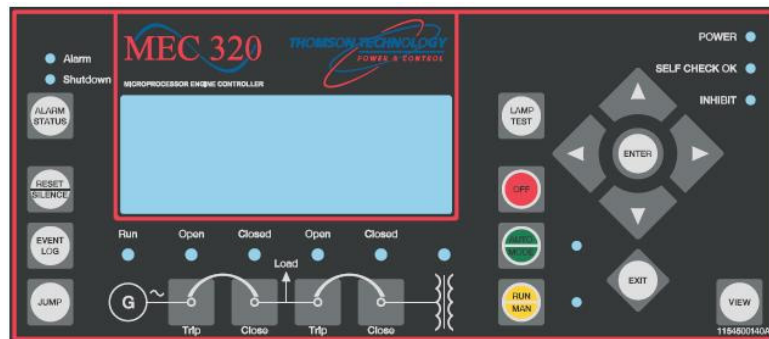




MEC 320

GENSET CONTROLLER

OPERATING MANUAL
SOFTWARE VERSION 2.33.X



PM079 Rev 0 07/06/08

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1. About this document

This chapter includes general user information about this handbook concerning the general purpose, the intended users and the overall contents and structure.

General purpose

This document is the Peak Plus Reference Handbook for Thomson Technology's Automatic Gen-set Controller, the MEC 320. The document mainly includes functional descriptions, presentation of display unit and menu structure, the procedure for parameter setup and complete standard parameter lists.

The general purpose of the Reference Handbook is to provide useful overall information about the functionality of the unit in the AMF/Load Take Over applications. This handbook also offers the user the information he needs in order to successfully set up the parameters needed.



Please make sure to read this handbook before working with the MEC 320 controller and the gen-set to be controlled. Failure to do this could result in human injury or damage to the equipment.

Intended users

The handbook is mainly intended for the person responsible for the unit parameter setup. In most cases, this would be a panel builder designer. Naturally, other users might also find useful information in this handbook.

Contents/overall structure

This Reference Handbook is divided into chapters and in order to make the structure of the document simple and easy to use, each chapter will begin from the top of a new page. The following will outline the contents of each of the chapters.

About this document

This first chapter includes general information about this handbook as a document. It deals with the general purpose and the intended users of the Reference Handbook. Furthermore, it outlines the overall contents and structure of the document.

Warnings and legal information

The second chapter includes information about general legal issues and safety precautions relevant in the handling of Thomson Technology products. Furthermore, this chapter will introduce note and warning symbols, which will be used throughout the handbook.

General product information

The third chapter will deal with the unit in general and its place in the Thomson Technology product range.

Functional descriptions

This chapter will include functional descriptions of the standard functions as well as illustrations of the Peak Plus application types. Flowcharts and single-line representations will be used in order to simplify the information.

Display unit and menu structure

This chapter deals with the display unit including the push-button and LED functions. In addition, the unit menu structure will be presented. Furthermore, the selection of unit mode and password will be illustrated.

Additional functions

This chapter describes the additional functions of the unit.

Procedure for parameter setup

This chapter deals with the procedure to be followed, when the parameters are set up or changed. By use of various illustrations this chapter will guide the user through the procedure for parameter setup step by step.

Parameter list

This chapter includes a complete standard parameter list for setup. Therefore, this chapter is to be used for reference, when information about specific parameters is needed.

2. Warnings and legal information

This chapter includes important information about general legal issues relevant in the handling of THOMSON TECHNOLOGY products. Furthermore, some overall safety precautions will be introduced and recommended. Finally, the highlighted notes and warnings, which will be used throughout this handbook, are presented.

Legal information and responsibility

THOMSON TECHNOLOGY takes no responsibility for installation or operation of the generator set. If there is any doubt about how to install or operate the generator set controlled by the unit, the company responsible for the installation or the operation of the set must be contacted.

The units are not to be opened by unauthorized personnel. If opened anyway, the warranty will be void.

Electrostatic discharge awareness

Sufficient care must be taken to protect the terminals against static discharges during the installation. Once the unit is installed and connected, these precautions are no longer necessary.

Safety issues

Installing the unit implies work with dangerous currents and voltages. Therefore, the installation should only be carried out by authorized personnel who understand the risks involved in working with live electrical equipment.



Be aware of the hazardous live currents and voltages. Do not touch any AC measurement inputs as this could lead to injury or death.

Definitions

Throughout this document a number of notes and warnings will be presented. To ensure that these are noticed, they will be highlighted in order to separate them from the general text.

Notes



The notes provide general information which will be helpful for the reader to bear in mind.

Warnings



The warnings indicate a potentially dangerous situation which could result in death, personal injury or damaged equipment, if certain guidelines are not followed.

3. General product information

This chapter will deal with the unit in general and its place in the THOMSON TECHNOLOGY product range.

Introduction

The MEC 320 is part of the THOMSON TECHNOLOGY product family.

The concept of the MEC 320 is to offer a cost-effective solution to gen-set builders, who need a flexible generator protection and control unit for medium to large gen-set applications. Being part of the THOMSON TECHNOLOGY product family, the standard functions can be supplemented with a variety of optional functions.

Type of product

The Automatic Gen-set Controller is a micro-processor based control unit containing all necessary functions for protection and control of a gen-set.

It contains all necessary 3-phase measuring circuits, and all values and alarms are presented on the LCD display

PC utility software warning



It is possible to remote control the gen-set from the PC utility software M-Vision or the Graphical Display Unit (GDU) by use of a modem. To avoid personal injury make sure that it is safe to remote control the gen-set.

4. Functional descriptions

This chapter includes functional descriptions of standard functions as well as illustrations of the relevant application types. Flowcharts and single-line diagrams will be used in order to simplify the information.

Standard functions

In the following paragraphs the standard functions are listed.

Operation modes

- Automatic Mains Failure
- Load take over

Engine control

- Start/stop sequences
- Fuel solenoid selection
- Relay outputs for governor control

Protections (ANSI)

- Overcurrent, 2 levels (51)
- Reverse power (32)
- 4-20mA inputs
- PT100 or VDO inputs
- Digital inputs

Display

- Prepared for remote mounting
- Push-buttons for start and stop
- Push-buttons for breaker operations
- Status texts

M-logic

- Simple logic configuration tool
- Selectable input events
- Selectable output commands

Applications



This section about applications is to be used for reference using the particular gen-set mode as starting point. It is not suitable for reading from beginning to end.

The unit can be used for the applications listed in the table below.

Application	Comment
Load take over	Standard
Automatic Mains Failure (no back sync. / Open Transition)	Standard
Automatic Mains Failure (with back sync. / Closed Transition)	Standard

Gen-set mode	Running mode				
	Auto	Semi	Test	Man	Block
Load take over	X	X	X	X	X
Automatic Mains Failure (no back sync. / Open Transition)	X	X	X	X	X
Automatic Mains Failure (with back sync. / Closed Transition)	X	X	X	X	X



See mode overview in chapter 6 on page 46 for short description.



The flowcharts below illustrate the full functionality of the mentioned gen-set modes.

Load take over

Auto mode description

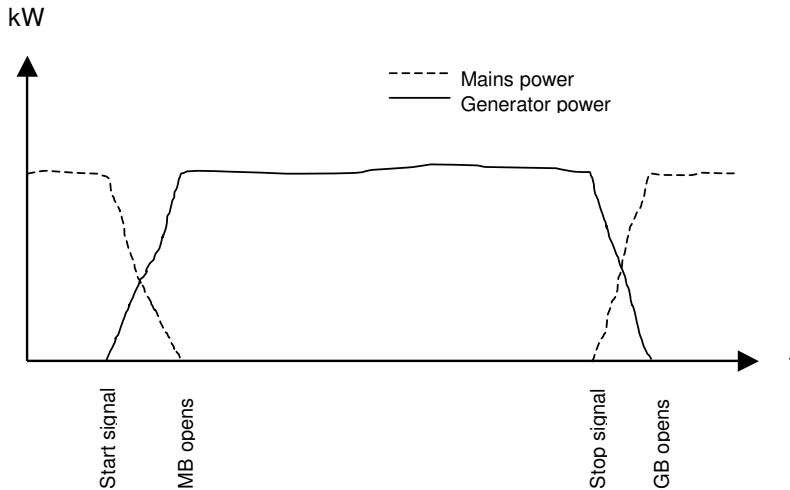
Back synchronizing ON (Closed Transition)

The purpose of the load take over mode is to transfer the load imported from the mains to the gen-set for operation on generator supply only.

When the start command is given, the gen-set will start and synchronize the generator breaker to the mains. When the generator breaker is closed, the imported load is decreased (the power is being transferred to the gen-set), until the load is at the open breaker point. Then the mains breaker opens.

When the stop command is given, the mains breaker is synchronized to the generator and after closure the gen-set is deloaded, cooled down and stopped.

A 4-20mA transducer is used for indication of the power imported from the mains.



Diagram, load take over - example

- i** The load take over mode can be combined with the short time parallel. In that case, the generator and the mains breakers will never be closed at the same time for a longer period than the adjusted 'short time parallel' time.
- i** If the imported load is higher than the nominal gen-set power, an alarm appears and the load take over sequence is paused.

Back synchronizing OFF (Open Transition)

When the start command is given, the gen-set will start. When the frequency and voltage is OK, the mains breaker is opened and the generator breaker is closed. Now the generator supplies the load, until the stop command is given. Then the generator breaker opens and the mains breaker closes. The gen-set cools down and stops.

A 4-20mA transducer is used for indication of the power imported from the mains.

- i** If the imported load is higher than the nominal gen-set an alarm appears, and the load take over sequence is paused.

Semi-auto mode

When the generator breaker is closed, and the mains breaker is opened, the unit will use the nominal frequency as set point for the speed governor.

When the generator is paralleled to the mains, it will be controlled, so the imported power from the mains will be kept at 0 kW.

- i** See general semi-auto mode description on page 12.

Test mode description

- i** See general test mode description valid for all gen-set modes on page 13.

Manual mode description

- i** See general manual mode description valid for all gen-set modes on page 13.

Block mode description



See general block mode description valid for all gen-set modes on page 14.

AMF (no back Synchronization / Open Transition)

Auto mode description

The unit automatically starts the gen-set and switches to generator supply at a mains failure after an adjustable delay time. It is possible to adjust the unit to change to gen-set operation in two different ways.

1. The mains breaker will be opened at gen-set start-up.
2. The mains breaker will remain closed, until the gen-set is running, and the gen-set voltage and frequency is OK.

In both cases, the generator breaker will be closed, when the generator voltage and frequency is OK, and the mains breaker is open.

When the mains returns, the unit will switch back to mains supply and cool down and stop the gen-set. The switching back to mains supply is done without back Synchronization (Open Transition), when the adjusted 'mains OK delay' has expired.

Semi-auto mode description

When the generator breaker is closed, the unit will use the nominal frequency as the set point for the speed governor.



See general semi-auto mode description on page 12.

Test mode description



See general test mode description valid for all gen-set modes on page 13.

Manual mode description



See general manual mode description valid for all gen-set modes on page 13.

Block mode description



See general block mode description valid for all gen-set modes on page 14.

AMF (with back Synchronization/Closed Transition)

Auto mode description

The unit automatically starts the gen-set and switches to generator supply at a mains failure after an adjustable delay time. It is possible to adjust the unit to change to gen-set operation in two different ways:

1. The mains breaker will be opened at gen-set start-up.
2. The mains breaker will remain closed until the gen-set is running and the gen-set voltage and frequency is OK.

In both cases, the generator breaker will be closed, when the generator voltage and frequency is OK, and the mains breaker is open.

When the mains returns, the unit will synchronize the mains breaker to the generator, when the 'mains OK delay' has expired. Then the gen-set cools down and stops.



The automatic mains failure mode can be combined with the short time parallel function. In that case, the generator breaker and the mains breaker will never be closed at the same time for a longer period than the adjusted 'short time parallel' time.

Semi-auto description

When the generator breaker is closed and the mains breaker is opened, the unit will use the nominal frequency as the set point for the speed governor.

When the generator is paralleled to the mains, the governor regulation will not be active.



See general semi-auto mode description on page 12.

Test mode description



See general test mode description valid for all gen-set modes on page 13.

Manual mode description



See general manual mode description valid for all gen-set modes on page 13.

Block mode description



See general block mode description valid for all gen-set modes on page 14.

General semi-auto mode description

The unit can be operated in semi-automatic mode. Semi-auto means that the unit will not initiate any sequences automatically, as is the case with the auto mode. It will only initiate sequences, if external signals are given.

An external signal may be given in three ways:

1. Push-buttons on the display are used
2. Digital inputs are used
3. Modbus command.

When the gen-set is running in semi-auto mode, the unit will control the speed governor.



It is possible to manually increase and decrease the speed when semi-auto is selected. When the digital up/down input is activated, then the regulator is deactivated as long as the manual up/down inputs are activated.

The following sequences can be activated in semi-auto:

Command	Description	Comment
Start	The start sequence is initiated and continues until the gen-set starts or the maximum number of start attempts has been reached. The frequency will be regulated to make the GB ready to close.	
Stop	The gen-set will be stopped. After disappearance of the running signal, the stop sequence will continue to be active in the 'extended stop time' period. The gen-set is stopped without cooling-down time.	
Close GB	The unit will close the generator breaker, if the mains breaker is open, synchronize and close the generator breaker, if the mains breaker is closed.	When AMF mode is selected, the unit will not regulate after breaker closure.
Open GB	The unit will ramp down and open the generator breaker at the breaker open point, if the mains breaker is closed.	
Close MB	The unit will close the mains breaker, if the generator breaker is open, synchronize and close the mains breaker, if the generator breaker is closed.	
Open MB	The unit opens the mains breaker instantly.	
Manual GOV UP	The regulator is deactivated and the governor output is activated as long as the GOV input is ON.	
Manual GOV DOWN	The regulator is deactivated and the governor output is activated as long as the GOV input is ON.	

General test mode description

The test mode function is activated by selecting test with the MODE push-button on the display or by activating a digital input, if one of them is configured to 'test'. The test mode will only test synchronizing, if the 'Sync. to mains' function is enabled. If this is the case, the gen-set will start, and the unit will synchronize and close the generator breaker to let the gen-set run in parallel, until the test time expires. If the 'Sync. to mains' function is not activated, then the gen-set will start and run at the nominal frequency with the generator breaker open.

The settings for the test function are set up in menu **6540 Test running**.

- Set point: Load set point when paralleling to mains.
- Timer: Engine run time during the test period
- Return: When the test is completed, the unit will return to the selected mode (semi-auto or auto).



If short time parallel is activated, the test will be terminated immediately after the short time parallel time has expired. This means the gen-set will cool down and stop.

General manual mode description

When manual mode is selected, the gen-set can be controlled with digital inputs. The following commands are possible:

Command	Comment
Start	Gen-set starts.
Stop	Gen-set opens GB and stops without cooling-down.
Manual increase speed	Unit gives increase signal to speed governor.
Manual decrease speed	Unit gives decrease signal to speed governor.



It is necessary to configure the digital inputs through the PC utility software to use the manual commands. The number of configurable digital inputs is option dependent.



It is not possible to open and close the generator breaker or the mains breaker in manual mode.



MAN mode cannot be selected, when AUTO mode is selected. To go from AUTO to MAN it is necessary to go to SEMI-AUTO to make MAN available.

General block mode description

When the block mode is selected, the unit is locked for certain actions. This means that it cannot start the gen-set or perform any breaker operations.

To change the running mode from the display, the user will be asked for a password, before the change can be made. It is not possible to select 'block mode', when running feedback is present.

The purpose of the block mode is to make sure that the gen-set does not start for instance during maintenance work.

If the digital inputs are used to change the mode, then it is important to know that the input configured to block mode is a constant signal. So, when it is ON the unit is in a blocked state, and when it is OFF, it returns to the mode it was in before block mode was selected.



If block mode is selected using the display after the digital block input is activated, the MEC 320 will stay in block mode after the block input is deactivated. The block mode must now be changed using the display. The block mode can only be changed locally by display or digital input.



Before the running mode is changed it is important to check that persons are clear of the gen-set and that the gen-set is ready for operation.



Alarms are not influenced by block mode selection.



The gen-set can be started from the local engine control panel, if such is installed. Therefore, Thomson Technology recommends to avoid local cranking and starting of the gen-set.

Flowcharts

Using flowcharts, the principles of the most important functions will be illustrated in the next sections. The functions included are:

- Mode shift
- MB open sequence
- GB open sequence
- Stop sequence
- Start sequence
- MB close sequence
- GB close sequence
- Load take over
- Automatic Mains Failure
- Test sequence

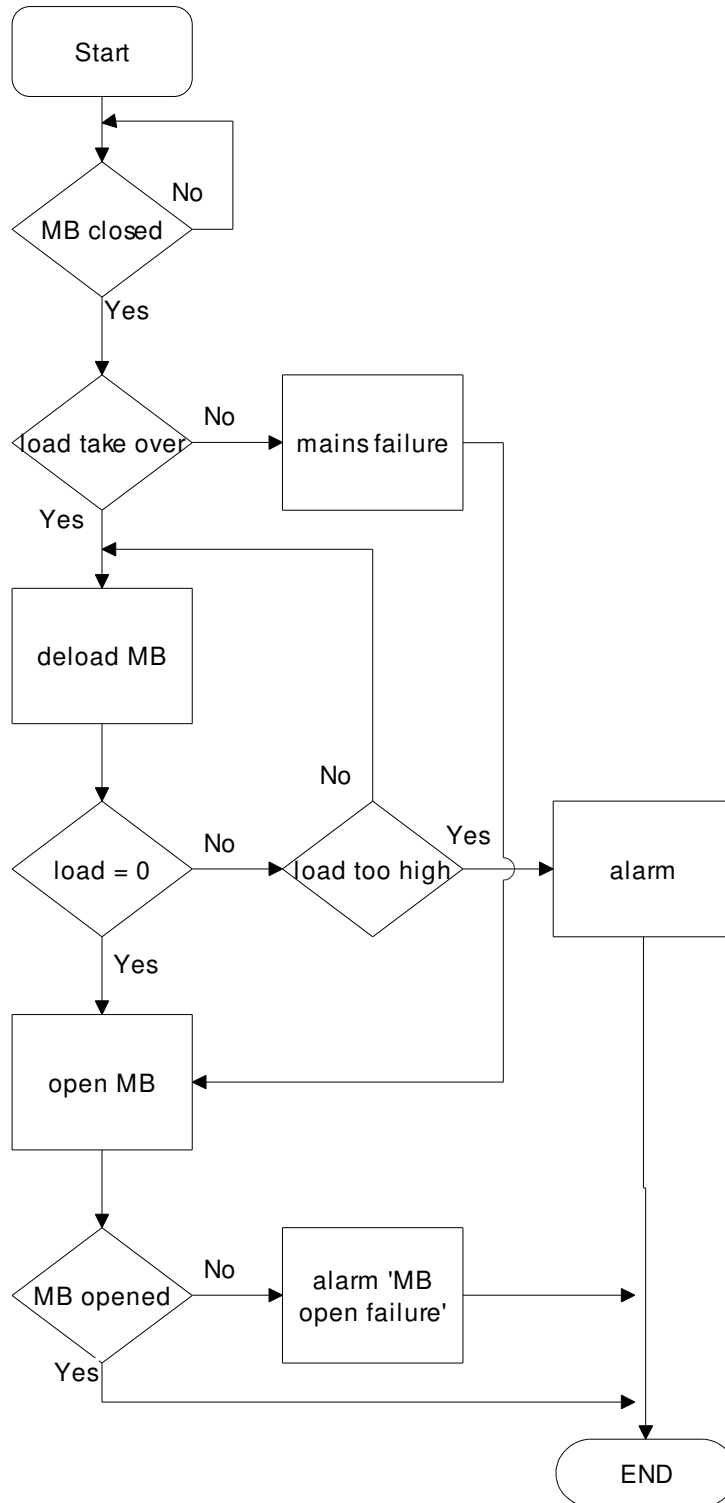


The flowcharts below are for guidance only. For illustrative purposes the flowcharts are simplified in some extent.

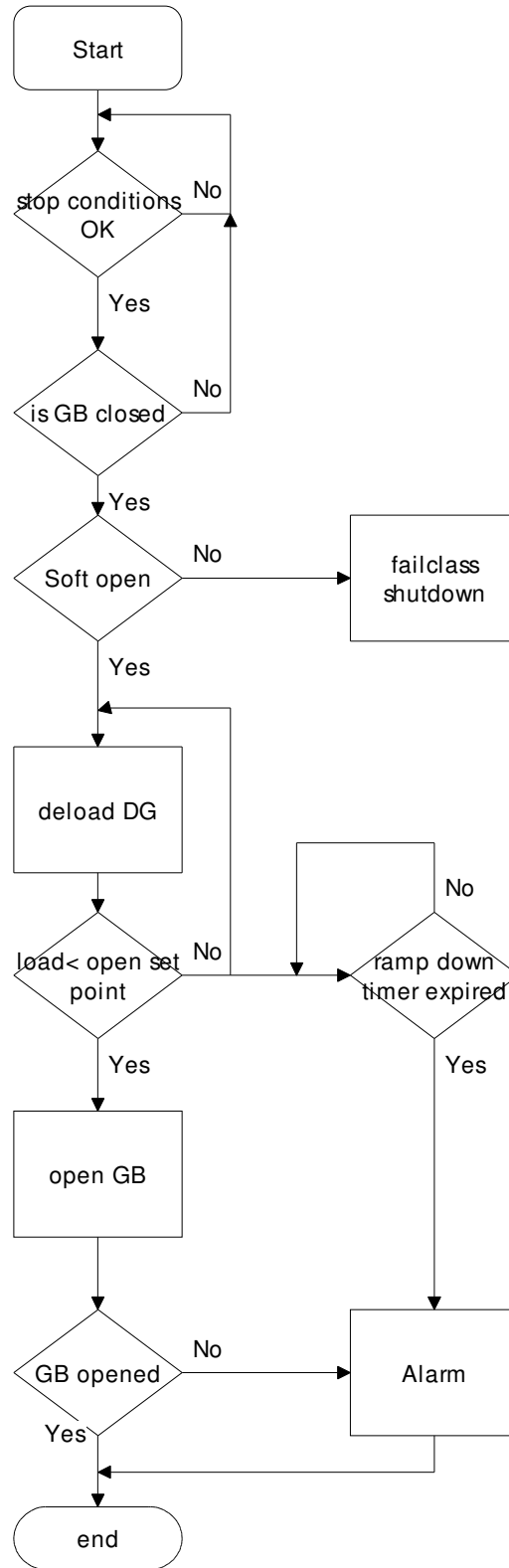
Mode shift



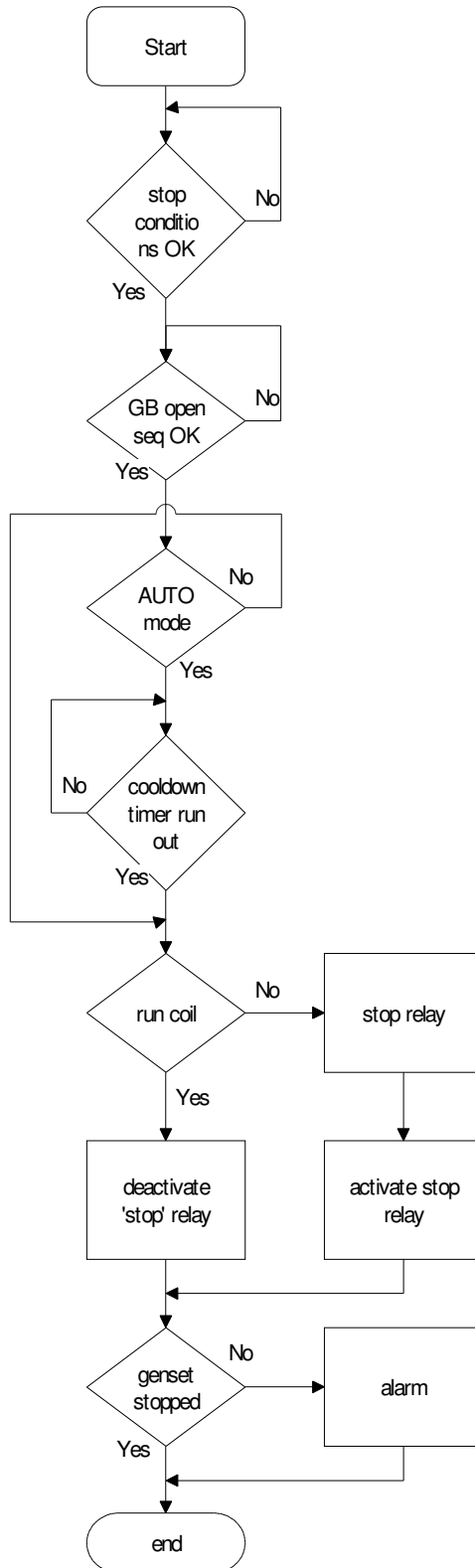
MB open sequence



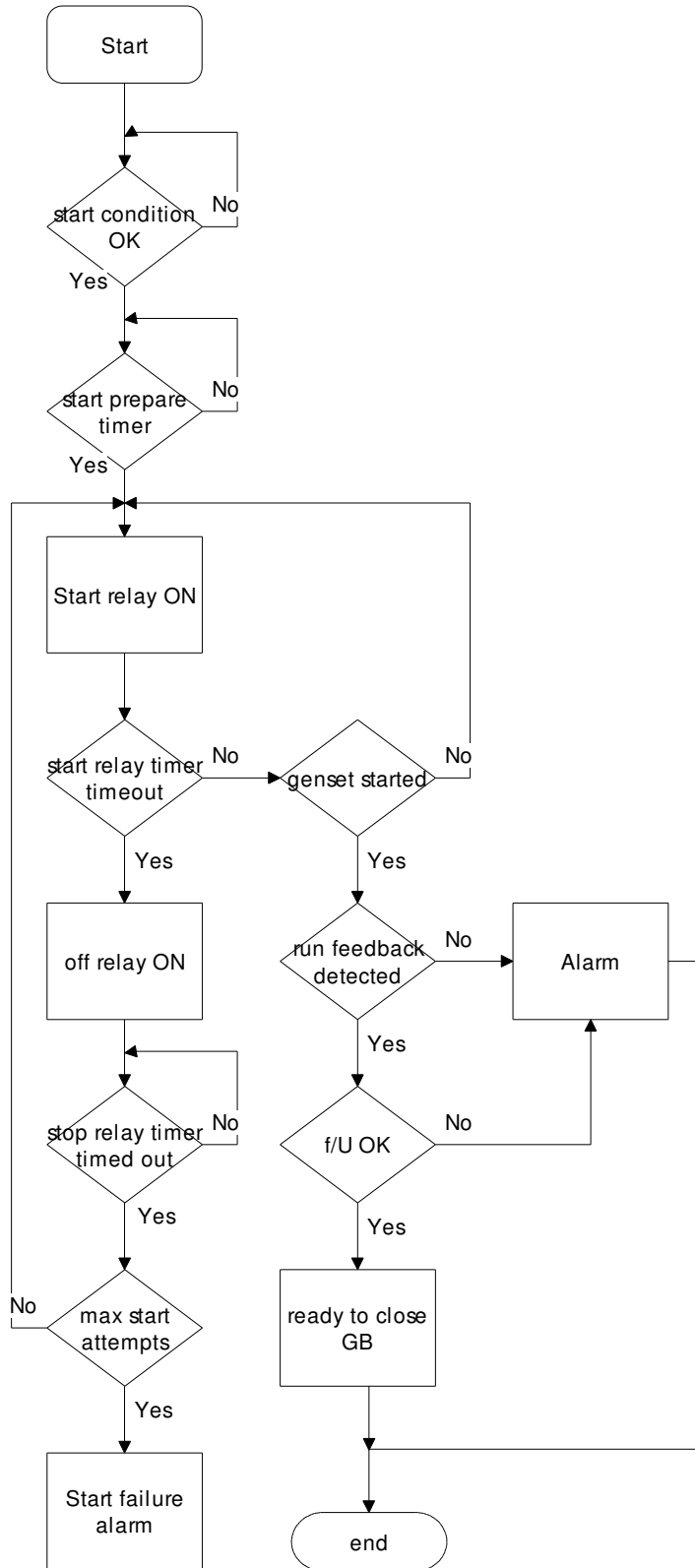
GB open sequence



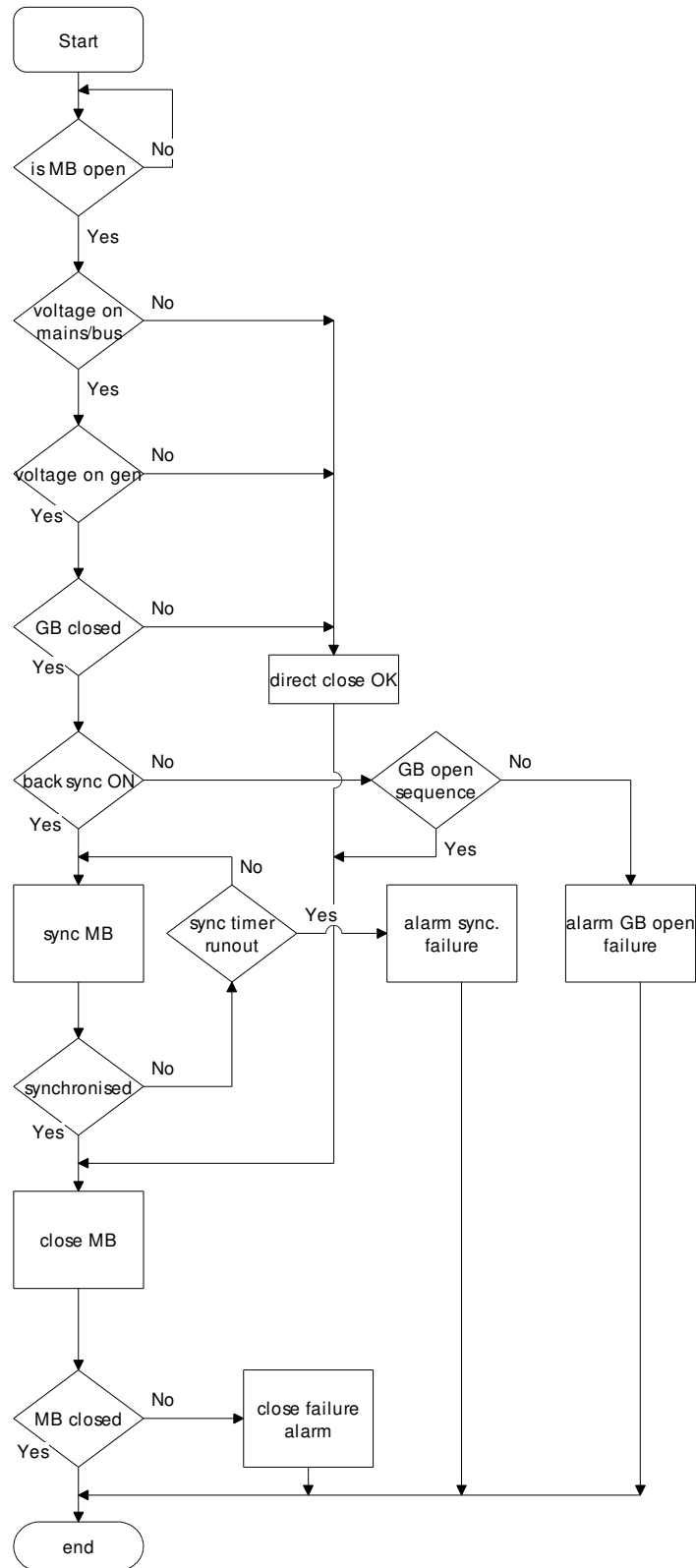
Stop sequence



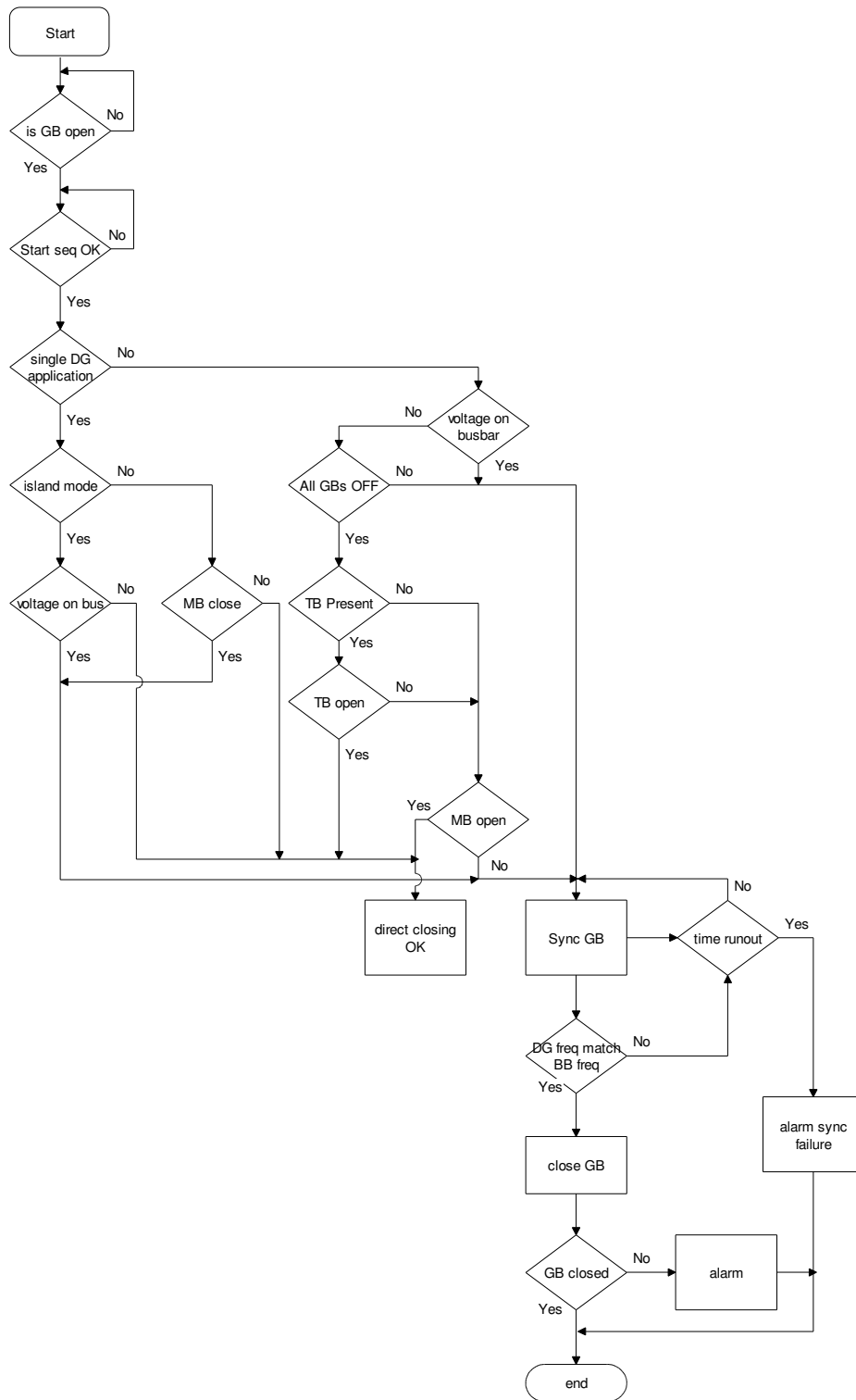
Start sequence



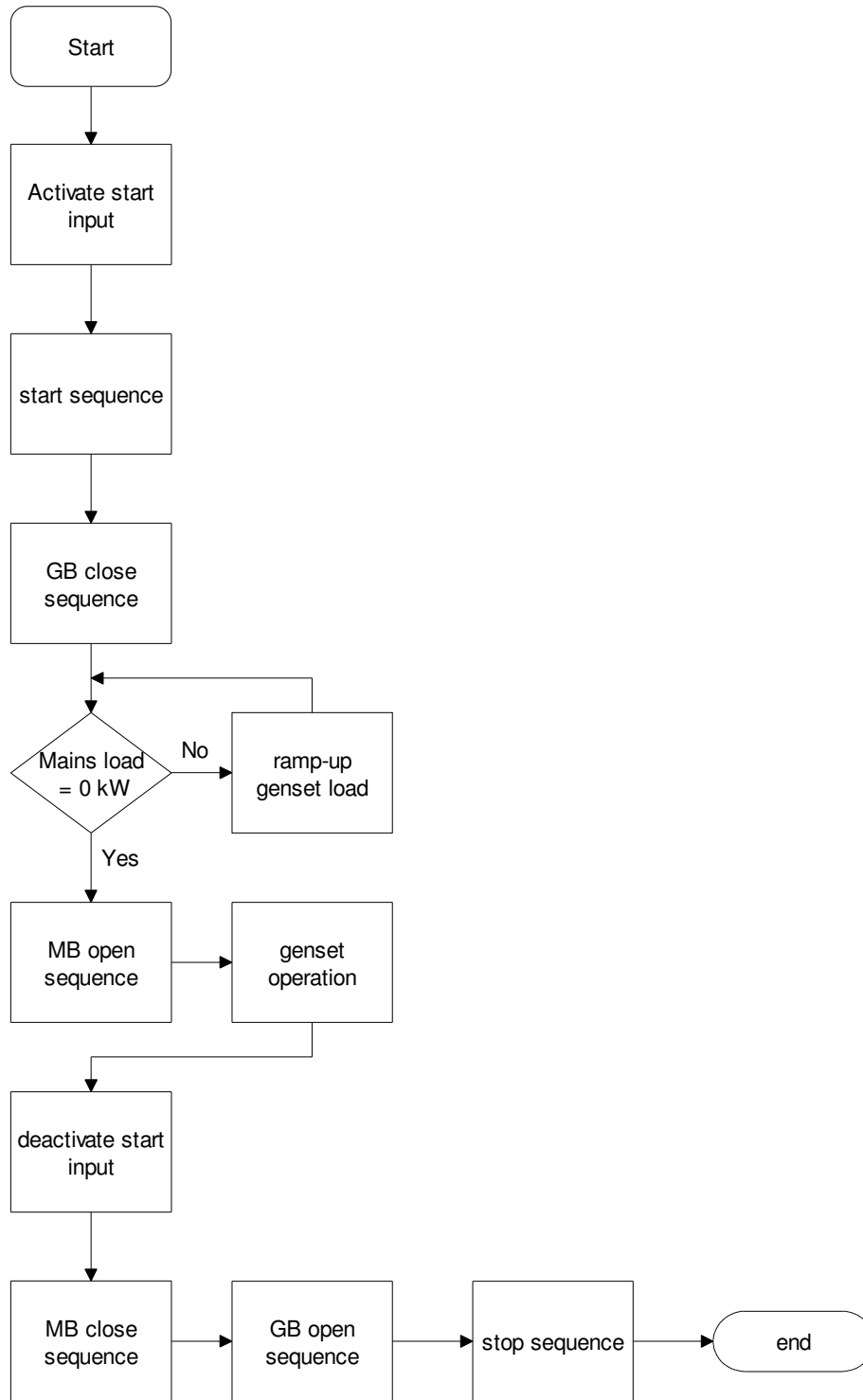
MB close sequence



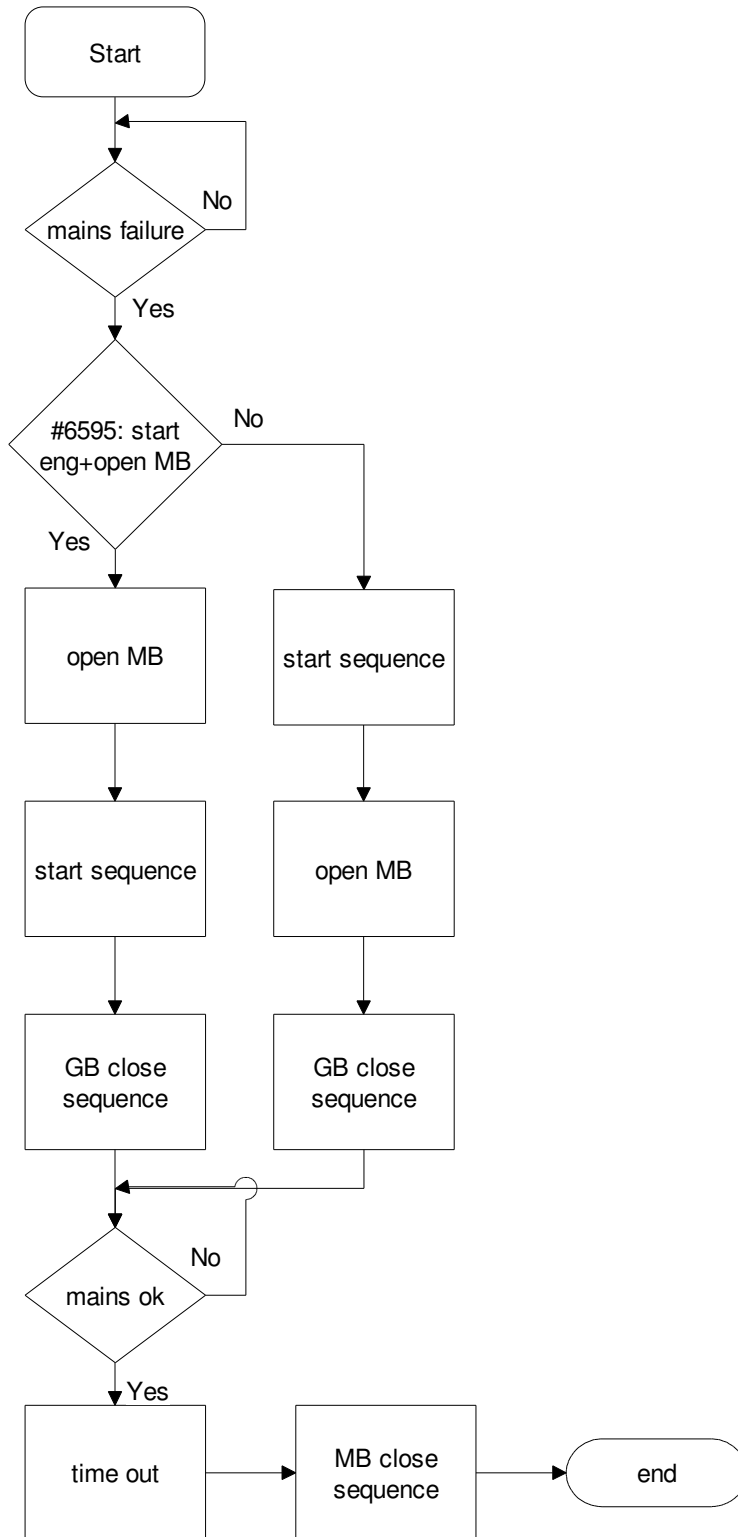
GB close sequence



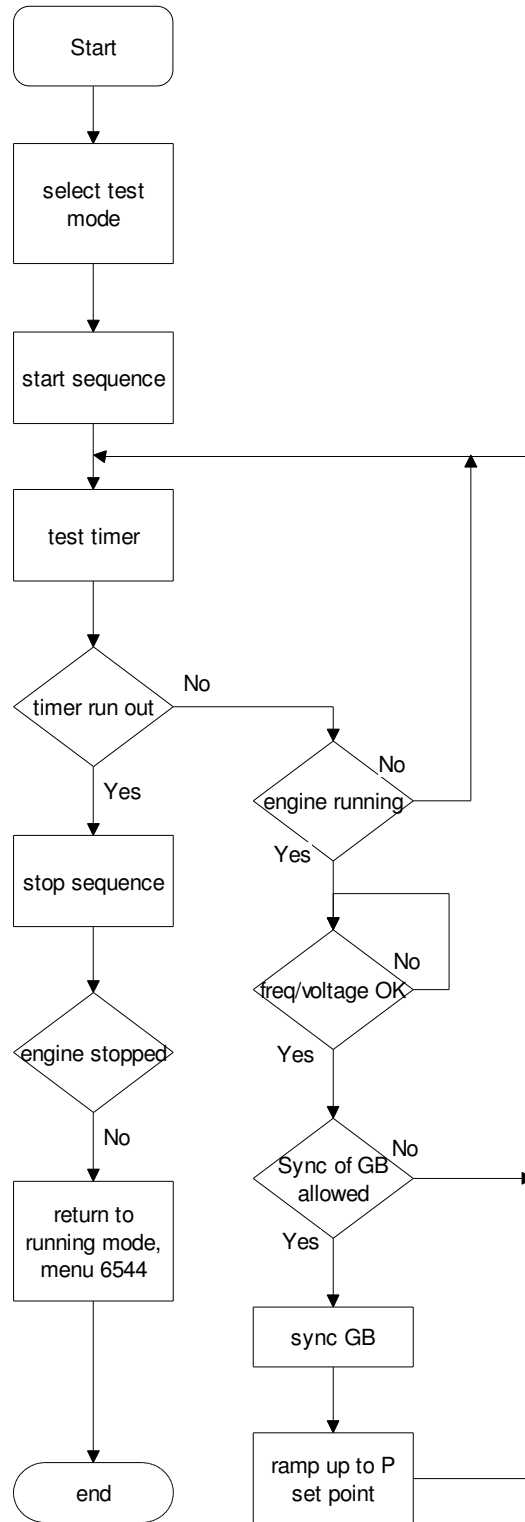
Load take over



Automatic Mains Failure



Test sequence



Sequences

The following contains information about the sequences of the engine, the generator breaker and, the mains breaker. These sequences are automatically initiated if the auto mode is selected, or if the commands are selected in the semi-auto mode.

In the semi-auto mode the selected sequence is the only sequence initiated (e.g. press the START push-button: The engine will start, but no subsequent synchronizing is initiated).

The following sequences will be illustrated below:

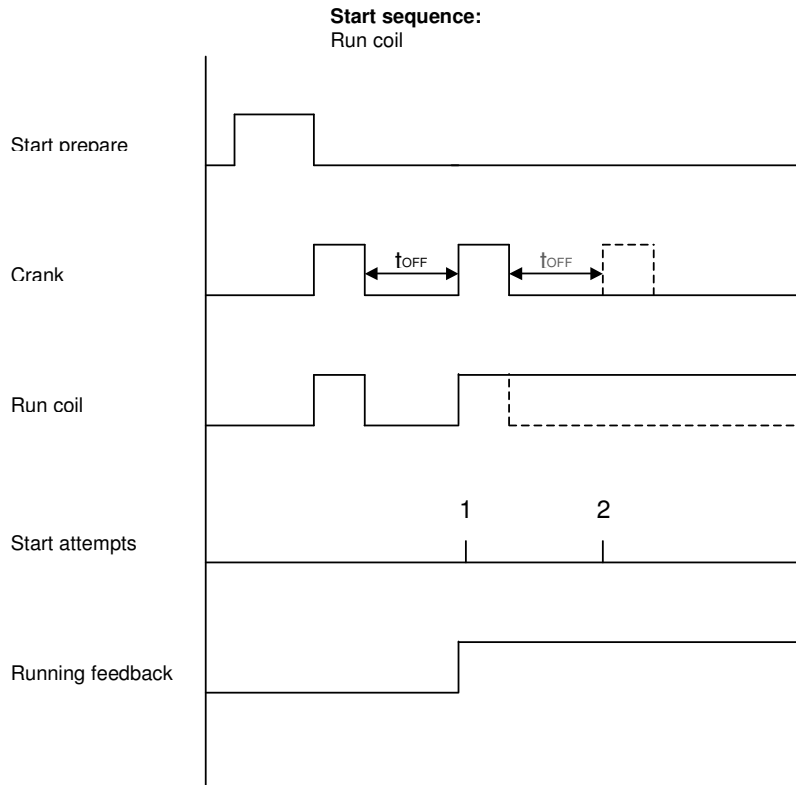
- START sequence
- STOP sequence
- Breaker sequences

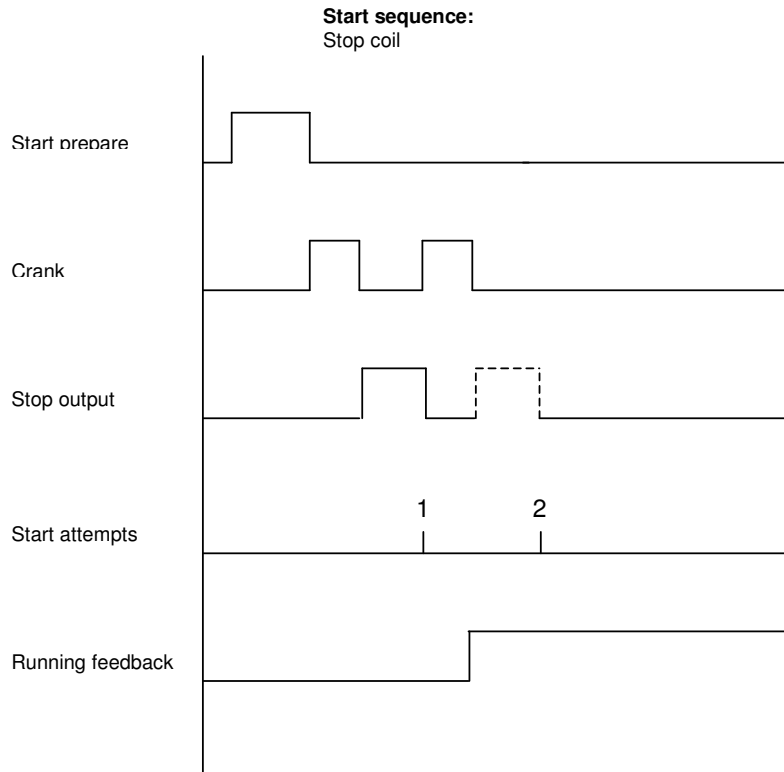


Refer to our 'Application Notes' for information about the required breaker wiring.

START sequence

The drawings illustrate the start sequences of the gen-set.



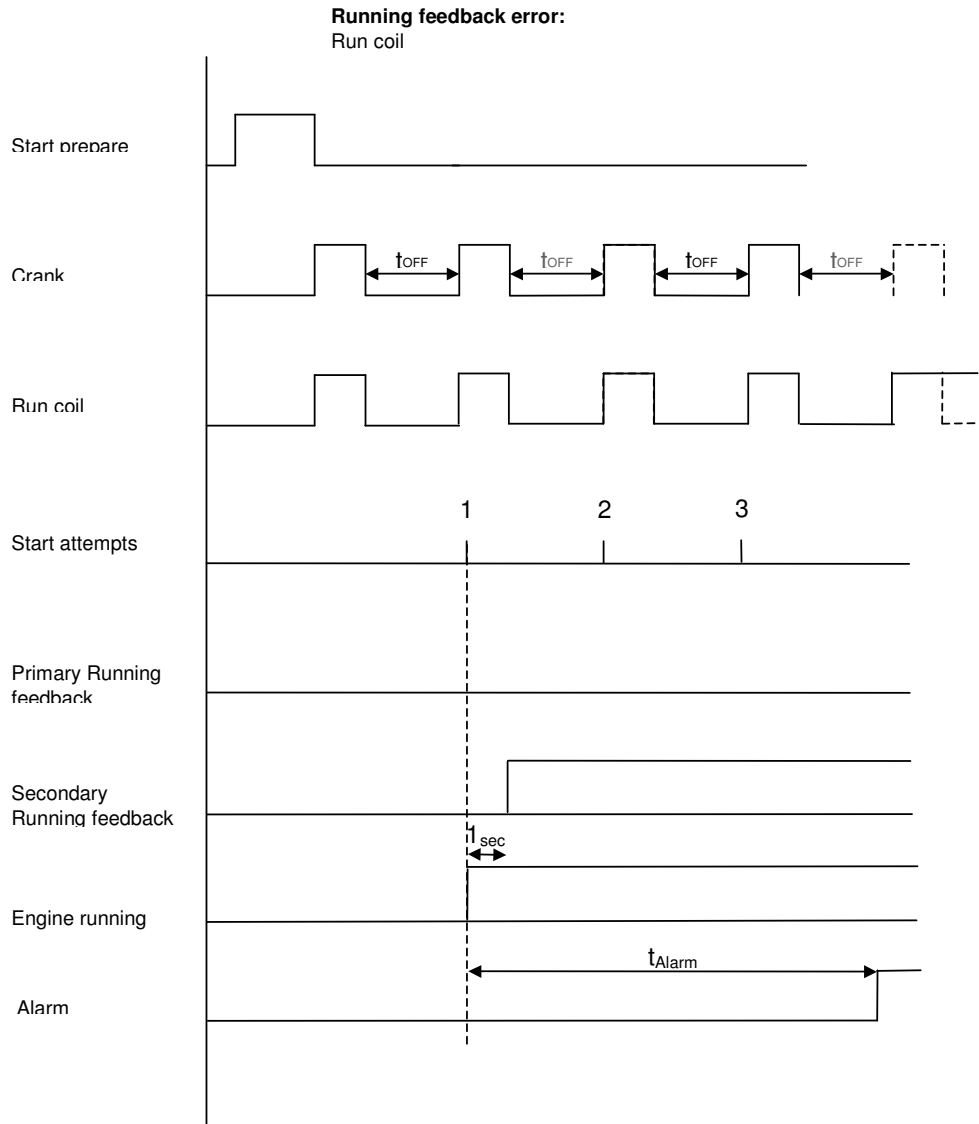


4 different types of running feedback can be used to detect if the motor is running. Refer to menu 4300 for selection of the running feedback type.

The running detection is made with a built-in safety routine. The running feedback selected in menu 4300 is the primary feedback. At all times all the types of running feedback is used for running detection. If for some reason the primary choice is not detecting any running feedback, the starter relay will stay activated for additionally 1 second. If a running feedback is detected based on one of the secondary choices, the gen-set will start. This way the gen-set will still be functional even though a tacho sensor is damaged or dirty.

As soon as the gen-set is running, no matter if the gen-set is started based on the primary or secondary feedback, the running detection will be made based on all 4 types.

The sequence is shown in the diagram below.



Interruption of start sequence

The start sequence is interrupted in the following situations:

Event	Comment
Stop signal	
Start failure	
Remove starter feedback	Tacho set point.
Running feedback	Digital input.
Running feedback	Tacho set point.
Running feedback	Frequency measurement above 32Hz. The frequency measurement requires a voltage measurement of 30% * U _{NOM} . The running detection based on the frequency measurement can replace the running feedback based on tacho or digital input or engine communication.
Emergency stop	
Alarm	Alarms with 'shutdown' or 'trip and stop' fail class.
Stop push-button on display	Only in semi-auto or manual mode.
Modbus stop command	Semi-auto or manual mode.
Binary stop input	Semi-auto or manual mode.
Deactivate the 'auto start/stop'	Auto mode in the load take over mode.
Running mode	It is not possible to change the running mode to 'block' as long as the gen-set is running.



If the tacho input is to be used to remove the starter, it has to be set up in menu 6161. If the digital input is to be used as running feedback, then terminal 115 has to be used.



The only protections that can stop the gen-set/interrupt the start sequence when the 'fire pump' input is activated, are the digital input 'emergency stop' and the tacho alarm 'overspeed 2'. Both of these must have the fail class 'shutdown'.

Start failure alarm (6180 Start attempts)

The start failure alarm occurs, if the gen-set has not started after the last start attempt. Output A (OA) and output B (OB) in this menu indicate the relay output(s) which will be activated at a start failure alarm.

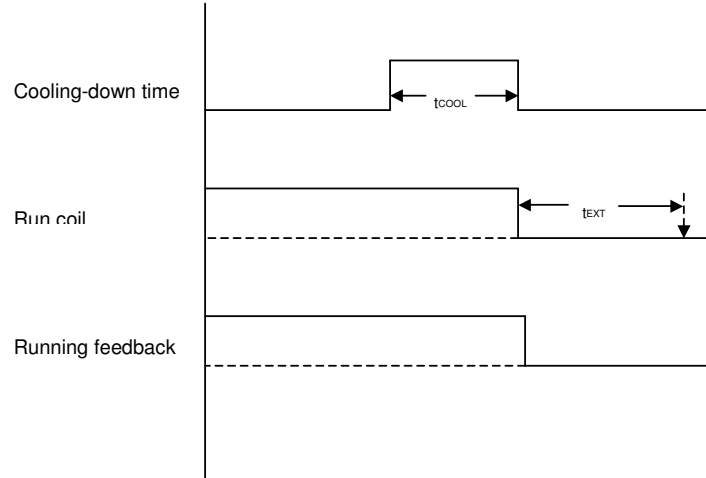
Start prepare (6170 Starter)

The start prepare timer can be used for start preparation purposes, e.g. pre-lubrication or pre-glowing.

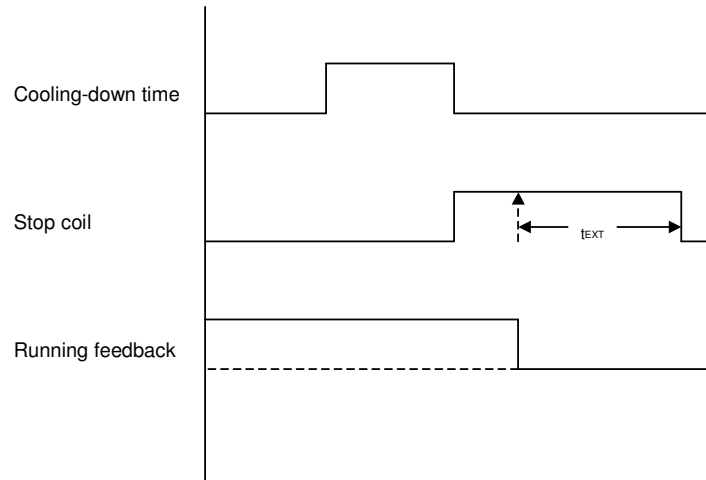
Stop sequence

The drawings illustrate the stop sequence.

Stop sequence/RUN coil



Stop sequence/STOP coil



Stop sequence, description

The stop sequence will be activated, if a stop command is given. The stop sequence includes the cooling-down time, if the stop is a normal or controlled stop.

Description	Cooling-down	Stop	Comment
Auto mode stop	X	X	
Trip and stop alarm	X	X	
Stop button on display		X	Semi-auto or manual.
Remove 'auto start/stop'	X	X	Auto mode: load take over.
Emergency stop		X	Engine shuts down and GB opens.

The stop sequence can only be interrupted during the cooling-down period. Interruptions can occur in these situations:

Event	Comment
Mains failure	AMF mode selected (or mode shift selected ON) and auto mode selected.
Start button is pressed	Semi-auto mode: Engine will run in idle speed.
Binary start input	Auto mode: load take over.
GB close button is pressed	Semi-auto mode only.



The stop sequence can only be interrupted during the cooling-down period.



When the engine is stopped, then the speed governor output is reset to the offset value if option E1 or EF2 is selected, or the initial value if option EF3 is selected and the PWM output is used. Please refer to the descriptions of the mentioned options.

Stop failure alarm

A stop failure alarm will occur, if the running feedback or the generator voltage and frequency are still active. The stop failure timer is adjusted in **6220 Stop failure**. Output A (OA) and output B (OB) in this menu indicate the relay output(s) that will be activated at a stop failure alarm.

Breaker sequences

The breaker sequences will be activated depending on the selected mode:

Mode	Gen-set mode	Breaker control
Auto	All	Controlled by the unit
Semi-auto	All	Push-button
Manual	All	None
Block	All	None

Before closing the breakers it must be checked that the voltage and frequency are OK. The limits are adjusted in **2040 Sync. blackout**.



MEC 320 without back Synchronization:
The GB can only be closed, if the mains breaker is open.
The MB can only be closed, if the generator breaker is open.



MEC 320 with back Synchronization:
If the GB or MB push-button is activated the MEC 320 will start synchronizing, if the generator or mains voltage is present.
The GB can close directly, if the MB is open.
The MB can close directly, if the GB is open.

AMF MB opening function (6590 Mains failure voltage)

It is possible to select the functionality of the mains breaker closing function. This is necessary, if the unit operates in Automatic Mains Failure (AMF).

The possibilities are:

Start engine and open mains breaker	When a mains failure occurs, the mains breaker opens, and the engine starts at the same time.
Start engine	When a mains failure occurs, the engine starts. When the generator is running and the frequency and voltage are OK, the MB opens and the GB closes.

AMF timers

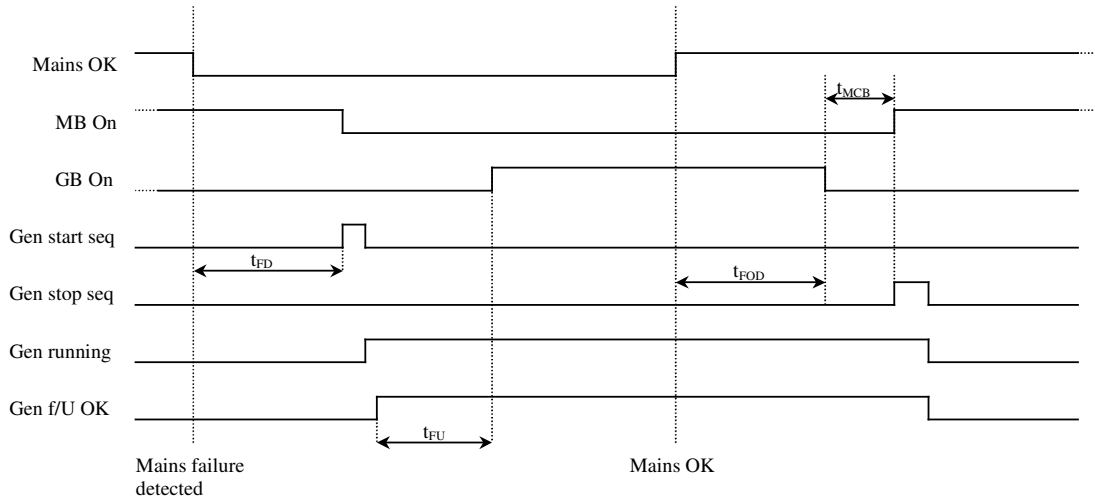
The time charts describe the functionality at a mains failure and at mains return. Back Synchronization is deactivated. The timers used by the AMF function are indicated in the table below:

Timer	Description	Menu number
t_{FD}	Mains failure delay	6600 Mains failure frequency 6590 Mains failure voltage
t_{FLL}	Frequency/voltage OK	6190 f/U OK
t_{FOD}	Mains failure OK delay	6600 Mains failure frequency 6590 Mains failure voltage
t_{GBC}	GB ON delay	6250 GB control
t_{MBC}	MB ON delay	6610 Mains breaker control

The timer t_{MBC} is only active, if back Synchronization is deactivated (**6610 Mains breaker control**).

Example 1 (6590 Mains failure voltage)

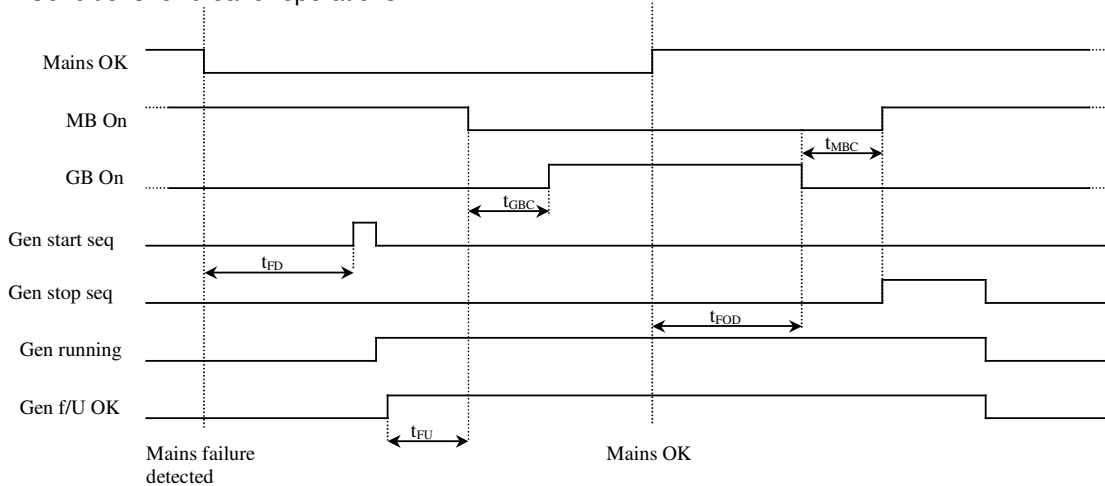
Start engine and open MB:



Example 2 (6590 Mains failure voltage)

Start engine:

Conditions for breaker operations



The breaker sequences react depending on the breaker positions and the frequency/voltage measurements.

The conditions for the ON and OFF sequences are described in the table below:

Conditions for breaker operations	
Sequence	Condition
GB ON, direct closing	Running feedback Generator frequency/voltage OK MB open
MB ON, direct closing	Mains frequency/voltage OK GB open
GB ON, synchronizing	Running feedback Generator frequency/voltage OK MB closed No generator failure alarms
MB ON, synchronizing	Mains frequency/voltage OK GB closed No generator failure alarms
GB OFF, direct opening	MB open
MB OFF, direct opening	Alarms with fail classes: Shut down Trip GB alarms
GB OFF, deloading	MB closed
MB OFF, deloading	Alarms with fail classes: Trip and stop

5. Display unit and menu structure

This chapter deals with the display unit including the push-button and LED functions. In addition, the unit menu structure will be presented.

Display unit





The display has 4 different lines, each with 20 characters, and holds a number of push-button functions.



Display dimensions are H x W = 115 x 220 mm (4.528" x 9.055").

Push-button functions

The display unit holds a number of push-button functions which are presented below.

- INFO:** Shifts the display 3 lower lines to show the alarm list.
- JUMP:** Enters a specific menu number selection. All settings have a specific number attached to them. The JUMP button enables the user to select and display any setting without having to navigate through the menus (see later).
- VIEW:** Shifts the first line displaying in the setup menus.
- LOG:** Shifts the display 3 lower lines to show the event and alarm list. The list holds 150 events. The events are not deleted when the auxiliary supply is switched off.
- : Moves the cursor left for maneuvering in the menus.
- : Increases the value of the selected set point (in the setup menu). In the daily use display, this button function is used for scrolling the second line displaying of generator values.
- SEL:** Is used to select the underscored entry in the fourth line of the display.
- : Decreases the value of the selected set point (in the setup menu). In the daily use display, this button function is used for scrolling the second line displaying of generator values.
- : Moves the cursor right for maneuvering in the menus.
- BACK:** Jumps one step backwards in the menu (to previous display or to the entry window).
- START:** Start of the gen-set if 'SEMI-AUTO' or 'MANUAL' is selected.
- STOP:** Stop of the gen-set if 'SEMI-AUTO' or 'MANUAL' is selected.
- (GB) ON:** Manual activation of close breaker and open breaker sequence if 'SEMI-AUTO' is selected.
- (MB) ON:** Manual activation of close breaker and open breaker sequence if 'SEMI-AUTO' is selected.
- MODE:** Changes the menu line (line 4) in the display to mode selection.

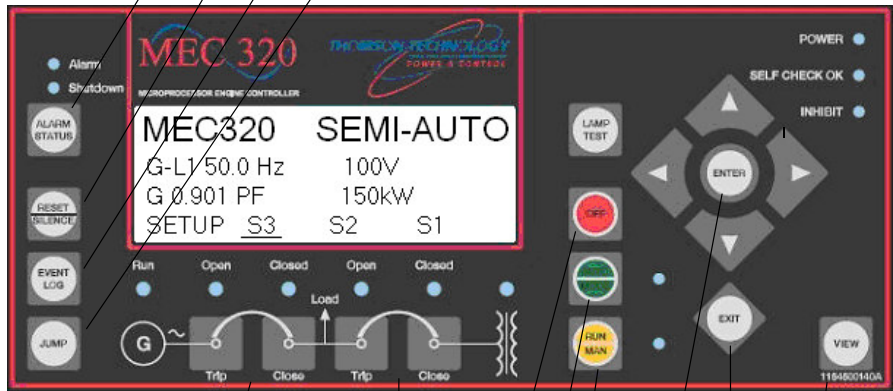
The push-buttons are placed as follows:

ALARM STATUS:
Shifts the display three lower lines to show the alarm list.

RESET:
Reset alarms on the controller.

EVENT LOG:
Shifts the display three lower lines to show the event and alarm list.

JUMP:
Enters a specific menu number selection.



GB: TRIP/CLOSE
Opens the GB, if it is closed.
Closes (sync.) the GB, if it is opened.

MB:
Opens the MB, if it is closed.
Closes (sync.) the MB, if it is opened.

OFF:
Stop of the gen-set if 'SEMI-AUTO' or 'MANUAL' is selected.

AUTO:
Place the gen-set in 'AUTO'

RUN:
Manual start and run the gen-set.

ENTER:
Selects the underscored entry in the fourth display line.

VIEW:
Shifts the first line displaying in the setup menus.

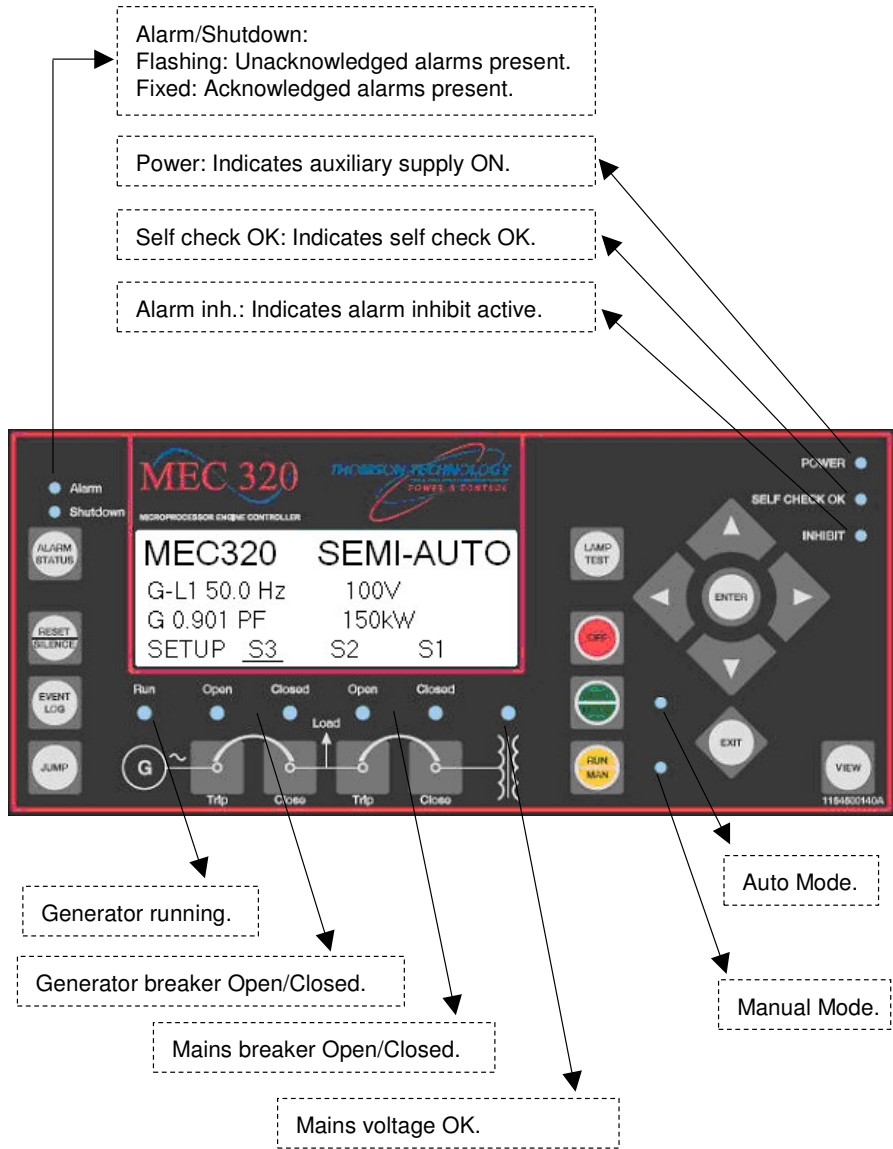
EXIT:
Jumps one step backwards in the menu.

LED functions

The display unit holds 10 LED functions. The colour is green or red or a combination in different situations.

Alarm/ShutDown:	LED flashing indicates that unacknowledged alarms are present. LED fixed light indicates that ALL alarms are acknowledged.
Power:	LED indicates that the auxiliary supply is switched on.
Self check OK:	LED indicates that the self check is OK.
Alarm inh:	Gen-set is stopped: LED fixed light indicates that the unit does not receive a running signal. The inhibit lamp will be switched off when the run status timer times out (6150 Running status) . Gen-set is running: LED fixed light indicates that the digital input is activated.
Run:	LED indicates that the generator is running.
(Gen.) OK:	LED green light indicates that the voltage/frequency is present and OK.
(GB) ON:	LED green light indicates that the generator breaker is closed. LED yellow light indicates that the generator breaker has received a command to close on a black BUS, but the breaker is not yet closed due to interlocking of the GB.
(MB) ON:	LED indicates that the mains breaker is closed.
(Mains) OK:	LED is green, if the mains is present and OK. LED is red at a measured mains failure. LED is flashing green when the mains returns during the 'mains OK delay' time.
Auto:	LED indicates that auto mode is selected.

The display LEDs are indicating as follows:



Menu structure

The display includes two menu systems which can be used without password entry:

View menu system

This is the commonly used menu system. 15 windows are configurable and can be entered by using the arrow push-buttons.

Setup menu system

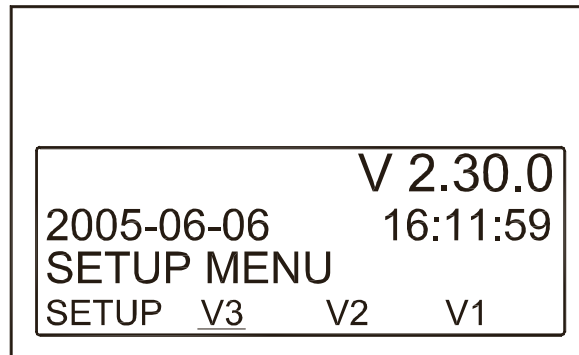
This menu system is used for setting up the unit, and if the user needs detailed information that is not available in the view menu system. Changing of parameter settings is password protected.

Entry window

When the unit is powered up, an entry window appears. The entry window is the turning point in the menu structure and as such the gateway to the other menus. It can always be reached by pressing the EXIT push-button 3 times.

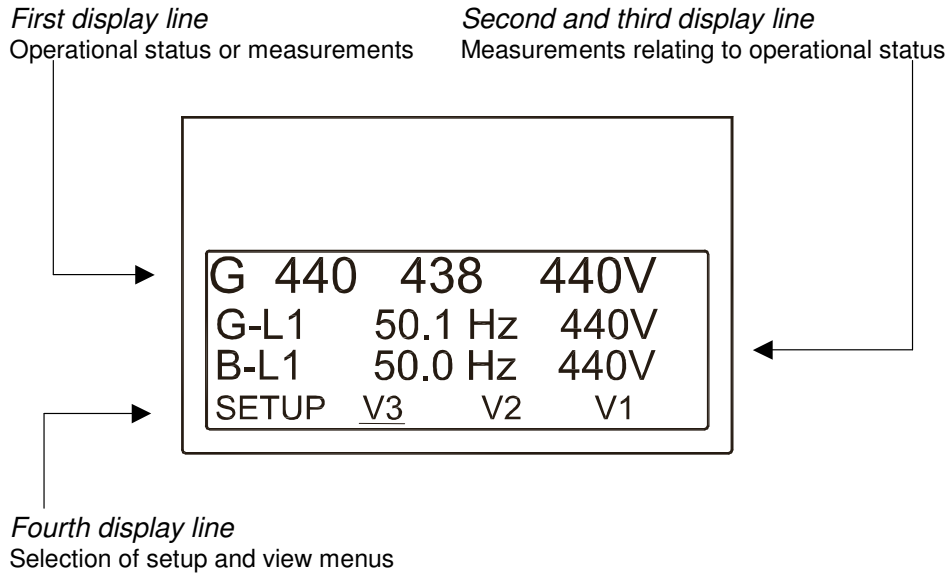


The event and alarm list will appear at power up, if an alarm is present.



View menu

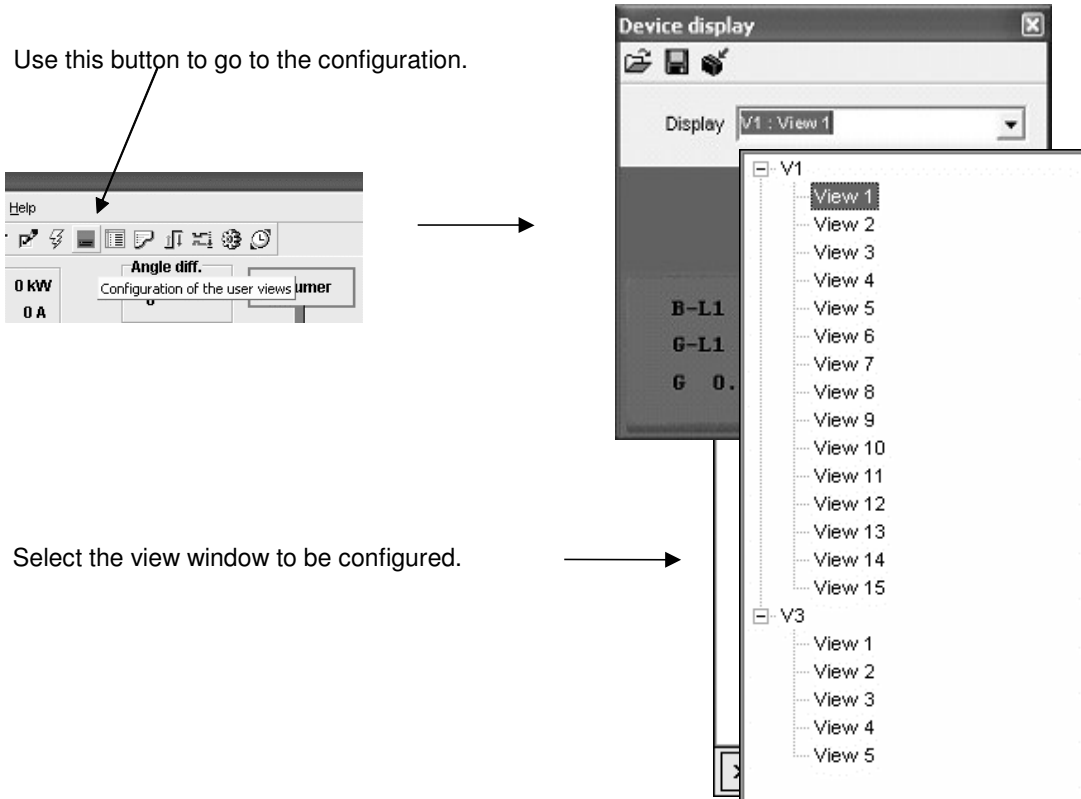
The view menus (V1, V2 and V3) are the most commonly used menus of the unit.

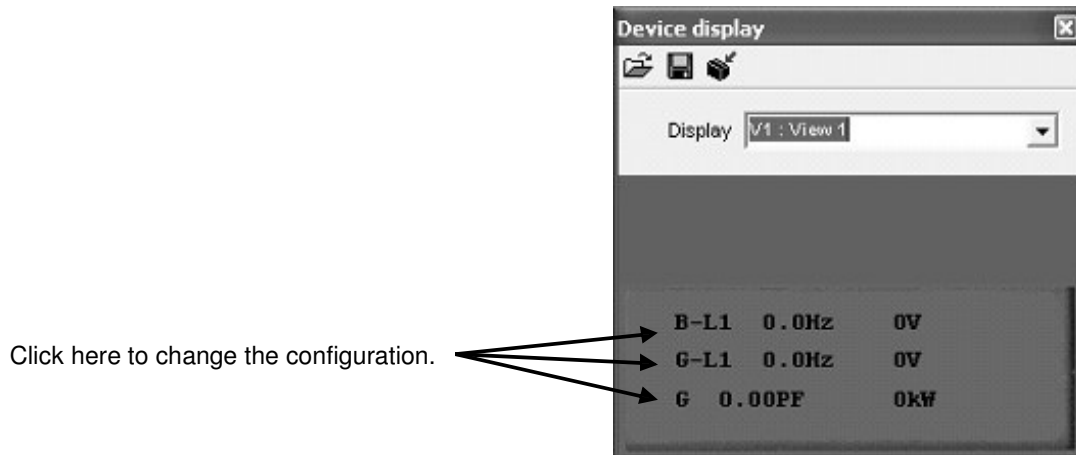


In the view menus various measured values are on display.

View window configuration

The individual view windows need to be configured through the PC software in the dialog box illustrated below.





It is only possible to configure the view windows via the PC software – configuration via the display unit is not possible.

The selectable values and measurements are presented in the table on page 44 in this handbook.

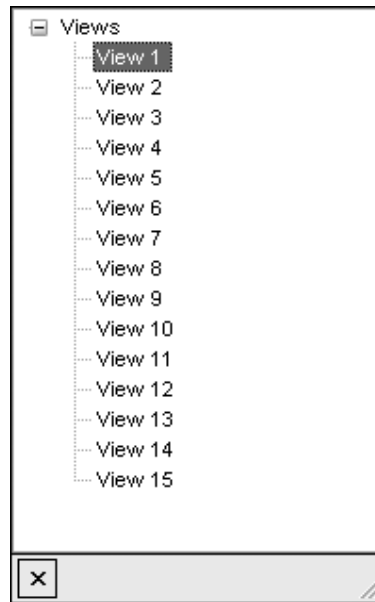
If the text 'no text' is selected in all 3 lines in a window, it will not be displayed. This is to get a continuous displaying, if a window is not to be used.



There is a maximum of 15 configurable view windows in V1.

View window overview

Windows	V1
View 1	Manual selection with key UP or key DOWN push-buttons
View 2	
View 3	
View 4	
View 5	
View 6	
View 7	
View 8	
View 9	
View 10	
View 11	
View 12	
View 13	
View 14	
View 15	

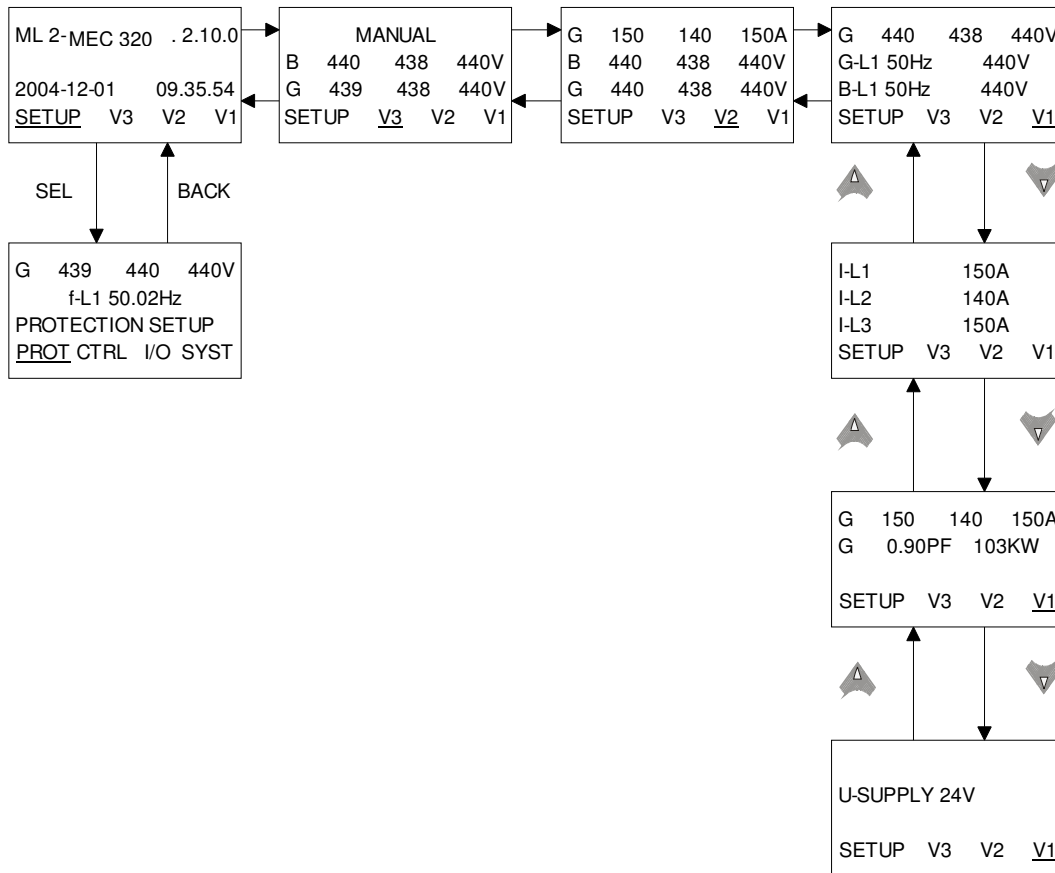


Windows	V 2	V 3
View 1	Changes automatically between the 5 first views:	Changes automatically between the 5 first views:
View 2		
View 3		
View 4		
View 5		
	1. View 1 (Start prepare)	1. View 1 (Start prepare)
	2. View 2 (Sync.)	2. View 2 (Sync.)
	3. View 3 (Ramp up/down)	3. View 3 (Ramp up/down)
	4. View 4	4. View 4
	5. View 5 (Default*)	5. View 5 (Default*)
	No manual selection.	No manual selection.
	All three lines show measuring values.	Line 1 shows the text 1...5 (above). Line 2 and line 3 show measurements.





* The default window is automatically selected after the generator breaker closure when the gen-set is in normal operation, e.g. fixed power mode after the ramping up.

View menu example

The following is an example of a configured view menu system. In this example 4 of 15 windows have been configured in view 1.



...Etc. (max. 15)

The menu navigating starts from the fourth display line in the entry window and is carried out using the , ,  and  push-buttons.

The entry window displays view 3, (in the illustration above the window where 'manual' is displayed).

Moving the cursor left or right offers the following possibilities.

- Setup menu – access to the following sub-menus:
 - Protection setup
 - Control setup
 - I/O setup
 - System setup
- View 3 – window displays operational status and selectable measurements
- View 2 – window displays selectable measurements
- View 1 – access to up to 15 selectable windows displaying selectable measurements

Setup menu

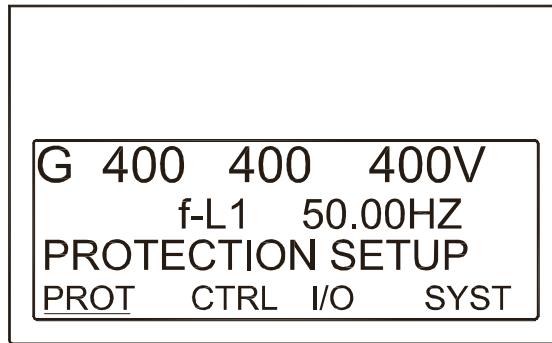
The setup menu system is used for parameter setup of the unit, and if the user needs detailed information that is not available in the view menu system. So, this menu can be used for both daily use and setup purposes. The menu is entered from the entry window by selecting the entry SETUP in the fourth display line.

First display line

(Daily use) The first line is used to display generator and BUS values

Second display line

(Daily use) Various values can be displayed
 (Menu system) Information about the selected channel number
 (Alarm/event list) The latest alarm/event is displayed



Third display line

(Daily use) Explanation for the fourth line cursor selection
 (Setup menu) Presents setting of the selected function, and, if changes are made, the possible max. and min. values for the setting

Fourth display line

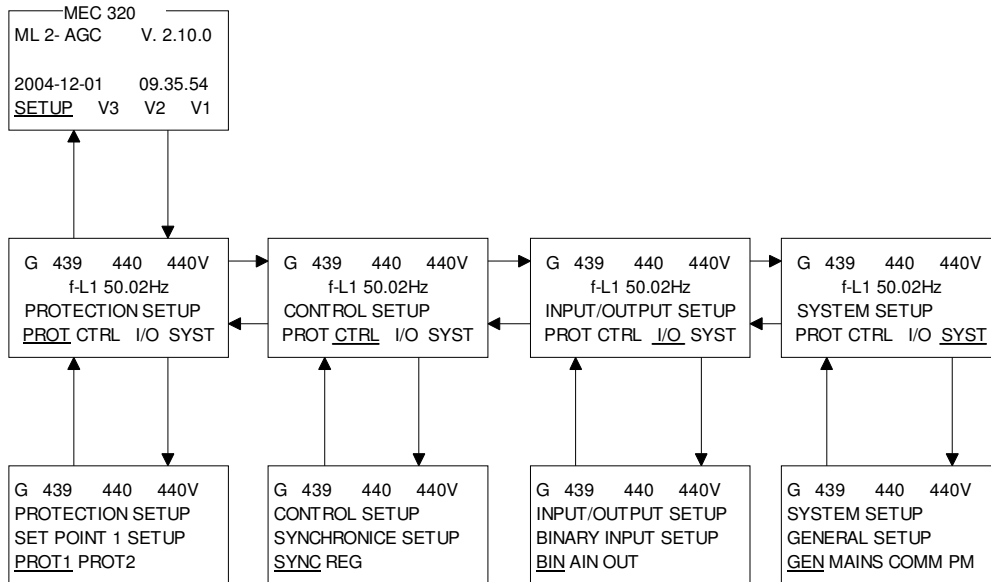
(Daily use) Entry selection for the setup menu. Press SEL to enter the underscored menu
 (Setup menu) Sub-functions for the individual parameters, e.g. limit

Possible values in second display line

View line/second display line configuration			
For generator	For bus/mains	For analogue input	Communication/other
Voltage L1 L2 L3 (V AC)	Voltage L1 L2 L3 (V AC)	Analog 98	PID Value #1.1
Voltage L1-N (V AC)	Voltage L1-N (V AC)	Analog 100 (oil press.)	PID Value #1.2
Voltage L2-N (V AC)	Voltage L2-N (V AC)		PID value #1.3
Voltage L3-N (V AC)	Voltage L3-N (V AC)	Analog 102 (fuel level)	PID value #1.4
Voltage L1-L2 (V AC)	Voltage L1-L2 (V AC)	Analog 104	PID value #1.5
Voltage L2-L3 (V AC)	Voltage L2-L3 (V AC)	Analog 91	PID value #1.6
Voltage L3-L1 (V AC)	Voltage L3-L1 (V AC)	Analog 93	PID value #1.7
Voltage max. (V AC)	Voltage max. (V AC)	Analog 95	PID value #1.8
Voltage min. (V AC)	Voltage min. (V AC)	Analog 97	PID value #2.1
Current L1 L2 L3 (A)	Frequency (Hz)	PT100 no. 106	PID value #2.2
Current L1 (A)	Frequency/voltage L1 (Hz/V AC)	PT100 no. 109	PID value #2.3
Current L2 (A)		Tacho	PID value #2.4
Current L3 (A)	Voltage angle between L1-L2 (deg.)	VDO 104 (pressure)	PID value #2.5
Frequency/voltage L1 (Hz/V AC)		VDO 105 (temperature)	PID value #2.6

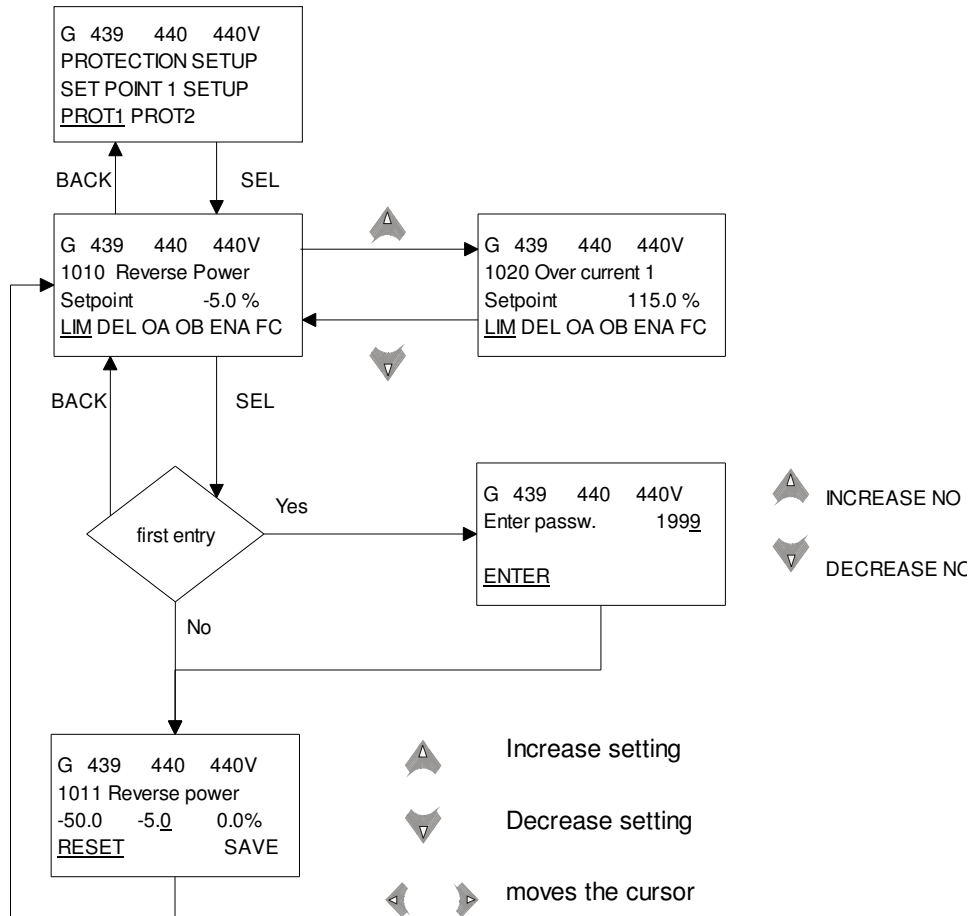
View line/second display line configuration			
For generator	For bus/mains	For analogue input	Communication/ other
Frequency L1 (Hz)	Voltage angle between generator voltage and bus voltage (deg.)	VDO 106 (fuel level)	PID value #2.7
Frequency L2 (Hz)			PID value #2.8
Frequency L3 (Hz)			Status line
Power factor/active power (PF/kW)	Power supply voltage (V DC)		Synchroscope
Active power (kW)	Mains power (kW)		Date and time
Reactive power/apparent power (kvar)/ (kVA)	Negative voltage		
Reactive power (kvar)	Negative current		
Apparent power (kVA)	Zero voltage		
Energy counter (kWh)	Zero current		
Power factor			
Voltage angle between L1-L2 (deg.)			
Voltage angle between L2-L3 (deg.)			
Voltage angle between L3-L1 (deg.)			
Absolute run time (h)			
Relative run time (h)			
Next priority shift (h and min.)			
Fire run			
Number of GB operations			
Number of MB operations			
Next service			

Setup structure



Setup example

The following example illustrates how a specific setting is changed in the setup menu. In this case **Reverse power** is the selected parameter.



Mode overview

The unit has four different running modes and one block mode. For detailed information see page 9.

Auto

In auto mode the unit will operate automatically, and the operator cannot initiate any sequences manually.

Semi-auto

In semi-auto mode the operator has to initiate all sequences. This can be done via the push-button functions, modbus commands or digital inputs. When started in semi-automatic mode, the gen-set will run at nominal values.

Test

The test sequence will start when the test mode is selected.

Manual

When manual mode is selected, the binary increase/decrease inputs can be used (if they have been configured) as well as the start and stop push-buttons. When starting in manual mode, the gen-set will start without any subsequent regulation.

Block

When the block mode is selected, the unit is not able to initiate any sequences, e.g. the start sequence.



Block mode must be selected, when maintenance work is carried out on the gen-set.

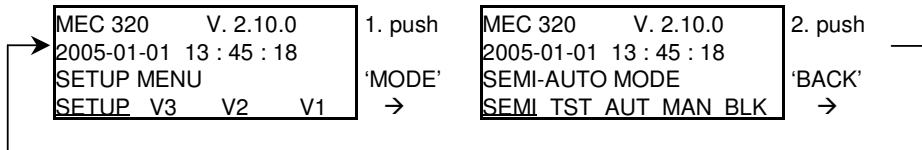
Mode selection

The following drawings illustrate how the mode selection is carried out.

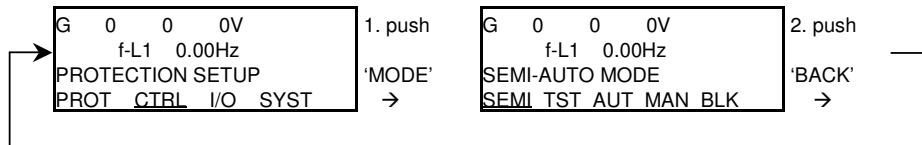
Pushing the MODE push-button will change the displayed text. After pushing 'MODE', the fourth display line indicates the selectable modes. In the third display line, the underscored (fourth line) selection will be displayed.

Two possibilities are now available:

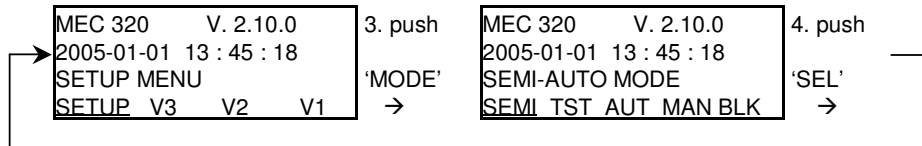
If 'BACK' is pushed, the display returns to the original text without changing the mode.



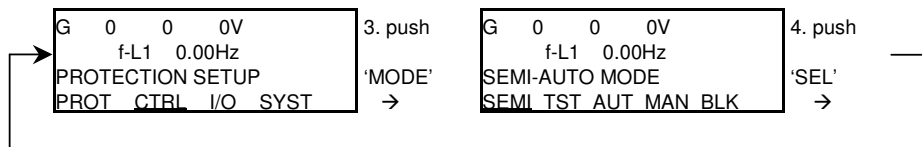
or



If 'SEL' is pushed, the underlined mode is selected, and the display returns to the original text. In this example the SEMI-AUTO mode is selected.



or



Password

The unit includes three password levels. All levels can be adjusted in the PC software.

Available password levels:

Password level	Factory setting	Access		
		Customer	Service	Master
Customer	2000	X		
Service	2001	X	X	
Master	2002	X	X	X

A parameter cannot be entered with a too low ranking password. But the settings can be displayed without password entry.

Each parameter can be protected at a specific password level. To do so, the PC utility software must be used. Enter the parameter to be configured and select the correct password level.

Parameter "Reverse power" (Channel 1010)

Setpoint :
-50 -5 % 0

Timer :
0,1 10 sec 100,0

Fail class : Trip of GB

Output A : Output 0

Output B : Output 0

Password level : Customer

Enabled
 ON
 High Alarm
 Inverse proportional

Commissioning
 Actual value : 0 %
 Time elapsed : 0 sec (0 %)
 0 sec 10 sec

Write OK Cancel

Parameter access

To get access to adjust the parameters, the password level must be entered:



If the password level is not entered, it is not possible to enter the parameters.



**The customer password can be changed in menu 9116 page 115.
The service password can be changed in menu 9117 page 115.
The master password can be changed in menu 9118 page 115.**



The factory passwords must be changed, if the operator of the gen-set is not allowed to change the parameters.



It is not possible to change the password at a higher level than the password entered.

6. Additional functions

This chapter describes the additional functions.

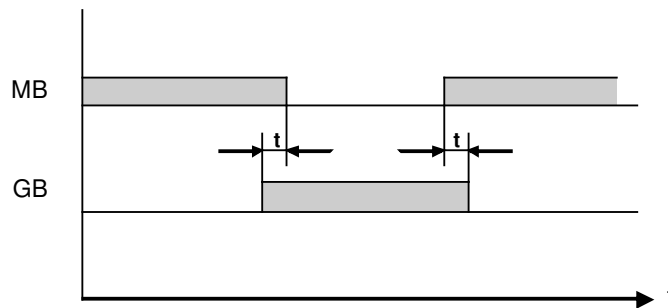
Short time parallel

The purpose of the *short time parallel* function is to be able to define a maximum paralleling time between the generator and the mains supply.

The function is typically used, if there are local requirements to maximum allowed paralleling time.



The short time paralleling function is only available in the automatic mains failure and load take over gen-set modes.



The diagram shows that when the generator breaker is synchronized, the mains breaker will be opened automatically after a time delay (t). Later the mains breaker is synchronized, and the generator breaker is opened after the time delay (t).

The time delay is measured in seconds and can be adjusted from 0.10 to 99.90 seconds.



The same time delay is used for both generator and mains breaker synchronization.



The time delay typed in the set point is a maximum time. This means that if 0.10 seconds are used, the two breakers will never be closed at the same time for a longer delay than the set point.

The short time parallel function is set up in **2700 Short time paralleling**.

Time dependent start/stop

The purpose of the time dependent start/stop function is to be able to start and stop the gen-set automatically at specific times each weekday or certain weekdays. Auto mode must be activated for this function. Up to 8 commands can be used for either start or stop. The settings are set up through the PC utility software. Each command can be set for the following time periods:

- Individual days (MO, TU, WE, TH, FR, SA, SU)
- MO, TU, WE, TH
- MO, TU, WE, TH, FR
- MO, TU, WE, TH, FR, SA, SU
- SA, SU



It is necessary to use the PC utility software when setting up the time dependent start/stop function.

Derate gen-set

The purpose of the derate function is to be able to reduce the maximum output power of the gen-set, if specific conditions require this. An example of such a condition is the ambient temperature. If the ambient temperature increases to a level where the cooling water coolers decrease in cooling capacity, it will be necessary to reduce the power of the gen-set. If the gen-set is not derated, alarms and shutdown events will very likely occur.



The derate function is typically used when cooling problems are expected.

Input selection

The derate function can be configured to one of the following inputs:

Input	Engine interface selection
Analogue input 100	X
VDO input 105	X
VDO input 106	X

Select the needed input in 6260 P_{nom} derate .



Refer to the type label for information about engine interface selection.

Derate parameters

The parameters that define the derate characteristics are the following:

Start derate point (6260 P_{nom} derate):

This is the setting where the derating must start. The setting can be in mA (max. 20mA) or in centigrades °C (max 200°C).

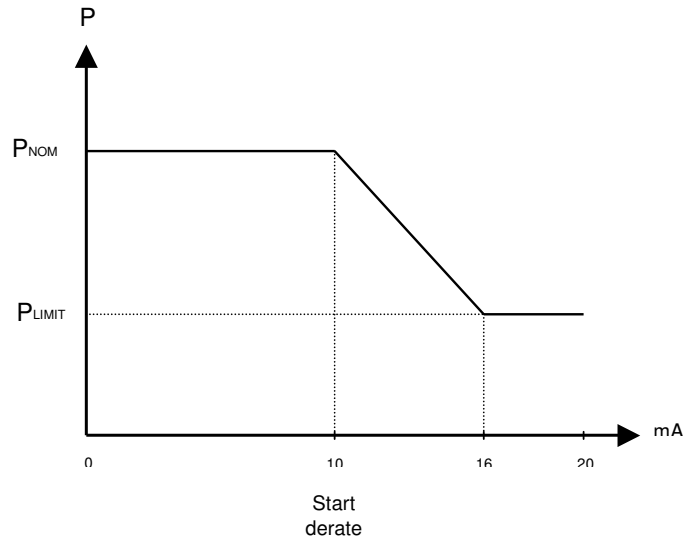
Slope (6260 P_{nom} derate):

Adjust the derating speed. The adjustment is in percent per unit, i.e. if the 4...20mA input is used (analogue 100), then the derating will be in %/mA, and if the PT100/VDO input is used, then the derating will be in %/C.



Be aware that the 4...20mA input can be configured with different minimum and maximum settings. In this case the settings 'start derate point' and 'slope' use these new settings.

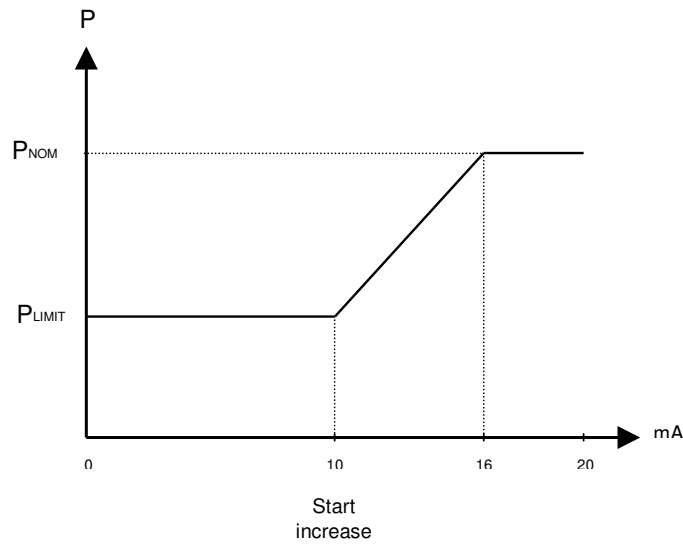
Derate limit (6260 P_{nom} derate):
 This is the lowest derate level.



Derate characteristic

It can be selected whether the characteristic of the derating should be proportional or inverse proportional. The drawing above shows the inverse characteristic.

The proportional characteristic is illustrated below.



The gen-set is derated when the control value is lower than the set point (in the example above the control value is an mA signal).

The derate characteristic is selected in **6260 P_{nom} derate** .

- Setting OFF: Inverse characteristic
- Setting ON: Proportional characteristic

Fail class

All activated alarms must be configured with a fail class. The fail classes define the category of the alarms and the subsequent alarm action.

Six different fail classes can be used. The tables below illustrate the action of each fail class when the engine is running or stopped.

Engine running

Action Fail class	Alarm horn relay	Alarm display	Deload	Trip of gen. breaker	Trip of mains breaker	Cooling-down gen-set	Stop gen-set
1 Alarm	X	X					
2 Warning	X	X					
3 Trip of GB	X	X		X			
4 Trip and stop	X	X	(X)	X		X	X
5 Shutdown	X	X		X			X
6 Trip of MB	X	X			X		

The table illustrates the action of the fail classes. If, for instance, an alarm has been configured with the 'shutdown' fail class, the following actions occur.

- The alarm horn relay will activate
- The alarm will be displayed in the alarm info screen
- The generator breaker will open instantly
- The gen-set is stopped instantly
- The gen-set cannot be started from the unit (see next table)



The fail class 'trip and stop' will only deload the gen-set before opening the breaker, if option G5 (power management) is included.

Engine stopped

Action Fail class	Block engine start	Block MB sequence	Block GB sequence
1 Alarm	X		
2 Warning			
3 Trip of GB	X		X
4 Trip and stop	X		X
5 Shutdown	X		X
6 Trip of MB		X	

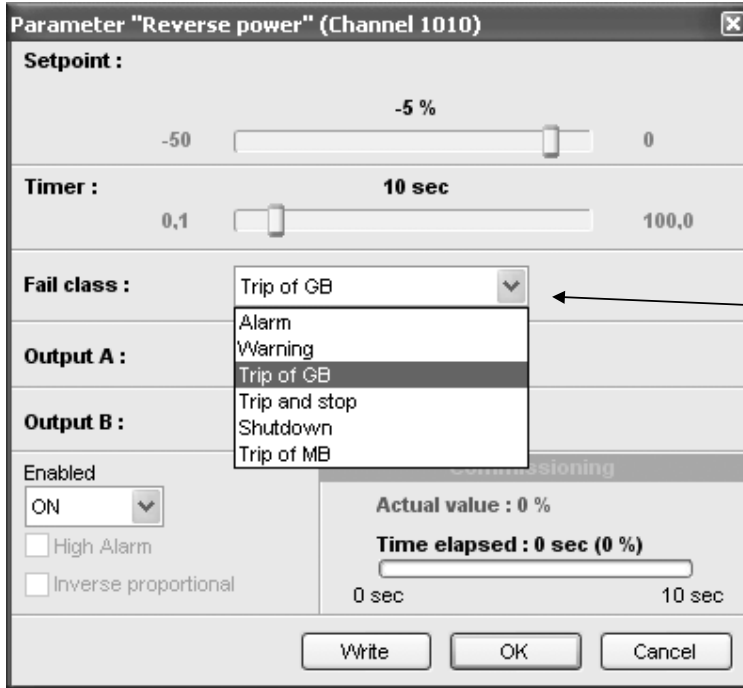


In addition to the actions defined by the fail classes, it is possible to activate one or two relay outputs, if additional relays are available in the unit.

Fail class configuration

The fail class can be selected for each alarm function either via the display or the PC software.

To change the fail class via the PC software, the alarm function to be configured must be selected. Select the desired fail class in the fail class roll-down panel.



The fail class drop down panel is activated, and the user wants to select the 'trip of GB' fail class.

Service timers

The unit is able to monitor the maintenance intervals. The menu is available in the system setup. 6090 Service timerThe function is based on running hours. When the adjusted time expires, the unit will display an alarm. The 'alarm acknowledge' function resets this alarm.

When acknowledging the alarm, the timer will be reset and a new service timer alarm will only reoccur after the adjusted time has elapsed. The running hours is counting, when the running feedback is present.

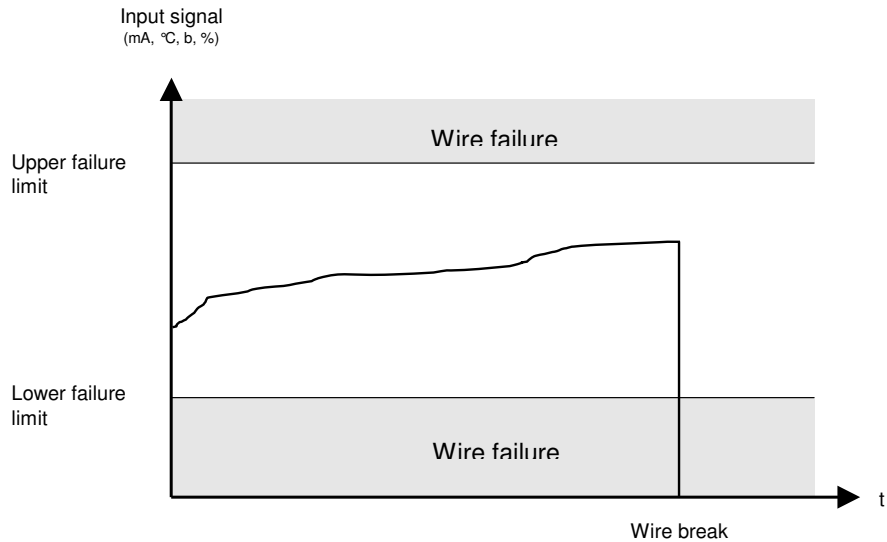
Wire break detection

If it is necessary to supervise the sensors/wires connected to the analogue inputs (4-20mA, VDO and PT100), then it is possible to use the menus 4370-4430 depending on the HW options available in the unit. If the measured value on the input is outside the normal dynamic area of the input, it will be detected, as if the wire has made a short circuit or a break. An alarm with a configurable fail class will be activated.

	Wire failure area	Normal range	Wire failure area
4-20mA	Below 4mA	4-20mA	Above 20mA
VDO 104	0...40%	-	60...100%
VDO 105	0...40%	-	60...100%
VDO 106	0...40%	-	60...100%

Principle

The illustration below shows that when the wire of the input breaks, the measured value will drop to zero. Then the alarm will occur.

**VDO settings**

The alarm set point of the VDO inputs can be calculated in percent like this:

VDO 104, oil pressure: $deviation\% = setting / 240 * 100$

VDO 105, cooling temp.: $deviation\% = setting / 530 * 100$

VDO 106, fuel level: $deviation\% = setting / 240 * 100$

The deviation is the alarm value entered in percent, and the setting is the required alarm setting in ohms.

Example:

Required set point of VDO104 is 180Ω. The adjustment must be:

$$deviation\% = 180 / 240 * 100$$

$$deviation\% = 75\%$$

VDO inputs

There are three VDO inputs in the unit. The inputs have different functions, as the hardware design allows for several VDO types.

- VDO input 104: Oil pressure
- VDO input 105: Cooling water temperature
- VDO input 106: Fuel level sensor

VDO input 104

This VDO input is used for measuring the lubricating oil pressure.

Pressure Bar	VDO sensor type		
	Type 1 Ω	Type 2 Ω	Type configurable Ω
0	10.0	10.0	Point 1
0.5	27.2		
1.0	44.9	31.3	
1.5	62.9		
2.0	81.0	51.5	
2.5	99.2		Point 2
3.0	117.1	71.0	
3.5	134.7		
4.0	151.9	89.6	
4.5	168.3		
5.0	184.0	107.3	Point 3
6.0		124.3	Point 4
7.0		140.4	Point 5
8.0		155.7	Point 6
9.0		170.2	Point 7
10.0		184.0	Point 8



The configurable type is configurable with 8 points.

Level switch type

VDO sensor type	
Type level switch	
Resistance	Function
>200 Ω	Normal situation, no alarm
<200 Ω	Alarm situation



If the VDO input is used as a level switch, then be aware that no voltage must be connected to the input. If any voltage is applied to the VDO inputs, then it will be damaged. Refer to the Application Notes for further wiring information.

VDO input 105

This VDO input is used for measuring the cooling water temperature.

	VDO sensor type			
Temperature	Type 1	Type 2	Type 3	Type 4
°C	Ω	Ω	Ω	Ω
40	291.5	480.7	69.3	Point 1
50	197.3	323.6		Point 2
60	134.0	222.5	36.0	Point 3
70	97.1	157.1		Point 4
80	70.1	113.2	19.8	Point 5
90	51.2	83.2		Point 6
100	38.5	62.4	11.7	Point 7
110	29.1	47.6		Point 8
120	22.4	36.8	7.4	
130		28.9		
140		22.8		
150		18.2		



The configurable type is configurable with 8 points.

Level switch type

	VDO sensor type
	Type 3
Resistance	Function
<1.7kΩ	Normal situation, no alarm
>1.7kΩ	Alarm situation



If the VDO input is used as a level switch, then be aware that no voltage must be connected to the input. If any voltage is applied to the VDO inputs, then it will be damaged. Refer to the Application Notes for further wiring information.

VDO input 106

This VDO input is used for the fuel level sensor.

	VDO sensor type
	Type 1
Value	Resistance
0%	78.8Ω
100%	1.6Ω

	VDO sensor type
	Type 2
Value	Resistance
0%	3Ω
100%	180Ω



If the VDO input is used as a level switch, then be aware that no voltage must be connected to the input. If any voltage is applied to the VDO inputs, then it will be damaged. Refer to the Application Notes for further wiring information.

	VDO sensor type
Value	Type configurable
%	Resistance
0	Point 1
10	
20	
30	
40	Point 2
50	Point 3
60	Point 4
70	Point 5
80	Point 6
90	Point 7
100	Point 8



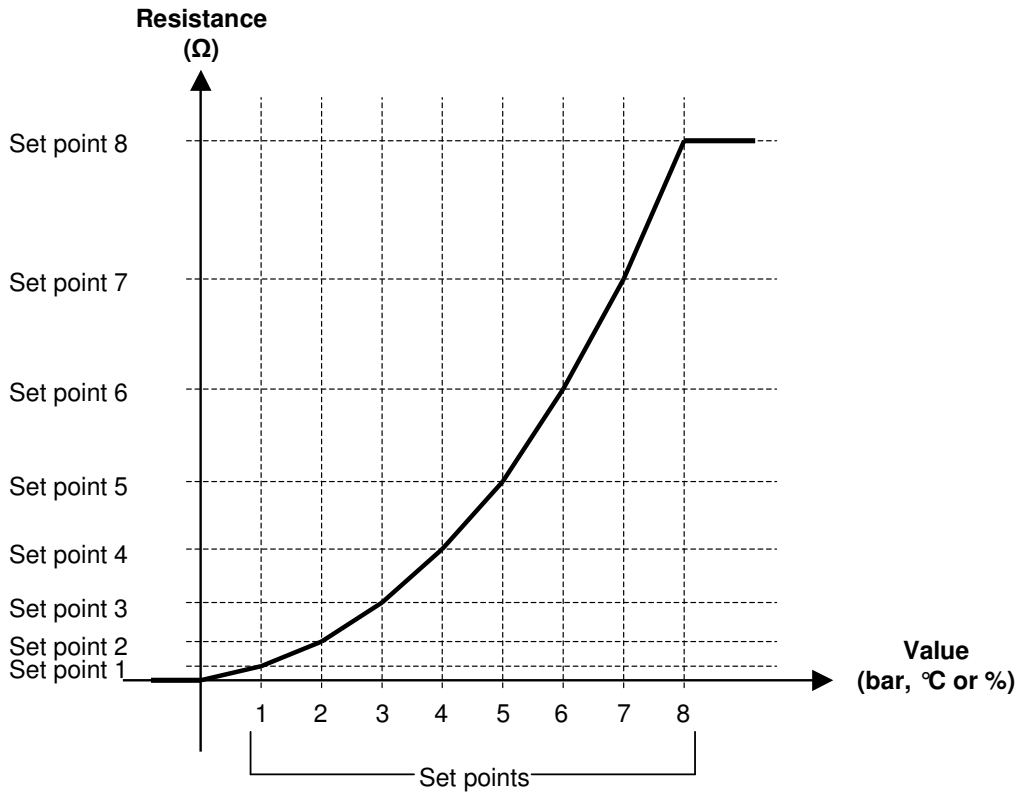
The configurable type is configurable with 8 points.

VDO usage

The VDO inputs are used as alarm inputs and can be configured in the following menus:

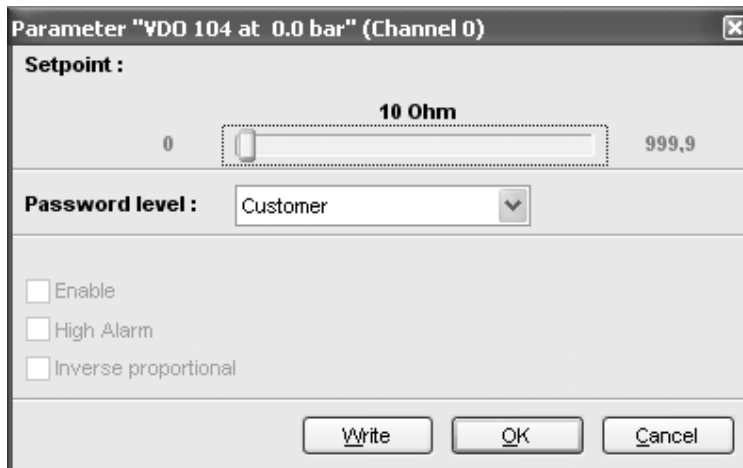
- VDO input 104: Lubricating oil pressure – alarm settings in menus 4170/4180.
- VDO input 105: Cooling water temperature – alarm settings in menus 4190/4200.
- VDO input 106: Fuel level switch – alarm settings in menus 4210/4220.

Illustration of configurable inputs



Configuration

The 8 curve settings for the configurable VDO inputs cannot be changed in the display, but **only** in the PC utility software. The alarm settings can be changed both in the display and in the PC utility software. In the PC utility software the configurable inputs are adjusted in this dialog box:



Adjust the resistance of the VDO sensor at the specific measuring value. In the example above the adjustment is 10Ω at 0.0 bar.

Language selection

The unit has the possibility to display different languages. English is the default language, and it cannot be changed. In addition to the master language 11 different languages can be configured. This is done via the PC utility software.

The languages are selected in the system setup (**6130 Language**)

The language can be changed when connected to the PC utility software. It is not possible to make language configuration from the display, but the already configured languages can be selected.

Buttons used in the PC utility software



Retrieve languages from the device:
Activating this button will retrieve the configured languages from the device.



Send languages to the device:
Activating this button will send the content of the 11 language frames to the device.



Synchronize a language file with the device:
Activating this button will synchronize a language file from a previous version of the software with a newer version. New functions that are not translated will be marked.

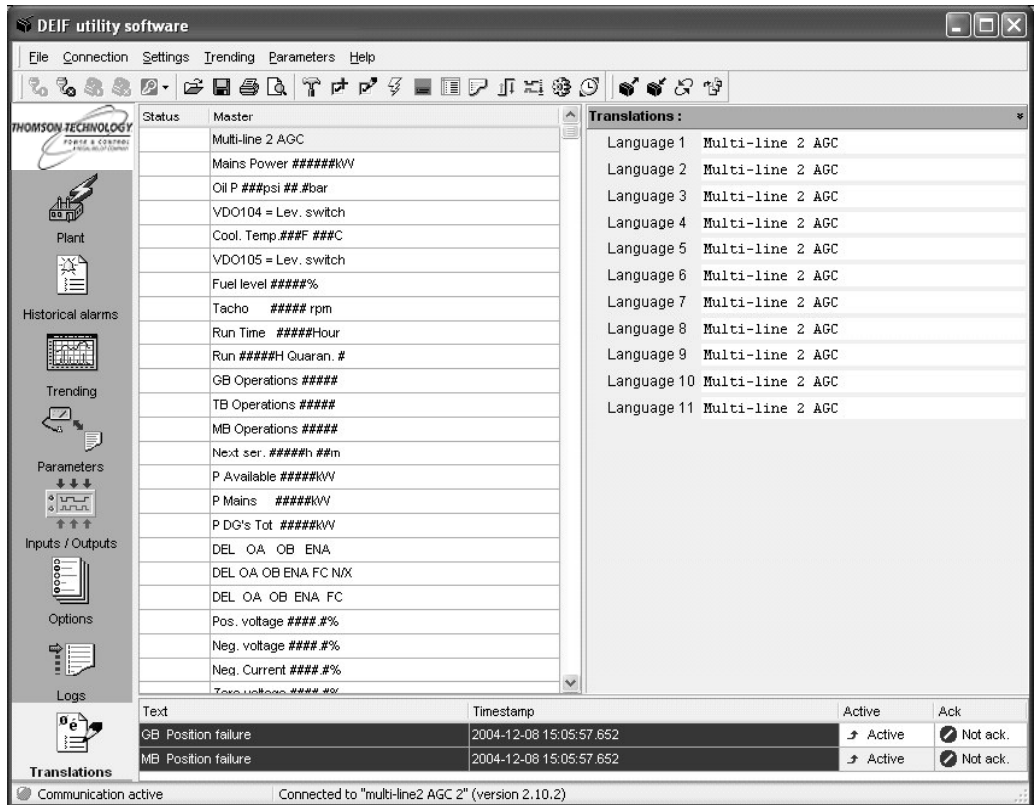
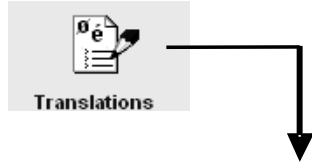


Copy master language to other languages:
Activating this button will send the master language to the 11 language frames (except for the already configured texts).

Language configuration

Besides the master language 11 empty language shells are available. These empty shells can be filled in via the PC utility software.

In the PC utility software the language is configured in the *Translations* menu. Activate the menu by pressing the *Translations* icon (see below):



All configurable entries are indicated in the left side column. The list can be scrolled with page DOWN/UP.

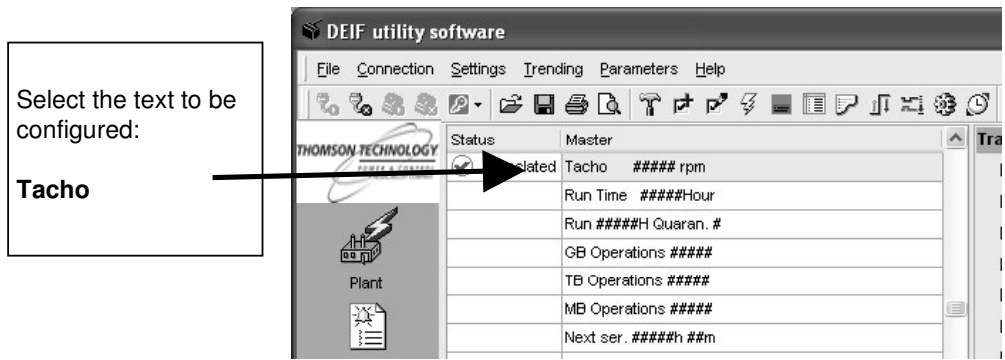
Example:

Language 1 = Spanish.

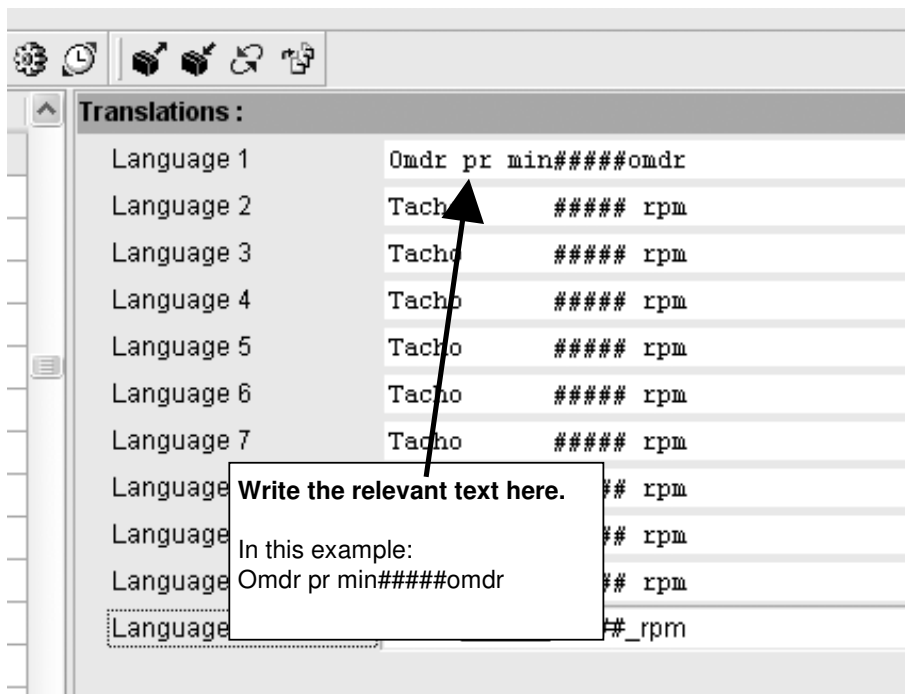
Tacho name is changed in this example:

- 'Tacho' is changed to 'RPM'
- 'RPM' is changed to 'RPM'

Select the line which needs to be edited.



Select language 1 and write the relevant text.



When the relevant texts have been configured, they can be downloaded to the unit.



The symbol '#####' indicates the measured value (in this case the actual RPM).



There is a maximum of 20 characters/text. The symbol ##### is included and will in this case use up 5 characters. It is not possible to change the number of characters in the measurement symbol (#####).

Translation status

To give an overview of the translated menus, a status indication can be given for each parameter. The check mark is green, and the cross is red.

<input checked="" type="checkbox"/>	Translated	RUN ##### SUR
<input checked="" type="checkbox"/>	Translated	GB Operations #
<input checked="" type="checkbox"/>	Translated	TB Operations #
<input checked="" type="checkbox"/>	Translated	MB Operations #
<input checked="" type="checkbox"/>	Translated	Next ser. #####
<input checked="" type="checkbox"/>	Translated	P Available ####
<input checked="" type="checkbox"/>	Translated	P Mains #####
<input checked="" type="checkbox"/>	Translated	P DG's Tot ####
<input checked="" type="checkbox"/>	Translated	DEL OA OB I
		DEL OA OB ENA
		DEL OA OB EN

Symbols

The following symbols can be used for this function:

	!	"	#	\$	%	&	'	()	*	+	,	-	.	/
0	1	2	3	4	5	6	7	8	9	:	:	<	=	>	?
@	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
P	Q	R	S	T	U	V	W	X	Y	Z	[\]	^	
`	a	b	c	d	e	f	g	h	i	j	k	l	m	n	o
p	q	r	s	t	u	v	w	x	y	z	{		}	~	

Texts in status line

The status texts must be self-explaining. If the operator does something wrong, then the status line must indicate it. The table below indicates the texts in the status line.

Status text	Condition	Comment
BLOCK		
Simple TEST	The TEST is activated. The gen-set will be started, but it is not allowed to close the generator breaker.	
Load TEST	The TEST is activated. The gen-set will be started, and the generator breaker will be synchronized/closed.	The test will be parallel to mains.
ISLAND MANUAL	If the gen-set is stopped, or if it is running and no other action takes place.	
ISLAND SEMI-AUTO		
ISLAND AUTO		
AMF MANUAL		
AMF SEMI-AUTO		
AMF AUTO		
FIXED MANUAL		
FIXED SEMI-AUTO		
FIXED AUTO		
Peak shave MANUAL		
Peak shave SEMI-AUTO		
Peak shave AUTO		
LTO MANUAL		

Status text	Condition	Comment
LTO SEMI-AUTO		
LTO AUTO		
MPE MANUAL		
MPE SEMI-AUTO		
MPE AUTO		
PM MANUAL		
PM SEMI-AUTO		
PM AUTO		
Fire pump		If the configurable input is active.
Display locked	If the 'Access lock' input is activated, and the operator tries to activate one of the blocked keys.	
GB tripped externally	This info. will be shown, if some external equipment has tripped the breaker.	An external trip is logged in the event log.
MB tripped externally	This info. will be shown, if some external equipment has tripped the breaker.	An external trip is logged in the event log.
TB tripped externally	This info. will be shown, if some external equipment has tripped the breaker.	An external trip is logged in the event log.
Power derate	If the 'power derate' function is activated and the nominal power set point has been decreased, this info. will appear.	
Idle run	If the 'Idle run' function is active, this info. will appear to inform the user that the gen-set will not stop, until a timer has expired.	
Idle run ###.#min.	If the timers in the 'Idle run' function are active, this info. will appear to inform the user that the gen-set will not start/stop, until a timer has expired.	
Compensation freq.	Compensation is active.	To inform the user that there is a reason why the frequency is not at the nominal setting.
Aux. test ###V ####s	This info. is shown during a battery test.	
Deload	This info. is shown when decreasing the load of the gen-set.	
Starting DG(s) ###s	When the start gen-set set point is exceeded, this info. is shown with the countdown of the timer.	
Stopping DG(s) ###s	When the stop gen-set set point is exceeded, this info. is shown with the countdown of the timer.	
Start prepare	This info. is shown during the time the start prepare relay is activated.	

Status text	Condition	Comment
Start ON	This info. is shown during the time the start relay is activated during the start sequence.	
Start OFF	This info. is shown during the time the start prepare relay is deactivated.	
Mains failure	This text appears as soon as a frequency or voltage measurement is outside the limits.	
Mains failure in ###s	This text appears as soon as a frequency or voltage measurement is outside the limits. The timer shown is the mains failure delay.	
Mains U OK del ####s	When the mains voltage is OK after a mains failure, this info. is shown with the countdown of the timer.	
Mains f OK del ####s	When the mains frequency is OK after a mains failure, this info. is shown with the countdown of the timer.	
Volt./freq. OK in ###s	As soon as the voltage and frequency on the gen-set are OK, this text is shown until it is allowed to operate the generator breaker.	
Cooling down ###s	When the cooling down period is started, this info. is shown with the countdown of the timer.	
Gen-set stopping	This info. is shown when cool down has finished.	
Ext. stop t. ###s		
Blackout enable	This info. is shown, if a CAN failure is present in a power management application.	Option G5 must be available.
Programming language	This info. is shown, if the language file is downloaded from the PC utility software.	

Service menu

The purpose of the service menu is to give information about the present operating condition of the gen-set. The service menu is entered using the 'JUMP' push-button (**9120 Service menu**).

Use the service menu for easy trouble shooting in connection with the event log (see page 35).

Entry window

The entry shows the possible selections in the service menu.

```
G 400 400 400V
9120 Service menu
ALARM
ALARM      IN OUT MISC
```

Available selections:

Alarm

Shows the alarm timer and the remaining time. The indicated remaining time is minimum remaining time. The timer will count downwards when the set point has been exceeded.

```
G 400 400 400V
1010 Reverse power
Remaining time 10.0s
UP DOWN
```

IN (digital input)

Shows the status of the digital inputs.

```
G 400 400 400V
Running
Input =   ON
UP DOWN
```

OUT (digital output)

Shows the status of the digital outputs.

```
G 400 400 400V
Horn
Output =  OFF
UP DOWN
```

MISC (miscellaneous)

Shows miscellaneous messages.

```
G 400 400 400V
M-logic Enabled
Various =  OFF
UP DOWN
```

Event log

The event log holds up to 150 events, and they can be viewed in the display or in the PC utility software. When more than 150 events have occurred, each new event will overwrite the oldest event following the 'first in – first out' principle.

Display

In the display it looks like this when the 'LOG' push-button is pressed (example):

G	400	400	400V
4170 Fuel level			
06-24		15:24:10.3	
INFO	<u>FIRST</u>	LAST	

The specific alarm or event is shown in the second line. In the example above the fuel level alarm has occurred. The third line shows the time stamp.

If the cursor is moved to 'INFO', the actual value can be read when pressing 'SEL':

G	400	400	400V
4170 Fuel level			
VALUE	8 %		
<u>INFO</u>	FIRST	LAST	

The first event in the list will be displayed, if the cursor is placed below 'FIRST' and 'SEL' is pressed.

The last event in the list will be displayed, if the cursor is placed below 'LAST' and 'SEL' is pressed.

The keyUP and keyDOWN push-buttons are used for navigating in the list.

PC utility software

Using the PC utility software the entire log stack of the last 150 events can be retrieved by activating the log button on the horizontal toolbar.



The alarms and events are displayed as indicated below. The actual alarms are displayed in the text column together with selected measurements.

In the right side column additional data is indicated. This is specific data for the most important measurements. The data is logged for each specific event and is used for troubleshooting after each alarm.

The screenshot shows the DEIF utility software interface. The main window displays a log of events with columns for TimeStamp, Text, PPower, QPower, PF, Gen. F, and BusF. A right-hand pane shows 'Additional data' for the selected event, including ID, TimeStamp, Text, Channel, PPower, QPower, PF, and various generator and bus parameters. A bottom pane shows a summary of the selected event with columns for Text, Timestamp, Active, and Ack.

TimeStamp	Text	PPower	QPower	PF	Gen. F	BusF
2004-01-01 00:00:00.2	POWER UP	0	0	0	0	0
2004-01-01 00:00:00.2	UP 3 PCB present	0	0	0	0	0
2004-01-01 00:00:00.2	Supply present 1	0	0	0	0	0
2004-01-01 00:00:00.2	CAN BUS 2 PCB pres.	0	0	0	0	0
2004-01-01 00:00:00.2	Led I/F 1 present	0	0	0	0	0
2004-01-01 00:00:00.2	LS PCB present	0	0	0	0	0
2004-01-01 00:00:00.2	AO PCB 2 present	0	0	0	0	0
2004-01-01 00:00:00.2	Eng.I/F 1 PCB present	0	0	0	0	0
2004-01-01 00:00:00.3	Standard unit	0	0	0	0	0
2004-01-01 00:00:03.2	GB Open	0	0	0	0	0
2004-01-01 00:00:03.2	MB Open	0	0	0	0	0
2004-01-01 00:00:28.7	L2 password entered	0	0	0	0	0
2004-01-01 00:04:22.2	GB Close	44	0	8	5019	5020
2004-01-01 00:04:27.1	GB Open	12	0	8	5016	5019
2004-06-24 16:08:35.5	GB Close	44	0	8	5025	5025
2004-06-24 16:09:51.0	1270 Over load 2	591	-1	10	4966	4966
2004-06-24 16:09:51.1	GB Open	15	0	7	4976	4960
2004-06-24 16:10:05.5	GB Close	323	-1	10	5003	5003
2004-06-24 16:10:26.1	1260 Over load 1	513	-1	10	4953	4953
2004-06-24 16:10:52.1	1270 Over load 2	559	-1	10	4960	4961
2004-06-24 16:10:52.2	GB Open	13	-2	5	4991	4961
2004-06-24 16:12:08.0	GB Close	44	0	8	5022	5022
2004-06-24 16:12:45.0	GB Open	95	-20	7	4999	4983
2004-06-24 16:12:45.9	3330 Emergency STOP	311	-1	10	4982	4981



The entire log can be saved in Excel format and in that particular program.

Counters

Counters for various values are included, and some of these can be adjusted if necessary, for instance if the unit is installed on an existing gen-set or a new circuit breaker has been installed.

The table shows the adjustable values and their function:

Description	Function	Comment
6081 Running time	Offset adjustment of the total running hours counter.	Counting when the running feedback is present.
6082 GB operations	Offset adjustment of the number of generator breaker operations.	Counting at each GB close command.
6083 MB operations	Offset adjustment of the number of mains breaker operations.	Counting at each MB close command.
6084 kWh reset	Resets the kWh counter.	Automatically resets to OFF after the reset. The reset function cannot be left active.
6085 Attempts	Offset adjustment of the number of start attempts.	Counting at each start attempt.
6086 Running time FP	The running hour counter for the fire pump operation can be reset in this menu.	The running hour counter is shown in the display.

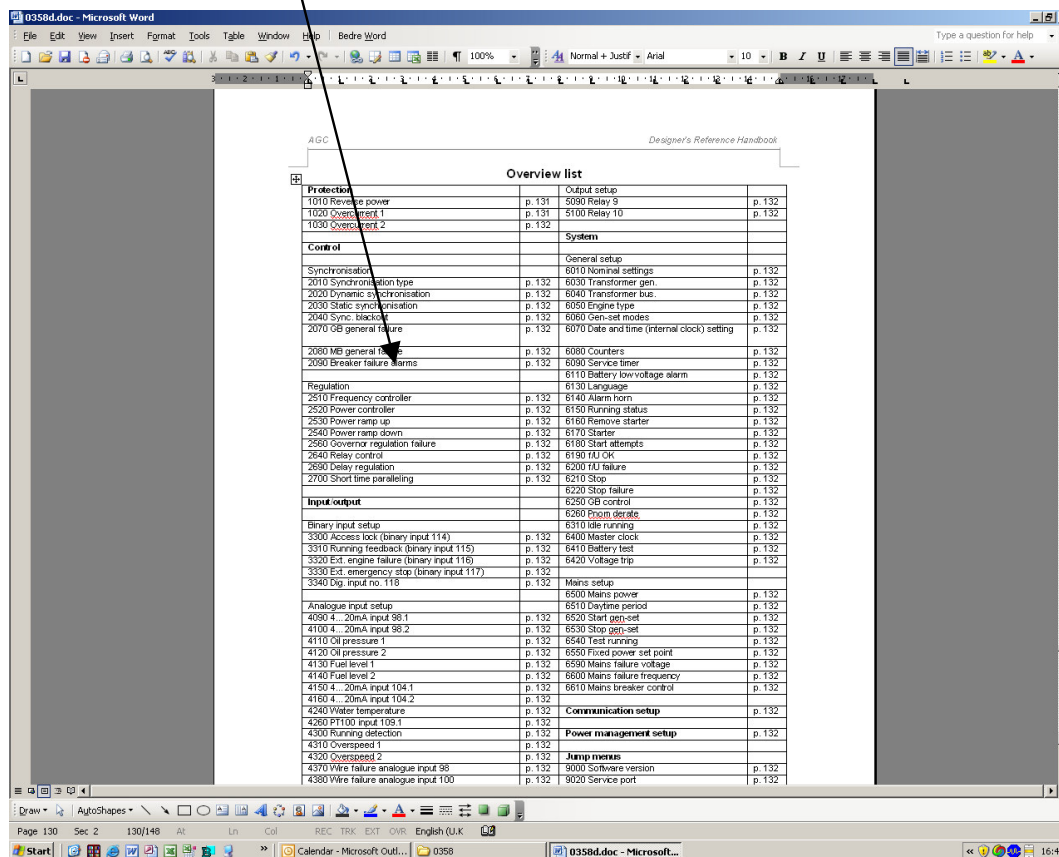
7. Procedure for parameter setup

This chapter deals with the procedure to be followed when the parameters of the unit are set up from the initial point of finding the individual parameter description in this handbook to the actual setup. By use of various illustrations the following will guide the user through the whole procedure for parameter setup step by step.

Finding the selected parameter

The first step in the parameter setup is finding the correct parameter descriptions. All parameter descriptions are located in chapter 8 'Parameter list' which is intended for reference purposes. The descriptions are structured according to their parameter titles and the main parameter group to which they belong.

Find the individual parameter title in the overview list on page 71.



In the overview list you will find the page location of the parameter description you are looking for.

Parameter descriptions

In chapter 8 each parameter description is structured according to the same principles. Under the parameter title heading, the detailed parameter descriptions are illustrated and presented. First, a table indicating the parameter facts related to the individual parameter title is presented:

Menu number indicated in display	Parameter title and menu number	Changeable settings indicated in display	Min. – max. set points		Default set point from factory	
1010 Reverse power						
No.	Setting		Min. setting	Max. setting	Third setting	Factory setting
1011	Reverse power	Set point	-50.0%	0.0%	-	-5.0%
1012	Reverse power	Timer	0.1 s	100.0 s	-	10.0 s
1013	Reverse power	Relay output A	R0 (none)	R3 (relay 3)	-	R0 (none)
1014	Reverse power	Relay output B	R0 (none)	R3 (relay 3)	-	R0 (none)
1015	Reverse power	Enable	OFF	ON	RUN	ON
1016	Reverse power	Fail class	1	5	-	3



Small differences due to the character of the parameters may exist between the individual tables.

The first column indicates the menu number in the display.

The second column indicates the changeable setting in the display.

The third and fourth columns indicate the minimum/maximum set point available for this setting.

The sixth column indicates the default set point of the unit from the factory. When it is necessary, additional information will be supplied after the table in order to make the individual parameter descriptions as informative as possible.

Setup

At this point of the process you will have located the specific parameter description that you were looking for. Now, follow the menu structure presented earlier in this handbook in order to set up the individual parameters. (In this overall example we have chosen to change the set point of the parameter **1010 Reverse power**).

- Step 1: Enter the 'setup' menu via SETUP in the fourth display line in the entry window
- Step 2: Enter the 'protection' menu via PROT in the fourth display line in the setup menu
- Step 3: Enter the 'set point 1' menu via PROT1 in the fourth display line in the setup menu
- Step 4: Use JUMP or the and push-buttons to locate the selected parameter
- Step 5: Enter the 'set point' menu via LIM in the fourth display line
- Step 6: Enter password to change the set point
- Step 7: Use the and push-buttons to increase/decrease the set point setting
- Step 8: Use the 'underscore' to save the new set point setting

8. Parameter list

This chapter includes a complete standard parameter list. Therefore, this part of the handbook is to be used for reference when specific information about the individual parameters is needed for the unit setup. An overview list can be seen on the next page.



The parameter lists for the available options are presented in the documents Description of Options describing the individual options in detail.

Parameter table description

The table consists of the following possible adjustments:

Set point: The alarm set point is adjusted in the set point menu. The setting is a percentage of the nominal values.

Timer: The timer setting is the time that must expire from the alarm level is reached until the alarm occurs.

Relay output A: A relay can be activated by output A.

Relay output B: A relay can be activated by output B.

Enable: The alarm can be activated or deactivated. ON means always activated, RUN means that the alarm has run status. This means it is activated when the running signal is present.

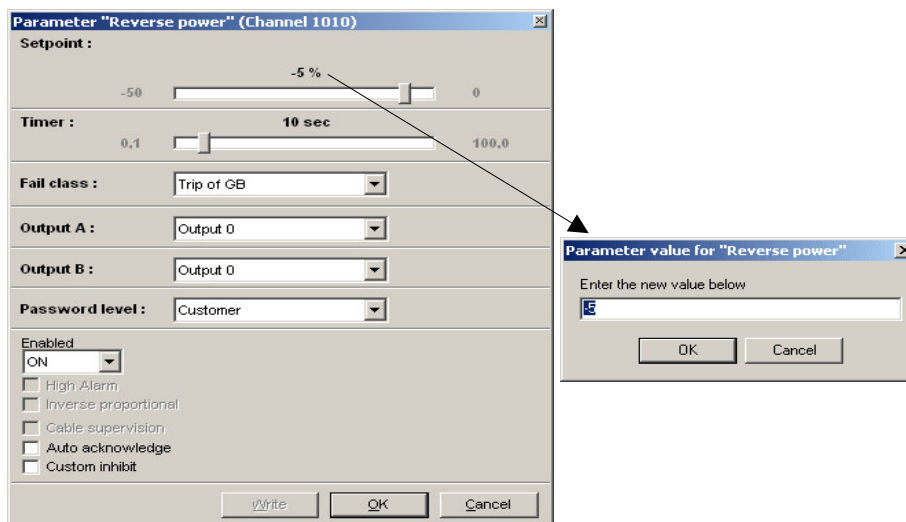
Fail class: When the alarm occurs the unit will react depending on the selected fail class.



Small differences due to the character of the parameters may exist between the individual tables.

It is also possible to configure the parameters by using the PC utility software. It will be possible to make the same configurations as described above.

By using the PC utility software some extra functionalities are available. For all the protections it is possible to make an automatic acknowledgement of the alarm. Usually it is important when the mains protections are used, as the sequences are blocked until the alarm is acknowledged.



Overview list

Protection		4410 Wire failure VDO input 104	p.83
1010 Reverse power	p.72	4420 Wire failure VDO input 105	p.83
1020 Overcurrent 1	p.72	4430 Wire failure VDO input 106	p.84
1030 Overcurrent 2	p.72		
		Output setup	
Synchronization		5090 Relay 9	p.85
2010 Synchronization type	p.73	5100 Relay 10	p.85
2020 Dynamic Synchronization	p.73	5110 Relay 11	p.85
2030 Static Synchronization	p.73	5120 Relay 12	p.85
2040 Sync. blackout	p.73	5130 Relay 13	p.85
2070 GB general failure	p.74	5490 Transistor setup	p.85
2080 MB general failure	p.74		
2090 Breaker failure alarms	p.74	General setup	
2100 Separate Synchronization relay	p.74	6010 Nominal settings 1	p.86
2110 Close before excitation	p.74	6020 Nominal settings 2	p.86
2120 Breaker sequence	p.75	6030 Transformer gen.	p.86
2130 Excitation failure	p.75	6040 Transformer bus.	p.86
		6050 Engine type	p.86
Regulation		6060 Gen-set modes	p.87
2510 Frequency controller	p.76	6070 Date and time (internal clock) setting	p.87
2520 Power controller	p.76	6080 Counters	p.87
2530 Power ramp up	p.76	6090 Service timer	p.87
2540 Power ramp down	p.76	6110 Battery low voltage alarm	p.88
2560 Governor regulation failure	p.76	6120 Battery high voltage alarm	p.88
2640 Relay control	p.77	6130 Language	p.88
2690 Delay regulation	p.77	6140 Alarm horn	p.88
2700 Short time paralleling	p.77	6150 Running status	p.88
		6160 Remove starter	p.88
Binary input setup		6170 Starter	p.88
3260 Dig. input no. 110	p.78	6180 Start attempts	p.89
3270 Dig. input no. 111	p.78	6190 f/U OK	p.89
3280 Dig. input no. 112	p.78	6200 f/U failure	p.89
3290 Dig. input no. 113	p.78	6210 Stop	p.89
3300 Access lock (binary input 114)	p.78	6220 Stop failure	p.89
3310 Running feedback (binary input 115)	p.79	6250 GB control	p.89
3320 Ext. engine failure (binary input 116)	p.79	6260 Pnom derate	p.89
3330 Ext. emergency stop (binary input 117)	p.79	6310 Idle running	p.90
3340 Dig. input no. 118	p.79	6400 Master clock	p.90
		6410 Battery test	p.90
Analogue input setup		6420 Voltage trip	p.90
4090 4...20mA input 98.1	p.80		
4100 4...20mA input 98.2	p.80	Mains setup	
4110 Oil pressure 1 (4...20mA input 100.1)	p.80	6500 Mains power	p.91
4120 Oil pressure 2	p.80	6510 Daytime period	p.91
4130 Fuel level 1 (4...20mA input 102.1)	p.81	6520 Start gen-set	p.91
4140 Fuel level 2	p.81	6530 Stop gen-set	p.91
4170 VDO 104.1	p.81	6540 Test running	p.91
4180 VDO 104.2	p.81	6550 Fixed power set point	p.91
4190 VDO 105.1	p.81	6590 Mains failure voltage	p.92
4200 VDO 105.2	p.82	6600 Mains failure frequency	p.92
4210 VDO 106.1	p.82	6610 Mains breaker control	p.92
4220 VDO 106.2	p.82		
4300 Running detection	p.82	Jump menus	
4310 Overspeed 1	p.82	9000 Software version	p.93
4320 Overspeed 2	p.83	9020 Service port	p.93
4370 Wire failure analogue input 98	p.83	911X User password	p.93
4380 Wire failure analogue input 100	p.83	9120 Service menu	p.93
4390 Wire failure analogue input 102	p.83	9130 Single phase/split phase/three phase	p.93

Protection

1010 Reverse power

No.	Setting		Min. setting	Max. setting	Third setting	Factory setting
1011	Reverse power	Set point	-50.0%	0.0%	-	-5.0%
1012	Reverse power	Timer	0.1 s	100.0 s	-	10.0 s
1013	Reverse power	Relay output A	R0 (none)	Option dependent	-	R0 (none)
1014	Reverse power	Relay output B	R0 (none)		-	R0 (none)
1015	Reverse power	Enable	OFF	ON	RUN	ON
1016	Reverse power	Fail class	Alarm (1)	Trip MB (6)	-	Trip GB (3)

1020 Overcurrent 1

No.	Setting		Min. setting	Max. setting	Third setting	Factory setting
1021	Overcurrent 1	Set point	50.0%	200.0%	-	115.0%
1022	Overcurrent 1	Timer	0.1 s	100.0 s	-	10.0 s
1023	Overcurrent 1	Relay output A	R0 (none)	Option dependent	-	R0 (none)
1024	Overcurrent 1	Relay output B	R0 (none)		-	R0 (none)
1025	Overcurrent 1	Enable	OFF	ON	RUN	ON
1026	Overcurrent 1	Fail class	Alarm (1)	Trip MB (6)	-	Warning (2)

1030 Overcurrent 2

No.	Setting		Min. setting	Max. setting	Third setting	Factory setting
1031	Overcurrent 2	Set point	50.0%	200.0%	-	120.0%
1032	Overcurrent 2	Timer	0.1 s	100.0 s	-	5.0 s
1033	Overcurrent 2	Relay output A	R0 (none)	Option dependent	-	R0 (none)
1034	Overcurrent 2	Relay output B	R0 (none)		-	R0 (none)
1035	Overcurrent 2	Enable	OFF	ON	RUN	ON
1116	Overcurrent 2	Fail class	Alarm (1)	Trip MB (6)	-	Trip GB (3)

Control

This setup menu consists of the synchronization setup and the regulation setup.

Synchronization

2010 Synchronization type

No.	Setting		First setting	Second setting	Factory setting
2011	Sync. type	Sync. type	Static sync.	Dynamic sync.	Dynamic sync.

If dynamic synchronization is chosen, the next menu will be **2020 Dynamic Synchronization**. If static synchronization is chosen, the next menu will be **2030 Static Synchronization**.

2020 Dynamic Synchronization

No.	Setting		Min. setting	Max. setting	Factory setting
2021	Dynamic sync.	df max.	0.0Hz	0.5Hz	0.3Hz
2022	Dynamic sync.	df min.	-0.5Hz	0.5Hz	0.0Hz
2023	Dynamic sync.	dU max.	2%	10%	5%
2024	Dynamic sync.	Breaker delay	40 ms	300 ms	50 ms

2030 Static Synchronization

No.	Setting		Min. setting	Max. setting	Factory setting
2031	Static sync.	Maximum df	0.00Hz	0.50Hz	0.10Hz
2032	Static sync.	Maximum dU	2%	10%	5%
2033	Static sync.	Close window	0.1 deg.	20.0 deg.	10.0 deg.
2034	Static sync.	Phase K_P	0	1000	10
2035	Static sync.	Phase K_I	0	1000	10

2040 Sync. blackout

No.	Setting		Min. setting	Max. setting	Factory setting
2041	Sync. blackout	df max.	0.0Hz	5.0Hz	3.0Hz
2042	Sync. blackout	dU max.	2%	10%	5%

Settings are accepted limits (generator voltage and frequency) for closing the generator and mains breaker. The values are according to nominal values.

Example:

f_{NOM} and U_{NOM} = 50 Hertz and 400 volts.

With factory settings the breaker is able to close, if the frequency is between 47 and 53 Hertz and the voltage is between 380 and 420 volts.

2120 Breaker sequence

No.	Setting		Min. setting	Max. setting	Factory setting
2121	Breaker seq.	Break	Close GB	Close GB+TB	Close GB
2122	Breaker seq.	Timer	0.0 s	999.0 s	5.0 s
2123	Breaker seq.	Run 90	0 RPM	4000 RPM	1450 RPM

2130 Excitation failure

No.	Setting		Min. setting	Max. setting	Factory setting
2131	Excit. failure	Timer	0.0 s	999.0 s	5.0 s
2132	Excit. failure	Relay output A	R0 (none)	Option dependent	R0 (none)
2133	Excit. failure	Relay output B	R0 (none)		R0 (none)
2134	Excit. failure	Enable	OFF	ON	OFF
2135	Excit. failure	Fail class	Alarm (1)	Trip MB (6)	Warning (2)

Regulation

2510 Frequency controller

No.	Setting		Min. setting	Max. setting	Factory setting
2511	Freq. control	Dead band	0.2%	10.0%	1.0%
2512	Freq. control	F K _P	0	1000	10
2513	Freq. control	F K _I	0	1000	10

Frequency % settings relate to nominal generator frequency (setting 6011). It is used for frequency control (fixed frequency or load sharing) when the breaker is closed, and for synchronizing if the breaker is open.

2520 Power controller

No.	Setting		Min. setting	Max. setting	Factory setting
2521	Power control	Dead band	0.2%	10.0%	2.0%
2522	Power control	P K _P	0	1000	10
2523	Power control	P K _I	0	1000	10

Power % settings relate to nominal generator power.

2530 Power ramp up

No.	Setting		Min. setting	Max. setting	Factory setting
2531	Power ramp up	Speed	1.0%/s	20.0%/s	2.0%/s
2532	Power ramp up	Delay point	1%	100%	10%
2533	Power ramp up	Delay time	0.0 s	180.0 s	10.0 s

The delay point determines when the generator will make a temporary stop ramping up after closing of the generator breaker to preheat the engine before commencing load taking. The time duration of this point is determined by the delay time setting. If the delay function is not needed, set this time to 0. Power % settings relate to nominal generator power.

2540 Power ramp down

No.	Setting		Min. setting	Max. setting	Factory setting
2541	Power ramp down	Speed	0.1%/s	20.0%/s	10.0%/s
2542	Power ramp down	Breaker open set point	1%	20%	5%
2543	Power ramp down	Fail class	1	6	2 (warning)

The breaker open point determines when the 'open breaker' relay output is activated to open the generator breaker before reaching 0 kW. Power % settings relate to nominal generator power.

2560 Governor regulation failure

No.	Setting		Min. setting	Max. setting	Factory setting
2561	Governor reg. failure	Reg. error	1.0%	100.0%	30.0%
2562	Governor reg. failure	Timer	10.0 s	360.0 s	60.0 s
2563	Governor reg. failure	Output A	R0 (none)	Option dependent	R0 (none)
2564	Governor reg. failure	Output B	R0 (none)		R0 (none)

The alarm is activated, if the difference between the measured value and the set point is outside the set point for a longer time period than specified by the timer set point.

2640 Relay control

No.	Setting		Min. setting	Max. setting	Factory setting
2641	Relay control	GOV ON time	10 ms	3000 ms	500 ms
2642	Relay control	GOV per. time	50 ms	15000 ms	2500 ms

2690 Delay regulation

No.	Setting		Min. setting	Max. setting	Factory setting
2691	Delay regulation	Timer	0 s	9900 s	0 s
2692	Delay regulation	Output A	R0 (none)	Option dependent	R0 (none)
2693	Delay regulation	Output B	R0 (none)		R0 (none)
2694	Delay regulation	Enable	OFF	ON	OFF

2700 Short time paralleling

No.	Setting		Min. setting	Max. setting	Factory setting
2701	Short paralleling	Enable	OFF	ON	OFF
2702	Short paralleling	Timer	0.10 s	99.90 s	0.30 s

Input/output

This menu consists of parameters for configuration of the inputs and outputs.

Binary input setup

3260 Dig. input no. 110

No.	Setting		Min. setting	Max. setting	Third setting	Factory setting
3261	Dig. input no. 110	Timer	0.0 s	100.0 s	-	10.0 s
3262	Dig. input no. 110	Relay output A	R0 (none)	Option dependent	-	R0 (none)
3263	Dig. input no. 110	Relay output B	R0 (none)		-	R0 (none)
3264	Dig. input no. 110	Enable	OFF	ON	RUN	OFF
3265	Dig. input no. 110	Fail class	Alarm (1)	Trip MB (6)	-	Warning (2)
3266	Dig. input no. 110	Type	N/O	N/C	-	N/O

3270 Dig. input no. 111

No.	Setting		Min. setting	Max. setting	Third setting	Factory setting
3271	Dig. input no. 111	Timer	0.0 s	100.0 s	-	10.0 s
3272	Dig. input no. 111	Relay output A	R0 (none)	Option dependent	-	R0 (none)
3273	Dig. input no. 111	Relay output B	R0 (none)		-	R0 (none)
3274	Dig. input no. 111	Enable	OFF	ON	RUN	OFF
3275	Dig. input no. 111	Fail class	Alarm (1)	Trip MB (6)	-	Warning (2)
3276	Dig. input no. 111	Type	N/O	N/C	-	N/O

3280 Dig. input no. 112

No.	Setting		Min. setting	Max. setting	Third setting	Factory setting
3281	Dig. input no. 112	Timer	0.0 s	100.0 s	-	10.0 s
3282	Dig. input no. 112	Relay output A	R0 (none)	Option dependent	-	R0 (none)
3283	Dig. input no. 112	Relay output B	R0 (none)		-	R0 (none)
3284	Dig. input no. 112	Enable	OFF	ON	RUN	OFF
3285	Dig. input no. 112	Fail class	Alarm (1)	Trip MB (6)	-	Warning (2)
3286	Dig. input no. 112	Type	N/O	N/C	-	N/O

3290 Dig. input no. 113

No.	Setting		Min. setting	Max. setting	Third setting	Factory setting
3291	Dig. input no. 113	Timer	0.0 s	100.0 s	-	10.0 s
3292	Dig. input no. 113	Relay output A	R0 (none)	Option dependent	-	R0 (none)
3293	Dig. input no. 113	Relay output B	R0 (none)		-	R0 (none)
3294	Dig. input no. 113	Enable	OFF	ON	RUN	OFF
3295	Dig. input no. 113	Fail class	Alarm (1)	Trip MB (6)	-	Warning (2)
3296	Dig. input no. 113	Type	N/O	N/C	-	N/O

3300 Access lock (binary input 114)

No.	Setting		Min. setting	Max. setting	Third setting	Factory setting
3301	Access lock	Timer	0.0 s	180.0 s	-	10.0 s
3302	Access lock	Relay output A	R0 (none)	Option dependent	-	R0 (none)
3303	Access lock	Relay output B	R0 (none)		-	R0 (none)
3304	Access lock	Enable	OFF	ON	RUN	OFF
3305	Access lock	Fail class	Alarm (1)	Trip MB (6)	-	Warning (2)
3306	Access lock	Type	N/O	N/C	-	N/O

3310 Running feedback (binary input 115)

No.	Setting		Min. setting	Max. setting	Third setting	Factory setting
3311	Run. feedback	Timer	0.0 s	180.0 s	-	10.0 s
3312	Run. feedback	Relay output A	R0 (none)	Option dependent	-	R0 (none)
3313	Run. feedback	Relay output B	R0 (none)		-	R0 (none)
3314	Run. feedback	Enable	OFF	ON	RUN	OFF
3315	Run. feedback	Fail class	Alarm (1)	Trip MB (6)	-	Warning (2)
3316	Run. feedback	Type	N/O	N/C	-	N/O

3320 Ext. engine failure (binary input 116)

No.	Setting		Min. setting	Max. setting	Third setting	Factory setting
3321	Engine failure	Timer	0.0 s	180.0 s	-	10.0 s
3322	Engine failure	Relay output A	R0 (none)	Option dependent	-	R0 (none)
3323	Engine failure	Relay output B	R0 (none)		-	R0 (none)
3324	Engine failure	Enable	OFF	ON	RUN	OFF
3325	Engine failure	Fail class	Alarm (1)	Trip MB (6)	-	Shutdown (5)
3326	Engine failure	Type	N/O	N/C	-	N/O

3330 Ext. emergency stop (binary input 117)

No.	Setting		Min. setting	Max. setting	Third setting	Factory setting
3331	Emergency STOP	Timer	0.0 s	60.0 s	-	0.0 s
3332	Emergency STOP	Relay output A	R0 (none)	Option dependent	-	R0 (none)
3333	Emergency STOP	Relay output B	R0 (none)		-	R0 (none)
3334	Emergency STOP	Enable	OFF	ON	RUN	OFF
3335	Emergency STOP	Fail class	Alarm (1)	Trip MB (6)	-	Shutdown (5)
3336	Emergency STOP	Type	N/O	N/C	-	N/O

3340 Dig. input no. 118

No.	Setting		Min. setting	Max. setting	Third setting	Factory setting
3341	Dig. input no. 118	Timer	0.0 s	100.0 s	-	10.0 s
3342	Dig. input no. 118	Relay output A	R0 (none)	Option dependent	-	R0 (none)
3343	Dig. input no. 118	Relay output B	R0 (none)		-	R0 (none)
3344	Dig. input no. 118	Enable	OFF	ON	RUN	OFF
3345	Dig. input no. 118	Fail class	Alarm (1)	Trip MB (6)	-	Warning (2)
3346	Dig. input no. 118	Type	N/O	N/C	-	N/O

Analogue input setup

4090 4...20mA input 98.1



The input is not configurable in the peak shaving mode, load takeover mode and mains power export, because it is used as a mains power input.

No.	Setting		Min. setting	Max. setting	Third setting	Factory setting
4091	4...20mA input 98.1	Set point	4mA	20mA	-	10mA
4092	4...20mA input 98.1	Timer	0.0 s	600.0 s	-	120.0 s
4093	4...20mA input 98.1	Relay output A	R0 (none)	Option dependent	-	R0 (none)
4094	4...20mA input 98.1	Relay output B	R0 (none)		-	R0 (none)
4095	4...20mA input 98.1	Enable	OFF	ON	RUN	OFF
4096	4...20mA input 98.1	Fail class	Alarm (1)	Trip MB (6)	-	Warning (2)

4100 4...20mA input 98.2



The input is not configurable in the peak shaving mode, load takeover mode and mains power export, because it is used as a mains power input.

No.	Setting		Min. setting	Max. setting	Third setting	Factory setting
4101	4...20mA input 98.2	Set point	4mA	20mA	-	10mA
4102	4...20mA input 98.2	Timer	0.0 s	600.0 s	-	120.0 s
4103	4...20mA input 98.2	Relay output A	R0 (none)	Option dependent	-	R0 (none)
4104	4...20mA input 98.2	Relay output B	R0 (none)		-	R0 (none)
4105	4...20mA input 98.2	Enable	OFF	ON	RUN	OFF
4106	4...20mA input 98.2	Fail class	Alarm (1)	Trip MB (6)	-	Warning (2)

4110 Oil pressure 1 (4...20mA input 100.1)

No.	Setting		Min. setting	Max. setting	Third setting	Factory setting
4111	Oil pressure 1	Set point	0 bar	50 bar	-	10 bar
4112	Oil pressure 1	Timer	0.0 s	180.0 s	-	5.0 s
4113	Oil pressure 1	Relay output A	R0 (none)	Option dependent	-	R0 (none)
4114	Oil pressure 1	Relay output B	R0 (none)		-	R0 (none)
4115	Oil pressure 1	Enable	OFF	ON	RUN	OFF
4116	Oil pressure 1	Fail class	Alarm (1)	Trip MB (6)	-	Warning (2)

4120 Oil pressure 2 (4...20mA input 100.2)

No.	Setting		Min. setting	Max. setting	Third setting	Factory setting
4121	Oil pressure 2	Set point	0 bar	50 bar	-	10 bar
4122	Oil pressure 2	Timer	0.0 s	180.0 s	-	5.0 s
4123	Oil pressure 2	Relay output A	R0 (none)	Option dependent	-	R0 (none)
4124	Oil pressure 2	Relay output B	R0 (none)		-	R0 (none)
4125	Oil pressure 2	Enable	OFF	ON	RUN	OFF
4126	Oil pressure 2	Fail class	Alarm (1)	Trip MB (6)	-	Warning (2)

4130 Fuel level 1 (4...20mA input 102.1)

No.	Setting		Min. setting	Max. setting	Third setting	Factory setting
4131	4...20mA input 102.1	Set point	0%	120%	-	10%
4132	4...20mA input 102.1	Timer	0.0 s	600.0 s	-	120.0 s
4133	4...20mA input 102.1	Relay output A	R0 (none)	Option dependent	-	R0 (none)
4134	4...20mA input 102.1	Relay output B	R0 (none)		-	R0 (none)
4135	4...20mA input 102.1	Enable	OFF	ON	RUN	OFF
4136	4...20mA input 102.1	Fail class	Alarm (1)	Trip MB (6)	-	Warning (2)

4140 Fuel level 2 (4...20mA input 102.2)

No.	Setting		Min. setting	Max. setting	Third setting	Factory setting
4141	4...20mA input 102.2	Set point	0%	120%	-	10%
4142	4...20mA input 102.2	Timer	0.0 s	600.0 s	-	120.0 s
4143	4...20mA input 102.2	Relay output A	R0 (none)	Option dependent	-	R0 (none)
4144	4...20mA input 102.2	Relay output B	R0 (none)		-	R0 (none)
4145	4...20mA input 102.2	Enable	OFF	ON	RUN	OFF
4146	4...20mA input 102.2	Fail class	Alarm (1)	Trip MB (6)	-	Warning (2)

4170 VDO 104.1

No.	Setting		Min. setting	Max. setting	Third setting	Factory setting
4171	VDO 104.1	Set point	0.0 bar	10.0 bar	-	4.0 bar
4172	VDO 104.1	Timer	0.0 s	100.0 s	-	5.0 s
4173	VDO 104.1	Relay output A	R0 (none)	Option dependent	-	R0 (none)
4174	VDO 104.1	Relay output B	R0 (none)		-	R0 (none)
4175	VDO 104.1	Enable	OFF	ON	RUN	OFF
4176	VDO 104.1	Fail class	Alarm (1)	Trip MB (6)	-	Warning (2)

4180 VDO 104.2

No.	Setting		Min. setting	Max. setting	Third setting	Factory setting
4181	VDO 104.2	Set point	0.0 bar	10.0 bar	-	5.0 bar
4182	VDO 104.2	Timer	0.0 s	100.0 s	-	5.0 s
4183	VDO 104.2	Relay output A	R0 (none)	Option dependent	-	R0 (none)
4184	VDO 104.2	Relay output B	R0 (none)		-	R0 (none)
4185	VDO 104.2	Enable	OFF	ON	RUN	OFF
4186	VDO 104.2	Fail class	Alarm (1)	Trip MB (6)	-	Trip/stop (4)

4190 VDO 105.1

No.	Setting		Min. setting	Max. setting	Third setting	Factory setting
4191	VDO 105.1	Set point	40 deg.	150 deg.	-	100 deg.
4192	VDO 105.1	Timer	0.0 s	100.0 s	-	5.0 s
4193	VDO 105.1	Relay output A	R0 (none)	Option dependent	-	R0 (none)
4194	VDO 105.1	Relay output B	R0 (none)		-	R0 (none)
4195	VDO 105.1	Enable	OFF	ON	RUN	OFF
4196	VDO 105.1	Fail class	Alarm (1)	Trip MB (6)	-	Warning (2)

4200 VDO 105.2

No.	Setting		Min. setting	Max. setting	Third setting	Factory setting
4201	VDO 105.2	Set point	40 deg.	150 deg.	-	110 deg.
4202	VDO 105.2	Timer	0.0 s	100.0 s	-	5.0 s
4203	VDO 105.2	Relay output A	R0 (none)	Option dependent	-	R0 (none)
4204	VDO 105.2	Relay output B	R0 (none)		-	R0 (none)
4205	VDO 105.2	Enable	OFF	ON	RUN	OFF
4206	VDO 105.2	Fail class	Alarm (1)	Trip MB (6)	-	Trip/stop (4)

4210 VDO 106.1

No.	Setting		Min. setting	Max. setting	Third setting	Factory setting
4211	VDO 106.1	Set point	0%	100%	-	10%
4212	VDO 106.1	Timer	0.0 s	100.0 s	-	10.0 s
4213	VDO 106.1	Relay output A	R0 (none)	Option dependent	-	R0 (none)
4214	VDO 106.1	Relay output B	R0 (none)		-	R0 (none)
4215	VDO 106.1	Enable	OFF	ON	RUN	OFF
4216	VDO 106.1	Fail class	Alarm (1)	Trip MB (6)	-	Warning (2)

4220 VDO 106.2

No.	Setting		Min. setting	Max. setting	Third setting	Factory setting
4221	VDO 106.2	Set point	0%	100%	-	5%
4222	VDO 106.2	Timer	0.0 s	100.0 s	-	10.0 s
4223	VDO 106.2	Relay output A	R0 (none)	Option dependent	-	R0 (none)
4224	VDO 106.2	Relay output B	R0 (none)		-	R0 (none)
4225	VDO 106.2	Enable	OFF	ON	RUN	OFF
4226	VDO 106.2	Fail class	Alarm (1)	Trip MB (6)	-	Trip/stop (4)

4300 Running detection

This set point is used to define the level where the gen-set is recognised as running. When this RPM level is reached, the automatic running detection is enabled (**6150 Running status**).

Also take notice of the menu 'remove starter' set point (**6160 Remove starter**).

No.	Setting		Min. setting	Max. setting	Factory setting
4301	Running detection	Set point	1 RPM	4000 RPM	1000 RPM
4302	Running detection	Type	Frequency detection		X
	Running detection	Type	Tacho		
	Running detection	Type	Binary input		
	Running detection	Type	Engine I/F communication		

4310 Overspeed 1

No.	Setting		Min. setting	Max. setting	Factory setting
4311	Overspeed 1	Set point	1 RPM	4000 RPM	1450 RPM
4312	Overspeed 1	Timer	0.0 s	100.0 s	5.0 s
4313	Overspeed 1	Relay output A	R0 (none)	Option dependent	R0 (none)
4314	Overspeed 1	Relay output B	R0 (none)		R0 (none)
4315	Overspeed 1	Enable	OFF	ON	OFF
4316	Overspeed 1	Fail class	Alarm (1)	Trip MB (6)	Warning (2)

4320 Overspeed 2

No.	Setting		Min. setting	Max. setting	Factory setting
4321	Overspeed 2	Set point	1 RPM	4000 RPM	1750 RPM
4322	Overspeed 2	Timer	0.0 s	100.0 s	1.0 s
4323	Overspeed 2	Relay output A	R0 (none)	Option	R0 (none)
4324	Overspeed 2	Relay output B	R0 (none)	dependent	R0 (none)
4325	Overspeed 2	Enable	OFF	ON	OFF
4326	Overspeed 2	Fail class	Alarm (1)	Trip MB (6)	Shutdown (5)

4370 Wire failure analogue input 98

No.	Setting		Min. setting	Max. setting	Factory setting
4371	W. fail. ana. 98	Output A	R0 (none)	Option	R0 (none)
4372	W. fail. ana. 98	Output B	R0 (none)	dependent	R0 (none)
4373	W. fail. ana. 98	Enable	OFF	ON	OFF
4374	W. fail. ana. 98	Fail class	Alarm (1)	Trip MB (6)	Warning (2)

4380 Wire failure analogue input 100

No.	Setting		Min. setting	Max. setting	Factory setting
4381	W. fail. ana. 100	Output A	R0 (none)	Option	R0 (none)
4382	W. fail. ana. 100	Output B	R0 (none)	dependent	R0 (none)
4383	W. fail. ana. 100	Enable	OFF	ON	OFF
4384	W. fail. ana. 100	Fail class	Alarm (1)	Trip MB (6)	Warning (2)

4390 Wire failure analogue input 102

No.	Setting		Min. setting	Max. setting	Factory setting
4391	W. fail. ana. 102	Output A	R0 (none)	Option	R0 (none)
4392	W. fail. ana. 102	Output B	R0 (none)	dependent	R0 (none)
4393	W. fail. ana. 102	Enable	OFF	ON	OFF
4394	W. fail. ana. 102	Fail class	Alarm (1)	Trip MB (6)	Warning (2)

4410 Wire failure VDO input 104

No.	Setting		Min. setting	Max. setting	Factory setting
4411	W. fail. VDO 104	Max.	60%	100%	100%
4412	W. fail. VDO 104	Min.	0%	40%	0%
4413	W. fail. VDO 104	Output A	R0 (none)	Option	R0 (none)
4414	W. fail. VDO 104	Output B	R0 (none)	dependent	R0 (none)
4415	W. fail. VDO 104	Enable	OFF	ON	OFF
4416	W. fail. VDO 104	Fail class	Alarm (1)	Trip MB (6)	Warning (2)

4420 Wire failure VDO input 105

No.	Setting		Min. setting	Max. setting	Factory setting
4421	W. fail. VDO 105	Max.	60%	100%	100%
4422	W. fail. VDO 105	Min.	0%	40%	0%
4423	W. fail. VDO 105	Output A	R0 (none)	Option	R0 (none)
4424	W. fail. VDO 105	Output B	R0 (none)	dependent	R0 (none)
4425	W. fail. VDO 105	Enable	OFF	ON	OFF
4426	W. fail. VDO 105	Fail class	Alarm (1)	Trip MB (6)	Warning (2)

4430 Wire failure VDO input 106

No.	Setting		Min. setting	Max. setting	Factory setting
4431	W. fail. VDO 106	Max.	60%	100%	100%
4432	W. fail. VDO 106	Min.	0%	40%	0%
4433	W. fail. VDO 106	Output A	R0 (none)	Option dependent	R0 (none)
4434	W. fail. VDO 106	Output B	R0 (none)		R0 (none)
4435	W. fail. VDO 106	Enable	OFF	ON	OFF
4436	W. fail. VDO 106	Fail class	Alarm (1)	Trip MB (6)	Warning (2)

Output setup

5090 Relay 9

The relay 9 is available, if options D1 are not selected and analogue governor outputs are not used.

No.	Setting		First/min. setting	Second/max. setting	Third setting	Factory setting
5091	Relay 9	Function	Alarm	Limit	Horn	Alarm
5092	Relay 9	Off delay	0.0 s	999.9 s	-	5.0 s

5100 Relay 10

The relay 10 is available, if options D1 are not selected and analogue governor outputs are not used.

No.	Setting		First/min. setting	Second/max. setting	Third setting	Factory setting
5101	Relay 10	Function	Alarm	Limit	Horn	Alarm
5102	Relay 10	Off delay	0.0 s	999.9 s	-	5.0 s

5110 Relay 11

No.	Setting		First/min. setting	Second/max. setting	Third setting	Factory setting
5111	Relay 11	Function	Alarm	Limit	Horn	Alarm
5112	Relay 11	Off delay	0.0 s	999.9 s	-	5.0 s

5120 Relay 12

The relay 12 is available, if 'Continues' is selected in menu 5491.

No.	Setting		First/min. setting	Second/max. setting	Third setting	Factory setting
5121	Relay 12	Function	Alarm	Limit	Horn	Alarm
5122	Relay 12	Off delay	0.0 s	999.9 s	-	5.0 s

5130 Relay 13

The relay 13 is available, if 'Continues' is selected in menu 5492.

No.	Setting		First/min. setting	Second/max. setting	Third setting	Factory setting
5131	Relay 13	Function	Alarm	Limit	Horn	Alarm
5132	Relay 13	Off delay	0.0 s	999.9 s	-	5.0 s

5490 Transistor setup

The transistor outputs on terminals 20 and 21 can be configured as constant or pulse signals. If 'Continues' is selected, the relays 12 and 13 will be available.

No.	Setting		First/min. setting	Second/max. setting	Factory setting
5491	Transistor 20	T20	Continues	kWh	kWh
5492	Transistor 21	T21	Continues	kVar	kVarh



If the transistor outputs are set to 'Continues', external relays are needed due to the limited current output of the transistors. Max 10mA.

System

The menu includes parameters for the system setup.

General setup

6010 Nominal settings 1

No.	Setting		Min. setting	Max. setting	Factory setting
6011	Nominal settings 1	Frequency	48.0Hz	62.0Hz	50.0Hz
6012	Nominal settings 1	Generator power	10kW	20000kW	480kW
6013	Nominal settings 1	Generator current	0A	9000A	867A
6014	Nominal settings 1	Generator volt.	100V	25000V	400V

6020 Nominal settings 2

No.	Setting		Min. setting	Max. setting	Factory setting
6021	Nominal settings 2	Frequency	48.0Hz	62.0Hz	60.0Hz
6022	Nominal settings 2	Generator power	10kW	20000kW	285kW
6023	Nominal settings 2	Generator current	0A	9000A	345A
6024	Nominal settings 2	Generator volt.	100V	25000V	480V
6025	Nominal settings 2	Set	OFF	2	OFF

6030 Transformer gen.

No.	Setting		Min. setting	Max. setting	Factory setting
6031	Transformer gen.	Volt. prim.	100V	25000V	400V
6032	Transformer gen.	Volt. sec.	100V	690V	400V
6033	Transformer gen.	Current prim.	5A	9000A	1000A
6034	Transformer gen.	Current sec.	1A	5A	5A



If no voltage transformer is present, the primary and secondary side values are set to generator nominal value.

6040 Transformer bus.

No.	Setting		Min. setting	Max. setting	Factory setting
6041	Transformer bus.	Volt. prim.	100V	25000V	400V
6042	Transformer bus.	Volt. sec.	100V	690V	400V



If no voltage transformer is present, the primary and secondary side values are set to generator nominal value.

6050 Engine type

No.	Setting		First setting	Second setting	Factory setting
6051	Engine type	Engine type	Diesel engine	None	Diesel engine



It is only possible to select diesel engine.

6060 Gen-set modes

No.	Setting		Setting	Factory setting
6061	Gen-set mode	Island operation	Island operation	-
	Gen-set mode	AMF	AMF	AMF
	Gen-set mode	Peak shaving	Peak shaving	-
	Gen-set mode	Fixed power	Fixed power	-
	Gen-set mode	Mains power export	Mains power export	-
	Gen-set mode	Load take over	Load take over	-

6070 Date and time (internal clock) setting



The date and time can easily be synchronized with the present time and date from the utility software.

No.	Setting		Min. setting	Max. setting	Factory setting
6071	Date and time	Year	2001	2100	Depending on the software version
6072	Date and time	Month	1	12	
6073	Date and time	Day	1	31	
6074	Date and time	Weekday	1	7	
6075	Date and time	Hour	0	23	
6076	Date and time	Minute	0	59	

6080 Counters

The settings below (except kWh) are offset values that need to be adjusted at the commissioning if the display is used for reading the values. A breaker operation is counted each time the breaker closes.

The setting 'reset kWh counter' resets the value of the produced kWh.

No.	Setting		Min. setting	Max. setting	Factory setting
6081	Counters	Running time	0	20000	0
6082	Counters	GB operations	0	20000	0
6083	Counters	MB operations	0	20000	0
6084	Counters	kWh	OFF	ON	OFF
6085	Counters	Start attempts	0	20000	0

6090 Service timer

The function of the service timer enables the user to get an alarm when service of the gen-set is needed. The timer is reset when the alarm is acknowledged or when the timer is disabled and enabled again.

No.	Setting		Min. setting	Max. setting	Factory setting
6091	Service timer	Set point	0 h	9000 h	500 h
6092	Service timer	Relay output A	R0 (none)	Option dependent	R0 (none)
6093	Service timer	Relay output B	R0 (none)		R0 (none)
6094	Service timer	Enable	OFF	ON	ON
6095	Service timer	Fail class	Alarm (1)	Trip MB (6)	Warning (2)

6110 Battery low voltage alarm

No.	Setting		Min. setting	Max. setting	Factory setting
6111	Battery low V	Set point	8/15.0V	32.0V	18.0V
6112	Battery low V	Timer	0.0 s	999.0 s	1.0 s
6113	Battery low V	Relay output A	R0 (none)	Option dependent	R0 (none)
6114	Battery low V	Relay output B	R0 (none)		R0 (none)
6115	Battery low V	Enable	OFF	ON	ON

The alarm is for the auxiliary power supply measured on terminal 1 and 2.

6120 Battery high voltage alarm

No.	Setting		Min. setting	Max. setting	Factory setting
6121	Battery high V	Set point	12.0V	36.0V	30.0V
6122	Battery high V	Timer	0.0 s	999.0 s	1.0 s
6123	Battery high V	Relay output A	R0 (none)	Option dependent	R0 (none)
6124	Battery high V	Relay output B	R0 (none)		R0 (none)
6125	Battery high V	Enable	OFF	ON	ON

The alarm is for the auxiliary power supply measured on terminals 1 and 2.

6130 Language

No.	Setting		Setting	Factory setting
6130	Language	Selection display	-	-
6131	Language	English	English	English
			Language 1-11	-

6140 Alarm horn

No.	Setting		Min. setting	Max. setting	Factory setting
6141	Alarm horn	Timer	0.0 s	990.0 s	20.0 s

The setting is the maximum time the horn relay activates at an alarm. If the setting is adjusted to 0 s, the horn relay will be activated continuously until the alarm is acknowledged.

6150 Running status

No.	Setting		Min. setting	Max. setting	Factory setting
6151	Run status	Timer	0.0 s	300.0 s	5.0 s
6152	Run status	Relay output A	R0 (none)	Option dependent	R0 (none)
6153	Run status	Relay output B	R0 (none)		R0 (none)
6154	Run status	Enable	OFF	ON	OFF

6160 Remove starter

No.	Setting		Min. setting	Max. setting	Factory setting
6161	Remove starter	Set point	1 RPM	2000 RPM	400 RPM
6162	Remove starter	Number of teeth	0 teeth	500 teeth	0 teeth

6170 Starter

No.	Setting		Min. setting	Max. setting	Factory setting
6171	Starter	Start prepare	0.0 s	600.0 s	5.0 s
6172	Starter	Start ON time	1.0 s	30.0 s	5.0 s
6173	Starter	Start OFF time	1.0 s	99.0 s	5.0 s

6180 Start attempts

No.	Setting		Min. setting	Max. setting	Factory setting
6181	Start attempts	Attempts	1	10	3
6182	Start attempts	Relay output A	R0 (none)	Option dependent	R0 (none)
6183	Start attempts	Relay output B	R0 (none)		R0 (none)
6184	Start attempts	Fire start attempt	1	10	7
6185	Start attempts	FP cool down	0.0 s	990.0 s	30.0 s



The number of start attempts adjusted in menu 6184 Fire start attempt, is used when the digital input 'fire pump' is used instead of the setting 6181.

6190 f/U OK

No.	Setting		Min. setting	Max. setting	Factory setting
6191	f/U OK	Timer	1.0 s	99.0 s	5.0 s

6200 f/U failure

No.	Setting		Min. setting	Max. setting	Factory setting
6201	f/U failure	Timer	1.0 s	99.0 s	30.0 s
6202	f/U failure	Relay output A	R0 (none)	Option dependent	R0 (none)
6203	f/U failure	Relay output B	R0 (none)		R0 (none)

6210 Stop

No.	Setting		Min. setting	Max. setting	Factory setting
6211	Stop	Cool down time	0.0 s	990.0 s	240.0 s
6212	Stop	Extended STOP	1.0 s	99.0 s	5.0 s
6213	Stop	Coil type	STOP	RUN	RUN

6220 Stop failure

No.	Setting		Min. setting	Max. setting	Factory setting
6221	Stop failure	Timer	10.0 s	120.0 s	30.0 s
6222	Stop failure	Relay output A	R0 (none)	Option dependent	R0 (none)
6223	Stop failure	Relay output B	R0 (none)		R0 (none)

6250 GB control

No.	Setting		Min. setting	Max. setting	Factory setting
6251	GB control	Timer t_{GBC}	0.0 s	30.0 s	2.0 s

6260 P_{nom} derate

No.	Setting		Min. setting	Max. setting	Factory setting
6261	P_{nom} derate	Input	4...20mA	VDO/PT100	4...20mA
6262	P_{nom} derate	Start derate	0	20000	16 units
6263	P_{nom} derate	Derate slope	0.1%/U	100.0%/U	5.0%/U
6264	P_{nom} derate	Proportional	OFF	ON	OFF
6265	P_{nom} derate	Enable	OFF	ON	OFF
6266	P_{nom} derate	Derate limit	0.0%	100.0%	80.0%

6310 Idle running

No.	Setting		Min. setting	Max. setting	Factory setting
6311	Idle running	Start timer	0.0 min	999.9 min	300.0 min
6312	Idle running	Enable start timer	OFF	ON	OFF
6313	Idle running	Stop timer	0.0 min	999.9 min	300.0 min
6314	Idle running	Enable stop timer	OFF	ON	OFF
6315	Idle running	Idle relay	Option dependent		R0 (none)
6316	Idle running	Enable	OFF	ON	OFF

6400 Master clock

No.	Setting		Min. setting	Max. setting	Factory setting
6401	Master clock	Start hour	0	23	8
6402	Master clock	Stop hour	0	23	8
6403	Master clock	Difference	0.1Hz	1.0Hz	0.1Hz
6404	Master clock	Set point	1 s	999 s	20 s
6405	Master clock	Enable	OFF	ON	OFF

6410 Battery test

No.	Setting		Min. setting	Max. setting	Factory setting
6411	Battery test	Set point	8.0V DC	32.0V DC	18.0V DC
6412	Battery test	Delay	1 s	300 s	20 s
6413	Battery test	Output A	Option dependent		R0 (none)
6414	Battery test	Output B			R0 (none)
6415	Battery test	Enable	OFF	ON	OFF

6420 Voltage trip

No.	Setting		Min. setting	Max. setting	Factory setting
6421	Voltage trip	Type	Phase-phase	Phase-neutral	Phase-phase

Mains setup**6500 Mains power**

No.	Setting		Min. setting	Max. setting	Factory setting
6501	Mains power	Day	-20000 kW	20000 kW	750 kW
6502	Mains power	Night	-20000 kW	20000 kW	1000 kW
6503	Mains power	Transducer max	0 kW	20000 kW	1500 kW
6504	Mains power	Transducer min	-20000 kW	0 kW	-1500 kW



Transducer max. equals 20mA, and Transducer min. equals 4mA. Both settings must be adjusted.

6510 Daytime period

The period outside the daytime period is defined as the nighttime period.

No.	Setting		Min. setting	Max. setting	Factory setting
6511	Daytime period	Start hour	0 h	23 h	8 h
6512	Daytime period	Start minute	0 min	59 min	0 min
6513	Daytime period	Stop hour	0 h	23 h	16 h
6514	Daytime period	Stop minute	0 min	59 min	0 min

6520 Start gen-set

The set point refers to the mains power set points in **6500 Mains power**.

No.	Setting		Min. setting	Max. setting	Factory setting
6521	Start generator	Set point	5%	100%	80%
6522	Start generator	Timer	0.0 s	990.0 s	10.0 s
6523	Start generator	Minimum load	0%	100%	5%

6530 Stop gen-set

The set point refers to the mains power set points in **6500 Mains power**.

No.	Setting		Min. setting	Max. setting	Factory setting
6531	Stop generator	Set point	0%	80%	60%
6532	Stop generator	Timer	0.0 s	990.0 s	30.0 s

6540 Test running

No.	Setting		Min. setting	Max. setting	Factory setting
6541	Test	Set point	1%	100%	80%
6542	Test	Timer	0.5 min	999.0 min	5.0 min
6543	Test	Return	Semi-auto	Auto	Auto

6550 Fixed power set point

No.	Setting		Min. setting	Max. setting	Factory setting
6551	Fixed power set point	P set point	0%	100%	100%

6590 Mains failure voltage

No.	Setting		Min. setting	Max. setting	Factory setting
6591	Mains failure U	Fail. delay	1.0 s	990.0 s	5.0 s
6592	Mains failure U	Mains OK delay	10 s	9900 s	60 s
6593	Mains failure U	Low voltage	80%	100%	90%
6594	Mains failure U	High voltage	100%	120%	110%
6595	Mains failure U	Mains fail. control	Start eng. + open MB	Start eng.	Start eng. + open MB

6600 Mains failure frequency

No.	Setting		Min. setting	Max. setting	Factory setting
6601	Mains failure f	Fail. delay	1.0 s	990.0 s	5.0 s
6602	Mains failure f	Mains OK delay	10 s	9900 s	60 s
6603	Mains failure f	Low frequency	80.0%	100.0%	95.0%
6604	Mains failure f	High frequency	100.0%	120.0%	105.0%

6610 Mains breaker control

No.	Setting		Min. setting	Max. setting	Factory setting
6611	MB control	Function	Mode shift OFF	Mode-AMF- Mode	Mode shift OFF
6612	MB control	Timer t_{MBC}	0.0 s	30.0 s	0.5 s
6613	MB control	Back synchroni- sation	OFF	ON	OFF
6614	MB control	Sync. to mains	OFF	ON	ON

Jump menus

A number of menus can only be entered using the jump menu.

9000 Software version

Information about the actual software downloaded to the unit. Please check this before contacting THOMSON TECHNOLOGY regarding service and support matters.

9020 Service port

The RS232 service port can be set up to use the ASCII communication. The ASCII communication is used when the utility software is connected through a modem.



Selection '0' must be used for cable connection between the MEC 320 and the PC. Selection '1' must be used for modem connection between the MEC 320 and the PC.

911X User password

The user password menu can only be entered using the "JUMP" push-button.

No.	Setting		Min. setting	Max. setting	Factory setting
9116	User password	Setting	0	32000	2000
9117	Service password	YYYYY Setting	0	32000	2001
9118	Master password	XXXXX Setting	0	32000	2002



It is recommended to change the password levels of the user, service and master password, if access to parameter settings must be restricted.

9120 Service menu

The service menu can only be entered using the 'JUMP' push-button. This menu is used in service situations.

In the alarm selection you can see all the alarm timers and their remaining time if they are counting.

The input and output selections show the present status of the inputs and outputs. E.g. mode inputs, relay outputs and load sharing lines.

No.	Setting		Description
9121	Service menu	Alarm	Shows remaining alarm delay time
9122	Service menu	Digital input	Shows digital input status
9123	Service menu	Digital output	Shows digital output status
9124	Service menu	Miscellaneous	Shows miscellaneous information

9130 Single phase/split phase/three phase

No.	Setting		Description
9131	Mode	Mode	0 = Three phase system
			1 = Split phase system
			2 = Single phase system

THOMSON TECHNOLOGY reserves the right to change any of the above