



Operator's manual

4000

Instrumentation

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Preface	3
Functions	3
Instrument panel	5
Display navigation	6
Overview of measured values for the generator	6
Overview of measured values for the electrical power network.	8
Detailed measured values for the generator .	10
Detailed measured values for the electrical power network	11
Monitored current	13
Detailed analogue input measured values . . .	14
Digital inputs and outputs	15
Digital inputs and outputs 1-8.	16
Digital inputs and outputs 9-16.	17
J1939	18
Messages from J1939	20
Time and date	21
Counter	22
Start counter	23
Inspection indicator.	24
Alarm messages	25
The four sub views of the display	26
Measured values	26
Messages	26
Operation.	27
Display buttons	27
Operating modes	28
Display buttons for selecting operating mode	28
Stop operating mode	28
Automatic operating mode	28
Manual operating mode	30
Components in the central electric unit	32

Preface

This Operator's manual describes operation of instrument panel 4000. The information was correct at the time of going to press. Scania reserves the right to make alterations without prior notice.

Note:

This Operator's manual describes a generator set that is equipped with all available options. Ignore inputs and outputs, functions, views and other details not found on your generator set.

This Operator's manual is for guidance only; this is because the large number of parameter settings does not make it possible to describe every possible combination.

Note:

Always use Scania spare parts for repair work.

Functions

Instrument panel 4000 is a microcontroller-based instrument panel used to start and stop the generator set manually or automatically via an external signal.

The instrument panel runs and monitors parameters to ensure trouble-free operation of the generator set. The instrument panel display displays the operational status and display messages.

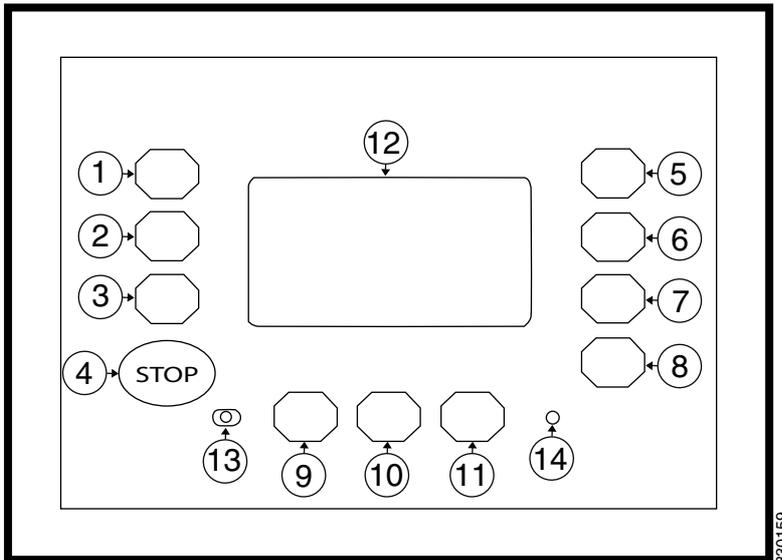
Instrument panel 4000 has the following functions:

- Operates the generator set.
- Protects the engine and generator.
- Measures engine data: oil pressure and temperature, coolant temperature, battery voltage, engine speed, inspection etc.
- Measures generator data: voltage, current, power, etc.
- Starts the engine.
- Displays alarms, trips the miniature circuit breakers and switches off the engine.
- With the generator set in standby mode: starting the generator set automatically when a power failure is detected on the electrical power network.

- Communicating with the engine control unit via CAN for diagnostics and prognostics.

Instrument panel

The illustration below displays the instrument panel with switches, indicator lamps and display.



330159

Item	Function
1-3 and 5-11	Display buttons with functions dependent on the operating mode selected.
4	The STOP switch is always active and switches off the generator set engine when it is pressed.
12	The display contains display buttons and displays measured values, operating mode and display messages.
13	The left-hand indicator lamp indicates that the instrument panel is in operating mode stop.
14	The right-hand indicator lamp indicates that there are alarm messages in the instrument panel.

Display navigation

The information content comprises different views.

The display buttons that are available in each view are described below.

Overview of measured values for the generator

This view is displayed on start up and is available in all application modes.

The generator symbol G located at the top of the display in front of the frequency value, indicates that the generator measured values are being displayed.



 330125	Navigate to the next view.
 330124	Display the main menu.
 330126	Display generator voltages (between phases and between phase and neutral conductor).
 330127	Display unacknowledged alarm messages.
 330128	Acknowledge display messages and cancel the alarm signal. Only displayed if the alarm indicator lamp is flashing.
 330129	Start or switch off the engine. Only displayed in manual operating mode.
 330130	Open or close the circuit breaker in the generator set or in the automatic transfer switch. Only displayed in manual operating mode.

 330131	Switch to automatic operating mode.
 330132	Switch to manual operating mode.
 330133	Switch to operating mode stop.

Overview of measured values for the electrical power network

This view is only available in the application modes that include the opening and closing of the circuit breaker in the generator set and in the automatic transfer switch.

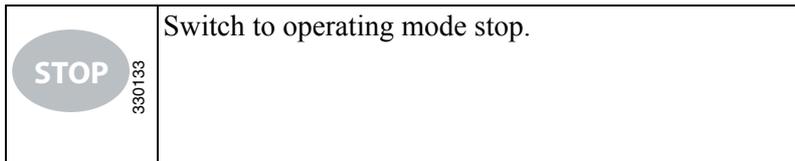
This view is displayed when the display button for next view is pressed.

The network symbol, which is located at the top of the display in front of the frequency value, indicates that the network measured values are being displayed.



Measured values for the electrical power network

 330125	Navigate to the next view.
 330134	Navigate to the previous view.
 330126	Display mains voltages (between phases and between phase and neutral conductor).
 330127	Display unacknowledged alarm messages.
 330129	Start or switch off the engine. Only displayed in manual operating mode.
 330130	Open or close the circuit breaker in the generator set or in the automatic transfer switch. Only displayed in manual operating mode.
 330181	Switch to automatic operating mode.
 330132	Switch to manual operating mode.



Detailed measured values for the generator

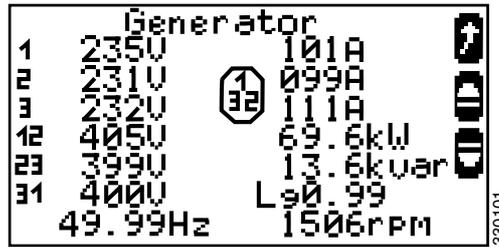
This view is available in all application modes.

This view is displayed when the display button for next view is pressed.

All generator measured values are displayed.

Note:

The view may deviate from this example (3-phase with neutral conductor), depending on the configured system.



Detailed measured values for the generator

 330125	Navigate to the next view.
 330134	Navigate to the previous view.
 330135	Return to the Home view.
 330133	Switch to operating mode stop.
1/2/3	Displays generator voltages $V_{L1N}/V_{L2N}/V_{L3N}$ and generator currents $I_{L1}/I_{L2}/I_{L3}$.
12/23/31	Displays generator voltages $V_{L12}/V_{L23}/V_{L31}$.
00.00Hz	Displays generator frequency.
000kW	Displays actual generator output.
000kvar	Displays reactive generator output.
1.00	Displays generator output factor = 1.
Lg0.00	Displays generator output factor (inductive load).
Ld0.00	Displays generator output factor (leading).
 330136	Displays the phase rotation clockwise.
 330137	Displays the phase rotation anticlockwise.

Detailed measured values for the electrical power network

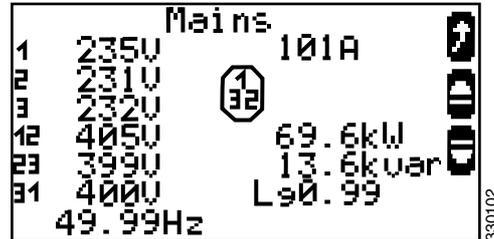
This view is only available in the application modes that include the opening and closing of the circuit breaker in the generator set and in the automatic transfer switch.

This view is displayed when the display button for next view is pressed.

All network measured values are displayed.

Note:

The view may deviate from this example (3-phase with neutral conductor), depending on the configured system.



Detailed measured values for the electrical power network

 330125	Navigate to the next view.
 330134	Navigate to the previous view.
 330135	Return to the Home view.
 330133	Switch to operating mode STOP.
1/2/3	Displays mains voltages $V_{L1N}/V_{L2N}/V_{L3N}$ and prospective currents $I_{L1}/I_{L2}/I_{L3}$.
12/23/31	Displays mains voltages $V_{L12}/V_{L23}/V_{L31}$.
00.00Hz	Displays mains frequency.
000kW	Displays actual mains output.
000kvar	Displays reactive mains output.
1.00	Displays generator output factor = 1.
Lg0.00	Displays generator output factor (inductive load).
Ld0.00	Displays generator output factor (leading).
 330136	Displays the phase rotation clockwise.

	Displays the phase rotation anticlockwise.
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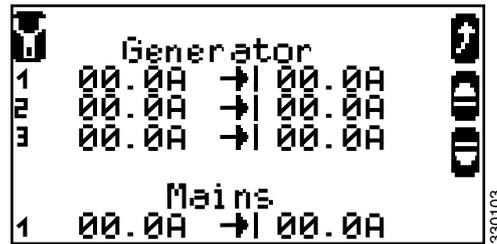
Monitored current

This view is available in all operating modes.

This view is displayed when the display button for next view is pressed.

The value to the right of the arrow symbol displays the maximum current measured by the instrument panel.

If the instrument panel is configured to monitor ground current no network current value is displayed here.



Monitored current

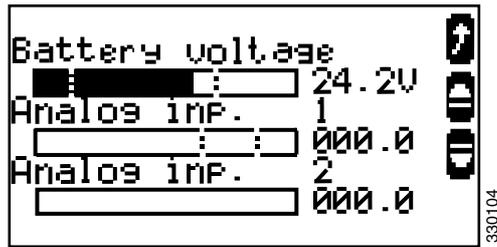
 330125	Navigate to the next view.
 330134	Navigate to the previous view.
 330135	Return to the Home view.
 330138	The actual measured value is displayed to the left of the arrow symbol. The maximum measured value is displayed to the right of the arrow symbol.
 330139	Zero the maximum measured value.
 330133	Switch to operating mode stop.
1/2/3	Displays generator currents $I_{L1}/I_{L2}/I_{L3}$ and network current I_L .

Detailed analogue input measured values

This view is available in all operating modes.

This view is displayed when the display button for next view is pressed.

The analogue input measured values are displayed graphically and numerically.



Detailed analogue input measured values

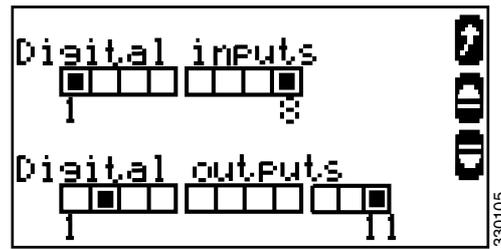
 330125	<p>Navigate to the next view.</p>
 330134	<p>Navigate to the previous view.</p>
 330135	<p>Return to the Home view.</p>
 330133	<p>Switch to operating mode stop.</p>

Digital inputs and outputs

This view is available in all application modes.

This view is displayed when the display button for next view is pressed.

The status of digital inputs and outputs is displayed.



Digital inputs and outputs

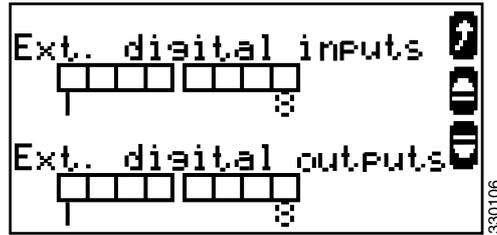
 330125	Navigate to the next view.
 330134	Navigate to the previous view.
 330135	Return to the Home view.
 330133	Switch to operating mode stop.
	Displays the status of digital inputs and outputs. The configuration of the input determines how the instrument panel reacts. If the input is configured as normally open it will react when it is energised. If the input is configured as normally closed it will react when it is de-energised.
 330141	Displays that a digital input is energised or that a digital output is active.
 330140	Displays that a digital input is de-energised or that a digital output is inactive.

Digital inputs and outputs 1-8

This view is available in all operating modes.

This view is displayed when the display button for next view is pressed if an external expansion board has been connected to the instrument panel.

The status of digital inputs and outputs 1-8 is displayed.



Digital inputs and outputs 1-8

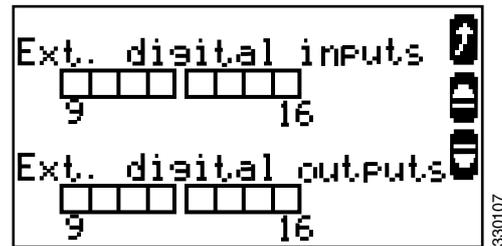
 330125	Navigate to the next view.
 330134	Navigate to the previous view.
 330135	Return to the Home view.
 330133	Switch to operating mode stop.
	Displays the status of digital inputs and outputs 1-8. The configuration of the input determines how the instrument panel reacts. If the input is configured as normally open it will react when it is energised. If the input is configured as normally closed it will react when it is de-energised.
 330141	Displays that a digital input is energised or that a digital output is active.
 330140	Displays that a digital input is de-energised or that a digital output is inactive.

Digital inputs and outputs 9-16

This view is available in all operating modes.

This view is displayed when the display button for next view is pressed if another external expansion board has been connected to the instrument panel.

The status of digital inputs and outputs 9-16 is displayed.



Digital inputs and outputs 9-16

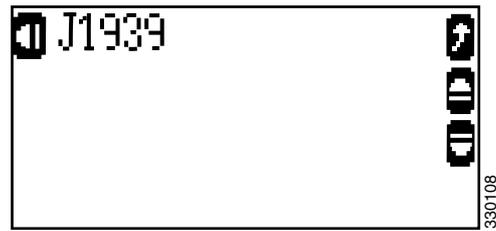
 330125	Navigate to the next view.
 330134	Navigate to the previous view.
 330135	Return to the Home view.
 330133	Switch to operating mode stop.
	Displays the status of digital inputs and outputs 9-16. The configuration of the input determines how the instrument panel reacts. If the input is configured as normally open it will react when it is energised. If the input is configured as normally closed it will react when it is de-energised.
 330141	Displays that a digital input is energised or that a digital output is active.
 330140	Displays that a digital input is de-energised or that a digital output is inactive.

J1939

This view is available in all operating modes.

This view is displayed when the display button for next view is pressed if a control unit is configured.

This allows access to a submenu that displays a list of messages from the instrument panel according to the J1939 standard for CAN communication.



J1939

 330142	<p>Go to the display of messages from the instrument panel.</p>
 330125	<p>Navigate to the next view.</p>
 330134	<p>Navigate to the previous view.</p>
 330135	<p>Return to the Home view.</p>
 330133	<p>Switch to operating mode stop.</p>

If the parameters ECU remote controlled and Device type are configured to S6 Scania this view is displayed.

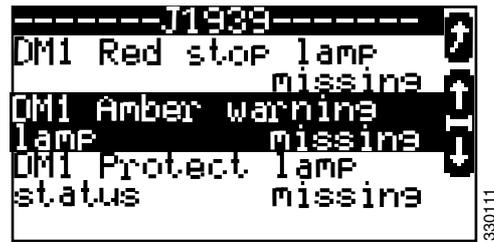
 <p>330139</p>	<p>Reset instrument panel flash codes.</p>	 <p>J1939</p>
 <p>330139</p>	<p>Display instrument panel flash codes.</p>	
 <p>330140</p>  <p>330141</p>	<p>Indicate the flash code visually.</p>	

Messages from J1939

This view is available in all operating modes.

This view is displayed when the display button on the top left of the J1939 view is pressed.

All messages that have been sent from the instrument panel are displayed.



Messages from J1939

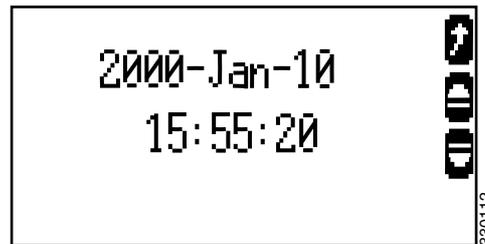
 330135	Return to the J1939 view.
 330143	Scroll up to the previous message.
 330144	Scroll down to the next message.

Time and date

This view is available in all operating modes.

This view is displayed when the display button for next view is pressed.

The date and time are displayed.



Date and time

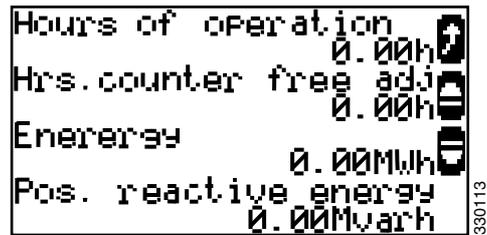
 330125	Navigate to the next view.
 330134	Navigate to the previous view.
 330135	Return to the Home view.

Counter

This view is available in all operating modes.

This view is displayed when the display button for next view is pressed.

All counters are displayed.



Counter

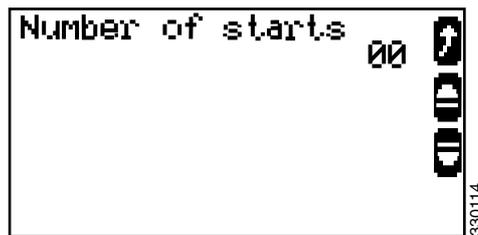
 330125	Navigate to the next view.
 330134	Navigate to the previous view.
 330135	Return to the Home view.
 330138	Switch to operating mode stop.

Start counter

This view is available in all operating modes.

This view is displayed when the display button for next view is pressed.

The counter displays the total number of starts.



Start counter

 330125	Navigate to the next view.
 330134	Navigate to the previous view.
 330135	Return to the Home view.
 330133	Switch to operating mode stop.
00	Total number of starts

Inspection indicator

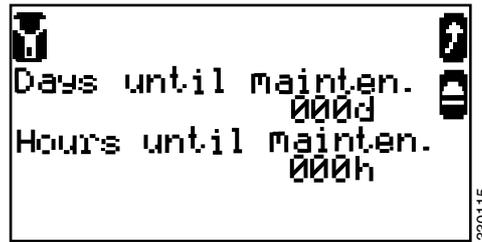
This view is available in all operating modes.

This view is displayed when the display button for next view is pressed.

The days/hours remaining until the next inspection are displayed.

If the date of the inspection has passed Maintenance overdue xxxd/xxxh is displayed.

A maximum of 999 days/999 hours since inspection are displayed.



Inspection indicator

 330125	Navigate to the previous view.
 330135	Return to the Home view.
 330139	Navigate to the Maintenance Reset view to reset the day and hour counters to the configured inspection intervals. The function is only available if the parameter Code level for reset maintenance is configured to the necessary access level.
 330133	Switch to operating mode STOP.
Days until mainten. 000d.	Days remaining until the next inspection. When the day counter reaches 000 an alarm message, to inspect the generator set, is sent. Reset the day counter when the requested inspection has been performed.
Hours until mainten. 000h	Hours remaining until the next inspection. When the time counter reaches 000 an alarm message, to inspect the generator set, is sent. Reset the day counter when the requested inspection has been performed.

Alarm messages

This view is available in all operating modes.

This view is displayed when the display button with the exclamation mark symbol on the home view is pressed.

Displays all the alarm messages that have not been acknowledged.

Each alarm message is displayed on two rows. The first row contains the alarm message and the second row displays the date and time of the alarm in the format month-day-hour-minute-second.



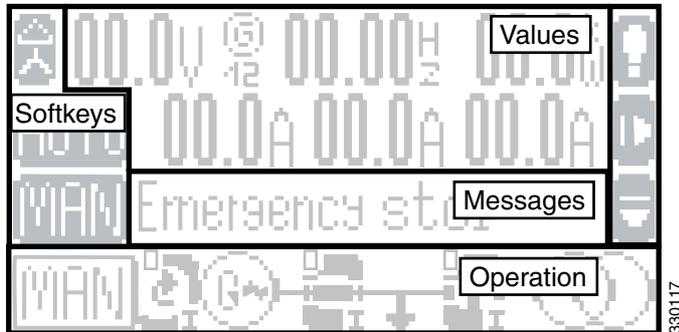
Alarm messages

The exclamation mark symbol indicates that the cause of the alarm persists.

<p>330135</p>	Return to the Home view.
<p>330143</p>	Scroll up to the next alarm message.
<p>330144</p>	Scroll down to the next alarm message.
<p>330128</p>	<p>Acknowledge the selected alarm message (inverted display). This is only possible if the cause of alarm no longer persists.</p> <p>If an alarm cause persists, and the alarm indicator lamp is flashing, the alarm signal is interrupted and the alarm is marked as acknowledged.</p>

The four sub views of the display

The display is divided into four sub views: Values, Softkeys, Messages and Operation.



The four sub views of the display

Measured values

The Values sub view displays voltages, frequencies and outputs.



Measured values

Messages

The Messages sub view displays all active alarm messages and the current operating mode.



Messages

Operation

The Operation sub view contains a line chart for the application mode that shows the current status of the circuit breaker in the automatic transfer switch and in the generator set.

In this sub view there are display buttons for manual operation of the generator set.



Operation

Display buttons

The Softkeys sub view allows navigation between views, levels and operating modes.



Display buttons

Operating modes

Display buttons for selecting operating mode

Press one of the display buttons AUTO, MAN or STOP to select operating mode.

Depending on the selected application, various display buttons are activated or deactivated.

If stop operating mode is selected, the indicator lamp next to the switch is on.

Note:

If the instrument panel is configured so that only one operating mode is possible, these display buttons are not displayed and the operating mode cannot be changed.



Display buttons for selecting operating mode

Stop operating mode

When stop operating mode has been selected the generator set engine is switched off.

Automatic operating mode

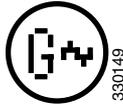
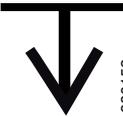
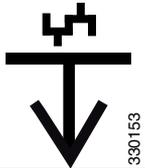
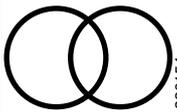
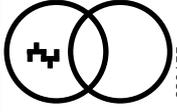
In automatic operating mode all functions for the engine and for the circuit breaker in the generator set and in the automatic transfer switch are carried out automatically by the instrument panel.

The function of the instrument panel depends on its configuration and how external signals are processed.



The following states are indicated in the line chart.

Engine		The engine is switched off.
--------	--	-----------------------------

		The engine is running.
Generator		The generator protection is not active (engine protection delay).
		The generator is not delivering voltage.
		The generator is delivering voltage within limits.
Circuit breaker in the generator set		The circuit breaker in the generator set is closed.
		The circuit breaker in the generator set is open.
Busbar		The busbar is not live (deactivated).
		The busbar is live (activated).
Circuit breaker in the automatic transfer switch		The circuit breaker in the automatic transfer switch is closed.
		The circuit breaker in the automatic transfer switch is open.
Electrical power network		The ordinary electrical power network is not delivering voltage.
		The ordinary electrical power network is delivering voltage within limits.

Manual operating mode

In manual operating mode the display buttons are activated for manual operation of the generator set and the circuit breakers in the automatic transfer switch and generator set.

The symbols "0" and "I" indicate whether a start or stop command is activated for the engine, and whether an open or close command is activated for each circuit breaker.



Manual operating mode

Engine

Press the left-hand display button to start the engine.

- If the engine starts, the arrow in the display button rotates, the ~ symbol is displayed to the right of the G symbol and the gap in the circle around the G symbol closes when delayed engine monitoring has been completed.
- If the engine does not start, the I symbol flashes during startup.

Press the left-hand display button to shut down the engine.

- If the engine is stopped "0" is displayed continuously, the rotating arrow and the ~ symbol disappear and the gap in the circle around the G symbol returns.
- If the engine is not stopped the arrow in the display button continues to rotate, the ~ symbol is displayed and "0" continues to flash for as long as a voltage is being detected.

Circuit breakers in the generator set and automatic transfer switch respectively

Press the display button under the desired circuit breaker (in the generator set or in the automatic transfer switch) when the symbol is vertical to close the circuit.

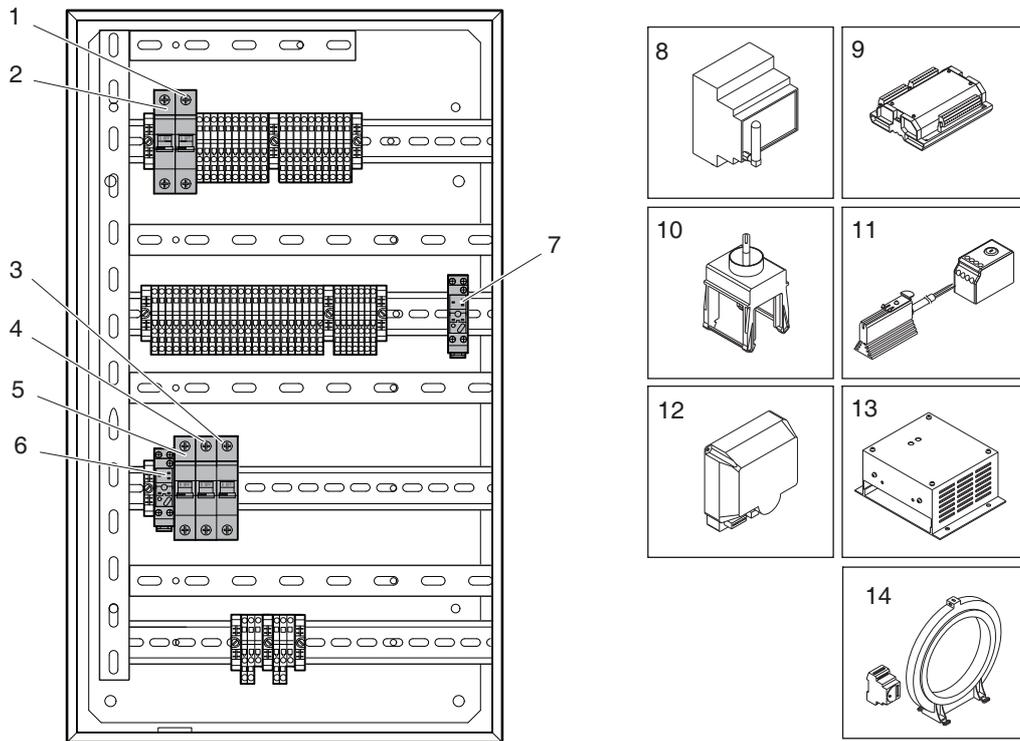
- If the circuit closes, the symbol rotates horizontally and "I" is displayed continuously in the display button.
- If the circuit does not close, the symbol remains vertical and "I" continues to flash in the display button until the circuit closes.

Press the display button under the desired circuit breaker (in the generator set or in the automatic transfer switch) when the symbol is horizontal to open the circuit.

- If the circuit opens the symbol rotates vertically and "0" is displayed continuously in the display button.
- If the circuit does not open the symbol remains horizontal and "0" continues to flash in the display button until the circuit opens.

Components in the central electric unit

The illustration below shows the location of the components inside the central electric unit. The illustration shows all options. The central electric unit ordered can therefore have other equipment.



340 157

Pos.	Designation	Description
1	MCB1	Miniature circuit breaker for engine control unit, 20 A
2	MCB2	Miniature circuit breaker for instrument panel, 10 A
3	MCB4	Miniature circuit breaker for instrument panel heating element, 2 A
4	MCB5	Miniature circuit breaker for engine heater, 6 A
5	MCB3	Miniature circuit breaker for engine heater, 10 A
6	HCR	Relay for engine heater, instrument panel heater element and generator heater
7	GRL	Relay for automatic circuit breaker
8	Netbiter WS200	Communication unit for remote connection
9	Expansion unit	16 additional inputs and outputs
10	Switch	For changing between 50/60 Hz
11	OH2/FLZ510	Heater element for instrument panel/thermostat
12	Battery charger	For 110 V electrical power network
13	Battery charger	For 220/240 V electrical power network
14	Hobut	Residual current device