

GROUP N

ELECTRICAL EQUIPMENT AND INSTRUMENTS

WIRING HARNESS, FUSE BOX

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WIRING HARNESS, FUSE BOX

SURVEY OF RELAYS AND CONTROL UNITS

A Beside driver's seat

- 1 ABS control unit K50 (up to MY '92)

B Front quarter panel, lower left

- 1 Time relay – outside mirror, heated K35
(up to MY '90, as of MY '91 Pos. 2 behind fuse box)

C Relay carrier in engine compartment, left up to MY '89

- 1 Relay – cooling fan, K51
- 2 Relay – cooling fan 1st speed K67
- 3 Relay – engine speed K82
- 4 Relay – auxiliary fan K87
- 5 Relay – mixture preheating K45 or
relay – filter heating K80
- 6 Relay – wash/wipe system, headlamp K9
- 7 Time relay – wash/wipe pump, headlamp K97 or
relay – surge arrestor K47

8 Relay – preheating time K25 or

- relay – fuel pump K58 or
relay – injection system K68 or
relay – electronic carburettor K55

D Front quarter panel, lower right

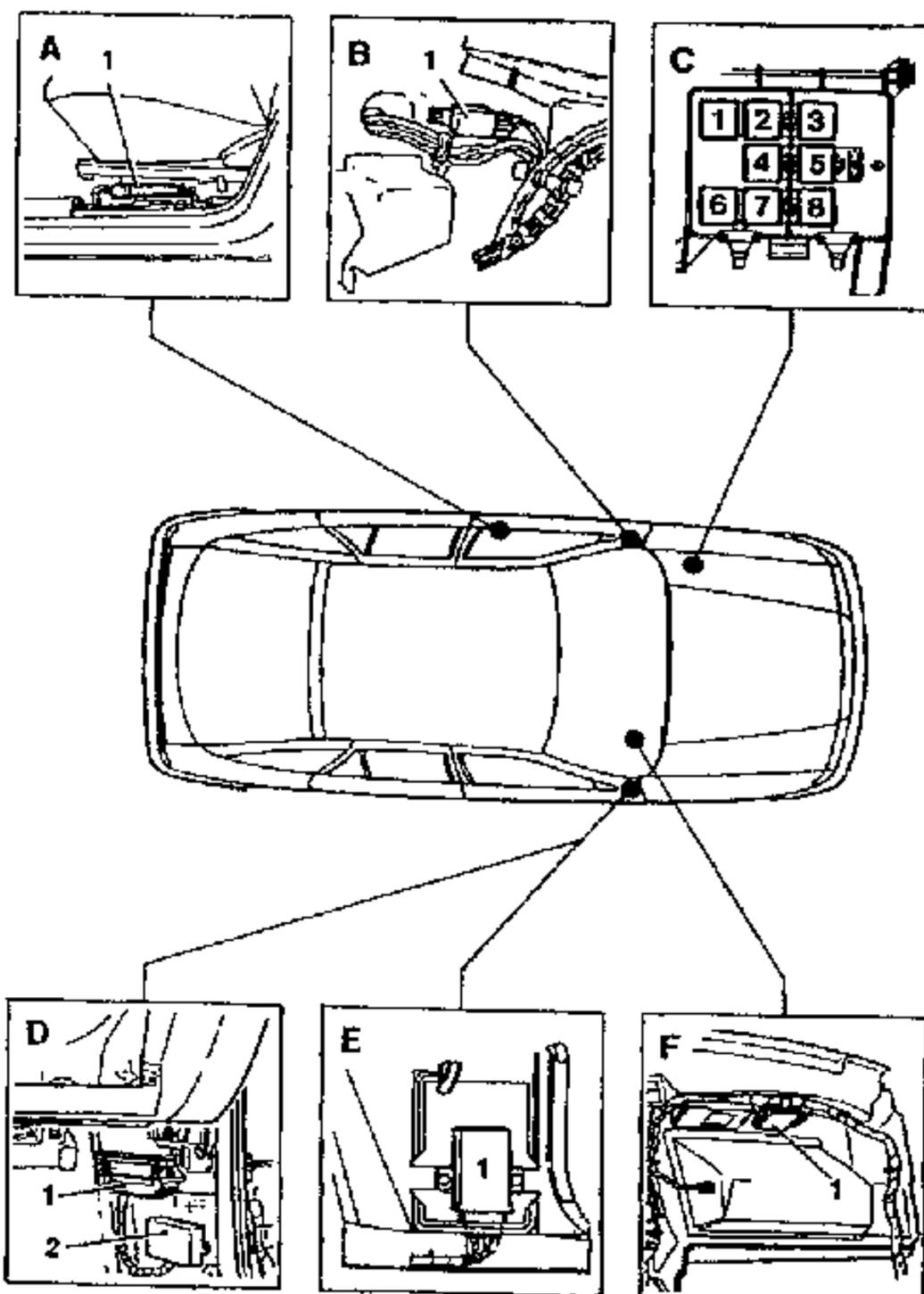
- 1 Motronic K91 or K69 or
TBI control unit K57
- 2 Carburettor, electronic control unit EID K54

E Quarter panel front, lower right

- 1 Control unit for central locking K37

F Above glove compartment

- 1 Control unit for check control K86



D 7901

WIRING HARNESS, FUSE BOX

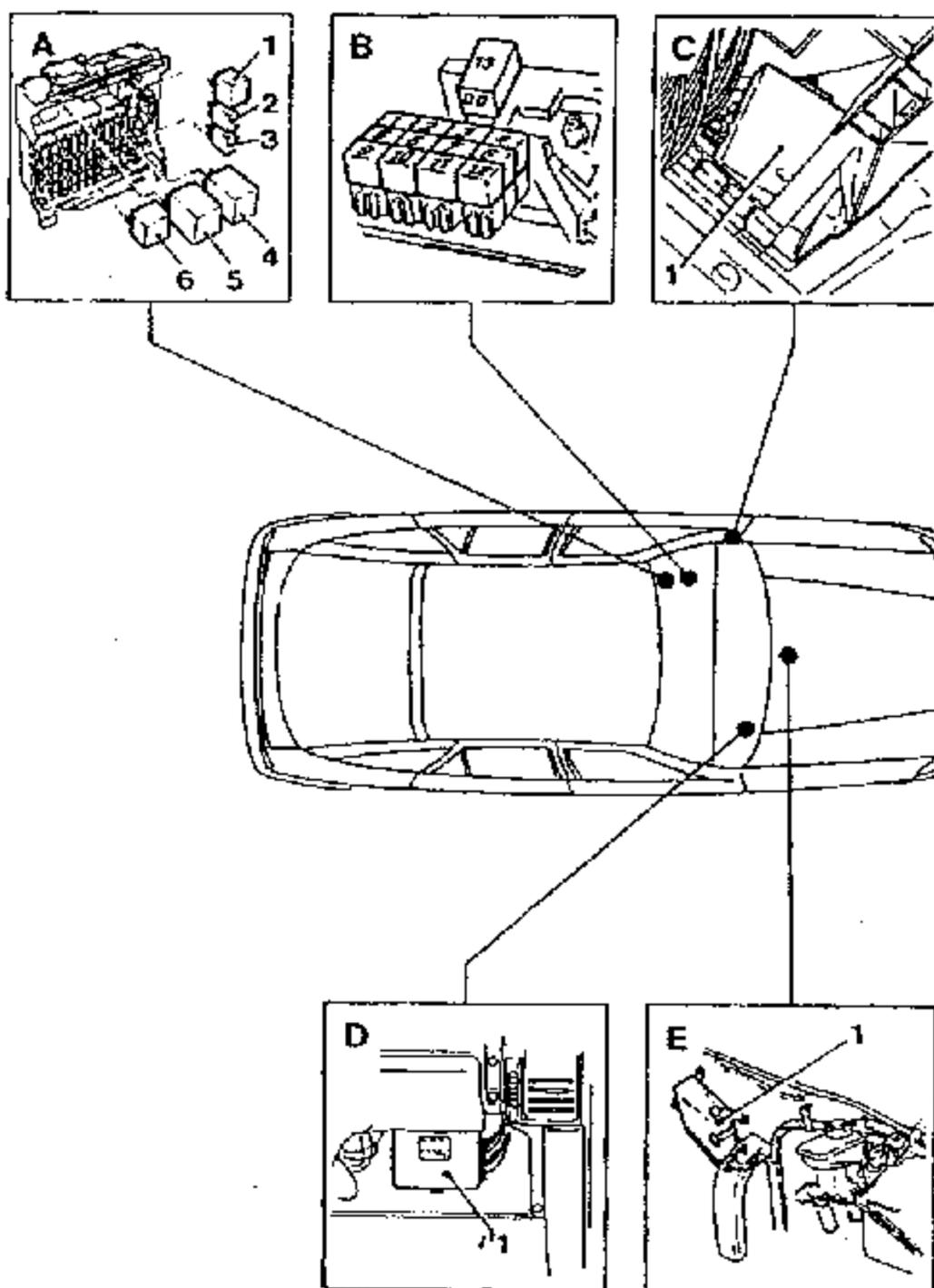
A Fuse box, view from passenger compartment

- 1 Relay – fog lamp K5 or
relay – rear fog lamp K89
- 2 Relay – heated rear screen K1 or
relay – fog lamp K5
- 3 Relay – heated rear screen K1 (up to MY '90, except Model
85)
Relay – fanfare K63 (Model 85)
Relay – fanfare K63 (all Models as of MY '91)
- 4 Relay – windscreen wipers, interval K8
- 5 Turn signal unit K10
- 6 Warning buzzer H19 (see B8)

- 3 Sensor – bulb control trailer hitch P39 up to
MY '90 or
relay – wash/wipe system, headlamp K9 except
Model 85 or relay – compressor K90 except
Model 85 or relay – fan, air conditioning K64
(see B7, B11)
Relay – headlamp wiper K97 (as of MY '91)
- 4 Fuse F38 – anti-theft warning system, except
Model 85
- 5 Relay – trailer hitch P39 as of MY '91
- 6 Relay – air conditioning K3 except Model 85
- 7 Relay – air conditioning and AT K90 or
relay – air conditioning K64 except Model 85

B Relay carrier – behind fuse box, view from engine compartment

- 1 Relay – rear screen wiper, interval K30 or
relay – air conditioning K6 (see B9)
Time relay – outside mirror, heated K35 as of MY '91
- 2 relay – fanfare K63 or
relay – fan, air conditioning K7 (see B10)



E 2354

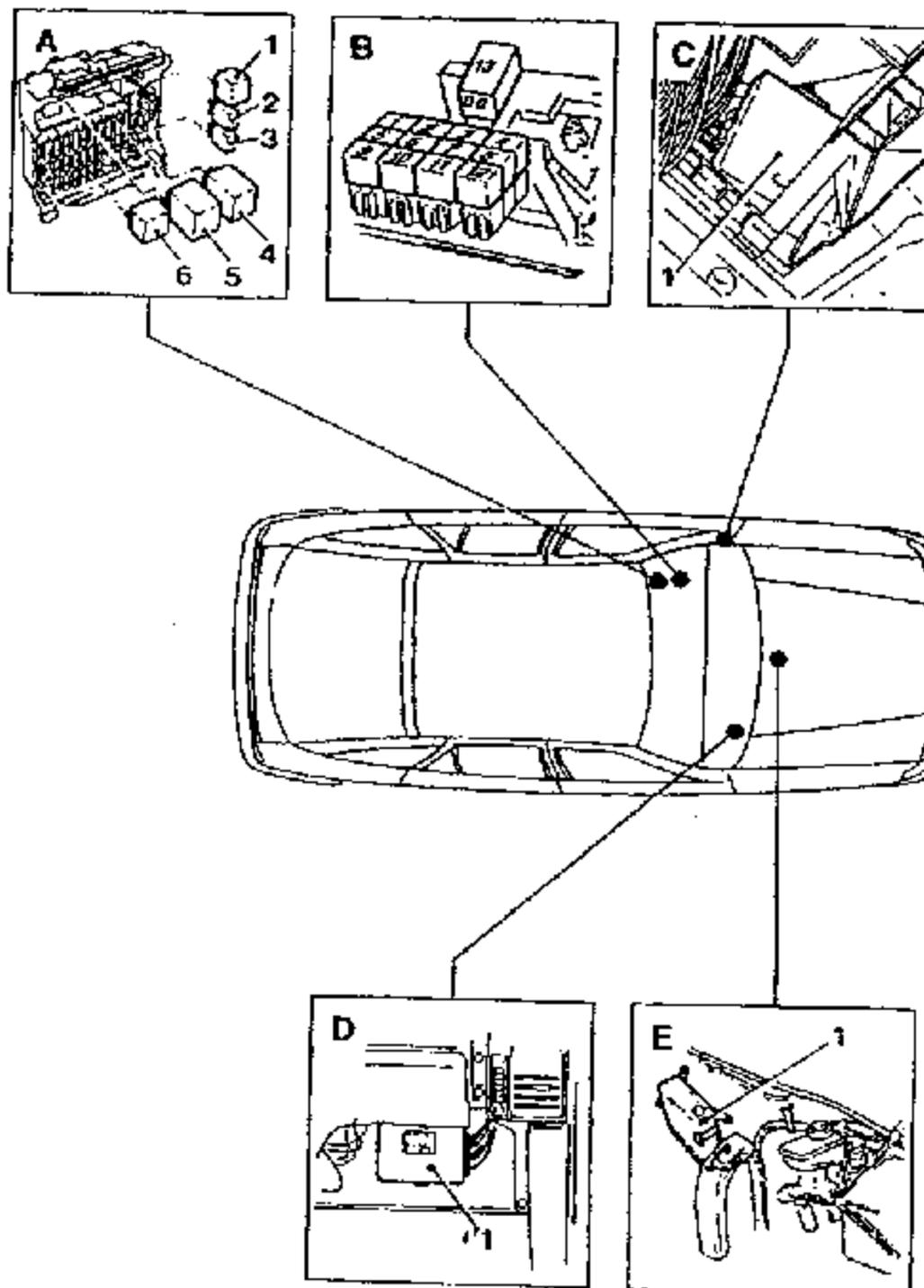
WIRING HARNESS, FUSE BOX

- B Relay carrier behind fuse box, view from engine compartment
- 8 Fuse – F38 anti-theft warning system Model 85 only
- 9 Relay – air conditioning K6 (see B1)
- 10 Relay – fan, air conditioning K7 (see B2)
- 11 Relay – fan, air conditioning K64 (see B3, B7)
- 12 Relay – anti-theft warning system K3 Model 85 only
- 13 Relay – low beam K59 or control unit – low beam reduced K62 (Great Britain only) or control unit - temperature, catalytic converter K88

- C Under instrument panel, left
- 1 Control unit – 4 wheel drive K83

- D Behind glove compartment
- 1 Control unit – automatic transmission K85

- E Engine compartment, centre splash wall
- 1 Control unit EI Plus K84

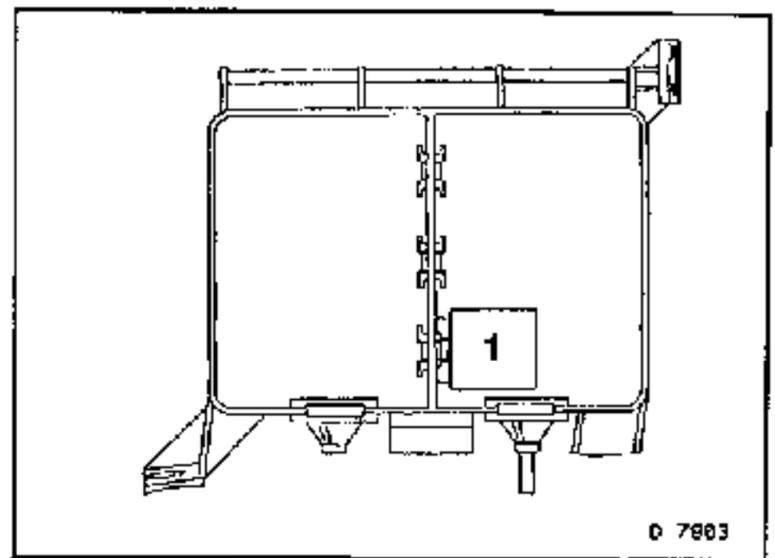


E 2354

WIRING HARNESS, FUSE BOX

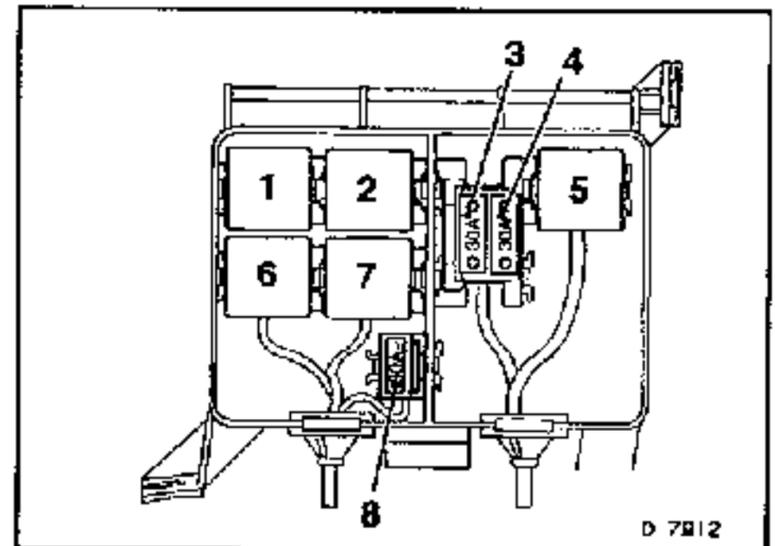
SURVEY OF RELAY CARRIER IN ENGINE COMPARTMENT MY '91

- 1 = Relay – injection system – fuel K68 (20 E) black wiring harness plug



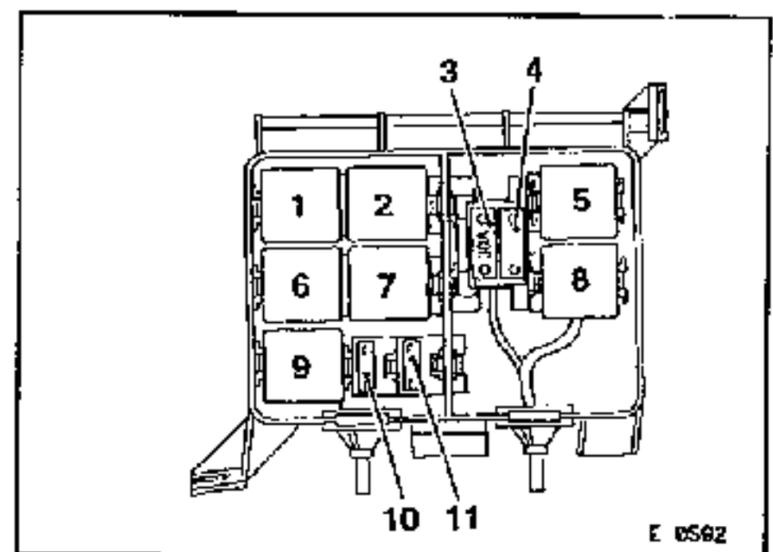
SURVEY OF RELAY CARRIER IN ENGINE COMPARTMENT MY '92

- 1 = Relay – cooling fan K52 green wiring harness plug
- 2 = Relay – cooling fan K87 blue wiring harness plug
- 3 = Fuse 30A AC F47 black wiring harness plug
- 4 = Fuse 30A cooling fan F42 black wiring harness plug
- 5 = Relay – parking lock K102 (AT) white wiring harness plug
- 6 = Relay – cooling fan, after-running, K34 (C 20 LET) blue wiring harness plug or Relay – cooling fan K51 (except C 20 LET) blue wiring harness plug
- 7 = Relay – cooling fan K67 blue wiring harness plug
- 8 = Fuse 30A cooling fan F34 green wiring harness plug



SURVEY OF RELAY CARRIER IN ENGINE COMPARTMENT MY '93

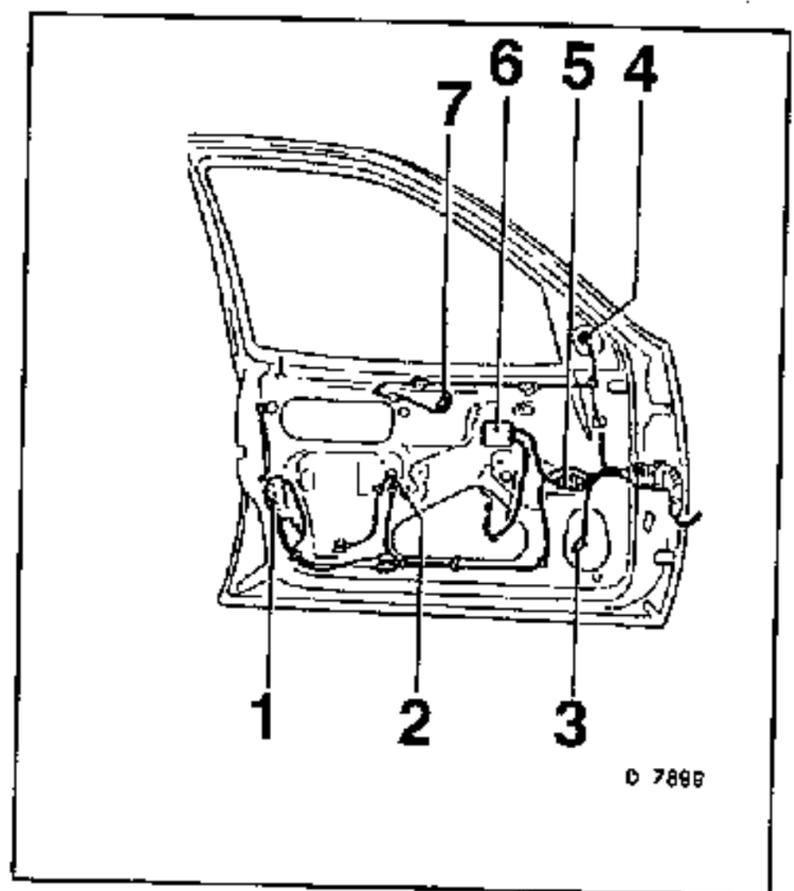
- 1 = Relay – cooling fan K52 green wiring harness plug
- 2 = Relay – cooling fan K87 blue wiring harness plug
- 3 = Fuse 30A air conditioning F47 green wiring harness plug
- 4 = Fuse 40A cooling fan F42 black wiring harness plug (C 20 LET)
- 4 = Fuse 30A cooling fan F42 black wiring harness plug
- 5 = Not applicable
- 6 = Relay – cooling fan, after - running, K34 green wiring harness plug (C 20 LET)
- 6 = Not applicable
- 6 = Relay – cooling fan K51 blue wiring harness plug
- 7 = Relay – cooling fan K67 blue wiring harness plug
- 7 = Relay – cooling fan K67 blue wiring harness plug (C 20 LET)
- 8 = Relay – parking lock K102 white wiring harness plug (AT / Japan, obligatory)
- 9 = Not applicable
- 10 = Not applicable
- 11 = Fuse 30A cooling fan F34 green wiring harness plug



WIRING HARNESS, FUSE BOX

WIRING HARNESS, FRONT DOOR

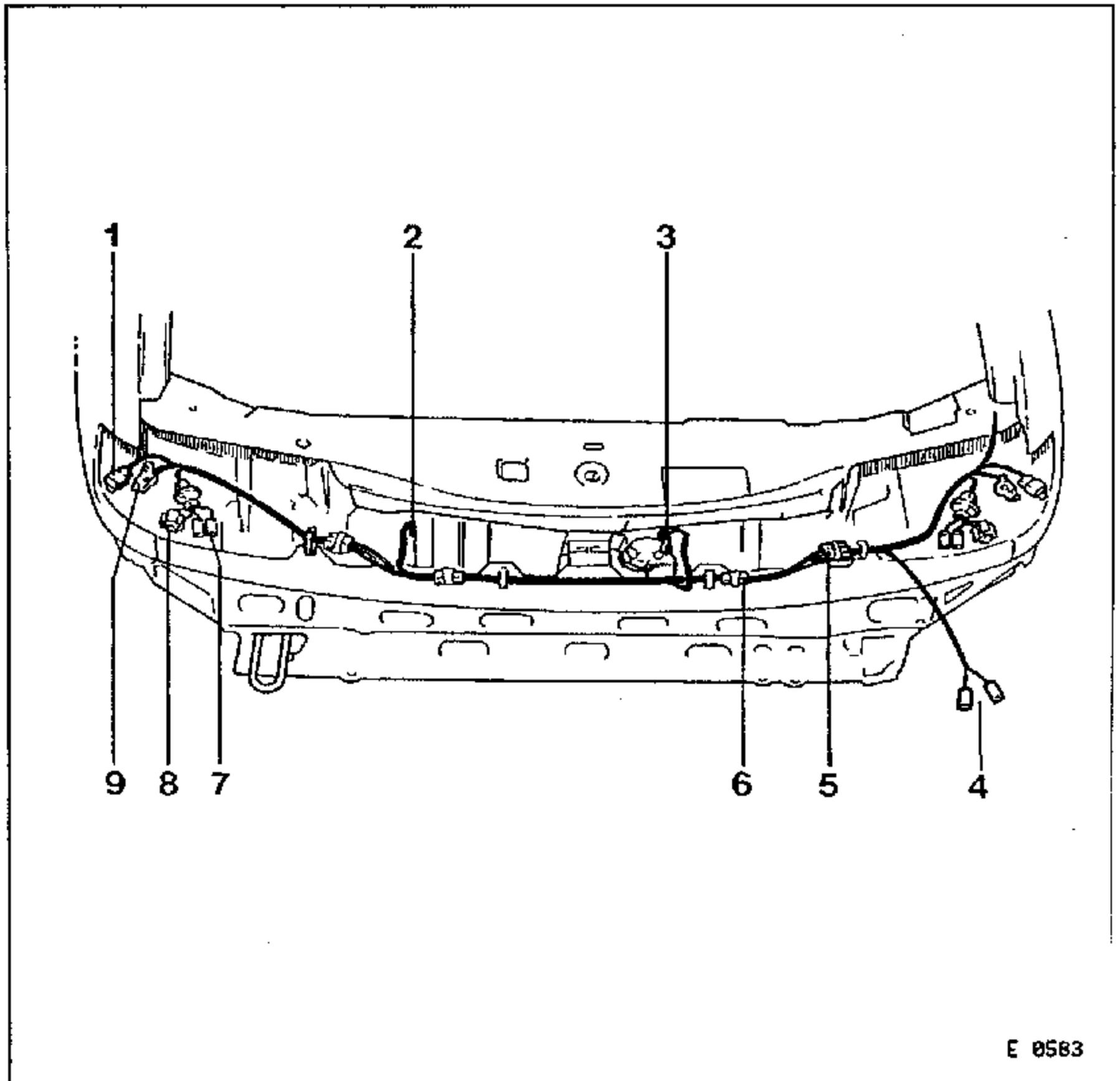
- 1 - Servo motor, door lock
- 2 - Wiring harness plug, lamp
- 3 - Wiring harness plug, door speaker
- 4 - Wiring harness plug, outside mirror
- 5 - Wiring harness plug, window winder
- 6 - Window winder motor with window winder control unit
- 7 - Operating switch, outside mirror left and right



WIRING HARNESS, FUSE BOX

WIRING HARNESS, BODY, FRONT

- 1 - Drive for headlamp range control
- 2 - Cooling fan switch
- 3 - Horn
- 4 - Fanfare
- 5 - Headlamp wiper motor
- 6 - Foglamp
- 7 - Parking lamp
- 8 - Headlamp
- 9 - Signal lamp



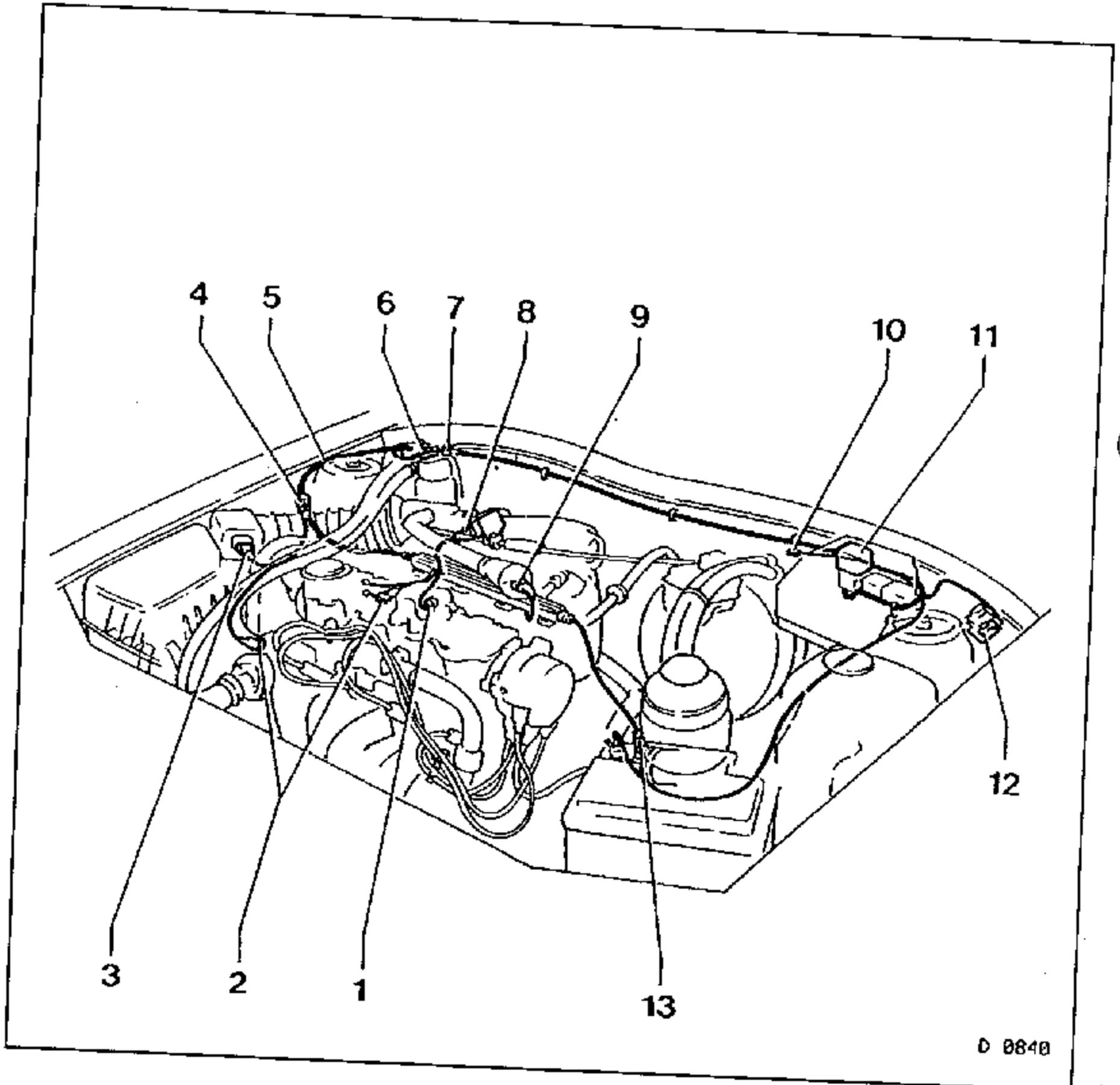
WIRING HARNESS, FUSE BOX

WIRING HARNESS, ENGINE

Illus. D 0840 gives example of wiring harness on C 20 NE engines.

- 1 - Fuel tank vent valve
- 2 - Temperature sensor, water
- 3 - Air flow meter
- 4 - Crankshaft pulse pick-up
- 5 - Motronic wiring harness
- 6 - For interference suppressor filter
- 7 - Oxygen sensor

- 8 - Throttle valve switch
- 9 - Idle speed actuator
- 10 - To transmission wiring harness
- 11 - Relay
- 12 - Octane number adjustment
- 13 - Ignition coil



WIRING HARNESS, FUSE BOX

WIRING HARNESS, INSTRUMENT PANEL

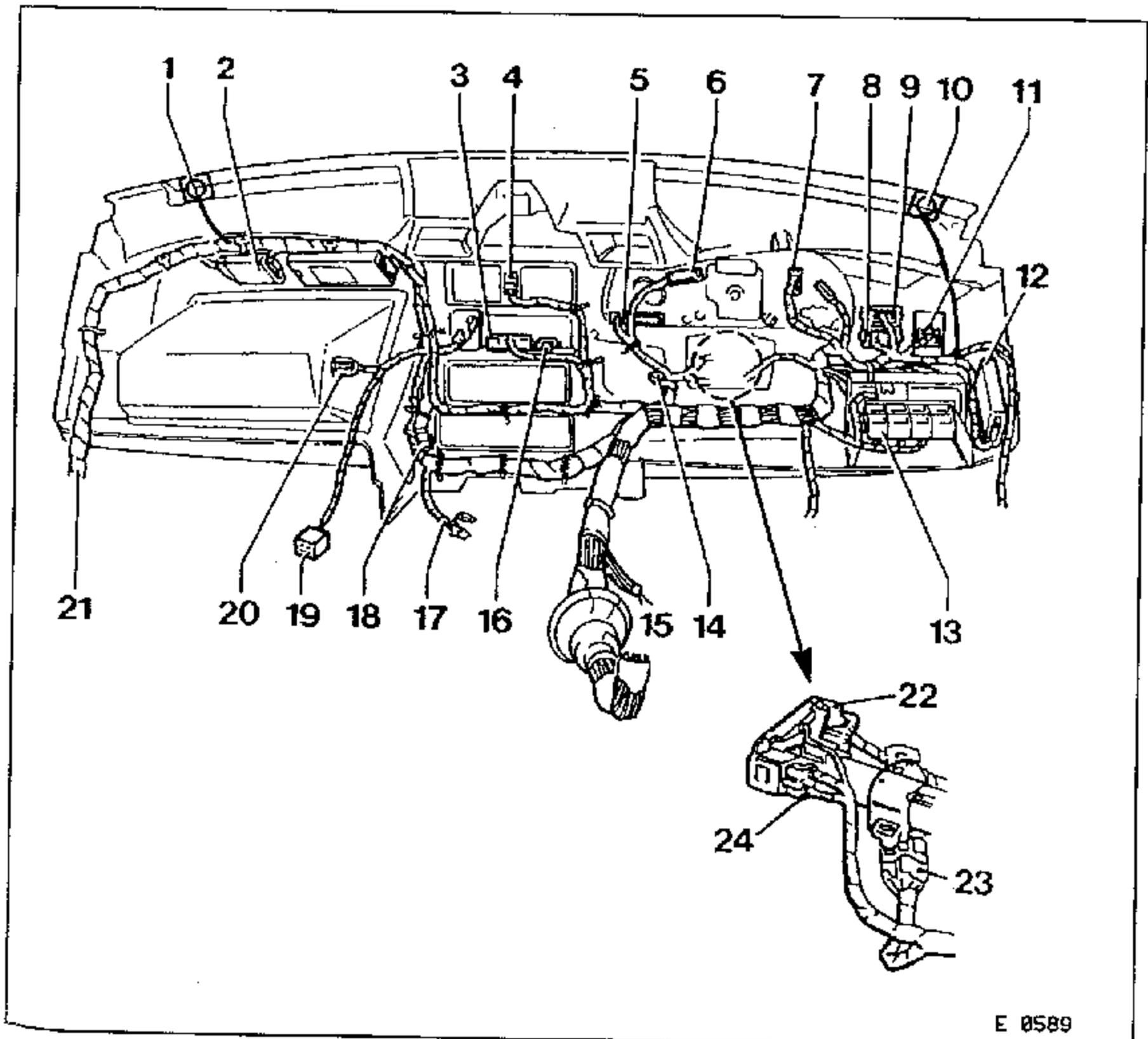
Illus. shows reverse side of instrument panel

- 1 - Loudspeaker, right
- 2 - Check Control control unit
- 3 - Switch
- 4 - Hazard warning light switch
- 5 - System monitoring display
- 6/7 - Instrument
- 8 - Headlamp range control
- 9 - Rear lamp switch
- 10 - Loudspeaker, left
- 11 - Light switch
- 12 - Four wheel drive control unit
- 13 - Relay

- 14 - To radio receiver wiring harness
- 15 - To left A pillar
- 16 - Fan switch
- 17 - Cigarette lighter
- 18 - Board computer
- 19 - Solenoid valve
- 20 - Glove compartment lamp
- 21 - ATWS control unit
- 22 - Turn signal lamp switch
- 23 - Ignition switch (contact piece)
- 24 - Wiper switch

Important

For vehicles with airbags observe safety regulations in group C.



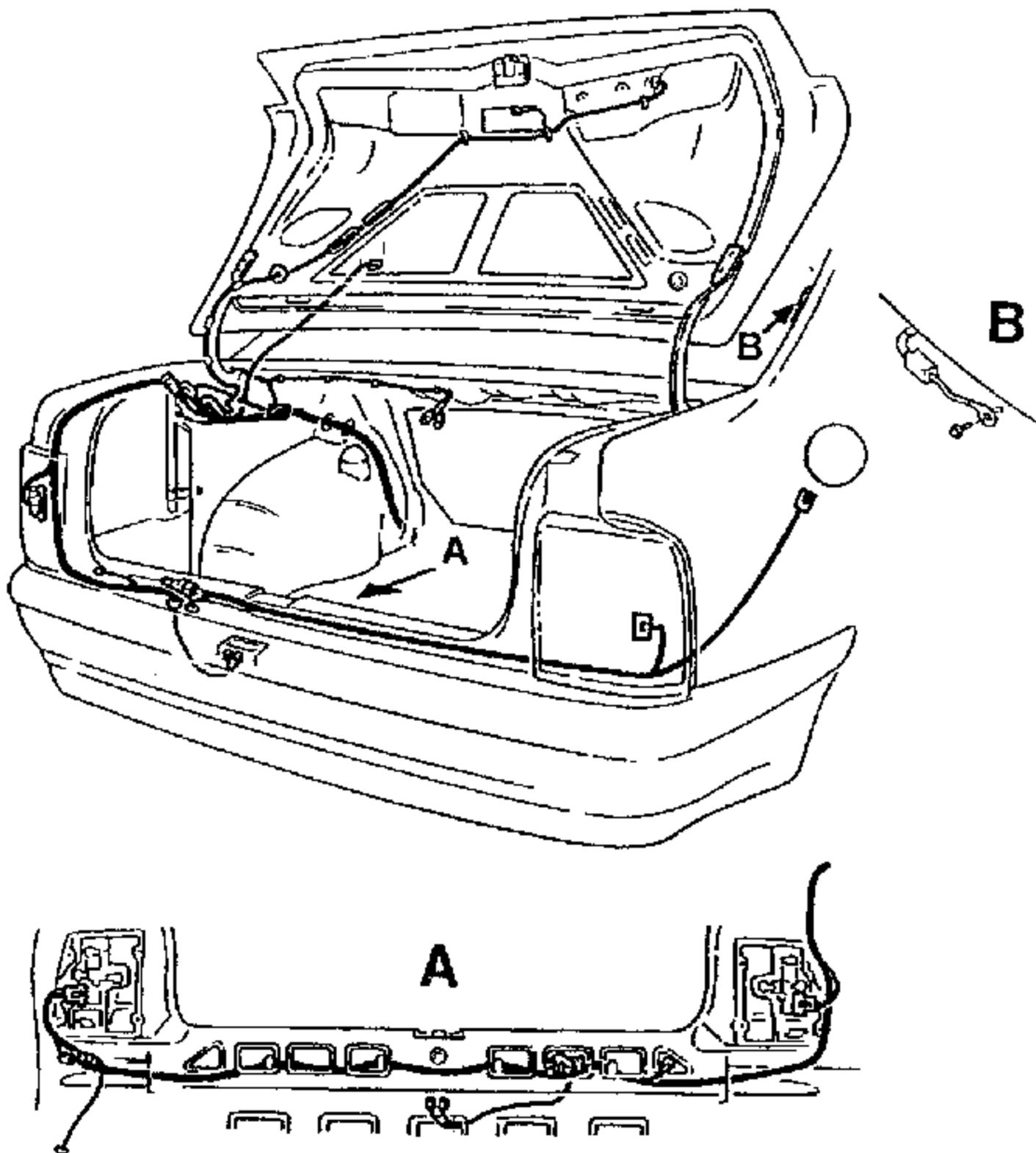
E 0589

WIRING HARNESS, FUSE BOX

WIRING HARNESS, BODY, REAR

A = Rear panel wiring harness

B = Heated rear screen ground connection



E 0584

WIRING HARNESS, FUSE BOX

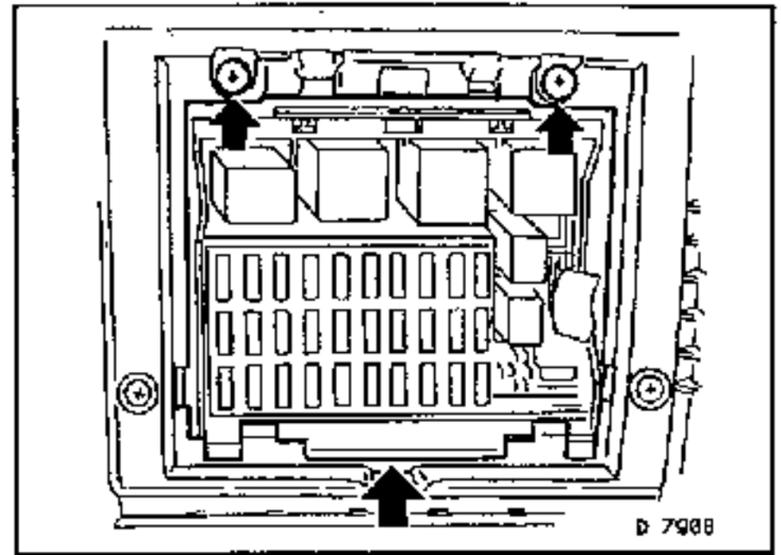
FUSE BOX, REMOVE AND INSTALL

Remove, Disconnect

Cover, unclip lower part of fuse box, 2 upper screws

Install, Connect

Fuse box, cover



GROUP N

ELECTRICAL EQUIPMENT AND INSTRUMENTS

CENTRAL DOOR LOCKING

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Servo Motor (Drivers Door), Adjust.....	N - 103
Servo Motor (Passenger Door), Adjust.....	N - 104

CENTRAL DOOR LOCKING

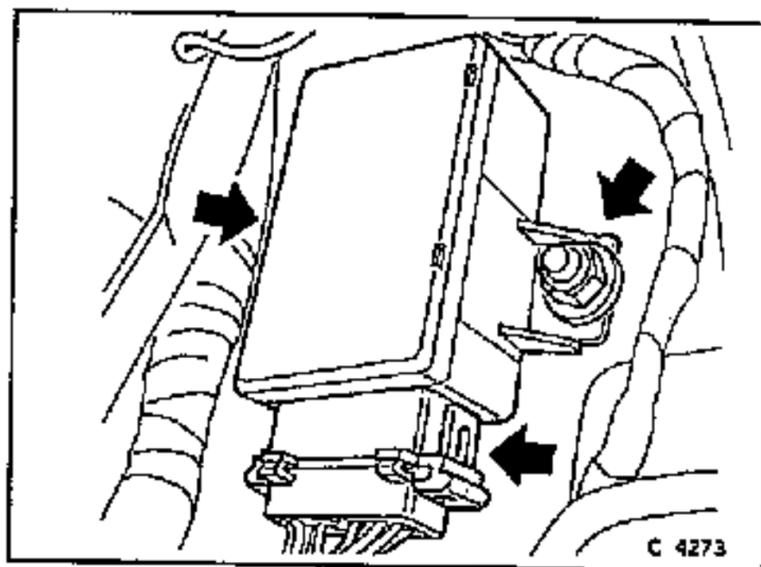
CONTROL UNIT, REMOVE AND INSTALL

Remove, Disconnect

A pillar trim – right footwell.
Control unit, wiring harness plug.

Install, Connect

Wiring harness plug, control unit, a pillar trim.



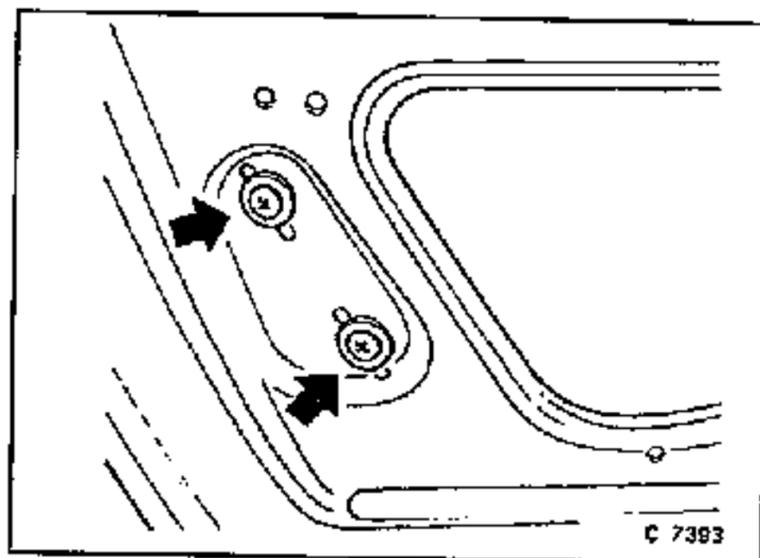
SERVO MOTOR (DOOR), REMOVE AND INSTALL

Remove, Disconnect

Door inner trim.
See corresponding operation in group C.
Servo motor from door, wiring harness plug from servo motor.

Install, Connect

Wiring harness plug, servo motor, door inner trim.



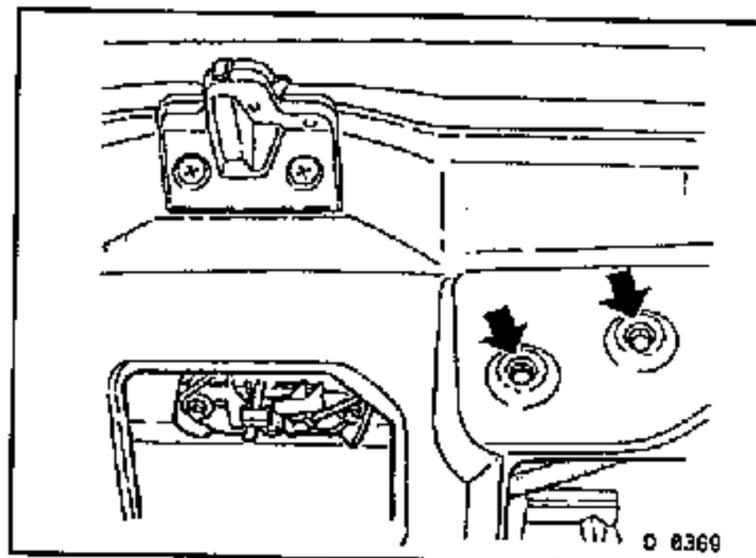
SERVO MOTOR (LUGGAGE COMPARTMENT LID), REMOVE AND INSTALL

Remove, Disconnect

Servo motor from luggage compartment lid, wiring harness plug.

Install, Connect

Wiring harness plug, servo motor.



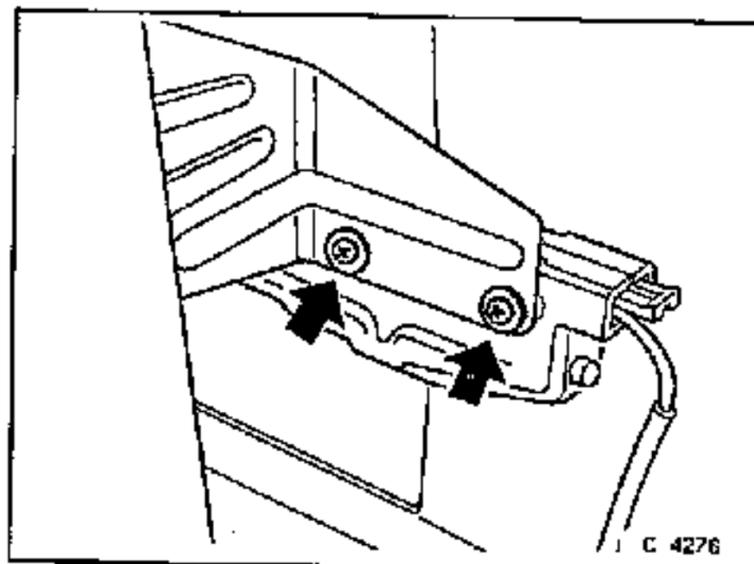
SERVO MOTOR (FUEL FILLER FLAP), REMOVE AND INSTALL

Remove, Disconnect

Luggage compartment side cover, servo motor from bracket, wiring harness plug from servo motor, linkage.

Install, Connect

Linkage, wiring harness plug, servo motor, luggage compartment side cover.

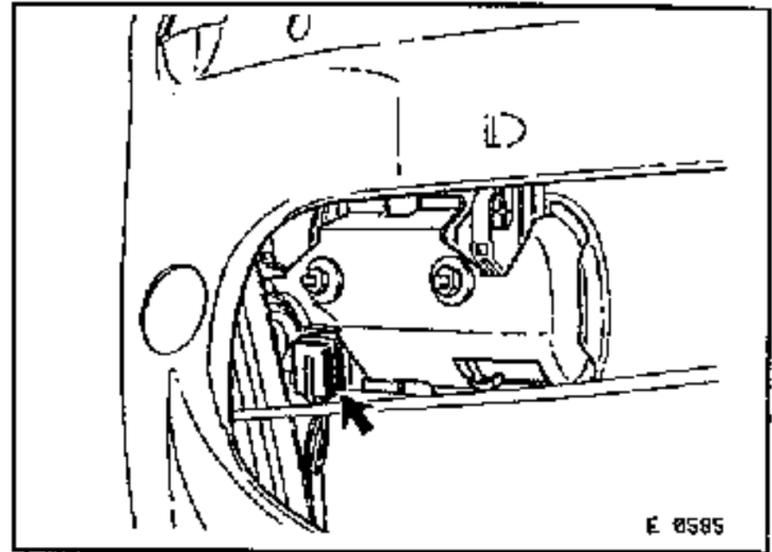


CENTRAL DOOR LOCKING

SWITCH (DRIVER'S DOOR), REMOVE AND INSTALL

Remove, Disconnect

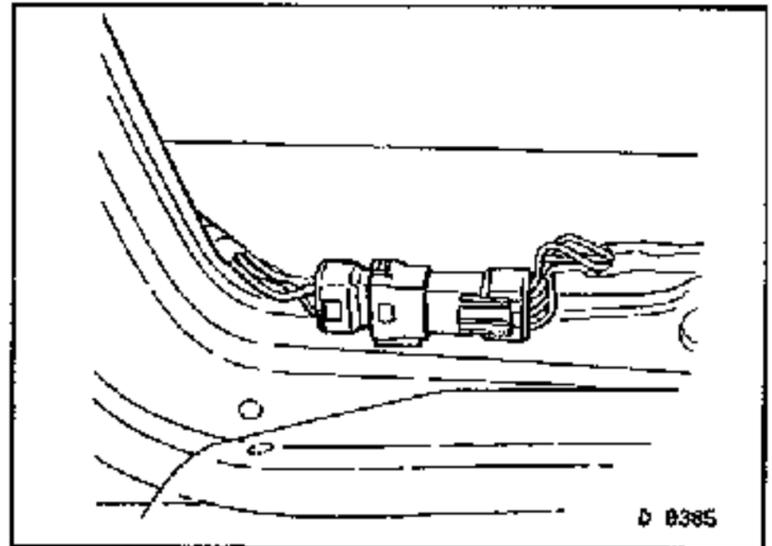
Door inner trim – group C.
Clip, switch and electrical connections.



Disconnect wiring harness plug at door wiring harness.

Install, Connect

Wiring harness plug, switch, door inner trim.



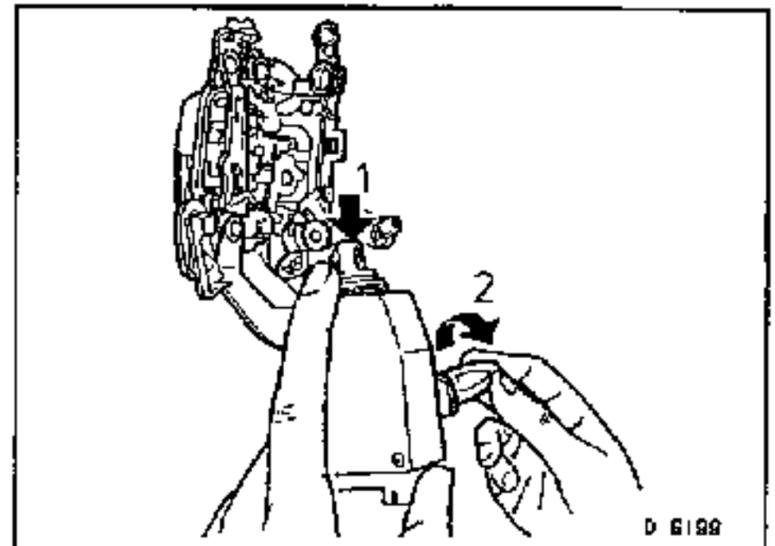
SERVO MOTOR (DRIVER'S DOOR), ADJUST

Remove, Disconnect

Disconnect battery, door inner trim panelling – group C,
Servo motor door lock assembly – group C.

Adjust

Press slider (1) of servo motor in lock position and hold, loosen servo motor screws (2).



Bring lock lever to stop by sliding servo motor with rubber damper, tighten screw.

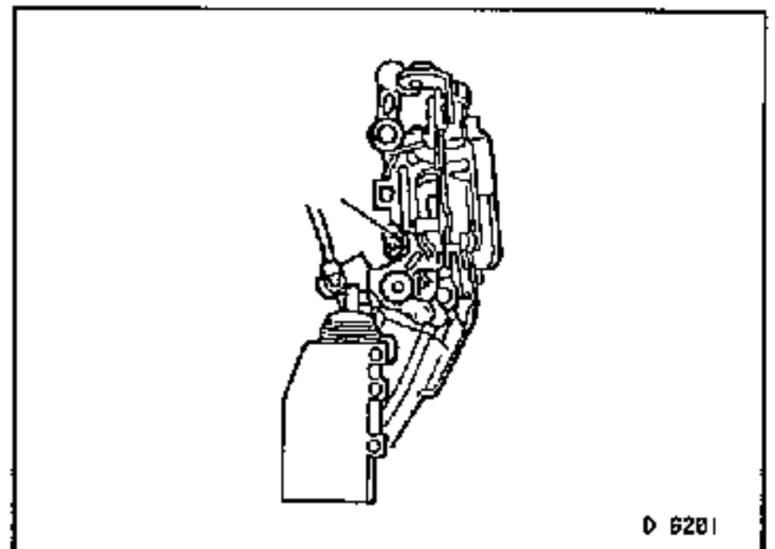
Install, Connect

Door lock servo motor assembly, connect battery.

Check for proper function.

Install door inner trim panelling.

If necessary, program electronic components
(i.e. board computer, electrical window winder).



CENTRAL DOOR LOCKING

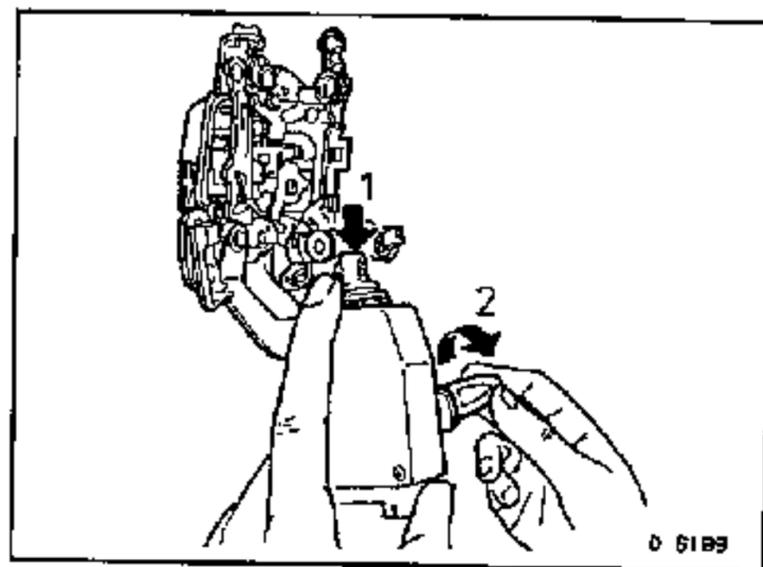
SERVO MOTOR (PASSENGER DOOR), ADJUST

Remove, Disconnect

Disconnect battery, door inner trim panelling – group C,
Door lock servo motor assembly – group C.

Adjust

Press servo motor slider (1) in lock position and hold, loosen
servo motor screws (2).



Adjust lock lever to a clearance of 2 mm/0.08 in. by moving the
servo motor, tighten screws.

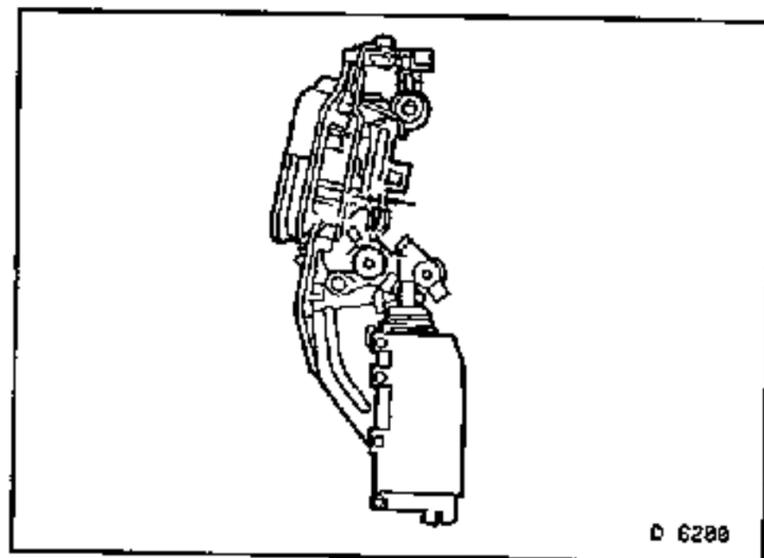
Install, Connect

Install door lock servo motor assembly, connect battery.

Check for proper function.

Install door inner trim panelling.

If necessary, program electronic components
(i.e. board computer, electrical window winder).



GROUP J

DOUBLE OVERHEAD CAM ENGINE

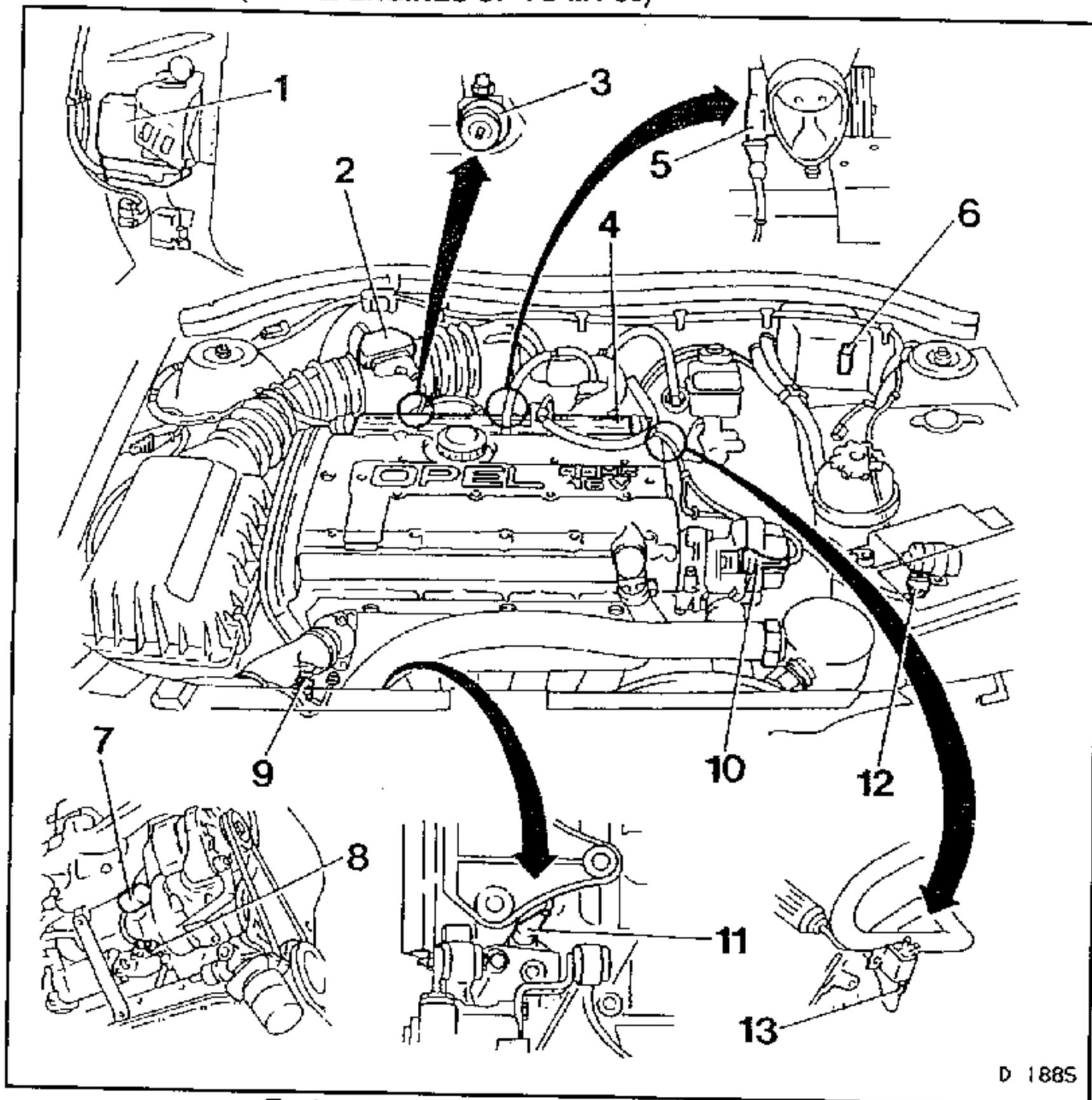
MOTRONIC M 2.5 (C 20 XE Engines Up To MY'93)

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DOHC ENGINE - MOTRONIC M 2.5

MOTRONIC M 2.5 (C 20XE ENGINES UP TO MY'93)



Typical Component Locations (LHD Shown)

Illustration Key:

- | | |
|--------------------------------------------|-----------------------------------------------|
| 1. Control Unit (Location; Right Footwell) | 8. Knock Sensor |
| 2. Hot Wire Mass Air Flow Meter | 9. Coolant Temperature Sensor |
| 3. Fuel Pressure Regulator | 10. High Voltage Distributor with Hall Sensor |
| 4. Injector Plug Strip | 11. Inductive Pulse Pick-up |
| 5. Throttle Valve Switch | 12. Ignition Coil |
| 6. Fuel Pump Relay | 13. Controlled canister Purge Valve |
| 7. Idle Speed Adjuster | |

General Instructions

This Section describes the service operations for the Motronic M 2.5 engine management system, which are generally, the same as those for Motronic M 2.8. In view of this, the illustrations used, show the Motronic M 2.5 system and, unless specified, relate to both the Motronic M 2.5 and Motronic M 2.8.

Alternatively, those operations that differ from Motronic M 2.5, are described in the Section "Motronic M 2.8 (C 20 XE Engines as of MY'93)".

DOHC ENGINE - MOTRONIC M 2.5

Throttle Body, Remove and Install (M 2.5, M 2.8)

Remove, Disconnect

Pre-volume chamber. Refer to this operation later in this Section.

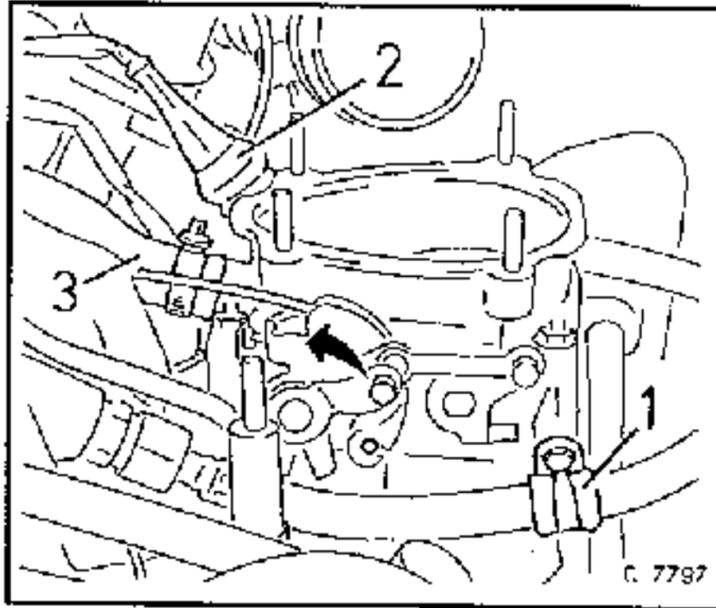
Fuel line bracket (1).

Wiring harness plug (2).

Bowden cable.

Hose (3).

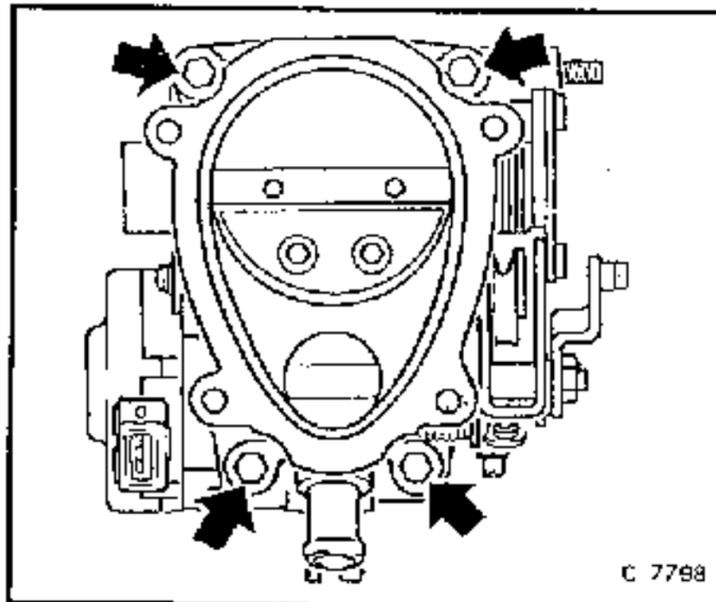
Vacuum hose from fuel pressure regulator.



Remove, Disconnect

Throttle body.

Throttle valve switch (M2.5) or throttle valve potentiometer (M 2.8).



Install, Connect

Throttle valve switch (M2.5) or throttle valve potentiometer (M 2.8).

Tighten (Torque)

Throttle body fasteners 9 Nm

Install, Connect

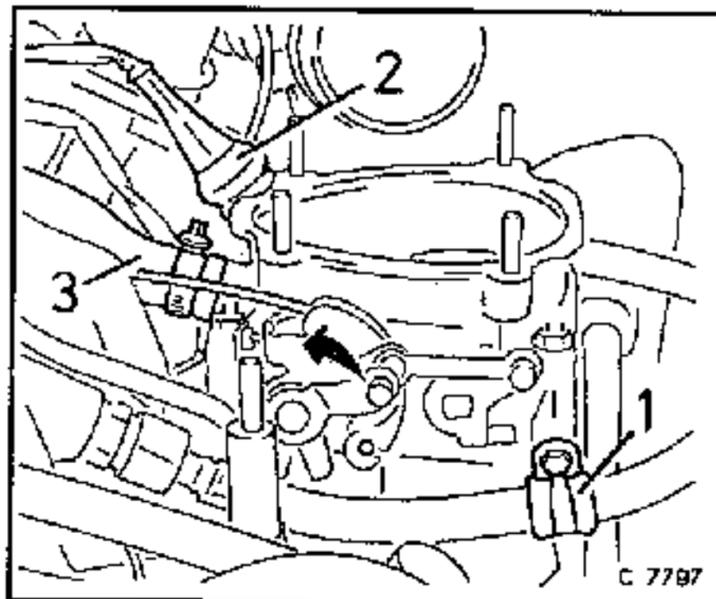
Fuel pressure regulator hose.

Bowden cable.

Wiring harness plug (2).

Fuel line bracket (1).

Pre-volume chamber. Refer to this operation later in this Section.



Important!

If any part of the throttle valve linkage is damaged or worn, replace the complete throttle body. No service adjustments are possible.

Adjust

Throttle valve switch (M2.5 only). Refer next operation.

DOHC ENGINE - MOTRONIC M 2.5

Throttle Valve Switch, Remove and Install (M 2.5)

Remove, Disconnect

Pre-volume chamber. Refer to this operation later in this Section.

Hot wire mass air flow meter. Refer to this operation later in this Section.

Throttle valve switch wiring harness plug.

Throttle valve switch.

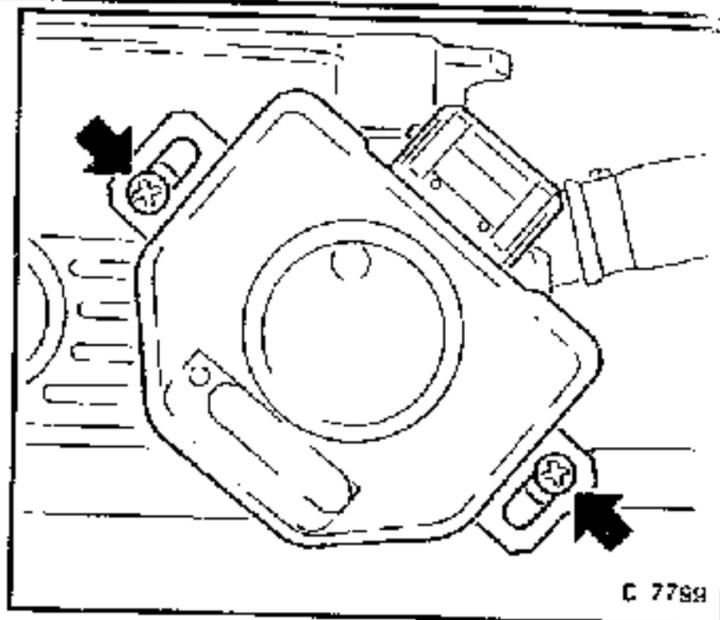
Install, Connect

Throttle valve switch. Adjust as detailed in this section.

Throttle valve switch wiring harness plug.

Hot wire mass air flow meter.

Pre-volume chamber.



Throttle Valve Switch, Adjust (M 2.5)

Remove, Disconnect

Pre-volume chamber. Refer to this operation later in this Section.

Hot wire mass air flow meter. Refer to this operation later in this Section.

Adjust

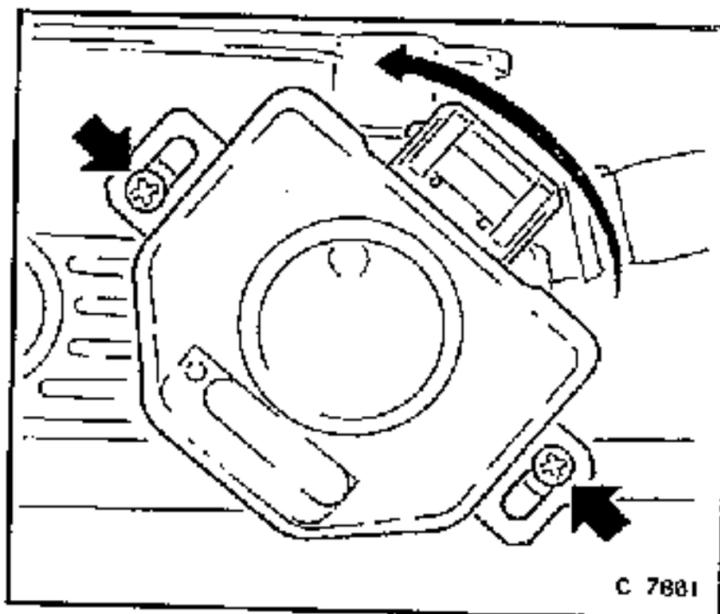
Loosen bolts, then turn throttle valve switch anti-clockwise until resistance is felt. Tighten the throttle valve switch in this position.

Check that an audible click is heard, both when the throttle is held wide open and when the throttle is closed.

Install, Connect

Pre-volume chamber.

Hot wire mass air flow meter.



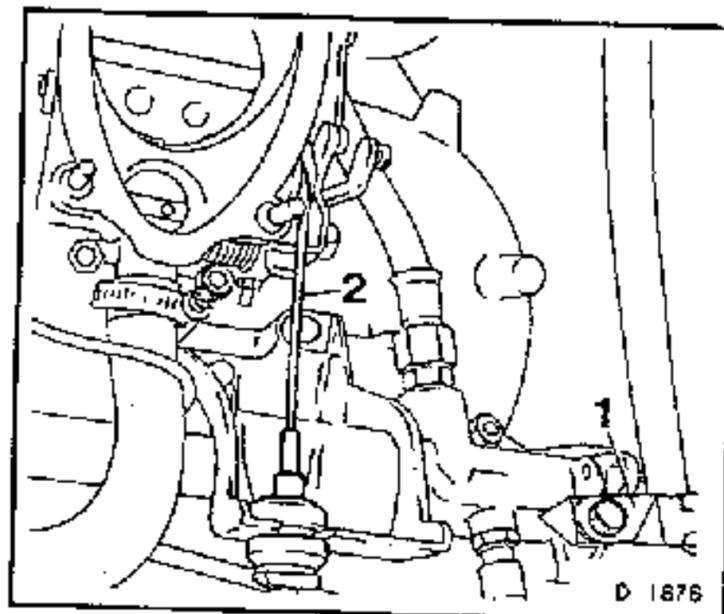
Injectors, Remove and Install (M2.5, M2.8)

Remove, Disconnect

Pre-volume chamber. Refer to this operation later in this Section.

Clamp (1).

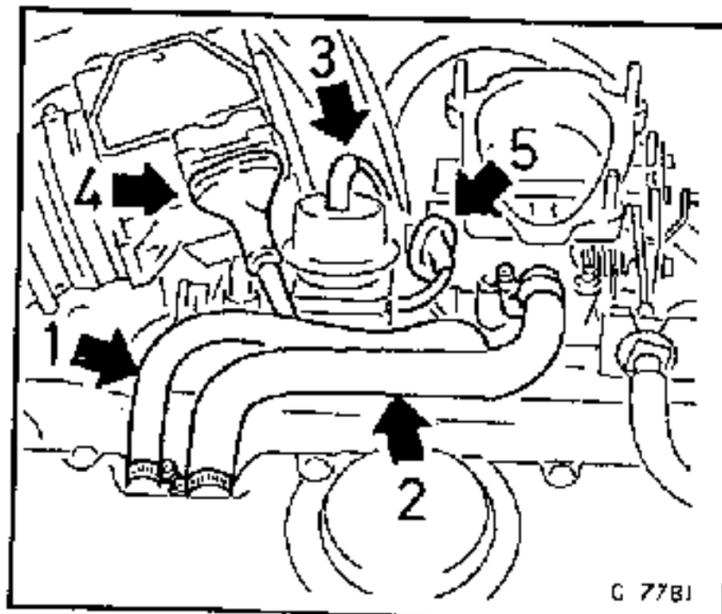
Bowden cable (2).



Remove, Disconnect

Hoses (1, 2 and 3).

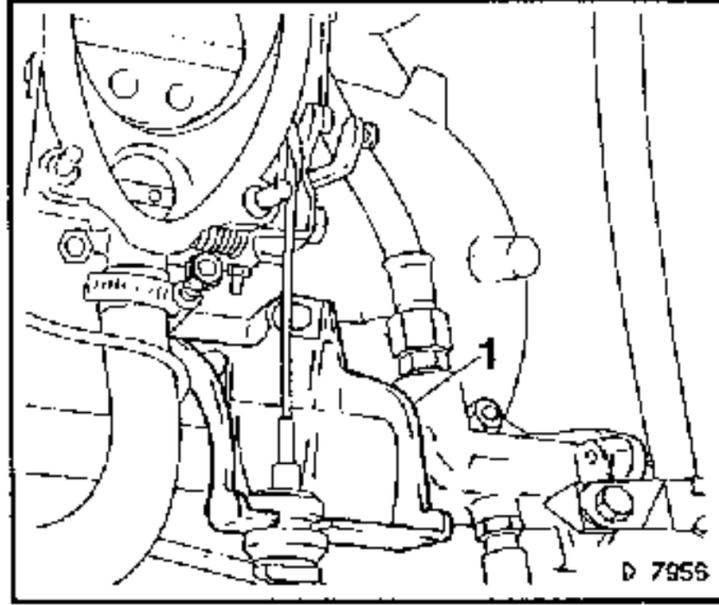
Wiring harness plugs (4 and 5).



DOHC ENGINE - MOTRONIC M 2.5

Remove, Disconnect

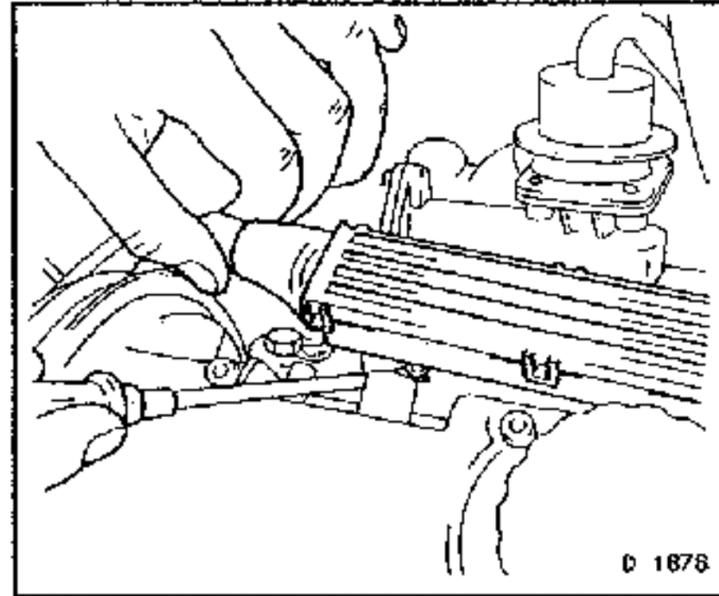
Bowden cable bracket (1).



Remove, Disconnect

No. 1 cylinder injector retaining clamp from the plug strip, then remove the plug strip.

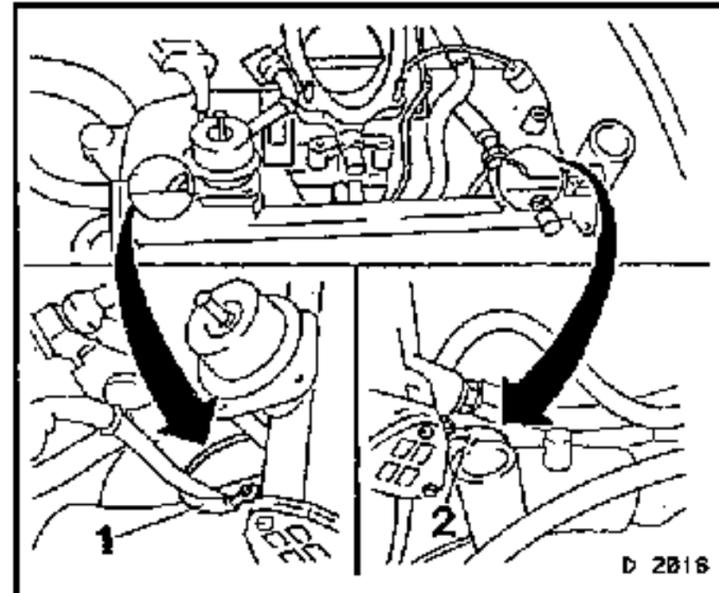
Insert retaining clamp in the plug strip.



Remove, Disconnect

Ground cables (1 and 2).

Fuel distributor pipe with the injectors still attached.



Remove, Disconnect

Retaining clip, then injector from fuel distribution pipe.

Important!

When installing use new sealing rings.

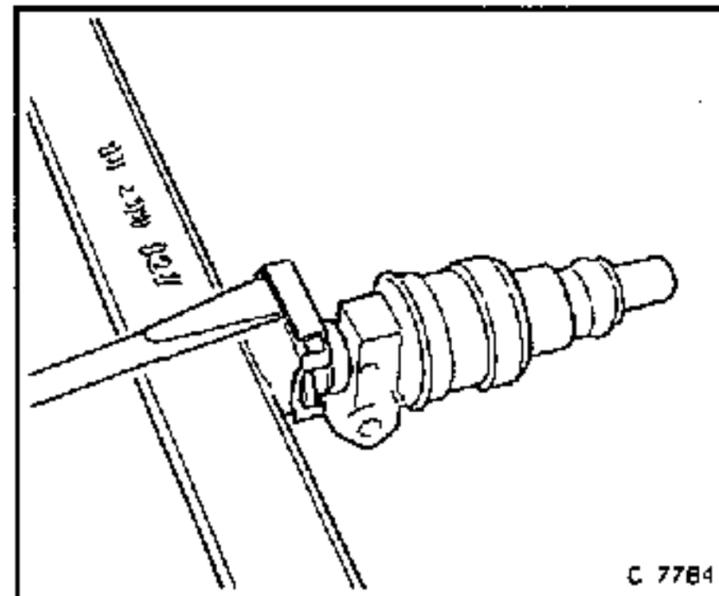
Also, ensure that all hoses and cables are routed and installed correctly.

Install, Connect

Injector, retaining clip.

Fuel distributor pipe with injector.

Nuts, ground cables.



DOHC ENGINE - MOTRONIC M 2.5

Install, Connect

Injector plug strip.
Bowden cable bracket.

Tighten (Torque)

Bowden cable bracket 8 Nm

Install, Connect

Wiring harness plugs to the throttle valve switch and hot wire mass air flow meter (M 2.5).

Wiring harness plugs to the throttle valve potentiometer and hot film mass air flow meter (M 2.8).

Adjust

Bowden cable.

Hot Wire Mass Air Flow Meter, Remove and Install (M 2.5)

Remove, Disconnect

Wiring harness plug from the hot wire mass air flow meter.

Install, Connect

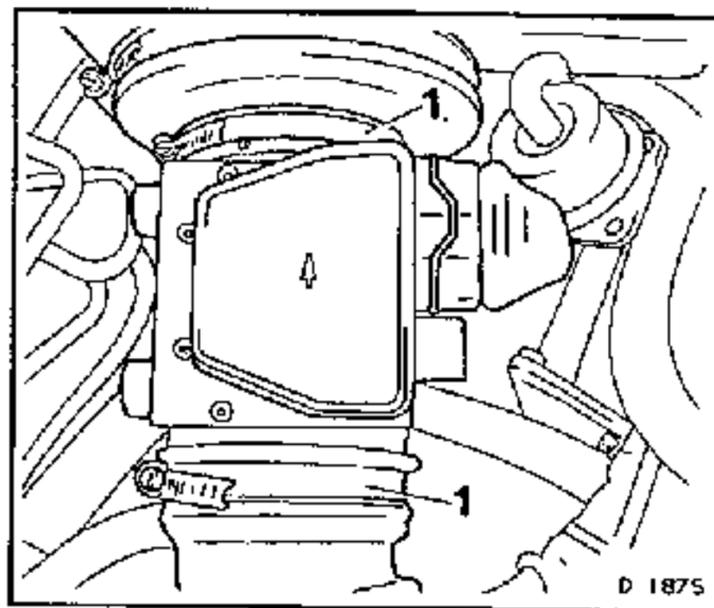
Hot wire mass air flow meter.

Hose clamps.

Wiring harness plug to the hot wire mass air flow meter.

Important!

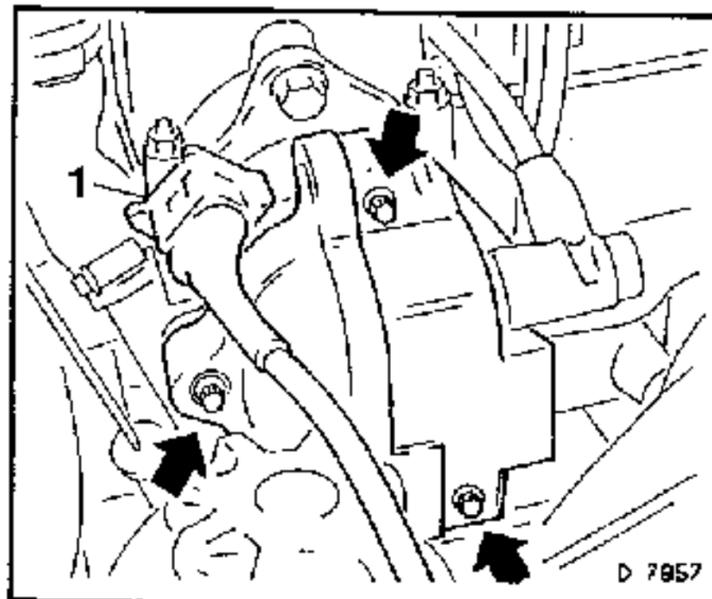
Ensure that all hoses and clamps are correctly installed and air tight.



High Voltage Distributor, Remove and Install (M 2.5)

Remove, Disconnect

Wiring harness plug (1), distributor cap.



Remove, Disconnect

High voltage distributor, seal ring.

Install, Connect

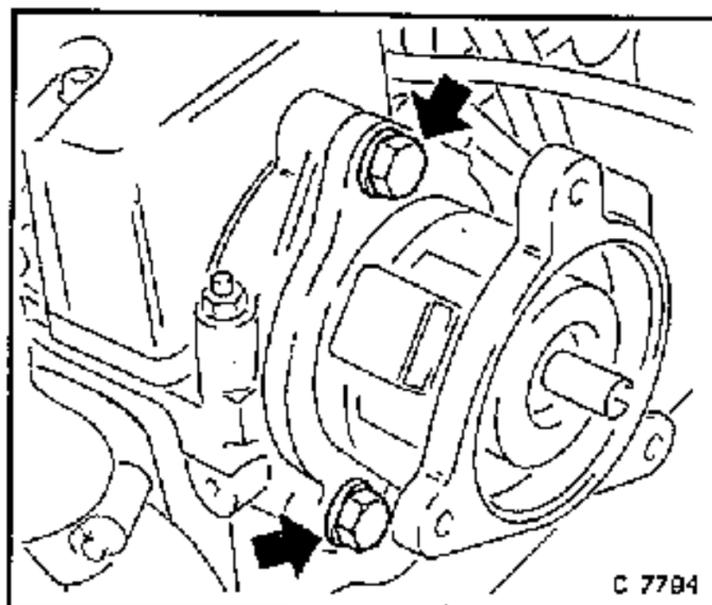
Seal ring, high voltage distributor.

Tighten (Torque)

Distributor bolts 15 Nm

Install, Connect

Distributor cap, wiring harness plug.

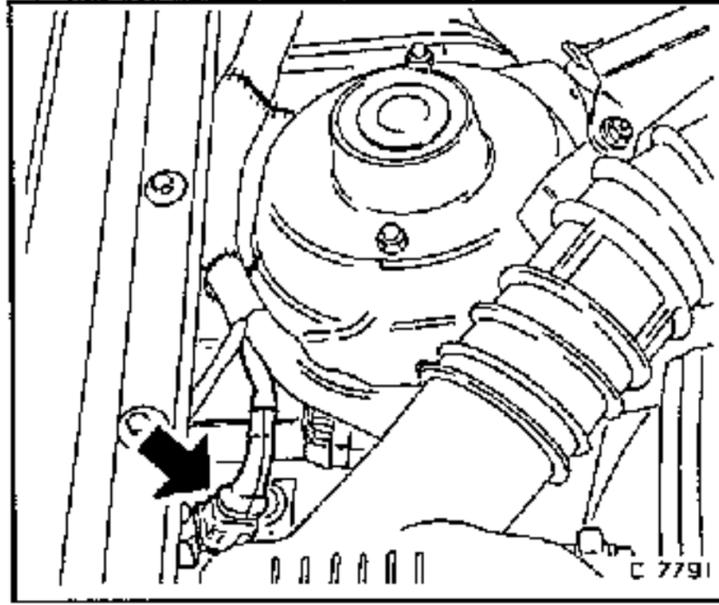


DOHC ENGINE - MOTRONIC M 2.5

Inductive Pulse Pick-Up, Remove and Install (M 2.5)

Remove, Disconnect

Wiring harness plug (arrow), noting wiring harness routing.



Remove, Disconnect

Pulse pick-up with seal ring.

Install, Connect

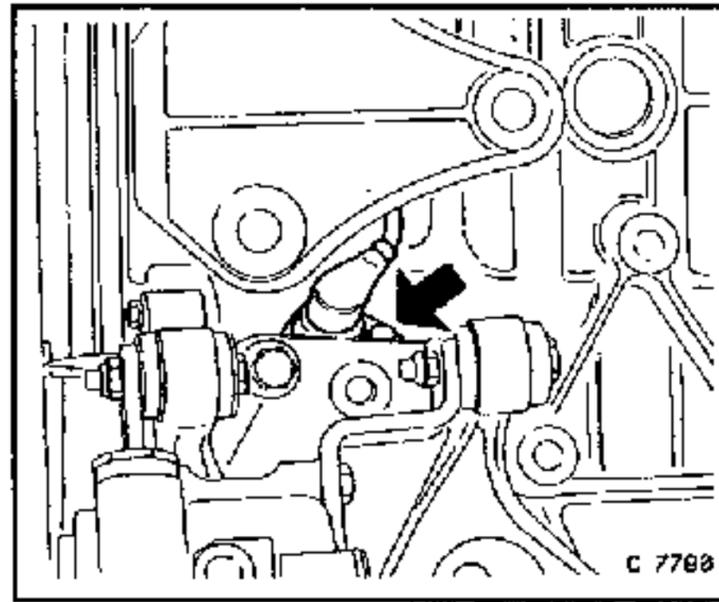
Pulse pick-up with new seal ring.

Tighten (Torque)

Pulse pick-up fastening bolt..... 6 Nm

Install, Connect

Wiring harness plug, Ensure correct wiring harness routing.



Knock Sensor, Remove and Install (M 2.5, M 2.8)

Remove, Disconnect

Ground cable from battery.

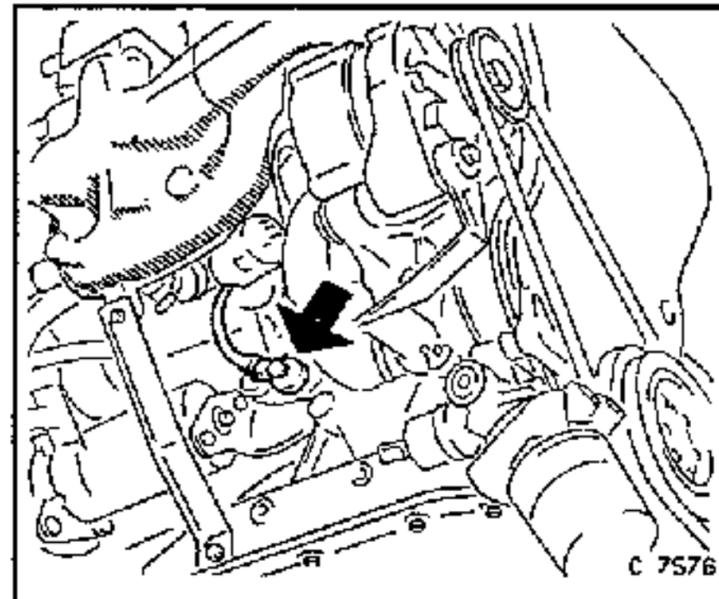
For C 20 LET:

Alternator. Refer to "Alternator" Section in this Volume.

Knock sensor wiring harness plug.

Important!

Carefully clean the knock sensor to cylinder block contact surfaces.



Install, Connect

Knock sensor.

Tighten (Torque)

Knock sensor bolt 20 Nm

Install, Connect

Knock sensor wiring harness plug.

For C 20 LET:

Alternator. Refer to "Alternator" Section in this Volume.

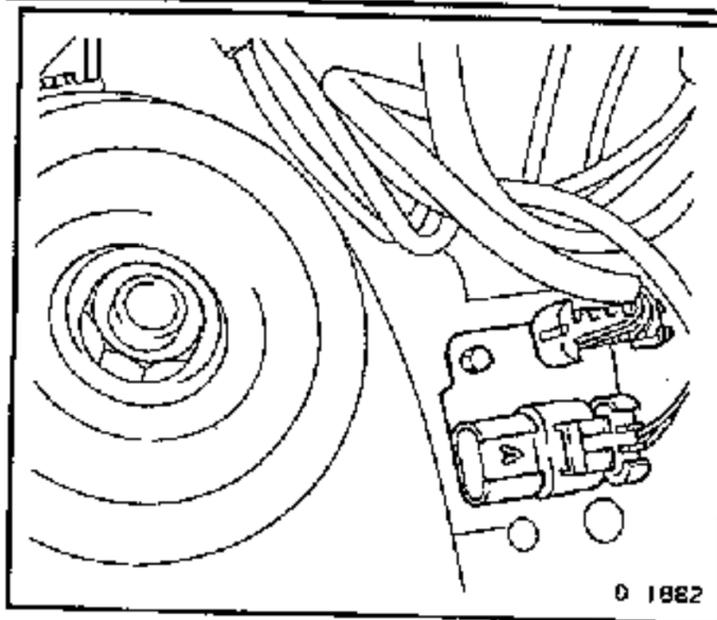
Ground cable to battery.

DOHC ENGINE - MOTRONIC M 2.5

Ignition Coding Plug (M 2.5)

Important!

The coding plug must not be changed. The coding plug fitted, matches the ignition map in the control unit, to enable the vehicle to comply with various regulations such as noise and exhaust emissions.



Fuel Pressure Regulator, Remove and Install (M 2.5, M 2.8)

Important!

Be careful of fuel spillage, when fuel pressure is released. Refer (1) in illustration D 7636.

Remove, Disconnect

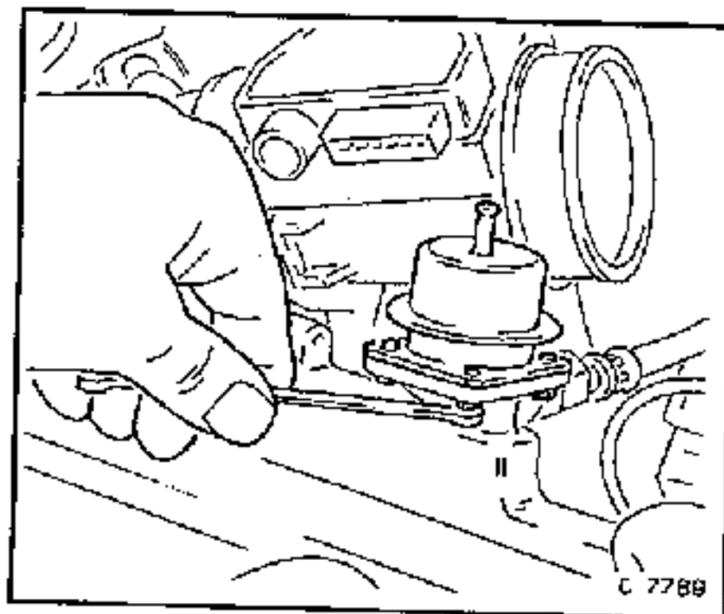
Pre-volume chamber. Refer to this operation later in this Section.

Wiring harness plugs from the throttle valve switch and hot wire mass air flow meter (M 2.5).

Wiring harness plugs from the throttle valve potentiometer and hot film mass air flow meter (M 2.8).

Vacuum hose from the fuel pressure regulator.

Fuel pressure regulator from the fuel distribution pipe.



Install, Connect

Fuel pressure regulator.

Tighten (Torque)

Fuel pressure regulator 4 Nm

Fuel pressure regulator vacuum hose.

Wiring harness plugs to the throttle valve switch and hot wire mass air flow meter (M 2.5).

Wiring harness plugs to the throttle valve potentiometer and hot film mass air flow meter (M 2.8).

Pre-volume chamber. Refer to this operation later in this Section.

Fuel Pressure, Check (M 2.5, M 2.8)

Remove, Disconnect

Slowly open screw cap (1) to decrease the fuel pressure.

Fuel pressure regulator vacuum hose.

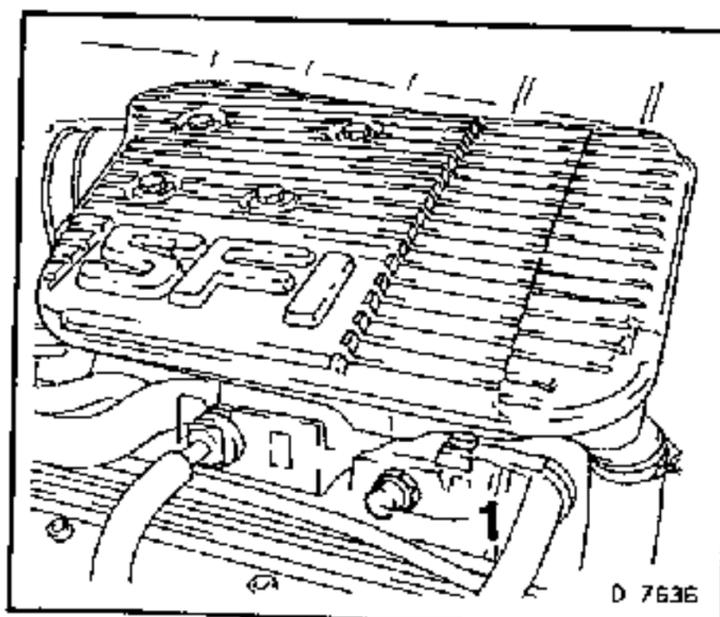
Measure

Fuel pressure.

Install, Connect

Fuel pressure gauge KM-J-34730-1 to the checking connection.

Bleed air from the fuel pressure gauge. Start the engine and run at idle speed.



DOHC ENGINE - MOTRONIC M 2.5

Specification:

M 2.5:

With vacuum hose connected 200 - 220 kPa
With vacuum hose disconnected 230 - 270 kPa

M 2.8:

With vacuum hose connected 220 - 270 kPa
With vacuum hose disconnected 300 - 350 kPa

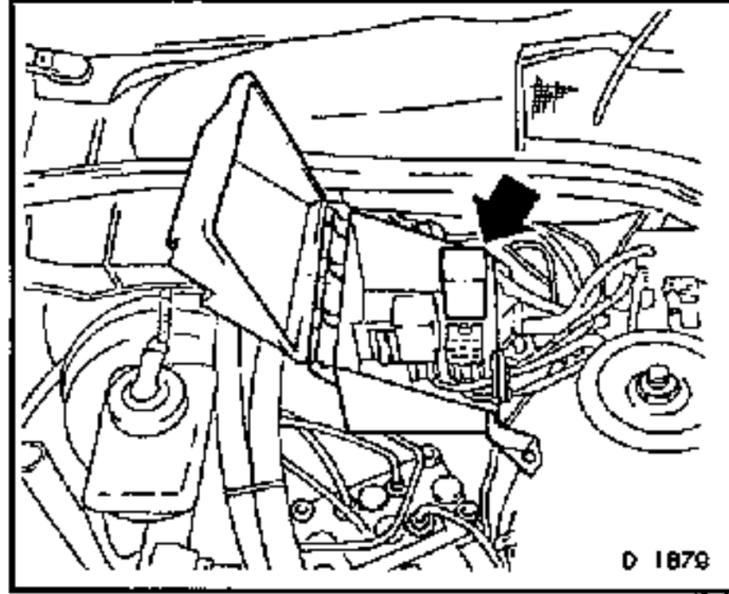
Fuel Pump Relay, Remove and Install (M 2.5)

Remove, Disconnect

Fuel pump relay from the relay socket (arrow).

Install, Connect

Fuel pump relay to the relay socket (arrow).

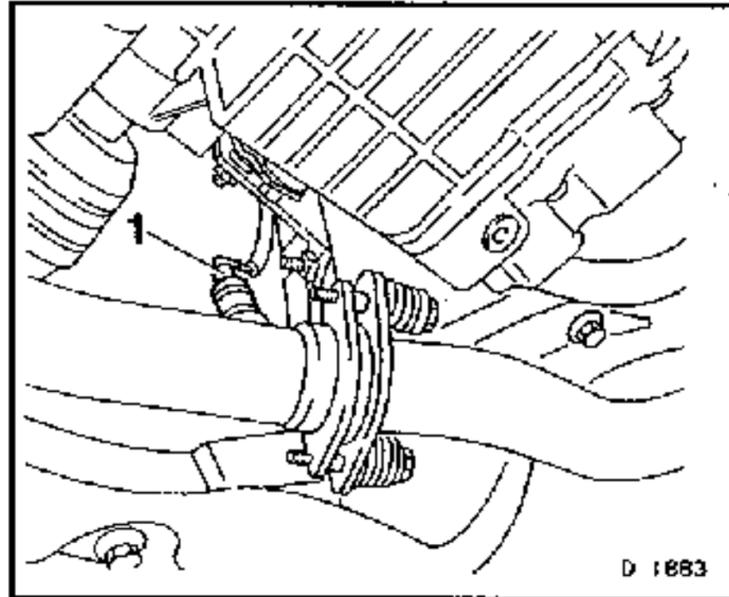


Oxygen Sensor, Remove and Install (M 2.5, M 2.8)

Remove, Disconnect

Oxygen sensor wiring harness plug.

Oxygen sensor (1) from the front exhaust pipe.



Tighten (Torque)

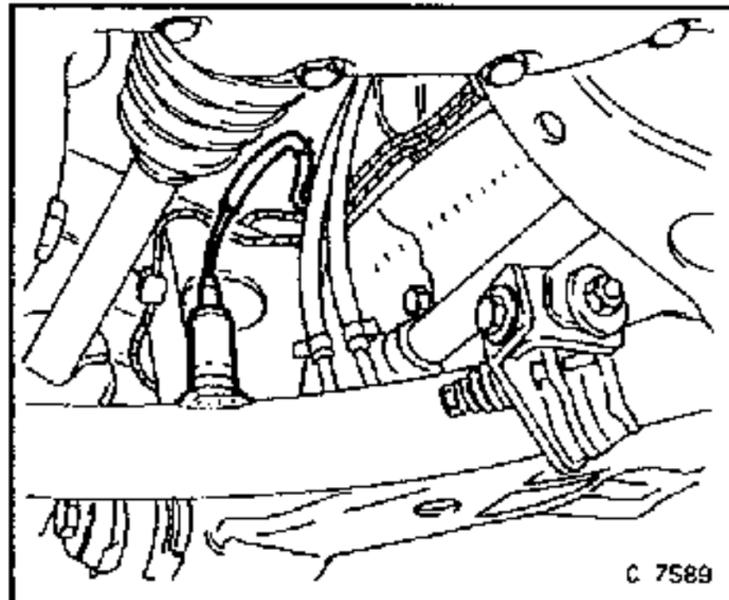
Oxygen sensor to exhaust pipe 30 Nm

Important!

If oxygen sensor is being re-used, apply special grease to the cleaned oxygen sensor threads. This grease, part number 5613695, is available from authorised Holden parts outlets.

Install, Connect

Oxygen sensor wiring harness plug, checking that the routing of the wiring harness is correct.



DOHC ENGINE - MOTRONIC M 2.5

Idle Speed Adjuster, Remove and Install (M 2.5, M 2.8)

Important!

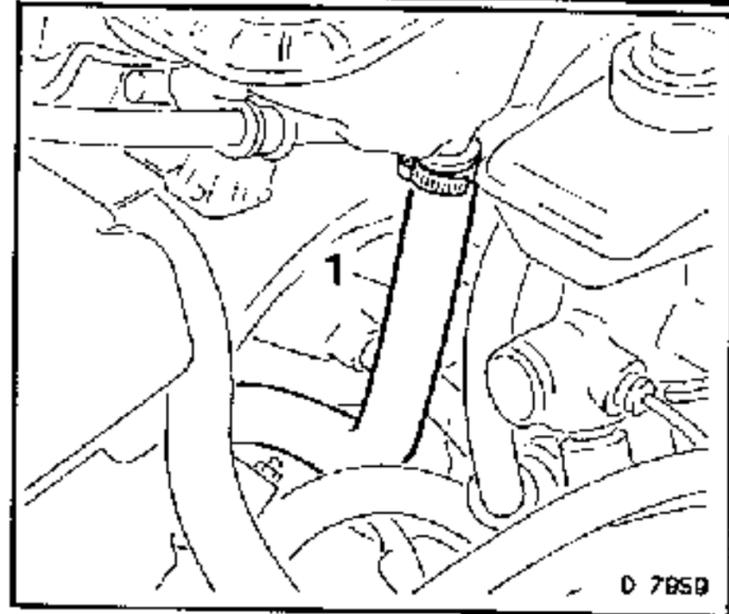
Mark hoses for correct installation.

Remove, Disconnect

Ground cable from battery.

Hose (1) from pre-volume chamber.

The intake manifold to idle speed adjuster hose from the intake manifold.



Remove, Disconnect

Wiring harness plug from the idle speed adjuster.

Idle speed adjuster with hoses still attached.

Hoses from the idle speed adjuster.

Install, Connect

Hoses to the idle speed adjuster.

Idle speed adjuster with hoses attached.

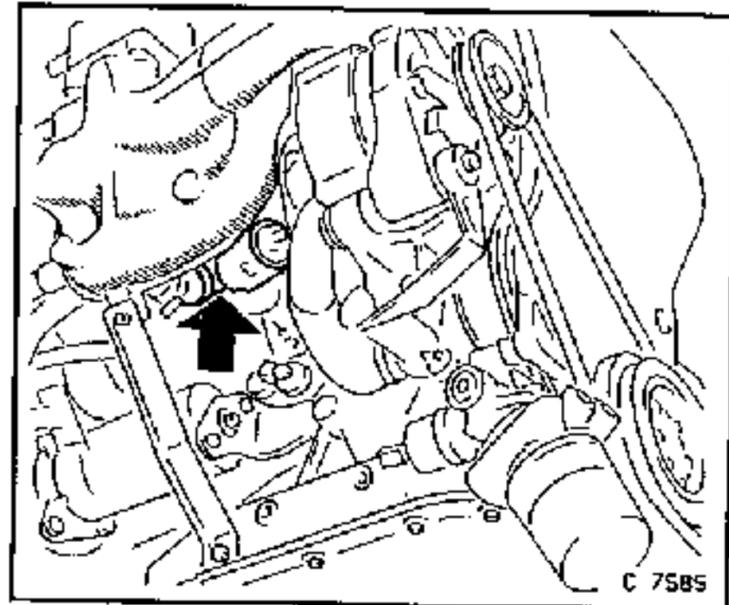
Hoses to pre-volume chamber and to Intake manifold.

Wiring harness plug to idle speed adjuster.

Ground cable to battery.

Important!

Ensure that all hoses are air tight and correctly routed.



Control Unit, Remove and Install (M 2.5)

Remove, Disconnect

Switch off ignition.

Unclip right footwell cover, after removing the right hand door sill panel.

Control unit.

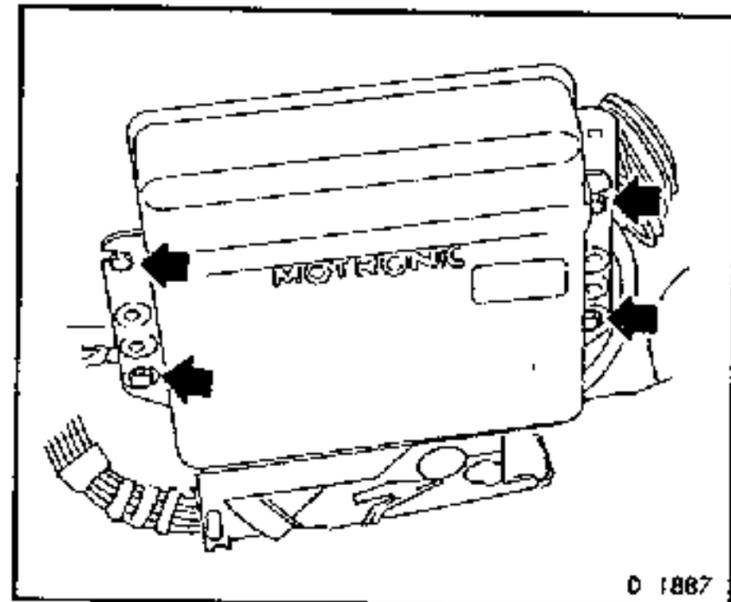
Control unit wiring harness plug.

Install, Connect

Control unit wiring harness plug.

Control unit.

Footwell cover, and right hand door sill panel.



Controlled Canister Purge Valve, Remove and Install (M 2.5)

Remove, Disconnect

Wiring harness plug (1) from controlled canister purge valve.

Hoses (2) from controlled canister purge valve. Close off hose to carbon canister with a suitable clamp.

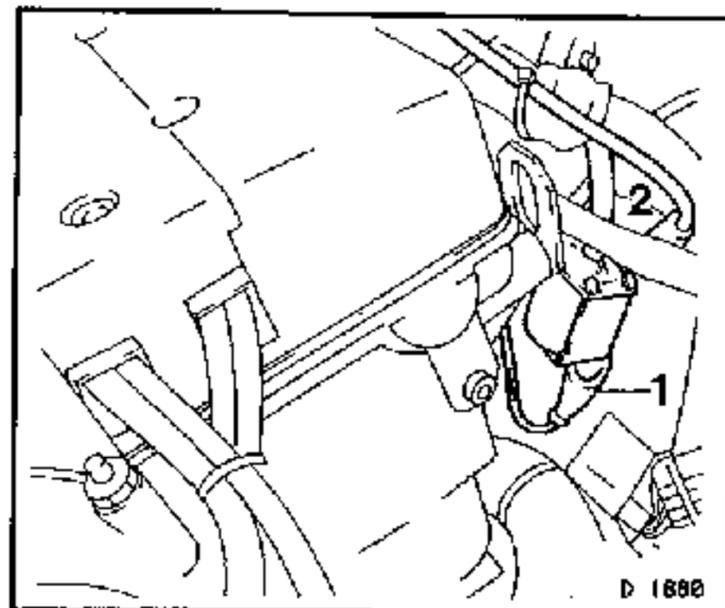
Controlled canister purge valve.

Install, Connect

Controlled canister purge valve.

Hoses (2). Remove clamp.

Wiring harness plug (1) to controlled canister purge valve.



DOHC ENGINE - MOTRONIC M 2.5

Coolant Temperature Sensor, Remove and Install (M 2.5, M 2.8)

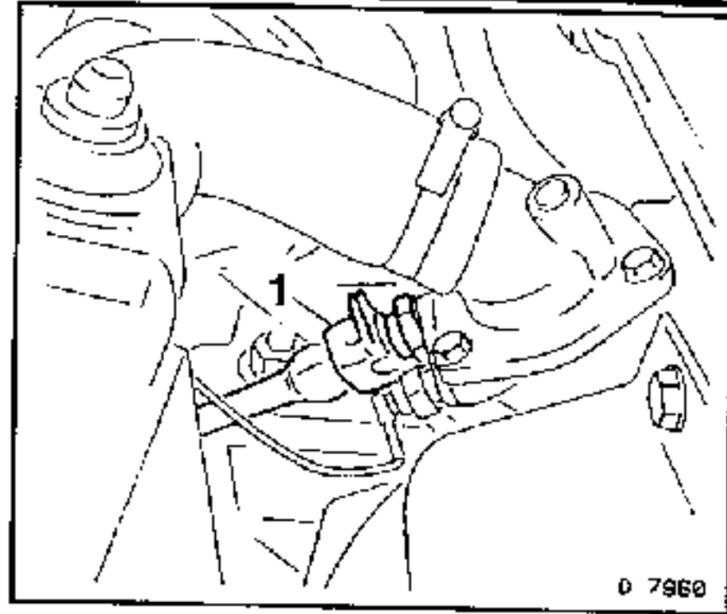
Important!

Use a suitable clean container to catch spilled coolant.

Remove, Disconnect

Wiring harness plug (1) from the coolant temperature sensor,

Coolant temperature sensor from the thermostat housing.



Install, Connect

Coolant temperature sensor to the thermostat housing, using a new seal.

Tighten (Torque)

Coolant temperature sensor..... 11Nm

Important!

Top up and bleed cooling system. Refer to "Cooling System", in this Volume.

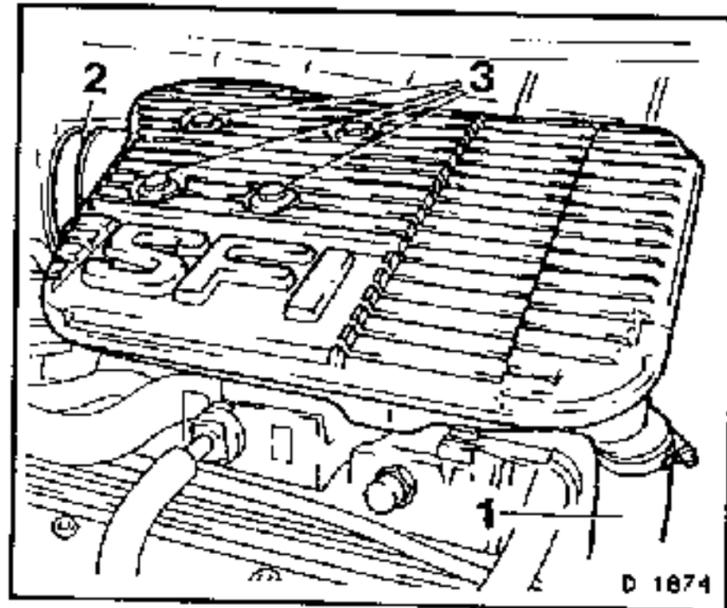
Pre-Volume Chamber, Remove and Install (M 2.5, M 2.8)

Remove, Disconnect

Hose (1), hose clamp (2).

Bolts (3).

Pre-volume chamber. Note seal ring.



Important!

Apply a contact cement such as Permatex MA1 or equivalent to 4 - 6 points in the seal seat, before installation.

Install, Connect

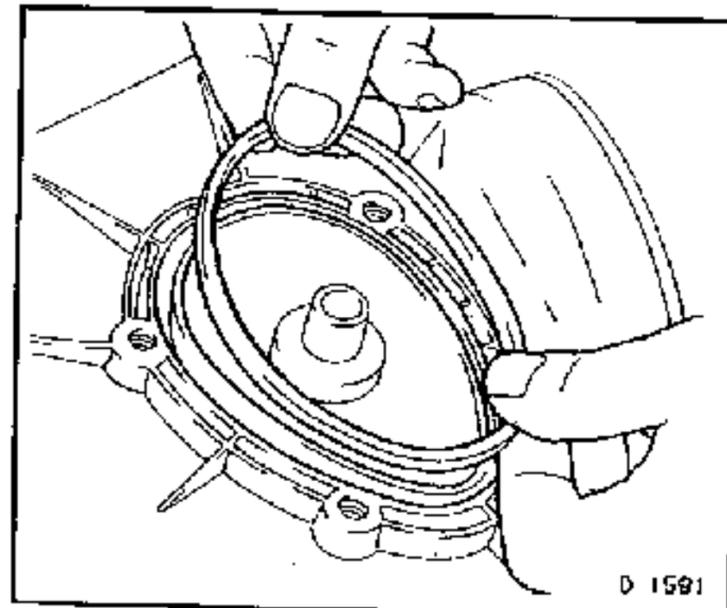
A new seal ring, ensuring that it seats correctly.

Pre-volume chamber.

Hose clamp (2, in D 1874).

Bolts (3, in D 1874).

Hose (1, in D 1874).



DOHC ENGINE - MOTRONIC M 2.5

Ignition Coil, Remove and Install (M 2.5)

Remove, Disconnect

Ignition switched off.

Cable connections from ignition coil.

Wiring harness plug from the ignition control unit.

Bolts (1).

Ignition coil with ignition control unit.

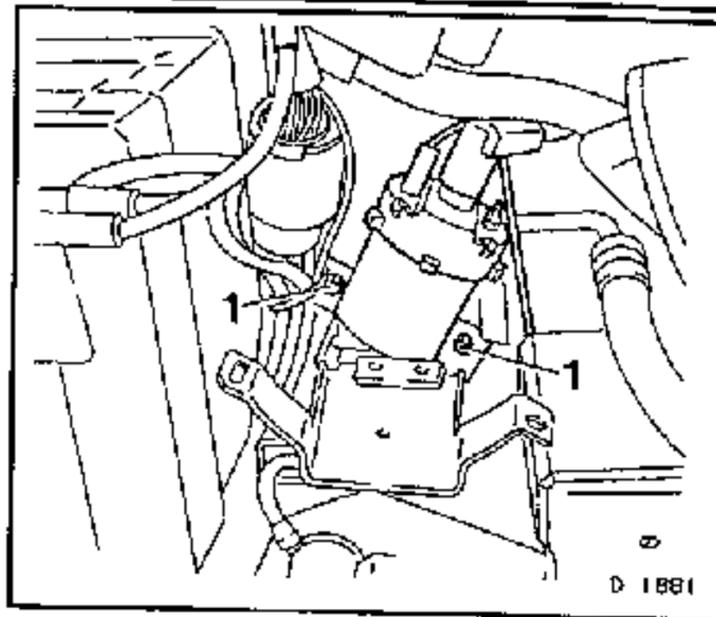
Install, Connect

Ignition coil with ignition control unit.

Bolts (1).

Cable connections to ignition coil.

Wiring harness plug to the ignition control unit.



RECOMMENDED TORQUE VALUES

(Motronic M 2.5)

	Nm
Bowden cable bracket	8
Coolant temperature sensor	11
Fuel pressure regulator.....	4
Injector plug strip	8
Knock sensor	20
Oxygen sensor to exhaust pipe	30 (1)
Pulse pick-up retaining bolt.....	6
High voltage distributor clamp bolt	15

(1) If re-using, apply Special Grease, Part Number 5613695 to the cleaned oxygen sensor threads.

GROUP J

DOUBLE OVERHEAD CAM ENGINE

MOTRONIC M 2.7 (C 20 LET)

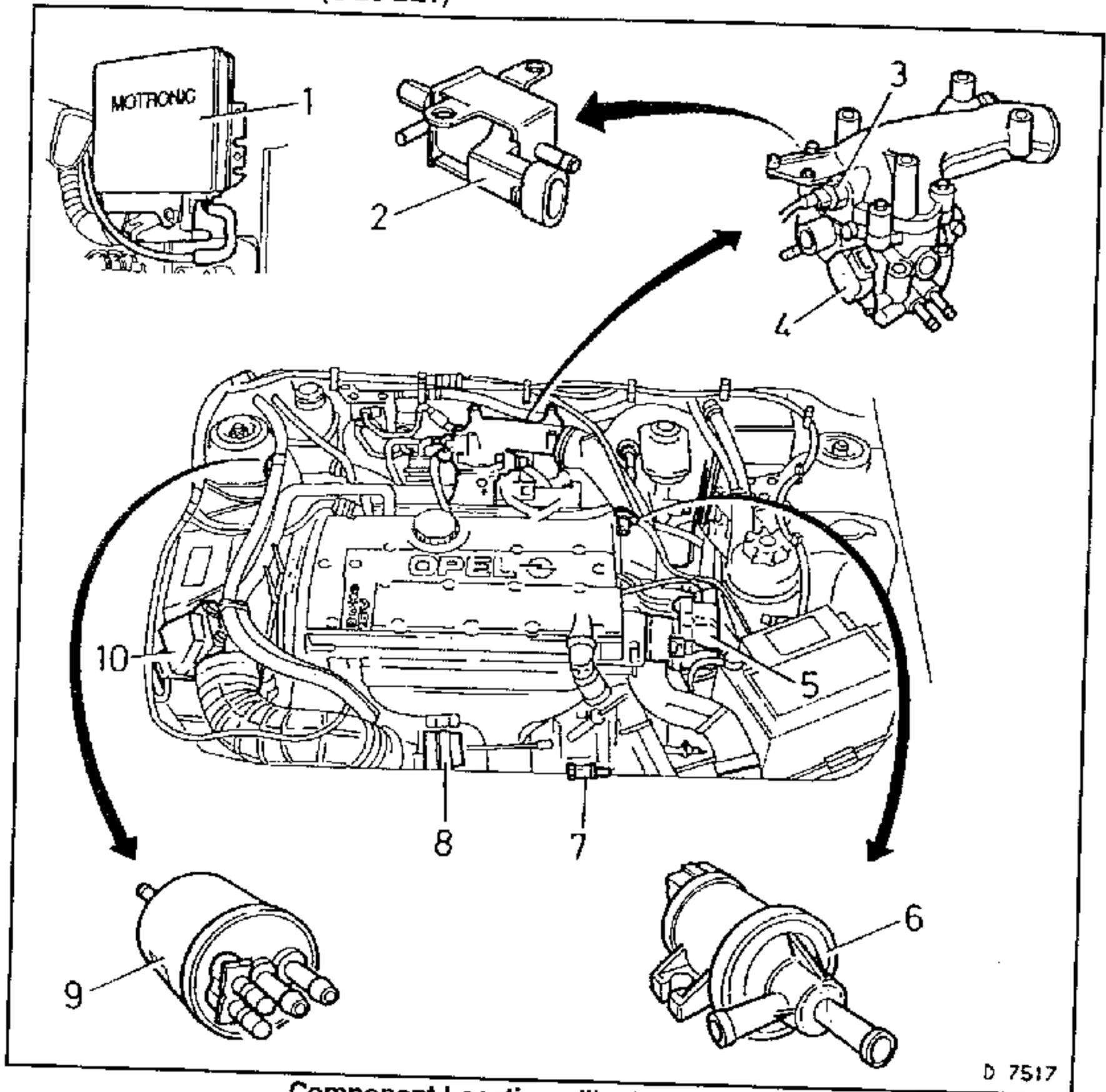
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- * For service procedures on this item, refer to Section K - "OPERATIONS ON MANUAL TRANSMISSION AND DIFFERENTIAL" in "CLUTCH AND TRANSMISSION", Volume 4 of these Service Instructions

DOHC ENGINE - MOTRONIC M 2.7

MOTRONIC M 2.7 (C 20 LET)



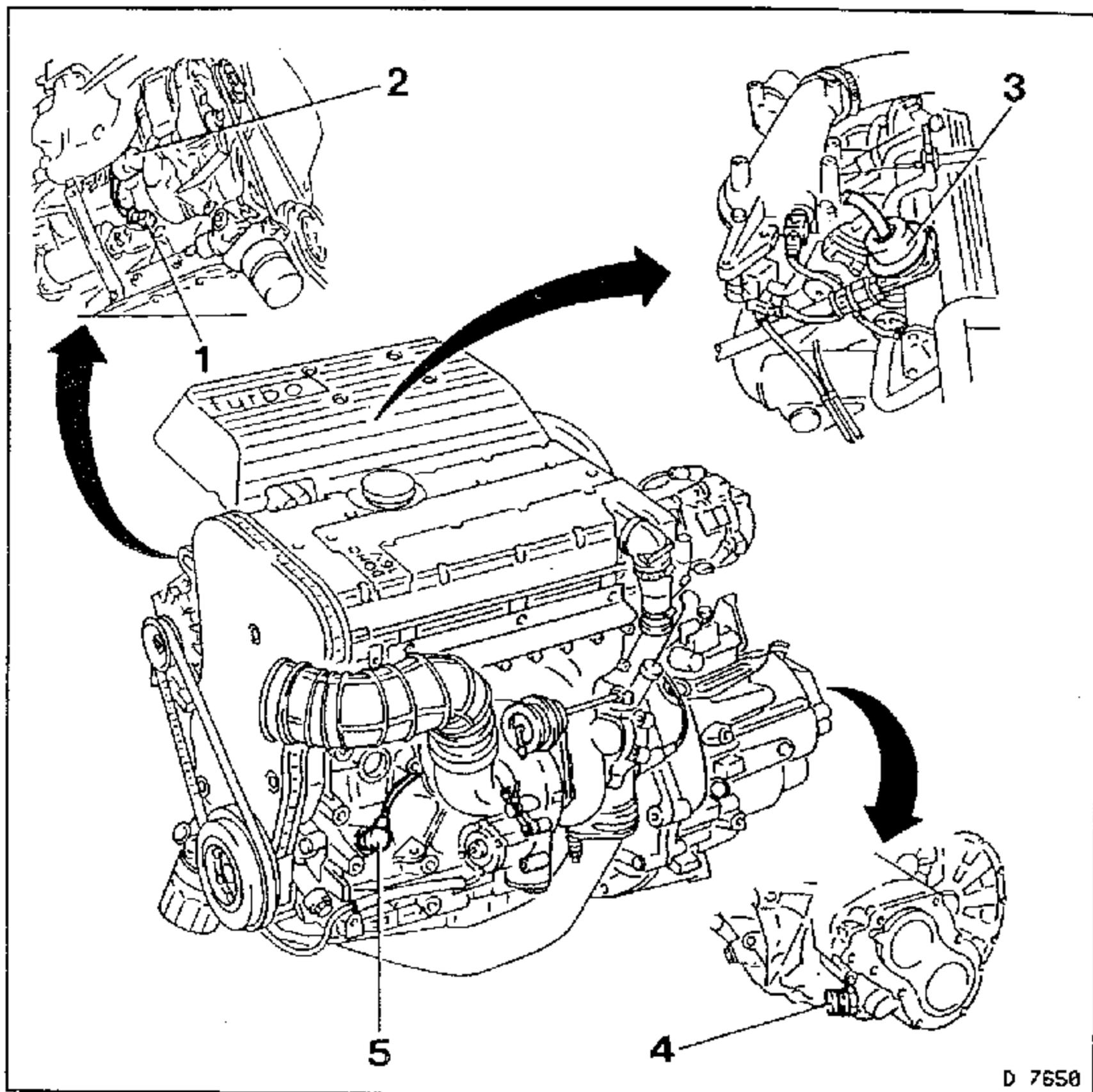
Component Location - Illustration No. 1

Illustration Key:

1. Control Unit (Location; Right Footwell)
2. Hot Start Valve
3. Intake Air Temperature Sensor
4. Throttle Valve Potentiometer
5. High Voltage Distributor with Hall Sensor
6. Controlled Canister Purge Valve
7. Oxygen Sensor
8. Charge Pressure Regulating Valve Control Unit
9. Charge Pressure Control Switchover Valve
10. Hot Wire Mass Air Flow Sensor

DOHC ENGINE - MOTRONIC M 2.7

MOTRONIC M 2.7 (C 20 LET)



D 7658

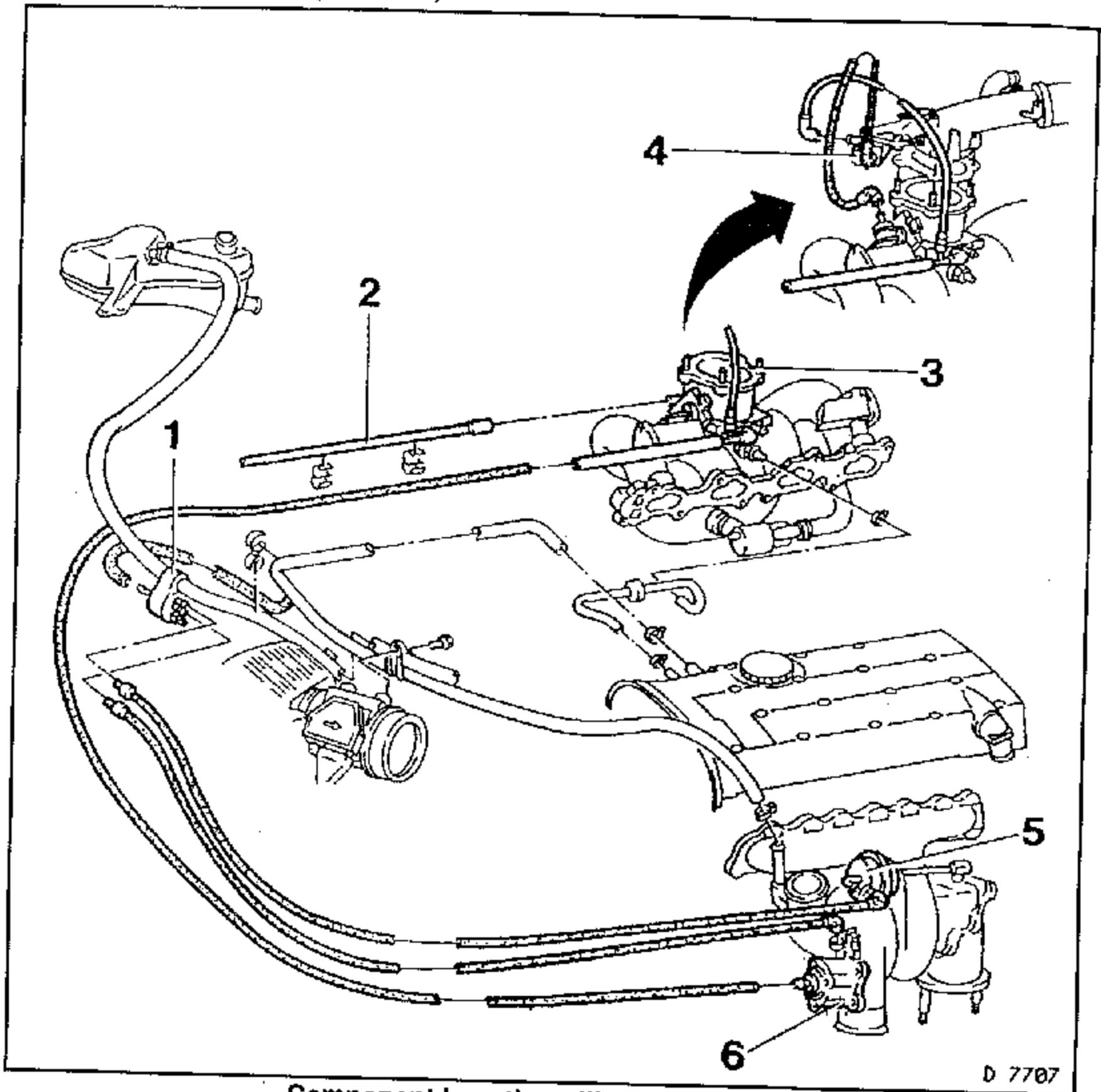
Component Location - Illustration No. 2

Illustration Key:

1. Knock Sensor
2. Idle Speed Adjuster
3. Fuel Pressure Regulator
4. Switch - 1st Gear Recognition
5. Inductive Pulse Pick-Up

DOHC ENGINE - MOTRONIC M 2.7

MOTRONIC M 2.7 (C 20 LET)



Component Location - Illustration No. 3

Illustration Key:

1. Charge Pressure Control Switchover Valve
2. Connection to Motronic Control Unit M 2.7
3. Throttle Body
4. Hot Start Valve
5. Charge Pressure Regulating Valve Control Unit
6. Air Bypass Valve

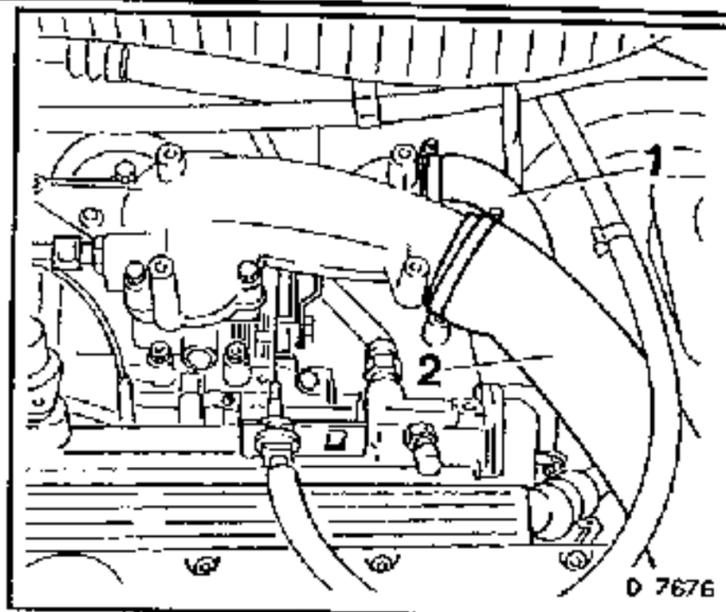
DOHC ENGINE - MOTRONIC M 2.7

Throttle Body, Remove and Install

Remove, Disconnect

Throttle body manifold cover.

Hose (1 and 2) from the throttle valve manifold.

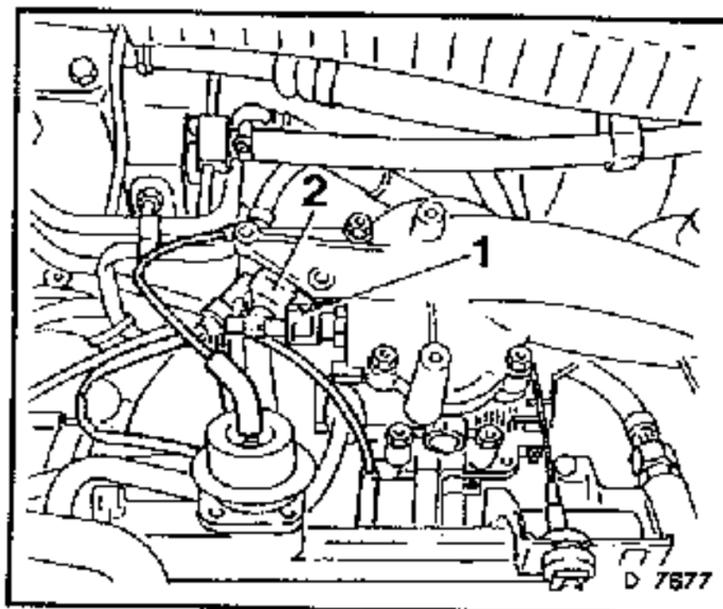


Remove, Disconnect

Label vacuum hoses.

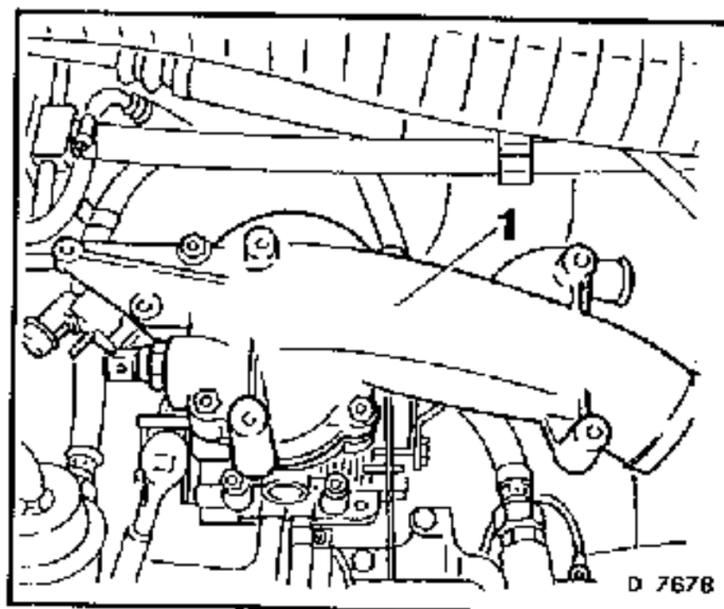
Wiring harness plug (1) from intake air temperature sensor.

Wiring harness plug and vacuum hoses from the hot start valve (2).



Remove, Disconnect

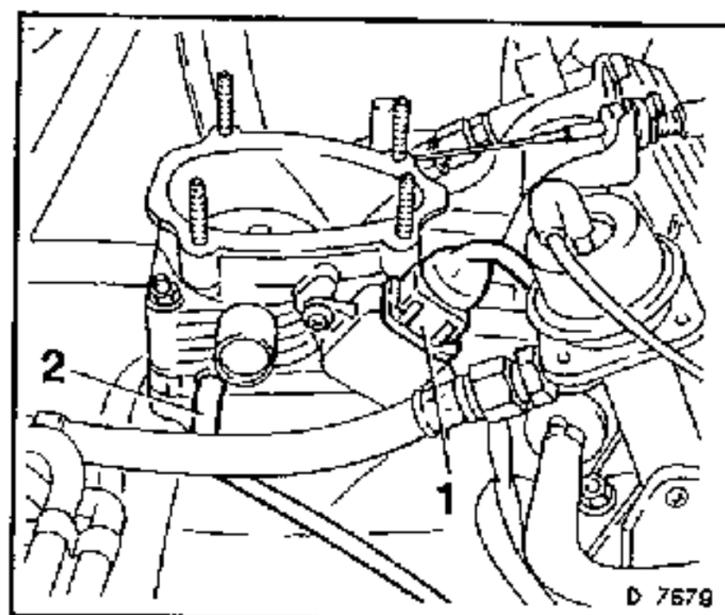
Throttle valve manifold (1) with gasket.



Remove, Disconnect

Wiring harness plug (1) from throttle valve potentiometer.

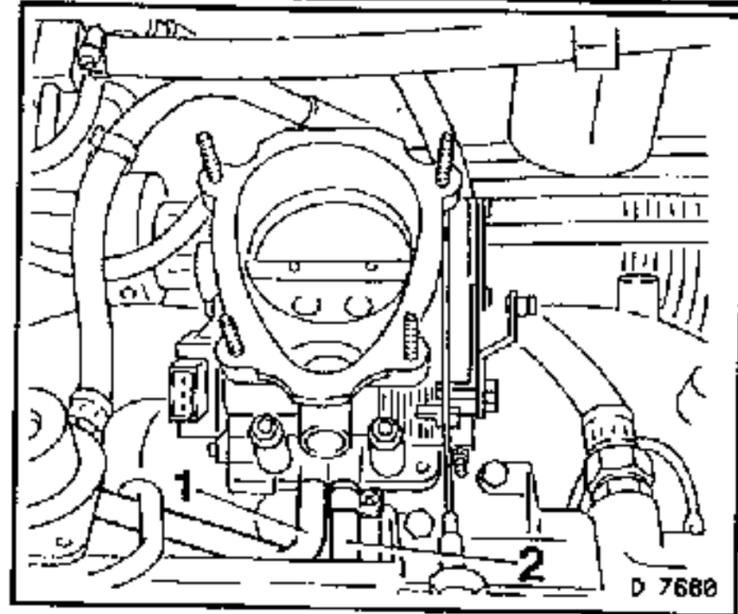
Pressure/vacuum hose (2) from throttle body.



DOHC ENGINE - MOTRONIC M 2.7

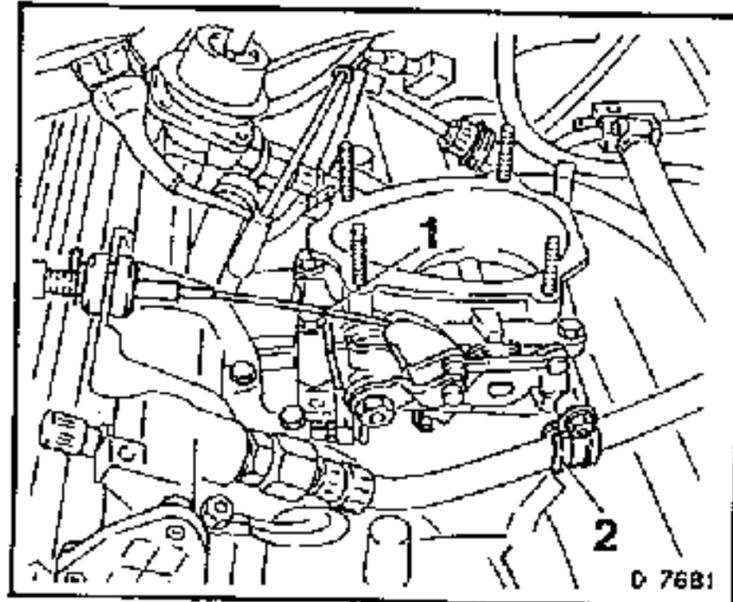
Remove, Disconnect

Pressure/vacuum hoses (1 and 2) from throttle body.
Throttle body.



Remove, Disconnect

Bowden cable (1).
Fuel line bracket (2).

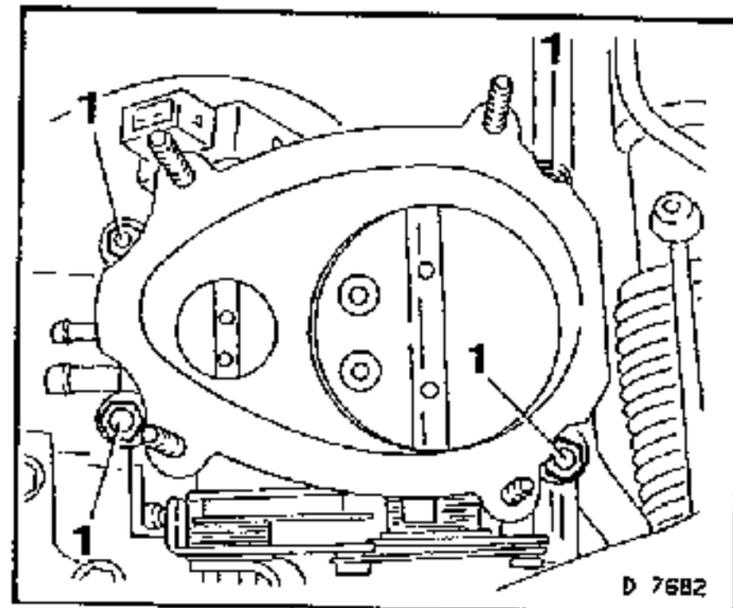


Remove, Disconnect

Nuts (1) from throttle body.
Throttle body with gasket.

Clean

Sealing surfaces of throttle body and intake manifold.
Ensure the utmost cleanliness.

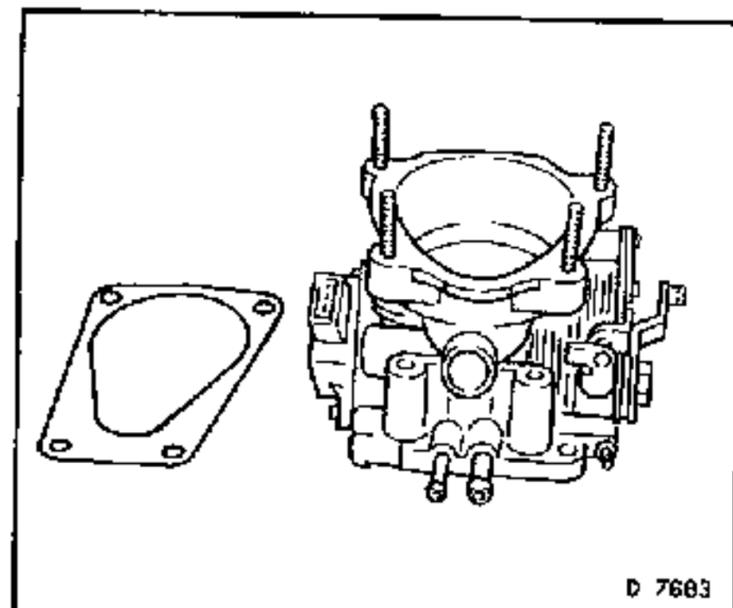


Install, Connect

Throttle body with new gasket.

Tighten (Torque)

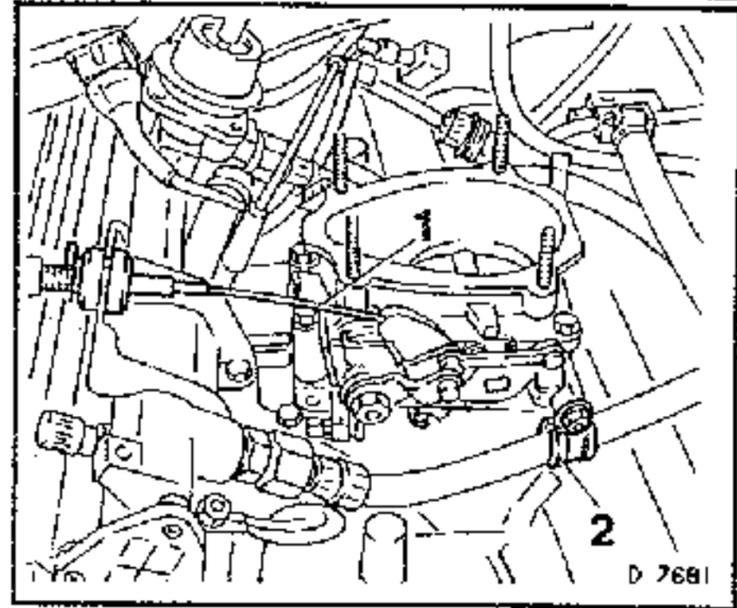
Throttle body to intake manifold..... 9 Nm



DOHC ENGINE - MOTRONIC M 2.7

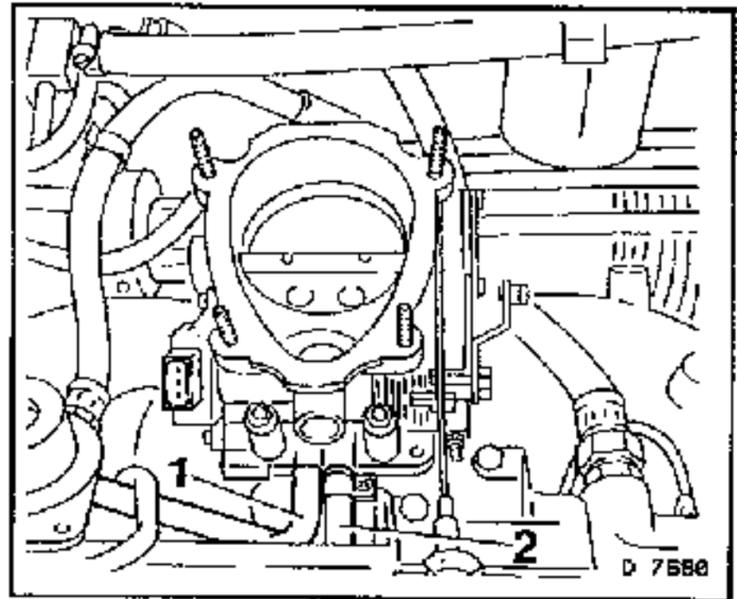
Install, Connect

- Bowden cable (1).
- Fuel line bracket (2).



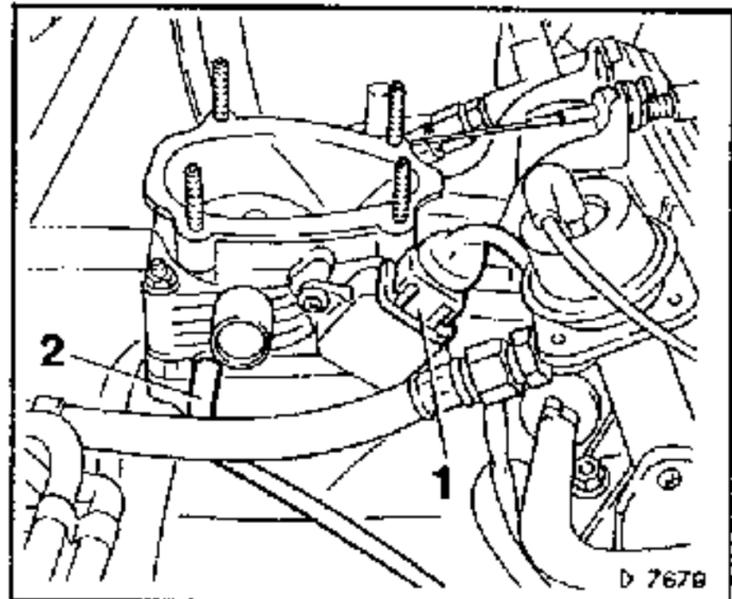
Install, Connect

- Pressure/vacuum hoses (1 and 2) to throttle body.



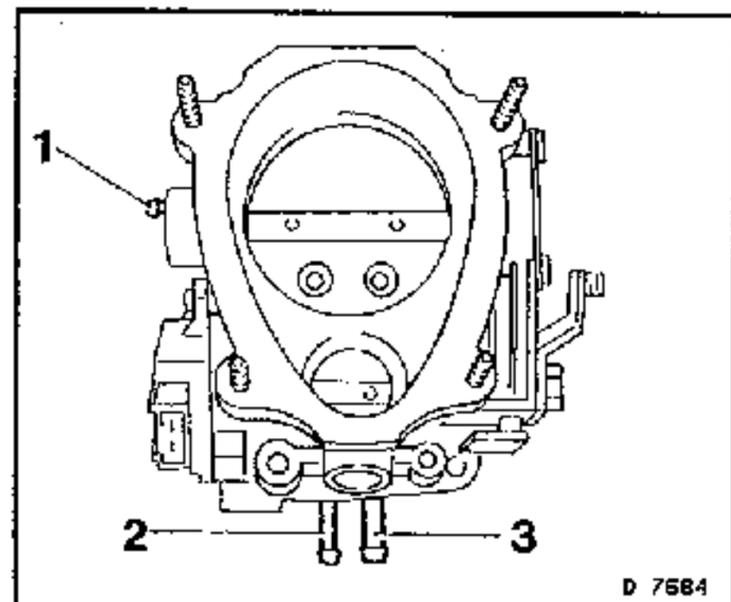
Install, Connect

- Wiring harness plug (1) to throttle valve potentiometer.
- Pressure/vacuum hose (2) to throttle body.



Install, Connect

- Throttle body connections;
- 1 = Connection to Motronic control unit M 2.7.
- 2 = Connection to branch piece.
- 3 = Connection to controlled canister purge valve.



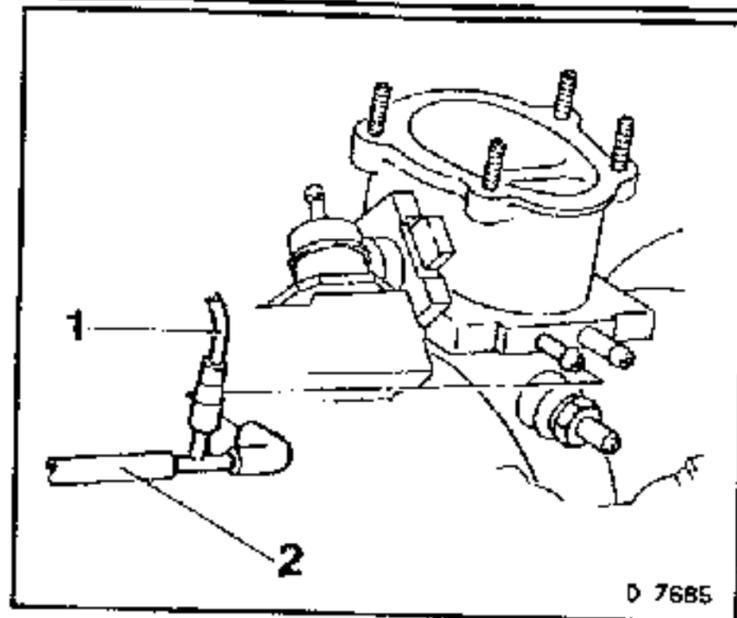
DOHC ENGINE - MOTRONIC M 2.7

Install, Connect

Branch piece connections;

1 = Connection to hot start valve.

2 = Connection to air bypass valve and turbocharger.

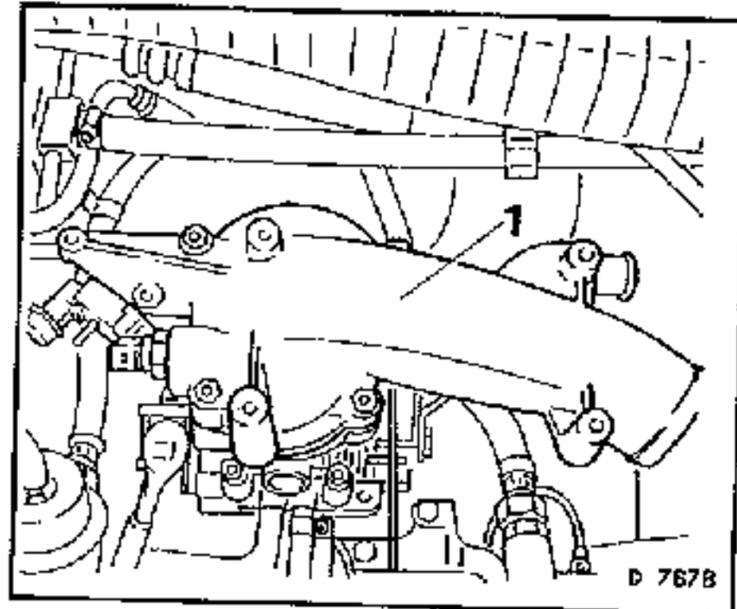


Install, Connect

Throttle valve manifold, using a new gasket.

Tighten (Torque)

Throttle valve manifold to throttle body .. 8 Nm



Install, Connect

Pressure/vacuum hose to branch piece.

Vacuum hose and wiring harness plug to hot start valve (2).

Wiring harness plug (1) to intake air temperature sensor.

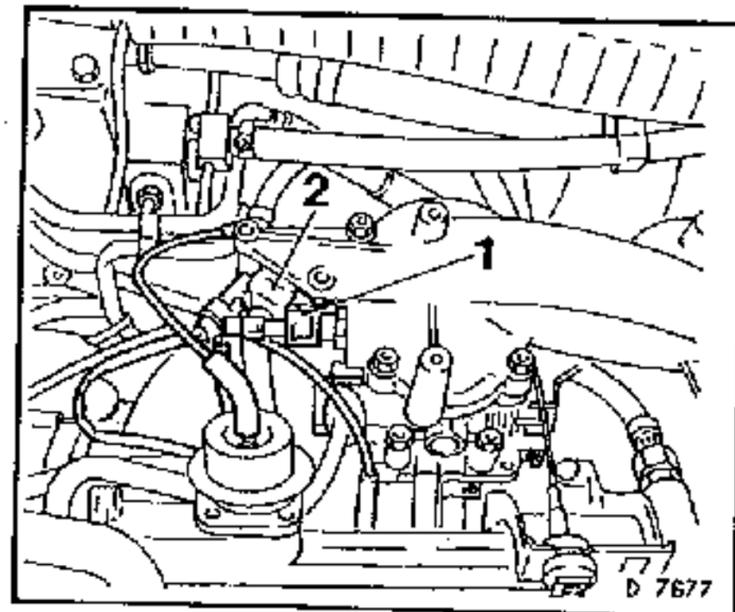
Hose for idle speed adjuster.

Hose for charge air cooler to throttle valve manifold.

Throttle valve manifold cover.

Tighten (Torque)

Throttle valve manifold cover..... 5 Nm.



Throttle Valve Potentiometer, Remove and Install

Note:

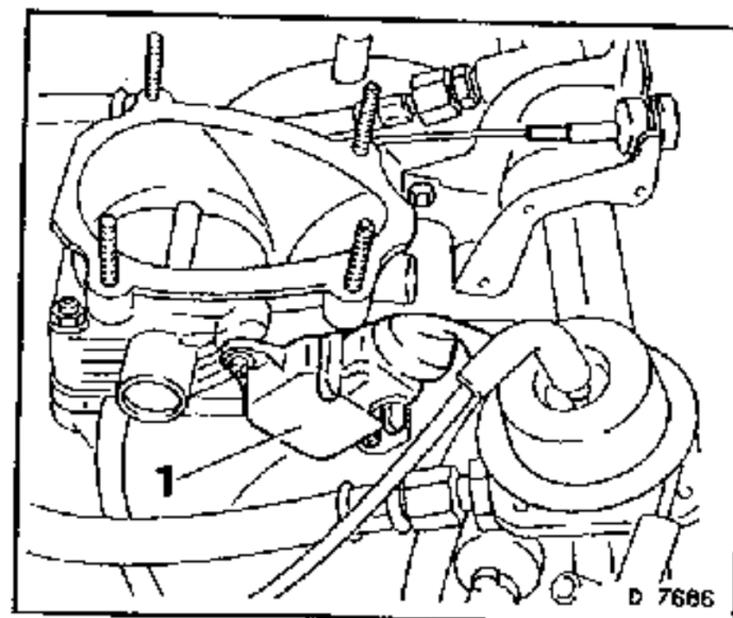
For a more clear view, illustration D 7686 shows the throttle valve potentiometer with the throttle valve manifold removed.

Remove, Disconnect

Throttle valve manifold cover.

Wiring harness plug to throttle valve potentiometer.

Throttle valve potentiometer (1).



DOHC ENGINE - MOTRONIC M 2.7

Install, Connect

Throttle valve potentiometer (1).
Wiring harness plug to throttle valve potentiometer.
Throttle valve manifold cover.

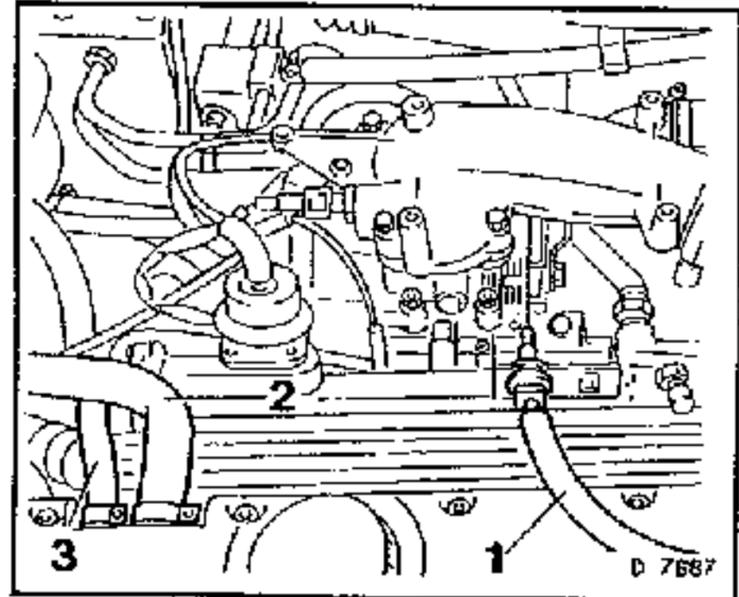
Tighten (Torque)

Throttle valve manifold to throttle body ... 5 Nm

Injectors, Remove and Install

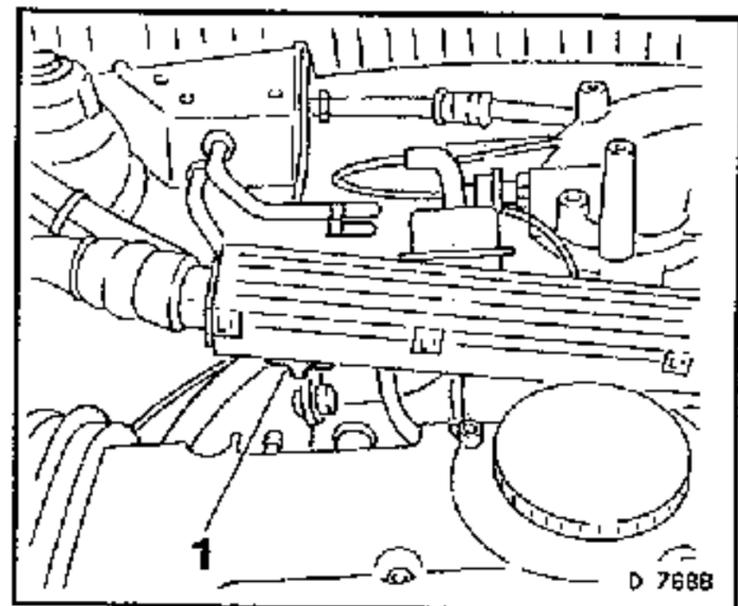
Remove, Disconnect

Throttle valve manifold cover.
Bowden cable (1).
Crankcase ventilation hoses (2 and 3).



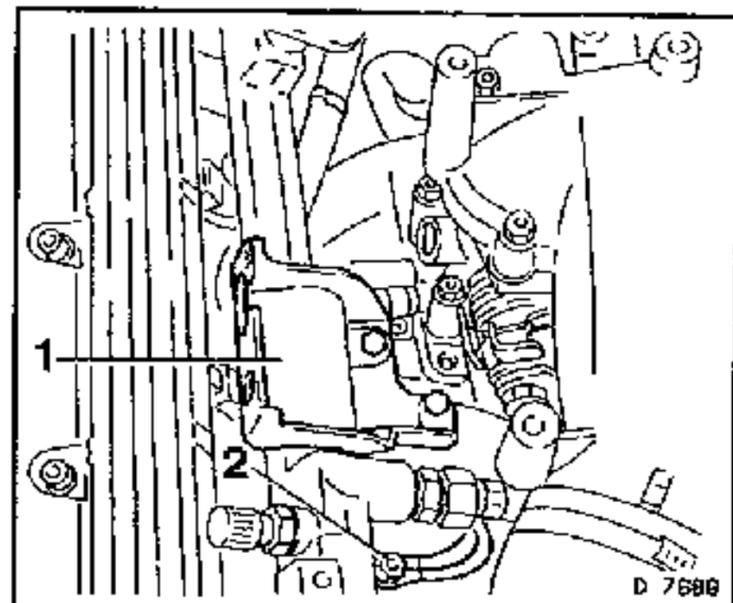
Remove, Disconnect

No. 1 cylinder injector retaining clip (1) from the plug strip.
Remove plug strip.
Insert retaining clamp (1) in plug strip.



Remove, Disconnect

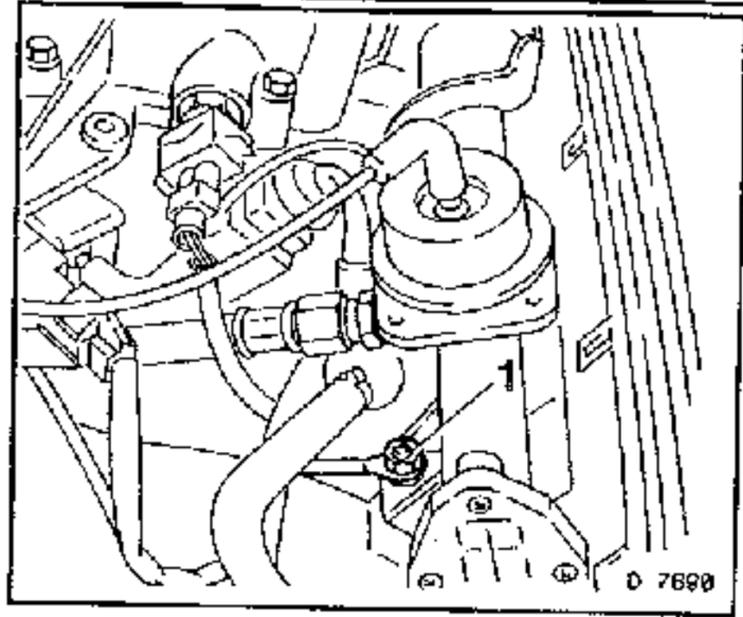
Bowden cable bracket (1).
Ground cable (2).



DOHC ENGINE - MOTRONIC M 2.7

Remove, Disconnect

Ground cable (1).



Remove, Disconnect

Fuel distributor pipe.

Fuel distributor pipe, with injectors, from the intake manifold.

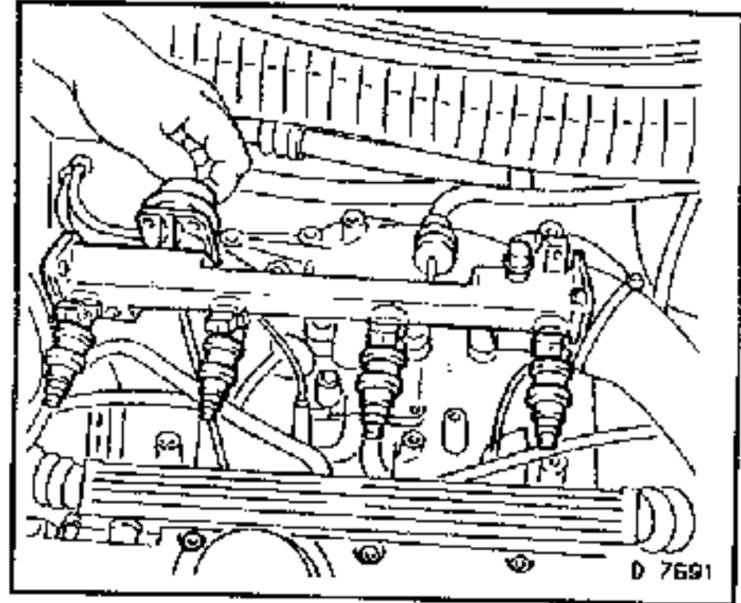
Injector clips and injectors from fuel distributor pipe.

Important!

Release fuel pressure first and be prepared for escaping fuel.

Install, Connect

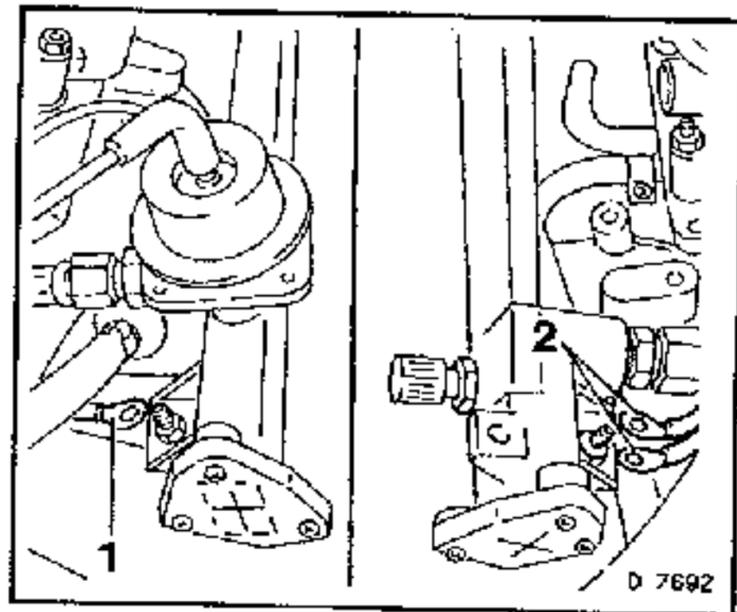
Injector/s with new seal rings to the fuel distributor pipe and secure with retaining clips.



Install, Connect

Fuel distributor pipe with injectors to the intake manifold, ensuring that all seat correctly.

Ground cable (1 and 2) to fuel distributor pipe.

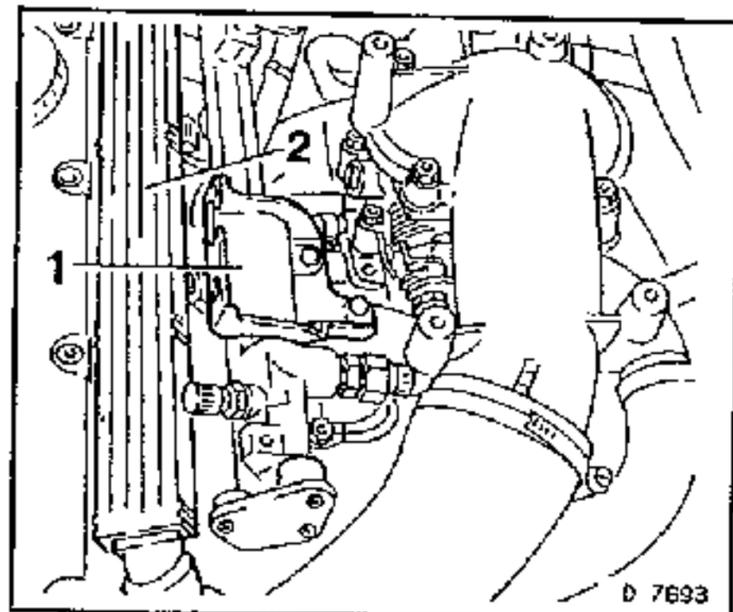


Install, Connect

Bowden cable bracket (1).

Plug strip (2) to injectors.

Plug strip must click with an audible sound when installed correctly.



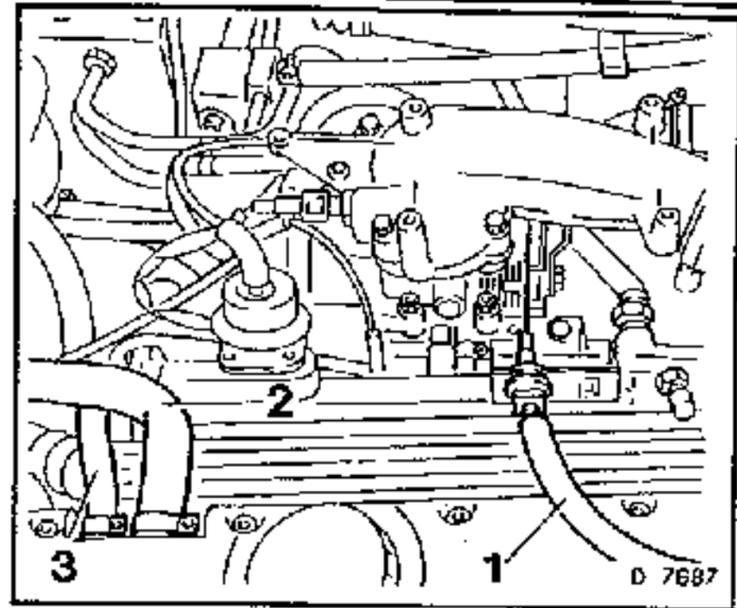
DOHC ENGINE - MOTRONIC M 2.7

Install, Connect

- Attach Bowden cable (1), free of tension.
- Crankcase ventilation hoses (1 and 2).
- Throttle valve manifold cover.

Tighten (Torque)

Throttle valve manifold cover..... 5 Nm



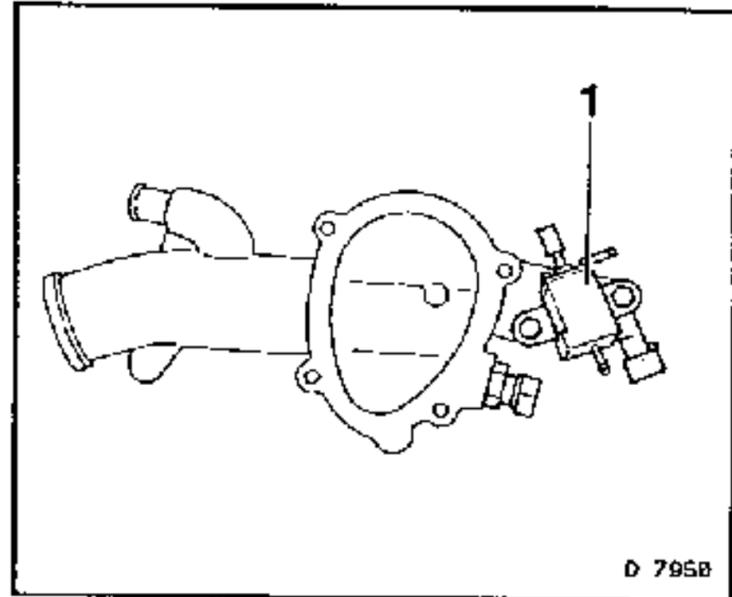
Hot Start Valve, Remove and Install

Note:

For a more clear view, Illustration D 7950 shows the hot start valve with the throttle valve manifold removed.

Remove, Disconnect

- Throttle valve manifold cover.
- Wiring harness plug from hot start valve.
- Vacuum hoses.
- Hot start valve (1) from the throttle valve manifold, removing the throttle valve manifold if necessary.



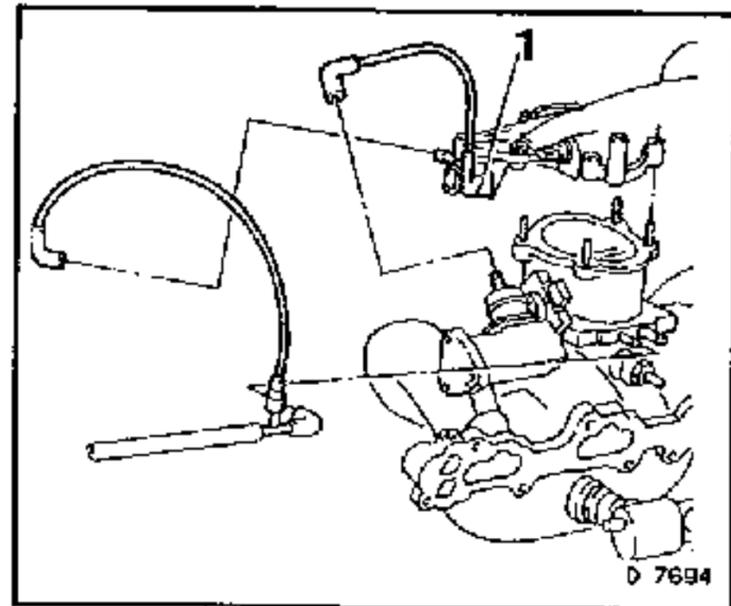
Hose layout diagram for the hot start valve.

Install, Connect

- Hot start valve (1) to throttle valve manifold.
- Vacuum hoses
- Wiring harness plug to hot start valve.
- Throttle valve manifold cover.

Tighten (Torque)

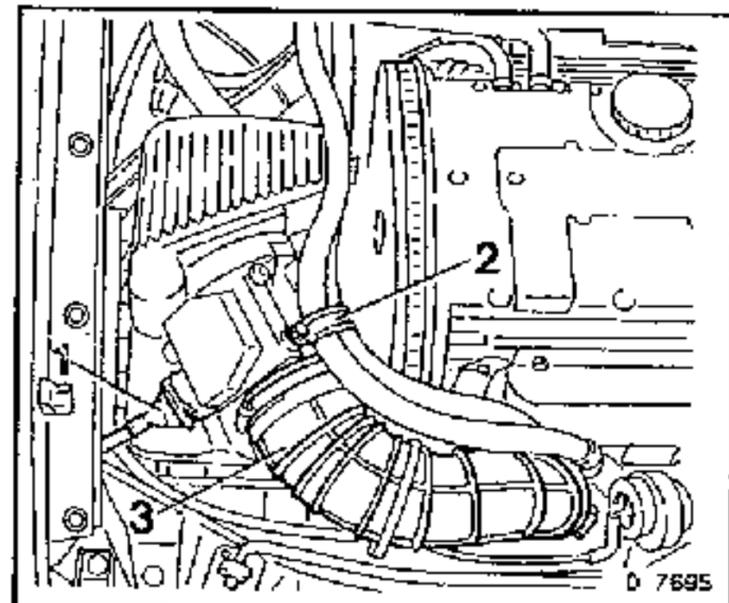
Throttle valve manifold cover..... 5 Nm



Hot Wire Mass Air Flow Meter, Remove and Install

Remove, Disconnect

- Wiring harness plug (1).
- Bracket (2) and intake hose (3) from the hot wire mass air flow sensor.

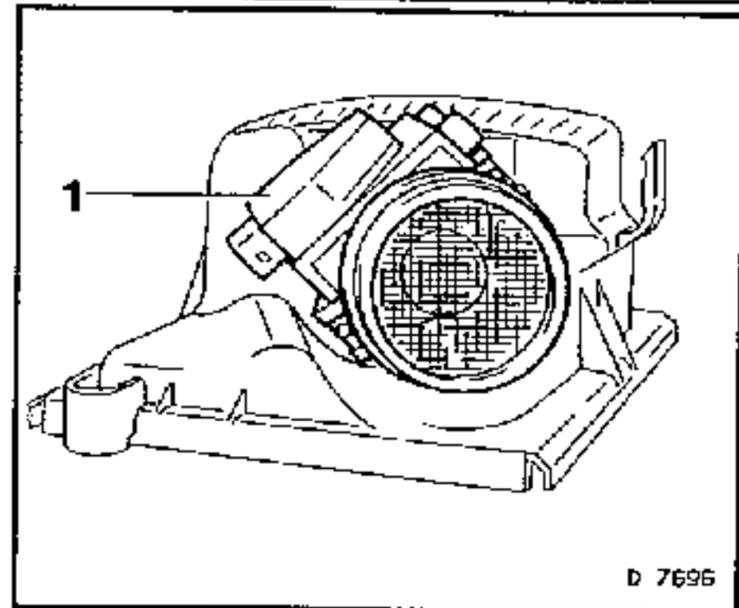


DOHC ENGINE - MOTRONIC M 2.7

Remove, Disconnect

Upper part of air cleaner with hot wire mass air flow sensor.

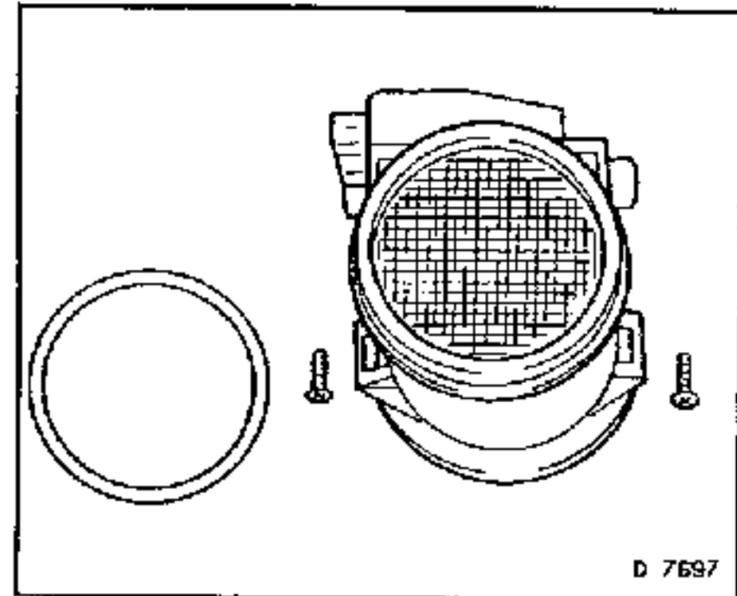
Hot wire mass air flow sensor (1) from the upper part of the air cleaner. Note the seal ring in the upper part of the air cleaner.



Install, Connect

Hot wire mass air flow sensor with new seal ring to the upper part of the air cleaner.

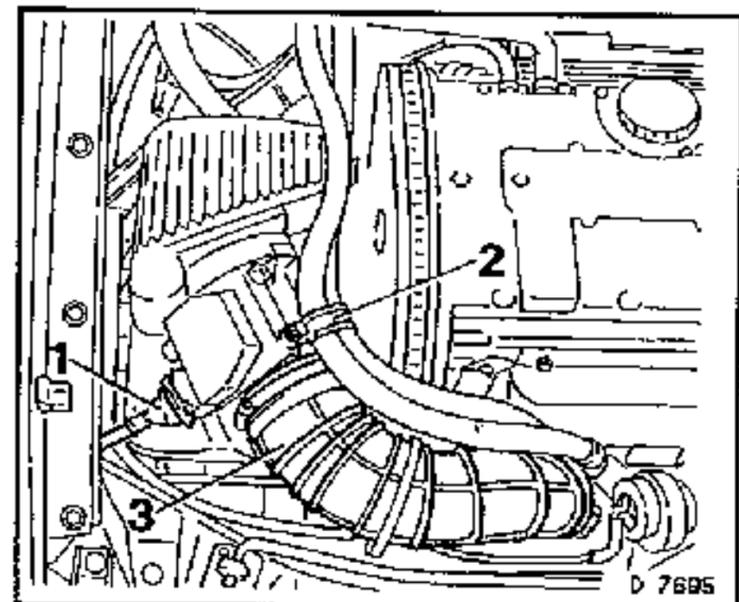
Upper part of the air cleaner and hot wire mass air flow sensor.



Wiring harness plug (1).

Bracket (2) and intake hose (3) to hot wire mass air flow sensor.

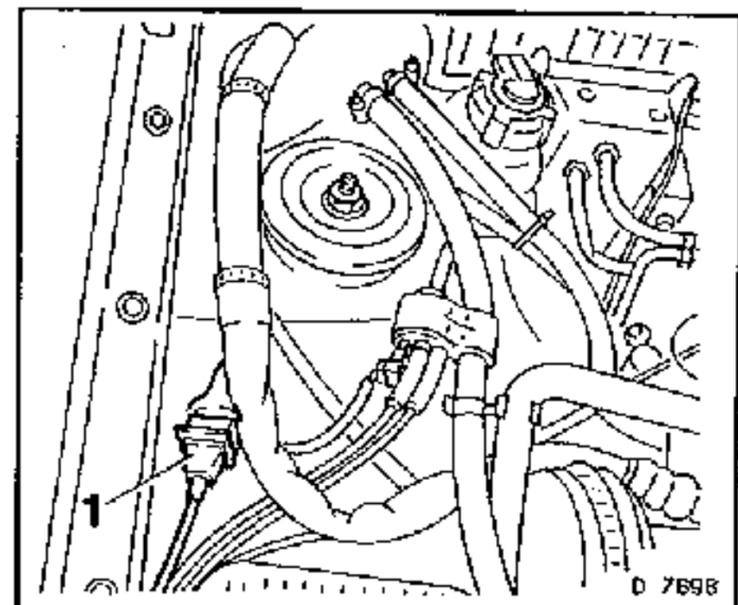
Ensure correct seal of the intake hose.



Inductive Pulse Pick-up, Remove and Install

Remove, Disconnect

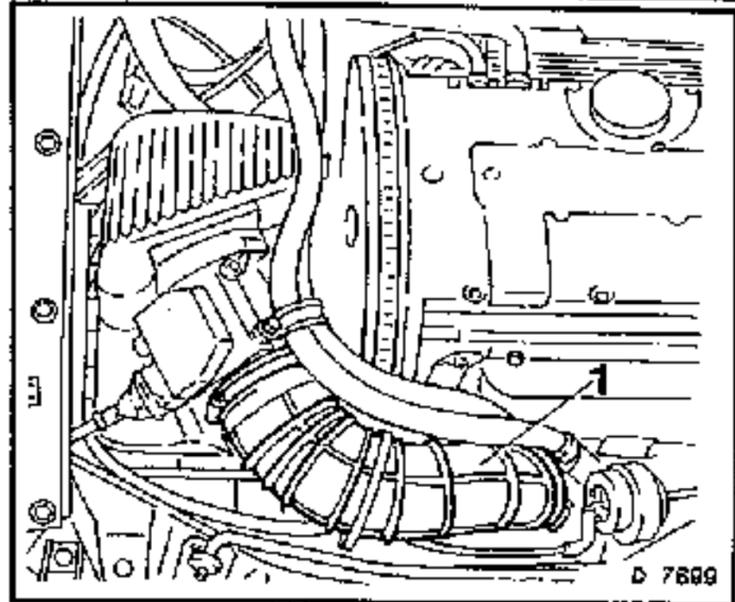
Wiring harness plug (1), noting the wiring harness routing.



DOHC ENGINE - MOTRONIC M 2.7

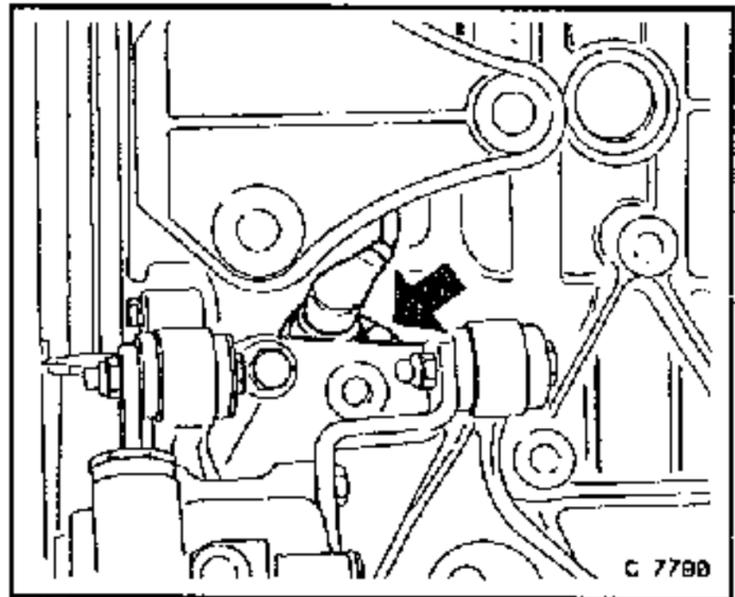
Remove, Disconnect

Intake hose (1) between the hot wire mass air flow sensor and turbocharger.



Remove, Disconnect

Inductive pulse pick-up with seal ring.



Install, Connect

Inductive pulse pick-up with new seal ring.

Tighten (Torque)

Inductive pulse pick-up 6 Nm

Install, Connect

Intake hose between hot wire mass air flow sensor and turbocharger.

Wiring harness plug to inductive pulse pick-up.

Ensure that all hoses are correctly fitted and air tight.

Fuel Pressure Regulator, Remove and Install

Remove, Disconnect

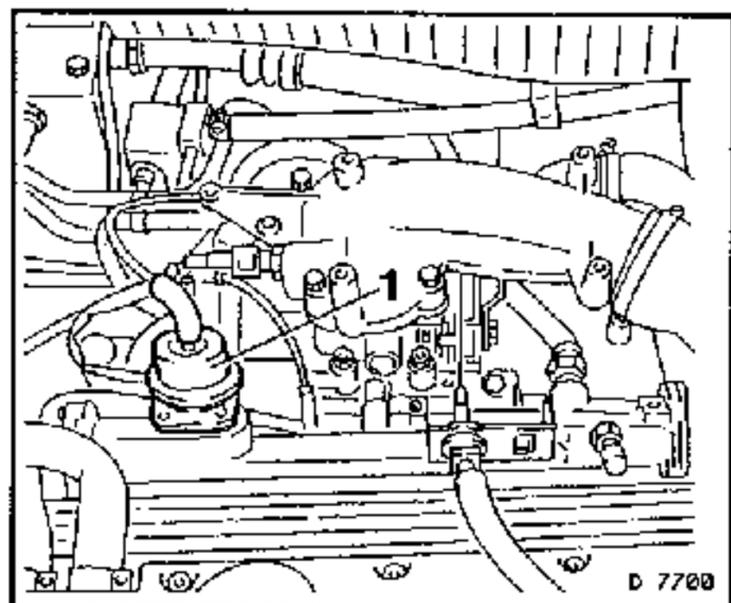
Throttle valve manifold cover.

Vacuum hose from fuel pressure regulator (1).

Fuel pressure regulator (1) from fuel distributor pipe.

Important!

Release fuel pressure first and be prepared for escaping fuel.



DOHC ENGINE - MOTRONIC M 2.7

Install, Connect

Fuel pressure regulator to fuel distributor pipe.

Vacuum hose to fuel pressure regulator.

Throttle valve manifold cover.

Tighten (Torque)

Fuel pressure regulator to
fuel distributor pipe..... 4 Nm
Throttle valve manifold cover..... 5 Nm

Fuel Pressure, Check

Remove, Disconnect

Throttle valve manifold cover.

Slowly open cap (1) to release fuel pressure. Be prepared for fuel spillage.

Install, Connect

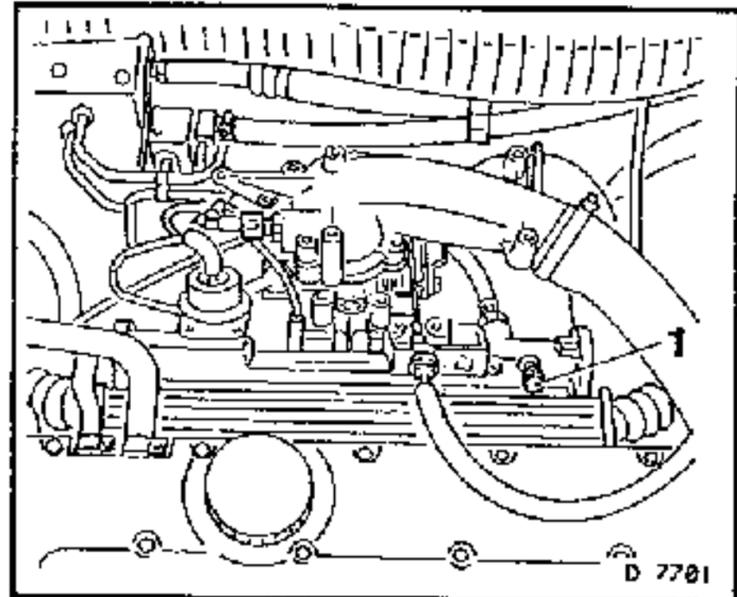
Fuel pressure gauge KM-J-34730-1 or KM-J-34730-91 to the pressure check point.

Bleed the fuel pressure gauge of air.

Start the engine and run at idle speed.

Measure

Fuel pressure.



Specification:

M 2.7:

With vacuum hose connected..... 220 - 270 kPa
With vacuum hose disconnected 300 - 350 kPa

Install, Connect

Throttle valve manifold cover.

Tighten (Torque)

Throttle valve manifold cover..... 5 Nm

Fuel Pump Relay, Remove and Install

Remove, Disconnect

Ground cable from battery.

Unclip right footwell cover, after removing the right hand door sill panel.

Relay bracket.

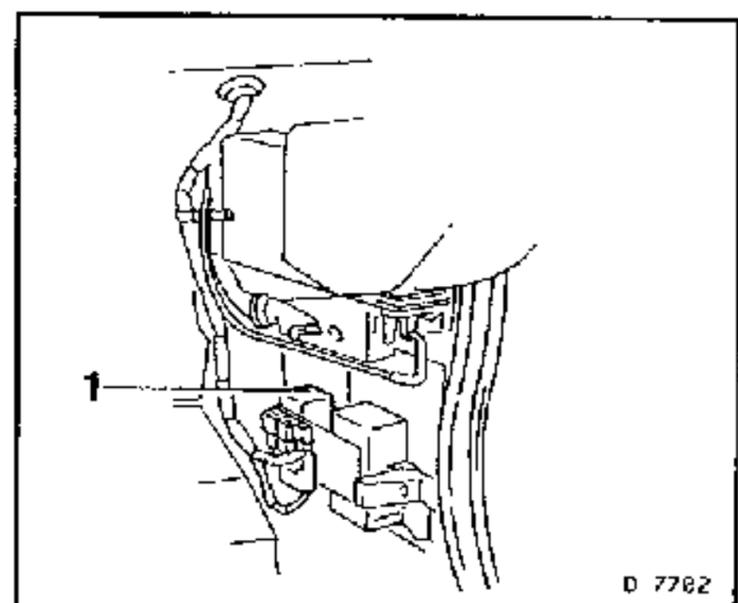
Fuel pump relay (1) from socket.

Install, Connect

Fuel pump relay (1) in socket.

Relay bracket.

Footwell cover, and right hand door sill panel.



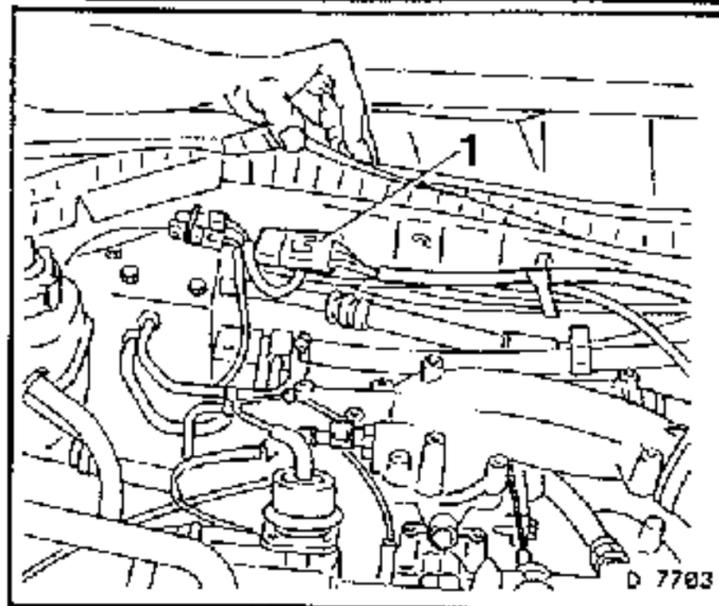
DOHC ENGINE - MOTRONIC M 2.7

Oxygen Sensor, Remove and Install

Remove, Disconnect

Oxygen sensor wiring harness plug.

Oxygen sensor (1) from the front exhaust pipe.



Install, Connect

Oxygen sensor.

Tighten (Torque)

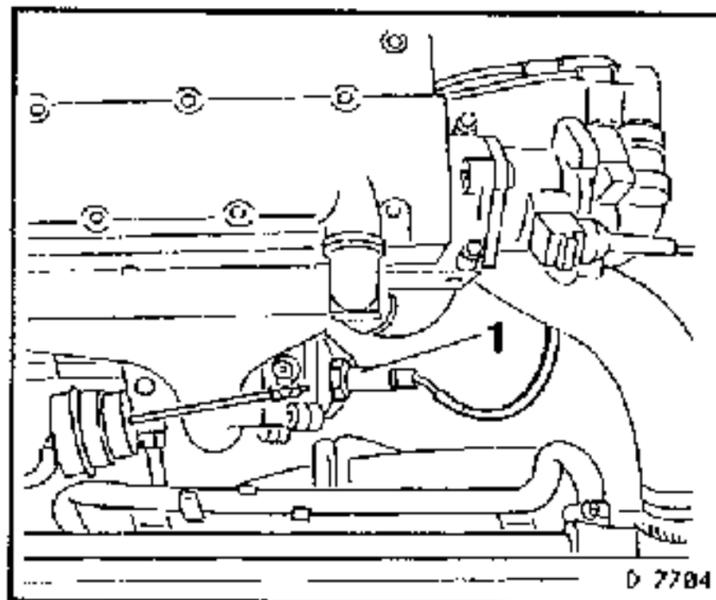
Oxygen sensor to exhaust pipe 30 Nm

Important!

If oxygen sensor is being re-used, apply special grease to the cleaned oxygen sensor threads. This grease, part number 5613696, is available from authorised Holden parts outlets.

Install, Connect

Oxygen sensor wiring harness plug, checking that the routing of the wiring harness is correct.



Idle Speed Adjuster, Remove and Install

Note:

For a more clear view, illustration D 7705 shows the idle speed adjuster with the engine removed.

Remove, Disconnect

Ground cable from battery.

Alternator. Refer to "Alternator" Section in this Volume.

Hose (1) from throttle valve manifold.

Hose (2) from the intake manifold.

Wiring harness plug from the idle speed adjuster.

Idle speed adjuster hose.

Note:

The hose routing.

Install, Connect

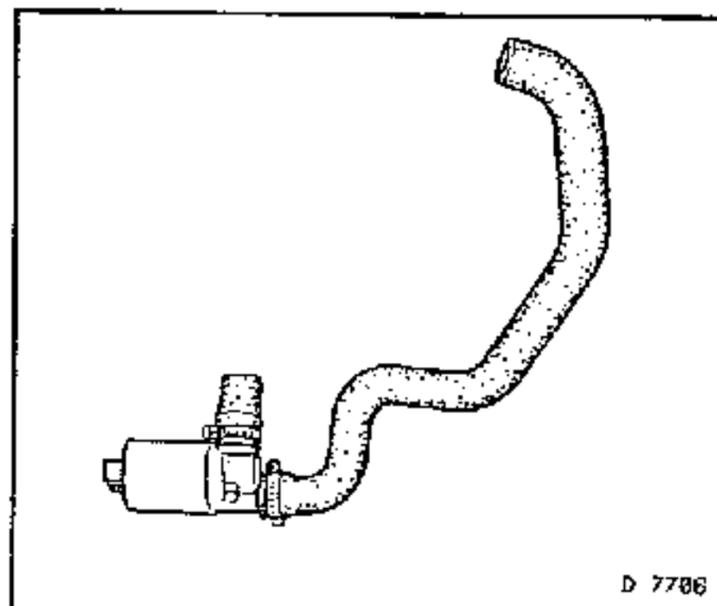
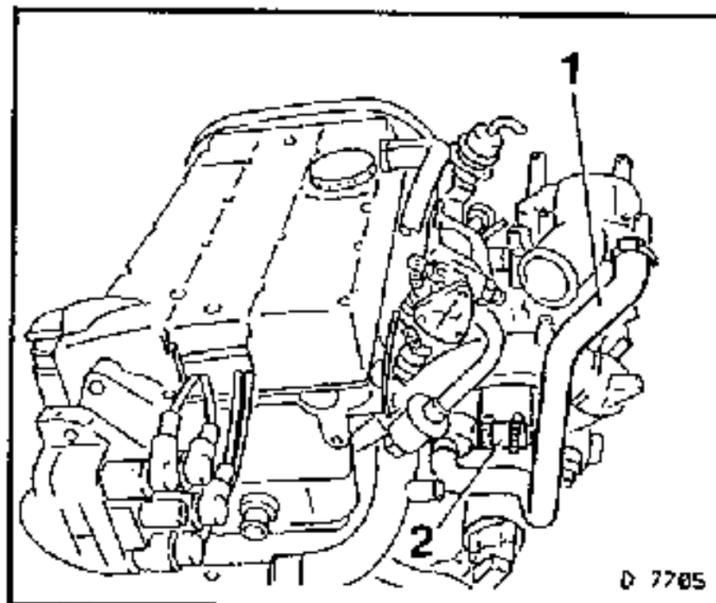
Idle speed adjuster.

Hoses to throttle valve manifold and intake manifold.

Wiring harness plug to idle speed adjuster.

Alternator. Refer to "Alternator" Section in this Volume.

Ground cable to battery.



DOHC ENGINE - MOTRONIC M 2.7

Motronic Control Unit, Remove and Install

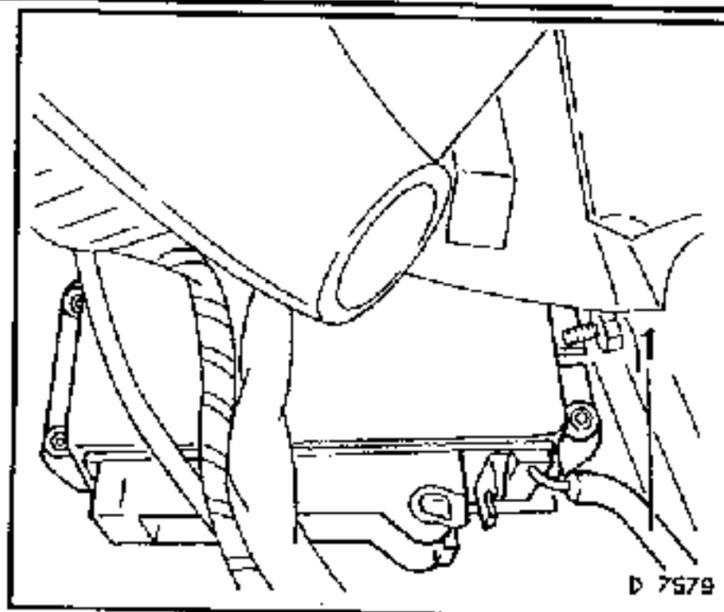
Remove, Disconnect

Ground cable from battery.

Unclip right footwell cover, after removing the right hand door sill panel.

Relay bracket, then control unit.

Wiring harness plug and pressure/vacuum hose from the control unit.



Install, Connect

Wiring harness plug and pressure/vacuum hose to the control unit.

Control unit, then relay bracket.

Footwell cover, and right hand door sill panel.

Ground cable to battery.

Controlled Canister Purge Valve, Remove and Install

Remove, Disconnect

Wiring harness plug from controlled canister purge valve.

Hoses (1 and 2) from controlled canister purge valve. Close off hose (2) (carbon canister) with a clamp.

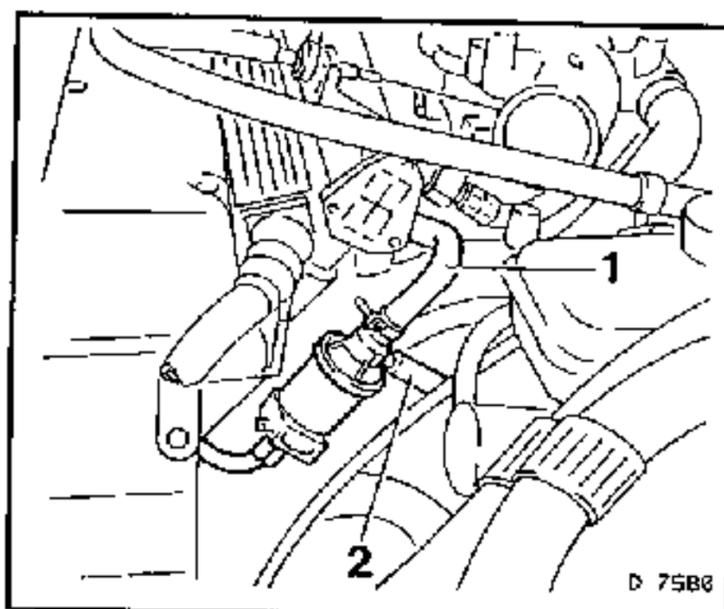
Controlled canister purge valve.

Install, Connect

Controlled canister purge valve.

Hose (1) from throttle body and hose (2) from carbon canister. Remove clamp from hose (2).

Wiring harness plug (1) to controlled canister purge valve.



Intake Air Temperature Sensor, Remove and Install

Remove, Disconnect

Throttle valve manifold cover.

Wiring harness plug from intake air temperature sensor.

Intake air temperature sensor (1) with seal ring.

Install, Connect

Intake air temperature sensor with a new seal ring.

Throttle valve manifold cover.

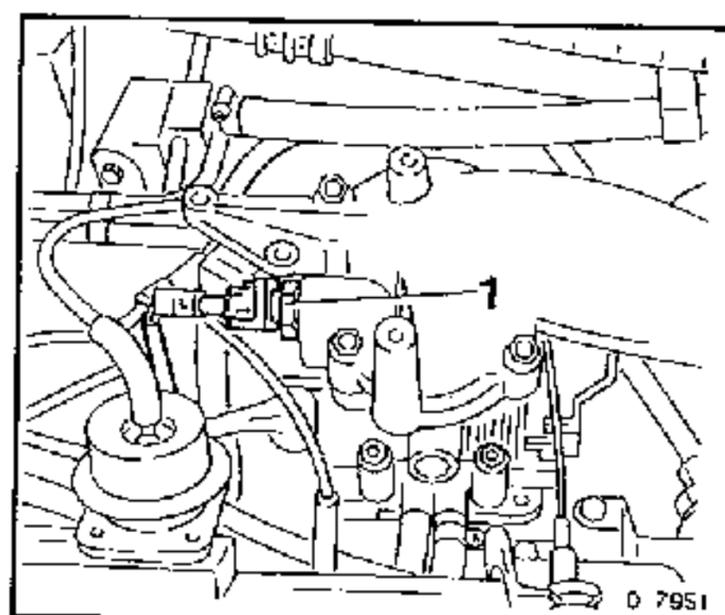
Tighten (Torque)

Intake air temperature sensor..... 10 Nm

Throttle valve manifold cover..... 5 Nm

Install, Connect

Wiring harness plug to Intake air temperature sensor.

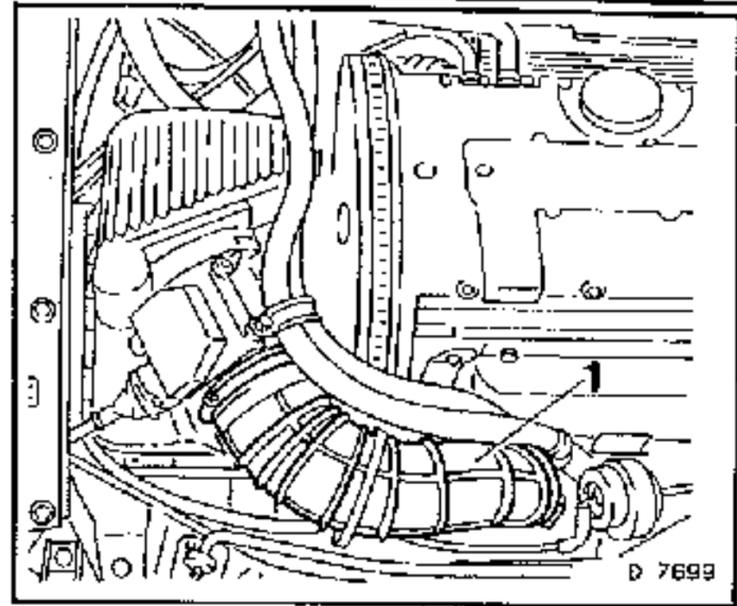


DOHC ENGINE - MOTRONIC M 2.7

Coolant Temperature Sensor, Remove and Install

Remove, Disconnect

Intake hose (1) between hot wire mass air flow sensor and turbocharger.



Remove, Disconnect

Wiring harness plug from coolant temperature sensor.

Coolant temperature sensor (1).

Note:

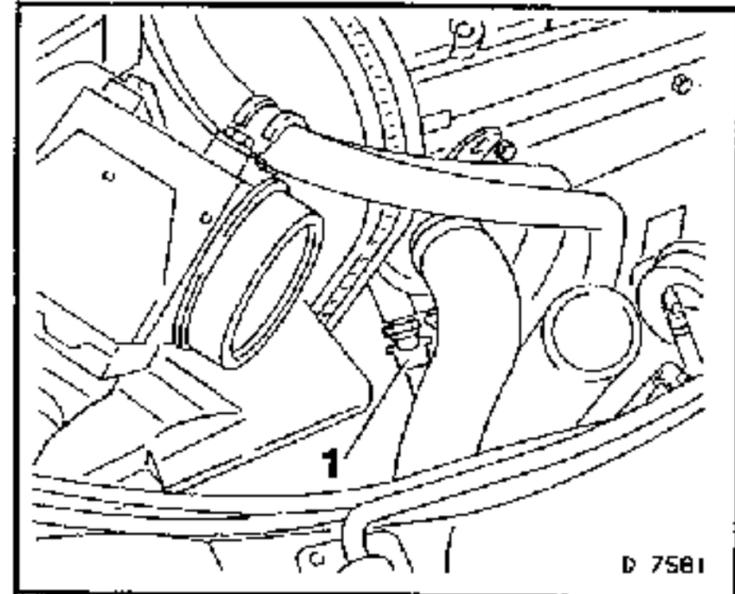
Have a suitable clean container available for coolant spillage.

Install, Connect

Coolant temperature sensor with new seal ring.

Tighten (Torque)

Coolant temperature sensor 11 Nm



Install, Connect

Wiring harness plug to coolant temperature sensor.

Intake hose between hot wire mass air flow sensor and turbocharger. Ensure that the hose is air tight.

Top up and bleed cooling system. Refer to "Cooling System", in this Volume.

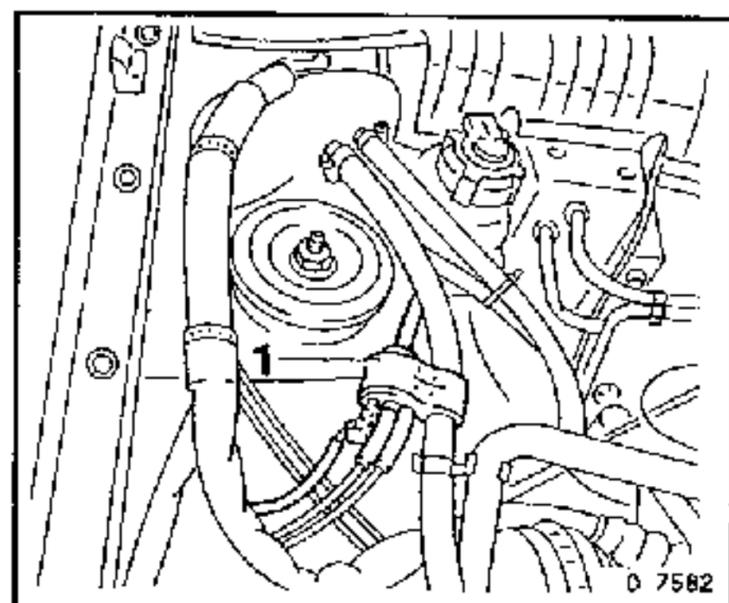
Charge Control Switchover Valve, Remove and Install

Remove, Disconnect

Wiring harness plug for charge pressure control switchover valve.

Pressure vacuum hoses. Identify each before removing.

Charge pressure control switchover valve from the rubber mounting.



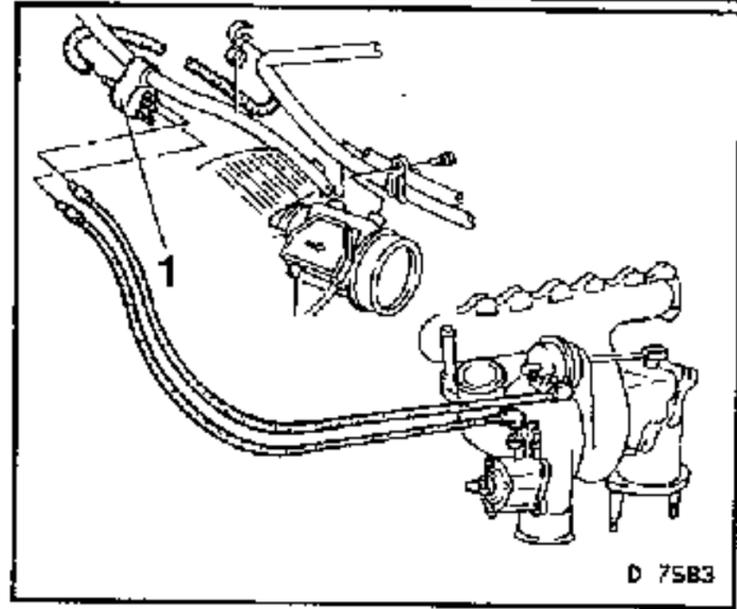
DOHC ENGINE - MOTRONIC M 2.7

Install, Connect

Charge pressure control switchover valve from the rubber mounting (1).

Pressure vacuum hoses, noting identification made before removal.

Wiring harness plug to charge pressure control switchover valve.



Ignition Coil, Remove and Install

Switch ignition off.

Remove, Disconnect

Cable connectors from ignition coil (1).

Wiring harness plug (2) from ignition module (trigger box).

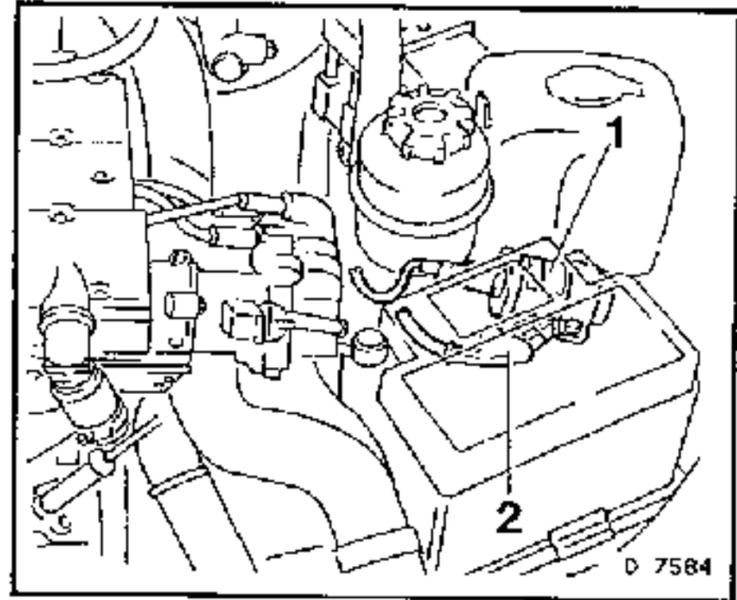
Ignition coil (1).

Install, Connect

Ignition coil (1).

Wiring harness plug (2) to ignition module (trigger box).

Cable connectors to ignition coil (1).



RECOMMENDED TORQUE VALUES

(Motronic M 2.7)

	Nm
Coolant temperature sensor with new seal ring.....	11
Fuel pressure regulator to fuel distributor pipe	4
Inductive pulse pick-up with new seal ring.....	6
Intake temperature sensor with new seal ring	10
Oxygen sensor to exhaust pipe	30 (1)
Throttle body to intake manifold.....	9
Throttle valve manifold to throttle body	8
Throttle valve manifold cover to throttle valve manifold.....	5

(1) If re-using, apply Special Grease, Part Number 5613695 to the cleaned oxygen sensor threads.

GROUP J

DOUBLE OVERHEAD CAM ENGINE

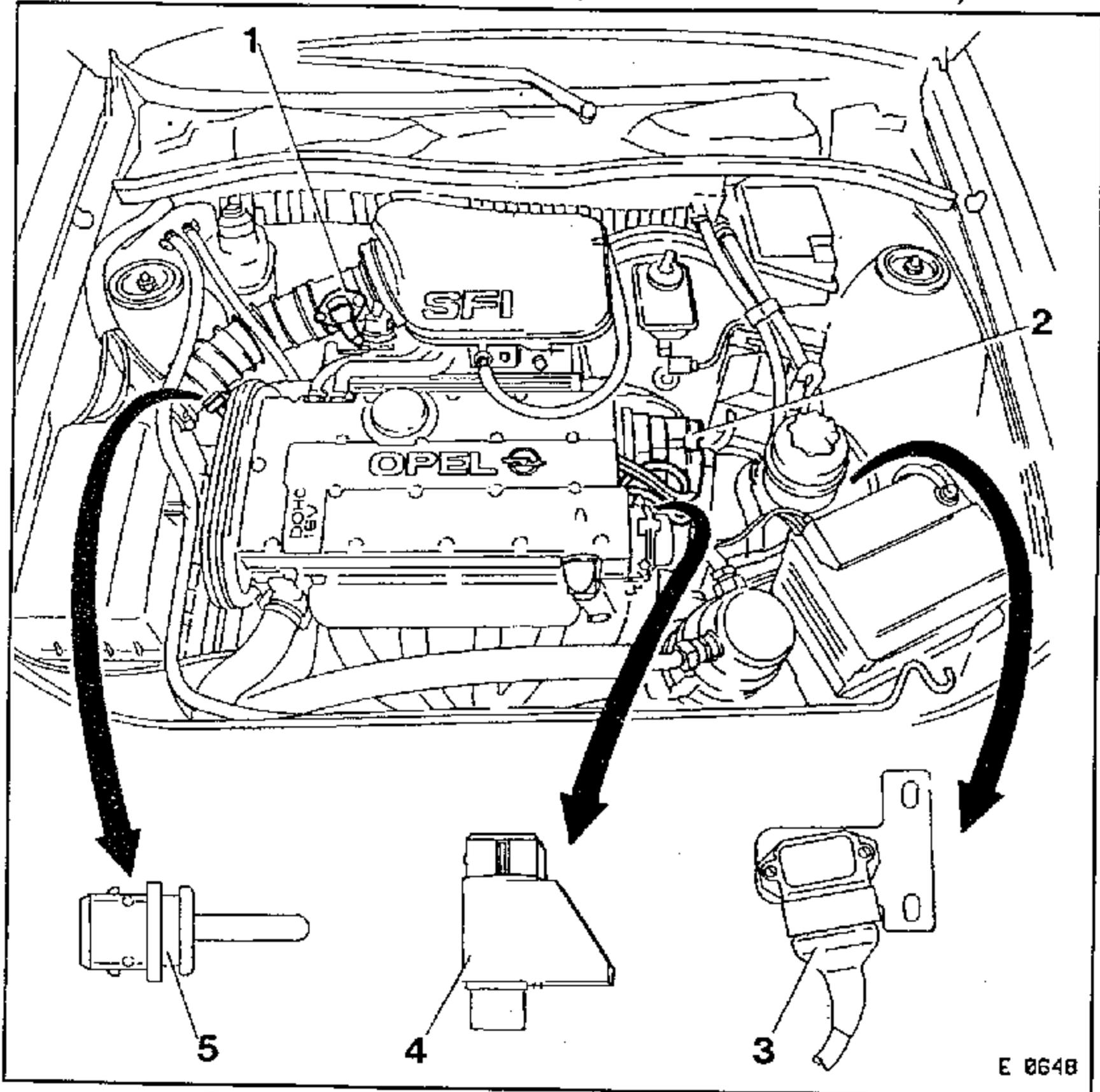
MOTRONIC M 2.8 (C 20 XE as of MY '93)

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DOHC ENGINE - MOTRONIC M 2.8

SURVEY OF ENGINE COMPARTMENT M 2.8 (C 20XE ENGINES as of MY'93)



Component Locations Different to M 2.5 (LHD Shown)

Illustration Key:

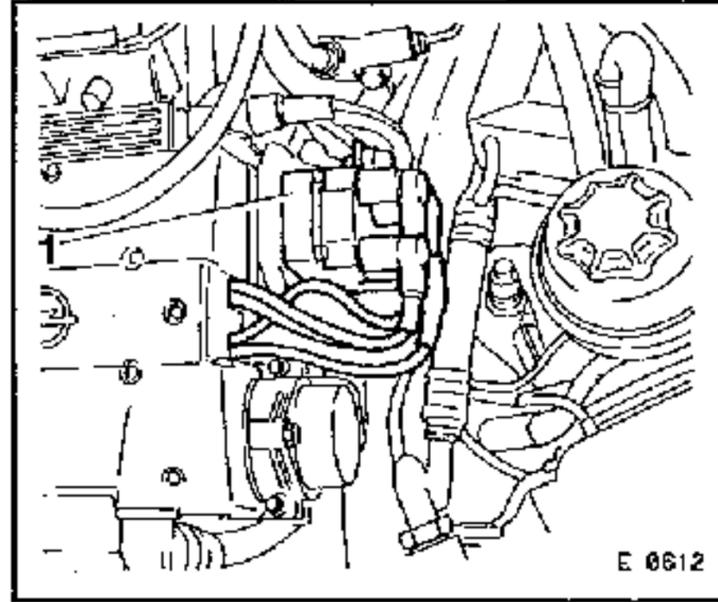
1. Hot Film Mass air Flow Sensor
2. Dual Spark Ignition Coil
3. Ignition Module (Trigger Box)
4. Camshaft Sensor
5. Intake Air Temperature Sensor

DOHC ENGINE - MOTRONIC M 2.8

Dual Spark Ignition Coil, Remove and Install

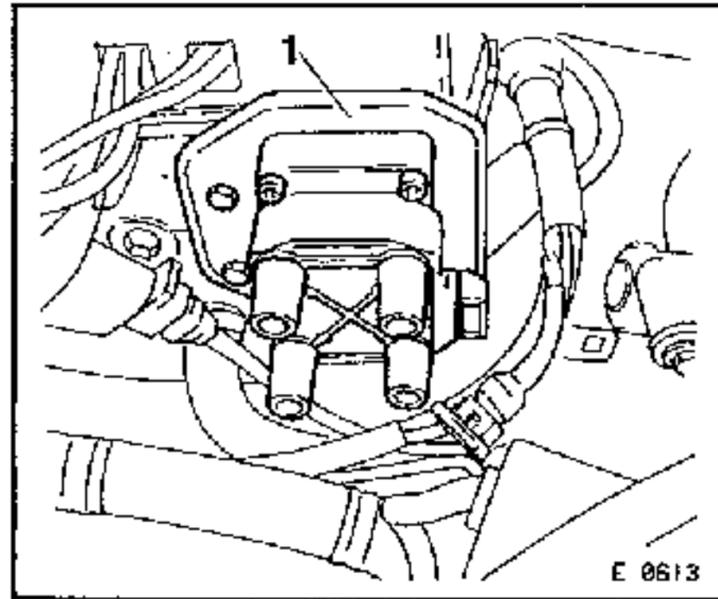
Remove, Disconnect

Ignition cable plug and wiring harness plug from the dual spark ignition coil (1).



Remove, Disconnect

Bracket (1) with the dual spark ignition coil.

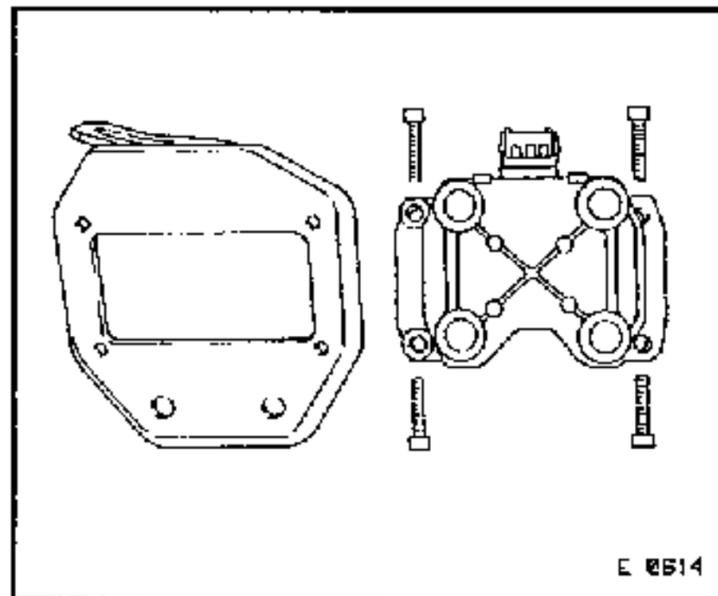


Remove, Disconnect

Dual ignition coil from the bracket, noting the position of the dual spark ignition coil for reassembly.

Install, Connect

Dual ignition coil to the bracket, noting the position of the dual spark ignition coil.



Install, Connect

Dual spark ignition coil and bracket assembly

Tighten (Torque)

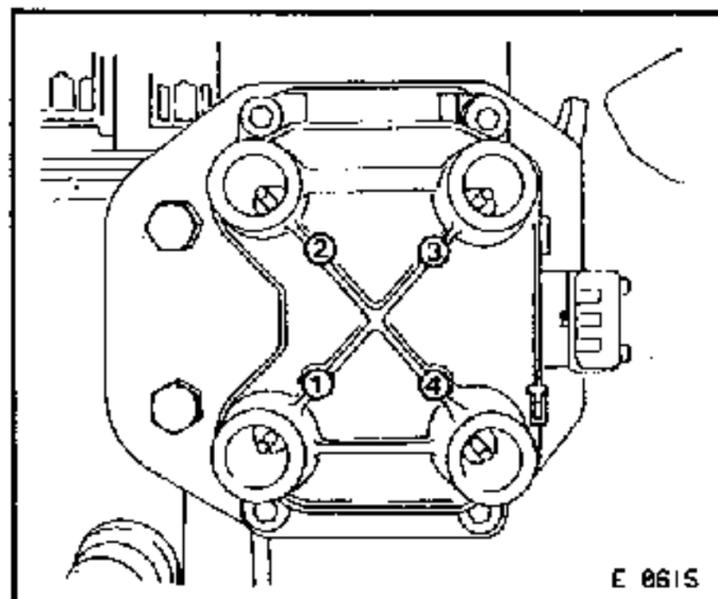
Dual spark ignition coil bracket 25 Nm

Wiring harness plug to dual spark ignition coil.

Ignition cables to the dual spark ignition coil, noting the correct sequence.

Note:

For convenience, cylinder numbers are on both the cables and the dual spark ignition coil.



DOHC ENGINE - MOTRONIC M 2.8

Ignition Module (Trigger Box), Remove and Install

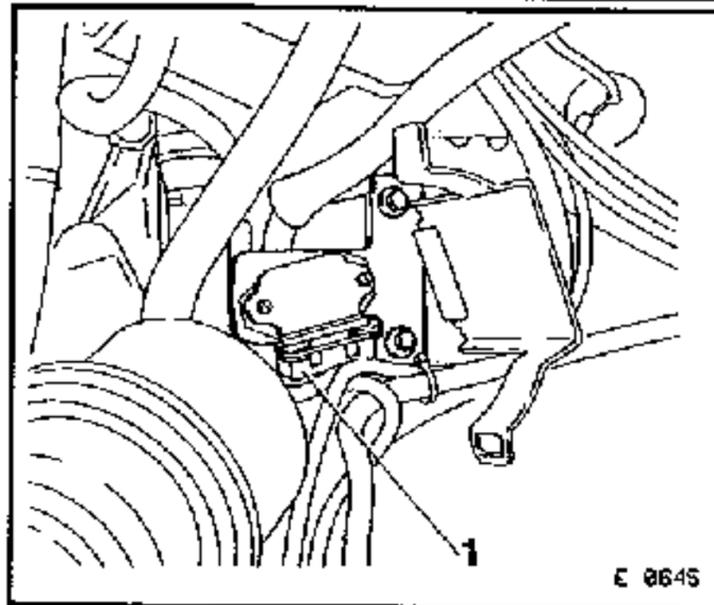
Note:

Illustration E 0645 shows the ignition module with the power steering fluid reservoir removed, for clarity.

Remove, Disconnect

Wiring harness plug (1) from ignition module.

Ignition module with heat sink plate.



Remove, Disconnect

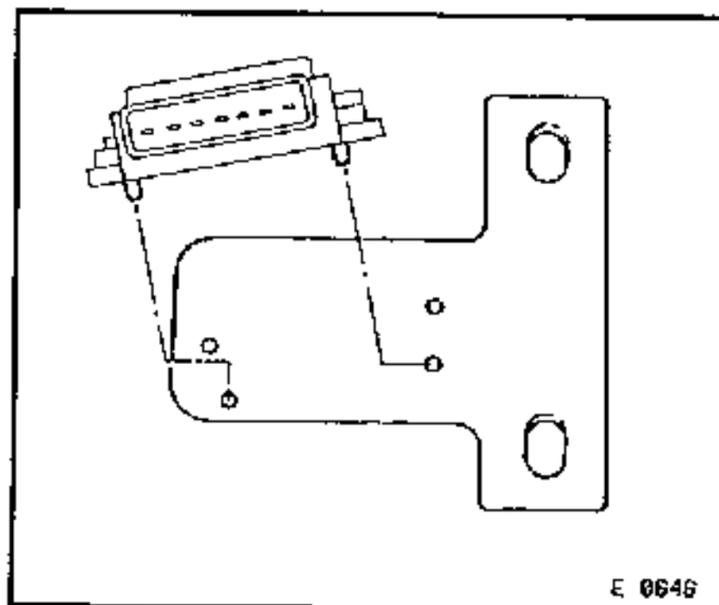
Ignition module from heat sink plate.

Install, Connect

Ignition module to heat sink plate, ensuring that a sound contact is made.

Ignition module and heat sink plate assembly.

Wiring harness plug to ignition module.



Throttle Valve Potentiometer, Remove and Install

Remove, Disconnect

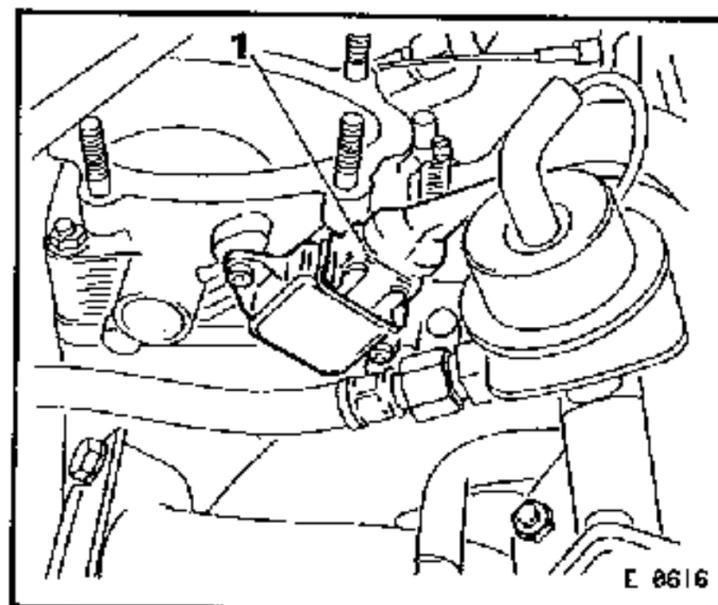
Wiring harness plug from the intake air temperature sensor.

Wiring harness plug from the hot film mass air flow sensor.

Pre-volume chamber, complete with air intake hose.

Wiring harness plug from the throttle valve potentiometer.

Throttle valve potentiometer from the throttle valve shaft.



Install, Connect

Throttle valve potentiometer from the throttle valve shaft.

Wiring harness plug (1) to the throttle valve potentiometer.

Pre-volume chamber, complete with air intake hose.

Wiring harness plug to the intake air temperature sensor.

Wiring harness plug to the hot film mass air flow sensor.

DOHC ENGINE - MOTRONIC M 2.8

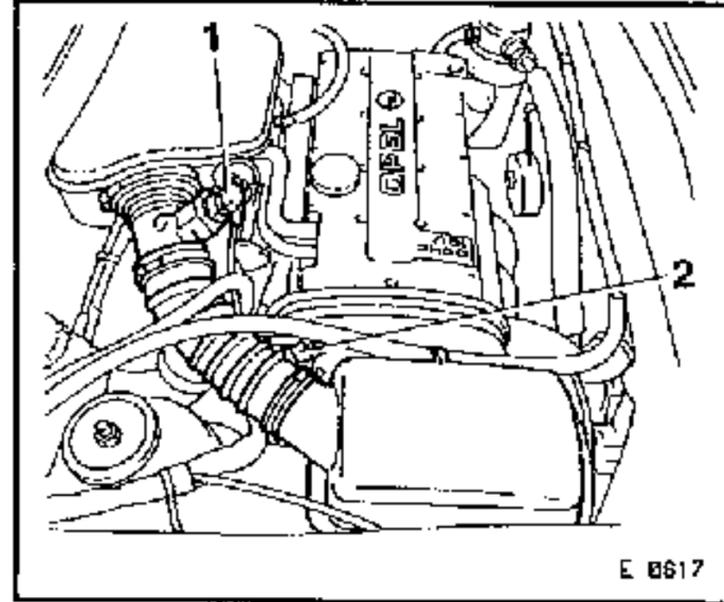
Hot Film Mass Air Flow Sensor, Remove and Install

Remove, Disconnect

Wiring harness plug (1) from the hot film mass air flow sensor.

Wiring harness plug (2) from the intake air temperature sensor.

Upper portion of the air cleaner, together with the air intake hose and hot film mass air flow sensor.

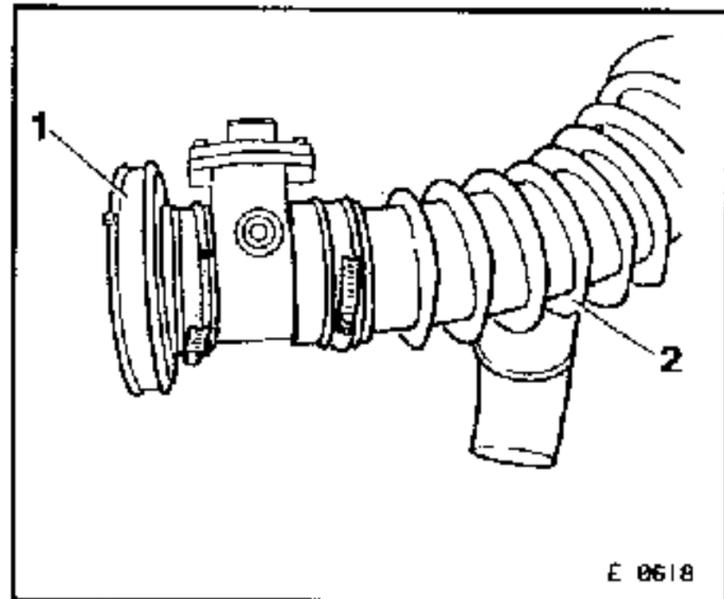


Remove, Disconnect

Intake hoses (1 and 2) from the hot film mass air flow sensor.

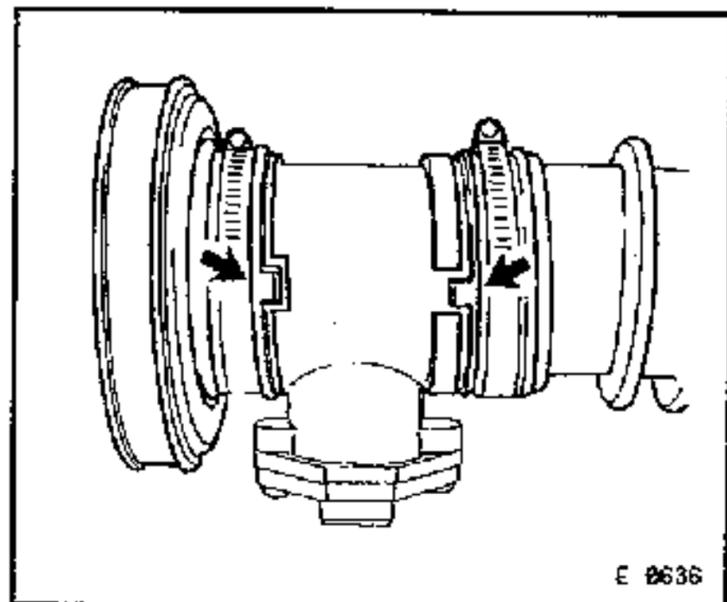
Note:

The position of the intake hoses for correct assembly.



Install, Connect

Both intake hoses to the hot film mass air flow sensor, ensuring correct positioning as indicated (arrows).



Install, Connect

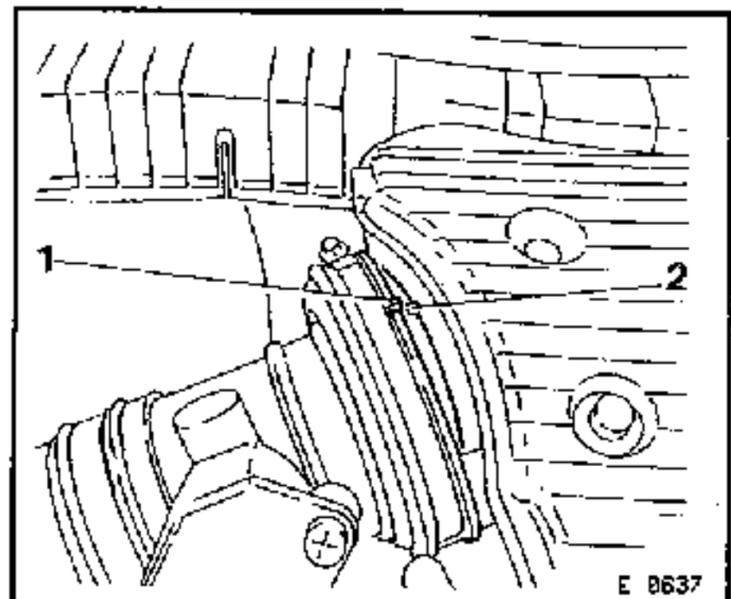
Upper portion of the air cleaner, together with the air intake hose and hot film mass air flow sensor.

Note:

Ensure that the seating at the pre-volume chamber is secure and that the marks (1 and 2) are aligned.

Wiring harness plug (1) to the hot film mass air flow sensor.

Wiring harness plug (2) to the intake air temperature sensor.



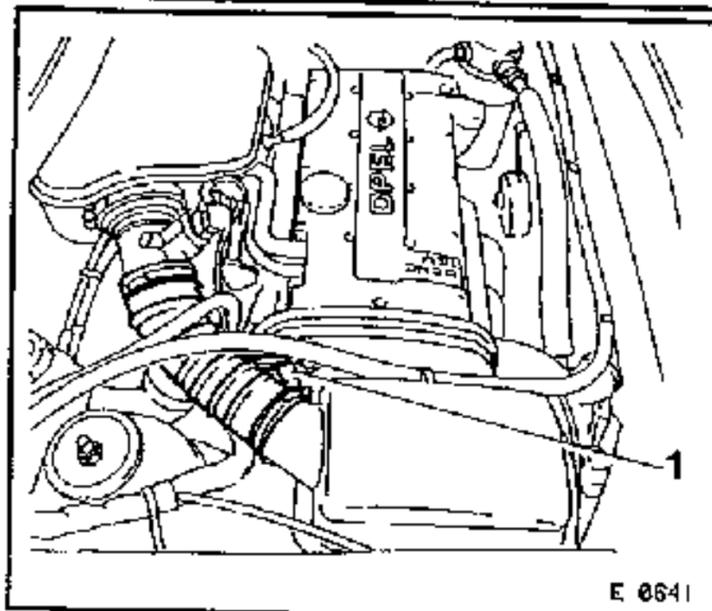
DOHC ENGINE - MOTRONIC M 2.8

Intake Air Temperature Sensor, Remove and Install

Remove, Disconnect

Wiring harness plug (1) from intake air temperature sensor.

Air intake hose.



Remove, Disconnect

Intake air temperature sensor from hose.

Important!

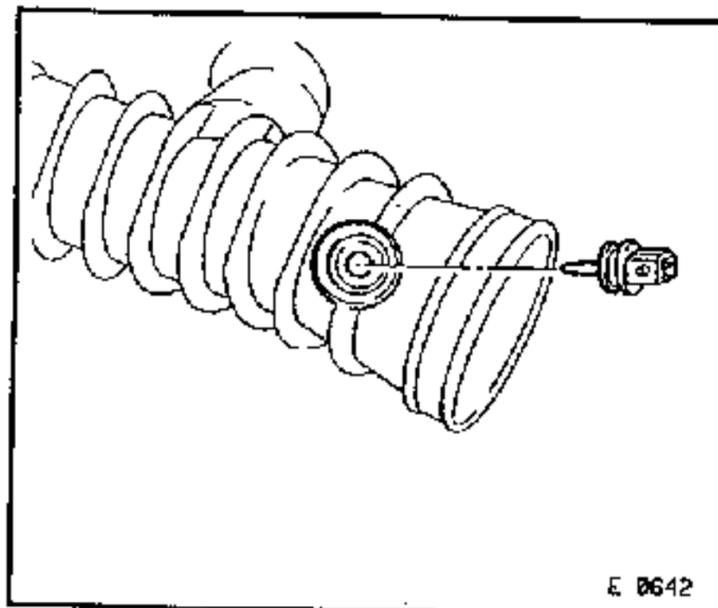
Do not damage the air intake hose during this process.

Install, Connect

Intake air temperature sensor to hose.

Air intake hose.

Wiring harness plug (1) to intake air temperature sensor.

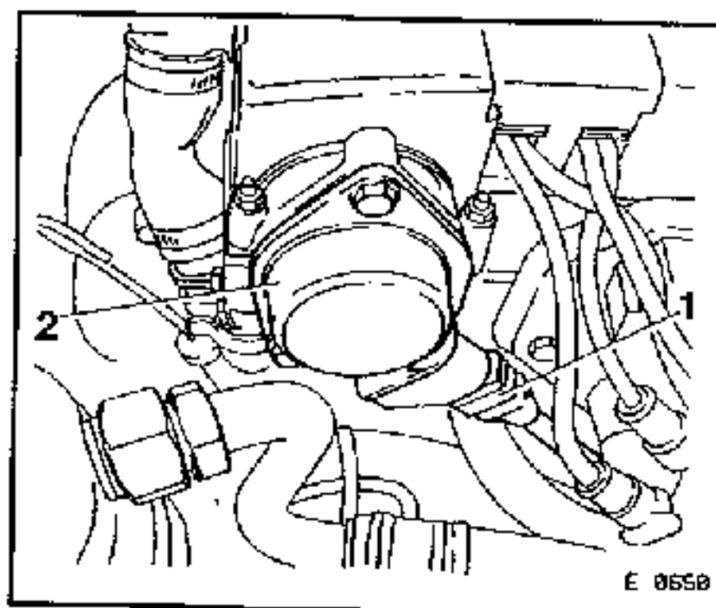


Camshaft Sensor Disc, Remove and Install

Remove, Disconnect

Wiring harness plug (1).

Camshaft sensor housing (2).



Remove, Disconnect

Disc (1).

Install, Connect

Disc (1).

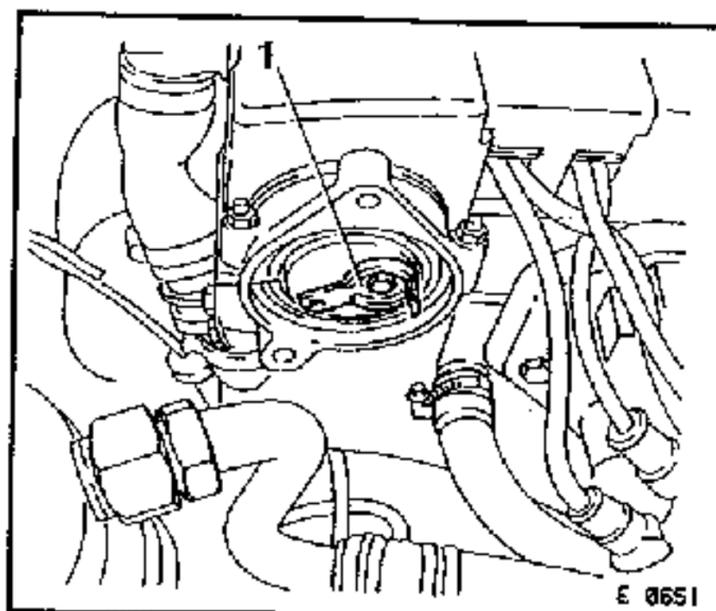
Camshaft sensor housing.

Tighten (Torque)

Camshaft sensor disc.....	8 Nm
Camshaft sensor housing.....	15 Nm

Install, Connect

Wiring harness plug to the camshaft sensor.



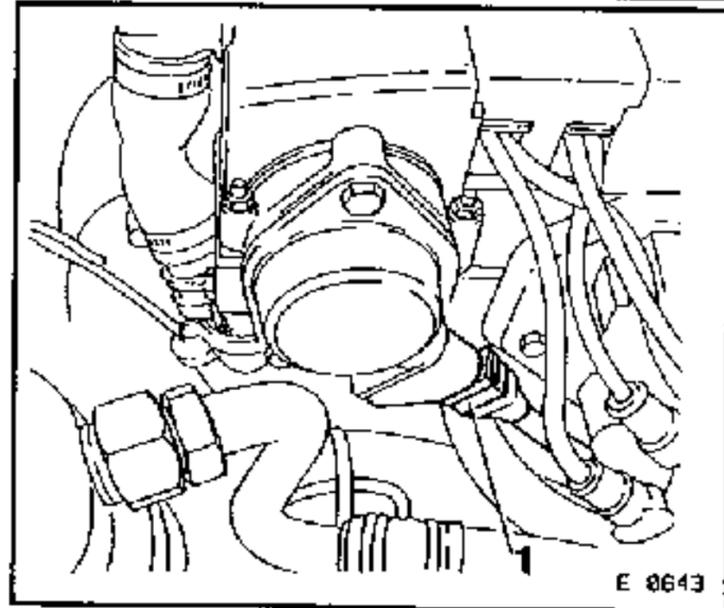
DOHC ENGINE - MOTRONIC M 2.8

Camshaft Sensor, Remove and Install

Remove, Disconnect

Wiring harness plug from camshaft sensor.

Camshaft sensor (1) with sealing ring, from housing.



Install, Connect

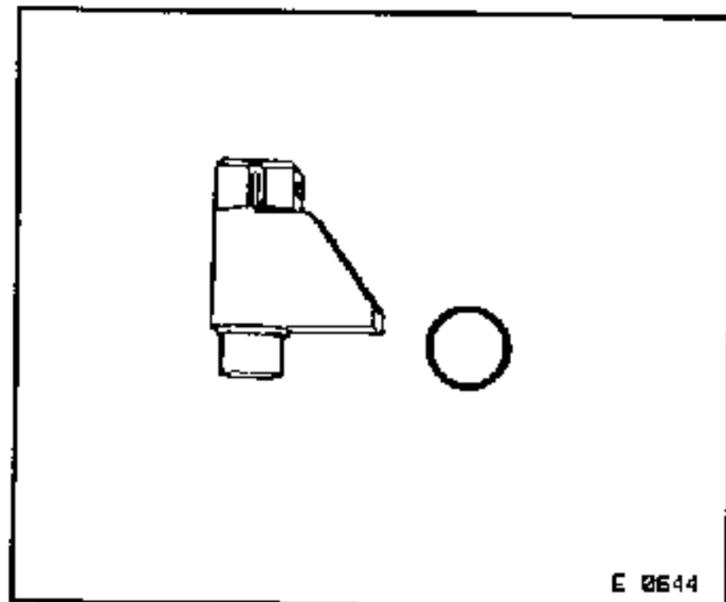
Camshaft sensor with seal ring.

Tighten (Torque)

Camshaft sensor..... 6 Nm

Install, Connect

Wiring harness plug to camshaft sensor.



Inductive Pulse Pick-up, Remove and Install

Note:

Inspect the engine accessories bracket to see if the hole (1) has a small opening. If so, remove the bracket. Refer to the Section, "Engine Timing Side, Air Cleaner Housing", in this Volume for the necessary procedure.

Remove, Disconnect

Wiring harness plug from the inductive pulse pick-up.

Required straps securing the inductive pulse pick-up lead. Note lead routing for reassembly.

Inductive pulse pick-up.

Note:

Should the engine accessories bracket have a large opening (1), level with the inductive pulse pick-up, separate the cable from the inductive pulse pick-up, then remove the inductive pulse pick-up.

Install, Connect

Inductive pulse pick-up with new seal ring.

Tighten (Torque)

Inductive pulse pick-up6 Nm4

Install, Connect

Wiring harness plug to inductive pulse pick-up.

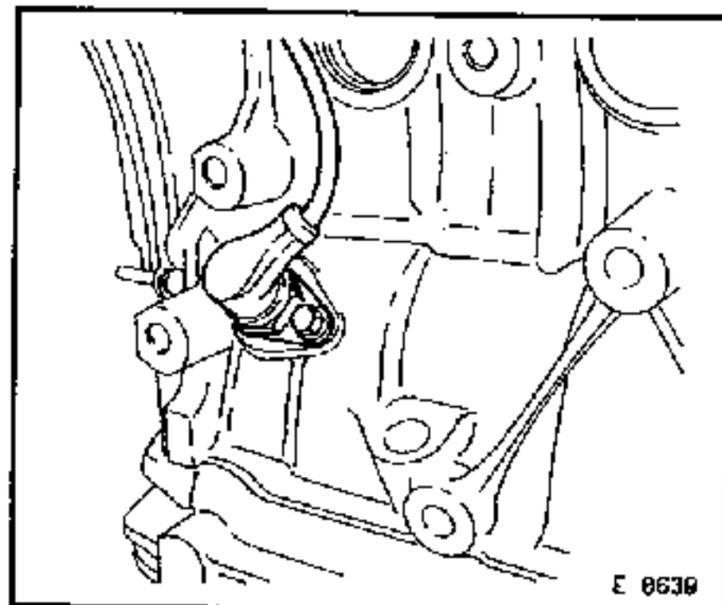
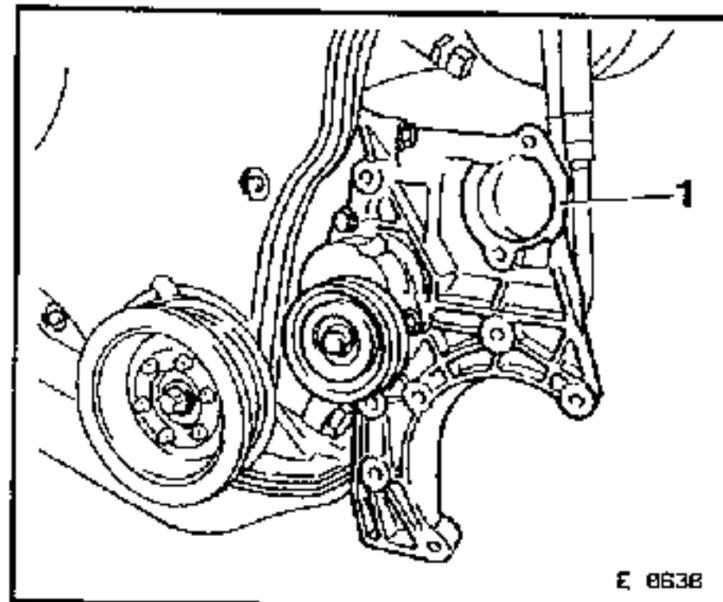
Note:

Version with larger opening; ensure that cable routing does not touch the exhaust manifold or rotating parts such as the ribbed V-belt.

Install, Connect

Cable retaining straps as noted on removal.

If removed, the engine accessories bracket. Refer to the Section, "Engine Timing Side, Air Cleaner Housing", in this Volume for the necessary procedure.



DOHC ENGINE - MOTRONIC M 2.8

Fuel Pump Relay, Remove and Install

Remove, Disconnect

Unclip right footwell cover, after removing the right hand door sill panel.

Relay bracket.

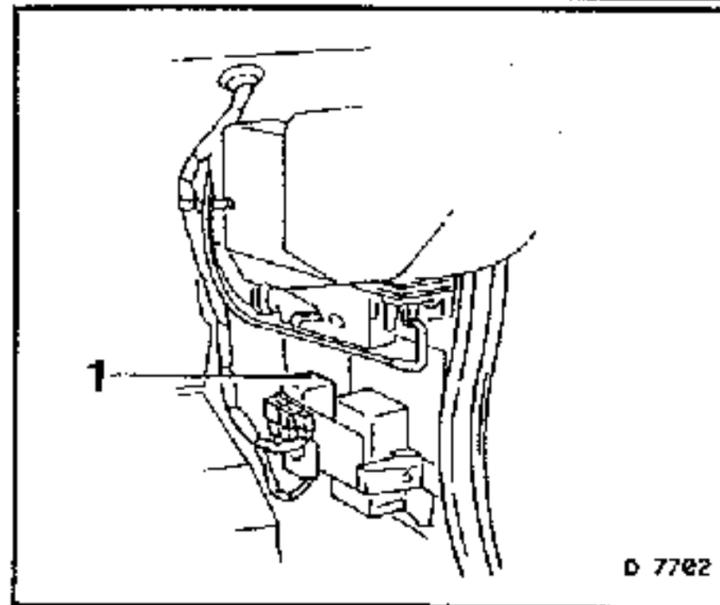
Fuel pump relay (1) from socket.

Install, Connect

Fuel pump relay (1) in socket.

Relay bracket.

Footwell cover, and right hand door sill panel.



Motronic Control Unit, Remove and Install

Remove, Disconnect

Switch off ignition.

Unclip right footwell cover, after removing the right hand door sill panel.

Control unit.

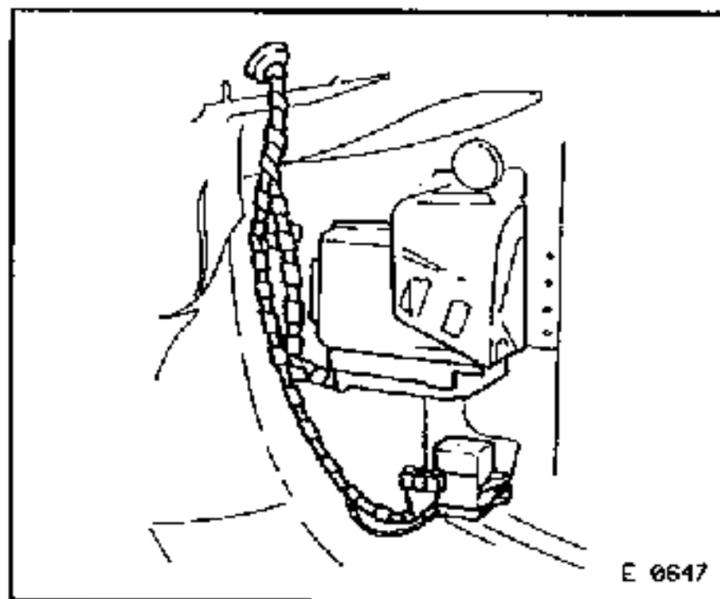
Control unit wiring harness plug.

Install, Connect

Control unit wiring harness plug.

Control unit.

Footwell cover, and right hand door sill panel.



Controlled Canister Purge Valve, Remove and Install

Note:

For a more clear presentation, illustration E 0640, shows the controlled canister purge valve with the engine removed.

Remove, Disconnect

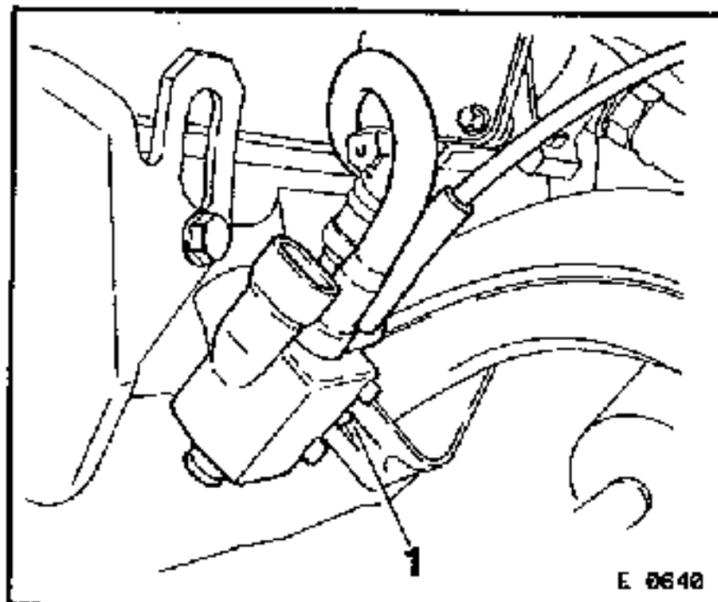
Wiring harness plug from controlled canister purge valve.

Hoses from the controlled canister purge valve.

Clamp the hose leading to the carbon canister.

Using a screwdriver, press in the lug (1) to release the controlled canister purge valve.

Controlled canister purge valve.



Install, Connect

Controlled canister purge valve to the bracket. Press the retaining lug back towards the transmission side.

Hoses to the controlled canister purge valve.

Unclamp the carbon canister hose.

Wiring harness plug to the controlled canister purge valve.

DOHC ENGINE - MOTRONIC M 2.8

RECOMMENDED TORQUE VALUES

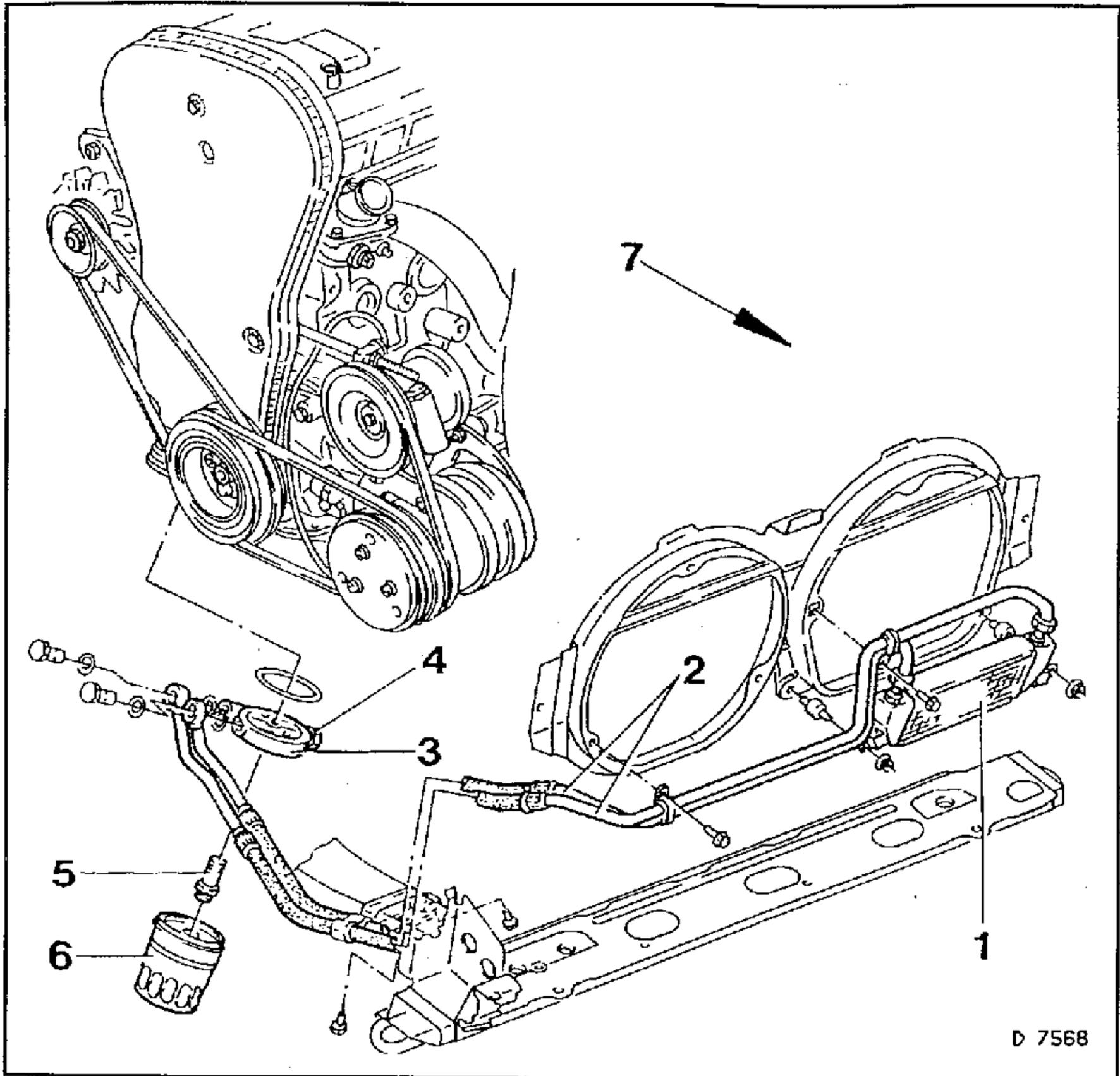
(Motronic M 2.8)

	Nm
Camshaft sensor disc retaining bolt	8
Camshaft sensor housing bolts	15
Camshaft sensor with sealing ring	6
Dual spark ignition coil with bracket	25
Inductive pulse pick-up with new seal ring	6
Oxygen sensor to exhaust pipe	30 (1)

(1) If re-using, apply Special Grease, Part Number 5613695 to the cleaned oxygen sensor threads.

DOHC ENGINE - OIL CIRCUIT

OIL CIRCUIT



D 7568

Layout of Oil Cooler (C 20 XE)

Illustration Key;

1. Oil Cooler
2. Oil Cooler Line
3. Adaptor, Oil Cooler
4. Blanking Plug for Thermostat
5. Hollow Threaded Adaptor
6. Oil Filter Cartridge
7. Front of Vehicle

Note:

While the above illustration shows a C 20 XE engine up to MY'93 (V-belt drive), the general arrangement of the oil cooler circuit and components remains the same for all C 20 XE models.

DOHC ENGINE - OIL CIRCUIT

Oil Filter Cartridge, Replace

Remove, Disconnect

Flap on engine compartment cover (Under the right hand wheel arch) for the oil filter cartridge.

Oil filter cartridge using a commercially available tool.

Install, Connect

New oil filter cartridge, after filling with clean engine oil and lightly applying a smear of oil to the oil filter cartridge seal ring.

Flap on the engine compartment cover for the oil filter cartridge.

Tighten (Torque)

Oil filter cartridge to oil pump..... 15 Nm

Inspect

Engine oil level, topping up as required.

Bypass Valve, Replace

Remove, Disconnect

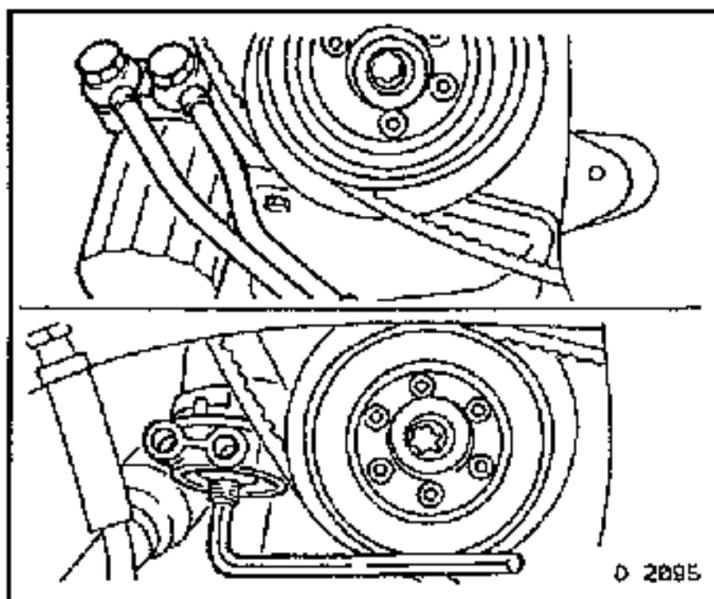
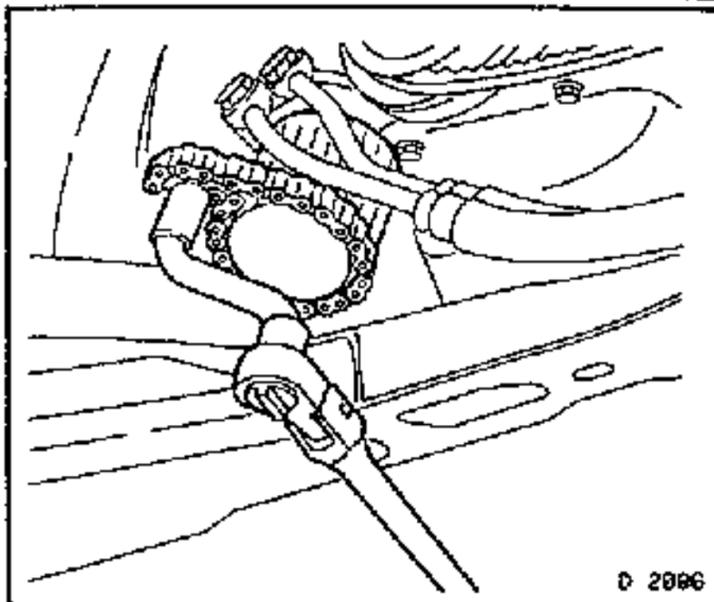
Engine compartment cover.

Oil cooler lines from oil cooler adaptor.

Oil filter cartridge using a commercially available tool.

Hollow threaded adaptor, using a commercially available Allen key.

Oil cooler adaptor.



Remove, Disconnect

Using an M 10, taper tap, cut a thread into the bypass valve disc, then prise the bypass valve from its seat.

Install, Connect

Bypass valve, using a 15 mm drift, until the valve is seated.

Oil cooler adaptor with a new seal ring.

Hollow threaded adaptor.

New oil filter cartridge. Refer to previous operation in this Section.

Fill engine with new engine oil as required.

Oil cooler lines to the oil cooler adaptor.

Engine compartment cover.

Tighten (Torque)

Hollow threaded adaptor to oil pump 23 Nm *

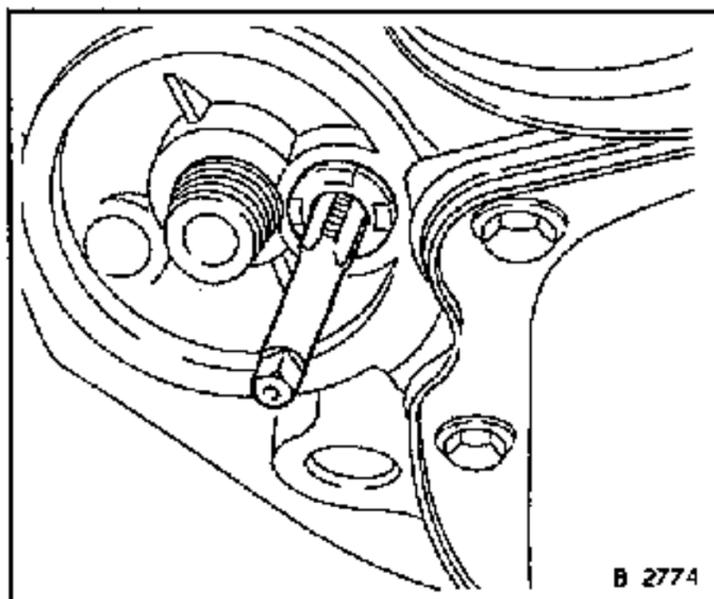
Oil filter cartridge to oil pump..... 15 Nm

Oil cooler lines to oil cooler adaptor..... 30 Nm

* Apply thread locking compound to the threads, such as Loctite 242 or equivalent to Holden's Specification HN1256.

Inspect

Check and adjust engine oil level.



DOHC ENGINE - OIL CIRCUIT

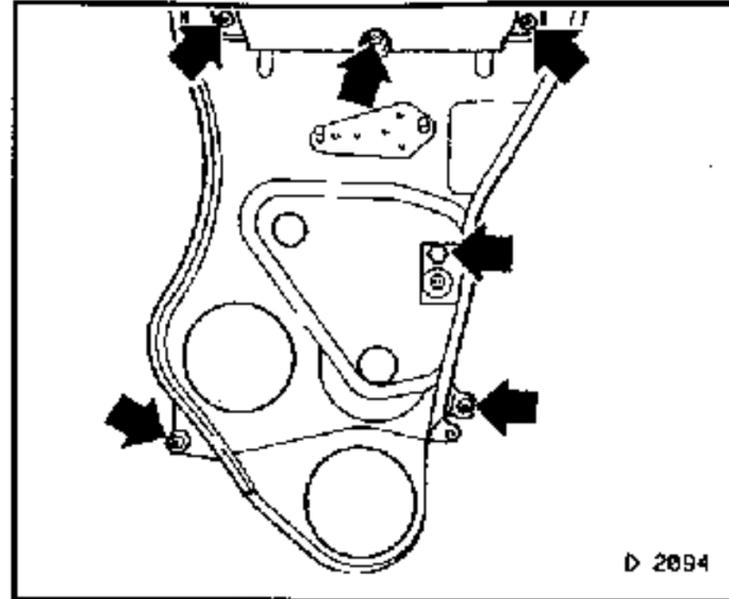
Oil Pump, Remove and Install

Remove, Disconnect

Right hand front wheel.

Engine compartment cover.

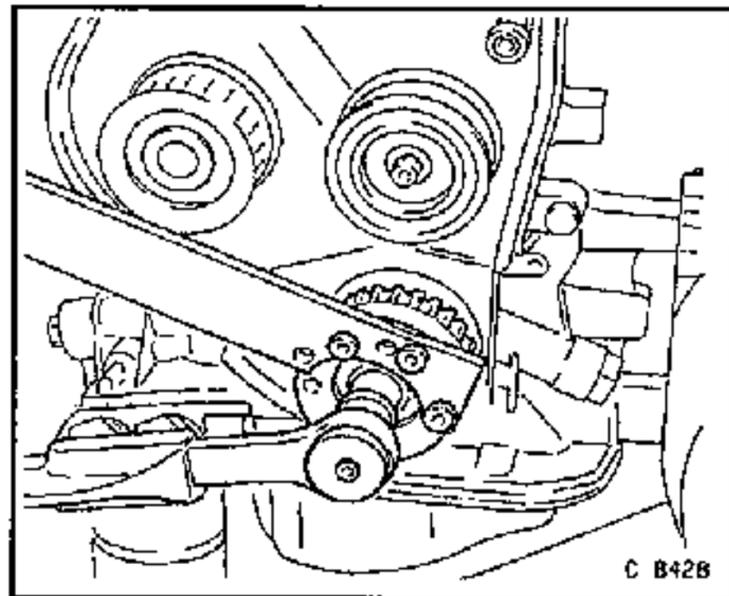
Toothed belt and rear toothed belt cover. Refer to respective operations in the Section, "Engine Timing Side", in this Volume.



Remove, Disconnect

Use holding wrench KM-662-A to hold the toothed belt drive gear, while removing the fastening bolt with MKM-604-21 (Torx E 20).

Install wheel puller KM-210-A with KM-516 and KM-647, as necessary and remove the toothed belt drive gear.



Remove, Disconnect

Spacing ring (1) from the crankshaft journal.

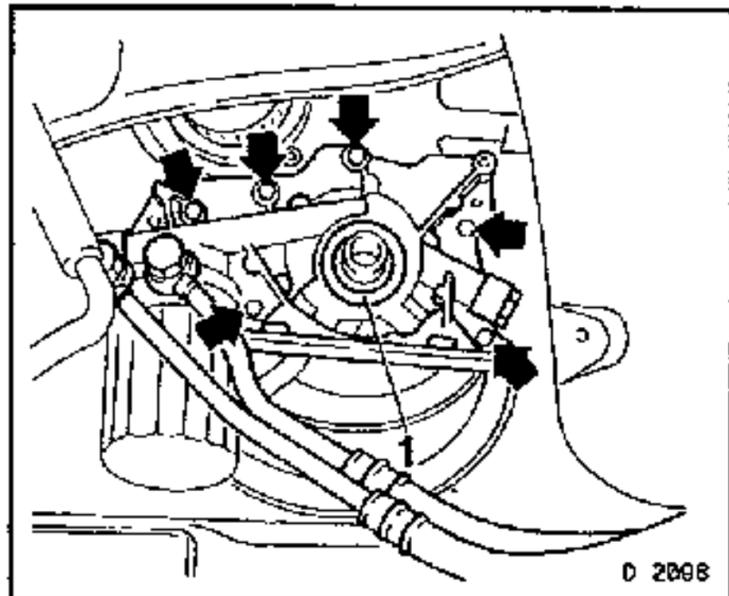
Oil pan. Refer 'Oil Pan Gasket, Replace', in this Section.

Oil pressure switch wiring harness plug.

Oil cooler lines from the oil cooler adaptor.

Oil filter cartridge using a commercially available tool.

Oil pump (arrows) from the cylinder block.



Oil Pump, Check

Remove, Disconnect

Oil pump. Refer to the previous operation.

Oil pump cover and pressure relief valve.

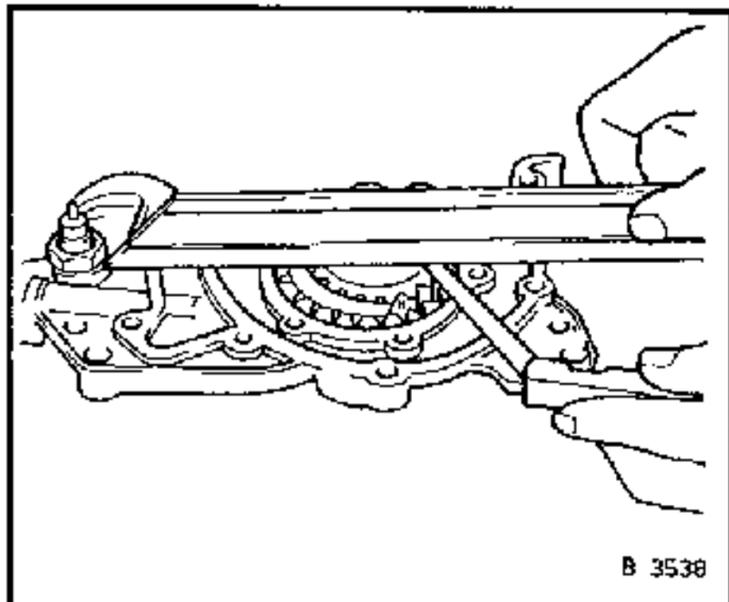
Inspect

End clearance of toothed gears..... 0.03 - 0.1 mm

Check housing, oil pump cover and pressure relief valve for signs of wear.

Clean

All sealing surfaces.



DOHC ENGINE - OIL CIRCUIT

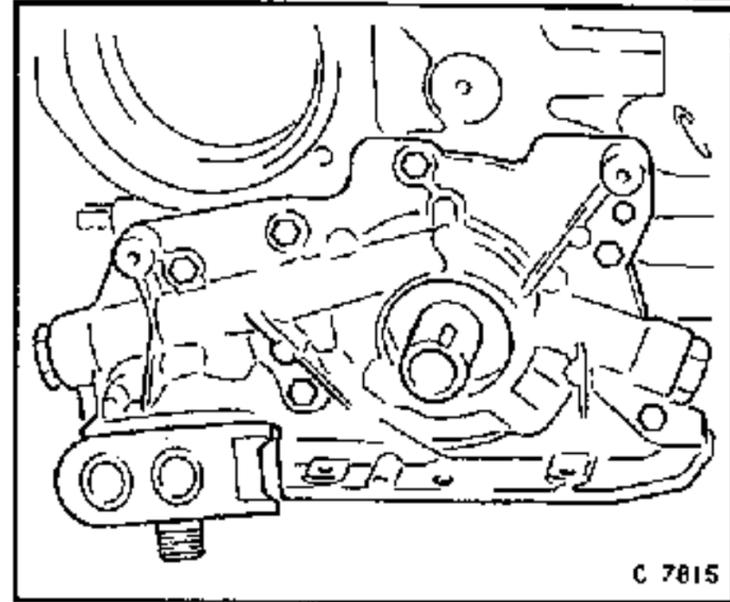
Install, Connect

Oil pump with new gasket and sealing ring (use protecting sleeve KM-693 after coating the seal lips with protective grease).

New oil filter cartridge, after filling with clean engine oil and applying a smear of oil to the sealing ring.

Oil cooler lines.

Wiring harness plug to the oil pressure switch.



C 7815

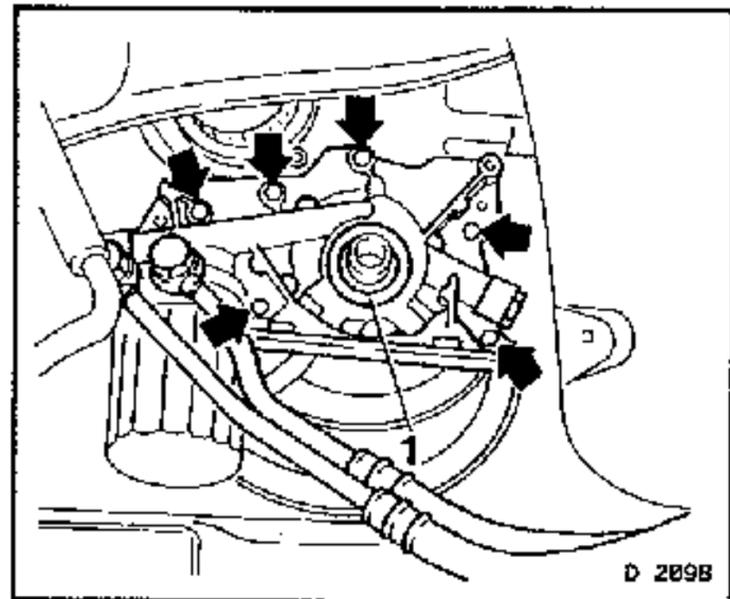
Install, Connect

Oil pan. Refer 'Oil Pan Gasket, Replace', in this Section.

Spacing ring on crankshaft after applying a thin layer of silicone sealant such as Dow Corning 732 or equivalent to Holden's Specification HN1373.

Tighten (Torque)

Oil pump to cylinder block.....	6 Nm
Oil filter cartridge to oil pump.....	15 Nm
Oil cooler lines to oil cooler adaptor .	30Nm



D 289B

Install, Connect

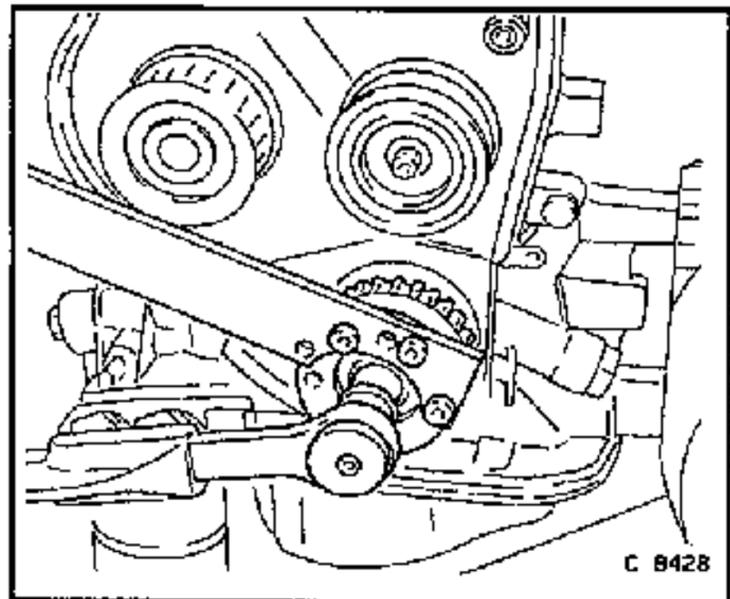
Toothed belt drive gear.

Use holding wrench KM-662-A, while tightening the fastening bolt with MKM-604-21 (Torx E 20). Apply grease to the Torx bolt threads.

Torque - Angle Method

Toothed belt drive gear to crankshaft.....	250 Nm + 40-50°
--------------------------------------------	-----------------

Use new bolts.



C 8428

Install, Connect

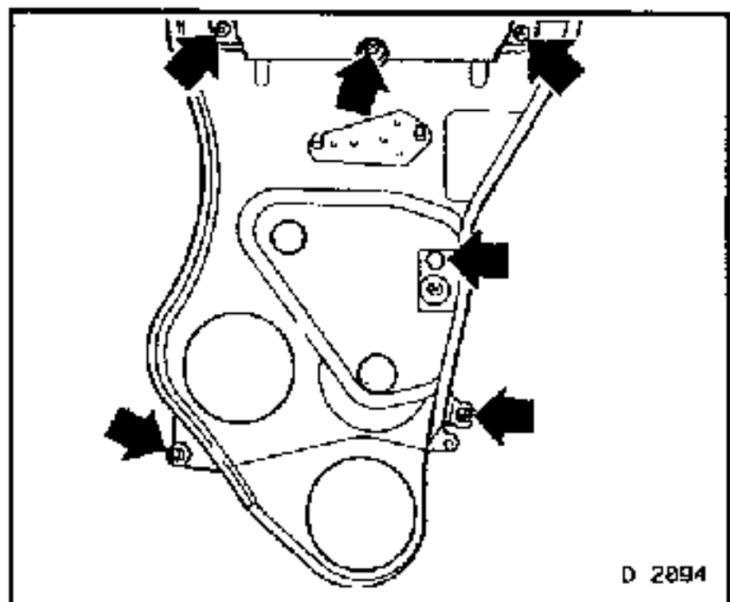
Rear toothed belt cover and toothed belt. Refer to respective operations in the Section, "Engine Timing Side", in this Volume.

Engine compartment cover.

Right hand front wheel.

Tighten (Torque)

Wheel bolts to front wheel hub	110 Nm
--------------------------------------	--------



D 2894

DOHC ENGINE - OIL CIRCUIT

Oil Pan Gasket, Replace

Remove, Disconnect

For C 20 XE:

Performance header. Refer to 'Gasket, Performance Header, Replace', in the Section "Cylinder Head", in this Volume.

For C 20 LET:

Front exhaust pipe.

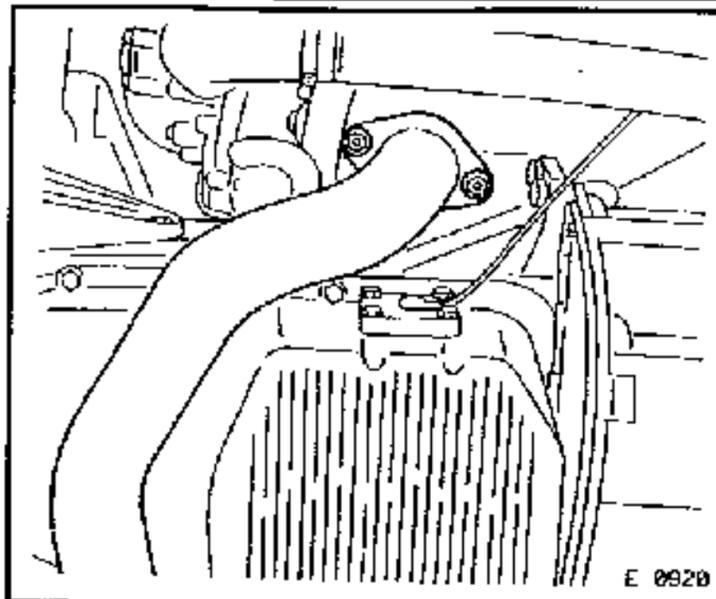
For all Engines:

Wiring harness plug for dynamic oil level check.

Oil drain plug. Collect engine oil in a suitable container.

Tighten (Torque)

Oil pan plug to oil pan..... 45 Nm

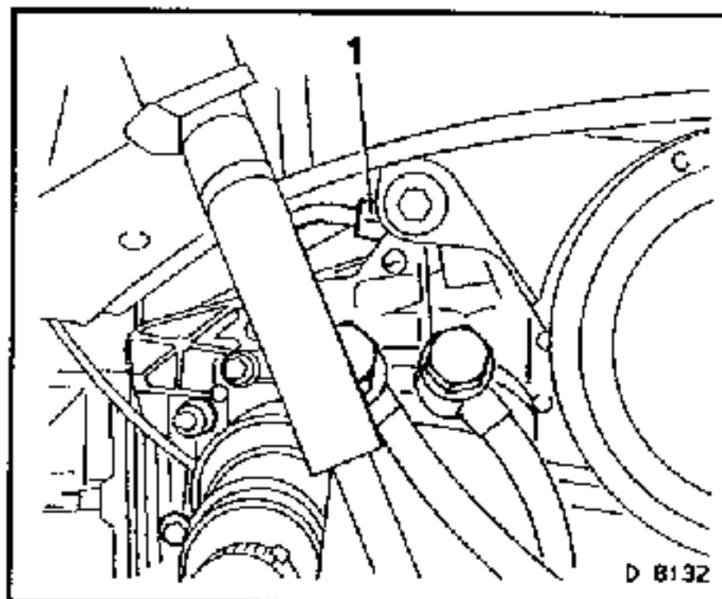


Remove, Disconnect

For C 20 LET:

Oil feed line (1) from cylinder block connection piece and from turbocharger.

Cover from the transmission.

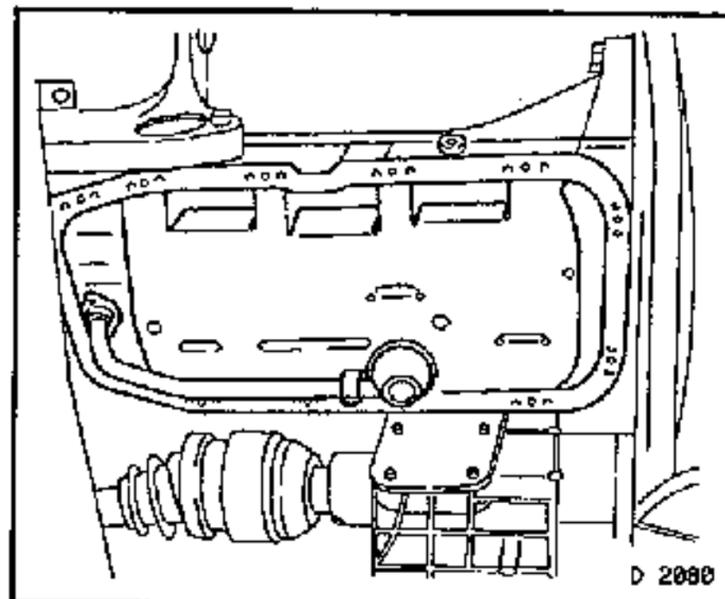


Remove, Disconnect

Oil pan, oil intake pipe, oil intake pipe bracket, baffle plate.

Clean

All sealing surfaces.



Apply

Sealing compound such as General Electric RTV 159 or equivalent to each of the joints (arrows).

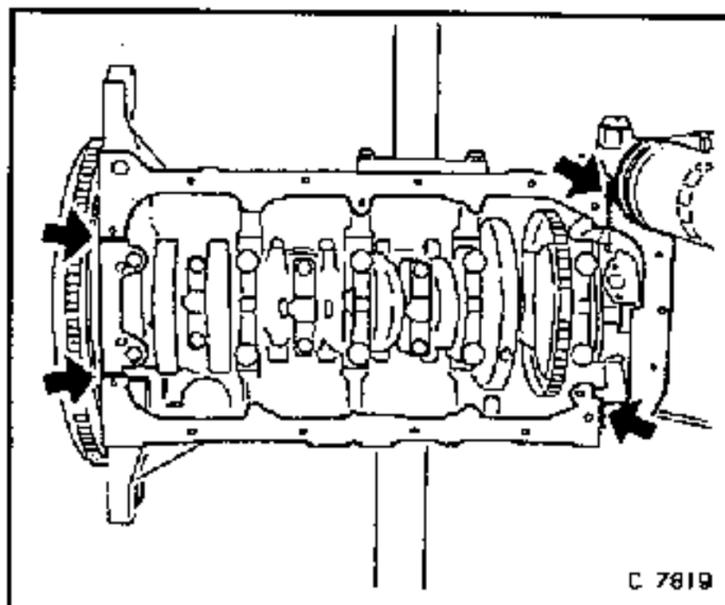
Install, Connect

New gasket.

Important!

Check that the correct number of spacing rings are available.

Baffle plate.



DOHC ENGINE - OIL CIRCUIT

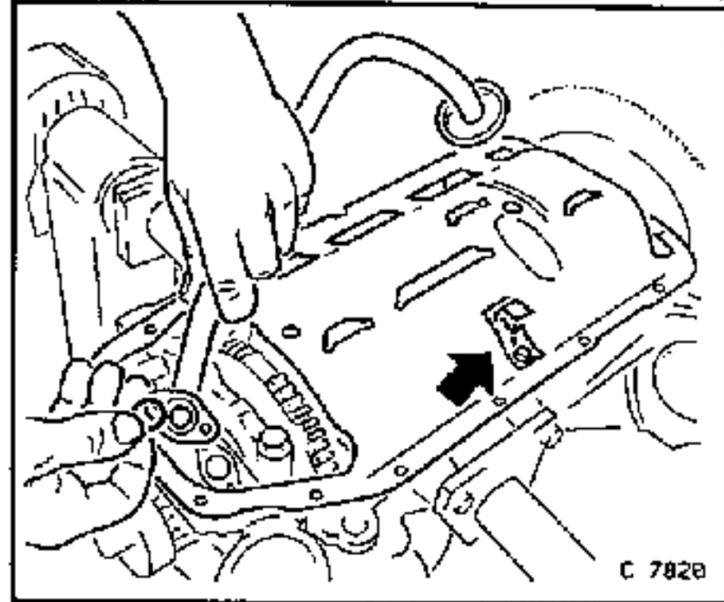
Install, Connect

Oil intake pipe (with a new seal ring) and bracket.

Tighten (Torque)

Oil intake pipe bracket to cylinder block.... 6 Nm
Oil intake pipe to the oil pump 8 Nm *

* Apply thread locking compound to the threads, such as Loctite 242 or equivalent to Holden's Specification HN1256.

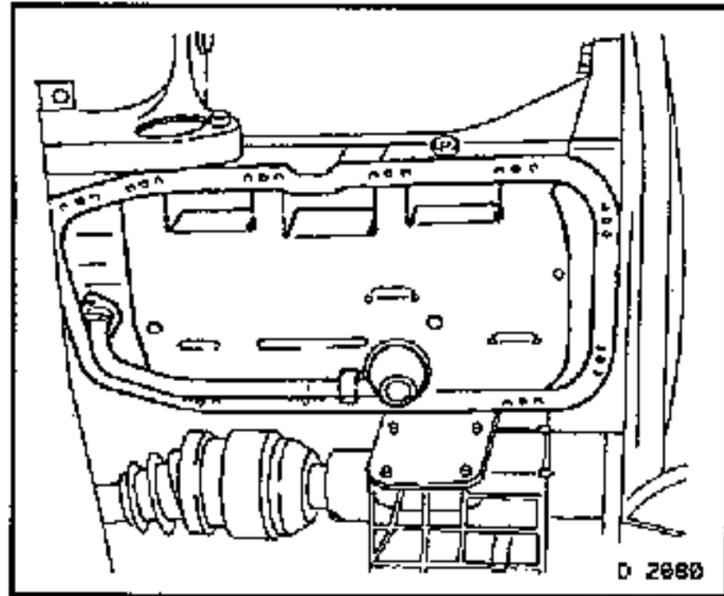


Install, Connect

Second cork gasket.

Important!

Check that the correct number of spacing rings are available.



Install, Connect

Oil pan to cylinder block.

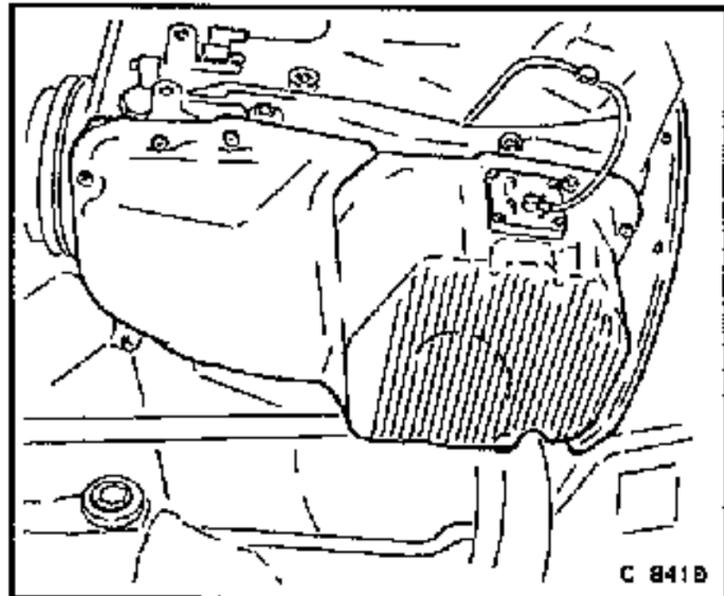
Tighten (Torque)

Oil pan to cylinder block 15 Nm *

* Apply thread locking compound to the threads, such as Loctite 242 or equivalent to Holden's Specification HN1256.

Note:

Maximum installation time for this operation is 10 minutes.



Install, Connect

Cover on transmission.

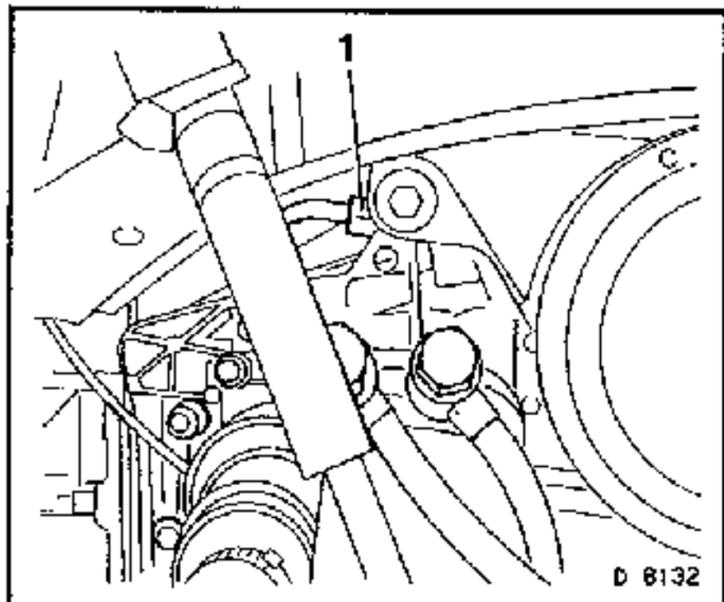
For C 20 LET:

Oil feed line (1) to cylinder block connection piece or to turbocharger.

Front exhaust pipe.

For C 20 XE:

Performance header. Refer to 'Gasket, Performance Header, Replace', in the Section "Cylinder Head", in this Volume.



DOHC ENGINE - OIL CIRCUIT

Oil Cooler Thermostat, Replace

Remove, Disconnect

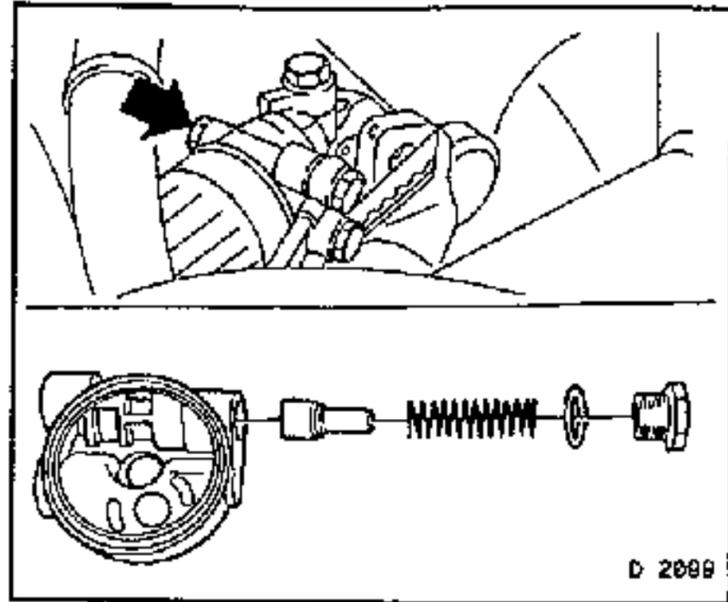
Engine compartment cover.
Blanking plug (arrow), seal ring, spring and piston.

Install, Connect

Piston, spring, new seal ring and blanking plug.
Engine compartment cover.

Tighten (Torque)

Blanking plug (M 20) to housing..... 30 Nm



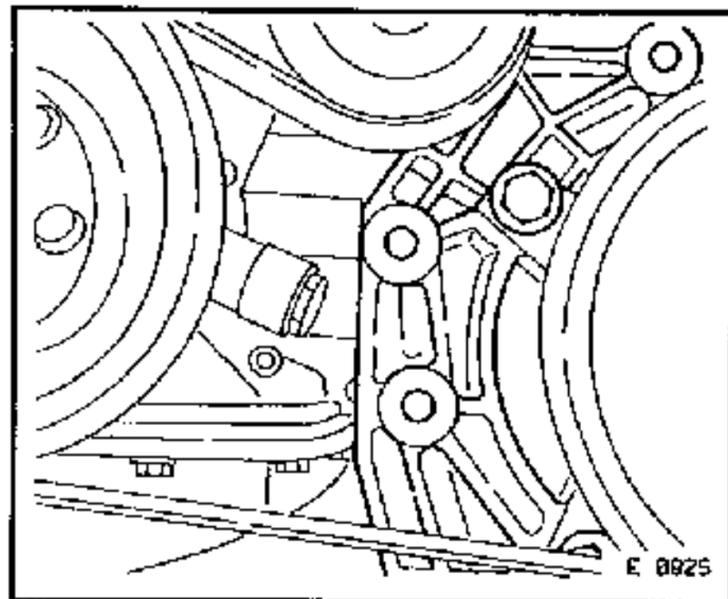
D 2089

Oil Pump Safety Valve, Replace

Remove, Disconnect

Engine compartment cover.
Engine accessories bracket.
For engines as of MY'93 with the ribbed V-belt, refer to 'Engine Accessories Bracket, Remove and Install', in the Section "Engine Timing Side, Air Cleaner Housing", in this Volume.

Blanking plug, seal ring, spring and piston.



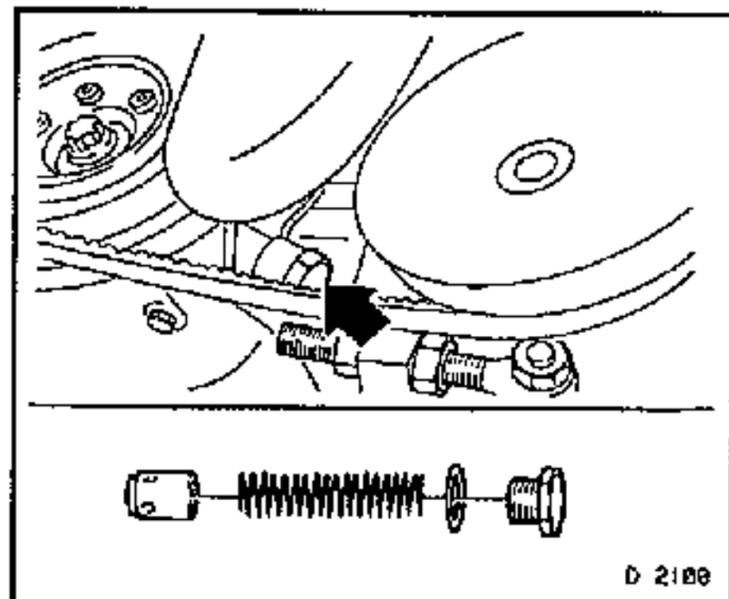
E 0925

Install, Connect

Piston, spring, new seal ring, blanking plug.
Engine accessories bracket.
Engine compartment cover.

Tighten (Torque)

Blanking plug to oil pump..... 30 Nm



D 2188

RECOMMENDED TORQUE VALUES

(Oil Circuit)

	Nm
Bracket for oil intake pipe to cylinder block	6
Closure bolt for safety valve to oil pump	30
Oil drain plug to oil pan	45
Oil intake pipe to oil pump	8 (1)
Oil pan to cylinder block (version: baffle plate with attached gasket)	5 (2)
Oil pan to cylinder block (version: baffle plate with vulcanised gasket) .	10 (2)
Oil pressure switch/sensor to oil pump.....	40
Oil pump to cylinder block.....	6

(1) Threads must be cleaned before reuse and coated with Locking Compound to Holden's Specification HN1256, Loctite 242 or equivalent.

(2) Maximum installation time 10 minutes.

GROUP C

BODY EQUIPMENT

SEATS, UPHOLSTERY, INNER TRIM PANELS

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SEATS, UPHOLSTERY, INNER TRIM PANELS

Door Inner Trim Panel - Front Door, Replace

Remove, Disconnect

Door handle cover. Lever out from below with a screwdriver.

Door inner trim panel 0 6 bolts (arrows), 12 clips.

Wiring harness plug from the speaker from behind the panel.

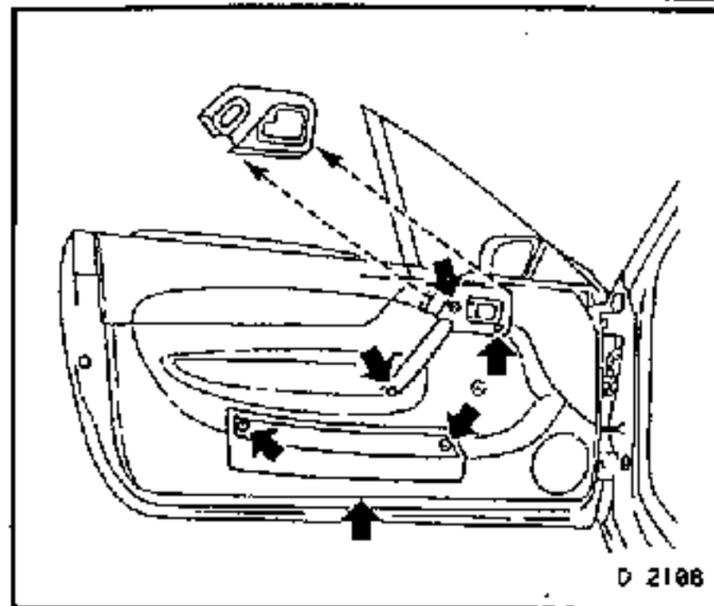
Door inner trim panel.

Note: For the RH door, disconnect the wiring harness plug from the external electric mirror switch.

Install, Connect

Wiring harness plug to the speaker and electric external mirror (RH door).

Door inner trim panel, door handle cover.



Door Pocket - Front Door, Replace

Remove, Disconnect

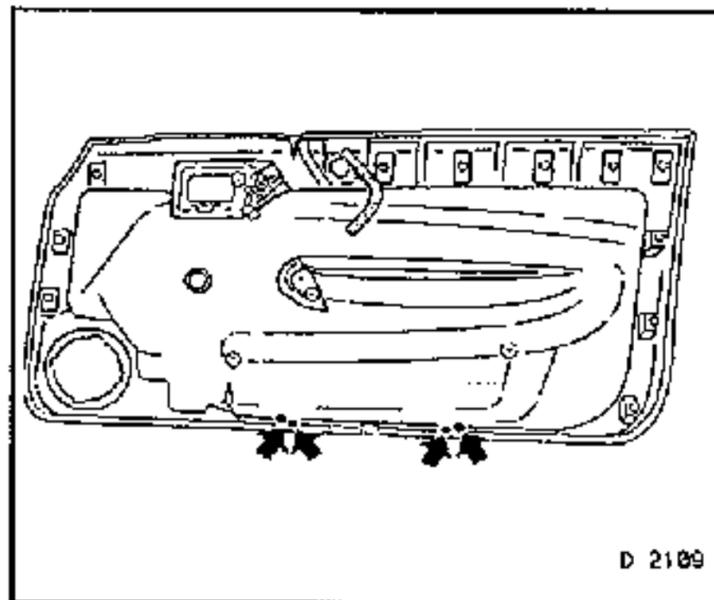
Inner front door trim panel. Refer to previous operation.

Door pocket - 2 bolts, 2 clips from inside.

Install, Connect

Door pocket.

Inner front door trim panel.



Handle - Front Door, Replace

Remove, Disconnect

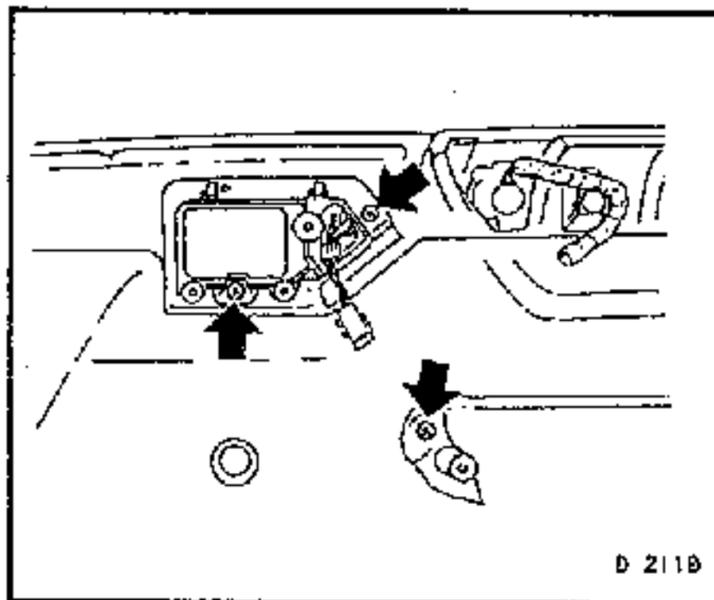
Inner front door trim panel. Refer to operation in this Section.

Handle - 3 bolts (arrows) from inside.

Install, Connect

Handle.

Inner front door trim panel. Refer to operation in this Section.



Rear Seat Cushion, Replace

Remove, Disconnect

Pull on each of the two straps provided, to release the two rear seat cushion catches.

Pull rear seat cushion forward and up.

Install, Connect

Rear seat belt buckles through holes in rear seat cushion.

Push seat cushion down and to the rear.

Push down at the front of the rear seat cushion at each side, until an audible click is heard indicating the catches have secured the rear seat cushion.

SEATS, UPHOLSTERY, INNER TRIM PANELS

Rear Seat Backrest, Remove and Install

Remove, Disconnect

Rear seat cushion. Refer to previous operation.

Release the seat back catch and pull the seat back forward.

Use trim remover KM-475-A to partially remove the rear seat back trim plugs from each lower corner of the rear seat back to be removed.

Two bolts from each side hinge, using MKM-604-A, Torx bit and socket set.

Rear seat back.

Install, Connect

Hinge bolts.

Rear seat back trim.

Rear seat back cushion.

Panelling - ABS Control Unit and/or Door Sill, Replace

Remove, Disconnect

ABS control unit panelling;

A - 2 bolts.

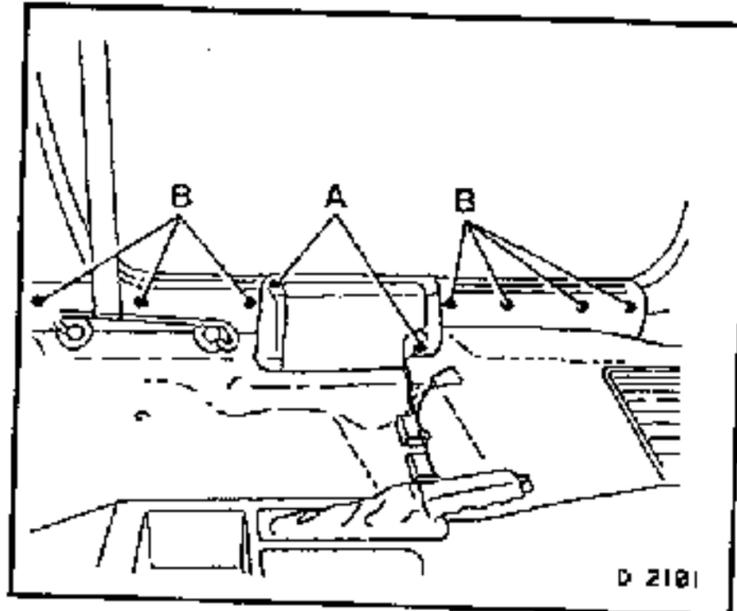
Door sill panelling;

B - 7 bolts.

Install, Connect

Door sill panelling.

ABS control unit panelling.



Panelling - Lower 'A' Pillar, Replace

Remove, Disconnect

ABS control unit panelling and/or door sill panelling.

Remove weatherstrip of front doors in area of lower 'A' pillar.

Panelling - 2 body bound bolts.

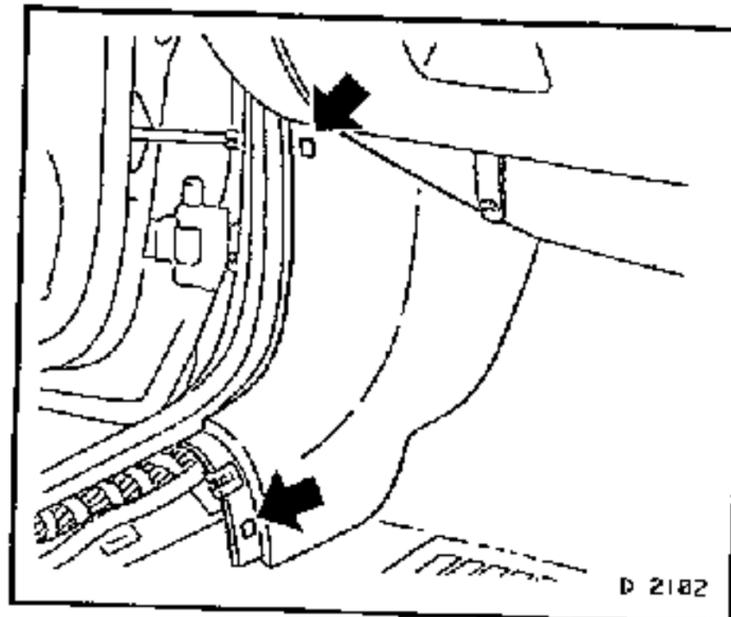
Install, Connect

Lower 'A' pillar panelling - 2 body bound bolts.

Weatherstrip.

Door sill panelling.

ABS control unit panelling.



Panelling - Rear Quarter Panel, Replace

Remove, Disconnect

Rear seat cushion. Refer to previous operation.

Partially loosen door sill panelling in area of 'B' pillar.

Partially remove weatherstrip of door in area of lower 'B' pillar.

Panelling of rear quarter panel;

A - 1 bolt.

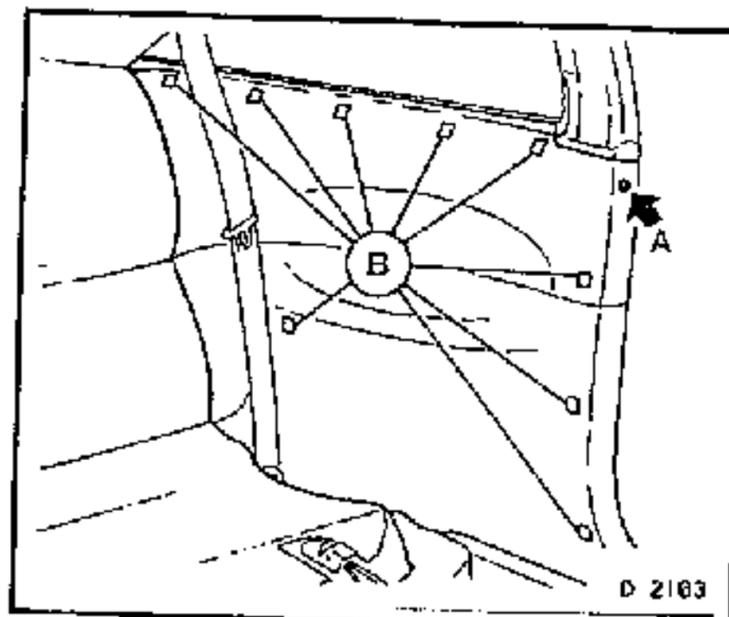
B - 9 clips (reverse of panelling).

Install, Connect

Panelling to rear quarter panel, weatherstrip.

Panelling on door sill.

Rear seat cushion.



SEATS, UPHOLSTERY, INNER TRIM PANELS

Panelling - 'B' Pillar, Replace

Remove, Disconnect

Panelling from rear quarter panel. Refer to previous operation.

Seat belt anchor.

Pull out coat hooks upwards.

Panelling on 'B' pillar, coat hooks.

Install, Connect

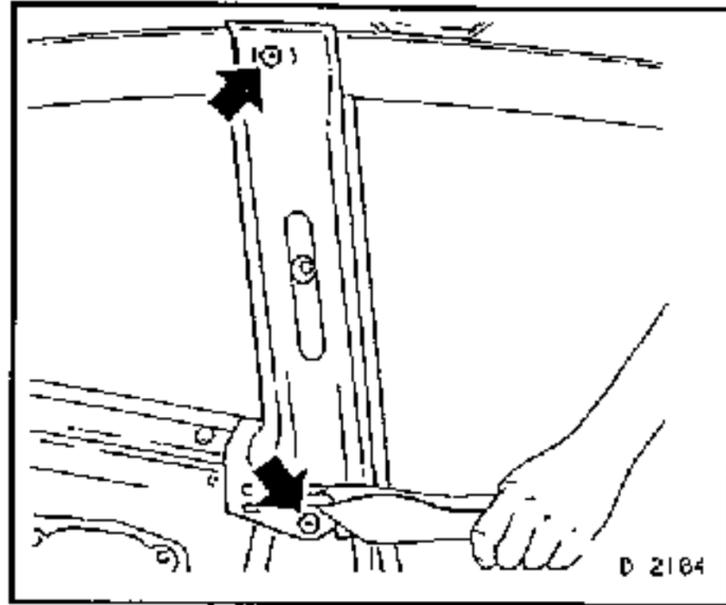
Belt anchor.

Tighten (Torque)

Belt anchor to 'B' pillar 35 Nm

Install, Connect

Rear quarter panelling. Refer to previous operation.



Panelling - Upper 'A' Pillar, Replace

Remove, Disconnect

Coat hooks. Partially loosen panelling from 'B' pillar.

Belt anchor.

Panelling from 'A' pillar.

A - 1 bolt

B - 5 clips

Panel from anti-theft warning system.

Install, Connect

Panelling on 'A' pillar.

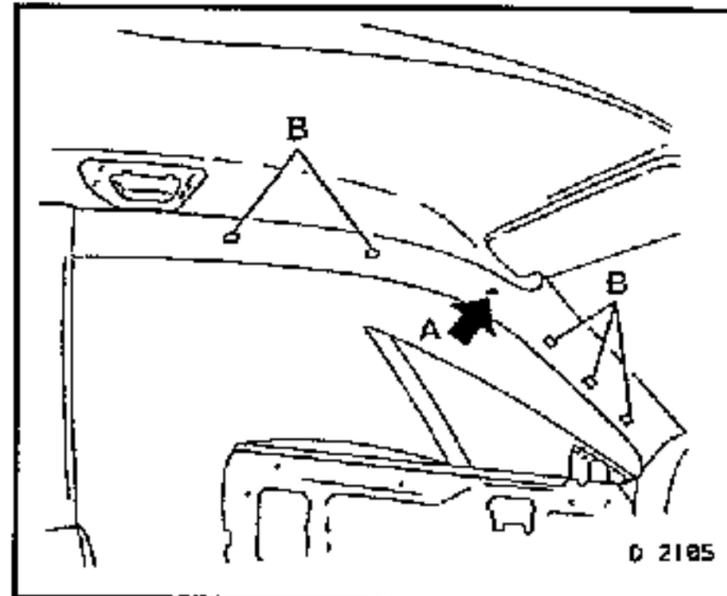
Panelling on 'B' pillar, coat hooks.

Belt anchor.

Tighten (Torque)

Belt anchor to 'B' pillar 35 Nm

Panel to anti-theft sensor.



Panelling 'C' Pillar, Replace

Remove, Disconnect

Rear seat cushion, loading compartment cover.

Panelling from rear quarter. Refer to previous operation.

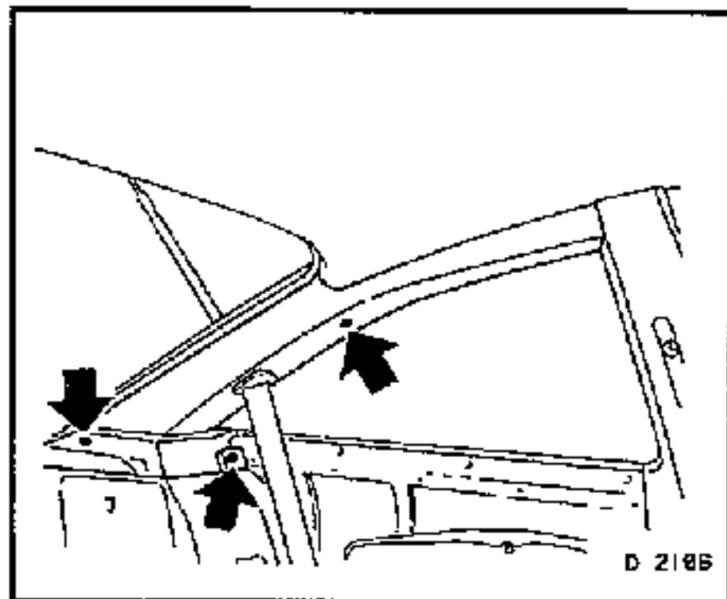
Seat belt anchors on 'B' and 'C' pillars.

Panelling from 'B' pillar. Refer to previous operation.

Panelling from 'C' pillar;

2 Torx bolts with MKM-604-A.

1 bolt.



Install, Connect

Panelling on 'C' pillar.

Panelling on 'B' pillar.

Belt anchors on 'B' and 'C' pillars.

Tighten (Torque)

Belt anchor to 'B' and 'C' pillars 35 Nm

Install, Connect

Panelling on rear quarter panel.

Rear seat cushion, rear seat back.

SEATS, UPHOLSTERY, INNER TRIM PANELS

Headlining, Replace

Remove, Disconnect

'A', 'B' and 'C' Inner panelling. See previous operations in this Section.

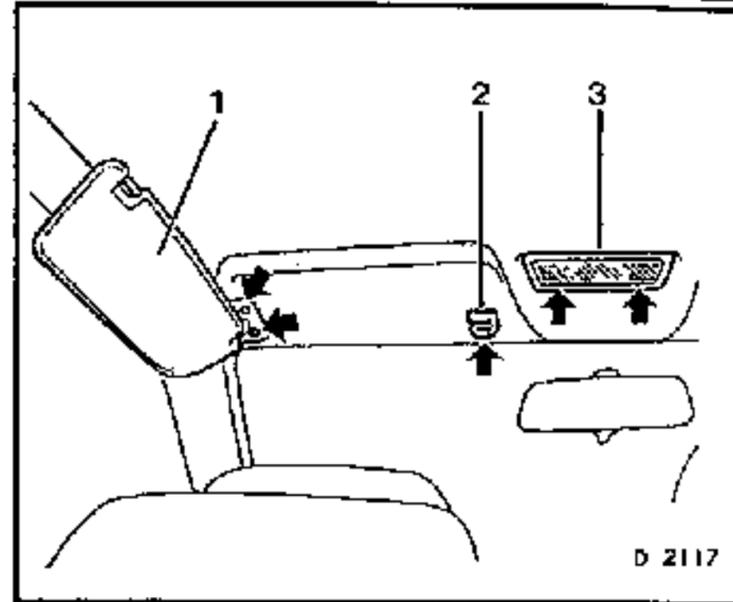
Sun visors (1) - 2 bolts each, retainer (2) - 1 bolt.

Unclip interior lamp (3).

Headlining - 3 clips at rear.

Sliding roof;
Electric winder unit
Edge strip.

Anti-theft warning system panel.



Install, Connect

Headlining.

Interior lamp.

Sun visors and retainers.

Inner panelling.

Sliding roof;
Electric winder unit
Edge strip.

Anti-theft warning system panel.

Panelling - Lower Rear Panel, Replace

Remove, Disconnect

Rear panel inner trim panelling;

A - 5 clips using KM-475-A.

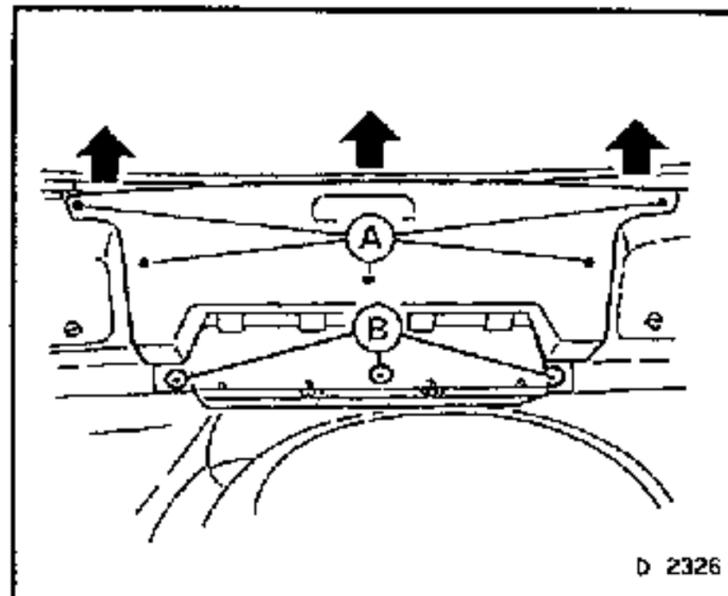
B - 3 plastic nuts.

Important!

Pull out inner trim panelling upwards.

Install, Connect

Inner trim panelling.



Panelling - Tailgate, Replace

Remove, Disconnect

Tailgate inner trim panelling;

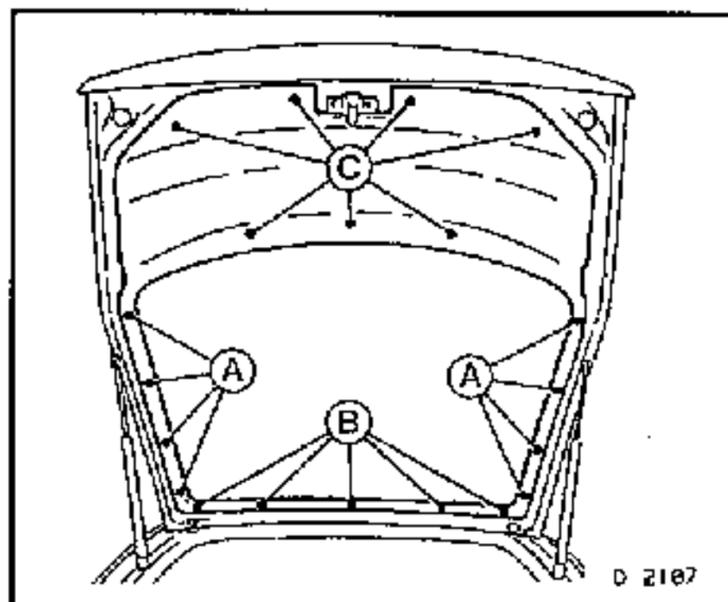
A - 4 clips each side, using KM-469-A.

B - 5 clips, using KM-469-A.

C - 7 torx bolts, using MKM-604-A.

Install, Connect

Tailgate inner panelling.

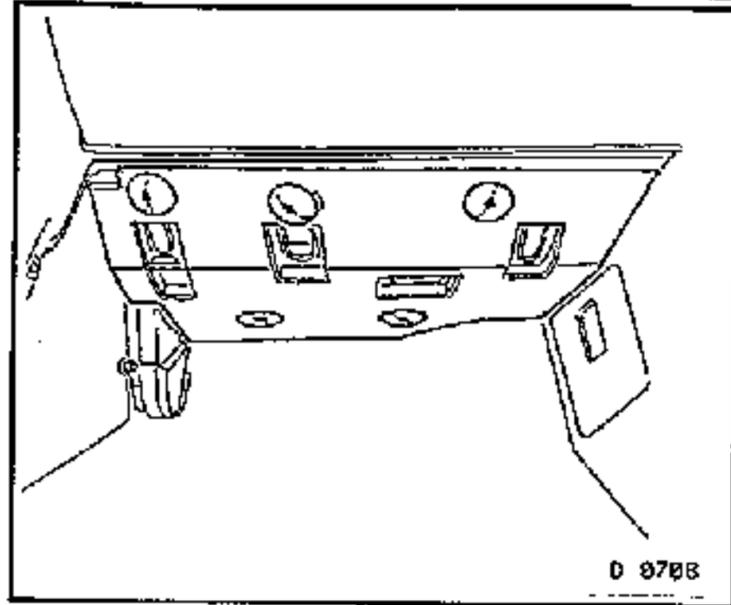


SEATS, UPHOLSTERY, INNER TRIM PANELS

Glove Compartment, Remove and Install

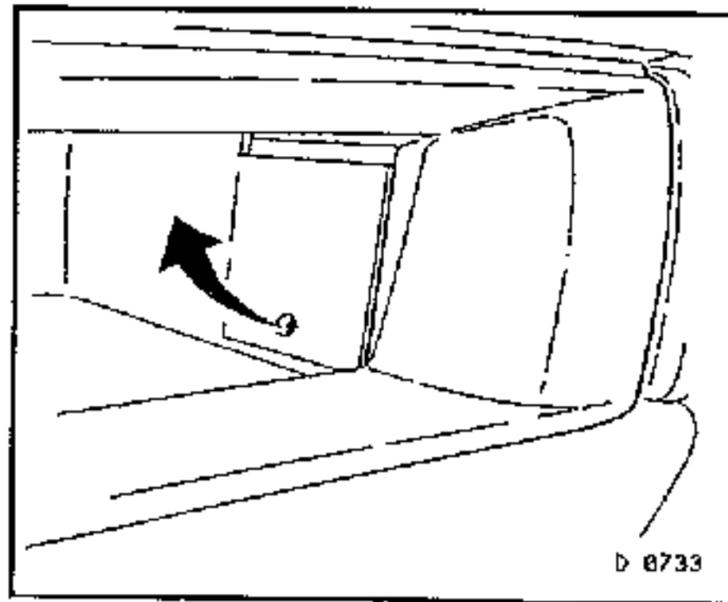
Remove, Disconnect

Footwell cover;
5 twist retainers.



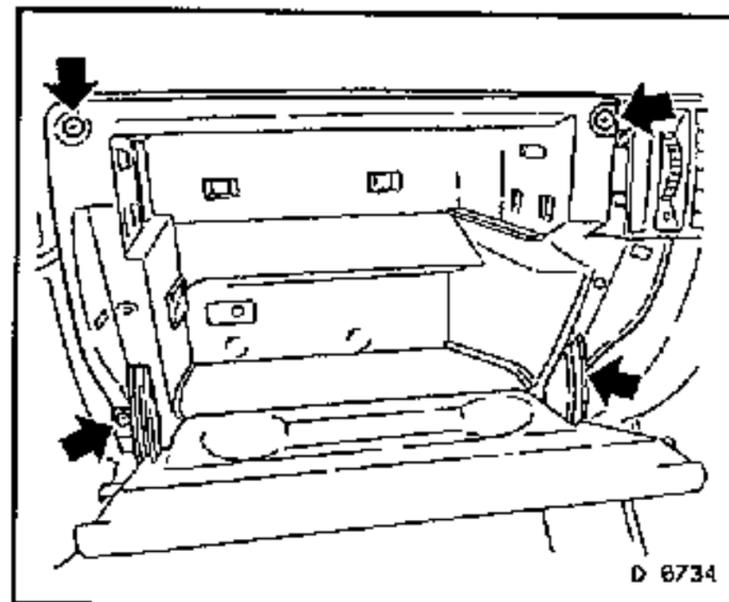
Remove, Disconnect

Upper part of glove compartment catches (arrow).



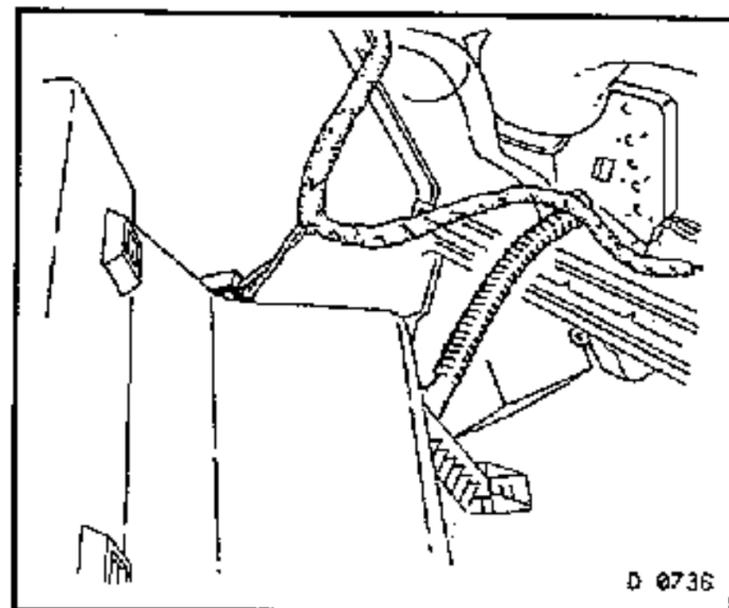
Remove, Disconnect

Glove compartment screws (arrows).
Glove compartment illumination lamp wiring harness plug.
Cooling duct connection from rear.



Install, Connect

Wiring harness plug to glove compartment illumination lamp.
Cooling duct.
Glove compartment.
Upper panel.
Footwell cover.

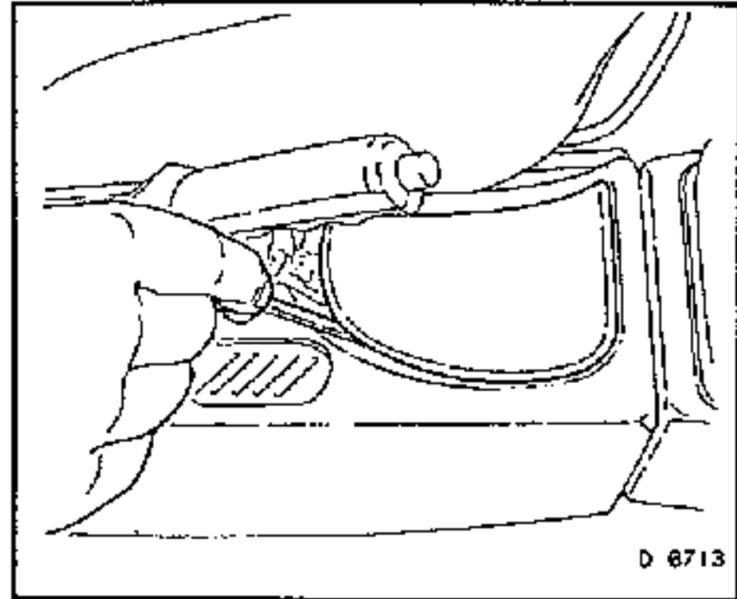


SEATS, UPHOLSTERY, INNER TRIM PANELS

Centre Console, Remove and Install

Remove, Disconnect

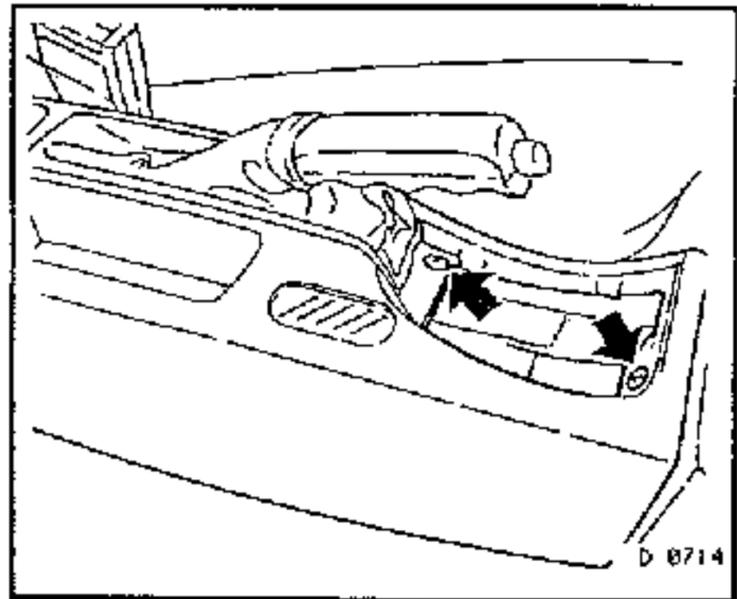
Unclip parking brake handle recess.



Remove, Disconnect

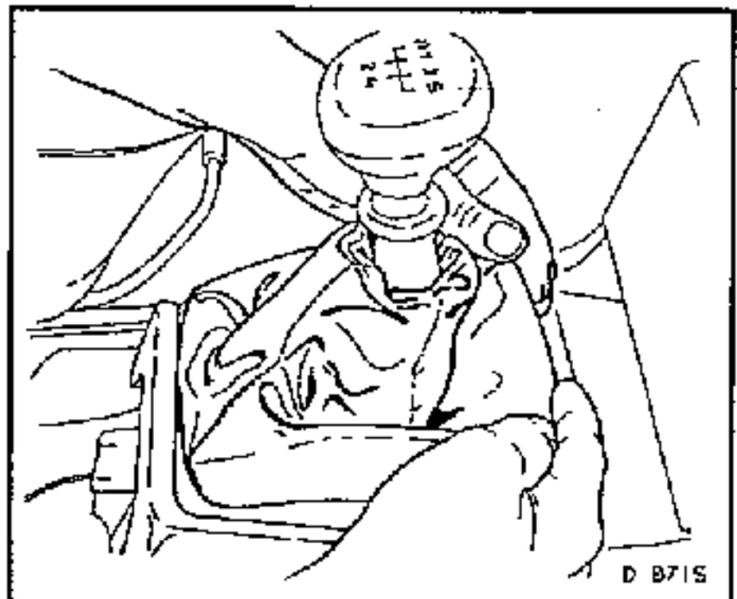
Cover of parking brake lever imitation leather cover.

Rear centre console.



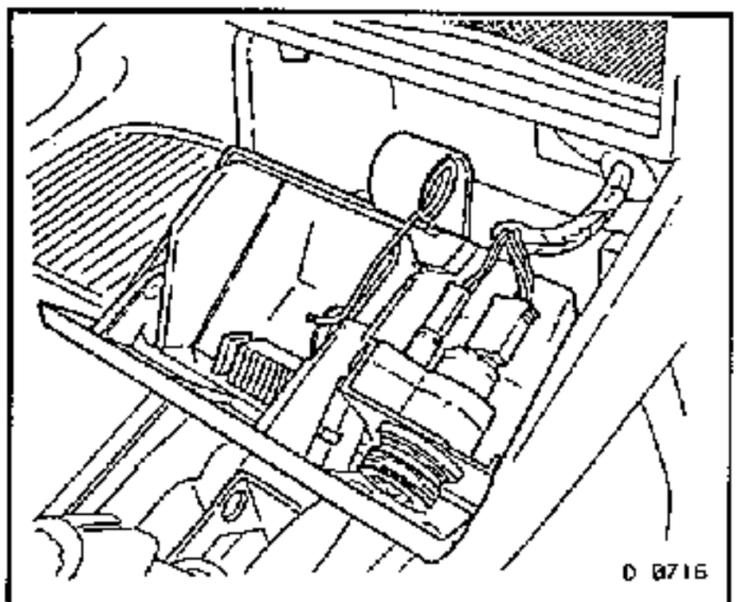
Remove, Disconnect

Gear shift lever imitation leather cover from front of centre console.



Remove, Disconnect

Ashtray, wiring harness plug from cigarette lighter and illumination - 2 bolts.



SEATS, UPHOLSTERY, INNER TRIM PANELS

Remove, Disconnect

Front centre console - 4 bolts.

Engage parking brake. Select 2nd gear.

Install, Connect

Front centre console.

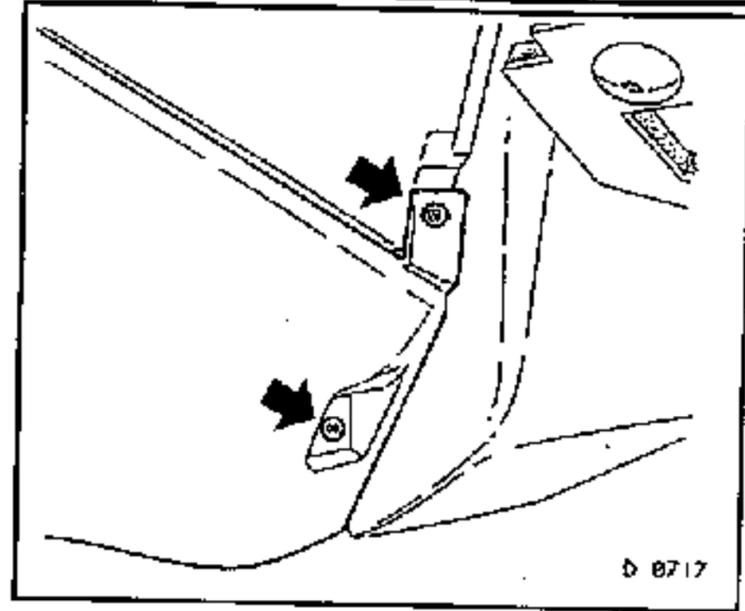
Wiring harness plug to cigarette lighter, ashtray.

Gear shift lever imitation leather cover.

Centre console.

Parking brake imitation leather cover.

Parking brake handle recess.



Instrument Panel Padding, Remove and Install

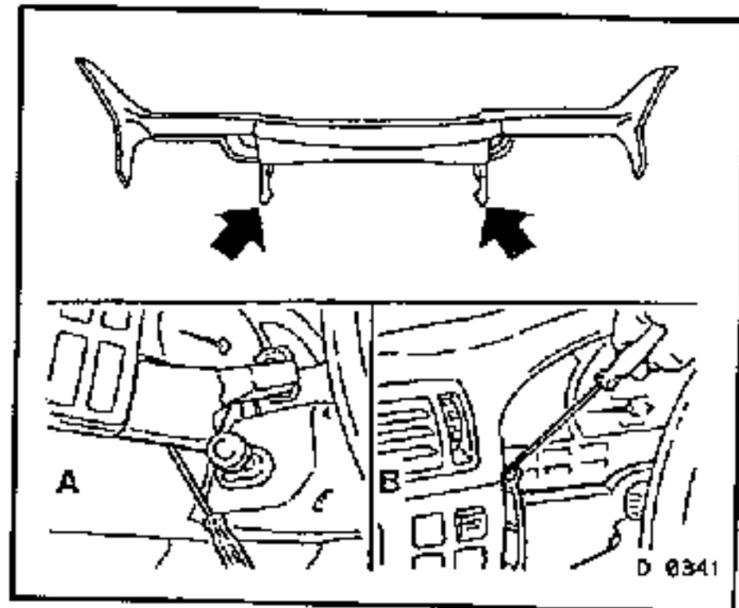
Remove, Disconnect

Glove compartment. Refer previous operation in this Section.

Steering wheel. Refer 'Air Bag', in this Section (if fitted) and/or Group M, 'Steering' in Volume 4.

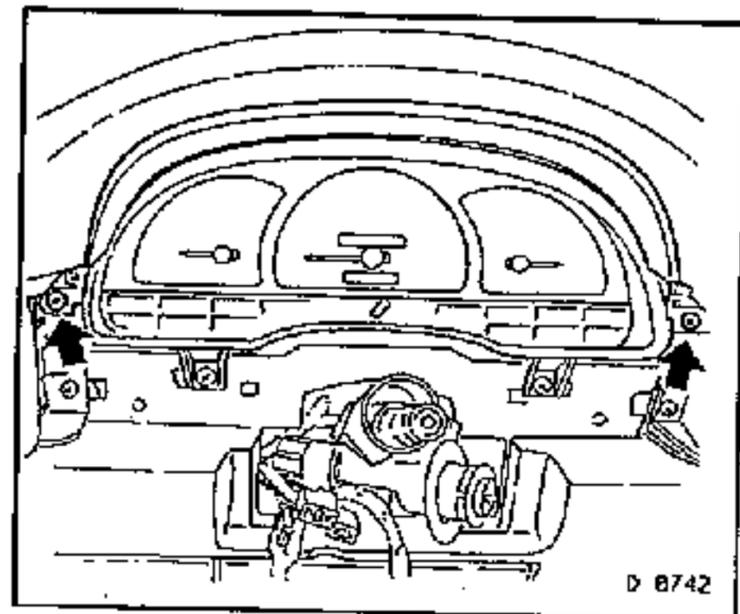
Signal switch panelling. Refer Group N, 'Headlamps, Exterior Lamps, Interior Lamps, Switches, in Volume 4.

Turn signal switch, wiper switch. Refer Group M, 'Steering Column Assembly, Remove and Install', in Volume 4.



Remove, Disconnect

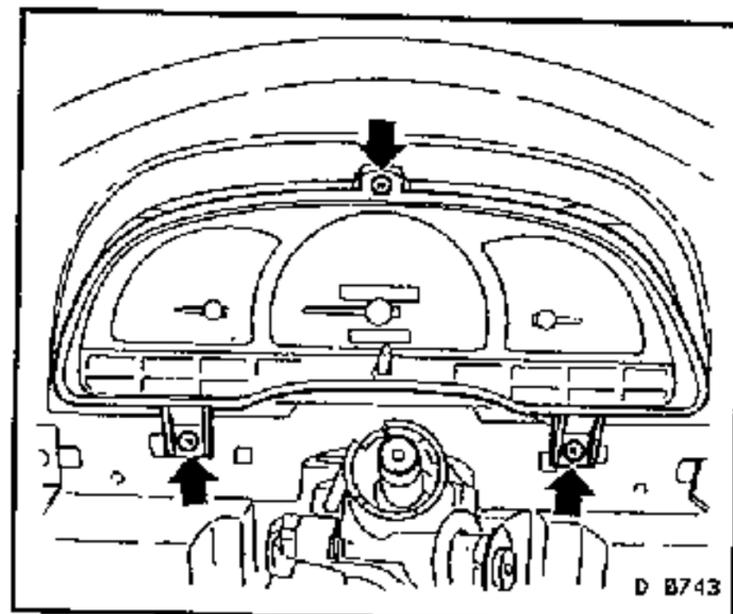
Lower and upper instrument panel covers.



Remove, Disconnect

Instrument cluster.

Wiring harness plugs from the rear of the cluster.

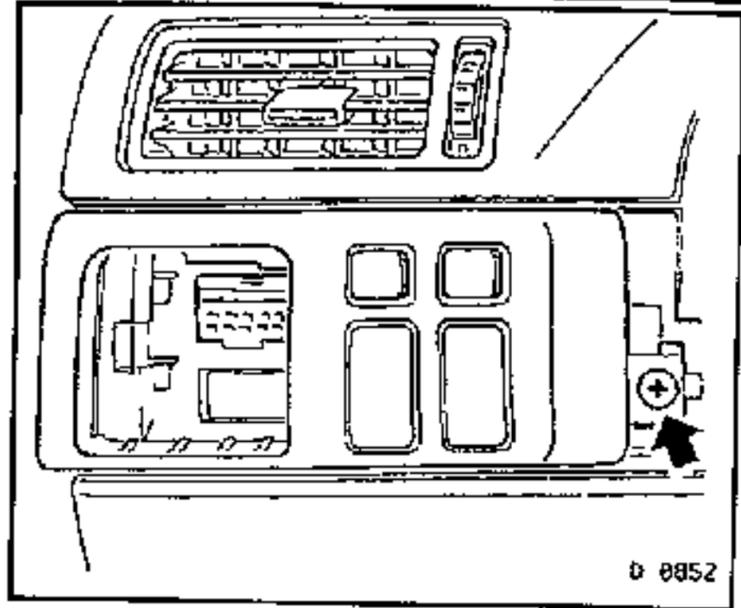


SEATS, UPHOLSTERY, INNER TRIM PANELS

Remove, Disconnect

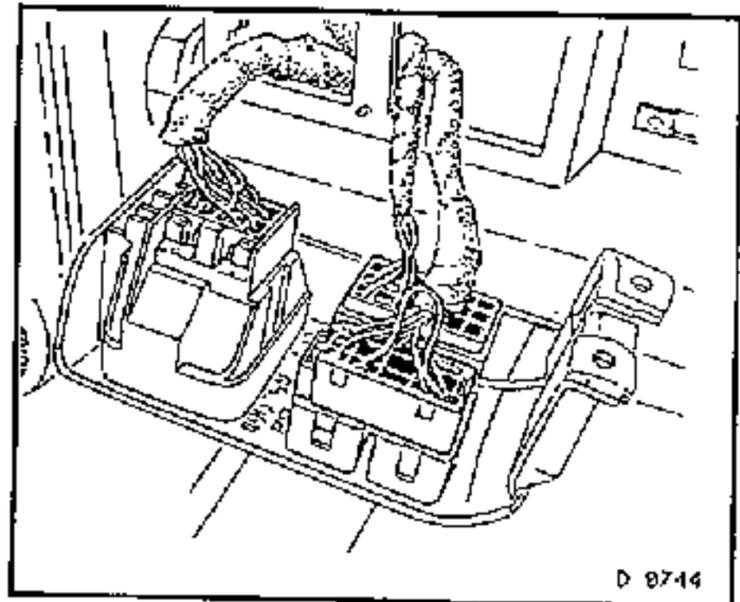
Lamp and interior switches. Refer N, 'Headlamps, Exterior Lamps, Interior Lamps, Switches, In Volume 4.

Pull insert sideways from instrument panel padding.



Remove, Disconnect

Wiring harness plugs, by depressing retainers.



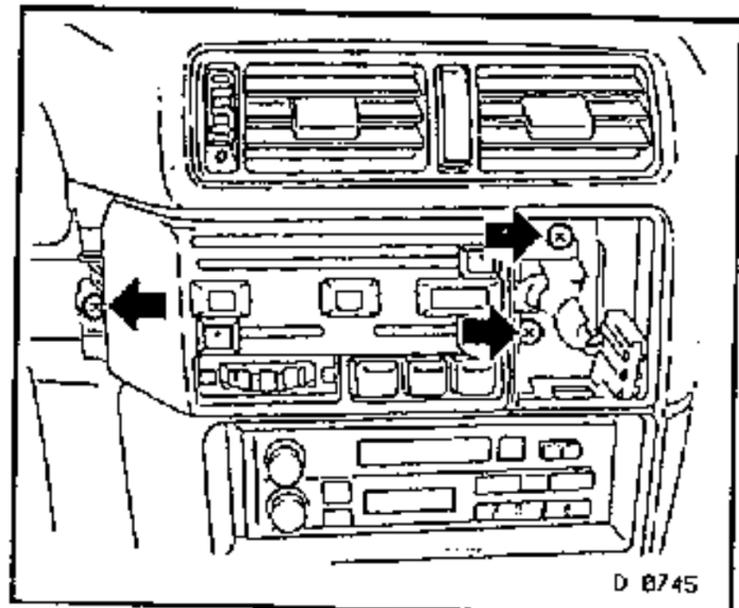
Remove, Disconnect

Radio. Refer Group R, 'Accessories' in Volume 4.

Clock or board computer.

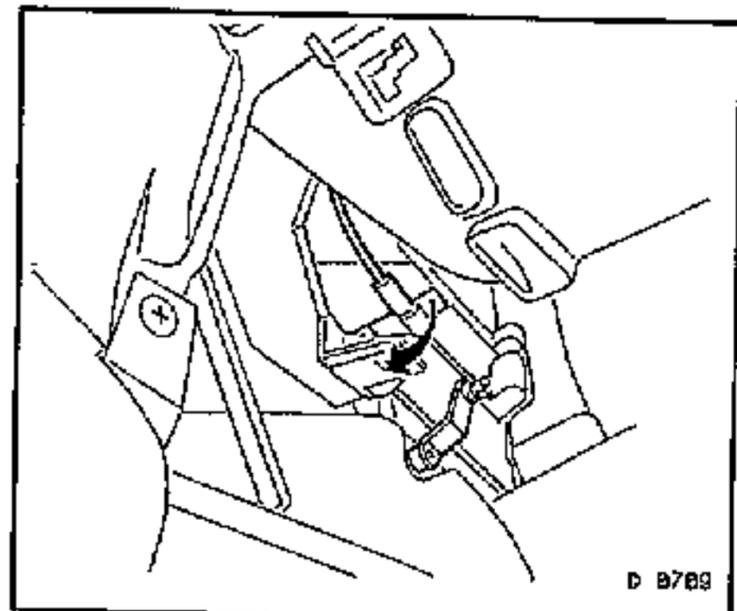
Wiring harness plug.

3 bolts (arrows).



Remove, Disconnect

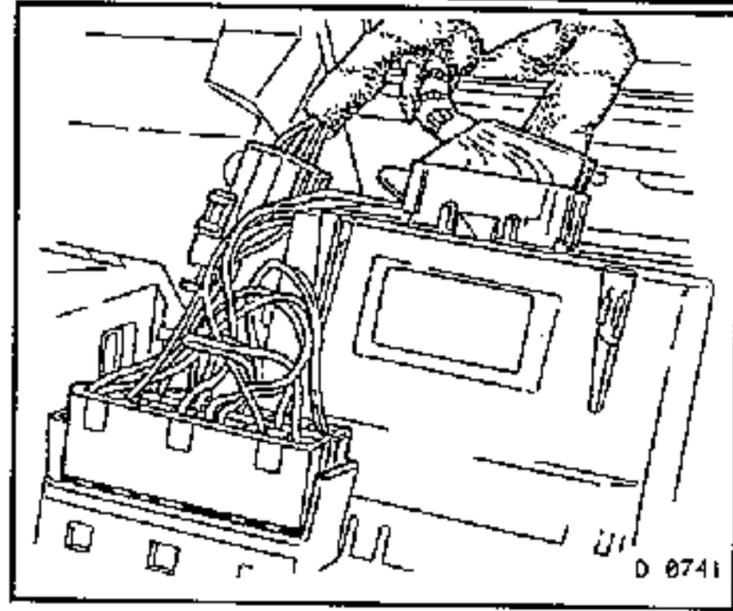
Bowden cable (arrow), counter hold for mixed air flap.



SEATS, UPHOLSTERY, INNER TRIM PANELS

Remove, Disconnect

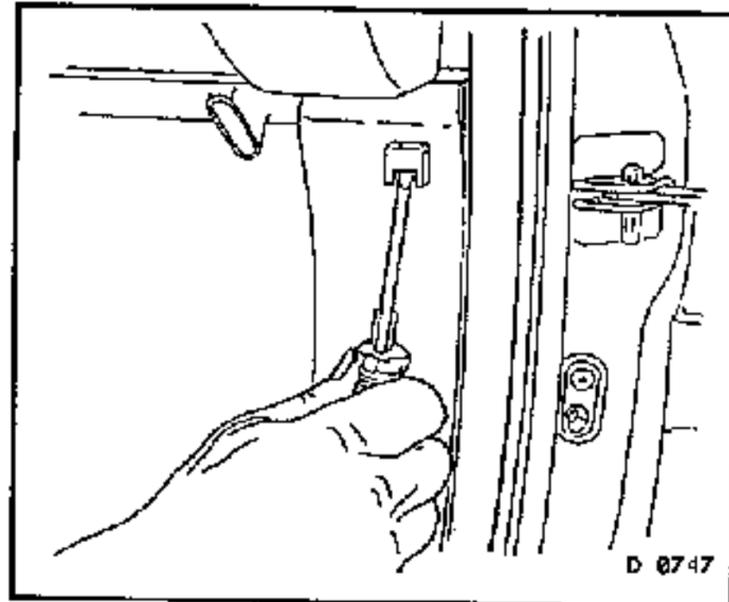
Wiring harness plug from controls, fan switch, illumination and switches for heated rear screen and front seat heating (if fitted).



Remove, Disconnect

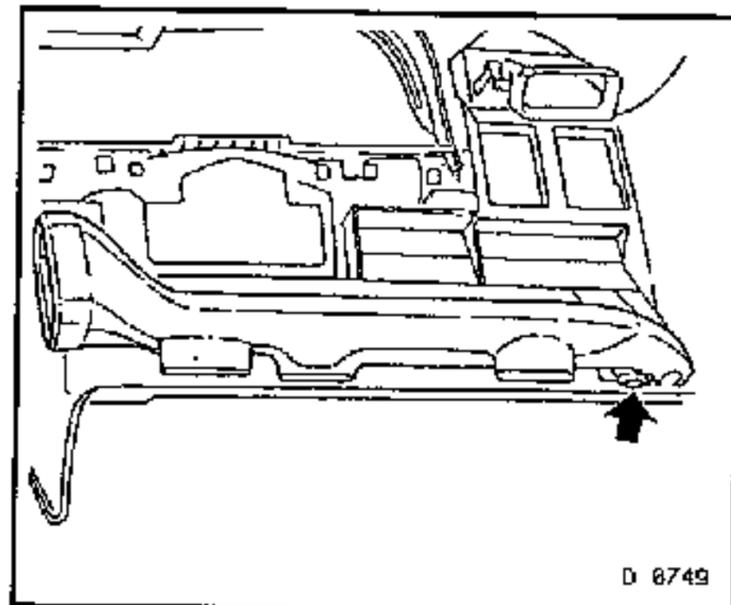
Housing for centre mixed air duct. Refer to operation in this Section.

Footwell side panelling from both sides. Prise the retaining plug out, using a screwdriver.



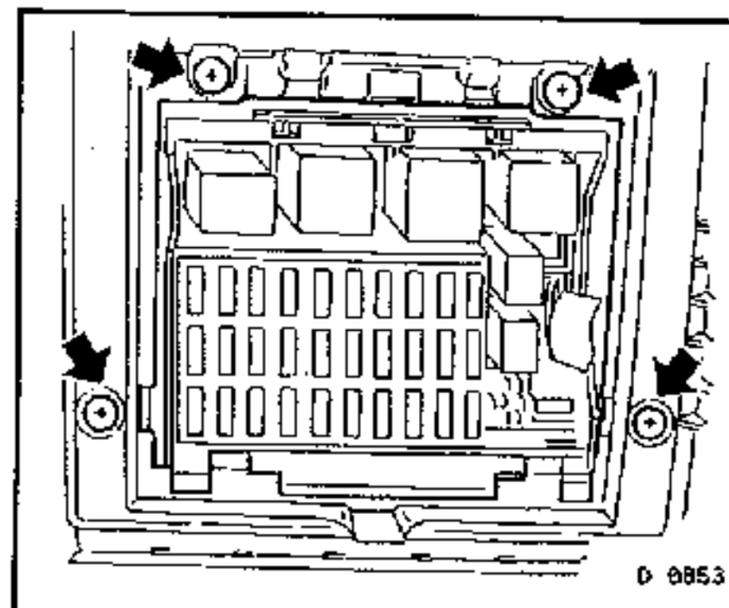
Remove, Disconnect

Air distribution channel for footwell. Illustration shows the RH channel.



Remove, Disconnect

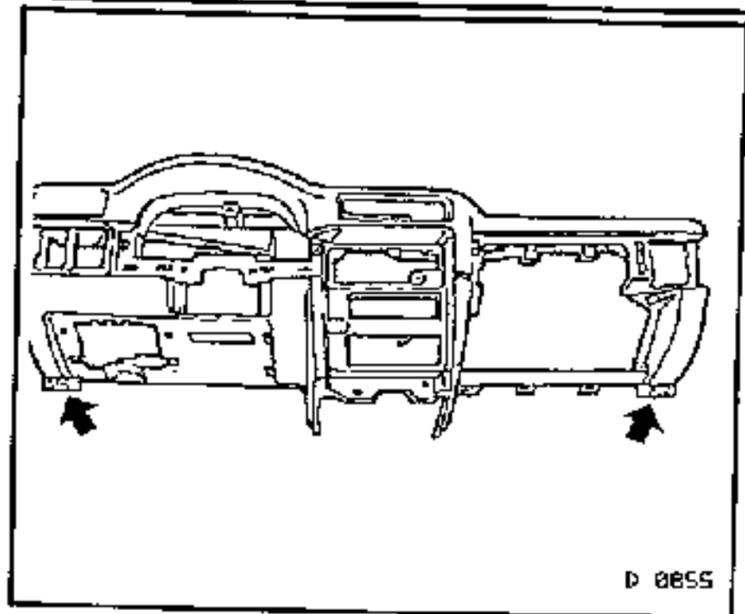
Fuse box cover. Press behind instrument panel padding.



SEATS, UPHOLSTERY, INNER TRIM PANELS

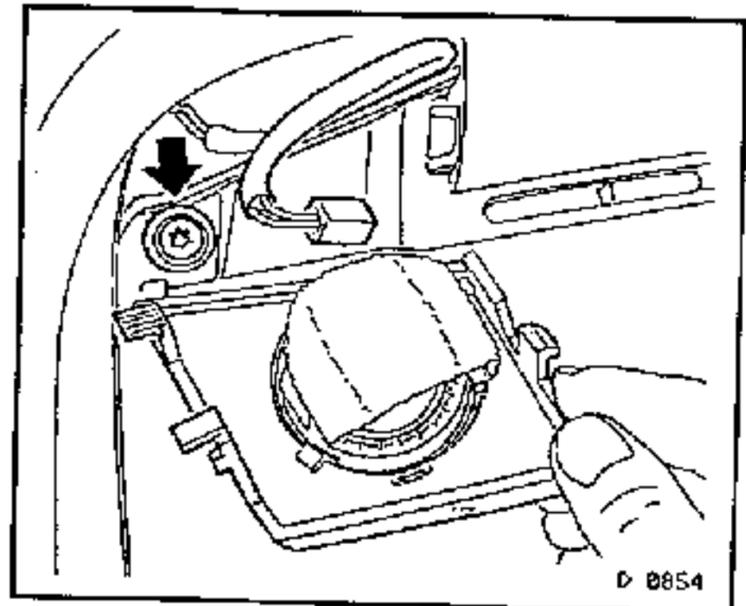
Remove, Disconnect

Wiring harness from instrument panel padding;
2 bolts - use MKM-604-9.



Remove, Disconnect

Cover with speaker from instrument panel padding;
2 bolts - use MKM-604-9.

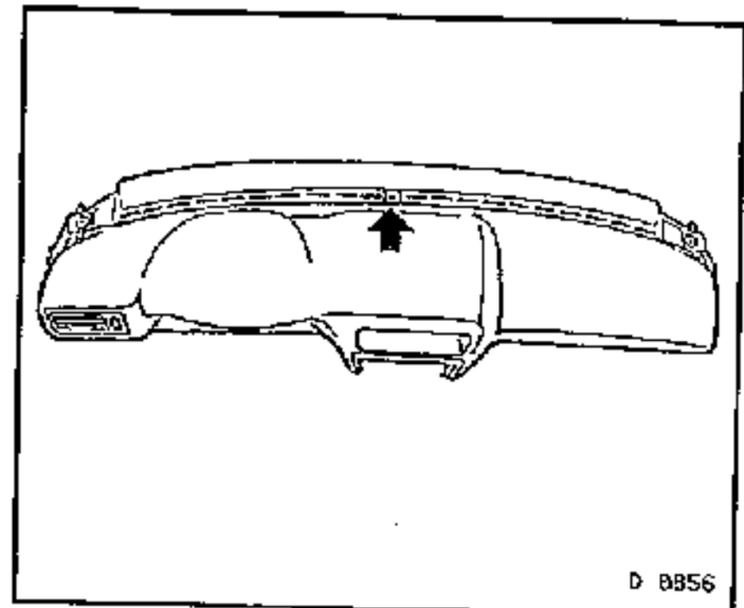


Remove, Disconnect

Unclip cover for centre bolt;
1 bolt - use MKM-604-9.
Instrument panel padding from vehicle.

Install, Connect

Instrument panel padding following the removal stages
in reverse.



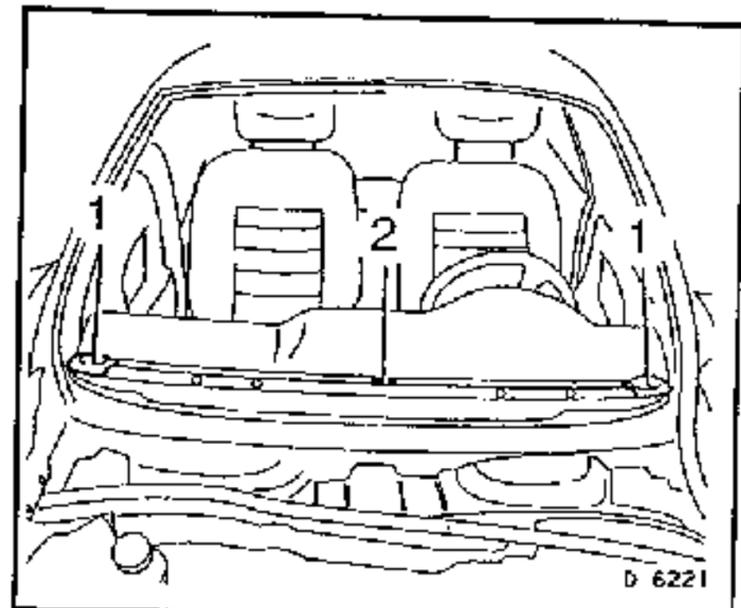
Air Duct Cover, Replace

Remove, Disconnect

Windscreen. Refer Group "Glass, Window Guides,
Window Winders", in this Section.

Speaker (1), cover (2).

Unbolt air duct cover.



SEATS, UPHOLSTERY, INNER TRIM PANELS

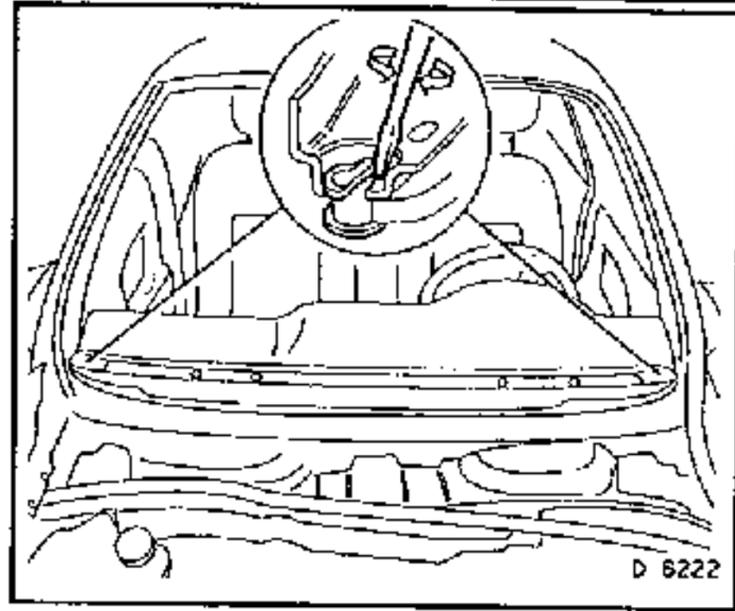
Remove, Disconnect

Bend up knurled edge of the two rivet sleeves with a screwdriver.

Rivet sleeves.

Note:

These sleeves are re-used for installation.



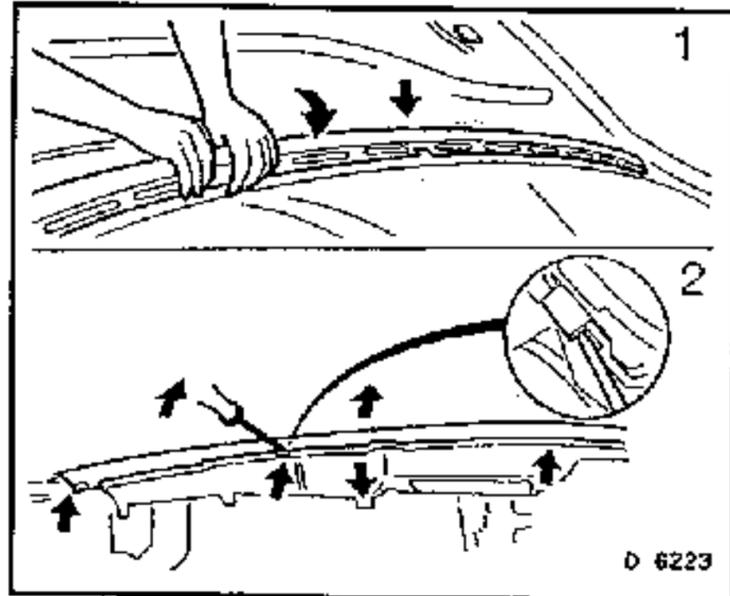
Remove, Disconnect

Loosen cover;

Pull up cover from connection seam, beginning at the sides (1).

Break off weld points at catches with a screwdriver (2).

Air duct cover.

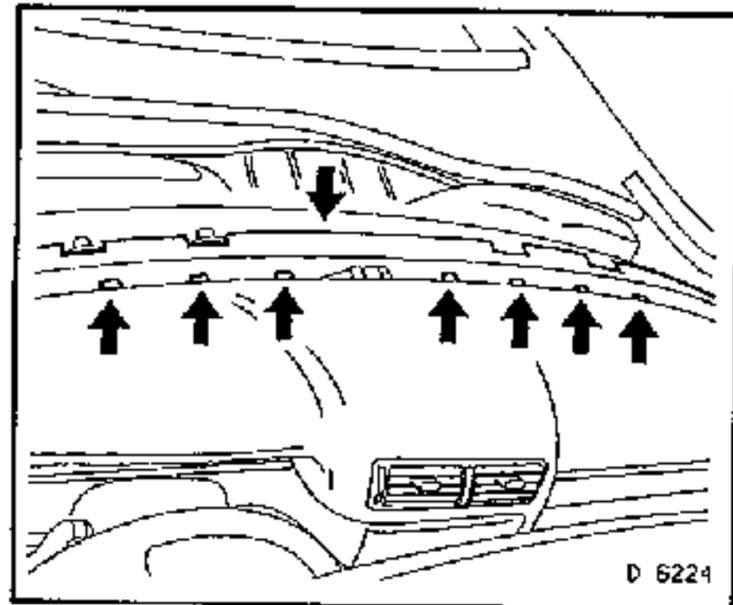


Install, Connect

Sand cement areas of new air duct cover, air duct and instrument panel padding, using paper with P180 - P240 grit.

Clean cementing surfaces.

Do not apply any primer to the cement surfaces.



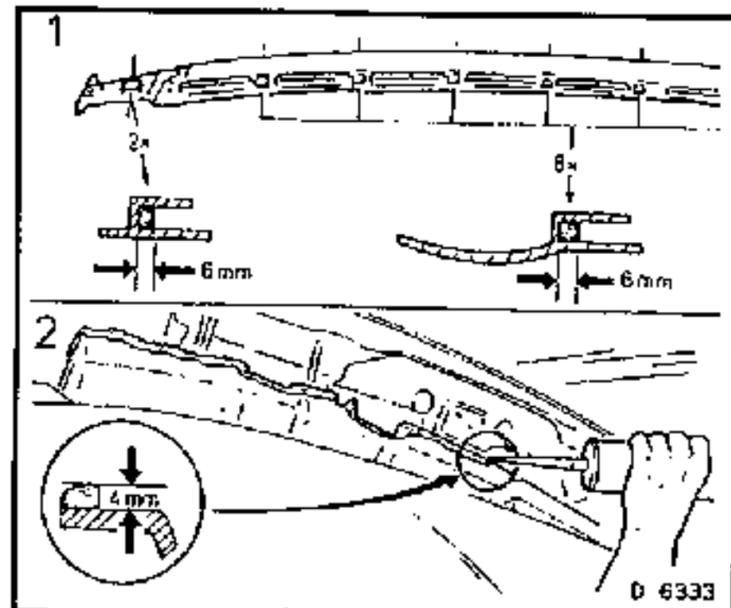
Install, Connect

Cement in cover, using 2 component glass cement;

Apply bead of cement to catches (1) and to air duct (2).

Important!

Work quickly to install both the air duct cover and the windscreen, as there is sufficient cement for both operations.



SEATS, UPHOLSTERY, INNER TRIM PANELS

Install, Connect

Hold cover at an angle and insert into the 10 catches, using an assistant.

Place cover lightly on the cement bead.

Insert rivet sleeves, bending back the sleeve edges.

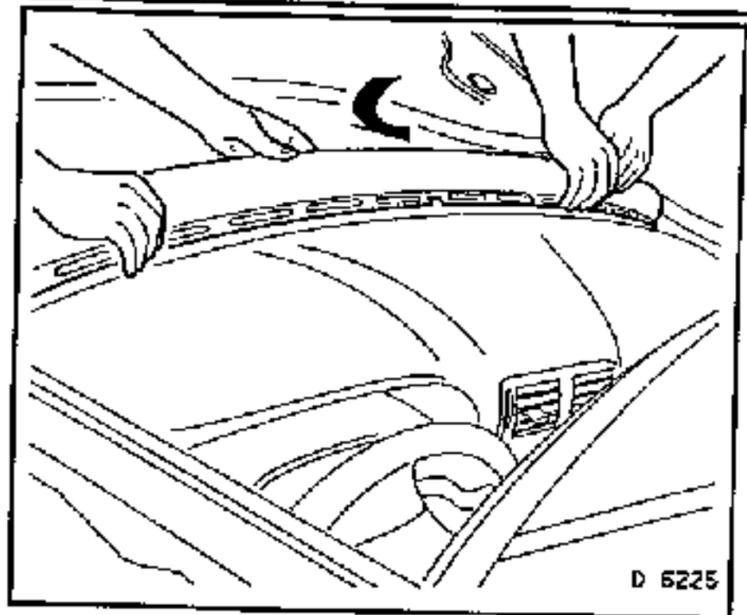
Cement in windscreen. Refer Group "Glass, Window Guides, Window Winders", in this Section.

Fasten cover.

Speaker.

Centre cover.

Bonnet.

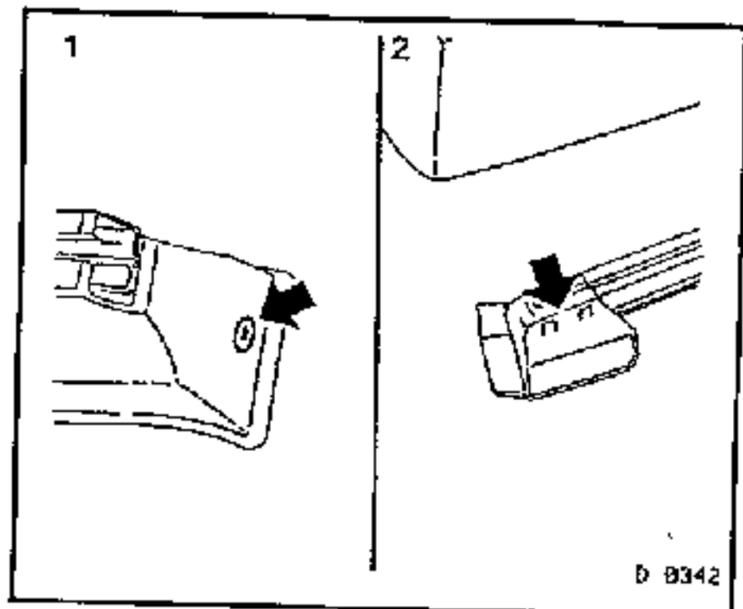


Front Seats, Remove and Install Vehicles Without Seat Belt Tensioner

Remove, Disconnect

Front outer panel - bolted (view 1).

Rear inner panel - clipped (view 2).

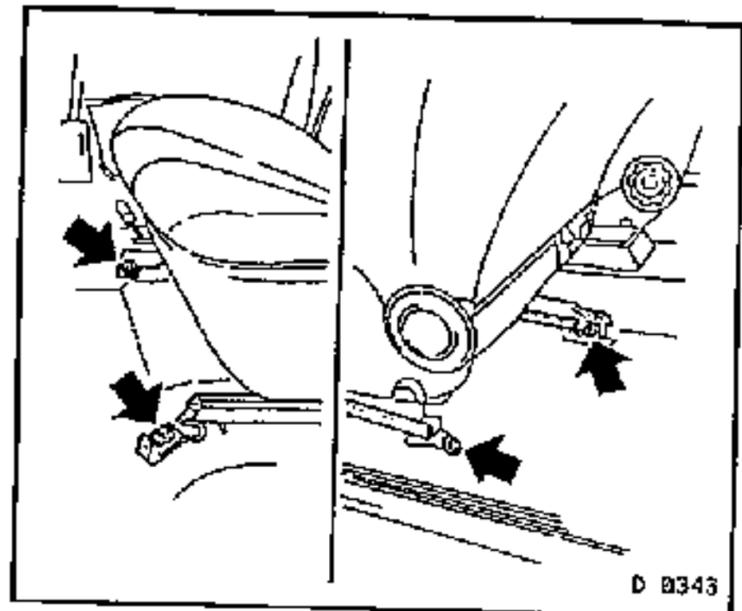


Remove, Disconnect

Bolts (2 off) from front seat rails.

Bolts (2 off) from rear seat rails.

Seat/s from vehicle.



Install, Connect

Seat/s to vehicle.

Tighten (Torque)

Bolts to underbody 20 Nm *

* Use new bolts.

Note: The sequence from 1 to 4.

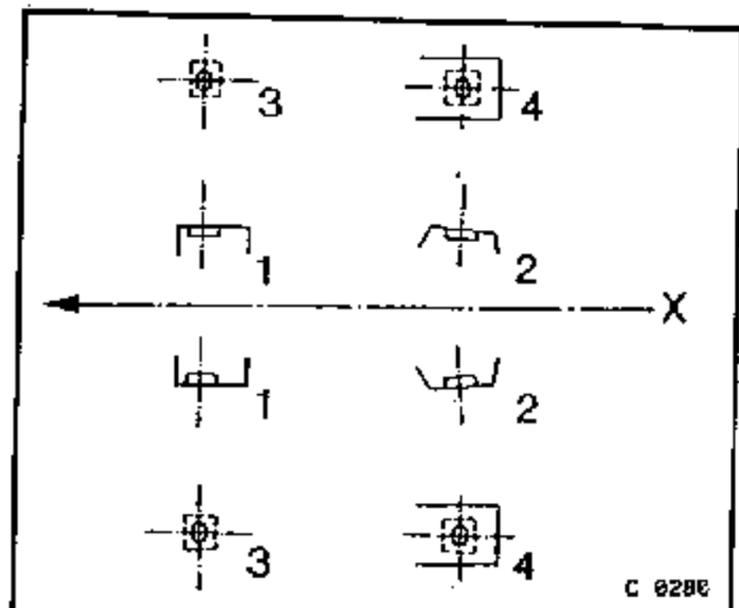
'X' is the centreline of the vehicle pointing to the front.

Install, Connect

Retaining plate for front outside panel.

Front panel.

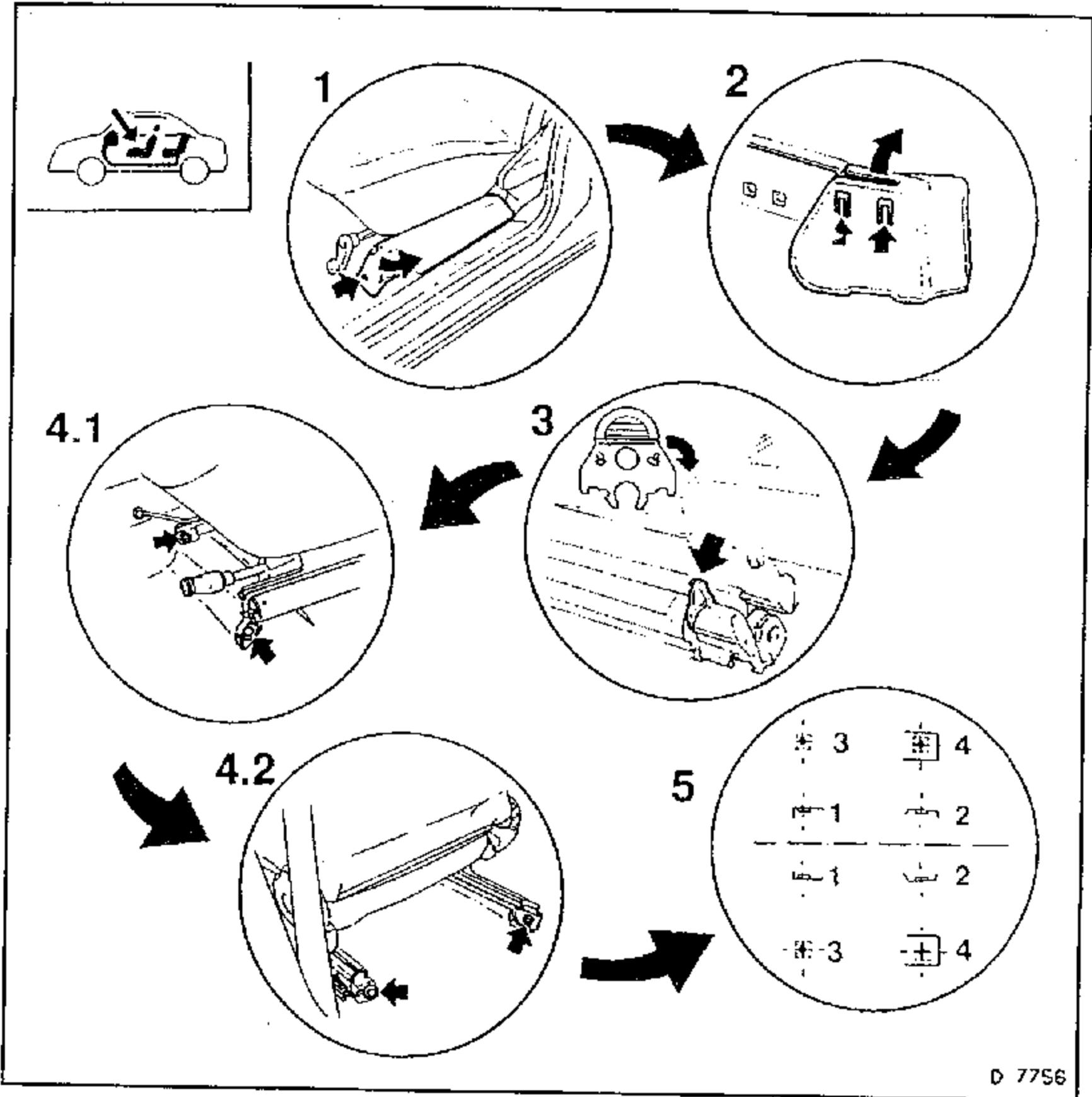
Rear panel.



SEATS, UPHOLSTERY, INNER TRIM PANELS

Front Seats, Remove and Install

Vehicles With Seat Belt Tensioner



D 7756

Remove, Disconnect

View 1: Cover, front outer;
1 bolt at front, 1 retaining lug at rear, then remove backwards.

View 2: Cover, rear inner - 2 retaining lugs.

Important!

View 3: Before removing seat, always insert securing fork, attached to the energy store, into the special aperture on seat belt tensioner.

View 4: Remove front seat.
View 4.1: 2 bolts at the front.
View 4.2: 2 bolts at the rear.

Install, Connect

Front seat.

Tighten (Torque)

Bolts to underbody 20 Nm *

* Use new bolts.

View 5: Note the sequence from 1 to 4. For a more clear view, see illustration C 0280 on the previous page.

'X' is the centreline of the vehicle pointing to the front.

Remove, Disconnect

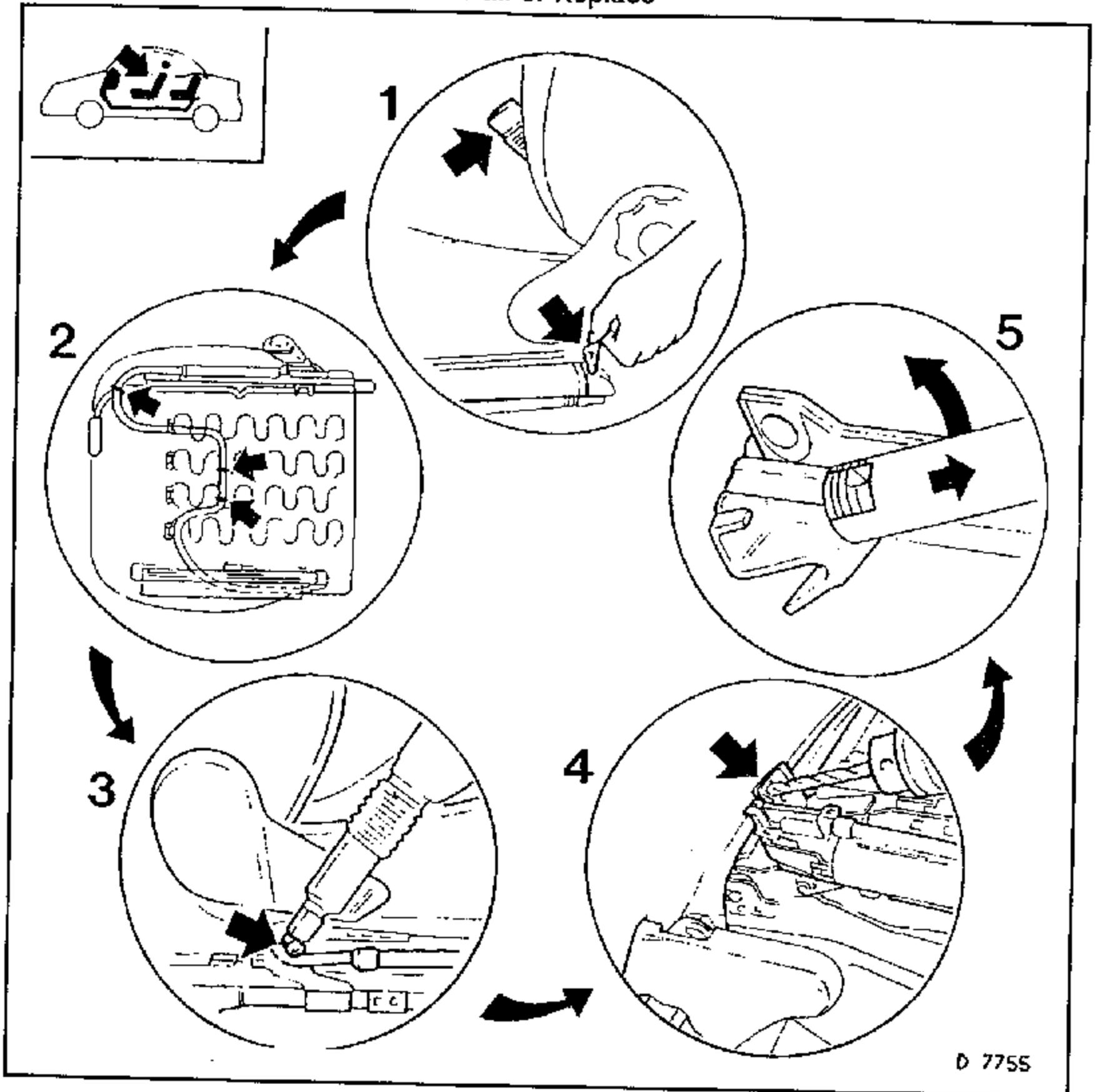
Securing fork.

Install, Connect

Front and rear covers.

SEATS, UPHOLSTERY, INNER TRIM PANELS

Seat Belt Tensioner, Remove and Install or Replace



Remove, Disconnect

View 1: If seat belt tensioner has not been triggered (no yellow trigger display visible at the lock), firmly insert the securing fork attached to the energy store, at right angles onto the guide tube of the Bowden cable with the covering cap removed (also see illustration D 9984).

Important!

The securing fork must be fully installed onto the tube. Otherwise the energy store device can easily be activated.

Remove, Disconnect

Front seat. Refer previous operation in this Section.

View 2: Unclip Bowden cable.

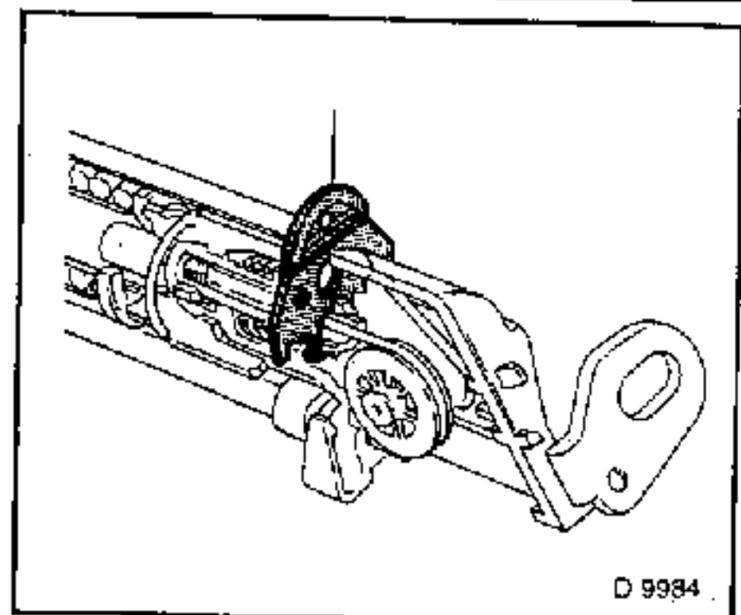
View 3: Unbolt energy lock.

View 4: Drill off energy store fastening rivet.

View 5: Remove energy store from the retainer.

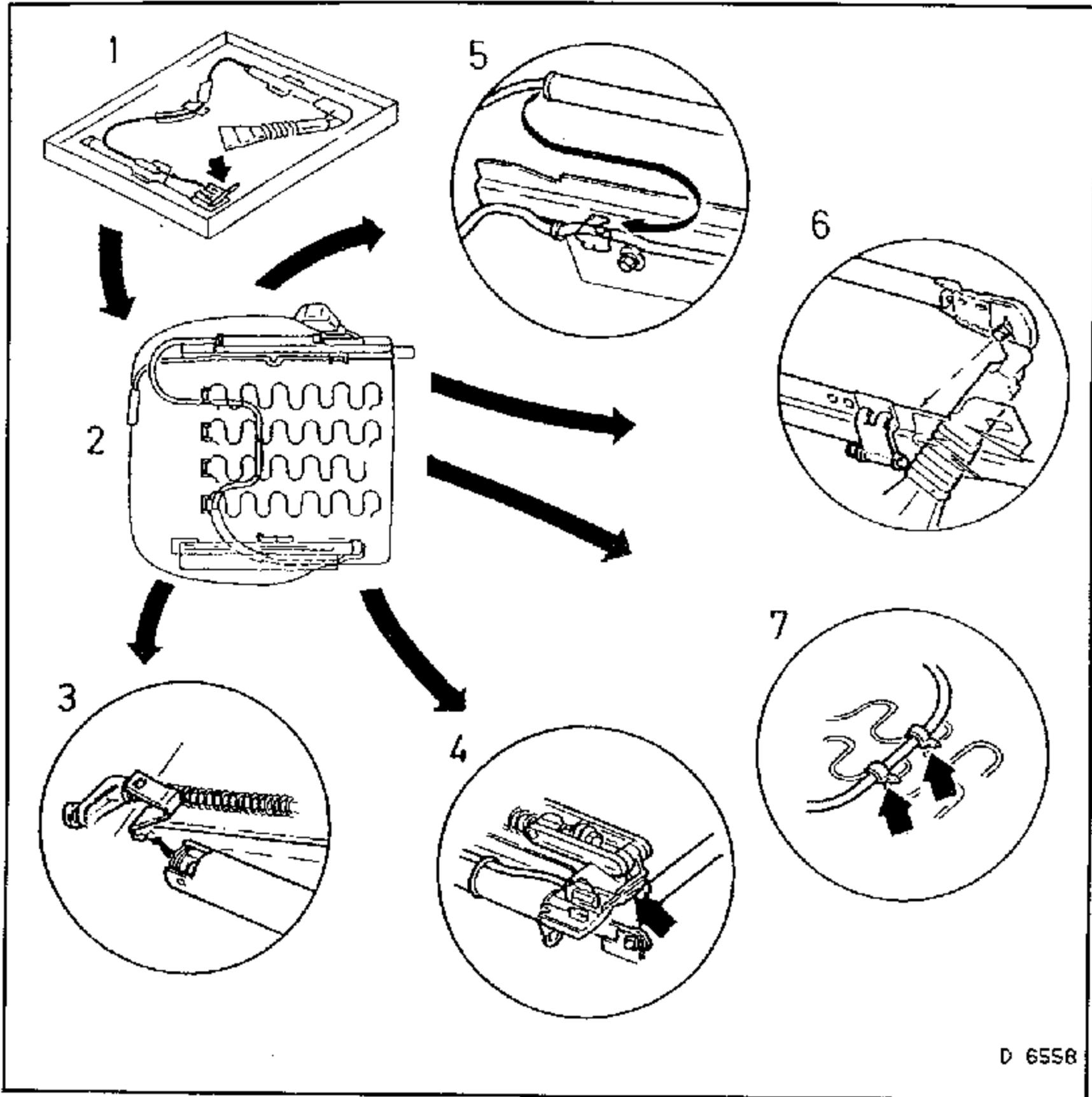
Important!

Protect the seat belt tensioner from vibration and do not attempt to dismantle the unit any further.



SEATS, UPHOLSTERY, INNER TRIM PANELS

Seat Belt Tensioner, Remove and Install or Replace (Continued)



Install, Connect

View 1: Check that securing fork is correctly installed (arrow). Remove seat belt tensioner from packaging.

View 2: Shows the installation position on the seat.

View 3: Attach the energy store in retainer.

View 4: Bolt the energy store fastening shackle.

View 5: Slide the sleeve into the retaining shackle.

View 6: Bolt the lock to the seat.

Tighten (Torque)

Seat belt tensioner to front seat..... 35 Nm

View 7: Fasten Bowden cable to seat springs and seat adjuster lever at the points indicated, using cable fasteners.

Install, Connect

Front seat.

Remove securing fork and store on the end of the energy store.

SEATS, UPHOLSTERY, INNER TRIM PANELS

Seat Belt Tensioner - Triggering Procedure

Remove, Disconnect

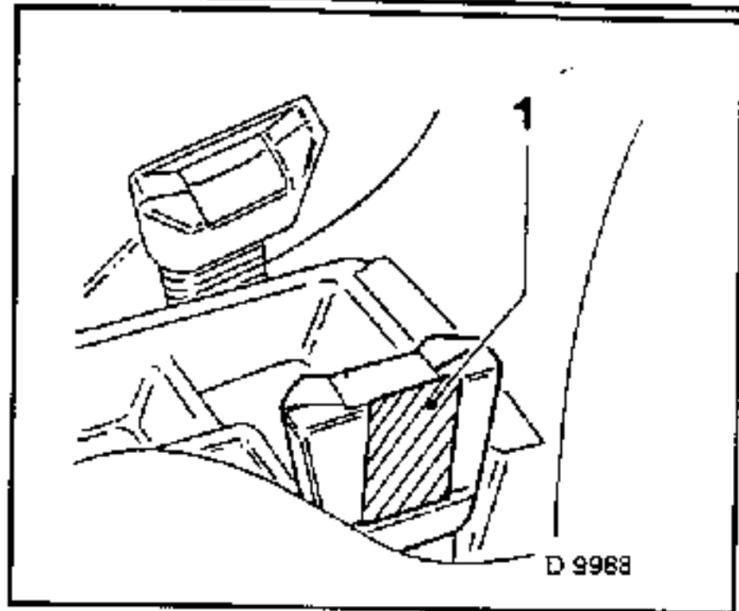
The securing fork from the energy store.

Covering cap.

Trigger

Strike the end of the Bowden cable guide tube with a sharp hammer blow.

Successful triggering is indicated by the appearance of a yellow tab (1) on the seat belt catch.



Upholstery - Front Seat, Replace

Remove, Disconnect

Front seat. Refer operation in this Section.

If fitted, secure seat belt tensioner with securing fork.

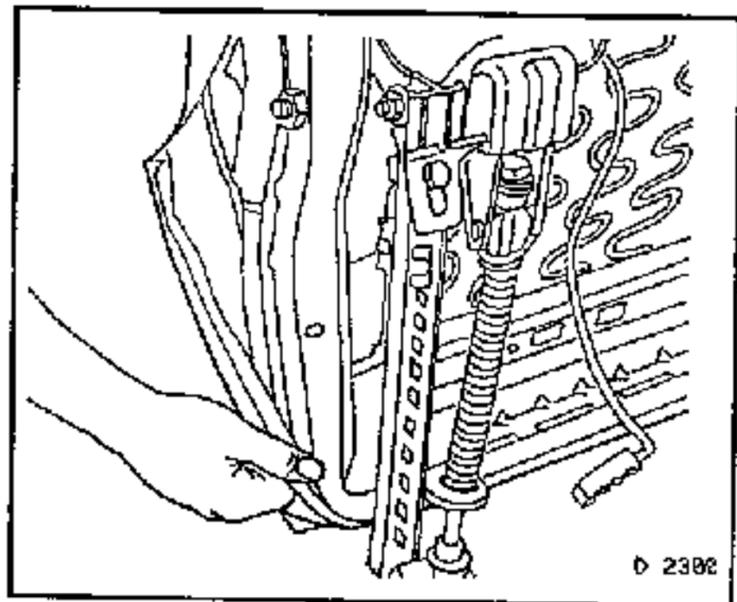
Front seat backrest.

Wiring harness plug for seat heating, if fitted.

Undo upholstery from below the seat.

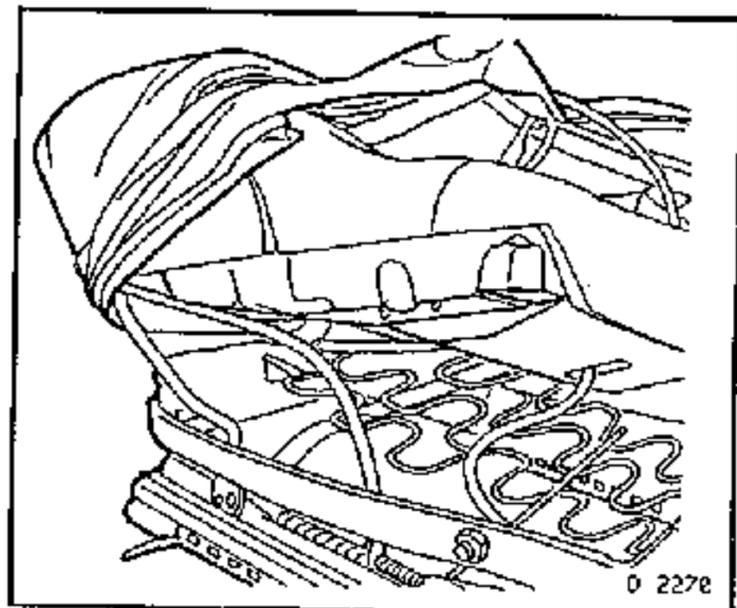
Important!

For vehicles with seat belt tensioners, protect the removed seat from vibration.



Remove, Disconnect

Upholstery with cushion from seat frame.



Remove, Disconnect

Seat surface ring clips.

Upholstery from the cushion.

Install, Connect

Upholstery on cushion. Secure cushion with ring clips underneath.

Front seat back rest to front seat.

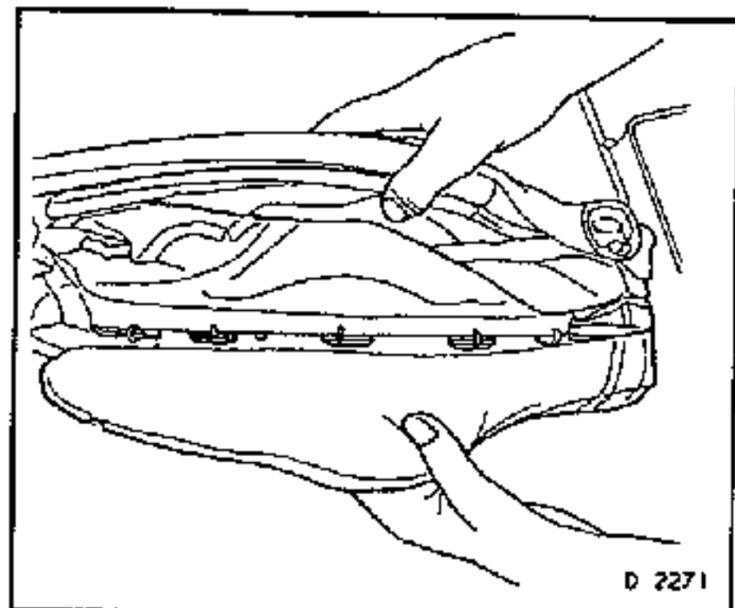
Connect wiring harness plug to seat heating (if fitted).

Front seat.

Remove seat belt tensioner securing fork if fitted.

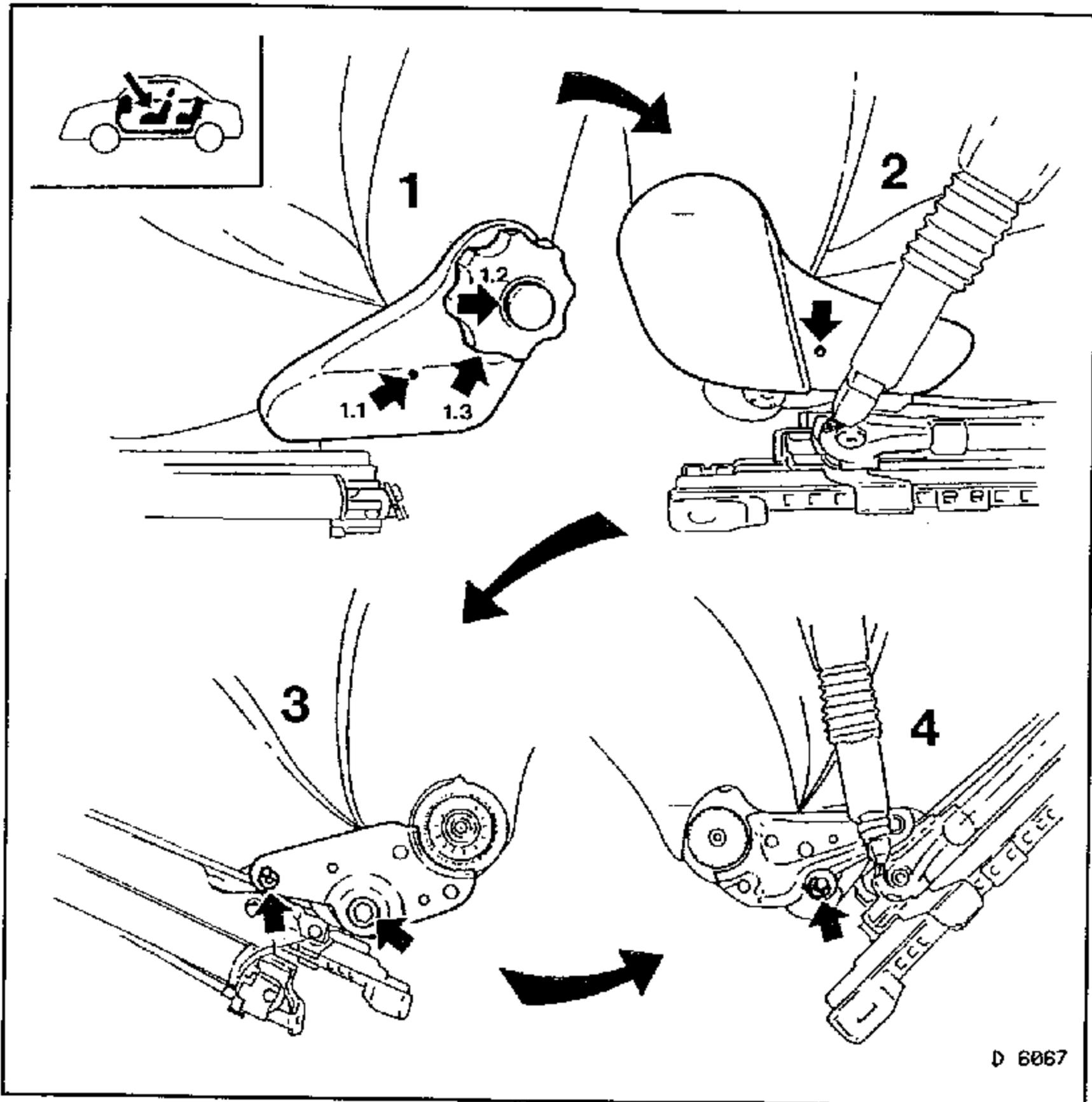
Important!

Ensure all cables are routed correctly.



SEATS, UPHOLSTERY, INNER TRIM PANELS

Front Seat Backrest, Remove and Install



Note: Illustration D 6067 shows a seat fitted with a seat belt tensioner but the procedure is the same for all seats.

Remove, Disconnect

Front seat. Refer to operation in this Section. If fitted with seat belt tensioners install securing fork.

View 1: Outer cover;
View 1.1 Pin, body bound rivet.
View 1.2: Lever off plug.
View 1.3: Remove hand wheel.

View 2: Inner cover;
Pin, body bound rivet.

View 3: Outside;
Bolt, retainer.

View 4: Inside;
Retainer

Front seat backrest.

Install, Connect

Front seat backrest.

Inner and outer covers

Front seat. If fitted, remove securing fork and clip onto the end of the energy store.

Important!

For vehicle fitted with seat belt tensioners, protect the seat from vibration at all times.

SEATS, UPHOLSTERY, INNER TRIM PANELS

Upholstery - Front Seat Backrest, Replace

Remove, Disconnect

Front seat. Refer operation in this Section. If fitted with seat belt tensioners insert securing fork.

Front set backrest, disconnecting wiring harness plug to seat heating if fitted.

Headrests.

Detach upholstery from underneath;
Ring clips, sleeves for headrests, upholstery.

Important!

If fitted with seat belt tensioners, protect seat from vibration.

Install, Connect

Upholstery;

Ring clips, hook into upholstery from underneath.

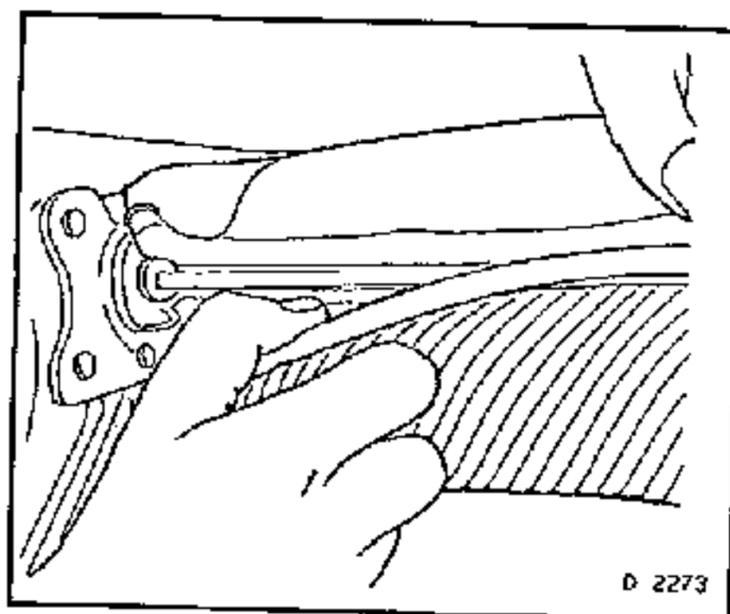
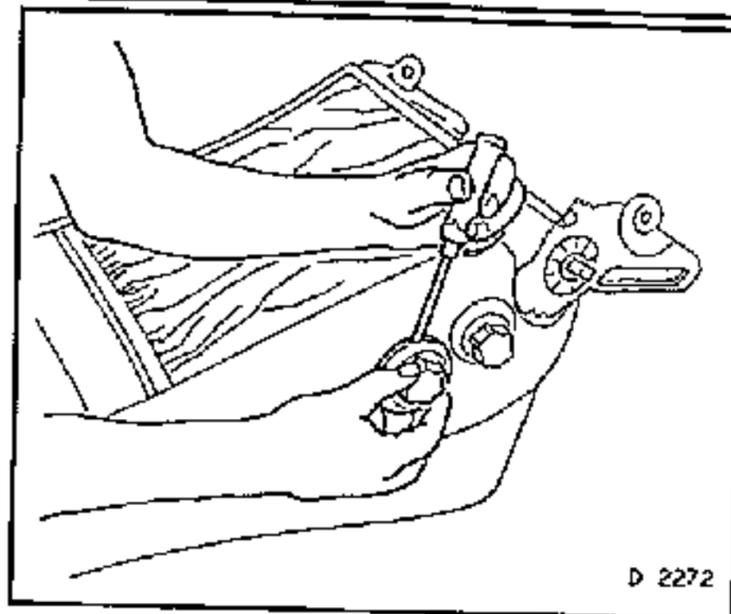
Sleeves for headrests.

Front seat backrest to front seat.

Wiring harness plug to seat heating if fitted.

Front seat. If fitted, remove securing fork and clip onto the end of the energy store.

Headrests.



Headrest Sleeve, Remove and Install

Remove, Disconnect

Headrest.

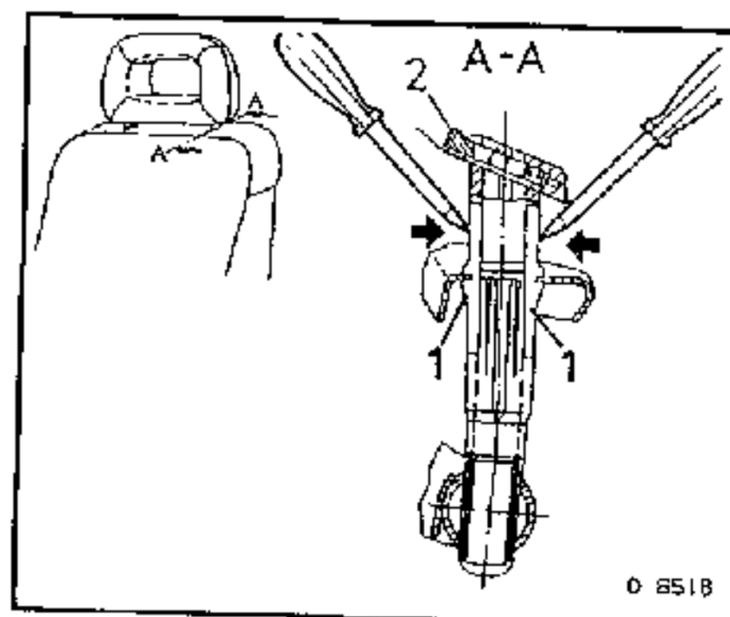
Sleeve from front headrest;

Release locking nubs (1), using two thin screwdrivers.

Lever out the sleeve, taking care not to damage the upholstery.

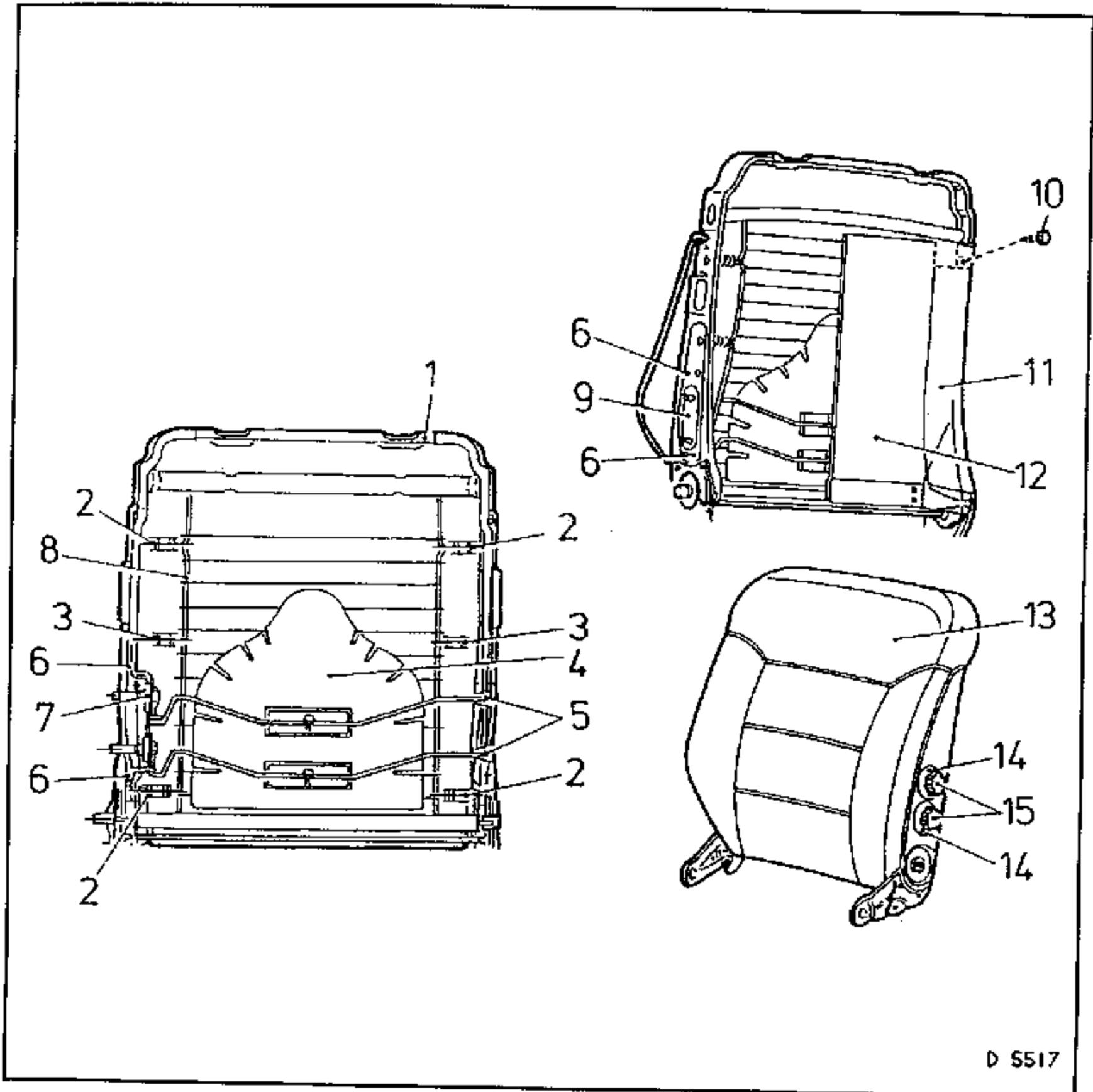
Install, Connect

Reverse to removal, except that the press button (2), faces forward.



SEATS, UPHOLSTERY, INNER TRIM PANELS

Lumber Support - Overview



D 5517

Illustration Key:

- | | | | |
|---|------------------------------------|-----|---------------------------------|
| 1 | Frame | 9. | Damping |
| 2 | Tension Spring (71 mm) | 10. | Bolt |
| 3 | Tension Spring (69 mm) | 11. | Wadding Liner (120 mm x 420 mm) |
| 4 | Pressure Plate | 12. | Cover |
| 5 | Bushing | 13. | Upholstery |
| 6 | Steel blind rivet (4.8 mm x 10 mm) | 14. | Cover Panel |
| 7 | Adjuster | 15. | Rotary Knob |
| 8 | Wire Mat | | |

SEATS, UPHOLSTERY, INNER TRIM PANELS

Lumbar Support, Replace Completely

Front Seat Backrest Frame, Replace

Remove, Disconnect

Front seat. Refer operation in this Section. If fitted with seat belt tensioners insert securing fork.

Front sea backrest, disconnecting wiring harness plug to seat heating if fitted.

Headrests, headrest sleeves.

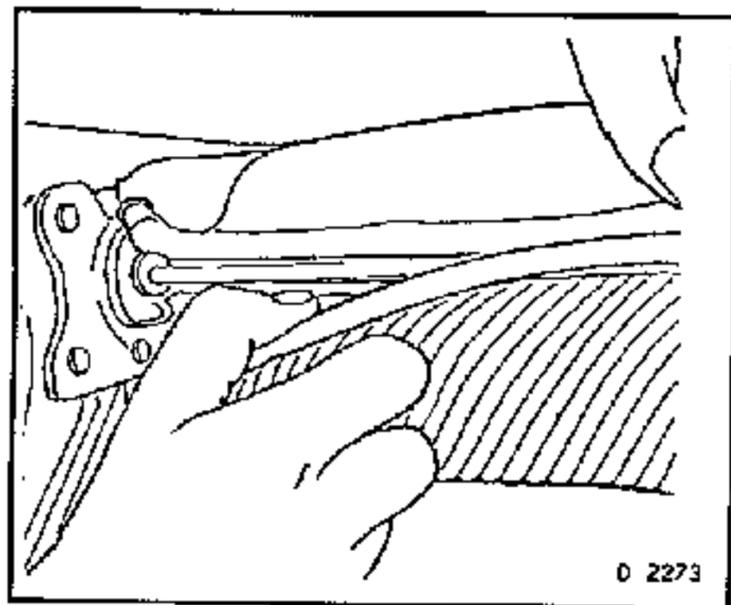
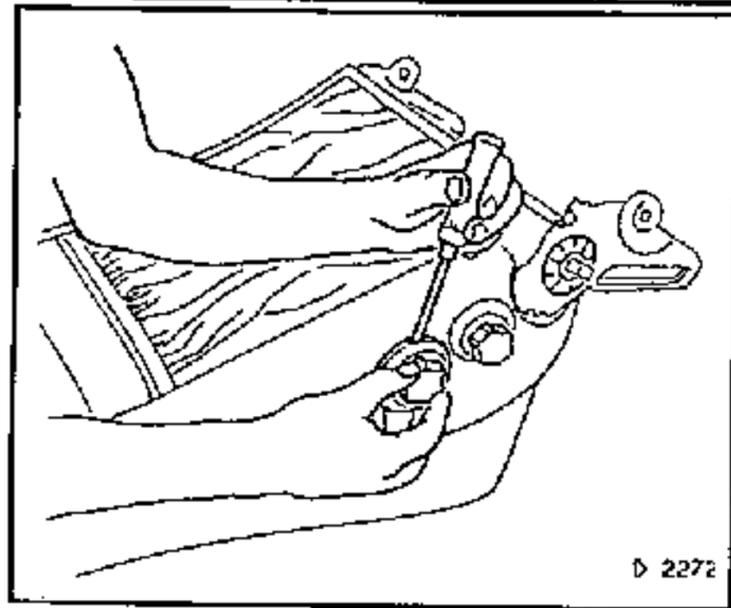
Rotary knob.

Important!

If fitted with seat belt tensioners, protect seat from vibration.

Remove, Disconnect

Front seat upholstery. Refer to the operation in this Section.



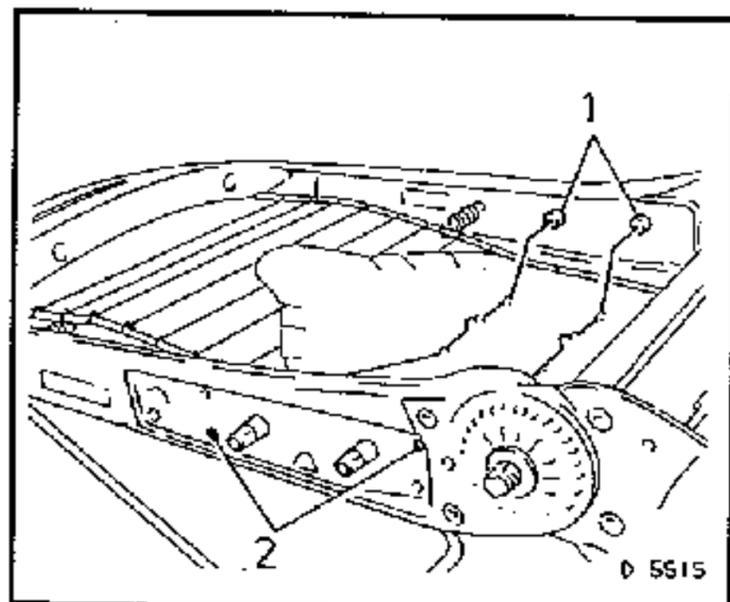
Remove, Disconnect

Cover from frame, damping.

Release bushings (1).

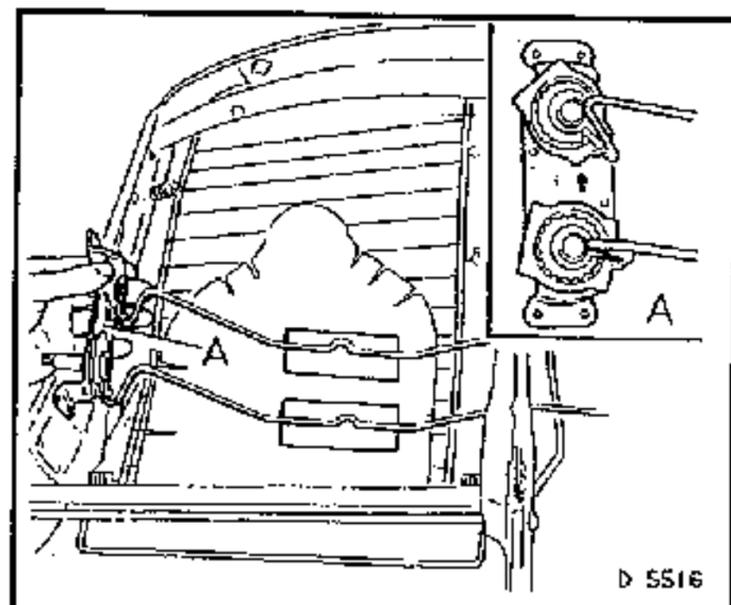
Drill off adjuster from frame (2). Do not damage frame during this process.

Pressure plate.



Install, Connect

Pressure plate adjuster, observing the mark shown in inset (A).



SEATS, UPHOLSTERY, INNER TRIM PANELS

Install, Connect

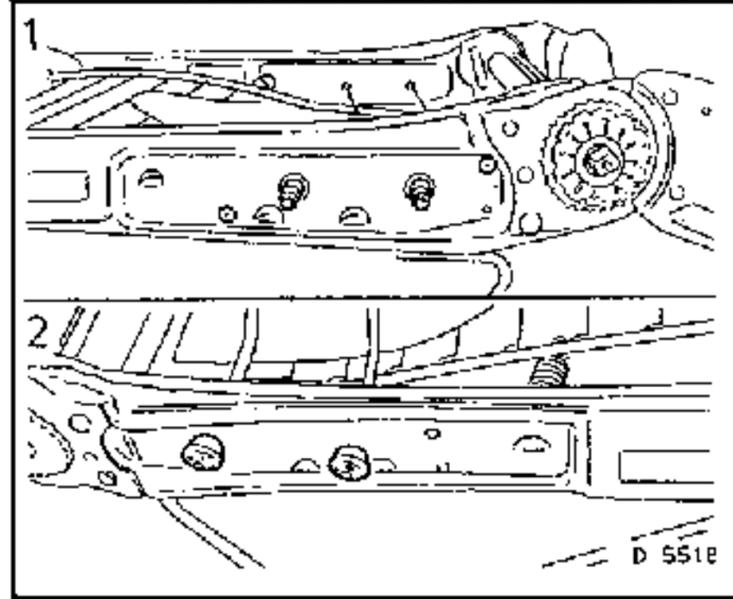
Rivet adjuster diagonally (1), using blind steel rivets, 4.8 mm x 10 mm.

Bushing (2).

Cement on damping cover.

Inspect

Lumbar support function.



Install, Connect

Front seat backrest upholstery.

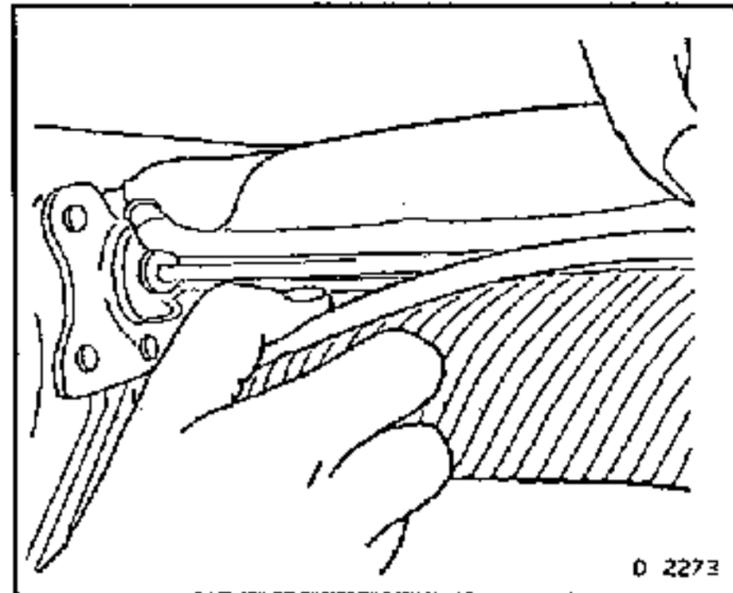
Rotary knob.

Headrest sleeves.

Front seat backrest.

Front seat. If fitted with seat belt tensioners, remove securing fork and clip onto the end of the energy store.

Headrest.



Upholstery - Rear Seat Cushion, Replace

Remove, Disconnect

Rear seat cushion. Refer to operation in this Section.

Ring clips around edges.

Ring clips for seat surface.

Upholstery.

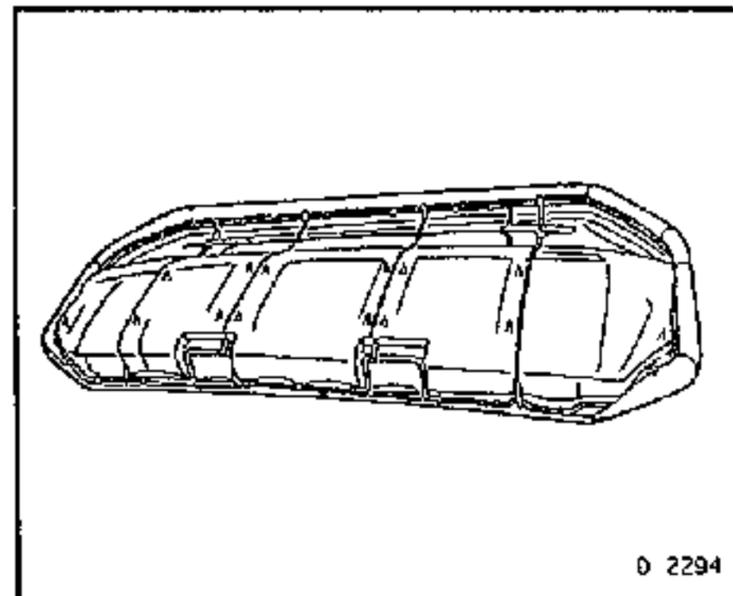
Install, Connect

Upholstery.

Ring clips for seat surface.

Ring clips around edges.

Rear seat cushion.

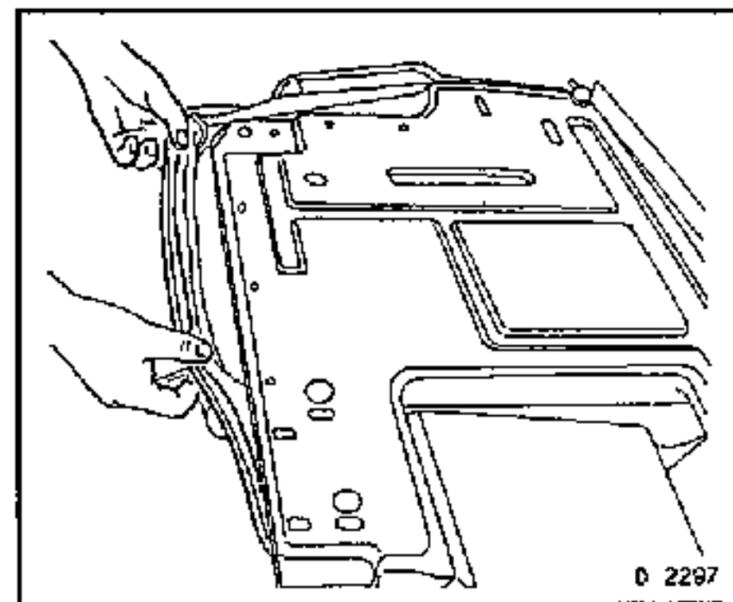


Upholstery - Rear Seat Backrest, Replace

Remove, Disconnect

Rear seat backrests. Refer operation in this Section.

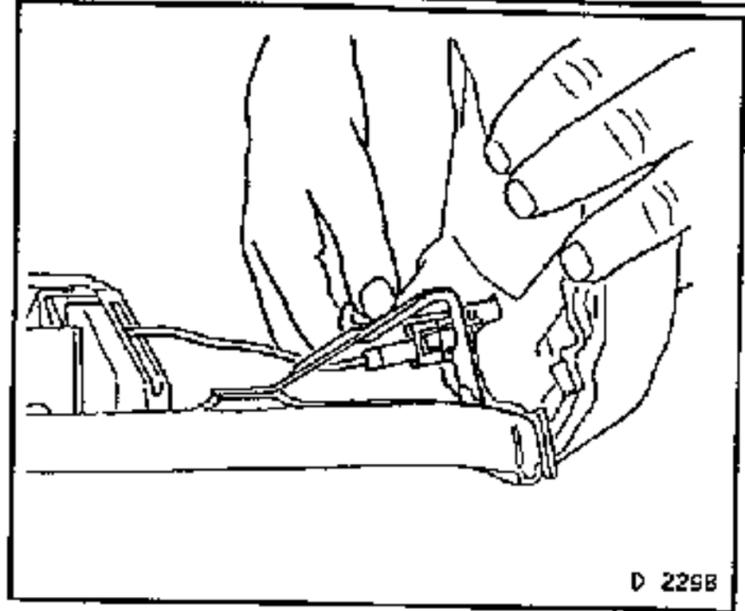
Upholstery from below the seat backrest.



SEATS, UPHOLSTERY, INNER TRIM PANELS

Remove, Disconnect

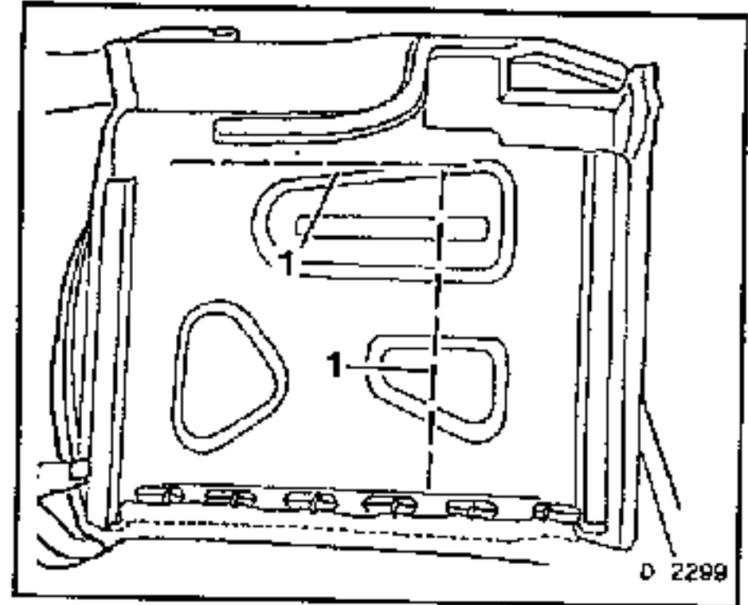
Fold up upholstery with the cushion and unclip the release button.



Remove, Disconnect

Ring clips (1).

Upholstery from cushion.



Install, Connect

Upholstery on cushion.

Upholstery and cushion on the frame.

Clip in release button.

Fasten upholstery, using ring clips to secure.

Rear seat backrests.

Wooden Strip - Door Inner Trim Panel, Replace

Remove, Disconnect

Door trim inner panelling. Refer to the operation in this Section.

4 spring clamps (arrows) from the rear of the door trim inner panel, securing the wooden strip.

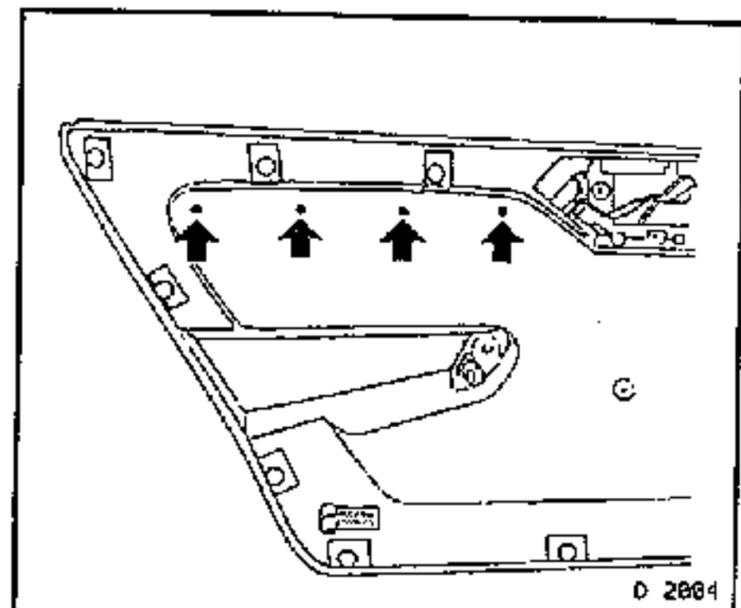
Wooden strip.

Install, Connect

Wooden strip.

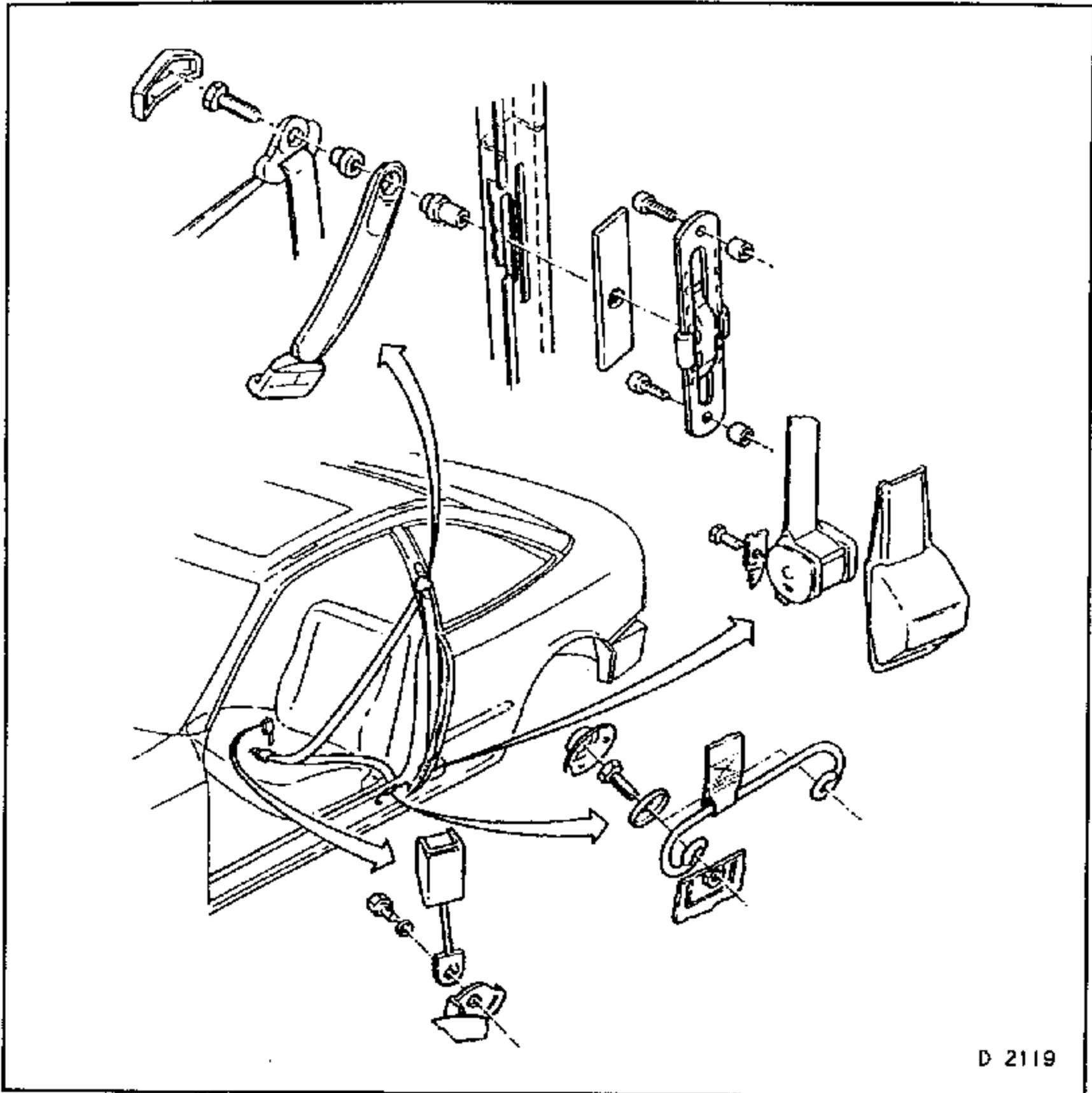
Spring clamps.

Door trim inner panelling.



SEATS, UPHOLSTERY, INNER TRIM PANELS

Front Seat Belt, Replace



Remove, Disconnect

Rear seat cushion, inner trim panelling on side quarter panel.
 Belt anchor on 'B' pillar.
 Inner trim panelling on 'B' pillar.
 Vehicles without seat belt tensioner;
 Seat, belt catch.
 Vehicles with seat belt tensioners;
 Front seat. Refer operation in this Section.
 Seat belt tensioner. Refer operation in this Section.
 Height adjuster.
 Reel retractor.
 Sliding bar.

Install, Connect

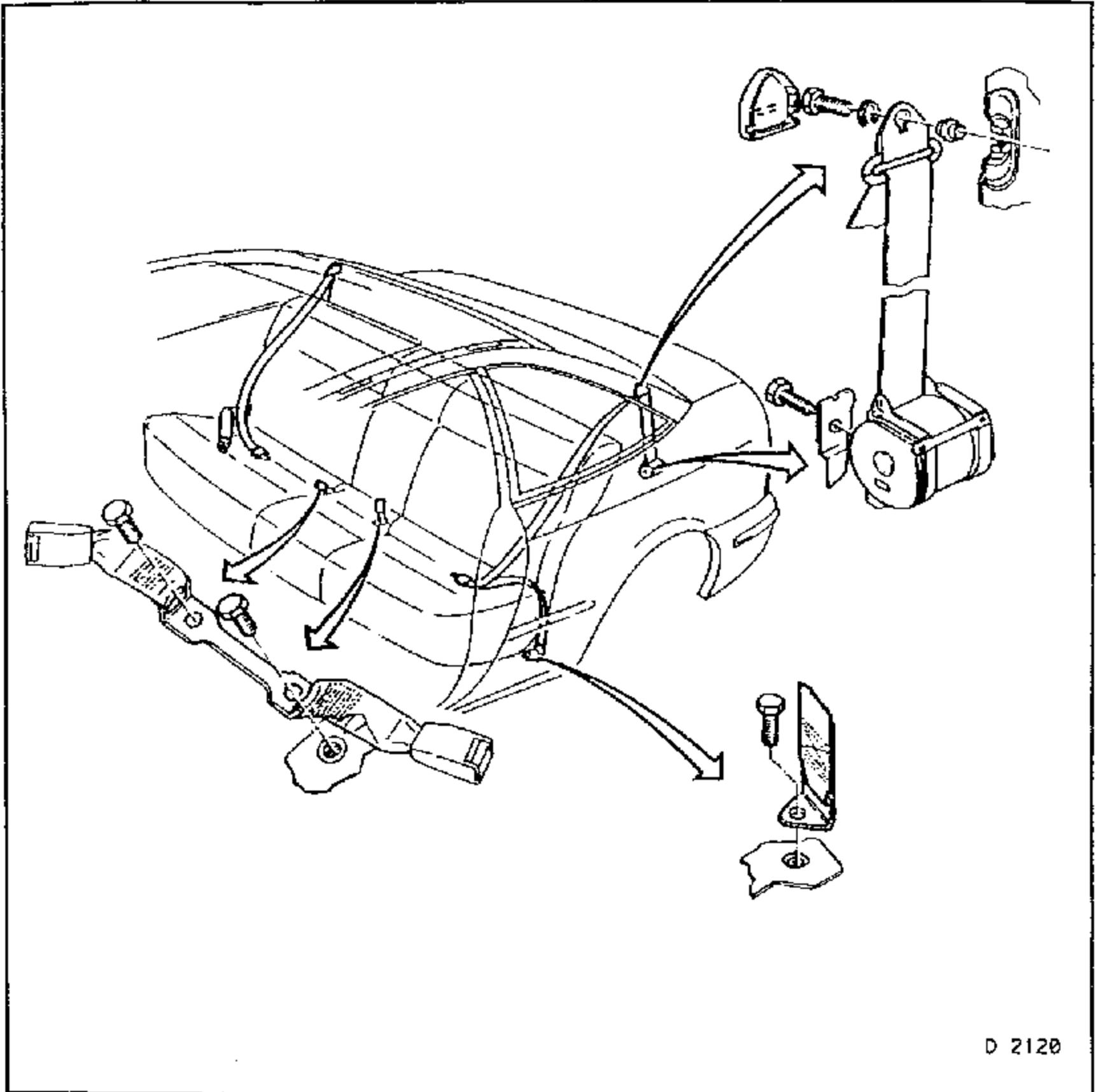
Sliding bar.
 Reel retractor.
 Height adjuster.
 Belt lock/seat belt adjuster.
 Seat.
 Inner trim panelling on 'B' pillar.
 Inner trim panelling on side quarter panel.
 Rear seat cushion.

Tighten (Torque)

Height adjuster to 'B' pillar	20 Nm
Reel retractor to 'B' pillar frame	35 Nm
Sliding bar to sill	35 Nm
Belt lock/seat belt tensioner to seat ..	35 Nm
Belt anchor to 'B' pillar	35 Nm
Seat to underbody	20 Nm

SEATS, UPHOLSTERY, INNER TRIM PANELS

Rear Seat Belt, Replace



Remove, Disconnect

Rear seat cushion.

Belt lock.

Belt anchor from floor and 'C' pillar.

Reel retractor.

Note:

The reel retractor is accessible from the storage box in the luggage compartment.

Install, Connect

Reel retractor.

Guide belt and guide through aperture of 'C' pillar inner panelling.

Belt anchor to floor assembly and 'C' pillar.

Belt lock.

Rear seat cushion.

Tighten (Torque)

Belt anchor to floor assembly and 'C' pillar	35 Nm
Reel retractor to 'C' pillar frame	35 Nm

GROUP K

CLUTCH AND TRANSMISSION

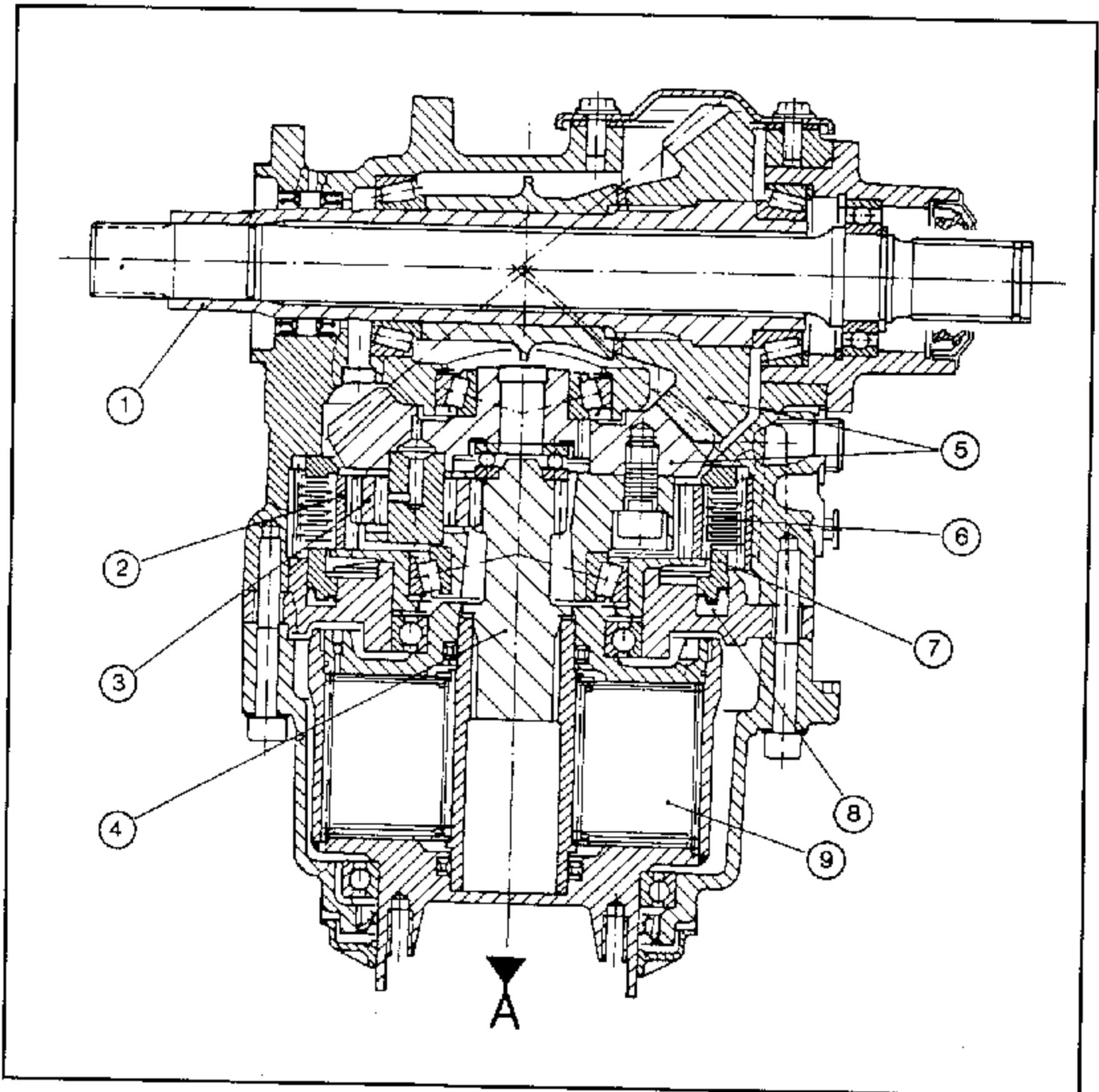
TRANSFER BOX

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TRANSFER BOX

TRANSFER BOX



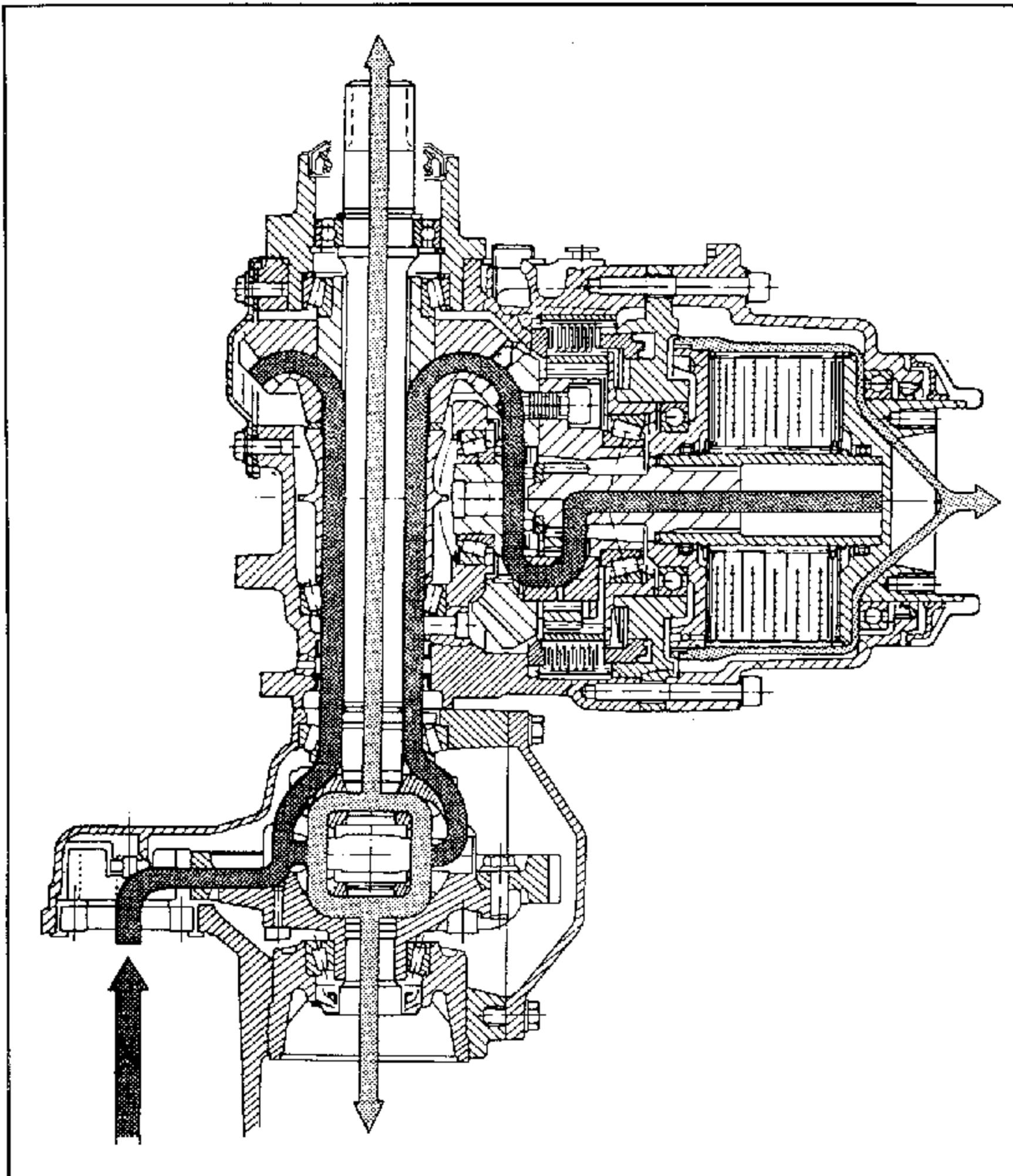
Sectioned View

Illustration Key:

- | | |
|--------------------------|---------------------|
| 1 Drive via Hollow Shaft | 6 Multi-Disc Clutch |
| 2 Ring Gear | 7 Hydraulic Piston |
| 3 Planetary Gear | 8 Cylinder Chamber |
| 4 Sun Gear | 9 Viscous Coupling |
| 5 Hypoid Gear | A To Rear Axle |

TRANSFER BOX

TRANSFER BOX

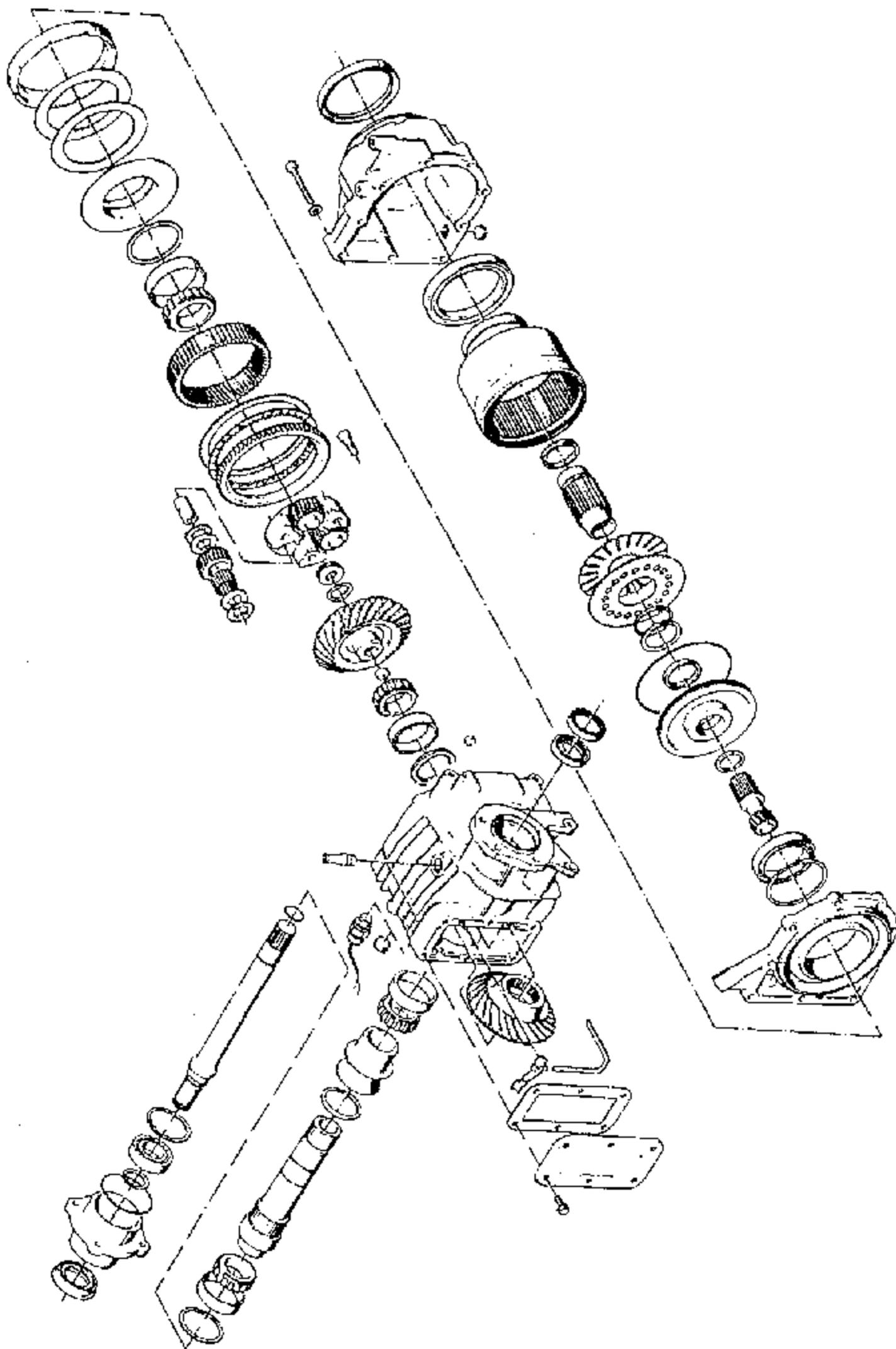


Power Flow

TRANSFER BOX

TRANSFER BOX

D 7268



Exploded View

● **General Info on 4WD:**

1. The 4WD is permanently engaged without any intervention on the part of the driver and is only switched off and on again when the brake pedal is actuated during braking operations of speeds over 25/km/h
2. If a fault develops in the 4WD system, a trouble code is registered in the control unit and the fault is indicated by the 4WD dash light, the system is immediately switched to FWD only
3. Differences in tire profile greater than 2 mm or differences in rolling circumference greater than 15 mm between the wheels of the front and rear axles, will lead to excessively high fluid temperatures. Always keep the tyres identical
4. The supply electrical voltage to 4WD control unit is interrupted if the fluid temperature exceeds 160C. should this occur, the vehicle will operate on FWD only, this operation will continue until the fluid temperature switch is replaced, the stored trouble code 33 can then be read with the use of Tech 1 or as a blink code

● **Maintenance:**

Observe the following when working on vehicle with 4WD system:

1. When electric welding remove the wiring harness plug to the ECU
2. during painting, the ECU can be exposed to temperatures in the order of 95C for very short periods or to a max of 2 hours if the temperature is 5C max
3. after working on the 4WD system, the hydraulic system must be bled
4. all connections must be checked for leaks
5. ensure the battery terminals are clean and tight
6. do not use quick charger for starting the engine
7. ensure that all wiring harness plugs are connected correctly
8. never connect or disconnect a wiring harness plug while the ignition is switched on

● **Important Service Note:**

With all 4WD Calibra vehicles, up to an ISOVIN of WOL00005R1102550, must have the pressure accumulator replaced every 6 years or 90,000 km whichever ever occurs first

From this ISOVIN, a revised design accumulator was introduced

TRANSFER BOX

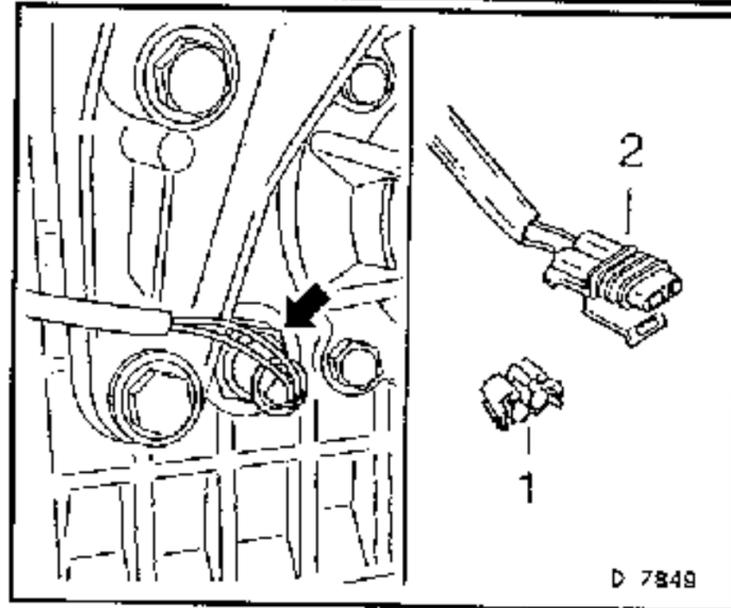
Transfer Box Fluid Level, Check

Remove, Disconnect

The wiring harness plug for the temperature switch, is located under the cowl cover. Separate the cable cover, exposing the wiring harness plug.

Wiring harness plug cover (1) from the wiring harness plug (2).

Unscrew the temperature switch, using a thin walled ring spanner.



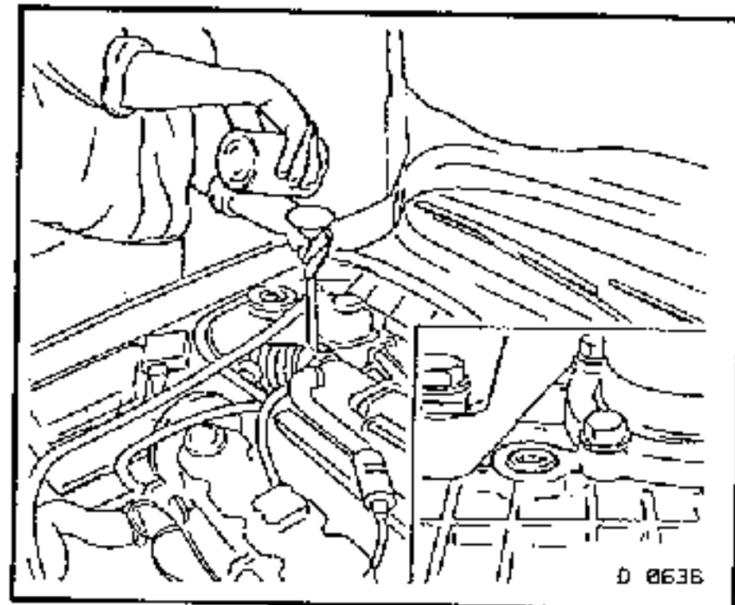
Inspect

Correct fluid level, to the lower edge of the threaded hole.

As required, top up with synthetic fluid, such as Castrol SYNTHANS 75W/80 or equivalent, to Holden's Specification HN2157.

Access is made through the bleeder hose.

Check the fluid level again after approximately 3 minutes.



Tighten (Torque)

Temperature switch..... 25 Nm *

* Use a new O-ring.

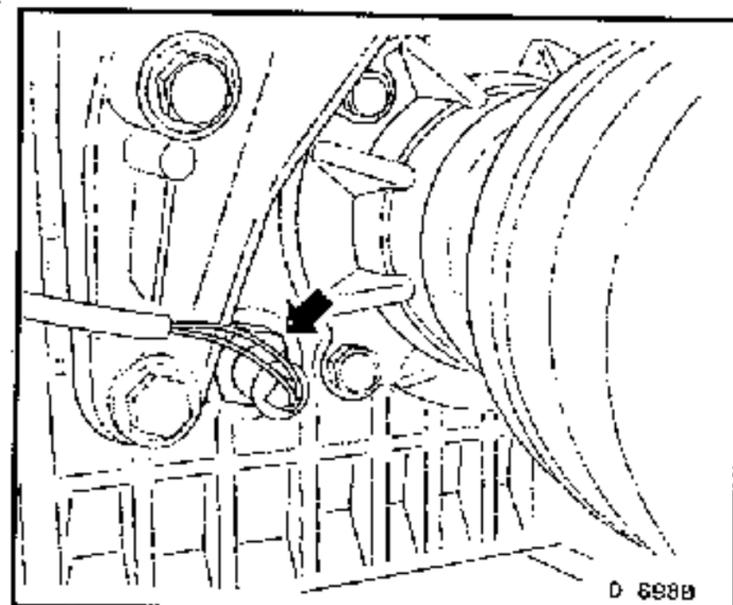
Install, Connect

The wiring harness plug for the temperature switch, under the cowl panel.

Fasten both the wiring harness and the bleeder hose to the wiring harness with cable straps.

Important!

Ensure that the bleeder hose is not flattened or kinked by the retaining straps. If this occurs, system bleeding operations will be hampered.



Hydraulic System, Top Up and Bleed

Remove, Disconnect

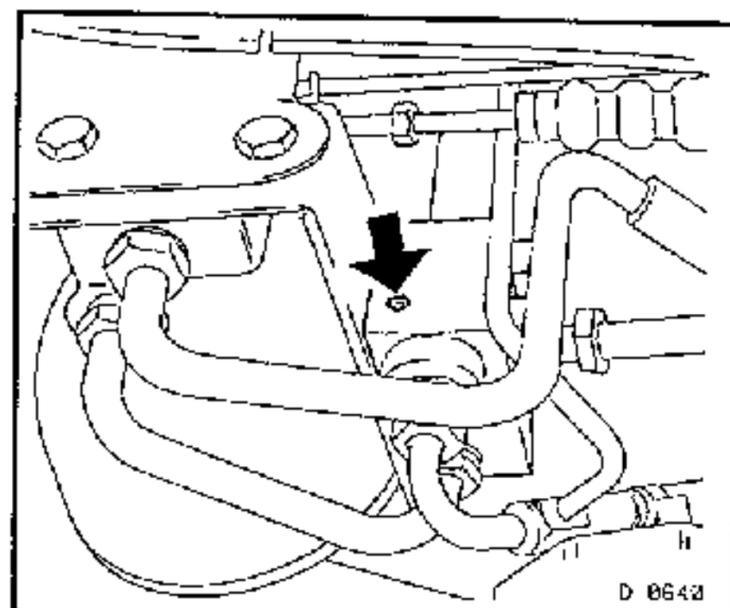
Fuse F 19 for the shift valve, from the fuse box.

Open the bypass screw on the shift valve (arrow), approximately 3 turns.

Fill the fluid reservoir to the 'MAX' mark and start the engine.

Top up the fluid as soon as the 'MIN' mark is reached. Allow the engine to run for approximately 5 minutes for the system to stabilise.

Turn the steering wheel to full lock and hold against the stop for approximately 5 seconds only. Turn the steering wheel to the opposite lock and repeat the process.



TRANSFER BOX

Close the bypass screw for 20 seconds and then re-open. After a further 20 seconds close the bleeder valve again.

Tighten (Torque)

Bleeder valve screw to modulator 1.5 Nm

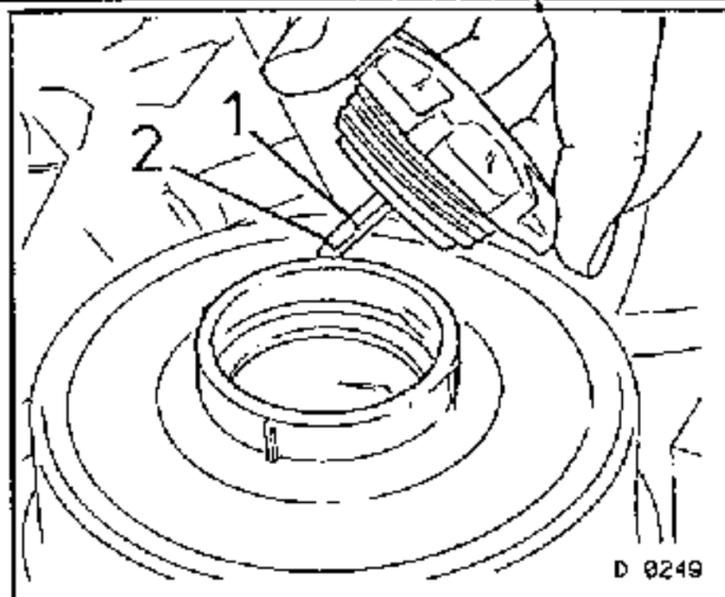
Reinstall the fuse (F 19) and switch the ignition ON.

Actuate the brake pedal approximately 25 times.

Fluid level;

Fluid at operating temperature (approximately 80 °C) to the 'MAX' mark.

Fluid cold (approximately 20 °C) to the 'MIN' mark.



FOUR WHEEL DRIVE CONTROL

Pressure Switch, Replace

Remove, Disconnect

Wiring harness plug from pressure switch.

Pressure switch from control valve.

As fluid will leak, block aperture with a suitable plug.

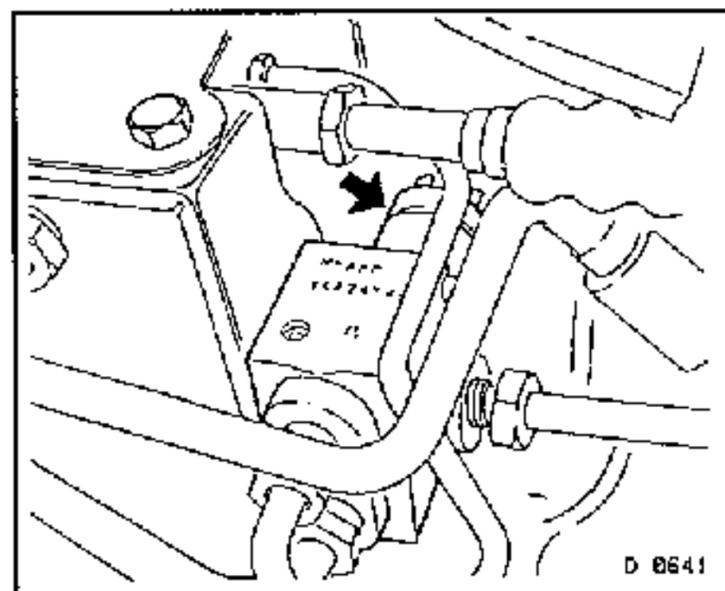
Tighten (Torque)

Pressure switch to control valve 17 Nm

Install, Connect

Wiring harness plug.

Bleed hydraulic system. Refer this operation in this Section.



Electronic Control Unit, Replace

Remove, Disconnect

Fuse box. Refer to Group N for this operation.

Control unit from bracket.

Wiring harness plug from control unit.

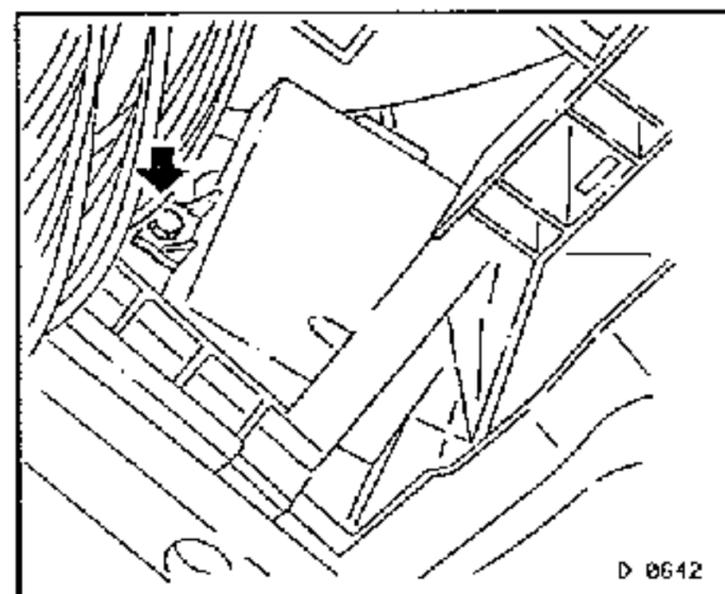
Install, Connect

Wiring harness plug to control unit.

Control unit to bracket.

Fuse box.

Carry out a system function check.



Fluid Pressure Regulator, Replace

Remove, Disconnect

Fluid lines from fluid pressure regulator. Leave in their respective installation positions or tag lines.

Also loosen lower line (2) at the control valve.

As fluid will escape, plug all openings.

Fluid pressure regulator from bracket (4 bolts).

TRANSFER BOX

Install, Connect

Fluid pressure regulator to bracket.

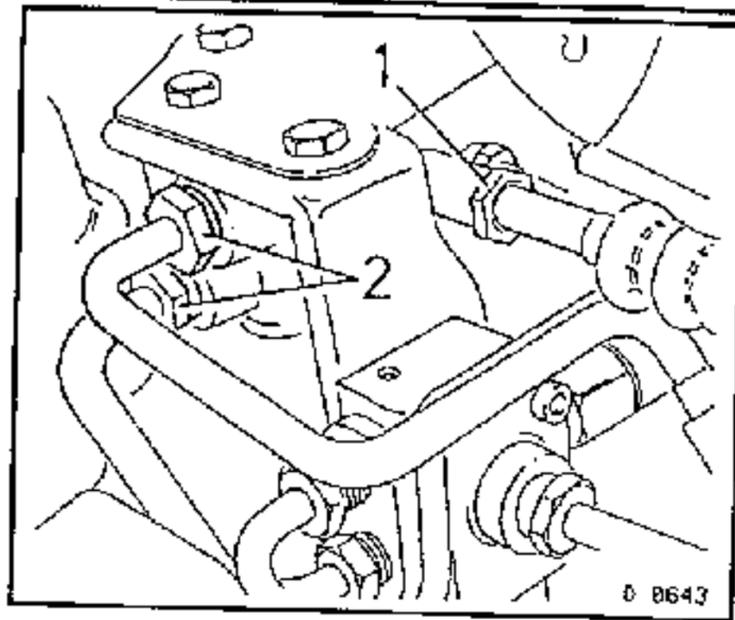
All fluid lines to the fluid pressure regulator.

Tighten (Torque)

Fluid pressure regulator to bracket	23 Nm
Fluid pressure lines (2) to fluid pressure regulator and control valve.....	30 Nm
Fluid return line (1)	17 Nm

Bleed the hydraulic system as detailed earlier in this Section.

Carry out a system function check.



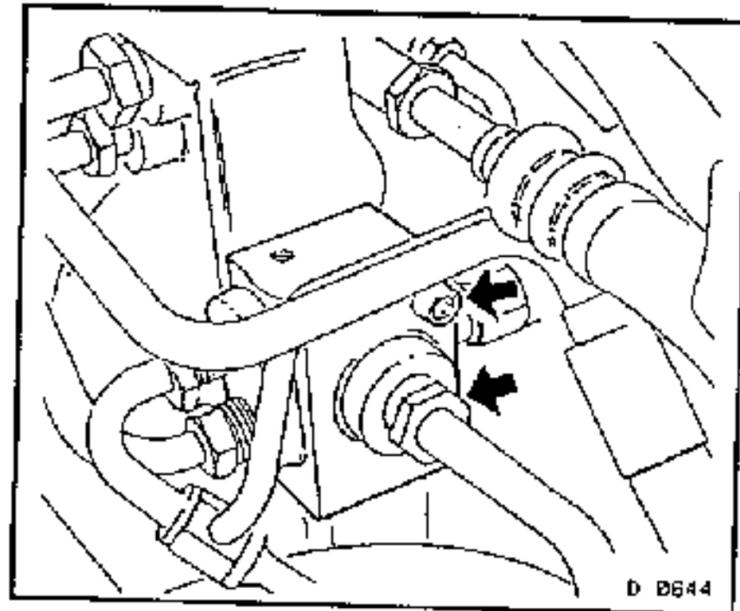
Control Valve, Replace

Remove, Disconnect

Fluid lines from control valve.

Wiring harness plug from pressure switch and control valve.

Control valve from bracket (2 bolts).



Tighten (Torque)

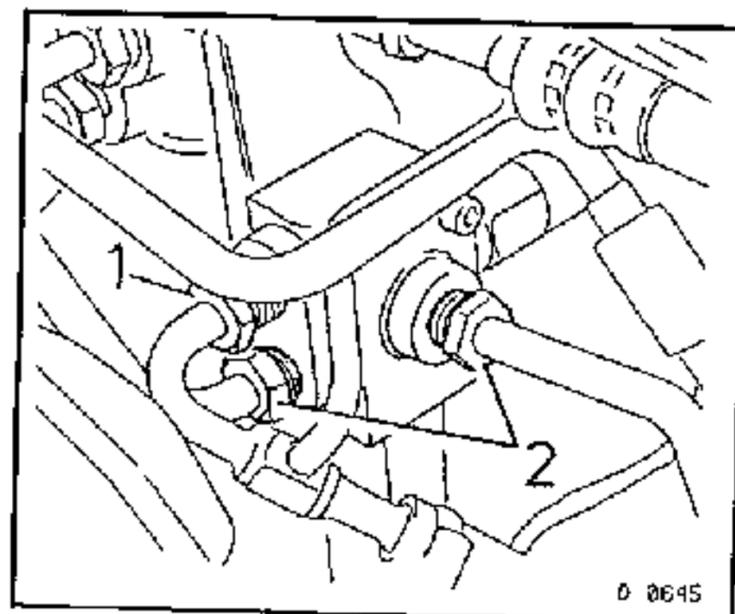
Control valve to bracket	7 Nm
Fluid pressure lines (2)	30 Nm
Fluid return line (1)	17 Nm

Install, Connect

Wiring harness plug.

Bleed the hydraulic system as detailed earlier in this Section.

Carry out a system function check.

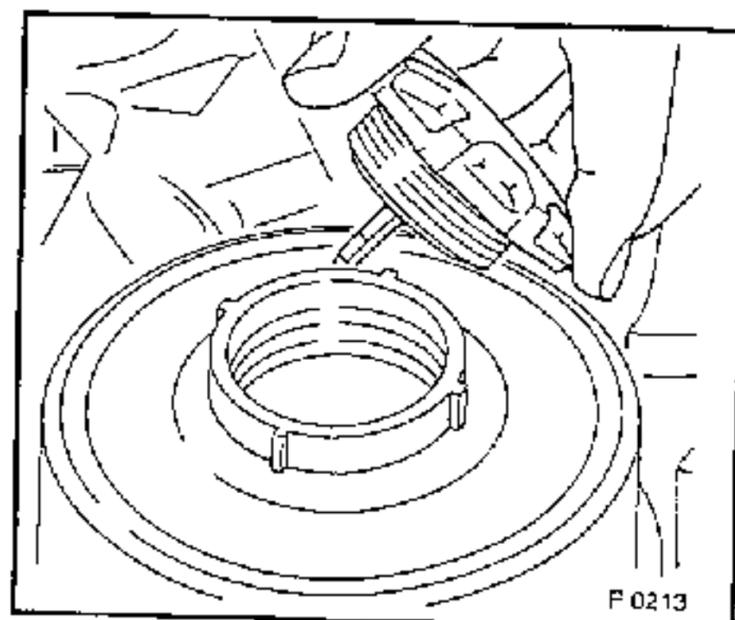


Fluid Pressure Accumulator, Replace

De-pressurise system, as follows:

Remove the cover on the fluid reservoir.

Switch on ignition and actuate the brake pedal approximately 25 times.



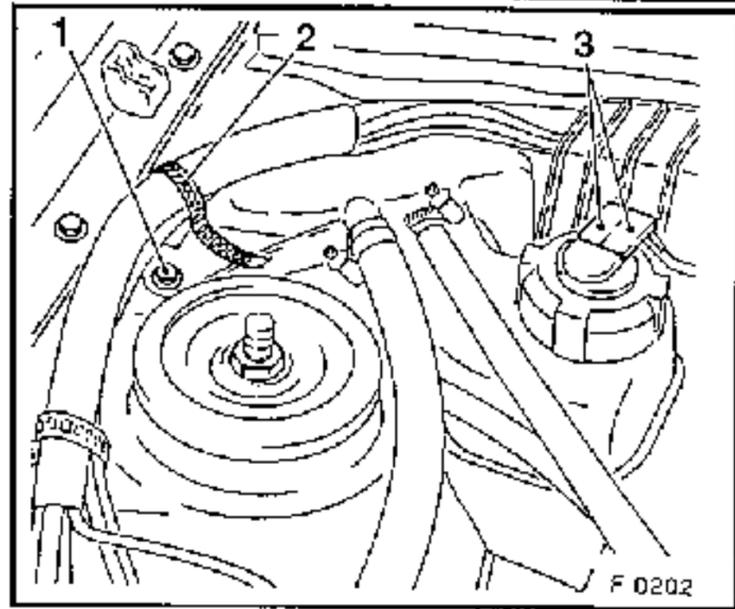
TRANSFER BOX

Remove, Disconnect

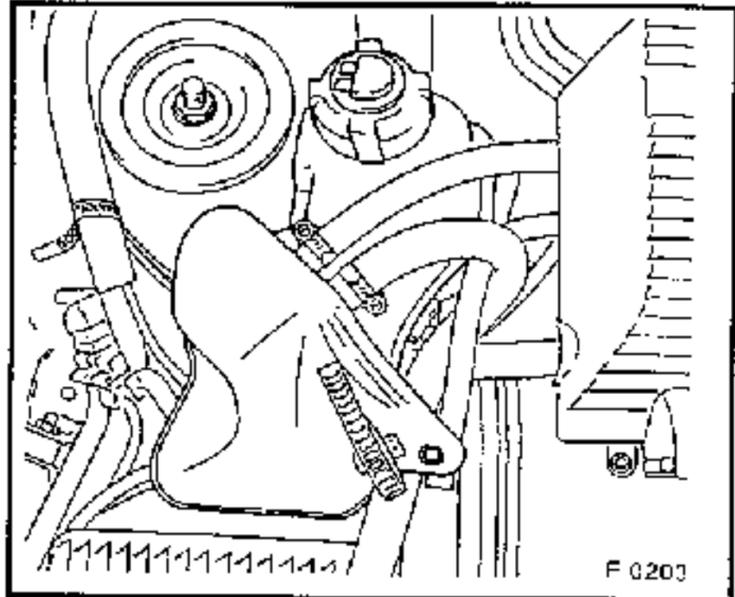
Bolt (1) from coolant reservoir tank.

Detach wiring harness from strap (2).

Both wiring harness plug connectors to the coolant reservoir cap (3).

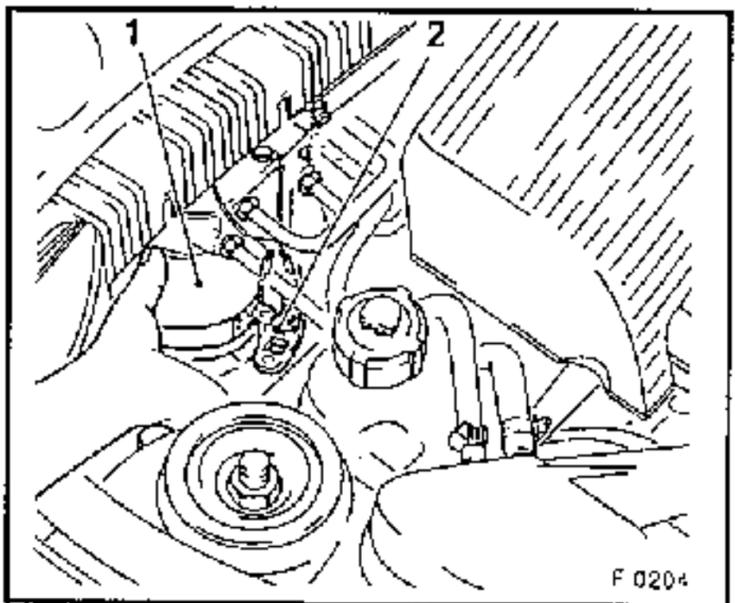


Lay the coolant reservoir tank to one side as shown.



Remove, Disconnect

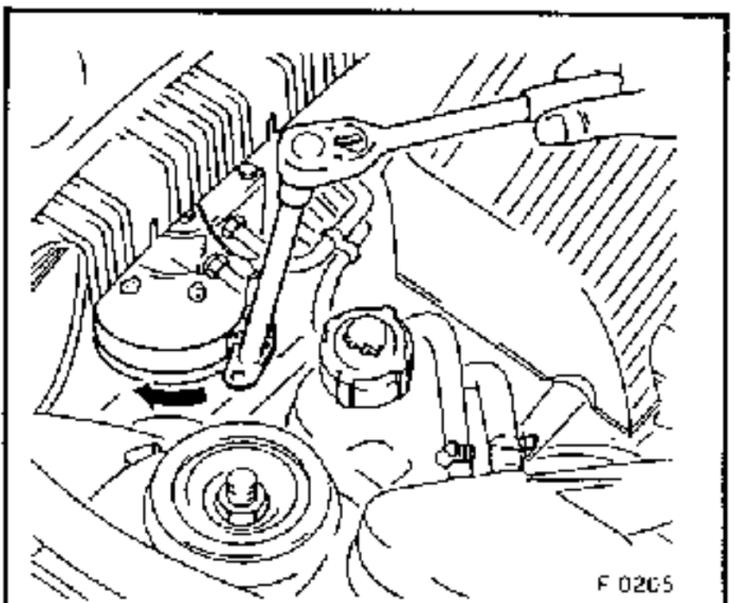
Apply a commercially available tool such as an oil filter wrench (2) to the accumulator (1).



Remove, Disconnect

Use a socket extension and ratchet to loosen the accumulator (arrow) from the fluid pressure regulator.

Unscrew accumulator and remove from above.



TRANSFER BOX

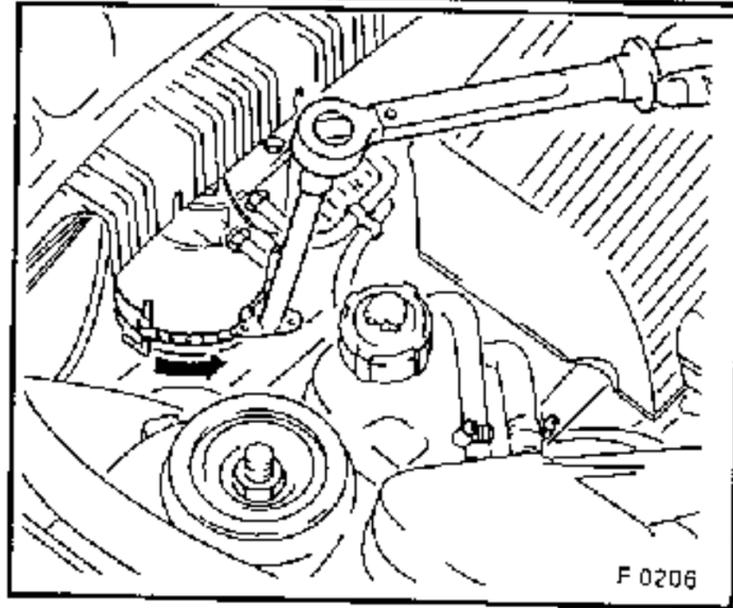
Install, Connect

New accumulator to the pressure regulator, and tighten by hand (arrow).

Then tighten with a torque wrench

Tighten (Torque)

Accumulator to pressure regulator..... 45 Nm



Install, Connect

Coolant reservoir tank.

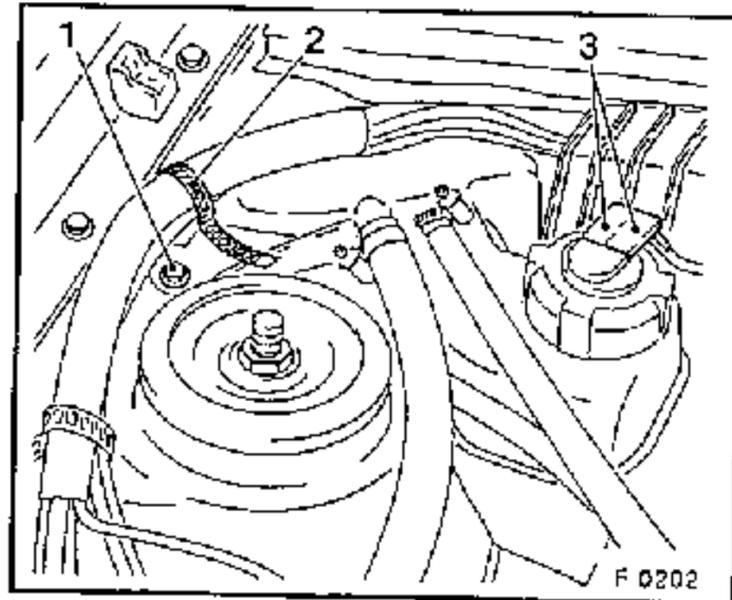
Fasten wiring harness with a cable strap.

Both wiring harness plugs to the coolant reservoir cap.

Inspect

Bleed the hydraulic system as detailed earlier in this Section.

Carry out a system function check.



SEALING OPERATIONS ON INSTALLED TRANSFER BOX

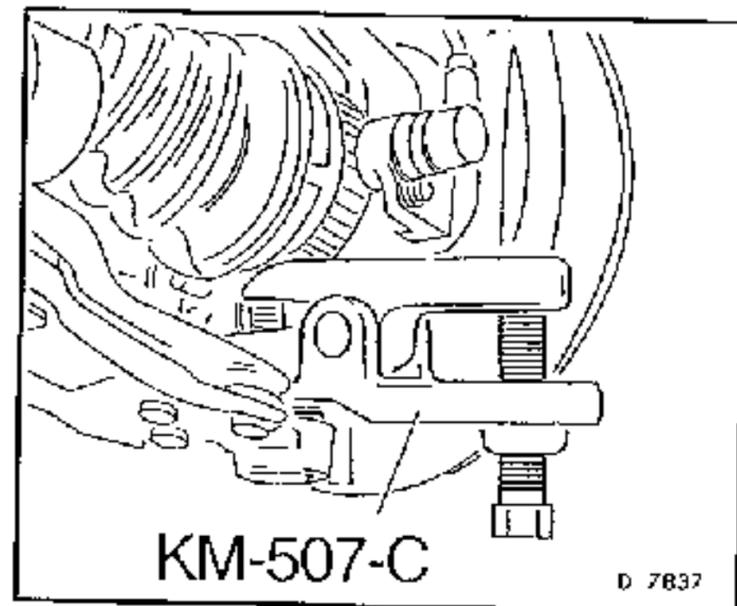
Axle Shaft Seal Ring, Right and/or Rubber O-ring of Drive-through Shaft, Replace

Remove, Disconnect

Right front wheel.

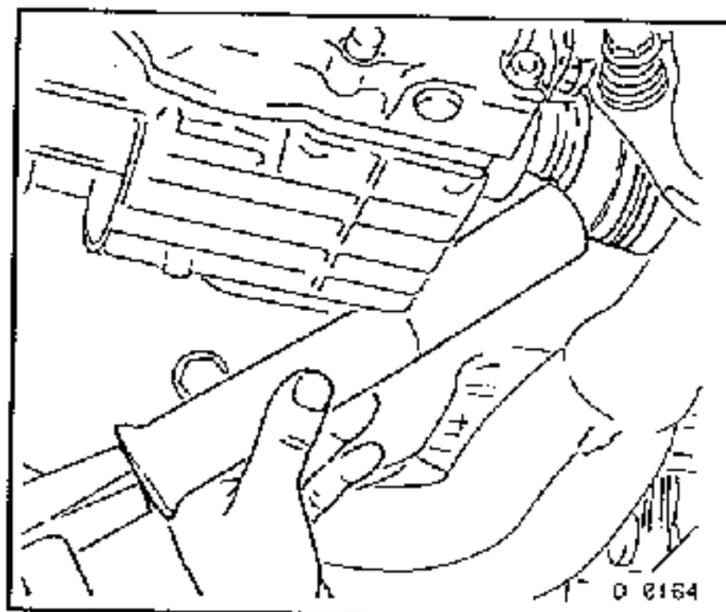
Right ball joint, using KM-507-C.

Lower engine compartment cover.



Remove, Disconnect

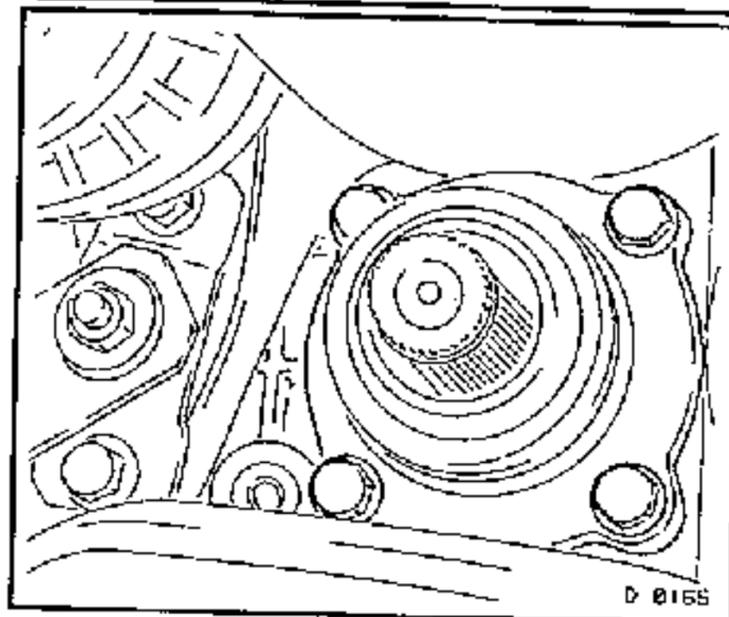
Right axle shaft from transfer box, using a soft metal drift.



TRANSFER BOX

Remove, Disconnect

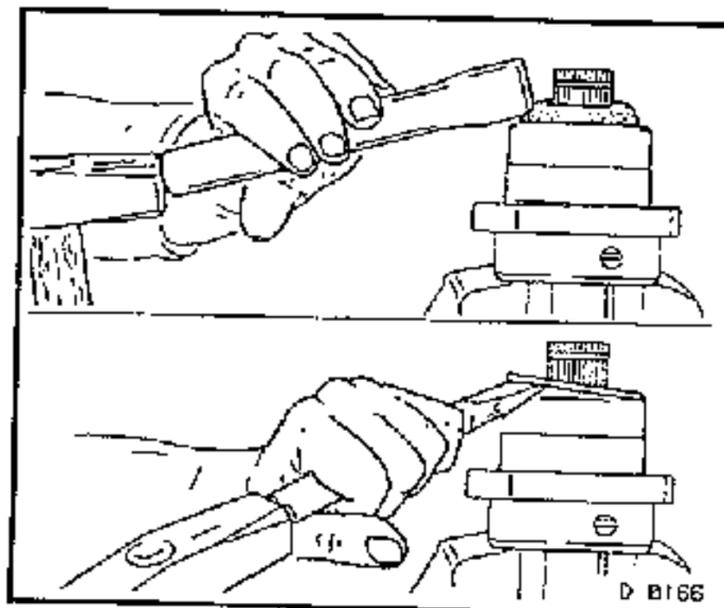
Bearing flange with drive-through shaft from transfer box.



Remove, Disconnect

Cover of seal ring, with a flat chisel.

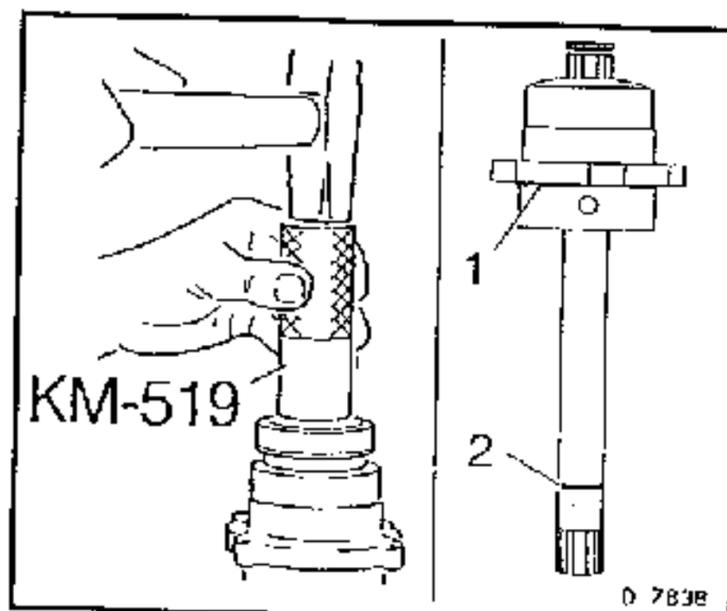
Seal ring by flanging the edge of the seat, using a flat chisel.



Install, Connect

New seal ring in end shield, using KM-519.

New rubber O-rings at end shield (1) and drive-through shaft (2).



Install, Connect

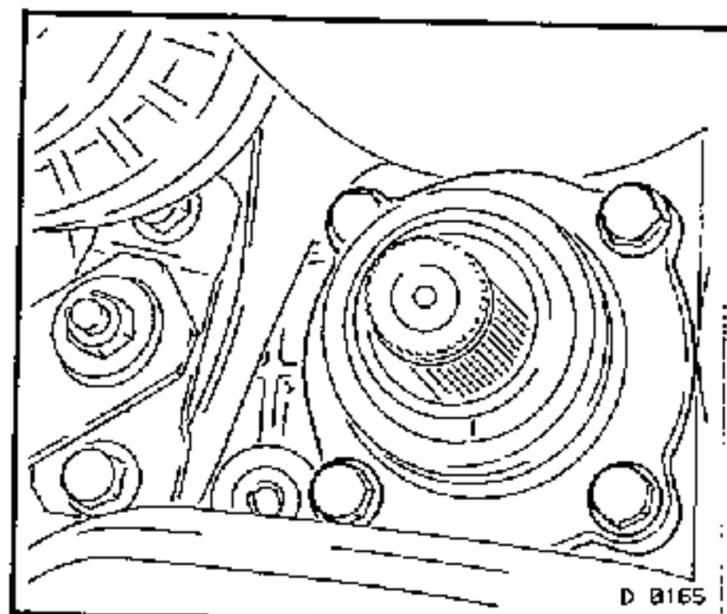
Bearing flange with drive-through shaft to transfer box.

Tighten (Torque)

Bearing flange to transfer box 25 Nm

Important!

Fluid bores at bearing flange and housing must be in alignment.



TRANSFER BOX

Install, Connect

New retaining ring on drive-through shaft.

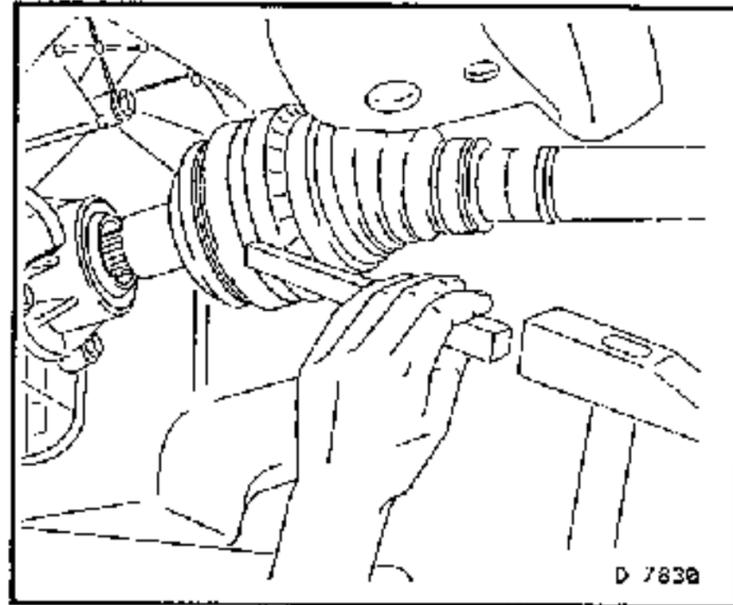
Lubricate splines with 80W transmission gear oil.

Insert axle shaft into transfer box.

Use a square drift at the friction welding seam and drive axle shaft in until it catches in the snap ring.

Inspect

Check for a firm seating by trying to pull the axle shaft out by grasping on the outer circumference of the joint itself. Do not pull on the shaft!



Install, Connect

Ball joint . Secure with cotter pin.

Front wheels.

Tighten (Torque)

Castellated nut to ball joint.....	70 Nm
Front wheel bolts.....	110 Nm

Inspect

Fluid levels of both the manual transmission and transfer box. Refer to these operations in the Section "Manual Transmission and Clutch" and in this Section, respectively.

Install, Connect

Lower engine compartment cover.

SEALING OPERATIONS ON REMOVED TRANSFER BOX

Seal Ring to VC * Clutch (Propshaft), Replace

* Reference to the Viscous Clutch is commonly by the expression "VC Clutch" throughout this Section.

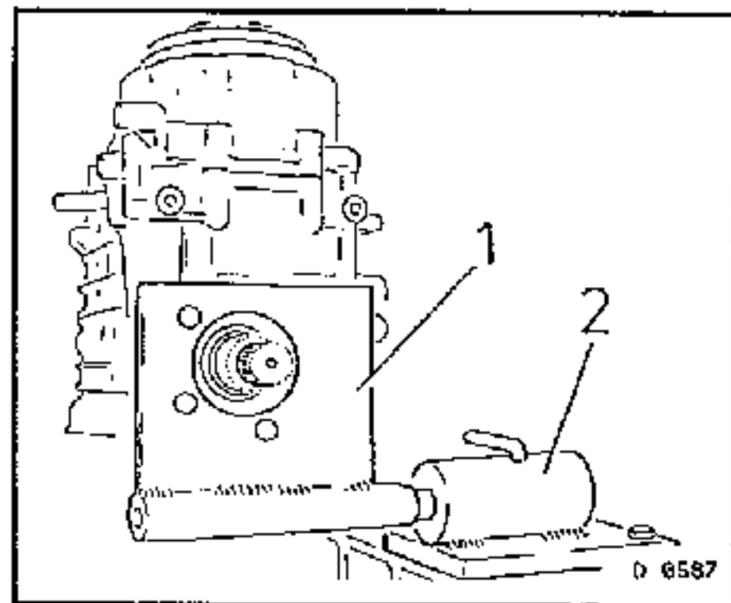
Install, Connect

Transfer box with KM-707 (1) to KM-113-2 (2).

Remove, Disconnect

Temperature switch and drain plug.

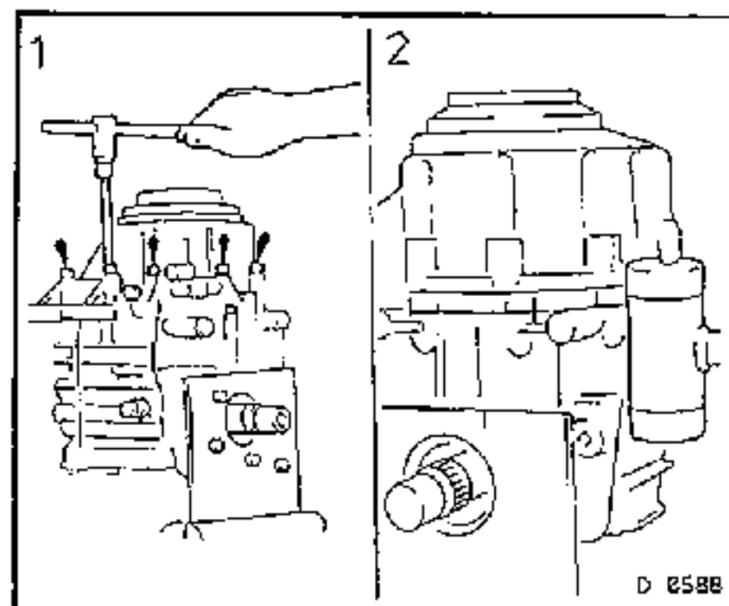
Drain transfer box fluid in to a suitable container.



Remove, Disconnect

Upper part of VC clutch housing.

Unscrew 9 hex bolts (view 1) and separate the housing by lightly tapping with a plastic hammer (view 2).



TRANSFER BOX

Remove, Disconnect

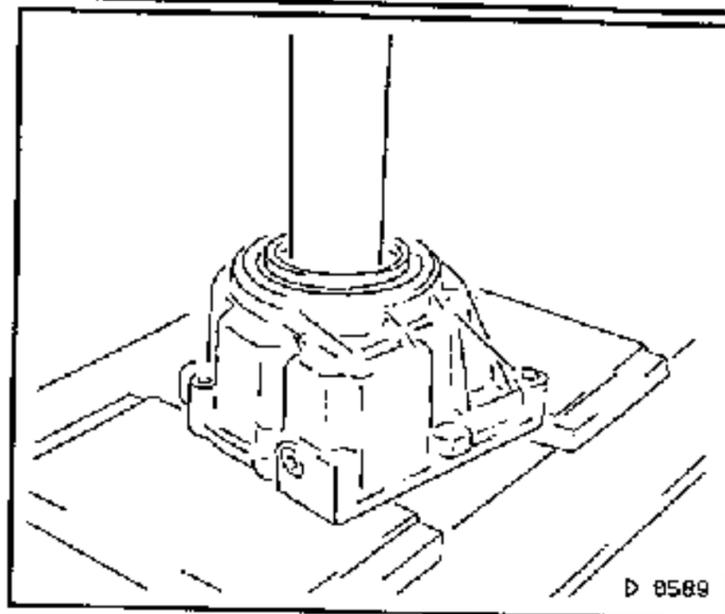
VC clutch.

Lay two flat or square bars underneath and press VC clutch from housing.

Press seal ring from housing.

Clean

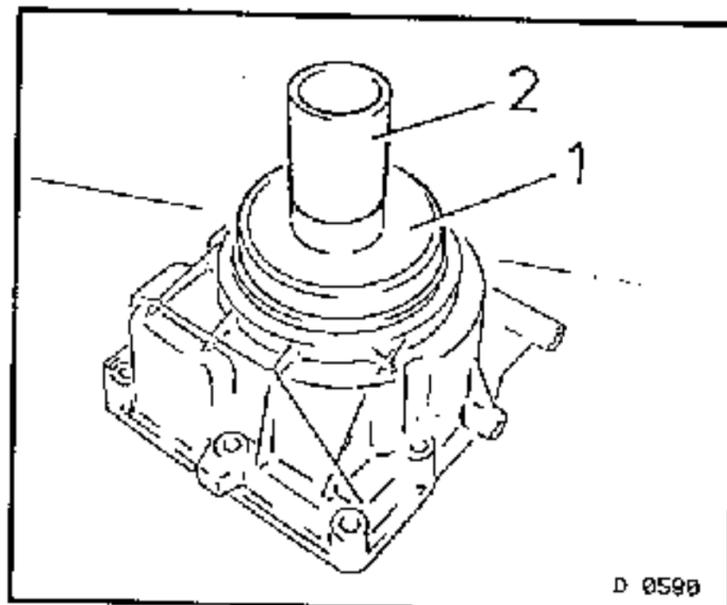
All sealing surfaces on the transfer box and housing.



Install, Connect

Seal ring.

Press flush into housing, using KM-635-2 (1) and sleeve (2).

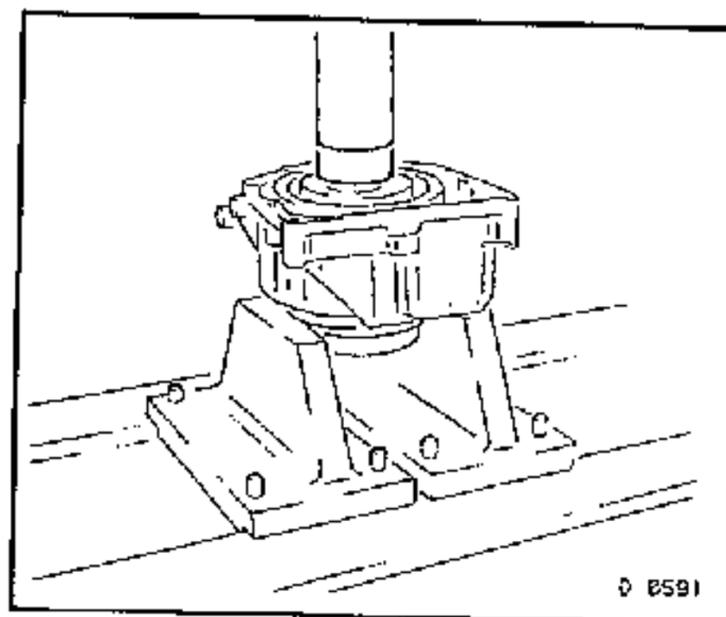


Install, Connect

VC clutch;

Lay two flat or square bars underneath and press VC clutch into housing up to stop

Apply sealant such as Loctite 515, or equivalent, to Holden's Specification HN1581, to the sealing surfaces.



Install, Connect

Upper part of housing with VC clutch to the transfer box.

Tighten (Torque)

Upper housing bolts to transfer box... 22 Nm

Adjust

Transmission and transfer box oil levels as required.

Install, Connect

Temperature switch, using a new seal ring.

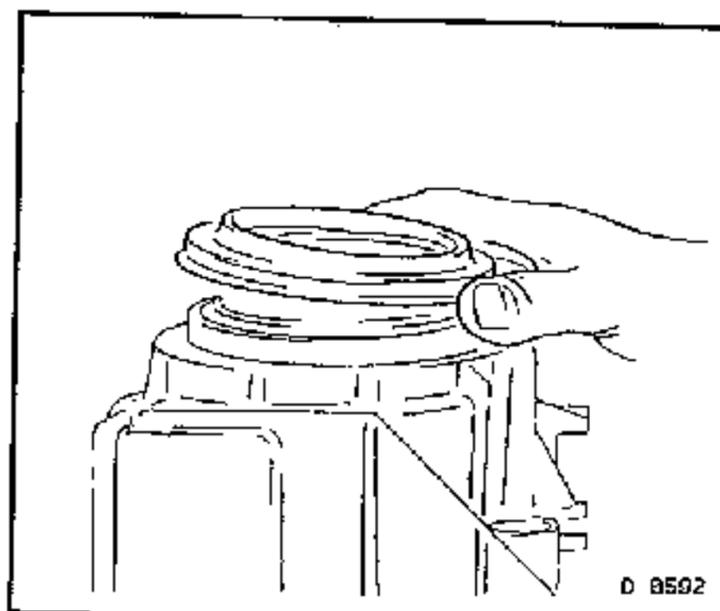
Tighten (Torque)

Temperature switch to transfer box... 25 Nm

Install, Connect

Cover on wiring harness plug to temperature switch.

Disconnect KM-707 from transfer box.



TRANSFER BOX

Seal Rings of Hollow Shaft, Replace

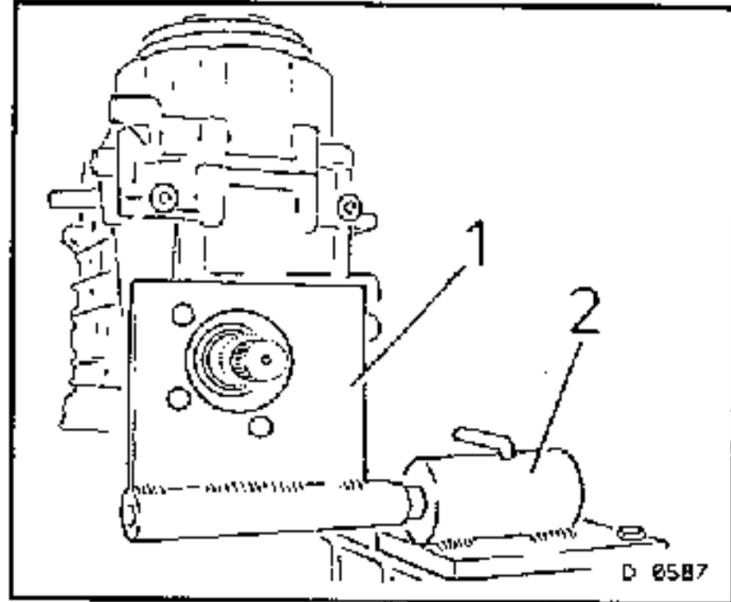
Install, Connect

Transfer box with KM-707 (1) on KM-113-2 (2).

Remove, Disconnect

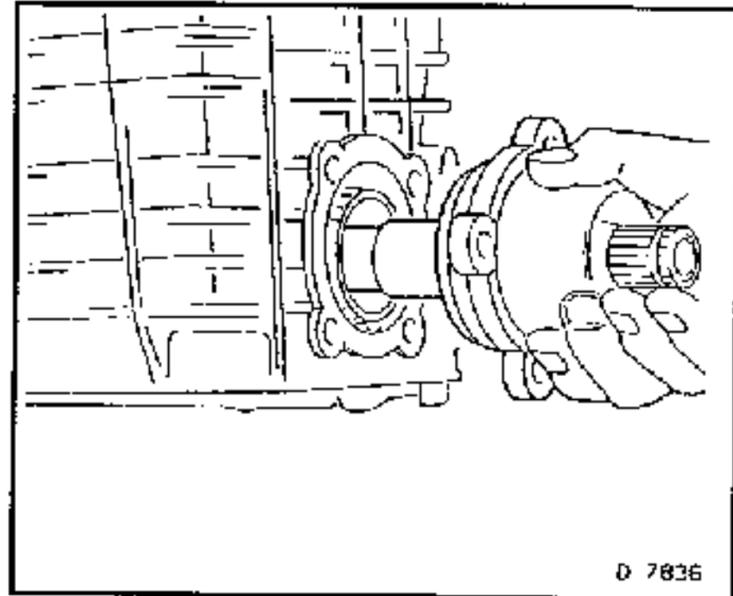
Temperature switch and drain plug.

Drain transfer box fluid in to a suitable container.



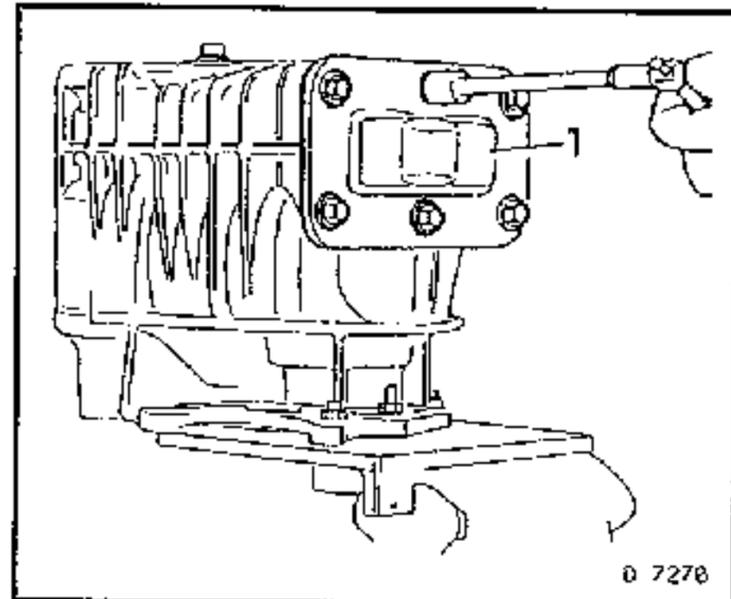
Remove, Disconnect

End shield with drive shaft from hollow shaft.



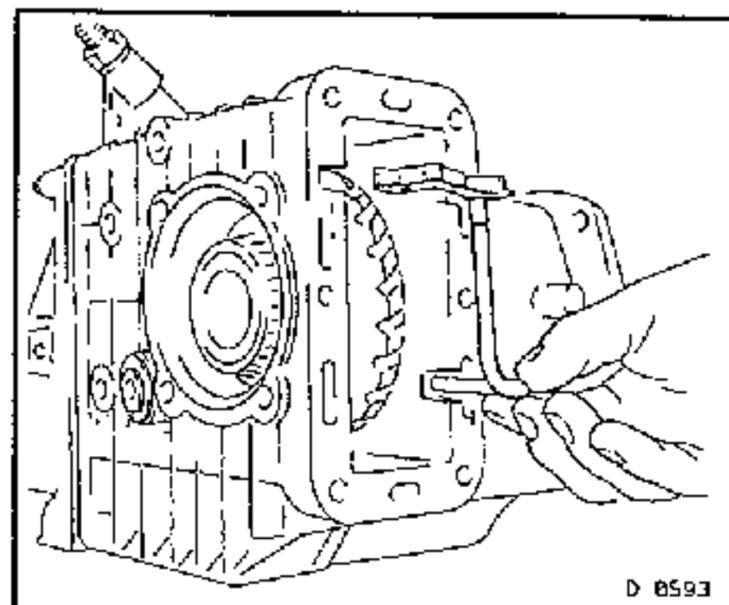
Remove, Disconnect

Housing cover from transfer box (6 bolts).



Remove, Disconnect

Fluid line from transfer box.

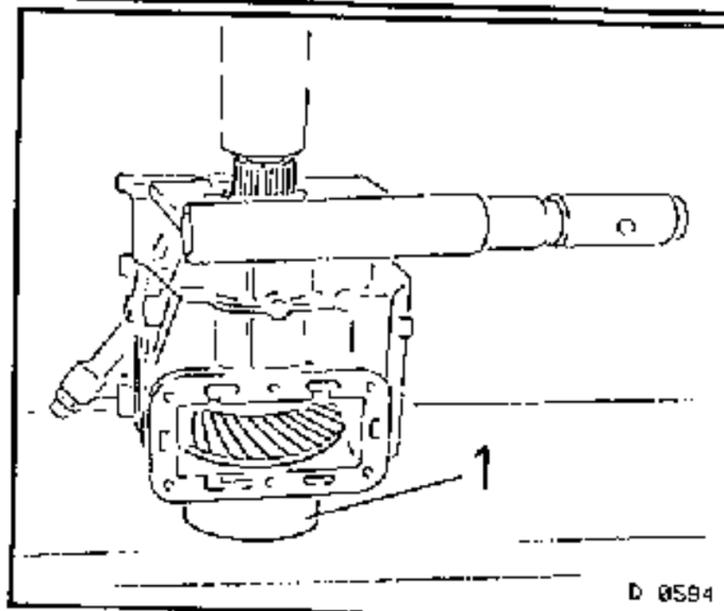


TRANSFER BOX

Remove, Disconnect

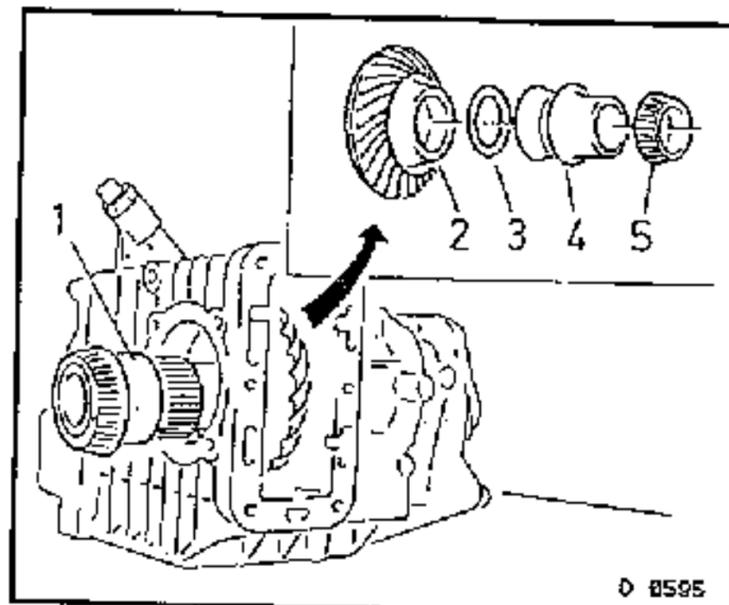
Hollow shaft.

Support bevel gear with sleeve (1) and press out hollow shaft.



Remove, Disconnect

Hollow shaft (1), bevel gear (2), adjustment disc (3), spacer block (4) and tapered roller bearing (5) from the transfer box.



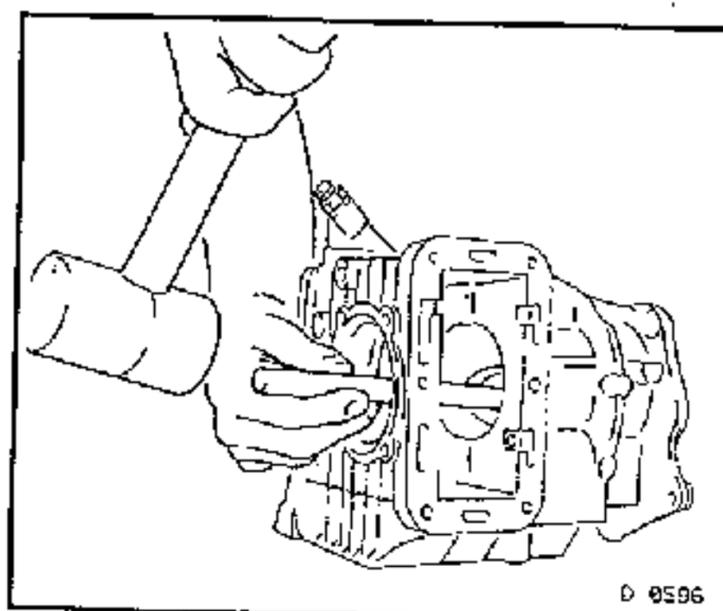
Remove, Disconnect

Seal rings.

Knock both seal rings from the housing using a suitable drift.

Clean

Sealing ring bores, sealing surfaces on housing cover and transfer box.



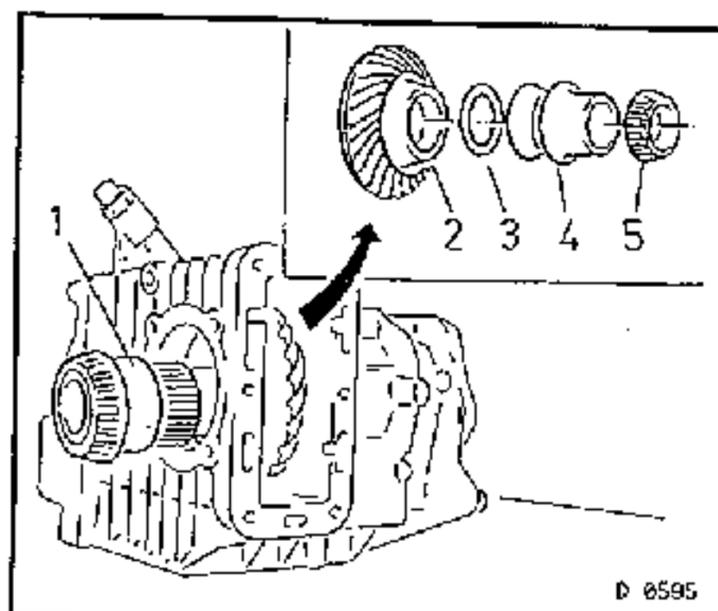
Install, Connect

Tapered roller bearing (5), spacer block (4), adjustment disc (3), bevel gear (2) and hollow shaft (1) into the transfer box.

Important!

The adjustment disc (3) must be inserted in spacer block (4).

Observe seating of the adjustment disc as well, when pressing in hollow shaft.



TRANSFER BOX

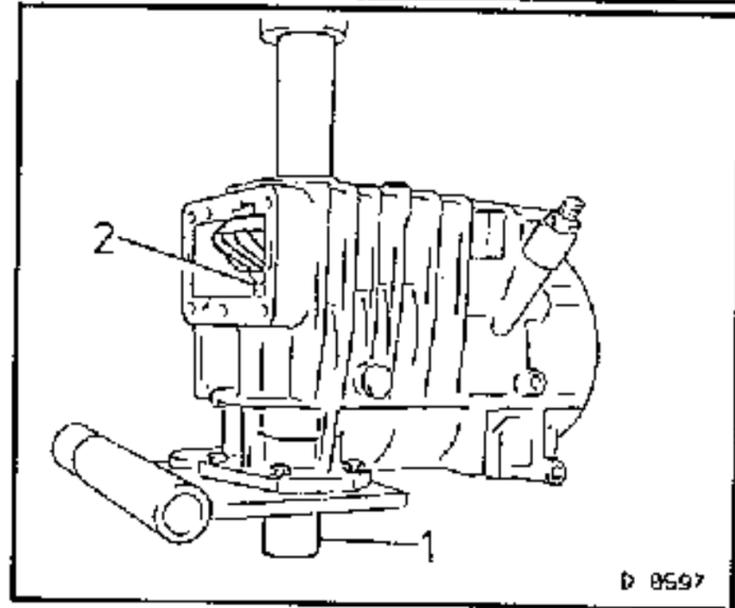
Install, Connect

Press in hollow shaft;

Place installing sleeve KM-706 (1) to support tapered roller bearing underneath and press hollow shaft in until it stops.

Important!

Observe the seating of adjustment disc (2).



Install, Connect

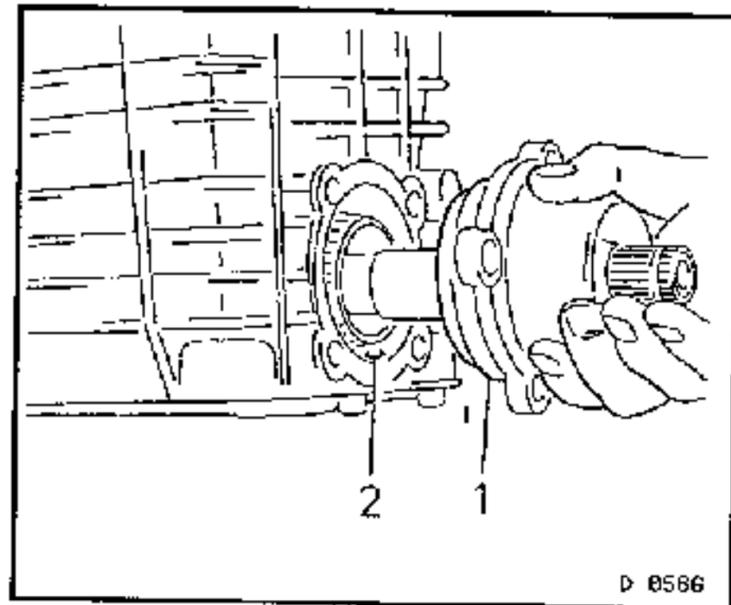
Fluid line to transfer box.

Tighten (Torque)

- Housing cover to transfer box..... 30 Nm
- End cover with drive shaft to transfer box..... 25 Nm

Note that the bore (1) in the end cover must match with the bore (2) in transfer box.

Use new rubber O-rings.



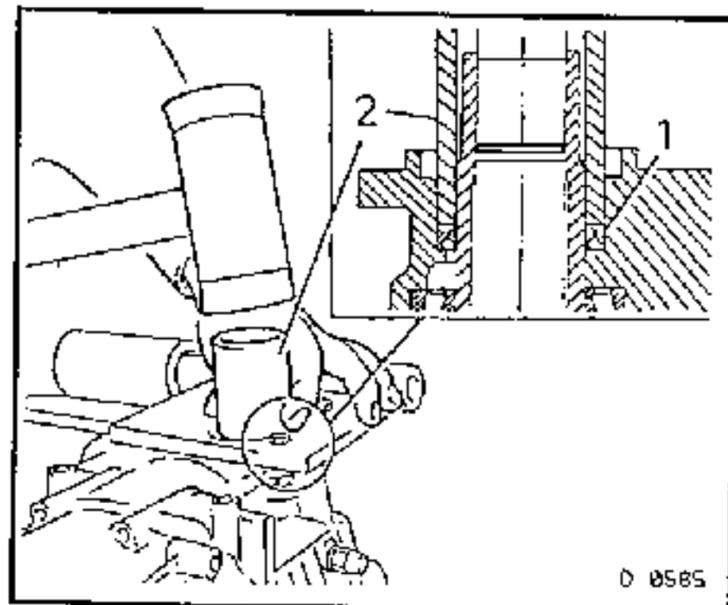
Install, Connect

Inner seal ring;

Coat seal ring (1) with multi-purpose grease and drive in up to the stop, using KM-705 (2).

Important!

The seal lip faces inwards.



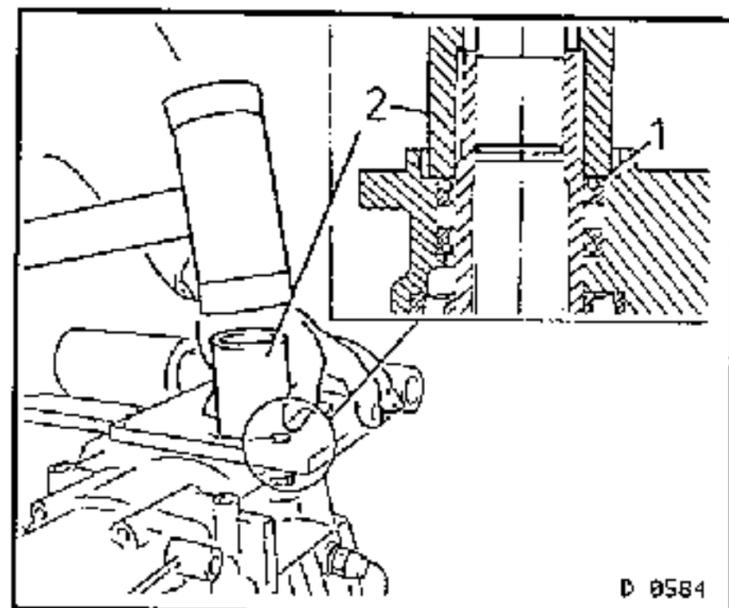
Install, Connect

Outer seal ring;

Coat seal ring with multi-purpose grease and drive in up to the stop, using KM-706 (2).

Important!

The seal lip of shaft seal ring must face outwards.



TRANSFER BOX

Tighten (Torque)

Fluid drain bolt to transfer box..... 4 Nm + 40° - 180°

Check

Fluid level in the transmission and transfer box. Adjust as required.

Tighten (Torque)

Temperature switch to transfer box..... 25 Nm

Use new seal ring.

Remove, Disconnect

KM-707 from transfer box.

OPERATIONS ON TRANSFER BOX

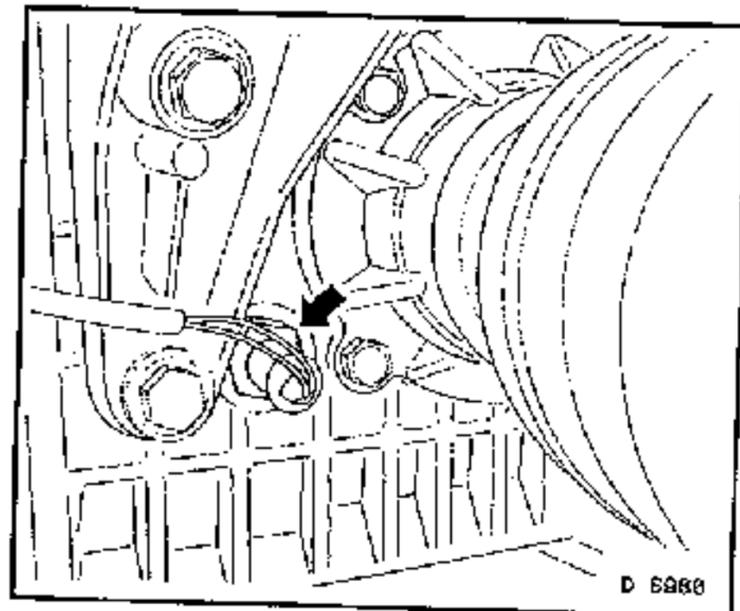
Temperature Switch, Replace

Remove, Disconnect

Wiring harness plug for transfer box temperature switch under the cowl cover.

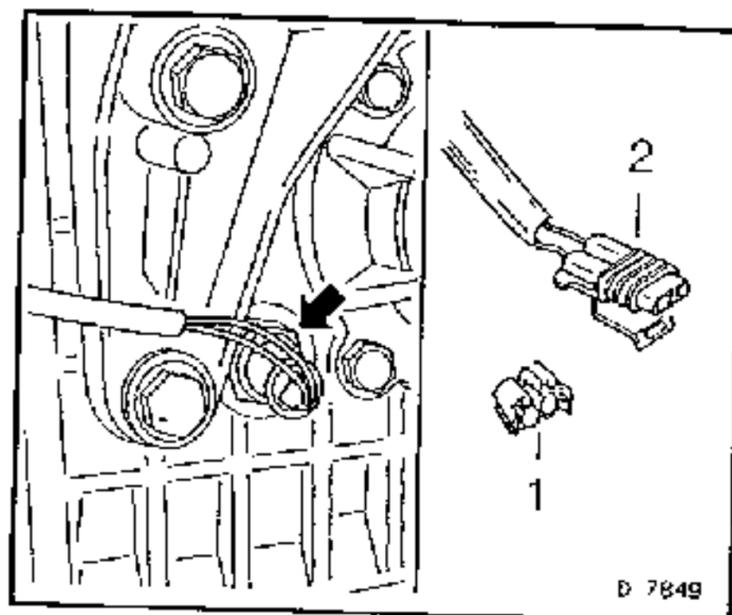
Separate the cable strap, bleeder hose and expose wiring harness for transfer box temperature switch downwards.

Separate wiring harness and unscrew temperature switch, using a thin walled ring spanner.



Remove, Disconnect

The wiring harness plug cover (1) from the wiring harness plug (2) of a new temperature switch.



Install, Connect

New temperature switch to the transfer box, using a new seal ring.

Tighten (Torque)

Transfer box temperature switch..... 25 Nm

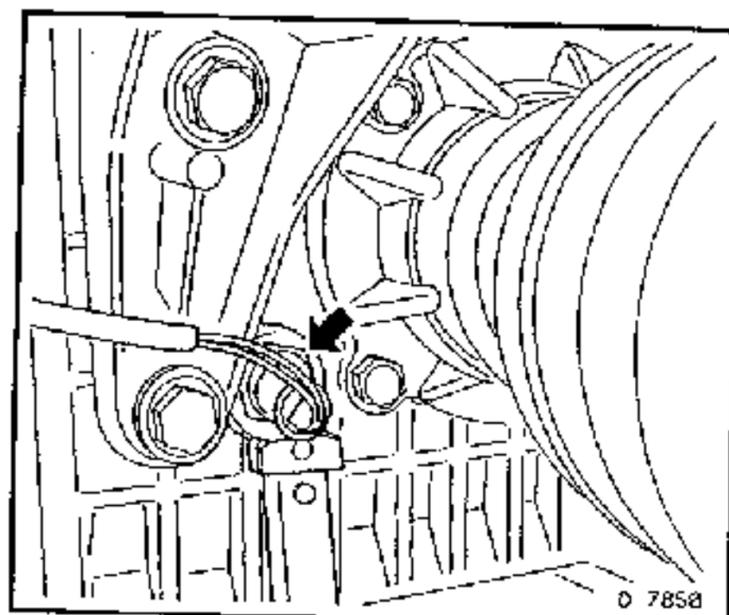
Wiring harness plug cover.

Wiring harness plug under cowl cover.

Fasten wiring harness and bleeder hose with a cable strap.

Important!

During this process, do not kink or twist the bleeder hose. If this occurs, bleeding the hydraulic system will be difficult.



TRANSFER BOX

Transfer Box, Remove and Install

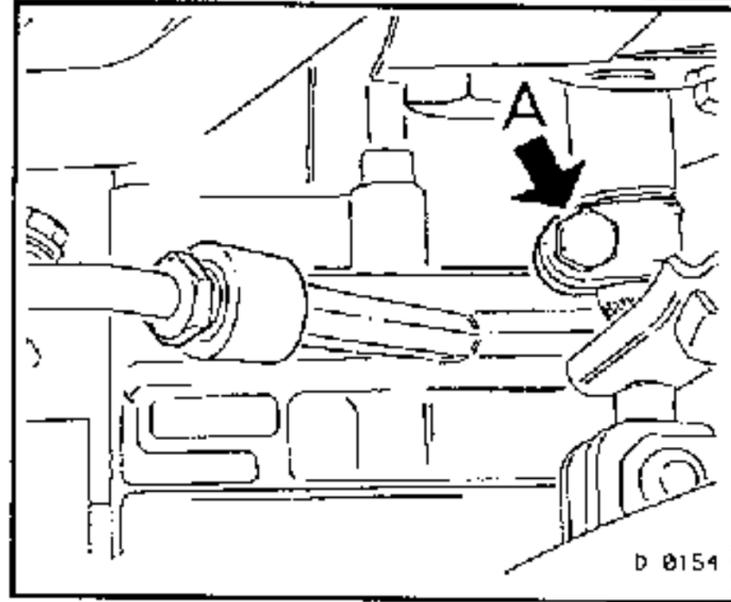
Remove, Disconnect

Intake manifold cover.

Ground cable from battery.

Loosen bolt (A) for shift rod clamp.

Select 4th gear position, then loosen the shift rod connection.

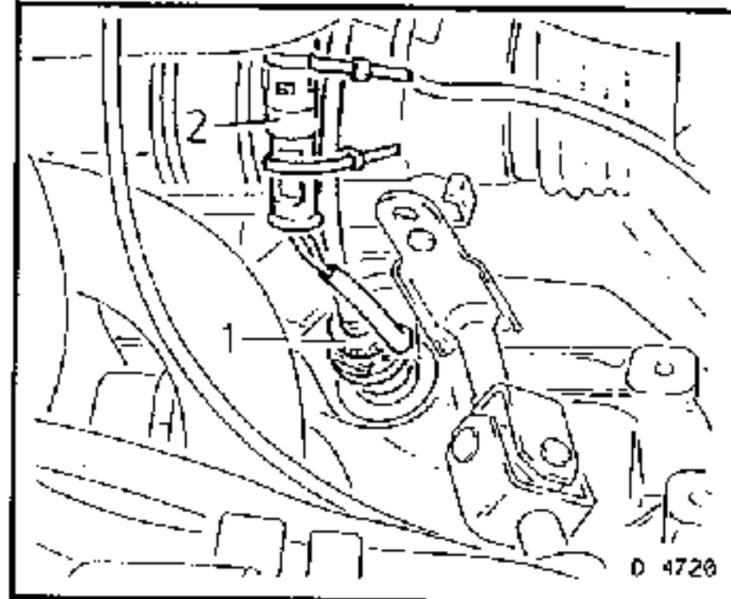


Remove, Disconnect

Wiring harness plug for transfer box temperature switch under the cowl cover.

Separate the cable strap, bleeder hose and expose wiring harness for transfer box temperature switch downwards.

Speedometer cable (1) and/or wiring harness plug (2) from odometer frequency sensor.



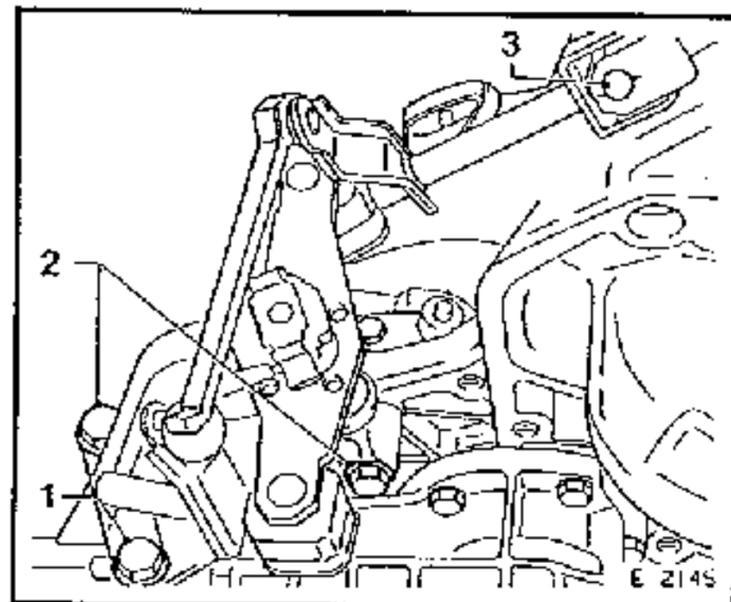
Remove, Disconnect

Bracket for coolant hoses (rear bolt for manual transmission to engine block).

Shift guide from transmission (2) and transfer box (1).

Compress detent clips from hollow universal joint pin (3).

Upper three fastening bolts from transfer box to manual transmission.



Remove, Disconnect

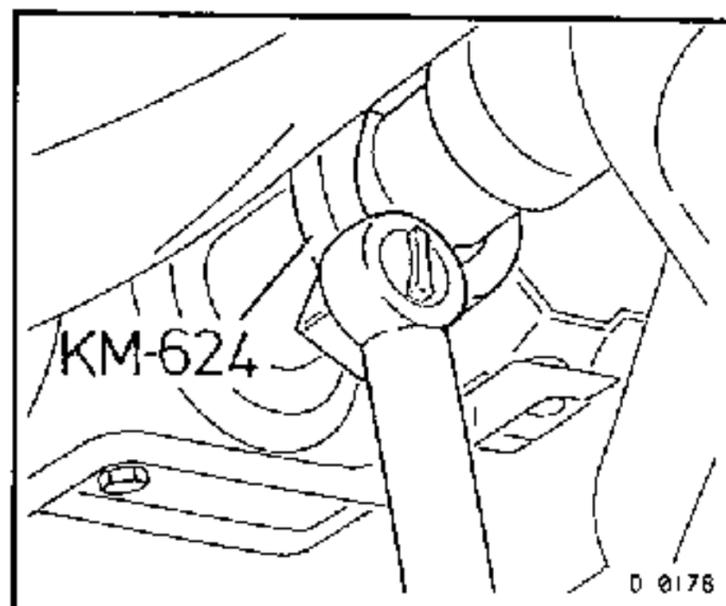
Lower engine compartment cover.

Drain fluid from transfer box.

Loosen lock nut for slider on propshaft, using KM-624.

Propshaft from transfer box, separating at the join with a suitable soft metal drift.

Front exhaust pipe.



TRANSFER BOX

Remove, Disconnect

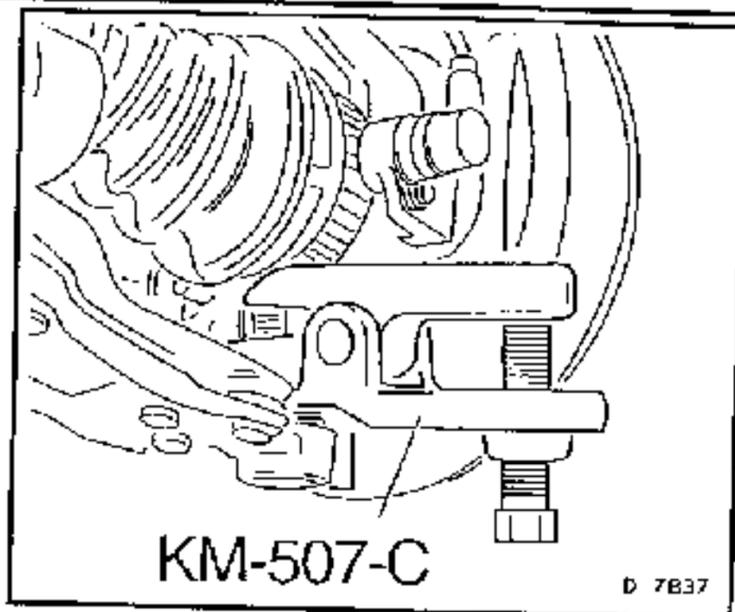
Right front wheel.

Retaining clamp and castellated nut from right hand ball joint.

Right ball joint from spring strut, using KM-507-C.

Front axle body. Refer the operation in Group E, Volume 1.

Hydraulic line from transfer box.

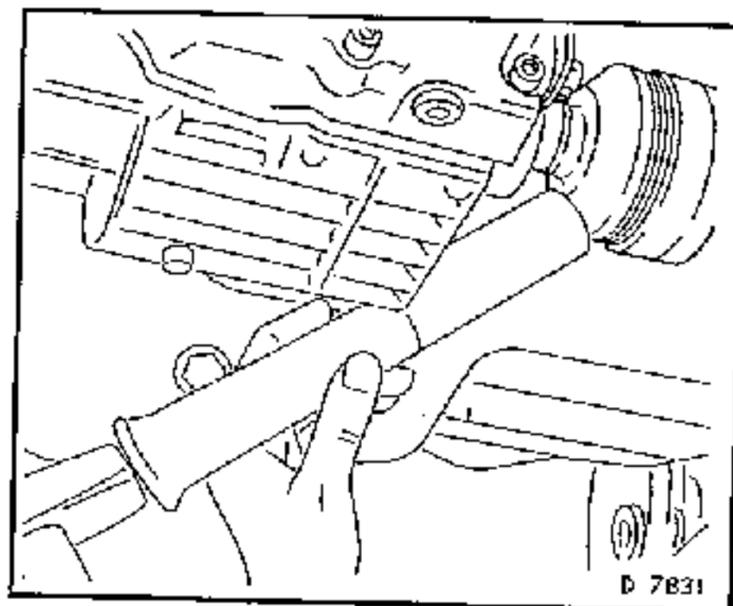


Remove, Disconnect

Right axle shaft from transfer box.

Separate axle shaft from seat at the transfer box end, using a soft metal drift.

Support dive axle with tie wire.



Remove, Disconnect

Lower fastening bolts (1) from transfer box.

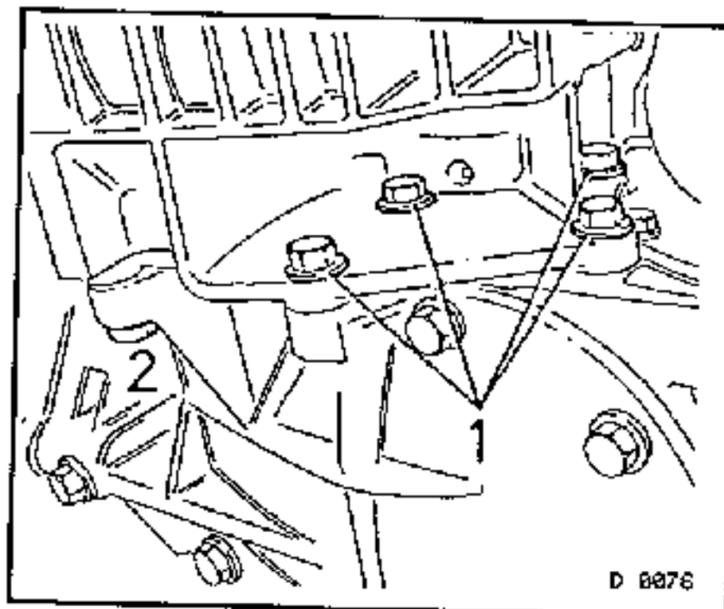
One bolt remains as a retainer (2).

Place hydraulic jack under transfer box.

Unscrew bolt (2).

Bracket for transfer box from engine and transfer box.

Separate transfer box from transmission sideways, then lower and remove from the vehicle.



Install, Connect

New O-ring seal at the flange of the transfer box.

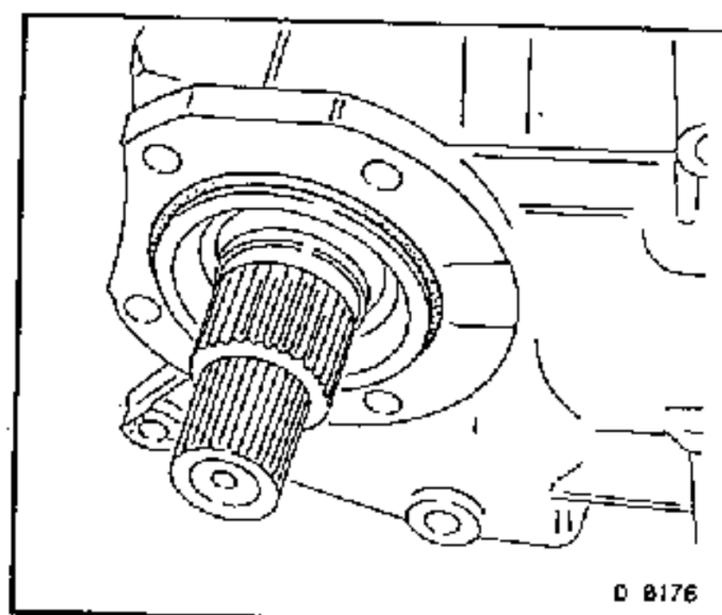
Inspect

Threads of;

8 bolt holes for transfer box at transmission.

3 bolt holes for bracket at transfer box.

If necessary, clean with an M 8 x 1.25 mm tap.



TRANSFER BOX

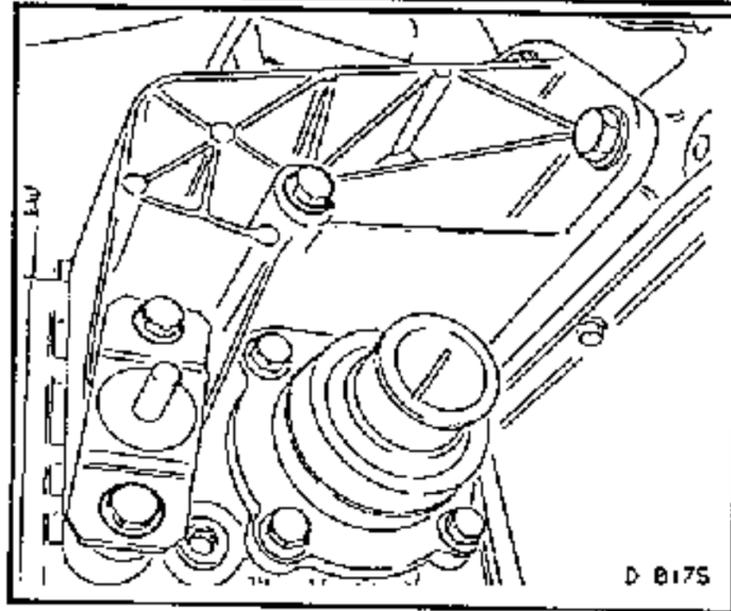
Install, Connect

Transfer box to transmission, using thread locking compound to the threads, such as Loctite 242 or equivalent to Holden's Specification HN1256.

Bracket for transfer box to engine.

Tighten (Torque)

Transfer box to transmission	20 Nm
Bracket to engine block	60 Nm



Install, Connect

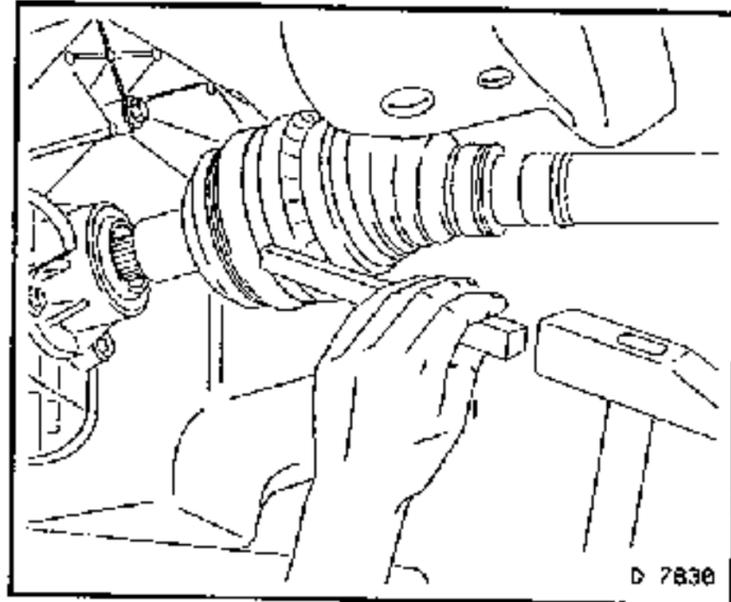
Right axle shaft with new retaining ring, until it catches. Use a square drift as shown.

Check that it is secure by trying to pull the joint from the transfer box. Do not pull on the axle shaft itself.

Tighten (Torque)

Hydraulic line to transfer box	30 Nm
Ball joint to steering knuckle	70 Nm *
Wheel bolts	110 Nm

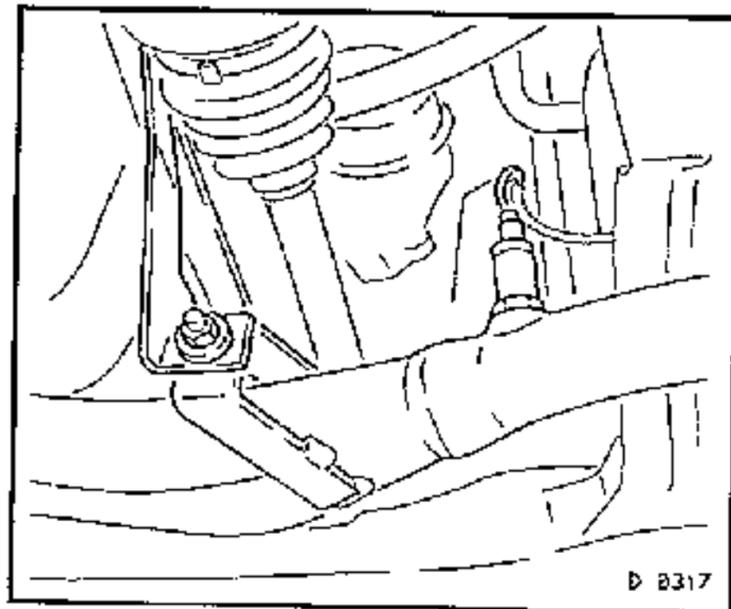
* Fit new retaining springs.



Install, Connect

Front axle body. Refer to operation in Group E, In Volume 1.

Front exhaust pipe.



Install, Connect

Propshaft to transfer box.

Lock nut to slider, using KM-524.

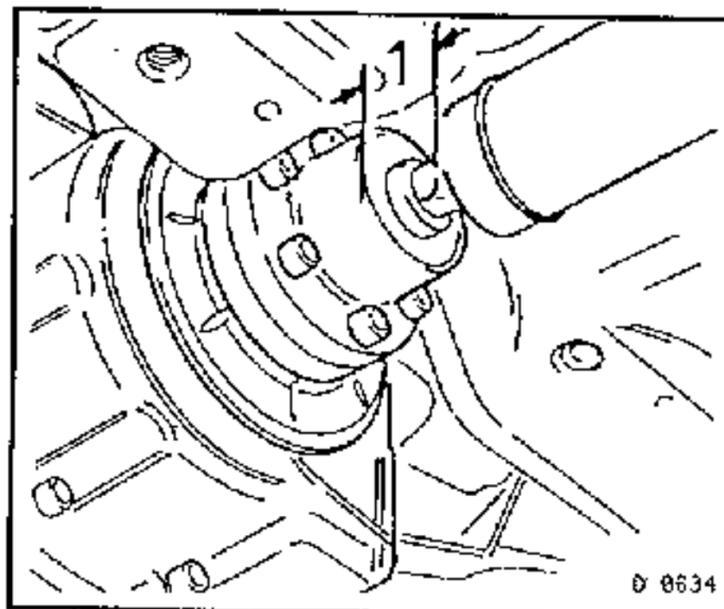
Note the distance "1" = 30 ± 2 mm

Tighten (Torque)

Propshaft to transfer box	30 Nm
Lock nut to slider	40 Nm

Note:

Illustration D 0634 Shows the propshaft at the transfer box end, with the front axle body removed, for clarity.



TRANSFER BOX

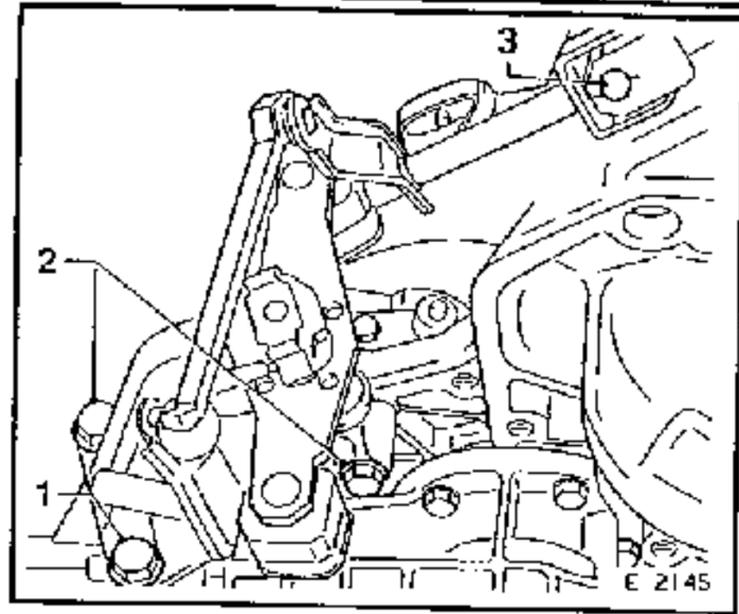
Install, Connect

Upper three bolts for transfer box to manual transmission.

Shift guide to manual transmission (2) and transfer box (1).

Tighten (Torque)

Transfer box to manual transmission.....	20 Nm
Shift guide to manual transmission and transfer box.....	22 Nm



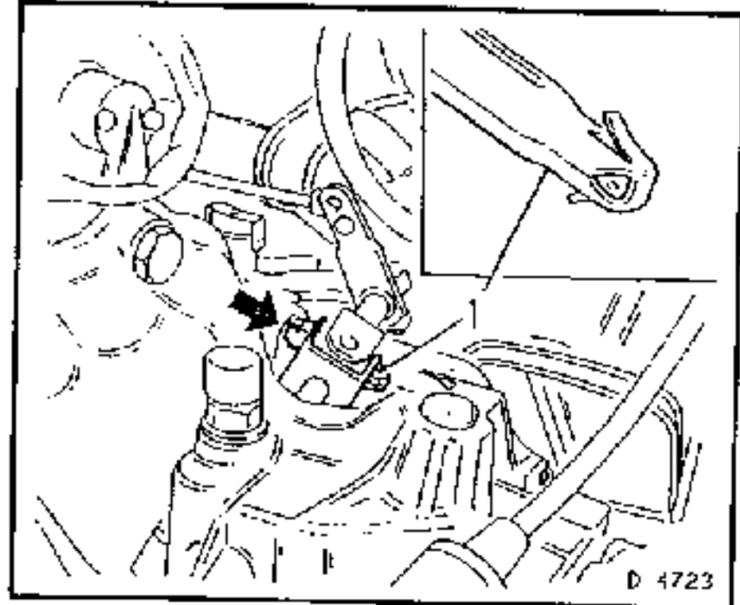
Install, Connect

New hollow pin (1) to universal joint, after applying silicone grease to the pin, such as Dow Corning No. 44, or equivalent, to Holden's Specification HN1014. The expanding clips snap into place.

Tighten (Torque)

Hydraulic line to transfer box..... 30 Nm

Position knurled stem to shift rod clamp but do not tighten clamp bolt before adjusting.



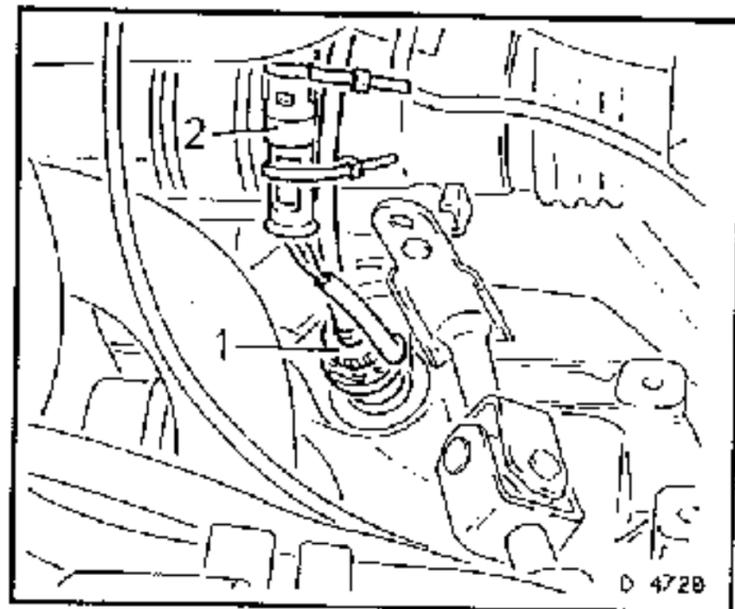
Install, Connect

Speedometer cable (1) and/or wiring harness plug (2) for odometer frequency sensor.

Wiring harness plug for transfer box temperature switch, to wiring harness with cable straps.

Important!

During this process do not kink or twist the bleeder hose. If this occurs, bleeding the hydraulic system will be difficult.



Install, Connect

Ground cable to battery.

Adjust

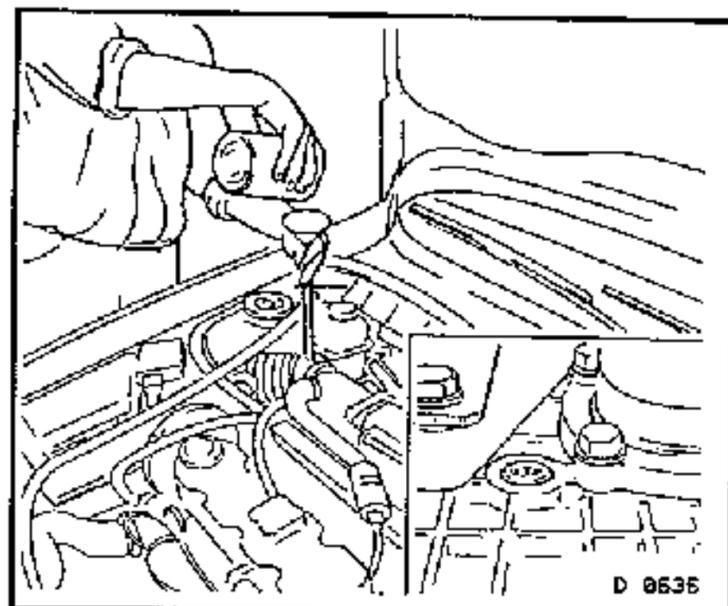
Transmission shift linkage. Refer to 'Checking and Adjusting Operations', in the Section, Manual Transmission, in this Group.

Inspect

Fluid levels of both the manual transmission and transfer box. Refer to these operations in the Section "Manual Transmission and Clutch" and in this Section, respectively.

Lower engine compartment cover.

Intake manifold cover.



TRANSFER BOX

3. Survey of System

3.1 Four Wheel Drive 4x4 Components in RHD Calibra

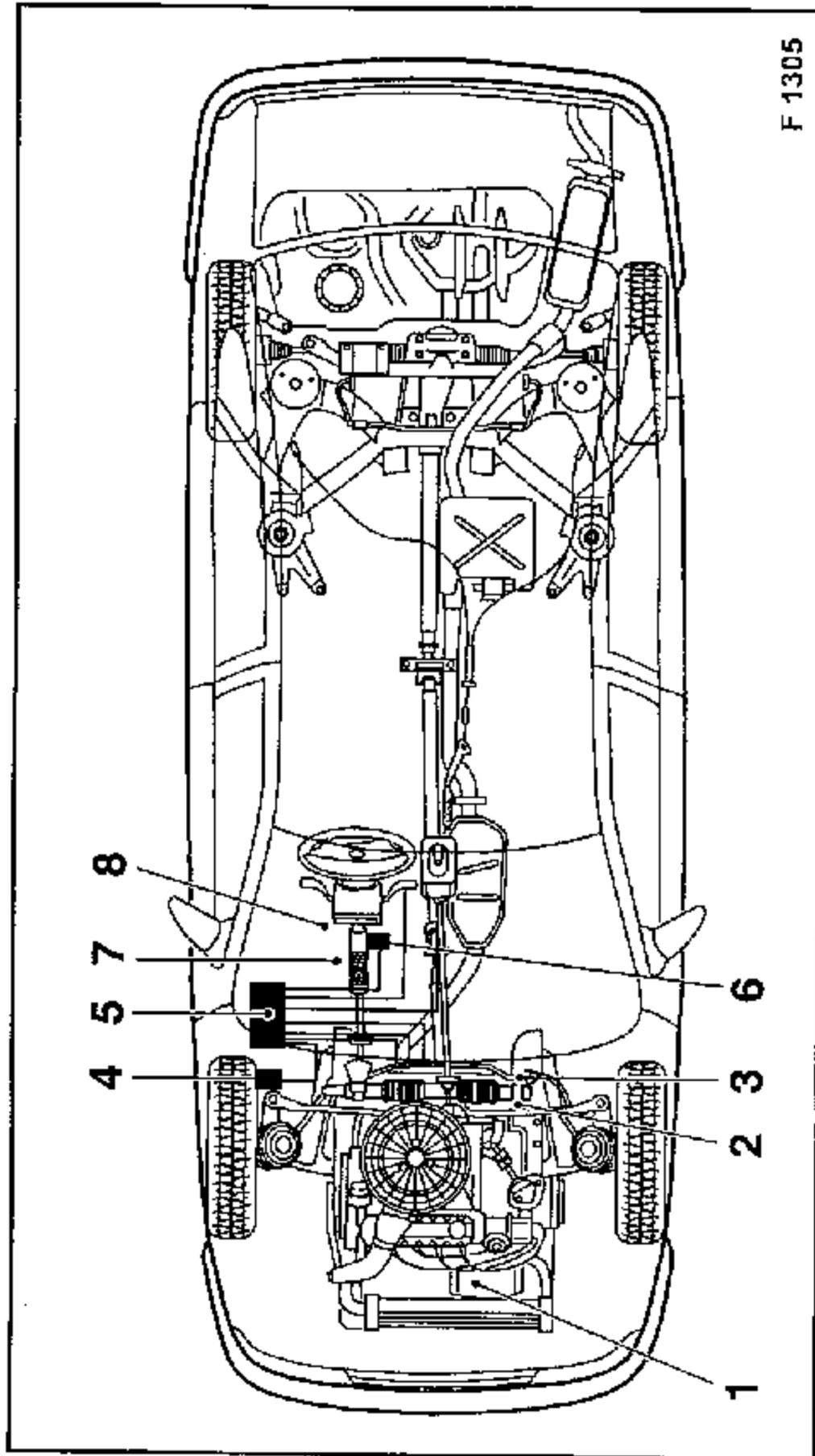
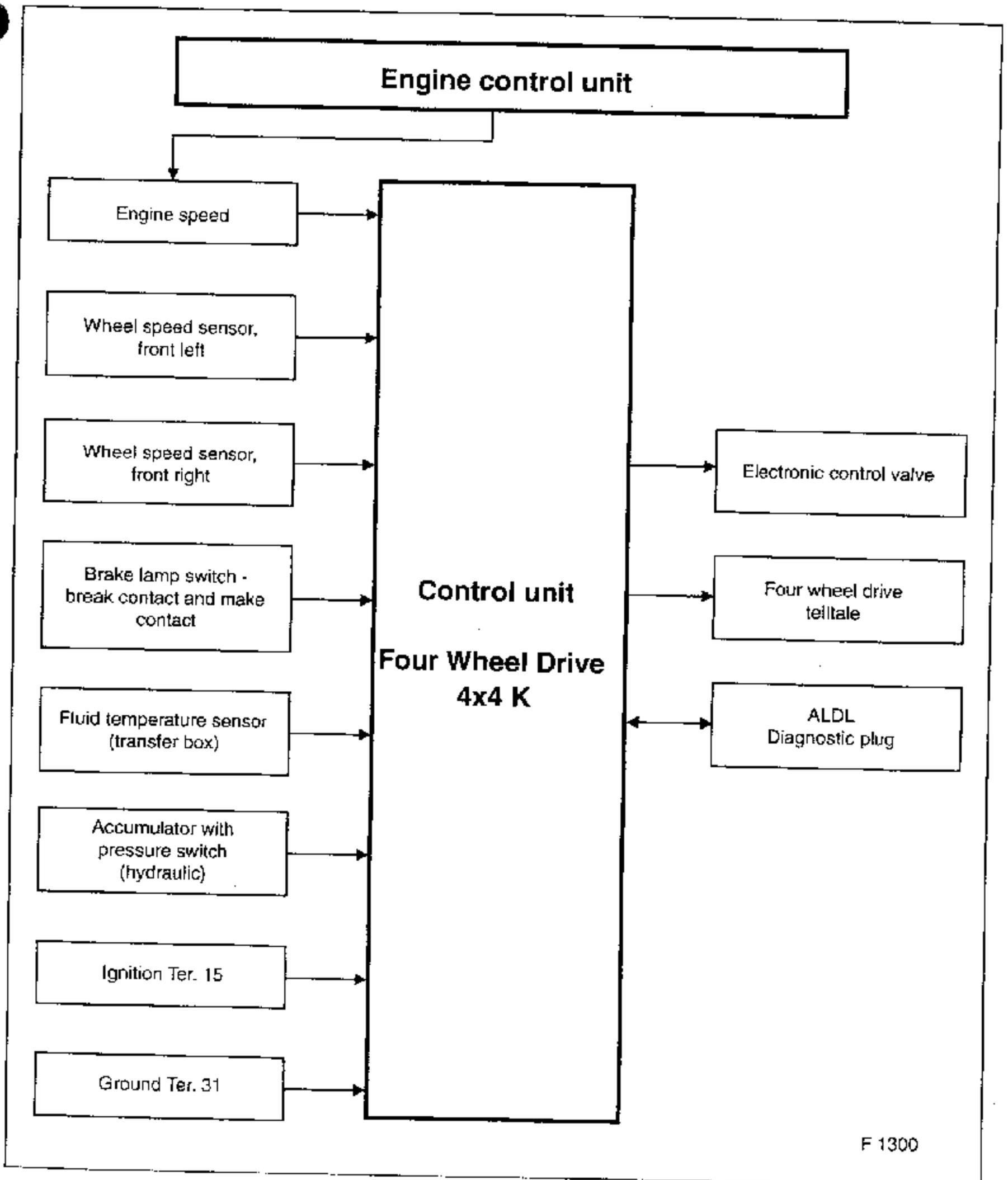


Illustration Key:

- | | | | |
|---|-------------------------------------------------------|---|---------------------------|
| 1 | Pulse Pick-up for engine speed | 5 | Electronic control unit |
| 2 | Accumulator | 6 | Plug connection X21/X22 |
| 3 | Control valve with solenoid valve and pressure switch | 7 | Brake lamp switch |
| 4 | Diagnostic plug | 8 | Four wheel drive telltale |

TRANSFER BOX

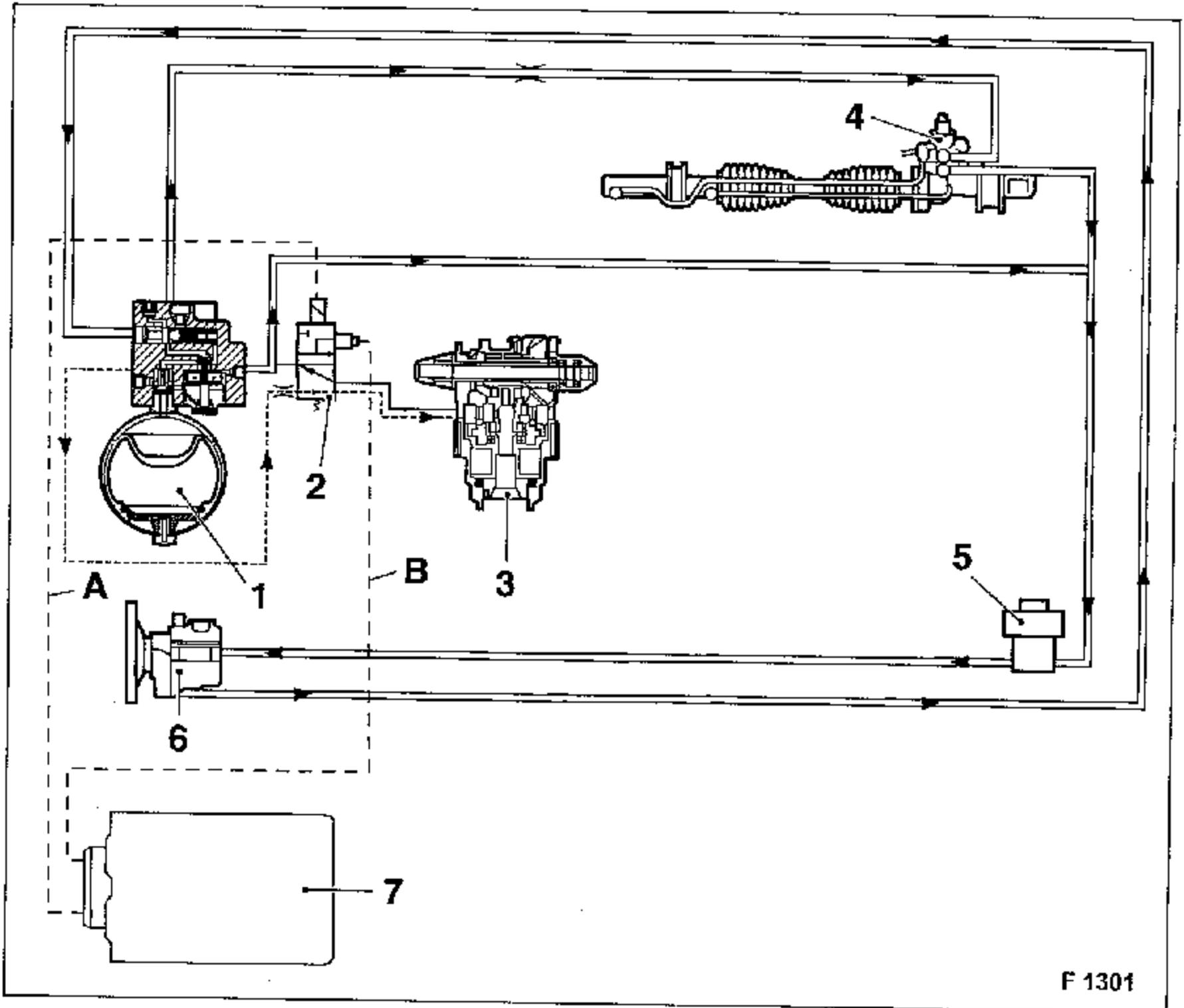
3.2 Block Diagram, Four Wheel Drive (4x4 K)



TRANSFER BOX

3.3 Hydraulic Regulation

3.3.1 Survey of Hydraulic System



- | | | | |
|---|-------------------------------------------------------|---|-------------------------------------------------------|
| 1 | Accumulator | 5 | Fluid reservoir - power steering and four wheel drive |
| 2 | Control valve with solenoid valve and pressure switch | 6 | Fluid pump |
| 3 | Transfer box | 7 | Control unit, 4x4 K |
| 4 | Power steering | A | Electr. connection, control unit to solenoid valve |
| | | B | Electr. connection, control unit to pressure switch |

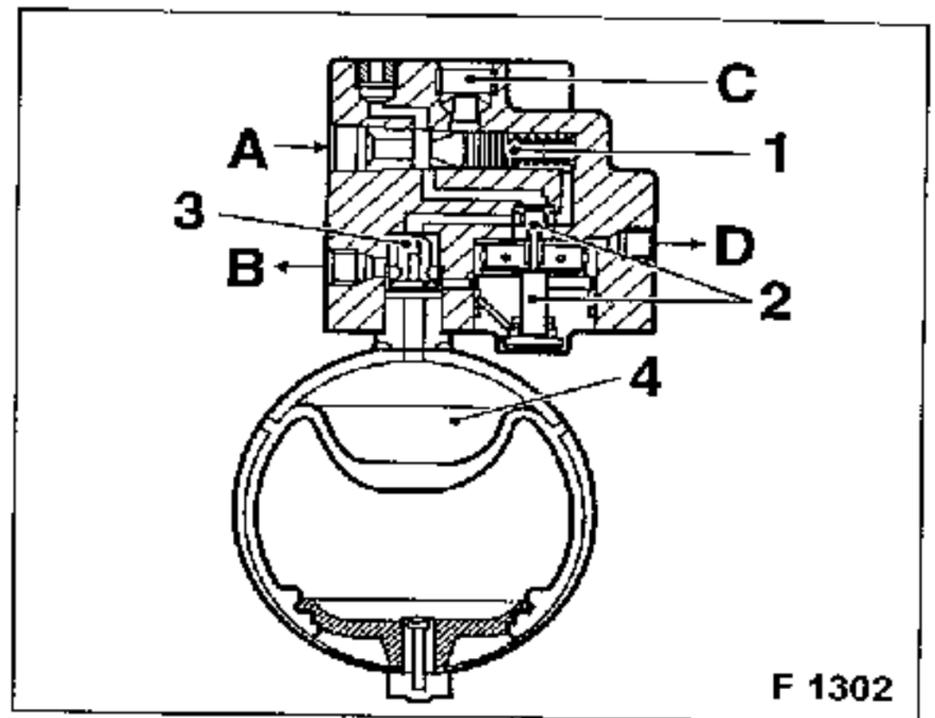
TRANSFER BOX

Survey of Hydraulic System (Continued)

Accumulator

- 1 Throttle valve
- 2 Shift valve
- 3 Non-return valve
- 4 Accumulator

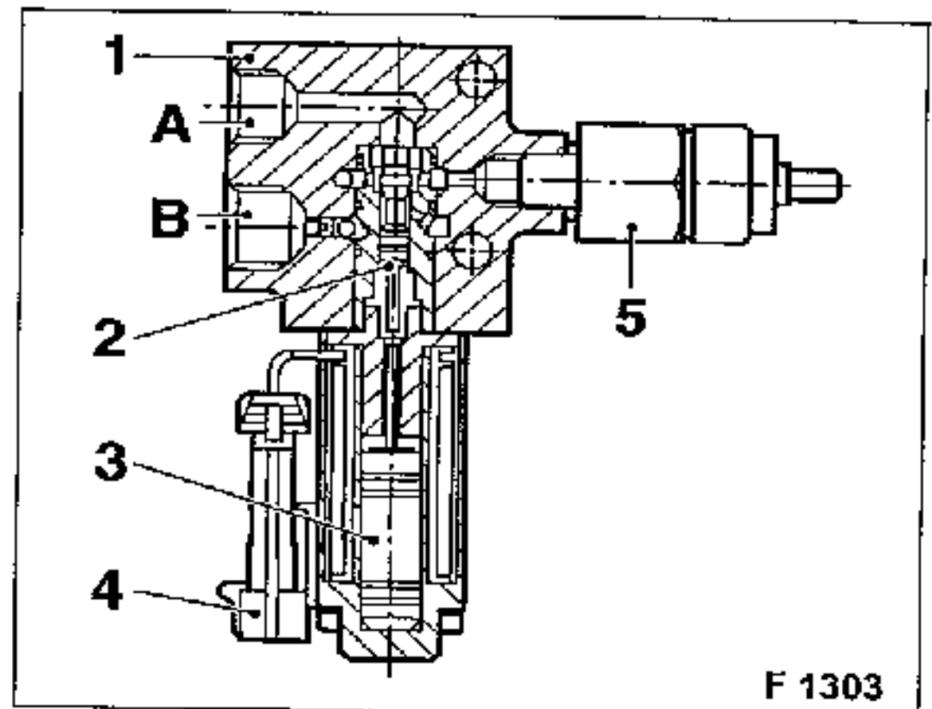
- A = from power steering fluid pump to fluid pressure regulator
- B = from accumulator to control valve
- C = from fluid pressure regulator to power steering
- D = from fluid pressure regulator to fluid reservoir



Control Valve

- 1 Valve body
- 2 Valve plunger
- 3 Solenoid
- 4 Electric plug connection
- 5 Pressure switch
- A Connection for return line
- B Connection from accumulator

The sectional view does not show the connection to the transfer box.



TRANSFER BOX

4 Abbreviations, Definitions

BATTERY VOLTAGE	=	Battery voltage
ENGINE SPEED	=	Actual engine speed
FL WHEEL SPEED	=	Wheel speed, front left wheel
FR WHEEL SPEED	=	Wheel speed, front right wheel
BRAKE SWITCH 1	=	Signal from brake lamp switch 1
BRAKE SWITCH 2	=	Signal from brake lamp switch 2
PRESSURE SWITCH	=	Hydraulic pressure switch, transfer box
SOLENOID VALVE	=	Solenoid valve, transfer box
OIL TEMPERATURE	=	Fluid temperature sensor in transfer box
CHECK LIGHT	=	Four wheel drive telltale

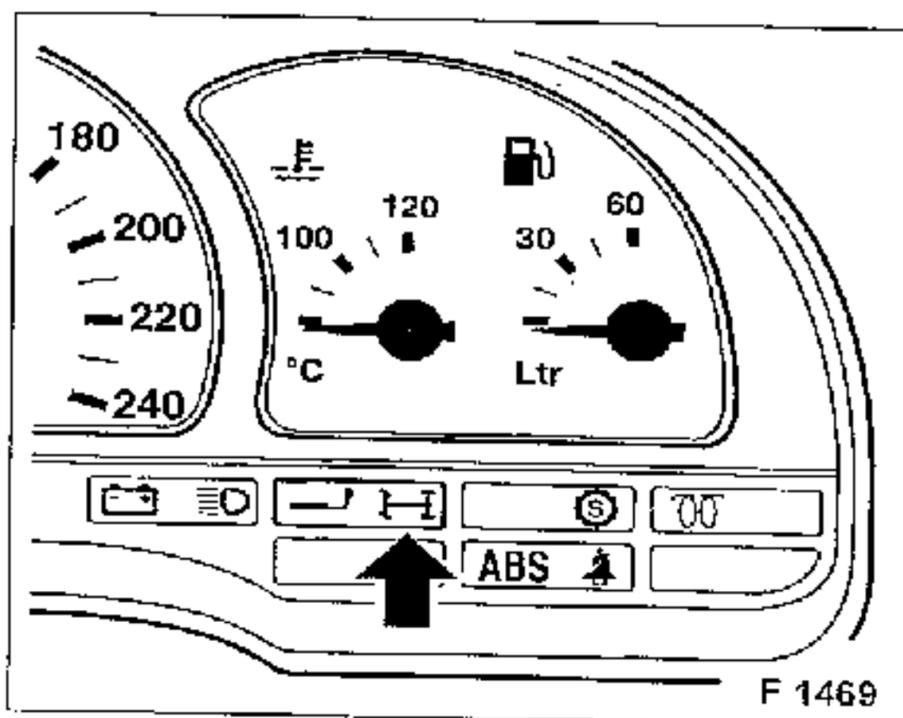
5 Checking

5.1 General Information

The four wheel drive is equipped with self-diagnosis.

If a fault is recognised, the control unit stores a two-digit trouble code. Note the following:

- **If the four wheel drive telltale illuminates constantly** and only extinguishes when the ignition is switched off, a fault has occurred, and has been recognised and stored by the control unit.
The four wheel drive is switched off. Braking stability is nonetheless guaranteed.



- **If the four wheel drive telltale flashes**, it must be assumed that the four wheel drive will not switch off during braking. This means that the vehicle does not brake with its usual stability, especially in low friction road conditions (ice, snow, rain).

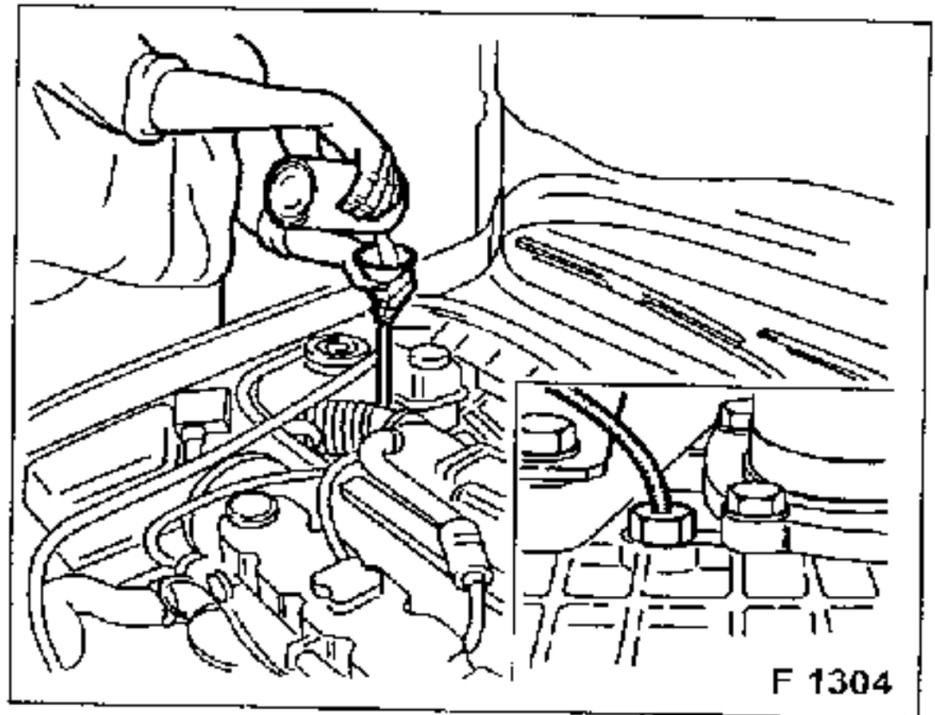
TRANSFER BOX

5.2 Fluid Level Check and Bleeding

Filling the Transfer Box

The transfer box is filled via its vent hose. Fluid also penetrates to the visco-clutch bearings through a bore in the interior of the transfer box. Therefore, note the following:

When filling or draining fluid, proceed with utmost care. Before filling the transfer box, unscrew the fluid temperature sensor. Use a funnel for filling.



The fluid flows very slowly. If poured in too quickly (capacity approx. 0.6 ltr.), the fluid will spill back out of the check bore. Note the filling capacity. The same applies for draining fluid. Fluid should be drained in a controlled manner to allow the amount of fluid which has already been lost to be determined. The amount of fluid which is drained can be used as a guide for the amount of fluid to be topped up.

Fluid Level Check in Transfer Box

The fluid in the transfer box must be changed as specified by the maintenance intervals in the Opel/Vauxhall Inspection System.

Top up the fluid to the lower edge of the checking bore.

For further details on the fluid change, consult the Service Instructions and the "Opel/Vauxhall Inspection System" brochure.

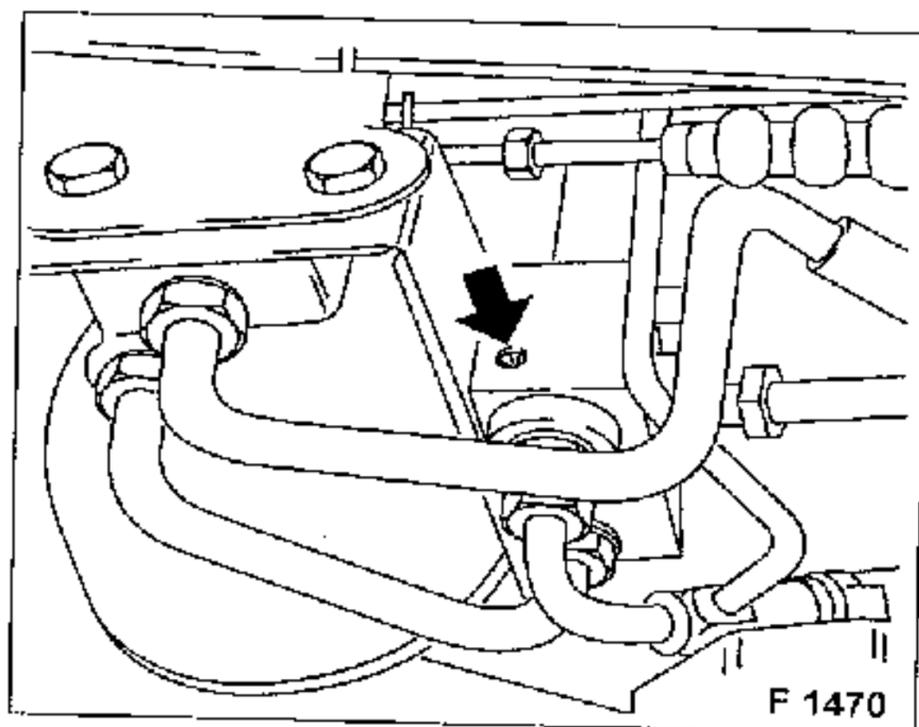
TRANSFER BOX

Hydraulic System, Bleed

Remove fuse F19 from the fuse box.
Open bypass bolt (see arrow in illus. F 1470) on control valve (approx. 3 turns).

Fill compensation tank (see illus. F 1471) to mark "MAX" (1) and start engine.
Immediately top up sinking fluid level to mark "MIN" (2) and allow engine to run for approx. 5 minutes.

Turn steering to right full lock and hold in this position for approx. 5 seconds; repeat procedure with steering at left full lock.

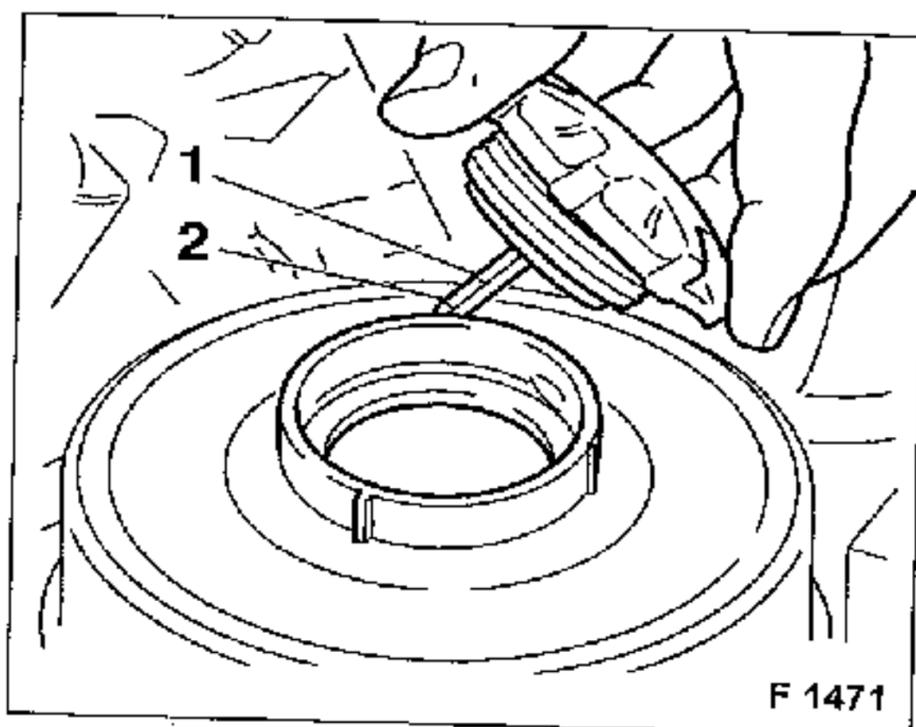


Close bypass bolt for 20 seconds and open again.
After a further 20 seconds, close bypass bolt (with 1.4 Nm/1 lbf. ft.).
Switch off engine.
Insert fuse F19 and switch on ignition.
Actuate brakes approx. 25 times.

Fluid level check:

Fluid at operating temperature
(approx. 80 °C/176 °F)
to mark "MAX" (1)

Fluid cold (approx. 20 °C/68 °F)
to mark "MIN" (2)



GROUP J

DOUBLE OVERHEAD CAM ENGINE

ENGINE TIMING SIDE, AIR CLEANER HOUSING

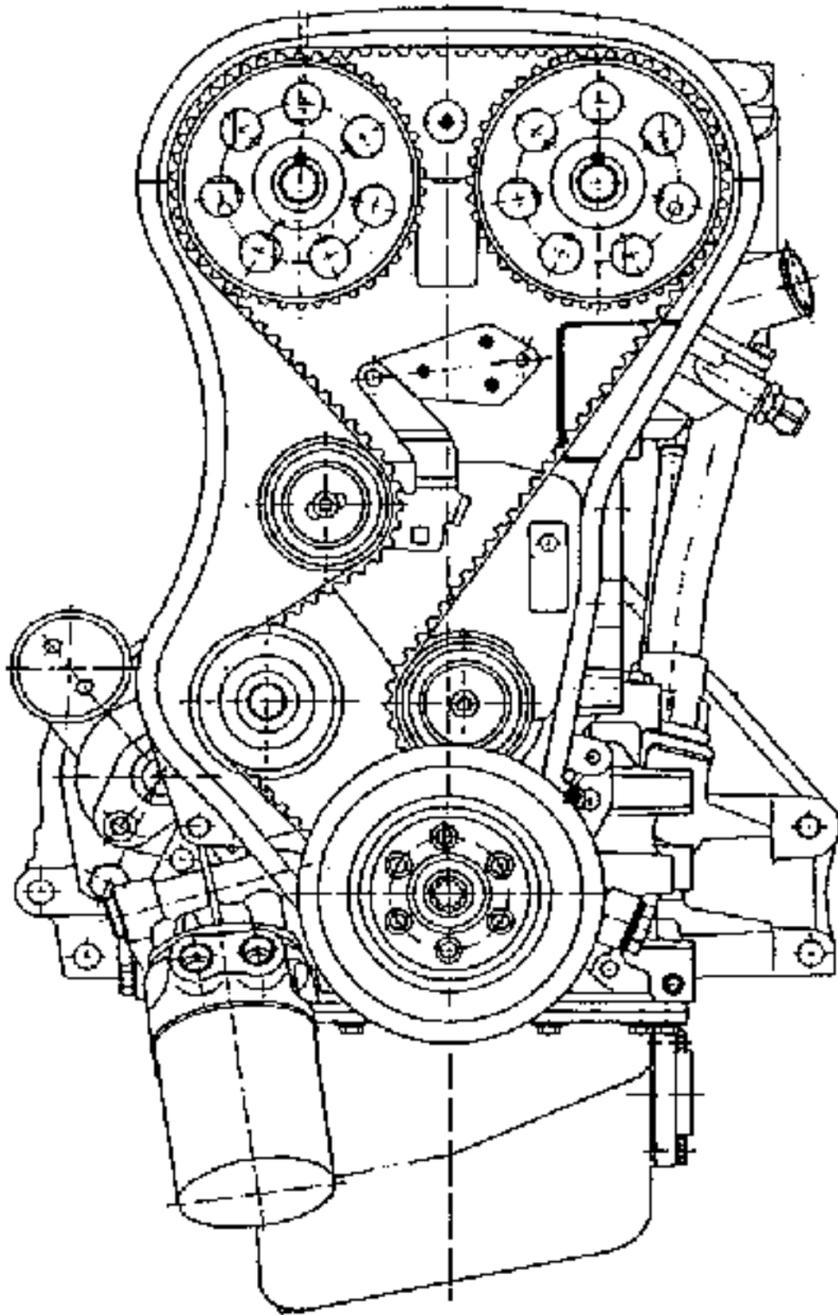
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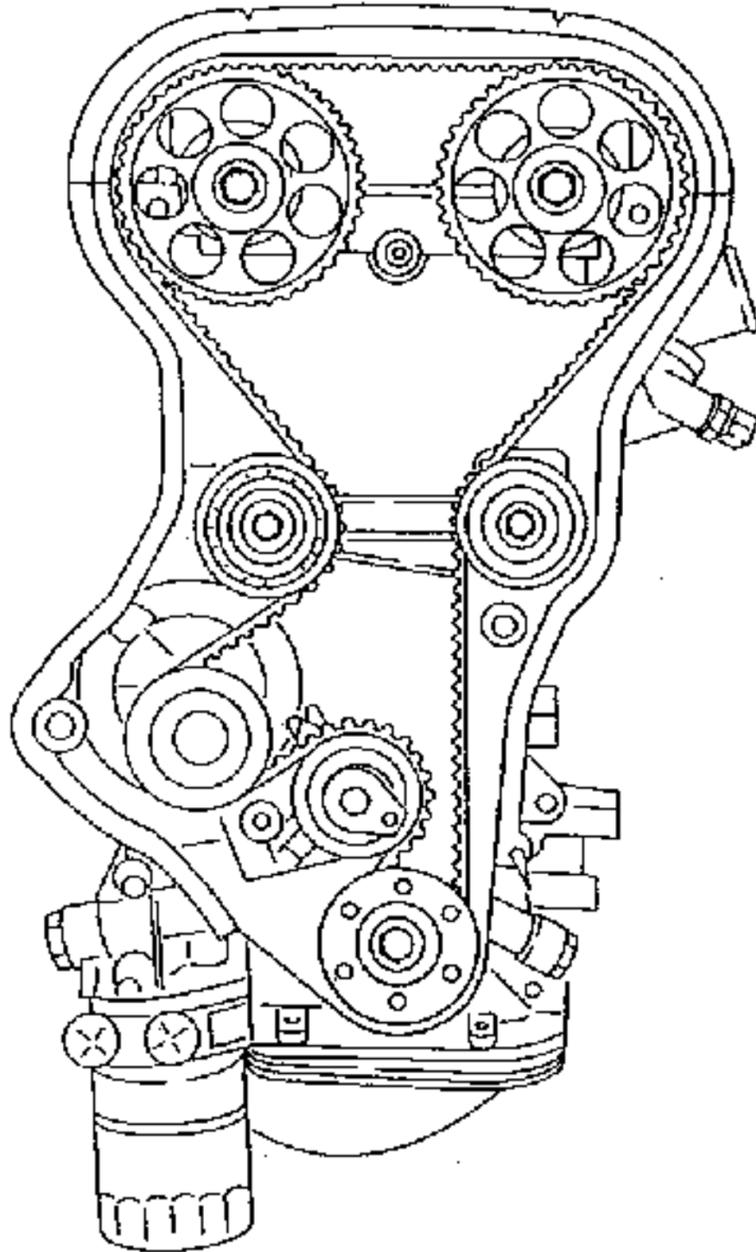
DOHC ENGINE - ENGINE TIMING SIDE/AIR CLEANER

ENGINE TIMING SIDE

Engine Timing -
C 20 XE (Up to MY'93)



Engine Timing -
C 20 XE and C 20 LET (As of MY'93)

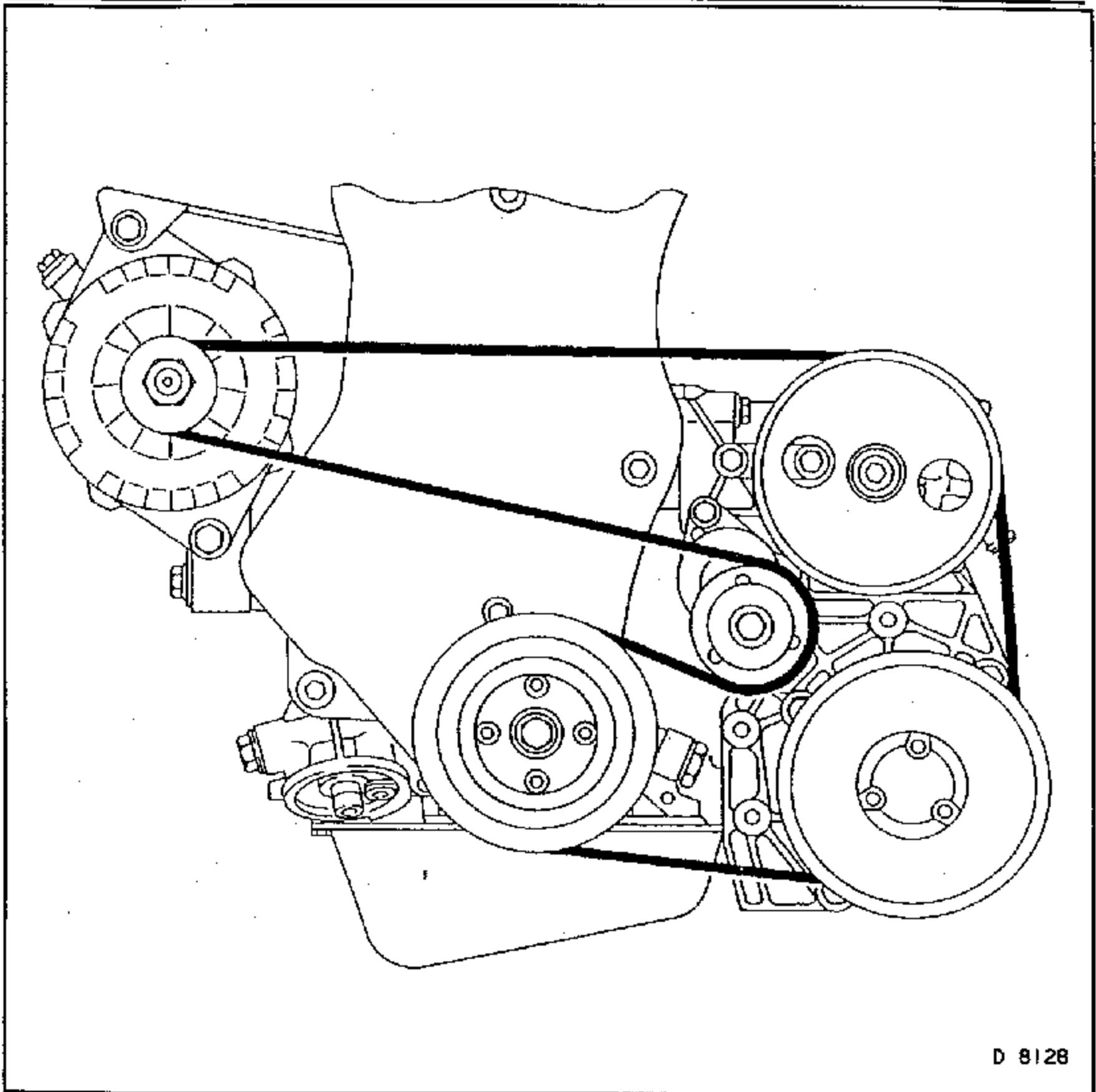


2 litre DOHC Engines

Important!

As the toothed belt, tooth profile also changed with the introduction of the automatic toothed belt tension roller from MY'93, the new belt will not service back to earlier engines unless all toothed belt gears are also changed. The tooth profile changed from a 'curvilinear' to a 'modified curvilinear' design.

DOHC ENGINE - ENGINE TIMING SIDE/AIR CLEANER



C 20 XE and C 20 LET - Ribbed V-belt Routing with Power Steering and Air Conditioning

DOHC ENGINE - ENGINE TIMING SIDE/AIR CLEANER

Ribbed V-belt, Replace (Engines as of MY '93, with Power Steering and A/C)

Remove, Disconnect

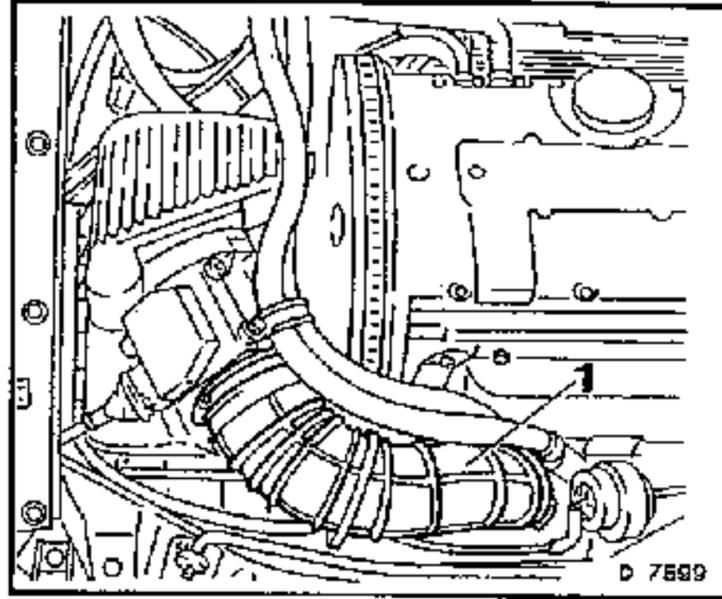
C 20 XE:

Air intake hose from air cleaner, engine compartment cover.

C 20 LET:

Air intake hose (1) between hot wire mass air flow meter and turbocharger.

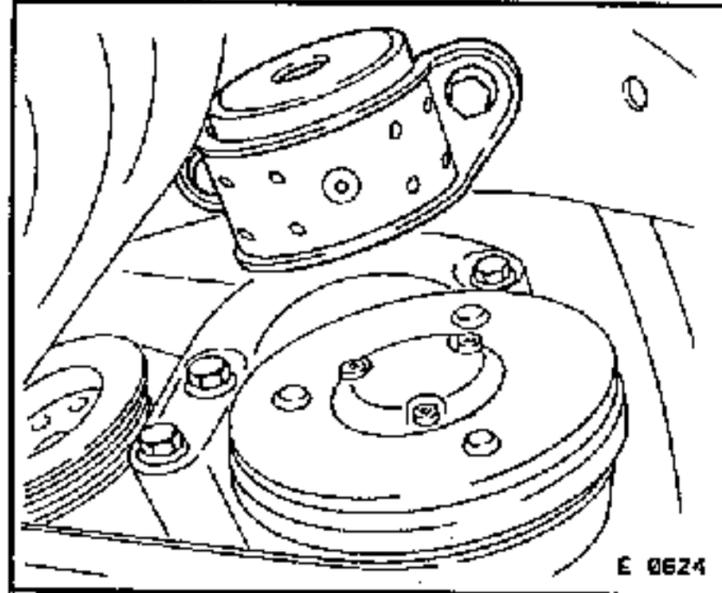
Attach engine to Engine Holder KM-263-B.



Remove, Disconnect

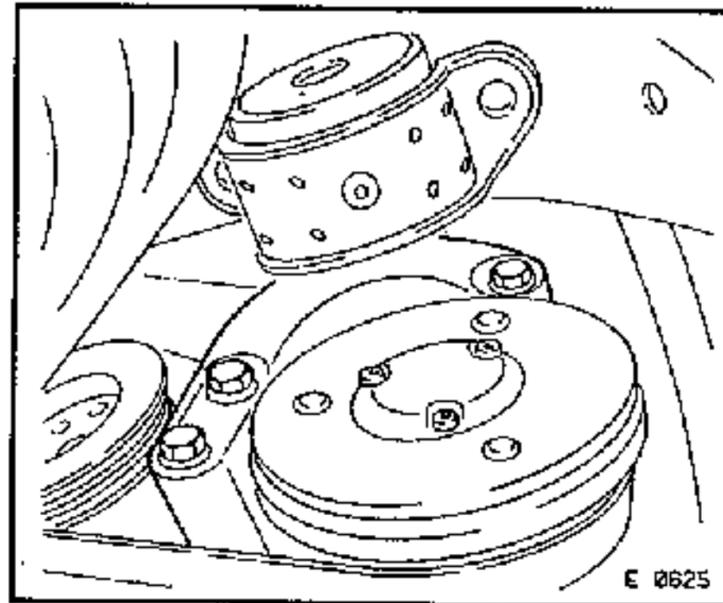
Right engine damping block from side member. Slowly lower engine.

Detach panelling from wheel housing.



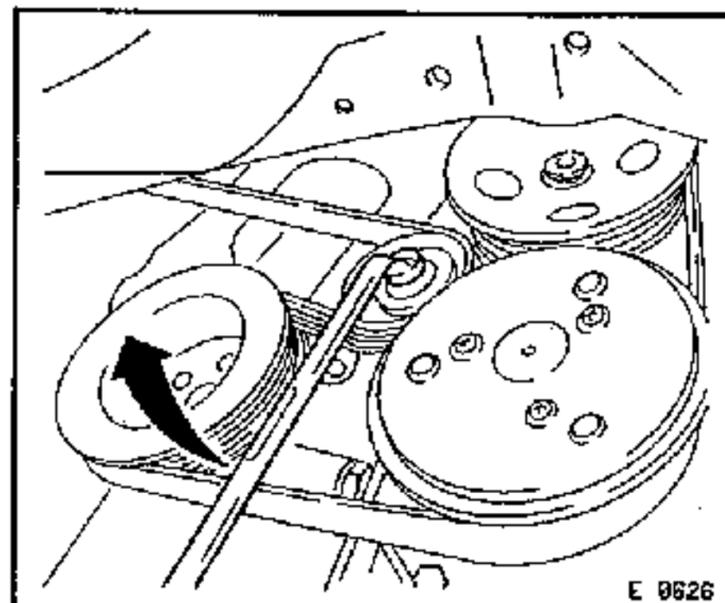
Remove, Disconnect

Engine damping block bracket from power steering pump/compressor support.



Remove, Disconnect

Release V-belt via ribbed V-belt-tension roller in direction of arrow and remove ribbed V-belt.



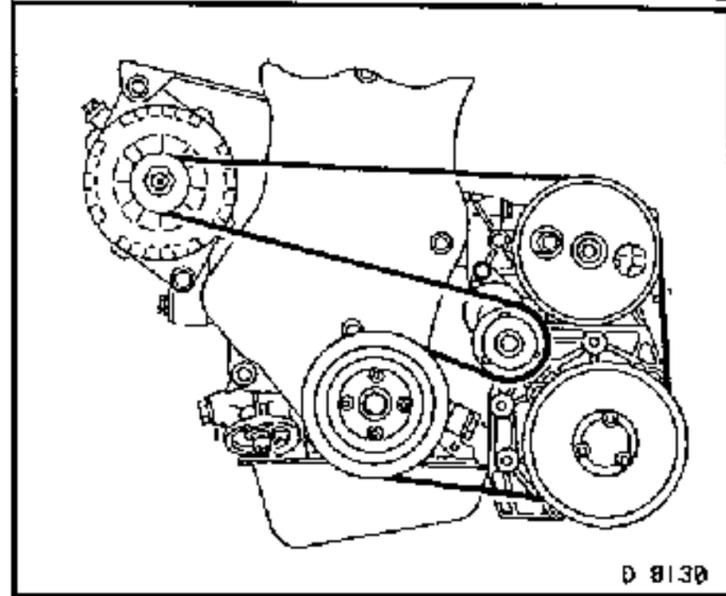
DOHC ENGINE - ENGINE TIMING SIDE/AIR CLEANER

Install, Connect

Install ribbed V-belt. Tension ribbed V-belt via ribbed V-belt tension roller.

Note ribbed V-belt routing.

The ribbed V-belt is automatically tensioned by the ribbed V-belt tension roller.



Install, Connect

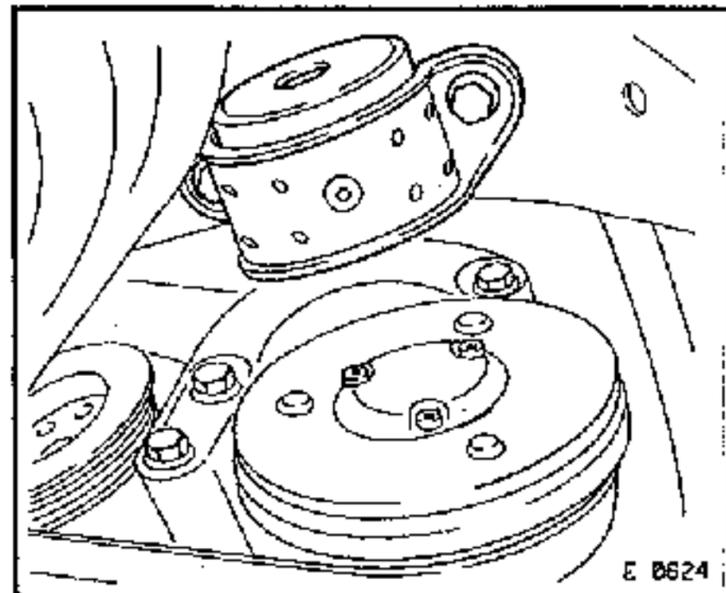
Engine damping block bracket, engine damping block to side member.

Paneling to wheel housing.

Tighten (Torque)

Engine damping block bracket to
P/S pump / A/C compressor support..... 60 Nm
Engine damping block to side member..... 65 Nm *

* Clean threads and install with sealing compound to Holden's Specification HN1256 - Loctite 242 or equivalent.

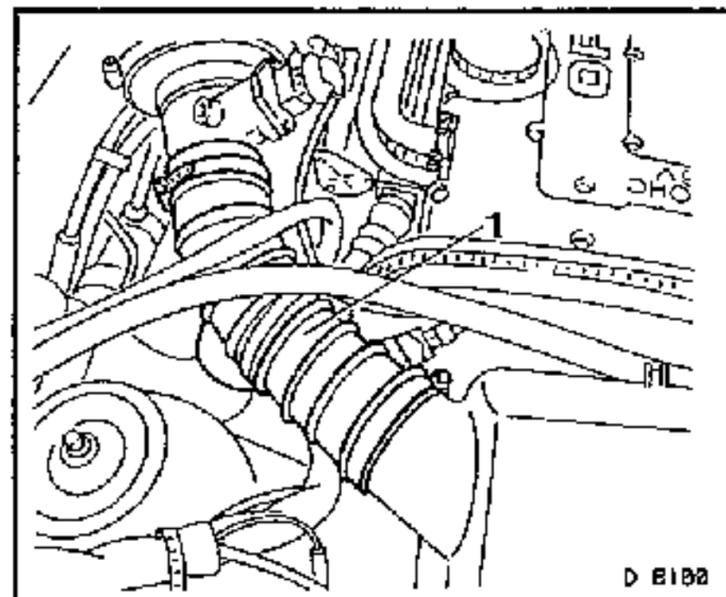


Install, Connect

Remove Engine Holder KM-263-B.

C 20 XE:
Engine compartment cover, air intake hose (1) to air cleaner.

C 20 LET:
Air intake hose to hot wire mass air flow meter or to turbocharger.



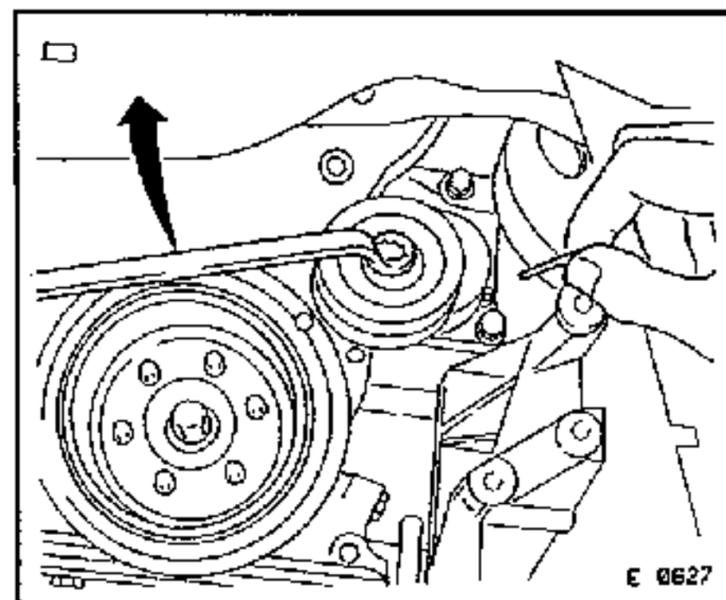
Ribbed V-belt Tension Roller, Replace (with Power Steering and A/C)

Note:
This operation is described for an engine with power steering but the procedure is similar for engines fitted with power steering and air conditioning.

Remove, Disconnect

Ribbed V-belt - see previous operation in this Section.

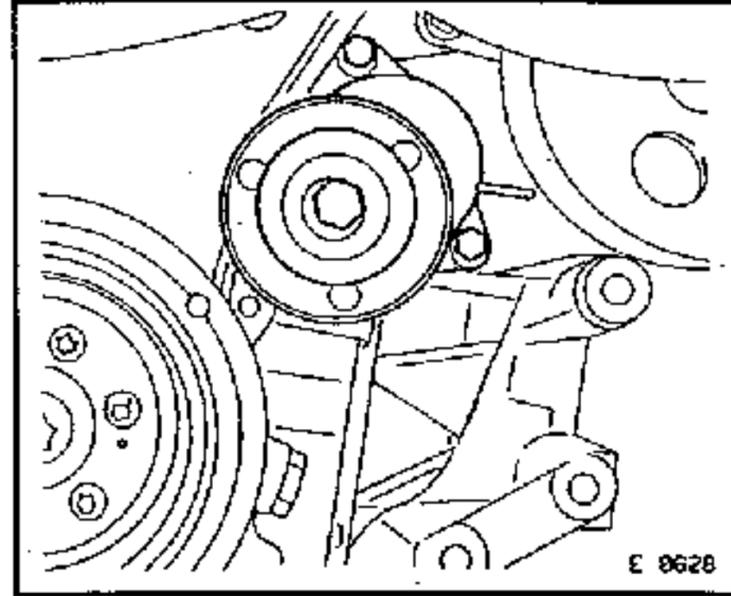
Tension ribbed V-belt-tension roller in direction of arrow using ring spanner and insert retaining pin in special opening.



DOHC ENGINE - ENGINE TIMING SIDE/AIR CLEANER

Remove, Disconnect

Ribbed V-belt- tension roller from support.



Install, Connect

New ribbed V-belt tension roller with retaining pin to support.

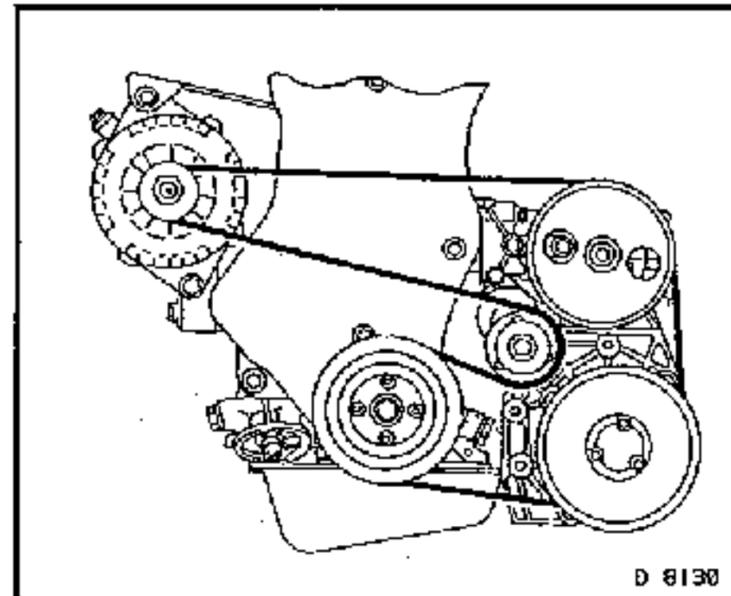
Tighten (Torque)

Ribbed V-belt tension roller to support... 18 Nm

Install, Connect

Install ribbed V- belt. Tension ribbed V-belt tension roller and remove retaining pin.

Ribbed V-belt - see previous operation in this Section.



Engine Accessories Bracket, Replace (With Power Steering & A/C)

Note:

The following describes the bracket removal procedure without disconnecting either the hydraulic or the air conditioning systems.

Remove, Disconnect

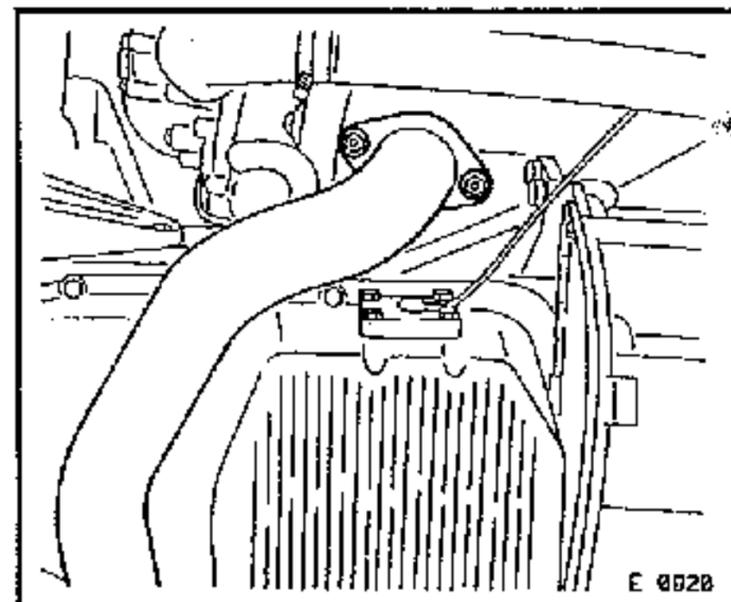
Ground cable from battery.

C 20 XE:

Performance header - refer to operation in the Section "Cylinder Head" in this Volume.

C 20 LET:

Front exhaust pipe.

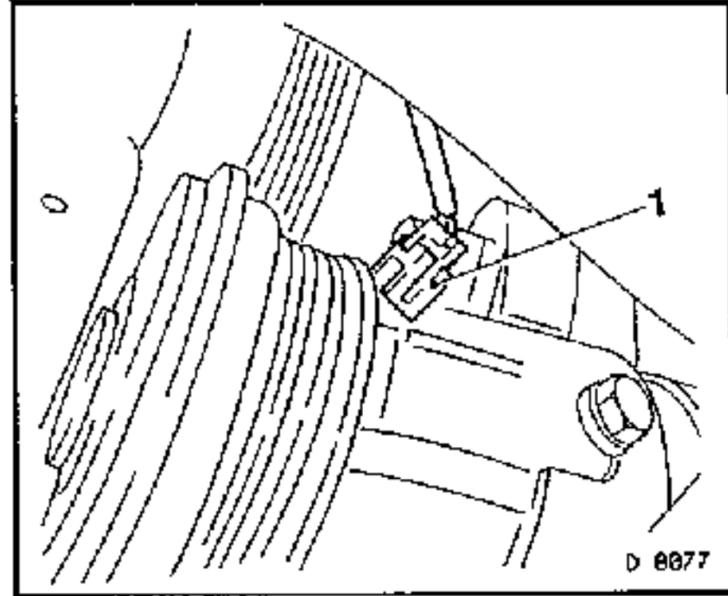


DOHC ENGINE - ENGINE TIMING SIDE/AIR CLEANER

Remove, Disconnect

Ribbed V-belt in conjunction with power steering and A/C. Refer "Ribbed V-belt Replace", in this Section.

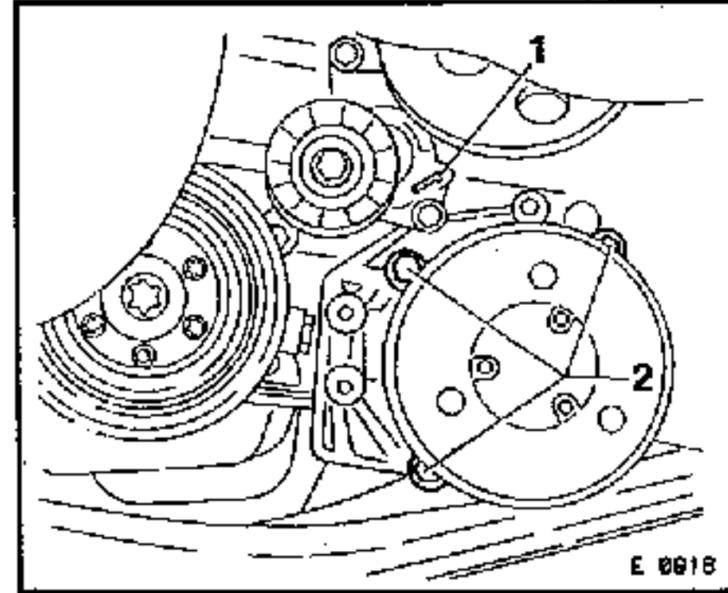
Wiring harness plug (1) from AC compressor.



Remove, Disconnect

Insert retaining pin (1) in ribbed V-belt tension roller.

Front fastening bolts (2) from A/C compressor.



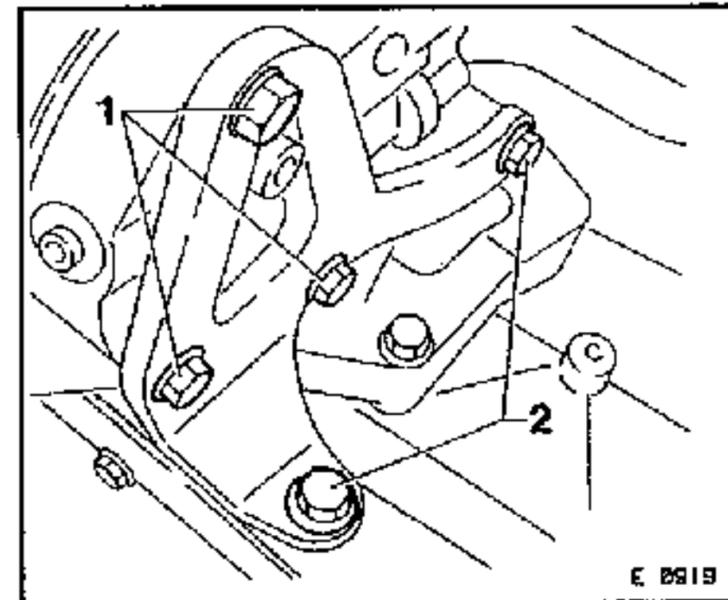
Remove, Disconnect

Rear fastening bolts (1) from A/C compressor.

Bracket fastening bolts (2) from support or from cylinder block.

Note:
The different bolt lengths.

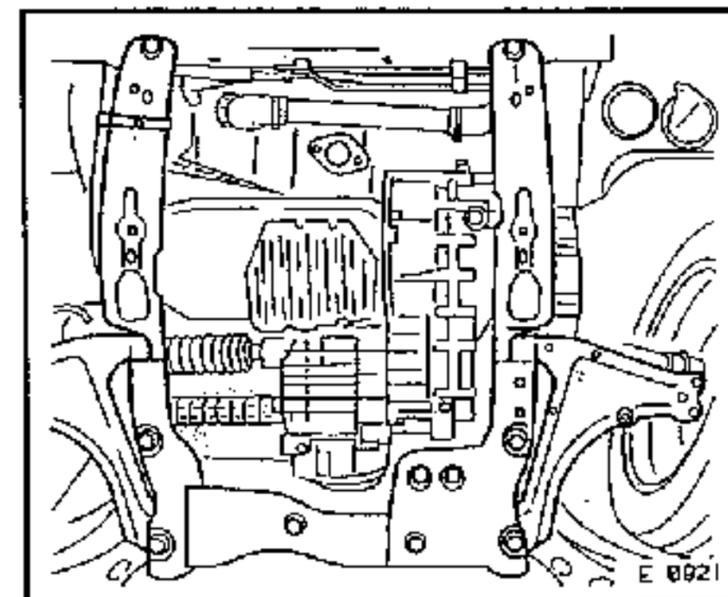
Place A/C compressor on front axle body.



Remove, Disconnect

Front axle body - see group E, in Volume 1 of these Service Instructions for details.

Note:
When the front axle body is lowered, check that the refrigerant lines are not under tension - support A/C compressor or detach.

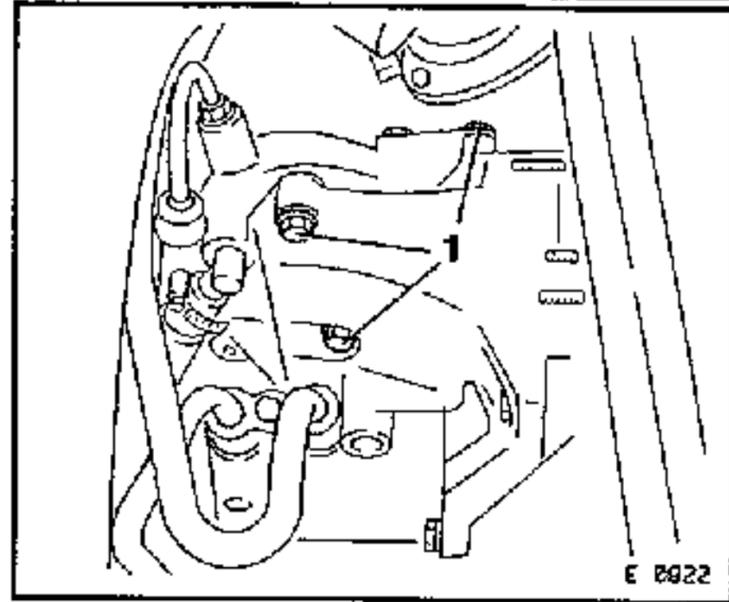


DOHC ENGINE - ENGINE TIMING SIDE/AIR CLEANER

Remove, Disconnect

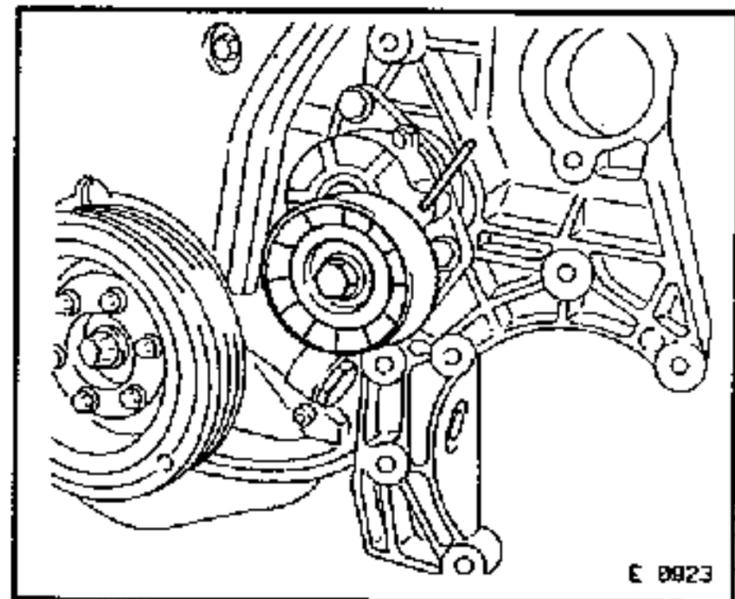
Fastening bolts (1) from the power steering pump.

Support power steering pump by tying to a suitable point, avoiding tension on the hydraulic hoses.



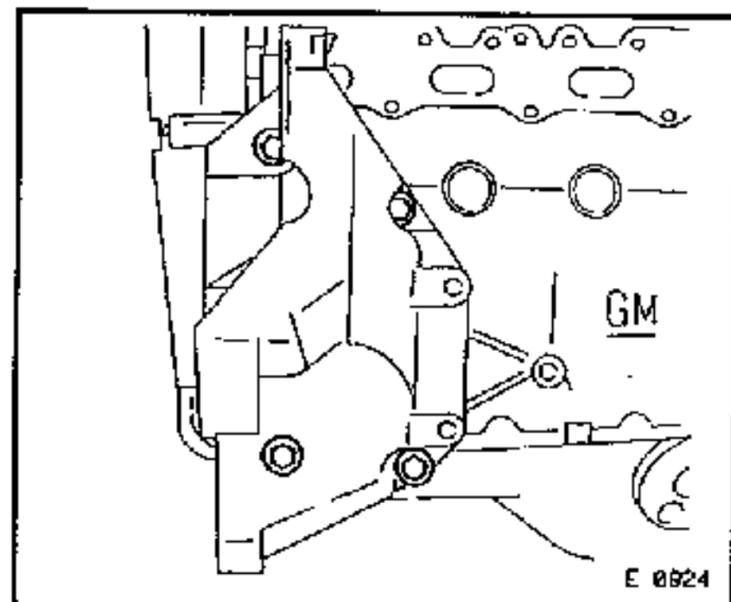
Remove, Disconnect

Ribbed V-belt tension roller from the support.



Remove, Disconnect

Support from cylinder block. Remove from below the vehicle.



Install, Connect

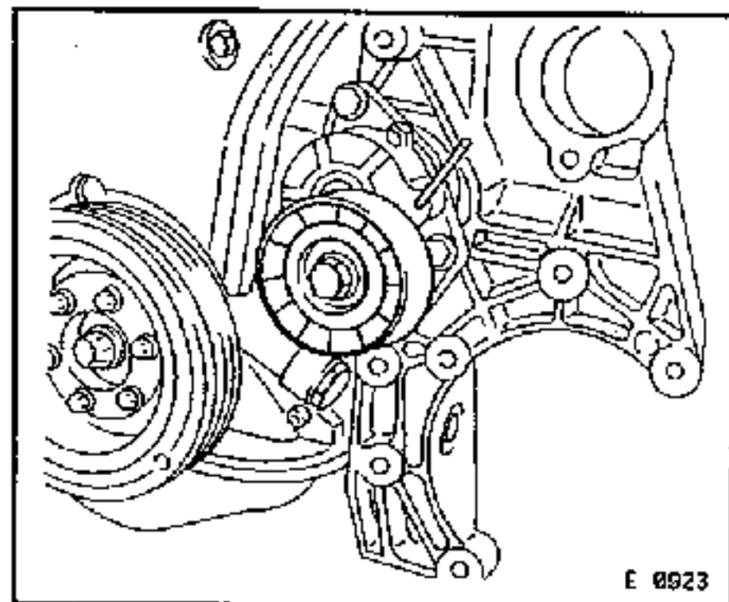
The support and the V-belt tension roller.

C 20 LET:

Before installing support - insert upper fastening bolt for the power steering hydraulic pump.

Tighten (Torque)

Support to cylinder block	35 Nm
Ribbed V-belt tension roller to support ...	18 Nm



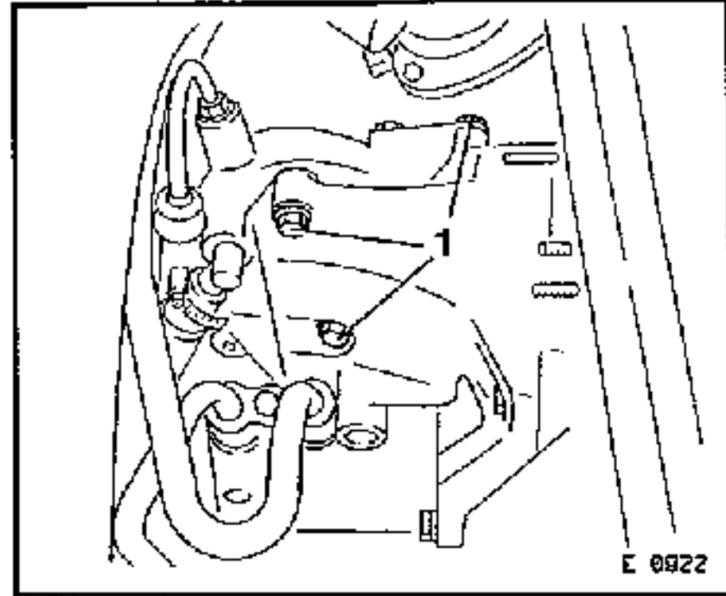
DOHC ENGINE - ENGINE TIMING SIDE/AIR CLEANER

Tighten (Torque)

- Power steering pump to support 25 Nm
- Shackle, power steering pump to support 18 Nm

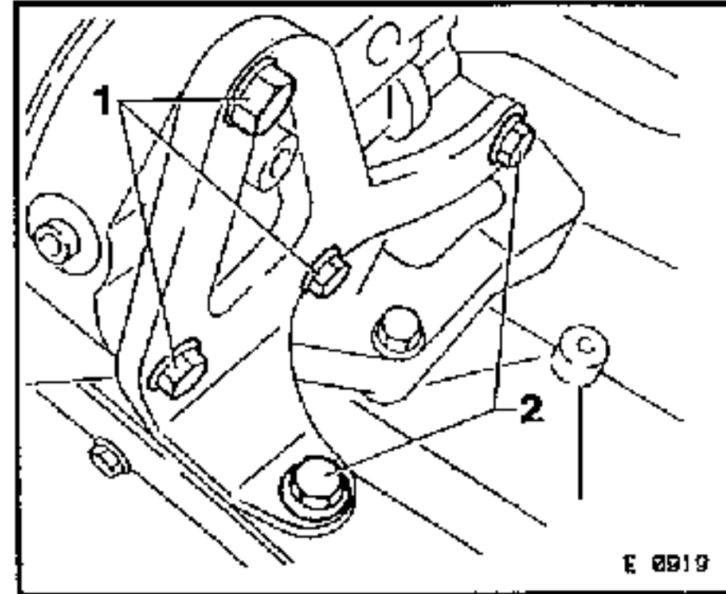
Install, Connect

Front axle body - see group E, in Volume 1 of these Service Instructions for details.



Tighten (Torque)

- Bolts (1) to A/C compressor 20 Nm
- Bolts (2) to support or to cylinder block 35 Nm
- A/C compressor to support 35 Nm



Install, Connect

Wiring harness plug to A/C compressor

Ribbed V-belt in conjunction with power steering and A/C. Refer "Ribbed V-belt Replace", in this Section.

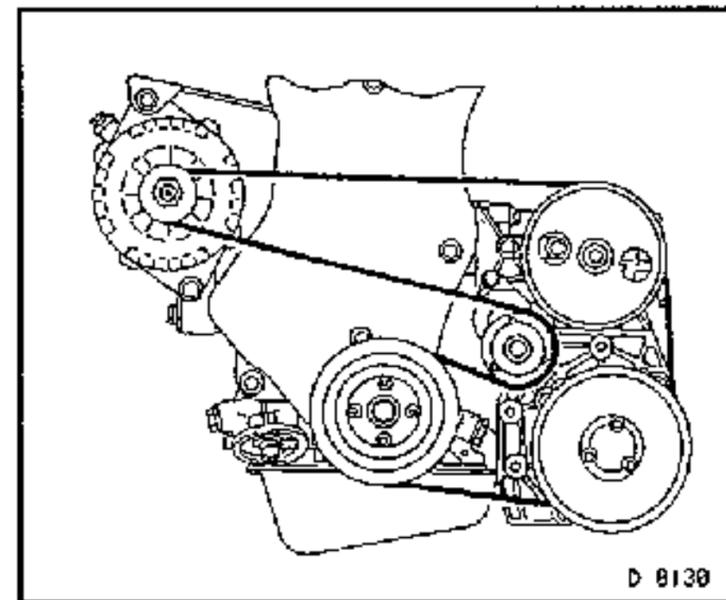
C 20 XE:

Performance header - refer to operation in the Section "Cylinder Head" in this Volume.

C 20 LET:

Front exhaust pipe.

Ground cable to battery.



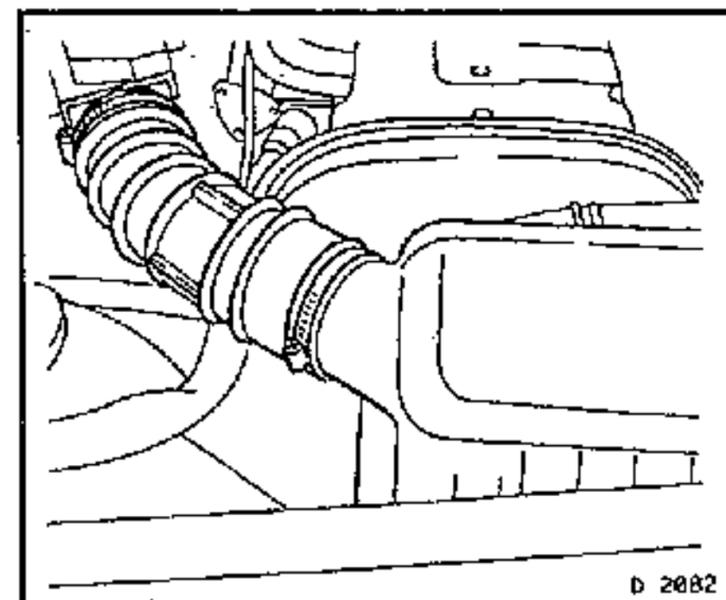
Toothed Belt, Replace (Engines up to MY'93)

Remove, Disconnect

Ground cable from battery.

Air intake hose.

Air cleaner housing. Refer to "Air Cleaner Housing, Remove and Install", at the end of this Section.

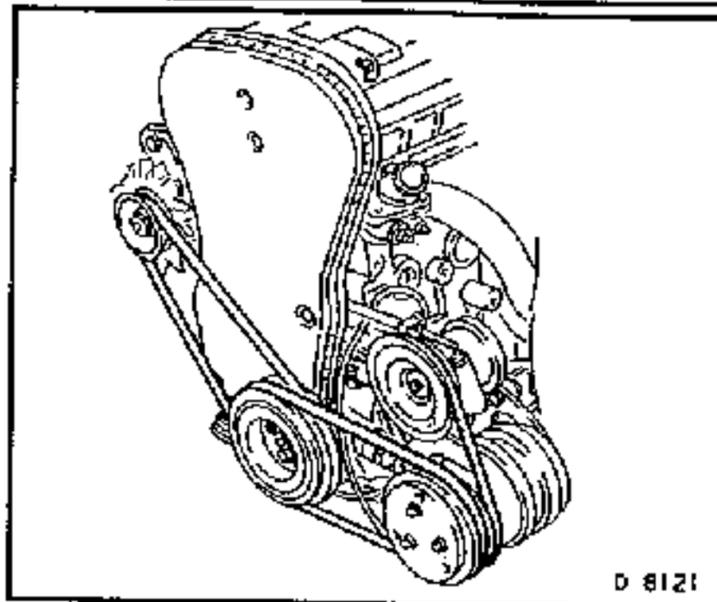


DOHC ENGINE - ENGINE TIMING SIDE/AIR CLEANER

Remove, Disconnect

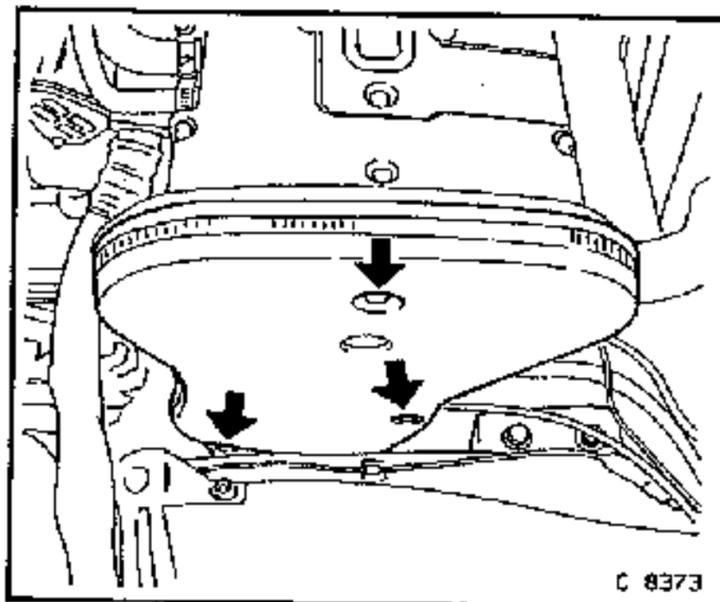
V-belts from alternator, A/C compressor and power steering pump.

Engine compartment cover.



Remove, Disconnect

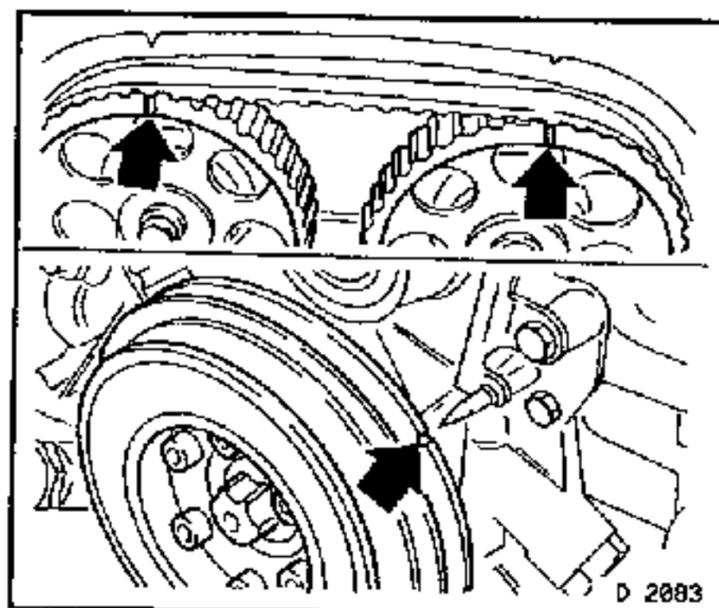
Front toothed belt cover (arrows).



Inspect

Using MKM-604-21 (Torx E 20) at the fastening bolt for the crankshaft pulley, turn the crankshaft slowly and evenly until No. 1 piston is at the "TDC" position, as indicated by the pulley notch and pointer being aligned. The camshaft gears should then be aligned as shown.

See "Valve Timing, Check and Adjust", on page J-279 in this Volume for more detail.

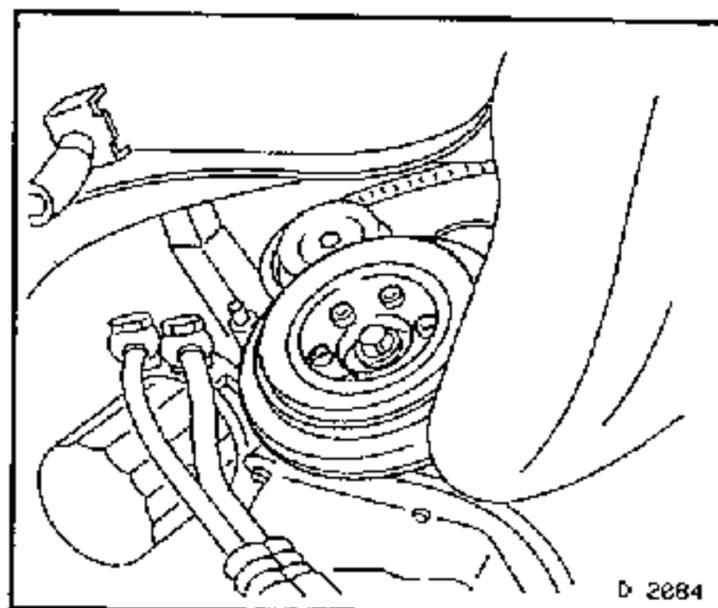


Remove, Disconnect

Crankshaft pulley using KM-321-1. Use MKM-604-21 (Torx E 20) to hold the pulley.

Important!

Before removing the crankshaft pulley, check that the crankshaft pulley and camshaft gear marks are all aligned.



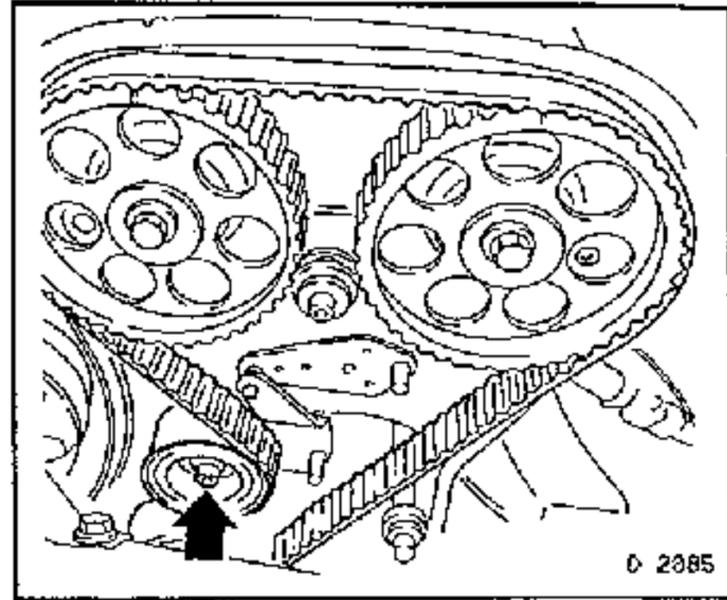
DOHC ENGINE - ENGINE TIMING SIDE/AIR CLEANER

Remove, Disconnect

Toothed belt tension roller (arrow) and remove toothed drive belt.

Important!

Do not turn the crankshaft or camshaft/s when the toothed belt tension roller is released.



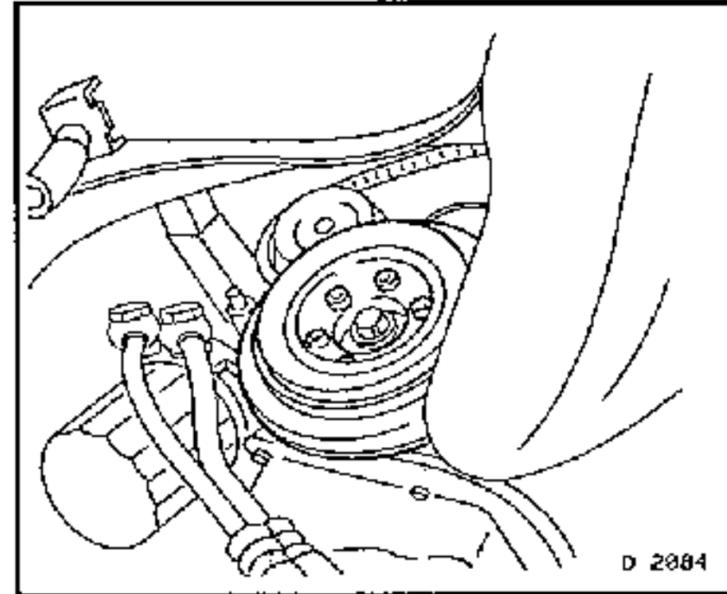
Install, Connect

New toothed belt, with the tension side, tightened.

Crankshaft pulley using KM-321-A. Use MKM-604-21 (Torx E 20) on a fastening bolt of the toothed belt drive gear to hold while tightening.

Tighten (Torque)

Crankshaft pulley to toothed belt drive gear..... 20 Nm



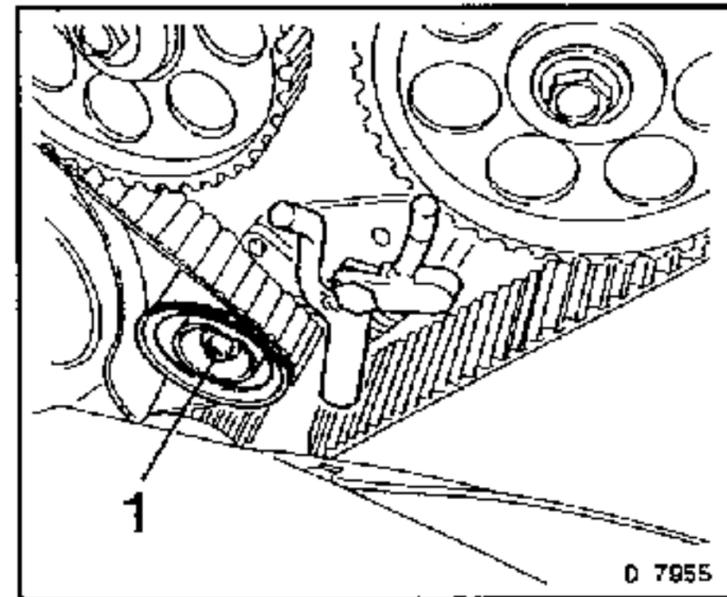
Adjust

Toothed belt tension.

Important!

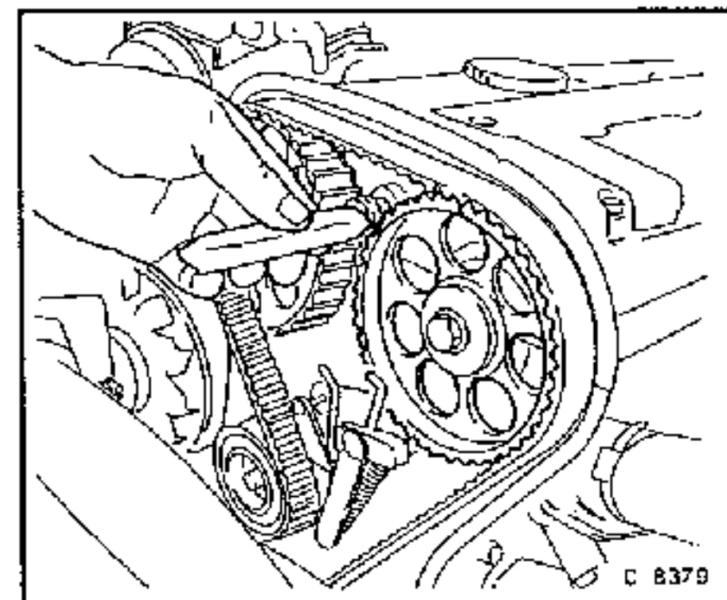
Adjust with then engine cold (ambient temperature).

Apply adjuster KM-666, with the fastening bolt (1) loosened.



Adjust

Mark the 8th tooth on the camshaft pulley, anti-clockwise from the TDC mark.



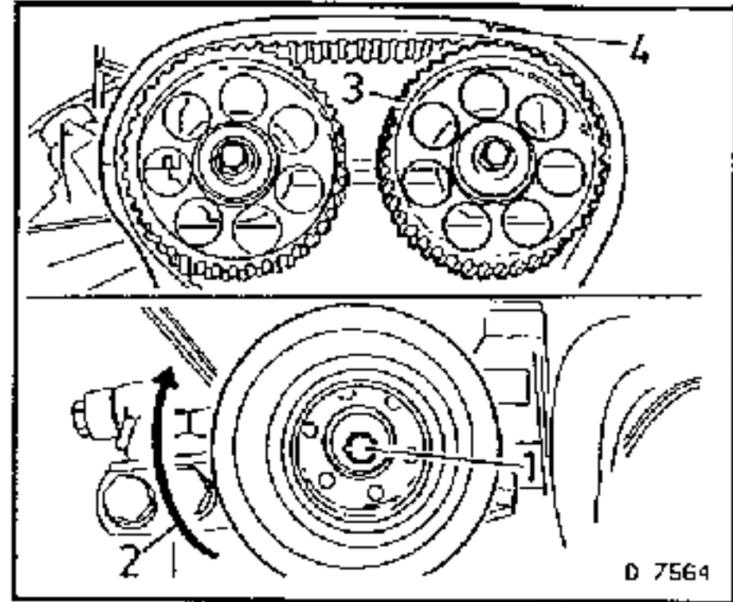
DOHC ENGINE - ENGINE TIMING SIDE/AIR CLEANER

Adjust

Using MKM-604-21 (Torx E 20) on the toothed belt drive gear (1), turn the crankshaft two turns in the direction of engine rotation (2), until the mark on the 8th tooth of the camshaft pulley (3) is aligned with the notch in the cylinder head cover (4).

Important!

Turn the crankshaft slowly and smoothly. Otherwise the toothed belt may jump a tooth.



Torque - Angle Method

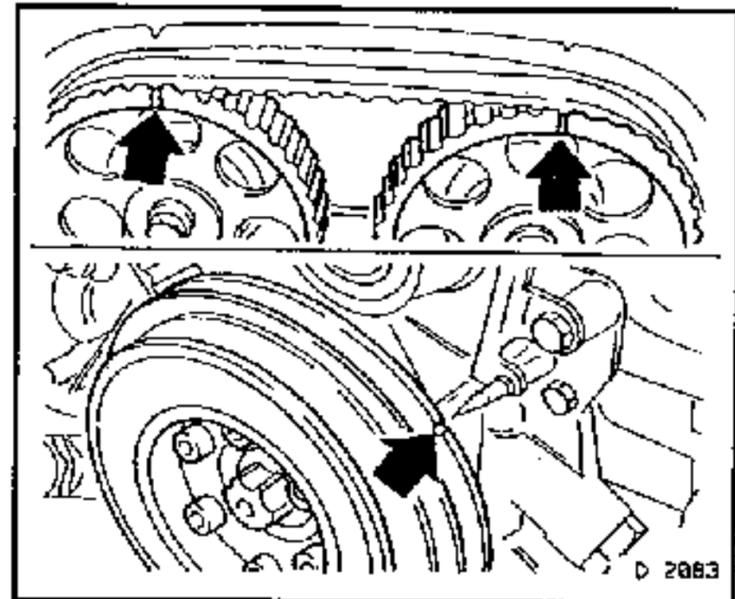
Toothed belt tension roller to cylinder block 25 Nm + 45° +15°

Important!

Use a new bolt.

Remove adjuster KM-666.

Turn camshaft pulleys in the direction of engine rotation until the TDC marks are lined up with the engine cover marks. The crankshaft pointer must then be aligned with the pointer (arrows).



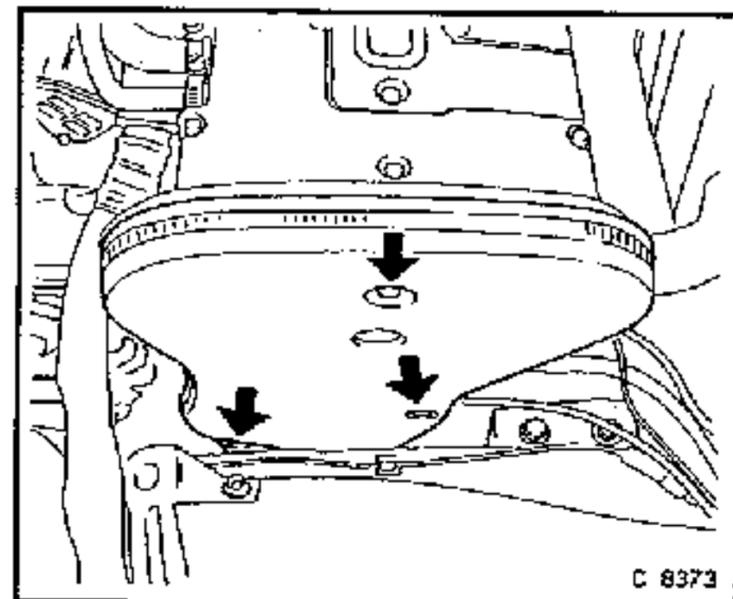
Install, Connect

Front toothed belt cover.

Tighten (Torque)

Front toothed belt cover bolts 8 Nm

Make sure that the rubber grommets on the fastening studs are firmly seated in position.

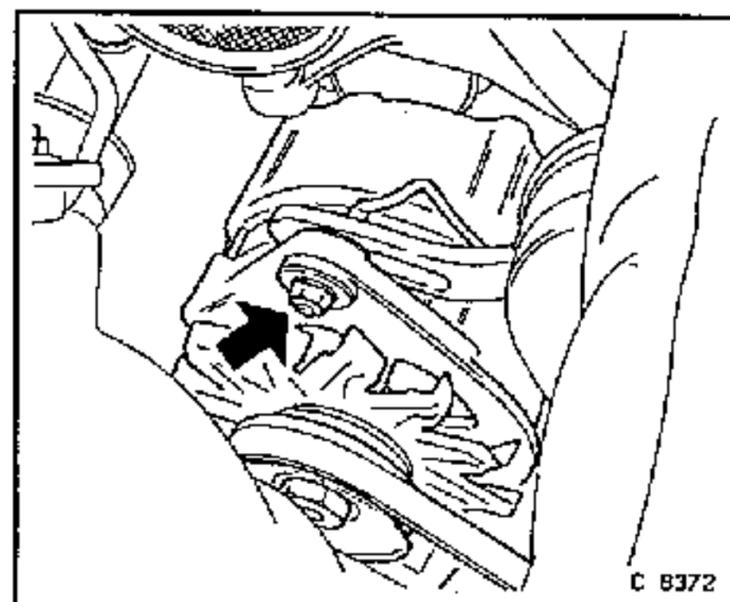


Install, Connect

V-belt to power steering pump, A/C compressor and alternator.

Adjust

V-belt tension. See operation in "Checking and Adjusting Procedures" on page J-272, in this Volume.



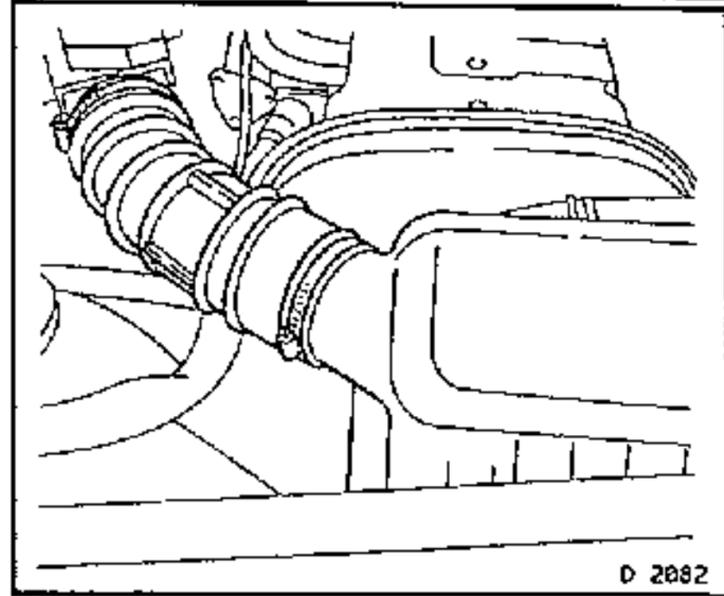
DOHC ENGINE - ENGINE TIMING SIDE/AIR CLEANER

Install, Connect

Air cleaner housing. Refer to "Air Cleaner Housing, Remove and Install", at the end of this Section.

Air intake hose.

Ground cable to battery.



Toothed Belt, Replace (Engines as of MY'93).

Remove, Disconnect

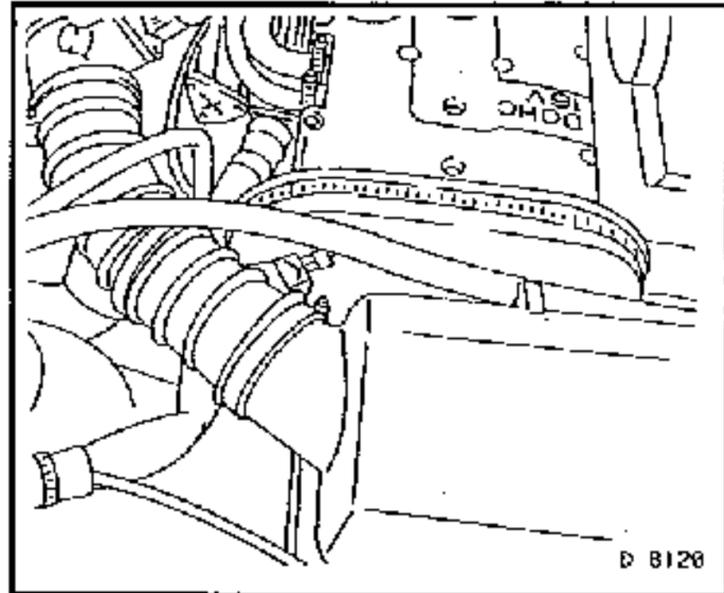
Ground cable from battery.

C 20 XE:

Wiring harness plug from intake air temperature sensor.

Air cleaner housing. Refer to "Air Cleaner Housing, Remove and Install", at the end of this Section.

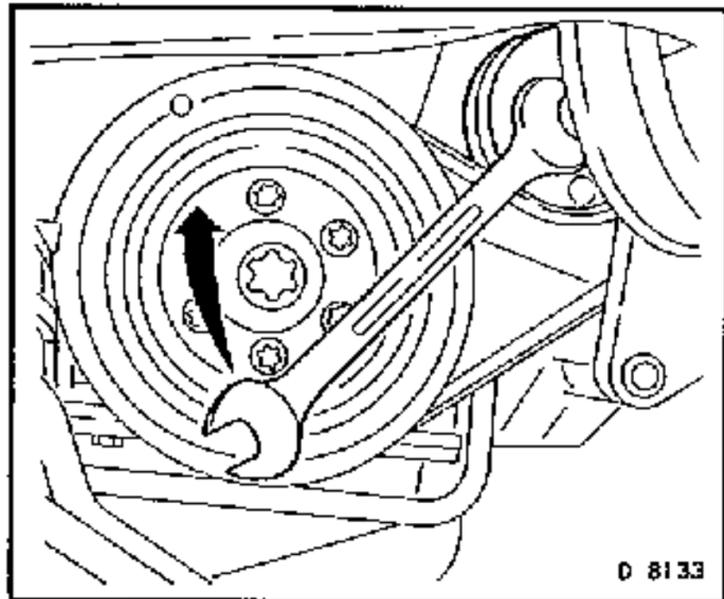
Engine compartment cover.



Remove, Disconnect

Mark rotational direction of ribbed V-belt.

Release V-belt by turning the V-belt tension roller in the direction shown, then remove V-belt.



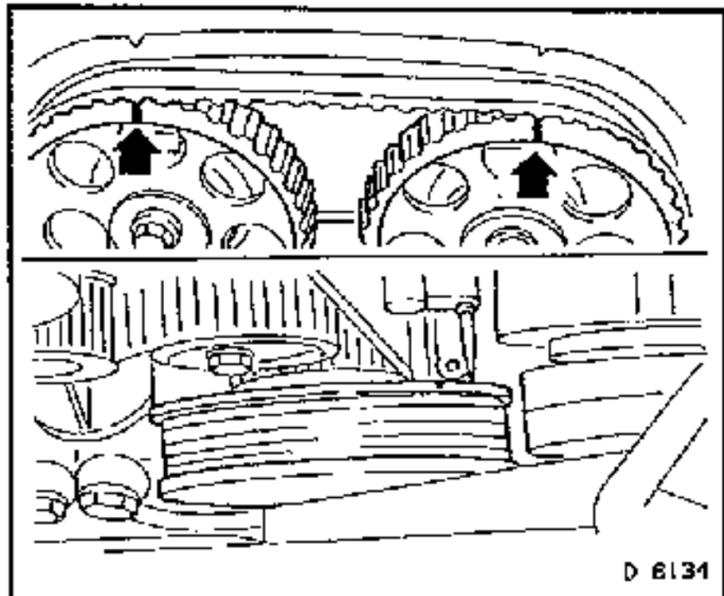
Remove, Disconnect

Front toothed belt cover.

Inspect

No.1 piston at TDC on the compression stroke.

If required, use MKM-604-21 (Torx E 20) and turn the toothed belt drive gear in the direction of engine rotation until the marks line up as shown.



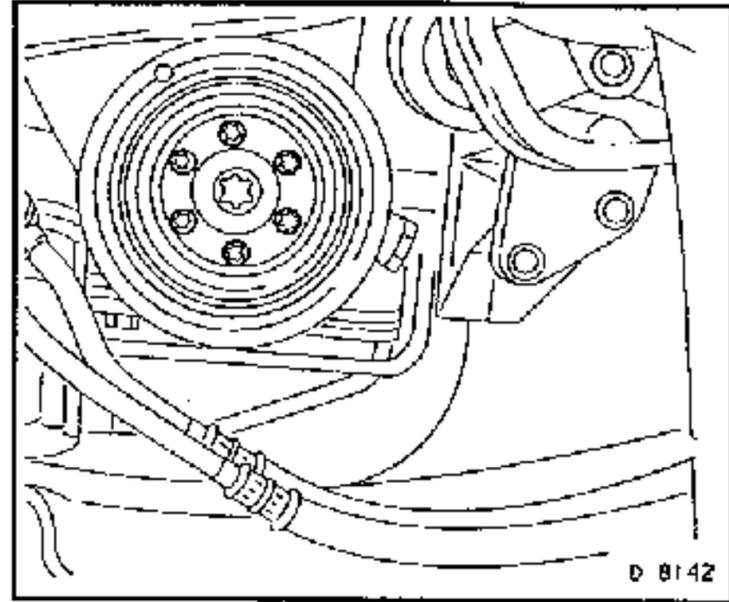
DOHC ENGINE - ENGINE TIMING SIDE/AIR CLEANER

Remove, Disconnect

Crankshaft pulley. Use MKM-604-21 (Torx E 20) to hold the toothed belt drive gear, then remove the pulley fastening bolts.

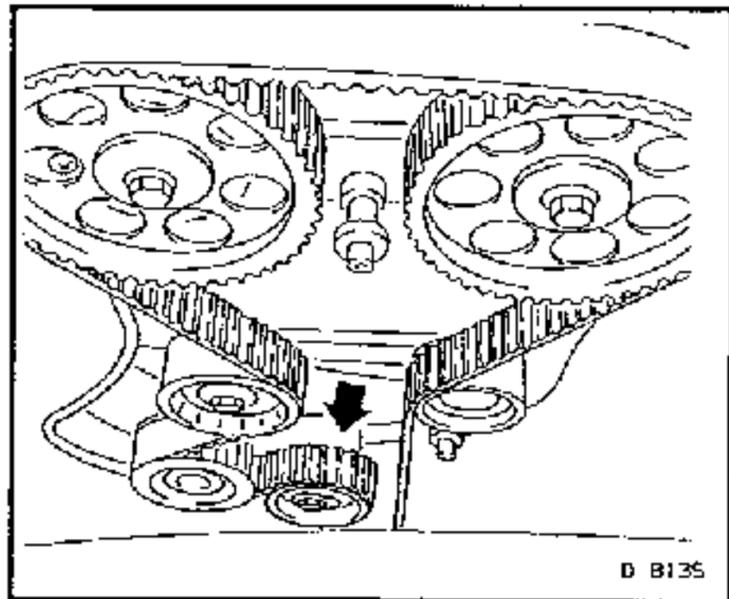
Important!

Make sure that the timing marks at the crankshaft and the camshafts are all lined up.



Remove, Disconnect

Loosen the toothed belt tension roller, then remove the toothed belt.

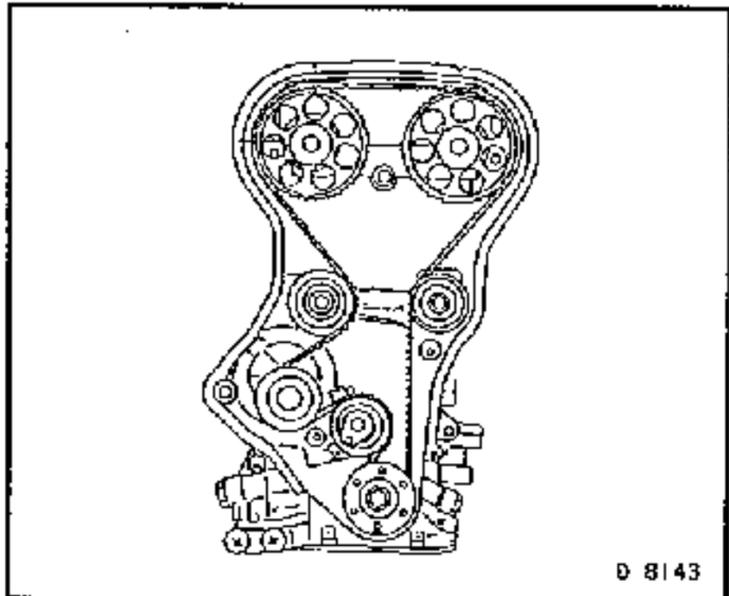


Install, Connect

Install new toothed belt, with the tension side, tight.

Check

That the timing marks at the crankshaft and the camshafts are all lined up.

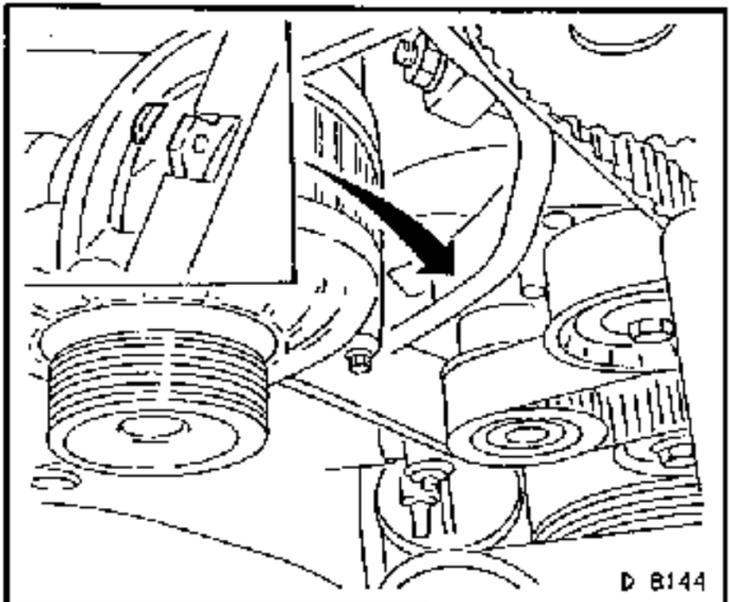


Adjust

Only adjust the toothed belt tension on a cold (ambient temperature) engine.

Check

That the lug on the water pump must align with the lug on the cylinder block.

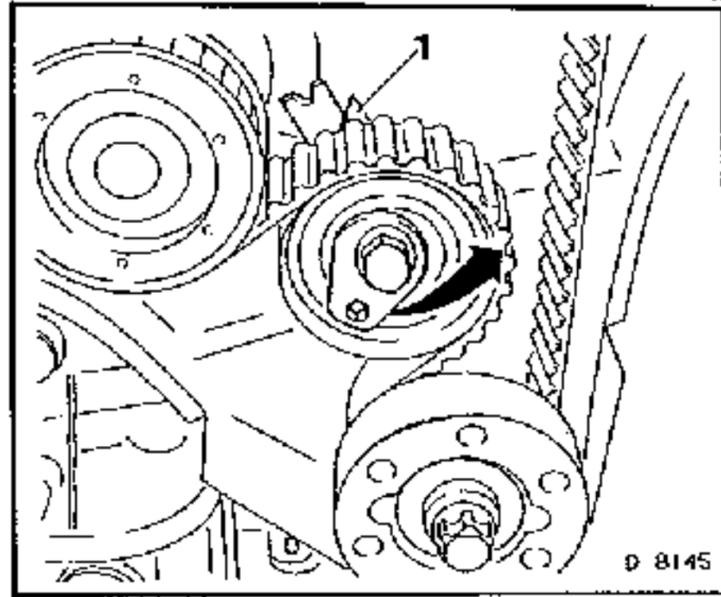


DOHC ENGINE - ENGINE TIMING SIDE/AIR CLEANER

Adjust

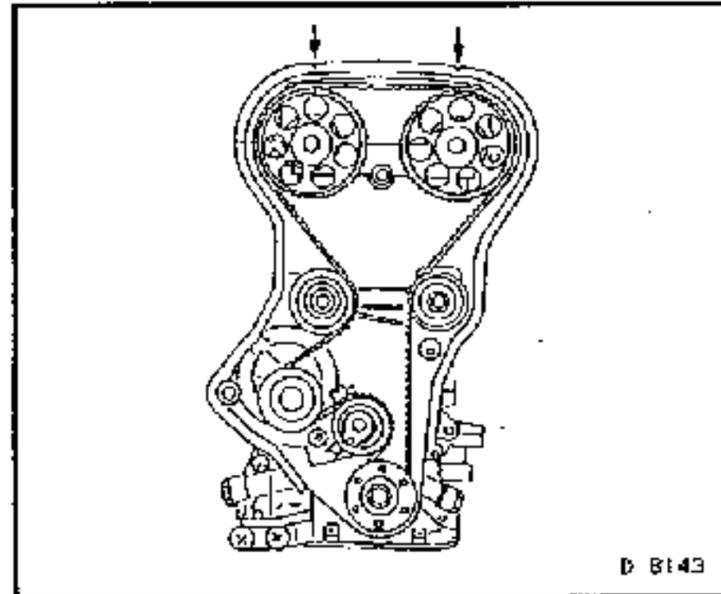
Tension toothed belt on the adjustment eccentric in the direction of the arrow until the pointer (1) is at the top.

Lightly tighten the toothed belt tension roller fastening bolt.



Adjust

Use MKM-604-212 (Torx E 20) on the toothed belt drive gear and turn the engine through two turns (720°), in the direction of engine rotation until II of the timing marks are aligned.



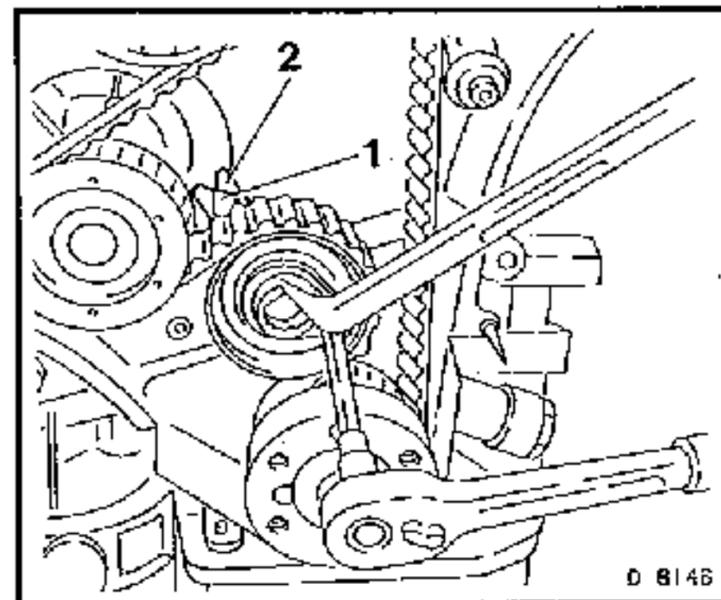
Adjust

Loosen the toothed belt tension roller, then turn the adjustment eccentric clockwise until pointer (1) lines up with the notch (2).

Turn engine through a full turn and check the alignment of the timing marks again.

Tighten (Torque)

Toothed belt tension roller to oil pump housing..... 20 Nm



Tighten (Torque)

Crankshaft pulley to toothed belt drive gear..... 20 Nm
Front toothed belt cover bolts..... 8 Nm

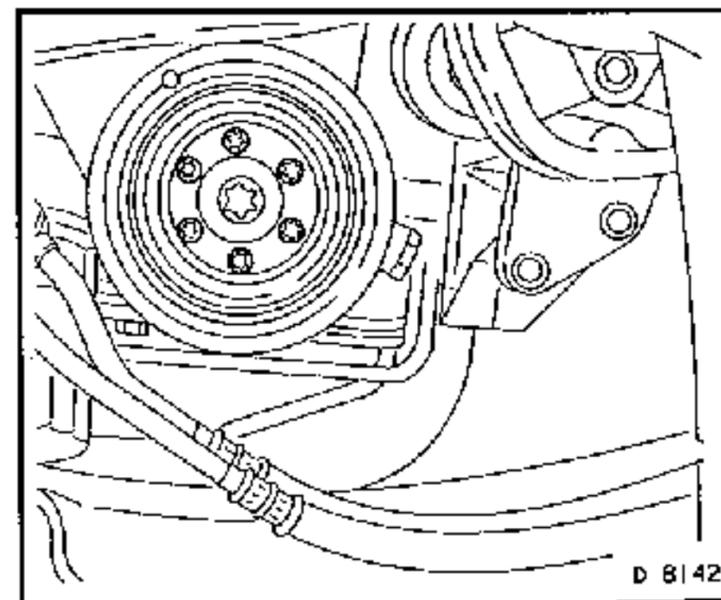
Make sure that the rubber grommets on the fastening studs are firmly seated in position.

Install, Connect

Ribbed V-belt. Tension ribbed V-belt via ribbed V-belt tension roller.

Note:

The direction of the ribbed V-belt.



DOHC ENGINE - ENGINE TIMING SIDE/AIR CLEANER

Install, Connect

If removed, the engine compartment cover.

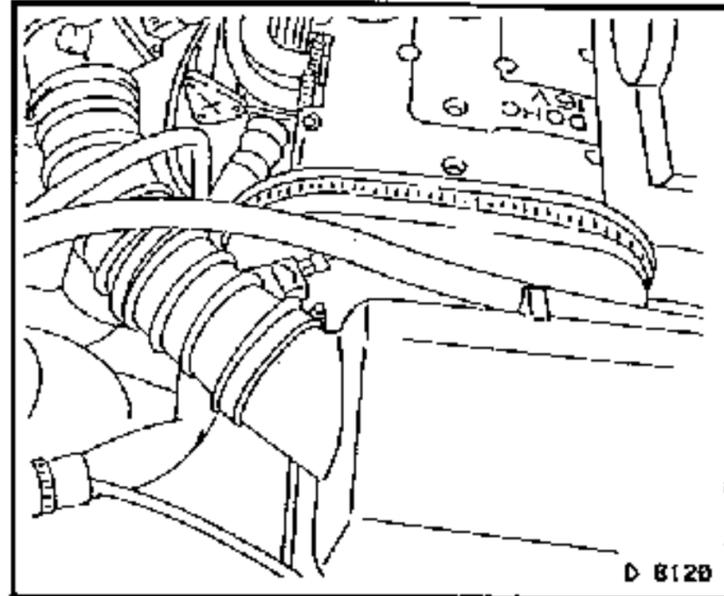
Air cleaner housing. Refer to "Air Cleaner Housing, Remove and Install", at the end of this Section.

C 20 XE:

Air intake hose to hot film mass air flow meter.

The wiring harness plug to the intake air temperature sensor.

Ground cable to battery.

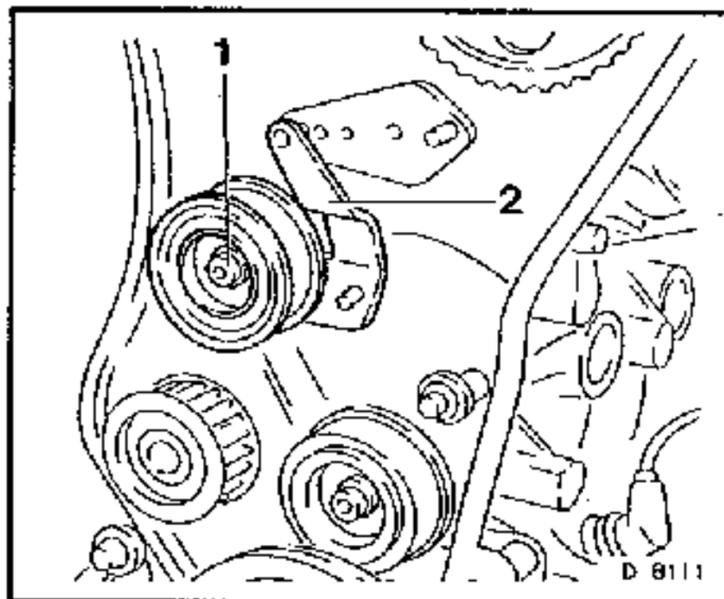


Toothed Belt Tension Roller, Replace (Engines up to MY'93)

Remove, Disconnect

Toothed belt. Refer to "Toothed Belt, Replace", in this Section.

Toothed belt tension roller (1), toothed belt tension roller support plate (2) with the spacer sleeve.



Install, Connect

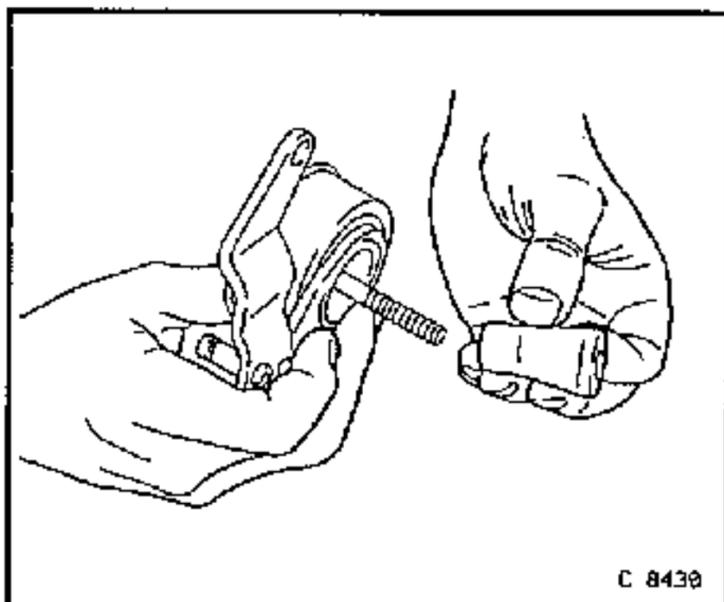
Spacer sleeve, toothed belt tension roller support plate, toothed belt tension roller.

Install new toothed belt and tension. Refer "Toothed Belt, Replace" in this Section.

When installing the spacer sleeve, note that the smaller diameter points to the toothed belt tension roller support plate.

Torque - Angle Method

Toothed belt tension roller to cylinder block 25 Nm + 45° + 15°



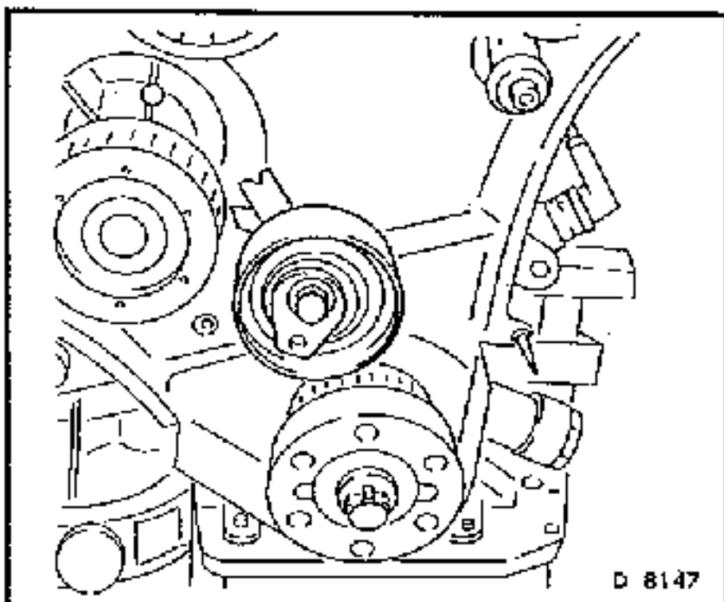
Toothed Belt Tension Roller, Replace (Engines as of MY'93)

Remove, Disconnect

Mark direction of rotation of toothed belt.

Toothed belt. Refer "Toothed Belt, Replace", in this Section.

Toothed belt tension roller from the oil pump housing.



DOHC ENGINE - ENGINE TIMING SIDE/AIR CLEANER

Install, Connect

Toothed belt tension roller. Ensure that stop lever (1) engages with the pilot holes (2) on oil pump housing.

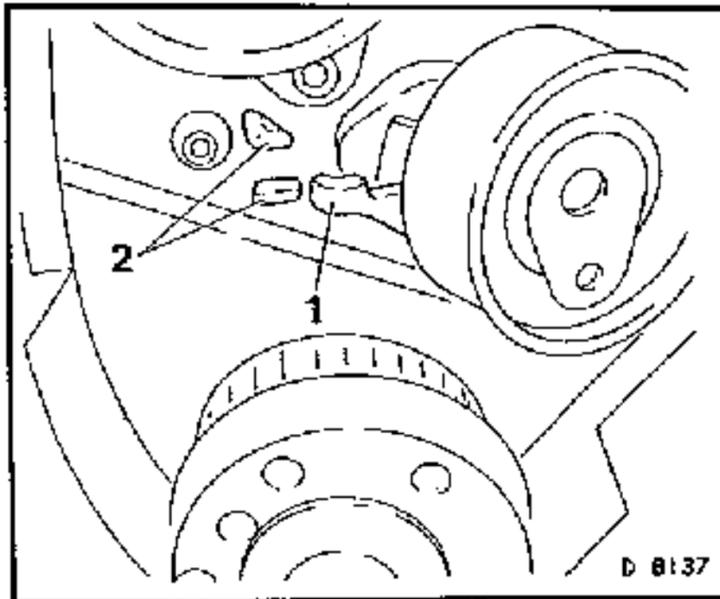
The toothed belt and tension. Refer "Toothed Belt, Replace", in this Section.

Note:

Direction of rotation of toothed belt.

Tighten (Torque)

Toothed belt tension roller to oil pump housing..... 20 Nm

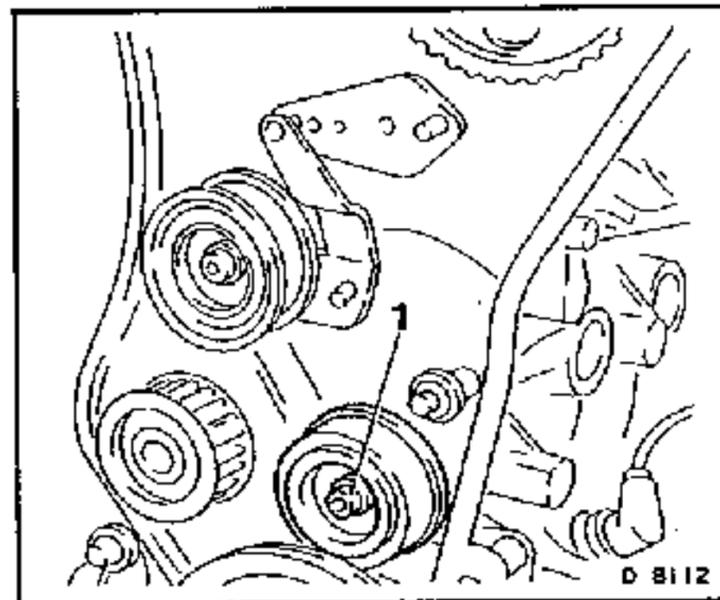


Toothed Belt Guide Roller, Replace (Engine up to MY'93)

Remove, Disconnect

Toothed belt. Refer "Toothed Belt, Replace", in this Section.

Toothed belt guide roller (1) with spacer sleeve.



Install, Connect

Spacer sleeve, toothed belt guide roller (1).

Install new toothed belt and tension. Refer "Toothed Belt, Replace", in this Section.

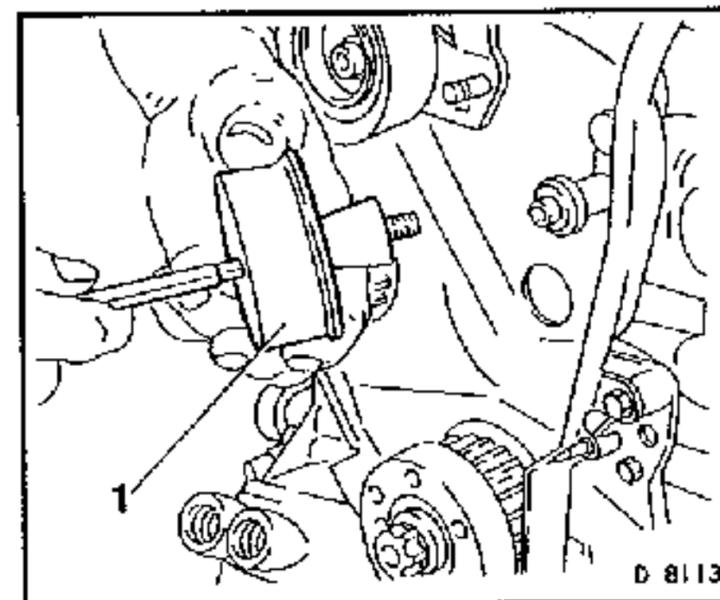
When installing the spacer sleeve, note that the smaller diameter points to the toothed belt guide roller support plate.

Torque - Angle Method

Toothed belt guide roller to cylinder block..... 25 Nm + 45° + 15°

Important!

Use a new bolt.



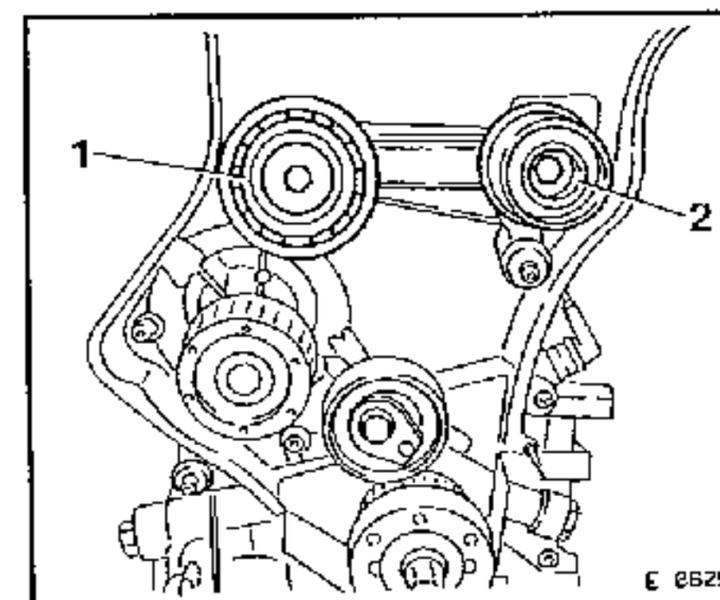
Toothed Belt Guide Roller, Replace (Engine as of MY'93)

Remove, Disconnect

Mark direction of rotation of toothed belt.

Toothed belt. Refer "Toothed Belt, Replace", in this Section.

Toothed belt guide roller (1 and 2), from bracket and from the cylinder block.



DOHC ENGINE - ENGINE TIMING SIDE/AIR CLEANER

Install, Connect

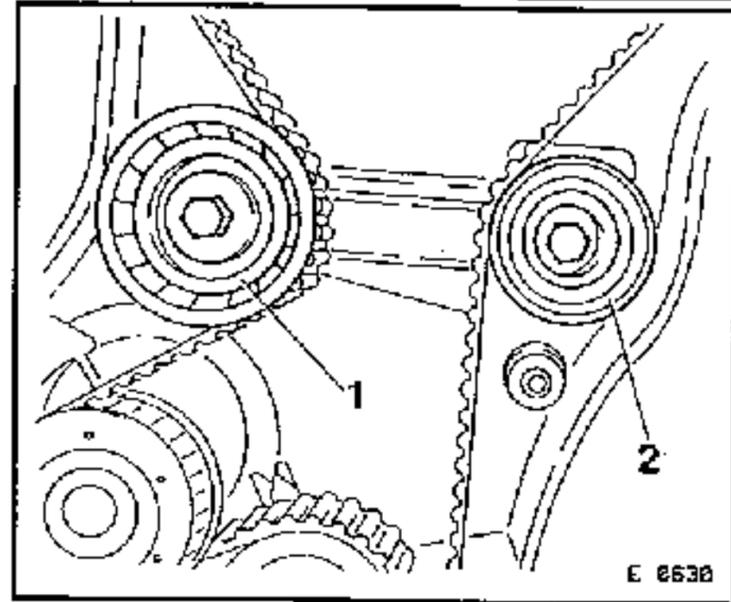
Toothed belt and tension. Refer "Toothed Belt, Replace", in this Section.

Note:

Direction of toothed belt rotation.

Tighten (Torque)

Toothed belt guide roller (1) to cylinder block.....	25 Nm
Toothed belt guide roller (2) to guide roller bracket.....	25 Nm



Rear Toothed Belt Cover, Remove and Install

Engines as of MY'93

Remove, Disconnect

Mark direction of rotation of toothed belt.

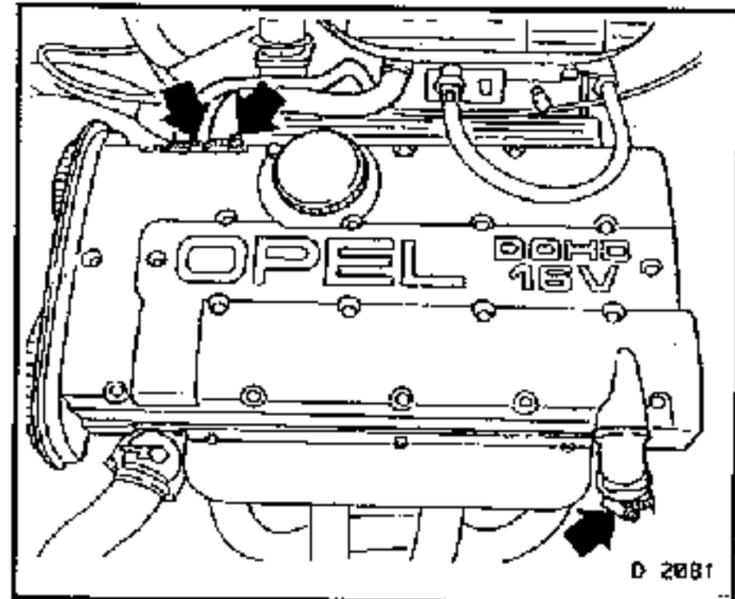
Toothed belt. Refer "Toothed Belt, Replace", in this Section.

C 20 LET:

Cover from throttle valve manifold.

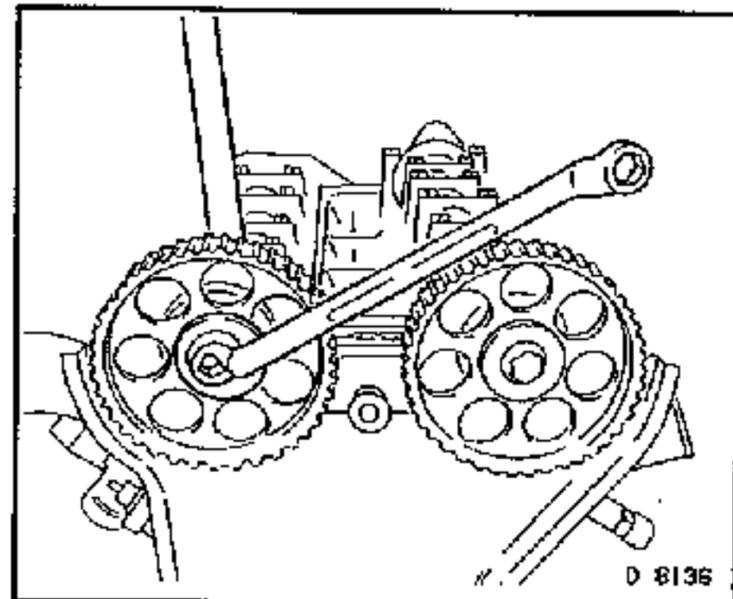
Both Engines:

Ignition cable cover, spark plug connectors using KM-717, hose connections (arrows) from cylinder head cover, cylinder head cover.



Remove, Disconnect

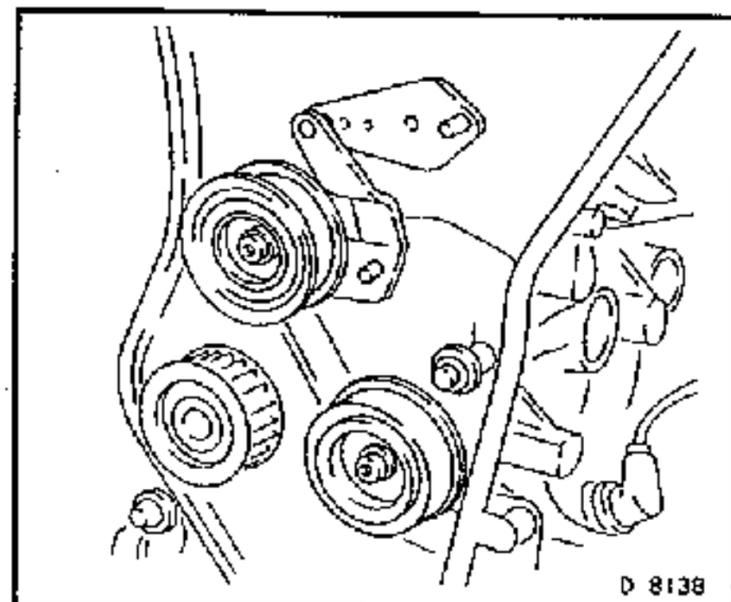
Camshaft pulleys. Hold each camshaft with an open ended spanner on the hex provided.



Remove, Disconnect

Engines up to MY'93

Toothed belt tension roller and toothed belt guide roller.

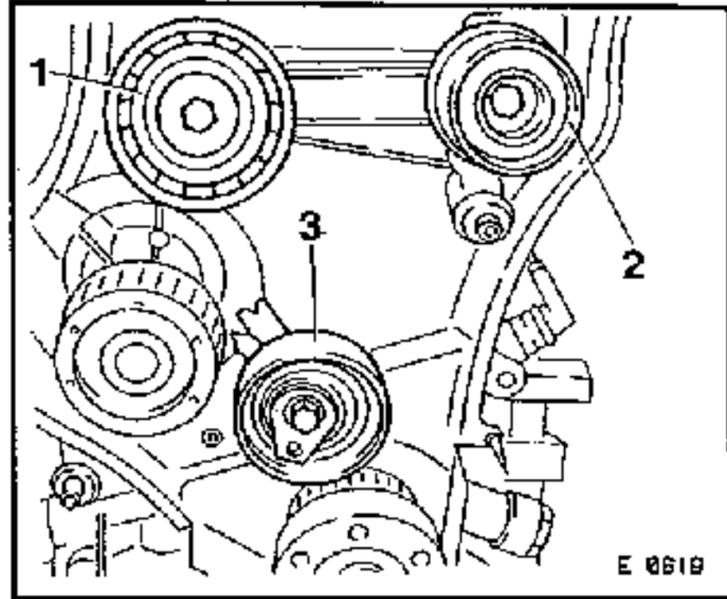


DOHC ENGINE - ENGINE TIMING SIDE/AIR CLEANER

Remove, Disconnect

Engines as of MY'93

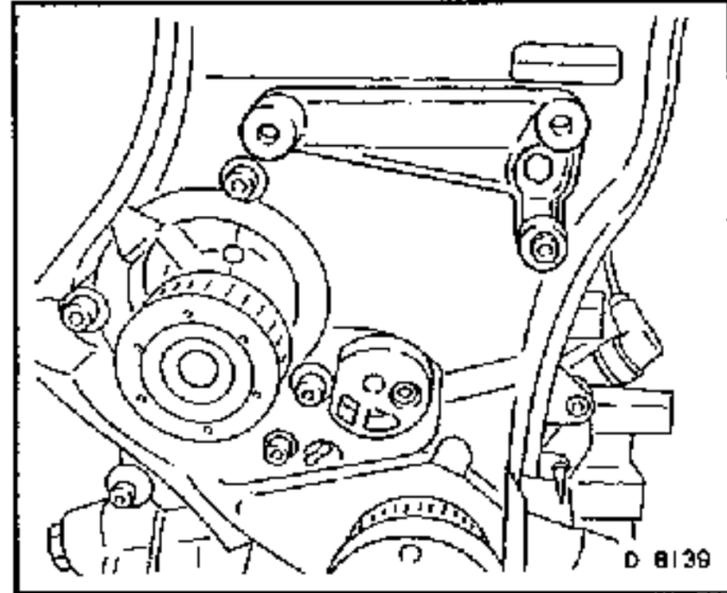
Toothed belt guide rollers (1 and 2), toothed belt tension roller (3).



Remove, Disconnect

Engines as of MY'93

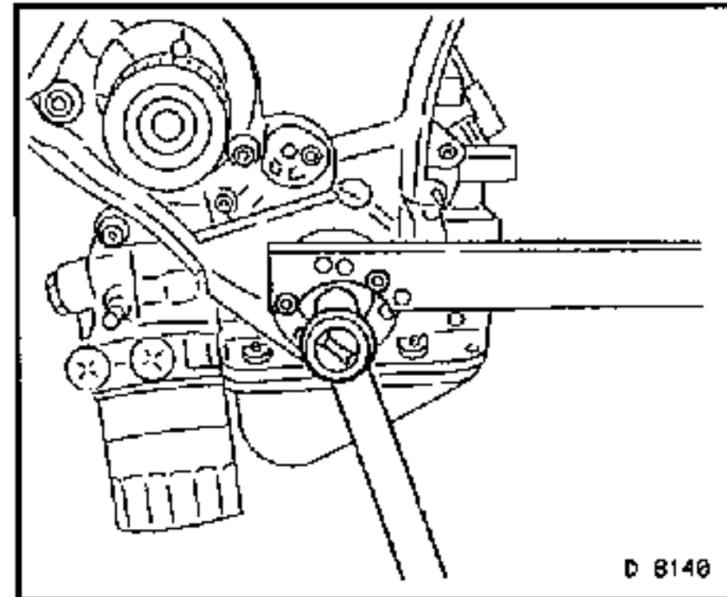
Toothed belt guide roller bracket.



Remove, Disconnect

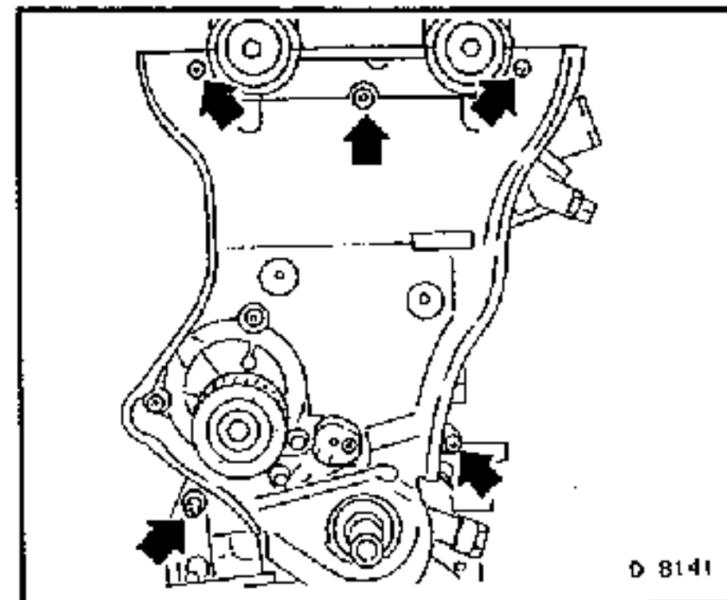
Toothed belt drive gear.

Hold with wrench KM-662-A, while removing drive gear bolt with MKM-604-21 (Torx E 20).



Remove, Disconnect

Rear toothed belt cover from cylinder head and oil pump housing (arrows).



DOHC ENGINE - ENGINE TIMING SIDE/AIR CLEANER

Install, Connect

Rear toothed belt cover.

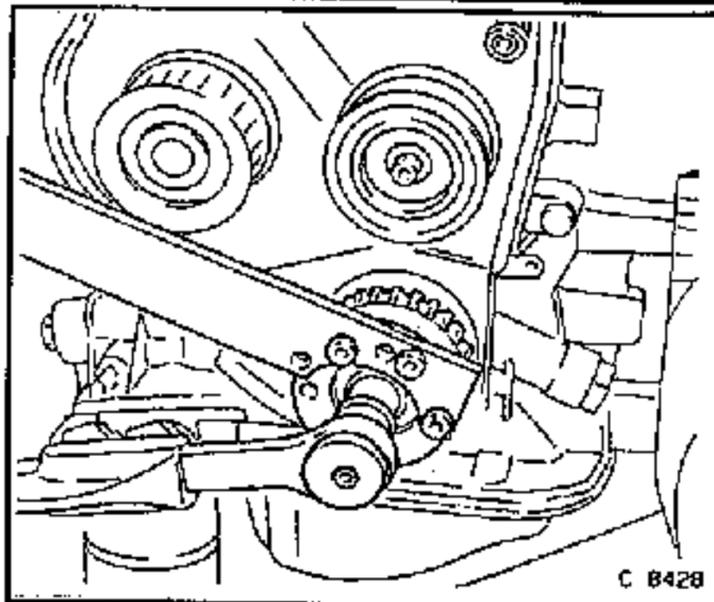
Push toothed belt drive gear on to crankshaft nose, noting the installation position.

Toothed belt guide roller bracket.

Tighten (Torque)

Toothed belt guide roller bracket to cylinder block	25 Nm
Rear toothed belt cover to cylinder head and oil pump housing.....	6 Nm
Toothed belt drive gear to crankshaft.....	250 Nm+40°+50°*

* Use new bolt.

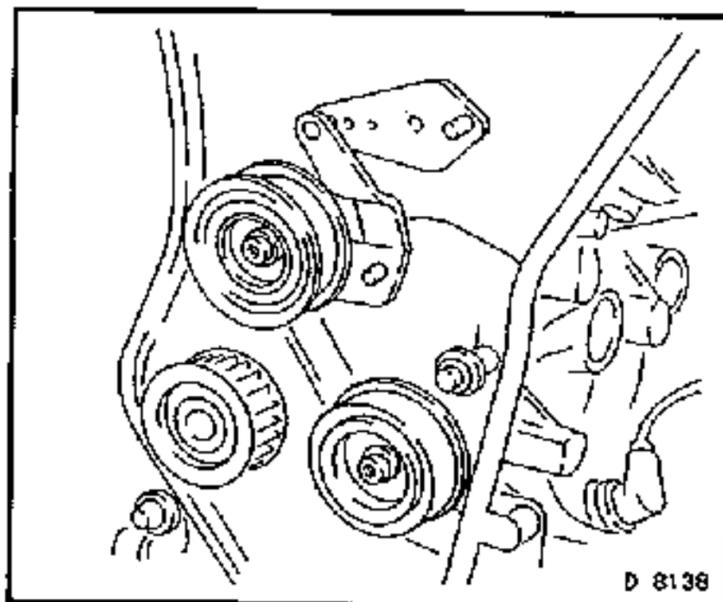


Engines up to MY'93

Tighten (Torque)

Toothed belt tension roller to cylinder block.....	25 Nm + 45° + 15° *
Toothed belt guide roller to cylinder block.....	25 Nm + 45° + 15° *

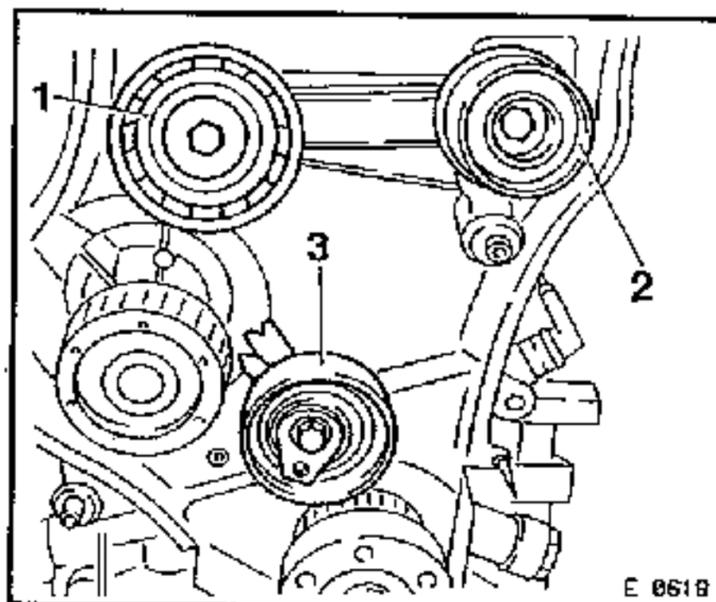
* Use new bolts.



Engines as of MY'93

Tighten (Torque)

Toothed belt guide roller (1) to cylinder block	25 Nm
Toothed belt guide roller (2) to guide roller bracket.....	25 Nm
Toothed belt tension roller (3) to oil pump housing.....	25 Nm



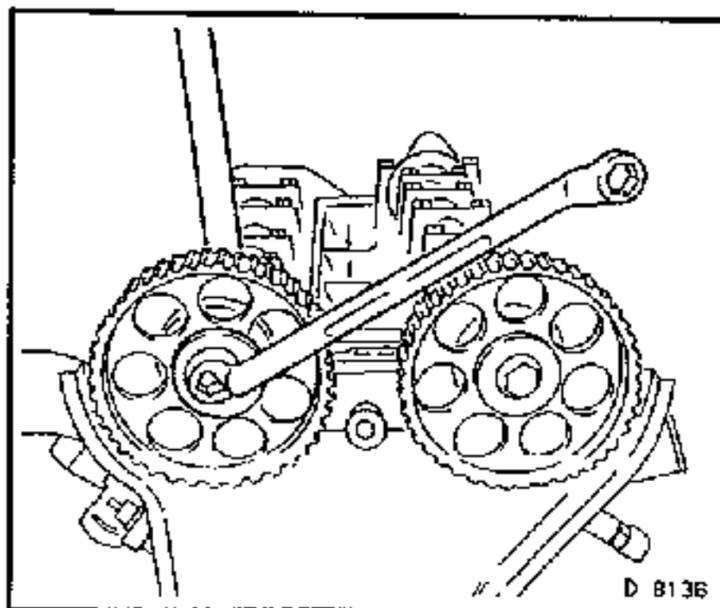
Install, Connect

Camshaft pulleys, cylinder head cover, hose connections to cylinder head cover, spark plug connectors, ignition cable cover.

Tighten (Torque)

Camshaft pulley to camshaft	50 Nm + 60° + 15° *
Cylinder head cover to cylinder head.....	8 Nm

* Use new bolts.



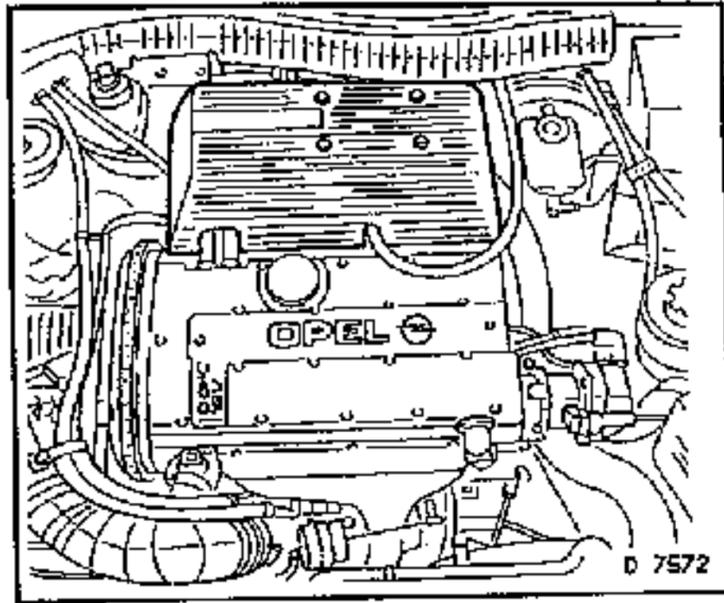
DOHC ENGINE - ENGINE TIMING SIDE/AIR CLEANER

C 20 LET only: Tighten (Torque)

Cover to throttle valve manifold 5 Nm

Install, Connect

Toothed belt. Refer "Toothed Belt, Replace", in this Section.



Air Cleaner Housing, Remove and install (C 20 XE)

Note:
For engines as of MY'93, only loosen the bolts shown in illustration D 2178.

Remove, Disconnect

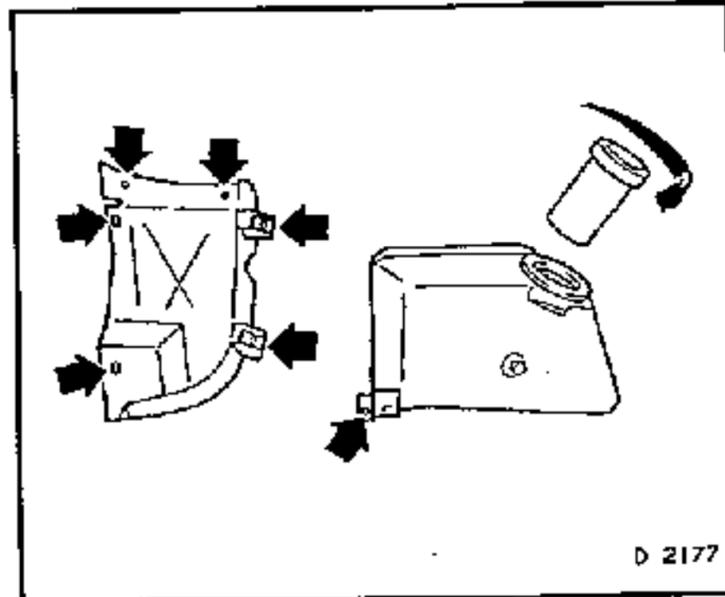
Engine compartment cover.

Lower right water deflector (6 places).

Resonator (1 bolt). Remove downwards, twist connection (bayonet catch).

Air intake hose, upper part of housing (2 clips, bolts)

Filter element, lower part of housing (3 bolts) remove upwards.



Install, Connect

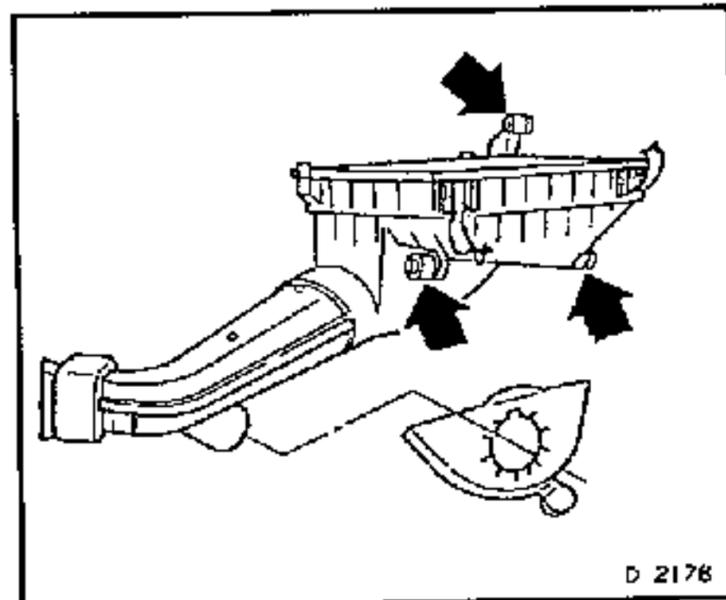
Lower part of housing (ensure that sleeve is correctly seated).

Filter element, upper part of housing and air intake hose.

Twist connection to connect resonator.

Lower right water deflector.

Engine compartment cover.



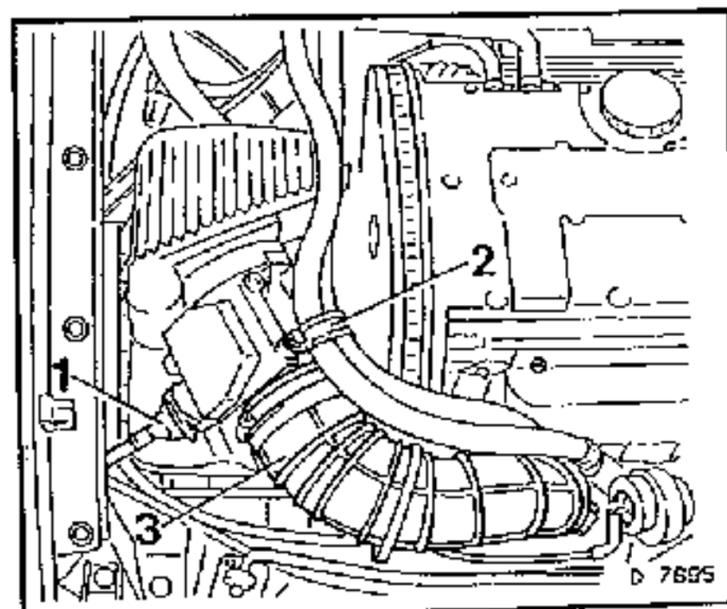
Air Cleaner Housing, Remove and Install (C 20 LET)

Remove, Disconnect

Wiring harness plug (1), bracket (2), air intake hose (3).

Upper part of housing (2 clips, 2 bolts).

Filter element, lower part of housing (3 bolts). Remove upwards.



DOHC ENGINE - ENGINE TIMING SIDE/AIR CLEANER

Install, Connect

Lower part of housing (ensure that sleeve is correctly seated).

Filter element, upper part of housing and air intake hose.

Bracket, wiring harness plug.

RECOMMENDED TORQUE VALUES

(Engine, Timing Side, Air Cleaner Housing)

	Nm
A/C compressor to auxiliary aggregates bracket	35 (2)
Auxiliary aggregates bracket to cylinder block.....	35 (2)
Bracket to A/C compressor.....	20 (2)
Bracket, engine damping block bracket to engine accessories bracket.....	60 (2)
Bracket, engine damping block to engine bracket	60 (2)
Bracket, toothed belt guide roller to cylinder block	25 (2)
Camshaft pulley to camshaft	50 + 60°, then 15° (4)
Cover to throttle valve manifold	5 (1)
Crankshaft pulley to toothed belt drive gear	20
Cylinder head cover to cylinder head	8
Engine damping block to bracket.....	65 (2)
Front toothed belt cover to cylinder head, intermediate piece and oil pump	8
Power steering hydraulic pump shackle to engine accessories bracket.....	18 (2)
Power steering hydraulic pump to engine accessories bracket.....	25 (2)
Rear toothed belt cover to cylinder head and oil pump housing.....	6
Ribbed V-belt tension roller to engine accessories bracket.....	18 (2)
Right engine damping block to side member.....	65 (3)
Toothed belt drive gear to crankshaft.....	250 + 40° - 50° (4)
Toothed belt guide roller to cylinder block	25 + 45°, then 15° (4)
Toothed belt tension roller to cylinder block	25 + 45°, then 15° (4)
Toothed belt guide roller to cylinder block	25 (2)
Toothed belt guide roller to guide roller bracket.....	25 (2)
Toothed belt tension roller to oil pump housing	20 (2)

(1) C 20 LET only

(2) Engines as of MY'93.

(3) Clean thread and insert bolt with Locking Compound to GMH Spec. HN1256, Loctite 242 or equivalent

(4) Use new bolt/s.