

VOLVO

for life



Course Code: 0819

2004 Model Year Product, Featuring the R-Range

TECHNICAL UPDATE 1



IMPORTANT SAFETY NOTICE

WARNING: Before performing service, diagnosis or troubleshooting procedures on a vehicle equipped with safety devices containing pyro-technical igniters, i.e., airbags, seatbelt tensioners, side impact curtains, etc., **you must be aware of certain precautions, and follow special procedures to help ensure your safety.** Refer to applicable SAFETY SYSTEM service information for these procedures and precautions.

NOTE: The information contained in this manual is intended for technical training purposes **ONLY.** Always refer to appropriate Volvo service information & wiring diagram manuals when performing fault tracing or service procedures.

Following proper service and repair procedures is essential for the safe, reliable operation of motor vehicles, as well as for the personal safety of the individual doing the work. This manual provides general directions for accomplishing service and repair work with tested, effective techniques.

Numerous variations in procedures, techniques, tools and parts for servicing vehicles, as well as the skill of individual doing the work cannot possibly be anticipated or provided for. Accordingly, anyone who departs from instructions provided in this manual must first establish that they compromise neither their own personal safety nor the vehicle integrity by their choice of methods, tools or parts.

As you read through the procedures, you will come across NOTES, CAUTIONS, and WARNINGS. Each one is there for a specific purpose. NOTES give you added information that can help you to complete a particular procedure. CAUTIONS are given to help prevent you from making an error that could damage the vehicle. WARNINGS remind you to be especially careful in areas where carelessness can cause personal injury. The following list contains some general WARNINGS that you should follow whenever you work on a vehicle.

- Always wear safety glasses for eye protection.
- Use safety stands whenever a procedure requires you to be under the vehicle.
- Turn the ignition switch OFF unless otherwise required by the procedure.
- Set the parking brake when working on the vehicle. If you have an automatic transmission, set it in PARK unless instructed otherwise for a specific service operation. If you have a manual transmission it should be in NEUTRAL unless instructed otherwise for a specific service operation.
- Operate the engine only in a well-ventilated area to avoid the danger from carbon monoxide.
- Keep yourself and your clothing away from moving parts when the engine is running, especially the cooling fan and belts.
- To prevent serious burns, avoid contact with hot metal parts such as the radiator, exhaust manifold, tail pipe, catalytic converter and muffler.
- Do not smoke while working on the vehicle.
- To avoid injury, always remove rings, watches, loose hanging jewelry, and loose clothing before beginning to work on a vehicle. Tie long hair securely behind your head.
- Keep hands and other objects clear of the radiator fan blades. Electric cooling fans can start to operate at any time even with the ignition turned OFF.

Date:

Retailer/Code:

S.S.N./S.I.N.:

Name:

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This content is available in digital format

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EXTERIOR

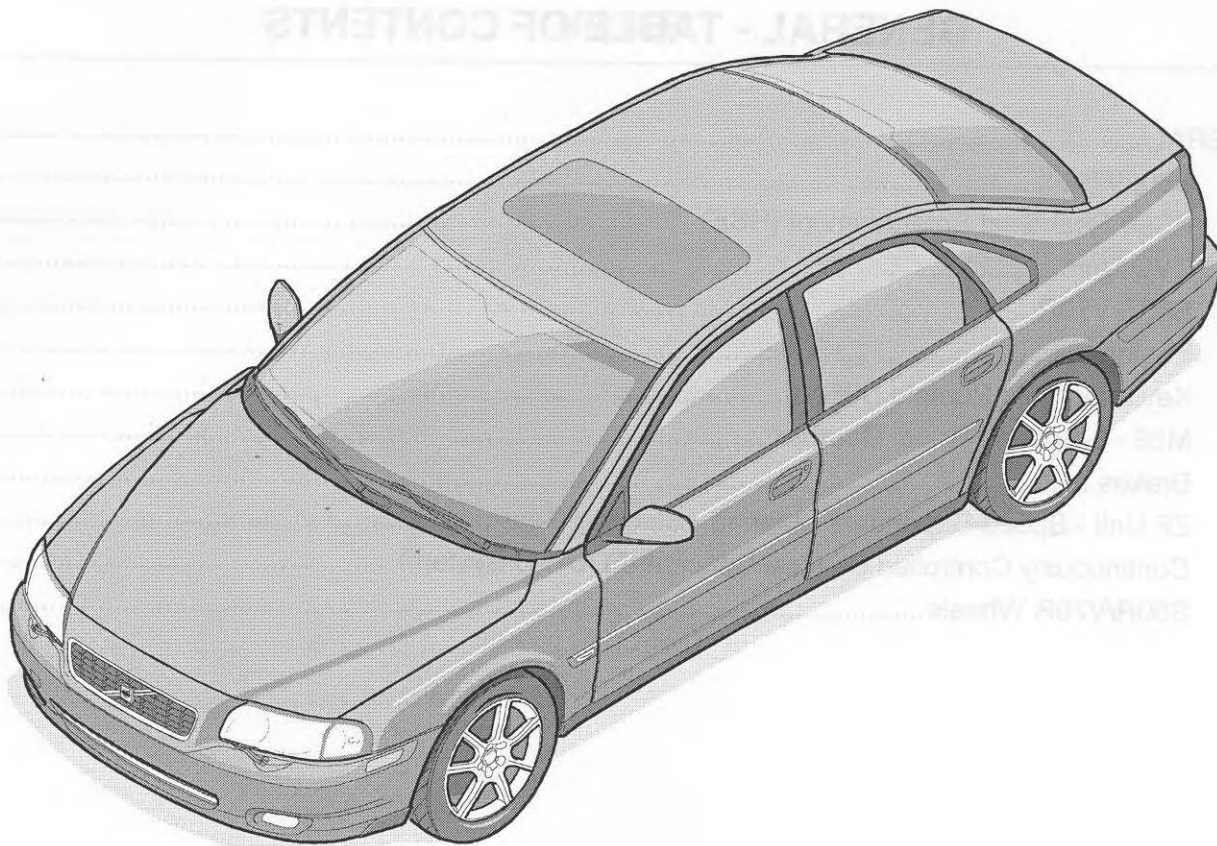
- New grille
- New front bumper (S60/V70) and rear bumper (XC90) (optional equipment)
- New outer rear-view mirrors (less road debris on side windows due to wind turbulence)
- Chrome-plated exterior door handles
- New chrome LED light signature
- Chrome strip (weather strip) on doors
- New chrome metal luggage compartment

INTERIOR

- Modified center console, S60
- New sunroof on panels for roof pillars and sun visors
- Color-coordinated leather air vents
- Driver Information Module (DIM), same as XC90
- Gear shift carrier with gearbox pattern
- Color-coordinated steering wheel, V70
- Color-coordinated control panel for electronically adjustable seats
- A new graphite color for fittings (chrome)
- New finish on seat belt lock tab, Silver Frost

EXTERIOR

- New outer rear-view mirrors (less road debris on side windows due to wind turbulence)



GENERAL

S60, V70

INTERIOR

- Modified center console, S60
- New surface on panels for roof, pillars and sun visor
- Color-coordinated fresh air grille
- Driver Information Module (DIM), same as XC90
- Gear shift carrier with gearbox pattern
- Color-coordinated steering wheel, V70
- Color-coordinated control panel for electrically adjustable seats
- A new graphite color for fittings (Charcoal)
- New finish on seat belt lock tab, Silver Frost

EXTERIOR

- New outer rear-view mirrors (less road debris on side windows due to wind turbulence)

S80**INTERIOR**

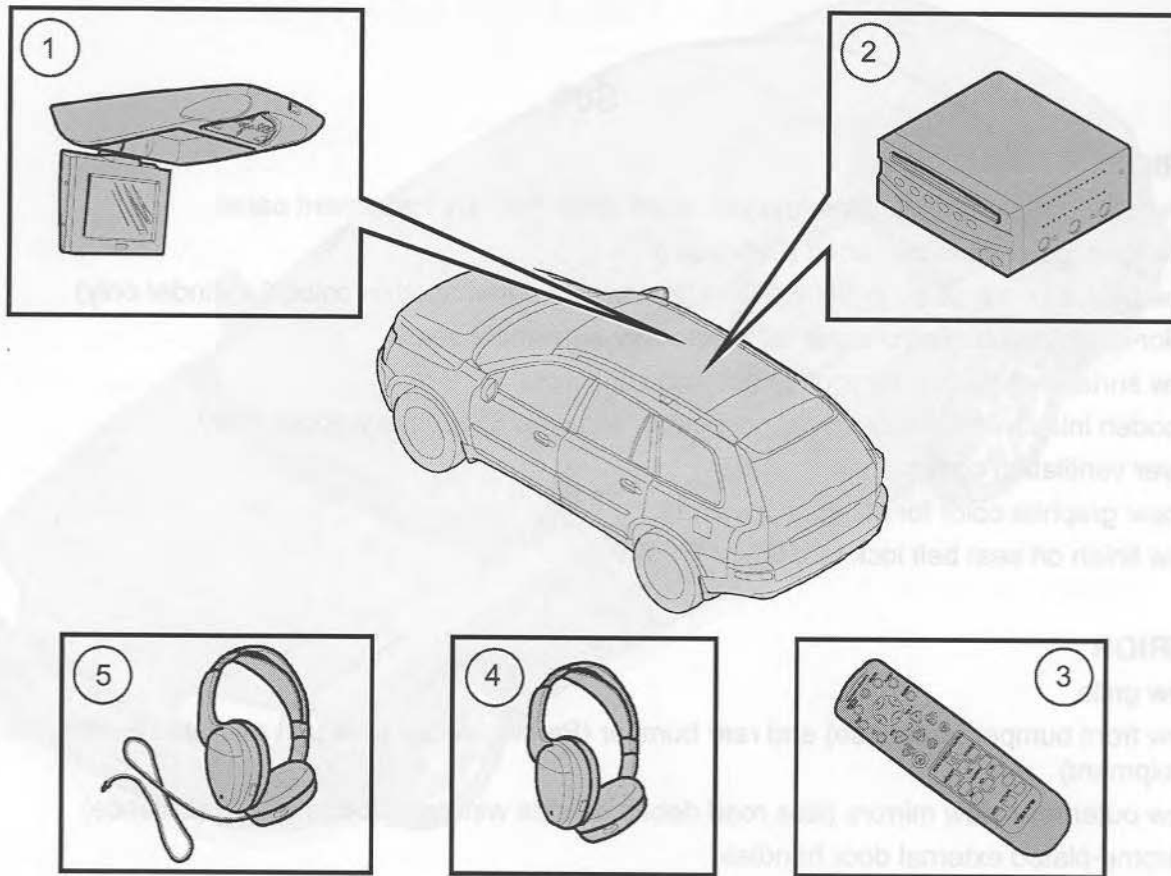
- New door panels with handles and improved fit/finish to the instrument panel
- New loudspeakers in rear shelf (Dynaudio)
- New DIM, same type as in S60R/V70R (instrument panel another color, 6-cylinder only)
- Color-coordinated control panel for electrically adjustable seats
- New surface on panels for roof, pillars and sun visor
- Wooden inlay available as an optional extra, same as Executive wooded inlay
- Silver ventilation controls
- A new graphite color for fittings (Charcoal)
- New finish on seat belt lock tab, Silver Frost

EXTERIOR

- New grille
- New front bumper (soft-nose) and rear bumper (Parking Assistance unit available as optional equipment)
- New outer rear-view mirrors (less road debris on side windows due to wind turbulence)
- Chrome-plated external door handles
- New, smaller tail lights with LED brake lights
- Chrome strip (weather strip) on doors, rear side window (fixed side window) and beneath tail lights
- New sheet metal luggage compartment lid, new hinges (reinforced hinge attachment)

XC90

- Front Wheel Drive will be introduced in North America during 2003.



XC90 REAR SEAT ENTERTAINMENT (RSE)

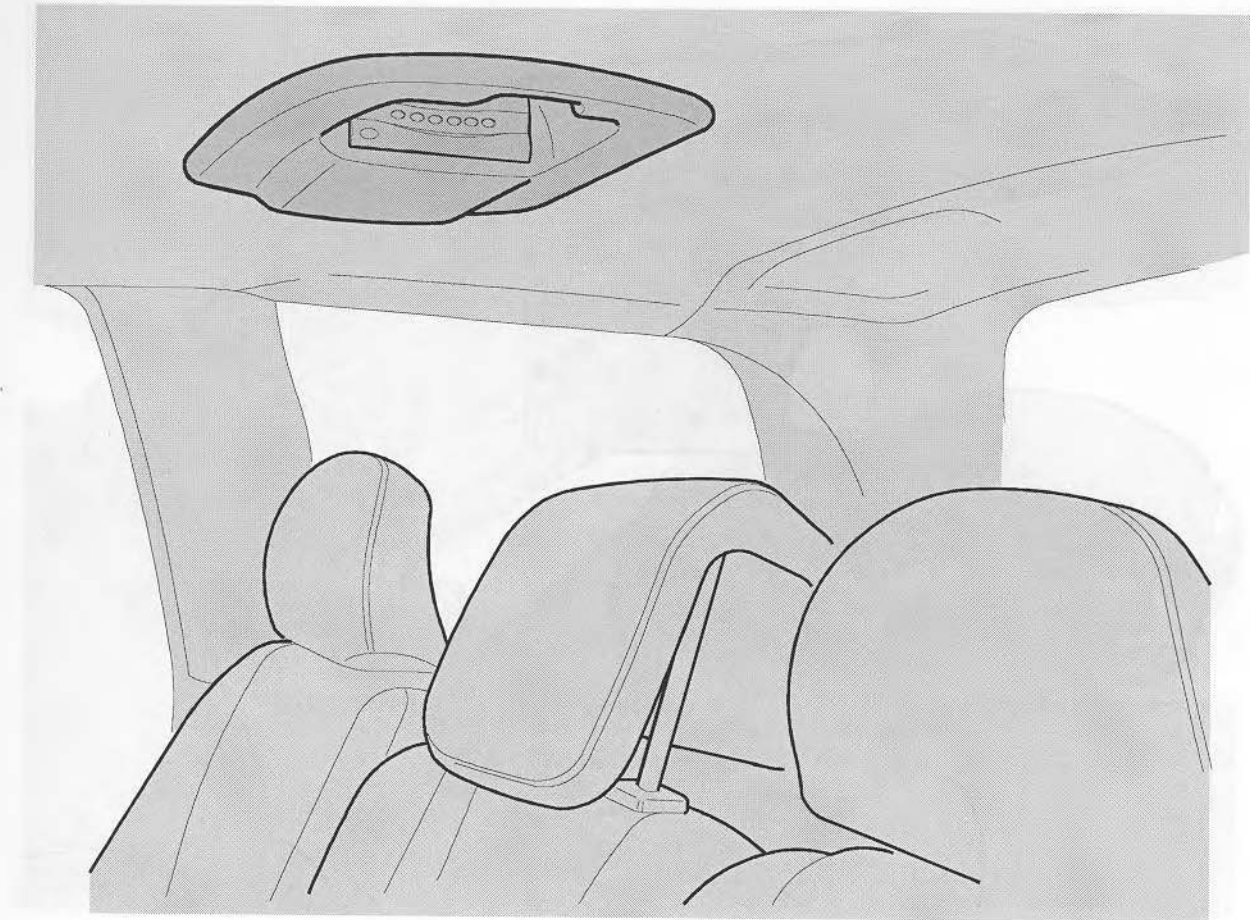
OVERVIEW

- This is a retailer-installed accessory
- DVD screen (1), 7 inches, independent of the MOST network
- DVD player (2)
- Remote control (3)
- The sound comes only from cordless earphones (IR) (4) or connected earphones (5)
- Option of connecting a video camera (AUX connector)

WARRANTY 12/12 IF INSTALLED AFTER PD1-

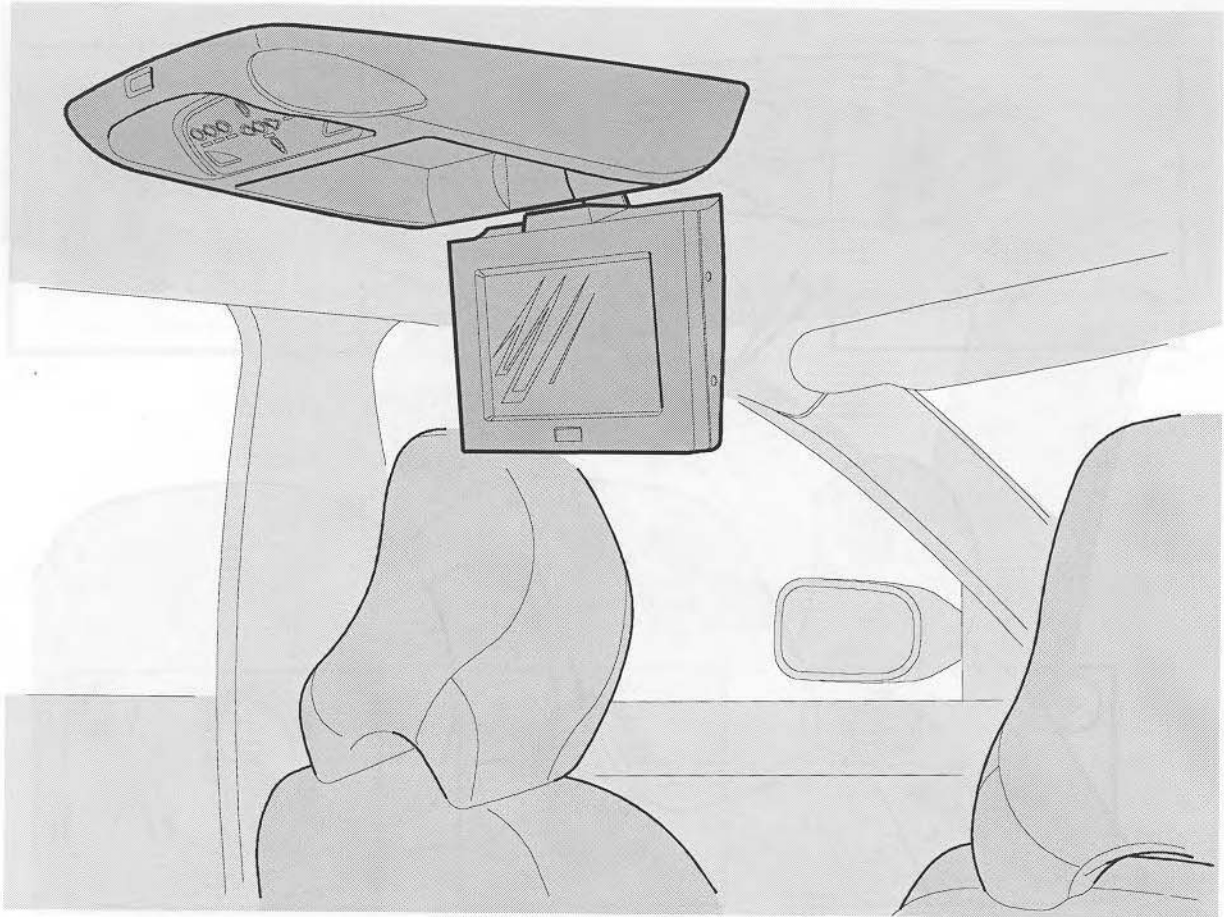
EXTERIOR

• New grille (part number 30512100) is available as an optional accessory.



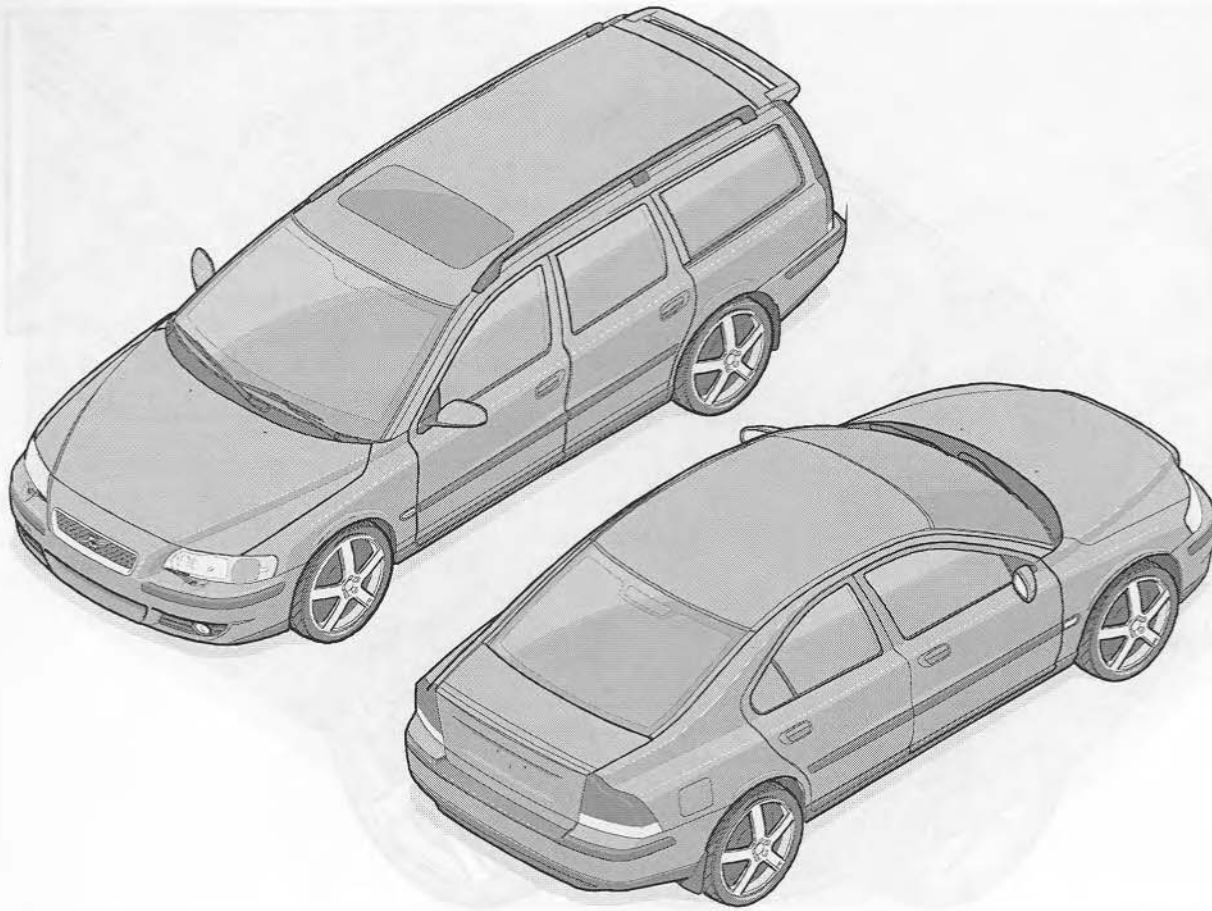
DVD UNIT

- DVD wiring is connected to the harness in the D pillar.
- Possible to fit earphone jacks in the C pillar (but only at certain Premium levels).



DVD UNIT (continued)

- To improve visibility, the screen retracts when the vehicle is in reverse.
- To install a DVD screen in vehicles with a sunroof, a hole must be cut in the headliner and an additional brace must be installed.



S60R/V70R

MODERN HIGH-PERFORMANCE CARS

The S60R and V70R are modern high-performance cars which include highly advanced technology:

- High-performance turbo engines with intelligent all-wheel drive using the second generation Active On-demand Coupling (AOC) and a dynamically controlled chassis which adapts quickly to changing road conditions.



EXTERIOR

Front

- The R models have a new, more rounded front than the standard S60 and V70 models.
- The S60R is 1.2 inches (30 mm) longer than the other S60s.
- The grille is smaller in size, positioned lower and colored gray with a matte silver frame.

Integrated Spoiler

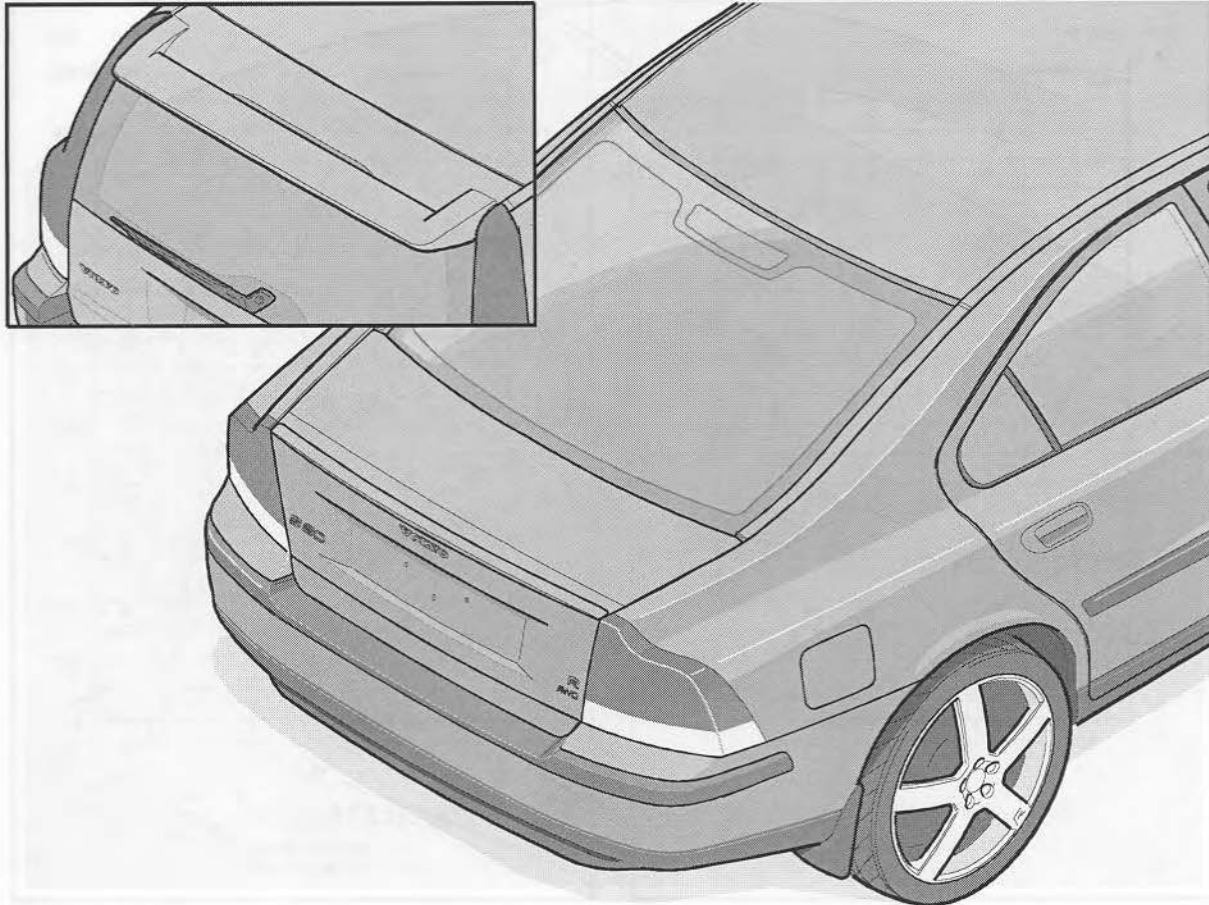
- The spoiler is integrated into the front valence. It is lower and has a larger air intake than in the standard models in order to give the radiator and both intercoolers enough cooling air.
- The outside edges of the spoiler are shaped to lead airflow out toward the body sides. This helps provide better vehicle stability at higher speeds.
- The black inserts in the lower corners of the spoiler visually link the front with the sill section and the car's rear section.

Additional Front Spoiler

- An additional transverse screen has been fitted beneath the spoiler, approximately 150 mm (6 in.) behind its lower edge. This reduces the lifting effect of the flow of air on the forward carriage by approximately 25%, which helps provide good stability at high speeds.

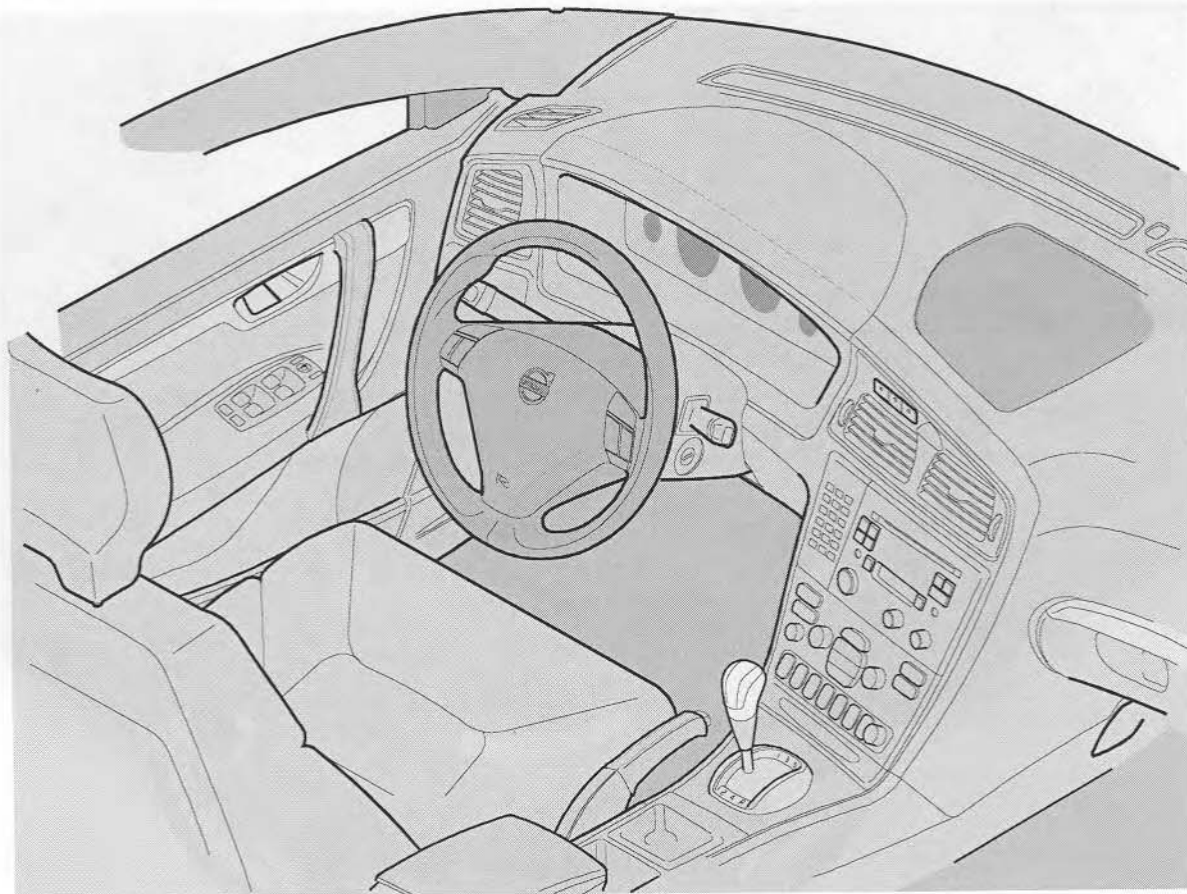
Bi-Xenon Headlamps

- The headlamps have clear glass covers and are fitted with Bi-Xenon gas discharge lamps. The glass section and headlight frame around the reflectors are painted matte silver. This adds to the unique R profile.
- The fog lights in the spoiler are a projector type.



Rear Spoiler

- The S60R has a small lip spoiler fitted as standard on the trunk lid. This reduces the lifting effect of the flow of air by approximately 20%. With the additional front spoiler, this improves stability at high speeds.
- The rear roof spoiler on the V70R enhances stability and helps maintain a cleaner rear window.



INTERIOR

Dashboard and Instrumentation

- The dashboard is dark gray in the R models. The edging above the instrument panel is leather with blue stitching, as is the steering wheel rim.
- The round instruments have blue metallic faces with brushed aluminum frames. They are illuminated from the front using LEDs. The marks are illuminated from behind.

Leather and Aluminum Decor

- The regular interior is dark gray in all versions. The door panels use the same material and color combinations as the seats. The door handles, gear shift and handbrake lever are covered with leather, with blue stitching.
- The decor inlays on panels, doors, and the automatic gearshift are brushed aluminum and are unique to the R models.

Steel Sill Plate

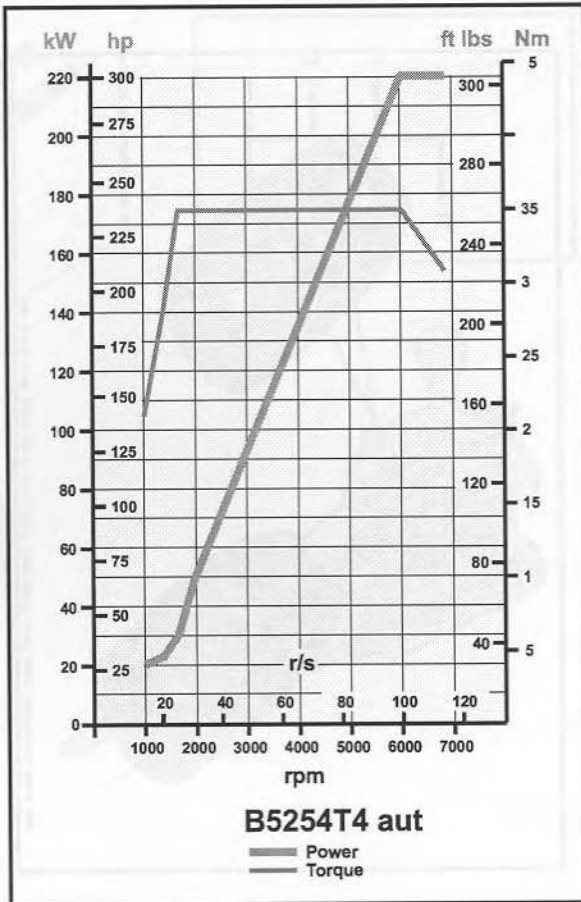
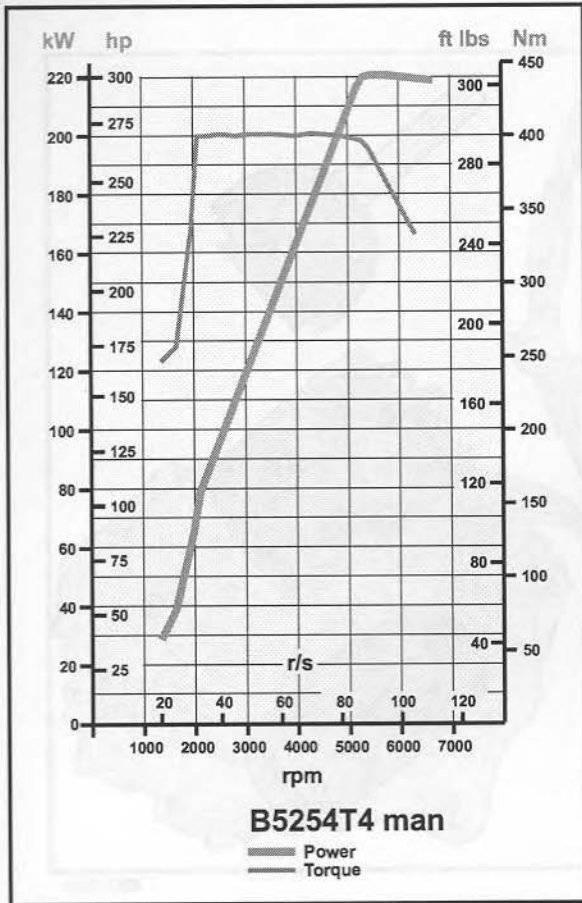
- The front door sills are protected by kick plates made of stainless steel bearing the R logo and rubber inlays.

Sports Seats

- The front seats have a deeper seat cushion and firmer side supports to provide good driving position.

Unique Leather Upholstery

- The upholstery is unique in the R models.
- The optional natural leather is dyed but does use the protective coating found on other leather seats; therefore, exposure and wear will result in a natural surface appearance over time and individual coloring of the natural leather. It may not be possible to exactly match colors with replacement material.
- Other upholstery options are a soft, dark blue leather or beige. The floor mats match the seat upholstery.



ENGINES

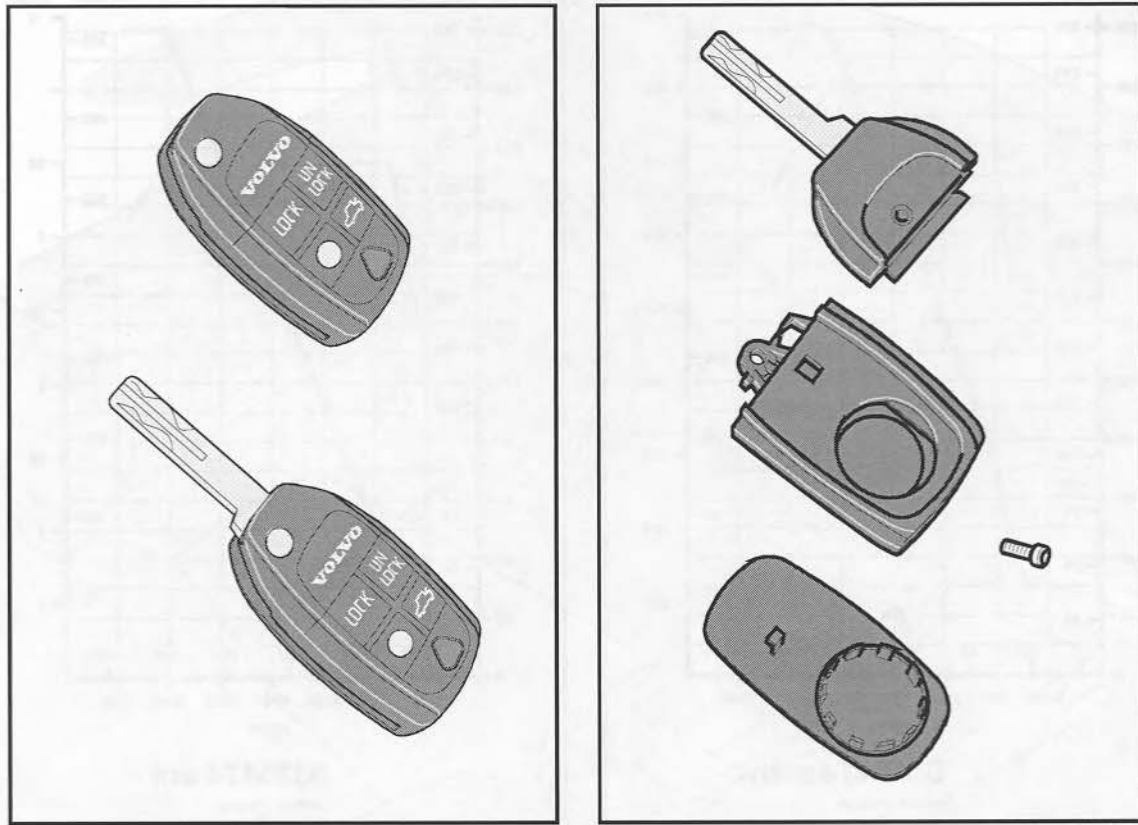
B5254T4 – S60R, V70R Only

General

- Based on B5254T2 (2.5 LT)
- Maximum output 220 kW (300 hp)
- Top speed is electronically limited
- Altered oil sump with level sensor
- Fuel system with demand-controlled pump (similar to M/Y 2003 Denso system)
- Larger turbo
- Two intercoolers

B5254T2 (2.5 Light Pressure Turbo) - Other Models

The front ceramic monolith has been replaced by one with a higher cell density to meet emission requirements of the U.S. market.

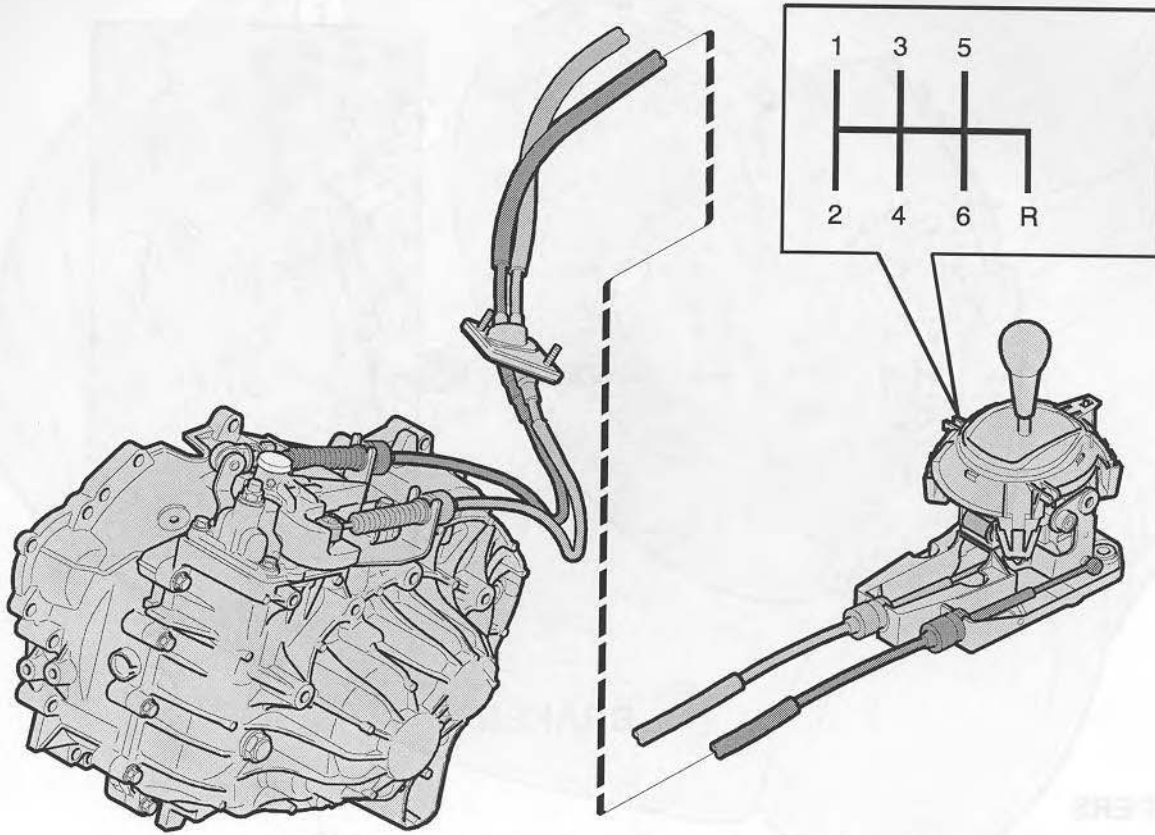


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KEY INTEGRATED REMOTE (KIR)

GENERAL

- Integrated key and remote key pad
- Retractable key blade
- Panic alarm function
- Approach light function



M66 SIX SPEED MANUAL GEARBOX

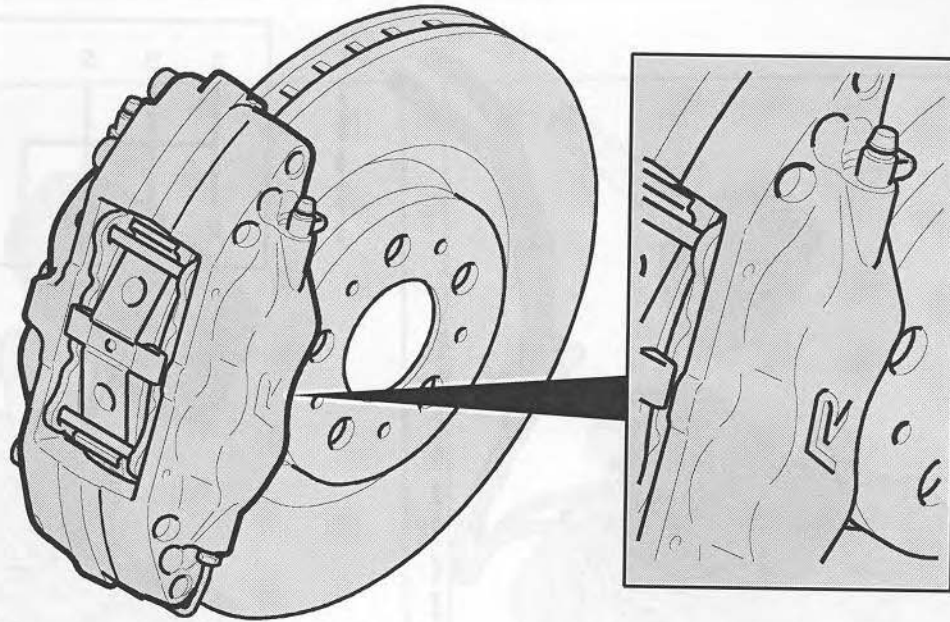
INTRODUCTION

General

- Includes four shafts: one input shaft and three countershafts.
 - All shafts have a larger diameter.
- The gear pattern is embossed on the panel.
 - A decal showing the shifting pattern is placed in U.S. vehicles.

Gear Shift Carrier and Cables

- The shift cable housings attach the gearshift carrier with snap-on couplings.
- Cable ends attach to the gearshift carrier and gearbox with ball seats.
- The selector cable is longitudinally adjustable.
- The adjustment is located on the gearshift mounting on the gearbox.



BRAKES

CALIPERS

The brake calipers are made of aluminum to help dissipate heat quickly.

4-piston Calipers

The brake calipers are 4 piston with two brake pistons on each side of the brake disc.

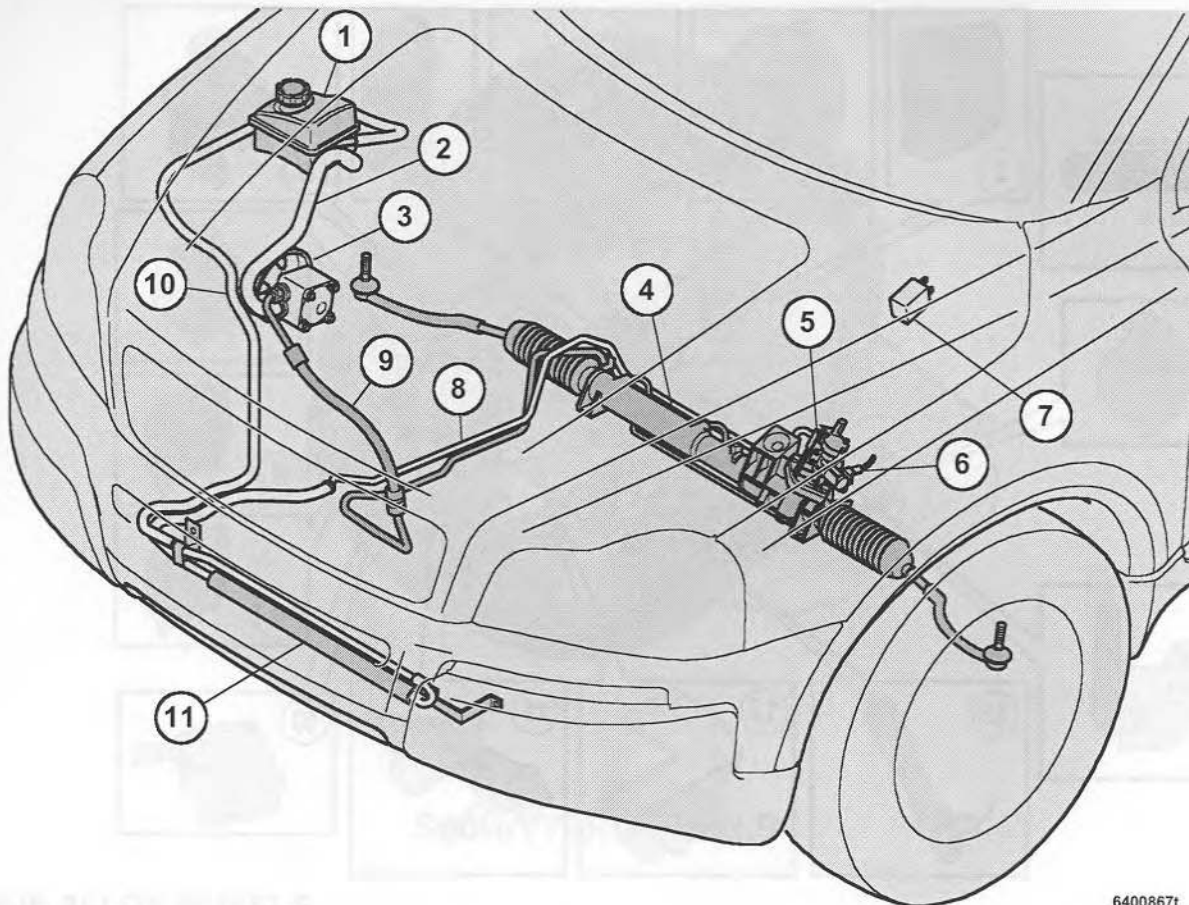
R-marked Calipers

The performance of the R models demands a powerful braking system. The large brake discs and brake calipers are visible through the wheels. The calipers are marked with a large 'R.'

DISCS

The braking system is adapted for the high performance of the R models. Both the front and rear brakes use ventilated discs.

- Dimensions, front: 336 x 30 mm (13.2 x 1.2 inches)
- Dimensions, rear: 330 x 28 mm (13.0 x 1.1 in.)



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ZF UNIT – SPEED-DEPENDENT STEERING - STEERING GEAR

COMPONENTS and LOCATION

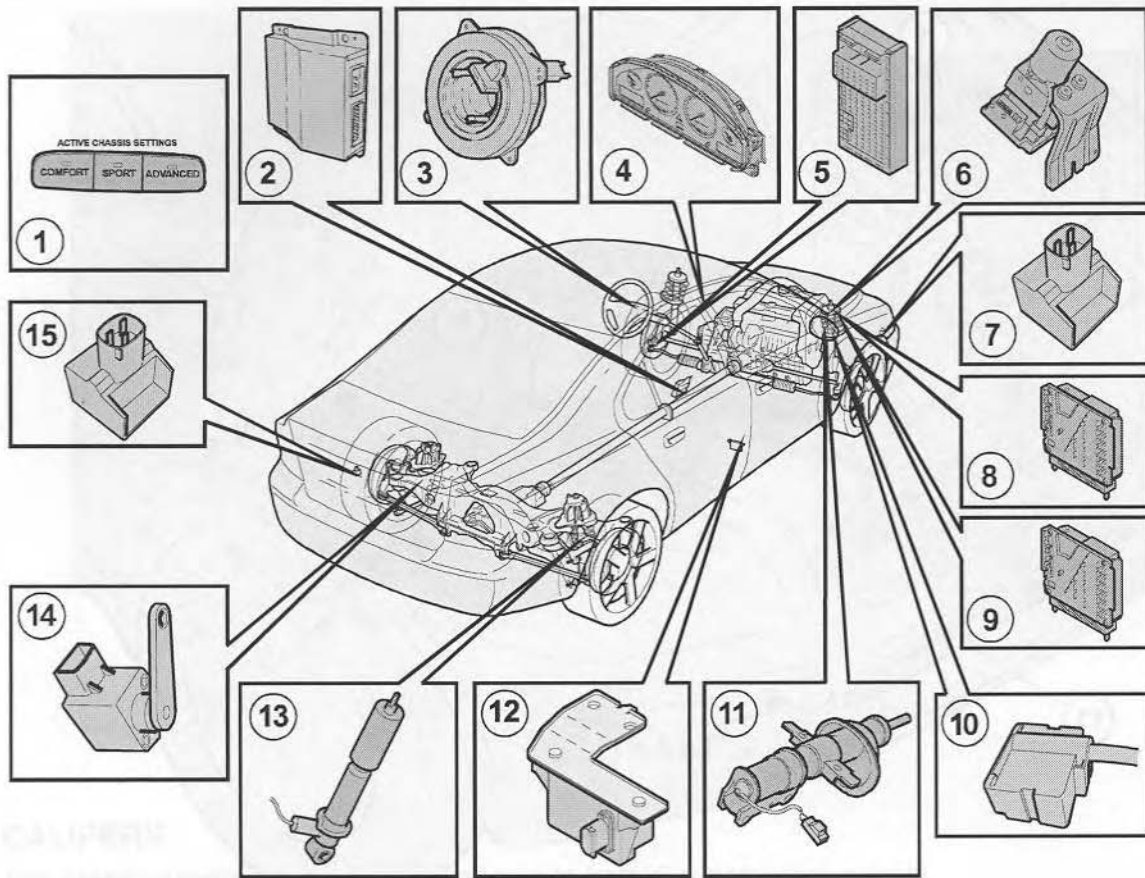
1	Servo oil reservoir	5	Rotating valve housing	9	Feed line to steering gear
2	Inlet pipe to servo pump	6	Solenoid valve	10	Return line
3	Steering servo pump	7	ZF control module	11	Oil cooler
4	Steering gear	8	Return pipe to cooling coil		

The ZF unit replaces the previous speed-dependent steering gear. Differences between them are as follows:

ZF Speed-Dependent Steering	Previous Speed-Dependent Steering
Communication BCM/CEM + separate control unit	Communication via BCM/CEM
Electrical system troubleshooting only	Diagnostics and troubleshooting (CAN)
Controlled by means of an actuator solenoid	Controlled by a step motor
Separate control module	Integrated function in CEM
Has a single-piece steering column housing	Intermediate section of steering column is steel
Servo oil cooler (front-mounted)	Cooling coil on return pipe to oil reservoir

Solenoid Valve

The speed signals are analyzed by the ZF control module and converted into a controlled electric current that actuates the solenoid valve located on the valve housing.



CONTINUOUSLY CONTROLLED CHASSIS CONCEPT (FOUR-C System)

COMPONENTS and LOCATION

1	ACS switch	6	BCM (RHD location shown)	11	Front shock absorber
2	SUM (SUspension Module)	7	Front accelerometer	12	DSTC sensor module
3	SAS (Steering Angle Sensor)	8	ECM	13	Rear shock absorber
4	DIM	9	TCM	14	Position level sensor
5	CEM	10	Accelerometer, damper	15	Rear accelerometer

FOUR-C Technology

An advanced chassis system controlled electronically. This system is based on a technology known as FOUR-C.

The driver can choose the chassis setting and degree of stability control while driving. The system activates automatically when the speed of the car exceeds 1km/h (0.6 mph).

Three Positions for S60R/V70R

Chassis control can be set to three different positions using the ACS switch on the instrument panel: Comfort, Sport, Advanced Sport.

S80 FOUR-C

- Only one button, as placed on CCM
 - Able to choose between Comfort and Sport only.

Rear shock absorbers differ between the S60R/V70R and S80 – due to the design of rear wheel suspension.

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S60R/V70R WHEELS

UNIQUE ALLOY WHEELS

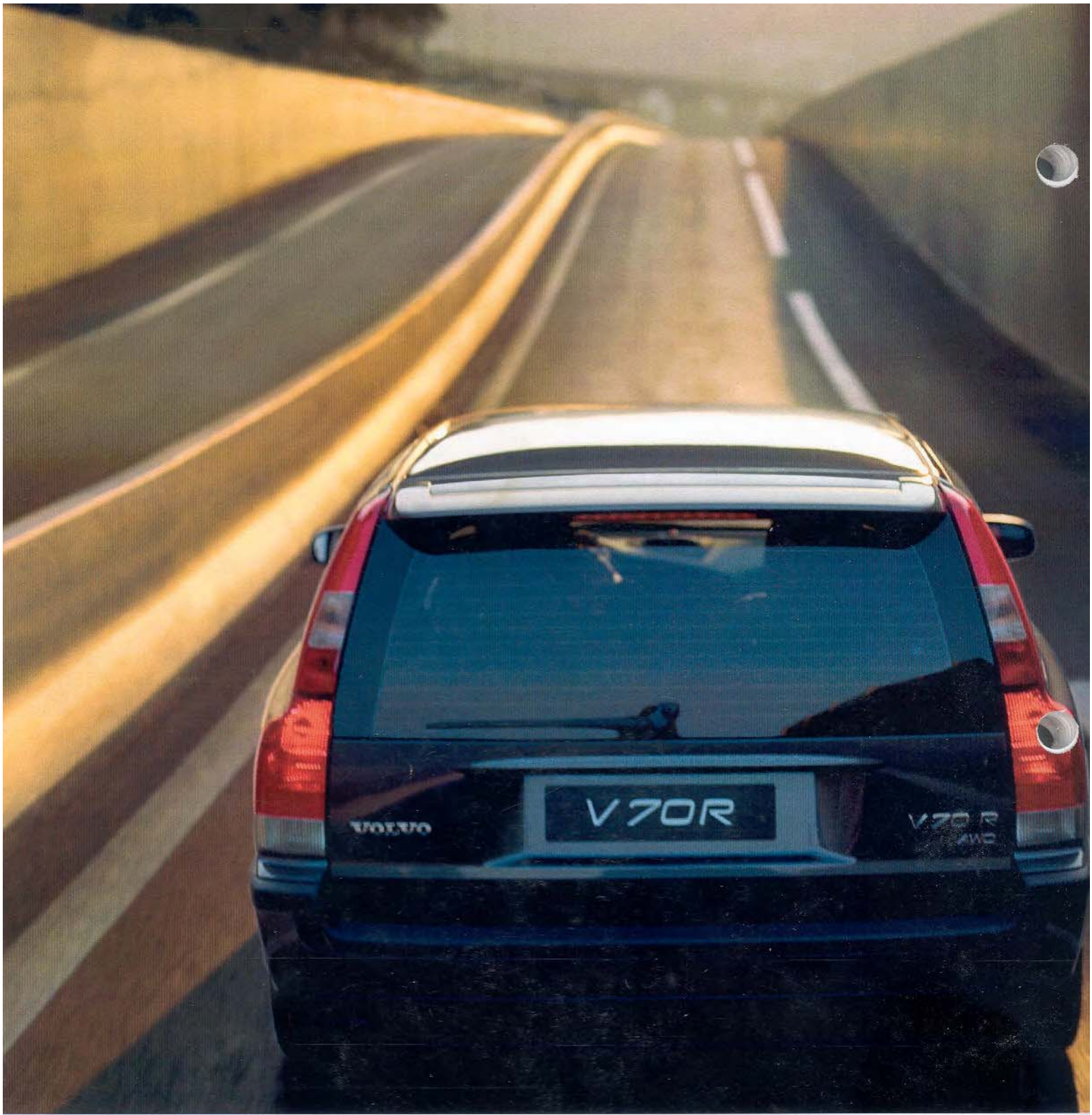
The S60R and V70R use unique five-spoke aluminum wheels designed to accommodate the larger brake calipers which require more clearance. The wheels are available in two diameters, both of which are 8 inches wide and designed for low-profile tires.

CAUTION: Do **not** interchange any other model wheel with the unique R-model wheel.

Other Volvo wheels are not designed for and must not be fitted to the R-range model.

GLOSSARY

ABS	Anti-lock Braking System	KIR	Key Integrated Remote
A/C	Air Conditioning	LDC	Load Dependable Control
ACS	Active Chassis Setting	LED	Light Emitting Diode
AUX	AUXiliary	LEV	Low Emission Vehicle
AWD	All Wheel Drive	LSM	Light Switch Module
AYC	Active Yaw Control	MHz	MegaHertz
BCM	Brake Control Module	MLS	Multi Layer Sealing
BGC	Brake Grip Control	MMS	Mass Movement Sensor
BRC	Bump and Rebound Control	MOST	Media Oriented Systems Transport
CAN	Controller Area Network	PDM	Passenger Door Module
CCC	Close Coupled Catalyst	PEM	Pump Electronic Module
CCM	Climate Control Module	Prog-mode	Programming mode
CEM	Central Electronic Module	PRV	Pressure Regulation Valve
CM	Control Module	PVV	Pressure Ventilation Valve
CVVT	Continuously Variable Valve Timing	PWM	Pulse Width Modulated
DBC	Dynamic Body Control	RSC	Roll Stability Control
DCC	Dynamic Cornering Control	REM	Rear Electronic Module
DDM	Driver Door Module	SAS	Steering Angle Sensor
DEM	Differential Electronic Module	SBL	Secondary BootLoader
DIM	Driver Information Module	SC	Stability Control
DLC	Dive and Lift Control	SCM	Siren Control Module
DSTC	Dynamic Stability and Traction Control	SRS	Supplementary Restraint System
DTC	Diagnostic Trouble Code	SULEV	Super Ultra Low Emission Vehicle
DVD	Digital Versatile/Video Disc	SUM	SUspension Module
EBA	Emergency Brake Assistance	TCM	Transmission Control Module
ECM	Engine Control Module	TCV	Turbo Control Valve
FOUR-C	Continuously Controlled Chassis Concept	TRACS	TRACtion Control System
FWD	Front Wheel Drive	UEM	Upper Electronic Module
GDL	Gas Discharge Lightning	VADIS	Volvo Aftersales Diagnostics & Information System
IR	Infra Red	WHC	Wheel Hop Control
ISM	Inclination Sensor Module		



VOLVO

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Service Training and Development Department

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