

FUEL SYSTEM

MECHANICAL

CONTENTS

Description and Operation

| | Page |
|--|------|
| Fuel system layout - up to 1992 models | 2 |
| Description | 2 |
| Fuel system layout - 1992 models on | 3 |
| Fuel system component location - up to 1992 models | 5 |
| Fuel system component location - 1992 models on | 7 |
| Operation | 8 |

Adjustments

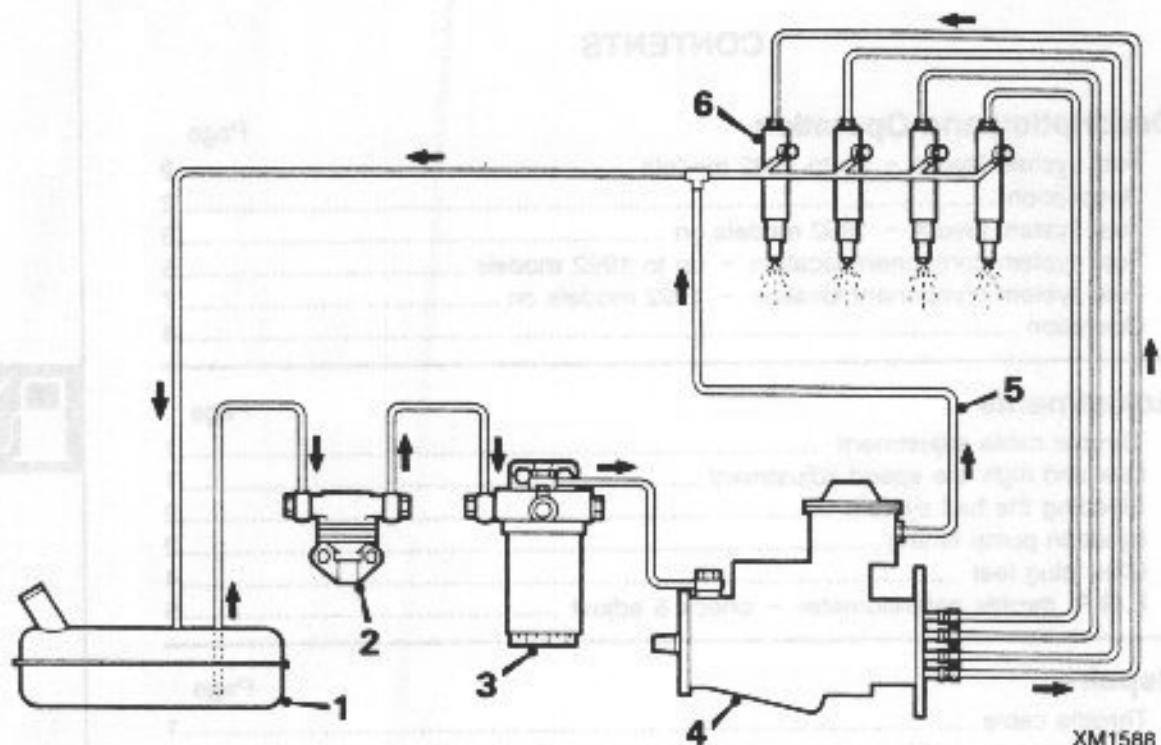
| | Page |
|--|------|
| Throttle cable adjustment | 1 |
| Low and high idle speed adjustment | 1 |
| Bleeding the fuel system | 2 |
| Injection pump timing | 2 |
| Glow plug test | 4 |
| E.G.R. throttle potentiometer - check & adjust | 5 |

Repairs

| | Page |
|---|------|
| Throttle cable | 1 |
| Air cleaner assembly | 2 |
| Air cleaner element | 2 |
| Intake hose - turbocharger | 3 |
| Intercooler | 3 |
| Turbocharger elbow gasket | 3 |
| Turbocharger oil feed pipe | 5 |
| Turbocharger and gasket | 5 |
| Fuel tank | 7 |
| Fuel filter element | 10 |
| Fuel heater and fuel heater switch | 11 |
| Fuel lift pump | 11 |
| Injection pump - up to 1992 models | 12 |
| Injector - up to 1992 models | 16 |
| Injector pipes | 17 |
| Spill return hose assembly | 17 |
| Glow plugs | 18 |
| Glow plug control unit | 19 |
| E.G.R. valve | 19 |
| E.G.R. solenoid valve | 20 |
| E.G.R. control unit | 20 |
| E.G.R. throttle potentiometer | 21 |
| Cold start advance temperature sensor | 21 |
| Injector - 1992 models on | 21 |
| Injection pump - 1992 models on | 21 |

Data, Torque & Tools

| | Page |
|-----------------------|------|
| Data | 1 |
| Torque Settings | 1 |
| Tool Numbers | 1 |



XM1588

FUEL SYSTEM LAYOUT - UP TO 1992 MODELS

1. Fuel tank
2. Fuel lift pump
3. Fuel filter
4. Fuel injection pump

5. Spill return line
6. Fuel injectors

DESCRIPTION

Air intake

The air cleaner is positioned to the left of the engine and connected by hoses to a cold air intake duct and the turbocharger inlet. A crankcase breather hose is fitted between the air cleaner and the separator.

A single stage turbocharger, fitted between the exhaust manifold and exhaust pipe, is connected by hoses to the air cleaner and to an intercooler mounted on the left of the coolant radiator behind the radiator grille. The intercooler is connected by hose to the inlet manifold.

Fuel system

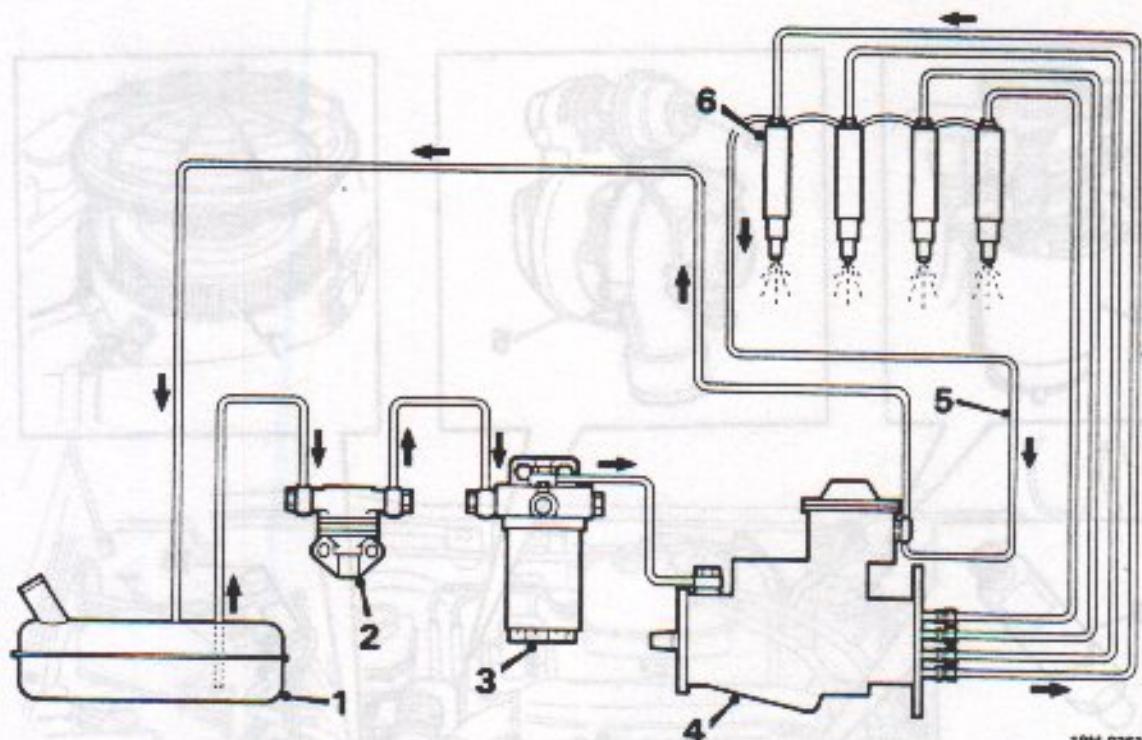
A 15 gallon (68 litre) fuel tank is mounted at the rear of the vehicle beneath the boot floor. The tank is vented by a 2 way valve in the filler cap.

A mechanical lift pump, driven by the camshaft, is mounted at the front of the engine.

A fuel filter, fitted with a replaceable element and incorporating a water separator, is positioned on the L.H. side of the bulkhead.

A Bosch Type injection pump, incorporating a cold start advance unit and a high idle setting is mounted on the front of the engine and is directly driven by gears from the crankshaft. The pump meters and distributes fuel to 4 pintle type injectors located in pre-combustion chambers in the cylinder heads.

A return line passes excess fuel from the injection pump and injectors back to the fuel tank.



FUEL SYSTEM LAYOUT - 1992 MODELS ON

1. Fuel tank
2. Fuel lift pump
3. Fuel filter
4. Fuel injection pump

5. Spill return line
6. Fuel injectors

Glow plugs

Four glow plugs are located in the cylinder heads, directly below each injector.

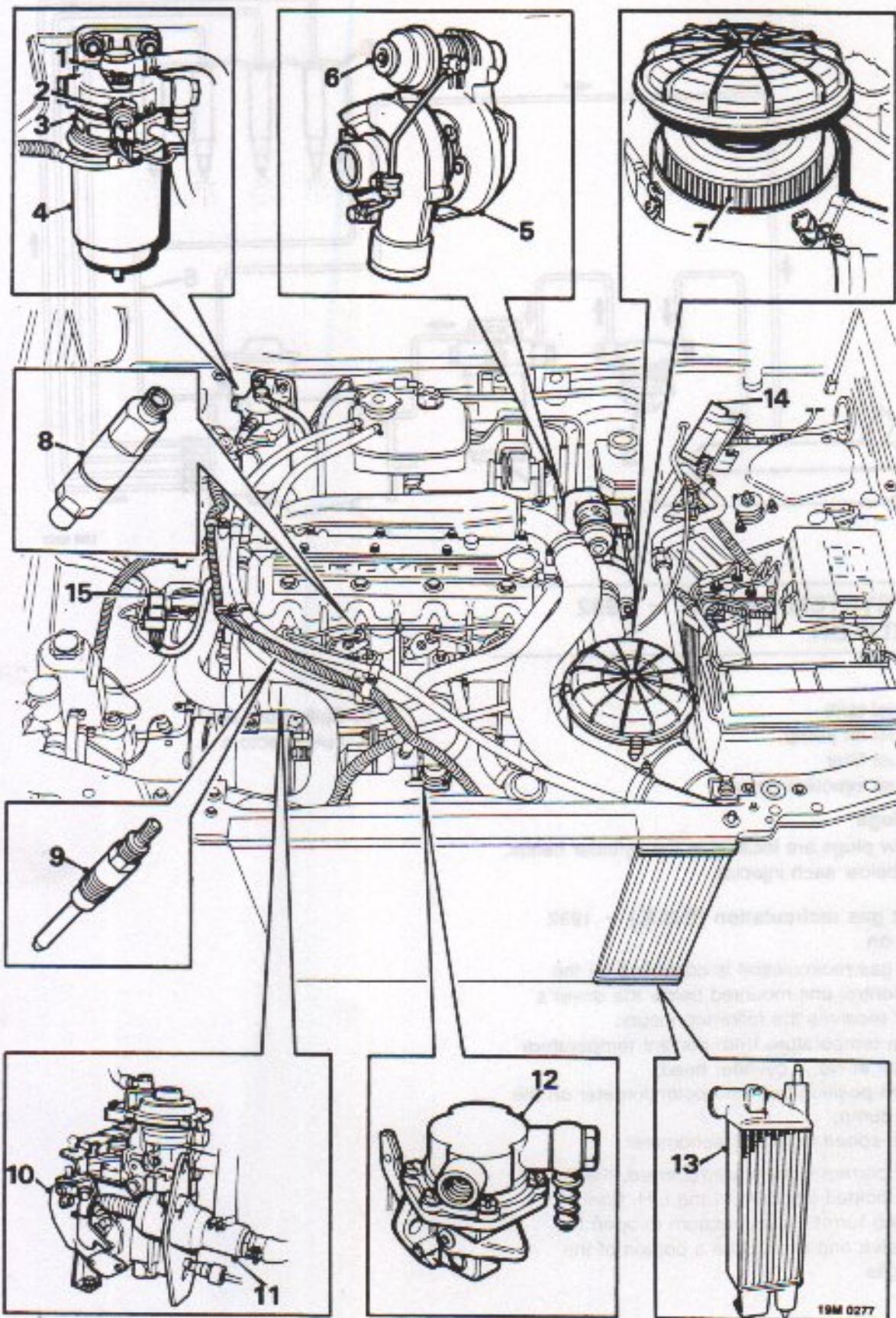
Exhaust gas recirculation (E.G.R.) - 1992 Models on

Exhaust gas recirculation is controlled by the E.G.R. control unit mounted below the driver's seat and receives the following inputs:

- a. Engine temperature from coolant temperature transmitter in No. 4 cylinder head;
- b. Throttle position from the potentiometer on the injection pump;
- c. Engine speed from the tachometer.

When all correct signals are received, the E.G.R. solenoid located adjacent to the L.H. front suspension turret allows vacuum to open the E.G.R. valve and recirculate a portion of the exhaust gas.

FUEL SYSTEM

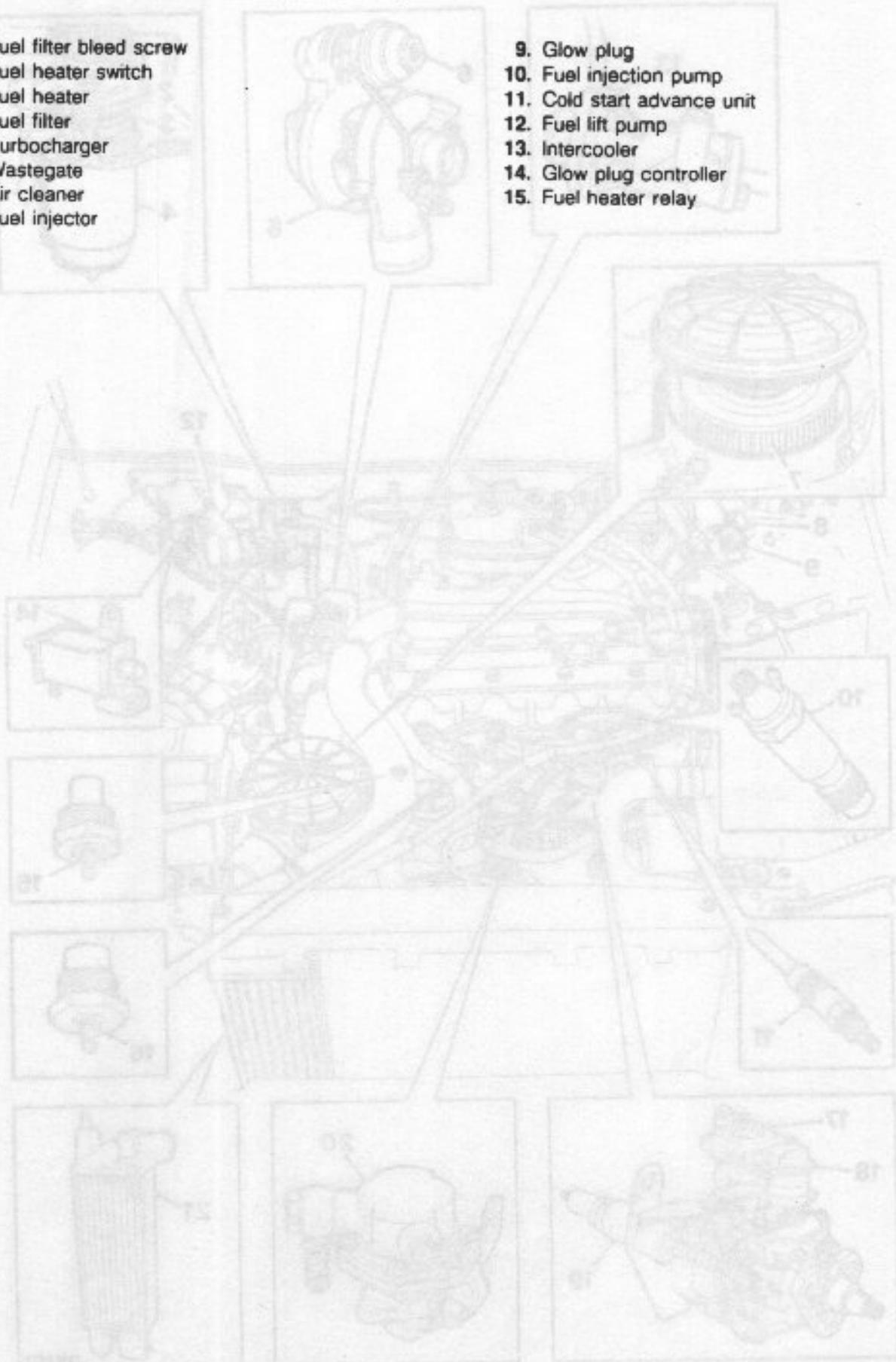




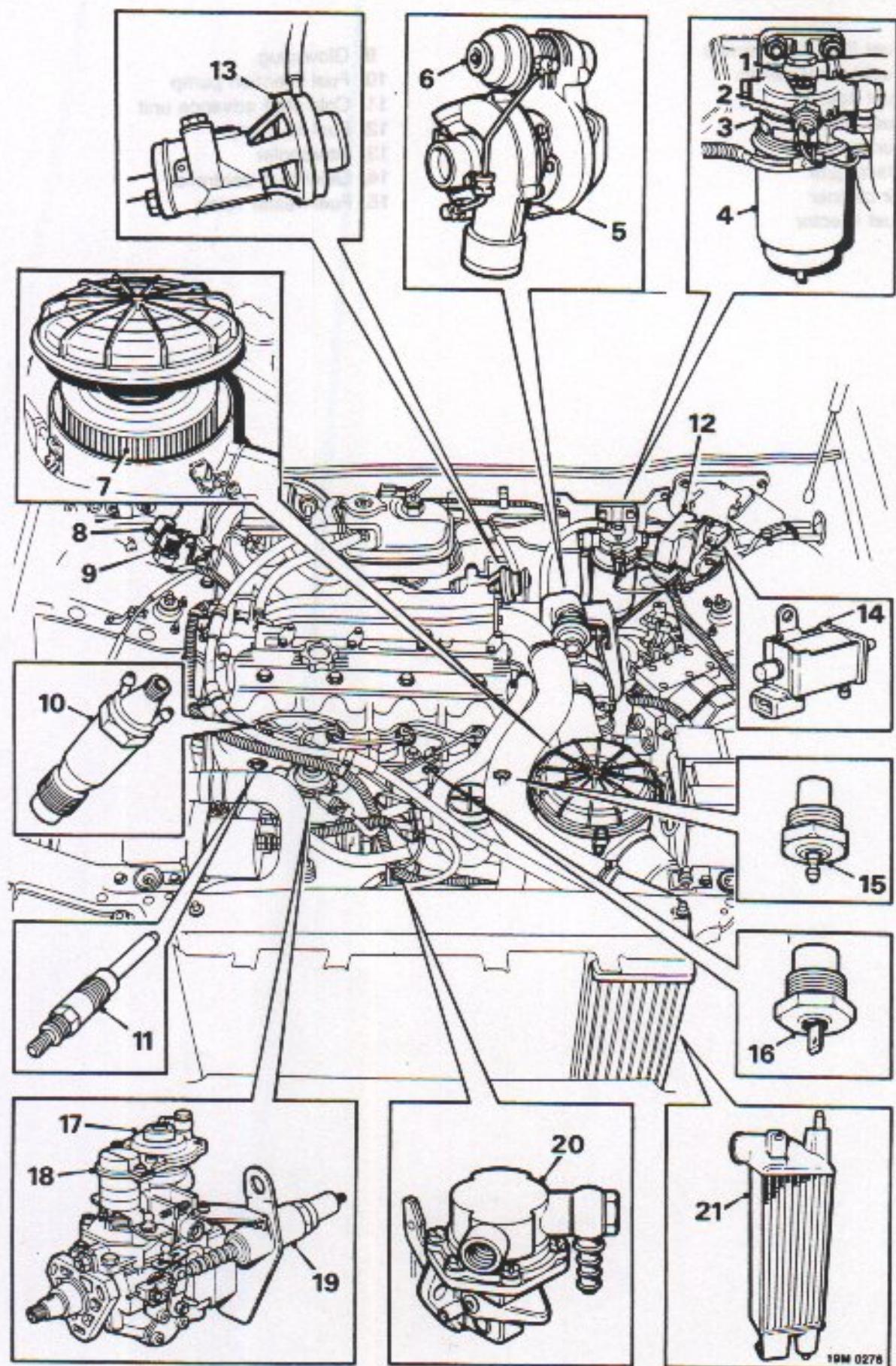
**FUEL SYSTEM COMPONENT
LOCATION - UP TO 1992 MODELS**

1. Fuel filter bleed screw
2. Fuel heater switch
3. Fuel heater
4. Fuel filter
5. Turbocharger
6. Wastegate
7. Air cleaner
8. Fuel injector

9. Glow plug
10. Fuel injection pump
11. Cold start advance unit
12. Fuel lift pump
13. Intercooler
14. Glow plug controller
15. Fuel heater relay



FUEL SYSTEM





FUEL SYSTEM COMPONENT LOCATION - 1992 MODELS ON

1. Fuel filter bleed screw
2. Fuel heater switch
3. Fuel heater
4. Fuel filter
5. Turbocharger
6. Wastegate
7. Air cleaner
8. Cold start advance relay
9. Fuel heater relay
10. Fuel injector
11. Glow plug
12. Glow plug controller

13. E.G.R. valve
14. E.G.R. solenoid
15. Coolant temperature transmitter - E.G.R. and instruments
16. Cold start advance temperature sensor
17. Fuel injection pump
18. E.G.R. throttle potentiometer
19. Cold start advance unit
20. Fuel lift pump
21. Intercooler

FUEL SYSTEM

OPERATION

Diesel engines operate by compression ignition. The rapid compression of air in the cylinder during the compression cycle heats the injected fuel, causing it to self ignite. During cold starting, automatically controlled glow plugs assist in raising the temperature of the compressed air to ignition point. A cold start advance unit advances the injection timing to further assist starting. Idle quality is improved by the high idle setting.

The engine is supplied with pre-compressed air by a single stage turbocharger. Exhaust gases passing over a turbine cause it to rotate, driving a compressor mounted on the turbine shaft. Air drawn from the cold air intake passes, via the air cleaner, to the turbocharger where it is compressed. The compressed air passes to the cylinders via an intercooler, which reduces the temperature of the compressed air, increasing its density.

Fuel is drawn from the tank by a mechanical lift pump and passes to the injection pump via a filter incorporating a heating element. In addition to removing particle contamination from the fuel, the filter incorporates a water separator, which removes and stores both bound and unbound water.

The injection pump meters a precisely timed, exact quantity of fuel to the injectors in response to throttle variations, injection timing varying with engine speed. Any excess fuel delivered to the injection pump is not injected, passing back to the tank via the fuel return line.

Fuel is injected in a finely atomised form into a pre-combustion chamber in the cylinder head where it ignites. The burning fuel expands rapidly into the main combustion chamber, creating extreme turbulence which mixes the burning fuel thoroughly with the compressed air, providing complete combustion.

Cold Starting is assisted by glow plugs, a cold start advance unit and a high idle setting.

Glow plugs

Glow plug operation is controlled by a timer unit, start relay and resistor. When the ignition is turned on the timer unit is energised, the glow plugs start to operate and a warning light on the dashboard illuminates, remaining illuminated until the glow plugs are automatically switched off.

The length of time the glow plugs will operate is dependent on under bonnet temperature, which is monitored by a sensor located in the timer unit.

Starting the engine results in the power supply to the glow plugs passing through the resistor, which reduces their operating temperature. The glow plugs are cut out either by the temperature sensor in the timer, or by a microswitch on the injection pump which operates when the throttle is depressed.

Cold start advance - up to 1992 models

The cold start advance unit is connected to the engine cooling system via hoses. It contains a temperature sensitive element which is retracted when cold and pulls the advance lever, via cable, towards the rear of the pump against spring pressure. As coolant temperature rises, the cold start element expands releasing tension on the cable and allowing spring pressure to move the advance lever forwards.

Cold start advance - 1992 models on

The cold start advance unit contains a temperature sensitive element which is retracted when cold, pulling the advance lever, via cable, towards the rear of the pump against spring pressure, thus advancing injection timing. When the engine has started and the temperature has risen to 30°C, the temperature sensor in No. 3 cylinder head will close supplying an earth for the cold start advance relay. The energised relay switches a supply to the cold start advance unit. The element heats up, releases tension on the cable and allows spring pressure to move the advance lever forwards, thus retarding injection timing.

High idle

High idle is obtained by the ball pin on top of the advance lever holding the engine speed lever away from its stop when the cold start advance unit is in the retracted position.

Exhaust Gas Recirculation (E.G.R.)

Operation of the E.G.R. system is dependant on the following:

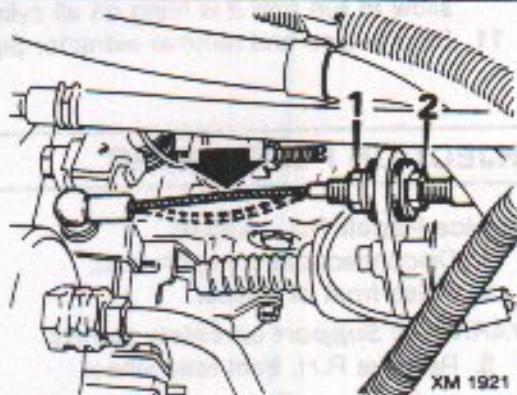
- Engine temperature - must be above 40°C;
- Engine speed - must be between 2000 - 4200 rev/min;
- Engine load - calculated by engine speed and throttle position.

The E.G.R. control unit monitors signals from the tachometer (engine speed), throttle potentiometer (throttle position) and coolant temperature transmitter (engine temperature) and, when all conditions are met, the control unit switches an earth path to the E.G.R. solenoid.

Once energised, the E.G.R. solenoid directs manifold vacuum to the E.G.R. valve. The E.G.R. valve opens and directs a quantity of exhaust gas back into the inlet manifold and from there into the engine.



THROTTLE CABLE ADJUSTMENT



1. Slacken cable lock nut.
2. Turn cable adjusting nut to achieve the following deflection:
15 to 20 mm - cold engine.
10 to 15 mm - hot engine.
3. Tighten locknut.

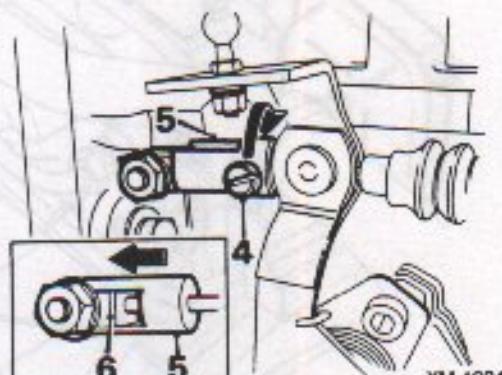
LOW AND HIGH IDLE SPEED ADJUSTMENT

Low idle speed

1. Check and adjust throttle cable.

Note: When the engine has reached normal operating temperature, throttle cable deflection will reduce to 10 to 15 mm.

2. Start engine and run it until normal operating temperature is reached; i.e. cooling fans have operated once.
3. Stop engine and attach a strip of reflective tape to crankshaft pulley for use with an optical tachometer.



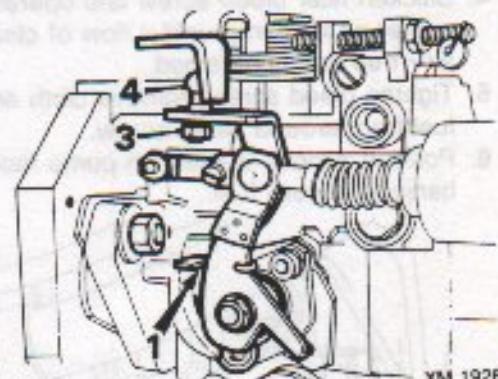
4. Slacken screw on cold start advance cable trunnion.
5. Turn trunnion through 90°.
6. Slide over cable end clamp.

7. Slacken lock nut on idle speed screw.
8. Start engine and check that idle speed is as follows:
Up to 1992 Models = 850 ± 50 rev/min.
1992 Models on = 900 ± 20 rev/min.
9. If idle speed is outside limits, turn idle speed screw to obtain correct speed. Tighten lock nut.
10. Pull trunnion away from cable end clamp, turn through 90° and tighten trunnion screw.

Note: Adjustment screw on front face of pump must not be disturbed - it is pre-set during pump calibration.

High idle speed

Note: High idle speed must only be adjusted when coolant temperature is below 40°C.



1. Insert a 4.5 mm spacer between cold start advance lever and its stop.
2. Using accelerator pedal, increase engine speed to achieve a high idle speed of 1000 to 1100 rev/min.
3. Slacken nut on throttle lever stop.
4. Move lever stop into contact with accelerator lever. Tighten nut and remove spacer.

FUEL SYSTEM

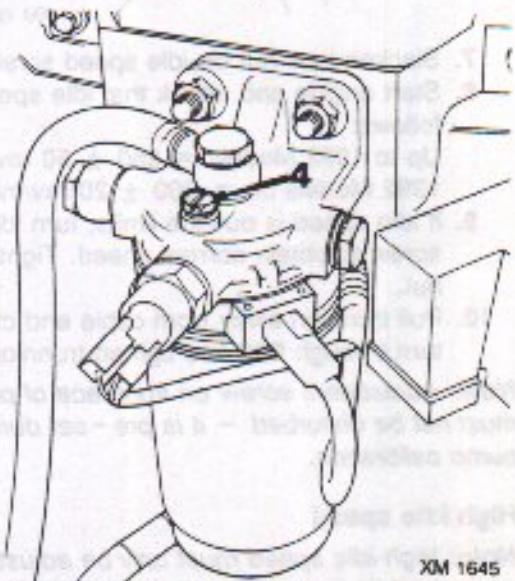
BLEEDING THE FUEL SYSTEM

Service Repair No. 19.50.07

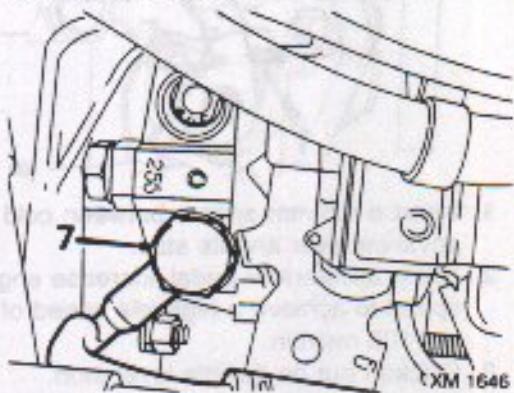
WARNING: Use gloves or suitable protective barrier cream to protect the hands against contact with diesel fuel.

CAUTION: Do not attempt to bleed the system by towing vehicle in gear, as this will result in damage to injection pump.

1. Disconnect battery earth lead.
2. Position cloth to absorb fuel.
3. Rotate crankshaft until lift pump operating lever is on the back of its cam, with priming lever operating through full stroke.



4. Slacken filter bleed screw and operate hand primer on lift pump until a flow of clean, air-free fuel is obtained.
5. Tighten bleed screw, remove cloth and wipe fuel from around bleed screw.
6. Position a cloth at injection pump feed hose banjo to absorb fuel.



7. Slacken feed hose banjo and operate hand primer on lift pump until a flow of clean, air-free fuel is obtained.
8. Tighten banjo union to 19 Nm. Remove cloth and wipe fuel from around banjo.
9. Connect battery earth lead.

10. Fit exhaust extractor pipe, start engine and allow to run until it is firing on all cylinders.
11. Stop engine and remove extractor pipe.

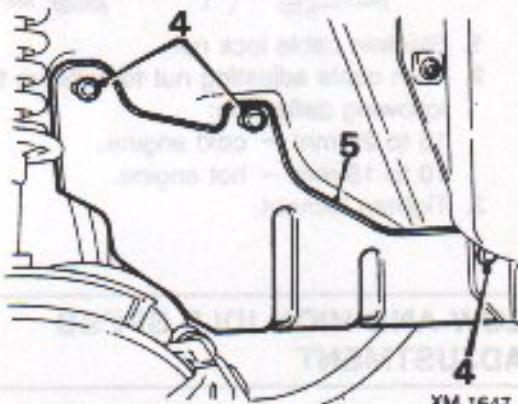
INJECTION PUMP TIMING

Service Repair No. 19.30.01

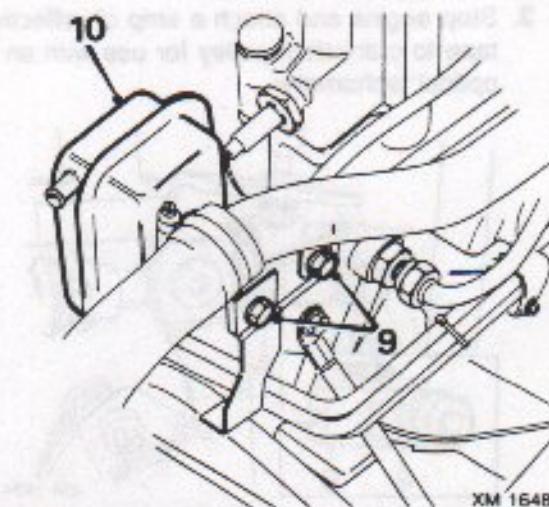
1. Disconnect battery earth lead.
2. Raise front of vehicle.

WARNING: Support on safety stands.

3. Remove R.H. front road wheel.

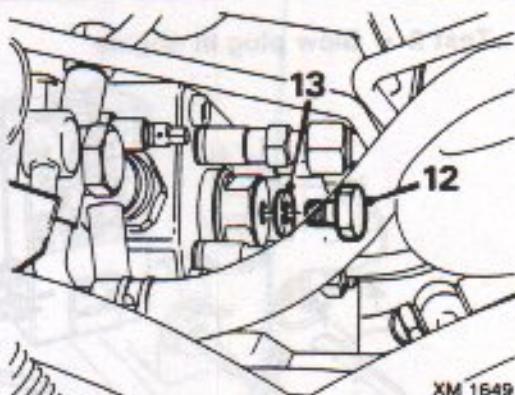


4. Remove 3 screws securing splash shield and collect spacer from front screw.
5. Remove splash shield.
6. Remove oil filler cap to view valves.
7. Rotate crankshaft until No. 1 piston is at T.D.C. on the compression stroke (No. 4 valves rocking).
8. Remove air cleaner assembly, see Repairs.



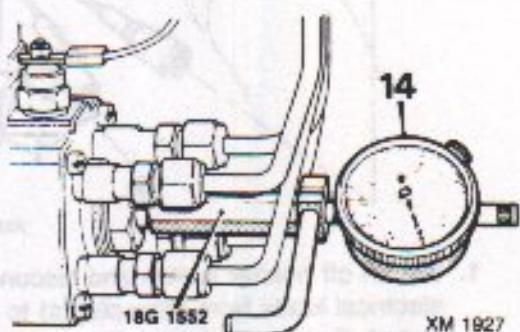
Pre 1992 model illustrated

9. Remove the 2 bolts securing breather separator.
10. Move separator aside. 1992 models on have a circular oil separator.
11. Remove injector pipes, see Repairs.



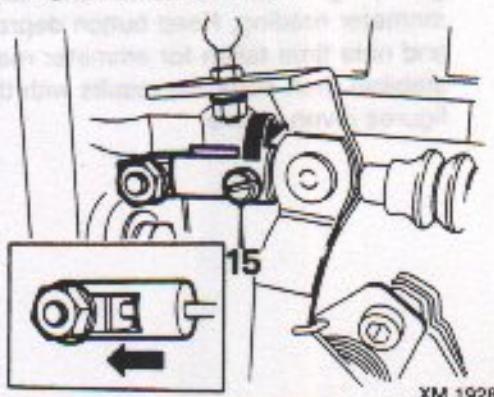
XM 1649

12. Remove plug from rear of pump.
13. Remove washer.



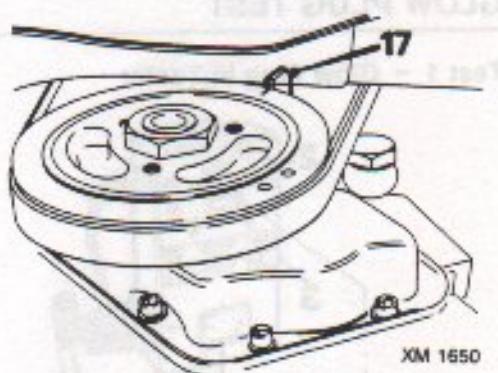
XM 1927

14. Fit tool 18G 1552 to pump and fit dial gauge to tool 18G 1552.



XM 1928

15. Slacken screw on cold start unit cable trunnion, turn trunnion through 90° and slide over cable end clamp. This releases pump advance lever.
16. Turn crankshaft anti - clockwise until the dial gauge needle stops moving. Zero gauge.



XM 1650

17. Turn crankshaft clockwise until pulley is aligned with T.D.C mark.
18. Slacken nuts securing injection pump. Adjust pump position until gauge reads 0.68 mm and tighten pump securing nuts to 30 Nm.

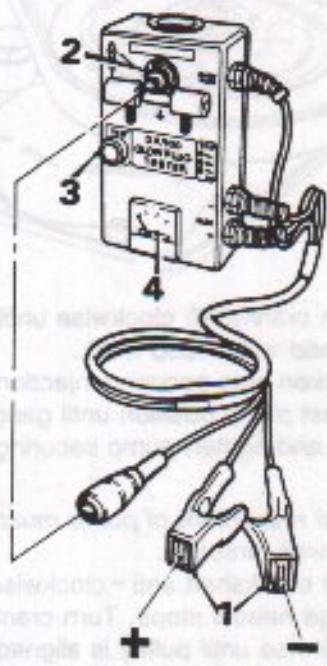
Note: Final movement of pump must ALWAYS be in a clockwise direction.

19. Turn crankshaft anti - clockwise until dial gauge needle stops. Turn crankshaft clockwise until pulley is aligned with T.D.C mark and check reading on dial gauge.
20. Pull trunnion away from cable end clamp, turn through 90° and tighten trunnion screw.
21. Remove dial gauge and tool 18G 1552 from pump.
22. Fit washer to plug and fit plug.
23. Refit injector pipes, see Repairs.
24. Align breather separator, harness clip bracket and hose clip, fit and tighten bolts securing breather separator.
25. Refit air cleaner assembly, see Repairs.
26. Refit oil filler cap.
27. Position splash shield, position spacer to front bolt and fit and tighten bolts.
28. Fit road wheel and tighten nuts to 110 Nm.
29. Remove stand(s) and lower vehicle.
30. Connect battery earth lead.

FUEL SYSTEM

GLOW PLUG TEST

Test 1 - Glow Plug in Tester

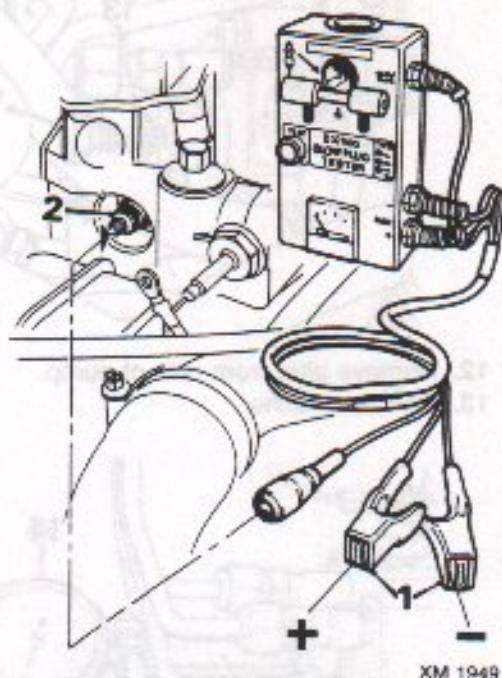


1. Connect red lead to battery positive terminal and black lead to negative terminal.
2. Fit glow plug in top of tester and retain with spring loaded bar. Connect yellow lead to threaded portion of glow plug.
3. Press test button and note ammeter reading. Keep button depressed and glow plug tip should start to glow after 5 seconds.

CAUTION: The glow plug tip must glow first. If it fails to do so replace glow plug.

4. Ammeter reading should show initial current draw of 25 amps, which should fall to 12 amps after 20 seconds.

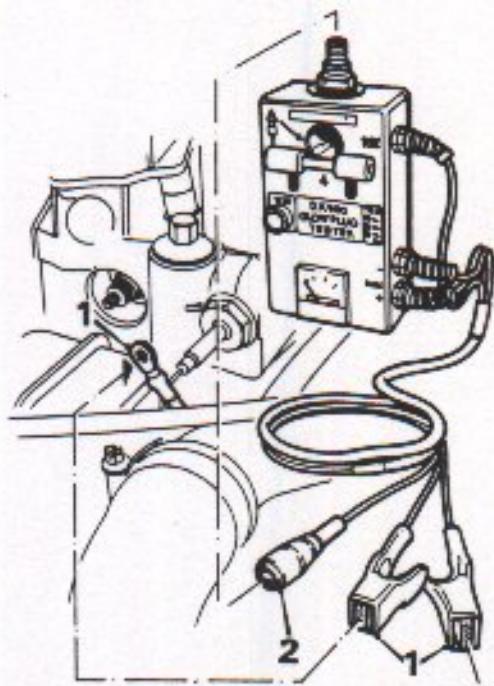
Test 2 - Glow plug in engine



1. Switch off master switch and disconnect all electrical leads from glow plug(s) to be tested. Connect red lead to battery positive terminal and black lead to negative terminal.
2. Connect yellow lead to threaded portion of glow plug. Press test button and note ammeter reading. Keep button depressed and note time taken for ammeter reading to stabilise then compare results with the figures given above.



Test 3 - Relay and timer circuit



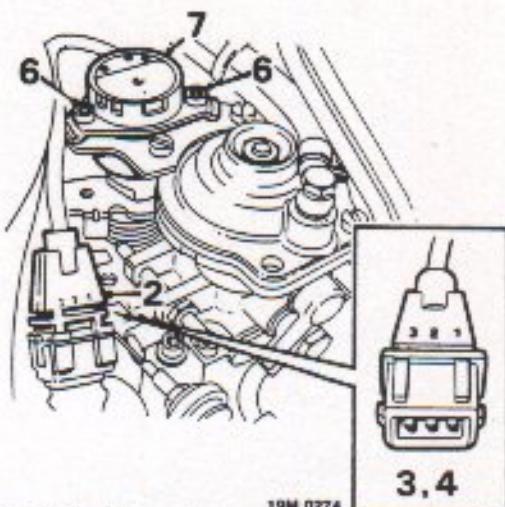
XM 1950

1. Switch off master switch and disconnect supply lead from glow plugs. Connect red lead to supply lead and connect black lead to battery negative terminal.
2. Connect yellow lead to a spare glow plug fitted in top of tester. Press and hold test button while switching on master switch and note ammeter reading. The reading should start to fall towards stabilised figure and drop to zero as timer breaks circuit.

E.G.R. THROTTLE POTENTIOMETER
- CHECK & ADJUST

Service Repair No. 19.30.15

1. Run engine until normal operating temperature is reached.



19M 0274

2. Switch off engine and disconnect throttle potentiometer multiplug.
3. Connect an ohmmeter to pins 1 and 3 of multiplug. Ohmmeter should read 1K to 1.05K ohms.
4. Connect ohmmeter to pins 1 and 2 of multiplug. Ohmmeter should read 850 to 900 ohms.
5. If readings are correct, connect multiplug. If readings are incorrect, adjust potentiometer.
6. Slacken 2 Torx screws securing potentiometer.
7. Rotate potentiometer to achieve correct ohmmeter readings, then tighten Torx screws.
8. Re-check ohmmeter readings, then disconnect ohmmeter and connect multiplug.

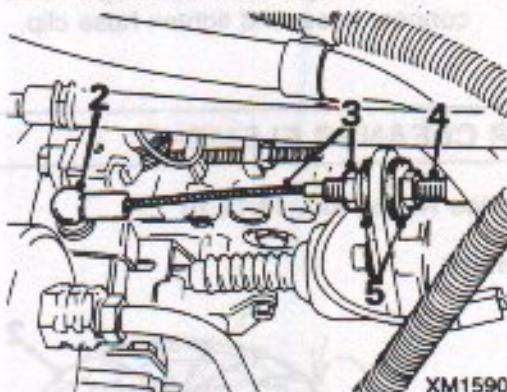


THROTTLE CABLE

Service Repair No. 19.20.06

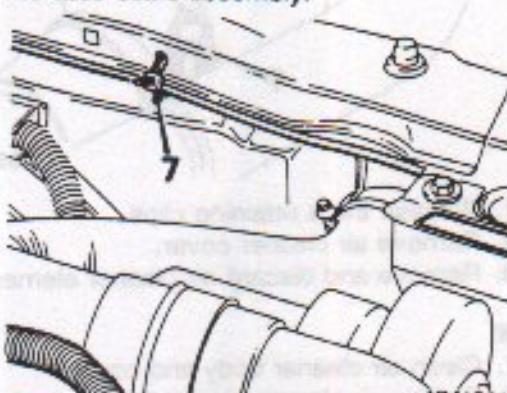
Remove

1. Disconnect battery earth lead.



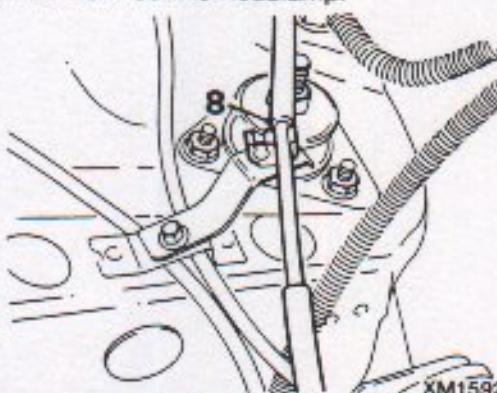
XM1590

2. Disconnect inner cable ball joint from throttle lever.
3. Unscrew locknut and withdraw inner cable from abutment bracket.
4. Withdraw outer cable from abutment bracket.
5. Release grommet and sleeve from abutment bracket.
6. Release cable assembly.



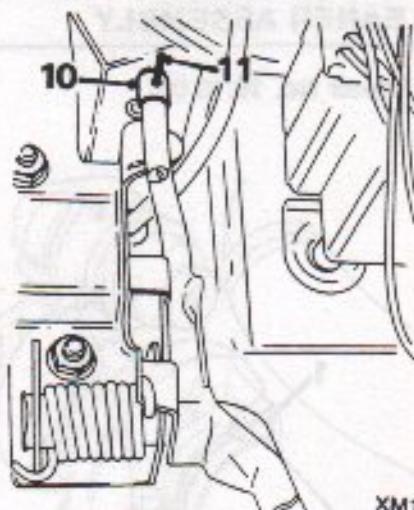
XM1591

7. R.H.D. models: Remove clip securing cable to bonnet locking platform and withdraw cable from behind headlamp.



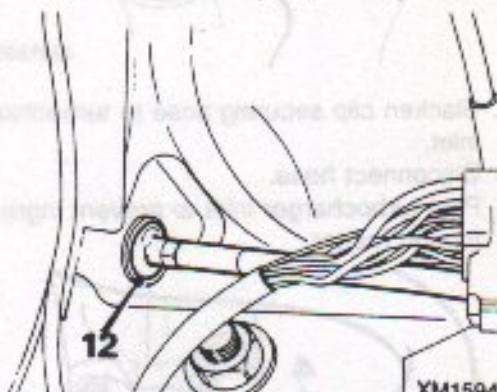
XM1592

8. R.H.D. models: Release cable from clip on suspension tower.
9. L.H.D. models: Remove clip securing cable.



XM1593

10. Remove clip securing cable to throttle pedal.
11. Release cable from pedal.



XM1594

12. Release outer cable from bulkhead.
13. Pull cable into engine bay, and remove cable assembly.

Refit

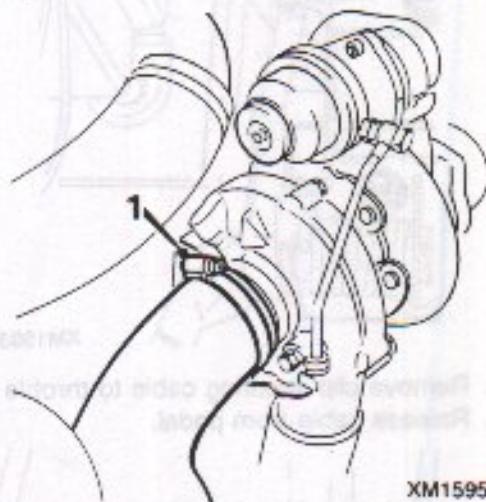
1. Position cable assembly in engine bay, feed inner cable through bulkhead.
2. Secure outer cable to bulkhead, connect inner cable to throttle pedal and fit securing clip.
3. R.H.D. models: Feed cable through behind headlamp.
4. Unscrew locknut and back off adjusting nut.
5. Feed inner cable through abutment bracket, fit abutment bracket grommet and fit outer cable to grommet.
6. Connect inner cable to throttle lever.
7. R.H.D. models: Secure cable to clips on bonnet locking platform and suspension tower.
8. L.H.D. models: Position cable to suspension tower and fit clip.
9. Adjust throttle cable, see **Adjustments**.
10. Connect battery earth lead.

FUEL SYSTEM

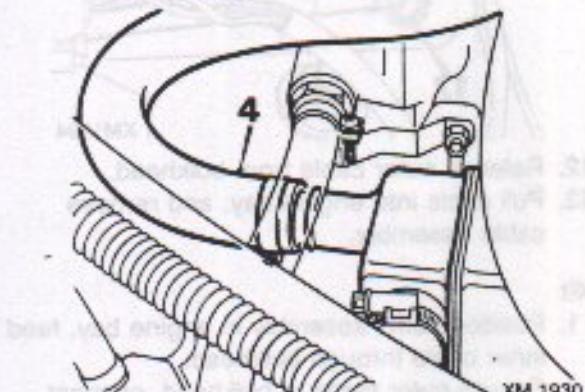
AIR CLEANER ASSEMBLY

Service Repair No. 19.10.01

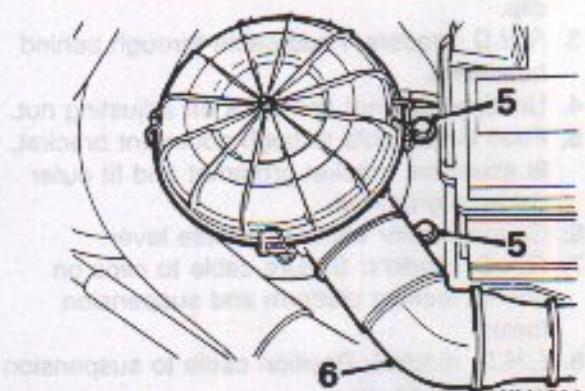
Remove



1. Slacken clip securing hose to turbocharger inlet.
2. Disconnect hose.
3. Plug turbocharger inlet to prevent ingress of foreign matter.



4. Disconnect breather hose from separator.



5. Remove the 2 screws securing air cleaner assembly to its mounting bracket.
6. Release air cleaner inlet from cold air intake duct and remove air cleaner assembly.

Refit

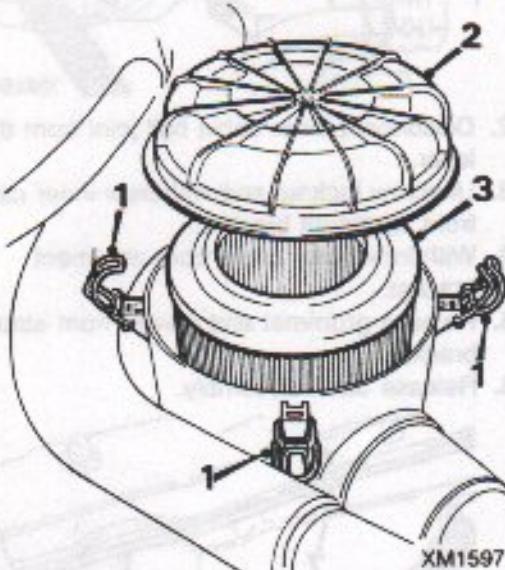
1. Position air cleaner assembly and connect air cleaner intake duct.

2. Align air cleaner assembly to its mounting bracket.
3. Fit air cleaner retaining screws and tighten to 8 Nm.
4. Connect breather hose to separator.
5. Remove plug from turbocharger inlet, connect hose, and tighten hose clip.

AIR CLEANER ELEMENT

Service Repair No. 19.10.10

Remove



1. Release the 4 retaining clips.
2. Remove air cleaner cover.
3. Remove and discard air cleaner element.

Refit

1. Clean air cleaner body and cover.
2. Fit new air cleaner element, refit air cleaner cover, and secure retaining clips.

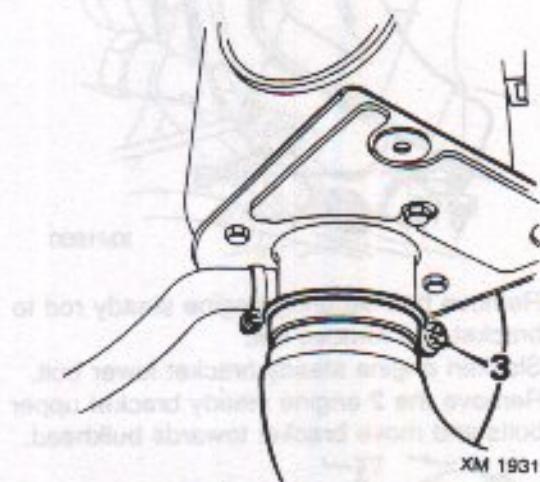


INTAKE HOSE - TURBOCHARGER

Service Repair No. 19.42.11

Remove

1. Disconnect battery earth lead.
2. Remove air cleaner assembly.



3. Slacken clip securing hose to air cleaner and remove hose.
4. Remove clips from hose.

Refit

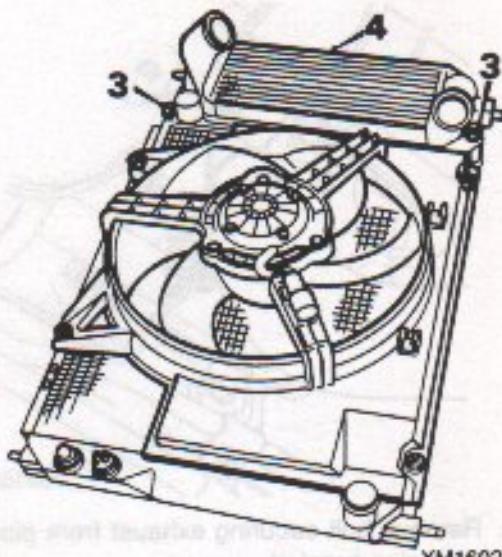
1. Fit a clip to each end of hose.
2. Fit hose to air cleaner and align and tighten hose clip.
3. Refit air cleaner assembly.
4. Fit hose to turbocharger inlet and align and tighten hose.

INTERCOOLER

Service Repair No. 19.42.15

Remove

1. Disconnect battery earth lead.
2. Remove radiator and intercooler assembly, see COOLING - Repairs - Radiator.



3. Remove the 2 bolts securing intercooler to radiator.
4. Remove intercooler.

Refit

1. Position intercooler.
2. Fit radiator to intercooler bolts and tighten to 15 Nm.
3. Refit radiator and intercooler assembly, see COOLING - Repairs - Radiator.
4. Connect battery earth lead.

FUEL SYSTEM

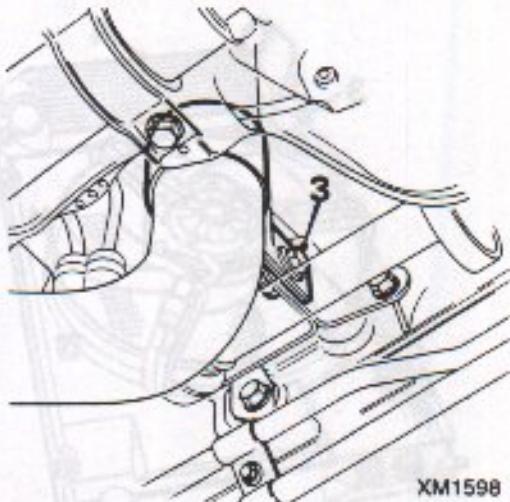
TURBOCHARGER ELBOW GASKET

Service Repair No. 19.42.21

Remove

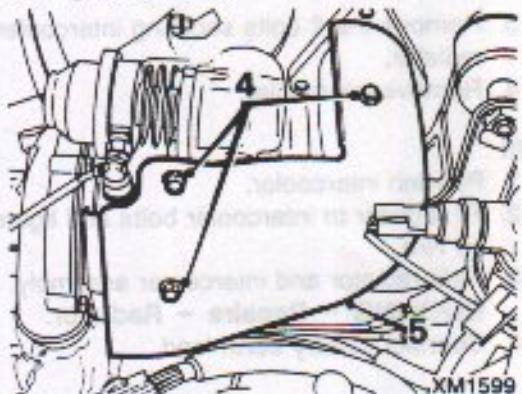
1. Disconnect battery earth lead.
2. Raise front of vehicle.

WARNING: Support on safety stands.



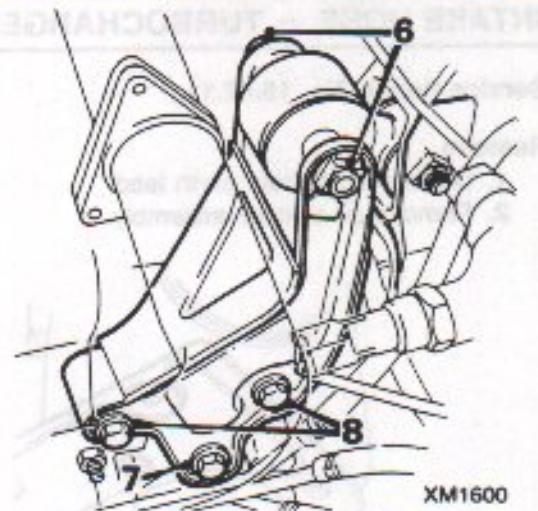
XM1598

3. Remove bolt securing exhaust front pipe clip to engine bracket.



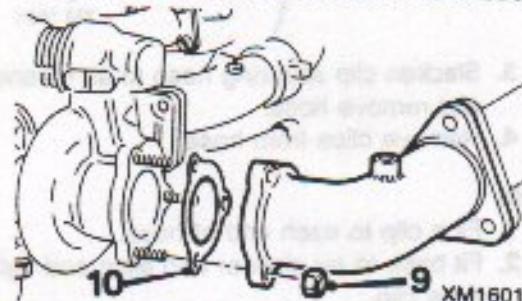
XM1599

4. Remove the 3 bolts securing turbocharger heatshield.
5. Remove heatshield.



XM1600

6. Remove bolt securing engine steady rod to bracket and remove nut.
7. Slacken engine steady bracket lower bolt.
8. Remove the 2 engine steady bracket upper bolts and move bracket towards bulkhead.



XM1601

9. Remove the 3 nuts securing turbocharger outlet elbow, release elbow from studs.
10. Discard gasket.

Refit

1. Clean turbocharger and outlet elbow mating faces, fit new gasket.
2. Position turbocharger elbow on studs and fit retaining nuts and tighten to 27 Nm.
3. Align engine steady bracket. Fit bolts and tighten to 90 Nm.
4. Position nut, fit bolt securing steady rod to bracket and tighten to 45 Nm.
5. Position turbocharger heatshield. Fit retaining bolts and tighten to 8 Nm.
6. Align exhaust front pipe clip to bracket and fit and tighten bolt.
7. Remove stand(s) and lower vehicle.
8. Connect battery earth lead.



TURBOCHARGER OIL FEED PIPE

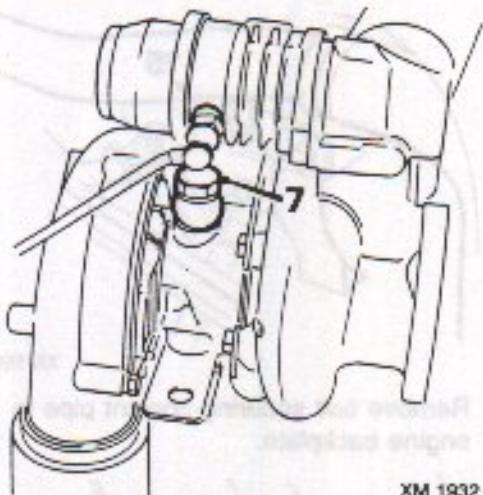
Service Repair No. 19.42.14

Remove

1. Disconnect battery earth lead.
2. Raise front of vehicle.

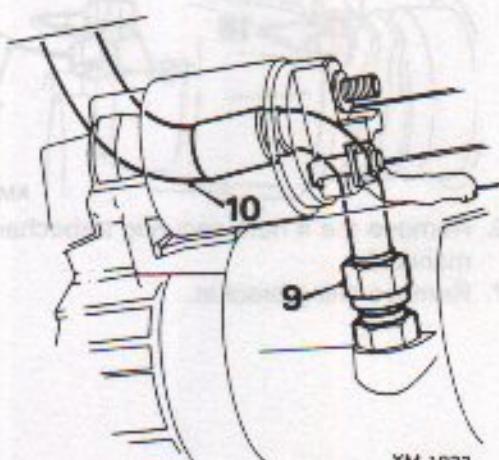
WARNING: Support on safety stands.

3. Disconnect exhaust down pipe flange from manifold, see **MANIFOLD & EXHAUST - Repairs - Down Pipe**.
4. Remove air cleaner assembly.
5. Remove turbocharger elbow, see **Turbocharger Elbow Gasket**.
6. Discard gasket.



XM 1932

7. Unscrew banjo bolt oil feed union from turbocharger.
8. Discard 2 washers.



XM 1933

9. Unscrew oil feed pipe union from cylinder block.
10. Release and remove pipe.

Refit

1. Clean feed pipe unions, connect pipe to cylinder block but do not tighten.
2. Align union to turbocharger, fit new sealing washers and tighten banjo bolt to 19 Nm.

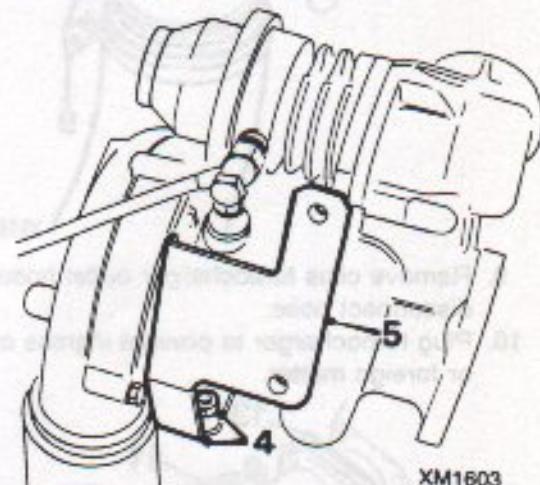
3. Tighten oil feed pipe union to cylinder block to 19 Nm.
4. Fit turbocharger elbow, see **Turbocharger Elbow Gasket**.
5. Fit air cleaner assembly.
6. Connect exhaust down pipe flange, see **MANIFOLD & EXHAUST - Repairs - Down Pipe**.
7. Remove stand(s) and lower vehicle.
8. Connect battery earth lead.

TURBOCHARGER AND GASKET

Service Repair No. Turbocharger 19.42.01
Service Repair No. Gasket 19.42.25

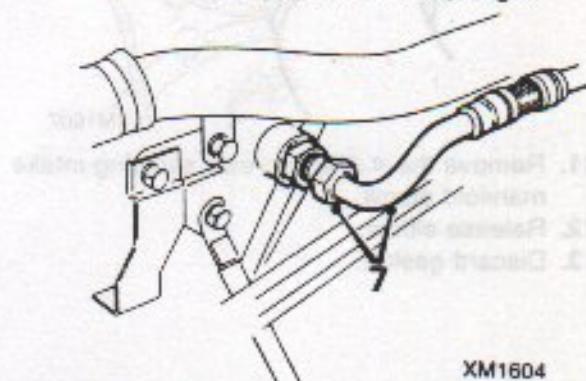
Remove

1. Disconnect battery earth lead.
2. Remove air cleaner assembly.
3. Remove turbocharger elbow, see **Turbocharger Elbow Gasket**.



XM1603

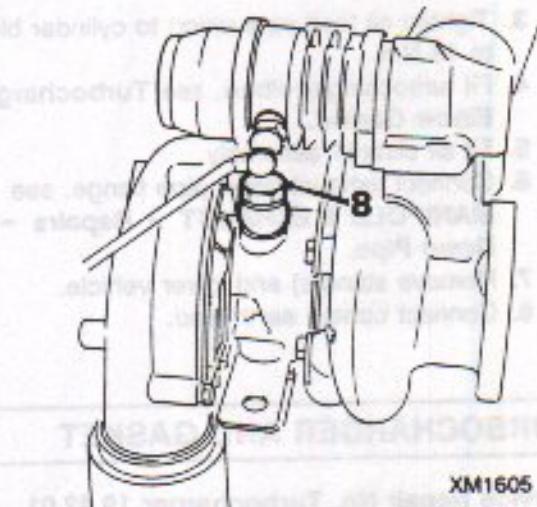
4. Remove nut securing heatshield bracket to turbocharger support bracket.
5. Remove bracket.
6. Position a cloth to absorb oil spillage.



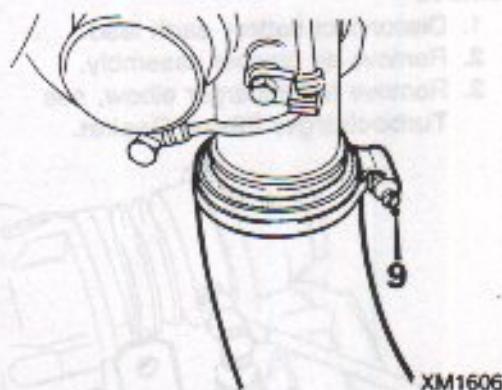
XM1604

7. Disconnect turbocharger oil return hose union.

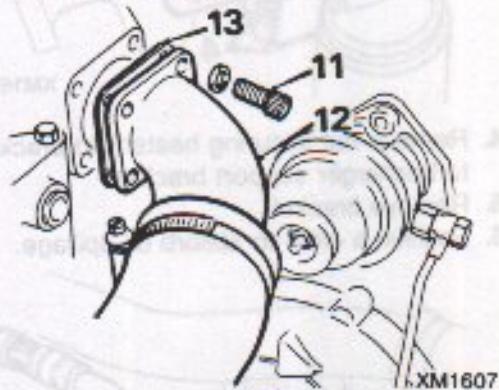
FUEL SYSTEM



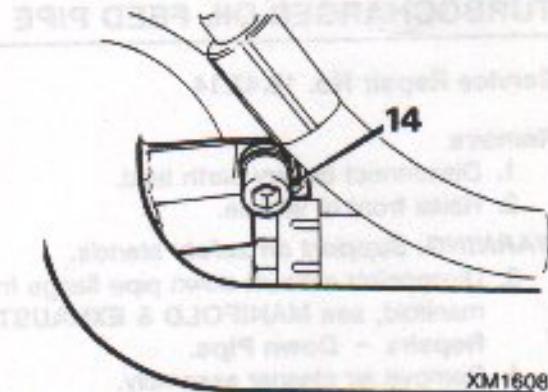
8. Disconnect turbocharger oil feed union and discard the 2 washers.



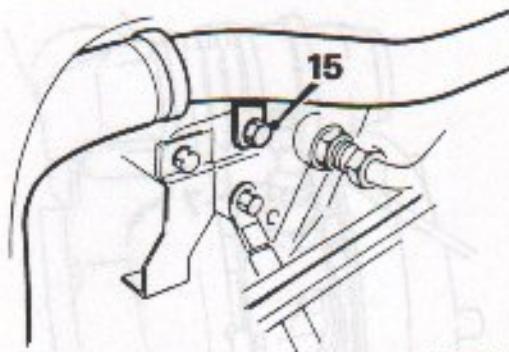
9. Remove clips turbocharger outlet hose and disconnect hose.
10. Plug turbocharger to prevent ingress of dirt or foreign matter.



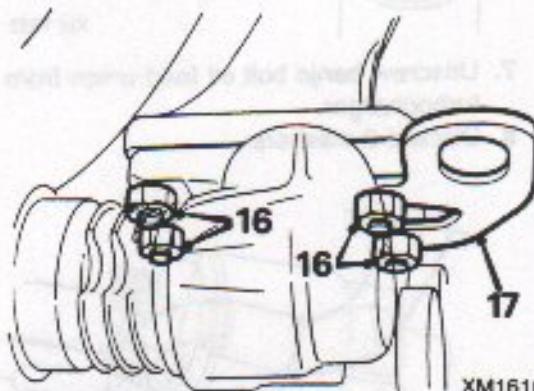
11. Remove the 4 Allen screws securing intake manifold elbow.
12. Release elbow.
13. Discard gasket.



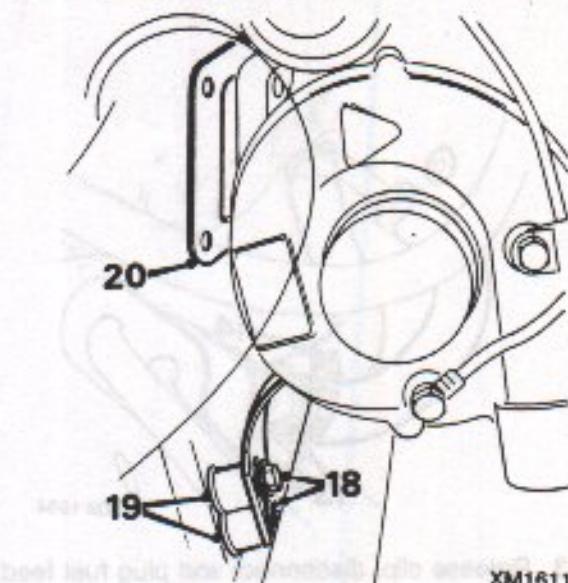
14. Remove Allen screw securing coolant pipe to turbocharger support bracket.



15. Remove bolt securing coolant pipe to engine backplate.

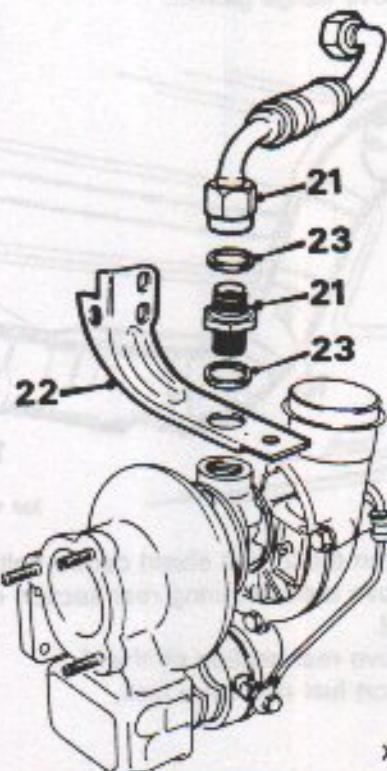


16. Remove the 4 nuts securing turbocharger to manifold.
17. Remove lifting bracket.



XM1611

18. Remove bolts securing turbocharger support bracket to engine backplate.
19. Remove the 2 spacers and remove turbocharger assembly.
20. Discard gasket.



XM1612

21. Unscrew oil return hose union, and remove hose and adapter.
22. Remove turbocharger support bracket.
23. Discard the 2 washers.

Refit

1. Position support bracket and, using new washer, fit and tighten adapter.
2. Clean return hose union and, using new washer, fit and tighten union.

3. Clean manifold and turbocharger mating faces, fit new gasket to manifold and position turbocharger.
4. Position 2 support bracket spacers and fit and tighten bolts.
5. Position lifting bracket.
6. Fit turbocharger securing nuts and tighten to 27 Nm.
7. Align coolant pipe to turbocharger support bracket and fit Allen screw but do not tighten.
8. Fit and tighten bolt securing coolant pipe to engine backplate. Tighten turbocharger support bracket Allen screw.
9. Clean inlet elbow mating faces, position a new gasket and align elbow. Fit and tighten Allen screws to 27 Nm.
10. Remove plug from turbocharger. Fit clip to intercooler hose, connect hose to turbocharger and align and tighten hose clip.
11. Fit new washers and tighten oil feed union.
12. Fit and tighten drain pipe union. Remove cloth and wipe surrounding area.
13. Position turbocharger heatshield bracket, fit nut and tighten to 8 Nm.
14. Fit turbocharger elbow, see **Turbocharger Elbow Gasket**.
15. Refit air cleaner assembly.
16. Connect battery earth lead.

FUEL TANK

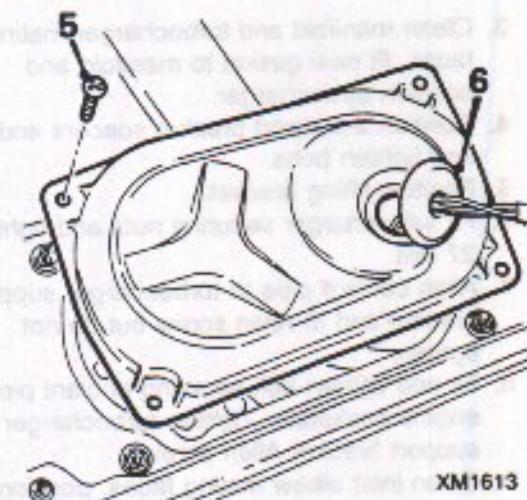
Service Repair No. 19.55.01

Remove

WARNING: Before removing the fuel tank from the vehicle it must be drained. Use gloves or suitable protective barrier cream to protect the hands against contact with diesel fuel.

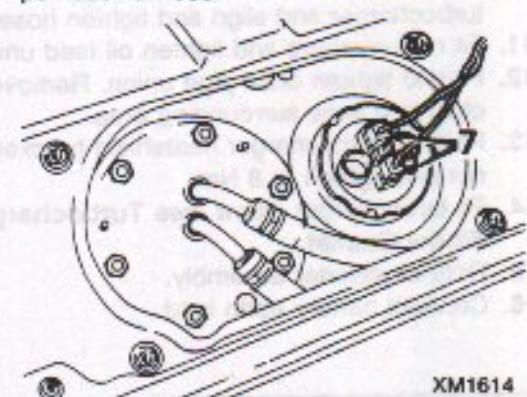
1. Disconnect battery earth lead.
2. Saloon: Remove luggage compartment floor carpet.
3. Fastback: Release and lower rear seat squab, and fold back luggage compartment floor carpet.
4. Remove spare wheel cover board and tool kit.

FUEL SYSTEM



XM1613

5. Remove 4 screws securing access panel.
6. Release grommet from access panel and pull out harness.



XM1614

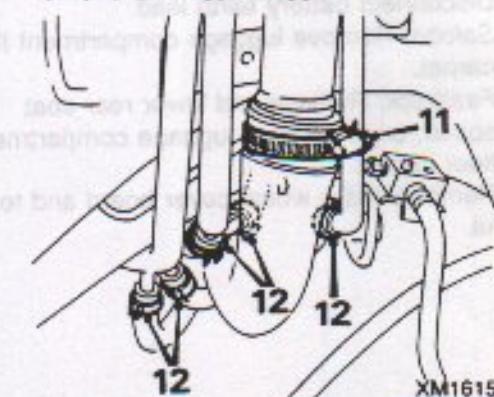
7. Disconnect tank unit Lucars.
8. Remove fuel filler cap, position a suitable container beneath drain plug and drain fuel tank.

WARNING: See REPAIR MANUAL - GENERAL INFORMATION - Fuel Handling Precautions.

9. Raise rear of vehicle.

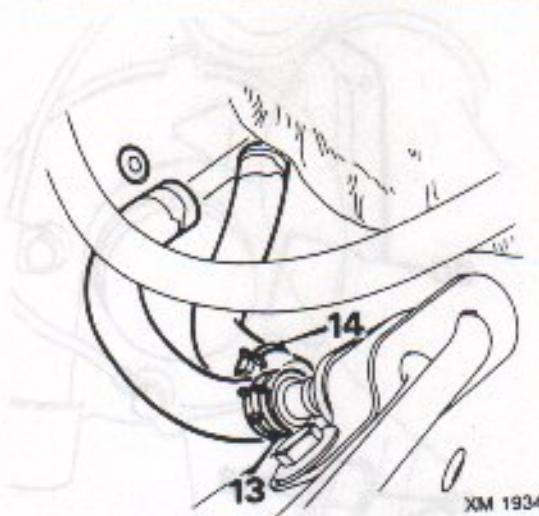
WARNING: Support on safety stands.

10. Remove L.H. rear wheel.



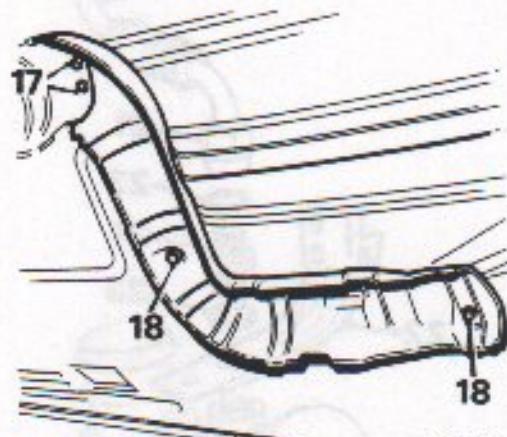
XM1615

11. Slacken clip securing filler hose to neck, disconnect hose and move aside. Plug hose.
12. Release the 5 clips securing breather hoses, disconnect and plug hoses.



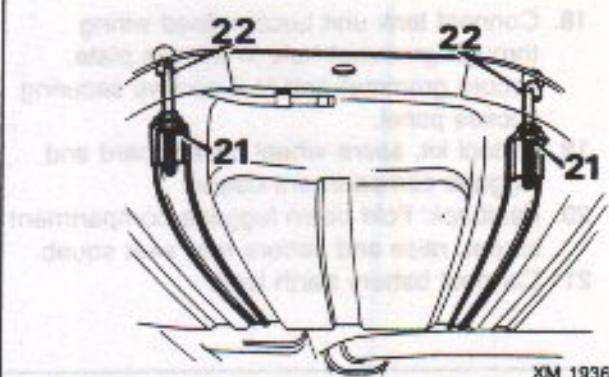
XM 1934

13. Release clip, disconnect and plug fuel feed hose.
14. Release clip, disconnect and plug spill return hose.
15. Remove intermediate and tail pipe assembly, see **MANIFOLD & EXHAUST - Repairs - Exhaust System**.
16. Remove flange gasket.



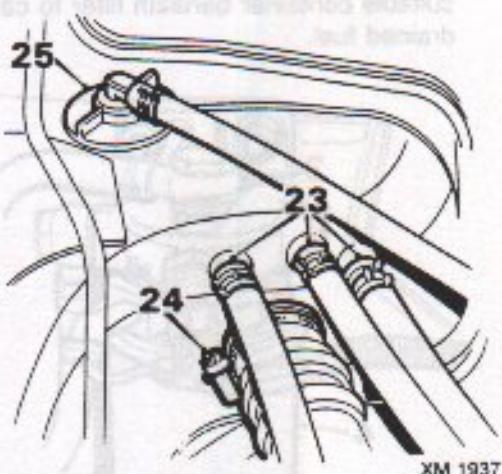
XM 1935

17. Slacken the 2 heat shield centre bolts.
18. Remove bolts securing rear section of heat shield.
19. Remove rear section of shield.
20. Support fuel tank on a jack.



21. Remove the 2 fuel tank strap nuts and lower straps.
22. Release hook bolts, lower and remove fuel tank.

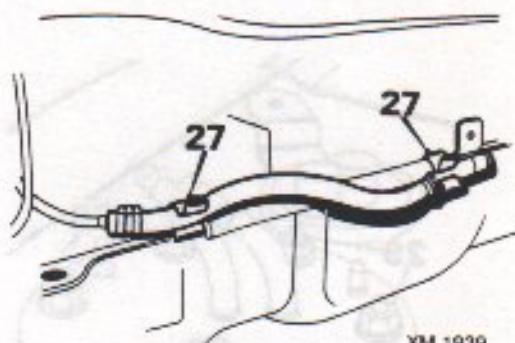
Do not carry out further dismantling if component is removed for access only



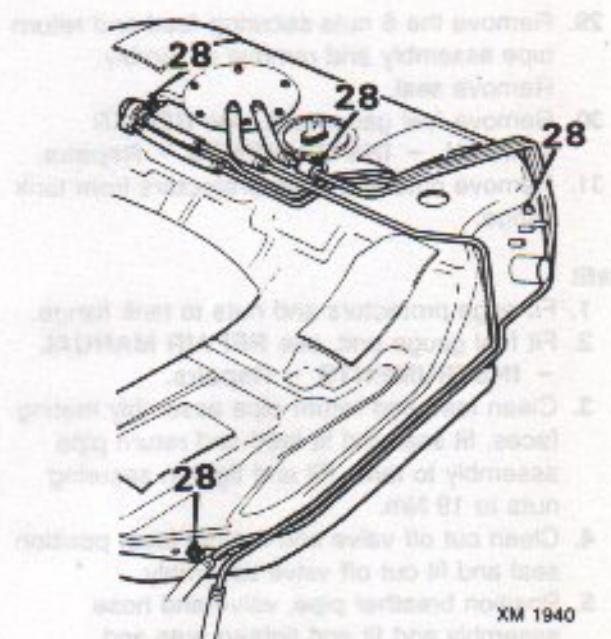
23. Release the 3 clips securing breather hoses and remove hoses.
24. Slacken filler hose clip and remove hose.
25. Remove cut off valve and hose assembly and remove seal.



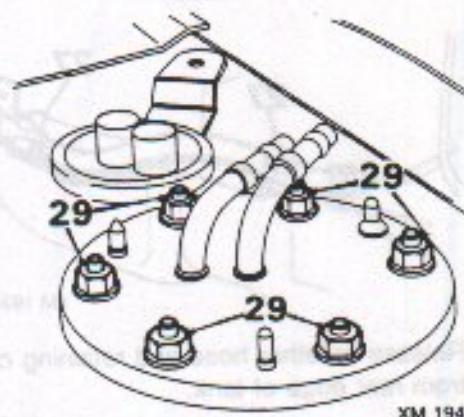
26. Release clips and disconnect fuel feed and spill return hoses from pipes.



27. Release breather hose and retaining clips from rear edge of tank.



28. Remove the 4 nuts and screws securing breather pipe, valve and hose assembly and remove assembly.



XM 1941

29. Remove the 6 nuts securing feed and return pipe assembly and remove assembly. Remove seal.
30. Remove fuel gauge unit, see **REPAIR MANUAL - INSTRUMENTS - Repairs.**
31. Remove nuts and edge protectors from tank flange.

Refit

1. Fit edge protectors and nuts to tank flange.
2. Fit fuel gauge unit, see **REPAIR MANUAL - INSTRUMENTS - Repairs.**
3. Clean feed and return pipe assembly mating faces, fit seal and fit feed and return pipe assembly to tank. Fit and tighten securing nuts to 19 Nm.
4. Clean cut off valve and mating face, position seal and fit cut off valve assembly.
5. Position breather pipe, valve and hose assembly and fit and tighten nuts and screws.
6. Connect feed and spill return hoses and secure clips.
7. Fit filler hose, align and tighten hose clip.
8. Fit breather hoses and secure clips.
9. Position tank, aligning whilst lifting into position.
10. Position hook bolts, connect support straps and fit and tighten nuts.
11. Position rear heat shield, fit and tighten securing bolts and tighten centre bolts.
12. Fit intermediate and tail pipe, see **MANIFOLD & EXHAUST - Repairs - Exhaust System.**
13. Remove plugs from feed and spill return hoses and pipes, reconnect hoses and tighten clips.
14. Remove plugs from breather and filler vent hoses, reconnect hoses and tighten clips.
15. Fit road wheel and tighten nuts to 110 Nm.
16. Remove stand(s) and lower vehicle.
17. Remove plug from filler neck hose, connect hose, tighten clip and fit filler cap.

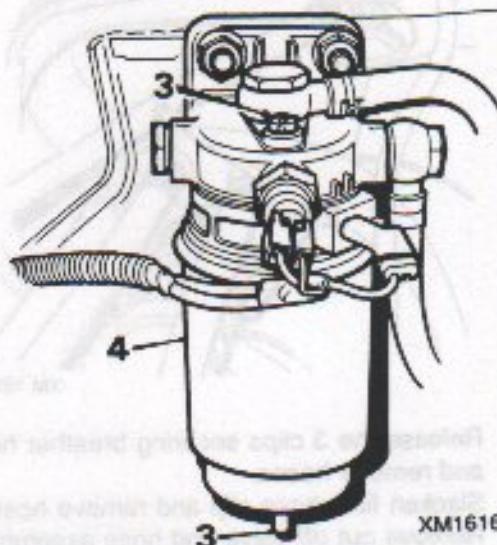
18. Connect tank unit Lucars, feed wiring through grommet hole in access plate, secure grommet and fit 4 screws securing access panel.
19. Fit tool kit, spare wheel cover board and luggage compartment carpet.
20. **Fastback:** Fold down luggage compartment carpet, raise and secure rear seat squab.
21. Connect battery earth lead.

FUEL FILTER ELEMENT

Service Repair No. 19.25.07

Remove

1. Disconnect battery earth lead.
2. Clean area around filter head, and position a suitable container beneath filter to catch drained fuel.



XM1616

3. Slacken bleed screw, turn drain tap a half - turn clockwise and drain filter.
4. Unscrew filter element and discard.

Refit

1. Wet the seal of a new filter element with clean fuel, fit into filter housing and hand tighten.
2. Connect heater switch Lucars.
3. Bleed fuel system, see **Adjustments.**
4. Wipe filter assembly and remove drain tray.
5. Connect battery earth lead.

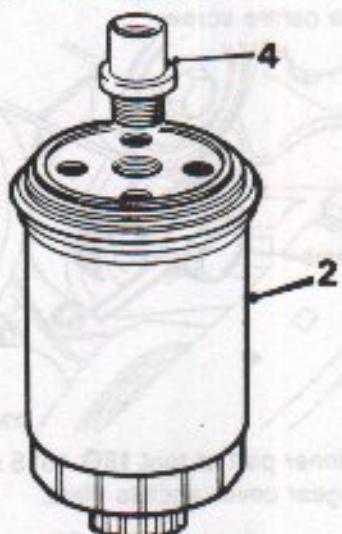
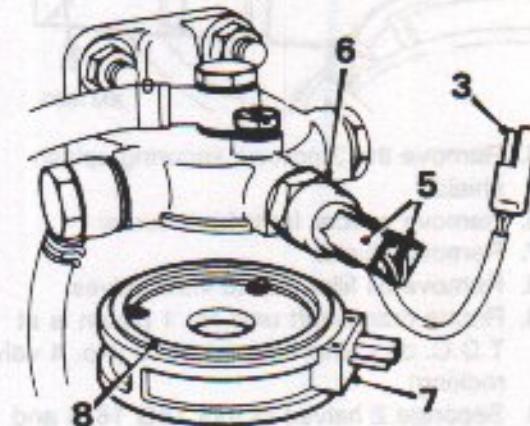


FUEL HEATER AND FUEL HEATER SWITCH

Service Repair No. Fuel heater 19.25.20
Service Repair No. Heater switch 19.25.21

Remove

1. Disconnect battery earth lead.



XM 1942

2. Remove fuel filter element.
3. Disconnect heater multiplug.
4. Remove filter head centre adapter.
5. Disconnect switch Lucars.
6. Remove heater switch.
7. Remove heater.
8. Remove seal.

Refit

1. Clean heater seal recess and mating face, lubricate seal with clean fuel and fit seal.
2. Position heater.
3. Fit filter head centre adapter.
4. Clean switch threads, fit switch and connect switch Lucars.
5. Align heater, tighten centre adapter and connect heater multiplug.
6. Refit fuel filter element.
7. Connect battery earth lead.

FUEL LIFT PUMP

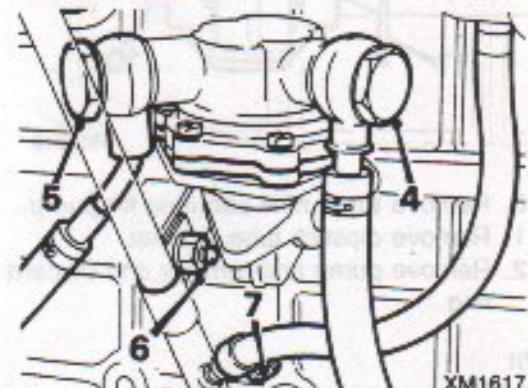
Service Repair No. 19.45.09

Remove

1. Disconnect battery earth lead.
2. Raise front of vehicle.

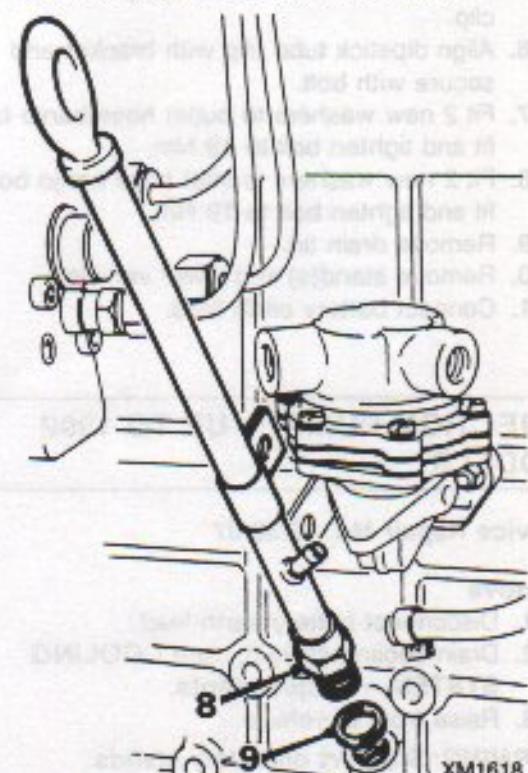
WARNING: Support on safety stands.

3. Position suitable container below lift pump to catch fuel spillage.



XM1617

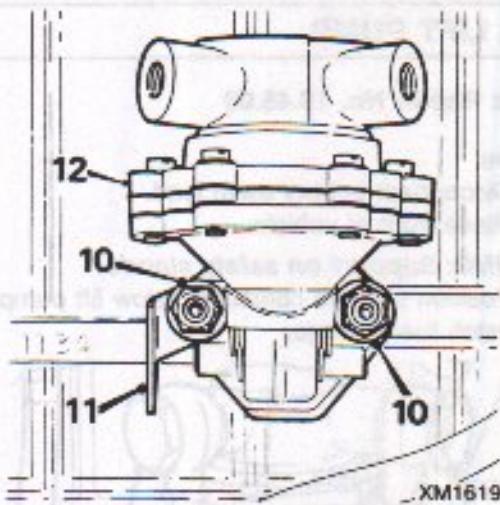
4. Remove fuel inlet hose banjo bolt and discard the 2 washers.
5. Remove fuel outlet hose banjo bolt and discard the 2 washers.
6. Remove bolt securing dipstick tube clip to bracket on R.H. pump stud.
7. Slacken clip securing breather hose to dipstick tube and disconnect hose.



XM1618

8. Unscrew and remove dipstick tube.
9. Collect washer.

FUEL SYSTEM



10. Remove the 2 nuts securing lift pump.
11. Remove dipstick tube bracket.
12. Remove pump and remove and discard 'O' ring.

Refit

1. Clean pump mating faces.
2. Lubricate new 'O' ring with fuel and fit to pump.
3. Position pump and dipstick tube bracket to engine, and fit and tighten the 2 securing nuts.
4. Fit dipstick tube washer, position dipstick tube and screw into position.
5. Connect breather hose and tighten hose clip.
6. Align dipstick tube clip with bracket and secure with bolt.
7. Fit 2 new washers to outlet hose banjo bolt, fit and tighten bolt to 19 Nm.
8. Fit 2 new washers to inlet hose banjo bolt, fit and tighten bolt to 19 Nm.
9. Remove drain tin.
10. Remove stand(s) and lower vehicle.
11. Connect battery earth lead.

INJECTION PUMP - UP TO 1992 MODELS

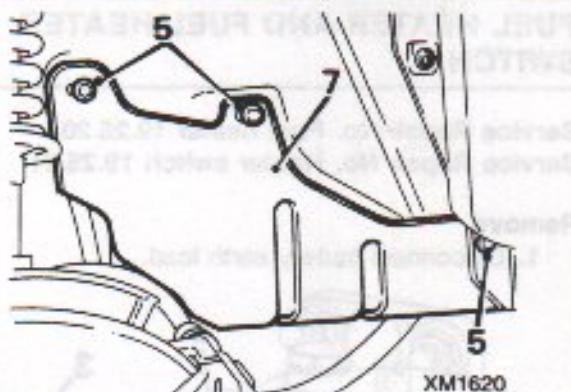
Service Repair No. 19.30.07

Remove

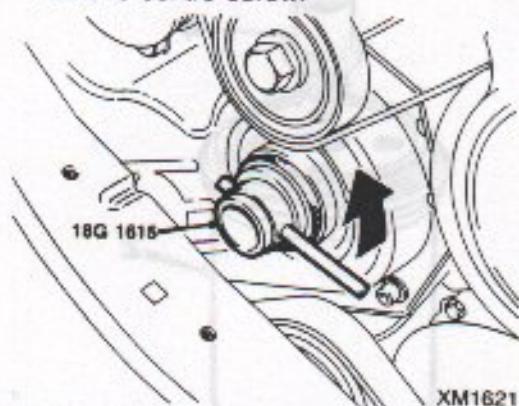
1. Disconnect battery earth lead.
2. Drain cooling system, see **COOLING SYSTEM - Adjustments**.
3. Raise front of vehicle.

WARNING: Support on safety stands.

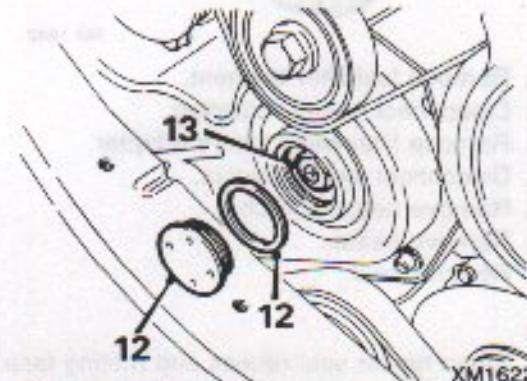
4. Remove R.H. front road wheel.



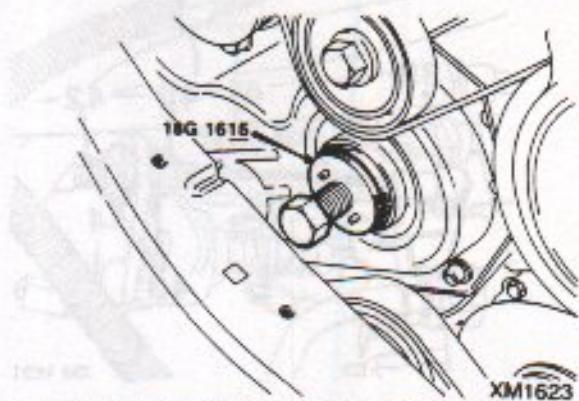
5. Remove the 3 screws securing splash shield.
6. Remove spacer from front screw.
7. Remove shield.
8. Remove oil filler cap to view valves.
9. Rotate crankshaft until No 1 piston is at T.D.C. on compression stroke (No. 4 valves rocking).
10. Separate 2 halves of tool 18G 1615 and remove centre screw.



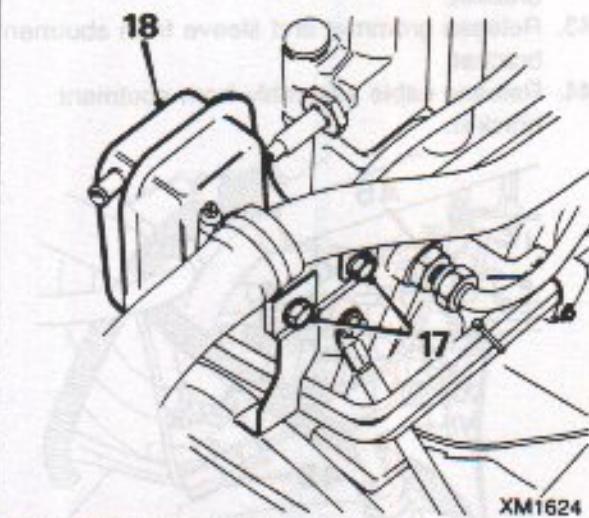
11. Using inner part of tool 18G 1615 slacken timing gear cover access plate.



12. Remove access plate and sealing washer.
13. Remove nut securing pump gear and collect washer.

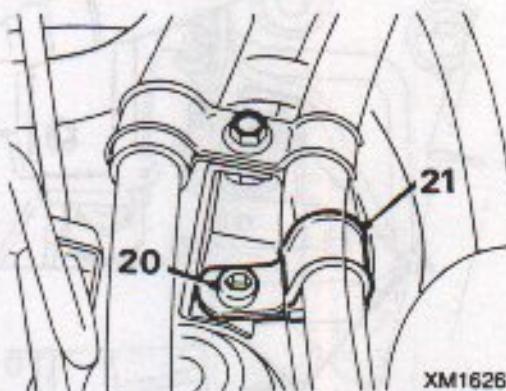


14. Screw outer part of tool **18G 1615** onto cover.
15. Fit centre screw to inner part of tool **18G 1615**, fit inner part through outer part and screw into pump gear.
16. Remove air cleaner assembly.

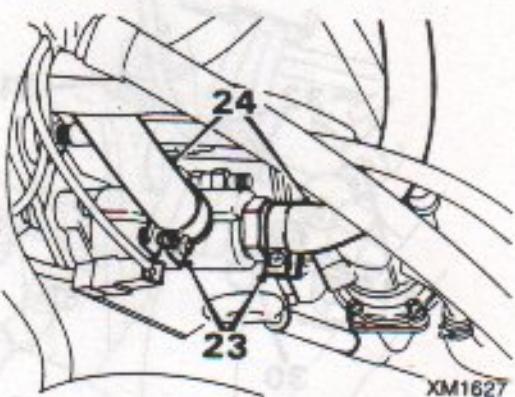


Pre 1992 Model illustrated

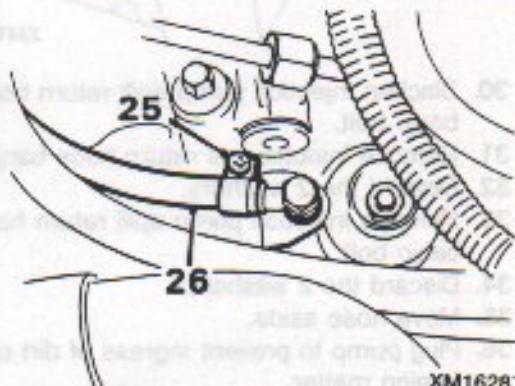
17. Remove the 2 bolts securing breather separator.
18. Move separator aside.
19. Remove injector pipes.



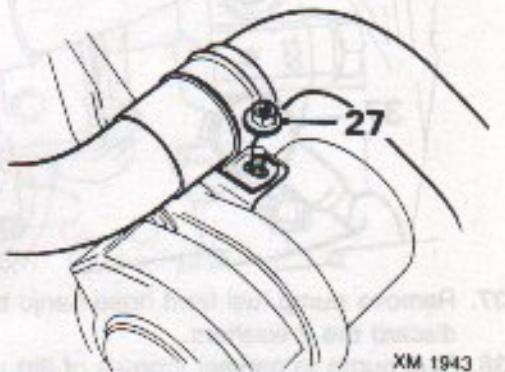
20. Remove Allen screw securing cold start advance unit hose clip and harness bracket to pump.
21. Remove bracket.
22. Position suitable container below cold start advance unit to catch coolant spillage.



23. Slacken the 2 cold start advance unit hose clips.
24. Disconnect cold start advance unit hoses.

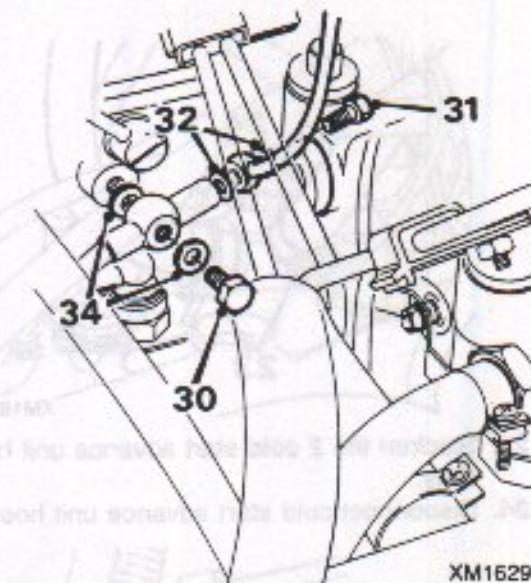


25. Slacken hose clip securing turbocharger pressure sensing hose to injection pump.
26. Disconnect hose.

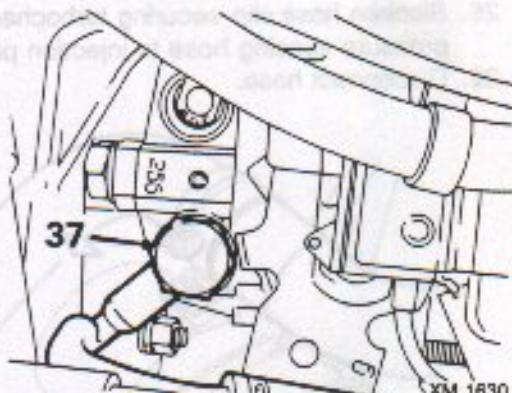


27. Remove nut securing top hose clip to bracket on P.A.S. pump bracket.
28. Slacken top hose clip.
29. Disconnect and move hose aside for access.

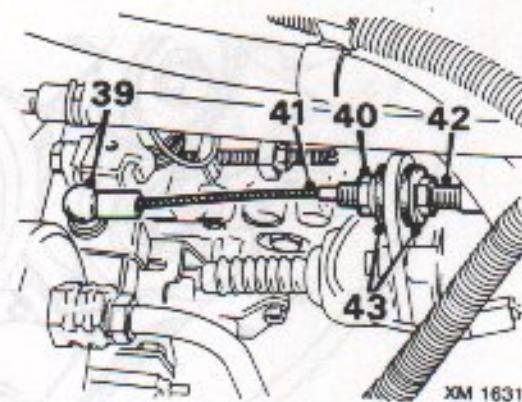
FUEL SYSTEM



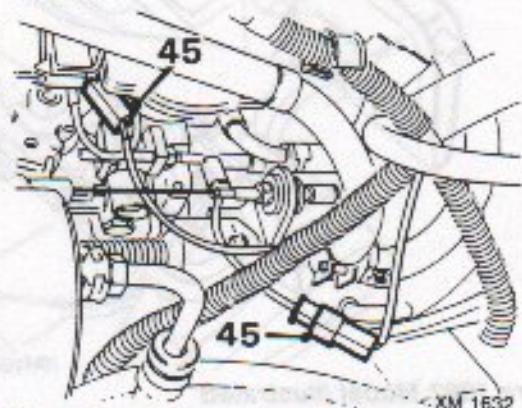
30. Slacken injection pump spill return hose banjo bolt.
31. Remove injector spill return hose banjo bolt.
32. Discard the 2 washers.
33. Remove injection pump spill return hose banjo bolt.
34. Discard the 2 washers.
35. Move hose aside.
36. Plug pump to prevent ingress of dirt or foreign matter.



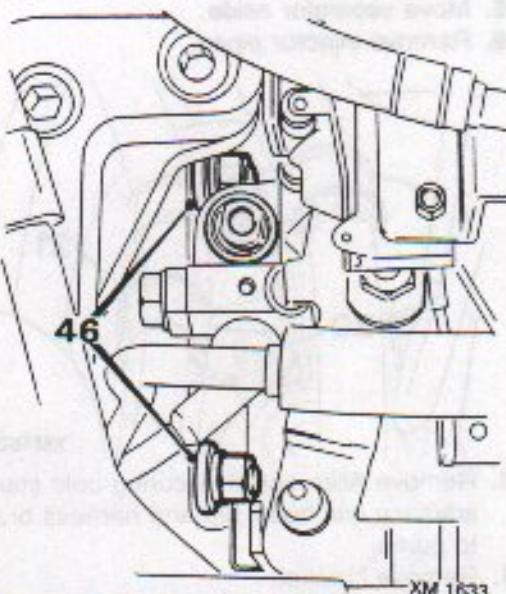
37. Remove pump fuel feed hose banjo bolt and discard the 2 washers.
38. Plug pump to prevent ingress of dirt or foreign matter.



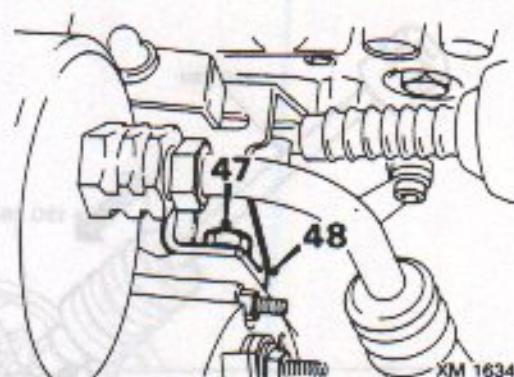
39. Release throttle cable ball joint from throttle lever.
40. Unscrew throttle cable locknut.
41. Withdraw inner cable from abutment bracket.
42. Withdraw outer cable from abutment bracket.
43. Release grommet and sleeve from abutment bracket.
44. Release cable assembly from abutment bracket.



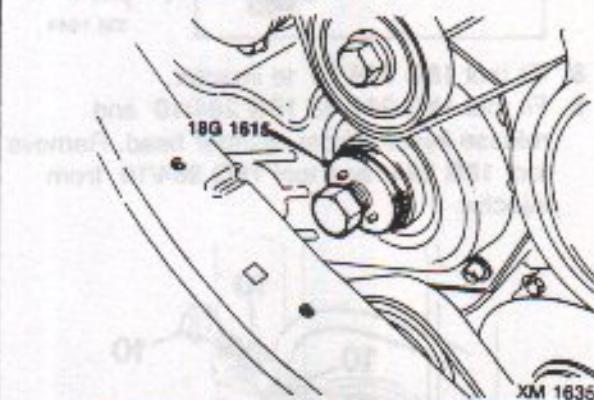
45. Disconnect Lucars from throttle lever microswitch and stop solenoid.



46. Remove the 3 nuts securing pump.



47. Remove bolt securing support bracket.
48. Remove support bracket.



49. Tighten centre screw on tool 18G 1615 to release pump drive from gear.
50. Slacken centre screw on tool 18G 1615.
51. Release injection pump from studs.
52. Move hoses aside and withdraw injection pump. Discard pump gasket.

Refit

- Clean pump and engine mating faces, clean pump drive spindle and drive gear bore and fit new pump gasket.
- Align pump drive spindle key to the eleven o'clock position, move hoses aside and place injection pump on its studs.
- Position support bracket, fit bolt securing bracket to P.A.S. pump bracket.
- Fit pump securing nuts but do not tighten.

Note: *Injection pump nuts are tightened and oil filler cap refitted after injection timing has been set.*

- Remove tool 18G 1615.
- Fit pump drive gear washer. Fit drive gear nut and tighten nut to 88 Nm.
- Clean access plate and mating face, fit washer to access plate and fit access plate.
- Remove centre screw from inner part of tool 18G 1615 and use tool to fit access plate.
- Set injection pump timing, see **Adjustments**.
- Connect stop solenoid and throttle lever microswitch Lucas.

- Feed throttle cable inner through abutment bracket, secure grommet to abutment bracket and secure sleeve to grommet.
- Connect inner cable to throttle lever.
- Remove plug from pump.
- Connect feed pipe to injection pump using banjo bolt with 3 large holes and new copper washers. Tighten banjo bolt to 19 Nm.
- Connect spill return hose to injection pump using new aluminium washers and banjo union with 'OUT' stamped on its head. Tighten banjo bolt to 19 Nm.
- Using new washers, fit and tighten injector spill return hose banjo bolt.
- Connect top hose, align top hose clip to P.A.S. bracket and fit and tighten nut.
- Tighten top hose clip.
- Connect turbocharger pressure sensing hose, align and tighten hose clip.
- Connect cold start advance unit hoses, align and tighten hose clips. Remove drain tin.
- Position harness bracket and fit and tighten Allen screw.
- Refit injector pipes.
- Align breather separator, align harness clip bracket and hose clip and fit and tighten bolts securing breather separator.
- Refit air cleaner assembly.
- Position splash shield, fit spacer to front bolt and fit and tighten bolts.
- Fit road wheel and tighten nuts to 110 Nm.
- Remove stand(s) and lower vehicle.
- Refill cooling system, see **COOLING - Adjustments**.
- Connect battery earth lead.

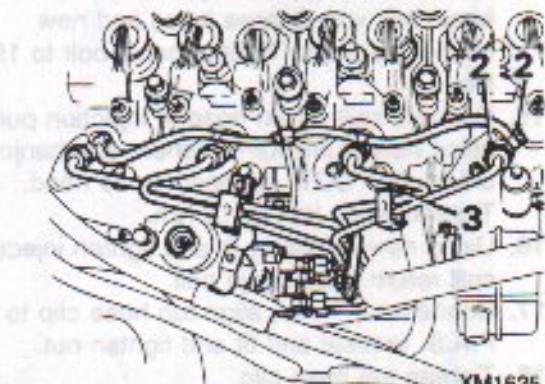
FUEL SYSTEM

INJECTOR

Service Repair No. 19.60.10

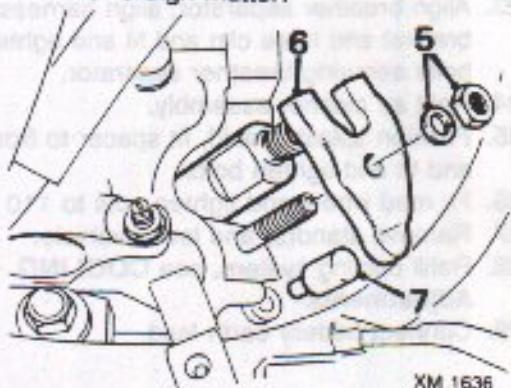
Remove

1. Disconnect battery earth lead.



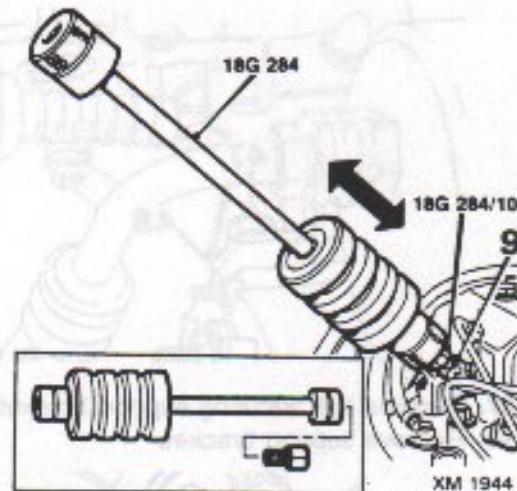
XM1625

2. Slacken spill return hose banjo bolt and disconnect injector pipe union.
3. Remove bolt securing injector pipe small clamp, remove the 2 clamp pieces and rubber sleeve and move injector pipe aside.
4. Plug pipe and injector to prevent ingress of dirt and foreign matter.



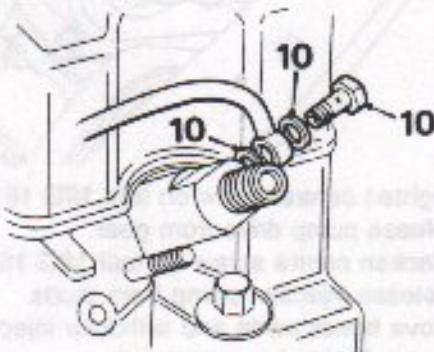
XM 1636

5. Remove injector retaining plate nut and washer.
6. Remove plate.
7. Remove dowel.



XM 1944

8. Fit tool 18G 284/10 to injector.
9. Fit tool 18G 284 to 18G 284/10 and release injector from cylinder head. Remove tool 18G 284 and tool 18G 284/10 from injector.



XM 1637

10. Remove spill return hose banjo bolt and the 2 washers and remove injector.
11. Remove injector washer from cylinder head.

Refit

1. Clean injector and injector seating. Fit new injector and spill return hose washers.
2. Position injector and spill return hose. Fit spill return hose banjo but do not tighten.
3. Locate injector to cylinder head.
4. Clean and fit dowel and retaining plate, and fit and tighten nut to 24 Nm.
5. Clean pipe unions and position and connect union to injector but do not tighten.
6. Position injector pipe small clamp rubber sleeve and 2 clamp pieces, and fit and tighten securing bolt.
7. Tighten pipe union at injector to 19 Nm.
8. Tighten spill return hose banjo bolt.
9. Connect battery earth lead.

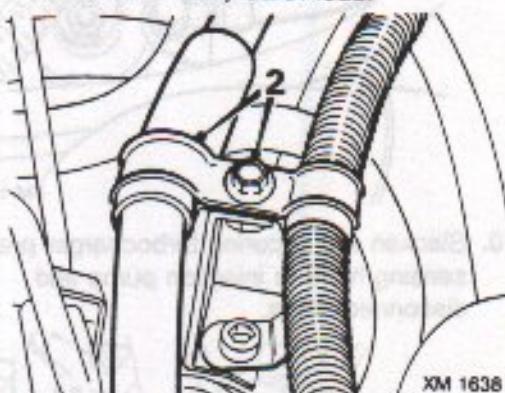


INJECTOR PIPES

Service Repair No. 19.60.14

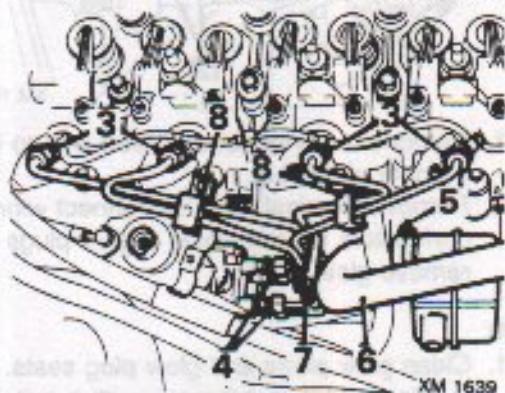
Remove

1. Disconnect battery earth lead.



XM 1638

2. Remove bolt securing hose and harness clamp at rear of injection pump, remove clamp and move hose and harness aside.



XM 1639

3. Disconnect the 4 injector pipe unions.
4. Slacken the 4 pipe unions from injection pump.
5. Slacken breather hose clip.
6. Disconnect breather hose from separator
7. Remove bolt securing injector pipe large clamp and remove the 2 clamp pieces and rubber sleeve.
8. Remove 2 bolts securing injector pipe small clamps, remove the 4 clamp pieces and 2 rubber sleeves.
9. Disconnect the 4 unions at pump and remove the pipes.

Refit

1. Clean pipe unions, position the 4 pipes and connect unions to injectors and pump but do not tighten.
2. Position injector pipe large clamp rubber sleeve and 2 clamp pieces, fit and tighten securing bolt.
3. Position the 2 small pipe clamp rubber sleeves and 4 clamp pieces, fit and tighten the 2 securing bolts.
4. Connect breather hose to separator and tighten hose clip.

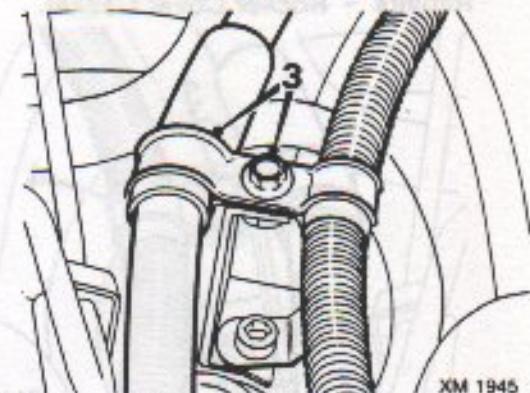
5. Tighten all injector pipe unions to 19 Nm.
6. Position hose and harness, position clamp and fit and tighten bolt.
7. Connect battery earth lead.

SPILL RETURN HOSE ASSEMBLY

Service Repair No. 19.43.12

Remove

1. Disconnect battery earth lead.
2. Remove rocker cover, see ENGINE - Repairs - Rocker Cover Gasket.



XM 1945

3. Remove bolt securing hose and harness clamp at rear of injection pump, remove clamp and move hose and harness aside



XM 1640

4. Remove the 4 spill return hose banjo bolts from injectors and discard the washers.
5. Slacken spill return hose banjo bolt at injection pump.
6. Position spill return hose to allow access to injector spill return hose banjo bolt.
7. Remove banjo bolt and discard the 2 washers. Remove the spill return hose assembly.

Refit

1. Position spill return hose assembly and, using new washers, fit and tighten injector spill return banjo bolt.
2. Tighten injection pump banjo bolt to 19 Nm.
3. Using new washers, fit and tighten spill return pipe unions to injectors.

FUEL SYSTEM

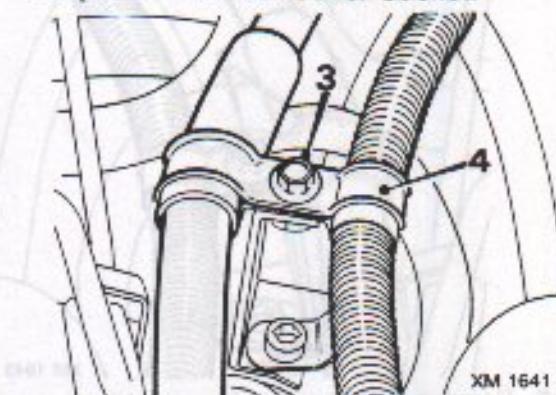
4. Position hose and harness, fit clamp and fit and tighten bolt.
5. Fit rocker cover, see **ENGINE - Repairs - Rocker Cover Gasket**.
6. Connect battery earth lead.

GLOW PLUGS

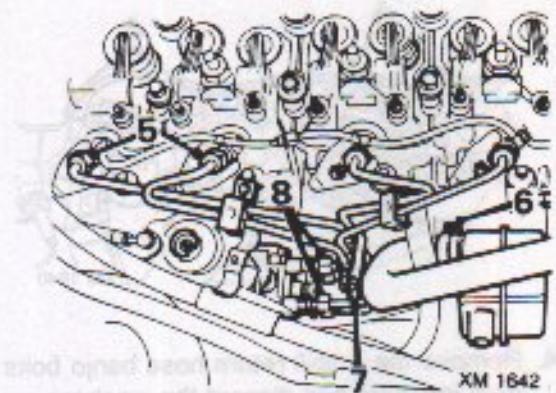
Service Repair No. 19.60.31

Remove

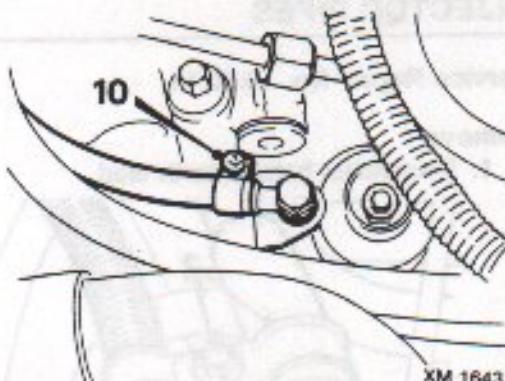
1. Disconnect battery earth lead.
2. Remove rocker cover, see **ENGINE - Repairs - Rocker Cover Gasket**.



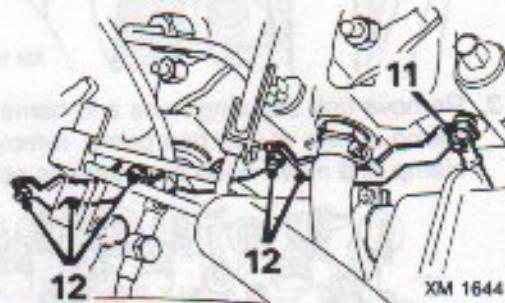
3. Remove bolt securing hose and harness clamp to rear of injection pump.
4. Remove clamp and move hose and harness aside.



5. Disconnect No. 1 and 2 injector pipe unions from injectors and slacken pipe unions at pump.
6. Slacken breather hose clip and disconnect breather hose from separator.
7. Remove bolt securing injector pipe large clamp and remove the 2 clamp pieces and rubber sleeve.
8. Disconnect unions from pump and remove No. 1 and 2 injector pipe assembly.
9. Plug injectors and pump to prevent ingress of dirt and foreign matter.



10. Slacken clip securing turbocharger pressure sensing hose to injection pump and disconnect hose.



11. Remove terminal nut and feed wire to No. 4 cylinder glow plug.
12. Remove terminal nuts, disconnect wiring connectors for remaining 3 glow plugs and remove glow plugs.

Refit

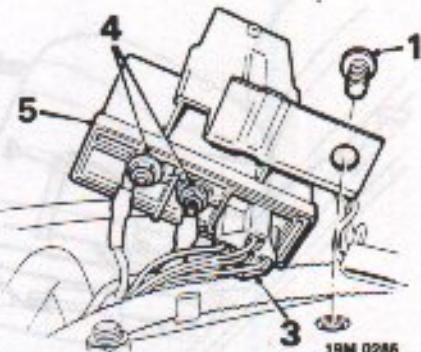
1. Clean glow plugs and glow plug seats. Lubricate seat and threads with a suitable anti-seize compound operational to a temperature of 1000°C.
2. Fit glow plugs and tighten to 23 Nm.
3. Fit the 3 terminal links and connect feed wire to No. 4 cylinder glow plug terminal.
4. Fit and tighten terminal nuts.
5. Clean injector pipe unions, position pipes and position unions to injectors and pump.
6. Remove plugs from injectors and pump.
7. Connect unions but do not tighten.
8. Position injector pipe large clamp rubber sleeve and clamp pieces, and fit and tighten bolt.
9. Connect turbocharger pressure sensing hose to injection pump and tighten hose clip.
10. Connect breather hose to separator and tighten hose clip.
11. Tighten injector pipe unions to 19 Nm.
12. Position hose, harness, and retaining clamp. Fit and tighten bolt.
13. Refit rocker cover, see **ENGINE - Repairs - Rocker Cover Gasket**.
14. Connect battery earth lead.



GLOW PLUG CONTROL UNIT

Service Repair No. 19.60.33

Remove



Pre 1992 model illustrated

1. Remove bolt securing bracket to body.
2. 1992 models on: Remove 2 nuts and bolts securing E.G.R. solenoid to bracket.
3. Disconnect multiplug.
4. Remove 2 nuts; noting their fitted position; disconnect 2 leads.
5. Remove control unit.

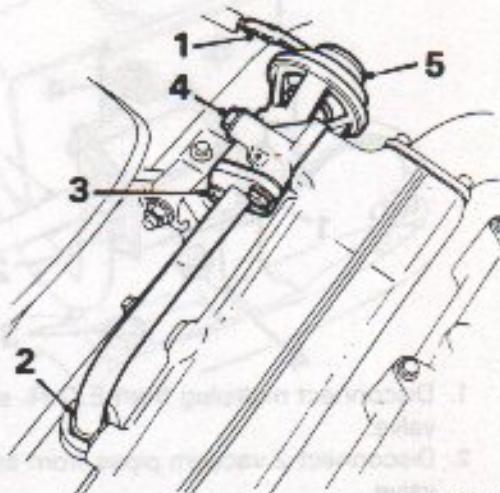
Refit

1. Position control unit, connect 2 leads; fit and tighten 2 nuts to 12 Nm.
2. Connect multiplug.
3. 1992 models on: Position control unit to E.G.R. solenoid, fit and tighten 2 nuts and bolts.
4. Fit bolt securing bracket to body and tighten to 12 Nm.

E.G.R. VALVE

Service Repair No. 17.45.01

Remove



1. Disconnect vacuum hose from E.G.R. valve.
2. Slacken union nut E.G.R. pipe to exhaust manifold.
3. Remove 2 bolts securing pipe to E.G.R. valve.
4. Remove bolts securing E.G.R. valve to inlet manifold.
5. Remove E.G.R. valve and discard both gaskets.

Refit

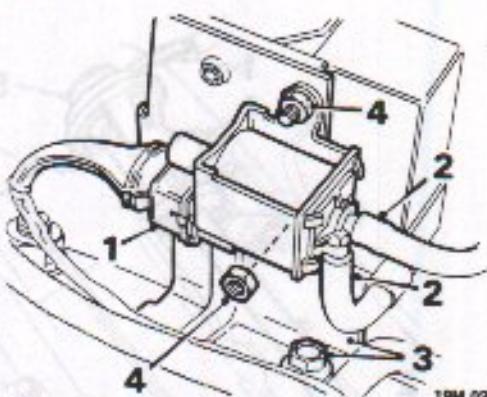
1. Clean mating face of pipe, manifold and E.G.R. valve.
2. Fit new gasket to inlet manifold, fit E.G.R. valve but do not tighten bolts.
3. Locate gasket between pipe and E.G.R. valve.
4. Fit bolts securing pipe to E.G.R. valve and tighten to 25 Nm.
5. Tighten bolts securing valve to manifold to 25 Nm, then tighten union nut to exhaust manifold. Connect vacuum hose to E.G.R. valve.

FUEL SYSTEM

E.G.R. SOLENOID VALVE

Service Repair No. 17.45.04

Remove



1. Disconnect multiplug from E.G.R. solenoid valve.
2. Disconnect 2 vacuum pipes from solenoid valve.
3. Remove bolt securing glow plug control unit/solenoid bracket to body.
4. Release bracket for access to solenoid fixings, then remove 2 nuts and bolts securing solenoid valve to bracket and collect solenoid valve.

Refit

1. Remove caps from new solenoid valve, fit solenoid valve to bracket and tighten nuts and bolts.
2. Align glow plug control unit/solenoid bracket to body and fit and tighten bolt to 12 Nm.
3. Identify and connect vacuum pipes to valve, then connect multiplug to valve.

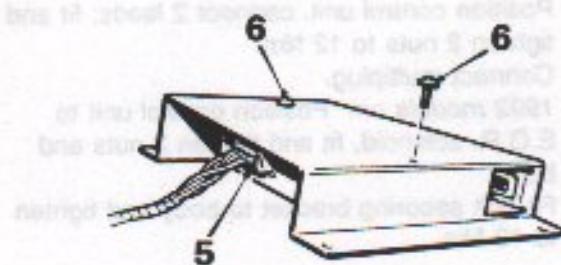
E.G.R. CONTROL UNIT

Service Repair No. 17.45.06

Remove



1. Slide drivers seat fully forwards to gain access to control unit.
2. Remove screw securing rear of control unit cover to floor.
3. Slide seat fully rearwards.
4. Remove 2 screws securing front of control unit cover to floor and pull control unit forward.



5. Disconnect multiplug from control unit.
6. Remove 2 screws securing control unit to cover and collect control unit.

Refit

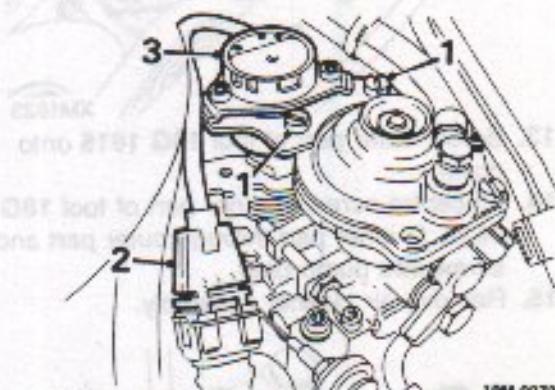
1. Fit cover to control unit and tighten screws.
2. Connect multiplug, then position assembly on vehicle floor.
3. Fit and tighten screws securing front of control unit cover to floor.
4. Slide seat forward and fit and tighten screw securing rear of control unit cover to floor. Reposition seat.



E.G.R. THROTTLE POTENTIOMETER

Service Repair No. 19.30.14

Remove



1. Remove 2 screws securing potentiometer mounting plate to injection pump.
2. Disconnect multiplug.
3. Remove potentiometer assembly.

Refit

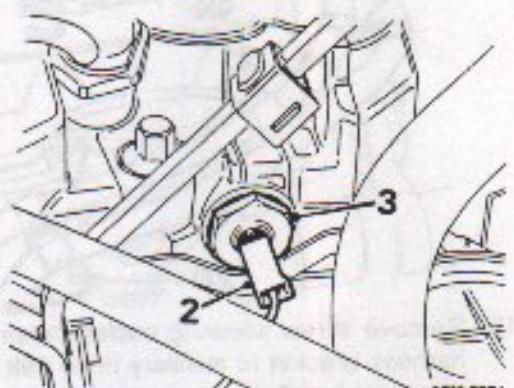
1. Locate potentiometer assembly on injection pump and fit and tighten screws.
2. Connect multiplug.
3. Adjust potentiometer, see **Adjustments**.

COLD START ADVANCE TEMPERATURE SENSOR

Service Repair No. 19.30.12

Remove

1. Drain cooling system, see **COOLING SYSTEM - Adjustments**.



2. Disconnect lead from sensor, located in No. 3 cylinder head.
3. Remove sensor from cylinder head and discard sealing washer.

Refit

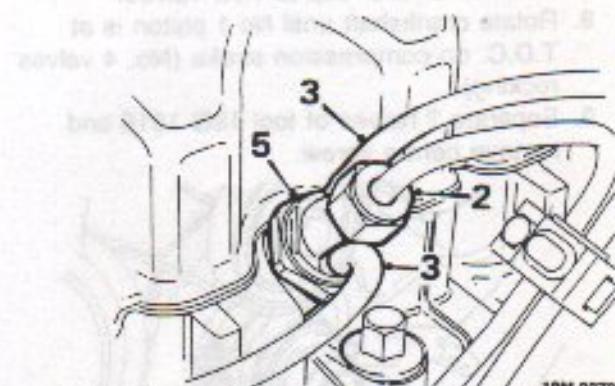
1. Clean sensor and cylinder head face.
2. Fit new sealing washer to sensor, fit sensor to cylinder head and tighten to 18 Nm.
3. Connect lead to sensor.
4. Refill cooling system, see **COOLING SYSTEM - Adjustments**. Remove drain tin

INJECTOR - 1992 MODELS ON

Service Repair No. 19.60.10

Remove

1. Disconnect battery earth lead.



2. Remove high pressure pipe from relevant injector and injection pump.
3. Disconnect spill return hose(s) from injector.
4. Plug pipes and injector to prevent ingress of dirt and foreign matter.
5. Using a deep 28 mm hexagon socket, unscrew the injector from the cylinder head.

Refit

1. Clean injector threads in cylinder head.
2. Fit injector and tighten to 70 Nm.
3. Connect spill return hose(s) and fit high pressure pipe.
4. Connect battery earth lead.

INJECTION PUMP - 1992 MODELS ON

Service Repair No. 19.30.07

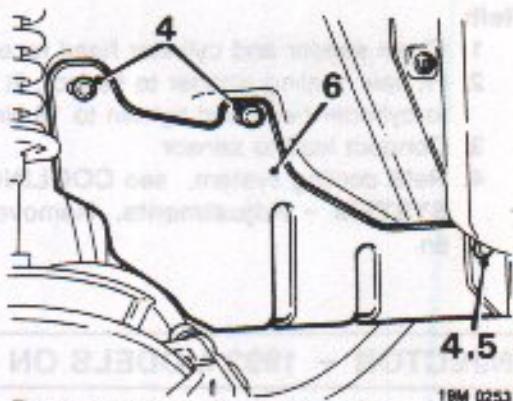
Remove

1. Disconnect battery earth lead.
2. Raise front of vehicle.

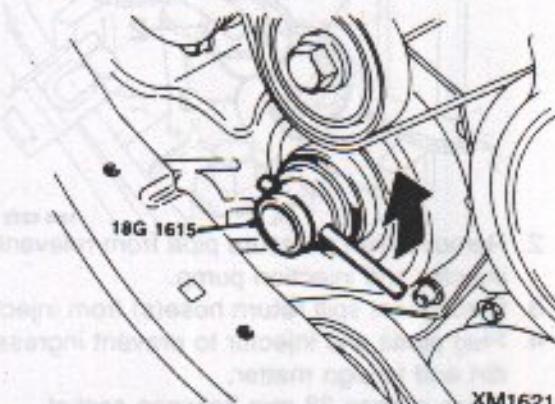
WARNING: Support on safety stands.

3. Remove R.H. front road wheel.

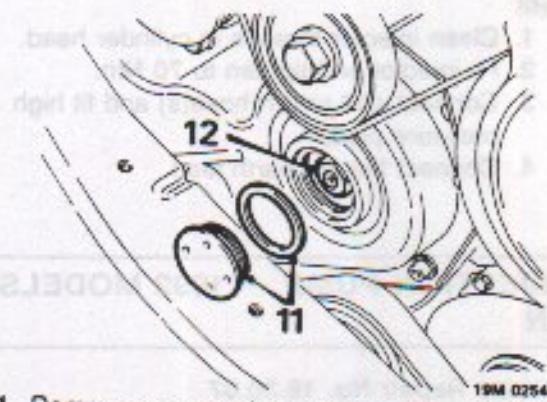
FUEL SYSTEM



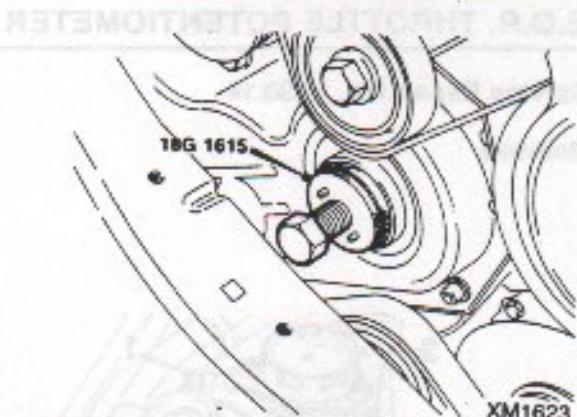
- Remove the 3 screws securing splash shield.
- Remove spacer from front screw.
- Remove shield.
- Remove oil filler cap to view valves.
- Rotate crankshaft until No 1 piston is at T.D.C. on compression stroke (No. 4 valves rocking).
- Separate 2 halves of tool 18G 1615 and remove centre screw.



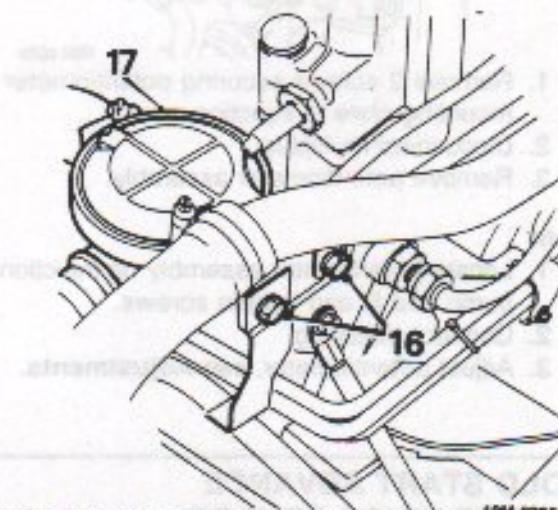
- Using inner part of tool 18G 1615 slacken timing gear cover access plate.



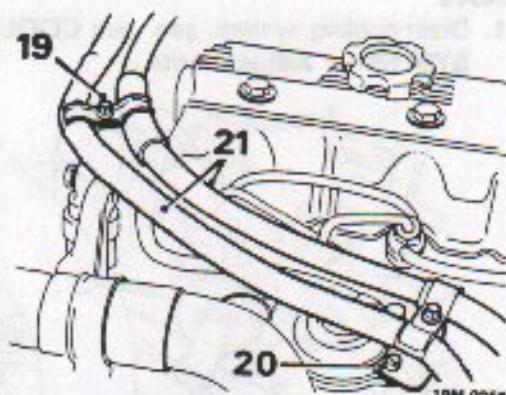
- Remove access plate and sealing washer.
- Remove nut securing pump gear and collect washer.



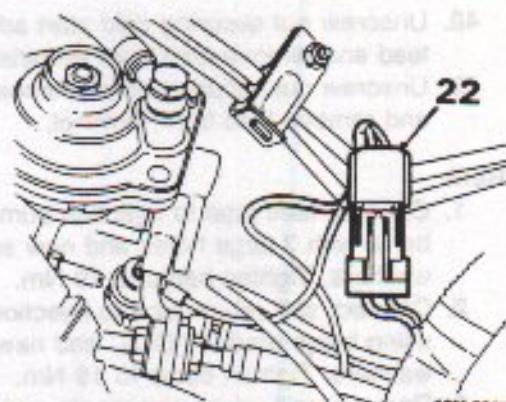
- Screw outer part of tool 18G 1615 onto cover.
- Fit centre screw to inner part of tool 18G 1615, fit inner part through outer part and screw into pump gear.
- Remove air cleaner assembly.



- Remove the 2 bolts securing breather separator.
- Move separator aside.
- Remove injector pipes.

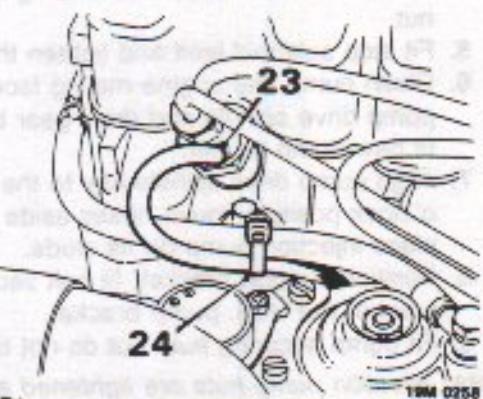


- Remove screw securing coolant hose and harness bracket to auxiliary drive belt tensioner bracket.
- Remove screw securing coolant hose and harness bracket to injection pump.
- Move pipe and harness aside.



22. Disconnect cold start advance and stop solenoid multiplug.

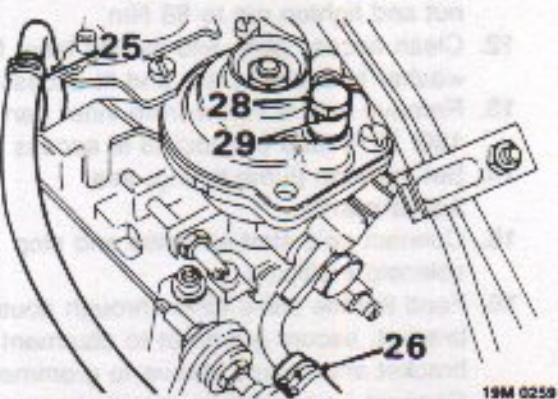
19M 0257



23. Disconnect spill return hose from No. 1 injector.

19M 0258

24. Release clip securing spill return to turbocharger pressure sensing hose.



19M 0259

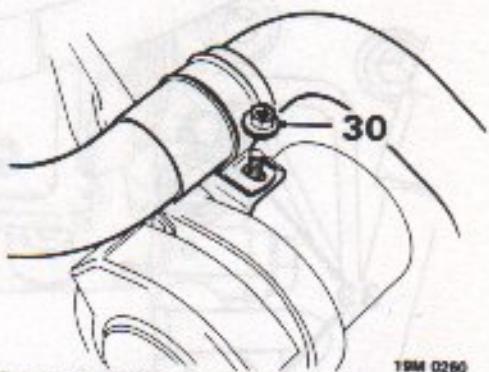
25. Release clip and disconnect fuel feed hose from injection pump.

26. Release clip and disconnect spill return hose from injection pump.

27. Plug hoses and pipes.

28. Remove banjo securing turbocharger pressure sensing hose to injection pump.

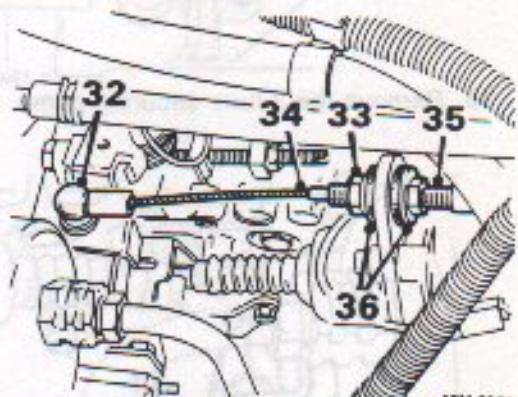
29. Discard 2 sealing washers.



19M 0260

30. Remove nut securing top hose clip to bracket on P.A.S. pump bracket.

31. Move hose aside for access.



19M 0261

32. Release throttle cable ball joint from throttle lever.

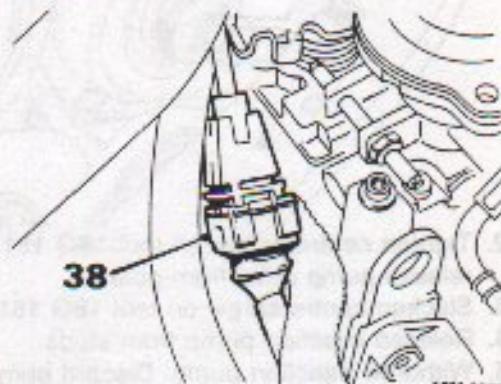
33. Unscrew throttle cable locknut.

34. Withdraw inner cable from abutment bracket.

35. Withdraw outer cable from abutment bracket.

36. Release grommet and sleeve from abutment bracket.

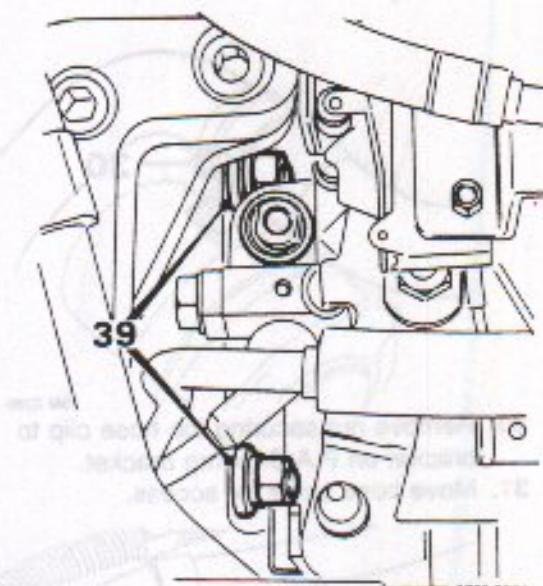
37. Release cable assembly from abutment bracket.



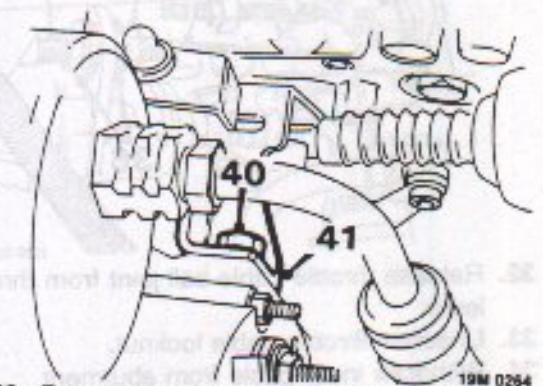
19M 0262

38. Disconnect E.G.R. throttle potentiometer multiplug.

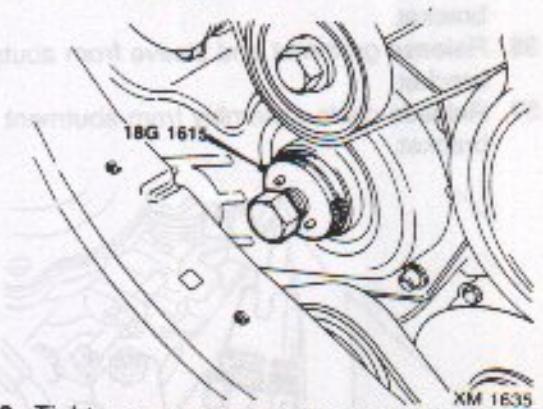
FUEL SYSTEM



39. Remove the 3 nuts securing pump.



40. Remove bolt securing support bracket.
41. Remove support bracket.



42. Tighten centre screw on tool 18G 1615 to release pump drive from gear.
43. Slacken centre screw on tool 18G 1615.
44. Release injection pump from studs.
45. Withdraw injection pump. Discard pump gasket.

Do not carry out further dismantling if component is removed for access only

46. Remove fuel feed pipe banjo and discard sealing washers.
47. Remove spill return pipe banjo and discard sealing washers.

48. Unscrew nut securing cold start advance lead and remove lead from terminal.
49. Unscrew nut securing stop solenoid lead and remove lead from terminal.

Refit

1. Connect feed pipe to injection pump using banjo with 3 large holes and new sealing washers. Tighten banjo to 19 Nm.
2. Connect spill return pipe to injection pump using banjo marked 'OUT' and new sealing washers. Tighten banjo to 19 Nm.
3. Remove spill return pipe banjo and discard sealing washers.
4. Fit cold start advance lead and tighten the nut.
5. Fit stop solenoid lead and tighten the nut.
6. Clean pump and engine mating faces, clean pump drive spindle and drive gear bore and fit new pump gasket.
7. Align pump drive spindle key to the eleven o'clock position, move hoses aside and place injection pump on its studs.
8. Position support bracket, fit bolt securing bracket to P.A.S. pump bracket.
9. Fit pump securing nuts but do not tighten.

Note: Injection pump nuts are tightened and oil filler cap refitted after injection timing has been set.

10. Remove tool 18G 1615.
11. Fit pump drive gear washer. Fit drive gear nut and tighten nut to 88 Nm.
12. Clean access plate and mating face, fit washer to access plate and fit access plate.
13. Remove centre screw from inner part of tool 18G 1615 and use tool to fit access plate.
14. Set injection pump timing, see **Adjustments**.
15. Connect cold start advance and stop solenoid multiplug.
16. Feed throttle cable inner through abutment bracket, secure grommet to abutment bracket and secure sleeve to grommet.
17. Connect inner cable to throttle lever.
18. Adjust throttle cable, see **Adjustments**.
19. Remove plugs from feed and spill return pipes and hoses.
20. Connect feed and spill return hoses to injection pump and secure with clips.
21. Align top hose clip to P.A.S. pump bracket and fit and tighten nut.
22. Connect turbocharger pressure sensing hose to injection pump, using new sealing washers.
23. Position harness bracket to injection pump and fit and tighten screw.
24. Position harness bracket to auxiliary drive belt tensioner bracket and fit and tighten screw.
25. Refit injector pipes.



26. Align breather separator, align harness clip bracket and hose clip and fit and tighten bolts securing breather separator.
27. Adjust E.G.R. throttle potentiometer, see **Adjustments**.

Note: E.G.R. throttle potentiometer multiplug is connected after adjustment.

28. Refit air cleaner assembly.
29. Position splash shield, fit spacer to front bolt and fit and tighten bolts.
30. Fit road wheel and tighten nuts to 110 Nm.
31. Remove stand(s) and lower vehicle.
32. Connect battery earth lead.

**DATA**

Throttle cable deflection:

| | |
|-------------|-------------|
| Cold engine | 15 to 20 mm |
| Hot engine | 10 to 15 mm |

Low idle speed:

| | |
|-----------------------------|----------------------|
| Up to 1992 models | 850 \pm 50 rev/min |
| 1992 models on | 900 \pm 20 rev/min |
| High idle speed | 1000 to 1100 rev/min |
| Maximum light running speed | 4700 to 4730 rev/min |
| Injection pump plunger lift | 0.68 mm |
| Injection pump timing | 3° to 4° B.T.D.C. |

Glow plug

| | |
|-------------------------------|-----------|
| Tip starts to glow | 5 seconds |
| Initial current draw | 25 amp |
| Current draw after 20 seconds | 12 am |

TORQUE SETTINGS

| | |
|--|--------|
| Fuel unions | 19 Nm |
| Injection pump nuts | 30 Nm |
| Road wheel nuts | 110 Nm |
| Air cleaner screws | 8 Nm |
| Intercooler bolts | 15 Nm |
| Turbocharger elbow nuts | 27 Nm |
| Engine steady bracket bolts | 90 Nm |
| Engine steady rod bracket nut and bolt | 45 Nm |
| Turbocharger heatshield bolts | 8 Nm |
| Turbocharger oil unions | 19 Nm |
| Oil pipe unions | 19 Nm |
| Injection pump drive gear nut | 88 Nm |
| Injector retaining plate nut - up to 1992 models | 24 Nm |
| Glow plugs | 23 Nm |
| Glow plug control unit connector nuts | 12 Nm |
| Glow plug control unit bolt | 12 Nm |
| E.G.R. valve to manifold bolts | 25 Nm |
| E.G.R. pipe to valve bolts | 25 Nm |
| Cold start advance temperature sensor | 18 Nm |
| Injector - 1992 models on | 70 Nm |

TOOL NUMBERS

| | |
|------------|----------------------------------|
| 18G 1552 | Injection pump timing adapter |
| 18G 1615 | Injection pump gear holding tool |
| 18G 284 | Slide Hammer (basic tool) |
| 18G 284/10 | Injector remover |