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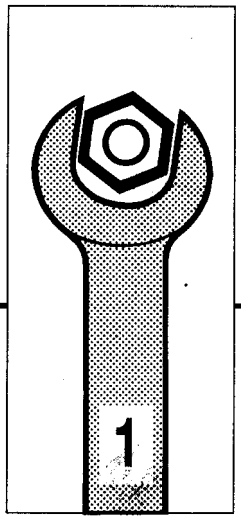
PETROL ENGINE

ES9J4 (2,946 cc V6)

- PRESENTATION
- ENGINE
- CYLINDER HEAD
- VALVE TIMING
- LUBRICATION
- COOLING SYSTEM
- AIR AND FUEL SUPPLY - TURBOCHARGING
- IGNITION
- EXHAUST SYSTEM
- AIR CONDITIONING



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PRESENTATION : ENGINE ES9J4

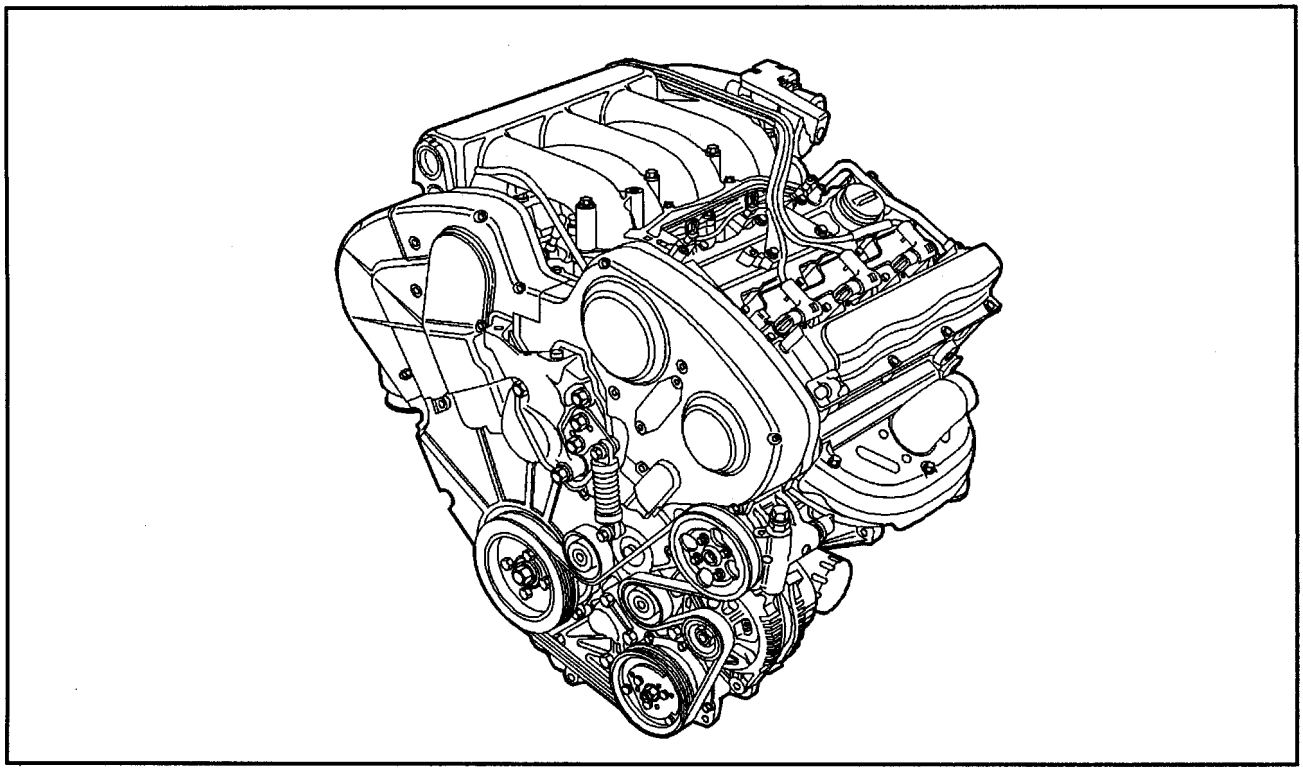

Fig : B1BP1GJD

Principal construction features of the ES9J4 engine :

- petrol engine with 6 cylinders in 60° Vee formation
- 24 valve engine with 4 overhead camshafts driven by toothed belt

1 - CYLINDER BLOCK

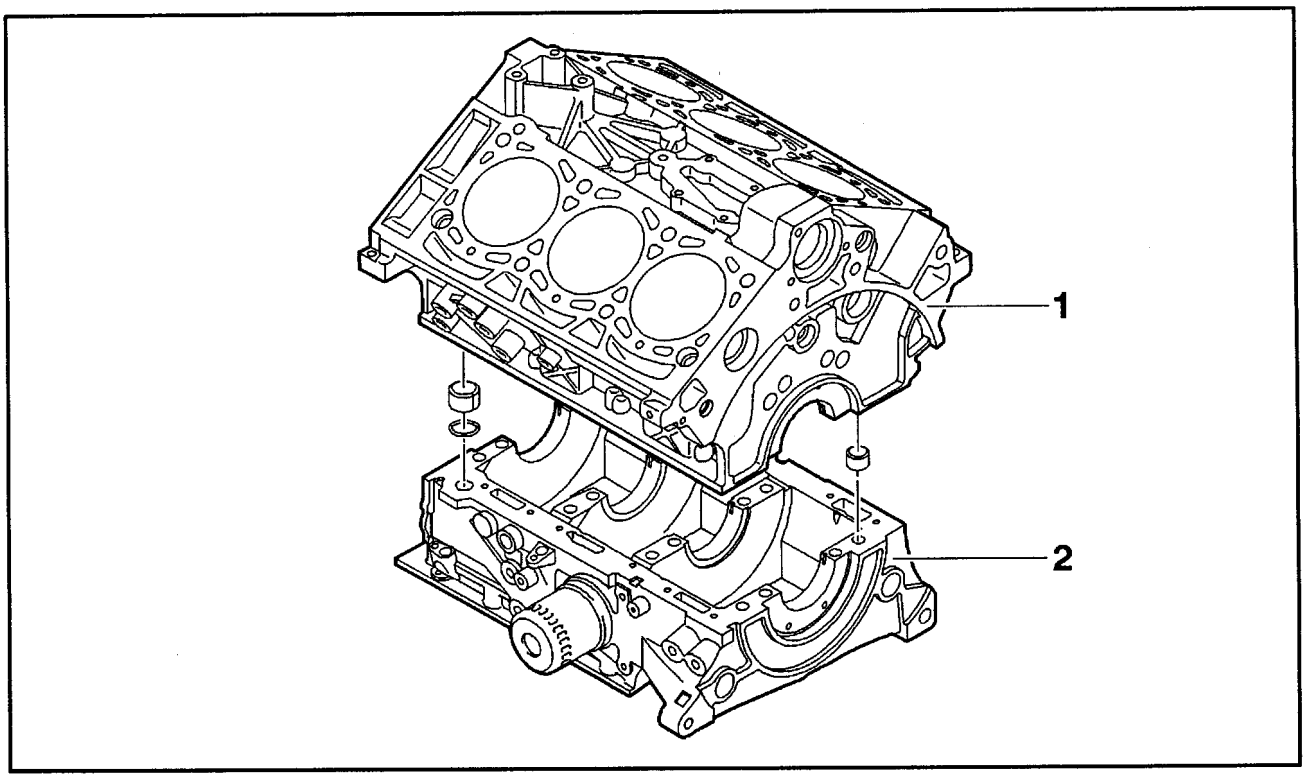

Fig : B1BP1GKD

(1) cylinder block.

(2) crankshaft main bearing cap casing.

The light alloy cylinder block is fitted with cast iron liners on assembly.

The light alloy crankshaft bearing cap casing incorporates the 4 cast iron bearing caps.

2 – RECIPROCATING GEAR

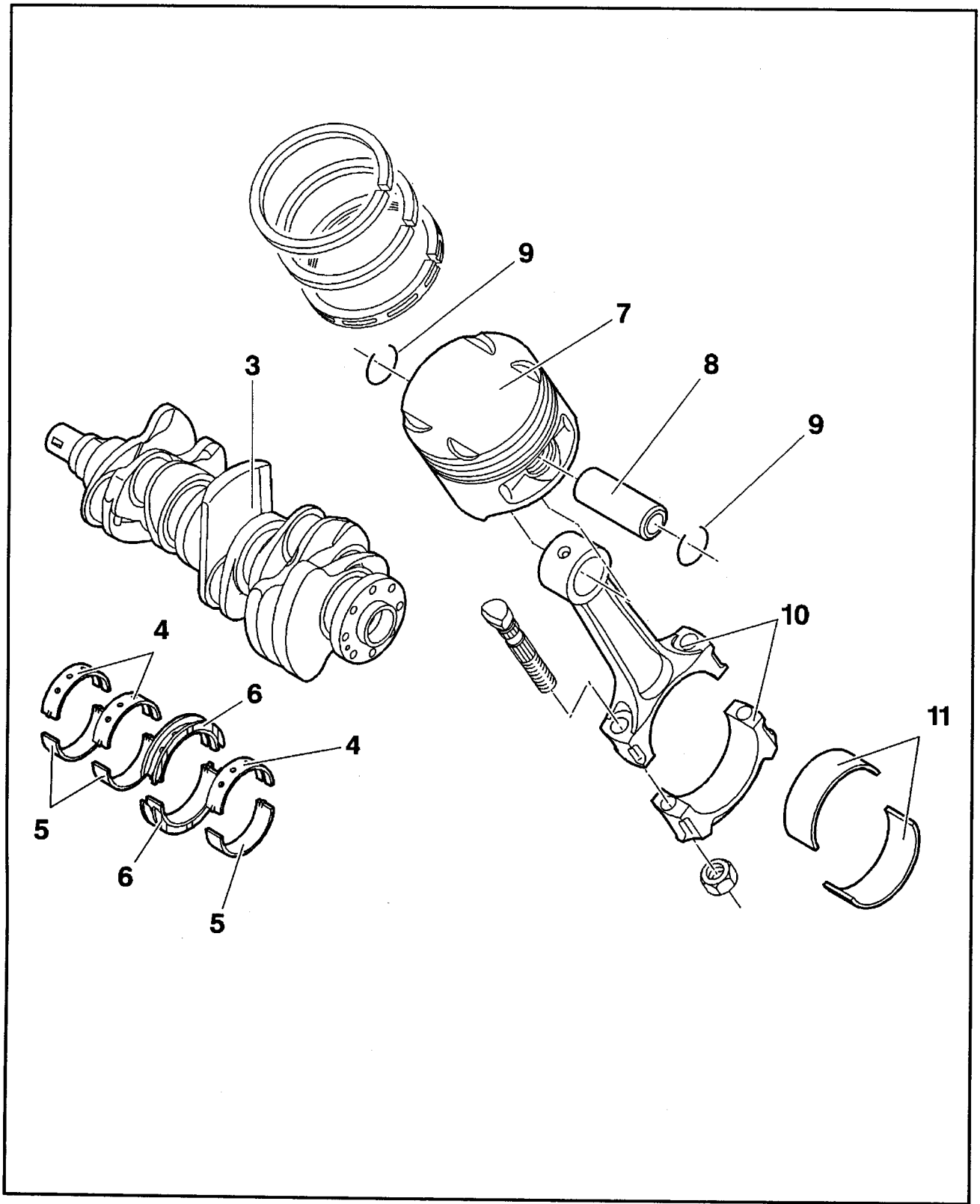

Fig : B1BP1GLP

(3) crankshaft.
(4) upper half-bearing shells.
(5) lower half-bearing shells.
(6) bearing shell on bearing no. 2.
(7) piston.
(8) the gudgeon pin.
(9) circlip.
(10) connecting rod.
(11) big-end bearing shells

2.1 – Crankshaft

4 bearing steel crankshaft.

Crankshaft endfloat is controlled by the integral thrust washers of the no.2 main bearing shells.

2.2 – Crankshaft bearing shells

Plain shell bearings bearing cap casing side.

Grooved shell bearings (cylinder block side).

The crankshaft and big-end bearings (cylinder block and bearing cap casing) are matched from markings on both the block and crankshaft.

The classing is achieved by 4 different thicknesses of plain shell bearings.

NOTE : There is one class, only, for the upper grooved half-bearing shells.

2.3 – Connecting rods / pistons

New connecting rods with a dimension of 154 mm between centres.

New light alloy pistons with valve recesses.

The gudgeon pins are free in the connecting rod small ends.

3 – CYLINDER HEAD UNIT

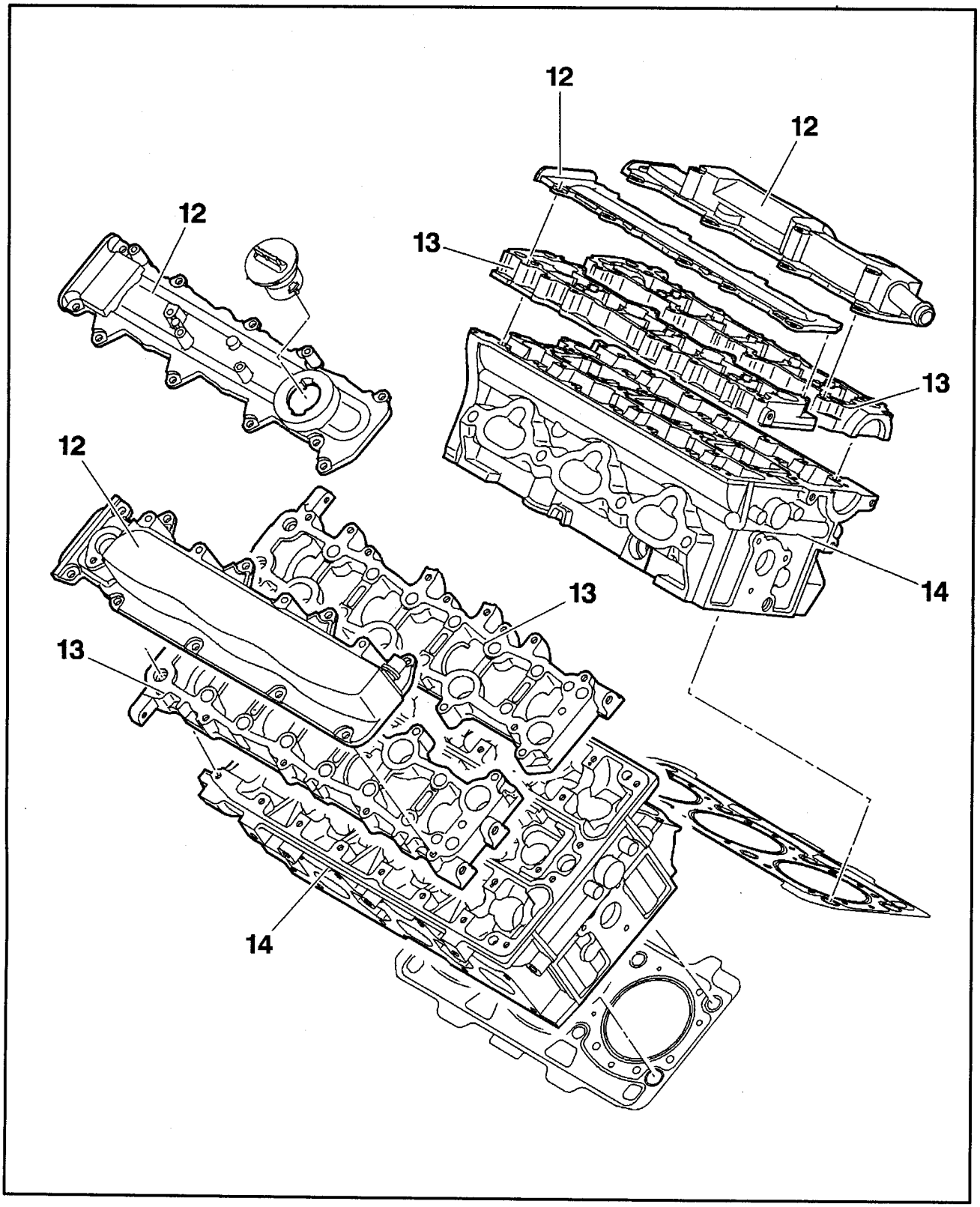

Fig : B1BP1GMP

(12) cylinder head cover.

(13) camshaft bearing cap casing.

(14) cylinder head.

NOTE : The cylinder head houses the valve gear.

The camshaft bearing cap casings are in light alloy.

3.1 – Camshaft bearing cap casings

The camshaft bearing cap casings house the 4 bearings of the 2 shafts of 6 lobes.

The camshaft bearings are lubricated under pressure and the cams by oil baths.

3.2 – Cylinder head

New light alloy cylinder heads.

4 valves per cylinder (2 for the inlet, 2 for the exhaust) with automatically adjusted hydraulic cam followers.

The sparking plugs are offset by 3 mm towards the exhaust side of the combustion chambers.

The front cylinder head houses the (BBC 3.2) ignition coil assembly (Compact Coil Unit).

The rear cylinder head houses the ignition HT harness cassette.

The cylinder heads are attached to the cylinder block by 8 bolts.

3.3 – The camshafts

The new cast iron camshafts comprise 6 lobes and 4 bearings.

The 4 camshafts are specific and act directly on the hydraulic cam followers.

4 – TIMING GEAR

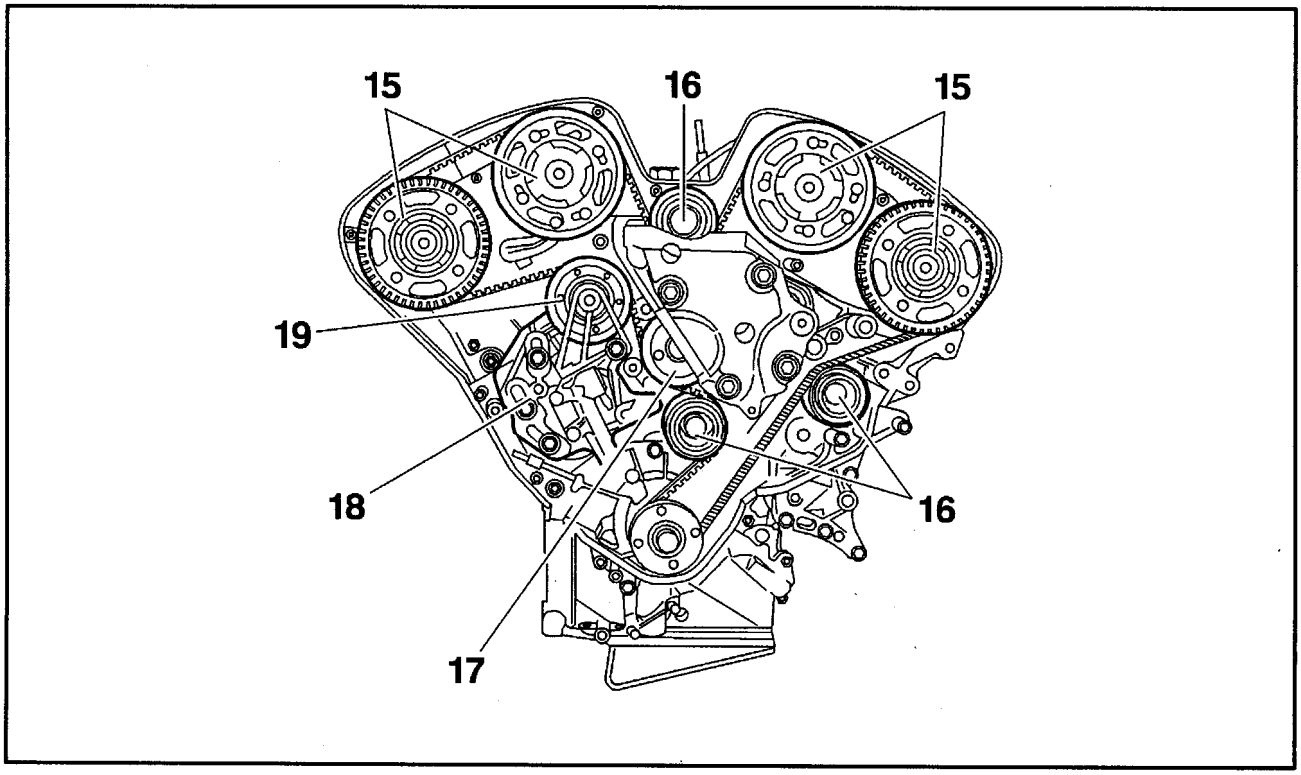

Fig : B1BP1GND

(15) camshaft gear wheel.

(16) roller tensioner.

(17) water pump drive pinion.

(18) dynamic tensioner.

(19) roller tensioner.

The valve gear comprises 4 direct operation camshafts.

4.1 – Timing belt

Engine code	XFZ
Width	32 mm
Number of teeth	259
Material	HSN quality
Supplier	DAYCO
Engraving enabling the identification	None
Replacement intervals	
Normal conditions of use	150 000 km
Severe driving conditions	120 000 km

4.2 – Camshaft gear wheel

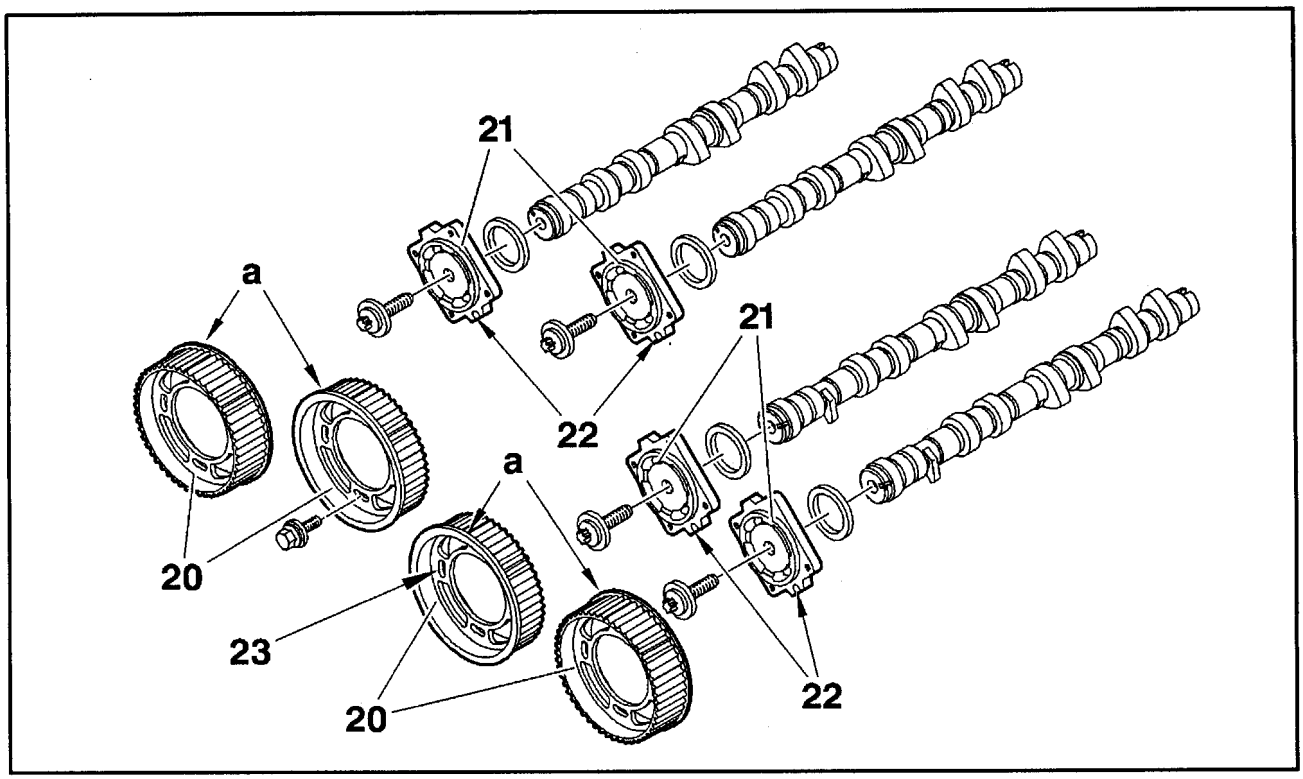

Fig : B1BP1GPD

(20) camshaft gear wheel.

(21) camshaft hub.

(22) locating peg notch.

(23) elongated hole.

The locating of the camshafts is achieved by using the hubs (21) keyed to the shafts.

The pinions are fixed to the camshaft hubs by the bolts 4.

When the 4 pinion fixing bolts are slackened, the pinions are free to rotate within the bounds of the elongated holes.

This method of fitting of the pinions allows :
- a more precise setting of the valve timing
- a more evenly distributed tension of the camshaft drive belt between the various belt pulleys

The hubs of the camshafts are identical.

The camshaft pinions are all identical.

Direction of fitting of the camshaft pulleys :
- inlet camshaft : flange "a" towards the outside
- exhaust camshaft : flange "a" towards the inside

5 – LUBRICATION

5.1 – Oil capacity

Engine legislation type	XFZ
Oil filter change	5.5 litres
No oil filter change	4.8 litres
Capacity of the gauge between the min. and max. marks	2 litres

5.2 – The lubrication circuit

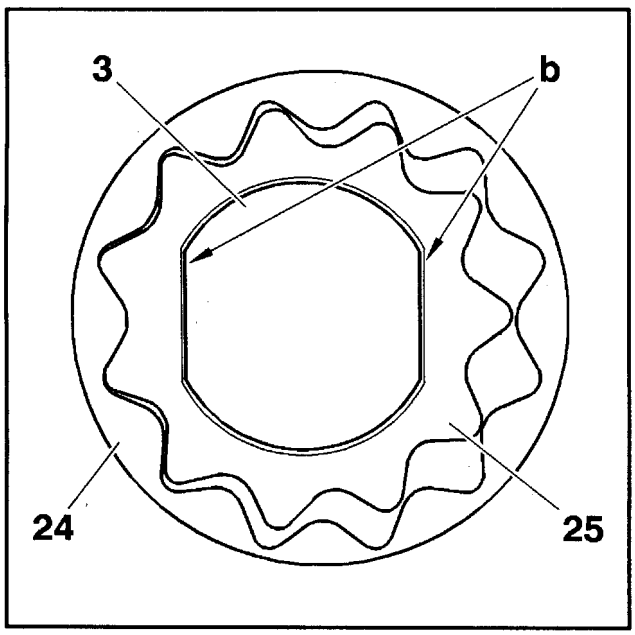

Fig : B1BP1GQC

(3) crankshaft.

(24) oil pump outer rotor.

(25) oil pump inner rotor.

The pressure–fed lubrication is provided by a dual eccentric gear type oil pump (inner and outer rotors).

The oil pump is driven by the end of the crankshaft by two flats "b".

5.3 – Engine draining

The draining operation should be carried out when the gearbox is hot, immediately after the engine has been switched off.

It is possible to drain the engines via a suction device.

The end of the dipstick guide tube has been enlarged, which enables a tube to be connected to a suction draining equipment.

NOTE : Engines can still be drained by taking out the oil sump drain plug.

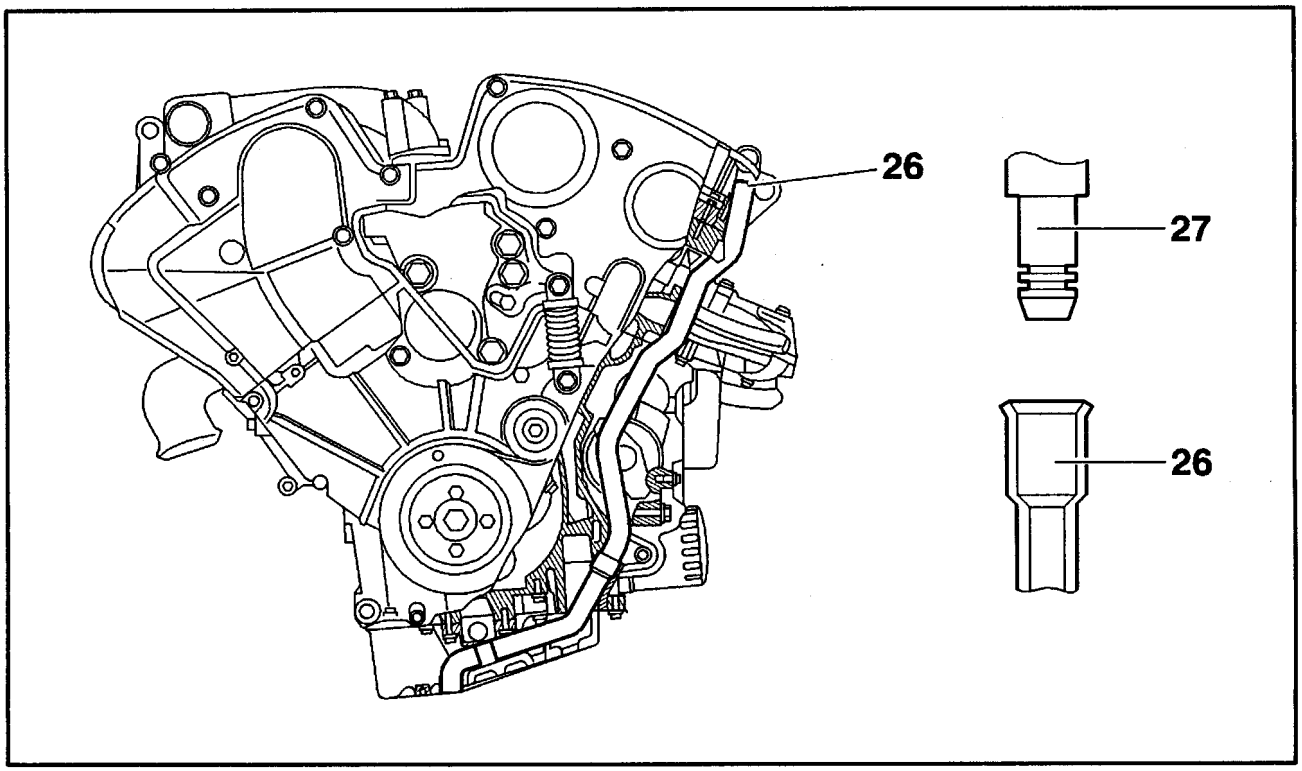

Fig : B1BP1GRD

(26) dipstick guide tube extremity.

(27) 14 mm dia. union.

6 – AIR SUPPLY CIRCUIT

The air induction system also serves as an induction silencer.

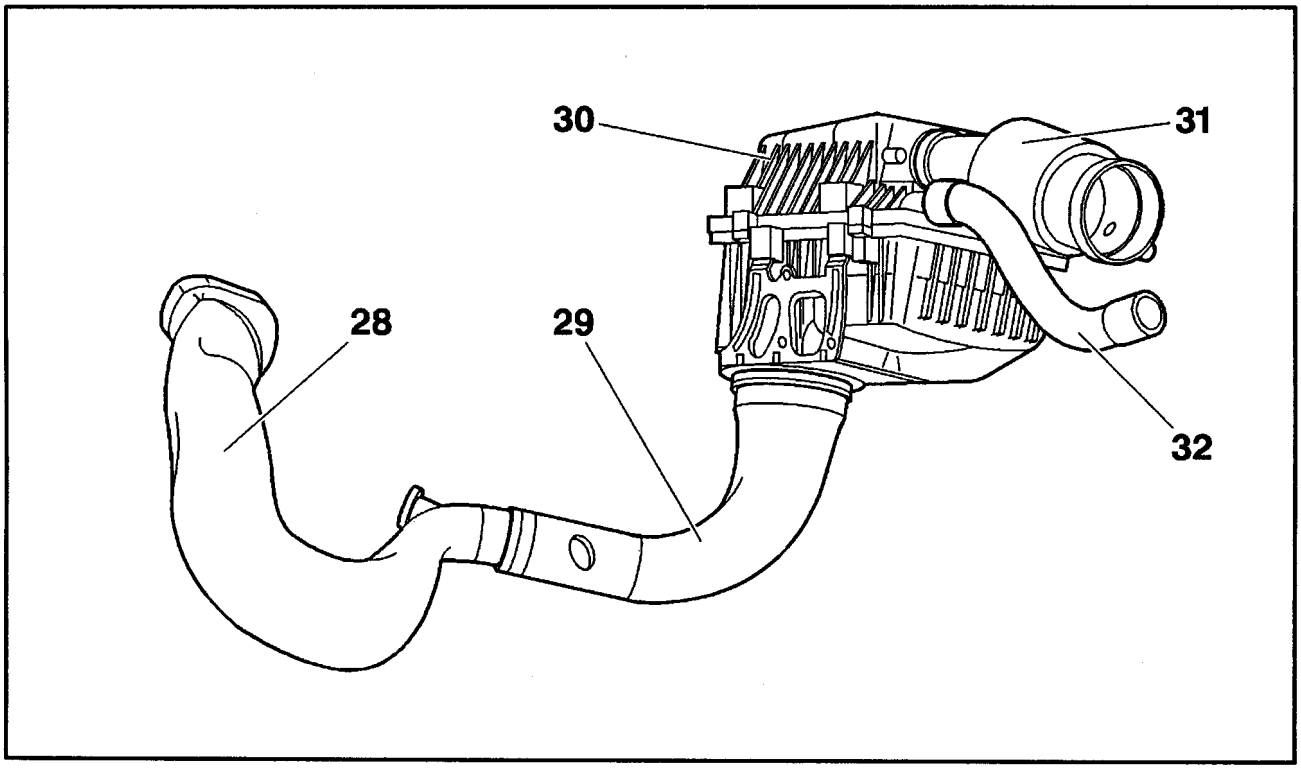

Fig : B1BP1GSD

(28) air inlet elbow.
(29) air inlet elbow/air filter duct.
(30) air filter unit.
(31) air filter/throttle butterfly housing duct.
(32) additionnal air duct.

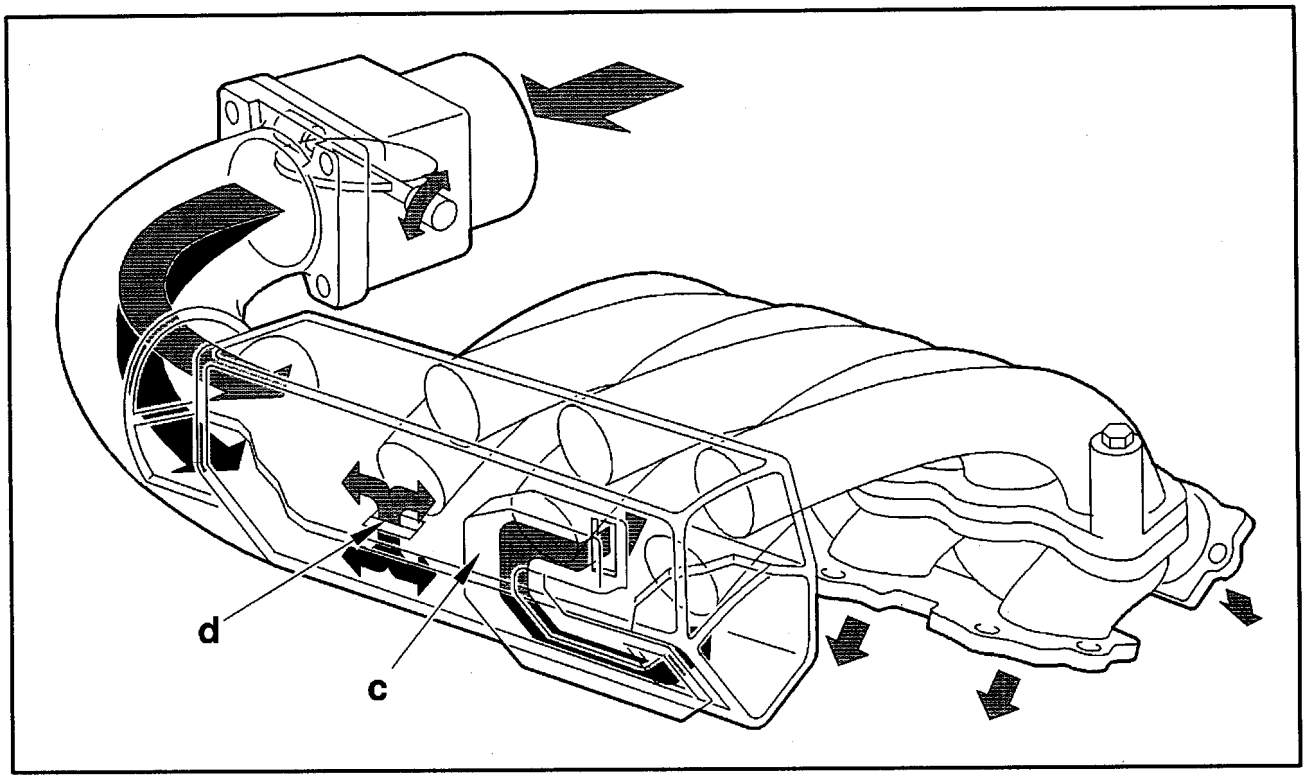

Fig : B1BP1GTD

Light alloy inlet manifold.

The interior gas flow of the inlet manifold enables high engine torque to be achieved at low engine speed and a smooth progressive torque curve (a volume for each cylinder bank with an interconnection between these 2 volumes for a long induction link "c" and a short induction link "d").

7 – INJECTION SYSTEM

Supplier : BOSCH.

Type : MP7.0.

7.1 – Injection ECU

The E.C.U. also controls the following functions :

- air fuel mixture
- ignition system
- autodiagnostic
- mixture adjustment
- adjustment of idling speed
- anti-knock adjustment

This ignition injection ECU is equipped with a "FLASH-EPROM" memory.

This type of memory permits, in the case of a change in calibration, a modification in the contents of the ECU without dismantling or replacing the ECU.

Instead of replacing the ECU or the eprom, the operation consists in "downloading" the ECU memory with its program, using an appropriate after sales tool, through the diagnostic socket : "ELIT".

7.2 – Fuel supply system

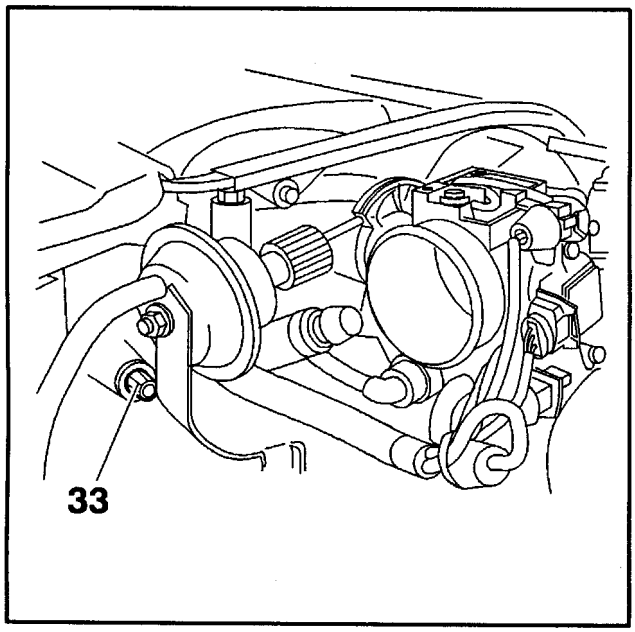

Fig : B1BP1GUC

The left hand injector rail is equipped with SCHRADER valve (33) to enable the following checks to be carried out :

- fuel pressure
- flow of injected fuel

DATA : ENGINE

1 – IDENTIFICATION

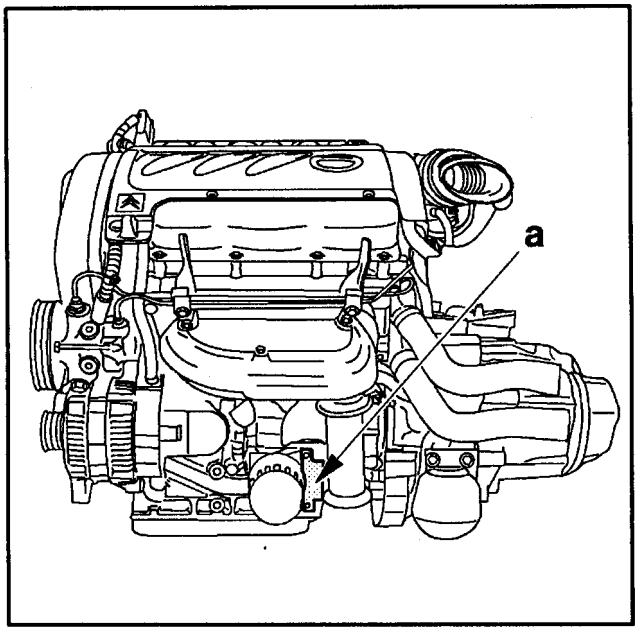

Fig : B1BP1EAC
(a) identification plate.

2 – DATA

Fuel injection engine :

Engine code	ES9J4
Legislation type	XFZ
Capacity (cc)	2946
Bore x stroke (mm)	87 x 82.6
Compression ratio	10.5:1
Max. power (E.E.C) Max. power (HP DIN)	140 kW at 5500 rpm 194
Max. torque (E.E.C.) Max. torque (DIN)	26.7 m.daN at 4000 rpm 27,8 m.kg
Emission standards	L3
Fuel	Unleaded premium 95 and 98 RON
Catalytic converter	Yes
Injection system	Multipoint injection
Supplier	BOSCH MP7.0

3 – CYLINDER HEAD GASKET

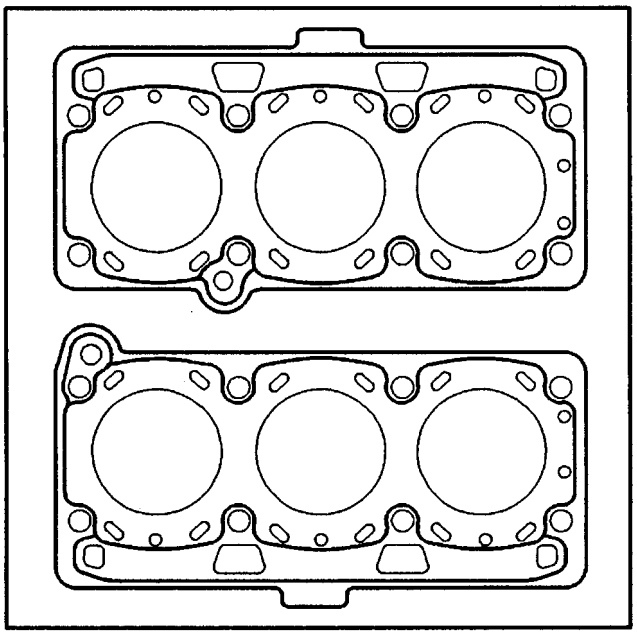

Fig : B1BP1EBC
Cylinder head gasket without asbestos.

Supplier	Thickness (standard size)	Thickness identification
ELRING	1.45 ± 0.04 mm	Central terminal on the exhaust side

4 – TIGHTENING THE CYLINDER HEADS

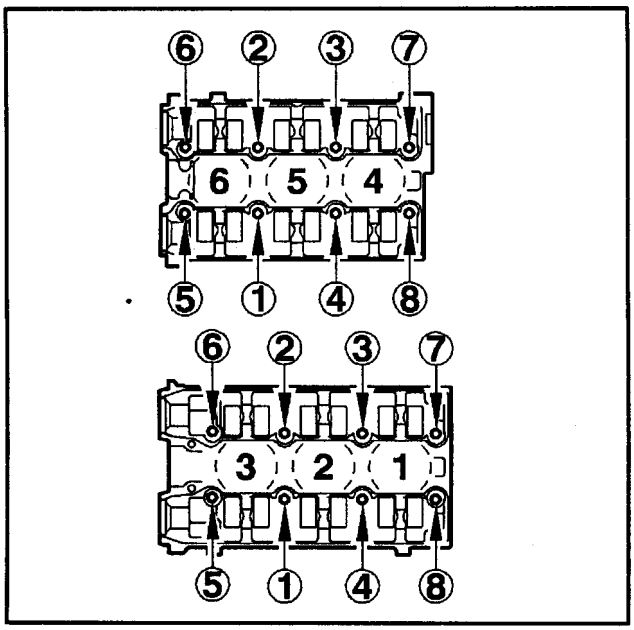

Fig : B1BP1ECC

Tightening method :

- pre–tighten the screws to 2 m.daN
- slacken
- pre–tighten the screws to 1.5 m.daN
- finish with an angular tightening of 225 °

5 – TIMING GEAR

5.1 – The camshafts

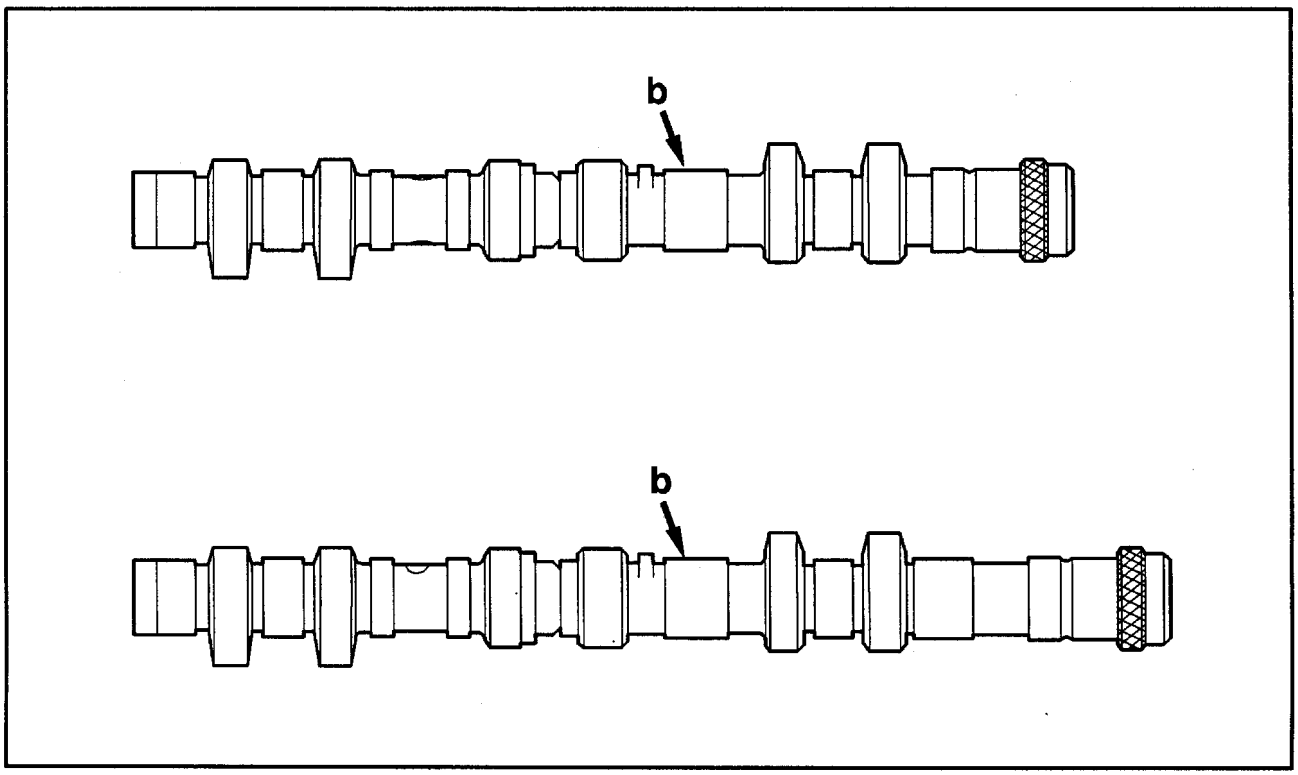

Fig : B1BP1EDD

Marking of the camshafts (at "b") :
- inlet camshaft (L.H.) : A 718
- inlet camshaft (R.H.) : A 717
- exhaust camshaft (L.H.) : E 720
- exhaust camshaft (R.H.) : E 719

5.2 – Timing diagram

Theoretical valve timing with a 1 mm valve clearance :

Inlet	A.T.D.C.	7°50'
	A.B.D.C.	37°50'
Exhaust	B.B.D.C.	38°
	B.T.D.C.	7°50'

5.3 – Valve clearances when cold

Hydraulic tappets with automatic adjustment.

DATA : ENGINE MOUNTING ASSEMBLY

1 – DESCRIPTION

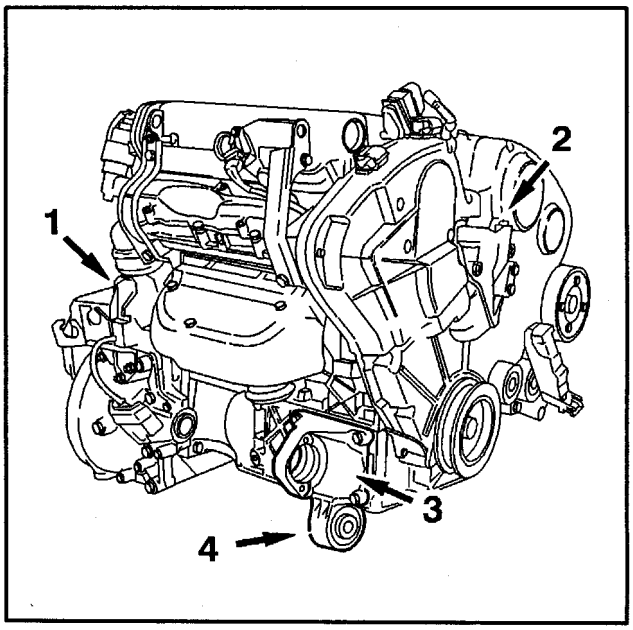

Fig : B1BP1ESC

(1) left hand upper engine mounting.
(2) right hand upper engine mounting.
(3) right hand lower engine mounting.
(4) torque rod.

2 – TIGHTENING TORQUE

2.1 – Left hand upper engine mounting

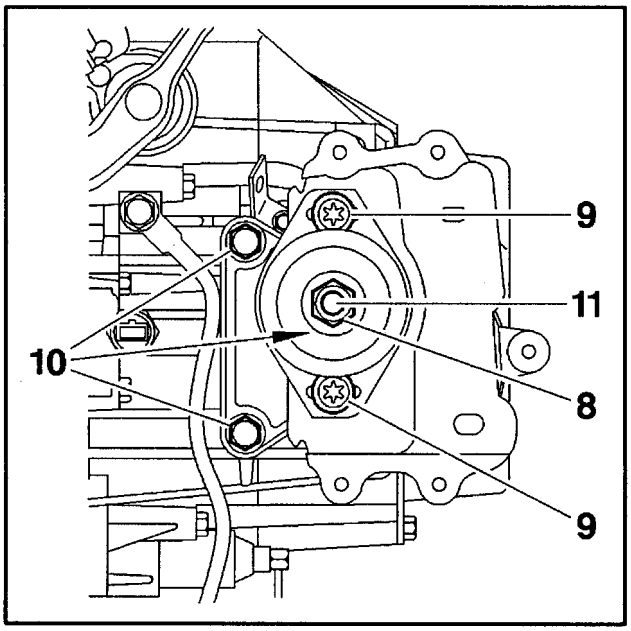

Fig : B1BP1EUC

Tighten the nut (8) to 6.5 m.daN.
Tighten the bolts (9) to 3 m.daN.
Tighten the bolts (10) to 4.5 m.daN.
Tighten the engine mounting shaft (11) to 5 m.daN.

2.2 – Right hand upper engine mounting

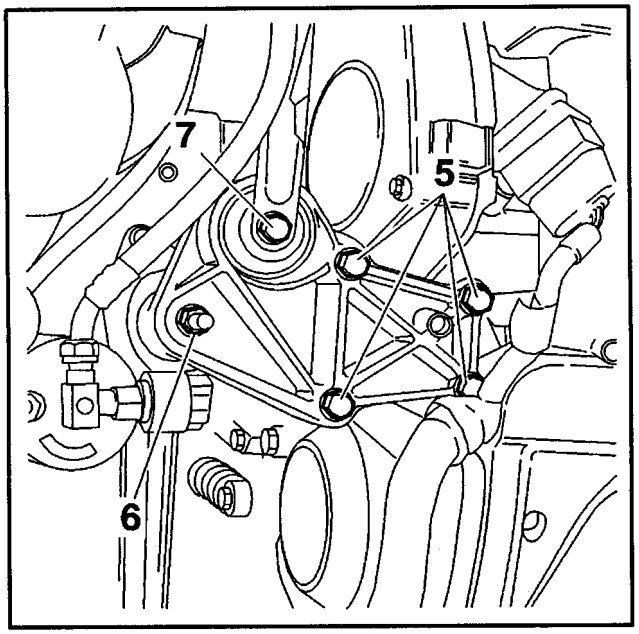

Fig : B1BP1ETC

Tighten the bolts (5) to 4.5 m.daN.
Tighten the nut (6) upto 4.5 m.daN.
Tighten the bolt (7) to 5 m.daN.

2.3 – Right hand lower engine mounting

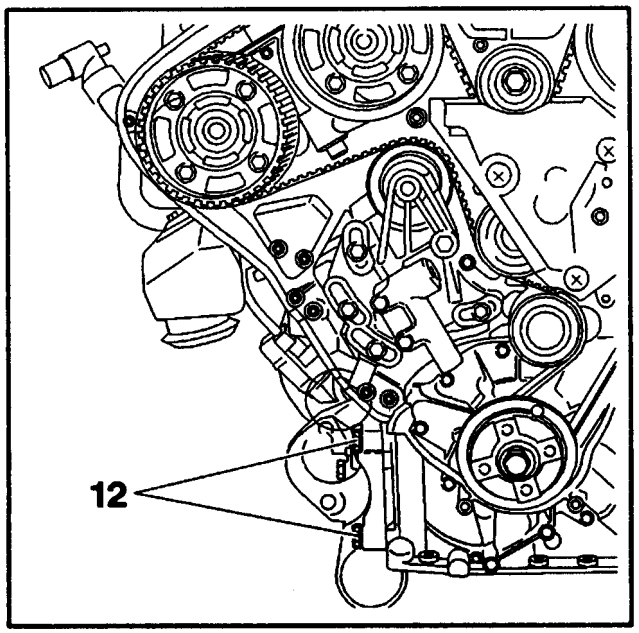

Fig : B1BP1EVC

Tighten the bolts (12) to 4.5 m.daN.

2.4 – Torque rod

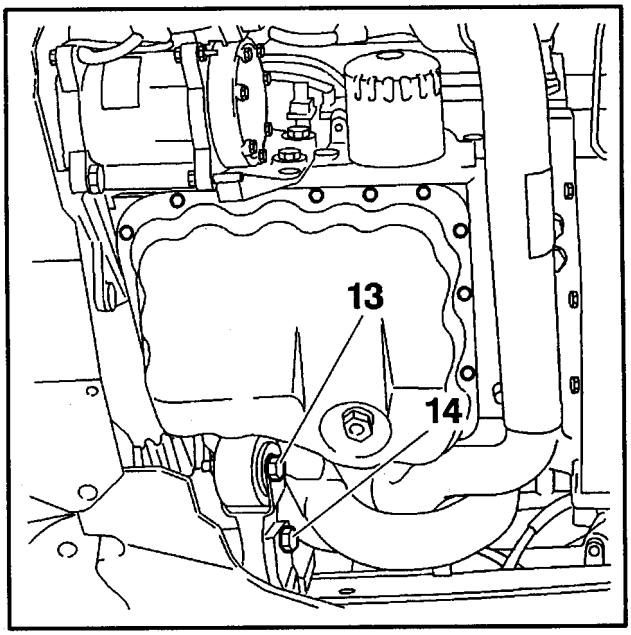

Fig : B1BP1EWC

Tighten the bolt (13) to 5 m.daN.
Tighten the bolt (14) to 5 m.daN.

DATA : TIGHTENING TORQUES

1 – ENGINE/GEARBOX MOUNTINGS

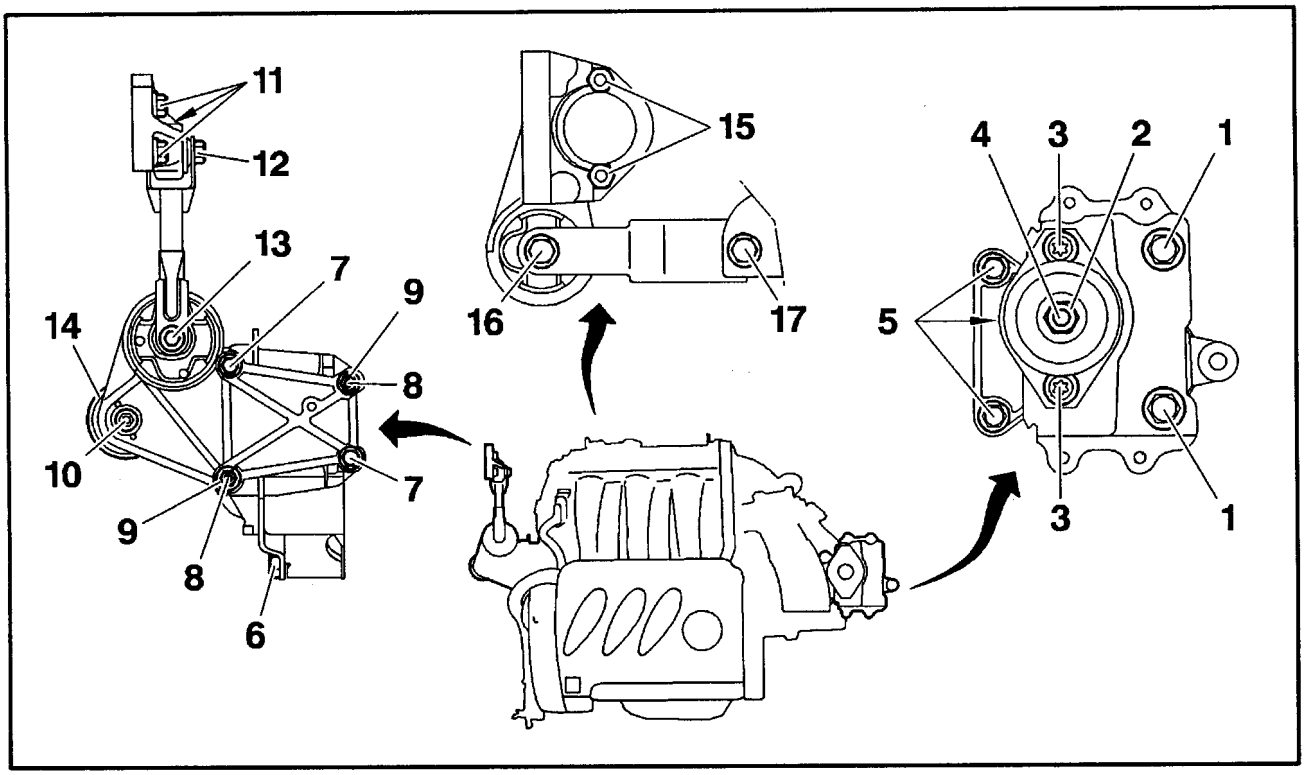

Fig : B1BP1GVD

Left hand engine mounting :
- tighten the bolts (1) to 2 m.daN
- tighten nut (2) to 6,5 m.daN : coat with threadlock LOCTITE FRENETANCH
- tighten the bolts (3) to 3 m.daN
- tighten the shaft (4) to 5 m.daN
- tighten the bolts (5) to 4,5 m.daN

Right hand upper engine mounting :
- tighten the bolts (6) to 6 m.daN
- tighten the bolts (7) to 4,5 m.daN
- tighten the studs (8) to 1,3 m.daN : coat with threadlock LOCTITE FRENETANCH
- tighten the nuts (9) to 4,5 m.daN
- tighten nut (10) to 4,5 m.daN
- tighten the bolts (11) to 5 m.daN
- tighten the bolt (12) to 3,5 m.daN
- tighten the bolt (13) to 5 m.daN
- tighten the mounting (14) to 4 m.daN

Right hand lower engine mounting :
- tighten the nuts (15) to 1 m.daN
- tighten the bolt (16) to 5 m.daN
- tighten the bolt (17) to 5 m.daN

2 – ENGINE

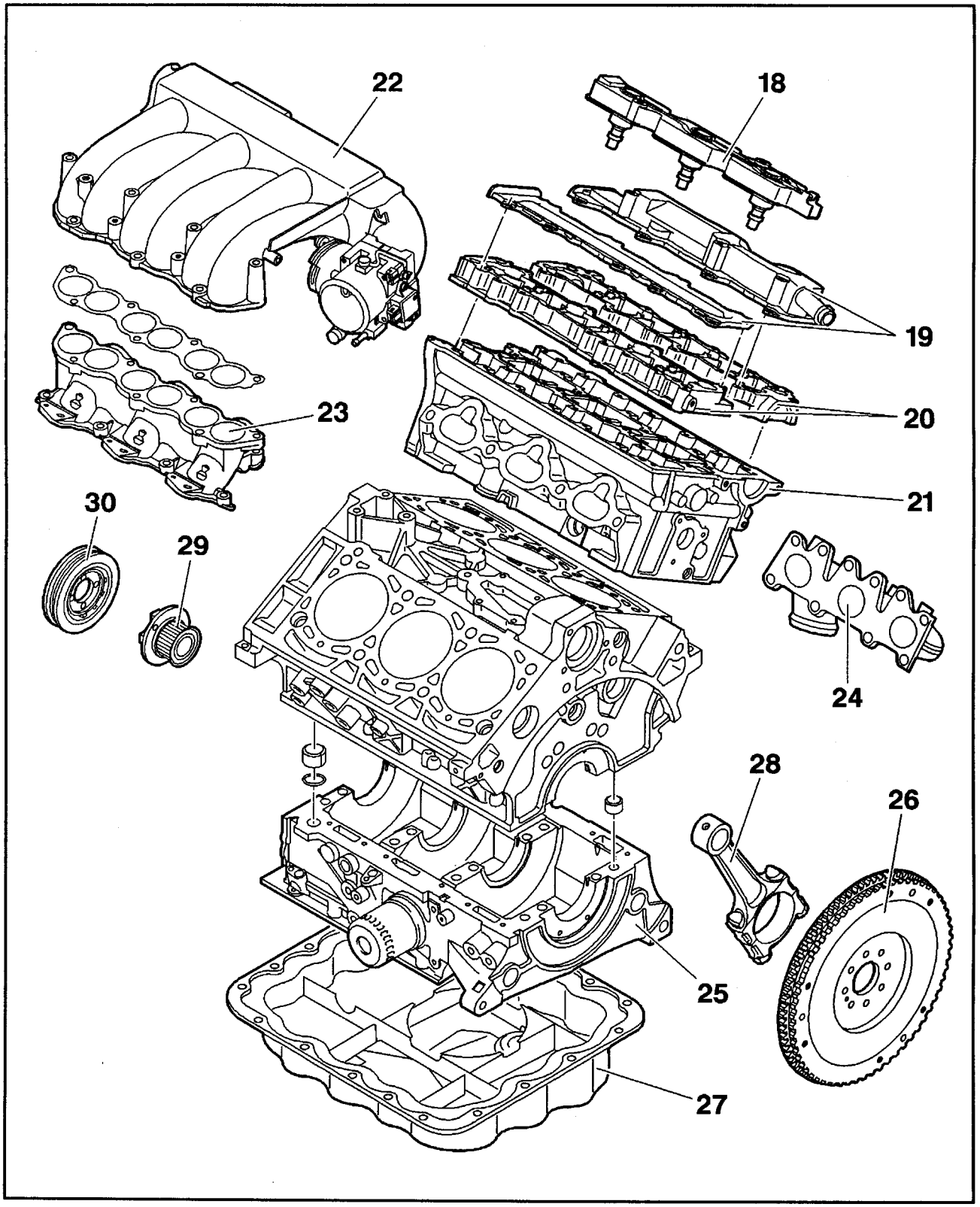

Fig : B1BP1GWP

(18) compact coil unit : tighten to 1 m.daN.

(19) cylinder head cover (refer to the Note) :
- 0,5 m.daN pre-tightening
- tightening torque = 1 m.daN

(20) camshaft bearing cap casing (refer to the Note) :
- 0,2 m.daN pre-tightening
- tightening torque = 0,8 m.daN

(21) cylinder head (refer to the Note).

Working one bolt at a time :
- pre-tightening to 2 mdaN
- slacken the bolts
- tighten to 1,5 m.daN
- finish with an angular tightening of 225 °

(22) air inlet manifold (refer to the Note) :
- 1 m.daN pre-tightening
- tightening torque = 2 m.daN

(23) inlet manifold (equipped with new seals)
(refer to the Note) :
- 1 m.daN pre-tightening
- tightening torque = 2,5 m.daN

NOTE : Respect the tightening order.

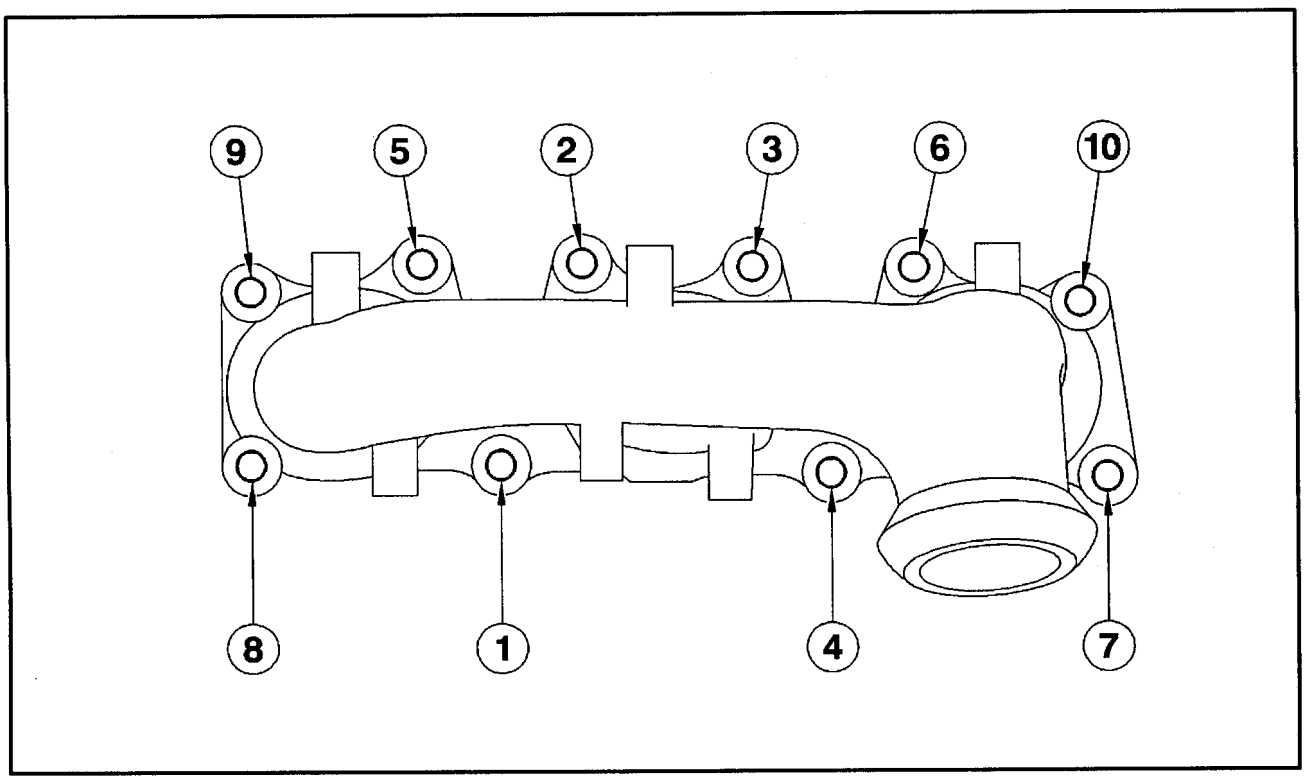

Fig : B1BP1GXD

(24) exhaust manifold (equipped with a new seal)
(refer to the Note) :
- 1 m.daN pre-tightening
- tightening torque = 3 m.daN

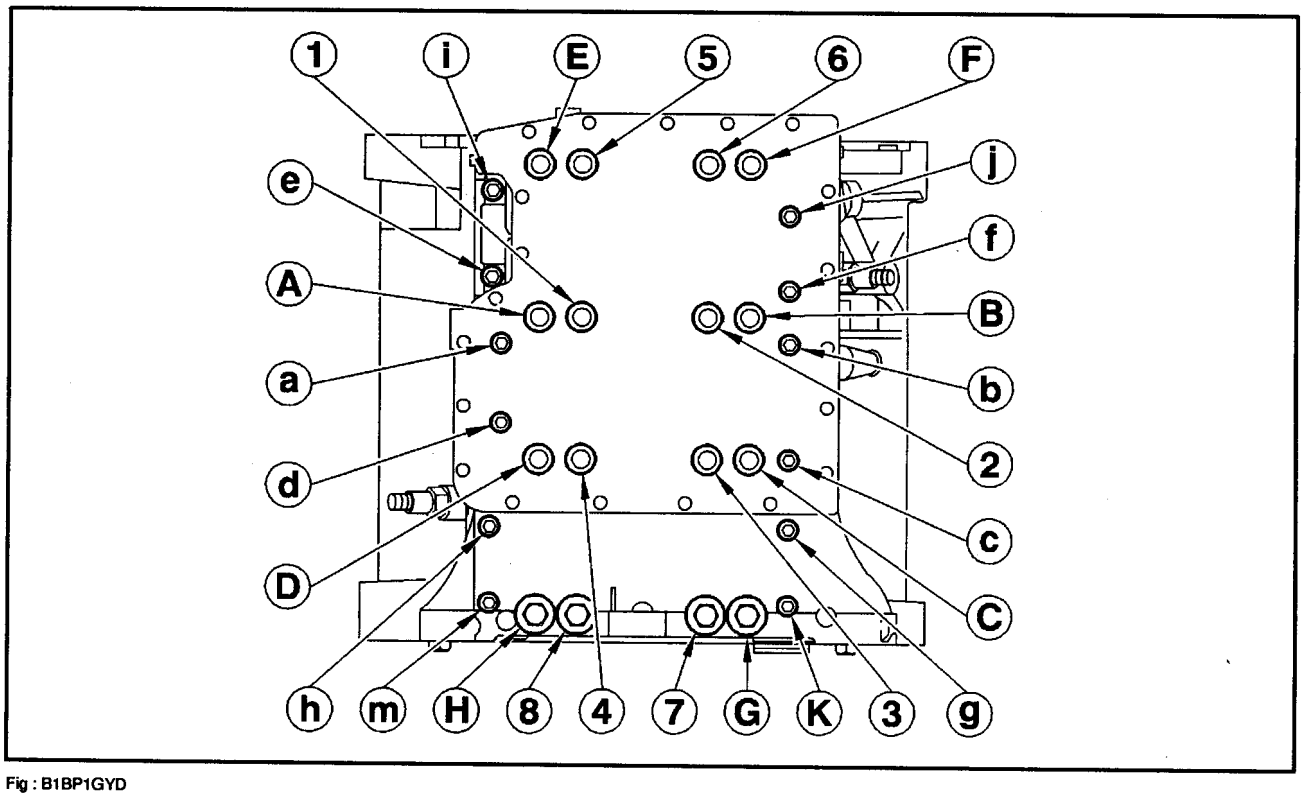

Fig : B1BP1GYD

(25) crankshaft main bearings.

The following operations should be carried out :

- brush clean the threads of the bolts
- using grease "MOLYKOTE G RAPID PLUS", lubricate the threads and below the heads of the bolts and refit them
- check that the 8 locating dowels are in place
- pre-tighten screws (M11) to 3 m.daN (sequence of 1 and 8)
- pre-tighten screws (M8) to 1 m.daN (sequence of A and H)
- tighten the bolts (M6) to 1 m.daN (sequence of a and m)
- slacken screws (M11) and (M8)

Working one bolt at a time :

- tighten the bolts (M11) to 3 m.daN (sequence of 1 and 8)
- tighten the bolts (M8) to 1 m.daN (sequence of A and H)

Max. bolt length below heads = M1 : 131,5 mm.

Max. bolt length below heads = M8 : 119 mm.

(26) flywheel :

- tighten to 1 m.daN
- angular tightening of 60°

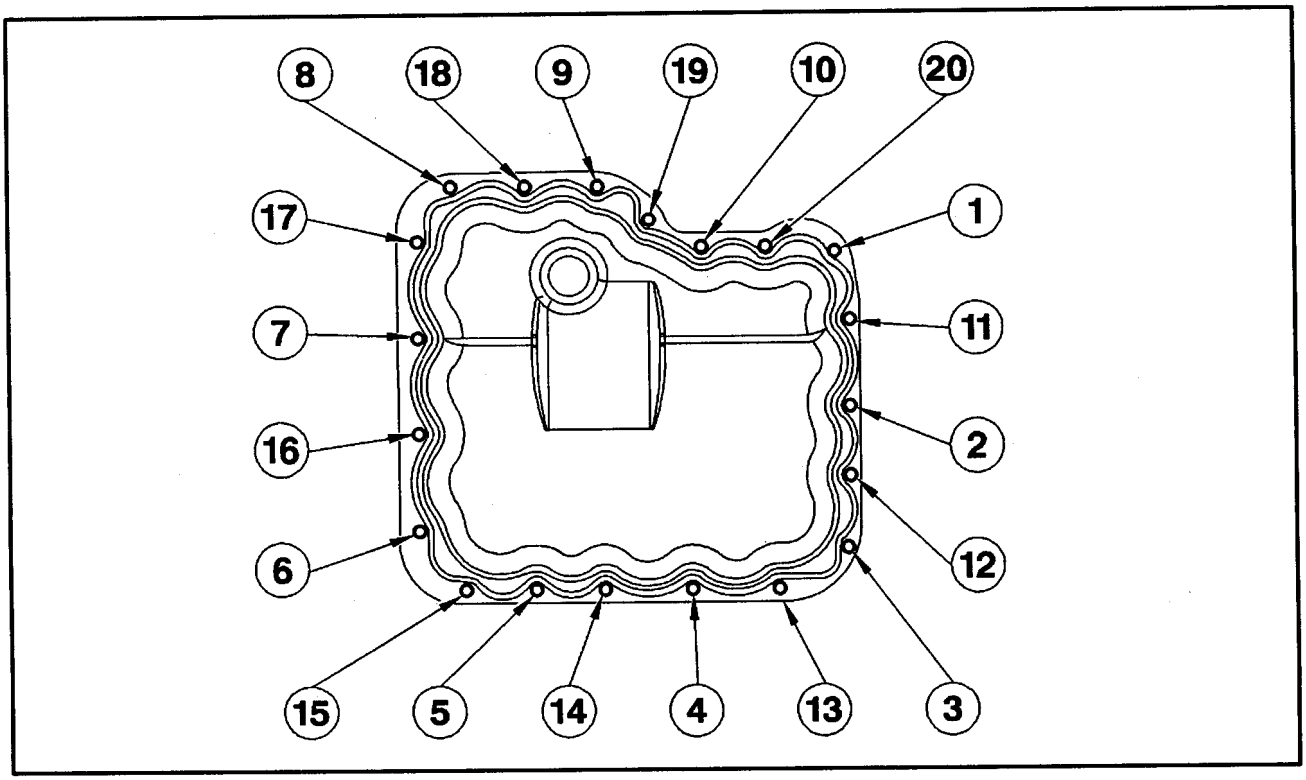

Fig : B1BP1GZD

(27) sump :
- 0,5 m.daN pre-tightening
- tightening torque = 0,8 m.daN

(28) con. rod caps :
- tighten to 2 m.daN
- angular tightening of 74°

(29) crankshaft pulley hub :
- tighten to 4 m.daN
- angular tightening of 80°

(30) crankshaft pulley : tighten to 2,5 m.daN.

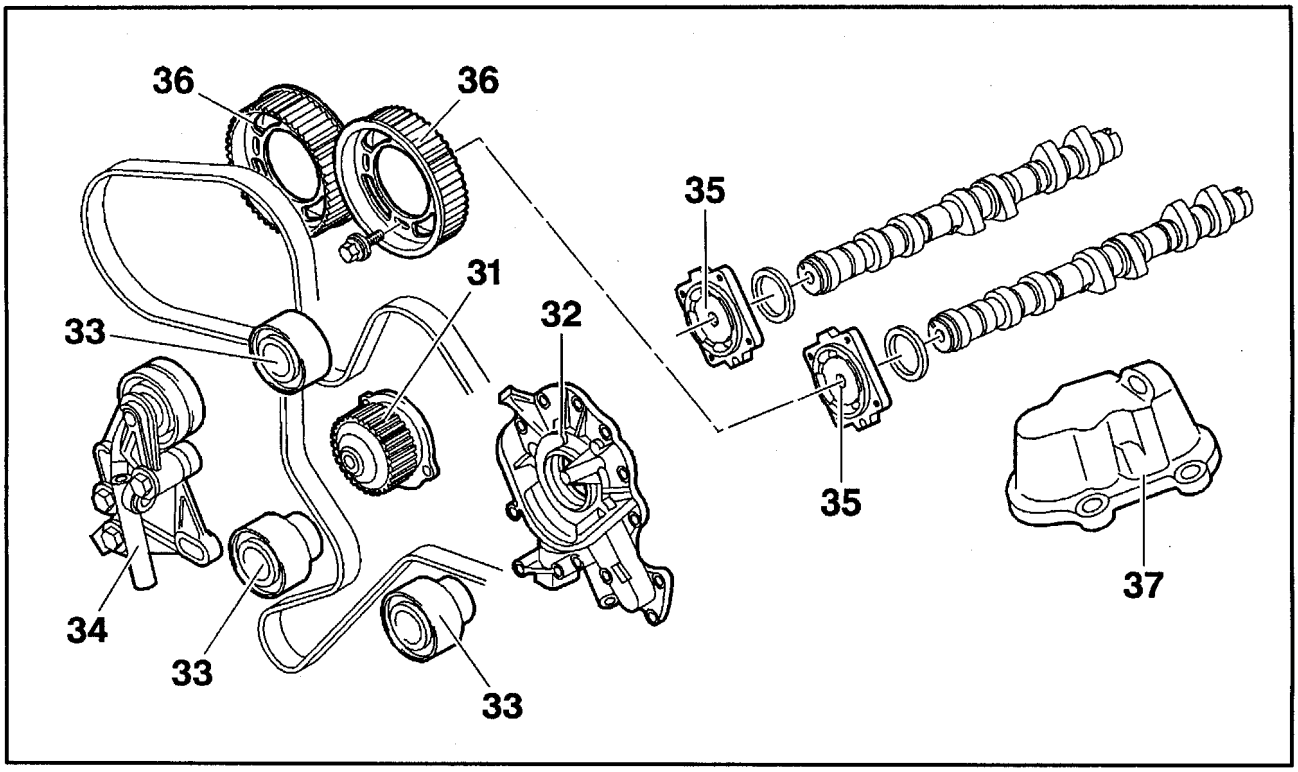

Fig : B1BP1H0D

(31) coolant pump (refer to the Note) :
- 0,5 m.daN pre-tightening
- tightening torque = 0,8 m.daN

(32) oil pump coolant pump (refer to the Note) :
- 0,5 m.daN pre-tightening
- tightening torque = 0,8 m.daN

NOTE : Respect the tightening order.

(33) roller tensioner : tighten to 8 m.daN.

(34) timing belt roller tensioner : tighten to 8 m.daN.

(35) camshaft hubs.

1st method (recommended method) :
- tighten to 2 m.daN
- angular tightening of 57°

2nd method : tightening torque = 8 m.daN.

(36) camshaft pulleys : tighten to 1 m.daN.

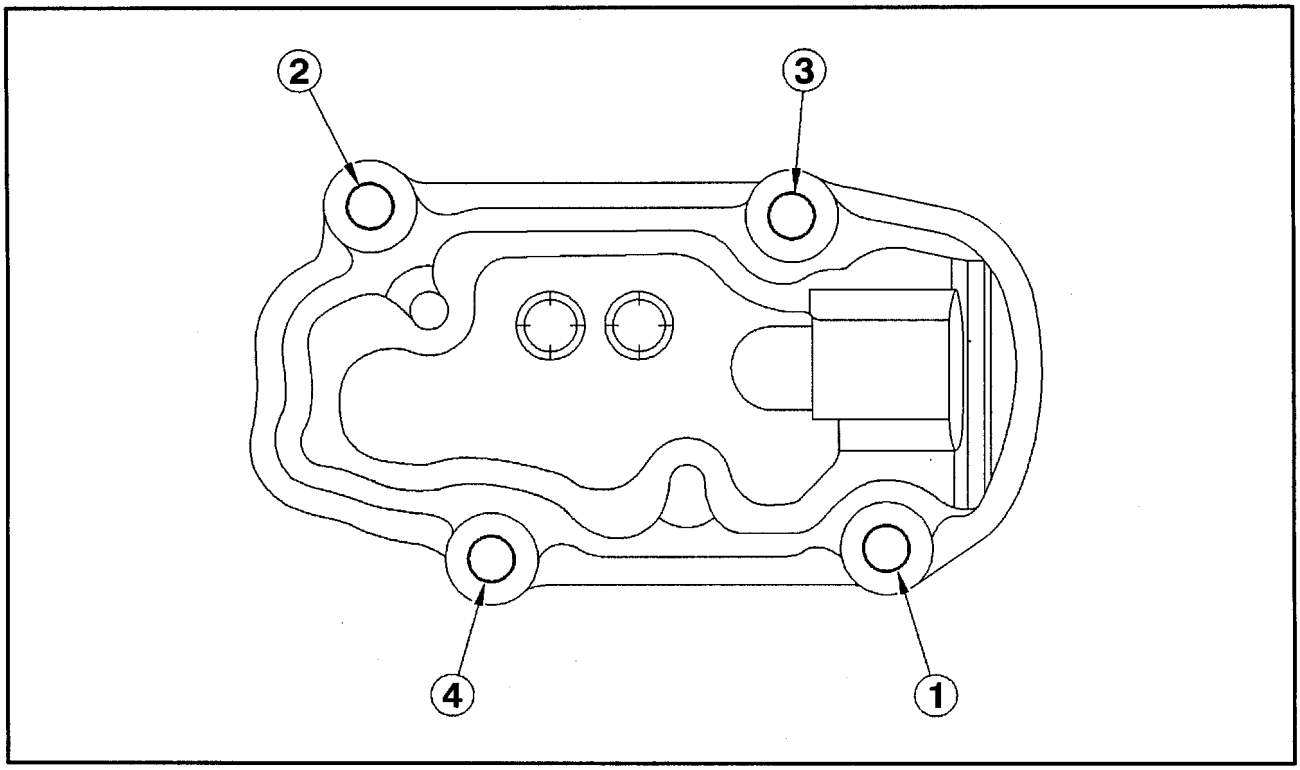

Fig : B1BP1H1D

(37) oil vapour recovery housing (sequence of 1 and 4) :
- 0,5 m.daN pre-tightening
- tightening torque = 1 m.daN

REMOVING – REFITTING : ENGINE/GEARBOX ASSEMBLY

1 – RECOMMENDED TOOLS

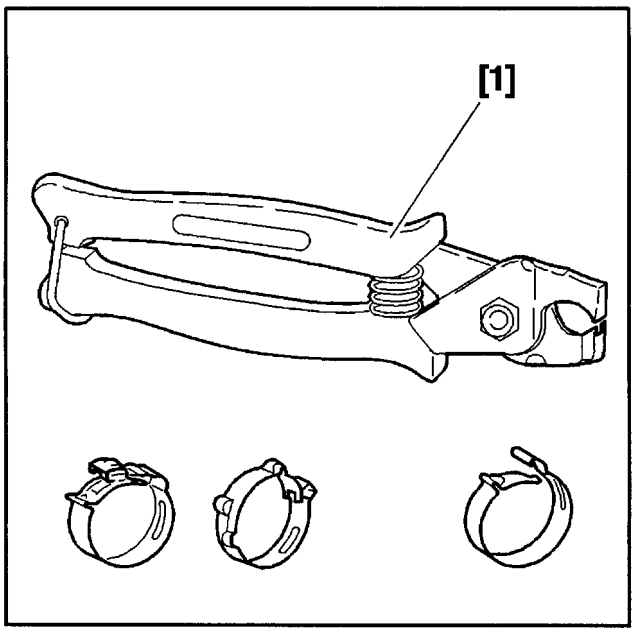

Fig : E5-P088C

[1] pliers to remove "clic" rings (4145–T).

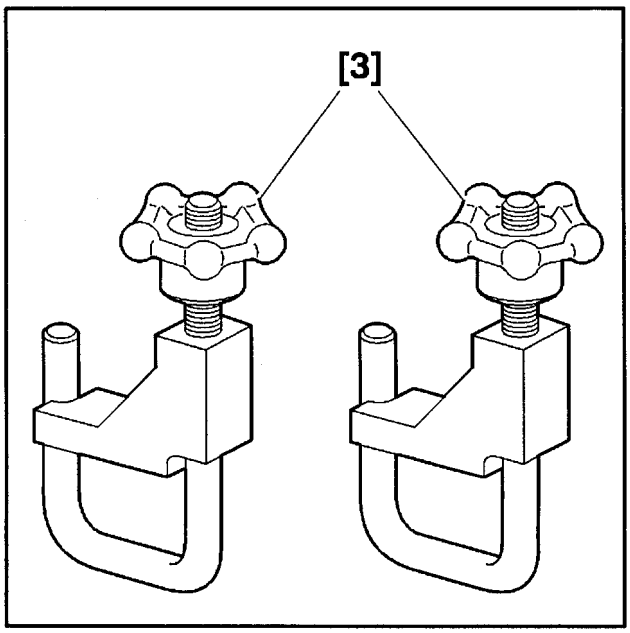

Fig : E5-P08JC

[3] hose clamp 4153–T.

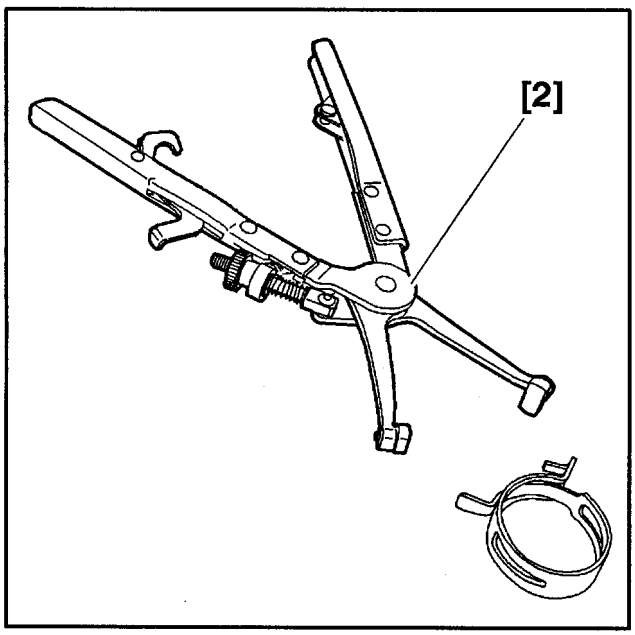

Fig : E5AP02WC

[2] 9029–T pliers for removing and refitting hose clips.

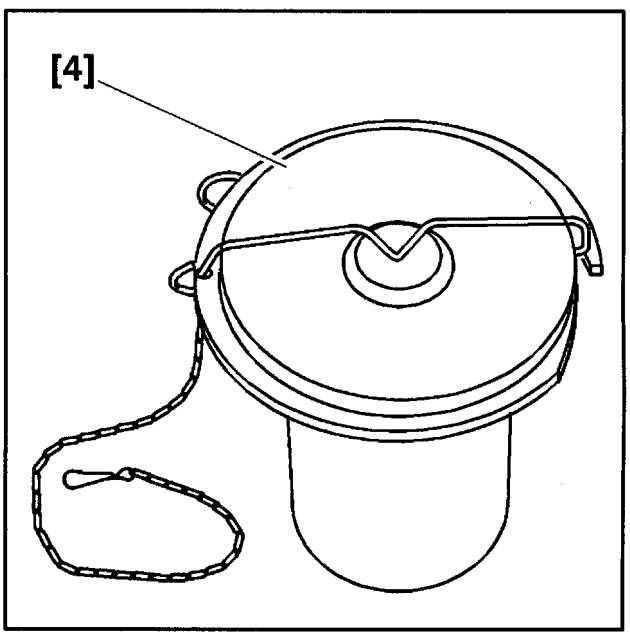

Fig : E5-P11HC

[4] LHM reservoir/filter assembly cover (9004–T).

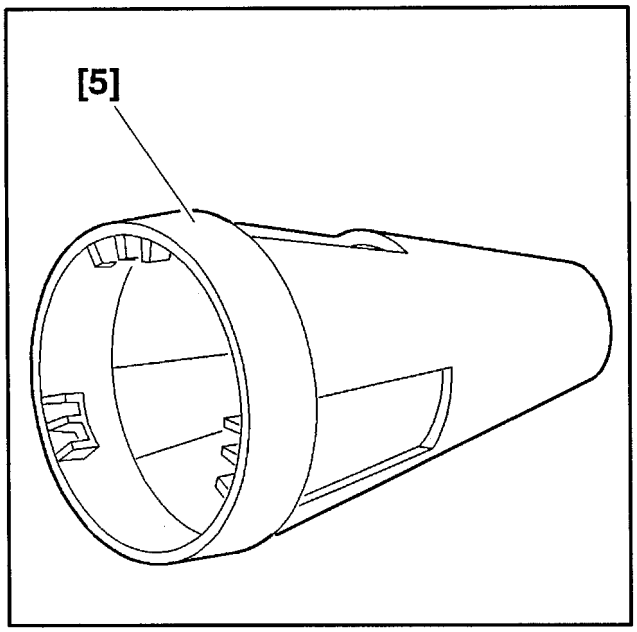

Fig : E5AP03CC

[5] slave cylinder locking end-piece 9040-T.

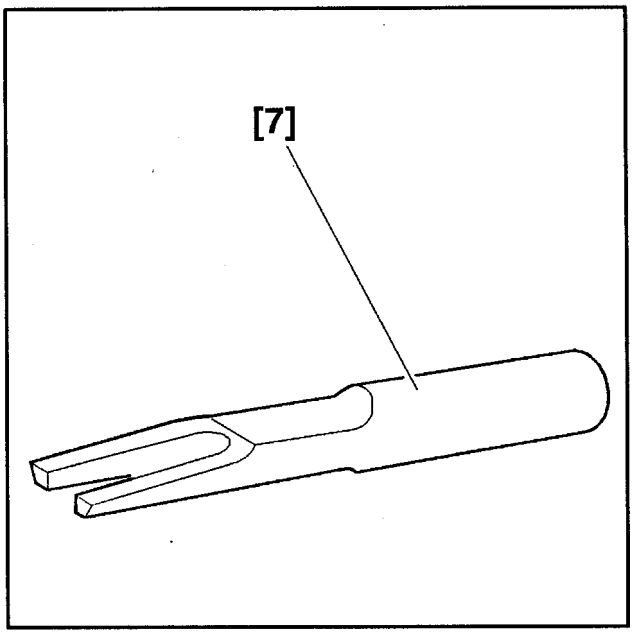

Fig : E5AP03DC

[7] ball joint extractor 9040-TG1.

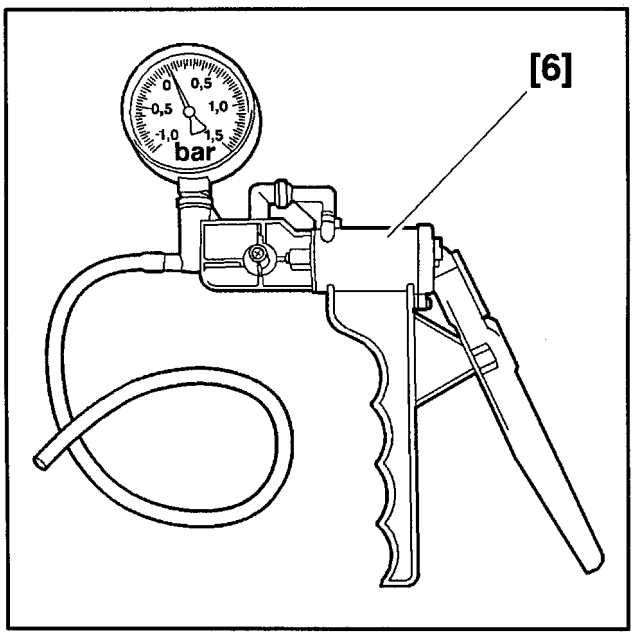

Fig : E5AP038C

[6] vacuum-pressure manual pump 4530-T.G".

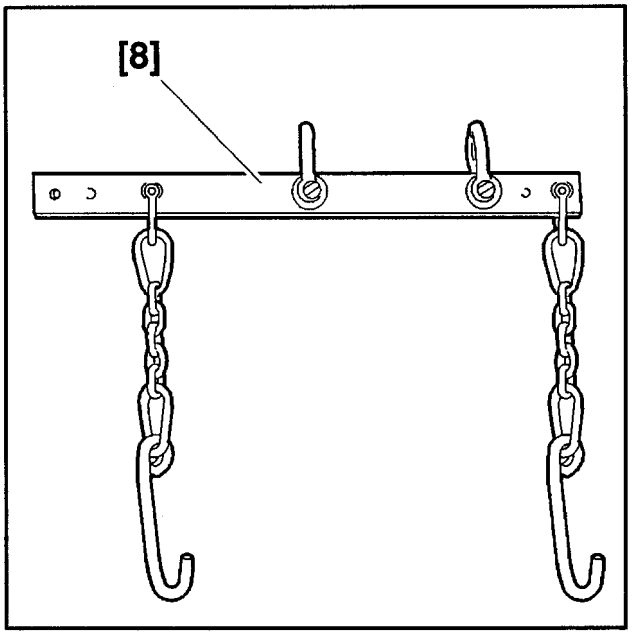

Fig : E5-P04DC

[8] sling 2517-T.bis.

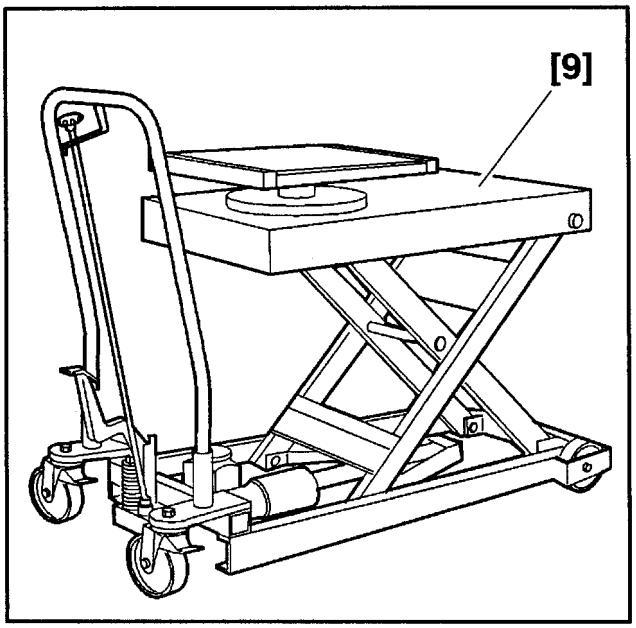

Fig : E5-P150C

[9] lifting table 5702-T.A.

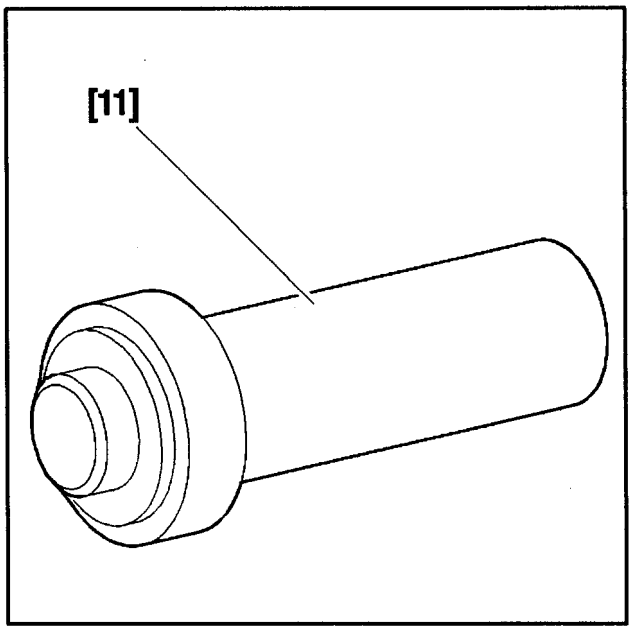

Fig : E5AP03BC

[11] fitting mandrel 9017-T.C.

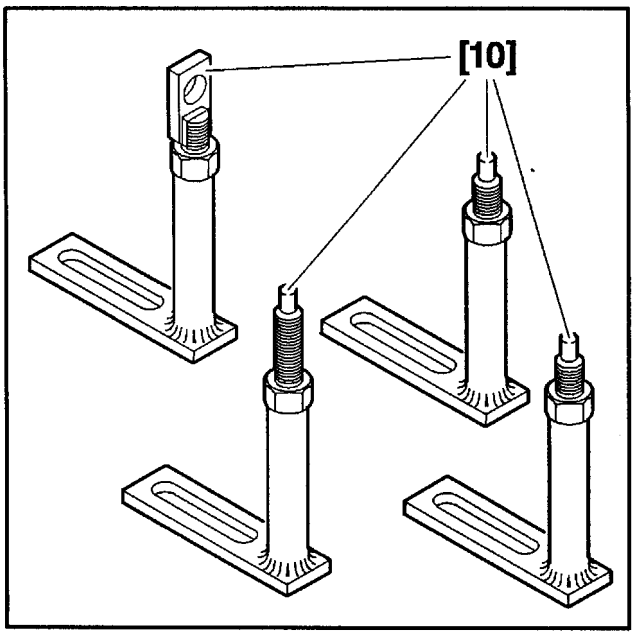

Fig : E5AP03EC

[10] engine supports 5704-T.

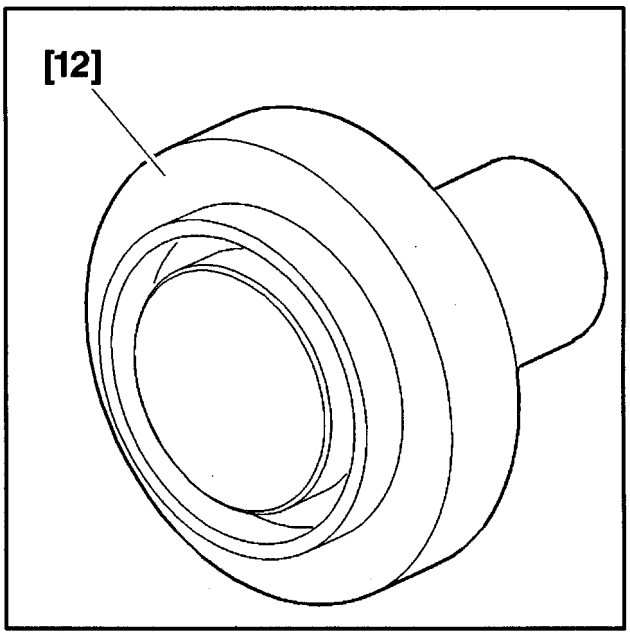

Fig : E5AP03FC

[12] differential L.H. side oil seal fitting mandrel 5701-T.A.

2 – PRELIMINARY OPERATIONS

Disconnect the battery negative terminal.

Depressurize the hydraulic circuit (see the relevant operation).

Remove the front panel.

Drain :

- the cooling system (see the relevant operation)
- the gearbox

Remove :

- the drive shafts (see the relevant operation)
- the auxiliary equipment drive belt (see the relevant operation)

3 – REMOVING

NOTE : This operation is carried out from above.

Uncouple the exhaust ball joint.

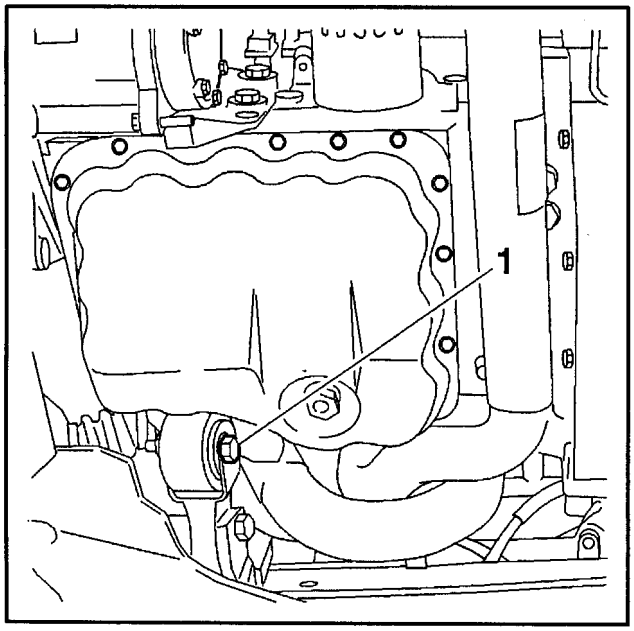

Fig : B1BP1EEC

Remove the fixings of the air conditioning compressor (suspend the air conditioner compressor from the bodyshell of the vehicle).

ATTENTION : Do not disconnect the air conditioning pipes from the compressor.

Take out screw (1).

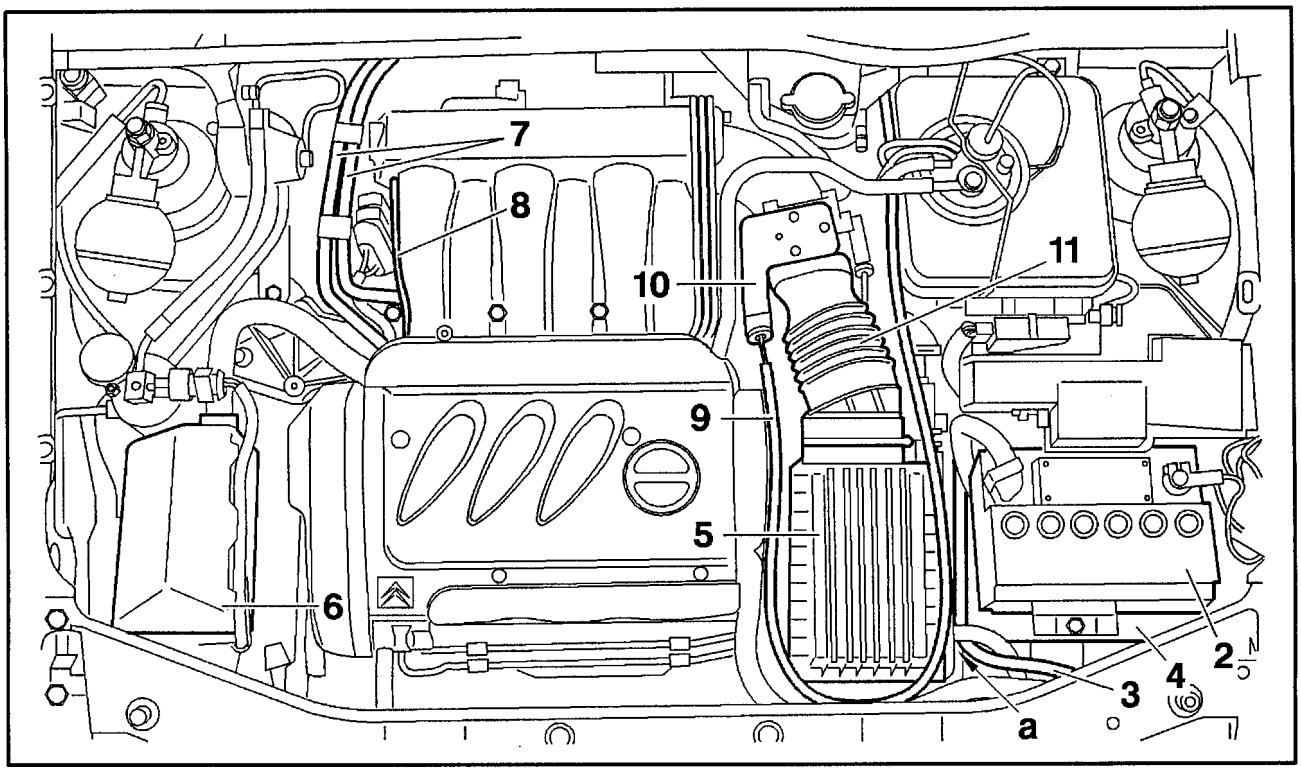

Fig : B1BP1EFD

Remove :
- the battery (2)
- the battery support (4)
- the air filter assembly (5)
- the air inlet elbow (at "a")
- the air sleeve (11)
- the ecu housing cover (6)
- the throttle butterfly housing (10)

Disconnect the accelerator cable (9).

Fit the tool [6] to the hose (8).

Drop the pressure in the injector fuel rail using the pump [6].

Connect the hose (8).

Uncouple :
- the "clic" unions of the fuel supply and return pipes (7)
- the canister hose (3) (active carbon filter)

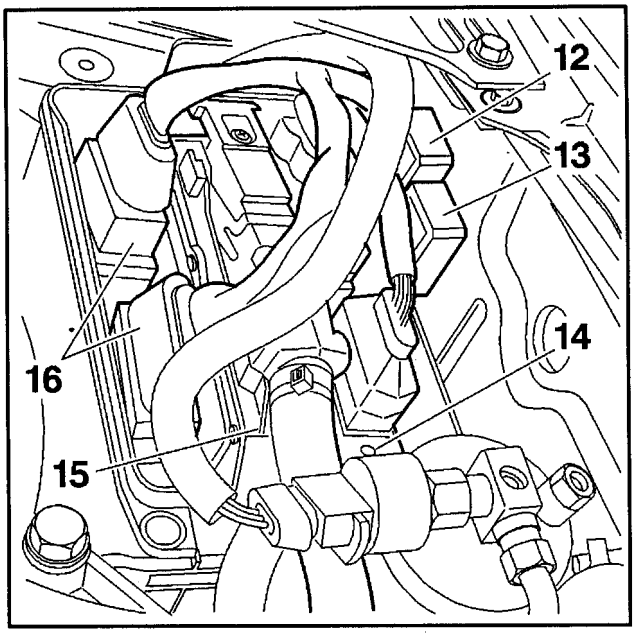

Fig : B1BP1EGC

Disconnect :
- the E.C.U.s (14 and 15)
- connectors (12) and (13)

Unclip the relays (16).

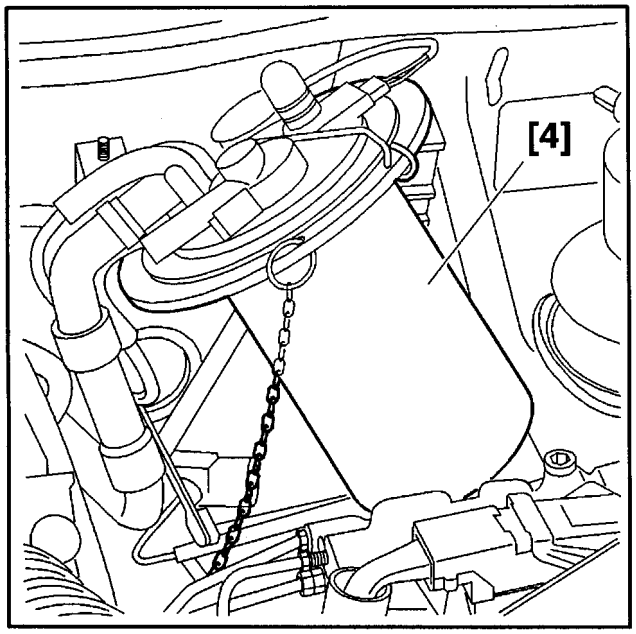

Fig : B1BP1EHC

Disconnect the hp pump supply hose from the pick-up unit ; by means of tool [1].

Remove :
- the LHM tank fluid pick-up unit
- the LHM tank

Put tool [4] into place.

Remove the radiator header tank.

Disconnect the hoses from the radiator header tank ; by means of tool [2].

Disconnect the connector from the radiator header tank.

Remove the ABS hydraulic valve block fixing bolts.

Uncouple the control rods for gears shift selection ; by means of tool [7].

Remove the retaining clips of the gear selector cables.

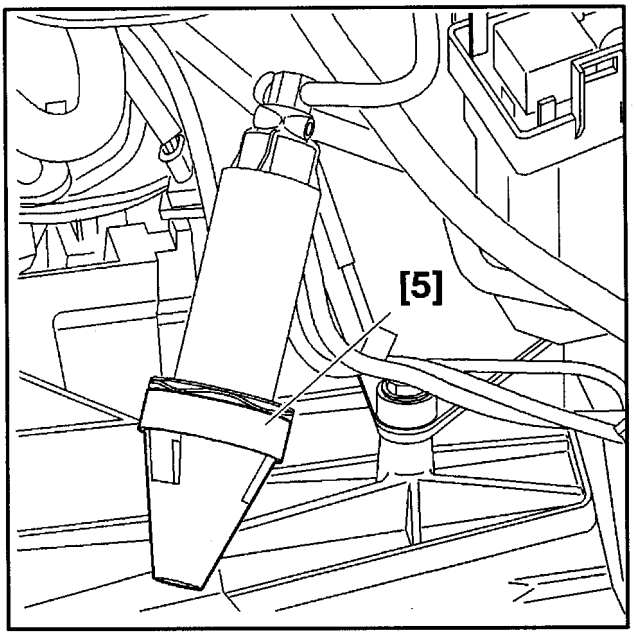

Fig : B1BP1EJC

Disconnect the clutch slave cylinder from the gearbox (by rotation).

Fit the tool [5] to the clutch slave cylinder.

ATTENTION : Do not drop the clutch push rod into the bell housing.

Disconnect the "clic-clip" hoses from the heater matrix.

Disconnect :
- the water temperature sensor
- the radiator hoses ; by means of tool [2]

Remove the radiator.

Disconnect :
- the Lambda probe
- the various components of the fusebox associated with the engine/gearbox assembly
- the earth points associated with the engine/gearbox assembly

Uncouple :
- the 4,5 mm dia. general hydraulic system supply pipe to the pressure regulator
- the pipe from the accumulator to the SC.CAR regulator

Remove the SC.CAR regulator complete with its fixing bracket.

Uncouple :
- the power steering flexible supply pipe from the 5 way union (power steering pressure sensor on the left hand front chassis member)
- the hydractive front regulator return pipe

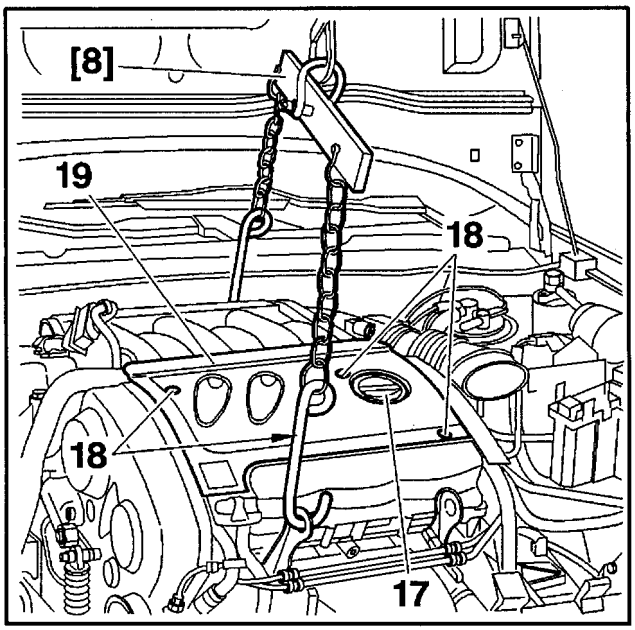

Fig : B1BP1EKC

Remove :
- the oil filler plug (17)
- screws (18)
- the engine cover (19)

Refit the oil filler plug (17).

Position a workshop crane.

Put tool [8] into place.

Support the power unit assembly.

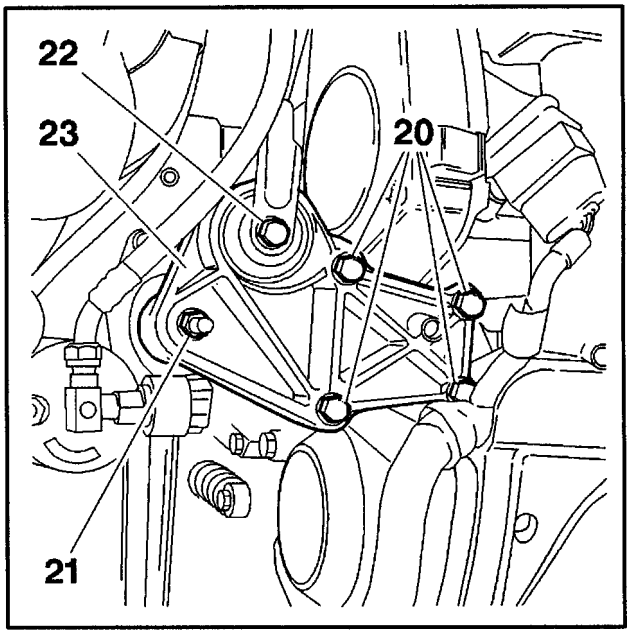

Fig : B1BP1ELC

Remove :
- screws (20)
- nut (21)
- screw (22)
- engine mounting bracket (23)
- the centre nut of the gearbox mounting (raise the ABS unit)

Remove the power unit assembly (rotate the assembly about its vertical axis).

Recover the spacer from the gearbox mounting.

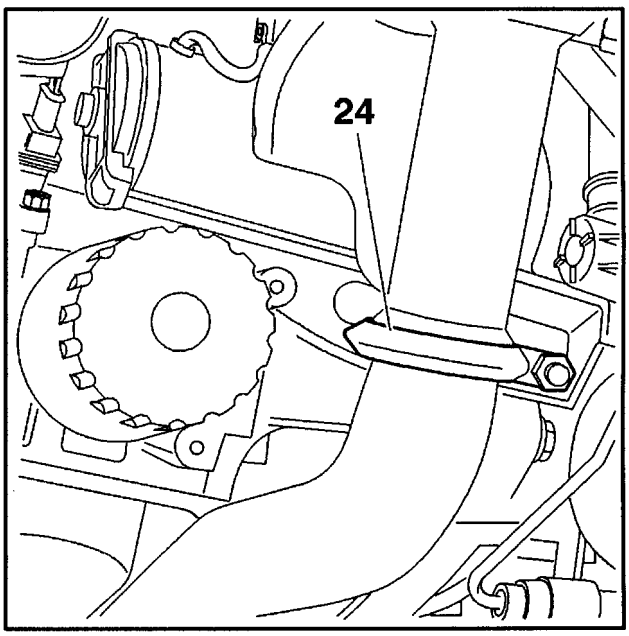

Fig : B1BP1EMC

Remove the exhaust clamping collar (24).

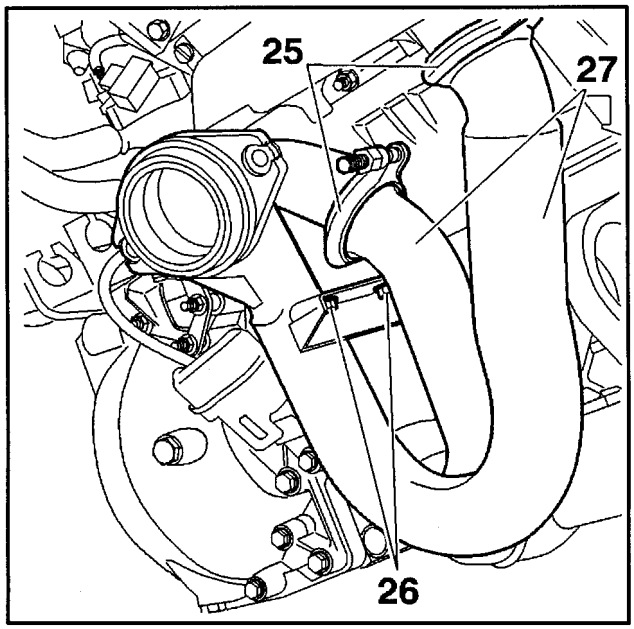

Fig : B1BP1ENC

Slacken the clips (25).

Remove :
- nuts (26)
- the exhaust pipes (27)

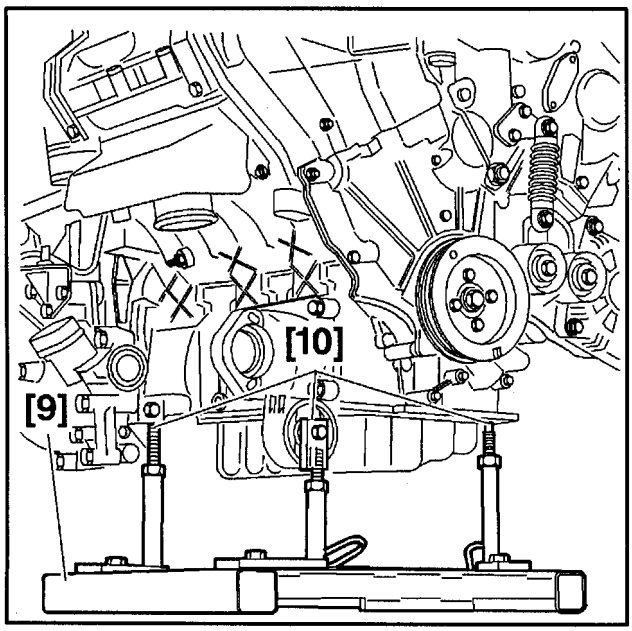

Fig : B1BP1EPC

Position retaining shafts (10).

Place the engine/gearbox assembly on the hydraulic table [9].

4 – REFITTING

Always fit new Nylstop nuts.

Use the drifts [11] [12] to fit the final drive oil seals, having greased the space between the seal lips.

Support the engine and gearbox assembly with a workshop engine hoist.

Fit :
- the exhaust pipes (27)
- nuts (26)
- clamping collars (24; 25) ; tighten to 2,5 m.daN
- the gearbox mounting spacer (wipe with MOLYKOTE G.RAPID PLUS grease)

Put the engine/gearbox assembly in place using an engine hoist.

Place a jack below the gearbox (use a block of wood).

Using the jack, locate the stud of the gearbox in its support.

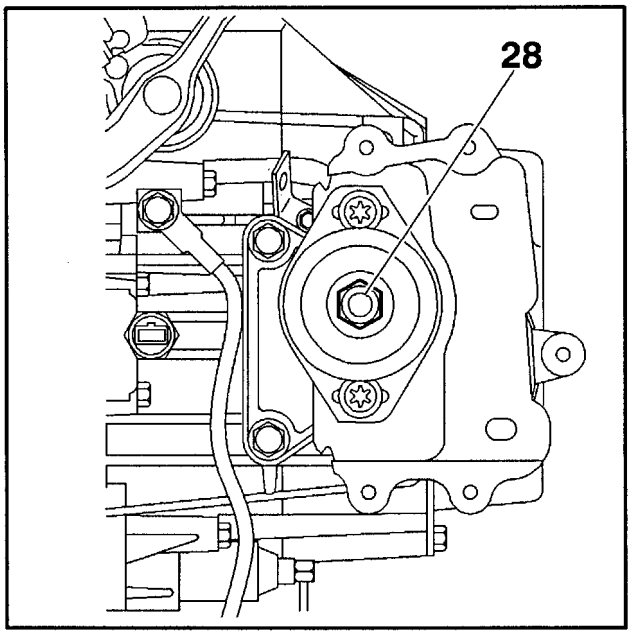

Fig : B1BP1EQC

Refit nut (28) ; tighten to 6,5 m.daN.

Fit :
- engine mounting bracket (23)
- screws (20) ; tighten to 4,5 m.daN
- nut (21) ; tighten to 4,5 m.daN
- screw (22) ; tighten to 5 m.daN
- screw (1) ; tighten to 5 m.daN

Refit the connector of the 5 way union of the power steering.

Connect the power steering flexible supply pipe.

Refit the SC/CAR regulating accumulator complete with its mounting bracket.

Recouple :
- the pipe from the accumulator to the SC.CAR regulator
- the 4,5 mm dia. general hydraulic system supply pipe to the pressure regulator
- the hydractive front regulator return pipe

Reconnect :
- the Lambda probe
- the various components of the fusebox associated with the engine/gearbox assembly
- the earth points associated with the engine/gearbox assembly

Refit the radiator header tank hoses ; by means of tool [2].

Refit the radiator header tank.

Remove tool [4].

Refit the connector to the radiator header tank.

Fit :
- the LHM tank fluid pick-up unit
- the LHM tank
- the engine cover (19)
- screws (18)

ATTENTION : Using LHM fluid, refill and prime the hp pump supply hose.

Connect the hp pump supply hose to the pick-up unit.

Refit the radiator.

Reconnect :
- the radiator hoses ; by means of tool [2]
- the water temperature sensor

Connect the "clic-clip" hoses to the heater matrix.

NOTE : Fit the O ring seals to the pipes to facilitate their reassembly.

Remove tool [5].

Refit the clutch slave cylinder.

Couple up the control rods for gears shift selection.

Refit the gear selector cable retaining clips.

Fit the ABS hydraulic valve block fixing bolts.

Refit the ecu housing.

Reconnect :
- the E.C.U.s (14 and 15)
- connectors (12) and (13)

Refit the ecu housing cover (6).

Reclip the relays (16).

Recouple :
- the fuel inlet and return click-fit connections (7)
- the canister hose (3) (active carbon filter)

Connect the accelerator cable (9).

Fit :
- the throttle butterfly housing (10)
- the battery support (4)
- the battery (2)
- the air filter assembly (5)
- the air inlet elbow (at "a")
- the air sleeve (11)
- the air conditioning compressor (see the relevant operation)

Refit the exhaust ball joint ; tighten to 1 m.daN.

Refit the front panel.

Fit :
- the auxiliary equipment drive belt (see the relevant operation)
- the drive shafts (see the relevant operation)

Fill and top up to level the following components :
- gearbox
- cooling system
- hydraulic circuit

Check that the cooling system is not-leaking.

Reconnect the battery negative terminal.

Fill and bleed the cooling system (see the relevant operation).

Carry out the initialisation procedure for the ignition injection E.C.U. (see the relevant operation).

IMPERATIVE : Start the engine, with the pressure regulator release screw loosened.

REMOVING – REFITTING : AUXILIARY EQUIPMENT DRIVE BELT

NOTE : The accessory drive belt is tensioned automatically by the dynamic tensioner.

1 – REMOVING

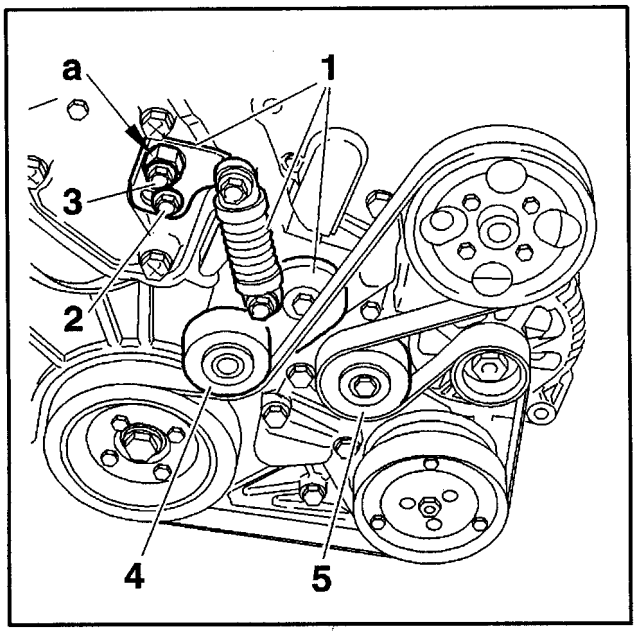

Fig : B1BP1EXC

Slacken bolt (3).

Keep the dynamic tensioner (1) under tension using the hexagon "a".

Disengage the shoulder of the bolt (2) from the oblong hole in the dynamic tensioner.

Release the dynamic tensioner (1) using the hexagon "a".

Remove the accessory drive belt.

NOTE : Check that rollers (4) and (5) rotate freely (no tight spot).

2 – REFITTING

Reinstall the auxiliary equipment drive belt.

NOTE : Check that the belt is correctly located in the grooves of the various pulleys.

Bring the dynamic tensioner (1) into its operating position using the hexagon "a".

Tighten the bolt (2) to 2,5 m.daN.

Tighten the bolt (3) to 2,5 m.daN.

REMOVING – REFITTING : CYLINDER HEAD

1 – RECOMMENDED TOOLS

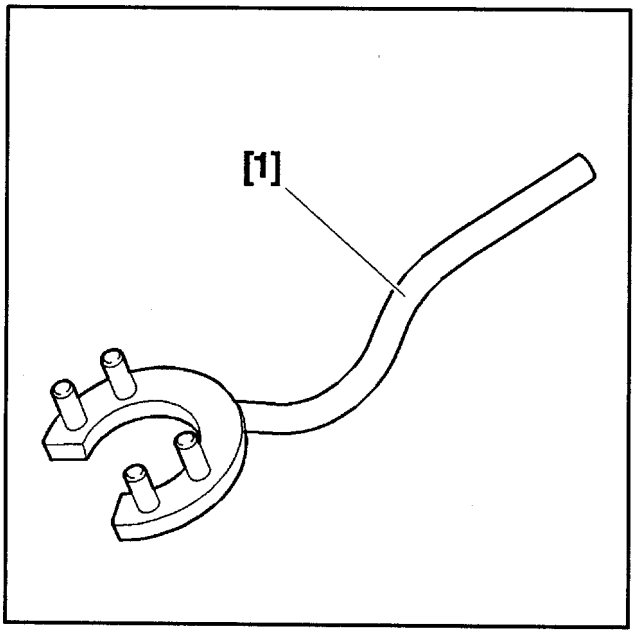

Fig : E5AP03NC

[1] camshaft immobilising key C.0187F.

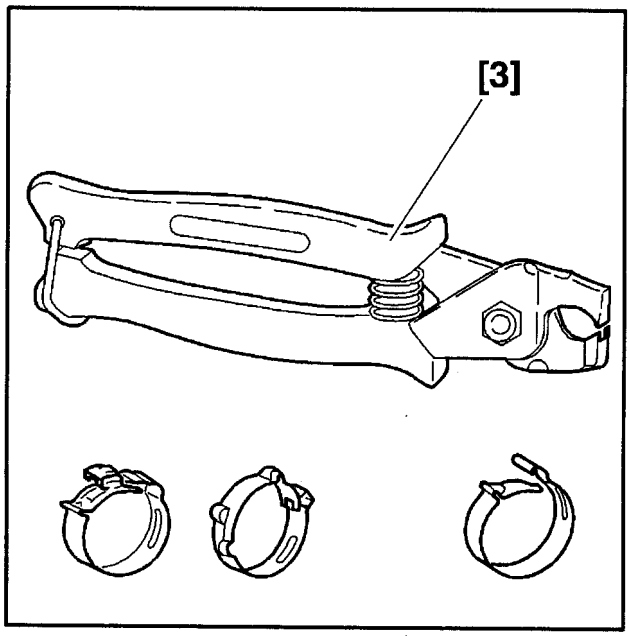

Fig : E5–P12HC

[3] pliers to remove "clic" rings (4145–T).

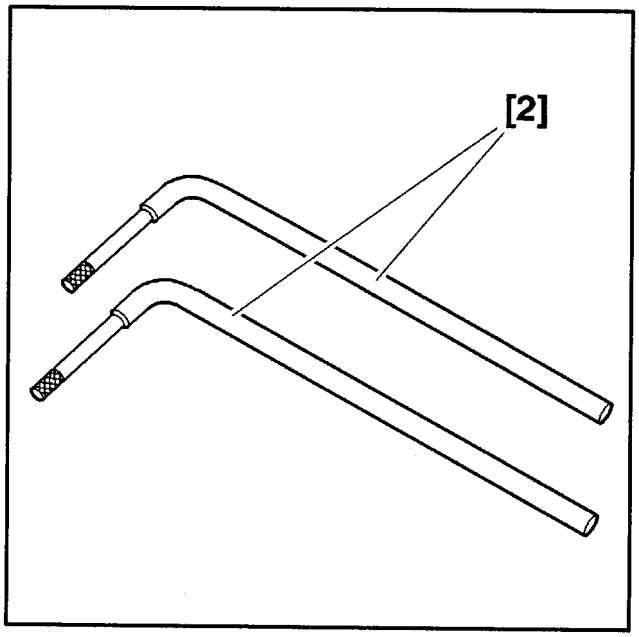

Fig : E5AP051C

[2] cylinder head releasing levers 149–T.

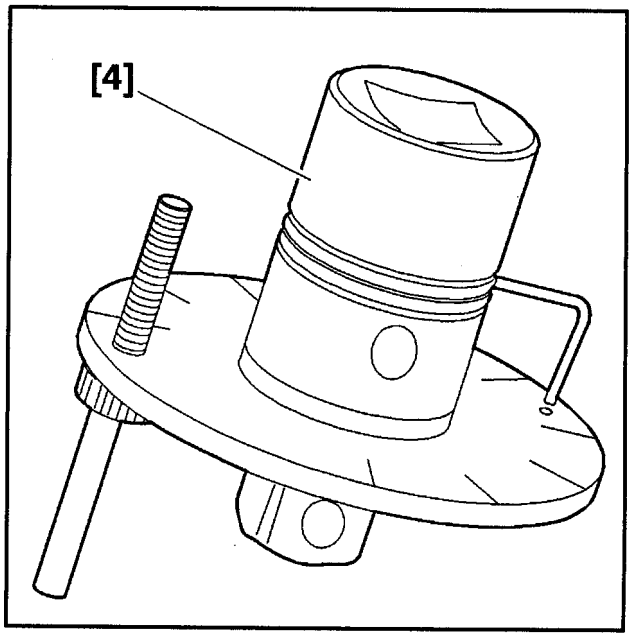

Fig : E5AP052C

[4] angle sector to tighten the cylinder head 4069–T.

2 - PRELIMINARY OPERATIONS

Drain the cooling system (see the relevant operation).

Remove :

- the engine cover
- the air intake housing from the cylinder block
- the right-hand engine mounting
- the timing belt (see the relevant operation)

Refit the right-hand engine mounting.

Disconnect the exhaust down pipe from the manifold.

3 - REMOVING

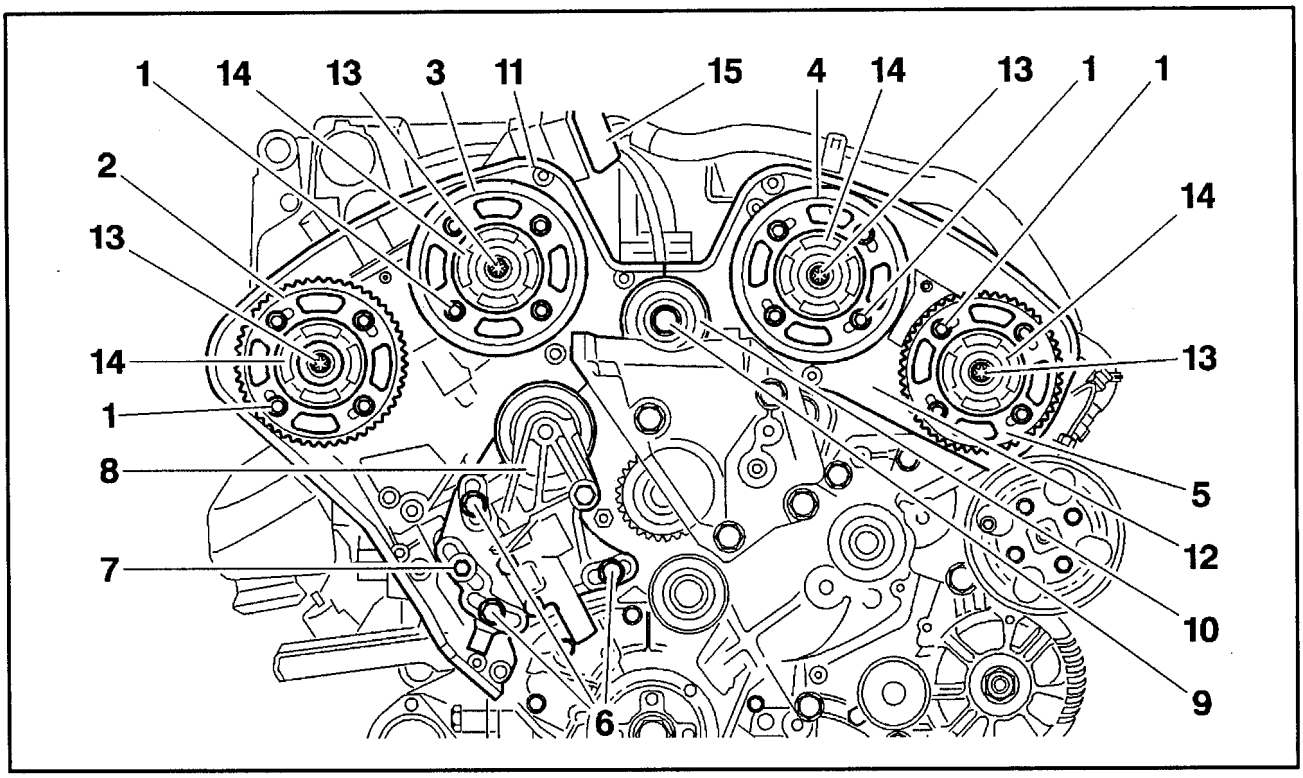

Fig : B1DP08XD

Remove :

- screws (1)
- the camshaft pulleys (2), (3), (4) and (5)
- screws (6)
- screw (7)
- the dynamic tensioner (8)
- screw (9)
- guide roller (10)

Carry out the operations below on both camshafts :

- immobilise the camshaft hub using the tool [1]
- take out screw (13)
- remove the camshaft hub (14)

Remove the timing cases (11) ; (12).

Disconnect the connector (15).

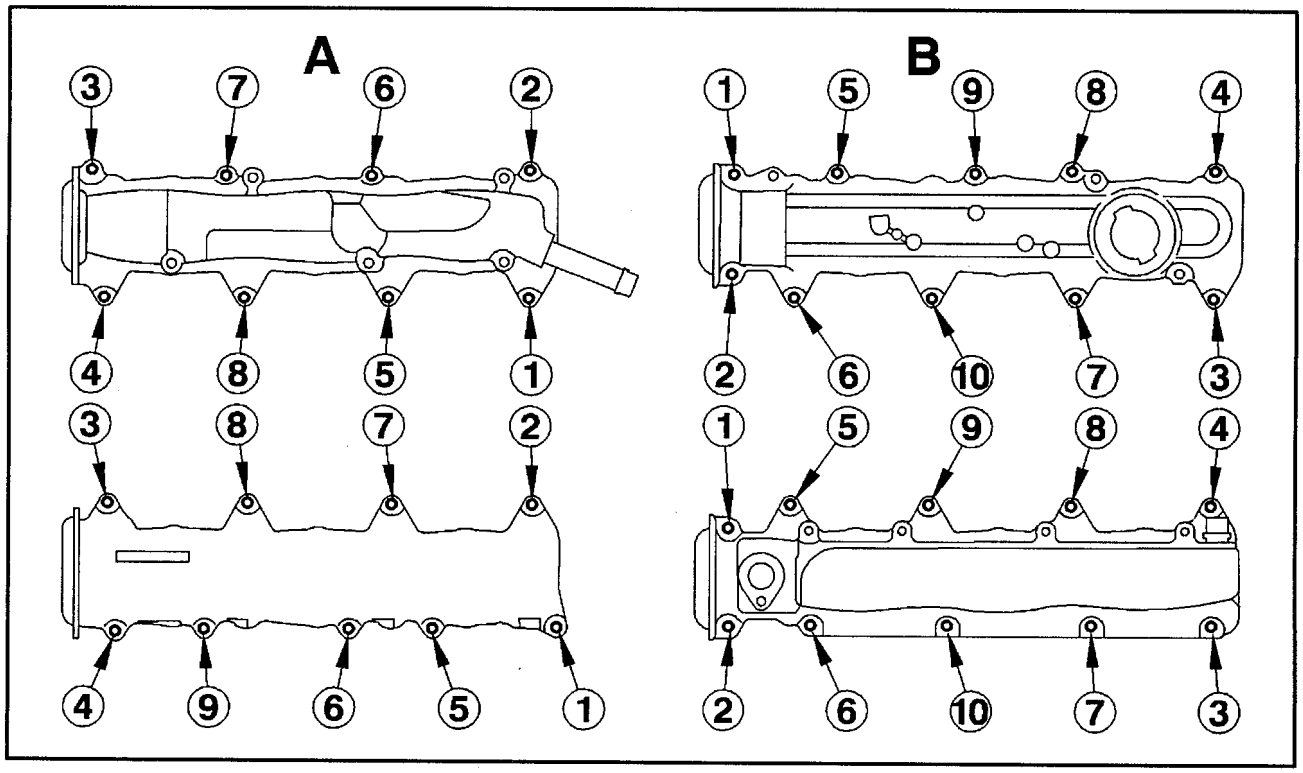

Fig : B1DP08YD

A. Front cylinder head.

B. Rear cylinder head.

Remove :

- the camshaft cover casing bolts following the sequence shown
- the casings cover the camshafts

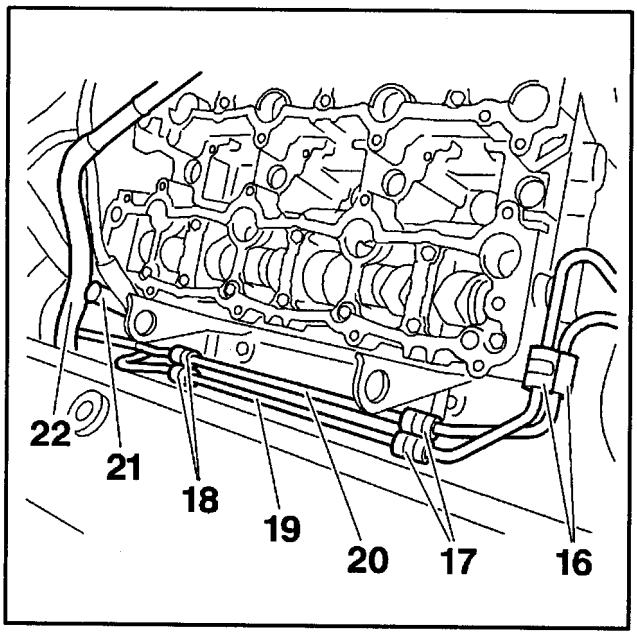

Fig : B1DP090C

Remove securing screws (16), (17), (18) from the clamps.

Disconnect the pipes (19) and (20) from the high pressure pump ; using a pipe spanner.

Remove the dipstick guide tube (21) fixing.

Disconnect the hp pump supply pipe (22).

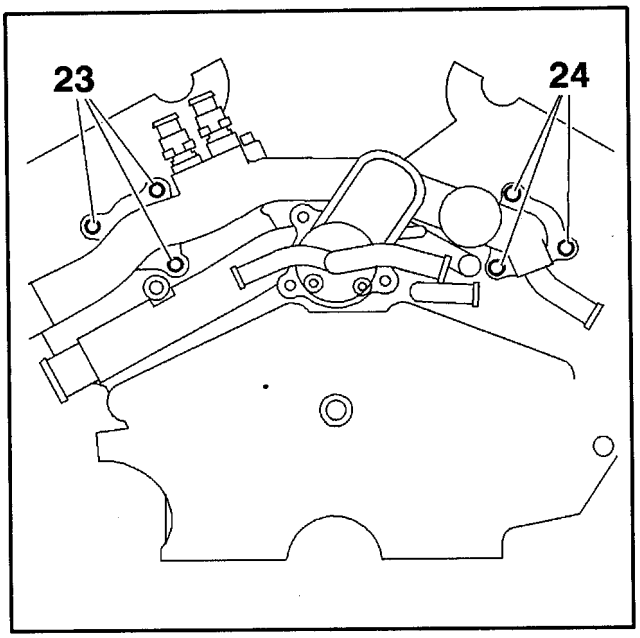

Fig : B1DP091C

Remove the screws (23) and (24).

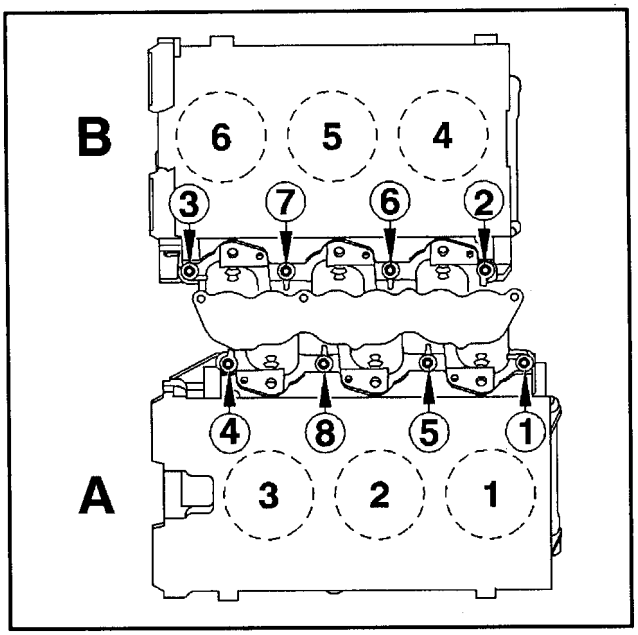

Fig : B1DP092C

A. Front cylinder head.

B. Rear cylinder head.

Following the sequence shown, slacken the nuts and bolts securing the inlet manifold and fuel rail assembly.

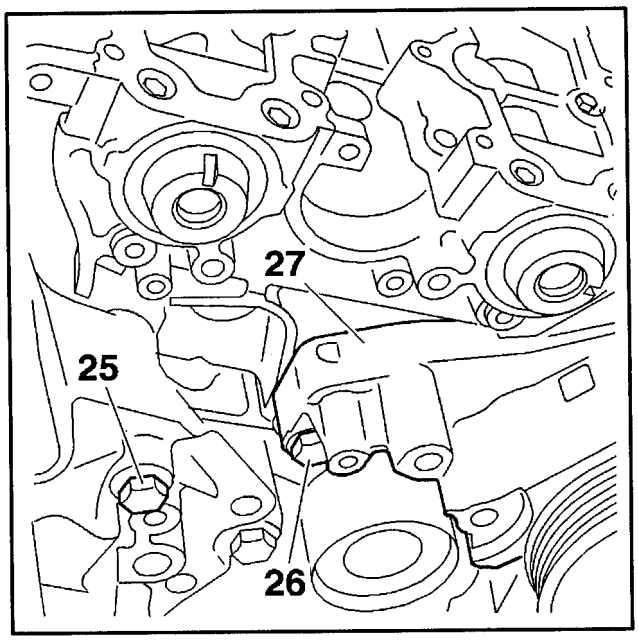

Fig : B1DP093C

Remove :

- screw (25)
- screw (26)

Move the clamp (27) clear of the cylinder head.

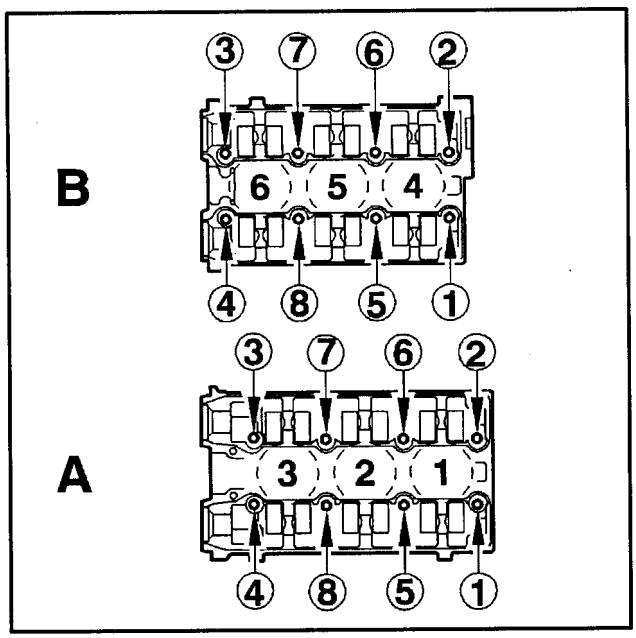

Fig : B1DP094C

A. Front cylinder head.

B. Rear cylinder head.

Slacken the cylinder head bolts following the sequence shown.

Release the cylinder heads from the cylinder block using the levers [2].

Remove the cylinder heads.

ATTENTION : Protect the various sealing faces.

4 – REFITTING

IMPERATIVE : The joint faces must not have any trace of knocks or scores.

Check that the two centring dowels are present.

Check the flatness of the cylinder head :
0,05 mm maximum.

Peg the camshafts.

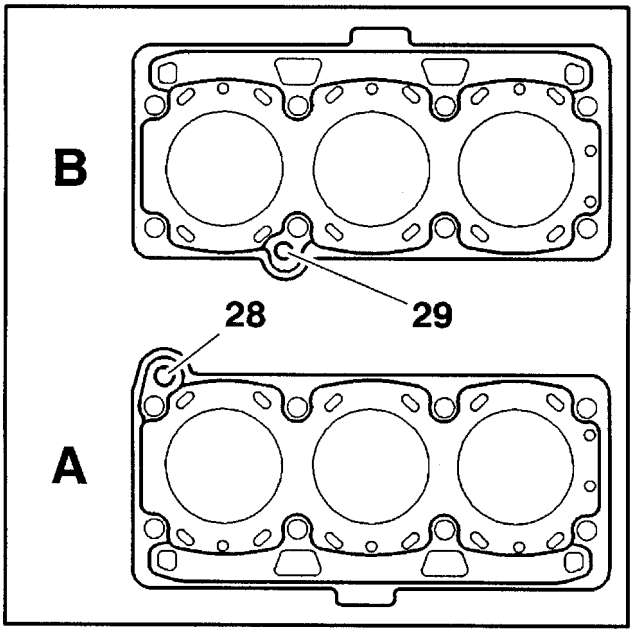

Fig : B1DP095C

A. Front cylinder head.

B. Rear cylinder head.

IMPERATIVE : Position the holes (28) and (29) opposite the oil supply holes.

Refit the cylinder heads.

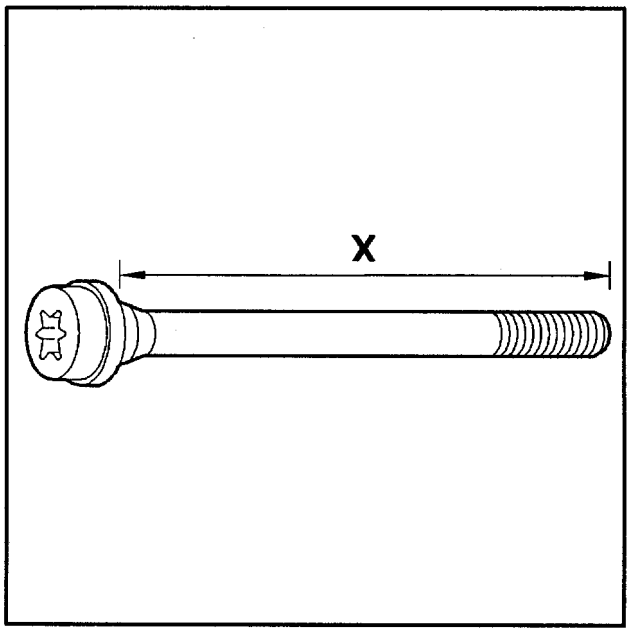

Fig : B1DP06JC

X = maximum length under head.

Check the length of the cylinder head screws :
max. bolt length below heads = 149,5 mm.

Clean the cylinder head bolts.

Smear the threads and contact faces under heads of the bolts with MOLYKOTE G. RAPID PLUS grease.

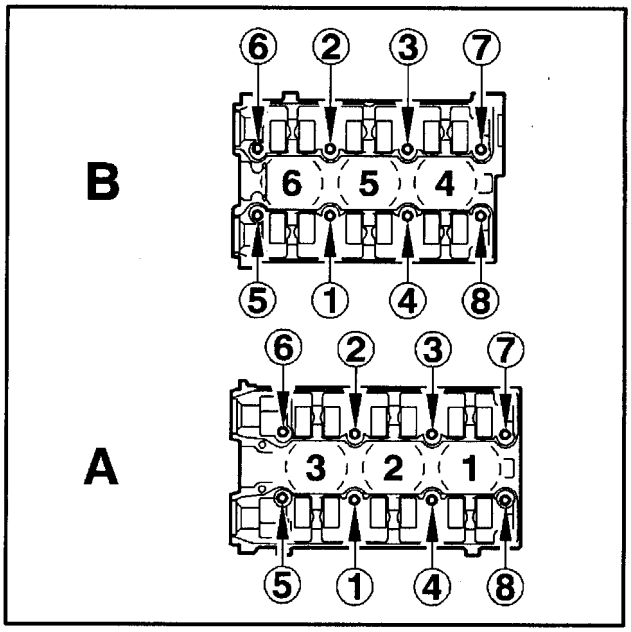

Fig : B1DP096C

A. Front cylinder head.

B. Rear cylinder head.

ATTENTION : Proceed bolt by bolt in the order shown.

Tightening method :
- pre-tighten the screws to 2 m.daN
- slacken the bolts
- tighten the bolts to 1,5 m.daN
- finish with an angular tightening of 225 ° ; by means of tool [4]

Couple up pipes (19) and (20).

Tighten the bolts (23) to 6 m.daN.

Tighten the bolts (24) to 4 m.daN.

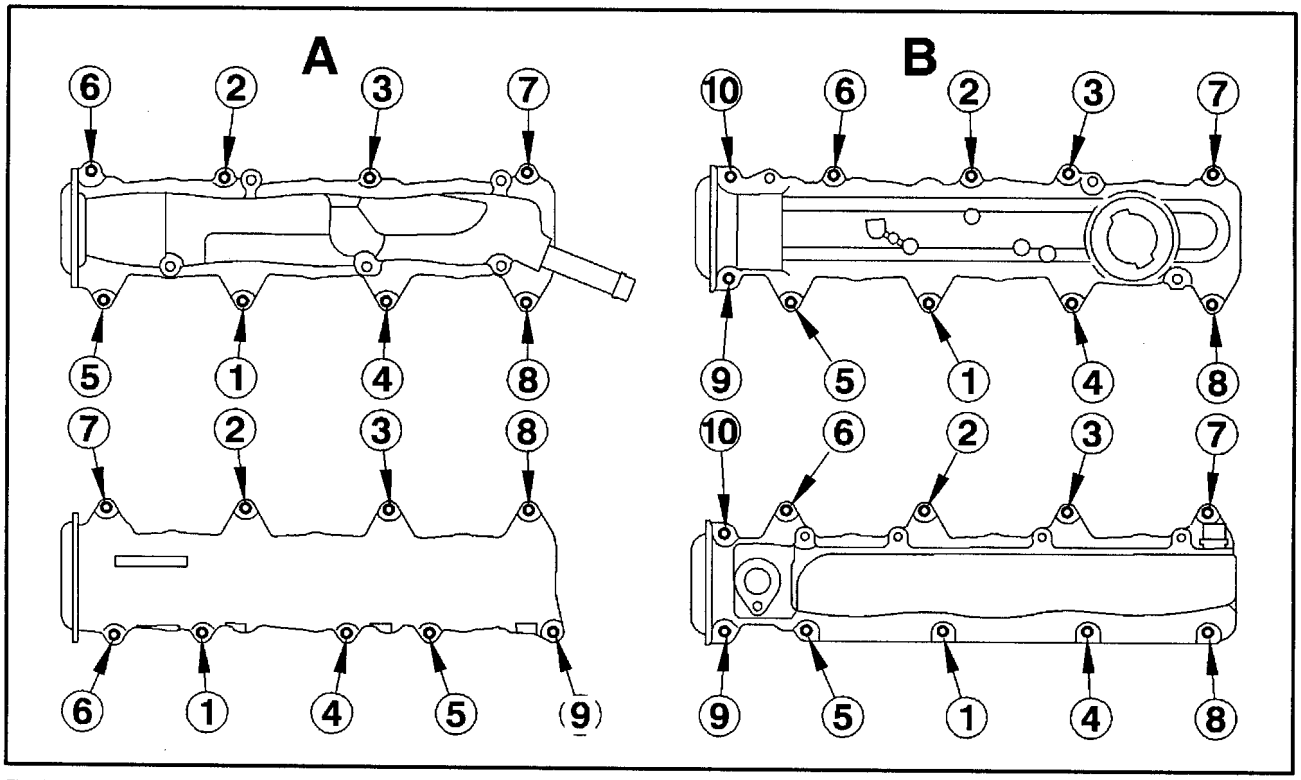

Fig : B1DP08UD

A. Front cylinder head.

B. Rear cylinder head.

Fit :
- the casings cover the camshafts
- the camshaft cover casing bolts following the sequence shown

ATTENTION : Proceed bolt by bolt in the order shown.

Tightening method :
- pre-tighten the screws to 0,5 m.daN
- tighten the bolts to 1 m.daN

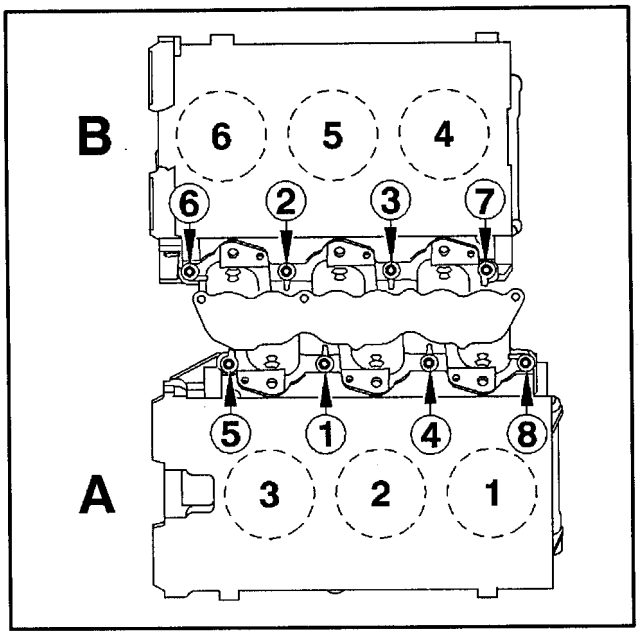

Fig : B1DP097C

A. Front cylinder head.

B. Rear cylinder head.

Replace the gasket between the lower manifold and the cylinder head.

Replace the seal between the upper and lower manifolds.

ATTENTION : Proceed bolt by bolt in the order shown.

Tightening method :
- pre-tighten the screws to 1 m.daN
- tighten the bolts to 2,5 m.daN

Reconnect the connector (15).

Refit the retaining clamp fixing bolts (16), (17), (18).

Connect the supply hose (22) to the hp pump.

Fit :
- nuts (23) ; (24)
- the timing cases (11) ; (12)

Carry out the operations below on both camshafts :
- fit the camshaft hub (14)
- immobilise the camshaft hub using the tool [1]
- refit and tighten screw (13) to 6 m.daN

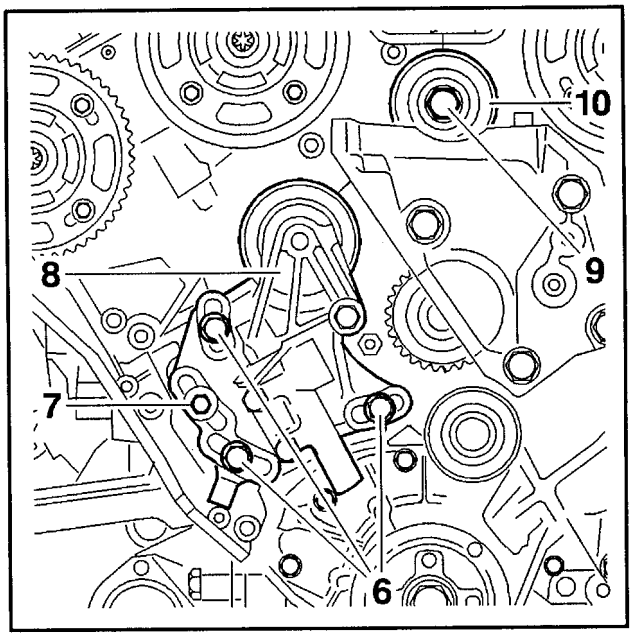

Fig : B1DP098C

Fit :
- the dynamic tensioner (8)
- screws (6) ; tighten to 2,5 m.daN
- screw (7) ; tighten to 1 m.daN
- the camshaft pulleys (2), (3), (4) and (5)
- screws (1) ; tighten to 1 m.daN
- guide roller (10)
- screw (9) ; tighten to 8 m.daN
- the exhaust clamping collar ; tighten to 2,5 m.daN

Remove the right-hand engine mounting.

Fit :
- the timing belt (see the relevant operation)
- the upper inlet manifold (see the relevant operation)

Fill and bleed the cooling system (see the relevant operation).

Reinitialise the injection ecu.

REMOVING – REFITTING : THE CAMSHAFTS

1 – RECOMMENDED TOOLS

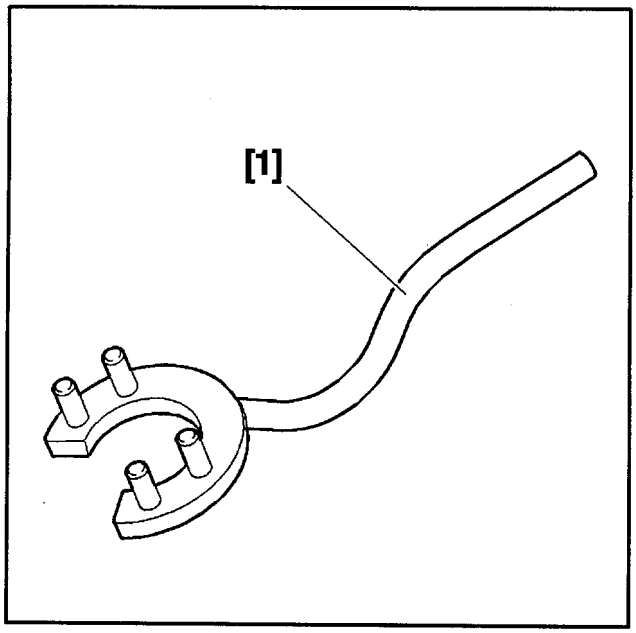

Fig : E5AP03NC

[1] immobilising the camshaft hubs (C.0187F).

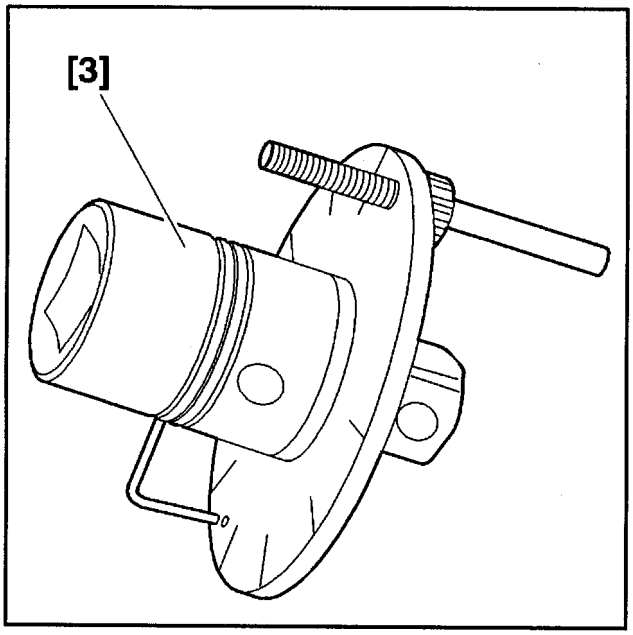

Fig : E5AP03QC

[3] adaptor for angular tightening 4069–T.

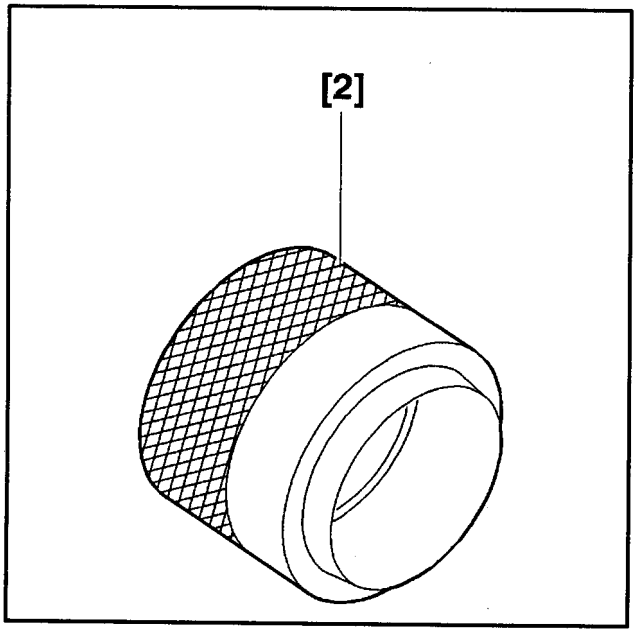

Fig : E5AP03PC

[2] fitting mandrel of the camshaft lipped seal 0187D.

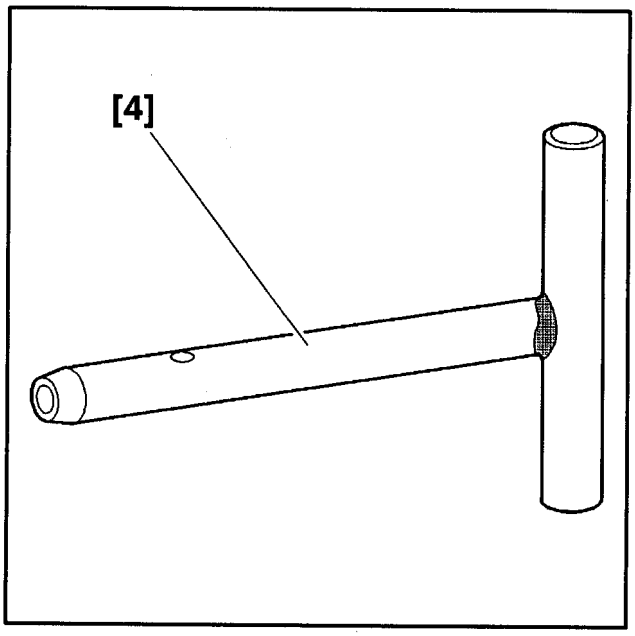

Fig : E5AP03TC

[4] camshaft setting pegs (C.0187B).

2 - REMOVING

Remove :
- the air filter housing
- the engine cover
- the upper inlet manifold (see the relevant operation)

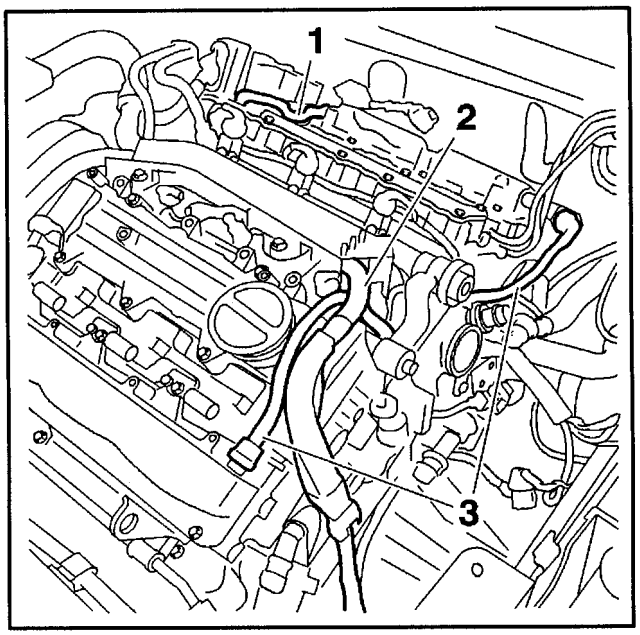

Fig : B1DP08MC

Unclip :
- the wiring harnesses (1) and (2)
- the hoses (3)

Remove the timing gear drive belt (see the relevant operation).

Refit the right hand upper engine mounting.

Remove the camshaft locating pins.

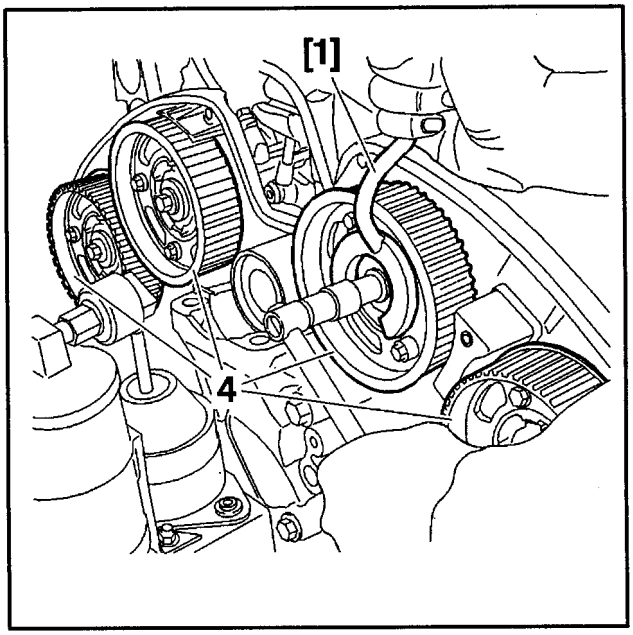

Fig : B1DP08NC

Carry out the operations below on both camshafts.

Immobilise the camshaft hub using the tool [1].

Remove the fixing bolt from the camshaft hub.

Remove :
- the camshaft hub and pulley assemblies (4)
- the timing cover bolts of the camshaft bearing cap casings
- the camshaft oil seals

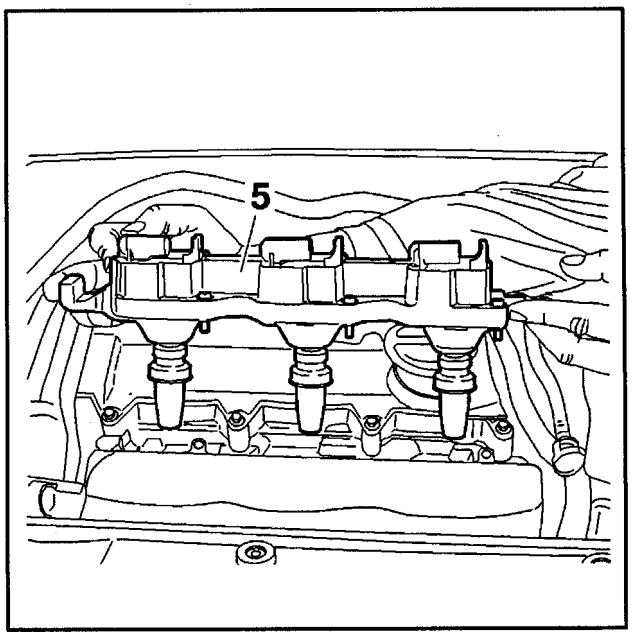

Fig : B1DP08PC

Remove the coil casing (5).

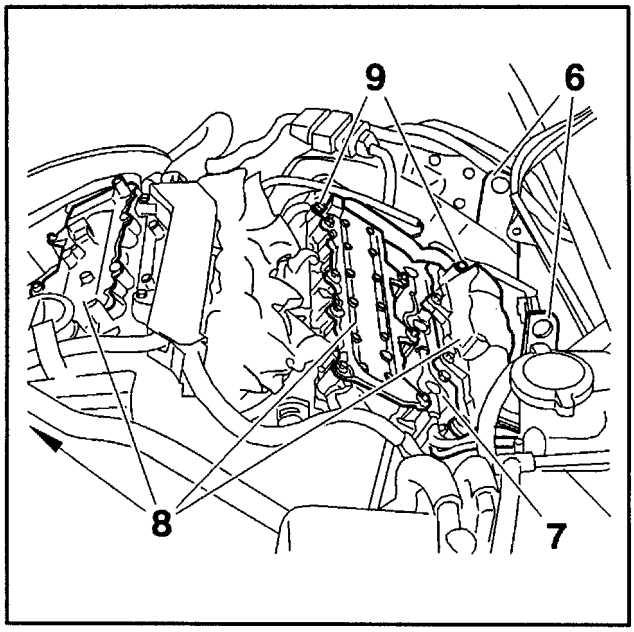

Fig : B1DP08QC

Remove :
- supports (6)
- the 2 screws (9)
- the HT ignition harness cassette (7)

Starting from the outside, loosen the screws of each cylinder head cover (8) gradually and in a spiral.

Remove the cylinder head covers (8).

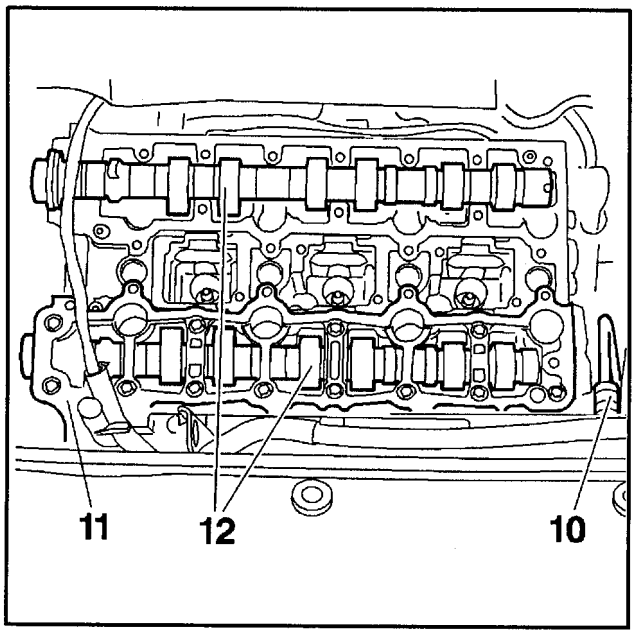

Fig : B1DP08RC

Remove the support (10).

ATTENTION : Starting from the outside and working in a spiral, progressively slacken the camshaft bearing cap casing fixings (11) until the sealing face is several millimetres clear.

Disengage the camshafts from their bearings by tapping with a mallet on pulley side.

Remove :
- the camshaft bearing cap casings (11)
- the camshafts (12)

2.1 – Remove the cam followers

NOTE : Mark the location of the tappets before removing them.

Use a suction pad of the valve grinder end type.

Clear the oil from the threaded holes of the camshaft bearing cap casing fixings.

Clean the gasket faces on the cylinder head and the camshaft bearing casing-caps carefully.

ATTENTION : Clean the joint faces with an approved descaling product. Do not use abrasives or sharp tools on the joint faces.

2.2 – Refit the cam followers

Oil the tappet bodies.

Refit the tappets observing their original location.

Make sure that the tappets rotate freely in the cylinder head.

3 – REFITTING

Lubricate cams and bearings.

Fit the camshafts.

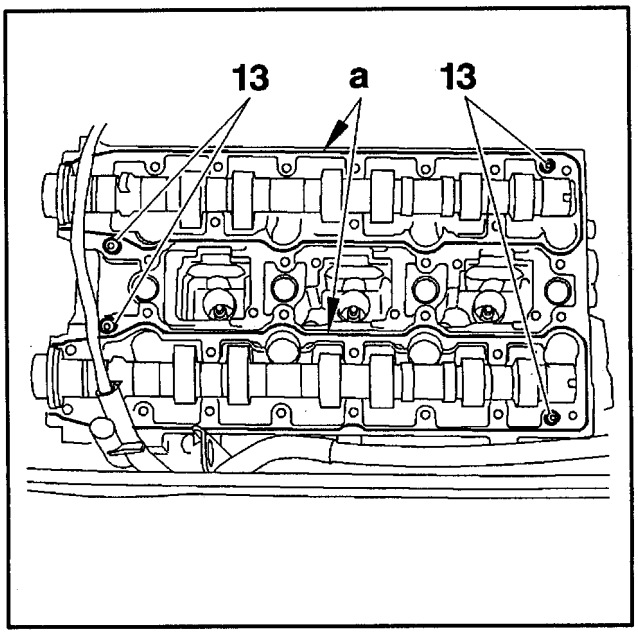

Fig : B1DP08SC

Check that the pins (13) are all present and correctly located.

Apply a ribbon of sealant AUTOJOINT OR to the sealing face at "a".

Refit the camshaft bearing cap casings (11).

3.1 – The camshaft bearing cap casings

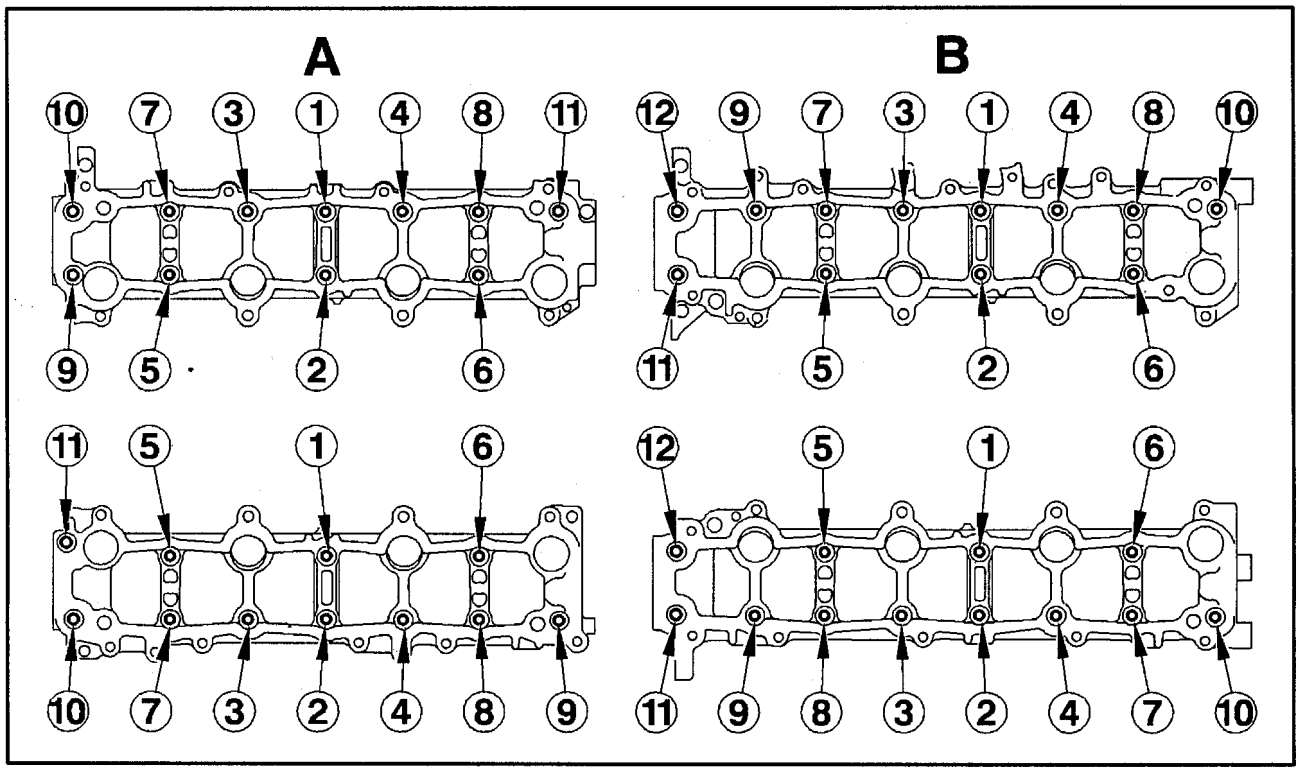

Fig : B1DP08TD

A : rear cylinder head.

B : front cylinder head.

Nip then progressively tighten the fixings bolt in the order shown.

Pre–tighten to 0,2 m.daN.

Tightening torque = 0,8 m.daN.

NOTE : The cylinder head covers are fitted with a gasket made of composite material which can be removed several times. If the seal is damaged, it can be partially repaired with sealing product AUTOJOINT OR.

Refit the cylinder head covers (8) after having cleaned the gaskets and gasket faces.

Refit the support (10).

3.2 – Cam covers

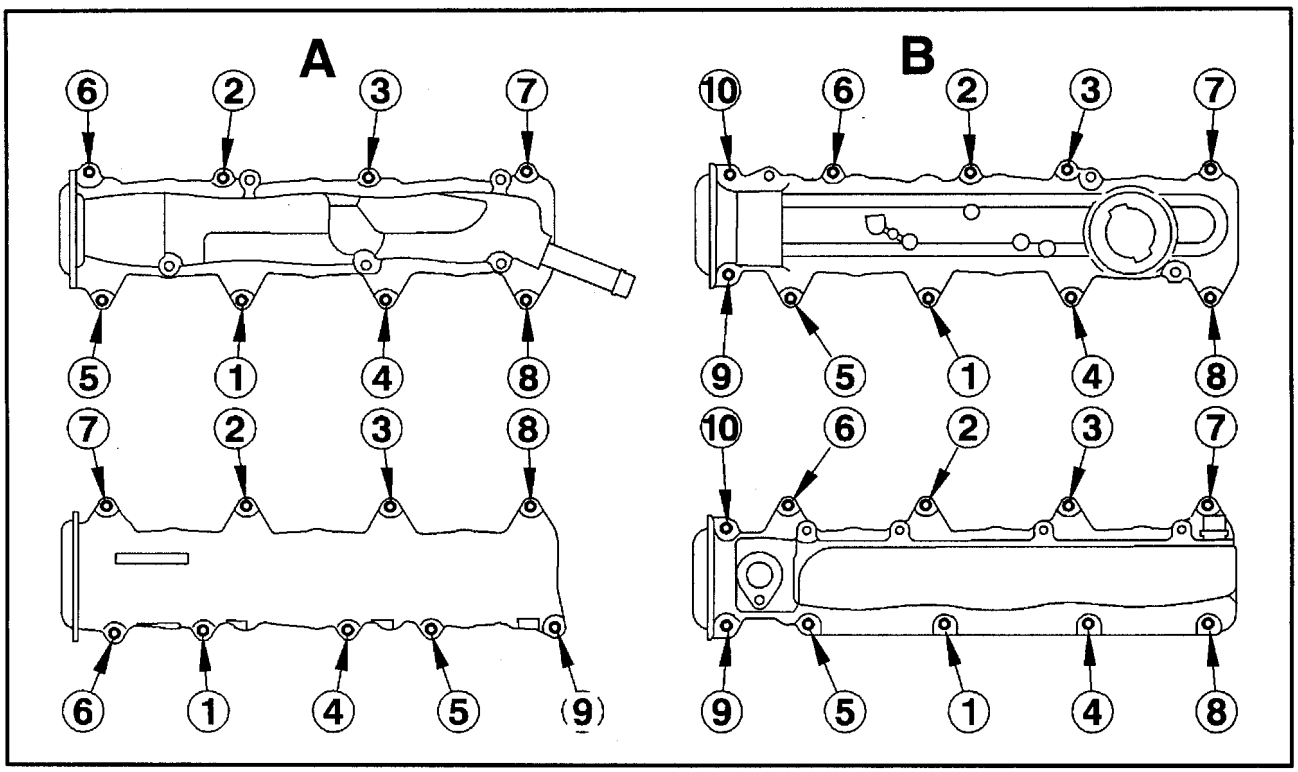

Fig : B1DP08UD

A : rear cylinder head.

B : front cylinder head.

Nip then progressively tighten the fixings bolt in the order shown.

Pre-tighten to 0,5 m.daN.

Tightening torque = 1 m.daN.

IMPERATIVE : Before fitting the camshaft oil seals, check that the seal locations are clean and are not obstructed by traces of sealant.

Apply a smear of grease between the lips of the seals.

IMPERATIVE : The outer face of the seals must be free of all traces of oil.

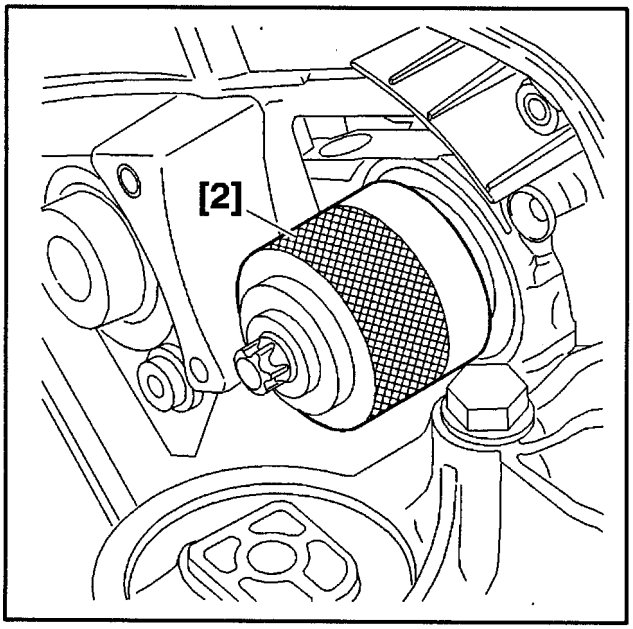

Fig : B1DP08VC

Fit the camshaft seals (12) using tool [2] and a camshaft hub bolt.

NOTE : Use only new seals.

Refit the timing cover fixing bolts to the camshaft bearing cap casings.

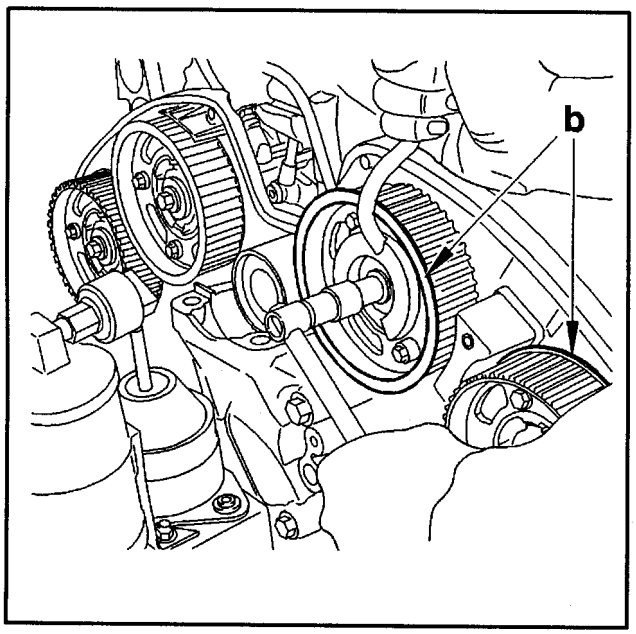

Fig : B1DP08WC

NOTE : The camshaft pulleys are identical.

Direction of fitting of the camshaft pulleys :
- inlet camshaft = flange "b" towards the outside
- exhaust camshaft = flange "b" towards the inside

Refit the camshaft hub and pulley assemblies (4) (respect the direction of fitting).

NOTE : Smear the threads and contact faces under heads of the bolts with MOLYKOTE G. RAPID PLUS grease.

Carry out the operations below on both camshafts.

Immobilise the camshaft hub using the tool [1].

Refit the camshaft hub retaining bolt.

Peg the camshaft hubs ; by means of tools [4].

Tighten the camshaft hub retaining bolt using one of the following two methods :
- 1st method : tighten to 2 m.daN. Angular tightening of 57° ; by means of tool [3]
- 2nd method : tighten to 8 m.daN

Fit :
- the HT ignition harness cassette (7)
- the 2 screws (9)
- supports (6)
- casing (5) of the HT coils

Install the timing belt (see the relevant operation).

Refit the right hand upper engine mounting.

Clip in place :
- the wiring harnesses (1) and (2)
- the hoses (3)

Fit :
- the upper inlet manifold (see the relevant operation)
- the engine cover
- the air filter housing

Reinitialise the injection ecu (see the relevant operation).

CHECKS : SETTING THE VALVE TIMING

1 – RECOMMENDED TOOLS

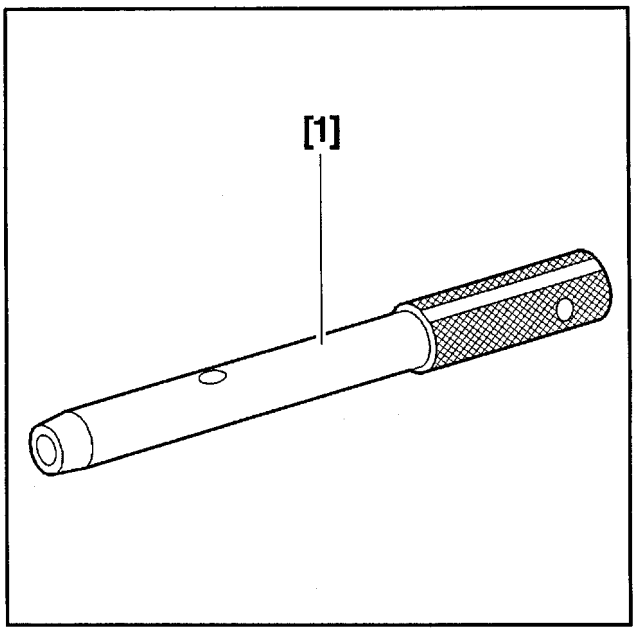

Fig : E5AP039C

[1] crankshaft setting rod C.0187A.

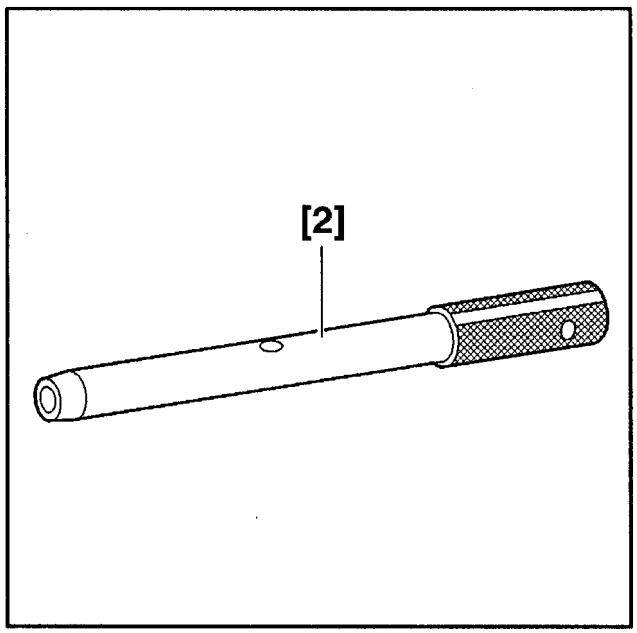

Fig : E5AP034C

[2] locating pin for checking the valve timing C.0187C.

2 – REMOVING

Disconnect the battery negative cable.

Remove the accessory drive belt (see the relevant operation).

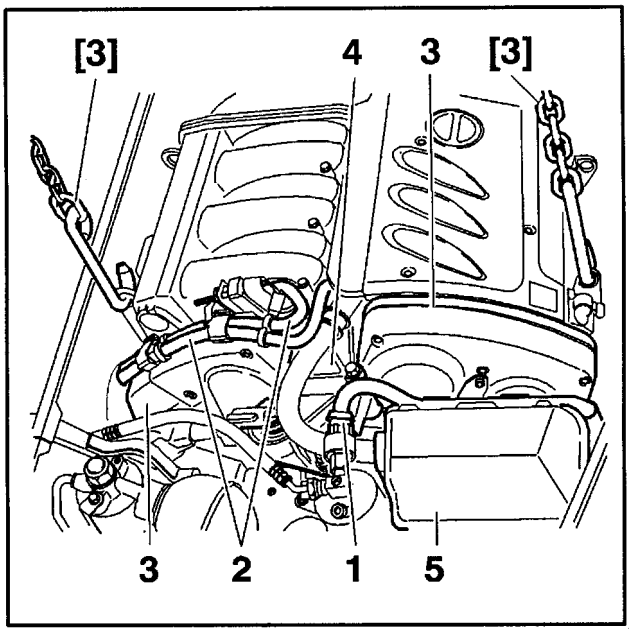

Fig : B1EP08QC

Disconnect the connector (1).

Hold the engine in place with the help of a workshop crane (R.H. side).

Unclip the hoses (2).

Remove the ecu housing cover (5).

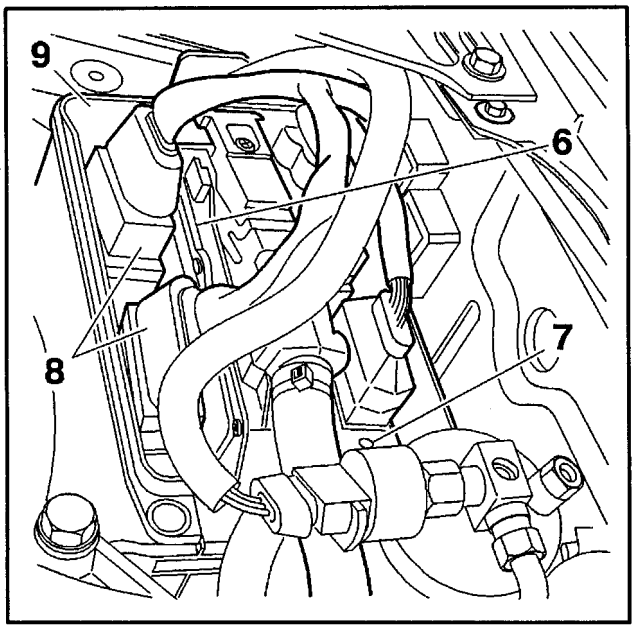

Fig : B1EP08RC

Disconnect the ecus (6) and (7).

Unclip the relays (8).

Remove :

- the ecu housing (9)
- the right hand engine mounting (4)
- the timing cases (3)
- the crankshaft pulley

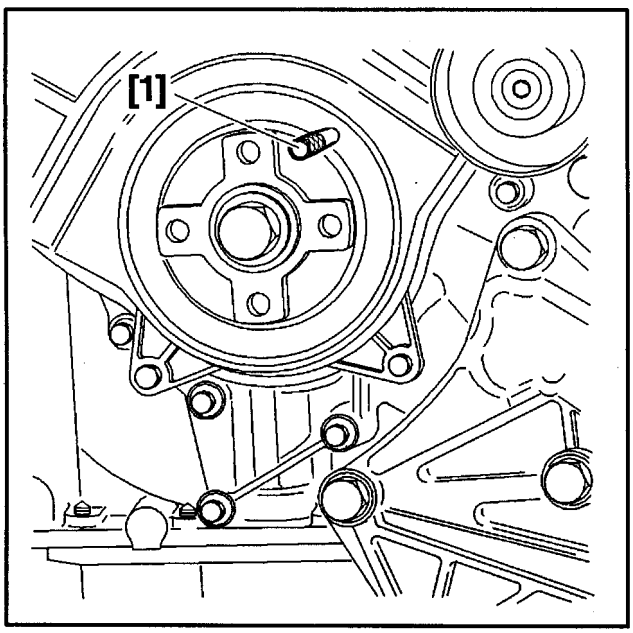

Fig : B1EP08TC

Peg the crankshaft by means of setting rod [1].

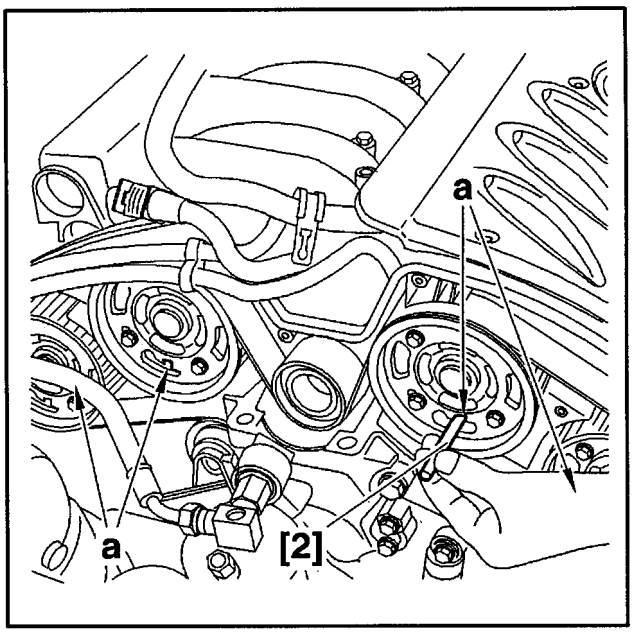

Fig : B1EP08SC

Check that the tool [2] can be passed freely through the pulleys and into the cylinder heads (at "a").

Remove tool [1].

Fit :

- the timing cases (3)
- the auxiliary equipment drive belt (see the relevant operation)
- the right hand engine mounting (4) (see the relevant operation)
- the ecu housing (9)
- the E.C.U.s

Withdraw the workshop crane.

Clip the pipes (2).

Reclip the relays (8).

Reconnect :

- the ecus (6) and (7)
- connector (1)

Refit the ecu housing cover (5).

Reconnect the battery negative terminal.

Reinitialise the injection ecu (see the relevant operation).

REMOVING – REFITTING : TIMING BELT

1 – RECOMMENDED TOOLS

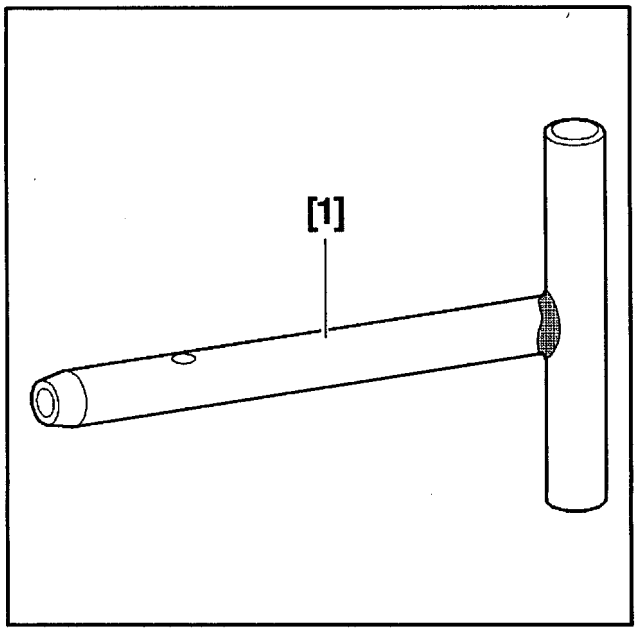

Fig : E5AP033C

[1] camshaft setting pegs (C.0187B).

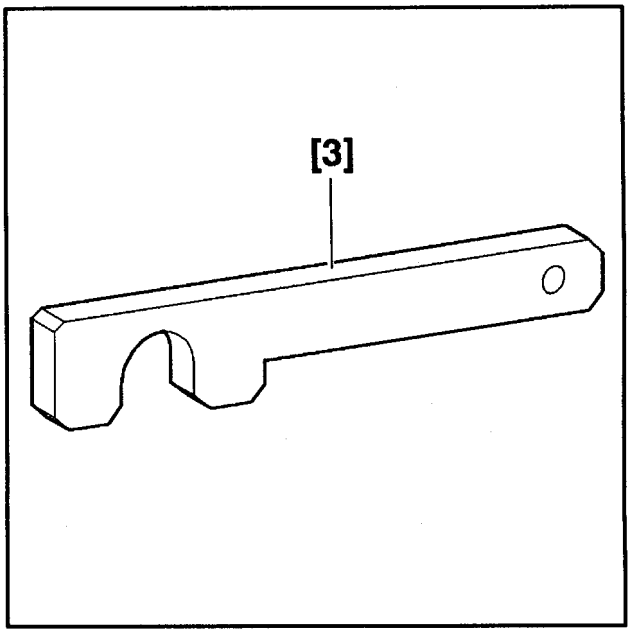

Fig : E5AP035C

[3] adjusting shim for the dynamic tensioner C.0187E.

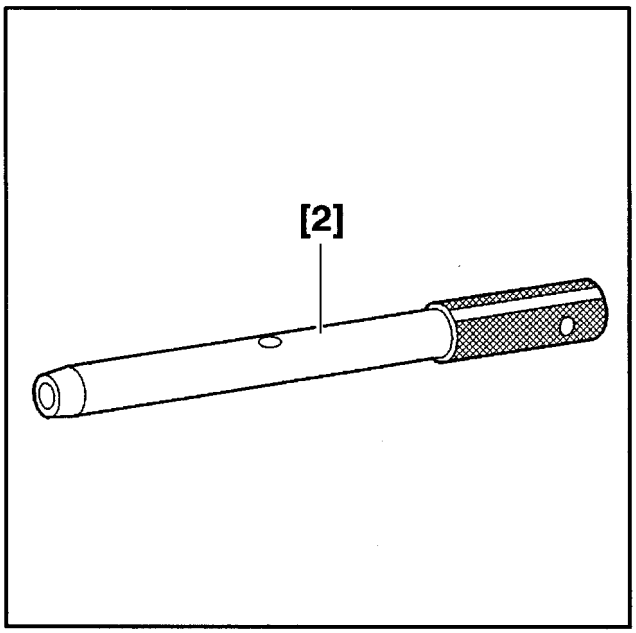

Fig : E5AP034C

[2] crankshaft setting rod C.0187A.

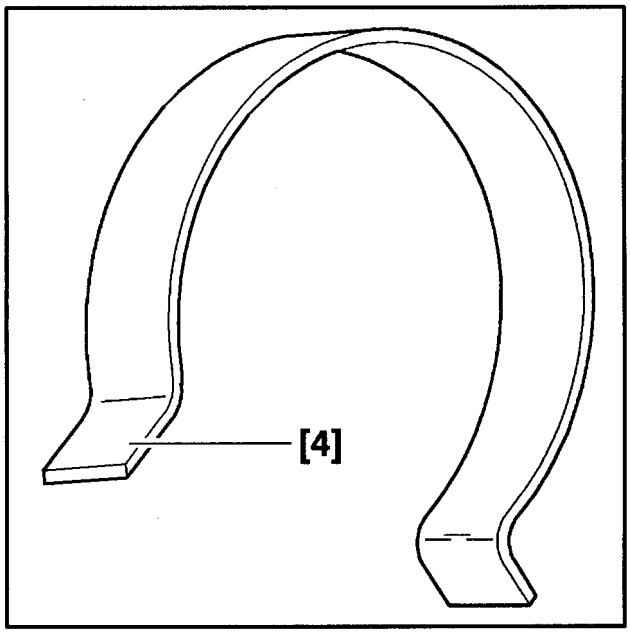

Fig : E5AP036C

[4] C.0187J belt retaining pin.

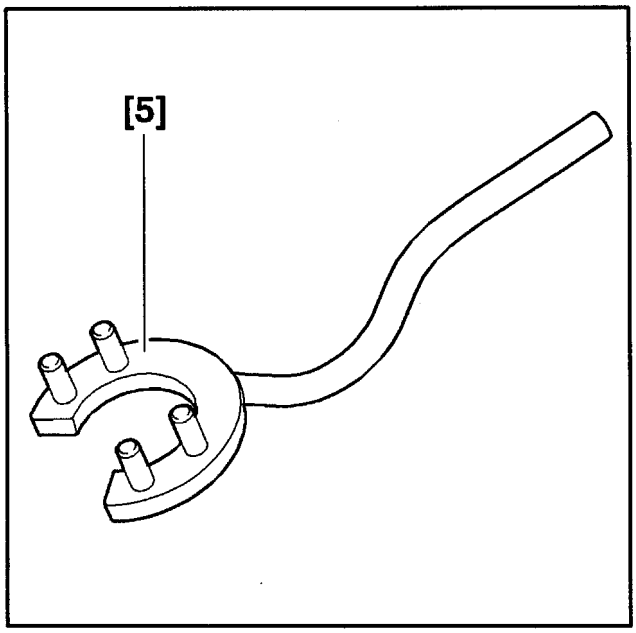

Fig : E5AP037C

[5] camshaft immobilising key C.0187F.

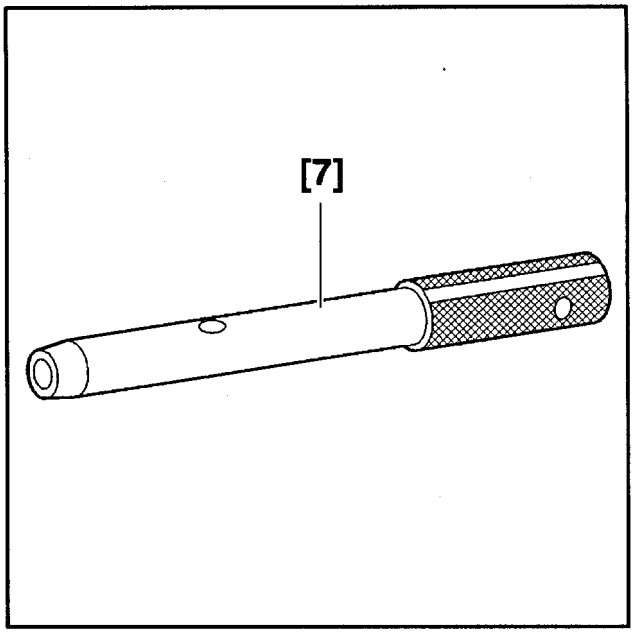

Fig : E5AP03AC

[7] locating pin for checking the valve timing C.0187C.

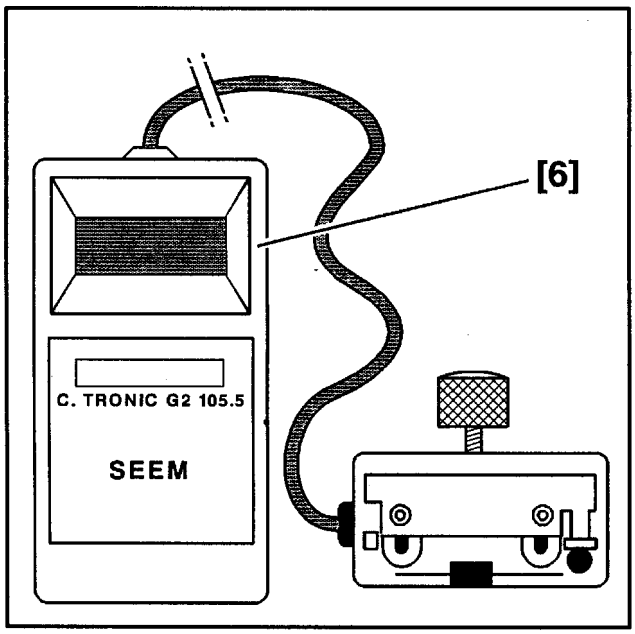

Fig : E5-P03SC

[6] 4122-T SEEM timing belt tightening tool.

2 – REMOVING

Disconnect the battery negative cable.

Remove the accessory drive belt (see the relevant operation).

Hold the engine in place with the help of a workshop crane (R.H. side).

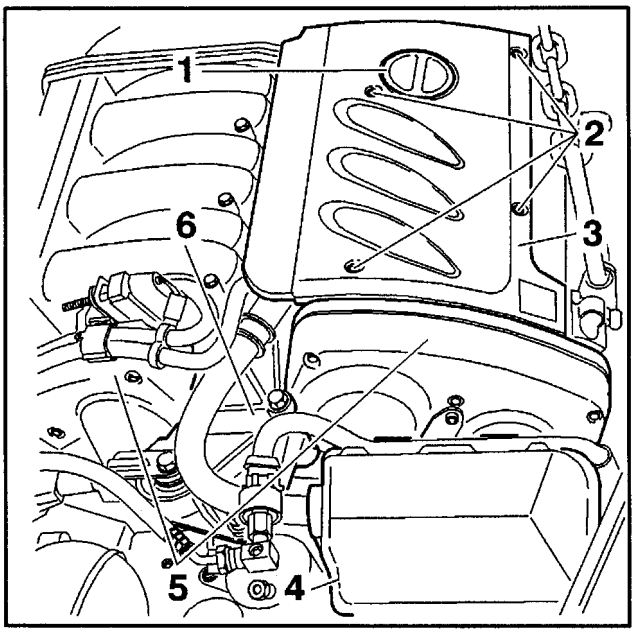

Fig : B1EP08AC

Remove :
- the oil filler plug (1)
- screws (2)
- the engine cover (3)
- the E.C.U.s

Unclip the relays.

Remove :
- the ecu housing (4)
- the right hand engine mounting (6)
- the accessory drive belt dynamic tensioner
- the crankshaft pulley
- the timing cases (5)
- the lower timing cover

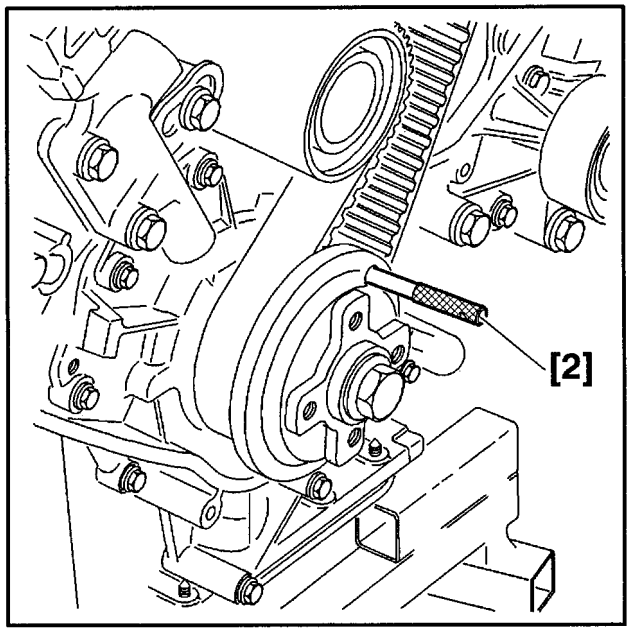

Fig : B1EP08BC

Peg the crankshaft by means of setting rod [2].

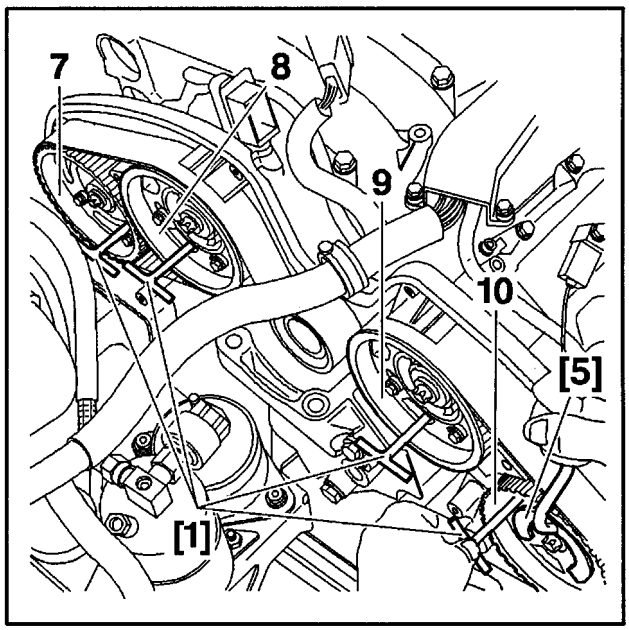

Fig : B1EP08CC

Peg the camshaft pulleys using the tools [1].

Observe the following order :
- the camshaft pulley (7)
- the camshaft pulley (8)
- the camshaft pulley (9)
- the camshaft pulley (10)

NOTE : If required, use tool [5].

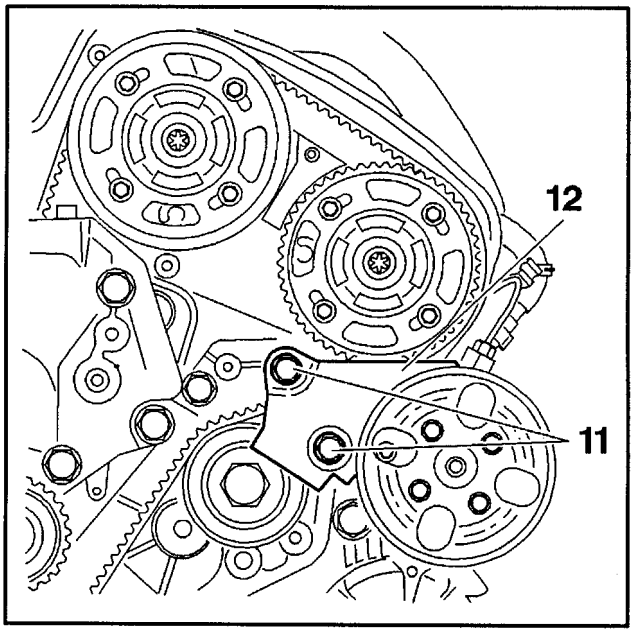

Fig : B1EP08DC

Remove :

- screws (11)
- the plate (12)

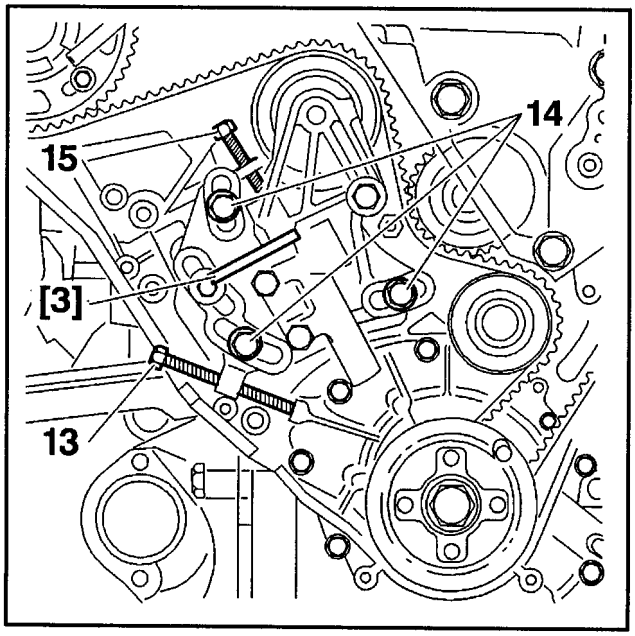

Fig : B1EP08EC

Screw in fully, a bolt M8 of length 75 mm (13).

Fit a bolt M8 of length 40 mm (15).

Put tool [3] into place.

Tighten the bolt (15) until the tool [3] is locked.

Loosen screws (14).

Slacken the bolt (13) to relax the tension of the cambelt.

Remove the timing gear drive belt.

3 – REFITTING

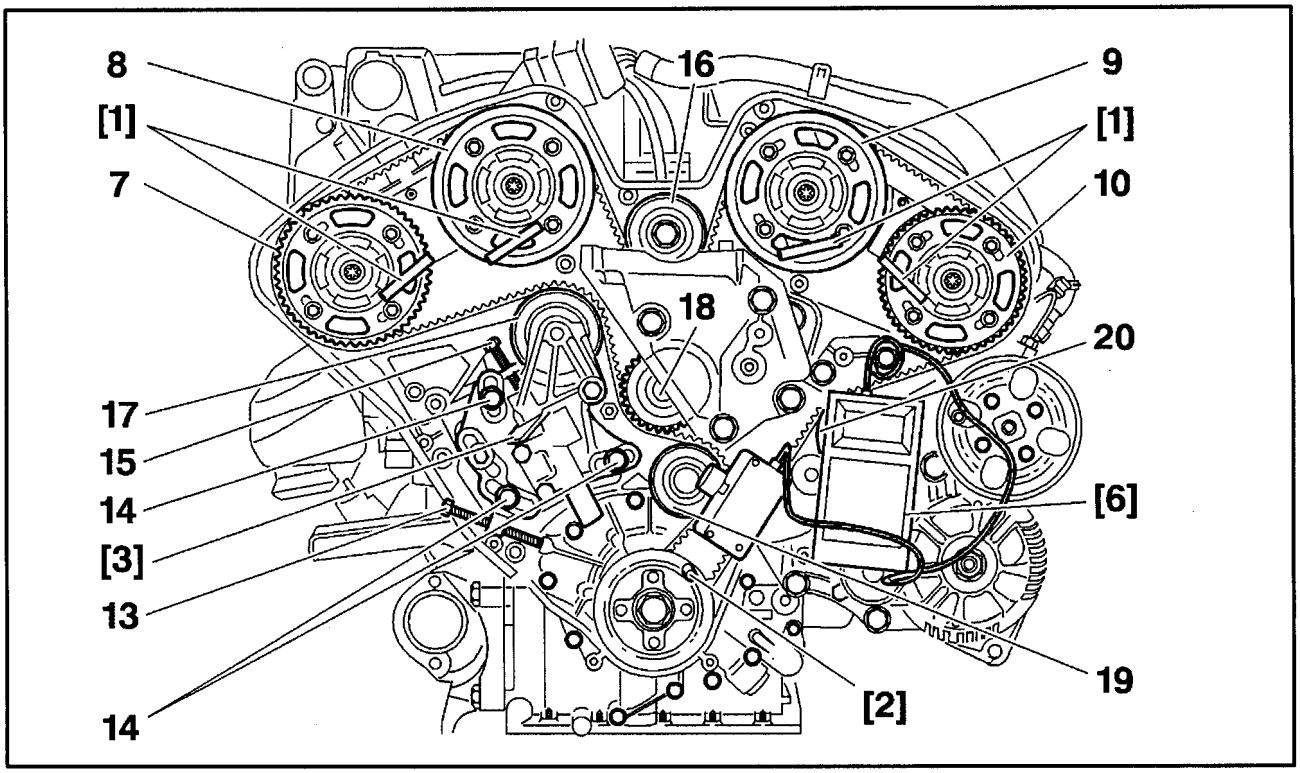

Fig : B1EP08FD

Check that the rollers (16); (17) and (19) rotate freely (no play and no stiffness).

Turn the camshaft pulleys fully clockwise to abut the ends of the elongated holes.

Tighten the camshaft pulley bolts to 0,5 m.daN.

Slacken the camshaft pulley bolts by 45°.

ATTENTION : Observe the fitting direction of the belt : looking at the valve timing, the markings on the belt should read from left to right.

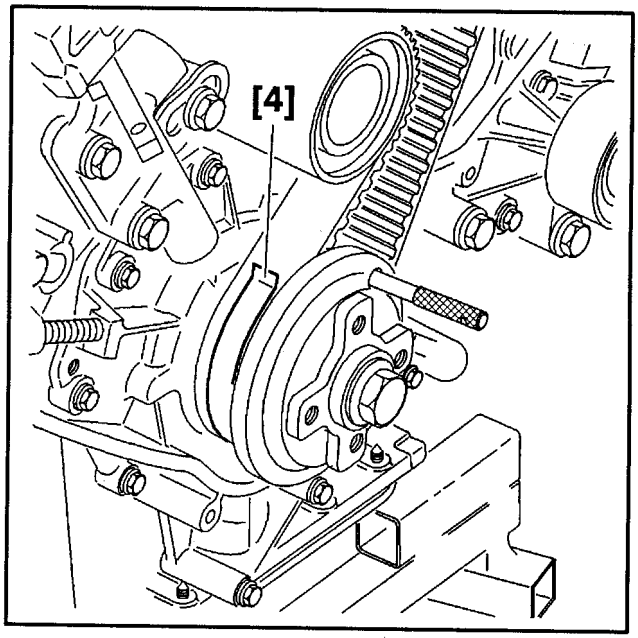

Fig : B1EP08GC

Fit the cambelt to the crankshaft pinion.

Put tool [4] into place.

Fit the cambelt following the sequence shown :
- guide roller (20)
- the camshaft pulley (10)
- the camshaft pulley (9)
- guide roller (16)
- the camshaft pulley (8)
- the camshaft pulley (7)
- roller tensioner (17)
- water pump pulley (18)
- guide roller (19)

NOTE : When fitting the cambelt to the camshaft pulleys, turn them anti-clockwise to align with the nearest tooth. The angular movement of the pulleys must be less than the width of one tooth.

Remove tool [4].

Put tool [6] into place.

Tighten the screw (13) to tension the belt to 83 ± 2 SEEM units.

IMPERATIVE : The camshaft pulleys must not be allowed to contact the ends of the elongated holes. If they do, repeat the cambelt fitting procedure.

Remove tools [2],[1] and [6].

Tighten the camshaft pulley bolts to 1 m.daN.

Observe the following order :
- the camshaft pulley (7)
- the camshaft pulley (8)
- the camshaft pulley (9)
- the camshaft pulley (10)

Tighten the bolts (14) to 2,5 m.daN.

Rotate the crankshaft by 10 turns in a clockwise direction (looking at the valve gear).

Peg the camshaft pulleys using the tools [1].

Peg the crankshaft by means of setting rod [2].

Unscrew :
- the camshaft pulley bolts
- screws (14)

Take out screw (15).

Undo bolt (13) to allow the tool [3] to slide but without play.

Wait one minute (damper action).

Ensure that the tool [3] slides without play.

Remove tool [3].

Tighten the bolts (14) to 2,5 m.daN.

Take out screw (13).

Remove tools [1] and [2].

4 – CHECKING THE VALVE TIMING

Turn the crankshaft 2 times in the direction of rotation.

Peg the crankshaft by means of setting rod [2].

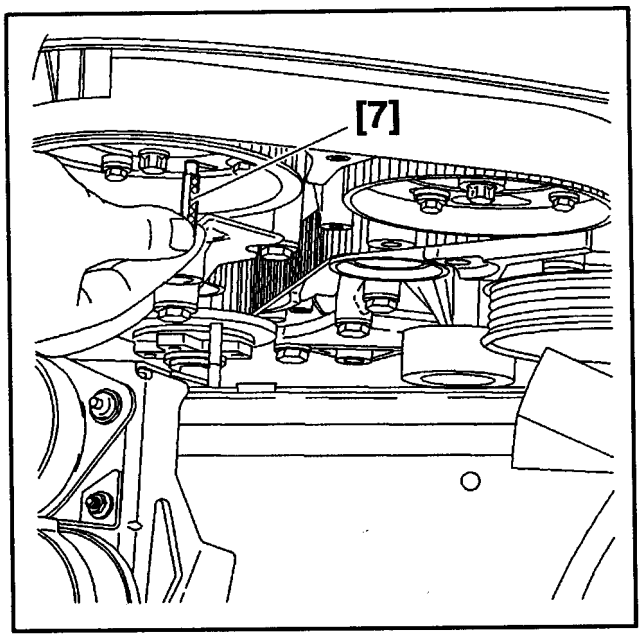

Fig : B1EP08HC

Check that the tool [7] can be passed freely through the pulleys and into the cylinder heads.

Fit :

- the plate (12)
- screws (11). Tighten to 4 m.daN
- the timing cases (5)
- the lower timing cover
- the accessory drive belt dynamic tensioner
- the crankshaft pulley (see the relevant operation)
- the auxiliary equipment drive belt (see the relevant operation)
- the right hand engine mounting (6)
- the ecu housing (4)
- the E.C.U.s
- the engine cover (3)
- screws (2)
- the oil filler plug (1)

Reconnect the negative cable to the battery.

Carry out the initialisation procedure for the ignition injection E.C.U. (see the relevant operation).

CHECKS : OIL PRESSURE

1 – RECOMMENDED TOOLS

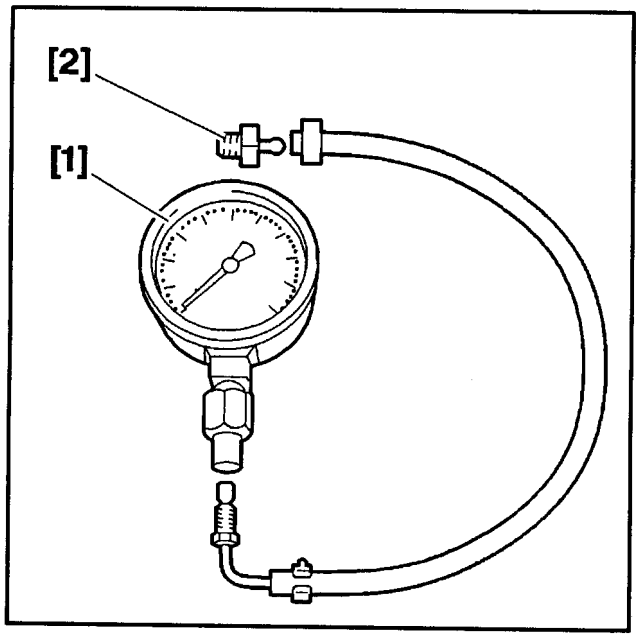

Fig : E5-P09VC

[1] 2279-T bis pressure gauge of the 4103-T box.

[2] union 7001-T engine oil pressure take-off of the 4103-T box.

2 – PRESSURE CHECKING

Oil pressure is checked with the engine hot after checking the oil level.

Engine oil temperature 90 °C.

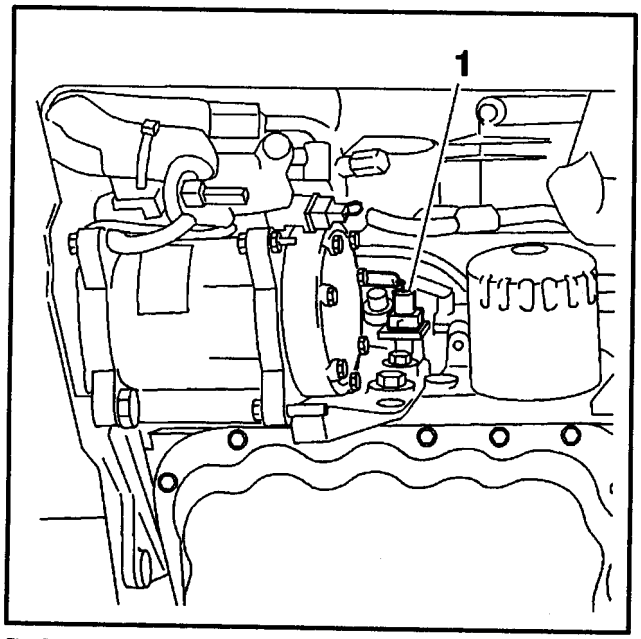

Fig : B1FP01VC

Disconnect the pressure switch (1).

Remove the oil pressure switch.

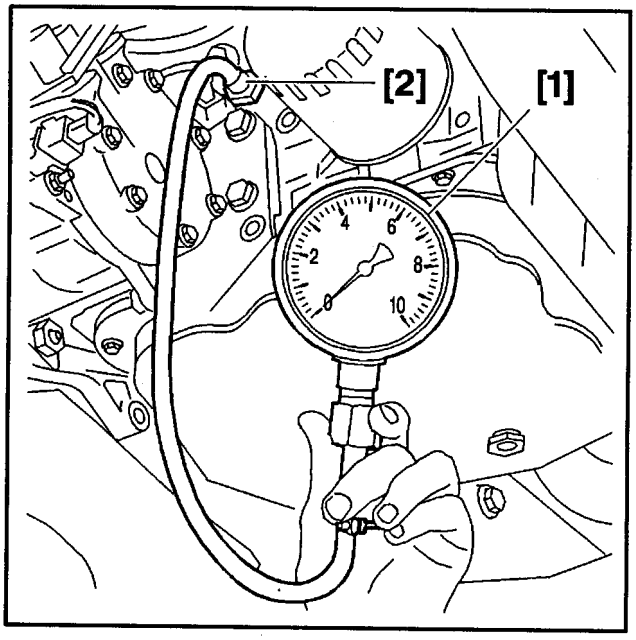

Fig : B1FP01WC

Fit the union [2].

Connect the pressure gauge [1] and its hose on the union [2].

Read the oil pressures.

Engine speed (rpm)	Pressure (bars)
900	2
3000	5

Remove the pressure gauge [1] and union [2].

Refit the oil pressure switch using a new joint.

Tighten to 3,5 m.daN.

Reconnect the pressure switch.

Top up the engine oil level.

DATA : COOLING SYSTEM

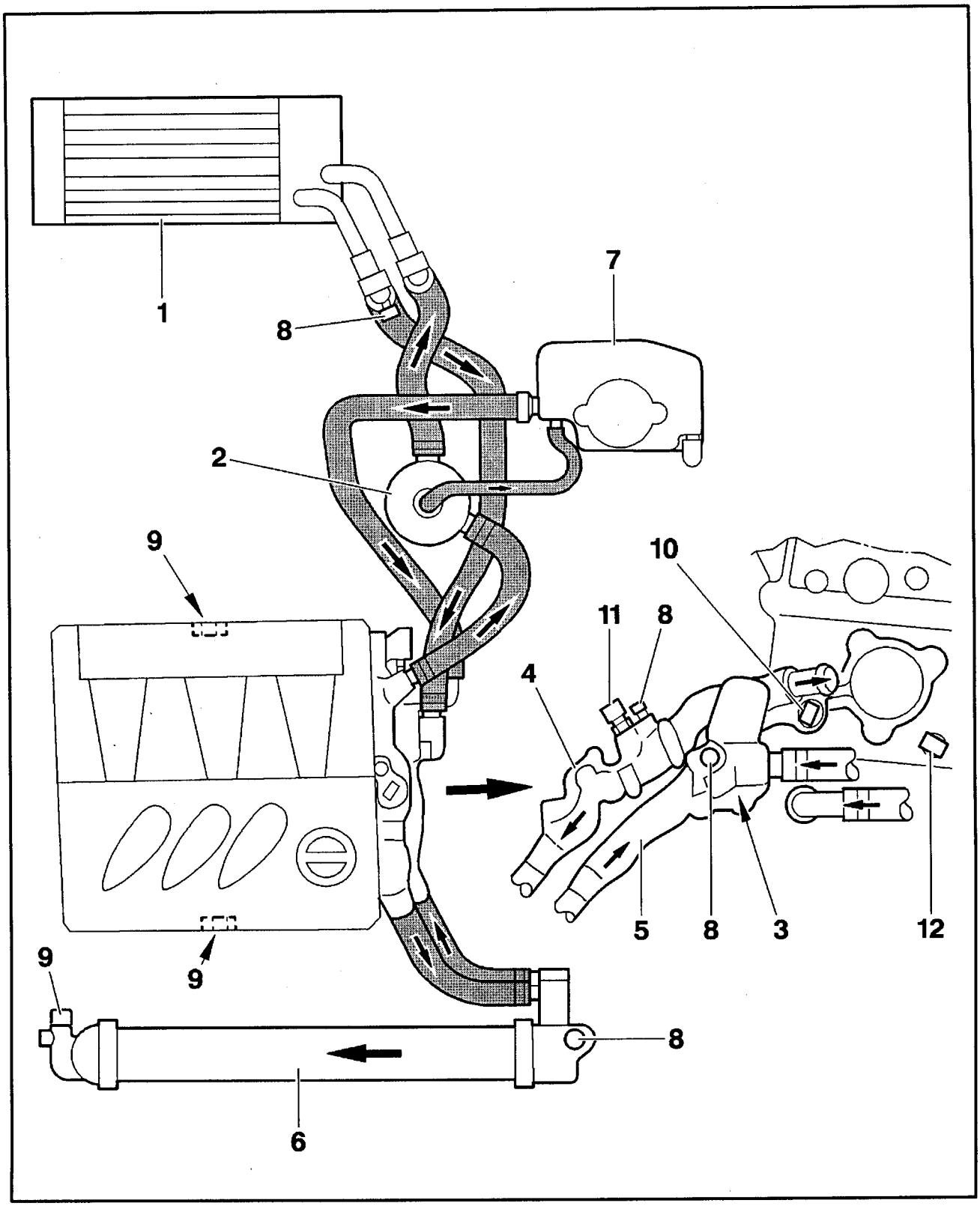

Fig : B1GP041P

(1) heater matrix.
(2) degasser.
(3) thermostat.
(4) coolant outlet housing.
(5) coolant inlet housing.
(6) engine cooling radiator.
(7) degassing housing.
(8) bleed screws.
(9) drain plug.
(10) temperature sensor.
(11) temperature sensor.
(12) thermal switch.

Data :

Total capacity of the system	10 litres
Radiator surface area	25 dm2
Pressure setting	1,4 bar
Thermostat opening at	82 °C
Fan	
Number x electric power	2 x 200 W
1st speed	96 °C
2nd speed	101 °C
Air con. switch-off at	112 °C
Warning	118 °C
Post-cooling	6 minutes

Reference	10	11	12
Sensor	Temperature sensor	Temperature sensor	Thermal switch
Data	Water temperature : warning	Water temperature : injection	Water temperature : gauge
Connector colour	Brown	Green	Blue
Tightening torque	1,7 m.daN	1,7 m.daN	1,7 m.daN

DRAINING – FILLING – BLEEDING : COOLING SYSTEM

1 – RECOMMENDED TOOLS

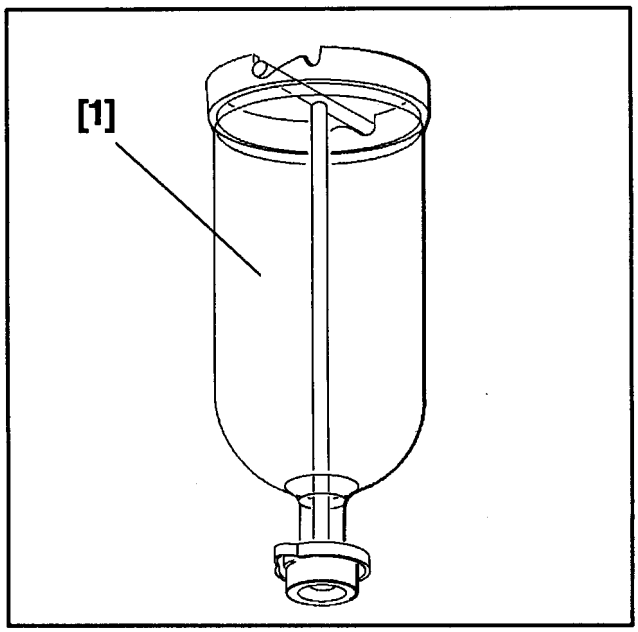

Fig : B1GP00AC

[1] filling cylinder 4520–T.

2 – DRAINING

Remove the header tank cap cautiously (with engine cold).

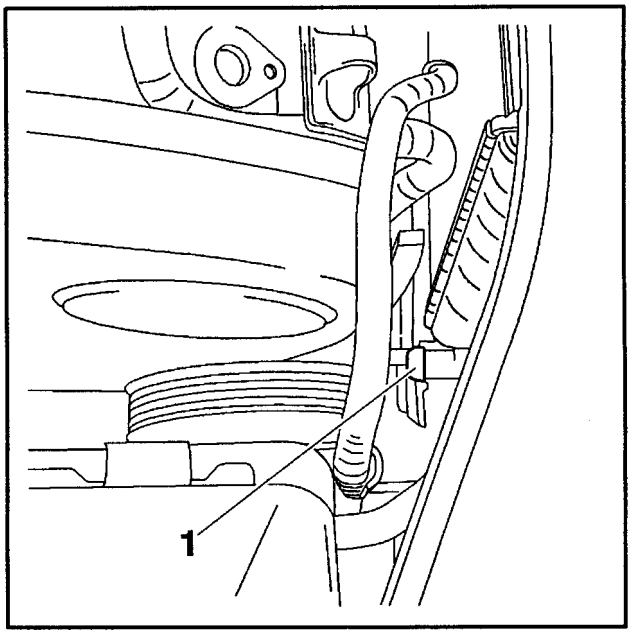

Fig : B1GP03VC

Open the radiator bleed screw.

Unscrew the radiator drain plug (1).

NOTE : The bolt (1) is equipped with a drain tube.

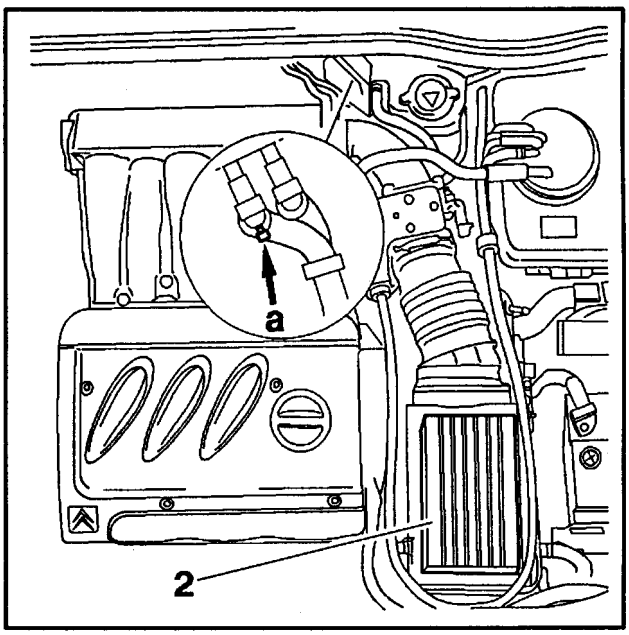

Fig : B1GP03WC

Open the bleed screw ; at "a".

Release the air filter housing (2).

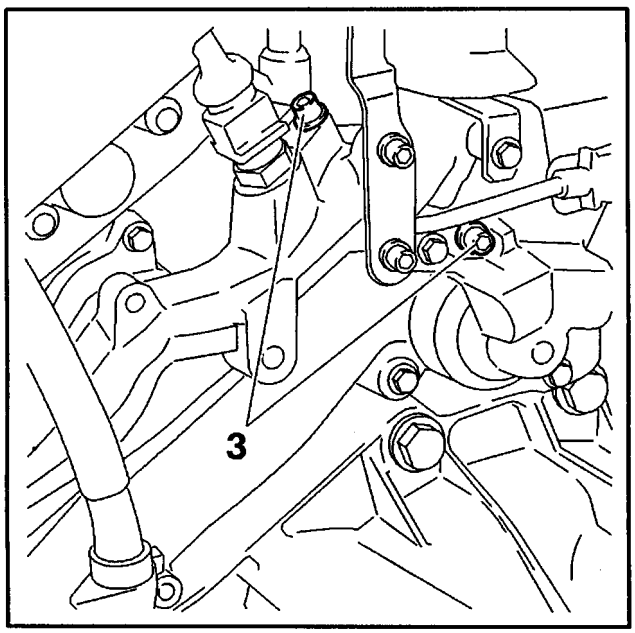

Fig : B1GP03XC

Open the bleed screws (3).

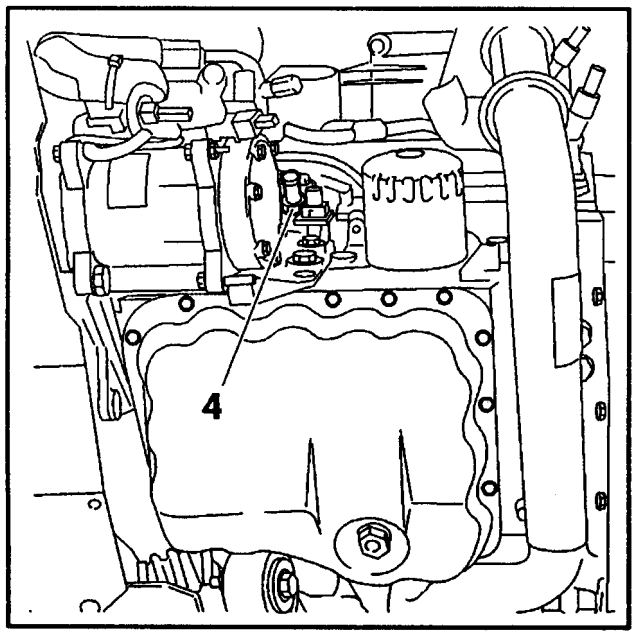

Fig : B1GP03YC

Undo the plug (4) to drain the first cylinder bank.

NOTE : The plug (4) is equipped with a drain tube.

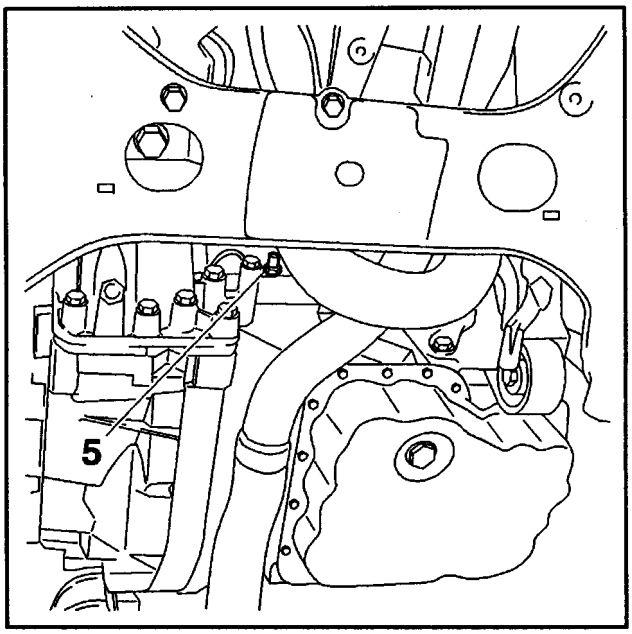

Fig : B1GP03ZC

Undo the plug (5) to drain the second cylinder bank.

NOTE : The plug (5) is equipped with a drain tube.

Remove drain plugs (4) and (5).

Replace the seals of the drain plugs.

Refit drain plugs (4) and (5) : tighten to 3 m.daN.

3 – FILLING AND BLEEDING THE SYSTEM

Before any filling operation, rinse the cooling system with clear water.

ATTENTION : Check that the cooling system is well-sealed.

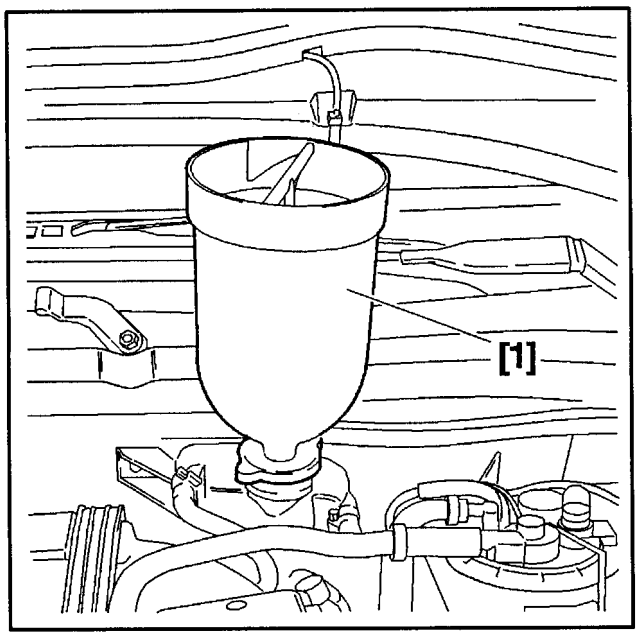

Fig : B1GP040C

Fit the filling cylinder [1] to the filler orifice.

Fill slowly (1).

Tighten again the bleed screws when the fluid flows cleanly and without any air bubbles.

Re-secure the air filter housing (2).

Run the engine at a speed of (1500/2500) rpm.

Maintain this speed for three cooling cycles (fans starting and stopping).

NOTE : To bleed the heater matrix correctly, the filler cylinder should be filled up to the "1 litre" mark.

Switch off the engine and wait for it to cool down.

Remove the filling cylinder [1].

Refit the header tank cap.

REMOVING – REFITTING : COOLANT PUMP

1 – REMOVING

Drain the cooling system (see the relevant operation).

Remove the timing gear drive belt (see the relevant operation).

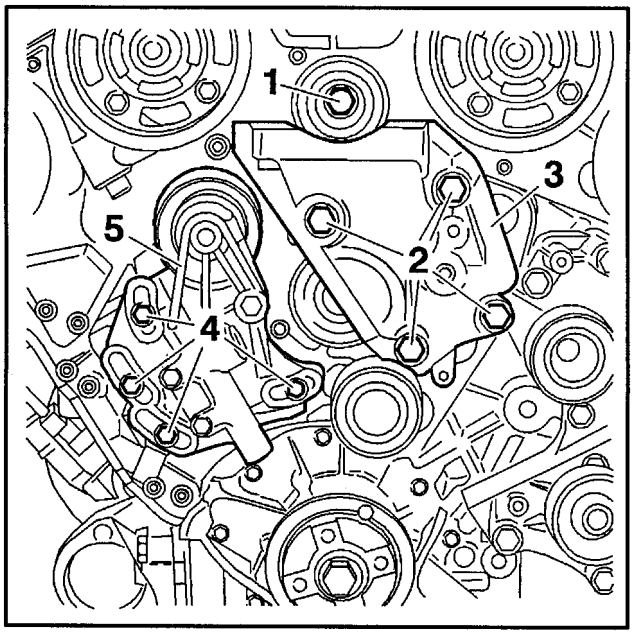

Fig : B1GP043C

Remove :

- screw (1)
- the roller tensioner
- screws (2)
- engine mounting bracket (3)
- screws (4)
- the dynamic tensioner (5)

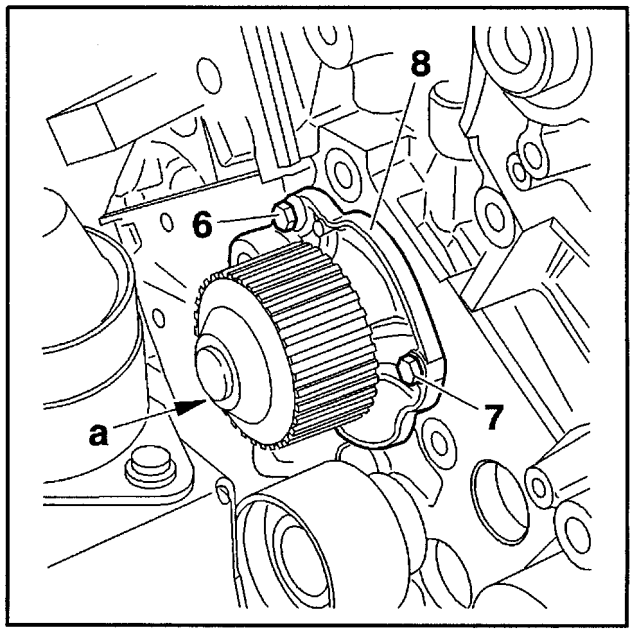

Fig : B1GP044C

Remove :

- screws (6) and (7)
- the bolt at "a"
- water pump (8)
- the water pump seal

2 – REFITTING

IMPERATIVE : Replace systematically the water pump seal.

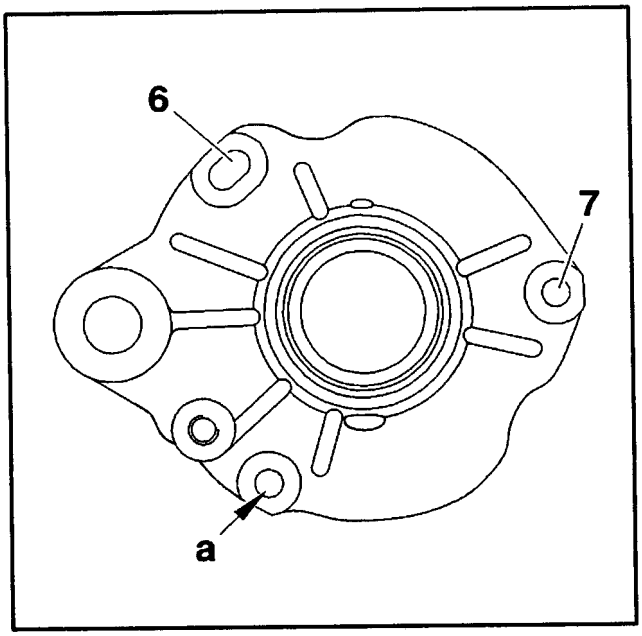

Fig : B1GP045C

Refit the water pump (8) using a new seal.

ATTENTION : Respect the tightening order : 7; 6; a.

Tightening method :
- pre-tighten to 0,5 m.daN
- tightening torque = 0,8 m.daN

Fit :
- the dynamic tensioner (5)
- screws (4)
- engine mounting bracket (3)
- screws (2) ; tighten to 6 m.daN
- the roller tensioner
- screw (1) ; tighten to 8 m.daN

Install the timing belt (see the relevant operation).

Fill and bleed the cooling system (see the relevant operation).

REMOVING – REFITTING : THERMOSTAT

1 – RECOMMENDED TOOLS

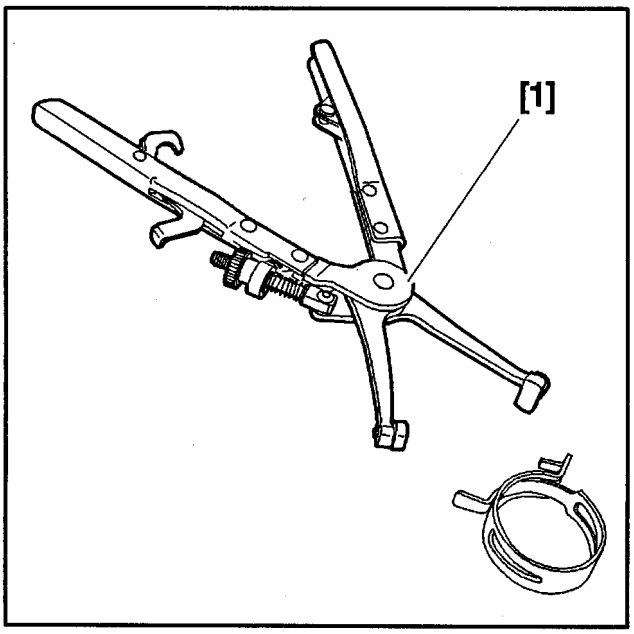

Fig : E5-P059C

[1] 9029–T pliers for removing and refitting hose clips.

2 – REMOVING

Disconnect the battery negative terminal.

Drain the cooling system (see the relevant operation).

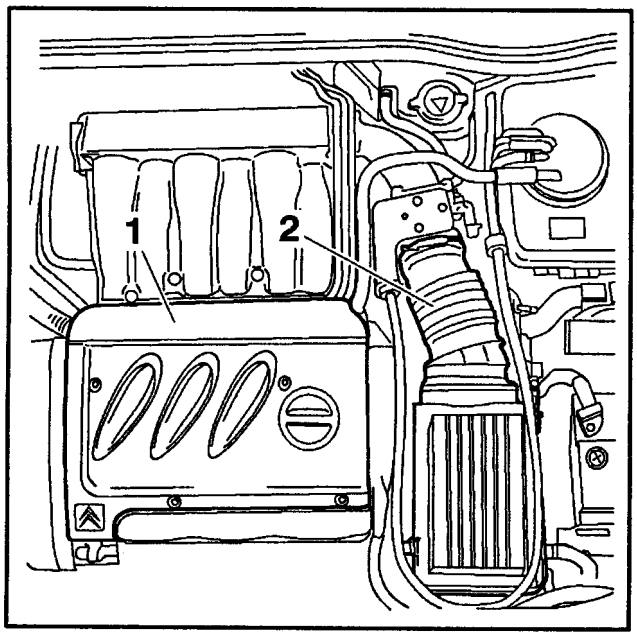

Fig : B1HP0LEC

Remove :

- the air filter housing (1)
- the air filter duct (2)

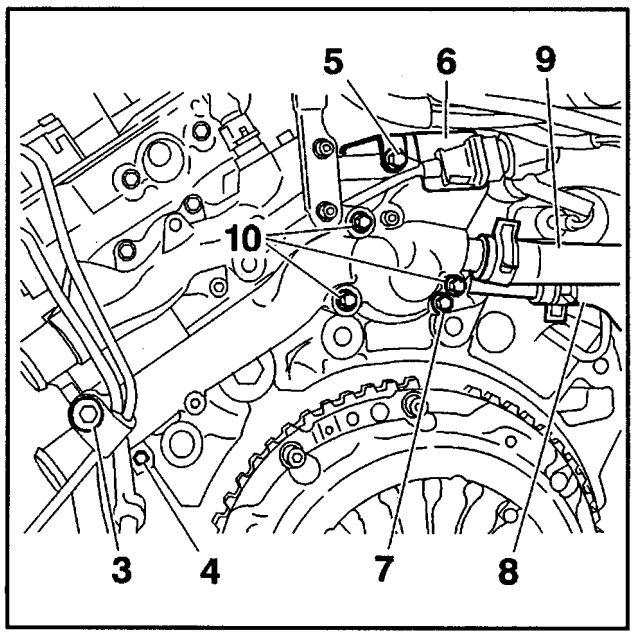

Fig : B1GP048C

Remove :

- screw (3)
- screw (4)
- screw (5)

Moving the fixing bracket (6) aside.

Take out screw (7).

Disconnect the hose (9) ; by means of tool [1].

Disconnect the pipe (8) from the cylinder block.

Take off screws (10).

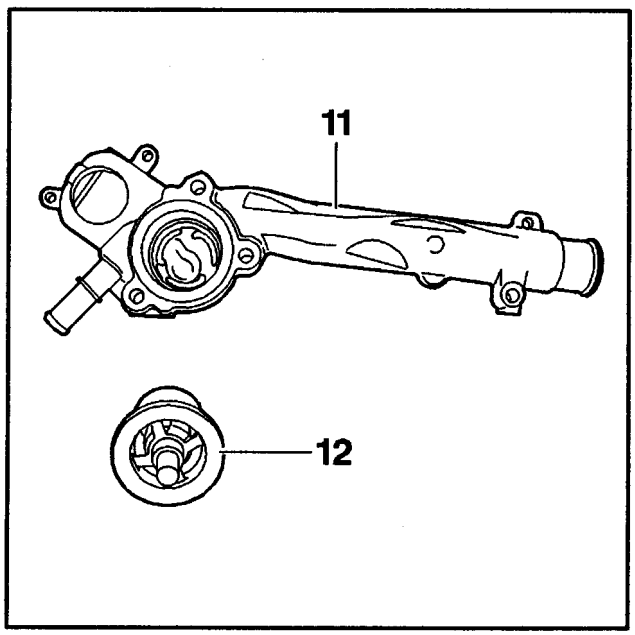

Fig : B1GP049C

Move the coolant outlet housing (11) clear of the cylinder block.

Remove the thermostat (12).

3 – REFITTING

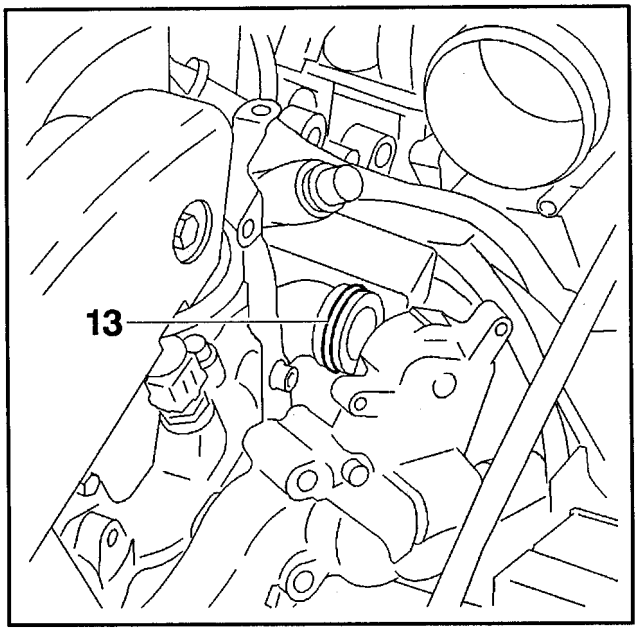

Fig : B1GP04AC

Replace the "O" ring seal (13).

ATTENTION : When refitting, do not damage the sealing ring (13).

Fit :
- the thermostat (12) (new)
- the coolant outlet housing (11)
- screws (10) ; tighten to 2,5 m.daN
- screw (7)

Connect the pipe (8) to the cylinder block.

Refit and tighten screw (4) to 0,8 m.daN.

Connect the hose (9).

Fit :
- the air filter duct (2)
- the air filter housing (1)

Reconnect the battery negative terminal.

DATA : BOSCH MP 7.0 MULTIPOINT INJECTION SYSTEM

1 – APPLICATION

This system applies to the engine XFZ (ES9J4) with a manual gearbox.

2 – SYNOPSIS

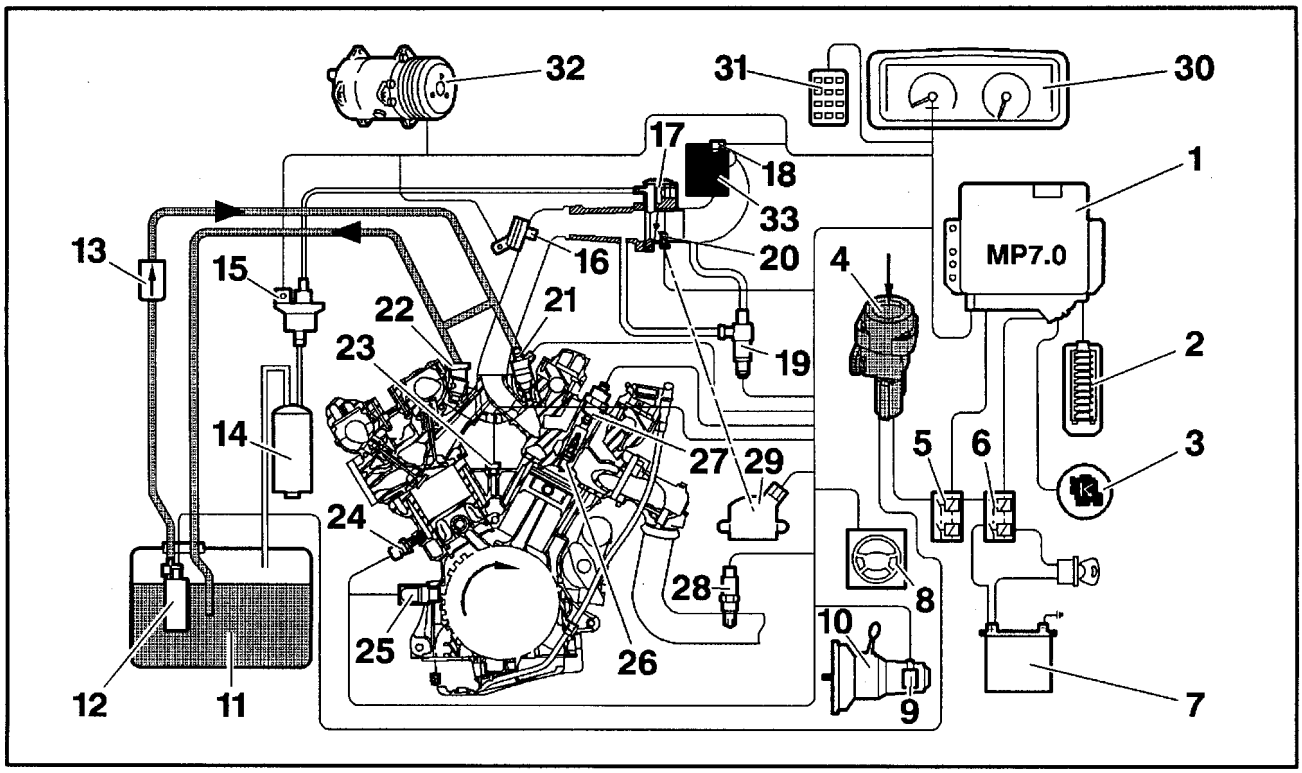

Fig : B1HP0KZD

(1) ignition injection control unit.
(2) diagnostic connector.
(3) injection ignition test warning lamp.
(4) inertia switch.
(5) double relay : power.
(6) double relay : principal.
(7) battery.
(8) pressure sensor : power assisted steering.
(9) vehicle speed sensor.
(10) manual gearbox.
(11) fuel tank.
(12) fuel pump.
(13) fuel filter.
(14) canister.
(15) canister discharge electrovalve.
(16) integral pressure sensor.
(17) canister purge unit – throttle housing.
(18) inlet air thermal sensor.
(19) idling actuator.
(20) throttle housing heating element.
(21) injectors.
(22) pressure regulator – pulsation damper.
(23) the knock sensor.
(24) engine coolant thermal sensor.
(25) engine speed sensor.
(26) sparking plugs (x6).
(27) the casing of HT coils (x6).
(28) oxygen sensor.
(29) throttle potentiometer.
(30) consumption information – engine speed.
(31) coded anti–theft keyboard.
(32) air conditioning compressor cut out information.
(33) air filter unit.

3 – DATA

Engine plate	XFZ (ES9J4)
Capacity (cc)	2946
Idling speed (rpm) (not adjustable)	600 ± 50 700 ± 50 (air conditioning) 800 ± 50 (parking manoeuvres)
Cutting off at maximum speed (rpm)	6520
Injection cut–out on deceleration (rpm)	1400
Reinstatement speed (rpm)	1100
% CO	< 0,5
% CO2	> 11

4 - FUEL SYSTEM

Component	Reference	Supplier	Reference	Remarks
Fuel to be used				95 RON or 98 RON premium unleaded petrol
Fuel tank	11			Capacity = 65 litres. Composition = polyethylene
Fuel pump	12	BOSCH	EKP 10 0 580 453 024	Electric pump immersed in the tank. Voltage : 12 V. Pressure : 3 bars. Delivery : 115 to 120 l/h
Fuel filter	13	PURFLUX		Fixing : on the fuel tank. The arrow, on the filter, indicates the direction of the fuel flow
Canister	14	PURFLUX	PPGF 30	Location : under the left hand front wing
Canister discharge electrovalve	15	BOSCH	0 280 142 317	Electrovalve normally closed. Brown 2 way connector. Location : under the left hand front wing. Resistance = 24 ohms
Injectors	21	BOSCH	EV 8 E 0 280 155 613	Injector group 1-2-3, brown 2 way connector. Injector group 4-5-6, 2-way black connector. Yellow marking. Bi-jet injector. Resistance = 16 ohms
Pressure regulator	22	BOSCH	0 280 160 560	Fixing on the return end of the fuel rail. Regulating pressure = 3 bars
Pulsation damper			0 280 161 500	Fixing on the supply end of the fuel rail

5 - AIR CIRCUIT

Component	Reference	Supplier	Reference	Remarks
Integral pressure sensor	16	BOSCH	DSS 0 261 230 012	Grey 3 way connector. Incorporated into the intake manifold
Throttle housing	17	MAGNETI-MARELLI	PSA 603	The unit comprises : heating element. Throttle potentiometer
Idling actuator	19	BOSCH	ZWD 5 0 280 140 563	Grey 3 way connector. Fixed to the butterfly housing by a retaining clamp

6 - ELECTRICAL CIRCUIT

Component	Reference	Supplier	Reference	Remarks
Ignition injection control unit	1	BOSCH	MP 7.0. Emission control Z/L3. 0 261 204 410 with manual gearbox	55-way connector. "semi-sequential" injection. "flash" type eprom (reprogrammable eprom). Located in the ecu housing
Inertia switch	4	FIRST INERTIA SWITCH	Type (505)	3-way black connector. Location on front right wheel arch, fixing on the suspension support. Manual reset in case of activation of the cutting of the system
Double relay : 1 - power : ignition system, coded anti-theft device, oxygen sensor heating	5	OMP / BITRON	240 104	15-way black connector. Located in the ecu housing
2 - main supply : injection ECU, electric fuel pump	6	CARTIER	03 723	
Pressure sensor power assisted steering	8	BITRON		Blue 2-way connector. Switch opens at 20 bars, information for ecu (steering on full lock). Mauve identification collar. Fixed to the power steering hydraulic 4 way union beneath the vehicle
Vehicle speed sensor	9	EATON		White 3 way connector. Fixing : on the differential housing of the gearbox
Inlet air thermal sensor	18	JAEGER		Grey 2 way connector. Fixing : on the air filter inlet duct
Throttle housing heating element	20	SOLEX	22 496 134	Yellow 2 way connector. Fixing : on the throttle housing. Supply : 13,5 Volts (+ 2,5 V / - 5,5 V). Consumption : 8 amps

Component	Reference	Supplier	Reference	Remarks
The knock sensor	23	BOSCH	0 261 231 10	3–way black connector. Fixing : on the central part of the Vee of the engine block. Imperatively observe the tightening torque : 2 ± 0,5 m.daN
Engine coolant thermal sensor	24	ELTH	0 953 001 9900	Green 2 way connector. Fixing : on the coolant outlet housing
Engine speed sensor	25	ELECTRIC-FIL	14 43 13	Brown 3 way connector. Fixing : on the gearbox bell housing
Oxygen sensor	28	BOSCH	Emission control K LSH23	White 4 way connector. Fixing : on the exhaust pipe below the body
			Emission control Z/L3 LSH24. 0 258 003 754	Brown 4 way connector. Fixing : on the exhaust pipe below the body
Throttle potentiometer	29	BOSCH	DKG1 0 280 122 009	Single track. White 3 way connector. Fixing : on the throttle housing. Not adjustable

7 – IGNITION SYSTEM

Component	Reference	Supplier	Reference	Remarks
Spark plugs	26	BOSCH	FR7 KDC	Electrode gap : 1 mm Tightening torque : 2,5 m.daN
		EYQUEM	RFC 58LSPD	
HT coil unit	27	SAGEM	BBC 3.2	4–way black connector. Static twin wasted–spark ignition

INITIALISATION PROCEDURE : BOSCH MP7.0 MULTIPOINT FUEL INJECTION ECU

1 – RECOMMENDED TOOLS

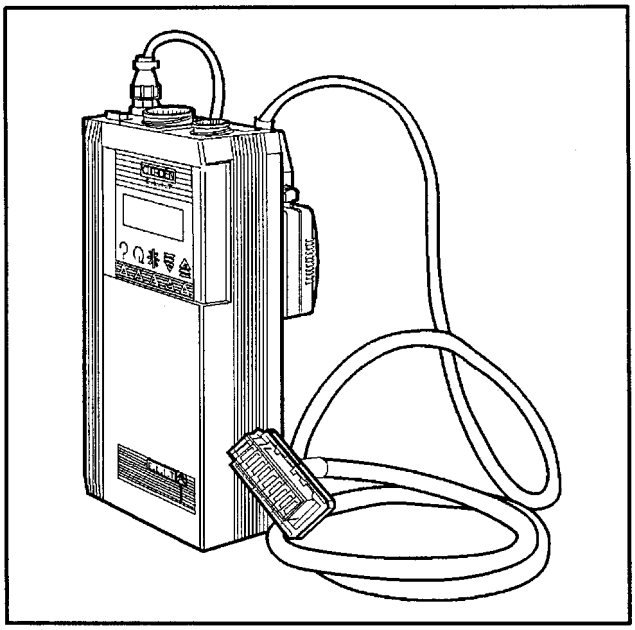

Fig : B3BP039C
ELIT 4125–T test unit.

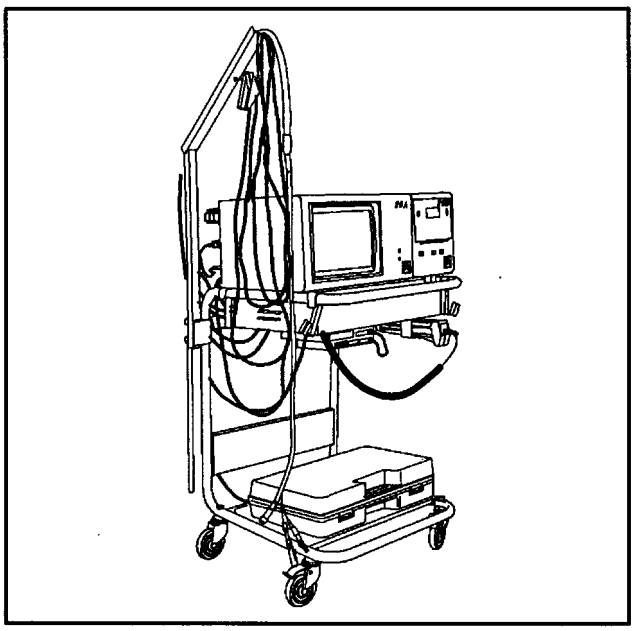

Fig : B3BP031C
26 A diagnostic station.

2 – INITIALISATION OF THE ENGINE IDLE SPEED

Switch on ignition.

Unlock the coded anti–theft device (according to equipment).

Wait 5 seconds before starting the engine. Do not depress the accelerator pedal.

3 – AUTO–ADAPTATION OF THE RICHNESS

Warm up the engine until the cooling fan or fans cut in and out : water temperature = 80 °C.

Connect the diagnostic equipment to the vehicle's diagnostic socket.

NOTE : The diagnostic socket is located in the passenger compartment fusebox.

IMPERATIVE : Switch off all the vehicle's electrical equipment.

Select the following in the "diagnosis" menu of the equipment :
- test by function
- reading fault codes

There must be no fault codes displayed.

Switch off the ignition, then switch it on.

Start the engine. Do not depress the accelerator pedal.

Run the engine at idle speed for 5 minutes. Do not depress the accelerator pedal.

Select the following in the "diagnosis" menu of the equipment :
- measure parameters
- injection information

Reading parameters for "butterfly position", the diagnostic equipment should read "IDLING".

If a different condition should be displayed, carry out the following operations :
- check the routing and tension of the accelerator cable
- ensure that the throttle butterfly returns to the idle stop
- slowly depress the accelerator pedal and check that the diagnostic equipment reads the throttle positions of "IDLE – MID–THROTTLE – FULL THROTTLE" when displaying "butterfly position"

If the throttle status does not alter, there is an electrical fault : refer to the specific brochure. Fault finding.

NOTE : Erasing the fault codes using diagnostic equipment does not erase the auto–adaptation of the mixture richness.

REMOVING – REFITTING : AIR INLET MANIFOLD

1 – REMOVING

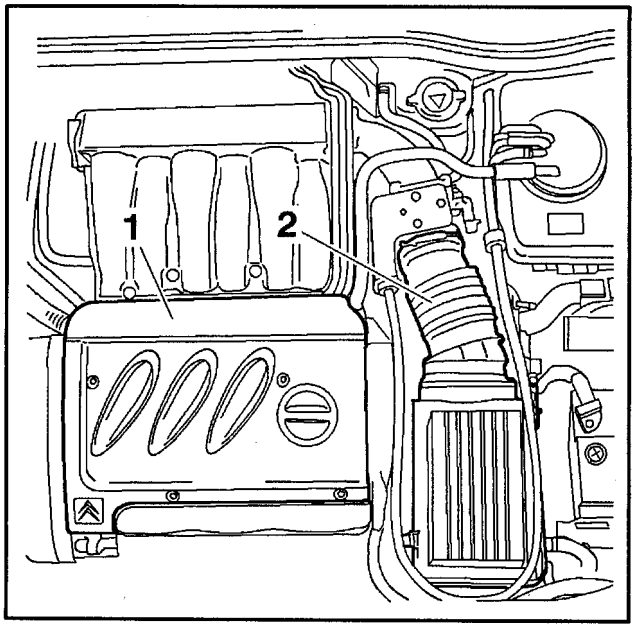

Fig : B1HP0LEC

Remove :
- the engine cover (1)
- the air filter housing (2)

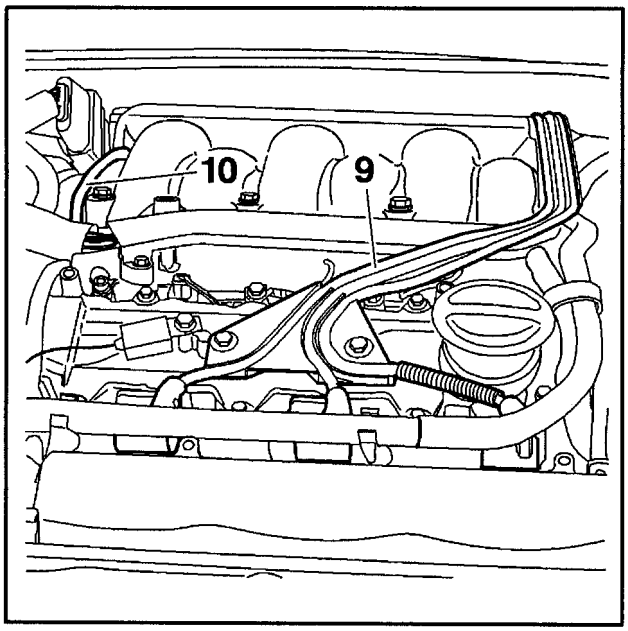

Fig : B1HP0LGC

Unclip the sparking plug leads (9).

Uncouple the pipe (10).

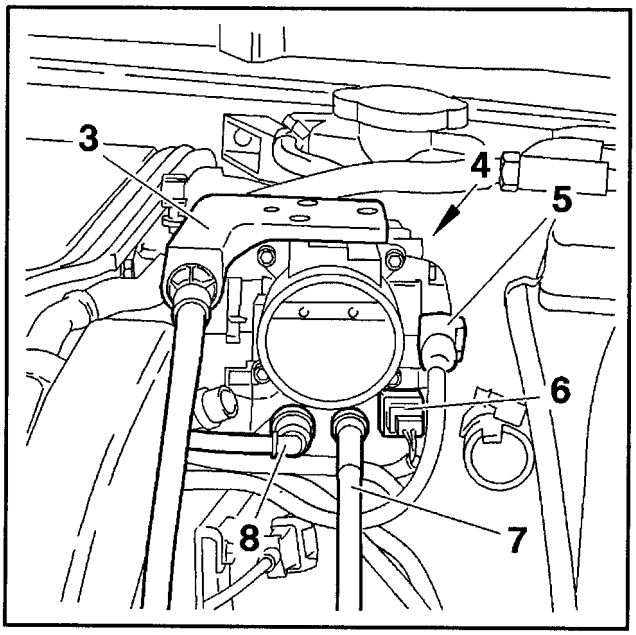

Fig : B1HP0LFC

Move the accelerator control assembly (3) aside.

Disconnect the connectors (4), (5) and (6).

Disconnect the pipes (7) and (8).

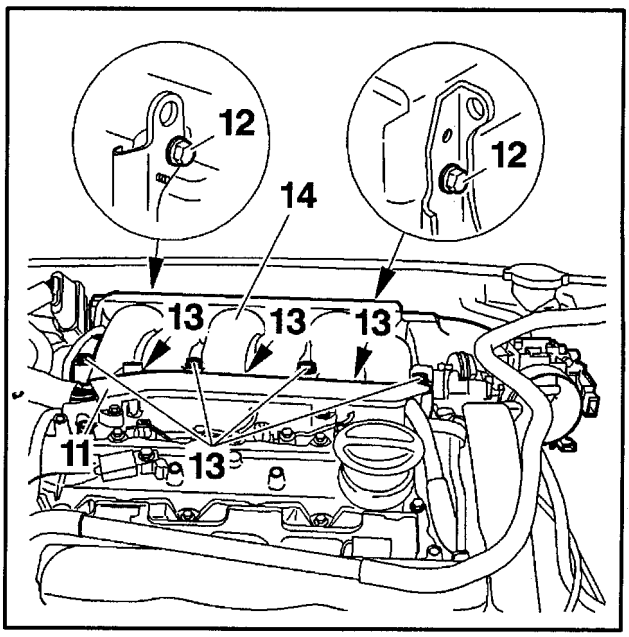

Fig : B1HP0LHC

Move the engine harness and its support (11) aside.

Undo the earth point fixing bolts.

Remove :
- the 2 screws (12)
- the 7 screws (13)
- the inlet manifold assembly and the throttle butterfly housing (14)
- the exhaust manifold gasket

Plug the air inlet passages.

2 – REFITTING

Fit :
- the exhaust manifold gasket (new seal)
- the inlet manifold assembly and the throttle butterfly housing (14)
- the 7 screws (13)
- the 2 screws (12)

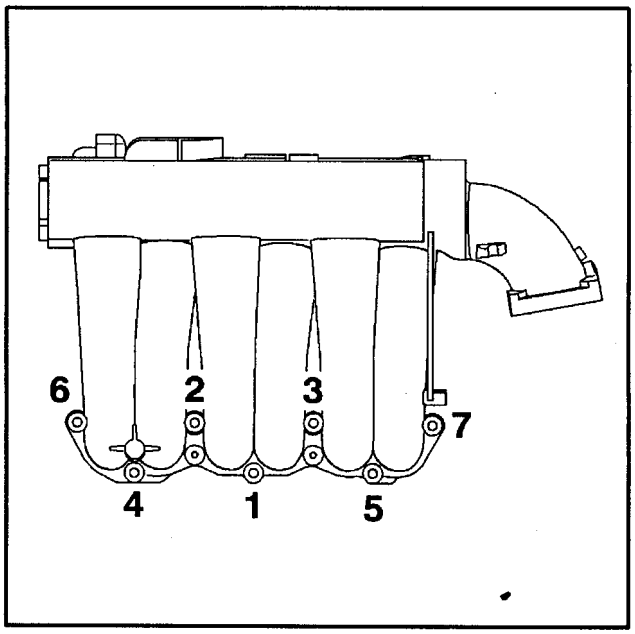

Fig : B1HP0LJC

Bolt (13) tightening sequence :
- pre-tighten each screw from 1 to 7 to a torque of 1 m.daN
- tighten the bolts from 1 to 7 to a torque of 2 m.daN

Clip in place the spark plug leads (9).

Refit the engine harness and its support (11).

Tighten the earth point fixing bolts.

Couple the pipe (10).

Reconnect connectors (4; 5; 6).

Couple up pipes (7) and (8).

Refit the accelerator control assembly (3).

Fit :
- the air filter housing (2)
- the engine cover (1)

REMOVING – REFITTING : SPARKING PLUGS

1 – RECOMMENDED TOOLS

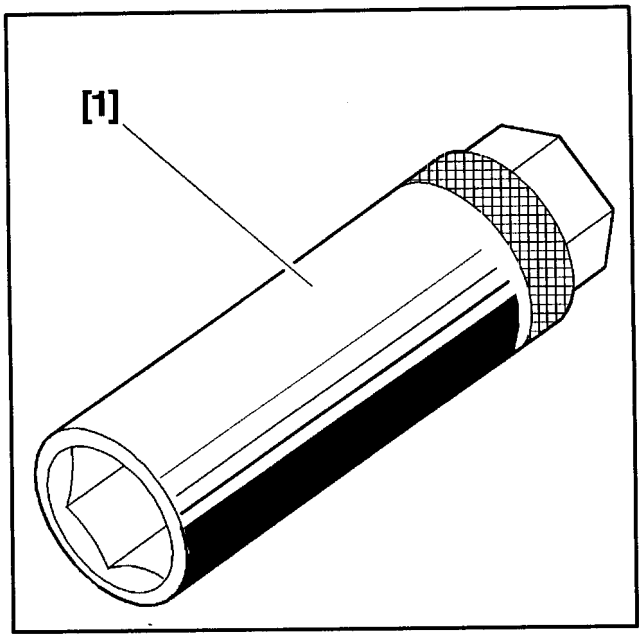

Fig : E5AP03MC

[1] spark plug spanner 9007–T.

2 – REMOVING

Remove inlet manifold (see the relevant operation).

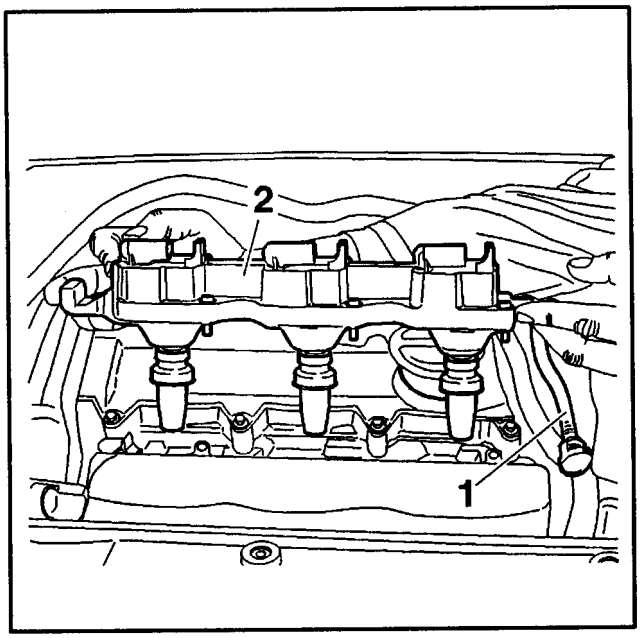

Fig : B1IP003C

Unclip the pipe (1).

Disconnect the electrical supply to the compact ignition coil unit.

Remove the coil casing (2).

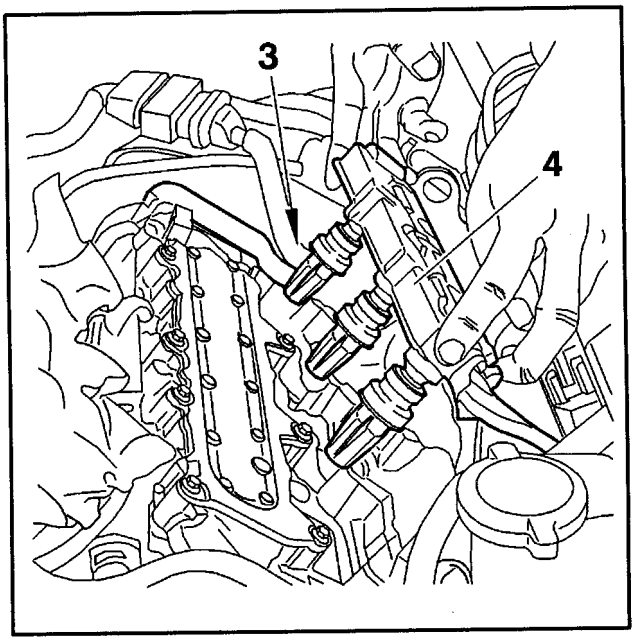

Fig : B1IP004C

Slacken screw (3).

Remove :

- the HT ignition harness cassette (4)
- the spark plugs ; by means of tool [1]

3 – REFITTING

Fit the sparking plugs.

Using tool [1], tighten the sparking plugs to 2,75 m.daN.

Refit the ignition HT harness cassette (4).

Retighten screw (3).

Remove the coil casing (2).

Connect the electrical supply to the compact ignition coil unit (2).

Reclip the pipe (1).

Refit the inlet manifold (see the relevant operation).

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DATA : EXHAUST

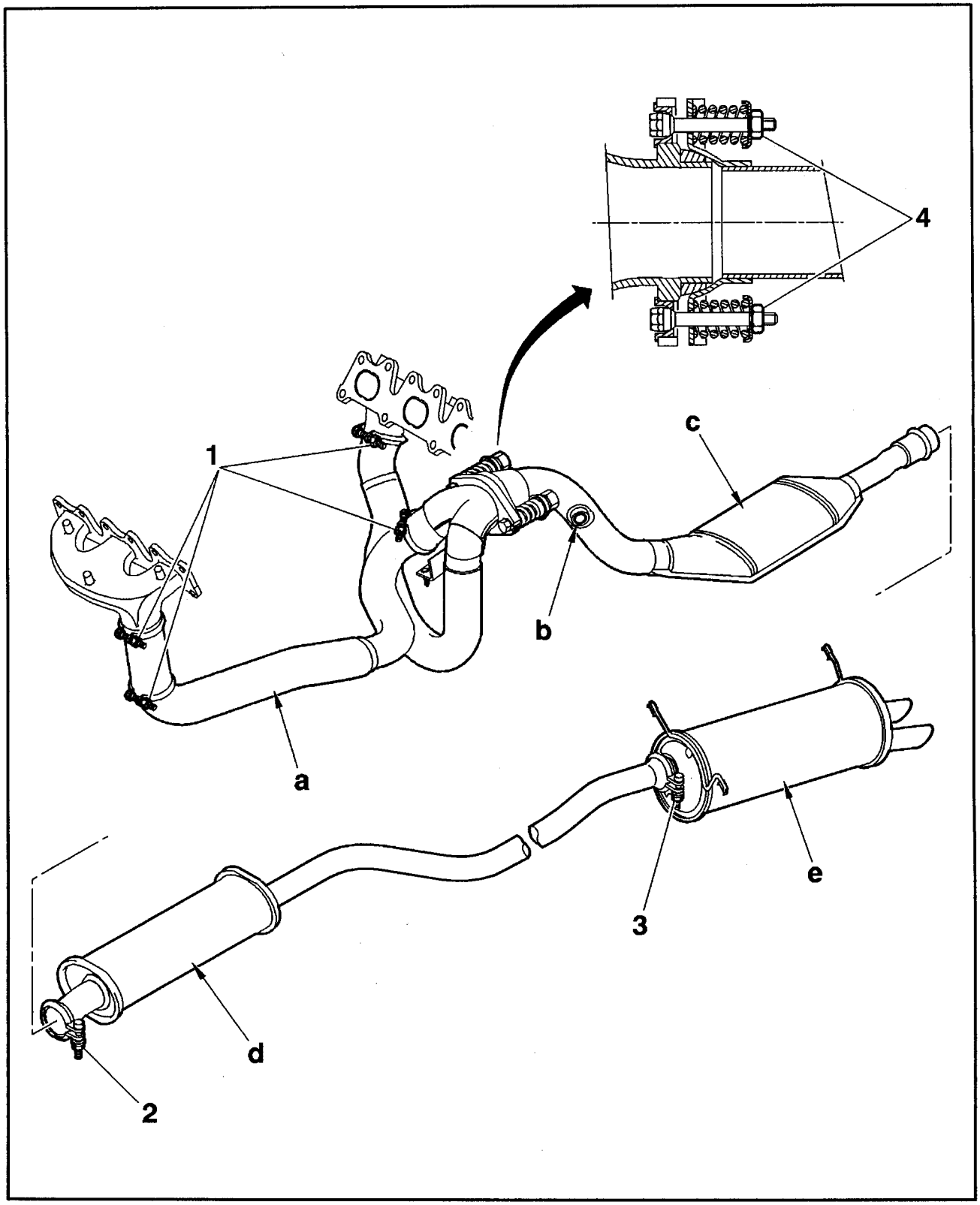

Fig : B1JP016P

"a" front pipe	Dual pipe. Ball-joint diameter = 73,6 mm
"b" oxygen sensor	-----
"c" catalyser	Reference (TR PSA K111)
"d" intermediate silencer	Reference (PSA 4120)
"e" rear silencers	Twin tail pipes. Reference (PSA 4121)

Tightening torques :
- tighten the bolts (1); (2) and (3) to 2,5 m.daN
- tighten the bolts (4) to 0,9 m.daN

REMOVING – REFITTING : AIR CONDITIONING COMPRESSOR

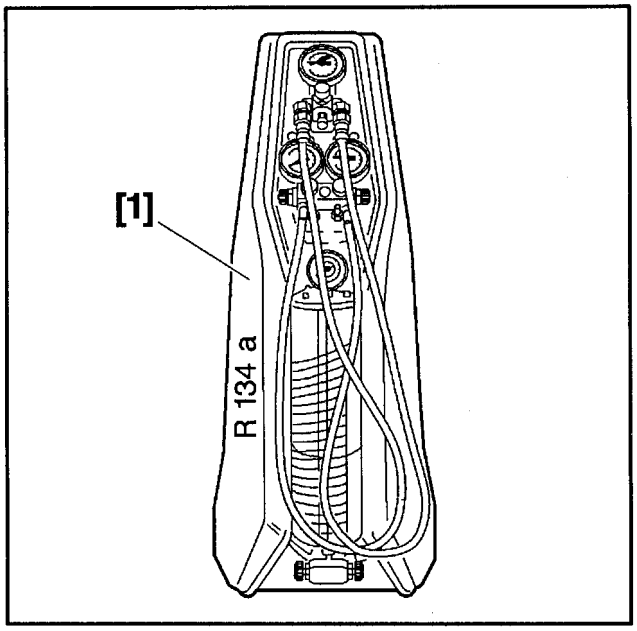

Fig : C5HP017C

[1] workshop mobile charging station : type (DIAVIA R 134 a).

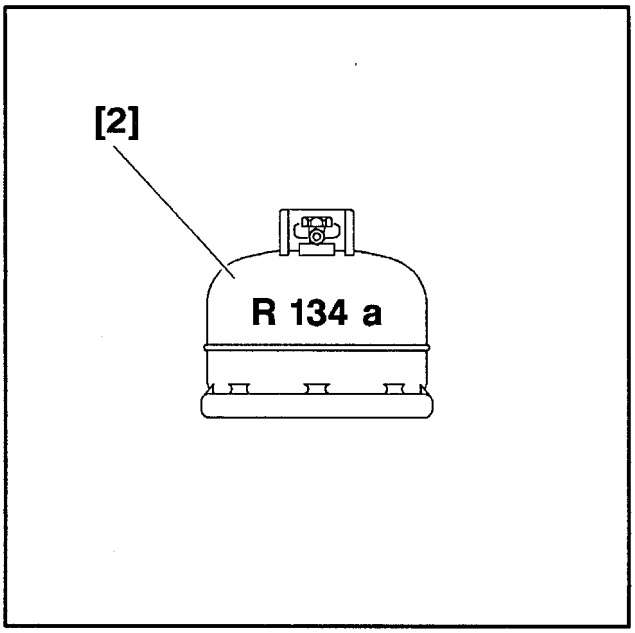

Fig : C5HP01AC

[2] (R 134 a 6 kg) gas bottle.

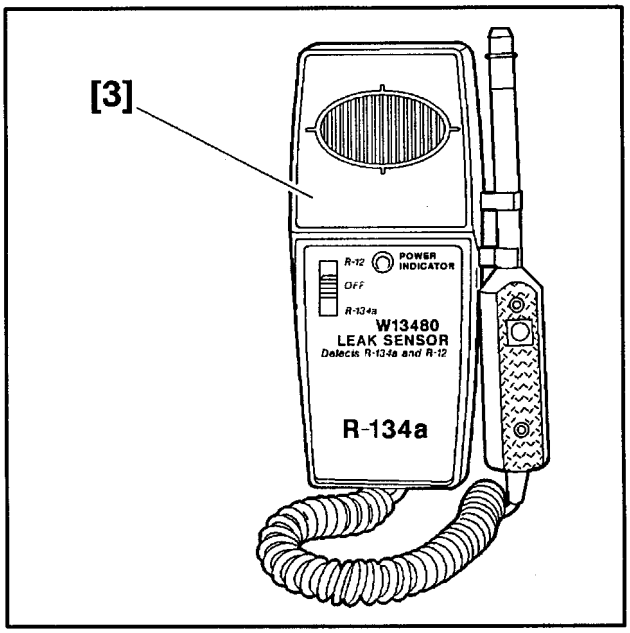

Fig : E5AP03HC

[3] leak detector.

Reference (AN.134 ANGLO-NORDIC).

Other version : reference (YOCOGAWA).

NOTE : It is recommended to use a leak detector equipped with a sensitivity adjustment.

1 – REMOVING

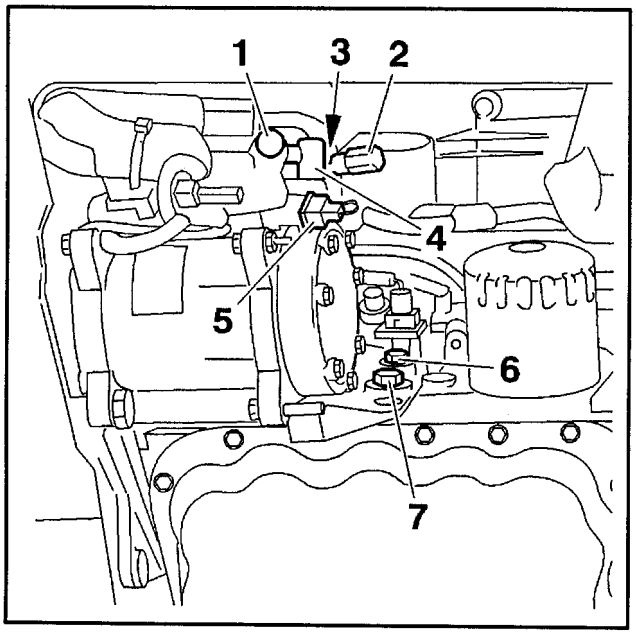

Fig : C5HP069C

Remove :
- the RH front road wheel
- the R.H. front mud shield
- the auxiliary equipment drive belt (see the relevant operation)

Drain the air conditioning circuit via unions (1) and (2) (see the relevant operation).

NOTE : The air conditioning circuit must be exhausted very slowly to avoid the loss of the compressor lubricating oil.

IMPERATIVE : Smoking is forbidden during this operation.

Remove :
- screw (3)
- the clamp and the pipes (4)

Disconnect the connector (5).

Remove the screws (6) and (7).

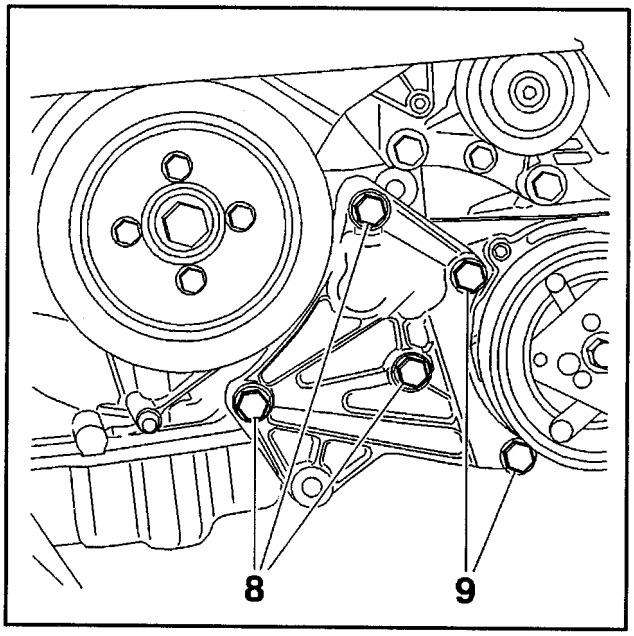

Fig : C5HP06AC

Loosen screws (9).

Remove :
- screws (8)
- the air conditioning compressor

2 – REFITTING

Fit :
- the air conditioning compressor
- screws (8) : tighten to 4 m.daN
- screws (6) and (7) : tighten to 4 m.daN
- the clamp and the pipes (4)
- screw (3)

Tighten the bolts (9) to 4 m.daN.

Reconnect the connector (5).

Refill the air conditioning circuit via unions (1) and (2) (see the relevant operation).

Fit :
- the auxiliary equipment drive belt (see the relevant operation)
- the R.H. front mud shield
- the RH front road wheel