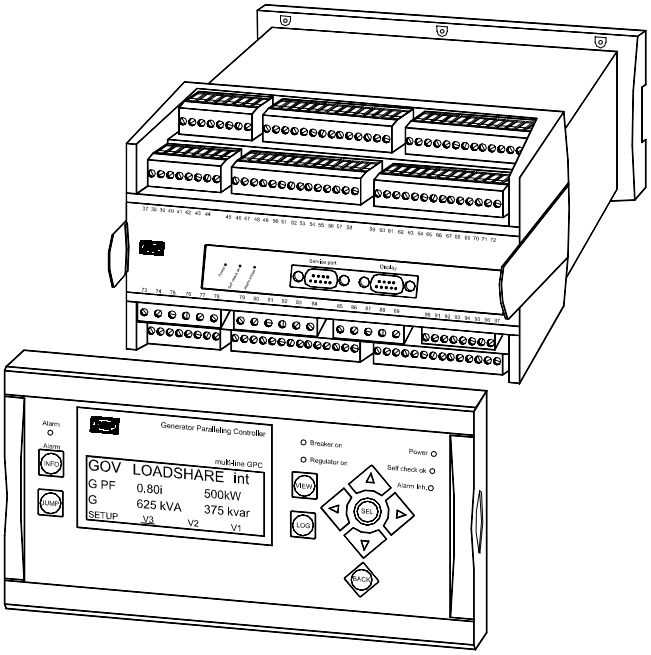
DEIF A/S

Operator's Manual

Multi-line 2/version 2-GS

4189340253E (UK)
SW version 2.4X.X



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

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1. About this document

General purpose

This document is the Operator's Manual for DEIF's generator control and protection units, the GPU, GPC and PPU. 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 navigating in the menus and carrying out alarm handling.

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.

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.

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.

3. Display push-buttons and LEDs

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 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 in the setup menu or for scrolling through the view windows (V1).

SEL: Is used to select the underscored entry in the fourth line of the display.

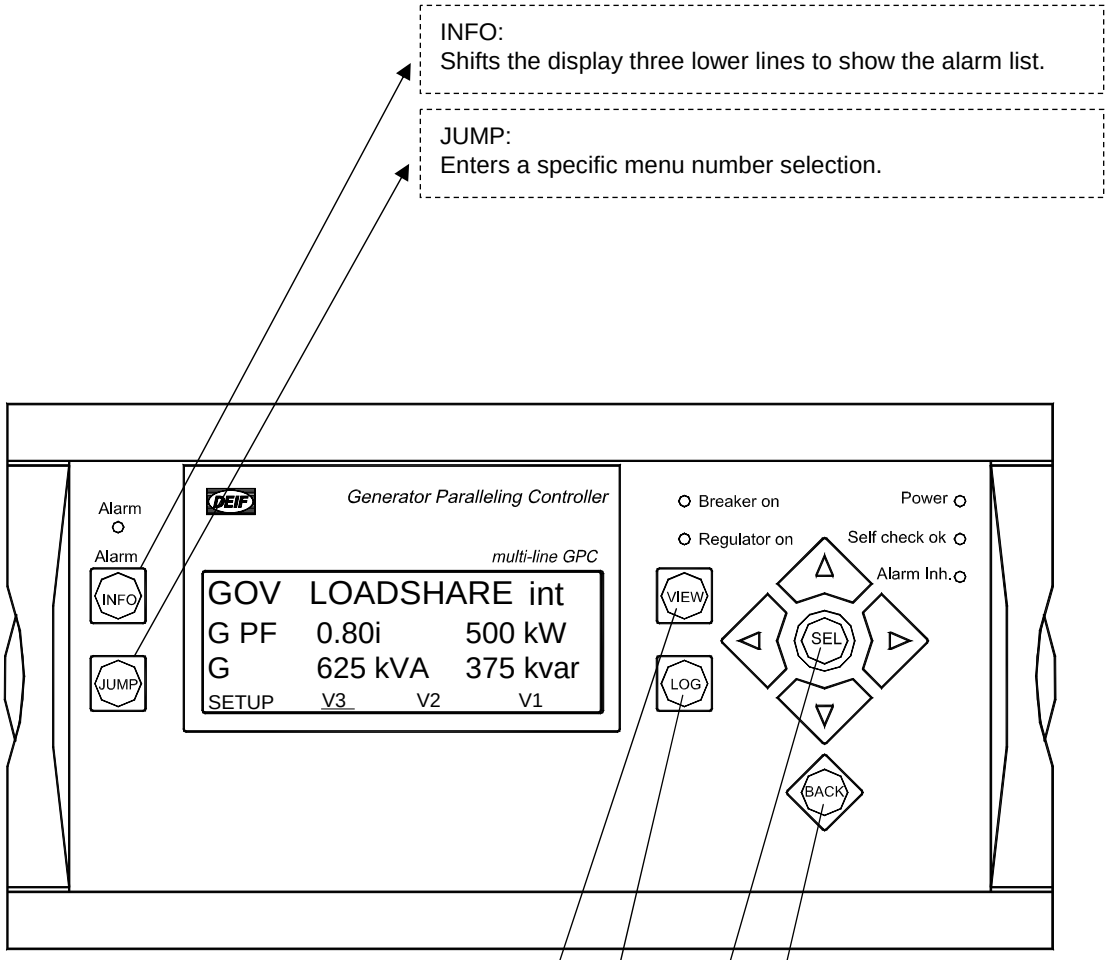
 : Decreases the value of the selected set point (in the setup menu). In the daily use display, this button function is used for scrolling the second line displaying of generator values in the setup menu or for scrolling through the view windows (V1).

 : 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).

The GPC display is shown on the next page.

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.

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.

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

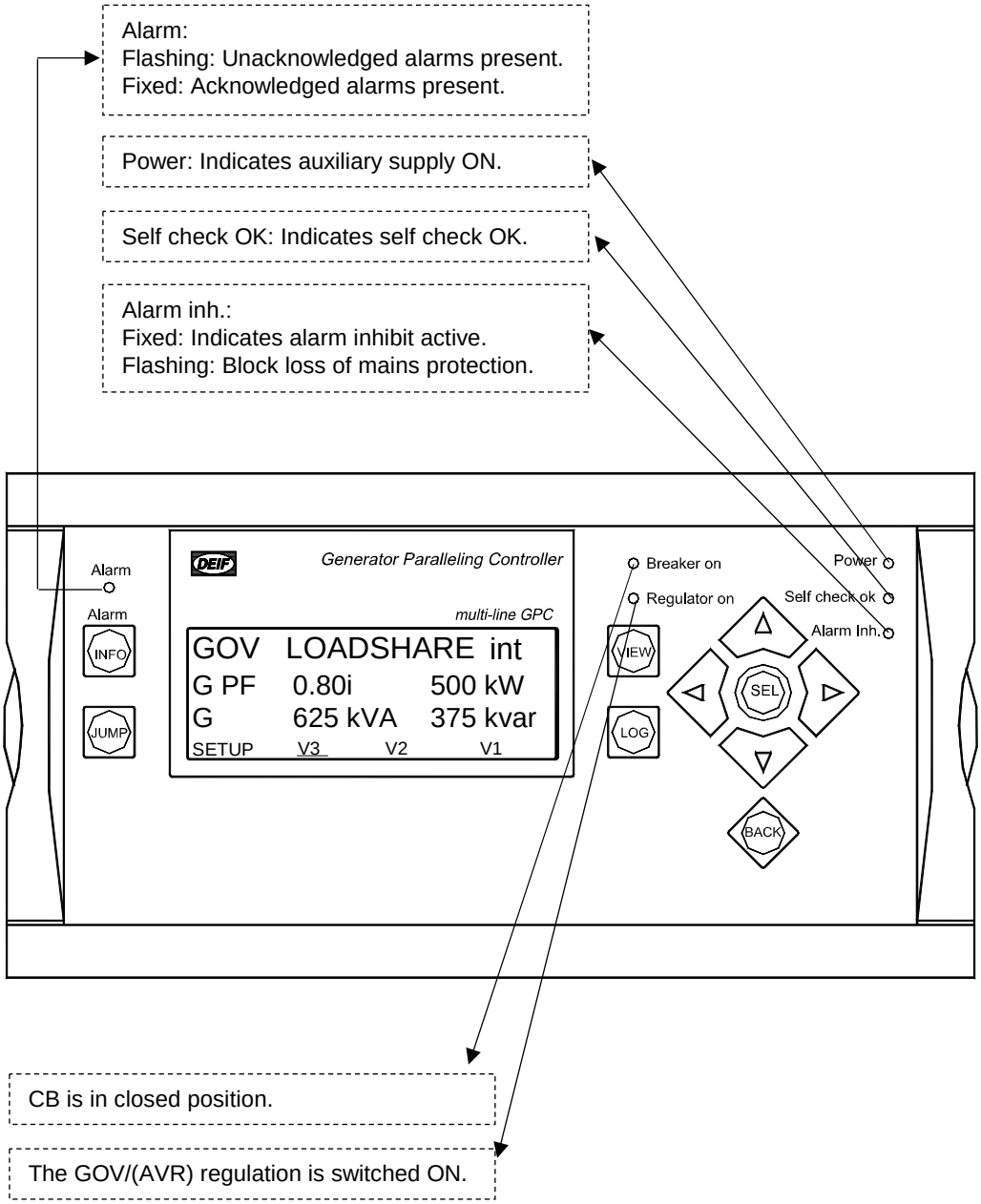
Self check OK: LED indicates that the self check is OK.

Alarm inh: LED flashing indicates that the loss of mains protections are inhibited (block loss of mains input is ON).
LED fixed light indicates that the inhibit function is ON.

Breaker on: LED green light indicates that the generator breaker is closed.

The GPC display is shown on the next page.

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:

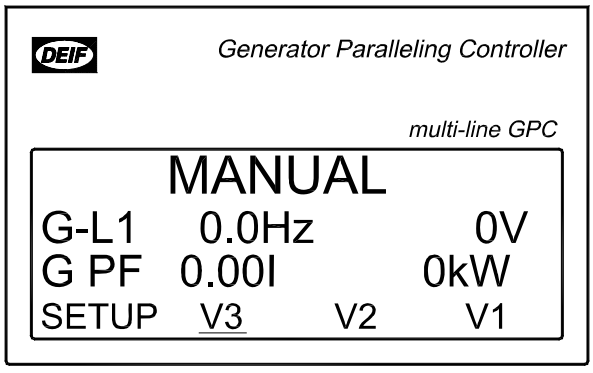
View menu system
This is the commonly used menu system. 15 windows are configurable and can be entered by using the arrow push-buttons.

Setup menu system ***(Not commonly used by the daily operator)***
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

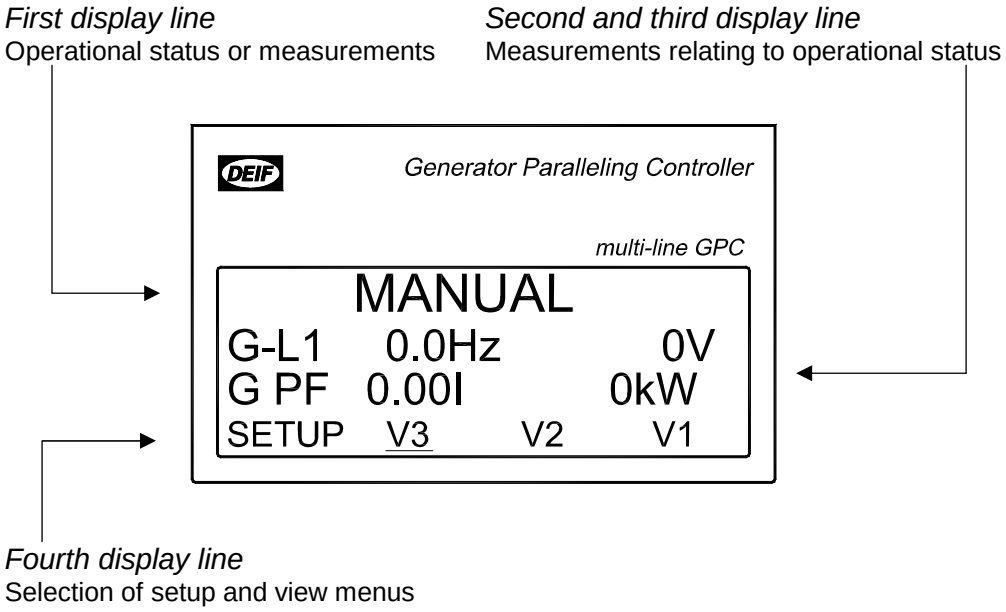
When the unit is powered up, an entry window appears. The entry window is the turning point in the menu structure and as such the gateway to the other menus. It can always be reached by pressing the BACK push-button 3 times.

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



View menu

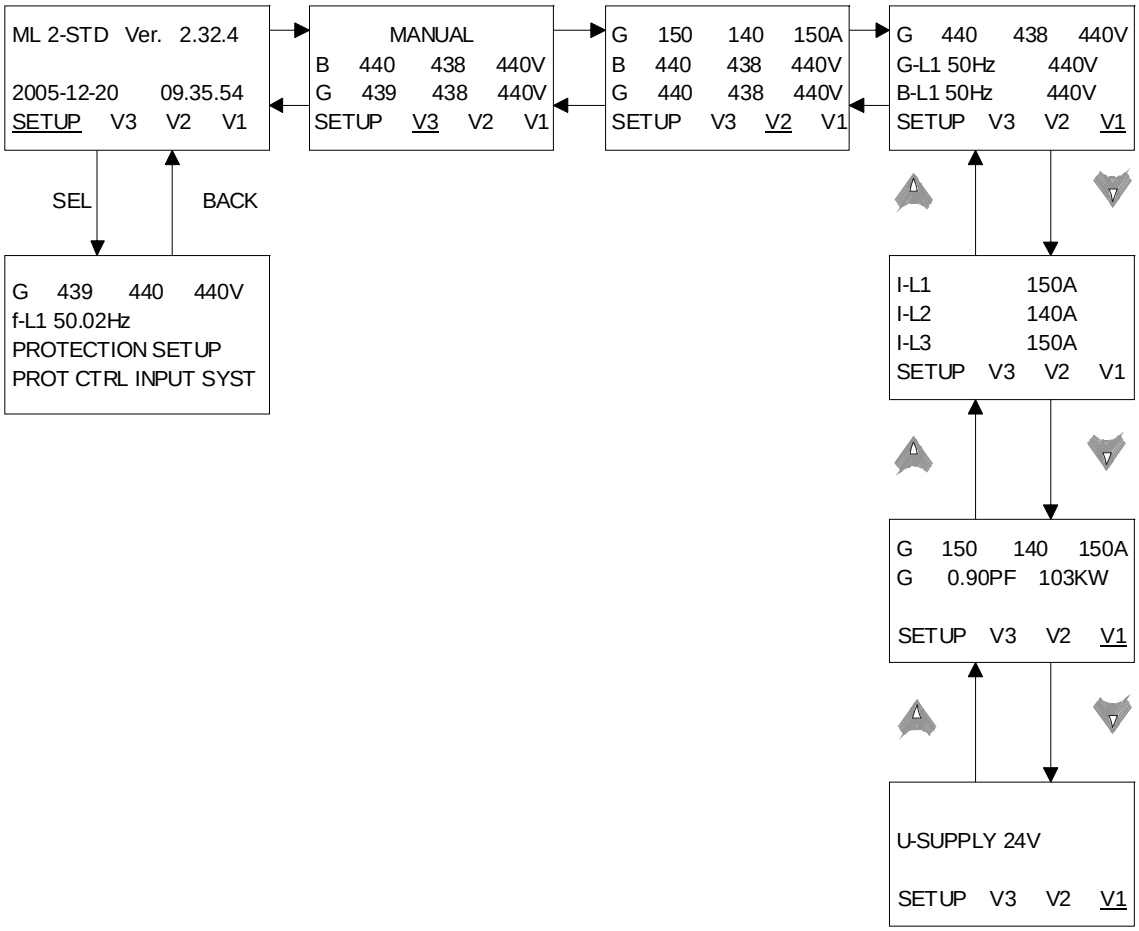
The view menus (V1, V2 and V3) are the most commonly used menus of the unit.



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

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 navigation 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
  - Input 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

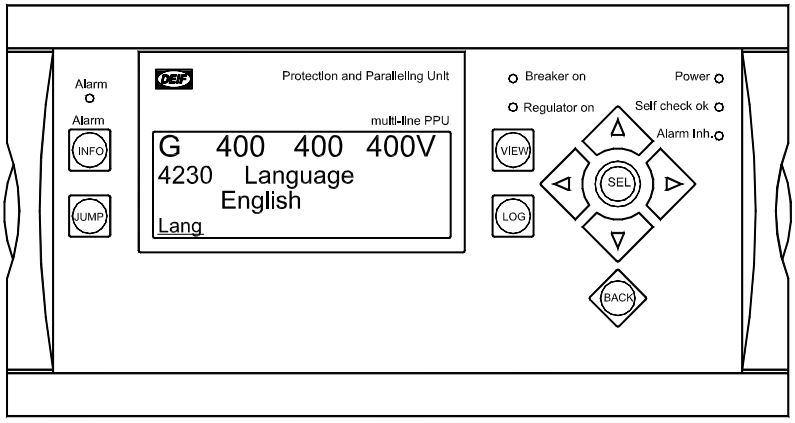
Status line text

Status text	Condition	Comment
Manual	No regulation	
No regulation	No regulation	The "start sync/reg" input term 25 may be ON, requiring the regulators to operate, but the condition is not fulfilled (e.g. generator not running)
Gov Static Sync	Static synchronisation in progress	Attempting to reach phase angle difference = 0 and frequency difference = 0
Gov Dynamic Sync	Dynamic synchronisation in progress	Attempting to synchronise with generator frequency slightly higher than busbar / Mains
Ramp down	Generator power is being lowered and breaker opens at a pre-set low power value	
Ramp up	Generator power increasing after synchronising of breaker	Only in load sharing and fixed power mode. Ramp up stops when power set point is reached
Gov fixed f int	Fixed frequency running mode	Using internal set point (f nom)
Gov fixed f ext	Fixed frequency running mode	Using external set point (analogue input)
Gov fixed P int	Fixed Power running mode	Using internal set point (P nom)
Gov fixed P ext	Fixed Power running mode	Using external set point (analogue input)
Droop int	Speed droop running mode	Using internal set point for frequency (f nom)
Droop ext	Speed droop running mode	Using external set point for frequency (analogue input)
Load sharing int	Load sharing running mode	Using internal set point for frequency (f nom)
Load sharing ext	Load sharing running mode	Using external set point for frequency (analogue input)
Water level control	Hydro turbine power production dependent on water level in storage	Option O, hydro turbine control only
Asynchron sync	Synchronisation of asynchronous generator by using RPM measurement	Requires a magnetic speed pickup
Async. fixed RPM	Fixed speed for asynchronous generator using RPM input	When terminal 25 (start/sync) and 43 (de-load/sync block) are both ON, the speed will go to nominal but breaker remains open
Start Prepare	Pre-start heating or oil pressure build up for engine	Options M1/M2 only
Start relay on	Cranking	Options M1/M2 only
Start relay off	Crank pause	Options M1/M2 only
Cooling down ###.# s	Engine cooling down timer running	Options M1/M2 only

Status text	Condition	Comment
Gen-set stopping	Stop command has been issued but running feedback is still present	Options M1/M2 only
Ext. stop T. ###.#s	Engine has stopped and the extended stop timer is running. During this the stop coil (if selected) will be activated	Options M1/M2 only. Gen-set cannot be started before the extended stop timer runs out

Language selection

English, German, French or Spanish language may be selected via the system set-up or the JUMP function.



This list explains how to change the language setting.

1. Press the JUMP button.
2. Use the up/down buttons to step to channel 4231.
3. Press the SEL button to enter the menu. (Password-protected – contact the switchboard manufacturer for information about the password).
4. Choose the password with the up/down buttons and press the SEL button.
5. Use the up/down buttons to select the desired language and press the SEL button.

The password must be re-entered when the display has not been used for 3 minutes.

6. Alarm handling and log list

Alarm function

The GPU, GPC and PPU include an alarm function. The alarm handling is explained in this chapter.

Setup

The alarms must typically be set up with set point, timer, relay outputs and enabling. The adjustable set points of the individual alarms vary in range, e.g. the minimum and maximum settings. This is done by the company in charge of the commissioning and the settings are normally not to be changed. The settings are password-protected.

Alarm display

All alarms that occur will be shown in the display.

Definitions

There are three different alarm LED modes:

1. Alarm is not present:	The display does not show any alarm. The alarm LED is dark.
2. Unacknowledged state:	The alarm has exceeded its set point and delay, and the alarm message is displayed. The GPU, GPC or PPU is in the alarm state and it can only leave the alarm state if the cause of the alarm disappears and the alarm message is acknowledged at the same time. The alarm LED is flashing.
3. Acknowledged state:	The alarm will be in an acknowledged state if the alarm situation is present and the alarm has been acknowledged. The alarm LED is lit with fixed light. Any new alarm will make the LED flash.

Alarm acknowledge

The alarms can be acknowledged directly on the multi-line 2 in two ways. Either by means of the binary input 'Alarm acknowledge' or using the push-buttons on the display. If the binary alarm input is used, this will typically be a central button placed in the switchboard.

The principle of acknowledging alarms differs from switchboard to switchboard. In SCADA- or PLC-based systems, the acknowledgement is typically carried out from these specific systems and their HMI interface. (Monitor or panel PC)

Binary acknowledge input

The alarm acknowledge input acknowledges all present alarms and the Alarm LED will change from flashing light to fixed light (alarms still present) or no light (no alarms present).

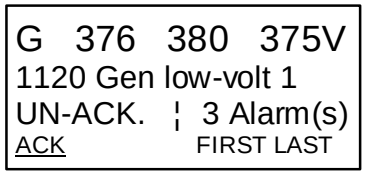
It is not possible to acknowledge individual alarms with the binary alarm acknowledge input. All alarms will be acknowledged when the input is activated.

Display acknowledge (push-buttons)

The display can be used for alarm acknowledgement when the alarm info window is entered.

Pressing the 'INFO' button will open this window.

The alarm information window displays one alarm at a time together with the alarm state (alarm acknowledged or not). If the alarm is unacknowledged, move the cursor to 'ACK' and press select to acknowledge it.



Use keyUP and keyDOWN to step through the alarm list. The alarm list contains all present alarms.

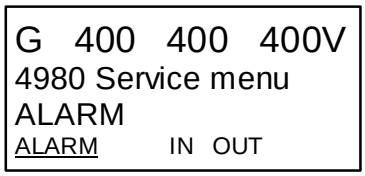
Service menu

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 (4920 Service menu).

Use the service menu for easy trouble shooting in connection with the event log (see page 16).

Entry window

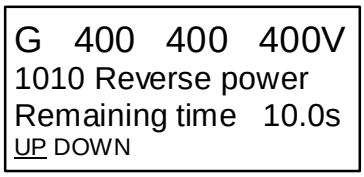
The entry shows the possible selections in the service menu.



Available selections:

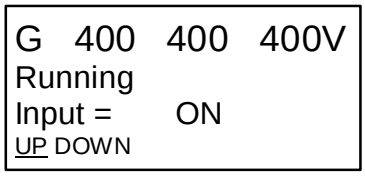
Alarm

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

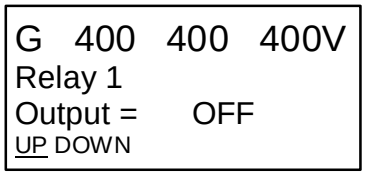


IN (digital input)

Shows the status of the digital inputs.



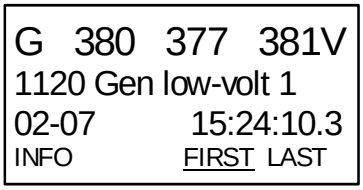
OUT (digital output)
Shows the status of the digital outputs.



Event log

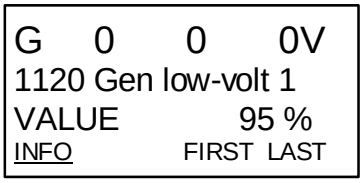
The event log holds up to 150 events, and they can be viewed in the display or in the PC utility software. When more than 150 events have occurred, each new event will overwrite the oldest event following the 'first in – first out' principle.

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



The specific alarm or event is described in the second line. In the above example, the generator low voltage, level 1 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':



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.