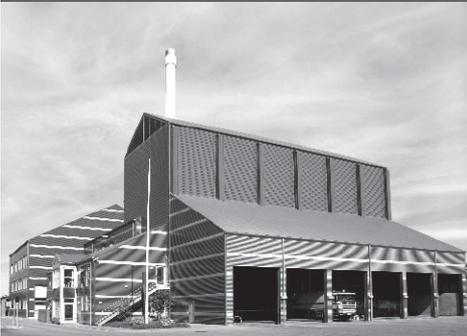




-power in control



OPERATOR'S MANUAL



Protection and Power Management, PPM-3

- Display and push-button functions
- Alarm handling
- Log list
- Failure mode and effect analysis



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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.

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 gen-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 unit and menu structure

2.1 Preface

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

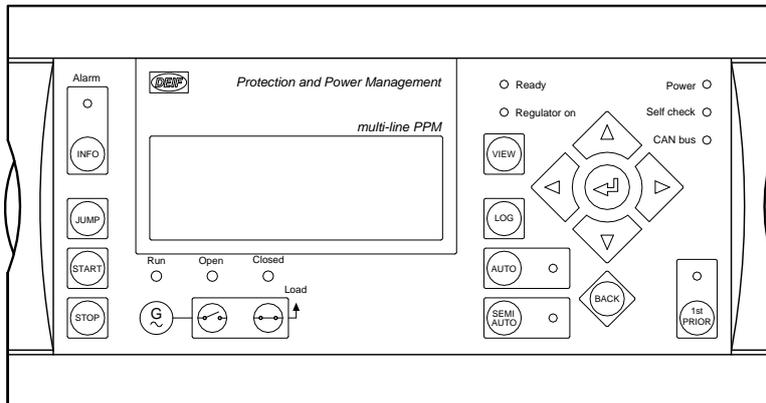
2.2 Display unit (DU-2)

It is possible to have up to four different kinds of displays in a PPM-3 system: Diesel Generator (DG), Shaft Generator/Shore Connection (SG/SC), Emergency Diesel Generator (EDG) and Bus Tie Breaker (BTB).

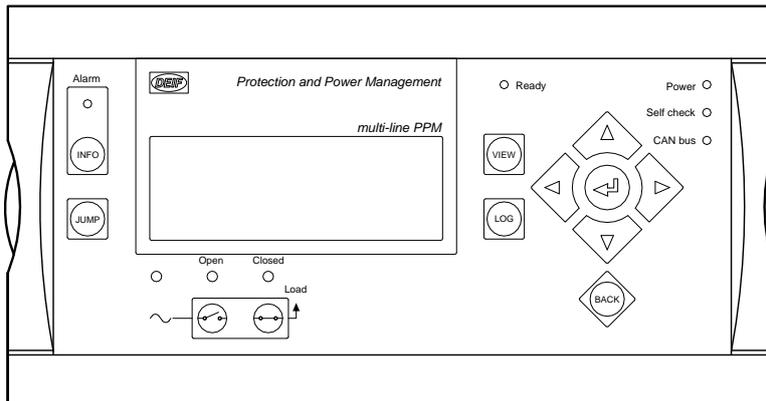
The display has 4 different lines, each with 20 characters, and holds a number of push-button functions.

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

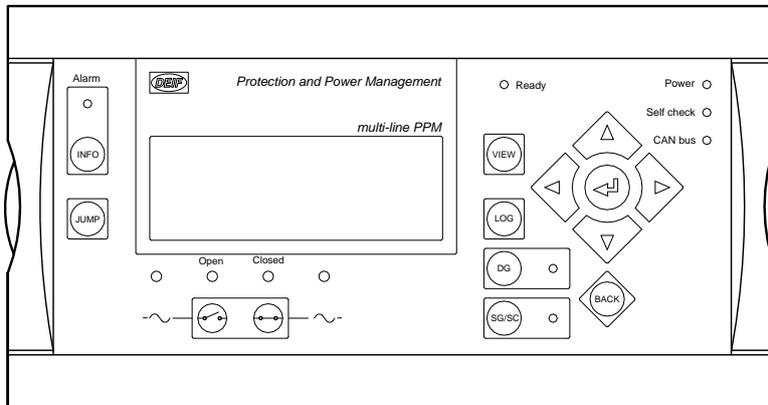
2.2.1 Diesel generator (DG) display unit



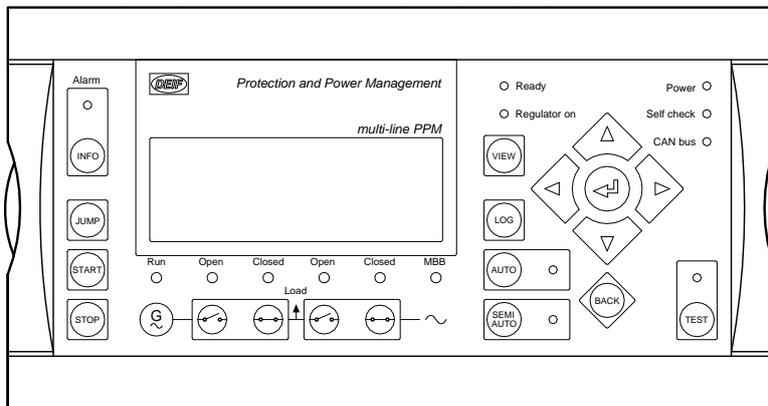
2.2.2 Shaft Generator (SG)/Shore Connection (SC) display unit



2.2.3 Bus Tie Breaker (BTB) display unit



2.2.4 Emergency Diesel Generator (EDG) display unit



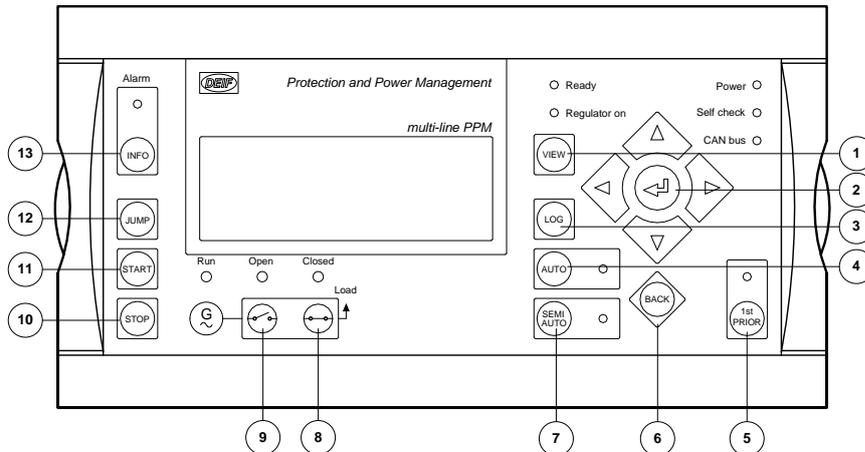
2.3 Push-button and LED functions

2.3.1 Push-buttons and LED

The common functions for all display push-buttons are described in this table:

Push-but- ton	Descripton
INFO	Moves directly to the alarm list where all unacknowledged and present alarms are displayed.
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.
VIEW	Shifts the first line displaying in the setup menus. Push 2 sec. to switch to master display in case more than 1 display is connected (master password is required).
LOG	Jumps directly to the event and alarm log. The display 3 lower lines will show the event and alarm log.
	Moves the cursor left for manoeuvring in the menus.
	Increases the value of the selected setpoint (in the setup menu). In the daily use display, this button function is used for changing between displayed percentage or real value of produced power (kW), reactive power (kVAr) and apparent power (kVA). This button is also used to perform lamp test of the display by moving the cursor to SETUP and activate the arrow up.
	Selects the underscored entry in the fourth line of the display, and acknowledges active alarm shown in the alarm list.
	Decreases the value of the selected setpoint (in the setup menu). In the daily use display, this button function is used for changing between displayed percentage or real value of produced power (kW), reactive poser (kVAr) and apparent power (kVA). This button is also used to perform lamp test of the display by moving the cursor to SETUP and activate the arrow down.
	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 push-buttons for a diesel generator display unit are placed as follows:

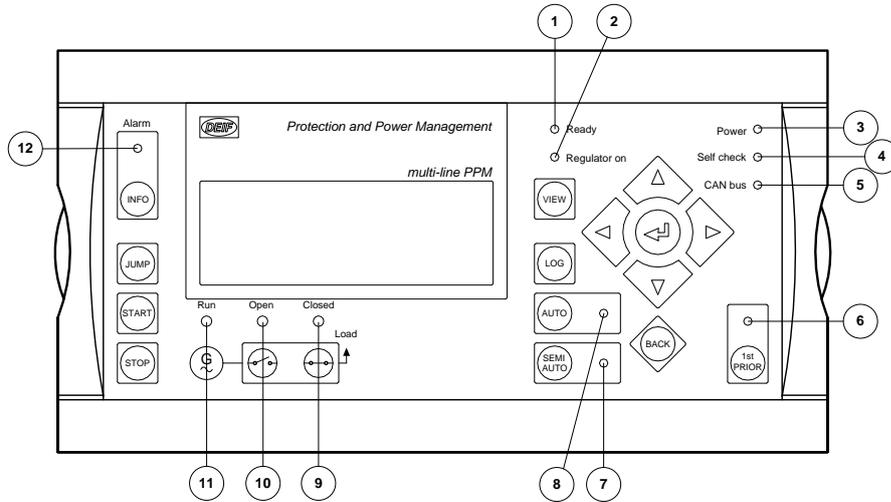


1. VIEW: shifts the first line displaying in the setup menus.
2. SELECT: selects the underscored entry in the fourth display line.
3. LOG: displays the historic alarm/event log.
4. AUTO: the generator is a part of the power management system.
5. 1st PRIOR: this generator has the highest priority.
6. BACK: jumps one step backwards in the menu.
7. SEMI AUTO: the generator is controlled by the operator.
8. GB ON: closes the generator breaker. **START: start of the gen-set if SEMI AUTO is selected.**
9. GB OFF: opens the generator breaker. **START: start of the gen-set if SEMI AUTO is selected.**
10. STOP of the gen-set **if SEMI AUTO is selected.**
11. START: start of the genset *if SEMI AUTO is selected.*
12. JUMP: jumps directly into a setting with a known parameter.
13. INFO: jumps directly to the alarm list.

Each LED located on the display has its own function. The colour is green, red or yellow (fixed or flashing), dependent on its function, as described in this table:

LED function	Description
Alarm	LED red flashing indicates that unacknowledged alarms are present. LED red fixed light indicates that ALL alarms are acknowledged, but some are still present.
Ready	LED green indicates that the unit is ready for operation.
Power	LED green indicates that the auxiliary supply is switched on.
Self check OK	LED green indicates that the unit is OK.
CANbus	LED green indicates that the CANbus line(s) is/are OK. LED yellow indicates that one communication line is interrupted. LED red indicates that both communication lines are interrupted.

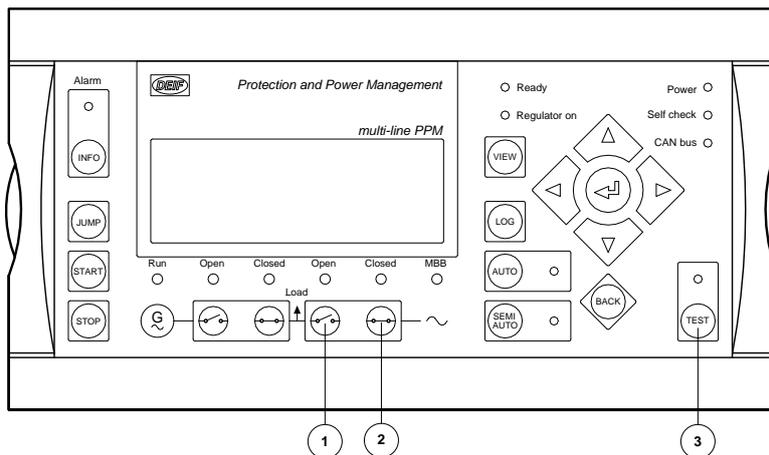
The LEDs for a diesel generator display unit are placed as follows:



1. Ready: ready for operation.
2. Regulator ON: regulators are active.
3. Power: power supply ON.
4. Self check: microprocessor OK.
5. CAN bus: internal CANbus OK.
6. 1st PRIOR: highest priority.
7. SEMI AUTO: semi auto running mode.
8. AUTO: auto running mode.
9. Closed: generator breaker closed.
10. Open: generator breaker open.
11. Run: generator voltage/frequency OK.
12. Alarm:
 1. Flashing: unacknowledged alarm.
 2. Steady: acknowledged and active alarm.

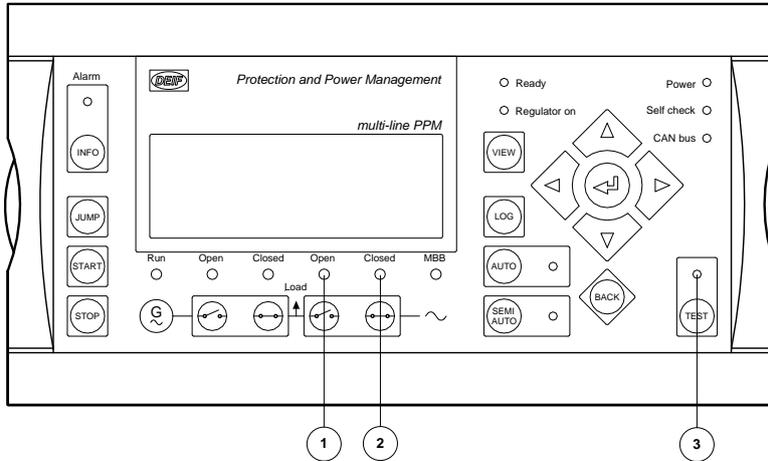
Additional push-buttons and LEDs

Additional push-buttons for the emergency diesel generator display unit:



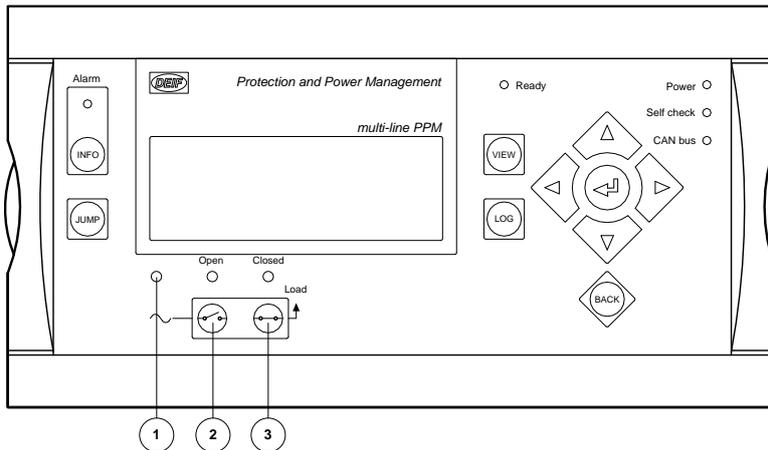
1. TB OFF: opens the bus tie breaker. *SEMI AUTO mode only.*
2. TB ON: closes the bus tie breaker. *SEMI AUTO mode only.*
3. TEST: the test mode function will be activated.

Additional LEDs for the emergency diesel generator display unit:



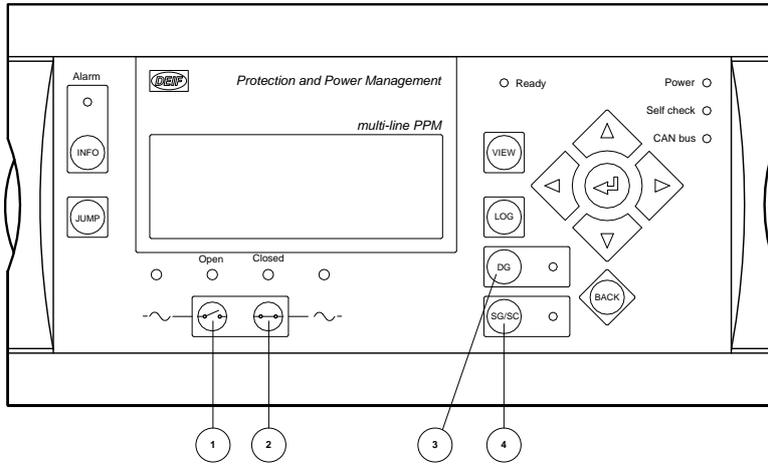
1. Open: bus tie breaker is open.
2. Closed: bus tie breaker is closed.
3. TEST: the test mode is active.

Additional push-buttons and LEDs for the shaft generator/shore connection display unit:



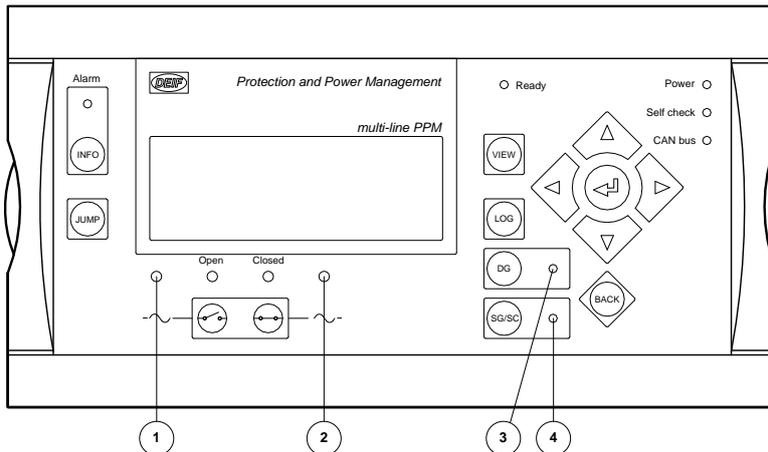
1. Shaft generator/shore connection voltage/frequency OK.
2. SG/SC OFF: opens the shaft/shore breaker. The system will automatically change to DG supply.
3. SG/SC ON: closes the shaft/shore breaker. The system will automatically change to shaft/shore supply.

Additional push-buttons for the bus tie breaker display unit:



1. BTB OFF: opens the bus tie breaker. The system will automatically change to DG supply.
2. BTB ON: closes the bus tie breaker. The system will automatically change to shaft/shore supply.
3. DG supply: the system will operate in DG supply after the bus tie breaker is closed.
4. SG/SC supply: the system will operate in SG or SC supply after the bus tie breaker is closed.

Additional LEDs for the bus tie breaker display unit:



1. Voltage/frequency on bus A is OK.
2. Voltage/frequency on bus B is OK.
3. DG supply has been selected after connection of the bus tie.
4. SG/SC supply has been selected after connection of the bus tie.

2.4 Menu structure

2.4.1 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 operator needs detailed information that is not available in the view menu system.

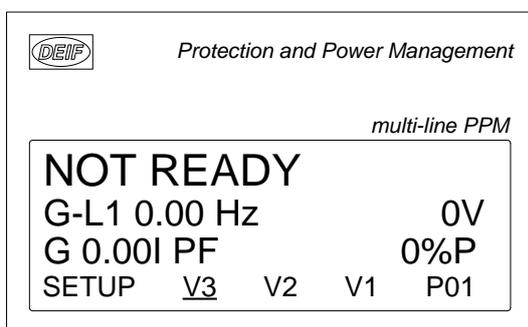
Changing of parameter settings is password-protected.

2.4.2 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.

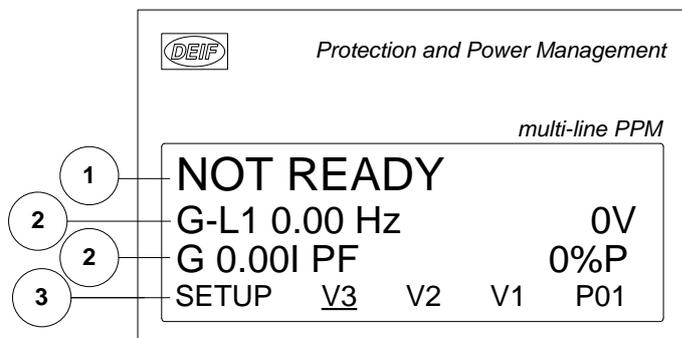


The event and alarm list will appear at power up if an alarm is present.



2.4.3 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 the display.



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

2.4.4 View menu navigation

Views and setup are all selected by moving the cursor in the fourth display line (note the underscore on V1 on the display - this indicates the position of the cursor).

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

2.4.5 View window 1 (V1)



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

V1 contains up to 20 different windows, which can be selected using the  and  push-buttons.

2.4.6 View window 2 (V2)

V2 is a copy of V1 and contains up to 20 different windows, which can be selected using the  and  push-buttons.

2.4.7 View window 3 (V3)

The V3 display changes with running mode:

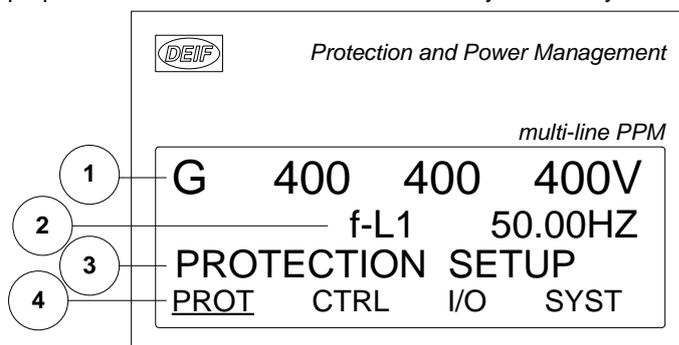
The first display line indicates the running status of the unit. The messages shown in the table at the end of this chapter can be displayed.

The second and third display lines display power consumption in kW or percentage. This is changed by pressing the arrow up or down.

The fourth display line displays the selection line.

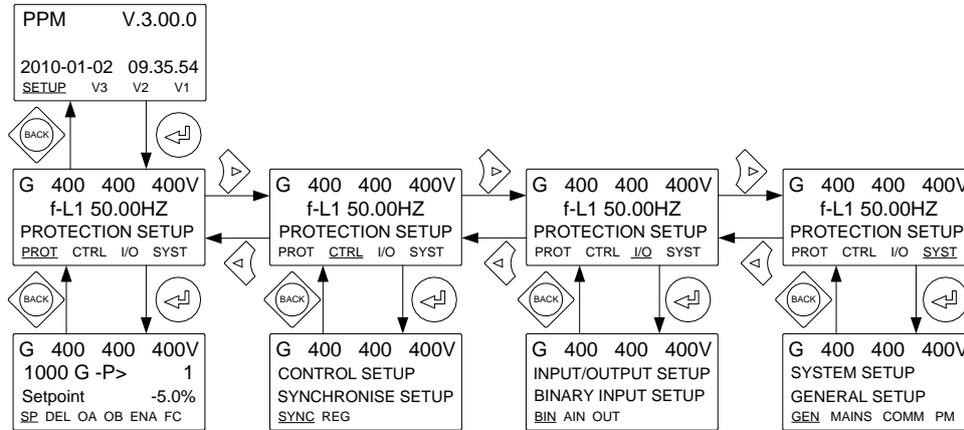
2.4.8 Setup menu

The setup menu system is used for parameter setup of the unit, but if the user needs detailed information, that is not available in the view menu system. In this way, 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.



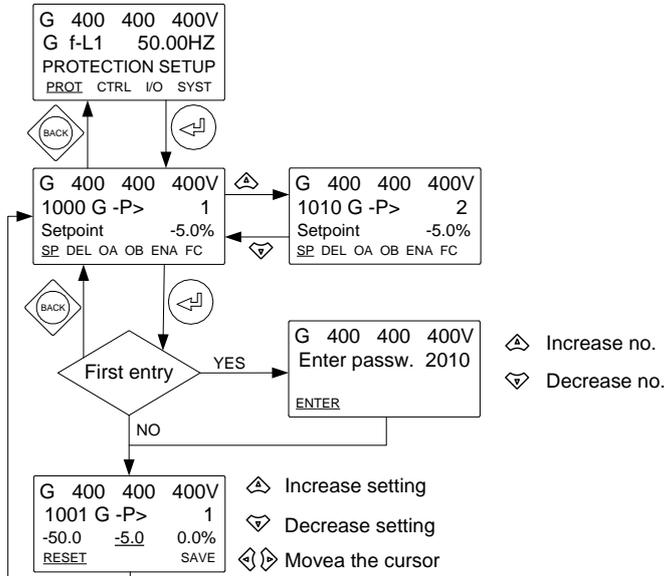
1. First display line
 - Daily use: the first line is used to display generator and BUS values
2. Second display line
 - Daily use: various values can be displayed
 - Menu system: information about the selected channel number
 - Alarm/event list: the latest alarm/event is displayed
3. Third display line
 - Daily use: presents setting of the selected function, and if changes are made, the possible max. and min. values for the setting
 - Setup menu: if changes are made, the possible max. and min. values for the setting are presented
4. Fourth display line
 - Daily use: entry selection for the setup menu. Press SELECT to select the underscored menu
 - Setup menu: sub-functions for the individual parameters, e.g. limit

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.



2.5 Text in the display

2.5.1 Display texts

This table explains the different information text messages on the display. The information messages are active for 3 sec. after a push-button has been pressed.

Information text	Condition	Comment
SPLIT NOT POSSIBLE	The bus tie breaker cannot be opened.	
SG SUPPLY BLOCKED	BTB transitional mode: The bus tie breaker cannot be closed for SG supply. Section mode: The shaft generator is not available.	
SHORE SUPPLY BLOCKED	BTB transitional mode: The bus tie breaker cannot be closed for SHORE supply. Section mode: The shore connection is not available.	
DG SUPPLY BLOCKED	BTB transitional mode: The bus tie breaker cannot be closed for DG supply. Section mode: The necessary amount of DG's cannot be started/synchronised.	
PTI NOT POSSIBLE	Power take in mode is not available for the SG/SHORE unit.	
SWBD CONTROL	The unit is under switchboard control.	
NOT IN SEMI MODE	The unit is not in SEMI-AUTO mode.	
NOT IN PMS CONTROL	The unit is not in power management control.	
START INHIBIT	The input "Start enable" is not set.	
BLOCK ALARM	The fail class BLOCK is active. The start + sync. sequence is blocked.	
TB BLOCK ALARM	The bus tie breaker is blocked by an active TB block alarm.	EDG only.
STOP FAILURE	Stop failure alarm has been detected.	
GEN. NOT RUNNING	The generator is not running.	
CB IS CLOSED	The connection breaker (GB, SG, SC, TB) is already closed.	
TB IS CLOSED	The bus tie breaker is closed.	EDG only.
CB IS OPEN	The connection breaker (GB, SG, SC, TB) is already open.	
TB IS OPEN	The bus tie breaker is open.	EDG only.
GB OFF NOT POSSIBLE	The generator breaker cannot be opened.	To prevent blackout.
TB OFF NOT POSSIBLE	It is not possible to disconnect the bus tie breaker. A blackout would occur.	EDG only.
LOAD TEST BLOCKED	There is not enough load on the busbar to make the load test.	
FULL TEST BLOCKED	The test mode "FULL TEST" cannot be done.	
SECONDARY DISPLAY	The desired function is not available as the display unit is not selected as primary display unit.	

The following table explains the different status text messages in the display. Status messages are automatically shown during operation without push-button activity from the operator.

Status text	Condition	Comment
SIMPLE TEST	Test mode on EDG is activated.	
LOAD TEST	Test mode on EDG is activated.	
FULL TEST	Test mode on EDG is activated.	
SIMPLE TEST ### min	Test mode on EDG is activated and test timer counting down.	
LOAD TEST ### min	Test mode on EDG is activated and test timer counting down.	
FULL TEST ### min	Test mode on EDG is activated and test timer counting down.	
LOAD DEP. START ###s	The load dependent start timer is running	
LOAD DEP. STOP ###s	The load dependent start timer is running	
FIXED FREQUENCY	The generator is running with fixed frequency.	Idle or as single connected gen-set
LOAD SHARING	The load sharing function is active.	Multiple gen-sets are running in parallel
FIXED POWER	The gen-set is running with base load.	
DELOAD	The unit (DG, SG, SC, TB) is de-loading before opening the breaker.	
RAMP DOWN	Decreasing the load of the gen-set.	
RAMP UP	Increasing the load of the gen-set.	
SWBD CONTROL	Switchboard control has been selected externally.	
READY FOR OPERATION	The generator is ready for operation.	
NOT READY	The generator is not ready for operation.	
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.	
COOLING DOWN ###s	Cooling down period is activated.	
GEN-SET STOPPING	This info is shown when cool down has finished.	
EXT. STOP T. ###s	Extended stop time after the running signal disappeared.	
TOO SLOW 00<-----	Generator running too slow during synchronising.	
-----> 00 TOO FAST	Generator running too fast during synchronising.	
PTH MODE ACTIVE	Power take home mode is selected for the shaft generator/shore connection breaker.	
BTB IN OPERATION	The bus tie breaker is closed and in operation.	

Status text	Condition	Comment
IN OPERATION	The SG/SC breaker is closed and in operation.	
FUEL OPTIMISATION	The fuel optimisation function is active.	
PROGRAMMING LANGUAGE	The language file is downloaded from the USW.	

2.6 Mode overview

2.6.1 Overview of modes

The unit has three (EDG: four) different running modes and one switchboard (blocked) mode.

Mode	Description
SEMI-AUTO	<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, i.e. the speed control will bring the generator to nominal speed upon start. When pushing a breaker button for closing, the DG will synchronise (if allowed) the breaker.
TEST (EDG)	<ul style="list-style-type: none"> 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 TB 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 TB GB. Load test: parallel to the BB and take load to a predefined value. Full test: transfer the load to the gen-set and open the TB.
AUTO	<ul style="list-style-type: none"> The unit will be a part of the power management system. The display control push-buttons (START, STOP, GB ON, GB OFF) are disabled.
SWBD	<ul style="list-style-type: none"> Display push-buttons are disabled. The generator can only be controlled by using the switchboard. The protection functions are still active. The regulators are not active, i.e. speed (and voltage) control has to take place using binary inputs for UP and DOWN control.

2.7 Mode selection

2.7.1 Selection of mode

The mode selection is carried out using the AUTO or SEMI push-buttons on the display. The SWBD mode is chosen when the binary input 23 (SWBD control) is activated.

The EDG test mode is activated by using the test push-button.

2.8 Password

2.8.1 Password levels

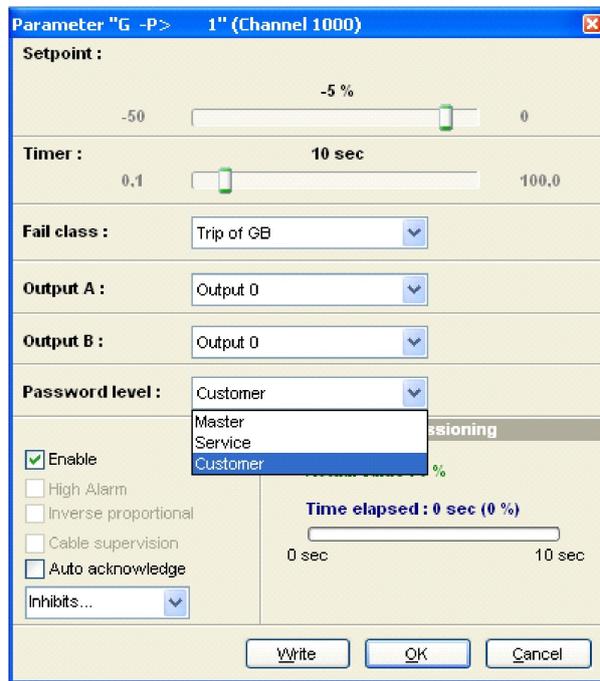
The unit includes three password levels. All levels can be adjusted in the PC software.

Available password levels:

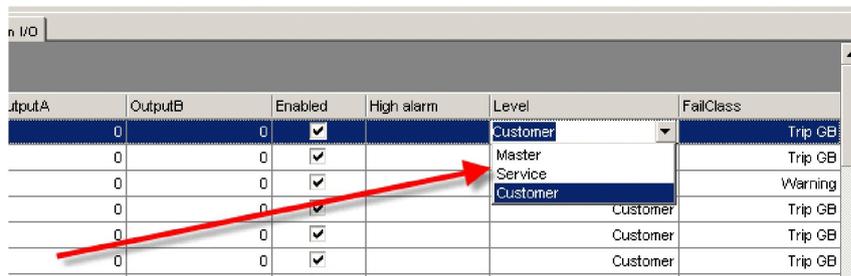
Password level	Factory setting	Access		
		Customer	Service	Master
Customer	2000	X		
Service	2001	X	X	
Master	2002	X	X	X

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 by 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.



The password level can be seen at the parameter view in the column level:



2.8.2 Parameter access

To gain 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. The service password can be changed in menu 9117. The master password can be changed in menu 9118.**
-  **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.**

3. Alarm handling and log list

3.1 Alarm handling

3.1.1 How to handle alarms

When an alarm occurs, the unit will automatically go to the alarm list for display of the alarm. This function can be disabled or enabled. For further explanation, please see the Designer's Reference Handbook.

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.

G	0	0	0V
1170 G U<			1
UN-ACK	I	2 Alarm(s)	
ACK		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 SELECT.

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

3.2 Log list

3.2.1 Log and event list

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.

The logging of data is divided into 3 different groups:

- Event log containing 150 loggings
- Alarm log containing 30 loggings
- Battery test log containing 52 loggings

The logs can be viewed in the display or in the PC utility software. When the individual logs are full, 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:

```

G   400   400   400V
LOG Setup
Event log
Event  Alarm  Batt.
  
```

Now it is possible to select one of the 3 logs.

If the 'Event' is selected, the log could look like this:

```

G   400   400   400V
4170 Fuel level
06-24           15:24:10.3
INFO           FIRST  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 'SELECT':

```

G   400   400   400V
4170 Fuel level
VALUE                               8%
INFO           FIRST  LAST
  
```

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

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

4. Service menu

4.1 Service menu overview

4.1.1 Present operating condition

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 and selecting menu 9120.

Use the service menu for easy troubleshooting in connection with the event log.

Entry window

The entry shows the possible selections in the service menu.

G	400	400	400V
9120 Service menu			
ALARM			
<u>ALARM</u>		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 setpoint has been exceeded.

G	400	400	400V
1010 Reverse power			
Remaining time		10.0s	
<u>UP</u>	DOWN		

IN (digital input)

Shows the status of the digital inputs.

G	400	400	400V
Running			
Input =		ON	
<u>UP</u>	DOWN		

OUT (digital output)

Shows the status of the digital outputs.

G	400	400	400V
Horn			
Output = OFF			
<u>UP</u>	DOWN		

MISC (miscellaneous)

Shows miscellaneous messages.

G	400	400	400V
M-logic Enabled			
Various = OFF			
<u>UP</u>	DOWN		

5. Parameter setup

5.1 About parameter setup



The complete parameter list is presented in the separate document **Parameter List**, document no. 4189340561.

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.

5.2 Finding the selected parameter

5.2.1 How to find the correct parameter

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

5.3 Parameter descriptions

5.3.1 Description of parameters

In the parameter list, 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:

No.	Setting	Min. Max.	Factory setting	Notes	Ref.	Description
1000 G/SG/SC reverse power 1						
1001	G/SG/SC -P> 1	Setpoint	-110.0% 0.0%	- 8.0%	Designer's Reference Handbook	The alarm and fail class are activated when the reverse power has been continuously above the programmed value during the programmed delay.
1002	G/SG/SC -P> 1	Delay	0.1 s 300.0 s	5.0 s		
1003	G/SG/SC -P> 1	Relay output A	Not used Option- dependent	Not used		
1004	G/SG/SC -P> 1	Relay output B	Not used Option- dependent	Not used		
1005	G/SG/SC -P> 1	Enable	OFF ON	ON		
1006	G/SG/SC -P> 1	Fail class	F1...F7	Trip GB (F3)		



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

The 1st column indicates the menu number in the display.

The 2nd column indicates the name of the setting.

The 3rd column indicates the setting function.

The 4th column indicates the minimum/maximum setpoint available for this setting.

The 5th column indicates the default setpoint of the unit from the factory.

The 6th column is used for user information notes.

The 7th column gives references for additional information.

The 8th column is describing the function.

5.4 Setup

5.4.1 Parameter setup

At this point of the process, the specific parameter description will have been located. Now, follow the menu structure presented earlier in this manual in order to set up the individual parameters. (In this overall example, we have chosen to change the setpoint of the parameter 1000 G -P>).

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: Use the  and  push-buttons to locate the selected parameter.

Step 4: Enter the 'setpoint' menu via SP in the fourth display line.

Step 5: Enter password to change the setpoint.

Step 6: Use the  and  push-buttons to increase/decrease the setpoint setting.

Step 7: Move the 'underscore' to save and press SEL, the new setpoint setting has now been saved.

6. Failure mode and effect analysis

6.1 Troubleshooting

6.1.1 Failure detection and correction

Failure	Failure cause	Local effect	Failure detection	System corrective actions
CAN1 ID x missing	Loose connection. Wire cut.	The unit has lost the communication to CAN ID xx on CAN I/F 1.	Alarm message. Red LED on display.	The CAN I/F 2 will be active if connected.
CAN2 ID x missing	Loose connection. Wire cut.	The unit has lost the communication to CAN ID xx on CAN I/F 2.	Alarm message. Red LED on display.	The CAN I/F 1 will be active.
Any DG missing	Loose connection. Wire cut.	The unit has lost the communication to CAN ID xx.	Alarm message. Red LED on display.	Dependent on the adjustment of the failure class (7535).
Any SG missing	Loose connection. Wire cut.	The unit has lost the communication to CAN ID xx.	Alarm message. Red LED on display.	Dependent on the adjustment of the failure class (7536).
Any BTB missing	Loose connection. Wire cut.	The unit has lost the communication to CAN ID xx.	Alarm message. Red LED on display.	Dependent on the adjustment of the failure class (7571).
Fatal CAN error	Loose connection. Wire cut. Short circuit on CAN.	The unit has lost the communication to more than one CAN ID on both CAN ports.	Alarm message. Red LED on display.	Dependent on the adjustment of the failure class (7534).
Missing all units	Loose connection. Wire cut. Short circuit on CAN.	The unit has lost the communication to all units.	Alarm message. Red LED on display.	Dependent on the adjustment of the failure class (7533).