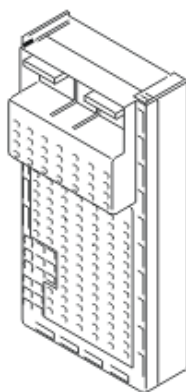


System overview

Control module



The rear electronic module (REM) handles functions for:

- alarm (certain functions)
- locks (certain functions)
- inclination sensor module (ISM)
- headlamp range adjustment position sensors (Bi-Xenon)
- fuel level (Gasoline/Diesel)
- fuel level (Bi-fuel)
- shut-off valve (Bi-fuel)
- diesel filter preheating (Diesel)
- rear fog lamps
- back-up lamp
- stop lamps
- high level stop lamps (V70/V70XC/XC70/XC90)
- rear windshield wiper/washers (V70/V70XC/XC70/XC90)
- rear demist
- electric folding rear head restraints (S60/S80)
- cargo compartment lighting (S60/S80/XC90)
- rear 12 V socket (V70/V70XC/XC70/XC90)
- parking assistance (applies only to the XC90 2003–2004 and S80 2004).

The control module is installed as a separate unit in the rear relay box. This is under the left-hand cargo compartment panel.

The rear electronic module (REM) communicates with components which are directly connected and also with other control modules and components via serial communication and the control area network (CAN).

The control module checks activations and input and output signals using an integrated diagnostic system. A diagnostic trouble code (DTC) is stored if the control module detects an error. In certain cases the control

module replaces the faulty signal with a substitute value.

Any diagnostic trouble codes (DTCs) are stored in the control module memory. This information can be read off using VIDA via the data link connector (DLC) in the car.

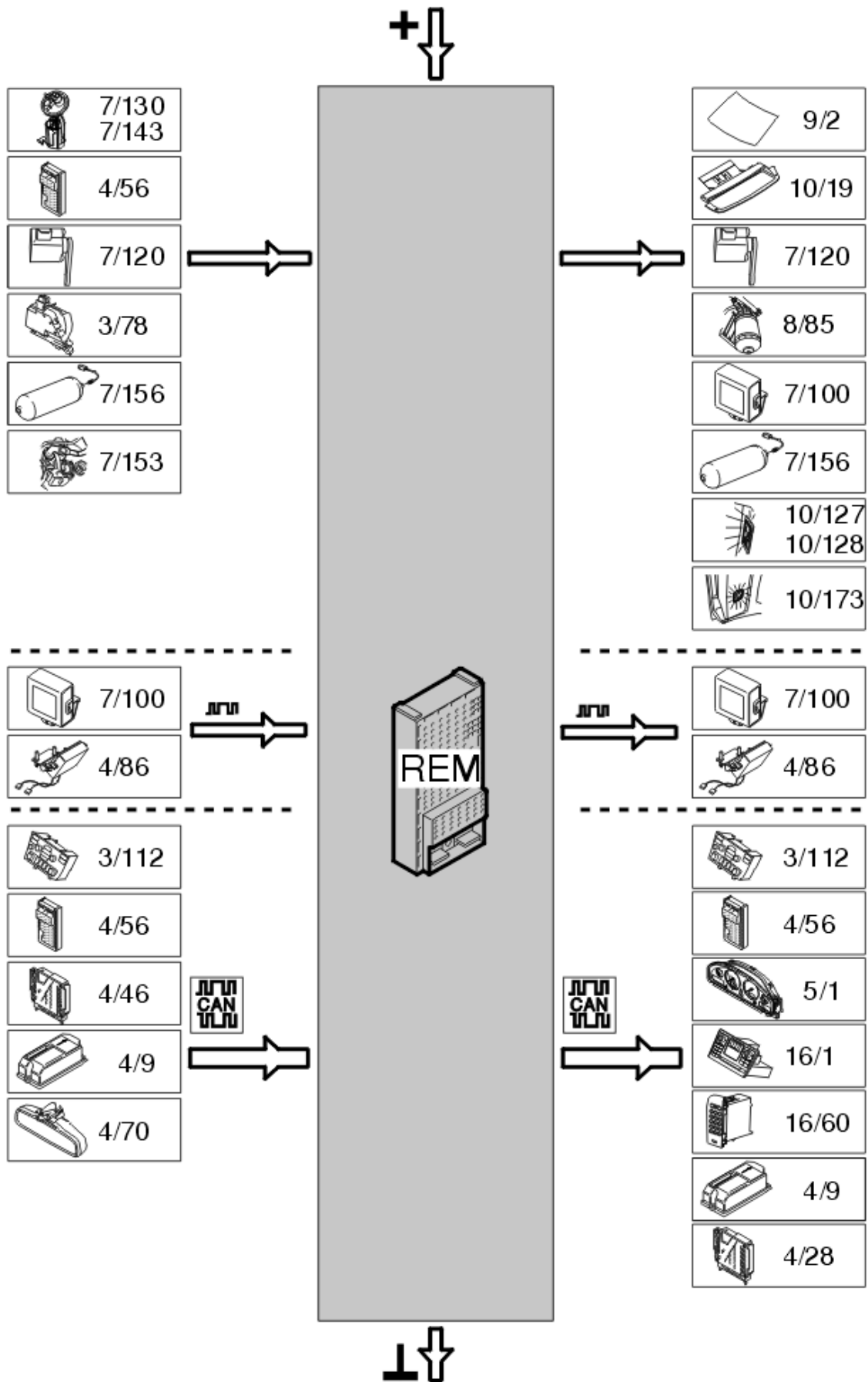
Lock and unlock the rear doors to check whether the rear electronic module (REM) is grounded and powered. The control module is powered and grounded if the doors lock and unlock. Another way to check whether the rear electronic module (REM) is powered and grounded is to switch on the rear fog lamp.

For further information, also see Signal specifications.

Signals

The following table summarizes input signals to and output signals from the rear electronic module (REM). The signal types are divided into directly connected signals, serial communication and controller area network (CAN) communication. The illustration below displays the same information with the Volvo component designations.

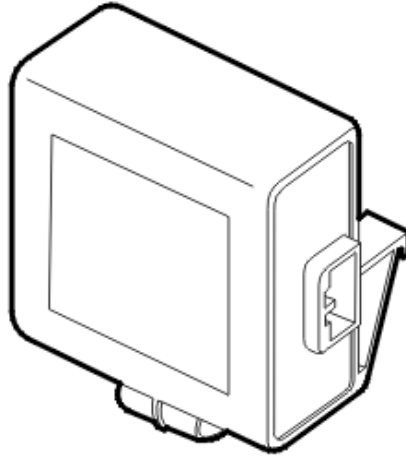
Input signals	Output signals
Directly connected: Fuel level sensor (7/130, 7/143) Fuel level sensor (CNG) (7/156) Fuel level sensor (LPG) (7/153) Stop lamps from the central electronic module (CEM) (4/56) Position sensor for headlamp range adjustment (Bi-Xenon) (7/120) Tailgate handle (S60/S80) (3/78).	Directly connected: Fuel level sensor (CNG) (7/156) Rear demist, relay (9/2) Cargo compartment lighting (S60/S80/XC90) (10-127-128, 10/173) High level stop lamp (V70/V70XC/XC70/XC90) (10/19) Position sensor for headlamp range adjustment (Bi-Xenon) (7/120) Fuel filter temperature switch (Diesel) (8/85) Inclination sensor module (ISM) (7/100).
Via serial communication: Inclination sensor module (ISM) (optional extra) (7/100) Parking assistance (optional extra) (4/86) (applies only to the XC90 2003–2004 and S80 2004).	Via serial communication: Inclination sensor module (ISM) (optional extra) (7/100) Parking assistance (optional extra) (4/86) (applies only to the XC90 2003–2004 and S80 2004).
Via Controller Area Network (CAN) communication: Climate Control Module (CCM) (3/112) Central electronic module (CEM) (4/56) Engine control module (ECM) (4/46) Supplemental Restraint System Module (SRS) (4/9) Upper electronic module (UEM) (4/70).	Via Controller Area Network (CAN) communication: Climate Control Module (CCM) (3/112) Central electronic module (CEM) (4/56) Driver information module (DIM) (5/1) Infotainment control module (ICM) (16/1) (XC90) Phone module (PHM) (optional equipment) (16/60) Supplemental Restraint System Module (SRS) (4/9) Transmission control module (TCM) (4/28).



Design Locks

See Design and Function, Central locking.

Inclination sensor module (ISM)



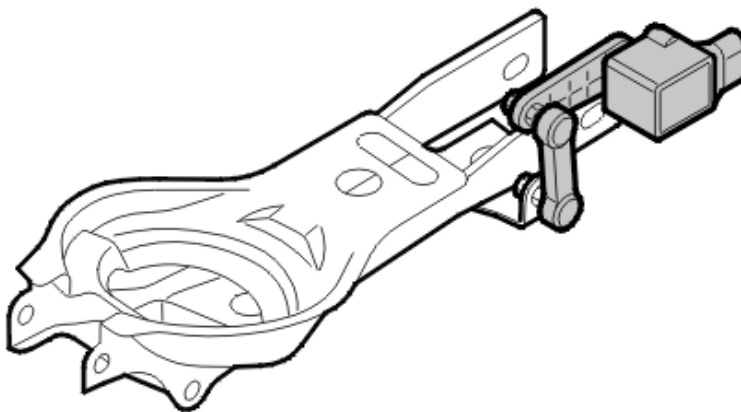
The inclination sensor module (ISM) is on the left-hand side of the rear relay box.

The inclination sensor module (ISM) is powered from the rear electronic module (REM), which both activates and deactivates it. Information is transferred from the inclination sensor module (ISM) to the rear electronic module (REM) using serial communication.

The inclination sensor module (ISM) detects when the angle of the car changes. If the angle changes when the car is alarmed, a signal is transmitted to the rear electronic module (REM) which sends this data out on the controller area network (CAN) to activate the alarm.

There are diagnostics for the Inclination Sensor Module (ISM).

Headlamp range adjustment position sensors (Bi-Xenon)



Cars with Bi-Xenon lamps have a position sensor so that the headlamps can automatically adjust beam length. The vertical adjustment accounts for load and road conditions to reduce the risk of dazzle.

The position sensor is beside the rear axle and is

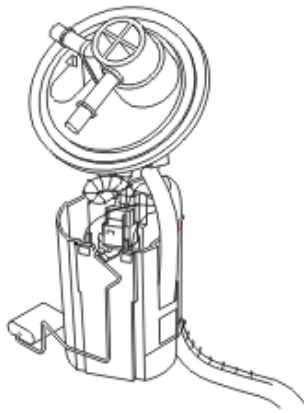
connected to the left-hand rear control arm by a linkage system. This linkage system affects the sensor, allowing the angle of the car to be gauged.

The position sensor is directly connected to the rear electronic module (REM) via three inputs. Two are used for the power supply and ground connection for the sensor. One input is used for signals about the angle of the car. The signals are received by the rear electronic module (REM) which sends them onwards via the Control area network (CAN) to the central electronic module (CEM) which controls the headlamp range adjustment function.

The position sensor can be calibrated using VIDA. The calibration is saved in the rear electronic module (REM) and must be carried out again if the rear electronic module (REM) or position sensor is replaced.

There are diagnostics for the position sensor.

Fuel level (Gasoline/Diesel)



The fuel level in the tank is measured by two sensors. The sensors are located on each side of the fuel tank. Cars with engine B5244S6 have only one sensor, on the pump side. The sensors are directly connected to the rear electronic module (REM).

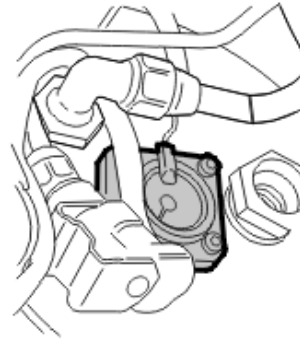
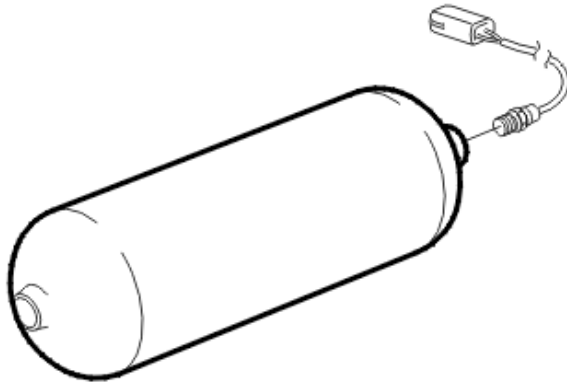
There are different tables for different fuel tank sizes. These are stored in the rear electronic module (REM) and indicate which sensor values correspond to the remaining fuel in the tank. The rear electronic module (REM) determines which tank is in the car by reading a parameter.

The resistance of the sensor increases as the fuel volume in the tank decreases. The signals from the sensors are compared with the values in the fuel tank table to obtain a value for the remaining fuel volume. This data is displayed by the fuel gauge in the driver information module (DIM).

If the sensors are faulty, the fuel gauge will show 0.

There are diagnostics for the fuel level sensors.

Fuel level (Bi-fuel)



CNG (Compressed Natural Gas)

The fuel level in the gasoline tank operates in the same way as for cars with B5244S6 engines, using a sensor in the tank. A combined pressure and temperature sensor is used to measure the fuel level in the gas tank. The sensor is on the left-hand side of the gas tank.

The sensor is directly connected to the rear electronic module (REM). The signals from the sensor are transmitted to the rear electronic module (REM) where they are calculated and sent to the driver information module (DIM) via the Control area network (CAN).

There are diagnostics for the fuel level sensor.

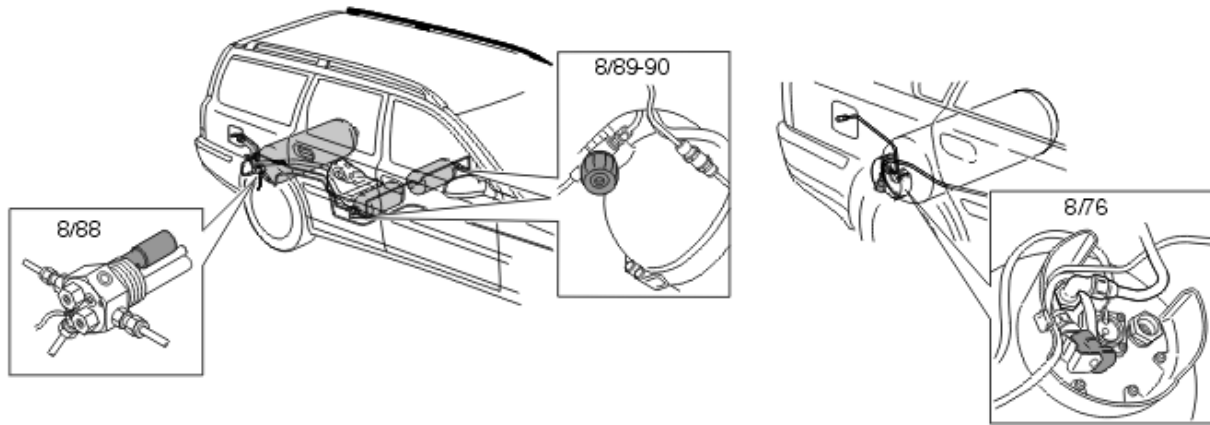
LPG (Liquefied Petroleum Gas)

The fuel level in the gasoline tank operates in the same way as for cars with B5244S6 engines, using a sensor in the tank.

A sensor, on the right-hand side of the tank, is used to measure the fuel level in the LPG tank. The sensor is directly connected to the rear electronic module (REM). The signals from the sensor are compared with a table stored in the rear electronic module (REM). Data about the remaining volume of fuel is transmitted via the Control area network (CAN) to the driver information module (DIM).

There are diagnostics for the fuel level sensor.

Shut-off valve (Bi-fuel)



There are shut-off valves on the gas tanks to open and close the tank valves on bi-fuel cars. These are positioned at the inlet/outlet on each gas tank. There is one for LPG and three for CNG.

The valves are controlled electro-magnetically and powered via a relay directly connected to the rear electronic module (REM). The rear electronic module (REM) activates the relay when a request for gas power is transmitted on the controller area network (CAN).

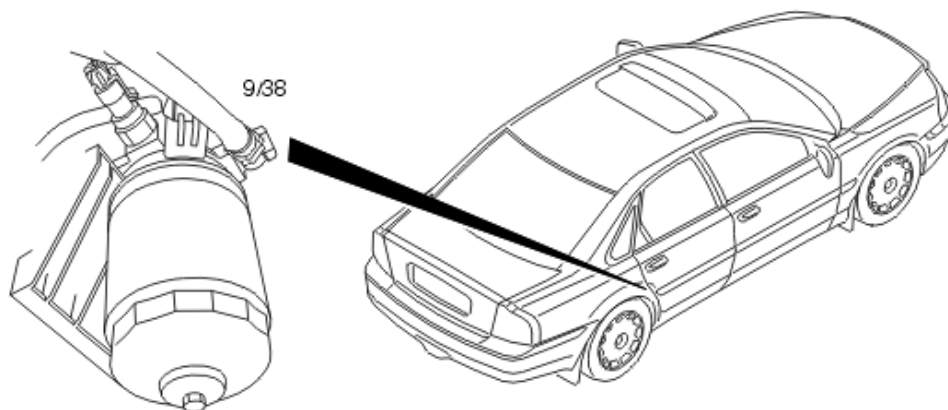
The valves close when the car is running on gasoline, when the ignition is switched off or in the event of a collision.

The valves can be opened via a diagnostic command by activating the relay for the gas valves. Activation is carried out in VIDA via the vehicle communication socket. See function group 3, Rear Electronic Module (REM).

The valves can also be closed manually using an Allen key or opened by unscrewing the shut-off valve and replacing it with a special tool.

There are diagnostics for the shut-off valve relay.

Diesel filter preheating (Diesel)



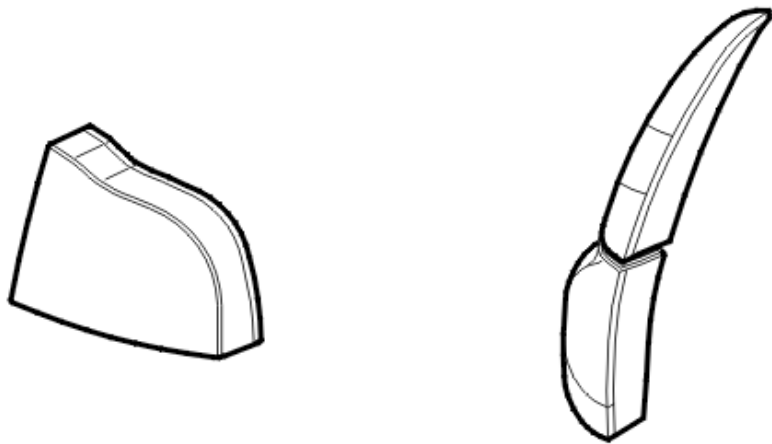
There is a diesel filter on the fuel line from the fuel tank.

The rear electronic module (REM) controls warming up the filter by checking the power supply to the filter via a relay. The relay is in the rear relay box.

There is a temperature switch between the rear electronic module (REM) and the relay. The temperature switch closes at approximately $-3\text{ }^{\circ}\text{C}$, which also closes the relay circuit. The temperature switch switches off at approximately $5\text{ }^{\circ}\text{C}$ which breaks the power supply by releasing the relay.

There are diagnostics for the relay circuit for warming up the diesel filter.

Rear fog lamp



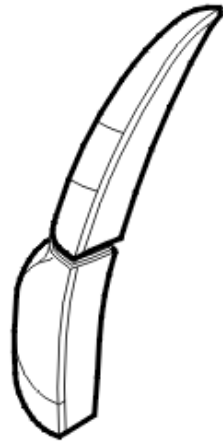
The rear fog lamp are in the tail lamps. The fog lamps are operated via a button in the light switch module (LSM). An LED in the button lights when the fog lamps are activated. The rear fog lamp can only be activated when low beam is on (market dependent). The light switch transmits information to the central electronic module (CEM) using serial communication when the button for the rear fog lamp is pressed. The central electronic module (CEM) transmits the data via the Controller area network (CAN) to the rear electronic module (REM). The power supply for the lamps is via a directly connected relay on the rear electronic module (REM).

When reactivating key position II, the function is set to non-activated mode.

In order to detect bulb faults for the rear fog lamp, the rear electronic module (REM) detects the power consumption in the circuit using a directly connected shunt. If the power consumption falls below a certain limit, a fault is indicated and a text message is displayed in the driver information module (DIM).

There are diagnostics for the rear fog lamp relay.

Back-up lamp



There are two back-up (reversing) lamps. These are in the tail lamps. The back-up (reversing) lamp lights when back-up (reverse) gear is selected. The back-up (reversing) lamps are connected to the rear electronic module (REM) via a directly connected relay. The lamps are powered via the relay.

Cars with manual transmissions

Cars with manual transmissions have a back-up (reverse) switch on the transmission. The switch closes and transmits a directly connected signal to the central electronic module (CEM) when back-up (reverse) gear is selected.

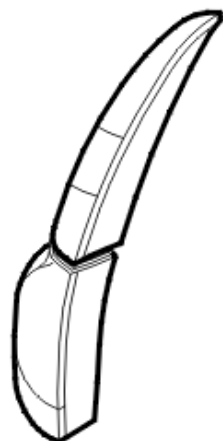
There are diagnostics for the back-up (reversing) lamp relay.

Cars with automatic transmissions

In cars with automatic transmissions, a signal is transmitted from the transmission control module (TCM) on the Control area network (CAN) to the central electronic module (CEM) indicating that back-up (reverse) gear is selected.

There are diagnostics for the back-up (reversing) lamp relay.

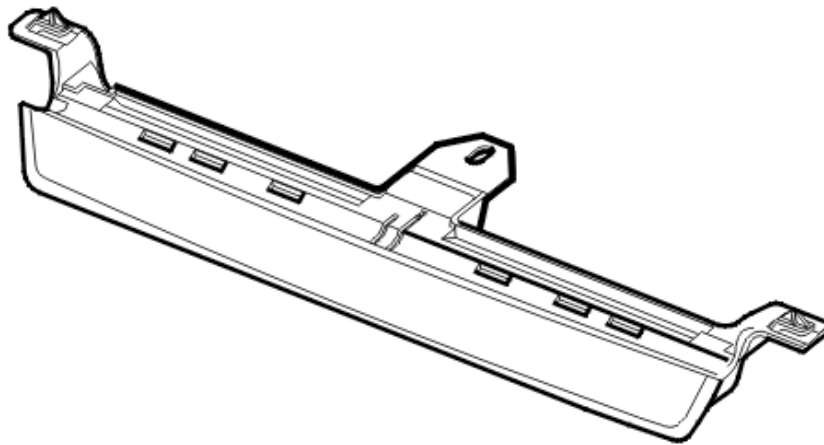
Brake light



The stop lamps are in the tail lamps. The lamps light when the stop lamp switch on the brake pedal is closed. The stop lamp switch is connected to the central electronic module (CEM). The signal from the stop lamp switch is sent on to the rear electronic module (REM) via a hardwired cable. The power supply for the lamps is via a directly connected relay on the rear electronic module (REM). In order for the stop lamps to work when the ignition is not on, there is no logic in the rear electronic module (REM) to activate the relay. The relay is activated directly by the signal from the stop lamp switch. The rear electronic module (REM) receives data via the controller area network (CAN) from the central electronic module (CEM) indicating that the stop lamp switch is activated.

In order to detect faults in the stop lamps, the rear electronic module (REM) detects the power consumption in the lamp circuit using a directly connected shunt. If the power consumption falls below a certain limit, a fault is indicated and a text message is displayed in the driver information module.

High level stop lamp (V70/V70XC/XC70/XC90)



There is a high-mounted stop (brake) lamp on the inside of the rear windshield. This lamp lights during braking together with the standard stop lamps. The stop lamp is activated when the stop lamp switch on the brake pedal is closed.

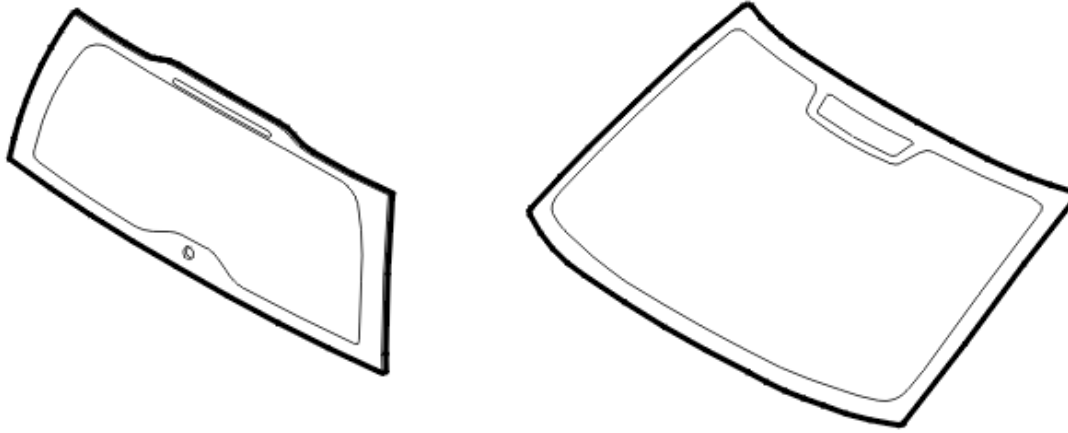
The high mounted stop lamp is supplied with power directly from the rear electronic module (REM). The lamp consists of a number of LEDs.

There are diagnostics for the high level stop lamp.

Rear windshield wiper/washers (V70/V70XC/XC70/XC90)

See Design and Function, central electronic module (CEM).

Rear demist



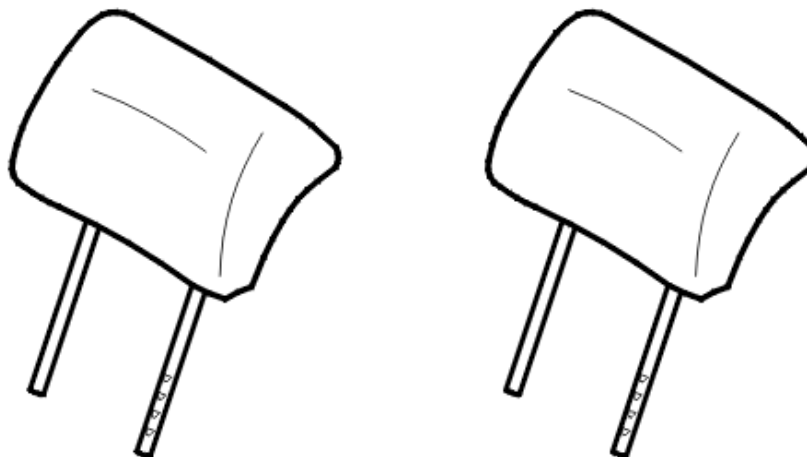
There are heating loops in the glass for demisting and to prevent ice from forming. The loops heat up when they are supplied with power. The power supply is via a relay on the rear relay box. The relay is controlled by the rear electronic module (REM).

Rear demist is controlled using a switch on the right-hand side of the climate control module (CCM).

The engine must be running for the demister to work. Press the button again to switch off the function. Demisting is switched off automatically after the maximum time of 12 minutes.

The relay can be diagnosed by the rear electronic module (REM). The switch can be diagnosed via the climate control module (CCM).

Electric folding rear head restraints (S60/S80)

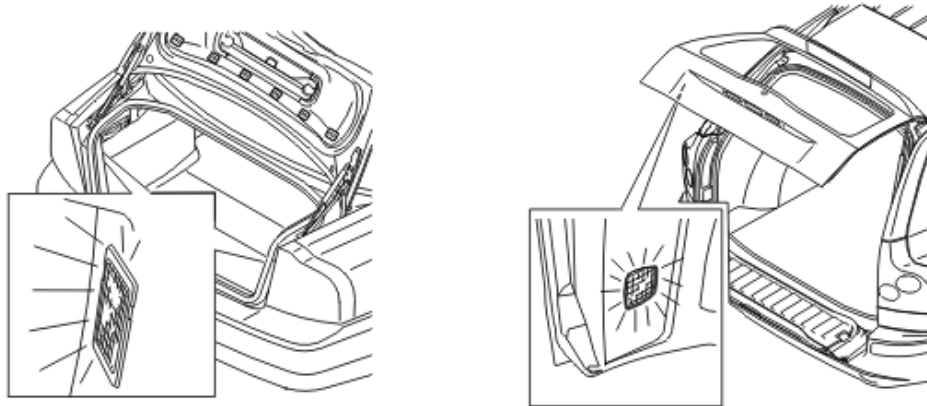


There are solenoids on the rear head restraints if the car has electrically folding head restraints (not the center rear seat). The solenoids can fold the head restraints when reversing, for example. The power supply for the solenoids is via a directly connected relay on the rear electronic module (REM).

The head restraints are folded using a switch on the lower section of the climate control module (CCM). The head restraints fold down when the switch is pressed. The head restraints fold back up manually.

The relay for the solenoids can be diagnosed by the rear electronic module (REM). The switch can be diagnosed via the climate control module (CCM).

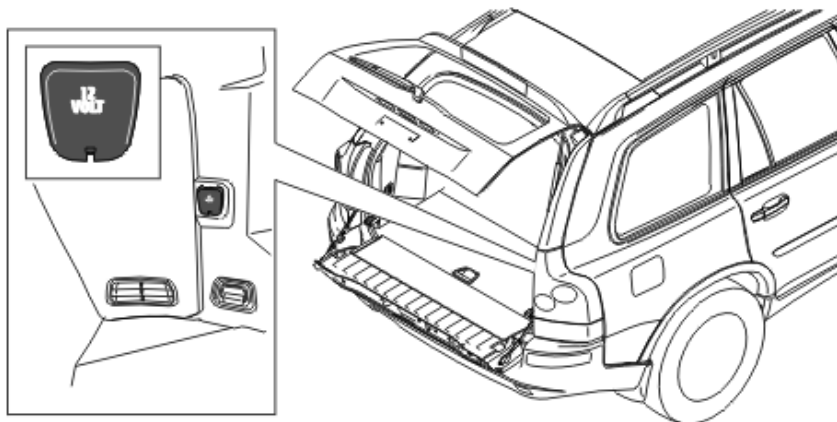
Cargo compartment lighting (S60/S80/XC90)



There are lamps in the cargo compartment. There are two lamps in the S60/S80. These are on the left and right-hand sides of the cargo compartment panels. In the XC90 there is a lamp in the trunk lid. The lamps light when the trunk lid is open. The cargo compartment lighting is powered directly from the rear electronic module (REM).

There are diagnostics for the cargo compartment lighting.

Rear 12 V socket (V70/V70XC/XC70/XC90)



There is a 12V socket on the right-hand side of the cargo compartment. This socket can be used to power a number of accessories.

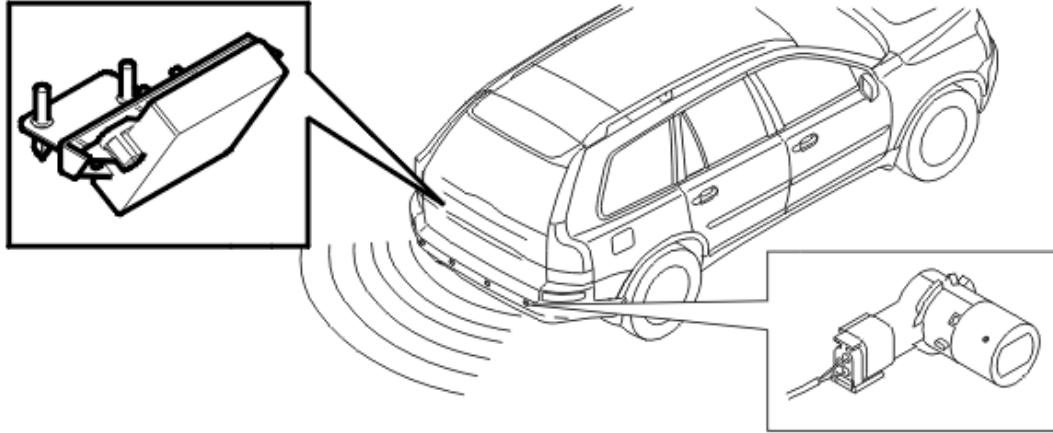
The socket is directly connected to the 30-supply via a fuse and a directly connected shunt on the rear

electronic module (REM).

The rear electronic module (REM) measures the current through the shunt periodically and calculates an average value. This is compared with a limit value to determine if any power consuming component is connected.

This information is transmitted via the Control area network (CAN) to the driver information module (DIM) which displays a text message when a power consuming component is connected (applies only to factory installed 12V sockets).

Parking assistance (applies only to the XC90 2003–2004 and S80 2004)



There is a back-up (reversing) warning system to assist reversing maneuvers. The back-up (reversing) warning system consists of:

- four sensors in the rear bumper
- a parking assistance module (PAM) under the rear relay box.

The parking assistance module (PAM) communicates with the rear electronic module (REM) using serial communication. The signals transmitted contain information about status and diagnostics. The sensors are directly connected to the Parking Assistance Module (PAM). The sensors are also powered via the parking assistance module (PAM).

The back-up (reversing) warning system is activated via a switch on the lower section of the climate control module (CCM). When the system is active, an LED lights in the switch and a text message is displayed in the infotainment control module (ICM) (XC90) or audio module (AUM) (S80).

The sensors detect objects within 1.5 meters and if reverse gear is engaged then a beeping tone can be heard from the rear loudspeakers (XC90) and the front loudspeakers (S80) respectively. The tone intensifies when the car draws closer to the object. At approx. 30

cm the tone becomes continuous.

In the event of a fault in the parking assistance module (PAM) or sensors, the general warning lamp in the driver information module (DIM) lights and a text message is displayed.

There are diagnostics for the back-up (reversing) warning system.

Function

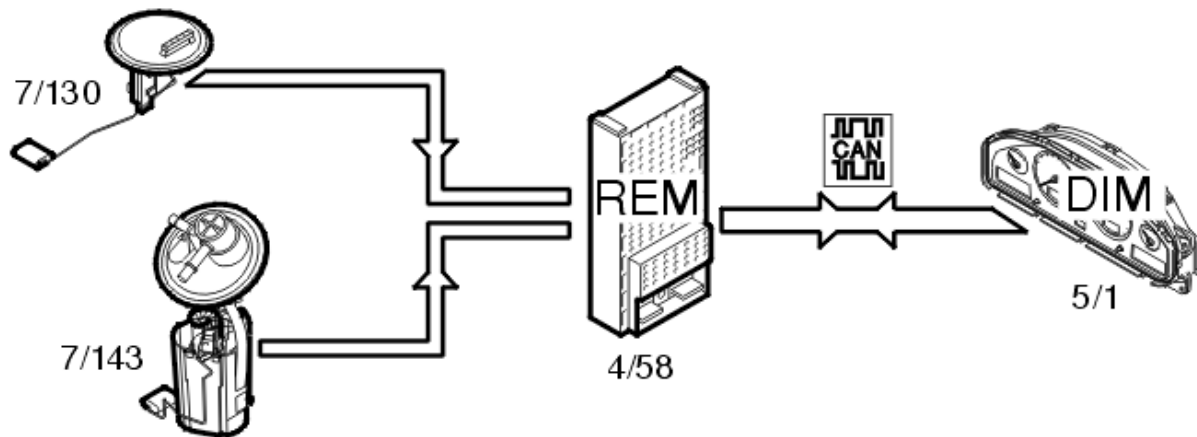
Alarm

See Design and Function, Alarm.

Locks

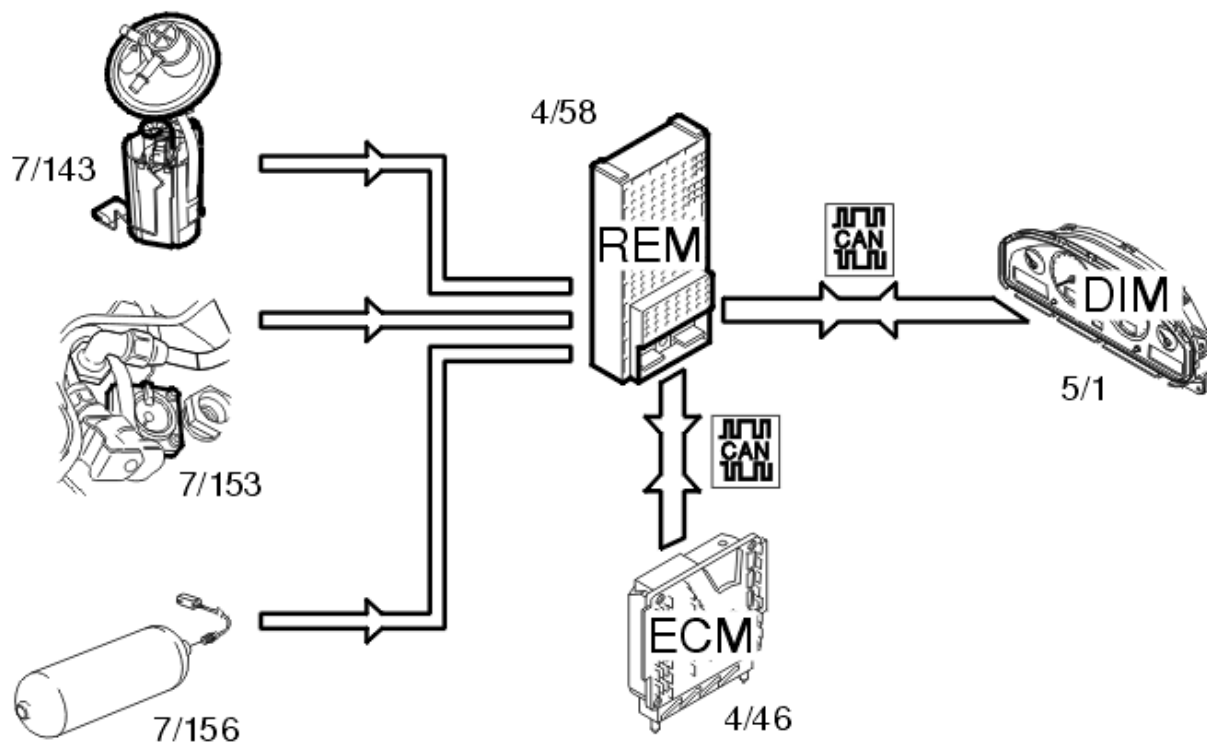
See Design and Function, Central locking.

Fuel level (Gasoline/Diesel)



The fuel level is gauged by the fuel level sensors (7/130, 7/143). The signals from the sensors are transmitted to the rear electronic module (REM) (4/58). The rear electronic module (REM) calculates the quantity of fuel remaining by comparing the signals with a tank table stored in the rear electronic module (REM). Information about the quantity of fuel is transmitted via the Control area network (CAN) to the driver information module (DIM) (5/1) where the fuel level is displayed on the fuel gauge.

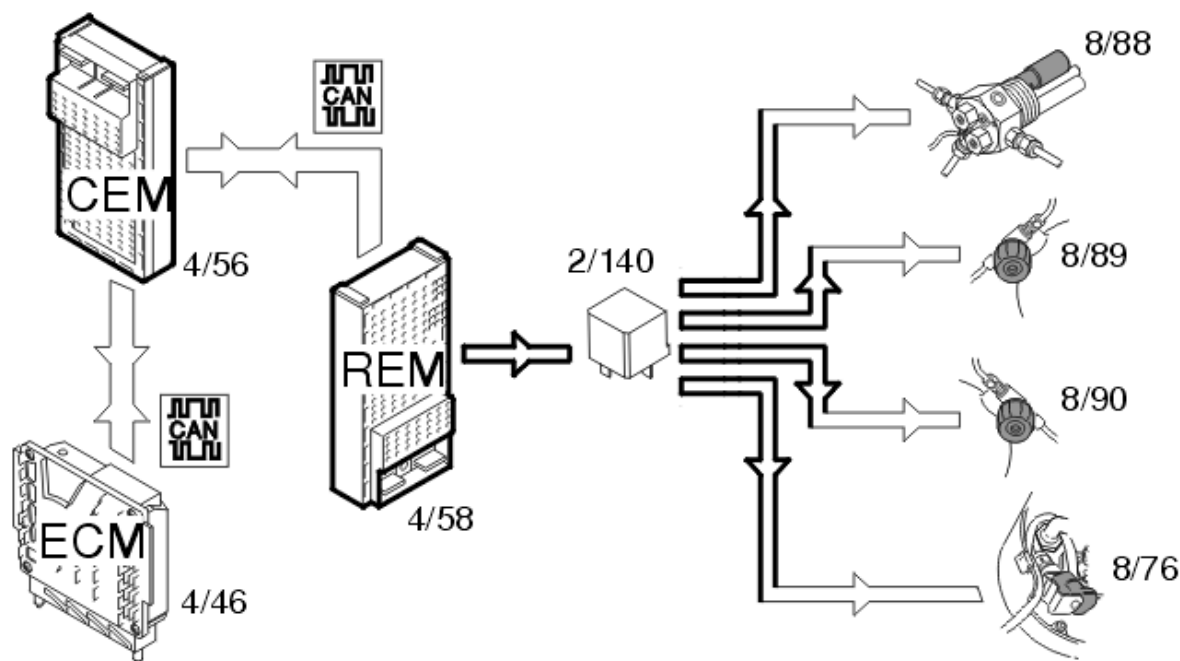
Fuel level (Bi-fuel)



The fuel level in the gasoline tank is measured by the fuel level sensor (7/143). The level in the gas tank is measured by the fuel level sensor (7/156) (CNG) or (7/153) (LPG). The signals from the sensors are transmitted to the rear electronic module (REM) (4/58).

The rear electronic module (REM) calculates the quantity of fuel remaining in each tank and transmits this information via the Control area network (CAN) to the driver information module (DIM) (5/1). The driver information module (DIM) also receives data via the Control area network (CAN) from the engine control module (ECM) (4/46) indicating which type of fuel the car is running on. The gas level in the tank is displayed via the fuel gauge. The gasoline fuel level is displayed in the text window in the driver information module (DIM).

Shut-off valve (Bi-fuel)



The rear electronic module (REM) (4/58) controls the shut-off valves, (8/88-90) (CNG) and (8/76) (LPG), via a directly connected relay (2/140) which supplies the valves with power when they should be open.

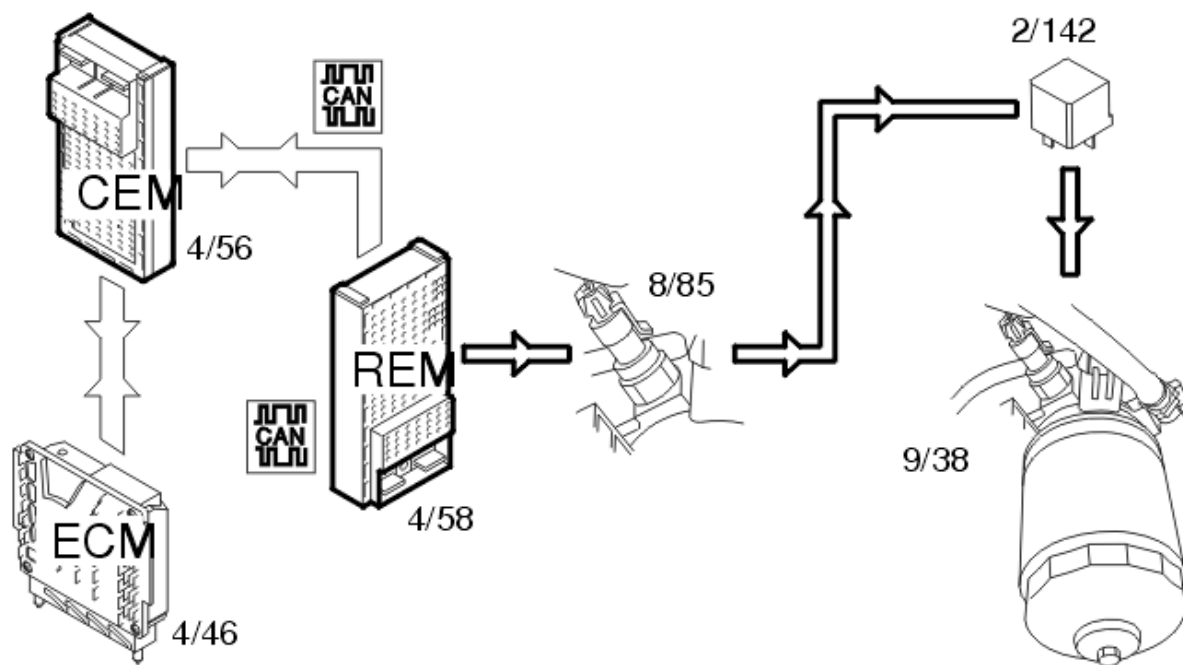
The rear electronic module (REM) receives information via the control area network (CAN) from the engine control module (ECM) (4/46) indicating that the car should run on gas/LPG. The rear electronic module (REM) also receives information via the control area network (CAN) from the central electronic module (CEM) (4/56) indicating the position of the ignition and data about collision status. When the ignition is on and no collision has been registered, the rear electronic module (REM) activates the relay, which supplies the valves with power.

The rear electronic module (REM) deactivates the relay in the following cases:

- there is a signal from the engine control module (ECM) indicating that gasoline operation has been selected
- ignition off
- the collision status changes
- there is a fault in the communication on the controller area network (CAN).

The relay can be activated via a diagnostic command to, for example, allow the tank to be drained. Activation is carried out in VIDA via the vehicle communication socket. See function group 3, Rear Electronic Module (REM).

Diesel filter preheating (Diesel)



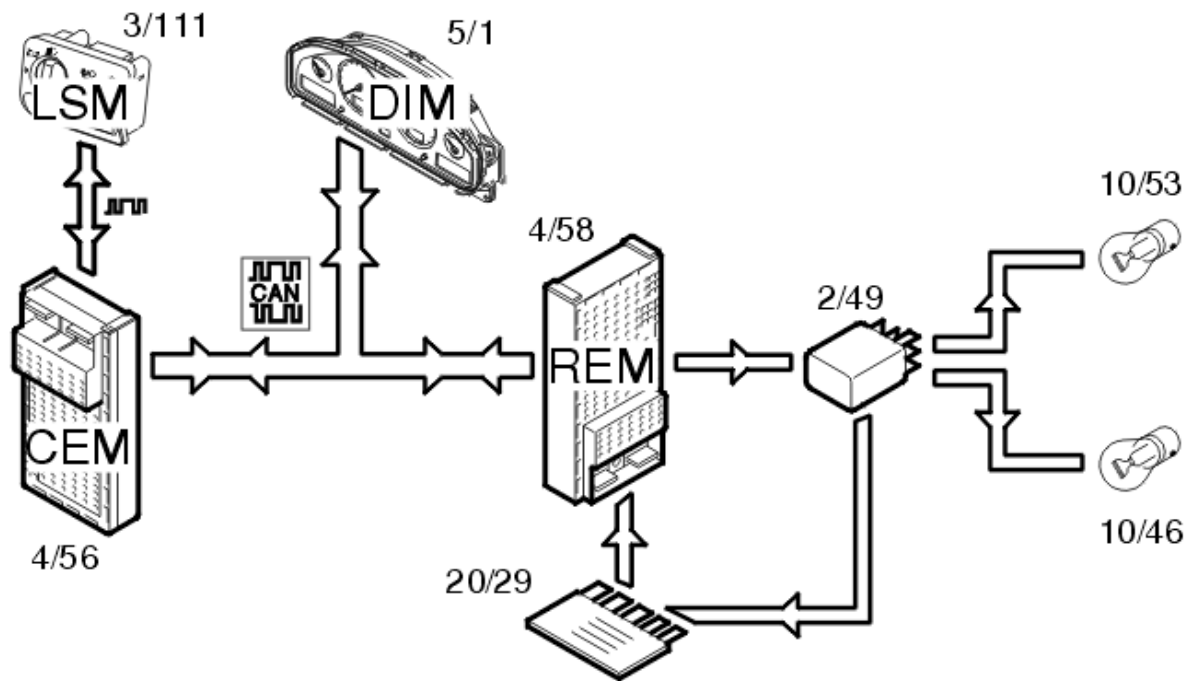
The rear electronic module (REM) (4/58) controls warming up the diesel filter.

The rear electronic module (REM) checks that the conditions to start the diesel filter have been met. The following is transmitted on the controller area network (CAN):

- the engine control module (ECM) (4/46) sends a signal indicating that the engine is running
- the central electronic module (CEM) (4/56) transmits a signal indicating the position of the ignition key. The key must be in position II.

When the conditions are met, the rear electronic module (REM) grounds the output for relay 2/142. There is a temperature switch (8/85) on the relay circuit which closes at approximately -3 °C and then activates the relay. The temperature switch switches off at approximately 5 °C which breaks the power supply by releasing the relay. The diesel filter (9/38) is then supplied with power via the relay.

Rear fog lamp



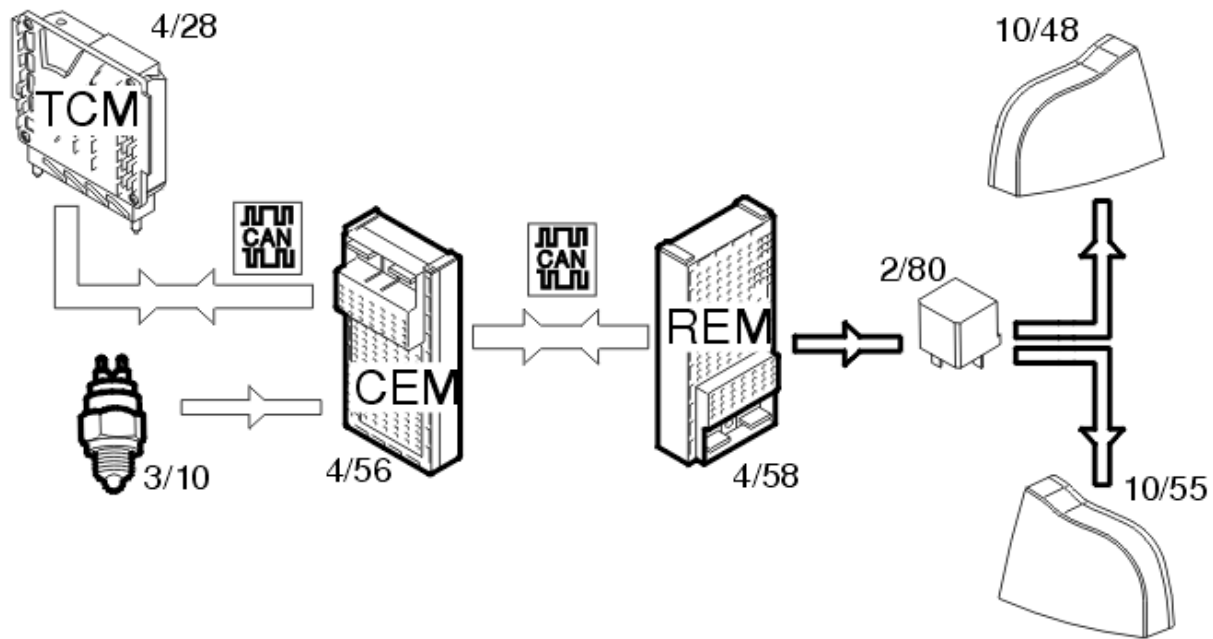
The rear fog lamps (10/46, 10/53) are activated by pressing the button for the rear fog lamps in the lamp switch module (3/111). The light switch module (LSM) transmits a request to light the lamps to the central electronic module (CEM) (4/56) using serial communication. The central electronic module (CEM) transmits the request to the rear electronic module (REM) (4/58) via the Controller area network (CAN). The rear electronic module (REM) activates the relay (2/49) and the lamps are supplied with power via the relay.

Central Electronic Module (CEM) transmits information:

- back to the light switch module (LSM) to light the LED in the button
- via the Controller area network (CAN) to the driver information module (DIM) (5/1) to light the indicator lamp for the rear fog lamps.

Information about the lamp circuit is obtained by the rear electronic module (REM) via a shunt (20/29). The rear electronic module (REM) sends the status of the lamp fault via the Control area network (CAN) to the central electronic module (CEM). In the event of a fault, the central electronic module (CEM) transmits data via the Control area network (CAN) to the driver information module (DIM) which displays a text message.

Back-up lamp



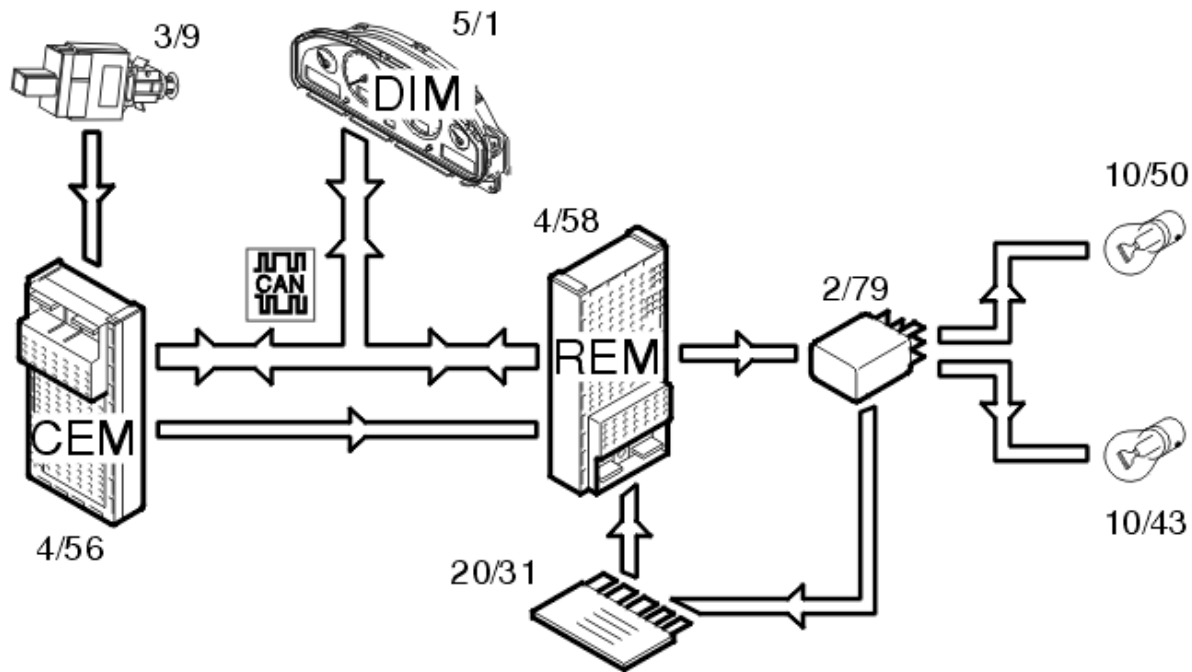
Manual transmissions

The back-up (reversing) lamps (10/48, 10/55) are activated when back-up (reverse) gear is selected. The switch (3/10) on the transmission is then closed. A directly connected signal is transmitted to the central electronic module (CEM) (4/56) indicating that back-up (reverse) gear is selected. The central electronic module (CEM) transmits the information via the controller area network (CAN) to the rear electronic module (REM) (4/58) to activate the back-up lamps. The rear electronic module (REM) activates the relay (2/80) and the lamps are supplied with power via the relay.

Automatic transmission

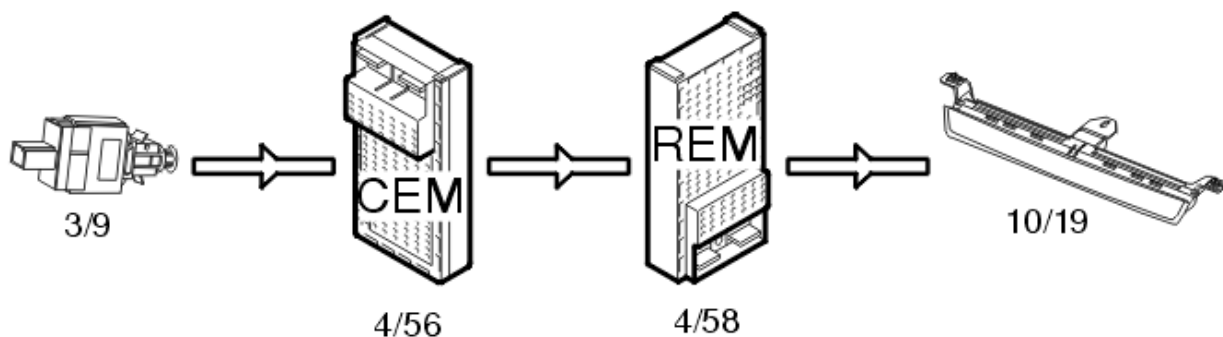
The back-up (reversing) lamps (10/48, 10/55) are activated when back-up (reverse) gear is selected. The transmission control module (TCM) (4/28) transmits information via the Control area network (CAN) to the central electronic module (CEM) (4/56) indicating that back-up (reverse) gear is selected. The central electronic module (CEM) transmits the information via the controller area network (CAN) to the rear electronic module (REM) (4/58) to activate the back-up lamps. The rear electronic module (REM) activates the relay (2/80) and the lamps are supplied with power via the relay.

Brake light



The stop lamps (10/43, 10/50) are activated when the brake switch is (3/9) closed. A directly connected signal is transmitted via the central electronic module (CEM) (4/56) to the rear electronic module (REM) (4/58) and activates the relay (2/79). The lamps are powered via the relay. The central electronic module (CEM) transmits the data via the Controller area network (CAN) to the rear electronic module (REM) indicating that the stop lamp switch is activated. Information about the lamp circuit is obtained by the rear electronic module (REM) via a shunt (20/31). The rear electronic module (REM) sends status information for the lamp fault via the Control area network (CAN) to the central electronic module (CEM). In the event of a fault, the central electronic module (CEM) transmits data via the Control area network (CAN) to the driver information module (DIM) (5/1) which displays a text message.

High level stop lamp (V70/V70XC/XC70/XC90)



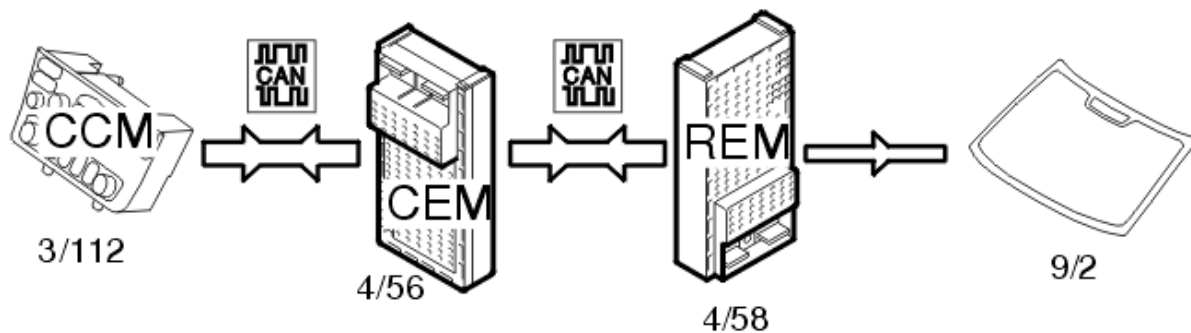
When the stop lamp switch (3/9) is closed, a signal is

transmitted to the central electronic module (CEM) (4/56). The signal is transmitted from the central electronic module (CEM) to the rear electronic module (REM) (4/58) via a directly connected cable. The high mounted stop lamp is supplied with power directly from the rear electronic module (REM). The stop lamp is supplied with power for as long as the stop lamp switch is closed.

Rear windshield wiper/washers (V70/V70XC/XC70/XC90)

See Design and Function, central electronic module (CEM).

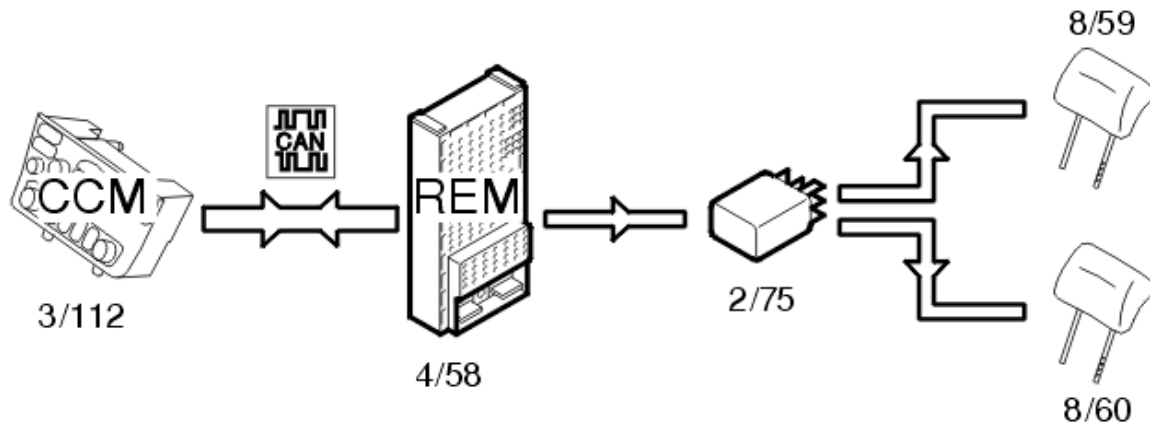
Rear demist



Rear demist (9/2) is activated by pressing the switch on the climate control module (CCM) (3/112). The climate control module (CCM) transmits the data via the Control area network (CAN) to the central electronic module (CEM) (4/56). The central electronic module (CEM) checks that the conditions to start the demist have been met. If the conditions are met, a request is sent via the Control area network (CAN) to the rear electronic module (REM) (4/58) to activate the relay (2/82). The rear electronic module (REM) powers the relay and the demister is powered.

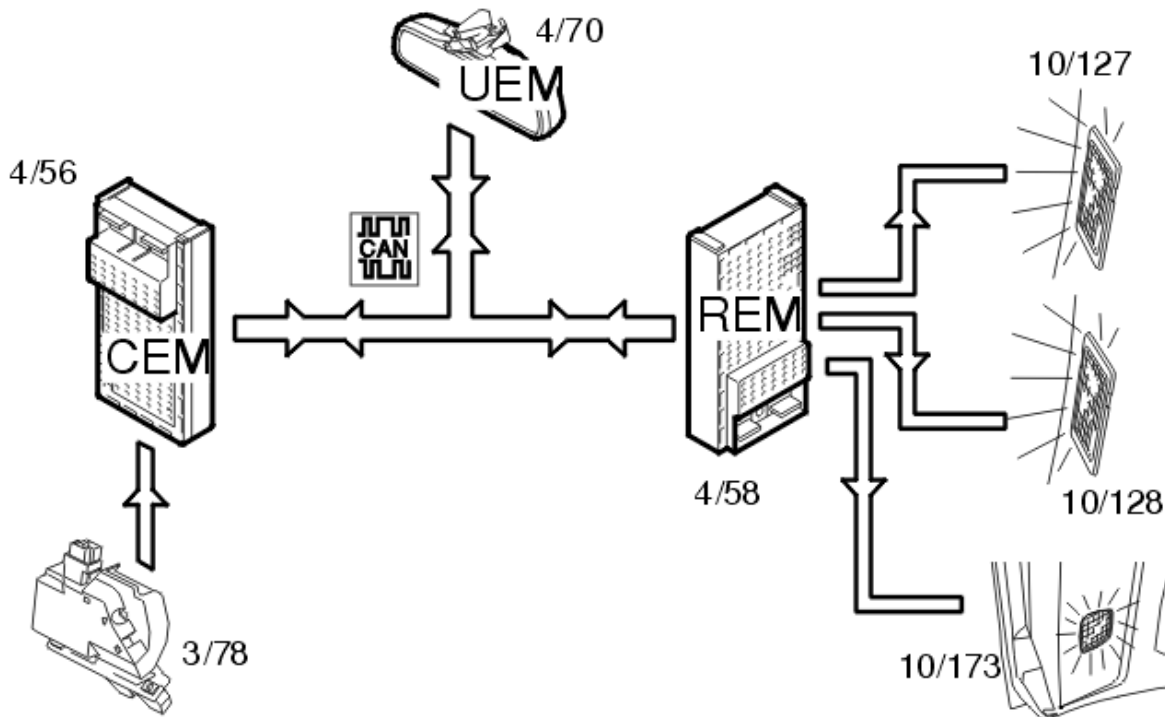
The central electronic module (CEM) also transmits a request via the Control area network (CAN) back to the climate control module (CCM) to light the LED in the switch.

Electric folding rear head restraints (S60/S80)



The rear head restraints fold down when the switch on the climate control module (CCM) (3/112) is pressed. The climate control module (CCM) transmits a request via the Controller area network (CAN) to the rear electronic module (REM) (4/58) to activate the function. The rear electronic module (REM) activates the relay (2/75). The solenoids (8/59-60) in the head restraints are then powered by the relay.

Cargo compartment lighting (S60/S80/XC90)

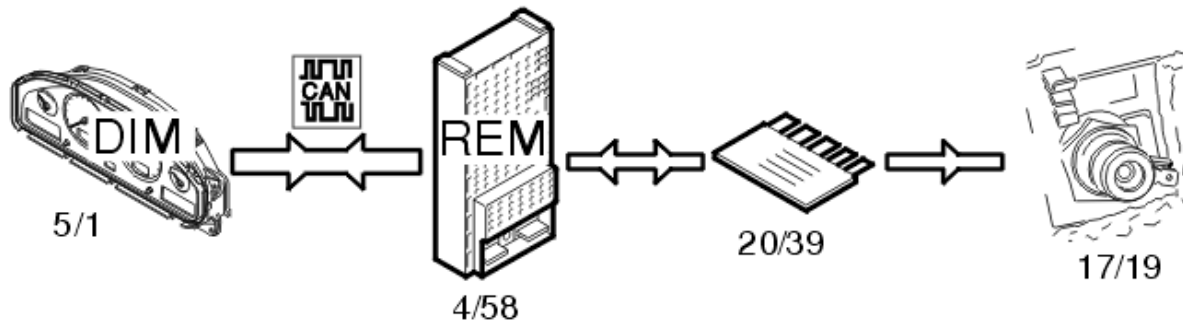


The cargo compartment lighting is activated when the trunk lid is opened. The central electronic module (CEM) (4/56) receives a signal from the lock (3/78) in the trunk lid. The central electronic module (CEM) transmits the information via the Controller area network (CAN) to the rear electronic module (REM) (4/58) about the status of the trunk lid. A request for cargo compartment lighting is also sent from the upper electronic module (UEM)

(4/70) to the rear electronic module (REM). The lamps (10/127-128 (S60/S80)) (10/173 (XC90)) are then powered directly from the rear electronic module (REM).

For the XC90, the roof lamp in the cargo compartment also lights. For further information about the inner roof lighting, see Design and Function, upper electronic module (UEM).

Rear 12 V socket (V70/V70XC/XC70/XC90)



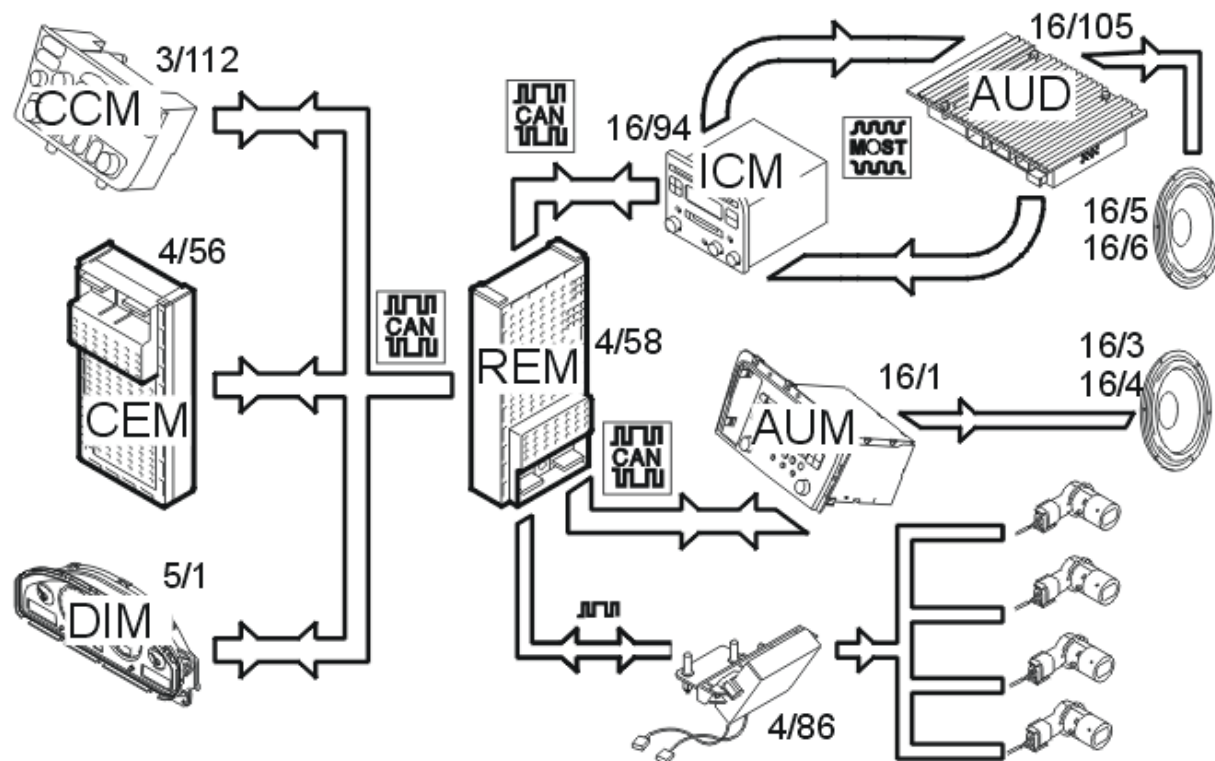
When a power consuming component is connected to the rear 12V socket (17/19), the power consumption is measured via a directly connected shunt (20/39) on the rear electronic module (REM) (4/58). The rear electronic module (REM) transmits status data via the control area network (CAN) to the driver information module (DIM) (5/1) which displays a text message (applies only to factory mounted 12V sockets).

The text message is also displayed if a power consuming component is connected when changing from ignition position:

- II to I
- I to 0 and
- 0 to the key is removed.

There is also an audible warning note when the key is removed.

Parking assistance (applies only to the XC90 2003–2004 and S80 2004)



The back-up (reverse) warning system is activated by pressing the switch on the climate control module (CCM) (3/112). Information about the position of the switch is sent via the Control area network (CAN) to the rear electronic module (REM) (4/58). When back-up (reverse) warning is selected, this is confirmed by the rear electronic module (REM) sending a signal back to the climate control module (CCM) to light the LED in the switch.

The rear electronic module (REM) also receives information via the Control area network (CAN) from the central electronic module (CEM) (4/56) about:

- the key position and
- that back-up (reverse) gear is selected.

The parking assistance system can detect nearby objects when the ignition is on in position II and back-up gear (R) is selected. The parking assistance system is deactivated automatically when the gear selector lever is moved from (R) to any other position.

When the conditions for activating the back-up (reverse) warning are met, the rear electronic module (REM) sends data via serial communication to the parking assistance module (PAM) (4/86). The parking assistance module (PAM) receives signals from the back-up (reversing) warning sensors. A signal for sound from the parking assistance system is sent back from the parking assistance module (PAM) via the rear electronic module (REM) to the infotainment control module (ICM) (16/94) (XC90 only). On the S80, the signal is transmitted to the

audio module (AUM) (16/1). The parking assistance module (PAM) sends the signal when there is an object within 1.5 meters of the rear of the car.

The Infotainment Control Module (ICM) (XC90) and the Audio Module (AUM) (S80) respectively display a text message that the back-up (reversing) warning is active. The Infotainment Control Module (ICM) also sends information via the MOST network to the Audio Control Module (AUD) (16/105). The information which is sent contains the time interval between the acoustic tones as well as the muting of other sound, e.g. CD or radio. The Audio Control Module (AUD) (XC90) and the Audio Module (AUM) (S80) respectively playback the sound in the rear loudspeakers (XC90) and front loudspeakers (S80) respectively.

Applicable to the XC90:

If the vehicle is left-hand drive then the sound comes from the right-hand rear loudspeaker (16/5). If the vehicle is right-hand drive then the sound comes from the left-hand rear loudspeaker (16/6).

Applicable to the S80:

The sound comes from both left-hand front (16/4) and right-hand front loudspeakers (16/3).

The acoustic signal will have closer intervals with reduced distance to the object. At a distance of approx. 30 cm and less the signal has a continuous tone.

In the event of a fault in the parking assistance module (PAM) or in the sensors, a signal is transmitted from the rear electronic module (REM) via the Control area network (CAN) to the driver information module (DIM) (5/1). The driver information module (DIM) then lights the general warning lamp and displays a text message.

Diagnostic functions

S60

- See: [Diagnostic functions](#)

S80

- For model year 1999–2003, see [Diagnostic functions](#)
- For model year 2004, see [Diagnostic functions](#)

V70

- See: [Diagnostic functions](#)

XC70/V70XC

- See: [Diagnostic functions](#)

XC90

- See: [Diagnostic functions](#)

Downloading software and replacing the control module

New software can be downloaded into the rear electronic module (REM). When ordering software, the hardware and the software in the car is compared to the information in the Volvo central database. If the comparison is OK the software is downloaded to the control module.

If the comparison between the car and Volvo central database is not OK, the database is updated with the car configuration. When this is complete the software is downloaded.

For further information regarding downloading, see Design and Function, Downloading Software.

The control module is mounted in a relay box behind the left-hand cargo compartment panel. To replace the rear electronic module (REM), remove it from the relay box.

For cars with Bi-Xenon lamps, the position sensor for headlamp range adjustment must be calibrated when the control module is replaced. This is carried out in VIDA via the vehicle communication socket. See function group 3, Rear Electronic Module (REM).