DEIF A/S

Operator's Manual

Automatic Gen-set Controller

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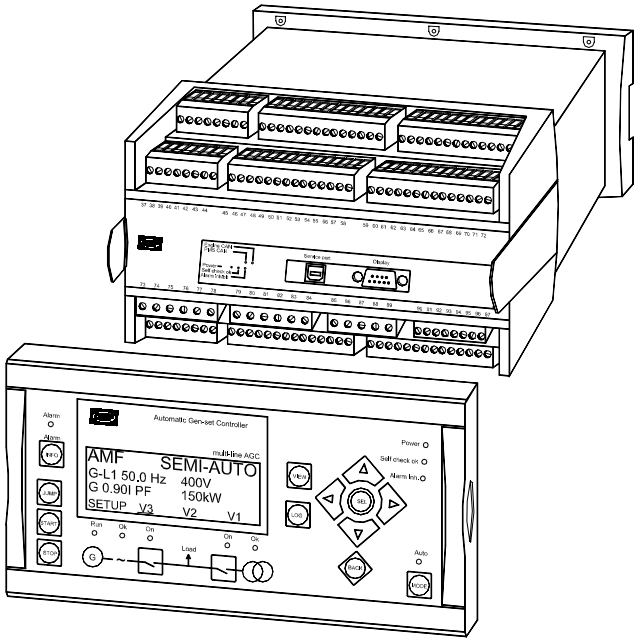
SW version 3.0X.X



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

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Table of contents

1. About this document

General purpose

This document is the Operator's Manual for DEIF's Automatic Gen-set Controller, the AGC. The document mainly includes general product information, display readings, push-button and LED functions, alarm handling descriptions and presentation of the log list.

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

Please make sure to read this handbook before working with the multi-line 2 controller and the gen-set to be controlled. Failure to do this could result in damage to the equipment or human injury.

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.

Contents/overall structure

The 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. Warnings and legal information

Legal information and responsibility

DEIF 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 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.

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.

Warning

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

3. Display push-buttons and LEDs

Push-button functions

The display unit holds a number of push-button functions which are described 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. These events are deleted when the AGC is switched off.

 : Moves the cursor left for manoeuvring 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: Selects 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 manoeuvring 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*.

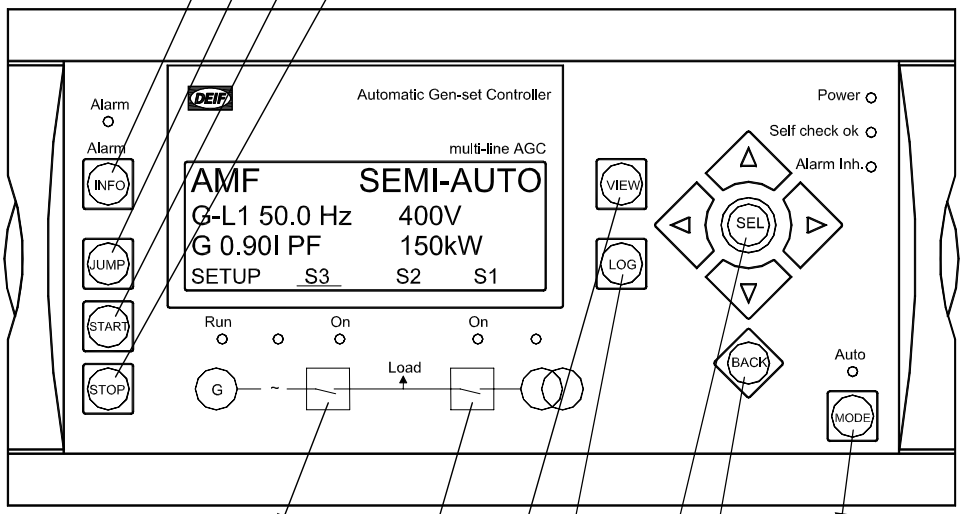
STOP: Stop of the gen-set *if 'SEMI-AUTO' or 'MANUAL' is selected*.

GB ON: Manual activation of close 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:



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

JUMP:
Enters a specific menu number selection.

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

MODE:
Changes the display menu line (line four) to mode selection.

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

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

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

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

BACK:
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: LED flashing indicates that unacknowledged alarms are present.
LED fixed light indicates that ALL alarms are acknowledged, but some are still present.

Power: LED indicates that the auxiliary supply is switched on.

Self check OK: LED indicates that the unit is OK.

Alarm inh.: LED fixed light indicates that an alarm is enabled but inhibited. Please refer to Help in the PC utility software for description of inhibit settings.

Run: LED indicates that the generator is running.

Hz/V OK: LED green light indicates that the voltage/frequency is present and OK.

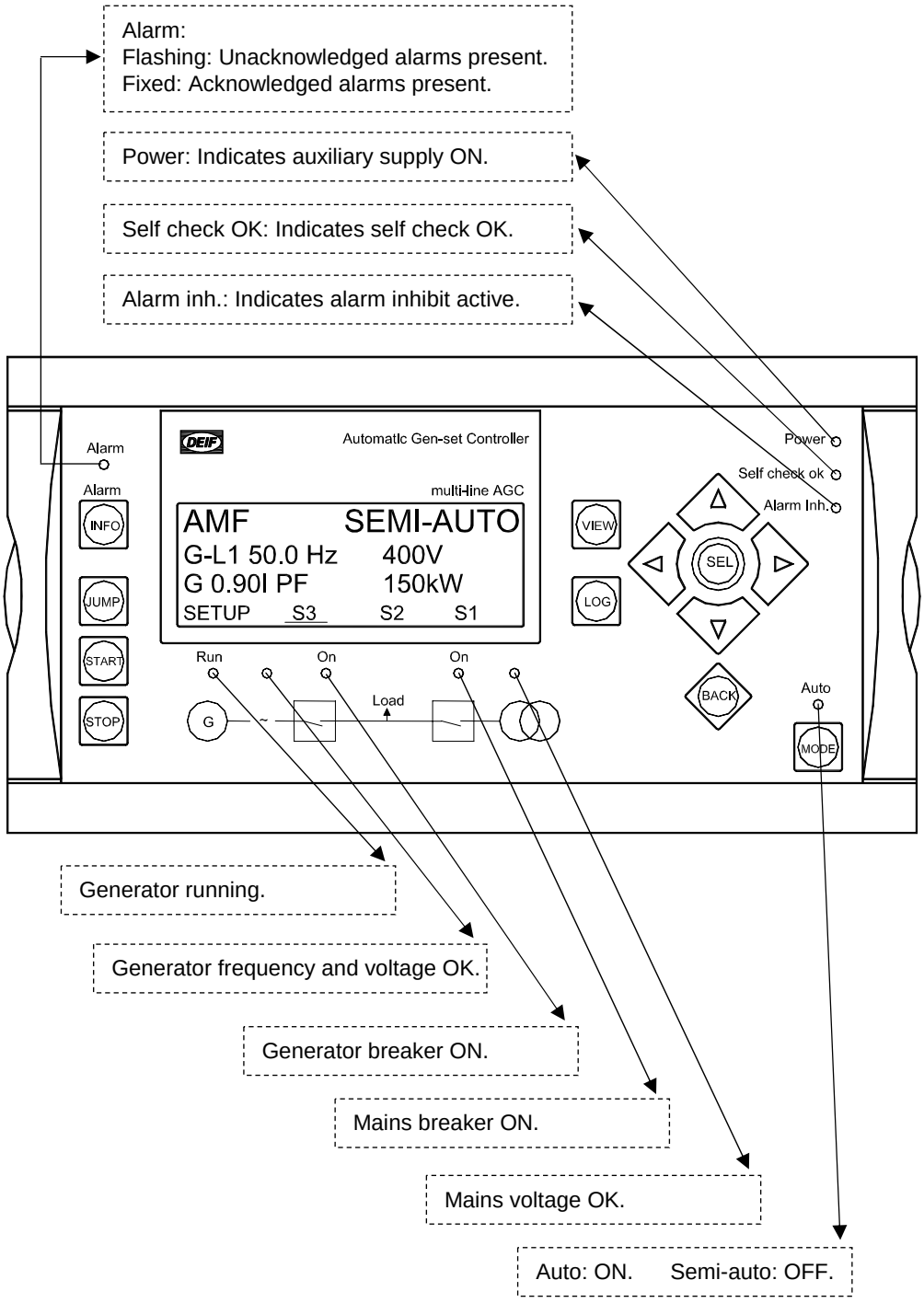
GB ON: LED indicates that the generator breaker is closed.

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 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:



4. Display and menu structure

LCD display

The display is a backlit LCD text display containing 4 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).

For selection of values, see the Designer's Reference Handbook.

Menu structure

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

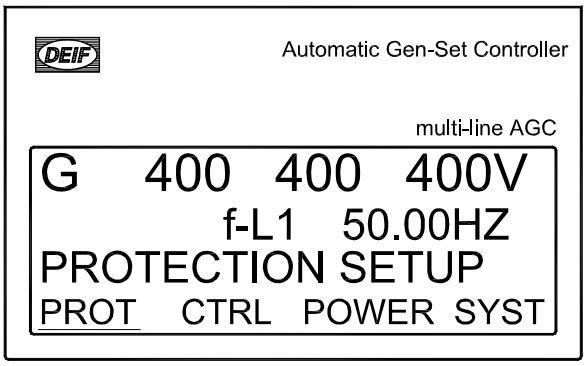
View menu system
This is the commonly used menu system. 15 windows are configurable and can be entered by using the arrow push-buttons.

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.

Entry window

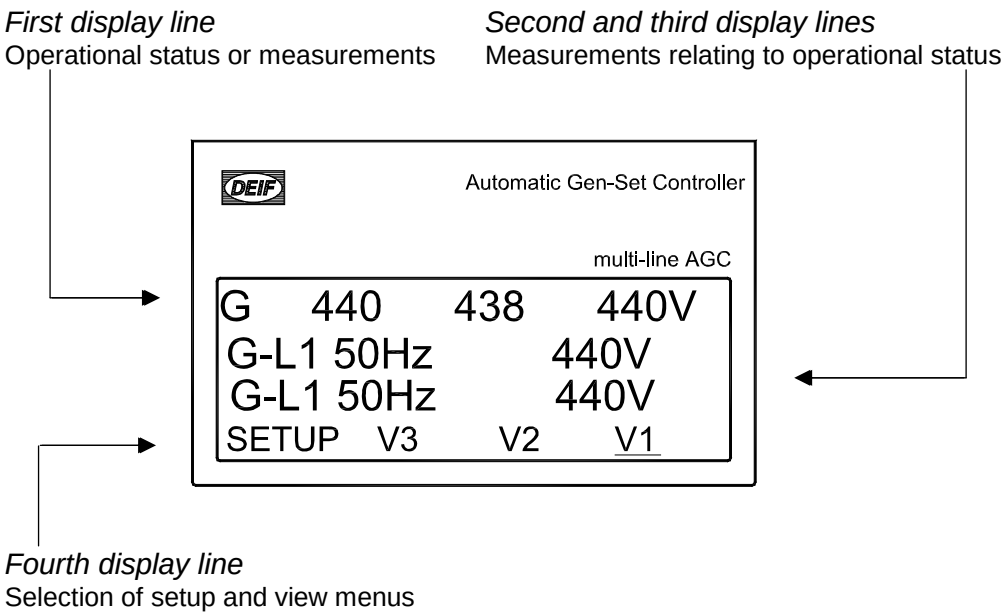
When the unit is powered up, an entry window appears. The entry window is the turning point in the menu structure and as such the gateway to the other menus. It can always be reached by pushing the BACK push-button 3 times.

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 daily use menus for the operator.



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

View menu navigation

The readings etc. are all selected by moving the cursor (fourth display line (note the underscore on V1 on the drawing above - this is the cursor)):

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

View window 1

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

For detailed information about configuration, please see the Designer's Reference Handbook.

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

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	

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 5 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 5 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 gen-set is in normal operation, e.g. fixed power mode.*

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	Changes automatically between the 5 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 5 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 gen-set is in normal operation, e.g. fixed power mode.*

Status line text

This table explains the different messages.

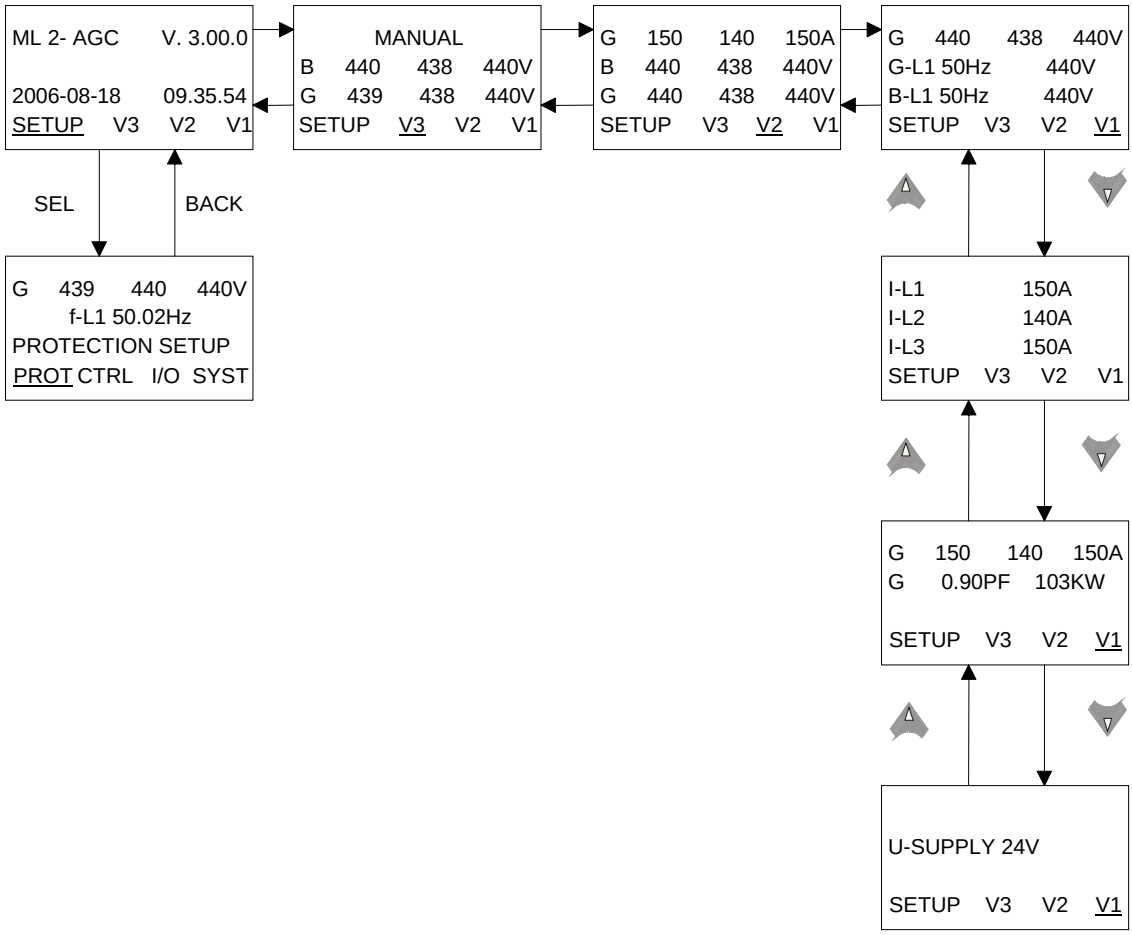
Status text	Condition	Comment
BLOCK	Block mode is activated	
SIMPLE TEST	Test mode is activated	
LOAD TEST		
FULL TEST		
SIMPLE TEST ###.#min	Test mode activated and test timer counting down	
LOAD TEST ###.#min		
FULL TEST ###.#min		
ISLAND MAN	Gen-set stopped or running and no other action taking place	
ISLAND SEMI		
READY ISLAND AUTO	Gen-set stopped in Auto	
ISLAND ACTIVE	Gen-set running in Auto	
AMF MAN	Gen-set stopped or running and no other action taking place	
AMF SEMI		
READY AMF AUTO	Gen-set stopped in Auto	
AMF ACTIVE	Gen-set running in Auto	
FIXED POWER MAN	Gen-set stopped or running and no other action taking place	
FIXED POWER SEMI		
READY FIXED P AUTO	Gen-set stopped in Auto	
FIXED POWER ACTIVE	Gen-set running in Auto	
PEAK SHAVING MAN	Gen-set stopped or running and no other action taking place	
PEAK SHAVING SEMI		
READY PEAK SHAV AUTO	Gen-set stopped in Auto	
PEAK SHAVING ACTIVE	Gen-set running in Auto	
LOAD TAKE OVER MAN	Gen-set stopped or running and no other action taking place	
LOAD TAKE OVER SEMI		
READY LTO AUTO	Gen-set stopped in Auto	
LTO ACTIVE	Gen-set running in Auto	
MAINS P EXPORT MAN	Gen-set stopped or running and no other action taking place	
MAINS P EXPORT SEMI		
READY MPE AUTO	Gen-set stopped in Auto	
MPE ACTIVE	Gen-set 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
TB trip externally	Some external equipment has tripped the breaker	An external trip is logged in the event log
POWER DERATE	The 'Power derate' function is activated and the nominal power set point has been decreased	

Status text	Condition	Comment
IDLE RUN	The 'Idle run' function is active The gen-set 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 gen-set in order to open the breaker	
RAMP DOWN	Decreasing the load of the gen-set	
RAMP UP	Increasing the load of the gen-set	
START DG(s) IN ###s	The start gen-set set point is exceeded	Option G5 must be available
STOP DG(s) IN ###s	The stop gen-set set point is exceeded	Option G5 must be available
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 gen-set is OK	When the timer runs out it is allowed to operate the generator breaker
COOLING DOWN ###s	Cooling down period is activated	
GEN-SET STOPPING	This info is shown when cool down has finished	
EXT. STOP TIME ###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	
UNIT STANDBY	If redundant mains units are present this message is shown on the redundant unit	Option G5 must be available
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

Status text	Condition	Comment
SELECT GEN-SET MODE	Power management has been deactivated and no other gen-set mode has been selected	Option G5 must be available

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.



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	- The display push-buttons (START, STOP, GB ON, GB OFF) are active and can be used by the operator. - The regulators are also active, i.e. 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	- The unit will start the generator, carry out the test sequence (predefined 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. NOTE: The test running can be: Simple test: starting the gen-set without closing the GB, Load test: Parallel to the mains and take load to a predefined value. Full test: Transfer the load to the gen-set and open the MB.
AUTO	- The unit will automatically carry out the control type selected (AMF, fixed power etc.). - 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 take over or island, timer start/stop (week watch) or binary input, then start/stop can be used.
MAN	- The display push-buttons (START, STOP) are active and can be used by the operator. - The regulators are not active, i.e. speed (and voltage) control has to take place using binary inputs for UP and DOWN control. - The breakers will be unable to open or close at all times.
BLOCK	- The unit will not be able to start. BLOCK mode can be selected during standstill and the password is needed to go away from BLOCK mode. If the BLOCK mode is selected while the gen-set is running, the mode will have no effect until the gen-set is stopped. To select another mode after the BLOCK mode, the password must be entered.

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

5. Alarm handling and log list

Alarm handling

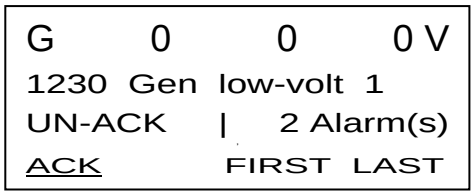
When an alarm occurs, the unit will automatically go to the alarm list for display of the alarm.

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 (i.e. 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.



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 (youngest) alarm, place the cursor under the selection (FIRST or LAST) and press SEL.

Log list

The log is divided into 3 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 e.g. closing of breaker and starting of engine. An alarm is e.g. overcurrent or high cooling water temperature. A battery test is e.g. test OK or test failed.

To enter the log list:

1. Press LOG.
2. Select the list which 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 (youngest) logging by placing the cursor (underscore) under the selection (move the cursor using the  and  push-buttons) and press the SEL push-button.