

## Turbocharged engine, removal and installation

Special tools: [999 2810](#) , [999 5428](#) , [999 5462](#) , [999 5474](#) , [999 5488](#) , [999 5533](#)

**Note!** From autumn 1993 onwards lifting arm 998 9734 is included in the kit for tool 999 2810. The lifting arm is required for removing and installing the turbo motor.

### Removing engine

#### Drain coolant

Remove expansion tank cap.

Raise the car.

**Automatic:** Remove air guide under engine.

Open the engine and radiator nipples. Thread hoses onto the nipple to collect the coolant.

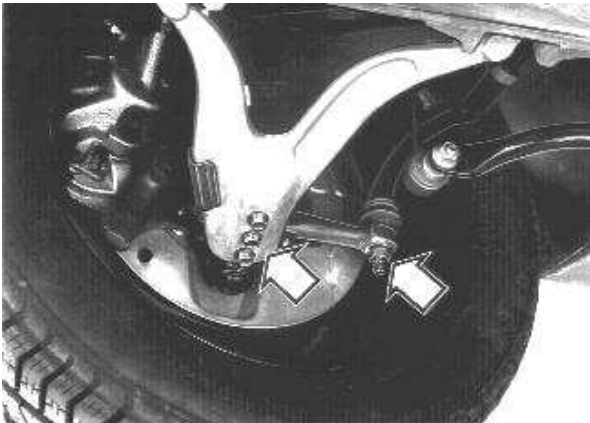
Disconnect the lower charge air pipe from charge air cooler (CAC) lower sleeve connector.

Close the nipples.



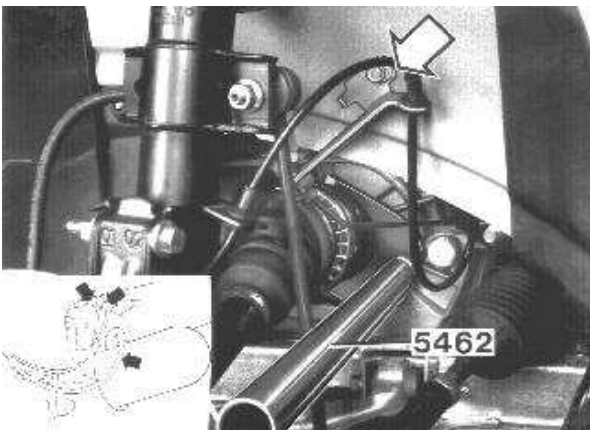
#### Remove:

- front wheels
- tie rod end from left stub axle
- the three nuts holding the ball joint to the control arm on the left-hand side



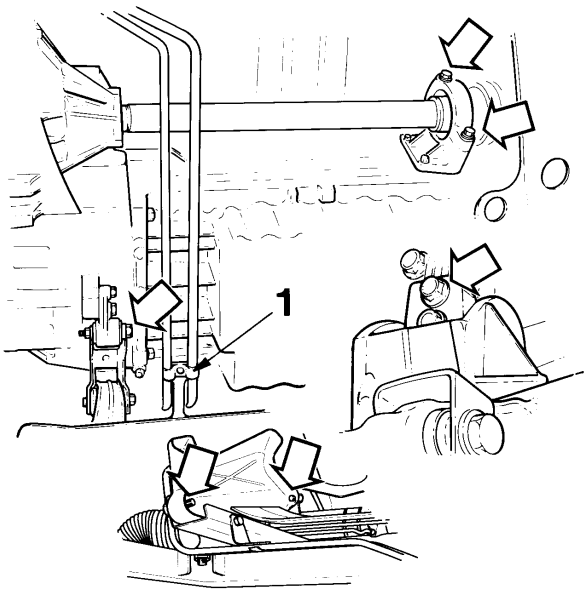
#### Remove:

- ABS cable and brake pipe/hose bracket screw
- left drive shaft, a gimmy bar [999 5462](#) must be used to release the drive shaft (the snap ring may be damaged otherwise)



#### Remove:

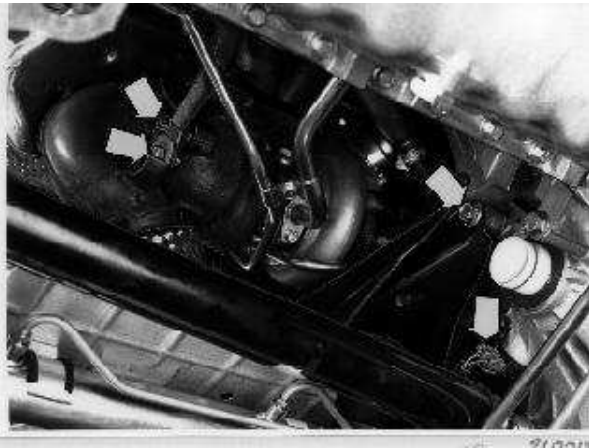
- tie rod end from right stub axle
- the three nuts which hold the ball joint to control arm on right-hand side
- right drive shaft and intermediate bearing cap from drive shaft, **carefully** place it on the steering servo



pipes

- the two screws for the right engine mounting (bend the right fender liner to one side slightly first)
- the transmission torque rod screw

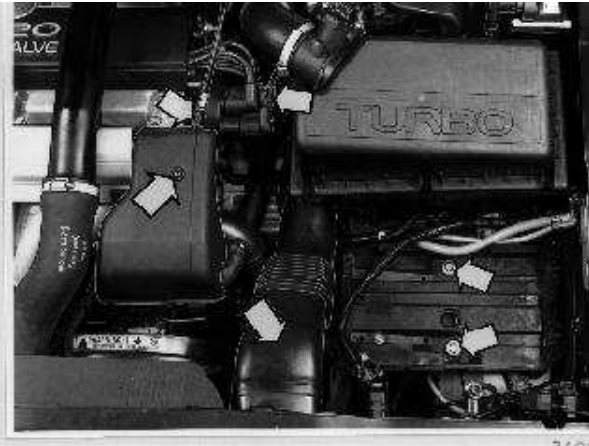
**Note!** Install sealing plugs [999 5488](#) in the holes left by the drive shafts.



#### Remove:

- front exhaust pipe lower nut and screw from the bracket
- speedometer connector
- front and rear engine mountings lower screws.

Lower car to a comfortable working height

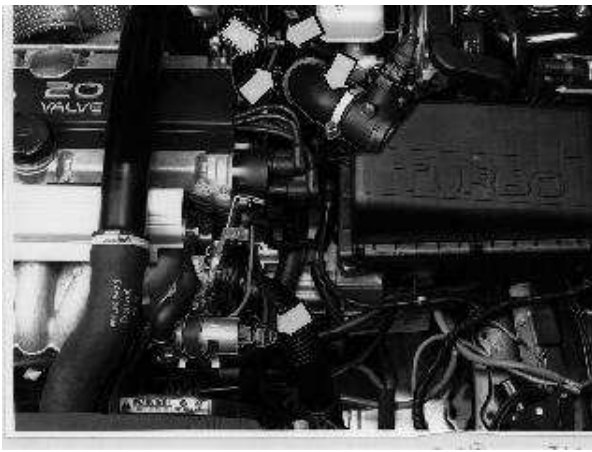


#### Remove:

- battery
- battery shelf, with a clutch slave cylinder for the cruise control (which is removed from the shelf and put to one side)
- fresh air intake hose from air intake to air cleaner (ACL) housing
- ignition cable between distributor/ignition coil
- throttle pulley cover
- throttle cable from throttle pulley

#### Disconnect hoses/connectors:

- Disconnect inlet hose from the turbocharger (TC) to air cleaner (ACL) at both ends
- disconnect the hose for the PTC valve and connector
- disconnect connector from throttle sensor
- disconnect idle air trim connector.
- disconnect turbocharger control valve (TCV) connector



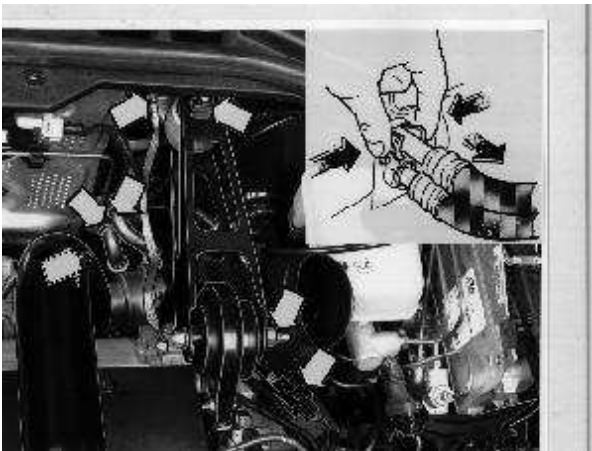
### Remove the air cleaner (ACL) housing

disconnect mass air flow (MAF) sensor connector  
Disconnect and raise air cleaner (ACL) housing.  
Remove two turbocharger control valve (TCV) bracket screws



### Remove:

- torque rod from bracket and cowl panel.
- ground strip from cowl panel
- the two heater hoses from the cowl panel
- heated oxygen sensor (HO2S) connector and clips ((USA variants are equipped with two heated oxygen sensors (HO2S))
- brake servo hose from engine or separate it under the air cleaner (ACL) housing



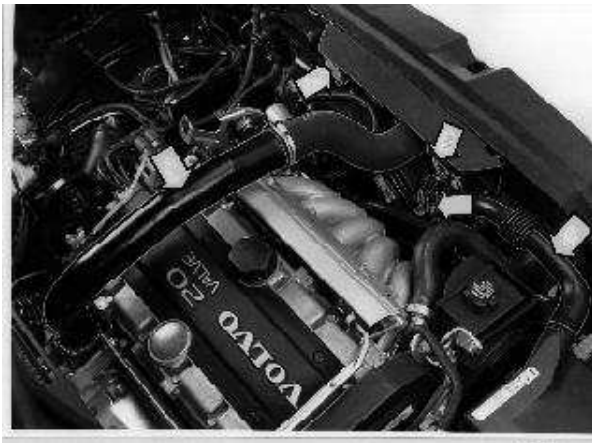
### Remove the engine coolant fan (FC)

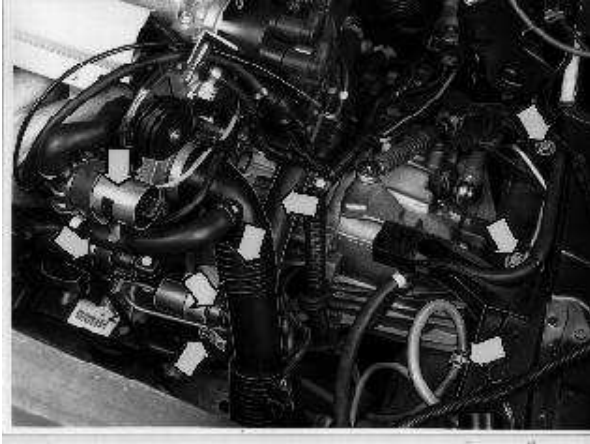
Remove relays from the fan shroud, separate the relay and fan connectors, put wiring to one side.  
Remove the air duct for cooling the control module box.  
Disconnect both canister hoses and valve from the radiator.

Remove the four fan shroud screws and the upper charge air pipe from the turbocharger. Slide the fan shroud slightly backward and remove the upper fan shroud. Remove upper charge air pipe.

Remove fresh air intake from radiator and disconnect vacuum hoses to Turbocharger instruments and EGR-regulator.

**Caution! Protect the radiator with a hard sheet or similar.**  
**Alternative protection [999 5474](#) .**





### Remove:

- idle air trim together with lower charge air pipe
- lower radiator hose, from engine
- the protective cover over the starter motor
- battery negative lead, from engine and wheel arch (also from transmission on automatic)

### *Car with manual transmission:*

- clutch slave cylinder snap ring

**Note! (Ensure that the piston does not slide out)**

- slave cylinder from gear box

### Remove:

- air cleaner housing bracket. (**Carefully** put air cleaner bracket and clutch slave cylinder to one side so that they are **not** separated.)

### Manual:

Remove: gear selector cables from their mountings on the transmission (mark up cable positions).  
Remove the rubber mounted section of the gear selector cable mounting.

### Automatic:

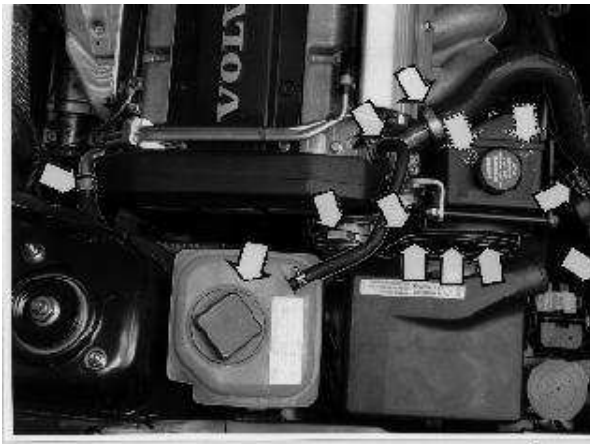
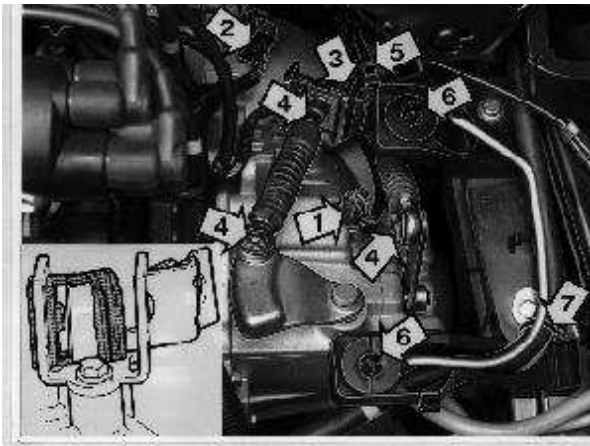
Disconnect connector and remove gear selector cables from the transmission (and mark up the cable positions).  
Disconnect the two oil cooler hoses from the radiator, using victory clip tool.

### Remove:

- upper radiator hose from thermostat housing
- expansion tank
- auxiliaries belt
- the six power steering pump screws (disconnect the temperature sensor cable from the bracket on the power steering pump)

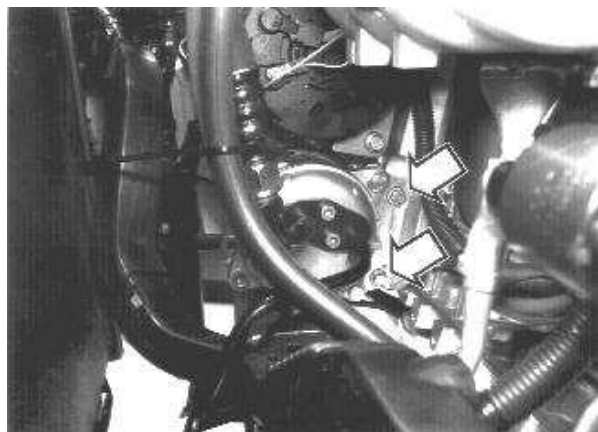
**Hint:** Allow power steering pump to remain on hose.

Disconnect the two oil cooler pipes from the radiator.



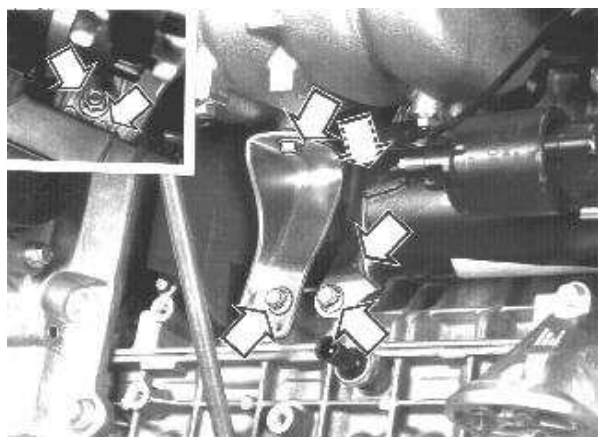
### Remove air conditioning (A/C) compressor

Remove air conditioning (A/C) compressor without removing hoses and put onto sub-frame. (Remove the screws on the right-hand side by bending the fender liner a little to one side.)



### Remove the cable duct bracket screws

Remove the cable duct bracket screws  
Remove starter motor support bracket.



### Remove:

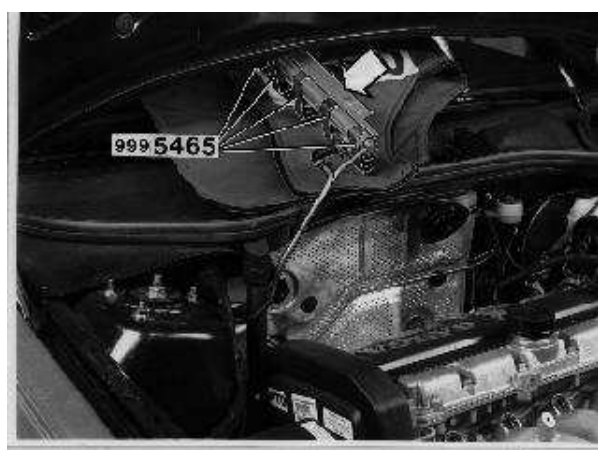
- the protective cover over the fuel rail
- injector connectors
- fuel line clip (upper/lower)
- engine ground strip



### Remove the fuel rail

Install holder [999 5533](#) (5 x) on the injectors  
Disconnect fuel pressure regulator vacuum hose.  
Lift up and put fuel rail with injectors to one side.

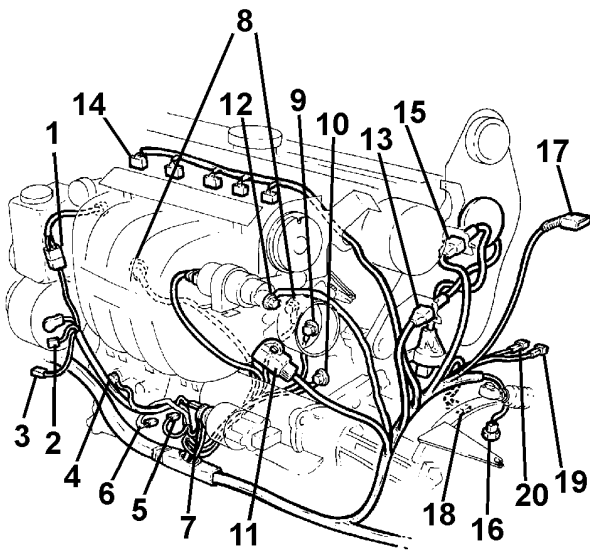
**Caution! Take care not to damage the injector nozzles and fuel needles.**



### Expose the engine cable harness

Disconnect all connectors and clamps from engine.

**Note! Note all the cable harness mountings positions.**



1. Thermostat
2. Generator (GEN)
3. Air conditioning (A/C) if installed
4. Ground terminal
5. Oil pressure switch
6. Oil level sensor
7. Starter motor (all)
8. Knock sensor (KS)
9. Ground terminal
10. Ground terminal
11. Throttle housing switch
12. Idle air trim
13. Flywheel sensor
14. Injectors
15. Camshaft position (CMP) sensor
16. Back-up (reversing) lamp switch
17. Mass air flow (MAF) sensor
18. Vehicle speed sensor (VSS)
19. Heated oxygen sensor (HO2S) (automatics x 2)
20. PTC element

### Remove engine with transmission

Lift power steering pump and put it to one side.

Remove front engine pad when lifting.

Remove engine, use lift yokes [999 2810](#) (in version with lifting arm [999 5428](#)).

Adjust lifting angle during the lift (a relatively large angle is required).

**Automatic:** Remove turbocharger (TC) oil cooler hoses with valve, from oil pan right side.

**Caution!** Check carefully that the driveline is clear of the bodywork and other optional extras.

### Engine replacement, transferring components (Turbo)

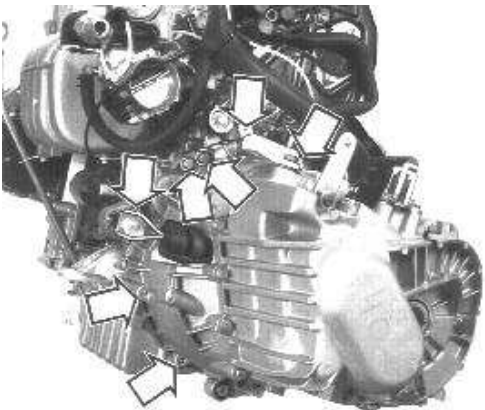
Special tools: [999 2520](#), [999 2810](#), [999 5112](#), [999 5297](#), [999 5428](#), [999 5429](#), [999 5463](#)

### Exposing engine

#### Remove transmission

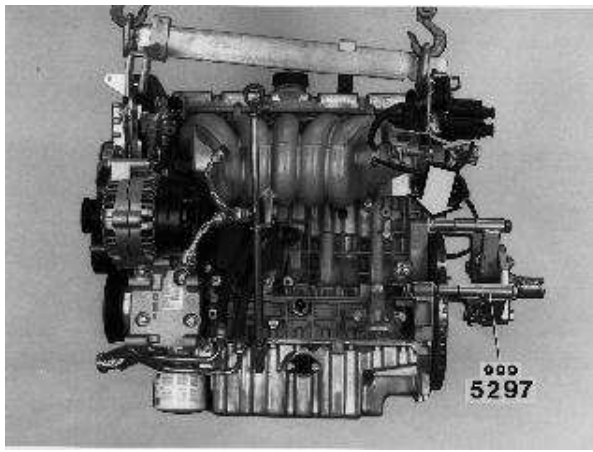
Automatic: Slacken off torque converter screws.  
Remove 12 transmission screws from the engine at the flywheel mounting in the cylinder block.

**Warning!** When the transmission is released use the mobile jack [999 5972](#) with transmission fixture [999 5463](#) as a support to avoid damage.



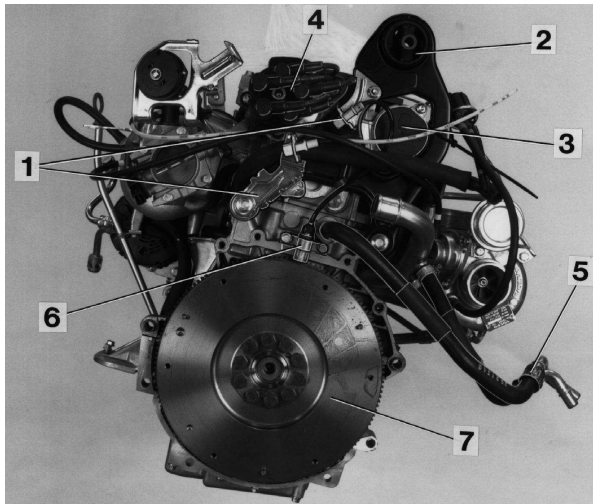
#### Install engine in stand

Use stand [999 2520](#) and fixture [999 5297](#).



Remove lifting tools.  
Install the correct number of washers to compensate transmission guide pins.

### Transferring rear components



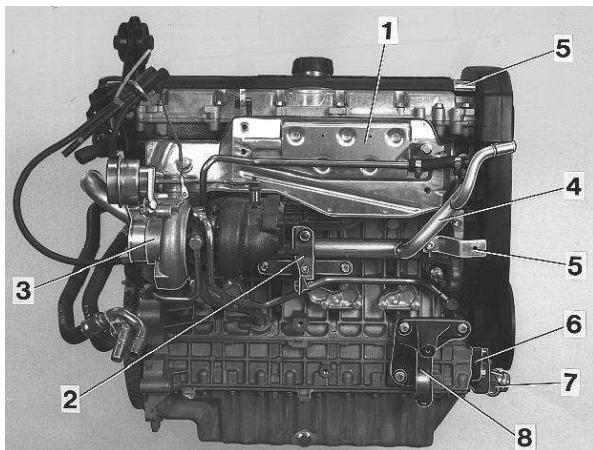
1. Connector brackets  
2. Torque control arm use new screws. Tighten screws in two stages:

Stage 1 **50 Nm**

Stage 2. **90° angle**

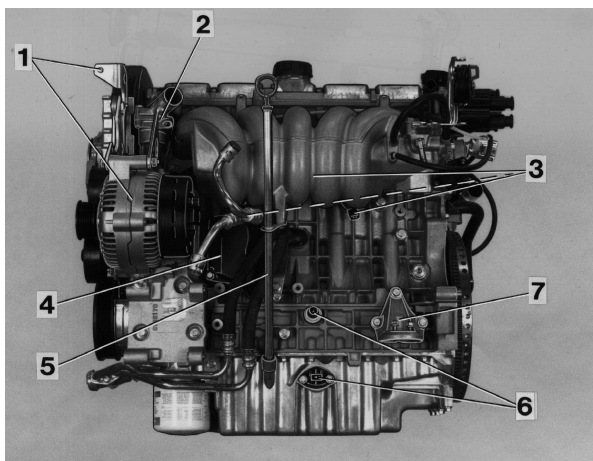
3. Camshaft position (CMP) sensor  
4. Distributor and ignition cables  
5. Heater pipes  
6. Engine speed (RPM) sensor  
7. Flywheel/carrier plate  
Transfer all vacuum hoses

### Transferring exhaust side components

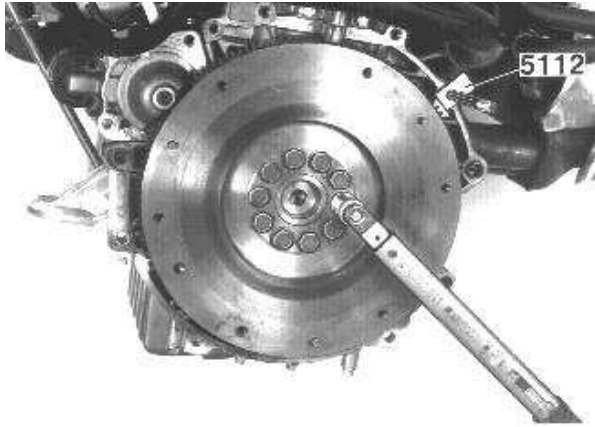


1. Heat deflector plate  
2. Exhaust pipe bracket  
3. Exhaust manifold with turbocharger (TC)  
4. Coolant pipe  
5. Fuel line mounting brackets  
6. Right engine mounting  
7. Thermostat housing, oil cooler  
8. Drive shaft bearing bracket

### Transferring intake side components



1. Lifting eyes  
2. Temperature sensor  
3. Intake manifold knock sensors (KS) (torque **20 Nm**)  
4. Dipstick and pipe  
5. Oil level sensor and oil pressure sensor  
6. Front engine mounting  
7. Flame trap with hose



### Install carrier plate/flywheel

Lift the engine from the fixture, use mounting [999 5429](#) and lifting yoke [999 2810](#) , [999 5428](#) .

Use gear sector [999 5112](#) .

Use new screws and thread sealant.

#### Tighten in two stages:

1. Tighten to: **45 Nm**
2. Angle-tighten: **50°**

### Install transmission

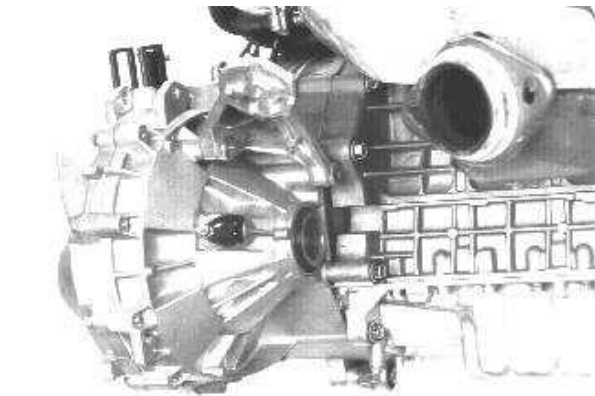
#### Automatic:

Tighten torque converter to: **50Nm**.

#### Manual:

Torque clutch driven plate and pressure plate to: **30 Nm**

The old motor is plugged in the same way as the new plug.



## Lifting engine in

Special tools: [999 2810](#) , [999 5428](#) , [999 5462](#) , [999 5474](#) , [999 5488](#) , [999 5533](#)

**Note!** From autumn 93 onwards lifting arm 998 9734 is included in the kit for tool 999 2810. The lifting arm is required for removing and installing the turbo motor.

#### Lift in engine with transmission

Use lifting yoke [999 2810](#) (in version with lifting arm [999 5428](#) .

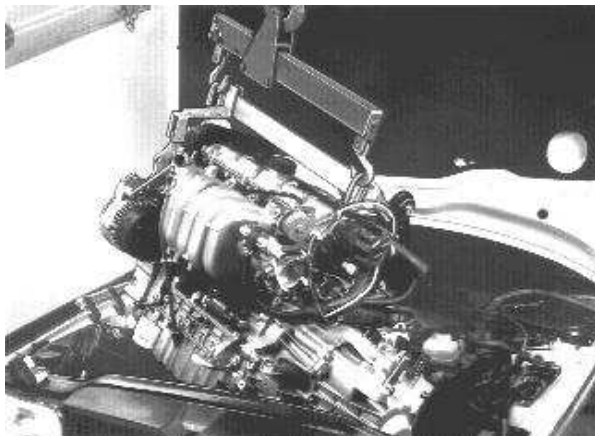
Locate lifting yoke so that the engine is balanced.  
Adjust lift angle during the lift.

**Caution!** Check that the driveline is clear of the bodywork and other equipment.

Tighten the front engine mounting nut.

#### Install:

- A/C compressor
- power steering pump and collision protection system

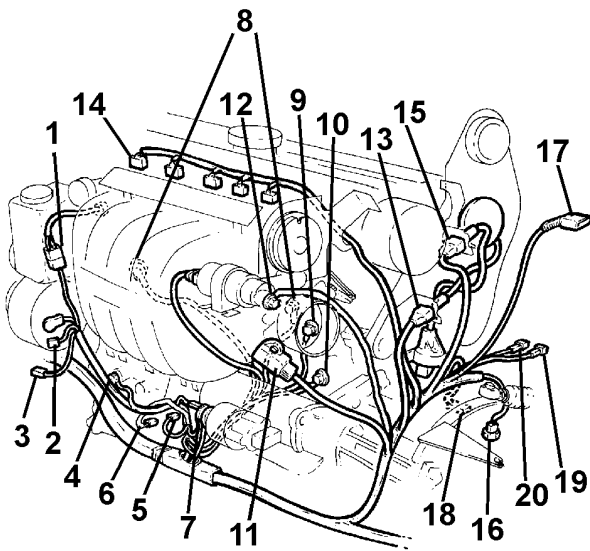


#### Install the engine cable harness

Install cable duct bracket. Connect all connectors as marked earlier.

1. Thermostat
2. Generator (GEN)
3. Air conditioning (A/C) if installed
4. Ground terminal
5. Oil pressure switch

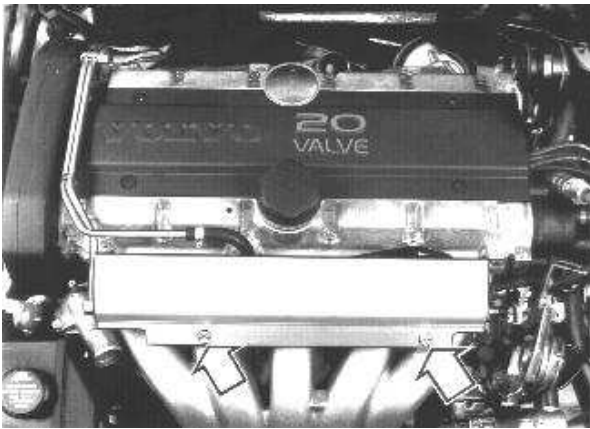




6. Oil level sensor
7. Starter motor (all)
8. Knock sensor (KS)
9. Ground terminal
10. Ground terminal
11. Throttle housing switch
12. Idle air trim
13. Flywheel sensor
14. Injectors
15. Camshaft position (CMP) sensor
16. Back-up (reversing) lamp switch
17. Mass air flow (MAF) sensor
18. Vehicle speed sensor (VSS)
19. Heated oxygen sensor (HO2S) (automatics x 2)
20. PTC element

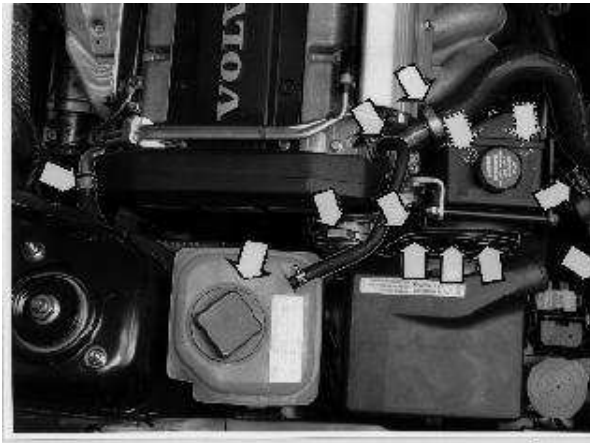
### Install fuel rail

- Grease O-rings for injectors.
- Tighten fuel rail.
- Remove holder [999 5533](#).



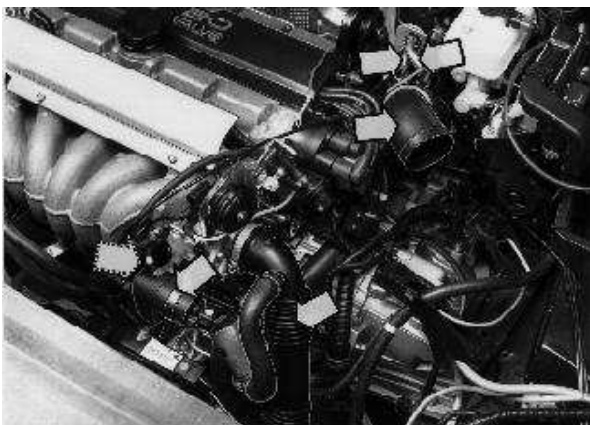
### Install:

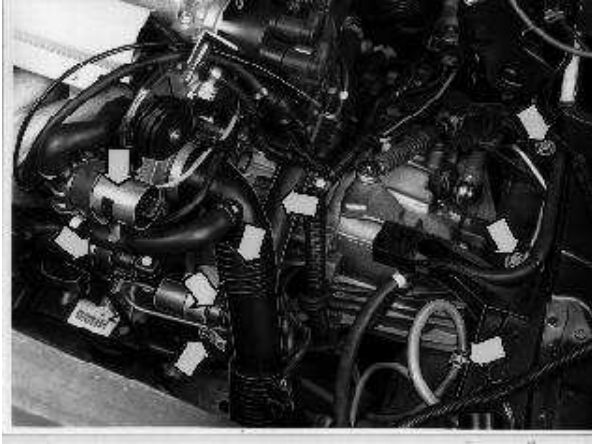
- the protective cover over the fuel rail
- fuel line clip (upper/lower)
- auxiliaries belt
- expansion tank with radiator pipes
- upper and lower oil cooling hoses



### Install:

- starter motor bracket and its splash guard
- cold air hose
- radiator hoses to the cowl panel
- fresh air intake hose to the turbocharger (TC)





### Install:

- negative lead to the engine, and install the clamp on the frame member
- lower radiator hose
- clutch slave cylinder to the gearbox

**Note! (Take care that the piston does not slide out)**

- slave cylinder snap ring
- the rubber air filter mountings and tighten bracket.
- idle air trim, connect connector

### Install the engine cooling fan (FC)

Remove shroud ([999 5474](#)) from radiator.

Lift out the engine cooling fan (FC) with the cover.

Connect the connector, clamp the wiring.

Install the upper charge air pipe, between charge air cooler and turbocharger (TC).

Install the fresh air intake.

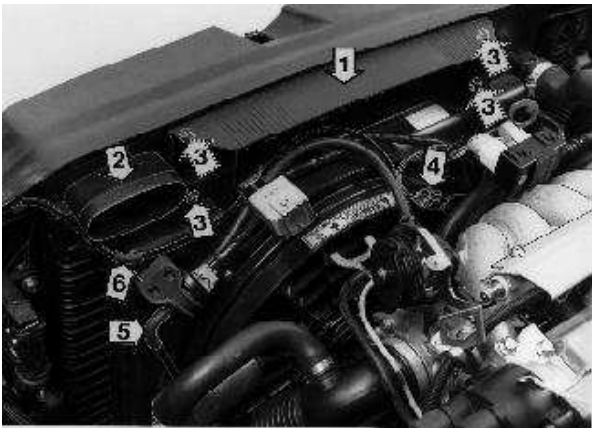
Install the upper fan shroud. Tighten the fan shroud to the radiator (ensure that the clip is in place).

Connect the pressure pipe (to the turbo instruments).

**USA:** Connect the vacuum hoses to the EGR-regulator. Install the EVAP canister shut-off valve in the bracket and connect the canister vacuum hose.

### Install:

- the air duct for cooling the control module box.
- both relays on the fan shroud and connect connectors. Clamp the wiring
- idle air trim



### Install:

- cable to the PTC-element and heated oxygen sensor (HO2S)

### Car with manual transmission:

- back-up (reversing) light switch cable
- the gear selector cables rubber mounting.
- gear selector cables to their mounting on the transmission.

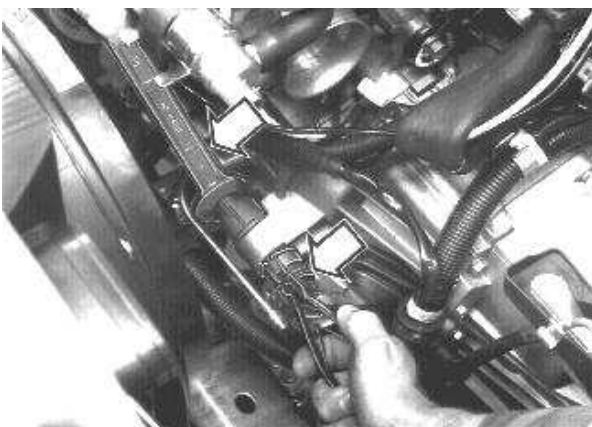
**Note! Color marking mounting/cable.**

### Cars with automatic transmission:

Connect connector to the transmission.

Install gear selector cable (as marked earlier)

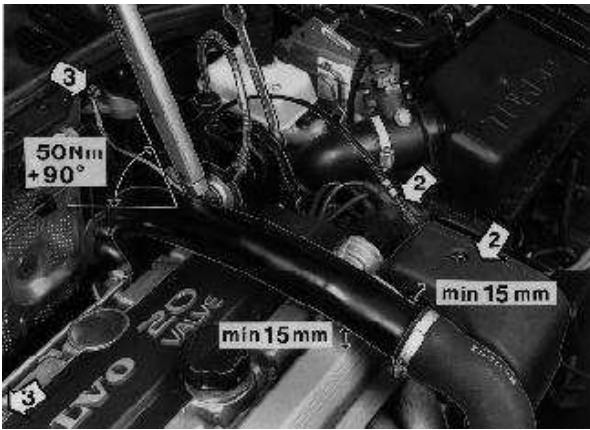
Install two transmission oil cooler hoses and negative



lead to the transmission.

#### Install:

- upper torque rod from the engine with new screws. Tighten to **50 Nm** and **90°** angle
- both ground strips
- throttle cable to the throttle pulley and cover
- charge air pipe to the turbocharger (TC) (adjust the distance to **15 mm**)



#### Install air cleaner (ACL) housing

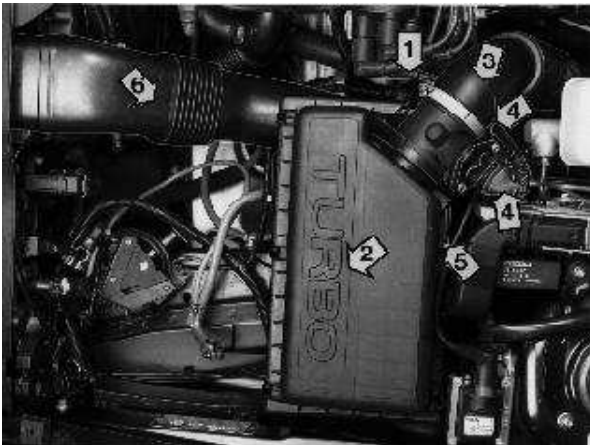
Connect the connector and vacuum hoses to the idle air control (IAC) valve.

Ignition cable between distributor/ignition coil.

**Note! Yellow marking first rib on cleaner cover.**

Install the air hose and the air cleaner (ACL) housing. Connect mass air flow (MAF) sensor connector. Connect fresh air intake.

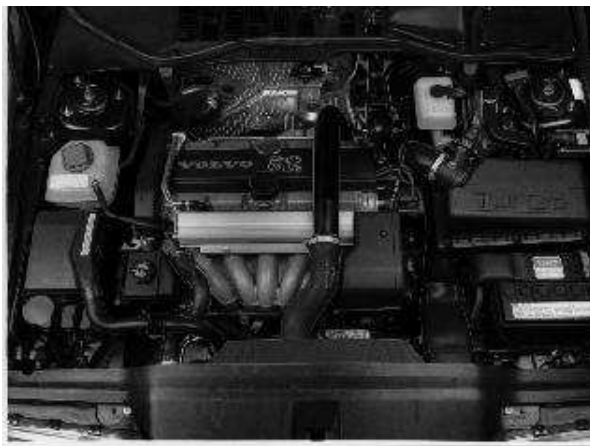
Install the bracket for the turbocharger control valve (TCV) on the air cleaner (ACL) housing.



#### Install:

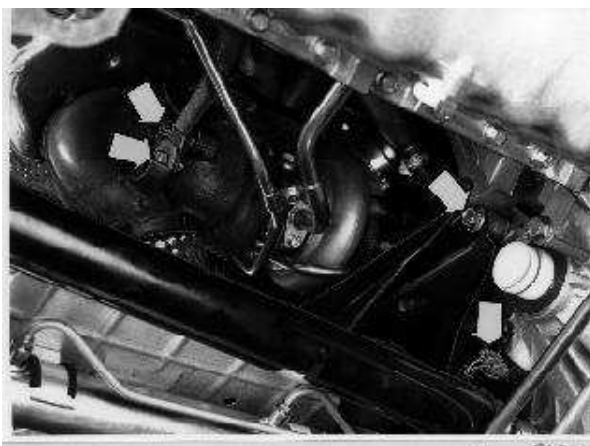
- the battery shelf and battery with the cables

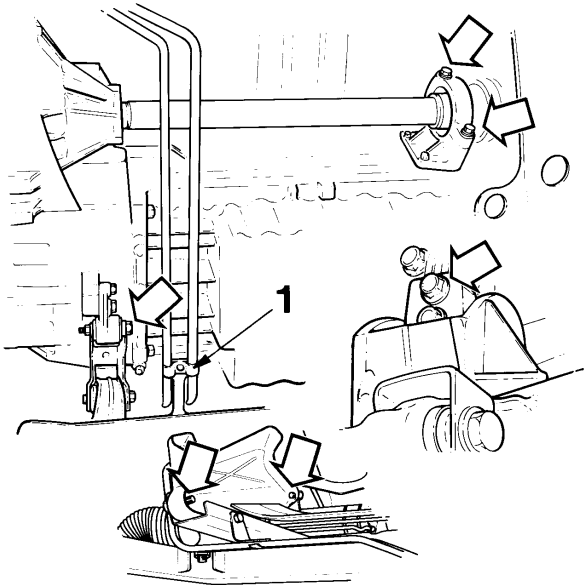
**Caution! If the car is equipped with a cruise control connect the vacuum hose and vacuum motor wiring before the battery shelf is screwed into place.**



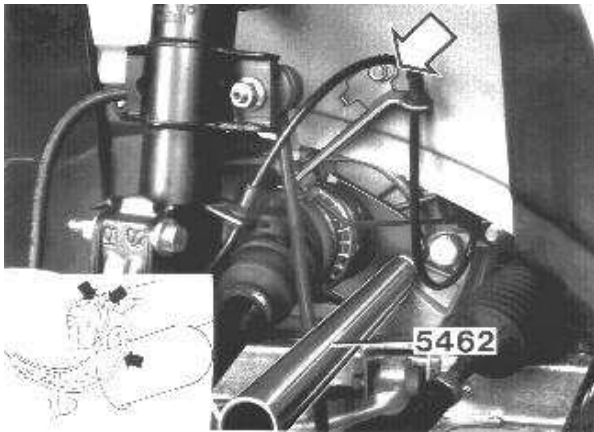
#### Install:

- two upper exhaust pipe nuts (do not tighten them), raise the car
- exhaust pipe lower nut (do not tighten them)
- screw for exhaust pipe bracket. Torque to **30 Nm**.
- speedometer connector.
- front and rear engine mounting screws. Torque to **50 Nm**.
- torque arm screw in the transmission, use a new screw and nut. Tighten to **35 Nm + 90°**.



**Install:**

- the two screws for the right engine mounting (bend the right fender liner to one side slightly first)
- right drive shaft and pilot bearing

**Install:**

- left drive shaft, this should be easily installed with hand pressure (**the snap ring is easy to damage**)
- ABS cable/brake pipe bracket screw

**Reinstall on both sides:**

- control arm to ball joint. Use **new** nuts.
- wheels

**Note! Ensure that mating faces on ball joint and link are clean and free of grease.**

Tighten the nuts in order from inside and outwards.

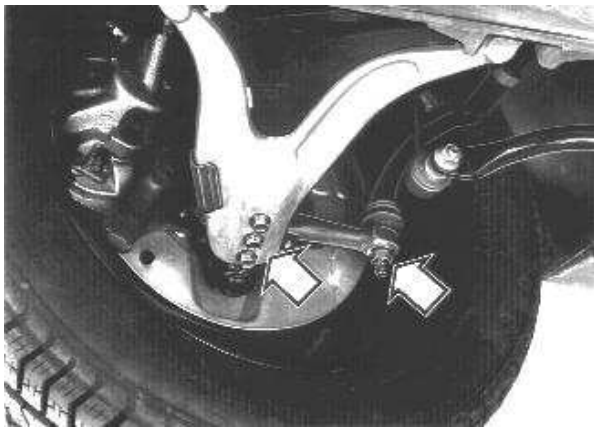
Tighten to: **18 Nm + 120°** Use protractor [951 2050](#).  
Rust protect the area between the ball joint, link and nuts carefully, using plenty of compound. Use rustproofing agent P/N: 1 161 432-8.

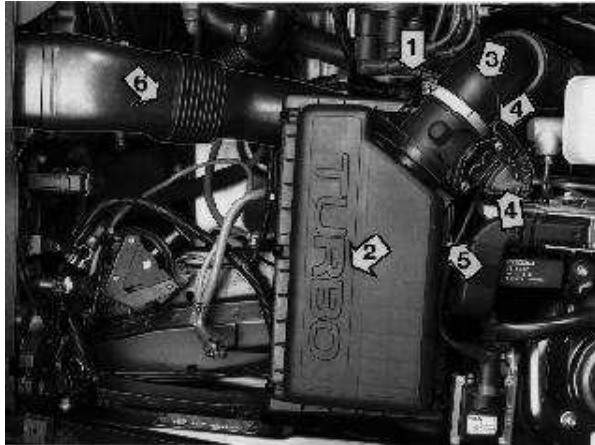
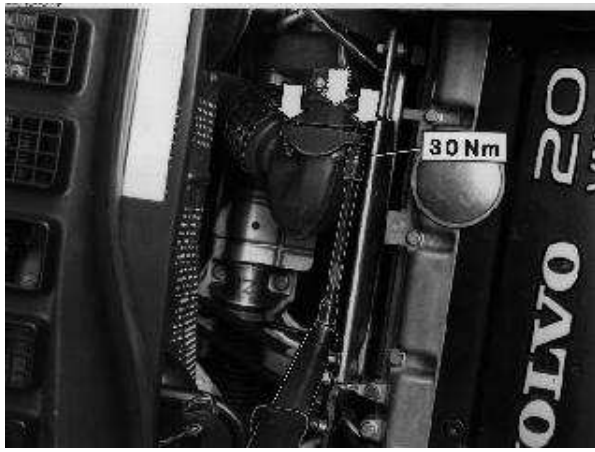
(New ball joint nut torque **70 Nm.**)

**Lower car**

Torque the three exhaust pipe nuts and check that the planes are parallel. Torque to **30 Nm**.

Install heat deflector plate, with turbocharger (TC) bracket.





### Top up coolant and engine oil

Coolant volume approximately: **7.20 liters.**

Oil capacity including filter: **5.3 liters.**

### Test function

Start engine run until thermostat opens.

Check for leaks.

Check and if necessary adjust oil and coolant levels.

**Automatic:** Check automatic transmission oil level.