



Operator's manual

Scania Instrumentation en-GB 2 374 015

Issue 2.0

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Introduction

This Operator's manual describes operation of Scania instrumentation.

The information in this manual was correct at the time of going to press. Scania reserves the right to make alterations without prior notice.

Note:

Always use Scania spare parts for repair work.

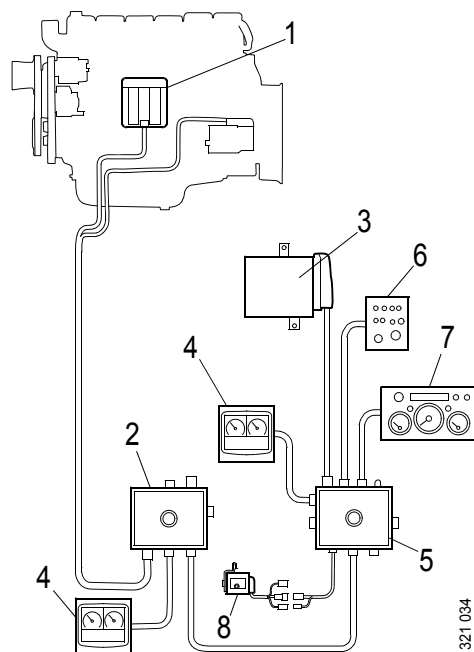
Overview

The base system consists of a coordinator, coordinator junction box and main junction box. The main junction box is connected directly to the engine control unit. There are a number of different options for the base system that can be connected to the system:

- A digital display together with a control panel with starter key.
- An analogue instrument panel that can be used instead of the digital display or together with it.
- An accelerator pedal sensor.
- A remote control (for marine engines only).

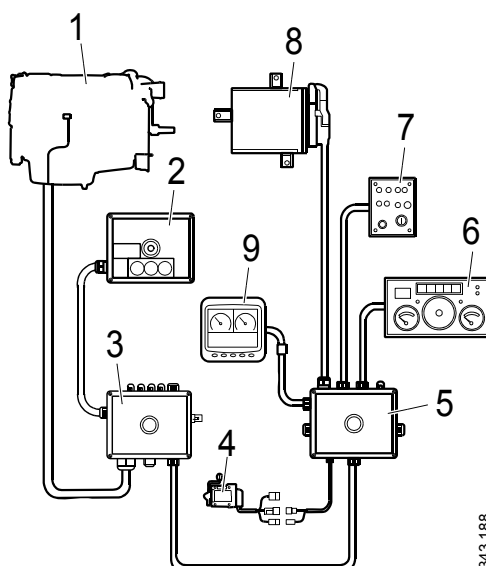
The entire instrumentation system is Plug and Play which makes it very easy to install.

This Operator's manual only describes the analogue instrument panel, remote control, digital display and control panel.



Base system for industrial engines

1. Engine control unit
2. Main junction box
3. Coordinator
4. Digital display
5. Coordinator junction box
6. Control panel
7. Analogue instrument panel
8. Accelerator pedal sensor



Base system for marine engines

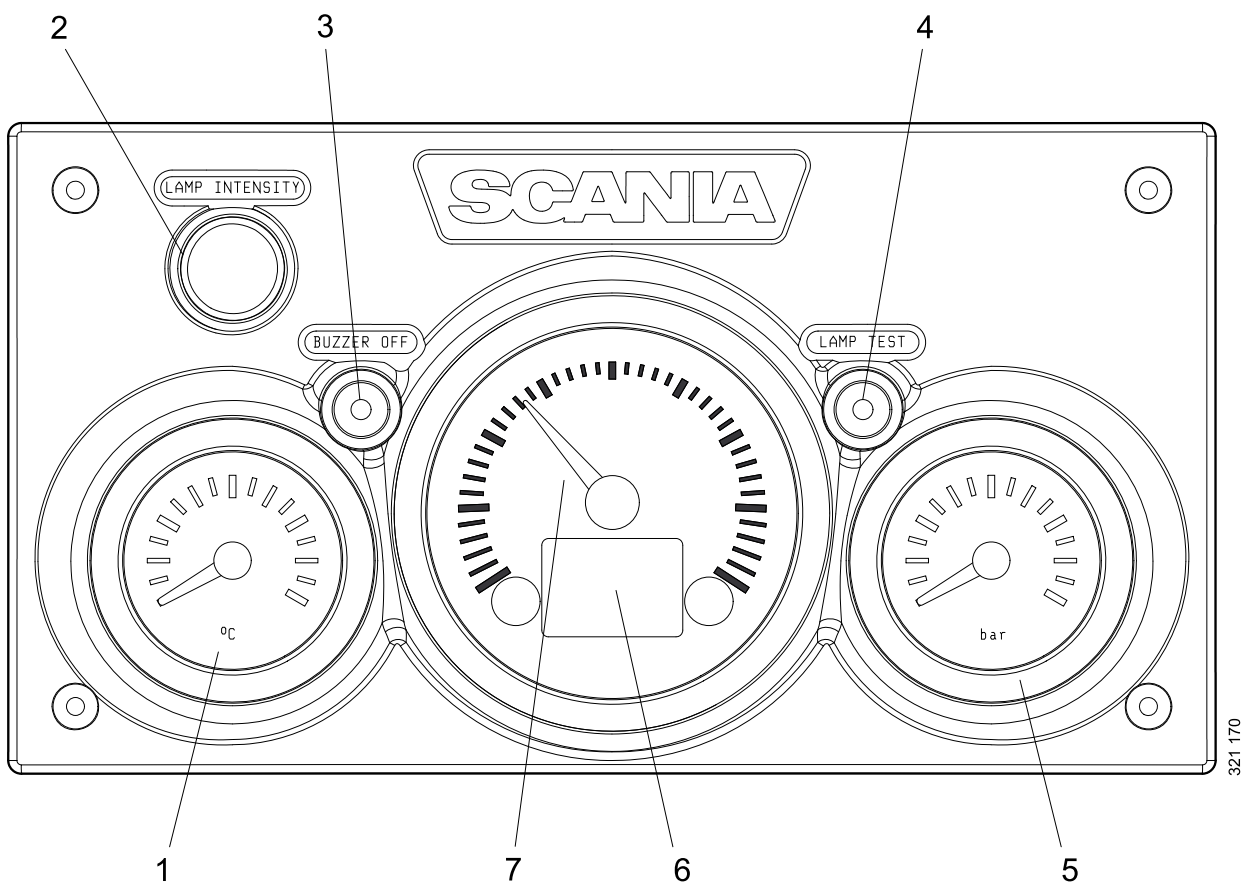
- 1. Engine control unit*
- 2. Remote control*
- 3. Main junction box*
- 4. Accelerator pedal sensor*
- 5. Coordinator junction box*
- 6. Analogue instrument panel*
- 7. Control panel*
- 8. Coordinator*
- 9. Digital display*

Analogue instrument panel

The analogue instrument panel has instruments for reading engine speed, coolant temperature and oil pressure. It also has hour counting and diagnostic and alarm switches and lamps.

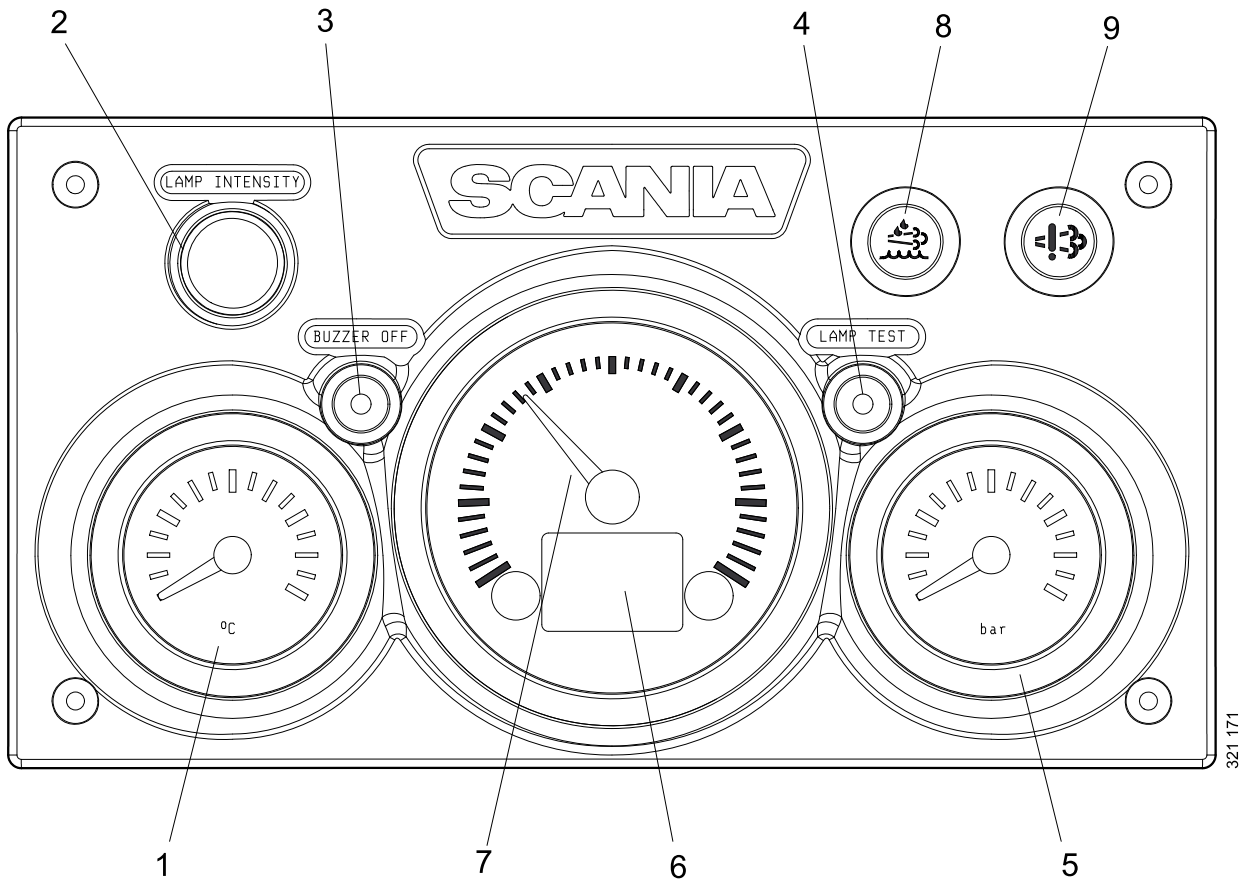
The analogue instrument panel is available in 2 versions, depending on whether the engine is equipped with an SCR system or not.

Analogue instrument panel for engines without SCR system



1. Coolant temperature display
2. Adjusting instrument lighting brightness (Lamp intensity)
3. Buzzer deactivation (Buzzer off)
4. Lamp test (Lamp test)
5. Display for oil pressure
6. Display showing engine data, alarms and fault codes
7. Tachometer

Analogue instrument panel for engines with SCR system

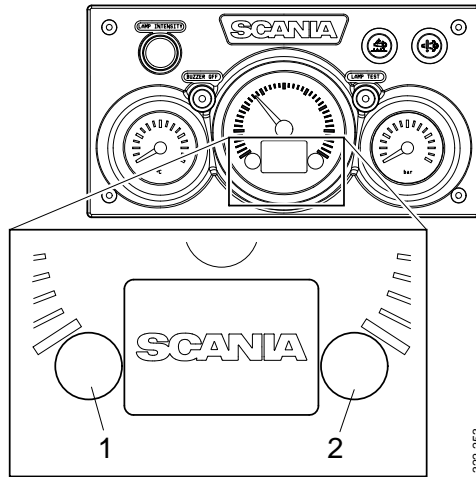


1. Coolant temperature display
2. Adjusting instrument lighting brightness (Lamp intensity)
3. Buzzer deactivation (Buzzer off)
4. Lamp test (Lamp test)
5. Display for oil pressure
6. Display showing engine data, alarms and fault codes
7. Tachometer
8. Warning lamp for low reductant level
9. Warning lamp for SCR system faults.

Display in tachometer

Integrated in the tachometer is a digital display that shows engine data, alarms and fault codes.

Button 1 displays the previous page and button 2 displays the next page. The table below describes how to go down a level in the structure.










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Engine data shown on the display

Engine data	Explanation
Coolant temperature	
Oil pressure	
Fuel level	
Fuel consumption	
Charge air pressure	
Trip meter	Reset the trip meter by holding buttons 1 and 2 down at the same time for 3 seconds.
Adjusting instrument lighting brightness	Reduce the brightness by holding button 1 down for 3 seconds Increase the brightness by holding button 2 down for 3 seconds
Settings	No settings can be changed. The only available language is English and the only available unit is metric
Fault codes	Display an explanation of active fault codes by holding buttons 1 and 2 down at the same time for 3 seconds.

Alarms

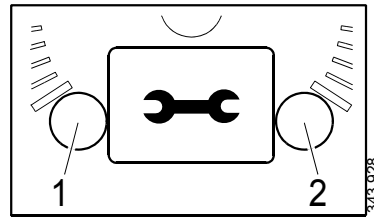
On the display in the tachometer, the following alarms are shown:

Alarm	Symbol
High coolant temperature	
Low oil pressure	
Oil level too high or low ¹	
Alternator not charging	
Low reductant level ¹	
SCR fault ¹	
Low coolant level ¹	

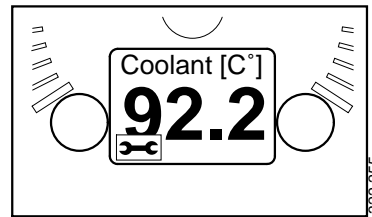
1. Depending on how the engine is equipped.

Fault codes

When a fault code is generated, a symbol is shown on the display in the tachometer. Acknowledge the fault code by pressing button 1 or 2.



Once the fault code has been acknowledged, the fault code symbol remains (refer to illustration) as long as the fault code is active.

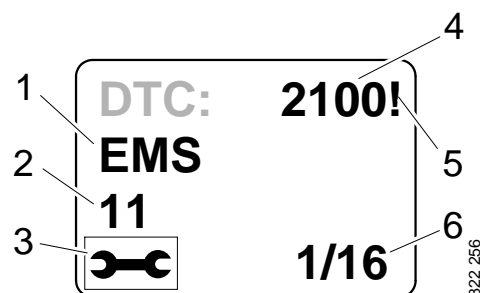


Fault code description

If you want to see a more detailed description of the fault code, hold buttons 1 and 2 down at the same time for 3 seconds.

The fault code contains the following information:

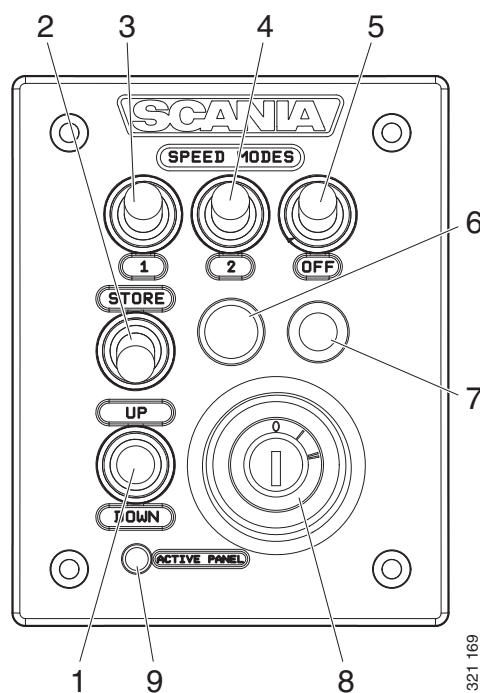
Pos	Information	Explanation
1	Shows the control unit in which the fault code was registered	The engine management system (EMS), coordinator (COO) or SCR control unit (SCR)
2	Counter	Shows how many times the displayed fault has occurred
3	Fault code symbol	
4	Fault code	Shows the fault code in hexadecimal form
5	Active fault code	! is shown if the fault code is active. If the fault code is inactive, no ! is displayed
6	Page	Shows which page is active and how many pages there are



Control panel

The engine is started and shut down from the control panel, which has a starter lock and functions for engine speed setting and idling setting.

1. Control for adjusting engine speed and idling speed
2. Control for storing new engine speed and idling speed
3. Control for activating engine speed setting 1
4. Control for activating engine speed setting 2
5. Control for deactivating engine speed setting 1 (marine engines) or 2 (industrial engines).
6. Indicator lamp for limp home throttle control¹
7. Limp home throttle control (Limp home)¹
8. Starter lock
9. Indicator lamp for active panel (Active panel)



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Starter lock

The starter lock (8) is used to start and shut down the engine.

Position 0: The engine electrical system and the engine are switched off.

Position 1: The engine electrical system is activated.

Position 2: The starter motor is activated.

1. Only available for marine engines.

Engine speed setting 1 and 2

Engine speed setting 1 is an engine speed set between high and low idling. High and low idling vary depending on the engine. The engine speed is set with control 3.

Engine speed setting 2 is an engine speed that is set between 450 and 2,000 rpm. The engine speed is set with control 4.

For both engine speed settings, torque limitation can be set via either the digital display or using SDP3. The engine speed settings are isochronous, i.e. the engine speed is held constant irrespective of load.

When either of the engine speed settings is activated, the engine speed goes up or down to the last saved engine speed.

In order to activate engine speed setting 1 or 2, the engine must be running, the active panel indicator lamp must be on and the throttle must be at 0%.

Change the engine speed:

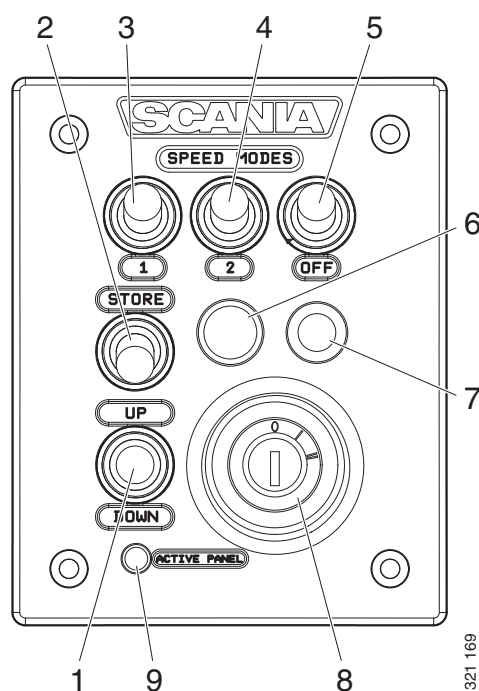
- Activate engine speed setting 1 or 2 with control 3 or 4.
- Adjust engine speed up or down with control 1.
- Save the new setting by holding control 2 down for 3 seconds.

Note:

If the setting is not saved, the engine uses the last saved value next time engine speed setting is activated.

This is how to switch off the engine speed settings:

- Press control 5, touch the accelerator pedal or switch off the engine.



Idling speed adjustment

Setting range:

Engine type	Setting range
XPI engine	600-750 rpm
PDE engine	500-1,300 rpm

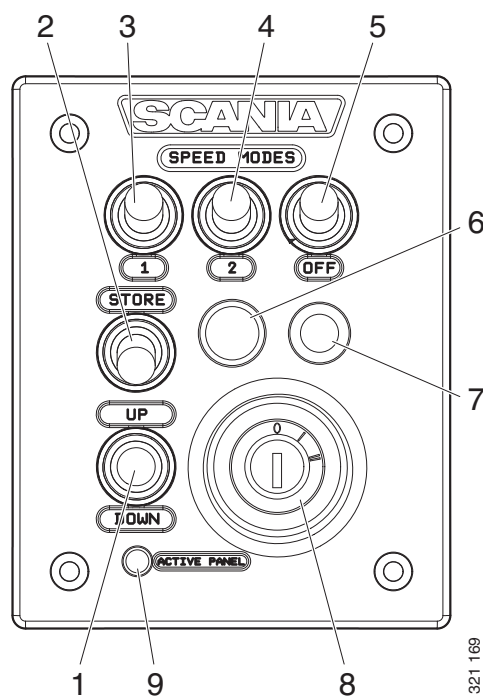
Set the engine idling speed:

- Hold control 2 down for 3 seconds. This will take you to the adjustment mode.
- Adjust idling up or down with control 3.
- Save the new setting by holding control 2 down for 3 seconds.

It is also possible to change engine idling speed with the digital display or using SDP3.

Note:

In order to change the idling speed setting, the coolant temperature must be higher than 50°C (122°F) with the engine idling.



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Limp home mode

Limp home mode is a marine engine function that is activated if the coordinator or accelerator pedal fails or if CAN communication is not working.

If one of these occurs, the indicator lamp for limp home throttle control 6 and limp home throttle control 7 is connected.

The limp home throttle consists of a potentiometer on the control panel which can be used to limp home. The potentiometer value goes directly to connector A2 on the engine control unit.

In order to use the limp home throttle control, the potentiometer must first be turned to the 0 position and then activated.

Remote control

The remote control for marine engines is connected on connector C4044 on the main junction box. The remote control can be used to lock the engine so that it cannot be controlled from anywhere other than where the remote control is located.



WARNING!

This can and should only be done when the boat is moored, i.e. when there is no risk that the boat will drift out of control. There is a sign on the remote control with this warning text.

There are 2 positions for key switch 3: Local and Remote.

- Local: The engine cannot be controlled from anywhere other than from the remote control.
- Remote: Normal position, i.e. the engine can be operated from the other throttle control positions.

When Local mode is activated, the green indicator lamp 1 comes on. At the same time the active panel indicator lamp on the control panel starts to flash, which indicates that the control panel cannot be activated.

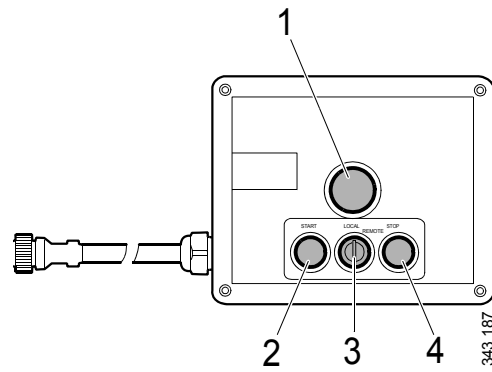
When the engine is started from the remote control via starter button 2, it only runs at idling speed while Local mode is activated and no other throttle control can be used.

If the key switch is reset from Local to Remote when the engine is running, the green indicator lamp 1 goes out and the engine continues to run at idling speed. Other control positions can however take command of throttle control, if the control panel is activated. If key switch 3 is reset from Remote to Local while running, nothing happens, but this will be regarded as an unintentional action.

If CAN communication fails when the engine has been started from the remote control, the engine will stop, but the limp home throttle pedal will not be engaged.

In order to start the engine again, it is necessary to carry out the following connection:

- Connect pin 50 on the starter relay to the positive pin on the starter motor. The engine



Remote control

1. Green indicator lamp
2. Starter button
3. Key switch to activate the Local function
4. Stop button

starts but it is only possible to control the throttle using the limp home throttle control.

In order to switch off the engine you must switch off the power to the engine control unit by turning the starter key to 0. Alternatively you can switch off the power via connector C4027 in the main junction box.

Digital display

The digital display shows engine data and any alarm systems and fault codes. But the display can also be used to set certain parameters in the engine control unit.

Function

The information content can be found in different screens according to a tree structure. There are 6 different screens at the top level:

- 3 favourite screens
- Information
- Diagnostics
- Settings

The buttons on the display have different functions depending on which screen is active. Use buttons 1 and 5 to scroll between the different screens at the top level, depending on which direction you want to go in the loop.

When one of the favourite screens is active, the information about each button's function is hidden. The reason for this is to make as big an area as possible available for presentation. When a button is pressed, the description of the buttons is displayed for about 5 seconds. Each window apart from the favourite screens is numbered at the top left. The numbering indicates the favourite screen and the level of the structure you are on.

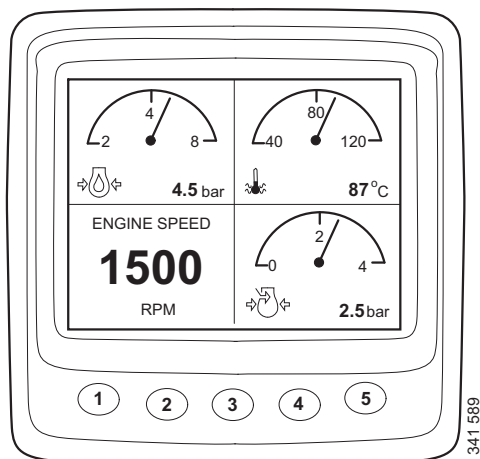
Display structure

Display modes, levels		
1	2	3
Favourite screen (3)	Change appearance of Favourite screen	Change content in window
Information	Statistics trip	Display and reset
	Performance	Display
	System data	Information
Fault codes	Clear fault codes	Acknowledgement
	Information on fault code	
	Update fault code list	Acknowledgement
Settings	Contrast/brightness	Adjust
	Button beep	Change
	Language	Change
	Units	Change
	Engine	Change engine settings ¹
	Base system	Change

1. A password is required to change engine settings.

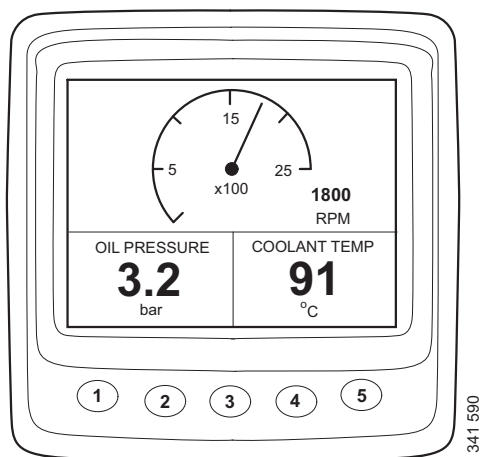
Favourite screens

The favourite screens are used to show engine data during operation. There are 3 different favourite screens which are all at the top level of the display structure.



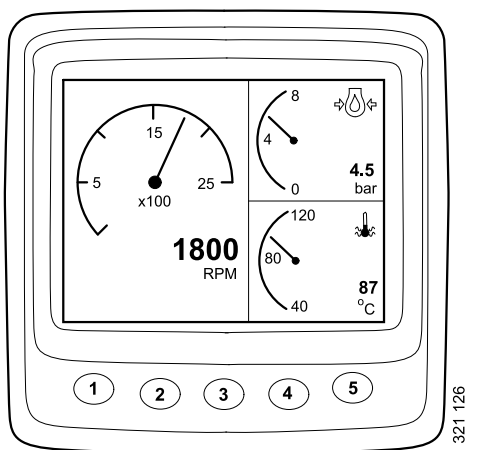
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Favourite screen 1



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Favourite screen 2






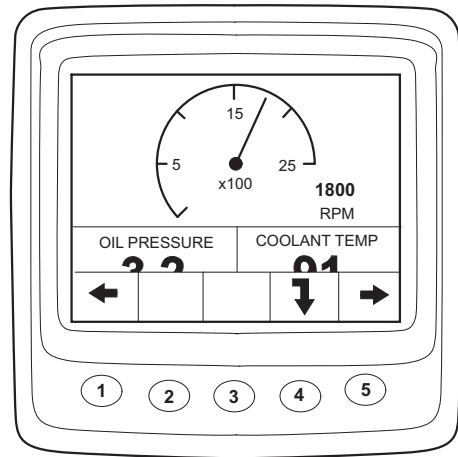
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Favourite screen 3

If you want to change from one favourite screen to another favourite screen, press button 1 or 5 depending on which is currently displayed.

In this display mode, the buttons have the following functions:

1		Scroll to the left in the top level
2		
3		
4		Go down one level in the structure
5		Scroll to the right in the top level



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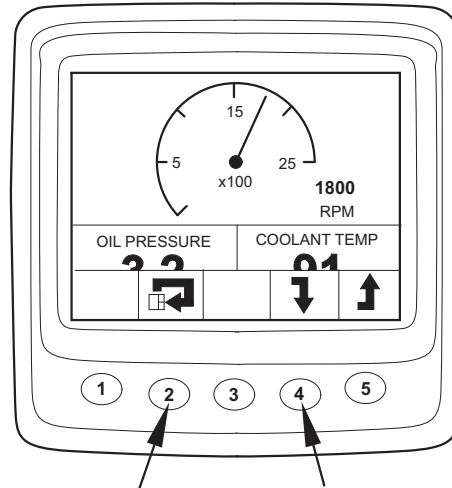
Change appearance of Favourite screen

If you want to change the appearance of a favourite screen, press button 4.





Then press button 2 to change the appearance of the screen in the sequence on the previous page.

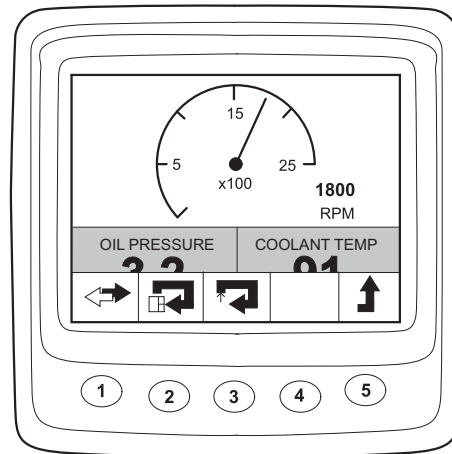
Change content in window

Press button 4 from the change appearance position on the favourite screen to display the button panel in the table below.



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1		Change between digital and analogue display
2		Change active (not greyed) window
3		Change content in active (not greyed) window
4		
5		Go up one level in the structure





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In order to select the contents of a subwindow, it must be active. Activate a window by pressing button 2.

The information in the different subwindows can be displayed in digital or analogue format.

Note:

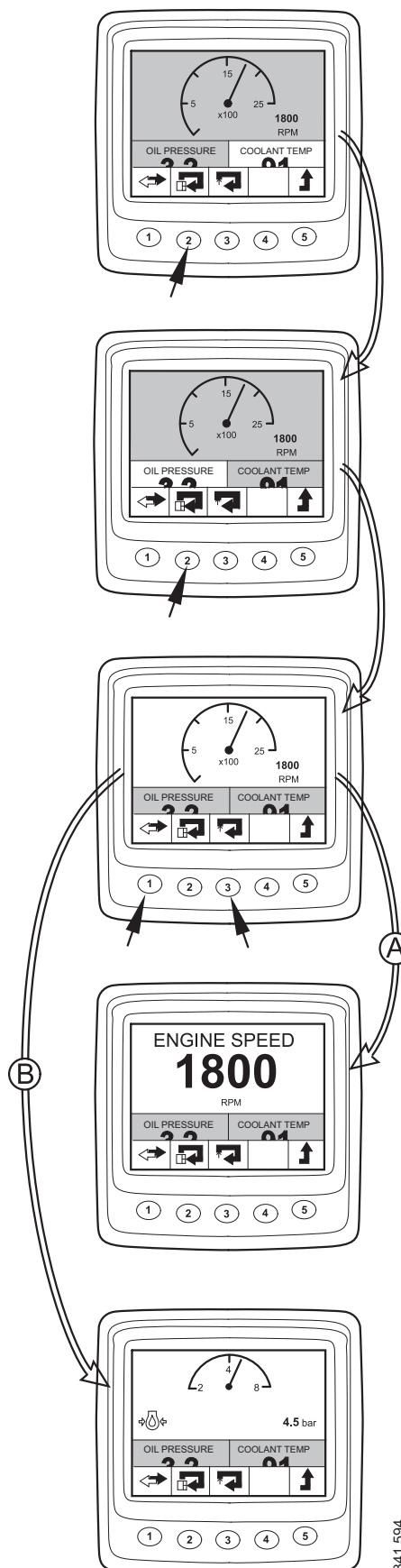
Some information can only be displayed in digital format. Refer to the table.

Parameter	Digital display	Ana-logue display	Symbol
Engine speed	x	x	
Oil pressure	x	x	
Coolant temperature	x	x	
Charge air pressure	x	x	
System voltage	x	x	
Fuel consumption	x		
Load at current engine speed	x		
Operating time	x		
Throttle	x		
Oil temperature ¹	x	x	
Oil level ¹	x		
Reductant level ¹	x		

1. Depending on how the engine is ordered.

Switch between analogue and digital display by pressing button 1 (A).

Change the contents of an activated subwindow by pressing button 3 (B).



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Information (4)

This is how to go to the Information display mode from a favourite screen:

Press any button to display the button bar on the screen.

Press button 5 one to three times, depending on which favourite screen is active, to open the Information display mode. The button bar now remains on the screen.

Move up and down the list by pressing buttons 2 and 3.

Statistics trip (4.1)

Go down one level in the Statistics trip structure by pressing button 4. This displays information about:

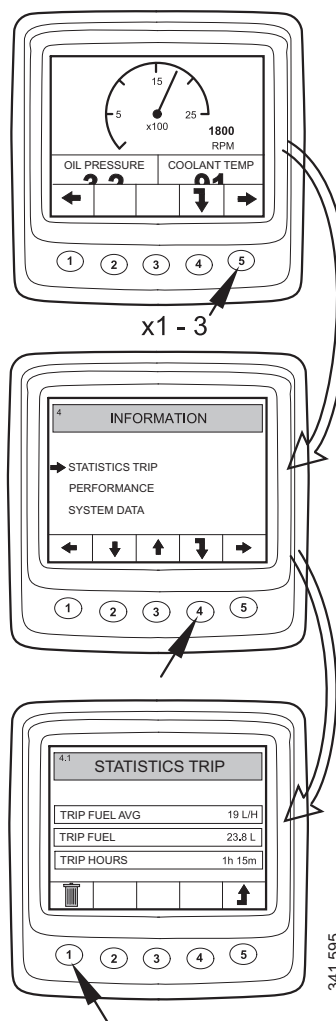
- average fuel consumption,
- total fuel consumption since last reset,
- total operating time since last reset

Reset the measurement by pressing button 1.

Go back to the Information display mode by pressing button 5.

Note:

The maximum measurement time is 999 h. After this period, the measurement is automatically reset.

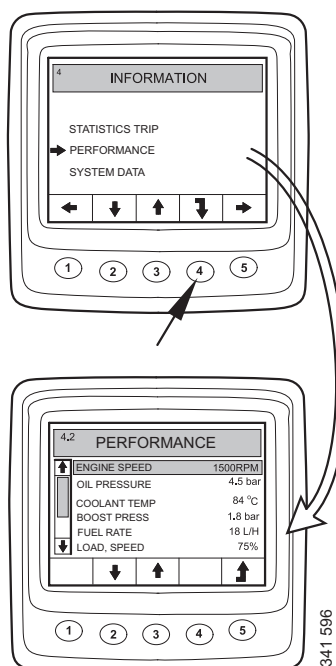


Performance (4.2)

Go down one step in the list by pressing button 2. Then press button 4 to go down one step in the structure to the Performance display mode.

This displays current performance in a well-organised manner.

Go back to the Information display mode by pressing button 5.



System data (4.3)

Go down 2 steps in the list by pressing button 2.
Then go down one step in the structure to the System data display by pressing button 4.

Information about the different system control units is displayed in this display mode:

- Digital display (Display)
- Engine control unit (EMS)
- Coordinator (COO Master)
- SCR control unit

Move up and down the list by pressing buttons 2 and 3.

Display information about the control unit concerned by pressing button 4.

Digital display (Display)

Information on:

- Part number (assembly part number)
- Hardware number
- Software number
- Version number

Engine control unit (EMS)

Information on:

- Engine serial number
- Engine type
- Engine control unit part number

Coordinator

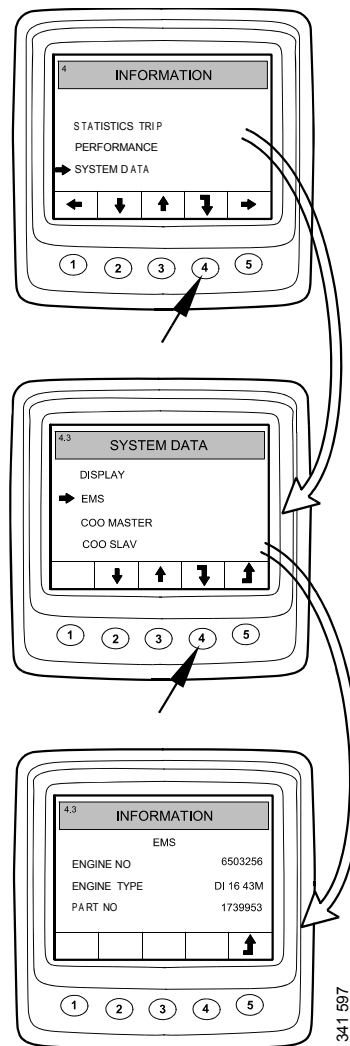
Information on:

- Part number (assembly part number)
- Hardware number
- Software number
- Version number

SCR control unit

Information on:






- Hardware number
- Software number



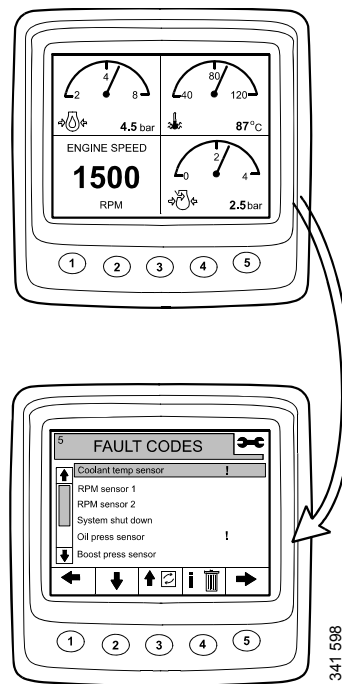
Fault codes (5)

This is how to go to the Fault codes display mode from a favourite screen:

- Press any button to display the button bar on the screen.
- Use button 1 or 5 to scroll in a favourite screen to open the Fault codes display mode. The button bar changes appearance and remains on the screen.

1		Scroll to the left in the top level
2		Go down one step in the list
3		Short press: Go up one step in the list
		Long press (3 s): Update the list
4		Short press: Display information about the selected fault code
		Long press (3 s): Clear fault codes
5		Scroll to the right in the top level

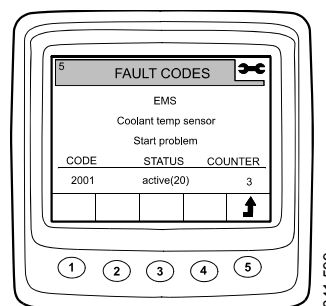
In the example, the Coolant temp sensor and Oil press sensor are marked with an !, which means that they are active fault codes.



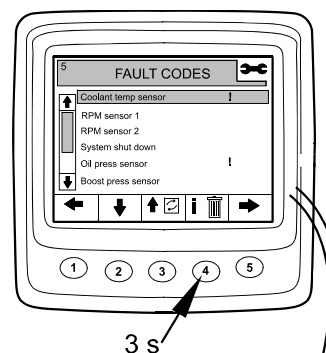
Information about the highlighted fault code

In the example on the previous page, Coolant temp sensor is selected. Give a short press on button 4 to bring up the information screen for the fault code.

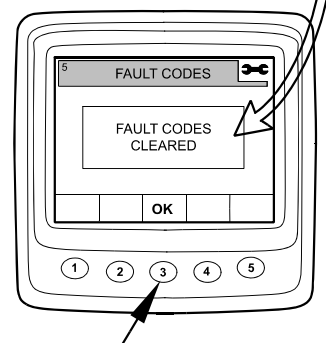
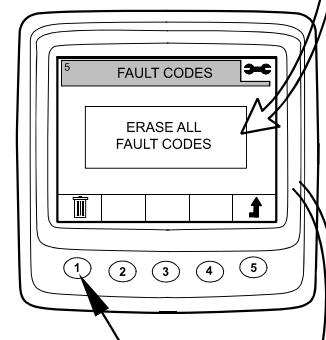
View on display	Description	In the example
EMS	Control unit in which the fault was registered	Engine control unit
Coolant temp sensor	Name of fault code	Coolant temperature sensor
Start problem	How the system reacts when the fault is active	Starting problems
Code	The number of the selected fault code	2001
Status	Fault status, i.e. active or passive	Active
Counter	How many times the fault has occurred	3 times



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3 s



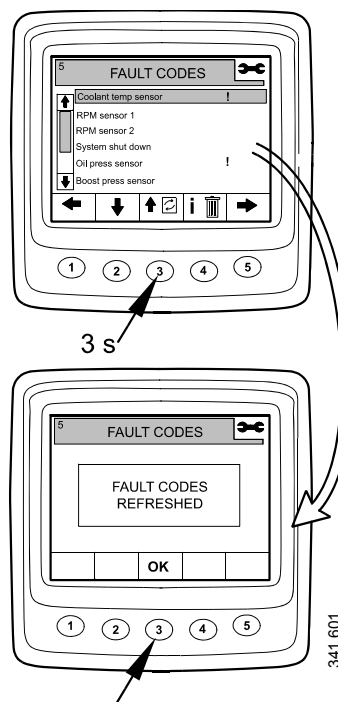
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Clear fault codes

- Hold control 4 down for 3 seconds.
- Delete all fault codes by pressing button 1.
- Confirm deletion by pressing button 3.

Update the fault code list

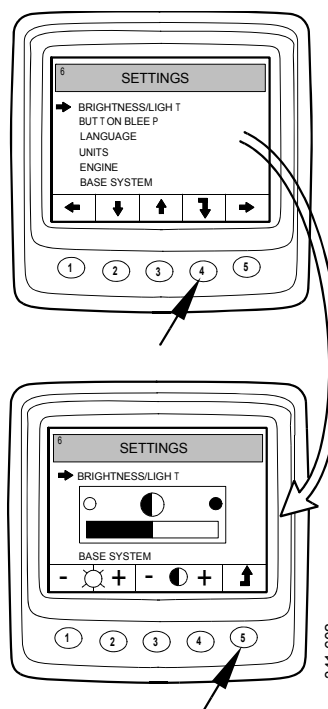
- Hold control 3 down for 3 seconds.
- Confirm the update by pressing button 3.



Settings (6)

- Use button 1 or 5 to scroll in a favourite screen to open the Settings display mode.
- Move up and down the list by pressing buttons 2 and 3.

To get to Settings more quickly, regardless of where you are in the structure, press buttons 2 and 4 simultaneously.



Contrast/brightness (6.1)

- Select Contrast/brightness and press button 4. This will take you to the adjustment mode.
- Adjust the brightness and the contrast to current operating conditions.

You can reset the contrast and brightness to the default settings by holding buttons 2, 3 and 4 down at the same time for 3 seconds.

Go back to the Settings display mode by pressing button 5.

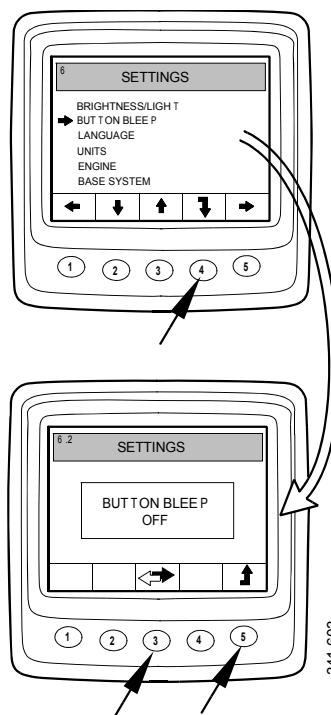
Button beep (6.2)

- Select Button beep and press button 4. This will take you to the adjustment mode.
- Switch between button beep off and button beep on by pressing button 3.

Go back to the Settings display mode by pressing button 5.

Note:

The Button beep off setting does not affect the alarm signal.



Language (6.3)

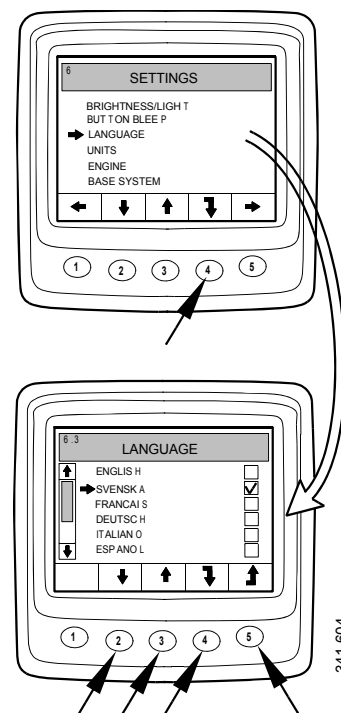
Information on the display can be shown in 7 different languages:

- English
- Swedish
- German
- French
- Spanish
- Italian
- Portuguese

The default setting is English.

- Select Language and press button 4. This will take you to the adjustment mode.
- Select the required language with buttons 2 and 3.
- Confirm by pressing button 4. The box on the right will be selected as an acknowledgement that the change has been saved.

Go back to the Settings display mode by pressing button 5.



Units (6.4)

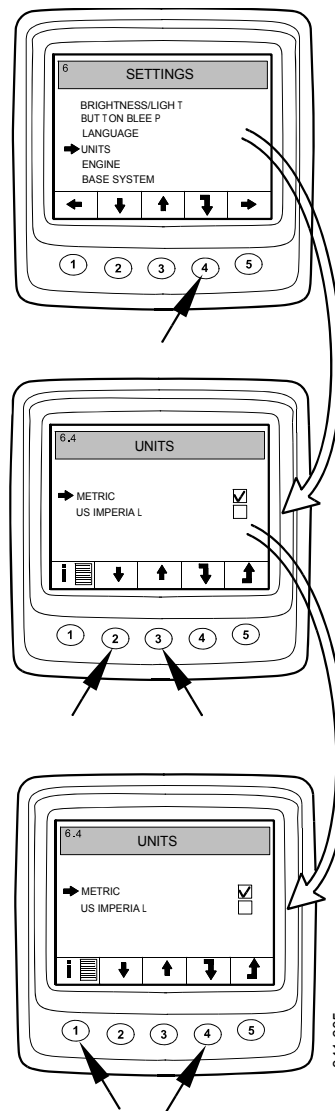
It is possible to choose between 2 different units
– metric and US Imperial:

Parameter	Metric	US Imperial
Pressure	Bar	Psi
Voltage	V	V
Engine speed	rpm	rpm
Temperature	°C	°F
Fuel consumption	L/h, L	US gallons/h, US gallons

- Select Units and press button 4. This will take you to the adjustment mode.
- Select the unit by pressing button 2 or 3.
- Confirm by pressing button 4. The box on the right will be selected as an acknowledgement that the change has been saved.

Display the information in the above table by pressing button 1.

Go back to the Settings display mode by pressing button 5.



Engine (6.5)

In this display mode, you can change the default settings of the engine.



WARNING!

If you change the default settings of the engine, it can affect safety-critical functions.

- Select Engine and press button 4. This will take you to the adjustment mode.
- Enter the password¹ and press button 4.
- A warning is displayed. Press button 3 to proceed to the list of parameters that can be set.

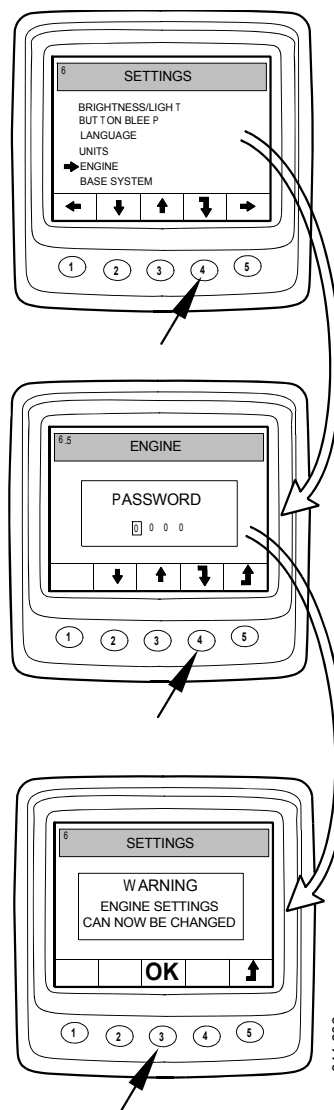
The engine settings that can be changed are described on this page and on subsequent pages.

Idling (6.5.1)

Low idling for PDE engines can be set between 500 and 1,300 rpm.

Low idling for XPI engines can be set between 600 and 750 rpm.

It is not possible to change the idling setting if the coolant temperature is below 50°C (122°F) or if the engine is running at raised low idling speed for some reason.

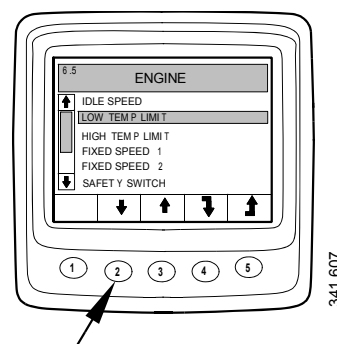


1. The default password is 2222, but this can be changed by the user. See section 6.5.9.

Lower temperature limit (6.5.2)

The lower temperature limit, which has a default setting of 95°C (203°F), is the level for the alarm and for torque reduction if torque reduction has been selected. See section 6.5.8.

The lower temperature limit can be set between 85°C (185°F) and 105°C (221°F). The lower temperature limit cannot be set to a higher value than the upper temperature limit.



Upper temperature limit (6.5.3)

The upper temperature limit, which has a default setting of 105°C (221°F), is the level for the alarm and also for engine shutdown if engine shutdown has been selected. See section 6.5.8.

The upper temperature limit can be set between 95°C (203°F) and 105°C (221°F). The upper temperature limit cannot be set to a lower value than the lower temperature limit.

Engine speed setting 1 (6.5.4)

Engine speed setting 1 is a constant idling speed set and activated from the control panel. See section Engine speed setting 1 and 2.

An upper torque limitation for engine speed setting 1 can be set in the digital display. The setting only applies when engine speed setting 1 is activated.

Engine speed setting 2 (6.5.5)

Engine speed setting 2 is a constant idling speed set and activated from the control panel. See section Engine speed setting 1 and 2.

An upper torque limitation for engine speed setting 2 can be set in the digital display. The setting only applies when engine speed setting 2 is activated.

Idling switch (6.5.6)

The idling switch is a safety function in Scania's electrical system which checks that the accelerator pedal is functioning correctly.

The idling switch is a closing switch that is activated when the accelerator pedal is activated.

The function can be disengaged.



WARNING!

If the idling switch is disengaged, a safety function is disengaged.

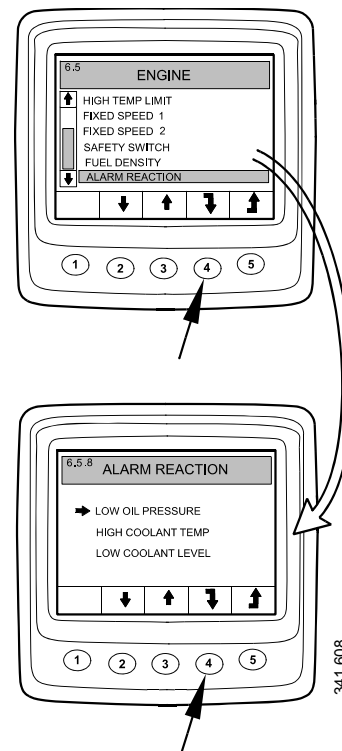
Fuel density (6.5.7)

The fuel density affects the calculation of the engine power, and it can be changed in the default settings for the engine. The default setting is 840 kg/m^3 , but the fuel density can be set between 700 and $1,000 \text{ kg/m}^3$.

Alarm reaction (6.5.8)

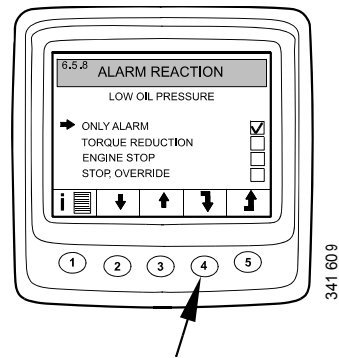
The engine behaviour may vary depending on how the engine control unit is programmed.

Signal	Line	Engine behaviour
Low oil pressure	1	Alarm only
	2	Alarm and torque reduction
	3	Alarm and engine shutdown
	4	Engine shutdown with override
High coolant temperature	1	Alarm only
	2	Torque reduction
	3	Engine shutdown
	4	Torque reduction at lower temperature limit Engine shutdown at upper temperature limit
	5	Engine shutdown with override
	6	Torque reduction at lower temperature limit Engine shutdown with override at upper temperature limit
Low coolant level	1	Alarm only
	2	Alarm and torque reduction
	3	Alarm and engine shutdown
	4	Engine shutdown with override



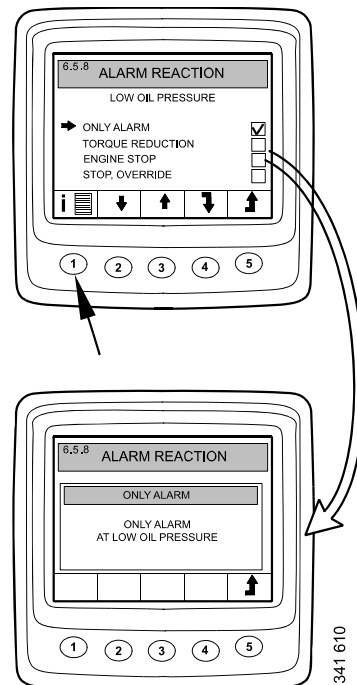
- Select Alarm reaction and press button 4. This will take you to the adjustment mode.
- Select signal type by pressing button 2 or 3.
- Press button 4 to go to the next level.

- Select an alarm reaction with buttons 2 and 3.
- Confirm by pressing button 4. The box on the right will be selected as an acknowledgement that the change has been saved.



Display a more detailed description of the selected alarm reaction by pressing button 1.

Go back to the Settings display mode by pressing button 5.



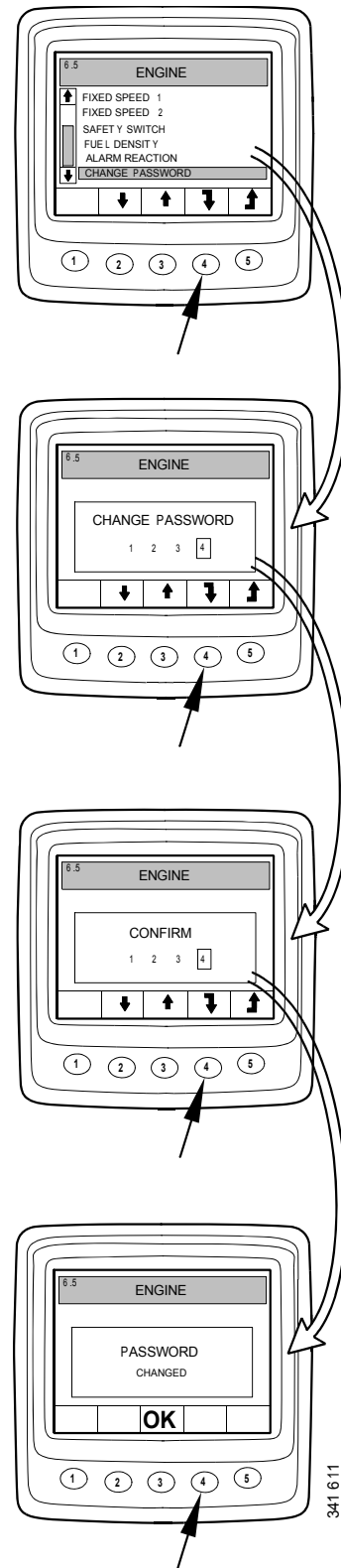
Change password (6.5.9)

You can set a new password. Valid values are 0001–9999.

- Select Change password and press button 4. This will take you to the adjustment mode.
- Enter the password and press button 4.
- Confirm the password by pressing button 4.
- Go back by pressing button 3.

Note:

Contact your nearest Scania distributor if you have forgotten the password.



Examples of setting

Set lower temperature limit (6.5.2)

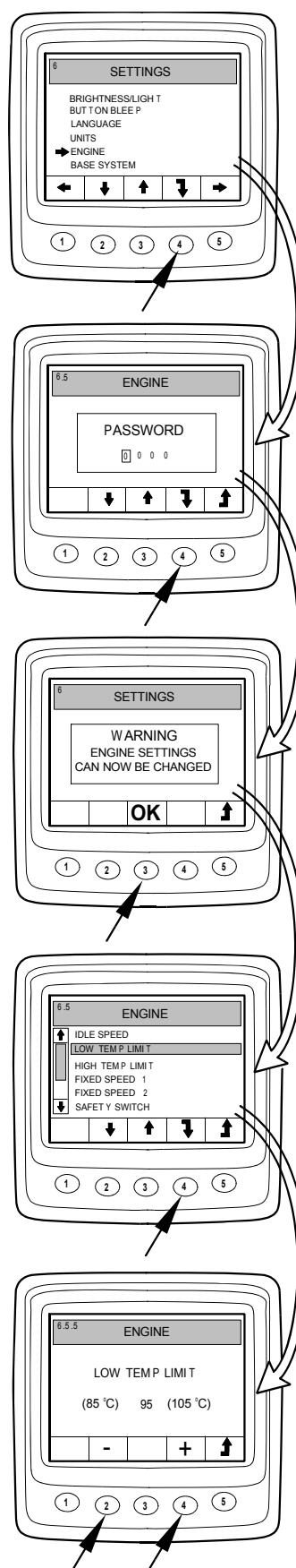
- Select Engine and press button 4. This will take you to the adjustment mode.
- Enter the password and press button 4.
- A warning is displayed. Press button 3 to proceed to the list of parameters that can be set.
- Move up and down the list by pressing buttons 2 and 3.
- Press button 4 when Lower temp limit has been selected.
- Press button 4 again. This will take you to the adjustment mode.
- increase or reduce the value by pressing button 2 or 4.

Note:

When one of the buttons is pressed, the old value is automatically deleted and the new value saved.

- Go back to the Settings by pressing button 5.

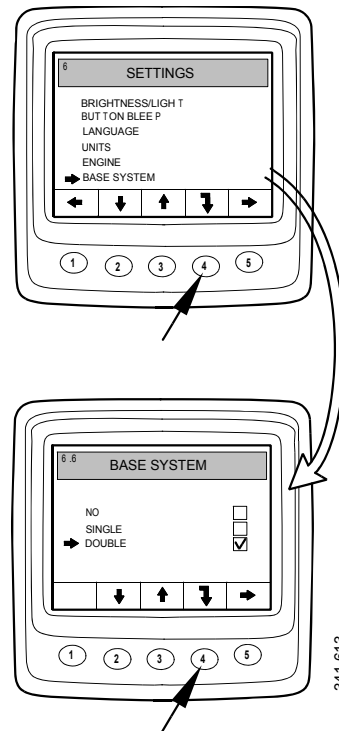
You can set other parameters in the same way.



Base system (6.6)

You can configure the digital display for the electrical system it will be used with in Base system mode. The options are:

- None
- Single
- Double
- Select Base system and press button 4. This will take you to the adjustment mode.
- Select the type of base system by pressing button 2 or 3.
- Confirm by pressing button 4. The box on the right will be selected as an acknowledgement that the change has been saved.
- Go back to the Settings by pressing button 5.










Alarm and fault code generation

Both new alarms and fault codes generate dialogue boxes in the digital display. The dialogue box for alarm has the highest priority of all functions in the digital display.

Alarms

There are 7 different alarms in the system.

Alarm	Icon	Comments
Low oil pressure		
High coolant temperature		
Low coolant level		
Alternator not charging		System voltage displayed
SCR fault		
Low reductant level		
Oil level too high or low		

Alarm function

When an alarm is generated, a warning is shown in the display together with the alarm icon. At the same time, an alarm signal sounds both in the analogue instrument panel and the digital display.

Acknowledge the alarm signal in the digital display by pressing button 3. If several alarms are active, acknowledge one alarm at a time. See figure A.

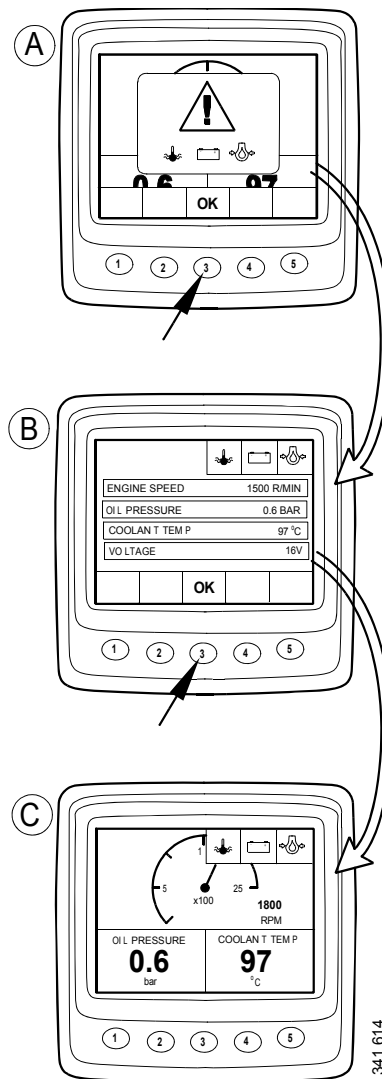
Each acknowledged alarm is then displayed as an icon at the top right of the display as long as the fault is active. The alarm is displayed regardless of which screen is active.

Note:

All alarms must be acknowledged before the next screen will be displayed.

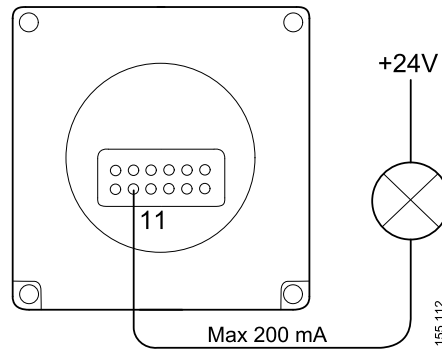
The screen in figure B always has the same content.

If you press button 3 in figure B, you will return to the screen displayed before the first alarm was generated. See figure C.



External alarm signal

When an alarm is generated, pin 11 in the 12-pin display connector is activated. The output can be used to activate a warning lamp or suchlike. In this case use pin 11 to ground a warning lamp. Maximum current 200 mA. Use a relay if a higher current than 200 mA is required. See illustration.



Output for external alarm

Fault code generation

There are several fault codes in the electrical system to help when a system fault or engine fault occurs.

When a new active fault code is registered in the system, it will be shown on the display as in figure A.

Acknowledge all active fault codes by pressing button 3. The next screen then displays a fault code icon at the top right as shown in figure B.

The icon is always displayed when at least one fault code is active.

When starting the system, a dialogue box as in figure A is always displayed if there is at least one active fault code.

