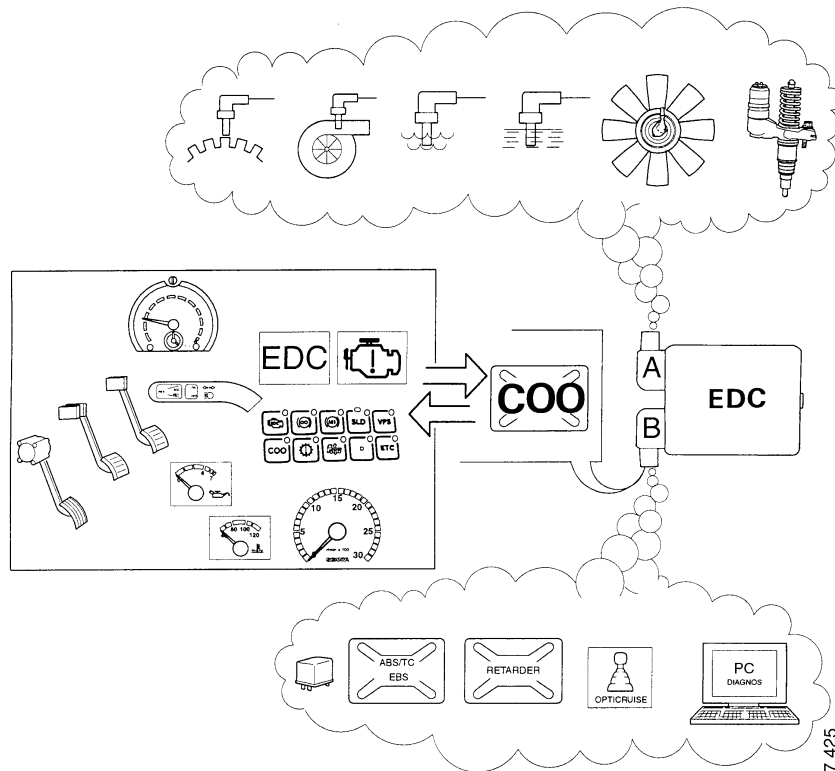


# Coordinator

## Generation 3

### Function description and troubleshooting



cardiagn.com

# Contents

Function description	General .....	3
	Instrument panel parts .....	4
	Main function .....	5
	Why use Scania Diagnos? .....	5
	An explanation of CAN communication .....	5
	Interaction with other systems .....	6
Components	Component location .....	7
	Accelerator pedal sensor .....	8
	Control for cruise control .....	9
	Brake pedal switches .....	11
	Clutch pedal switch .....	12
	Tachograph .....	13
	Indicator and warning lamps .....	14
	Diagnostic switch panel .....	15
	Coolant temperature gauge .....	16
	Oil pressure gauge .....	16
	Bodywork equipment connector .....	17
Troubleshooting	Reading fault codes .....	19
	Clearing fault codes .....	19
	Limitations .....	19
	Fault code 11 - 25 .....	20
Electrical system	Connectors .....	26
	Input signals .....	27
	Output signals .....	28
	Other signals .....	29
	Wiring Diagrams .....	30

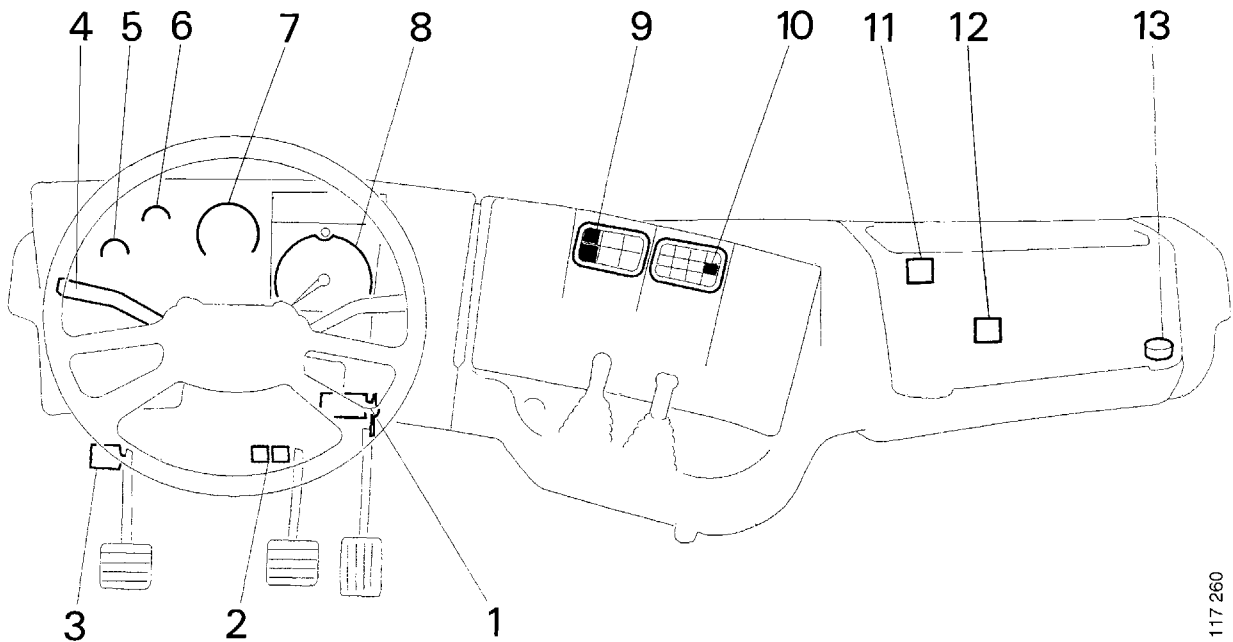
# Function description

## General

The main task of the coordinator is to convey data to other control units, currently this is mainly the engine control unit, from those controls, pedals etc. that are operated by the driver in the cab. The coordinator also conveys information from the engine control unit out to gauges and lamps in the instrument panel (e.g. for oil pressure) and to other systems (e.g. Retarder). The coordinator is located in the cab.

The engine control unit is located on the engine. The coordinator administers the signals to and from the components in the cab and communicates with the engine via the CAN circuit. This means that no separate cables are required between the cab and the control units for each individual cab component.

## Instrument panel parts



117 260

- 1 Accelerator pedal sensor
- 2 Brake pedal switches
- 3 Make switch, clutch pedal
- 4 Control for cruise control
- 5 Oil pressure gauge
- 6 Coolant temperature gauge
- 7 Tachometer
- 8 Tachograph
- 9 Diagnostic panel
- 10 Warning lamps
- 11 Diode unit (D18)
- 12 Bodywork equipment connector (C271)
- 13 Diagnostic socket

The above illustration shows those controls, pedals, gauges etc. that interact with the coordinator.

## Main function

The coordinator converts messages to signals and vice versa.

The coordinator sends the vehicle speed signal as a message, via the CAN circuit, to other systems.

The coordinator receives the messages concerning coolant temperature, oil pressure and engine speed from the engine control unit and sends an output signal about this to the instrument cluster.

A PWM signal is sent from the coordinator to other systems with information on the amount of fuel supplied to the engine. The PWM signal is a message that the coordinator received from the engine control unit and then converted. The message states how much fuel is being injected into the cylinders (actual throttle actuation)

We have chosen to call such information transferred via the CAN circuit, between the coordinator and other control units, *messages*. These cables convey different *messages*, between different control units, at different times.

The information which goes to and from the coordinator in the form of voltage levels we call *signals*. Each component has its own connection to the control unit.

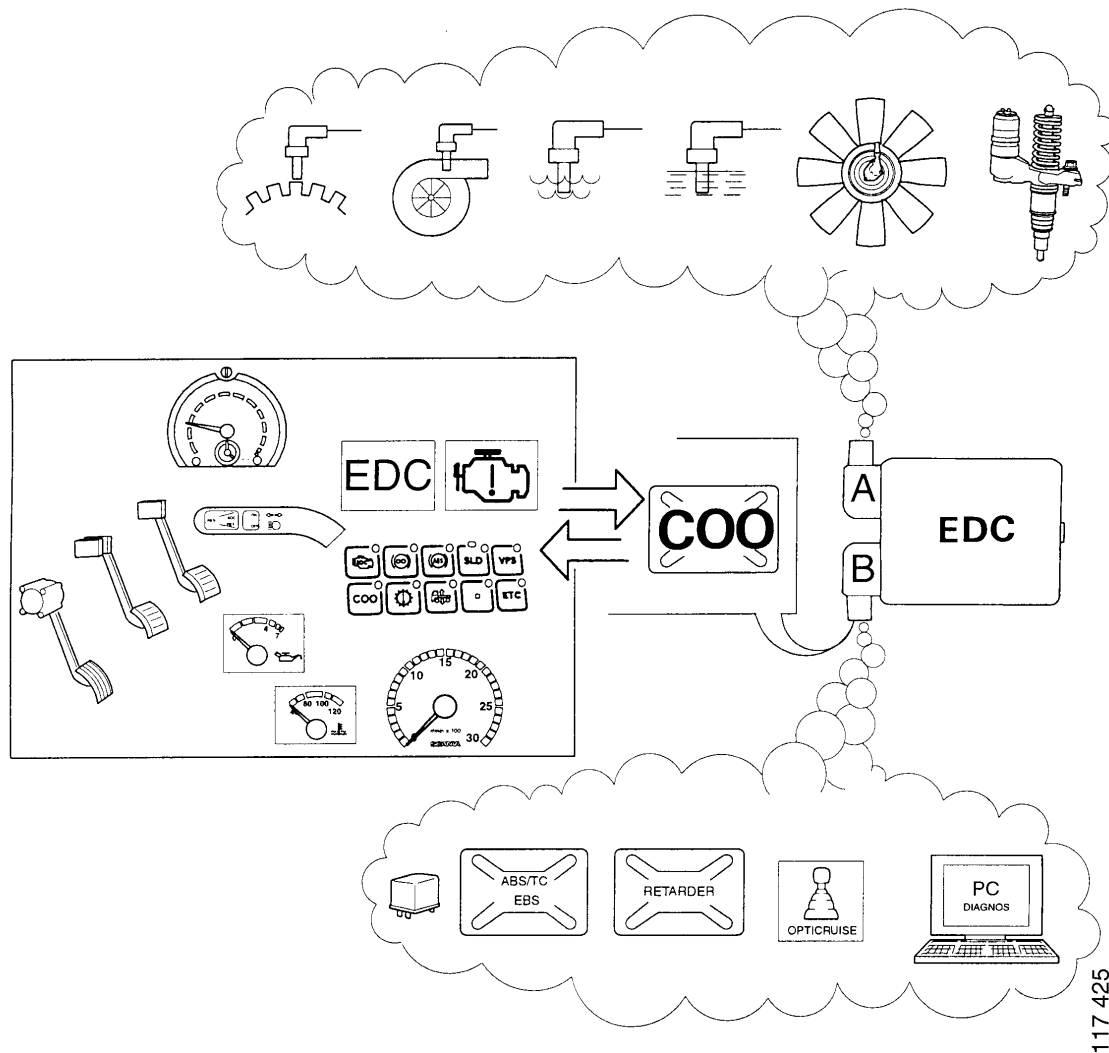
## Why use Scania Diagnos?

- Scania Diagnos can show all the fault codes that are generated in the coordinator, there is also the possibility of further information on those components that may be traced to the fault code.
- The components that interact with the coordinator are described and an overview figure shows where those components are located.
- Wiring diagrams for all the connections are available.
- Many graphic symbols give better support when troubleshooting.

## An explanation of CAN communication

The coordinator and the engine control unit communicate with each other through the CAN circuit. The information in the CAN circuit cannot be checked by using a multimeter. However, it is still possible to measure at each current consumer (component) that is connected to the coordinator or the engine control unit.

## Interaction with other systems



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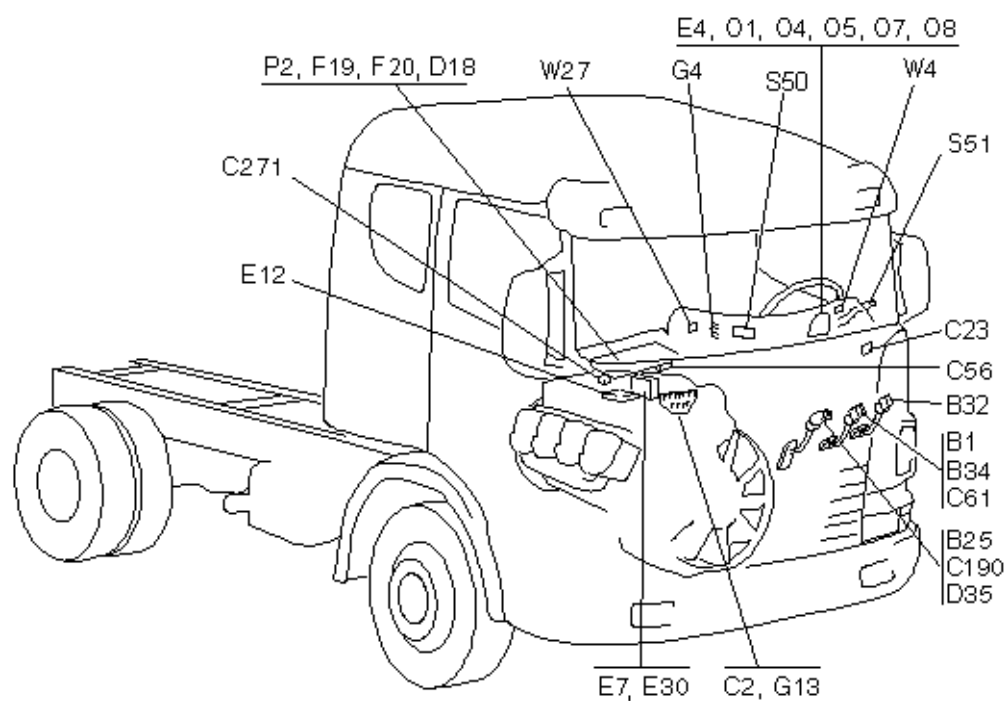
The coordinator conveys information to and from the following components:

- accelerator pedal
- brake pedal
- clutch pedal
- control for cruise control
- coolant temperature gauge
- oil pressure gauge
- speedometer/tachograph
- warning lamp for low oil pressure
- diagnostic lamp/ diagnostic switch for Coordinator

- diagnostic lamp/ diagnostic switch for engine control unit
- warning lamp for engine
- special functions from the bodywork equipment connector
- the Retarder system

# Components

## Component location



117 279

Component	Description
B1	Brake pedal switch 1
B25	Throttle actuation switch
B32	Clutch pedal switch
B34	Brake pedal switch 2
C2	Connector
C23	Connector
C56	Distribution block
C61	Connector
C190	Connector
C271	Bodywork equipment connector
D18	Diode unit
D35	Potentiometer
E4	Pulse generator
E7	VPS control unit
E12	EDC control unit
E30	Coordinator control unit
G4	Earthing point
G13	Earthing point

Component	Description
F 19	Fuse
F 20	Fuse
O1	Instrument cluster
O4	Tachograph
O5	Tachometer
O7	Coolant temperature gauge
O8	Oil pressure gauge
P2	Central electric unit
S50	Diagnostic panel
S51	Control for cruise control
W4	Warning lamp for low oil pressure
W27	EDC indicator lamp

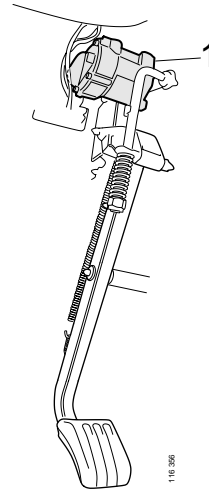
## Accelerator pedal sensor - B25, B26 and D35

The accelerator pedal sensor supplies the coordinator with input signals. The coordinator interprets the input signals and sends information about these to other control units via the CAN circuit.

The accelerator pedal sensor consists of the following three components.

- Potentiometer (D35)
- Throttle actuation switch (B25)
- Kick-down switch (B26)

Accelerator pedal and accelerator pedal sensor



1 Accelerator pedal sensor

The potentiometer (D35) informs the Coordinator control unit about the accelerator pedal position. The potentiometer receives a supply voltage of approximately +5 V from control unit pin 28 and is then earthed via pin 24. The sensor sends a signal voltage to control unit pin 54. The voltage is directly dependent on how much the accelerator pedal is depressed.

The throttle actuation switch informs the control unit pin 30 if the accelerator pedal is fully released or depressed. When the pedal is fully released, the throttle actuation switch is open. The control unit interprets this as a request for idling speed. The throttle actuation switch closes when the pedal is pressed down and earths pin 30 on the control unit.

The kick-down switch is activated when the accelerator pedal is depressed from full throttle to the kick-down position. The coordinator does not receive any signals from the kick-

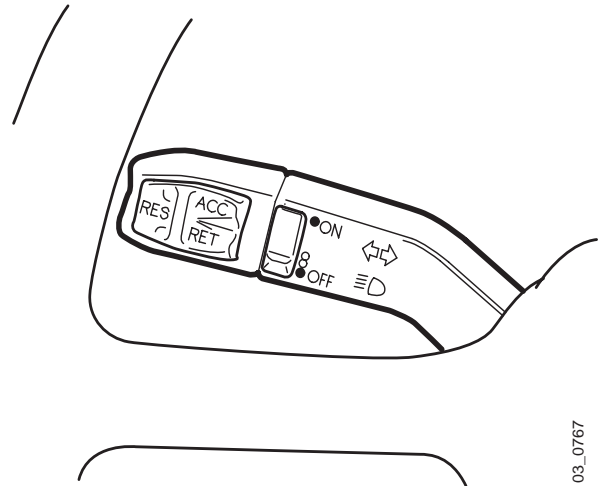
down switch.



## Control for cruise control - S51

The control for the cruise control sends input signals to the coordinator. The coordinator interprets the input signals and sends information about these to other control units via the CAN circuit.

Using the control for cruise control, the coordinator is informed of the speed the vehicle is required to hold.



The control for cruise control is also used when adjusting idling speed or when using the functions for engine speed control.

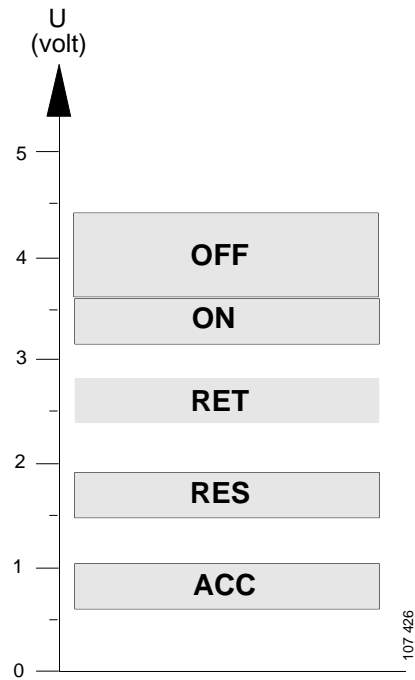
The control for cruise control has the following five functions.

- ON
- OFF
- ACC (accelerate, the speed of the vehicle increases)
- RET (retard, the speed of the vehicle decreases)
- RES (resume, the vehicle returns to the previously selected speed)

There are only two cables between the control and the control unit. The cables are connected to the control unit pins 29 and 48. Each function gives a certain voltage level (refer to graph) which the control unit senses across the pins.

The voltage levels are created when the resistance in the circuit changes depending on which function is engaged.

The control receives a supply voltage of approximately +5 V from control unit pin 29 and is earthed via pin 48.



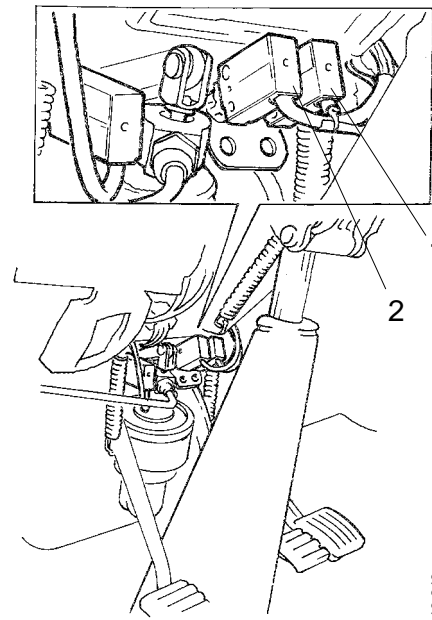
*The different voltage levels of the cruise control functions.*

## Brake pedal switches - B1 and B34

The brake pedal switches send input signals to the Coordinator. The Coordinator interprets the input signals and sends information about these to other control units via the CAN circuit.

Brake pedal switches B1 and B34 sense when the brake pedal is depressed. The switches are connected so that one opens and the other closes when the pedal is depressed. They open/close simultaneously when the pedal is lightly depressed, i.e. at the beginning of the pedal movement.

The pedals



- 1 Brake pedal switch 1 B1
- 2 Brake pedal switch 2 B34

The switch that opens (B1) when the pedal is depressed is called brake pedal switch 1 and the switch that closes (B34) is called brake pedal switch 2.

B1, brake pedal switch 1, is connected between the Coordinator pin 52 and chassis earth. When the brake pedal is depressed, the earth connection to pin 52 is broken.

B34, brake pedal switch 2, is connected between the control unit pin 53 and chassis earth. When the pedal is depressed, pin 53 is earthed.

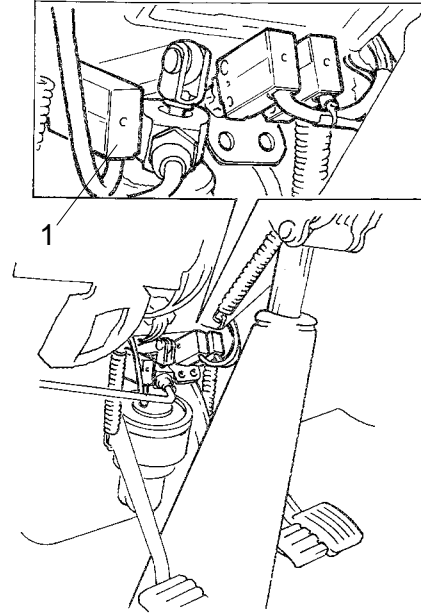
## Clutch pedal switch B32

The clutch pedal switch supplies the Coordinator with an input signal. The Coordinator interprets the input signal and sends information about this to other control units via the CAN circuit.

The clutch pedal switch (B32) senses when the clutch pedal is depressed.

The switch is connected between the Coordinator pin 50 and chassis earth. The switch closes and earths pin 50 when the pedal is lightly depressed, i.e. at the beginning of the pedal movement.

### The pedals



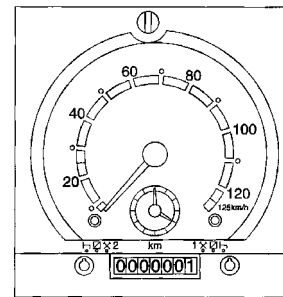
1 Clutch pedal switch B32

## Tachograph O4

The tachograph sends input signals to the Coordinator. The Coordinator interprets the input signals and sends information about these to other control units via the CAN circuit.

The tachograph (O4) informs the Coordinator about vehicle speed. Vehicle speed sensing is a prerequisite for certain functions such as cruise control and speed limiter.

The tachograph sends the vehicle speed signal to Coordinator pin 41.

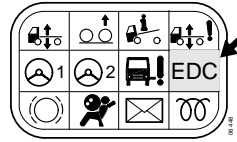


## Indicator and warning lamps W27 and W4

The Coordinator receives information from the engine control unit via the CAN circuit. The Coordinator switches the lamps on and off in the instrument cluster as required.

The Coordinator controls the following lamps:

- Indicator lamp for engine control unit (W27)
- Low oil pressure warning lamp (W4)



*Indicator lamp for EDC, truck*

When starter voltage is switched on, the indicator lamps come on for a few seconds to check that they are intact.

The indicator lamp receives voltage +24 V from Coordinator pin 2 and is earthed via pin 9.

## Diagnostic switch panel - S50

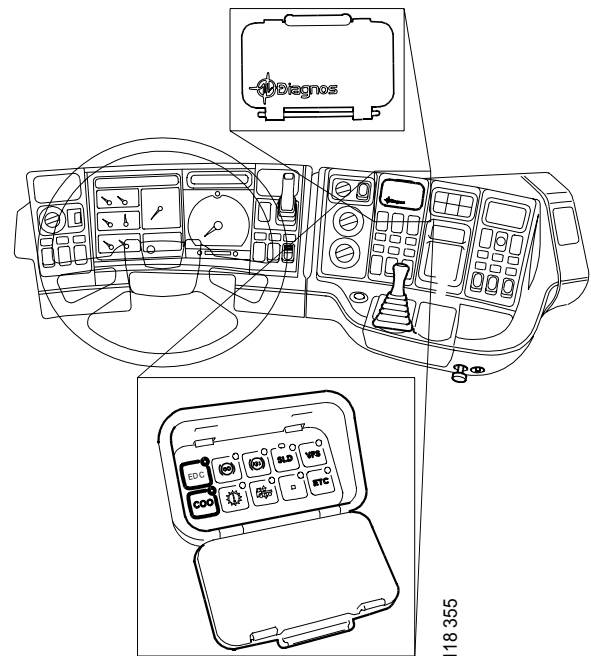
The Coordinator sends a message via the CAN circuit to the affected control units, which in turn return any registered fault codes. The Coordinator flashes the fault codes via the respective diagnostic lamp.

At present, only the Engine Control Unit and Coordinator flashing codes are controlled by the Coordinator. Other diagnostic buttons are connected directly to their respective control unit.

Using the diagnostic switches, it is possible to extract fault codes that may be stored in the memories of the control units. The fault codes are flashed out by the diagnostic lamp. The switches are also used for deleting fault codes.

The diagnostic panel switch is supplied with + 24V from fuse 4 in the central electrical unit to pin 3 of the diagnostic panel and is earthed via pin 4 of the diagnostic panel.

The engine system switch receives voltage from Coordinator pin 2.



*Diagnostic switches.*

### Coordinator

Switch, pin 10 on the diagnostic panel, is connected to Coordinator pin 12. The switch, which has a return spring, closes and earths pin 12 when it is depressed.

The Coordinator interprets this as a request to show any flashing codes and will flash them out by intermittently connecting pin 12 to earth in the required pulse sequence when the button on the panel is released.

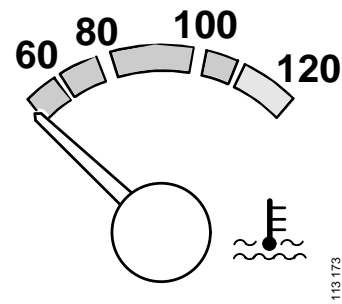
### Engine system

Switch, pin 6 on the diagnostic panel, is connected to Coordinator pin 9. The switch, which has a return spring, closes and earths pin 9 when it is depressed.

The Coordinator sends a message to the engine control unit that the button is depressed and in return, the Coordinator receives which flashing codes to indicate.

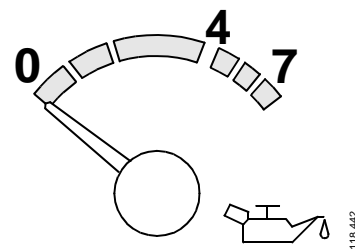
## Coolant temperature gauge O7

The Coordinator receives information about the coolant temperature from the engine control unit via the CAN circuit. The Coordinator sends an analogue signal via pin 10 to the temperature gauge (O7) in the instrument cluster.



## Oil pressure gauge O8

The Coordinator receives information about the oil pressure from the engine control unit via the CAN circuit. The Coordinator sends an analogue signal via pin 11 to the oil pressure gauge (O8) in the instrument cluster.





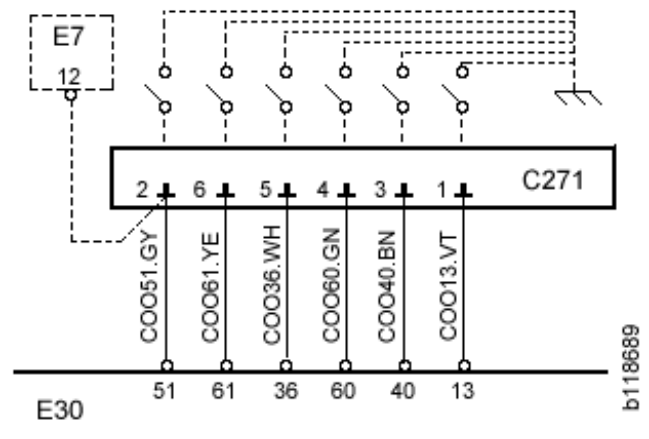
## Bodywork equipment connector (C271)

There is a connector, C 271, in the central electric unit for engine control from bodywork equipment. C 271 is connected to the Coordinator.

The Coordinator informs the engine control unit, via the CAN circuit, which pins have been earthed in C 271.

The functions which can be connected to C 271 are:

- Engine speed control.
- Torque limitation control.
- Speed limiter 2 control.
- Emergency stop control.



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## Engine speed

Engine speed can be controlled by connecting a type of control to pin 1 and pin 5 in connector C 271. By earthing the pins as below the following functions can be achieved:

Pin	Function
Pin 1 and 5 <b>not</b> earthed	Normal hand throttle
Pin 1 earthed	Limited hand throttle
Pin 5 earthed	Raised idling speed
Pin 1 and 5 earthed	Fixed engine speed

More information about this function can be found in the Function description of the engine system.

## Torque limitation

Engine torque can be controlled by connecting a control to pin 3 and pin 4 in connector C 271. By earthing the pins as below the following functions can be achieved:

<b>Pin</b>	<b>Function</b>
Pin 3 and 4 <b>not</b> earthed	No torque limitation
Pin 4 earthed	Torque limiter 1
Pin 3 earthed	Torque limiter 2
Pin 3 and 4 earthed	Torque limiter 3

More information about this function can be found in the Function description of the engine system.

## Speed limiter 2

Speed limiter 2 can be activated by connecting a control to pin 6 in connector C 271. It is activated when the pin is earthed.

More information about this function can be found in the Function description of the engine system.

## Emergency stop

Emergency stop can be activated by connecting a control to pin 2 in connector C 271. It is activated when the pin is earthed.

More information about this function can be found in the Function description of the Engine system.

# Troubleshooting

## Fault codes in the Coordinator

Reading of fault codes can be carried out by using Scania Diagnos or the diagnostic lamp in the instrument panel.

### Reading fault codes

Switch on the ignition.

Depress the diagnostic switch and keep it depressed for 2 seconds.

When reading fault codes, a long flash indicates units of ten and a short flash indicates one unit. Example according to the illustration: Fault code 21 has the following flashes: Long - long - short. If there are no fault codes registered the lamp will be on for 4 seconds.

Depress the diagnostic switch once again to read the next fault code.

### Clearing fault codes

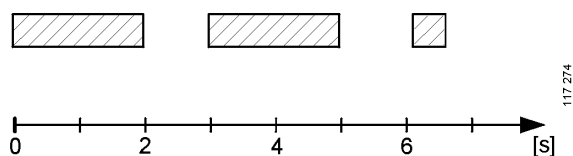
Clear all fault codes as follows:

- 1 Begin by switching off the ignition (15 supply).
- 2 Press in the diagnostic switch and keep it depressed.
- 3 Switch on the ignition (15 supply) whilst still depressing the diagnostic switch.

### Limitations

Despite the advanced software, a fault may arise which the control unit is unable to distinguish from normal operation. If this is the case, no fault code is generated.

Fault codes may have been generated when a cable connection was disconnected whilst the ignition was on. This is quite a common occurrence. The control unit will then interpret it as a



fault.

In cases of loose connections the fault may no longer be present; but the fault code is stored in the control unit memory until it is cleared. It is then possible to see in which circuit the fault occurred and look for the cause there, even if there is currently no fault.

### Faults that do not generate a fault code

If there is no information from the engine control unit about the coolant temperature, the gauge will show full heat, i.e. a maximum reading. No fault code is generated in the Coordinator.

If there is no information from the engine control unit about the oil pressure, the gauge will show zero bars, i.e. no oil pressure. No fault code is generated in the Coordinator.

## List of fault codes

### Fault code 11

#### Fault

Prohibited signal from the accelerator pedal sensor potentiometer.

#### Cause

Too low or too high input voltage to pin 54.

#### Remarks

The voltage from the potentiometer was below approximately 0.2 V or in excess of approximately 4.0 V.

The supply voltage and the resistance in the accelerator pedal potentiometer may however vary between vehicles, therefore the values are not exact, only reference values.

#### Action

Check the accelerator pedal potentiometer, the connectors and wiring.

### Fault code 12

#### Fault

Prohibited deviation between the accelerator pedal sensor potentiometer and the throttle actuation switch.

#### Cause

Input voltage on pin 54 is too low at the same time as pin 30 is earthed. Alternatively, input voltage on pin 54 is too high at the same time as pin 30 is not earthed.

The voltage from the potentiometer was lower than 0.49 V while the throttle actuation switch was closed. Alternatively, the voltage was in excess of 0.90 V while the throttle actuation switch was open.

#### Remarks

The values of the throttle actuation switch and the potentiometer must correspond. The potentiometer may not indicate throttle actuation whilst the throttle actuation switch indicates idling speed.

#### Action

Check the potentiometer and the throttle actuation switch.

Check the connectors and wiring.

**Fault code 13****Fault**

Prohibited signal from the control for cruise control.

**Cause**

Voltage too low or too high between pins 29 and 48. The fault may also be a prohibited voltage level between the following functions: ACC, RES, RET, ON and OFF.

**Remarks**

Cruise control and engine idling speed adjustment will not function as long as the fault is present.

The control unit interprets the voltage level as follows:

0.7 - 0.9 V: ON+ACC, (14.4 - 18.3% of the supply)

1.6 - 1.7 V: ON+RES, (31.2 - 35.1% of the supply)

2.5 - 2.7 V: ON+RET, (49.6 - 53.5% of the supply)

3.3 - 3.5 V: ON, (66.4 - 70.3% of the supply)

3.7 - 4.3 V: OFF, (74.2 - 85.9% of the supply)

The voltage levels shown above apply to 5 V supply. The supply voltage may however vary between vehicles.

The fault code is generated in the event of voltage levels outside these ranges.

**Action**

Check the control, connectors and wiring.

**Fault code 14****Fault**

No communication with the engine control unit.

**Cause**

Communication between the engine control unit and the coordinator control unit has been broken.

**Remarks**

The indicator lamp for engine control comes on. Fault codes from the engine cannot be read.

**Action**

Check the connectors and wiring.

## Fault code 17

### Fault

The connection to the tachograph is broken or short circuited.

### Cause

The input signal to pin 41 is missing or the voltage level is too low or too high. The fault code can only be generated when the road speed is 0 km/h.

### Remarks

When the road speed is 0 km/h the control unit carries out a connection test with the tachograph. If the test shows prohibited measurements the fault code is generated.

Only the system that limits maximum road speed may be connected to tachograph output D3.

### Action

Check the operation of the tachograph. If the tachograph is functioning correctly, check the wiring between the tachograph and the control unit.

## Fault code 18

### Fault

The brake pedal switches 1 and 2 have supplied conflicting signals on the position of the pedal. One switch has indicated that the pedal was released while the other switch has indicated that it was depressed.

### Cause

Both pins 52 and 53 have been earthed at the same time or neither of them have been earthed at the same time.

Both brake pedal switches have been closed or been open at the same time for more than five minutes.

### Remarks

The cruise control and engine idling speed adjustment will not function as long as the fault is present.

### Action

Check the switches, the connectors and wiring.

## Fault code 19

### Fault

Short circuit of the PWM signal from the engine concerning the amount of fuel supplied to the engine.

### Cause

The signal from the output is short circuited to supply voltage.

The fault code is generated if the fault has been active for longer than 10 seconds.

### Remarks

When this fault code is generated, fault codes may also be generated in other control units.

### Action

Check the connectors and wiring.

## Fault code 21

### Fault

Short circuit of the signal to the coolant temperature gauge.

### Cause

The signal from the output is short circuited to supply voltage.

The fault code is generated after the fault has been active for longer than 10 seconds.

### Remarks

If this fault occurs the gauge will begin to indicate a lower temperature.

### Action

Check the instrument cluster, the connectors and wiring.

## Fault code 22

### Fault

Short circuit of the signal to the oil pressure gauge.

### Cause

The signal from the output is short circuited to supply voltage.

The fault code is generated after the fault has been active for longer than 10 seconds.

### Remarks

If this fault occurs the gauge will begin to indicate a higher pressure.

### Action

Check the instrument cluster, the connectors and wiring.

## Fault code 23

### Fault

Short circuit of the signal to the oil pressure warning lamp.

### Cause

The signal from the output is short circuited to supply voltage.

The fault code is generated after the fault has been active for longer than 10 seconds.

### Remarks

If this fault occurs the warning lamp will not come on.

### Action

Check the instrument cluster, the connectors and wiring.



**Fault code 24****Fault**

Short circuit of coordinator pin 2.

**Cause**

The signal from the output is short circuited to earth

The fault code is generated after the fault has been active for longer than 10 seconds.

**Remarks**

When the fault occurs the EDC warning lamp does not come on as this is connected to the output.

**Action**

Check the connectors and wiring.

**Fault code 25****Fault**

The ways in which the coordinator and the engine control unit communicate differ.

**Cause**

The coordinator does not have the support to give the engine control unit the information it requests.

**Remarks**

The fault code may be generated for example in connection with one of the control units being renewed with a spare part control unit.

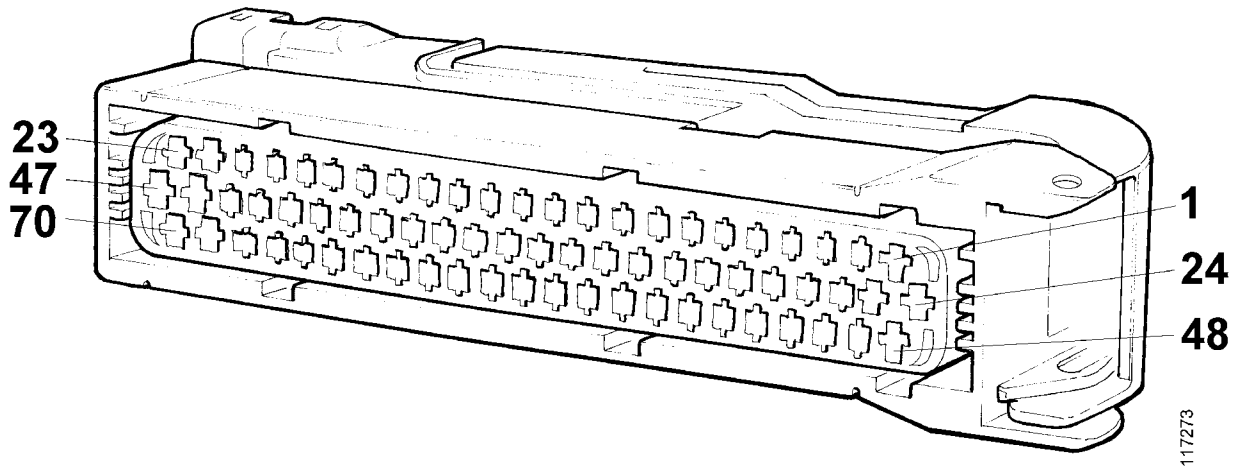
A coordinator can adapt itself to older engine control units but not to newer ones. A newer engine control unit may for example request information that an older coordinator cannot supply.

**Action**

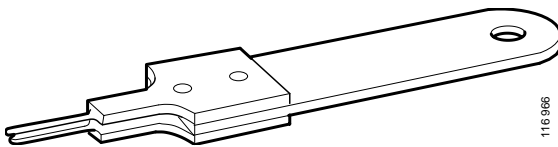
Ensure that the new control unit is of the same version as the old one.

# Electrical system

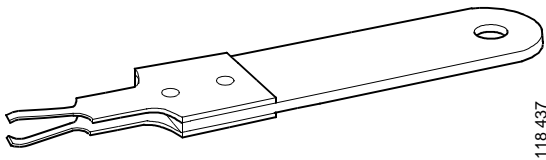
## Connector



### Connector



*Removing tool 588 219, for smaller pins*



*Removing tool 588 192, for larger pins*

## Input signals

The table below shows which input signals the control unit receives.

Task	Source	Signal type	Pin
Ignition (15 supply)	Fuse 20	+24 V (U+)	7
Disengagement of cruise control	Diode unit	+24 V	8
Diagnostic switch	EDC indicator lamp	Earthing (0 V)	9
Diagnostic switch	Diagnostic panel	Earthing (0 V)	12
Limited hand throttle	Bodywork equipment connector	Earthing (0 V)	13
Control of cruise control and hand throttle	Control for cruise control	Analogue	29
Depressed accelerator pedal	Throttle actuation switch	Earthing (0 V)	30
Raised idling speed	Bodywork equipment connector	Earthing (0 V)	36
Input signal for torque limiter 2	Bodywork equipment connector	Earthing (0 V)	40
Indicates the road speed	Tachograph	Frequency	41
Initiated pedal movement	Clutch pedal switch	Earthing (0 V)	50
Activates emergency stop function	Bodywork equipment connector	Earthing (0 V)	51
Depressed brake pedal	Brake pedal switch 1	Earthing (0 V)	52
Depressed brake pedal	Brake pedal switch 2	Earthing (0 V)	53
Depressed accelerator pedal	Potentiometer	Analogue	54
Idling speed request		+24 V	57
Input signal for torque limiter 1	Bodywork equipment connector	Earthing (0 V)	60
Activates speed limiter 2	Bodywork equipment connector	Earthing (0 V)	61

*\*The signal varies, e.g. depending on how much the accelerator pedal is depressed.*

## Output signals

The table below shows which output signals the control unit can deliver.

Task	Destination	Signal type	Pin
Supply for EDC indicator lamp	EDC indicator lamp	+24 V	2
Regulated fuel volume	Other control units	PWM signal	6
Output signal to instrument cluster	Coolant temperature gauge	Analogue	10
Output signal to instrument cluster	Oil pressure gauge	Analogue	11
Output signal to instrument cluster	Warning lamp	+24 V	15
Output signal to instrument cluster	Tachometer	Frequency	18

*\*The signal varies, e.g. depending on the coolant temperature.*

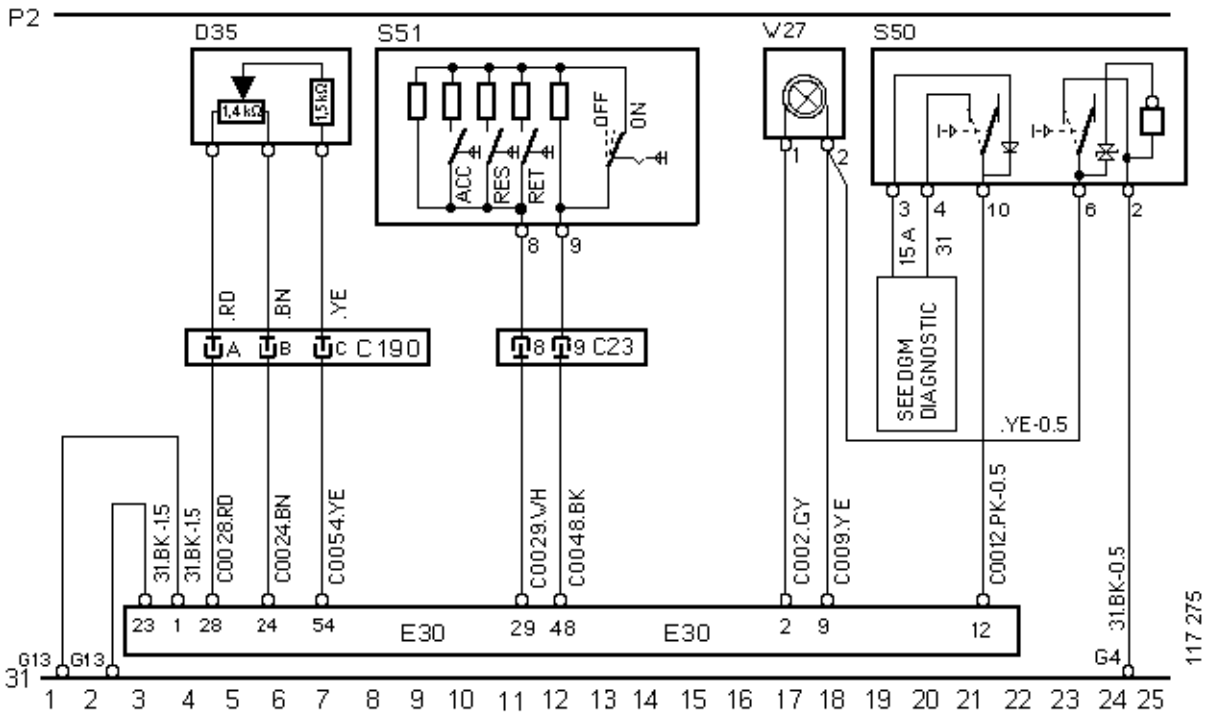
## Other signals

The table below shows the control unit connections for voltage supply, system earth, communication cables etc.

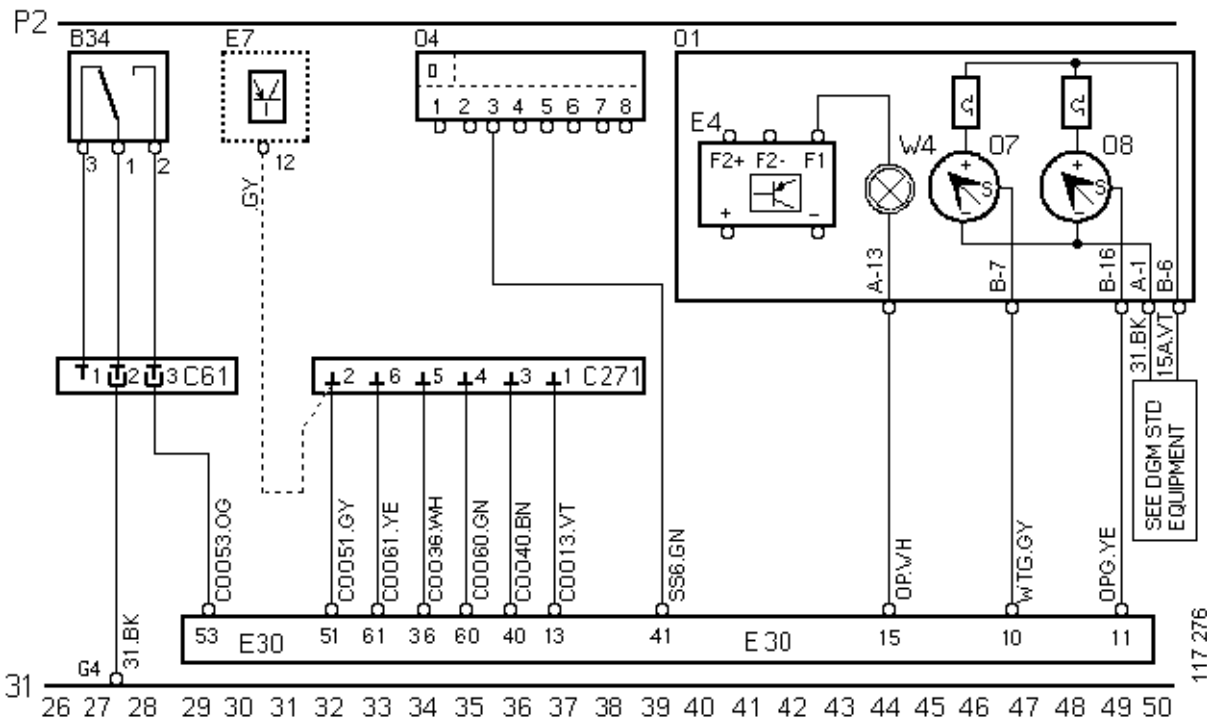
Task	Source/Destination	Signal type	Pin
Earthing of the control unit	G13	Earthing (0 V)	1
Communication	CAN circuit	Data/Messages	21
Earthing of the control unit	G13	Earthing (0 V)	23
Earthing of accelerator pedal supply		0 V	24
Voltage supply for the control unit (30 supply).	Fuse 19	+24 V	26
Voltage supply to the potentiometer in the throttle pedal sensor	Potentiometer	+5 V	28
Communication	CAN circuit	Data/Messages	45
Earthing of the control for the cruise control	Control for cruise control	0 V	48
Voltage supply to the control unit	Fuse 19	+24 V	49
Communication	K cable	Data	65

# Wiring Diagrams

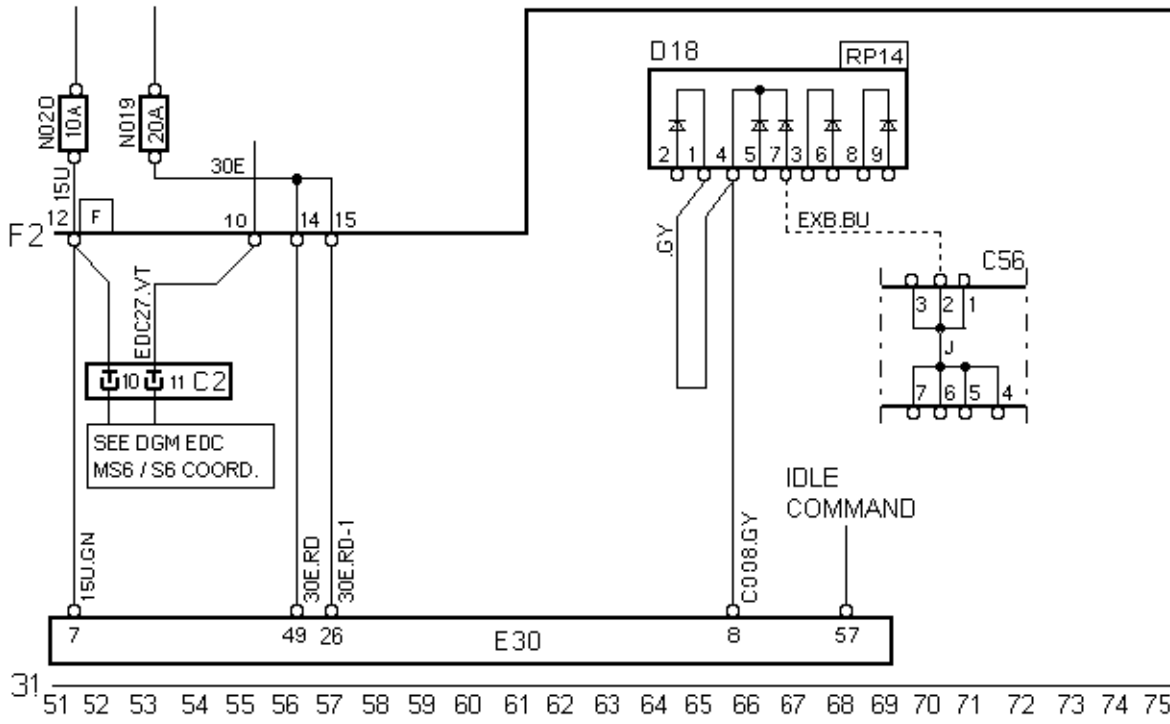
## Current path 1 - 25



## Current path 26 - 50

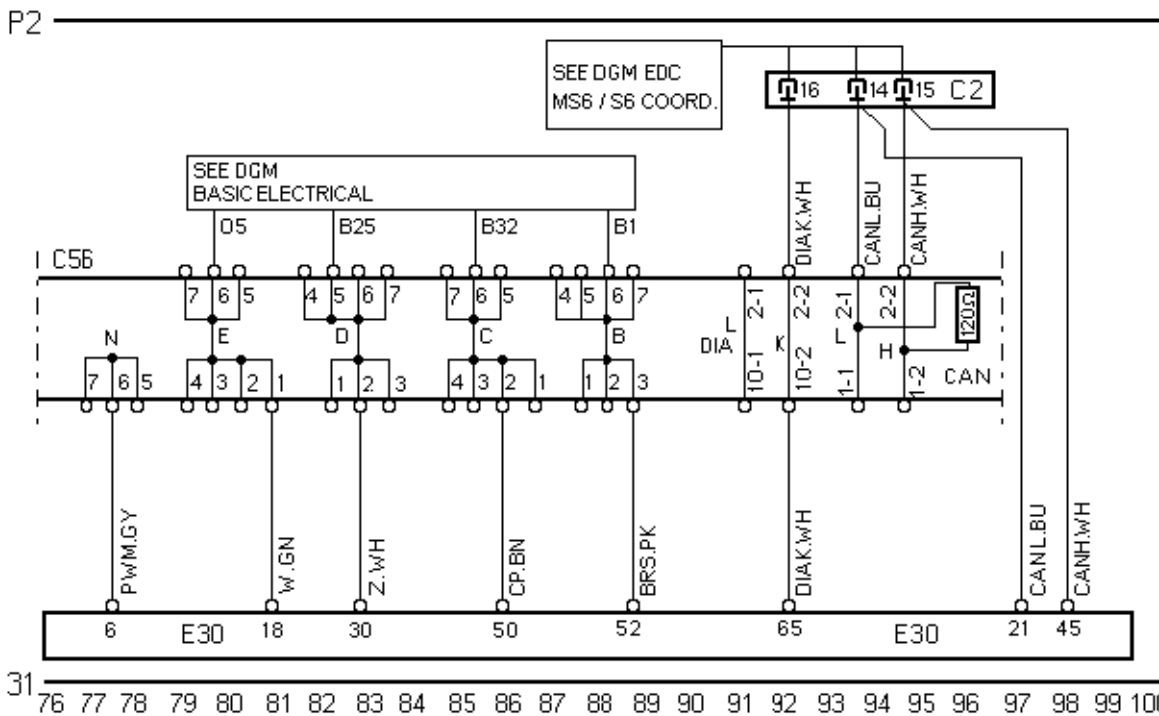


Current path 51 - 75



117 277

Current path 76 - 100



117 278