Xm

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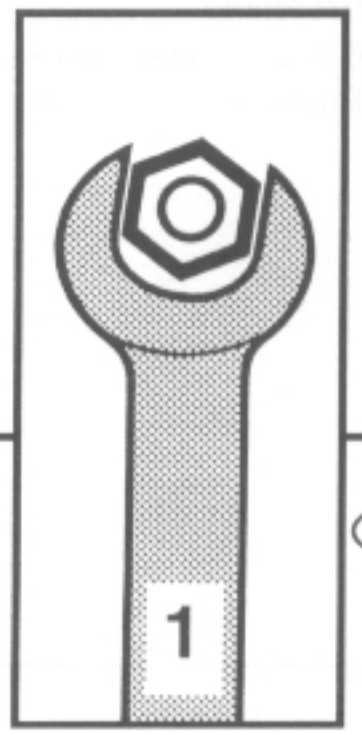
PRESENTATION

XM V6 (ES9J4 engine 2946 cm³)

- GENERAL SPECIFICATIONS
- POWER UNIT
- GEARBOX
- SOURCE-RESERVE OF PRESSURE
- STEERING SYSTEM
- SUSPENSION
- BRAKES
- AIR CONDITIONING

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"The technical information appearing in this brochure is subject to updating as the characteristics of each model in the range evolve. Motor vehicle repairers are invited to contact the CITROËN network periodically for further information and to obtain any possible updates".



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CONTENTS

GENERAL SPECIFICATION

GENERAL : CITROEN XM V6 1

1 – Marketed range of vehicles 1
2 – General specifications 2
3 – Wheels and tyres 3

POWER UNIT

PRESENTATION : ES9J4 ENGINE 4

1 – Presentation : ES9J4 engine 4
2 – Principal construction features of the ES9J4 engine 6
3 – Cylinder block 7
4 – Cooling system 10
5 – Fuel supply 13
6 – Induction circuit –
7 – Injection system 14
8 – Exhaust 17

GEARBOX

PRESENTATION : 4HP20 AUTOMATIC GEARBOX 18

1 – General 18
2 – Identification of the vehicles 20
3 – Difference between ZF 4HP18 and ZF 4HP20 gearboxes 21
4 – Driver information – use 22
5 – Fault management 24
6 – General architecture : ZF 4HP20 automatic gearbox 25
7 – Operating principle 28

PRESENTATION : ML5T GEARBOX 31

1 – Gearbox 31
2 – Hydraulic clutch control 32

SOURCE – RESERVE OF PRESSURE

SPECIAL FEATURES : PRESSURE SOURCE AND RESERVE CIRCUIT 33

1 – Preamble 33
2 – 6+2 piston high pressure pump –
3 – Power steering hydraulic circuit 34

STEERING SYSTEM

SPECIAL FEATURES : STEERING **36**

1 – Special features 36
2 – Data –
3 – Tightening torques 37

SUSPENSION

SPECIAL FEATURES : SUSPENSION **38**

1 – Suspension components 38
2 – Anti–roll bar –
3 – SC/MAC system 39
4 – Suspension spheres 40

BRAKES

SPECIAL FEATURES : BRAKING SYSTEM **42**

1 – Front brakes 42
2 – Rear brakes 43

AIR CONDITIONING

SPECIAL FEATURES : REFRIGERATION SYSTEM **44**

1 – Synopsis 44
2 – Refrigerant fluid 45
3 – Refrigeration compressor clutch –

GENERAL : CITROEN XM V6

Vehicle application : XM saloon and estate.

The vehicles in question are fitted with a new 6 cylinder, 24 valve, 3 litre capacity engine : ES9J4 engine type (that replaces ZPJ).

The engine is manufactured from light alloy, mounted transversely and tilted at 0°.

Commercial designation : CITROEN XM V6.

The injection and ignition are "pressure–speed" type with 2 injections and 2 sparks per engine cycle.

Gearboxes :

- manual gearbox : ML5T gearbox (that replaces MG5T)
- new automatic gearbox with 4 forward gears and electronic management of gear selection : type ZF 4HP20 gearbox

Vehicle specific features :

- engine mounting assembly (specific)
- 6+2–piston high pressure pump (specific)
- power assisted steering (all vehicle types; all destinations)
- power steering hydraulic circuit (with pressure regulator)
- SC/MAC : Citroën system for maintaining a constant ground clearance
- new brake fitting surface area of brake pads increased

NOTE : The SC/MAC system makes it possible to limit the amount the vehicle sinks when stationary, engine off.

1 – MARKETED RANGE OF VEHICLES

Ref. letters used in the tables "commercial range of vehicles" :

- (a) = automatic gearbox
- (m) = manual gearbox
- (f) = fiscal rating in "HP"

1.1 – "Saloon" version

Vehicle		Engine		Gearbox
Official designation	Trim level	Plate (d) Type	Power kW/hp (f) (in HP)	Reference Type
Y4–WG	VSX	ES9J4 XFZ	140/194 (15)	20LE33 ML5T (m)
	EXCLUSIVE			
Y4–WH	SX		140/194 (16)	20HZ02 4HP20 (a)
	EXCLUSIVE			

1.2 – "Estate" version

Y4–WJ	SX	ES9J4 XFZ	140/194 (15)	20LE33 ML5T (m)
Y4–TN			140/194 (16)	20HZ02 4HP20 (a)

NOTE : All the vehicles meet the emission standard L3 (CEE 96).

2 – GENERAL SPECIFICATIONS

2.1 – Performances

	"Saloon" version		"Estate" version	
	Manual gearbox	Automatic gearbox	Manual gearbox	Automatic gearbox
0 to 400 m, standing start (DIN load)	16.1 s	17.2 s	16.5 s	17.6 s
0 to 1000 m, standing start (DIN load)	29.4 s	31.1 s	30.2 s	31.8 s
0 to 100 km/h (DIN load)	8.4 s	10.2 s	8.9 s	10.7 s
Max. speed	233 km/h	230 km/h	228 km/h	225 km/h

2.2 – Consumption (litres per 100 km)

	"Saloon" version		"Estate" version	
	Manual gearbox (litres per 100 km)	Automatic gearbox (litres per 100 km)	Manual gearbox (litres per 100 km)	Automatic gearbox (litres per 100 km)
Urban cycle	15.9	18	15.9	18
Extra–urban	8	8.4	8	8.4
Mixed	10.9	11.9	10.9	11.9

2.3 – Weights (kg)

		"Saloon" version		"Estate" version	
		Manual gearbox (kg)	Automatic gearbox (kg)	Manual gearbox (kg)	Automatic gearbox (kg)
Unladen weight in running order		1625	1666	1690	1730
Gross vehicle weight		2080	2155	2220	2260
Gross train weight		3500	3545	3640	3680
Max. trailer weight	Unbraked	750	750	750	750
	Braked	1500	1500	1500	1500
Max. nose weight		80	80	80	80
Max. roof rack load		80	80	100	100

3 – WHEELS AND TYRES

	Tyres (rolling circumference)	Wheels	Inflation pressure (in bar)		
			Ft	Rr	Sp
"Saloon" version. Manual gearbox	205/65 R15 V (1.970 m)	Steel wheel : 6J15 H2 5.45	2.5 2.7(1)	1.9 2(1)	2.7
"Saloon" version. Automatic gearbox		Spare wheel : 6J15 H2 5.45	2.5 2.7(1)		
"Estate" version. Manual gearbox		Light alloy wheel : 6J15 CH 5.43	2.5	2.5	
"Estate" version. Automatic gearbox			2.5	2.5	

Ft : front wheel.
Rr : rear road wheel.
Sp : spare wheel.
(1) when the vehicle is travelling at a speed of more than 200 kmh.

3.1 – Snow tyre fitting

First fitting	"Snow" equipment		
205/65 R15 V	XM+S 130 (190 km/h)	XM+S 330 (210 km/h)	XM+S 260 (1) (160 km/h)
Steel wheel : 6J15 H2 5.45 Light alloy wheel : 6J15 CH 5.43 (2)	205/65 R15 94T	205/65 R15 94H	205/65 R15 94Q

Tyres (1) MUST be studded.
(2) : use the bolts adapted to the wheel types (bolts with flat or conical bearing surface).

3.2 – Speeds in km/h per 1000 rpm

	Tyres (rolling circumference)	Vehicle speed (km/h)					
		1st	2nd	3rd	4th	5th	Reverse
Manual gearbox	205/65 R15 V (1.970 m)	8.72	15.9	23.75	31.41	38.65	9
Automatic gearbox		10.95	20.9	29.77	41.36	—	11.59

PRESENTATION : ES9J4 ENGINE

1 – PRESENTATION : ES9J4 ENGINE

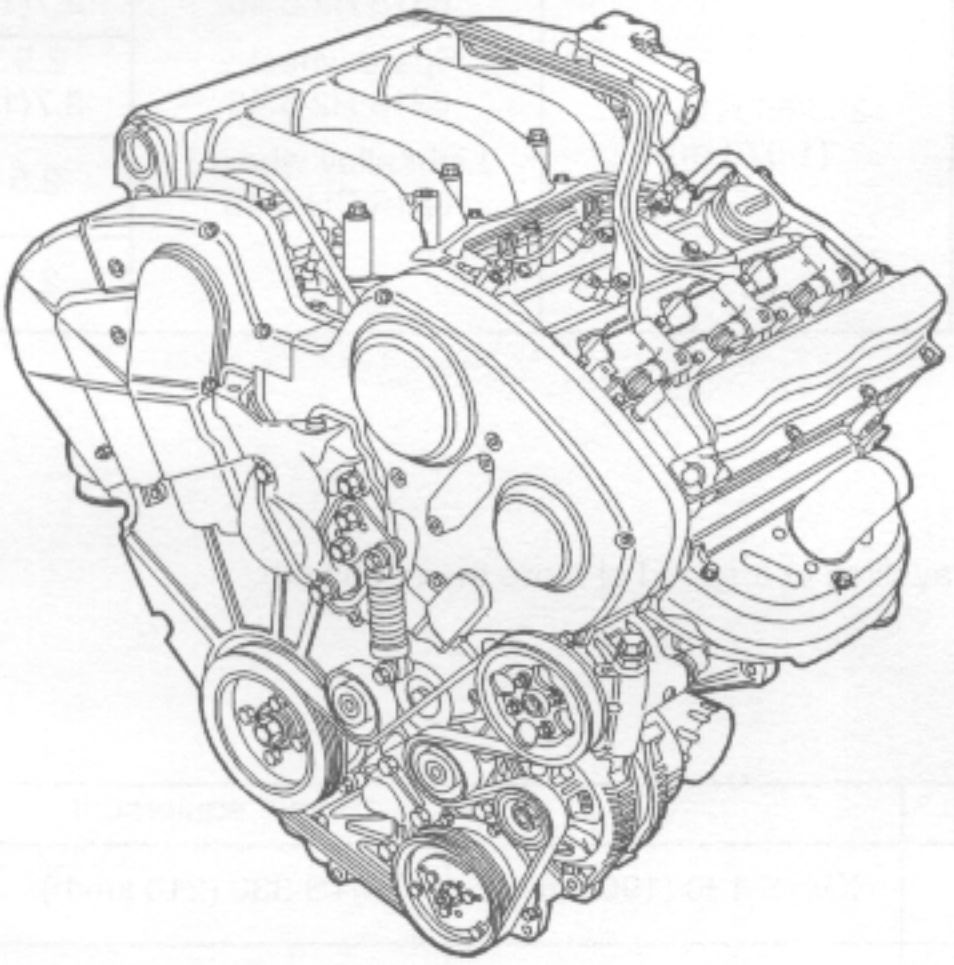


Fig : B1BP1GJD

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 a toothed belt

1.1 – Data

Engine code	ES9J4
Legislation type	XFZ
Capacity (cc)	2946
Number of cylinders	6 in V at 60°
Bore x stroke (mm)	87 x 82.6
Compression ratio	10.5/1
Max. power (E.E.C) Max. power (DIN)	140 kW at 5500 rpm 194 hp at 5500 rpm
Max. torque (E.E.C.) Max. torque (DIN)	26.7 m.daN at 4000 rpm 27.8 m.kg at 4000 rpm
Emission standard	L3 (EURO 96)
Fuel	Unleaded premium 95 and 98 RON
Catalytic converter	Yes
Injection system	Multipoint injection (semi–sequential)
Supplier	BOSCH
Type	MP7.0

1.2 – Power and torque curves

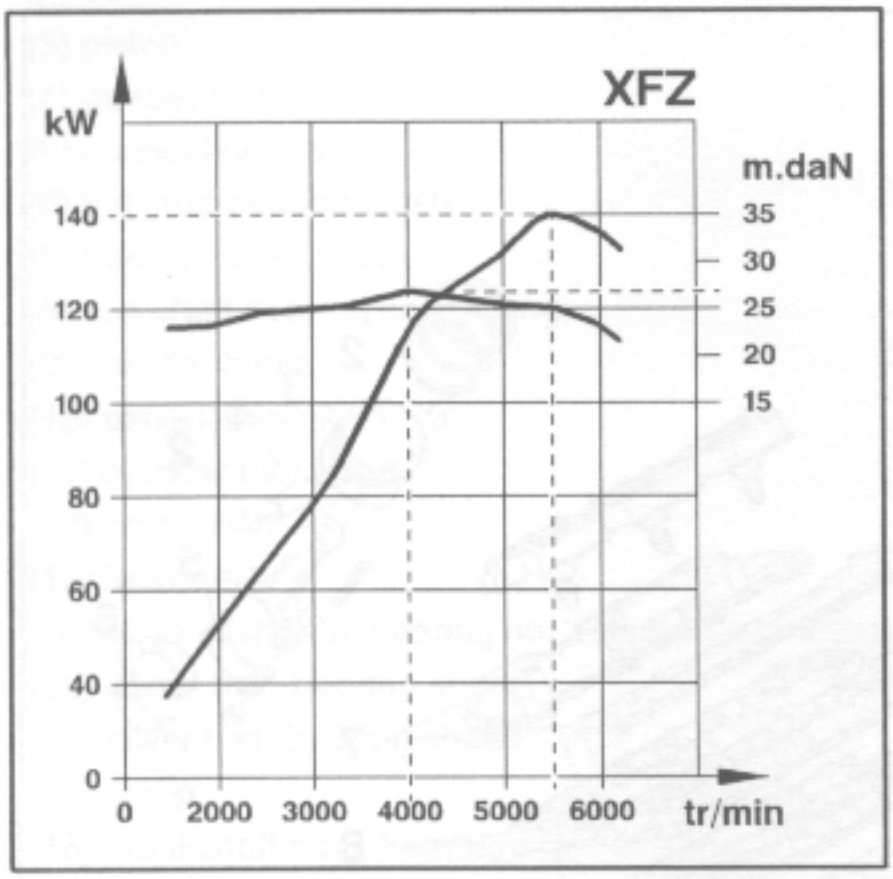


Fig : E1AP046C

2 – PRINCIPAL CONSTRUCTION FEATURES OF THE ES9J4 ENGINE

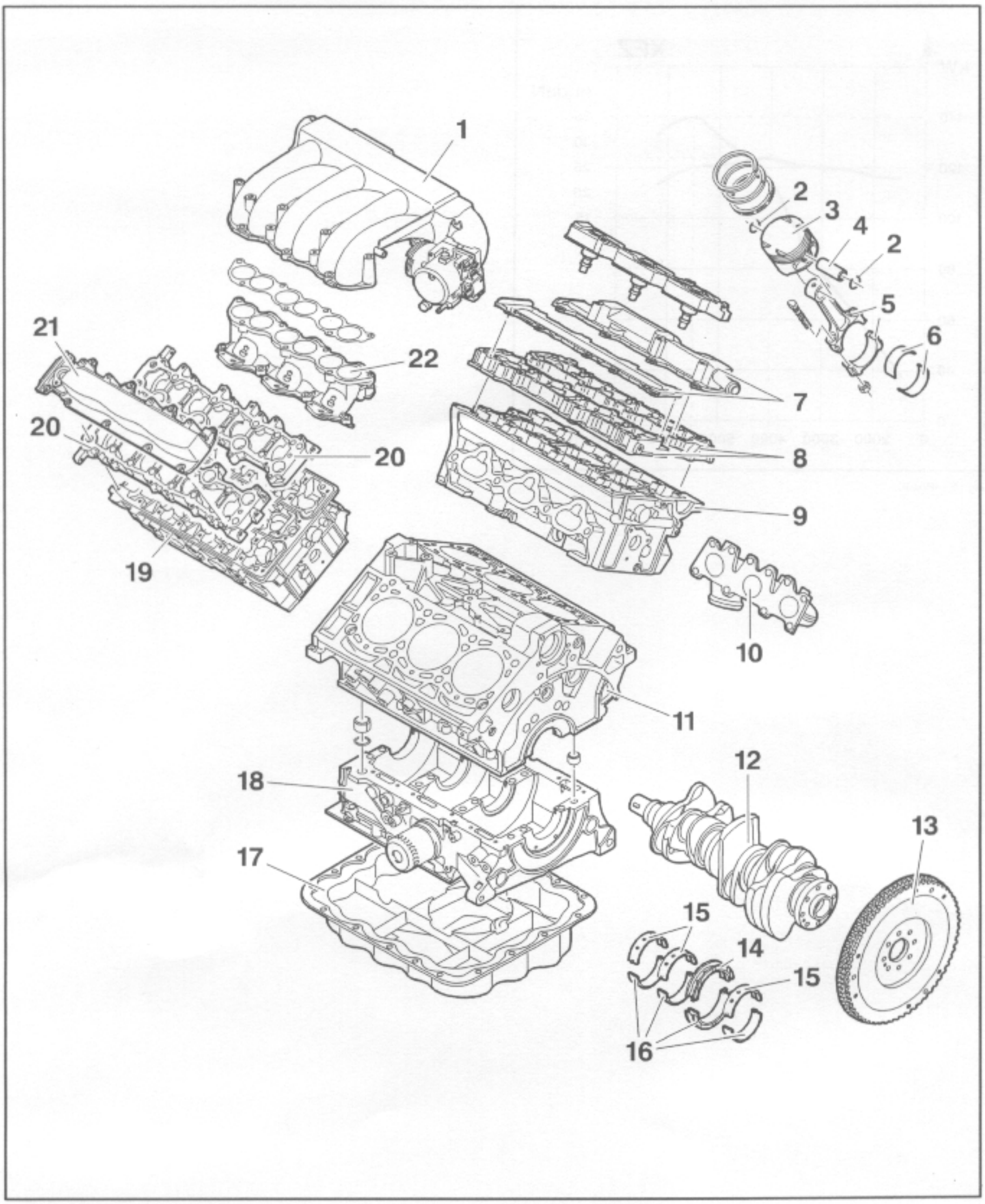


Fig : B1BP1LCP

(1) inlet manifold.
(2) circlip.
(3) piston.
(4) gudgeon pin.
(5) connecting rod.
(6) big–end bearing shells.
(7) cylinder head cover.
(8) camshaft bearing cap casing.
(9) cylinder head.
(10) exhaust manifold.
(11) cylinder block.
(12) crankshaft.
(13) flywheel.
(14) bearing shell on bearing no. 2 (end stop bearing).
(15) upper half–bearing shells.
(16) lower half–bearing shells.
(17) sump.
(18) crankshaft main bearing cap casing.
(19) cylinder head.
(20) cylinder head cover.
(21) camshaft bearing carriers.
(22) inlet manifold.

3 – CYLINDER BLOCK

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.

3.1 – Reciprocating gear

3.1.1 – Crankshaft

It is a 4 bearing steel crankshaft.

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

3.1.2 – 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.

3.1.3 – 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.

3.2 – Cylinder head unit

3.2.1 – Camshaft bearing cap casings

The camshaft bearing cap casings are in light alloy.

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

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

3.2.2 – 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 (Compact Coil Unit) ignition coil assembly.

The rear cylinder head houses the ignition HT harness cassette.

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

3.2.3 – The camshafts

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

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

The camshaft is pegged using the keyed hubs on the shafts.

3.3 – Lubrication circuit

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

The oil pump is driven on the end of the crankshaft by two lugs (timing side).

3.4 – Auxiliary equipment drive

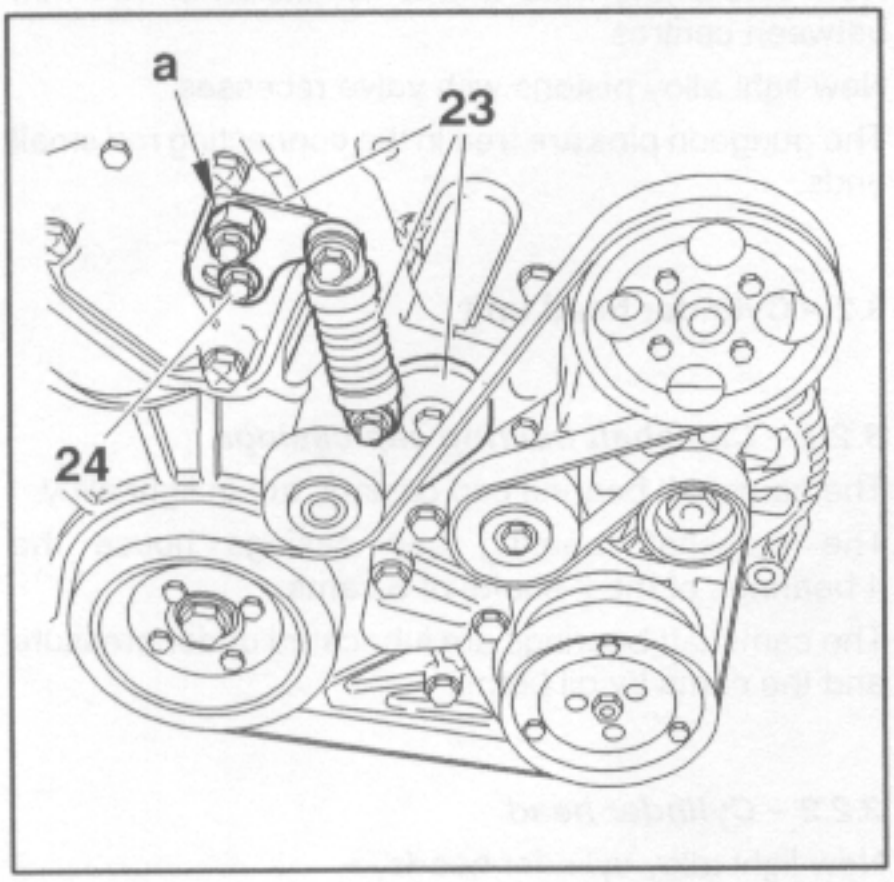


Fig : B1BP1LDC

The auxiliary equipment drive belt is automatically tensioned by a dynamic tensioner (23).

Replacing the belt requires the bolt (24) and nut "a" to be adjusted.

3.5 – Timing gear

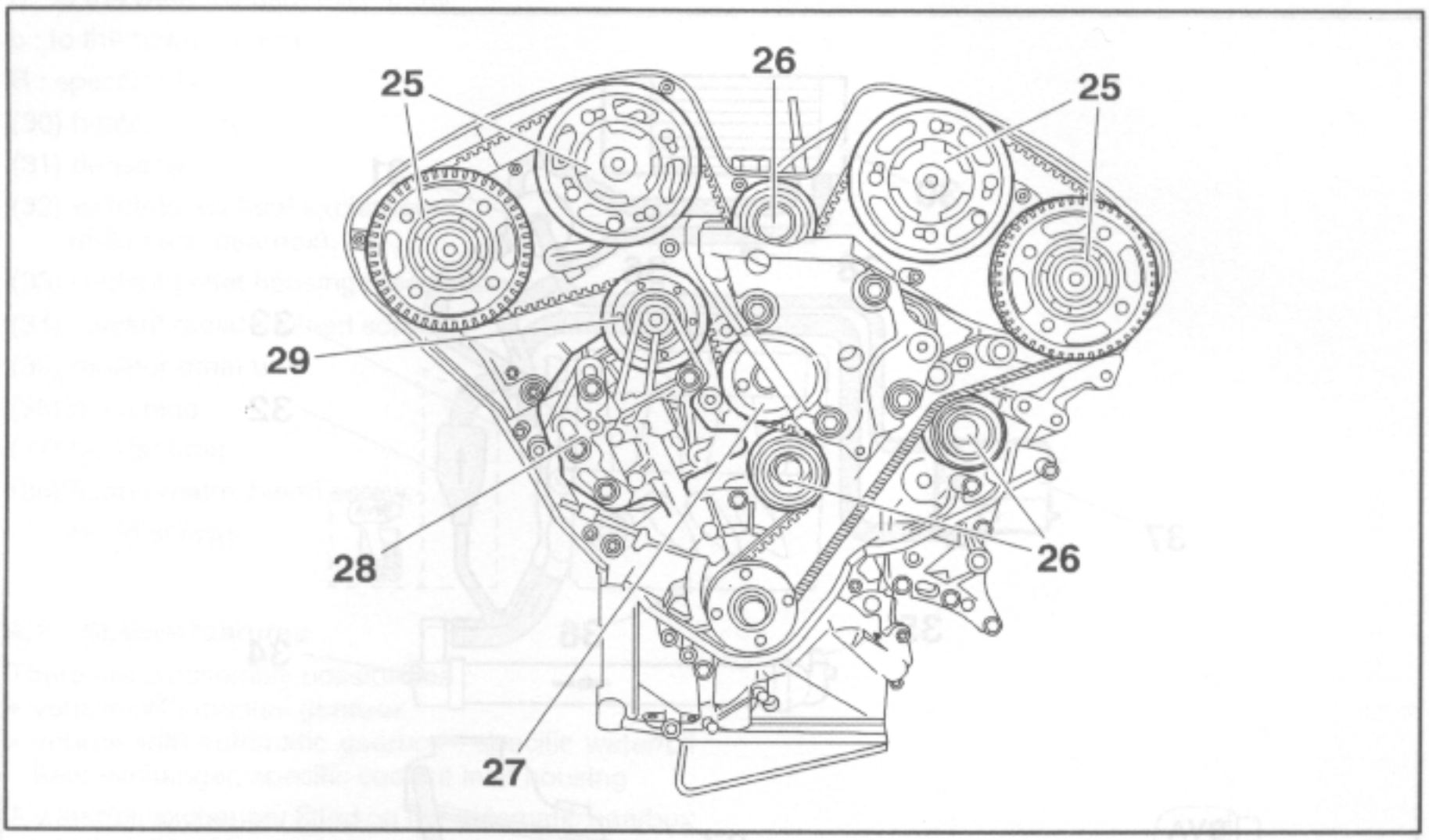


Fig : B1BP1LED

(25) camshaft gear wheel.

(26) roller tensioner.

(27) water pump drive pinion.

(28) dynamic tensioner.

(29) roller tensioner.

The timing gear comprises 4 direct operation camshafts.

The camshaft is pegged using the keyed hubs on the shafts.

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 belt is tensioned by the roller (29) of the dynamic tensioner (28).

4 – COOLING SYSTEM

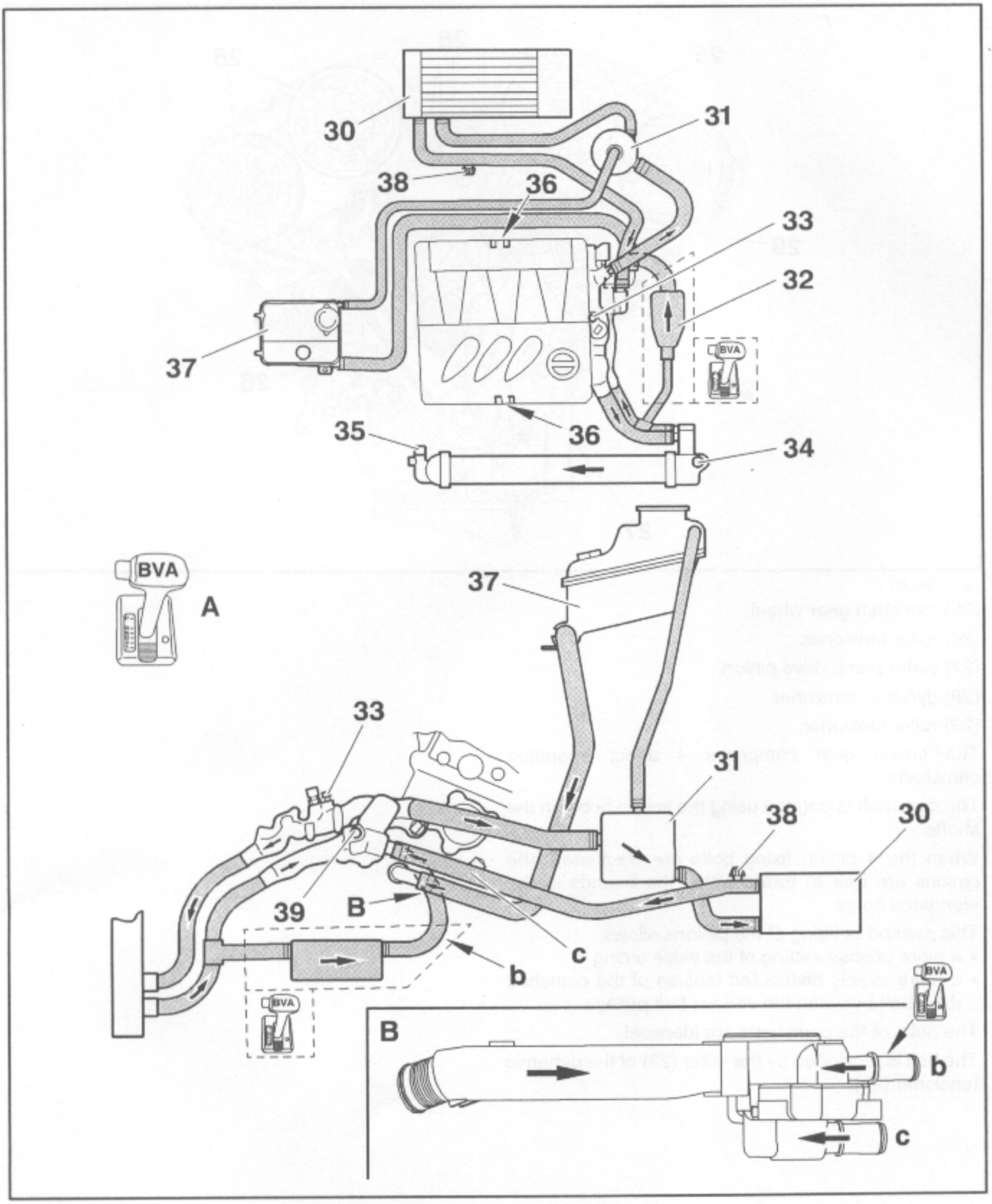


Fig : B1GP05UP

A : specific 4HP20.
b : to the water/oil heat exchanger.
c : to the heater matrix
B : specific 4HP20.
(30) heater matrix.
(31) degasser.
(32) water–to–oil heat exchanger (automatic gearbox).
(33) coolant outlet housing bleed screw.
(34) coolant radiator bleed screw.
(35) radiator drain tap.
(36) drain plug.
(37) header tank.
(38) heater matrix bleed screw.
(39) bleed screws.

4.1 – Special features

There are 2 assembly possibilities :
- vehicle with manual gearbox
- vehicle with automatic gearbox : specific water/oil heat exchanger, specific coolant inlet housing

A water/oil exchanger fitted on the automatic gearbox cools the oil inside.

The double shell water pump is incorporated into the cylinder block and driven by the timing belt.

The coolant inlets and outlets are grouped together on the clutch side.

4.2 – Data

	Manual gearbox	Automatic gearbox
Total capacity of the system	9.4 litres	
Radiator surface area	25 dm2	
Pressure setting	1.4 bar (purple cap)	
Thermostat opening at	82 °C	

Fans :

	Without air conditioning	With air conditioning
Number x electrical power	2 x 200 W	2 x 310 W

NOTE : The 2 fans are controlled by the coolant temperature housing.

4.3 – Water temperature sensors

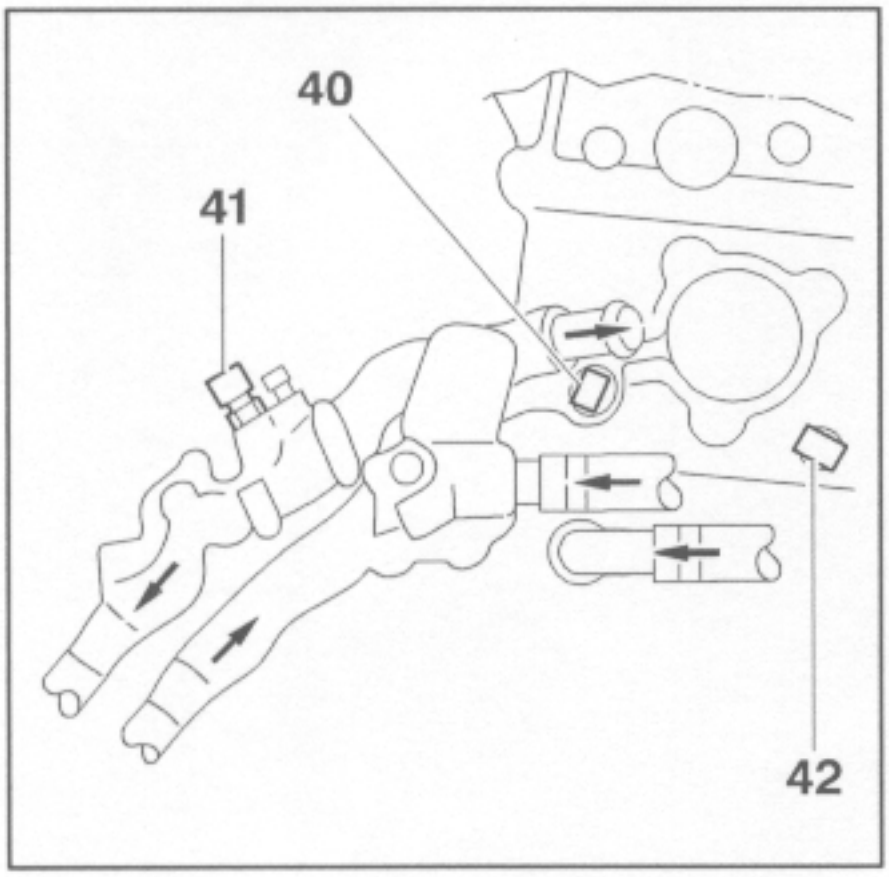


Fig : B1GP05VC

Item	40	41	42
Sensor	Temperature sensor	Temperature sensor	Temperature sensor
Data	Water temperature : BITRON water temperature control unit	Water temperature : injection	Water temperature warning
Connector colour	Brown	Green	Blue
Tightening torque	1.7 m.daN		

4.4 – Water temperature control unit

Vehicle	Without air conditioning	With air conditioning
Colour identification	Brown	Grey
Engine warm information	–	48 °C
Cooling fan unit slow speed	96 °C	
Cooling fan unit fast speed	101 °C	
Air conditioning compressor cut–out		112 °C
Pre–warning		115 °C
Warning	118 °C	
Post–ventilation engagement limit	105 °C	
Post–ventilation duration	6 minutes	

The engine cooling fans are powered for up to 6 minutes when the water temperature exceeds 105°C.

5 – FUEL SUPPLY

5.1 – Fuel rail

The supply rails are made from plastic.

The fuel pipes and the supply rails are connected with click–fit connectors.

The pulse damper and the "SCHRADER" valve (wheel type valve) are mounted on the front rail.

The pressure regulator is mounted on the rear rail.

Role of the "SCHRADER" valve :
- to bleed the supply system
- to control the flow
- to check the pressure

Twin jet injectors.

5.2 – Fuel filter

Location : on the rear subframe, R.H. side.

5.3 – Fuel vapour recycling (canister)

Location : in front of the front right hand wheel arch, behind the bumper.

The canister is bled in the intake manifold (downstream of the throttle) through the canister electrovalve, piloted by the ECU.

Canister discharge electrovalve :
- location : in front of the ECU housing
- colour : brown

5.4 – Fuel pump

Electric gear fuel pump.

Regulating pressure : 3.5 bars.

6 – INDUCTION CIRCUIT

Dry element air filter.

Idle regulation electrovalve located on the inlet manifold.

Unique throttle housing for the 2 rows of cylinders.

Air temperature sensor :
- location : on the connector between the air filter and the throttle housing
- identification : grey 2–way connector

Aluminium alloy inlet manifold.

The complex internal shape of the inlet manifold allows a high torque at low engine speeds and a progressive torque curve to be obtained.

7 – INJECTION SYSTEM

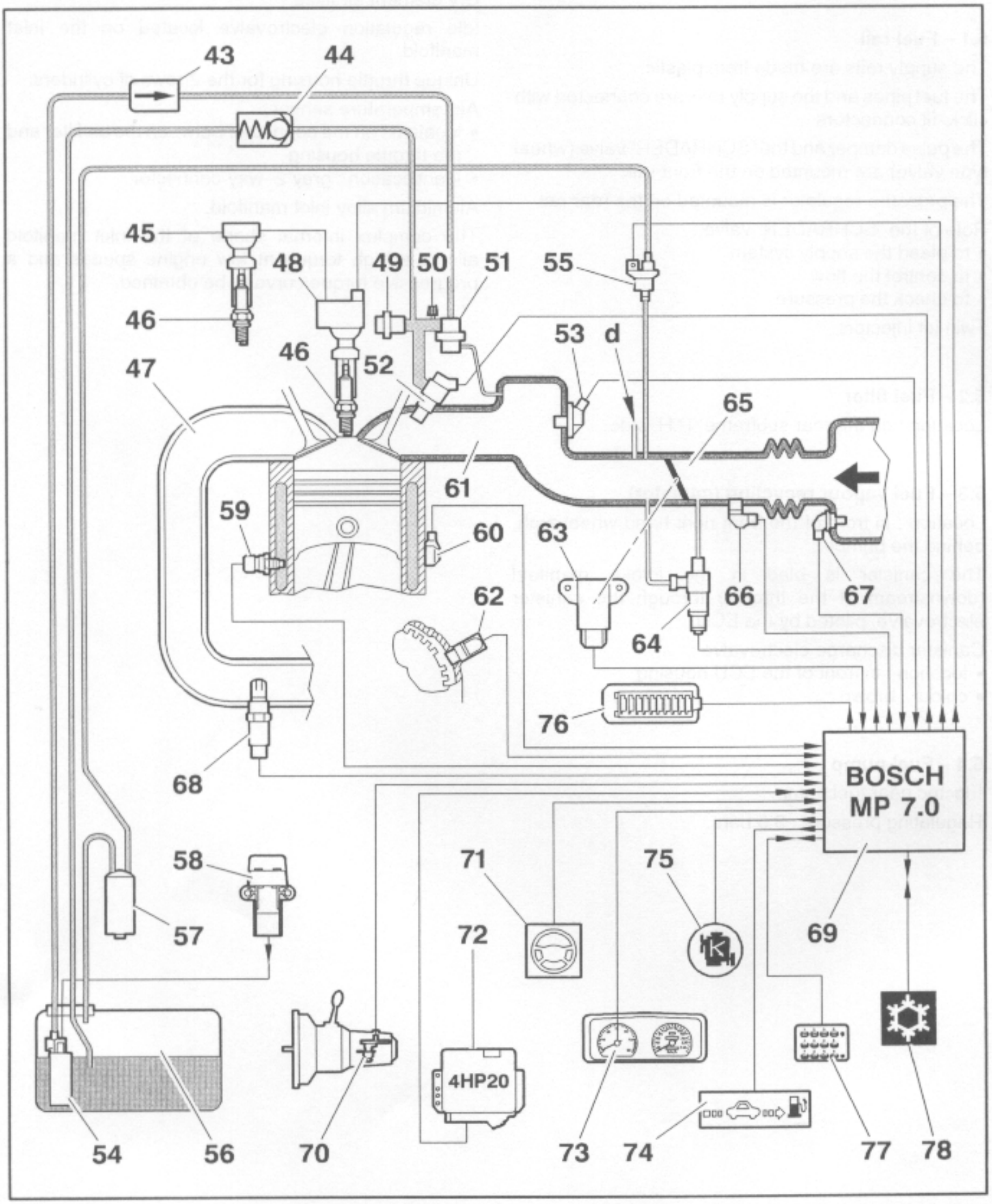


Fig : B1HP0U8P

(43) fuel filter.
(44) one–way valve.
(45) ignition cassette on the rear cylinder head.
(46) sparking plugs.
(47) exhaust manifold.
(48) block of three coils on the front cylinder head.
(49) pulsation damper.
(50) SCHRADER valve.
(51) fuel pressure regulator.
(52) injectors.
(53) inlet manifold pressure sensor.
(54) fuel pump.
(55) canister discharge electrovalve.
(56) fuel tank.
(57) canister.
(58) inertia switch.
(59) engine coolant temperature sensor.
(60) knock sensor.
(61) inlet manifold.
(62) position and speed sensor.
(63) throttle axle potentiometer.
(64) idling regulation electrovalve.
(65) throttle housing.
(66) throttle housing heating element.
(67) air temperature sensor.
(68) oxygen sensor.
(69) ignition injection control unit.
(70) vehicle speed sensor.
(71) power–assisted steering pressure switch.
(72) automatic gearbox ECU.
(73) tachometer.
(74) trip computer.
(75) diagnostic warning lamp.
(76) diagnostic socket.
(77) coded anti–theft keypad.
(78) air conditioning.

"d" tapping for the oil fumes recycling.

The injection and ignition are "pressure–speed" type with 2 injections and 2 sparks per engine cycle.

7.1 – Ignition system

The BBC 3.2 twin static ignition (lost spark) consists of :

- block of three coils on the front cylinder head
- ignition cassette on the rear cylinder head

Firing order : 1–6–3–5–2–4.

Double electrode resistive plugs.

"semi–sequential" injection BOSCH MP 7.0 (cylinders grouped 2 by 2).

7.2 – Injection

This ignition injection ECU is equipped with a "FLASH–EPROM" memory :

- this type of memory permits, in the case of a change in calibration, the memory of the ECU to be modified 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

Identification of the ECU :

Version	PSA reference	Reference of the Manufacturer	ECU software	
			Version	Indication
Manual gearbox	96 255 524 80	241290159A	1037358699	26FM0376
Automatic gearbox	96 255 525 80	241290159E	1037355192	26FD0280

WARNING : The ECUs for manual gearboxes and automatic gearboxes cannot be interchanged.

7.3 – Operation strategies

Main functions ensured by the injection ECU :

- adjustment of idling speed
- hesitation regulation as a function of load, engine speed and gear engaged
- anti–knock adjustment
- idle regulation as a function of air conditioning, power steering and battery voltage
- air conditioning on/off management
- regulation of coil charging time
- canister bleed

7.4 – Special features : idling speed

The idling speed is regulated from the following information :

- coolant temperature : 1000 rpm at 0 °C, 1200 rpm at –30 °C, 650 rpm the engine must be warm
- battery voltage : up to 1000 rpm
- refrigeration : 700 rpm
- parking

NOTE : The idling speed is not adjustable.

7.5 – Special features : automatic gearbox

The ignition injection ECU communicates with the automatic gearbox ECU to ensure an optimum operation of the gearbox and engine.

Roles :

- to improve the driveability
- increases the mechanical protection of the engine and gearbox : overspeed protection
- increased operating reliability
- to comply with emission standards

The automatic gearbox ECU receives the following information from the injection ECU :

- throttle butterfly position (kickdown)
- engine torque (instantaneous value)
- coolant temperature (only when starting the engine)
- engine speed

The injection ECU receives the gear change information from the automatic gearbox ECU.

The engine torque is reduced by retarding the ignition according to a pre–programmed table.

Idle speed compensation through the information supplied to the injection–ignition ECU.

IMPERATIVE : In the event of abnormal vehicle behaviour and before repairing the injection system, always ensure there are no faults in the automatic gearbox ECU.

8 – EXHAUST

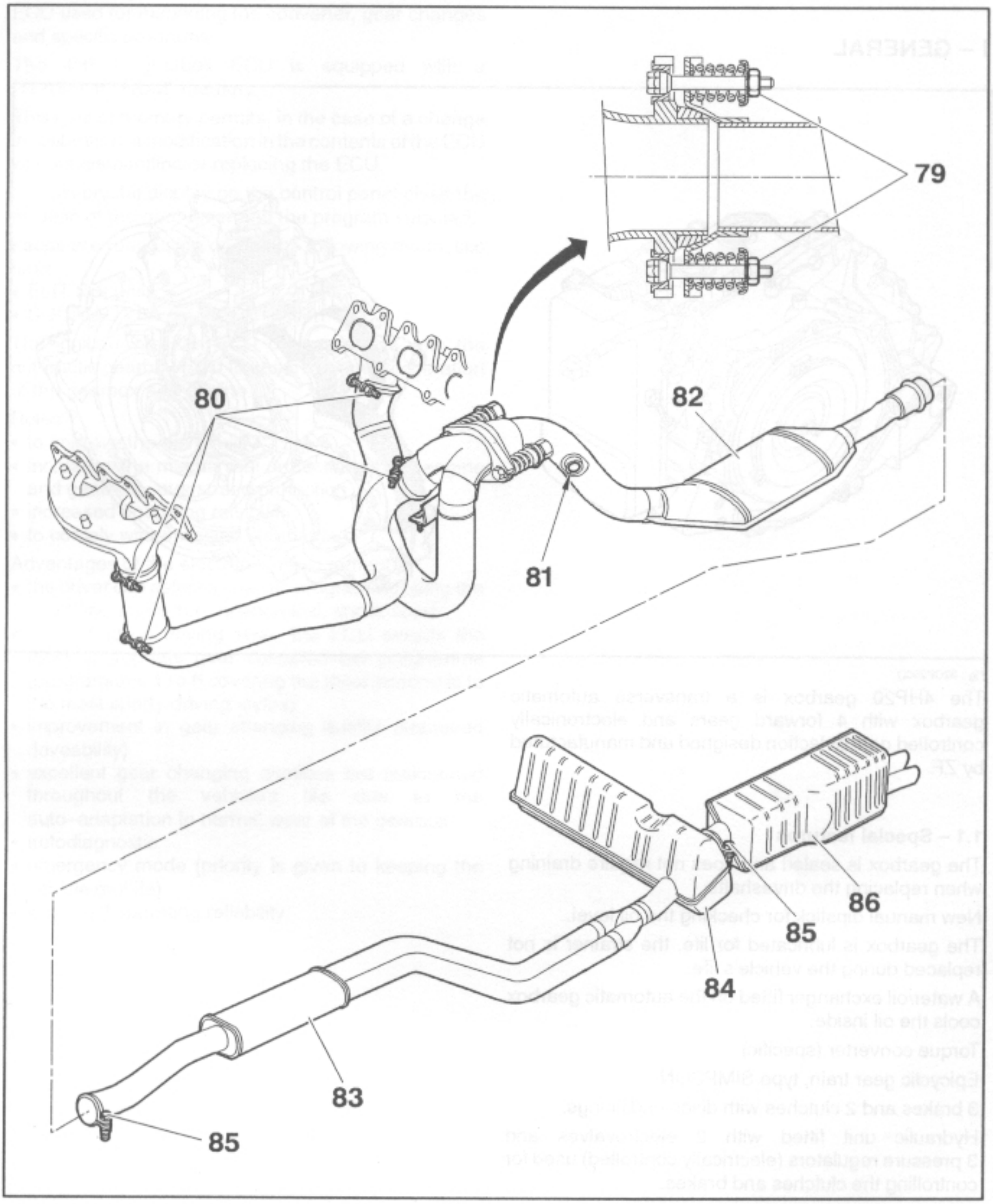


Fig : B1JP01PP

(81) oxygen sensor (PSA).
(82) catalytic converter (PSA 3351).
(83) intermediate silencer (PSA 4122).
(84) transverse silencer (PSA 4123).
(86) double nozzle rear silencer.

NOTE : The rear silencers of saloon and estate vehicles can be distinguished by the length of the outlet pipes.

Tightening torques :
- tighten the bolts (80) and (85) to 2.5 m.daN
- tighten the bolts (79) to 0.9 m.daN

NOTE : The catalytic converter is impregnated with 50 grammes of precious metals.

PRESENTATION : 4HP20 AUTOMATIC GEARBOX

1 – GENERAL

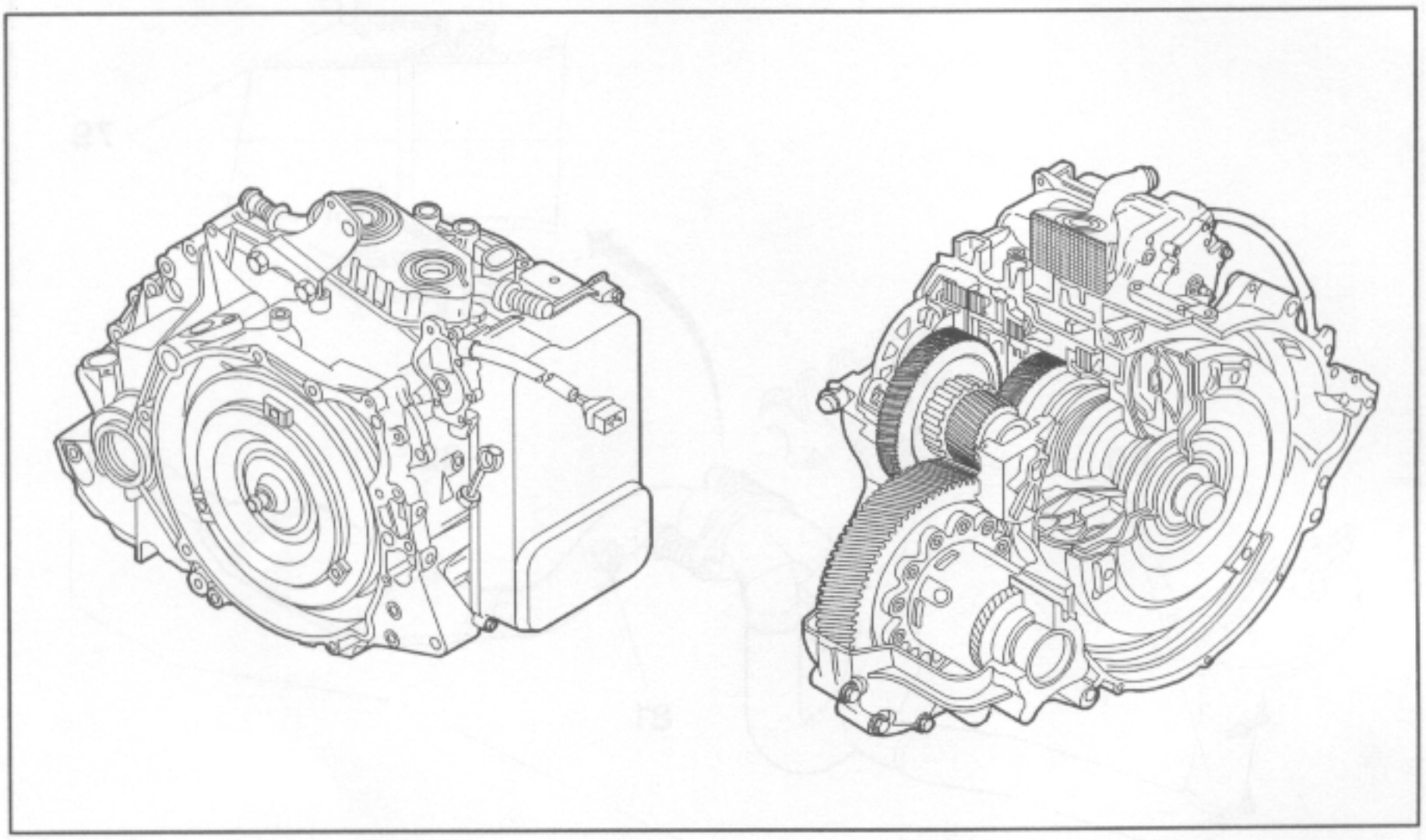


Fig : B2CP290D

The 4HP20 gearbox is a transverse automatic gearbox with 4 forward gears and electronically controlled gear selection designed and manufactured by ZF.

1.1 – Special features

The gearbox is sealed and does not require draining when replacing the driveshafts.

New manual dipstick for checking the oil level.

The gearbox is lubricated for life, the strainer is not replaced during the vehicle's life.

A water/oil exchanger fitted on the automatic gearbox cools the oil inside.

Torque converter (specific).

Epicyclic gear train, type SIMPSON.

3 brakes and 2 clutches with discs and linings.

Hydraulic unit fitted with 2 electrovalves and 3 pressure regulators (electrically controlled) used for controlling the clutches and brakes.

WARNING : The gearbox uses a new type of oil (synthetic).

1.2 – Electronic gearbox management

The 4HP20 gearbox is fitted with an auto–adaptive ECU used for managing the converter, gear changes and specific programs.

The 4HP20 gearbox 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.

A liquid crystal display on the control panel gives the position of the gear lever and the program selected.

Faults are read using one of the following diagnostic tools :

- ELIT test unit
- SOURIAU 26A diagnostic station

The ignition injection ECU communicates with the automatic gearbox ECU to ensure optimum operation of the gearbox and engine.

Roles :

- to improve the driveability
- increases the mechanical protection of the engine and gearbox : overspeed protection
- increased operating reliability
- to comply with emission standards

Advantages of the electronic management :

- the driver can select a specific programme using the sport/snow selector : economical, snow, sport
- depending on driving style, the ECU selects the most appropriate gear selection law programme (programmes 1 to 6 covering the most economic to the most sporty driving styles)
- improvement in gear changing quality (improved driveability)
- excellent gear changing qualities are maintained throughout the vehicle's life due to the auto–adaptation to normal wear of the gearbox
- autodiagnostic
- emergency mode (priority is given to keeping the vehicle mobile)
- improved operating reliability

2 – IDENTIFICATION OF THE VEHICLES

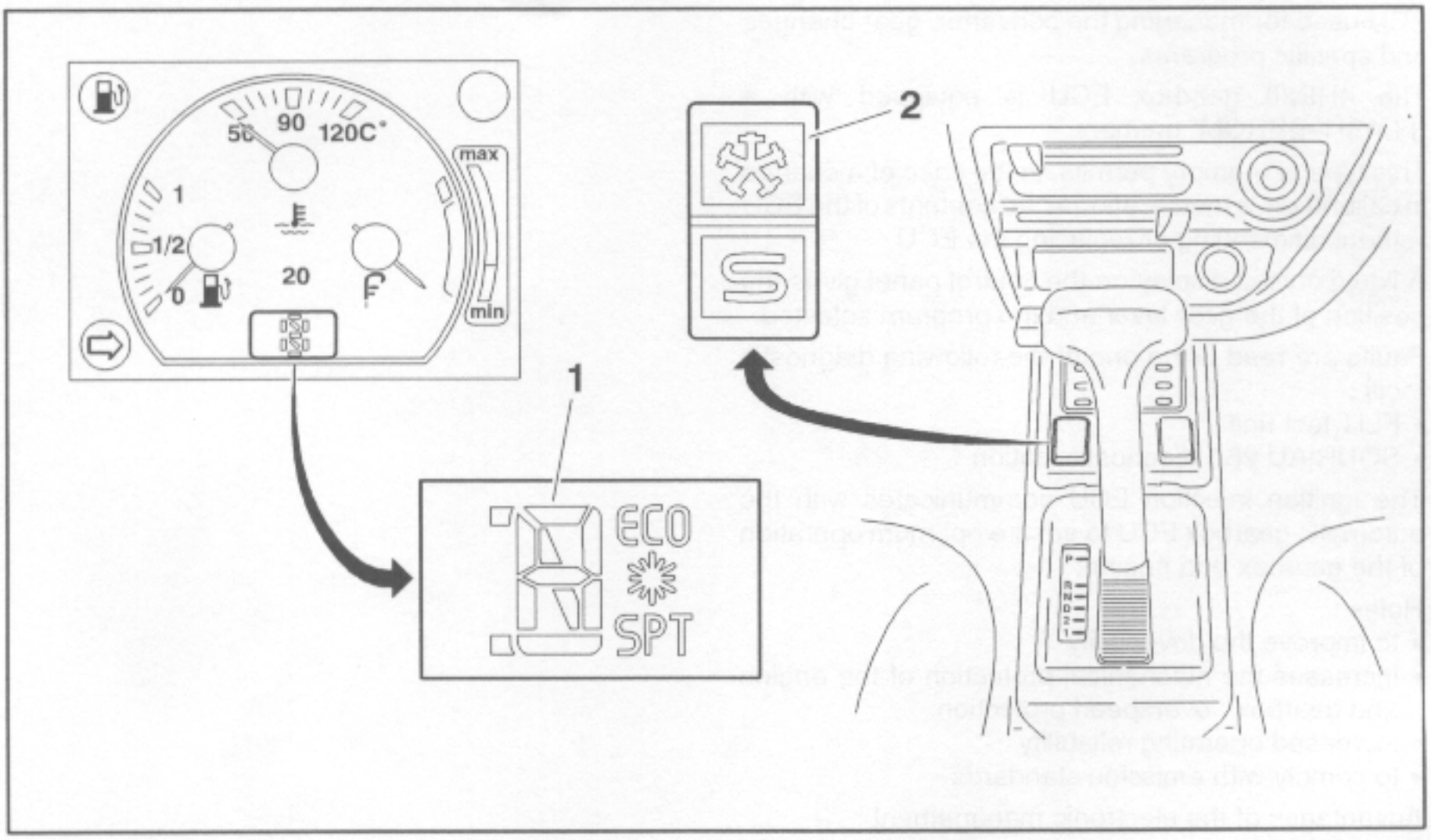


Fig : C5FP048D

(1) liquid crystal display.

(2) programme selector.

Vehicles can be identified by :

- liquid crystal display, in the instrument panel
- programme selector (located in the centre console)

A switch mounted to the left of the lever allows the driver to choose from 3 programs :

- economical (ECO)
- snow (snowflake)
- sport (SPT)

NOTE : The gear selector lever (specific) is of the same type as for vehicles fitted with the ZF 4HP18 gearbox.

3 – DIFFERENCE BETWEEN ZF 4HP18 AND ZF 4HP20 GEARBOXES

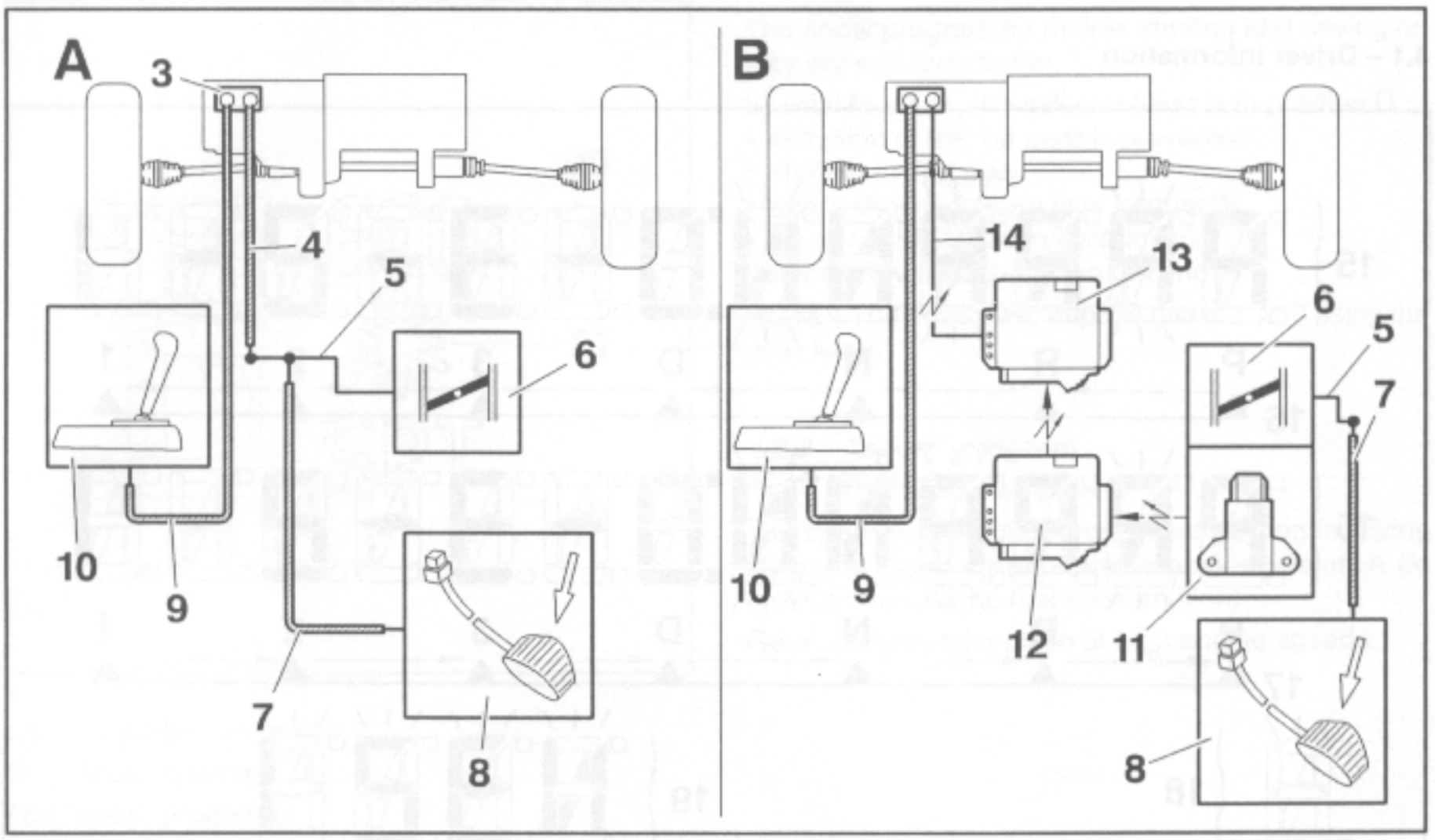


Fig : B2CP291D

A 4HP18 gearbox.
B 4HP20 gearbox.
(3) hydraulic valve block.
(4) cable (kickdown).
(5) throttle flap drive cam.
(6) throttle housing.
(7) accelerator cable.
(8) accelerator pedal.
(9) gear selection cable.
(10) gear lever.
(11) throttle potentiometer.
(12) MP 7.0 multipoint fuel injection ECU.
(13) automatic gearbox ECU.
(14) electrical harness.

Difference between ZF 4HP18 and ZF 4HP20 gearboxes :

	Automatic gearbox	
	ZF 4HP18	ZF 4HP20
Gear selector control	Cable control	
Downshift (kickdown)	Cable–driven control, with hard point (hydraulic control)	Electronic control, without hard point. The kick–down function, informed by the throttle potentiometer, is incorporated into the ECU
Display of gear selected	This information, supplied by the multifunction switch, is independent of the gearbox ECU	The instrument panel display is controlled by the gearbox ECU in accordance with the information received from the "multifunction" switch
Gearchange lever	Gears are changed by the hydraulic valve block, (hydraulic control). Gear changing thresholds determined hydraulically	Gears are changed by the hydraulic valve block, the gearbox ECU controls the electrovalves and regulators incorporated into the hydraulic valve block. Gear changing thresholds determined electronically

4 – DRIVER INFORMATION – USE

4.1 – Driver information

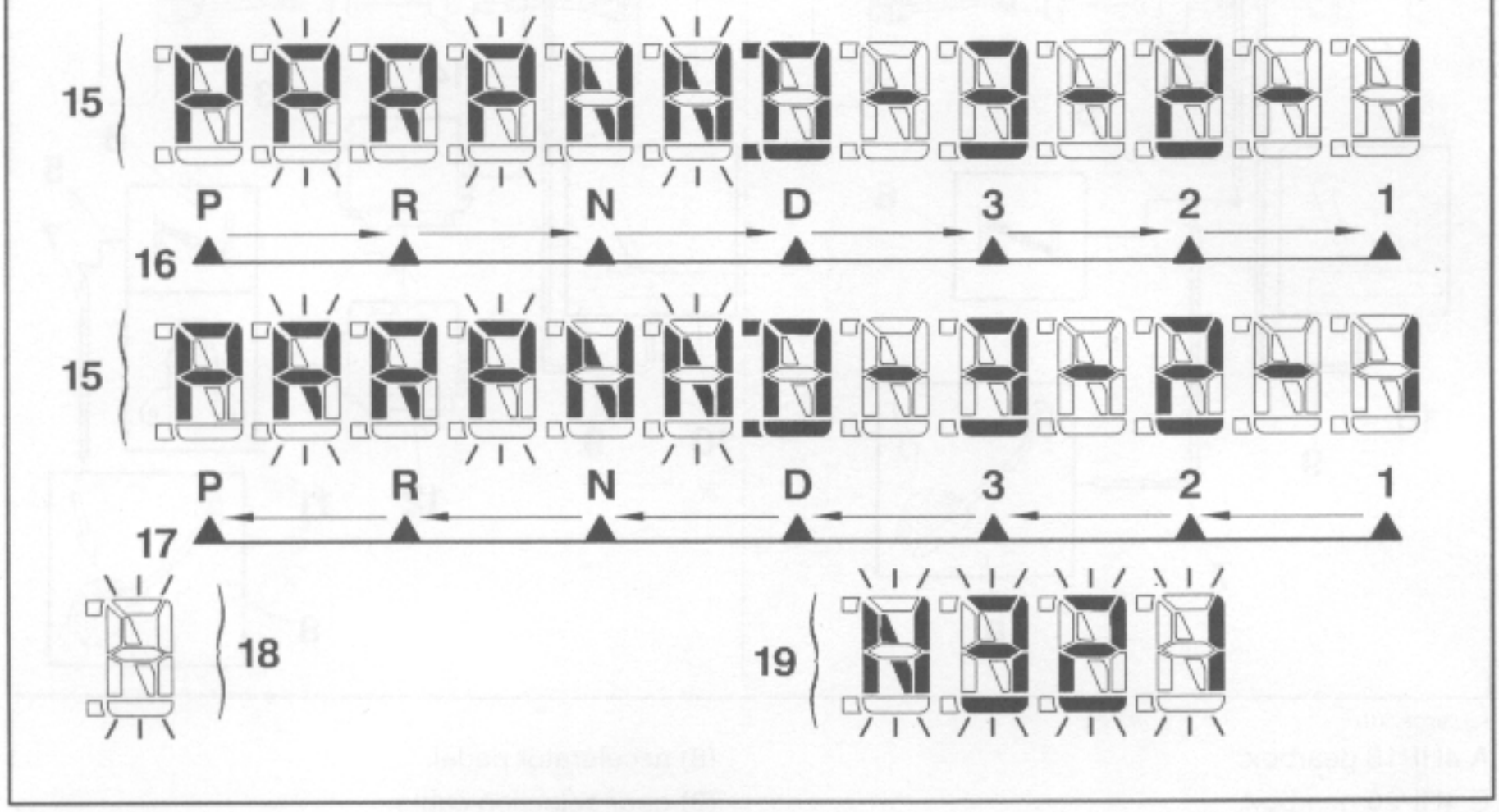


Fig : C5FP049D

(15) display of gear selected.

(16) the selection lever is moved from position P to position 1.

(17) the selection lever is moved from position 1 to position P.

(18) display flashing.

(19) display flashing : gear ratio selected but not engaged.

The instrument panel display is controlled by the gearbox ECU in accordance with the information received from the "multifunction" switch (standard connection).

When the gear lever is between two positions, a specific character is displayed on the control panel.

A gear is only engaged if the vehicle speed is compatible with the gear selected.

If a gear selected is incompatible with the vehicle speed, the gear displayed on the instrument panel flashes.

Gear engagement thresholds :

- reverse : vehicle speed lower than 10 km/h
- 3rd gear : vehicle speed lower than 165 km/h
- 2nd gear : vehicle speed lower than 110 km/h
- 1st gear : vehicle speed lower than 60 km/h

4.2 – Selection of programs

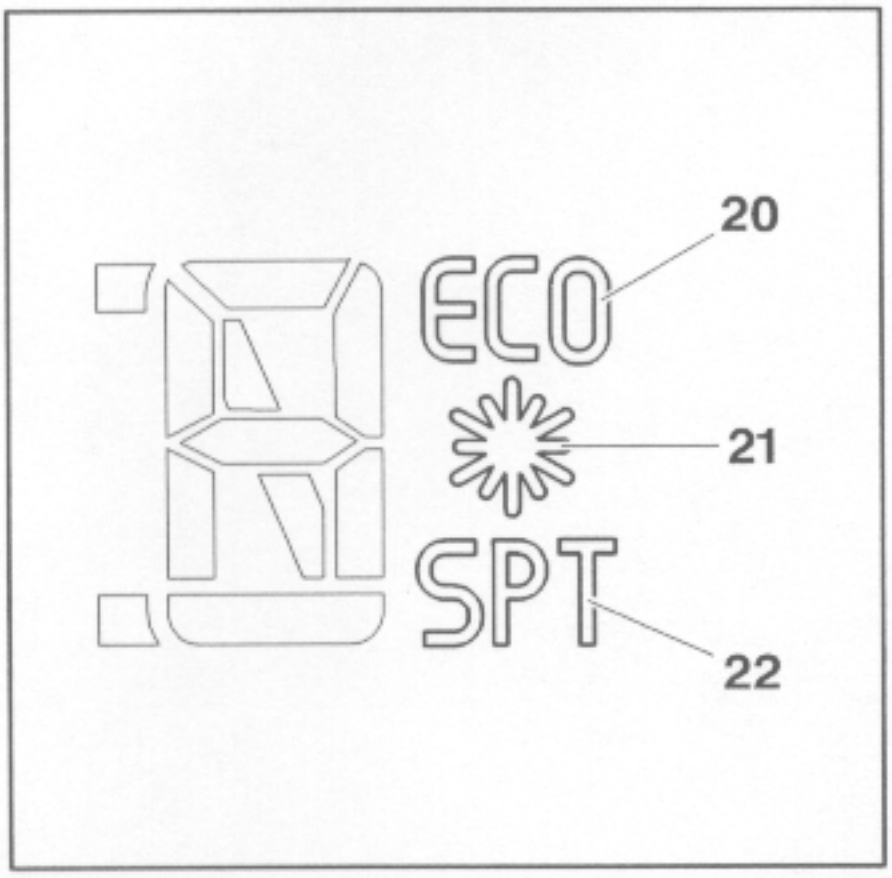


Fig : C5FP04AC

(20) "economic" program.

(21) "snow" program.

(22) "sport" program.

Every time the ignition is switched on, the system automatically selects the economic program.

The driver can select the desired program by pressing the corresponding button.

The selected program is shown on the control panel by the corresponding lamp illuminating.

The economical driving program is selected by pressing the button of the program currently activated.

4.2.1 – "economic" program

ECO (20) indicator lamp on.

Program suited to normal driving (favouring economic fuel consumption).

The ECU adapts the gearbox operation to the road, engine load and driving style.

4.2.2 – "snow" program

Indicator lamp (21) on.

The snow programme makes starting and driving on slippery surfaces easier.

Special features, the selector lever is in position D :

- selection of the 1st gear is prevented
- starting in 2nd gear
- gears changed down less frequently
- no downshift function (kickdown)
- forced downshifting when braking

NOTE : The driver may impose gears 1, 2, 3 using the gear lever.

4.2.3 – "sport" program

SPT (22) indicator lamp on.

The sport programme allows a more dynamic driving style and favours performance and acceleration (to the detriment of the fuel consumption).

Gear changes take place at high engine speeds.

5 – FAULT MANAGEMENT

5.1 – Faults display

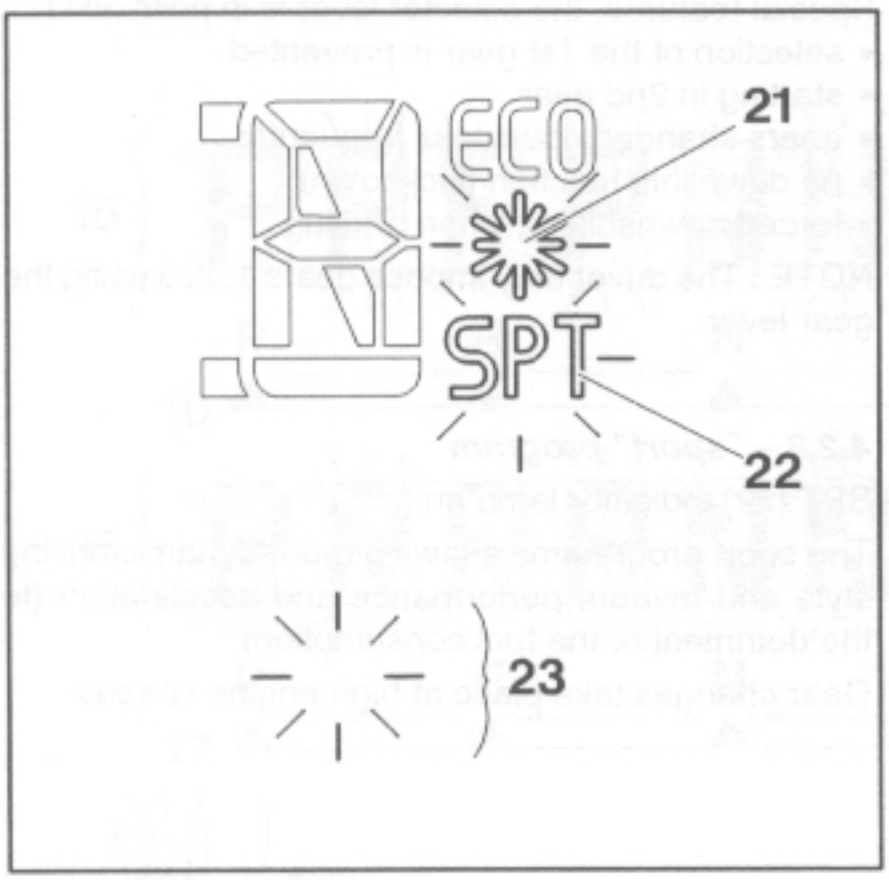


Fig : C5FP04BC

(20) "economic" program.

(21) "snow" program.

(22) "sport" program.

The "sport" and "snow" warning lamps flash simultaneously to indicate a fault.

Possible fault causes :

- break in the connection between the gearbox ECU and the instrument panel
- operating fault in the gearbox management system

5.2 – Back–up mode

In the event of a gearbox malfunction, there exist 2 possible configurations depending on the severity of the fault :

- gearbox in back–up mode with a substitute programme (the default values are used)
- gearbox in back–up mode with an emergency programme

NOTE : The gearbox therefore remains in 3rd or 4th hydraulic.

WARNING : In the emergency programme, significant snatching can be felt when shifting P/R or N/R.

6 – GENERAL ARCHITECTURE : ZF 4HP20 AUTOMATIC GEARBOX

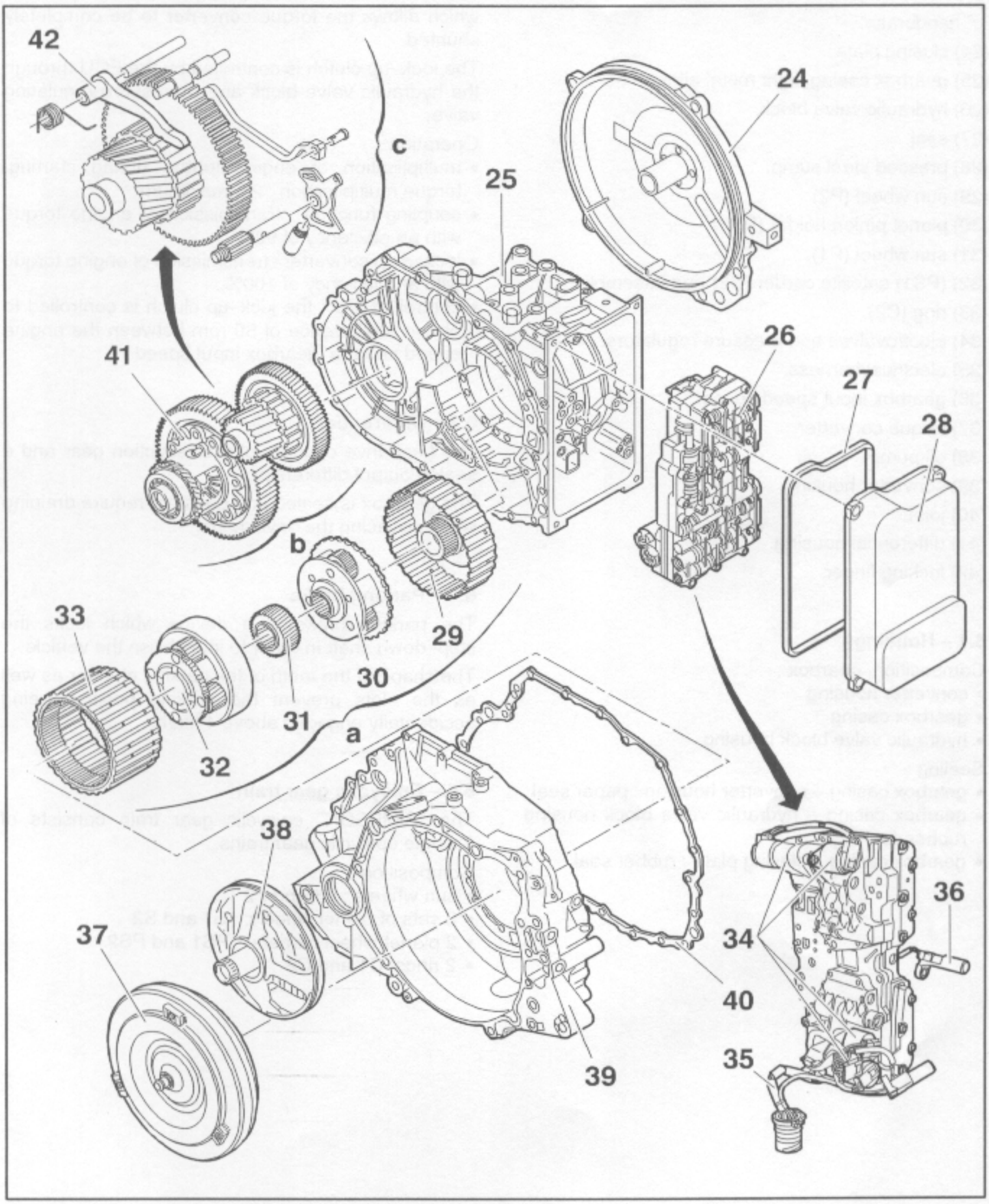


Fig : B2CP292P

"a" epicyclic gear train.
"b" reduction gear.
"c" handbrake.
(24) closing plate.
(25) gearbox casing, light metal alloy.
(26) hydraulic valve block.
(27) seal.
(28) pressed steel sump.
(29) sun wheel (P2).
(30) planet pinion holder (PS2).
(31) sun wheel (P1).
(32) (PS1) satellite carrier (C2) ring assembly.
(33) ring (C2).
(34) electrovalves and pressure regulators.
(35) electrical harness.
(36) gearbox input speed sensor.
(37) torque converter.
(38) oil pump.
(39) converter housing.
(40) joint.
(41) differential housing.
(42) locking finger.

6.1 – Housings

Composition, gearbox :
- converter housing
- gearbox casing
- hydraulic valve block housing

Sealing :
- gearbox casing – converter housing : paper seal
- gearbox casing – hydraulic valve block housing : rubber seal
- gearbox casing – closing plate : rubber seal

6.2 – Torque converter

The torque converter is fitted with a lock–up clutch which allows the torque converter to be completely shunted.

The lock–up clutch is controlled by the ECU through the hydraulic valve block and a pressure regulating valve.

Operation :
- multiplication of engine torque during starting, torque multiplication : 2.5 maximum
- coupling function : transmission of engine torque with an efficiency of 98%
- locked up converter : transmission of engine torque with an efficiency of 100%
- controlled slip : the lock–up clutch is controlled to obtain a difference of 50 rpm between the engine speed and the gearbox input speed

6.3 – Differential

The final drive consists of the reduction gear and a sealed output differential.

The gearbox is sealed and does not require draining when replacing the driveshafts.

6.4 – Parking brake

The parking brake is a device which locks the step–down shaft in order to immobilise the vehicle.

The shape of the teeth of the parking plunger as well as the slots prevent the parking position being accidentally engaged above 4 km/h.

6.5 – Epicyclic gear train

The "SIMPSON" epicyclic gear train consists of 2 single epicyclic gear trains.

Composition :
- sun wheels : P1 and P2
- 2 sets of planet wheels: : S1 and S2
- 2 planet wheel carriers: : PS1 and PS2
- 2 rings: C1 and C2

6.6 – Oil pump

Gear type oil pump with half–moon.

The oil pump is driven directly by the vehicle engine through the oil pump shaft that is integral with the converter body.

The oil flow delivered by the oil pump is proportional to the engine speed.

The pump sucks up the oil in the lower casing of the automatic gearbox through the strainer and directs it towards the hydraulic valve block.

The strainer is not replaced during the vehicle's life.

Role :

- to supply the torque converter and the control circuits : hydraulic valve block, pressure regulators, lock–up clutch, brakes and clutches
- to supply the gearbox lubricating circuit
- to cool the gearbox through oil circulation

6.7 – Brakes and clutches

System composition :

- 2 clutches
- 3 brakes

The brakes and clutches enable the selected gear to be obtained by locking or releasing one of the elements of the epicyclic gear train.

The clutches and brakes are controlled by the electrovalves and pressure regulators operated directly by the gearbox ECU.

6.8 – Hydraulic valve block

Using valves and electrovalves, the hydraulic valve block (26) supplies the clutches and brakes, in order to obtain the different gear ratios.

7 – OPERATING PRINCIPLE

7.1 – Presentation of the system

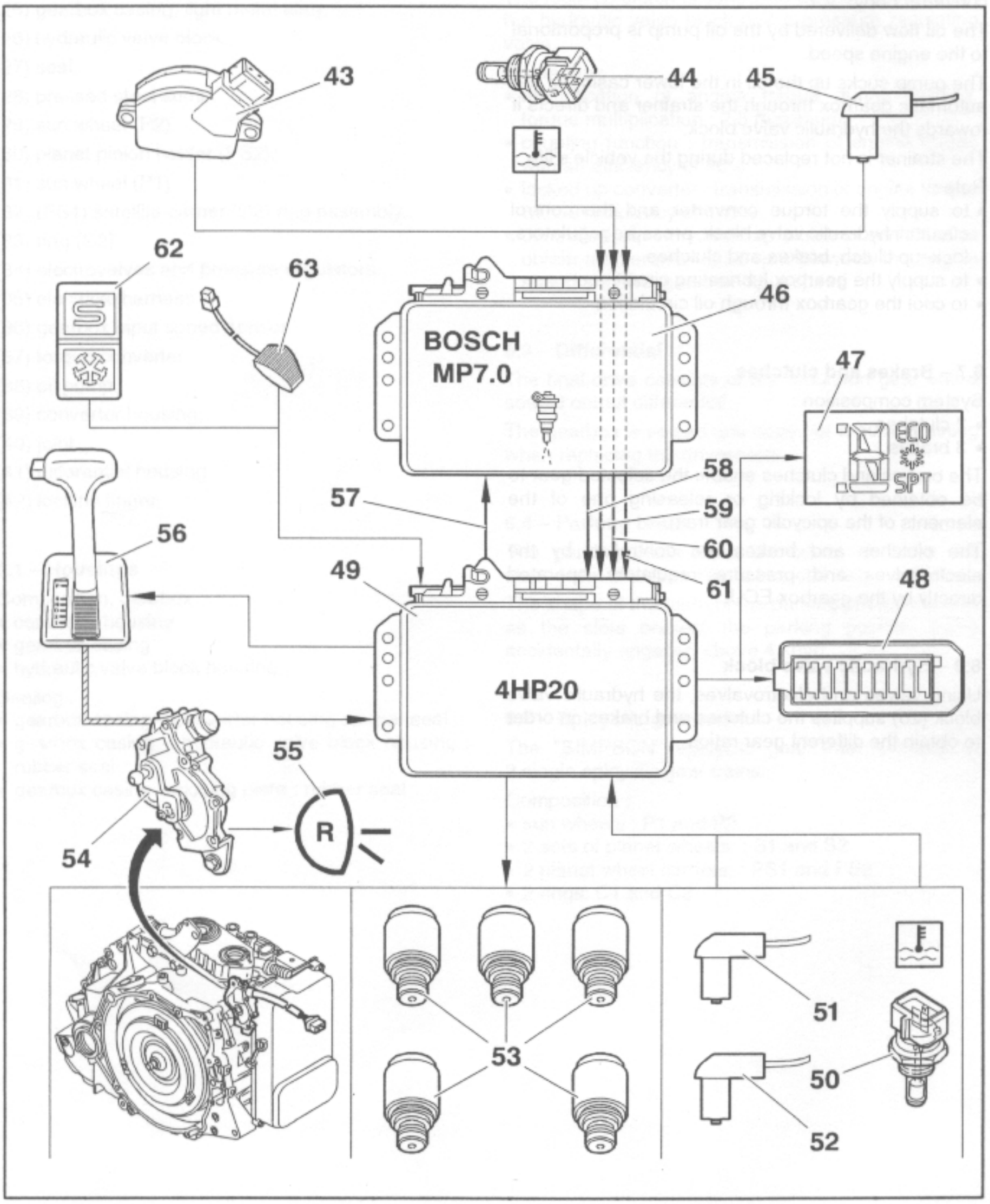


Fig : B2CP293P

(43) throttle potentiometer.
(44) coolant temperature sensor.
(45) TDC and engine speed sensor.
(46) ignition injection control unit.
(47) liquid crystal display.
(48) diagnostic socket.
(49) automatic gearbox ECU.
(50) gearbox oil temperature sensor.
(51) gearbox input speed sensor.
(52) gearbox output speed sensor.
(53) electrovalves – pressure regulators.
(54) multifunction switch.
(55) reversing lamps.
(56) gear lever.
(57) engine torque reduction signal.
(58) engine torque information via the injection ECU MP 7.0.
(59) throttle position information via the injection ECU MP 7.0.
(60) engine coolant temperature information.
(61) engine speed information.
(62) programme selector.
(63) brake pedal (braking information).

7.2 – Automatic gearbox ECU

The gearbox ECU uses the following information :
- throttle butterfly position (kickdown)
- engine torque (instantaneous value)
- coolant temperature (only when starting the engine)
- engine speed
- gearbox input speed
- gearbox output speed
- gearbox oil temperature
- position of the gear lever ("multifunction" switch)
- programme selector
- braking

ECU outputs :
- controlling the electrovalve and pressure regulators
- torque reduction command to the injection
- management of warning lamps

7.3 – Operation strategies

ECU functions :
- control and autoadaptivity of the gear and programme selection
- autoadaptivity to the vehicle driving style, road conditions and vehicle load
- torque reduction command to the injection
- changing down gears
- kickdown function (kickdown)
- torque converter control
- management of warning lamps
- autodiagnostic
- emergency mode (priority is given to keeping the vehicle mobile)

7.3.1 – Automatic gearbox starter safety device

Prevents the engine from starting in positions other than N or P.

7.3.2 – Control and autoadaptivity of the gear and programme selection

The "gearbox" ECU manages the 3 auto–adaptive programs below (chosen by the driver) :
- "economic" program
- "snow" program
- "sport" program

7.3.3 – Autoadaptivity to the vehicle driving style, road conditions and vehicle load

The ECU adapts gear changes as a function of the following elements :
- driving style
- program selected by the driver
- vehicle : no load, loaded, whilst accelerating, when decelerating
- road profile : adherence to road surface, unevenness of road
- gearbox : oil temperature, wear state
- engine : load, engine speed, temperature

7.3.4 – Changing down gears

The ECU fully controls downshifting as a function of the following parameters :
- engine load
- vehicle speed
- depending on the driving conditions

In some cases, the ECU can impose a double downshift (from 4 to 2 or from 3 to 1) or a single downshift to increase engine braking.

In some cases, downshifting may be forbidden in order to maintain engine braking.

The kick–down function, informed by the throttle potentiometer, is incorporated into the ECU.

7.3.5 – Torque reduction

The quality of the gear selection is improved by an engine torque reduction order given by the gearbox ECU to the injection ignition ECU (improved driveability).

Operating procedure :
- torque reduction command to the injection ECU
- the engine torque is reduced by retarding the ignition according to a pre–programmed table
- the automatic gearbox ECU checks the torque reduction phase by looking at the engine speed
- gearshift control

7.3.6 – Emergency mode

The "sport" and "snow" warning lamps flash simultaneously to indicate a fault.

Possible fault causes :
- break in the connection between the gearbox ECU and the control panel
- operating fault in the gearbox management system

WARNING : If there is a fault, a snatching may be experienced when engaging the lever in positions "R" or "N".

PRESENTATION : ML5T GEARBOX

New mechanical gearbox "ML5T".

The new gearbox replaces the previous model (MG5T).

Special features :

- the gearchange control is cable–operated
- hydraulic clutch control

1 – GEARBOX

1.1 – Identification

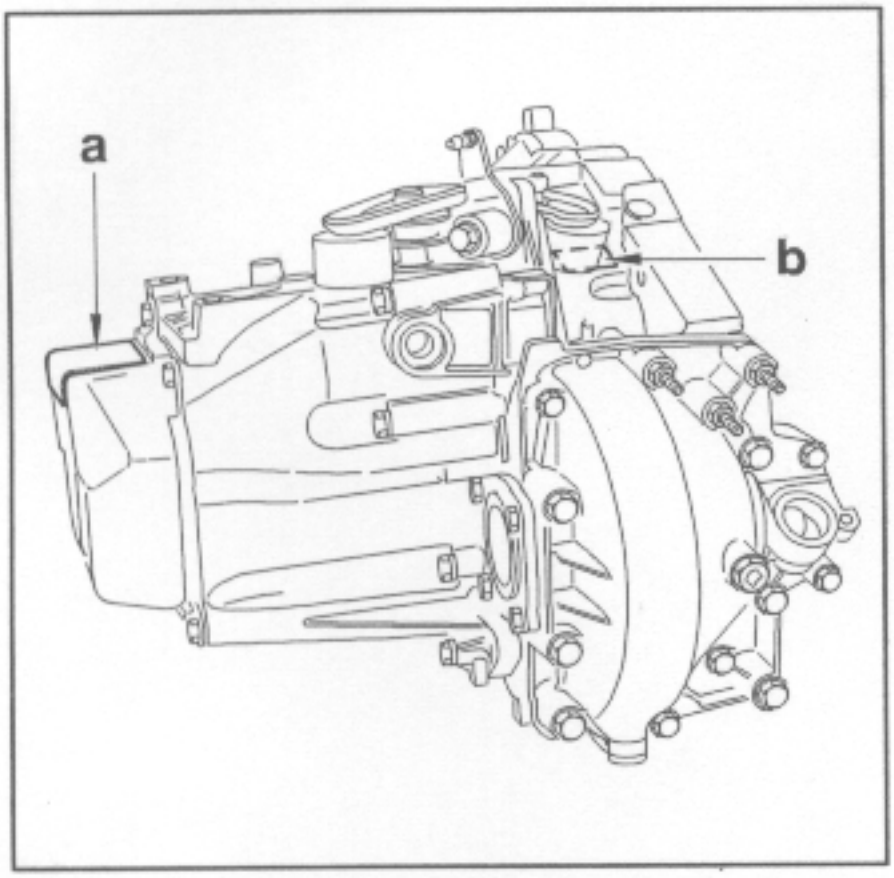


Fig : B2CP14WC

(a) identification label stuck onto cover of 5th speed.

(b) location of engraving of serial and gearbox numbers.

1.2 – Data

Vehicle		XM V6 (Saloon and Estate)
Sequence number		20LE33
Gearbox ratio	1st	12x39
	2nd	23x41
	3rd	31x37
	4th	41x37
	5th	45x33
Reverse		12x26x41
Final drive		17x71
Speedometer drive ratio		25x20

2 – HYDRAULIC CLUTCH CONTROL

Pre–filled with of hydraulic fluid, this type of control, sealed and without maintenance, allows the automatic adjustment of the clutch pedal movement (no adjustment).

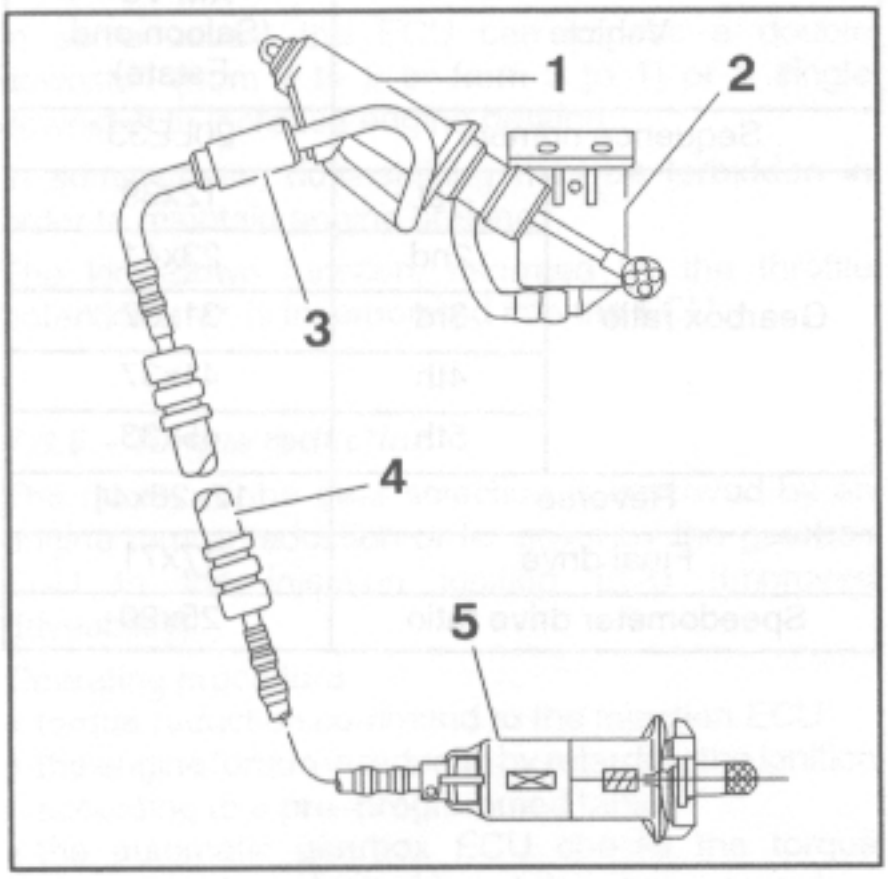


Fig : B2BR001C

Composition :

- (1) a transmitter cylinder controlled by the clutch pedal (located on pedal bracket)
- (2) reservoir (located on pedal bracket)
- (3) a quick–fit union
- (4) a transmitter–receiver connection ensured by hydraulic piping
- (5) a receiver cylinder, fastened on the clutch housing, enabling the change of position of the fork

Removing the union requires the use of a specific tool : 9040 T–H.

WARNING : The union can only be removed 4 – 5 times, do not remove unnecessarily.

Repair recommendations, see chapter :
0, XM 000–00/8, MAN 008931.

SPECIAL FEATURES : PRESSURE SOURCE AND RESERVE CIRCUIT

1 – PREAMBLE

Special features :
- SC/MAC : Citroën system for maintaining a constant ground clearance
- 6+2 piston high pressure pump (specific)
- pressure regulator
- specific steering hydraulic circuit with pressure switch and pressure regulator
- new CITROEN union on the pressure regulator

Reminder : the SC/MAC system makes it possible to limit the amount the vehicle sinks when stationary, engine off.

Operating principle : refer to the bulletin N° (XM 430–00/3) (chapter 9), MAN 008932.

2 – 6+2 PISTON HIGH PRESSURE PUMP

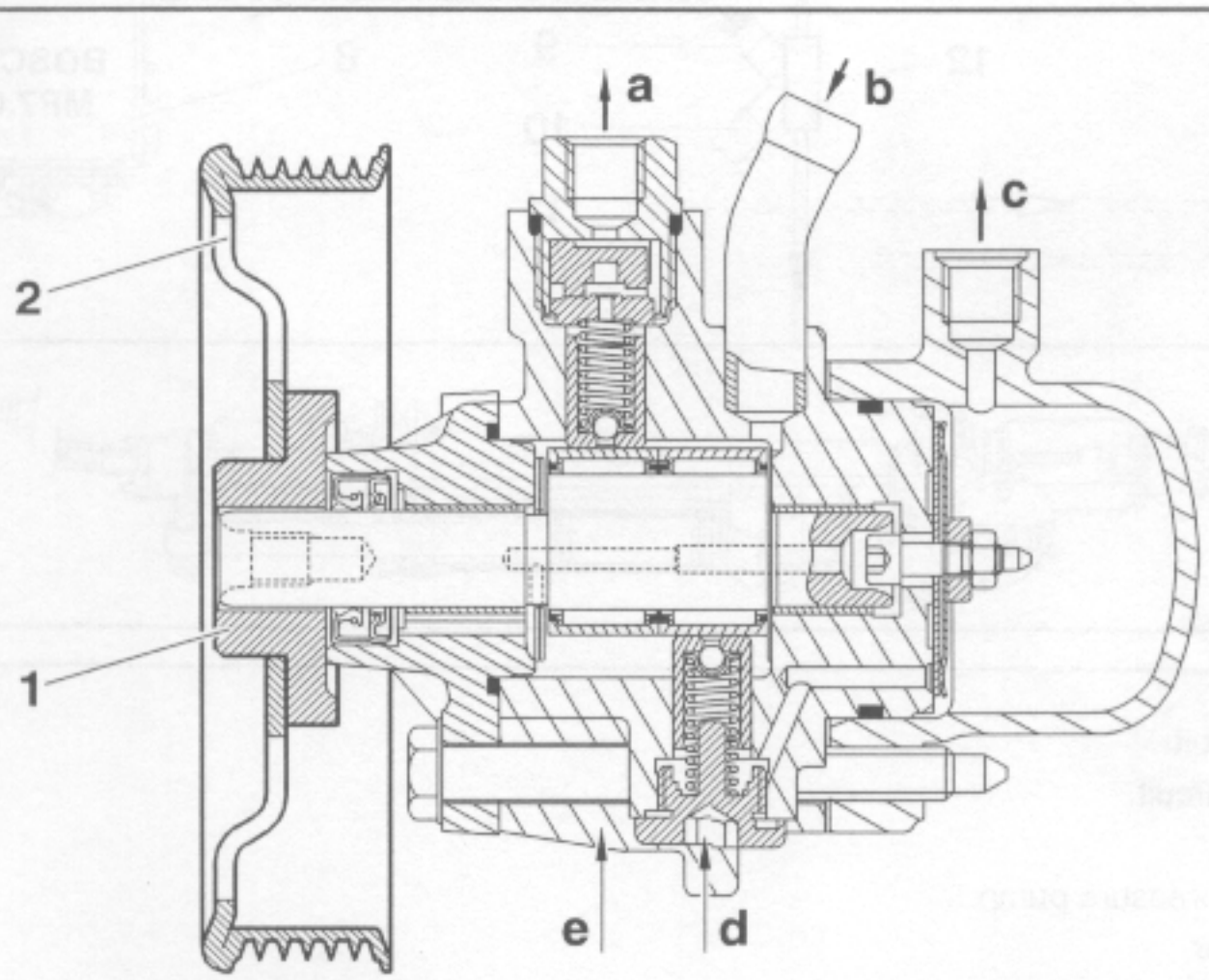


Fig : B4BP013D

"a" "suspension – brakes" outlet.

"b" suction line.

"c" "steering" output.

"d" 6 piston stage.

"e" 2 piston stage.

(1) hub.

(2) drive pulley.

Special features :
- the pulley of the high pressure pump can be removed
- hub pressed onto the pump shaft (can't be removed)
- high pressure pump without pressure regulator
- high pressure pump shaft mounted on a plastic bearing with an eccentric part fitted with needle roller bearings

3 – POWER STEERING HYDRAULIC CIRCUIT

XM V6 all types : power–assisted steering as standard.

Special features :

- the steering pressure switch allows the engine ECU to increase the engine idling speed when parking
- a pressure regulator is used to limit the pressure in the steering hydraulic circuit

3.1 – Synopsis

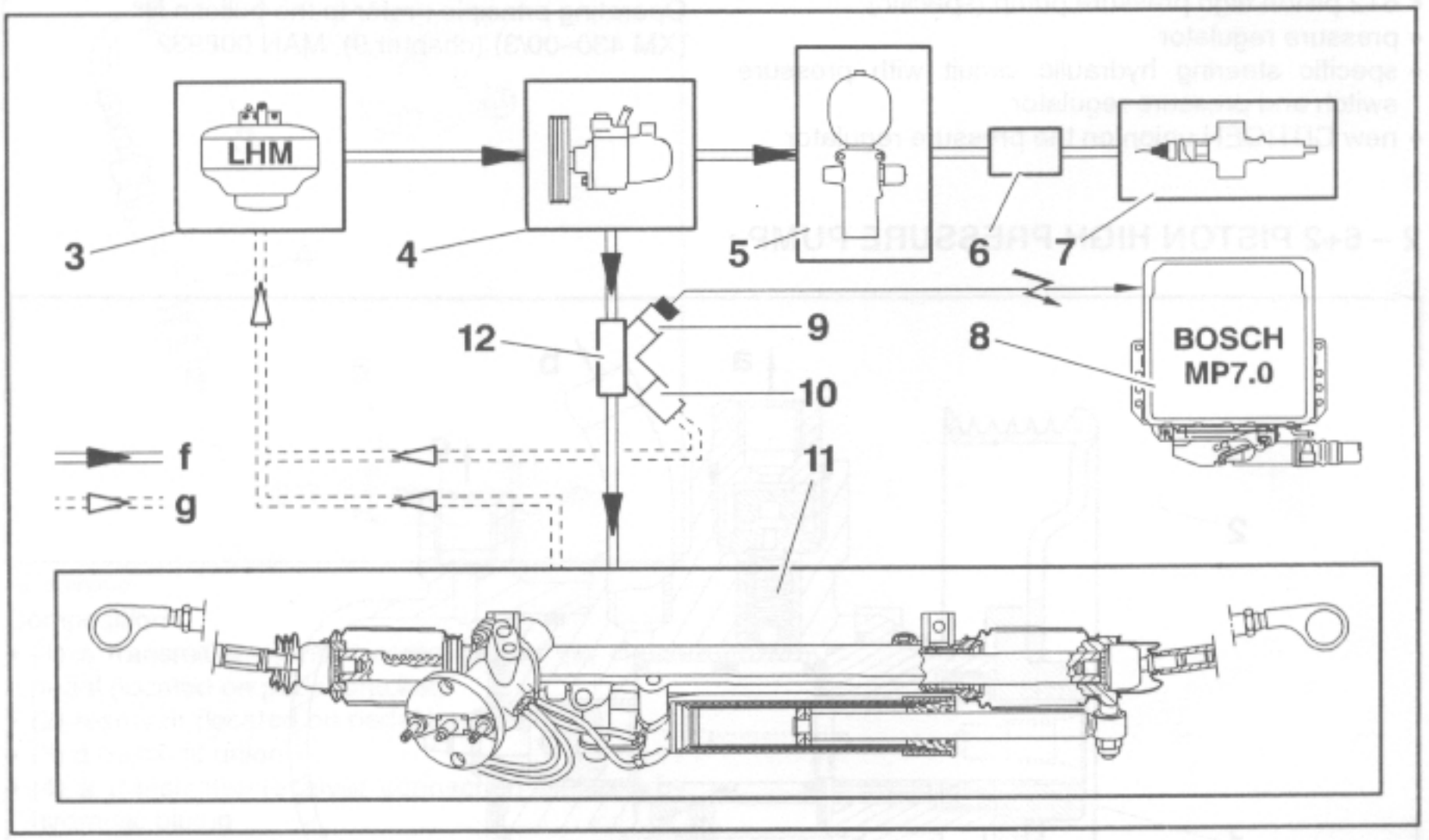


Fig : B4BP014D

"f" high pressure circuit.

"g" reservoir return circuit.

(3) reservoir.

(4) 6+2–piston high pressure pump.

(5) pressure regulator.

(6) 2–way union.

(7) security valve.

(8) ignition injection control unit.

(9) pressure switch.

(10) pressure regulator.

(11) power assisted steering.

(12) 4–way union.

Maximum circuit pressure : 160 bars.

When the steering is turned, the pressure switch informs the ECU of any pressure increase occuring at the end of the travel, in order to make up for the loss of engine speed.

Pressure switch :

- pressure lower than 10 bars : closed
- pressure higher than 20 bars : open

3.2 – Location : 4–way union

Location : to the front left of the subframe.

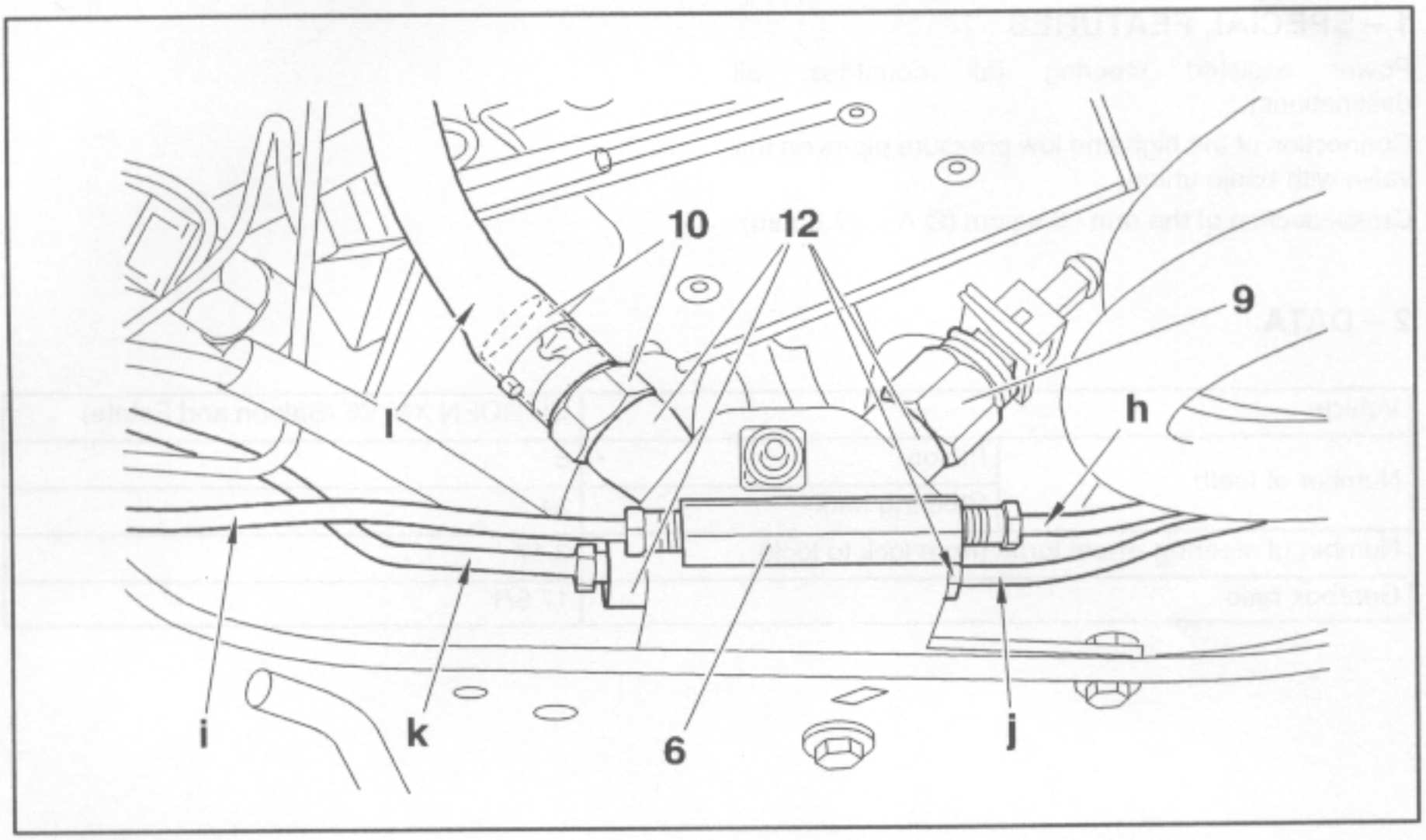


Fig : B4BP015D

"h" to high pressure pump.

"i" to safety valve.

"j" to pressure regulator.

"k" to steering valve.

"l" to reservoir.

(6) 2–way union.

(9) pressure switch.

(10) pressure regulator.

(12) 4–way union.

Tightening torques :

- pressure switch : 1.3 m.daN
- pressure regulator : 1.3 m.daN

SPECIAL FEATURES : STEERING

1 – SPECIAL FEATURES

Power assisted steering (all countries, all destinations).

Connection of the high and low pressure pipes on the valve with banjo union.

Cross–section of the ram : 6 sq.cm (Ø A = 27,6 mm).

2 – DATA

Vehicle		CITROEN XM V6 (Saloon and Estate)
Number of teeth	Pinion	8
	Steering rack	34
Number of steering wheel turns (from lock to lock)		3.17
Gearbox ratio		17.5/1

3 – TIGHTENING TORQUES

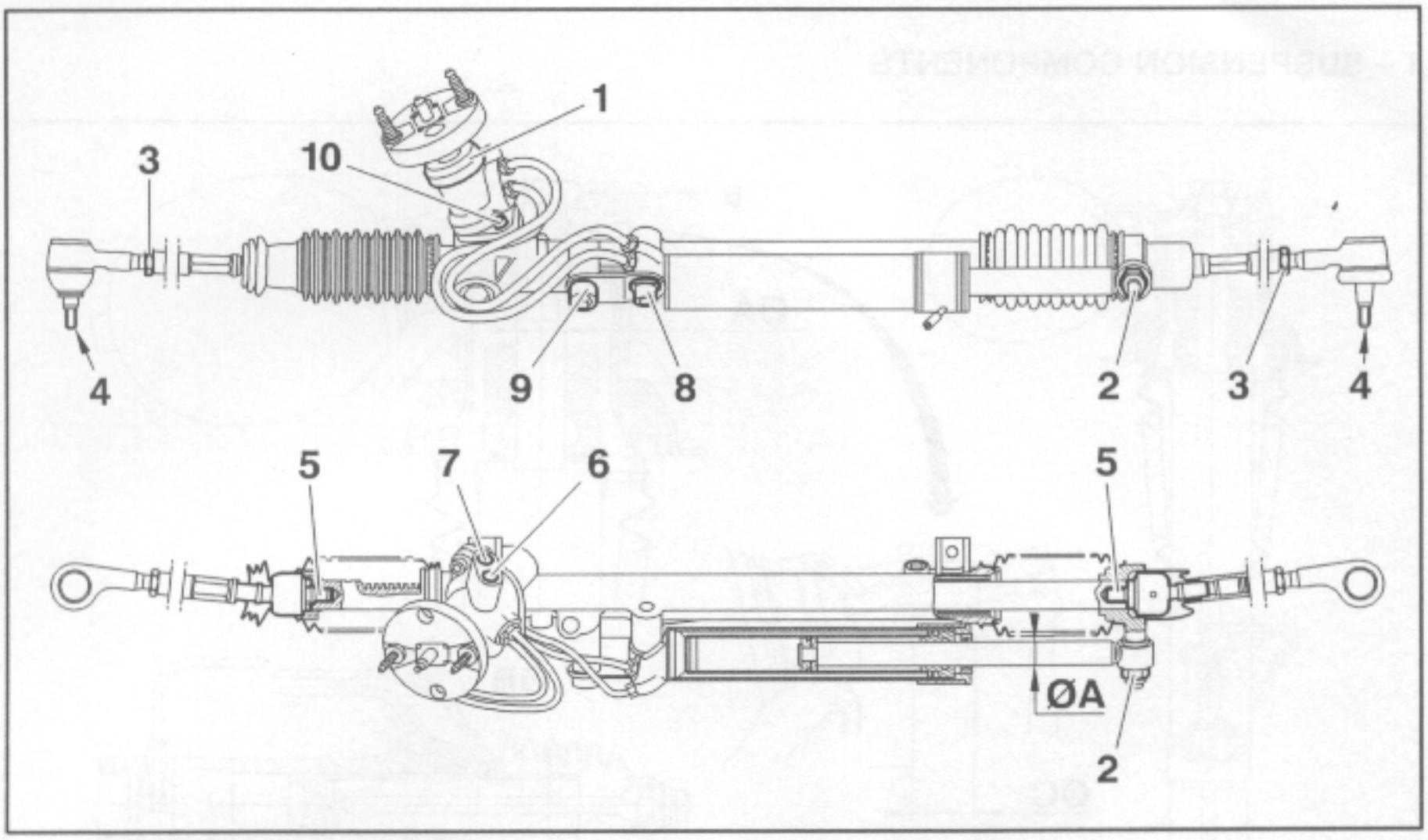


Fig : B3EP098D

(1) steering valve (yellow plastic ring).

(2) steering rack/ram fixing	9 m.daN
(3) lock nut for adjusting the steering track rods	4.5 m.daN
(4) pivot ball–joint nut	4.5 m.daN
(5) steering rack ball–joint	6 m.daN
(6) and (7) hydraulic connector on the valve (banjo union)	2 m.daN
(8) ; (9) steering system/ram fixing	New rack housing : Pre–tighten the screws to 12 m.daN Unscrew Tighten to 9 m.daN
	Reconditioned rack housing : Tighten to 9 m.daN
(10) housing/valve fixing	1.3 m.daN

SPECIAL FEATURES : SUSPENSION

1 – SUSPENSION COMPONENTS

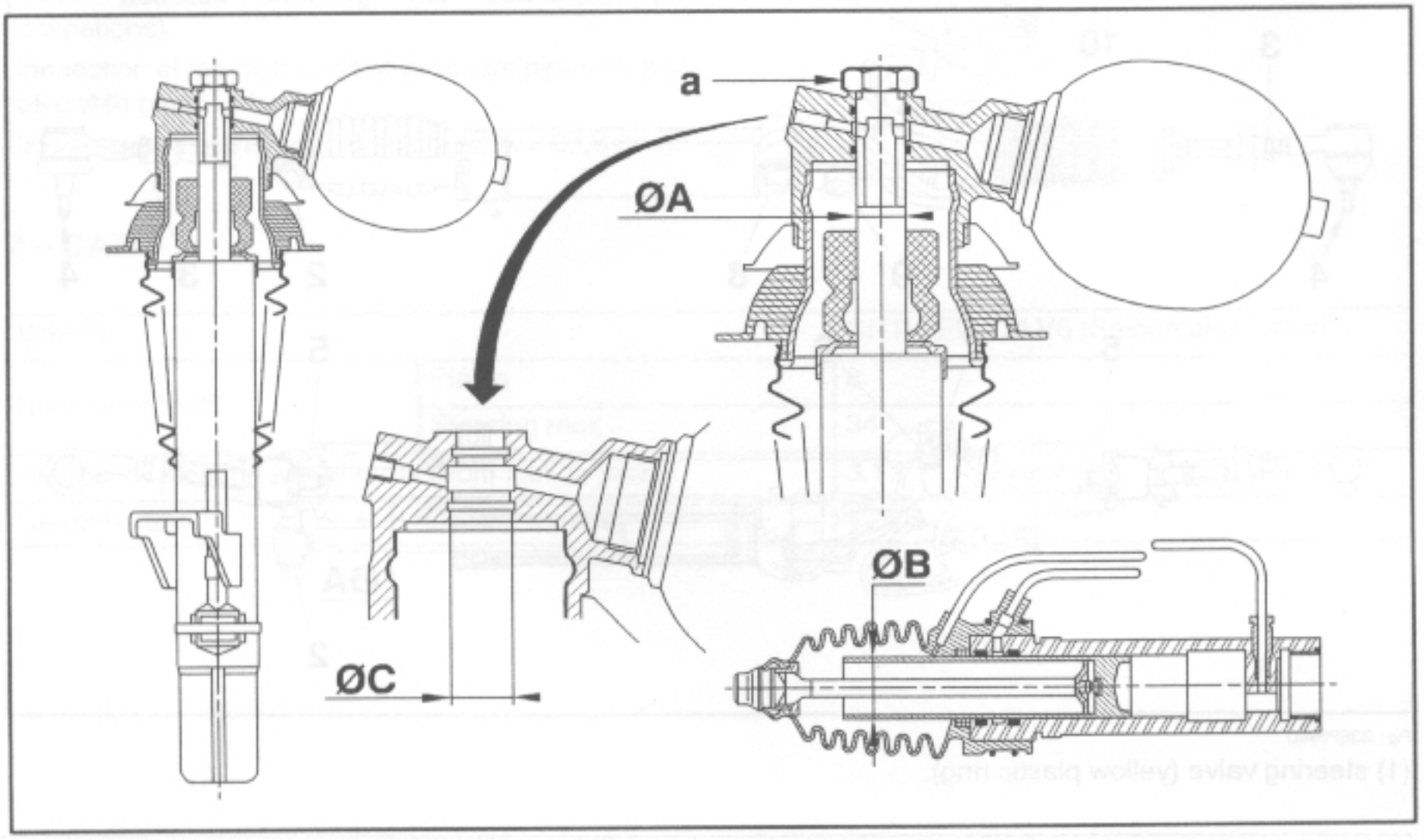


Fig : B3BP11XD

"a" nut, tightening torque : 6.5 m.daN.

1.1 – Front suspension unit

Special features :

- Ø A = 25 mm
- specific sphere support : Ø C = 24 mm (as a guide)

1.2 – Rear suspension

Special features :

- "Estate" version : Ø B = 42,5 mm
- "Saloon" version : Ø B = 37 mm

2 – ANTI–ROLL BAR

Data :

Vehicle type	Front	Rear
Saloon	Ø 24 mm	Ø 22 mm
Estate	Ø 25 mm	Ø 22.5 mm

3 – SC/MAC SYSTEM

The SC/MAC system makes it possible to limit the amount the vehicle sinks when stationary, engine off.

SC/MAC : Citroën system maintaining a constant ground clearance.

When the vehicle is stopped for a long time, the suspension suffers a loss of pressure through the following components :

- front height corrector
- rear height corrector
- brake control valve

With the SC/MAC device, the suspension is isolated from the rest of the hydraulic circuit when the main pressure is less than that in the suspension.

Operating principle : refer to the bulletin N° (XM 430–00/3) (chapter 9), MAN 008932.

3.1 – SC/MAC valve

Composition, front suspension :

- SC/MAC valve
- height corrector
- suspension cylinders (x2)
- firmness regulator (hydractive suspension)

Hydractive suspension : the regulator is operated by an electrovalve.

Composition, rear suspension :

- SC/MAC valve
- SC/MAC accumulator
- height corrector
- suspension cylinders (x2)
- firmness regulator (hydractive suspension)

Hydractive suspension : the regulator is operated by an electrovalve.

3.2 – Location

3.2.1 – At the front

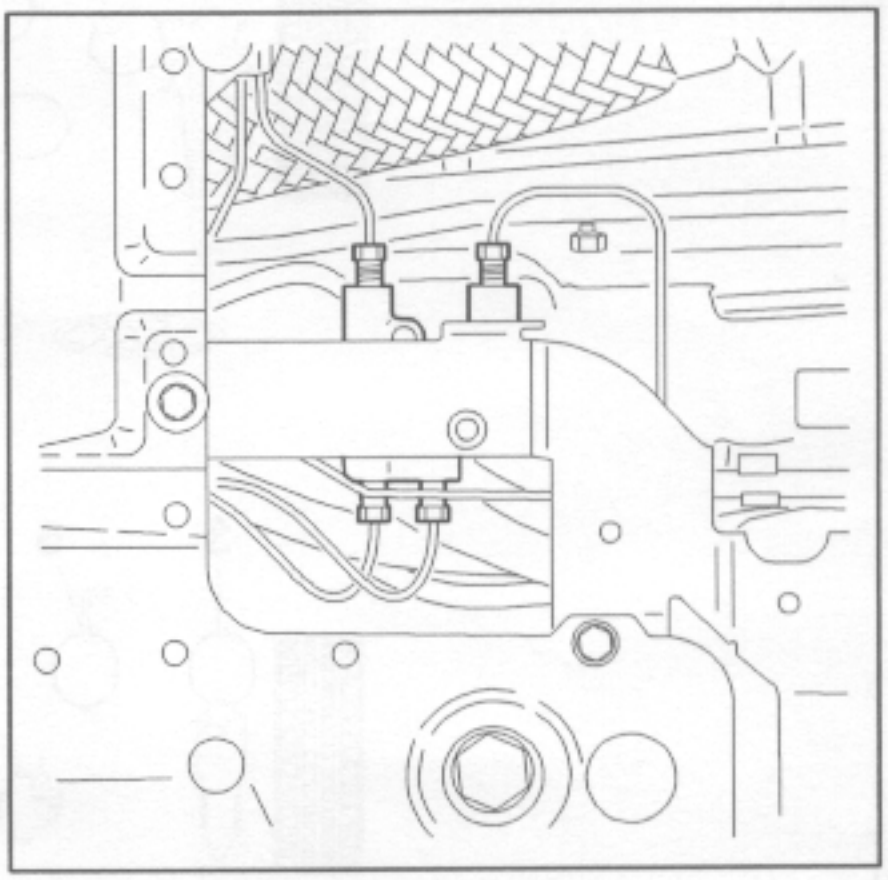


Fig : B3BR00CC

SC/MAC valve : at the front right hand side of the vehicle on the bracket secured to the rear of the subframe.

3.2.2 – At the rear

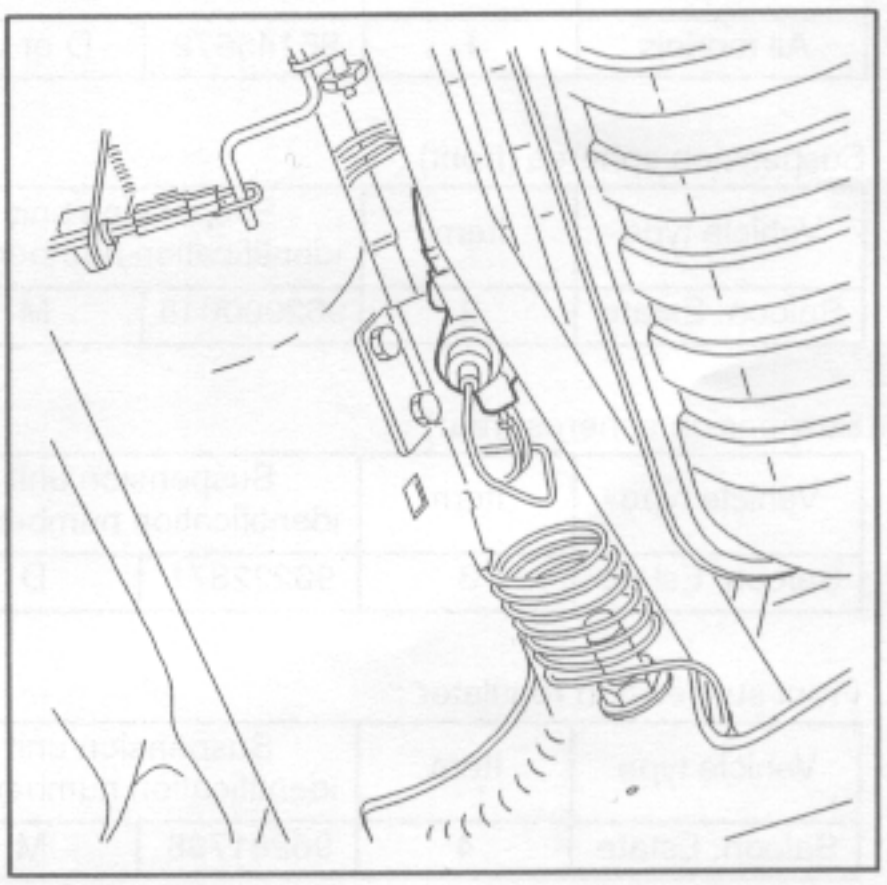


Fig : B3BR00EC

SC/MAC valve, SC/MAC accumulator : on the rear axle cross member.

4 – SUSPENSION SPHERES

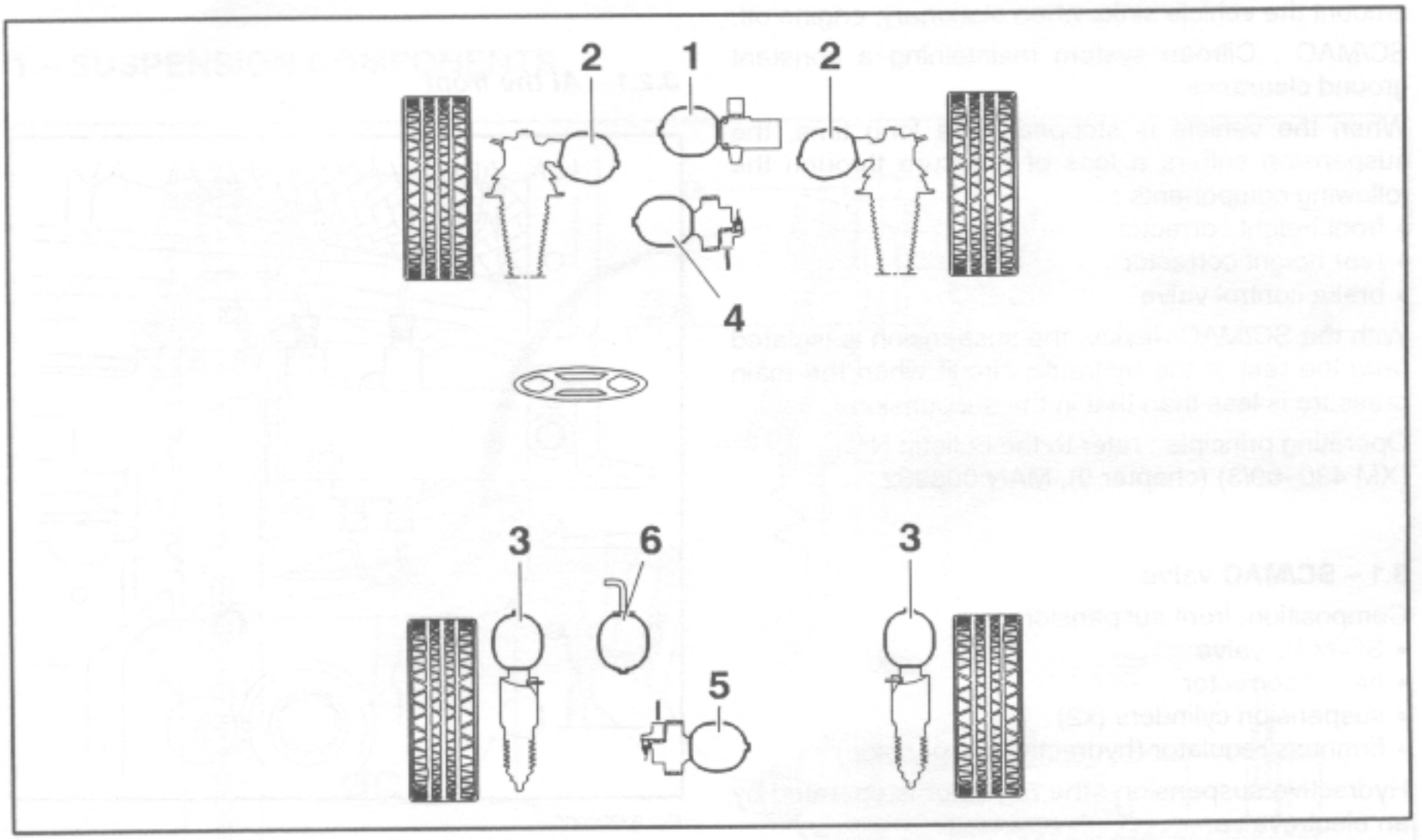


Fig : B3BP11YD

NOTE : CITROEN XM V6 : hydractive suspension standard on the complete Saloon and Estate range of vehicles.

Main pressure accumulator :

Vehicle type	Item	Suspension unit identification number (*)		Volume (cc)	Pressure (bars)	Damper (mm)
All models	1	96145672	D or U	450	62 (+5, –32)	Without

Suspension spheres (front) :

Vehicle type	Item	Suspension unit identification number (*)		Volume (cc)	Pressure (bars)	Damper (mm)
Saloon. Estate	2	962900048	M	450	40 (+5, –15)	0.7

Suspension spheres (rear) :

Vehicle type	Item	Suspension unit identification number (*)		Volume (cc)	Pressure (bars)	Damper (mm)
Saloon. Estate	3	96222871	D	400	30 (+5, –15)	0.6

Front suspension regulator :

Vehicle type	Item	Suspension unit identification number (*)		Volume (cc)	Pressure (bars)	Damper (mm)
Saloon. Estate	4	96281798	M	450	70 (+5, –25)	1.25

Rear suspension regulator :

Vehicle type	Item	Suspension unit identification number (*)		Volume (cc)	Pressure (bars)	Damper (mm)
Saloon. Estate	5	96238950	D	400	40 (+5, –15)	1.25

SC/MAC accumulator :

Vehicle type	Item	Suspension unit identification number (*)		Volume (cc)	Pressure (bars)	Damper (mm)
Saloon. Estate	6	96198613	D	400	50 (+5, –15)	Without

(*) : D = Desmopan U = Urepan M = Multicouche.

SPECIAL FEATURES : BRAKING SYSTEM

Vehicle application : XM V6.

Applicable from RPO number : 7483.

New components :

- front brake caliper (Saloon and Estate)
- front brake pads : surface area of brake pads increased (Saloon and Estate)
- front brake discs (Saloon and Estate)
- rear brake pads : surface area of brake pads increased
- rear brake discs (Saloons only)

1 – FRONT BRAKES

1.1 – Front brake calipers

Simple piston and floating caliper (Saloon and Estate) :

- piston : Ø = 60 mm
- reference : BENDIX 5Z0

Parking brake self–adjusting mechanism.

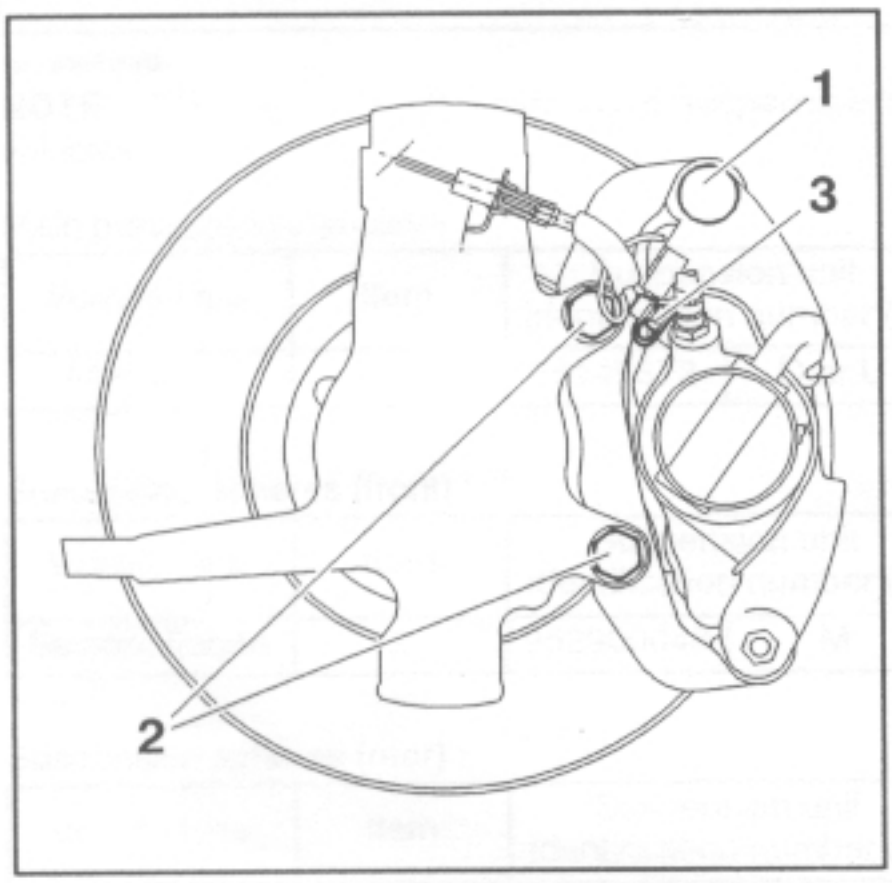


Fig : B3FP107C

Tightening torques :

- (1) stud : 2.5 m.daN
- (2) caliper bolt : 10.5 m.daN
- (3) bleed screw : 0.7 m.daN
- floating brake caliper lower bolt : 3 m.daN

1.2 – Front brake discs

Front discs with ventilated discs.

Vehicle		Saloon	Estate
Diameter (mm)		288	
Thickness (mm)	Min.	26	
	Max.	28	
Maximum run out (mm)		0.05	
Max. thickness variation on one circumference (mm)		0.01	

1.3 – Front brake pads

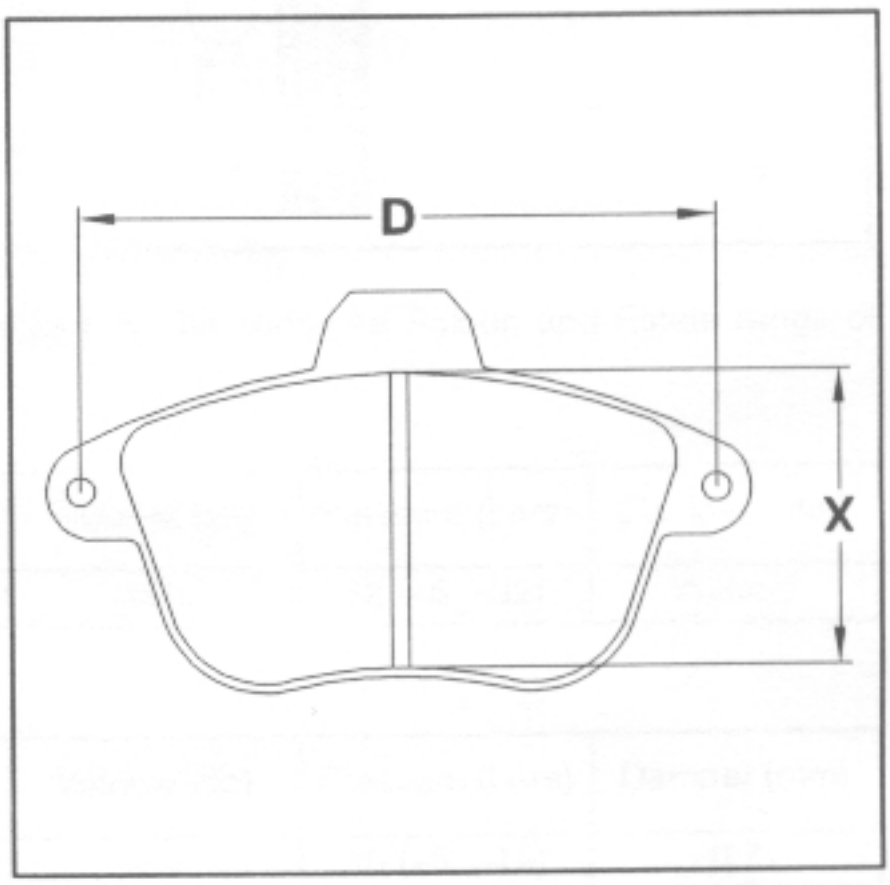


Fig : B3FP108C

Brake pads :

Vehicle		Saloon	Estate
Make		ABEX	
Material		FERF 949	
Width D (mm)		158	
Height X (mm)		59.5	
Thickness (mm)	Min.	2	
	Max.	11,8	
Surface area of each pad		61.5 cm²	

Asbestos free brake linings with wire for wear warning lamp in instrument panel.

2 – REAR BRAKES

2.1 – Rear brake calipers

CITROEN fixed brake calipers fitted with 2 pistons.

Piston diameter (mm) :

- Saloon : 33
- Estate : 40

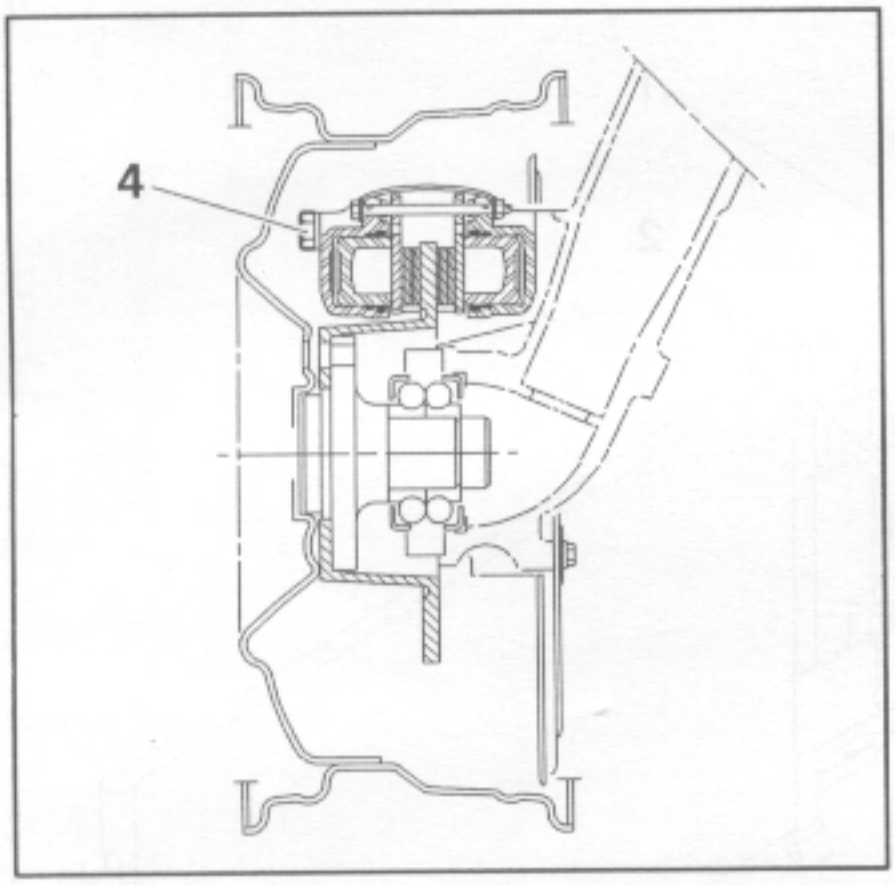


Fig. B3FP109C

Tightening torque (screw (4)) :

- Saloon : 4.5 m.daN
- Estate : 7 m.daN

2.2 – Rear brake discs

The rear brake discs are non–ventilated.

Vehicle		Saloon	Estate
Diameter (mm)		232	251
Thickness (mm)	Min.	7	10
	Max.	9	12
Maximum run out (mm)		0.05	
Max. thickness variation on one circumference (mm)		0.01	

2.3 – Rear brake pads

Brake pads :

Vehicle		Saloon	Estate
Make		ABEX	
Material		FERF 949 asbestos free	
Thickness (mm)	Min.	2	
	Max.	11.4	
Surface area of each pad		19 cm²	36,25 cm²

SPECIAL FEATURES : REFRIGERATION SYSTEM

1 – SYNOPSIS

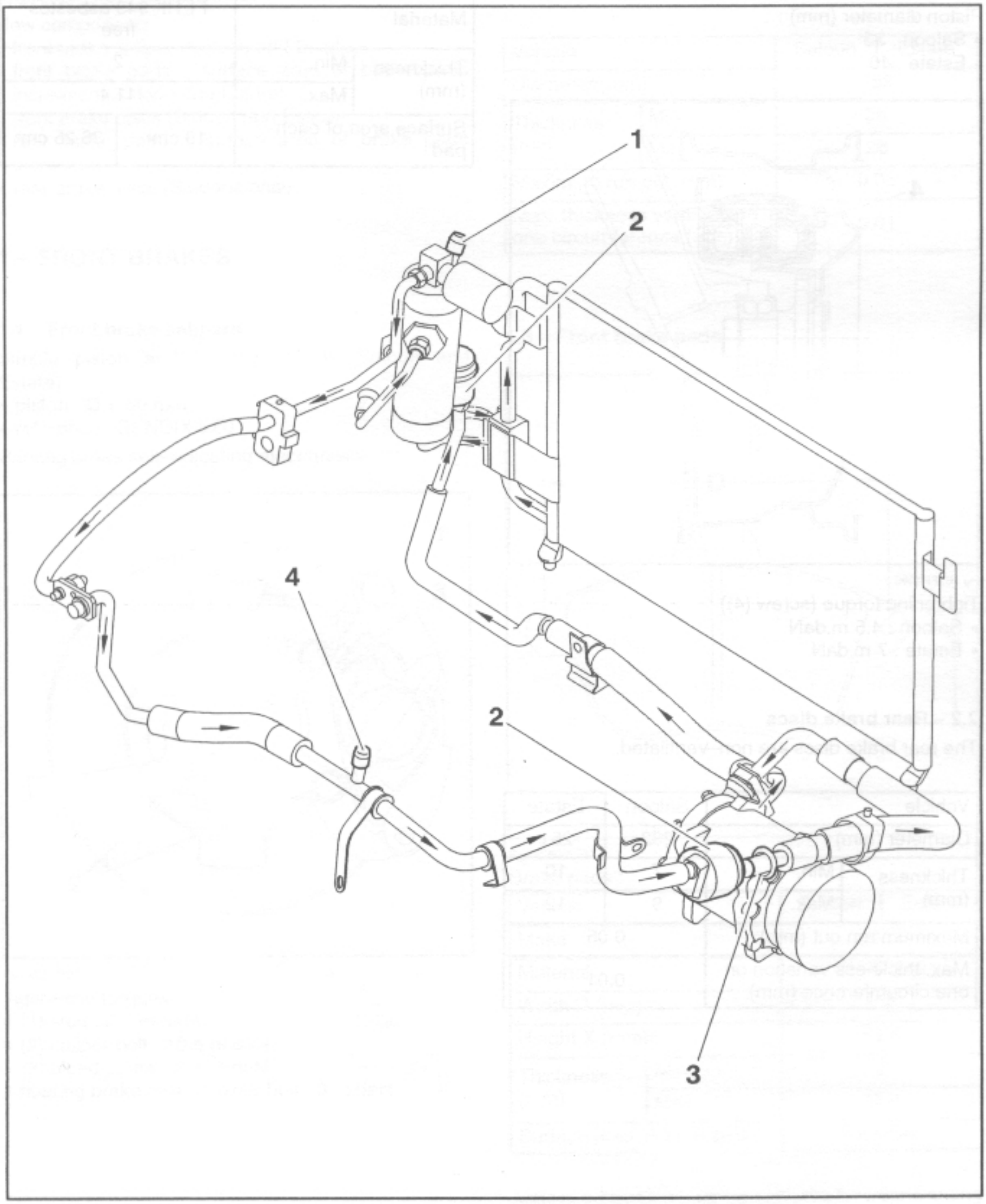


Fig : C5HP08KP

(1) high pressure charge valve.

(2) buffer volumes.

(3) click–fit connection.

(4) low pressure charge valve.

Special features :

- air conditioning circuit suited to the engine environment (late type)
- 2 buffer volumes are incorporated into the circuit to minimise noise
- the compressor can be removed by removing the compressor + compressor support assembly
- click–fit connector on the low pressure circuit removable using the black ring 8005–TA (5/8")

2 – REFRIGERANT FLUID

Reference : R134a.

Recommended quantity : 875 g ± 25 g.

3 – REFRIGERATION COMPRESSOR CLUTCH

Data :

- variable capacity compressor
- 7 pistons
- 16 cc

Engine types	Type	ES9J4
	Plate	XFZ
Refrigeration compressor clutch	Make	SANDEN
	Reference	SD7V16
	Poly–V belt	6 V belt
Recommended oil	Reference	SP10
	Capacity	135 cc