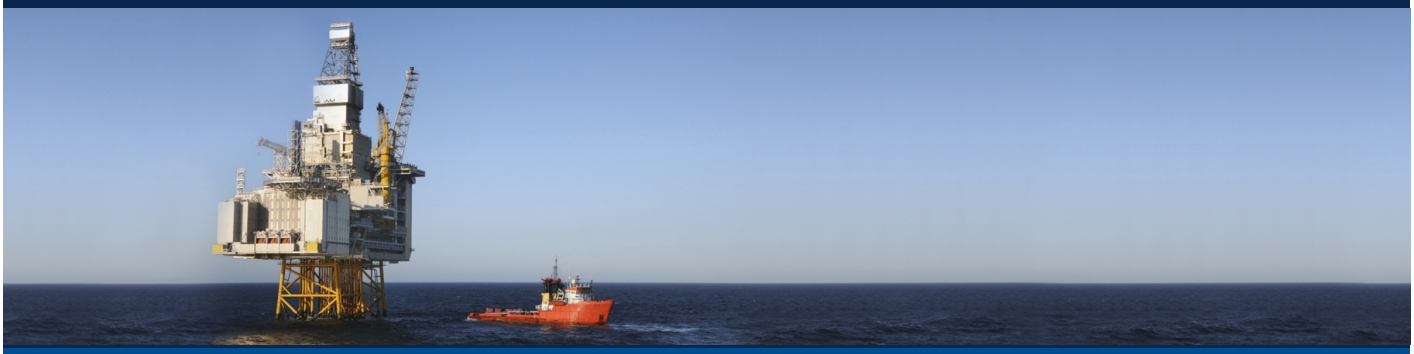
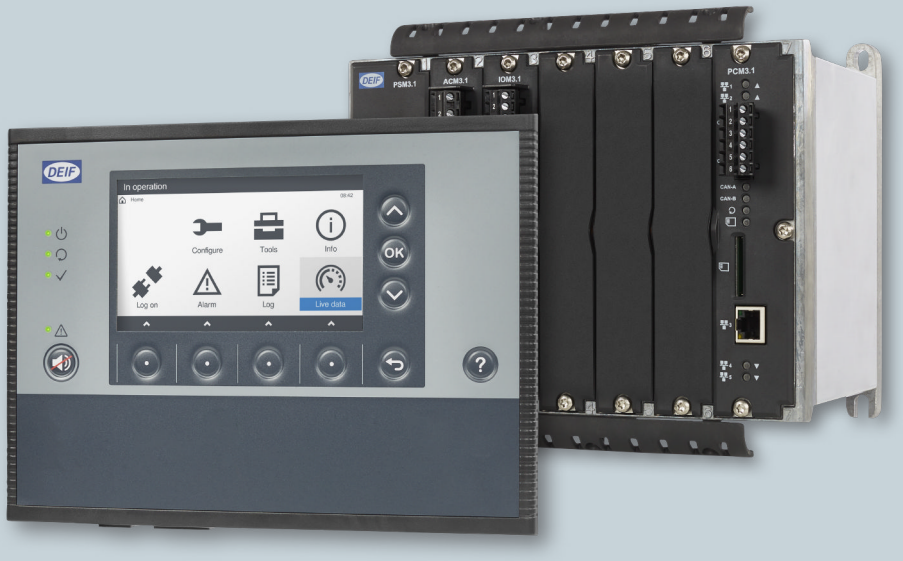
OPERATOR'S MANUAL



Generator Protection Unit
GPU 300



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Document no.: 4189341034A

1. Introduction

2. Overview of the controller

3. Controller equipment

4. Alarms

5. Using the display unit

6. Troubleshooting

1. Introduction

1.1 About the Operator's manual

1.1.1 Intended users of the Operator's manual

This is the operator's manual for DEIF's Generator Protection Unit, GPU 300. The manual is for the operator who uses the display unit to acknowledge and view alarms. The manual also describes how to change the configuration, and trouble shooting. The information in this manual is simplified and general.

See the **Designer's handbook** for more detailed information and descriptions..

DANGER!
Read this manual before you operate the system. Failure to do this could result in personal injury and damage to the equipment.

1.1.2 Software version

This **Operator's manual** corresponds to the following software versions.

Table 1.1 Software versions

Software	Details	Version
PCM APPL	Controller application	GPU 300 1.0.x
DU APPL	Display unit application	GPU 300 1.0.x

1.1.3 Technical support

You can read about service and support options on the DEIF website, www.deif.com. You can also find contact details on the DEIF website.

You have the following options if you need technical support:

- Help: The display unit includes context-sensitive help.
- Technical documentation: Download all the product technical documentation from the DEIF website: www.deif.com/documentation
- Training: DEIF regularly offers training courses at the DEIF offices worldwide.
- Support: DEIF offers 24-hour support. See www.deif.com for contact details. There may be a DEIF subsidiary located near you. You can also e-mail support@deif.com.
- Service: DEIF engineers can help with design, commissioning, operating and optimisation.

1.1.4 List of technical documentation for GPU 300

Document	Contents
Data sheet	• Controller application, functions, hardware and protections • Technical specifications • Hardware modules, display unit, and accessories • Ordering information
Quick start guide	• Mounting • Connecting wiring • PICUS (PC software) ◦ Download and install ◦ Controller configuration • Display unit overview
Designer's handbook	• Controller principles and functions • Alarms • AC configuration and nominal settings • Breaker • Hardware characteristics • PICUS parameters, alarms and passwords • Modbus
Installation instructions	• Tools and materials • Mounting • Minimum wiring for the controller • Wiring for hardware module terminals • Wiring for controller functions • Wiring communication • Wiring the display unit
Commissioning guidelines	• Tools, software and information required • Controller and equipment checks • Testing • Troubleshooting
Operator's manual	• Controller equipment • Operating the controller • Alarms and log • Using the display unit • Troubleshooting and maintenance
PICUS manual	Using PICUS and CustomLogic

1.2 Warnings and safety

1.2.1 Safety during installation and operation

Installing and operating the equipment may require work with dangerous currents and voltages. The installation must only be carried out by authorised personnel who understand the risks involved in working with electrical equipment.

DANGER!
Hazardous live currents and voltages. Do not touch any terminals, especially the AC measurement inputs and the relay terminals. Touching the terminals could lead to injury or death.

1.2.2 Controller power supply

If the controller has no power supply, it is OFF and does not provide any protection to the system. The controller cannot enforce any trip, block, or latch when it is off. All the controller relays de-energise.

The controller must have a reliable power supply, which must include a backup power supply. In addition, the switchboard design must ensure that the system is sufficiently protected if the controller power supply fails.

1.2.3 Factory settings

The controller is delivered pre-programmed from the factory with a set of default settings. These settings are based on typical values and may not be correct for your system. You must therefore check all parameters before using the controller.

1.2.4 Electrostatic discharge

You must protect the equipment terminals from static discharge during handling, including installation and dismounting. Once the equipment is correctly installed and the frame ground is connected, it is no longer necessary to protect the terminals from static discharge.

1.2.5 Shelving and taking alarms out of service

DANGER!
Shelved and out of service alarms are completely disabled. These alarms cannot be activated by the operating conditions, and provide NO protection. Note: Shelving or taking out of service also automatically acknowledges the alarm and resets the latch.

It is possible to shelve and/or take selected alarms out of service. However, only qualified personnel should shelve and/or take alarms out of service. This must be done carefully, and only as a temporary measure, for example, during commissioning.

1.2.6 Do not manually override active alarm actions

DANGER!
Do not use switchboard or manual control to override the alarm action of an active alarm.

An alarm may be active because it is latched, or because the alarm condition is still present. If the alarm action is manually overridden, a latched alarm does not do its alarm action again. In this situation, the latched alarm does not provide protection.

Latched *Over-current* alarm example

The controller trips a breaker because of over-current. The operator then manually (that is, not using the controller) closes the breaker while the *Over-current* alarm is still latched.

If another over-current situation arises, the controller **does not trip the breaker again**. The controller regards the original *Over-current* latched alarm as still active, and does not provide protection.

1.3 Legal information

1.3.1 Third party equipment

DEIF takes no responsibility for the installation or operation of any third party equipment, including the **genset**. Contact the **genset company** if you have any doubt about how to install or operate the genset.

1.3.2 Warranty

CAUTION
The rack may only be opened to remove, replace, and/or add a hardware module. The procedure in the **Installation instructions** must be followed. If the rack is opened for any other reason, and/or the procedure is not followed, then the warranty is void.

CAUTION
If the display unit is opened, then the warranty is void.

1.3.3 Open source software

This product contains open source software licensed under, for example, the GNU General Public License (GNU GPL) and GNU Lesser Public License (GNU LGPL). The source code for this software can be obtained by contacting DEIF at support@deif.com. DEIF reserves the right to charge for the cost of the service.

1.3.4 Trademarks

DEIF, power in control and the DEIF logo are trademarks of DEIF A/S.

Modbus is a registered trademark of Schneider Automation Inc.

Windows is a registered trademark of Microsoft Corporation in the United States and other countries.

All trademarks are the properties of their respective owners.

1.3.5 Copyright

1.3.6 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.

2. Overview of the controller

2.1 Overview

2.1.1 Operating the GPU 300

The GPU 300 controller ensures that the system is protected for typical marine applications.

Only qualified people may install and commission the controllers. After the controllers are installed and commissioned, they are easy to operate.

LEDs
For the display unit *With LEDs*, the operator can look at the LEDs to see the operating status of the genset, breaker, and busbar.

Display unit screen*
The operator can monitor system operation on the display unit screen. The operator can also use the soft key buttons and the display unit screen to log into the controller. The operator can then see the alarm lists and logs, and acknowledge and unlatch alarms. The operator can also see and/or change the controller configuration.

PICUS*
PICUS - Power In Control Utility Software

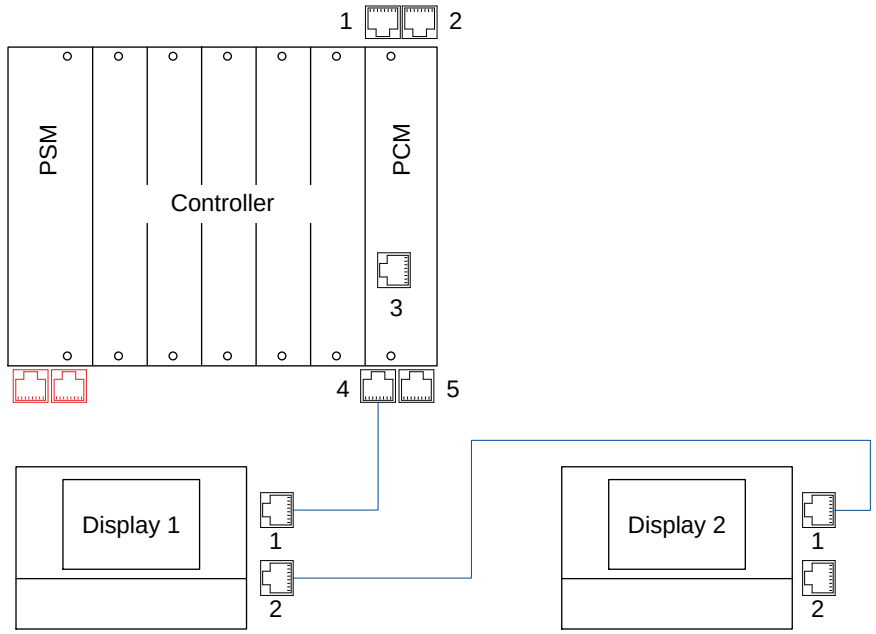
PICUS is the PC programming and monitoring tool, available from DEIF free of charge. The operator can connect a computer with PICUS to the controller by using a direct connection. The operator can log into the controller. The operator can then use PICUS to monitor operation, manage alarms, and see or change the controller configuration. *

*Note: Both the display unit and PICUS are controlled by user level permissions which grant or restrict access to features of the controller. Some features or functions may not be accessible to an operator depending upon the design of the controller permissions.

2.1.2 Active and Observer display unit(s)

Each controller can support more than one display unit. The display units are connected in a **Daisy chain**.

Figure 2.1 Example controller connection with two display units



When more than one display unit is connected to the same controller, only one of the display units can be the **Active** display. The remaining display unit(s) are **Observer** display(s).

The **Active** display unit can be operated.

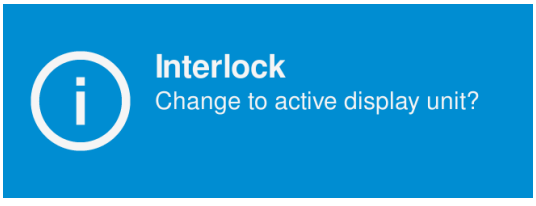
The **Observer** display unit(s) can only *view* information, and can not operate the system.

INFO
When a display is powered for the first time, it always prompts you to confirm whether to connect to the controller.

Confirm Active display unit

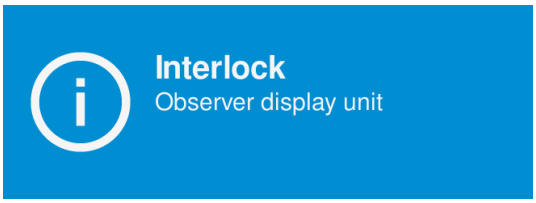
When logging on or operating the display (for example, closing a breaker), if the display is not the current **Active** display, then you are prompted to confirm changing the **Active** display.

The following confirmation is displayed:



By confirming this, the **Active** display is changed.

The other display unit shows the following message:



2.2 Operator messages

2.2.1 Controller status texts

The controller status texts are shown on the display unit screen status bar.

Status text	Description
-	The display unit cannot read the controller status. For example, slow communication or a loss of communication.
Alarm testing	The *Enable alarm test* parameter is enabled.
Frequency too high	The genset frequency is too high during synchronisation and should be adjusted to a lower value.
Frequency too low	The genset frequency is too low during synchronisation and should be adjusted to a higher value.
In operation	The breaker is closed.
Ready for operation	The breaker is open and no trip alarms are active.
Trip breaker active	An alarm with the action *Trip breaker* is active.
Voltage too high	The genset voltage is too high during synchronisation and should be adjusted to a lower value.
Voltage too low	The genset voltage is too low during synchronisation and should be adjusted to a higher value.
Waiting for software	A software update is in progress.

2.2.2 Operator information messages

When a situation arises that makes an operator information message relevant, it is shown in a blue box on the display unit screen for a few seconds.

Heading	Message	Description
Alarm info	Network OFF: No contact with rack	The Ethernet connection between the display unit and the controller is broken.
Info	Busbar V/Hz not OK	There is a signal to close the breaker, but the busbar voltage and/or frequency is not OK.

Heading	Message	Description
Info	GB close blocked	The open breaker cannot be closed because the *Generator breaker* < *Command* >*Block close* digital input is activated.
Info	GB close unblocked	The *Generator breaker* < *Command* >*Block close* digital input has been deactivated.
Info	GB is closed	There is a signal to close the breaker, but the breaker is already closed.
Info	Generator V/Hz not OK	There is a signal to close the breaker, but the generator voltage and/or frequency is not OK.
Info	Possible to remove latches	There are acknowledged latched alarms in the alarm list that can be reset.
Info	Breaker close activated	The *Generator breaker* > *Command* > *Activate breaker close* digital input is activated.
Info	Breaker close deactivated	The *Generator breaker* > *Command* > *Deactivate breaker close* digital input has been activated.
Interlock	Change to active display unit?	You tried to use the display unit to make changes, but another display unit is the active display unit. The display unit with this message becomes the active display unit if you press *OK*.
Interlock	Observer display unit	Another display unit is active. The observer display unit cannot make changes.
New base found	Press OK to connect?	When the display unit starts up, it detects that it is plugged into to a different controller. If you press *OK*, then the display unit connects to the new controller.

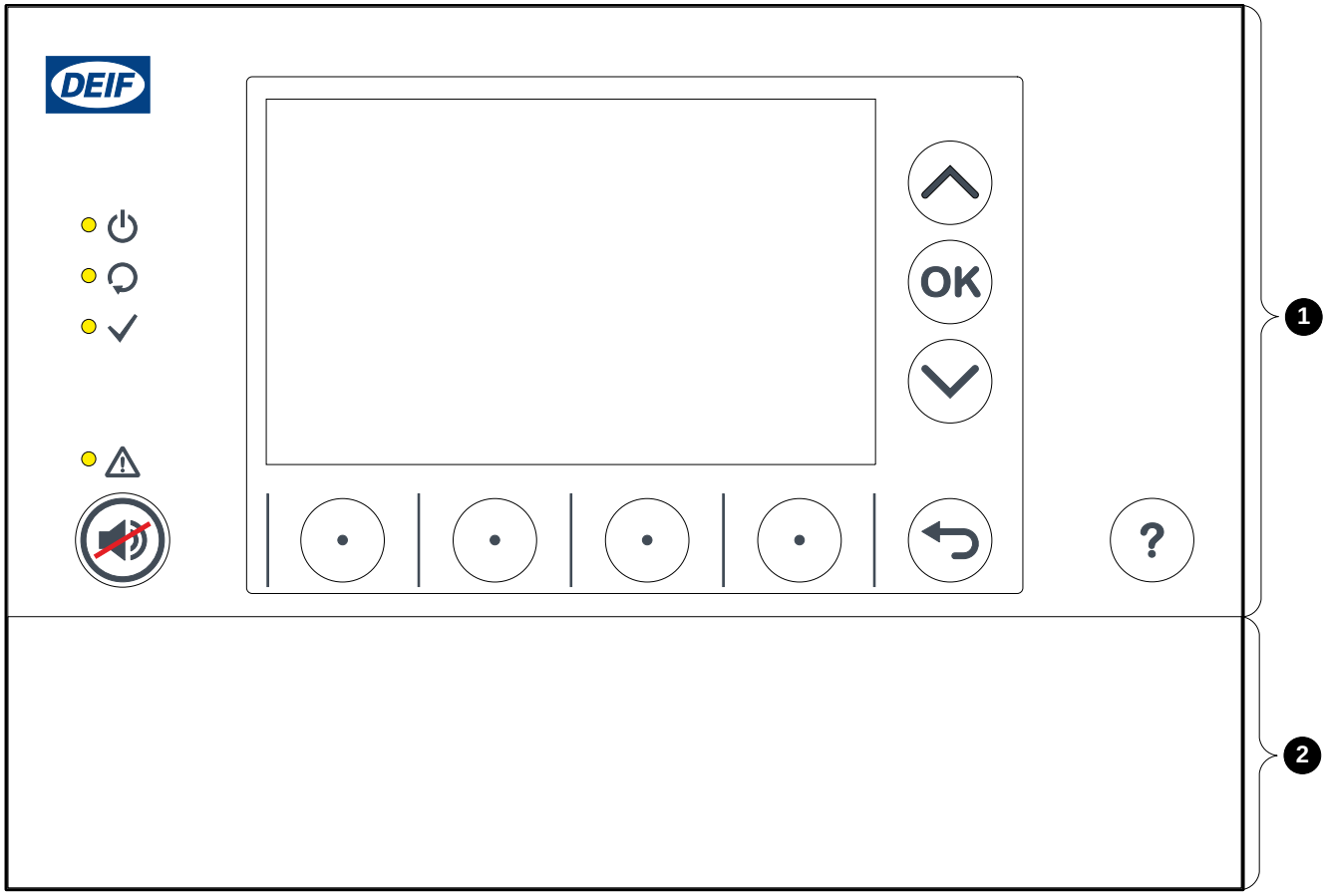
3. Controller equipment

3.1 Display unit

3.1.1 Introduction to the display unit

The front of the display unit consists of a top part and a bottom strip.

Figure 3.1 Display unit parts



No.	
1	Top part
2	Bottom strip

The LEDs and push-buttons for the top part are the same for all controller types. The LEDs, push-buttons and picture on the bottom strip vary according to the controller type. These are described below.

3.1.2 Display unit LEDs and push-buttons

The top part of the front of the display unit is the same for both display options. It includes LEDs that show the controller status and a push-button to silence the alarm horn. The other push-buttons allow the operator to see controller information on the display unit screen. The actual information available to the operator depends upon the permission access for the operator's log on profile.* Using the push-buttons and the screen, the operator can see Live Data, or see, acknowledge and unlatch alarms. If the operator logs in with the right permission level, he can also change the controller configuration.

* Some features or functions of the display unit may only be accessible if the user profile logged on has the necessary permission access.

Figure 3.2 Display unit LEDs and push-buttons

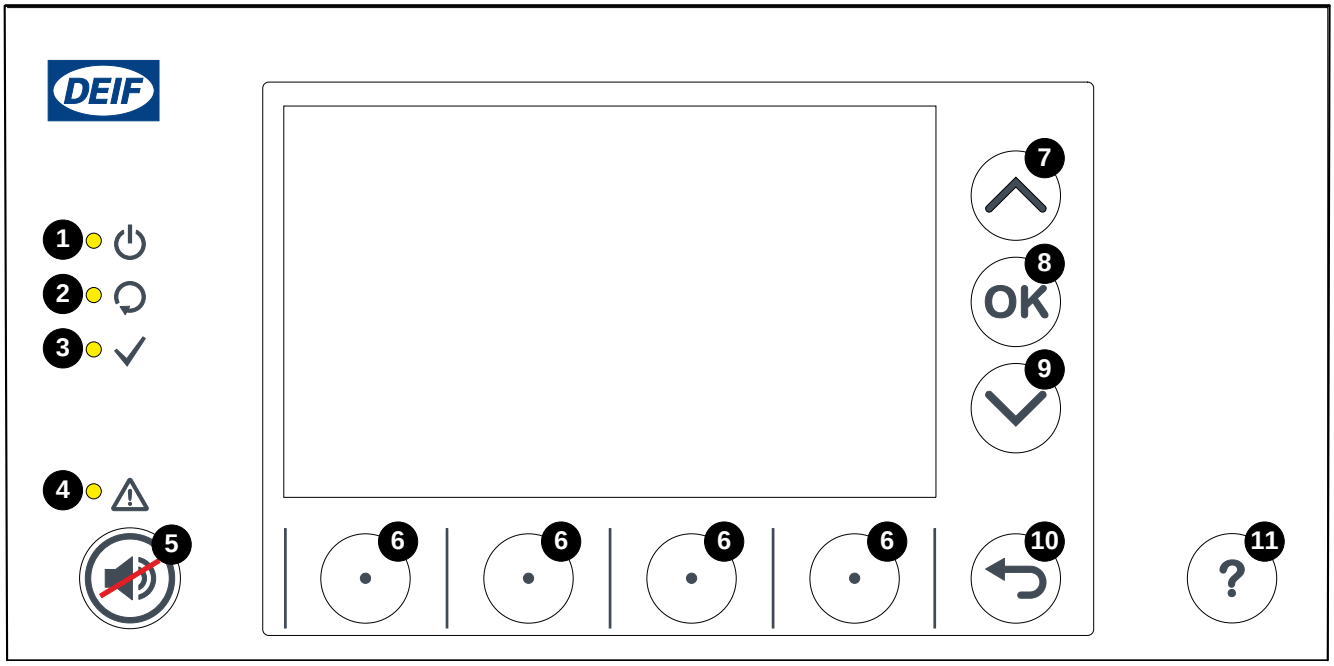


Table 3.1 Display unit LED functions

No.	Name	Function
1	Display unit power OK	**Green**: The display unit power is OK. **OFF**: The display unit power is not OK.
2	Self-check OK	**Green**: The controller self-check is OK. **OFF**: The controller self-check is not OK, or there is no connection to the controller
3	Ready for operation	**Green**: There is no alarm action (trip) that prevents the equipment from connecting and supplying power. **OFF**: There is an alarm action (trip) that prevents the equipment from connecting and supplying power.
4	Alarm	**Red (constant)**: Alarm(s) active, and all alarms acknowledged **Red (flashing)**: Unacknowledged alarm(s) **Yellow**: Unlatched alarms can be reset (when no other alarms require action) **Green (flashing)**: Only unacknowledged alarm(s) where the alarm condition has cleared **Green (constant)**: No alarms

INFO
The display unit LEDs show the status of the controller, and not the status of the display unit. The display unit screen is lit if the display unit has power. The display unit screen is not lit if there is no power supply.

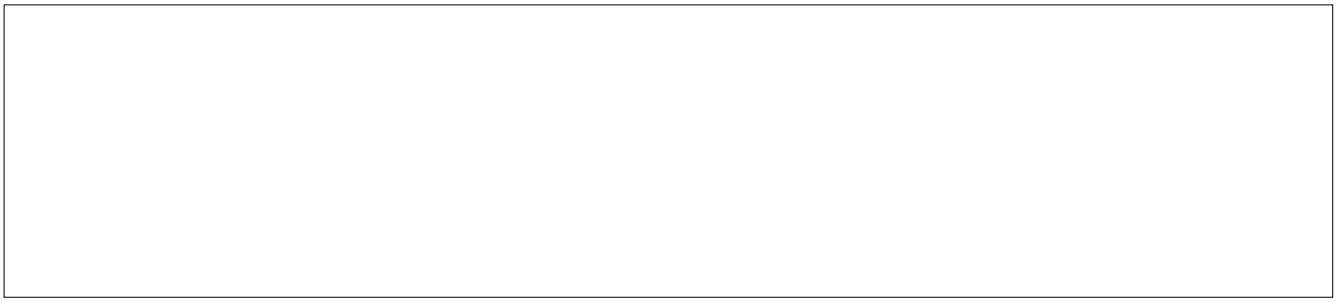
Table 3.2 Display unit push-button functions

No.	Name	Button	Function
5	Horn silence		Stop the horn output immediately. Long press (> 0.5 s): Go to the alarms page.
6	Soft key		Move the selector to a different column, or select the soft key shown on the screen.
7	Up		Move the selector up on the screen.
8	OK		Confirm the selection on the screen.
9	Down		Move the selector down on the screen.
10	Back		Short press (< 0.5 s): Go to the previous page. Long press (> 0.5 s): Go to the home page.
11	Help		Short press (< 0.5 s): Display help. Long press (> 0.5 s): Go to Live data.

3.1.3 Display unit option LEDs

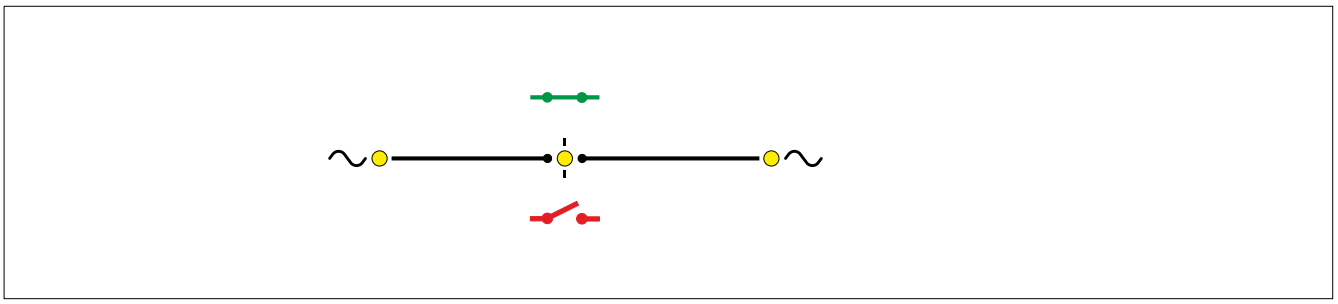
The bottom strip of the front of the display unit can include LEDs that show the equipment and controller status, as well as push-buttons for operator actions.

Default display unit



The bottom strip for the *Default* display unit does not include any LEDs or push-buttons.

Display unit with LEDs



The bottom strip for the display unit *With LEDs* includes LEDs that show the equipment status, but no push-buttons for operator actions.

Display unit LEDs

Figure 3.3 Display unit with LEDs

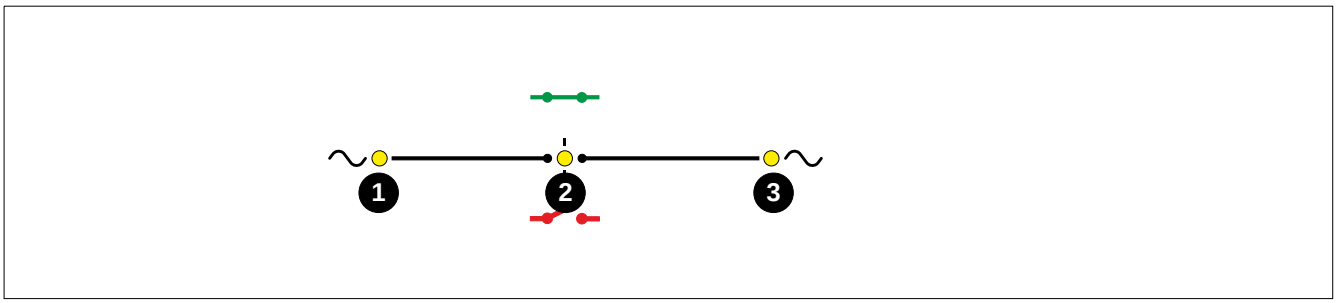


Table 3.3 LED functions

No.	Name	Function
1	Generator	**Green**: The generator voltage and frequency are OK. **Green (flashing)**: The generator voltage and frequency are OK, but the V&Hz OK timer is still running. **Yellow**: The generator voltage and frequency are measurable, but not OK. The breaker cannot close. **OFF**: The generator voltage is too low to measure.
2	Breaker	**Green**: The breaker is closed. **Red**: The controller tripped the breaker, and the trip alarm is unacknowledged and/or the alarm condition is still present. **Red (flashing)**: Any generator breaker trip alarm is active. **OFF**: The breaker is open.
3	Busbar	**Green**: The busbar voltage and frequency are OK. **Green (flashing)**: The busbar voltage and frequency are OK, but the V&Hz OK timer is still running. **Yellow**: The busbar voltage and frequency are measurable, but not OK. **Red**: The busbar voltage is too low to measure (for example, during a blackout).

3.2 Controller rack

3.2.1 Rack LEDs

You will normally not be able to see the controller rack, since it is normally in an enclosed switchboard. However, the controller rack includes LEDs that can be useful for troubleshooting, and these are described here.

Module LEDs

PSM3.1, ACM3.1, and PCM3.1 each have a red status LED. The module status LED lights if the hardware module self-check is not OK. If the controller power supply LED on PSM3.1 is red, the LED(s) at the top of the hardware module(s) that failed the self-check may be red.

These LEDs are at the top of the hardware module inside the rack frame, and may be hidden by wiring or other equipment. If there is not too much light, the glow from the LED(s) should be visible at the top of the rack.

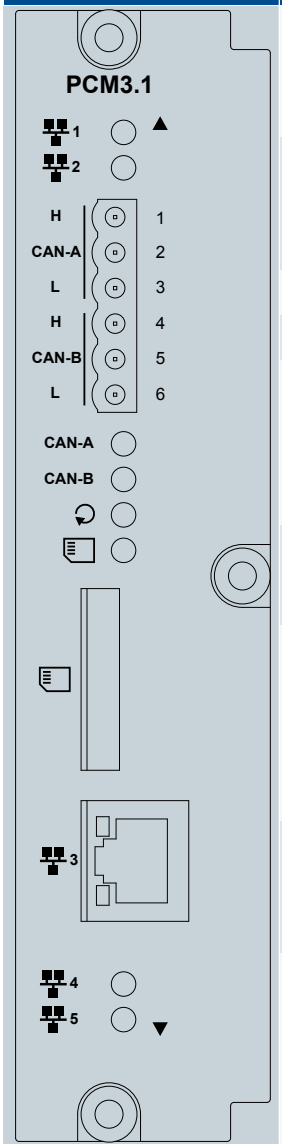
INFO
The hardware modules' LEDs may be red while the controller is starting up, or during a software update. This is normal, and does not mean that the hardware modules failed the self-check.

3.2.2 PSM3.1 LEDs

PSM3.1 supplies power to the controller.

Symbol	Name	Function
⏻	Power	**Green**: The power supply to PSM3.1 is OK, and all of the controller hardware module self-checks were OK. **Red**: The power supply to PSM3.1 is OK, but one or more controller hardware module self-checks were not OK. **OFF**: No power.
⇆	Internal communication	**Green**: The internal communication between the hardware modules in the controller is OK. **Green (flashing)**: There is internal communication, however, the controller is starting up, or there are internal communication problems. **OFF**: There is no internal communication between the hardware modules in the controller.
⇥	Controller extension rack internal communication in	For future use to connect extension rack.
⇤	Controller extension rack internal communication out	For future use to connect extension rack.

3.2.3 PCM3.1 LEDs



Symbol	Name	Function
1	DEIF network port 1*	**Green**: The Ethernet connection is OK. **Green (flashing)**: There is data traffic in the Ethernet connection. **OFF**: There is no Ethernet connection, or the Ethernet connection is not OK.
2	DEIF network port 2*	**Green**: The Ethernet connection is OK. **Green (flashing)**: There is data traffic in the Ethernet connection. **OFF**: There is no Ethernet connection, or the Ethernet connection is not OK.
CAN A	CAN bus A	For future use with engine communication.
CAN B	CAN bus B	For future use with engine communication.
	Self-check OK	**Green**: The controller self-check is OK. **Red (flashing fast)**: The power supply to the PSM has failed. **Red (flashing slowly)**: One or more hardware module self-check is not OK. **OFF**: There is no power on the rack backplane.
	SD card status	**Green**: SD card OK. **Green (flashing)**: The controller is writing to the SD card. **OFF**: No SD card, or SD card not OK.
3	DEIF network port 3	**Green**: The Ethernet connection is OK. **Green (flashing)**: There is data traffic in the Ethernet connection. **Orange**: The data traffic in the Ethernet connection is over 1000 Mbps. **OFF**: There is no Ethernet connection, or the Ethernet connection is not OK.
4	DEIF network port 4*	**Green**: The Ethernet connection is OK. **Green (flashing)**: There is data traffic in the Ethernet connection. **OFF**: There is no Ethernet connection, or the Ethernet connection is not OK.
5	DEIF network port 5*	**Green**: The Ethernet connection is OK. **Green (flashing)**: There is data traffic in the Ethernet connection. **OFF**: There is no Ethernet connection, or the Ethernet connection is not OK.

*Note: For ports 1, 2, 4 and 5, the green LED on the front of the module works in the same way as the green LED on the actual port. The actual Ethernet ports at the top (ports 1 and 2) and bottom (ports 4 and 5) of the rack also have an orange LED.

4. Alarms

4.1 Introduction

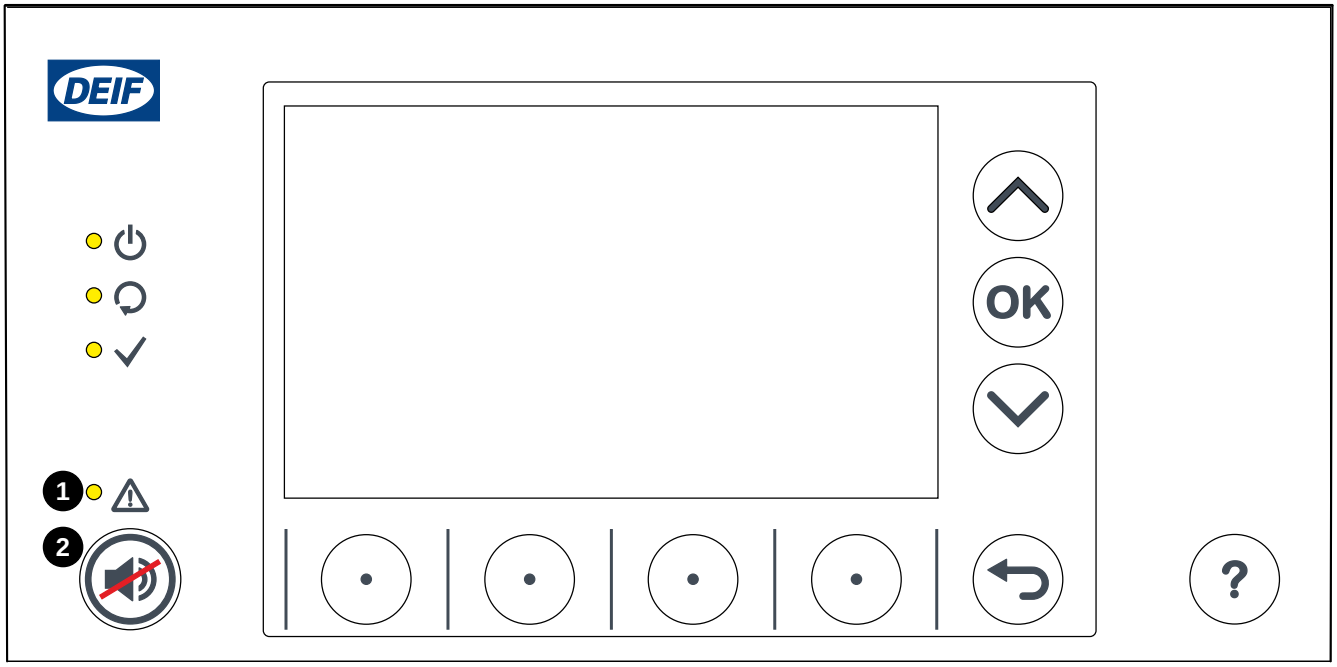
4.1.1 Alarm indication

When an alarm protection becomes active in the system, an active alarm is added to the alarm list. The alarm can give both a visual and audible indication (subject to design of the system).

Alarms, typically, require action and acknowledgement before they clear from the alarm list.

An alarm may also have a latch as an extra level of protection, so that in addition to acknowledging the alarm, you also have to unlatch the alarm before the alarm action can be deactivated.

Figure 4.1 Example display unit



No.	Item	Notes
1.	Alarm indicator (LED)	Displays the current alarm situation for the system.
2.	Horn output silence push-button	Used to silence the horn output, if configured.

Alarm indicator (LED)
The alarm indicator shows the current alarm situation for the system.

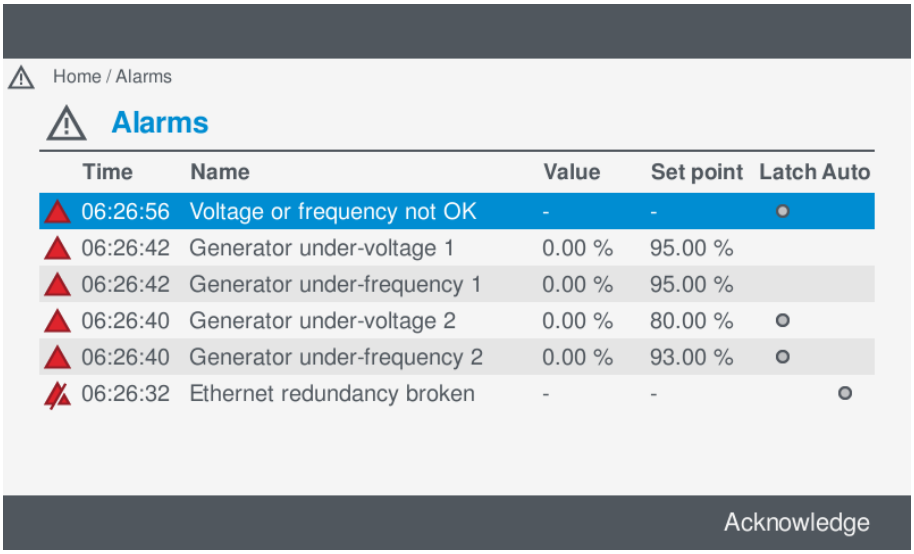
Indicator (LED)	Notes
Red (flashing)	Unacknowledged alarm(s)
Red (constant)	Active alarm(s), and all alarms acknowledged
Yellow (constant)	Unlatched alarms can be reset (when no other alarms require action)
Green (flashing)	Only unacknowledged alarm(s) where the alarm condition has cleared
Green (constant)	No alarms

4.1.2 About the alarm list

Alarms are shown on the alarm list. You can review and action all the current alarms for the controller.

View the alarm list under **Alarms**.

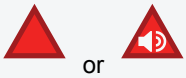
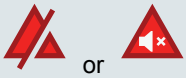
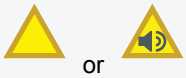
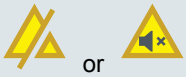
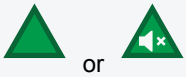
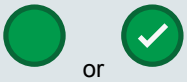
Figure 4.2 Example alarm list



4.1.3 Alarm symbols

The alarms shown in the alarms list are marked with an symbol to show the type of alarm and status.

Table 4.1 Alarm list symbols

Symbol	Alarm condition*	Alarm action**	Acknowledge	Notes
	Active	Active	Unacknowledged	• Alarm condition is occurring. • Alarm action is active. • Alarm requires acknowledgement. • Alarm requires action to clear the alarm condition.
	Active	Active	Acknowledged	• Alarm condition is occurring. • Alarm action is active. • Alarm is acknowledged. • Alarm requires action to clear the alarm condition.
	Inactive	Active	Unacknowledged	• Alarm condition has cleared. • Alarm action is active. • Alarm requires acknowledgement. • Alarm latch requires reset.
	Inactive	Active	Acknowledged	• Alarm condition has cleared. • Alarm action is active. • Alarm is acknowledged. • Alarm latch requires reset.
	Inactive	Inactive	Unacknowledged	• Alarm condition occurred but has cleared. • Alarm action is inactive. • Alarm requires acknowledgement.
	Inactive	Inactive	-	Normal state.
	Active or Inactive	Inactive	-	• Alarm has been shelved for a period of time. • Alarm returns automatically after the period has expired.
	Active or Inactive	Inactive	-	• Alarm has been marked *out of service* for an indefinite period. • Alarm does not return automatically and requires manual returning to service.
	Active or inactive	Inactive	-	Alarm has been inhibited from occurring.

*Note: **Alarm condition** is typically where the *Set point* has been exceeded.

Note: **Alarm action (protection) is the configured action taken to protect the situation. When active, this action occurs in the controller. For example, the alarm action could be *Trip breaker*.

See **Protections**, **Alarm handling** in the **Designer's handbook** for more information about alarm handling.

4.1.4 Alarm actions

Table 4.2 Typical alarm actions

Action	Notes
Acknowledge	Unacknowledged alarms must be acknowledged. Acknowledging an alarm does not remove the alarm or active protection if the *Alarm condition* continues.
Silence	You can silence the alarm (horn/siren) output from the display unit.
Reset latches	Alarms can be configured with a *Latch* as an extra layer of protection. Latched alarms require resetting after they have been acknowledged.
Shelve	Most alarms can be shelved for a selected period of time. During this period the alarm protection is not active. Once the period of time has expired, the *Alarm condition* is rechecked and may become active again if the *Alarm condition* remains active.
Out of service	Most alarms can be removed from service. No period of time needs to be given. The system does not automatically return the alarm to service, and this requires action to do so.

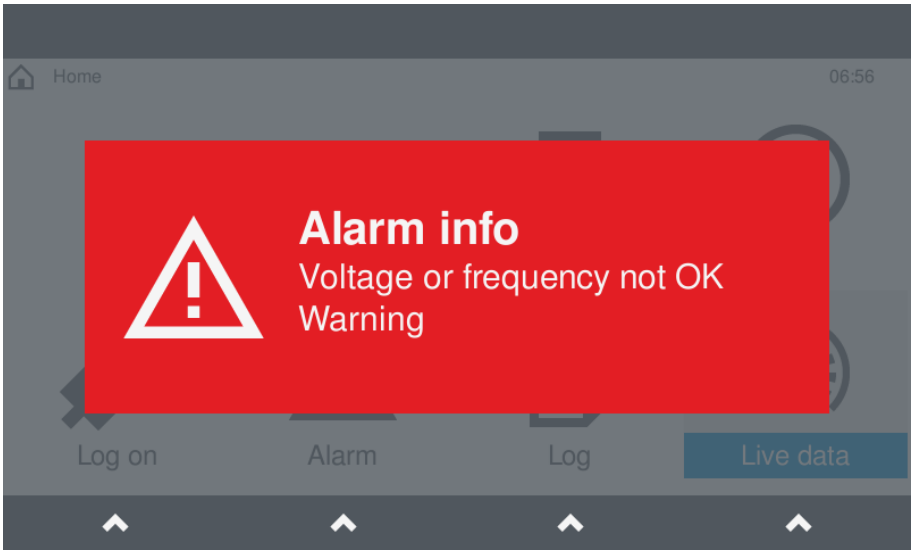
INFO
Some alarms can be inhibited from occurring depending on the designer's configuration of the system.

See **Protections**, **Alarm handling** in the Designer's handbook for more information about alarm handling and actions.

4.1.5 Alarm notification

New alarms activated in the controller display a red alarm notification pop-up.

Figure 4.3 Example alarm notification



Alarm notification
From the pop-up window you can either:

- Select **OK** to go directly to the alarms page.
- Select **Back** to close the notification and remain on the same page.

4.2 Alarm handling

4.2.1 Operator actions

An operator of the display unit can perform the following actions:

- Acknowledge
- Silence alarm(s)
- Reset alarm latches (if applicable)
- Shelve
- Out of service

INFO
Available operator actions are controlled by the permissions of the logged on user.

DANGER!
Alarm protections that are NOT actioned and cleared, could be manually overridden by the operator under switchboard/manual control. For example, if an alarm action such as trip or shutdown, has been triggered, and the alarm remains unacknowledged and not actioned, then the operator could close the breaker manually under switchboard control. In this situation, the alarm protection does not trigger again, as it is already considered currently active by the controller. Using switchboard/manual control while the alarm protection is not cleared can render the protection ineffective.

4.2.2 Acknowledge

All unacknowledged alarms must be acknowledged. Some alarms can be configured with *Auto acknowledge*, which will automatically acknowledge the alarm. The alarm does not require acknowledging again.

INFO
Acknowledging an alarm that has a *Latch* configured, does not remove the alarm from the alarm list. These alarms must be reset before the alarm protection becomes inactive.

Acknowledging an alarm

To acknowledge an alarm, perform the following steps:

1. Select **Alarms** to view the alarm list.
2. Highlight the alarm to acknowledge by using **Up** or **Down**.
3. Select **Acknowledge** Acknowledge by using to acknowledge the alarm.
4. If the alarm condition clears and the alarm has no *Latch* configured:
   - The acknowledged alarm is removed from the alarm list.
5. If the alarm condition clears and the alarm has a *Latch* configured:
   - The acknowledged alarm remains on the alarm list and requires a reset before the alarm is removed.*
6. If the alarm condition remains active:
   - The acknowledged alarm remains on the alarm list, but is now marked as acknowledged.

* Until the latched alarm is reset the alarm action (protection) remains active even though the alarm condition has cleared.

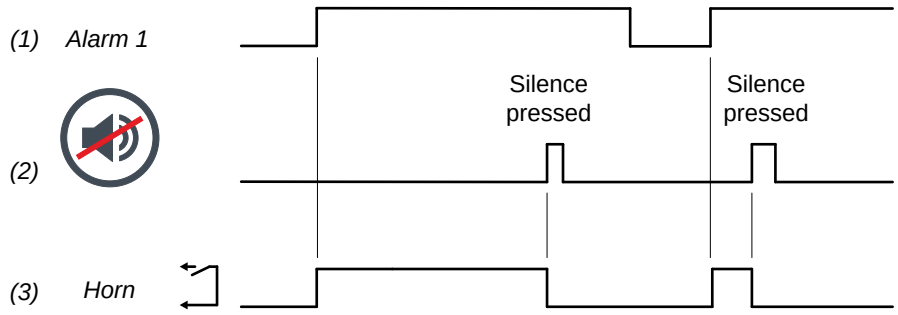
4.2.3 Silence horn

INFO
The following information only applies if the controller has been configured with horn output(s) to either audible or visual equipment.

When an active alarm condition occurs, the *Horn output* is activated by the controller. The audible or visual equipment is also activated.

You can silence the equipment by pressing **Silence horn** on the display unit. The controller immediately deactivates all horn outputs. However, the horn silence push-button does NOT have any other effect on the alarm system. If a new alarm is activated after the push-button is pressed, the horn output restarts.

Figure 4.4 Example of the effect of the horn silence push-button on the horn output



CAUTION
The horn silence push-button on the display unit does not affect the acknowledgement status of any alarms.

See **Protections**, **Horn outputs** in the Designer's handbook for more information on the configuration of these outputs.

4.2.4 Reset latches

Latched alarms that have been already acknowledged, can be reset. Until a latched alarm is reset the *Alarm action* (protection) remains active.

CAUTION
You cannot reset any latched alarms if the *Alarm condition* remains active and alarms exist that have not been acknowledged. All alarms must be acknowledged before you can reset (unlatch) the latched alarms.

Reset all cleared alarm latches

INFO
Resetting clears all alarm latches for all the latched alarms where the *Alarm condition* has cleared. Latched alarms where the alarm condition has not cleared are not affected by the reset.

To reset all cleared alarm latches, perform the following steps:

1. Select **Alarms** to view the alarm list.
2. Select **Reset latches** Reset latches by using .
3. All alarm latches, that can be reset, are reset.

4.2.5 Shelve

Most alarms on the alarm display can be shelved for a given period of time, if required. After the period of time expires the controller automatically returns the alarm to the previous state and rechecks the alarm condition.

INFO
If the user logged on does not have the necessary permission access to the *Shelve* option, you are prompted to log on.

CAUTION
Shelving alarms is useful during commissioning or service. Do not shelve alarms without good reasoning, as the alarm protection becomes inactive during the shelving.

Shelve an alarm

To shelve an alarm, perform the following steps:

1. Select **Alarms** to view the alarm list.
2. Highlight the alarm to shelve by using **Up** or **Down** .
3. Select the alarm to shelve by using **OK** .
4. Select **Service** by using **Up** or **Down** , and select **OK** to open the service menu.
5. Select **Shelve** by using **Up** or **Down** , and select **OK** to open the shelve options.
6. A list of available shelve periods are shown.
7. Select the required period to shelve the alarm by using **Up** or **Down** , and use **OK** to select.
8. The alarm is shelved for the period of time that was selected (or).

INFO
After the shelve period has expired, the controller automatically re-checks the alarm protection. If the alarm condition is still present in the system, the alarm protection becomes active again.

4.2.6 Out of service

Most alarms on the alarm list can be marked as *Out of service* for an indefinite period. The alarm will not automatically return to the system and requires action to bring the alarm back into service.

INFO
If the user logged on does not have the necessary permission access to the *Out of service* option, you are prompted to log on.

CAUTION
Marking alarms as *Out of service* is useful during commissioning or service. It is not recommended to mark alarms *Out of service* without good reasoning, as the alarm protection remains inactive while the alarm is marked as *Out of service*.

Remove an alarm from service

To remove an alarm from service, perform the following steps:

1. Select **Alarms** to view the alarm list.
2. Highlight the alarm to remove from service by using **Up** or **Down** .
3. Select the alarm details by using **OK** .
4. Select **Service** by using **Up** or **Down** , and use **OK** to open the service menu.
5. Select **Remove from service** by using **Up** or **Down** , and use **OK** to remove the alarm.
6. The alarm protection becomes inactive and the alarm is marked as *Out of service* (or).

Return an alarm to service

To return an alarm to service, perform the following steps:

1. Select **Alarms** to view the alarm list.
2. Highlight the *Out of service* alarm by using **Up** or **Down**.
3. Select the alarm details by using **OK** .
4. Select **Service** by using **Up** or **Down** , and use **OK** to open the service menu.
5. Select **Return to service** by using **Up** or **Down** , and use **OK** to return the alarm.
6. The alarm protection is checked by the controller and may become active again.

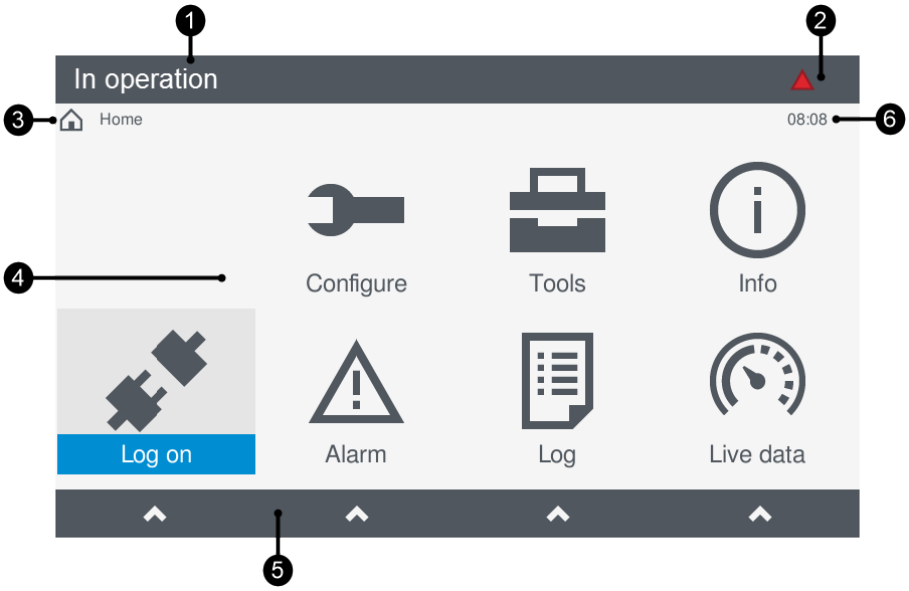
5. Using the display unit

5.1 Introduction

5.1.1 About the display unit

The display unit provides you quick and easy access to both operating and configuration information for the controller.

Figure 5.1 Display unit DU 300 example



No.	Item	Notes
1.	Controller status text	Displays the current controller status text. This varies depending upon the operation of the controller. See **Operator messages**, **Controller status texts** for more information.
2.	Status bar icons	Icons represent certain active features or functions. See **About the status bar**, in this chapter for more information.
3.	Path	Path for the currently viewed menu or feature.
4.	Menu or page	The menu or page currently being viewed.
5.	Selection bar	Soft keys used for selection or options, depending upon the page being viewed. See **About the soft keys**, in this chapter for more information.
6.	Time	Current time taken from the controller.

5.1.2 About the status bar

There is a status bar at the top of the display unit screen. This shows the following information.

Figure 5.2 Status bar example

No.	Item	Notes
1.	Controller status text	Displays the current controller status text. This varies depending on the operation of the controller. See **Operator messages**, **Controller status texts** for more information.
2.	Active alarm(s)	At least one active alarm is present. This can include latched alarms.
3.	User	The display unit has a user logged on.
4.	Page number	Shows the Live data page number (only on the Live data screen).

5.1.3 About the soft keys

The soft key buttons, which are displayed on screen, allow you to perform different features or options for the screen you are viewing. The soft key buttons also allow you to navigate the menus on the display unit.

You select a soft key function by pressing under the option.

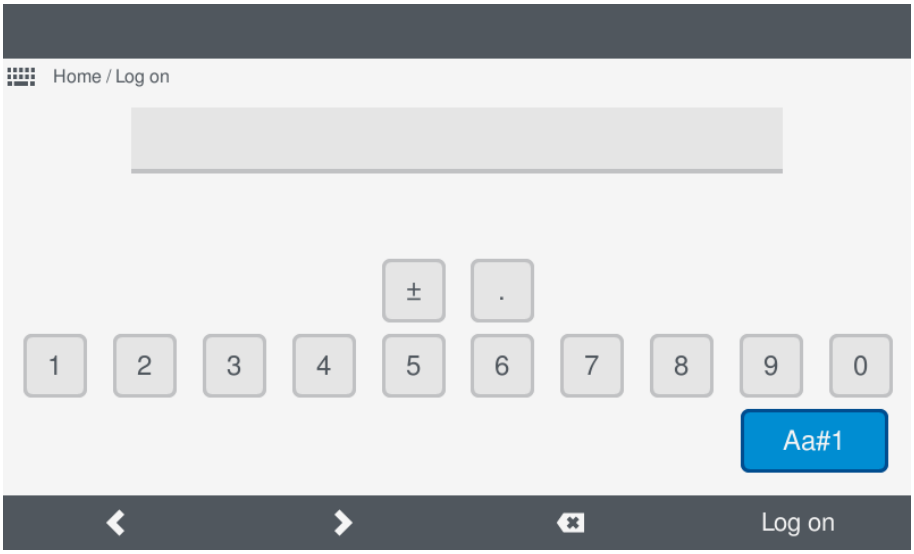
Soft key	Area	Notes
Home	Live data	Returns to the *Home* menu.
Next	Data entry	Confirms the information entered.
Toggle	Data entry	Toggle the option **ON**/**OFF**.
Clear	Data entry	Clears all selected options.
Reset latches	Alarms	Resets all latched alarms.
Acknowledge	Alarms	Acknowledges an alarm.
^	All	Moves the highlighted option up.
v	All	Moves the highlighted option down.
<	All	Moves the highlighted option left.
>	All	Moves the highlighted option right.

Soft key	Area	Notes
⌫	Virtual keyboard	Deletes the previous character.
User info	Log on	Views additional user information.
Log off	Log on	Log off the current user.
Language	Log on	Change displayed language.
Reset	Log on	Allows a reset of the display unit.
Alarm	I/O	View selectable alarm.
Functions	I/O	View selectable functions.
I/O name	I/O	Change the I/O name.
Next	I/O	View next settings page.
Edit	I/O	Edit the information.
Relay	I/O	View or configure the relay setup
Energise	I/O	Relay energise
De-energise	I/O	Relay de-energise
Write	All	Write information to the controller.

5.1.4 About the virtual keyboard

The display unit features a *virtual keyboard*, which is used to enter the information for the controller settings or features. The virtual keyboard can display characters for *lowercase* and *uppercase* letters, *numbers* or *symbols*.

Figure 5.3 Example virtual keyboard with numbers



Move around the virtual keyboard

- To move up or down:
  - Press **Up** or **Down** .
- To move left or right:
  - Select **Left** or **Right** , by pressing .

Adding or removing a highlighted character

- To add the highlighted character:
  - Press **OK** .
- To delete the last character:
  - Select **Delete** , by pressing .
- To cycle through the available different keyboard:
  - Select **Aa#1** Aa#1 , by pressing .
    - Press **OK** to continue to cycle through the available keyboards.
      - Numbers
      - Lowercase letters
      - Uppercase letters
      - Symbols
- To confirm the entered information:
  - Select **Next** Next , by pressing .

5.2 Log on

5.2.1 About permissions

The controller is protected by *group* and *user* permissions, which allow access to the functionality of the controller. To access the controller you must log on by using a *user* and *password*. The *user* has associated permissions to the controller and software.

INFO
Group and *user* permissions can only be created and configured by using PICUS.

The display unit can be used without the need to log on a *user* profile, however this only provides limited access or features.

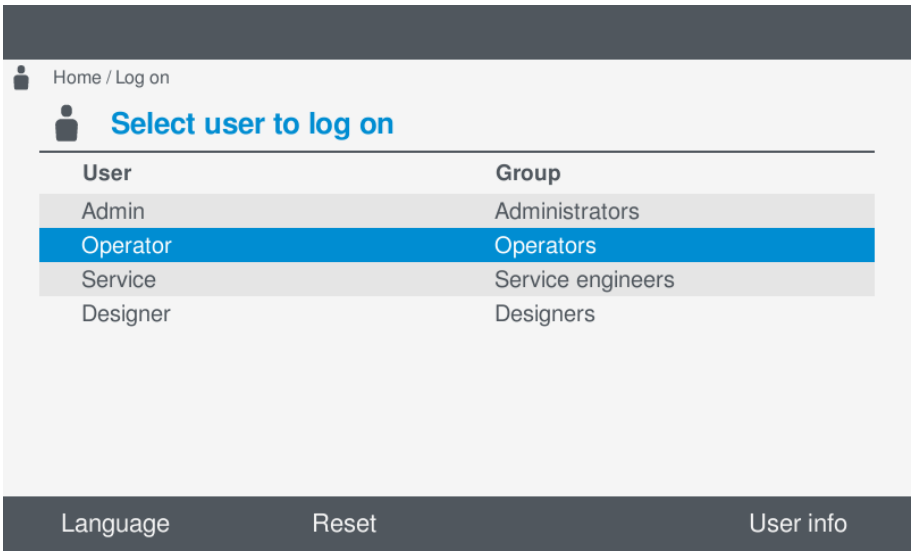
See **Permissions** in the **PICUS manual** for more information regarding groups and users.

5.2.2 Log on to controller

Log on to the display under **Log on**.

INFO
You do not need to log on to the controller to view the Live data information or access Alarms.

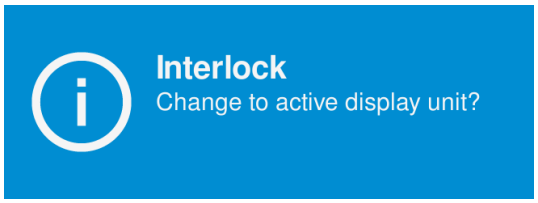
Figure 5.4 Example log on screen



CAUTION
If the controller has more than one display unit connected, and this display unit is **not** the active controlling display, then you are prompted to change the active display.

Log on to controller

To log on the controller, perform the following steps:

1. Select **Log on**, from the *Home* menu, to view the available users for the controller.
   - If a user is currently logged on this is shown with a green dot .
2. Highlight the required *user* by pressing **Up** or **Down**.
3. Select the highlighted *user* by pressing **OK**.
   - If the display is **not** the currently active display, then a blue pop up confirmation is displayed:
     - 

     - Confirm this display unit as the new active display by pressing **OK**.
     - Cancel the log on by pressing **Back** to return to the previous list of users.
   - A *virtual keyboard* is then displayed on screen.
   - You must enter the *password* for the selected *user*.
4. Enter the *password* by using the virtual keyboard.
5. If the password entered is correct, you are logged on as the new *user* and permissions.

INFO
You do not need to log off a user to log on as different one. You can simply log on as the new user.

5.2.3 View user information

View further user information under **Log on**.

View user information

To view further information about a user, perform the following steps:

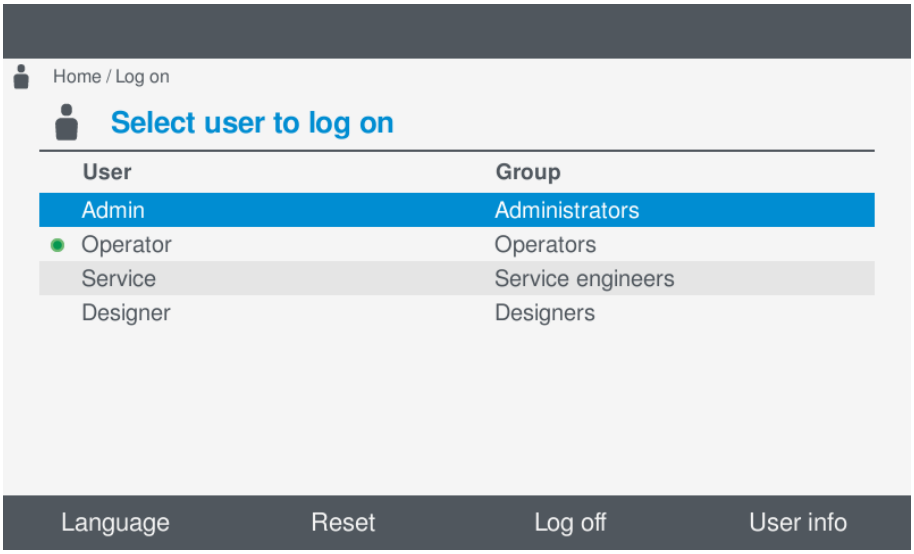
1. Select **Log on** to view the available users for the controller.
2. Highlight the required *user* by pressing **Up** or **Down**.
3. Select **User info** User info.
   - Further details about the *user* are displayed on screen.
4. Press **Back** to return to the previous list of users.

INFO
You can also view user information from **Tools > Advanced > Permissions > Users**.

5.2.4 Log off from controller

Log off from the display under **Log on**.

Figure 5.5 Example log off screen



To log on the controller, perform the following steps:

1. Select **Log on**, from the *Home* menu.
2. Select **Log off** Log off.
   - The logged on user is now logged off.
   - You are returned to the *Home* menu.

INFO
Any logged on *user* will be automatically logged off after 3 minutes of inactivity. After the 3 minutes have expired the default *user* will become active and have limited access to the display unit features or functions.

5.2.5 Reset display unit

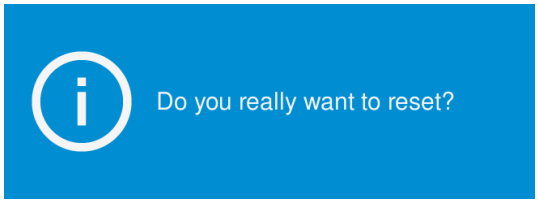
If you unplug the Ethernet connection and move it to another controller, you need to reset the display unit.

INFO
When the display unit starts, it connects to the controller that its Ethernet cable is connected to. If you unplug the Ethernet cable and move it to a different controller, the display unit uses the network to resume its connection to the original controller. You therefore need to reset the display unit.

Reset the display unit under **Log on**.

Reset the display unit

To reset the display unit, perform the following steps:

1. Select **Log on**, from the *Home* menu.
2. Select **Reset** Reset.
   - A blue pop is displayed:
   - 

3. Select either:
   - Press **OK** OK to reset the display unit.
   - Press **Back** to cancel the reset and return to the previous screen.

5.2.6 Change language

The controller can be installed and configured with different language files. You can change the displayed language by using this option.

CAUTION
The language feature is only available if both the controller and the display unit have the necessary language software installed.

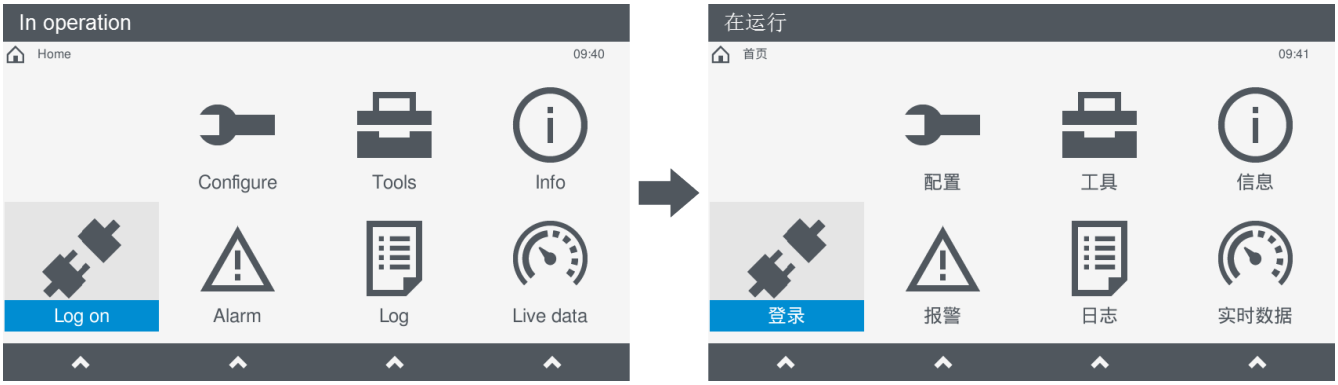
Change the display language under **Log on**.

Here you can configure the displayed language for the display unit.

By changing the display language, all of the menus, options, and help become translated automatically.

INFO
The master language is always available to select, but it cannot be modified.

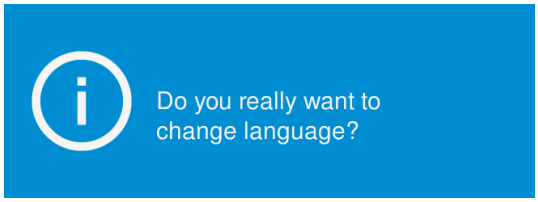
Figure 5.6 Example of language change



You can then operate the display in your desired language.

Changed the display language

To change the displayed language, perform the following steps:

1. Select **Log on**, from the *Home* menu.
2. Select **Language** Language.
   - A blue pop is displayed:
   - 

3. Select either:
   - Press **OK** OK to change the displayed language.
     - The display unit now restarts in the new language.
   - Press **Back** to cancel the change and return to the previous screen.

5.3 Configure

5.3.1 About configure

The configure menu allows you to do the following:

I/O Configure the I/O settings.

Configure the parameter settings.

5.3.2 Configure parameters

Configure parameter settings under **Configure > Parameters**.

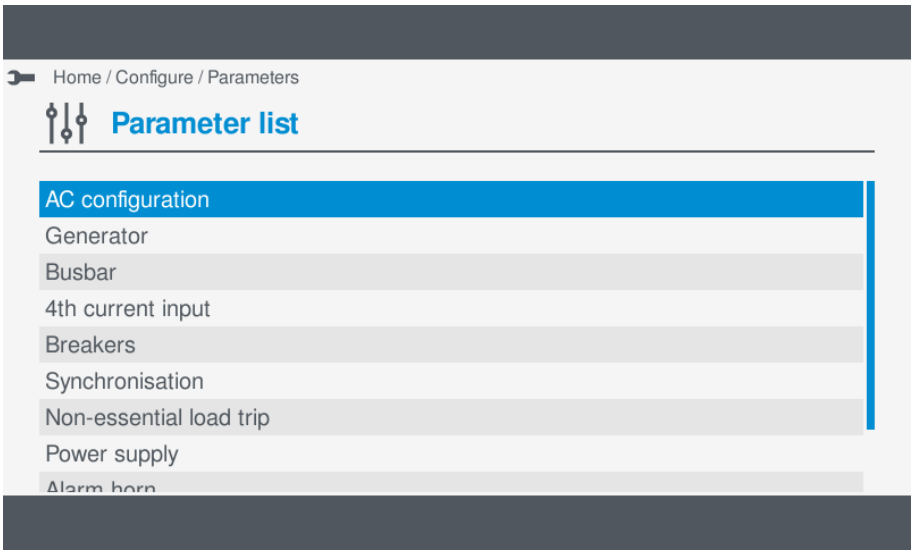
You can configure the parameters for both system settings and alarm settings.

The parameters are organised into categories and groups:

Category
↳ Group
↳ Parameter(s)

Configure parameters

Figure 5.7 Example parameter categories



To configure the parameters, perform the following steps:

1. Select **Configure** , from the *Home* menu.
2. Select **Parameters** to view the controller parameter categories.
   - The parameter categories shown depend upon the type of controller or whether the associated I/O has been configured.
3. Highlight the parameter category you wish to open, by pressing **Up** or **Down**.
4. Select the highlighted parameter category by pressing **OK**.
   - The parameter groups under the selected category are shown on the display.
5. Highlight the parameter group you wish to open, by pressing **Up** or **Down**.

6. Select the highlighted parameter group by pressing **OK** OK.
   - The parameter settings are shown on the display.
7. To highlight the parameter, select **Up** ^ or **Down** v, by pressing •.
8. To highlight the parameter settings, press **Up** ^ or **Down** v.
9. Change the setting, by pressing **OK** OK.
   - If the setting can be toggled, you can use **Toggle** Toggle, by pressing •.
   - If the setting is text or a value, pressing **OK** OK displays the *virtual keyboard* to alter the setting.
     - The parameter settings *minimum*, *maximum* and *default* are also shown.
     - Use the *Virtual keyboard* to make the required changes.
     - To confirm the setting, select **Write** Write, by pressing •.
   - If the setting is a selection, pressing **OK** OK displays an available list of selection options.
     - Highlight the option required, by pressing **Up** ^ or **Down** v.
     - Select the option, by pressing **OK** OK.
     - To confirm the setting, select **Write** Write, by pressing •.

5.3.3 Configure I/O setup

I/O Configure I/O settings under **Configure > Input/Output**.

You can configure the I/O settings and terminals for any of the hardware modules within the connected controller.

See **Hardware characteristics**, in the **Designer's handbook** for more information regarding the different hardware modules and their terminal details.

To configure the I/O settings you need to perform the following steps:

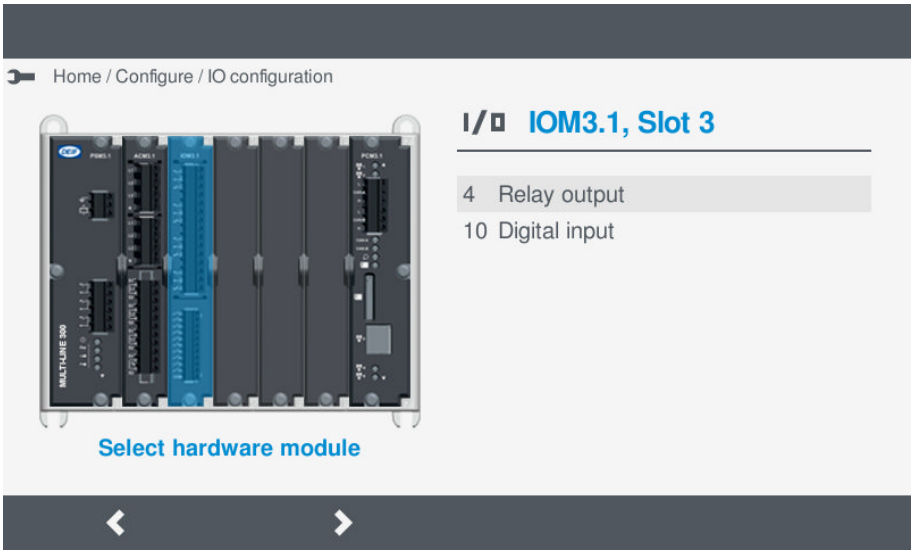
1. Select hardware module to configure
2. Select terminal(s) to configure
3. Configure the terminal(s) settings

5.3.4 Selecting a hardware module

Before you can configure the I/O settings, you first need to select the hardware module in the controller.

INFO
The hardware selection screen shows the same hardware modules as you have installed in the controller.

Figure 5.8 Example select hardware module



INFO
Basic details about the available I/Os on the module are shown at the right.

Selecting a hardware module

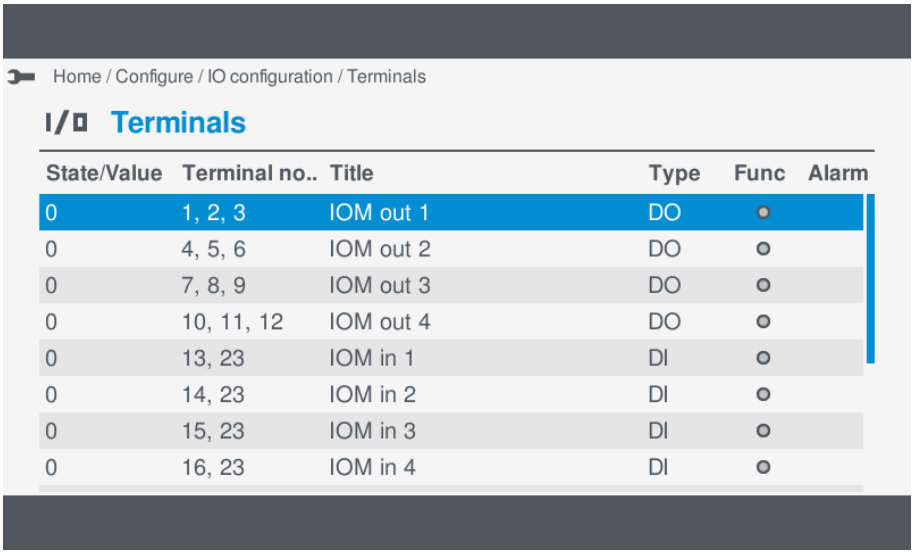
To select the hardware module, perform the following steps:

1. To move between the hardware modules, select **Left** or **Right**, by pressing .
   - Basic information about the selected hardware module is shown at the right.
2. Select the highlighted hardware module by pressing **OK** .
   - The I/O terminals for the hardware module are displayed on screen.

5.3.5 View or configure hardware module I/O terminals

After selecting the hardware module, the details of the available terminals are shown on the display.

Figure 5.9 Example I/O configuration terminals



If a terminal has already has either a *Function* or an *Alarm* configured, the terminal is marked with grey dot .

INFO
The actual terminal types shown depend upon the type of hardware module selected or installed.

Type	Notes
DI	Digital input
DO	Digital output

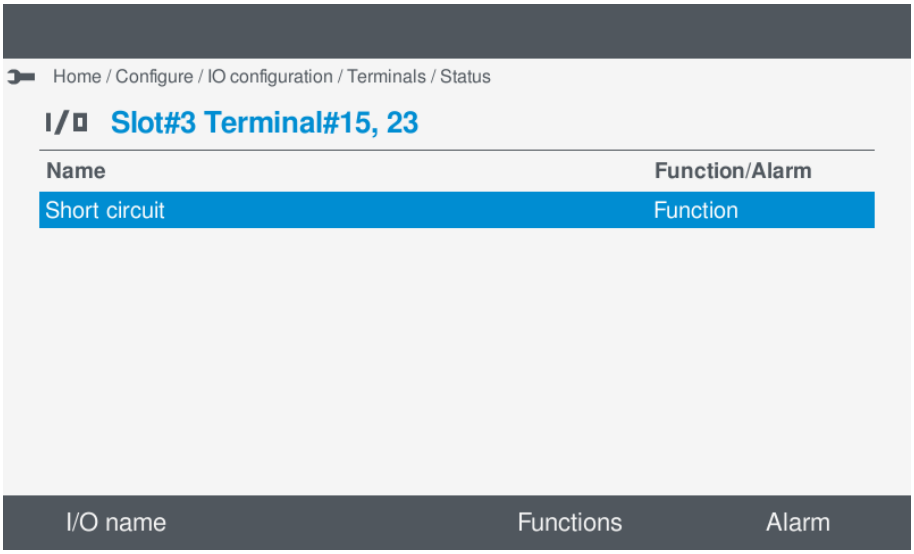
View or configure terminal settings

1. Highlight the required terminal, by pressing **Up** or **Down** .
2. Select the highlighted terminal by pressing **OK** .
   - Details of the terminal settings are displayed on the screen.

5.3.6 I/O terminal settings

After selecting the hardware module and the required terminal, the details of the terminal settings are shown on the display.

Figure 5.10 Example hardware module terminals



Here you can configure various settings for the terminal, subject to the type of terminal and hardware module selected. The actual features you can select or configure are also subject to the type of hardware module you have selected.

From this screen you can:	
I/O name	Configure I/O name (applicable to all).
Relay	Configure relay (applicable to DO).
Functions	Assign function(s) to the I/O (applicable to all).
Alarm	Assign alarm(s) to the I/O: • DI - Selectable/configurable custom alarm(s). • DO - Selectable alarm(s). .

Configure the I/O name

To rename the input or output name:

1. Select **I/O name** I/O name, by pressing .
   - The *virtual keyboard* is displayed on screen to edit the I/O name.
2. Enter the required I/O name and select **Next** Next, by pressing .

Configure relay (if applicable)

1. Select **Relay** Relay, by pressing .
   - The relay configuration is shown on the screen.

See **View or configure I/O relay**, in the following section of this document for more information.

View or configure alarm(s)

1. Select **Alarm** Alarm, by pressing .
   - The alarm(s) are shown on screen.

See **Configure alarms**, in the following section of this document for more information.

View or configure function(s)

1. Select **Functions** Functions, by pressing .
   - The functions are shown on screen.

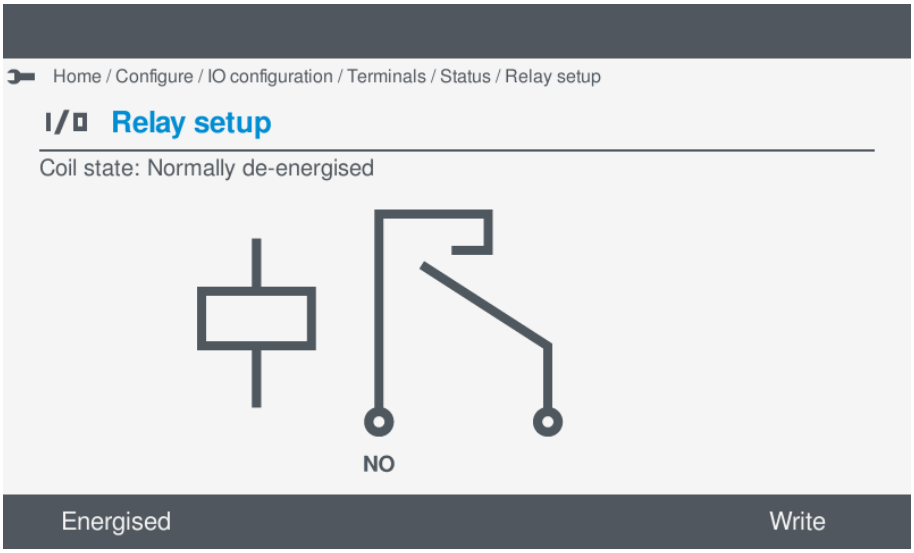
See **View or configure functions**, in the following section of this document for more information.

5.3.7 View or configure I/O relay

You can configure the setting for the relay. The current configure state for the relay is shown on the display. By default all relays are considered to be *Normally open* and in a *De-energised* state.

From this screen you can configure either a standard relay or a changeover relay, depending upon the type of relay that can be connected to the hardware module terminals.

Figure 5.11 Example relay setup



See **Hardware characteristics**, in the *Designer's handbook* for more information about the hardware modules that support relays.

Configure the relay

1. You can set the relay as either *Energise* or *De-energise*.
   - The current setting is shown on the display.
2. You can set the relay as either *Energise* or *De-energise*.
3. To set as *Energise* select **Energise** Energise, by pressing •.
4. To set as *De-energise* select **De-energise** De-energise, by pressing the appropriate push-button •.
5. To save the setting to the controller, select **Write** Write, by pressing •.
   - You are returned to the terminal screen.

5.3.8 Configure DI alarm(s)

INFO
When viewing or configuring a previously configured I/O with an alarm, the display will automatically jump to the alarm settings. You can, if required, use **Back** to return to the alarm selection screen.

You can enable or not enable a pre-configured alarm, edit an existing alarm, or create a new custom alarm. You can also edit alarms that are not enabled.

Enable an alarm

1. Highlight the required custom alarm, by pressing **Up** or **Down**.
   - Details of the alarm settings are shown at the right side of the display.
2. Select the alarm, by pressing **OK** OK.
   - The selected alarm is shown with a solid box.
   - To remove the selection, press **OK** OK again.
   - You can also reconfigure the alarm by using **Edit** Edit (see below for further information).
3. To save the settings to the controller, select **Write** Write.
   - This only saves the selected alarm(s) and their settings to the controller. It does not save other I/O settings.

Clear all enabled alarm(s)

1. To clear all the selected alarms, select **Clear** Clear.
2. To save the new setting to the controller, select **Write** Write.
   - This only saves the selected alarm(s) and their settings to the controller. It does not save other I/O settings.

Editing a custom alarm

CAUTION
If a custom alarm is already used on another DI, editing the alarm settings will change the alarm for both terminals.

1. Highlight the required custom alarm, by pressing **Up** or **Down**.
2. Select **Edit** Edit.
   - Details of the alarm settings are shown on the display for you to configure.
     a. Highlight the required alarm setting, by pressing **Up** or **Down**.
     b. To change the setting, press **OK**.
        - If the setting is text or a value, pressing **OK** displays the *virtual keyboard* to alter the setting.
          - Make the required changes using the *virtual keyboard*.
          - To confirm the changes, select **Next** Next.
        - If the setting is a selection, pressing **OK** displays an available list of selection options.
          - Highlight the option required, by pressing **Up** or **Down**.
          - Select or unselect the option, by pressing **OK**.
          - To confirm the setting, select **Next** Next.
     c. Once you have made all the required changes to the alarm settings, select **Write** Write.
        - This saves the alarm setting to the controller. This does not save any other settings.
        - The list of available alarms is shown again on the display.
3. To save the new setting to the controller, select **Write** Write.
   - This only saves the selected alarm(s) and their settings to the controller. It does not save other I/O settings.

Create a new custom alarm

To create a new alarm, simply edit one of the available *Custom alarms* listed.

INFO
It is recommended to give your created alarms a new descriptive name for easier reference.

1. Highlight a previously unused alarm, typically named digital or analogue custom alarm, by pressing **Up** or **Down**.
2. Select **Edit** Edit.
   - Details of the alarm settings are shown on the display for you to configure (see above for further information).

5.3.9 Configure DO alarms

INFO
When viewing or configuring a previously configured I/O with an alarm, the display will automatically jump to the alarm settings. You can, if required, use **Back** to return to the alarm selection screen.

Selecting an alarm

1. Highlight a category or group, by pressing **Up** or **Down**.
2. Select the highlighted category or group, by pressing **OK**.
   - A further group may be shown or the alarm list to select the actual alarm(s).
   - If a further group is shown, simply repeat step 1 to locate and open the required group.

You can enable or not enable a pre-configured alarm, edit an existing alarm, or create a new custom alarm. You can also edit alarms that are not enabled.

Enable an alarm

1. Highlight the required alarm, by pressing **Up** or **Down**.
   - Details of the alarm settings are shown at the right side of the display.
2. Select the alarm, by pressing **OK**.
   - The selected alarm is shown with a solid box.
   - To remove the selection, press **OK** again.
3. To save the settings to the controller, select **Write** Write.
   - This only saves the selected alarm(s) and their settings to the controller. It does not save other I/O settings.

Clear all enabled alarm(s)

1. To clear all the selected alarms, select **Clear** Clear.
2. To save the new setting to the controller, select **Write** Write.
   - This only saves the selected alarm(s) and their settings to the controller. It does not save other I/O settings.

5.3.10 View or configure functions

The functions available are organised in to categories and groups, which is similar to a tree structure view.

Selecting a function

1. Highlight a category or group, by pressing **Up** or **Down**.
2. Select the highlighted category or group, by pressing **OK**.
   - A further group may be shown or the function list to select the actual function.
   - If a further group is shown, simply repeat step 1 to locate and open the required group.

Configure functions

1. To select the functions for the terminal:
   - Highlight the required function, by pressing **Up** or **Down**.
   - Enable the highlighted function, by pressing **OK**.
     - Selected function(s) are shown with a solid box.
   - To clear all the **Enabled** functions, select **Clear** Clear.
   - To save the setting(s) to the controller, select **Write** Write.
     - This only applies to the selected functions and does not apply other I/O change(s).

5.4 Tools

5.4.1 About tools

The tools menu allows you to do the following:

View or configure the communication information.

View the advanced menu.

5.4.2 Configure communication

The communication screen displays all of the communication settings for the controller.

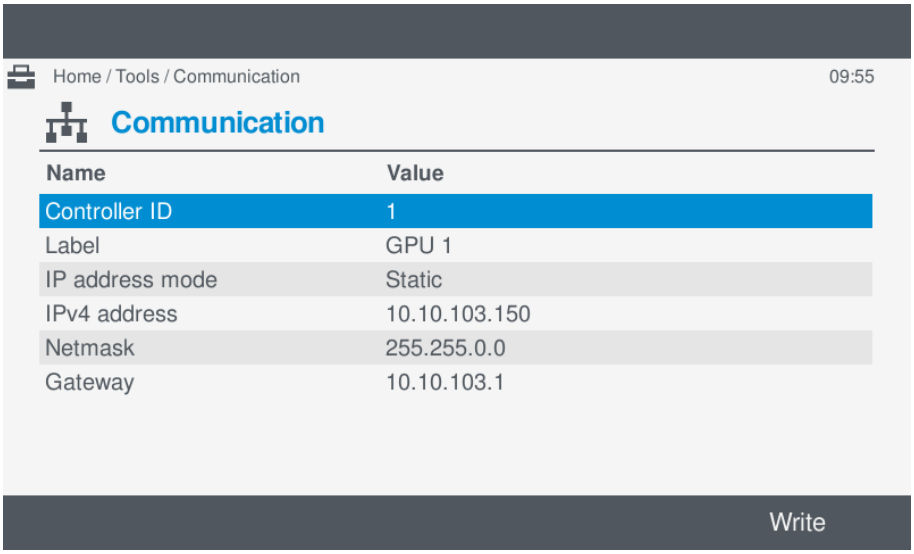
Configure the communication information under **Tools > Advanced > Communication**.

CAUTION
The DEIF controllers do not include a firewall or other Internet security measures. It is the customer's own responsibility to protect the network. DEIF therefore recommends only connecting the controllers to local networks.

DANGER!
Changes to the communication settings require the controller to be powered off and powered on again for the settings to take effect. The controller MUST only be powered off and powered on by authorised personnel whom understand the risks involved in accessing the controller power supply or installation design. Take extreme care in the enclosure next to the ACM terminals. Ensure the controller is not running and in operation, and that the controlled breaker is open before powering off and on the controller.

INFO
The information shown can be different for different types of controller.

Figure 5.12 Example communication screen



See **Hardware characteristics**, **DEIF Ethernet network** in the **Designer's handbook** for more information regarding the communication possibilities.

Setting	Range	Default	Notes
Controller ID	1, 64	1	
Label	Text	No default	
IP address mode	Static, Auto	Auto	Select *Static* to specify an IPv4 address.
IPv4 address	0.0.0.0, 255.255.255.255 *	No default	Static IPv4 address for the controller.
Netmask	0.0.0.0, 255.255.255.255 *	No default	Depends upon IPv4 address.
Gateway	0.0.0.0, 255.255.255.255 *	No default	

* Note: This is the range of addresses that you can select. The range of addresses that you can actually use depends on your network design. In addition, some addresses in this range are reserved.

Reviewing communication information

To view the communication information, perform the following steps:

1. Select **Tools** , from the *Home* menu.
2. Select **Advanced**, from the *Tools* menu.
3. Select **Communication** to view the communication settings for the controller.
4. Scroll through the information by pressing **Up** or **Down** .

Configuring communication information

To change the communication information, perform the following steps:

1. Select **Tools** , from the *Home* menu.
2. Select **Advanced**, from the *Tools* menu.
3. Select **Communication** to view the communication settings for the controller.
4. Select the information to configure by pressing **OK** OK.

INFO
Some information is not configurable on some controller types. A message displays when you cannot change the information.

- Either the *virtual keyboard* or a selection choice is displayed on screen.
- Make the required changes or selection.
- Select **Next** Next, by pressing the appropriate push-button .

5. When all change(s) have been made, select **Write** Write by pressing to save the settings to the controller.
6. For the change(s) to take effect, you must power off and on the controller rack and reset the display unit.

DANGER!
The controller MUST only be powered off and powered on by authorised personnel whom understand the risks involved in accessing the controller power supply or installation design.

5.4.3 About advanced

The advanced menu allows you to do the following:

View the *Brightness* menu.

View the *Permissions* menu.

5.4.4 About brightness menu

The brightness menu allows you to do the following:

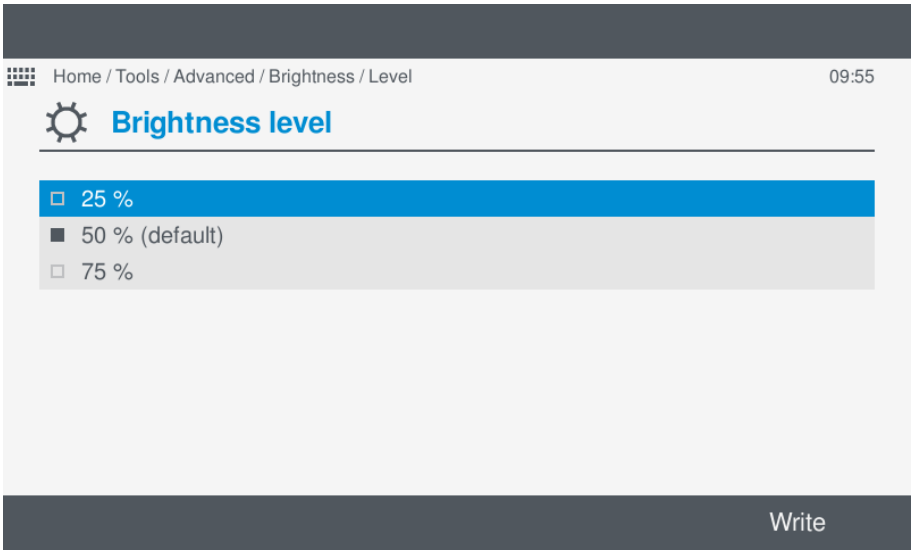
View or configure the *Brightness level* setting.

View or configure the *Brightness time* setting.

5.4.5 View or configure brightness level setting

View or configure the *Brightness level* setting under **Tools > Advanced > Brightness > Brightness level**.

Figure 5.13 Example brightness level screen



Changing brightness level setting

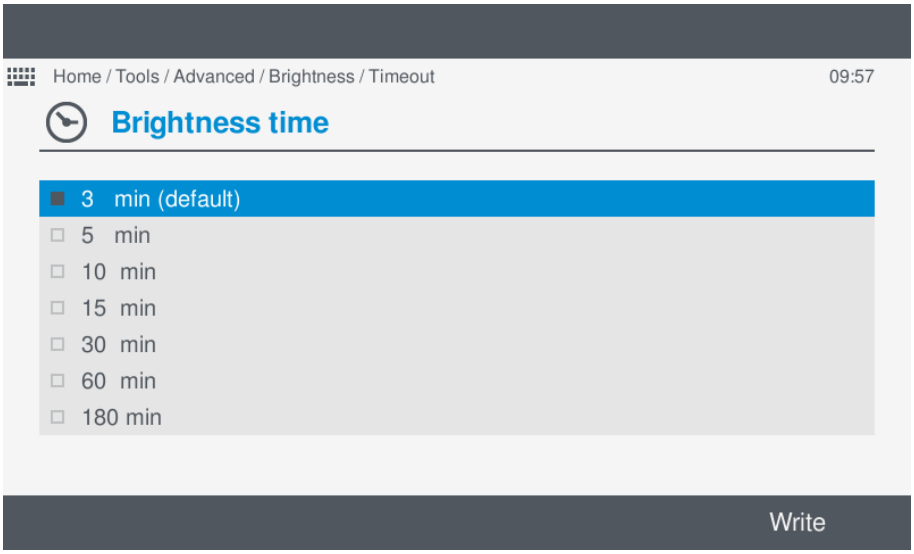
To change the brightness level setting, perform the following steps:

1. Select **Tools**, from the *Home* menu.
2. Select **Advanced**, from the *Tools* menu.
3. Select **Brightness**, from the *Advanced* menu.
4. Select **Brightness level**, from the *Brightness* menu.
   - The currently configured brightness level is shown with a solid box.
5. Highlight the required brightness level by pressing **Up** or **Down**.
6. Select the brightness level by pressing **OK**.
   - The selected brightness level is shown with a solid box.
7. To confirm the change, select **Next**.
   - The setting becomes saved to the display unit.
   - After the brightness time setting expires, due to inactivity with the display unit, the display becomes the brightness level.

5.4.6 View or configure the brightness time setting

View or configure the *Brightness time* setting under **Tools > Advanced > Brightness > Brightness time**.

Figure 5.14 Example brightness time screen



Changing brightness time setting

To change the brightness time setting, perform the following steps:

1. Select **Tools**, from the *Home* menu.
2. Select **Advanced**, from the *Tools* menu.
3. Select **Brightness**, from the *Advanced* menu.
4. Select **Brightness time**, from the *Brightness* menu.
   - The currently configured brightness time is shown with a solid box.
5. Highlight the required brightness time by pressing **Up** or **Down** .
6. Select the brightness time by pressing **OK** .
   - The selected brightness time is shown with a solid box.
7. To confirm the change, select **Next** Next .
   - The setting becomes saved to the display unit.
   - After the brightness time setting expires, due to inactivity with the display unit, the display becomes the brightness level.

5.4.7 About permissions

The permissions menu allows you to do the following:

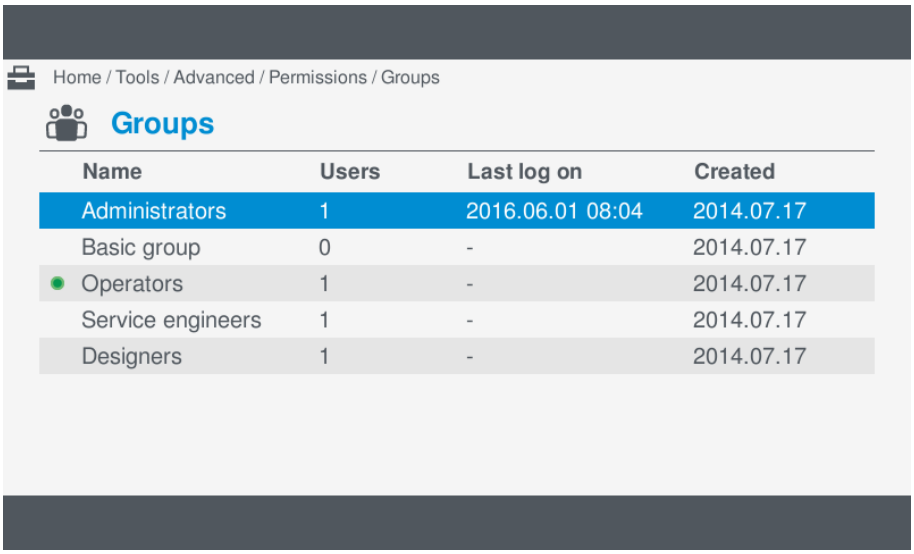
View the *Group* information.

View the *User* information.

5.4.8 View groups

View the *Group* information under **Tools > Advanced > Permissions > Groups**.

Figure 5.15 Example groups screen



See **PICUS software**, **Group permissions and users** in the **Designer's handbook** for more information regarding permissions.

Reviewing group information

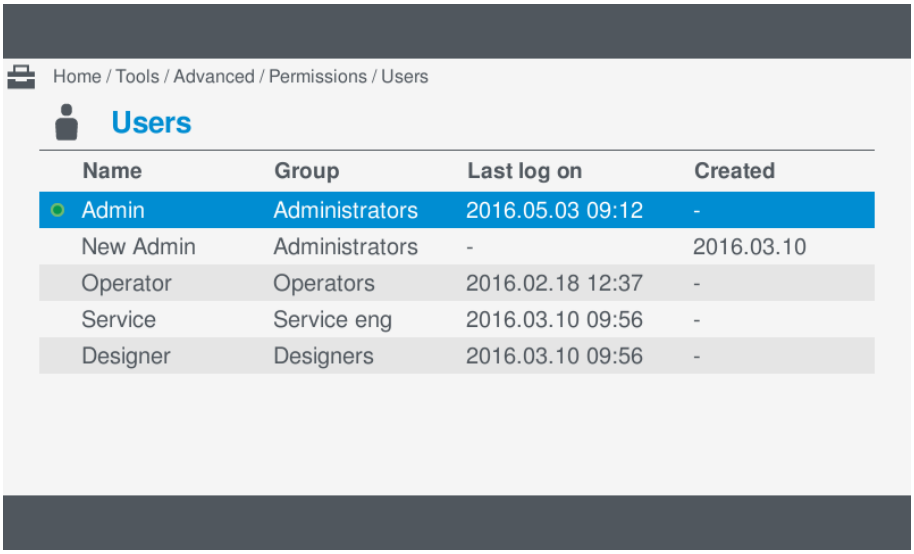
To view the group information, perform the following steps:

1. Select **Tools**, from the *Home* menu.
2. Select **Advanced**, from the *Tools* menu.
3. Select **Permissions**, from the *Advanced* menu.
4. Select **Groups**, from the *Permissions* menu, to view the group information.
   - Details of the groups setup on the controller are displayed on screen.
   - The group for the currently logged on user is shown with a green dot .
5. Scroll through the information by pressing **Up** or **Down** .
6. Further information is displayed by pressing **OK** on a highlighted group.
   - This includes all the associated users for the selected group.

5.4.9 View users

View the *User* information under **Tools > Advanced> Permissions > Users**.

Figure 5.16 Example user screen



See **PICUS software**, **Group permissions and users** in the **Designer's handbook** for more information regarding permissions.

Reviewing user information

To view the user information, perform the following steps:

1. Select **Tools**, from the *Home* menu.
2. Select **Advanced**, from the *Tools* menu.
3. Select **Permissions**, from the *Advanced* menu.
4. Select **Users**, from the *Permissions* menu, to view the group information.
   - Details of the users setup on the controller are displayed on screen.
   - The user currently logged on is shown with a green dot .
5. Scroll through the information by pressing **Up** or **Down** .
6. Further information is displayed by pressing **OK** on a highlighted user.

5.5 Alarms

5.5.1 About alarms

View the alarms under **Alarms**.

You can view or action alarms from the alarm list.

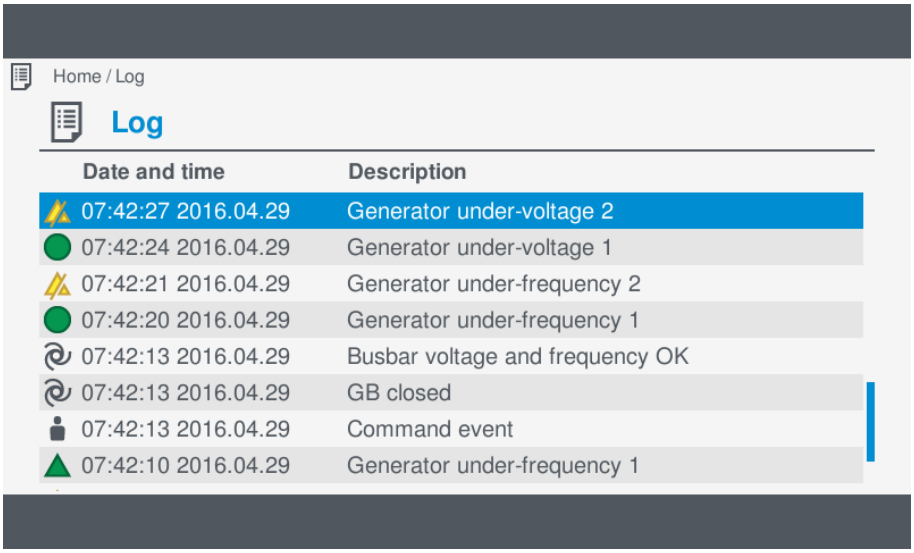
See **Alarms**for more information regarding the alarm list and actions.

5.6 Log

5.6.1 About the log

The log records activities and events that occur during the operation of the system. This includes any operator actions.

Figure 5.17 Example log display



5.6.2 Log events

Table 5.1 Log event symbols

Event	Icon	Examples
General		• System commands • Breaker open
System		• Power up • Download firmware • I/O hardware modules installed in controller, serial number, software, hardware version and revision.
Alarms	Varies by alarm state	• Alarms occurring in the system • Alarms being acknowledged by the user • Alarm condition going back to normal
Parameters		• Parameter change(s)
Shelve		Alarm has been shelved for a specific period of time.
Out of service		Alarm has been marked as *Out of service.*

5.6.3 Reviewing log events

Events that occur during the operation of the controller are recorded in the event log.

View the events that have occurred in the system under **Log**.

Reviewing log events
To view a log entry, perform the following steps:

1. Select **Log** to view the event log.
2. Scroll through the event log by pressing **Up** or **Down**.
3. Select an event by pressing **OK**.
4. Select either **Info** or **Diagram** by pressing **Up** or **Down** and pressing **OK**.
5. Further details of the event are shown on the display.

5.7 Live data

5.7.1 Viewing the Live data

View the current state of the system under **Live data**.

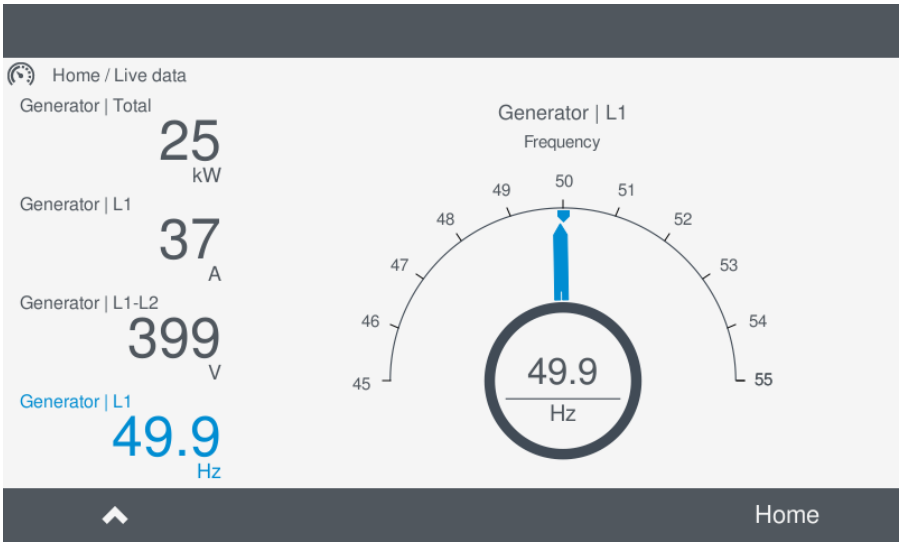
The Live data display contains many different information screens showing the current operation information for the controller. You can also view the counter information here.

Reviewing Live data
To view the different Live data screens, perform the following steps:

1. Select **Live data** to view the current operating information.
2. Scroll through the screens by pressing **Up** or **Down**.

Changing Live data display (if applicable)
Some screens in the Live data display can be changed to view alternative information.

Figure 5.18 Example Live data screen



To cycle through the different information on a specific screen, perform the following steps:

1. Select **Live data** to view the current operating information.
2. Scroll to the required screen by pressing **Up** or **Down** .
3. Select **Up** by pressing to cycle through the different information.

You can return to the main menu by using **Home** Home by pressing .

Alternatively, press and hold **Back** for > 0.2 seconds to return to the main menu.

5.7.2 Live data counters

View counters under **Live data**.

The Live data page has a display for counters.

Figure 5.19 Example Live data counters for GPU

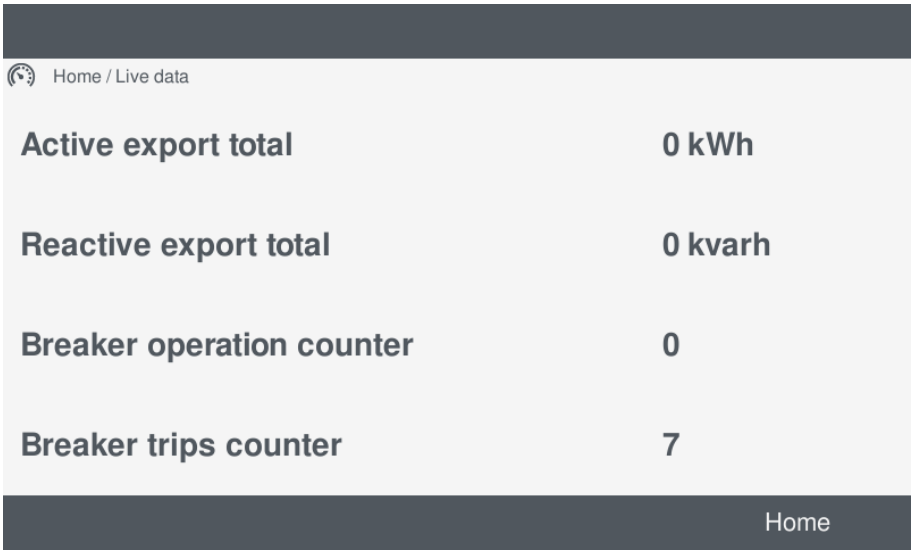


Table 5.2 GPU Live data counters

Counter	Unit
Active export total	kWh
Reactive power export total	kvarh
Breaker operation counter	(Count)
Breaker trips counter	(Count)

5.8 Info

5.8.1 About info

The info menu ⓘ allows you to do the following:

View production information for the controller.

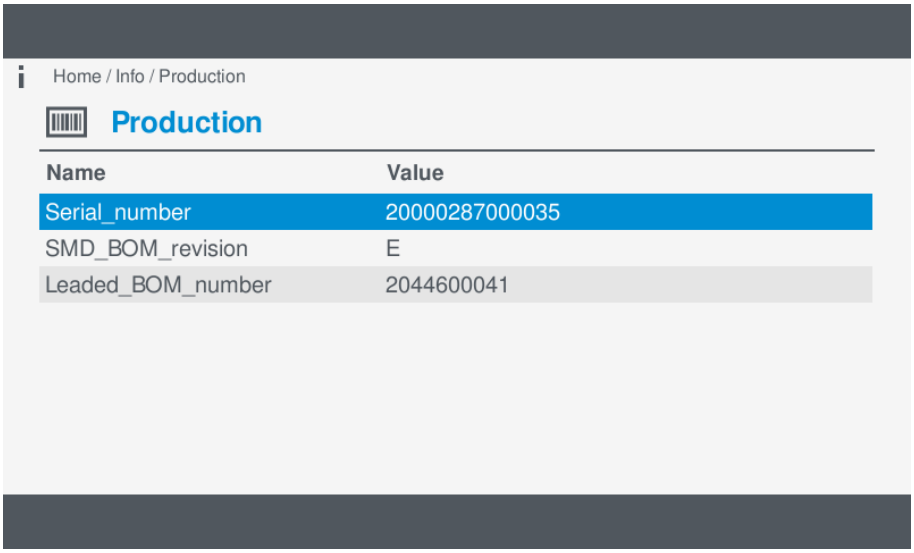
View the about information, including firmware versions.

5.8.2 View production

View the production information under **Info > Production**.

Here you can view information about the production of the controller.

Figure 5.20 Example production screen



Press **Back** to return to the **Info** menu.

To scroll the production information use **Up** or **Down**.

5.8.3 View about

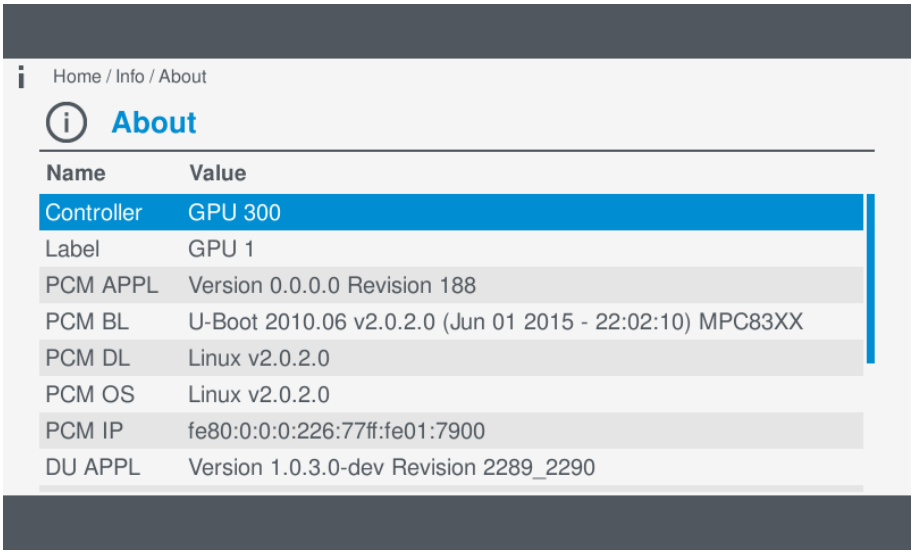
Here you can view the about information for the controller and display unit.

This screen shows:

- Firmware version and revision for the hardware modules.
- Firmware version and revision for the application software.
- Firmware version and revision for the display unit (DU).
- IPv6 address of the display unit.

View the about information under **Info > About**.

Figure 5.21 Example about screen



Press **Back** to return to the **Info** menu.

To scroll the production information use **Up** or **Down**.

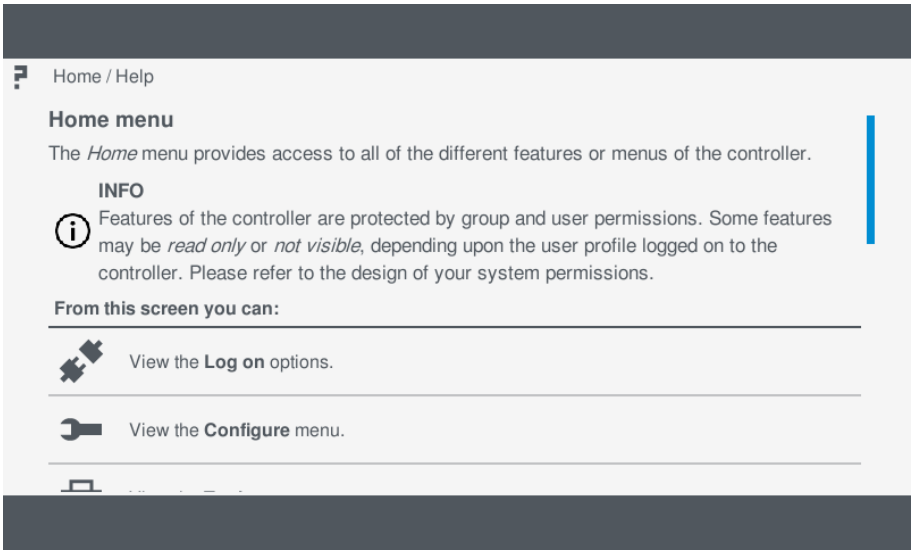
5.9 Help

5.9.1 View help

View help for the page you are reading by pressing the help button.

You can view help for the page your viewing by pressing **Help**.

Figure 5.22 Example help



You can scroll the displayed information by pressing **Up** or **Down** .

Select **Back** to close the help information and return to the previous page.

6. Troubleshooting

6.1 Introduction

6.1.1 General

The controller includes a number of alarms. When alarms are activated, this normally means that there is a problem in the system. In some cases there can be a problem with the controller.

Troubleshooting requires an understanding of the system, a logical and systematic approach, and careful observation of the system reactions to the troubleshooting actions. It is not possible to describe every possible system problem and solution.

CAUTION
This chapter only lists possible root causes of alarms. The operator must investigate carefully to determine and address the actual root cause.

Combinations of alarms

Certain root causes activate more than one alarm. For example, if there is both a **Voltage unbalance** and a **Current unbalance** alarm, then the root cause is probably unbalanced loads.

Commissioning

Certain root causes are rare during normal operation. However, these can be common during commissioning. To aid troubleshooting, these are highlighted with a star (*).

Controller configuration

The controller configuration should be checked during commissioning. DEIF recommends the following:

1. Use the parameter path provided to check the alarm settings.
2. Ensure that the nominal settings (for both the generator AND the busbar) are correct. Many alarms are specified as a percentage of a nominal setting.
   - For example, if the nominal voltage is too low, the controller may activate the **Over-voltage** alarm. Similarly, if the over-voltage alarm set point is too low, the controller may activate the **Over-voltage** alarm.
3. For AC protections, ensure that the current transformers and voltage transformers are configured correctly.

See **Alarms and log** for information about handling alarms.

See the **Designer's handbook** for more information about the alarms.

See **Troubleshooting** in the **Commissioning guidelines** for information about troubleshooting terminal damage.

6.2 Generator AC protections

6.2.1 Over-voltage

Configure > Parameters > Generator > Voltage protections > Over-voltage #, where # is 1 or 2.

Reason	Possible root cause(s)
High voltage from the generator	• The AVR is faulty. • The AVR set point is incorrect.* • The AVR regulation tuning is incorrect.*
The controller configuration is incorrect	• The nominal generator voltage is too low.* • The alarm set point is too low.* • The voltage transformers (if applicable) are configured incorrectly in the controller.*

*Note: This problem should not occur after commissioning.

6.2.2 Under-voltage

Configure > Parameters > Generator > Voltage protections > Under-voltage #, where # is 1 or 2.

Reason	Possible root cause(s)
Low voltage from the generator	• The AVR is faulty. • The AVR set point is incorrect.* • The AVR regulation tuning is incorrect.*
Low measured voltage	One or more of the voltage measurements are faulty. For example: A wire is broken or disconnected. A faulty voltage measurement will also activate other alarms.
The controller configuration is incorrect	• The nominal generator voltage is too high.* • The alarm set point is too high.* • The voltage transformers (if applicable) are configured incorrectly in the controller.*

*Note: This problem should not occur after commissioning.

6.2.3 Voltage unbalance

Configure > Parameters > Generator > Voltage protections > Voltage unbalance

Reason	Possible root cause(s)
The generator phase voltages are unbalanced	• The generator is faulty. • There is a relatively big load on one phase. Check for **Current unbalance**. • One or more of the voltage measurements are faulty. For example: A wire is broken or disconnected.

6.2.4 Negative sequence voltage

Configure > Parameters > Generator > Voltage protections > Negative sequence voltage

Reason	Possible root cause(s)
The virtual representation of the phase rotation for an unbalanced system appears negative	• Single phase loads. • Unbalanced line short circuits and open conductors. • Unbalanced phase-to-phase or phase-to-neutral loads.

6.2.5 Zero sequence voltage

Configure > Parameters > Generator > Voltage protections > Zero sequence voltage

Reason	Possible root cause(s)
The vector zero value (star point) is displaced	An earth fault.

6.2.6 Over-current

Configure > Parameters > Generator > Current protections > Over-current #, where # is 1 or 2.

Reason	Possible root cause(s)
High current from the generator	• The generator is supplying a large load. • There is a large capacitive or inductive load. • A motor with a high start current attempted to start. • If load sharing is used, the generator is supplying too much of the load. • One or more other generators tripped.
The controller configuration is incorrect	• The nominal generator current is too low.* • The alarm set point is too low.* • The current transformers are configured incorrectly in the controller.*

*Note: This problem should not occur after commissioning.

6.2.7 Fast over-current

Configure > Parameters > Generator > Current protections > Fast over-current #, where # is 1 or 2.

Reason	Possible root cause(s)
High current from the generator	• A motor with a high start current attempted to start. • There is a short circuit.

6.2.8 Current unbalance

Configure > Parameters > Generator > Current protections > Current unbalance (average calc), and **Current unbalance (nominal calc)**.

Reason	Possible root cause(s)
The generator phase currents are unbalanced	• The generator is faulty. • There is a relatively big load on one phase. Check for **Voltage unbalance**.

6.2.9 Inverse time over-current

Configure > Parameters > Generator > Current protections > Inverse time over-current

See **Over-current** for reasons and possible root causes for this alarm.

6.2.10 Directional over-current

Configure > Parameters > Generator > Current protections > Directional over-current #, where # is 1 or 2.

If the set point is positive, see **Over-current** for reasons and possible root causes for this alarm.

If the set point is negative, see **Reverse power** for reasons and possible root causes for this alarm.

6.2.11 Negative sequence current

Configure > Parameters > Generator > Current protections > Negative sequence current

Reason	Possible root cause(s)
The virtual representation of the phase rotation for an unbalanced system appears negative	• Single phase loads. • Unbalanced line short circuits and open conductors. • Unbalanced phase-to-phase or phase-to-neutral loads.

6.2.12 Zero sequence current

Configure > Parameters > Generator > Current protections > Zero sequence current

Reason	Possible root cause(s)
The vector zero value (star point) is displaced	An earth fault.

6.2.13 Over-frequency

Configure > Parameters > Generator > Frequency protections > Over-frequency #, where # is 1 or 2.

Reason	Possible root cause(s)
High frequency from the generator	• The governor set point is incorrect. • For relay control, the governor **Down** relay stops working. • The generator nominal speed is too high.* • The governor regulation tuning is incorrect.* • The governor is faulty.*
The controller configuration is incorrect	• The nominal generator frequency is too low.* • The alarm set point is too low.*

*Note: This problem should not occur after commissioning.

6.2.14 Under-frequency

Configure > Parameters > Generator > Frequency protections > Under-frequency #, where # is 1 or 2.

Reason	Possible root cause(s)
Low frequency from the generator	• The governor set point is incorrect. • The governor is faulty. • The engine is failing, running out of fuel, or had a blocked fuel filter. • For relay control, the governor **Up** relay stops working. • The generator nominal speed is too low.* • The governor regulation tuning is incorrect.*
The controller configuration is incorrect	• The nominal generator frequency is too high.* • The alarm set point is too high.*

*Note: This problem should not occur after commissioning.

6.2.15 Overload

Configure > Parameters > Generator > Power protections > Overload #, where # is 1 or 2.

Reason	Possible root cause(s)
High power from the generator	• The generator is supplying too much load. • If load sharing is used, the generator is supplying too much of the load. • A partial short circuit. • A short circuit.
The controller configuration is incorrect	• The nominal generator power is too low.* • The alarm set point is too low.*

*Note: This problem should not occur after commissioning.

6.2.16 Reverse power

Configure > Parameters > Generator > Power protections > Reverse power, where # is 1 or 2.

Reason	Possible root cause(s)
Power flows to the generator immediately after synchronisation	The engine was running too slowly when the breaker closed.
Power flows to the generator during normal operation	• The engine is failing, or running out of fuel. • The governor is faulty. • The governor set point is incorrect. • The governor regulation tuning is incorrect.*

*Note: This problem should not occur after commissioning.

6.2.17 Over-excitation

Configure > Parameters > Generator > Reactive power protections > Over-excitation #, where # is 1 or 2.

Reason	Possible root cause(s)
High reactive power from the generator	• The generator is supplying a large reactive load. • If reactive power load sharing is used, the generator is supplying too much of the reactive load. • For relay control, the AVR **Down** relay stops working. • The AVR set point is incorrect. • The AVR is faulty. • The AVR regulation tuning is incorrect.*
The controller configuration is incorrect	• The nominal generator power factor is too high.* • The alarm set point is too low.*

*Note: This problem should not occur after commissioning.

6.2.18 Under-excitation

Configure > Parameters > Generator > Reactive power protections > Under-excitation #, where # is 1 or 2.

Reason	Possible root cause(s)
Low reactive power from the generator	• The generator is supplying a small reactive load. • If reactive power load sharing is used, the generator is supplying too little of the reactive load. • For relay control, the AVR **Up** relay stops working. • The AVR set point is incorrect. • The AVR is faulty. • The AVR regulation tuning is incorrect.*
The controller configuration is incorrect	• The nominal generator power factor is too low.* • The alarm set point is too high.*

*Note: This problem should not occur after commissioning.

6.3 Busbar AC protections

6.3.1 Over-voltage

Configure > Parameters > Busbar > Voltage protections > Over-voltage #, where # is 1 or 2.

Reason	Possible root cause(s)
High voltage on the busbar	• One of the gensets supplying the busbar has a faulty AVR. This genset supplies more reactive power (Q) than it should. • A large reactive load is suddenly disconnected.
The controller configuration is incorrect	• The nominal busbar voltage is too low.* • The alarm set point is too low.* • The voltage transformers (if applicable) are configured incorrectly in the controller.*

*Note: This problem should be detected and resolved during commissioning.

6.3.2 Under-voltage

Configure > Parameters > Busbar > Voltage protections > Under-voltage #, where # is 1 or 2.

Reason	Possible root cause(s)
Low voltage on the busbar	• One of the gensets supplying the busbar has a faulty AVR. This genset supplies less reactive power (Q) than it should. • A large reactive load is suddenly connected. • The available power is too low.
The controller configuration is incorrect	• The nominal busbar voltage is too high.* • The alarm set point is too high.* • Optional: The voltage transformers are configured incorrectly in the controller.*

*Note: This problem should not occur after commissioning.

6.3.3 Voltage unbalance

Configure > Parameters > Busbar > Voltage protections > Voltage unbalance

Reason	Possible root cause(s)
The busbar phase voltages are unbalanced	• A generator is faulty. • There is a relatively big load on one phase. Check for **Current unbalance**.

6.3.4 Over-frequency

Configure > Parameters > Busbar > Frequency protections > Over-frequency #, where # is 1 or 2.

Reason	Possible root cause(s)
High frequency on the busbar	• A large load is suddenly disconnected. • One of the gensets supplying the busbar has a faulty governor and is running too fast. This genset supplies more power (P) than it should.
The controller configuration is incorrect	• The nominal busbar frequency is too low.* • The alarm set point is too low.*

*Note: This problem should be detected and resolved during commissioning.

6.3.5 Under-frequency

Configure > Parameters > Busbar > Frequency protections > Under-frequency #, where # is 1 or 2.

Reason	Possible root cause(s)
Low frequency on the busbar	• A large load is suddenly connected. • One of the gensets supplying the busbar is slowing down, for example, due to engine failure. There may be a reverse power alarm for this genset. • One of the gensets supplying the busbar has a faulty governor. This genset supplies less power (P) than it should.
The controller configuration is incorrect	• The nominal busbar voltage is too high.* • The alarm set point is too high.* • Optional: The voltage transformers are configured incorrectly in the controller.*

*Note: This problem should not occur after commissioning.

6.4 Other AC protections

6.4.1 Earth inverse-time over-current

Configure > Parameters > 4th current > Current protections > Earth inverse time over-current

Reason	Possible root cause(s)
High earth current	There is an earth leakage.
The controller configuration is incorrect	• The nominal earth current is too low.* • The alarm set point is too low.* • The current transformers are configured incorrectly in the controller.*

*Note: This problem should not occur after commissioning.

6.4.2 Neutral inverse time over-current

Configure > Parameters > 4th current > Current protections > Neutral inverse time over-current

Reason	Possible root cause(s)
High neutral current	The phases are unbalanced.
The controller configuration is incorrect	• The nominal neutral current is too low.* • The alarm set point is too low.* • The current transformers are configured incorrectly in the controller.*

*Note: This problem should not occur after commissioning.

6.5 Breaker alarms

6.5.1 GB opening failure

Configure > Parameters > Breakers > Generator breaker > Opening failure

Reason	Possible root cause(s)
Breaker not opened	• The breaker is faulty and did not open. • The breaker is unavailable and did not open.
Breaker opened	• The breaker open feedback is faulty. Check for **GB position failure**.

6.5.2 GB closing failure

Configure > Parameters > Breakers > Generator breaker > Closing failure

Reason	Possible root cause(s)
Breaker not closed	• The breaker internal protection stopped the breaker from closing. • The breaker is faulty and did not close. • The breaker is unavailable and did not close.
Breaker closed	• The breaker closed feedback is faulty. Check for **GB position failure**.

6.5.3 GB position failure

Configure > Parameters > Breakers > Generator breaker > Position failure

Reason	Possible root cause(s)
Two, or zero breaker feedbacks	• The breaker is faulty. • The breaker feedback(s) are faulty. Check for **GB opening failure** and **GB closing failure**. • The breaker feedback wiring is incorrect.* • The breaker feedback configuration in the controller is incorrect.*

*Note: This problem should not occur after commissioning.

6.5.4 GB tripped (external)

Configure > Parameters > Breakers > Generator breaker > Tripped (external)

Reason	Possible root cause(s)
The breaker opened without an open signal from the controller	• The operator opened the breaker. • The breaker internal protection opened the breaker. • External protection equipment opened the breaker.

6.5.5 Short circuit

Configure > Parameters > Breakers > Generator breaker > Short circuit

Reason	Possible root cause(s)
The controller's short circuit digital input is activated	• The breaker internal protection opened the breaker. • The breaker short circuit wiring is incorrect.* • The breaker short circuit configuration in the controller is incorrect.*

*Note: This problem should not occur after commissioning.

6.5.6 GB configuration failure

Digital inputs are not configured for one or both breaker feedback functions. You cannot change the parameters for this alarm. This problem should not occur after commissioning.

6.6 Synchronisation check

6.6.1 Phase sequence error terminal A (generator)

Configure > Parameters > AC configuration > Generator > Phase sequence error

Reason	Possible root cause(s)
The phase angle differs from the expected angle by more than ±40°	• The phase rotation is incorrect.* • The voltage measurement wiring is incorrect.* • The phase rotation configured in the controller is incorrect.*

*Note: This problem should not occur after commissioning.

6.6.2 Phase sequence error terminal B (busbar)

Configure > Parameters > AC configuration > Busbar > Phase sequence error

Reason	Possible root cause(s)
The phase angle differs from the expected angle by more than ±40°	• The phase rotation is incorrect.* • The voltage measurement wiring is incorrect.* • The phase rotation configured in the controller is incorrect.*

*Note: This problem should not occur after commissioning.

6.6.3 Vector mismatch

Configure > Parameters > Synchronisation > Alarms > Vector mismatch

Reason	Possible root cause(s)
During synchronisation, the differences in the phase angles on either side of the breaker is more than the set point	• The load is unbalanced, with a relatively big load on one phase.

6.6.4 Voltage or frequency not OK

Configure > Parameters > AC configuration > Generator > Voltage or frequency not OK

Reason	Possible root cause(s)
During synchronisation, the generator voltage and/or frequency are not within the required range	• See **Generator over-voltage**, **Generator under-voltage**, **Generator over-frequency** and **Generator under-frequency**.

6.6.5 GB synchronisation failure

Configure > Parameters > Breakers > Generator breaker > Synchronisation failure

Reason	Possible root cause(s)
The generator and busbar are not synchronised within the time allowed	• The system that regulates the generator is not synchronising the generator to the busbar. • There is a problem with the generator's governor and/or AVR.

6.7 Input alarms

6.7.1 Digital inputs

Configure > Input/output > [Hardware module] > [Digital input] > Alarms

The customised digital input was activated (or de-activated).

6.7.2 Emergency stop

Configure > Input/output > [Hardware module] > [Digital input] > Functions > Alarm > Emergency stop

The emergency stop digital input was de-activated.

6.8 Non-essential loads

6.8.1 NEL over-current

Configure > Parameters > Non-essential load trip > Trip # > Over-current, where # is the NEL number (1 to 3).

See **Generator AC protections, Over-current** for reasons and possible root causes for this alarm.

6.8.2 NEL under-frequency

Configure > Parameters > Non-essential load trip > Trip # > Under-frequency, where # is the NEL number (1 to 3).

See **Busbar AC protections, Under-frequency** for reasons and possible root causes for this alarm.

6.8.3 NEL overload

Configure > Parameters > Non-essential load trip > Trip # > Overload 1 or **2**, where # is the NEL number (1 to 3).

See **Generator AC protections, Overload** for reasons and possible root causes for this alarm.

6.8.4 NEL reactive overload

Configure > Parameters > Non-essential load trip > Trip # > Reactive overload, where # is the NEL number (1 to 3).

See **Generator AC protections, Over-excitation** for reasons and possible root causes for this alarm.

6.9 ACM measurement errors

6.9.1 Generator L1-L2-L3 wire break

Configure > Parameters > AC configuration > Generator > Multiple phase wire break

The generator voltage measurements have a failure.

6.9.2 Busbar L1-L2-L3 wire break

Configure > Parameters > AC configuration > Busbar > Multiple phase wire break

The busbar voltage measurements have a failure.

6.9.3 Generator L# wire break

Configure > Parameters > AC configuration > Generator > L# wire break, where # is phases 1 to 3.

There is a voltage measurement failure on the phase.

6.9.4 Busbar L# wire break

Configure > Parameters > AC configuration > Busbar > L# wire break, where # is phases 1 to 3.

There is a voltage measurement failure on the phase.

6.10 Network alarms

6.10.1 Ethernet redundancy broken

Configure > Parameters > Utility > Network

Reason	Possible root cause(s)
No redundant Ethernet connections	• The redundant Ethernet connection is unplugged, or faulty. • The redundant Ethernet cable is damaged. • The system does not have a redundant Ethernet connection.* • The redundant Ethernet connection is plugged into the wrong hardware module. The Ethernet connections must be plugged into the PCM hardware module, and NOT into the PSM hardware module.*

*Note: This problem should not occur after commissioning.

6.10.2 Modbus communication timeout

Configure > Parameters > Utility > Network > Modbus communication timeout

Reason	Possible root cause(s)
Modbus communication is lost	• There are no Modbus requests within the alarm's delay time. • There is a problem with the network connection.

See **Ethernet redundancy broken** for more information about network connections.

6.11 Hardware alarms

6.11.1 System not OK

There is a problem with one of the hardware modules in the controller. You cannot change the parameters for this alarm.

6.11.2 Controller temperature too high

The controller internal temperature is higher than 80 °C (176 °F). You cannot change the parameters for this alarm.

6.11.3 PCM clock battery failure

The clock battery in PCM3.1 needs to be replaced. You cannot change the parameters for this alarm.

6.11.4 PSM 1 supply voltage high

Configure > Parameters > Power supply > PSM 1 > High voltage alarm

Reason	Possible root cause(s)
The controller power supply voltage is too high	• The DC power supply is faulty.

6.11.5 PSM 1 supply voltage low

Configure > Parameters > Power supply > PSM 1 > Low voltage alarm

The controller power supply voltage is too low.

Reason	Possible root cause(s)
The controller power supply voltage is too low	• The DC power supply is faulty. • The DC power supply is overloaded. • The battery power supply system is drained.

6.11.6 Software mismatch on hardware module(s)

One or more of the hardware modules in the controller have a software version installed that differs from the expected version. You cannot change the parameters for this alarm.

6.11.7 Required IO card(s) not found

One or more of the default hardware modules for the controller were not found. You cannot change the parameters for this alarm.

7. Maintenance

7.1 PCM3.1 internal battery

7.1.1 Changing the battery

The controller has a replaceable battery located in the PCM3.1 module. When the power is low or fails on this battery, a battery failure alarm is activated. To replace the battery you need to remove the PCM module.

See **Processor and communication module PCM3.1**, **PCM3.1 technical specifications** in the Data sheet for more information regarding the type of battery.

Legal

INFO
The manufacturer's warranty will not apply if the rack has been opened by unauthorised persons. However, you are allowed to replace the battery on the PCM3.1 module. To retain the warranty, the battery must be replaced by a qualified person, in accordance with these written instructions.

Safety: Hazardous live currents and voltages

DANGER!
Hazardous live currents and voltages may be present in a rack that is already installed. Contact with these could kill you. Only authorised personnel, who understand the precautions needed and the risks involved in working with live electrical equipment, may do this work.

Safety: Disrupting control

DANGER!
Working on the rack may disrupt the control of the generator, busbar or connection. Take the necessary precautions.

Protecting equipment: No hot swapping

CAUTION
Disconnect all power supplies before replacing the battery.

Electrostatic precautions

CAUTION
Protect the hardware modules against static discharge during the battery replacement.

Replacing the battery

1. Disconnect the power supply to protect the hardware modules and personnel.
2. Test the resistance of the wrist strap and the resistance of the wrist strap connection. Do not continue if the wrist strap connection is faulty. Use the wrist strap at all times while replacing the battery to protect against static discharge.

3. Remove the PCM3.1 hardware module from the rack:
   a. Remove the terminal blocks, and make sure that there are no wires in the way of removing the hardware module.
      • Disconnect any Ethernet cables from the top, middle or bottom of the hardware module.
   b. Loosen the hardware module faceplate screws using a screwdriver with a TX20 bit.
      • Do not force the screws to unscrew completely. The screws are built-in and therefore normally remain attached to the faceplate.
   c. Use pliers to pull the faceplate screws, and carefullly slide the hardware module out of the rack.
      • Only pull the screws. Do not pull any other part of the faceplate.
   d. Hold the hardware module by the faceplate when handling.
   e. Remove the old battery from the holder, taking care not to damage any components.
   f. Insert the correct replacement battery in the correct polarity into the holder, taking care not to damage any components.
4. Replace the PCM3.1 hardware module to the rack:
   a. Hold the PCM3.1 only by its faceplate.
   b. Make sure that the hardware module is the right way up, and slide it back into slot 7.
      • The hardware module should slide in easily.
   c. Tighten the screws on the hardware module faceplate using a screwdriver with a TX20 bit, and 0.5 N·m (4.4 lb-in) of torque.

INFO
After replacing the battery, check that the date and time settings are correct.

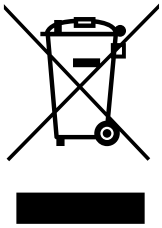
See **Processor and communication module PCM3.1**, **PCM3.1 technical specifications** in the Data sheet for more information regarding the type of battery.

8. End-of-life

8.1 Disposal of WEEE

8.1.1 Disposal of waste electrical and electronic equipment

WEEE symbol



All products that are marked with the crossed-out wheeled bin (the WEEE symbol) are electrical and electronic equipment (EEE). EEE contains materials, components and substances that can be dangerous and harmful to people's health and to the environment. Waste electrical and electronic equipment (WEEE) must therefore be disposed of properly. In Europe, the disposal of WEEE is governed by the WEEE directive issued by the European Parliament. DEIF complies with this directive.

You must not dispose of WEEE as unsorted municipal waste. Instead, WEEE must be collected separately, to minimise the load on the environment, and to improve the opportunities to recycle, reuse and/or recover the WEEE. In Europe, local governments are responsible for facilities to receive WEEE. If you need more information on how to dispose of DEIF WEEE, please contact DEIF.

9. Glossary

9.1 Terms and abbreviations

9.1.1 Terms and abbreviations

Term	Abbreviation	Explanation
Action		The pre-defined set of actions that an alarm initiates. Also known as fail class.
Alternating current	AC	
Breaker		A mechanical switching device that closes to connect the generator to the busbar. The breaker opens to disconnect the generator.
Busbar		The copper conductors which connect the power sources to the power consumers. Represented on the single-line diagram as the line that connects all the power sources and power consumers. If the bus tie breaker is open, there are two separate and independent busbar sections. Similarly, if the bus tie breaker is closed, there is only one busbar.
Commissioning		The careful and systematic process that takes place after installation and before the system is handed over to the operator. Commissioning must include checking and adjusting the controller.
Configuration		Assigning input and output functions to terminals, and setting parameters, so that the controller is suitable for the application where it is installed.
Connected		A generator is connected to the system if it is running, synchronised with the busbar, and its breaker is closed.
Controller		DEIF equipment that measures system conditions and then uses outputs to make the system respond appropriately.
Digital input	DI	Terminals on a controller hardware module that the controller uses to measure a digital input. A pre-configured digital input function or alarm can be assigned to the input.
Digital output	DO	Terminals on a controller hardware module that the controller uses to send a digital output. A pre-configured digital output function can be assigned to the output.
Direct current	DC	
Generator breaker	GB	The breaker between a genset and the busbar. The controller can control a generator breaker.
Horn output		The controller's digital output(s) that can be connected to a horn, a siren, lights, or other equipment. This alerts the operator that one or more alarms are activated.
Inhibit		A pre-defined condition that inhibits the alarm action. For example, for the inhibit ACM wire break, if the controller detects a wire break on the voltage measurements, the voltage unbalance alarm is prevented from occurring. Inhibited alarms are not shown in the alarm display.
Input output module 3.1	IOM3.1	A replaceable PCB, with four relay outputs, and 10 digital inputs. Used in the DEIF controller.
Latch		An extra layer of protection that keeps the alarm action activated. When the alarm is not active and acknowledged, it can be unlatched.
Light emitting diode	LED	Used to show the controller and equipment status and alarms.
Liquid crystal display	LCD	The screen of the display unit. The information displayed varies, depending on the controller mode, the equipment operation and the operator input.

Term	Abbreviation	Explanation
Module		A standardised, replaceable printed circuit board that is mounted in the rack. For example, PSM3.1 is a hardware module that supplies power to the rest of the rack.
Nominal setting	nom or NOM	Defines the expected voltage and frequency for the system, along with each power source's maximum load and current. Many of the controller's alarms are based on percentages of the nominal settings.
Non-essential load	NEL	A load that is not critical to the system. These may be disconnected by the controller in the event of over-load, over-current, or busbar under-current.
Out of service		A state that an alarm can be assigned to by an operator. Out of service alarms are inactive alarms. Out of service alarms do not automatically return to service and require operator action.
Parameter		A value, or set point, used to determine the controller's operation. Parameters include nominal values, the configuration options for the configurable inputs and outputs, and alarm settings. The same set of parameters can be uploaded to several controllers.
Personal computer	PC	Used to run the PICUS software. For example, a laptop computer.
Power	P	The 3-phase active power, measured in kW.
Power in Control Utility Software	PICUS	The DEIF utility software, used to design, configure, troubleshoot and monitor a system.
Power supply module 3.1	PSM3.1	A replaceable PCB that powers the controller. This module includes three relay outputs for status signals. Used in the DEIF controller.
Printed circuit board	PCB	Supports and electrically connects components.
Shelve		A temporary state that an alarm can be assigned to by an operator. Shelved alarms are inactive alarms, but only for a selected period by the operator. When the period of time expires, the alarm is automatically unshelved by the system restoring the alarm to the previous alarm state. Alarm conditions are checked again.
Switchboard		The cabinet where the power sources are connected to the power consumers. See Busbar too.
Third-party equipment		Equipment other than the DEIF controller. For example: The genset, the genset engine control system, the wiring, the busbars, and the switchboard.
Time	t	
Trip		An emergency or fast opening of a breaker. No attempt is made to de-load the breaker before it opens.
Voltage	V	Electrical potential difference. U is used as an abbreviation for voltage in most of Europe, Russia and China.
Voltage and frequency	V & Hz	For certain controller actions, both the voltage and frequency must be within the specified range. For example, for busbar OK, or to start synchronising a genset to the busbar.

9.2 Units

The table below lists the units used in the documentation, as well as the US units where these are different. In the documentation, the US units are given in brackets, for example, 80 °C (176 °F).

Table 9.1 Units used in the documentation

Unit	Name	Measures	US unit	US name	Conversion	Alternative units
A	ampere	Current				
bar	bar	Pressure	psi	pounds per square inch	1 bar = 14.5 psi	1 bar = 0.980665 atmosphere (atm) 1 bar = 100,000 Pascal (Pa)
ºC	degrees Celsius	Temperature	ºF	Fahrenheit	T[ºC] = (T[ºF] - 32 º) × 5 / 9	T[ºC] = T[Kelvin (K)] - 273.15
dB	decibel	Noise or interference (a logarithmic scale)				
g	gram	Weight	oz	ounce	1 g = 0.03527 oz	
g	gravitational force	Gravity, g = 9.8 m/s^2	ft/s^2		g = 32.2 ft/s^2	
h	hour	Time				
Hz	hertz	Frequency (cycles per second)				
kg	kilogram	Weight	lb	pound	1 kg = 2.205 lb	
kPa	kilopascal	Pressure	psi	pounds per square inch	1 kPa = 0.145 psi	
m	metre	Length	ft	foot (or feet)	1 m = 3.28 ft	
mA	milliampere	Current				
min	minute	Time				
mm	millimetre	Length	in	inch	1 mm = 0.0394 in	
ms	millisecond	Time				
N·m	newton metre	Torque	lb-in	pound-force inch	1 N·m = 8.85 lb-in	
RPM	revolutions per minute	Frequency of rotation (rotational speed)				
s	second	Time				
V	volt	Voltage				
V AC	volt (alternating current)	Voltage (alternating current)				
V DC	volt (direct current)	Voltage (direct current)				
W	watt	Power				
Ω	ohm	Resistance				

9.3 Symbols

9.3.1 Symbols for notes

Safety notes

DANGER!
This highlights dangerous situations. If the guidelines are not followed, these situations could result in death, serious personal injury, and equipment damage or destruction.

CAUTION
This highlights potentially dangerous situations. If the guidelines are not followed, these situations could result in personal injury or damaged equipment.

General notes

INFO
This highlights general information.

This highlights where to find more information.

Example heading

This highlights examples.

9.3.2 Display unit symbols

Symbol	Symbol name
	Controller power OK
	Self-check OK
	Ready for operation
	Alarm
	Horn silence
	Soft key
	Up

Symbol	Symbol name
	OK
	Down
	Back
	Help
	Breaker is closed
	Breaker is open