

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:

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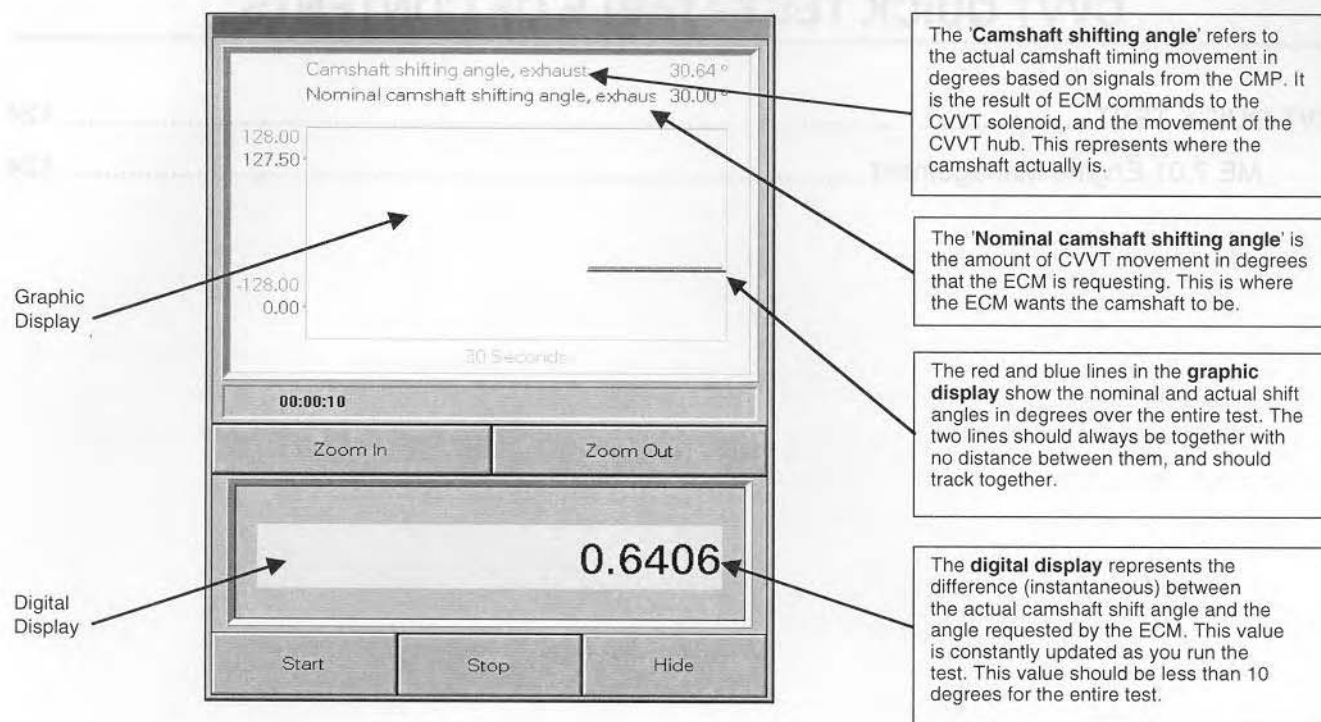
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CVVT QUICK TEST

ME 7.01 ENGINE MANAGEMENT

The Bosch ME 7.01 engine management system has a software function that can be used as a diagnostic tool to quickly determine if timing problems exist on camshafts that are equipped with CVVT (continuously variable camshaft timing). The software function is accessed through VADIS Vehicle Communications for the ECM.

By activating this program in VADIS, the CVVT camshaft control system will run through a predetermined advance / retard program.

The amount of camshaft control requested by the ECM can be compared with the amount of camshaft control that actually occurs. This allows you to see if the requested camshaft control amount and the actual camshaft movement are the same.

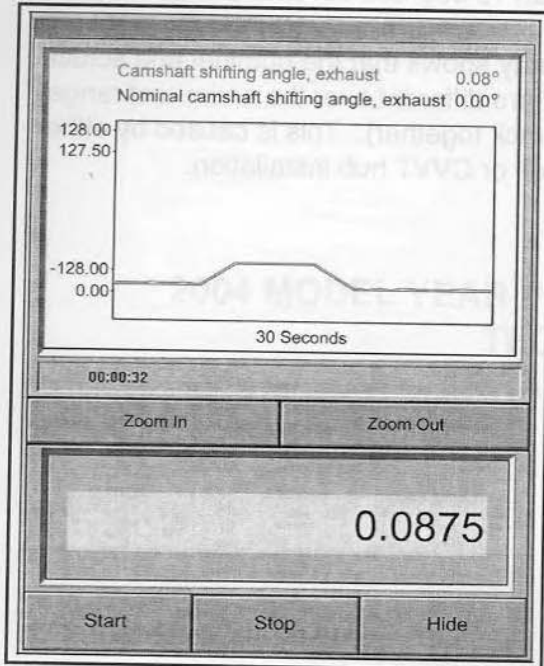
This test can be used to check for:

- Incorrectly installed timing belt.
- Incorrectly mounted CVVT hub on the camshaft.
- A CVVT solenoid or solenoid circuit problem.
- A CVVT hub sticking or jamming problem.

Here's how to access the Camshaft Quick Test:

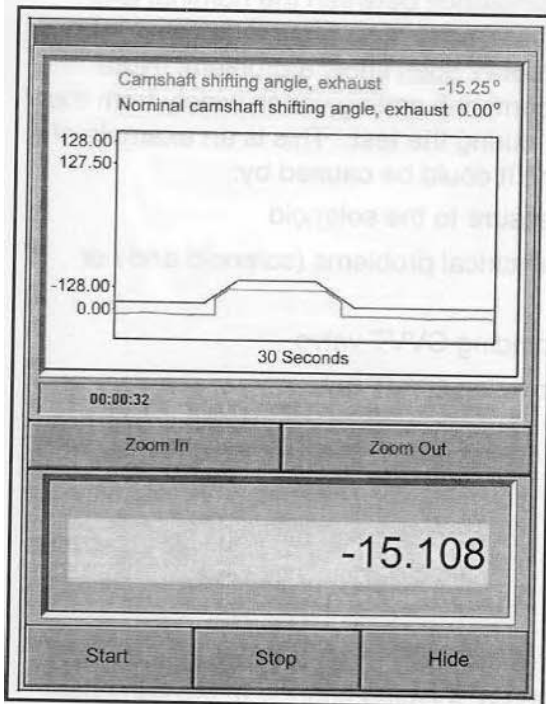
- Set up the vehicle profile.
- Go to VADIS Vehicle Communication.
- Select Group 2, Engine Control Module.
- Select Intake Camshaft Quick Test or Exhaust Camshaft Quick Test.
- Start the engine and select the VCT 2000 icon to begin the test.
- Follow the on screen instructions to run the test.

EXAMPLES of CAMSHAFT QUICK TEST SCREENS



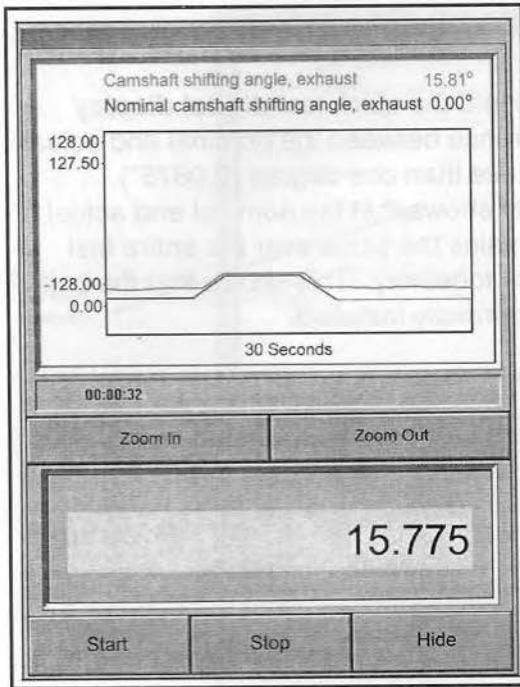
In the screen on the left, the quick test **digital display** shows that the difference between the nominal and actual camshaft setting is less than one degree (0.0875°).

The **graphic display** shows that the nominal and actual camshaft setting remains the same over the entire test range (the lines track together). This shows that the belt and CVVT hub are correctly installed.



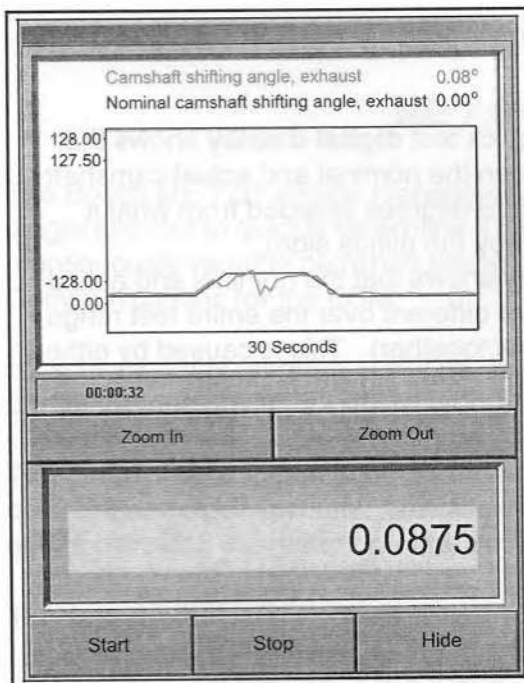
In this screen, the quick test **digital display** shows that the difference between the nominal and actual camshaft setting is more than 15 degrees retarded from what it should be (indicated by the minus sign).

The **graphic display** shows that the nominal and actual camshaft settings are different over the entire test range (the lines do not track together). This is caused by either incorrect timing belt or CVVT hub installation.



In this screen, the quick test **digital display** shows that the difference between the nominal and actual camshaft setting is more than 15 degrees advanced from what it should be.

The **graphic display** shows that the nominal and actual camshaft settings are different over the entire test range (the lines do not track together). This is caused by either incorrect timing belt or CVVT hub installation.



In this screen, the quick test **digital display** may not be helpful to locate the problem. It only shows the instantaneous difference between the nominal and actual camshaft settings.

The **graphic display** does show a problem. Note that the actual camshaft setting varies widely from the nominal setting during the test. This is an example of a control problem. It could be caused by:

- Low oil pressure to the solenoid
- Solenoid electrical problems (solenoid and / or wiring)
- Sticking / binding CVVT valve
- Sticking / binding CVVT hub

General notes on camshaft timing:

On Volvo Modular engines, each camshaft timing gear has 42 (5 cylinder) or 46 teeth (6 cylinder). Each tooth on the camshaft gear represents about 8 – 8.5 degrees of timing change at the camshaft. This represents about 16 – 17 degrees of timing change at the crankshaft, because the crankshaft timing gear has 21 (5 cylinder) or 23 (6 cylinder) teeth (camshafts turn at ½ crankshaft speed).

What this means is that being just one tooth off at either the crank or cam gear will put the timing outside the allowable limit, and should be easily found during a Camshaft Quick Test.

NOTE: The Camshaft Quick Test will not locate camshaft / hub / belt timing problems on non-CVVT camshafts.

VOCP Activation Job Aid

Follow these steps to activate the On-Call Plus customer service.

NOTE: If the PHM has been replaced be sure to complete and confirm the module SW reload prior to activation.

1. Access the **Volvo On-Call Plus** icon on your VADIS cart or at Web address <http://vocplus.com> and log in.
2. Get activation information from site by printing or copying the phone **ESN, VOCP MIN, VOCP SID, CSC Number, Activation Code** and **Vehicle Identification Number (VIN)**.
3. Park the vehicle outdoors.
4. Leave the ignition key in position I or II.
5. Press READ on the stalk until the text window is blank.
6. Switch on the personal phone by pressing the ON button. Wait 10 seconds.

NOTE: The ON button is between YES and NO buttons – when PHM is on, the green LED in the button will be lit.

7. Press buttons 8, 3, and 6 in sequence.
8. Press the right button (>>) twice.
9. The menu '**Satellite ESN**' is shown in the text window on the instrument panel.
10. Press the right button (>>) once. Phone ESN will be displayed.
11. Press the YES button.
12. Verify the phone ESN by comparing it with the phone ESN number obtained from the VOCP Web page.
13. Press YES.
14. Press the right button (>>) one time. '**VOCP MIN**' will be displayed.
15. Press YES and clear present digits by pressing CLR repeatedly.
16. Enter the assigned VOCP MIN code from your sheet. Press YES to confirm.
17. 'Save Setting?' will be displayed. Press YES.
18. Press the right button (>>) one time. '**VOCP SID**' will be displayed.
19. Press YES and clear present digits by pressing CLR repeatedly.
20. Enter the assigned SID code from your sheet; verify the numbers.
21. Press YES to confirm.
22. 'Save Setting?' is displayed. Press YES.
23. Press the right button (>>) one time. '**CSC Number**' will be displayed.
24. Press YES and enter the assigned CSC number from your sheet; verify the numbers.
25. Press YES to confirm.
26. 'Save Setting?' will be displayed. Press YES.
27. Press NO and the phone will go back to normal mode. Wait until phone active mode is present. (If not, press NO repeatedly until display is blank, and then press YES.)
28. Press the right button (>>) **seven times** and the 'On Call Plus' menu will be displayed.
29. Press the YES button.
30. The '**ActivatnCode**' menu will be displayed.
31. Press the YES button.
32. Enter the received activation code and then press the YES button.
33. The search of the GPS signals will now start, and 'Finding Vehicle Position' is displayed.
34. When the location has been calculated, the text changes to 'Press ON CALL to complete.'
35. Remove the label over the buttons.
36. Press the ON CALL button for at least 3 seconds.
37. A Volvo On Call Plus specialist will answer.
38. Identify yourself as a retailer calling to activate a customer's On Call Plus account.
39. During call, some of the received data from the vehicle will be verified, including VIN, location of the car, fuel level, etc.
40. If during this process anything differs from the above information consult the owner's manual or VADIS.

Phone ESN _____

VOCP MIN _____

VOCP SID _____

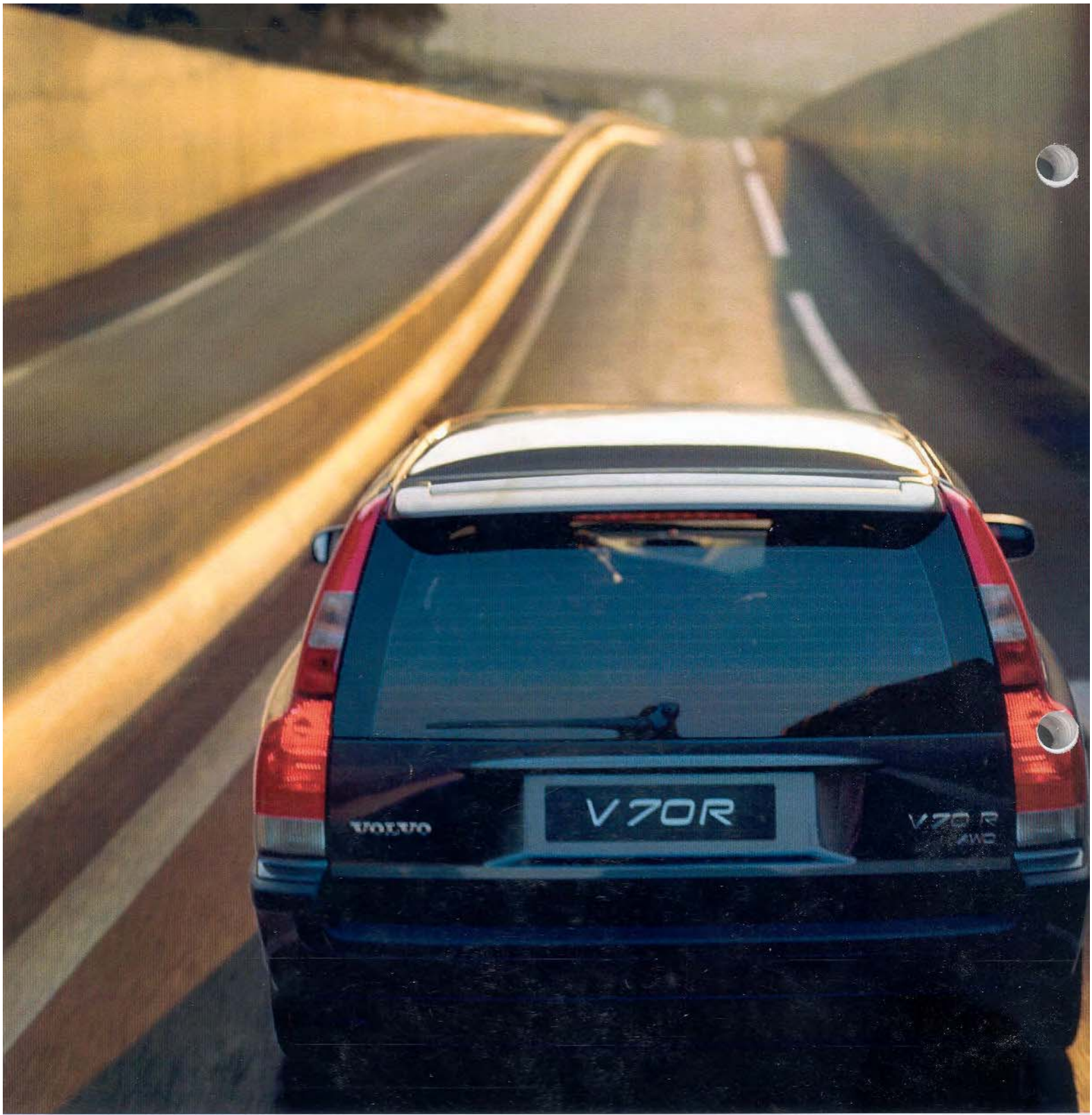
CSC number _____

Activation code _____

Vehicle Identification Number (VIN) _____

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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