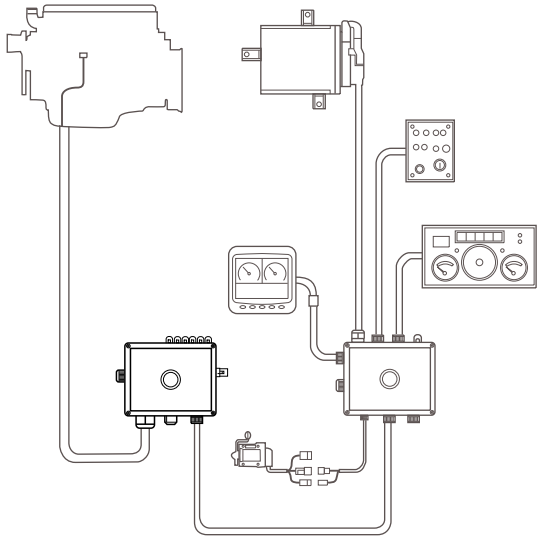
Coordinator and base system

Industrial engines
DC09, DC13, DC16

Marine engines
DI09, DI13, DI16



339 182

Introduction **3**
Different requirements 3
Without Scania's base system 3
With Scania's base system 3
Grounding 4
Abbreviations 4

Coordinator **5**
Operating voltage 5
Protection class 5
Vibration levels 5
Fitting the coordinator 6
Connection to coordinator 7
Coolant temperature gauge configuration 8
Oil pressure gauge configuration 8
Single-speed engines 9
Industrial engines 18
Marine engines 22

Base system for industrial engines **26**
Connection to main junction box 28
Connection to coordinator junction box 32

Base system for marine engines **40**
Connection to main junction box 42
Connection to coordinator junction box 45

Extra functions **46**
Industrial and marine engines 46
Industrial engines only 48

Introduction

Different requirements

S6 engine management system is used for PDE engines. S8 engine management system is used for XPI engines.

There are two different conditions for the electrical installation of S6 and S8: with or without Scania's base system. This installation manual describes Scania's coordinator and base system only. All other information about the electrical installation can be found in 03:01 Electrical systems.

Without Scania's base system

Engine only

All electrical connections by Scania are carried out to the engine control unit. The customer is responsible for the electrical system otherwise.

With a coordinator

The engine can be ordered with or without a coordinator.

The task of the coordinator is to convert the CAN signals from the engine control unit to analogue signals.

In addition to the engine control unit, indicator lamps, switches, controls and other equipment related to the engine are connected to the coordinator.

With Scania's base system

The engine is supplied with a plug and play base system. It is easy to connect the system, and no major adaptations are required. The base system is not classified.

Grounding

In this document the term ground is used. Ground means that there is a connection to the battery negative terminal (U31).

Abbreviations

Abbreviations used in this document are listed in the table below.

Abbreviation	Explanation
PDE	Fuel injection system (unit injector)
S6	Engine control unit for PDE engines
S8	Engine control unit for XPI engines
SCR	Emission control system (Selective Catalytic Reduction)
SDP3	Scania Diagnos & Programmer 3
XPI	Fuel injection system (extra high pressure injection)

Abbreviations for voltage

The abbreviations in the table below are used to describe different types of voltage. Unless otherwise specified, always +24 V.

Abbreviation	Explanation
U15	Starter key voltage (15 voltage)
U30	Battery voltage
U50	Voltage to the starter motor

Coordinator

Operating voltage

For the coordinator to function according to specification, the voltage must be 22-30 V. The normal voltage is 28 V.

Protection class

The coordinator has IP class 5K4.

Vibration levels

The driver's cab is an example of a suitable location to place the coordinator.

The coordinator withstands the following vibration levels:

ASD level	Frequency range	RMS level
$0.05g^2/Hz$	10-50 Hz	In total 3.2 g
$0.015g^2/Hz$	100-500 Hz	

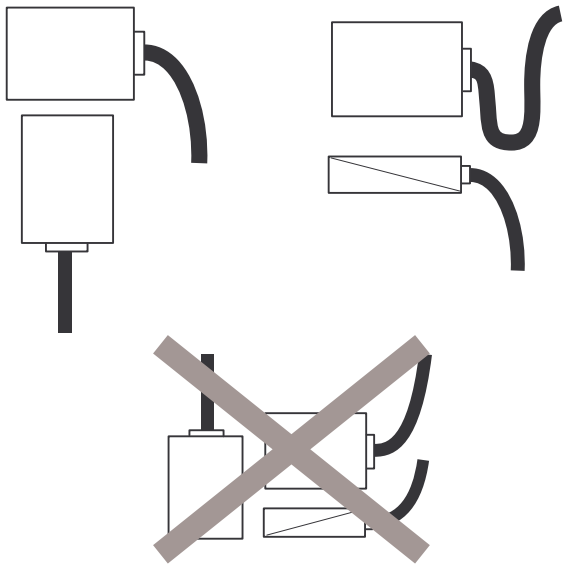
Fitting the coordinator

IMPORTANT!

Protect the coordinator against impact from the environment. Position the coordinator with the electrical cables downwards as illustrated to minimise the risk of moisture and water entering the electrical cable.

The following factors can cause electronic components to malfunction:

- Electromagnetic interference
- Extreme heat or cold
- High voltages
- Vibrations
- Water and moisture



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Location of the coordinator

Connection to coordinator

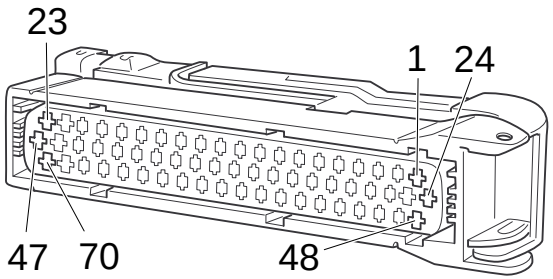
Contact housing kit 1 505 750 for coordinator contains the following parts:

Qty	Part No.	Designation
1	1 404 305	Contact housing, 70-pin
4	815 886	Cable terminal, flat socket
30	816 054	Cable terminal, flat socket
1	815 361	Cable ties, 185 x 4.6 mm
1		Resistor, 665 ohms

Use the following tools for contact housing kit 1 505 750:

- Hand crimping tool 99 491.
- Dismantling tools 588 219 and 99 585.

Use electrical cables which are twisted 40 turns per metre when connecting an accelerator pedal to an all-speed engine and a potentiometer for engine speed setting to a single-speed engine.



Connector for coordinator

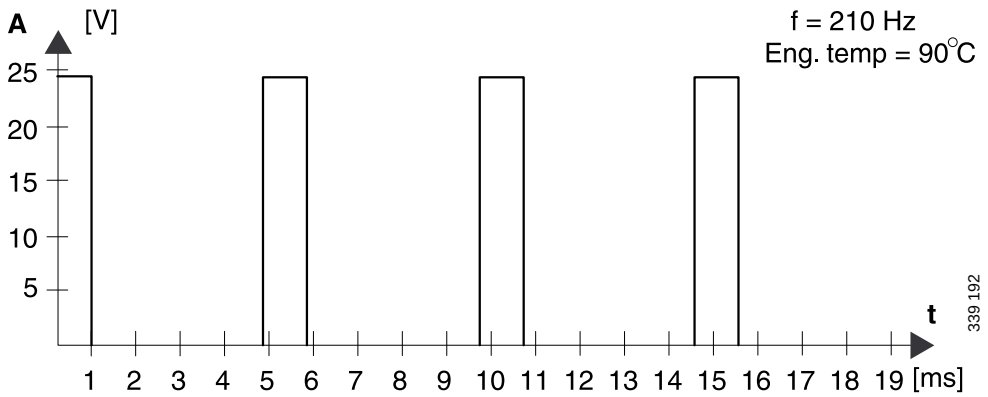
Coolant temperature gauge configuration

If Scania's base system is not used, the following coolant temperature output parameters should be set:

Temperature gauge calibration X: can be set between -40 and +140°C in increments of 1°C.

Temperature gauge calibration Y: can be set between 0 and 100% operating cycle in increments of 0.1%.

X	40	70	80	90	100	110	120	**°C**
Y	55.3	32.9	26.6	21.1	16.1	12.1	9.0	**%**



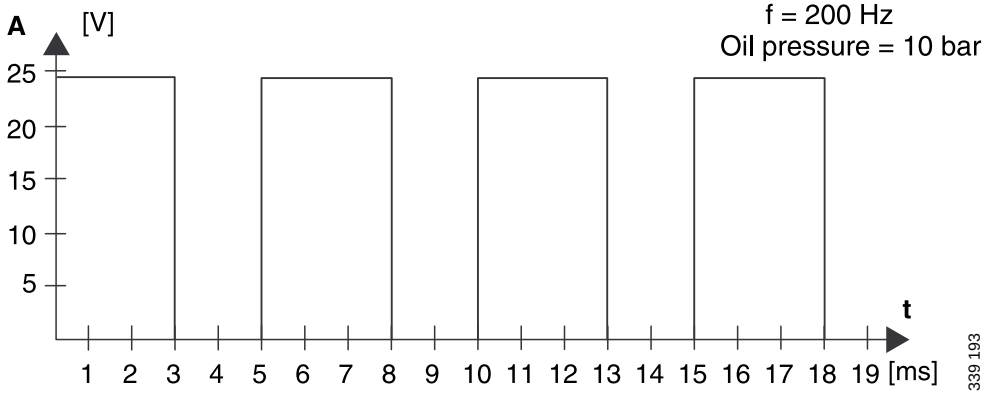
Oil pressure gauge configuration

If Scania's base system is not used, the following oil pressure output parameters should be set:

Oil pressure gauge calibration X: can be set between 0 and 10 bar in increments of 0.1 bar.

Oil pressure gauge calibration Y: can be set between 0 and 100% operating cycle in increments of 0.1%.

X	0	1.0	2.0	4.0	6.0	8.0	10.0	**bar**
Y	10.0	23.8	31.3	43.1	50.3	54.5	59.4	**%**



Single-speed engines

Coordinator inputs and outputs

The illustration shows a schematic description of the coordinator inputs and outputs (I/O).

IMPORTANT!

To prevent the engine control unit from generating fault codes, the following pins in the coordinator must be connected:

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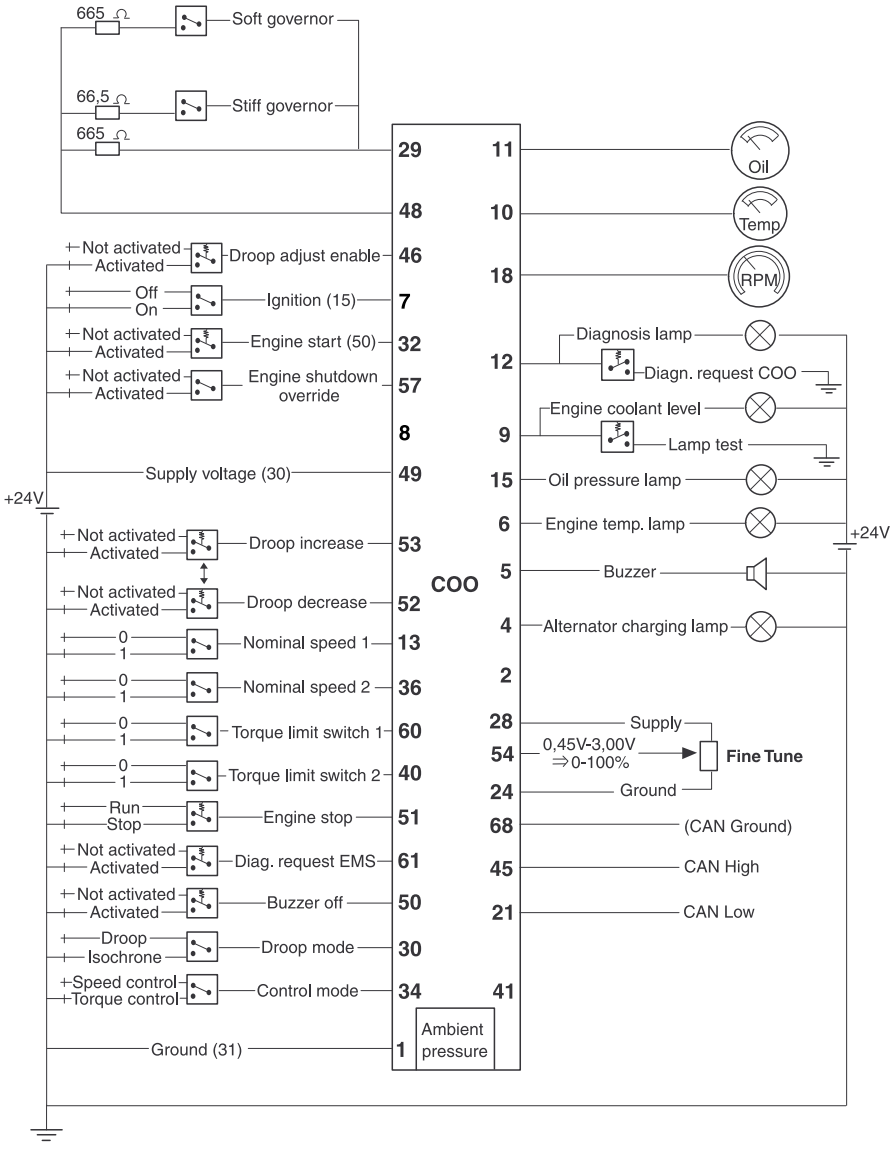
21
29
32
45
48
49



Pin	I/O	Function	Description	Comments
1	-	Ground	Ground for coordinator.	
4	O	Warning lamp for alternator	Lights in the event of an alternator fault.	A CAN message is sent to the coordinator if an alternator does not charge correctly. The coordinator then sends out +24 V and the warning lamp lights. Note: The lamp must be a bulb.
5	O	Buzzer	Signal in the event of an engine alarm.	The coordinator sends out +24 V in the event of an engine alarm.
6	O	Warning lamp for coolant temperature	Lights when the coolant temperature is too high.	The coordinator sends out ground if the coolant temperature is too high. Note: The lamp must be a bulb.
7	I	Drive position	Starter key in the drive position.	Should be connected to U15 when it is active.
9	O/I	Warning lamp for low coolant level or lamp test	The pin has two different functions: • To light an indicator lamp when the coolant level is too low. • To carry out a lamp test.	The coolant level monitor is connected to the engine control unit. When the coolant level is too low, the coordinator sends out ground on the pin and the warning lamp lights. If the pin is connected to ground, a lamp test is carried out on pins 4, 5, 6, 15, 9 and 12. The lamp test is active as long as pin 9 is connected to ground. Note: The lamp must be a bulb.
10	O	Gauge for coolant temperature	Gauge displaying the engine coolant temperature.	If a Scania instrument is not used, an instrument should be used which can be configured with the PWM signal. See the section Configuring coolant temperature gauge.
11	O	Gauge for oil pressure	Gauge displaying the engine oil pressure.	If a Scania instrument is not used, an instrument should be used which can be configured with the PWM signal. See the section Configuring oil pressure gauge.
12	O/I	Diagnostics lamp	Shows if there is an active fault code for the coordinator or engine control unit.	
13	I	Switch 1 for nominal engine speed	Switch to change the fixed engine speed which the engine is set to.	The nominal engine speed can be changed by connecting pin 13 and 36 to ground in different combinations. See section Change in nominal engine speed.
15	O	Warning lamp for low oil pressure	Lights when oil pressure is too low.	Ground is sent out from this pin when the oil pressure is too low. Note: The lamp must be a bulb.
18	O	Gauge for engine speed	Scania's gauge for engine speed.	If pin 46 is activated, the droop value is shown on the instrument instead. See the Droop translation table in the Droop or isochronous section.

Pin	I/O	Function	Description	Comments
21	-	CAN low		
24	-	Fine adjustment of nominal engine speed	Zero potential from coordinator for the signal for adjustment of nominal engine speed.	This pin is the zero potential 0 V for the potentiometer for adjustment of the engine speed around the pre-set engine speed. More information is available in the section Fine adjustment of nominal engine speed.
28	-	Fine adjustment of nominal engine speed	Supply voltage from coordinator for the signal for adjustment of nominal engine speed.	This pin is the voltage potential 5 V for the potentiometer for adjustment of the engine speed around the pre-set engine speed. More information is available in the section Fine adjustment of nominal engine speed.
29	-	Governor function	Connection of resistor as per figure creates a stiff or soft governor function. Used in combination with pin 48.	If no resistor net is connected, the standard governor.
30	I	Droop or isochronous	Switching between droop and isochronous engine speed.	If the pin is not connected, the engine can be run with droop. See pin 46 for droop adjustment. If the pin is connected to ground, isochronous operation is possible.
32	I	Engine start (U50)	Engine start via CAN.	The engine is started by connecting the pin to +24 V.
34	I	Engine speed or torque control	Control of engine speed or engine torque.	The function makes it possible to control torque instead of engine speed. The engine default is engine speed control. To control torque, the pin should be connected to ground.
36	I	Switch 2 for nominal engine speed	Switch to change the fixed engine speed which the engine is set to.	The nominal engine speed can be changed by connecting pin 13 and 36 to ground in different combinations. See section Change in nominal engine speed.
40	I	Torque limit switch 2	Used together with torque limit switch 1 to select a preset torque curve.	It is also possible to program two power curves with SDP3. There is a description of how to ground pin 40 and 60 in the Torque limitation section.
45	-	CAN high		
46	I	Droop adjustment	Adjusting the droop value.	If the pin is connected to +24 V the droop value can be adjusted via pin 52 and 53 on the coordinator. The current droop value is displayed on the engine speed gauge. See pin 18 and the Droop translation table in the Droop or isochronous section.
48	-	Ground for the governor function	See pin 29.	
49	-	Battery voltage	Battery voltage for the coordinator.	The pin should be connected to U30.

Pin	I/O	Function	Description	Comments
50	I	Buzzer off	Disconnecting buzzer.	If the pin is connected to ground, the connected buzzer is switched off. The coordinator does not send out a signal on pin 5.
51	I	Engine shutdown	Shutting down the engine.	To stop the engine, the pin should be connected to ground. The engine can also be shut down via the starter lock by disconnecting U15.
52	I	Droop decrease	Decrease in the droop value.	More information is available in the Droop or isochronous section.
53	I	Droop increase	Increase in the droop value.	More information is available in the Droop or isochronous section.
54	I	Fine adjustment of nominal engine speed	Fine adjustment of engine speed around the selected nominal engine speed (output signal 5 V).	• 0.45-3 V equivalent to 0-100% • 0% equivalent to -120 rpm • 100 % equivalent to +120 rpm Between these two, the value changes linearly. The limit values are 0-0.25 V and 4-5 V. If a value is within these intervals, a fault code is generated.
57	I	Disengaging engine shutdown	If the function is active, the engine continues to run even if a fault code is generated which specifies that the engine should stop due to safety reasons.	The function is activated by connecting the pin to U15. An information code is generated which shows that the function is activated. The engine control unit must be programmed for the function.
60	I	Torque limit switch 1	Used together with torque limit switch 2 to select a preset torque curve.	It is also possible to program two power curves with SDP3. There is a description of how to ground pin 40 and 60 in the Torque limitation section.
61	I	Reading flash codes for the engine control unit		Not used.

Change in nominal engine speed

It is possible to change the nominal engine speed set at the factory.

There are 4 alternatives to choose from. The different alternatives are selected by changing pins 13 and 36 on the coordinator in different combinations.

The following combinations are possible:

Value	Pin 13	Pin 36
Factory default	Not connected	Not connected
1,500 rpm	Ground	Not connected
1,800 rpm	Not connected	Ground
Idling speed	Ground	Ground

Fine adjustment of nominal engine speed

The coordinator has a function for fine adjustment of nominal engine speed. This can be used to adjust the engine speed with ±120 rpm. If you wish to use this function, it must be specified when ordering. For fine adjustment of the nominal engine speed, a potentiometer is connected to coordinator pins 24, 28 and 54.

Examples of fine adjustment of nominal engine speed with potentiometer:

54% = (3.0 - 0.45) x 0.54 + 0.45 = 1.827 V => engine speed adjusted by +10 rpm.

Without droop = 1,500 + 10 = 1,510 rpm.

With droop 4% = 1,500 + (0.04 x 1,500) + 10 = 1,570 rpm.

The adjustment range can be changed with SDP3.

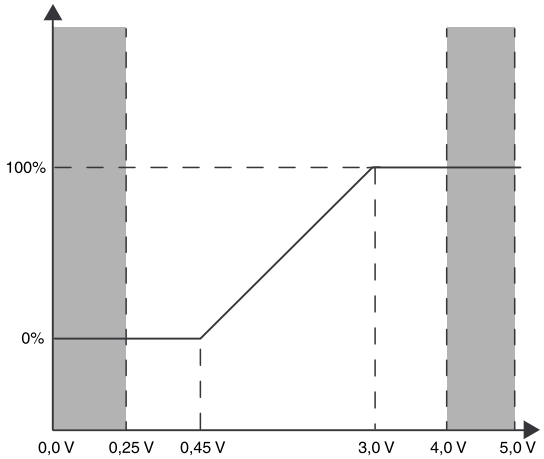
The coordinator has a basic setting so that 0.45-2.97 V corresponds to 0-100% on the potentiometer.

0% equivalent to -120 rpm

100% corresponds to +120 rpm, with a linear change.

Example: 50% (1.725 V) on the potentiometer corresponds to 0 rpm adjustment.

The limit values outside of the adjustment range are 0-0.25 V and 4.0-5.0 V. If a value is within these ranges, a fault code is generated and the engine runs at nominal speed.



If no potentiometer is installed and the coordinator is programmed for one, a fault code will be generated and the engine will run at nominal engine speed.

To achieve nominal engine speed without potentiometer and without fault code generation, a resistor (R1) must be connected between coordinator pins 28 and 54 and another resistor (R2) must be connected between coordinator pins 24 and 54.

The ratio between R1 and R2 should be
R1 = 2.15 x R2.

Scania recommends
R1 = 1,000 ohms and R2 = 470 ohms.

Using SDP3, it is possible to set whether the coordinator should receive a potentiometer signal or not.

Droop or isochronous

In order to obtain a more dynamic system, the engine can be run with droop engine speed increase.

Isochronous engine speed increase means that the engine is operated with 0% droop.

In order to run the engine with droop, pin 30 of the coordinator must not be connected (default setting).

For isochronous engine running, connect pin 30 of the coordinator to ground.

Droop is calculated for full load (100%).

The default value for droop is 4%, but this can be changed from 0 to 20% with SDP3. Contact the supplier for assistance.

The droop value can be changed directly on the coordinator as follows:

1. Activate pin 46 (droop adjustment) by connecting it to U30.
2. Increase the value: Connect pin 52 to and from ground. Each connection increases the droop value by 0.1%.
3. Decrease the value: Connect pin 53 to and from ground. Each connection decreases the droop value by 0.1%.
4. The current droop value can be read from the engine speed gauge (pin 18) when pin 46 is not connected. See the Droop translation table on the next page.
5. Save the set droop value by disconnecting pin 46.

Droop translation table

Read the droop value on the engine speed gauge using the translation table below.

If a frequency gauge is connected to pin 18, the table can be used to read the droop value as a frequency instead.

Droop (%)	Engine speed (rpm)	Frequency (Hz)
0.0	00	0
0.1	50	17
0.2	100	34
0.3	150	52
0.4	200	69
0.5	250	86
0.6	300	104
0.7	350	121
0.8	400	139
0.9	450	156
1.0	500	173
1.1	550	191
1.2	600	208
1.3	650	226
1.4	700	243
1.5	750	260
1.6	800	278

Droop (%)	Engine speed (rpm)	Frequency (Hz)
1.7	850	295
1.8	900	313
1.9	950	330
2.0	1,000	347
2.1	1,050	365
2.2	1,100	382
2.3	1,150	400
2.4	1,200	417
2.5	1,250	434
2.6	1,300	452
2.7	1,350	469
2.8	1,400	486
2.9	1,450	504
3.0	1,500	521
3.1	1,550	539
3.2	1,600	556
3.3	1,650	573

Droop (%)	Engine speed (rpm)	Frequency (Hz)
3.4	1,700	591
3.5	1,750	608
3.6	1,800	626
3.7	1,850	643
3.8	1,900	660
3.9	1,950	678
4.0	2,000	695
4.1	2,050	713
4.2	2,100	730
4.3	2,150	747
4.4	2,200	765
4.5	2,250	782
4.6	2,300	800
4.7	2,350	817

Droop (%)	Engine speed (rpm)	Frequency (Hz)
4.8	2,400	834
4.9	2,450	852
5.0	2,500	869
5.1	2,550	886
5.2	2,600	904
5.3	2,650	921
5.4	2,700	939
5.5	2,750	956
5.6	2,800	973
5.7	2,850	991
5.8	2,900	1,008
5.9	2,950	1,026
6.0	3,000	1,043

Torque and engine speed control

If pin 34 of the coordinator is connected to ground, the system begins to regulate the torque instead of the engine speed.

The user can now set the load from 0 to 100% with the potentiometer, i.e. from idling to full load with coordinator pins 24, 28 and 54.

Engine speed must then be regulated by an external network. If pin 34 on the coordinator is not connected, the user regulates the engine speed.

Industrial engines

Coordinator inputs and outputs

The illustration shows a schematic description of the coordinator inputs and outputs (I/O).

IMPORTANT!

To prevent the engine control unit from generating fault codes, the following pins in the coordinator must be connected:

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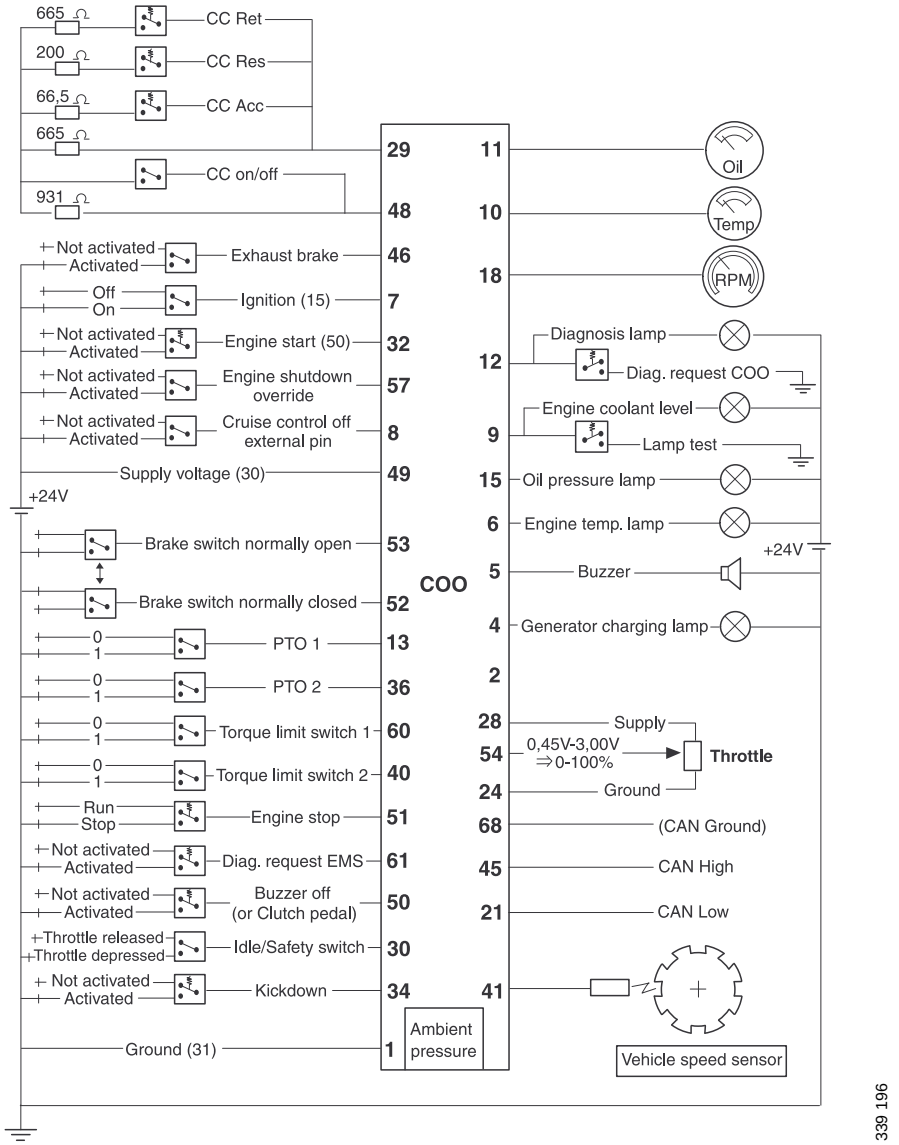

Pin	I/O	Function	Description	Comments
1	-	Ground	Ground for coordinator.	
4	O	Warning lamp for alternator	Lights in the event of an alternator fault.	A CAN message is sent to the coordinator if an alternator does not charge correctly. The coordinator then sends out +24 V and the warning lamp lights. Note: The lamp must be a bulb.
5	O	Buzzer	Signal in the event of an engine alarm.	The coordinator sends out +24 V in the event of an engine alarm.
6	O	Warning lamp for coolant temperature	Lights when the coolant temperature is too high.	The coordinator sends out ground if the coolant temperature is too high. Note: The lamp must be a bulb.
7	I	Drive position	Starter key in the drive position.	Should be connected to U15 when it is active.
8	I	Cruise control off	Disconnects speed adjustment functions.	Connected to U30 to deactivate selected speed adjustment function.
9	O/I	Warning lamp for low coolant level or lamp test	The pin has two different functions: • To light an indicator lamp when the coolant level is too low. • To carry out a lamp test.	The coolant level monitor is connected to the engine control unit. When the coolant level is too low, the coordinator sends out ground on the pin and the warning lamp lights. If the pin is connected to ground, a lamp test is carried out on pins 4, 5, 6, 15, 9 and 12. The lamp test is active as long as pin 9 is connected to ground. Note: The lamp must be a bulb.
10	O	Gauge for coolant temperature	Gauge displaying the engine coolant temperature.	If a Scania instrument is not used, an instrument should be used which can be configured with the PWM signal. See the section Configuring coolant temperature gauge.
11	O	Gauge for oil pressure	Gauge displaying the engine oil pressure.	If a Scania instrument is not used, an instrument should be used which can be configured with the PWM signal. See the section Configuring oil pressure gauge.
12	O/I	Diagnostics lamp	Shows if there is an active fault code for the coordinator or engine control unit.	
13	I	Engine speed setting 1		The function is activated by connecting the pin to ground. More information is available in the sections Engine speed setting 1 and 2.
15	O	Warning lamp for low oil pressure	Lights when oil pressure is too low.	Ground is sent out from this pin when the oil pressure is too low. Note: The lamp must be a bulb.
18	O	Gauge for engine speed	Scania's gauge for engine speed.	Frequency X 2.88 gives the engine speed.
21	-	CAN low		

Pin	I/O	Function	Description	Comments
24	-	Ground for accelerator pedal	Connected directly to the coordinator.	Must not be connected to battery ground.
28	-	Supply to accelerator pedal	+5 V directly from the coordinator.	
29	I	Adjust 1	Used in combination with pin 48 to set the engine speed.	• To activate, 665 ohms between pin 29 and 48. • To deactivate, 1,596 ohms between pin 29 and 48. • To increase, 61 ohms between pin 29 and 48. • To save, 154 ohms between pin 29 and 48. • To reduce, 332 ohms between pin 29 and 48.
30	I	Idling switch	Signals to the coordinator that the accelerator pedal is fully functional.	The function is activated by connecting the pin to ground. If the function should be deactivated, the pin must not be connected. It should be activated when the throttle signal is in the range 0.4-20%. If it is not activated between the set values, a fault code is generated and the throttle control stops to function.
32	I	Engine start (U50)	Engine start via CAN.	Connect the pin to +24 V to start the engine.
34	I	Kickdown signal	Signals to the coordinator that the accelerator pedal is fully depressed. The function must be ordered.	The function is activated by connecting the pin to ground. It is activated or is deactivated over 3 V and under 4 V. The function does not need to be engaged. The only requirement is that the throttle is at 100% if it is to be activated. If the function is activated before the throttle is at 100%, a fault code is generated but the throttle control is functioning. The function must be activated when the throttle control is at 100% in order to get a temporary power increase. No fault code is generated if the function is deactivated.
36	I	Engine speed setting 2		See pin 13.
40	I	Torque limit switch 2	Used together with torque limit switch 1 to select a preset torque curve.	It is also possible to program two power curves with SDP3. There is a description of how to ground pin 40 and 60 in the Torque limitation section.
41	I	Vehicle speed		Not used.
45	-	CAN high		
46	I	Exhaust brake	Activated by connecting to U30.	The engine should have an electrically controlled exhaust brake, and the function should be activated with SDP3.

Pin	I/O	Function	Description	Comments
48	I	Adjust 2	See pin 29.	
49	-	Battery voltage	Battery voltage for the coordinator.	The pin should be connected to U30.
50	I	Buzzer off	Disconnecting buzzer.	If this pin is connected to ground, the connected buzzer is switched off. The coordinator does not send out a signal on pin 5.
51	I	Engine shutdown	Shutting down the engine.	To stop the engine, the pin should be connected to ground. The engine can also be shut down via the starter lock by disconnecting U15.
52	I	Low idle speed adjustment 1	Connected to ground.	When the brake pedal is activated, both pins should be in alternate positions, i.e. pin 4 should be connected to ground and pin 5 should remain disconnected. These 2 pins work together for safety reasons, and should be in alternate positions all the time.
53	I	Low idle speed adjustment 2	Not connected.	
54	I	Accelerator pedal signal	Signal from the throttle control to the coordinator.	The basic value for signal level is 0.45-3 V[1] => 0-100%. The signal level 0-100% can be set using SDP3.
57	I	Disengaging engine shutdown	If the function is active, the engine continues to run even if a fault code is generated which specifies that the engine should stop due to safety reasons.	The function is activated by connecting the pin to U15. An information code is generated which shows that the function is activated. The engine control unit must be programmed for the function.
60	I	Torque limit switch 1	Used together with torque limit switch 2 to select a preset torque curve.	It is also possible to program two power curves with SDP3. There is a description of how to ground pin 40 and 60 in the Torque limitation section.
61	I	Reading flash codes for the engine control unit		Not used.

1. For PDE engines, 0.485-2.693 V applies.

Marine engines

Coordinator inputs and outputs

The illustration shows a schematic description of the coordinator inputs and outputs (I/O).

IMPORTANT!

To prevent the engine control unit from generating fault codes, the following pins in the coordinator must be connected:

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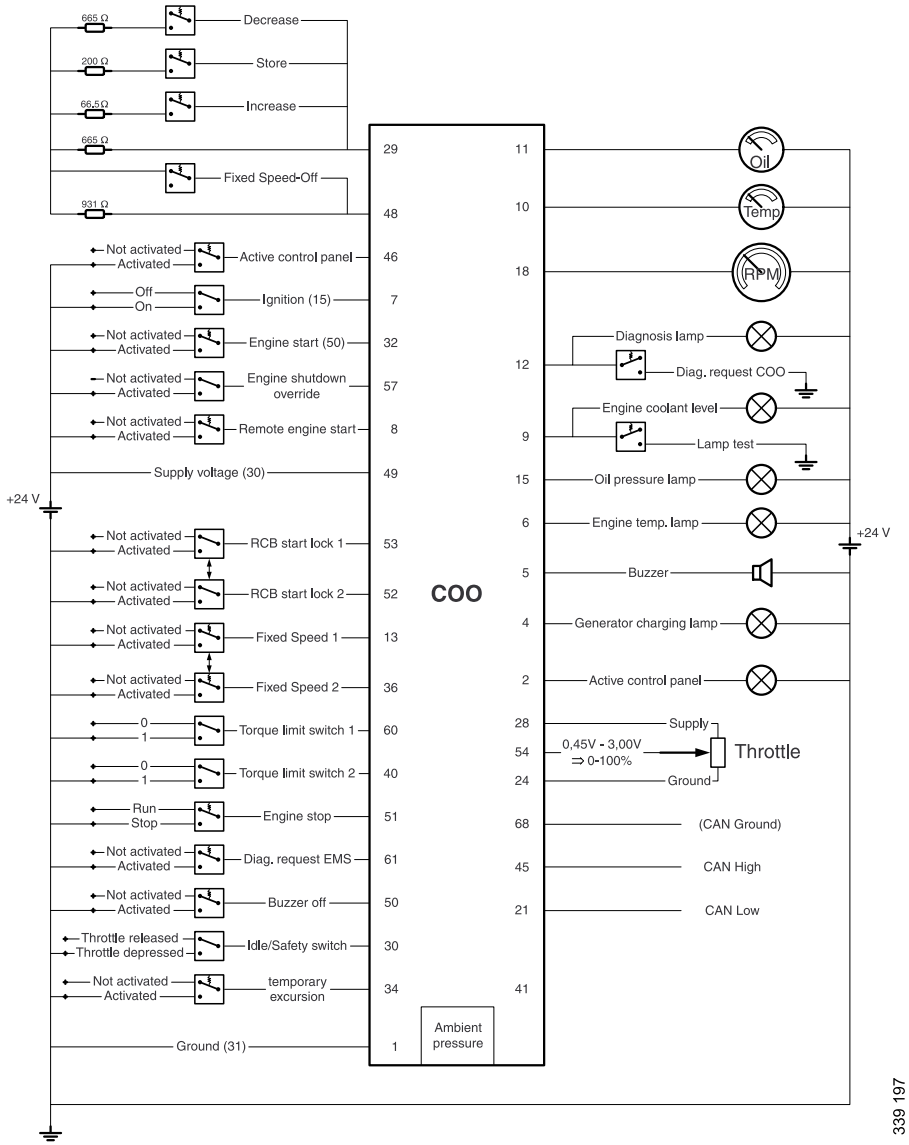


Pin	I/O	Function	Description	Comments
1	-	Ground	Ground for coordinator.	
4	O	Warning lamp for alternator	Lights in the event of an alternator fault.	A CAN message is sent to the coordinator if an alternator does not charge correctly. The coordinator then sends out +24 V and the warning lamp lights. Note: The lamp must be a bulb.
5	O	Buzzer	Signal in the event of an engine alarm.	The coordinator sends out +24 V in the event of an engine alarm.
6	O	Warning lamp for coolant temperature	Lights when the coolant temperature is too high.	The coordinator sends out ground if the coolant temperature is too high. Note: The lamp must be a bulb.
7	I	Drive position	Starter key in the drive position.	Should be connected to U15 when it is active.
8	I	Remote engine start	Starts the engine remotely.	When the pin is connected to +24 V, the starter motor runs and the engine only runs at idling.
9	O/I	Warning lamp for low coolant level or lamp test	The pin has two different functions: • To light an indicator lamp when the coolant level is too low. • To carry out a lamp test.	The coolant level monitor is connected to the engine control unit. When the coolant level is too low, the coordinator sends out ground on the pin and the warning lamp lights. If the pin is connected to ground, a lamp test is carried out on pins 4, 5, 6, 15, 9 and 12. The lamp test is active as long as pin 9 is connected to ground. Note: The lamp must be a bulb.
10	O	Gauge for engine temperature	Pulse width modulated (PWM) signal which is a function of the engine temperature.	If a Scania instrument is not used, an instrument should be used which can be configured with the PWM signal.
11	O	Gauge for oil pressure	Gauge displaying the engine oil pressure.	If a Scania instrument is not used, an instrument should be used which can be configured with the PWM signal. See the section Configuring oil pressure gauge.
12	O/I	Diagnostics lamp	Shows if there is an active fault code for the coordinator or engine control unit.	
13	I	Fixed engine speed 1	Use of a fixed engine speed between low and high idling.	The function is activated by connecting the pin to ground via a spring-loaded switch.
15	O	Warning lamp for low oil pressure	Lights when oil pressure is too low.	Ground is sent out from this pin when the oil pressure is too low.
				Note: The lamp must be a bulb.
18	O	Gauge for engine speed	Scania's gauge for engine speed.	Frequency x 2.88 = the engine speed.

Pin	I/O	Function	Description	Comments
21	-	CAN low		
24	-	Ground for accelerator pedal	Connected directly to the coordinator.	Must not be connected to battery ground.
28	-	Supply to accelerator pedal	+5 V directly from the coordinator.	
29	I	Adjust 1	Used in combination with pin 48 to set the engine speed.	• To activate, 665 ohms between pin 29 and 48. • To deactivate, 1,596 ohms between pin 29 and 48. • To increase, 61 ohms between pin 29 and 48. • To save, 154 ohms between pin 29 and 48. • To reduce, 332 ohms between pin 29 and 48.
30	I	Idling switch	Signals to the coordinator that the accelerator pedal is fully functional.	The function is activated by connecting the pin to ground. If the function should be deactivated, the pin must not be connected. It should be activated when the throttle signal is in the range 0.4-20%. If it is not activated between the set values, a fault code is generated and the throttle control stops to function.
32	I	Engine start (U50)	Engine start via CAN.	The engine is started by connecting the pin to +24 V.
34	I	Temporary surplus gas		Not used.
36	I	Fixed engine speed 2	Use of a fixed engine speed between low and high idling.	The function is activated by connecting the pin to ground via a spring-loaded switch.
40	I	Torque limit switch 2	Used together with torque limit switch 1 to select a preset torque curve.	It is also possible to program two power curves with SDP3. There is a description of how to ground pin 40 and 60 in the Torque limitation section.
41	I	Vehicle speed		Not used.
45	-	CAN high		
46	I	Active control panel		Not used.
48	I	Adjust 2	See pin 29.	
49	-	Battery voltage	Battery voltage for the coordinator.	The pin should be connected to U30.
50	I	Buzzer off	Disconnecting buzzer.	If this pin is connected to ground, the connected buzzer is switched off. The coordinator does not send out a signal on pin 5.

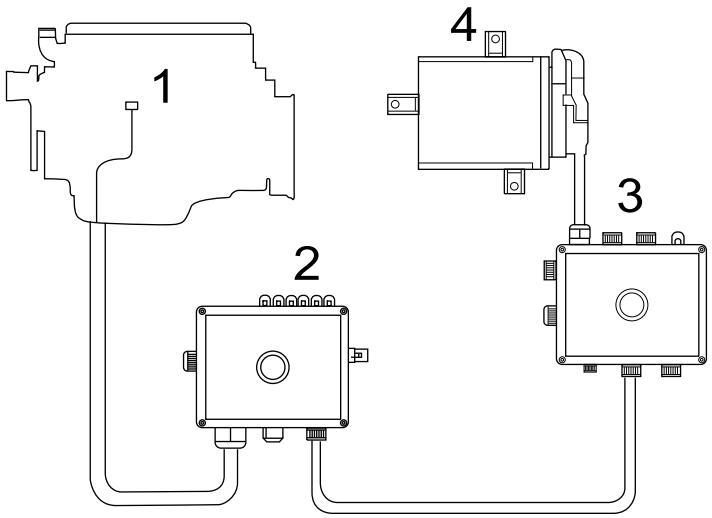
Pin	I/O	Function	Description	Comments
51	I	Engine shutdown	Shutting down the engine.	To stop the engine, the pin should be connected to ground. The engine can also be shut down via the starter lock by disconnecting U15.
52	I	Remote control lock 2	Blocks operation from positions other than the remote control.	When the pin is connected to ground, the engine cannot be run from the normal position.
53	I	Remote control lock 1	Blocks operation from positions other than the remote control.	When the pin is connected to ground, the engine cannot be run from the normal position.
54	I	Accelerator pedal signal	The signal from the throttle control to the coordinator.	The basic value for signal level is 0.485-2.693 V => 0-100%. The signal level 0-100% can be set using SDP3.
57	I	Disengaging engine shutdown	If the function is active, the engine continues to run even if a fault code is generated which specifies that the engine should stop due to safety reasons.	The function is activated by connecting the pin to U15. An information code is generated which shows that the function is activated. The engine control unit must be programmed for the function.
60	I	Torque limit switch 1	Used together with torque limit switch 2 to select a preset torque curve.	It is also possible to program two power curves with SDP3. There is a description of how to ground pin 40 and 60 in the Torque limitation section.
61	I	Reading flash codes for the engine control unit		Not used.

Base system for industrial engines

The base system is easy to connect without any major adaptations.

It can be supplemented with an accelerator pedal sensor, analogue instrument panel, control panel with key switch and digital display. All these accessories are connected and are ready for immediate use.

Other units can also be connected via the CAN network.

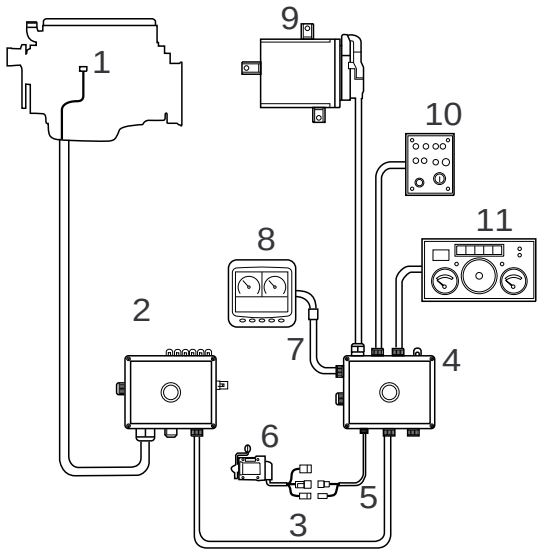


Base system for industrial engines

1. *Engine control unit*
2. *Main junction box*
3. *Coordinator junction box*
4. *Coordinator*

A base system for industrial engines is shown here with Scania units connected.

All connectors on the main junction box and the coordinator junction box are listed on the following pages. The functions of the connectors are also described here. The purpose is to show how an electrical system other than Scania's is connected.



339 199

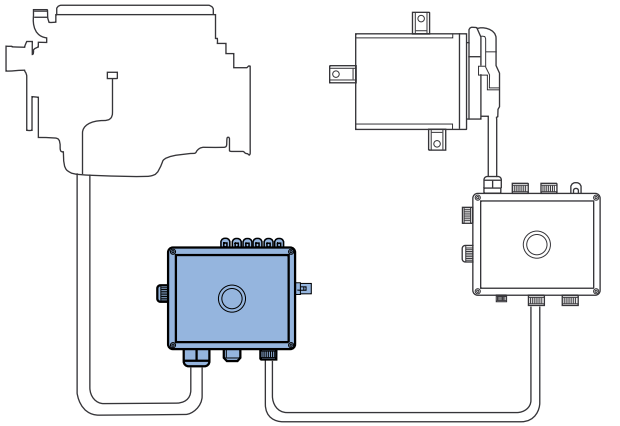
Base system for industrial engines with Scania units connected

1. *Engine control unit*
2. *Main junction box*
3. *Connection cable: 2, 8, 12 or 24 m*
4. *Coordinator junction box*
5. *Extension cable: 2 or 8 m*
6. *Accelerator pedal sensor*
7. *Extension cable: 2 m*
8. *Scania digital display*
9. *Coordinator*
10. *Control panel*
11. *Analogue instrument panel*

Connection to main junction box

The main junction box is located between the engine control unit on the engine and the rest of the system.

It has four connectors for connecting other items to the external electrical system.

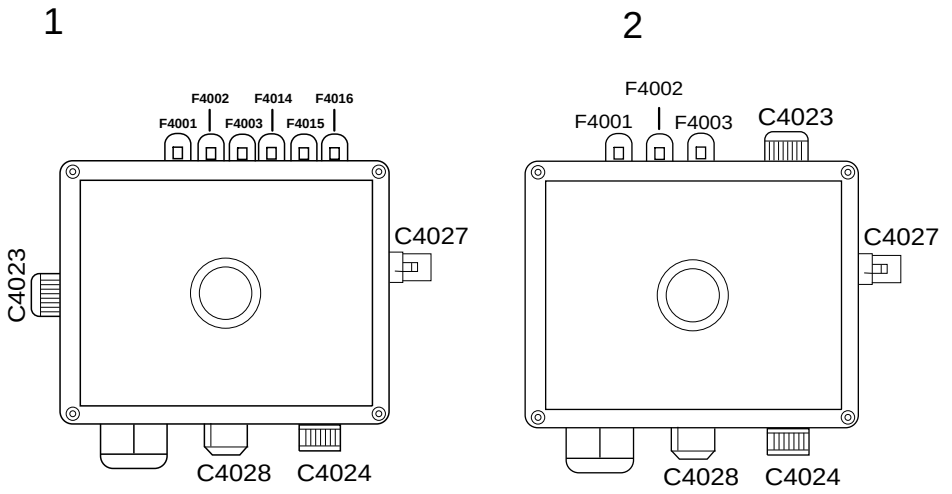


Main junction box

Fuses

The main junction box has 3 or 6 fuses depending on engine emission class. The fuses are positioned next to each other along one of the long sides of the junction block.

Emission class	Designation	Description
All	F4001	Miniature circuit breaker of 20 A for U30 to the engine control unit.
	F4002	Miniature circuit breaker of 20 A for U30 to the engine control unit.
	F4003	Miniature circuit breaker of 8 A for U30 to the instruments.
Stage IV/ Tier 4f only	F4014	Miniature circuit breaker of 20 A for U30 to the variable geometry turbocharger.
	F4015	Miniature circuit breaker of 20 A for U30 to the SCR system.
	F4016	Miniature circuit breaker of 20 A for U15 to the exhaust brake actuator.



1. *Main junction box for Stage IV/Tier 4f*
2. *Main junction box for Stage III B/Tier 4i and less restrictive emission laws*

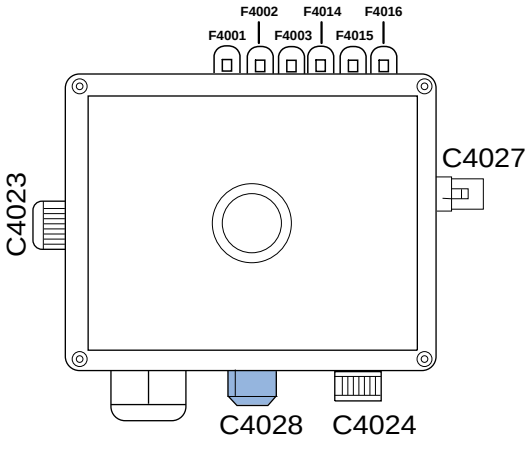
Connector C4028 for CAN connection

Diagnostic socket for connecting e.g. SDP3 and CAN communication. Use connector 1 508 055.

Note:

Any equipment connected to the connector must comply with the CAN specification.

Pin	I/O	Function	Description
1	-	U15	+24 V after fuse F4005 and relay in the junction box. Controlled by the starter lock.
2	-	Ground	
3	-	CAN high	
4	-	CAN low	



Use the following tools for connector 1 508 055:

- Hand crimping tool 99 494.
- Dismantling tool 99 581.

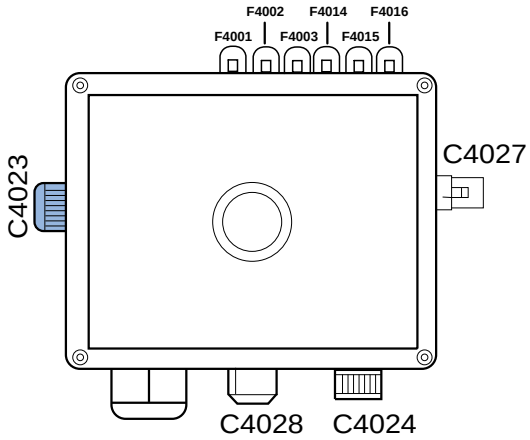
Connector C4023 for engine running signal

Connector for signal that the engine is running. When the engine is running, +24 V is sent out to pin 2. Use connector 1 508 055.

Pin	I/O	Function	Description
1	-	-	Not used.
2	O	Engine operating mode	The pin receives +24 V from the engine control unit when the engine has started.
3	-	Ground	
4	-	-	Not used.

Use the following tools for connector 1 508 055:

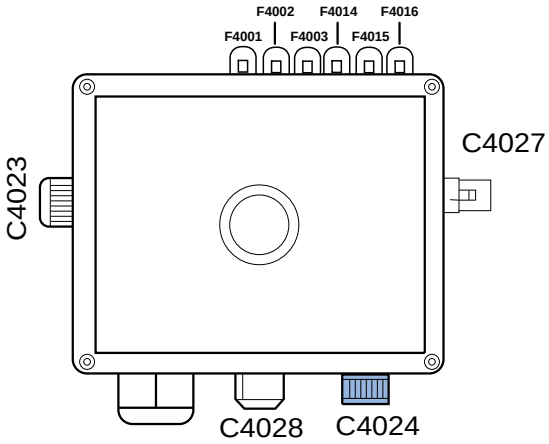
- Hand crimping tool 99 494.
- Dismantling tool 99 581.



Note: For engines certified according to Stage III B/Tier 4i and less restrictive emission laws, C4023 is located next to the fuses on one of the long sides of the main junction box.

Connector C4024 for junction box

Connector for electrical cable to junction box.



Connector C4027 for connecting emergency stop

Connector for connecting an emergency stop. The emergency stop disconnects the voltage to the engine control unit.

Pin	I/O	Function	Description
1	-	U30	Battery voltage
2	-	U30	Supply to engine control unit
3	-	U30	Battery voltage
4	-	U30	Supply to engine control unit

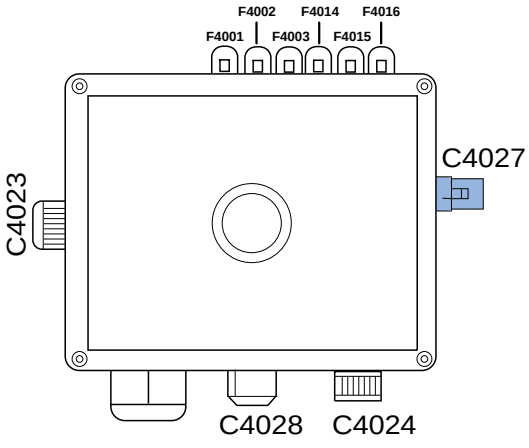
Remove the plug in the connector. Then use connector 1 845 823, which is supplied with the engine.

Use the following tools for connector 1 845 823:

- Hand crimping tool 588 206.
- Dismantling tool 99 591.

Then connect pin 1 and 3 to a switch. Route the cables back to pin 2 and 4 in connector C4027.

Now it is possible to break the main power circuit. If an emergency situation arises and the engine must be stopped quickly, this switch can be used. If the power to the system is cut 10[1] times in a row in this way, a fault code is generated which indicates that the engine has been stopped incorrectly.

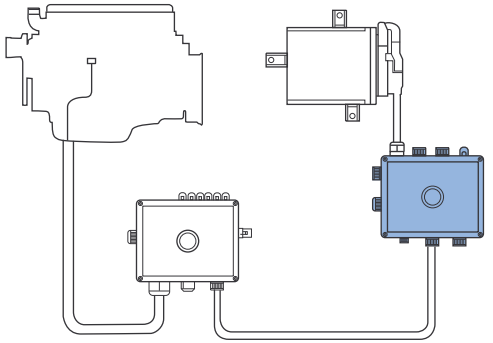


1. Adjustable parameter.

Connection to coordinator junction box

The coordinator junction box is a fuse box which is the link between the coordinator and the rest of the system via a 70-pin connector.

In addition, it has 7 connectors for connecting other items.



339 497

Coordinator junction box

Fuses

The coordinator junction box for has 4 fuses.

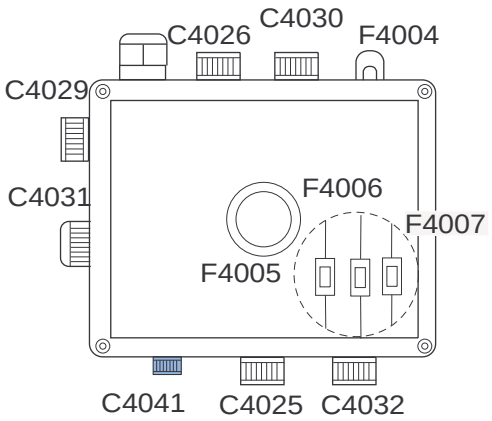
Designation	Description
F4004	Miniature circuit breaker of 8 A for U15, located on one of the long sides of the junction box. It prevents engine stop in the event of a short circuit of a lamp or a switch etc. in the instrument panel.
F4005	A 7.5 A fuse for U15 which is installed by the customer inside the junction box. It prevents engine stop in the event of a disruption or short circuit from a customer system.
F4006	Fuse of 2 A for U30 to the instruments.
F4007	Fuse of 2 A for U15 to the instruments.

Connector C4041 for connecting throttle control

Connector for connecting Scania throttle control or equivalent equipment. Use connector 1 507 253, which is supplied with the engine.

Pin	I/O	Function	Pin on coordinator.[1]	Comments
1	-	Ground		
2	I	Idling switch	30	
3	-	Supply to accelerator pedal	28	The electrical cables should be twisted 40 turns per metre.
4	-	Ground for accelerator pedal	24	May only be connected to pin 24 on the coordinator, not to the battery negative terminal. The electrical cables should be twisted 40 turns per metre.
5	I	Accelerator pedal signal	54	The electrical cables should be twisted 40 turns per metre.
6	-	Ground		
7	I	Kickdown signal	34	

1. The functions on the pins are described in the list of coordinator inputs and outputs for industrial engines.



339 204

Use the following tools for connector 1 507 253:

- Hand crimping tool 99 494.
- Dismantling tool 99 581.

Connector C4029 and C4031 for CAN connection

Diagnostic socket for connecting e.g. SDP3 and CAN communication. Use connector 1 508 055.

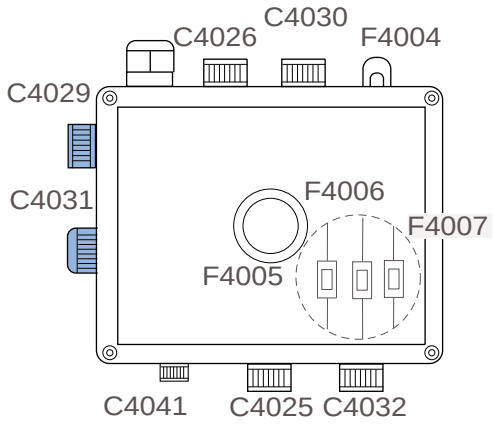
Note:

Any equipment connected to the connector must comply with the CAN specification.

Pin	I/O	Function	Description
1	O	U15	+24 V after fuse F4005 and relay in the junction box. Controlled by the starter lock.
2	O	Ground	Ground
3	-	CAN high	
4	-	CAN low	

Use the following tools for connector 1 508 055:

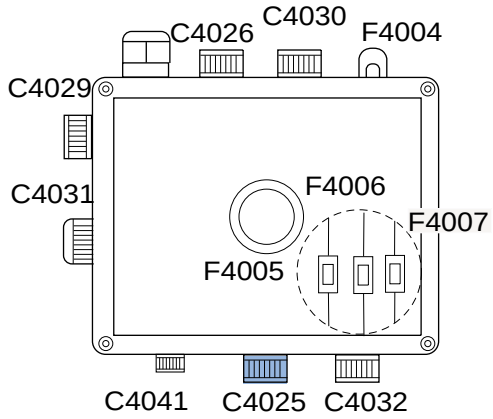
- Hand crimping tool 99 494.
- Dismantling tool 99 581.



339 205

Connector C4025 for connection to main junction box

Connector for connecting the junction box to the main junction box.

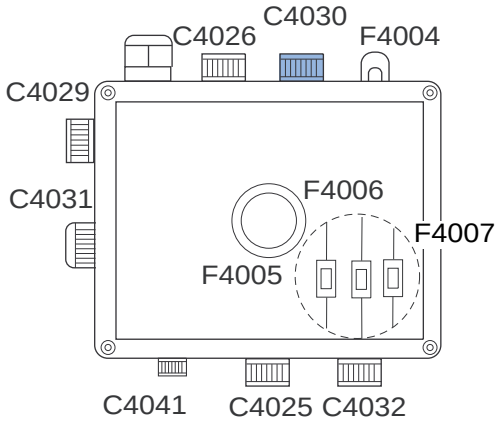


339 206

Connector C4030 for connecting instrumentation

Connector for connecting an analogue instrument panel. Use connector 1 725 857.

Pin	I/O	Function	Pin on co-ordinator.[1]	Comments
1	O	U30		Battery voltage.
2	O	U15		+24 V after fuse F4004 in the junction box. Controlled by the starter lock.
3	O	Ground		
4	O	Buzzer	5	
5	I	Buzzer off	50	
6	O	Warning lamp + for SCR malfunction and torque reduction. The signal comes from the engine control unit.	-	Pin 5 on C4002. The pin is not used on marine engines.
7	-	CAN high	45	
8	-	CAN low	21	
9	-	Not used		
10	-	Not used		
11	O	Warning lamp + for low reductant level. The signal comes from the engine control unit	-	Pin 3 on C4002. The pin is not used on marine engines.
12	O	Warning lamp - for low reductant level. The signal comes from the engine control unit.	-	Pin 4 on C4002. The pin is not used on marine engines.



339 207

Pin	I/O	Function	Pin on co-ordina-tor.[1]	Comments
13	I	Lamp test	9	
14	O	Warning lamp - for SCR mal-function and torque reduction, the signal comes from the en-gine control unit	-	Pin 6 on C4002. The pin is not used on marine en-gines.

1. The functions on the pins are described in the list of coordinator inputs and outputs for industrial engines.

Use the following tools for connector 1 725 857:

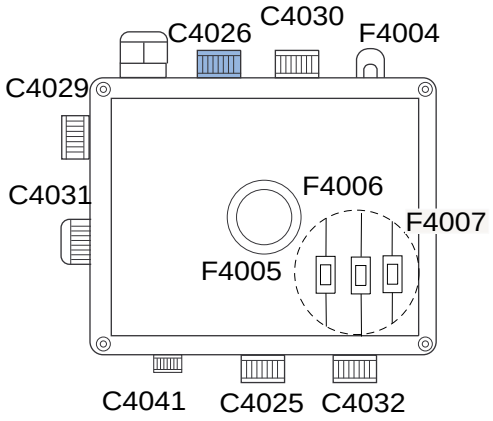
- Hand crimping tool 99 491.
- Dismantling tool 99 582.

Connector C4026 for connecting control panel

Connector for the Scania control panel or equivalent equipment. Use connector 1 505 531.

IMPORTANT!

When connecting to connector C4026, a resistor should be connected between pin 10 and 11, otherwise a fault code is generated.



339 208

Pin	I/O	Function	Pin on co-ordina-tor.[1]	Comments
1	O	U30		Battery voltage.
2	I	U15		+24 V after the starter lock, not fused.
3		Not used		
4	O	Ground		
5	I	Engine start (U50)	32	
6-9	-	Not used		
10	I	Adjust 1	29	A fault code is generated if the pins are not used. A resistor should be connected between pin 10 and 11.
11	I	Adjust 2	48	
12	I	Engine speed setting 1	13	
13	I	Engine speed setting 2	36	
14		Not used		
15	I	Engine shutdown	51	

Pin	I/O	Function	Pin on co-ordina-tor.[1]	Comments
16-24	-	Not used		

1. The functions on the pins are described in the list of coordinator inputs and outputs for industrial engines.

Use the following tools for connector 1 505 531:

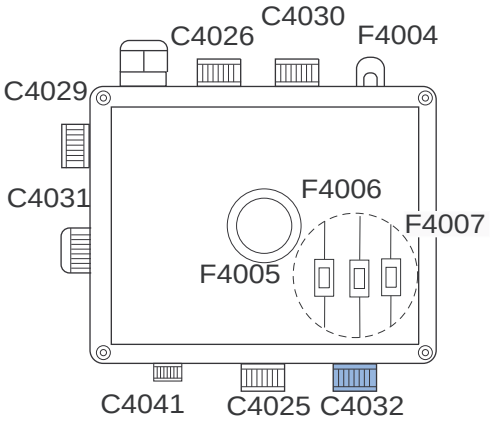
- Hand crimping tool 99 491.
- Dismantling tool 99 582.

Connector C4032 for connecting extra functions

Connector for connecting extra functions. Use connector 1 725 857.

Pin	I/O	Function	Pin on co-ordinator.[1]	Comments
1	O	Ground		
2	I	Engine speed setting 1	13	See section Engine speed setting 1 and 2.
3	I	Engine speed setting 2	36	
4	I	Low idle speed adjustment 1	52	Should be connected to ground, otherwise a fault code is generated.
5	I	Low idle speed adjustment 2	53	Not connected.
6	I	Torque limit switch 1	60	
7	I	Torque limit switch 2	40	
8-10	-	Not used		
11	I	Disengaging engine shutdown	57	
12	I	Exhaust brake	46	
13	I	Cruise control off	8	
14	O	U30		Battery voltage. Fused with 7.5 A.

1. The functions on the pins are described in the list of coordinator inputs and outputs for industrial engines.



339 209

Use the following tools for connector 1 725 857:

- Hand crimping tool 99 491.
- Dismantling tool 99 582.

Base system for marine engines

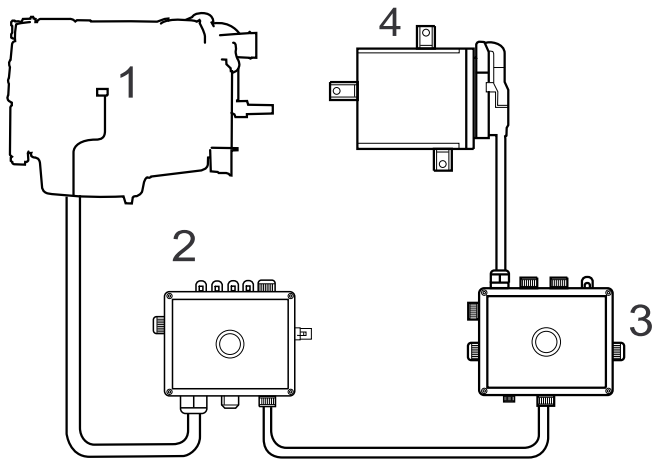
Note:

The following pages list the connectors on the main junction box and the coordinator junction box which are unique to the base system for marine engines. Other connectors are described in the Base system for industrial engines section.

The base system is easy to connect without any major adaptations.

It can be supplemented with an accelerator pedal sensor, analogue instrument panel, control panel with key switch, remote control and digital display. All these accessories are connected and are ready for immediate use.

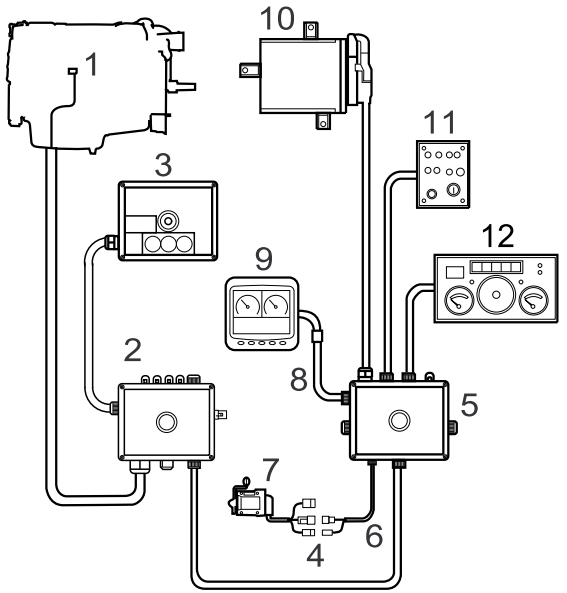
Other units can also be connected via the CAN network.



Base system for marine engines

1. *Engine control unit*
2. *Main junction box*
3. *Coordinator junction box*
4. *Coordinator*

A base system for marine engines is shown here with Scania units connected.



339 211

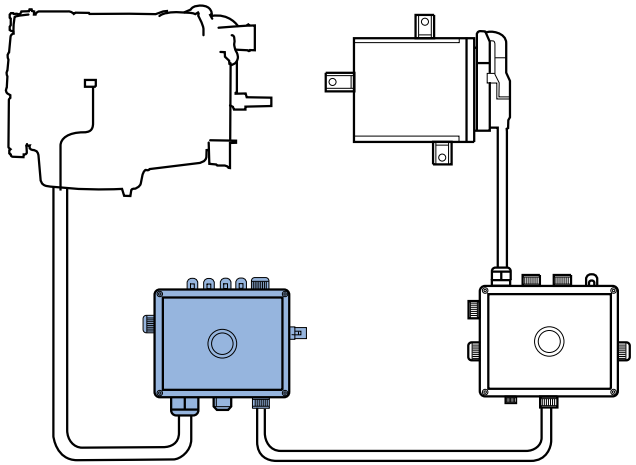
Base system for marine engines with Scania units connected

1. *Engine control unit*
2. *Main junction box*
3. *Remote control*
4. *Connection cable: 2, 8, 12 or 24 m*
5. *Coordinator junction box*
6. *Extension cable: 2 or 8 m*
7. *Accelerator pedal sensor*
8. *Extension cable: 2 m*
9. *Scania digital display*
10. *Coordinator*
11. *Control panel*
12. *Analogue instrument panel*

Connection to main junction box

The main junction box is located between the engine control unit on the engine and the rest of the system.

It has five connectors for connecting other items to the external electrical system. One of the connectors is unique for the base system for marine engines – C4404. The other four connectors are described under the heading Connection to main junction box in the Base system for industrial engines section.



339 218

Main junction box

Fuses

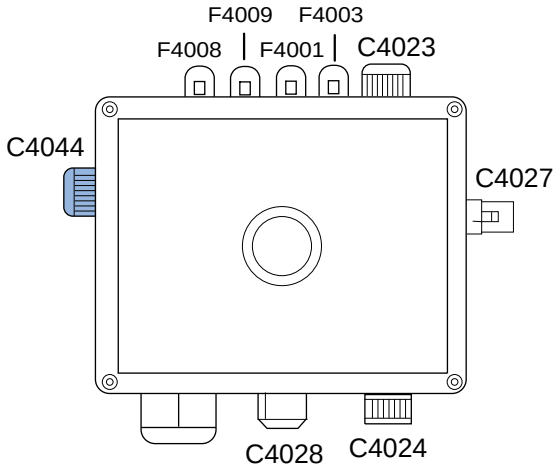
The main junction box has 4 fuses. They are positioned next to each other along one of the long sides of the junction block.

Designation	Description
F4001	Miniature circuit breaker of 20 A for U30 to the engine control unit.
F4003	Miniature circuit breaker of 8 A for U30 to the instruments.
F4008	Miniature circuit breaker of 20 A for U31 to the engine control unit.
F4009	Miniature circuit breaker of 8 A for U31 to the instruments.

Connector C4044 for connecting remote control

Connector for connecting a remote control. Use connector 1 507 253, which is supplied with the engine.

Pin	I/O	Function	Description	Comments
1	I	Remote control lock 1	Blocks operation from positions other than the remote control.	When the pin is connected to ground, the engine cannot be run from the normal position.
2	I	Remote control lock 2	Blocks operation from positions other than the remote control.	When the pin is connected to ground, the engine cannot be run from the normal position.
3	I	Engine start (U50)	Starts the engine.	When the pin is connected to +24 V, the starter motor runs and the engine only runs at idling.
4	-	+24 V (U30)	Power supply to the remote control.	Direct supply from the battery. Fuse, 20 A.
5	-	Ground	Ground for the remote control.	
6	I	Engine shutdown	Shutting down the engine.	To stop the engine, the pin should be connected to ground. The engine can also be shut down via the starter lock by disconnecting U15.
7	O	Indicator lamp	+24 V when the remote control lock is activated.	The signal from S6 indicates that this position is active.



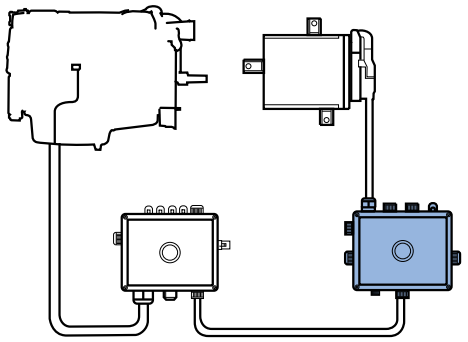
Use the following tools for connector 1 507 253:

- Hand crimping tool 99 494.
- Dismantling tool 99 581.

Connection to coordinator junction box

The coordinator junction box is a fuse box which is the link between the coordinator and the rest of the system via a 70-pin connector.

In addition, it has 7 connectors for connecting other items. One of the connectors is unique for the base system for marine engines – C4045. The other six connectors are described under the heading Connection to junction box in the Base system for industrial engines section. The four fuses of the junction box are also described there.



339 219

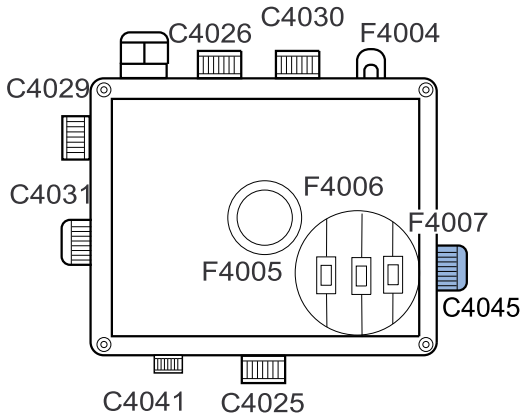
Coordinator junction box

Connector C4045 for connecting extra functions

Connector for connecting extra functions. Use connector 1 508 055.

Pin	I/O	Function	Pin on coordinator.[1]
1	I	Disengaging engine shutdown	57
2	-	Ground	
3	I	Torque limit switch 2	40
4	I	Torque limit switch 1	60

1. The functions on the pins are described in the list of Coordinator inputs and outputs for marine engines.



339 213

Use the following tools for connector 1 508 055:

- Hand crimping tool 99 494.
- Dismantling tool 99 581.

Extra functions

Industrial and marine engines

Throttle control

There are three alternative ways to increase engine speed.

1. With Scania throttle control which is connected to the coordinator junction box.
2. With your own throttle control via the CAN network if this has been ordered.
3. With your own analogue throttle control which is connected to the junction box.

Engine speed adjustment

There are three ways of changing the set idling speed on an engine:

1. Using Scania's control panel.
2. Using the Scania digital display.
3. Using SDP3.

Torque limitation

For industrial engines, torque limitation is routed to pin 6 and 7 on the junction box connector C4032. For marine engines, torque limitation is routed to pin 3 and 4 on the junction box connector C4045.

Using this function, it is possible to choose which power curve the engine should follow. Most engine types only have one standard curve: maximum engine torque. Some engine types also have a lower standard curve.

For S8 it is possible to program one customised power curve using SDP3. For S6 it is possible to program two customised power curves using SDP3. These curves can be selected by activating torque limit switches 1 and 2 in different combinations according to the table. The two customised power curves can only be set lower than the standard curve.

Torque limit switch 1 - pin 60 on coordinator	**Torque limit switch 2 - pin 40 on coordinator**	**Curve**
Not connected	Not connected	"0", maximum engine torque
Ground	Not connected	"1", maximum engine torque/other and lower engine torque requested
Not connected	Ground	"2", customised, engine control unit S6
Ground	Ground	"3", customised, engine control unit S6 and S8

Industrial engines only

Engine speed setting 1 and 2

Engine speed setting 1 and 2 are routed to pin 2 and 3 on the junction box connector C4032.

The function can be used to control the engine speed in different ways, e.g. setting a fixed engine speed. Using the setting buttons on the control panel, the engine speed can be changed between low and high idling.

The engine speed can also be changed and saved using the functions Adjust 1 and Adjust 2 on pin 10 and 11 in connector C4026.

The following functions are available:

Function	Engine speed setting 1	Engine speed setting 2
Normal hand throttle	-	-
Limited hand throttle	Ground	-
Fixed raised idling speed	-	Ground
Fixed engine speed	Ground	Ground

Engine speed setting 1 and 2 can be used together with power take-off operation.

Normal hand throttle

Maximum engine speed and maximum engine torque can be set using SDP3. It is also possible to set maximum engine torque using the Scania digital display.

It is also possible to change the engine speed between low and high idling using the functions Adjust 1 and 2 in connector C4026. The functions are described at pin 29 in the list for the industrial engine coordinator. The following can be done:

- Activate: Activates the functions.
- Deactivate: Switches off the functions.
- Increase: Increases the engine speed. A short signal increases the engine speed by 20 rpm while a signal longer than 0.5 s increases the engine speed until the signal stops.
- Decrease: Decreases the engine speed. A short signal decreases the engine speed by 20 rpm while a signal longer than 0.5 s decreases the engine speed until the signal stops.
- Save: Saves the current engine speed if the signal is at least 3 s; a short signal makes the engine speed return to the last saved value.

The function can be deactivated in two ways:

1. Via Activate using Adjust 1 and 2.
2. Activate Cruise control off: C4032 pin 13 to +24 V.

Limited hand throttle

Limited hand throttle functions in the same way as Normal hand throttle. It is also possible to set if it should be possible to overspeed using the accelerator pedal or not with SDP3.

The function can be deactivated in three ways:

1. Disconnect ground from pins 2 and 3 in connector C4032.
2. Connect pin 13 in connector C4032 to +24 V.
3. Connect pin 5 in connector C4030 to ground.

Fixed raised idling speed

The function is used to temporarily increase the idling speed. The idling speed can be set and saved between 450 and 800 rpm.

The idling speed is changed and saved using the buttons, to increase (UP), decrease (DOWN) and save (STORE) on the Scania control panel.

The function can only be deactivated by disconnecting ground from pins 2 and 3 in connector C4032.

Fixed engine speed

If a fixed engine speed has been set in the engine control unit using SDP3, it can be used here. The set value cannot be changed using the setting buttons on the control panel nor can it be changed with the accelerator pedal.

The function can be deactivated in three ways:

1. Disconnect ground from pins 2 and 3 in connector C4032.
2. C4032 pin 13 to +24 V.
3. C4030 pin 5 to ground.