0..32 characters)
Dimension	Dimension of value of the setpoint.
Resolution	Resolution of the value of the setpoint. Resolution adjust number of decimal places in low and high limit.
Low limit	The lowest value of setpoint. Digit place of this value can be decrease or increase by resolution of setpoint.
High limit	The highest value of setpoint. Digit place of this value can be decrease or increase by resolution of setpoint.

back to List of setpoints

PLC Setpoint 31

Setpoint group	PLC	**Related FW**	1.3.0
Range [units]	Depends on resolution of value [-]		
Default value	Depends on resolution of value [-]	**Alternative config**	NO
Step	Depends on resolution of value [-]		
Comm object	10470	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Only if relevant setpoint is used in PLC		
Description			

Adjustable value for input in PLC logic.

Configuration of setpoint:

Configuration is made via configuration PC tool InteliConfig

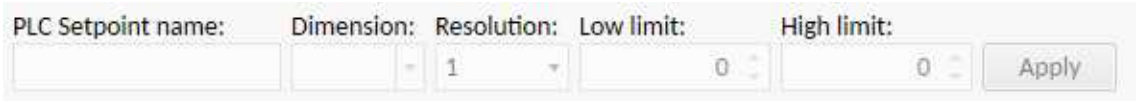


Image 8.99 Screen of configuration from InteliConfig

PLC Setpoint name	Name of the setpoint (0..32 characters)
Dimension	Dimension of value of the setpoint.
Resolution	Resolution of the value of the setpoint. Resolution adjust number of decimal places in low and high limit.
Low limit	The lowest value of setpoint. Digit place of this value can be decrease or increase by resolution of setpoint.
High limit	The highest value of setpoint. Digit place of this value can be decrease or increase by resolution of setpoint.

back to List of setpoints

PLC Setpoint 32

Setpoint group	PLC	**Related FW**	1.3.0
Range [units]	Depends on resolution of value [-]		
Default value	Depends on resolution of value [-]	**Alternative config**	NO
Step	Depends on resolution of value [-]		
Comm object	10471	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Only if relevant setpoint is used in PLC		
Description			

Adjustable value for input in PLC logic.

Configuration of setpoint:

Configuration is made via configuration PC tool InteliConfig

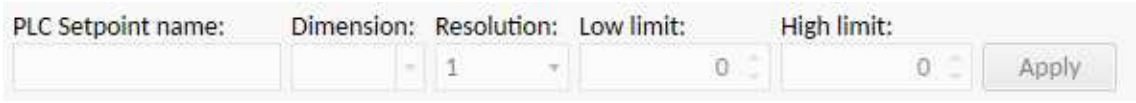


Image 8.100 Screen of configuration from InteliConfig

PLC Setpoint name	Name of the setpoint (0..32 characters)
Dimension	Dimension of value of the setpoint.
Resolution	Resolution of the value of the setpoint. Resolution adjust number of decimal places in low and high limit.
Low limit	The lowest value of setpoint. Digit place of this value can be decrease or increase by resolution of setpoint.
High limit	The highest value of setpoint. Digit place of this value can be decrease or increase by resolution of setpoint.

back to List of setpoints

PLC Setpoint 33

Setpoint group	PLC	**Related FW**	1.3.0
Range [units]	Depends on resolution of value [-]		
Default value	Depends on resolution of value [-]	**Alternative config**	NO
Step	Depends on resolution of value [-]		
Comm object	10472	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Only if relevant setpoint is used in PLC		
Description			

Adjustable value for input in PLC logic.

Configuration of setpoint:

Configuration is made via configuration PC tool InteliConfig

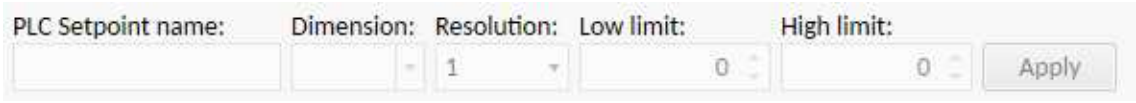


Image 8.101 Screen of configuration from InteliConfig

PLC Setpoint name	Name of the setpoint (0..32 characters)
Dimension	Dimension of value of the setpoint.
Resolution	Resolution of the value of the setpoint. Resolution adjust number of decimal places in low and high limit.
Low limit	The lowest value of setpoint. Digit place of this value can be decrease or increase by resolution of setpoint.
High limit	The highest value of setpoint. Digit place of this value can be decrease or increase by resolution of setpoint.

back to List of setpoints

PLC Setpoint 34

Setpoint group	PLC	**Related FW**	1.3.0
Range [units]	Depends on resolution of value [-]		
Default value	Depends on resolution of value [-]	**Alternative config**	NO
Step	Depends on resolution of value [-]		
Comm object	10473	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Only if relevant setpoint is used in PLC		
Description			

Adjustable value for input in PLC logic.

Configuration of setpoint:

Configuration is made via configuration PC tool InteliConfig

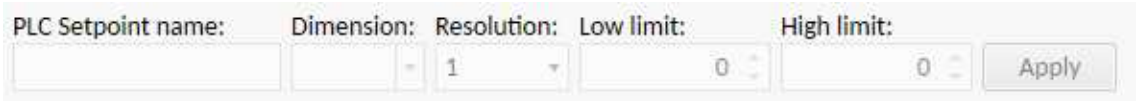


Image 8.102 Screen of configuration from InteliConfig

PLC Setpoint name	Name of the setpoint (0..32 characters)
Dimension	Dimension of value of the setpoint.
Resolution	Resolution of the value of the setpoint. Resolution adjust number of decimal places in low and high limit.
Low limit	The lowest value of setpoint. Digit place of this value can be decrease or increase by resolution of setpoint.
High limit	The highest value of setpoint. Digit place of this value can be decrease or increase by resolution of setpoint.

back to List of setpoints

PLC Setpoint 35

Setpoint group	PLC	**Related FW**	1.3.0
Range [units]	Depends on resolution of value [-]		
Default value	Depends on resolution of value [-]	**Alternative config**	NO
Step	Depends on resolution of value [-]		
Comm object	10474	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Only if relevant setpoint is used in PLC		
Description			

Adjustable value for input in PLC logic.

Configuration of setpoint:

Configuration is made via configuration PC tool InteliConfig

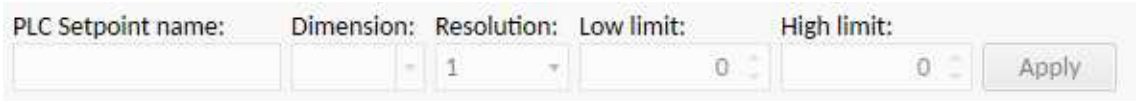


Image 8.103 Screen of configuration from InteliConfig

PLC Setpoint name	Name of the setpoint (0..32 characters)
Dimension	Dimension of value of the setpoint.
Resolution	Resolution of the value of the setpoint. Resolution adjust number of decimal places in low and high limit.
Low limit	The lowest value of setpoint. Digit place of this value can be decrease or increase by resolution of setpoint.
High limit	The highest value of setpoint. Digit place of this value can be decrease or increase by resolution of setpoint.

back to List of setpoints

PLC Setpoint 36

Setpoint group	PLC	**Related FW**	1.3.0
Range [units]	Depends on resolution of value [-]		
Default value	Depends on resolution of value [-]	**Alternative config**	NO
Step	Depends on resolution of value [-]		
Comm object	10475	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Only if relevant setpoint is used in PLC		
Description			

Adjustable value for input in PLC logic.

Configuration of setpoint:

Configuration is made via configuration PC tool InteliConfig

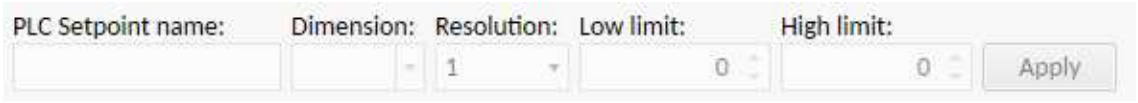


Image 8.104 Screen of configuration from InteliConfig

PLC Setpoint name	Name of the setpoint (0..32 characters)
Dimension	Dimension of value of the setpoint.
Resolution	Resolution of the value of the setpoint. Resolution adjust number of decimal places in low and high limit.
Low limit	The lowest value of setpoint. Digit place of this value can be decrease or increase by resolution of setpoint.
High limit	The highest value of setpoint. Digit place of this value can be decrease or increase by resolution of setpoint.

back to List of setpoints

PLC Setpoint 37

Setpoint group	PLC	**Related FW**	1.3.0
Range [units]	Depends on resolution of value [-]		
Default value	Depends on resolution of value [-]	**Alternative config**	NO
Step	Depends on resolution of value [-]		
Comm object	10476	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Only if relevant setpoint is used in PLC		
Description			

Adjustable value for input in PLC logic.

Configuration of setpoint:

Configuration is made via configuration PC tool InteliConfig

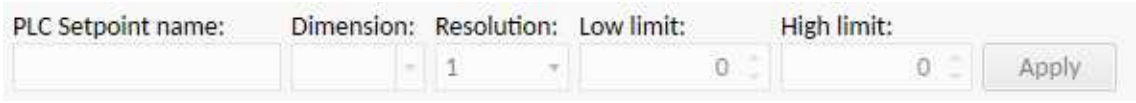


Image 8.105 Screen of configuration from InteliConfig

PLC Setpoint name	Name of the setpoint (0..32 characters)
Dimension	Dimension of value of the setpoint.
Resolution	Resolution of the value of the setpoint. Resolution adjust number of decimal places in low and high limit.
Low limit	The lowest value of setpoint. Digit place of this value can be decrease or increase by resolution of setpoint.
High limit	The highest value of setpoint. Digit place of this value can be decrease or increase by resolution of setpoint.

back to List of setpoints

PLC Setpoint 38

Setpoint group	PLC	**Related FW**	1.3.0
Range [units]	Depends on resolution of value [-]		
Default value	Depends on resolution of value [-]	**Alternative config**	NO
Step	Depends on resolution of value [-]		
Comm object	10477	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Only if relevant setpoint is used in PLC		
Description			

Adjustable value for input in PLC logic.

Configuration of setpoint:

Configuration is made via configuration PC tool InteliConfig

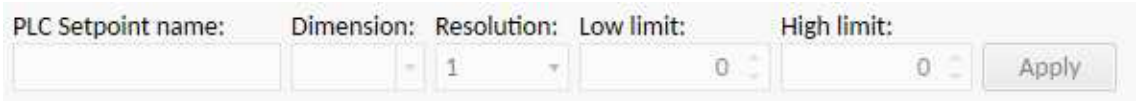


Image 8.106 Screen of configuration from InteliConfig

PLC Setpoint name	Name of the setpoint (0..32 characters)
Dimension	Dimension of value of the setpoint.
Resolution	Resolution of the value of the setpoint. Resolution adjust number of decimal places in low and high limit.
Low limit	The lowest value of setpoint. Digit place of this value can be decrease or increase by resolution of setpoint.
High limit	The highest value of setpoint. Digit place of this value can be decrease or increase by resolution of setpoint.

back to List of setpoints

PLC Setpoint 39

Setpoint group	PLC	**Related FW**	1.3.0
Range [units]	Depends on resolution of value [-]		
Default value	Depends on resolution of value [-]	**Alternative config**	NO
Step	Depends on resolution of value [-]		
Comm object	10478	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Only if relevant setpoint is used in PLC		
Description			

Adjustable value for input in PLC logic.

Configuration of setpoint:

Configuration is made via configuration PC tool InteliConfig

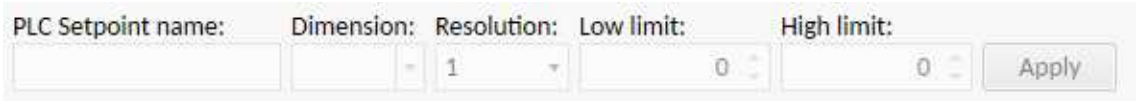


Image 8.107 Screen of configuration from InteliConfig

PLC Setpoint name	Name of the setpoint (0..32 characters)
Dimension	Dimension of value of the setpoint.
Resolution	Resolution of the value of the setpoint. Resolution adjust number of decimal places in low and high limit.
Low limit	The lowest value of setpoint. Digit place of this value can be decrease or increase by resolution of setpoint.
High limit	The highest value of setpoint. Digit place of this value can be decrease or increase by resolution of setpoint.

back to List of setpoints

PLC Setpoint 40

Setpoint group	PLC	**Related FW**	1.3.0
Range [units]	Depends on resolution of value [-]		
Default value	Depends on resolution of value [-]	**Alternative config**	NO
Step	Depends on resolution of value [-]		
Comm object	10479	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Only if relevant setpoint is used in PLC		
Description			

Adjustable value for input in PLC logic.

Configuration of setpoint:

Configuration is made via configuration PC tool InteliConfig

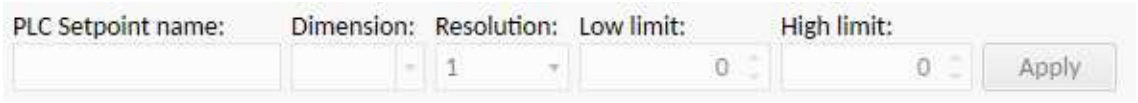


Image 8.108 Screen of configuration from InteliConfig

PLC Setpoint name	Name of the setpoint (0..32 characters)
Dimension	Dimension of value of the setpoint.
Resolution	Resolution of the value of the setpoint. Resolution adjust number of decimal places in low and high limit.
Low limit	The lowest value of setpoint. Digit place of this value can be decrease or increase by resolution of setpoint.
High limit	The highest value of setpoint. Digit place of this value can be decrease or increase by resolution of setpoint.

back to List of setpoints

PLC Setpoint 41

Setpoint group	PLC	**Related FW**	1.3.0
Range [units]	Depends on resolution of value [-]		
Default value	Depends on resolution of value [-]	**Alternative config**	NO
Step	Depends on resolution of value [-]		
Comm object	10480	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Only if relevant setpoint is used in PLC		
Description			

Adjustable value for input in PLC logic.

Configuration of setpoint:

Configuration is made via configuration PC tool InteliConfig

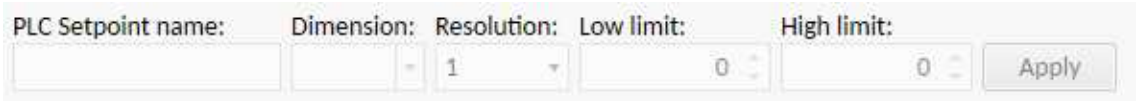


Image 8.109 Screen of configuration from InteliConfig

PLC Setpoint name	Name of the setpoint (0..32 characters)
Dimension	Dimension of value of the setpoint.
Resolution	Resolution of the value of the setpoint. Resolution adjust number of decimal places in low and high limit.
Low limit	The lowest value of setpoint. Digit place of this value can be decrease or increase by resolution of setpoint.
High limit	The highest value of setpoint. Digit place of this value can be decrease or increase by resolution of setpoint.

back to List of setpoints

PLC Setpoint 42

Setpoint group	PLC	**Related FW**	1.3.0
Range [units]	Depends on resolution of value [-]		
Default value	Depends on resolution of value [-]	**Alternative config**	NO
Step	Depends on resolution of value [-]		
Comm object	10481	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Only if relevant setpoint is used in PLC		

Description

Adjustable value for input in PLC logic.

Configuration of setpoint:

Configuration is made via configuration PC tool InteliConfig

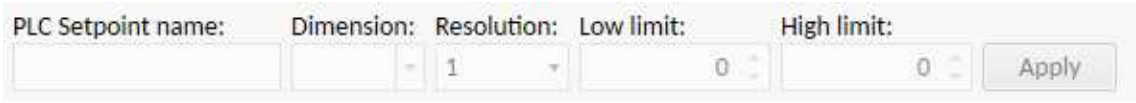


Image 8.110 Screen of configuration from InteliConfig

PLC Setpoint name	Name of the setpoint (0..32 characters)
Dimension	Dimension of value of the setpoint.
Resolution	Resolution of the value of the setpoint. Resolution adjust number of decimal places in low and high limit.
Low limit	The lowest value of setpoint. Digit place of this value can be decrease or increase by resolution of setpoint.
High limit	The highest value of setpoint. Digit place of this value can be decrease or increase by resolution of setpoint.

back to List of setpoints

PLC Setpoint 43

Setpoint group	PLC	**Related FW**	1.3.0
Range [units]	Depends on resolution of value [-]		
Default value	Depends on resolution of value [-]	**Alternative config**	NO
Step	Depends on resolution of value [-]		
Comm object	10482	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Only if relevant setpoint is used in PLC		
Description			

Adjustable value for input in PLC logic.

Configuration of setpoint:

Configuration is made via configuration PC tool InteliConfig

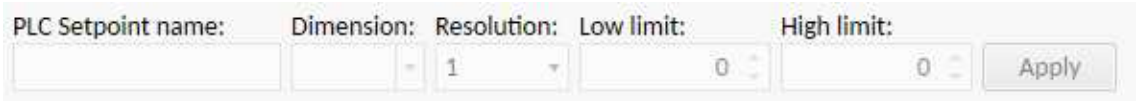


Image 8.111 Screen of configuration from InteliConfig

PLC Setpoint name	Name of the setpoint (0..32 characters)
Dimension	Dimension of value of the setpoint.
Resolution	Resolution of the value of the setpoint. Resolution adjust number of decimal places in low and high limit.
Low limit	The lowest value of setpoint. Digit place of this value can be decrease or increase by resolution of setpoint.
High limit	The highest value of setpoint. Digit place of this value can be decrease or increase by resolution of setpoint.

back to List of setpoints

PLC Setpoint 44

Setpoint group	PLC	**Related FW**	1.3.0
Range [units]	Depends on resolution of value [-]		
Default value	Depends on resolution of value [-]	**Alternative config**	NO
Step	Depends on resolution of value [-]		
Comm object	10483	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Only if relevant setpoint is used in PLC		
Description			

Adjustable value for input in PLC logic.

Configuration of setpoint:

Configuration is made via configuration PC tool InteliConfig

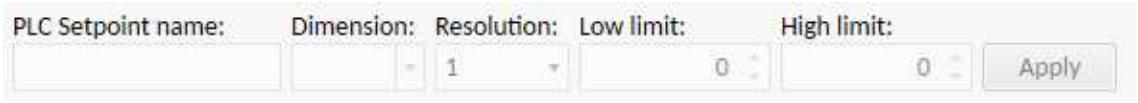


Image 8.112 Screen of configuration from InteliConfig

PLC Setpoint name	Name of the setpoint (0..32 characters)
Dimension	Dimension of value of the setpoint.
Resolution	Resolution of the value of the setpoint. Resolution adjust number of decimal places in low and high limit.
Low limit	The lowest value of setpoint. Digit place of this value can be decrease or increase by resolution of setpoint.
High limit	The highest value of setpoint. Digit place of this value can be decrease or increase by resolution of setpoint.

back to List of setpoints

PLC Setpoint 45

Setpoint group	PLC	**Related FW**	1.3.0
Range [units]	Depends on resolution of value [-]		
Default value	Depends on resolution of value [-]	**Alternative config**	NO
Step	Depends on resolution of value [-]		
Comm object	10484	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Only if relevant setpoint is used in PLC		
Description			

Adjustable value for input in PLC logic.

Configuration of setpoint:

Configuration is made via configuration PC tool InteliConfig

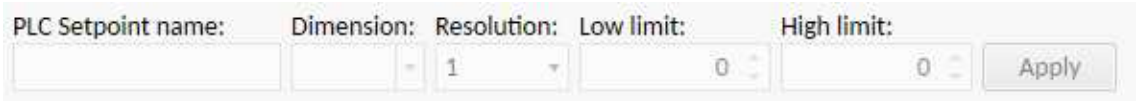


Image 8.113 Screen of configuration from InteliConfig

PLC Setpoint name	Name of the setpoint (0..32 characters)
Dimension	Dimension of value of the setpoint.
Resolution	Resolution of the value of the setpoint. Resolution adjust number of decimal places in low and high limit.
Low limit	The lowest value of setpoint. Digit place of this value can be decrease or increase by resolution of setpoint.
High limit	The highest value of setpoint. Digit place of this value can be decrease or increase by resolution of setpoint.

back to List of setpoints

PLC Setpoint 46

Setpoint group	PLC	**Related FW**	1.3.0
Range [units]	Depends on resolution of value [-]		
Default value	Depends on resolution of value [-]	**Alternative config**	NO
Step	Depends on resolution of value [-]		
Comm object	10485	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Only if relevant setpoint is used in PLC		
Description			

Adjustable value for input in PLC logic.

Configuration of setpoint:

Configuration is made via configuration PC tool InteliConfig

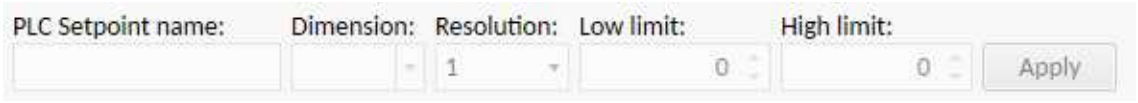


Image 8.114 Screen of configuration from InteliConfig

PLC Setpoint name	Name of the setpoint (0..32 characters)
Dimension	Dimension of value of the setpoint.
Resolution	Resolution of the value of the setpoint. Resolution adjust number of decimal places in low and high limit.
Low limit	The lowest value of setpoint. Digit place of this value can be decrease or increase by resolution of setpoint.
High limit	The highest value of setpoint. Digit place of this value can be decrease or increase by resolution of setpoint.

back to List of setpoints

PLC Setpoint 47

Setpoint group	PLC	**Related FW**	1.3.0
Range [units]	Depends on resolution of value [-]		
Default value	Depends on resolution of value [-]	**Alternative config**	NO
Step	Depends on resolution of value [-]		
Comm object	10486	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Only if relevant setpoint is used in PLC		
Description			

Adjustable value for input in PLC logic.

Configuration of setpoint:

Configuration is made via configuration PC tool InteliConfig

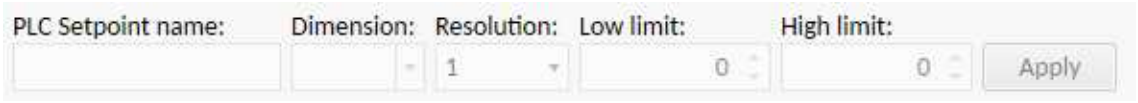


Image 8.115 Screen of configuration from InteliConfig

PLC Setpoint name	Name of the setpoint (0..32 characters)
Dimension	Dimension of value of the setpoint.
Resolution	Resolution of the value of the setpoint. Resolution adjust number of decimal places in low and high limit.
Low limit	The lowest value of setpoint. Digit place of this value can be decrease or increase by resolution of setpoint.
High limit	The highest value of setpoint. Digit place of this value can be decrease or increase by resolution of setpoint.

back to List of setpoints

PLC Setpoint 48

Setpoint group	PLC	**Related FW**	1.3.0
Range [units]	Depends on resolution of value [-]		
Default value	Depends on resolution of value [-]	**Alternative config**	NO
Step	Depends on resolution of value [-]		
Comm object	10487	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Only if relevant setpoint is used in PLC		
Description			

Adjustable value for input in PLC logic.

Configuration of setpoint:

Configuration is made via configuration PC tool InteliConfig

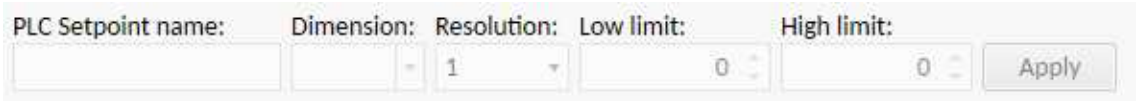


Image 8.116 Screen of configuration from InteliConfig

PLC Setpoint name	Name of the setpoint (0..32 characters)
Dimension	Dimension of value of the setpoint.
Resolution	Resolution of the value of the setpoint. Resolution adjust number of decimal places in low and high limit.
Low limit	The lowest value of setpoint. Digit place of this value can be decrease or increase by resolution of setpoint.
High limit	The highest value of setpoint. Digit place of this value can be decrease or increase by resolution of setpoint.

back to List of setpoints

PLC Setpoint 49

Setpoint group	PLC	**Related FW**	1.3.0
Range [units]	Depends on resolution of value [-]		
Default value	Depends on resolution of value [-]	**Alternative config**	NO
Step	Depends on resolution of value [-]		
Comm object	10488	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Only if relevant setpoint is used in PLC		
Description			

Adjustable value for input in PLC logic.

Configuration of setpoint:

Configuration is made via configuration PC tool InteliConfig

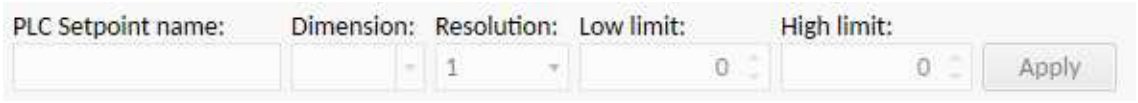


Image 8.117 Screen of configuration from InteliConfig

PLC Setpoint name	Name of the setpoint (0..32 characters)
Dimension	Dimension of value of the setpoint.
Resolution	Resolution of the value of the setpoint. Resolution adjust number of decimal places in low and high limit.
Low limit	The lowest value of setpoint. Digit place of this value can be decrease or increase by resolution of setpoint.
High limit	The highest value of setpoint. Digit place of this value can be decrease or increase by resolution of setpoint.

back to List of setpoints

PLC Setpoint 50

Setpoint group	PLC	**Related FW**	1.3.0
Range [units]	Depends on resolution of value [-]		
Default value	Depends on resolution of value [-]	**Alternative config**	NO
Step	Depends on resolution of value [-]		
Comm object	10489	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Only if relevant setpoint is used in PLC		
Description			

Adjustable value for input in PLC logic.

Configuration of setpoint:

Configuration is made via configuration PC tool InteliConfig

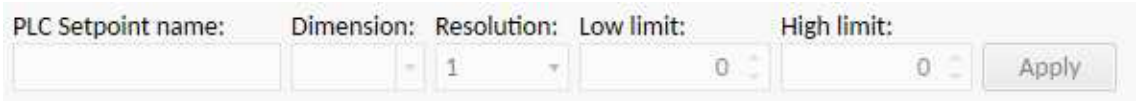


Image 8.118 Screen of configuration from InteliConfig

PLC Setpoint name	Name of the setpoint (0..32 characters)
Dimension	Dimension of value of the setpoint.
Resolution	Resolution of the value of the setpoint. Resolution adjust number of decimal places in low and high limit.
Low limit	The lowest value of setpoint. Digit place of this value can be decrease or increase by resolution of setpoint.
High limit	The highest value of setpoint. Digit place of this value can be decrease or increase by resolution of setpoint.

back to List of setpoints

PLC Setpoint 51

Setpoint group	PLC	**Related FW**	1.3.0
Range [units]	Depends on resolution of value [-]		
Default value	Depends on resolution of value [-]	**Alternative config**	NO
Step	Depends on resolution of value [-]		
Comm object	10490	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Only if relevant setpoint is used in PLC		
Description			

Adjustable value for input in PLC logic.

Configuration of setpoint:

Configuration is made via configuration PC tool InteliConfig

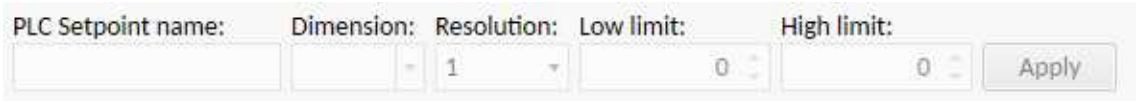


Image 8.119 Screen of configuration from InteliConfig

PLC Setpoint name	Name of the setpoint (0..32 characters)
Dimension	Dimension of value of the setpoint.
Resolution	Resolution of the value of the setpoint. Resolution adjust number of decimal places in low and high limit.
Low limit	The lowest value of setpoint. Digit place of this value can be decrease or increase by resolution of setpoint.
High limit	The highest value of setpoint. Digit place of this value can be decrease or increase by resolution of setpoint.

back to List of setpoints

PLC Setpoint 52

Setpoint group	PLC	**Related FW**	1.3.0
Range [units]	Depends on resolution of value [-]		
Default value	Depends on resolution of value [-]	**Alternative config**	NO
Step	Depends on resolution of value [-]		
Comm object	10491	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Only if relevant setpoint is used in PLC		
Description			

Adjustable value for input in PLC logic.

Configuration of setpoint:

Configuration is made via configuration PC tool InteliConfig

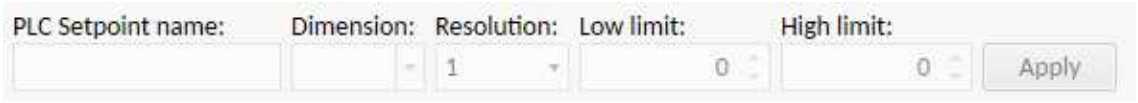


Image 8.120 Screen of configuration from InteliConfig

PLC Setpoint name	Name of the setpoint (0..32 characters)
Dimension	Dimension of value of the setpoint.
Resolution	Resolution of the value of the setpoint. Resolution adjust number of decimal places in low and high limit.
Low limit	The lowest value of setpoint. Digit place of this value can be decrease or increase by resolution of setpoint.
High limit	The highest value of setpoint. Digit place of this value can be decrease or increase by resolution of setpoint.

back to List of setpoints

PLC Setpoint 53

Setpoint group	PLC	**Related FW**	1.3.0
Range [units]	Depends on resolution of value [-]		
Default value	Depends on resolution of value [-]	**Alternative config**	NO
Step	Depends on resolution of value [-]		
Comm object	10492	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Only if relevant setpoint is used in PLC		
Description			

Adjustable value for input in PLC logic.

Configuration of setpoint:

Configuration is made via configuration PC tool InteliConfig

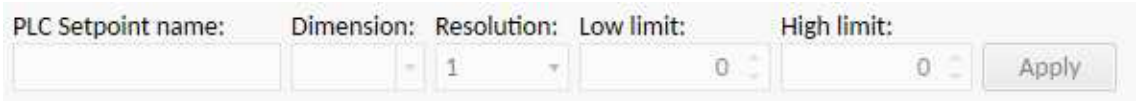


Image 8.121 Screen of configuration from InteliConfig

PLC Setpoint name	Name of the setpoint (0..32 characters)
Dimension	Dimension of value of the setpoint.
Resolution	Resolution of the value of the setpoint. Resolution adjust number of decimal places in low and high limit.
Low limit	The lowest value of setpoint. Digit place of this value can be decrease or increase by resolution of setpoint.
High limit	The highest value of setpoint. Digit place of this value can be decrease or increase by resolution of setpoint.

back to List of setpoints

PLC Setpoint 54

Setpoint group	PLC	**Related FW**	1.3.0
Range [units]	Depends on resolution of value [-]		
Default value	Depends on resolution of value [-]	**Alternative config**	NO
Step	Depends on resolution of value [-]		
Comm object	10493	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Only if relevant setpoint is used in PLC		
Description			

Adjustable value for input in PLC logic.

Configuration of setpoint:

Configuration is made via configuration PC tool InteliConfig

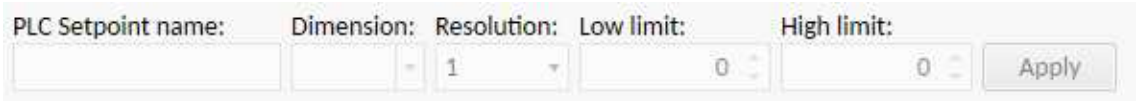


Image 8.122 Screen of configuration from InteliConfig

PLC Setpoint name	Name of the setpoint (0..32 characters)
Dimension	Dimension of value of the setpoint.
Resolution	Resolution of the value of the setpoint. Resolution adjust number of decimal places in low and high limit.
Low limit	The lowest value of setpoint. Digit place of this value can be decrease or increase by resolution of setpoint.
High limit	The highest value of setpoint. Digit place of this value can be decrease or increase by resolution of setpoint.

back to List of setpoints

PLC Setpoint 55

Setpoint group	PLC	**Related FW**	1.3.0
Range [units]	Depends on resolution of value [-]		
Default value	Depends on resolution of value [-]	**Alternative config**	NO
Step	Depends on resolution of value [-]		
Comm object	10494	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Only if relevant setpoint is used in PLC		
Description			

Adjustable value for input in PLC logic.

Configuration of setpoint:

Configuration is made via configuration PC tool InteliConfig

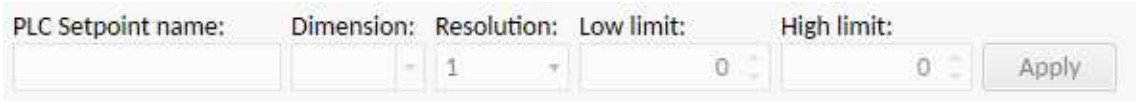


Image 8.123 Screen of configuration from InteliConfig

PLC Setpoint name	Name of the setpoint (0..32 characters)
Dimension	Dimension of value of the setpoint.
Resolution	Resolution of the value of the setpoint. Resolution adjust number of decimal places in low and high limit.
Low limit	The lowest value of setpoint. Digit place of this value can be decrease or increase by resolution of setpoint.
High limit	The highest value of setpoint. Digit place of this value can be decrease or increase by resolution of setpoint.

back to List of setpoints

PLC Setpoint 56

Setpoint group	PLC	**Related FW**	1.3.0
Range [units]	Depends on resolution of value [-]		
Default value	Depends on resolution of value [-]	**Alternative config**	NO
Step	Depends on resolution of value [-]		
Comm object	10495	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Only if relevant setpoint is used in PLC		
Description			

Adjustable value for input in PLC logic.

Configuration of setpoint:

Configuration is made via configuration PC tool InteliConfig

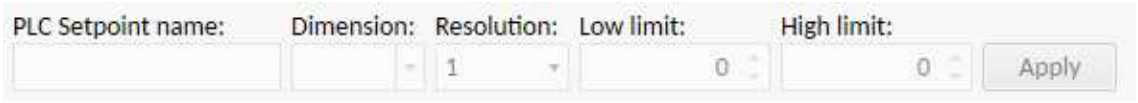


Image 8.124 Screen of configuration from InteliConfig

PLC Setpoint name	Name of the setpoint (0..32 characters)
Dimension	Dimension of value of the setpoint.
Resolution	Resolution of the value of the setpoint. Resolution adjust number of decimal places in low and high limit.
Low limit	The lowest value of setpoint. Digit place of this value can be decrease or increase by resolution of setpoint.
High limit	The highest value of setpoint. Digit place of this value can be decrease or increase by resolution of setpoint.

back to List of setpoints

PLC Setpoint 57

Setpoint group	PLC	**Related FW**	1.3.0
Range [units]	Depends on resolution of value [-]		
Default value	Depends on resolution of value [-]	**Alternative config**	NO
Step	Depends on resolution of value [-]		
Comm object	10496	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Only if relevant setpoint is used in PLC		
Description			

Adjustable value for input in PLC logic.

Configuration of setpoint:

Configuration is made via configuration PC tool InteliConfig

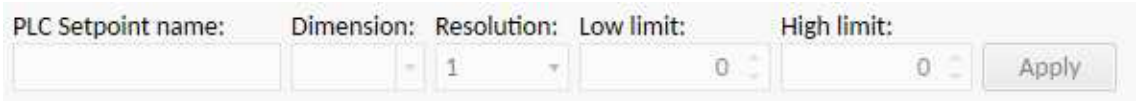


Image 8.125 Screen of configuration from InteliConfig

PLC Setpoint name	Name of the setpoint (0..32 characters)
Dimension	Dimension of value of the setpoint.
Resolution	Resolution of the value of the setpoint. Resolution adjust number of decimal places in low and high limit.
Low limit	The lowest value of setpoint. Digit place of this value can be decrease or increase by resolution of setpoint.
High limit	The highest value of setpoint. Digit place of this value can be decrease or increase by resolution of setpoint.

back to List of setpoints

PLC Setpoint 58

Setpoint group	PLC	**Related FW**	1.3.0
Range [units]	Depends on resolution of value [-]		
Default value	Depends on resolution of value [-]	**Alternative config**	NO
Step	Depends on resolution of value [-]		
Comm object	10497	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Only if relevant setpoint is used in PLC		
Description			

Adjustable value for input in PLC logic.

Configuration of setpoint:

Configuration is made via configuration PC tool InteliConfig

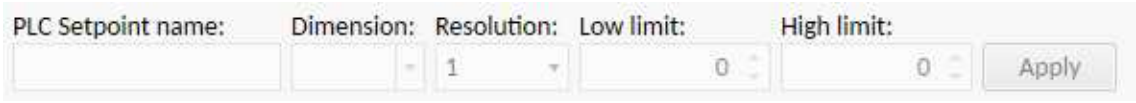


Image 8.126 Screen of configuration from InteliConfig

PLC Setpoint name	Name of the setpoint (0..32 characters)
Dimension	Dimension of value of the setpoint.
Resolution	Resolution of the value of the setpoint. Resolution adjust number of decimal places in low and high limit.
Low limit	The lowest value of setpoint. Digit place of this value can be decrease or increase by resolution of setpoint.
High limit	The highest value of setpoint. Digit place of this value can be decrease or increase by resolution of setpoint.

back to List of setpoints

PLC Setpoint 59

Setpoint group	PLC	**Related FW**	1.3.0
Range [units]	Depends on resolution of value [-]		
Default value	Depends on resolution of value [-]	**Alternative config**	NO
Step	Depends on resolution of value [-]		
Comm object	10498	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Only if relevant setpoint is used in PLC		
Description			

Adjustable value for input in PLC logic.

Configuration of setpoint:

Configuration is made via configuration PC tool InteliConfig

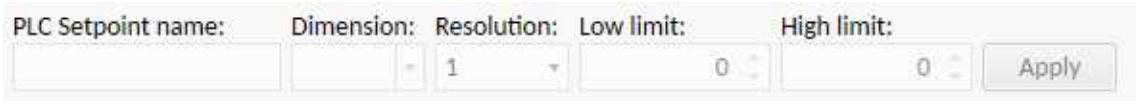


Image 8.127 Screen of configuration from InteliConfig

PLC Setpoint name	Name of the setpoint (0..32 characters)
Dimension	Dimension of value of the setpoint.
Resolution	Resolution of the value of the setpoint. Resolution adjust number of decimal places in low and high limit.
Low limit	The lowest value of setpoint. Digit place of this value can be decrease or increase by resolution of setpoint.
High limit	The highest value of setpoint. Digit place of this value can be decrease or increase by resolution of setpoint.

back to List of setpoints

PLC Setpoint 60

Setpoint group	PLC	**Related FW**	1.3.0
Range [units]	Depends on resolution of value [-]		
Default value	Depends on resolution of value [-]	**Alternative config**	NO
Step	Depends on resolution of value [-]		
Comm object	10499	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Only if relevant setpoint is used in PLC		
Description			

Adjustable value for input in PLC logic.

Configuration of setpoint:

Configuration is made via configuration PC tool InteliConfig

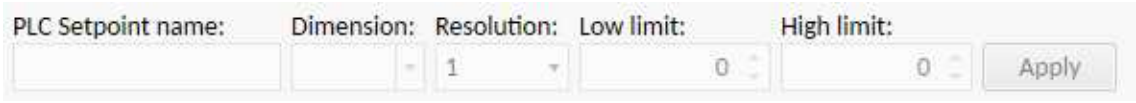


Image 8.128 Screen of configuration from InteliConfig

PLC Setpoint name	Name of the setpoint (0..32 characters)
Dimension	Dimension of value of the setpoint.
Resolution	Resolution of the value of the setpoint. Resolution adjust number of decimal places in low and high limit.
Low limit	The lowest value of setpoint. Digit place of this value can be decrease or increase by resolution of setpoint.
High limit	The highest value of setpoint. Digit place of this value can be decrease or increase by resolution of setpoint.

back to List of setpoints

PLC Setpoint 61

Setpoint group	PLC	**Related FW**	1.3.0
Range [units]	Depends on resolution of value [-]		
Default value	Depends on resolution of value [-]	**Alternative config**	NO
Step	Depends on resolution of value [-]		
Comm object	10500	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Only if relevant setpoint is used in PLC		
Description			

Adjustable value for input in PLC logic.

Configuration of setpoint:

Configuration is made via configuration PC tool InteliConfig

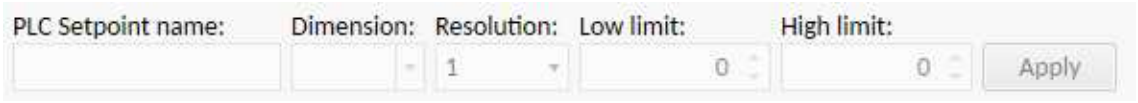


Image 8.129 Screen of configuration from InteliConfig

PLC Setpoint name	Name of the setpoint (0..32 characters)
Dimension	Dimension of value of the setpoint.
Resolution	Resolution of the value of the setpoint. Resolution adjust number of decimal places in low and high limit.
Low limit	The lowest value of setpoint. Digit place of this value can be decrease or increase by resolution of setpoint.
High limit	The highest value of setpoint. Digit place of this value can be decrease or increase by resolution of setpoint.

back to List of setpoints

PLC Setpoint 62

Setpoint group	PLC	**Related FW**	1.3.0
Range [units]	Depends on resolution of value [-]		
Default value	Depends on resolution of value [-]	**Alternative config**	NO
Step	Depends on resolution of value [-]		
Comm object	10501	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Only if relevant setpoint is used in PLC		
Description			

Adjustable value for input in PLC logic.

Configuration of setpoint:

Configuration is made via configuration PC tool InteliConfig

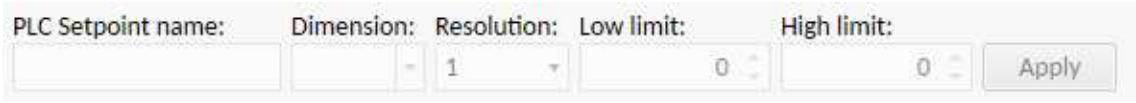


Image 8.130 Screen of configuration from InteliConfig

PLC Setpoint name	Name of the setpoint (0..32 characters)
Dimension	Dimension of value of the setpoint.
Resolution	Resolution of the value of the setpoint. Resolution adjust number of decimal places in low and high limit.
Low limit	The lowest value of setpoint. Digit place of this value can be decrease or increase by resolution of setpoint.
High limit	The highest value of setpoint. Digit place of this value can be decrease or increase by resolution of setpoint.

back to List of setpoints

PLC Setpoint 63

Setpoint group	PLC	**Related FW**	1.3.0
Range [units]	Depends on resolution of value [-]		
Default value	Depends on resolution of value [-]	**Alternative config**	NO
Step	Depends on resolution of value [-]		
Comm object	10502	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Only if relevant setpoint is used in PLC		
Description			

Adjustable value for input in PLC logic.

Configuration of setpoint:

Configuration is made via configuration PC tool InteliConfig

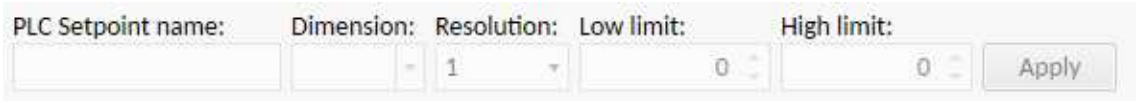


Image 8.131 Screen of configuration from InteliConfig

PLC Setpoint name	Name of the setpoint (0..32 characters)
Dimension	Dimension of value of the setpoint.
Resolution	Resolution of the value of the setpoint. Resolution adjust number of decimal places in low and high limit.
Low limit	The lowest value of setpoint. Digit place of this value can be decrease or increase by resolution of setpoint.
High limit	The highest value of setpoint. Digit place of this value can be decrease or increase by resolution of setpoint.

back to List of setpoints

PLC Setpoint 64

Setpoint group	PLC	**Related FW**	1.3.0
Range [units]	Depends on resolution of value [-]		
Default value	Depends on resolution of value [-]	**Alternative config**	NO
Step	Depends on resolution of value [-]		
Comm object	10503	**Related applications**	MINT, SPtM
Config level	Standard		
Setpoint visibility	Only if relevant setpoint is used in PLC		
Description			

Adjustable value for input in PLC logic.

Configuration of setpoint:

Configuration is made via configuration PC tool InteliConfig

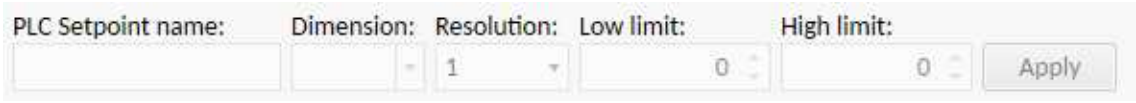


Image 8.132 Screen of configuration from InteliConfig

PLC Setpoint name	Name of the setpoint (0..32 characters)
Dimension	Dimension of value of the setpoint.
Resolution	Resolution of the value of the setpoint. Resolution adjust number of decimal places in low and high limit.
Low limit	The lowest value of setpoint. Digit place of this value can be decrease or increase by resolution of setpoint.
High limit	The highest value of setpoint. Digit place of this value can be decrease or increase by resolution of setpoint.

back to List of setpoints

8.1.2 Values

What values are:

Values (or quantities) are analog or binary data objects, measured or computed by the controller, that are intended for reading from the controller screen, PC, MODBUS, etc. Values are organized into groups according to their meaning.

Invalid flag

If valid data is not available for a particular value, the invalid flag is set to it. This situation may be due to the following:

- The value is not being evaluated in the scope of the current application and configuration.
- Sensor fail has been detected on an analog input.
- The configured ECU or extension module does not provide the particular value.
- The communication with the ECU or extension module is interrupted.

A value containing the invalid flag is displayed as "#####" in InteliConfig and on the controller screen. If such a value is read out via MODBUS, it will contain the data 32768 in the case of signed values and 65535 in the case of unsigned values.

List of values groups

Group: Engine 571
Group: Generator 575
Group: Load 584
Group: Mains/Bus 585
Group: Power Management 587
Group: Speed/Load Control 591
Group: Voltage/PF Control 592
Group: Controler I/O 592
Group: Statistics 594
Group: Info 599
Group: Log Bout 604
Group: CM-GPRS 606
Group: CM-4G-GPS 611
Group: CM-Ethernet 617
Group: Date/Time 620
Group: Plug-In I/O 620
Group: PLC 621

For full list of setpoints go to the chapter **List of values (page 568)**.

List of values

Engine

DEF Level 571
DPF Ash Load 571
DPF Soot Load 571
ECU-BIN 1 571
ECU-BIN 2 572
ECU-BIN 3 572
ECU-BIN 4 572
ECU-BIN 5 572
ECU-BIN 6 573
ECU-BIN 7 573
ECU-BIN 8 573
ECU-BIN 9 573
ECU-BIN-EXT-1 574
ECU Frequency Select ... 574
ECU State 574
RPM 575
Speed Required RPM 575

Generator

Generator Frequency 580
Generator Voltage L1-L2 .. 580
Generator Voltage L1-N ... 580
Generator Voltage L2-L3 .. 580
Generator Voltage L2-N ... 581
Generator Voltage L3-L1 .. 581
Generator Voltage L3-N ... 581
Slip Angle 582
Slip Frequency 582
Nominal Current 583
Nominal Power 583
Nominal Voltage 583
Earth Fault Current 583

Load

Generator kW 575
Generator kW L1 575
Generator kW L2 576
Generator kW L3 576
Generator kVA 576
Generator kVA L1 576
Generator kVA L2 577
Generator kVA L3 577
Generator kVAr 577
Generator kVAr L1 577
Generator kVAr L2 578
Generator kVAr L3 578
Generator Load Character 578
Generator Load Character L1 578
Generator Load Character L2 579
Generator Load Character L3 579
Generator Power Factor .. 579
Generator Power Factor L1 579
Generator Power Factor L2 579
Generator Power Factor L3 580
Generator Current L1 581
Generator Current L2 582
Generator Current L3 582
Load kW 584
Load kVAr 584
Load Power Factor 584
Load Character 584

Mains/Bus

Mains/Bus Frequency 585
Mains/Bus Voltage L1-L2 . 585
Mains/Bus Voltage L1-N .. 585
Mains/Bus Voltage L2-L3 . 585
Mains/Bus Voltage L2-N .. 585
Mains/Bus Voltage L3-L1 . 586
Mains/Bus Voltage L3-N .. 586
Mains/Bus Current L1 586
Mains Import kW 586
Mains Import kVAr 586
Mains Power Factor 587
Mains Load Character 587
Max Vector Shift 587

Power Management

Engine Priority 587
Actual Reserve 588
Actual Relative Reserve .. 588
Start Reserve 588
Stop Reserve 588
Start Relative Reserve ... 589
Stop Relative Reserve 589
Actual Active Power In PM 589
Actual Reactive Power In PM 589
Running Nominal Power In PM 589
Running Nominal Power Of All 590
Available Nominal Power . 590
Minimal Running Nominal Power 590
Actual Power Band 590
Next Power Band 591

Speed/Load Control

Active Power Required ... 588
Speed Regulator Output .. 591
Speed Request 591
Requested RPM 591

Voltage/PF Control

Reactive Power Required 592
Voltage Regulator Output 592
Voltage Request 592

Controler I/O

E-STOP 592
Analog Input 1 593
Analog Input 2 593
Analog Input 3 593
Analog Input 4 593
Battery Volts 593
Binary Inputs 594
Binary Outputs 594
D+ 594
CAN16 602
CAN32 603
Reg16 603
Reg32 603
Gen Loaded 16 603
Gen Loaded 32 604

Statistics

Genset kVArh 594
Genset kWh 595
Mains kVArh 595
Mains kWh 595
Maintenance 1 595
Maintenance 2 596
Maintenance 3 596
Maintenance 4 596
Maintenance 5 596
Maintenance 6 596
Num E-Stops 597
Num Starts 597
Rental 1 597
Rental 2 597
Running Hours 597
Shutdowns 598
Time Till Empty 598
Time Till Empty 598
Time Till Empty 598
Total Fuel Consumption 599

Info

Application Mode 599
Load Shedding Status 599
Engine State 600
Breaker State 600
Timer Text 600
Connection Type 600
SPI Module A 601
SPI Module B 601
Timer Value 601
ID String 601
FW Version 601
Application 602
FW Branch 602
Password Decode 602

Log Bout

Log Bout 1 604
Log Bout 2 604
Log Bout 3 604
Log Bout 4 605
Log Bout 5 605
Log Bout 6 605
Log Bout 7 605
Log Bout 8 605
Log Bout 9 606
Log Bout 10 606
Log Bout 11 606

Date/Time

Time 620
Date 620

Plug-In I/O

EM BIO A 620
EM BIO B 621

Log Bout

Log Bout 1 604
Log Bout 2 604
Log Bout 3 604
Log Bout 4 605
Log Bout 5 605
Log Bout 6 605
Log Bout 7 605
Log Bout 8 605
Log Bout 9 606
Log Bout 10 606
Log Bout 11 606

CM-GPRS ; CM-4G-GPS (4G part)

AirGate Status 606
AirGate ID 607
Connection Type 607
Cell Diag Code 607
Cell ErrorRate 609
Cell Signal Lev 609
Cell Status 609
Last Email Result 610
Operator 611
AirGate ID 612
AirGate Status 613
Connection Type 613
Cell Diag Code 613
Cell ErrorRate 615
Cell Signal Lev 615
Cell Status 615
Last Email Result 616
Operator 617

CM-4G-GPS (GPS part)

Altitude 611
HomePosDist 611
Latitude 611

Longitude 612
Satellites 612

CM-Ethernet

AirGate Status 617
AirGate ID 617
Current DNS 618
ETH Interface Status 618
Current Gateway 618
Current IP Address 618
Last Email Result 619
MAC Address 619
Current Subnet Mask 620

Date/Time

Time 620
Date 620

Plug-In I/O

EM BIO A 620
EM BIO B 621

PLC

PLC Resource 1 621
PLC Resource 2 621
PLC Resource 3 621
PLC Resource 4 621
PLC Resource 5 622
PLC Resource 6 622
PLC Resource 7 622
PLC Resource 8 622
PLC-BOUT 1 622
PLC-BOUT 2 623
PLC-BOUT 3 623
PLC-BOUT 4 623
PLC-BOUT 5 623
PLC-BOUT 6 623
PLC-BOUT 7 624

Group: Engine

DEF Level

Value group	Engine	**Related FW**	1.3.0
Units	%		
Comm object	14522	**Related applications**	MINT, SPtM
Description			
The level of diesel exhaust fluid tank.			

back to List of values

DPF Ash Load

Value group	Engine	**Related FW**	1.3.0
Units	%		
Comm object	12483	**Related applications**	MINT, SPtM
Description			
The rate of ash in DPF (Diesel particulate filter).			

back to List of values

DPF Soot Load

Value group	Engine	**Related FW**	1.3.0
Units	%		
Comm object	12484	**Related applications**	MINT, SPtM
Description			
The rate of soot in DPF (Diesel particulate filter).			

back to List of values

ECU-BIN 1

Value group	Engine	**Related FW**	1.3.0
Units	Depends on ECU value		
Comm object	10153	**Related applications**	MINT, SPtM
Description			
This is one of the inputs, which are defined by ECU. Order of values depends on type of ECU. ***Note:*** *Usually there are engine speed[RPM], fuel rate[L/h], coolant temperature[°C], intake temperature [°C], oil pressure[bar], boost pressure[bar], load[%], oil temperature[°C] etc.*			

back to List of values

ECU-BIN 2

Value group	Engine	Related FW	1.3.0
Units	Depends on ECU value		
Comm object	10154	Related applications	MINT, SPtM
Description			
This is one of the inputs, which are defined by ECU. Order of values depends on type of ECU. ***Note:*** *Usually there are engine speed[RPM], fuel rate[L/h], coolant temperature[°C], intake temperature [°C], oil pressure[bar], boost pressure[bar], load[%], oil temperature[°C] etc.*			

back to List of values

ECU-BIN 3

Value group	Engine	Related FW	1.3.0
Units	Depends on ECU value		
Comm object	10155	Related applications	MINT, SPtM
Description			
This is one of the inputs, which are defined by ECU. Order of values depends on type of ECU. ***Note:*** *Usually there are engine speed[RPM], fuel rate[L/h], coolant temperature[°C], intake temperature [°C], oil pressure[bar], boost pressure[bar], load[%], oil temperature[°C] etc.*			

back to List of values

ECU-BIN 4

Value group	Engine	Related FW	1.3.0
Units	Depends on ECU value		
Comm object	10156	Related applications	MINT, SPtM
Description			
This is one of the inputs, which are defined by ECU. Order of values depends on type of ECU. ***Note:*** *Usually there are engine speed[RPM], fuel rate[L/h], coolant temperature[°C], intake temperature [°C], oil pressure[bar], boost pressure[bar], load[%], oil temperature[°C] etc.*			

back to List of values

ECU-BIN 5

Value group	Engine	Related FW	1.3.0
Units	Depends on ECU value		
Comm object	10157	Related applications	MINT, SPtM
Description			
This is one of the inputs, which are defined by ECU. Order of values depends on type of ECU. ***Note:*** *Usually there are engine speed[RPM], fuel rate[L/h], coolant temperature[°C], intake temperature [°C], oil pressure[bar], boost pressure[bar], load[%], oil temperature[°C] etc.*			

back to List of values

ECU-BIN 6

Value group	Engine	Related FW	1.3.0
Units	Depends on ECU value		
Comm object	10158	Related applications	MINT, SPtM
Description			
This is one of the inputs, which are defined by ECU. Order of values depends on type of ECU. ***Note:*** *Usually there are engine speed[RPM], fuel rate[L/h], coolant temperature[°C], intake temperature [°C], oil pressure[bar], boost pressure[bar], load[%], oil temperature[°C] etc.*			

back to List of values

ECU-BIN 7

Value group	Engine	Related FW	1.3.0
Units	Depends on ECU value		
Comm object	10159	Related applications	MINT, SPtM
Description			
This is one of the inputs, which are defined by ECU. Order of values depends on type of ECU. ***Note:*** *Usually there are engine speed[RPM], fuel rate[L/h], coolant temperature[°C], intake temperature [°C], oil pressure[bar], boost pressure[bar], load[%], oil temperature[°C] etc.*			

back to List of values

ECU-BIN 8

Value group	Engine	Related FW	1.3.0
Units	Depends on ECU value		
Comm object	10160	Related applications	MINT, SPtM
Description			
This is one of the inputs, which are defined by ECU. Order of values depends on type of ECU. ***Note:*** *Usually there are engine speed[RPM], fuel rate[L/h], coolant temperature[°C], intake temperature [°C], oil pressure[bar], boost pressure[bar], load[%], oil temperature[°C] etc.*			

back to List of values

ECU-BIN 9

Value group	Engine	Related FW	1.3.0
Units	Depends on ECU value		
Comm object	10161	Related applications	MINT, SPtM
Description			
This is one of the inputs, which are defined by ECU. Order of values depends on type of ECU. ***Note:*** *Usually there are engine speed[RPM], fuel rate[L/h], coolant temperature[°C], intake temperature [°C], oil pressure[bar], boost pressure[bar], load[%], oil temperature[°C] etc.*			

back to List of values

ECU-BIN-EXT-1

Value group	Engine	Related FW	1.3.0
Units	Depends on ECU value		
Comm object	10173	Related applications	MINT, SPtM
Description			
This is one of the inputs, which are defined by ECU. Order of values depends on type of ECU. ***Note:*** *Usually there are engine speed[RPM], fuel rate[L/h], coolant temperature[°C], intake temperature [°C], oil pressure[bar], boost pressure[bar], load[%], oil temperature[°C] etc.*			

back to List of values

ECU Frequency Select

Value group	Engine	Related FW	1.3.0
Units	-		
Comm object	12926	Related applications	MINT, SPtM
Description			
Shows selected frequency of ECU. The value is calculated from setpoint **Nominal Frequency (page 257)** ▶ If is **Nominal Frequency (page 257)** in range from 45 Hz to 54 Hz, is considered as 50 Hz application. The value is set to 0. ▶ If is **Nominal Frequency (page 257)** in range from 55 Hz to 65 Hz, is considered as 60 Hz application. The value is set to 1.			

back to List of values

ECU State

Value group	Engine	Related FW	1.3.0
Units	-		
Comm object	10034	Related applications	MINT, SPtM
Description			
Shows binary status (0 or 1) of ECU: ▶ ECU Yellow Lamp ▶ ECU Red Lamp ▶ Wait To Start			

back to List of values

RPM

Value group	Engine	Related FW	1.3.0
Units	RPM		
Comm object	10123	Related applications	MINT, SPtM
Description			
This value contains the current engine speed. The value is obtained from one of the following sources: ▶ ECU, if an ECU is configured ▶ Pickup input ▶ Generator frequency			

back to List of values

Speed Required RPM

Value group	Engine	Related FW	1.3.0
Units	RPM		
Comm object	10006	Related applications	MINT, SPtM
Description			
Requested engine speed.			

back to List of values

Group: Generator

Generator kW

Value group	Generator	Related FW	1.3.0
Units	kW		
Comm object	8202	Related applications	MINT, SPtM
Description			
Generator active power. ***Note:*** *This value can be also switch into one decimal power format (via InteliConfig PC tool). In this case the range of value is decrease 10 times.*			

back to List of values

Generator kW L1

Value group	Generator	Related FW	1.3.0
Units	kW		
Comm object	8524	Related applications	MINT, SPtM
Description			
Generator active power in phase L1. ***Note:*** *This value can be also switch into one decimal power format (via InteliConfig PC tool). In this case the range of value is decrease 10 times.*			

back to List of values

Generator kW L2

Value group	Generator	Related FW	1.3.0
Units	kW		
Comm object	8525	Related applications	MINT, SPtM
Description			
Generator active power in phase L2. ***Note:*** *This value can be also switch into one decimal power format (via InteliConfig PC tool). In this case the range of value is decrease 10 times.*			

back to List of values

Generator kW L3

Value group	Generator	Related FW	1.3.0
Units	kW		
Comm object	8526	Related applications	MINT, SPtM
Description			
Generator active power in phase L3. ***Note:*** *This value can be also switch into one decimal power format (via InteliConfig PC tool). In this case the range of value is decrease 10 times.*			

back to List of values

Generator kVA

Value group	Generator	Related FW	1.3.0
Units	kVA		
Comm object	8565	Related applications	MINT, SPtM
Description			
Generator apparent power. ***Note:*** *This value can be also switch into one decimal power format (via InteliConfig PC tool). In this case the range of value is decrease 10 times.*			

back to List of values

Generator kVA L1

Value group	Generator	Related FW	1.3.0
Units	kVA		
Comm object	8530	Related applications	MINT, SPtM
Description			
Generator apparent power L1. ***Note:*** *This value can be also switch into one decimal power format (via InteliConfig PC tool). In this case the range of value is decrease 10 times.*			

back to List of values

Generator kVA L2

Value group	Generator	Related FW	1.3.0
Units	kVA		
Comm object	8531	Related applications	MINT, SPtM
Description			
Generator apparent power L2.			

Note: *This value can be also switch into one decimal power format (via InteliConfig PC tool). In this case the range of value is decrease 10 times.*

back to List of values

Generator kVA L3

Value group	Generator	Related FW	1.3.0
Units	kVA		
Comm object	8532	Related applications	MINT, SPtM
Description			
Generator apparent power L3.			

Note: *This value can be also switch into one decimal power format (via InteliConfig PC tool). In this case the range of value is decrease 10 times.*

back to List of values

Generator kVAr

Value group	Generator	Related FW	1.3.0
Units	kVAr		
Comm object	8203	Related applications	MINT, SPtM
Description			
Generator reactive power.			

Note: *This value can be also switch into one decimal power format (via InteliConfig PC tool). In this case the range of value is decrease 10 times.*

back to List of values

Generator kVAr L1

Value group	Generator	Related FW	1.3.0
Units	kVAr		
Comm object	8527	Related applications	MINT, SPtM
Description			
Generator reactive power in phase L1.			

Note: *This value can be also switch into one decimal power format (via InteliConfig PC tool). In this case the range of value is decrease 10 times.*

back to List of values

Generator kVAr L2

Value group	Generator	Related FW	1.3.0
Units	kVAr		
Comm object	8528	Related applications	MINT, SPtM
Description			
Generator reactive power in phase L2. ***Note:*** *This value can be also switch into one decimal power format (via InteliConfig PC tool). In this case the range of value is decrease 10 times.*			

back to List of values

Generator kVAr L3

Value group	Generator	Related FW	1.3.0
Units	kVAr		
Comm object	8529	Related applications	MINT, SPtM
Description			
Generator reactive power in phase L3. ***Note:*** *This value can be also switch into one decimal power format (via InteliConfig PC tool). In this case the range of value is decrease 10 times.*			

back to List of values

Generator Load Character

Value group	Generator	Related FW	1.3.0
Units	[-]		
Comm object	8395	Related applications	MINT, SPtM
Description			
Character of the generator load. “L” means inductive load, “C” is capacitive and “R” is resistive load (power factor = 1).			

back to List of values

Generator Load Character L1

Value group	Generator	Related FW	1.3.0
Units	[-]		
Comm object	8626	Related applications	MINT, SPtM
Description			
Character of the generator load in the L1 phase. “L” means inductive load, “C” is capacitive and “R” is resistive load (power factor = 1).			

back to List of values

Generator Load Character L2

Value group	Generator	**Related FW**	1.3.0
Units	[-]		
Comm object	8627	**Related applications**	MINT, SPtM
Description			
Character of the generator load in the L2 phase. “L” means inductive load, “C” is capacitive and “R” is resistive load (power factor = 1).			

back to List of values

Generator Load Character L3

Value group	Generator	**Related FW**	1.3.0
Units	[-]		
Comm object	8628	**Related applications**	MINT, SPtM
Description			
Character of the generator load in the L3 phase. “L” means inductive load, “C” is capacitive and “R” is resistive load (power factor = 1).			

back to List of values

Generator Power Factor

Generator	Generator	**Related FW**	1.3.0
Units	[-]		
Comm object	8204	**Related applications**	MINT, SPtM
Description			
Generator power factor.			

back to List of values

Generator Power Factor L1

Generator	Generator	**Related FW**	1.3.0
Units	[-]		
Comm object	8533	**Related applications**	MINT, SPtM
Description			
Generator power factor in phase L1.			

back to List of values

Generator Power Factor L2

Generator	Generator	**Related FW**	1.3.0
Units	[-]		
Comm object	8534	**Related applications**	MINT, SPtM
Description			
Generator power factor in phase L2.			

back to List of values

Generator Power Factor L3

Generator	Generator	**Related FW**	1.3.0
Units	[-]		
Comm object	8535	**Related applications**	MINT, SPtM
Description			
Generator power factor in phase L3.			

back to List of values

Generator Frequency

Value group	Generator	**Related FW**	1.3.0
Units	Hz		
Comm object	8210	**Related applications**	MINT, SPtM
Description			
Frequency of generator.			

back to List of values

Generator Voltage L1-L2

Value group	Generator	**Related FW**	1.3.0
Units	V		
Comm object	9628	**Related applications**	MINT, SPtM
Description			
Generator phase to phase voltage between L1 and L2 phases.			

back to List of values

Generator Voltage L1-N

Value group	Generator	**Related FW**	1.3.0
Units	V		
Comm object	8192	**Related applications**	MINT, SPtM
Description			
Generator voltage on phase 1.			

back to List of values

Generator Voltage L2-L3

Value group	Generator	**Related FW**	1.3.0
Units	V		
Comm object	9629	**Related applications**	MINT, SPtM
Description			
Generator phase to phase voltage between L2 and L3 phases.			

back to List of values

Generator Voltage L2-N

Value group	Generator	**Related FW**	1.3.0
Units	V		
Comm object	8193	**Related applications**	MINT, SPtM
Description			
Generator voltage on phase 2.			

back to List of values

Generator Voltage L3-L1

Value group	Generator	**Related FW**	1.3.0
Units	V		
Comm object	9630	**Related applications**	MINT, SPtM
Description			
Generator phase to phase voltage between L3 and L1 phases.			

back to List of values

Generator Voltage L3-N

Value group	Generator	**Related FW**	1.3.0
Units	V		
Comm object	8194	**Related applications**	MINT, SPtM
Description			
Generator voltage on phase 3.			

back to List of values

Generator Current L1

Value group	Generator	**Related FW**	1.3.0
Units	A		
Comm object	8198	**Related applications**	MINT, SPtM
Description			
Generator current phase L1. ***Note:*** *This value can be also switch into one decimal power format (via InteliConfig PC tool). In this case the range of value is decrease 10 times.*			

back to List of values

Generator Current L2

Value group	Generator	Related FW	1.3.0
Units	A		
Comm object	8199	Related applications	MINT, SPtM
Description			
Generator current phase L2. ***Note:*** *This value can be also switch into one decimal power format (via InteliConfig PC tool). In this case the range of value is decrease 10 times.*			

back to List of values

Generator Current L3

Value group	Generator	Related FW	1.3.0
Units	A		
Comm object	8200	Related applications	MINT, SPtM
Description			
Generator current phase L3. ***Note:*** *This value can be also switch into one decimal power format (via InteliConfig PC tool). In this case the range of value is decrease 10 times.*			

back to List of values

Slip Angle

Value group	Generator	Related FW	1.3.0
Units	°		
Comm object	8225	Related applications	MINT, SPtM
Description			
Slip angle during synchronization.			

back to List of values

Slip Frequency

Value group	Generator	Related FW	1.3.0
Units	Hz		
Comm object	8224	Related applications	MINT, SPtM
Description			
Slip frequency during synchronization.			

back to List of values

Nominal Current

Value group	Generator	**Related FW**	1.3.0
Units	A		
Comm object	9978	**Related applications**	MINT, SPtM
Description			
Generator nominal current.			

back to List of values

Nominal Power

Value group	Generator	**Related FW**	1.3.0
Units	V		
Comm object	9018	**Related applications**	MINT, SPtM
Description			
Generator nominal power.			

back to List of values

Nominal Voltage

Value group	Generator	**Related FW**	1.3.0
Units	V		
Comm object	9917	**Related applications**	MINT, SPtM
Description			
Generator nominal voltage.			

back to List of values

Earth Fault Current

Value group	Generator	**Related FW**	1.3.0
Units	A		
Comm object	14325	**Related applications**	MINT, SPtM
Description			
Measured value of fault for evaluation of earth fault protection.			

back to List of values

Group: Load

Load kW

Value group	Load	**Related FW**	1.3.0
Units	kW		
Comm object	10601	**Related applications**	MINT, SPtM
Description			
Load active power. ***Note:*** *This value can be also switch into one decimal power format (via InteliConfig PC tool). In this case the range of value is decrease 10 times.*			

back to List of values

Load kVAr

Value group	Load	**Related FW**	1.3.0
Units	kVAr		
Comm object	10644	**Related applications**	MINT, SPtM
Description			
Load reactive power. ***Note:*** *This value can be also switch into one decimal power format (via InteliConfig PC tool). In this case the range of value is decrease 10 times.*			

back to List of values

Load Power Factor

Load	Load	**Related FW**	1.3.0
Units	[-]		
Comm object	9025	**Related applications**	MINT, SPtM
Description			
Load power factor.			

back to List of values

Load Character

Value group	Load	**Related FW**	1.3.0
Units	A		
Comm object	9026	**Related applications**	MINT, SPtM
Description			
Character of the load. “L” means inductive load, “C” is capacitive and “R” is resistive load (power factor = 1). ***Note:*** *This value can be also switch into one decimal power format (via InteliConfig PC tool). In this case the range of value is decrease 10 times.*			

back to List of values

Group: Mains/Bus

Mains/Bus Frequency

Value group	Mains	**Related FW**	1.3.0
Units	Hz		
Comm object	8211	**Related applications**	MINT, SPtM
Description			
Frequency of mains/bus.			

back to List of values

Mains/Bus Voltage L1-L2

Value group	Mains	**Related FW**	1.3.0
Units	V		
Comm object	9631	**Related applications**	MINT, SPtM
Description			
Mains/Bus phase to phase voltage between L1 and L2 phases.			

back to List of values

Mains/Bus Voltage L1-N

Value group	Mains	**Related FW**	1.3.0
Units	V		
Comm object	8195	**Related applications**	MINT, SPtM
Description			
Mains/Bus voltage on phase 1.			

back to List of values

Mains/Bus Voltage L2-L3

Value group	Mains	**Related FW**	1.3.0
Units	V		
Comm object	9632	**Related applications**	MINT, SPtM
Description			
Mains/Bus phase to phase voltage between L2 and L3 phases.			

back to List of values

Mains/Bus Voltage L2-N

Value group	Mains	**Related FW**	1.3.0
Units	V		
Comm object	8196	**Related applications**	MINT, SPtM
Description			
Mains/Bus voltage on phase 2.			

back to List of values

Mains/Bus Voltage L3-L1

Value group	Mains	**Related FW**	1.3.0
Units	V		
Comm object	9633	**Related applications**	MINT, SPtM
Description			
Mains/Bus phase to phase voltage between L3 and L1 phases.			

back to List of values

Mains/Bus Voltage L3-N

Value group	Mains	**Related FW**	1.3.0
Units	V		
Comm object	8197	**Related applications**	MINT, SPtM
Description			
Mains/Bus voltage on phase 3.			

back to List of values

Mains/Bus Current L1

Value group	Mains	**Related FW**	1.3.0
Units	A		
Comm object	8208	**Related applications**	SPtM
Description			
Mains current in phase L1.			

back to List of values

Mains Import kW

Value group	Mains	**Related FW**	1.3.0
Units	kW		
Comm object	8703	**Related applications**	SPtM
Description			
Imported kW from mains.			

back to List of values

Mains Import kVAr

Value group	Mains	**Related FW**	1.3.0
Units	kVAr		
Comm object	8704	**Related applications**	SPtM
Description			
Imported kVAr from mains.			

back to List of values

Mains Power Factor

Value group	Mains	**Related FW**	1.3.0
Units	Hz		
Comm object	8705	**Related applications**	SPtM
Description			
Mains power factor.			

back to List of values

Mains Load Character

Value group	Mains	**Related FW**	1.3.0
Units	Hz		
Comm object	8709	**Related applications**	SPtM
Description			
Character of mains load. “L” means inductive load, “C” is capacitive and “R” is resistive load (power factor = 1).			

back to List of values

Max Vector Shift

Value group	Mains	**Related FW**	1.3.0
Units	Hz		
Comm object	9847	**Related applications**	SPtM
Description			
This is maximal measured value of vector shift of the generator voltage. It is set to zero always when Controller goes to parallel to mains operation (When Vector Shift Protection = PARALLEL ONLY) or when MCB gets closed (when Vector shift protection = ENABLED).			

back to List of values

Group: Power Management

Engine Priority

Value group	Power Management	**Related FW**	1.3.0
Units	-		
Comm object	8624	**Related applications**	MINT
Description			
This value shows current priority number. It corresponds to the setpoint **Priority (page 328)** except following situations: ▶ If at least one of binary inputs **TOP PRIORITY (PAGE 664)** is configured on some source and is active ▶ **#Priority Auto Swap (page 329)** is active			

back to List of values

Actual Reserve

Value group	Power Management	Related FW	1.3.0
Units	kW		
Comm object	15805	Related applications	MINT
Description			
Actual absolute reserve in power management.			

back to List of values

Actual Relative Reserve

Value group	Power Management	Related FW	1.3.0
Units	%		
Comm object	10788	Related applications	MINT
Description			
Actual relative reserve in power management.			

back to List of values

Active Power Required

Value group	Speed/Load Control	Related FW	1.3.0
Units	kW		
Comm object	8663	Related applications	MINT, SPtM
Description			
This value contains actual required load level, which is used as the input into the load regulation loop in the parallel to mains operation.			

back to List of values

Start Reserve

Value group	Power Management	Related FW	1.3.0
Units	kW		
Comm object	15806	Related applications	MINT
Description			
Actual absolute reserve for start.			

back to List of values

Stop Reserve

Value group	Power Management	Related FW	1.3.0
Units	kW		
Comm object	15807	Related applications	MINT
Description			
Actual absolute reserve - when the reserve is higher than this value the last started gen-set (the gen-set with the highest priority) is stopped.			

back to List of values

Start Relative Reserve

Value group	Power Management	Related FW	1.3.0
Units	%		
Comm object	10786	Related applications	MINT
Description			
Actual relative reserve for start.			

back to List of values

Stop Relative Reserve

Value group	Power Management	Related FW	1.3.0
Units	%		
Comm object	10787	Related applications	MINT
Description			
Actual relative reserve - when the relative reserve is higher than this value the last started gen-set (the gen-set with the highest priority) is stopped.			

back to List of values

Actual Active Power In PM

Value group	Power Management	Related FW	1.3.0
Units	kW		
Comm object	10657	Related applications	MINT
Description			
Actual value of active power from all gen-sets running in power management.			

back to List of values

Actual Reactive Power In PM

Value group	Power Management	Related FW	1.3.0
Units	kVAr		
Comm object	10656	Related applications	MINT
Description			
Actual value of reactive power from all gen-sets running in power management.			

back to List of values

Running Nominal Power In PM

Value group	Power Management	Related FW	1.3.0
Units	kW		
Comm object	10658	Related applications	MINT
Description			
Actual nominal power of all gen-sets in power management, which are running.			

back to List of values

Running Nominal Power Of All

Value group	Power Management	**Related FW**	1.3.0
Units	kW		
Comm object	10999	**Related applications**	MINT
Description			
Actual nominal power of all gen-sets, which are running.			

back to List of values

Available Nominal Power

Value group	Power Management	**Related FW**	1.3.0
Units	kW		
Comm object	10998	**Related applications**	MINT
Description			
Available nominal power of all gen-sets in power management.			

back to List of values

Minimal Running Nominal Power

Value group	Power Management	**Related FW**	1.3.0
Units	kW		
Comm object	10012	**Related applications**	MINT
Description			
Actual minimal nominal power of all gen-sets, which are running.			

back to List of values

Actual Power Band

Value group	Power Management	**Related FW**	1.3.0
Units	-		
Comm object	8974	**Related applications**	MINT
Description			
State of all gen-sets in actual power band of power management. 1 means that gen-set is running, 0 means that gen set is stopped. ***Note:*** *This value is evaluated only in controller with the lowest CAN address.*			

back to List of values

Next Power Band

Value group	Power Management	Related FW	1.3.0
Units	-		
Comm object	8975	Related applications	MINT
Description			
State of all gen-sets in next higher power band of power management.. 1 means that gen-set is running, 0 means that gen set is stopped. ***Note:*** *This value is evaluated only in controller with the lowest CAN address.*			

back to List of values

Group: Speed/Load Control

Speed Regulator Output

Value group	Speed/Load Control	Related FW	1.3.0
Units	V		
Comm object	9052	Related applications	MINT, SPtM
Description			
This is the actual voltage on the speed governor output of the controller. In case the output is switched to PWM mode, the relation is 10 V ~ 100 % PWM. -10 V is 0 % PWM			

back to List of values

Speed Request

Value group	Speed/Load Control	Related FW	1.3.0
Units	%		
Comm object	10137	Related applications	MINT, SPtM
Description			
This value contains the speed control signal expressed in %. This value is used for digital interfacing (via a communication bus) with ECUs that require the requested speed in %.			

back to List of values

Requested RPM

Value group	Speed/Load Control	Related FW	1.3.0
Units	RPM		
Comm object	10006	Related applications	MINT, SPtM
Description			
This value contains the speed which is currently requested by the controller from the attached ECU. This value is used for digital interfacing (via a communication bus) with ECUs that require the requested speed directly in RPM.			

back to List of values

Group: Voltage/PF Control

Reactive Power Required

Value group	Voltage/PF Control	**Related FW**	1.3.0
Units	kVAr		
Comm object	12877	**Related applications**	MINT, SPtM
Description			
Requested reactive power.			

back to List of values

Voltage Regulator Output

Value group	Voltage/PF Control	**Related FW**	1.3.0
Units	V		
Comm object	9053	**Related applications**	MINT, SPtM
Description			
Actual voltage between the AVR OUT and AVR COM terminals.			

back to List of values

Voltage Request

Value group	Voltage/PF Control	**Related FW**	1.3.0
Units	%		
Comm object	14997	**Related applications**	MINT, SPtM
Description			
Internal Voltage request of internal Voltage regulator.			

back to List of values

Group: Controler I/O

E-STOP

Value group	Controler I/O	**Related FW**	1.3.0
Units	[-]		
Comm object	15780	**Related applications**	MINT, SPtM
Description			
Shows number of E-STOP input - the same principle of visualization like binary inputs. Principle of value (principle of normally close binary input): ▶ 1 - E-STOP has voltage - state is OK ▶ 0 - E-STOP has no voltage - protection is active			

back to List of values

Analog Input 1

Value group	Controler I/O	**Related FW**	1.3.0
Units	Configurable		
Comm object	9151	**Related applications**	MINT, SPtM
Description			
This is the value of the analog input 1 of the controller.			

back to List of values

Analog Input 2

Value group	Controler I/O	**Related FW**	1.3.0
Units	Configurable		
Comm object	9152	**Related applications**	MINT, SPtM
Description			
This is the value of the analog input 2 of the controller.			

back to List of values

Analog Input 3

Value group	Controler I/O	**Related FW**	1.3.0
Units	Configurable		
Comm object	9153	**Related applications**	MINT, SPtM
Description			
This is the value of the analog input 3 of the controller.			

back to List of values

Analog Input 4

Value group	Controler I/O	**Related FW**	1.3.0
Units	Configurable		
Comm object	9154	**Related applications**	MINT, SPtM
Description			
This is the value of the analog input 4 of the controller.			

back to List of values

Battery Volts

Value group	Controler I/O	**Related FW**	1.3.0
Units	V		
Comm object	8213	**Related applications**	MINT, SPtM
Description			
Controller supply voltage.			

back to List of values

Binary Inputs

Value group	Controler I/O	**Related FW**	1.3.0
Units	[-]		
Comm object	8235	**Related applications**	MINT, SPtM
Description			
State of the binary inputs of the controller.			

back to List of values

Binary Outputs

Value group	Controler I/O	**Related FW**	1.3.0
Units	[-]		
Comm object	8239	**Related applications**	MINT, SPtM
Description			
State of the binary outputs of the controller.			

back to List of values

D+

Value group	Controler I/O	**Related FW**	1.3.0
Units	V		
Comm object	10603	**Related applications**	MINT, SPtM
Description			
D+ terminal voltage.			

back to List of values

Group: Statistics

Genset kVArh

Value group	Statistics	**Related FW**	1.3.0
Units	kVArh		
Comm object	8539	**Related applications**	MINT, SPtM
Description			
Counter of gen-set reactive power. ***Note:*** *This value can be also switch into one decimal power format (via InteliConfig PC tool). In this case the range of value is decrease 10 times.*			

back to List of values

Genset kWh

Value group	Statistics	**Related FW**	1.3.0
Units	kWh		
Comm object	8205	**Related applications**	MINT, SPtM
Description			
Counter of gen-set active power. ***Note:*** *This value can be also switch into one decimal power format (via InteliConfig PC tool). In this case the range of value is decrease 10 times.*			

back to List of values

Mains kVArh

Value group	Statistics	**Related FW**	1.3.0
Units	kVArh		
Comm object	11026	**Related applications**	MINT, SPtM
Description			
Counter of mains reactive power. ***Note:*** *This value can be also switch into one decimal power format (via InteliConfig PC tool). In this case the range of value is decrease 10 times.*			

back to List of values

Mains kWh

Value group	Statistics	**Related FW**	1.3.0
Units	kWh		
Comm object	11025	**Related applications**	MINT, SPtM
Description			
Counter of mains active power. ***Note:*** *This value can be also switch into one decimal power format (via InteliConfig PC tool). In this case the range of value is decrease 10 times.*			

back to List of values

Maintenance 1

Value group	Statistics	**Related FW**	1.3.0
Units	hours		
Comm object	10528	**Related applications**	MINT, SPtM
Description			
Countdown until next maintenance 1. Initial value can be set in **Maintenance Timer 1 (page 295)**.			

back to List of values

Maintenance 2

Value group	Statistics	Related FW	1.3.0
Units	hours		
Comm object	10529	Related applications	MINT, SPtM
Description			
Countdown until next maintenance 2. Initial value can be set in **Maintenance Timer 2 (page 296)**.			

back to List of values

Maintenance 3

Value group	Statistics	Related FW	1.3.0
Units	hours		
Comm object	10530	Related applications	MINT, SPtM
Description			
Countdown until next maintenance 3. Initial value can be set in **Maintenance Timer 3 (page 296)**.			

back to List of values

Maintenance 4

Value group	Statistics	Related FW	1.3.0
Units	hours		
Comm object	16387	Related applications	MINT, SPtM
Description			
Countdown until next maintenance 4. Initial value can be set in **Maintenance Timer 4 (page 296)**.			

back to List of values

Maintenance 5

Value group	Statistics	Related FW	1.3.0
Units	hours		
Comm object	16388	Related applications	MINT, SPtM
Description			
Countdown until next maintenance 5. Initial value can be set in **Maintenance Timer 5 (page 297)**.			

back to List of values

Maintenance 6

Value group	Statistics	Related FW	1.3.0
Units	hours		
Comm object	16389	Related applications	MINT, SPtM
Description			
Countdown until next maintenance 6. Initial value can be set in **Maintenance Timer 6 (page 297)**.			

back to List of values

Num E-Stops

Value group	Statistics	Related FW	1.3.0
Units	[-]		
Comm object	11195	Related applications	MINT, SPtM
Description			
Emergency stop alarms counter.			

back to List of values

Num Starts

Value group	Statistics	Related FW	1.3.0
Units	[-]		
Comm object	8207	Related applications	MINT, SPtM
Description			
Engine start commands counter. The counter is increased by 1 even if the particular start command will take more than one attempt.			

back to List of values

Rental 1

Value group	Statistics	Related FW	1.3.0
Units	hours		
Comm object	14328	Related applications	MINT, SPtM
Description			
Remaining hours of **Rental Timer 1 (page 436)**.			

back to List of values

Rental 2

Value group	Statistics	Related FW	1.3.0
Units	days		
Comm object	14369	Related applications	MINT, SPtM
Description			
Remaining days of **Rental Timer 2 (page 438)**.			

back to List of values

Running Hours

Value group	Statistics	Related FW	1.3.0
Units	hours		
Comm object	8206	Related applications	MINT, SPtM
Description			
Engine operation hours counter. The engine hours are incremented in the controller while the engine is running. ***Note:*** *If an ECU is configured and it provides engine hours value, the value is taken from the ECU.*			

back to List of values

Shutdowns

Value group	Statistics	**Related FW**	1.3.0
Units	[-]		
Comm object	11196	**Related applications**	MINT, SPtM
Description			
Shutdown alarms counter. This counter counts all occurrences of a shutdown alarm, not only real shutdowns of the gen-set, i.e. the counter is increased by 2 if two shutdown alarms appear simultaneously.			

back to List of values

Time Till Empty

Value group	Statistics	**Related FW**	1.3.0
Units	days		
Comm object	13770	**Related applications**	MINT, SPtM
Description			
Assessment in days when the fuel tank will be empty. ***Note:*** *This value is based on setpoint* ***Fuel Tank Volume (page 291)*** *and value from ECU Fuel Rate. For correct calculation of this value is necessary to have configured ECU which send Fuel Rate value, otherwise this value can't be calculated.*			

back to List of values

Time Till Empty

Value group	Statistics	**Related FW**	1.3.0
Units	hours		
Comm object	13771	**Related applications**	MINT, SPtM
Description			
Assessment in hours when the fuel tank will be empty. ***Note:*** *This value is based on setpoint* ***Fuel Tank Volume (page 291)*** *and value from ECU Fuel Rate. For correct calculation of this value is necessary to have configured ECU which send Fuel Rate value, otherwise this value can't be calculated.*			

back to List of values

Time Till Empty

Value group	Statistics	**Related FW**	1.3.0
Units	minutes		
Comm object	13772	**Related applications**	MINT, SPtM
Description			
Assessment in minutes when the fuel tank will be empty. ***Note:*** *This value is based on setpoint* ***Fuel Tank Volume (page 291)*** *and value from ECU Fuel Rate. For correct calculation of this value is necessary to have configured ECU which send Fuel Rate value, otherwise this value can't be calculated.*			

back to List of values

Total Fuel Consumption

Value group	Statistics	**Related FW**	1.3.0
Units	L		
Comm object	9040	**Related applications**	MINT, SPtM
Description			

Value containing total amount of consumed fuel by engine. The controller automatically updates this value every 30 s. The controller can calculate it in three ways:

- Direct reading from ECU
- Calculation based on actual fuel consumption reading from ECU
- Calculation from fuel level drop in tank (using Fuel Level Analog Input + **Fuel Tank Volume (page 291)** setpoint)

Note: *The accuracy of Total Fuel Consumption depends on the precision of ECU values or precision of* ***Fuel Tank Volume (page 291)*** *and fuel level sensor.*

back to List of values

Group: Info

Application Mode

Value group	IL Info	**Related FW**	1.3.0
Units	[-]		
Comm object	14446	**Related applications**	MINT, SPtM
Description			

This Value mirrors the active application in the controller.
The intend of use it to display the value of the active application in InteliConfig or at the screen of the controller.

back to List of values

Load Shedding Status

Value group	IL Info	**Related FW**	1.3.0
Units	[-]		
Comm object	9591	**Related applications**	MINT, SPtM
Description			

The value contains actual “load shedding stage. The Value can get the values of the range 0 to 3, where 0 means no load shedding stage is active and 1, 2 or 3 means that the corresponding loadshedding stage is active.

back to List of values

Engine State

Value group	Info	Related FW	1.3.0
Units	[-]		
Comm object	9244	Related applications	MINT, SPtM
Description			
The value contains actual “engine state” message which is shown on the main screen of the controller.			

back to List of values

Breaker State

Value group	IL Info	Related FW	1.3.0
Units	[-]		
Comm object	9245	Related applications	MINT, SPtM
Description			
The value contains actual “breaker state” message which is shown on the main screen of the controller.			

back to List of values

Timer Text

Value group	IL Info	Related FW	1.3.0
Units	[-]		
Comm object	10040	Related applications	MINT, SPtM
Description			
The value contains the numeric code of the “Current process timer” text which is shown on the main screen of the controller. The assignment of texts to the codes can be obtained using InteliConfig. Open any connection (also offline with a previously saved archive) and go to the Tools ribbon -> Generate CFG image (all). The resulting file will contain the assignment of texts to the codes.			

back to List of values

Connection Type

Value group	IL Info	Related FW	1.3.0
Units	[-]		
Comm object	12944	Related applications	MINT, SPtM
Description			
The text of this value represents the connection type which is adjusted in setpoint **Connection type (page 254)**.			

back to List of values

SPI Module A

Value group	IL Info	**Related FW**	1.3.0
Units	[-]		
Comm object	14447	**Related applications**	MINT, SPtM
Description			
The name of plug-in module which is inserted in slot A.			

back to List of values

SPI Module B

Value group	IL Info	**Related FW**	1.3.0
Units	[-]		
Comm object	14448	**Related applications**	MINT, SPtM
Description			
The name of plug-in module which is inserted in slot B.			

back to List of values

Timer Value

Value group	IL Info	**Related FW**	1.3.0
Units	[HH:MM:SS]		
Comm object	14147	**Related applications**	MINT, SPtM
Description			
The value contains the "Current process timer" value which is shown on the main screen of the controller.			

back to List of values

ID String

Value group	IL Info	**Related FW**	1.3.0
Units	[-]		
Comm object	24501	**Related applications**	MINT, SPtM
Description			
Name of controller which is used in InteliConfig in command bar.			

back to List of values

FW Version

Value group	IL Info	**Related FW**	1.3.0
Units	[-]		
Comm object	24339	**Related applications**	MINT, SPtM
Description			
Major and minor firmware version number.			

back to List of values

Application

Value group	IL Info	Related FW	1.3.0
Units	[-]		
Comm object	8480	Related applications	MINT, SPtM
Description			
The value contains actual application in controller.			

back to List of values

FW Branch

Value group	IL Info	Related FW	1.3.0
Units	[-]		
Comm object	8707	Related applications	MINT, SPtM
Description			
The value contains actual branch of firmware in controller.			

back to List of values

Password Decode

Value group	IL Info	Related FW	1.3.0
Units	[-]		
Comm object	24202	Related applications	MINT, SPtM
Description			
This value contains a number which can be used for retrieving a lost password. Send this number together with the controller serial number to your distributor if you have lost your password.			

back to List of values

CAN16

Value group	IL Info	Related FW	1.3.0
Units	V		
Comm object	8546	Related applications	MINT, SPtM
Description			
Bits of this value show "1" if the controller receives messages from the controller which has address corresponding with the bit position. Bit 0 represents address 1 etc. This value contains information about controllers with addresses 1-16.			

back to List of values

CAN32

Value group	IL Info	Related FW	1.3.0
Units	V		
Comm object	8827	Related applications	MINT, SPtM
Description			
Bits of this value show "1" if the controller receives messages from the controller which has address corresponding with the bit position. Bit 0 represents address 17 etc. This value contains information about controllers with addresses 17-32.			

back to List of values

Reg16

Value group	IL Info	Related FW	1.3.0
Units			
Comm object	11081	Related applications	MINT, SPtM
Description			
Bits of this value show "1" if the controller which has address corresponding with the bit position plays active role in the power management. Bit 0 represents address 1 etc. This value contains information about controllers with addresses 1-16.			

back to List of values

Reg32

Value group	IL Info	Related FW	1.3.0
Units			
Comm object	11082	Related applications	MINT, SPtM
Description			
Bits of this value show "1" if the controller which has address corresponding with the bit position plays active role in the power management. Bit 0 represents address 17 etc. This value contains information about controllers with addresses 17-32.			

back to List of values

Gen Loaded 16

Value group	IL Info	Related FW	1.3.0
Units	V		
Comm object	10196	Related applications	MINT, SPtM
Description			
Bits of this value show "1" if the controller which has address corresponding with the bit position plays active role in the power management. Bit 0 represents address 1 etc. This value contains information about controllers with addresses 1-16.			

back to List of values

Gen Loaded 32

Value group	IL Info	**Related FW**	1.3.0
Units	V		
Comm object	10197	**Related applications**	MINT, SPtM
Description			
Bits of this value show "1" if the controller which has address corresponding with the bit position plays active role in the power management. Bit 0 represents address 17 etc. This value contains information about controllers with addresses 17-32.			

back to List of values

Group: Log Bout

Log Bout 1

Value group	Log Bout	**Related FW**	1.3.0
Units	[-]		
Comm object	9143	**Related applications**	MINT, SPtM
Description			
State of binary outputs.			

back to List of values

Log Bout 2

Value group	Log Bout	**Related FW**	1.3.0
Units	[-]		
Comm object	9144	**Related applications**	MINT, SPtM
Description			
State of binary outputs.			

back to List of values

Log Bout 3

Value group	Log Bout	**Related FW**	1.3.0
Units	[-]		
Comm object	9145	**Related applications**	MINT, SPtM
Description			
State of binary outputs.			

back to List of values

Log Bout 4

Value group	Log Bout	Related FW	1.3.0
Units	[-]		
Comm object	9146	Related applications	MINT, SPtM
Description			
State of binary outputs.			

back to List of values

Log Bout 5

Value group	Log Bout	Related FW	1.3.0
Units	[-]		
Comm object	9147	Related applications	MINT, SPtM
Description			
State of binary outputs.			

back to List of values

Log Bout 6

Value group	Log Bout	Related FW	1.3.0
Units	[-]		
Comm object	9148	Related applications	MINT, SPtM
Description			
State of binary outputs.			

back to List of values

Log Bout 7

Value group	Log Bout	Related FW	1.3.0
Units	[-]		
Comm object	9149	Related applications	MINT, SPtM
Description			
State of binary outputs.			

back to List of values

Log Bout 8

Value group	Log Bout	Related FW	1.3.0
Units	[-]		
Comm object	9150	Related applications	MINT, SPtM
Description			
State of binary outputs.			

back to List of values

Log Bout 9

Value group	Log Bout	Related FW	1.3.0
Units	[-]		
Comm object	11896	Related applications	MINT, SPtM
Description			
State of binary outputs.			

back to List of values

Log Bout 10

Value group	Log Bout	Related FW	1.3.0
Units	[-]		
Comm object	11897	Related applications	MINT, SPtM
Description			
State of binary outputs.			

back to List of values

Log Bout 11

Value group	Log Bout	Related FW	1.3.0
Units	[-]		
Comm object	11898	Related applications	MINT, SPtM
Description			
State of binary outputs.			

back to List of values

Group: CM-GPRS

AirGate Status

Value group	CM-GPRS; CM-4G-GPS (4G part)	Related FW	1.3.0
Units	[-]		
Comm object	24308	Related applications	MINT, SPtM
Description			

Diagnostic code for AirGate connection. Helps in troubleshooting.

Code	Description
0	SIM card is not inserted
1	Controller registered, waiting for authorization
2	Not possible to register, controller blacklisted
3	Not possible to register, server has no more capacity
4	Not possible to register, other reason
5	Controller registered and authorized

back to List of values

AirGate ID

Value group	CM-GPRS; CM-4G-GPS (4G part)	**Related FW**	1.3.0
Units	[-]		
Comm object	24309	**Related applications**	MINT, SPtM
Description			
Identification string generated by AirGate server for the purpose of establishing communication via InteliConfig or any other supported PC tool.			

back to List of values

Connection Type

Value group	CM-GPRS; CM-4G-GPS (4G part)	**Related FW**	1.3.0
Units	[-]		
Comm object	24146	**Related applications**	MINT, SPtM
Description			
The type of data connection.			

back to List of values

Cell Diag Code

Value group	CM-GPRS; CM-4G-GPS (4G part)	**Related FW**	1.3.0
Units	[-]		
Comm object	24288	**Related applications**	MINT, SPtM
Description			

Diagnostic code for the CM-GPRS or CM-4G-GPS module.

GSM Diag Code – Common list of diagnostic codes for cellular modules

Code	Description
0	OK. No error.
1	Not possible to hang up.
2	Modul is switched off
3	Module is switched on
4	Module – error in initialization
5	Module – not possible to set the APN
6	Module – not possible to connect to GPRS network
7	Module – not possible to retrieve IP address
8	Module – not accepted DNS IP address
9	Error in modem detection
10	Error in initialization of analog modem
11	SIM card is locked (Possibly PIN code required, PIN needs to be deactivated) or

	unknown status of SIM locking
12	No GSM signal
13	Not possible to read the SIM card parameters
14	GSM modem did not accepted particular initialization command, possibly caused by locked SIM card
15	Unknown modem
16	Bad answer to complement initialization string
17	Not possible to read GSM signal strength
18	CDMA modem not detected
19	No CDMA network
20	Unsuccessful registration to CDMA network
21	SIMCom/ME909s: can´t read FW version
22	SIMCom: GSM signal not found
23	SIMCom: can´t detect module speed
24	SIMCom: HW reset issued
25	PUK is required
26	Error of SIM card detected
27	ME909s: can't set module bps
28	ME909s: can't set link configuration
29	ME909s: can't do power-off
30	ME909s: can't do power-on
31	ME909s: can't do hardware reset
32	ME909s: ME909s not started
33	ME909s: switch off issued
34	ME909s: switch on issued
35	ME909s: HW reset issued
36	ME909s: can't switch echo off
37	ME909s: can't find out state of registration
38	ME909s: GSM signal not found
39	ME909s: no SIM memory for SMS
40	ME909s: waiting for registration
41	Can't read operator name
42	ME909s: can't set flow control
43	APN not typed
255	Only running communication is needed to indicate

back to List of values

Cell ErrorRate

Value group	CM-GPRS; CM-4G-GPS (4G part)	**Related FW**	1.3.0
Units	%		
Comm object	24300	**Related applications**	MINT, SPtM
Description			
This value contains information about relative quality of the cellular signal received by the CM-GPRS module or by CM-4G-GPS module. The lower value means higher quality of signal.			

back to List of values

Cell Signal Lev

Value group	CM-GPRS; CM-4G-GPS (4G part)	**Related FW**	1.3.0
Units	%		
Comm object	24302	**Related applications**	MINT, SPtM
Description			
This value contains information about relative strength of the cellular signal received by the CM-GPRS module or by CM-4G-GPS module. It is a relative value helping to find the best signal and for troubleshooting cases.			

back to List of values

Cell Status

Value group	CM-GPRS; CM-4G-GPS (4G part)	**Related FW**	1.3.0
Units	[-]		
Comm object	24290	**Related applications**	MINT, SPtM
Description			
The text of this value represents the status of the GSM modem.			

back to List of values

Last Email Result

Value group	CM-GPRS; CM-4G-GPS (4G part)	Related FW	1.3.0
Units	[-]		
Comm object	24307	**Related applications**	MINT, SPtM

Description

Result of last email, which was sent by controller.

Code	Description
0	Email was successfully sent.
2	It is not possible to establish connection with SMTP server.
3	SMTP server is not ready for communication.
4	Maximum length of data can't be read.
5	No appeal to send command.
6	Command can't be send.
7	Command can't be send.
8	HELO command was refused.
11	AUTH LOGIN command was refused.
12	Wrong user name.
13	Wrong password.
14	MAIL FROM command was refused.
15	RCPT TO command was refused.
16	DATA command was refused.
17	Sending of email failed.
18	SMTP server refused the data of email.
19	SMTP server refused the data of email.
20	QUIT command was refused.
21	Lost of connection.
23	Error during closing the connection.
24	No answer from server.
25	It is impossible to create data for command DATA.
26	It is impossible to read data for command DATA.
28	Error of encoding.
29	There was no attempt to send email.

back to List of values

Operator

Value group	CM-GPRS; CM-4G-GPS (4G part)	**Related FW**	1.3.0
Units	[-]		
Comm object	24147	**Related applications**	MINT, SPtM
Description			
The name of operator which to SIM card is connected. ***Note:*** *If roaming service is used then prefix "R" is added before the name of operator.*			

back to List of values

Group: CM-4G-GPS

Altitude

Value group	CM-4G-GPS (GPS part)	**Related FW**	1.3.0
Units	m		
Comm object	24266	**Related applications**	MINT, SPtM
Description			
Actual GPS altitude.			

back to List of values

HomePosDist

Value group	CM-4G-GPS (GPS part)	**Related FW**	1.3.0
Units	km		
Comm object	11680	**Related applications**	MINT, SPtM
Description			
Actual distance from home position. Home position is adjusted via setpoints **Home Latitude (page 441)** and **Home Longitude (page 441)** or by binary input **GEO HOME POSITION (PAGE 653)**.			

back to List of values

Latitude

Value group	CM-4G-GPS (GPS part)	**Related FW**	1.3.0
Units	[-]		
Comm object	24268	**Related applications**	MINT, SPtM
Description			
Actual GPS latitude. Positions on north hemisphere have positive value, position on south hemisphere have negative value.			

back to List of values

Longitude

Value group	CM-4G-GPS (GPS part)	**Related FW**	1.3.0
Units	[-]		
Comm object	24267	**Related applications**	MINT, SPtM
Description			
Actual GPS longitude. Positions on east hemisphere have positive value, position on west hemisphere have negative value.			

back to List of values

Satellites

Value group	CM-4G-GPS (GPS part)	**Related FW**	1.3.0
Units	[-]		
Comm object	24265	**Related applications**	MINT, SPtM
Description			
Number of available satellites for GPS location.			

back to List of values

AirGate ID

Value group	CM-GPRS; CM-4G-GPS (4G part)	**Related FW**	1.3.0
Units	[-]		
Comm object	24309	**Related applications**	MINT, SPtM
Description			
Identification string generated by AirGate server for the purpose of establishing communication via InteliConfig or any other supported PC tool.			

back to List of values

AirGate Status

Value group	CM-GPRS; CM-4G-GPS (4G part)	**Related FW**	1.3.0
Units	[-]		
Comm object	24308	**Related applications**	MINT, SPtM
Description			

Diagnostic code for AirGate connection. Helps in troubleshooting.

Code	Description
0	SIM card is not inserted
1	Controller registered, waiting for authorization
2	Not possible to register, controller blacklisted
3	Not possible to register, server has no more capacity
4	Not possible to register, other reason
5	Controller registered and authorized

back to List of values

Connection Type

Value group	CM-GPRS; CM-4G-GPS (4G part)	**Related FW**	1.3.0
Units	[-]		
Comm object	24146	**Related applications**	MINT, SPtM
Description			

The type of data connection.

back to List of values

Cell Diag Code

Value group	CM-GPRS; CM-4G-GPS (4G part)	**Related FW**	1.3.0
Units	[-]		
Comm object	24288	**Related applications**	MINT, SPtM
Description			

Diagnostic code for the CM-GPRS or CM-4G-GPS module.

GSM Diag Code – Common list of diagnostic codes for cellular modules

Code	Description
0	OK. No error.
1	Not possible to hang up.
2	Modul is switched off
3	Module is switched on

4	Module – error in initialization
5	Module – not possible to set the APN
6	Module – not possible to connect to GPRS network
7	Module – not possible to retrieve IP address
8	Module – not accepted DNS IP address
9	Error in modem detection
10	Error in initialization of analog modem
11	SIM card is locked (Possibly PIN code required, PIN needs to be deactivated) or unknown status of SIM locking
12	No GSM signal
13	Not possible to read the SIM card parameters
14	GSM modem did not accepted particular initialization command, possibly caused by locked SIM card
15	Unknown modem
16	Bad answer to complement initialization string
17	Not possible to read GSM signal strength
18	CDMA modem not detected
19	No CDMA network
20	Unsuccessful registration to CDMA network
21	SIMCom/ME909s: can´t read FW version
22	SIMCom: GSM signal not found
23	SIMCom: can´t detect module speed
24	SIMCom: HW reset issued
25	PUK is required
26	Error of SIM card detected
27	ME909s: can't set module bps
28	ME909s: can't set link configuration
29	ME909s: can't do power-off
30	ME909s: can't do power-on
31	ME909s: can't do hardware reset
32	ME909s: ME909s not started
33	ME909s: switch off issued
34	ME909s: switch on issued
35	ME909s: HW reset issued
36	ME909s: can't switch echo off
37	ME909s: can't find out state of registration
38	ME909s: GSM signal not found
39	ME909s: no SIM memory for SMS
40	ME909s: waiting for registration

41	Can't read operator name
42	ME909s: can't set flow control
43	APN not typed
255	Only running communication is needed to indicate

back to List of values

Cell ErrorRate

Value group	CM-GPRS; CM-4G-GPS (4G part)	**Related FW**	1.3.0
Units	%		
Comm object	24300	**Related applications**	MINT, SPtM
Description			
This value contains information about relative quality of the cellular signal received by the CM-GPRS module or by CM-4G-GPS module. The lower value means higher quality of signal.			

back to List of values

Cell Signal Lev

Value group	CM-GPRS; CM-4G-GPS (4G part)	**Related FW**	1.3.0
Units	%		
Comm object	24302	**Related applications**	MINT, SPtM
Description			
This value contains information about relative strength of the cellular signal received by the CM-GPRS module or by CM-4G-GPS module. It is a relative value helping to find the best signal and for troubleshooting cases.			

back to List of values

Cell Status

Value group	CM-GPRS; CM-4G-GPS (4G part)	**Related FW**	1.3.0
Units	[-]		
Comm object	24290	**Related applications**	MINT, SPtM
Description			
The text of this value represents the status of the GSM modem.			

back to List of values

Last Email Result

Value group	CM-GPRS; CM-4G-GPS (4G part)	**Related FW**	1.3.0
Units	[-]		
Comm object	24307	**Related applications**	MINT, SPtM
Description			

Result of last email, which was sent by controller.

Code	Description
0	Email was successfully sent.
2	It is not possible to establish connection with SMTP server.
3	SMTP server is not ready for communication.
4	Maximum length of data can't be read.
5	No appeal to send command.
6	Command can't be send.
7	Command can't be send.
8	HELO command was refused.
11	AUTH LOGIN command was refused.
12	Wrong user name.
13	Wrong password.
14	MAIL FROM command was refused.
15	RCPT TO command was refused.
16	DATA command was refused.
17	Sending of email failed.
18	SMTP server refused the data of email.
19	SMTP server refused the data of email.
20	QUIT command was refused.
21	Lost of connection.
23	Error during closing the connection.
24	No answer from server.
25	It is impossible to create data for command DATA.
26	It is impossible to read data for command DATA.
28	Error of encoding.
29	There was no attempt to send email.

back to List of values

Operator

Value group	CM-GPRS; CM-4G-GPS (4G part)	**Related FW**	1.3.0
Units	[-]		
Comm object	24147	**Related applications**	MINT, SPtM
Description			
The name of operator which to SIM card is connected. ***Note:*** *If roaming service is used then prefix "R" is added before the name of operator.*			

back to List of values

Group: CM-Ethernet

AirGate Status

Value group	CM-Ethernet	**Related FW**	1.3.0
Units	[-]		
Comm object	24344	**Related applications**	MINT, SPtM
Description			

Diagnostic code for AirGate connection. Helps in troubleshooting.

Code	Description
0	Ethernet cable is disconnected
1	Controller registered, waiting for authorization
2	Not possible to register, controller blacklisted
3	Not possible to register, server has no more capacity
4	Not possible to register, other reason
5	Controller registered and authorized

back to List of values

AirGate ID

Value group	CM-Ethernet	**Related FW**	1.3.0
Units	[-]		
Comm object	24345	**Related applications**	MINT, SPtM
Description			
Identification string generated by AirGate server for the purpose of establishing communication via InteliConfig or any other supported PC tool.			

back to List of values

Current DNS

Value group	CM-Ethernet	**Related FW**	1.3.0
Units	[-]		
Comm object	24181	**Related applications**	MINT, SPtM
Description			
Current domain name server.			

back to List of values

ETH Interface Status

Value group	CM-Ethernet	**Related FW**	1.3.0
Units	[-]		
Comm object	24180	**Related applications**	MINT, SPtM
Description			
Current status of ethernet communication.			

back to List of values

Current Gateway

Value group	CM-Ethernet	**Related FW**	1.3.0
Units	[-]		
Comm object	24182	**Related applications**	MINT, SPtM
Description			
Current gateway address.			

back to List of values

Current IP Address

Value group	CM-Ethernet	**Related FW**	1.3.0
Units	[-]		
Comm object	24184	**Related applications**	MINT, SPtM
Description			
Current IP address of the controller.			

back to List of values

Last Email Result

Value group	CM-Ethernet	Related FW	1.3.0
Units	[-]		
Comm object	24332	Related applications	MINT, SPtM
Description			

Result of last email, which was sent by controller.

Code	Description
0	Email was successfully sent.
2	It is not possible to establish connection with SMTP server.
3	SMTP server is not ready for communication.
8	HELO command was refused.
9	EHLO command was refused.
11	AUTH LOGIN command was refused.
12	Wrong user name.
13	Wrong password.
14	MAIL FROM command was refused.
15	RCPT TO command was refused.
16	DATA command was refused.
17	Sending of email failed.
20	QUIT command was refused.
25	It is impossible to create data for command DATA.
26	It is impossible to read data for command DATA.
27	Email address can't be read.
30	SMTP server address translation error (from DNS server).
31	Error reading email content data (24327).

back to List of values

MAC Address

Value group	CM-Ethernet	Related FW	1.3.0
Units	[-]		
Comm object	24333	Related applications	MINT, SPtM
Description			

Current MAC address of the controller ethernet interface.

back to List of values

Current Subnet Mask

Value group	CM-Ethernet	**Related FW**	1.3.0
Units	[-]		
Comm object	24183	**Related applications**	MINT, SPtM
Description			
Current subnet mask.			

back to List of values

Group: Date/Time

Time

Value group	Date/Time	**Related FW**	1.3.0
Units	HH:MM:SS		
Comm object	24554	**Related applications**	MINT, SPtM
Description			
Shows setup time.			

back to List of values

Date

Value group	Date/Time	**Related FW**	1.3.0
Units	DD.MM.YYYY		
Comm object	24553	**Related applications**	MINT, SPtM
Description			
Shows setup date.			

back to List of values

Group: Plug-In I/O

EM BIO A

Value group	Plug-In I/O	**Related FW**	1.3.0
Units	[-]		
Comm object	14291	**Related applications**	MINT, SPtM
Description			
Binary inputs from extension module in slot A.			

back to List of values

EM BIO B

Value group	Plug-In I/O	**Related FW**	1.3.0
Units	[-]		
Comm object	14292	**Related applications**	MINT, SPtM
Description			
Binary inputs from extension module in slot B.			

back to List of values

Group: PLC

PLC Resource 1

Value group	PLC	**Related FW**	1.3.0
Units	[-]		
Comm object	10504	**Related applications**	MINT, SPtM
Description			
Internal state of PLC countdowns (e.g. state of block Timer etc.).			

back to List of values

PLC Resource 2

Value group	PLC	**Related FW**	1.3.0
Units	[-]		
Comm object	10505	**Related applications**	MINT, SPtM
Description			
Internal state of PLC countdowns (e.g. state of block Timer etc.).			

back to List of values

PLC Resource 3

Value group	PLC	**Related FW**	1.3.0
Units	[-]		
Comm object	10506	**Related applications**	MINT, SPtM
Description			
Internal state of PLC countdowns (e.g. state of block Timer etc.).			

back to List of values

PLC Resource 4

Value group	PLC	**Related FW**	1.3.0
Units	[-]		
Comm object	10507	**Related applications**	MINT, SPtM
Description			
Internal state of PLC countdowns (e.g. state of block Timer etc.).			

back to List of values

PLC Resource 5

Value group	PLC	Related FW	1.3.0
Units	[-]		
Comm object	10508	Related applications	MINT, SPtM
Description			
Internal state of PLC countdowns (e.g. state of block Timer etc.).			

back to List of values

PLC Resource 6

Value group	PLC	Related FW	1.3.0
Units	[-]		
Comm object	10509	Related applications	MINT, SPtM
Description			
Internal state of PLC countdowns (e.g. state of block Timer etc.).			

back to List of values

PLC Resource 7

Value group	PLC	Related FW	1.3.0
Units	[-]		
Comm object	10510	Related applications	MINT, SPtM
Description			
Internal state of PLC countdowns (e.g. state of block Timer etc.).			

back to List of values

PLC Resource 8

Value group	PLC	Related FW	1.3.0
Units	[-]		
Comm object	10511	Related applications	MINT, SPtM
Description			
Internal state of PLC countdowns (e.g. state of block Timer etc.).			

back to List of values

PLC-BOUT 1

Value group	PLC	Related FW	1.3.0
Units	[-]		
Comm object	10424	Related applications	MINT, SPtM
Description			
State of binary outputs of PLC.			

back to List of values

PLC-BOUT 2

Value group	PLC	**Related FW**	1.3.0
Units	[-]		
Comm object	10425	**Related applications**	MINT, SPtM
Description			
State of binary outputs of PLC.			

back to List of values

PLC-BOUT 3

Value group	PLC	**Related FW**	1.3.0
Units	[-]		
Comm object	10426	**Related applications**	MINT, SPtM
Description			
State of binary outputs of PLC.			

back to List of values

PLC-BOUT 4

Value group	PLC	**Related FW**	1.3.0
Units	[-]		
Comm object	10427	**Related applications**	MINT, SPtM
Description			
State of binary outputs of PLC.			

back to List of values

PLC-BOUT 5

Value group	PLC	**Related FW**	1.3.0
Units	[-]		
Comm object	10428	**Related applications**	MINT, SPtM
Description			
State of binary outputs of PLC.			

back to List of values

PLC-BOUT 6

Value group	PLC	**Related FW**	1.3.0
Units	[-]		
Comm object	10429	**Related applications**	MINT, SPtM
Description			
State of binary outputs of PLC.			

back to List of values

PLC-BOUT 7

Value group	PLC	**Related FW**	1.3.0
Units	[-]		
Comm object	10430	**Related applications**	MINT, SPtM
Description			
State of binary outputs of PLC.			

back to List of values

8.1.3 Logical binary inputs

What Logical binary inputs are:

Logical binary inputs are inputs for binary values and functions.

Alphabetical groups of Logical binary inputs

LBI: A 627
LBI: B 628
LBI: C 648
LBI: D 649
LBI: E 649
LBI: F 650
LBI: G 652
LBI: H 653
LBI: I 654
LBI: L 654
LBI: M 655
LBI: N 657
LBI: O 658
LBI: R 658
LBI: S 664
LBI: T 664

For full list of Logical binary inputs go to the chapter **Logical binary inputs alphabetically (page 626)**.

Logical binary inputs alphabetically

Access Lock 627
Alternate Config 2 627
Alternate Config 3 627
AMF Start Block 627
Battery Charger 628
BIN Protection 1 628
BIN Protection 02 629
BIN Protection 03 629
BIN Protection 04 630
BIN Protection 05 630
BIN Protection 06 631
BIN Protection 07 631
BIN Protection 08 632
BIN Protection 09 632
BIN Protection 10 633
BIN Protection 11 633
BIN Protection 12 634
BIN Protection 13 634
BIN Protection 14 635
BIN Protection 15 635
BIN Protection 16 636
BIN Protection 17 636
BIN Protection 18 637
BIN Protection 19 637
BIN Protection 20 638
BIN Protection 21 638
BIN Protection 22 639
BIN Protection 23 639
BIN Protection 24 640
BIN Protection 25 640
BIN Protection 26 641
BIN Protection 27 641
BIN Protection 28 642
BIN Protection 29 642
BIN Protection 30 643
BIN Protection 31 643
BIN Protection 32 644
BIN Protection 33 644
BIN Protection 34 645
BIN Protection 35 645
BIN Protection 36 646
BIN Protection 37 646
BIN Protection 38 647
BIN Protection 39 647
BIN Protection 40 648
Coolant Temp 648
Droop Unload Disl 649
ECU Key Switch 649
Emergency MAN 649
Emergency Stop 650
Fault Reset Button 650
Force Droop Oper 650
Force Island 650
Force Parallel 650
Force Protection Disable 651
Fuel Level 651
Fuel Pump On/Off 651
GCB Button 652
GCB Feedback 652
Geo Home Position 653
Geo-Fencing Enabled 653
Group link 653
Horn Reset Button 653
Idle Speed 654
Lang Selection 1 654
Lang Selection 2 654
Load Res 2 Active 655
Mains Fail Block 655
Manual Load Reconnection 655
MCB Button 655
MCB Feedback 656
Min Run Power Active 657
NCB Feedback 657
Not Used 657
Oil Pressure 658
Regeneration Force 658
Regeneration Inhib 658
Remote AUTO 659
Remote Ctrl Lock 659
Remote MAN 659
Remote OFF 660
Remote Start/Stop 661
Remote TEST 662
Remote Test On Load 663
Sd Override 664
Start Button 664
Stop Button 664
Top Priority 664

LBI: A

Access Lock

Related FW	1.3.0	**Related applications**	MINT, SPtM
Comm object	1		
Description			
When this input is closed, no setpoints can be adjusted from controller's front panel and controller mode (OFF / MAN / AUTO / TEST) cannot be changed. ***Note:*** *Access Lock does not protect setpoints and mode changing from InteliConfig. To avoid unqualified changes the selected setpoints have to be password protected.* *Also the buttons Fault Reset and Horn Reset are not blocked at all and buttons Start and Stop in MAN mode are not blocked.*			

back to Logical binary inputs alphabetically

Alternate Config 2

Related FW	1.3.0	**Related applications**	MINT, SPtM
Comm object	859		
Description			
This binary input can switch between configuration sets. When this binary input is active, setpoints in Alternate Config group are switched to the second set (setpoints with number 2).			

back to Logical binary inputs alphabetically

Alternate Config 3

Related FW	1.3.0	**Related applications**	MINT, SPtM
Comm object	860		
Description			
This binary input can switch between configuration sets. When this binary input is active, setpoints in Alternate Config group are switched to the third set (setpoints with number 3).			

back to Logical binary inputs alphabetically

AMF Start Block

Related FW	1.3.0	**Related applications**	MINT, SPtM
Comm object	211		
Description			
This binary input can allow or block the AMF start. In case of running gen-set in AUTO mode gen-set goes to cooling procedure and stops.			

back to Logical binary inputs alphabetically

LBI: B

Battery Charger

Related FW	1.3.0	**Related applications**	MINT, SPtM
Comm object	623		
Description			
When binary input is active and his delay **Battery Charger Fail Delay (page 295)** is out of time than alarm **Battery Charger Fail (page 779)** is activated, written into history log and logical binary output **AL BATTERY CHARGER (PAGE 670)** is activated.			

back to Logical binary inputs alphabetically

BIN Protection 1

Related FW	1.3.0	**Related applications**	MINT, SPtM
Comm object	9999		
Description			
This binary input is for general input function used as alarm.			

Protection types

Monitoring	Binary input is not used for protection or any other function. Signal is only monitored.
HistRecOnl	Binary input is not used for protection. Only history record is made if binary input is active.
AL Indic	Binary input is not used for protection. Only alarmlist record is made if binary input is active.
Wrn	Binary input is used for warning protection only.
Stp	Binary input is used for slow stop protection
BOC	Binary input is used for BOC (Breaker Open and Cooling) protection.
Sd	Binary input is used for shutdown protection.

back to Logical binary inputs alphabetically

BIN Protection 02

Related FW	1.3.0	Related applications	MINT, SPtM
Comm object	9998		
Description			

This binary input is for general input function used as alarm.

Protection types

Monitoring	Binary input is not used for protection or any other function. Signal is only monitored.
HistRecOnl	Binary input is not used for protection. Only history record is made if binary input is active.
AL Indic	Binary input is not used for protection. Only alarmlist record is made if binary input is active.
Wrn	Binary input is used for warning protection only.
Stp	Binary input is used for slow stop protection
BOC	Binary input is used for BOC (Breaker Open and Cooling) protection.
Sd	Binary input is used for shutdown protection.

back to Logical binary inputs alphabetically

BIN Protection 03

Related FW	1.3.0	Related applications	MINT, SPtM
Comm object	9997		
Description			

This binary input is for general input function used as alarm.

Protection types

Monitoring	Binary input is not used for protection or any other function. Signal is only monitored.
HistRecOnl	Binary input is not used for protection. Only history record is made if binary input is active.
AL Indic	Binary input is not used for protection. Only alarmlist record is made if binary input is active.
Wrn	Binary input is used for warning protection only.
Stp	Binary input is used for slow stop protection
BOC	Binary input is used for BOC (Breaker Open and Cooling) protection.
Sd	Binary input is used for shutdown protection.

back to Logical binary inputs alphabetically

BIN Protection 04

Related FW	1.3.0	Related applications	MINT, SPtM
Comm object	9996		
Description			

This binary input is for general input function used as alarm.

Protection types

Monitoring	Binary input is not used for protection or any other function. Signal is only monitored.
HistRecOnl	Binary input is not used for protection. Only history record is made if binary input is active.
AL Indic	Binary input is not used for protection. Only alarmlist record is made if binary input is active.
Wrn	Binary input is used for warning protection only.
Stp	Binary input is used for slow stop protection
BOC	Binary input is used for BOC (Breaker Open and Cooling) protection.
Sd	Binary input is used for shutdown protection.

back to Logical binary inputs alphabetically

BIN Protection 05

Related FW	1.3.0	Related applications	MINT, SPtM
Comm object	9995		
Description			

This binary input is for general input function used as alarm.

Protection types

Monitoring	Binary input is not used for protection or any other function. Signal is only monitored.
HistRecOnl	Binary input is not used for protection. Only history record is made if binary input is active.
AL Indic	Binary input is not used for protection. Only alarmlist record is made if binary input is active.
Wrn	Binary input is used for warning protection only.
Stp	Binary input is used for slow stop protection
BOC	Binary input is used for BOC (Breaker Open and Cooling) protection.
Sd	Binary input is used for shutdown protection.

back to Logical binary inputs alphabetically

BIN Protection 06

Related FW	1.3.0	Related applications	MINT, SPtM
Comm object	9994		
Description			

This binary input is for general input function used as alarm.

Protection types

Monitoring	Binary input is not used for protection or any other function. Signal is only monitored.
HistRecOnl	Binary input is not used for protection. Only history record is made if binary input is active.
AL Indic	Binary input is not used for protection. Only alarmlist record is made if binary input is active.
Wrn	Binary input is used for warning protection only.
Stp	Binary input is used for slow stop protection
BOC	Binary input is used for BOC (Breaker Open and Cooling) protection.
Sd	Binary input is used for shutdown protection.

back to Logical binary inputs alphabetically

BIN Protection 07

Related FW	1.3.0	Related applications	MINT, SPtM
Comm object	9993		
Description			

This binary input is for general input function used as alarm.

Protection types

Monitoring	Binary input is not used for protection or any other function. Signal is only monitored.
HistRecOnl	Binary input is not used for protection. Only history record is made if binary input is active.
AL Indic	Binary input is not used for protection. Only alarmlist record is made if binary input is active.
Wrn	Binary input is used for warning protection only.
Stp	Binary input is used for slow stop protection
BOC	Binary input is used for BOC (Breaker Open and Cooling) protection.
Sd	Binary input is used for shutdown protection.

back to Logical binary inputs alphabetically

BIN Protection 08

Related FW	1.3.0	Related applications	MINT, SPtM
Comm object	9992		
Description			

This binary input is for general input function used as alarm.

Protection types

Monitoring	Binary input is not used for protection or any other function. Signal is only monitored.
HistRecOnl	Binary input is not used for protection. Only history record is made if binary input is active.
AL Indic	Binary input is not used for protection. Only alarmlist record is made if binary input is active.
Wrn	Binary input is used for warning protection only.
Stp	Binary input is used for slow stop protection
BOC	Binary input is used for BOC (Breaker Open and Cooling) protection.
Sd	Binary input is used for shutdown protection.

back to Logical binary inputs alphabetically

BIN Protection 09

Related FW	1.3.0	Related applications	MINT, SPtM
Comm object	9991		
Description			

This binary input is for general input function used as alarm.

Protection types

Monitoring	Binary input is not used for protection or any other function. Signal is only monitored.
HistRecOnl	Binary input is not used for protection. Only history record is made if binary input is active.
AL Indic	Binary input is not used for protection. Only alarmlist record is made if binary input is active.
Wrn	Binary input is used for warning protection only.
Stp	Binary input is used for slow stop protection
BOC	Binary input is used for BOC (Breaker Open and Cooling) protection.
Sd	Binary input is used for shutdown protection.

back to Logical binary inputs alphabetically

BIN Protection 10

Related FW	1.3.0	Related applications	MINT, SPtM
Comm object	9990		
Description			

This binary input is for general input function used as alarm.

Protection types

Monitoring	Binary input is not used for protection or any other function. Signal is only monitored.
HistRecOnl	Binary input is not used for protection. Only history record is made if binary input is active.
AL Indic	Binary input is not used for protection. Only alarmlist record is made if binary input is active.
Wrn	Binary input is used for warning protection only.
Stp	Binary input is used for slow stop protection
BOC	Binary input is used for BOC (Breaker Open and Cooling) protection.
Sd	Binary input is used for shutdown protection.

back to Logical binary inputs alphabetically

BIN Protection 11

Related FW	1.3.0	Related applications	MINT, SPtM
Comm object	9989		
Description			

This binary input is for general input function used as alarm.

Protection types

Monitoring	Binary input is not used for protection or any other function. Signal is only monitored.
HistRecOnl	Binary input is not used for protection. Only history record is made if binary input is active.
AL Indic	Binary input is not used for protection. Only alarmlist record is made if binary input is active.
Wrn	Binary input is used for warning protection only.
Stp	Binary input is used for slow stop protection
BOC	Binary input is used for BOC (Breaker Open and Cooling) protection.
Sd	Binary input is used for shutdown protection.

back to Logical binary inputs alphabetically

BIN Protection 12

Related FW	1.3.0	Related applications	MINT, SPtM
Comm object	9988		
Description			

This binary input is for general input function used as alarm.

Protection types

Monitoring	Binary input is not used for protection or any other function. Signal is only monitored.
HistRecOnl	Binary input is not used for protection. Only history record is made if binary input is active.
AL Indic	Binary input is not used for protection. Only alarmlist record is made if binary input is active.
Wrn	Binary input is used for warning protection only.
Stp	Binary input is used for slow stop protection
BOC	Binary input is used for BOC (Breaker Open and Cooling) protection.
Sd	Binary input is used for shutdown protection.

back to Logical binary inputs alphabetically

BIN Protection 13

Related FW	1.3.0	Related applications	MINT, SPtM
Comm object	9987		
Description			

This binary input is for general input function used as alarm.

Protection types

Monitoring	Binary input is not used for protection or any other function. Signal is only monitored.
HistRecOnl	Binary input is not used for protection. Only history record is made if binary input is active.
AL Indic	Binary input is not used for protection. Only alarmlist record is made if binary input is active.
Wrn	Binary input is used for warning protection only.
Stp	Binary input is used for slow stop protection
BOC	Binary input is used for BOC (Breaker Open and Cooling) protection.
Sd	Binary input is used for shutdown protection.

back to Logical binary inputs alphabetically

BIN Protection 14

Related FW	1.3.0	Related applications	MINT, SPtM
Comm object	9986		
Description			

This binary input is for general input function used as alarm.

Protection types

Monitoring	Binary input is not used for protection or any other function. Signal is only monitored.
HistRecOnl	Binary input is not used for protection. Only history record is made if binary input is active.
AL Indic	Binary input is not used for protection. Only alarmlist record is made if binary input is active.
Wrn	Binary input is used for warning protection only.
Stp	Binary input is used for slow stop protection
BOC	Binary input is used for BOC (Breaker Open and Cooling) protection.
Sd	Binary input is used for shutdown protection.

back to Logical binary inputs alphabetically

BIN Protection 15

Related FW	1.3.0	Related applications	MINT, SPtM
Comm object	9985		
Description			

This binary input is for general input function used as alarm.

Protection types

Monitoring	Binary input is not used for protection or any other function. Signal is only monitored.
HistRecOnl	Binary input is not used for protection. Only history record is made if binary input is active.
AL Indic	Binary input is not used for protection. Only alarmlist record is made if binary input is active.
Wrn	Binary input is used for warning protection only.
Stp	Binary input is used for slow stop protection
BOC	Binary input is used for BOC (Breaker Open and Cooling) protection.
Sd	Binary input is used for shutdown protection.

back to Logical binary inputs alphabetically

BIN Protection 16

Related FW	1.3.0	Related applications	MINT, SPtM
Comm object	9984		
Description			

This binary input is for general input function used as alarm.

Protection types

Monitoring	Binary input is not used for protection or any other function. Signal is only monitored.
HistRecOnl	Binary input is not used for protection. Only history record is made if binary input is active.
AL Indic	Binary input is not used for protection. Only alarmlist record is made if binary input is active.
Wrn	Binary input is used for warning protection only.
Stp	Binary input is used for slow stop protection
BOC	Binary input is used for BOC (Breaker Open and Cooling) protection.
Sd	Binary input is used for shutdown protection.

back to Logical binary inputs alphabetically

BIN Protection 17

Related FW	1.3.0	Related applications	MINT, SPtM
Comm object	9983		
Description			

This binary input is for general input function used as alarm.

Protection types

Monitoring	Binary input is not used for protection or any other function. Signal is only monitored.
HistRecOnl	Binary input is not used for protection. Only history record is made if binary input is active.
AL Indic	Binary input is not used for protection. Only alarmlist record is made if binary input is active.
Wrn	Binary input is used for warning protection only.
Stp	Binary input is used for slow stop protection
BOC	Binary input is used for BOC (Breaker Open and Cooling) protection.
Sd	Binary input is used for shutdown protection.

back to Logical binary inputs alphabetically

BIN Protection 18

Related FW	1.3.0	Related applications	MINT, SPtM
Comm object	9982		
Description			

This binary input is for general input function used as alarm.

Protection types

Monitoring	Binary input is not used for protection or any other function. Signal is only monitored.
HistRecOnl	Binary input is not used for protection. Only history record is made if binary input is active.
AL Indic	Binary input is not used for protection. Only alarmlist record is made if binary input is active.
Wrn	Binary input is used for warning protection only.
Stp	Binary input is used for slow stop protection
BOC	Binary input is used for BOC (Breaker Open and Cooling) protection.
Sd	Binary input is used for shutdown protection.

back to Logical binary inputs alphabetically

BIN Protection 19

Related FW	1.3.0	Related applications	MINT, SPtM
Comm object	9981		
Description			

This binary input is for general input function used as alarm.

Protection types

Monitoring	Binary input is not used for protection or any other function. Signal is only monitored.
HistRecOnl	Binary input is not used for protection. Only history record is made if binary input is active.
AL Indic	Binary input is not used for protection. Only alarmlist record is made if binary input is active.
Wrn	Binary input is used for warning protection only.
Stp	Binary input is used for slow stop protection
BOC	Binary input is used for BOC (Breaker Open and Cooling) protection.
Sd	Binary input is used for shutdown protection.

back to Logical binary inputs alphabetically

BIN Protection 20

Related FW	1.3.0	Related applications	MINT, SPtM
Comm object	9980		
Description			

This binary input is for general input function used as alarm.

Protection types

Monitoring	Binary input is not used for protection or any other function. Signal is only monitored.
HistRecOnl	Binary input is not used for protection. Only history record is made if binary input is active.
AL Indic	Binary input is not used for protection. Only alarmlist record is made if binary input is active.
Wrn	Binary input is used for warning protection only.
Stp	Binary input is used for slow stop protection
BOC	Binary input is used for BOC (Breaker Open and Cooling) protection.
Sd	Binary input is used for shutdown protection.

back to Logical binary inputs alphabetically

BIN Protection 21

Related FW	1.3.0	Related applications	MINT, SPtM
Comm object	9979		
Description			

This binary input is for general input function used as alarm.

Protection types

Monitoring	Binary input is not used for protection or any other function. Signal is only monitored.
HistRecOnl	Binary input is not used for protection. Only history record is made if binary input is active.
AL Indic	Binary input is not used for protection. Only alarmlist record is made if binary input is active.
Wrn	Binary input is used for warning protection only.
Stp	Binary input is used for slow stop protection
BOC	Binary input is used for BOC (Breaker Open and Cooling) protection.
Sd	Binary input is used for shutdown protection.

back to Logical binary inputs alphabetically

BIN Protection 22

Related FW	1.3.0	Related applications	MINT, SPtM
Comm object	9978		
Description			

This binary input is for general input function used as alarm.

Protection types

Monitoring	Binary input is not used for protection or any other function. Signal is only monitored.
HistRecOnl	Binary input is not used for protection. Only history record is made if binary input is active.
AL Indic	Binary input is not used for protection. Only alarmlist record is made if binary input is active.
Wrn	Binary input is used for warning protection only.
Stp	Binary input is used for slow stop protection
BOC	Binary input is used for BOC (Breaker Open and Cooling) protection.
Sd	Binary input is used for shutdown protection.

back to Logical binary inputs alphabetically

BIN Protection 23

Related FW	1.3.0	Related applications	MINT, SPtM
Comm object	9977		
Description			

This binary input is for general input function used as alarm.

Protection types

Monitoring	Binary input is not used for protection or any other function. Signal is only monitored.
HistRecOnl	Binary input is not used for protection. Only history record is made if binary input is active.
AL Indic	Binary input is not used for protection. Only alarmlist record is made if binary input is active.
Wrn	Binary input is used for warning protection only.
Stp	Binary input is used for slow stop protection
BOC	Binary input is used for BOC (Breaker Open and Cooling) protection.
Sd	Binary input is used for shutdown protection.

back to Logical binary inputs alphabetically

BIN Protection 24

Related FW	1.3.0	Related applications	MINT, SPtM
Comm object	9976		
Description			

This binary input is for general input function used as alarm.

Protection types

Monitoring	Binary input is not used for protection or any other function. Signal is only monitored.
HistRecOnl	Binary input is not used for protection. Only history record is made if binary input is active.
AL Indic	Binary input is not used for protection. Only alarmlist record is made if binary input is active.
Wrn	Binary input is used for warning protection only.
Stp	Binary input is used for slow stop protection
BOC	Binary input is used for BOC (Breaker Open and Cooling) protection.
Sd	Binary input is used for shutdown protection.

back to Logical binary inputs alphabetically

BIN Protection 25

Related FW	1.3.0	Related applications	MINT, SPtM
Comm object	9975		
Description			

This binary input is for general input function used as alarm.

Protection types

Monitoring	Binary input is not used for protection or any other function. Signal is only monitored.
HistRecOnl	Binary input is not used for protection. Only history record is made if binary input is active.
AL Indic	Binary input is not used for protection. Only alarmlist record is made if binary input is active.
Wrn	Binary input is used for warning protection only.
Stp	Binary input is used for slow stop protection
BOC	Binary input is used for BOC (Breaker Open and Cooling) protection.
Sd	Binary input is used for shutdown protection.

back to Logical binary inputs alphabetically

BIN Protection 26

Related FW	1.3.0	Related applications	MINT, SPtM
Comm object	9974		
Description			

This binary input is for general input function used as alarm.

Protection types

Monitoring	Binary input is not used for protection or any other function. Signal is only monitored.
HistRecOnl	Binary input is not used for protection. Only history record is made if binary input is active.
AL Indic	Binary input is not used for protection. Only alarmlist record is made if binary input is active.
Wrn	Binary input is used for warning protection only.
Stp	Binary input is used for slow stop protection
BOC	Binary input is used for BOC (Breaker Open and Cooling) protection.
Sd	Binary input is used for shutdown protection.

back to Logical binary inputs alphabetically

BIN Protection 27

Related FW	1.3.0	Related applications	MINT, SPtM
Comm object	9973		
Description			

This binary input is for general input function used as alarm.

Protection types

Monitoring	Binary input is not used for protection or any other function. Signal is only monitored.
HistRecOnl	Binary input is not used for protection. Only history record is made if binary input is active.
AL Indic	Binary input is not used for protection. Only alarmlist record is made if binary input is active.
Wrn	Binary input is used for warning protection only.
Stp	Binary input is used for slow stop protection
BOC	Binary input is used for BOC (Breaker Open and Cooling) protection.
Sd	Binary input is used for shutdown protection.

back to Logical binary inputs alphabetically

BIN Protection 28

Related FW	1.3.0	Related applications	MINT, SPtM
Comm object	9972		
Description			

This binary input is for general input function used as alarm.

Protection types

Monitoring	Binary input is not used for protection or any other function. Signal is only monitored.
HistRecOnl	Binary input is not used for protection. Only history record is made if binary input is active.
AL Indic	Binary input is not used for protection. Only alarmlist record is made if binary input is active.
Wrn	Binary input is used for warning protection only.
Stp	Binary input is used for slow stop protection
BOC	Binary input is used for BOC (Breaker Open and Cooling) protection.
Sd	Binary input is used for shutdown protection.

back to Logical binary inputs alphabetically

BIN Protection 29

Related FW	1.3.0	Related applications	MINT, SPtM
Comm object	9971		
Description			

This binary input is for general input function used as alarm.

Protection types

Monitoring	Binary input is not used for protection or any other function. Signal is only monitored.
HistRecOnl	Binary input is not used for protection. Only history record is made if binary input is active.
AL Indic	Binary input is not used for protection. Only alarmlist record is made if binary input is active.
Wrn	Binary input is used for warning protection only.
Stp	Binary input is used for slow stop protection
BOC	Binary input is used for BOC (Breaker Open and Cooling) protection.
Sd	Binary input is used for shutdown protection.

back to Logical binary inputs alphabetically

BIN Protection 30

Related FW	1.3.0	Related applications	MINT, SPtM
Comm object	9970		
Description			

This binary input is for general input function used as alarm.

Protection types

Monitoring	Binary input is not used for protection or any other function. Signal is only monitored.
HistRecOnl	Binary input is not used for protection. Only history record is made if binary input is active.
AL Indic	Binary input is not used for protection. Only alarmlist record is made if binary input is active.
Wrn	Binary input is used for warning protection only.
Stp	Binary input is used for slow stop protection
BOC	Binary input is used for BOC (Breaker Open and Cooling) protection.
Sd	Binary input is used for shutdown protection.

back to Logical binary inputs alphabetically

BIN Protection 31

Related FW	1.3.0	Related applications	MINT, SPtM
Comm object	9969		
Description			

This binary input is for general input function used as alarm.

Protection types

Monitoring	Binary input is not used for protection or any other function. Signal is only monitored.
HistRecOnl	Binary input is not used for protection. Only history record is made if binary input is active.
AL Indic	Binary input is not used for protection. Only alarmlist record is made if binary input is active.
Wrn	Binary input is used for warning protection only.
Stp	Binary input is used for slow stop protection
BOC	Binary input is used for BOC (Breaker Open and Cooling) protection.
Sd	Binary input is used for shutdown protection.

back to Logical binary inputs alphabetically

BIN Protection 32

Related FW	1.3.0	Related applications	MINT, SPtM
Comm object	9968		
Description			

This binary input is for general input function used as alarm.

Protection types

Monitoring	Binary input is not used for protection or any other function. Signal is only monitored.
HistRecOnl	Binary input is not used for protection. Only history record is made if binary input is active.
AL Indic	Binary input is not used for protection. Only alarmlist record is made if binary input is active.
Wrn	Binary input is used for warning protection only.
Stp	Binary input is used for slow stop protection
BOC	Binary input is used for BOC (Breaker Open and Cooling) protection.
Sd	Binary input is used for shutdown protection.

back to Logical binary inputs alphabetically

BIN Protection 33

Related FW	1.3.0	Related applications	MINT, SPtM
Comm object	9967		
Description			

This binary input is for general input function used as alarm.

Protection types

Monitoring	Binary input is not used for protection or any other function. Signal is only monitored.
HistRecOnl	Binary input is not used for protection. Only history record is made if binary input is active.
AL Indic	Binary input is not used for protection. Only alarmlist record is made if binary input is active.
Wrn	Binary input is used for warning protection only.
Stp	Binary input is used for slow stop protection
BOC	Binary input is used for BOC (Breaker Open and Cooling) protection.
Sd	Binary input is used for shutdown protection.

back to Logical binary inputs alphabetically

BIN Protection 34

Related FW	1.3.0	Related applications	MINT, SPtM
Comm object	9966		
Description			

This binary input is for general input function used as alarm.

Protection types

Monitoring	Binary input is not used for protection or any other function. Signal is only monitored.
HistRecOnl	Binary input is not used for protection. Only history record is made if binary input is active.
AL Indic	Binary input is not used for protection. Only alarmlist record is made if binary input is active.
Wrn	Binary input is used for warning protection only.
Stp	Binary input is used for slow stop protection
BOC	Binary input is used for BOC (Breaker Open and Cooling) protection.
Sd	Binary input is used for shutdown protection.

back to Logical binary inputs alphabetically

BIN Protection 35

Related FW	1.3.0	Related applications	MINT, SPtM
Comm object	9965		
Description			

This binary input is for general input function used as alarm.

Protection types

Monitoring	Binary input is not used for protection or any other function. Signal is only monitored.
HistRecOnl	Binary input is not used for protection. Only history record is made if binary input is active.
AL Indic	Binary input is not used for protection. Only alarmlist record is made if binary input is active.
Wrn	Binary input is used for warning protection only.
Stp	Binary input is used for slow stop protection
BOC	Binary input is used for BOC (Breaker Open and Cooling) protection.
Sd	Binary input is used for shutdown protection.

back to Logical binary inputs alphabetically

BIN Protection 36

Related FW	1.3.0	Related applications	MINT, SPtM
Comm object	9964		
Description			

This binary input is for general input function used as alarm.

Protection types

Monitoring	Binary input is not used for protection or any other function. Signal is only monitored.
HistRecOnl	Binary input is not used for protection. Only history record is made if binary input is active.
AL Indic	Binary input is not used for protection. Only alarmlist record is made if binary input is active.
Wrn	Binary input is used for warning protection only.
Stp	Binary input is used for slow stop protection
BOC	Binary input is used for BOC (Breaker Open and Cooling) protection.
Sd	Binary input is used for shutdown protection.

back to Logical binary inputs alphabetically

BIN Protection 37

Related FW	1.3.0	Related applications	MINT, SPtM
Comm object	9963		
Description			

This binary input is for general input function used as alarm.

Protection types

Monitoring	Binary input is not used for protection or any other function. Signal is only monitored.
HistRecOnl	Binary input is not used for protection. Only history record is made if binary input is active.
AL Indic	Binary input is not used for protection. Only alarmlist record is made if binary input is active.
Wrn	Binary input is used for warning protection only.
Stp	Binary input is used for slow stop protection
BOC	Binary input is used for BOC (Breaker Open and Cooling) protection.
Sd	Binary input is used for shutdown protection.

back to Logical binary inputs alphabetically

BIN Protection 38

Related FW	1.3.0	Related applications	MINT, SPtM
Comm object	9962		
Description			

This binary input is for general input function used as alarm.

Protection types

Monitoring	Binary input is not used for protection or any other function. Signal is only monitored.
HistRecOnl	Binary input is not used for protection. Only history record is made if binary input is active.
AL Indic	Binary input is not used for protection. Only alarmlist record is made if binary input is active.
Wrn	Binary input is used for warning protection only.
Stp	Binary input is used for slow stop protection
BOC	Binary input is used for BOC (Breaker Open and Cooling) protection.
Sd	Binary input is used for shutdown protection.

back to Logical binary inputs alphabetically

BIN Protection 39

Related FW	1.3.0	Related applications	MINT, SPtM
Comm object	9961		
Description			

This binary input is for general input function used as alarm.

Protection types

Monitoring	Binary input is not used for protection or any other function. Signal is only monitored.
HistRecOnl	Binary input is not used for protection. Only history record is made if binary input is active.
AL Indic	Binary input is not used for protection. Only alarmlist record is made if binary input is active.
Wrn	Binary input is used for warning protection only.
Stp	Binary input is used for slow stop protection
BOC	Binary input is used for BOC (Breaker Open and Cooling) protection.
Sd	Binary input is used for shutdown protection.

back to Logical binary inputs alphabetically

BIN Protection 40

Related FW	1.3.0	Related applications	MINT, SPtM
Comm object	9960		
Description			

This binary input is for general input function used as alarm.

Protection types

Monitoring	Binary input is not used for protection or any other function. Signal is only monitored.
HistRecOnl	Binary input is not used for protection. Only history record is made if binary input is active.
AL Indic	Binary input is not used for protection. Only alarmlist record is made if binary input is active.
Wrn	Binary input is used for warning protection only.
Stp	Binary input is used for slow stop protection
BOC	Binary input is used for BOC (Breaker Open and Cooling) protection.
Sd	Binary input is used for shutdown protection.

back to Logical binary inputs alphabetically

LBI: C

Coolant Temp

Related FW	1.3.0	Related applications	MINT, SPtM
Comm object	625		
Description			

Binary input for COOLANT TEMP (PAGE 756) protection.

Protection types

Monitoring	Binary input is not used for protection or any other function. Signal is only monitored.
HistRecOnl	Binary input is not used for protection. Only history record is made if binary input is active.
Wrn	Binary input is used for warning protection only.
Stp	Binary input is used for slow stop protection
BOC	Binary input is used for BOC (Breaker Open and Cooling) protection.
Sd	Binary input is used for shutdown protection.

back to Logical binary inputs alphabetically

LBI: D

Droop Unload Disl

Related FW	1.3.0	Related applications	MINT
Comm object	597		
Description			
Activation of this logical binary input avoids the soft unload function of the gen-set if it is running in droop. GCB is opened immediately after the stop request or pressing of GCB button. If this input is not active the unloading is given by the setpoint **Load Ramp (page 348)**. ***Note:*** *This function is used when there is no other gen-set to take over the load of the gen-set which is being unloaded.*			

back to Logical binary inputs alphabetically

LBI: E

ECU Key Switch

Related FW	1.3.0	Related applications	MINT, SPtM
Comm object	951		
Description			
This binary input is used to switch on **ECU Power Relay (page 696)**, when engine start is not requested. It is intended to enable engine values reading, when engine doesn't run. When this binary input is active, binary output **ECU Power Relay (page 696)** is active too. When this binary input is inactive, function of **ECU Power Relay (page 696)** is not affected.			

back to Logical binary inputs alphabetically

Emergency MAN

Related FW	1.3.0	Related applications	MINT, SPtM
Comm object	45		
Description			
This input is designed to allow the gen-set or breakers to be controlled externally, not by the controller. This feature can be useful in case of or in case of some failure, which disables the gen-set or breakers to be controlled by the controller, but the gen-set itself is operational. The controller behaves in the following way: ▶ Shows the text EmergMan in the engine status on the main screen. ▶ Stops all functions regarding the gen-set or breaker control, deactivates all outputs related to it. ▶ Stop Fail alarm is not being evaluated and stop solenoid is not activated if nonzero speed is detected. ▶ When the input is deactivated, the controller takes control according to the situation in the moment of deactivation, i.e. the gen-set remains running loaded if it was running and GCB was closed in the moment the input was deactivated.			

back to Logical binary inputs alphabetically

Emergency Stop

Related FW	1.3.0	**Related applications**	MINT, SPtM
Comm object	40		
Description			
When this binary input is activated, gen-set is immediately stopped. Also binary outputs are disconnected. Alarm **Emergency Stop (page 805)** is activated.			

back to Logical binary inputs alphabetically

LBI: F

Fault Reset Button

Related FW	1.3.0	**Related applications**	MINT, SPtM
Comm object	191		
Description			
Binary input has the same function as Fault Reset button  on the InteliGen 200 front panel.			

back to Logical binary inputs alphabetically

Force Droop Oper

Related FW	1.3.0	**Related applications**	MINT
Comm object	788		
Description			
When this logical binary input is active, the regulations is forced to droop (the same behavior like the setpoint **Load/Var Sharing Regulation Type (page 356)** = Droop.			

back to Logical binary inputs alphabetically

Force Island

Related FW	1.3.0	**Related applications**	SPtM
Comm object	787		
Description			
Activation of this logical binary input start the gen-set and go to island operation. Transition of load from mains is adjusted via setpoint **Transfer Mains To Gen (page 346)**.			

back to Logical binary inputs alphabetically

Force Parallel

Related FW	1.3.0	**Related applications**	MINT, SPtM
Comm object	786		
Description			
Activation of this logical binary input start the gen-set and go to parallel operation if mains is healthy. Island operation is not allowed.			

back to Logical binary inputs alphabetically

Force Protection Disable

Related FW	1.3.0	**Related applications**	MINT, SPtM
Comm object	16		
Description			

Selected protections are disabled, if LBI: Force Protection Disable is active..

Activation and deactivation of this binary input will create history record:

- Force Protection Disable active
- Force Protection Disable inactive

Behaviour depends on configuration of LBI - normally close or normally open.

back to Logical binary inputs alphabetically

Fuel Level

Related FW	1.3.0	**Related applications**	MINT, SPtM
Comm object	626		
Description			

Binary input for **FUEL LEVEL (PAGE 757)** protection.

Protection types

Monitoring	Binary input is not used for protection or any other function. Signal is only monitored.
HistRecOnl	Binary input is not used for protection. Only history record is made if binary input is active.
Wrn	Binary input is used for warning protection only.
Stp	Binary input is used for slow stop protection
BOC	Binary input is used for BOC (Breaker Open and Cooling) protection.
Sd	Binary input is used for shutdown protection.

back to Logical binary inputs alphabetically

Fuel Pump On/Off

Related FW	1.3.0	**Related applications**	MINT, SPtM
Comm object	694		
Description			

This binary input is used for manual control of binary output **FUEL PUMP (PAGE 699)**.

Note: *This binary input is basically designed for ON and OFF switch (switch with arrestment in these positions) because controller reacts to rising and falling edge of signal in this input.*

> **IMPORTANT: When binary input FUEL PUMP ON/OFF (PAGE 651) is configured then binary output FUEL PUMP (PAGE 699) is control by this binary input. Setpoints Fuel Pump On (page 292) and Fuel Pump Off (page 293) are not evaluated!**

> **IMPORTANT: It is necessary to configure analog input FUEL LEVEL (PAGE 757) for proper function of this binary input.**

back to Logical binary inputs alphabetically

LBI: G

GCB Button

Related FW	1.3.0	Related applications	MINT, SPtM
Comm object	193		
Description			
Binary input has the same function as GCB button I/O on the InteliGen 200 front panel. It is evaluated in MAN mode only.			

back to Logical binary inputs alphabetically

GCB Feedback

Related FW	1.3.0	Related applications	MINT, SPtM
Comm object	63		
Description			
Use this input for indication whether the generator circuit breaker is open or closed.			

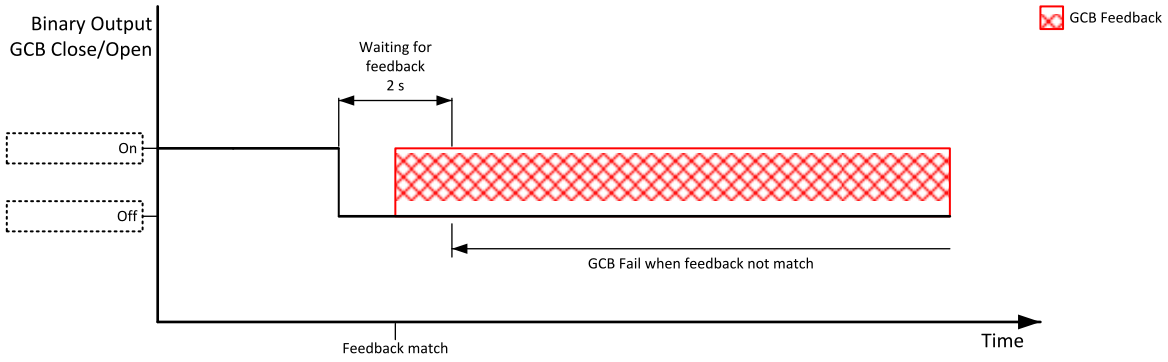


Image 8.133 GCB Feedback 1

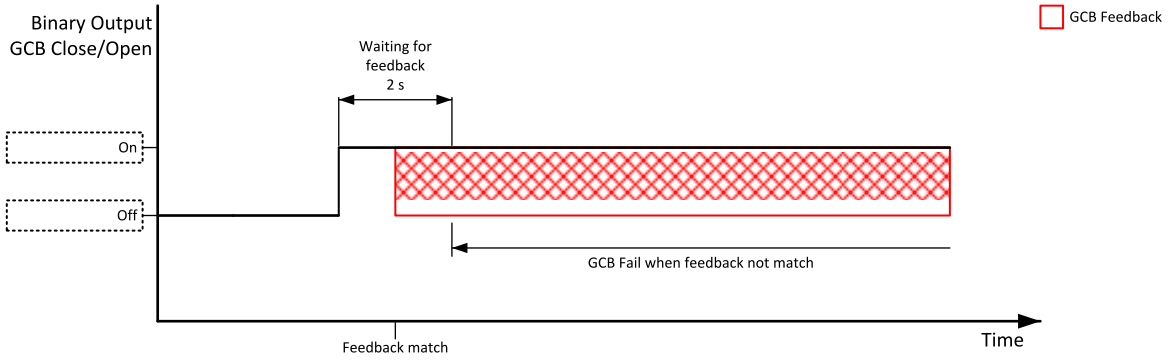


Image 8.134 GCB Feedback 2

back to Logical binary inputs alphabetically

Geo Home Position

Related FW	1.3.0	**Related applications**	MINT, SPtM
Comm object	219		
Description			
This binary input can be used to adjust home position of gen-set. In case that binary input is active, setpoints **Home Latitude (page 441)** and **Home Longitude (page 441)** are adjusted automatically from actual coordinates from GPS signal. ***Note:*** *Input has to be activated for at least 2 seconds.*			

back to Logical binary inputs alphabetically

Geo-Fencing Enabled

Related FW	1.3.0	**Related applications**	MINT, SPtM
Comm object	218		
Description			
This binary input enables or disables **Fence 1 Protection (page 444)** and **Fence 2 Protection (page 445)** if **Geo-Fencing (page 443)** is adjusted to value "LBI Enable".			

back to Logical binary inputs alphabetically

Group link

Related FW	1.3.0	**Related applications**	MINT, SPtM
Comm object	59		
Description			
This input is used for logical connection and disconnection of two gen-set groups selected with setpoints **Group Link L (page 339)** and **Group Link R (page 340)**. If the input is active, then the two selected groups will perform power management, load sharing and kVAr sharing together as one large group. ***Note:*** *This function is independent on the group which the particular controller belongs to, i.e. the controller can provide linking function e.g. for groups 3,4 although it belongs to group 2.*			

back to Logical binary inputs alphabetically

LBI: H

Horn Reset Button

Related FW	1.3.0	**Related applications**	MINT, SPtM
Comm object	192		
Description			
Binary input has the same function as Horn reset button on the InteliGen 200 front panel.			

back to Logical binary inputs alphabetically

LBI: I

Idle Speed

Related FW	1.3.0	**Related applications**	MINT, SPtM
Comm object	624		
Description			
This binary input changes cooling speed from nominal to idle.			

back to Logical binary inputs alphabetically

LBI: L

Lang Selection 1

Related FW	1.3.0	**Related applications**	MINT, SPtM
Comm object	107		
Description			

Use this binary input with binary input **LANG SELECTION 2 (PAGE 654)** to choose required language of controller. The system is based on binary numbers.

Binary input	Binary number	Active language
Language Selection 1 is active	1	First language (English)
LANG SELECTION 2 (PAGE 654) is active	2	Second language
Language Selection 1 and **LANG SELECTION 2 (PAGE 654)** are active	3	Third language

back to Logical binary inputs alphabetically

Lang Selection 2

Related FW	1.3.0	**Related applications**	MINT, SPtM
Comm object	108		
Description			

Use this binary input with binary input **LANG SELECTION 1 (PAGE 654)** to choose required language of controller. The system is based on binary numbers.

Binary input	Binary number	Active language
LANG SELECTION 1 (PAGE 654) is active	1	First language (English)
Lang Selection 2 is active	2	Second language
LANG SELECTION 1 (PAGE 654) and Lang Selection 2 are active	3	Third language

back to Logical binary inputs alphabetically

Load Res 2 Active

Related FW	1.3.0	Related applications	MINT
Comm object	49		
Description			
Activation of this logical binary input changes the set of load reserve setpoint, which are used in **Power management (page 112)**. This input is used to activate the load reserve set 2 instead of the set 1, which is active by default.			

back to Logical binary inputs alphabetically

LBI: M

Mains Fail Block

Related FW	1.3.0	Related applications	MINT, SPtM
Comm object	622		
Description			
If the input is closed, the automatic start of the gen-set at Mains failure is blocked. In case of running gen-set in AUTO mode, timer **Mains Return Delay (page 314)** is started and when it elapses GCB is opened, gen-set goes to cooling procedure and stops. When GCB is opened after **Open Transfer Min Break (page 345)** the MCB is closed. ***Note:*** *This input simulates healthy Mains.*			

back to Logical binary inputs alphabetically

Manual Load Reconnection

Related FW	1.3.0	Related applications	MINT, SPtM
Comm object	60		
Description			
This input is used for manual reconnection of the last disconnected part of the load, if the load has dropped below the setpoint **Load Reconnection Level (page 325)**. This works only if automatic reconnection is disabled, i.e. the setpoint **Auto Load Reconnection (page 326)** = Disabled.			

back to Logical binary inputs alphabetically

MCB Button

Related FW	1.3.0	Related applications	MINT, SPtM
Comm object	194		
Description			
This binary input has the same function as MCB button I/O on the InteliGen 200 front panel. It is evaluated in MAN mode only.			

back to Logical binary inputs alphabetically

MCB Feedback

Related FW	1.3.0	Related applications	MINT, SPtM
Comm object	65		

Description

Use this input for indication whether the mains circuit breaker is open or closed.

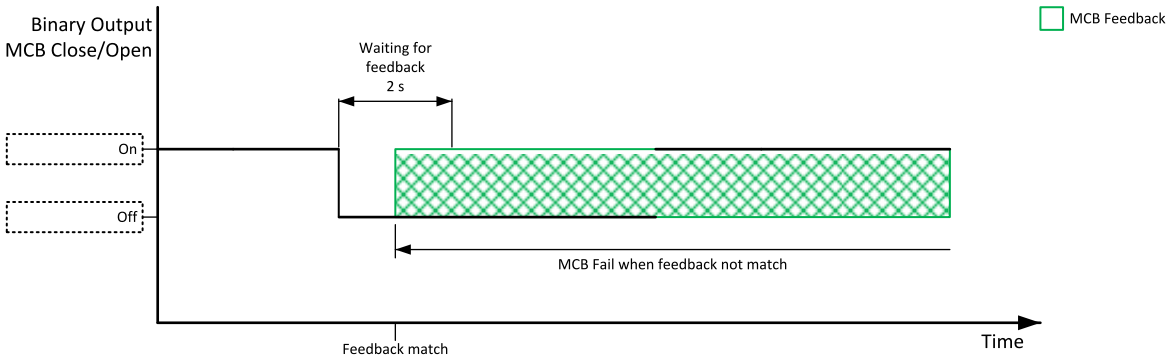


Image 8.135 MCB Feedback 1

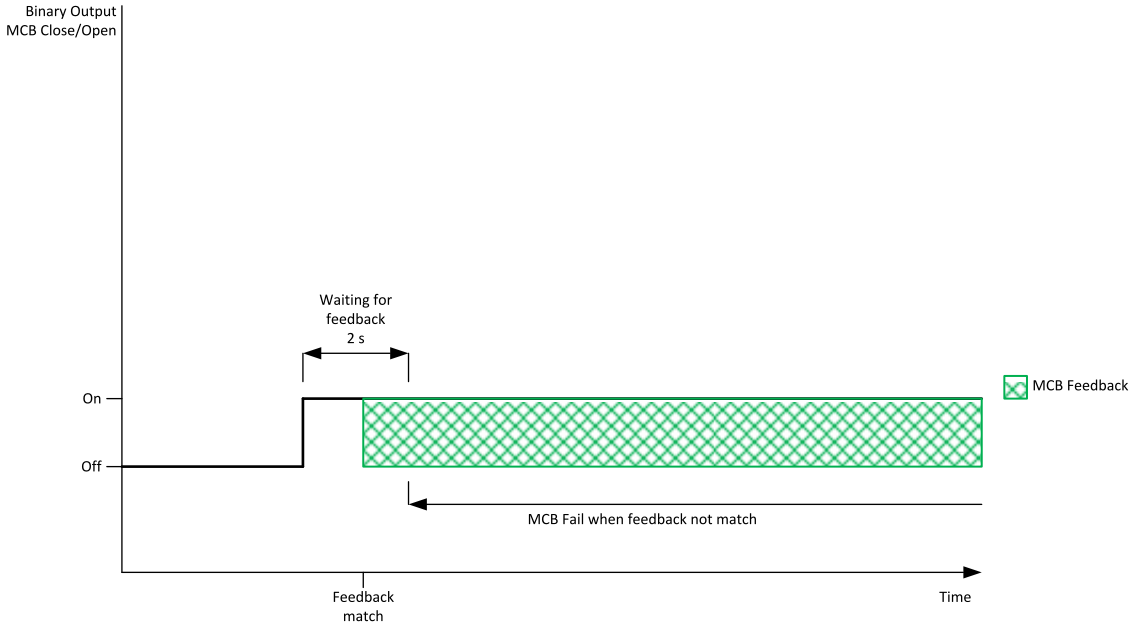


Image 8.136 MCB Feedback 2

back to Logical binary inputs alphabetically

Min Run Power Active

Related FW	1.3.0	**Related applications**	MINT
Comm object	52		
Description			
This input is used to activate the function minimal running power, which is adjusted via setpoint **#Min Run Power (page 334)**.			

back to Logical binary inputs alphabetically

LBI: N

NCB Feedback

Related FW	1.3.0	**Related applications**	MINT
Comm object	67		
Description			
This input is used for connection of feedback contact from the neutral contactor. If the input is active, the controller will consider the neutral contactor as closed and vice versa. See also setpoint **#Neutral Contactor Control (page 247)**.			

back to Logical binary inputs alphabetically

Not Used

Related FW	1.3.0	**Related applications**	MINT, SPtM
Comm object	184		
Description			
Binary input has no function. Use this configuration when binary input is not used.			

back to Logical binary inputs alphabetically

LBI: O

Oil Pressure

Related FW	1.3.0	**Related applications**	MINT, SPtM
Comm object	43		
Description			

Binary input for **OIL PRESSURE (PAGE 759)** protection.

Protection types

Monitoring	Binary input is not used for protection or any other function. Signal is only monitored.
HistRecOnl	Binary input is not used for protection. Only history record is made if binary input is active.
Wrn	Binary input is used for warning protection only.
Sd	Binary input is used for shutdown protection.

IMPORTANT: This binary input is also used for evaluating engine running condition.

Example: Normally close connection - when LBI is closed then oil pressure is OK and is higher than starting oil pressure.

Note: *In case that you want to use binary input of oil pressure sensor just for protection please use one of the* ***BIN PROTECTION 1 (PAGE 628)****.*

back to Logical binary inputs alphabetically

LBI: R

Regeneration Force

Related FW	1.3.0	**Related applications**	MINT, SPtM
Comm object	680		
Description			

When this binary input is activated, the controller send request for force regeneration of DPF (diesel particulate filter) to ECU.

Note: *ECU with Tier IV support is required for proper functionality.*

back to Logical binary inputs alphabetically

Regeneration Inhib

Related FW	1.3.0	**Related applications**	MINT, SPtM
Comm object	679		
Description			

When this binary input is activated, the controller sends request to inhibit regeneration of DPF (diesel particulate filter) to ECU.

Note: *ECU with Tier IV support is required for proper functionality.*

back to Logical binary inputs alphabetically

Remote AUTO

Related FW	1.3.0	Related applications	MINT, SPtM
Comm object	620		
Description			
The controller is switched to the AUTO mode (there are four modes OFF / MAN / AUTO / TEST) when this binary input is closed. When opens controller is switched back to previous mode. This binary input has the lowest priority from Remote OFF / MAN / AUTO / TEST binary inputs Remote control priority: ▶ Remote OFF (Highest priority) ▶ Remote TEST ▶ Remote MAN ▶ Remote AUTO (Lowest Priority)			

back to Logical binary inputs alphabetically

Remote Ctrl Lock

Related FW	1.3.0	Related applications	MINT, SPtM
Comm object	4		
Description			
If the input is active, the controller will not accept any actions regarding the system control – e.g. writing of commands and setpoint changes via remote communication interfaces.			

back to Logical binary inputs alphabetically

Remote MAN

Related FW	1.3.0	Related applications	MINT, SPtM
Comm object	618		
Description			
The controller is switched to the MAN mode (there are four modes OFF / MAN / AUTO / TEST) when this binary input is closed. When opens controller is switched back to previous mode. Remote control priority: ▶ Remote OFF (Highest priority) ▶ Remote TEST ▶ Remote MAN ▶ Remote AUTO (Lowest Priority)			

back to Logical binary inputs alphabetically

Remote OFF

Related FW	1.3.0	Related applications	MINT, SPtM
Comm object	617		
Description			
The controller is switched to the OFF mode (there are four modes OFF / MAN / AUTO / TEST) when this binary input is closed. When opens controller is switched back to previous mode. Remote control priority: ▶ Remote OFF (Highest priority) ▶ Remote TEST ▶ Remote MAN ▶ Remote AUTO (Lowest Priority)			

back to Logical binary inputs alphabetically

Remote Start/Stop

Related FW	1.3.0	Related applications	MINT, SPtM
Comm object	38		

Description

Use this input to start and stop the gen-set in AUTO mode and TEST mode.

Taken action in SPtM application (AUTO Mode)	
Active	Start genset, synchronization, parallel operation (baseload/Imp/Exp), Regardless the Mains params OK. ▶ Start the genstet to Island if Mains Not OK ▶ Reverse synchronisation when mains gets restored
Inactive	Unloading of the genset if it is running in parallel, stop the genset.
Taken action in MINT application (AUTO Mode)	
Active	Start the Genset - After Powermanagement/ #System Start Delay (Actually is using the existing **REMOTE START/STOP (PAGE 661)** internaly (this LBI is not visible in any application)).
Inactive	Stop the Genset - After Powermanagement/ #System Stop Delay (Actually is using the existing LBI **REMOTE START/STOP (PAGE 661)** internaly (this LBI is not visible in any application)).
Taken action in AMF application (AUTO Mode)	
Active	▶ Start the genset and stay running with opened GCB if Mains OK. ▶ Go to Island if Mains fails (due to AMF function). ▶ If Mains is not OK the AMF function starts the genset to Island anyway.
Inactive	▶ Stop the genset if Mains is OK. ▶ If Mains not Ok the genset stays running due to AMF function anyway.
Taken action in MRS application (AUTO Mode)	
Active	▶ Start the Genset - No delay ▶ Close GCB
Inactive	▶ Open GCB ▶ Stop the Genset - No delay

Note: *In the SPTM and AMF application there are more LBIs that can influence the state of the application and can be in the collision with the Common LBI Remote Start/Stop.*

back to Logical binary inputs alphabetically

Remote TEST

Related FW	1.3.0	Related applications	MINT, SPtM
Comm object	621		
Description			
The controller is switched to the TEST mode (there are four modes OFF / MAN / AUTO / TEST) when this binary input is closed. When opens controller is switched back to previous mode. Remote control priority: ▶ Remote OFF (Highest priority) ▶ Remote TEST ▶ Remote MAN ▶ Remote AUTO (Lowest Priority)			

back to Logical binary inputs alphabetically

Remote Test On Load

Related FW	1.3.0	Related applications	MINT, SPtM
Comm object	61		

Description

Closing of the GCB in MRS and MINT or transferring of the load from the mains to genset in SPTM and AMF

Application	TEST	Remote TEST On Load
SPtM	Gen-set started and running until the TEST mode deactivated.	**Active:** Gen-set is put to TEST mode. On the top of it the load is transfered to the genset. The same behaviour like the LBI **Force Island (page 650)**. The load transfer according to the settings is performed. ***Note:*** *Whenever the LBI **Remote Start/Stop (page 661)** is active, the LBI **Remote Test On Load (page 663)** has higher priority because it takes the same action like LBI **Force Island (page 650)*** **Inactive:** Gen-set comes back to the original mode and behaves accordingly to this mode and other conditions. (the load can be transfered back to the mains (OFF, AUTO) or stay on the genset (MAN).
MRS		**Active:** Gen-set is put to TEST mode. On the top of it the GCB is closed. The same behaviour like the LBI **Remote Start/Stop (page 661)** **Inactive:** Gen-set comes back to the original mode and behaves accordingly to this mode and other conditions.
MINT		**Active:** Gen-set is put to TEST mode. On the top of it the GCB is closed (synchronized if the common bus bar is not dead). The same behaviour like the LBI **Remote Start/Stop (page 661)**. **Inactive:** Gen-set comes back to the original mode and behaves accordingly to this mode and other conditions.
AMF		**Active:** Gen-set is put to TEST mode. On the top of it the load is transfered to the genset. The same behaviour like the LBI **Force Island (page 650)**. The open load transfer is performed. **Inactive:** Genset comes back to the original mode and behaves accordingly to this mode and other conditions. (the load can be transfered back to the mains (OFF, AUTO) or stay on the genset (MAN).

back to Logical binary inputs alphabetically

LBI: S

Sd Override

Related FW	1.3.0	Related applications	MINT, SPtM
Comm object	44		
Description			

If this input is active, all alarms except Emergency Stop and Overspeed are suppressed. The suppressed alarms will be displayed in the alarm list, but they will not take effect regarding the gen-set control.

> ***Note:*** *Sd Override (page 664) is indicated in the alarm list if Sd Override mode is active to inform the operator that the engine is not protected.*

> **IMPORTANT: MISUSE OF THIS INPUT CAN CAUSE DAMAGE TO THE GEN-SET!**

back to Logical binary inputs alphabetically

Start Button

Related FW	1.3.0	Related applications	MINT, SPtM
Comm object	189		
Description			

Binary input has the same function as Start Button I on the InteliGen 200 front panel. It is evaluated in MAN mode only.

back to Logical binary inputs alphabetically

Stop Button

Related FW	1.3.0	Related applications	MINT, SPtM
Comm object	190		
Description			

Binary input has the same function as Stop Button O on the InteliGen 200 front panel. It is evaluated in MAN Mode only.

back to Logical binary inputs alphabetically

LBI: T

Top Priority

Related FW	1.3.0	Related applications	MINT
Comm object	199		
Description			

If this input is active, the controller will have the highest priority in the group independent of the setpoint **Priority (page 328)**.

> **IMPORTANT: This binary input can be used only if setpoint #Priority Auto Swap (page 329) = Disabled.**

back to Logical binary inputs alphabetically

8.1.4 Logical binary outputs

What Logical binary outputs are:

Logical binary outputs are outputs for binary values and functions.

Alphabetical groups of Logical binary outputs

LBO: A 668
LBO: B 691
LBO: C 695
LBO: E 695
LBO: F 698
LBO: G 701
LBO: H 707
LBO: I 708
LBO: L 710
LBO: M 710
LBO: N 716
LBO: P 717
LBO: R 720
LBO: S 721
LBO: T 726

For full list of Logical binary outputs go to the chapter **Logical binary outputs alphabetically (page 666)**.

Logical binary outputs alphabetically

Air Valves 668
AL AIN 1 Sd+BOC 668
AL AIN 1 Wrn 668
AL AIN 2 Sd+BOC 669
AL AIN 2 Wrn 669
AL AIN 3 Sd+BOC 669
AL AIN 3 Wrn 669
AL AIN 4 Sd+BOC 669
AL AIN 4 Wrn 670
AL Battery Flat 670
AL Battery Charger 670
AL Battery Voltage 670
AL Common BOC 670
AL Common Fls 671
AL Common Sd 671
AL Common Stp 671
AL Common Wrn 671
AL CoolantTemp Low 672
AL CoolantTemp Sd 672
AL CoolantTemp Wrn 672
AL D+ Fail 672
AL Earth Fault 672
AL Fence 1 673
AL Fence 2 673
AL Fuel Level Sd 673
AL Fuel Level Wrn 673
AL Gen Freq Wrn 673
AL Gen Frequency 674
AL Gen Overfrequency 674
AL Gen Overvoltage 674
AL Gen Underfrequency 674
AL Gen Undervoltage 674
AL Gen Voltage Wrn 675
AL Gen Voltage 675
AL Mains Fail 675
AL Mains Frequency 675
AL Mains Voltage 675
AL Maintenance 1 676
AL Maintenance 2 676
AL Maintenance 3 676
AL Maintenance 4 676
AL Maintenance 5 676
AL Maintenance 6 677
AL Oil Press Sd 677
AL Oil Press Wrn 677
AL Overcurrent 677
AL Overload BOC 677
AL Overload Wrn 678
AL Overspeed 678
AL Rental Timer 1 678
AL Rental Timer 2 679
AL Start Fail 679
AL Stop Fail 679
AL Underspeed 679
Alarm 680
AIN Switch01 680
AIN Switch02 681
AIN Switch03 681
AIN Switch04 682
AIN Switch05 682
AIN Switch06 683
AIN Switch07 683
AIN Switch08 684
AIN Switch09 684
AIN Switch10 685
AIN Switch11 685
AIN Switch12 686
AIN Switch13 686
AIN Switch14 687
AIN Switch15 687
AIN Switch16 688
AIN Switch17 688
AIN Switch18 689
AIN Switch19 689
AIN Switch20 690
AVR Down 690
AVR Up 690
BIN 1 Status 691
BIN 2 Status 691
BIN 3 Status 692
BIN 4 Status 692
BIN 5 Status 693
BIN 6 Status 693
BIN 7 Status 694
BIN 8 Status 694
Cooling Pump 695
Cooling 695
ECU Communic Error 695
ECU Communic OK 696
ECU Power Relay 696
ECU Red Lamp 697
ECU Run Stop 697
ECU Yellow Lamp 697
Exercise Timer 1 697
Exercise Timer 2 698
FltRes Button Echo 698
Frequency Select 698
Fuel Pump 699
Fuel Solenoid 699
GCB Button Echo 701
GCB Close/Open 701
GCB OFF Coil 702
GCB ON Coil 703
GCB UV Coil 703
Generator Healthy 705
Glow Plugs 705
Heartbeat 707
HEST Lamp 707
Horn 707
HornRes Button Echo 707
Idle/Nominal 708

Ignition 708
Ignition On 709
Load Shedding Stage 1 ... 710
Load Shedding Stage 2 ... 710
Load Shedding Stage 3 ... 710
Mains Healthy 710
Manual Ready 711
MCB Button Echo 711
MCB Close/Open 711
MCB OFF Coil 713
MCB ON Coil 714
MCB UV Coil 715
Mode AUTO 716
Mode MAN 716
Mode OFF 716
Mode TEST 716
NCB Close/Open 716
Not In AUTO 717
Not Used 717
Peak Shaving Active 717
Power Switch 718
Prestart 718
Ready To AMF 720
Ready To Load 720
Ready 720
RegenerationNeeded 721
Running 721
Sd Override 721
Speed Down 722
Speed Up 722
Start Button Echo 722
Starter 723
Still Log 0 723
Still Log 1 723
Stop Button Echo 724
Stop Pulse 724
Stop Solenoid 724
Supplying Load 726
System Reserve OK 726
Temperature Switch 726

LBO: A

Air Valves

Related FW	1.3.0	**Related applications**	MINT, SPtM
Comm object	1247		
Description			
This output closes together with binary output **PRESTART (PAGE 718)** and opens after the engine is stopped or in case that engine is not ready.			

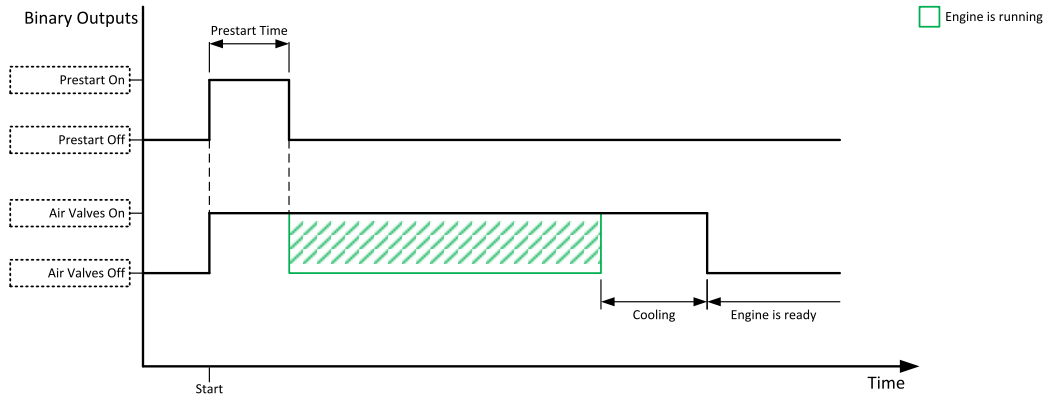


Image 8.137 Air Valves

back to Logical binary outputs alphabetically

AL AIN 1 Sd+BOC

Related FW	1.3.0	**Related applications**	MINT, SPtM
Comm object	1386		
Description			
The output is closed when there is the shutdown or BOC alarm from the analog input 1 of the controller present in the alarmlist or isn't confirmed.			

back to Logical binary outputs alphabetically

AL AIN 1 Wrn

Related FW	1.3.0	**Related applications**	MINT, SPtM
Comm object	1382		
Description			
The output is closed when there is the warning alarm from the analog input 1 of the controller present in the alarmlist or isn't confirmed.			

back to Logical binary outputs alphabetically

AL AIN 2 Sd+BOC

Related FW	1.3.0	**Related applications**	MINT, SPtM
Comm object	1387		
Description			
The output is closed when there is the shutdown or BOC alarm from the analog input 2 of the controller present in the alarmlist or isn't confirmed.			

back to Logical binary outputs alphabetically

AL AIN 2 Wrn

Related FW	1.3.0	**Related applications**	MINT, SPtM
Comm object	1383		
Description			
The output is closed when there is the warning alarm from the analog input 2 of the controller present in the alarmlist or isn't confirmed.			

back to Logical binary outputs alphabetically

AL AIN 3 Sd+BOC

Related FW	1.3.0	**Related applications**	MINT, SPtM
Comm object	1388		
Description			
The output is closed when there is the shutdown or BOC alarm from the analog input 3 of the controller present in the alarmlist or isn't confirmed.			

back to Logical binary outputs alphabetically

AL AIN 3 Wrn

Related FW	1.3.0	**Related applications**	MINT, SPtM
Comm object	1384		
Description			
The output is closed when there is the warning alarm from the analog input 3 of the controller present in the alarmlist or isn't confirmed.			

back to Logical binary outputs alphabetically

AL AIN 4 Sd+BOC

Related FW	1.3.0	**Related applications**	MINT, SPtM
Comm object	1389		
Description			
The output is closed when there is the shutdown or BOC alarm from the analog input 4 of the controller present in the alarmlist or isn't confirmed.			

back to Logical binary outputs alphabetically

AL AIN 4 Wrn

Related FW	1.3.0	**Related applications**	MINT, SPtM
Comm object	1385		
Description			
The output is closed when there is the warning alarm from the analog input 4 of the controller present in the alarmlist or isn't confirmed.			

back to Logical binary outputs alphabetically

AL Battery Flat

Related FW	1.3.0	**Related applications**	MINT, SPtM
Comm object	1292		
Description			
This output is active when the **Sd Battery Flat (page 805)** or **Wrn Battery Voltage (page 779)** alarm is present in the alarmlist or isn't confirm.			

back to Logical binary outputs alphabetically

AL Battery Charger

Related FW	1.3.0	**Related applications**	MINT, SPtM
Comm object	1272		
Description			
This output is active when the **Battery Charger Fail (page 779)** alarm is present in the alarmlist or isn't confirmed.			

back to Logical binary outputs alphabetically

AL Battery Voltage

Related FW	1.3.0	**Related applications**	MINT, SPtM
Comm object	1293		
Description			
This output is active when the **Wrn Battery Voltage (page 779)**alarm is present in the alarmlist or isn't confirm.			

back to Logical binary outputs alphabetically

AL Common BOC

Related FW	1.3.0	**Related applications**	MINT, SPtM
Comm object	9		
Description			
Output closes when any BOC alarm appears. The output opens, if: ▶ No BOC alarm is active and ▶ Fault reset button is pressed			

back to Logical binary outputs alphabetically

AL Common Fls

Related FW	1.3.0	Related applications	MINT, SPtM
Comm object	6		
Description			
Output closes when any sensor fail alarm appears. The output opens, if: ▶ No sensor fail alarm is active and ▶ Fault reset button is pressed			

back to Logical binary outputs alphabetically

AL Common Sd

Related FW	1.3.0	Related applications	MINT, SPtM
Comm object	4		
Description			
Output closes when any shutdown alarm appears. The output opens, if: ▶ No shutdown alarm is active and ▶ Fault reset button is pressed			

back to Logical binary outputs alphabetically

AL Common Stp

Related FW	1.3.0	Related applications	MINT, SPtM
Comm object	5		
Description			
Output closes when any slow stop alarm appears. The output opens, if: ▶ No slow stop alarm is active and ▶ Fault reset button is pressed			

back to Logical binary outputs alphabetically

AL Common Wrn

Related FW	1.3.0	Related applications	MINT, SPtM
Comm object	3		
Description			
Output closes when any warning alarm appears. The output opens, if: ▶ No warning alarm is active and ▶ Fault reset button is pressed			

back to Logical binary outputs alphabetically

AL CoolantTemp Low

Related FW	1.3.0	Related applications	MINT, SPtM
Comm object	1295		
Description			
The output is closed when there is the Wrn Coolant Temperature Low (page 785) alarm from the COOLANT TEMP (PAGE 756) in the alarmlist or isn't confirmed.			

Logical binary outputs alphabetically (page 666)

AL CoolantTemp Sd

Related FW	1.3.0	Related applications	MINT, SPtM
Comm object	1421		
Description			
The output is closed when there is the shutdown or BOC alarm from the COOLANT TEMP (PAGE 756) in the alarmlist or isn't confirmed.			

Logical binary outputs alphabetically (page 666)

AL CoolantTemp Wrn

Related FW	1.3.0	Related applications	MINT, SPtM
Comm object	1420		
Description			
The output is closed when there is the warning alarm from the COOLANT TEMP (PAGE 756) in the alarmlist or isn't confirmed. ***Note:*** *Binary output is also active if protection type is set to HistRecOnl and threshold level for history record is reach.*			

back to Logical binary outputs alphabetically

AL D+ Fail

Related FW	1.3.0	Related applications	MINT, SPtM
Comm object	1260		
Description			
This output is active when the Wrn Charging Alternator Fail (page 784) alarm is present in the alarmlist or isn't confirm.			

back to Logical binary outputs alphabetically

AL Earth Fault

Related FW	1.3.0	Related applications	MINT, SPtM
Comm object	1294		
Description			
This output is active when the Sd Earth Fault Current (page 807) alarm is present in alarm list or isn't confirm. ***Note:*** *It is strongly recommended to use this output only onetime.*			

back to Logical binary outputs alphabetically

AL Fence 1

Related FW	1.3.0	Related applications	MINT, SPtM
Comm object	1548		
Description			
This output is active when the Wrn Fence 1 Alarm (page 786) or BOC Fence 1 Alarm (page 816) or Sd Fence 1 Alarm (page 807) (depends on configuration of alarm type) alarm is present in the alarmlist or isn't confirm.			

back to Logical binary outputs alphabetically

AL Fence 2

Related FW	1.3.0	Related applications	MINT, SPtM
Comm object	1549		
Description			
This output is active when the Wrn Fence 2 Alarm (page 787) or BOC Fence 2 Alarm (page 816) or Sd Fence 2 Alarm (page 807) (depends on configuration of alarm type) alarm is present in the alarmlist or isn't confirm.			

back to Logical binary outputs alphabetically

AL Fuel Level Sd

Related FW	1.3.0	Related applications	MINT, SPtM
Comm object	1423		
Description			
The output is closed when there is the shutdown or BOC alarm from the FUEL LEVEL (PAGE 757) in the alarmlist or isn't confirmed.			

back to Logical binary outputs alphabetically

AL Fuel Level Wrn

Related FW	1.3.0	Related applications	MINT, SPtM
Comm object	1422		
Description			
The output is closed when there is the warning alarm from the FUEL LEVEL (PAGE 757) in the alarmlist or isn't confirmed. ***Note:*** *Binary output is also active if protection type is set to HistRecOnl and threshold level for history record is reach.*			

back to Logical binary outputs alphabetically

AL Gen Freq Wrn

Related FW	1.3.0	Related applications	MINT, SPtM
Comm object	1267		
Description			
This output is active generator frequency warning alarm is present in alarmlist or isn't confirm.			

back to Logical binary outputs alphabetically

AL Gen Frequency

Related FW	1.3.0	**Related applications**	MINT, SPtM
Comm object	1266		
Description			
This output is active when at least one generator frequency BOC or Sd alarm is present in alarmlist or isn't confirm.			

back to Logical binary outputs alphabetically

AL Gen Overfrequency

Related FW	1.3.0	**Related applications**	MINT, SPtM
Comm object	1264		
Description			
This output is active when at least one generator overfrequency alarm is present in alarmlist or isn't confirm.			

back to Logical binary outputs alphabetically

AL Gen Overvoltage

Related FW	1.3.0	**Related applications**	MINT, SPtM
Comm object	1261		
Description			
This output is active when at least one generator overvoltage alarm is present in alarmlist or isn't confirm.			

back to Logical binary outputs alphabetically

AL Gen Underfrequency

Related FW	1.3.0	**Related applications**	MINT, SPtM
Comm object	1265		
Description			
This output is active when at least one generator underfrequency alarm is present in alarmlist or isn't confirm.			

back to Logical binary outputs alphabetically

AL Gen Undervoltage

Related FW	1.3.0	**Related applications**	MINT, SPtM
Comm object	1262		
Description			
This output is active when at least one generator undervoltage alarm is present in alarmlist or isn't confirm.			

back to Logical binary outputs alphabetically

AL Gen Voltage Wrn

Related FW	1.3.0	**Related applications**	MINT, SPtM
Comm object	1289		
Description			
This output is active when at least one generator voltage warning alarm is present in alarmlist or isn't confirm.			

back to Logical binary outputs alphabetically

AL Gen Voltage

Related FW	1.3.0	**Related applications**	MINT, SPtM
Comm object	1263		
Description			
This output is active when at least one generator voltage BOC or Sd alarm is present in alarmlist or isn't confirm.			

back to Logical binary outputs alphabetically

AL Mains Fail

Related FW	1.3.0	**Related applications**	MINT, SPtM
Comm object	197		
Description			
Output for signaling Mains Failure. This output is active when at least one mains frequency BOC or Sd alarm or at least one mains voltage BOC or Sd alarm is present in alarmlist or isn't confirmed.			

back to Logical binary outputs alphabetically

AL Mains Frequency

Related FW	1.3.0	**Related applications**	MINT, SPtM
Comm object	1271		
Description			
This output is active when at least one mains frequency BOC or Sd alarm is present in alarmlist or isn't confirm.			

back to Logical binary outputs alphabetically

AL Mains Voltage

Related FW	1.3.0	**Related applications**	MINT, SPtM
Comm object	1270		
Description			
This output is active when at least one mains voltage BOC or Sd alarm is present in the alarmlist or isn't confirm.			

back to Logical binary outputs alphabetically

AL Maintenance 1

Related FW	1.3.0	**Related applications**	MINT, SPtM
Comm object	1254		
Description			
This output is active when the Alarm Maintenance 1 is present in the alarmlist. It means that counter of maintenance is on zero or the Alarm Maintenance 1 isn't confirm.			

back to Logical binary outputs alphabetically

AL Maintenance 2

Related FW	1.3.0	**Related applications**	MINT, SPtM
Comm object	1255		
Description			
This output is active when the Alarm Maintenance 2 is present in the alarmlist. It means that counter of maintenance is on zero or the Alarm Maintenance 2 isn't confirm.			

back to Logical binary outputs alphabetically

AL Maintenance 3

Related FW	1.3.0	**Related applications**	MINT, SPtM
Comm object	1256		
Description			
This output is active when the Alarm Maintenance 3 is present in the alarmlist. It means that counter of maintenance is on zero or the Alarm Maintenance 3 isn't confirm.			

back to Logical binary outputs alphabetically

AL Maintenance 4

Related FW	1.3.0	**Related applications**	MINT, SPtM
Comm object	2211		
Description			
This output is active when the Alarm Maintenance 4 is present in the alarmlist. It means that counter of maintenance is on zero or the Alarm Maintenance 4 isn't confirm.			

back to Logical binary outputs alphabetically

AL Maintenance 5

Related FW	1.3.0	**Related applications**	MINT, SPtM
Comm object	2212		
Description			
This output is active when the Alarm Maintenance 5 is present in the alarmlist. It means that counter of maintenance is on zero or the Alarm Maintenance 5 isn't confirm.			

back to Logical binary outputs alphabetically

AL Maintenance 6

Related FW	1.3.0	**Related applications**	MINT, SPtM
Comm object	2213		
Description			
This output is active when the Alarm Maintenance 6 is present in the alarmlist. It means that counter of maintenance is on zero or the Alarm Maintenance 6 isn't confirm.			

back to Logical binary outputs alphabetically

AL Oil Press Sd

Related FW	1.3.0	**Related applications**	MINT, SPtM
Comm object	1419		
Description			
The output is closed when there is the shutdown alarm from the **OIL PRESSURE (PAGE 759)** in the alarmlist or isn't confirmed.			

back to Logical binary outputs alphabetically

AL Oil Press Wrn

Related FW	1.3.0	**Related applications**	MINT, SPtM
Comm object	1418		
Description			
The output is closed when there is the warning alarm from the **OIL PRESSURE (PAGE 759)** in the alarmlist or isn't confirmed. ***Note:*** *Binary output is also active if protection type is set to HistRecOnl and threshold level for history record is reach.*			

back to Logical binary outputs alphabetically

AL Overcurrent

Related FW	1.3.0	**Related applications**	MINT, SPtM
Comm object	109		
Description			
This output is active when the **BOC Overcurrent IDMT (page 820)** or alarm is present in alarmlist or isn't confirm.			

back to Logical binary outputs alphabetically

AL Overload BOC

Related FW	1.3.0	**Related applications**	MINT, SPtM
Comm object	1268		
Description			
This output is active when the **Sd Overload (page 813)** alarm is present in the alarmlist or isn't confirm.			

back to Logical binary outputs alphabetically

AL Overload Wrn

Related FW	1.3.0	Related applications	MINT, SPtM
Comm object	1269		
Description			
This output is active when the Wrn Overload (page 794) alarm is present in alarmlist or isn't confirm.			

back to Logical binary outputs alphabetically

AL Overspeed

Related FW	1.3.0	Related applications	MINT, SPtM
Comm object	779		
Description			
This output is active when the Sd Overspeed (page 813) alarm is present in the alarmlist or isn't confirm.			

back to Logical binary outputs alphabetically

AL Rental Timer 1

Related FW	1.3.0	Related applications	MINT, SPtM
Comm object	1370		
Description			

The binary output closes when the **Rental Timer 1 (page 436)** elapsed.

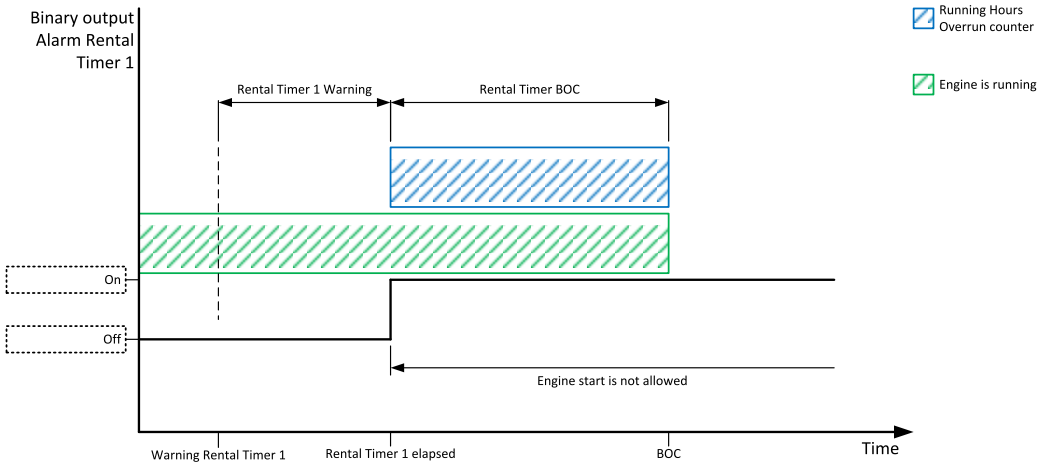


Image 8.138 Rental Timer 1

back to Logical binary outputs alphabetically

AL Rental Timer 2

Related FW	1.3.0	Related applications	MINT, SPtM
Comm object	1371		
Description			
The binary output closes when the **Rental Timer 2 (page 438)** elapsed.			

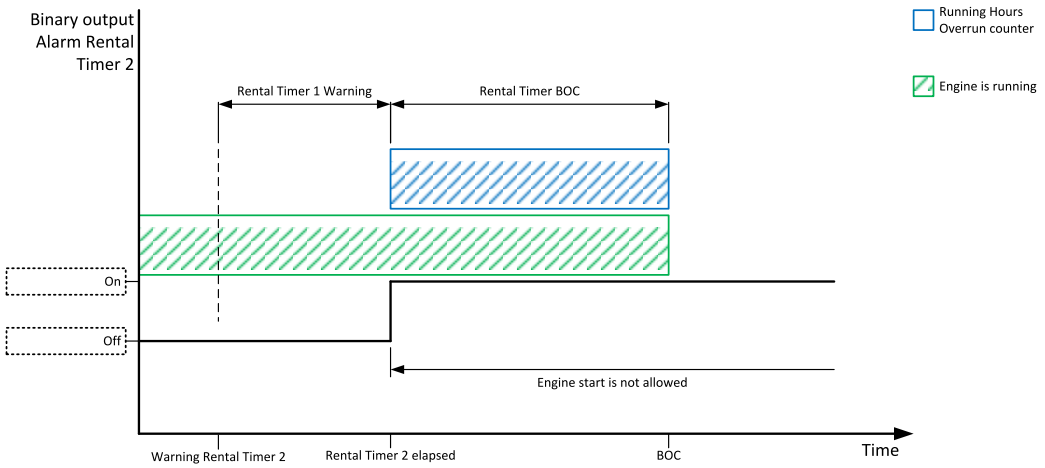


Image 8.139 Rental Timer 2

back to Logical binary outputs alphabetically

AL Start Fail

Related FW	1.3.0	Related applications	MINT, SPtM
Comm object	1291		
Description			
This output is active when the **Sd Start Fail (page 814)** alarm is present in the alarmlist or isn't confirm.			

back to Logical binary outputs alphabetically

AL Stop Fail

Related FW	1.3.0	Related applications	MINT, SPtM
Comm object	339		
Description			
This output is active when the **Wrn Stop Fail (page 795)** alarm is present in the alarmlist or isn't confirm.			

back to Logical binary outputs alphabetically

AL Underspeed

Related FW	1.3.0	Related applications	MINT, SPtM
Comm object	1296		
Description			
This output is active when the **Sd Underspeed (page 814)** alarm is present in the alarmlist or isn't confirm.			

back to Logical binary outputs alphabetically

Alarm

Related FW	1.3.0	Related applications	MINT, SPtM
Comm object	2		
Description			
The output is designed to be used as external alarm indication such as a red bulb in the control room etc. The output is active when at least one unconfirmed alarm is present in the alarmlist and remains active until confirmation of alarm.			

back to Logical binary outputs alphabetically

AIN Switch01

Related FW	1.3.0	Related applications	MINT, SPtM
Comm object	1400		
Description			
This is an output from the General Analog Input 1 switch function. The behavior of the switch depends on the adjustment of the setpoints **Analog Switch 1 On (page 362)** and **Analog Switch 1 Off (page 363)**. The value is measured from **AIN SWITCH 01 (PAGE 749)** analog input.			

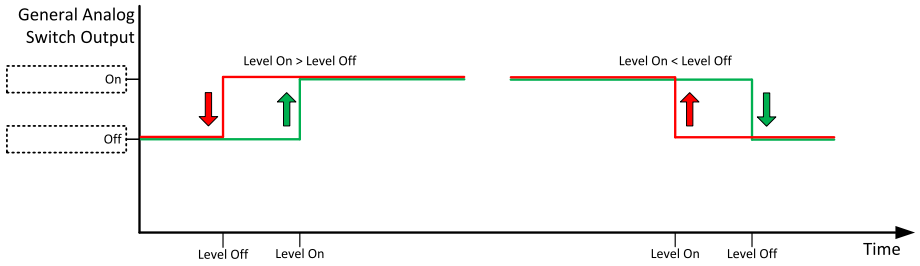


Image 8.140 General analog input 1 switch

back to Logical binary outputs alphabetically

AIN Switch02

Related FW	1.3.0	Related applications	MINT, SPtM
Comm object	1401		
Description			

This is an output from the General Analog Input 2 switch function. The behavior of the switch depends on the adjustment of the setpoints **Analog Switch 2 On (page 365)** and **Analog Switch 2 Off (page 366)**. The value is measured from **AIN SWITCH 02 (PAGE 749)** analog input.



Image 8.141 General analog input 2 switch

back to Logical binary outputs alphabetically

AIN Switch03

Related FW	1.3.0	Related applications	MINT, SPtM
Comm object	1402		
Description			

This is an output from the General Analog Input 3 switch function. The behavior of the switch depends on the adjustment of the setpoints **Analog Switch 3 On (page 368)** and **Analog Switch 3 Off (page 369)**. The value is measured from **AIN SWITCH 03 (PAGE 749)** analog input.



Image 8.142 General analog input 3 switch

back to Logical binary outputs alphabetically

AIN Switch04

Related FW	1.3.0	Related applications	MINT, SPtM
Comm object	1403		
Description			
This is an output from the General Analog Input 4 switch function. The behavior of the switch depends on the adjustment of the setpoints **Analog Switch 4 On (page 371)** and **Analog Switch 4 Off (page 372)**. The value is measured from **AIN SWITCH 04 (PAGE 750)** analog input.			



Image 8.143 General analog input 4 switch

Logical binary outputs alphabetically (page 666)

AIN Switch05

Related FW	1.3.0	Related applications	MINT, SPtM
Comm object	1787		
Description			
This is an output from the General Analog Input 5 switch function. The behavior of the switch depends on the adjustment of the setpoints **Analog Switch 5 On (page 374)** and **Analog Switch 5 Off (page 375)**. The value is measured from **AIN SWITCH 05 (PAGE 750)** analog input.			



Image 8.144 General analog input 5 switch

Logical binary outputs alphabetically (page 666)

AIN Switch06

Related FW	1.3.0	Related applications	MINT, SPtM
Comm object	1788		
Description			
This is an output from the General Analog Input 6 switch function. The behavior of the switch depends on the adjustment of the setpoints **Analog Switch 6 On (page 377)** and **Analog Switch 6 Off (page 378)**. The value is measured from **AIN SWITCH 06 (PAGE 750)** analog input.			



Image 8.145 General analog input 6 switch

Logical binary outputs alphabetically (page 666)

AIN Switch07

Related FW	1.3.0	Related applications	MINT, SPtM
Comm object	1789		
Description			
This is an output from the General Analog Input 7 switch function. The behavior of the switch depends on the adjustment of the setpoints **Analog Switch 7 On (page 380)** and **Analog Switch 7 Off (page 381)**. The value is measured from **AIN SWITCH 07 (PAGE 751)** analog input.			



Image 8.146 General analog input 7 switch

Logical binary outputs alphabetically (page 666)

AIN Switch08

Related FW	1.3.0	Related applications	MINT, SPtM
Comm object	1790		
Description			
This is an output from the General Analog Input 8 switch function. The behavior of the switch depends on the adjustment of the setpoints **Analog Switch 8 On (page 383)** and **Analog Switch 8 Off (page 384)**. The value is measured from **AIN SWITCH 08 (PAGE 751)** analog input.			



Image 8.147 General analog input 8 switch

Logical binary outputs alphabetically (page 666)

AIN Switch09

Related FW	1.3.0	Related applications	MINT, SPtM
Comm object	1791		
Description			
This is an output from the General Analog Input 9 switch function. The behavior of the switch depends on the adjustment of the setpoints **Analog Switch 9 On (page 386)** and **Analog Switch 9 Off (page 387)**. The value is measured from **AIN SWITCH 09 (PAGE 751)** analog input.			



Image 8.148 General analog input 9 switch

Logical binary outputs alphabetically (page 666)

AIN Switch10

Related FW	1.3.0	Related applications	MINT, SPtM
Comm object	1792		
Description			
This is an output from the General Analog Input 10 switch function. The behavior of the switch depends on the adjustment of the setpoints **Analog Switch 10 On (page 389)** and **Analog Switch 10 Off (page 390)**. The value is measured from **AIN SWITCH 10 (PAGE 752)** analog input.			



Image 8.149 General analog input 10 switch

Logical binary outputs alphabetically (page 666)

AIN Switch11

Related FW	1.3.0	Related applications	MINT, SPtM
Comm object	1793		
Description			
This is an output from the General Analog Input 11 switch function. The behavior of the switch depends on the adjustment of the setpoints **Analog Switch 11 On (page 392)** and **Analog Switch 11 Off (page 393)**. The value is measured from **AIN SWITCH 11 (PAGE 752)** analog input.			



Image 8.150 General analog input 11 switch

Logical binary outputs alphabetically (page 666)

AIN Switch12

Related FW	1.3.0	Related applications	MINT, SPtM
Comm object	1794		
Description			
This is an output from the General Analog Input 12 switch function. The behavior of the switch depends on the adjustment of the setpoints **Analog Switch 12 On (page 395)** and **Analog Switch 12 Off (page 396)**. The value is measured from **AIN SWITCH 12 (PAGE 752)** analog input.			



Image 8.151 General analog input 12 switch

Logical binary outputs alphabetically (page 666)

AIN Switch13

Related FW	1.3.0	Related applications	MINT, SPtM
Comm object	1795		
Description			
This is an output from the General Analog Input 13 switch function. The behavior of the switch depends on the adjustment of the setpoints **Analog Switch 13 On (page 398)** and **Analog Switch 13 Off (page 399)**. The value is measured from **AIN SWITCH 13 (PAGE 753)** analog input.			



Image 8.152 General analog input 13 switch

Logical binary outputs alphabetically (page 666)

AIN Switch14

Related FW	1.3.0	Related applications	MINT, SPtM
Comm object	1796		
Description			
This is an output from the General Analog Input 14 switch function. The behavior of the switch depends on the adjustment of the setpoints **Analog Switch 14 On (page 401)** and **Analog Switch 14 Off (page 402)**. The value is measured from **AIN SWITCH 14 (PAGE 753)** analog input.			



Image 8.153 General analog input 14 switch

Logical binary outputs alphabetically (page 666)

AIN Switch15

Related FW	1.3.0	Related applications	MINT, SPtM
Comm object	1797		
Description			
This is an output from the General Analog Input 15 switch function. The behavior of the switch depends on the adjustment of the setpoints **Analog Switch 15 On (page 404)** and **Analog Switch 15 Off (page 405)**. The value is measured from **AIN SWITCH 15 (PAGE 753)** analog input.			



Image 8.154 General analog input 15 switch

Logical binary outputs alphabetically (page 666)

AIN Switch16

Related FW	1.3.0	Related applications	MINT, SPtM
Comm object	1798		
Description			
This is an output from the General Analog Input 16 switch function. The behavior of the switch depends on the adjustment of the setpoints **Analog Switch 16 On (page 407)** and **Analog Switch 16 Off (page 408)**. The value is measured from **AIN SWITCH 16 (PAGE 754)** analog input.			

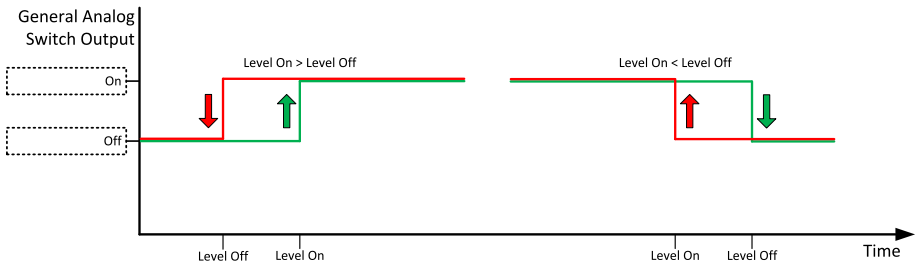


Image 8.155 General analog input 16 switch

Logical binary outputs alphabetically (page 666)

AIN Switch17

Related FW	1.3.0	Related applications	MINT, SPtM
Comm object	1799		
Description			
This is an output from the General Analog Input 17 switch function. The behavior of the switch depends on the adjustment of the setpoints **Analog Switch 17 On (page 410)** and **Analog Switch 17 Off (page 411)**. The value is measured from **AIN SWITCH 17 (PAGE 754)** analog input.			

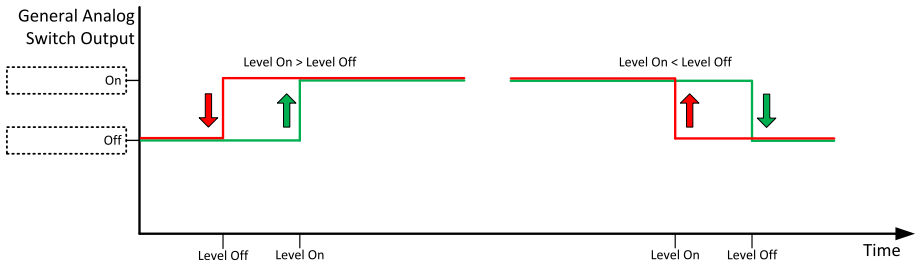


Image 8.156 General analog input 17 switch

Logical binary outputs alphabetically (page 666)

AIN Switch18

Related FW	1.3.0	Related applications	MINT, SPtM
Comm object	1800		
Description			

This is an output from the General Analog Input 18 switch function. The behavior of the switch depends on the adjustment of the setpoints **Analog Switch 18 On (page 413)** and **Analog Switch 18 Off (page 414)**. The value is measured from **AIN SWITCH 18 (PAGE 754)** analog input.



Image 8.157 General analog input 18 switch

Logical binary outputs alphabetically (page 666)

AIN Switch19

Related FW	1.3.0	Related applications	MINT, SPtM
Comm object	1801		
Description			

This is an output from the General Analog Input 19 switch function. The behavior of the switch depends on the adjustment of the setpoints **Analog Switch 19 On (page 416)** and **Analog Switch 19 Off (page 417)**. The value is measured from **AIN SWITCH 19 (PAGE 755)** analog input.



Image 8.158 General analog input 19 switch

Logical binary outputs alphabetically (page 666)

AIN Switch20

Related FW	1.3.0	Related applications	MINT, SPtM
Comm object	1802		
Description			
This is an output from the General Analog Input 20 switch function. The behavior of the switch depends on the adjustment of the setpoints **Analog Switch 20 On (page 419)** and **Analog Switch 20 Off (page 420)**. The value is measured from **AIN SWITCH 20 (PAGE 755)** analog input.			



Image 8.159 General analog input 20 switch

Logical binary outputs alphabetically (page 666)

AVR Down

Related FW	1.3.0	Related applications	MINT, SPtM
Comm object	55		
Description			
This output together with the complementary output **AVR UP (PAGE 690)** is designed for voltage and power factor control at gen-sets, where the AVR does not support analog control.			

back to Logical binary outputs alphabetically

AVR Up

Related FW	1.3.0	Related applications	MINT, SPtM
Comm object	54		
Description			
This output together with the complementary output **AVR DOWN (PAGE 690)** is designed for voltage and power factor control at gen-sets, where the AVR does not support analog control.			

back to Logical binary outputs alphabetically

LBO: B

BIN 1 Status

Related FW	1.3.0	Related applications	MINT, SPtM
Comm object	1374		
Description			
This output is closed, when Binary Input 1 is active and open when Binary Input 1 is inactive. When Binary Input 1 is used for BIN protection function then this output is closed when BIN protection alarm is in Alarmlist.			

Note: *When LBI 1 is used like protection, then state of this LBO is connected with this protection e.g. when LBI is inactive but alarm of protection is not confirm in alarmlist, LBO is still active.*

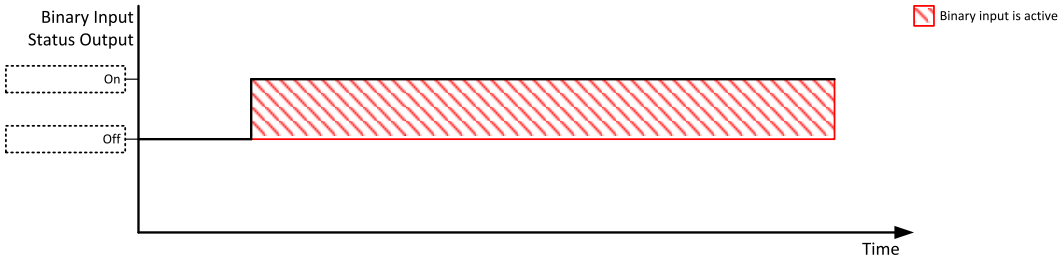


Image 8.160 Binary Input 1 Status

back to Logical binary outputs alphabetically

BIN 2 Status

Related FW	1.3.0	Related applications	MINT, SPtM
Comm object	1375		
Description			
This output is closed, when Binary Input 2 is active and open when Binary Input 2 is inactive. When Binary Input 2 is used for BIN protection function then this output is closed when BIN protection alarm is in Alarmlist.			

Note: *When LBI 2 is used like protection, then state of this LBO is connected with this protection e.g. when LBI is inactive but alarm of protection is not confirm in alarmlist, LBO is still active.*

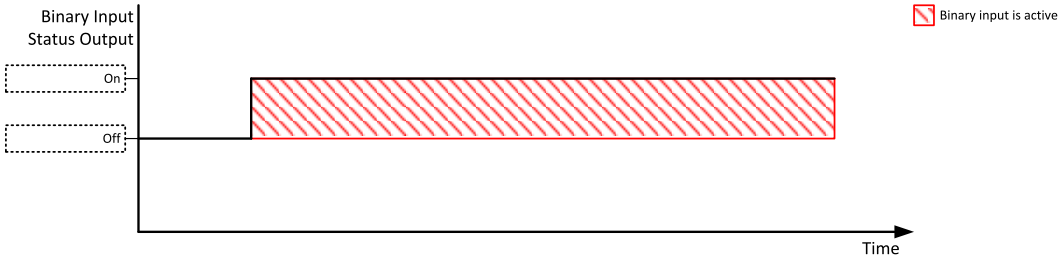


Image 8.161 Binary Input 2 Status

back to Logical binary outputs alphabetically

BIN 3 Status

Related FW	1.3.0	Related applications	MINT, SPtM
Comm object	1376		
Description			

This output is closed, when Binary Input 3 is active and open when Binary Input 3 is inactive. When Binary Input 3 is used for BIN protection function then this output is closed when BIN protection alarm is in Alarmlist.

Note: *When LBI 3 is used like protection, then state of this LBO is connected with this protection e.g. when LBI is inactive but alarm of protection is not confirm in alarmlist, LBO is still active.*

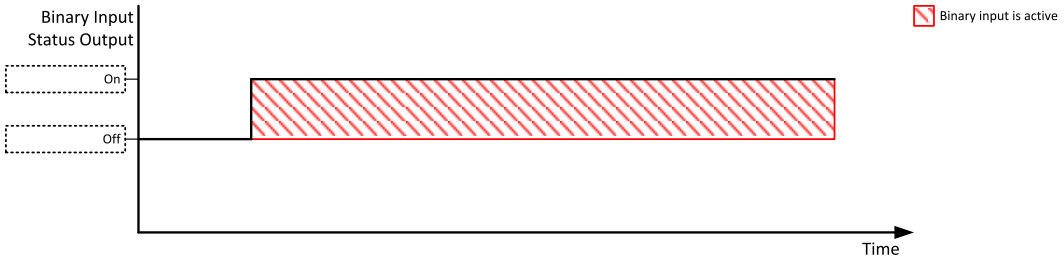


Image 8.162 Binary Input 3 Status

back to Logical binary outputs alphabetically

BIN 4 Status

Related FW	1.3.0	Related applications	MINT, SPtM
Comm object	1377		
Description			

This output is closed, when Binary Input 4 is active and open when Binary Input 4 is inactive. When Binary Input 4 is used for BIN protection function then this output is closed when BIN protection alarm is in Alarmlist.

Note: *When LBI 4 is used like protection, then state of this LBO is connected with this protection e.g. when LBI is inactive but alarm of protection is not confirm in alarmlist, LBO is still active.*

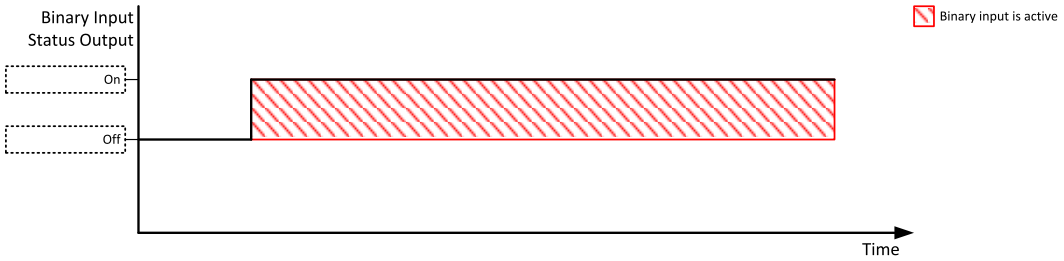


Image 8.163 Binary Input 4 Status

back to Logical binary outputs alphabetically

BIN 5 Status

Related FW	1.3.0	**Related applications**	MINT, SPtM
Comm object	1378		
Description			

This output is closed, when Binary Input 5 is active and open when Binary Input 5 is inactive. When Binary Input 5 is used for BIN protection function then this output is closed when BIN protection alarm is in Alarmlist.

Note: *When LBI 5 is used like protection, then state of this LBO is connected with this protection e.g. when LBI is inactive but alarm of protection is not confirm in alarmlist, LBO is still active.*

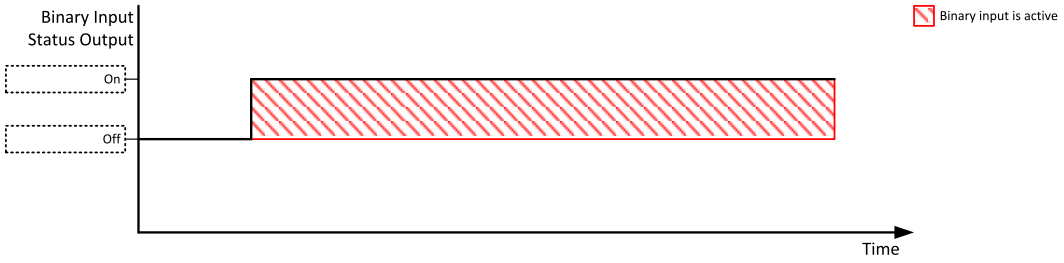


Image 8.164 Binary Input 5 Status

back to Logical binary outputs alphabetically

BIN 6 Status

Related FW	1.3.0	**Related applications**	MINT, SPtM
Comm object	1379		
Description			

This output is closed, when Binary Input 6 is active and open when Binary Input 6 is inactive. When Binary Input 6 is used for BIN protection function then this output is closed when BIN protection alarm is in Alarmlist.

Note: *When LBI 6 is used like protection, then state of this LBO is connected with this protection e.g. when LBI is inactive but alarm of protection is not confirm in alarmlist, LBO is still active.*

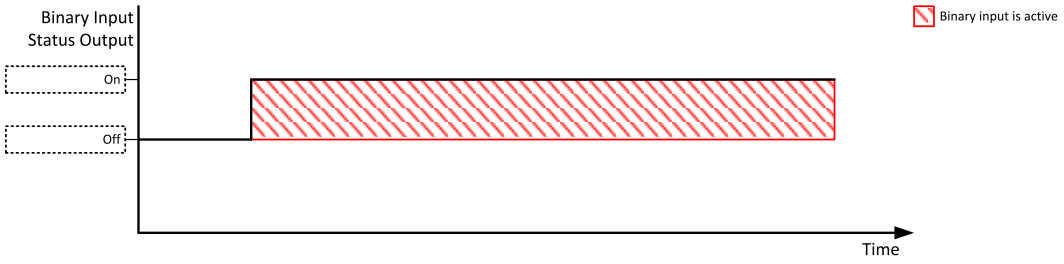


Image 8.165 Binary Input 6 Status

back to Logical binary outputs alphabetically

BIN 7 Status

Related FW	1.3.0	Related applications	MINT, SPtM
Comm object	1380		
Description			
This output is closed, when Binary Input 7 is active and open when Binary Input 7 is inactive. When Binary Input 7 is used for BIN protection function then this output is closed when BIN protection alarm is in Alarmlist. ***Note:*** *When LBI 7 is used like protection, then state of this LBO is connected with this protection e.g. when LBI is inactive but alarm of protection is not confirm in alarmlist, LBO is still active.*			

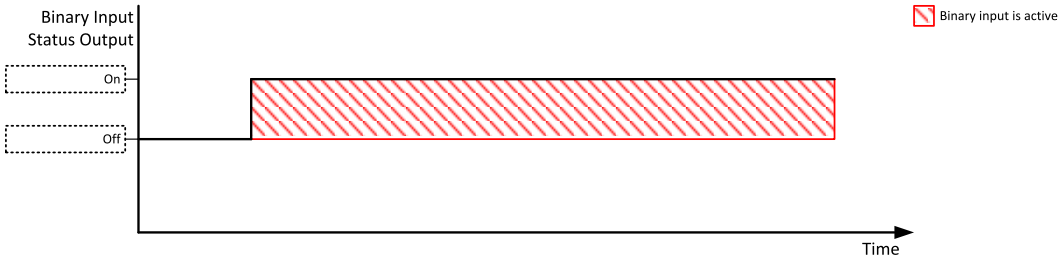


Image 8.166 Binary Input 7 Status

back to Logical binary outputs alphabetically

BIN 8 Status

Related FW	1.3.0	Related applications	MINT, SPtM
Comm object	1381		
Description			
This output is closed, when Binary Input 8 is active and open when Binary Input 8 is inactive. When Binary Input 8 is used for BIN protection function then this output is closed when BIN protection alarm is in Alarmlist. ***Note:*** *When LBI 8 is used like protection, then state of this LBO is connected with this protection e.g. when LBI is inactive but alarm of protection is not confirm in alarmlist, LBO is still active.*			

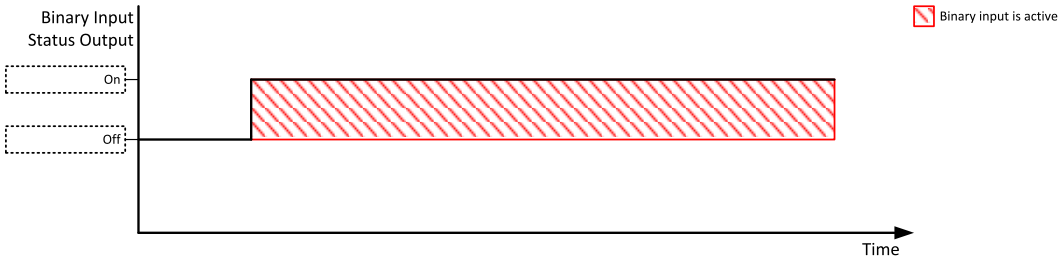


Image 8.167 Binary Input 8 Status

back to Logical binary outputs alphabetically

LBO: C

Cooling Pump

Related FW	1.3.0	Related applications	MINT, SPtM
Comm object	40		
Description			
This output is dedicated for coolant pump control. It is closed in the moment the gen-set is started and remains closed until the gen-set is stopped and **After Cooling Time (page 275)** elapses or the cranking pause or the Emergency Stop occurs or the controller is switched to OFF mode.			

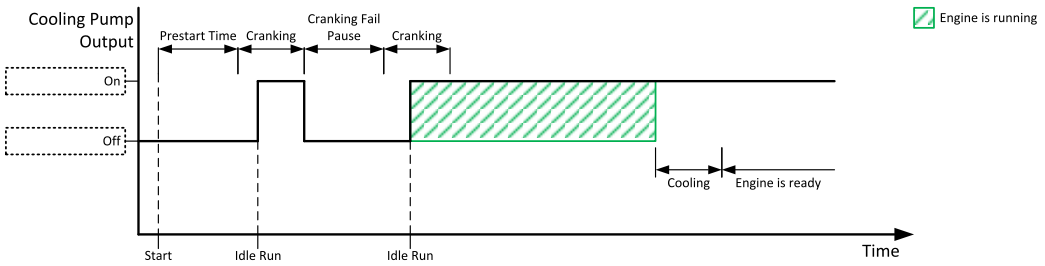


Image 8.168 Cooling Pump

back to Logical binary outputs alphabetically

Cooling

Related FW	1.3.0	Related applications	MINT, SPtM
Comm object	74		
Description			
The output closes when gen-set is in Cooling state.			

back to Logical binary outputs alphabetically

LBO: E

ECU Communic Error

Related FW	1.3.0	Related applications	MINT, SPtM
Comm object	114		
Description			
This output is active when an ECU is configured, but the communication with the ECU is not established or has dropped out.			

> ***Note:*** *When **ECU POWER RELAY (PAGE 696)** is not configured, output is evaluated all the time. If **ECU POWER RELAY (PAGE 696)** is configured, output is evaluated only when engine is not stop (**ECU POWER RELAY (PAGE 696)** is active).*

back to Logical binary outputs alphabetically

ECU Communic OK

Related FW	1.3.0	Related applications	MINT, SPtM
Comm object	347		
Description			

This output is active when an ECU is configured, connected and the communication with the ECU is established.

> ***Note:*** *When* ***ECU POWER RELAY (PAGE 696)*** *is not configured, output is evaluated all the time. If* ***ECU POWER RELAY (PAGE 696)*** *is configured, output is evaluated only when engine is not stop (****ECU POWER RELAY (PAGE 696)*** *is active).*

back to Logical binary outputs alphabetically

ECU Power Relay

Related FW	1.3.0	Related applications	MINT, SPtM
Comm object	116		
Description			

This output is to be used for control of “keyswitch” input of an ECU. If the particular ECU does not have keyswitch or a similar input, it can be used for control of DC power for the ECU.

The output closes together with **PRESTART (PAGE 718)** and remains closed for the entire duration that the engine is running. It is opened at the moment that the engine comes to a stop (i.e. together with the **FUEL SOLENOID (PAGE 699)**).

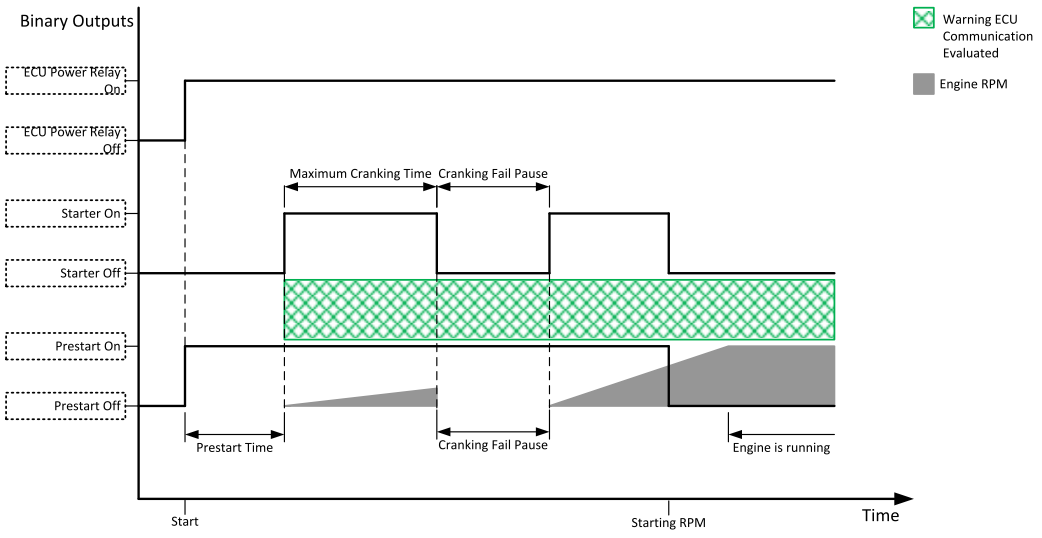


Image 8.169 ECU Power Relay

> **IMPORTANT: This LBO also affects evaluation of Sd ECU Communication Fail (page 807) or Wrn ECU Communication Fail (page 786) alarms. With configured LBO ECU Power Relay, these alarms are evaluated only when this LBO is active. Without configured LBO ECU Power Relay, these alarm are evaluated all the time.**

back to Logical binary outputs alphabetically

ECU Red Lamp

Related FW	1.3.0	**Related applications**	MINT, SPtM
Comm object	350		
Description			
This output is active when the ECU sends an active “red lamp” flag, i.e. it has detected a critical malfunction and the engine should not be operated until a service check is performed. This flag is taken from the DM1 frame on standard J1939 ECUs. Some ECUs provide this flag in their own proprietary frames and some do not provide the flag at all.			

back to Logical binary outputs alphabetically

ECU Run Stop

Related FW	1.3.0	**Related applications**	MINT, SPtM
Comm object	958		
Description			
Signal for starting and stopping of ECU.			

back to Logical binary outputs alphabetically

ECU Yellow Lamp

Related FW	1.3.0	**Related applications**	MINT, SPtM
Comm object	349		
Description			
This output is active when the ECU sends an active “yellow lamp” flag, i.e. it has detected a non-critical malfunction. This flag is taken from the DM1 frame on standard J1939 ECUs. Some ECUs provide this flag in their own proprietary frames and some do not provide the flag at all.			

back to Logical binary outputs alphabetically

Exercise Timer 1

Related FW	1.3.0	**Related applications**	MINT, SPtM
Comm object	1250		
Description			
This is an output from the Exercise timer 1. This output makes it easy to make periodic tests of the gen-set and its activation depends on the setpoints in the **Subgroup: Timer 1 (page 422)** subgroup. This output is active when Timer 1 is active. ***Note:*** *In the event that both Timers are active at the same time,* ***Subgroup: Timer 1 (page 422)*** *has a higher priority than* ***Subgroup: Timer 2 (page 429)****.*			

back to Logical binary outputs alphabetically

Exercise Timer 2

Related FW	1.3.0	Related applications	MINT, SPtM
Comm object	1251		
Description			
This is an output from the Exercise timer 2. This output makes it easy to make periodic tests of the gen-set and its activation depends on the setpoints in the **Subgroup: Timer 2 (page 429)** subgroup. This output is active when Timer 2 is active. ***Note:*** *In the event that both Timers are active at the same time,* ***Subgroup: Timer 1 (page 422)*** *has a higher priority than* ***Subgroup: Timer 2 (page 429)****.*			

back to Logical binary outputs alphabetically

LBO: F

FltRes Button Echo

Related FW	1.3.0	Related applications	MINT, SPtM
Comm object	592		
Description			
This output provides 1s pulse when: ▶ Fault Reset button is pressed on the controller front facia or ▶ Fault Reset button is pressed on any of external local/remote terminals or ▶ Fault Reset command is received via communication line or ▶ the input FAULT RESET BUTTON is activated.			

back to Logical binary outputs alphabetically

Frequency Select

Related FW	1.3.0	Related applications	MINT, SPtM
Comm object	1815		
Description			
The Frequency select output is opened when Nominal Frequency (Frequency Settings) is equal to 50Hz and closed when Nominal Frequency (Frequency Settings) is equal to 60Hz.			

back to Logical binary outputs alphabetically

Fuel Pump

Related FW	1.3.0	**Related applications**	MINT, SPtM
Comm object	1253		
Description			

Output closes when the value of Fuel Level lies under the value of **Fuel Pump On (page 292)** setpoint and opens when value of **Fuel Pump Off (page 293)** is reached.

This output also can be closed by binary input **FUEL PUMP ON/OFF (PAGE 651)**. In this case the binary output **FUEL PUMP ON (PAGE 292)** is closed until the binary input **FUEL PUMP ON/OFF (PAGE 651)** is active or until the value of **Fuel Pump Off (page 293)** is reached.

> ***Note:*** *Setpoints **Fuel Pump On (page 292)** and **Fuel Pump Off (page 293)** are invisible until configuration of this LBO.*

back to Logical binary outputs alphabetically

Fuel Solenoid

Related FW	1.3.0	**Related applications**	MINT, SPtM
Comm object	22		
Description			

This output controls the fuel solenoid valve. The Fuel Solenoid output has two different behaviors depending on engine type – gas or diesel. This setting is done by **Fuel Solenoid (page 264)** setpoint in Engine Settings group.I

Diesel:

The output closes before binary output **STARTER (PAGE 723)**.The lead time is adjusted by setpoint **Fuel Solenoid Lead (page 269)**.

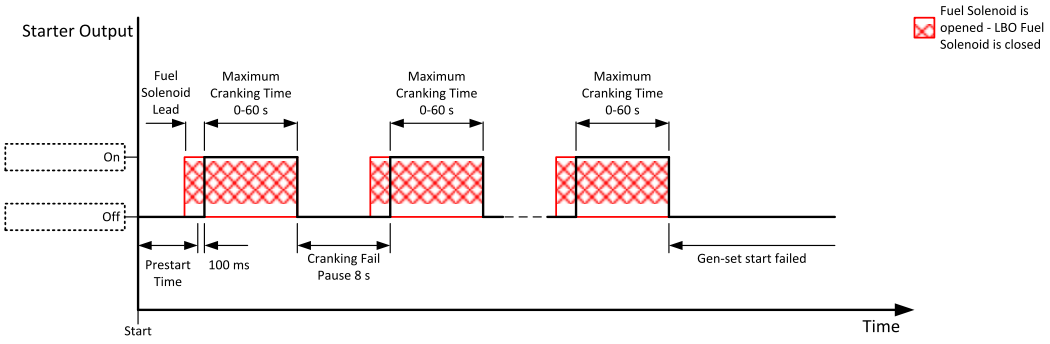


Image 8.170 Fuel Solenoid 1

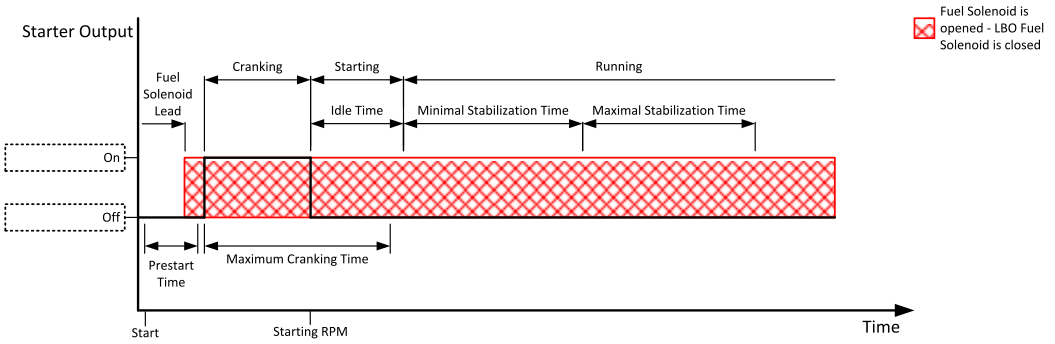


Image 8.171 Fuel Solenoid 2

The output opens when:

- Emergency Stop comes
- cooled gen-set is stopped
- in pause between repeated starts

Gas:

The output closes together with binary output **IGNITION (PAGE 708)** when engine RPM exceed 30 RPM (fix value).

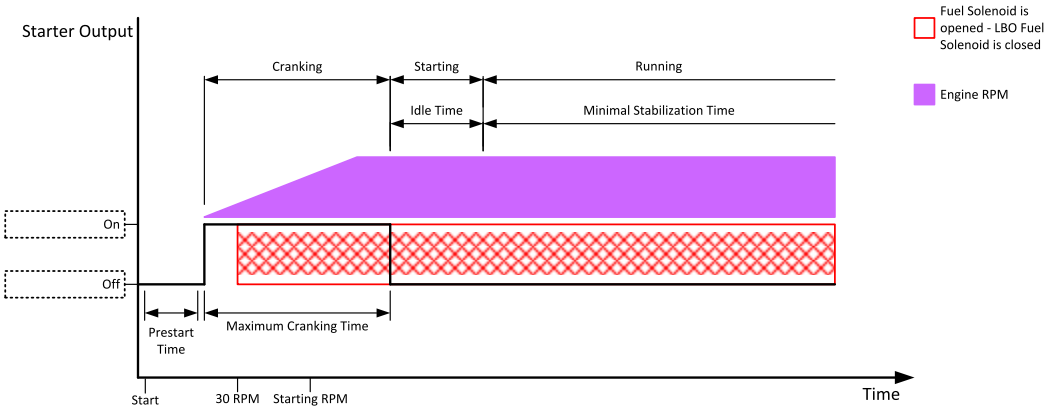


Image 8.172 Fuel Solenoid 3

The output opens when:

- Emergency Stop comes
- cooled gen-set is stopped
- in pause between repeated starts

back to Logical binary outputs alphabetically

LBO: G

GCB Button Echo

Related FW	1.3.0	**Related applications**	MINT, SPtM
Comm object	35		
Description			

This output provides 1s pulse when:

- GCB button is pressed on the controller front facia or
- GCB button is pressed on any of external local/remote terminals or
- GCB command is received via communication line or
- the input GCB BUTTON is activated.

back to Logical binary outputs alphabetically

GCB Close/Open

Related FW	1.3.0	**Related applications**	MINT, SPtM
Comm object	41		
Description			

The output controls the generator circuit breaker. Its state represents the breaker position requested by the controller. The breaker must react within 5 seconds to a close or open command, otherwise an alarm is issued.

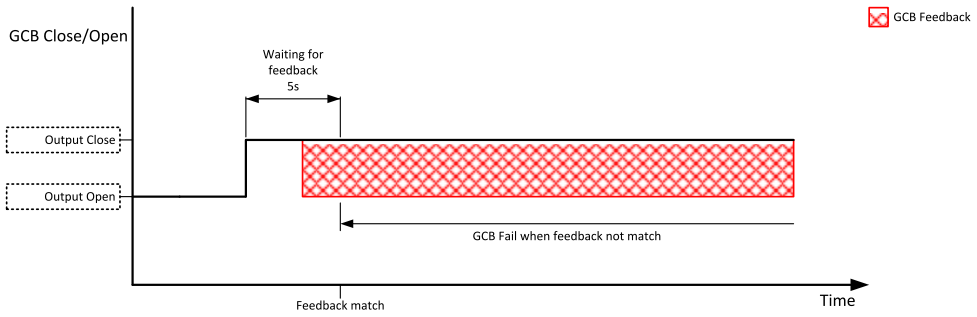


Image 8.173 GCB Close command

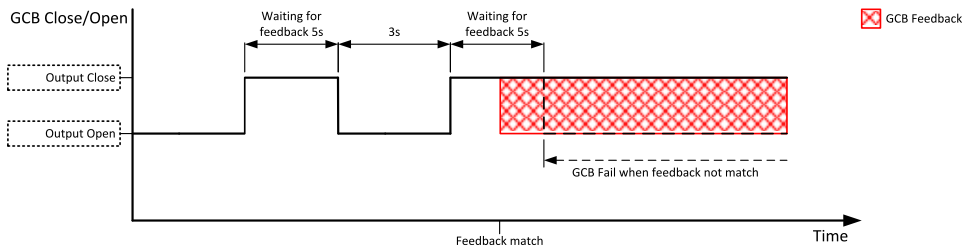


Image 8.174 Repeated GCB Close command

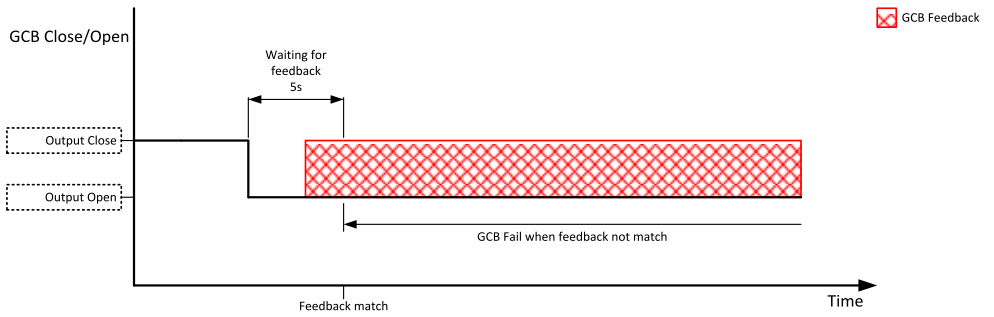


Image 8.175 GCB Open command

back to Logical binary outputs alphabetically

GCB OFF Coil

Related FW	1.3.0	Related applications	MINT, SPtM
Comm object	43		

Description

The output is intended for control of open coil of generator circuit breaker. The output gives a pulse in the moment the breaker has to be opened. The pulse lasts until the feedback deactivates, but at least for 5 seconds.

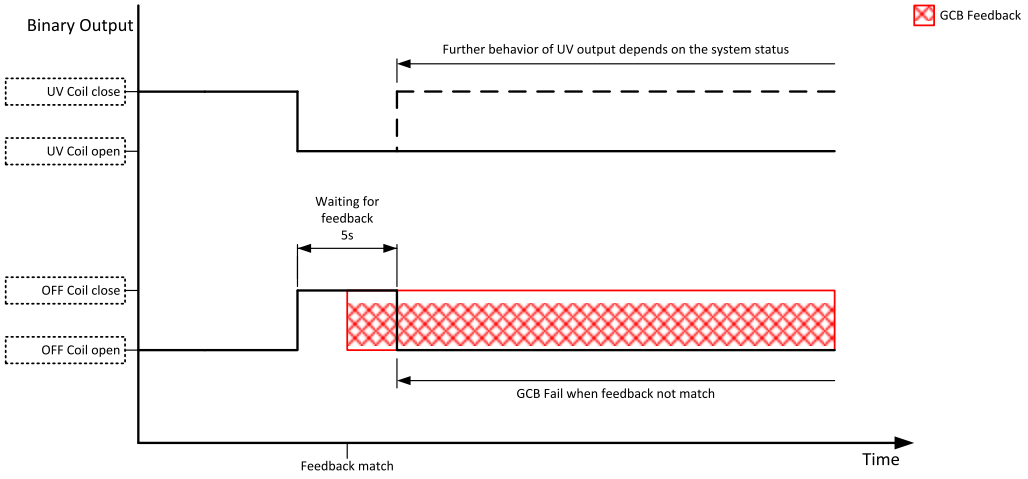


Image 8.176 GCB OFF Coil command

back to Logical binary outputs alphabetically

GCB ON Coil

Related FW	1.3.0	Related applications	MINT, SPtM
Comm object	42		
Description			
The output is intended for control of close coil of generator circuit breaker. The output gives at least 5 second pulse in the moment the breaker has to be closed.			

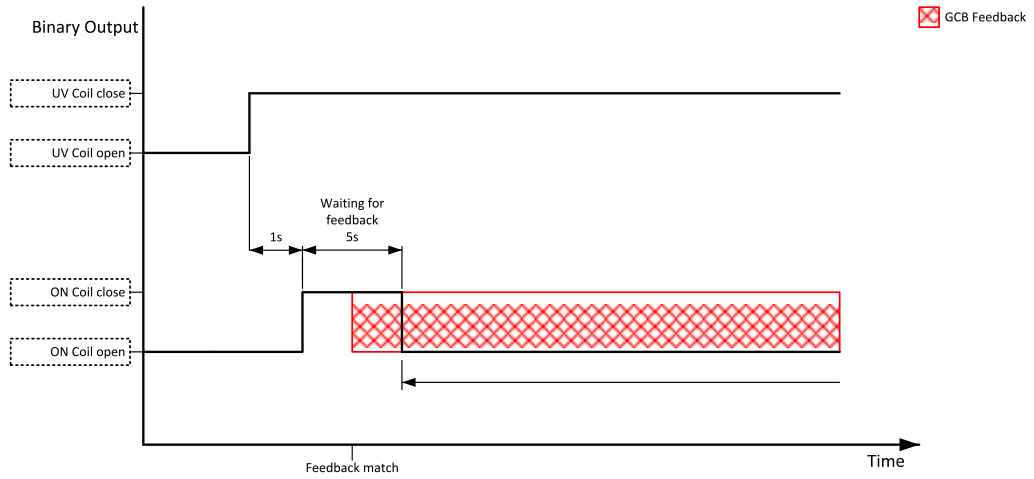


Image 8.177 GCB ON Coil close command

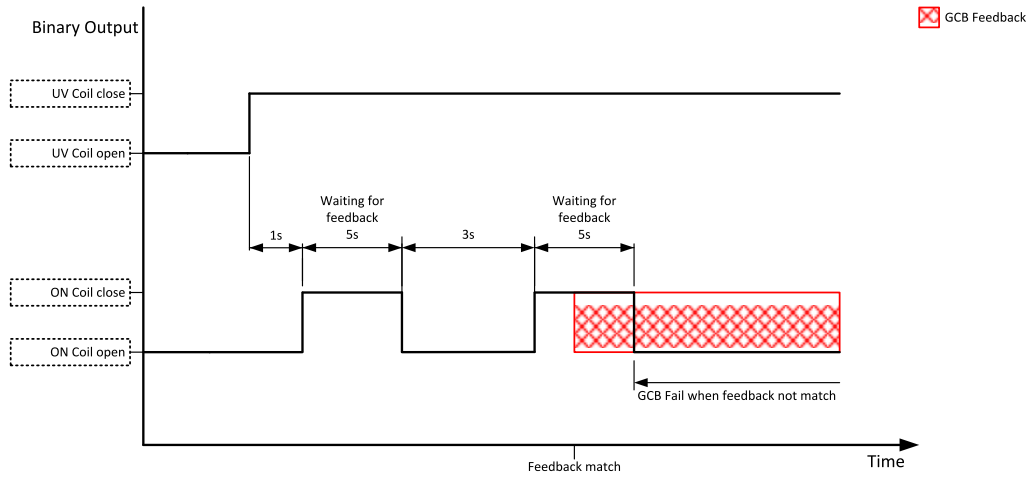


Image 8.178 Repeated GCB ON coil close command

back to Logical binary outputs alphabetically

GCB UV Coil

Related FW	1.3.0	Related applications	MINT, SPtM
Comm object	44		
Description			
The output is intended for control of undervoltage coil of generator circuit breaker. The output is active the			

whole time when the generator is running. The output is deactivated for at least 5 seconds in the moment the breaker has to be switched off.

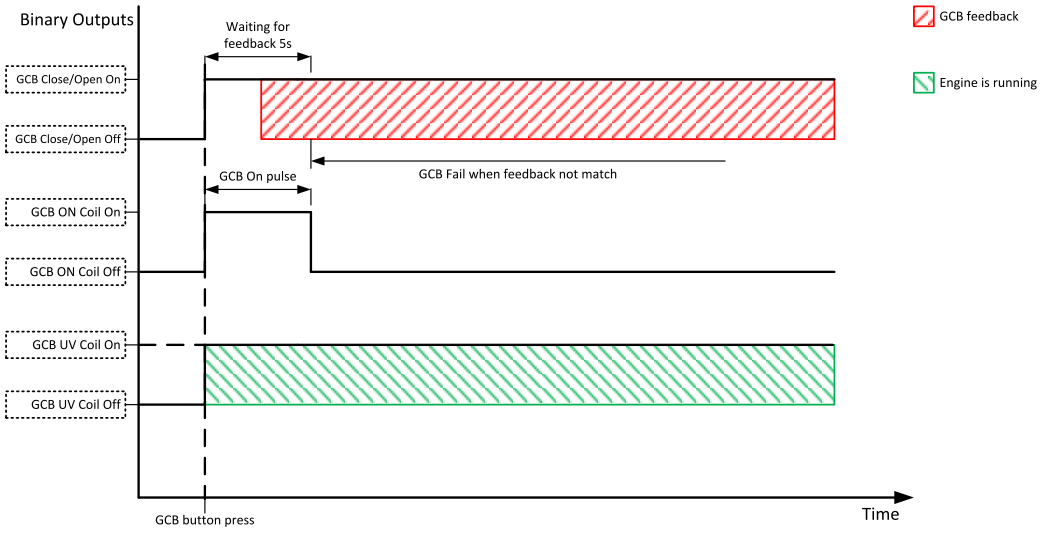


Image 8.179 GCB UV Coil close command

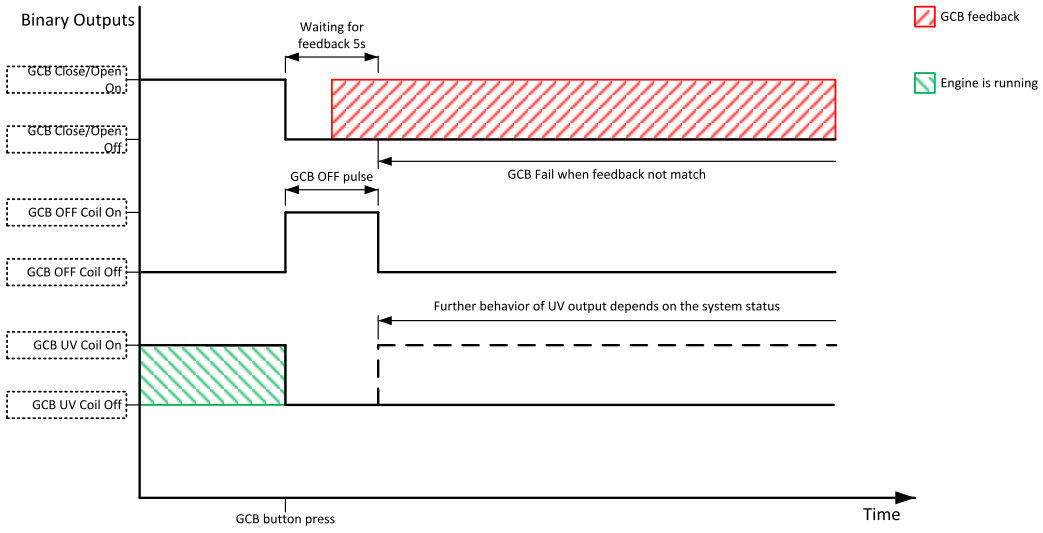


Image 8.180 GCB UV Coil open command

back to Logical binary outputs alphabetically

Generator Healthy

Related FW	1.3.0	Related applications	MINT, SPtM
Comm object	77		
Description			

This output is active when the generator voltage, frequency and voltage unbalance is within limits. It is deactivated:

- immediately when the voltage/frequency/voltage unbalance gets out of limits (when GCB is not closed)
  or
- with an appropriate delay after the voltage/frequency/voltage unbalance has got out of limits (when GCB is closed)

back to Logical binary outputs alphabetically

Glow Plugs

Related FW	1.3.0	Related applications	MINT, SPtM
Comm object	1252		
Description			

This output is dedicated for diesel engine only. This output will close for exact time pre-set by setpoint **Glow Plugs Time (page 268)** before every starting attempt. The output opens in same time as the **STARTER (PAGE 723)** output closes (100 ms after **PRESTART (PAGE 718)** output opens).

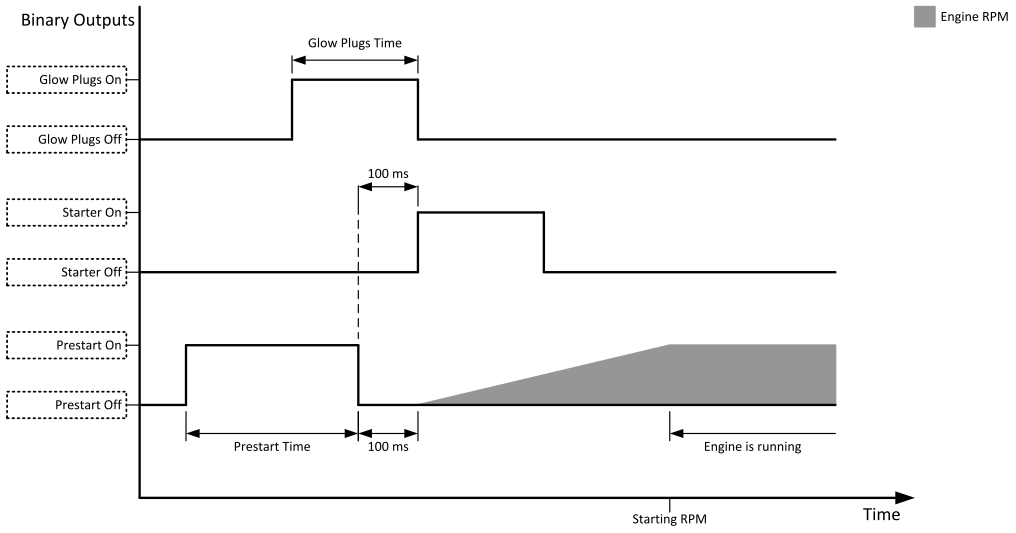


Image 8.181 Glow Plugs

When the **Glow Plugs Time (page 268)** is longer than **Cranking Fail Pause (page 265)** then the **Glow Plugs Time (page 268)** in **Cranking Fail Pause (page 265)** is long as **Cranking Fail Pause (page 265)**.

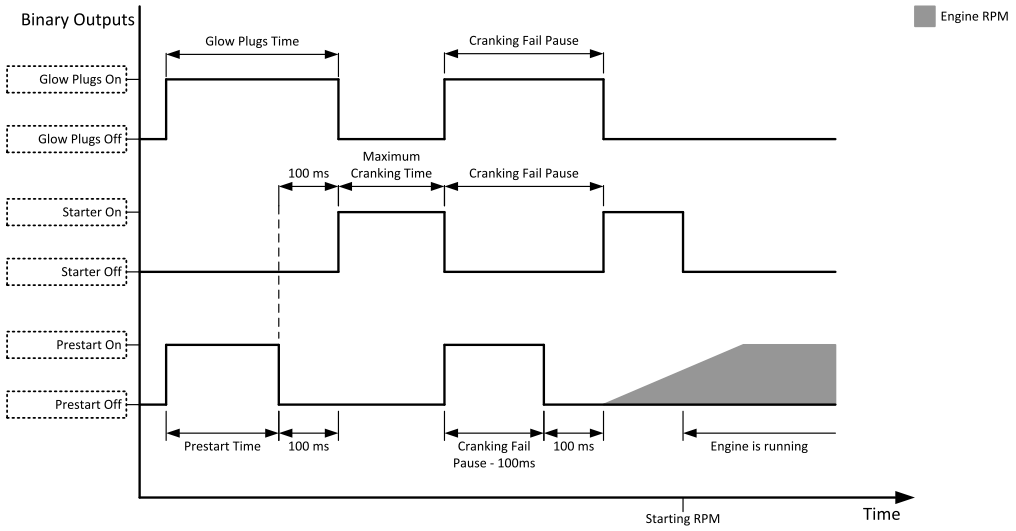


Image 8.182 Glow Plugs in Cranking Fail Pause 1

When the **Glow Plugs Time (page 268)** is shorter than **Cranking Fail Pause (page 265)** then the **Glow Plugs Time (page 268)** in **Cranking Fail Pause (page 265)** is long as normal **Glow Plugs Time (page 268)**.

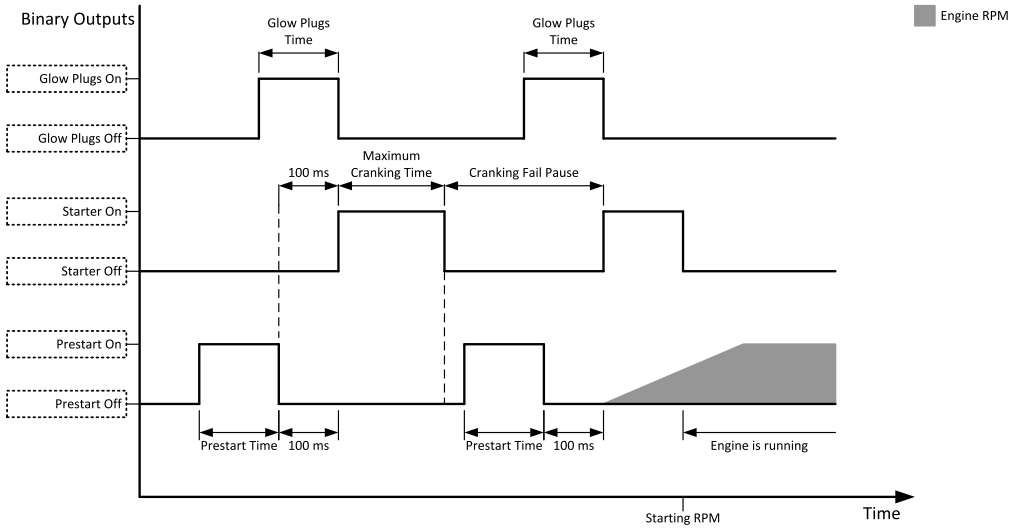


Image 8.183 Glow Plugs in Cranking Fail Pause 2

back to Logical binary outputs alphabetically

LBO: H

Heartbeat

Related FW	1.3.0	**Related applications**	MINT, SPtM
Comm object	81		
Description			
This output toggles on/off in a period of 500 ms whenever the controller is switched on and functional.			

back to Logical binary outputs alphabetically

HEST Lamp

Related FW	1.3.0	**Related applications**	MINT, SPtM
Comm object	1373		
Description			
This output is closed if ECU send signal HEST Lamp. If ECU stop send HEST LAMP signal binary input will be opened without no matter if alarms in alarmlist are confirmed or not.			

back to Logical binary outputs alphabetically

Horn

Related FW	1.3.0	**Related applications**	MINT, SPtM
Comm object	1		
Description			

The output designed to be used for acoustic indication of a newly appeared alarm. The output is activated each time a new alarm has appeared and remains active until one of the following events occurs:

- Fault reset is pressed
- Horn reset is pressed
- **Horn Timeout (page 261)** has elapsed

back to Logical binary outputs alphabetically

HornRes Button Echo

Related FW	1.3.0	**Related applications**	MINT, SPtM
Comm object	31		
Description			

This output provides 1s pulse when:

- Horn Reset button is pressed on the controller front facia or
- Horn Reset button is pressed on any of external local/remote terminals or
- Horn Reset command is received via communication line or
- the input HORN RESET BUTTON is activated.

back to Logical binary outputs alphabetically

LBO: I

Idle/Nominal

Related FW	1.3.0	**Related applications**	MINT, SPtM
Comm object	39		
Description			

This output is used for switching between idle speed and nominal speed of the engine during the startup phase, if this feature (input) is available on the particular engine. In the case of some EFI engines, the idle/nominal switching is performed over the communication bus.

The output Idle/Nominal closes after the timer **Idle Time (page 269)** elapses. The **Idle Time (page 269)** starts to countdown when **Starting RPM (page 266)** reached. The underspeed protection is not evaluated during fixed 5 seconds period after reaching **Starting RPM (page 266)**. A Start Fail protection occurs if the RPM drop below 2RPM during idle.

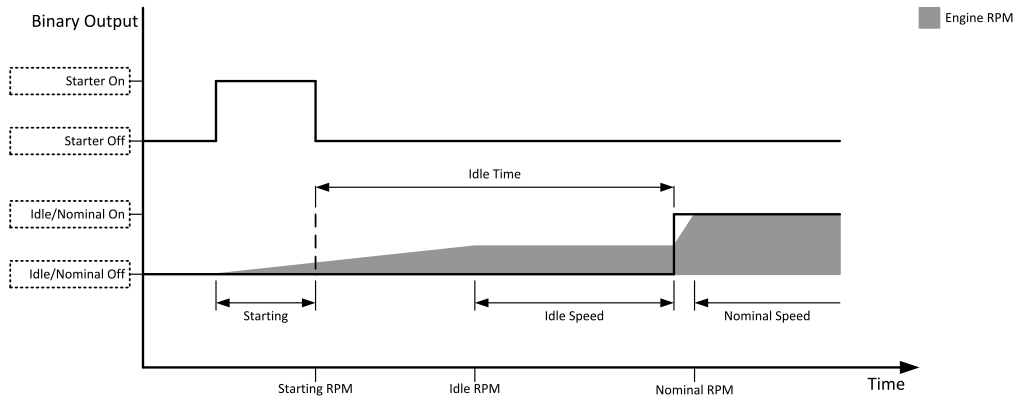


Image 8.184 Idle/Nominal

Note: *Connect binary output Idle/Nominal to speed governor to switch the speed:*
opened = Idle
closed = Nominal
(for normally open contact type)

back to Logical binary outputs alphabetically

Ignition

Related FW	1.3.0	**Related applications**	MINT, SPtM
Comm object	37		
Description			

This output is dedicated to controlling the ignition at a gas engine. The output is closed together with binary output **FUEL SOLENOID (PAGE 699)** in the moment when the timer **Sd Ventilation Time (page 273)** elapsed and the gen-set reaches at least 30 RPM during cranking. The timer **Sd Ventilation Time (page 273)** become active when the gen-set has been stopped for any Sd protection or the controller has been turned on only before first cranking attempt. The output is opened 500ms after all Additional running engine indication **Additional running engine indications (page 165)** will be inactive. The output is opened when the gen-set has to be stopped or in pause during repeated starts.

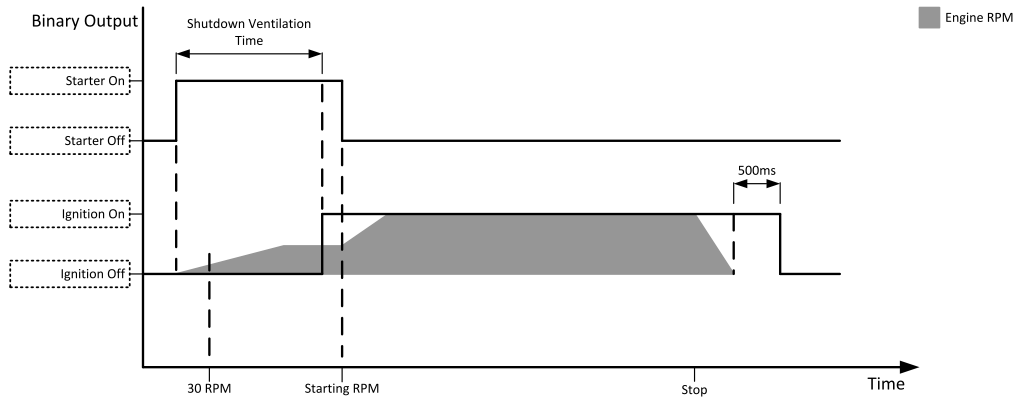


Image 8.185 Ignition 1

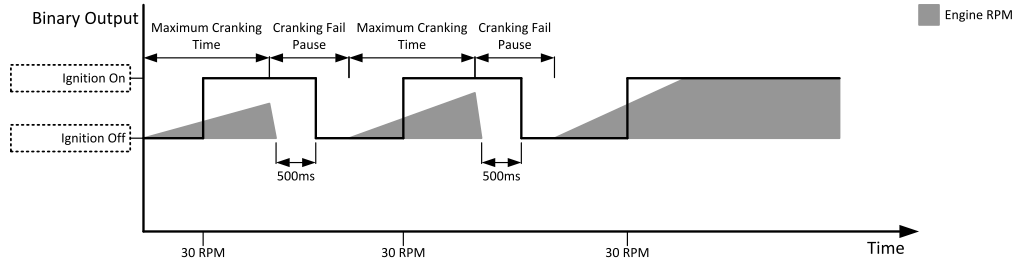


Image 8.186 Ignition 2

back to Logical binary outputs alphabetically

Ignition On

Related FW	1.3.0	**Related applications**	MINT, SPtM
Comm object	1257		

Description

This input is on since start button is pressed till the unit is completely stopped (or the engine doesn't start or Sd or E-Stop becomes active)

> ***Note:*** *This function is the same as* ***ECU POWER RELAY (PAGE 696)*** *. Ignition ON stays there from historical reasons.*

back to Logical binary outputs alphabetically

LBO: L

Load Shedding Stage 1

Related FW	1.3.0	**Related applications**	MINT, SPtM
Comm object	51		
Description			
Particular instances of the load shedding functionality The load shedding outputs are activated (load is beeing shedd) in the order 1, 2, 3. The load shedding outputs are deactivated (load is beeing reconnected) in the order 3, 2, 1. The load disconnected by the LBO Nr.1 is the less essential load of these three possible loads instances.			

back to Logical binary outputs alphabetically

Load Shedding Stage 2

Related FW	1.3.0	**Related applications**	MINT, SPtM
Comm object	52		
Description			
Particular instances of the load shedding functionality The load shedding outputs are activated (load is beeing shedd) in the order 1, 2, 3. The load shedding outputs are deactivated (load is beeing reconnected) in the order 3, 2, 1. The load disconnected by the LBO Nr.1 is the less essential load of these three possible loads instances.			

back to Logical binary outputs alphabetically

Load Shedding Stage 3

Related FW	1.3.0	**Related applications**	MINT, SPtM
Comm object	53		
Description			
Particular instances of the load shedding functionality The load shedding outputs are activated (load is beeing shedd) in the order 1, 2, 3. The load shedding outputs are deactivated (load is beeing reconnected) in the order 3, 2, 1. The load disconnected by the LBO Nr.1 is the less essential load of these three possible loads instances.			

back to Logical binary outputs alphabetically

LBO: M

Mains Healthy

Related FW	1.3.0	**Related applications**	MINT, SPtM
Comm object	78		
Description			
This output is active while mains failure is not detected and mains voltage and frequency is within limits.			

back to Logical binary outputs alphabetically

Manual Ready

Related FW	1.3.0	Related applications	MINT, SPtM
Comm object	1258		
Description			
This output is active when controller is in MAN mode and the engine is stopped and it is possible to start it i.e. no red alarm is activated or SD OVERRIDE (PAGE 664) is active (Output READY (PAGE 720) is active).			

back to Logical binary outputs alphabetically

MCB Button Echo

Related FW	1.3.0	Related applications	MINT, SPtM
Comm object	34		
Description			

This output provides 1s pulse when:

- MCB button is pressed on the controller front facia or
- MCB button is pressed on any of external local/remote terminals or
- MCB command is received via communication line or
- the input MCB BUTTON is activated.

back to Logical binary outputs alphabetically

MCB Close/Open

Related FW	1.3.0	Related applications	MINT, SPtM
Comm object	45		
Description			

The output controls the mains circuit breaker. Its state represents the breaker position requested by the controller. The breaker must react within 5 seconds to a close or open command, otherwise an alarm is issued.

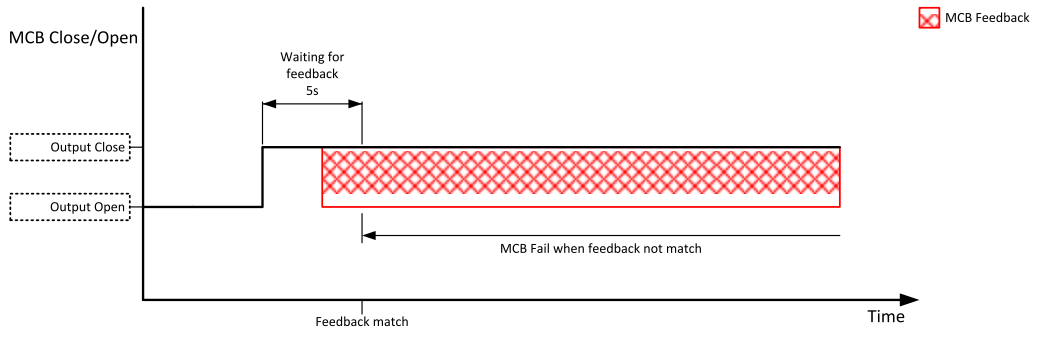


Image 8.187 MCB Close command

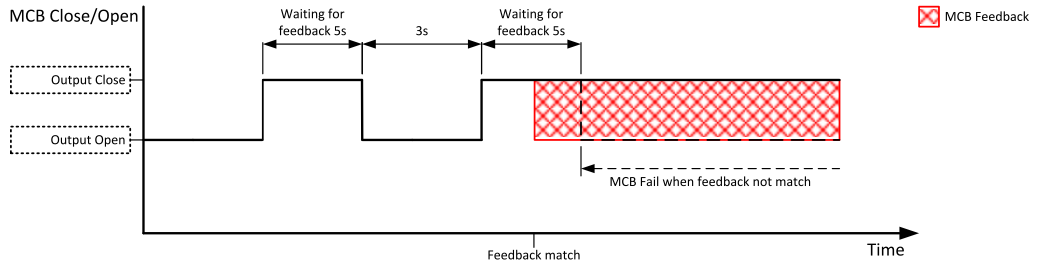


Image 8.188 Repeated MCB Close command

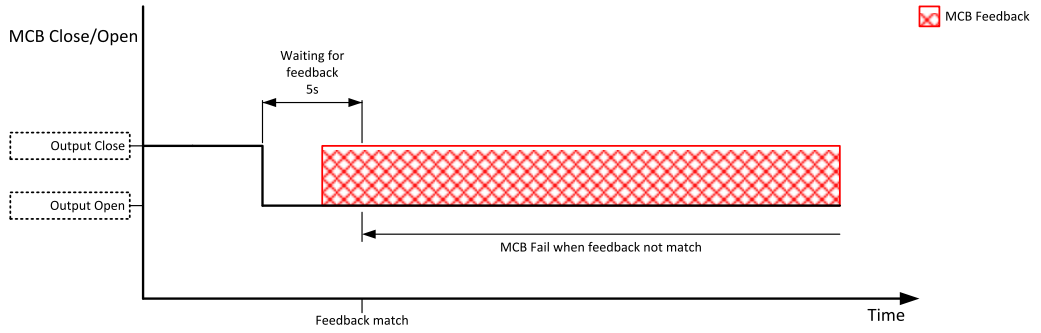


Image 8.189 MCB Open command

back to Logical binary outputs alphabetically

MCB OFF Coil

Related FW	1.3.0	Related applications	MINT, SPtM
Comm object	47		

Description

The output is intended for control of open coil of mains circuit breaker. The output gives a pulse in the moment the breaker has to be opened. The pulse lasts until the feedback deactivates, but at least for 5 seconds.

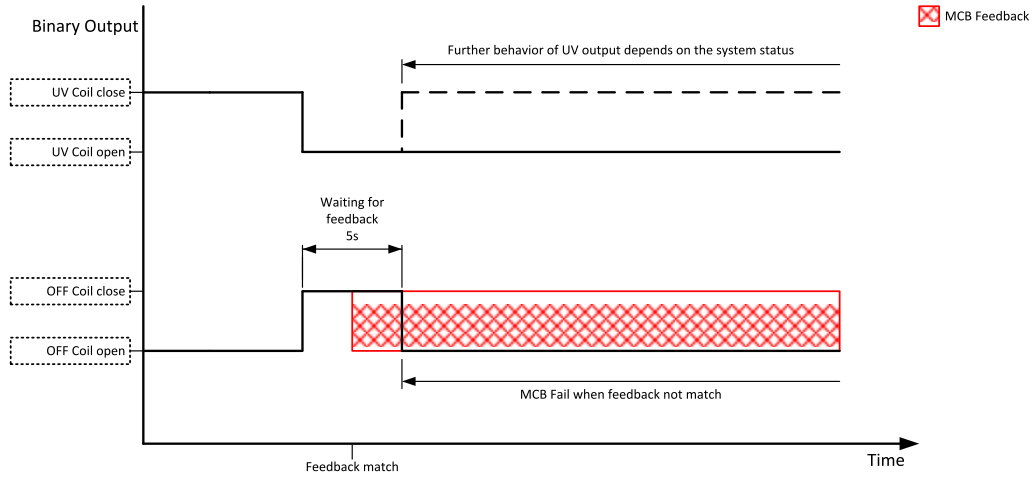


Image 8.190 MCB OFF Coil command

back to Logical binary outputs alphabetically

MCB ON Coil

Related FW	1.3.0	Related applications	MINT, SPtM
Comm object	46		

Description

The output is intended for control of close coil of mains circuit breaker. The output gives at least 5 second pulse in the moment the breaker has to be closed.

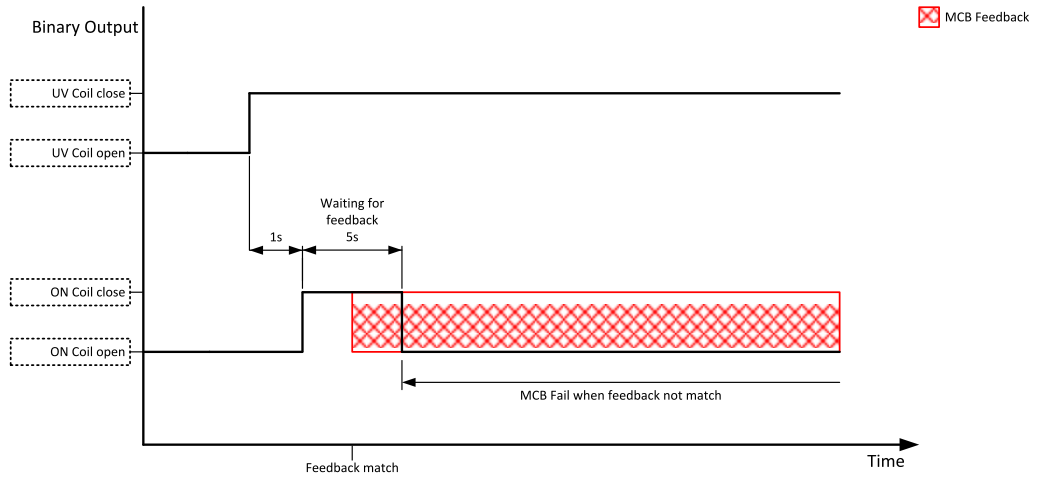


Image 8.191 MCB ON Coil close command

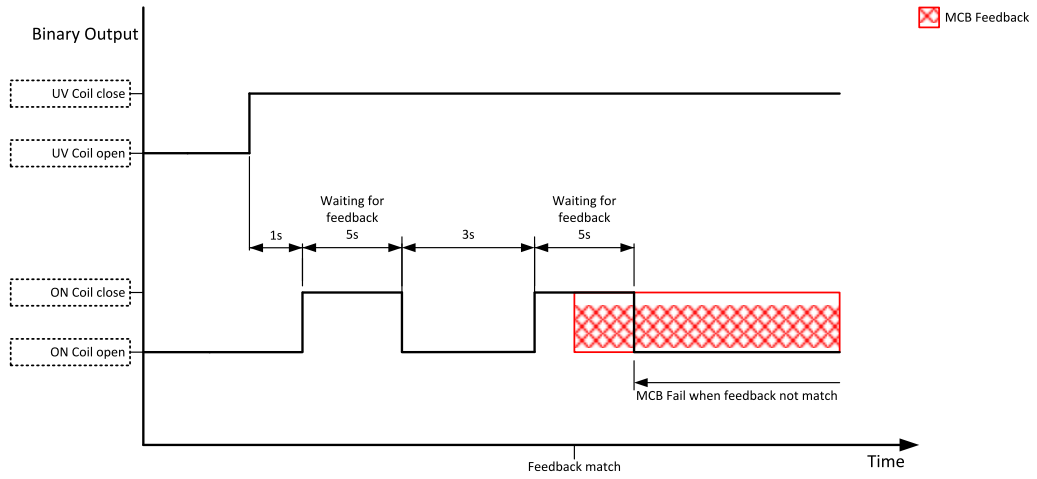


Image 8.192 Repeated MCB ON coil close command

back to Logical binary outputs alphabetically

MCB UV Coil

Related FW	1.3.0	Related applications	MINT, SPtM
Comm object	48		

Description

The output is intended for control of undervoltage coil of mains circuit breaker. The output is active the whole time when the controller is switched on. The output is deactivated for at least 5 seconds in the moment the breaker has to be switched off.

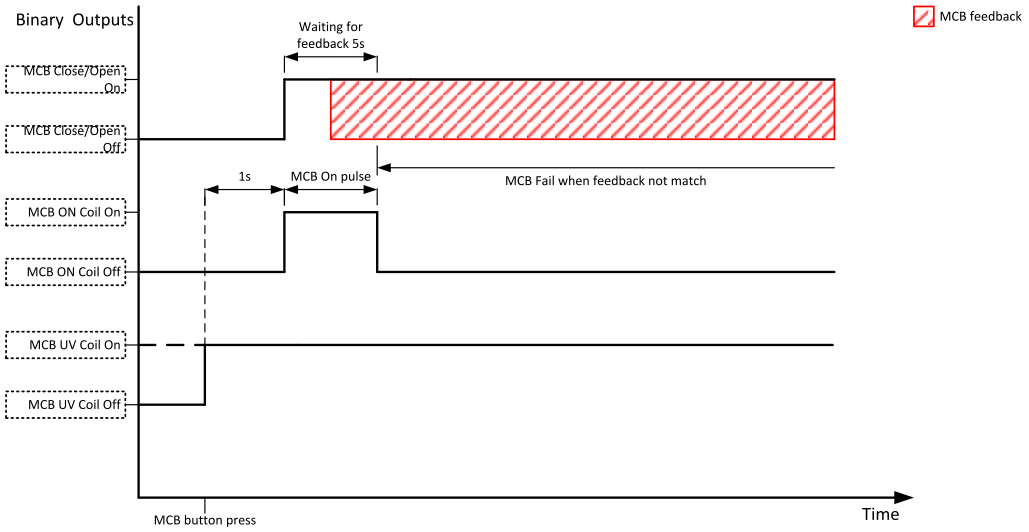


Image 8.193 MCB UV Coil close command

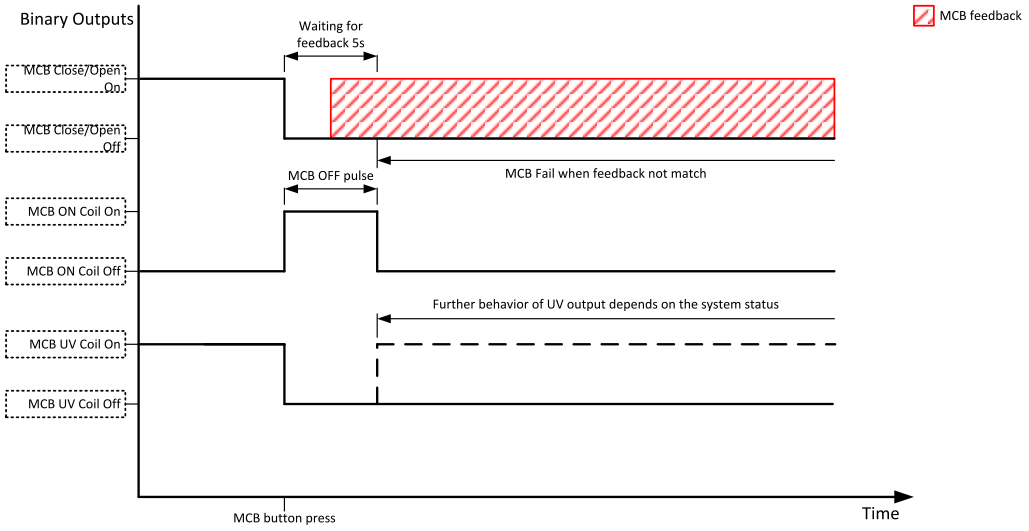


Image 8.194 MCb UV Coil open command

back to Logical binary outputs alphabetically

Mode AUTO

Related FW	1.3.0	**Related applications**	MINT, SPtM
Comm object	19		
Description			
This output is active whenever the controller is in AUTO mode.			

back to Logical binary outputs alphabetically

Mode MAN

Related FW	1.3.0	**Related applications**	MINT, SPtM
Comm object	18		
Description			
This output is active whenever the controller is in MAN mode.			

back to Logical binary outputs alphabetically

Mode OFF

Related FW	1.3.0	**Related applications**	MINT, SPtM
Comm object	17		
Description			
This output is active whenever the controller is in OFF mode.			

back to Logical binary outputs alphabetically

Mode TEST

Related FW	1.3.0	**Related applications**	MINT, SPtM
Comm object	20		
Description			
This output is active whenever the controller is in TEST mode.			

back to Logical binary outputs alphabetically

LBO: N

NCB Close/Open

Related FW	1.3.0	**Related applications**	MINT
Comm object	50		
Description			
Neutral circuit breaker Close/Open output controls the generator neutral circuit breaker. It is intended for contactors – provides a continual active signal if NCB should be closed.			

back to Logical binary outputs alphabetically

Not In AUTO

Related FW	1.3.0	**Related applications**	MINT, SPtM
Comm object	1248		
Description			
This output is active when controller isn't in AUTO mode.			

back to Logical binary outputs alphabetically

Not Used

Related FW	1.3.0	**Related applications**	MINT, SPtM
Comm object	286		
Description			
Output has no function.			

back to Logical binary outputs alphabetically

LBO: P

Peak Shaving Active

Related FW	1.3.0	**Related applications**	MINT, SPtM
Comm object	2118		
Description			
Active anytime, when the peak shaving start condition is fulfilled.			

back to Logical binary outputs alphabetically

Power Switch

Related FW	1.3.0	**Related applications**	MINT, SPtM
Comm object	290		

Description

This is an output from the Power switch function. The behavior of the switch depends on the adjustment of the setpoints **Power Switch On (page 275)** and **Power Switch Off (page 276)**. When the dummy load function is used the switching ON of Power switch is block when the engine isn't running and is allowed 30 s after start of the engine.



Image 8.195 Power Switch

***Note:** Setpoints **Power Switch On (page 275)** and **Power Switch Off (page 276)** are invisible until configuration of this LBO.*

back to Logical binary outputs alphabetically

Prestart

Related FW	1.3.0	**Related applications**	MINT, SPtM
Comm object	36		

Description

This output can be used for control of any device, which has to be activated just before start. The output is closed for time period of **Prestart Time (page 266)**. The output opens 100 ms before the **STARTER (PAGE 723)** output closes.

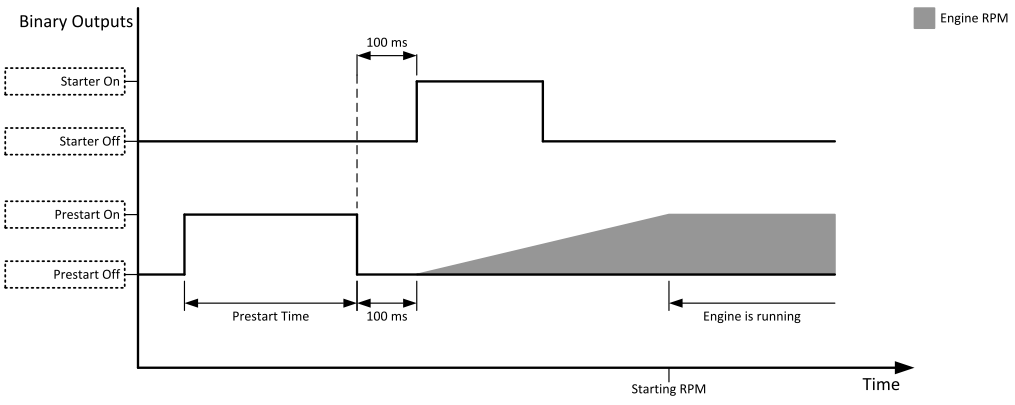


Image 8.196 Engine start

When the **Prestart Time (page 266)** is longer than **Cranking Fail Pause (page 265)** then the **Prestart Time (page 266)** in **Cranking Fail Pause (page 265)** is long as **Cranking Fail Pause (page 265)** minus 100ms.

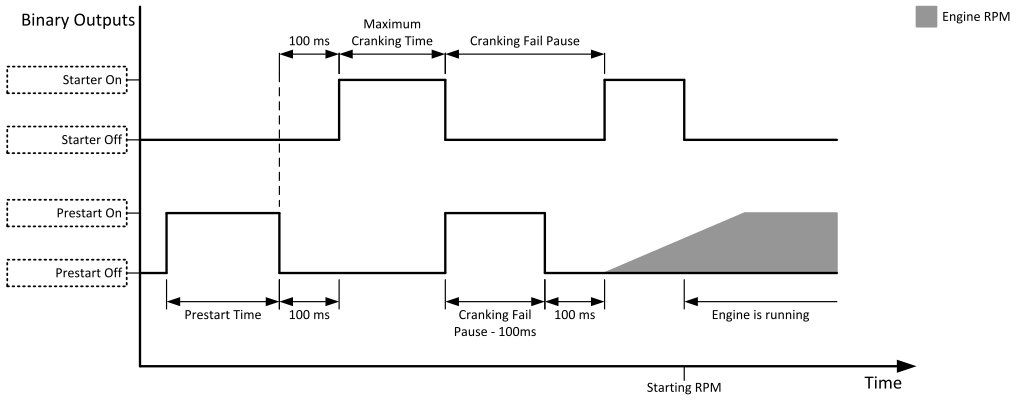


Image 8.197 Prestart in Cranking Fail Pause 1

When the **Prestart Time (page 266)** is shorter than **Cranking Fail Pause (page 265)** then the **Prestart Time (page 266)** in **Cranking Fail Pause (page 265)** is long as normal **Prestart Time (page 266)**.

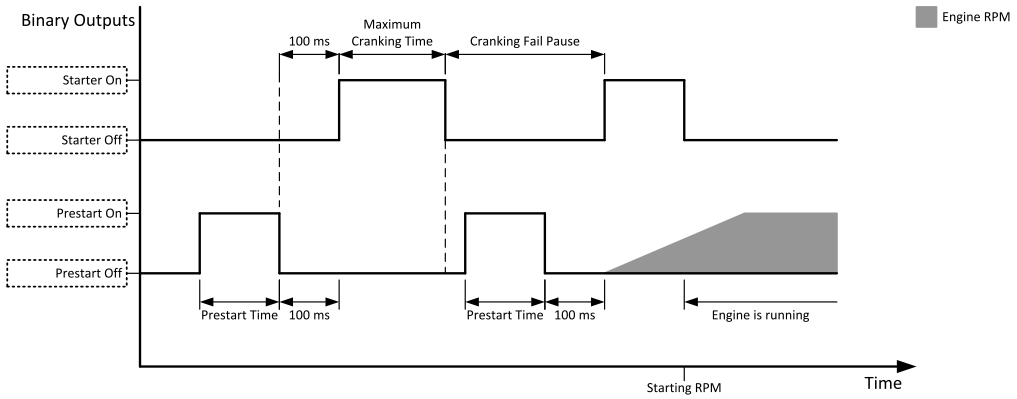


Image 8.198 Prestart in Cranking Fail Pause 2

back to Logical binary outputs alphabetically

LBO: R

Ready To AMF

Related FW	1.3.0	**Related applications**	MINT, SPtM
Comm object	324		
Description			

The output is closed if the gen-set is ready to start automatically and take the load if the mains fails, i.e.:

- the controller is in AMF operating mode
- the controller is in AUTO controller mode and
- no red alarm is present in the alarmlist
- when the red alarm is confirmed during Stop Valve and other requirements are fulfilled then the LBO is still inactive until the state ready

back to Logical binary outputs alphabetically

Ready To Load

Related FW	1.3.0	**Related applications**	MINT, SPtM
Comm object	58		
Description			

The output is closed whenever the GCB is closed or can be closed i.e. the stabilization phase is finished, the gen-set is running and the **Minimal Stabilization Time (page 271)** timer has elapsed.
and the gen-set voltage and frequency are within limits.

If GCB is open then gen-set voltage and frequency must be in limits.

If GCB is close then gen-set voltage and frequency can be out of limits, but protection delay can't be count down. If gen-set voltage and frequency will return into limits until delay is count down then output is still closed.

back to Logical binary outputs alphabetically

Ready

Related FW	1.3.0	**Related applications**	MINT, SPtM
Comm object	62		
Description			

The binary output is closed, when the engine is stopped and it is possible to start it i.e. no red alarm is activated or **SD OVERRIDE (PAGE 664)** is active.

The binary output is switch on when the Ready state occurs.

The binary output is switch off when the Prestart or the Not Ready or the Stop state occurs i.e. always except Ready state.

back to Logical binary outputs alphabetically

RegenerationNeeded

Related FW	1.3.0	**Related applications**	MINT, SPtM
Comm object	1372		
Description			
This output is closed when DPF lamp from ECU is active.			

back to Logical binary outputs alphabetically

Running

Related FW	1.3.0	**Related applications**	MINT, SPtM
Comm object	67		
Description			

The output is designed to be used as an indication that the gen-set is running. The output closes if **FUEL SOLENOID (PAGE 699)** is closed and **STARTER (PAGE 723)** and **PRESTART (PAGE 718)** are open. The out remains close until engine stop and cooling period elapses.

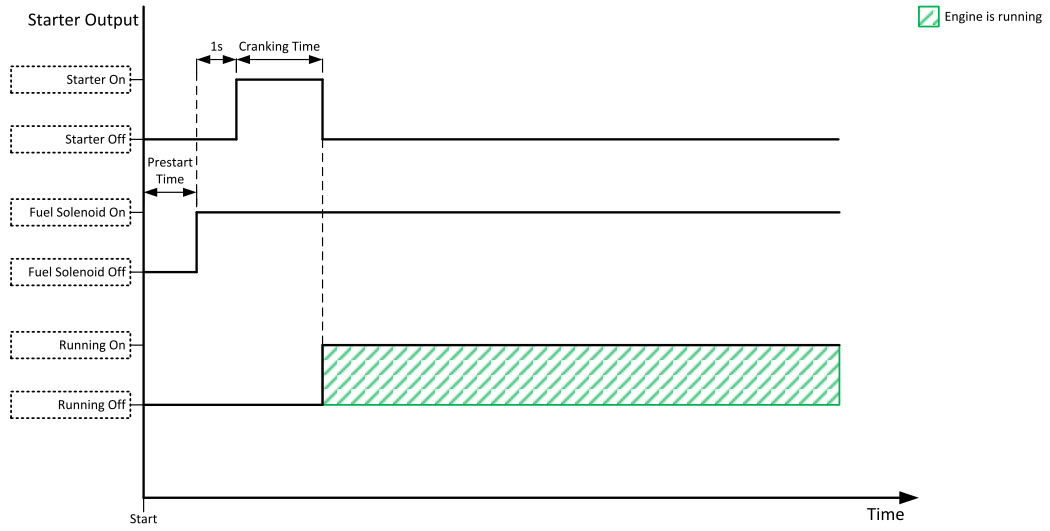


Image 8.199 Running

back to Logical binary outputs alphabetically

LBO: S

Sd Override

Related FW	1.3.0	**Related applications**	MINT, SPtM
Comm object	962		
Description			

The output is closed if **SD OVERRIDE (PAGE 664)** input is active and open if **SD OVERRIDE (PAGE 664)** input is inactive. This output is usually used to send information about **SD OVERRIDE (PAGE 664)** input into ECU.

back to Logical binary outputs alphabetically

Speed Down

Related FW	1.3.0	**Related applications**	MINT, SPtM
Comm object	57		
Description			
This output together with the complementary output **SPEED UP (PAGE 722)** are designed for speed and power control at gen-sets where the speed governor does not support analogue control.			

back to Logical binary outputs alphabetically

Speed Up

Related FW	1.3.0	**Related applications**	MINT, SPtM
Comm object	56		
Description			
This output together with the complementary output **SPEED DOWN (PAGE 722)** are designed for speed and power control at gen-sets where the speed governor does not support analogue control.			

back to Logical binary outputs alphabetically

Start Button Echo

Related FW	1.3.0	**Related applications**	MINT, SPtM
Comm object	33		
Description			

This output provides 1s pulse when:

- Start button is pressed on the controller front facia or
- Start button is pressed on any of external local/remote terminals or
- Start command is received via communication line or
- the input START BUTTON is activated.

back to Logical binary outputs alphabetically

Starter

Related FW	1.3.0	Related applications	MINT, SPtM
Comm object	24		
Description			

This output is dedicated for starter motor control. The number of cranking attempts is adjusted by setpoint **Cranking Attempts (page 265)** in Engine Settings group. Cranking fail pause is adjusted by setpoint **Cranking Fail Pause (page 265)**.

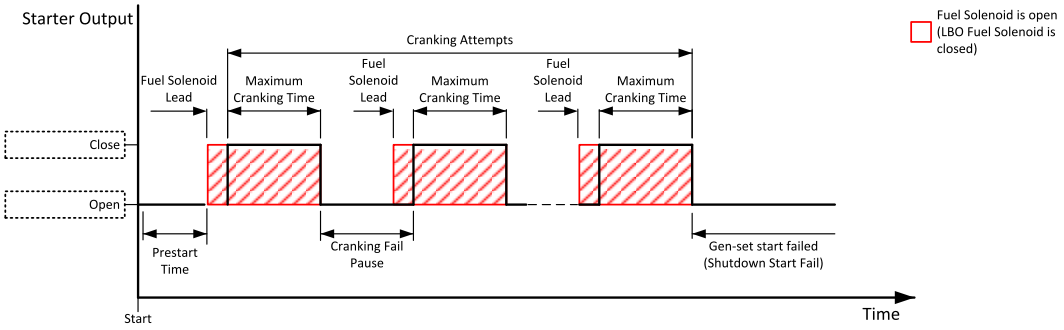


Image 8.200 Starter

The starter output opens when:

- the “firing” speed is reached
- maximum time of cranking is exceeded
- request to stop comes up
- D+ value is higher than 80%
- Oil pressure value is higher than **Starting Oil Pressure (page 267)**
- Generator voltage > 25% of **Nominal Voltage Ph-N (page 256)** or **Nominal Voltage Ph-Ph (page 256)** (any phase)

back to Logical binary outputs alphabetically

Still Log 0

Related FW	1.3.0	Related applications	MINT, SPtM
Comm object	26		
Description			

Logical binary output which is still in logical 0.

back to Logical binary outputs alphabetically

Still Log 1

Related FW	1.3.0	Related applications	MINT, SPtM
Comm object	27		
Description			

Logical binary output which is still in logical 1.

back to Logical binary outputs alphabetically

Stop Button Echo

Related FW	1.3.0	Related applications	MINT, SPtM
Comm object	32		
Description			
This output provides 1s pulse when: ▶ Stop button is pressed on the controller front facia or ▶ Stop button is pressed on any of external local/remote terminals or ▶ Stop command is received via communication line or ▶ the input STOP BUTTON is activated.			

back to Logical binary outputs alphabetically

Stop Pulse

Related FW	1.3.0	Related applications	MINT, SPtM
Comm object	25		
Description			
Output is active for 1 second after **STOP SOLENOID (PAGE 724)** output activation. This signal is sent to ECU in case of engine stop request.			

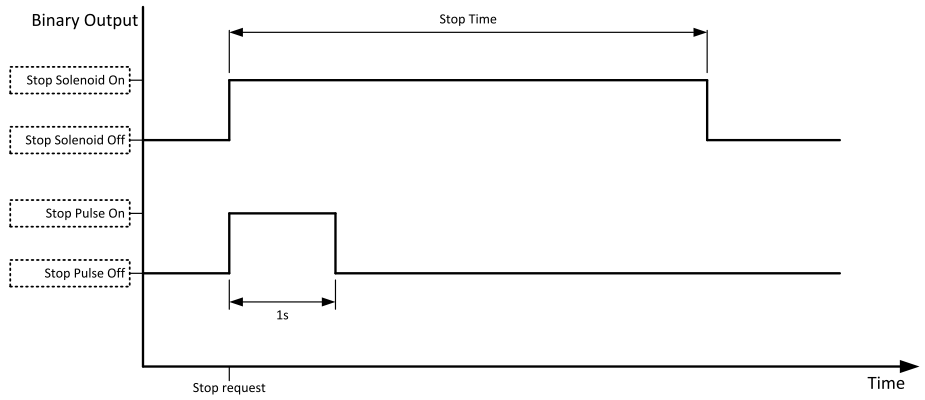


Image 8.201 Stop Pulse

back to Logical binary outputs alphabetically

Stop Solenoid

Related FW	1.3.0	Related applications	MINT, SPtM
Comm object	23		
Description			
This output is dedicated to control the stop solenoid (valve). The output closes when an engine stop command is received and is deactivated 12 s after last running engine indication went off, i.e. engine is stopped.			

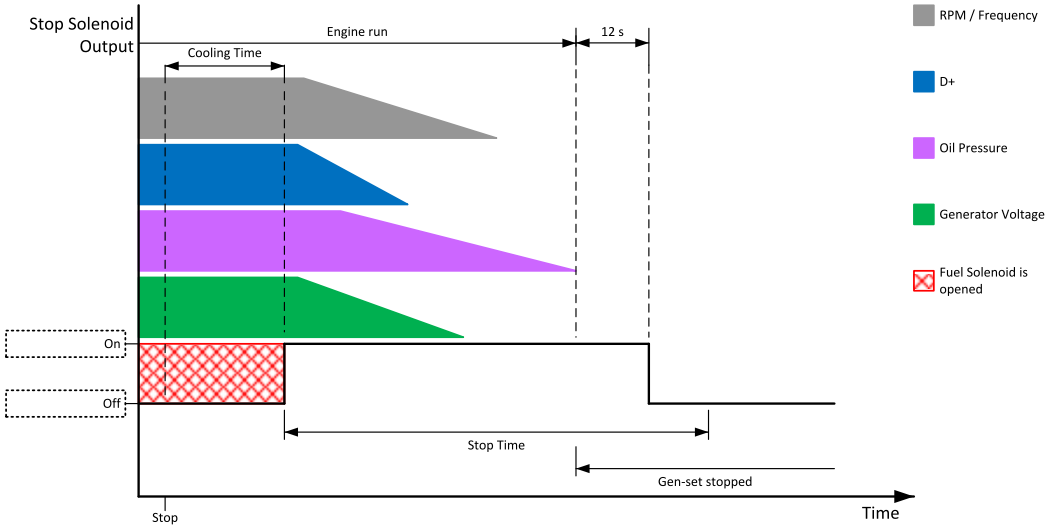


Image 8.202 Stop Solenoid 1

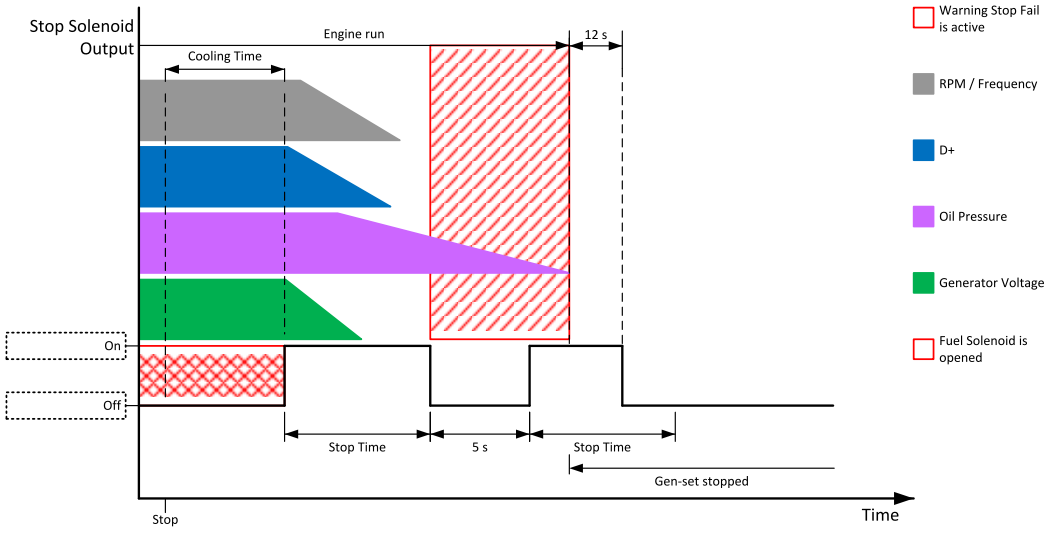


Image 8.203 Stop Solenoid 2

Note: *If **Additional running engine indications (page 165)** went off during 5 s pause than Stop Solenoid is not activated again otherwise stop solenoid is activated again.*

Logical binary outputs alphabetically (page 666)

Supplying Load

Related FW	1.3.0	Related applications	MINT, SPtM
Comm object	1249		
Description			
The binary output depends on measured generator active power. Power is compared with generator nominal active power with use of hysteresis and with delay of switch 1 s. When the measured active power is equal or bigger than 5 % of **Nominal Power (page 252)** for 1 s than the binary output is closed. When the measured active power is equal or lower than 3 % of **Nominal Power (page 252)** for 1 s than the binary output is opened.			

back to Logical binary outputs alphabetically

System Reserve OK

Related FW	1.3.0	Related applications	MINT, SPtM
Comm object	87		
Description			
This LBO is active when System Reserve is higher than the actual reserve for start of next gen-sets.			

back to Logical binary outputs alphabetically

LBO: T

Temperature Switch

Related FW	1.3.0	Related applications	MINT, SPtM
Comm object	563		
Description			
This is an output from the Temperature switch function. The behavior of the switch depends on the adjustment of the setpoints **Temperature Switch On (page 287)** and **Temperature Switch Off (page 288)**.  Image 8.204 Temperature Switch ***Note:*** *Setpoints **Temperature Switch On (page 287)** and **Temperature Switch Off (page 288)** are invisible until configuration of this LBO.*			

back to Logical binary outputs alphabetically

8.1.5 Logical analog inputs

What Logical analog inputs are:

Logical analog inputs are inputs for analog values.

Alphabetical groups of Logical analog inputs

LAI: A 729
LAI: C 756
LAI: F 757
LAI: M 758
LAI: N 758
LAI: O 759

For full list of Logical analog inputs go to the chapter **Logical analog inputs alphabetically (page 728)**.

Logical analog inputs alphabetically

AIN Prot01 729
AIN Prot02 730
AIN Prot03 731
AIN Prot04 732
AIN Prot05 733
AIN Prot06 734
AIN Prot07 735
AIN Prot08 736
AIN Prot09 737
AIN Prot10 738
AIN Prot11 739
AIN Prot12 740
AIN Prot13 741
AIN Prot14 742
AIN Prot15 743
AIN Prot16 744
AIN Prot17 745
AIN Prot18 746
AIN Prot19 747
AIN Prot20 748
AIN Switch 01 749
AIN Switch 02 749
AIN Switch 03 749
AIN Switch 04 750
AIN Switch 05 750
AIN Switch 06 750
AIN Switch 07 751
AIN Switch 08 751
AIN Switch 09 751
AIN Switch 10 752
AIN Switch 11 752
AIN Switch 12 752
AIN Switch 13 753
AIN Switch 14 753
AIN Switch 15 753
AIN Switch 16 754
AIN Switch 17 754
AIN Switch 18 754
AIN Switch 19 755
AIN Switch 20 755
Coolant Temp 756
Fuel Level 757
Mains Import Measurement 758
Not Used 758
Oil Pressure 759
Oil Temp 760

LAI: A

AIN Prot01

Related FW	1.3.0	**Related applications**	MINT, SPtM
Comm object	9999		
Description			

Logical analog input designed for general value received from analog sensor. For more information about wiring of analog inputs **see Analog inputs on page 48**. Limits for this protection are adjusted by setpoints **Analog Protection 1 Wrn (page 361)** and **Analog Protection 1 Sd (page 361)**. Delay is adjusted by setpoint **Analog Protection 1 Delay (page 362)**.

Protection types

Monitoring	Analog value is only measured and displayed on the LCD screen but not used for protection.
HistRecOnl	Analog value is only measured and displayed on the LCD screen but not used for protection. History record is made if value is out of the limits.
AL Indic	Analog value is not used for protection. Only alarmlist record is made if analog value is out of the limits.
Wrn	Analog value is used for warning protection only.
Wrn+Stp	Analog value is used for warning and slow stop protection
Stp	Analog value is used for slow stop protection
Wrn + BOC	Analog value is used for warning and BOC (Breaker Open and Cooling) protection.
BOC	Analog value is used for BOC (Breaker Open and Cooling) protection.
Wrn + Sd	Analog value is used for warning and shutdown protection.
Sd	Analog value is used for shutdown protection.

Note: *This parameter has to be adjusted via InteliConfig.*

Alarm

Under limit	Alarm is activated when value of analog input is under adjusted limits
Over limit	Alarm is activated when value of analog input is over adjusted limits
Under limit + fls	Alarm is activated when value of analog input is under adjusted limits. If sensor fail is detected then the alarm with higher level is activate as well.
Over limit + fls	Alarm is activated when value of analog input is over adjusted limits. If sensor fail is detected then the alarm with higher level is activate as well.

Example: Protection type is Wrn + Sd. When sensor fail is detected then Sd alarm will be activated + Sensor fail alarm will be activated.

Note: *This parameter has to be adjusted via InteliConfig.*

back to Logical analog inputs alphabetically

AIN Prot02

Related FW	1.3.0	**Related applications**	MINT, SPtM
Comm object	9998		

Description

Logical analog input designed for general value received from analog sensor. For more information about wiring of analog inputs **see Analog inputs on page 48**. Limits for this protection are adjusted by setpoints **Analog Protection 2 Wrn (page 363)** and **Analog Protection 2 Sd (page 364)**. Delay is adjusted by setpoint **Analog Protection 2 Delay (page 364)**.

Protection types

Monitoring	Analog value is only measured and displayed on the LCD screen but not used for protection.
HistRecOnl	Analog value is only measured and displayed on the LCD screen but not used for protection. History record is made if value is out of the limits.
AL Indic	Analog value is not used for protection. Only alarmlist record is made if analog value is out of the limits.
Wrn	Analog value is used for warning protection only.
Wrn+Stp	Analog value is used for warning and slow stop protection
Stp	Analog value is used for slow stop protection
Wrn + BOC	Analog value is used for warning and BOC (Breaker Open and Cooling) protection.
BOC	Analog value is used for BOC (Breaker Open and Cooling) protection.
Wrn + Sd	Analog value is used for warning and shutdown protection.
Sd	Analog value is used for shutdown protection.

Note: *This parameter has to be adjusted via InteliConfig.*

Alarm

Under limit	Alarm is activated when value of analog input is under adjusted limits
Over limit	Alarm is activated when value of analog input is over adjusted limits
Under limit + fls	Alarm is activated when value of analog input is under adjusted limits. If sensor fail is detected then the alarm with higher level is activate as well.
Over limit + fls	Alarm is activated when value of analog input is over adjusted limits. If sensor fail is detected then the alarm with higher level is activate as well.

Example: Protection type is Wrn + Sd. When sensor fail is detected then Sd alarm will be activated + Sensor fail alarm will be activated.

Note: *This parameter has to be adjusted via InteliConfig.*

back to Logical analog inputs alphabetically

AIN Prot03

Related FW	1.3.0	Related applications	MINT, SPtM
Comm object	9997		

Description

Logical analog input designed for general value received from analog sensor. For more information about wiring of analog inputs **see Analog inputs on page 48**. Limits for this protection are adjusted by setpoints **Analog Protection 3 Wrn (page 366)** and **Analog Protection 3 Sd (page 367)**. Delay is adjusted by setpoint **Analog Protection 3 Delay (page 367)**.

Protection types

Monitoring	Analog value is only measured and displayed on the LCD screen but not used for protection.
HistRecOnl	Analog value is only measured and displayed on the LCD screen but not used for protection. History record is made if value is out of the limits.
AL Indic	Analog value is not used for protection. Only alarmlist record is made if analog value is out of the limits.
Wrn	Analog value is used for warning protection only.
Wrn+Stp	Analog value is used for warning and slow stop protection
Stp	Analog value is used for slow stop protection
Wrn + BOC	Analog value is used for warning and BOC (Breaker Open and Cooling) protection.
BOC	Analog value is used for BOC (Breaker Open and Cooling) protection.
Wrn + Sd	Analog value is used for warning and shutdown protection.
Sd	Analog value is used for shutdown protection.

Note: *This parameter has to be adjusted via InteliConfig.*

Alarm

Under limit	Alarm is activated when value of analog input is under adjusted limits
Over limit	Alarm is activated when value of analog input is over adjusted limits
Under limit + fls	Alarm is activated when value of analog input is under adjusted limits. If sensor fail is detected then the alarm with higher level is activate as well.
Over limit + fls	Alarm is activated when value of analog input is over adjusted limits. If sensor fail is detected then the alarm with higher level is activate as well.

Example: Protection type is Wrn + Sd. When sensor fail is detected then Sd alarm will be activated + Sensor fail alarm will be activated.

Note: *This parameter has to be adjusted via InteliConfig.*

back to Logical analog inputs alphabetically

AIN Prot04

Related FW	1.3.0	**Related applications**	MINT, SPtM
Comm object	9996		

Description

Logical analog input designed for general value received from analog sensor. For more information about wiring of analog inputs **see Analog inputs on page 48**. Limits for this protection are adjusted by setpoints **Analog Protection 4 Wrn (page 369)** and **Analog Protection 4 Sd (page 370)**. Delay is adjusted by setpoint **Analog Protection 4 Delay (page 370)**.

Protection types

Monitoring	Analog value is only measured and displayed on the LCD screen but not used for protection.
HistRecOnl	Analog value is only measured and displayed on the LCD screen but not used for protection. History record is made if value is out of the limits.
AL Indic	Analog value is not used for protection. Only alarmlist record is made if analog value is out of the limits.
Wrn	Analog value is used for warning protection only.
Wrn+Stp	Analog value is used for warning and slow stop protection
Stp	Analog value is used for slow stop protection
Wrn + BOC	Analog value is used for warning and BOC (Breaker Open and Cooling) protection.
BOC	Analog value is used for BOC (Breaker Open and Cooling) protection.
Wrn + Sd	Analog value is used for warning and shutdown protection.
Sd	Analog value is used for shutdown protection.

Note: *This parameter has to be adjusted via InteliConfig.*

Alarm

Under limit	Alarm is activated when value of analog input is under adjusted limits
Over limit	Alarm is activated when value of analog input is over adjusted limits
Under limit + fls	Alarm is activated when value of analog input is under adjusted limits. If sensor fail is detected then the alarm with higher level is activate as well.
Over limit + fls	Alarm is activated when value of analog input is over adjusted limits. If sensor fail is detected then the alarm with higher level is activate as well.

Example: Protection type is Wrn + Sd. When sensor fail is detected then Sd alarm will be activated + Sensor fail alarm will be activated.

Note: *This parameter has to be adjusted via InteliConfig.*

back to Logical analog inputs alphabetically

AIN Prot05

Related FW	1.3.0	**Related applications**	MINT, SPtM
Comm object	9995		
Description			

Logical analog input designed for general value received from analog sensor. For more information about wiring of analog inputs **see Analog inputs on page 48**. Limits for this protection are adjusted by setpoints **Analog Protection 5 Wrn (page 372)** and **Analog Protection 5 Sd (page 373)**. Delay is adjusted by setpoint **Analog Protection 5 Delay (page 373)**.

Protection types

Monitoring	Analog value is only measured and displayed on the LCD screen but not used for protection.
HistRecOnl	Analog value is only measured and displayed on the LCD screen but not used for protection. History record is made if value is out of the limits.
AL Indic	Analog value is not used for protection. Only alarmlist record is made if analog value is out of the limits.
Wrn	Analog value is used for warning protection only.
Wrn+Stp	Analog value is used for warning and slow stop protection
Stp	Analog value is used for slow stop protection
Wrn + BOC	Analog value is used for warning and BOC (Breaker Open and Cooling) protection.
BOC	Analog value is used for BOC (Breaker Open and Cooling) protection.
Wrn + Sd	Analog value is used for warning and shutdown protection.
Sd	Analog value is used for shutdown protection.

Note: *This parameter has to be adjusted via InteliConfig.*

Alarm

Under limit	Alarm is activated when value of analog input is under adjusted limits
Over limit	Alarm is activated when value of analog input is over adjusted limits
Under limit + fls	Alarm is activated when value of analog input is under adjusted limits. If sensor fail is detected then the alarm with higher level is activate as well.
Over limit + fls	Alarm is activated when value of analog input is over adjusted limits. If sensor fail is detected then the alarm with higher level is activate as well.

Example: Protection type is Wrn + Sd. When sensor fail is detected then Sd alarm will be activated + Sensor fail alarm will be activated.

Note: *This parameter has to be adjusted via InteliConfig.*

back to Logical analog inputs alphabetically

AIN Prot06

Related FW	1.3.0	Related applications	MINT, SPtM
Comm object	9994		

Description

Logical analog input designed for general value received from analog sensor. For more information about wiring of analog inputs **see Analog inputs on page 48**. Limits for this protection are adjusted by setpoints **Analog Protection 6 Wrn (page 375)** and **Analog Protection 6 Sd (page 376)**. Delay is adjusted by setpoint **Analog Protection 6 Delay (page 376)**.

Protection types

Monitoring	Analog value is only measured and displayed on the LCD screen but not used for protection.
HistRecOnl	Analog value is only measured and displayed on the LCD screen but not used for protection. History record is made if value is out of the limits.
AL Indic	Analog value is not used for protection. Only alarmlist record is made if analog value is out of the limits.
Wrn	Analog value is used for warning protection only.
Wrn+Stp	Analog value is used for warning and slow stop protection
Stp	Analog value is used for slow stop protection
Wrn + BOC	Analog value is used for warning and BOC (Breaker Open and Cooling) protection.
BOC	Analog value is used for BOC (Breaker Open and Cooling) protection.
Wrn + Sd	Analog value is used for warning and shutdown protection.
Sd	Analog value is used for shutdown protection.

Note: *This parameter has to be adjusted via InteliConfig.*

Alarm

Under limit	Alarm is activated when value of analog input is under adjusted limits
Over limit	Alarm is activated when value of analog input is over adjusted limits
Under limit + fls	Alarm is activated when value of analog input is under adjusted limits. If sensor fail is detected then the alarm with higher level is activate as well.
Over limit + fls	Alarm is activated when value of analog input is over adjusted limits. If sensor fail is detected then the alarm with higher level is activate as well.

Example: Protection type is Wrn + Sd. When sensor fail is detected then Sd alarm will be activated + Sensor fail alarm will be activated.

Note: *This parameter has to be adjusted via InteliConfig.*

back to Logical analog inputs alphabetically

AIN Prot07

Related FW	1.3.0	Related applications	MINT, SPtM
Comm object	9993		

Description

Logical analog input designed for general value received from analog sensor. For more information about wiring of analog inputs **see Analog inputs on page 48**. Limits for this protection are adjusted by setpoints **Analog Protection 7 Wrn (page 378)** and **Analog Protection 7 Sd (page 379)**. Delay is adjusted by setpoint **Analog Protection 7 Delay (page 379)**.

Protection types

Monitoring	Analog value is only measured and displayed on the LCD screen but not used for protection.
HistRecOnl	Analog value is only measured and displayed on the LCD screen but not used for protection. History record is made if value is out of the limits.
AL Indic	Analog value is not used for protection. Only alarmlist record is made if analog value is out of the limits.
Wrn	Analog value is used for warning protection only.
Wrn+Stp	Analog value is used for warning and slow stop protection
Stp	Analog value is used for slow stop protection
Wrn + BOC	Analog value is used for warning and BOC (Breaker Open and Cooling) protection.
BOC	Analog value is used for BOC (Breaker Open and Cooling) protection.
Wrn + Sd	Analog value is used for warning and shutdown protection.
Sd	Analog value is used for shutdown protection.

Note: *This parameter has to be adjusted via InteliConfig.*

Alarm

Under limit	Alarm is activated when value of analog input is under adjusted limits
Over limit	Alarm is activated when value of analog input is over adjusted limits
Under limit + fls	Alarm is activated when value of analog input is under adjusted limits. If sensor fail is detected then the alarm with higher level is activate as well.
Over limit + fls	Alarm is activated when value of analog input is over adjusted limits. If sensor fail is detected then the alarm with higher level is activate as well.

Example: Protection type is Wrn + Sd. When sensor fail is detected then Sd alarm will be activated + Sensor fail alarm will be activated.

Note: *This parameter has to be adjusted via InteliConfig.*

back to Logical analog inputs alphabetically

AIN Prot08

Related FW	1.3.0	Related applications	MINT, SPtM
Comm object	9992		

Description

Logical analog input designed for general value received from analog sensor. For more information about wiring of analog inputs **see Analog inputs on page 48**. Limits for this protection are adjusted by setpoints **Analog Protection 8 Wrn (page 381)** and **Analog Protection 8 Sd (page 382)**. Delay is adjusted by setpoint **Analog Protection 8 Delay (page 382)**.

Protection types

Monitoring	Analog value is only measured and displayed on the LCD screen but not used for protection.
HistRecOnl	Analog value is only measured and displayed on the LCD screen but not used for protection. History record is made if value is out of the limits.
AL Indic	Analog value is not used for protection. Only alarmlist record is made if analog value is out of the limits.
Wrn	Analog value is used for warning protection only.
Wrn+Stp	Analog value is used for warning and slow stop protection
Stp	Analog value is used for slow stop protection
Wrn + BOC	Analog value is used for warning and BOC (Breaker Open and Cooling) protection.
BOC	Analog value is used for BOC (Breaker Open and Cooling) protection.
Wrn + Sd	Analog value is used for warning and shutdown protection.
Sd	Analog value is used for shutdown protection.

Note: *This parameter has to be adjusted via InteliConfig.*

Alarm

Under limit	Alarm is activated when value of analog input is under adjusted limits
Over limit	Alarm is activated when value of analog input is over adjusted limits
Under limit + fls	Alarm is activated when value of analog input is under adjusted limits. If sensor fail is detected then the alarm with higher level is activate as well.
Over limit + fls	Alarm is activated when value of analog input is over adjusted limits. If sensor fail is detected then the alarm with higher level is activate as well.

Example: Protection type is Wrn + Sd. When sensor fail is detected then Sd alarm will be activated + Sensor fail alarm will be activated.

Note: *This parameter has to be adjusted via InteliConfig.*

back to Logical analog inputs alphabetically

AIN Prot09

Related FW	1.3.0	Related applications	MINT, SPtM
Comm object	9991		

Description

Logical analog input designed for general value received from analog sensor. For more information about wiring of analog inputs **see Analog inputs on page 48**. Limits for this protection are adjusted by setpoints **Analog Protection 9 Wrn (page 384)** and **Analog Protection 9 Sd (page 385)**. Delay is adjusted by setpoint **Analog Protection 9 Delay (page 385)**.

Protection types

Monitoring	Analog value is only measured and displayed on the LCD screen but not used for protection.
HistRecOnl	Analog value is only measured and displayed on the LCD screen but not used for protection. History record is made if value is out of the limits.
AL Indic	Analog value is not used for protection. Only alarmlist record is made if analog value is out of the limits.
Wrn	Analog value is used for warning protection only.
Wrn+Stp	Analog value is used for warning and slow stop protection
Stp	Analog value is used for slow stop protection
Wrn + BOC	Analog value is used for warning and BOC (Breaker Open and Cooling) protection.
BOC	Analog value is used for BOC (Breaker Open and Cooling) protection.
Wrn + Sd	Analog value is used for warning and shutdown protection.
Sd	Analog value is used for shutdown protection.

Note: *This parameter has to be adjusted via InteliConfig.*

Alarm

Under limit	Alarm is activated when value of analog input is under adjusted limits
Over limit	Alarm is activated when value of analog input is over adjusted limits
Under limit + fls	Alarm is activated when value of analog input is under adjusted limits. If sensor fail is detected then the alarm with higher level is activate as well.
Over limit + fls	Alarm is activated when value of analog input is over adjusted limits. If sensor fail is detected then the alarm with higher level is activate as well.

Example: Protection type is Wrn + Sd. When sensor fail is detected then Sd alarm will be activated + Sensor fail alarm will be activated.

Note: *This parameter has to be adjusted via InteliConfig.*

back to Logical analog inputs alphabetically

AIN Prot10

Related FW	1.3.0	**Related applications**	MINT, SPtM
Comm object	9990		

Description

Logical analog input designed for general value received from analog sensor. For more information about wiring of analog inputs **see Analog inputs on page 48**. Limits for this protection are adjusted by setpoints **Analog Protection 10 Wrn (page 387)** and **Analog Protection 10 Sd (page 388)**. Delay is adjusted by setpoint **Analog Protection 10 Delay (page 388)**.

Protection types

Monitoring	Analog value is only measured and displayed on the LCD screen but not used for protection.
HistRecOnl	Analog value is only measured and displayed on the LCD screen but not used for protection. History record is made if value is out of the limits.
AL Indic	Analog value is not used for protection. Only alarmlist record is made if analog value is out of the limits.
Wrn	Analog value is used for warning protection only.
Wrn+Stp	Analog value is used for warning and slow stop protection
Stp	Analog value is used for slow stop protection
Wrn + BOC	Analog value is used for warning and BOC (Breaker Open and Cooling) protection.
BOC	Analog value is used for BOC (Breaker Open and Cooling) protection.
Wrn + Sd	Analog value is used for warning and shutdown protection.
Sd	Analog value is used for shutdown protection.

Note: *This parameter has to be adjusted via InteliConfig.*

Alarm

Under limit	Alarm is activated when value of analog input is under adjusted limits
Over limit	Alarm is activated when value of analog input is over adjusted limits
Under limit + fls	Alarm is activated when value of analog input is under adjusted limits. If sensor fail is detected then the alarm with higher level is activate as well.
Over limit + fls	Alarm is activated when value of analog input is over adjusted limits. If sensor fail is detected then the alarm with higher level is activate as well.

Example: Protection type is Wrn + Sd. When sensor fail is detected then Sd alarm will be activated + Sensor fail alarm will be activated.

Note: *This parameter has to be adjusted via InteliConfig.*

back to Logical analog inputs alphabetically

AIN Prot11

Related FW	1.3.0	**Related applications**	MINT, SPtM
Comm object	9989		

Description

Logical analog input designed for general value received from analog sensor. For more information about wiring of analog inputs **see Analog inputs on page 48**. Limits for this protection are adjusted by setpoints **Analog Protection 11 Wrn (page 390)** and **Analog Protection 11 Sd (page 391)**. Delay is adjusted by setpoint **Analog Protection 11 Delay (page 391)**.

Protection types

Monitoring	Analog value is only measured and displayed on the LCD screen but not used for protection.
HistRecOnl	Analog value is only measured and displayed on the LCD screen but not used for protection. History record is made if value is out of the limits.
AL Indic	Analog value is not used for protection. Only alarmlist record is made if analog value is out of the limits.
Wrn	Analog value is used for warning protection only.
Wrn+Stp	Analog value is used for warning and slow stop protection
Stp	Analog value is used for slow stop protection
Wrn + BOC	Analog value is used for warning and BOC (Breaker Open and Cooling) protection.
BOC	Analog value is used for BOC (Breaker Open and Cooling) protection.
Wrn + Sd	Analog value is used for warning and shutdown protection.
Sd	Analog value is used for shutdown protection.

Note: *This parameter has to be adjusted via InteliConfig.*

Alarm

Under limit	Alarm is activated when value of analog input is under adjusted limits
Over limit	Alarm is activated when value of analog input is over adjusted limits
Under limit + fls	Alarm is activated when value of analog input is under adjusted limits. If sensor fail is detected then the alarm with higher level is activate as well.
Over limit + fls	Alarm is activated when value of analog input is over adjusted limits. If sensor fail is detected then the alarm with higher level is activate as well.

Example: Protection type is Wrn + Sd. When sensor fail is detected then Sd alarm will be activated + Sensor fail alarm will be activated.

Note: *This parameter has to be adjusted via InteliConfig.*

back to Logical analog inputs alphabetically

AIN Prot12

Related FW	1.3.0	**Related applications**	MINT, SPtM
Comm object	9988		

Description

Logical analog input designed for general value received from analog sensor. For more information about wiring of analog inputs **see Analog inputs on page 48**. Limits for this protection are adjusted by setpoints **Analog Protection 12 Wrn (page 393)** and **Analog Protection 12 Sd (page 394)**. Delay is adjusted by setpoint **Analog Protection 12 Delay (page 394)**.

Protection types

Monitoring	Analog value is only measured and displayed on the LCD screen but not used for protection.
HistRecOnl	Analog value is only measured and displayed on the LCD screen but not used for protection. History record is made if value is out of the limits.
AL Indic	Analog value is not used for protection. Only alarmlist record is made if analog value is out of the limits.
Wrn	Analog value is used for warning protection only.
Wrn+Stp	Analog value is used for warning and slow stop protection
Stp	Analog value is used for slow stop protection
Wrn + BOC	Analog value is used for warning and BOC (Breaker Open and Cooling) protection.
BOC	Analog value is used for BOC (Breaker Open and Cooling) protection.
Wrn + Sd	Analog value is used for warning and shutdown protection.
Sd	Analog value is used for shutdown protection.

Note: *This parameter has to be adjusted via InteliConfig.*

Alarm

Under limit	Alarm is activated when value of analog input is under adjusted limits
Over limit	Alarm is activated when value of analog input is over adjusted limits
Under limit + fls	Alarm is activated when value of analog input is under adjusted limits. If sensor fail is detected then the alarm with higher level is activate as well.
Over limit + fls	Alarm is activated when value of analog input is over adjusted limits. If sensor fail is detected then the alarm with higher level is activate as well.

Example: Protection type is Wrn + Sd. When sensor fail is detected then Sd alarm will be activated + Sensor fail alarm will be activated.

Note: *This parameter has to be adjusted via InteliConfig.*

back to Logical analog inputs alphabetically

AIN Prot13

Related FW	1.3.0	Related applications	MINT, SPtM
Comm object	9987		

Description

Logical analog input designed for general value received from analog sensor. For more information about wiring of analog inputs **see Analog inputs on page 48**. Limits for this protection are adjusted by setpoints **Analog Protection 13 Wrn (page 396)** and **Analog Protection 13 Sd (page 397)**. Delay is adjusted by setpoint **Analog Protection 13 Delay (page 397)**.

Protection types

Monitoring	Analog value is only measured and displayed on the LCD screen but not used for protection.
HistRecOnl	Analog value is only measured and displayed on the LCD screen but not used for protection. History record is made if value is out of the limits.
AL Indic	Analog value is not used for protection. Only alarmlist record is made if analog value is out of the limits.
Wrn	Analog value is used for warning protection only.
Wrn+Stp	Analog value is used for warning and slow stop protection
Stp	Analog value is used for slow stop protection
Wrn + BOC	Analog value is used for warning and BOC (Breaker Open and Cooling) protection.
BOC	Analog value is used for BOC (Breaker Open and Cooling) protection.
Wrn + Sd	Analog value is used for warning and shutdown protection.
Sd	Analog value is used for shutdown protection.

Note: *This parameter has to be adjusted via InteliConfig.*

Alarm

Under limit	Alarm is activated when value of analog input is under adjusted limits
Over limit	Alarm is activated when value of analog input is over adjusted limits
Under limit + fls	Alarm is activated when value of analog input is under adjusted limits. If sensor fail is detected then the alarm with higher level is activate as well.
Over limit + fls	Alarm is activated when value of analog input is over adjusted limits. If sensor fail is detected then the alarm with higher level is activate as well.

Example: Protection type is Wrn + Sd. When sensor fail is detected then Sd alarm will be activated + Sensor fail alarm will be activated.

Note: *This parameter has to be adjusted via InteliConfig.*

back to Logical analog inputs alphabetically

AIN Prot14

Related FW	1.3.0	**Related applications**	MINT, SPtM
Comm object	9986		
Description			

Logical analog input designed for general value received from analog sensor. For more information about wiring of analog inputs **see Analog inputs on page 48**. Limits for this protection are adjusted by setpoints **Analog Protection 14 Wrn (page 399)** and **Analog Protection 14 Sd (page 400)**. Delay is adjusted by setpoint **Analog Protection 14 Delay (page 400)**.

Protection types

Monitoring	Analog value is only measured and displayed on the LCD screen but not used for protection.
HistRecOnl	Analog value is only measured and displayed on the LCD screen but not used for protection. History record is made if value is out of the limits.
AL Indic	Analog value is not used for protection. Only alarmlist record is made if analog value is out of the limits.
Wrn	Analog value is used for warning protection only.
Wrn+Stp	Analog value is used for warning and slow stop protection
Stp	Analog value is used for slow stop protection
Wrn + BOC	Analog value is used for warning and BOC (Breaker Open and Cooling) protection.
BOC	Analog value is used for BOC (Breaker Open and Cooling) protection.
Wrn + Sd	Analog value is used for warning and shutdown protection.
Sd	Analog value is used for shutdown protection.

Note: *This parameter has to be adjusted via InteliConfig.*

Alarm

Under limit	Alarm is activated when value of analog input is under adjusted limits
Over limit	Alarm is activated when value of analog input is over adjusted limits
Under limit + fls	Alarm is activated when value of analog input is under adjusted limits. If sensor fail is detected then the alarm with higher level is activate as well.
Over limit + fls	Alarm is activated when value of analog input is over adjusted limits. If sensor fail is detected then the alarm with higher level is activate as well.

Example: Protection type is Wrn + Sd. When sensor fail is detected then Sd alarm will be activated + Sensor fail alarm will be activated.

Note: *This parameter has to be adjusted via InteliConfig.*

back to Logical analog inputs alphabetically

AIN Prot15

Related FW	1.3.0	Related applications	MINT, SPtM
Comm object	9985		

Description

Logical analog input designed for general value received from analog sensor. For more information about wiring of analog inputs **see Analog inputs on page 48**. Limits for this protection are adjusted by setpoints **Analog Protection 15 Wrn (page 402)** and **Analog Protection 15 Sd (page 403)**. Delay is adjusted by setpoint **Analog Protection 15 Delay (page 403)**.

Protection types

Monitoring	Analog value is only measured and displayed on the LCD screen but not used for protection.
HistRecOnl	Analog value is only measured and displayed on the LCD screen but not used for protection. History record is made if value is out of the limits.
AL Indic	Analog value is not used for protection. Only alarmlist record is made if analog value is out of the limits.
Wrn	Analog value is used for warning protection only.
Wrn+Stp	Analog value is used for warning and slow stop protection
Stp	Analog value is used for slow stop protection
Wrn + BOC	Analog value is used for warning and BOC (Breaker Open and Cooling) protection.
BOC	Analog value is used for BOC (Breaker Open and Cooling) protection.
Wrn + Sd	Analog value is used for warning and shutdown protection.
Sd	Analog value is used for shutdown protection.

Note: *This parameter has to be adjusted via InteliConfig.*

Alarm

Under limit	Alarm is activated when value of analog input is under adjusted limits
Over limit	Alarm is activated when value of analog input is over adjusted limits
Under limit + fls	Alarm is activated when value of analog input is under adjusted limits. If sensor fail is detected then the alarm with higher level is activate as well.
Over limit + fls	Alarm is activated when value of analog input is over adjusted limits. If sensor fail is detected then the alarm with higher level is activate as well.

Example: Protection type is Wrn + Sd. When sensor fail is detected then Sd alarm will be activated + Sensor fail alarm will be activated.

Note: *This parameter has to be adjusted via InteliConfig.*

back to Logical analog inputs alphabetically

AIN Prot16

Related FW	1.3.0	**Related applications**	MINT, SPtM
Comm object	9984		

Description

Logical analog input designed for general value received from analog sensor. For more information about wiring of analog inputs **see Analog inputs on page 48**. Limits for this protection are adjusted by setpoints **Analog Protection 16 Wrn (page 405)** and **Analog Protection 16 Sd (page 406)**. Delay is adjusted by setpoint **Analog Protection 16 Delay (page 406)**.

Protection types

Monitoring	Analog value is only measured and displayed on the LCD screen but not used for protection.
HistRecOnl	Analog value is only measured and displayed on the LCD screen but not used for protection. History record is made if value is out of the limits.
AL Indic	Analog value is not used for protection. Only alarmlist record is made if analog value is out of the limits.
Wrn	Analog value is used for warning protection only.
Wrn+Stp	Analog value is used for warning and slow stop protection
Stp	Analog value is used for slow stop protection
Wrn + BOC	Analog value is used for warning and BOC (Breaker Open and Cooling) protection.
BOC	Analog value is used for BOC (Breaker Open and Cooling) protection.
Wrn + Sd	Analog value is used for warning and shutdown protection.
Sd	Analog value is used for shutdown protection.

Note: *This parameter has to be adjusted via InteliConfig.*

Alarm

Under limit	Alarm is activated when value of analog input is under adjusted limits
Over limit	Alarm is activated when value of analog input is over adjusted limits
Under limit + fls	Alarm is activated when value of analog input is under adjusted limits. If sensor fail is detected then the alarm with higher level is activate as well.
Over limit + fls	Alarm is activated when value of analog input is over adjusted limits. If sensor fail is detected then the alarm with higher level is activate as well.

Example: Protection type is Wrn + Sd. When sensor fail is detected then Sd alarm will be activated + Sensor fail alarm will be activated.

Note: *This parameter has to be adjusted via InteliConfig.*

back to Logical analog inputs alphabetically

AIN Prot17

Related FW	1.3.0	**Related applications**	MINT, SPtM
Comm object	9983		
Description			

Logical analog input designed for general value received from analog sensor. For more information about wiring of analog inputs **see Analog inputs on page 48**. Limits for this protection are adjusted by setpoints **Analog Protection 17 Wrn (page 408)** and **Analog Protection 17 Sd (page 409)**. Delay is adjusted by setpoint **Analog Protection 17 Delay (page 409)**.

Protection types

Monitoring	Analog value is only measured and displayed on the LCD screen but not used for protection.
HistRecOnl	Analog value is only measured and displayed on the LCD screen but not used for protection. History record is made if value is out of the limits.
AL Indic	Analog value is not used for protection. Only alarmlist record is made if analog value is out of the limits.
Wrn	Analog value is used for warning protection only.
Wrn+Stp	Analog value is used for warning and slow stop protection
Stp	Analog value is used for slow stop protection
Wrn + BOC	Analog value is used for warning and BOC (Breaker Open and Cooling) protection.
BOC	Analog value is used for BOC (Breaker Open and Cooling) protection.
Wrn + Sd	Analog value is used for warning and shutdown protection.
Sd	Analog value is used for shutdown protection.

Note: *This parameter has to be adjusted via InteliConfig.*

Alarm

Under limit	Alarm is activated when value of analog input is under adjusted limits
Over limit	Alarm is activated when value of analog input is over adjusted limits
Under limit + fls	Alarm is activated when value of analog input is under adjusted limits. If sensor fail is detected then the alarm with higher level is activate as well.
Over limit + fls	Alarm is activated when value of analog input is over adjusted limits. If sensor fail is detected then the alarm with higher level is activate as well.

Example: Protection type is Wrn + Sd. When sensor fail is detected then Sd alarm will be activated + Sensor fail alarm will be activated.

Note: *This parameter has to be adjusted via InteliConfig.*

back to Logical analog inputs alphabetically

AIN Prot18

Related FW	1.3.0	**Related applications**	MINT, SPtM
Comm object	9982		

Description

Logical analog input designed for general value received from analog sensor. For more information about wiring of analog inputs **see Analog inputs on page 48**. Limits for this protection are adjusted by setpoints **Analog Protection 18 Wrn (page 411)** and **Analog Protection 18 Sd (page 412)**. Delay is adjusted by setpoint **Analog Protection 18 Delay (page 412)**.

Protection types

Monitoring	Analog value is only measured and displayed on the LCD screen but not used for protection.
HistRecOnl	Analog value is only measured and displayed on the LCD screen but not used for protection. History record is made if value is out of the limits.
AL Indic	Analog value is not used for protection. Only alarmlist record is made if analog value is out of the limits.
Wrn	Analog value is used for warning protection only.
Wrn+Stp	Analog value is used for warning and slow stop protection
Stp	Analog value is used for slow stop protection
Wrn + BOC	Analog value is used for warning and BOC (Breaker Open and Cooling) protection.
BOC	Analog value is used for BOC (Breaker Open and Cooling) protection.
Wrn + Sd	Analog value is used for warning and shutdown protection.
Sd	Analog value is used for shutdown protection.

Note: *This parameter has to be adjusted via InteliConfig.*

Alarm

Under limit	Alarm is activated when value of analog input is under adjusted limits
Over limit	Alarm is activated when value of analog input is over adjusted limits
Under limit + fls	Alarm is activated when value of analog input is under adjusted limits. If sensor fail is detected then the alarm with higher level is activate as well.
Over limit + fls	Alarm is activated when value of analog input is over adjusted limits. If sensor fail is detected then the alarm with higher level is activate as well.

Example: Protection type is Wrn + Sd. When sensor fail is detected then Sd alarm will be activated + Sensor fail alarm will be activated.

Note: *This parameter has to be adjusted via InteliConfig.*

back to Logical analog inputs alphabetically

AIN Prot19

Related FW	1.3.0	**Related applications**	MINT, SPtM
Comm object	9981		

Description

Logical analog input designed for general value received from analog sensor. For more information about wiring of analog inputs **see Analog inputs on page 48**. Limits for this protection are adjusted by setpoints **Analog Protection 19 Wrn (page 414)** and **Analog Protection 19 Sd (page 415)**. Delay is adjusted by setpoint **Analog Protection 19 Delay (page 415)**.

Protection types

Monitoring	Analog value is only measured and displayed on the LCD screen but not used for protection.
HistRecOnl	Analog value is only measured and displayed on the LCD screen but not used for protection. History record is made if value is out of the limits.
AL Indic	Analog value is not used for protection. Only alarmlist record is made if analog value is out of the limits.
Wrn	Analog value is used for warning protection only.
Wrn+Stp	Analog value is used for warning and slow stop protection
Stp	Analog value is used for slow stop protection
Wrn + BOC	Analog value is used for warning and BOC (Breaker Open and Cooling) protection.
BOC	Analog value is used for BOC (Breaker Open and Cooling) protection.
Wrn + Sd	Analog value is used for warning and shutdown protection.
Sd	Analog value is used for shutdown protection.

Note: *This parameter has to be adjusted via InteliConfig.*

Alarm

Under limit	Alarm is activated when value of analog input is under adjusted limits
Over limit	Alarm is activated when value of analog input is over adjusted limits
Under limit + fls	Alarm is activated when value of analog input is under adjusted limits. If sensor fail is detected then the alarm with higher level is activate as well.
Over limit + fls	Alarm is activated when value of analog input is over adjusted limits. If sensor fail is detected then the alarm with higher level is activate as well.

Example: Protection type is Wrn + Sd. When sensor fail is detected then Sd alarm will be activated + Sensor fail alarm will be activated.

Note: *This parameter has to be adjusted via InteliConfig.*

back to Logical analog inputs alphabetically

AIN Prot20

Related FW	1.3.0	**Related applications**	MINT, SPtM
Comm object	9980		

Description

Logical analog input designed for general value received from analog sensor. For more information about wiring of analog inputs **see Analog inputs on page 48**. Limits for this protection are adjusted by setpoints **Analog Protection 20 Wrn (page 417)** and **Analog Protection 20 Sd (page 418)**. Delay is adjusted by setpoint **Analog Protection 20 Delay (page 418)**.

Protection types

Monitoring	Analog value is only measured and displayed on the LCD screen but not used for protection.
HistRecOnl	Analog value is only measured and displayed on the LCD screen but not used for protection. History record is made if value is out of the limits.
AL Indic	Analog value is not used for protection. Only alarmlist record is made if analog value is out of the limits.
Wrn	Analog value is used for warning protection only.
Wrn+Stp	Analog value is used for warning and slow stop protection
Stp	Analog value is used for slow stop protection
Wrn + BOC	Analog value is used for warning and BOC (Breaker Open and Cooling) protection.
BOC	Analog value is used for BOC (Breaker Open and Cooling) protection.
Wrn + Sd	Analog value is used for warning and shutdown protection.
Sd	Analog value is used for shutdown protection.

Note: *This parameter has to be adjusted via InteliConfig.*

Alarm

Under limit	Alarm is activated when value of analog input is under adjusted limits
Over limit	Alarm is activated when value of analog input is over adjusted limits
Under limit + fls	Alarm is activated when value of analog input is under adjusted limits. If sensor fail is detected then the alarm with higher level is activate as well.
Over limit + fls	Alarm is activated when value of analog input is over adjusted limits. If sensor fail is detected then the alarm with higher level is activate as well.

Example: Protection type is Wrn + Sd. When sensor fail is detected then Sd alarm will be activated + Sensor fail alarm will be activated.

Note: *This parameter has to be adjusted via InteliConfig.*

back to Logical analog inputs alphabetically

AIN Switch 01

Related FW	1.3.0	Related applications	MINT, SPtM
Comm object	209		
Description			
Logical analog input designed for general value received from analog sensor. For more information about wiring of analog inputs **see Analog inputs on page 48**. This analog input controls logical binary output **AIN SWITCH01 (PAGE 680)**. The behavior of the switch depends on the adjustment of the setpoints **Analog Switch 1 On (page 362)** and **Analog Switch 1 Off (page 363)**. **IMPORTANT: This analog input has no protection. Input is designed only to control appropriate logical binary output.**			

back to Logical analog inputs alphabetically

AIN Switch 02

Related FW	1.3.0	Related applications	MINT, SPtM
Comm object	210		
Description			
Logical analog input designed for general value received from analog sensor. For more information about wiring of analog inputs **see Analog inputs on page 48**. This analog input controls logical binary output **AIN SWITCH02 (PAGE 681)**. The behavior of the switch depends on the adjustment of the setpoints **Analog Switch 2 On (page 365)** and **Analog Switch 2 Off (page 366)**. **IMPORTANT: This analog input has no protection. Input is designed only to control appropriate logical binary output.**			

back to Logical analog inputs alphabetically

AIN Switch 03

Related FW	1.3.0	Related applications	MINT, SPtM
Comm object	211		
Description			
Logical analog input designed for general value received from analog sensor. For more information about wiring of analog inputs **see Analog inputs on page 48**. This analog input controls logical binary output **AIN SWITCH03 (PAGE 681)**. The behavior of the switch depends on the adjustment of the setpoints **Analog Switch 3 On (page 368)** and **Analog Switch 3 Off (page 369)**. **IMPORTANT: This analog input has no protection. Input is designed only to control appropriate logical binary output.**			

back to Logical analog inputs alphabetically

AIN Switch 04

Related FW	1.3.0	Related applications	MINT, SPtM
Comm object	212		
Description			
Logical analog input designed for general value received from analog sensor. For more information about wiring of analog inputs **see Analog inputs on page 48**. This analog input controls logical binary output **AIN SWITCH04 (PAGE 682)**. The behavior of the switch depends on the adjustment of the setpoints **Analog Switch 4 On (page 371)** and **Analog Switch 4 Off (page 372)**. **IMPORTANT: This analog input has no protection. Input is designed only to control appropriate logical binary output.**			

back to Logical analog inputs alphabetically

AIN Switch 05

Related FW	1.3.0	Related applications	MINT, SPtM
Comm object	278		
Description			
Logical analog input designed for general value received from analog sensor. For more information about wiring of analog inputs **see Analog inputs on page 48**. This analog input controls logical binary output **AIN SWITCH05 (PAGE 682)**. The behavior of the switch depends on the adjustment of the setpoints **Analog Switch 5 On (page 374)** and **Analog Switch 5 Off (page 375)**. **IMPORTANT: This analog input has no protection. Input is designed only to control appropriate logical binary output.**			

back to Logical analog inputs alphabetically

AIN Switch 06

Related FW	1.3.0	Related applications	MINT, SPtM
Comm object	279		
Description			
Logical analog input designed for general value received from analog sensor. For more information about wiring of analog inputs **see Analog inputs on page 48**. This analog input controls logical binary output **AIN SWITCH06 (PAGE 683)**. The behavior of the switch depends on the adjustment of the setpoints **Analog Switch 6 On (page 377)** and **Analog Switch 6 Off (page 378)**. **IMPORTANT: This analog input has no protection. Input is designed only to control appropriate logical binary output.**			

back to Logical analog inputs alphabetically

AIN Switch 07

Related FW	1.3.0	**Related applications**	MINT, SPtM
Comm object	280		
Description			
Logical analog input designed for general value received from analog sensor. For more information about wiring of analog inputs **see Analog inputs on page 48**. This analog input controls logical binary output **AIN SWITCH07 (PAGE 683)**. The behavior of the switch depends on the adjustment of the setpoints **Analog Switch 7 On (page 380)** and **Analog Switch 7 Off (page 381)**. **IMPORTANT: This analog input has no protection. Input is designed only to control appropriate logical binary output.**			

back to Logical analog inputs alphabetically

AIN Switch 08

Related FW	1.3.0	**Related applications**	MINT, SPtM
Comm object	281		
Description			
Logical analog input designed for general value received from analog sensor. For more information about wiring of analog inputs **see Analog inputs on page 48**. This analog input controls logical binary output **AIN SWITCH08 (PAGE 684)**. The behavior of the switch depends on the adjustment of the setpoints **Analog Switch 8 On (page 383)** and **Analog Switch 8 Off (page 384)**. **IMPORTANT: This analog input has no protection. Input is designed only to control appropriate logical binary output.**			

back to Logical analog inputs alphabetically

AIN Switch 09

Related FW	1.3.0	**Related applications**	MINT, SPtM
Comm object	282		
Description			
Logical analog input designed for general value received from analog sensor. For more information about wiring of analog inputs **see Analog inputs on page 48**. This analog input controls logical binary output **AIN SWITCH09 (PAGE 684)**. The behavior of the switch depends on the adjustment of the setpoints **Analog Switch 9 On (page 386)** and **Analog Switch 9 Off (page 387)**. **IMPORTANT: This analog input has no protection. Input is designed only to control appropriate logical binary output.**			

back to Logical analog inputs alphabetically

AIN Switch 10

Related FW	1.3.0	Related applications	MINT, SPtM
Comm object	283		
Description			
Logical analog input designed for general value received from analog sensor. For more information about wiring of analog inputs **see Analog inputs on page 48**. This analog input controls logical binary output **AIN SWITCH10 (PAGE 685)**. The behavior of the switch depends on the adjustment of the setpoints **Analog Switch 10 On (page 389)** and **Analog Switch 10 Off (page 390)**. **IMPORTANT: This analog input has no protection. Input is designed only to control appropriate logical binary output.**			

back to Logical analog inputs alphabetically

AIN Switch 11

Related FW	1.3.0	Related applications	MINT, SPtM
Comm object	284		
Description			
Logical analog input designed for general value received from analog sensor. For more information about wiring of analog inputs **see Analog inputs on page 48**. This analog input controls logical binary output **AIN SWITCH11 (PAGE 685)**. The behavior of the switch depends on the adjustment of the setpoints **Analog Switch 11 On (page 392)** and **Analog Switch 11 Off (page 393)**. **IMPORTANT: This analog input has no protection. Input is designed only to control appropriate logical binary output.**			

back to Logical analog inputs alphabetically

AIN Switch 12

Related FW	1.3.0	Related applications	MINT, SPtM
Comm object	285		
Description			
Logical analog input designed for general value received from analog sensor. For more information about wiring of analog inputs **see Analog inputs on page 48**. This analog input controls logical binary output **AIN SWITCH12 (PAGE 686)**. The behavior of the switch depends on the adjustment of the setpoints **Analog Switch 12 On (page 395)** and **Analog Switch 12 Off (page 396)**. **IMPORTANT: This analog input has no protection. Input is designed only to control appropriate logical binary output.**			

back to Logical analog inputs alphabetically

AIN Switch 13

Related FW	1.3.0	Related applications	MINT, SPtM
Comm object	286		
Description			
Logical analog input designed for general value received from analog sensor. For more information about wiring of analog inputs **see Analog inputs on page 48**. This analog input controls logical binary output **AIN SWITCH13 (PAGE 686)**. The behavior of the switch depends on the adjustment of the setpoints **Analog Switch 13 On (page 398)** and **Analog Switch 13 Off (page 399)**. **IMPORTANT: This analog input has no protection. Input is designed only to control appropriate logical binary output.**			

back to Logical analog inputs alphabetically

AIN Switch 14

Related FW	1.3.0	Related applications	MINT, SPtM
Comm object	287		
Description			
Logical analog input designed for general value received from analog sensor. For more information about wiring of analog inputs **see Analog inputs on page 48**. This analog input controls logical binary output **AIN SWITCH14 (PAGE 687)**. The behavior of the switch depends on the adjustment of the setpoints **Analog Switch 14 On (page 401)** and **Analog Switch 14 Off (page 402)**. **IMPORTANT: This analog input has no protection. Input is designed only to control appropriate logical binary output.**			

back to Logical analog inputs alphabetically

AIN Switch 15

Related FW	1.3.0	Related applications	MINT, SPtM
Comm object	288		
Description			
Logical analog input designed for general value received from analog sensor. For more information about wiring of analog inputs **see Analog inputs on page 48**. This analog input controls logical binary output **AIN SWITCH15 (PAGE 687)**. The behavior of the switch depends on the adjustment of the setpoints **Analog Switch 15 On (page 404)** and **Analog Switch 15 Off (page 405)**. **IMPORTANT: This analog input has no protection. Input is designed only to control appropriate logical binary output.**			

back to Logical analog inputs alphabetically

AIN Switch 16

Related FW	1.3.0	Related applications	MINT, SPtM
Comm object	289		
Description			
Logical analog input designed for general value received from analog sensor. For more information about wiring of analog inputs **see Analog inputs on page 48**. This analog input controls logical binary output **AIN SWITCH16 (PAGE 688)**. The behavior of the switch depends on the adjustment of the setpoints **Analog Switch 16 On (page 407)** and **Analog Switch 16 Off (page 408)**. **IMPORTANT: This analog input has no protection. Input is designed only to control appropriate logical binary output.**			

back to Logical analog inputs alphabetically

AIN Switch 17

Related FW	1.3.0	Related applications	MINT, SPtM
Comm object	290		
Description			
Logical analog input designed for general value received from analog sensor. For more information about wiring of analog inputs **see Analog inputs on page 48**. This analog input controls logical binary output **AIN SWITCH17 (PAGE 688)**. The behavior of the switch depends on the adjustment of the setpoints **Analog Switch 17 On (page 410)** and **Analog Switch 17 Off (page 411)**. **IMPORTANT: This analog input has no protection. Input is designed only to control appropriate logical binary output.**			

back to Logical analog inputs alphabetically

AIN Switch 18

Related FW	1.3.0	Related applications	MINT, SPtM
Comm object	291		
Description			
Logical analog input designed for general value received from analog sensor. For more information about wiring of analog inputs **see Analog inputs on page 48**. This analog input controls logical binary output **AIN SWITCH18 (PAGE 689)**. The behavior of the switch depends on the adjustment of the setpoints **Analog Switch 18 On (page 413)** and **Analog Switch 18 Off (page 414)**. **IMPORTANT: This analog input has no protection. Input is designed only to control appropriate logical binary output.**			

back to Logical analog inputs alphabetically

AIN Switch 19

Related FW	1.3.0	Related applications	MINT, SPtM
Comm object	292		
Description			

Logical analog input designed for general value received from analog sensor. For more information about wiring of analog inputs **see Analog inputs on page 48**. This analog input controls logical binary output **AIN SWITCH19 (PAGE 689)**. The behavior of the switch depends on the adjustment of the setpoints **Analog Switch 19 On (page 416)** and **Analog Switch 19 Off (page 417)**.

> **IMPORTANT: This analog input has no protection. Input is designed only to control appropriate logical binary output.**

back to Logical analog inputs alphabetically

AIN Switch 20

Related FW	1.3.0	Related applications	MINT, SPtM
Comm object	293		
Description			

Logical analog input designed for general value received from analog sensor. For more information about wiring of analog inputs **see Analog inputs on page 48**. This analog input controls logical binary output **AIN SWITCH20 (PAGE 690)**. The behavior of the switch depends on the adjustment of the setpoints **Analog Switch 20 On (page 419)** and **Analog Switch 20 Off (page 420)**.

> **IMPORTANT: This analog input has no protection. Input is designed only to control appropriate logical binary output.**

back to Logical analog inputs alphabetically

LAI: C

Coolant Temp

Related FW	1.3.0	Related applications	MINT, SPtM
Comm object	67		

Description

Logical analog input designed for coolant temperature value received from analog sensor. For more information about wiring of analog inputs **see Analog inputs on page 48**. Limits for this protection are adjusted by setpoints **Coolant Temperature Wrn (page 282)** and **Coolant Temperature Sd (page 283)**. Delay is adjusted by setpoint **Coolant Temperature Delay (page 283)**.

Protection types

Monitoring	Analog value is only measured and displayed on the LCD screen but not used for protection.
HistRecOnl	Analog value is only measured and displayed on the LCD screen but not used for protection. History record is made if value is out of the limits.
Wrn	Analog value is used for warning protection only.
Wrn+Stp	Analog value is used for warning and slow stop protection
Stp	Analog value is used for slow stop protection
Wrn + BOC	Analog value is used for warning and BOC (Breaker Open and Cooling) protection.
BOC	Analog value is used for BOC (Breaker Open and Cooling) protection.
Wrn + Sd	Analog value is used for warning and shutdown protection.
Sd	Analog value is used for shutdown protection.

Note: *This parameter has to be adjusted via InteliConfig.*

Alarm

Under limit	Alarm is activated when value of analog input is under adjusted limits
Over limit	Alarm is activated when value of analog input is over adjusted limits
Under limit + fls	Alarm is activated when value of analog input is under adjusted limits. If sensor fail is detected then the alarm with higher level is activate as well.
Over limit + fls	Alarm is activated when value of analog input is over adjusted limits. If sensor fail is detected then the alarm with higher level is activate as well.

Example: Protection type is Wrn + Sd. When sensor fail is detected then Sd alarm will be activated + Sensor fail alarm will be activated.

Note: *This parameter has to be adjusted via InteliConfig.*

Note: *This analog function can by also configured on binary input as binary function. In this case chose* ***COOLANT TEMP (PAGE 648)*** *binary input in the list of binary inputs. Delay of this binary input is adjusted via the same setpoint like for analog function.*

IMPORTANT: Value from analog input has higher priority than value from ECU.

back to Logical analog inputs alphabetically

LAI: F

Fuel Level

Related FW	1.3.0	**Related applications**	MINT, SPtM
Comm object	78		

Description

Logical analog input designed for fuel level value received from analog sensor. For more information about wiring of analog inputs **see Analog inputs on page 48**. Limits for this protection are adjusted by setpoints **Fuel Level Wrn (page 289)** and **Fuel Level Sd (page 289)**. Delay is adjusted by setpoint **Fuel Level Delay (page 290)**.

Protection types

Monitoring	Analog value is only measured and displayed on the LCD screen but not used for protection.
HistRecOnl	Analog value is only measured and displayed on the LCD screen but not used for protection. History record is made if value is out of the limits.
Wrn	Analog value is used for warning protection only.
Wrn+Stp	Analog value is used for warning and slow stop protection
Stp	Analog value is used for slow stop protection
Wrn + BOC	Analog value is used for warning and BOC (Breaker Open and Cooling) protection.
BOC	Analog value is used for BOC (Breaker Open and Cooling) protection.
Wrn + Sd	Analog value is used for warning and shutdown protection.
Sd	Analog value is used for shutdown protection.

Note: *This parameter has to be adjusted via InteliConfig.*

Alarm

Under limit	Alarm is activated when value of analog input is under adjusted limits
Over limit	Alarm is activated when value of analog input is over adjusted limits
Under limit + fls	Alarm is activated when value of analog input is under adjusted limits. If sensor fail is detected then the alarm with higher level is activate as well.
Over limit + fls	Alarm is activated when value of analog input is over adjusted limits. If sensor fail is detected then the alarm with higher level is activate as well.

Example: Protection type is Wrn + Sd. When sensor fail is detected then Sd alarm will be activated + Sensor fail alarm will be activated.

Note: *This parameter has to be adjusted via InteliConfig.*

IMPORTANT: For right behavior of this function, curve for analog input has to be in percentage and setpoint Fuel Tank Volume (page 291) has to be adjusted correctly.

Note: *This analog function can by also configured on binary input as binary function. In this case chose* ***FUEL LEVEL (PAGE 651)*** *binary input in the list of binary inputs. Delay of this binary input is adjusted via the same setpoint like for analog function.*

IMPORTANT: Value from analog input has higher priority than value from ECU.

back to Logical analog inputs alphabetically

LAI: M

Mains Import Measurement

Related FW	1.3.0	**Related applications**	MINT, SPtM
Comm object	5		
Description			
Logical analog input designed for **Mains import measurement (page 186)**. Value from this input is used in load transfer from mains to generator. Load transfer is considered to be finished when this value is lower then **Mains Unload MCB Open Window (page 348)**			

back to Logical analog inputs alphabetically

LAI: N

Not Used

Related FW	1.3.0	**Related applications**	MINT, SPtM
Comm object	230		
Description			
Input has no function.			

back to Logical analog inputs alphabetically

LAI: O

Oil Pressure

Related FW	1.3.0	**Related applications**	MINT, SPtM
Comm object	9		
Description			

Logical analog input designed for oil pressure value received from analog sensor. For more information about wiring of analog inputs **see Analog inputs on page 48**. Limits for this protection are adjusted by setpoints **Oil Pressure Wrn (page 280)** and **Oil Pressure Sd (page 281)**. Delay is adjusted by setpoint **Oil Pressure Delay (page 281)**.

Protection types

Monitoring	Analog value is only measured and displayed on the LCD screen but not used for protection.
HistRecOnl	Analog value is only measured and displayed on the LCD screen but not used for protection. History record is made if value is out of the limits.
Wrn	Analog value is used for warning protection only.
Wrn + Sd	Analog value is used for warning and Sd protection.
Sd	Analog value is used for Sd protection.

Note: *This parameter has to be adjusted via InteliConfig.*

Alarm

Under limit	Alarm is activated when value of analog input is under adjusted limits
Over limit	Alarm is activated when value of analog input is over adjusted limits
Under limit + fls	Alarm is activated when value of analog input is under adjusted limits. If sensor fail is detected then the alarm with higher level is activate as well.
Over limit + fls	Alarm is activated when value of analog input is over adjusted limits. If sensor fail is detected then the alarm with higher level is activate as well.

Example: Protection type is Wrn + Sd. When sensor fail is detected then Sd alarm will be activated + Sensor fail alarm will be activated.

Note: *This parameter has to be adjusted via InteliConfig.*

Note: *This analog function can by also configured on binary input as binary function. In this case chose* ***OIL PRESSURE (PAGE 658)*** *binary input in the list of binary inputs. Delay of this binary input is adjusted via the same setpoint like for analog function.*

IMPORTANT: Value from analog input has higher priority than value from ECU.

back to Logical analog inputs alphabetically

Oil Temp

Related FW	1.3.0	Related applications	MINT, SPtM
Comm object	77		

Description

Logical analog input designed for oil temperature value received from analog sensor. For more information about wiring of analog inputs **see Analog inputs on page 48**. Limits for this protection are adjusted by setpoints **Oil Temp Wrn (page 284)** and **Oil Temp Sd (page 285)**. Delay is adjusted by setpoint **Oil Temp Delay (page 285)**.

Protection types

Monitoring	Analog value is only measured and displayed on the LCD screen but not used for protection.
HistRecOnl	Analog value is only measured and displayed on the LCD screen but not used for protection. History record is made if value is out of the limits.
Wrn	Analog value is used for warning protection only.
Wrn+Stp	Analog value is used for warning and slow stop protection
Stp	Analog value is used for slow stop protection
Wrn + BOC	Analog value is used for warning and BOC (Breaker Open and Cooling) protection.
BOC	Analog value is used for BOC (Breaker Open and Cooling) protection.
Wrn + Sd	Analog value is used for warning and shutdown protection.
Sd	Analog value is used for shutdown protection.

Note: *This parameter has to be adjusted via InteliConfig.*

Alarm

Under limit	Alarm is activated when value of analog input is under adjusted limits
Over limit	Alarm is activated when value of analog input is over adjusted limits
Under limit + fls	Alarm is activated when value of analog input is under adjusted limits. If sensor fail is detected then the alarm with higher level is activate as well.
Over limit + fls	Alarm is activated when value of analog input is over adjusted limits. If sensor fail is detected then the alarm with higher level is activate as well.

Example: Protection type is Wrn + Sd. When sensor fail is detected then Sd alarm will be activated + Sensor fail alarm will be activated.

Note: *This parameter has to be adjusted via InteliConfig.*

IMPORTANT: Value from analog input has higher priority than value from ECU.

back to Logical analog inputs alphabetically

8.1.6 PLC

List of PLC groups

Group: Basic Logical functions 763
Group: Comparison of analog inputs 766
Group: Time functions 768
Group: Other functions 772

For full list of PLC blocks go to the chapter **List of PLC blocks (page 762)**.

List of PLC blocks

Group: Basic logical functions

OR/AND 763
XOR/RS 765

Group: Comparison of analog inputs

Comparator With Hysteresis 766
Comparator With Delay ... 767

Group: Time functions

Timer 768
Delay 770

Group: Other functions

Force History Record 772
Force Protection 772

Group: Basic Logical functions

OR/AND

PLC group	Basic logical functions
Related FW	1.3.0
Related applications	MINT, SPtM
Comm object	1



Inputs

Input	Type	Negation	Range	Function
Input 1..8	Binary	Yes	0/1	Inputs 1..8

Outputs

Output	Type	Negation	Range	Function
Output	Binary	Yes	0/1	Result of the logical operation

Description

The block performs logical operation OR / AND of 2 - 8 binary operands. The inputs as well as the output can be inverted.

Function OR

Input 1	Input 2	Output
0	0	0
0	1	1
1	0	1
1	1	1

Function AND

Input 1	Input 2	Output
0	0	0
0	1	0
1	0	0
1	1	1

There have to be at least 2 inputs every time. There may be up to 8 inputs configured.

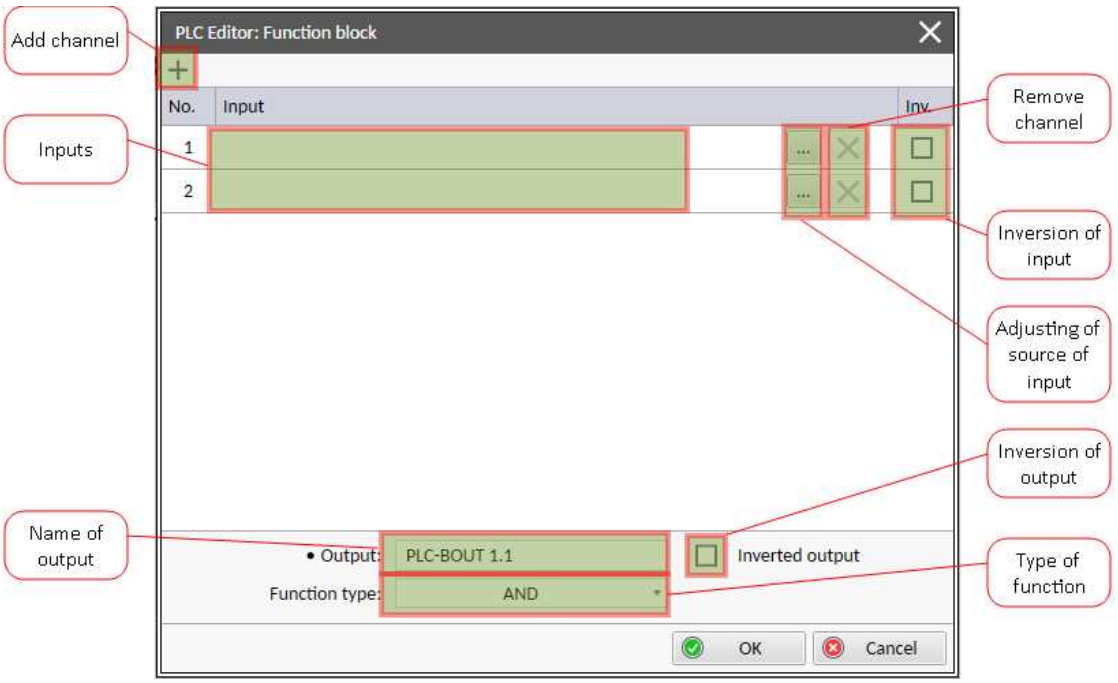


Image 8.205 Configuration of OR/AND block

back to List of PLC blocks

XOR/RS

PLC group	Basic logical functions
Related FW	1.3.0
Related applications	MINT, SPtM
Comm object	2



Inputs

Input	Type	Negation	Range	Function
Input 1..2	Binary	Yes	0/1	Inputs 1..2

Outputs

Output	Type	Negation	Range	Function
Output	Binary	Yes	0/1	Result of the logical operation

Description

The block provides logical function of two values - XOR or RS flip-flop. Both inputs and output can be inverted.

Function XOR

Input 1	Input 2	Output
0	0	0
0	1	1
1	0	1
1	1	0

Function RS

R	S	Q_{n+1}
0	0	Q_n
0	1	1
1	0	0
1	1	0

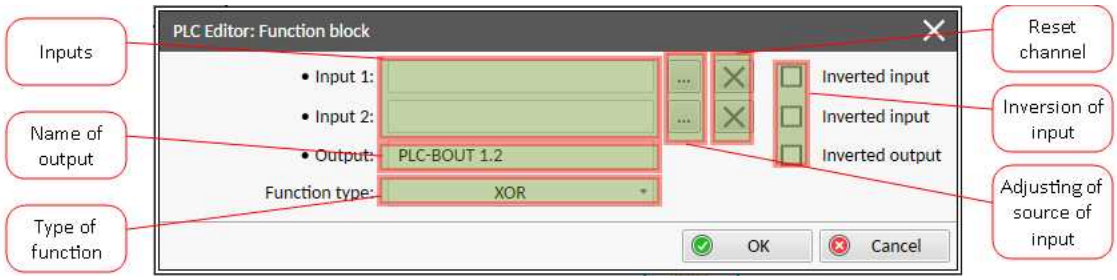


Image 8.206 Configuration of XOR/RS block

back to List of PLC blocks

Group: Comparison of analog inputs

Comparator With Hysteresis

PLC group	Comparison of analog inputs
Related FW	1.3.0
Related applications	MINT, SPtM
Comm object	3



Inputs

Input	Type	Negation	Range	Function
Input	Analog	No	Any	Compared value
Input ON	Analog	No	Same as Input	Comparative level for switching on
Input OFF	Analog	No	Same as Input	Comparative level for switching off

Outputs

Output	Type	Negation	Range	Function
Output	Binary	No	0/1	Comparator output

Description

The block compares the input value with the comparative levels. The behavior depends on whether the ON level is higher than OFF level or vice versa.

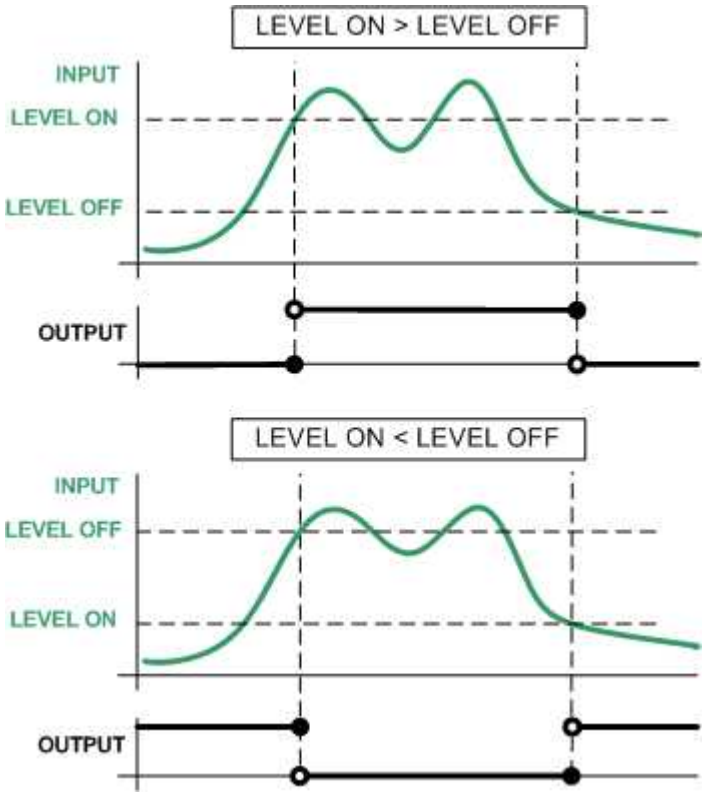


Image 8.207 Different On and Off levels

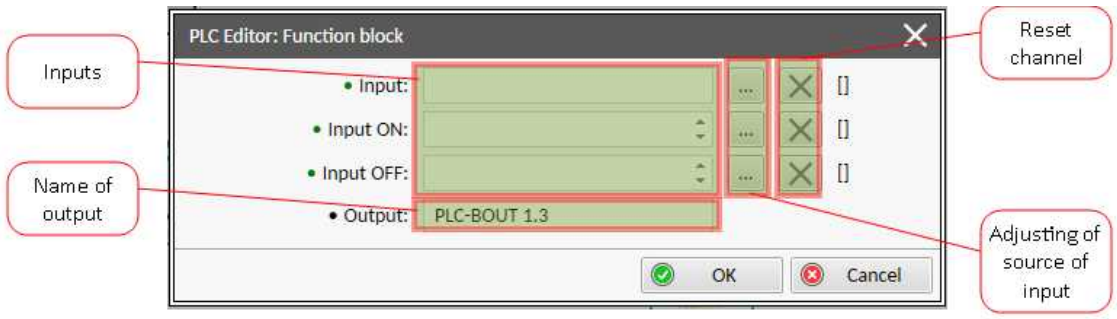


Image 8.208 Configuration of Comp Hyst block

Note: *Level On and Level Off can be constants or values from controller.*

> **IMPORTANT: In case that values on inputs have different decimal numbers than the values are converted and the name of block is red. It is strongly recommended to use values with the same decimal numbers.**

back to List of PLC blocks

Comparator With Delay

PLC group	Comparison of analog inputs
Related FW	1.3.0
Related applications	MINT, SPtM
Comm object	4



Inputs

Input	Type	Negation	Range	Function
Input 1	Analog	No	Any	Compared value
Input 2	Analog	No	Same as Input 1	Comparative level
Delay	Analog	No	0.0..3000,0 [s]	Comparative delay

Outputs

Output	Type	Negation	Range	Function
Output	Binary	No	0/1	Comparator output

Description

The block works as an analog switch. It compares the input value with the comparative level. The output will switch on if the input is equal or higher than the comparative level for time longer than the delay.

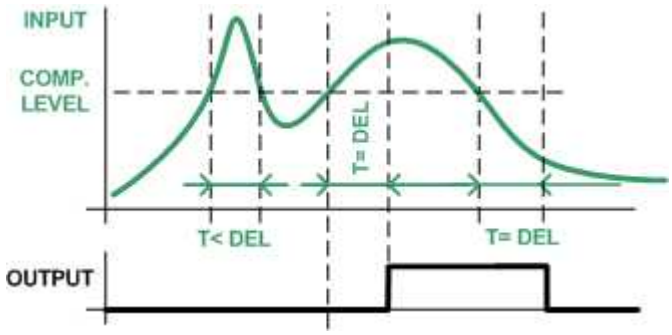


Image 8.209 Principle of delay

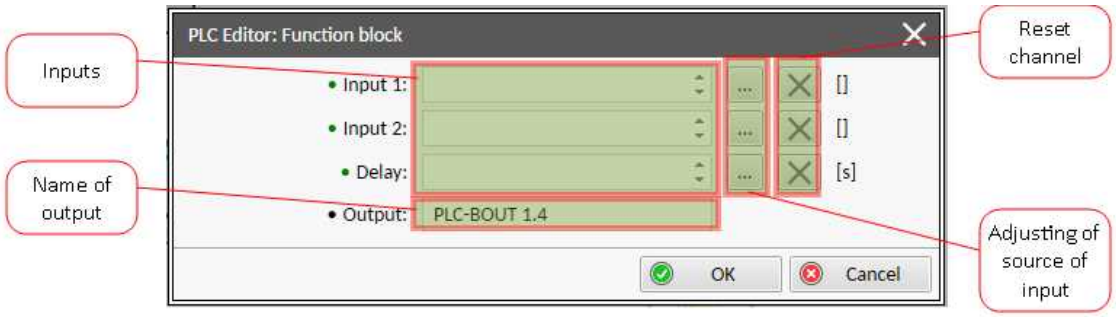


Image 8.210 Configuration of Comp Time block

Note: *Input 2 and Delay can be constants or values from controller.*

back to List of PLC blocks

Group: Time functions

Timer

PLC group	Time functions
Related FW	1.3.0
Related applications	MINT, SPtM
Comm object	14



Inputs

Input	Type	Negation	Range	Function
Run	Binary	No	0/1	The timer runs only if this input is active or not connected
Reload	Binary	No	0/1	This input reloads the timer to the initial value
Reload value	Analog	No	0,0..3276,7 [s]	Initial value of the timer

Outputs

Output	Type	Negation	Range	Function
Output	Binary	No	0/1	Timer output

Description

The block works as a countdown timer which is decreased by 1 every PLC cycle. The timer initial value is adjustable by the "Reload value" input. The timer is automatically reloaded with the initial value when it reaches zero or it can be reloaded in any other moment using the "reload" input. The timer is held at reload value until the reload input is deactivated. The timer output is inverted always when the timer is reloaded.

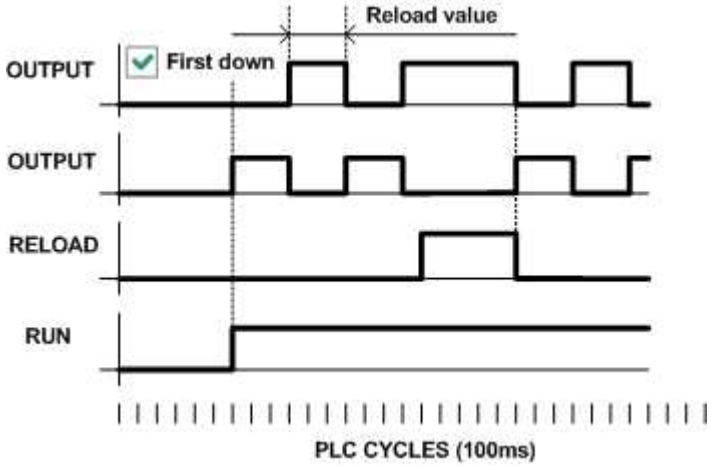


Image 8.211 Principle of timer

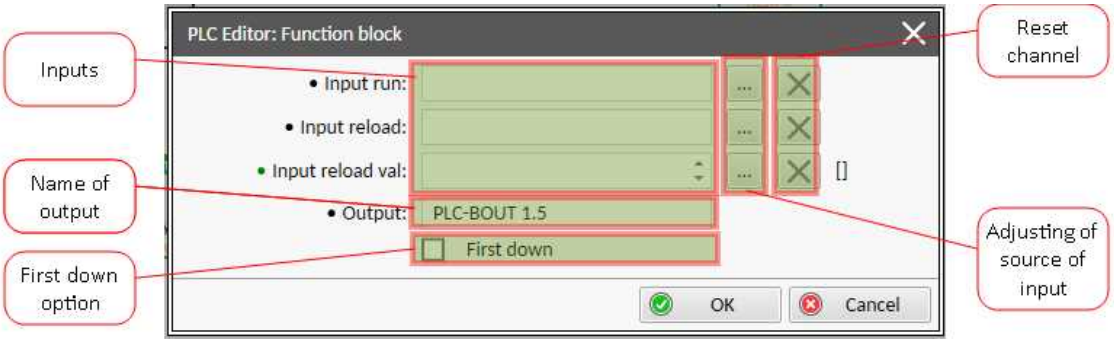


Image 8.212 Configuration of Timer block

Note: *Input reload value can be constant or value from controller.*

Note: *If you want the output to start at logical 0, tick First down option. Otherwise the output will start at logical 1.*

> **IMPORTANT: In case that inputs are not connected and First down option isn´t tick, than output is active.**

back to List of PLC blocks

Delay

PLC group	Time functions
Related FW	1.3.0
Related applications	MINT, SPtM
Comm object	33



Inputs

Input	Type	Negation	Range	Function
Input	Binary	No	0/1	Input signal to be delayed
Input time up	Analog	No	-3200,0..3200,0 [s, m, h]	Delay of the rising edge resp. pulse length generated by rising edge of the input
Input time down	Analog	No	-3200,0..3200,0 [s, m, h]	Delay of the falling edge resp. pulse length generated by falling edge of the input
Input reset	Binary	No	0/1	Resets the output to logical 0. The output remains in logical 0 until new rising edge appears on Input (when Input reset is deactivated already)

Outputs

Output	Type	Negation	Range	Function
Output	Binary	No	0/1	Output signal

Description

This block can work in two modes of operation:

- Delay mode - the rising edge at the output is generated with delay of "input time up" when a rising edge at the input is detected. The falling edge at the output is generated with delay of "input time down" when a falling edge at the input is detected. If the delayed falling edge at the output came earlier than the delayed rising edge, then no pulse would be generated at the output.
- Pulse mode - a pulse of "input time up" length is generated at the output when a rising edge is detected, a pulse of "input time down" length is generated at the output when a falling edge is detected.

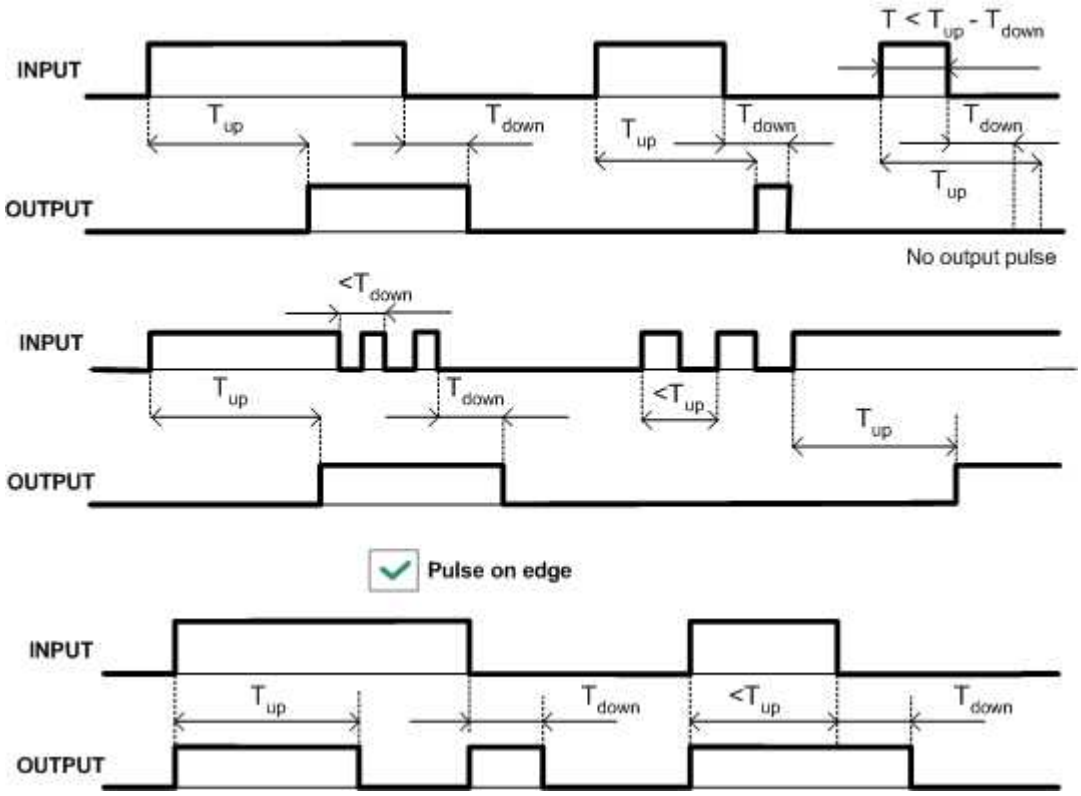


Image 8.213 Delay modes principles

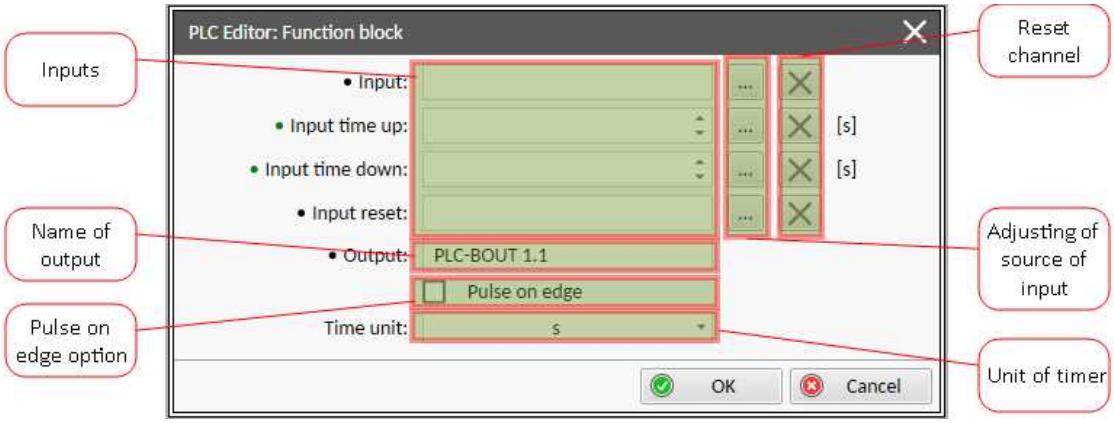


Image 8.214 Configuration of Delay block

Note: *If Input time up or Input time down value is <0, this input is internally set to zero.*

Note: *Input time up and Input time down values can be constants or values from controller.*

Note: *Use Pulse on edge option to choose between delay and pulse mode.*

back to List of PLC blocks

Group: Other functions

Force History Record

PLC group	Other functions
Related FW	1.3.0
Related applications	MINT, SPtM
Comm object	9



Inputs

Input	Type	Negation	Range	Function
Input	Binary	No	0/1	A record with configured text is recorded into the controller history when the input is activated.

Outputs

No outputs.

Description

This block writes a record with defined text into the history when the input is activated.

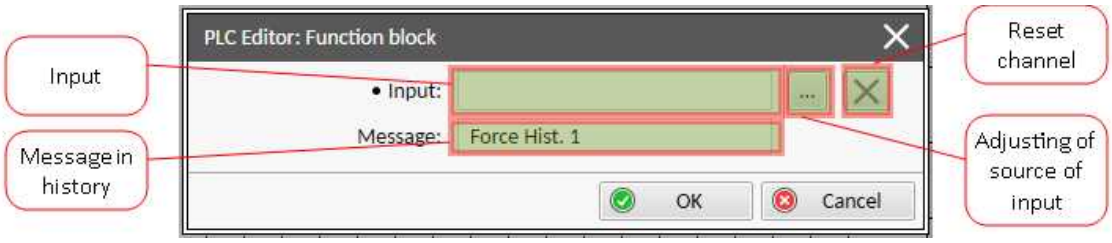


Image 8.215 Configuration of Force Hist block

Note: *Maximal number of characters for history message is 15.*

back to List of PLC blocks

Force Protection

PLC group	Other functions
Related FW	1.3.0
Related applications	MINT, SPtM
Comm object	10



Inputs

Input	Type	Negation	Range	Function
Lvl 1	Binary	No	0/1	The input activates yellow level of the configured protection if it is configured
Lvl 2	Binary	No	0/1	The input activates red level of the configured protection if a red level protection is configured
Fls	Binary	No	0/1	The input activates sensor fail if a fls protection is configured

Outputs
No outputs.
Description
This block issues alarms of configured type and text when appropriate binary input is activated.

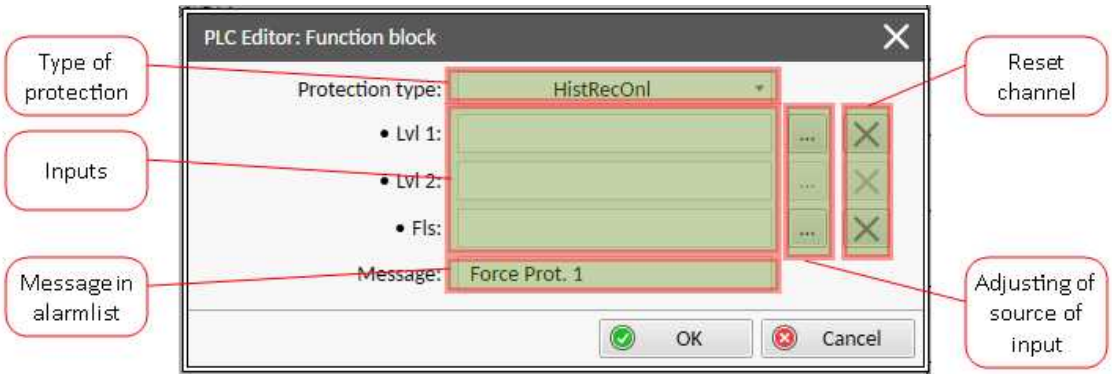


Image 8.216 Configuration of Force Prot block

Available protections are:

- Monitoring
- HistRecOnl
- AL Indic
- Wrn
- Wrn+BOC
- BOC
- Wrn+Sd
- Sd

Note: *Maximal number of characters for alarmlist message is 15.*

Note: *Prefix of protection (e.g. Wrn, Sd, BOC) is added automatically into alarmlist message.*

back to List of PLC blocks

8.2 Alarms

8.2.1 Alarms level 1 774
8.2.2 Alarms level 2 802
8.2.3 Fail sensor and other types 822

What alarms are:

The controller evaluates two levels of alarms. For more information **see Alarm management on page 144**.

8.2.1 Alarms level 1

Warnings 777
Other type 796

For full list of Alarms level 1 go to **List of alarms level 1 (page 775)**.

What alarms level 1 are:

The level 1 alarm indicates that a value or parameter is out of normal limits, but has still not reached critical level. For more information **see Alarm types - Level 1 on page 146**.

List of alarms level 1

Alarm Email 1 Fail 777
Alarm Email 2 Fail 777
Alarm Email 3 Fail 777
Alarm Email 4 Fail 777
Alarm SMS 1 Fail 778
Alarm SMS 2 Fail 778
Alarm SMS 3 Fail 778
Alarm SMS 4 Fail 778
Battery Charger Fail 779
Wrn Battery Voltage 779
Bus CCW Rotation 779
ECU Wait To Start 779
Wrn Emergency Droop Active 780
Event Email 1 Fail 780
Event Email 2 Fail 780
Event Email 3 Fail 780
Event Email 4 Fail 780
Event SMS 1 Fail 781
Event SMS 2 Fail 781
Event SMS 3 Fail 781
Event SMS 4 Fail 781
Generator CCW Rotation .782
Mains CCW Rotation 782
Rental Timer 1 Elapsed ...782
Rental Timer 2 Elapsed ...782
Rental Timer Block Start . 783
Soft Transfer Fail 783
Speed Regulation Limit ...783
Voltage Regulation Limit ..783
Wrn AIN Prot 783
Wrn Charging Alternator Fail 784
Wrn BadPwrCfg 784
Wrn Battery > Voltage 784
Wrn Battery < Voltage 784
Wrn BIN Protection 785
Wrn Coolant Temp 785
Wrn Coolant Temperature Low 785
Wrn ECU Communication Fail 786
ECU Red Lamp 786
ECU Yellow Lamp 786
Wrn Fence 1 Alarm 786
Wrn Fence 2 Alarm 787
Wrn Fuel Level 787
Wrn Fuel Theft 787
Wrn GCB Fail 787
Wrn Generator L1 > Voltage 788
Wrn Generator L1 < Voltage 788
Wrn Generator L1L2 > Voltage 788
Wrn Generator L1L2 < Voltage 789
Wrn Generator L2 > Voltage 789
Wrn Generator L2 < Voltage 789
Wrn Generator L2L3 > Voltage 789
Wrn Generator L2L3 < Voltage 790
Wrn Generator L3 > Voltage 790
Wrn Generator L3 < Voltage 790
Wrn Generator L3L1 > Voltage 791
Wrn Generator L3L1 < Voltage 791
Wrn Generator > Frequency 791
Wrn Generator < Frequency 791
Wrn Check DPF Status .. 792
Wrn Maintenance 1 792
Wrn Maintenance 2 792
Wrn Maintenance 3 793
Wrn Maintenance 4 793
Wrn Maintenance 5 793
Wrn Maintenance 6 793
Wrn MCB Fail 794
Wrn Oil Pressure 794
Wrn Overload 794
Wrn Override All Sd 795
Wrn Rental Timer 1 795
Wrn Rental Timer 2 795
Wrn Reverse Synchro Fail 795
Wrn Stop Fail 795
Wrn Unsupported PMS Mode 796
After-Treatment 796
Dead Bus GCB Blocked ..797
EM(A) - a message lost ...797
EM(A) - configuration mistake 797
EM(A) - insufficient 797
EM(A) - missing or damaged 798
EM(B) - a message lost ...798
EM(B) - configuration mistake 798
EM(B) - insufficient 798
EM(B) - missing or damaged 799
Generator CCW Rotation .799
Mains CCW Rotation 799
Manual Restore 799
Module(slotA) - comm. outage 800
Module(slotA) - false module 800
Module(slotA) - unattended 800

Module(slotA) - unexpected 800
Module(slotA) - unknown module 801
Module(slotB) - comm. outage 801
Module(slotB) - false module 801
Module(slotB) - unattended 801
Module(slotB) - unexpected 802
Module(slotB) - unknown module 802

Warnings

Alarm Email 1 Fail

Alarm Type	Other
Alarmlist message	Alarm Email 1 Fail
Alarm evaluated	All the time
Related applications	MINT, SPtM
Description	The alarm indicates that there was a request to send an alarm email to email address which is adjusted in setpoint **Email Address 1 (page 487)** and email wasn't send.

back to List of alarms level 1

Alarm Email 2 Fail

Alarm Type	Other
Alarmlist message	Alarm Email 2 Fail
Alarm evaluated	All the time
Related applications	MINT, SPtM
Description	The alarm indicates that there was a request to send an alarm email to email address which is adjusted in setpoint **Email Address 2 (page 488)** and email wasn't send.

back to List of alarms level 1

Alarm Email 3 Fail

Alarm Type	Other
Alarmlist message	Alarm Email 3 Fail
Alarm evaluated	All the time
Related applications	MINT, SPtM
Description	The alarm indicates that there was a request to send an alarm email to email address which is adjusted in setpoint **Email Address 3 (page 488)** and email wasn't send.

back to List of alarms level 1

Alarm Email 4 Fail

Alarm Type	Other
Alarmlist message	Alarm Email 4 Fail
Alarm evaluated	All the time
Related applications	MINT, SPtM
Description	The alarm indicates that there was a request to send an alarm email to email address which is adjusted in setpoint **Email Address 4 (page 489)** and email wasn't send.

back to List of alarms level 1

Alarm SMS 1 Fail

Alarm Type	Other
Alarmlist message	Alarm SMS 1 Fail
Alarm evaluated	All the time
Related applications	MINT, SPtM
Description	The alarm indicates that there was a request to send an alarm SMS to telephone number which is adjusted in setpoint **Telephone Number 1 (page 484)** and SMS wasn't send.

back to List of alarms level 1

Alarm SMS 2 Fail

Alarm Type	Other
Alarmlist message	Alarm SMS 2 Fail
Alarm evaluated	All the time
Related applications	MINT, SPtM
Description	The alarm indicates that there was a request to send an alarm SMS to telephone number which is adjusted in setpoint **Telephone Number 2 (page 484)** and SMS wasn't send.

back to List of alarms level 1

Alarm SMS 3 Fail

Alarm Type	Other
Alarmlist message	Alarm SMS 3 Fail
Alarm evaluated	All the time
Related applications	MINT, SPtM
Description	The alarm indicates that there was a request to send an alarm SMS to telephone number which is adjusted in setpoint **Telephone Number 3 (page 485)** and SMS wasn't send.

back to List of alarms level 1

Alarm SMS 4 Fail

Alarm Type	Other
Alarmlist message	Alarm SMS 4 Fail
Alarm evaluated	All the time
Related applications	MINT, SPtM
Description	The alarm indicates that there was a request to send an alarm SMS to telephone number which is adjusted in setpoint **Telephone Number 4 (page 485)** and SMS wasn't send.

back to List of alarms level 1

Battery Charger Fail

Alarm Type	Warning
Alarmlist message	Battery Charge Fail
Alarm evaluated	Mains is OK
Related applications	MINT, SPtM
Description	This alarm is activated when logical binary input **BATTERY CHARGER (PAGE 628)** is active.

back to List of alarms level 1

Wrn Battery Voltage

Alarm Type	Warning
Alarmlist message	Wrn Battery Voltage
Alarm evaluated	All the time
Related applications	MINT, SPtM
Description	This alarm informs the operator that the controller supply voltage is out of limits. The following setpoints are related to it: ▶ **Battery Undervoltage (page 294)** ▶ **Battery Overvoltage (page 294)** ▶ **Battery <> Voltage Delay (page 295)**

back to List of alarms level 1

Bus CCW Rotation

Alarm Type	Warning
Alarmlist message	Bus CCW Rotation
Alarm evaluated	All the time
Related applications	MINT
Description	The controller detects phase sequence on bus voltage terminals. This protection is important after controller installation to avoid wrong voltage phase connection.

back to List of alarms level 1

ECU Wait To Start

Alarm Type	Warning
Alarmlist message	ECU Wait To Start
Alarm evaluated	Only when ECU is connected
Related applications	MINT, SPtM
Description	This alarm is activated when ECU send information that ECU Wait To Start lamp is activated. LBO **ALARM (PAGE 680)**is not activated, after deactivation of lamp, alarm automatically disappear.

back to List of alarms level 1

Wrn Emergency Droop Active

Alarm Type	Warning
Alarmlist message	Wrn Emergency Droop Active
Alarm evaluated	All the time
Related applications	MINT, SPtM
Description	This alarm is issued when Emergency Droop regulation as active.

back to List of alarms level 1

Event Email 1 Fail

Alarm Type	Other
Alarmlist message	Event Email 1 Fail
Alarm evaluated	All the time
Related applications	MINT, SPtM
Description	The alarm indicates that there was a request to send an event email to email address which is adjusted in setpoint **Email Address 1 (page 487)** and email wasn't send.

back to List of alarms level 1

Event Email 2 Fail

Alarm Type	Other
Alarmlist message	Event Email 2 Fail
Alarm evaluated	All the time
Related applications	MINT, SPtM
Description	The alarm indicates that there was a request to send an event email to email address which is adjusted in setpoint **Email Address 2 (page 488)** and email wasn't send.

back to List of alarms level 1

Event Email 3 Fail

Alarm Type	Other
Alarmlist message	Event Email 2 Fail
Alarm evaluated	All the time
Related applications	MINT, SPtM
Description	The alarm indicates that there was a request to send an event email to email address which is adjusted in setpoint **Email Address 3 (page 488)** and email wasn't send.

back to List of alarms level 1

Event Email 4 Fail

Alarm Type	Other
Alarmlist message	Event Email 4 Fail
Alarm evaluated	All the time

Related applications	MINT, SPtM
Description	The alarm indicates that there was a request to send an event email to email address which is adjusted in setpoint **Email Address 4 (page 489)** and email wasn't send.

back to List of alarms level 1

Event SMS 1 Fail

Alarm Type	Other
Alarmlist message	Event SMS 1 Fail
Alarm evaluated	All the time
Related applications	MINT, SPtM
Description	The alarm indicates that there was a request to send an event SMS to telephone number which is adjusted in setpoint **Telephone Number 1 (page 484)** and SMS wasn't send.

back to List of alarms level 1

Event SMS 2 Fail

Alarm Type	Other
Alarmlist message	Event SMS 2 Fail
Alarm evaluated	All the time
Related applications	MINT, SPtM
Description	The alarm indicates that there was a request to send an event SMS to telephone number which is adjusted in setpoint **Telephone Number 2 (page 484)** and SMS wasn't send.

back to List of alarms level 1

Event SMS 3 Fail

Alarm Type	Other
Alarmlist message	Event SMS 3 Fail
Alarm evaluated	All the time
Related applications	MINT, SPtM
Description	The alarm indicates that there was a request to send an event SMS to telephone number which is adjusted in setpoint **Telephone Number 3 (page 485)** and SMS wasn't send.

back to List of alarms level 1

Event SMS 4 Fail

Alarm Type	Other
Alarmlist message	Event SMS 4 Fail
Alarm evaluated	All the time

Related applications	MINT, SPtM
Description	The alarm indicates that there was a request to send an event SMS to telephone number which is adjusted in setpoint **Telephone Number 4 (page 485)** and SMS wasn't send.

back to List of alarms level 1

Generator CCW Rotation

Alarm Type	Warning
Alarmlist message	Generator CCW Rotation
Alarm evaluated	All the time
Related applications	MINT, SPtM
Description	The controller detects phase sequence on generator voltage terminals. This protection is important after controller installation to avoid wrong voltage phase connection.

back to List of alarms level 1

Mains CCW Rotation

Alarm Type	Warning
Alarmlist message	Mains CCW Rotation
Alarm evaluated	All the time
Related applications	MINT, SPtM
Description	The controller detects phase sequence on mains voltage terminals. This protection is important after controller installation to avoid wrong voltage phase connection.

back to List of alarms level 1

Rental Timer 1 Elapsed

Alarm Type	Warning
Alarmlist message	Rental Timer 1 Elapsed
Alarm evaluated	All the time
Related applications	MINT, SPtM
Description	This alarm is activated when **Rental Timer 1 (page 436)** elapses.

back to List of alarms level 1

Rental Timer 2 Elapsed

Alarm Type	Warning
Alarmlist message	Rental Timer 2 Elapsed
Alarm evaluated	All the time
Related applications	MINT, SPtM
Description	This alarm is activated when **Rental Timer 2 (page 438)** elapses.

back to List of alarms level 1

Rental Timer Block Start

Alarm Type	Other
Alarmlist message	Rental Timer Block Start
Alarm evaluated	All the time
Related applications	MINT, SPtM
Description	Alarm is active when there is start command and **Rental Timer 1 (page 436)** or **Rental Timer 2 (page 438)** elapsed.

back to List of alarms level 1

Soft Transfer Fail

Alarm Type	Warning
Alarmlist message	Soft Transfer Fail
Alarm evaluated	During transition of load
Related applications	MINT, SPtM
Description	This alarm is issued when the unloading was not successful (**Load Ramp (page 348)** + 10 % gets elapsed).

back to List of alarms level 1

Speed Regulation Limit

Alarm Type	Warning
Alarmlist message	Speed Regulation Limit
Alarm evaluated	Gen-set is running
Related applications	MINT, SPtM
Description	This alarm is issued when speed governor output (**Speed control outputs (page 138)**) stays close to one of the limit values for more than 2 seconds.

back to List of alarms level 1

Voltage Regulation Limit

Alarm Type	Warning
Alarmlist message	Voltage Regulation Limit
Alarm evaluated	Gen-set is running
Related applications	MINT, SPtM
Description	This alarm is issued when AVR output (**Voltage control outputs (page 140)**) stays close to one of the limit values for more than 2 seconds.

back to List of alarms level 1

Wrn AIN Prot

Alarm Type	Warning
Alarmlist message	Wrn + Name of analog input
Alarm evaluated	All the time

Related applications	MINT, SPtM
Description	This alarm indicates that value the general analog protection is out of warning protection limit.

back to List of alarms level 1

Wrn Charging Alternator Fail

Alarm Type	Warning
Alarmlist message	Wrn Charging Alternator Fail
Alarm evaluated	Engine running only
Related applications	MINT, SPtM
Description	This alarm is issued if the engine is running and the voltage on the D+ terminal is lower than 80% of the controller supply voltage. This alarm works similar to the red “battery” alarm indicator on a vehicle dashboard. The setpoint has to be in Charge Fail or Enabled position to enable this alarm.

back to List of alarms level 1

Wrn BadPwrCfg

Alarm Type	Warning
Alarmlist message	Wrn BadPwrCfg
Alarm evaluated	All the time
Related applications	MINT
Description	This alarm is issued when there is different power format on controller which are connected via CAN2.

back to List of alarms level 1

Wrn Battery > Voltage

Alarm Type	Warning
Alarmlist message	All the time
Alarm evaluated	Wrn Battery > Voltage
Related applications	MINT, SPtM
Description	This alarm informs the operator that the controller supply voltage is too high. The following setpoints are related to it: ▶ **Battery Overvoltage (page 294)** ▶ **Battery <> Voltage Delay (page 295)**

back to List of alarms level 1

Wrn Battery < Voltage

Alarm Type	Warning
Alarmlist message	Wrn Battery < Voltage
Alarm evaluated	All the time

Related applications	MINT, SPtM
Description	This alarm informs the operator that the controller supply voltage is too low. The following setpoints are related to it: ▶ **Battery Undervoltage (page 294)** ▶ **Battery <> Voltage Delay (page 295)**

back to List of alarms level 1

Wrn BIN Protection

Alarm Type	Warning
Alarmlist message	Wrn + Name of binary input
Alarm evaluated	All the time
Related applications	MINT, SPtM
Description	Binary input also can be adjusted like alarm. In this case message in alarmlist contains prefix - Wrn and binary input name. This alarm occurs, when appropriate binary input is active.

back to List of alarms level 1

Wrn Coolant Temp

Alarm Type	Warning
Alarmlist message	Wrn Coolant Temp
Alarm evaluated	All the time
Related applications	MINT, SPtM
Description	This alarm indicates that the coolant temperature is higher than the temperature set in **Coolant Temperature Wrn (page 282)** setpoint.

back to List of alarms level 1

Wrn Coolant Temperature Low

Alarm Type	Warning
Alarmlist message	Wrn Coolant Temperature Low
Alarm evaluated	All the time
Related applications	MINT, SPtM
Description	This alarm indicates that the coolant temperature is lower than the temperature set in **Coolant Temperature Low Wrn (page 288)** setpoint.

back to List of alarms level 1

Wrn ECU Communication Fail

Alarm Type	Warning
Alarmlist message	Wrn ECU Communication Fail
Alarm evaluated	With configured LBO **ECU Power Relay (page 696)** - only when this LBO is active Without configured LBO **ECU Power Relay (page 696)** - all the time
Related applications	MINT, SPtM
Description	This alarm occurs when an ECU is configured, but the communication with the ECU is not established or has dropped out.

back to List of alarms level 1

ECU Red Lamp

Alarm Type	Other
Alarmlist message	ECU Red Lamp
Alarm evaluated	All the time
Related applications	MINT, SPtM
Description	This alarm occurs when an red ECU alarm is logged in Alarm List. ***Note:*** *This lamp can be ignored during prestart phase. Use InteliConfig to enable this function.*

back to List of alarms level 1

ECU Yellow Lamp

Alarm Type	Other
Alarmlist message	ECU Yellow Lamp
Alarm evaluated	All the time
Related applications	MINT, SPtM
Description	This alarm occurs when an yellow ECU alarm is logged in Alarm List. ***Note:*** *This lamp can be ignored during prestart phase. Use InteliConfig to enable this function.*

back to List of alarms level 1

Wrn Fence 1 Alarm

Alarm Type	Warning
Alarmlist message	Wrn Fence 1 Alarm
Alarm evaluated	All the time
Related applications	MINT, SPtM
Description	This alarm evaluates the GPS position of gen-set. The following setpoint are related to it: ▶ **Geo-Fencing (page 443)** ▶ **Fence 1 Protection (page 444)** ▶ **Fence Radius 1 (page 442)**

back to List of alarms level 1

Wrn Fence 2 Alarm

Alarm Type	Warning
Alarmlist message	Wrn Fence 2 Alarm
Alarm evaluated	All the time
Related applications	MINT, SPtM
Description	This alarm evaluates the GPS position of gen-set. The following setpoint are related to it: ▶ **Geo-Fencing (page 443)** ▶ **Fence 2 Protection (page 445)** ▶ **Fence Radius 2 (page 442)**

back to List of alarms level 1

Wrn Fuel Level

Alarm Type	Warning
Alarmlist message	Wrn Fuel Level
Alarm evaluated	All the time
Related applications	MINT, SPtM
Description	This alarm indicates that the fuel level is lower than the level set in **Fuel Level Wrn (page 289)** setpoint.

back to List of alarms level 1

Wrn Fuel Theft

Alarm Type	Warning
Alarmlist message	Wrn Fuel Theft
Alarm evaluated	All the time
Related applications	MINT, SPtM
Description	This alarm occurs when the fuel level value measured at relevant AI (Fuel Level) drops faster than is the limit adjusted by setpoint **Maximal Fuel Drop (page 291)**.

back to List of alarms level 1

Wrn GCB Fail

Alarm Type	Warning
Alarmlist message	Wrn GCB Fail
Alarm evaluated	All the time

Related applications	MINT, SPtM
Description	This alarm will occur when the **GCB Feedback (page 652)** input does not match the expected position given by the **GCB Close/Open (page 701)** output. It stays active until the mismatch between the output and feedback persists. ▶ If there was no command issued by the controller and the breaker (feedback) changes suddenly the position itself, the alarm will be issued immediately. ▶ The alarm will be also issued if the breaker does not respond to an open or close command within 2 seconds.

back to List of alarms level 1

Wrn Generator L1 > Voltage

Alarm Type	Warning
Alarmlist message	Wrn Generator L1 > Voltage
Alarm evaluated	Generator excited only
Related applications	MINT, SPtM
Description	This alarm evaluates the generator phase voltage in phase 1. The following setpoints are related to it: ▶ **Generator Overvoltage Wrn (page 302)** ▶ **Generator <> Voltage Delay (page 303)**

back to List of alarms level 1

Wrn Generator L1 < Voltage

Alarm Type	Warning
Alarmlist message	Wrn Generator L1 < Voltage
Alarm evaluated	Generator excited only
Related applications	MINT, SPtM
Description	This alarm evaluates the generator phase voltage in phase 1. The following setpoints are related to it: ▶ **Generator Undervoltage Wrn (page 303)** ▶ **Generator <> Voltage Delay (page 303)**

back to List of alarms level 1

Wrn Generator L1L2 > Voltage

Alarm Type	Warning
Alarmlist message	Wrn Generator L1L2 > Voltage
Alarm evaluated	Generator excited only
Related applications	MINT, SPtM
Description	This alarm evaluates the generator phase to phase voltage between phases 1 and 2. The following setpoints are related to it: ▶ **Generator Overvoltage Wrn (page 302)** ▶ **Generator <> Voltage Delay (page 303)**

back to List of alarms level 1

Wrn Generator L1L2 < Voltage

Alarm Type	Warning
Alarmlist message	Wrn Generator L1L2 < Voltage
Alarm evaluated	Generator excited only
Related applications	MINT, SPtM
Description	This alarm evaluates the generator phase to phase voltage between phases 1 and 2. The following setpoints are related to it: ▶ **Generator Undervoltage Wrn (page 303)** ▶ **Generator <> Voltage Delay (page 303)**

back to List of alarms level 1

Wrn Generator L2 > Voltage

Alarm Type	Warning
Alarmlist message	Wrn Generator L2 > Voltage
Alarm evaluated	Generator excited only
Related applications	MINT, SPtM
Description	This alarm evaluates the generator phase voltage in phase 2. The following setpoints are related to it: ▶ **Generator Overvoltage Wrn (page 302)** ▶ **Generator <> Voltage Delay (page 303)**

back to List of alarms level 1

Wrn Generator L2 < Voltage

Alarm Type	Warning
Alarmlist message	Wrn Generator L2 < Voltage
Alarm evaluated	Generator excited only
Related applications	MINT, SPtM
Description	This alarm evaluates the generator phase voltage in phase 2. The following setpoints are related to it: ▶ **Generator Undervoltage Wrn (page 303)** ▶ **Generator <> Voltage Delay (page 303)**

back to List of alarms level 1

Wrn Generator L2L3 > Voltage

Alarm Type	Warning
Alarmlist message	Wrn Generator L2L3 > Voltage
Alarm evaluated	Generator excited only

Related applications	MINT, SPtM
Description	This alarm evaluates the generator phase to phase voltage between phases 2 and 3. The following setpoints are related to it: ▶ **Generator Overvoltage Wrn (page 302)** ▶ **Generator <> Voltage Delay (page 303)**

back to List of alarms level 1

Wrn Generator L2L3 < Voltage

Alarm Type	Warning
Alarmlist message	Wrn Generator L2L3 < Voltage
Alarm evaluated	Generator excited only
Related applications	MINT, SPtM
Description	This alarm evaluates the generator phase to phase voltage between phases 2 and 3. The following setpoints are related to it: ▶ **Generator Undervoltage Wrn (page 303)** ▶ **Generator <> Voltage Delay (page 303)**

back to List of alarms level 1

Wrn Generator L3 > Voltage

Alarm Type	Warning
Alarmlist message	Wrn Generator L3 > Voltage
Alarm evaluated	Generator excited only
Related applications	MINT, SPtM
Description	This alarm evaluates the generator phase voltage in phase 3. The following setpoints are related to it: ▶ **Generator Overvoltage Wrn (page 302)** ▶ **Generator <> Voltage Delay (page 303)**

back to List of alarms level 1

Wrn Generator L3 < Voltage

Alarm Type	Warning
Alarmlist message	Wrn Generator L3 < Voltage
Alarm evaluated	Generator excited only
Related applications	MINT, SPtM
Description	This alarm evaluates the generator phase voltage in phase 3. The following setpoints are related to it: ▶ **Generator Undervoltage Wrn (page 303)** ▶ **Generator <> Voltage Delay (page 303)**

back to List of alarms level 1

Wrn Generator L3L1 > Voltage

Alarm Type	Warning
Alarmlist message	Wrn Generator L3L1 > Voltage
Alarm evaluated	Generator excited only
Related applications	MINT, SPtM
Description	This alarm evaluates the generator phase to phase voltage between phases 3 and 1. The following setpoints are related to it: ▶ **Generator Overvoltage Wrn (page 302)** ▶ **Generator <> Voltage Delay (page 303)**

back to List of alarms level 1

Wrn Generator L3L1 < Voltage

Alarm Type	Warning
Alarmlist message	Wrn Generator L3L1 < Voltage
Alarm evaluated	Generator excited only
Related applications	MINT, SPtM
Description	This alarm evaluates the generator phase to phase voltage between phases 3 and 1. The following setpoints are related to it: ▶ **Generator Undervoltage Wrn (page 303)** ▶ **Generator <> Voltage Delay (page 303)**

back to List of alarms level 1

Wrn Generator > Frequency

Alarm Type	Warning
Alarmlist message	Wrn Generator > Frequency
Alarm evaluated	Generator excited only
Related applications	MINT, SPtM
Description	This alarm evaluates the generator frequency in the phase L1. The following setpoints are related to it: ▶ **Generator Overfrequency Wrn (page 304)** ▶ **Generator <> Frequency Delay (page 305)**

back to List of alarms level 1

Wrn Generator < Frequency

Alarm Type	Warning
Alarmlist message	Wrn Generator < Frequency
Alarm evaluated	Generator excited only
Related applications	MINT, SPtM
Description	This alarm evaluates the generator frequency in the phase L1. The following setpoints are related to it: ▶ **Generator Underfrequency Wrn (page 305)** ▶ **Generator <> Frequency Delay (page 305)**

back to List of alarms level 1

Wrn Check DPF Status

Alarm Type	Warning
Alarmlist message	Wrn Check DPF Status
Alarm evaluated	When ECU is configured
Related applications	MINT, SPtM
Description	This alarm occurs when ECU send alarm message about Tier IV protection. ***Note:*** *Tier IV protection have to be supported by ECU.*

back to List of alarms level 1

Wrn Maintenance 1

Alarm Type	Warning
Alarmlist message	Wrn Maintenance 1
Alarm evaluated	All the time
Related applications	MINT, SPtM
Description	Adjust the setpoint **Maintenance Timer 1 (page 295)** to the interval of the next maintenance check. The value of the setpoint will count down while the engine is running and if reaches zero, this alarm will be issued. The alarm message will remain in the alarm list (even if the controller is switched off and on again) until the setpoint is re-adjusted to a positive value.

back to List of alarms level 1

Wrn Maintenance 2

Alarm Type	Warning
Alarmlist message	Wrn Maintenance 2
Alarm evaluated	All the time
Related applications	MINT, SPtM
Description	Adjust the setpoint **Maintenance Timer 2 (page 296)** to the interval of the next maintenance check. The value of the setpoint will count down while the engine is running and if reaches zero, this alarm will be issued. The alarm message will remain in the alarm list (even if the controller is switched off and on again) until the setpoint is re-adjusted to a positive value.

back to List of alarms level 1

Wrn Maintenance 3

Alarm Type	Warning
Alarmlist message	Wrn Maintenance 3
Alarm evaluated	All the time
Related applications	MINT, SPtM
Description	Adjust the setpoint **Maintenance Timer 3 (page 296)** to the interval of the next maintenance check. The value of the setpoint will count down while the engine is running and if reaches zero, this alarm will be issued. The alarm message will remain in the alarm list (even if the controller is switched off and on again) until the setpoint is re-adjusted to a positive value.

back to List of alarms level 1

Wrn Maintenance 4

Alarm Type	Warning
Alarmlist message	Wrn Maintenance 4
Alarm evaluated	All the time
Related applications	MINT, SPtM
Description	Adjust the setpoint **Maintenance Timer 4 (page 296)** to the date of the next maintenance check. Alarm is issued when the actual date reaches the value of this setpoint. The alarm message will remain in the alarm list (even if the controller is switched off and on again) until the setpoint is re-adjusted to new date.

back to List of alarms level 1

Wrn Maintenance 5

Alarm Type	Warning
Alarmlist message	Wrn Maintenance 5
Alarm evaluated	All the time
Related applications	MINT, SPtM
Description	Adjust the setpoint **Maintenance Timer 5 (page 297)** to the date of the next maintenance check. Alarm is issued when the actual date reaches the value of this setpoint. The alarm message will remain in the alarm list (even if the controller is switched off and on again) until the setpoint is re-adjusted to new date.

back to List of alarms level 1

Wrn Maintenance 6

Alarm Type	Warning
Alarmlist message	Wrn Maintenance 6
Alarm evaluated	All the time
Related applications	MINT, SPtM
Description	Adjust the setpoint **Maintenance Timer 6 (page 297)** to the date of the next maintenance check. Alarm is issued when the actual date reaches the value of this setpoint. The alarm message will remain in the alarm list (even if the controller is switched off and on again) until the setpoint is re-adjusted to new date.

back to List of alarms level 1

Wrn MCB Fail

Alarm Type	Warning
Alarmlist message	Wrn MCB Fail
Alarm evaluated	All the time
Related applications	MINT, SPtM
Description	This alarm will occur when the **MCB Feedback (page 656)** input does not match the expected position given by the **MCB Close/Open (page 711)** output. It stays active until the mismatch between the output and feedback disappears. ▶ If there was no command issued by the controller and the breaker (feedback) changes suddenly the position itself, the alarm will be issued immediately. ▶ Self-opening of the breaker is not considered a fault and if all mains values are within limits, the command to reclose the breaker is issued after delay given by the setpoint **Mains Return Delay (page 314)** has elapsed. ▶ The alarm will be also issued, if the breaker does not respond to the close command within 2 seconds. After this period has elapsed the output MCB Close/Open is deactivated again and the next attempt to close the breaker will occur first after the alarm is reset. ▶ The alarm will be also issued if the breaker does not respond to the open command within 2 seconds. The output MCB Close/Open will stay deactivated. Closing of GCB is blocked until this alarm becomes inactive.

back to List of alarms level 1

Wrn Oil Pressure

Alarm Type	Warning
Alarmlist message	Wrn Oil Pressure
Alarm evaluated	Gen-set is running
Related applications	MINT, SPtM
Description	This alarm indicates that the oil pressure is lower than the pressure set in **Oil Pressure Wrn (page 280)** setpoint.

back to List of alarms level 1

Wrn Overload

Alarm Type	Warning
Alarmlist message	Wrn Overload
Alarm evaluated	All the time
Related applications	MINT, SPtM
Description	The alarm is issued when the gen-set power is over the limit for time period longer than the delay. The following setpoints are related to it: ▶ **Overload Wrn (page 298)** adjusts the overload limit. ▶ **Overload Delay (page 298)** Overload Del adjusts the delay.

back to List of alarms level 1

Wrn Override All Sd

Alarm Type	Warning
Alarmlist message	Override All Sd
Alarm evaluated	All the time
Related applications	MINT, SPtM
Description	This alarm occurs when binary input **SD OVERRIDE (PAGE 664)** is activated.

back to List of alarms level 1

Wrn Rental Timer 1

Alarm Type	Warning
Alarmlist message	Wrn Rental Timer 1
Alarm evaluated	All the time
Related applications	MINT, SPtM
Description	This alarm occurs xx hours before **Rental Timer 1 (page 436)** elapsed. Hours are adjusted by setpoint **Rental Timer 1 Wrn (page 438)**.

back to List of alarms level 1

Wrn Rental Timer 2

Alarm Type	Warning
Alarmlist message	Wrn Rental Timer 2
Alarm evaluated	All the time
Related applications	MINT, SPtM
Description	This alarm occurs xx hours before **Rental Timer 2 (page 438)** elapsed. Hours are adjusted by setpoint **Rental Timer 2 Wrn (page 440)**.

back to List of alarms level 1

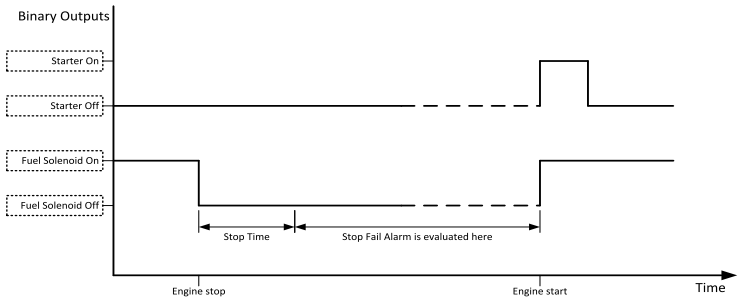
Wrn Reverse Synchro Fail

Alarm Type	Warning
Alarmlist message	Wrn Reverse Synchro Fail
Alarm evaluated	During synchronization
Related applications	MINT, SPtM
Description	This alarm is issued when gen-set is synchronizing to the mains/bus via MCB and **Synchronization Timeout (page 353)** gets elapsed.

back to List of alarms level 1

Wrn Stop Fail

Alarm Type	Warning
Alarmlist message	Wrn Stop Fail
Alarm evaluated	While the engine shall be stopped

Related applications	MINT, SPtM
Description	This alarm occurs if the gen-set shall be stopped, but some symptom indicates that it is not stopped. The period when the gen-set shall be stopped begins after the **FUEL SOLENOID (PAGE 699)** has been switched off and time delay **Stop Time (page 274)** has elapsed and lasts for the entire time the **FUEL SOLENOID (PAGE 699)** or **STARTER (PAGE 723)** are off.  Image 8.217 Stop Fail ***Note:*** *Gen-set cannot be started until this alarm is inactive and reset.*

back to List of alarms level 1

Wrn Unsupported PMS Mode

Alarm Type	Warning
Alarmlist message	Wrn Unsupported PMS Mode
Alarm evaluated	All the time
Related applications	MINT, SPtM
Description	This alarm is active if setpoint **#Power Management Mode (page 328)** is adjusted to not available option.

back to List of alarms level 1

Other type

After-Treatment

Alarm Type	Alarm indication
Alarmlist message	After-Treatment
Alarm evaluated	All the time
Related applications	MINT, SPtM
Description	This alarm occurs when appropriate after-treatment lamp is active.

back to List of alarms level 1

Dead Bus GCB Blocked

Alarm Type	Alarm indication
Alarmlist message	Dead Bus GCB Blocked
Alarm evaluated	All the time
Related applications	MINT, SPtM
Description	This alarm is issued when controller is in AUTO mode and Droop operation is active.

back to List of alarms level 1

EM(A) - a message lost

Alarm Type	Other
Alarmlist message	EM(A) - a message lost
Alarm evaluated	All the time
Related applications	MINT, SPtM
Description	This alarm indicates that there is a problem with communication between controller and module in slot.

back to List of alarms level 1

EM(A) - configuration mistake

Alarm Type	Other
Alarmlist message	EM(A) - configuration mistake
Alarm evaluated	All the time
Related applications	MINT, SPtM
Description	This alarm indicates that there is a problem with configuration of binary input or output of module in slot.

back to List of alarms level 1

EM(A) - insufficient

Alarm Type	Other
Alarmlist message	EM(A) - insufficient
Alarm evaluated	All the time
Related applications	MINT, SPtM
Description	This alarm indicates that module does not support all required features.

back to List of alarms level 1

EM(A) - missing or damaged

Alarm Type	Other
Alarmlist message	EM(A) - missing or damaged
Alarm evaluated	All the time
Related applications	MINT, SPtM
Description	This alarm indicates that there is a problem with communication with module in slot (in first 5 second there was no communication and module is configured in slot).

back to List of alarms level 1

EM(B) - a message lost

Alarm Type	Other
Alarmlist message	EM(B) - a message lost
Alarm evaluated	All the time
Related applications	MINT, SPtM
Description	This alarm indicates that there is a problem with communication between controller and module in slot.

back to List of alarms level 1

EM(B) - configuration mistake

Alarm Type	Other
Alarmlist message	EM(B) - configuration mistake
Alarm evaluated	All the time
Related applications	MINT, SPtM
Description	This alarm indicates that there is a problem with configuration of binary input or output of module in slot.

back to List of alarms level 1

EM(B) - insufficient

Alarm Type	Other
Alarmlist message	EM(B) - insufficient
Alarm evaluated	All the time
Related applications	MINT, SPtM
Description	This alarm indicates that module does not support all required features.

back to List of alarms level 1

EM(B) - missing or damaged

Alarm Type	Other
Alarmlist message	EM(B) - missing or damaged
Alarm evaluated	All the time
Related applications	MINT, SPtM
Description	This alarm indicates that there is a problem with communication with module in slot (in first 5 second there was no communication and module is configured in slot).

back to List of alarms level 1

Generator CCW Rotation

Alarm Type	Warning
Alarmlist message	Generator CCW Rotation
Alarm evaluated	All the time
Related applications	MINT, SPtM
Description	The controller detects phase sequence on generator voltage terminals. This protection is important after controller installation to avoid wrong voltage phase connection. There is a fixed defined phase sequence in InteliGen 200 controller: T35 = N, T36 = L1, T37 = L2 and T38 = L3. When the phases are connected in a different order, alarms are detected. This alarm prevent circuit breaker closing.

back to List of alarms level 1

Mains CCW Rotation

Alarm Type	Alarm indication
Alarmlist message	Mains CCW Rotation
Alarm evaluated	All the time
Related applications	MINT, SPtM
Description	The controller detects phase sequence on mains voltage terminals. This protection is important after controller installation to avoid wrong voltage phase connection. There is a fixed defined phase sequence in InteliGen 200 controller: T39 = N, T40 = L1, T41 = L2 and T42 = L3. When the phases are connected in a different order, alarms are detected. This alarm prevent circuit breaker closing.

back to List of alarms level 1

Manual Restore

Alarm Type	Alarm indication
Alarmlist message	Manual Restore
Alarm evaluated	All the time
Related applications	MINT, SPtM
Description	Alarm is activated when controller is in AUTO mode, **Return From Island (page 319)** setpoint is set to manual, load is on gen-set a mains has returned.

back to List of alarms level 1

Module(slotA) - comm. outage

Alarm Type	Other
Alarmlist message	Module(slotA) - comm. outage
Alarm evaluated	All the time
Related applications	MINT, SPtM
Description	This alarm indicates that there is a problem with communication between controller and module in slot.

back to List of alarms level 1

Module(slotA) - false module

Alarm Type	Other
Alarmlist message	Module(slotA) - fake module
Alarm evaluated	All the time
Related applications	MINT, SPtM
Description	This alarm indicates that false module is inserted in slot.

back to List of alarms level 1

Module(slotA) - unattended

Alarm Type	Other
Alarmlist message	Module(slotA) - unattended
Alarm evaluated	All the time
Related applications	MINT, SPtM
Description	This alarm indicates that two same communication modules are inserted in slots and one of them will be inactive.

back to List of alarms level 1

Module(slotA) - unexpected

Alarm Type	Other
Alarmlist message	Module(slotA) - unexpected
Alarm evaluated	All the time
Related applications	MINT, SPtM
Description	This alarm indicates that in slot is inserted different module than which is configured or the module is unconfigured and has to be configured for proper function.

back to List of alarms level 1

Module(slotA) - unknown module

Alarm Type	Other
Alarmlist message	Module(slotA) - unknown module
Alarm evaluated	All the time
Related applications	MINT, SPtM
Description	This alarm indicates that unknown module is inserted in slot.

back to List of alarms level 1

Module(slotB) - comm. outage

Alarm Type	Other
Alarmlist message	Module(slotB) - comm. outage
Alarm evaluated	All the time
Related applications	MINT, SPtM
Description	This alarm indicates that there is a problem with communication between controller and module in slot.

back to List of alarms level 1

Module(slotB) - false module

Alarm Type	Other
Alarmlist message	Module(slotB) - fake module
Alarm evaluated	All the time
Related applications	MINT, SPtM
Description	This alarm indicates that false module is inserted in slot.

back to List of alarms level 1

Module(slotB) - unattended

Alarm Type	Other
Alarmlist message	Module(slotB) - unattended
Alarm evaluated	All the time
Related applications	MINT, SPtM
Description	This alarm indicates that two same communication modules are inserted in slots and one of them will be inactive.

back to List of alarms level 1

Module(slotB) - unexpected

Alarm Type	Other
Alarmlist message	Module(slotB) - unexpected
Alarm evaluated	All the time
Related applications	MINT, SPtM
Description	This alarm indicates that in slot is inserted different module than which is configured or the module is unconfigured and has to be configured for proper function.

back to List of alarms level 1

Module(slotB) - unknown module

Alarm Type	Other
Alarmlist message	Module(slotB) - unknown module
Alarm evaluated	All the time
Related applications	MINT, SPtM
Description	This alarm indicates that unknown module is inserted in slot.

back to List of alarms level 1

Wrn Fuel Transfer Failed

Alarm Type	Warning
Alarmlist message	Wrn Fuel Transfer Failed
Alarm evaluated	When **FUEL PUMP (PAGE 699)** is active
Related applications	MINT, SPtM
Description	This alarm will occur when there is no increase of fuel level when **FUEL PUMP (PAGE 699)** is active.

back to List of alarms level 1

Wrn Transferring Fuel

Alarm Type	Warning
Alarmlist message	Transferring Fuel
Alarm evaluated	When **FUEL PUMP (PAGE 699)** is active
Related applications	MINT, SPtM
Description	This alarm will occur when **FUEL PUMP (PAGE 699)** is active.

back to List of alarms level 1

8.2.2 Alarms level 2

Shutdown 805
Other type 815

For full list of Alarms level 2 go to **List of alarms level 2 (page 804)**.

What alarms level 2 are:

The level 2 level alarm indicates that a critical level of the respective value or parameter has been reached. For

more information **see Alarm types - Level 2 on page 146**.

List of alarms level 2

Emergency Stop 805
E-Stop 805
Sd AIN Protec 805
Sd Battery Flat 805
Sd BIN Protection 806
Sd Coolant Temp 806
Sd Current Unbalance 806
Sd Earth Fault Current 807
Sd ECU Communication Fail 807
Sd Fence 1 Alarm 807
Sd Fence 2 Alarm 807
Sd Fuel Level 808
Sd GCB Fail 808
Sd Generator L1 > Voltage 808
Sd Generator L1 < Voltage 809
Sd Generator L1L2 > Voltage 809
Sd Generator L1L2 < Voltage 809
Sd Generator L2 > Voltage 809
Sd Generator L2 < Voltage 810
Sd Generator L2L3 > Voltage 810
Sd Generator L2L3 < Voltage 810
Sd Generator L3 > Voltage 810
Sd Generator L3 < Voltage 811
Sd Generator L3L1 > Voltage 811
Sd Generator L3L1 < Voltage 811
Sd Generator > Frequency 812
Sd Generator < Frequency 812
Sd Generator Voltage Unbalance Ph-Ph 812
Sd Generator Voltage Unbalance Ph-N 812
Sd Oil Pressure 813
Sd Overload 813
Sd Overspeed 813
Sd RPM Measurement Fail 814
Sd Short Circuit 814
Sd Start Fail 814
Sd Underspeed 814
BOC AIN Prot 815
BOC BIN Protection 815
BOC Coolant Temp 815
BOC Current Unbalance .. 815
BOC Excitation Loss 816
BOC Fence 1 Alarm 816
BOC Fence 2 Alarm 816
BOC Fuel Level 816
BOC Generator L1 < Voltage 817
BOC Generator L1L2 < Voltage 817
BOC Generator L2 < Voltage 817
BOC Generator L2L3 < Voltage 817
BOC Generator L3 < Voltage 818
BOC Generator L3L1 < Voltage 818
BOC Generator > Frequency 818
BOC Generator < Frequency 818
BOC Gen Voltage Unbalance Ph-Ph 819
BOC Gen Voltage Unbalance Ph-N 819
BOC NCB Fail 819
BOC Oil Pressure 820
BOC Overcurrent IDMT .. 820
BOC Overload 820
BOC Rental Timer 821
BOC Reverse Power 821
BOC Short Circuit 821
STP Bus Measurement Error 821
STP Synchronization Fail 822

Shutdown

Emergency Stop

Alarm Type	Shutdown
Alarmlist message	Emergency Stop
Alarm evaluated	All the time
Related applications	MINT, SPtM
Description	Alarm is activated when binary input **EMERGENCY STOP (PAGE 650)** is activated. The gen-set shuts down in the moment the input is activated and starting is blocked until the input is deactivated and fault reset is pressed. ***Note:*** *Use red emergency button placed on the switchboard door and connect it to a binary input of the controller. Then configure the function Emergency Stop to this binary input. It is recommended to use NC contact of the button.* ***Note:*** *The MCB control is not affected by this alarm.*

back to List of alarms level 2

E-Stop

Alarm Type	Shutdown
Alarmlist message	E-Stop
Alarm evaluated	All the time
Related applications	MINT, SPtM
Description	Alarm is activated when dedicated E-Stop input is activated. The gen-set shuts down in the moment the input is activated and starting is blocked until the input is deactivated and fault reset is pressed.

back to List of alarms level 2

Sd AIN Protec

Alarm Type	Sd
Alarmlist message	Sd + Name of analog input
Alarm evaluated	All the time
Related applications	MINT, SPtM
Description	This alarm indicates that value the general analog protection is out of shutdown protection limit.

back to List of alarms level 2

Sd Battery Flat

Alarm Type	Shutdown
Alarmlist message	Sd Battery Flat
Alarm evaluated	During cranking

Related applications	MINT, SPtM
Description	This alarm will be issued if the controller was reset during cranking of the gen-set. If this situation occurs, the controller supposes the starting battery is so exhausted that its voltage drops so low when starter motor is energized that it causes controller reset.

back to List of alarms level 2

Sd BIN Protection

Alarm Type	Shutdown
Alarmlist message	Sd + Name of binary input
Alarm evaluated	All the time
Related applications	MINT, SPtM
Description	Binary input also can be adjusted like alarm. In this case message in alarmlist contains prefix - Sd and binary input name. This alarm occurs, when appropriate binary input is active.

back to List of alarms level 2

Sd Coolant Temp

Alarm Type	Shutdown
Alarmlist message	Sd Coolant Temp
Alarm evaluated	All the time
Related applications	MINT, SPtM
Description	This alarm indicates that the coolant temperature is higher than the temperature set in **Coolant Temperature Sd (page 283)** setpoint.

back to List of alarms level 2

Sd Current Unbalance

Alarm Type	Shutdown
Alarmlist message	Sd Current Unbalance
Alarm evaluated	All the time
Related applications	MINT, SPtM
Description	This alarm evaluates the unbalance of the phase currents, i.e. the difference between highest and lowest phase current at any given time. The following setpoints are related to it: ▶ **Current Unbalance BOC (page 301)** adjusts the maximum allowed difference between the highest and lowest phase current at any given time. ▶ **Current Unbalance BOC Delay (page 301)** adjusts the alarm delay.

back to List of alarms level 2

Sd Earth Fault Current

Alarm Type	Shutdown
Alarmlist message	Sd Earth Fault Current
Alarm evaluated	All the time
Related applications	MINT, SPtM
Description	This alarm indicates that the value of earth fault current is higher than adjusted limit. The following setpoints are related to it: ▶ **Earth Fault Sd (page 502)** adjusts the maximum allowed earth fault current. ▶ **Earth Fault Delay (page 501)** adjusts the alarm delay.

back to List of alarms level 2

Sd ECU Communication Fail

Alarm Type	Shutdown
Alarmlist message	Sd ECU Communication Fail
Alarm evaluated	With configured LBO **ECU Power Relay (page 696)** - only when this LBO is active Without configured LBO **ECU Power Relay (page 696)** - all the time
Related applications	MINT, SPtM
Description	This alarm occurs when an ECU is configured, but the communication with the ECU is not established or has dropped out.

back to List of alarms level 2

Sd Fence 1 Alarm

Alarm Type	Shutdown
Alarmlist message	Sd Fence 1 Alarm
Alarm evaluated	All the time
Related applications	MINT, SPtM
Description	This alarm evaluates the GPS position of gen-set. The following setpoint are related to it: ▶ **Geo-Fencing (page 443)** ▶ **Fence 1 Protection (page 444)** ▶ **Fence Radius 1 (page 442)**

back to List of alarms level 2

Sd Fence 2 Alarm

Alarm Type	Shutdown
Alarmlist message	Sd Fence 2 Alarm
Alarm evaluated	All the time

Related applications	MINT, SPtM
Description	This alarm evaluates the GPS position of gen-set. The following setpoint are related to it: ▶ **Geo-Fencing (page 443)** ▶ **Fence 1 Protection (page 444)** ▶ **Fence Radius 1 (page 442)**

back to List of alarms level 2

Sd Fuel Level

Alarm Type	Shutdown
Alarmlist message	Sd Fuel Level
Alarm evaluated	All the time
Related applications	MINT, SPtM
Description	This alarm indicates that the fuel level is lower than the level set in **Fuel Level Sd (page 289)** setpoint.

back to List of alarms level 2

Sd GCB Fail

Alarm Type	Shutdown
Alarmlist message	Sd GCB Fail
Alarm evaluated	All the time
Related applications	MINT, SPtM
Description	This alarm will occur when the **GCB FEEDBACK (PAGE 652)** input does not match the expected position given by the **GCB CLOSE/OPEN (PAGE 701)** output. It stays active until the mismatch between the output and feedback persists. ▶ If there was no command issued by the controller and the breaker (feedback) changes suddenly the position itself, the alarm will be issued immediately. ▶ The alarm will be also issued if the breaker does not respond to an open or close command within 5 seconds.

back to List of alarms level 2

Sd Generator L1 > Voltage

Alarm Type	Shutdown
Alarmlist message	Sd Generator L1 > Voltage
Alarm evaluated	Generator excited only
Related applications	MINT, SPtM
Description	This alarm evaluates the generator phase voltage in phase 1. The following setpoints are related to it: ▶ **Generator Overvoltage Sd (page 301)** ▶ **Generator <> Voltage Delay (page 303)**

back to List of alarms level 2

Sd Generator L1 < Voltage

Alarm Type	Shutdown
Alarmlist message	Sd Generator L1 < Voltage
Alarm evaluated	Generator excited only
Related applications	MINT, SPtM
Description	This alarm evaluates the generator phase voltage in phases 1. The following setpoints are related to it: ▶ **Generator Undervoltage BOC (page 302)** ▶ **Generator <> Voltage Delay (page 303)**

back to List of alarms level 2

Sd Generator L1L2 > Voltage

Alarm Type	Shutdown
Alarmlist message	Sd Generator L1L2 > Voltage
Alarm evaluated	Generator excited only
Related applications	MINT, SPtM
Description	This alarm evaluates the generator phase to phase voltage between phases 1 and 2. The following setpoints are related to it: ▶ **Generator Overvoltage Sd (page 301)** ▶ **Generator <> Voltage Delay (page 303)**

back to List of alarms level 2

Sd Generator L1L2 < Voltage

Alarm Type	Shutdown
Alarmlist message	Sd Generator L1L2 < Voltage
Alarm evaluated	Generator excited only
Related applications	MINT, SPtM
Description	This alarm evaluates the generator phase to phase voltage between phases 1 and 2. The following setpoints are related to it: ▶ **Generator Undervoltage BOC (page 302)** ▶ **Generator <> Voltage Delay (page 303)**

back to List of alarms level 2

Sd Generator L2 > Voltage

Alarm Type	Shutdown
Alarmlist message	Sd Generator L2 > Voltage
Alarm evaluated	Generator excited only
Related applications	MINT, SPtM
Description	This alarm evaluates the generator phase voltage in phase 2. The following setpoints are related to it: ▶ **Generator Overvoltage Sd (page 301)** ▶ **Generator <> Voltage Delay (page 303)**

back to List of alarms level 2

Sd Generator L2 < Voltage

Alarm Type	Shutdown
Alarmlist message	Sd Generator L2 < Voltage
Alarm evaluated	Generator excited only
Related applications	MINT, SPtM
Description	This alarm evaluates the generator phase voltage in phases 2. The following setpoints are related to it: ▶ **Generator Undervoltage BOC (page 302)** ▶ **Generator <> Voltage Delay (page 303)**

back to List of alarms level 2

Sd Generator L2L3 > Voltage

Alarm Type	Shutdown
Alarmlist message	Sd Generator L2L3 > Voltage
Alarm evaluated	Generator excited only
Related applications	MINT, SPtM
Description	This alarm evaluates the generator phase to phase voltage between phases 2 and 3. The following setpoints are related to it: ▶ **Generator Overvoltage Sd (page 301)** ▶ **Generator <> Voltage Delay (page 303)**

back to List of alarms level 2

Sd Generator L2L3 < Voltage

Alarm Type	Shutdown
Alarmlist message	Sd Generator L2L3 < Voltage
Alarm evaluated	Generator excited only
Related applications	MINT, SPtM
Description	This alarm evaluates the generator phase to phase voltage between phases 2 and 3. The following setpoints are related to it: ▶ **Generator Undervoltage BOC (page 302)** ▶ **Generator <> Voltage Delay (page 303)**

back to List of alarms level 2

Sd Generator L3 > Voltage

Alarm Type	Shutdown
Alarmlist message	Sd Generator L3 > Voltage
Alarm evaluated	Generator excited only

Related applications	MINT, SPtM
Description	This alarm evaluates the generator phase voltage in phase 3. The following setpoints are related to it: ▶ **Generator Overvoltage Sd (page 301)** ▶ **Generator <> Voltage Delay (page 303)**

back to List of alarms level 2

Sd Generator L3 < Voltage

Alarm Type	Shutdown
Alarmlist message	Sd Generator L3 < Voltage
Alarm evaluated	Generator excited only
Related applications	MINT, SPtM
Description	This alarm evaluates the generator phase voltage in phases 3. The following setpoints are related to it: ▶ **Generator Undervoltage BOC (page 302)** ▶ **Generator <> Voltage Delay (page 303)**

back to List of alarms level 2

Sd Generator L3L1 > Voltage

Alarm Type	Shutdown
Alarmlist message	Sd Generator L3L1 > Voltage
Alarm evaluated	Generator excited only
Related applications	MINT, SPtM
Description	This alarm evaluates the generator phase to phase voltage between phases 3 and 1. The following setpoints are related to it: ▶ **Generator Overvoltage Sd (page 301)** ▶ **Generator <> Voltage Delay (page 303)**

back to List of alarms level 2

Sd Generator L3L1 < Voltage

Alarm Type	Shutdown
Alarmlist message	Sd Generator L3L1 < Voltage
Alarm evaluated	Generator excited only
Related applications	MINT, SPtM
Description	This alarm evaluates the generator phase to phase voltage between phases 3 and 1. The following setpoints are related to it: ▶ **Generator Undervoltage BOC (page 302)** ▶ **Generator <> Voltage Delay (page 303)**

back to List of alarms level 2

Sd Generator > Frequency

Alarm Type	Shutdown
Alarmlist message	Sd Generator > Frequency
Alarm evaluated	Generator excited only
Related applications	MINT, SPtM
Description	This alarm evaluates the generator frequency in the phase L1. The following setpoints are related to it: ▶ **Generator Overfrequency BOC (page 304)** ▶ **Generator <> Frequency Delay (page 305)**

back to List of alarms level 2

Sd Generator < Frequency

Alarm Type	Shutdown
Alarmlist message	Sd Generator < Frequency
Alarm evaluated	Generator excited only
Related applications	MINT, SPtM
Description	This alarm evaluates the generator frequency in the phase L1. The following setpoints are related to it: ▶ **Generator Underfrequency BOC (page 305)** ▶ **Generator <> Frequency Delay (page 305)**

back to List of alarms level 2

Sd Generator Voltage Unbalance Ph-Ph

Alarm Type	Shutdown
Alarmlist message	Sd Generator Voltage Unbalance Ph-Ph
Alarm evaluated	Generator excited only
Related applications	MINT, SPtM
Description	This alarm evaluates the unbalance of the phase to phase voltage, i.e. the difference between highest and lowest phase to phase voltage at any given time. The following setpoints are related to it: ▶ **Voltage Unbalance BOC (page 303)** adjusts the maximum allowed difference between the highest and lowest phase voltage at any given time. ▶ **Voltage Unbalance BOC Delay (page 304)** adjusts the alarm delay.

back to List of alarms level 2

Sd Generator Voltage Unbalance Ph-N

Alarm Type	Shutdown
Alarmlist message	Sd Generator Voltage Unbalance Ph-N
Alarm evaluated	Generator excited only

Related applications	MINT, SPtM
Description	This alarm evaluates the unbalance of the phase voltage, i.e. the difference between highest and lowest phase voltage at any given time. The following setpoints are related to it: ▶ **Voltage Unbalance BOC (page 303)** adjusts the maximum allowed difference between the highest and lowest phase voltage at any given time. ▶ **Voltage Unbalance BOC Delay (page 304)** adjusts the alarm delay.

back to List of alarms level 2

Sd Oil Pressure

Alarm Type	Shutdown
Alarmlist message	Sd Oil Pressure
Alarm evaluated	Gen-set is running
Related applications	MINT, SPtM
Description	This alarm indicates that the oil pressure is lover than the pressure set in **Oil Pressure Sd (page 281)** setpoint.

back to List of alarms level 2

Sd Overload

Alarm Type	Shutdown
Alarmlist message	Sd Overload
Alarm evaluated	All the time
Related applications	MINT, SPtM
Description	The alarm is issued when the gen-set power is over the limit for time period longer than the delay. The behavior of the overload alarm is adjusted by the following setpoints: ▶ **Overload BOC (page 298)** adjusts the overload limit. ▶ **Overload Delay (page 298)** adjusts the delay

back to List of alarms level 2

Sd Overspeed

Alarm Type	Shutdown
Alarmlist message	Sd Overspeed
Alarm evaluated	All the time
Related applications	MINT, SPtM
Description	This alarm occurs immediately when the engine speed has exceeded the limit. The behavior of the overspeed alarm is adjusted by the following setpoints: ▶ **Overspeed Sd (page 278)** adjust the overspeed limit

back to List of alarms level 2

Sd RPM Measurement Fail

Alarm Type	Shutdown
Alarmlist message	Sd RPM Measurement Fail
Alarm evaluated	During cranking
Related applications	MINT, SPtM
Description	The alarm is issued if the engine speed has not exceeded the **Starting RPM (page 266)** within the **Maximum Cranking Time (page 265)**, although some of additional running engine indication sources indicate that the engine has started.

back to List of alarms level 2

Sd Short Circuit

Alarm Type	Shutdown
Alarmlist message	Sd Short Circuit
Alarm evaluated	All the time
Related applications	MINT, SPtM
Description	This is a fast overcurrent protection. The following setpoints are related to this alarm: ▶ **Short Circuit BOC (page 299)** adjusts the short current limit ▶ **Short Circuit BOC Delay (page 299)** adjusts the delay in fine steps

back to List of alarms level 2

Sd Start Fail

Alarm Type	Shutdown
Alarmlist message	Sd Start Fail
Alarm evaluated	When the gen-set is being started
Related applications	MINT, SPtM
Description	This alarm will be issued after all attempts to start the gen-set have run out but the gen-set did not start. The following setpoints are related to this alarm: ▶ **Cranking Attempts (page 265)** adjust the number of attempts

back to List of alarms level 2

Sd Underspeed

Alarm Type	Shutdown
Alarmlist message	Sd Underspeed
Alarm evaluated	Engine running only
Related applications	MINT, SPtM
Description	This alarm will be issued when the gen-set is running and then stops by itself, i.e. the RPM drops under the value of setpoint **Starting RPM (page 266)**. The underspeed alarm starts to be evaluated after successful gen-set start and is being evaluated for the entire time that the fuel solenoid is on.

back to List of alarms level 2

Other type

BOC AIN Prot

Alarm Type	BOC
Alarmlist message	BOC + Name of analog input
Alarm evaluated	All the time
Related applications	MINT, SPtM
Description	This alarm indicates that the value of general analog protection is out of BOC protection limit.

back to List of alarms level 2

BOC BIN Protection

Alarm Type	BOC
Alarmlist message	BOC + Name of binary input
Alarm evaluated	All the time
Related applications	MINT, SPtM
Description	Binary input also can be adjusted like alarm. In this case message in alarmlist contains prefix - BOC and binary input name. This alarm occurs, when appropriate binary input is active.

back to List of alarms level 2

BOC Coolant Temp

Alarm Type	BOC
Alarmlist message	BOC Coolant Temperature
Alarm evaluated	All the time
Related applications	MINT, SPtM
Description	This alarm indicates that the coolant temperature is higher than the temperature set in **Coolant Temperature Sd (page 283)** setpoint.

back to List of alarms level 2

BOC Current Unbalance

Alarm Type	BOC
Alarmlist message	BOC Current Unbalance
Alarm evaluated	All the time
Related applications	MINT, SPtM
Description	This alarm evaluates the unbalance of the phase currents, i.e. the difference between highest and lowest phase current at any given time. The following setpoints are related to it: ▶ **Current Unbalance BOC (page 301)** adjusts the maximum allowed difference between the highest and lowest phase current at any given time. ▶ **Current Unbalance BOC Delay (page 301)** adjusts the alarm delay.

back to List of alarms level 2

BOC Excitation Loss

Alarm Type	BOC
Alarmlist message	BOC Excitation Loss
Alarm evaluated	Gen-set is running
Related applications	MINT, SPtM
Description	The alarm is issued when the level of reactive power (-kVAr) gets under limit given by setpoint **Excitation Loss Level (page 306)** for time longer then the value of setpoint **Excitation Loss Delay (page 307)**.

back to List of alarms level 2

BOC Fence 1 Alarm

Alarm Type	BOC
Alarmlist message	BOC Fence 1 Alarm
Alarm evaluated	All the time
Related applications	MINT, SPtM
Description	This alarm evaluates the GPS position of gen-set. The following setpoint are related to it: ▶ **Geo-Fencing (page 443)** ▶ **Fence 1 Protection (page 444)** ▶ **Fence Radius 1 (page 442)**

back to List of alarms level 2

BOC Fence 2 Alarm

Alarm Type	BOC
Alarmlist message	BOC Fence 2 Alarm
Alarm evaluated	All the time
Related applications	MINT, SPtM
Description	This alarm evaluates the GPS position of gen-set. The following setpoint are related to it: ▶ **Geo-Fencing (page 443)** ▶ **Fence 1 Protection (page 444)** ▶ **Fence Radius 1 (page 442)**

back to List of alarms level 2

BOC Fuel Level

Alarm Type	BOC
Alarmlist message	BOC Fuel Level
Alarm evaluated	All the time
Related applications	MINT, SPtM
Description	This alarm indicates that the fuel level is lower than the level set level in **Fuel Level Sd (page 289)** setpoint.

back to List of alarms level 2

BOC Generator L1 < Voltage

Alarm Type	BOC
Alarmlist message	BOC Generator L1 < Voltage
Alarm evaluated	Generator excited only
Related applications	MINT, SPtM
Description	This alarm evaluates the generator phase voltage in phases 1. The following setpoints are related to it: ▶ **Generator Undervoltage BOC (page 302)** ▶ **Generator <> Voltage Delay (page 303)**

back to List of alarms level 2

BOC Generator L1L2 < Voltage

Alarm Type	BOC
Alarmlist message	BOC Generator L1L2 < Voltage
Alarm evaluated	Generator excited only
Related applications	MINT, SPtM
Description	This alarm evaluates the generator phase to phase voltage between phases 1 and 2. The following setpoints are related to it: ▶ **Generator Undervoltage BOC (page 302)** ▶ **Generator <> Voltage Delay (page 303)**

back to List of alarms level 2

BOC Generator L2 < Voltage

Alarm Type	BOC
Alarmlist message	BOC Generator L2 < Voltage
Alarm evaluated	Generator excited only
Related applications	MINT, SPtM
Description	This alarm evaluates the generator phase voltage in phases 2. The following setpoints are related to it: ▶ **Generator Undervoltage BOC (page 302)** ▶ **Generator <> Voltage Delay (page 303)**

back to List of alarms level 2

BOC Generator L2L3 < Voltage

Alarm Type	BOC
Alarmlist message	BOC Generator L2L3 < Voltage
Alarm evaluated	Generator excited only
Related applications	MINT, SPtM
Description	This alarm evaluates the generator phase to phase voltage between phases 2 and 3. The following setpoints are related to it: ▶ **Generator Undervoltage BOC (page 302)** ▶ **Generator <> Voltage Delay (page 303)**

back to List of alarms level 2

BOC Generator L3 < Voltage

Alarm Type	BOC
Alarmlist message	BOC Generator L3 < Voltage
Alarm evaluated	Generator excited only
Related applications	MINT, SPtM
Description	This alarm evaluates the generator phase voltage in phases 3. The following setpoints are related to it: ▶ **Generator Undervoltage BOC (page 302)** ▶ **Generator <> Voltage Delay (page 303)**

back to List of alarms level 2

BOC Generator L3L1 < Voltage

Alarm Type	BOC
Alarmlist message	BOC Generator L3L1 < Voltage
Alarm evaluated	Generator excited only
Related applications	MINT, SPtM
Description	This alarm evaluates the generator phase to phase voltage between phases 3 and 1. The following setpoints are related to it: ▶ **Generator Undervoltage BOC (page 302)** ▶ **Generator <> Voltage Delay (page 303)**

back to List of alarms level 2

BOC Generator > Frequency

Alarm Type	BOC
Alarmlist message	BOC Generator > Frequency
Alarm evaluated	Generator excited only
Related applications	MINT, SPtM
Description	This alarm evaluates the generator frequency in the phase L1. The following setpoints are related to it: ▶ **Generator Overfrequency BOC (page 304)** ▶ **Generator <> Frequency Delay (page 305)**

back to List of alarms level 2

BOC Generator < Frequency

Alarm Type	BOC
Alarmlist message	BOC Generator < Frequency
Alarm evaluated	Generator excited only

Related applications	MINT, SPtM
Description	This alarm evaluates the generator frequency in the phase L1. The following setpoints are related to it: ▶ **Generator Underfrequency BOC (page 305)** ▶ **Generator <> Frequency Delay (page 305)**

back to List of alarms level 2

BOC Gen Voltage Unbalance Ph-Ph

Alarm Type	BOC
Alarmlist message	BOC Gen Voltage Unbalance ph-ph
Alarm evaluated	Generator excited only
Related applications	MINT, SPtM
Description	This alarm evaluates the unbalance of the phase to phase voltages, i.e. the difference between highest and lowest phase to phase voltage at any given time. The following setpoints are related to it: ▶ **Voltage Unbalance BOC (page 303)** adjusts the maximum allowed difference between the highest and lowest phase voltage at any given time. ▶ **Voltage Unbalance BOC Delay (page 304)** adjusts the alarm delay.

back to List of alarms level 2

BOC Gen Voltage Unbalance Ph-N

Alarm Type	BOC
Alarmlist message	BOC Gen Voltage Unbalance ph-n
Alarm evaluated	Generator excited only
Related applications	MINT, SPtM
Description	This alarm evaluates the unbalance of the phase voltages, i.e. the difference between highest and lowest phase voltage at any given time. The following setpoints are related to it: ▶ **Voltage Unbalance BOC (page 303)** adjusts the maximum allowed difference between the highest and lowest phase voltage at any given time. ▶ **Voltage Unbalance BOC Delay (page 304)** adjusts the alarm delay.

back to List of alarms level 2

BOC NCB Fail

Alarm Type	BOC
Alarmlist message	BOC NCB Fail
Alarm evaluated	All the time

Related applications	MINT, SPtM
Description	This alarm will occur when the **NCB Feedback (page 657)** input does not match the expected position given by the **NCB Close/Open (page 716)** output. It stays active until the mismatch between the output and feedback persists. ▶ If there was no command issued by the controller and the breaker (feedback) changes suddenly the position itself, the alarm will be issued immediately. ▶ The alarm will be also issued if the breaker does not respond to an open or close command within 5 seconds.

back to List of alarms level 2

BOC Oil Pressure

Alarm Type	BOC
Alarmlist message	BOC Oil Pressure
Alarm evaluated	All the time
Related applications	MINT, SPtM
Description	This alarm indicates that the oil pressure is lover than the pressure set in **Oil Pressure Sd (page 281)** setpoint.

back to List of alarms level 2

BOC Overcurrent IDMT

Alarm Type	Shutdown
Alarmlist message	Sd + Name of binary input
Alarm evaluated	Generator excited only
Related applications	MINT, SPtM
Description	The overcurrent alarm is based on IDMT principle. The reaction time of an IDMT alarm is not fixed, but depends on how much is the protected value (generator current in this case) above the limit (**Nominal Current (page 253)**). The higher is the overcurrent, the shorter the reaction time will be. All generator phases are evaluated. The behaviour of the overcurrent alarm is adjusted by the following setpoints: ▶ **IDMT Overcurrent Delay (page 300)** defines the reaction time of the protection when the current is twice the amount of nominal value. ▶ **Nominal Current (page 253)** set the nominal current level, where the alarm starts to be evaluated. The reaction time is infinite at this point.

back to List of alarms level 2

BOC Overload

Alarm Type	BOC
Alarmlist message	BOC Overload
Alarm evaluated	All the time

Related applications	MINT, SPtM
Description	The alarm is issued when the gen-set power is over the limit for time period longer than the delay. The behavior of the overload alarm is adjusted by the following setpoints: ▶ **Overload BOC (page 298)** adjusts the overload limit. ▶ **Overload Delay (page 298)** adjusts the delay

back to List of alarms level 2

BOC Rental Timer

Alarm Type	Shutdown
Alarmlist message	BOC Rental Timer
Alarm evaluated	All the time
Related applications	MINT, SPtM
Description	This alarm occurs when **Rental Timer BOC (page 440)** elapses.

back to List of alarms level 2

BOC Reverse Power

Alarm Type	BOC
Alarmlist message	BOC Reverse Power
Alarm evaluated	Gen-set is running
Related applications	MINT, SPtM
Description	The alarm is issued when the level of active power (-kW) gets under limit given by setpoint **Reverse Power Level (page 306)** for time longer then the value of setpoint **Reverse Power Delay (page 306)**.

back to List of alarms level 2

BOC Short Circuit

Alarm Type	BOC
Alarmlist message	BOC Short Circuit
Alarm evaluated	All the time
Related applications	MINT, SPtM
Description	This is a fast overcurrent protection. The following setpoints are related to this alarm: ▶ **Short Circuit BOC (page 299)** adjusts the short current limit ▶ **Short Circuit BOC Delay (page 299)** adjusts the delay in fine steps

back to List of alarms level 2

STP Bus Measurement Error

Alarm Type	STP
Alarmlist message	STP Bus Measurement Error
Alarm evaluated	All the time

Related applications	MINT, SPtM
Description	The alarm is issued when any controller on the CAN has closed its GCB, or MCB feedback is active and voltage on bus is within limits.

back to List of alarms level 2

STP Synchronization Fail

Alarm Type	STP
Alarmlist message	STP Synchronization Fail
Alarm evaluated	During synchronization
Related applications	MINT, SPtM
Description	This alarm is issued when gen-set is synchronizing to the mains/bus via GCB and **Synchronization Timeout (page 353)** gets elapsed.

back to List of alarms level 2

8.2.3 Fail sensor and other types

Fls Coolant Temp 825
Fls Fuel Level 825
Fls AIN Prot 1 825
Fls AIN Protect 2 825
Fls AIN Protect 3 826
Fls AIN Protect 4 826
Fls AIN Protect 5 826
Fls AIN Protect 6 826
Fls AIN Protect 7 827
Fls AIN Protect 8 827
Fls AIN Protect 9 827
Fls AIN Protect 10 827
Fls AIN Protect 11 828
Fls AIN Protect 12 828
Fls AIN Protect 13 828
Fls AIN Protect 14 828
Fls AIN Protect 15 829
Fls AIN Protect 16 829
Fls AIN Protect 17 829
Fls AIN Protect 18 829
Fls AIN Protect 19 830
Fls AIN Protect 20 830
Fls Oil Pressure 830

For full list of Fails sensor and other types of alarms go to **List of fail sensor alarms (page 824)**.

What Fail sensor and other types of alarms are

If the measured resistance on an analog input exceeds the valid range, a sensor fail will be detected and a sensor fail message will appear in the Alarmlist. For more information **see Sensor fail detection (FLS) on page 147**.

List of fail sensor alarms

Fls Coolant Temp 825
Fls Fuel Level 825
Fls AIN Prot 1 825
Fls AIN Protect 2 825
Fls AIN Protect 3 826
Fls AIN Protect 4 826
Fls AIN Protect 5 826
Fls AIN Protect 6 826
Fls AIN Protect 7 827
Fls AIN Protect 8 827
Fls AIN Protect 9 827
Fls AIN Protect 10 827
Fls AIN Protect 11 828
Fls AIN Protect 12 828
Fls AIN Protect 13 828
Fls AIN Protect 14 828
Fls AIN Protect 15 829
Fls AIN Protect 16 829
Fls AIN Protect 17 829
Fls AIN Protect 18 829
Fls AIN Protect 19 830
Fls AIN Protect 20 830
Fls Oil Pressure 830

Fail sensor

FIs Coolant Temp

Alarm Type	FIs
Alarmlist message	FIs Coolant Temperature
Alarm evaluated	All the time
Related applications	MINT, SPtM
Description	This alarm occurs when measurement value of coolant temperature is out of range or is missing.

back to List of fail sensor alarms

FIs Fuel Level

Alarm Type	FIs
Alarmlist message	FIs Fuel Level
Alarm evaluated	All the time
Related applications	MINT, SPtM
Description	This alarm occurs when measurement value of fuel level is out of range or is missing.

List of fail sensor alarms (page 824)

FIs AIN Prot 1

Alarm Type	FIs
Alarmlist message	FIs + name of analog input 1
Alarm evaluated	All the time
Related applications	MINT, SPtM
Description	This alarm indicates that the value of general analog protection is out of range or is missing.

back to List of fail sensor alarms

FIs AIN Protect 2

Alarm Type	FIs
Alarmlist message	FIs + name of analog input 2
Alarm evaluated	All the time
Related applications	MINT, SPtM
Description	This alarm occurs when measurement value of analog input 2 is out of range or is missing.

back to List of fail sensor alarms

Fls AIN Protect 3

Alarm Type	Fls
Alarmlist message	Fls + name of analog input 3
Alarm evaluated	All the time
Related applications	MINT, SPtM
Description	This alarm occurs when measurement value of analog input 3 is out of range or is missing.

back to List of fail sensor alarms

Fls AIN Protect 4

Alarm Type	Fls
Alarmlist message	Fls + name of analog input 4
Alarm evaluated	All the time
Related applications	MINT, SPtM
Description	This alarm occurs when measurement value of analog input 4 is out of range or is missing.

back to List of fail sensor alarms

Fls AIN Protect 5

Alarm Type	Fls
Alarmlist message	Fls + name of analog input 5
Alarm evaluated	All the time
Related applications	MINT, SPtM
Description	This alarm occurs when measurement value of analog input 5 is out of range or is missing.

back to List of fail sensor alarms

Fls AIN Protect 6

Alarm Type	Fls
Alarmlist message	Fls + name of analog input 6
Alarm evaluated	All the time
Related applications	MINT, SPtM
Description	This alarm occurs when measurement value of analog input 6 is out of range or is missing.

back to List of fail sensor alarms

Fls AIN Protect 7

Alarm Type	Fls
Alarmlist message	Fls + name of analog input 7
Alarm evaluated	All the time
Related applications	MINT, SPtM
Description	This alarm occurs when measurement value of analog input 7 is out of range or is missing.

back to List of fail sensor alarms

Fls AIN Protect 8

Alarm Type	Fls
Alarmlist message	Fls + name of analog input 8
Alarm evaluated	All the time
Related applications	MINT, SPtM
Description	This alarm occurs when measurement value of analog input 8 is out of range or is missing.

back to List of fail sensor alarms

Fls AIN Protect 9

Alarm Type	Fls
Alarmlist message	Fls + name of analog input 9
Alarm evaluated	All the time
Related applications	MINT, SPtM
Description	This alarm occurs when measurement value of analog input 9 is out of range or is missing.

back to List of fail sensor alarms

Fls AIN Protect 10

Alarm Type	Fls
Alarmlist message	Fls + name of analog input 10
Alarm evaluated	All the time
Related applications	MINT, SPtM
Description	This alarm occurs when measurement value of analog input 10 is out of range or is missing.

back to List of fail sensor alarms

Fls AIN Protect 11

Alarm Type	Fls
Alarmlist message	Fls + name of analog input 11
Alarm evaluated	All the time
Related applications	MINT, SPtM
Description	This alarm occurs when measurement value of analog input 11 is out of range or is missing.

back to List of fail sensor alarms

Fls AIN Protect 12

Alarm Type	Fls
Alarmlist message	Fls + name of analog input 12
Alarm evaluated	All the time
Related applications	MINT, SPtM
Description	This alarm occurs when measurement value of analog input 12 is out of range or is missing.

back to List of fail sensor alarms

Fls AIN Protect 13

Alarm Type	Fls
Alarmlist message	Fls + name of analog input 13
Alarm evaluated	All the time
Related applications	MINT, SPtM
Description	This alarm occurs when measurement value of analog input 13 is out of range or is missing.

back to List of fail sensor alarms

Fls AIN Protect 14

Alarm Type	Fls
Alarmlist message	Fls + name of analog input 14
Alarm evaluated	All the time
Related applications	MINT, SPtM
Description	This alarm occurs when measurement value of analog input 14 is out of range or is missing.

back to List of fail sensor alarms

Fls AIN Protect 15

Alarm Type	Fls
Alarmlist message	Fls + name of analog input 15
Alarm evaluated	All the time
Related applications	MINT, SPtM
Description	This alarm occurs when measurement value of analog input 15 is out of range or is missing.

back to List of fail sensor alarms

Fls AIN Protect 16

Alarm Type	Fls
Alarmlist message	Fls + name of analog input 16
Alarm evaluated	All the time
Related applications	MINT, SPtM
Description	This alarm occurs when measurement value of analog input 16 is out of range or is missing.

back to List of fail sensor alarms

Fls AIN Protect 17

Alarm Type	Fls
Alarmlist message	Fls + name of analog input 17
Alarm evaluated	All the time
Related applications	MINT, SPtM
Description	This alarm occurs when measurement value of analog input 17 is out of range or is missing.

back to List of fail sensor alarms

Fls AIN Protect 18

Alarm Type	Fls
Alarmlist message	Fls + name of analog input 18
Alarm evaluated	All the time
Related applications	MINT, SPtM
Description	This alarm occurs when measurement value of analog input 18 is out of range or is missing.

back to List of fail sensor alarms

Fls AIN Protect 19

Alarm Type	Fls
Alarmlist message	Fls + name of analog input 19
Alarm evaluated	All the time
Related applications	MINT, SPtM
Description	This alarm occurs when measurement value of analog input 19 is out of range or is missing.

back to List of fail sensor alarms

Fls AIN Protect 20

Alarm Type	Fls
Alarmlist message	Fls + name of analog input 20
Alarm evaluated	All the time
Related applications	MINT, SPtM
Description	This alarm occurs when measurement value of analog input 20 is out of range or is missing.

back to List of fail sensor alarms

Fls Oil Pressure

Alarm Type	Fls
Alarmlist message	Fls Oil Pressure
Alarm evaluated	All the time
Related applications	MINT, SPtM
Description	This alarm occurs when measurement value of oil pressure is out of range or is missing.

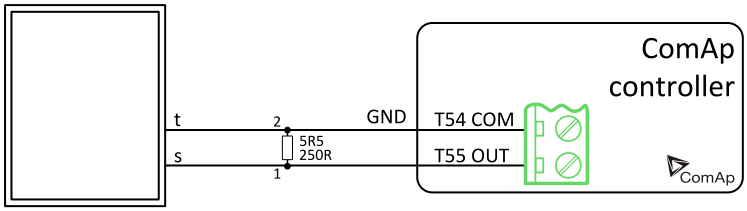
back to List of fail sensor alarms

8.3 AVR interfaces

> **IMPORTANT: Read carefully AVR instructions before connecting to a controller! It is not sufficient to use suggested wiring settings, it is necessary as well to adjust AVR settings!**

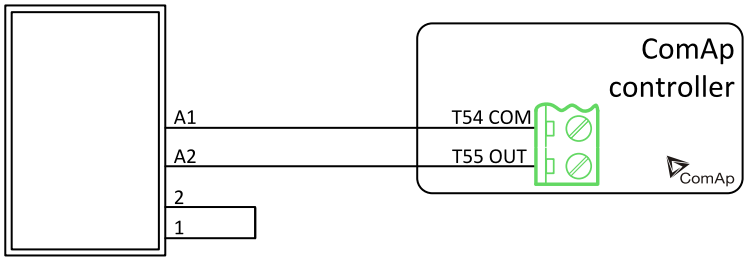
8.3.1 AVR interfaces alphabetically

AVK Newage Cosimat N+



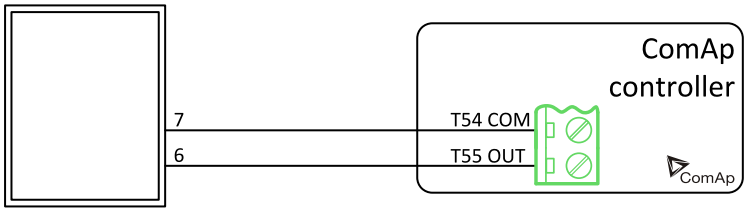
Voltage Control:
Voltage Regulator Character = NEGATIVE
Voltage Regulator Bias = 0.50 V
Voltage Regulator Low Limit = 0.00 V
Voltage Regulator High Limit = 2.00 V

AVK Newage MA330, 327, 321, 341



Voltage Control:
Voltage Regulator Character = POSITIVE
Voltage Regulator Bias = 0.00 V
Voltage Regulator Low Limit = -2.00 V
Voltage Regulator High Limit = 2.00 V

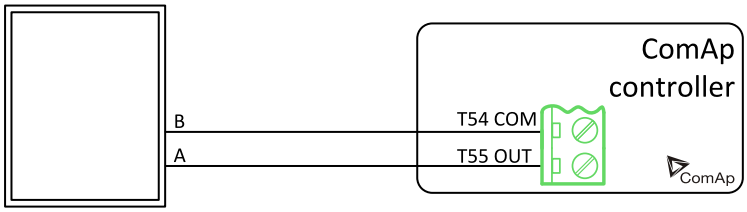
Basler: APR 63-5, AEC 63-7, KR-FX, KR-FFX



AVRi output is connected instead of external resistor for voltage adjusting.

Voltage Control:
Voltage Regulator Character = POSITIVE
Voltage Regulator Bias = 1.00 V
Voltage Regulator Low Limit = 0.00 V
Voltage Regulator High Limit = 2.00 V

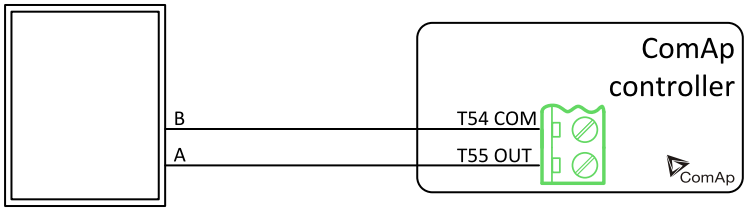
Basler: DECS 100



AVRi output is connected instead of external resistor for voltage adjusting.

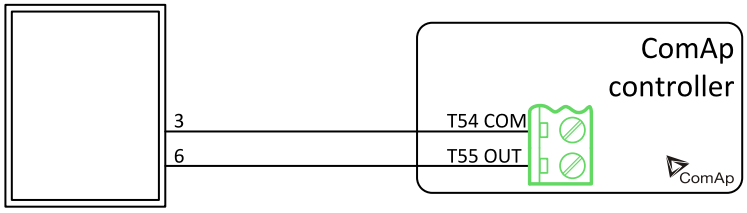
Voltage Control:
Voltage Regulator Character = POSITIVE
Voltage Regulator Bias = 0.00 V
Voltage Regulator Low Limit = -2.00 V
Voltage Regulator High Limit = 2.00 V

Basler: DECS 200



Voltage Control:
Voltage Regulator Character = POSITIVE
Voltage Regulator Bias = 0.00 V
Voltage Regulator Low Limit = -2.00 V
Voltage Regulator High Limit = 2.00 V

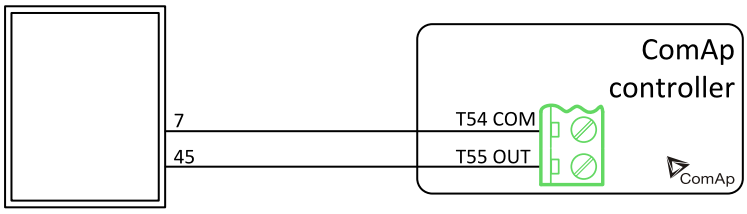
Catterpillar CDVR



Pin 44 on DVR – PF regulation directly from DVR is not connected.

Voltage Control:
Voltage Regulator Character = POSITIVE
Voltage Regulator Bias = 0.00 V
Voltage Regulator Low Limit = -6.00 V
Voltage Regulator High Limit = 6.00 V

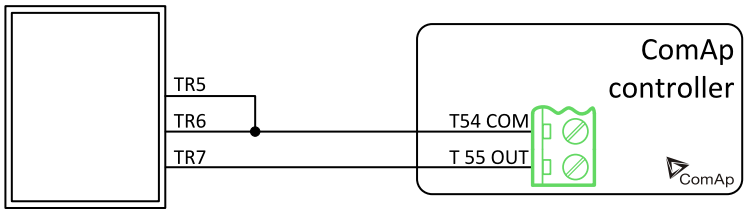
Catterpillar DVR



Pin 44 on DVR – PF regulation directly from DVR is not connected.

Voltage Control:
Voltage Regulator Character = POSITIVE
Voltage Regulator Bias = 2.00 V
Voltage Regulator Low Limit = 0.00 V
Voltage Regulator High Limit = 4.00 V

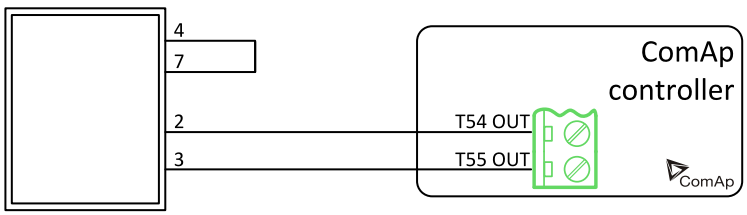
Catterpillar VR6, VR3F



For VR3F link 4-7 has to be removed.

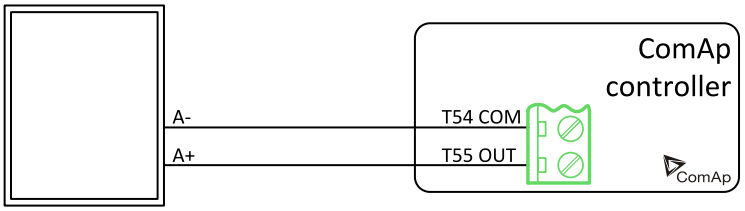
Voltage Control:
Voltage Regulator Character = POSITIVE
Voltage Regulator Bias = 1.00 V
Voltage Regulator Low Limit = 0.00 V
Voltage Regulator High Limit = 2.00 V

Catterpillar VR6-B



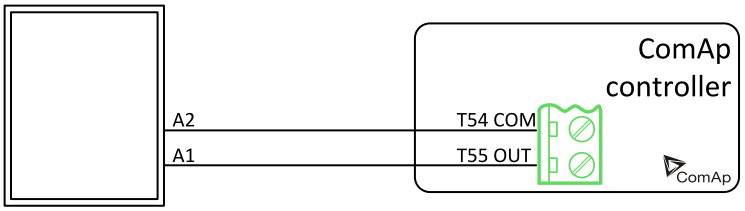
Voltage Control:
Voltage Regulator Character = POSITIVE
Voltage Regulator Bias = 0.00 V
Voltage Regulator Low Limit = -2.00 V
Voltage Regulator High Limit = 2.00 V

ENGGA WT- 2



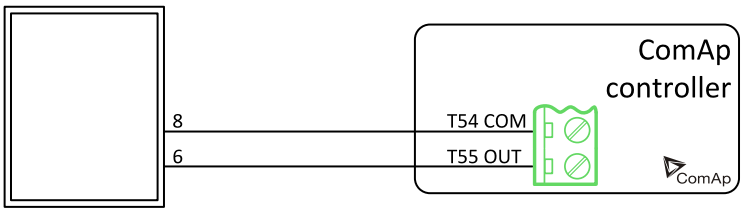
Voltage Control:
Voltage Regulator Character = POSITIVE
Voltage Regulator Bias = 0.00 V
Voltage Regulator Low Limit = -2.00 V
Voltage Regulator High Limit = 2.00 V

ENGGA WT- 3



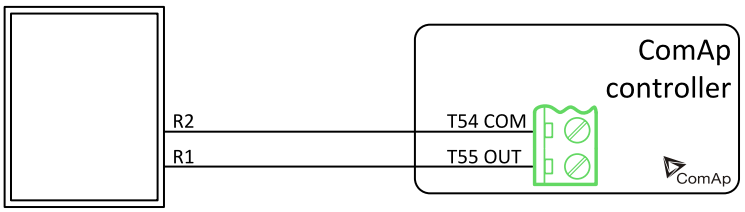
Voltage Control:
Voltage Regulator Character = POSITIVE
Voltage Regulator Bias = 0.00 V
Voltage Regulator Low Limit = -2.00 V
Voltage Regulator High Limit = 2.00 V

KATO KCR 360



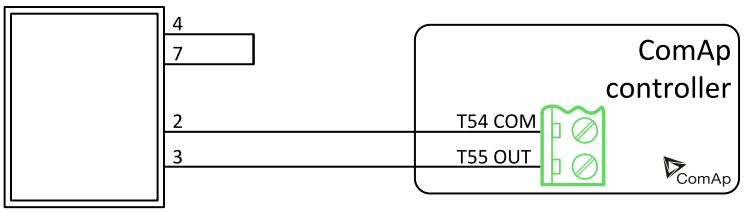
Voltage Control:
Voltage Regulator Character = POSITIVE
Voltage Regulator Bias = 0.00 V
Voltage Regulator Low Limit = -2.00 V
Voltage Regulator High Limit = 2.00 V

KATO KCR 760



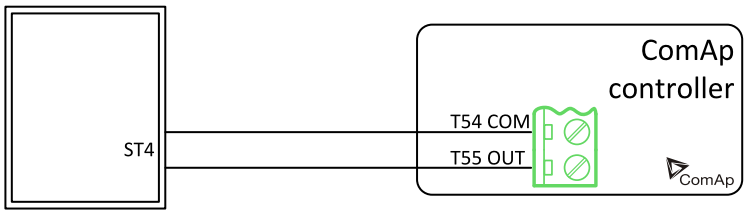
Voltage Control:
Voltage Regulator Character = POSITIVE
Voltage Regulator Bias = -0.20 V
Voltage Regulator Low Limit = -2.00 V
Voltage Regulator High Limit = 2.00 V

KATO KCR K-65-12B



Voltage Control:
Voltage Regulator Character = POSITIVE
Voltage Regulator Bias = 0.00 V
Voltage Regulator Low Limit = -2.00 V
Voltage Regulator High Limit = 2.00 V

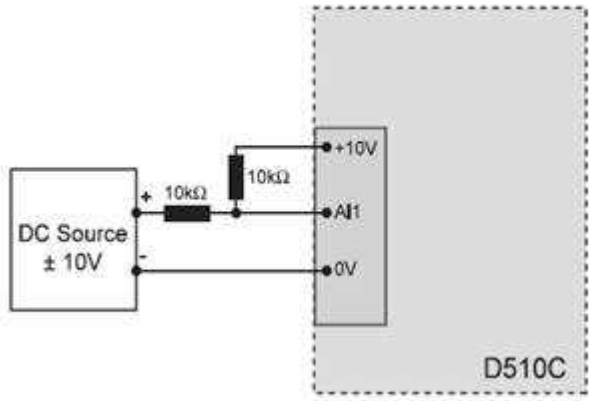
Kutai EA448



AVRi output is connected instead Remote voltage trimmer 470 Ω to terminal ST4. Module R726 is not required.

Voltage Control:
Voltage Regulator Character = POSITIVE
Voltage Regulator Bias = 1.00 V
Voltage Regulator Low Limit = 0.00 V
Voltage Regulator High Limit = 2.00 V

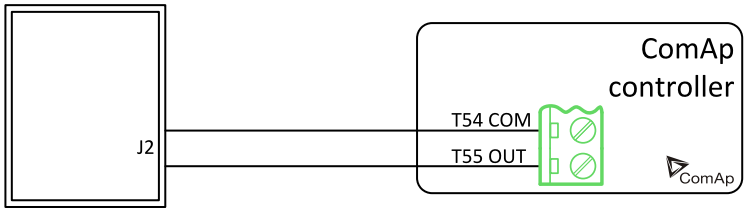
Leroy somer D510C



AVRi output is connected instead Remote voltage trimmer 470 Ω to terminal J2. module R726 is not required.

Regulator of automatic voltage.
Volt/PF ctrl::
AVR DCout bias = 50%
VoltRegChar = POSITIVE

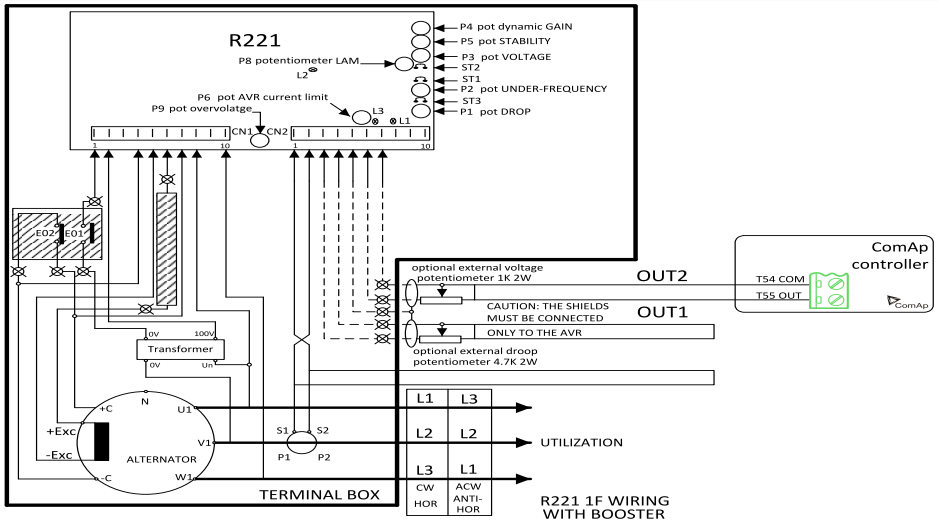
Leroy Somer: R 129



AVRi output is connected instead Remote voltage trimmer 470 Ω to terminal J2. module R726 is not required.

Voltage Control:
Voltage Regulator Character = POSITIVE
Voltage Regulator Bias = 1.00 V
Voltage Regulator Low Limit = 0.00 V
Voltage Regulator High Limit = 2.00 V

Leroy Somer: R 221, R 222



Voltage Control:

Voltage Regulator Character = POSITIVE

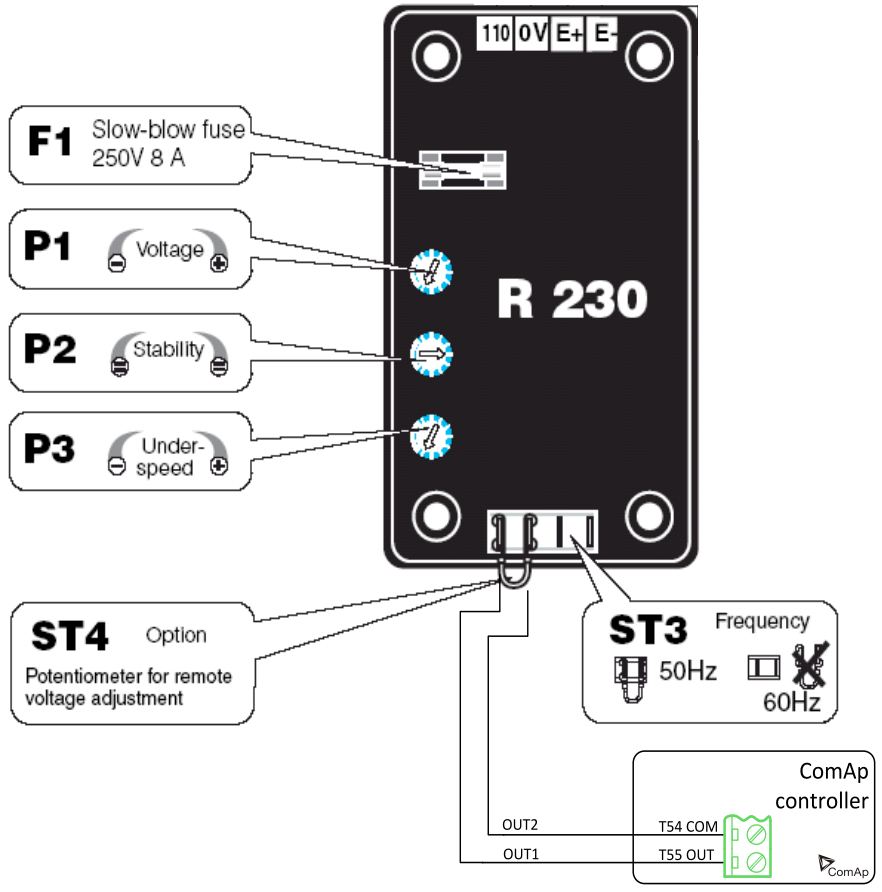
Voltage Regulator Bias = -1.00 V

Voltage Regulator Low Limit = -2.10 V

Voltage Regulator High Limit = 2.10 V

Module R726 is not required. AVRi trim to minimum counter clockwise +5%.

Leroy Somer: R 230



Voltage Control:

Voltage Regulator Character = POSITIVE

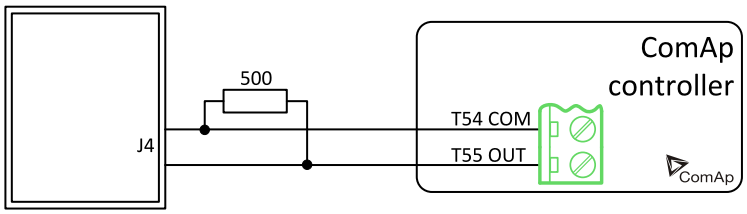
Voltage Regulator Bias = 0.00 V

Voltage Regulator Low Limit = -2.00 V

Voltage Regulator High Limit = 2.00 V

Module R726 is not required. AVRi trim minimum counter clockwise.

Leroy Somer: R 230



Remove Link J4 and replace through R500

Primary voltage setting with resistors connected: 230V

progress hint:

- Disconnect one wire (OUT 1), set voltage on running Generator to U = nom.
- Measure Voltage over Resistor
- Depending on Value increase AVRi potentiometer to get Range
- Set exact Value with Bias Voltage//PF regulation (gain = 0)
- Stop gen-set and connect when equal Voltage and polarity is achieved
- Set again regulation loop on demand

Voltage Control:

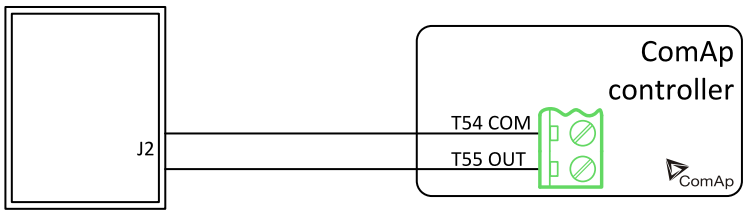
Voltage Regulator Character = POSITIVE

Voltage Regulator Bias = 0.00 V

Voltage Regulator Low Limit =-2.00 V

Voltage Regulator High Limit = 2.00 V

Leroy Somer: R 250



Voltage Control:

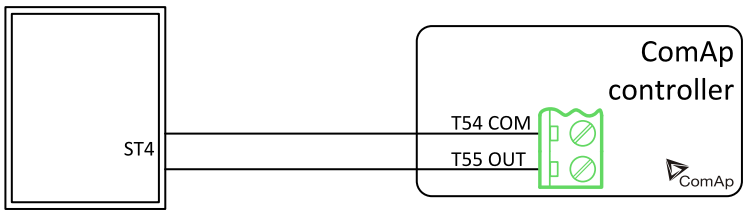
Voltage Regulator Character = POSITIVE

Voltage Regulator Bias = 1.00 V

Voltage Regulator Low Limit = 0.00 V

Voltage Regulator High Limit = 2.00 V

Leroy Somer: R 438 LS, R448



AVRi output is connected (Undefined variable: Specific.Remote Voltage trimmer 470 Ω to terminals) ST4. (Undefined variable: Specific.Module R726 is not reauired.).

Voltage Control:

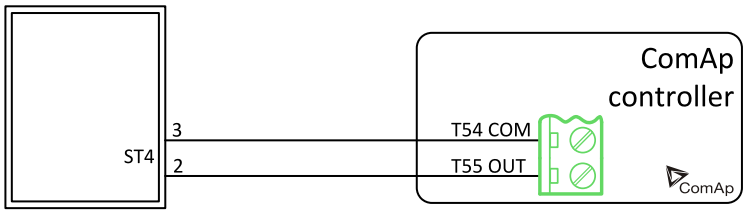
Voltage Regulator Character = POSITIVE

Voltage Regulator Bias = 1.00 V

Voltage Regulator Low Limit = 0.00 V

Voltage Regulator High Limit = 2.00 V

Leroy Somer: R 449



Module R726 is not required..

Voltage Control:

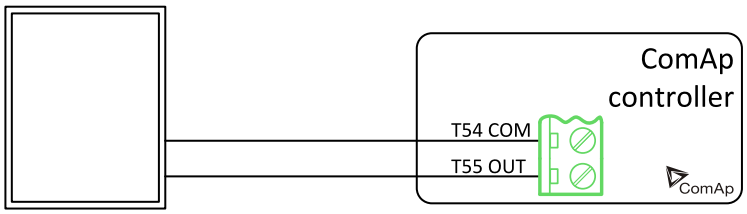
Voltage Regulator Character = POSITIVE

Voltage Regulator Bias = 0.00 V

Voltage Regulator Low Limit = -2.00 V

Voltage Regulator High Limit = 2.00 V

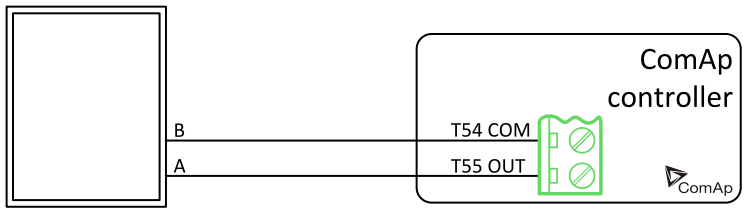
Leroy Somer: R 450



Use Avri instead pf potentiometer 1000 Ω. Read Leroy Somer R 450 manual before use.

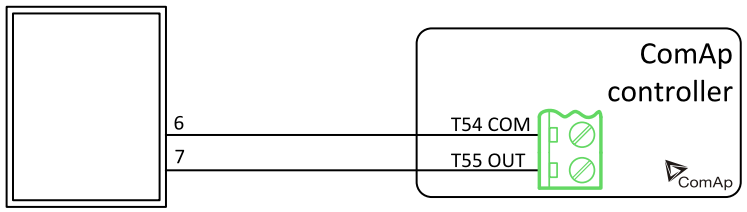
Voltage Control:
Voltage Regulator Character = POSITIVE
Voltage Regulator Bias = 1.00 V
Voltage Regulator Low Limit = 0.00 V
Voltage Regulator High Limit = 2.00 V

Marathon DVR2000E



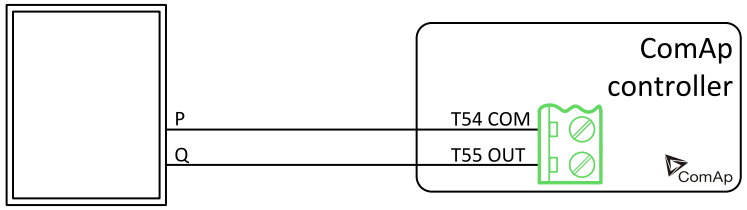
Voltage Control:
Voltage Regulator Character = POSITIVE
Voltage Regulator Bias = 0.00 V
Voltage Regulator Low Limit = -5.00 V
Voltage Regulator High Limit = 5.00 V

Marathon PM100, 200



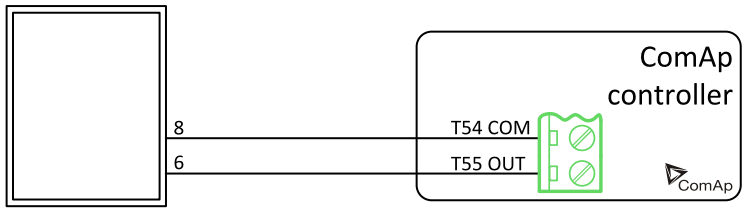
Voltage Control:
Voltage Regulator Character = POSITIVE
Voltage Regulator Bias = 0.00 V
Voltage Regulator Low Limit = -2.00 V
Voltage Regulator High Limit = 2.00 V

MarelliGenerators MARK 5 (M16FA655A)



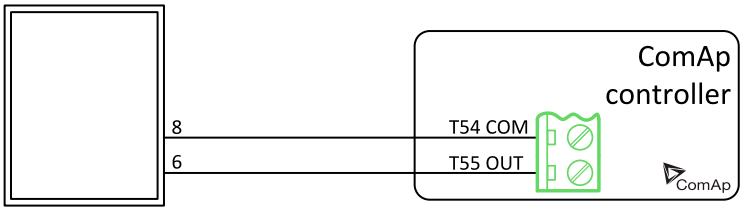
Voltage Control:
Voltage Regulator Character = POSITIVE
Voltage Regulator Bias = 0.60 V
Voltage Regulator Low Limit = 0.00 V
Voltage Regulator High Limit = 4.00 V

MarelliMotori (M40FA610A)



Voltage Control:
Voltage Regulator Character = POSITIVE
Voltage Regulator Bias = 0.00 V
Voltage Regulator Low Limit = -3.50 V
Voltage Regulator High Limit = 3.50 V

MarelliMotori Mark I (M40FA640A/A)



Voltage Control:

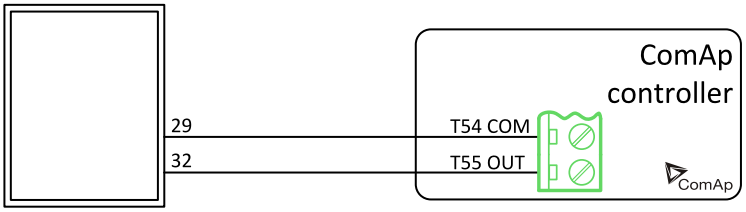
Voltage Regulator Character = POSITIVE

Voltage Regulator Bias = 0.00 V

Voltage Regulator Low Limit = -3.50 V

Voltage Regulator High Limit = 3.50 V

Mecc Alte Der 1



Remove jumpers connecting input 27 to 28 and input 31 to 32.

Voltage Control:

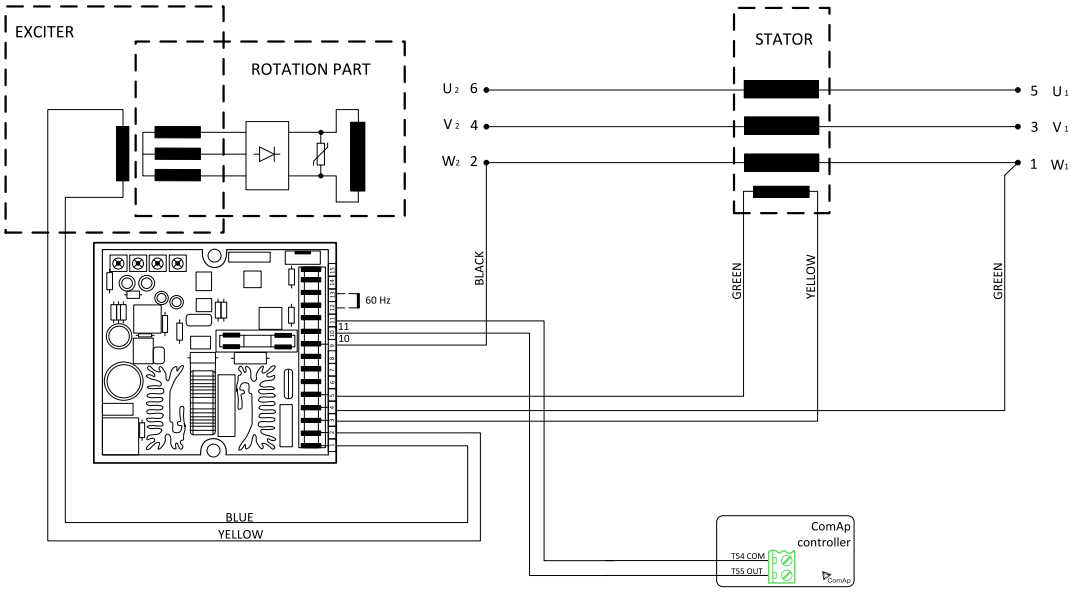
Voltage Regulator Character = POSITIVE

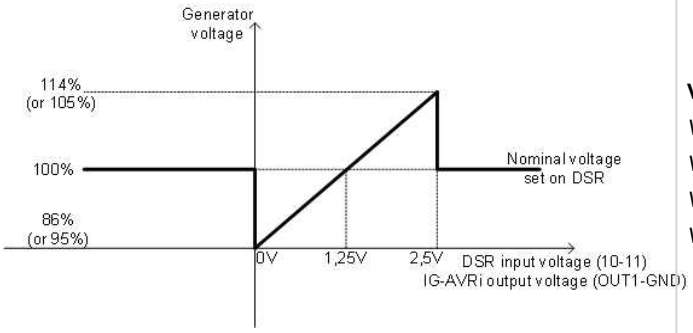
Voltage Regulator Bias = 0.00 V

Voltage Regulator Low Limit =-10.00 V

Voltage Regulator High Limit = 10.00 V

Mecc Alte DSR





Voltage Control:

Voltage Regulator Character = POSITIVE

Voltage Regulator Bias = 1.25 V

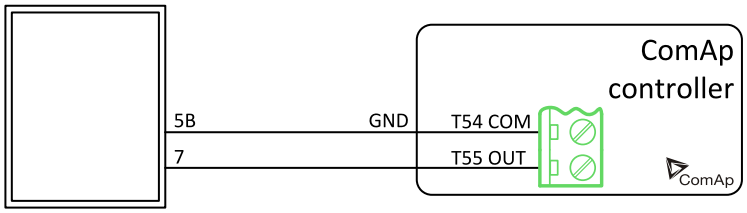
Voltage Regulator Low Limit = 0.00 V

Voltage Regulator High Limit = 2.50 V

The Vext input (connector CN1 – terminals 10 and 11) permits analogical remote control of output voltage with a programmable variation range of up to ±10% (parameter 16, by default the setting is ±5%) with respect to the value set. If you want to use continuous voltage, it will be effective if it is in the range between 0 V and +2,5 V. The input tolerates voltages from –5 V to +5 V, but for values exceeding the limits of 0 V / +2,5 V (or in the event of disconnection) it is automatically disabled and the voltage adjustment goes back to the value set through

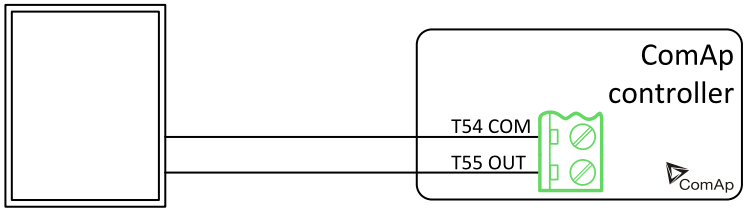
the trimmer (if enabled) or through parameter 19 (as shown on the picture). Changing of DSR parameters requires PC with dedicated software and DI1-DSR unit! DSR automatically detects presence of transformer for parallel operation (if used it works with droop, if not used it works isochronous).

Mecc Alte Spa: S.R:7/2



Voltage Control:
Voltage Regulator Character = NEGATIVE
Voltage Regulator Bias = 7.50 V
Voltage Regulator Low Limit = 0.00 V
Voltage Regulator High Limit = 10.00 V

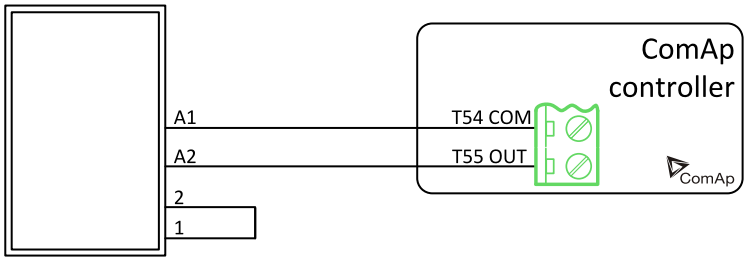
Mecc Alte Spa U.V.R.6



AVRi output is connected instead Remote voltage trimmer 100 Kohm
(T55 OUT = top position wire and T54 COM = second top position).

Voltage Control:
Voltage Regulator Character = NEGATIVE
Voltage Regulator Bias = 7.50 V
Voltage Regulator Low Limit = 0.00 V
Voltage Regulator High Limit = 10.00 V

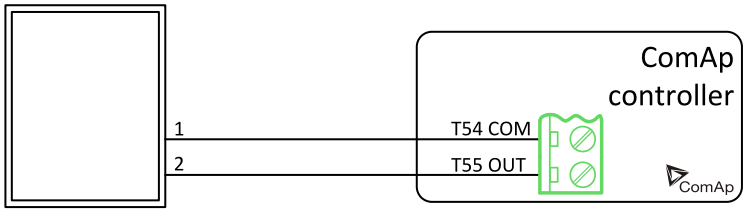
Newer Leroy Somer



Regulation signal +/- 0...2,5 V

Voltage Control:
Voltage Regulator Character = POSITIVE
Voltage Regulator Bias = 0.00 V
Voltage Regulator Low Limit = -2.50 V
Voltage Regulator High Limit = 2.50 V

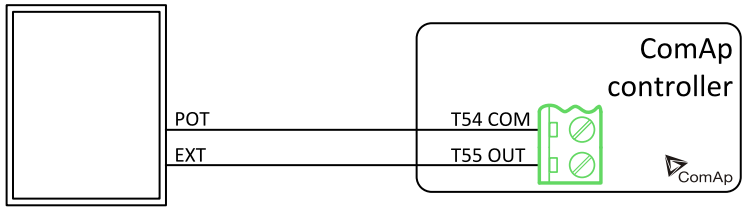
Piller



AVRi output is connected instead Remote voltage trimmer 100 kΩ.

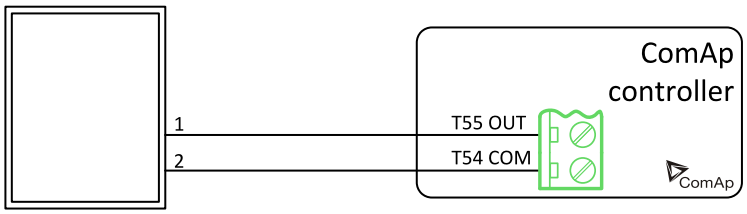
Voltage Control:
Voltage Regulator Character = POSITIVE
Voltage Regulator Bias = -0.44 V
Voltage Regulator Low Limit = -2.00 V
Voltage Regulator High Limit = 2.00 V

SINCRO AVR BL4 or AVR BL3



Voltage Control:
Voltage Regulator Character = NEGATIVE
Voltage Regulator Bias = 1.20 V
Voltage Regulator Low Limit = 0.00 V
Voltage Regulator High Limit = 6.00 V

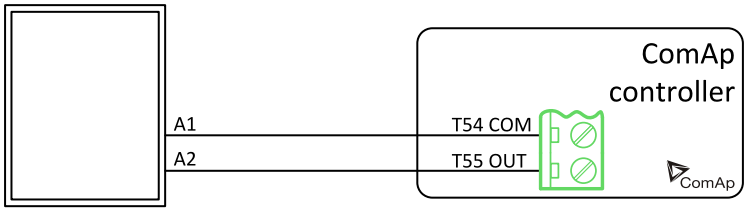
Stamford AS480



AVRi output is connected instead of external resistor for voltage adjusting.

Voltage Control:
Voltage Regulator Character = NEGATIVE
Voltage Regulator Bias = 1.00 V
Voltage Regulator Low Limit = 0.00 V
Voltage Regulator High Limit = 2.00 V

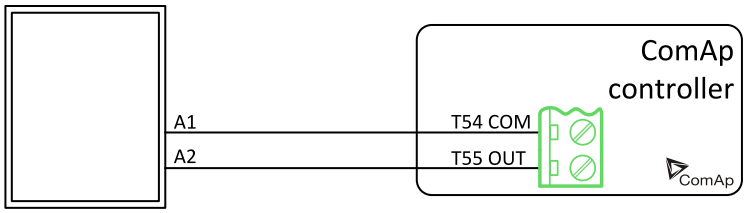
Stamfrod MX 341



Disconnect the droop CT (terminal S1&S2) and short the droop CT leads.

Voltage Control:
Voltage Regulator Character = POSITIVE
Voltage Regulator Bias = 1.00 V
Voltage Regulator Low Limit = 0.00 V
Voltage Regulator High Limit = 2.00 V

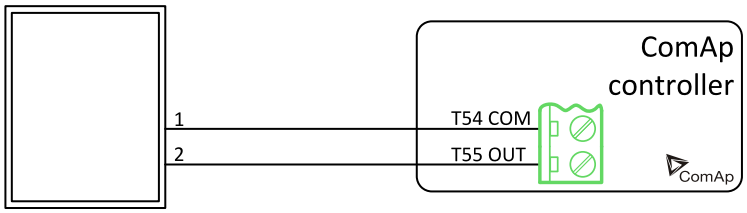
Stamford SX 440, AS 440, MX 321, SX 421



PFC3 module is not required.

Voltage Control:
Voltage Regulator Character = POSITIVE
Voltage Regulator Bias = 0.00 V
Voltage Regulator Low Limit = -2.00 V
Voltage Regulator High Limit = 2.00 V

Stamford SX 460



AVRi output is connected instead of external resistor for voltage adjusting.

Voltage Control:
Voltage Regulator Character = POSITIVE
Voltage Regulator Bias = 0.00 V
Voltage Regulator Low Limit = -2.00 V
Voltage Regulator High Limit = 2.00 V

back to Appendix

8.4 Speed governor interfaces

> **IMPORTANT: Read carefully Speed governor instructions before connecting controller Speed governor interface! It is not sufficient to use suggested wiring settings, it is necessary as well to adjust speed governor settings!**

8.4.1 Electronic engines interface

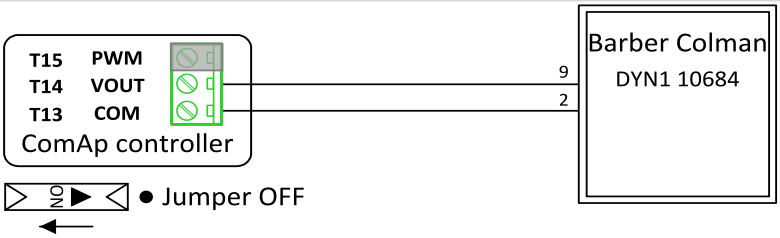
All below mentioned interface examples describe analog interface even if they are (in some cases) used for Electronic Control Units (electronic engines) with CAN data bus. There are several possibilities to connect CAN bus interface between Electronic engine and ComAp controller. Refer to ComAp Electronic Engines Support manual.

8.4.2 Controller Speed Regulator Output voltage limits

Setpoints **Sync/Load Control:** Speed Governor Low Limit [0.01 V] and Speed Governor High Limit [0.01 V] limit low and high levels of output voltage. E.g. instead of full -10 V to +10 V Speed governor output range can be set Speed Governor Low Limit = 0.00 V and Speed Governor High Limit = 5.00 V to reduce the output range from 0 to 5 V.

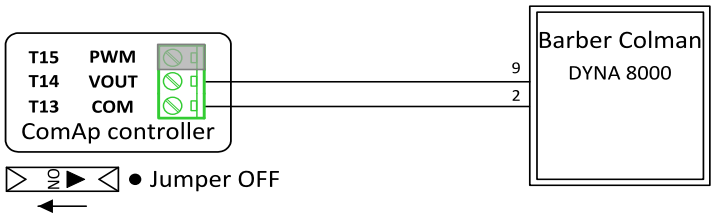
8.4.3 Speed governors interfaces alphabetically

Barber Colman DYN1 10684



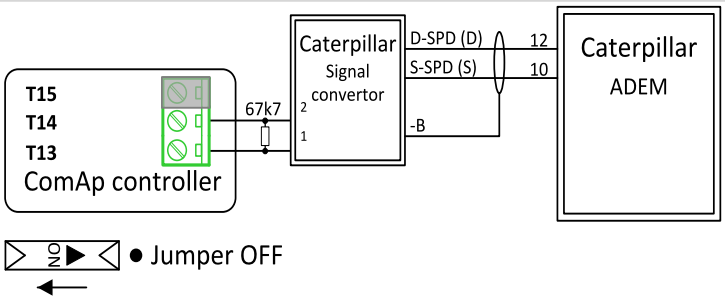
Speed/Load control:
Speed Govovernor Bias = 6,00 V
Speed Regulator Character = POSITIVE
Speed Governor Low Limit = 4 V
Speed Governor High Limit = 8 V

Barber Colman DYNA 8000



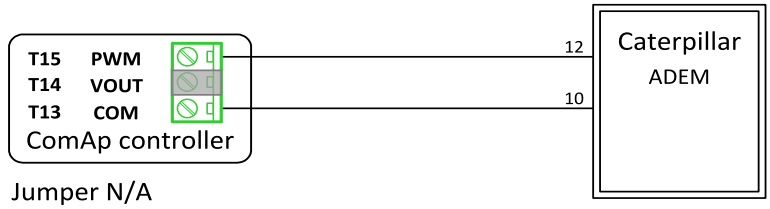
Speed/Load control:
Speed Governor Bias = 6,00 V
Speed Regulator Character = POSITIVE
SpeedGovernor Low Limit = 4 V
Speed Governor Hi Limit = 8 V

Caterpillar ADEM + Signal convertor



Speed/Load control:
Speed Governor Bias = 5,10 V
Speed Regulator Character = POSITIVE
Speed Governor Low Limit = 0 V
Speed Governor High Limit = 10 V

Caterpillar ADEM



Speed/Load control:

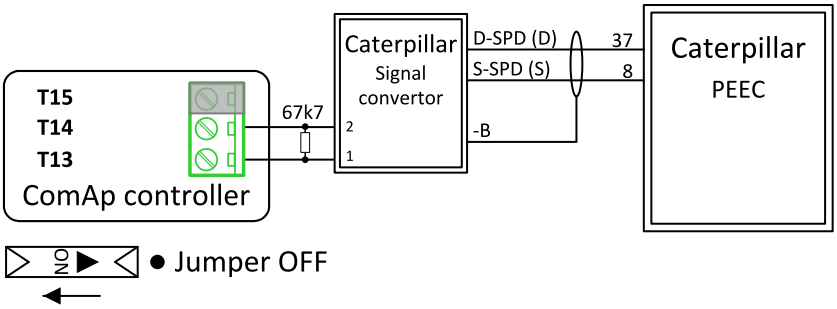
Speed Gov overnor Bias = 5,10 V

Speed Regulator Character = POSITIVE

Speed Governor Low Limit = 0 V

Speed Governor High Limit = 10 V

Caterpillar PEEC + Signal convertor



Speed/Load control:

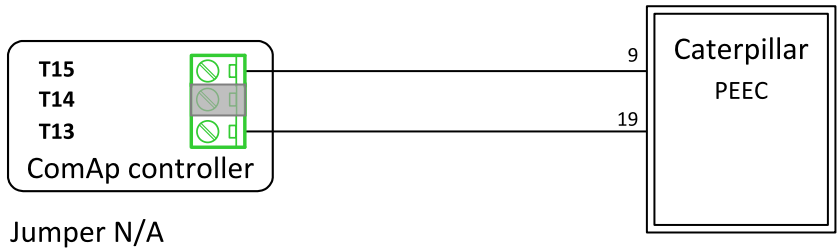
Speed Governor Bias = 5,10 V

Speed Regulator Character = POSITIVE

Speed Governor Low Limit = 0 V

Speed Governor High Limit = 10 V

Caterpillar PEEC

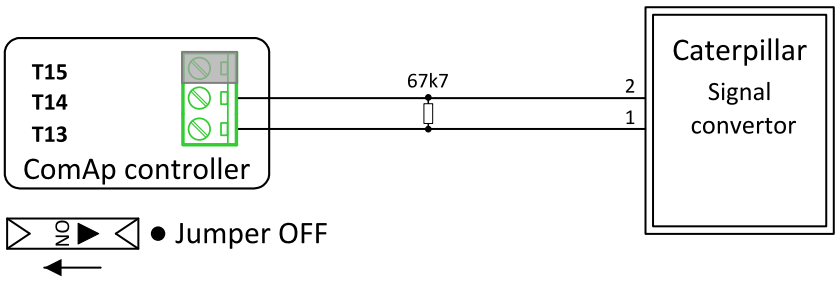


Speed/Load control:

Speed Governor PWM rate = 500 Hz

Caterpillar Signal Converter

It is not necessary to use Caterpillar Signal Converter with InteliGen 200 Use direct PWM output instead.



Potentiometer turns clockwise (droop 0%)

Speed/Load control:

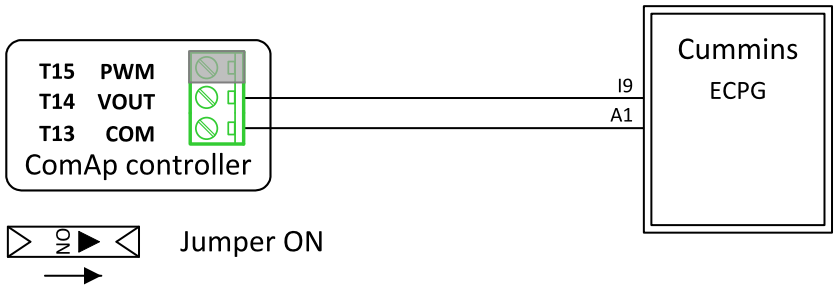
Speed Governor Bias = 5,10 V

Speed Regulator Character = POSITIVE

Speed Governor Low Limit = 0 V

Speed Governor High Limit = 10 V

Cummins ECPG

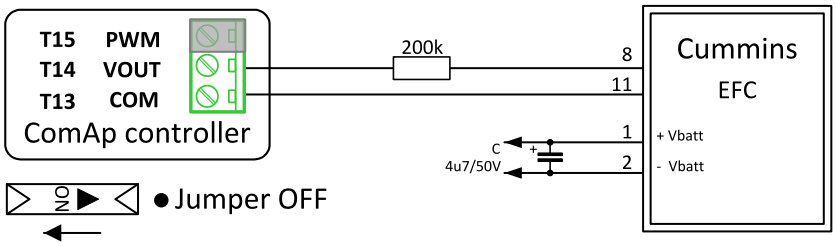


Speed/Load control:

Speed Governor Bias = 2,50 V

Speed Regulator Character = POSITIVE

Cummins EFC



Spurious operation of the controller push buttons is caused by excessive interference from the speed controller when capacitor is not connected between power supply terminals 1 and 2.

Speed/Load control:

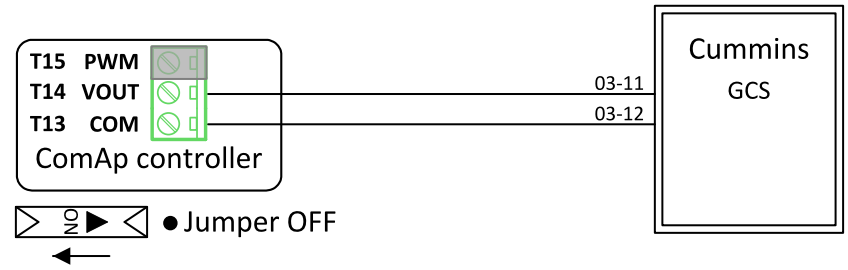
Speed Governor Bias = 6,40 V

Speed Regulator Character = POSITIVE

Speed Governor Low Limit = 5 V

Speed Governor High Limit = 7,8 V

Cummins GCS



Speed/Load ctrl:

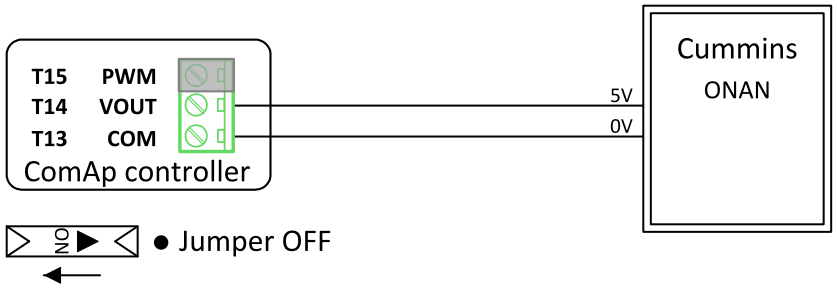
Speed Governor Bias = 5,00 V

Speed Regulator Character = POSITIVE

Speed Governor Low Limit = 2,5 V

Speed Governor High Limit = 7,5 V

Cummins ONAN



Speed/Load ctrl:

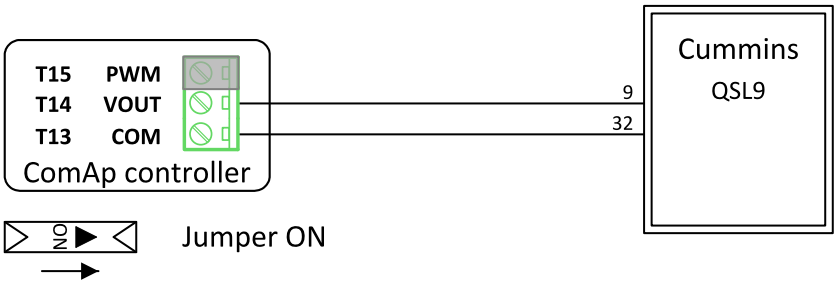
Speed Govovernor Bias = 2,50 V

Speed Regulator Character = POSITIVE

Speed Governor Low Limit = 0V

Speed Governor High Limit = 5 V

Cummins QSL9



Speed/Load ctrl:

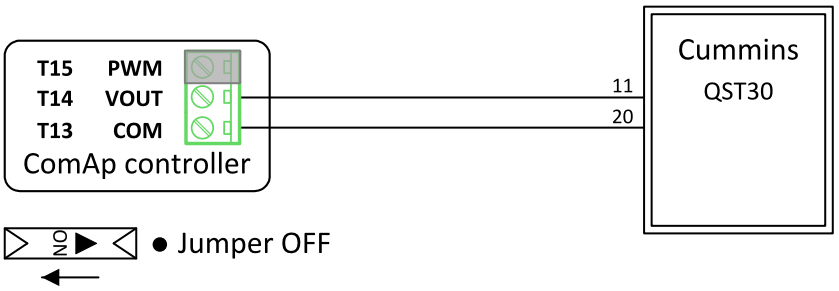
Speed Governor Bias = 3,50 V

Speed Regulator Character = POSITIVE

Speed Governor Low Limit = 2,5 V

Speed Governor High Limit = 5 V

Cummins QST30

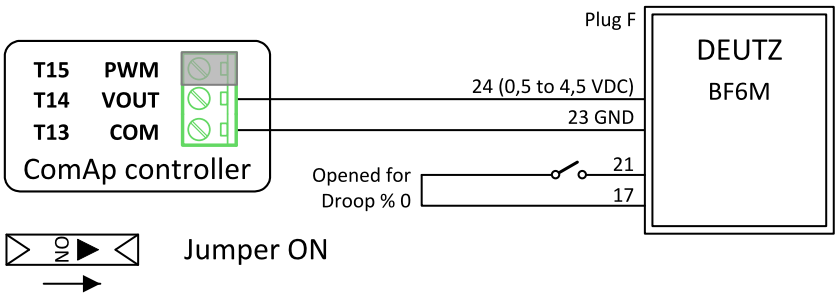


Speed/Load ctrl:

Speed Governor Bias = 5,00 V

Speed Regulator Character = POSITIVE

DEUTZ BF6M



Speed/Load ctrl:

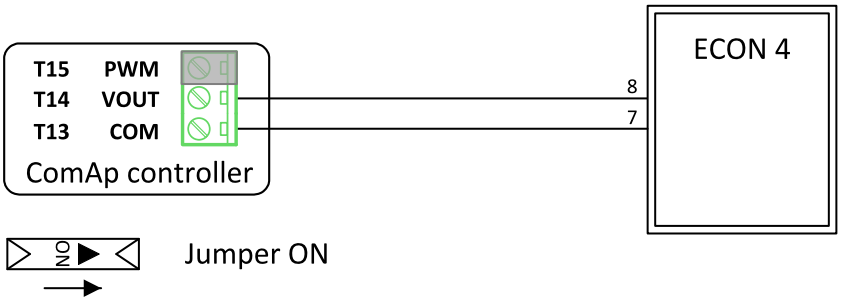
Speed Governor Bias = 2.50 V

Speed Regulator Character = POSITIVE

Speed Governor Low Limit = 0.5 V

Speed Governor High Limit = 4.5 V

ECON 4



Speed/Load ctrl:

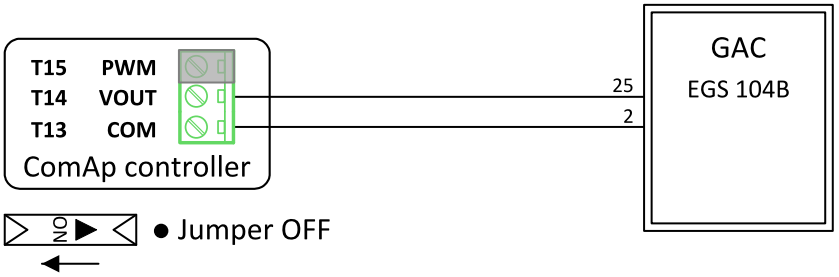
Speed Governor Bias = 5,1 V

Speed Regulator Character = POSITIVE

Speed Governor Low Limit = 0,0 V

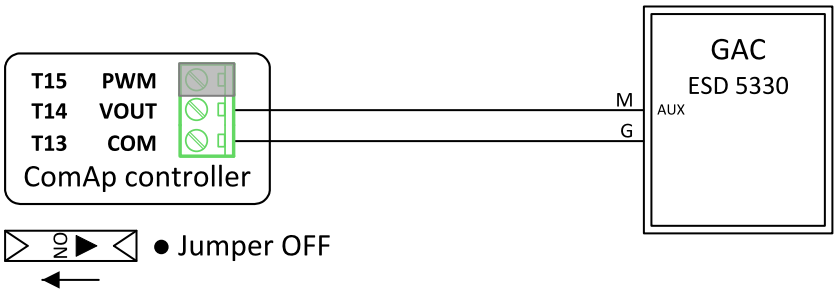
Speed Governor High Limit = 10 V

GAC EGS 104B



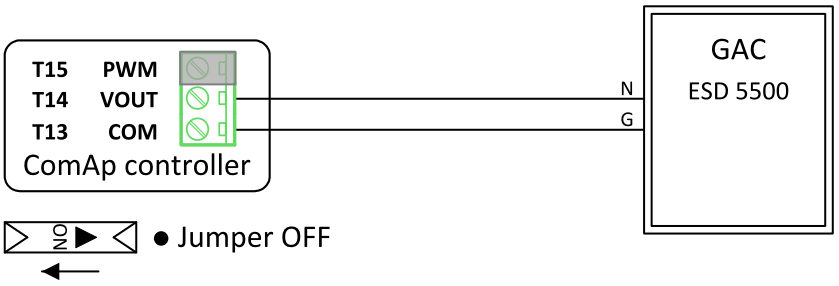
Speed/Load ctrl:
Speed Governor Bias = 5,00 V
Speed Regulator Character = NEGATIVE
Speed Governor Low Limit = 4 V
Speed Governor High Lim = 6 V

GAC ESD 5330



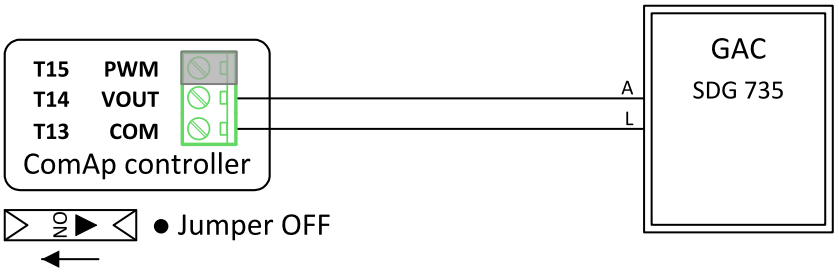
Speed/Load ctrl:
Speed Gov Bias = 5,00 V
Speed Regulator Character = NEGATIVE

GAC ESD 5500



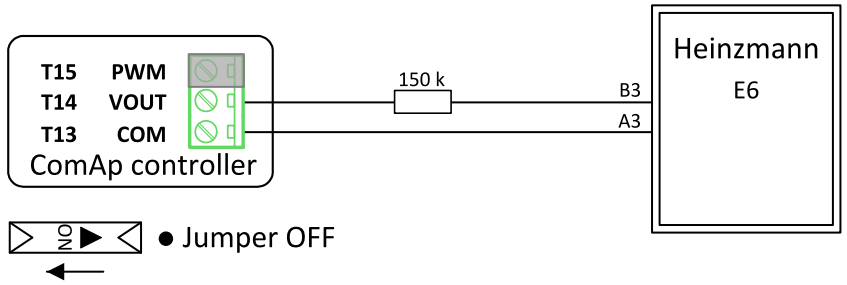
Speed/Load ctrl:
Speed Governor Bias = 5,00 V
Speed Regulator Character = NEGATIVE
Speed Governor Low Limit = 4 V
Speed Governor High Limit = 6 V

GAC SDG 735



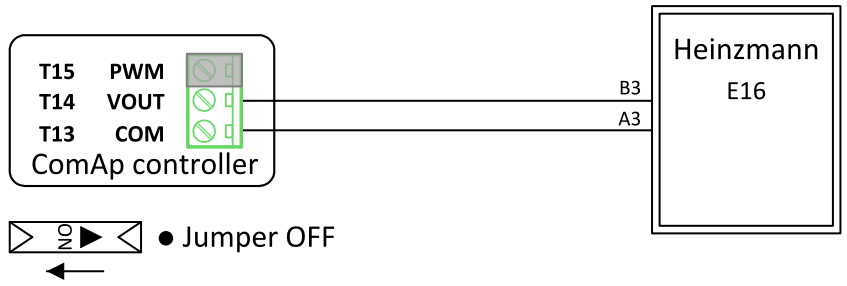
Speed/Load ctrl:
Speed Governor Bias = 5,00 V
Speed Regulator Character = NEGATIVE
Speed Governor Low Limit = 2,5 V
Speed Governor High Limit = 7,5 V
Tau act. = 1

Heinzmann E6



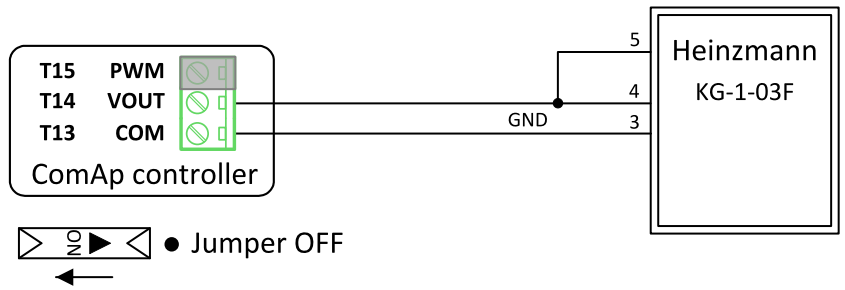
Speed/Load ctrl:
Speed Governor Bias = 5,00 V *Speed Regulator Character* = POSITIVE

Heinzmann E16



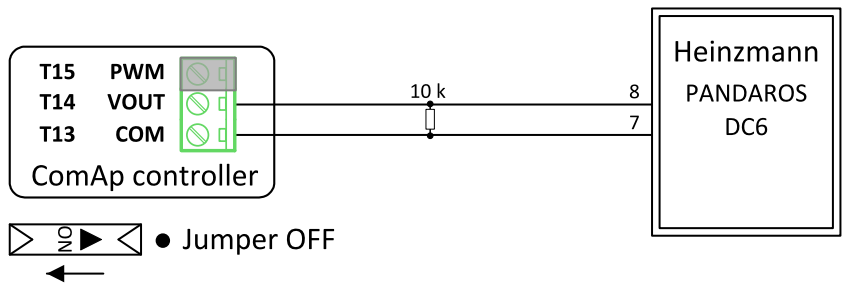
Speed/Load ctrl:
Speed Governor Bias = 0,00 V *Speed Regulator Character* = POSITIVE

Heinzmann KG-1-03F



Speed/Load ctrl:
Speed Governor Bias = 0,00 V
Speed Regulator Character = POSITIVE

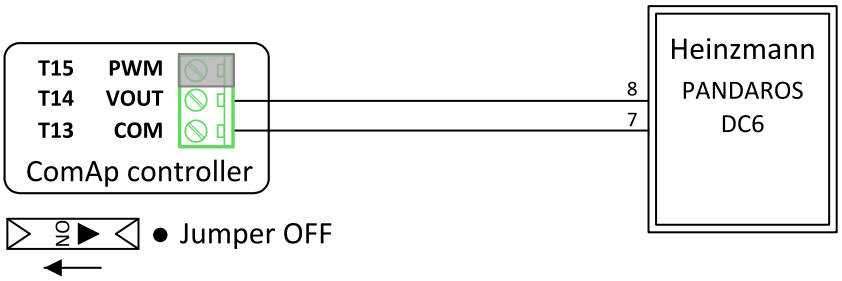
Heinzmann PANDAROS DC6



Terminals A3 and B3 are on OEM 14-pin connector.
Mounted on Perkins 40xx engines.

Speed/Load ctrl:
Speed Governor Bias = 5 V
Speed Regulator Character = POSITIVE
Speed Governor Low Limit = 0,8 V
For connection w/o resistor refer to the next setting

Heinzmann PANDAROS DC6



Speed/Load ctrl:

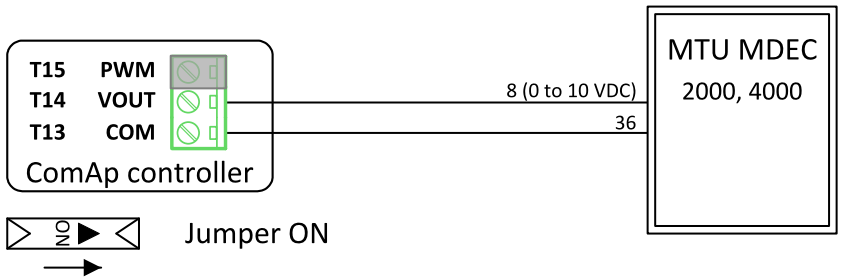
Speed Governor Bias = 2,7 V

Speed Regulator Character = POSITIVE

Speed Governor Low Limit = 0 V

Speed Governor High Limit = 6 V

MTU MDEC 2000, 4000



Speed/Load ctrl:

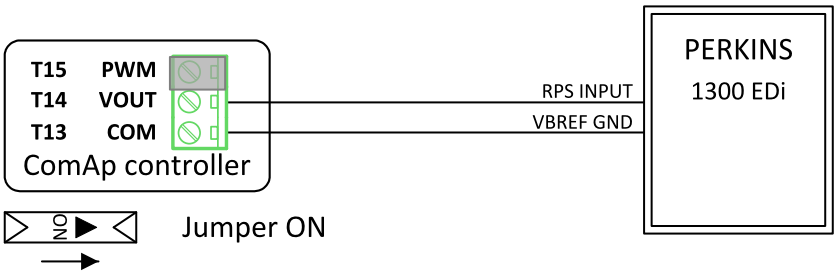
Speed Governor Bias = 4,90 V

Speed Regulator Character = POSITIVE

Speed Governor Low Limit = 0 V

Speed Governor High Limit = 10 V

PERKINS 1300 EDi



Speed/Load ctrl:

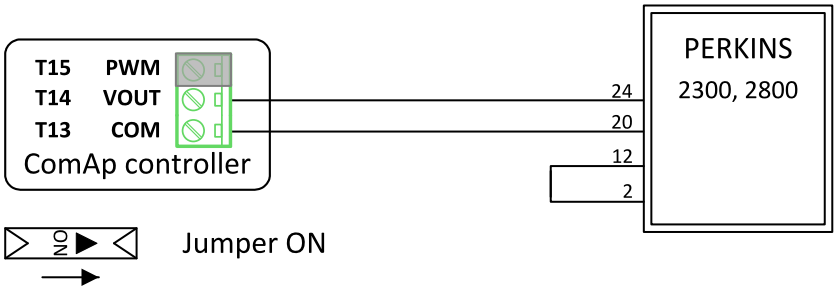
Speed Governor Bias = 2,50 V

Speed Regulator Character = POSITIVE

Speed Governor Low Limit = 0,8V

Speed Governor High Limit = 4,5 V

PERKINS 2300, 2800



Above mentioned pin numbers refer to the Customer Interface Connector. The J1 connector on ECM has the following numbering:

20 = J1/3; 24 = J1/17

Speed/Load ctrl:

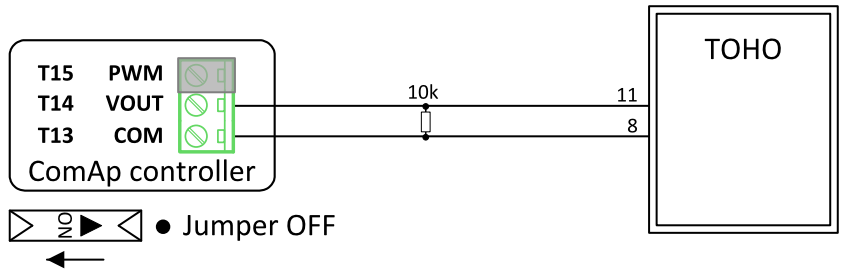
Speed Governor Bias = 2,50 V

Speed Regulator Character = POSITIVE

Speed Governor Low Limit = 0,5 V

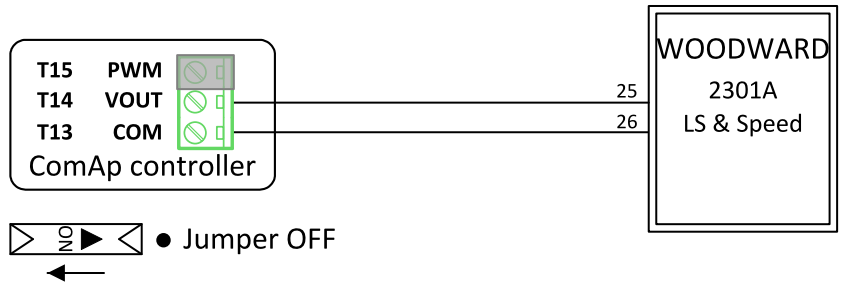
Speed Governor High Limit = 4,5 V

TOHO



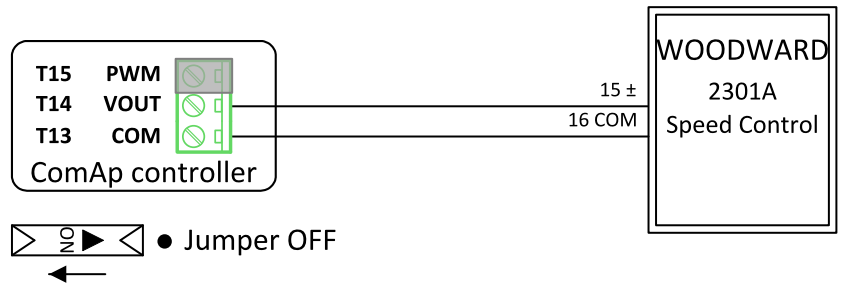
Speed/Load ctrl:
Speed Governor Bias = 4,00 V
Speed Regulator Character = POSITIVE

WOODWARD 2301A LS and Speed



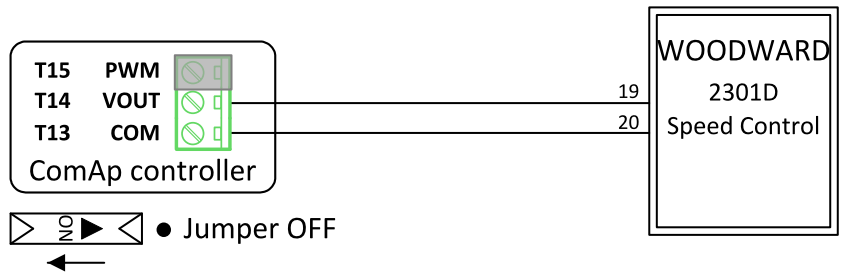
Speed/Load ctrl:
Speed Governor Bias = 5,00 V
Speed Regulator Character = POSITIVE

WOODWARD 2301A Speed Control



Speed/Load ctrl:
Speed Governor Bias = 5,00 V
Speed Regulator Character = POSITIVE

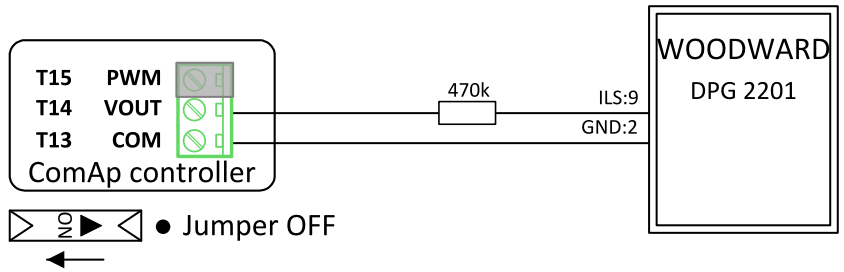
WOODWARD 2301D Speed Control



Terminals 19 and 20 are marked as Analog inputs #1.
25,26 = Speed Signal Inputs

Speed/Load ctrl:
Speed Governor Bias = 5,00 V
Speed Regulator Character = POSITIVE

WOODWARD DPG 2201



For Woodward DPG 2223 the ILS terminal is 10.

Speed/Load ctrl:

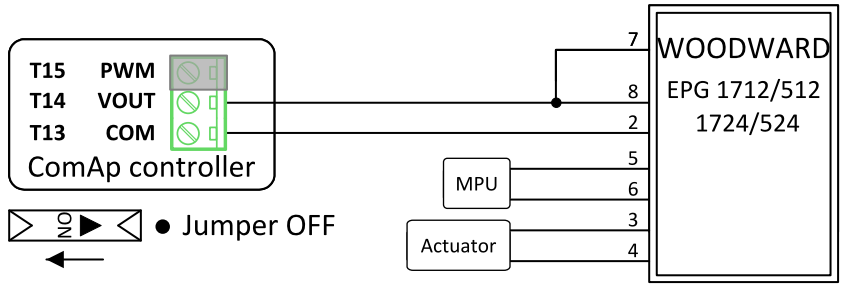
Speed Governor Bias = 2,50 V

Speed Regulator Character = POSITIVE

Speed Governor Low Limit = 0 V

Speed Governor High Limit = 5 V

WOODWARD EPG 1712/512 (1724/524)



Speed/Load ctrl:

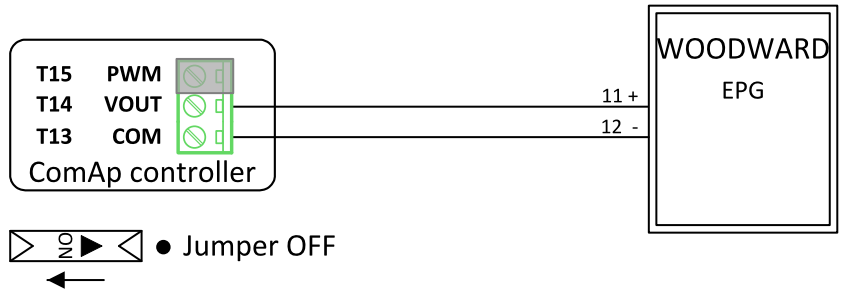
Speed Governor Bias = 3,1 V

Speed Regulator Character = POSITIVE

Speed Governor Low Limit = 6,5V

Speed Governor High Limit = 0,0 V

WOODWARD EPG



For Woodward EPG speed governor (revision F) are limits:

Speed Governor Low Limit = -3 V

Speed Governor High Limit = + 2 V

Speed Governor Bias = - 0,5 V

Speed/Load ctrl:

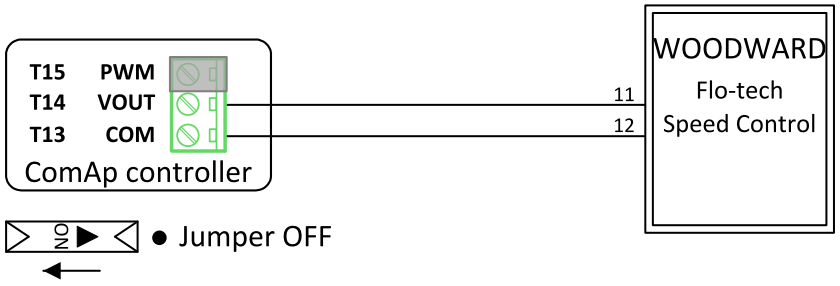
Speed Governor Bias = 0,00 V

Speed Regulator Character = POSITIVE

Speed Governor Low Limit = - 3 V

Speed Governor High Limit = 3 V

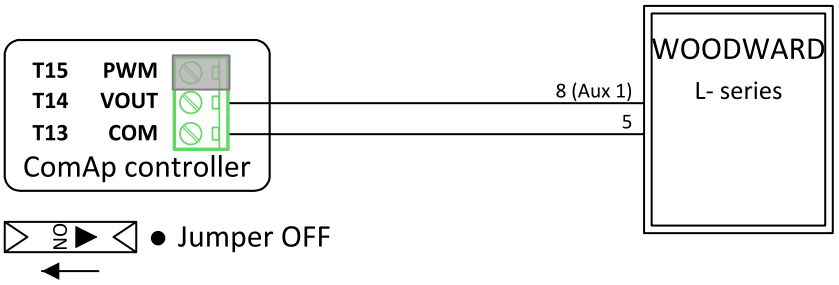
WOODWARD Flo - tech Speed Control



Speed/Load ctrl:

Speed Governor Bias = 0,00 V

WOODWARD L - series



Speed/Load ctrl:

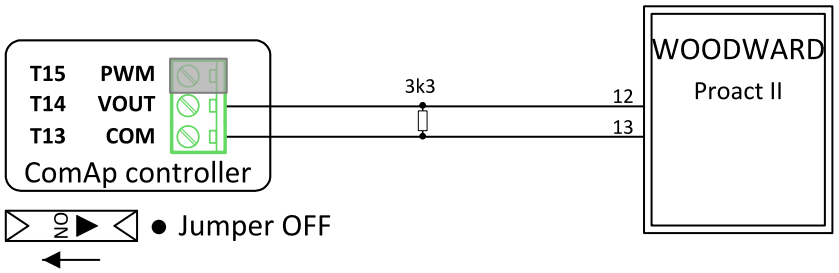
Speed Governor Bias = 2,50 V

Speed Regulator Character = POSITIVE

Speed Govenor Low Limit = 0 V

Speed Governor High Limit = 5 V

WOODWARD Proact II



Speed/Load ctrl:

Speed Governor Bias = 0,00 V

Speed Regulator Character = POSITIVE

Speed Governor Low Limit = - 2,5V

Speed GovernorHigh Limit = 2,5 V

back to Appendix

8.5 Modules

8.5.1 Plug-In modules 850
8.5.2 CAN modules 865

8.5.1 Plug-In modules

Communication modules 851
Extension modules 863

The available communication plug-in modules are:

- CM-RS232-485 - communication module for connection via RS232 or RS485 line
- CM-4G-GPS - communication module for connection via 4G
- CM-GPRS - communication module for connection via GPRS
- CM-Ethernet - communication module for internet connection via Ethernet

The available extension plug-in modules are:

- EM-BIO8-EFCP - extension module with 8 binary inputs/outputs and with earth fault current protection

Note: *Controller has 2 plug-in module slots.*

Supported combinations of plug-in modules

Module	CM-Ethernet	CM-4G-GPS	CM-GPRS	CM-RS232-485	EM-BIO8-EFCP
CM-Ethernet	✗	✓	✓	✓	✓
CM-4G-GPS	✓	✗	✗	✓	✓
CM-GPRS	✓	✗	✗	✓	✓
CM-RS232-485	✓	✓	✓	✗	✓
EM-BIO8-EFCP	✓	✓	✓	✓	✓

Communication modules

CM-RS232-485 851
CM-Ethernet 853
CM-GPRS 855
CM-4G-GPS 858

CM-RS232-485

CM-RS232-485 is optional plug-in card to enable InteliGen 200 the RS232 and RS485 communication. This is required for computer or MODBUS connection. The CM-RS232-485 is a dual port module with RS232 and RS485 interfaces at independent COM channels. The RS232 is connected to COM1 and RS485 to COM2.



Image 8.218 CM-RS232-485 interface

IMPORTANT: Any manipulation with plug-in module shall be done with disconnected power supply to controller.

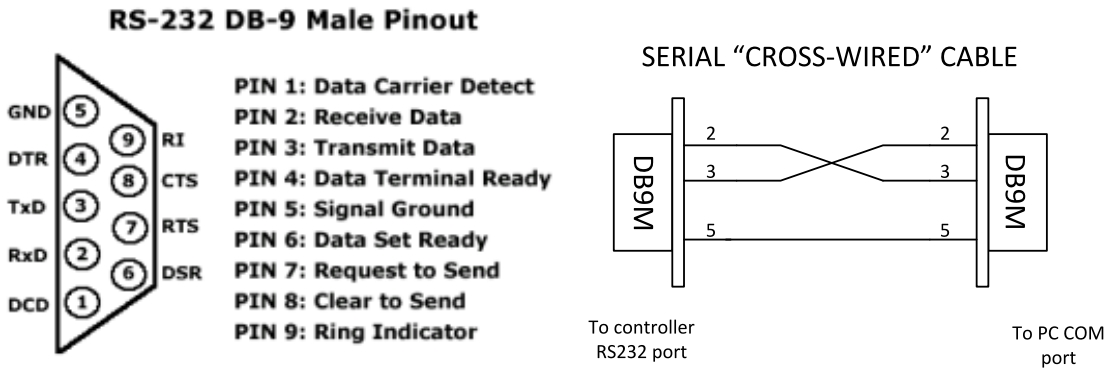


Image 8.219 Pinout of RS-232 line

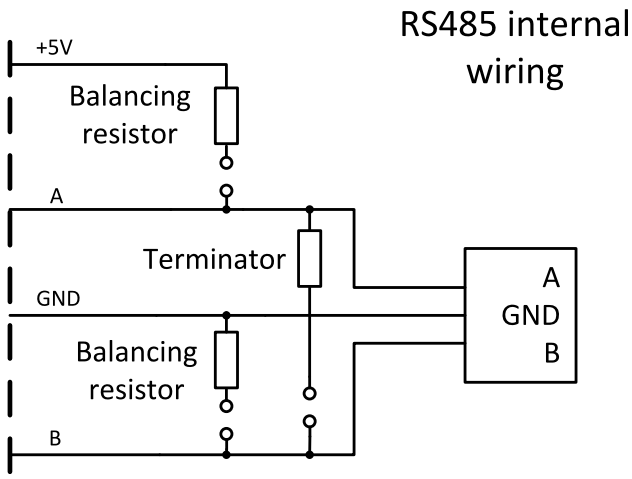


Image 8.220 Pinout of RS-485 line



Image 8.221 Jumpers description

Note: *Balancing resistors shall be both closed at only one device in whole RS485 network.*

Maximal distance of line is 10m for RS232 line and 1200m for RS485 line.

Terminator 120Ω

Balancing resistor +5V

Technical data

Power consumption	40 mA / 8 VDC 26 mA / 12 VDC 14 mA / 24 VDC 10 mA / 36 VDC
Isolation	Galvanic separation

Firmware upgrade

- Download the newest FW of module from ComAp website (in form of PSI file or installation package)
- Instal package to computer or open PSI to instal it into InteliConfig
- Plug the module into the controller and power the controller on.
- Open a connection with controller via InteliConfig
- Go the menu Tools -> Firmware upgrade, select the Plug-in modules tab and select the appropriate firmware you want to program into the module (in InteliConfig).
- Press the OK button to start upgrade of firmware.

The firmware update process may be performed via any kind of connection including connection via the same module in which the firmware is to be updated. The connection is reestablished again automatically when the update process is finished.

CM-Ethernet

CM-Ethernet is a plug-in card with Ethernet 10/100 Mbit interface in RJ45 connector. It provides an interface for connecting a PC with through ethernet/internet network, for sending active e-mails and for integration of the controller into a building management (MODBUS TCP and SNMP protocols). This card also enables to monitor and control the gen-set over web browser from any location with internet access using appropriate security measures.

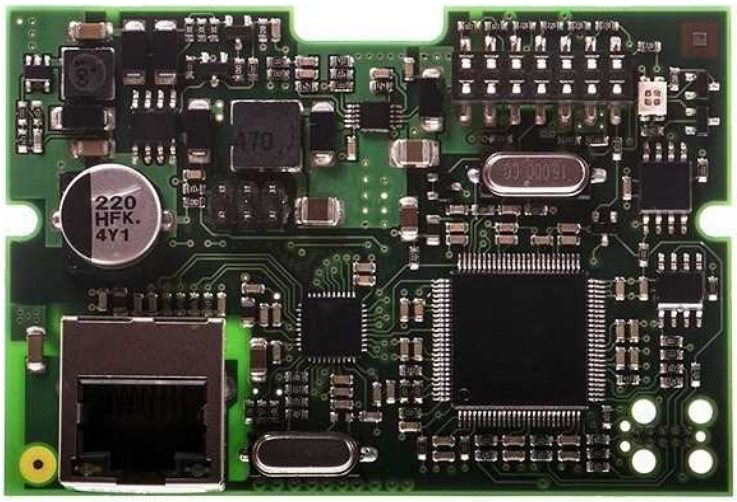


Image 8.222 CM-Ethernet interface

IMPORTANT: Any manipulation with plug-in module shall be done with disconnected power supply to controller.

Use an Ethernet UTP cable with a RJ45 connector for linking the module with your Ethernet network. The module can also be connected directly to a PC using cross-wired UTP cable.

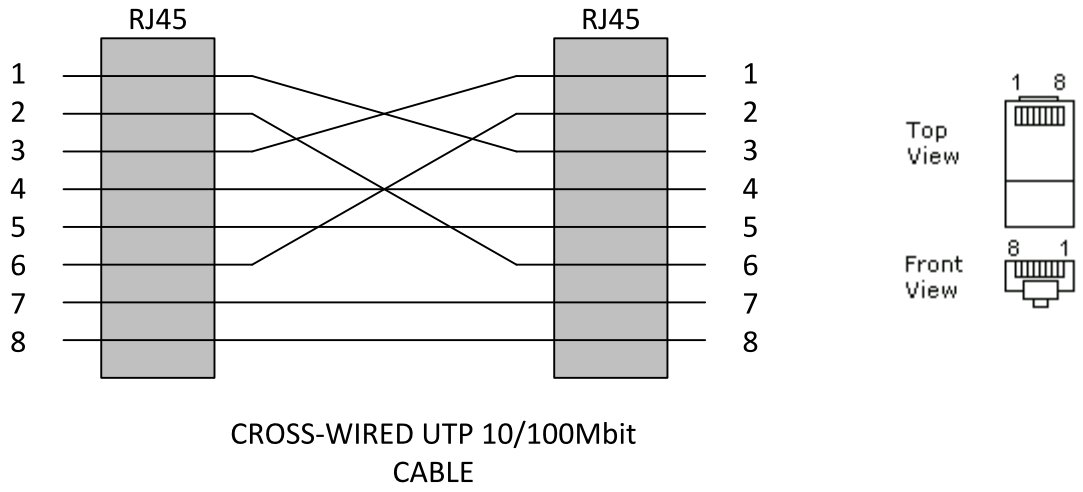


Image 8.223 Cross-wired cable

Technical data

Power consumption	120 mA / 8 VDC 82 mA / 12 VDC 35 mA / 24 VDC 25 mA / 36 VDC

Module setup

All settings related to the module are to be adjusted via the controller setpoints. The respective setpoints are located in the setpoint **Group: CM-Ethernet (page 487)**.

All actual operational values like actual IP address etc. are available in controller values in a specific group as well.

Status LED

Blinking frequency	Color
1 Hz	Green - everything is OK Red - some of following errors occurred: ▶ unplugged ethernet cable ▶ module cannot connect to AirGate ▶ module can not obtain IP address from DHCP
10 Hz	Green - firmware is currently being programmed Red - no firmware present in the module

Firmware upgrade

- Download the newest FW of module from ComAp website (in form of PSI file or installation package)
- Instal package to computer or open PSI to instal it into InteliConfig
- Plug the module into the controller and power the controller on.
- Open a connection with controller via InteliConfig
- Go the menu Tools -> Firmware upgrade, select the Plug-in modules tab and select the appropriate firmware you want to program into the module (in InteliConfig).
- Press the OK button to start upgrade of firmware.

The firmware update process may be performed via any kind of connection including connection via the same module in which the firmware is to be updated. The connection is reestablished again automatically when the update process is finished.

CM-GPRS

CM-GPRS plug-in module is a GSM/GPRS modem which can works in two modes of operation based on the settings in the setpoint **Mode (page 475)**.

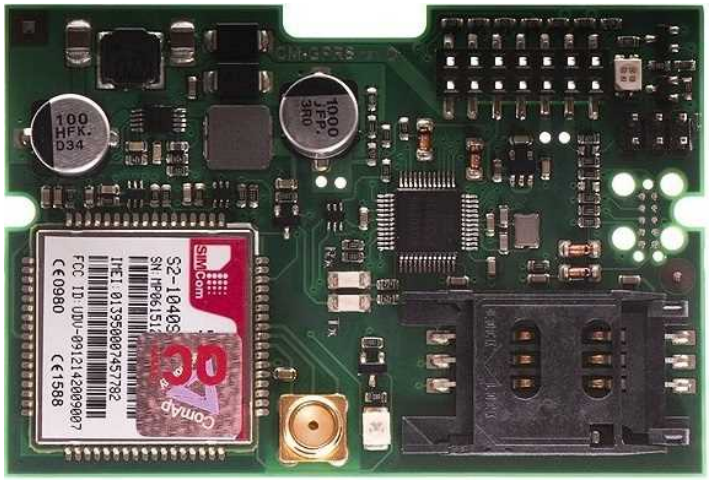


Image 8.224 CM-GPRS module

IMPORTANT: Any manipulation with plug-in module shall be done with disconnected power supply to controller.

IMPORTANT: CM-4G-GPS and CM-GPRS modules can't be used in one controller in the same time.

Note: *GPRS and CSD services must be provided by your GSM/GPRS operator for successful operation.*

Note: *The GPRS and CSD connection should not be used for the firmware update process.*

CM-GPRS module works with:

- WebSupervisor – internet-based remote monitoring solution
- AirGate – powerful connection technology to make internet access as simple as possible

Technical data

Power consumption	32 mA / 8 VDC 18 mA / 12 VDC 10 mA / 24 VDC 12 mA / 36 VDC

SIM card settings

SIM card to be used in CM-4G-GPS or CM-GPRS modules must be adjusted as follows:

- SMS service enabled
- Packet data (Internet access) enabled (when required for the selected mode of operation)
- PIN code security disabled

How to start using CM-GPRS module

- You will need a controller, CM-GPRS module, antenna and SIM card with SMS and packet data service.

Make sure that your SIM supports the packet data network type you want to use. I.e. if you want to use the module in GPRS (2,5G) network you have to confirm with the operator that the particular SIM card does support 2,5G network.

- Contact your mobile operator for getting packet data APN (APN = Access Point Name), username and password.

Example: APN Name = "internet", UserName = [blank], Password = [blank].

- Make sure SIM card does not require PIN code. Use any mobile phone to switch the SIM PIN security off.
- Place the SIM card into slot on CM-GPRS card
- Connect the antenna to Cellular module antenna connector.
- Switch off the controller.
- Insert CM-GPRS module into controller
- Power up the controller.
- Select the mode of CM-GPRS module by adjusting setpoint Mode.
- Enter correct APN Name, APN User Name and APN User Password in controller's setpoint group CM-GPRS which is accessible by PAGE button from any measurement screen on controller. Setpoints can be set on controller's front panel keyboard or by InteliConfig.
- Switch the controller off and on.
- Wait for approx 2 - 4 minutes for first connection of the system to AirGate. AirGate will generate automatically the AirGate ID value. Then navigate to measurement screens where you will find signal strength bar and AirGate ID identifier.

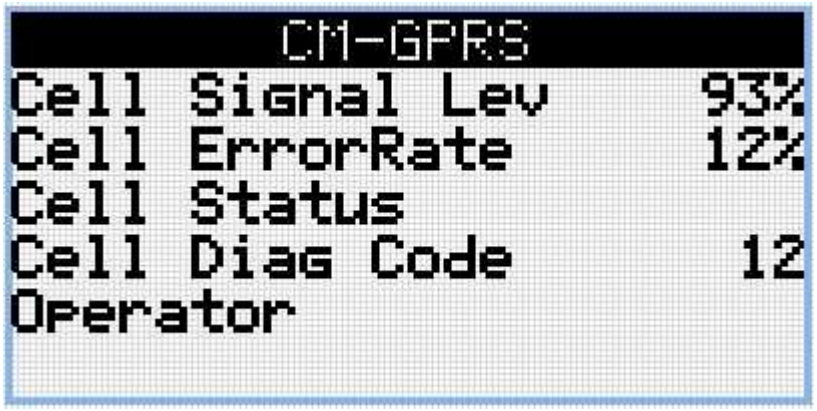


Image 8.225 Main screen of CM-GPRS module



Image 8.226 Screen of AirGate

GSM Diag Code – Common list of diagnostic codes for cellular modules

Code	Description
0	OK. No error.
1	Not possible to hang up.
2	Modul is switched off
3	Module is switched on
4	Module – error in initialization
5	Module – not possible to set the APN
6	Module – not possible to connect to GPRS network
7	Module – not possible to retrieve IP address
8	Module – not accepted DNS IP address
9	Error in modem detection
10	Error in initialization of analog modem
11	SIM card is locked (Possibly PIN code required, PIN needs to be deactivated) or unknown status of SIM locking
12	No GSM signal
13	Not possible to read the SIM card parameters
14	GSM modem did not accepted particular initialization command, possibly caused by locked SIM card
15	Unknown modem
16	Bad answer to complement initialization string
17	Not possible to read GSM signal strength
18	CDMA modem not detected
19	No CDMA network
20	Unsuccessful registration to CDMA network
21	SIMCom/ME909s: can´t read FW version
22	SIMCom: GSM signal not found
23	SIMCom: can´t detect module speed
24	SIMCom: HW reset issued
25	PUK is required
26	Error of SIM card detected
27	ME909s: can't set module bps
28	ME909s: can't set link configuration
29	ME909s: can't do power-off
30	ME909s: can't do power-on
31	ME909s: can't do hardware reset
32	ME909s: ME909s not started
33	ME909s: switch off issued

34	ME909s: switch on issued
35	ME909s: HW reset issued
36	ME909s: can't switch echo off
37	ME909s: can't find out state of registration
38	ME909s: GSM signal not found
39	ME909s: no SIM memory for SMS
40	ME909s: waiting for registration
41	Can't read operator name
42	ME909s: can't set flow control
43	APN not typed
255	Only running communication is needed to indicate

AirGate Diag – Diagnostic Code for AirGate connection

Code	Description
0	Waiting for connection to AirGate Server
1	Controller registered, waiting for authorization
2	Not possible to register, controller blacklisted
3	Not possible to register, server has no more capacity
4	Not possible to register, other reason
5	Controller registered and authorized

Firmware upgrade

- Download the newest FW of module from ComAp website (in form of PSI file or installation package)
- Instal package to computer or open PSI to instal it into InteliConfig
- Plug the module into the controller and power the controller on.
- Open a connection with controller via InteliConfig
- Go the menu Tools -> Firmware upgrade, select the Plug-in modules tab and select the appropriate firmware you want to program into the module (in InteliConfig).
- Press the OK button to start upgrade of firmware.

The firmware update process may be performed via any kind of connection including connection via the same module in which the firmware is to be updated. The connection is reestablished again automatically when the update process is finished.

CM-4G-GPS

CM-4G-GPS plug-in module containing a GPS receiver and GSM/WCDMA/LTE modem which can works in two modes of operation based on the settings in the setpoint **Mode (page 475)**.



Image 8.227 CM-4G-GPS module

IMPORTANT: Any manipulation with plug-in module shall be done with disconnected power supply to controller.

IMPORTANT: CM-4G-GPS and CM-GPRS modules cant be used in one controller in the same time.

IMPORTANT: Operating temperature of module is from -30°C to +75°C.

Note: *Cellular data service must be enabled in your SIM card by your mobile operator for successful operation.*

CM-4G-GPS module works with:

- WebSupervisor – internet-based remote monitoring solution
- AirGate – powerful connection technology to make internet access as simple as possible
- Locate – Celluar network based localization service

CM-4G-GPS module also works like GPS locator. Geo-fencing function can be used with this module.

Supported 4G bands are as follows:

- FDD LTE: Band 1, Band 2, Band 3, Band 4, Band 5, Band 7, Band 8, Band 20, all bands with diversity
- WCDMA/HSDPA/HSUPA/HSPA+: Band 1, Band 2, Band 5, Band 8, all bands with diversity
- GSM/GPRS/EDGE: 850 MHz/900 MHz/1800 MHz/1900 MHz

Technical data

Power consumption	55 mA / 8 VDC 35 mA / 12 VDC 8 mA / 24 VDC 5 mA / 36 VDC

SIM card settings

SIM card to be used in CM-4G-GPS or CM-GPRS modules must be adjusted as follows:

- SMS service enabled
- Packet data (Internet access) enabled (when required for the selected mode of operation)
- PIN code security disabled

How to start using CM-4G-GPS module

- You will need a controller, CM-4G-GPS module, antenna and SIM card with SMS and packet data service.

Note: *Make sure that your SIM supports the packet data network type you want to use. - i.e. if you want to use the module in LTE (4G) network you have to confirm with the operator that the particular SIM card supports 4G network.*

- Contact your mobile operator for getting packet data APN (APN = Access Point Name), username and password.

Example: APN Name = "internet", UserName = [blank], Password = [blank].

- Make sure SIM card does not require PIN code. Use any mobile phone to switch the SIM PIN security off.
- Place the SIM card into slot on CM-4G-GPS card
- Connect the antenna to Cellular module antenna connector.
- If you want to use the built-in GPS receiver connect also an **active** GPS antenna to the GPS antenna connector.
- Switch off the controller.
- Insert CM-4G-GPS module into controller
- Power up the controller.
- Select the mode of CM-4G-GPS module by adjusting setpoint Mode.
- Enter correct APN Name, APN User Name and APN User Password in controller's setpoint group CM-4G-GPS which is accessible by PAGE button from any measurement screen on controller. Setpoints can be set on controller's front panel keyboard or by InteliConfig.
- Switch the controller off and on.
- Wait for approx 2 - 4 minutes for first connection of the system to AirGate. AirGate will generate automatically the AirGate ID value. Then navigate to measurement screens where you will find signal strength bar and AirGate ID identifier.



Image 8.228 Main screen of CM-4G-GPS module



Image 8.229 Screen of AirGate

GSM Diag Code – Common list of diagnostic codes for cellular modules

GSM Diag Code – Common list of diagnostic codes for cellular modules

Code	Description
0	OK. No error.
1	Not possible to hang up.
2	Modul is switched off
3	Module is switched on
4	Module – error in initialization
5	Module – not possible to set the APN
6	Module – not possible to connect to GPRS network
7	Module – not possible to retrieve IP address
8	Module – not accepted DNS IP address
9	Error in modem detection
10	Error in initialization of analog modem
11	SIM card is locked (Possibly PIN code required, PIN needs to be deactivated) or unknown status of SIM locking
12	No GSM signal
13	Not possible to read the SIM card parameters
14	GSM modem did not accepted particular initialization command, possibly caused by locked SIM card
15	Unknown modem
16	Bad answer to complement initialization string
17	Not possible to read GSM signal strength
18	CDMA modem not detected
19	No CDMA network
20	Unsuccessful registration to CDMA network
21	SIMCom/ME909s: can´t read FW version
22	SIMCom: GSM signal not found
23	SIMCom: can´t detect module speed

24	SIMCom: HW reset issued
25	PUK is required
26	Error of SIM card detected
27	ME909s: can't set module bps
28	ME909s: can't set link configuration
29	ME909s: can't do power-off
30	ME909s: can't do power-on
31	ME909s: can't do hardware reset
32	ME909s: ME909s not started
33	ME909s: switch off issued
34	ME909s: switch on issued
35	ME909s: HW reset issued
36	ME909s: can't switch echo off
37	ME909s: can't find out state of registration
38	ME909s: GSM signal not found
39	ME909s: no SIM memory for SMS
40	ME909s: waiting for registration
41	Can't read operator name
42	ME909s: can't set flow control
43	APN not typed
255	Only running communication is needed to indicate

AirGate Diag – Diagnostic Code for AirGate connection

Code	Description
0	Waiting for connection to AirGate Server
1	Controller registered, waiting for authorization
2	Not possible to register, controller blacklisted
3	Not possible to register, server has no more capacity
4	Not possible to register, other reason
5	Controller registered and authorized

Firmware upgrade

- Download the newest FW of module from ComAp website (in form of PSI file or installation package)
- Instal package to computer or open PSI to instal it into InteliConfig
- Plug the module into the controller and power the controller on.
- Open a connection with controller via InteliConfig
- Go the menu Tools -> Firmware upgrade, select the Plug-in modules tab and select the appropriate firmware you want to program into the module (in InteliConfig).
- Press the OK button to start upgrade of firmware.

The firmware update process may be performed via any kind of connection including connection via the same module in which the firmware is to be updated. The connection is reestablished again automatically when the update process is finished.

Extension modules

EM-BIO8-EFCP 863

EM-BIO8-EFCP

EM-BIO8-EFCP is optional plug-in card. Through this card controller can accommodate one AC current (CT) measuring input (1A or 5A input) and up to 8 binary inputs or outputs. In InteliConfig PC configuration tool it is possible to easily choose if particular I/O will be binary input or output.



Image 8.230 EM-BIO8-EFCP interface

IMPORTANT: Any manipulation with plug-in module shall be done with disconnected power supply to controller.

IMPORTANT: Earth fault current measurement is supported by controller only in slot A.

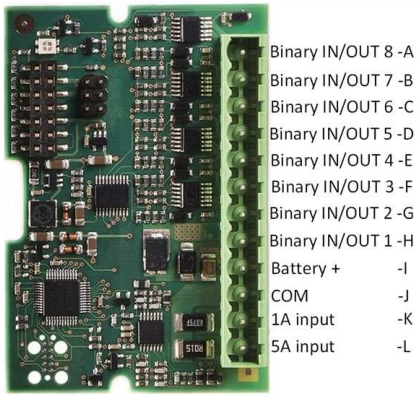


Image 8.231 Overview of EM-BIO8-EFCP

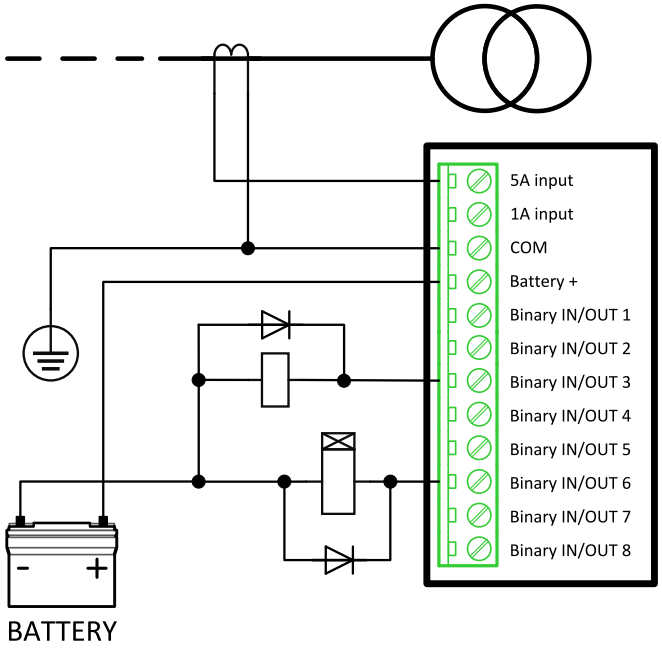


Image 8.232 EM-BIO8-EFCP wiring

EM-BIO8-EFCP technical data

Power supply

Power supply range	8-36 VDC
Power consumption	40 mA / 8 VDC 27 mA / 12 VDC 22 mA / 24 VDC 19 mA / 36 VDC

Binary inputs

Number	Up to 8, non-isolated
Close/Open indication	0-2 VDC close contact >6 VDC open contact

Binary outputs

Number	Up to 8 , non-isolated
Max. current	0,5A
Switching to	positive supply terminal

Current measuring input

Number of inputs	2
Nominal input current	1A/5A
Load (CT output impedance)	< 0,1
Max measured current from CT	10 A
Current measurement tolerance	2% from Nominal current
Max peak current from CT	150 A / 1 s
Max continuous current	10 A

Earth fault current measurement

The Earth Fault protection is done by the extension module EM-BIO8-EFCP.

When the measured current exceeds the set value, which indicates that part of the current is dispersed to earth, and when the set **Earth Fault Delay (page 501)** time elapses, the **Earth Fault Current Protection (page 501)**, **Sd Earth Fault Current (page 807)** alarm and **AL EARTH FAULT (PAGE 672)** output are activated. Earth Fault protection is not active when gen-set does not run and when the **Earth Fault Current Protection (page 501)** is disabled.

IMPORTANT: Earth fault current measurement is not intended to protect human health, but the machines!

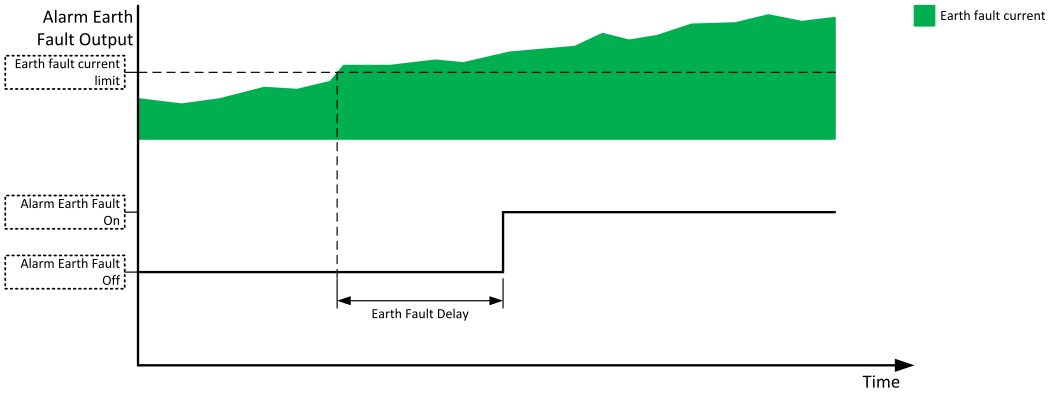


Image 8.233 Earth fault current protection

Firmware upgrade

- Download the newest FW of module from ComAp website (in form of PSI file or installation package)
- Instal package to computer or open PSI to instal it into InteliConfig
- Plug the module into the controller and power the controller on.
- Open a connection with controller via InteliConfig
- Go the menu Tools -> Firmware upgrade, select the Plug-in modules tab and select the appropriate firmware you want to program into the module (in InteliConfig).
- Press the OK button to start upgrade of firmware.

The firmware update process may be performed via any kind of connection including connection via the same module in which the firmware is to be updated. The connection is reestablished again automatically when the update process is finished.

8.5.2 CAN modules

Communication modules 866
Extension modules 871

The available extension CAN modules are:

- Inteli AIN8 - extension CAN module with 8 analog inputs
- Inteli IO8/8 - extension CAN module with 8 binary inputs, 8 binary outputs and 2 analog outputs
  - this CAN module can be switched to Inteli IO16/0 - extension CAN module with 16 binary inputs and 2 analog outputs

Supported combinations of modules

Slot	Inteli AIN8	Inteli AIN8TC	Inteli IO8/8	Inteli IO16/0	IGL-RA15	IGS-PTM	Inteli AIO9/1
1	✓	✓	✓	✓	✓	✓	✓
1	✓	✓	✓	✓	✓	✓	✓
3	✓	✓	✓	✓	✓	✗	✗
4	✓	✓	✓	✓	✓	✗	✗
5	✗	✗	✓	✓	✗	✗	✗

IMPORTANT: In slot 3, 4 and 5 CAN modules Inteli IO8/8 and Inteli IO16/0 are supported without analog outputs. Analog outputs of these CAN modules are supported only in slot 1 and 2.

It is possible to add up to 80 binary inputs or up to 68 binary outputs or up to 32 analog inputs on CAN modules.

Communication modules

I-LB+ 866

I-LB+

I-LB+ is communication modules for communication with all devices connected to CAN2 bus. Speed for direct/modem connection can be up to 57600 bps. I-LB+ can be connected with PC via USB, RS232 or RS485.



Image 8.234 I-LB+

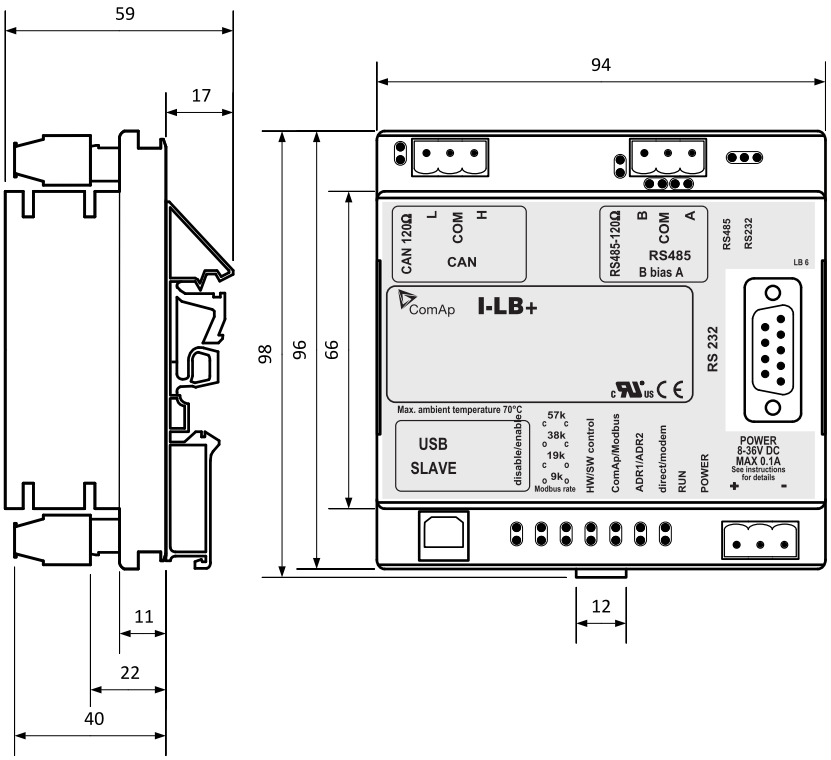
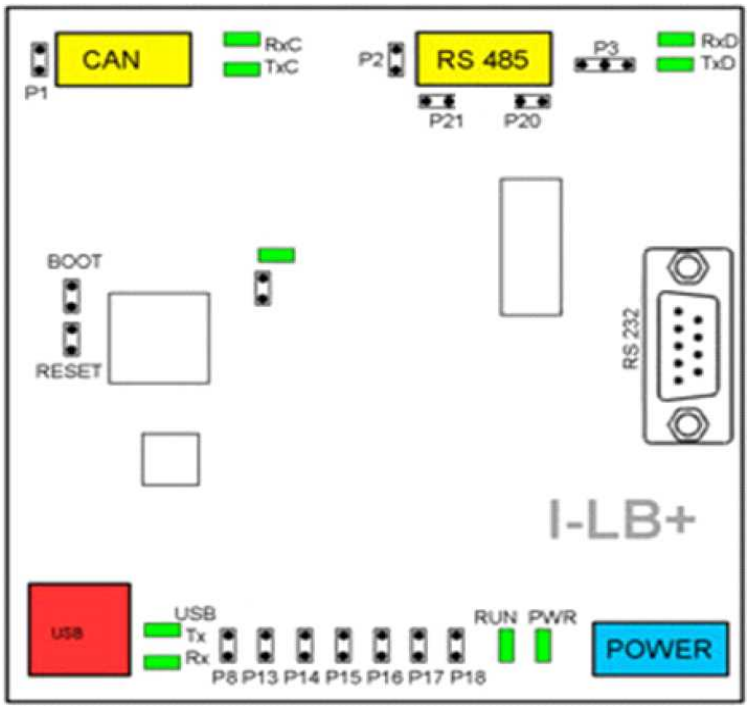


Image 8.235 I-LB+ dimensions

Note: *All dimensions are in mm.*

Terminals



POWER	Power supply
CAN	CAN 1 line
USB	USB line
RS232	RS485 line
J13 - J18	SW / HW control
BOOT	Programming
RESET	Programming / reset
P1	Terminating resistor
P2	Terminating resistor
P3	RS485 or RS232
P8	USB enable/disable
P13	Communication speed
P14	Communication speed
P15	Modem control (HW / SW)
P16	Protocol (Modbus/ComAp)
P17	CAN address
P18	Connection (direct/modem)

P20	Bias - A
P21	Bias - B
RxC,TxC	CAN data
RxD, TxD	RSxxx data
Tx,Rx USB	USB data
RUN	Power
PWR	Module state

CAN1 termination (P1)

I-LB+ has included CAN terminating resistor (120 ohm). Close jumper P1 to connect terminating resistor to CAN bus, open jumper P1 to disconnect terminating resistor.

RS232 or RS485 termination (P2)

I-LB+ has included RS232/RS485 terminating resistor (120 ohm). Close jumper P2 to connect terminating resistor to RS232/RS485 bus, open jumper P2 to disconnect terminating resistor.

Select RS mode (P3)

Jumper P3 selecting RS mode. When jumper P3 is connected to 1-2(from left side), RS485 mode is activated. When jumper P3 is connected to 2-3, RS232 mode is actives.

ComAp / Modbus (P16)

Jumper P16 selects between ComAp PC tools and third party PC SW for monitoring with Modbus interface. ComAp PC tools are selected when P16 is opened; Modbus is selected when P16 is closed.

Modbus rate (P13 and P14)

Modbus rate is set by jumpers P13 and P14; description is in the table bellow.

Modbus rate	P13	P14
9600 bps	Open	Open
19200 bps	Close	Open
38400 bps	Open	Close
57600 bps	Close	Close

Direct / Modem (P18)

Select between direct connection via RS232 or RS485 and modem connection type. For modem connection is jumper P18 closed, for direct connection is jumper P18 opened.

ADR1 / ADR2 (P17)

Select device address. ADR1 is selected if P17 is opened and ADR2 is selected if P17 is closed.

SW / HW control (P15)

Select SW or HW modem control. Jumper P15 is opened for HW modem control and closed for SW modem control.

RS485 bias resistor (P20 and P21)

Jumpers P20 and P21 are opened if the bias resistors (560R) are not requested. Closed jumper connects bias resistor to the line A (P20) or B (P21).

USB interface enable/disable (P8)

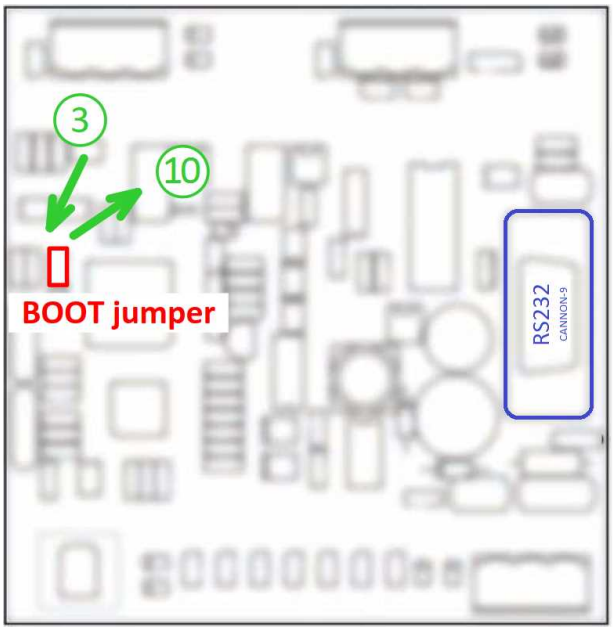
Jumper P8 has to be set to enable USB interface. Opened jumper disables USB interface (disabled USB doesn't occupies a communication channel on the CAN bus i.e. there are still 3 free communications channels on the CAN bus). USB interface allows only local communication (modbus is not implemented in this interface).

Default jumpers settings

Jumper	Description	State
P1	CAN terminating resistor	Opened - not connect
P2	RS485 terminating resistor	Opened - not connect
P3	RS232 or RS485	1 - 2 RS485 activated, 2 - 3 RS232 activated
P8	USB enable/disable	Opened - disabled
P13	Modbus rate	Opened
P14	Modbus rate	Opened - 9600 bps
P15	HW or SW modem control	Opened - HW control
P16	ComAp or Modbus	Opened - ComAp protocol
P17	ADR1 or ADR2	Opened - ADR1
P18	Direct or Modem	Opened - Direct

Programming firmware

1. Disconnect all terminals from the unit.
2. Disassemble the unit.
3. Put the BOOT jumper on a pin.
4. Connect the unit with PC via RS232-null modem cable : launch



5. Connect power supply of the module
6. Launch FlashPgr.exe PC software
7. In FlashPrg program choose card 90F352 and load FW for the module
8. Set the proper COM port (connected with the unit) and press Start button

9. Wait till process is done (If the process doesn't start – after 60 second the "Timeout" will be evaluated. In this case please check:
   - Proper connection with the unit
   - COM port selection
   - Unit's power supply is according manual
   - BOOT jumper is set on, try again from point 3
10. After successful programming, disconnect the power supply from the unit and remove the BOOT jumper
11. Assemble the unit again
12. Module FW is upgraded

LED indication

LED	Description State	State
RxC	No data are received on the CAN line	Dark
	Data are received on the CAN line	Blink
TxC	No data are transmitted on the CAN line	Dark
	Data are transmitted on the CAN line	Blink
RxD	No data are received on the RS232 or RS485 line	Dark
	Data are received on the RS232 or RS485 line	Blink
TxD	No data are transmitted on the RS232 or RS485 line	Dark
	Data are transmitted on the RS232 or RS485 line	Blink
TxUSB	No data are received on USB	Dark
	Data are received on USB	Blink
RxUSB	No data are transmitted on USB	Dark
	Data are transmitted on USB	Blink
PWR	No power supply	Dark
	Power supply OK	Continuous light
RUN	When at least one controller is active on the CAN bus	Continuous light
	After connection power supply - no controller detected on the CAN bus (during communication speed detection).	Blink

Wiring

I-LB+ has to be connected to modem via standard modem cable (full RS232) where the DSR (Data Set Ready) signal detects modem presence (when MODEM (HW) type selected). Three-wire RS232 cable (TxD, RxD, GND) can be used (e.g. for GSM modems) when MODEM (SW) type is selected.

Technical data

General data

Power supply	8 to 36 V DC
Current consumption	100 mA at 24 V
Interface to controller	CAN2

Interface to modem or PC	RS232, RS485, USB
Storage temperature	- 40 °C to + 80 °C
Operating temperature	- 30 °C to + 70 °C
Dimensions (WxHxD)	95x96x43 mm (3,7”x3,8”x1,7”)

Extension modules

Inteli AIN8 871
Inteli IO8/8 877
IGS-PTM 884

Inteli AIN8

Inteli AIN8 module is extension module equipped with analog inputs. Inteli AIN8 module is connected to controller by CAN1 bus.



Image 8.236 Inteli AIN8

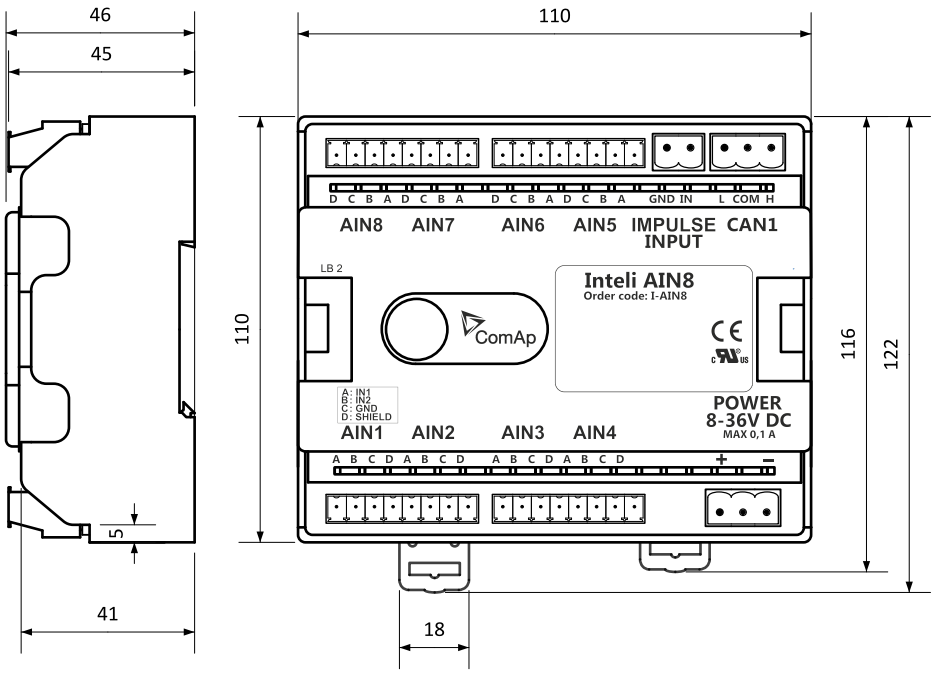
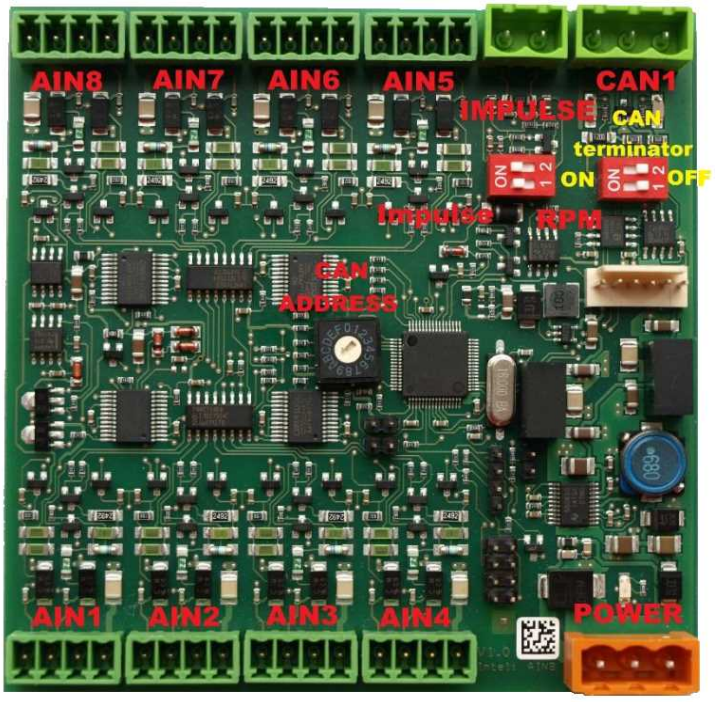


Image 8.237 Inteli AIN8 dimensions

Note: *All dimensions are in mm.*

Terminals



Analog input	8 analog Inputs
CAN	CAN1 line
Power	Power supply
CAN LED Tx, Rx	Indication transmitted or received data
Status LED	LED indication of correct function
CAN terminator	Terminating CAN resistor (active in position “ON” - switch both switches)

Note: *Impulse input is not supported.*

Analog inputs

- 8 channels
- can be configured as:
  - resistor three wire input
  - current input
  - voltage input

All inputs can be configured to any logical function or protection.

IMPORTANT: Impulse input is not supported in controller.

Supported sensors

Sensors		
User curves	NI100 [°F] (fix)	0-5V
PT100 [°C] (fix)	NI1000 [°F] (fix)	0-10V
PT1000 [°C] (fix)		4-20mA passive
NI100 [°C] (fix)	0-2400ohm	4-20mA active
NI1000 [°C] (fix)	0-10k ohm	0-20mA passive
PT100 [°F] (fix)	+-1V	+-20mA active
PT1000 [°F] (fix)	0-2.4V	

CAN address

DIP switch determinates CAN address for analog inputs.



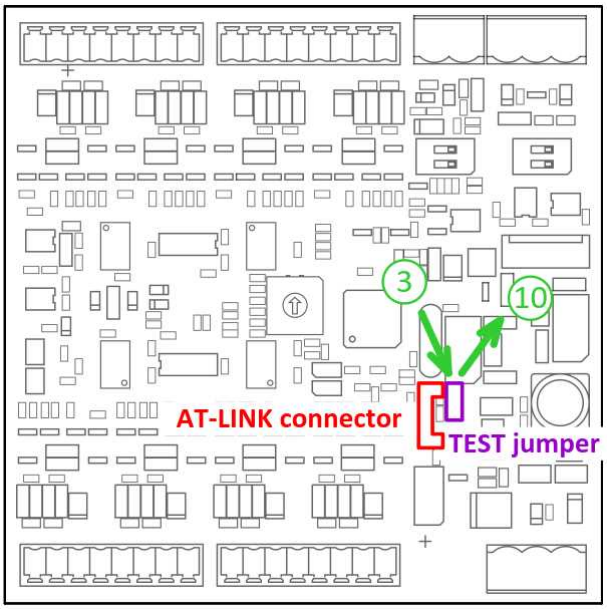
Note: *In case of setting the CAN address to zero, the appropriate group of signals is deactivated.*

Programming firmware

Firmware upgrade process:

1. Disconnect all terminals from the unit.
2. Separate the top cover of module
3. Put the TEST jumper on a pins

4. Connect the unit with PC via RS232-null modem cable and AT-Link conv



5. Connect power supply of the module (status LED lights continuously)
6. Launch FlashPgr.exe PC software (version 4.2 or higher)
7. In FlashPrg program choose card Inteli AIN8 and load FW for the module
8. Set the proper COM port (connected with the unit) and press Start button
9. Wait till process is done (If the process doesn't start – after 60 second the "Timeout" will be evaluated. In this case please check:
   - You have proper connection with the unit
   - COM port selection is correct
   - Module has power supply, (no CAN bus connection, status LED lights continuously)
10. After successful programming disconnect AT-Link conv , remove TEST jumper and disconnect power supply
11. Connect power supply again (status LED should blinking)
12. Module FW is upgraded

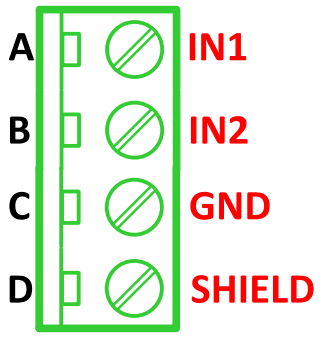
LED indication

LED status	Description
Dark	Fw in module does not work correctly.
Flashing	Module does not communicate with controller (in case non-zero CAN address).
Lights	Power supply is in the range and the communication between Inteli AIN8 and controller works properly. Or power supply is in range and zero CAN address is set. (in case zero CAN address module doesn't communicate with the controller).

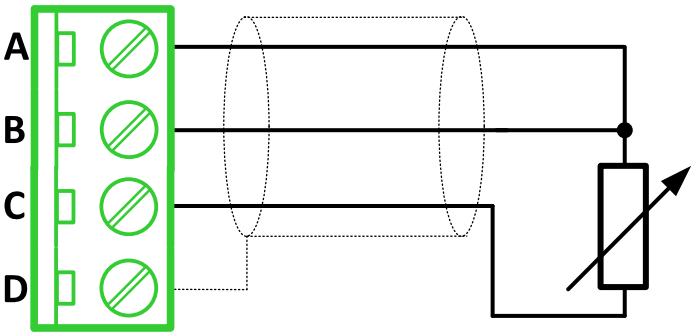
Wiring

The following diagrams show the correct connection of sensors.

Terminator

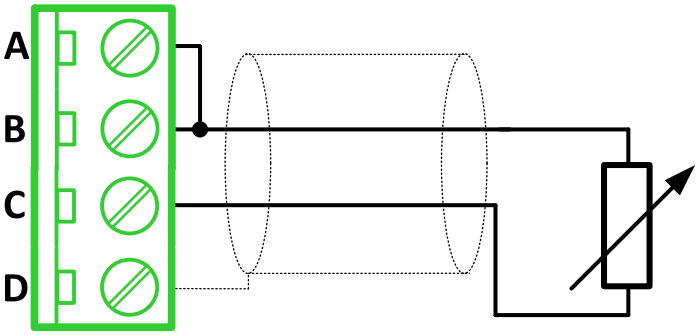


Resistance sensor - 3 wires



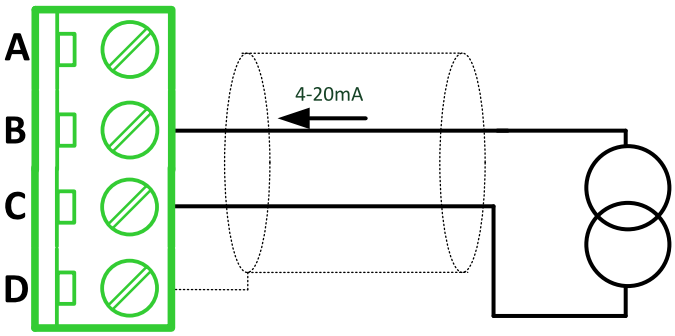
Note: *Ranges: Pt100, Pt1000, Ni100, Ni1000, 0 – 2400 Ω, 0 – 10 kΩ*

Resistance sensor - 2 wires



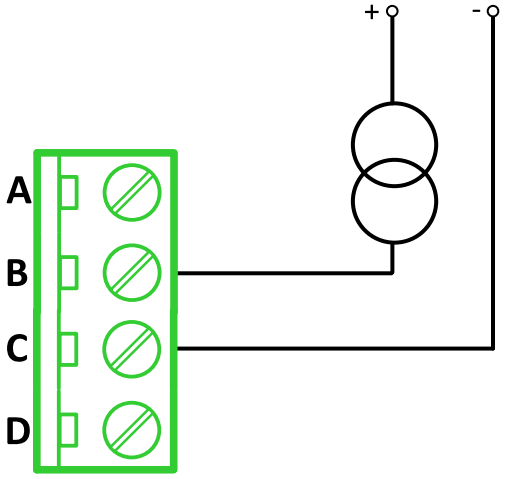
Note: *Ranges: Pt100, Pt1000, Ni100, Ni1000, 0 – 2400 Ω, 0 – 10 kΩ*

Current sensor - active



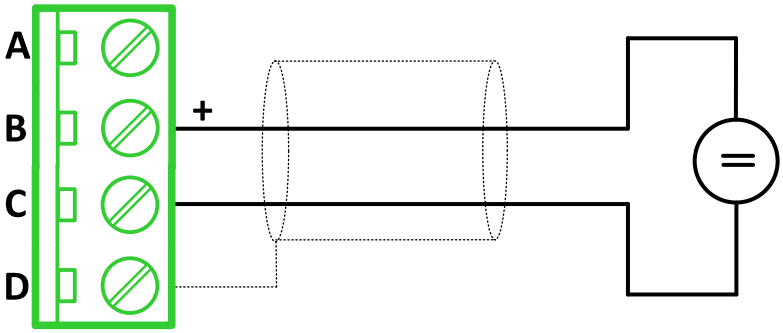
Note: *Ranges: ±20 mA, 4 – 20 mA*

Current sensor - passive



Note: *Ranges: 0 – 20 mA, 4 – 20 mA*

Voltage sensor



Note: *Ranges: ±1 V, 0 – 2,5 V, 0 – 5 V, 0 – 10 V*

Technical data

General data

Power supply	8 to 36 V DC
Current consumption	35 mA at 24 V ÷ 100 mA at 8 V
Interface to controller	CAN1
Protection	IP20
Storage temperature	- 40 °C to + 80 °C
Operating temperature	- 30 °C to + 70 °C
Dimensions (WxHxD)	110x110x46 mm (4,3”x4,3”x1,8”)
Weight	221,5 grams

Analog inputs

Number of channels	8
Voltage	Range 0-10 V Accuracy: ± 0,25 % of actual value + ± 25 mV
Current	Range: ±20 mA

	Accuracy: ± 0,25 % of actual value + ± 50 µA
Resistive	Range: 0- 10 kΩ Accuracy: ± 0,5 % of actual value + ± 2 Ω

Inteli IO8/8

Inteli IO8/8 module is an extension module equipped with binary inputs, binary outputs and analog outputs.

Inteli IO8/8 is the name of the module, but it is possible to configure the module (by internal switch) to two configurations:

- Inteli IO8/8 - 8 binary inputs, 8 binary outputs and 2 analog outputs
- Inteli IO16/0 - 16 binary inputs, 0 binary outputs and 2 analog outputs

The detection of communication speed is indicated by fast flashing of status LED. Once the speed is detected the module remains set for the speed even when the communication is lost. Renewal of communication speed detection is done by reset of the module.



Image 8.238 Inteli IO8/8

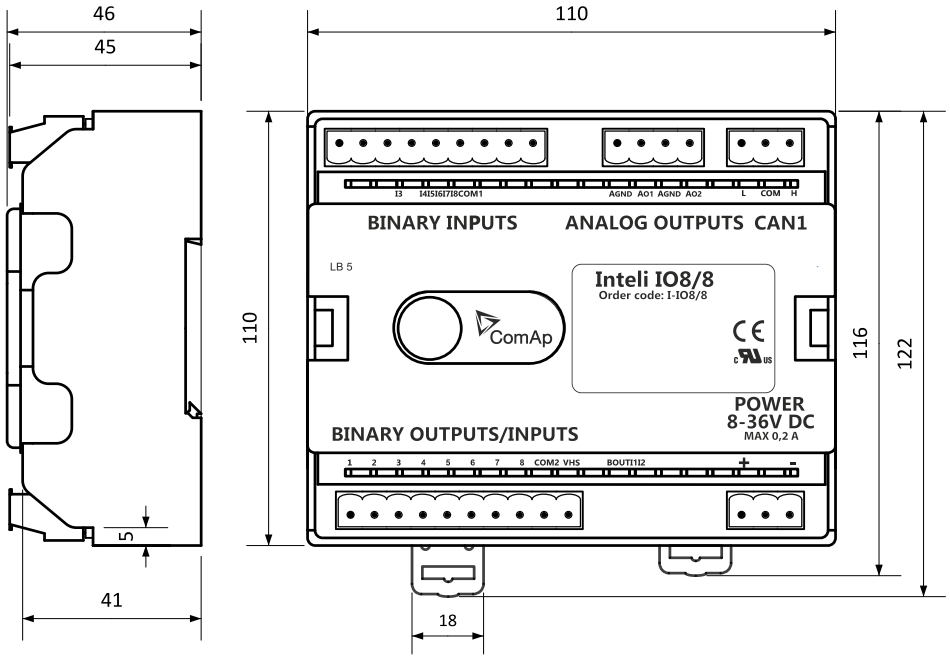
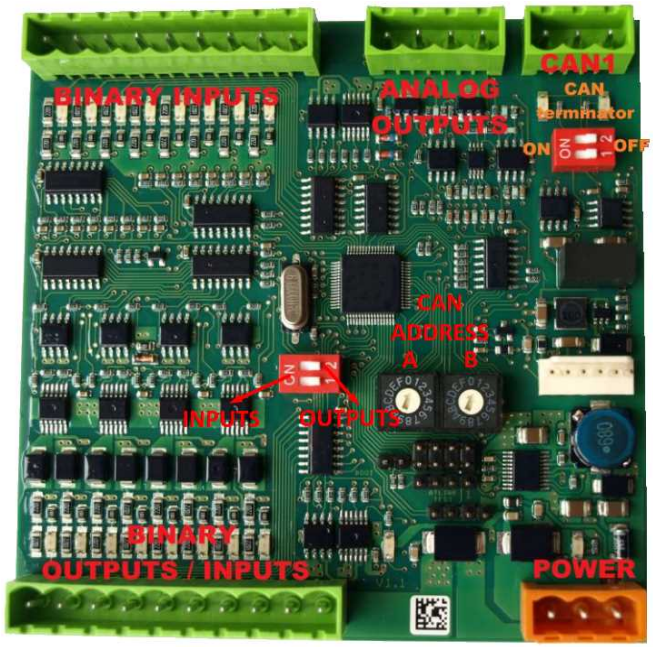


Image 8.239 Inteli IO8/8 dimensions

Note: *All dimensions are in mm.*

Terminals



Binary inputs	8 binary inputs
Binary outputs	8 binary outputs (8 binary inputs)
Analog outputs	2 analog outputs
CAN	CAN1 line
Power	Power supply
Binary inputs LEDs	8 LEDs for binary input indication

Binary outputs LEDs	8 LEDs for binary output indication
CAN LED	Indication transmitted or received data
Status	LED indication of correct function
CAN terminator	Terminating CAN resistor (active in position “ON” - switch both switches)

Inputs and outputs

Binary inputs

- 8 channels
- can be configured as:
  - pull up
  - pull down

All 8 inputs are configured to one type together.

All inputs can be configured to any logical function or protection.

Binary outputs

- 8 channels
- can be configured as:
  - High side switch
  - Low side switch

Always all 8 inputs are configured to one type (HSS/LSS) together. All 8 outputs can be modified to inputs by switch on the PCB (Inteli IO8/8 to Inteli IO16/0).

Analog outputs

- 2 channels
- can be configured as:
  - voltage 0-10V
  - current 0-20mA
  - PWM (level 5V, with adjustable frequency from 200Hz to 2400Hz, with step 1Hz)

All inputs/outputs can be configured to any logical function or protection.

Output state check

Output state check function evaluates in real time the state of binary outputs and adjusted (required) state. In case of failure (different state of required state and real state) history record and alarm are issued (type of the alarm is set by “Protection upon module failure” - (No protection / Warning / Shutdown)).

This function is designed for short-circuit or other failure, which causes change of set state of binary output.

CAN address

In Inteli IO8/8 mode CAN address for binary inputs is determined by DIP switch A, CAN address for binary output and analog outputs is determined by DIP switch B.

In Inteli IO16/0 mode CAN address for binary inputs is determined by DIP switch A, first group of 8 input has address A, second group of 8 inputs has address A+1. CAN address of analog outputs is set by DIP switch B.

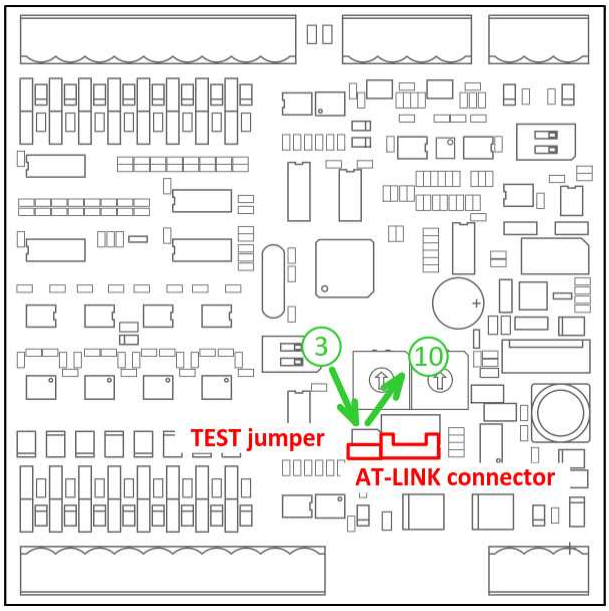


Note: *In case of setting the CAN address to zero, the appropriate group of signals is deactivated.*

Programming firmware

Firmware upgrade process:

1. Disconnect all terminals from the unit.
2. Separate the top cover of module
3. Put the TEST jumper on a pins
4. Connect the unit with PC via RS232-null modem cable and AT-Link conv



5. Connect power supply of the module (status LED lights continuously)
6. Launch FlashPgr.exe PC software (version 4.2 or higher)
7. In FlashPrg program choose card Inteli IO8/8 and load FW for the module
8. Set the proper COM port (connected with the unit) and press Start button
9. Wait till process is done (If the process doesn't start – after 60 second the "Timeout" will be evaluated. In this case please check:
   - You have proper connection with the unit
   - COM port selection is correct
   - Module has power supply, (no CAN bus connection, status LED lights continuously)
10. After successful programming disconnect AT-Link conv , remove TEST jumper and disconnect power supply
11. Connect power supply again (status LED should blinking)
12. Module FW is upgraded

LED indication

Binary input

Each binary input has LED which indicates input signal. LED is shining when input signal is set, and LED is dark while input signal has other state.

Binary output

Each binary output has LED which indicates output signal. Binary output LED is shining when binary output is set. When this LED is shining, then module is configured as 8 binary inputs and 8 binary outputs. When this LED is dark, then the module is configured as 16 binary inputs.

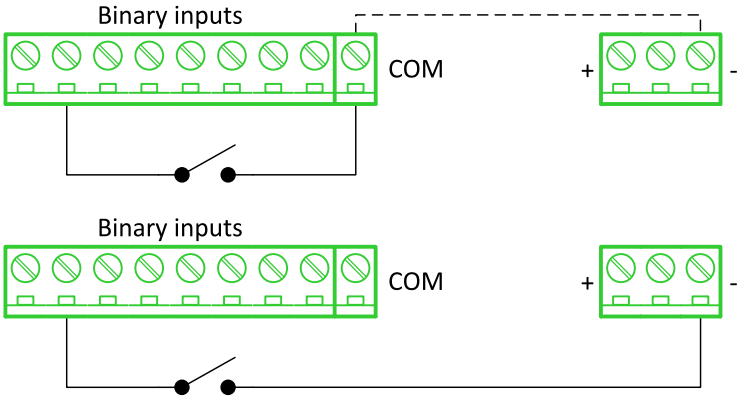
LED at power connector - status LED

LED status	Description
Dark	Fw in module does not work correctly.
Flashing	Module does not communicate with controller (in case non-zero CAN address).
Lights	Power supply is in the range and the communication between Inteli IO8/8 and controller works properly. Or power supply is in range and zero CAN address is set. (in case zero CAN address module doesn't communicate with the controller).

Wiring

The following diagrams show the correct connection of inputs and outputs.

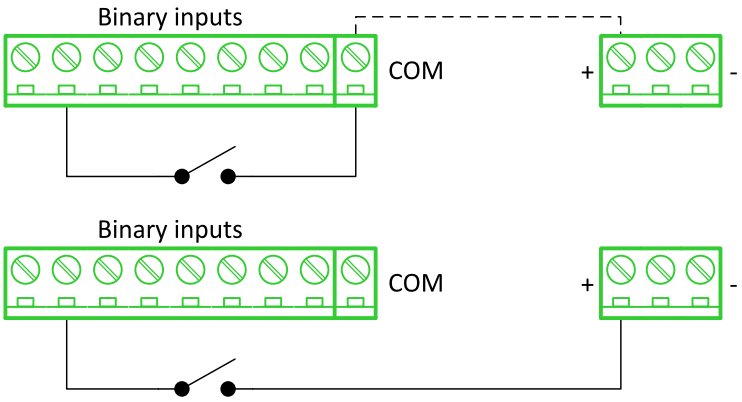
Binary inputs - pull up



There are two options of wiring. On upper picture you can see case when binary input is connected between BIN2 and COM (COM is connected internally to the GND (-) - dashed line).

On lower picture is case of wiring between BIN2 and GND (-). Both ways are correct.

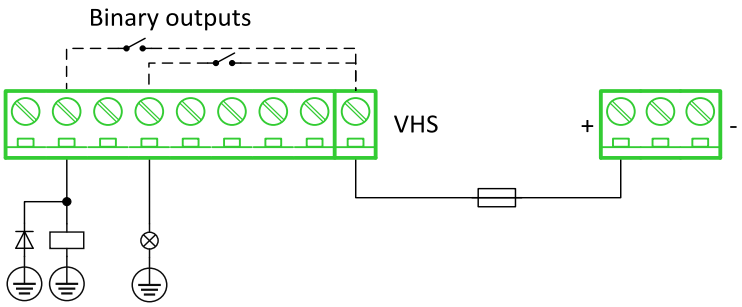
Binary inputs - pull down



There are two options of wiring. On upper picture you can see case when binary input is connected between BIN2 and COM (COM is connected internally to the Ucc (+) - dashed line).

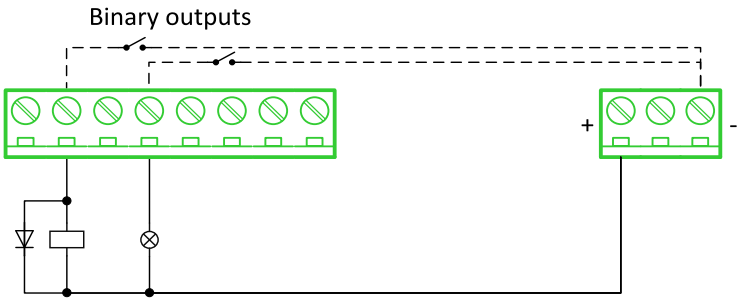
On lower picture is case of wiring between BIN2 and Ucc (+). Both ways are correct.

Binary outputs - high side



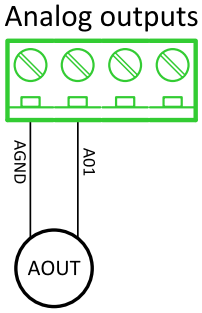
When high side setting of outputs is chosen - binary output must be connected to the minus potential directly Terminal VHS (voltage High side) has to be connected to positive potential directly. Maximal current of each binary output is 500 mA. Size of fuse depends on load.

Binary outputs - low side



When low side setting of outputs is chosen - binary output must be connected to the plus potential of power supply directly. Minus potential is connected internally - dashed line.

Analog outputs



Note: *Limit of analog ground (AGND) is 100mA.*

IMPORTANT: Terminator for analog output has special analog ground (AGND), which must not be connected to the GND.

Technical data

General data

Power supply	8 to 36 V DC
Current consumption	35 mA at 24 V ÷ 100 mA at 8 V
Interface to controller	CAN1
Protection	IP20
Storage temperature	- 40 °C to + 80 °C
Operating temperature	- 30 °C to + 70 °C
Dimensions (WxHxD)	110x110x46 mm (4,3”x4,3”x1,8”)
Weight	240 grams

Analog outputs

Number of channels	2
Voltage	Range 0-10 V Accuracy: ± 20 mV + ±0,5 % of actual value Imax 5 mA
Current	Range: 0-20 mA Accuracy: ± 100 µA + ±0,5 % of actual value Rmax 500 Ω
PWM	Level 5 V Frequency - adjustable 200÷2400 Hz Imax 20 mA

Binary inputs

Number of channels	8 for Inteli IO8/8, 16 for Inteli IO16/0
Input resistance	4400 Ω
Input range	0 to 36 V DC
Switching voltage level for open contact indication	0 to 2 V DC
Max voltage level for close contact indication	6 to 36 V DC

Binary outputs

Number of channels	8 for Inteli IO8/8, 0 for Inteli IO16/0
Max current	500 mA
Max switching voltage	36 V DC

IGS-PTM

IGS-PTM module is extension module equipped with binary inputs, binary outputs, analog inputs and analog output. IGS-PTM module is connected to controller by CAN1 bus.



Image 8.240 IGS-PTM

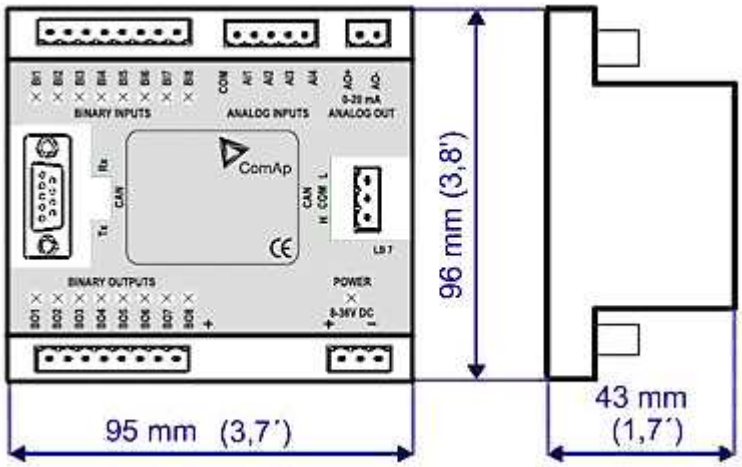
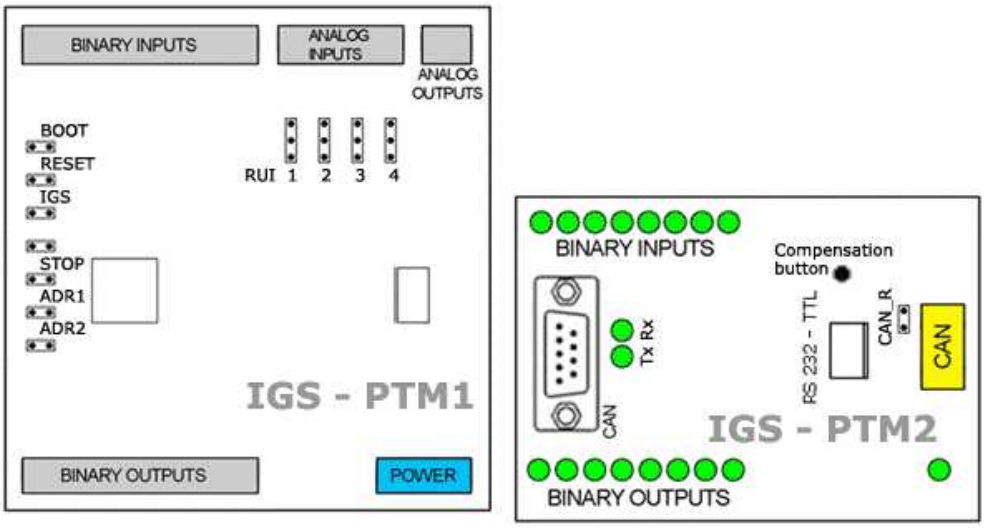


Image 8.241 IGS-PTM dimensions

Terminals



Binary inputs	8 binary inputs
Analog inputs	4 analog inputs
Analog outputs	1 analog output
Binary outputs	8 binary outputs
CAN	CAN1 line
RS232-TTL	Interface for programming
Power	Power supply

Analog inputs

Analog inputs can be configured for:

- Resistance measurement
- Current measurement
- Voltage measurement

The type of analog inputs is configured via jumpers RUI located on lower PCB.

RUI	Analog input configuration
1 - 2	Resistance measuring
2 - 3	Current measuring
no jumper	Voltage measuring

Supported sensors

Sensors	
PT100 [°C] (fix)	User curves
NI100 [°C] (fix)	0-100 mV
PT100 [°F] (fix)	0-2400 ohm
NI100 [°F] (fix)	±20 mA

CAN address

Controller type selection

The type of controller to be used with IGS-PTM must be selected via jumper labeled IGS accessible at the lower PCB.

IGS jumper	Controller type
OPEN	IL-NT, IC-NT
CLOSE	IG-NT, IS-NT, InteliGen

Address configuration

If InteliGen controller type is selected (by IGS jumper), address of IGS-PTM could be modified via jumpers labeled ADR1 and ADR2.

ADR1	ADR2	ADR offset	BIN module	BOUT module	AIN module
Open	Open	0 (default)	1	1	1
Close	Open	1	2	2	2
Open	Close	2	3	3	3
Close	Close	3	4	4	4

Programing firmware

Firmware upgrade is via AT-link (TTL). For programming is necessary to close jumper BOOT. RESET jumper is used to reset the device. Close jumper to reset the device. For programming is used FlashProg PC tool.

LED indication

Binary input

Each binary input has LED which indicates input signal. LED is shining when input signal is set, and LED is dark while input signal has other state.

Binary output

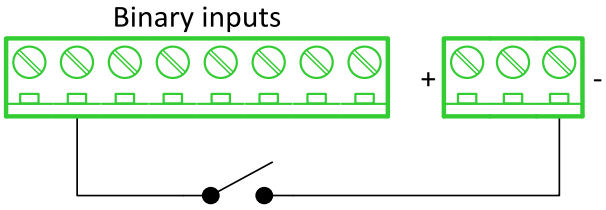
Each binary output has LED which indicates output signal. Binary output LED is shining when binary output is set.

LED at power connector - status LED

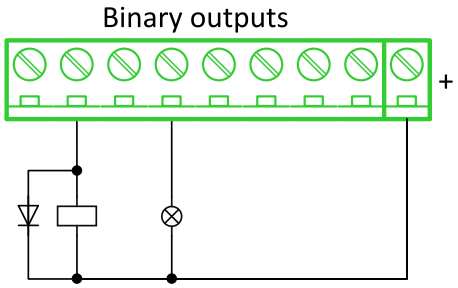
LED status	Description
Dark	No required power connected.
Quick flashing	Program check failure.
One flash and pause	Compensation fail.
Three flashes and pause	Compensation successful.
Flashes	There is no communication between IGS-PTM and the controller.
Lights	Power supply is in the range and communication between IGS-PTM and controller properly works.

Wiring

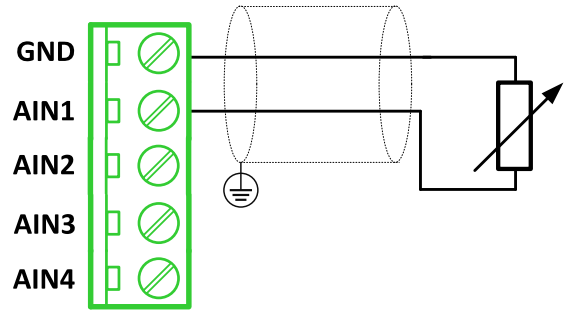
Binary inputs



Binary outputs



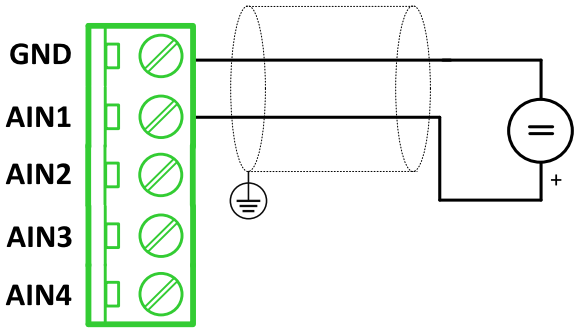
Resistance sensor



Note: *Range: 0- 2400 Ω*

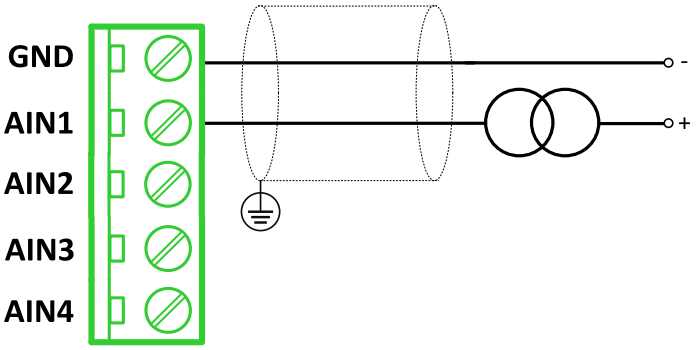
IMPORTANT: Physical analog input range is 0-250 Ω. In sensor configuration in PC tool it is necessary to chose 0-2400 Ω sensor HW type to ensure proper function of analog input.

Voltage sensor



Note: *Range 0-100 mV*

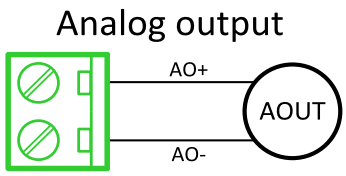
Current sensor - passive



Note: *Range: ± 0-20 mA*

IMPORTANT: Physical analog input range is 0-20mA. In sensor configuration in PC tool it is necessary to chose +- 20mA active sensor HW type to ensure proper function of analog input.

Analog outputs



Note: *Range: 0 to 20 mA ± 0,33 mA*

Technical data

General data

Power supply	8 to 36 V DC
Current consumption	100 mA at 24V ÷ 500 mA
Interface to controller	CAN1
Protection	IP20
Storage temperature	- 40 °C to + 80 °C
Operating temperature	- 30 °C to + 70 °C
Dimensions (WxHxD)	95×96×43 mm (3.7'×3.8'×1.7')

Analog inputs

Number of channels	8
Voltage	Range 0-100 mV Accuracy: 1,5 % ± 1 mV out of measured value
Current	Range: 0-20 mA Accuracy: 2.5 % ± 0,5 ohm out of measured value
Resistive	Range: 0- 250 Ω Accuracy: 1 % ± 2 ohm out of measured value

Analog outputs

Number of channels	1
Current	Range: 0 to 20 mA ± 0,33 mA Resolution 10 bit

Binary inputs

Number of channels	8
Input resistance	4700 Ω
Input range	0 to 36 V DC
Switching voltage level for open contact indication	0 to 2 V DC
Max voltage level for close contact indication	8 to 36 V DC

Binary outputs

Number of channels	8
Max current	500 mA
Max switching voltage	36 V DC
Number of channels	8
Voltage	Range 0-100 mV Accuracy: 1,5 % ± 1 mV out of measured value
Current	Range: 0-20 mA Accuracy: 2.5 % ± 0,5 ohm out of measured value
Resistive	Range: 0- 250 Ω Accuracy: 1 % ± 2 ohm out of measured value

IGL-RA15

Remote annunciator (IGL-RA15) is designed as an extension signaling unit.

The unit is equipped with a fully configurable tri color (red, orange, green) LED for intuitive operation together with high functionality.



Image 8.242 IGL-RA15

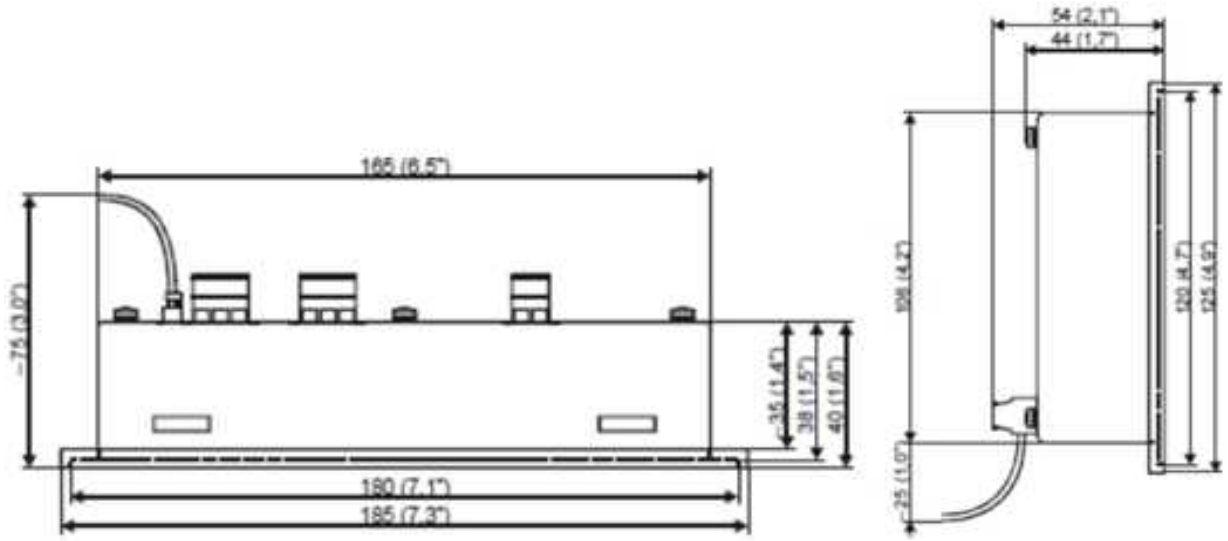


Image 8.243 IGL-RA15 dimensions

Terminals

Horn	Horn
CAN	CAN1 line
Power	Power supply

CAN address

Address	Jumper A	Jumper B
1	OPEN	OPEN
5+6	CLOSED	OPEN
Customer defined	CLOSED	CLOSED

SW changing of CAN1 address is enabled only when both jumpers are closed. Any one of these addresses (1+2 or 3+4 or 5+6 or 7+8) can be set by following steps:

- Switch to programming mode (Hold the Horn reset and Lamp test when unit is powering on). Status led is yellow
- Press Lamp test sixteen times
- Set the address up by pressing Horn reset.
  - The number of red luminous LEDs means the CAN1 addresses (two for addresses 1+2, four for addresses 3+4, six for addresses 5+6 and eight for addresses 7+8)
- Press Lamp test

LED indication

Each LED color is adjusted independently of controller output settings. If controller output 1 is set as “Common Shutdown” it doesn’t mean red LED1 color for iGL-RA15. The LEDs color can by adjust by following steps:

- Switch to programming mode (Hold the Horn reset and Lamp test when unit is powering on). Status led is yellow
- Press Horn reset to change the LED1 color (green, yellow, red)

- Press Lamp test to switch to the next LED color adjusting
- Continue to adjust all LEDs color
- After LED15 color adjusting press three times Lamp test

Note: *If there is no operator action during address setting, color adjusting or timeout setting, the unit returns to normal operation without changes saving.*

Status LED

The signals LEDs are handled like binary outputs. It means all what can be configured to binary outputs can be also configured to the LEDs of IGL-RA15.

LED status	Description
Lights	Configured logical output is active on the controller
Dark green LED	Configured logical output is not active on the controller
Dark yellow or red LED	Configured logical output is not active on the controller and horn reset was pressed.
Yellow or red LED blinks	Configured logical output is not active on the controller and horn reset was still not pressed.

Power LED

LED status	Description
Blinking green	The unit is OK and the communication to the master controller is OK.
Blinking red	The unit is OK, but the communication to the master controller is not running.
Blinking yellow	EEPROM check not passed OK after power on
Yellow	Horn timeout or controller address adjustment

Horn setting

The horn output is activated if any of red or yellow LED is on. Output is on until pressing Horn reset or horn timeout counts down. The timeout can by set by following steps:

- Switch to programming mode (Hold the Horn reset and Lamp test when unit is powering on). Status led is yellow
- Press Lamp test fifteen times
- Set the horn timeout by pressing Horn reset.
  - The number of green luminous LEDs means timeout in 10 s (any for disabling horn output, 1 for 10s timeout, 2 for 10s timeout, 15 for disabling horn timeout).
  - Press Lamp test two times

Note: *If there is no operator action during address setting, color adjusting or timeout setting, the unit returns to normal operation without changes saving.*

The horn is activated if:

- Some of red or yellow LED lights up or
- At the end of the extended lamp test. See chapter **Lamp and horn test (page 892)**

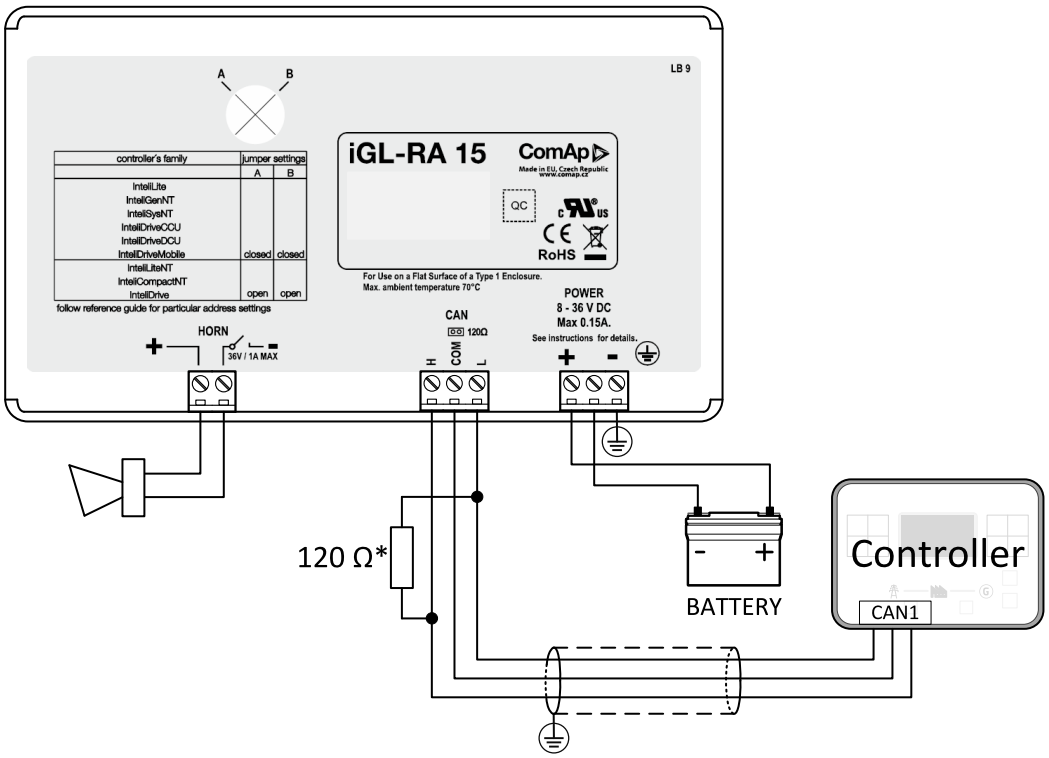
The horn can be silenced:

- By pressing horn reset button or
- It silences automatically after adjusted time

Lamp and horn test

Pressing and holding lamp test button for less than 2 s execute the basic lamp test. All LEDs light up with the configured colour. If the button is hold longer than 2 s, an extended test is started. Every LED is tested step-by-step in green colour and then in red colour. The horn is activated at the end of the test. After that the unit returns to normal operation. The horn can be silenced with horn reset.

Wiring



* terminator resistor only when iGL-RA 15 is the last unit on the CAN1 bus.

Note: *The shielding of the CAN bus cable has to be grounded at one point only!*

Note: *See the section **Technical data (page 892)** for recommended CAN bus cable type*

Technical data

General data

Power supply	8 to 36 V DC
Current consumption	0.35-0.1A (+1Amax horn output) depends on supply voltage
Protection	IP65
Humidity	85%
Storage temperature	- 30 °C to + 80 °C
Operating temperature	- 20 °C to + 70 °C
Dimensions (WxHxD)	180x120x55 mm
Weight	950 g

Horn output

Maximum current	1.0 A
Maximum switching voltage	36 V DC

CAN bus interface

Galvanic separated	
Maximal CAN bus length	200 m
Speed	250 kBd
Nominal impedance	120 Ω
Cable type	twisted pair (shielded)
Following dynamic cable parameters are important especially for maximal 200 meters CAN bus length	
Nominal Velocity of Propagation	min. 75 % (max. 4,4 ns/m)
Wire crosscut	min.0,25 mm^2
Maximal attenuation (at 1 MHz)	2 dB/100m
Recommended Industrial Automation & Process Control Cables	
BELDEN (www.belden.com)	▶ 3082A DeviceBus for Allen-Bradley DeviceNet ▶ 3083A DeviceBus for Allen-Bradley DeviceNet ▶ 3086A DeviceBus for Honeywell SDS ▶ 3087A DeviceBus for Honeywell SDS ▶ 3084A DeviceBus for Allen-Bradley DeviceNet ▶ 3085A DeviceBus for Allen-Bradley DeviceNet ▶ 3105A Paired EIA Industrial RS485 cable
LAPP CABLE (www.lappcable.com)	▶ Unitronic BUS DeviceNet Trunk Cable ▶ Unitronic BUS DeviceNet Drop Cable ▶ Unitronic BUS CAN ▶ Unitronic-FD BUS P CAN UL/CSA