



-power in control



OPERATOR'S MANUAL



Automatic Genset Controller, AGC-4

- Display readings
- Push-button functions
- Alarm handling
- Log list



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1. General information

1.1 Warnings, legal information and safety

1.1.1 Warnings and notes

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

Warnings



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

Notes



Notes provide general information, which will be helpful for the reader to bear in mind.

1.1.2 Legal information and disclaimer

DEIF takes no responsibility for installation or operation of the generator set. If there is any doubt about how to install or operate the engine/generator controlled by the Multi-line 2 unit, the company responsible for the installation or the operation of the set must be contacted.



The Multi-line 2 unit is not to be opened by unauthorised personnel. If opened anyway, the warranty will be lost.

Disclaimer

DEIF A/S reserves the right to change any of the contents of this document without prior notice.

The English version of this document always contains the most recent and up-to-date information about the product. DEIF does not take responsibility for the accuracy of translations, and translations might not be updated at the same time as the English document. If there is a discrepancy, the English version prevails.

1.1.3 Safety issues

Installing and operating the Multi-line 2 unit may imply 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.

1.1.4 Electrostatic discharge awareness

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

1.1.5 Factory settings

The Multi-line 2 unit is delivered from factory with certain factory settings. These are based on average values and are not necessarily the correct settings for matching the engine/generator set in question. Precautions must be taken to check the settings before running the engine/generator set.

1.2 About the Operator's Manual

1.2.1 General purpose

This Operator's Manual mainly includes general product information, display readings, push-button and LED functions, alarm handling descriptions and presentation of the log list.

The general purpose of this document is to give the operator important information to be used in the daily operation of the unit.



Please make sure to read this document before starting to work with the Multi-line 2 unit and the generator set to be controlled. Failure to do this could result in human injury or damage to the equipment.

1.2.2 Intended users

This Operator's Manual is mainly intended for the daily user. On the basis of this document, the operator will be able to carry out simple procedures such as start/stop and control of the generator set.

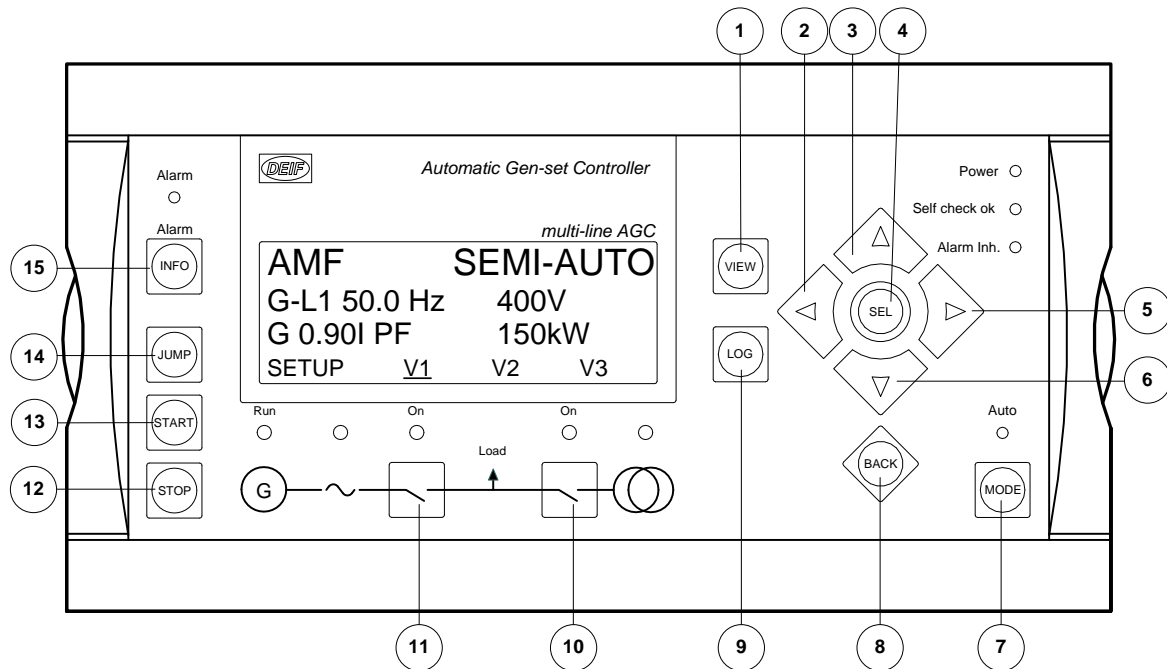
1.2.3 Contents and overall structure

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

2. Display push-buttons and LEDs

2.1 Push-button functions

The display unit holds a number of push-button functions which are described below:

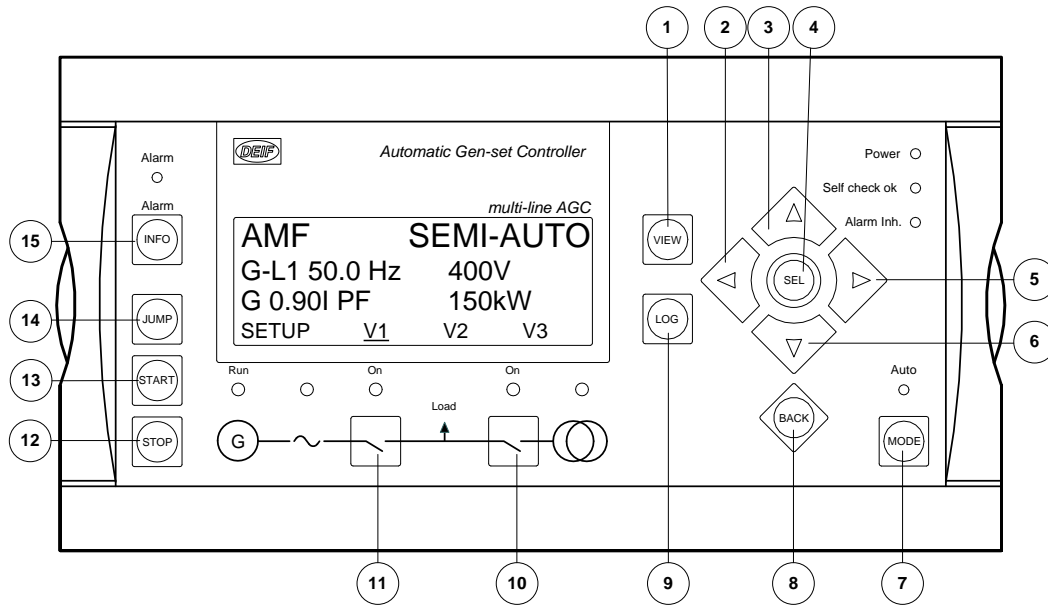


1. Shifts the first line displaying in the setup menus. Push two seconds to switch to master display in case more than one display is connected.
2. Moves the cursor left for manoeuvring in the menus.
3. Increases the value of the selected set point (in the setup menu). In the daily use display, this button function is used for scrolling the second line displaying of generator values.
4. Selects the underscored entry in the fourth line of the display.
5. Moves the cursor right for manoeuvring in the menus.
6. 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.
7. Changes the menu line (line four) in the display to mode selection.
8. Jumps one step backwards in the menu (to previous display or to the entry window).
9. Shifts the display three lower lines to show the event and alarm list. The list holds 150 events. These events are deleted when the AGC is switched off.
10. Manual activation of close breaker and open breaker sequence if "SEMI-AUTO" is selected.
11. Manual activation of close breaker and open breaker sequence if "SEMI-AUTO" is selected.
12. Stop of the genset if "SEMI-AUTO" or "MANUAL" is selected.
13. Start of the genset if "SEMI-AUTO" or "MANUAL" is selected.
14. 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).
15. Shifts the display three lower lines to show the alarm list.

2.2 LED functions

2.2.1 Push-button functions

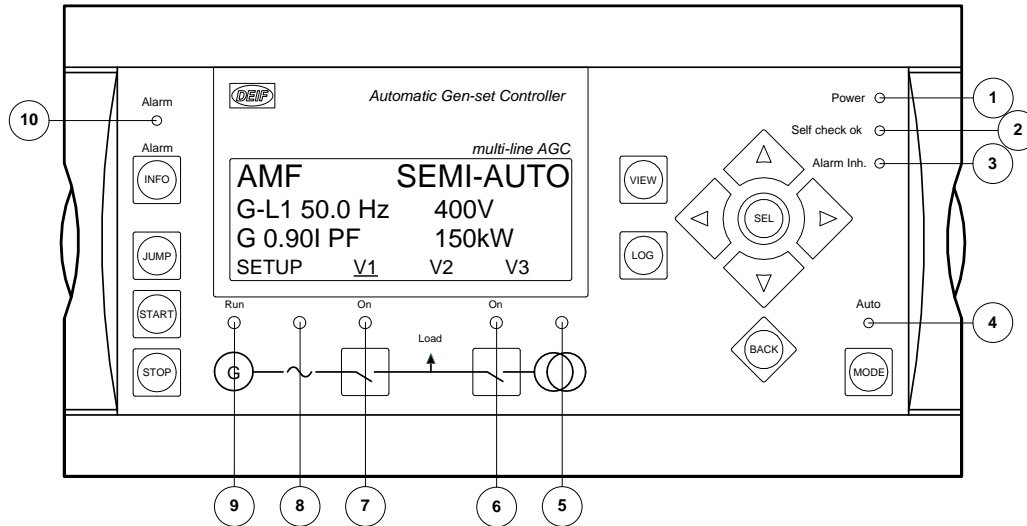
The display unit holds a number of push-button functions which are described below:



1. Shifts the first line displaying in the setup menus. Push 2 seconds to switch to master display in case more than one display is connected.
2. Moves the cursor left for manoeuvring in the menus.
3. 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 view lines in V1 or the second line (in the setup menu) displaying of generator values.
4. Selects the underscored entry in the fourth line of the display.
5. Moves the cursor right for manoeuvring in the menus.
6. 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.
7. Changes the menu line (line four) in the display to mode selection.
8. Jumps one step backwards in the menu (to previous display or to the entry window).
9. Displays the LOG SETUP window where you can choose between the Event, Alarm and Battery logs. The logs are not deleted when the auxiliary supply is switched off.
10. Manual activation of close breaker and open breaker sequence if "SEMI-AUTO" is selected.
11. Manual activation of close breaker and open breaker sequence if "SEMI-AUTO" is selected.
12. Stop of the genset if "SEMI-AUTO" or "MANUAL" is selected.
13. Start of the genset if "SEMI-AUTO" or "MANUAL" is selected.
14. 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).
15. Shifts the display three lower lines to show the alarm list. By holding the button, all alarms will be acknowledged.

2.2.2 LED functions

The display unit holds 10 LED functions. The colour is green or red or a combination in different situations. The display LEDs are indicating as follows:



1. LED indicates that the auxiliary supply is switched on.
2. LED indicates that the unit is OK.
3. See "Alarm inhibit" in the chapter "Additional functions".
4. LED indicates that auto mode is selected.
5. 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.
6. LED indicates that the mains breaker is closed. LED is flashing yellow if the "MB spring loaded" signal from the breaker is missing or the MB load time has not expired.
7. 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. LED is flashing yellow if the "enable GB black close" or the "GB spring loaded" signal is missing or the GB load time has not expired.
8. LED green light indicates that the voltage/frequency is present and OK.
9. LED indicates that the generator is running.
10. LED flashing indicates that unacknowledged alarms are present. LED fixed light indicates that ALL alarms are acknowledged, but some are still present.

In the AGC there are configured two colour schemes for the display LEDs. In parameter 6082 it is possible to toggle between the two schemes. In the table below are the LEDs and their interpretation in the two colour schemes.


Breaker or bus status	Colour scheme 1	Colour scheme 2
Breaker closed	Green	Red
Breaker open	White/no color	Green
Mains fail 0-30%	Red	Green
Mains above 30% but not inside "Hz/V OK" window.	Red	Red
Mains inside "Hz/V OK" window	Green	Red
Busbar fail 0-30%	No color	Green
Busbar above 30% but not side "Hz/V OK" window	Red	Red
Busbar inside "Hz/V OK" window	Green	Red
DG fail 0-30%	No color	Green
DG above 30% but not inside "Hz/V OK" window	Red	Red
DG inside "Hz/V OK" window	Green	Red

3. Display and menu structure

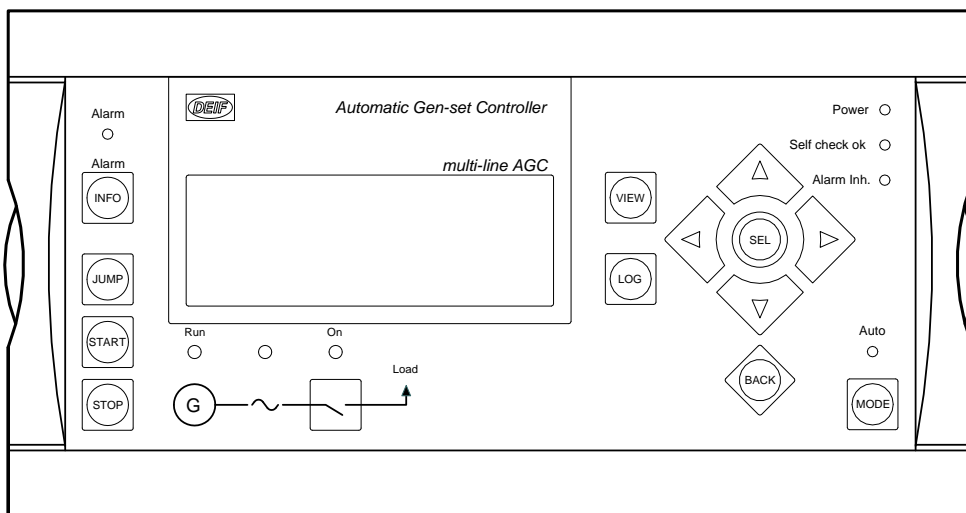
3.1 General

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

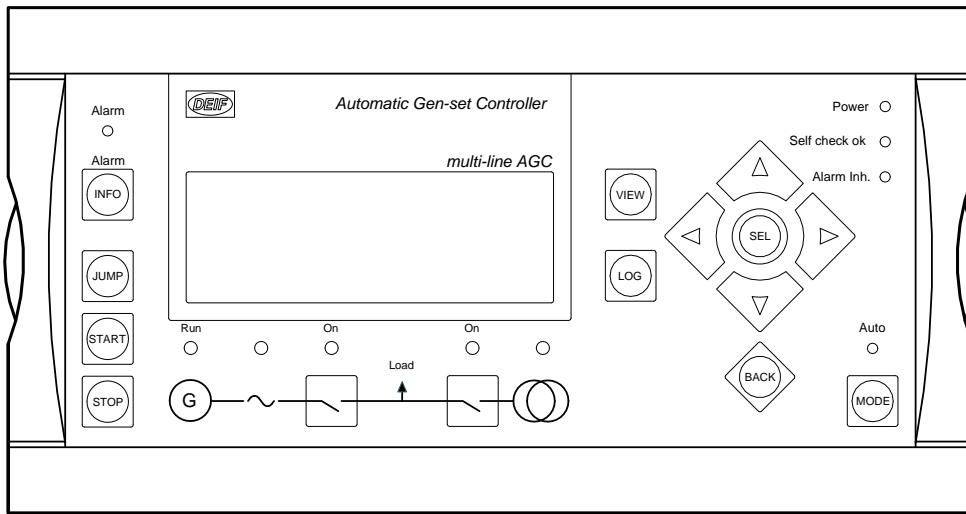
3.2 Display layouts for AGC-4

 The display dimensions are H × W = 115 × 220 mm (4.528" × 8.661").

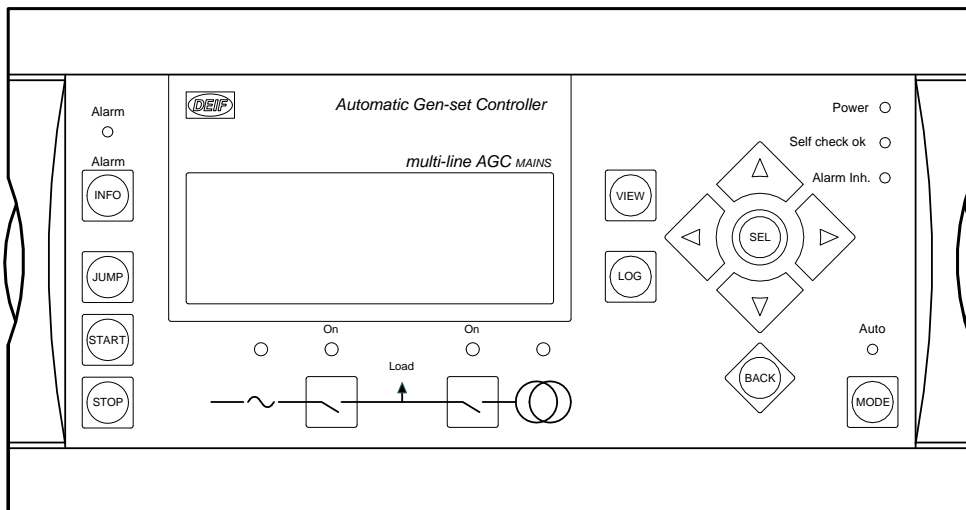
Engine and generator breaker control (island) (option Y1)



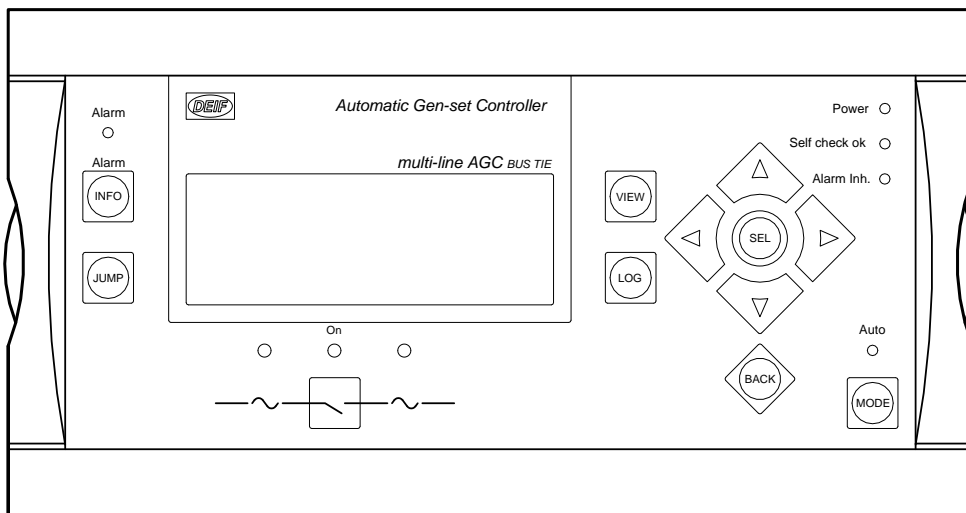
Generator breaker and mains breaker control (option Y3)



Tie breaker and mains breaker control (option Y4)



Bus tie breaker control (option Y5)



3.3 LCD display

The display is a backlit LCD text display containing four lines with 20 characters in each line. There is no control of the display light intensity (no dimmer). Basically, all measured and calculated values can be read in the display. These may be selected via the PC utility software (USW).

i For selection of values, see the Designer’s reference handbook.

3.4 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 (not commonly used by the operator):

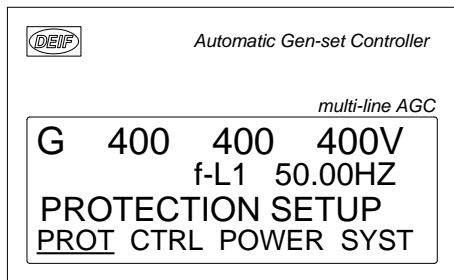
This menu system is used for setting up the unit, and if the operator needs detailed information that is not available in the view menu system.

Changing of parameter settings is password-protected.

3.4.1 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 pushing the BACK push-button three times.

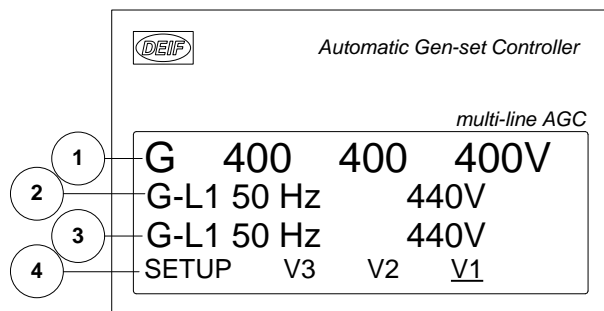
i The event and alarm list will appear at power up if an alarm is present.



3.4.2 View menu

The view menus (V1, V2 and V3) are the daily use menus for the operator.



In the view menus, various measured values are on display.



1. First display line: operational status or measurements
2. Second display line: measurements relating to operational status
3. Third display line: measurements relating to operational status
4. Fourth display line: selection of setup and view menus

3.4.3 View menu navigation

The readings, and so on, are all selected by moving the cursor (fourth display line (note the underscore of V1 in the drawing above - this is the cursor)):



The cursor is moved using the  and  push-buttons on the right side of the display.



3.4.4 View window 1

Display of measured values according to the selections made during configuration.



For detailed information about configuration, see the Designer's reference handbook.

V1 contains up to 15 different windows that can be selected using the  and  push-buttons located on the right hand side of the display.

Windows	V1
View 1	Manual selection with  or  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	
View 16	
View 17	
View 18	
View 19	
View 20	

3.4.5 View window 2

Display of measured values according to the selections made during configuration.

Display V2 follows the selection in V1 as follows:

- 1: View 1: (Start prepare)
- 2: View 2: (Synchronising)
- 3: View 3: (Ramp up/down)
- 4: View 4:
- 5: View 5: (Default* (when none of the above are in operation))

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

* The default window is automatically selected after the ramping up when the genset is in normal operation, for example fixed power mode.

3.4.6 View window 3

Display of measured values according to the selections made during configuration.

The V3 display changes with running modes:

First display line indicates running status of the unit. The messages shown in the table at the end of this chapter can be displayed.

Second and third display lines display measured values.

Fourth display line displays the selection line.

Display V3 follows the selection in V1 as follows:

- 1: View 1: (Start prepare)
- 2: View 2: (Synchronising)
- 3: View 3: (Ramp up/down)
- 4: View 4:
- 5: View 5: (Default* (when none of the above are in operation))

Windows	V 2	V 3
View 1	<p>Changes automatically between the five first views:</p> <ol style="list-style-type: none"> 1. View 1 (Start prepare) 2. View 2 (Sync.) 3. View 3 (Ramp up/down) 4. View 4 5. View 5 (Default*) <p>No manual selection.</p> <p>All three lines show measuring values.</p>	<p>Changes automatically between the five first views:</p> <ol style="list-style-type: none"> 1. View 1 (Start prepare) 2. View 2 (Sync.) 3. View 3 (Ramp up/down) 4. View 4 5. View 5 (Default*) <p>No manual selection.</p> <p>Line 1 shows the text 1...5 (above). Line 2 and line 3 show measurements.</p>
View 2		
View 3		
View 4		
View 5		

* The default window is automatically selected after the ramping up when the genset is in normal operation, for example fixed power mode.

3.5 Status line text

3.5.1 Standard texts

Status text	Condition	Comment
BLOCK	Block mode is activated	
SIMPLE TEST	Test mode is activated	
LOAD TEST		
FULL TEST		
SIMPLE TEST ###.##min	Test mode activated and test timer counting down	
LOAD TEST ###.##min		
FULL TEST ###.##min		
ISLAND MAN	Genset stopped or running and no other action taking place	
ISLAND SEMI		
READY ISLAND AUTO	Genset stopped in Auto	
ISLAND ACTIVE	Genset running in Auto	
AMF MAN	Genset stopped or running and no other action taking place	
AMF SEMI		
READY AMF AUTO	Genset stopped in Auto	
AMF ACTIVE	Genset running in Auto	
FIXED POWER MAN	Genset stopped or running and no other action taking place	
FIXED POWER SEMI		
READY FIXED P AUTO	Genset stopped in Auto	
FIXED POWER ACTIVE	Genset running in Auto	
PEAK SHAVING MAN	Genset stopped or running and no other action taking place	
PEAK SHAVING SEMI		
READY PEAK SHAV AUTO	Genset stopped in Auto	
PEAK SHAVING ACTIVE	Genset running in Auto	
LOAD TAKEOVER MAN	Genset stopped or running and no other action taking place	
LOAD TAKEOVER SEMI		
READY LTO AUTO	Genset stopped in Auto	
LTO ACTIVE	Genset running in Auto	
MAINS P EXPORT MAN	Genset stopped or running and no other action taking place	
MAINS P EXPORT SEMI		

Status text	Condition	Comment
READY MPE AUTO	Genset stopped in Auto	
MPE ACTIVE	Genset running in Mains power export mode	
DG BLOCKED FOR START	Generator stopped and active alarm(s) on the generator	
GB ON BLOCKED	Generator running, GB open and an active "Trip GB" alarm	
SHUTDOWN OVERRIDE	The configurable input is active	
ACCESS LOCK	The configurable input is activated, and the operator tries to activate one of the blocked keys	
GB TRIP EXTERNALLY	Some external equipment has tripped the breaker	An external trip is logged in the event log
MB TRIP EXTERNALLY	Some external equipment has tripped the breaker	An external trip is logged in the event log
IDLE RUN	The "Idle run" function is active. The genset will not stop until a timer has expired	
IDLE RUN ###.#min	The timer in the "Idle run" function is active	
COMPENSATION FREQ.	Compensation is active	The frequency is not at the nominal setting
Aux. test ##.#V ####s	Battery test activated	
DELOAD	Decreasing the load of the genset in order to open the breaker	
START DG(s) IN ###s	The start genset setpoint is exceeded	
STOP DG(s) IN ###s	The stop genset setpoint is exceeded	
START PREPARE	The start prepare relay is activated	
START RELAY ON	The start relay is activated	
START RELAY OFF	The start relay is deactivated during the start sequence	
MAINS FAILURE	Mains failure and mains failure timer expired	
MAINS FAILURE IN ###s	Frequency or voltage measurement is outside the limits	The timer shown is the Mains failure delay. Text in mains units
MAINS U OK DEL ####s	Mains voltage is OK after a mains failure	The timer shown is the Mains OK delay
MAINS f OK DEL ####s	Mains frequency is OK after a mains failure	The timer shown is the Mains OK delay
Hz/V OK IN ###s	The voltage and frequency on the genset is OK	When the timer runs out it is allowed to operate the generator breaker

Status text	Condition	Comment
COOLING DOWN ###s	Cooling down period is activated	
COOLING DOWN	Cooling down period is activated and infinite	Cooling down timer is set to 0.0 s
GENSET STOPPING	This info is shown when cooling down has finished	
EXT. STOP TIME ###s		
PROGRAMMING LANGUAGE	This info is shown if the language file is downloaded from the PC utility software	
TOO SLOW 00<-----	Generator running too slow during synchronising	
-----> 00 TOO FAST	Generator running too fast during synchronising	
EXT. START ORDER	A planned AMF sequence is activated	There is no failure on the mains during this sequence
SELECT GEN-SET MODE	Power management has been deactivated and no other genset mode has been selected	Option G5 must be available
QUICK SETUP ERROR	Quick setup of the application failed	
MOUNT CAN CONNECTOR	Connect the power management CAN line	
ADAPT IN PROGRESS	The AGC is receiving the application that it has just been connected to	
SETUP IN PROGRESS	The new AGC is being added to the existing application	
SETUP COMPLETED	Successful update of the application in all AGC units	
REMOVE CAN CONNECTOR	Remove the power management CAN lines	
RAMP TO #####kW	The power ramp is ramping in steps, and the next step that will be reached after the timer has expired will be displayed	
DERATED TO #####kW	Displays the ramp down set point	
PREPARING ETHERNET	Preparing Ethernet connection	
PREPARING ENGINE IF	Preparing engine IF	
PROGRAMMING MLOGIC	Downloading M-Logic to the unit	
CBE config. relay/DVC	CBE is enabled in parameter 2254, but no AVR relay or DVC 310/D510C is configured	CBE sequence will not be executed
UNEXPECTED GB ON BB	Another generator breaker is closed on to the busbar (due to a GB position failure) while no voltage is present on the busbar	This indicates that other breakers cannot close to the busbar because of position failure on one or more GBs

Status text	Condition	Comment
WARM UP RAMP	Wamp up ramp is active	The available power is limited until the pre-defined temperature is reached, or when the input that activated warm up ramp is set low

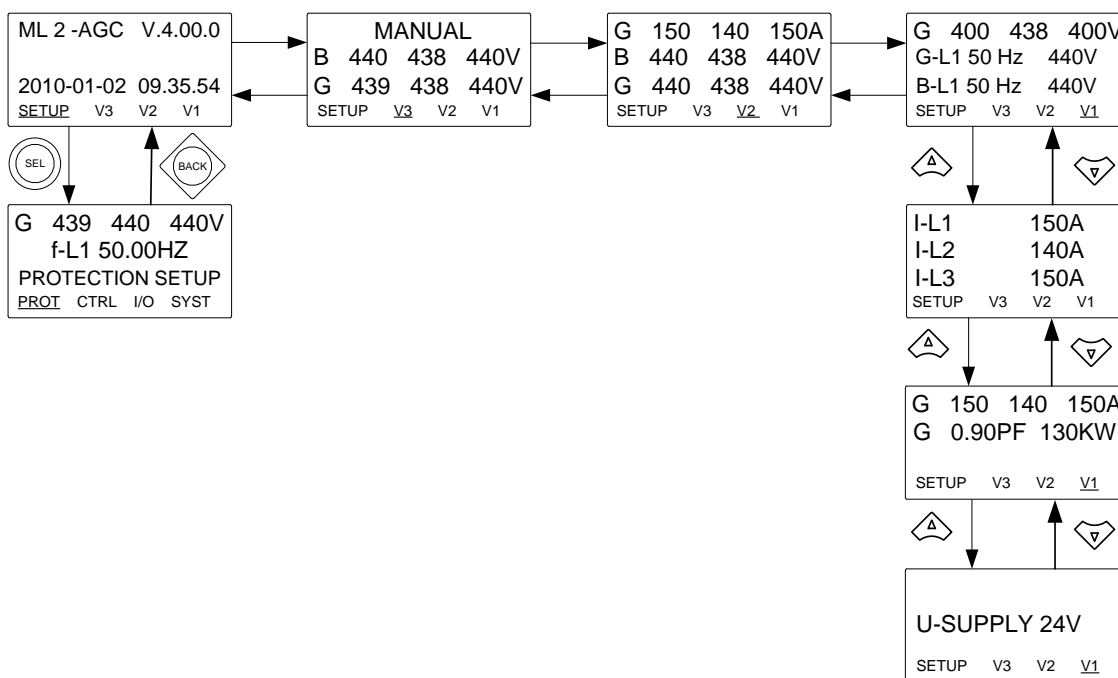
3.5.2 Texts only related to power management (option G5)

Status text	Condition	Comment
DG unit		
BLACKOUT ENABLE	This info is shown if a CAN failure is present in a power management application.	
UNIT STANDBY	If redundant mains units are present, this message is shown on the redundant unit.	
DELOADING BTB XX	DG units are load sharing asymmetrically to de-load BTB XX dividing two sections in an island application.	
BTB XX DIVIDING SEC.	BTB XX is dividing two sections in an island application.	
SYNCHRONISING TB XX	TB XX is synchronising.	
SYNCHRONISING MB XX	MB XX is synchronising.	
SYNCHRONISING BTB XX	BTB XX is synchronising.	
Mains unit		
UNIT STANDBY	If redundant mains units are present this message is shown on the redundant unit.	
TB TRIP EXTERNALLY	Some external equipment has tripped the breaker.	An external trip is logged in the event log.
BTB unit		
DIVIDING SECTION	A BTB unit is dividing two sections in an island application.	
READY AUTO OPERATION	BTB unit in Auto and ready for breaker operation (no active BTB trip" alarm).	
SEMI OPERATION	BTB unit in Semi.	
AUTO OPERATION	BTB unit in Auto, but not ready for breaker operation (active "BTB trip" alarm).	
BLOCKED FOR CLOSING	Last open BTB in a ring bus.	
BTB TRIP EXTERNALLY	Some external equipment has tripped the breaker.	An external trip is logged in the event log.
All units		
BROADCASTING APPL. #	Broadcast an application through the CAN line.	Broadcasts one of the four applications from one unit to the other AGCs in the power management system.
RECEIVING APPL. #	AGC receiving an application.	

Status text	Condition	Comment
BROADCAST COMPLETED	Successful broadcast of an application.	
RECEIVE COMPLETED	Application received successfully.	
BROADCAST ABORTED	Broadcast terminated.	
RECEIVE ERROR	Application is not received correctly.	



3.5.3 View menu example

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



3.6 Mode menu

If the MODE push-button is pushed, a selection of possible running modes appears in the fourth display line.

Using the  and  push-buttons moves the cursor, and the appropriate mode can be selected by pressing the SEL button:

Mode	Description
SEMI	<ul style="list-style-type: none"> - The display push-buttons (START, STOP, GB ON, GB OFF) are active and can be used by the operator. - The regulators are also active, that is, the speed control will bring the generator to nominal speed upon start. - When pushing a breaker button for closing, the AGC will synchronise (if allowed) the breaker. When the breaker closes, the controls stop.
TEST	<ul style="list-style-type: none"> - The unit will start the generator, carry out the test sequence (pre-defined time period) and stop the generator again. Subsequently, the generator will return to AUTO or SEMI-AUTO mode. The mains breaker will remain closed, and the generator breaker will remain open. <p>NOTE: The test running can be: Simple test: starting the genset without closing the GB; Load test: parallel to the mains and take load to a pre-defined value; Full test: transfer the load to the genset and open the MB.</p>
AUTO	<ul style="list-style-type: none"> - The unit will automatically carry out the control type selected (AMF, fixed power, and so on). - The display control push-buttons (START, STOP, GB ON, GB OFF) are disabled. - If the selected running mode is fixed power, mains power export, load takeover or island, timer start/stop (week watch) or binary input, then start/stop can be used.
MAN	<ul style="list-style-type: none"> - The display push-buttons (START, STOP) are active and can be used by the operator. - The regulators are not active, that is, speed (and voltage) control has to take place using binary inputs for UP and DOWN control. - The breakers will be able to open or close at any time. A synchronisation check will always be performed to ensure safe closing of the breakers.
BLOCK	<ul style="list-style-type: none"> - The unit will not be able to start. BLOCK mode can be selected during standstill and the password is needed to exit BLOCK mode. If BLOCK mode is selected while the genset is running, the mode will have no effect until the genset is stopped. To select another mode after BLOCK mode, the password must be entered.

To return to the other display functions from MODE selection, press the BACK push-button.

4. Alarm handling and log list

4.1 Alarm handling

When an alarm occurs, the unit will automatically go to the alarm list for display of the alarm.

If reading of the alarms is not desired, use the BACK push-button to exit the alarm list.

If you decide to enter the alarm list later, use the INFO push-button to jump directly to the alarm list reading.

The alarm list contains both acknowledged and unacknowledged alarms provided that they are still active (that is, the alarm condition is still present). Once an alarm is acknowledged and the condition has disappeared, the alarm will no longer be displayed in the alarm list.



This means that if there are no alarms, the alarm list will be empty.



If an alarm is blocking a genset in AUTO from starting, the genset will automatically start and close the breaker if the condition that triggered the alarm has disappeared and the alarm has been acknowledged.

G	0	0	0V
1230 Gen low-volt 1			
UN-ACK 2 Alarm(s)			
<u>ACK</u>	FIRST	LAST	

This display example indicates an unacknowledged alarm. The display can show only one alarm at a time. Therefore, all other alarms are hidden.

To see the other alarms, use the  and  push-buttons to scroll in the display.

To acknowledge an alarm, place the cursor (underscore) under "ACK" and then press SEL.

To jump to the first (oldest) or the last (most recent) alarm, place the cursor under the selection (FIRST or LAST) and press SEL.

4.2 Log list





The log is divided into three different lists:

1. Events
2. Alarms
3. Battery test



The log list contains up to 150 events, the alarm list contains up to 30 historical alarms and the battery test list contains up to 52 historical battery tests.

An event is, for example, closing of breaker and starting of engine. An alarm is, for example, over-current or high cooling water temperature. A battery test is, for example, test OK or test failed.

To enter the log list:

1. Press LOG.
2. Select the list that is needed by using the  and  push-buttons, and press the SEL push-button.
3. To scroll up and down in the list, use the  and  push-buttons.

It is also possible to go to the first (oldest) logging or the last (most recent) logging by placing the cursor

(underscore) under the selection (move the cursor using the  and  push-buttons) and then pressing the SEL push-button.