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1	Ground terminals	3	Integrated relay/fusebox, engine compartment (central electrical unit)
2	Integrated relay/fusebox, interior compartment (CEM)	4	Battery

ELECTRICAL SYSTEM

GENERAL

POWER SUPPLY

The battery is located in the engine compartment, on the inside of the left-hand spring strut turret.

The system voltage is divided at the starter motor/generator (GEN) and the central electrical unit in the engine compartment.

- Two 150 A fuses are integrated into each positive cable, one each for the starter motor/generator and the central electrical unit (engine compartment relay/fusebox).

There are easily accessible ground terminals on both the spring strut turrets.

WIRING AND FUSES

Integrated relay/fuseboxes are located:

- in the engine compartment.
- in the passenger compartment under the glove compartment (CEM).

VEHICLE CURRENT CONSUMPTION LIMITATION

Example 1: If the engine is not running and the battery voltage is too low to supply current to the Infotainment system, a message on the Infotainment Control Unit (ICM) will indicate that the system will shut down within two minutes. Then the ICM shuts down the system (at 11.8 volts at 20°C).

There is an NTC temperature sensor beneath the battery that the CEM uses to determine the shutdown voltage for the ICM. At higher temperatures, the ICM will be shut down at a higher voltage.

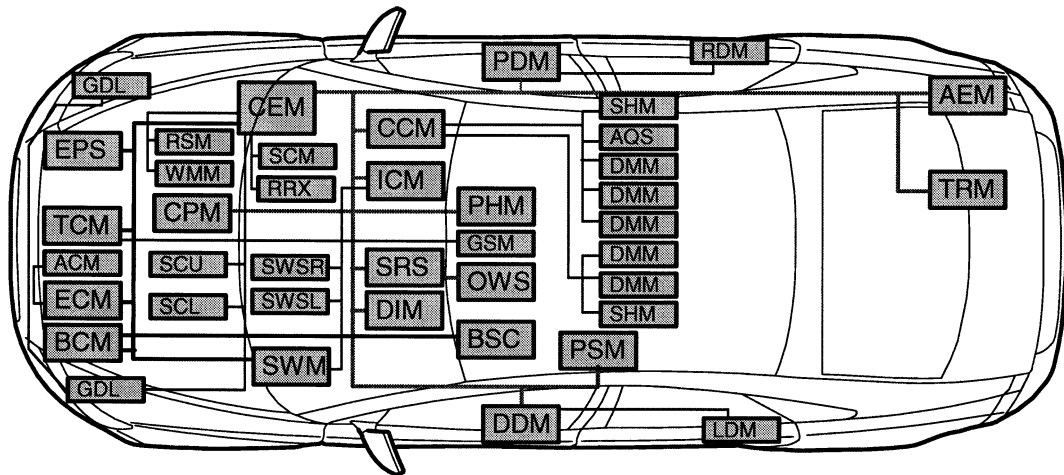
Example 2: Blower fan will only run for two minutes in manual mode without engine running. The fan speed cannot be adjusted at low battery voltage.

TRANSPORT MODE

Vehicles are delivered in Transport Mode. The following functions are limited or disabled:

- No lighting or limited lighting after 20 minutes
- No remote locking/unlocking

A DIM message appears prior to startup alerting the driver that the vehicle is in Transport Mode. Use VADIS to set vehicle to normal mode.



NETWORK

GENERAL

The data network in the S40 consists of a high and a low speed CAN bus, a fiber-optic bus for Infotainment (MOST, Multimedia Oriented Systems Transport) and a number of local network on subordinate buses (LIN, Local Interconnect Network).

A data bus is the channel for transferring data (communication) between different units in a network.

CAN

CAN is divided on two different buses. One high speed bus (HS, High Speed) for the driveline and chassis and a lower speed (LS, Low Speed) bus for comfort and bodywork.

The master computer in the car, the CEM, has twin processors. One processor is connected to both the HS and LS CAN and the other processor is only connected to the LS CAN.

CEM

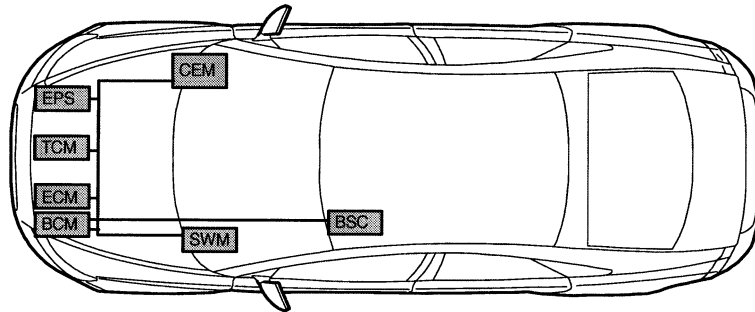
The CEM is under the glove compartment.

The CEM communicates with other control modules and components via LIN and CAN communication. In addition, the CEM manages a number of the directly connected components and functions.

The vehicle configuration file is stored in the Central Electronic Module (CEM).

The CEM is connected to the Data Link Connector (DLC). This connection is continuously linked to CAN H and CAN L on both high and low speed busses even when VADIS is not accessing the network.

Control Modules HS CAN



The transfer speed on the HS CAN is 500 Kbps.

- The steering wheel module (SWM) is on the HS CAN.
- The control stalks are directly connected to the SWM.
- The steering wheel buttons communicate via LIN.
- The headlamp flash is directly connected to the CEM.

The terminal resistors (120 ohm) are located in the ECM and the SWM.

BCM	Brake Control Module	BSC	Body Sensor Cluster
CEM	Central Electronic Module	ECM	Engine Control Module
EPS	Electrical Power Steering	SWM	Steering Wheel Module
TCM	Transmission Control Module		

BSC

Specially adapted (supplier specific) CAN communication between the BCM (master) and BSC (slave) as in Mark 25 ABS (*Refer to Bodywork, Exterior, Interior, Safety Systems*).

EPS

Control module for electrical power steering (*Refer to Steering and Suspension*).

SWM

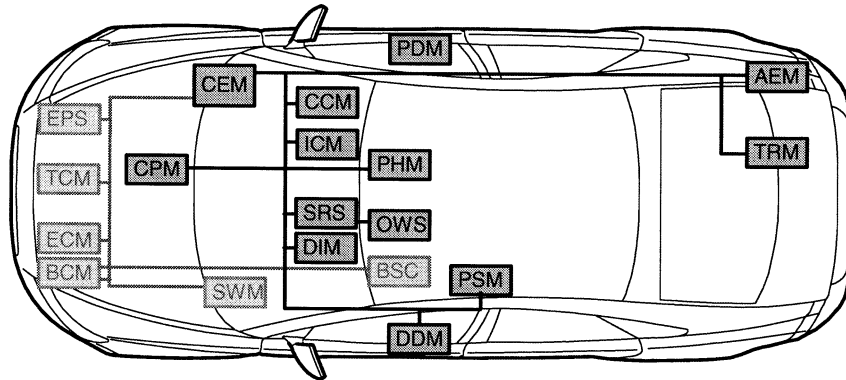
The SWM is connected to the high speed CAN so that the electrical power steering (EPS) module receives information from the steering wheel angle sensor integrated in the SWM. The power steering is a safety critical system. SAS CM is integrated into the SWM and not on the CEM as it was previously.

SWM is a high speed module but also has LIN connections to low speed modules for radio and navigation functions.

Other

Note that the S40/V50 does not have a Upper Electronic Module (UEM) or a Rear Electronic Module (REM). Most of the functions are controlled by the CEM.

Control Modules, LS CAN



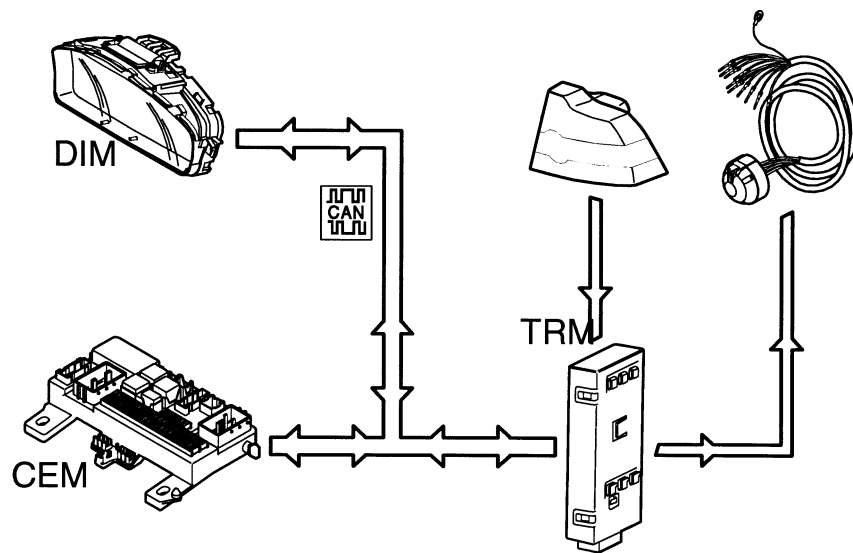
The transfer speed on the LS CAN is 125 Kbps.

The terminal resistors (120 ohm) are located in the SRS and the DIM.

AEM	Accessory Electronic Module	CCM	Climate Control Module
CEM	Central Electronic Module	DDM	Driver Door Module
DIM	Driver Information Module	ICM	Infotainment Control Module
OWS	Occupant Weight Sensor	PDM	Passenger Door Module
PSM	Power Seat Module	SRS	Supplementary Restraint System
TRM	Trailer Module		

OWS

Specially adapted (supplier specific) CAN communication between SRS (master) and OWS (slave)
(Refer to Bodywork, Exterior, Interior, Safety Systems).



TRM

Handles signals for trailer connection.

Feed from RH brake light is only used for backup in case of network failure.

LIN

Local Interconnect Network

LIN is an automotive industry standard type of serial communication. Volvo has used serial communication before for communication between master and slave modules on the CAN network (called VOLCANO lite), and for communication between the VST and various control modules for diagnostics (diagnostic K-link). By using an industry standard rather than a Volvo-specific standard, component suppliers can build fewer brand-specific components. This should help lower costs. The first application of an LIN standard serial communication in Volvo was the Parking Assistance System (PAS) communication between the Parking Assistance Module (PAM) and the REM in the XC90.

'Local Interconnect' means that a number of adjacent control modules build a local network using their own data bus. The control modules on the LIN bus communicate with the other networks via one of the control modules connected to the CAN bus.

Each LIN is a subordinate bus to CAN and can be made up of one or more control modules.

- The buses can be extended.

The CAN control module controls the slaves on the LIN bus.

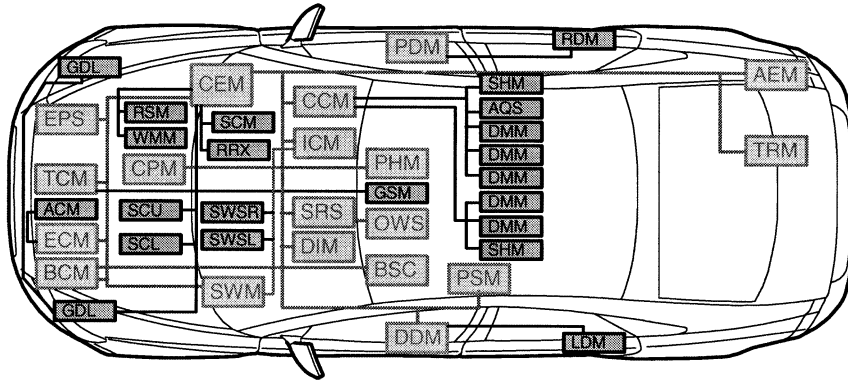
Several LIN buses can be connected to a CAN control module.

The diagnostic function is in the CAN control module which also stores all the diagnostic trouble codes.

Communication on the LIN bus is serial by conventional cable and at a transfer speed of about 10 kbps.

The network in the S40 contains a total of 10 LIN buses and covers up to 22 control modules at the time of introduction.

Control Modules, LIN



Slave		Master	Slave		Master
DMM	Damper Motor Module	CCM	LDM	rear Left Door Module	DDM/PDM
RDM	rear Right Door Module	DDM/PDM	RRX	Remote Entry	CEM
SCL	Steering Column Lock	CEM	SCU	Start Control Unit	CEM
WMM	Wiper Motor Module	CEM	AQS	Air Quality Sensor	CCM
GDL	Gas Discharge Lamp (x2)	CEM	GSM	Gear Selector Module	TCM
RSM	Rain Sensor Module	CEM	SCM	Siren Control Module	CEM
SHM	Seat Heating Module (x2)	CCM	SWSL	Steering Wheel Switch Left	SWM
SWSR	Steering Wheel Switch Right	SWM			

DMM

General climate control module with damper motors which need to be identified by the CCM. Defroster, air distribution, recirculation and temperature damper (*Refer to Climate Control Unit*).

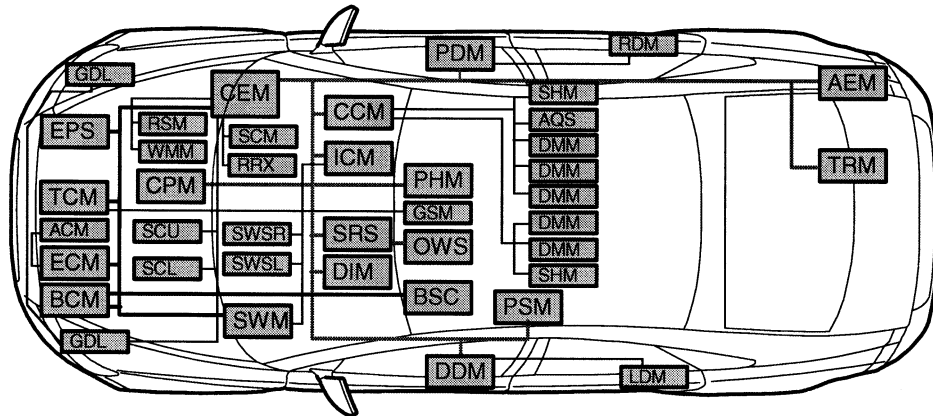
GDL

Control modules for Bi-Xenon.

RRX

Remote receivers for remote control.

Fully Equipped S40



CEM LIN busses:

- 1) SCU, SCL, GDL (left), GDL (right)
- 2) SCM, RRX
- 3) RSM, WMM

DDM LIN bus:

- 1) LDM

PDM LIN bus:

- 1) RDM

SWM LIN bus (via low speed CAN to ICM):

- 1) SWSR, SWSL

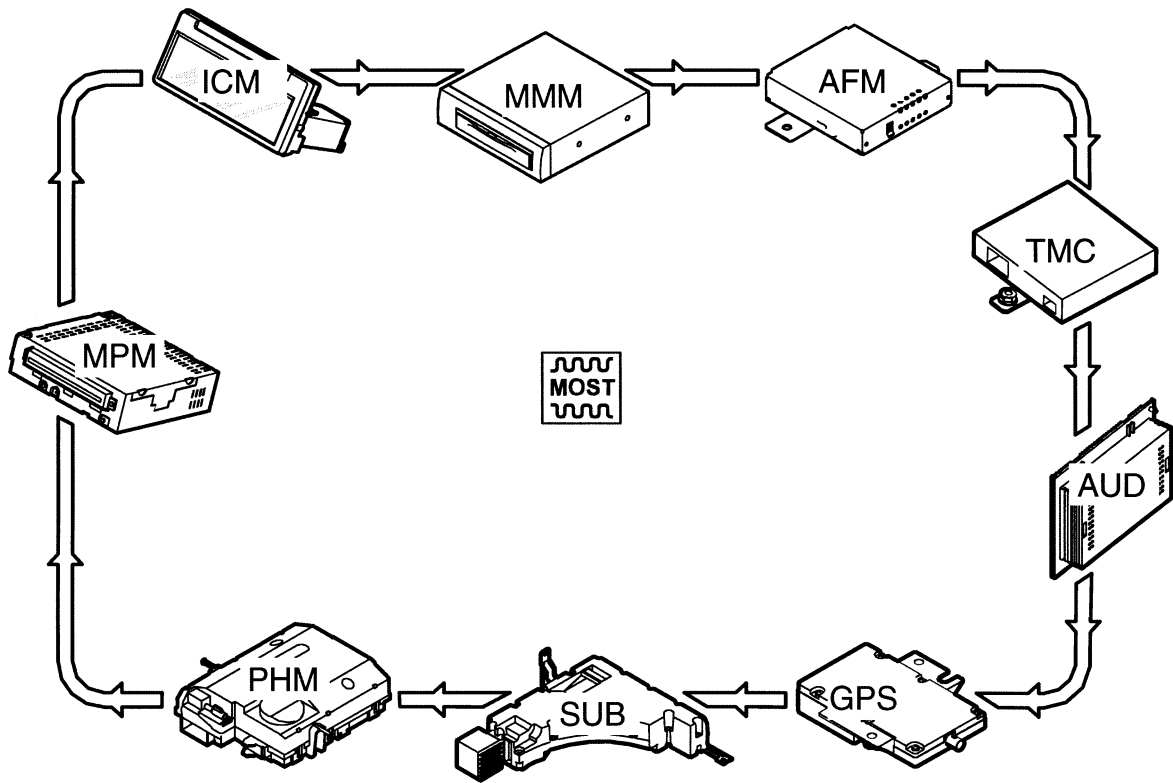
CCM LIN busses:

- 1) DMM, DMM SHM (left)
- 2) DMM, DMM, DMM, SHM (right), AQS

TCM LIN bus:

- 1) GSM

LIN communication speed is approximately 10kbps.



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AFM	AM/FM Module
AUD	AUdio Module
GPS	Global Positioning System
ICM	Infotainment Control Module
MMM	MultiMedia Module
MPM	Media Player Module
PHM	PHone Module
SUB	SUBwoofer
TMC	Traffic Message Channel

MOST

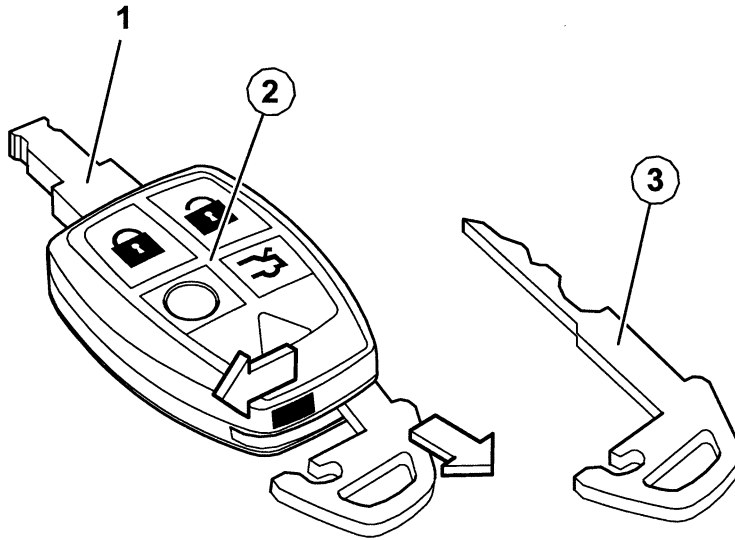
The technology behind the fiber optic network is the same as the system introduced in the XC90. Note that the order and location of the control modules differs from the XC90.

ICM

The ICM is connected to the CAN and acts as the master control module on the MOST bus.

Standard Edition

The simplest configuration is ICM, AFM and AUD.



1	Transponder section	3	Key blade
2	Remote control		

LOCKS AND ALARM

REMOTE CONTROL AND KEY

The electronic ignition key and remote control are integrated with a key blade that can be used to unlock the driver's door manually.

Shaped lithium battery button: CR 2032, 3V.

- When the battery voltage is low, a text message is displayed in the DIM.

The CEM can be programmed with a maximum of 6 keys.

- The remote control has a unique ID.
- The PIN code for the transponder is unique.

NOTE: It is normal when programming a key that the DIM does not light up in key position. Follow the instructions in VADIS.

REMOTE CONTROL

The remote controls have five buttons:

Locking

Unlocking

Unlocking trunk lid

Panic alarm

Approach light

Acknowledgement when Locking/Unlocking

The turn signal lamps give one extended flash to acknowledge that the car is locked and two short flashes indicate unlocking.

(This can be activated/deactivated via the menu system in the ICM or VADIS.)

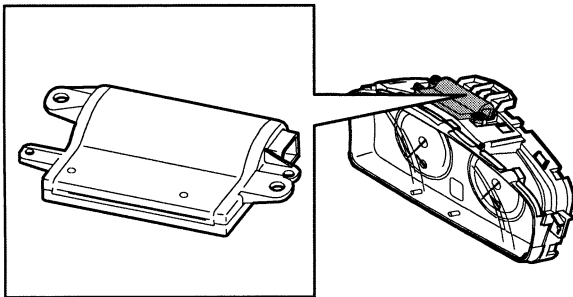
Comfort Function (Depending on Market)

If the unlocking button is depressed for approximately 1.5 seconds all windows are **opened**.

If the locking button is depressed for approximately 1.5 seconds, all windows and the sunroof are **closed**.

The function can also be activated from the front door panels.

Remote Receiver

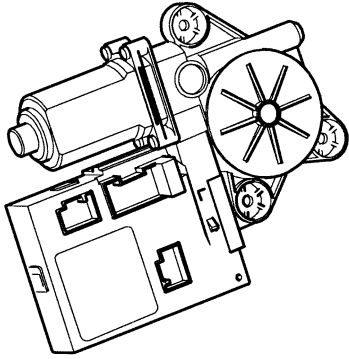


RRX (Remote entry) communicates with the CEM via LIN.

The receiver is on the top of the combined instrument panel.

CONTROL MODULES, DOORS

Front Door, CAN



The Driver Door Module (DDM) and Passenger Door Module (PDM) manage the functions for:

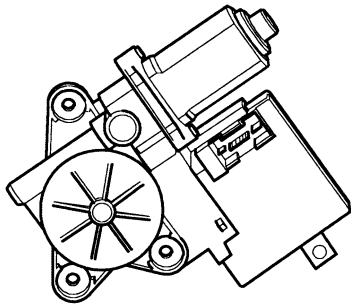
- Power windows
- Door locks
- Door mirrors
- Approach light
- Home safe light
- Turn signals in door mirrors

The control modules in the front doors are integrated with the power window lift motors.

Other

The DDM and PDM have different software.

Rear Door, LIN



LIN communication with the front door control module on each side of the car.

The rear Left Door Module (LDM) and rear Right Door Module (RDM) handle the functions for:

- Power windows
- Door locks

The control modules in the rear doors are integrated with the power window motors.

Other

Diagnostic trouble codes for the rear door modules are stored in the corresponding control modules in the front doors.

Rear window up and down position must be calibrated through the corresponding front door modules using VADIS.

CENTRAL LOCKING

The central locking system is controlled and monitored by the CEM.

Lock Units, Doors

The lock units are directly connected to the relevant door control module and can have different configurations of lock motor.

Front Doors

Available in two variants with lock motors for:

- Central locking
- Central locking and deadlocking

Rear Doors

Available in four variants with lock motors for:

- Central locking
- Central locking and deadlocking
- Central locking, deadlocking and child-proof locking
- Central locking and child-proof locking

Motors

The lock motor for central locking locks/unlocks the door.

The lock motor for deadlocking disengages the inner lock button and door handle.

The lock motor for child-proof locking disengages the inner handle.

Collision

In the event of a collision, the CEM receives a signal from the SRS and unlocks the doors and releases the deadlock or child safety locks if they are activated.

Functions

The following functions can be activated depending on the version of lock unit:

Certain function settings can be set by the customer via the menus in the ICM.
(Refer to Personal Preferences).

Locking Function

Unlocks all doors and activates the electrical lock in the trunk lid.

Two settings are available:

Total unlocking

- All doors are unlocked at the same time as the lock in the trunk lid is unlocked.

Unlocking in two stages:

- Press once to unlock the driver's door. If the button is pressed once again within 10 seconds the other doors and the lock in the trunk lid are unlocked.

This function can be activated via the menu system in the ICM or VADIS.

Valet Locking

Security locking for the glove box and cargo compartment in the S40

There is a switch in the dashboard above the glove compartment. This switch is directly connected to the CEM. The switch closes when the key blade is turned 180° in the lock (90° = normal locking). In this position the trunk cannot be unlocked.

A text message is displayed in the DIM display when the function is activated.

For a maximum security, there are lock cylinders available as an accessory. These are installed in the lock mechanism for the rear seat backrests.

Trunk Lid

The electrical lock motor and switch in the trunk lid handle are directly connected to the CEM.

The CEM determines whether the lock motor should be activated or not, when the switch is pressed in.

The trunk lid can also be opened separately using the special button on the remote control.

Fuel Tank Filler Cover

The lock motor is on the rear edge of the fuel tank filler flap. The switch for unlocking is in the lighting panel.

The motor and switch are directly connected to the CEM.

Home Safe Light

The home safe light is activated when the high/low beam switch is moved backwards. The duration the lights remain on is programmable via the menu system in ICM or VADIS.

Approach Light

Approach lighting is activated from the remote control. The duration the lights remain on is programmable via the menu system in ICM or VADIS.

Status Indication on the Doors and Hatches

There are switches in the doors and hatches to indicate whether they are opened or closed. If the car is equipped with an alarm, there is also a hood switch.

The information/warning symbol and text message are displayed in the Driver Information Module (DIM) if one or more doors or the trunk lid is open.

Automatic Locking (programmable)

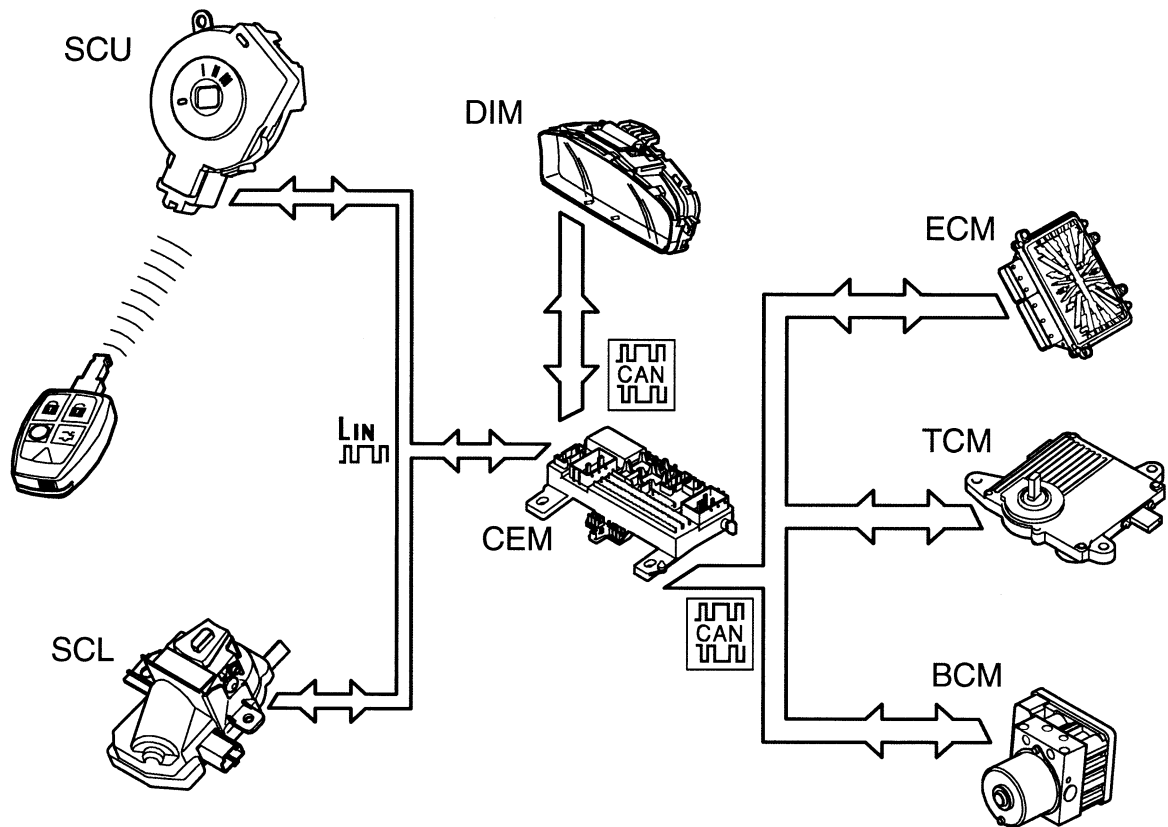
The vehicle is automatically locked when a speed of 7 km/h is reached.

Can be activated/deactivated via the menu system in the ICM or VADIS. (Refer to Personal Preferences).

Automatic Relocking

Automatic locking if the car is unlocked and no doors or trunk lid are opened within two minutes.

The function can be activated/deactivated via the ICM or VADIS. (Refer to Personal Preferences).



IMMOBILIZER

The immobilizes system checks electronically that the correct key is inserted in the ignition switch. If the key is not approved, the steering wheel lock does not unlock and the engine cannot be started. The system is activated when the ignition is switched off.

Control modules which are part of the system:

CEM (Central Electronic Module)

SCU (Start Control Unit)

SCL (Steering Column Lock)

ECM (Engine Control Module)

BCM (Brake Control Module)

TCM (Transmission Control Module)

DIM (Driver Information Module)

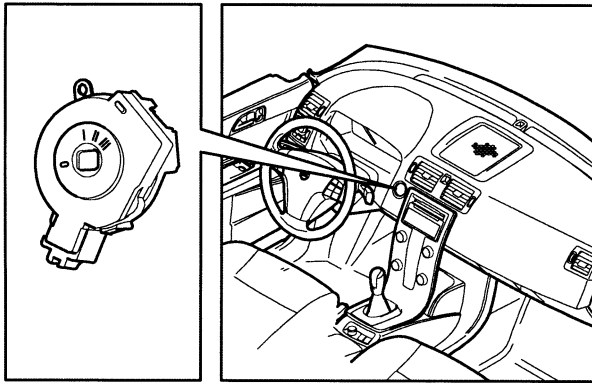
Task:

- master unit
- ignition switch
- steering column lock
- engine status, logic for start blocking
- vehicle speed
- gearshift selector position and vehicle speed
- text messages and key warning

High Security

The CEM, ECM and SCL are linked to each other by unique codes, ensuring high levels of security. In addition, the ECM must recognize the serial number of the BCM for the engine to start. The serial number is entered automatically in the Engine Control Module (ECM) when software is downloaded after replacing the BCM.

Ignition Switch



The Start Control Unit (SCU) communicates with the CEM via LIN and is installed in the dashboard beside the steering wheel.

Components involved:

Antenna ring - activated by the CEM and allows communication with the key transponder.

Four micro-switches.

- One for indicating if the key is inserted in the ignition switch (position 0).
- Three for indicating key positions I-III.

Solenoid to prevent the key from being removed. This feature replaces key lock cable.

NOTE: On manual gearboxes the key can be removed regardless of the position of the gear selector lever. This is because the CEM never requests the solenoid (ignition switch interlock) to be activated.

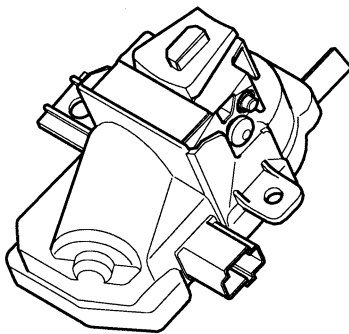
The ECM, CEM and SCL are powered as soon as the key is inserted in the ignition switch (S position).

The ECM activates the fuel pump (FP) for a maximum of 5 seconds as soon as the key is in S position. If the immobilizes system detects a fault, an incorrect key for example, at this time the pump is switched off.

Key Warning

A warning is displayed in the DIM if the key is in the ignition switch and the driver's door is opened.

Steering Wheel Lock



Steering Column Lock (SCL) communicates with the CEM via LIN and is installed on the underside of the steering column.

Electric motor

Spring bolt

Micro-switches

Transponder (communication circuit)

The lock is only active when the car is not in motion and the engine is switched off. While moving the SCL is monitored by the CEM. This module contains software which must be downloaded when replaced.

Note that the solenoid may end up in an intermediate position if the key is turned back to a position between 0 and 1. This is normal and is to prevent the solenoid from overheating.

START INHIBITION

The ECM checks the parameters which determine if a start attempt is permitted.

The following are checked:

Depressed pedals

- The brake pedal must be pressed for automatic transmissions.
- In certain markets the clutch must be pressed for manual transmissions. (USA/Canada).

The position of the gear selector for cars with automatic transmissions. P (Park) or N (Neutral).
Signal from the Gear Selector Module (GSM) via the TCM.

Immobilizer-OK!

Steering wheel lock-the spring bolt must be in the unlocked position.

Checks Before Starting

Key Check, SCU

The key check occurs in key position S (takes approximately 140 ms).

First the CEM checks that the correct ignition key is used. If the transponder in the key gives the correct ID and responds correctly to the encrypted query from the CEM, the CEM interprets the key as correct.

Unlocking Steering Wheel Lock, SCL

The steering wheel lock is unlocked in key position S (takes approximately 250 ms).

The basic conditions for the steering wheel lock to unlock are that the CEM:

- has registered approved key from SCU.
- has registered an 'engine not running' signal from the ECM.
- has registered a 'speed 0 km/h' signal from the BCM/TCM.

The CEM then checks that the correct SCL is installed. This occurs by the SCL responding to an encrypted query with a code. If the OEM receives the correct code the CEM transmits a request to the SCL to release the steering wheel lock.

The SCL unlocks the steering wheel lock and transmits a confirmation that the steering wheel lock is unlocked and the status of the lock (locked/unlocked).

The OEM cancels the power supply to the SCL when the steering wheel lock is unlocked. This is to prevent accidental locking while driving, if a fault in the SCL should occur.

If steering wheel is bound, such as wheels against a curb, three attempts are made by SCL to unlock the steering wheel. The key must be cycled in order to initiate another unlock attempt.

If battery goes dead SCL remains in the same position as before.

Checks between the ECM, CEM and BCM

The check between the ECM, CEM and BCM occurs when the ignition key is turned to position II (takes approximately 100 ms).

After the CEM has approved the key, the ECM is informed that this is the case.

The following checks occur before the engine is started:

Check 1

The ECM transmits a request to the BCM to transmit its serial number. The ECM checks that the serial number corresponds to the serial number it has stored. If the serial number is correct the start conditions have been met.

Check 2

At the same time as the ECM checks the BCM, the ECM transmits a random number and a code to the CEM. The CEM checks that the code corresponds to the code it has stored. If the code is correct the CEM transmits another code back to the ECM. The ECM checks the code and compares it to the code it has stored. If it is correct another start condition has been met.

When *Check 1* and *Check 2* are complete and approved the CEM permits the ECM to activate the relays for the starter motor and the engine can be started.

ALARM

The functions of the alarm in the S40/V50 can be compared to the S60.

Sensors

The switches for the doors, the hood and the trunk are integrated in the lock units.

Mass Movement Sensor (MMS). Two for the V50.

Siren Control Module (SCM)

This is a LIN unit containing both the siren and the level sensor.

It is under the plenum on the passenger side.

The siren has an integrated battery and charger which makes it independent of the vehicle power supply. The siren is activated if the power supply is interrupted or in the event of a communication fault between the SCM and CEM.

The whole assembly must be replaced and configured using VADIS.

Alarm LED

Located on the dashboard and directly connected to the CEM. The LED indicates the alarm status (Refer to the instruction book).

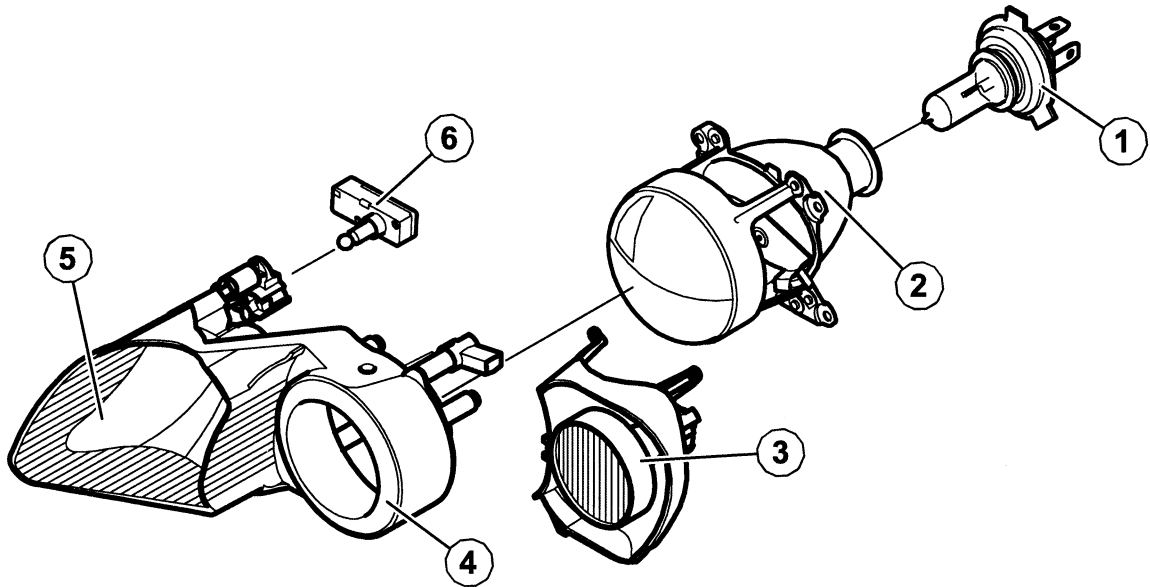
In some cases the unit also contains the sun sensor and the twilight sensor.

Reduced Alarm

The button with LED for reduced alarm is located in the roof panel and deactivates:

The level sensor is in the siren.

MMS



1	Low beam lamp	4	Ring shaped lens
2	Projector	5	Main beam reflector
3	Diffusion lens, turn signal lamp	6	Motor for headlamp range adjustment

LIGHTING

HEADLAMPS, GENERAL

A projection type of headlamp which is new to Volvo is used on the S40/V50. There are two versions of the headlamps:

Halogen

Bi-xenon (option in certain markets)

HEADLAMPS, HALOGEN

Low beam is the projector type with an H7 bulb (H11 in USA).

The voltage for the low beam is governed to 13 ± 0.2 V by a PWM signal.

Lamp fault detection is monitored by the CEM.

Plastic lenses are bonded to the headlight unit.

The headlamps are installed with a common pin in the rear edge of the housing. The pin engages in the front section of the body work. The whole headlamp assembly is removed to replace bulbs.

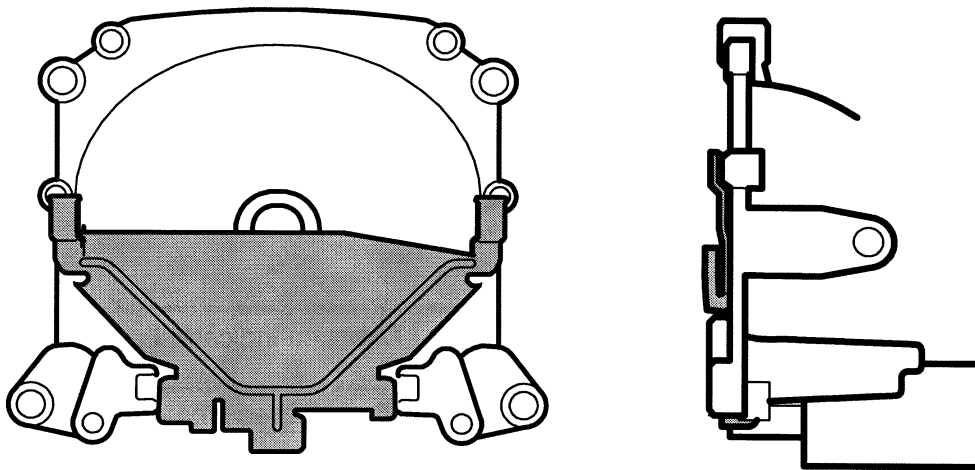
Main beam with a separate reflector and HB3 bulb.

Motor for headlamp range adjustment.

A diffusion lens in front of the turn signal lamp bulb for better light diffusion.

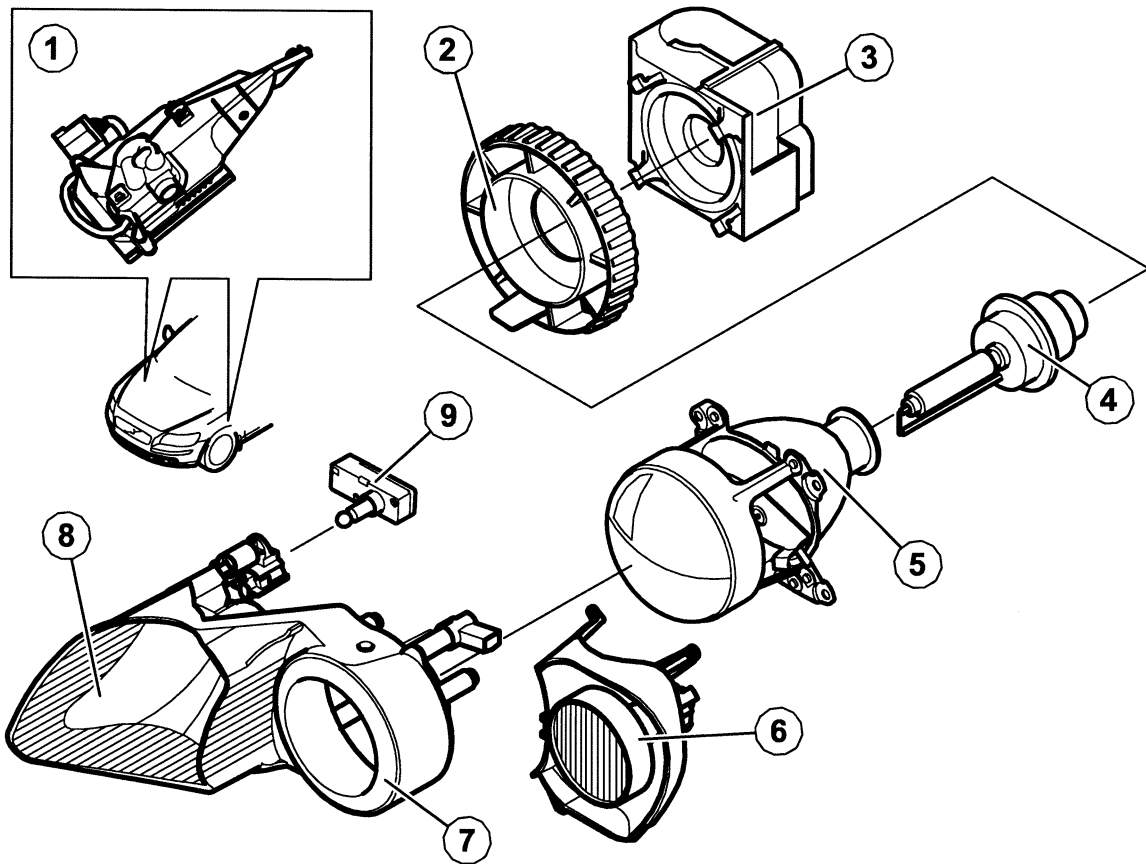
An outer ring shaped lens outside the projector lens gives a larger light pattern and makes the light source appear bigger. This allows better distance judgment by oncoming traffic.

Projector, Halogen



The projection system consists of:

- Lamp
- Reflector
- Fixed diffuser
- Projector lens



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1	Ballast, gas discharge lamp module (GDL)	6	Direction indicator lights
2	Lock ring, gas discharge lamp	7	Ring shaped lens
3	Igniter	8	Main beam reflector
4	Xenon lamp, D2S	9	Motor for headlamp range adjustment
5	Projector		

HEADLAMP, BI-XENON

A different type of headlamp than previously used has been introduced in S40/V50. The new system is the projection type and has a combined high/low beam with one D2S type gas discharge lamp.

Control Modules

The system has two LIN control modules (GDL) connected to the CEM. One for each headlamp.

- The left is the master module and the right hand side is a slave module.

Located in the wheel arch.

Ballast

The ballast generates high voltage and acts as a voltage regulator.

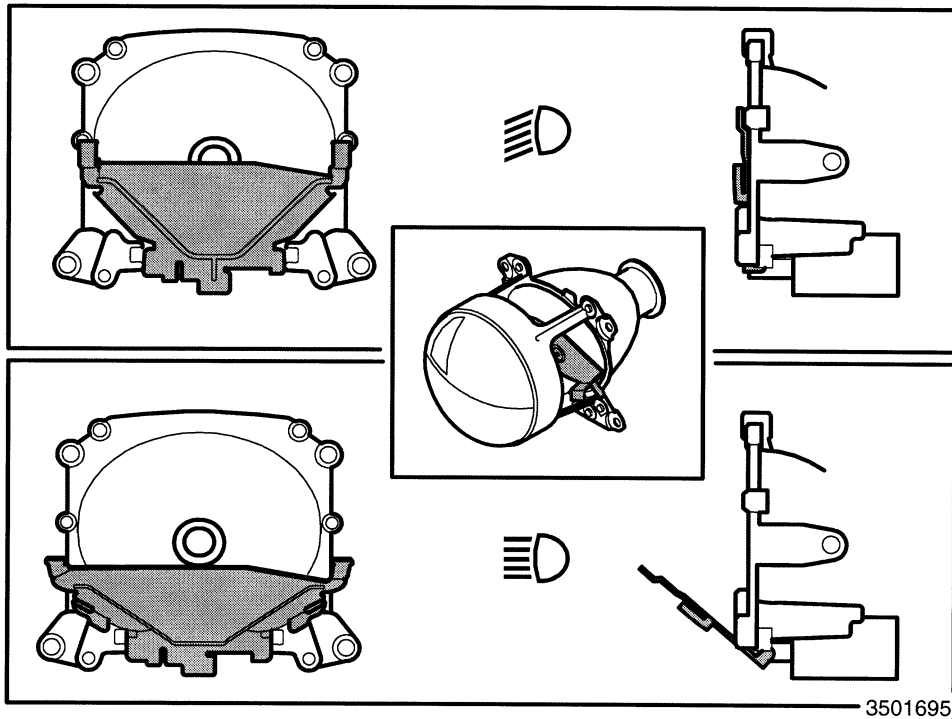
It is integrated in the relevant control module (GDL).

Igniter

A power stage amplifies the voltage from the ballast.

IMPORTANT: Follow the safety instructions in VADIS carefully when working with high voltages.

Projector, Bi-Xenon



The projection system consists of:

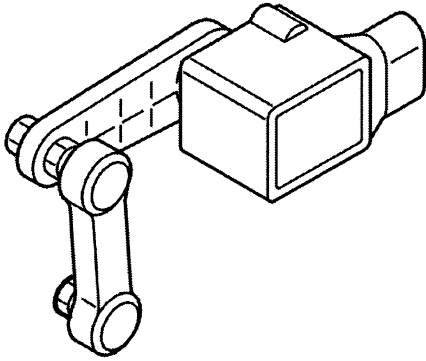
- Lamp
- Reflector
- Variable diffuser
- Projector lens.

The diffuser is electro-magnetically controlled.

Note that the projector unit differs from the halogen version. The reflector is a different shape. It has a variable diffuser and another design of lens.

Headlamp Range Adjustment

There are two position sensors for automatic headlamp range adjustment. These sensors determine the bodywork angle in relation to the chassis. One is located between the front right control arm and the bodywork. The other is located between the rear right control arm and the sub-frame.



The sensors are directly connected to the master control module (GDL).

There are diagnostics for both the sensors and they can be calibrated using VADIS.

- Calibration is stored in the master control module (GDL).

Headlamp range is adjusted in 16 fixed positions.

IMPORTANT: Calibration must be performed when the CEM has been replaced, when sensors have been removed/installed, or when sensors, bushings, shock absorbers, or springs have been replaced.

Headlamp Washing

High-pressure cleaning of the same type as on the XC90.

Washing occurs in two stages:

- **Pre-wash** for 0.7 seconds > **pause** > **wash** for 0.8 seconds

Headlamp washing occurs every fifth washing (using the control stalk).

- Applies within a ten minute period. Otherwise washing occurs at the first time the control stalk is activated.

There are separate pump motors for high pressure headlamp washing and washing the windshield/rear windscreen.

- headlamp washing is not activated if the level in the windscreen washer reservoir is lower than 0.7 litres.

The capacity and location of the reservoir are different depending on the engine variant.

- 5 cylinder:

6.5 litres located in the left-hand wheel arch.

- 4 cylinder and diesel:

4 litres divided between 2 reservoirs located in the right-hand wheel arch.

LIGHTING, REAR

Conventional, using normal bulbs.

- Lamp fault detection is monitored by the CEM.

Stop (Brake) Lamps

Conventional using normal bulbs.

High level brake lights with LEDs are bonded to the roof.

Lamp fault detection is monitored by the CEM.

Other

Direction Indicator Lights

The control stalk has a spring loaded position to each side which gives three flashes.

Twilight Sensor

The twilight sensor is located in the dashboard and is integrated in the same unit as the alarm LED. The sensor is photo sensor. Increased sun intensity leads to decreased voltage over the photo-diode. It is directly connected to the CEM.

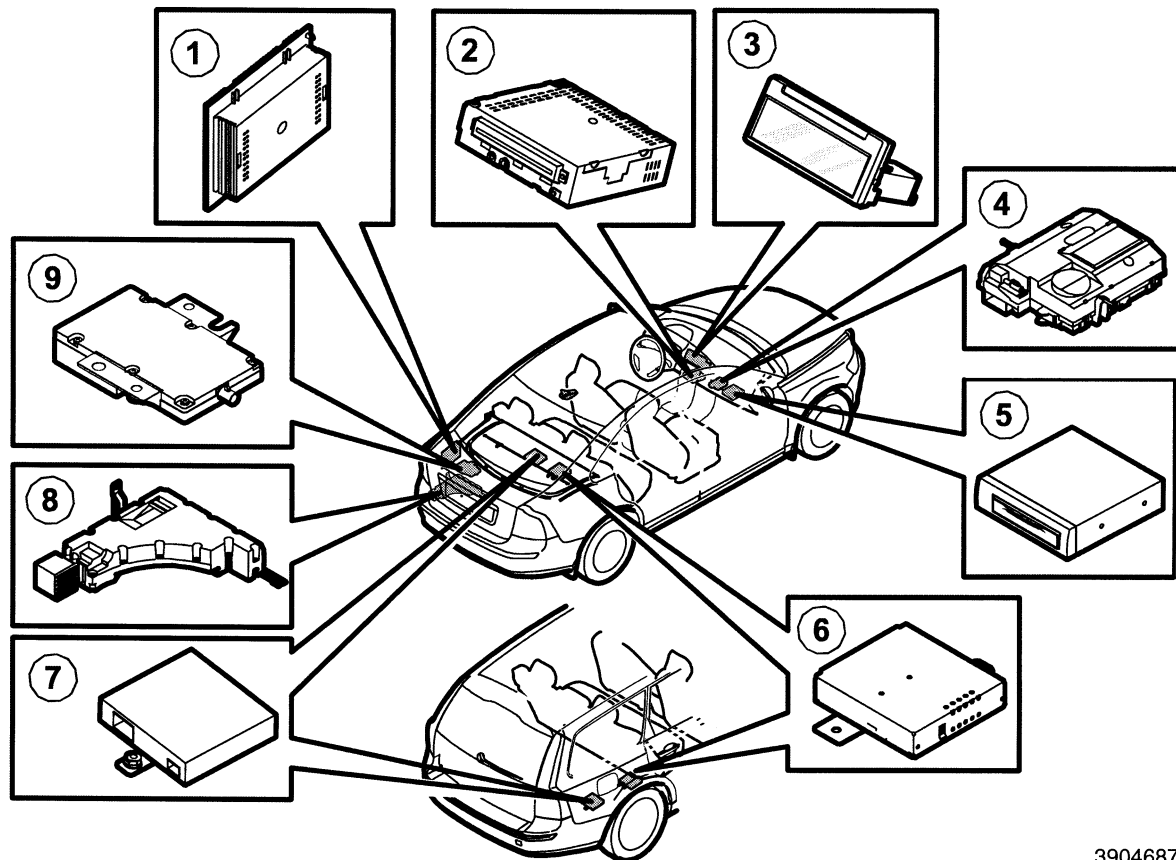
Rain Sensor (option)

LIN control module, location and function is the same as previous models.

Differences

Operation using the on/off button on the right-hand control stalk.

Rain sensor symbol is displayed in the lower DIM display when the function is activated.



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1	AUD	4	PHM	7	TMC
2	MPM	5	MMM	8	SUB
3	ICM	6	AFM	9	GPS

INFOTAINMENT

COMPONENTS ON MOST

AUDio Module (AUD)

An amplifier which also manages the functions of all loudspeakers and the microphone in the roof console.

Located in the cargo compartment behind the left-hand wheel arch.

Media Player Module (MPM)

Positioned uppermost in the center console and available in three versions:

CD player

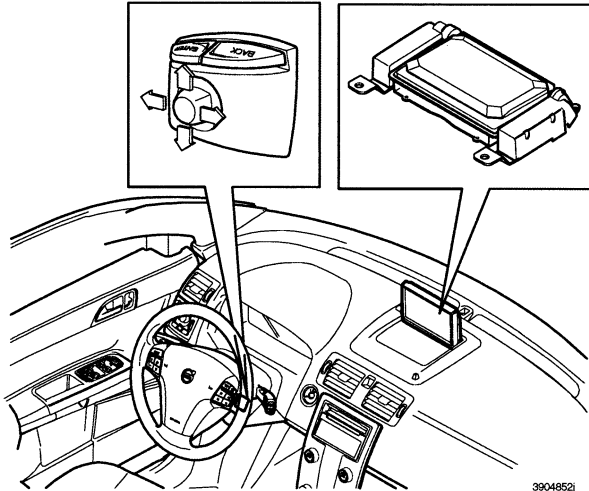
CD changer

Combined CD/Minidisc player.

Infotainment Control Module (ICM)

The ICM is the interface between LS CAN and MOST. It has a graphic monochrome display with a resolution of 128x64 pixels and is located in the center console. Connected to the LIN bus for steering wheel buttons.

MMM (Multi Media Module)



As before the unit has an integrated DVD reader (for maps) and is located in the glove compartment.

The 6.5 inch folding display screen (400 mm x 234 mm) is located in the center of dashboard and is directly connected to the MultiMedia Module (MMM).

There is a steering wheel button for up/down/right/left.

AM/FM Module (AFM)

The radio receiver is positioned on the left side of the parcel shelf (S40), or under the right rear side window (V50).

Subwoofer (SUB)

Has an integrated 140W (2x70W) amplifier and an 8 inch cone transducer. Active with integrated limiter.

Global Positioning System (GPS)

The GPS receiver is located on the left side rear wheel housing beside the AUD.

Antenna for GPS

An active antenna (Shark fin) is bonded to the rear section of the roof and is used by GPS receiver.

Supplied with power by the same coaxial cable that transmits the signals.

On cars without GPS, a termination device is installed to cover the opening in the roof.

Operating Using a Remote Control

ICM can be operated by remote control. The IR detector is in the grille for the center loudspeaker.

AUDIO EQUIPMENT

There are two different levels of audio equipment available for the S40/V50 :

- High Performance
- Premium Sound

NOTE: When upgrading or replacing the sound system, both the amplifiers and the loudspeakers must be changed because the components in the different systems are adapted to each other for impedance and output tolerance.

Subwoofer

Can only be combined with High performance and Premium Sound.

Cone transducer: 8 inch with twin voice coils.

Power: 140W

Frequency range: 20-100 Hz

Trunk depth decreases when the subwoofer is installed.

Media Player

Three variants of media players are available which cannot be combined with each other.

CD player for one disc

CD changer for six discs

Combined CD and MD player

Antenna

The AFM and TMC receivers have antenna inputs. If a TMC is installed, the antenna signals reach the AFM via the TMC receiver.

Radio Reception

All antennas are integrated in the rear window.

The AM and FM (two) antennas are integrated in the rear window of the 540.

INSTRUMENTATION

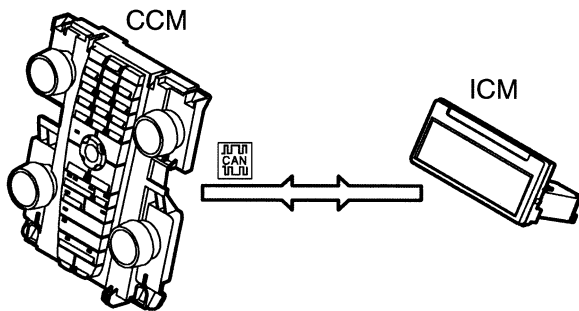
DRIVER INFORMATION MODULE

The combined instrument panel is unique to the S40 and V50.

The symbol with a warning triangle only lights up if there is a fault which affects the safety or driveability of the car. In the event of other faults, only the 'new' information symbol will light with other symbols or a text message.

There is a seat belt reminder for rear seat passengers. The three seat belts in the rear seat have sensors which detect how many of the seat belts are in use. The number is shown in the display.

CENTER CONSOLE



Switches, Keypad

The keypad on the CCM can, in principle, be divided into upper and lower sections.

The upper section covers functions for the infotainment system. When these switches are activated the CCM transmits the signal to the ICM via the CAN.

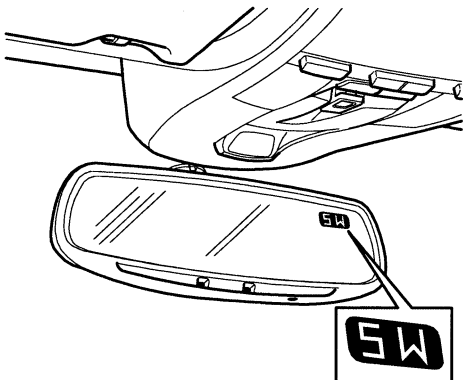
The switches in the lower section directly affect the CCM by activating functions such as climate control and activating the seat heater.

Service Messages

The counter for the Service Reminder Lamp (SRL) can be set to zero manually or using VADIS.

Manually resetting the counter is the same as on S80/S60 and other vehicles.

COMPASS



As an **option** in certain markets, an electronic compass is integrated in the rear view mirror

There is a display in the top right hand corner of the mirror.

Eight points of the compass can be displayed - N, S, E, W, NE, NW, SE and SW - depending on the direction of the vehicle.

If the letter C is displayed the compass must be calibrated (Refer to the owner's manual). This is done using a button on the rear view mirror.

For correct indication of the direction of travel the compass must be set for its present geographic location because magnetic fields vary in different locations.

INTELLIGENT DRIVER INFORMATION SYSTEM (IDIS)

Additional Electrical Information

This is a logic-controlled system which detects certain of the driver's activities while driving. Depending on the driver's workload, the system automatically lowers the priority of information which might distract the driver's attention from the traffic.

The system handles:

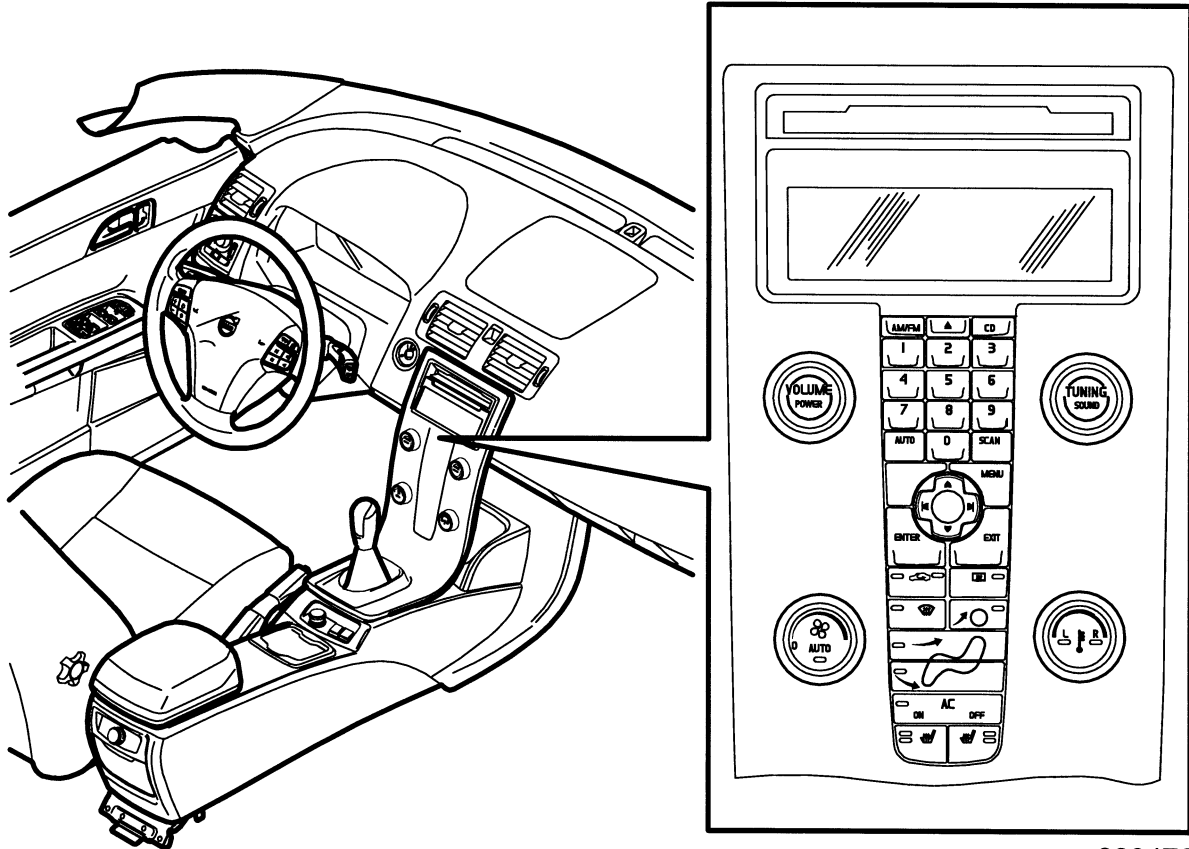
- Text and warning messages in the DIM

The software is implemented in the DIM and consists of an algorithm which uses a number of parameters.

- Speed (acceleration and deceleration).
- Steering wheel angle.
- If the turn signal lamps are active.
- If reverse gear is engaged.
- Button activity in the center console.
- Button activity for the navigation system.
- Door mirror adjustment active.
- Power seat adjustment active.
- Activated wiper lever.
- Windshield and headlamp washing active.

The system takes account of fixed parameters, and the output signal (CAN) can adopt one of two values - low or high workload. In high workload conditions certain information is delayed until the workload is no longer high.

PERSONAL PREFERENCES



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The following settings/read offs can be made from the control panel in the center console:

Acknowledgement when locking/unlocking.

Automatic locking of doors and hatches (On/Off).

Unlocking (all doors /two stage unlocking).

Home safe lighting period (30/60/90 seconds).

Approach lighting period (30/60/90 seconds).

Reading off the car's Vehicle Information Number (VIN).

The number of registered keys.

Climate control functions:

- Blower fan speed in AUTO mode in cars with ECC (Low/Normal/High).
- Recirculation timer (On/Off).
- Resetting the standard values for all parameters.

GENERAL

Sun Roof

The Sun Roof Module (SRM) communicates serially with the CEM and has diagnostics. The sun roof is powered by an electric motor located in the roof in front of the sun roof. The sun roof is operated from switches in the roof console and the position is determined by two sensors.

Power Windows

The function is the same as the S60.

Auto-up and auto-down function for all four windows.

Hall sensors which measure the speed of rotation of the motor shafts are used to determine the window position.

- If a hall sensor is defective, the auto up/down function cannot be activated.

The window lift mechanisms have pinch protection.

The mechanicals, motor, hall sensor and control module are integrated and must be replaced as a complete unit.

Note that after replacing the control module, the window position must be initiated.

The window lift mechanism can be initiated using VADIS, in case it loses information about its present position.

All the lift mechanisms and sensors can be diagnosed via the front control modules (DDM and PDM).

Door Mirrors

Setting

Each door mirror contains:

Two motors for setting the X and Y axes.

Two sensors for determining the position.

The motor and sensors are integrated and must be replaced as a complete unit.

Lighting

Turn signal lamps.

Lamps for Approach lighting/Home safe lighting.

The lamps are powered and controlled by their respective door control module.

Other

Electrical heating with integrated heating loops on the reverse of the mirror glass. Replaced as one unit.

- Defrosting is activated from the CCM at the same time as the rear windscreen demist.

An outside temperature sensor is located in the left door mirror.

- It is directly connected to the CEM and can be replaced separately.

- The ECM uses this information. (Not separate like the S60).

Motor for retracting the door mirrors (option).

- Activated by holding the L and R buttons on the control panel down together.

The function for automatic setting for the door mirrors comes together with the power seat with memory.

POWER FRONT SEATS

Power Seat

The control panel is directly connected to the motors and there is no control module.

Power Seat with Memory (driver's side)

The control panel is integrated in the PSM (power seat module).

In total six different settings can be stored by the control module:

Three from the remote controls.

Three from the control panel.

The memory function includes automatic door mirror settings.

Motors

There are four motors to control the seats. A maximum of two motors can be activated at the same time. To set the programmed position, the longitudinal and backrest adjustments are prioritized. To determine the seat position, each motor has a Hall sensor which calculates the number of rotations of the motor shaft.