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REF.

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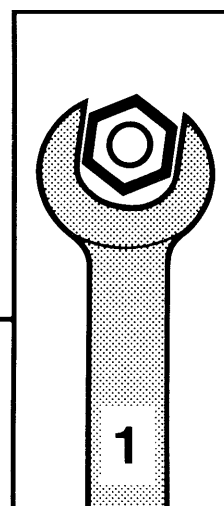
No XM 146-00/8

ABONNEMENT GME

# DK5 ENGINE

## ● AIR AND FUEL SUPPLY

MAN 058931



GB



**AUTOMOBILES CITROËN**  
DIRECTION COMMERCE EUROPE  
DOCUMENTATION APRES VENTE

## CONTENTS

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### **AIR AND FUEL SUPPLY – SUPERCHARGING**

DATA – IDENTIFICATION : INJECTORS, BOSCH EQUIPMENT .....	3
DATA – IDENTIFICATION : PRE AND POST-HEATING CIRCUITS .....	4
DATA – IDENTIFICATION : AIR SUPPLY CIRCUIT .....	5
DATA – IDENTIFICATION : FUEL SUPPLY SYSTEM .....	8
CHECKING-ADJUSTING : BOSCH INJECTORS .....	11
REMOVING – REFITTING : BOSCH INJECTION PUMP .....	13
REMOVING – REFITTING : INJECTORS .....	15
REMOVING – REFITTING : THE TURBOCHARGER .....	17
OVERHAULING : INJECTORS .....	19

## DATA – IDENTIFICATION : INJECTORS, BOSCH EQUIPMENT

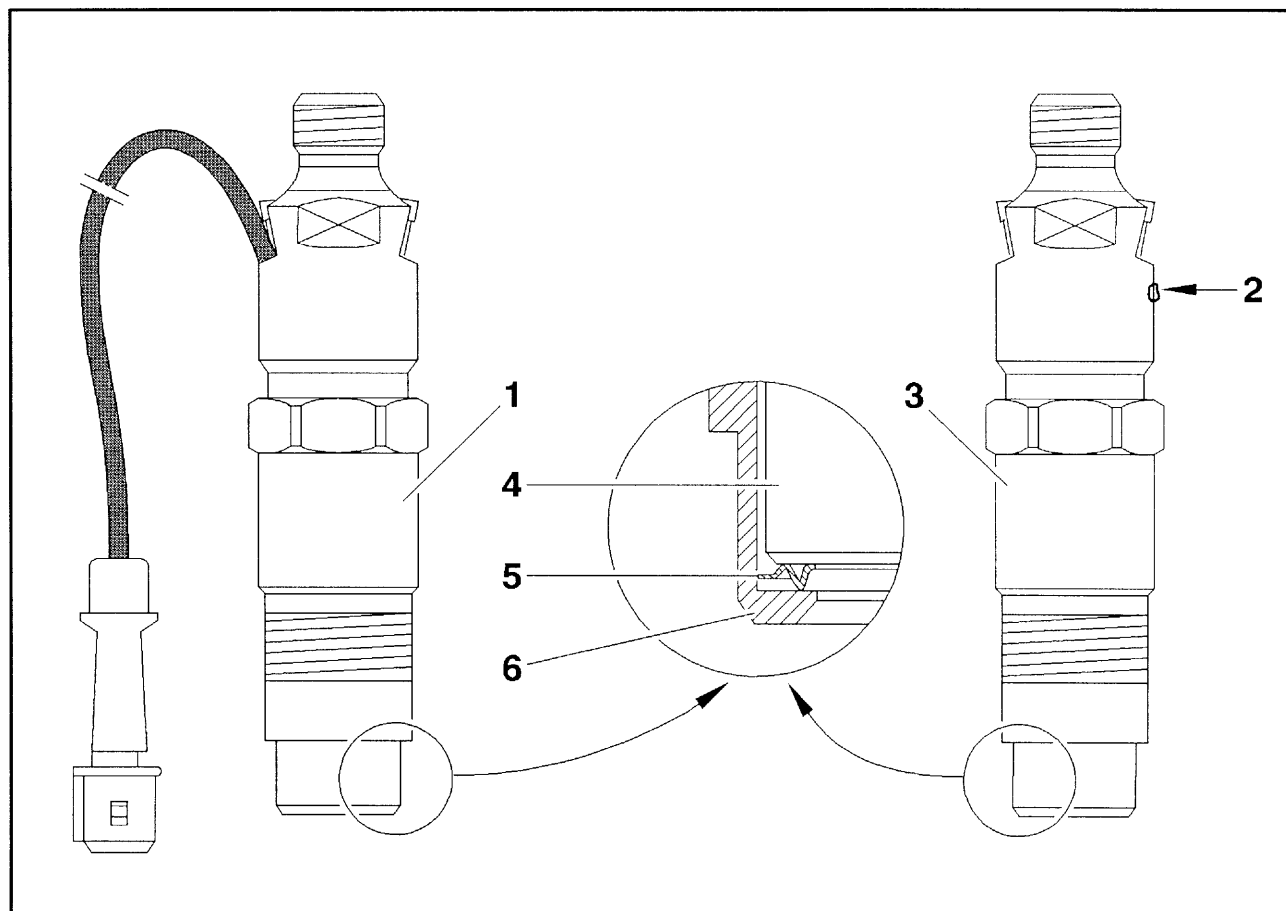


Fig : B1HP094D

- (1) – no. 3 cylinder injector.
- (2) – code.
- (3) – no. 1 ; 2 ; 4 cylinder injector.
- (4) – injector.
- (5) – fire ring.
- (6) – injector holder.

**NOTE :** Fire ring (5) is inside the injector carrier.

Engine THY(DK5ATE)	Injectors	
	Cylinder No.1 , 2 , 4	Cylinder No.3
Injector holder	KCE 30 S5	KCE 30 S7
Injector	DNOSD312	DNOSD316
Code	Yellow	Connector
Setting in bars	170–175	170–175

## DATA – IDENTIFICATION : PRE AND POST-HEATING CIRCUITS

### 1 – DATA

In order to conciliate driving pleasure and a correct engine combustion when starting from cold, there is a tendency to reduce the engine pre-heating time, compensating it by a continuation of the supply to the heater plugs after starting.

This phase is called post-heating.

The pre and post-heating times are determined by the injection E.C.U..

The pre-heating circuit can be checked with a diagnostic instrument.

### 2 – IDENTIFICATION

Pre and post-heating plugs :  
BERU 0 100 226 186.

Pre and post-heating control unit :  
BOSCH 0 281 003 004.

## DATA – IDENTIFICATION : AIR SUPPLY CIRCUIT

## 1 – AIR SUPPLY CIRCUIT

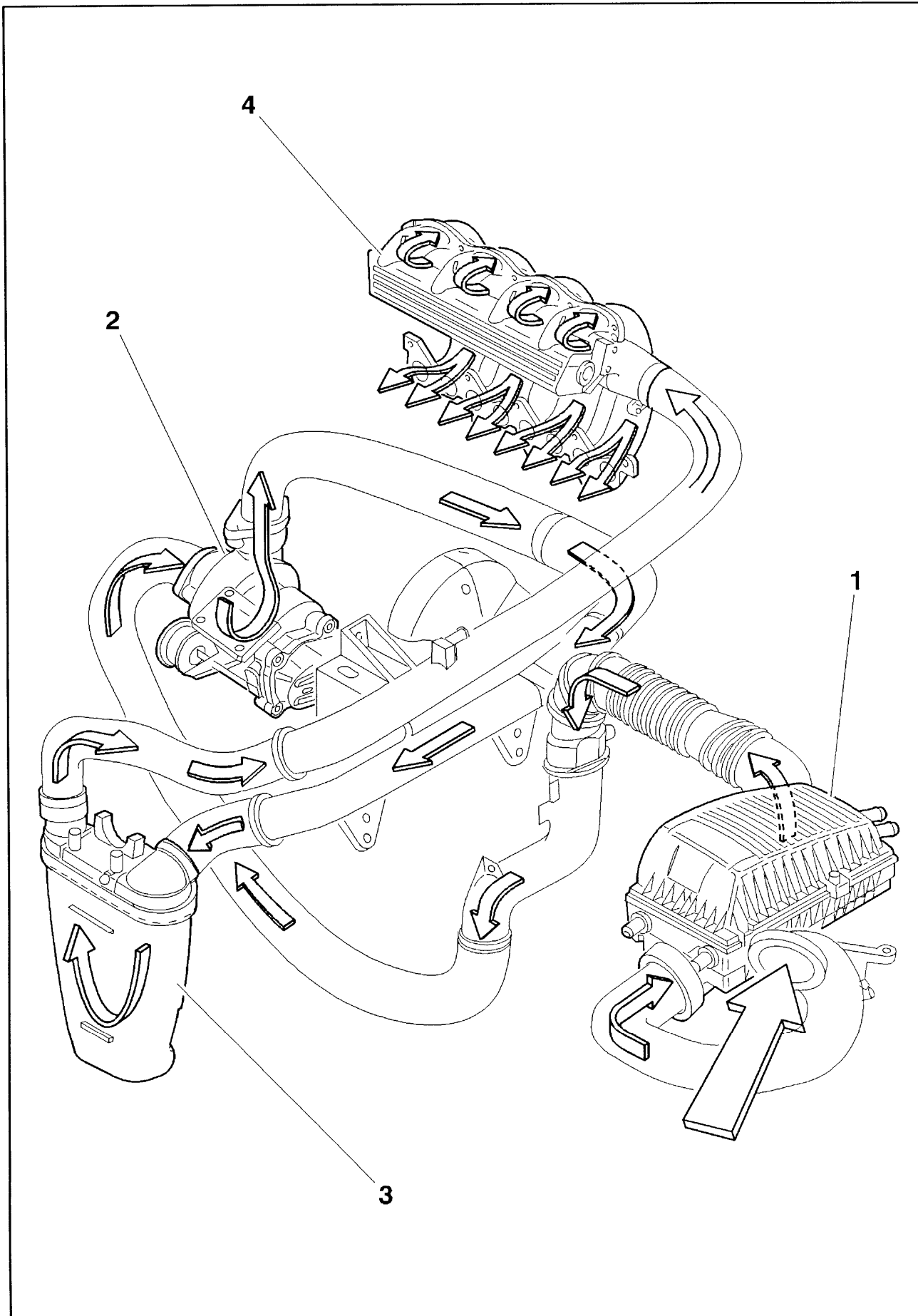


Fig : B1HP096P

- (1) air filter.
- (2) turbocharger.
- (3) water-to-air heat exchanger.
- (4) inlet manifold – exhaust gas recycling electrovalve.

## **2 – TURBOCHARGER**

GARRET T2 Type	Boost pressure	Rotational speed
No load	300 mbar $\pm$ 100	3000 rpm
	650 mbar $\pm$ 100	4500 rpm
Full load	900 mbar	3000 rpm

## **3 – WASTEGATE VALVE**

Control pressure	1000 mbar
Rod travel	3 mm

## **4 – WATER-TO-AIR HEAT EXCHANGER**

Reference : VALEO PA66-GF30.

The water-to-air heat exchanger cools the compressed air.

The inlet air temperature borders on 60 °C (in normal driving conditions).

Advantages (by comparison with an air-to-air exchanger) :

- inlet air cooling improved, for a broad engine speed range
- reduced size of the exchanger

## **5 – EXHAUST GAS RECYCLING ELECTROVALVE**

PURFLUX Type	EGR 50	EGR 82
Emission standards	L	Y
Shaft/guide clearance	0.10 $\pm$ 5 mm	0.10 $\pm$ 5 mm
Overall valve travel	9 $\pm$ 0.5 mm	12 $\pm$ 0.5 mm
Valve completely open	Control vacuum : 700 mbar	

## DATA – IDENTIFICATION : FUEL SUPPLY SYSTEM

### 1 – FUEL SUPPLY SYSTEM

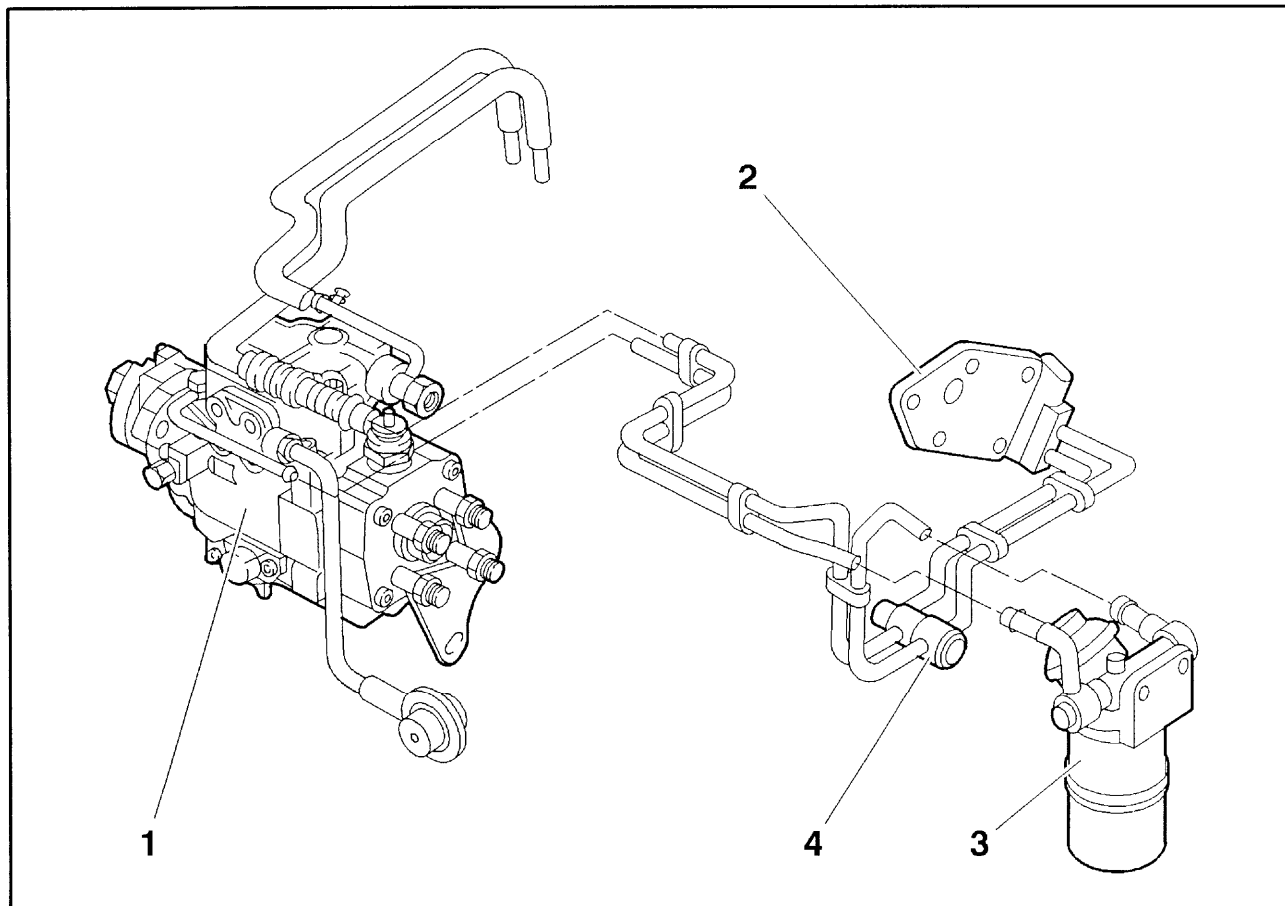


Fig : B1HP097D

- (1) injection pump.
- (2) diesel fuel heater.
- (3) diesel fuel filter.
- (4) thermostat.

### 2 – FUEL TANK

Plastic fuel tank capacity : 80 litres.



## 3 – DIESEL FUEL HEATER

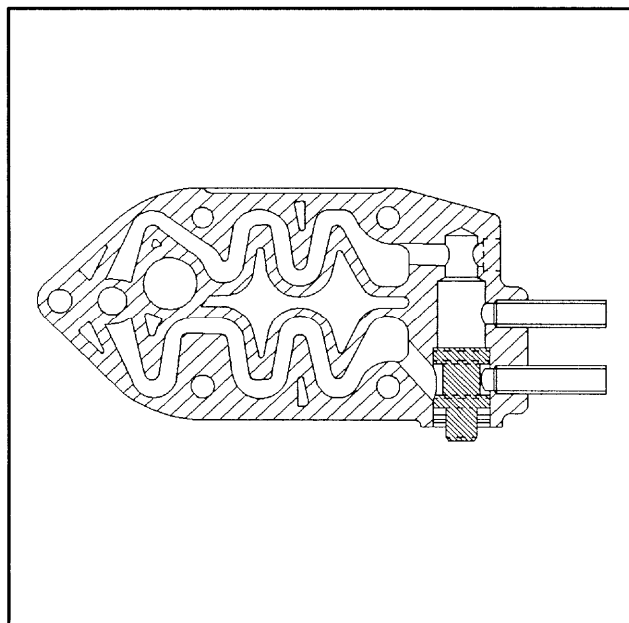


Fig : B1HP098C

Operating principle :

- temperature  $< 15^{\circ}\text{C}$  : all the Diesel fuel circulates through the heater
- temperature between  $15^{\circ}\text{C}$  and  $35^{\circ}\text{C}$  : a proportion of the Diesel fuel, is heated
- temperature  $> 35^{\circ}\text{C}$  : no Diesel fuel heating

## 4 – THERMOSTAT

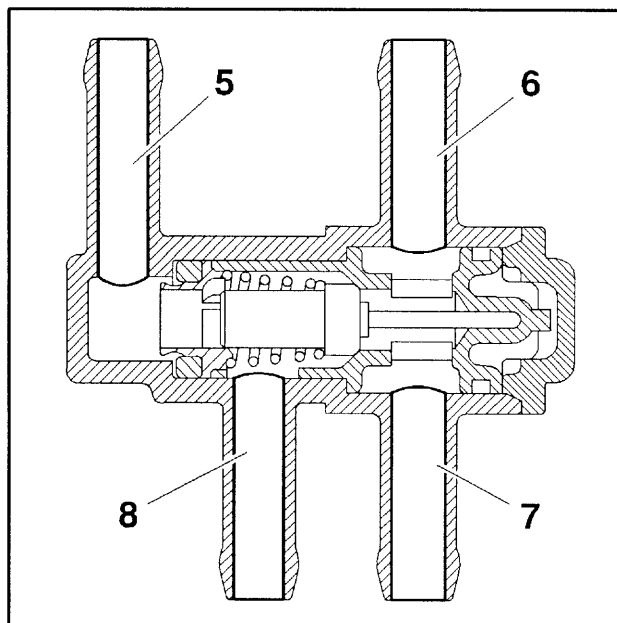


Fig : B1HP099C

(7) Diesel fuel inlet.

(6) Diesel fuel supply to heater.

(5) heated Diesel fuel return.

(8) heated Diesel fuel outlet.

Operating principle :

Temperature	Thermostatic unit	Diesel fuel
Temperature $< 15^{\circ}\text{C}$	Closed position :	All the Diesel fuel circulates through the heater
Temperature between $15^{\circ}\text{C}$ and $35^{\circ}\text{C}$	Intermediate position :	A proportion of the Diesel fuel, is heated
Temperature $> 35^{\circ}\text{C}$	Open position :	No Diesel fuel heating

### 5 – DIESEL FUEL FILTER

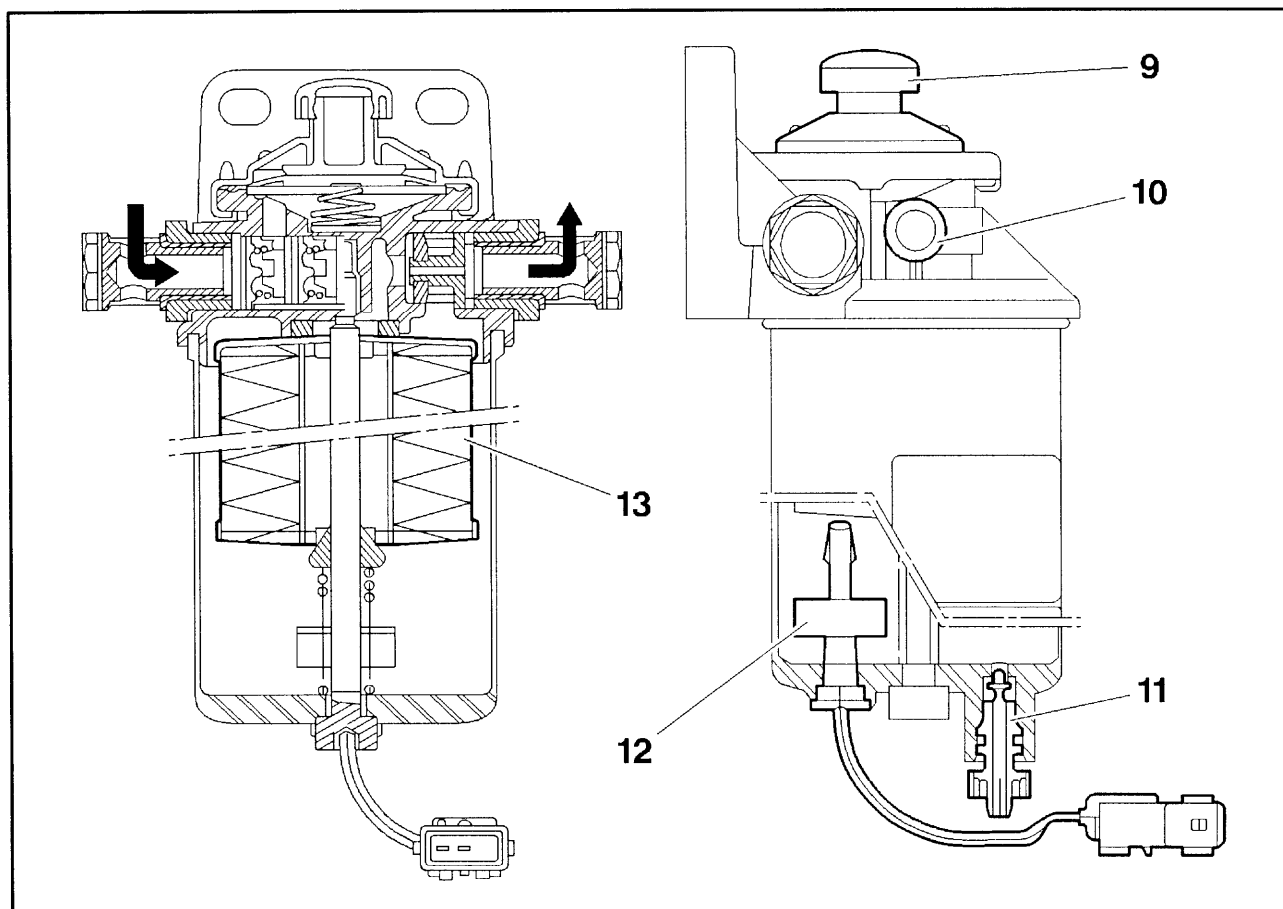


Fig : B1HP09AD

(9) priming pump.

(10) bleed screws (Diesel fuel).

(11) bleed screws (water).

(12) water detector.

(13) filter cartridge.

Diesel fuel filter equipped with a water-in-fuel detection device.

Diesel fuel filter reference (BOSCH 9 454 160 142).

### 6 – WATER DETECTOR

Operating principle :

- the base of the Diesel fuel filter houses the water detector
- if water is present in the fuel, due to its density, it will stay in the lower section of the Diesel fuel filter
- when the water level reaches the detection sensor electrodes, the instrument panel warning lamp is reconnected to earth and lights up, which indicates the need to bleed the Diesel fuel filter
- whenever ignition is switched on, if the condition of the electronic function and lamp is correct, the warning lamp will illuminate for about 1.5 second

## CHECKING-ADJUSTING : BOSCH INJECTORS

### 1 – RECOMMENDED TOOLS

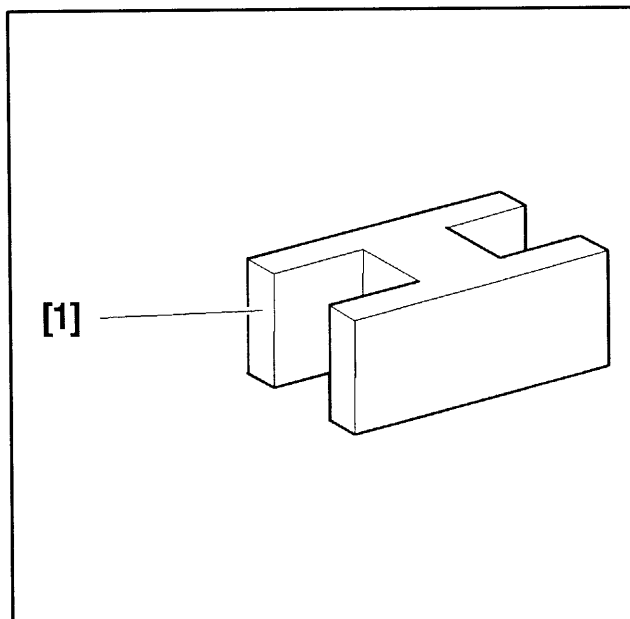


Fig : B1HP04VC

[1] clamp 7008-T.A for slackening and retightening the injector holder body (tool box 4123-T).

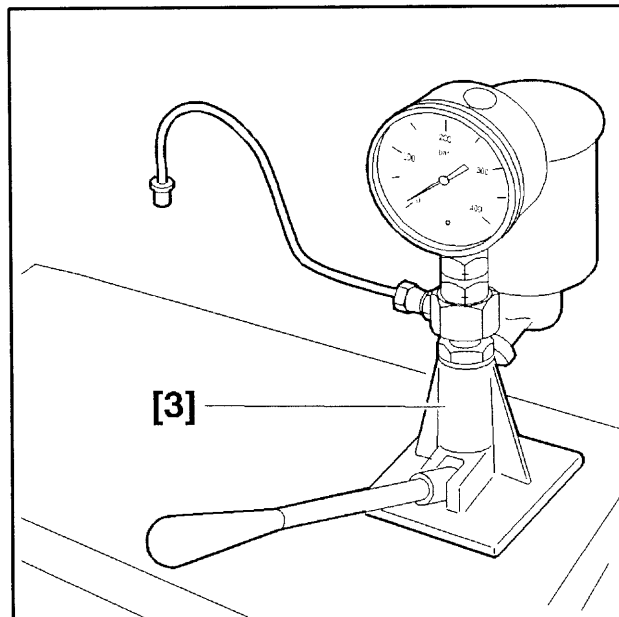


Fig : B1HP021C

[3] injector testing pump 4026-T.bis.

Test fluid : de-odourised paraffin.

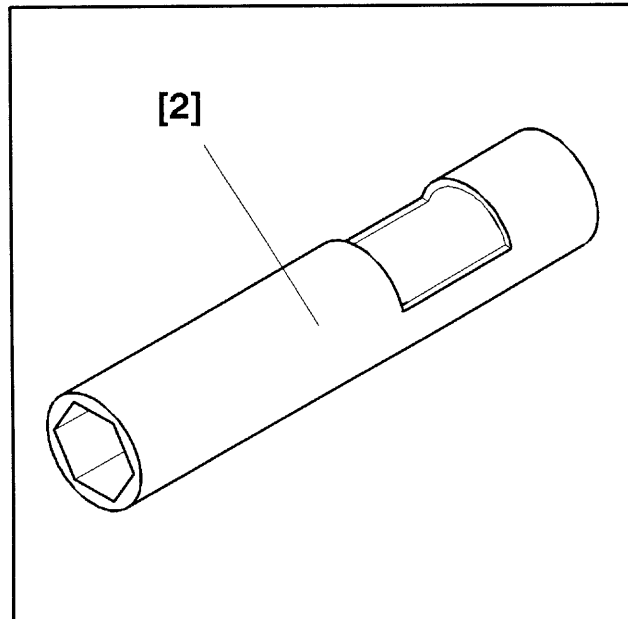


Fig : B1HP04WC

[2] spanner 5710-T for removing and refitting the injector holders.

**ATTENTION :** Use a suitable test fluid. Never expose the hands to the spray; risk of injury and serious blood poisoning. The sprayed fluid catches fire very easily.

### 2 – CHECKING FOR LEAKS

Pressure gauge in circuit.

Dry the end of the injector.

Operate the pump lever.

Maintain a pressure 20 bars below the calibration pressure.

The injector should not drip within 10 seconds.

### 3 – CHECKING THE SHAPE OF THE SPRAY AND THE GRUNT OF THE INJECTOR

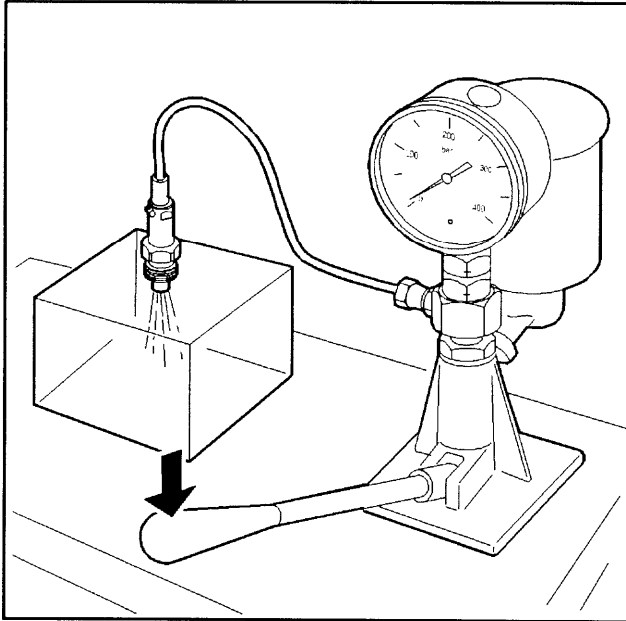


Fig : B1HP022C

Pressure gauge isolated.

Operate the pump lever with short sharp strokes.

The injector should produce a very fine and homogeneous spray.

At a frequency of one or two strokes a second, the injector should have a very soft grunt.

With more rapid strokes, the grunt should disappear.

### 5 – ADJUSTING THE CALIBRATION PRESSURE

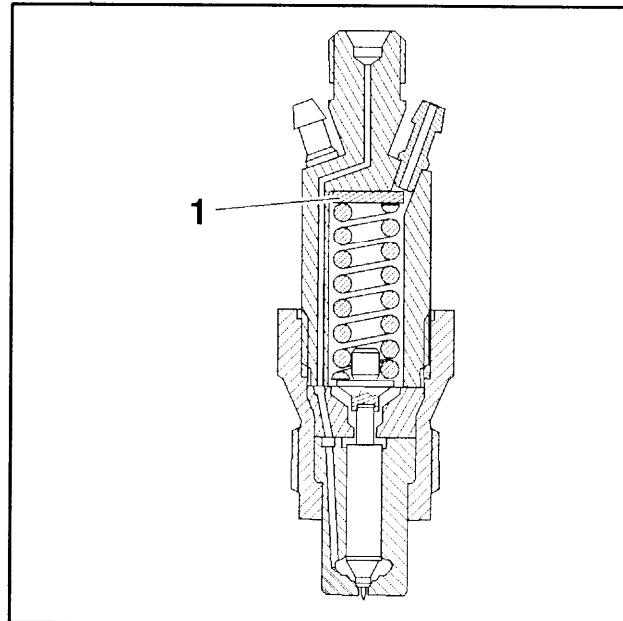


Fig : B1HP05CC

The calibration is adjusted by means of a thicker or thinner shim (1).

**NOTE :** A change in shim thickness of 0.10 mm gives, on average, a calibration pressure change of 10 bars.

### 4 – CHECKING THE CALIBRATION PRESSURE

Pressure gauge isolated.

Give several rapid pump strokes to bleed the circuit.

Pressure gauge in circuit.

Operate the pump lever very slowly.

Read the pressure at the moment the injector opens.

Compare with the theoretical setting pressure of the injector.

## REMOVING – REFITTING : BOSCH INJECTION PUMP

### 1 – RECOMMENDED TOOLS

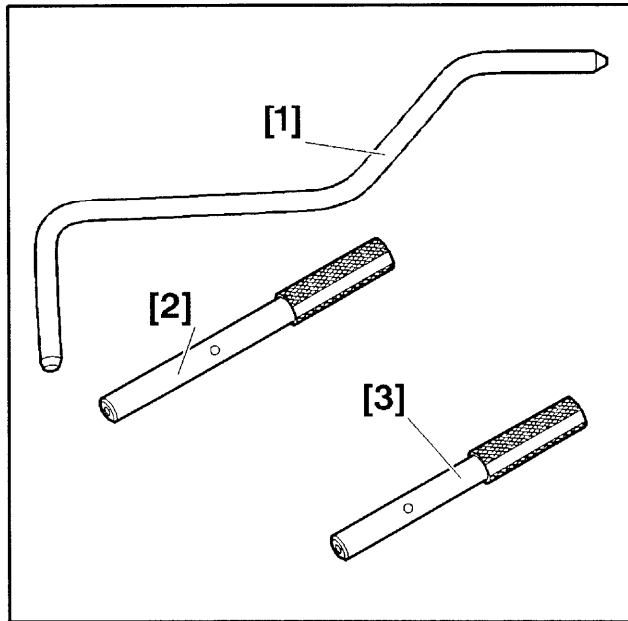


Fig : B1EP01FC

[1] flywheel setting rod 7014-T.J (tool box 7004-T).

[2] camshaft gear wheel setting rod 5711-T.A (tool box 5711-T).

[3] injection pump setting rod 5711-T.B (tool box 5711-T).

### 2 – REMOVAL

Unclip the battery trim cover :

- 2 attachment points, front side end
- 1 attachment point marked by an arrow towards the air filter (using a screwdriver)

Disconnect the battery negative terminal.

Raise and support the vehicle with the wheels clear of the ground.

Timing belt – carry out a partial removal operation (see the relevant operation).

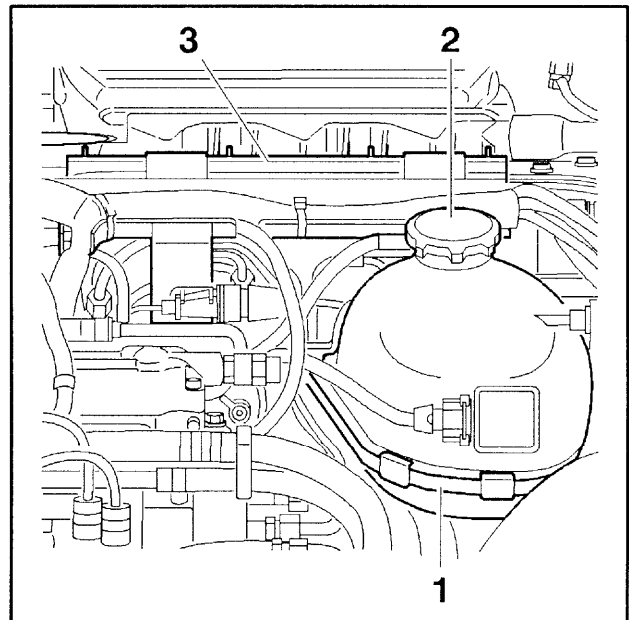


Fig : B1HP07XC

Remove header tank (1) fixing collar (2).

Push header tank (2) aside.

Separate the wiring harnesses and connection hoses from harness support (3).

Remove :

- wiring harness support (3)
- the electrical and mechanical junctions adjoining the injection pump
- the injector pipes

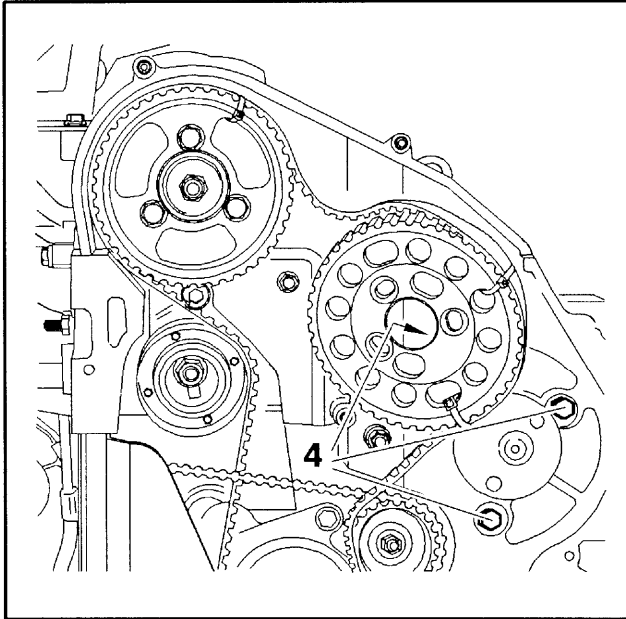


Fig : B1HP07YC

Remove :

- injection pump fixing screws (4)
- the pump rear fixing
- the injection pump

### 3 – REFITTING

Fit :

- the injection pump
- injection pump fixing screws (4) ; tighten to 2.25 m.daN
- the pump rear fixing ; tighten to 2.25 m.daN
- the injector pipes ; tighten to 2.5 m.daN
- the electrical and mechanical junctions adjoining the injection pump
- wiring harness support (3)

Clip the electrical harnesses and flexible hoses in place to the harness support.

Fit :

- header tank (2)
- the timing belt (see the relevant operation)

Return the vehicle to its wheels.

Bleed the fuel system.

Connect the battery.

Clip in place the battery trim cover.

## REMOVING – REFITTING : INJECTORS

### 1 – RECOMMENDED TOOLS

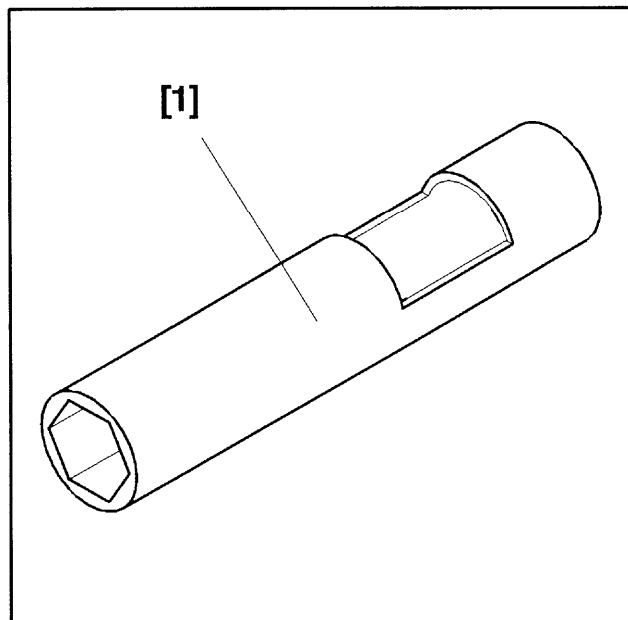


Fig : B1HP051C

[1] spanner 5710-T for removing and refitting the injector holders.

### 2 – REMOVAL

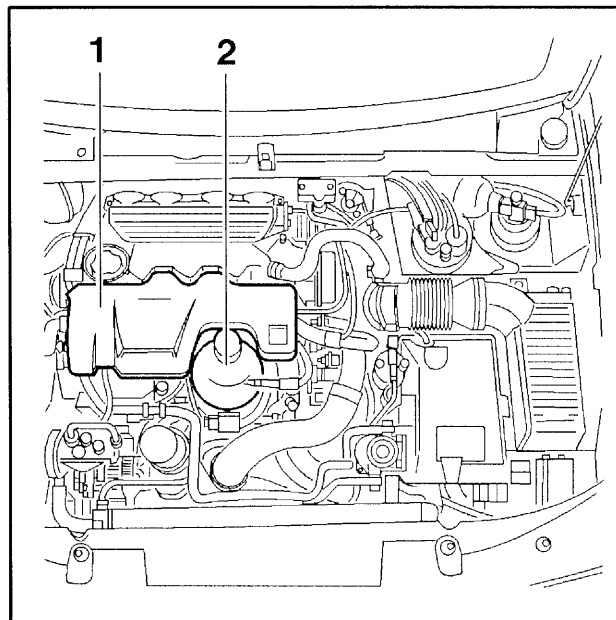


Fig : B1HP06BC

Remove spoke trim (1).

Separate the wiring harnesses from the harness support.

Remove :

- wiring harness support
- header tank fixing clamping collar (2)

Push header tank (2) aside.

Remove :

- the header tank fixing bracket
- the Diesel fuel inlet and return pipes

Disconnect the connector from number 3 cylinder injector.

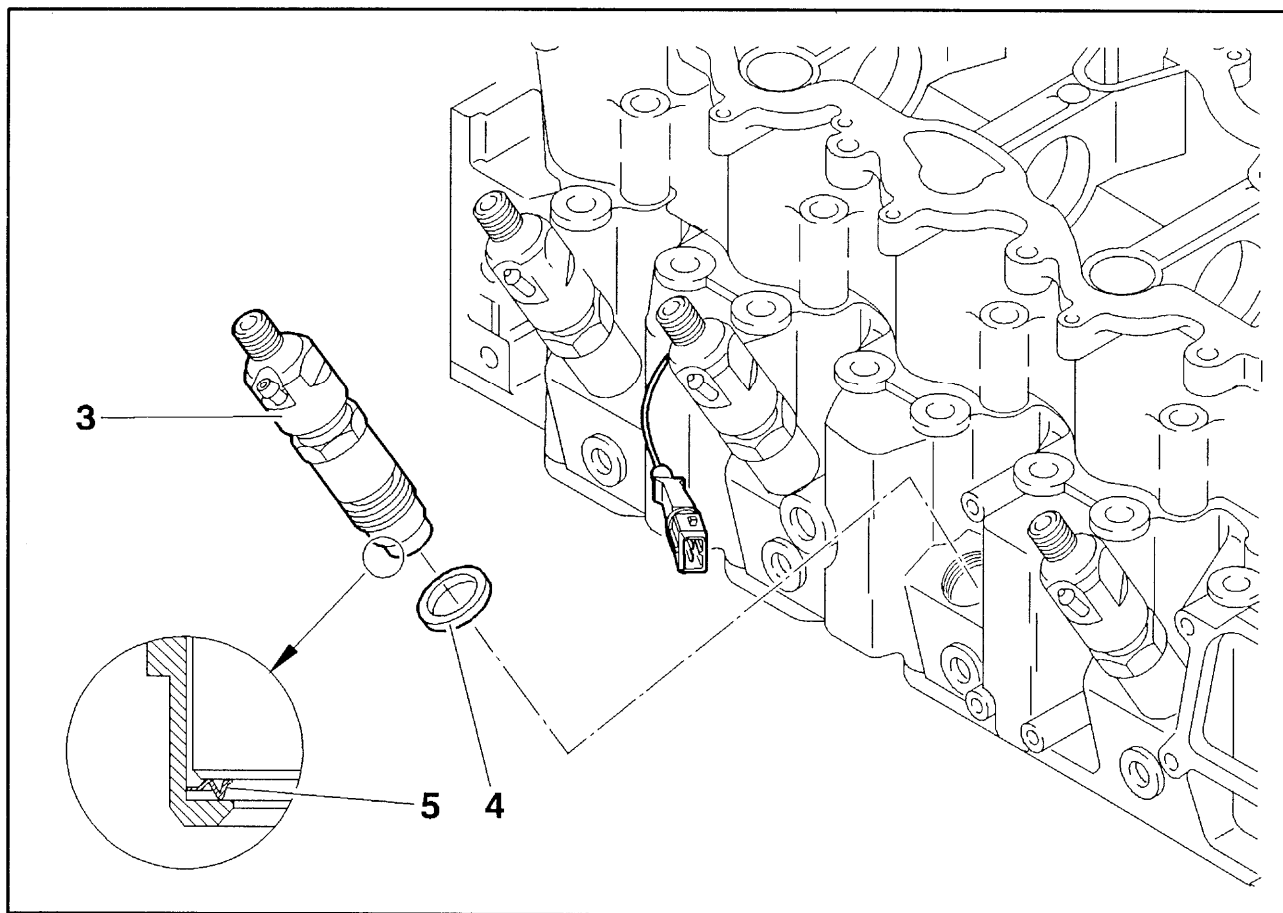


Fig : B1HP06CD

Remove :

- the injector holders (3) using socket [1]
- sealing washers (4)

**NOTE** : Fire ring (5) is inside the injector carrier.

### 3 – REFITTING

**IMPERATIVE** : Replace the sealing washer systematically.

Fit :

- sealing washers (4)
- injector holders (3) ; tighten to 5.5 m.daN
- the Diesel fuel inlet and return pipes ; tighten to 2 m.daN

Reconnect number 3 cylinder injector connector.

Fit :

- the header tank fixing bracket
- the header tank
- wiring harness support

Clip the electrical harnesses to the harness support

Refit the centre trim



## REMOVING – REFITTING : THE TURBOCHARGER

### 1 – PRELIMINARY OPERATIONS

Lift and support the vehicle with front wheels suspended.

Unclip the battery trim cover : 2 attachment points, front side end, 1 attachment point marked by an arrow towards the air filter (using a screwdriver).

Disconnect the battery negative terminal.

Remove :

- the protective plate under the engine
- the RH front road wheel
- the engine protection plate situated under the R.H. front wheelarch

### 2 – REMOVAL

Drain the gearbox.

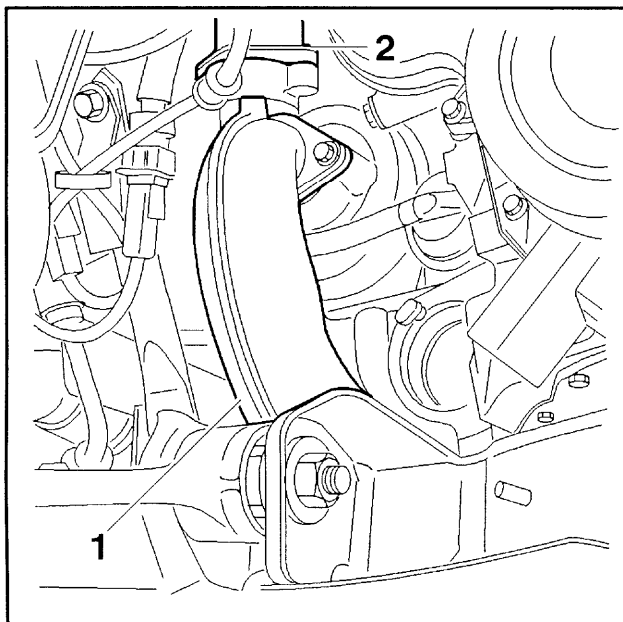


Fig : B1HP08LC

Remove :

- the R.H. drive shaft (see the relevant operation)
- sleeve (1)

Uncouple sleeve (2) from the turbocharger.

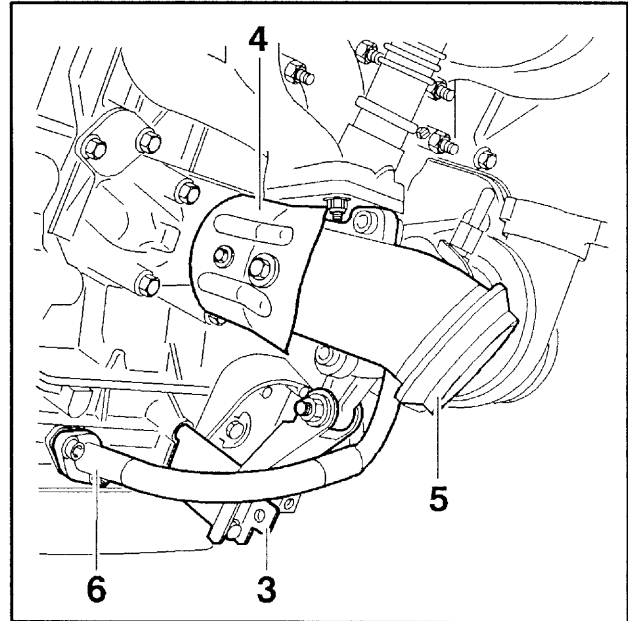


Fig : B1HP08MC

Remove :

- mounting bracket (3)
- metal plate (4)
- turbocharger outlet pipe bend (5)

Uncouple oil return pipe (6) from the cylinder block.

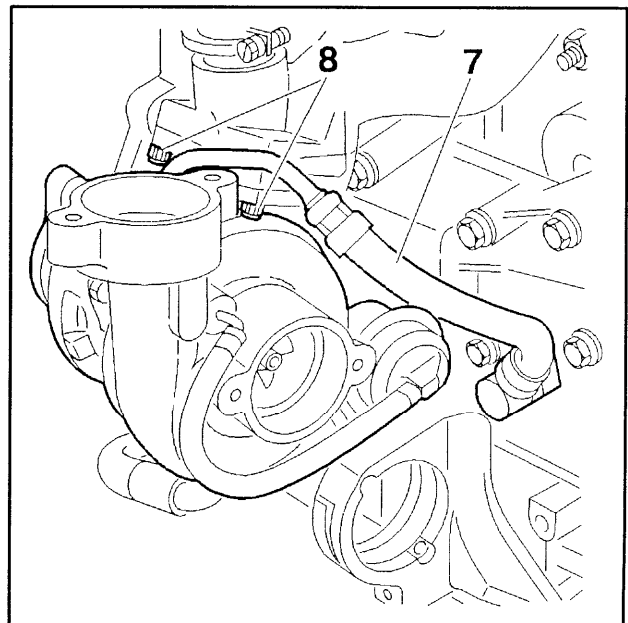


Fig : B1HP08NC

Remove :

- oil inlet union (7)
- the fixing bolts (8)
- the turbocharger

### 3 – REFITTING

#### 3.1 – Generality

Precautions to be taken before carrying out any work :

- examine the engine air filtering system
- drain the engine oil
- replace the oil filter
- ensure that the oil circuit unions are clean
- fit new seals
- use the recommended securing screws (heat resistant)

Check that no foreign body is present :

- in the inlet circuit
- in the exhaust gas manifold (it may cause the destruction of the turbocharger when operating it)

#### 3.2 – Refitting – turbocharger

Fit :

- the turbocharger
- the fixing bolts (8). Tightening : 2.25 m.daN
- mounting bracket (3)
- oil inlet union (7)

Couple up sleeve (2) with the turbocharger.

Fit :

- turbocharger outlet pipe bend (5)
- metal plate (4)
- cylinder block oil return pipe (6)
- sleeve (1)
- the R.H. drive shaft (see the relevant operation)

Refill the gearbox with oil and top up to level.

### 4 – COMPLEMENTARY OPERATIONS

Fit :

- the engine protection plate situated under the R.H. front wheelarch
- the RH front road wheel
- the protective plate under the engine

Reconnect the negative cable to the battery.

Clip in place the battery trim cover.

Return the vehicle to its wheels.

Precautions to be taken before starting the vehicle :

- disconnect the injection double relay
- rotate the engine with the starter and stop when the oil pressure warning lamp has gone out
- reconnect the injection double relay
- let the engine turn at idle for 30 seconds, before increasing the load
- after the starting up, check the tightness of the various hose connections

## OVERHAULING : INJECTORS

### 1 – RECOMMENDED TOOLS

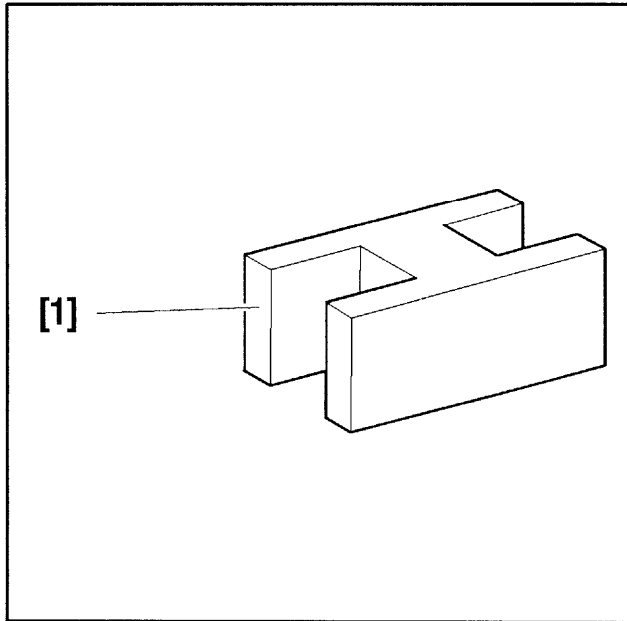


Fig : B1HP04VC

[1] clamp 7008-T.A for slackening and retightening the injector holder body (tool box 4123-T).

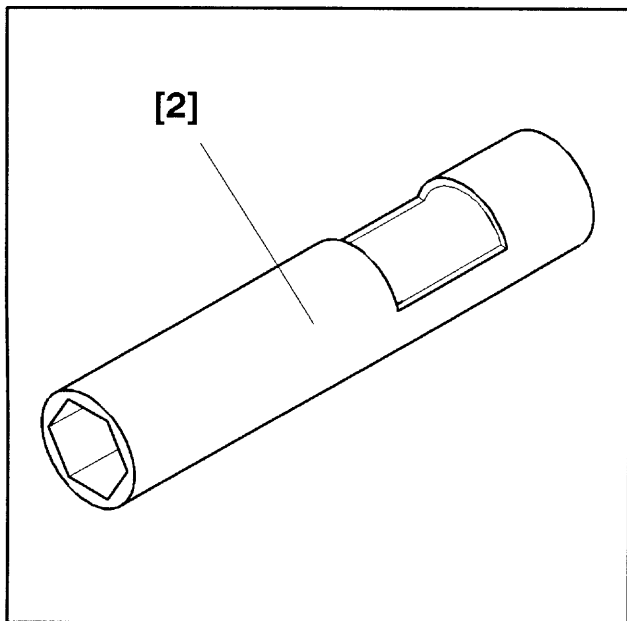


Fig : B1HP04WC

[2] spanner 5710-T for removing and refitting the injector holders.

### 2 – DISMANTLING

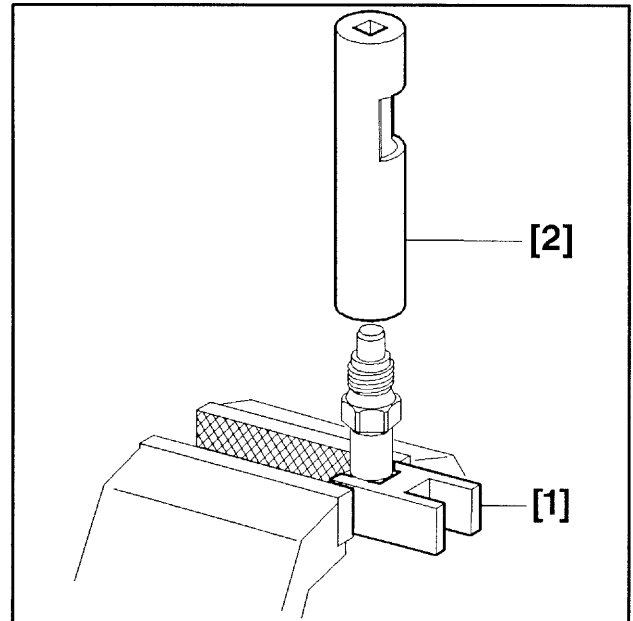


Fig : B1HP04ZC

Grip the injector holder and tool [1] in a vice.  
Unscrew the injector holder using socket [2].  
Immerse the parts in test fluid.  
The nozzle/needle must be kept paired.

### 3 – REFITTING

**ATTENTION** : Extreme cleanliness should be observed during the rebuilding operations.

Lubricate the parts with test fluid before fitting.

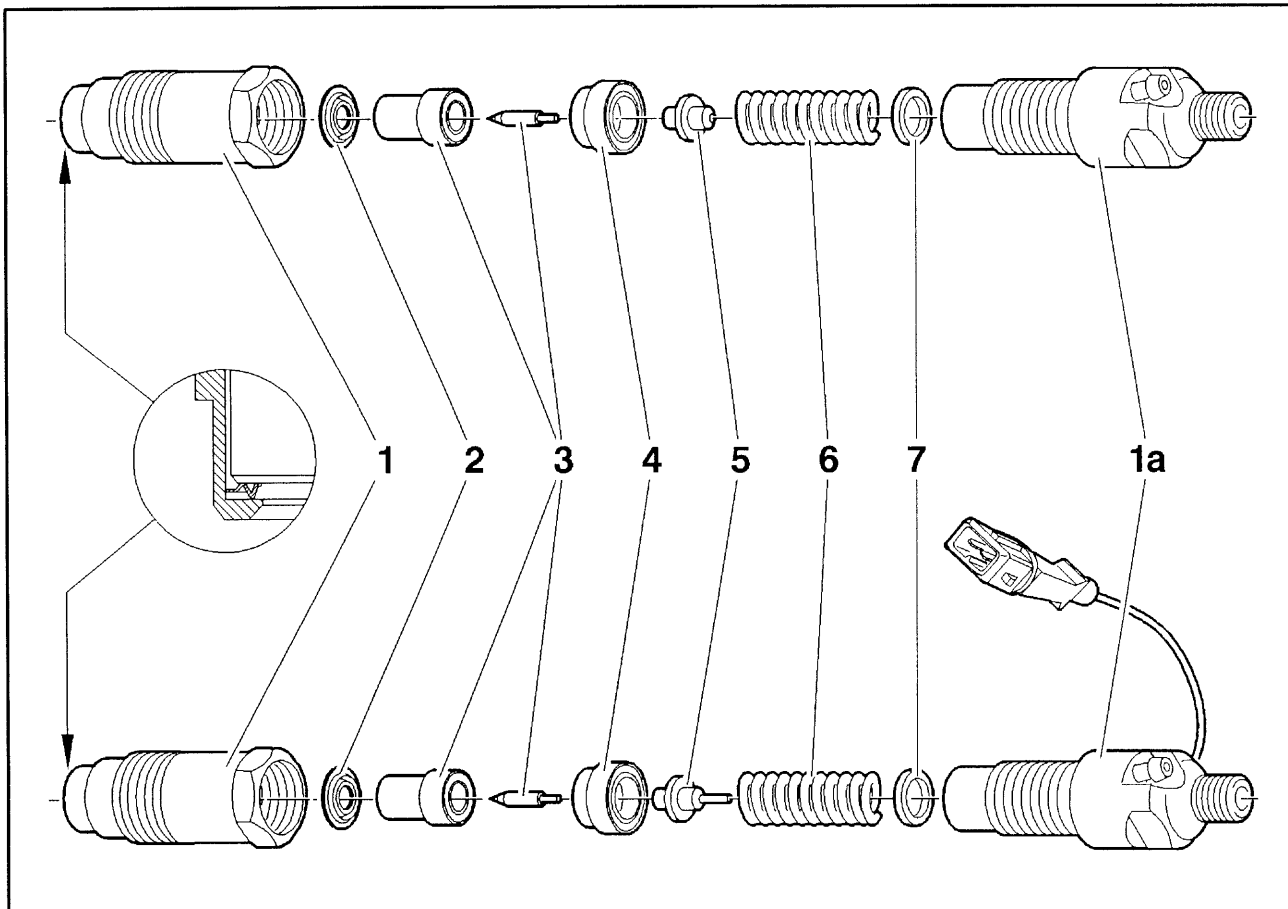


Fig : B1HP06DD

In injector holder (1), place :

- fire ring (2)
- injector (3)
- distance piece (4)
- push-rod (5)
- spring (6)
- adjusting shim (7)
- body (1a)

Systematically replace the fire ring. Respect the fitting direction.

Tighten the assembly to 7 m.daN.