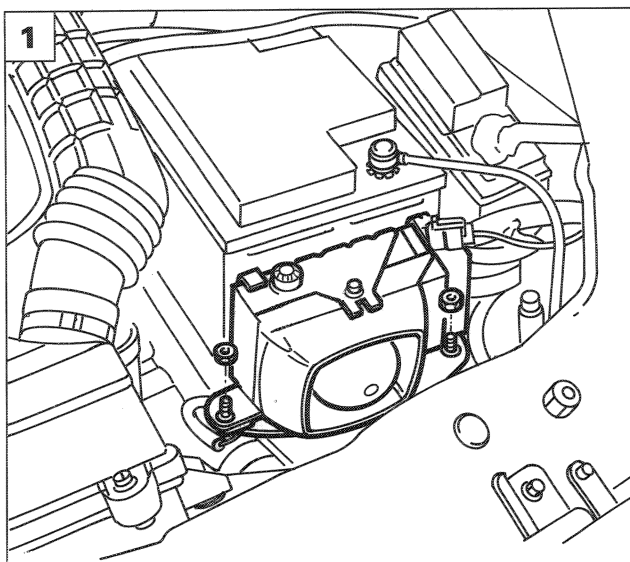


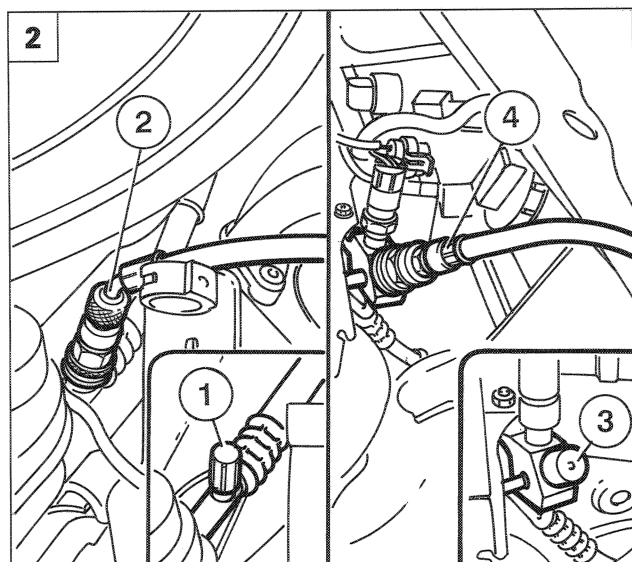
# PUNTO eMANUAL

Engines

Title	Page
Removal/refitting power unit .....	1 ➡
Separating gearbox from power unit .....	9 ➡
Removal/refitting Auxiliary drive belts .....	12 ➡
Removal/refitting timing belt .....	15 ➡
Removal/refitting cylinder head .....	21 ➡
Removal/refitting exhaust manifold .....	25 ➡
Removal/refitting inlet manifold .....	26 ➡
Removal/refitting coolant pump & radiator .....	28 ➡
Refilling coolant system .....	30 ➡



P3M01AX01

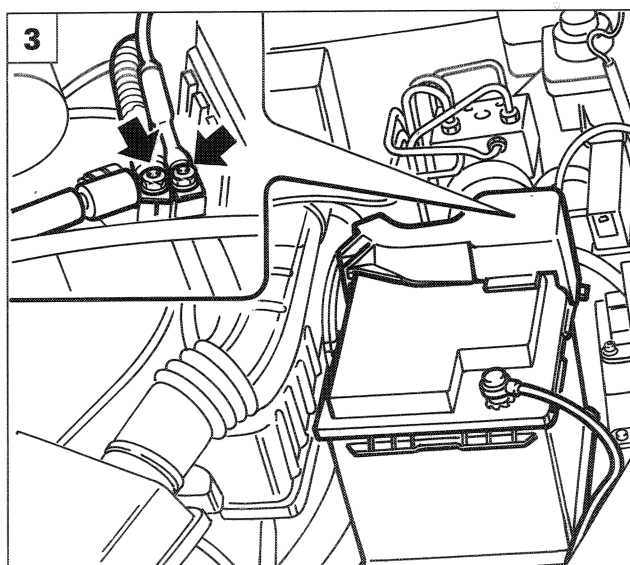
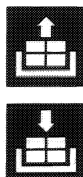


P3M01AX02

### REMOVING-REFITTING POWER UNIT

Position the car on a lift and then proceed as follows:

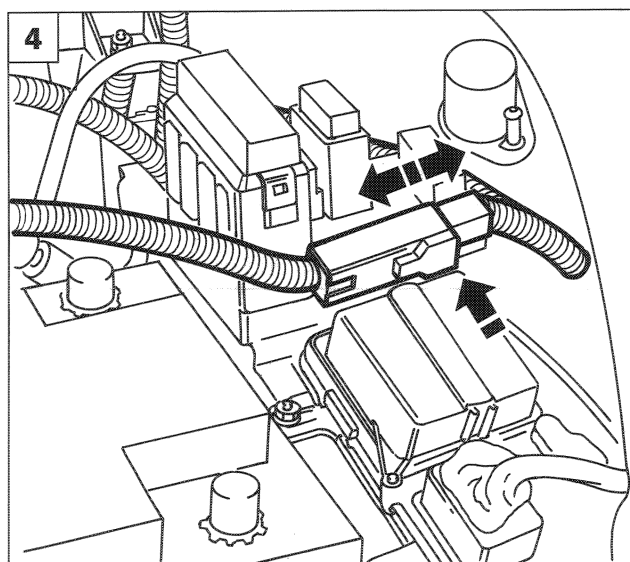
1. Remove the nuts securing the anti-theft alarm to the bracket and then place the siren to one side without disconnecting the supply leads.
2. Drain the air conditioning system by means of an appropriate device. Connect quick-release fittings (2) of the blue pipe (low pressure) to needle valve (1) and quick-release fitting (4) of the red pipe (high pressure) to needle valve (3).



P3M01AX03



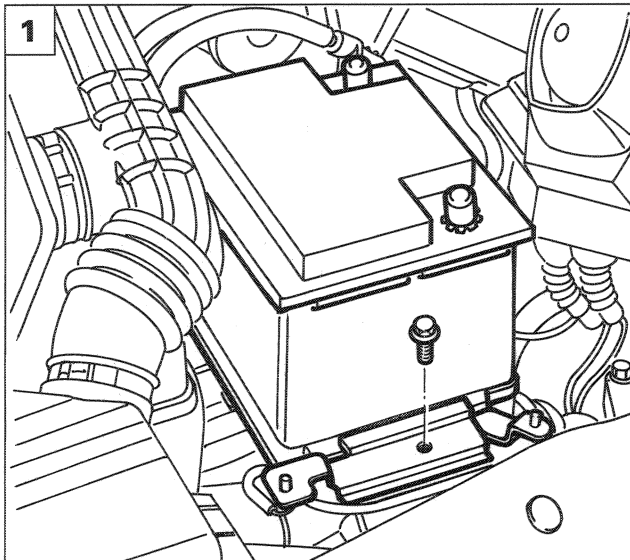
*While draining the system, use gloves and goggles to safeguard against damaging contact with jets of R134A. Run the cooling system (and of course the car engine) for 10-15 minutes beforehand because this will make the coolant easier to drain off. Consult section 50 of this manual for further information.*



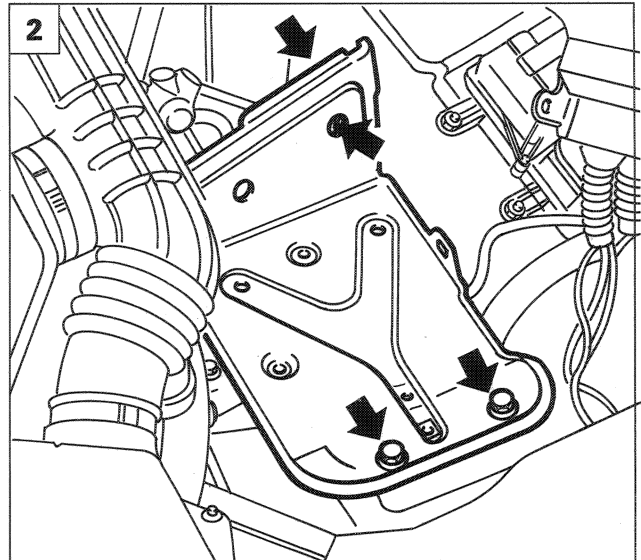
P3M01AX04

3. Disconnect the battery negative lead, then lift the positive terminal cover. Disconnect the terminal and unscrew the starter motor supply leads shown in the box.
4. Disconnect connector shown in the figure and undo the tab shown. Then release the connector from the bracket.

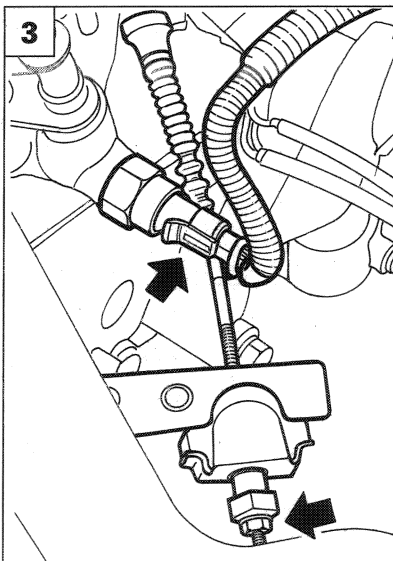
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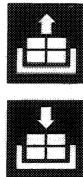
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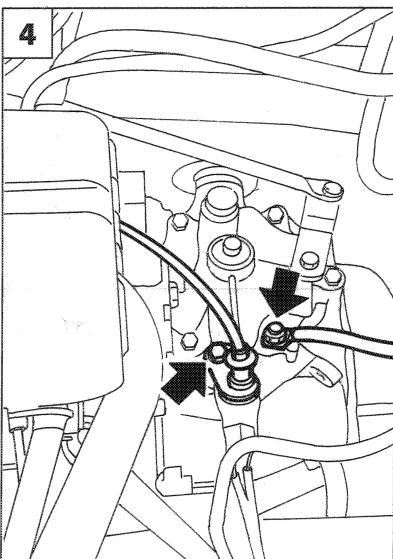
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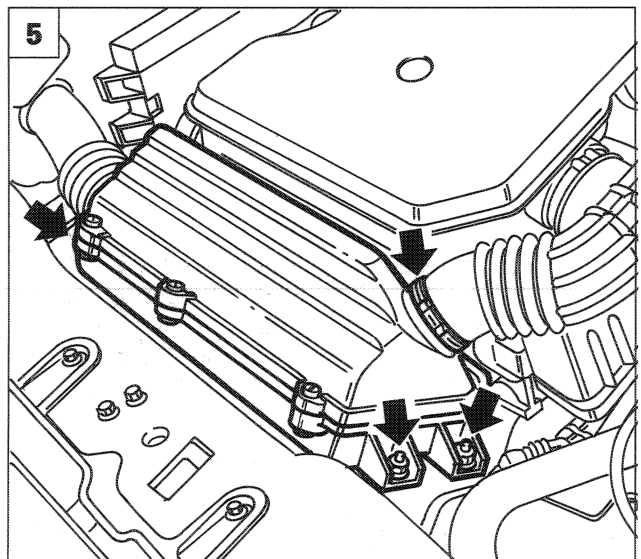
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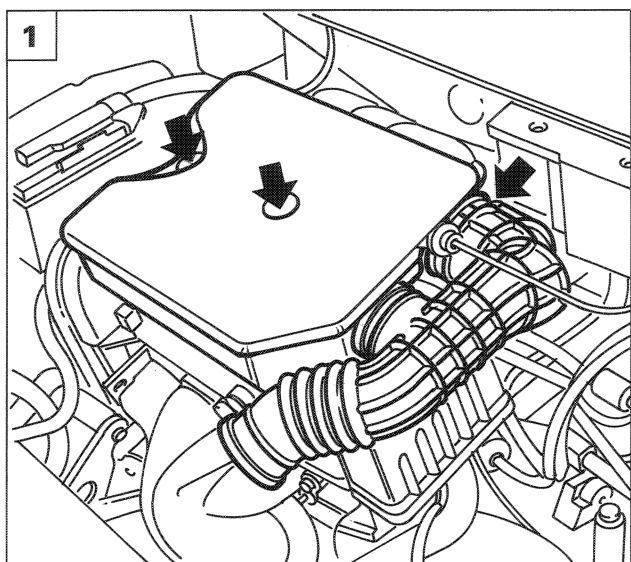
1. Undo the battery bracket retaining bolts, then remove the battery from the engine bay.
2. Remove battery tray by undoing the fastenings shown in the figure.
3. Disconnect the reversing light switch connector and the clutch cable by unscrewing the retaining nut and lock-nut. Then withdraw the clutch cable from its mount.
4. Disconnect the earth lead shown in the figure and the reverse inhibitor lead.
5. Remove the filter housing assembly by unscrewing the retaining bolts and the clip shown.



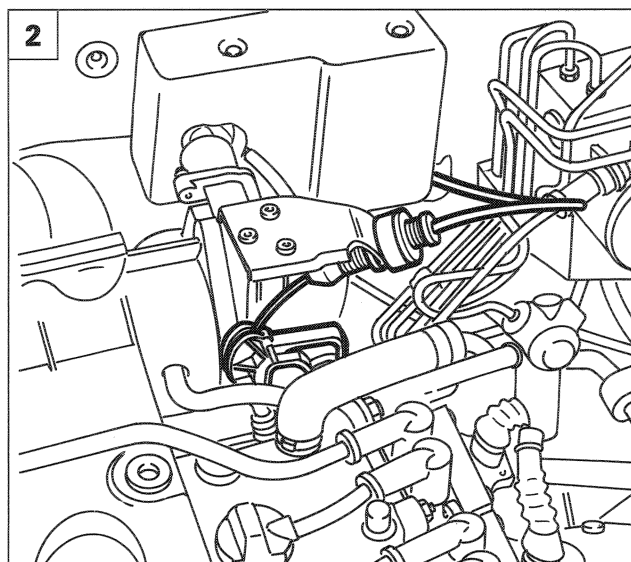
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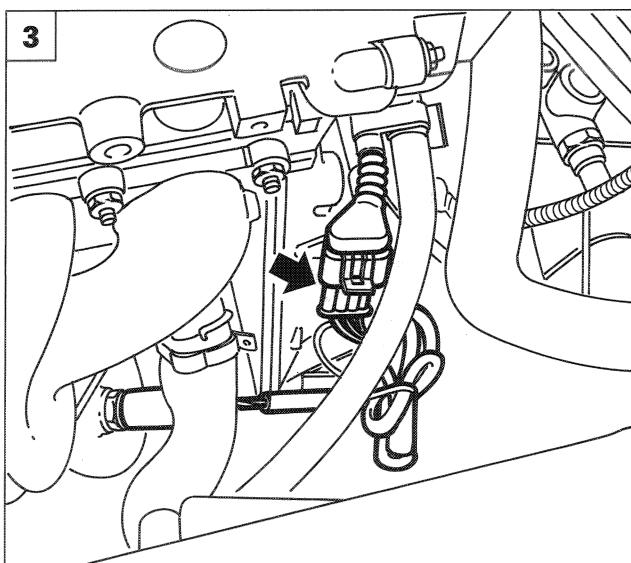
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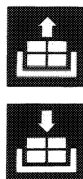
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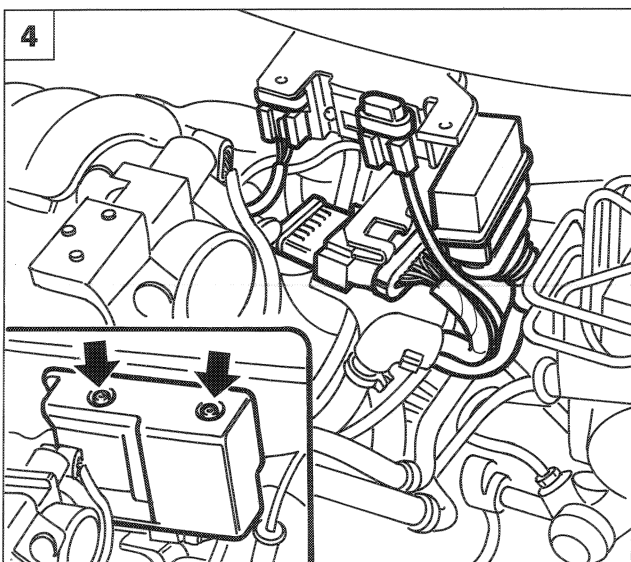
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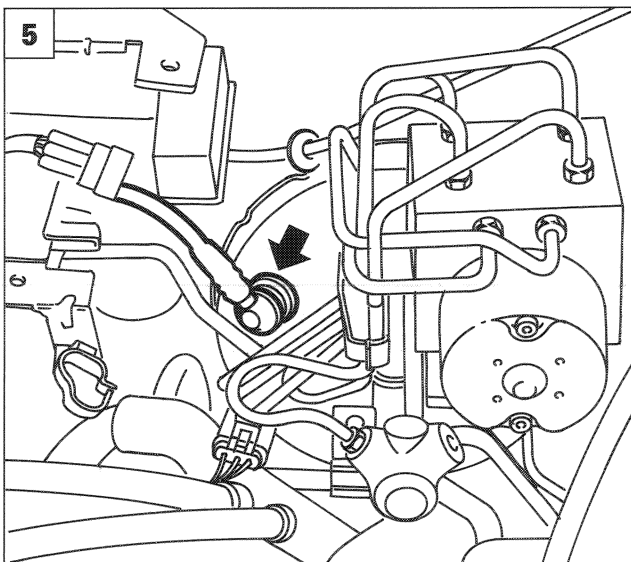
P3M03AX03



1. Remove the resonator with its intake sleeve by disconnecting the clip shown from the butterfly valve case and unscrewing the retaining bolts. Also disconnect the oil vapour recovery pipe from the lower part of the resonator.
2. Disconnect the accelerator control cable.
3. Disconnect the lambda probe connector.
4. Remove the guard shown in the figure, then disconnect the connector shown in the figure and release the fuse holder from its metal mount.
5. Disconnect the brake serve vacuum pipe.



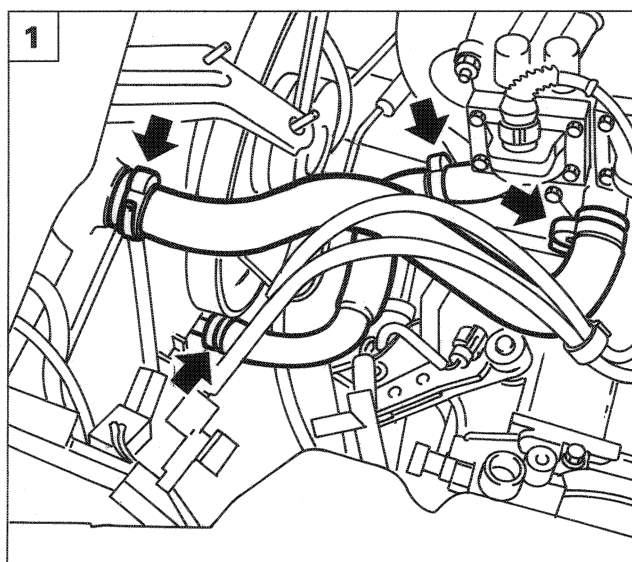
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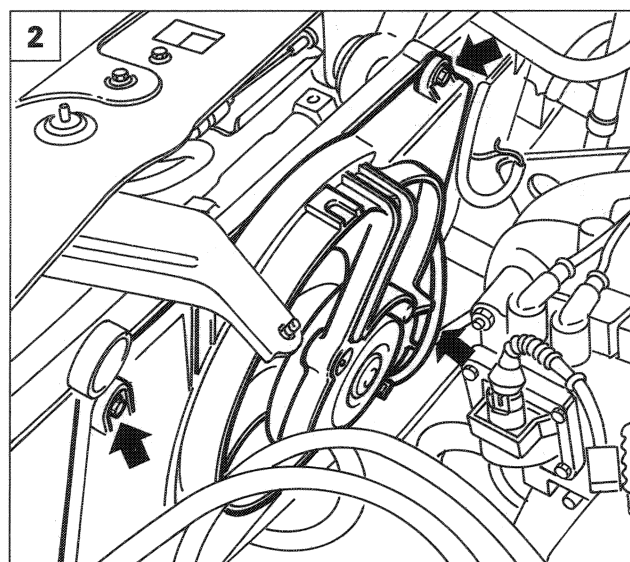
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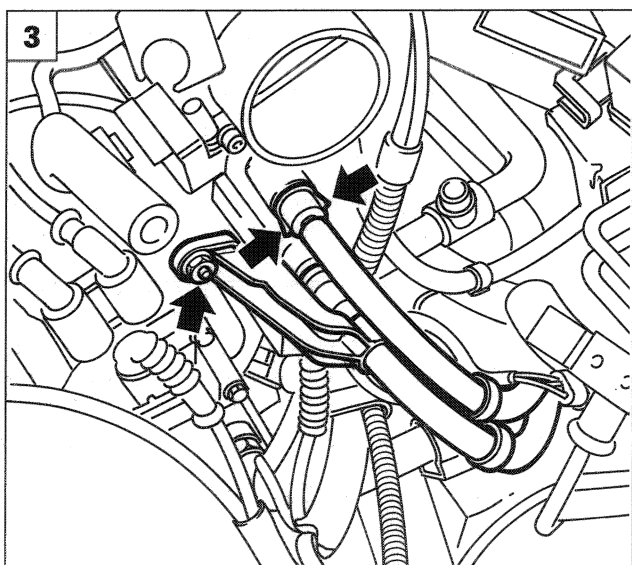
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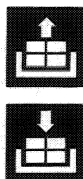
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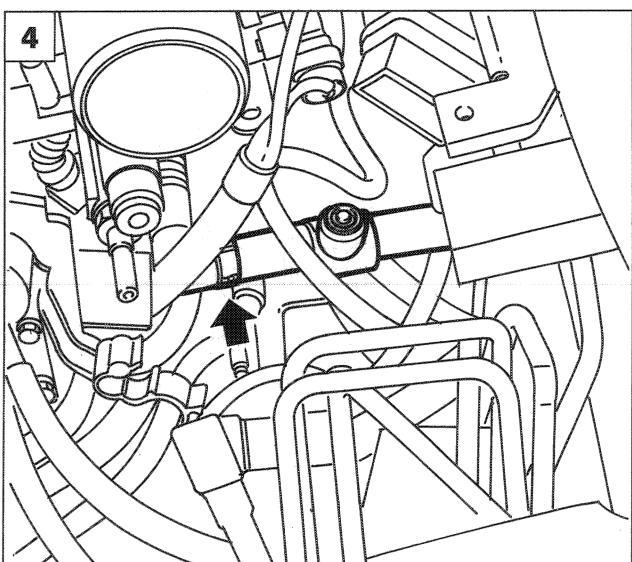
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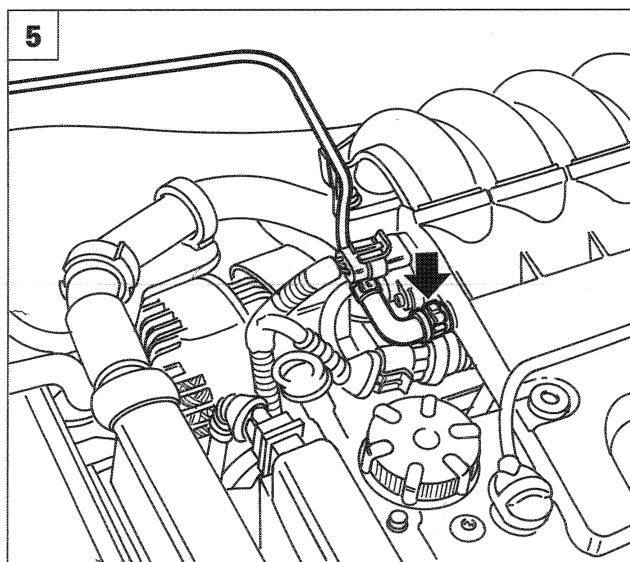
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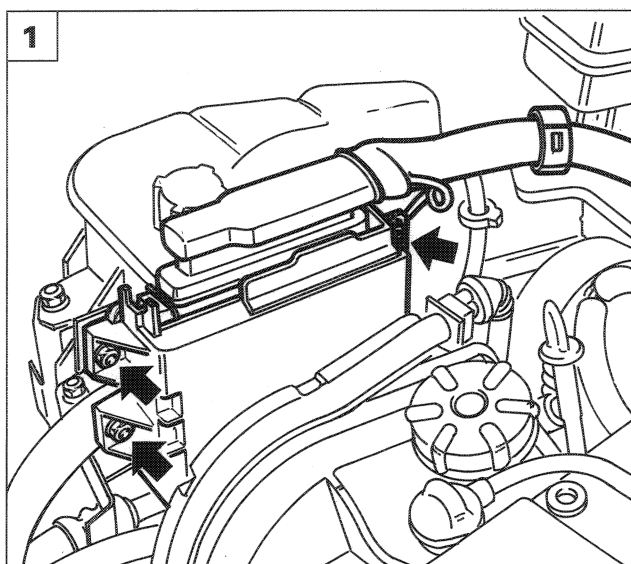
1. Drain the engine cooling system by disconnecting both pipes shown in the figure.
2. Remove the cooling fan by unscrewing the bolts securing it to the radiator and disconnecting the supply connection.
3. Disconnect the fuel intake lines by undoing the retaining tabs. Remove the support bracket shown in the figure.
4. Disconnect the radiator outlet pipe shown in the figure.
5. Disconnect the evaporation control system pipe from the upper part of the inlet manifold.



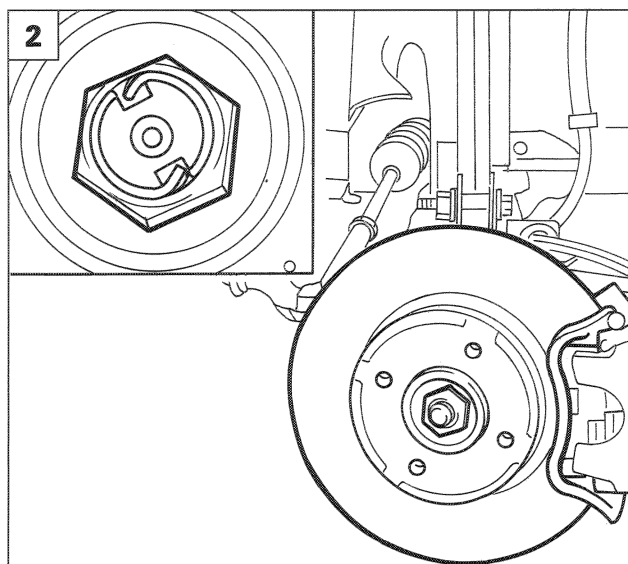
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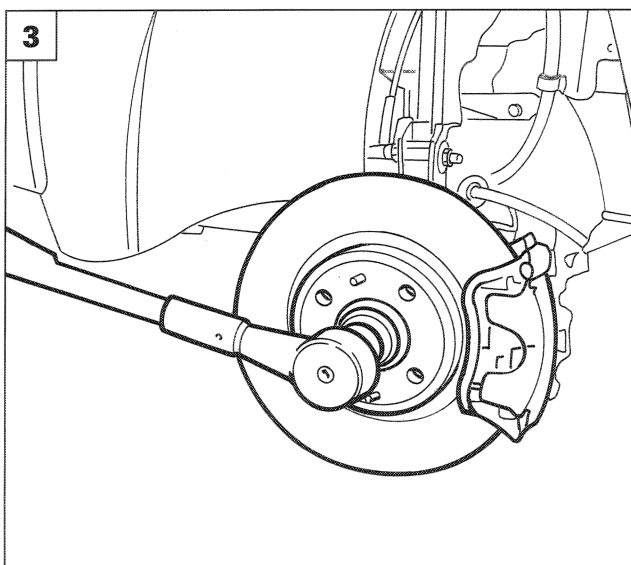
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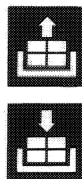
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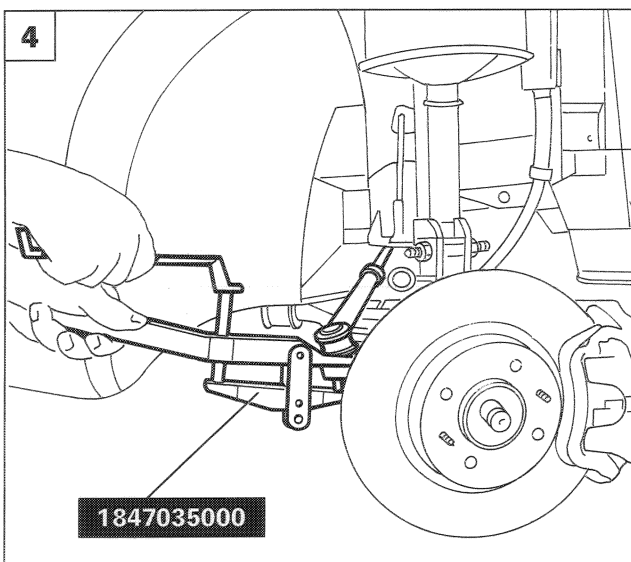
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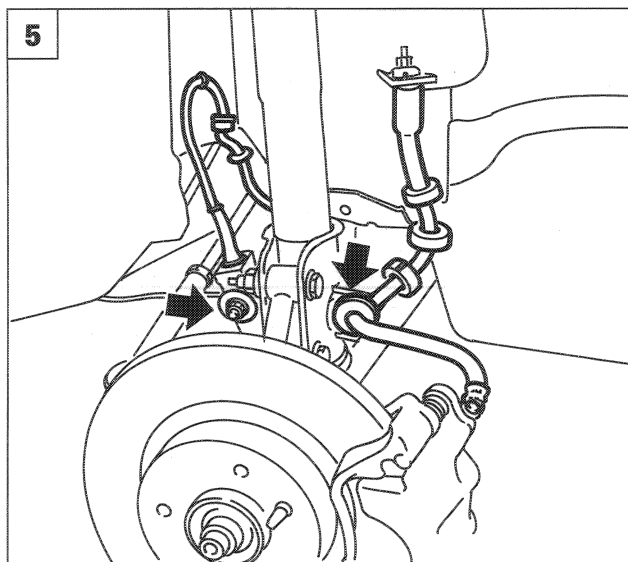
P3M05AX03



1. Disconnect the connector from the injection control unit, release wiring from retaining clips and then remove the control unit from its bracket.
2. Remove staking on the wheel hub retaining nuts.
3. Unscrew the wheel hub retaining bolts.
4. Remove the nut securing the steering head to the pillar, then disconnect the head itself using tool 1847035000. Repeat the operation on the other side.
5. Release the brake oil line and ABS sensor cable from the fastening point.

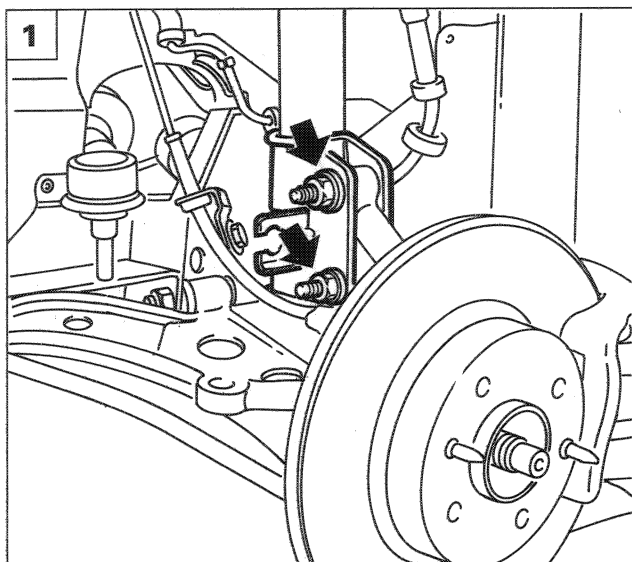


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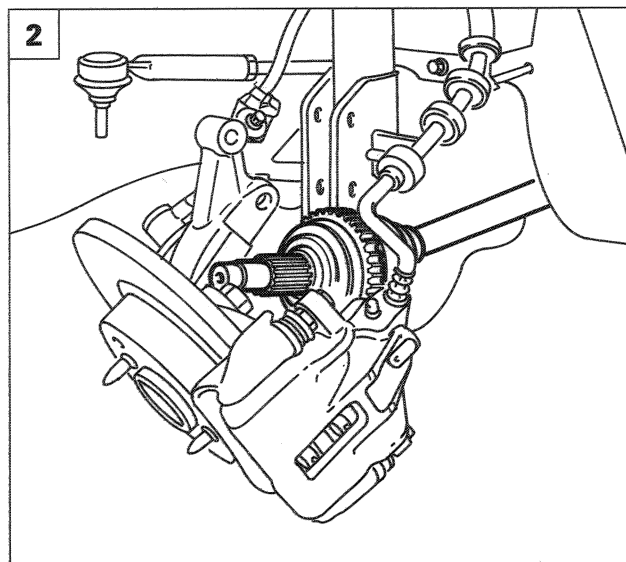


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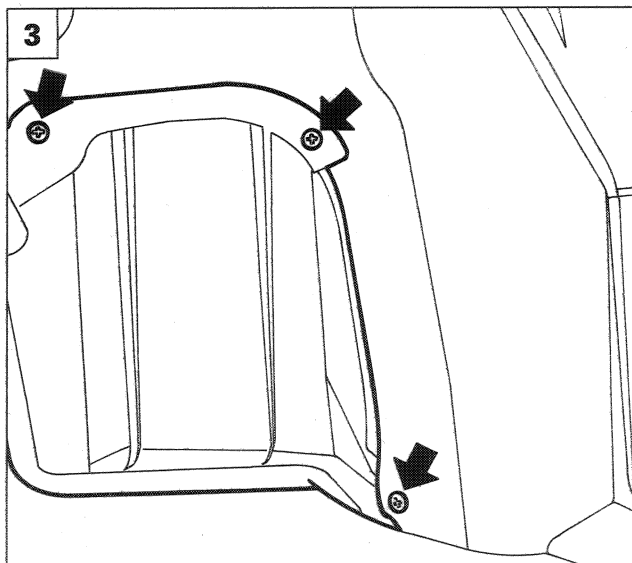
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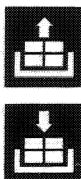
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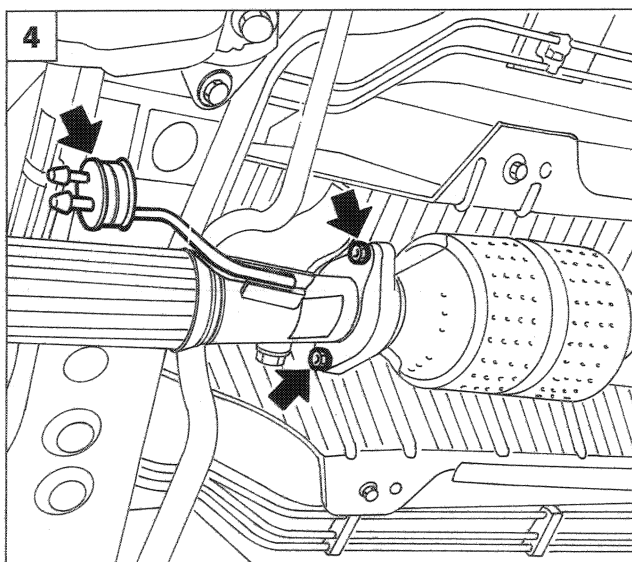
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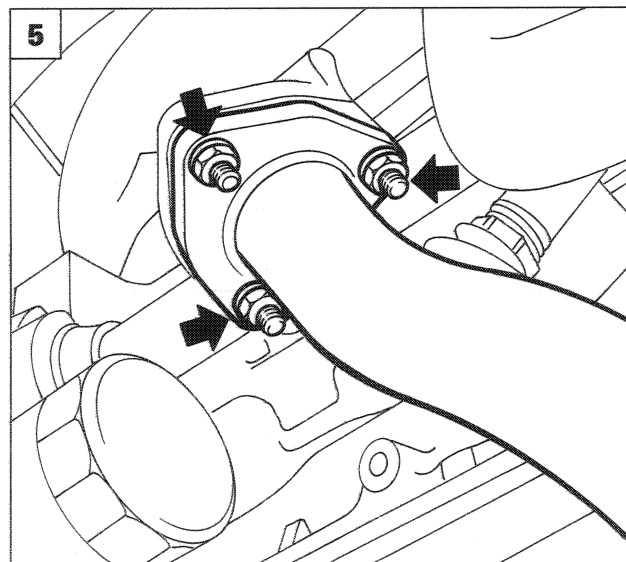
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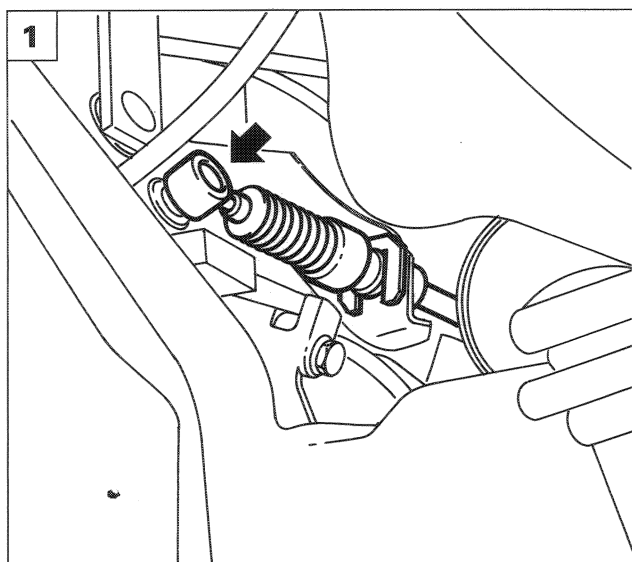
1. Unscrew the bolts retaining the damper to the pillar to allow removal of half-axes from wheel hubs. Repeat the operation on the other side.
2. Turn the pillar forward and remove the half-axle from the hub. Then secure the half-axle to the gearbox-differential unit. Repeat the operation on the other side.
3. Unscrew bolts indicated in figure and remove the engine protection from the wheel arch compartment.
4. Undo bolts securing the first section of the exhaust pipe to the catalytic converter. Release the pipe from the retaining device shown in the figure.
5. Undo nuts retaining the first section of the exhaust pipe to the manifold, then remove the pipe.



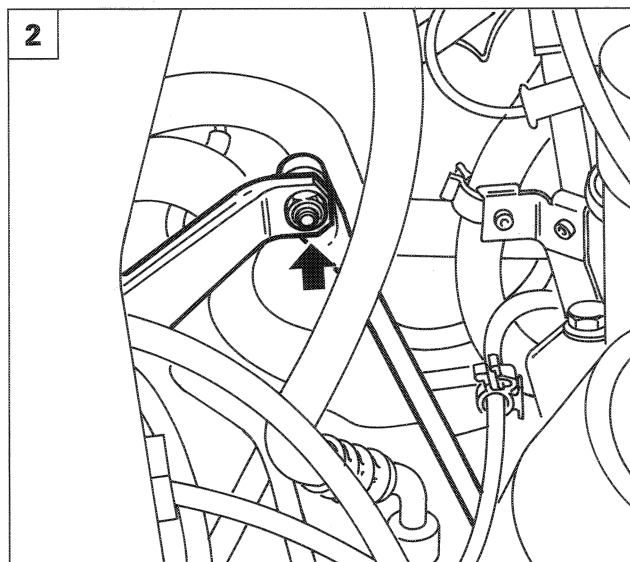
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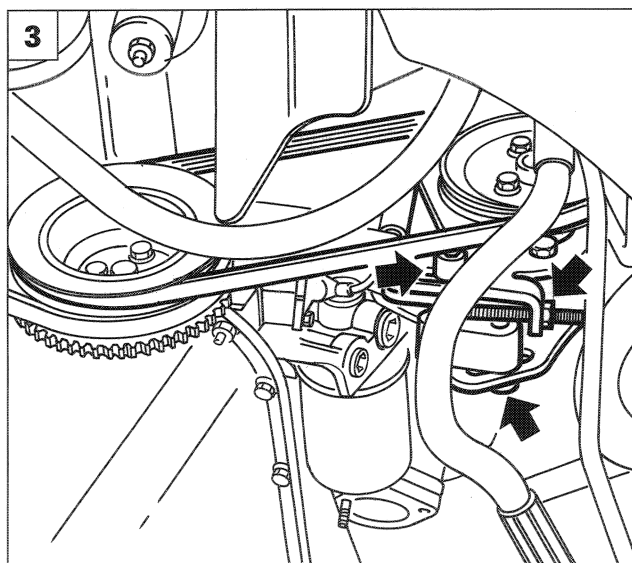
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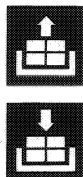
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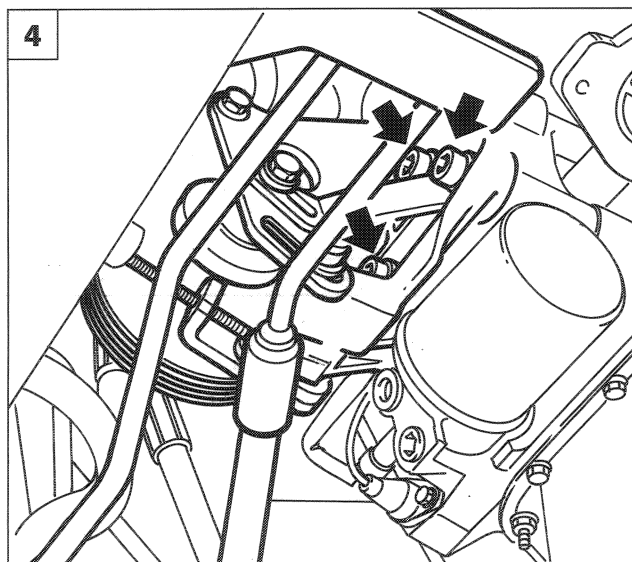
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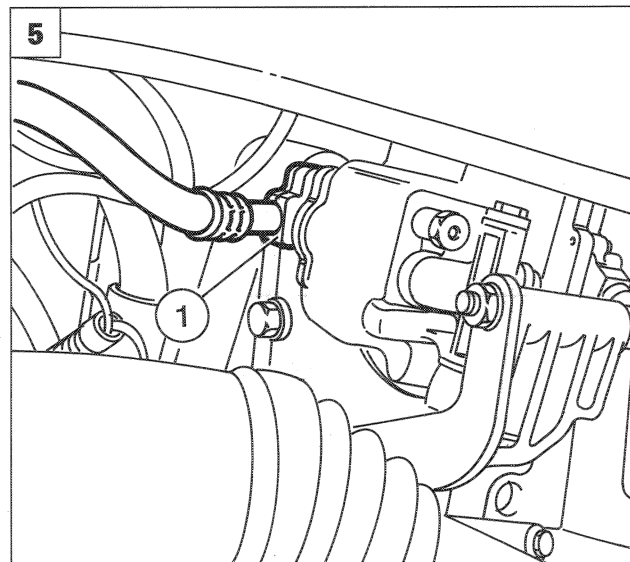
P3M07AX03



1. Lift the gear engagement bowden cable bracket and then disconnect the control head.
2. Disconnect the gear selection lever by unscrewing the nut shown in the figure.
3. Slacken tension in the power steering pump belt by adjusting the screws shown. Remove the belt from the damping flywheel and leave in place on the power steering pump pulley.
4. Remove the bolts securing the power steering pump bracket, then place the assembly to one side out of the working area. Release the power steering lines from the retaining brackets to facilitate operations.
5. Disconnect the air conditioning lines from fitting (1) on the compressor and fitting located behind the intake manifold.

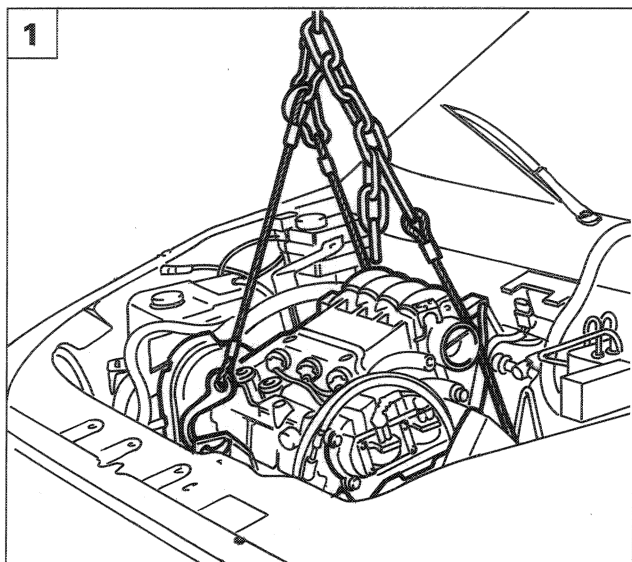


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P3M07AX05

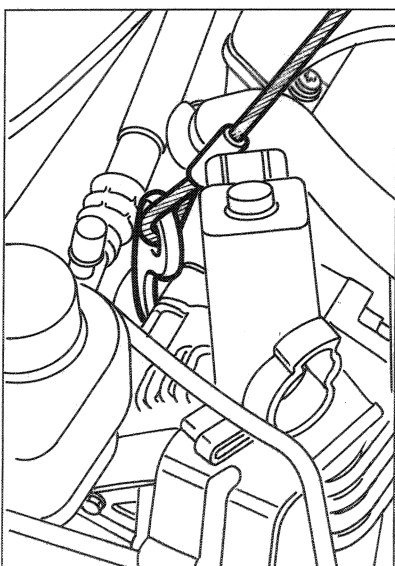
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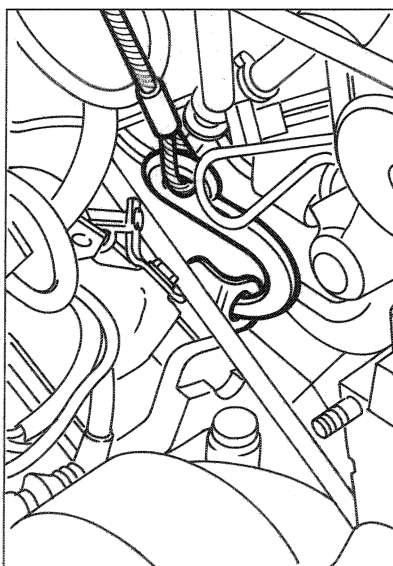
P3M08AX01

1. Position universal hook 1860592000 fitted to an A-frame. Adjust the A-frame to put the cables and chains supporting the power unit under tension.

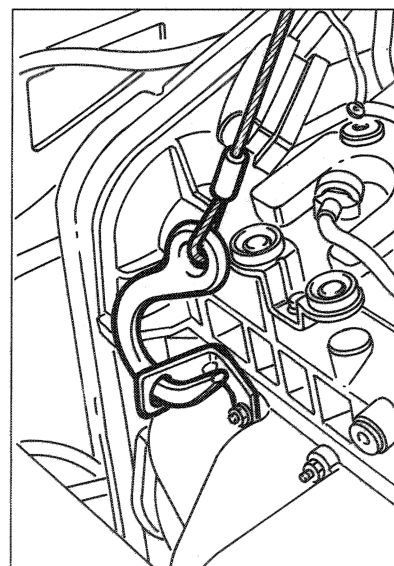
**NOTE** The figures below show the location of hooks in the power unit brackets.



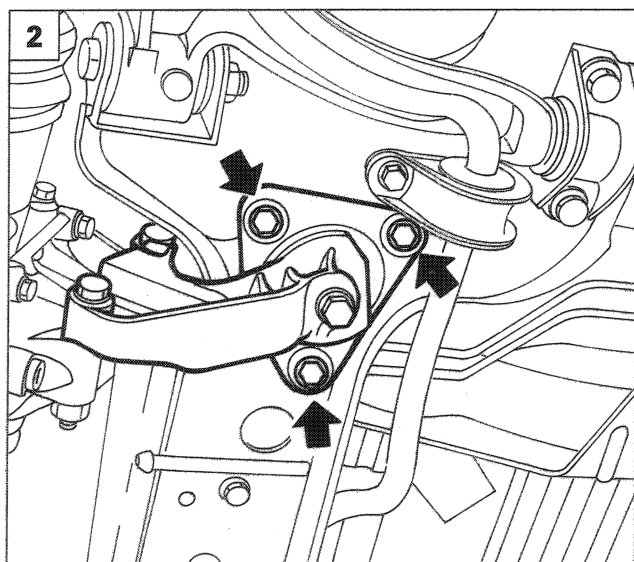
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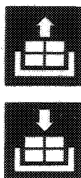
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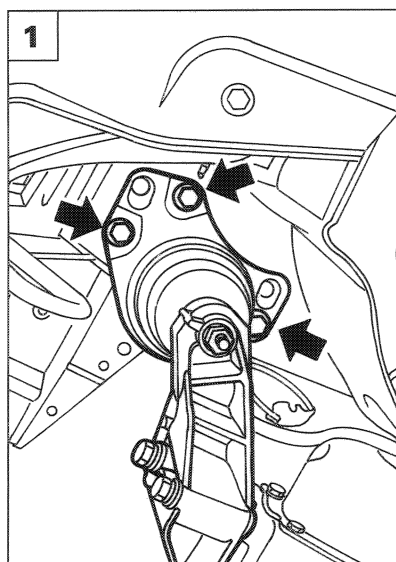
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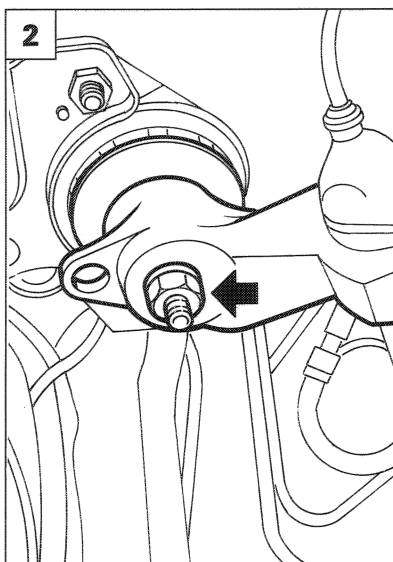
P3M08AX05



2. Unscrew the bolts retaining the central power unit mount to the body.

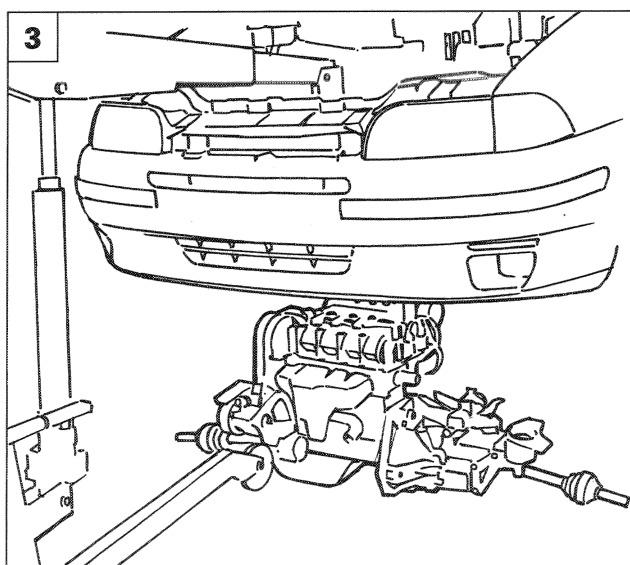


P3M09AX01



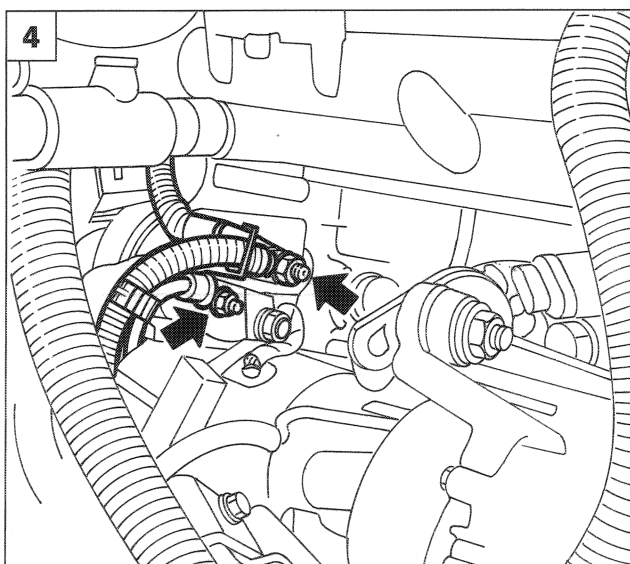
P3M09AX02

1. Unscrew bolts retaining the gearbox end power unit mount to the body.
2. Unscrew the nut retaining the timing end power unit mount bracket to the mount.



P3M09AX03

3. Remove the power unit from below the engine bay by adjusting the A-frame and lift. With the aid of a second operator, stand the power unit on a board and ensure that it is stable.



P3M09AX04

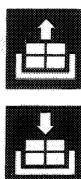
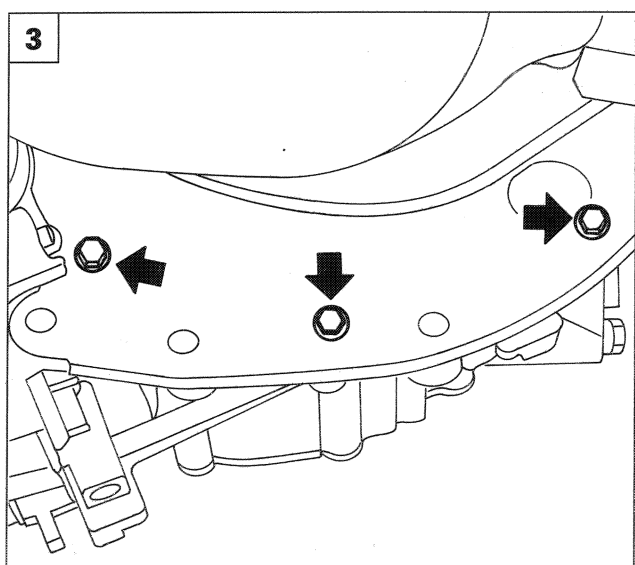
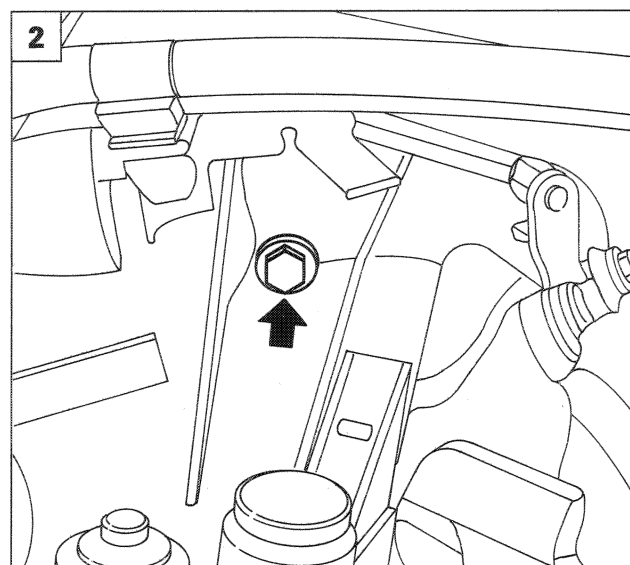
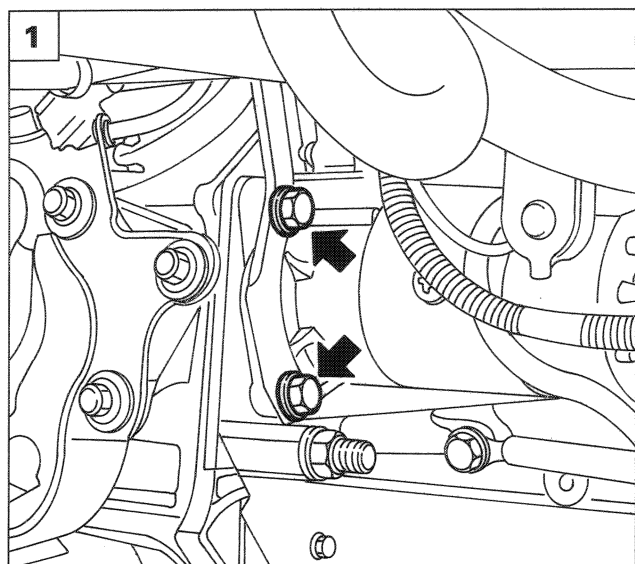
#### SEPARATING GEARBOX-DIFFERENTIAL UNIT

#### Operation sequence

4. Lift the protective cover, unscrew the nuts and disconnect the starter motor leads.

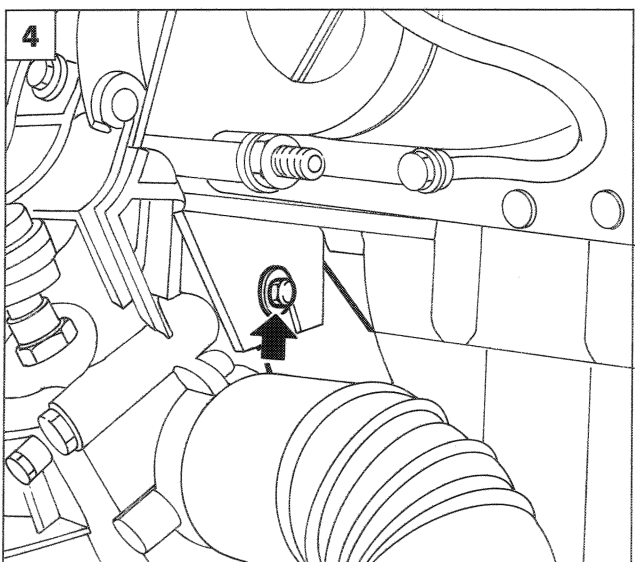


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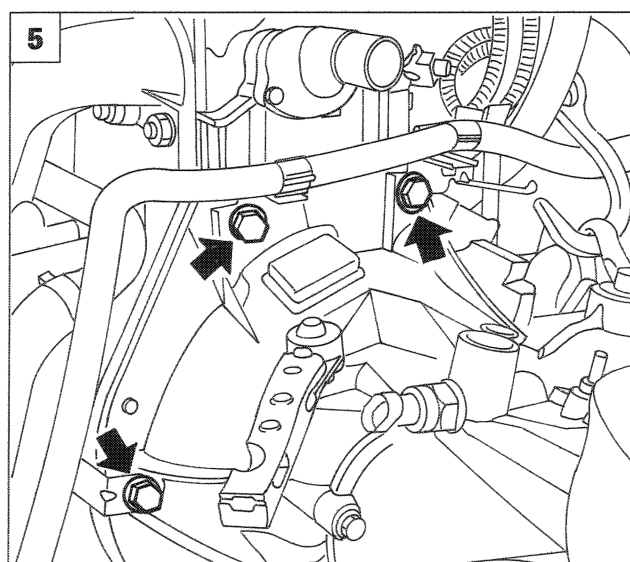


1. Unscrew the bolts fastening the starter motor.
2. Unscrew the screw shown in the figure, then remove the starter motor.
3. Unscrew the bolts fastening the engine flywheel protection
4. Unscrew the screw shown in the figure, then remove the flywheel protection.
5. Unscrew the bolts fastening the gearbox -differential unit to the engine.

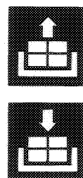
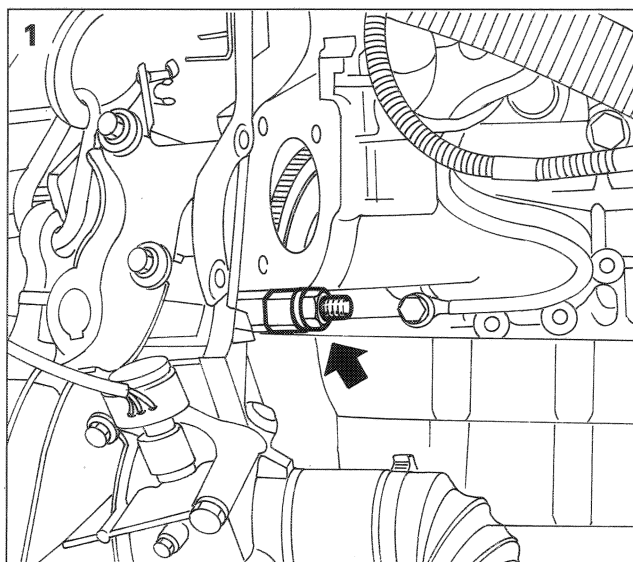
P3M10AX03



P3M10AX04



P3M10AX05



1. Unscrew nut joining gearbox to engine. Then separate the gearbox-differential unit from the engine.

**NOTE** Reverse disassembly instructions to refit the gearbox-differential unit to the engine. To refit the power unit, simply carry out removal instructions in reverse order.

- Prepare the engine bay to fit the power unit. Take care to position all electrical leads, pipes etc. so that they do not get in the way during installation;
- take great care when fitting the power unit to ensure individual components are not damaged;
- when fitting the coolant pipes, align the groove on the rubber hose with the ridge on the rigid coupling sleeve. Consult the "Removing-refitting radiator" chapter in this section when filling the cooling circuit.

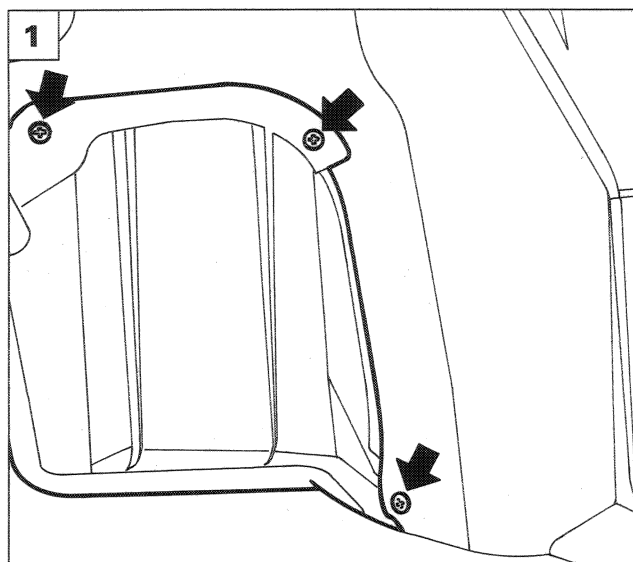


Once the power unit is in place, check that the bolts retaining the power unit mounts to the body are properly tightened.



Clutch pedal height

### 10.



P3M12AX01



#### REMOVING-REFITTING DRIVEBELTS

#### AUXILIARY

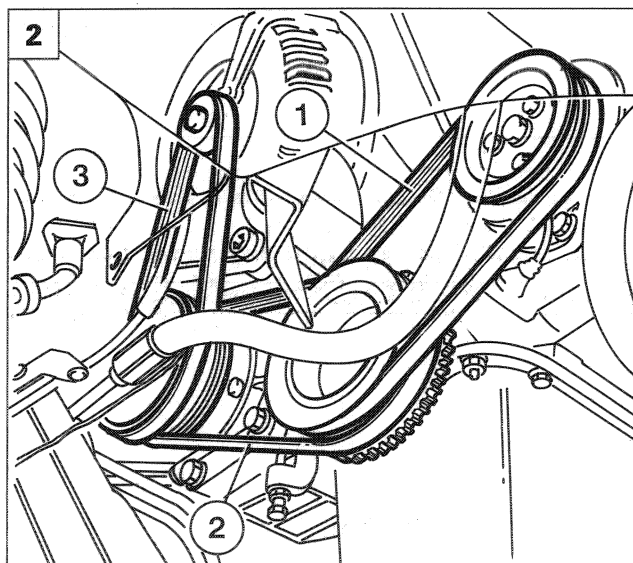
Position the car on a lift, disconnect the battery negative lead, remove the right front wheel and then proceed as follows:



1. Remove the auxiliary drivebelt guard.



*Check drivebelt condition and tension. In particular, ensure that the belts do not show signs of cracks, cuts, surface wear (shiny in appearance) and dry or hard places which could lead to loss of grip. If one of the following defects is found, replace the affected belts.*



P3M12AX02

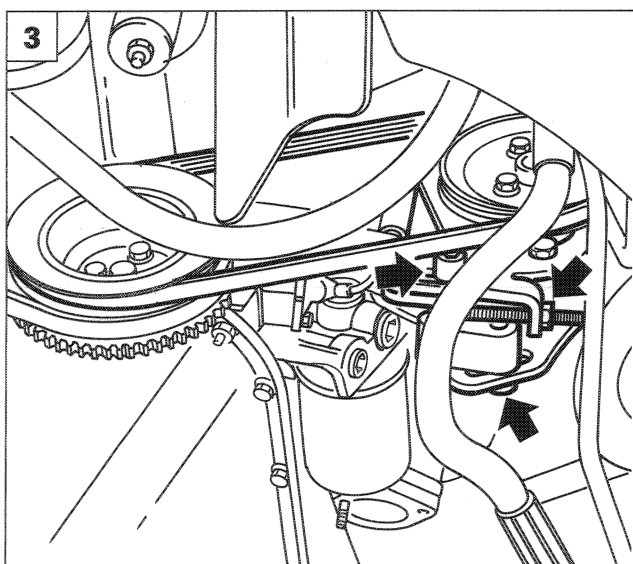


2. View of auxiliary drivebelts fitted to car:

1. Power steering pump drive belt.
2. Air conditioner compressor drive belt.
3. Alternator drive belt.



*Prevent belts coming into contact with oil or solvents which could impair rubber elasticity and thus reduce grip.*

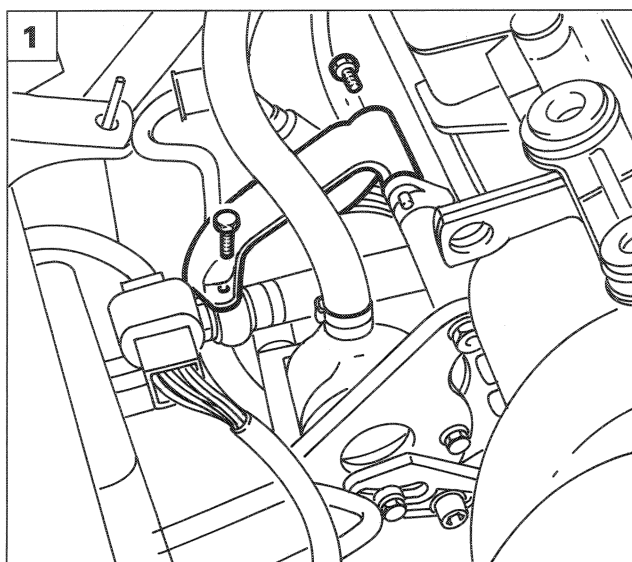


P3M07AX03

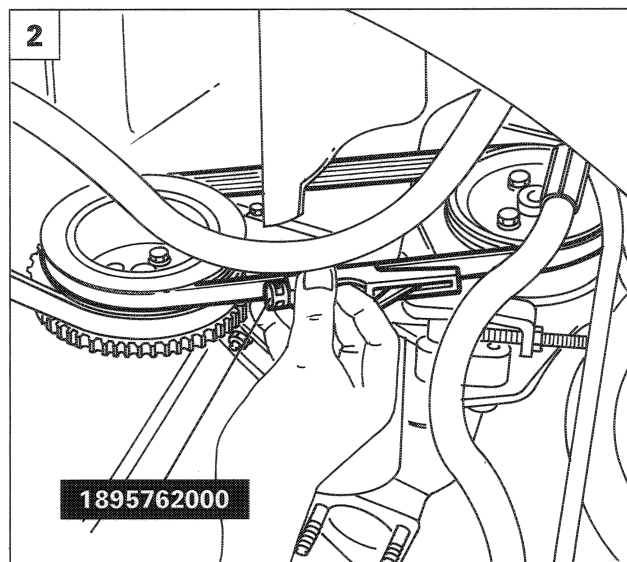


#### Power steering pump drive belt

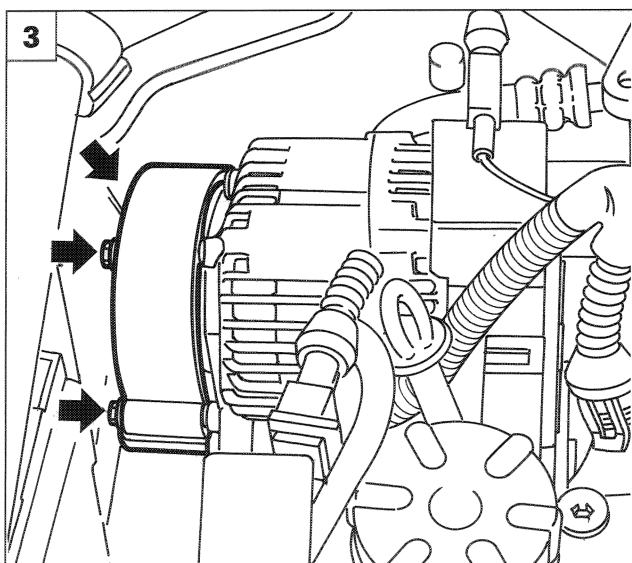
3. Slacken power steering pump drive belt by adjusting the screws shown in the figure.



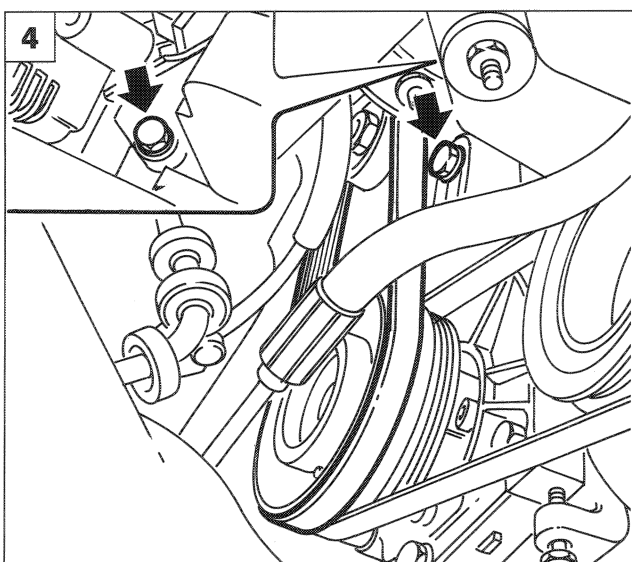
P3M13AX01



P3M13AX02



P3M13AX03



P3M13AX04

1. Remove the power steering pump pulley guard, then take off the drive belt.

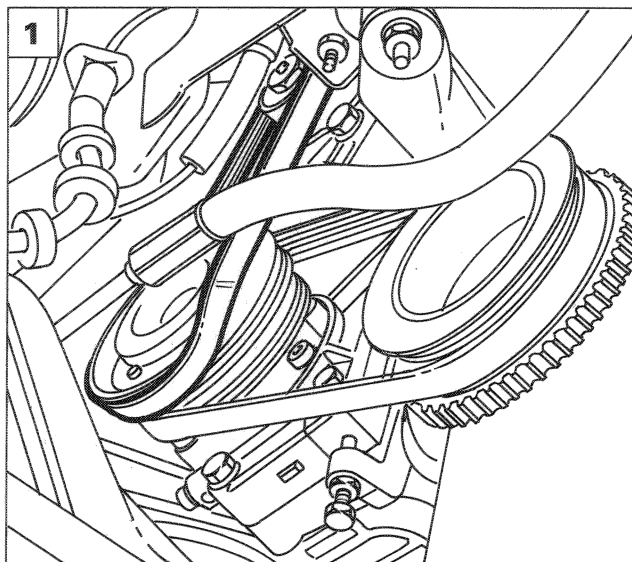
### Refitting

2. Tension the power steering belt by adjusting the bolts retaining the pump bracket. Use tool 1895762000 to check that new belt tension is 36 - 45 daN. The tension should be 23 - 30 daN if the same belt is refitted

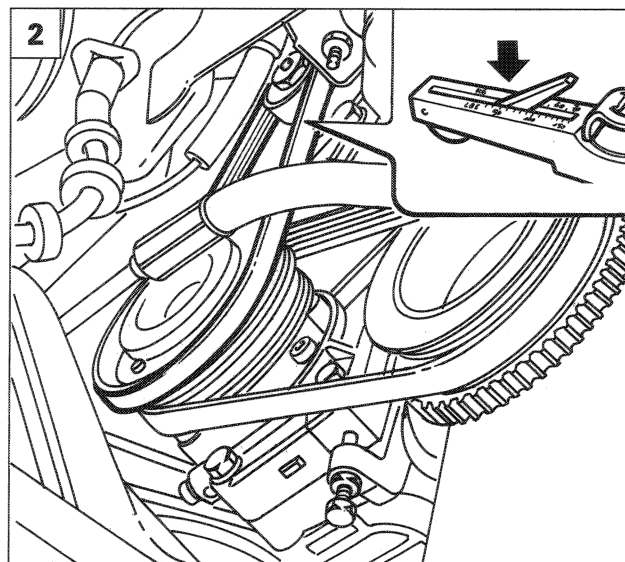
### Alternator drive belt

3. After removing the auxiliary drivebelt, remove the alternator pulley protective cover.
4. Slacken the alternator drive belt by adjusting the screws shown in the figure and the rear bolt retaining the belt to the alternator bracket.

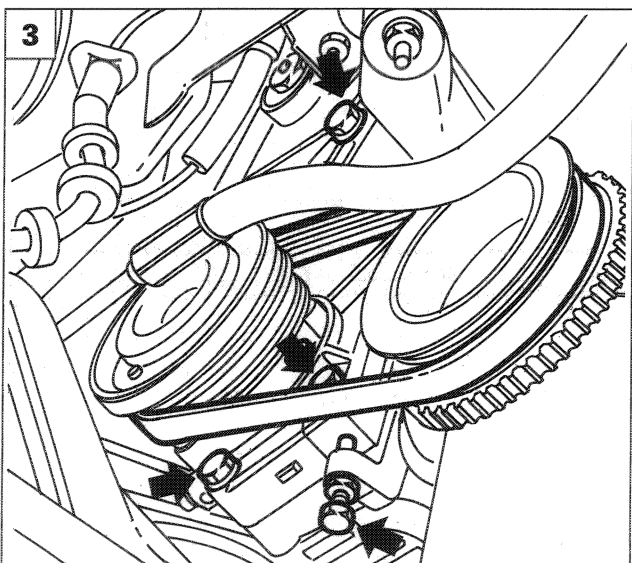
### 10.



P3M14AX01



P3M14AX02



P3M14AX03



1. Slip the alternator drive belt off the drive pulleys and remove.

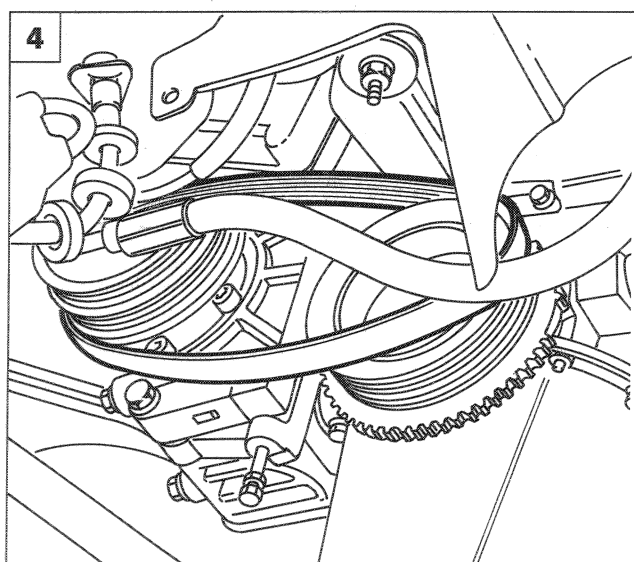
#### Refitting

2. Position the alternator drive belt and tension by adjusting the alternator retaining bolts. Use tool 1895762000 to check that new belt tension is between 48 - 60 daN; if the same belt is refitted, check that tension is 30 - 41 daN. Then refit parts removed previously.

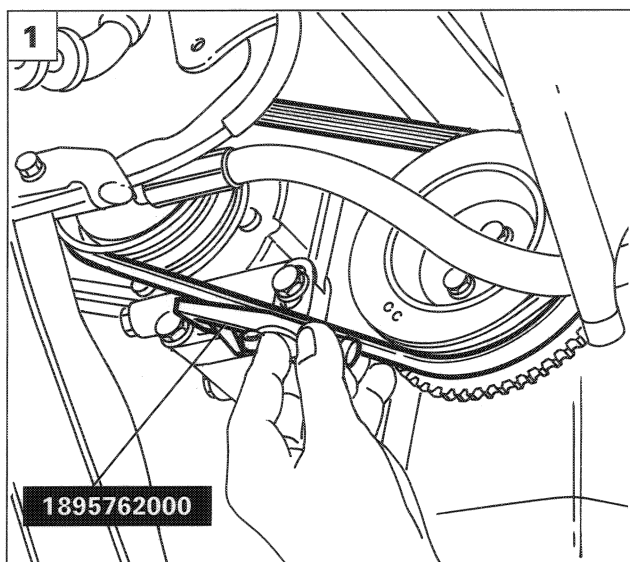
#### Air conditioner compressor drive belt

After removing the auxiliary drivebelt guard, remove the power steering and alternator drivebelts as described previously, then proceed as follows:

3. Loosen tension of the air conditioner compressor drive belt by adjusting the screws shown in the figure.
4. Slip the compressor drive belt off its pulleys and remove.



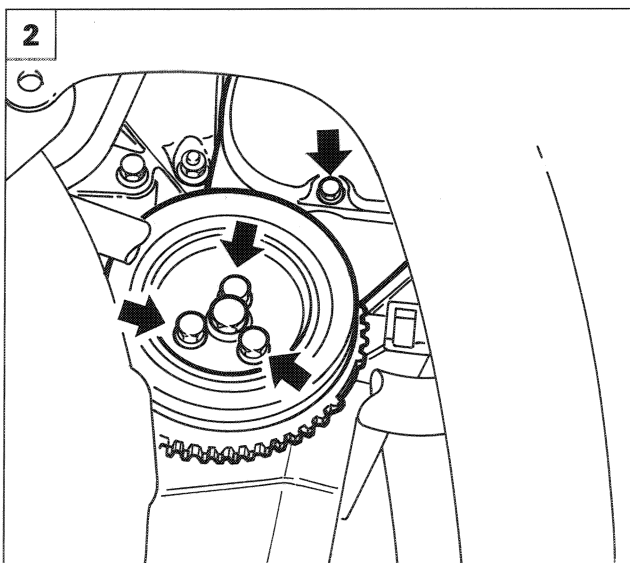
P3M14AX04



P3M15AX01

### Refitting

1. Position the compressor drive belt in its drive pulleys and tension by adjusting the compressor bracket retaining bolts. Use tool 1895762000 to check that new belt tension is 48 - 60 daN. If the same belt is refitted, the tension should be 30 - 41 daN. Then refit the parts removed previously, and also the alternator and power steering drive belts.



P3M15AX02

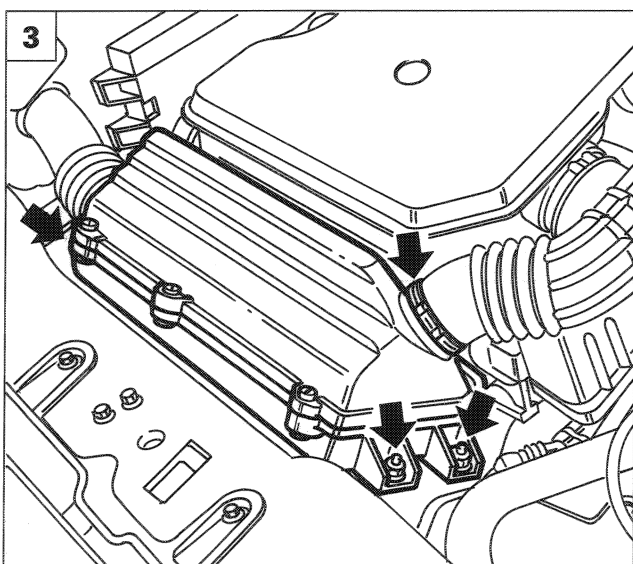


### REMOVING-REFITTING TIMING BELT



*Before removing the timing belt, disconnect the battery negative terminal, remove the auxiliary drivebelt guard and slip the power steering and compressor drive belts off the flywheel without removing from their drive pulleys. To slacken tension in the compressor belt, first slacken the alternator drivebelt (consult previous paragraphs).*

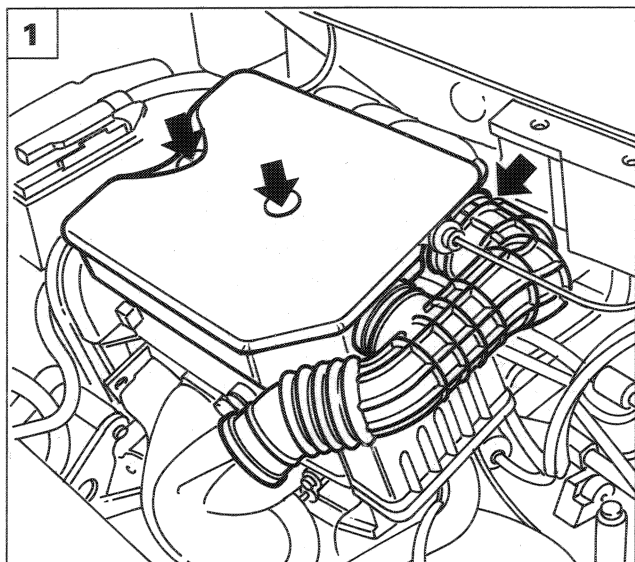
2. Unscrew flywheel retaining bolts and remove. Also unscrew the bolts securing the lower timing belt guard and release the rpm and TDC sensor lead from the belt.
3. Remove the filter case assembly by unscrewing the retaining nuts and clip indicated.



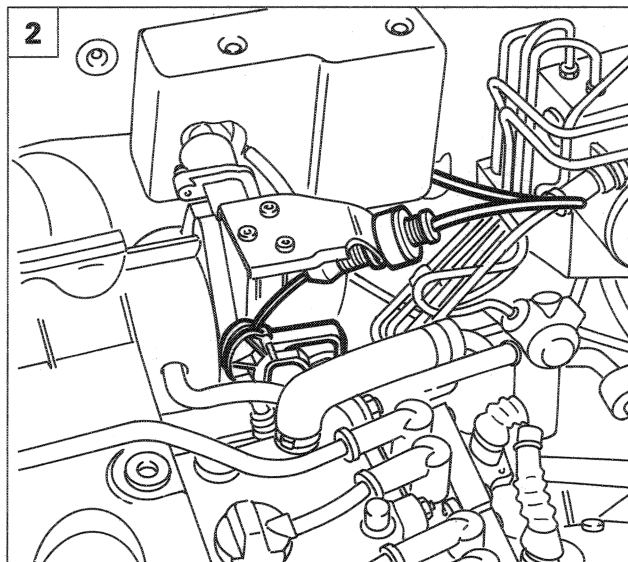
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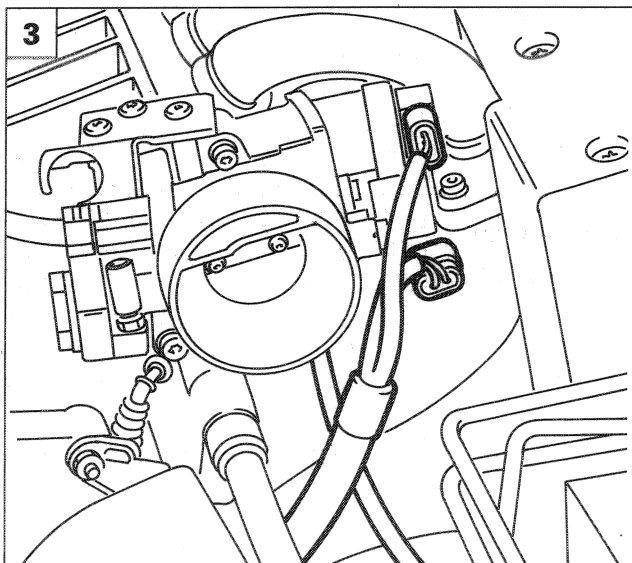
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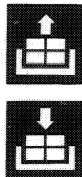
P3M03AX01



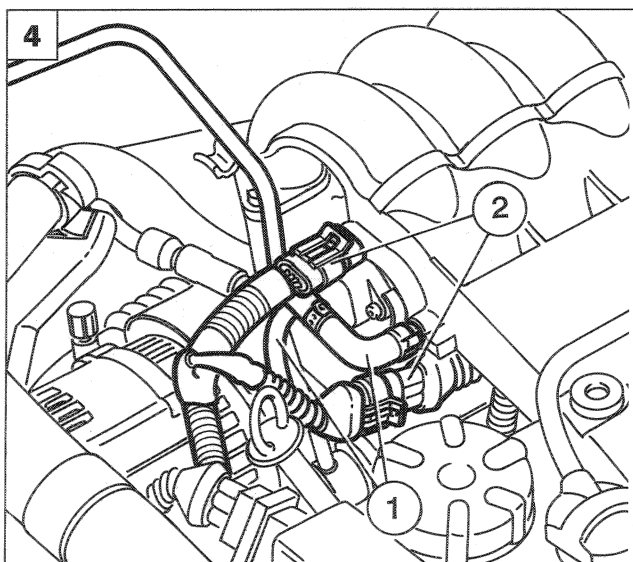
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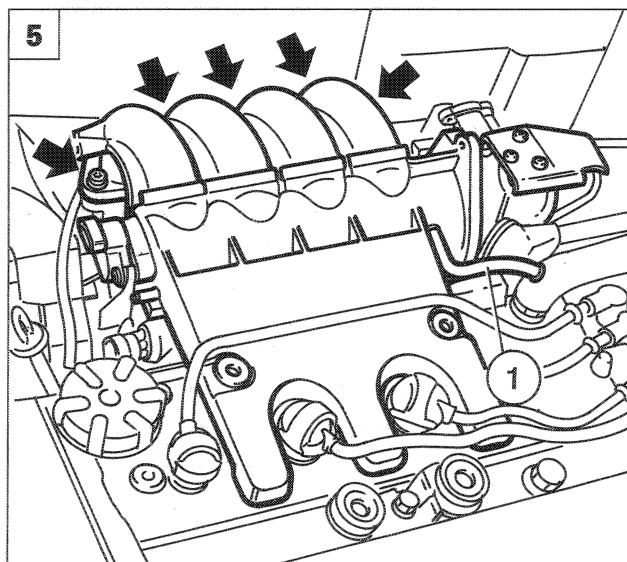
P3M16AX01



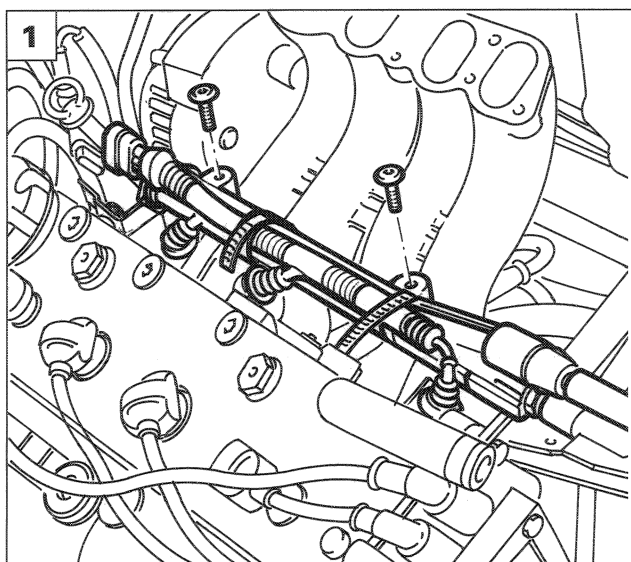
1. Remove the resonator together with the intake manifold by disconnecting the clip shown from the butterfly valve case and unscrewing the retaining bolts. Then disconnect the oil vapour recovery pipe from the lower part of the resonator.
2. Disconnect the accelerator control cable.
3. Disconnect the connections shown and the brake servo vacuum line from the butterfly valve case.
4. Disconnect pipes (1) and connections (2) from the upper part of the intake manifold.
5. Remove screws retaining the upper part of the intake manifold using wrench USAG TX 27 or similar. Disconnect oil vapour recovery pipe (1) and remove the manifold from the vehicle together with the butterfly valve case.



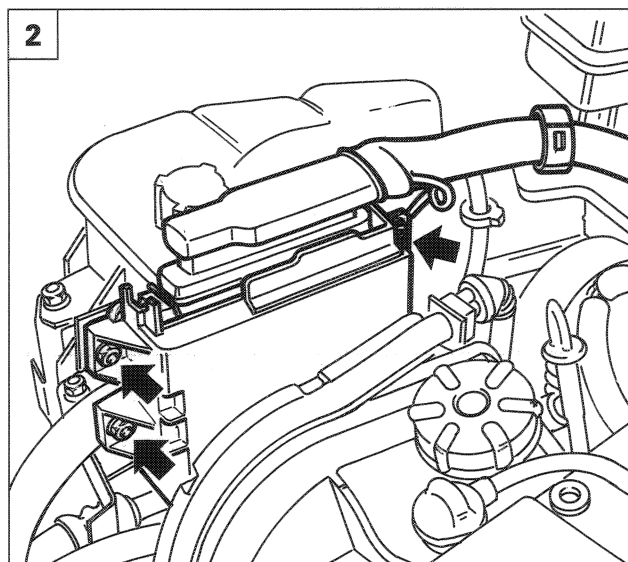
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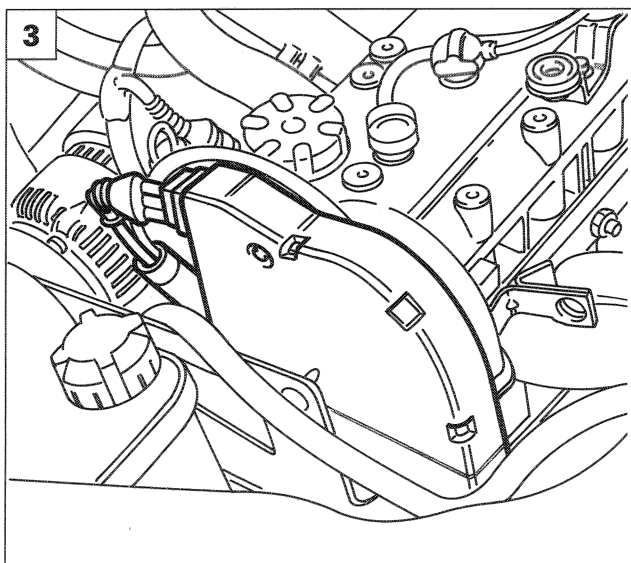
P3M16AX03



P3M17AX01



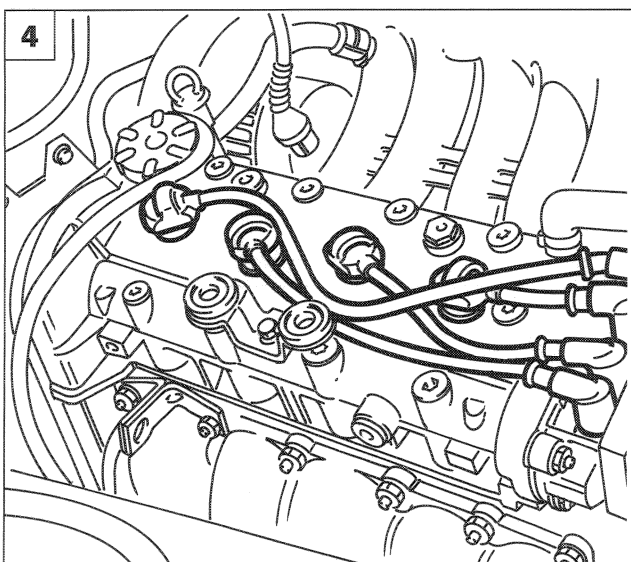
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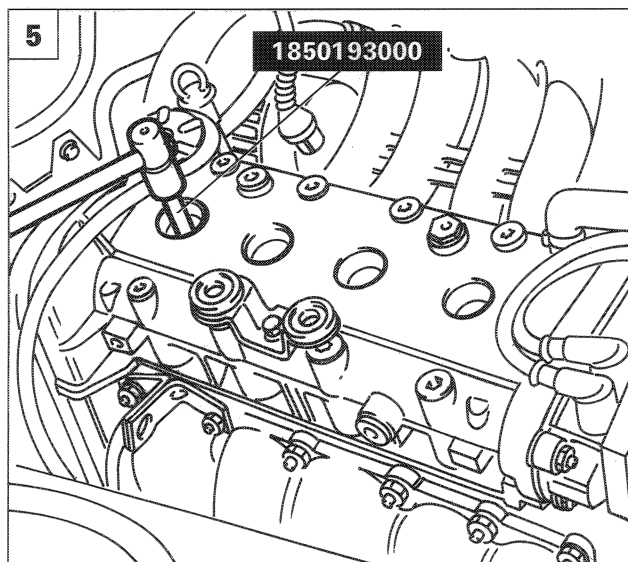
P3M17AX02



1. Unscrew the bolts retaining the fuel manifold, remove together with injectors and place outside the working area.
2. Unscrew the bolts fastening the injection ECU to its bracket and then place to one side without disconnecting the connector.
3. Unscrew the bolts fastening the upper timing belt guard; disconnect the rpm and TDC sensor connector, then remove the upper and lower timing belt guards (bolts removed previously).
4. Disconnect the H.T. leads from the spark plugs.
5. Remove the spark plugs using wrench 1850193000.

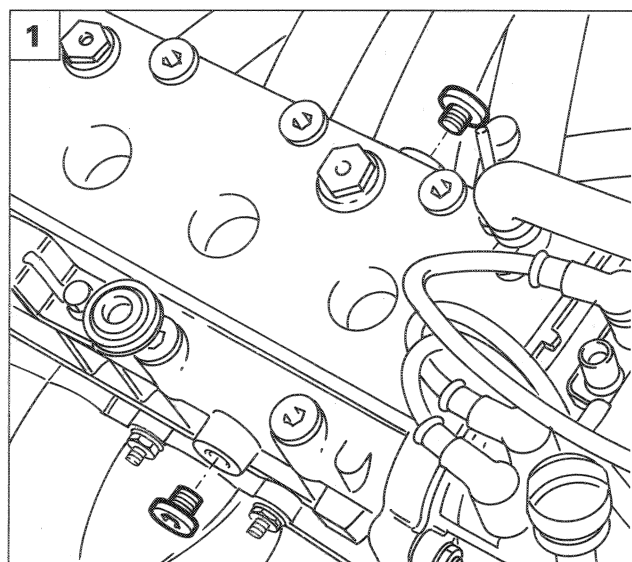


P3M17AX03

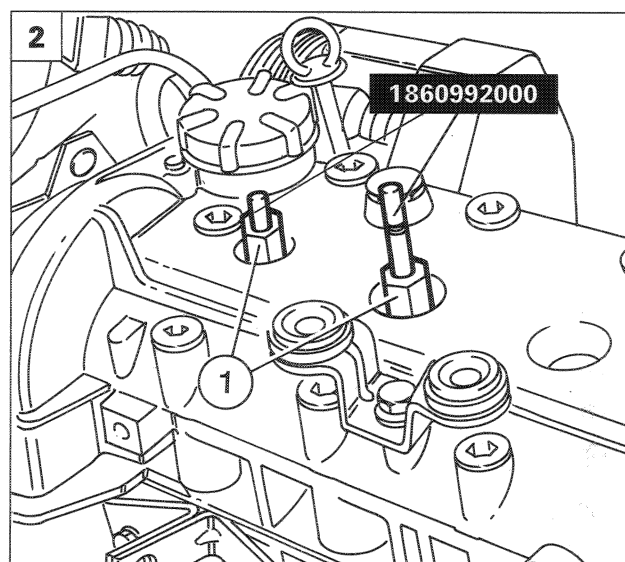


P3M17AX04

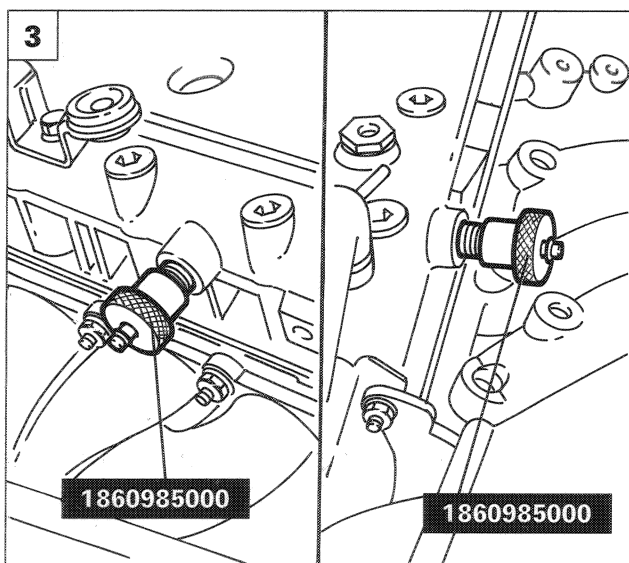
### 10.



P3M18AX01



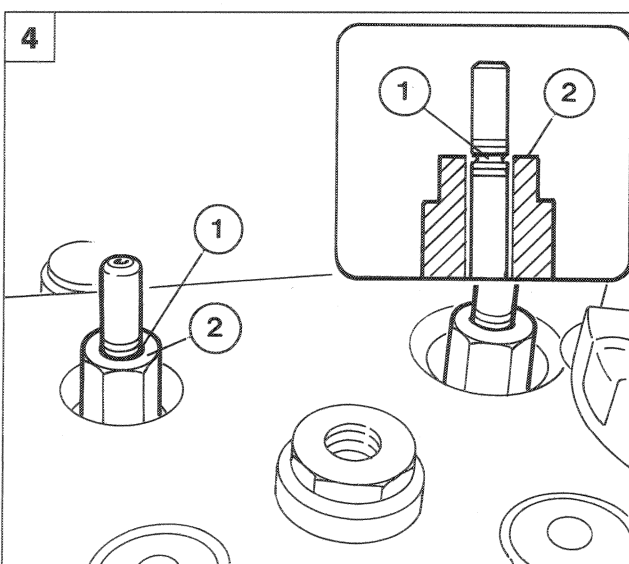
P3M18AX02



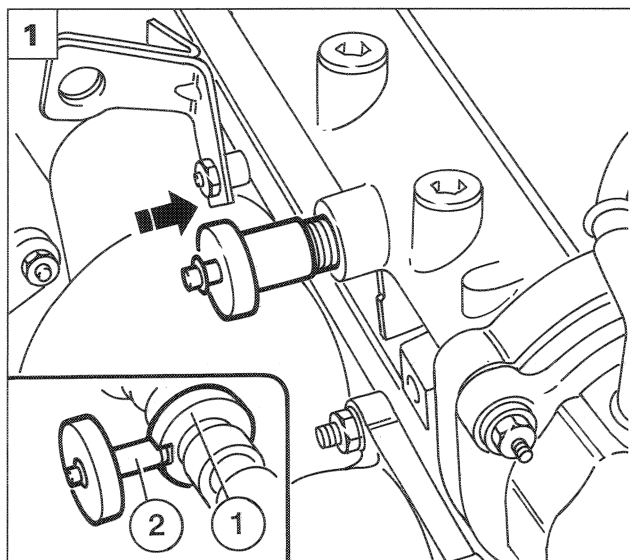
P3M18AX03



1. Remove both sealing plugs shown in the figure from the cylinder head extension.
2. Position the pair of tools 1860992000 in the spark plug seats on cylinders 1 and 2. Hand tighten parts (1) and ensure torque does exceed 0.5 daNm.
3. Tighten camshaft timing adjustment tools 1860985000 in place of the plugs removed previously.
4. Turn the crankshaft in its normal direction of rotation. Proceed gradually to ensure the pin of tools 1860992000 is not expelled by piston compression. Turn the shaft until notch (1) on the mobile part of the tool is aligned with surface (2) on the fixed part in the spark plug seat. When both tools fitted in the spark plug seats are in this position, the engine pistons will be aligned, i.e. half way along their effective stroke.



P3M18AX04



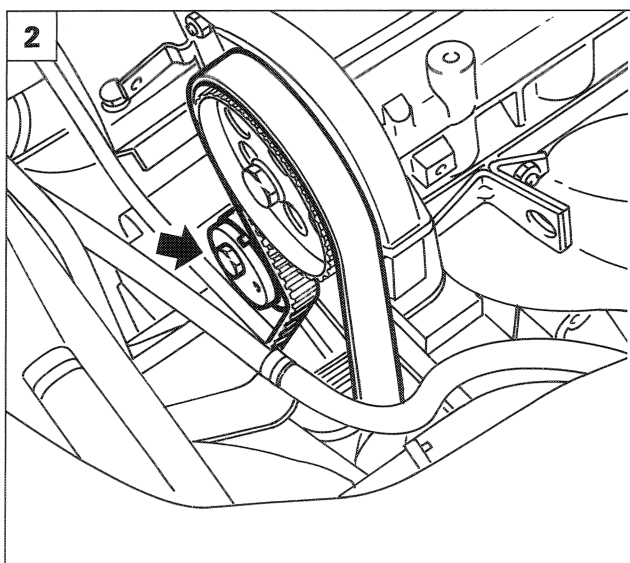
P3M19AX01

1. With tools 1860992000 aligned and springs of tool 1860985000 positioned in the plug seats on the cylinder head extension, pin (2) should click into position in groove (1) on the camshafts. Camshaft timing is correctly adjusted in this position.



*If tools 1860985000 do not fit into the camshaft grooves, remove the belt and then turn the camshafts slightly until the pin and groove fit together properly.*

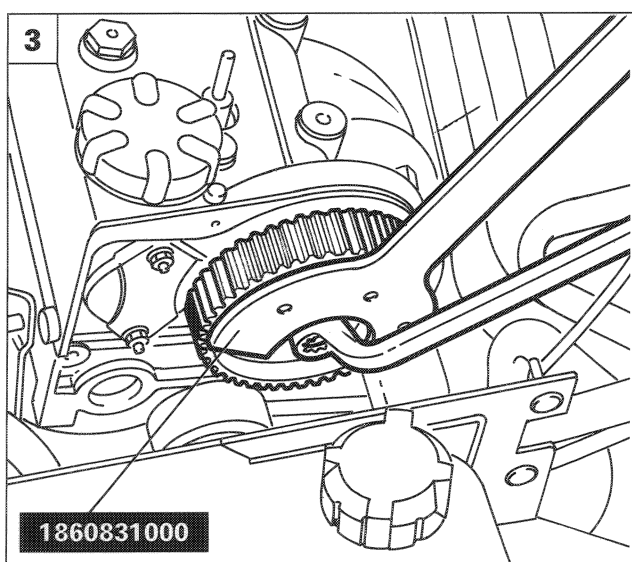
*Tools 1860985000 may be used as reaction tools to loosen the bolts of the camshaft rear gears (if these require attention).*



P3M19AX02



2. Loosen the timing belt tensioner retaining nut, then remove the belt.

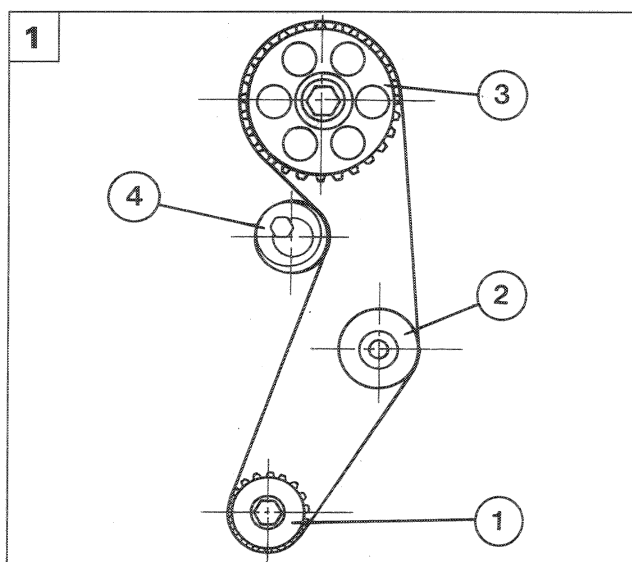


P3M19AX03

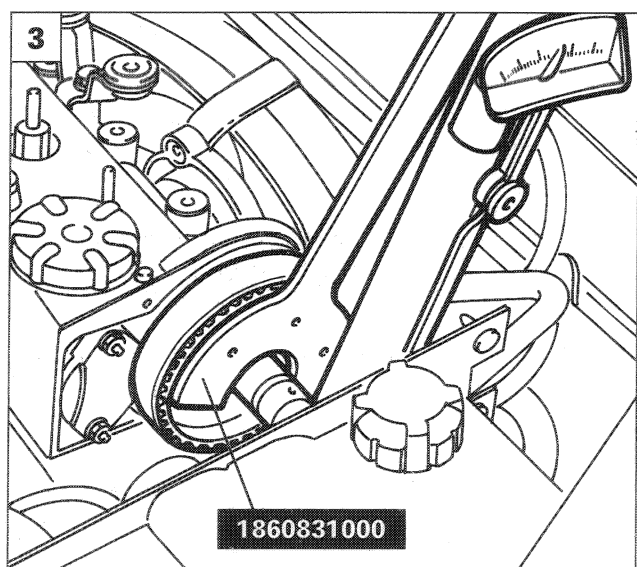
### Refitting and tensioning timing belt

3. The camshaft drive pulley is slotted. To ensure the pulley teeth and timing belt are properly coupled, loosen the pulley retaining screw by using reaction tool 1860831000.

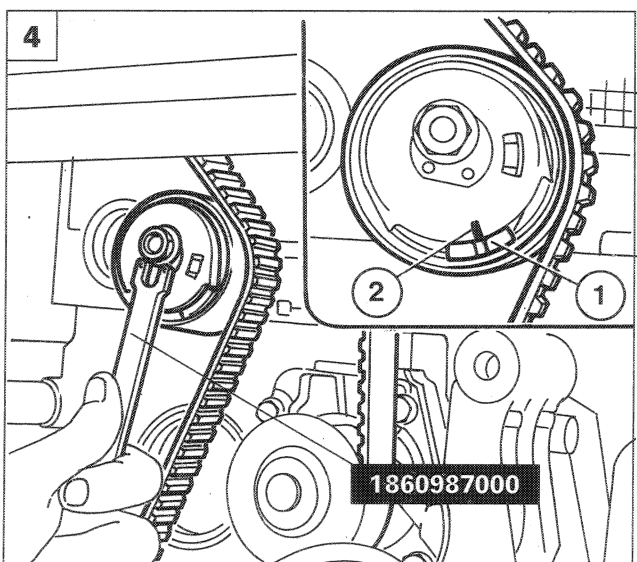
### 10.



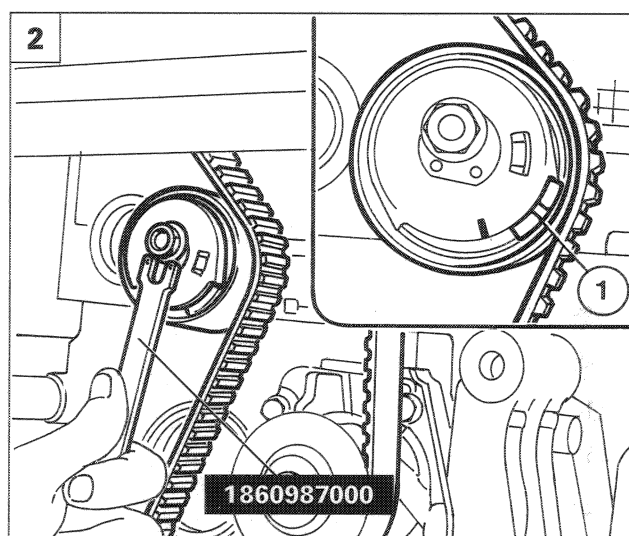
P3M20AX01



P3M20AX03



P3M20AX04



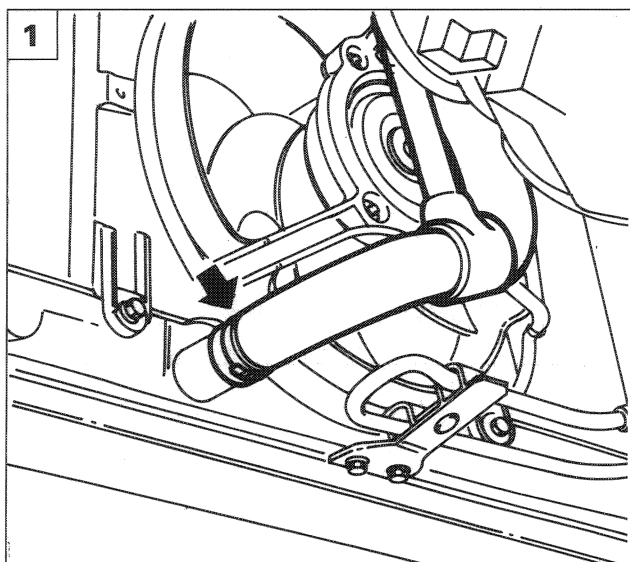
1. Before fitting the timing belt, ensure that camshaft timing is correct and that camshafts are secured by means of tools 1860985000. Ensure that pistons are aligned by checking the position of the pins on tools 1860992000 as described previously. Then fit the timing belt as described below:

1. Crankshaft drive gear
2. Coolant pump gear
3. Timing pulley
4. Belt tensioner fixed guide pulley
2. Position tool 1860987000 and adjust until automatic belt tension is set to maximum tension, i.e. with mobile reference (1) positioned as shown in the figure. Then tighten the nut retaining the tensioner to the mount.
3. Use reaction wrench 1860831000 to tighten the timing pulley on the intake side to the specified torque. Remove the tools positioned previously for camshaft timing adjustment and retention and then turn the crankshaft through two turns in its direction of rotation.
4. Loosen the tensioner retaining nut and align the mobile indicator on tensioner (1) with fixed reference (2). Then tighten the tensioner retaining nut to the specified torque. Turn the crankshaft through another two turns in its normal direction of rotation, and then replace engine timing adjustment tools described previously. Check that engine timing is correct.

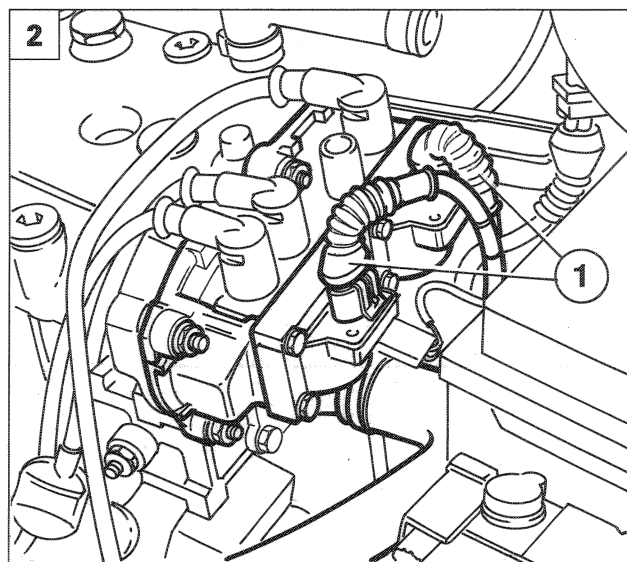


*Fit the remaining parts by reversing removal instructions.*

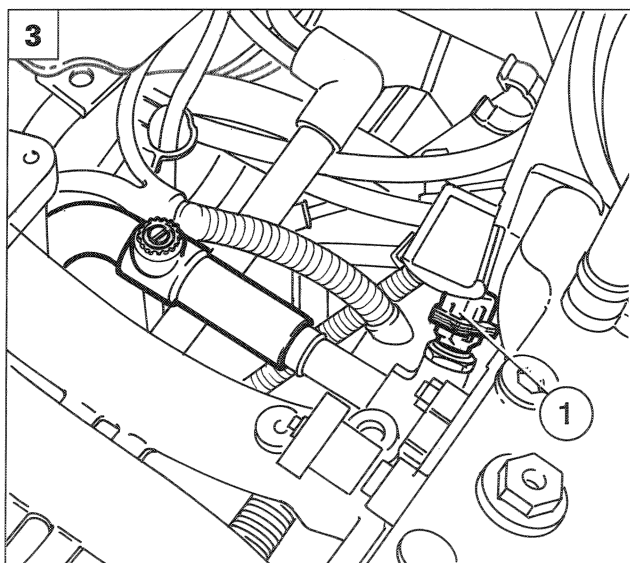




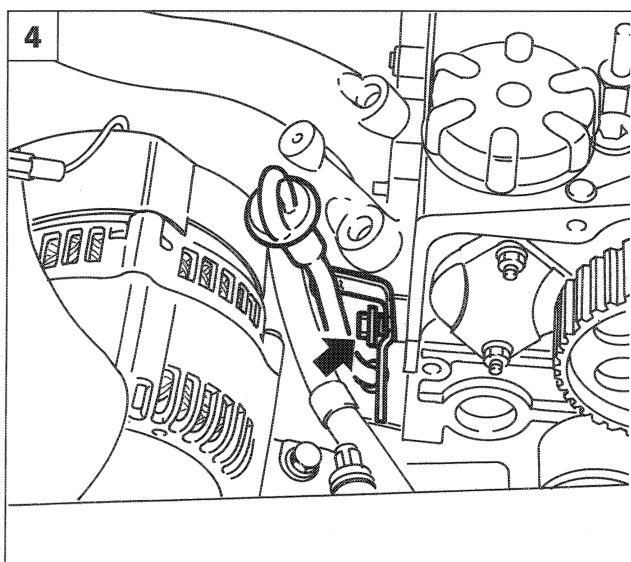
P3M21AX01



P3M21AX02



P3M21AX03



P3M21AX04



## REMOVING-REFITTING CYLINDER HEAD

Position the car on a lift, disconnect the battery negative terminal and then proceed as follows:

1. Drain the coolant by disconnecting the sleeve shown in the figure from the lower part of the car

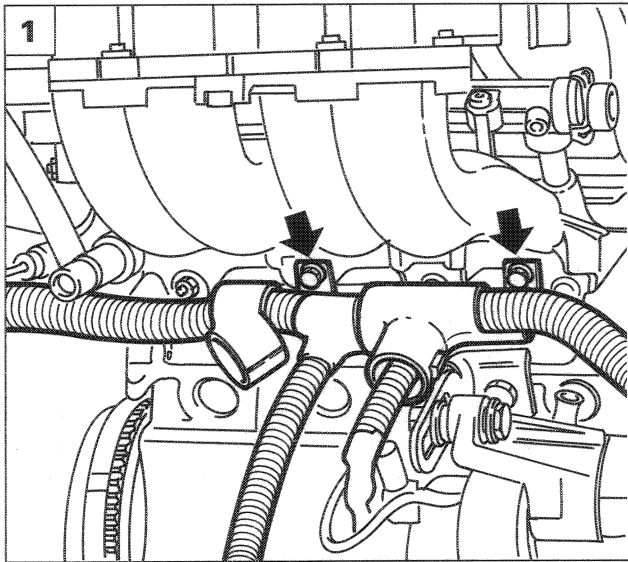


*Remove the timing belt as described in the previous paragraph.*

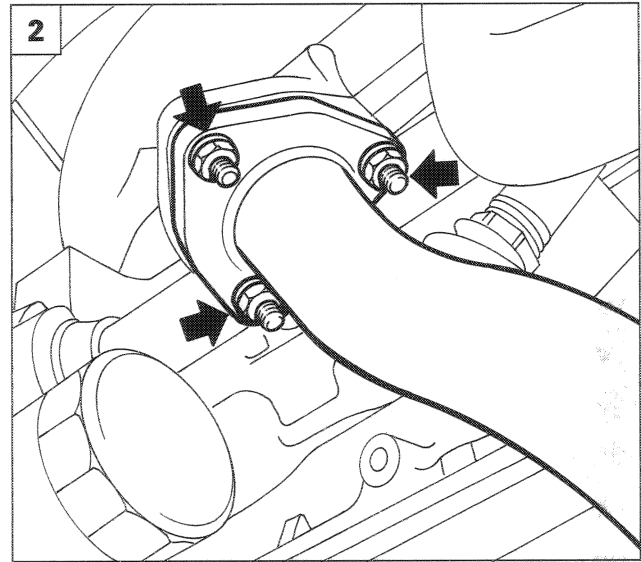
2. Disconnect connections (1), then remove the ignition coils by undoing the retaining nuts and underlying cooling system pipe.
3. Disconnect the outlet pipe from heater and connection (1).
4. Unscrew screw retaining engine oil dipstick bracket to the cylinder head.



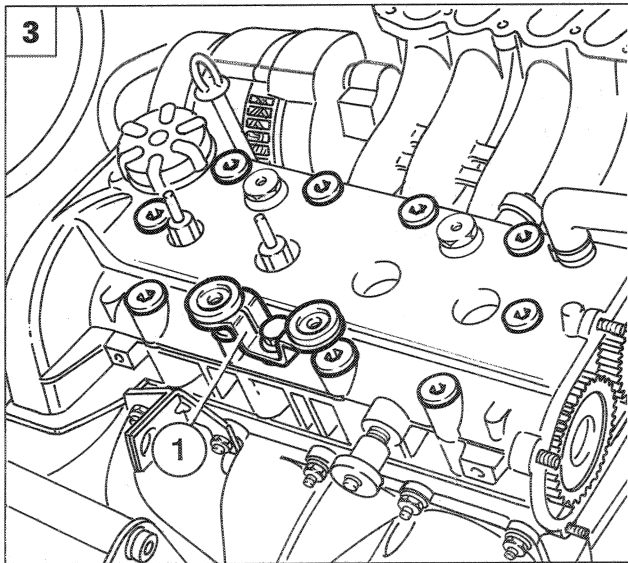
### 10.



P3M22AX01



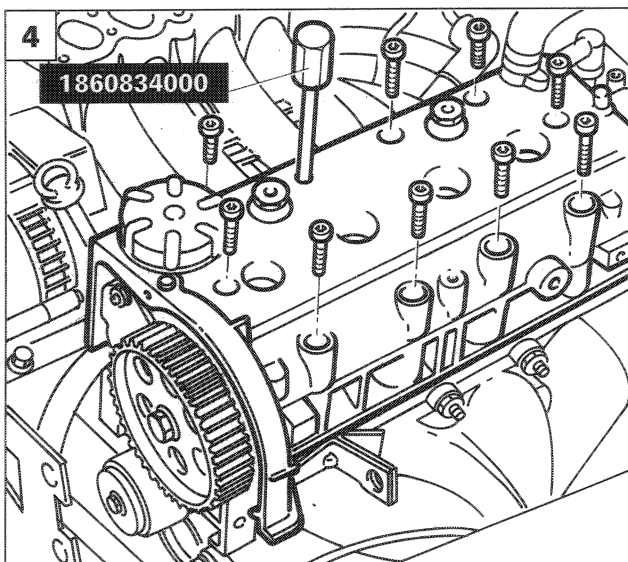
P3M22AX02



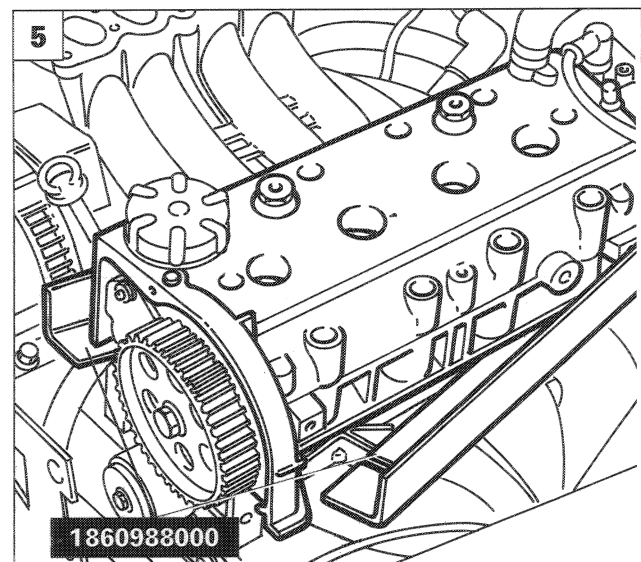
P3M22AX03



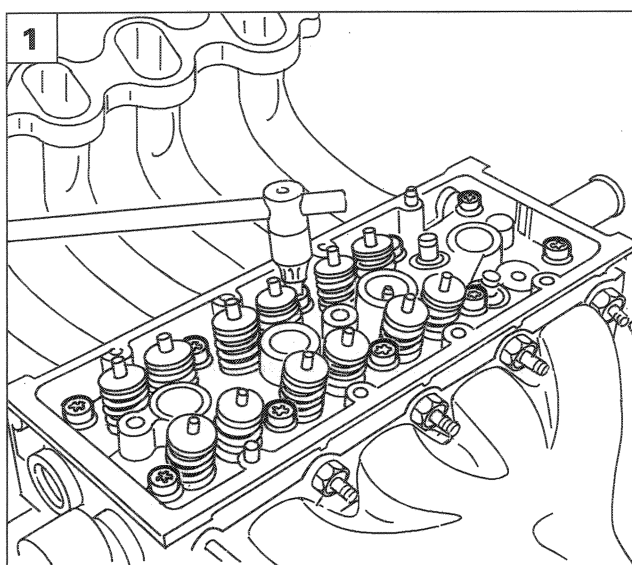
1. Release the injection leads from the lower part of the intake manifold by unscrewing the support bracket retaining bolts.
2. Undo nuts retaining the first exhaust pipe section to the manifold.
3. Unscrew caps protecting bolts securing cylinder head extension to cylinder head. Remove part (1).
4. Use wrench 1860834000 to unscrew bolts retaining the cylinder head extension to the cylinder head.
5. Position tappet retaining tool pair 1860988000, then remove the cylinder head extension from the cylinder head, tools 1860992000 and cylinder head gasket.



P3M22AX04



P3M22AX05

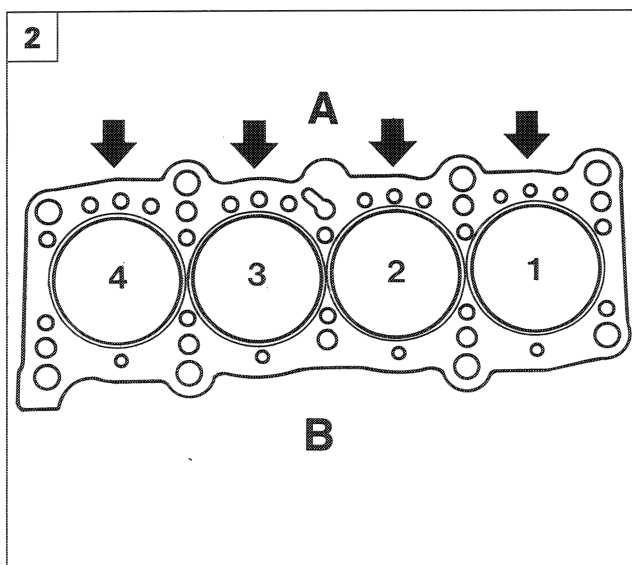


P3M23AX01

1. Use USAG wrench diam. 10 233 1/2 S or similar to unscrew bolts securing cylinder head to engine block. Then remove the cylinder head and the underlying gasket.

### Fitting cylinder head

2. Fit the gasket on the engine block with the wording "ALTO" [TOP] facing the operator. Take care not to contaminate or lubricate the gasket and engine block surface. The arrowed holes increase in diameter from cylinders 1-4 in order to distribute coolant evenly over the engine block.



P3M23AX02

A = exhaust end

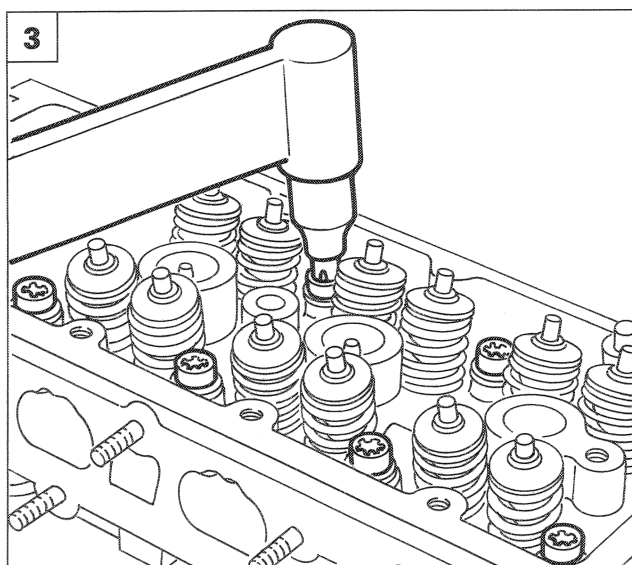
B = intake end



*The cylinder head gasket is AS-TADUR type. This type of gasket is made from a special material which undergoes a process of polymerisation while the engine is running and therefore hardens considerably during use.*

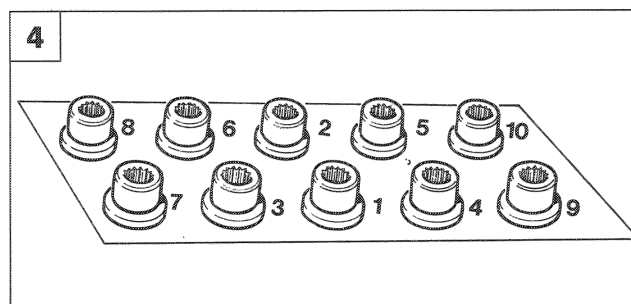
*The following conditions must be satisfied in order to ensure polymerisation occurs:*

- keep the gasket sealed in its plastic bag;
- take out only shortly before fitting;
- do not oil the gasket or contaminate with oil. Ensure cylinder head and crankcase surfaces are thoroughly clean.



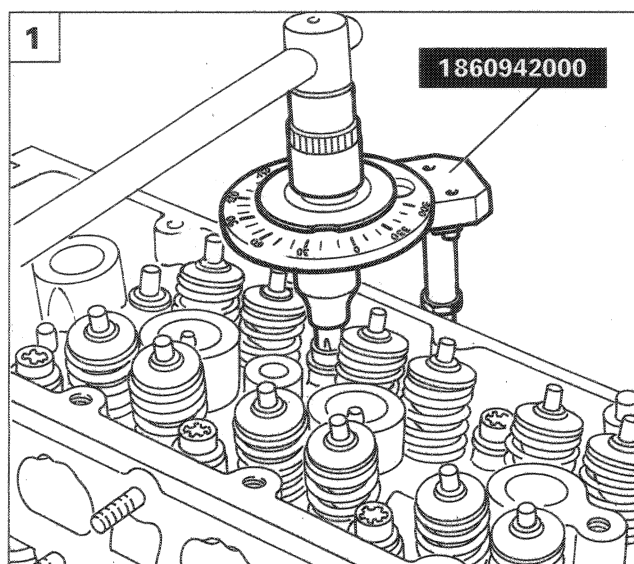
P3M23AX03

- 3-4. Then fit the cylinder head and tighten retaining screws to a torque of 2 daNm. Observe the tightening pattern shown in the figure.

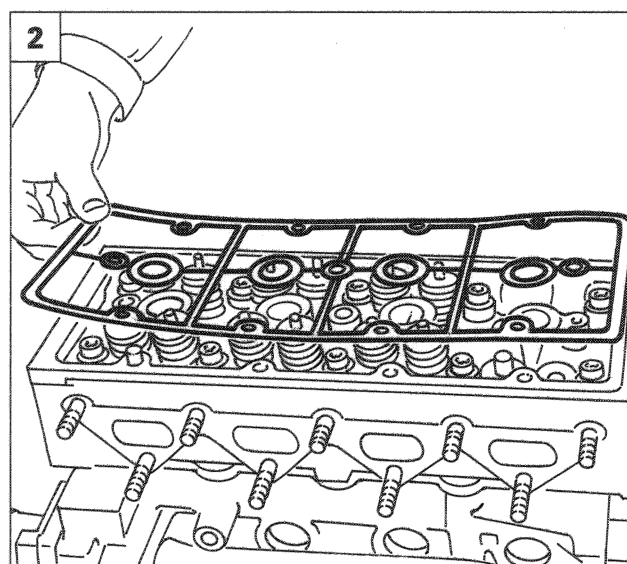


P3M23AX04

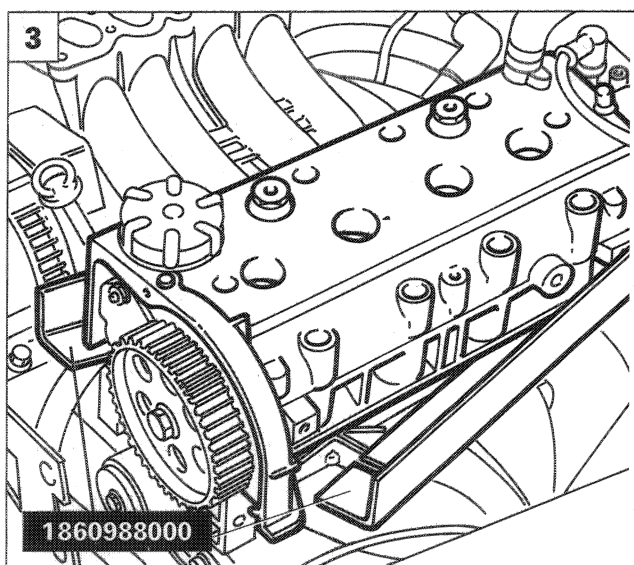
### 10.



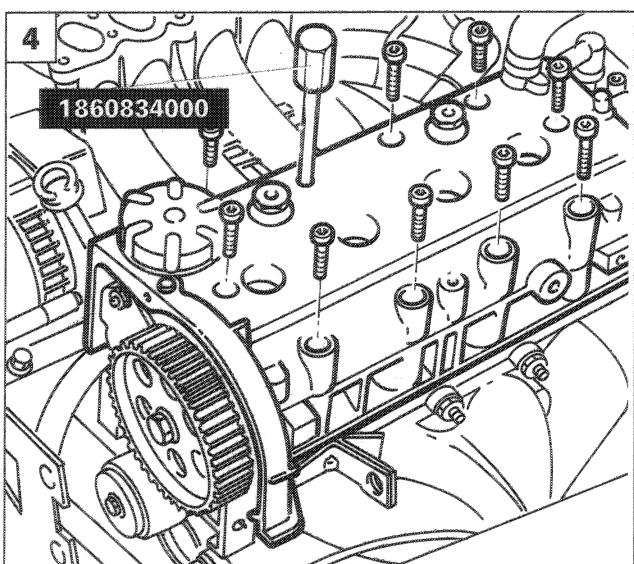
P3M24AX01



P3M24AX02



P3M22AX05



P3M22AX04

1. Tightening cylinder head retaining bolts to the engine block

Stage 1: Tighten the bolts to a torque of 3 daNm in the order shown previously.

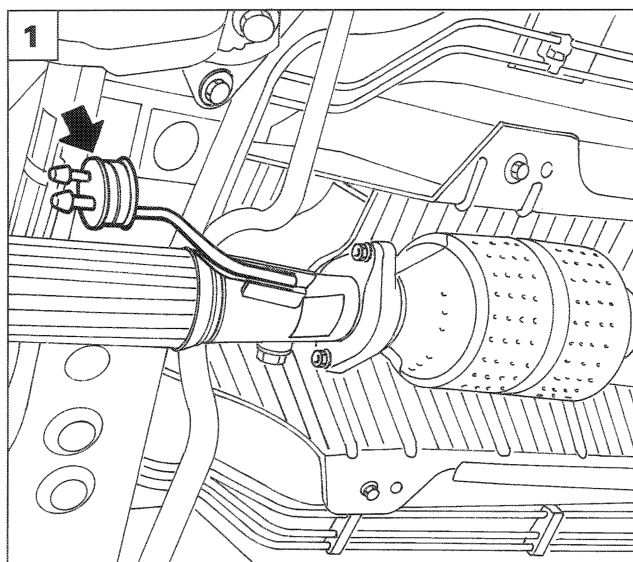
Stage 2: Tighten the bolts through 90° using tool 1860942000.

Stage 3: Further tighten all bolts by 90°.

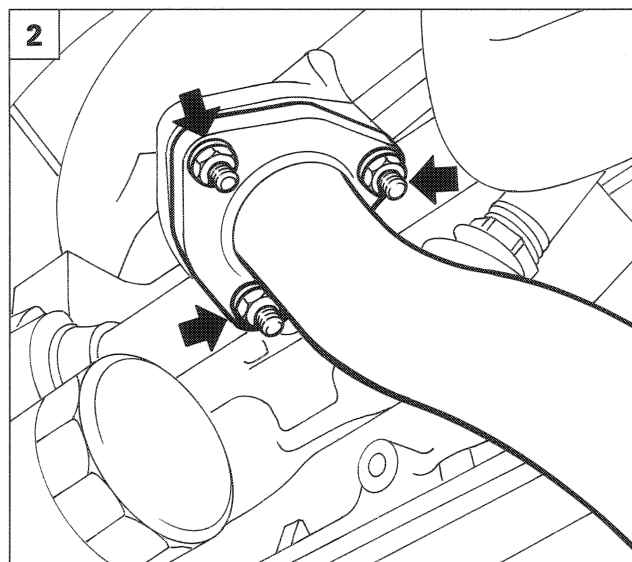
2. Position cylinder head gasket on the cylinder head mating surface.
3. Position the cylinder head extension on the cylinder head, then remove tappet retaining tools 1860988000.
4. Use wrench 1860834000 to tighten bolts retaining cylinder head extension to cylinder head to the specified torque. Then position the bolt protective caps.



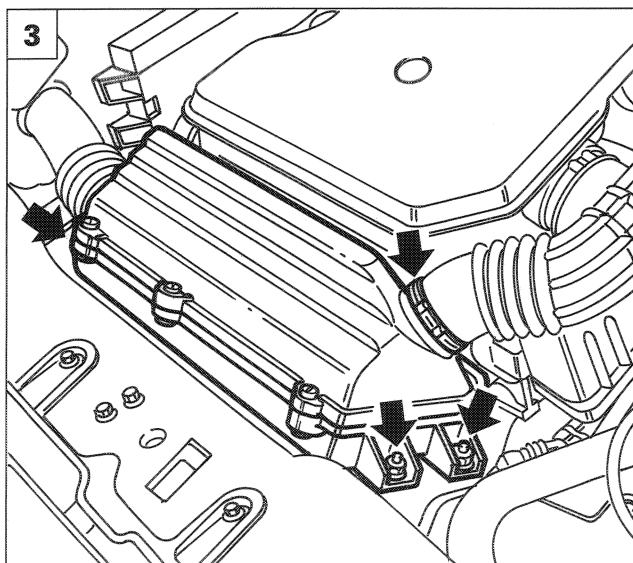
*Fit the remaining parts by reversing disassembly procedure. Consult the previous paragraph to fit the timing belt.*



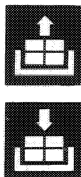
P3M25AX01



P3M22AX02

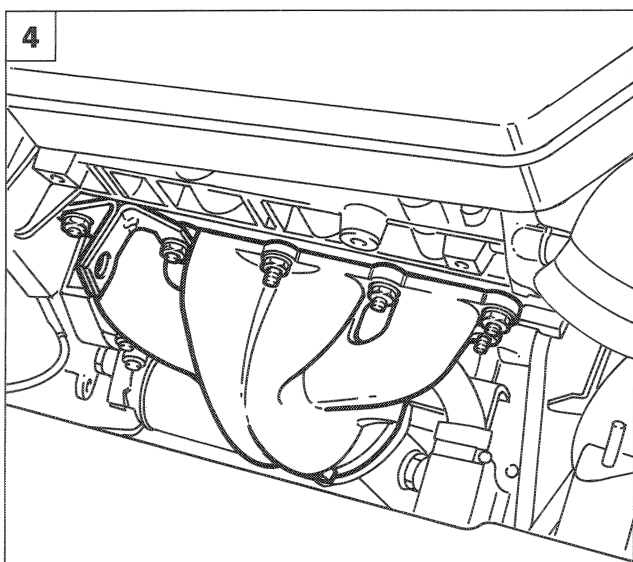


P3M02AX05



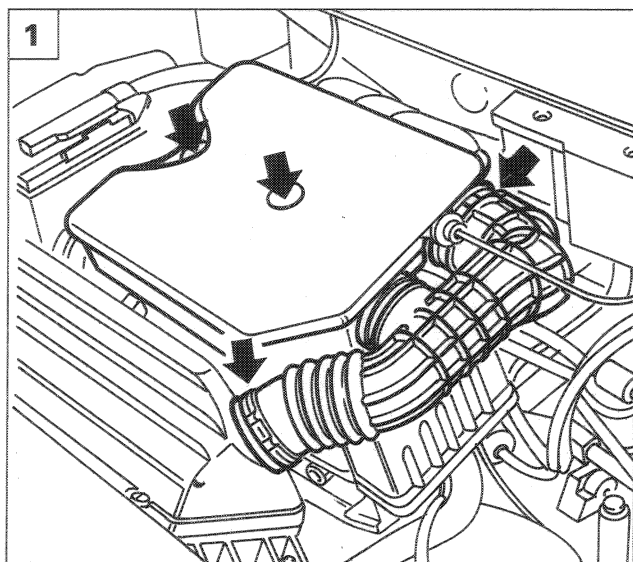
### REMOVING-REFITTING EXHAUST MAN-IFOLD

1. Position the vehicle on a lift, then release the first exhaust pipe section from the flexible mount shown in the figure.
2. Unscrew the nuts retaining the first exhaust pipe section to the manifold.
3. Lower the lift and remove the air cleaner housing assembly by unscrewing the retaining nuts and the clip indicated.
4. Undo nuts retaining the exhaust manifold and remove the assembly from the underlying gasket .

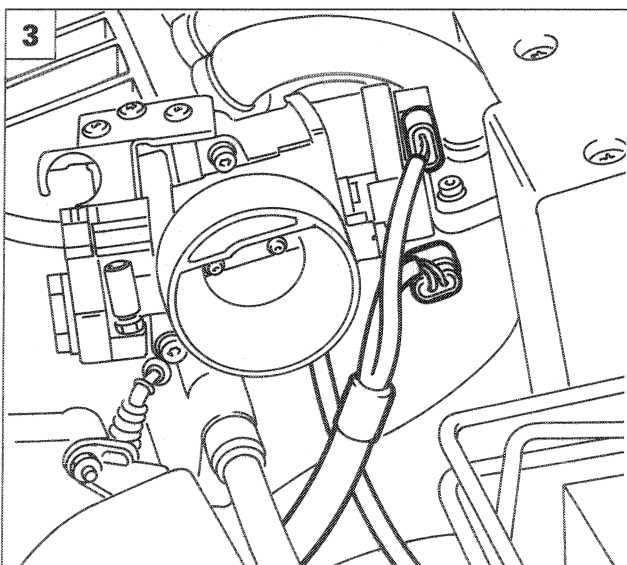
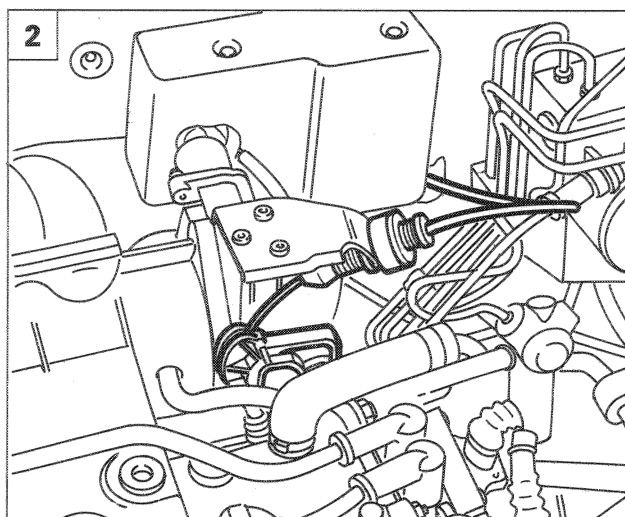


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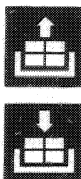
# 10.



P3M26AX01

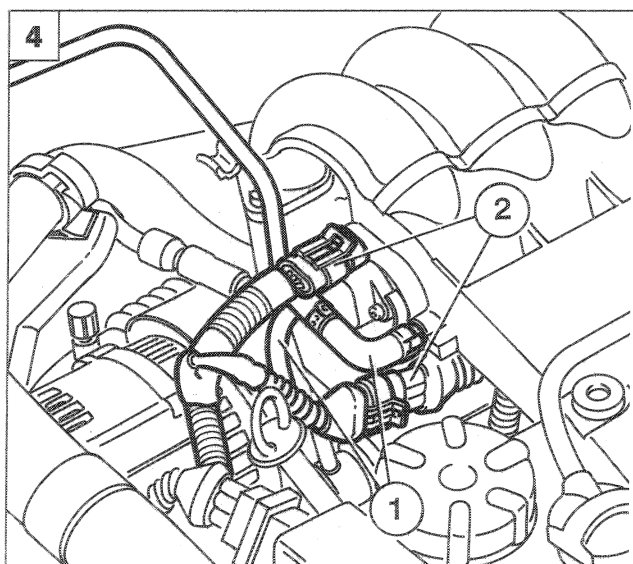


P3M16AX01

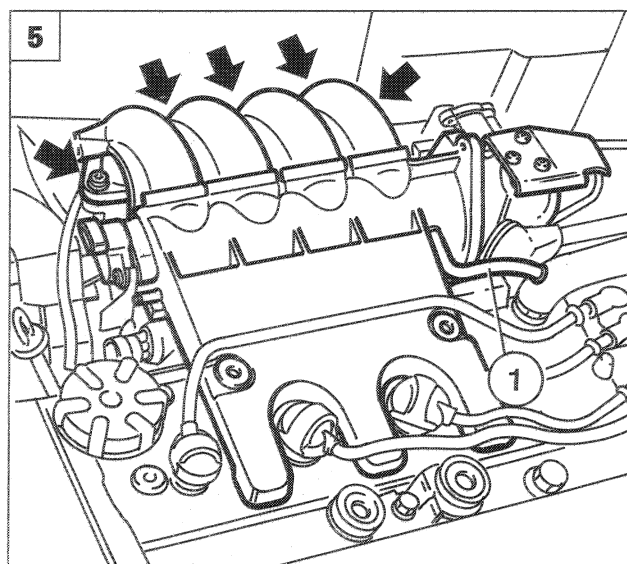


## REMOVING-REFITTING INLET MANIFOLD

1. Remove the resonator together with air intake sleeve by undoing the clips shown and unscrewing the retaining bolts. Disconnect the oil vapour recovery pipe from the lower part of the resonator.
2. Disconnect the accelerator control cable
3. Disconnect the connections shown and the brake servo vacuum line from the butterfly valve case.
4. Disconnect pipes (1) and connections (2) from the upper part of the intake manifold.
5. Remove screws retaining the upper part of the inlet manifold using wrench USAG TX 27 or similar, disconnect oil vapour recovery pipe (1) and remove the manifold from the car together with the butterfly valve case.

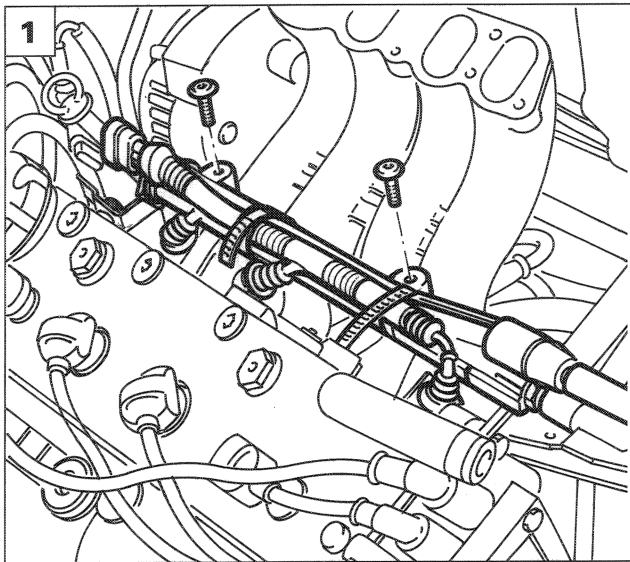


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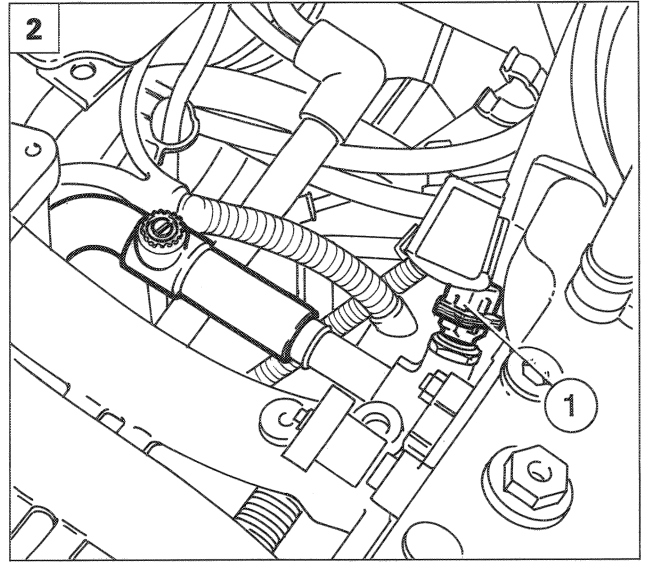


P3M16AX03

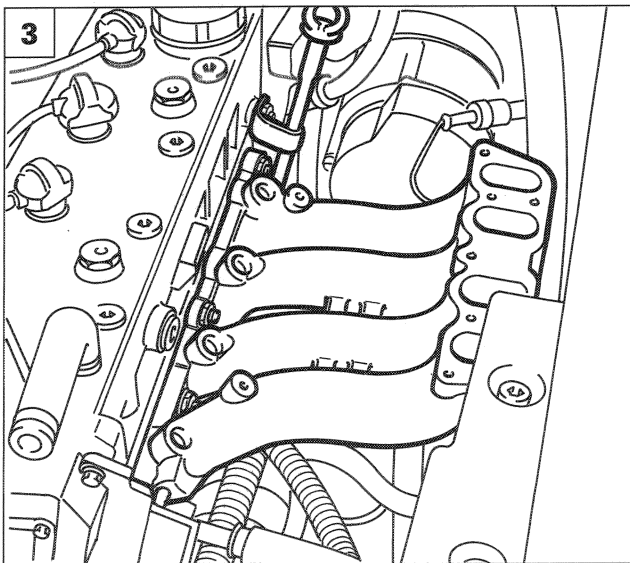




P3M17AX01



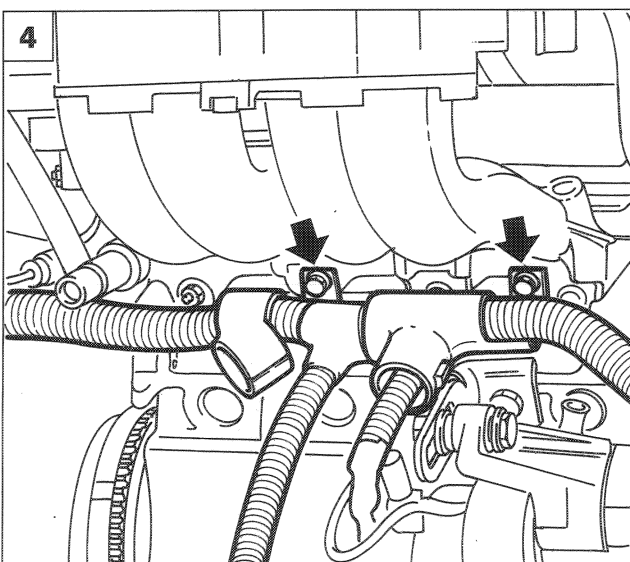
P3M21AX03



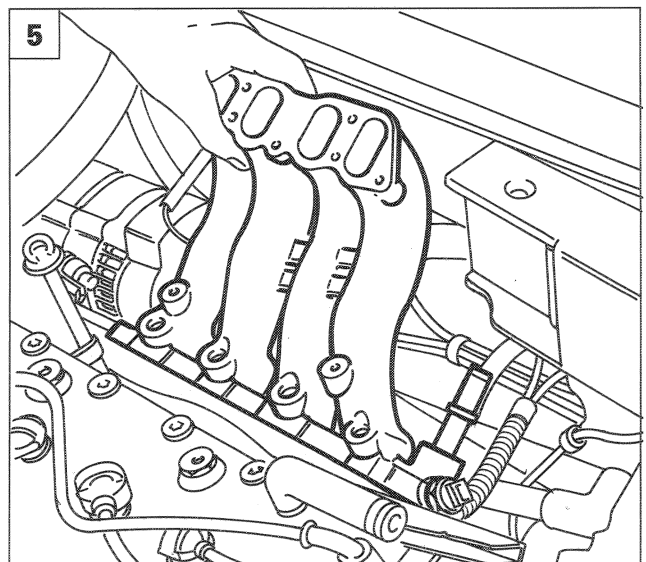
P3M27AX01



1. Unscrew the bolts retaining the fuel manifold, remove together with injectors and place outside the working area.
2. Disconnect heater outlet pipe and connection (1).
3. Undo intake manifold retaining nuts and release the engine oil dipstick from its bracket.
4. Pull out the intake manifold slightly and release the injection leads from the rear by unscrewing the retaining bracket bolts.
5. Then remove the upper part of the intake manifold.



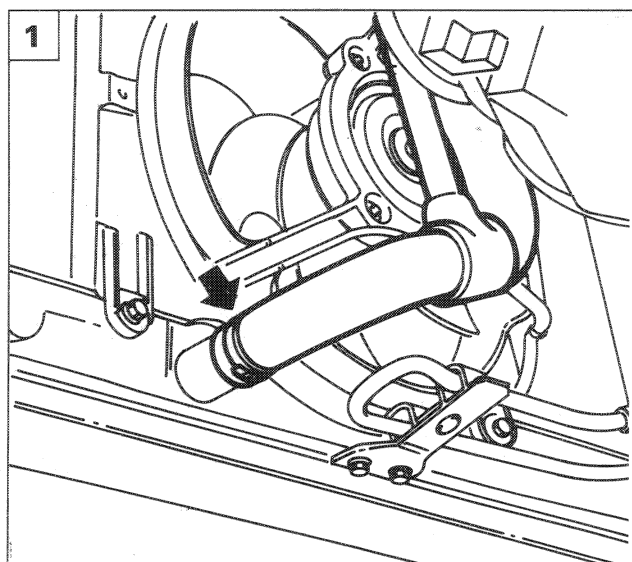
P3M27AX02



P3M27AX03



### 10.



P3M21AX01

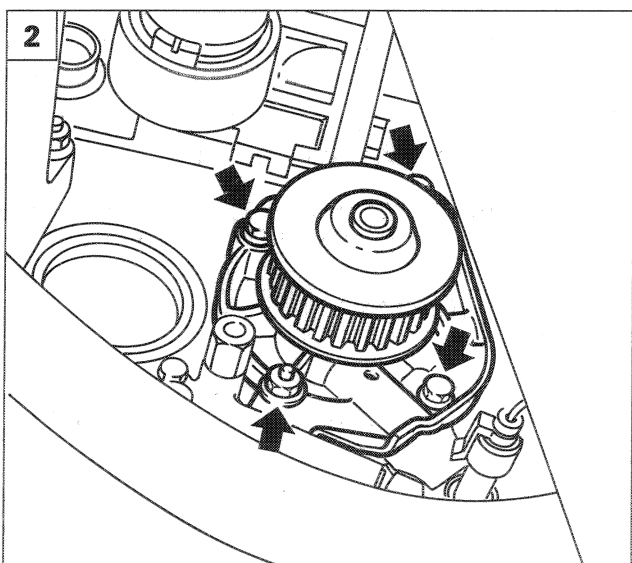


#### REMOVING-REFITTING COOLANT PUMP

1. Position the car on a lift, disconnect the battery negative terminal and drain the coolant by disconnecting the sleeve shown from the lower part of the radiator.



*Remove the timing belt as described previously.*

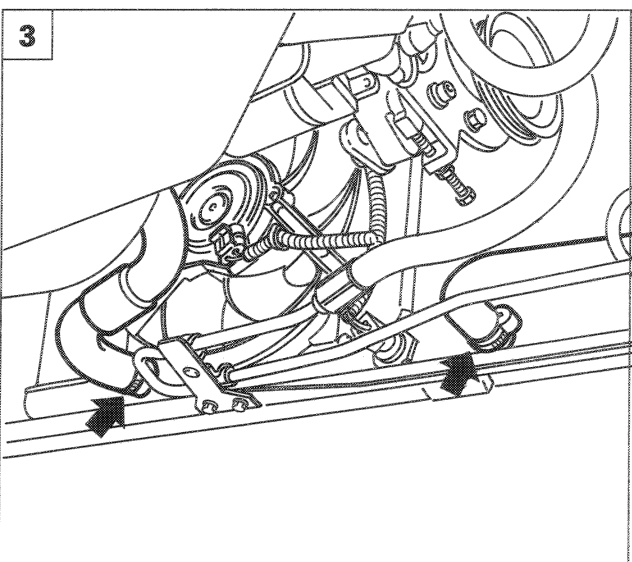


P3M28AX01

2. Remove the coolant pump by undoing the fastenings shown in the figure.



*Refit the parts removed previously and adjust timing belt tension as described previously.*



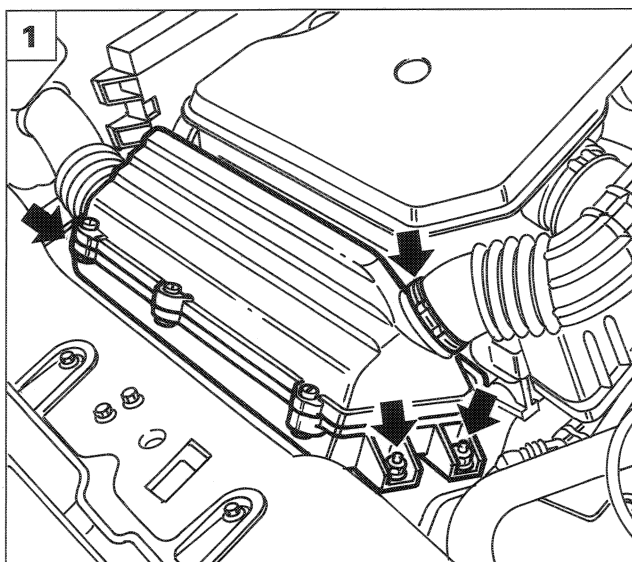
P3M28AX02



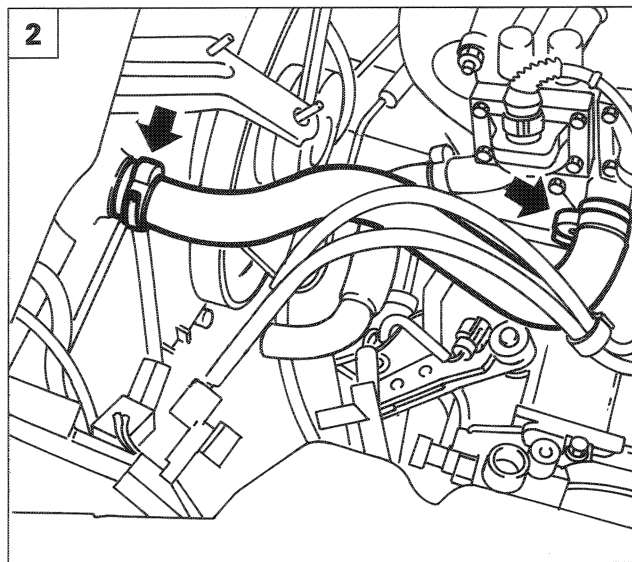
#### REMOVING-REFITTING RADIATOR

Position the car on a lift, disconnect the battery negative terminal and then proceed as follows:

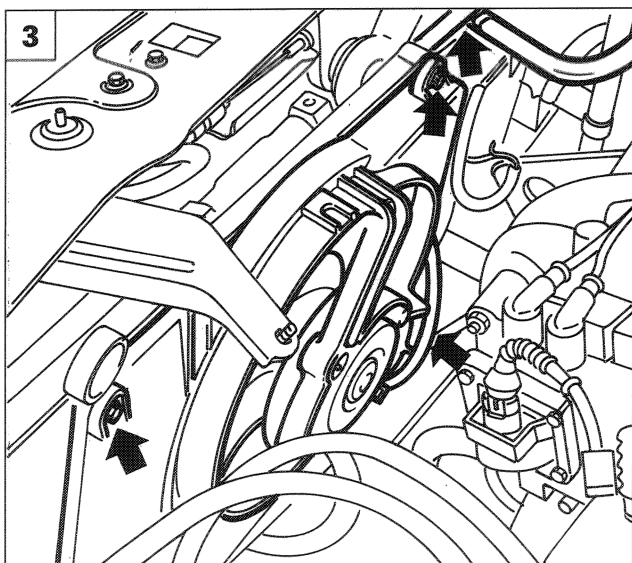
3. Drain the coolant by disconnecting the pipes shown in the figure.



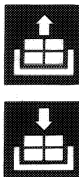
P3M02AX05



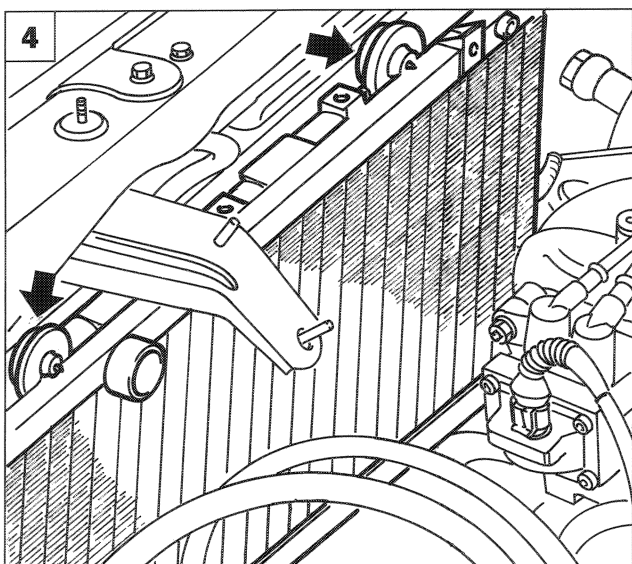
P3M29AX01



P3M29AX02



1. Remove the filter case assembly by undoing the retaining bolts and clip shown.
2. Disconnect the sleeve shown in the figure from the upper part of the radiator.
3. Remove the cooling fan by unscrewing the bolts securing it to the radiator and disconnecting the supply connections. Then disconnect the pipe indicated from the expansion tank.
4. Unscrew the bolts fastening the radiator to the condenser and lift out the radiator.



P3M29AX03

# 10.

## PROCEDURE FOR FILLING COOLING SYSTEM (heated version)

Total system capacity: 4.67 litres

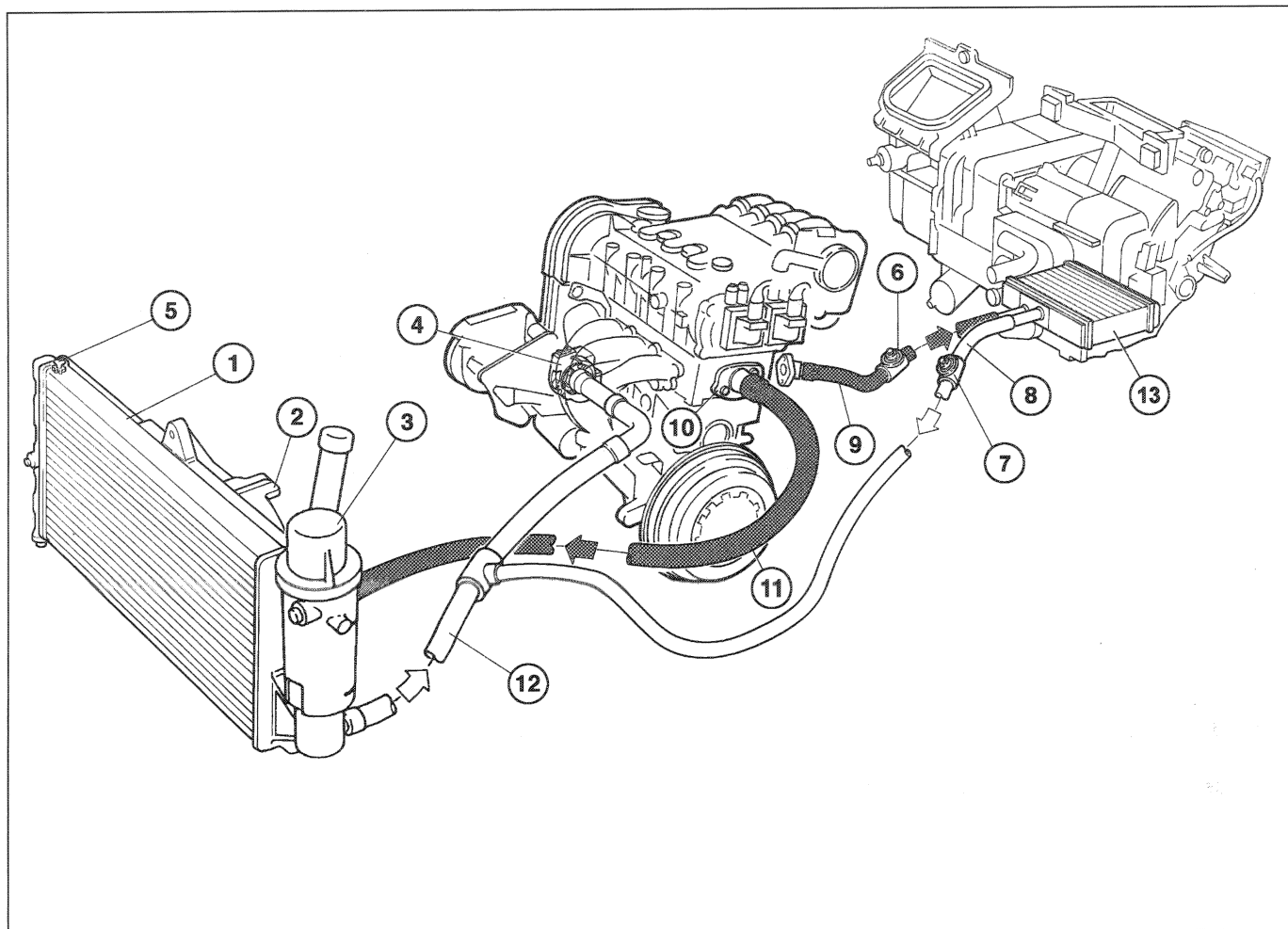
Amount of coolant to be added during filling: 4.47 litres

### Circuit filling procedure

1. Ensure that the cooling system components (engine, heater, radiator, etc.) are completely drained.
2. Open bleed fitting (5) on the radiator, bleed fitting (6) on the heater intake sleeve and bleed fitting (7) on the heater outlet sleeve.
3. Slowly pour in fluid (mixture consisting of 50% water and 50% paraflù), until the fluid emerges from bleed fitting (5) on the radiator, then tighten fitting (5).  
Carry on filling until fluid emerges from bleed fitting (6) located on the heater outlet sleeve (now liquid will no longer emerge from bleed fitting (7) on the heater outlet sleeve and level will exceed the MAX mark in the built-in expansion tank). Now close fittings (6) and (7) on the heater inlet and outlet sleeves).
4. Start up engine and maintain at maximum revs for 2 or 3 minutes. Then pump the accelerator every 30 seconds or so to take engine speed gradually up to 3/4 of maximum power speed. Continue this operation until the fan comes on for the first time.  
Return engine to idling speed and unscrew bleed fitting (5) on the radiator (with care, because the coolant is very hot) to release any residual air.  
Increase engine speed slowly until fluid emerges from bleed fitting (5). Close fitting (5) again then reduce engine speed to idling.  
Keep the engine idling for at least 5 minutes. Stop the engine. The fluid should settle at a level between the MAX and MIN marks on the expansion tank. Draw off any fluid above the MAX level notch.

**NOTE** *Stop the procedure if coolant boils during the operations listed under point 4. Check that the procedure has been correctly carried out and, if it has, find and change the defective component responsible for bringing about boiling. Then repeat the procedure.*

**Components of cooling system (heated version)**



P3M31AX01

1. Coolant cooling radiator
2. Electric cooling fan
3. Coolant expansion tank
4. Cooling system pump
5. Bleeding fitting on radiator
6. Bleed fitting on heater inlet sleeve
7. Bleed fitting on heater outlet sleeve
8. Coolant return line from interior radiator to vehicle cooling radiator
9. Line carrying coolant to interior heater radiator
10. Coolant by-pass thermostat
11. Line carrying coolant from thermostat to engine cooling radiator
12. Coolant return line from radiator to pump
13. Passenger compartment heating radiator

### 10.

#### PROCEDURE FOR FILLING COOLING SYSTEM (version with a/c)

Total system capacity: 4.45 litres

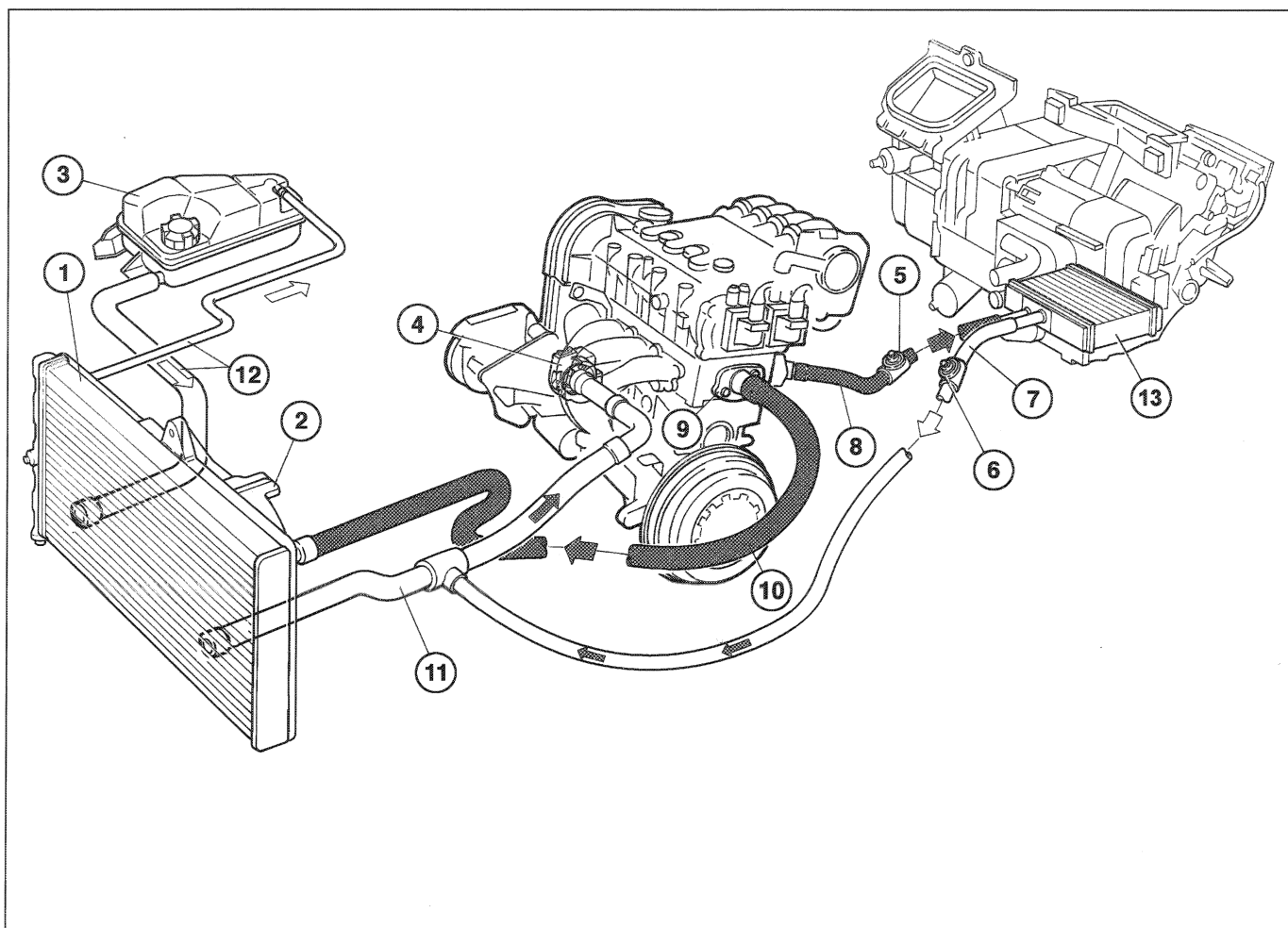
Amount of coolant to be added during filling: 4.30 litres

#### Circuit filling procedure

1. Ensure that the cooling system components (engine, heater, radiator, etc.) are completely drained.
2. Open bleed fitting (5) on the heater inlet sleeve and bleed fitting (6) on the heater outlet sleeve.
3. Slowly pour in fluid (mixture consisting of 50% water and 50% paraflù), until the fluid emerges from bleed fitting (5) on the heater intake sleeve and bleed fitting (6) on the heater outlet sleeve. Now tighten fittings (5) and (6).  
Carry on filling until the level reaches the MAX notch on the expansion tank.
4. Start up engine and maintain at maximum revs for 2 or 3 minutes. Then pump the accelerator every 30 seconds or so to take engine speed gradually up to 3/4 of maximum power speed. Simultaneously add coolant to the expansion tank, but do not allow the level to exceed the MAX level notch. Continue this operation until the radiator cooling fan comes on for the first time. Leave the engine idling for at least 5 minutes and then stop the engine.
5. Top up, if necessary, to a level between the MAX and MIN marks on the expansion tank. Before doing this, leave the engine to cool until coolant temperature is no higher than 25 °C.

**NOTE** *Stop the procedure if coolant boils during the operations listed under point 4. Check that the procedure has been correctly carried out and, if it has, find and change the defective component responsible for bringing about boiling. Then repeat the procedure.*

**Components of cooling system (version with a/c)**



P3M33AX01

1. Coolant cooling radiator
2. Electric cooling fan
3. Coolant expansion tank
4. Cooling system pump
5. Bleed fitting on heater inlet sleeve
6. Bleed fitting on heater outlet sleeve
7. Coolant return line from interior radiator to vehicle cooling radiator
8. Line carrying coolant to interior heater radiator
9. Coolant by-pass thermostat
10. Line carrying coolant from thermostat to engine cooling radiator
11. Coolant return line from radiator to pump
12. Lines connecting radiator to expansion tank
13. Passenger compartment heating radiator