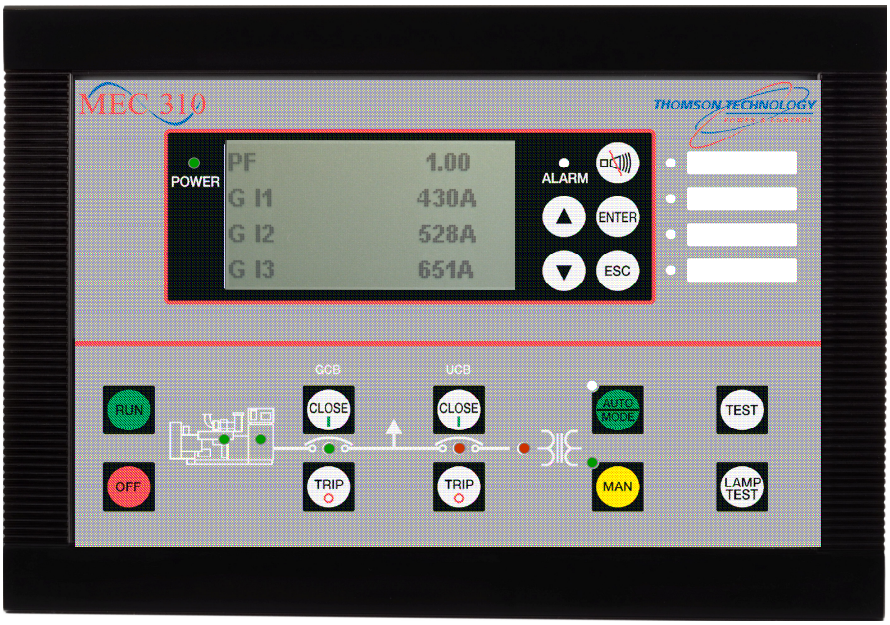
THOMSON TECHNOLOGY
POWER & CONTROL
A REGAL-BELOIT COMPANY

MEC 310

GENSET CONTROLLER

Option A - Automatic Mains Failure

r.0473A



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1. Warnings and legal information

Legal information and responsibility

Thomson Technology takes no responsibility for installation or operation of the engine set. If there is any doubt about how to install or operate the engine/generator 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 unauthorised personnel. If opened anyway, the warranty will be lost.

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 authorised 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.

Factory settings

The unit is delivered with certain factory settings. Given the fact that these settings are based on average values, they are not necessarily the correct settings for matching the individual engine/generator. Thus precautions must be taken to check the settings before running the engine.

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.

2. Description of option

This document describes the functionality of AC voltage measurement and function contained in option A.

ANSI numbers

Function	ANSI no.
3-phase AC voltage measurement, 50-480V AC, 50/60Hz	-
3-phase over- and undervoltage failure	27/59
3-phase over- and underfrequency failure	81

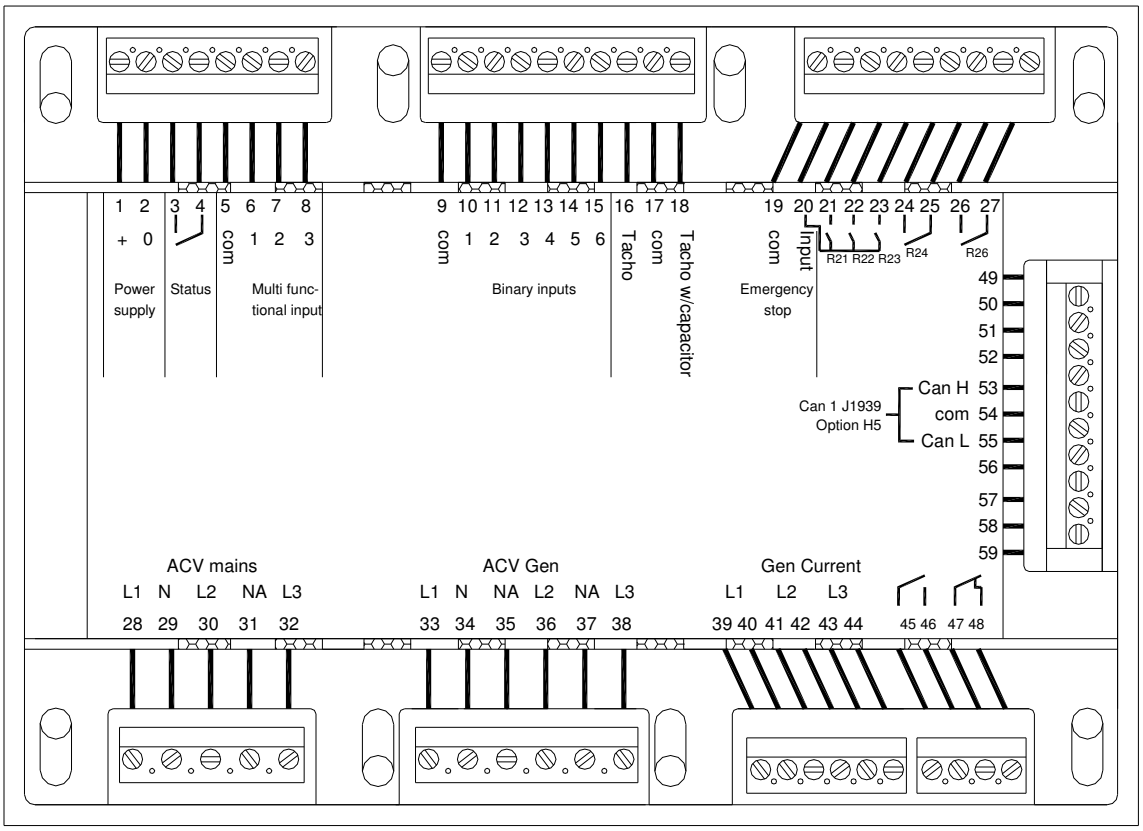
Option A

Option A is a software and hardware option, which means that the front foil will have to be changed. The basic MEC 310 generator controller unit can be equipped with option A. With option A the MEC 310 will function as a real emergency power system controller. The mains (busbar) is supervised, and if a fault (voltage/frequency) is detected, then a disconnection signal will be sent to the mains breaker. At the same time the start sequence for the generator is initiated. When the generator voltage is within the limits, a signal will be transmitted to close the generator breaker. When the mains returns and the mains OK timer is expired, then the generator breaker will open and the mains breaker is closed.

3. Hardware

Terminals

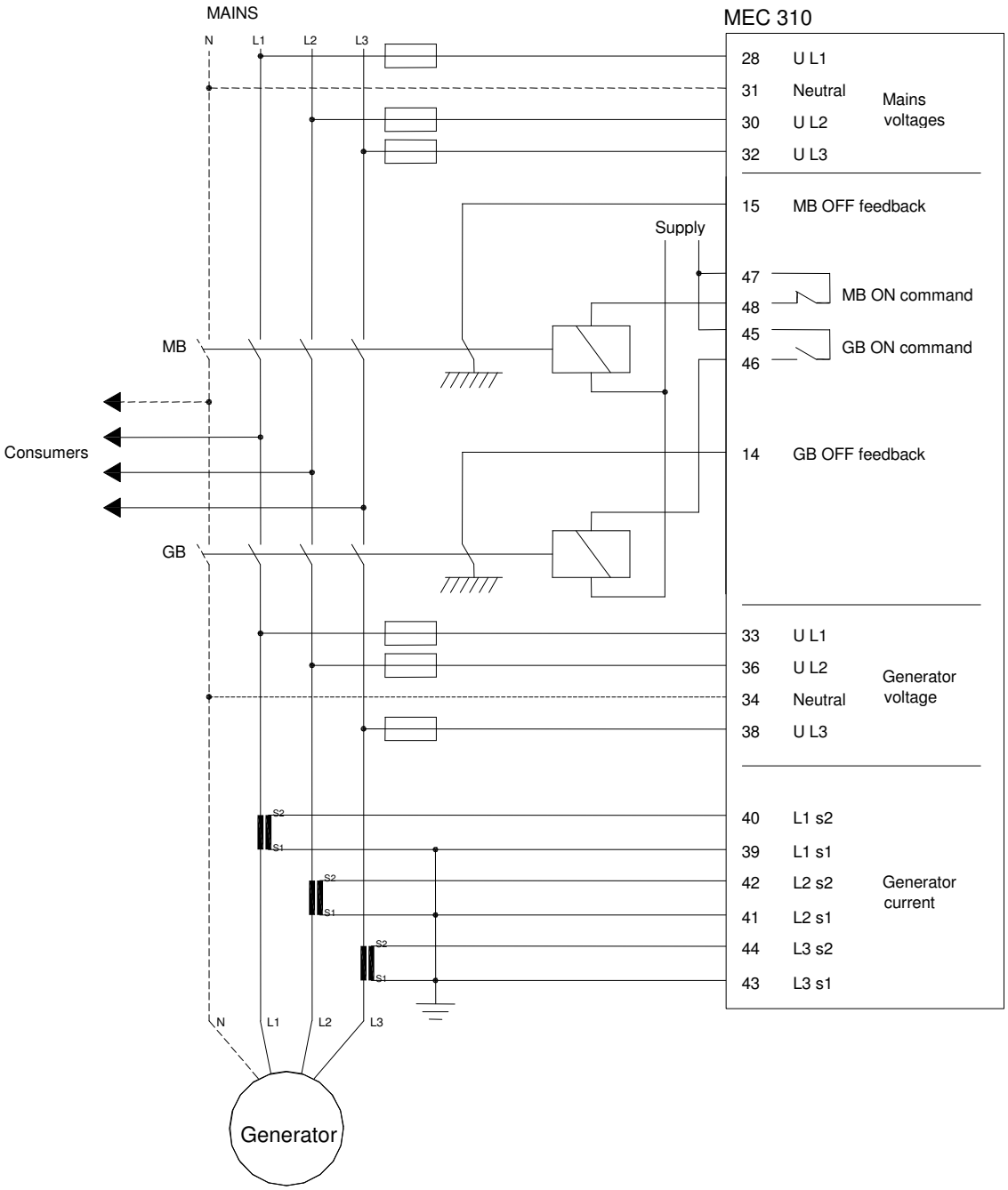
The AC voltage inputs are placed on terminals 43-47. Mains breaker control relay output is placed on terminals 51 and 52.



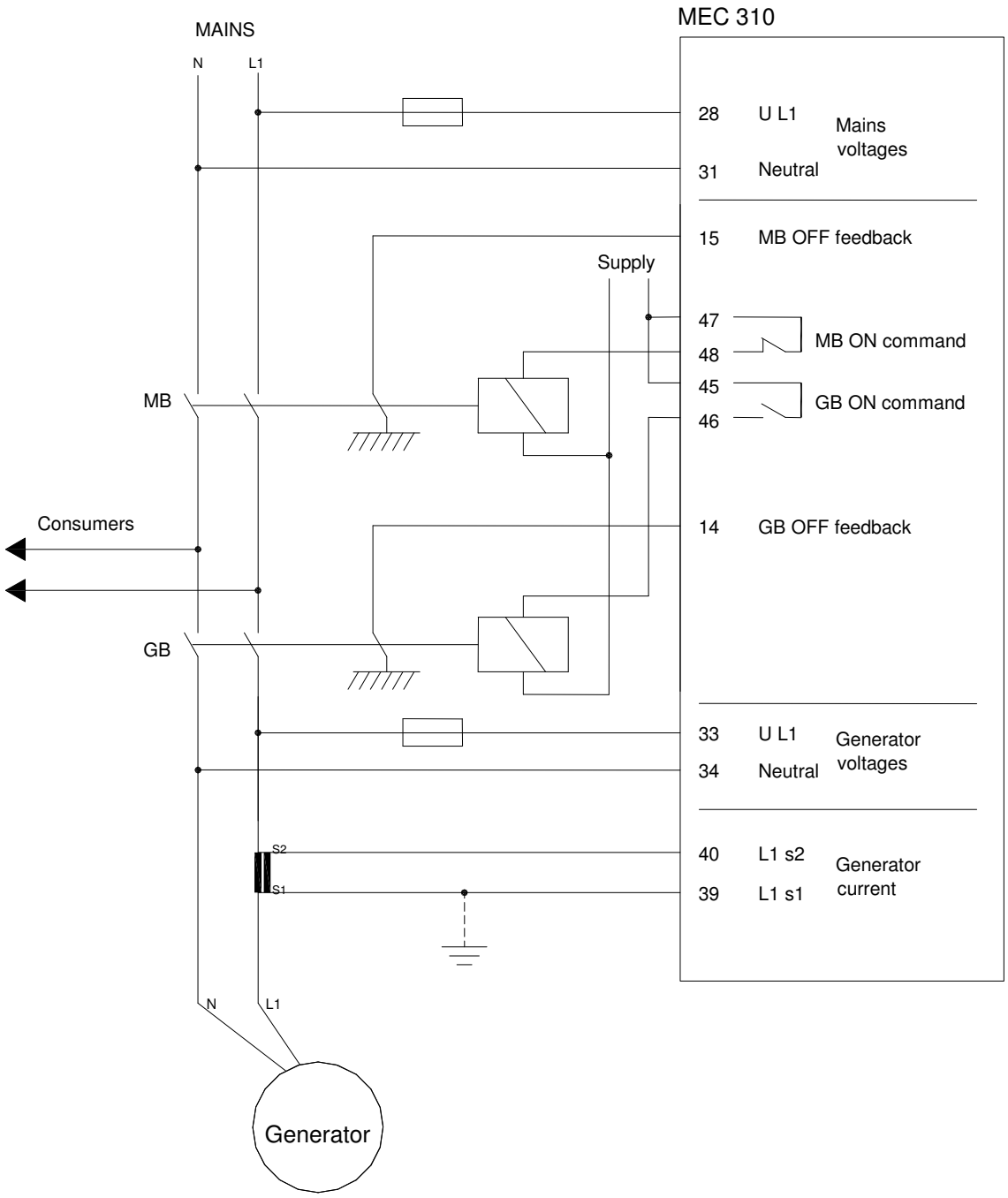
Unit rear view

AMF control		
28	Mains L1 voltage	Voltage range 50-480V AC Ph-Ph value
29	Mains neutral voltage	
30	Mains L2 voltage	
31	Do not connect	
32	Mains L3 voltage	
47-48	Mains breaker control relay, 2A 230V DC/V AC	Function NC (normally closed). Not configurable

Wiring 3-phased

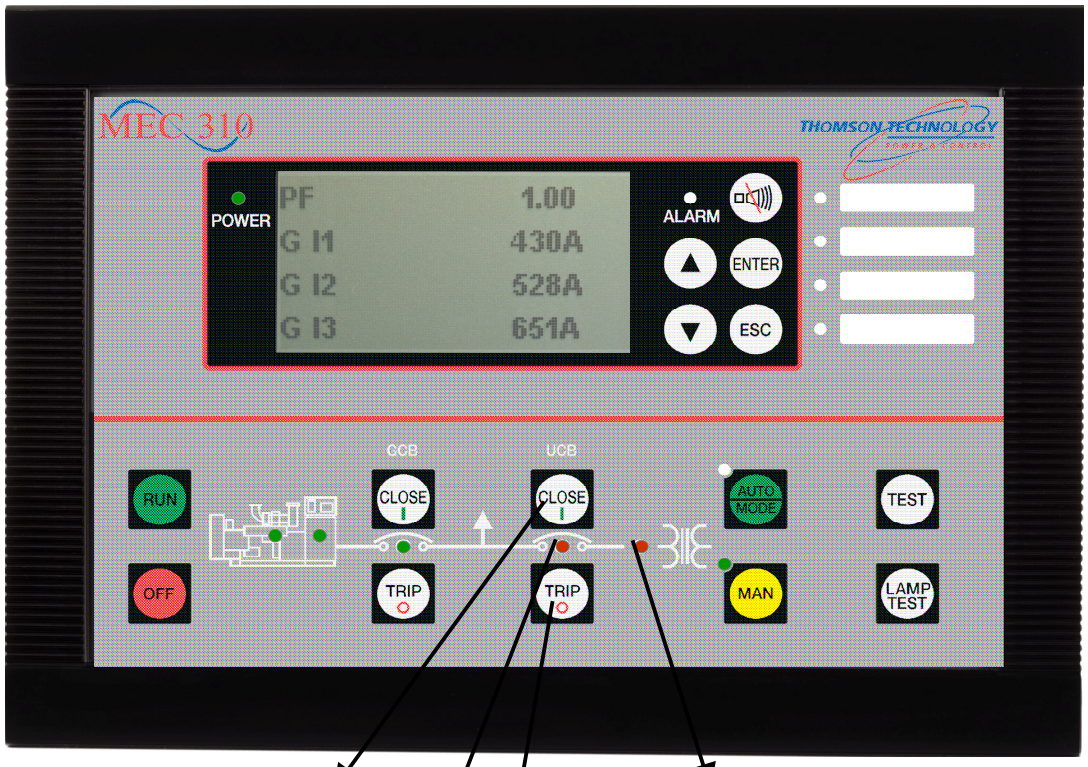


Wiring 1-phased



Push-buttons and LEDs

The display for option A includes 1 extra push-button and 2 LEDs.



Manual closing of the mains breaker. Only possible if MANUAL is selected.

LED is on (green), if MB is closed. LED is off, if MB is open.

Manual opening of the mains breaker. Only possible if MANUAL is selected.

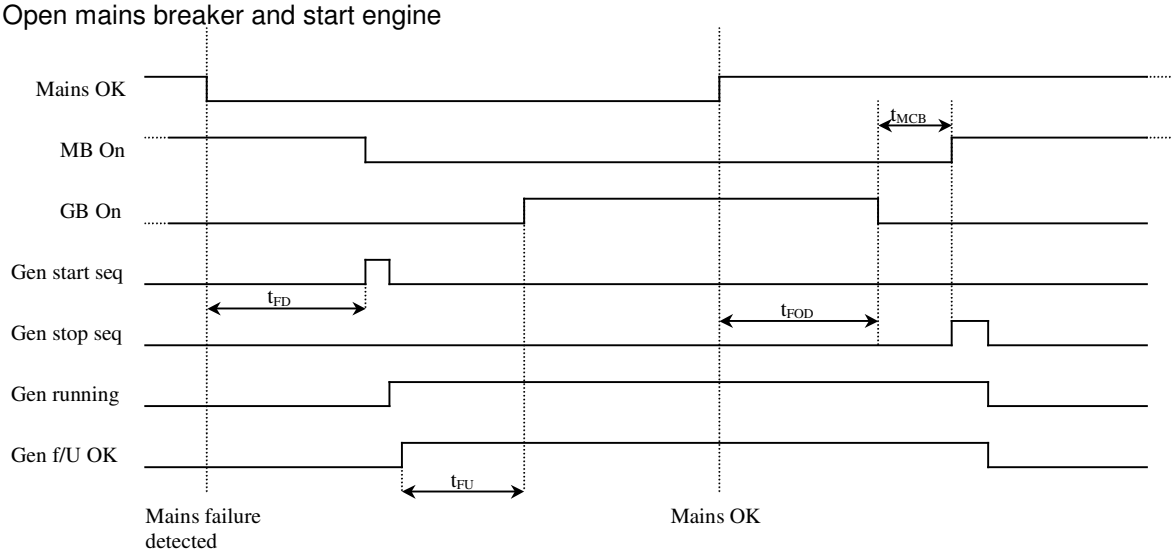
MAINS PRESENT: LED is on (green), if mains is present and within limits.
MAINS FAILURE: LED is flashing (red), when the mains failure occurs and turns to steady red when the mains failure timer expires.
Starts flashing (green), when mains restores. LED keeps flashing (green), until the "Mains OK delay" time runs out.

For general information about the display push-buttons and LEDs, please see the Installation Instructions and Reference Handbook.

4. Functional descriptions

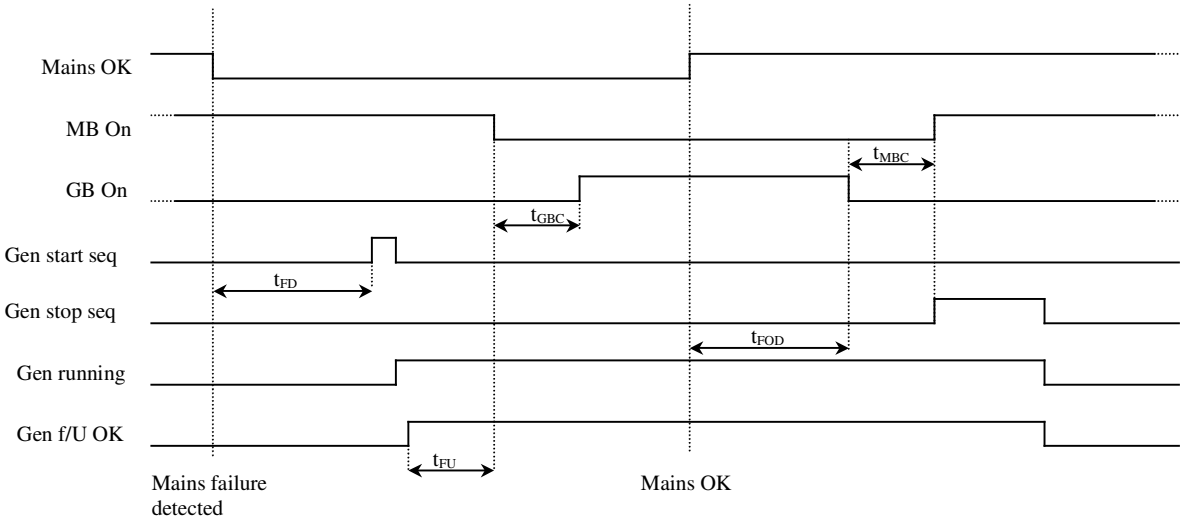
Mains fail timing sequence

Open mains breaker and start engine



Mains fail timing sequence

Start engine and open mains breaker



Timer explanation

Timer	Description
t_{FD}	Mains failure delay See 7063 and 7073
t_{FU}	Frequency/voltage OK See 6220
t_{FOD}	Mains failure OK delay See 7062 and 7072
t_{GBC}	GB ON delay See 6231
t_{MBC}	MB ON delay See 7082

ON and OFF sequences

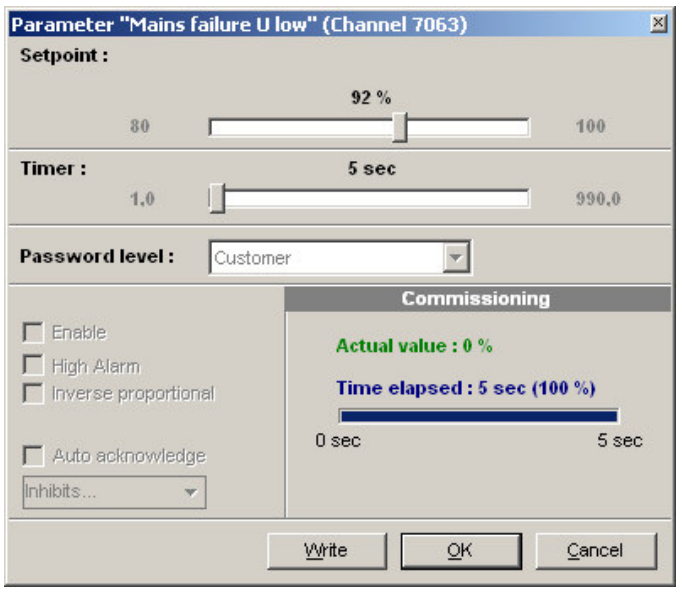
Conditions for breaker operations	
Sequence	**Condition**
GB ON, direct closing	Running feedback Generator frequency/voltage OK MB open
MB ON, direct closing	Mains frequency/voltage OK GB open
GB OFF, direct opening	Shutdown Trip GB alarms
MB OFF, direct opening	Mains failure

Mains failure control set Start engine + open MB
If the generator fails to start or the generator breaker fails to close and the mains is OK, the mains "ok u" and mains "ok f" timer must expire, before the mains breaker is closed.

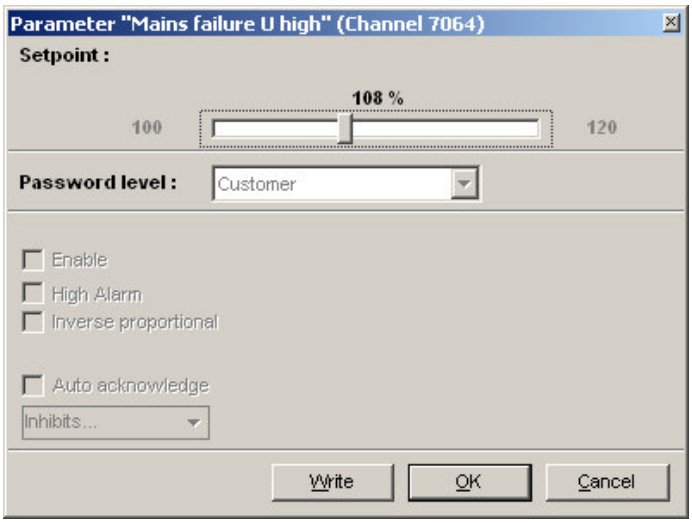
Mains failure control set Start engine
If the generator fails to start or the generator breaker fails to close, the mains breaker is closed.

Configuration

The example below shows the menu for setting the mains failure low voltage:

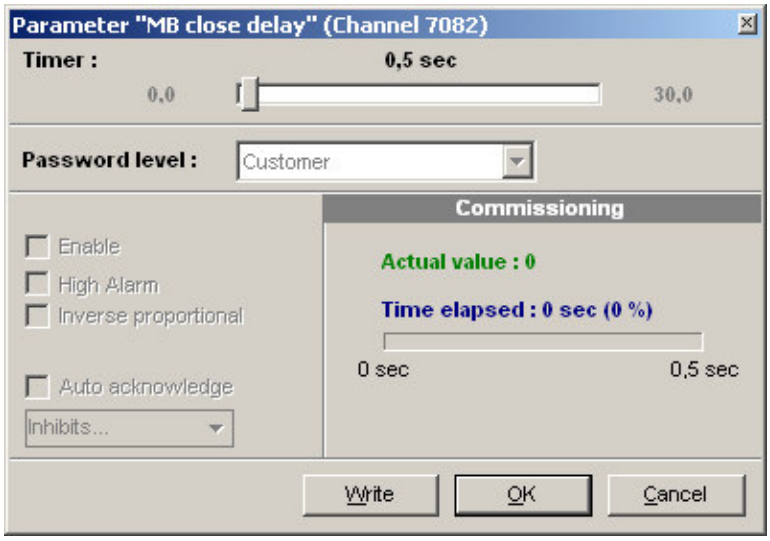


The example below shows the menu for setting the mains failure high voltage:



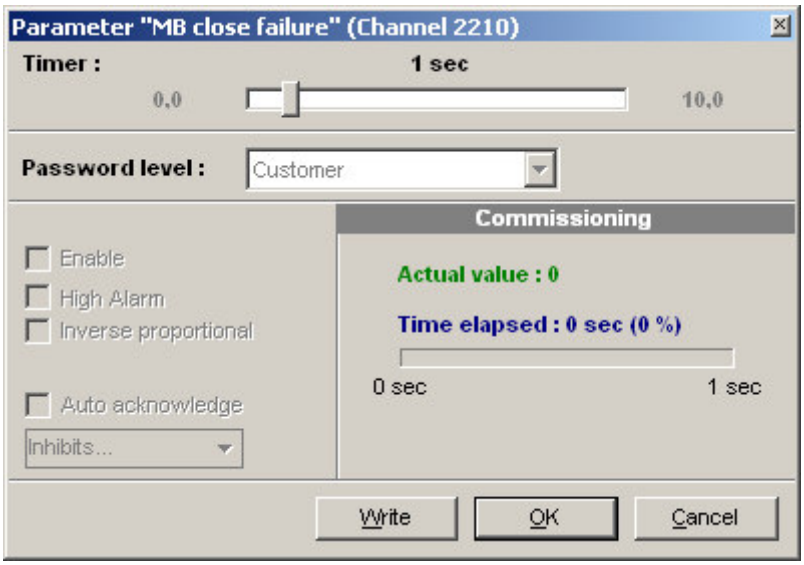
The timer for both low and high voltage set point is set in the menu for low voltage. The same principle is used for the setting of low and high frequency.

The example below shows the MB close delay timer. The delay set is the time between the transmission of the GB open signal to the transmission of the MB close signal.



The example below shows the MB close failure timer. If the timer expires before the MB is closed, then the alarm will be activated. If no sign signals are used, then the MEC 310 will automatically assume that the breaker is closing.

The same principle is used for the GB.



5. Parameter list

The setup of parameters is done via the TPS 300 programming software. In the following the settings are presented in tables. Default settings can be changed to the relevant settings.

Settings marked with a * can also be changed using the display.

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.

Overview table

2160 GB close failure

2170 GB open failure

2200 MB close failure

2210 MB open failure

6050 Transformer mains

6070 Gen-set mode

6100 Counter

6230 Generator breaker control

7040 AMF test

7060 Mains failure voltage

7062 Mains OK voltage

7065 Mains failure control

7070 Mains failure frequency

7072 Mains OK frequency

7080 Mains breaker control

Parameter tables

2160 GB close failure

No.	Setting		Min. setting	Max. setting	Factory setting
2161	GB close failure	Timer	0.0 s	10.0 s	1.0 s

2170 GB open failure

No.	Setting		Min. setting	Max. setting	Factory setting
2171	GB open failure	Timer	0.0 s	10.0 s	1.0 s

2200 MB close failure

No.	Setting		Min. setting	Max. setting	Factory setting
2201	MB close failure	Timer	0.0 s	10.0 s	1.0 s

2210 MB open failure

No.	Setting		Min. setting	Max. setting	Factory setting
2211	MB open failure	Timer	0.0 s	10.0 s	1.0 s

6050 Transformer mains

No.	Setting		Min. setting	Max. setting	Factory setting
6051	Transformer mains	Primary	50V	25000V	440V
6052	Transformer mains	Secondary	50V	480V	440V

If no voltage transformer is used, the setting 440/440V can be maintained.

6070 Gen-set mode

No.	Setting	Min. setting	Max. setting	Factory setting
6071	Gen-set mode	Island	AMF	Island

6100 Counter

No.	Setting		Min. setting	Max. setting	Factory setting
6103*	Counter	No. of MB operations	0	20000	0

6230 Generator breaker control

No.	Setting		Min. setting	Max. setting	Factory setting
6231	GB close delay	Timer	0.0 s	30.0 s	0.5 s

7040 AMF test

No.	Setting		Min. setting	Second setting	Max. setting	Factory setting
7042	Activation	Set point	Digital input	Button	Digital input or button	Button
7041	Timer	Timer	0.0 s	-	990.0 s	5.0 s
7043	Enable	Enable	OFF	-	ON	ON

7060 Mains failure voltage

No.	Setting		Min. setting	Max. setting	Factory setting
7063*	Mains failure U low	Set point	80%	100%	92%
7061*	Mains failure	Timer	1.0 s	990.0 s	5.0 s
7064*	Mains failure U high	Set point	100%	120%	103%

7062 Mains OK voltage

No.	Setting		Min. setting	Max. setting	Factory setting
7062*	Mains OK U	Timer	1.0 s	9900.0 s	60.0 s

7065 Mains failure control

No.	Setting		Min. setting	Max. setting	Factory setting
7065	Mains failure control		Start eng. + open MB	Start eng.	Start eng. + open MB

7070 Mains failure frequency

No.	Setting		Min. setting	Max. setting	Factory setting
7073	Mains failure f low*	Set point	80%	100%	97%
7071	Mains failure*	Timer	1.0 s	990.0 s	5.0 s
7074	Mains failure f high*	Set point	100%	120%	103%

7072 Mains OK frequency

No.	Setting		Min. setting	Max. setting	Factory setting
7072	Mains OK f *	Timer	1.0 s	9900.0 s	60.0 s

7080 Mains breaker control

No.	Setting		Min. setting	Max. setting	Factory setting
7082	MB close delay	Timer	0.0 s	30.0 s	0.5 s

Thomson Technology reserves the right to change any of the above