

# RENAULT

## Technical Note 6004A

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### DXX, and D4D or D4F

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### D4 4-cylinder petrol engine

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JULY 2004

Edition Anglaise

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"The repair methods given by the manufacturer in this document are based on the technical specifications current when it was prepared.

The methods may be modified as a result of changes introduced by the manufacturer in the production of the various component units and accessories from which his vehicles are constructed."

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# D4 4-cylinder petrol engine

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## General information

D4D, and 700 or 712 or 720 – D4F, and 702 or 706 or 708 or 712 or 714 or 716 or 722 or 728 or 730 or 740

### I - UNITS OF MEASUREMENT

- All dimensions are expressed in millimetres (mm) (unless stated otherwise).
- Tightening torques are expressed in Newton metres (Nm) (reminder: 10 Nm = 1.02 m/kg)
- Pressures are expressed in bar (reminder: 1 bar = 100 000 Pa).

### II - TOLERANCES

Tightening torques given without a tolerance must be accurate to within:

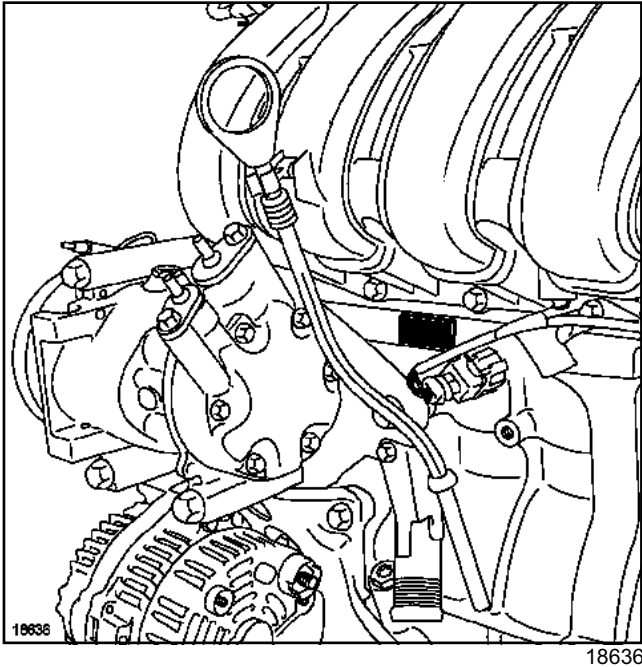
- in degrees ( $\pm 6^\circ$ ),
- in Nm ( $\pm 10\%$ ).

## Engine identification

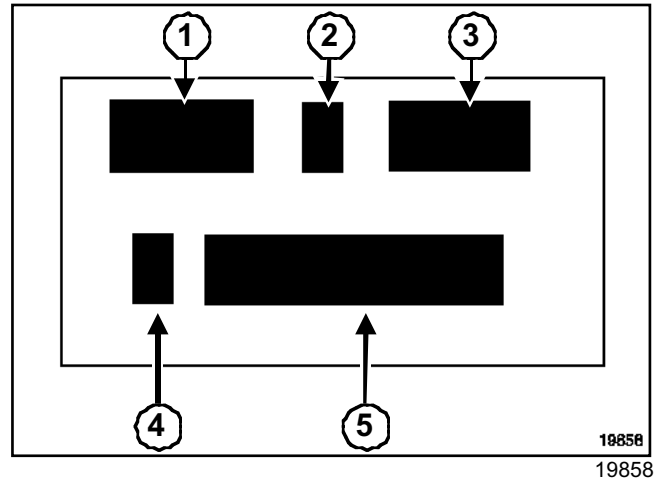
D4D, and 700 or 712 or 720 – D4F, and 702 or 706 or 708 or 712 or 714 or 716 or 722 or 728 or 730 or 740

### I -ENGINE IDENTIFICATION

The engine identification is located on the cylinder block under the inlet manifold.



### Details of markings



The markings include:

- (1): the engine type
- (2): the engine approval letter
- (3): the engine suffix
- (4): the factory where the engine was fitted
- (5): the engine production number

### II - ENGINE SPECIFICATION TABLES

Vehicle	After-Sales Type:	Engine type	Engine suffix	Cubic capacity (cm <sup>3</sup> )	Bore (mm)	Stroke (mm)	Compression ratio
TWINGO	C06H	D4D	712	999	69	66.8	9.8 ± 0.6
	X06C	D4F	702	1149	69	76.8	9.8 ± 0.6
	X06D X06K						
CLIO II	XB06	D4D	700	999	69	66.8	9.8 ± 0.6
	XB05	D4F	706	1149	69	76.8	9.8 ± 0.6
	XB0W		712				
	XB11		714				
	XB19 XB1Y						
	XB2T XB2U XB2V		722 728				

# ENGINE AND LOWER ENGINE ASSEMBLY

## Engine identification

# 10A

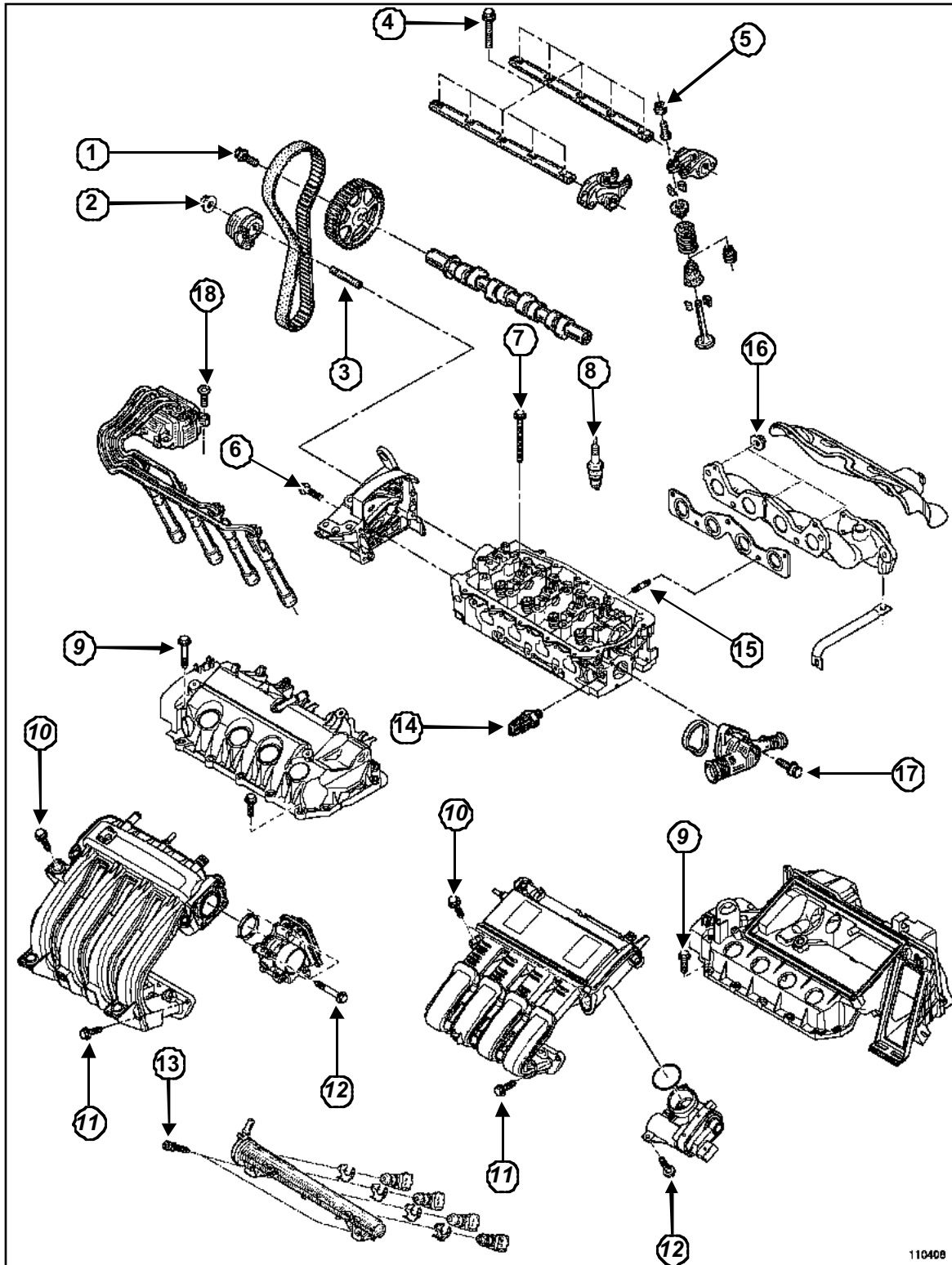
D4D, and 700 or 712 or 720 – D4F, and 702 or 706 or 708 or 712 or 714 or 716 or 722 or 728 or 730 or 740

Vehicle	After-Sales Type:	Engine type	Engine suffix	Cubic capacity (cm <sup>3</sup> )	Bore (mm)	Stroke (mm)	Compression ratio
KANGOO	XC06	D4D	720	999	69	66.8	9.8 ± 0.6
	XC05	D4F	714	1149	69	76.8	9.8 ± 0.6
	XC0T XC03		716				
	XC1D		730				
MODUS	JP0C JP0K	D4F	740	1149	69	76.8	9.8 ± 0.6

## Tightening torque

D4D, and 700 or 712 or 720 – D4F, and 702 or 706 or 708 or 712 or 714 or 716 or 722 or 728 or 730 or 740

### Upper engine



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# ENGINE AND LOWER ENGINE ASSEMBLY

## Tightening torque

# 10A

D4D, and 700 or 712 or 720 – D4F, and 702 or 706 or 708 or 712 or 714 or 716 or 722 or 728 or 730 or 740

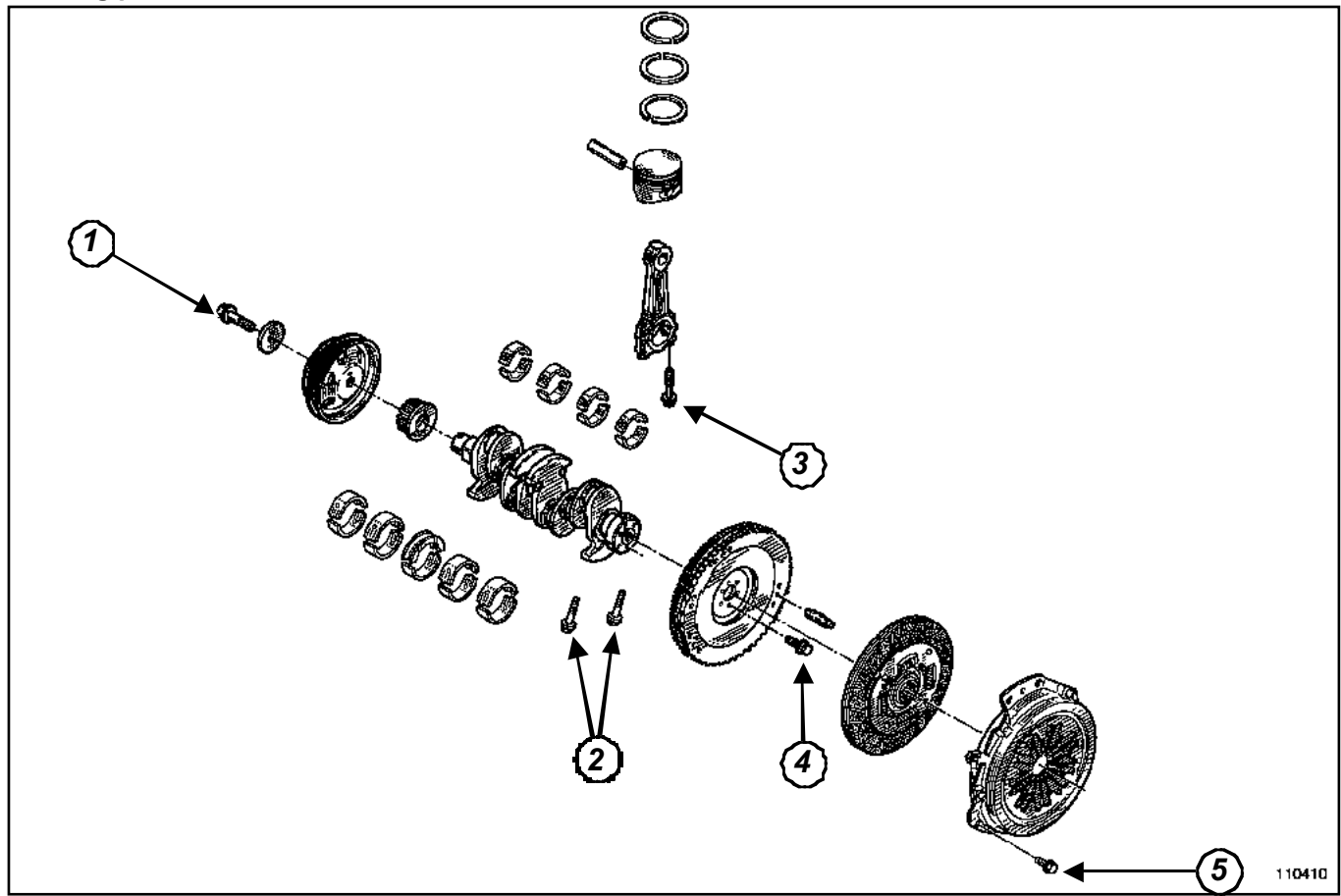
### Upper engine

Tightening torques in Nm and/or in °		
1	Camshaft pulley bolt	<b>30 + 45° ± 6°</b>
2	Timing tensioner nut	<b>24</b>
3	Timing tension wheel stud	<b>10</b>
4	Camshaft securing bolt	<b>7 + 50° ± 6°</b>
5	Valve clearance adjusting nut	<b>10</b>
6	Upper timing cover bolt	<b>33</b>
7	Cylinder head bolts	see tightening procedure
8	Spark plugs	<b>27 to 20</b>
9	Rocker cover bolts	<b>12 / see order of tightening</b>
10	Inlet manifold / rocker cover	<b>8</b>
11	Inlet manifold / cylinder head bolts	<b>10 / see order of tightening</b>
12	Motorised throttle valve bolt	<b>10</b>
13	Injection rail bolt	<b>10</b>
14	Coolant temperature sensor	<b>22</b>
15	Exhaust manifold nut	<b>25 / see order of tightening</b>
16	Heat shield nut	<b>15</b>
Mark 17	Cylinder head coolant outlet unit mounting bolt	<b>10</b>
Mark 18	Ignition coil	<b>7</b>

## Tightening torque

D4D, and 700 or 712 or 720 – D4F, and 702 or 706 or 708 or 712 or 714 or 716 or 722 or 728 or 730 or 740

### Rotating parts



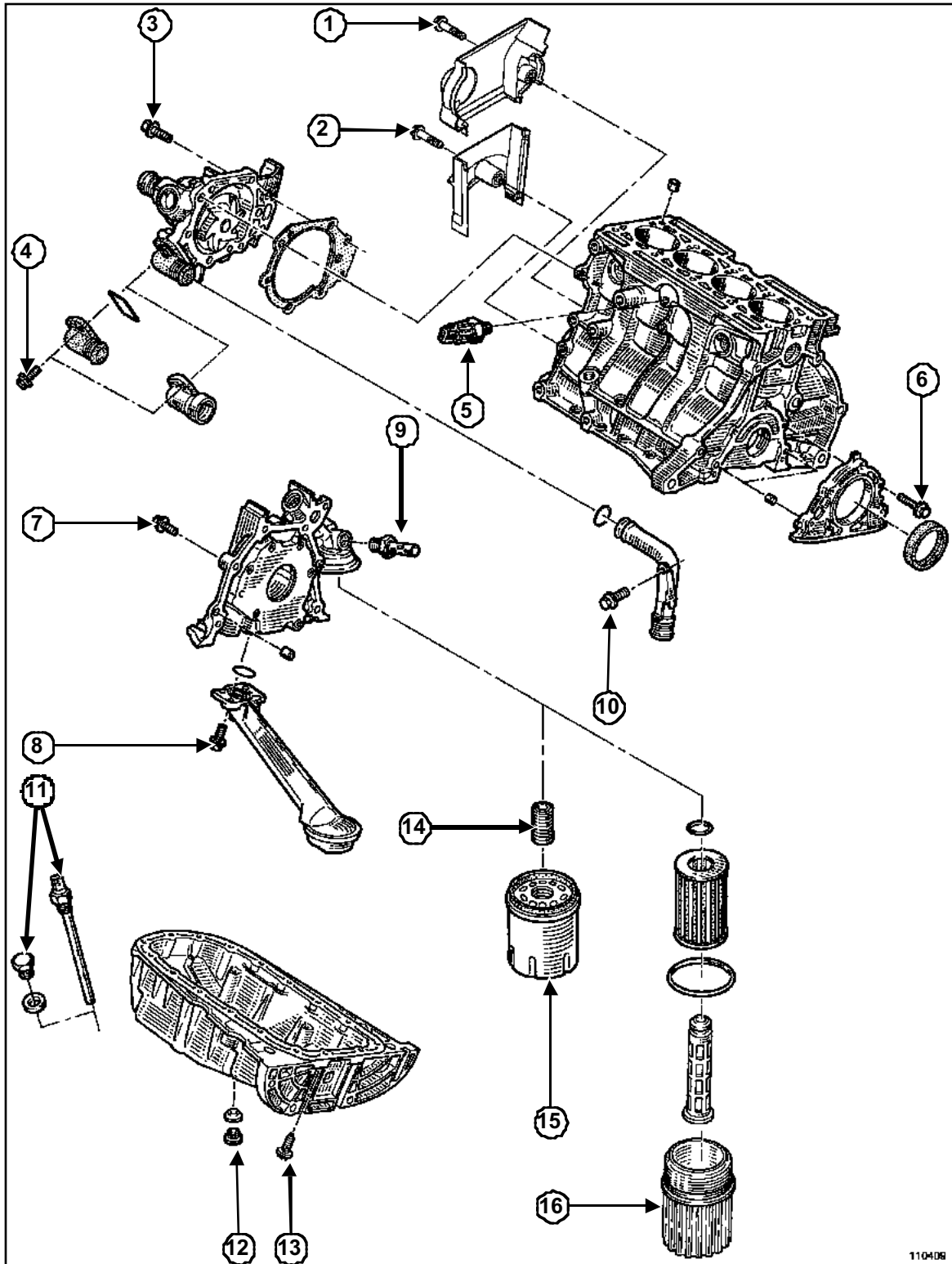
### Rotating parts

Tightening torques in Nm and/or in °		
1	Crankshaft accessories pulley bolt	40 + 70° ± 6°
2	Crankshaft bearing bolts	20 + 76° ± 6°
3	Con rod cap bolt	14 + 39° ± 6°
4	Flywheel bolts	18 + 110° ± 6°
5	Clutch pressure plate bolt	25

## Tightening torque

D4D, and 700 or 712 or 720 – D4F, and 702 or 706 or 708 or 712 or 714 or 716 or 722 or 728 or 730 or 740

Lower engine:



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# ENGINE AND LOWER ENGINE ASSEMBLY

## Tightening torque

# 10A

D4D, and 700 or 712 or 720 – D4F, and 702 or 706 or 708 or 712 or 714 or 716 or 722 or 728 or 730 or 740

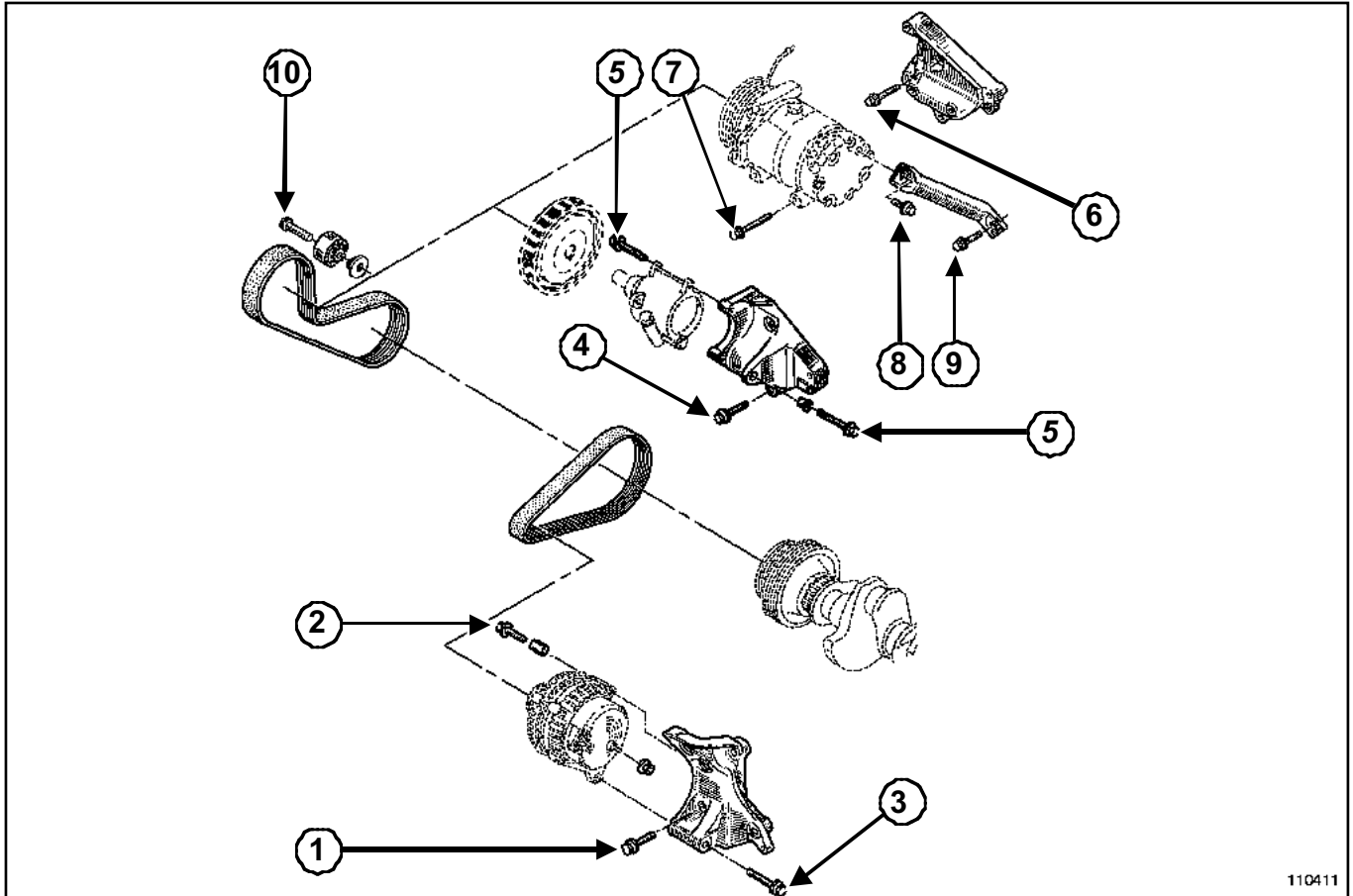
### Lower engine:

Tightening torques in Nm and/or in °		
1	Intermediate timing housing bolts	<b>10</b>
2	Lower timing cover bolt	<b>10</b>
3	Water pump bolts	<b>9</b>
4	Coolant pump inlet pipe bolts	<b>9</b>
5	Pinking sensor	<b>20 ± 4</b>
6	Crankshaft closure panel bolt	<b>9</b>
7	Oil pump housing bolt	<b>9</b>
8	Oil pump strainer bolt	<b>9</b>
9	Oil pressure sensor	<b>32 ± 2</b>
10	Water pump inlet pipe bolts	<b>9</b>
11	Oil level sensor Blanking cover cap	<b>30 ± 5</b>
12	Oil drain plug	<b>20</b>
13	Oil sump bolt	<b>10 / see order of tightening</b>
14	Oil filter fitting	<b>15 ± 3</b>
15	Oil filter	<b>10</b>
16	Oil filter	<b>20</b>

## Tightening torque

D4D, and 700 or 712 or 720 – D4F, and 702 or 706 or 708 or 712 or 714 or 716 or 722 or 728 or 730 or 740

Accessories end: Alternator / Power assisted steering / Air conditioning



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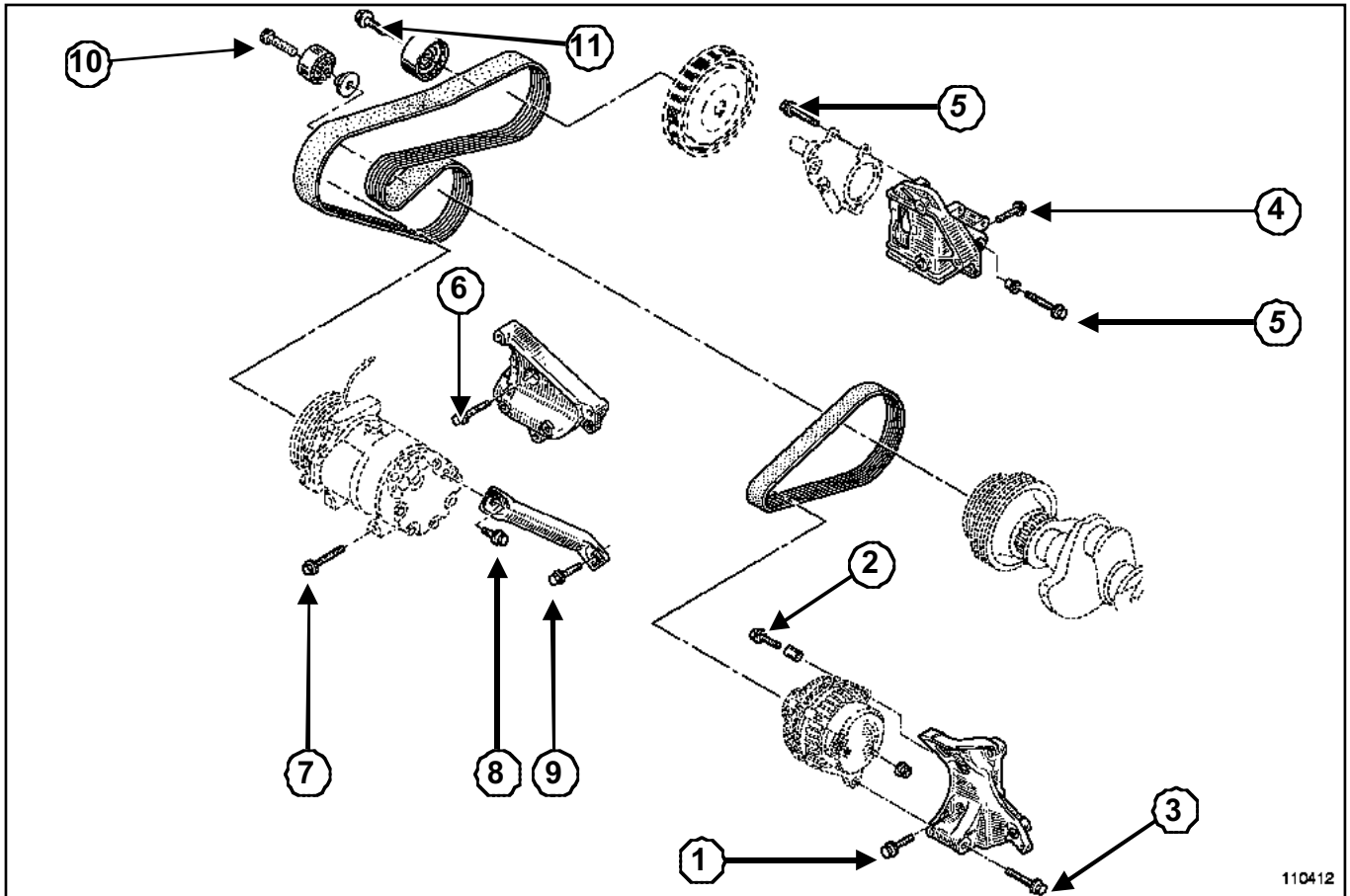
Accessories end: Alternator / Power assisted steering / Air conditioning

Tightening torques in Nm and/or in °		
1	Alternator mounting bolt	50
2	Alternator upper M8 bolt	21
3	Alternator lower M10 bolt	50
4	Power assisted steering mounting bolt	50
5	Power assisted steering pump bolt	21
6	Air conditioning compressor bracket bolt	50
7	Air conditioning compressor bolt	50
8	Air conditioning compressor strut bolt	12
9	Strut bolt on the cylinder block	21
10	Manual tensioner bolt	37

## Tightening torque

D4D, and 700 or 712 or 720 – D4F, and 702 or 706 or 708 or 712 or 714 or 716 or 722 or 728 or 730 or 740

Accessories end: Alternator / Power assisted steering / Air conditioning



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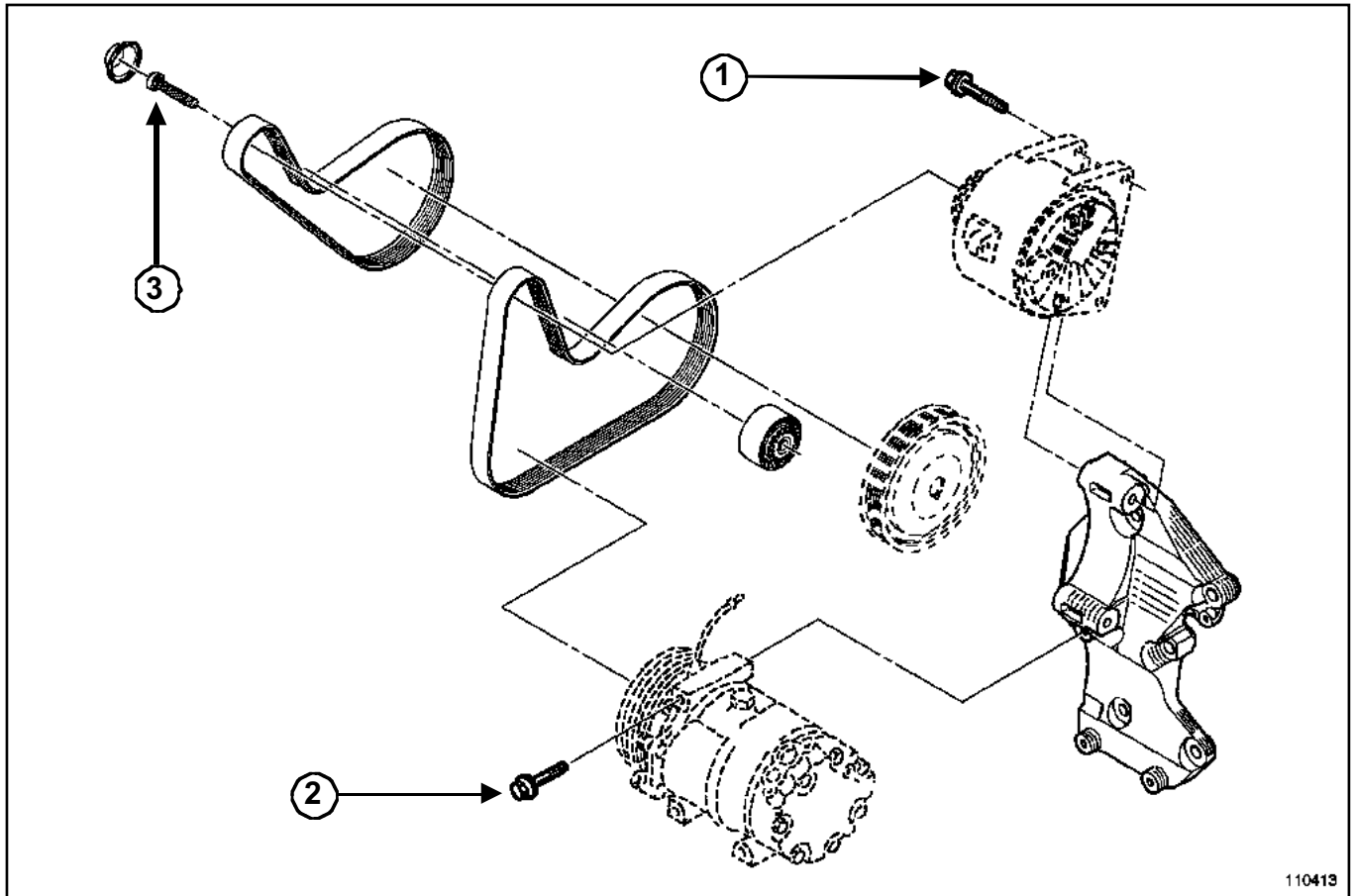
Accessories end: Alternator / Power assisted steering / Air conditioning

Tightening torques in Nm and/or in °		
1	Alternator mounting bolt	50
2	Alternator upper M8 bolt	21
3	Alternator lower M10 bolt	50
4	Power assisted steering mounting bolt	50
5	Power assisted steering pump bolt	21
6	Air conditioning compressor bracket bolt	50
7	Air conditioning compressor bolt	50
8	Air conditioning compressor strut bolt	12
9	Strut bolt on the cylinder block	21
10	Manual tensioner bolt	37
11	Pulley bolt	21

## Tightening torque

D4D, and 700 or 712 or 720 – D4F, and 702 or 706 or 708 or 712 or 714 or 716 or 722 or 728 or 730 or 740

Accessories end: Alternator / Air conditioning



110413

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Accessories end: Alternator / Air conditioning

Tightening torques in Nm and/or in °		
-	Multifunction accessories mounting bolt	50
1	Alternator bolt	21
2	Air conditioning compressor bolt	21
3	Manual tensioner bolt	37

## Upper engine: Specifications

D4D, and 700 or 712 or 720 – D4F, and 702 or 706 or 708 or 712 or 714 or 716 or 722 or 728 or 730 or 740

### UPPER ENGINE

#### 1 - Cylinder head tightening procedure

##### WARNING

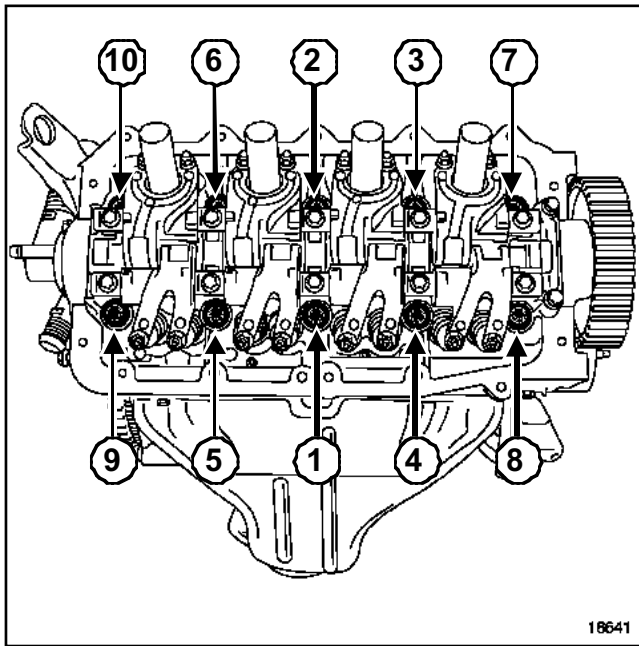
- To ensure that the bolts are correctly tightened, use a syringe to remove any oil that may be in the cylinder head mounting holes.

##### WARNING

- Replace the cylinder head mounting bolts with new ones whenever they are removed.

##### WARNING

- Do not oil the new bolts.



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Preseating the gasket:

- Tighten to torque, in the correct order, the cylinder head mounting bolts **20 Nm ± 2 Nm**

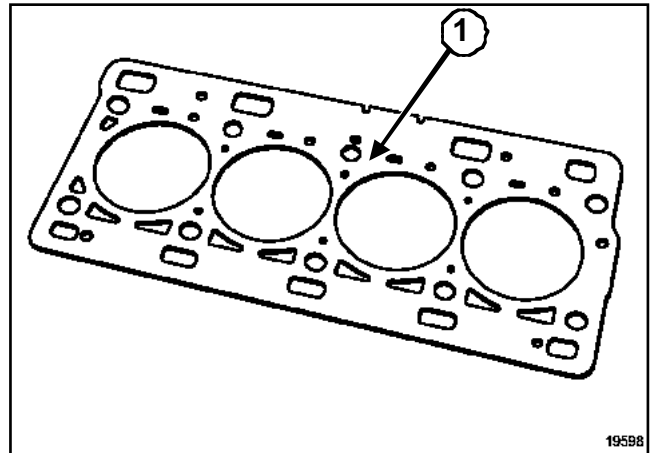
Tightening the cylinder head:

- Loosen and retighten to torque, bolt by bolt, in the order and to the correct angle: **20 Nm ± 2 Nm + 230° ± 6°**.

##### WARNING

Do not retighten the cylinder head bolts after applying this procedure.

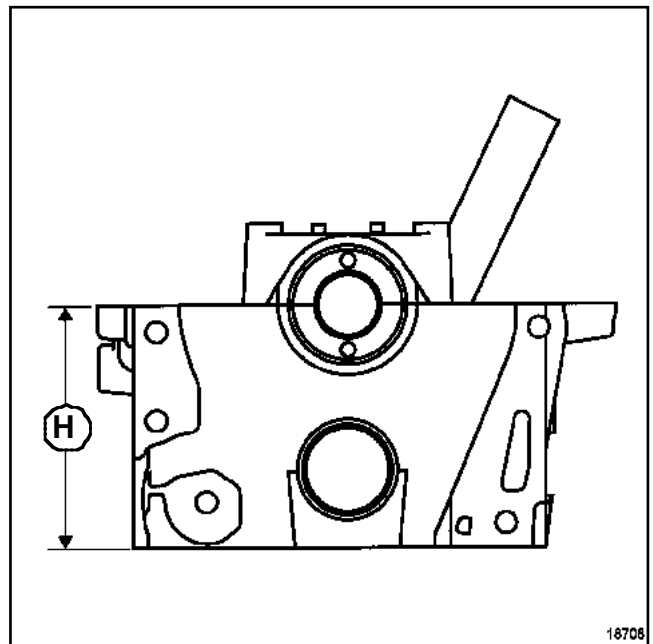
#### 2 - Cylinder head gasket



19598  
19598

The thickness of the cylinder head gasket is measured at (1): **0.49 ± 0.04 mm**

#### 3 - Cylinder head



18708  
18708

The height of the cylinder head (H) is measured **99 ± 0.05 mm**.

Maximum bow of sealing surface:

- cylinder head: **0.05 mm**.

- cylinder block: **0.03 mm**

Test the cylinder head for possible cracks with the cylinder head test kit (see **Garage Equipment Catalogue**).

## Upper engine: Specifications

D4D, and 700 or 712 or 720 – D4F, and 702 or 706 or 708 or 712 or 714 or 716 or 722 or 728 or 730 or 740

### WARNING

No regrinding is permitted.

### 4 - Ignition

The firing order is 1 - 3 - 4 - 2 .

Cylinder **no. 1** is at the flywheel end.

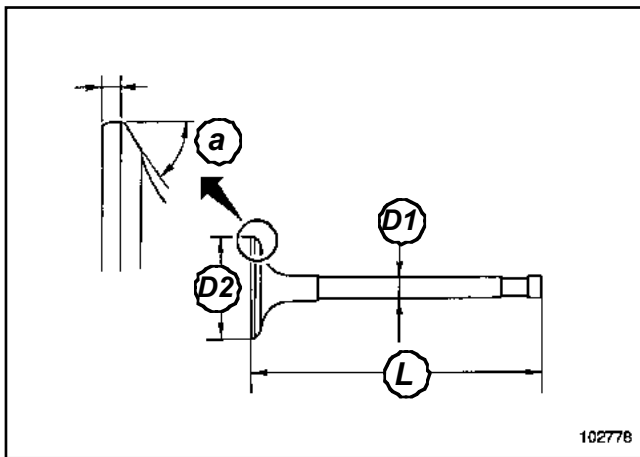
### Spark plugs

Electrode gap = **0.90 ± 0.05 mm**.

The tightening torque of the spark plugs should be **20 to 27 Nm**.

### 5 - Valves

#### a - Valve dimensions



	Inlet	Exhaust
(D1) Stem diameter (mm)	5.48 <sup>0</sup> <sub>-0.015</sub>	5.47 <sup>0</sup> <sub>-0.015</sub>
(D2) Head diameter (mm)	26 ± 0.12	22.1 ± 0.12
(L) Total length (mm)	110.54 to 110.99	112.27 to 112.72
(A) Face angle (°)	90	

#### b - Maximum valve lift

D4D, and 712 – D4F, and 702 or 706 or 708 or 712 or 714 or 716 or 722 or 728 or 730

Inlet: **8.849 mm**.

Exhaust: **8.850 mm**.

D4F, and 740

Inlet: **8.004 mm**.

Exhaust: **8.850 mm**.

### 6 - Checking the valve clearance

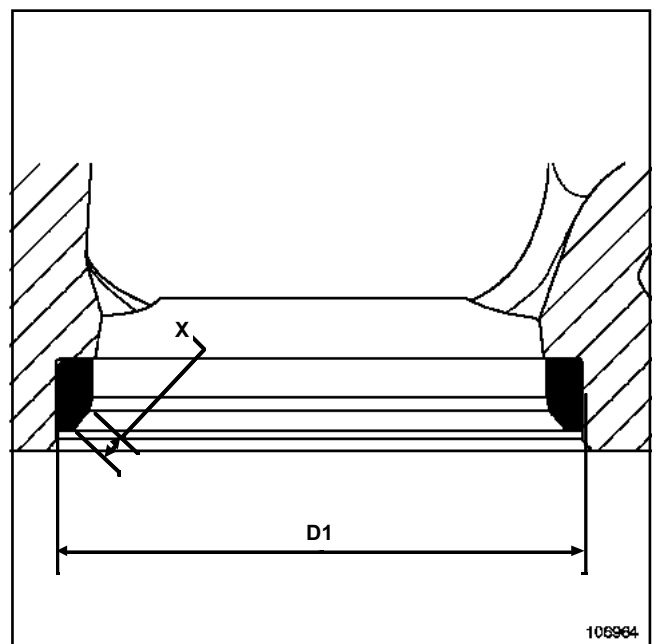
#### Clearance when cold (mm)

- Inlet: **0.05 to 0.15 mm**.

- Exhaust: **0.10 to 0.20 mm**.

Tighten to torque the rocker arm adjusting nut **10 Nm**.

### 7 - Valve seats



## Upper engine: Specifications

D4D, and 700 or 712 or 720 – D4F, and 702 or 706 or 708 or 712 or 714 or 716 or 722 or 728 or 730 or 740

	Inlet	Exhaust
Face angle $\alpha$ (°)	89°30'	
Mating face width (mm)	0.994 ± 0.403	1.136 ± 0.377
External diameter of seat D1 (mm)	28 ± 0.005	24 ± 0.005

## 8 - Valve guides

## a - Valve guide dimensions

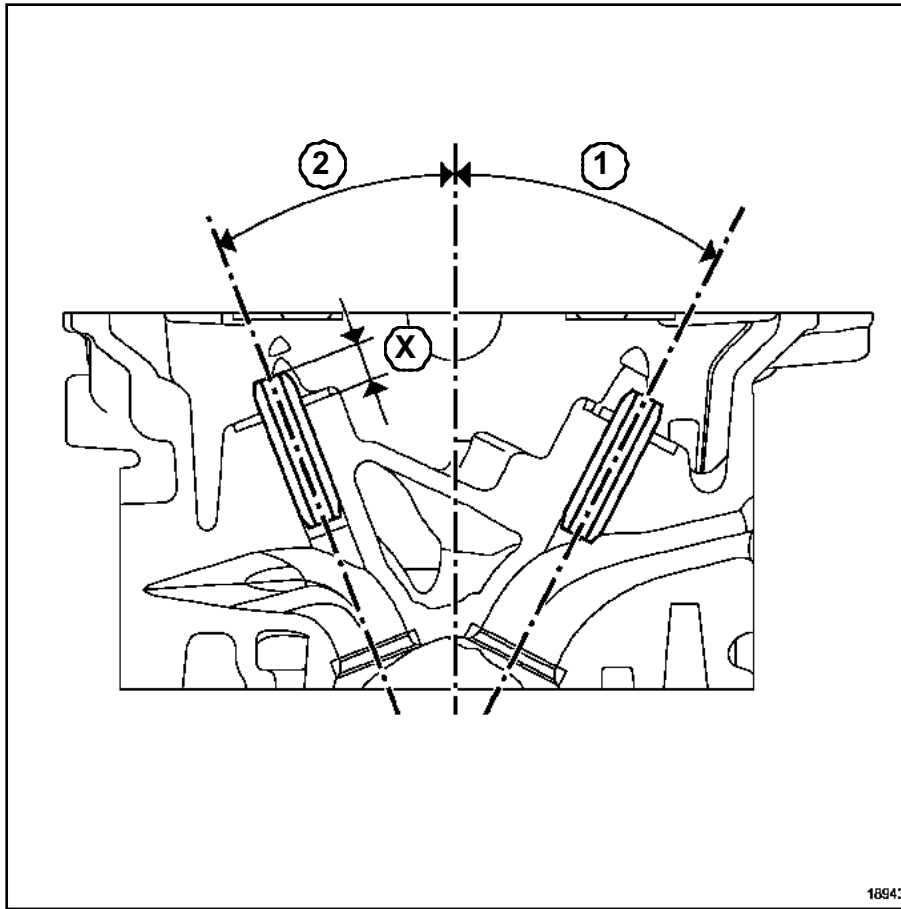
	Inlet	Exhaust
Guide length (mm)	40.5 ± 0.15	
Guide external diameter (mm)	11 <sup>+0.068</sup> <sub>+0.050</sub>	
Internal diameter of non-machined guide (mm)*	5 <sup>+0.075</sup> <sub>0</sub>	
Internal diameter of non-machined guide (mm)*	5.5 <sup>+0.018</sup> <sub>0</sub>	
Internal diameter of seat in cylinder head (mm)	11 ± 0.013	

\* The dimension is measured with the guide fitted to the cylinder head.

## Upper engine: Specifications

D4D, and 700 or 712 or 720 – D4F, and 702 or 706 or 708 or 712 or 714 or 716 or 722 or 728 or 730 or 740

### b - Angles and positions of the guides



18943

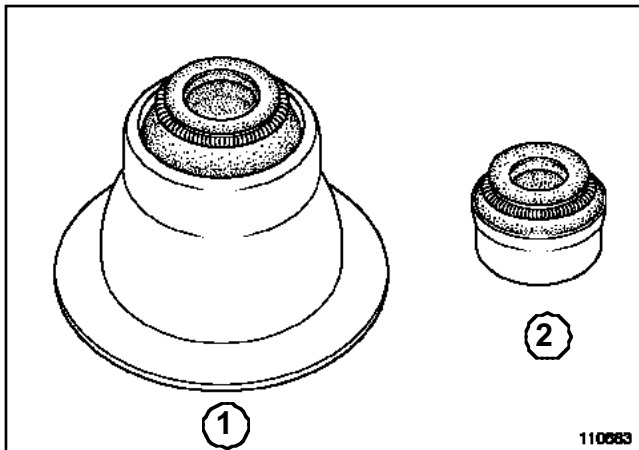
#### Guide angles

- (1) Inlet:  $\alpha = 27^\circ$ ,
- (2) Exhaust:  $\alpha = 21^\circ$ .

#### Guide positions:

- Inlet and exhaust: (x) =  $10.3 \pm 0.15$  mm.

### 9 - Valve stem seals



110683

#### Note:

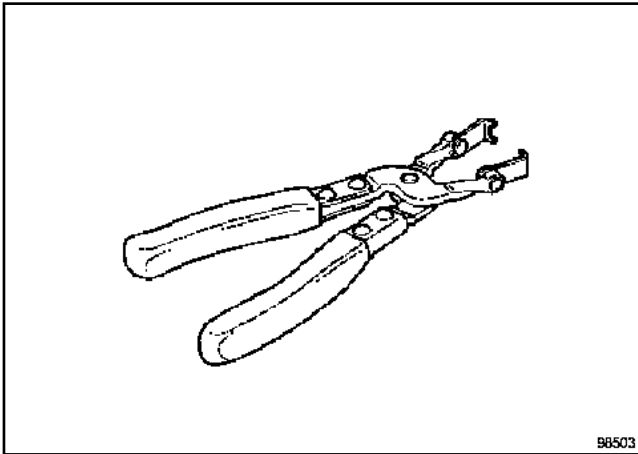
There are two types of valve stem seal:

- the valve stem seal with a lower spring retaining washer (1),
- the valve stem seal without a lower spring retaining washer (2)

The valve stem seals must be replaced each time the valves are removed.

## Upper engine: Specifications

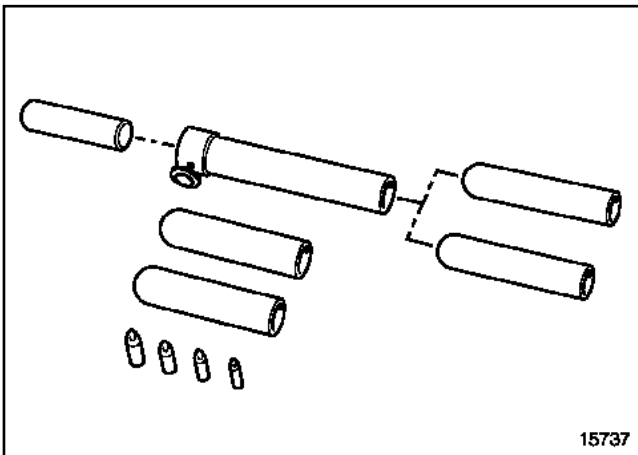
D4D, and 700 or 712 or 720 – D4F, and 702 or 706 or 708 or 712 or 714 or 716 or 722 or 728 or 730 or 740



98503  
98503

Removal is carried out using tool (Mot. 1335).

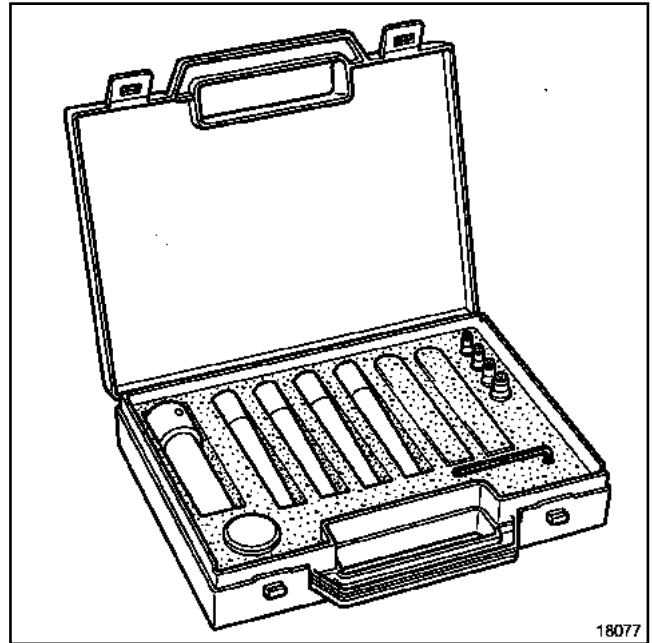
It is imperative to fit the valve stem seals using these tools:



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- kit (Mot. 1511) for seal types (1).

- kit (Mot. 1755) for seal types (2).



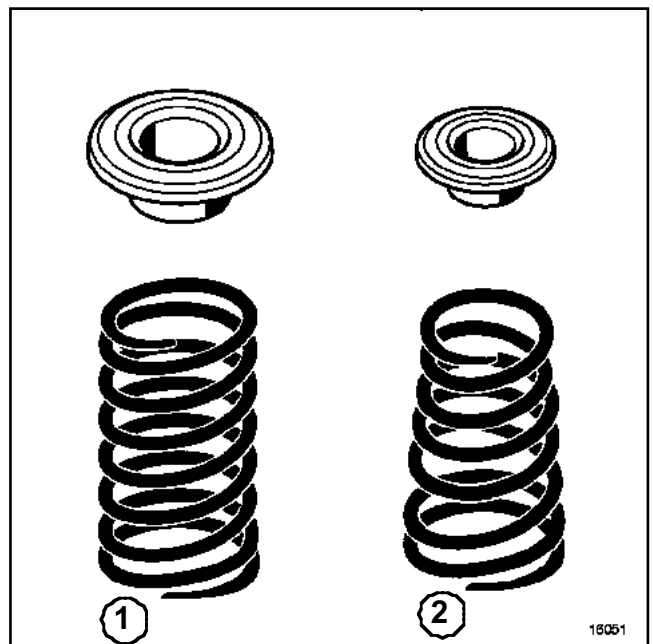
18077  
18077

- or using suitable equipment (for both types of seal).

### WARNING

Do not lubricate the valve stem seals before fitting them.

### 10 - Valve springs



16051  
16051

The valve stem springs may either be of the **cylindrical type(1)** or the **conical type(2)**.

## Upper engine: Specifications

D4D, and 700 or 712 or 720 – D4F, and 702 or 706 or 708 or 712 or 714 or 716 or 722 or 728 or 730 or 740

### a - Conical springs

Free length **40.20 mm**

Length under load:

- **145 ± 8 N: 34 mm**

- **428 ± 20 N: 25.15 mm**

Length of coiled seals **23.50 mm**

Wire diameter: **3.10 ± 0.03 mm**

Internal diameter:

- at top: **14.10 ± 0.2 mm,**

- At bottom: **16.80 ± 0.2 mm.**

External diameter:

- at top: **20.30 ± 0.2 mm,**

- At bottom: **23 ± 0.2 mm.**

### b - Cylindrical type springs

Free length: **42.9 ± 1 mm**

Length under load:

- **156 ± 10 N: 36 mm**

- **420 ± 20 N: 27.15 mm**

Length of coiled seals **25.7 mm**

Diameter of wire: **3 ± 0.03 mm.**

Internal diameter: **14.1 mm**

External diameter: **20.6 mm**

### 11 - Camshaft

#### a - Bearing diameters (mm)

Number of bearings: **5**

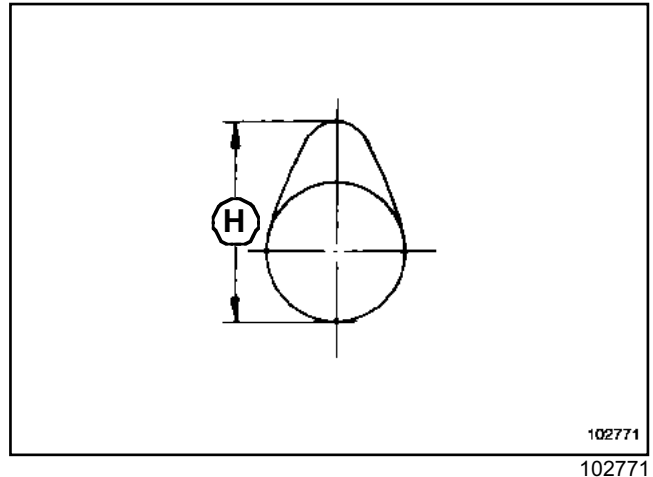
Longitudinal play: **0.08 to 0.178 mm**

Diametric clearance: **0.05 to 0.09 mm**

Flywheel end		
	Diameters of the journals on the camshaft (mm)	Diameters of the bearings on the cylinder head (mm)
1	<b>24.98 ± 0.01</b>	<b>25.05 ± 0.01</b>
2		
3		
4		

Flywheel end		
5	<b>27.98 ± 0.01</b>	<b>28.05 ± 0.01</b>
Timing end		

### b - Cam height H (mm)



D4D, and 712 – D4F, and 702 or 706 or 708 or 712 or 714 or 716 or 722 or 728 or 730

- Inlet cam: **38.586 ± 0.03 mm**

- Exhaust cam: **38.794 ± 0.03 mm**

D4F, and 740

- Inlet cam: **38.163 ± 0.03 mm**

- Exhaust cam: **38.794 ± 0.03 mm**

### c - Timing graphs (degrees °) (non verifiable)

D4D, and 712 – D4F, and 702 or 706 or 708 or 712 or 714 or 716 or 722 or 728 or 730

Theoretical settings for a lift of **0.7 mm** zero play.

## Upper engine: Specifications

D4D, and 700 or 712 or 720 – D4F, and 702 or 706 or 708 or 712 or 714 or 716 or 722 or 728 or 730 or 740

	Inlet	Exhaust
Inlet opening retardation*	10°	-
Inlet closing retardation	31°	-
Exhaust opening advance	-	25°
Exhaust closing advance**	-	8°

D4F, and 740

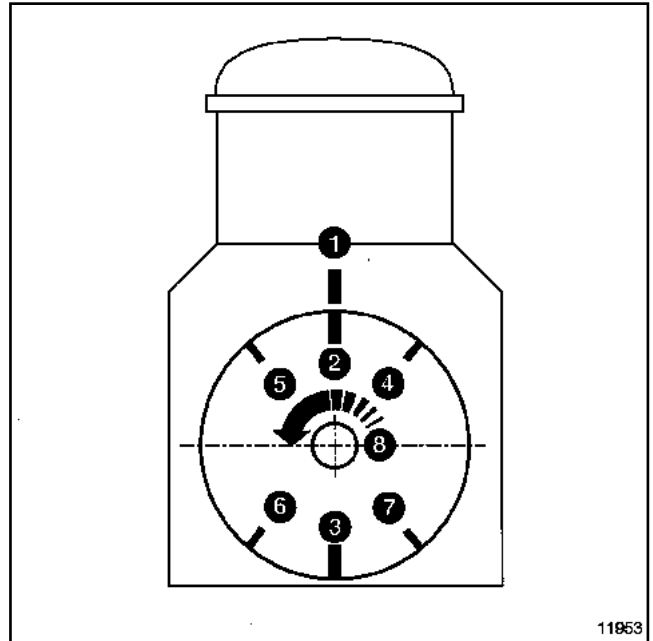
Theoretical settings for a lift of **0.7 mm** zero play.

	Inlet	Exhaust
Inlet opening retardation*	10°	-
Inlet closing retardation	24°	-
Exhaust opening advance	-	25°
Exhaust closing advance**	-	8°

**Note:**

\*If the inlet opening retardation is negative, the valves open after top dead centre.

If the exhaust closing advance is negative, the valves open before top dead centre.



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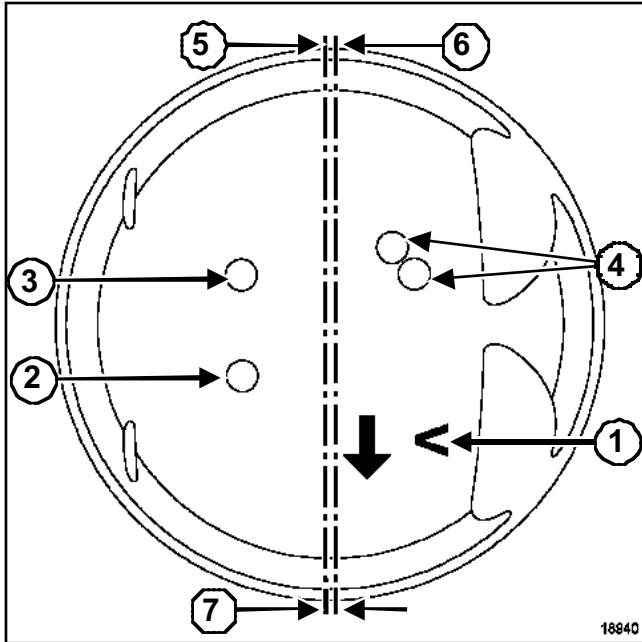
- 1 - Cylinder block TDC fixed marking
- 2 - Engine flywheel TDC moving marker
- 3 - Engine flywheel BDC moving marker
- 4 - Inlet opening retardation
- 5 - Exhaust closing advance
- 6 - Inlet closing retardation
- 7 - Exhaust opening advance
- 8 - Crankshaft direction of rotation

D4D, and 700 or 712 or 720 – D4F, and 702 or 706 or 708 or 712 or 714 or 716 or 722 or 728 or 730 or 740

### I - PISTONS

#### 1 - Piston markings

D4D



18840  
18940

(1) Direction of fitting of the piston, arrow towards the flywheel.

(2) Class of piston (A-B).

(3) Used by the supplier only.

(4) Used by the supplier only.

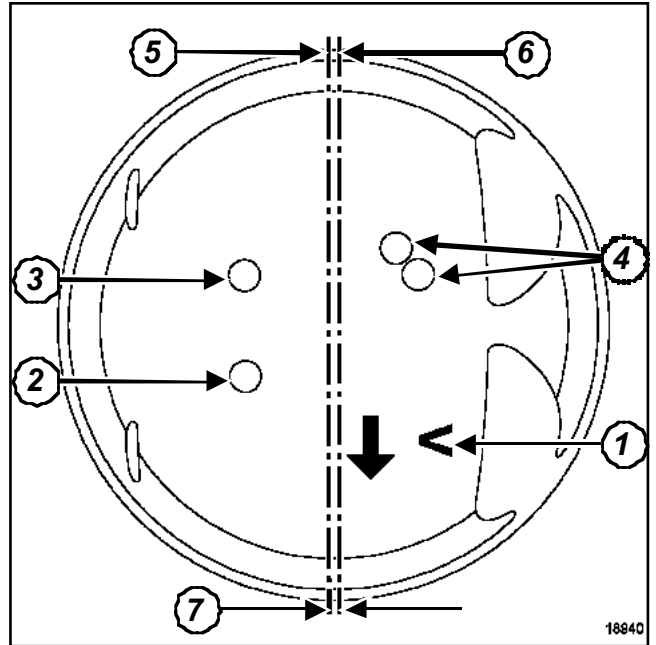
(5) Piston axis of symmetry.

(6) Gudgeon pin hole axis.

(7) Offset between gudgeon pin hole and piston axis of symmetry is **0.8 mm**.

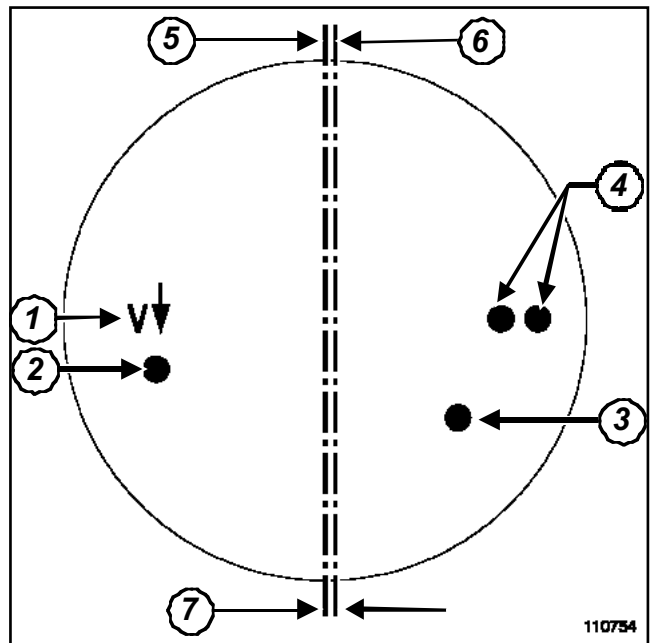
D4F

Model 1



18840  
18940

Model 2



110754  
110754

(1) Direction of fitting of the piston, arrow towards the flywheel.

(2) Class of piston (A-B).

(3) Used by the supplier only.

(4) Used by the supplier only.

(5) Piston axis of symmetry.

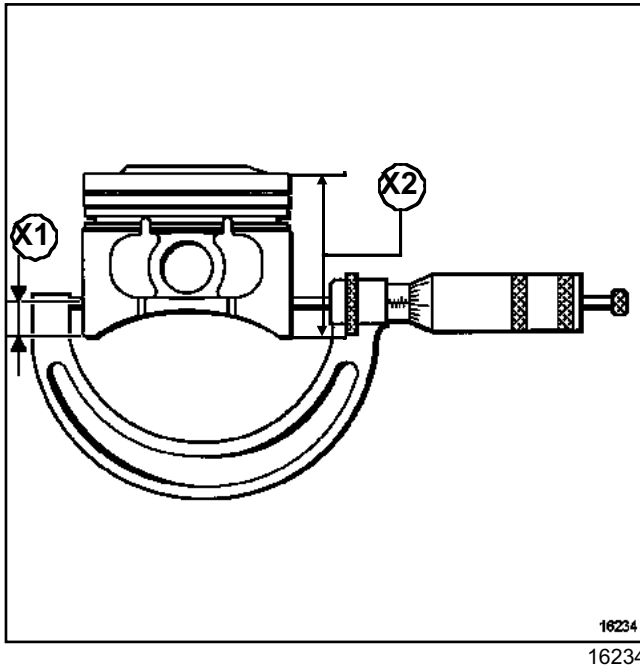
## Engine peripherals: Specifications

D4D, and 700 or 712 or 720 – D4F, and 702 or 706 or 708 or 712 or 714 or 716 or 722 or 728 or 730 or 740

(6) Gudgeon pin hole axis.

(7) Offset between gudgeon pin hole and piston axis of symmetry is **0.8 mm**.

### 2 - Measuring the piston diameter



#### D4D

The piston diameter should be measured at height **X1 = 10 mm** for a diameter of:

- class (A): **68.956 ± 0.006 mm**.
- class (B): **68.969 ± 0.006 mm**.

The height of the piston is **X2 = 50.86 mm**.

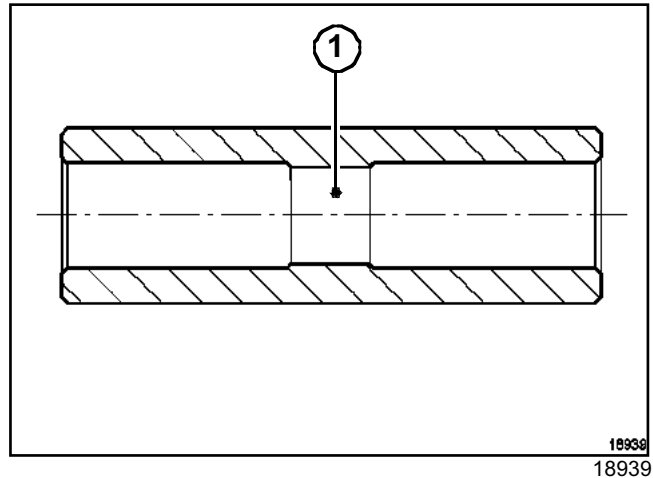
#### D4F

The piston diameter should be measured at height **X1 = 9 mm** for a diameter of:

- class (A): **68.976 ± 0.006 mm**.
- class (B): **68.989 ± 0.006 mm**.

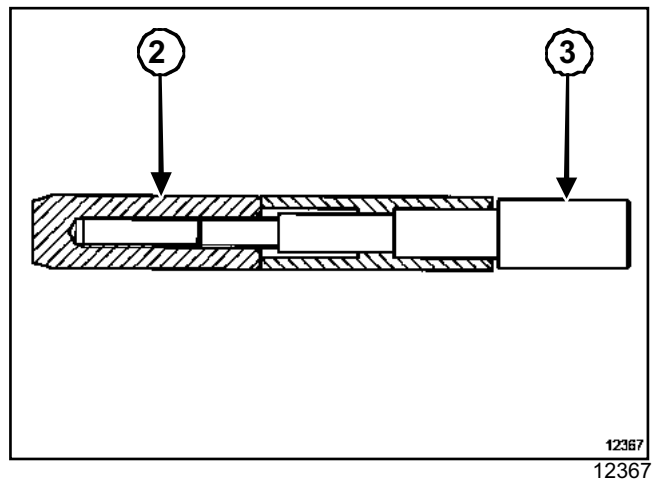
The height of the piston is **X2 = 44,70 mm**.

### II - GUDGEON PIN



The gudgeon pin is fitted freely in the piston and tight in the con rod.

The gudgeon pin has an inner shoulder (1).



The gudgeon pins are fitted using ring **19 B**, centring device **C19(2)** and fitting shaft **A19(3)** of (Mot. 574-25)

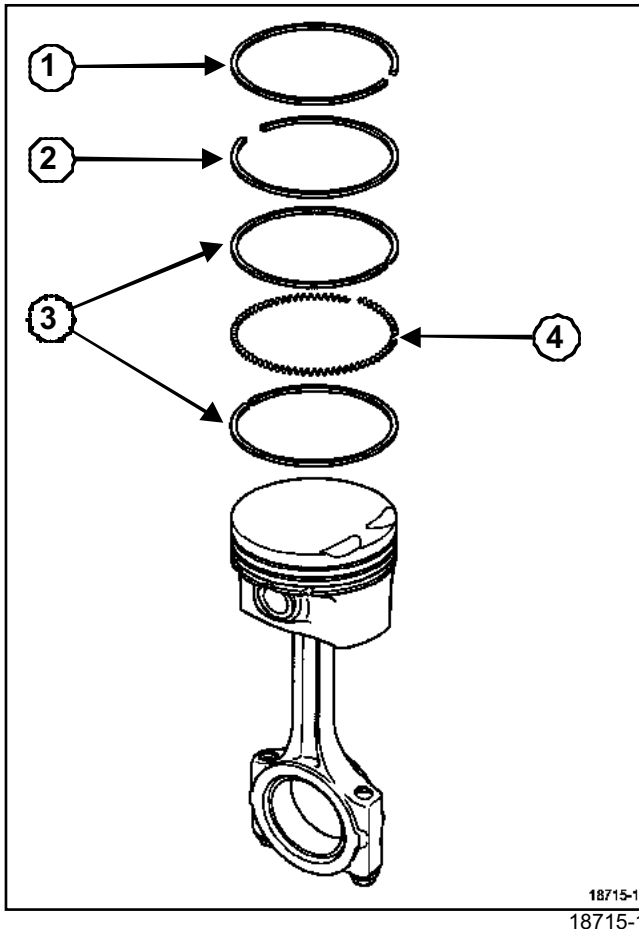
#### Measuring the gudgeon pin

- External diameter: **17.495 to 17.499 mm**
- Internal diameter: **10.3 to 10.6 mm**
- Length: **53.8 to 54 mm**
- Internal diameter of shoulder: **9.66 ± 0.2 mm**
- Length of inner shoulder: **8.2 ± 0.15 mm**

## Engine peripherals: Specifications

D4D, and 700 or 712 or 720 – D4F, and 702 or 706 or 708 or 712 or 714 or 716 or 722 or 728 or 730 or 740

### III - PISTON RINGS



Piston rings are supplied ready adjusted.  
The piston rings must be free to move in their grooves.

#### 1 - Thickness (mm)

Compression (1) :

- (D4D 700 / D4F 702,704,708,712,722,728,730,740):  
**1.175 to 1.19,**

- (D4D 700,706,712,720,726 / D4F 702,706,712,716):  
**1.5.**

Sealing (2) : **1.475 to 1.49**

Scraper ring: **2.31 to 2.46**

which consists of three parts:

two steel rings (3),

a circlip piston ring (4).

#### 2 - End gap (mm)

Compression ring: **0.2 to 0.35**

Sealing ring: **0.35 to 0.50**

Scraper ring: **0.2 to 0.9**

### IV - CON RODS

#### 1 - Con rod measurements

Big end side clearance: **0.21 to 0.453 mm**

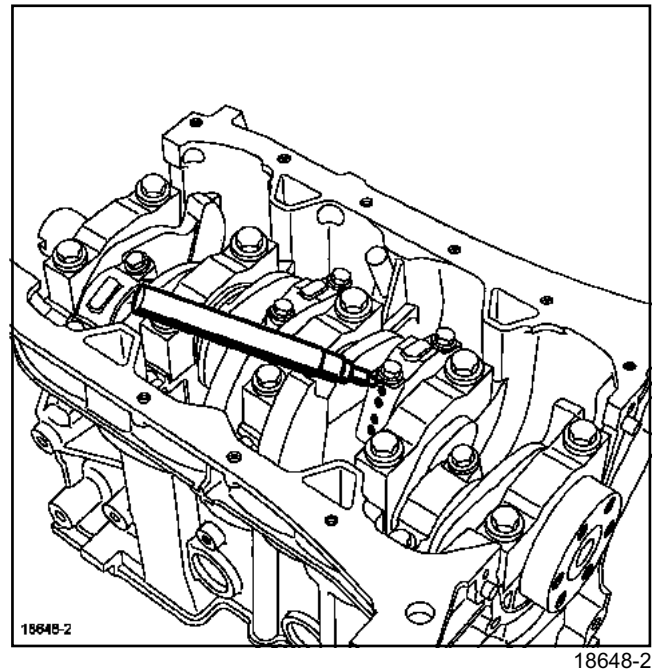
Big end diametric clearance: **0.025 to 0.064 mm**

Centre-to-centre distance between the big end and the small end: **122 ± 0.03 mm**

Diameter of the big end: **43.639 to 43.650 mm,**

Diameter of the small end: **17.461 to 17.479 mm**

The maximum weight difference for the con rod/piston/gudgeon pin assembly for the same engine must be **11 g.**



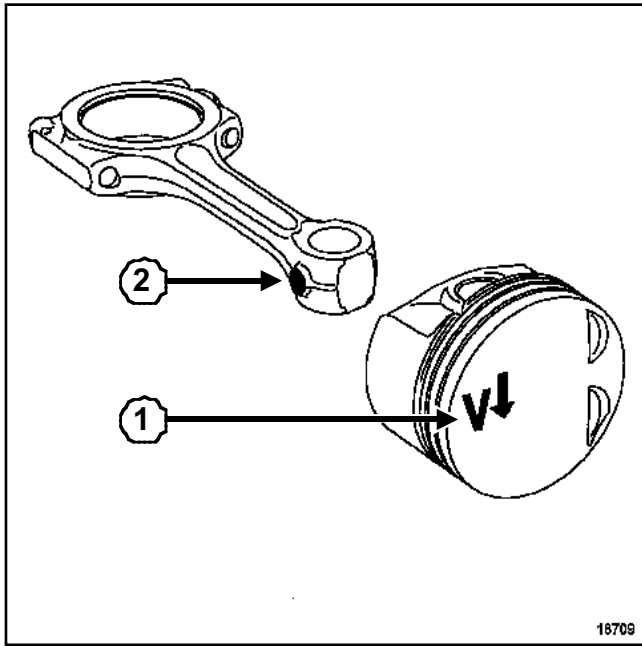
#### WARNING

Do not use a punch or an etching tool to mark the con rod caps to match their bodies, to prevent incipient breakage of the con rod.

Use a permanent marker pen.

D4D, and 700 or 712 or 720 – D4F, and 702 or 706 or 708 or 712 or 714 or 716 or 722 or 728 or 730 or 740

### 2 - Direction of fitting for con rod on the piston



Position arrow (1) on the piston facing downwards and index (2) on the con rod as shown in the drawing.

### V - CRANKSHAFT

#### Crankshaft measurements

Number of journals: 5

Burnished main bearing journals: nominal diameter **44 ± 0.01 mm**,

Burnished big end journals: nominal diameter **40<sup>0</sup><sub>-0.016</sub> mm**,

Crankshaft lateral play: **0 to 0.275 mm**.

Crankshaft diametrical play: **0.02 to 0.046 mm**.

The lateral shims must be on bearing n°3.

Crankshaft travel:

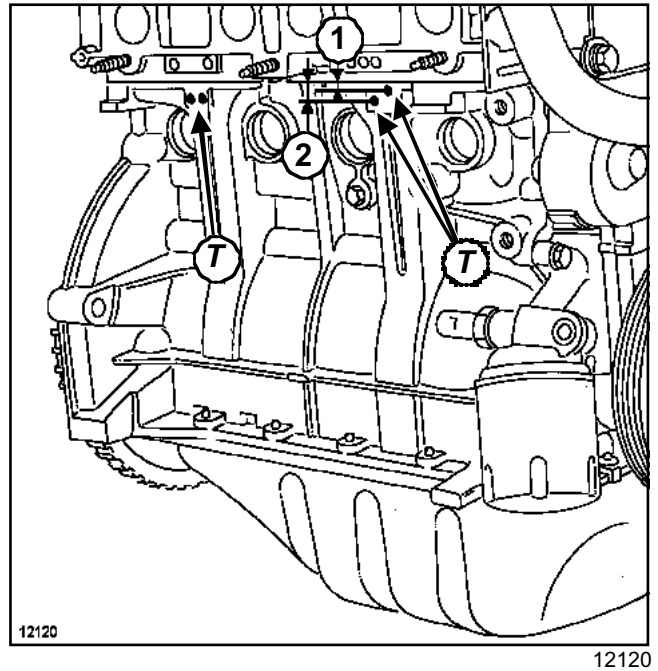
- D4D: **66.8 ± 0.05 mm**,

- D4F: **76.8 ± 0.05 mm**.

The lateral shims must be flush with bearing N°3.

### VI - CYLINDER BLOCK

#### Identifying the cylinder barrel diameter



#### WARNING

It is essential to observe the diameter pairings of the pistons and the cylinder block barrels.

The position of holes (T) in relation to the cylinder block sealing surface is used to identify the original nominal dimension of the barrel and consequently the diameters of the corresponding pistons.

D4D

#### Cylinder block barrel diameter table

Position of the holes (T)	Class marking	Piston diameter (mm)	Cylinder block barrel diameter in mm
1 = 5 mm	A	68.956 ± 0.006	69 to 69.015
2 = 9 mm	B	68.969 ± 0.006	69.015 to 69.030

## Engine peripherals: Specifications

D4D, and 700 or 712 or 720 – D4F, and 702 or 706 or 708 or 712 or 714 or 716 or 722 or 728 or 730 or 740

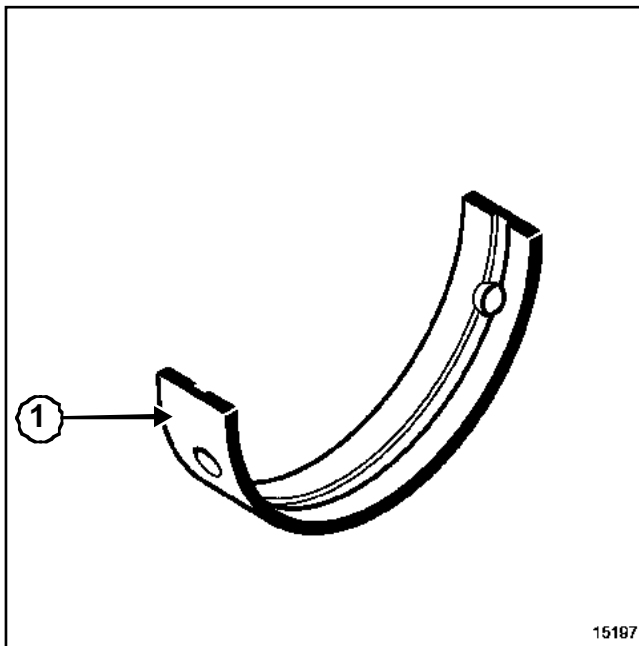
D4F

### Cylinder block barrel diameter table

Position of the holes (T)	Class marking	Piston diameter (mm)	Cylinder block barrel diameter in mm
1 = 5 mm	A	68.976 ± 0.006	69 to 69.015
2 = 9 mm	B	68.989 ± 0.006	69.015 to 69.030

## VII - BEARING SHELLS

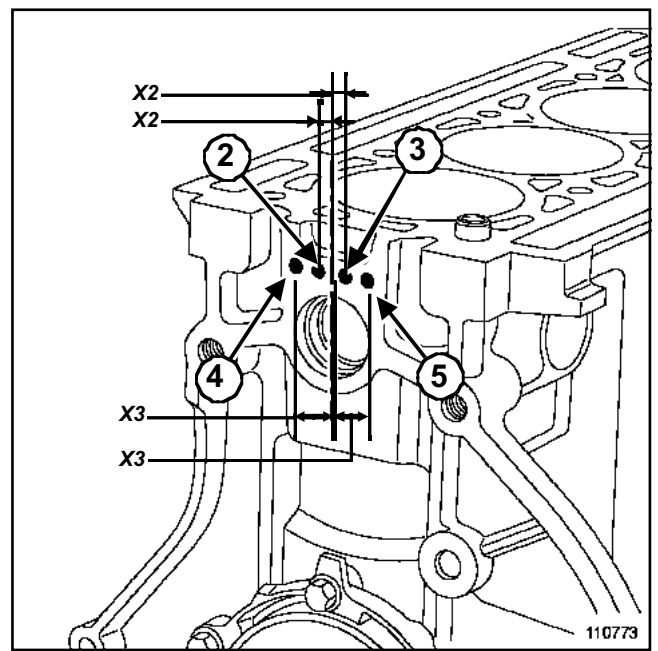
### 1 - Crankshaft bearing shells



The engine is fitted with bearing shells without foolproofing.

The bearing shells are engraved with a letter (1) corresponding to their colour. (B = blue, J = yellow, M = brown, R = red, V = green).

The bearing shells are fitted using tool (Mot. 1493-02).



Holes (2) and (3) correspond to class A and B upper bearings and are positioned at (X2) = 5 mm from the crankshaft vertical axis.

There cannot be only a single hole (A or B) corresponding to the single class of upper bearing shells.

Holes (4) and (5) are only used in the factory and are located at (X3) = 12 mm from the crankshaft vertical axis.

### Definition of an upper bearing shell

	Hole (2)	Hole (3)
Class type	Class A	Class B

## Engine peripherals: Specifications

D4D, and 700 or 712 or 720 – D4F, and 702 or 706 or 708 or 712 or 714 or 716 or 722 or 728 or 730 or 740

	Hole (2)	Hole (3)
Diameter of oil sump bearing	<b>47.612 inclusive to 47.618 exclusive</b>	<b>47.618 inclusive to 47.625 inclusive</b>
Marking and thickness of upper bearing shell	"B" blue <b>1.792 inclusive to 1.798 exclusive</b>	"V" green <b>1.798 inclusive to 1.804 inclusive</b>

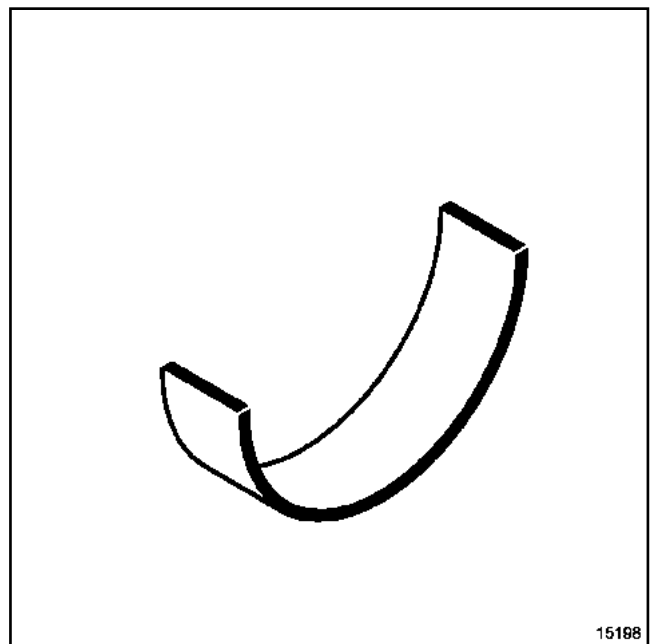
### Definition of a lower bearing shell

Crankshaft bushing diameter measurement	<b>A = 44.003 inclusive to 44.010 inclusive</b>	<b>B = 43.997 inclusive to 44.003 exclusive</b>	<b>C = 43.990 inclusive to 43.997 exclusive</b>
Marking and thickness of lower bearing shell	"M" brown <b>1.792 inclusive to 1.798 exclusive</b>	"J" yellow <b>1.798 inclusive to 1.804 inclusive</b>	"R" red <b>1.805 inclusive to 1.811 inclusive</b>

### Combinations

Oil sump bearing diameter	Class A			Class B		
Upper bearing shell marking	"B" blue			"V" green		
Crankshaft bearing diameters	A	B	C	A	B	C
Lower bearing shell marking	<b>"M" brown</b>	<b>"J" yellow</b>	<b>"R" red</b>	<b>"M" brown</b>	<b>"J" yellow</b>	<b>"R" red</b>
Combinations	1	2	3	4	5	6
Play between <b>0.020 and 0.046 mm</b> in consideration of <b>0.014 mm</b> expansion.						

### 2 - Con rod bearing shells



15198

15198

## Engine peripherals: Specifications

D4D, and 700 or 712 or 720 – D4F, and 702 or 706 or 708 or 712 or 714 or 716 or 722 or 728 or 730 or 740

The engine is fitted with bearing shells without foolproofing.

The bearing shells are fitted using tools (Mot. 1492) and (Mot. 1492-04).

# ENGINE AND LOWER ENGINE ASSEMBLY

## Consumables

# 10A

D4D, and 700 or 712 or 720 – D4F, and 702 or 706 or 708 or 712 or 714 or 716 or 722 or 728 or 730 or 740

### CONSUMABLES

Type	Quantity	Component concerned	Part no.
DECAPJOINT	Coat	Cleaning gasket faces	77 01 405 952
RHODORSEAL 5661	Coat	Engine oil sump Water pump Oil pump Crankshaft closure panel, engine flywheel end	77 01 404 452
LOCTITE FRENETANCHE	1 - 2 drops	-	77 01 394 070
Fluoride grease	Bead	Spark plug lead caps	82 00 168 855

## Parts to be replaced systematically

D4D, and 700 or 712 or 720 – D4F, and 702 or 706 or 708 or 712 or 714 or 716 or 722 or 728 or 730 or 740

### **PARTS ALWAYS TO BE REPLACED IN AN ENGINE REBUILD**

- All seals
- The oil filter
- The valve guides
- The valve stem seals
- The cylinder head bolts,
- The engine flywheel bolts
- The crankshaft bearing cap bolts
- the con-rod cap bolts
- the piston-gudgeon pin assembly (when they have been separated),
- The camshaft pulley bolt,
- The timing and accessories tensioners and pulleys,
- the belts,
- The crankshaft accessories pulley bolt
- The thermostat
- The cooling circuit hoses if they are damaged

# ENGINE AND LOWER ENGINE ASSEMBLY

## Special notes

# 10A

D4D, and 700 or 712 or 720 – D4F, and 702 or 706 or 708 or 712 or 714 or 716 or 722 or 728 or 730 or 740

### I -CLEANING THE ENGINE

Protect the various accessories to prevent them being splashed by water and cleaning products.

Do not allow water to enter the water intake pipes.

### II - FITTING THREAD INSERTS

All the threaded holes of the assembly including the engine (except the rocker cover) may be repaired using tool **threading repair kit**.

### III - CLEANING ENGINE PARTS

#### **WARNING**

When cleaning parts, it is essential to not knock the parts against each other, or their mating faces may be damaged and therefore their adjustments may be altered, which could damage the engine.

# ENGINE AND LOWER ENGINE ASSEMBLY

## Standard replacement

# 10A

D4D, and 700 or 712 or 720 – D4F, and 702 or 706 or 708 or 712 or 714 or 716 or 722 or 728 or 730 or 740

### STANDARD EXCHANGE ENGINE

#### 1 - Preparation of the old engine for return

Clean the engine.

Drain the oil and coolant from the old engine.

Secure the old engine to the stand and in the same conditions as the standard exchange engine:

- fit plastic plugs and covers,
- fit the cardboard cover over the whole assembly.

#### 2 - Parts to leave on the old engine

Parts to leave on the old engine or to include in the return box:

- the dipstick,
- the oil pump housing,
- the oil filter,
- the water pump,
- the rocker cover,
- the entire timing end (crankshaft sprocket, belt, tensioner, camshaft sprocket),
- the timing gear cases,
- the crankshaft accessories pulley,
- the flywheel or the starter plate,
- the clutch pressure plate and disc,
- the cylinder head suspended mounting support,
- the spark plugs.

#### 3 - Parts to remove from the old engine

Parts to remember to remove from the old engine:

- all the coolant circuit pipes,
- the lifting rings,
- the oil pressure switch,
- the pinking sensor,
- the coolant temperature sensor,
- the coolant inlet pipe,
- the coolant outlet unit,
- the inlet distributor,
- the exhaust manifold,
- the ignition coil,
- the accessories (alternator, air conditioning compressor, power assisted steering pump),

- the accessories multifunction mounting.

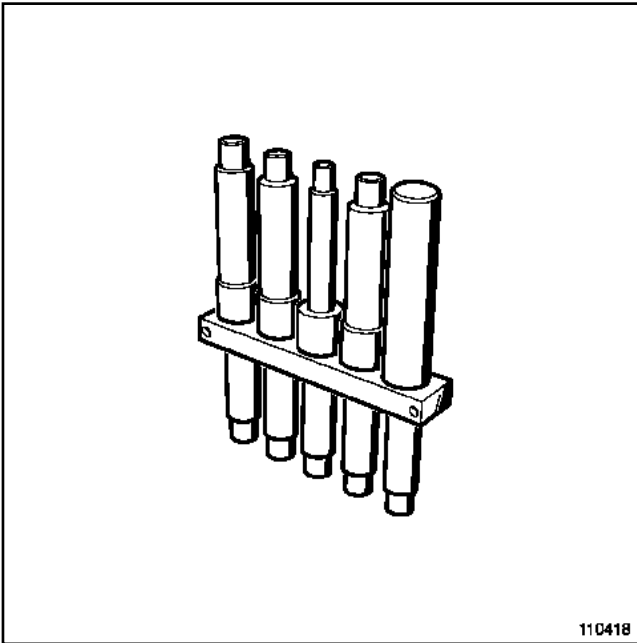
#### WARNING

The engine is supplied without oil.

Fill the engine.

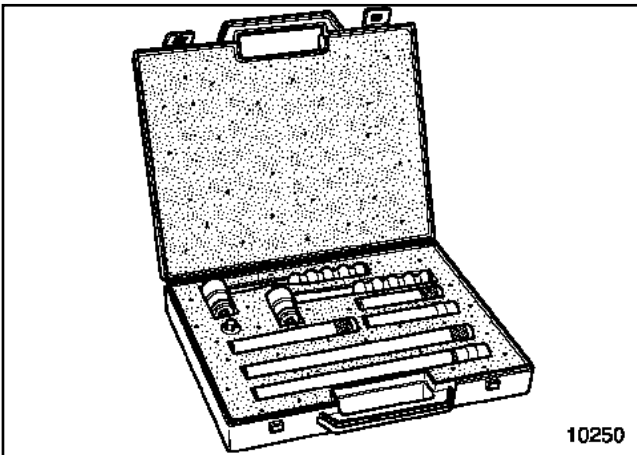
## Special tooling

D4D, and 700 or 712 or 720 – D4F, and 702 or 706 or 708 or 712 or 714 or 716 or 722 or 728 or 730 or 740



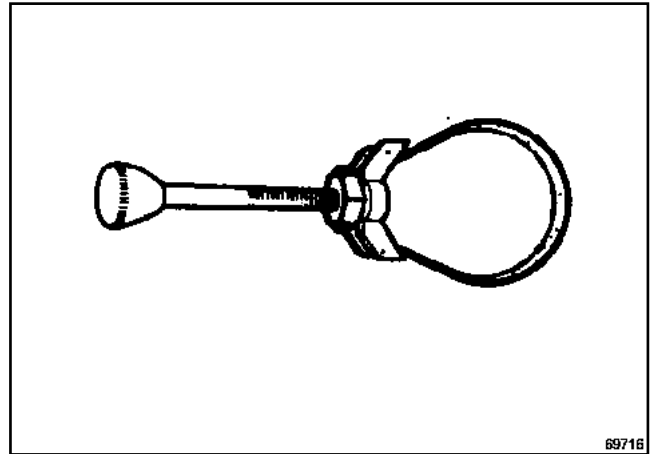
110418  
110418

Procedure part number	Parts Department Number	Description
(Emb. 1518)	00 00 151 800	Set of clutch plate centring mandrels



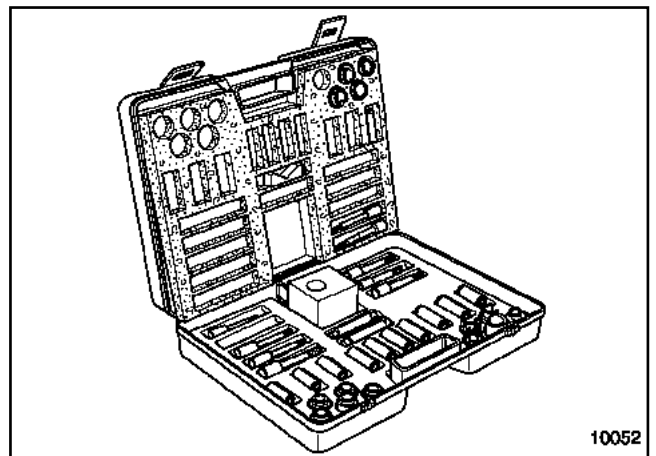
10250  
10250

Procedure part number	Parts Department Number	Description
(Ele. 1382)	00 00 138 200	Set of spark plug spanners



69716  
69716

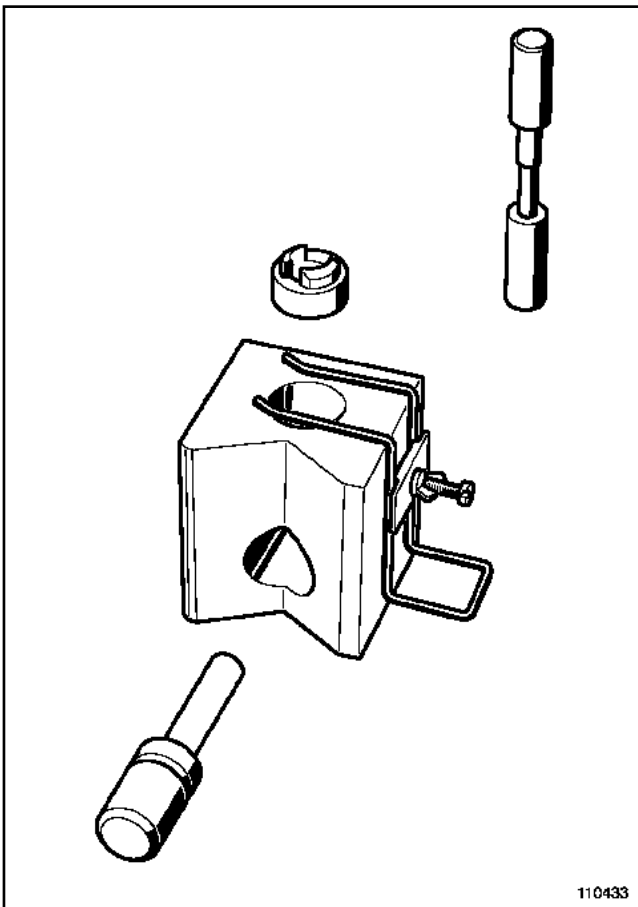
Procedure part number	Parts Department Number	Description
(Mot. 445)	00 00 044 500	Universal strap wrench for oil filter



10052  
10052

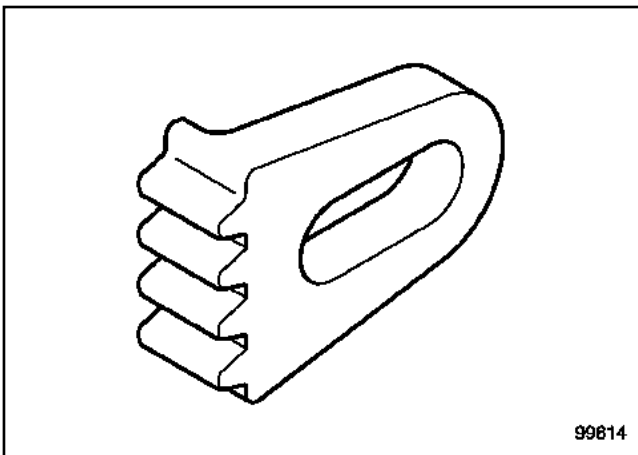
Procedure part number	Parts Department Number	Description
(Mot. 574-22)	00 00 057 422	Tooling for replacing gudgeon pins. Set in case.

D4D, and 700 or 712 or 720 – D4F, and 702 or 706 or 708 or 712 or 714 or 716 or 722 or 728 or 730 or 740



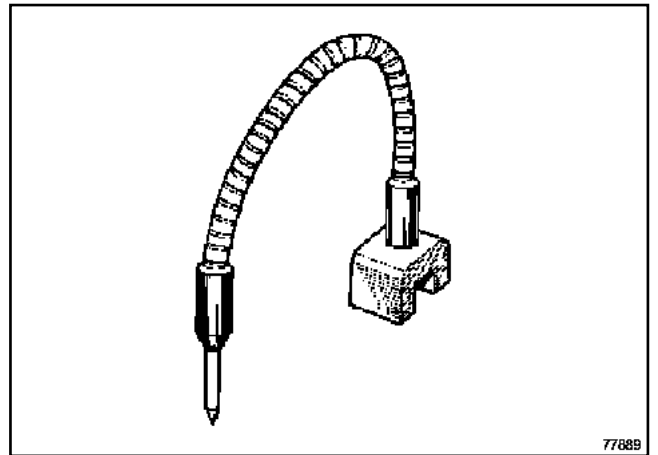
110433  
110433

Procedure part number	Parts Department Number	Description
(Mot. 574-25)	00 00 057 425	Shaft A19 and Shim C19 for fitting gudgeon pins



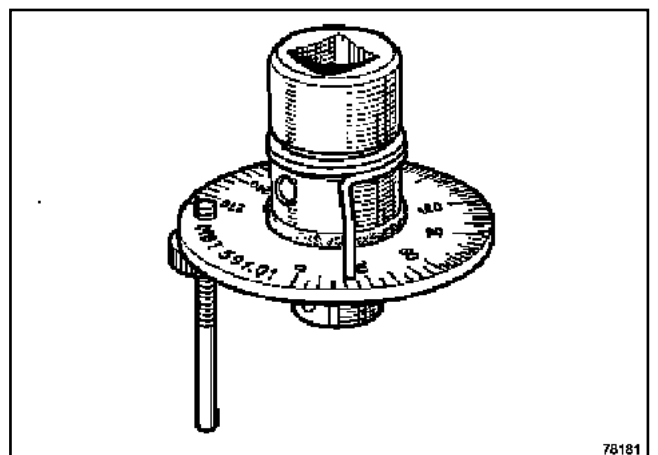
99614  
99614

Procedure part number	Parts Department Number	Description
(Mot. 582-01)	00 00 058 201	Engine flywheel immobilising tool.



77889  
77889

Procedure part number	Parts Department Number	Description
(Mot. 591-02)	00 00 059 102	Magnetised indexed flexible arm for cylinder head tightening angular wrench

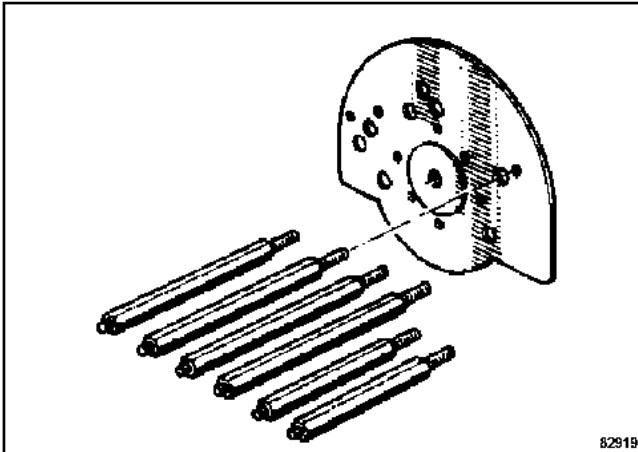


78181  
78181

## Special tooling

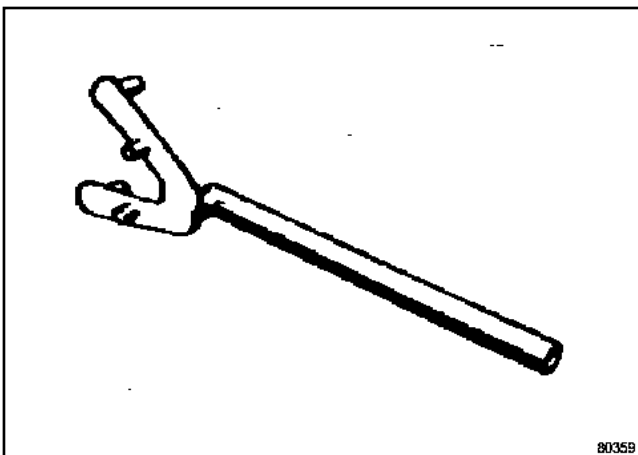
D4D, and 700 or 712 or 720 – D4F, and 702 or 706 or 708 or 712 or 714 or 716 or 722 or 728 or 730 or 740

Procedure part number	Parts Department Number	Description
(Mot. 591-04)	00 00 059 104	Cylinder head tightening angular wrench (1/2" drive)



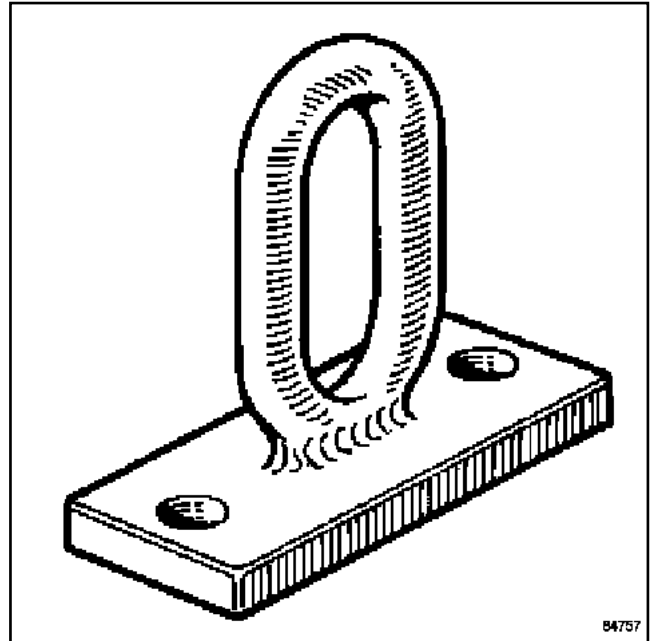
82919  
82919

Procedure part number	Parts Department Number	Description
(Mot. 792-03)	00 00 079 203	Engine support plate for Desvil engine stand (with studs from A to W)



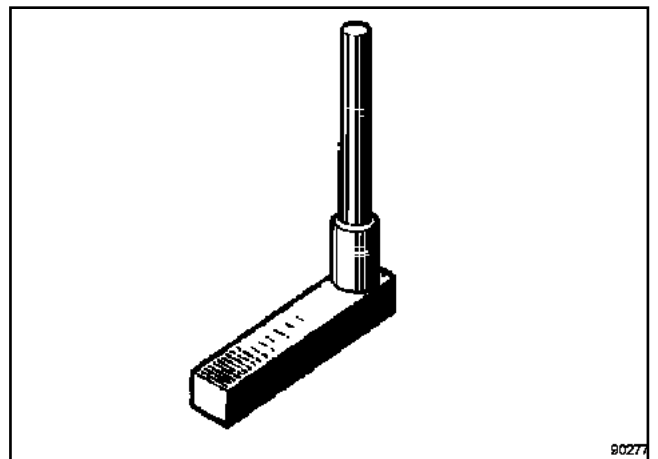
80359  
80359

Procedure part number	Parts Department Number	Description
(Mot. 799-01)	00 00 079 901	Tool for locking sprockets on toothed timing belt



84757  
84757

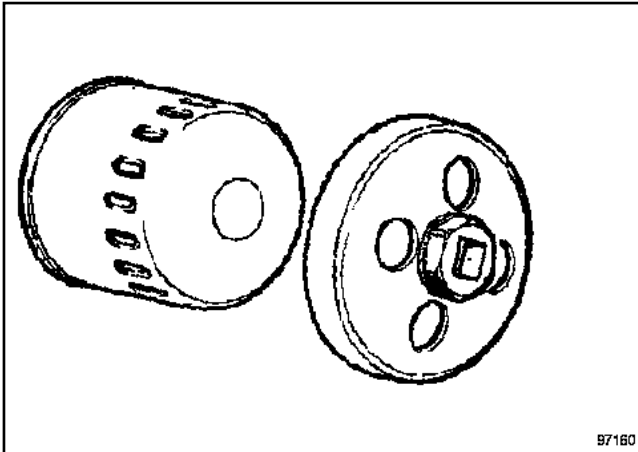
Procedure part number	Parts Department Number	Description
(Mot. 923)	00 00 092 300	Engine lifting ring.



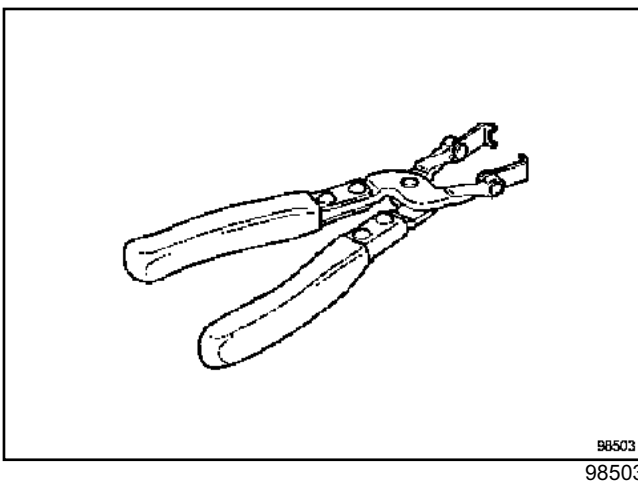
90277  
90277

D4D, and 700 or 712 or 720 – D4F, and 702 or 706 or 708 or 712 or 714 or 716 or 722 or 728 or 730 or 740

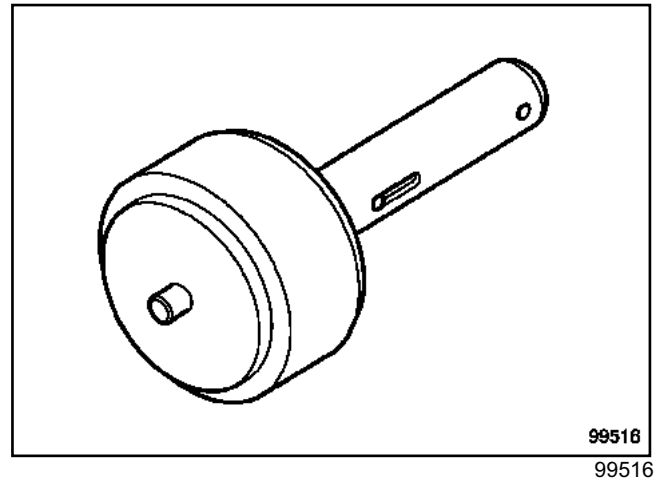
Procedure part number	Parts Department Number	Description
(Mot. 1054)	00 00 105 400	TDC setting rod



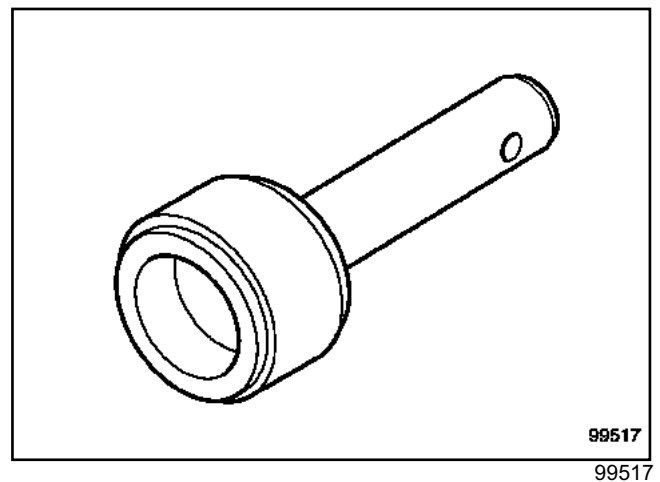
Procedure part number	Parts Department Number	Description
(Mot. 1330)	00 00 133 000	Oil filter removing tool (66 mm diameter).



Procedure part number	Parts Department Number	Description
(Mot. 1335)	00 00 133 500	Tool for removing valve stem seals

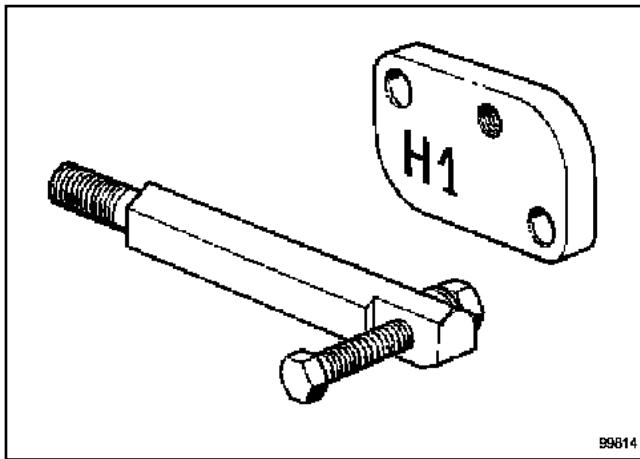


Procedure part number	Parts Department Number	Description
(Mot. 1354)	00 00 135 400	Tool for fitting crankshaft seal 70 x 86 x 8



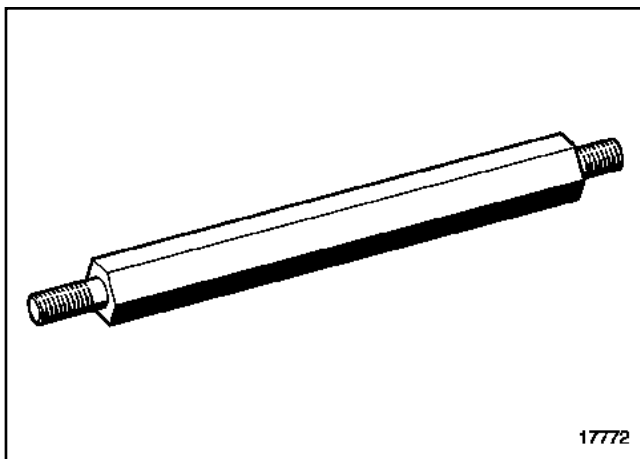
D4D, and 700 or 712 or 720 – D4F, and 702 or 706 or 708 or 712 or 714 or 716 or 722 or 728 or 730 or 740

Procedure part number	Parts Department Number	Description
(Mot. 1355)	00 00 135 500	Tool for fitting oil pump seal 32 x 44 x 6



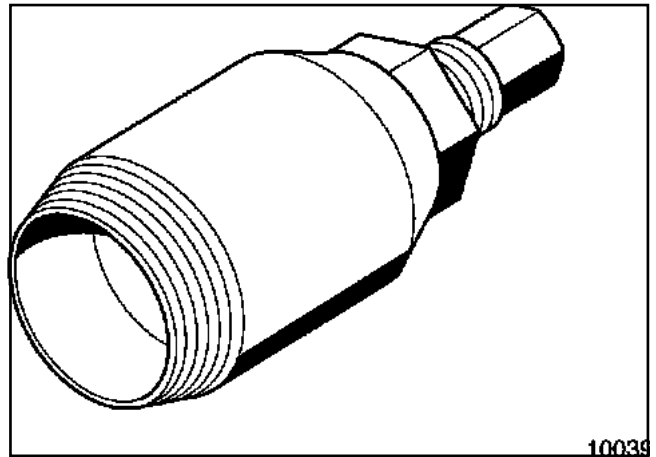
99814  
99814

Procedure part number	Parts Department Number	Description
(Mot. 1360)	00 00 136 000	Stud W and support plate H1 for engine support, can be adapted to a DESVIL support.



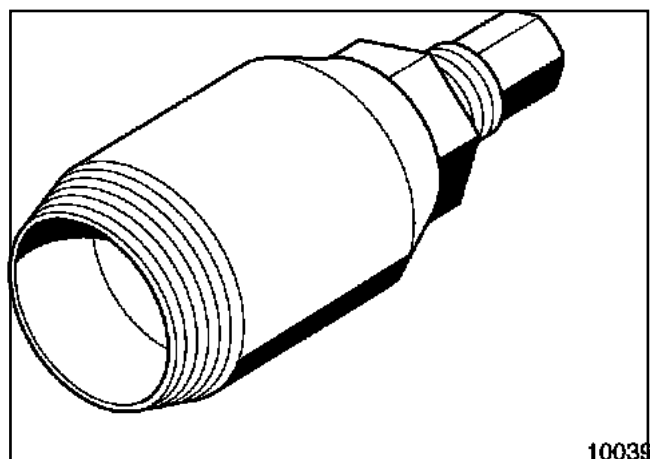
17772  
17772

Procedure part number	Parts Department Number	Description
(Mot. 1360-01)	00 00 136 001	W1 stud, replaces Mot. 1360 stud W



10039  
10039

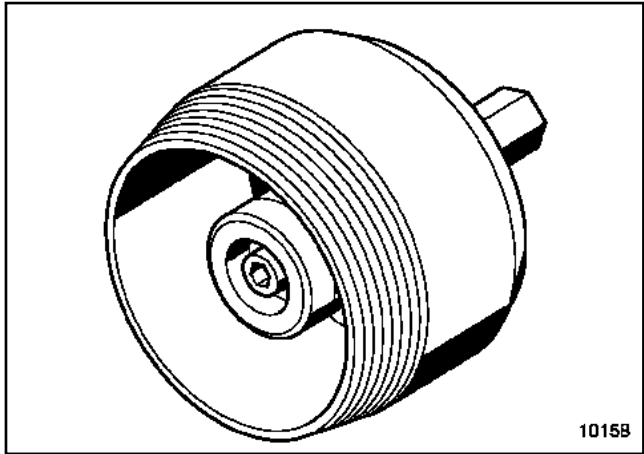
Procedure part number	Parts Department Number	Description
(Mot. 1381)	00 00 138 100	Camshaft seal extractor 30 x 42 x 7



10039  
10039

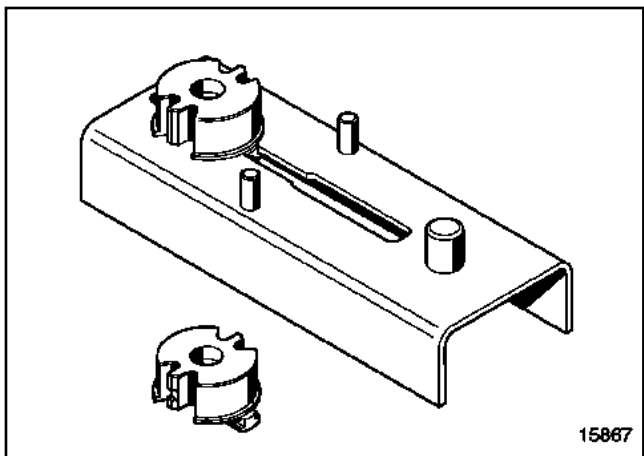
D4D, and 700 or 712 or 720 – D4F, and 702 or 706 or 708 or 712 or 714 or 716 or 722 or 728 or 730 or 740

Procedure part number	Parts Department Number	Description
(Mot. 1374)	00 00 137 400	Oil pump seal extractor



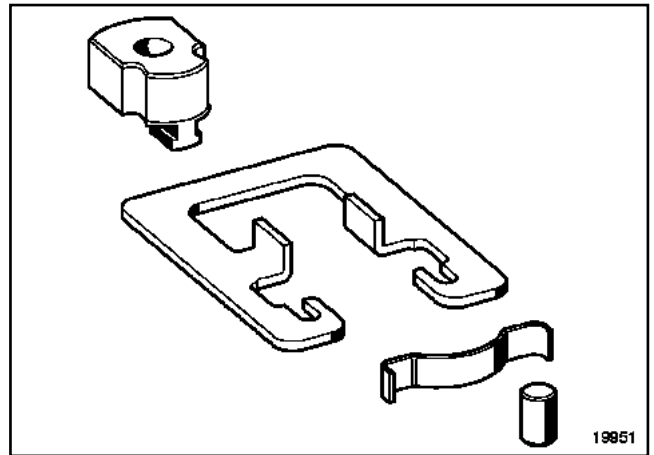
10158

Procedure part number	Parts Department Number	Description
(Mot. 1377)	00 00 137 700	Crankshaft oil seal removal tool, 80 x 70 x 8.



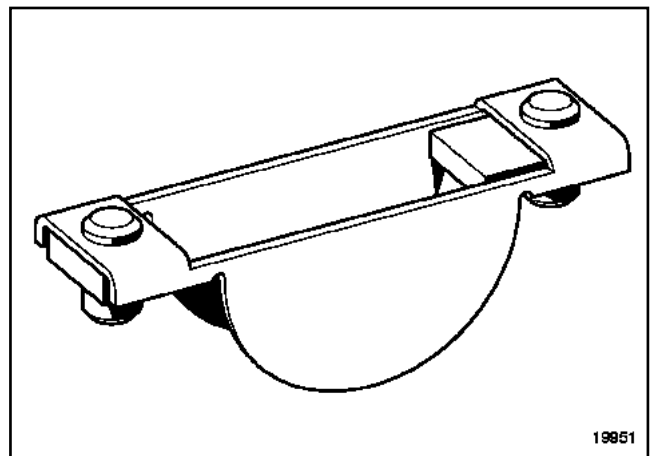
15867

Procedure part number	Parts Department Number	Description
(Mot. 1492)	00 00 149 200	Tool for fitting con rod bearing shells



19950

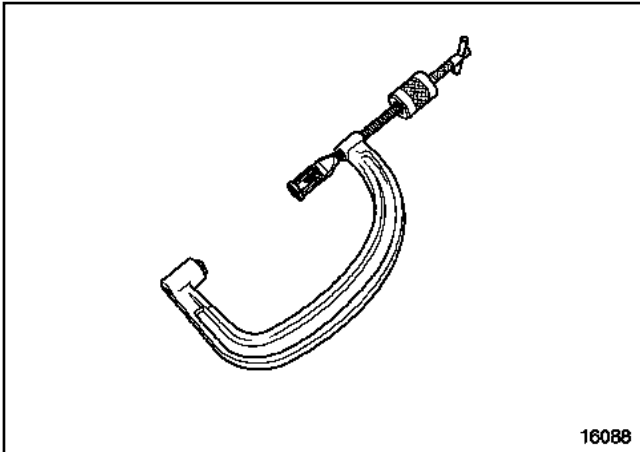
Procedure part number	Parts Department Number	Description
(Mot. 1492-04)	00 00 149 204	Adaptation kit for fitting the separable con rod bearing shells.



19951

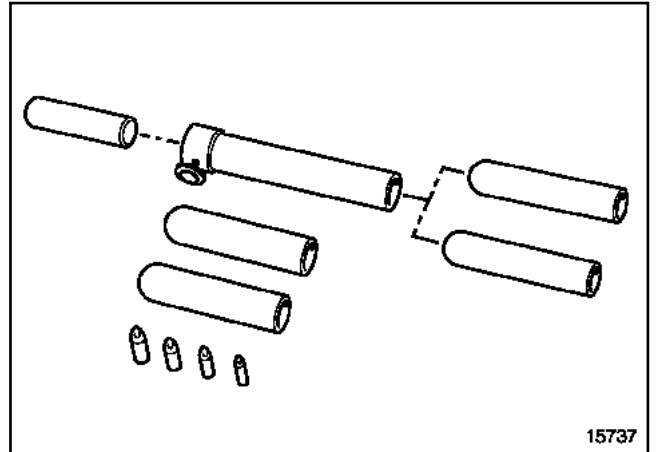
D4D, and 700 or 712 or 720 – D4F, and 702 or 706 or 708 or 712 or 714 or 716 or 722 or 728 or 730 or 740

Procedure part number	Parts Department Number	Description
(Mot. 1493-02)	00 00 149 302	Crankshaft bearing centring tool



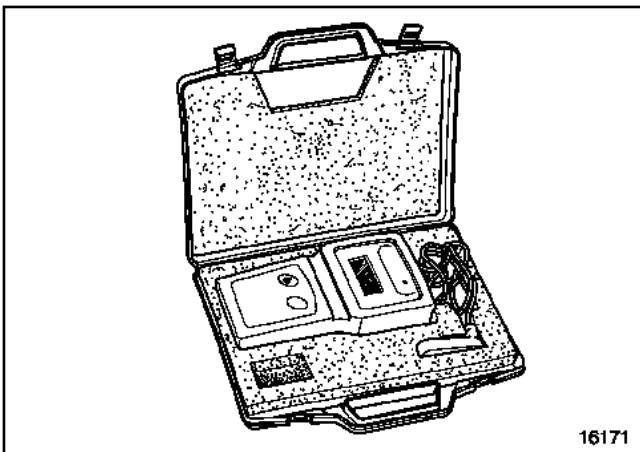
16088  
16088

Procedure part number	Parts Department Number	Description
(Mot. 1505)	00 00 150 500	Belt tension setting tool (frequency meter)



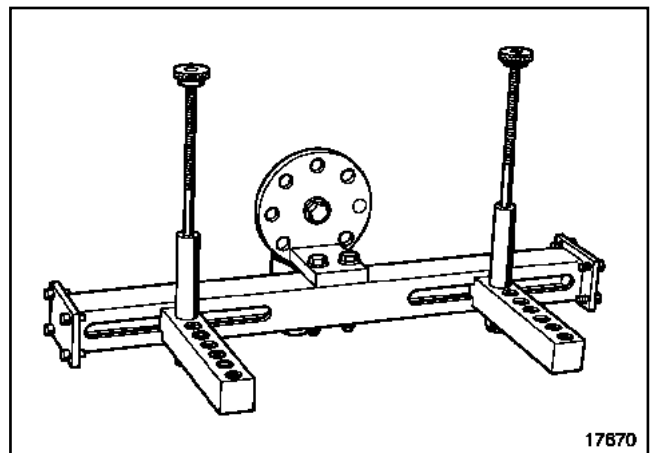
15737  
15737

Procedure part number	Parts Department Number	Description
(Mot. 1502)	00 00 150 200	Tool for removing valve stem collets



16171  
16171

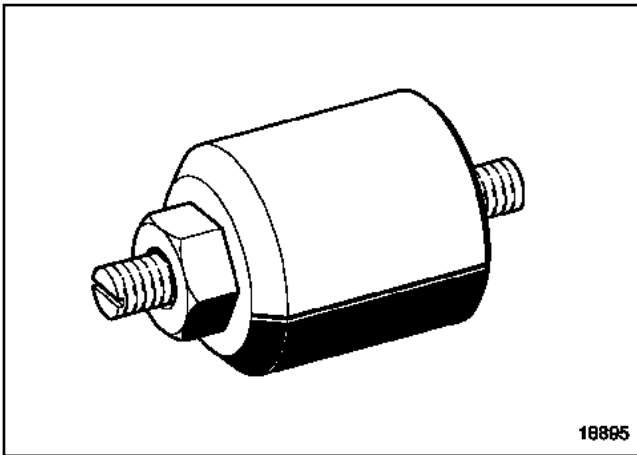
Procedure part number	Parts Department Number	Description
(Mot. 1511)	00 00 151 100	Tool for fitting valve stem seals (with valve spring lower washer)



17670  
17670

D4D, and 700 or 712 or 720 – D4F, and 702 or 706 or 708 or 712 or 714 or 716 or 722 or 728 or 730 or 740

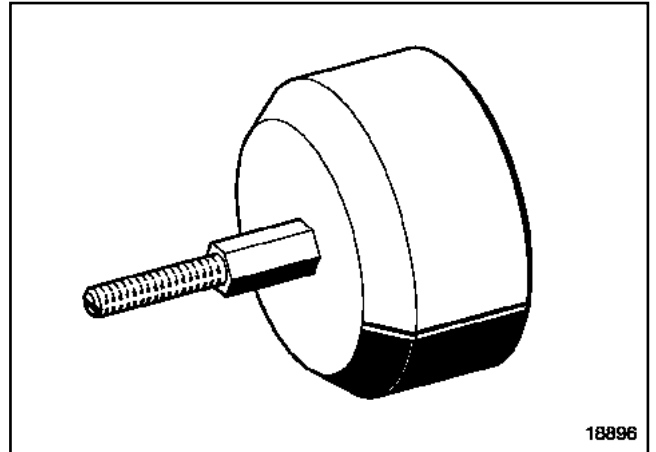
Procedure part number	Parts Department Number	Description
(Mot. 1573)	00 00 157 300	Cylinder head support



18895

18895

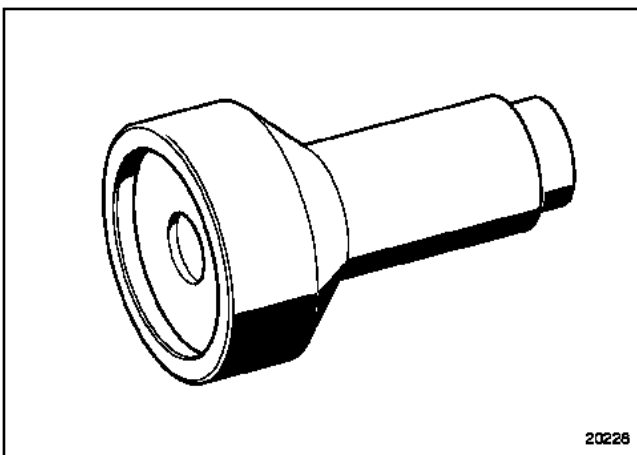
Procedure part number	Parts Department Number	Description
(Mot. 1605)	00 00 160 500	Tool for fitting cylinder head cap.



18896

18896

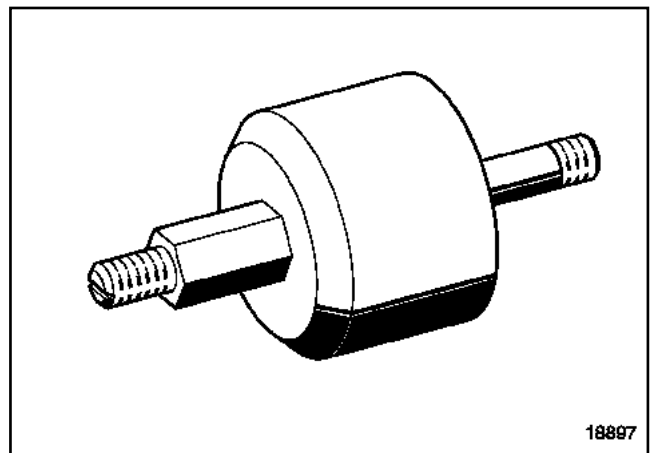
Procedure part number	Parts Department Number	Description
(Mot. 1587)	00 00 158 700	Tool for fitting PTFE camshaft seal



20228

20228

Procedure part number	Parts Department Number	Description
(Mot. 1625)	00 00 162 500	Tool for fitting PTFE crankshaft seal at the crankshaft end



18897

18897

# ENGINE AND LOWER ENGINE ASSEMBLY

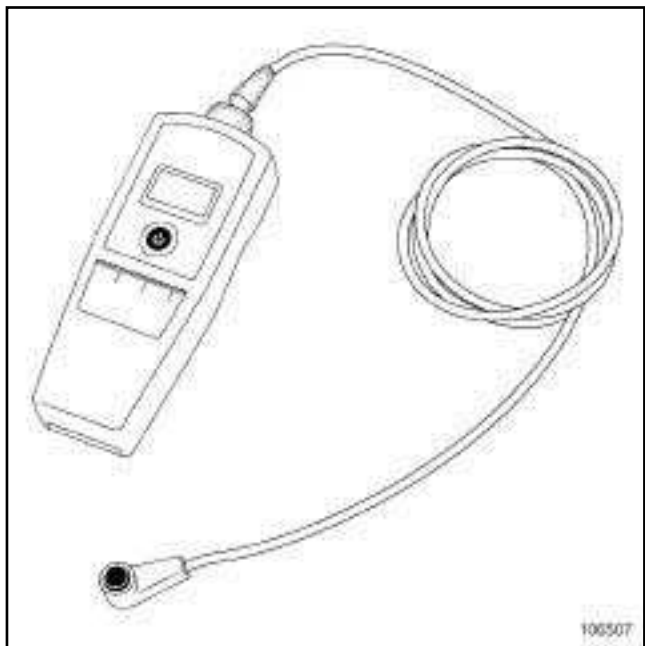
## Special tooling

# 10A

D4D, and 700 or 712 or 720 – D4F, and 702 or 706 or 708 or 712 or 714 or 716 or 722 or 728 or 730 or 740

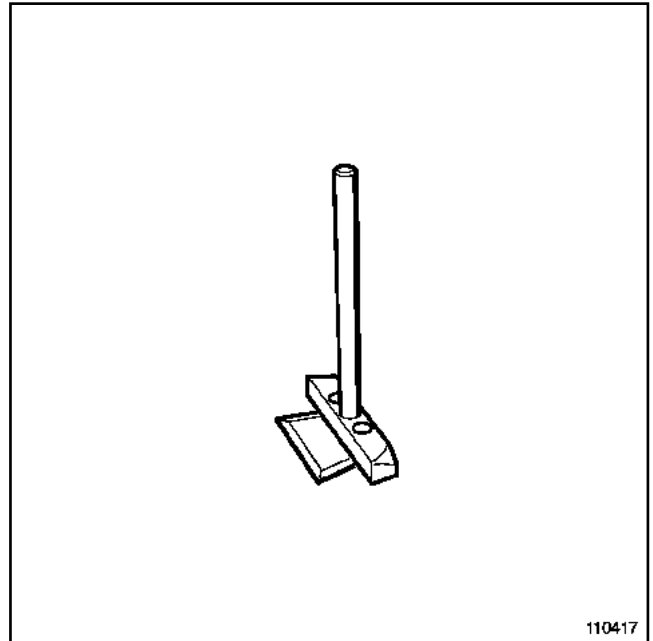
Procedure part number	Parts Department Number	Description
(Mot. 1626)	00 00 162 600	Tool for fitting PTFE crankshaft seal, timing end

Procedure part number	Parts Department Number	Description
(Mot. 1661)	00 00 166 100	Tool for fitting spark plug wells



106507

Procedure part number	Parts Department Number	Description
(Mot. 1715)	77 11 381 715	Belt tension setting tool (frequency meter)



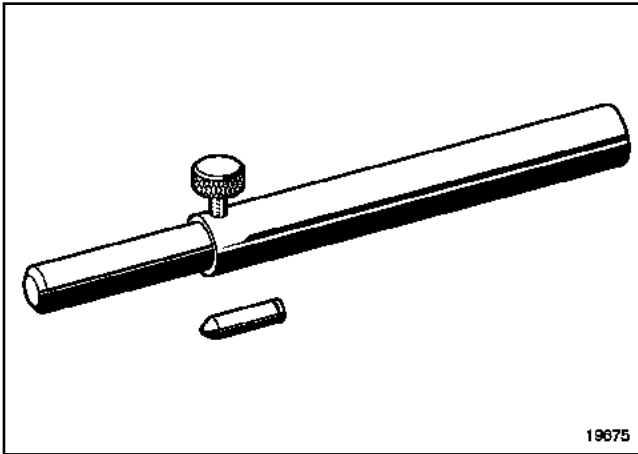
110417  
110417

Procedure part number	Parts Department Number	Description
(Mot. 1716)	77 11 381 716	Silicone seal casing extractor

Procedure part number	Parts Department Number	Description
(Mot. 1723)	77 11 172 300	Engine support plate (holding the engine by the mating surfaces)

## Special tooling

D4D, and 700 or 712 or 720 – D4F, and 702 or 706 or 708 or 712 or 714 or 716 or 722 or 728 or 730 or 740



19675

Procedure part number	Parts Department Number	Description
(Mot. 1755)	77 11 175 500	Tool for fitting valve stem seals (with valve spring lower washer)

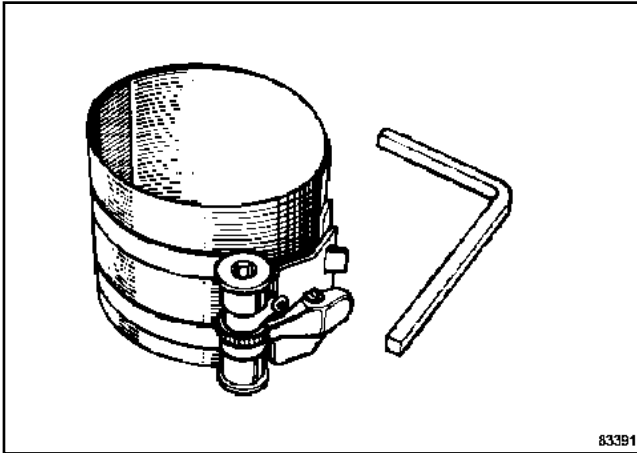
# ENGINE AND LOWER ENGINE ASSEMBLY

## Equipment

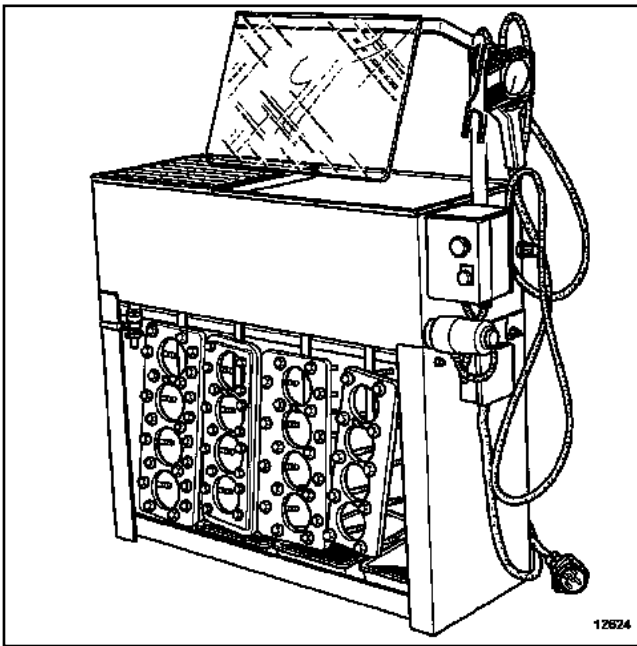
# 10A

D4D, and 700 or 712 or 720 – D4F, and 702 or 706 or 708 or 712 or 714 or 716 or 722 or 728 or 730 or 740

### THE TOOLS REQUIRED ARE:



- piston ring compressor,



- cylinder head testing tool,

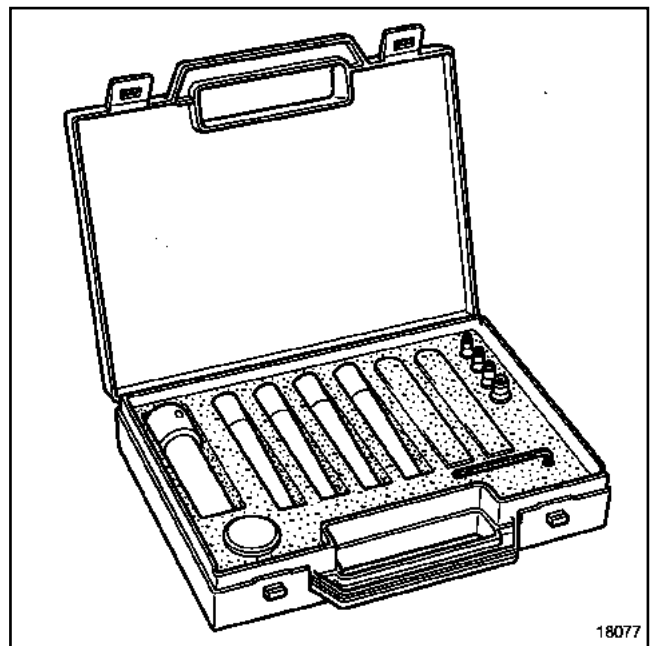
- angular tightening wrench,

- low torque wrench,

- standard 1/2" female torx socket 8/12/14 (12.7 mm squared),

- tweezers for removing/refitting the valve stem cot-ters,

- threading repair kit,



- valve stem seal fitting kit,

- Jacking point,

- Circlip pliers,

- Sliding calliper,

- Micrometer,

- Dial gauge,

# ENGINE AND LOWER ENGINE ASSEMBLY

## Equipment

# 10A

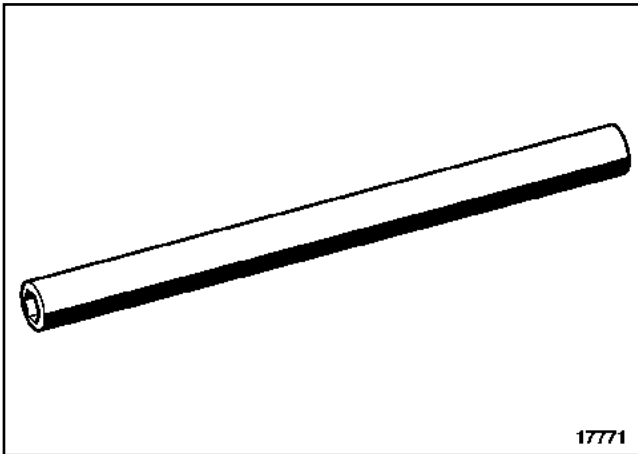
D4D, and 700 or 712 or 720 – D4F, and 702 or 706 or 708 or 712 or 714 or 716 or 722 or 728 or 730 or 740

- Dial gauge support,

- Cylinder head rule,

- Height gauge,

- 1500-watt heater panel.



17771

- Set of spark pug spanners

- Dowel machine.

- Self-fluxing solder.

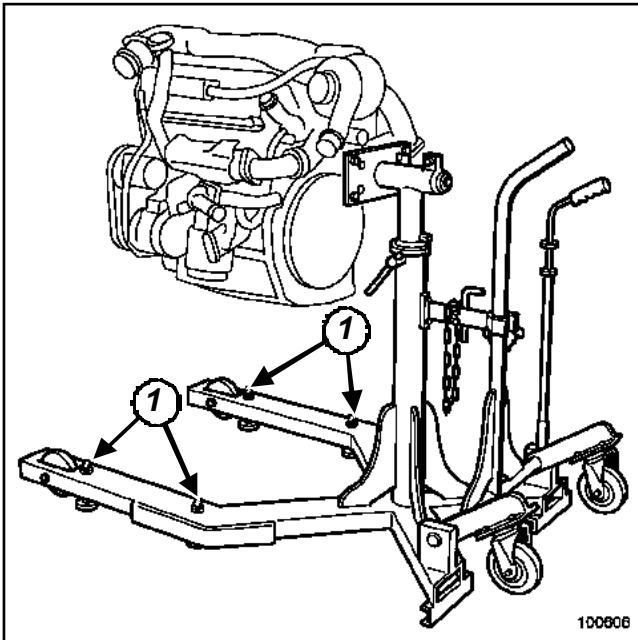
## Engine: Dismantling

D4D, and 700 or 712 or 720 – D4F, and 702 or 706 or 708 or 712 or 714 or 716 or 722 or 728 or 730 or 740

### Essential special tooling

<b>Mot. 1360</b>	Stud W and support plate H1 for engine support, fits on DES-VIL support.
<b>Mot. 1360-01</b>	W1 pin, replaces W pin of Mot.1360.
<b>Mot. 792-03</b>	Engine mounting plate for Desvil stand

### PREPARING THE ENGINE TO BE PLACED ON THE STAND



100806  
100606

#### IMPORTANT

In order to work on the engine in complete safety, it is essential to have the new stand, or have the old stand modified by the manufacturer. When the engine is on the stand, it is essential to fit mounting pads (1).

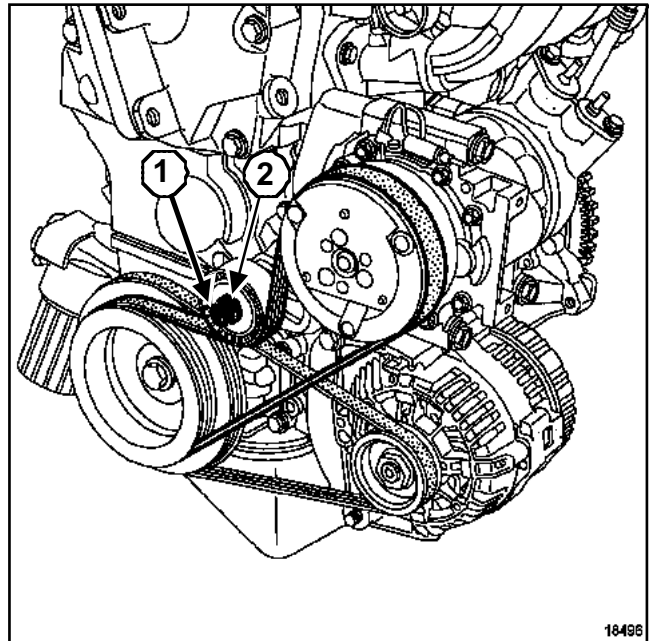
Drain the engine oil.

#### Note:

There are two procedures for securing the engine to the stand:

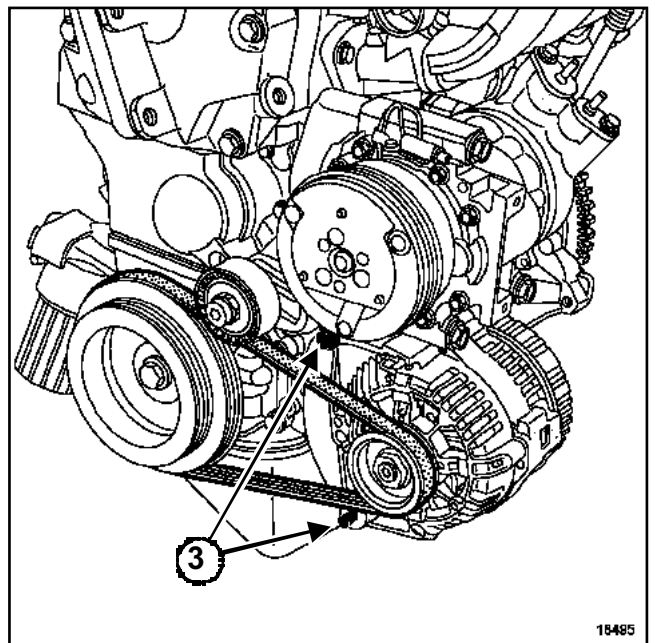
- by the accessories end,
- by the clutch end.

### 1 - ENGINE SECURED BY THE ACCESSORIES END



18498  
18496

- Loosen tensioner bolt (1).
- Turn the hexagon bolt (2) in an anti-clockwise direction.
- Remove the air conditioning compressor accessories belt.

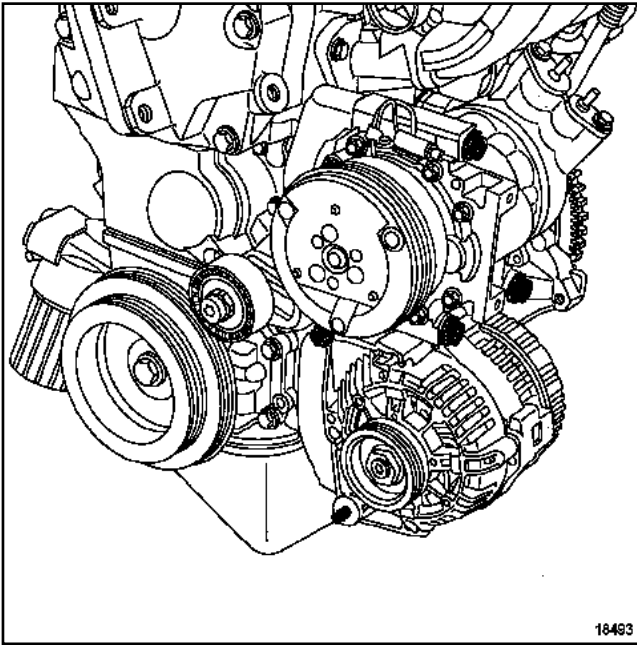


18485  
18495

- Loosen alternator bolts (3).
- Remove the alternator accessories belt.

## Engine: Dismantling

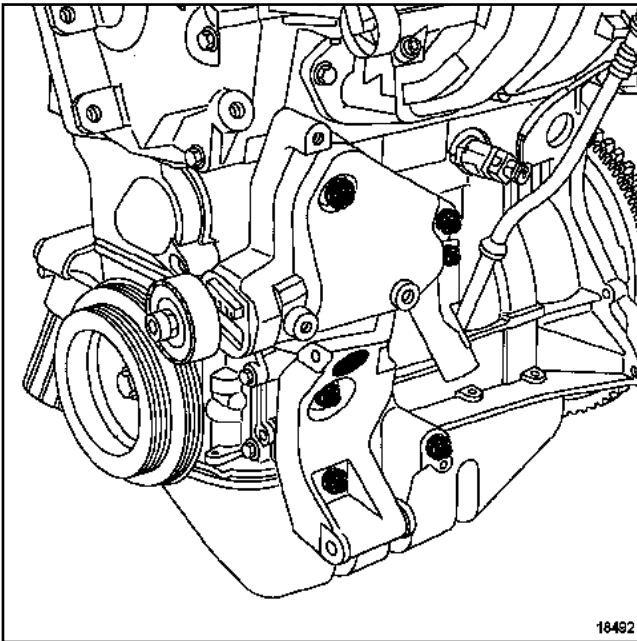
D4D, and 700 or 712 or 720 – D4F, and 702 or 706 or 708 or 712 or 714 or 716 or 722 or 728 or 730 or 740



18493

 Remove:

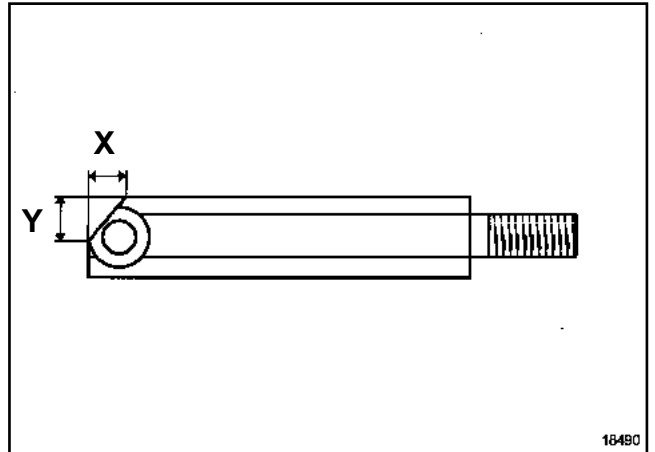
- the alternator ,
- the air conditioning compressor.



18492

 Remove:

- the accessories mountings,
- the coolant inlet pipe.



18490

18490



## Note:

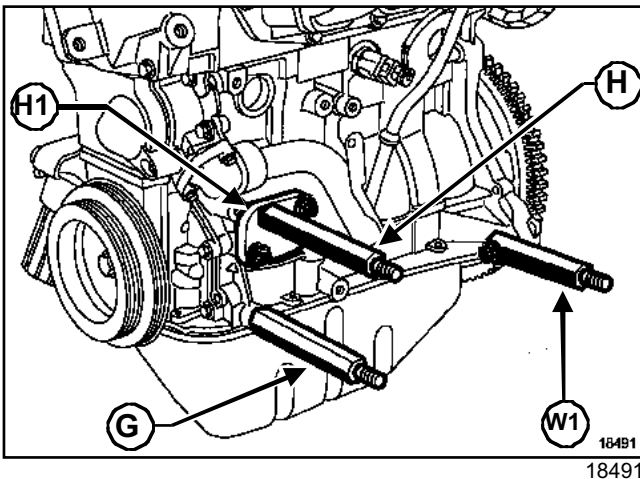
Before mounting the cylinder block rods, modify rod **W1** by making a chamfer with the following dimensions:

X = 10 mm,

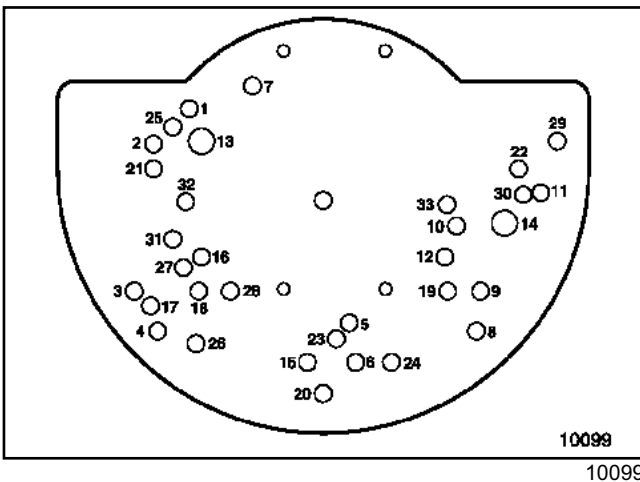
Y = 15 mm.

## Engine: Dismantling

D4D, and 700 or 712 or 720 – D4F, and 702 or 706 or 708 or 712 or 714 or 716 or 722 or 728 or 730 or 740



### Engine stand plate



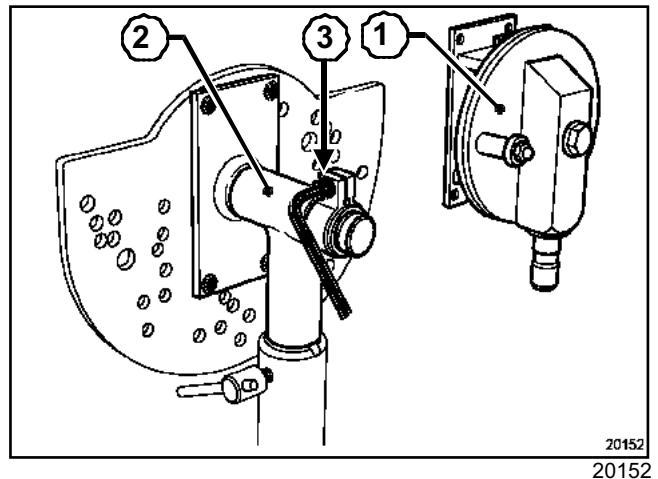
- Fit the studs **G, H and W1** and the plate **H1** of tool (Mot. 1360) and (Mot. 1360-01) (including the rod **W1** and the plate **H1**), on the cylinder block so that they fit the holes (18.8 and 4) on the engine mounting (Mot. 792-03).

### 2 - ENGINE SECURED BY THE CLUTCH END

- Fit the studs, mounting them on the cylinder block such that they fit in the holes in the engine stand plate. **Mot. 1723**.

#### Note:

A Technical Note will eventually be available regarding the use of tool **Mot.1723** on the various engines.



- Modification of the **DESVIL** engine stand head used in engine repair: replacement of head **TS 126 (1)** with head **TS 127 (2)**.
- Special features of this new head
  - rotation axle permanently lubricated,
  - variable locking of the head.

#### WARNING

The clamping bolt (3) must be fully undone to release the head when there is no longer an engine resting on the stand.

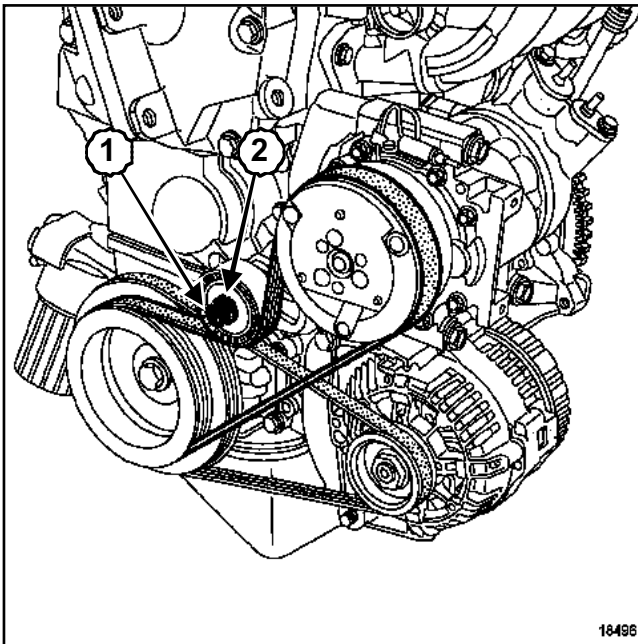
## Timing - cylinder head: Removal

D4D, and 700 or 712 or 720 – D4F, and 702 or 706 or 708 or 712 or 714 or 716 or 722 or 728 or 730 or 740

### Essential special tooling

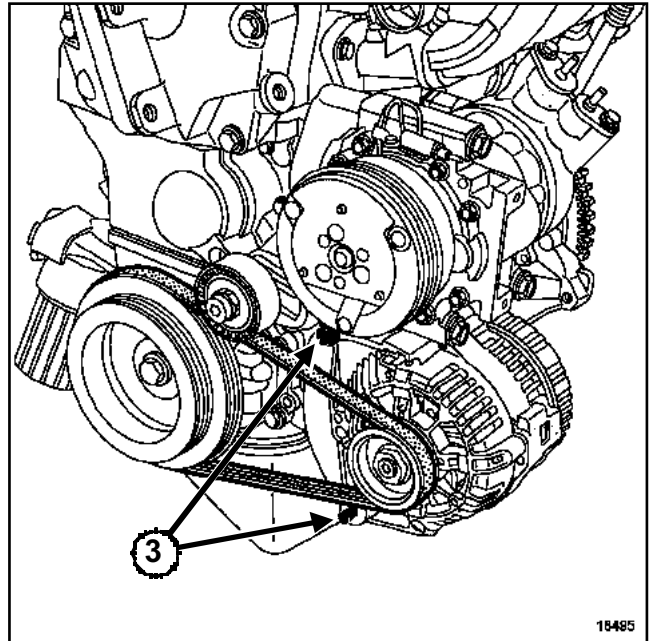
<b>Mot. 582-01</b>	Flywheel locking tool (K engines)
<b>Mot. 1054</b>	TDC setting pin
<b>Mot. 1573</b>	Cylinder head support

### I - REMOVING THE ACCESSORIES BELT (ON ENGINES MOUNTED AT THE CLUTCH END)



18496  
18496

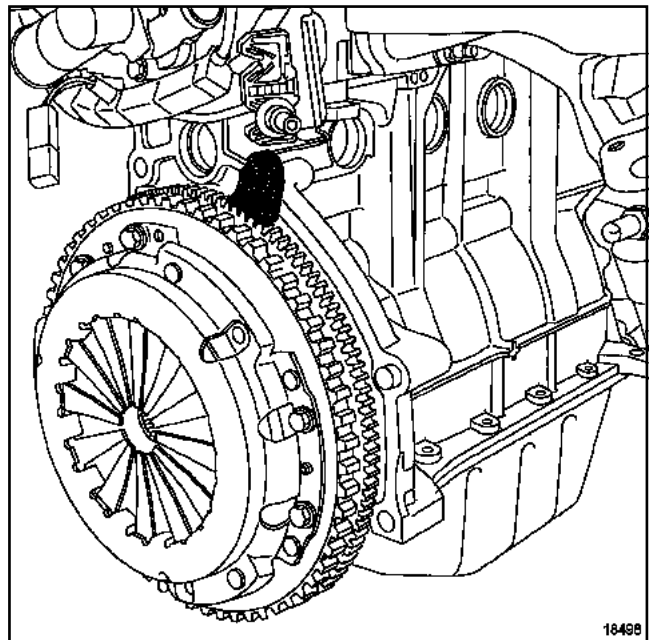
- Loosen tensioner bolt (1).
- Turn the hexagon bolt (2) in an anti-clockwise direction.
- Remove the air conditioning compressor accessories belt.



18495  
18495

- Loosen alternator bolts (3).
- Remove the alternator accessories belt.

### II - REMOVING THE TIMING

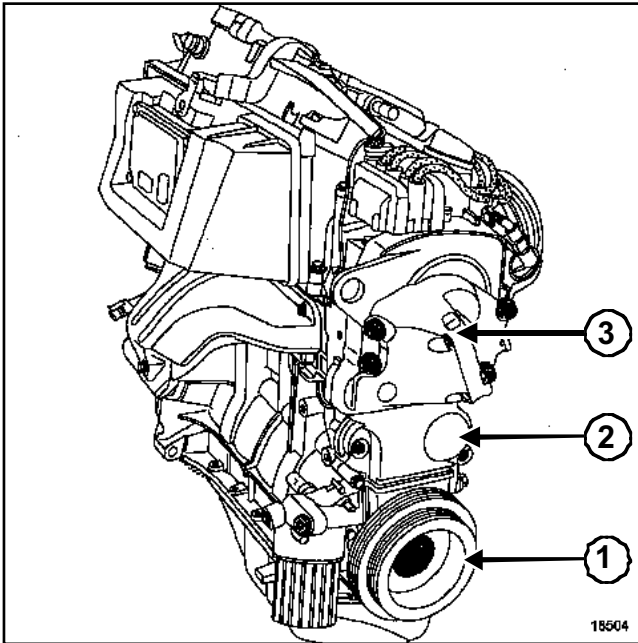


18498  
18498

- Fit the flywheel immobiliser tool. (Mot. 582-01).

## Timing - cylinder head: Removal

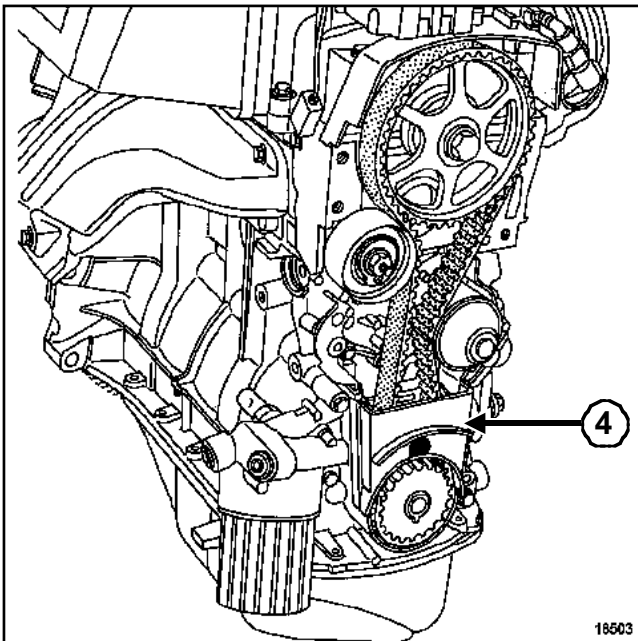
D4D, and 700 or 712 or 720 – D4F, and 702 or 706 or 708 or 712 or 714 or 716 or 722 or 728 or 730 or 740



18504  
18504

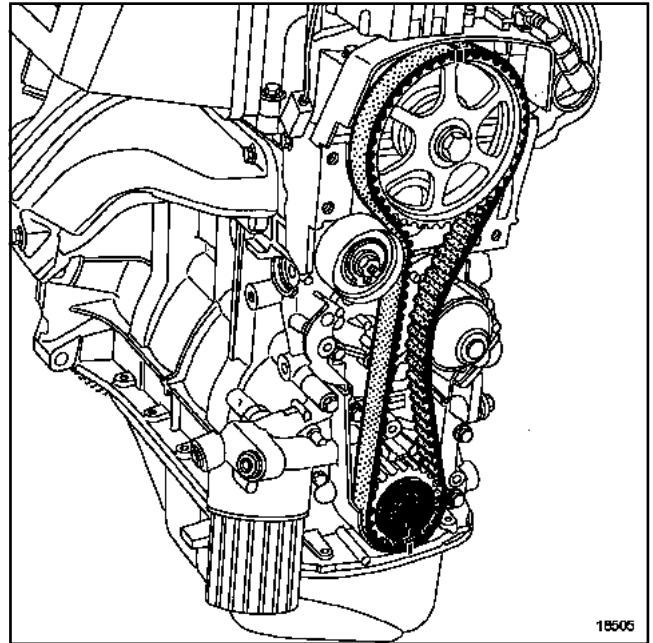
❑ Remove:

- the crankshaft accessories pulley (1),
- the timing intermediate housing (2),
- the upper timing cover (3),
- flywheel immobiliser tool (Mot. 582-01).



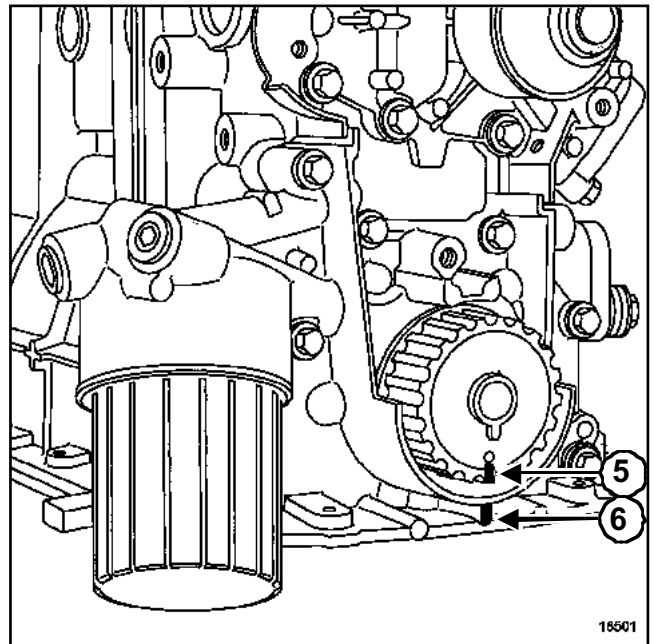
18503  
18503

❑ Remove the lower housing(4)



18505  
18505

❑ Refit the crankshaft accessories pulley bolt with a spacer.

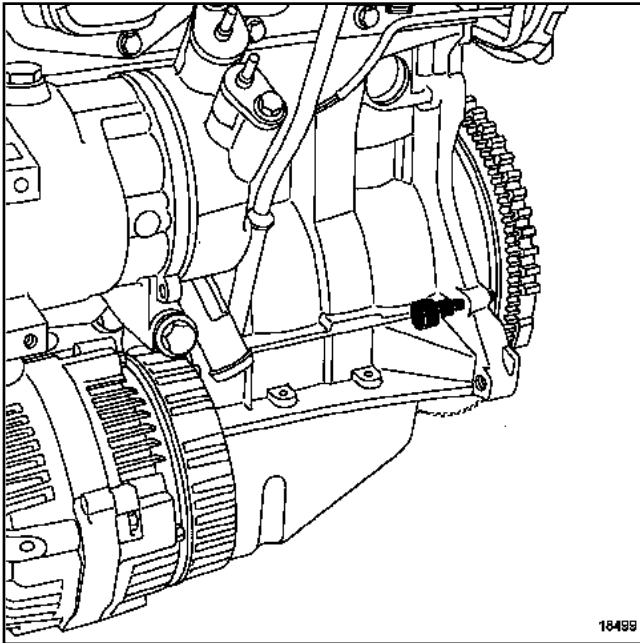


18501  
18501

❑ Rotate the crankshaft in its operating direction (clockwise, timing end) to position the crankshaft sprocket mark (5) one half-tooth before the alignment of fixed mark (6) on the oil pump body.

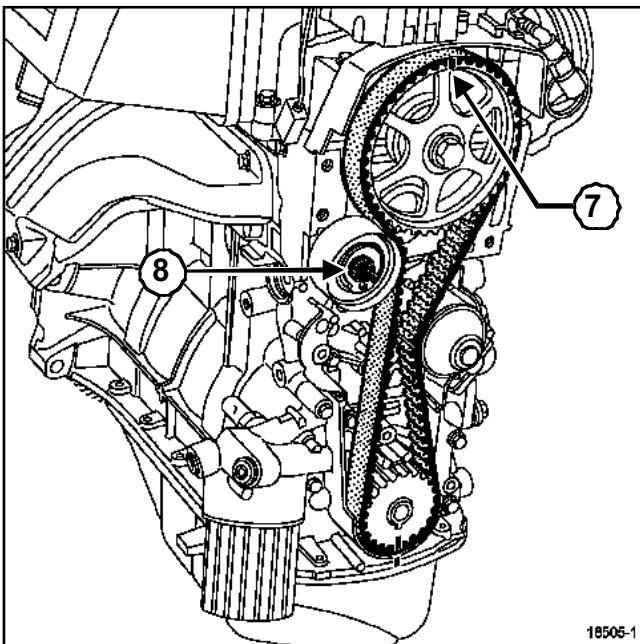
## Timing - cylinder head: Removal

D4D, and 700 or 712 or 720 – D4F, and 702 or 706 or 708 or 712 or 714 or 716 or 722 or 728 or 730 or 740



18499  
18499

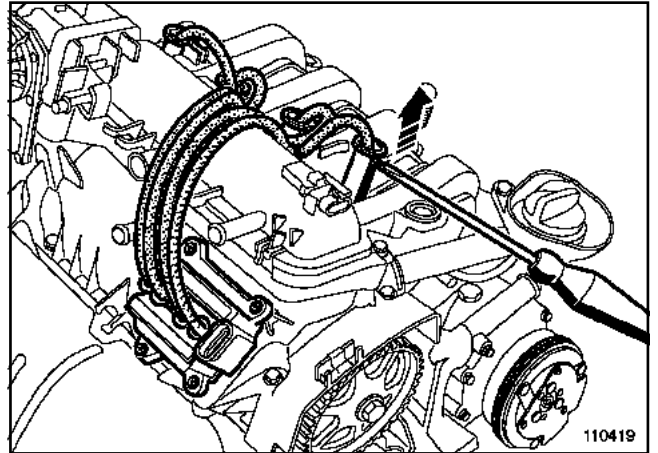
- Insert the TDC pin (Mot. 1054).
- Turn the crankshaft to the setting point.



18505-1  
18505-1

- Check that mark (7) of the crankshaft pulley is vertical to the engine.
- Loosen the timing tension wheel nut (8).
- Remove:
  - the timing belt,
  - the TDC setting pin (Mot. 1054).

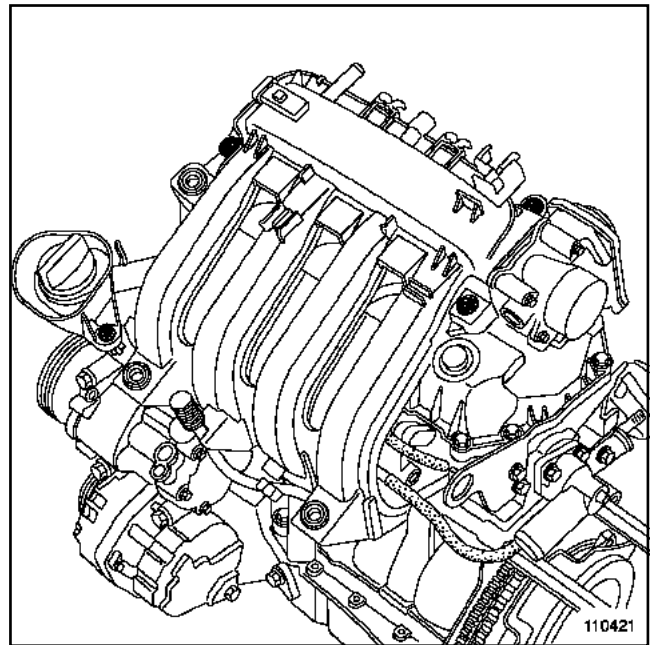
### III - REMOVING THE CYLINDER HEAD



110419  
110419

- Remove the spark plug caps using a screwdriver.
- Remove the coil / ignition wire assembly.

D4F, and 708 or 722 or 740



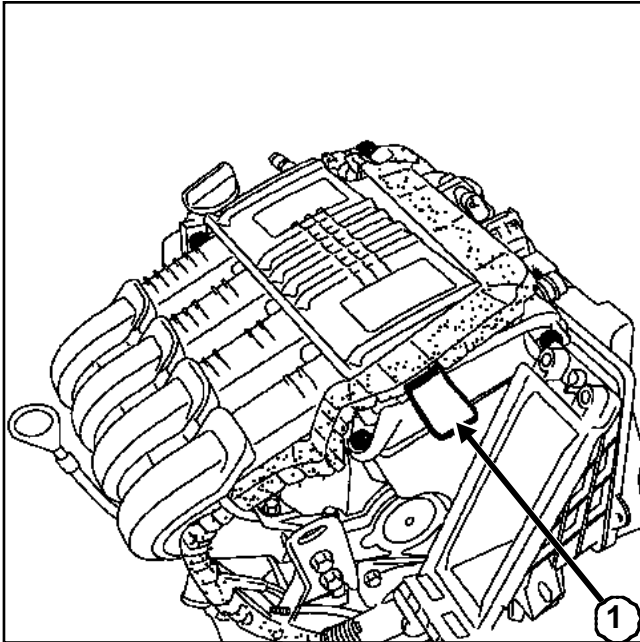
110421  
110421

- Remove the four inlet manifold upper bolts,

## Timing - cylinder head: Removal

D4D, and 700 or 712 or 720 – D4F, and 702 or 706 or 708 or 712 or 714 or 716 or 722 or 728 or 730 or 740

D4D, and 712 – D4F, and 702 or 706 or 712 or 714 or 716 or 728 or 730

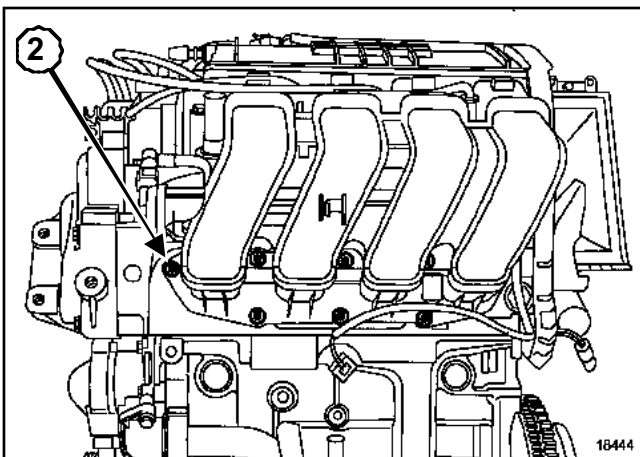


18638

- Remove the four inlet manifold upper bolts,
- 

### WARNING

Do not pull wiring harness section (1) because it is positioned between the rocker cover and the inlet manifold.

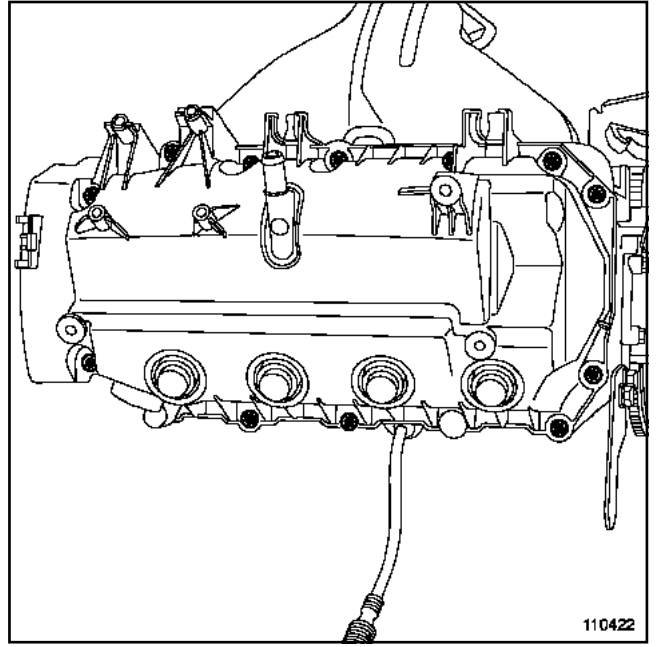


18444  
18444

- Remove the inlet manifold wiring harness.
- Remove:
  - the inlet manifold bolts (2),

- the inlet distributor.

D4F, and 708 or 722 or 740



110422

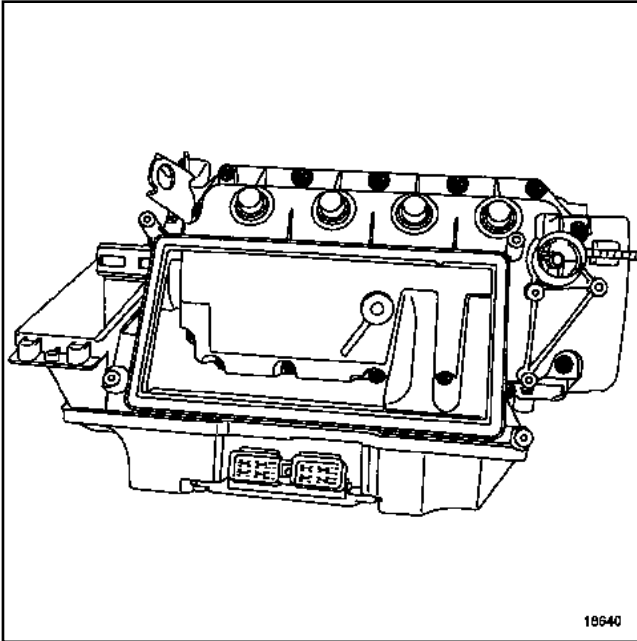
110422

- Remove the rocker cover.

## Timing - cylinder head: Removal

D4D, and 700 or 712 or 720 – D4F, and 702 or 706 or 708 or 712 or 714 or 716 or 722 or 728 or 730 or 740

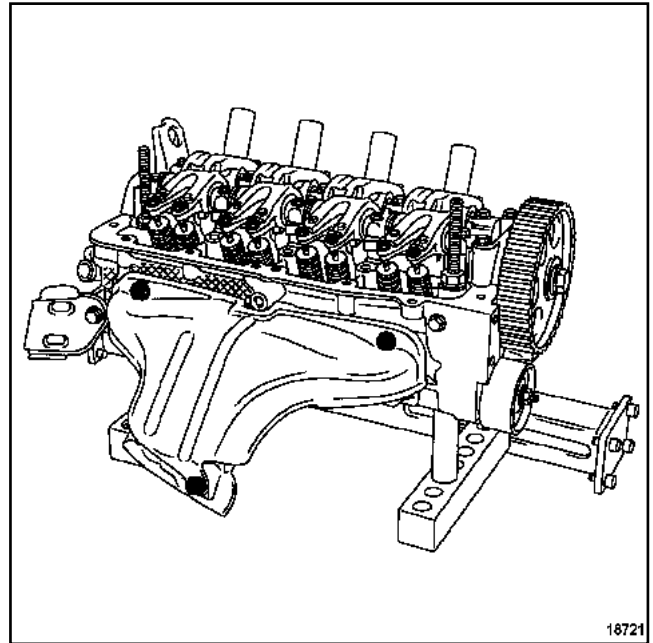
D4D, and 712 – D4F, and 702 or 706 or 712 or 714 or 716 or 728 or 730



18640

18640

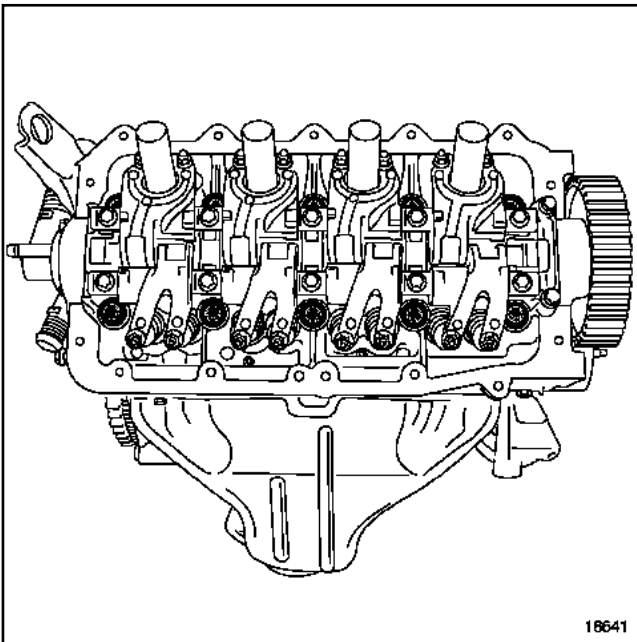
- Remove the rocker cover.



18721

18721

- Position the cylinder head assembly on the on the mounting tool (Mot. 1573).
- Remove the cylinder head gasket from the cylinder block.



18641

18641

- Remove:
  - the cylinder head mounting bolts,
  - the cylinder head assembly.

## Stripping the cylinder head

D4D, and 700 or 712 or 720 – D4F, and 702 or 706 or 708 or 712 or 714 or 716 or 722 or 728 or 730 or 740

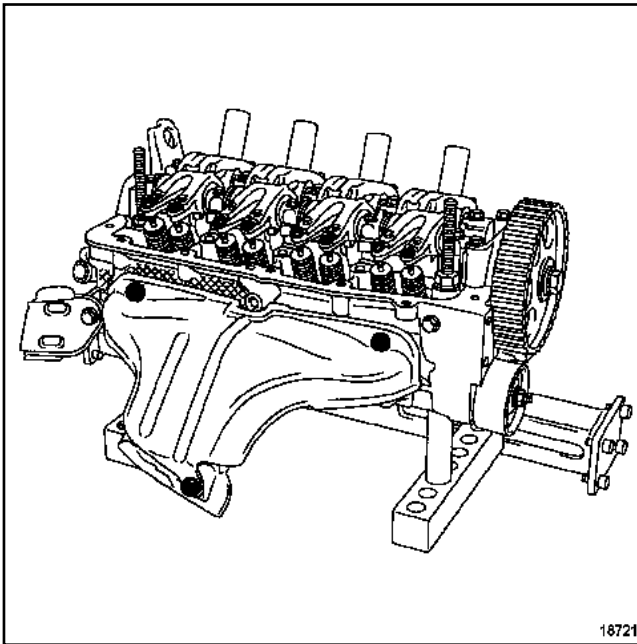
### Essential special tooling

<b>Mot. 799-01</b>	Tool for locking sprockets on toothed timing belt
<b>Mot. 1381</b>	Camshaft oil seal removal tool, 30 x 42 x 7.
<b>Mot. 1502</b>	Tool for removing valve stem cotters
<b>Mot. 1335</b>	Tool for removing valve stem seals

### Essential equipment

valve stem seal fitting kit

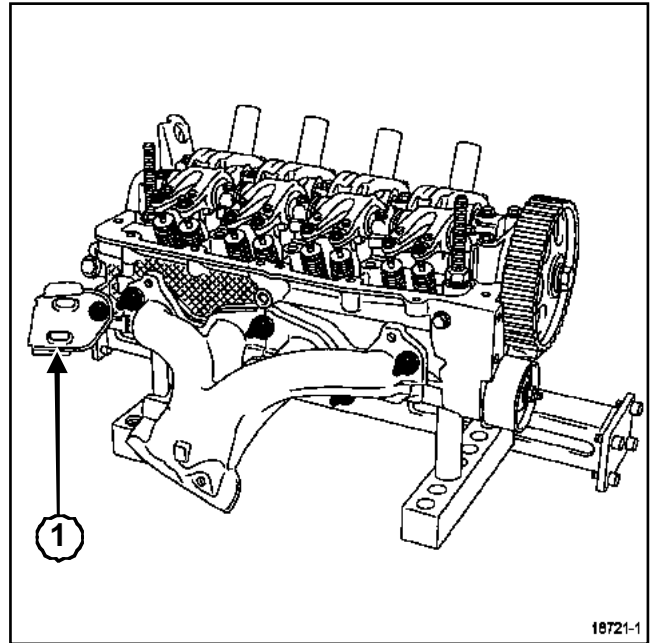
### STRIPPING THE CYLINDER HEAD



18721

18721

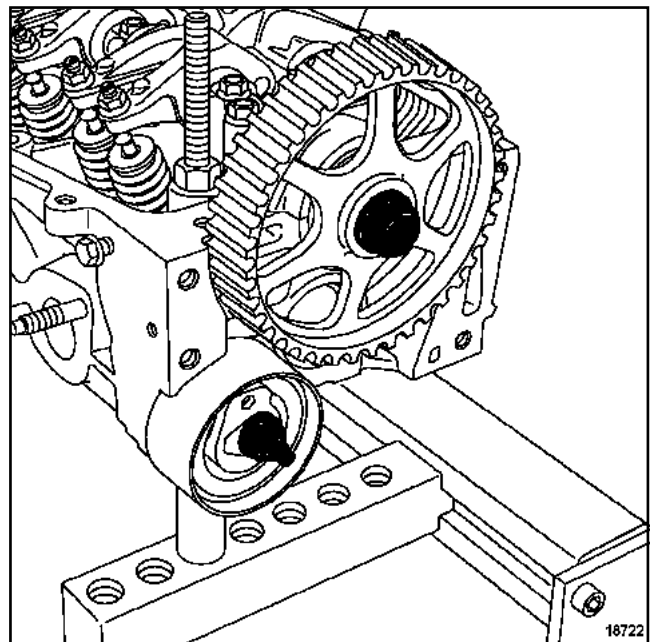
- Remove the heat shield.



18721-1

18721-1

- Remove:
  - the exhaust manifold,
  - the fuel pipe retaining bracket. (1)



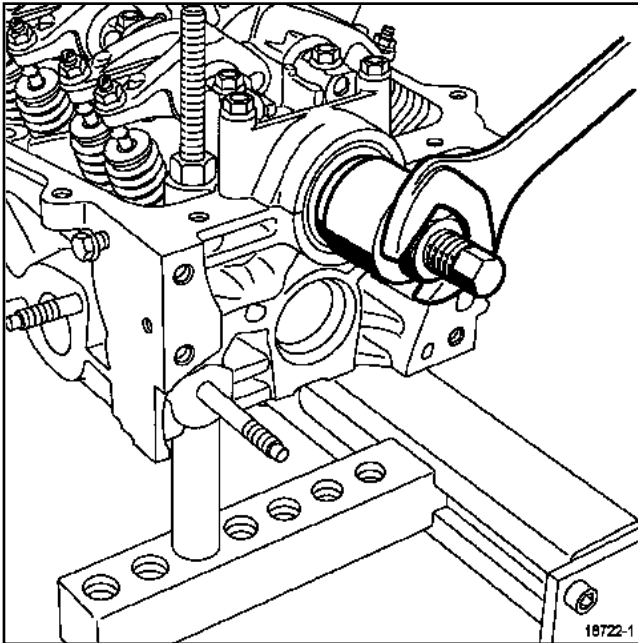
18722

18722

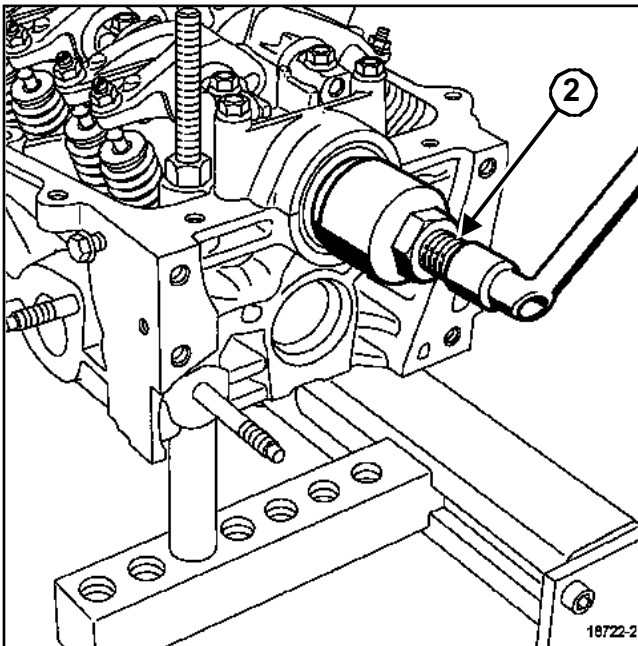
- Remove:
  - the camshaft pulley bolt using (Mot. 799-01),
  - the camshaft pulley,
  - the timing tension wheel.

## Stripping the cylinder head

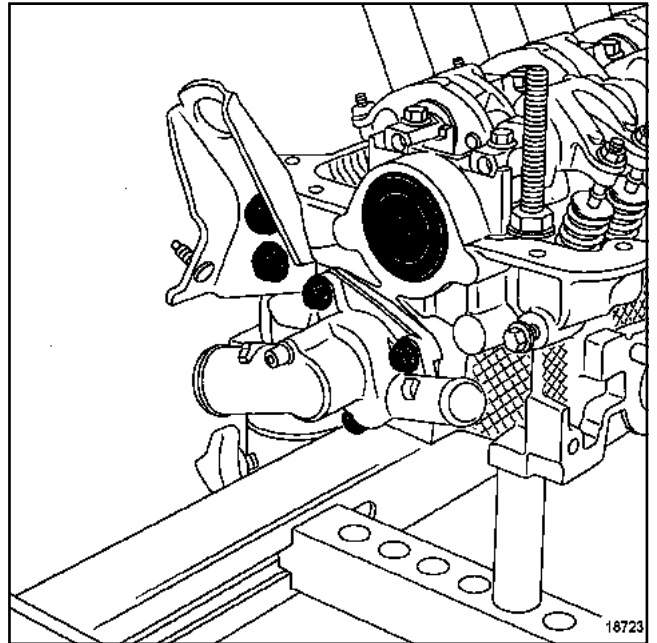
D4D, and 700 or 712 or 720 – D4F, and 702 or 706 or 708 or 712 or 714 or 716 or 722 or 728 or 730 or 740



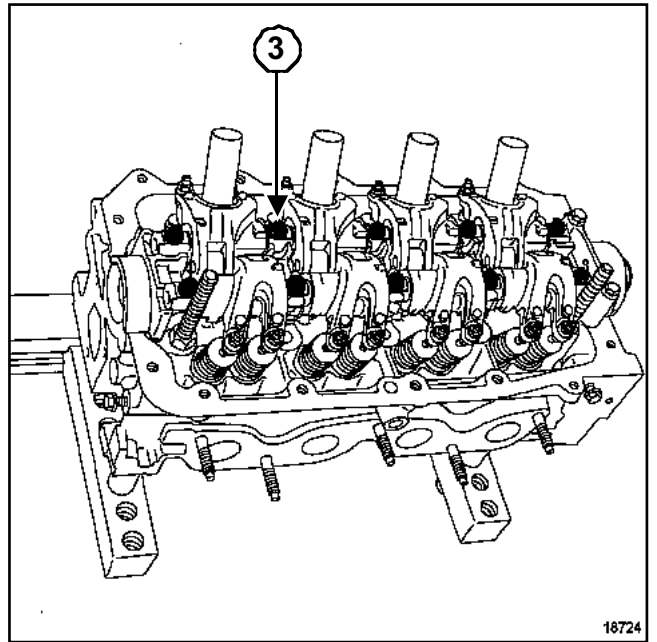
- Remove the lip seal by screwing extractor (Mot. 1381) into the seal.



- Remove the seal by tightening bolt (2) of the (Mot. 1381).



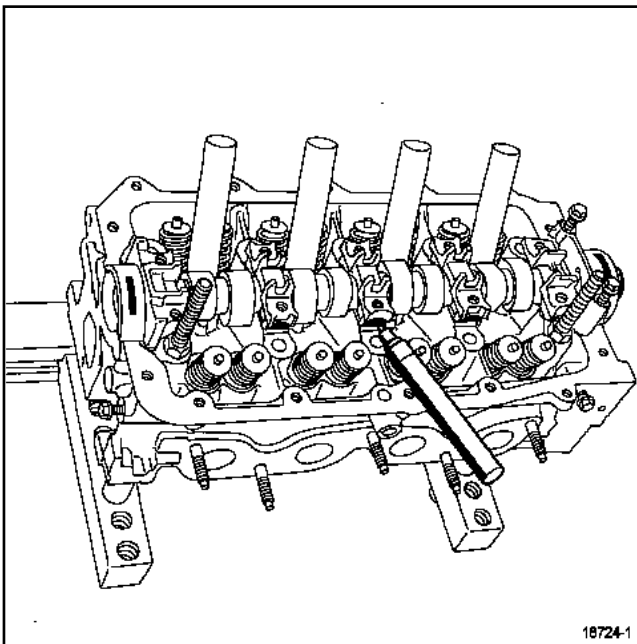
- Remove:
  - the lifting eye,
  - the coolant outlet unit,
  - the camshaft cap.



- Remove the rocker arm rails, unscrewing bolts (3).

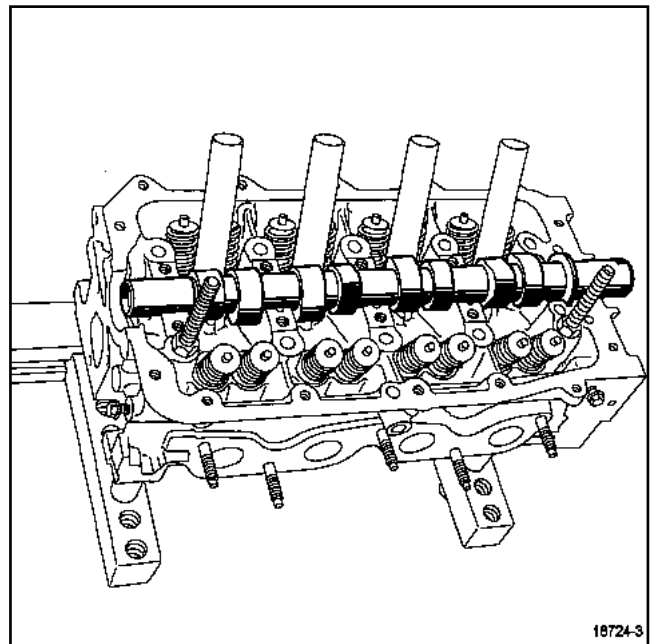
## Stripping the cylinder head

D4D, and 700 or 712 or 720 – D4F, and 702 or 706 or 708 or 712 or 714 or 716 or 722 or 728 or 730 or 740



18724-1

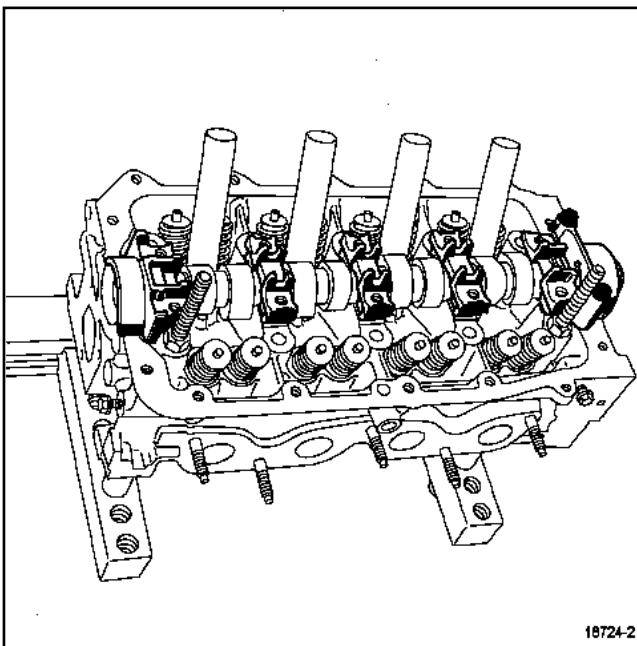
- Mark the camshaft bearing caps with a permanent marker pen.



18724-3

18724-3

- Remove the camshaft.



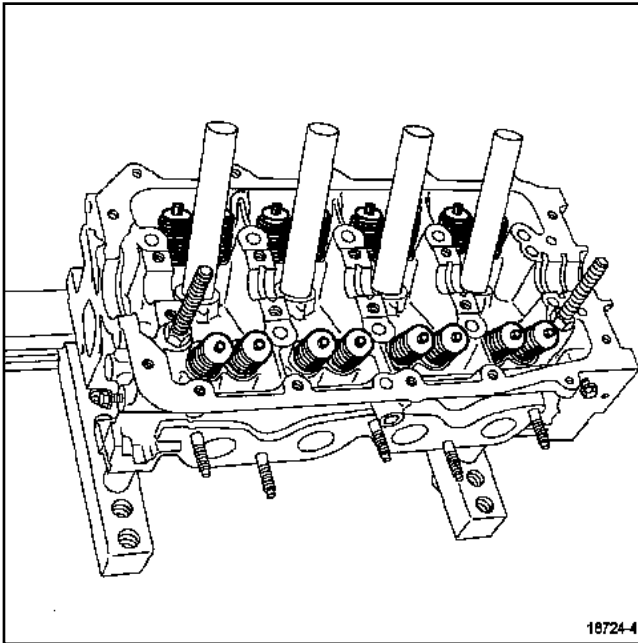
18724-2

18724-2

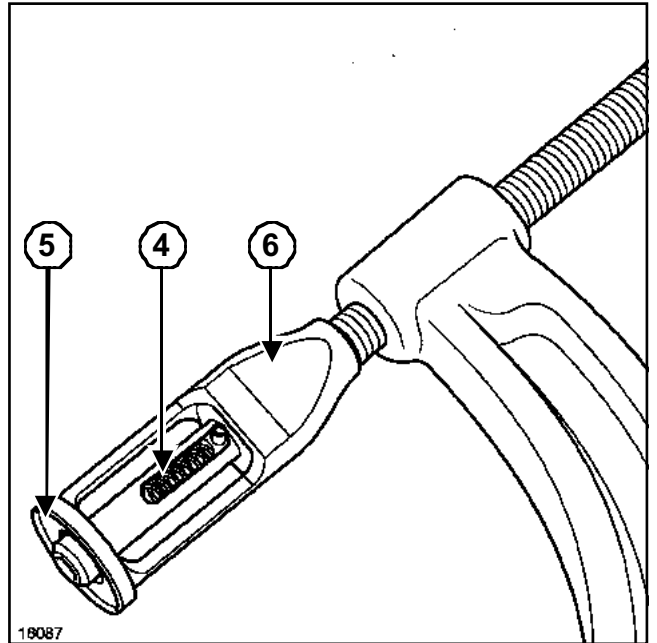
- Remove the camshaft bearing caps.

## Stripping the cylinder head

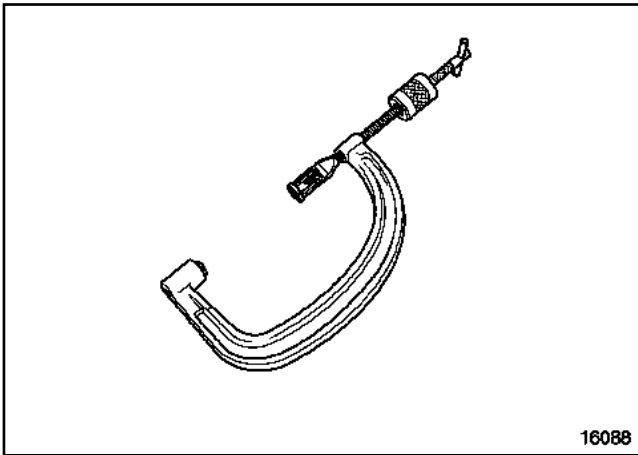
D4D, and 700 or 712 or 720 – D4F, and 702 or 706 or 708 or 712 or 714 or 716 or 722 or 728 or 730 or 740



18724-4

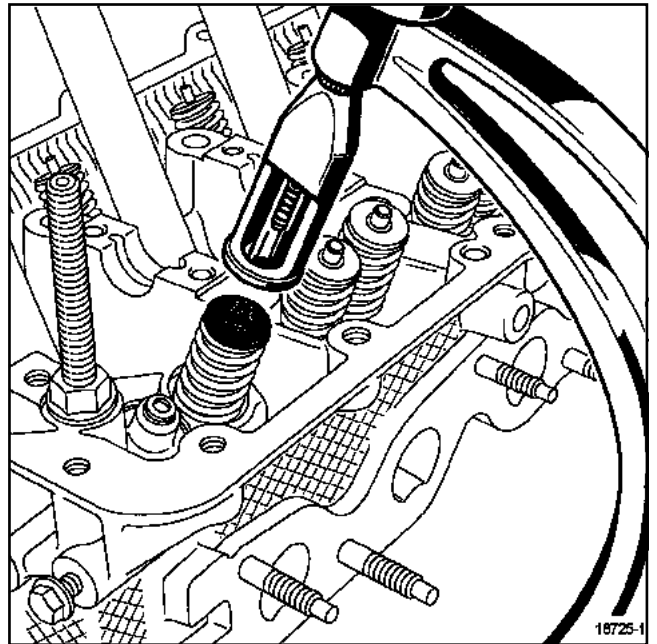


16087



16088

- Remove the valve springs using tool (Mot. 1502).



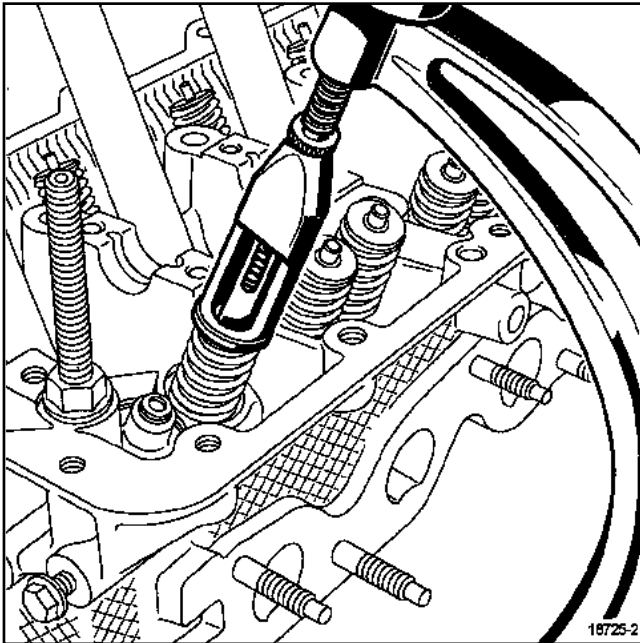
18725-1

- To correctly compress the valve springs, the piston (4) of (Mot. 1502) must be centred on the valve stem seal.

The upper cup of the spring should enter housing (5) of socket (6) of (Mot. 1502).

## Stripping the cylinder head

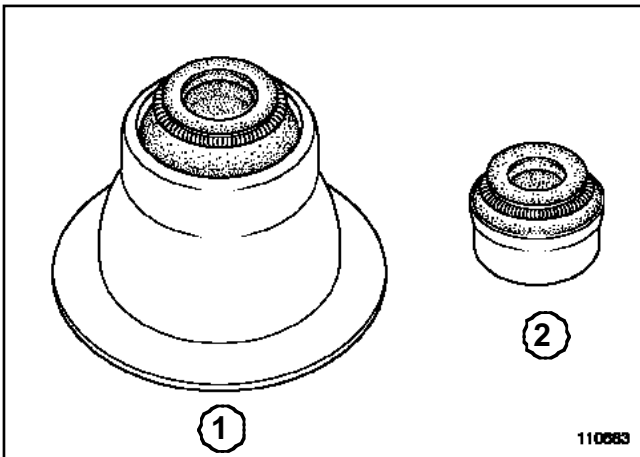
D4D, and 700 or 712 or 720 – D4F, and 702 or 706 or 708 or 712 or 714 or 716 or 722 or 728 or 730 or 740



18725-2  
18725-2

Remove:

- the cotters,
- the upper cups,
- the springs,
- the valves.



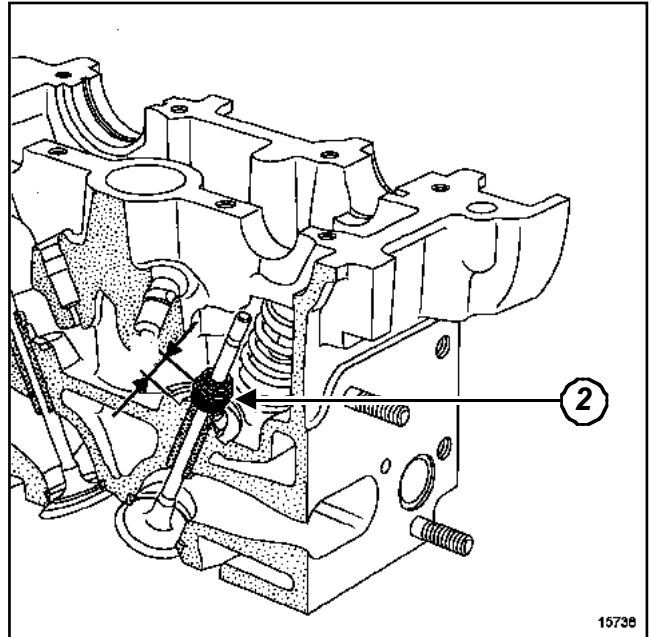
110683  
110683

Note:

There are two types of valve stem seal:

- the valve stem seal with a lower spring retaining washer (1),
- the valve stem seal only (2).

### Valve stem seal with lower spring washer



15738  
15738

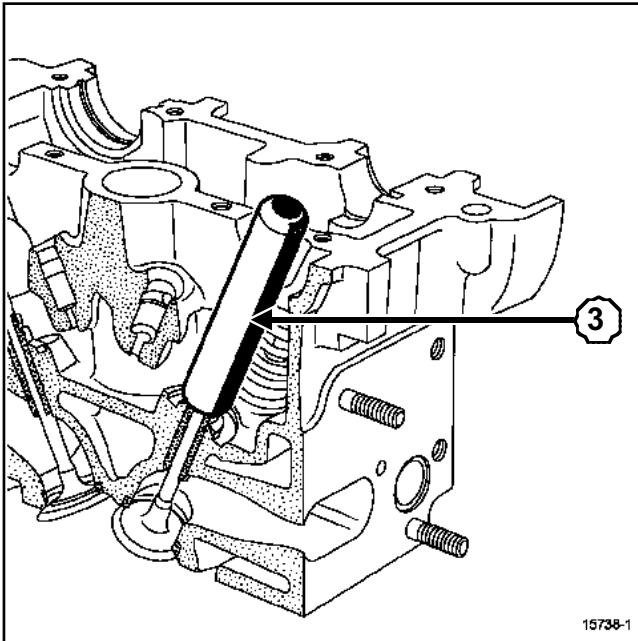
Note:

Before removing the valve stem seals (2), it is essential to mark the position (H) of the old seals on the intake side, then the exhaust side (the fitting dimension of the seals may differ between the intake and exhaust sides).

- Fit a valve, then take the measurement (H) from an old seal in relation to the valve spring lower washer using (Mot. 1755) or valve stem seal fitting kit.

## Stripping the cylinder head

D4D, and 700 or 712 or 720 – D4F, and 702 or 706 or 708 or 712 or 714 or 716 or 722 or 728 or 730 or 740

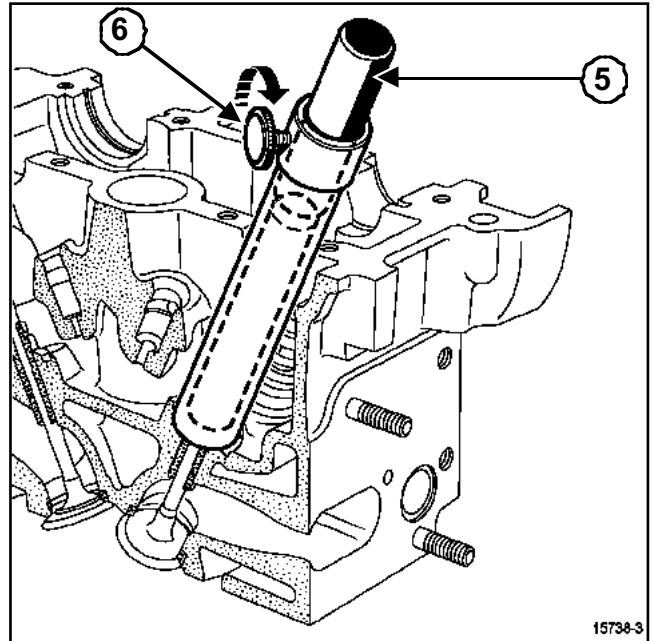


15738-1

- Position the pushrod (3) of tool (Mot. 1755) onto the valve stem seal.

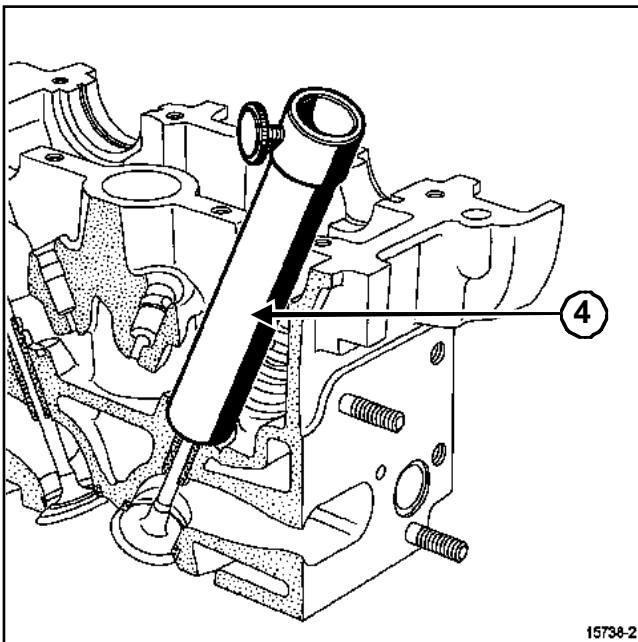
**Note:**

The internal diameter of the pushrod must be identical to that of the valve. In addition, the bottom of the pushrod must cover the metal upper section of the valve stem seal.



15738-3

- Insert sleeve (5) into the guide tube, until it comes into contact with the pushrod.
- Lock the sleeve using tumblewheel (6).
- Remove the guide tube/sleeve assembly, being careful not to loosen the tumblewheel.
- Remove:
  - the valves,
  - the valve stem seals using tool . (Mot. 1335).



15738-2

- Fit the guide tube (4) above the pushrod until it comes into contact with the cylinder head.

## Upper engine: Cleaning

D4D, and 700 or 712 or 720 – D4F, and 702 or 706 or 708 or 712 or 714 or 716 or 722 or 728 or 730 or 740

### CLEANING THE CYLINDER HEAD



#### IMPORTANT

- Do not scratch the aluminium sealing surfaces.
- Wear goggles.
- Wear gloves during the operation.
- Clean the sealing surfaces with DECAPJOINT compound to dissolve any parts of the seal that are still attached.
- Apply the product to the section to be cleaned, Wait around ten minutes, then remove the residue using a wooden spatula.

#### WARNING

- Do not allow this product to drip on to the paintwork.
- Clean the cylinder head carefully to prevent any foreign bodies entering the oil supply and return pipes.

Failure to follow this advice could lead to various oil inlet ducts blocking, resulting in rapid damage to the engine.

#### WARNING

When cleaning parts, it is essential to not knock the parts against each other, or their mating faces may be damaged and therefore their adjustments may be altered, which could damage the engine.

## Upper engine: Checking

D4D, and 700 or 712 or 720 – D4F, and 702 or 706 or 708 or 712 or 714 or 716 or 722 or 728 or 730 or 740

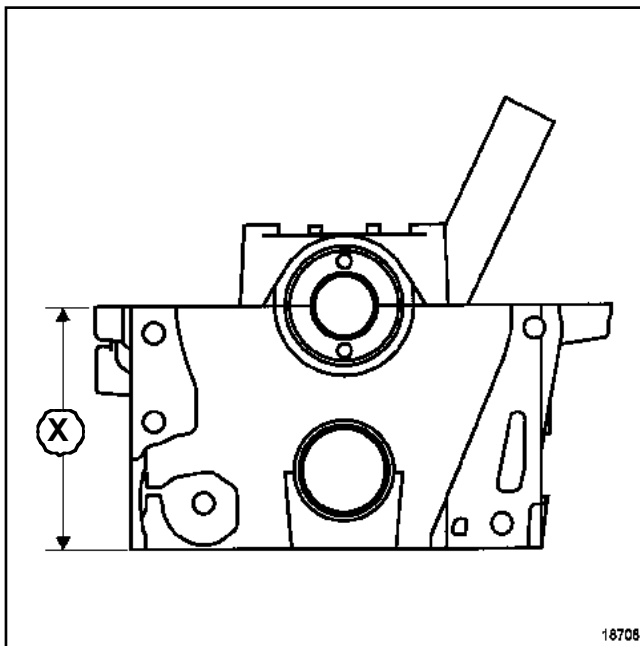
Essential equipment
Sliding calliper
Micrometer
Dial gauge
Dial gauge support
Cylinder head rule
Height gauge
cylinder head testing equipment

### CHECKING THE UPPER ENGINE

❑ Essential measuring tools:

- Sliding calliper,
- Micrometer,
- Dial gauge,
- Dial gauge support,
- Cylinder head rule,
- Height gauge.

### 1 - Checking the height of cylinder head



18708  
18708

❑ Measure the height of the cylinder head (x) which should be **99 mm** using a **Height gauge**.

### 2 - Checking the cylinder head gasket face

❑ Check using a **Cylinder head rule** and a set of shims for deformation of a sealing surface.

Maximum bow: **0.05 mm**

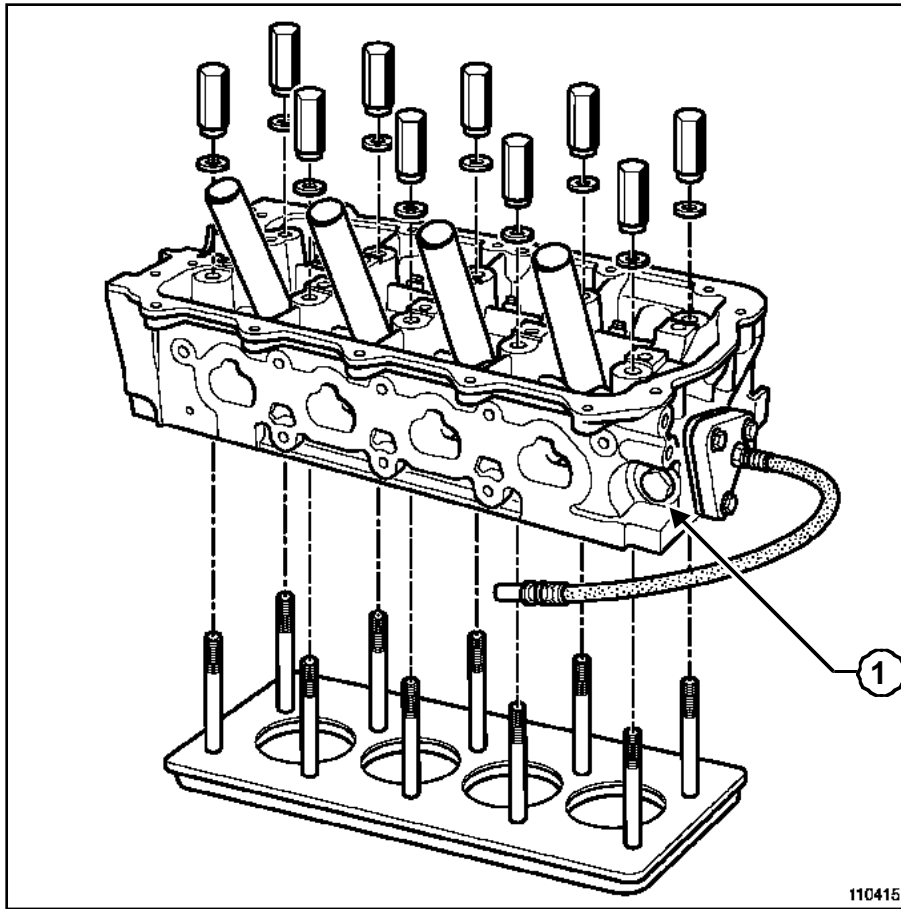
#### WARNING

No regrinding is permitted.

## Upper engine: Checking

D4D, and 700 or 712 or 720 – D4F, and 702 or 706 or 708 or 712 or 714 or 716 or 722 or 728 or 730 or 740

### 3 - Checking the cylinder head seal



110415

110415

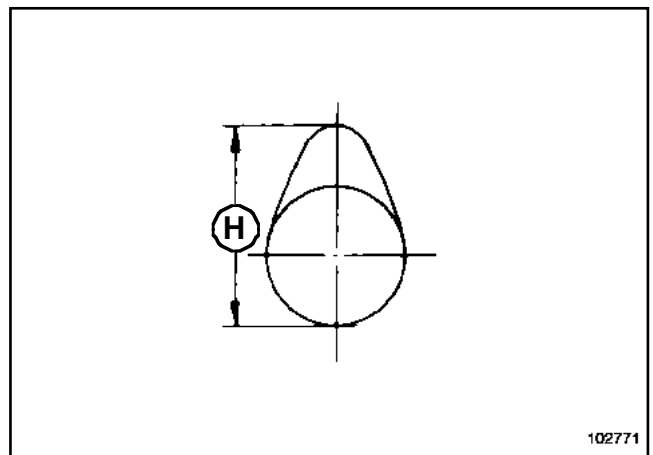
- ❑ Check the cylinder head for any cracks using **cylinder head testing equipment** (see **Garage Equipment Catalogue**).

#### WARNING

It is essential to replace the coolant temperature sensor by a bolt at (1).

- ❑ For the use of a heating bench, refer to technical note **NT 2781E**.

### 4 - Cam height checks



102771

102771

- ❑ Measure the height of the cam lobes.

D4D, and 712 – D4F, and 702 or 706 or 708 or 712 or 714 or 716 or 722 or 728 or 730

- ❑ Cam height:

- Inlet: **38.586 mm**,

## Upper engine: Checking

D4D, and 700 or 712 or 720 – D4F, and 702 or 706 or 708 or 712 or 714 or 716 or 722 or 728 or 730 or 740

- Exhaust: **38.794 mm**.

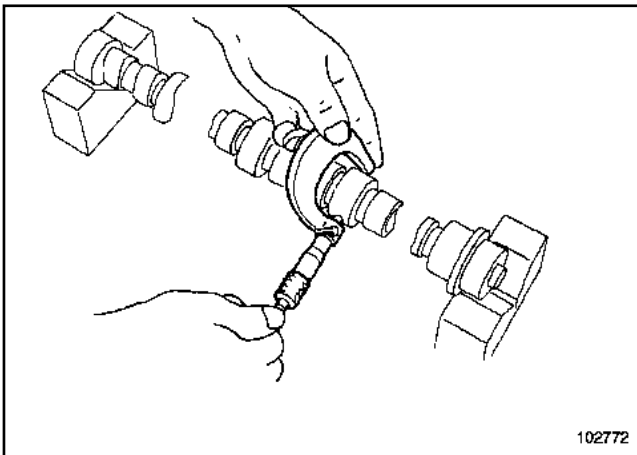
D4F, and 740

❑ Cam height:

- Inlet: **38.163 mm**,

- Exhaust: **38.794 mm**.

### 5 - Check the camshaft bearing diameters



❑ Measure the external diameter of each camshaft bearing:

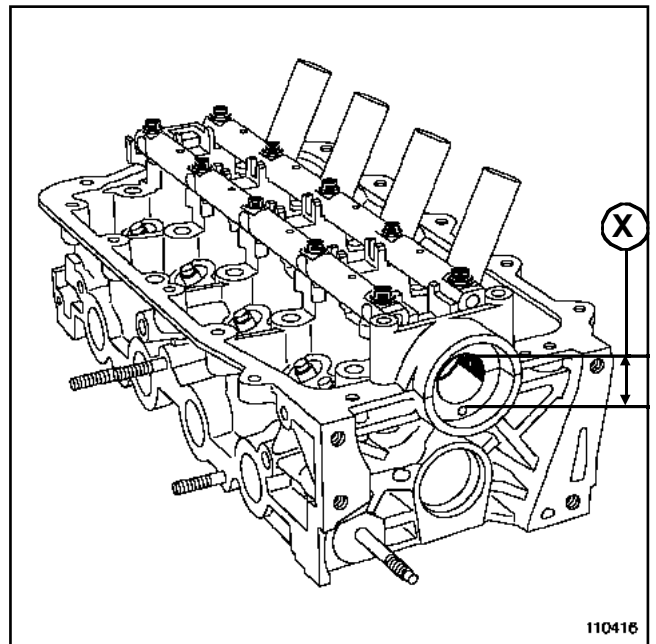
- bearing no. 1: **24.98 ± 0.01 mm**,

- bearing no. 2: **24.98 ± 0.01 mm**,

- bearing no. 3: **24.98 ± 0.01 mm**,

- bearing no. 4: **24.98 ± 0.01 mm**,

- bearing no. 5: **27.98 ± 0.01 mm**.



❑ Measure the external diameter of each camshaft bearing:

- bearing no. 1: **25.05 ± 0.01 mm**,

- bearing no. 2: **25.05 ± 0.01 mm**,

- bearing no. 3: **25.05 ± 0.01 mm**,

- bearing no. 4: **25.05 ± 0.01 mm**,

- bearing no. 5: **28.05 ± 0.01 mm**.

### 6 - Checking camshaft end play

❑ Refit:

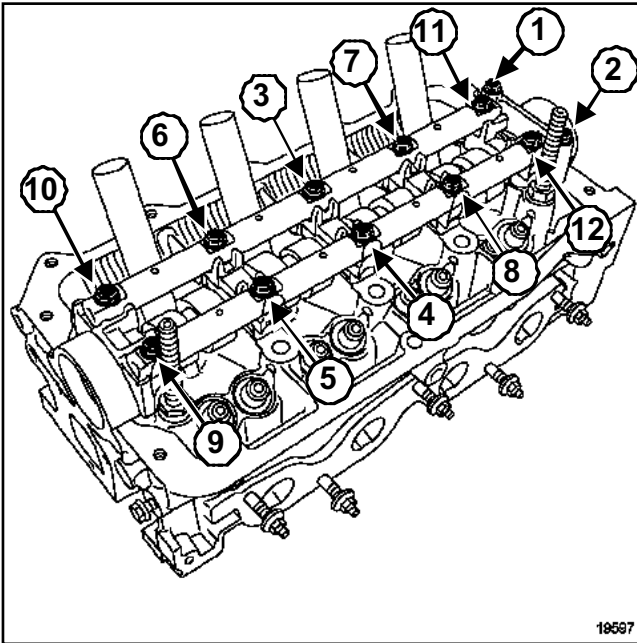
- the camshaft,

- the camshaft bearing caps,

- the rocker arms.

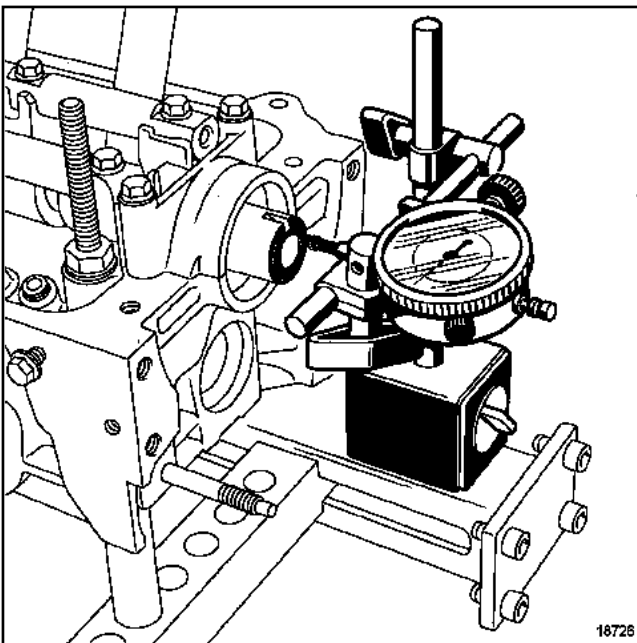
## Upper engine: Checking

D4D, and 700 or 712 or 720 – D4F, and 702 or 706 or 708 or 712 or 714 or 716 or 722 or 728 or 730 or 740



18597  
19597

- Torque tighten bolts (1) and (2) to **9 Nm**.
- Pretighten bolts (3), (4), (5), (6), (7), (8), (9), (10), (11), (12) to **3 Nm**.
- Unscrew bolt (3) until it comes free.
- Torque tighten bolt (3) to **5 Nm**.
- Repeat the operation on bolts (4), (5), (6), (7), (8), (9), (10), (11), (12).



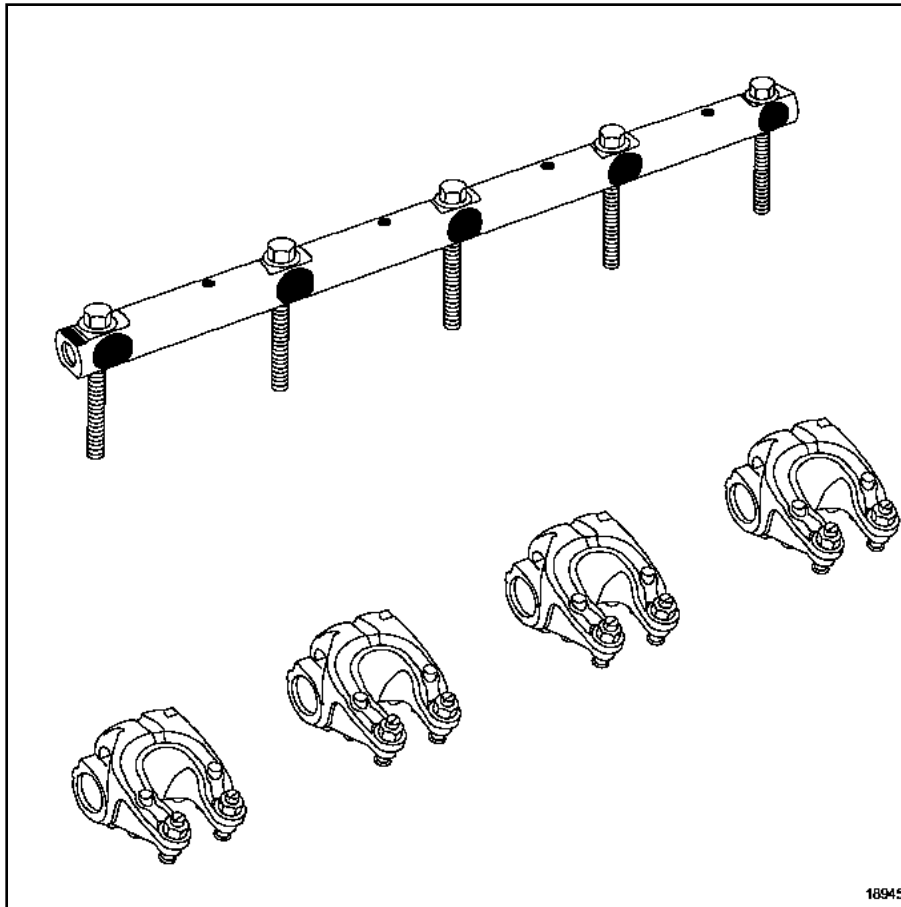
18726  
18726

- Check the longitudinal play of the camshaft which should be **0.08 to 0.178 mm**.

## Upper engine: Checking

D4D, and 700 or 712 or 720 – D4F, and 702 or 706 or 708 or 712 or 714 or 716 or 722 or 728 or 730 or 740

### 7 - Check the rocker arms



18945

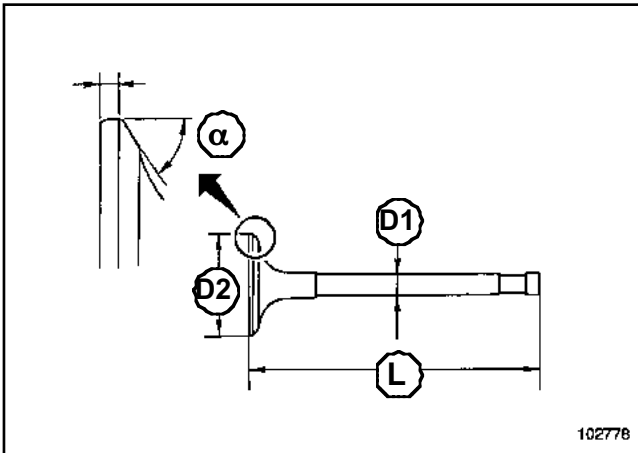
18945

- Examine the condition of the bearing surfaces and the rocker arm bolts.
- Check that the cam/tappet lubricating holes are not blocked.

## Upper engine: Checking

D4D, and 700 or 712 or 720 – D4F, and 702 or 706 or 708 or 712 or 714 or 716 or 722 or 728 or 730 or 740

### 8 - Checking the valves



102778  
102778

□ Measure the valve stem diameter (D1) :

- Inlet:  $5.48^{0}_{-0.015}$  mm,
- Exhaust:  $5.47^{0}_{-0.015}$  mm,

Measure the valve head diameter (D2) :

- Inlet:  $26 \pm 0.12$  mm,
- Exhaust:  $22.1 \pm 0.12$  mm.

Measure the valve length (L) :

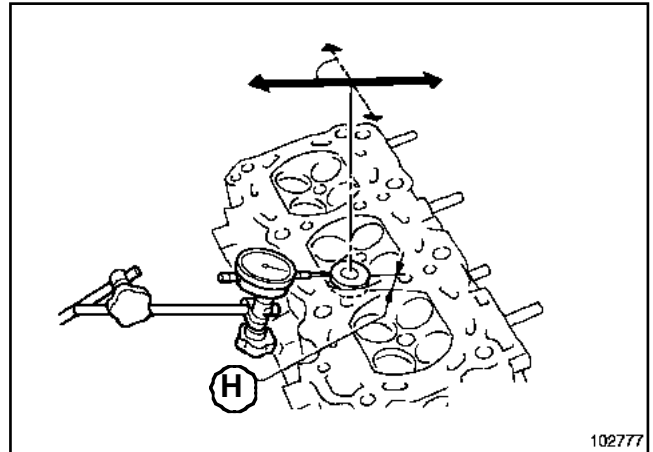
- Inlet: **110.54 to 110.99 mm**,
- Exhaust: **112.27 to 112.72 mm**.

Measure the seat angle:

- Inlet: **90°**,
- Exhaust: **90°**.

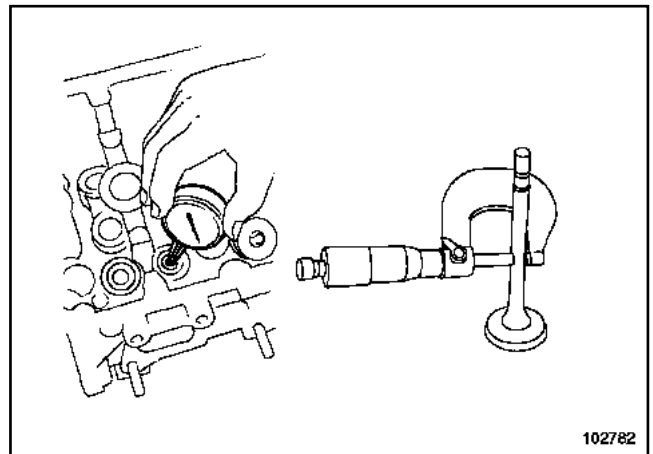
### 9 - Checking the clearance between the valve and the guide

- The clearance between the valve and the guide can be checked in two different ways.



102777  
102777

- Make the valve head exceed a height (H) of **25mm**, then, using a dial gauge, measure in the direction of the arrows, keeping the angle at **90°** in relation to the camshaft axis. The clearance between the valve and the guide is equal to half the measured value.



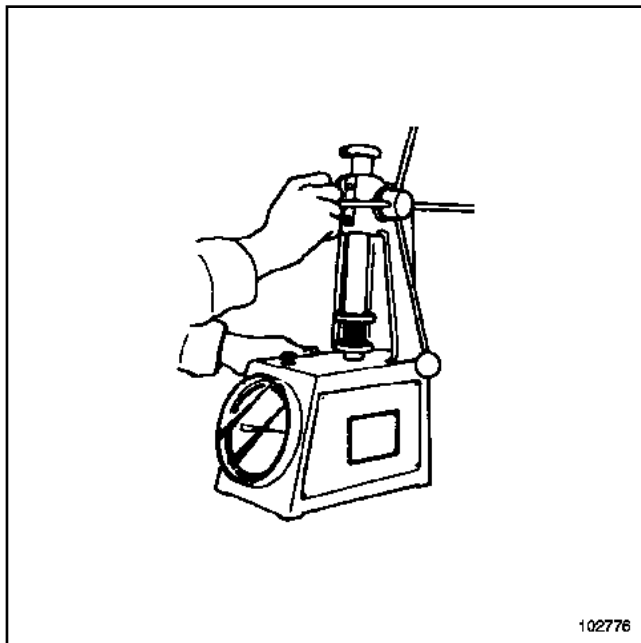
102782  
102782

- Or measure the external diameter of the valve stem and the internal diameter of the valve guide.
- Clearance between the valve and the valve guide should be:
- Inlet: **0.020 to 0.053 mm**,
  - Exhaust: **0.030 to 0.063 mm**.

## Upper engine: Checking

D4D, and 700 or 712 or 720 – D4F, and 702 or 706 or 708 or 712 or 714 or 716 or 722 or 728 or 730 or 740

## 10 - Checking the valve springs

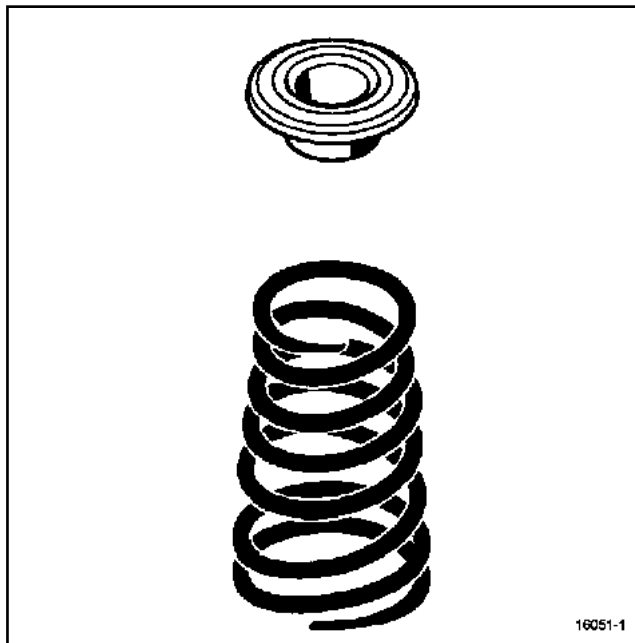


102776

102776

- Check the strength of the springs concerned.

## a - Conical spring



16051-1

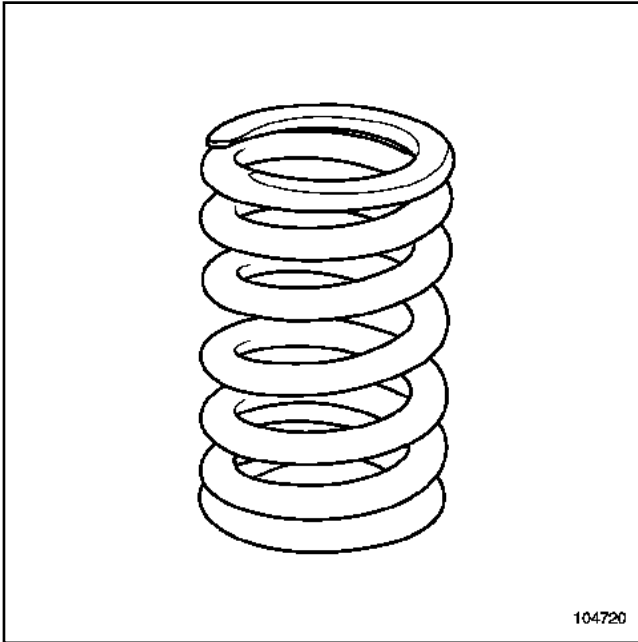
16051-1

- Free length: **40.20 mm.**  
 Length under load:  
 - **145 ± 80 N : 34 mm,**  
 - **428 ± 20 N: 25.15 mm.**  
 Length of coiled seals **23.50 mm**  
 Wire diameter: **3.10 mm**  
 Internal diameter:  
 - at top: **14.10 ± 0.2 mm,**  
 - At bottom: **16.80 ± 0.2 mm.**  
 External diameter:  
 - at top: **20.30 ± 0.2 mm,**  
 - at bottom: **23 ± 0.2 mm.**

## Upper engine: Checking

D4D, and 700 or 712 or 720 – D4F, and 702 or 706 or 708 or 712 or 714 or 716 or 722 or 728 or 730 or 740

### **b - Cylindrical spring**



104720

□ Free length: **42.90 ± 1 mm**

Length under load:

- **156 ± 10 N: 36 mm**

- **420 ± 20 N: 27.15 mm.**

Length of coiled seals **25.70 mm**

Diameter of wire: **3 ± 0.03 mm.**

Internal diameter: **14.10 mm.**

External diameter: **20.60 mm**


# ENGINE AND LOWER ENGINE ASSEMBLY

## Rebuilding the cylinder head

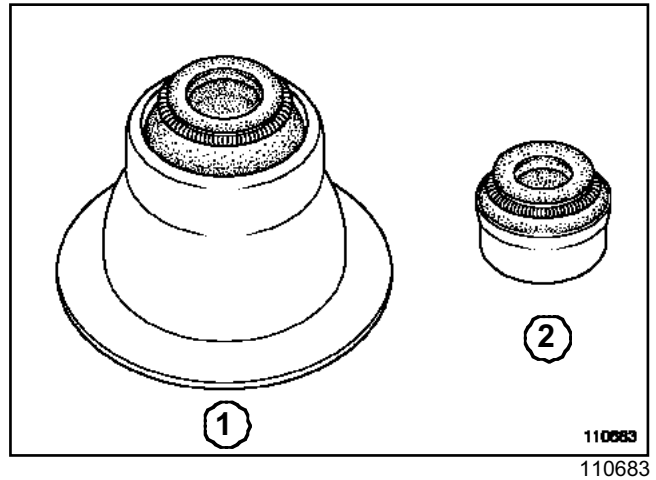
# 10A

D4D, and 700 or 712 or 720 – D4F, and 702 or 706 or 708 or 712 or 714 or 716 or 722 or 728 or 730 or 740

Essential special tooling	
<b>Mot. 1511</b>	Tool for fitting valve stem seals
<b>Mot. 1502</b>	Tool for removing valve stem cotters
<b>Mot. 1605</b>	For fitting cylinder head cap.
<b>Ele. 1382</b>	Spark plug key kit 16 & 21 mm torque 1.75 & 2.8 daNm + 9-9.52 square drive for spanner Ele. 1086
<b>Mot. 1587</b>	Tool for fitting camshaft "PTFE" seal.
<b>Mot. 799-01</b>	Tool for locking sprockets on toothed timing belt

Tightening torques 	
cylinder head plenum chamber bolts	<b>10 Nm</b>
the engine lifting eye at the flywheel end.	<b>22 Nm</b>
spark plugs	<b>20 to 27 Nm</b>
camshaft pulley bolt	<b>30 Nm + 45° ± 6°</b>
exhaust manifold nuts	<b>25 Nm</b>
exhaust manifold strut bolt	<b>21 Nm</b>
exhaust heat shield bolt	<b>15 Nm</b>

### I -REFITTING THE VALVE STEM SEALS

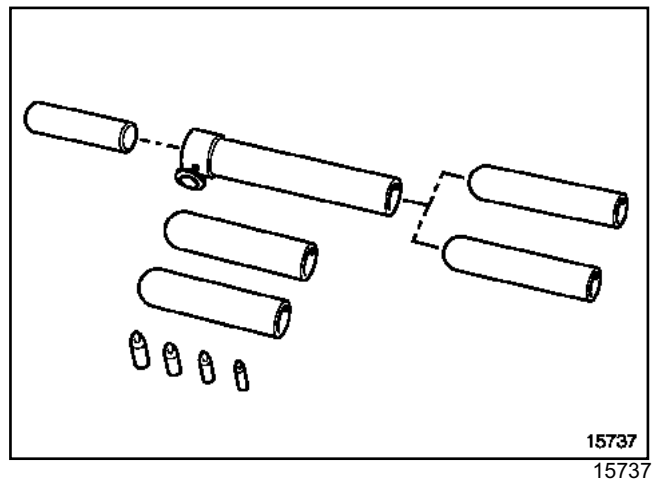


Note:

There are two types of valve stem seal:

- the valve stem seal with a lower spring retaining washer (1)
- the valve stem seal without a lower spring retaining washer(2)

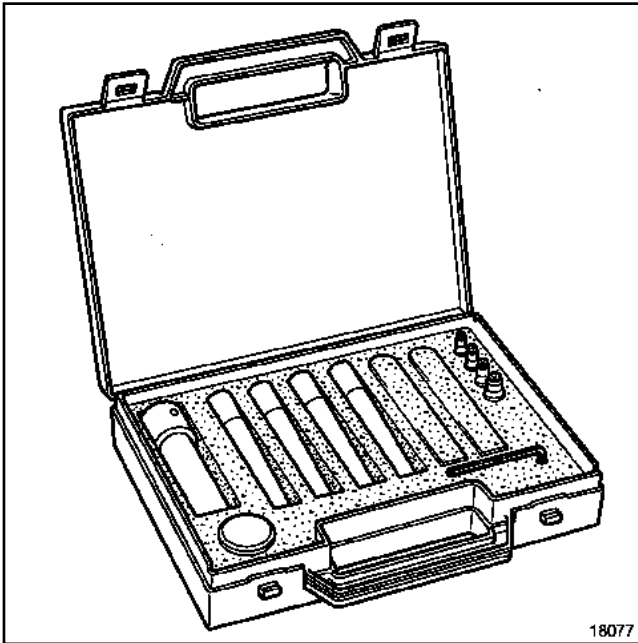
- 
- Lubricate the inside of the valve guide.



- 
- It is imperative to fit the seals using:

- kit (Mot. 1511) for seal types (1),
- kit (Mot. 1755) for seal types (2).

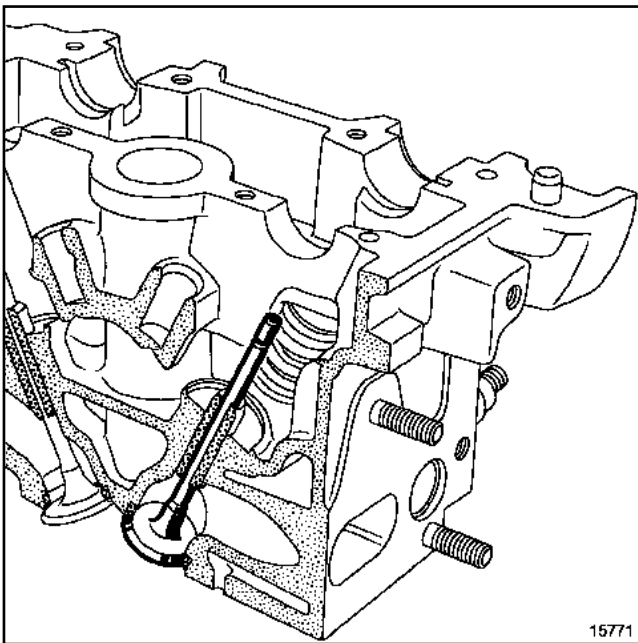
D4D, and 700 or 712 or 720 – D4F, and 702 or 706 or 708 or 712 or 714 or 716 or 722 or 728 or 730 or 740



18077  
18077

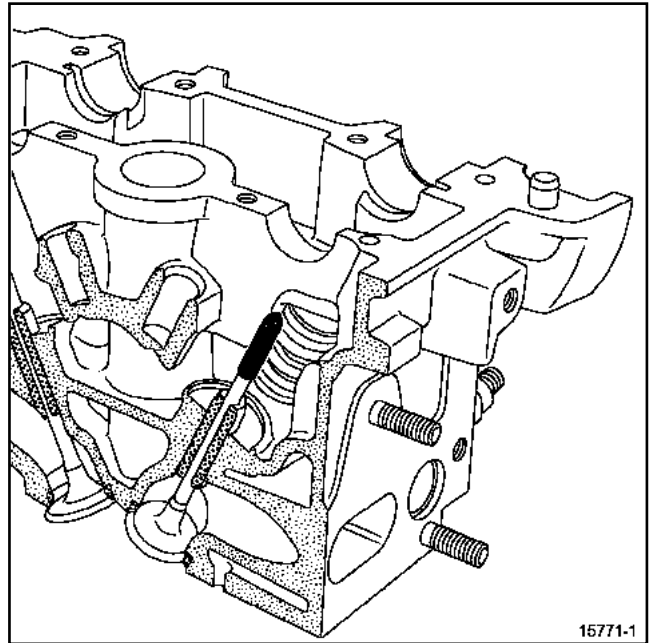
- - Or using suitable equipment (for both types of seal).

### 1 - VALVE STEM SEAL WITH SPRING LOWER RETAINING WASHER (1)



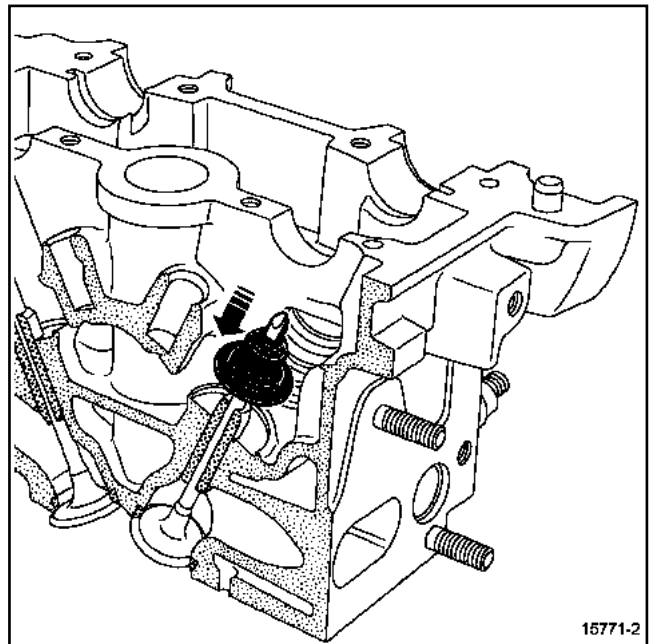
15771  
15771

- Place the valve in the cylinder head.



15771-1  
15771-1

- Fit the valve insert of tool (Mot. 1511) on the valve stem (the internal diameter of the valve insert should be the same as the valve stem).



15771-2  
15771-2

- Keep the valve pressed against its seat.

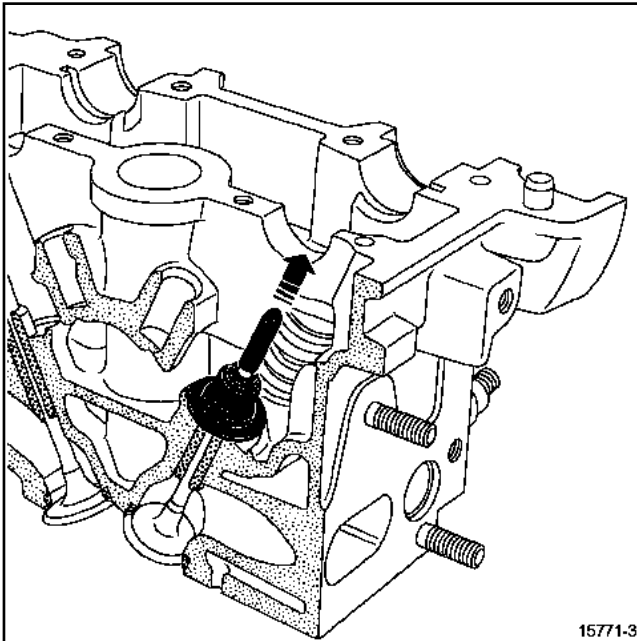
#### WARNING

Do not lubricate the valve stem seals before fitting them.

- Fit the valve stem seal on the barrel.

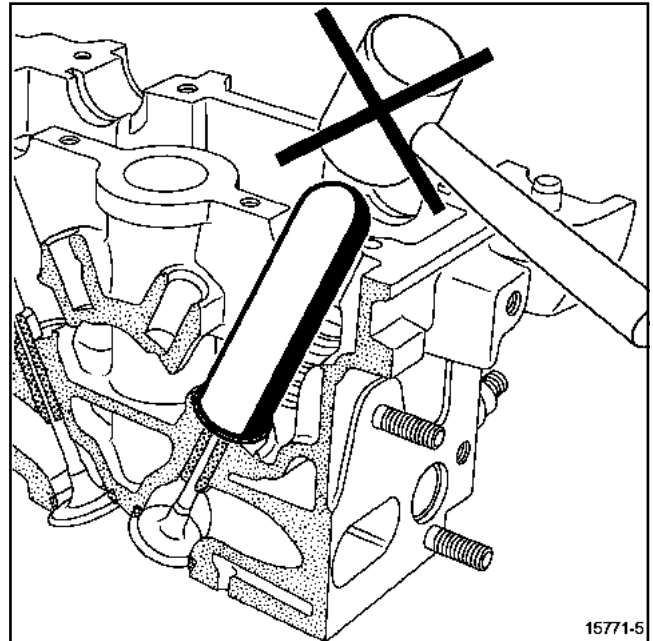
## Rebuilding the cylinder head

D4D, and 700 or 712 or 720 – D4F, and 702 or 706 or 708 or 712 or 714 or 716 or 722 or 728 or 730 or 740



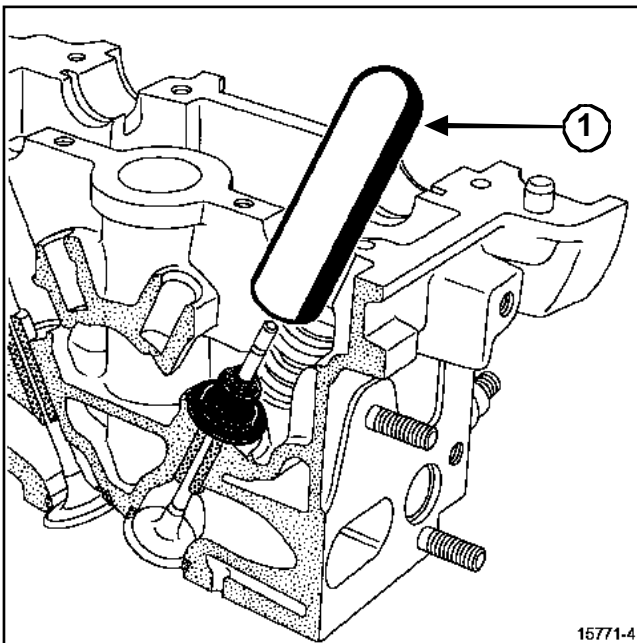
15771-3  
15771-3

- ❑ Push the valve stem seal past the tool barrel, then withdraw the barrel.



15771-5  
15771-5

- ❑ Push home the valve stem seal by gently striking the top of the pushrod with the palm of the hand, until the valve stem seal makes contact with the cylinder head.



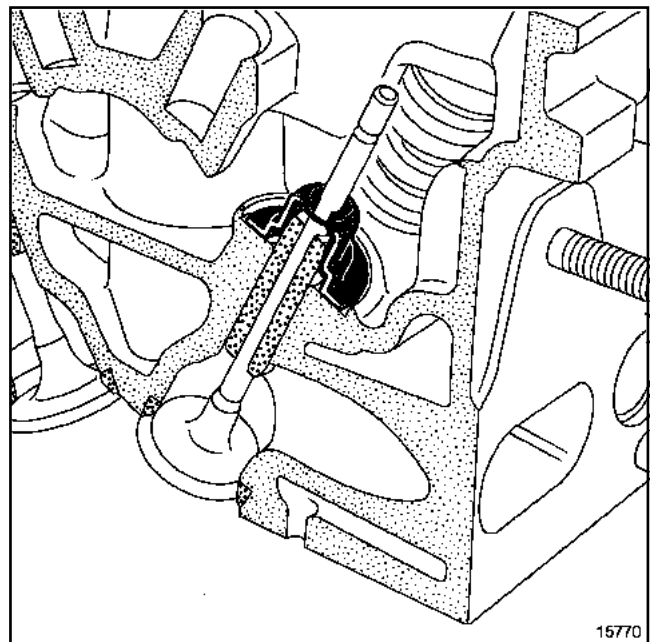
15771-4  
15771-4

- ❑ Place the pushrod(1) over the valve stem seal.

**Note:**

The internal diameter of the pushrod must be identical to the diameter of the valve stem.

Also, the base of the pushrod must press against the part of the valve stem seal that acts as the lower thrust washer for the valve spring.



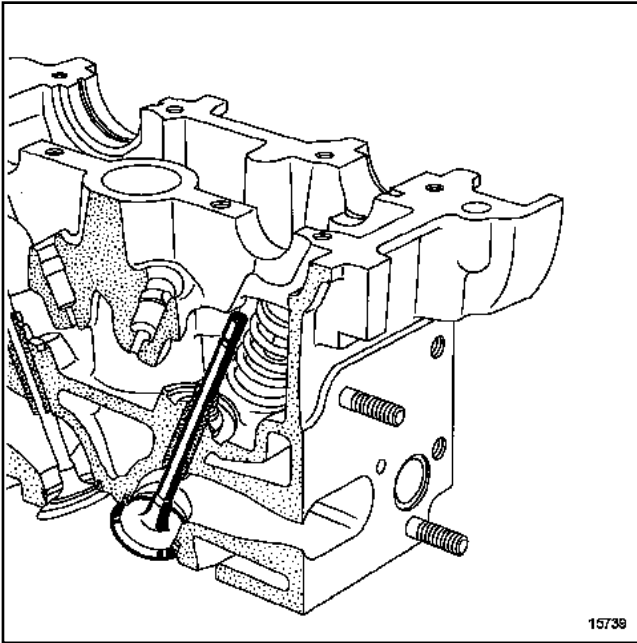
15770  
15770

- ❑ Repeat these operations for all the valves.

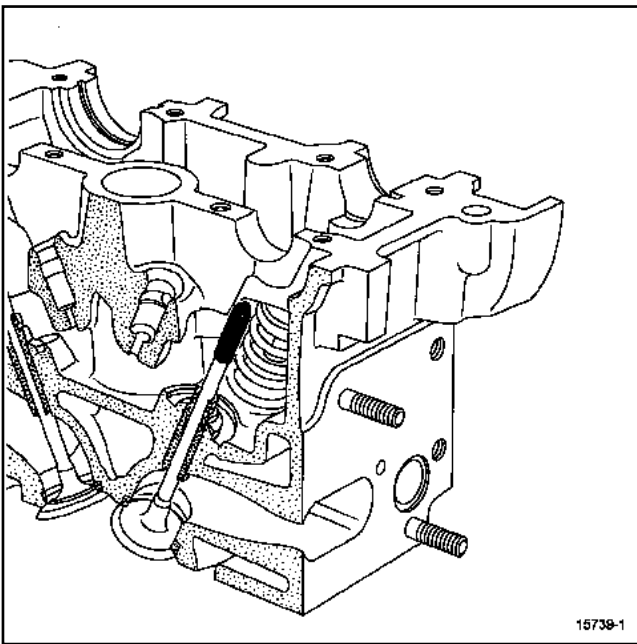
## Rebuilding the cylinder head

D4D, and 700 or 712 or 720 – D4F, and 702 or 706 or 708 or 712 or 714 or 716 or 722 or 728 or 730 or 740

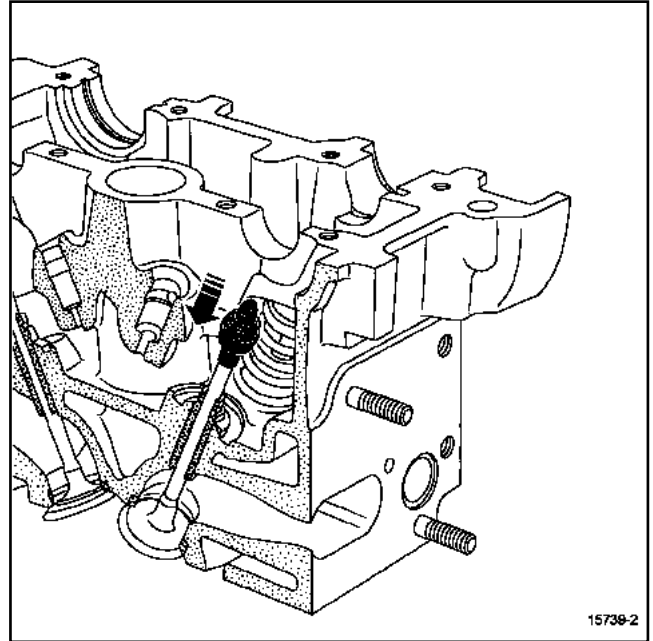
### 2 - VALVE STEM SEAL WITHOUT SPRING LOWER RETAINING WASHER (2)



- Place the valve in the cylinder head.



- Fit the valve insert of tool (**Mot 1755**) on the valve stem (the diameter of the valve insert should be the same as the valve stem).

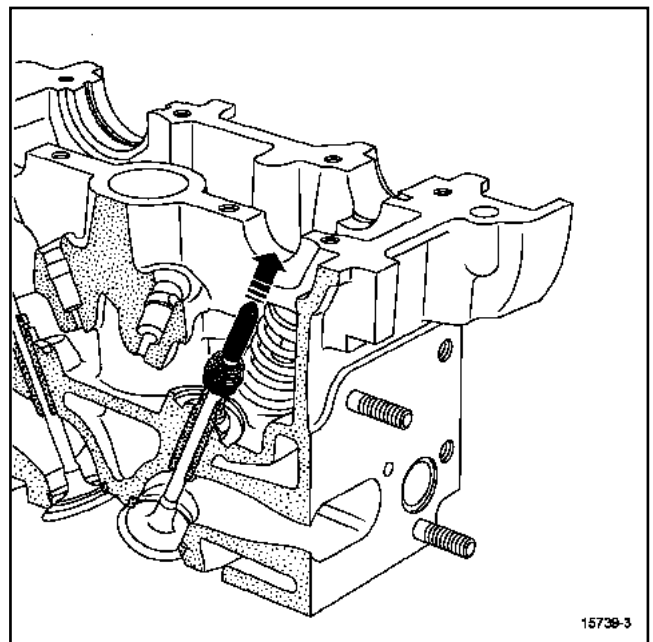


- Keep the valve pressed against its seat.

#### WARNING

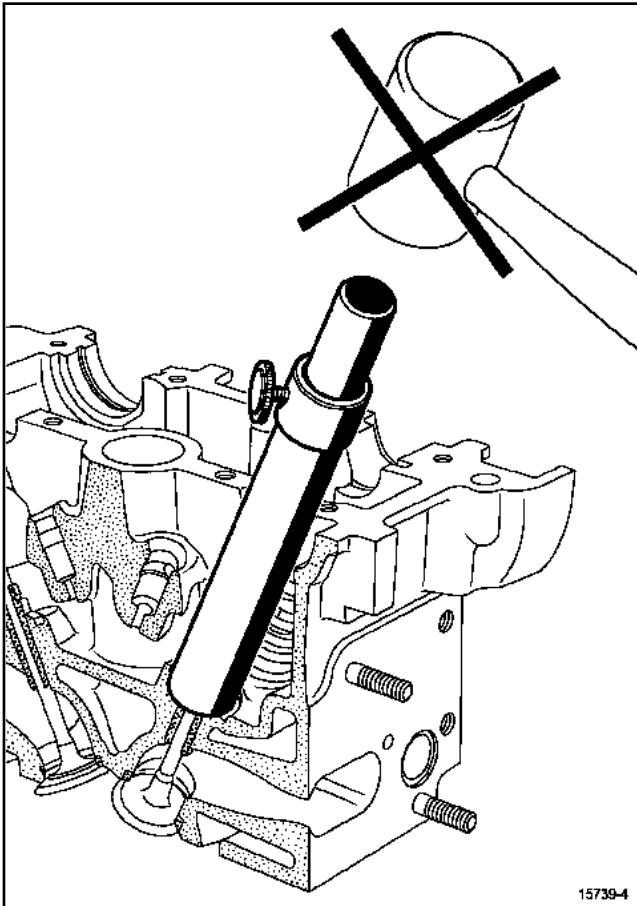
Do not grease the valve stem seals.

- Fit the valve stem seal (not lubricated) over the valve insert.
- Push the valve stem seal until it goes past the valve insert.



- Remove the valve insert.

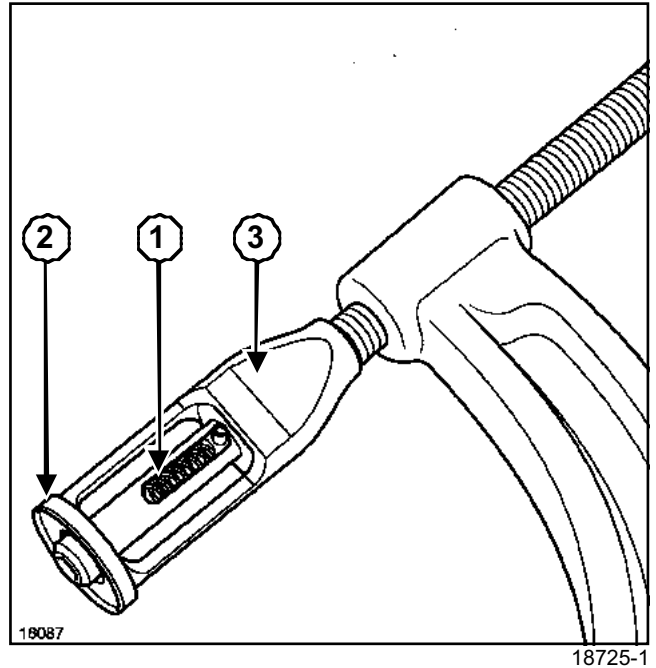
D4D, and 700 or 712 or 720 – D4F, and 702 or 706 or 708 or 712 or 714 or 716 or 722 or 728 or 730 or 740

15739-4  
15739-4

- Place the guide tube and sleeve assembly over the pushrod.
- Push the valve stem seal down by tapping the top of the sleeve with the palm of your hand until the guide tube touches the cylinder head.
- Repeat these operations for all the valves.

## II - REASSEMBLING THE CYLINDER HEAD

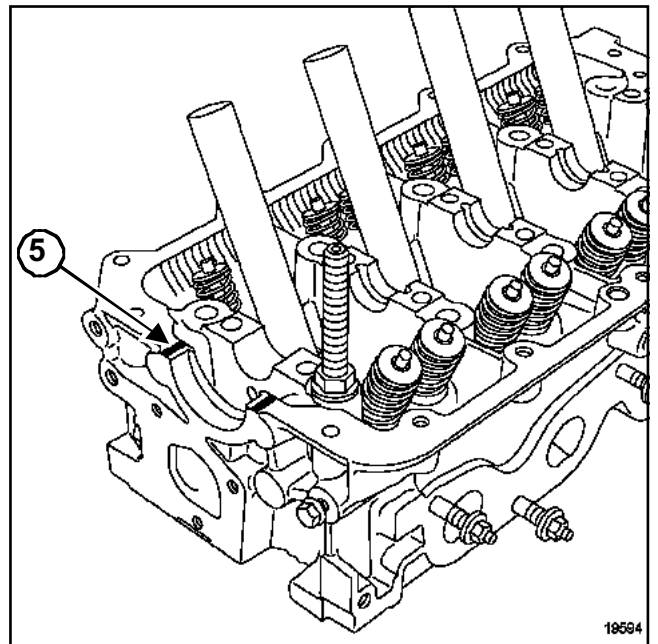
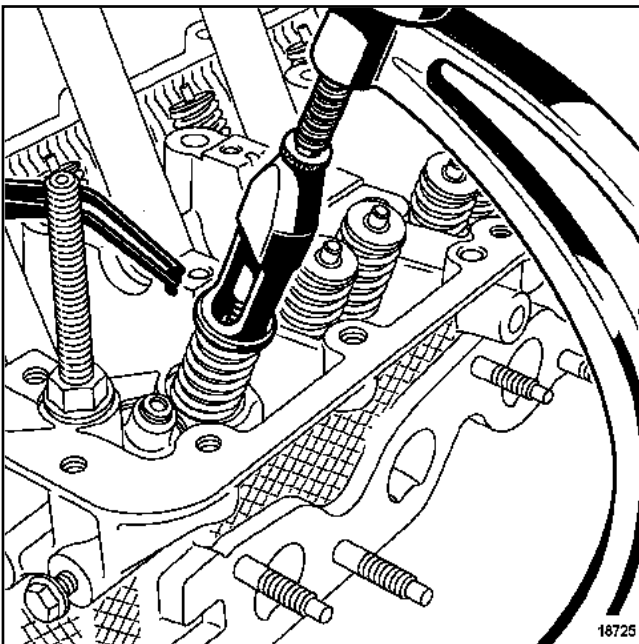
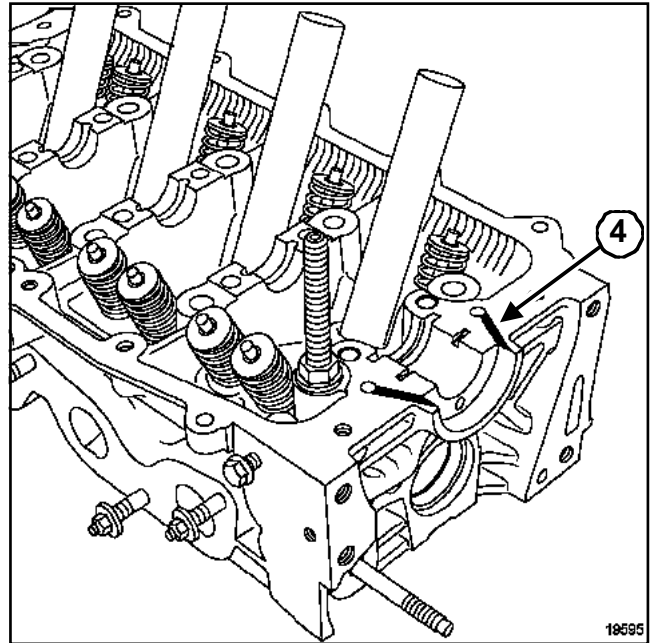
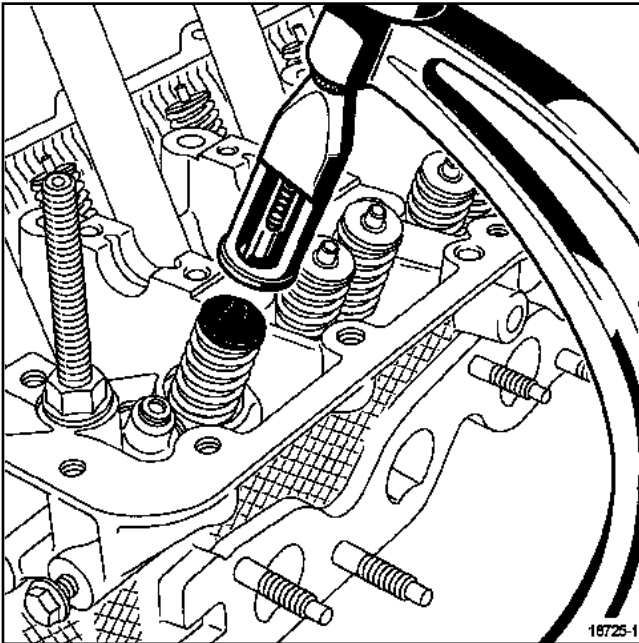
- Refit:
  - the springs,
  - the valve spring upper cups,



- To correctly compress the valve springs, the piston of (1)(Mot. 1502) must be centred on the valve stem seal.

The upper cup of the spring should enter housing (2) of socket (3) of (Mot. 1502).

D4D, and 700 or 712 or 720 – D4F, and 702 or 706 or 708 or 712 or 714 or 716 or 722 or 728 or 730 or 740



□ Refit the cotters using tweezers.

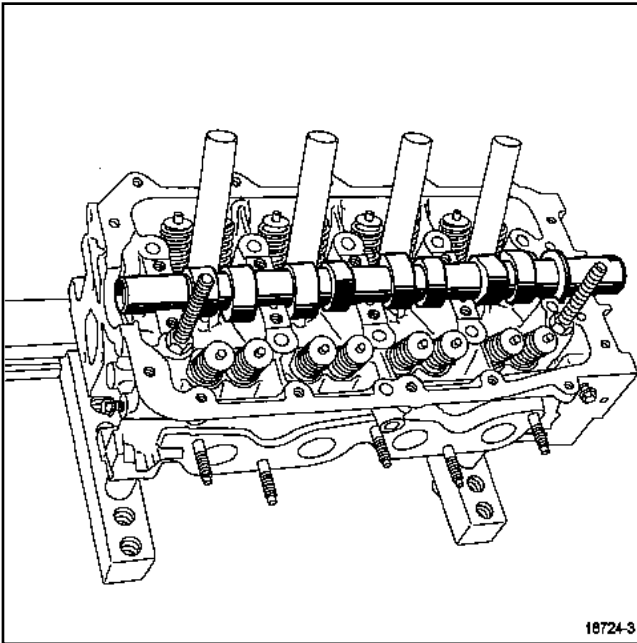
□ Apply:

- two beads (4) of **RHODORSEAL 56612** mm in width to bearing no. 5 on the cylinder head,
- two beads (5) of **RHODORSEAL 5661** to bearing no. 1 on the cylinder head

□ Apply a blob of oil to the camshaft bearings.

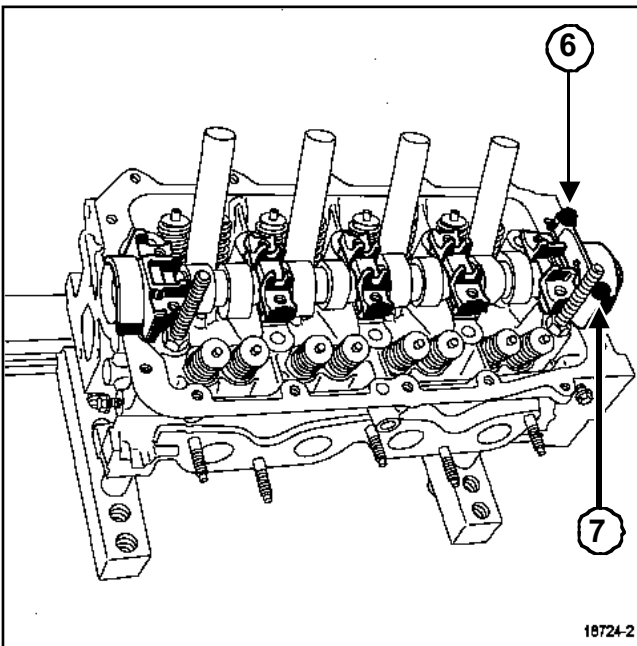
## Rebuilding the cylinder head

D4D, and 700 or 712 or 720 – D4F, and 702 or 706 or 708 or 712 or 714 or 716 or 722 or 728 or 730 or 740



18724-3

- Refit the camshaft.



18724-2

- Refit the camshaft bearing caps.
- Torque tighten the two bearing no. 5 bolts to **9 N.m** at **(6)** and **(7)**.

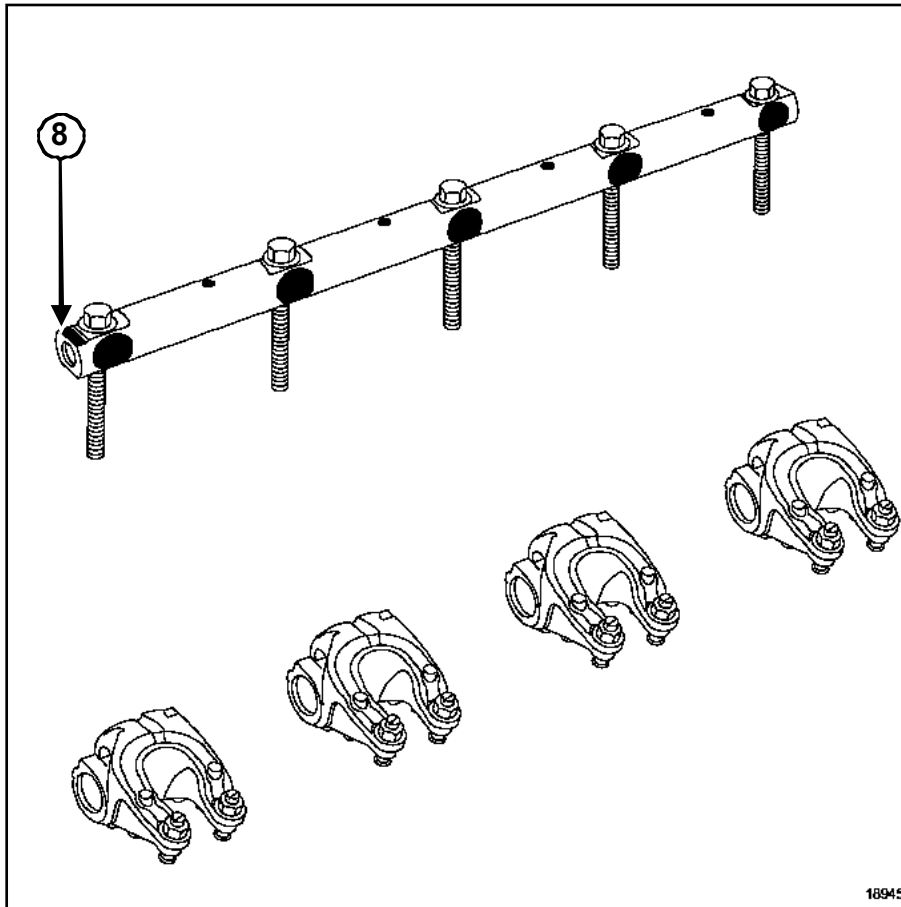
# ENGINE AND LOWER ENGINE ASSEMBLY

## Rebuilding the cylinder head

# 10A

D4D, and 700 or 712 or 720 – D4F, and 702 or 706 or 708 or 712 or 714 or 716 or 722 or 728 or 730 or 740

### Intake rocker arm rails



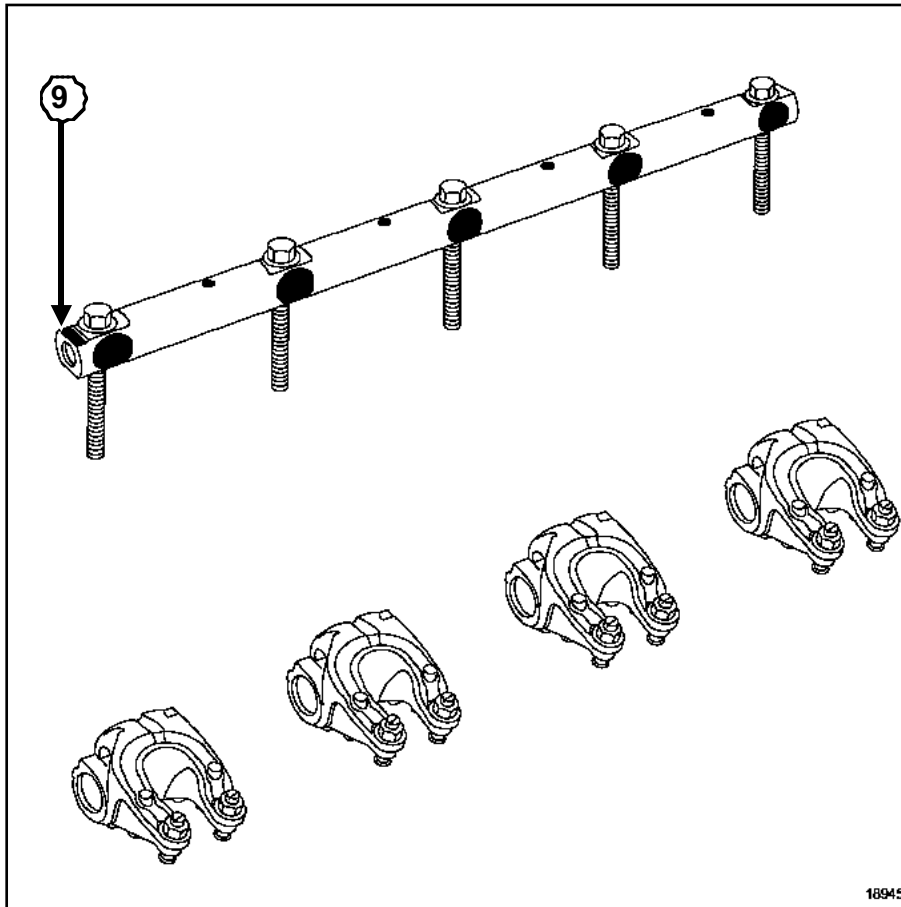
18945

- ❑ Refit the intake rocker arm rail positioning:
  - the rails in relation to the tappets,
  - mark **(8)** end **timing**.

## Rebuilding the cylinder head

D4D, and 700 or 712 or 720 – D4F, and 702 or 706 or 708 or 712 or 714 or 716 or 722 or 728 or 730 or 740

### Exhaust rocker arm rail



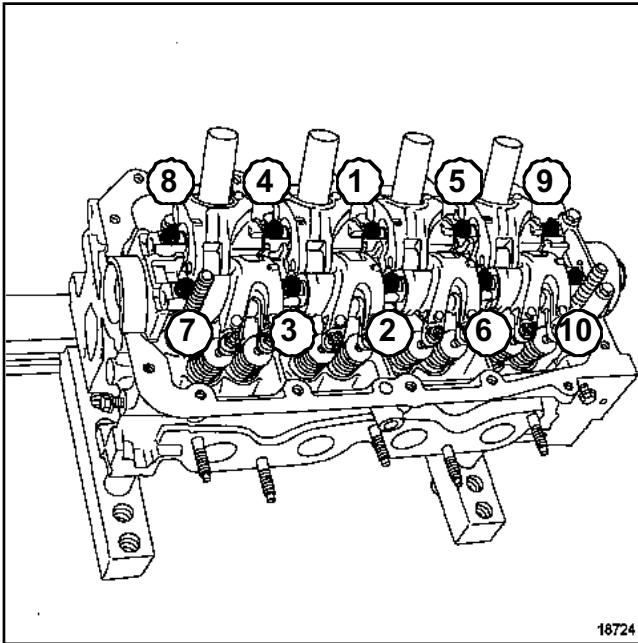
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- ❑ Refit the intake rocker arm rail positioning:
  - the rails in relation to the tappets,
  - mark (9) end **flywheel**.

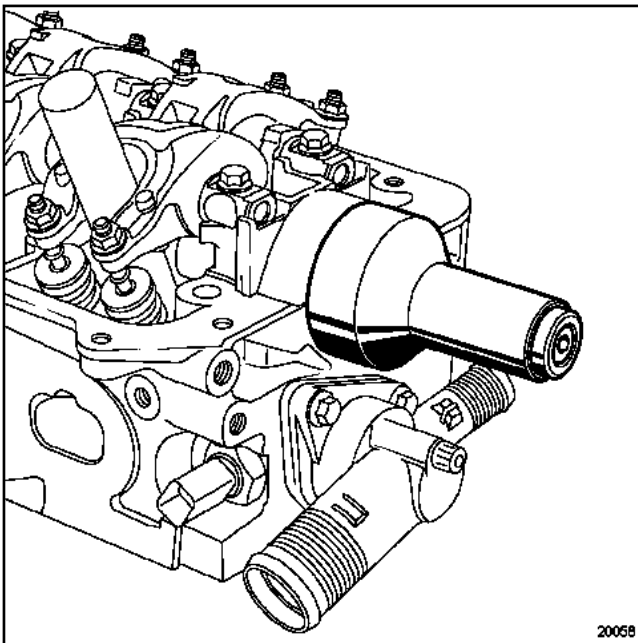
## Rebuilding the cylinder head

D4D, and 700 or 712 or 720 – D4F, and 702 or 706 or 708 or 712 or 714 or 716 or 722 or 728 or 730 or 740



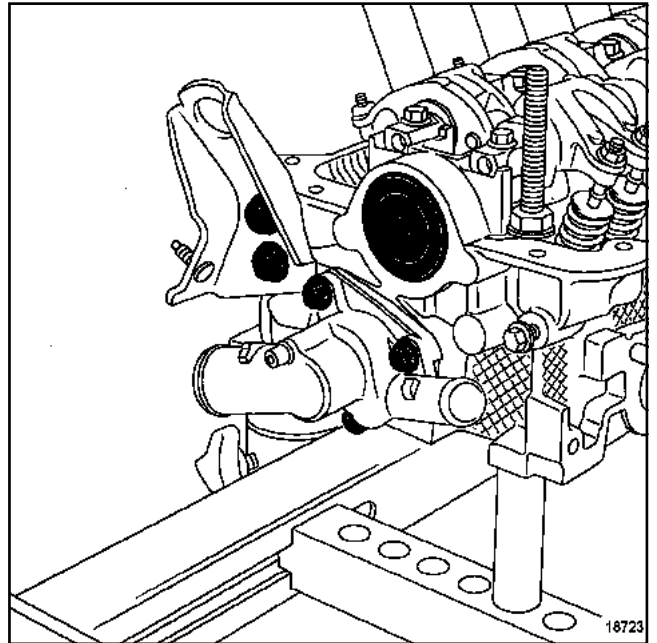
18724  
18724

- ❑ Tighten in order and to torque the camshaft bearing caps to **5 Nm**.
- ❑ Completely loosen bolt (1).
- ❑ Torque and angle tighten bolt (1) to **7 Nm + 50° ± 6°**.
- ❑ Carry out the previous operations for each bolt from (2) to (10).



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- ❑ Refit a cap at the end of the camshaft with tool (Mot. 1605).



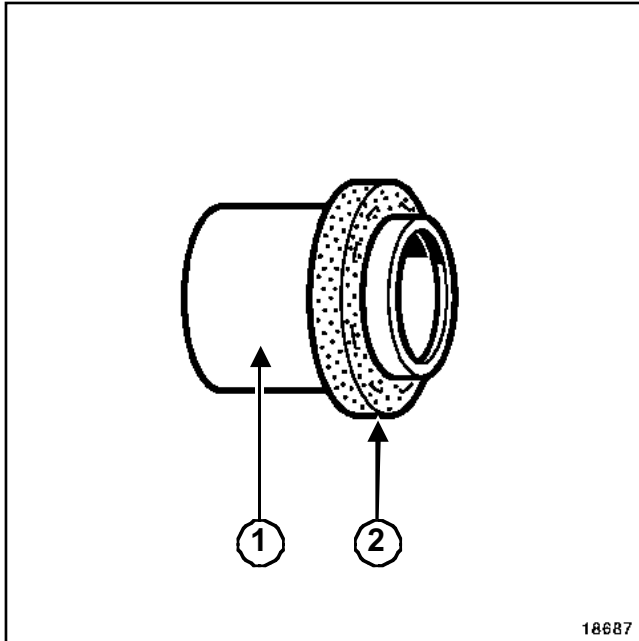
18723  
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- ❑ Refit the cylinder head outlet plenum chamber with a new seal.
- ❑ Tighten to torque the **cylinder head plenum chamber bolts (10 Nm)**.
- ❑ Refit the engine lifting eye at the engine flywheel end.
- ❑ Tighten to torque the **the engine lifting eye at the flywheel end. (22 Nm)**.
- ❑ Refit the spark plugs using a tool kit (Ele. 1382).
- ❑ Tighten to torque the **spark plugs (20 to 27 Nm)**.

## Rebuilding the cylinder head

D4D, and 700 or 712 or 720 – D4F, and 702 or 706 or 708 or 712 or 714 or 716 or 722 or 728 or 730 or 740

### III - REFIT THE CAMSHAFT SEAL



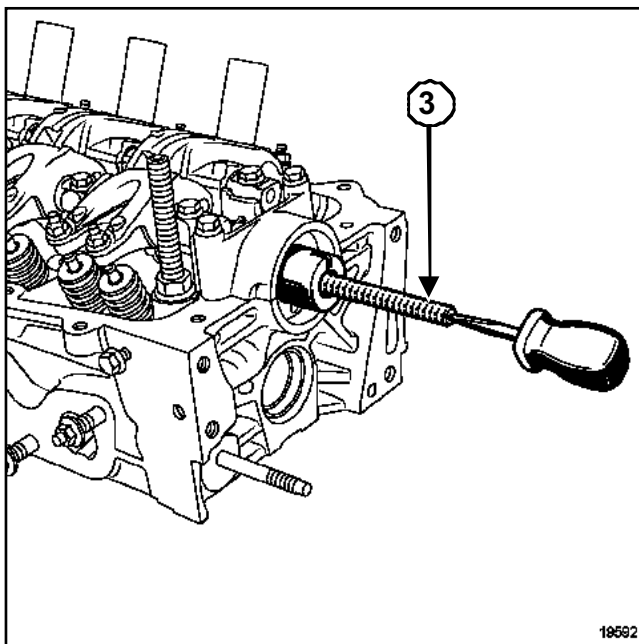
18687  
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#### WARNING

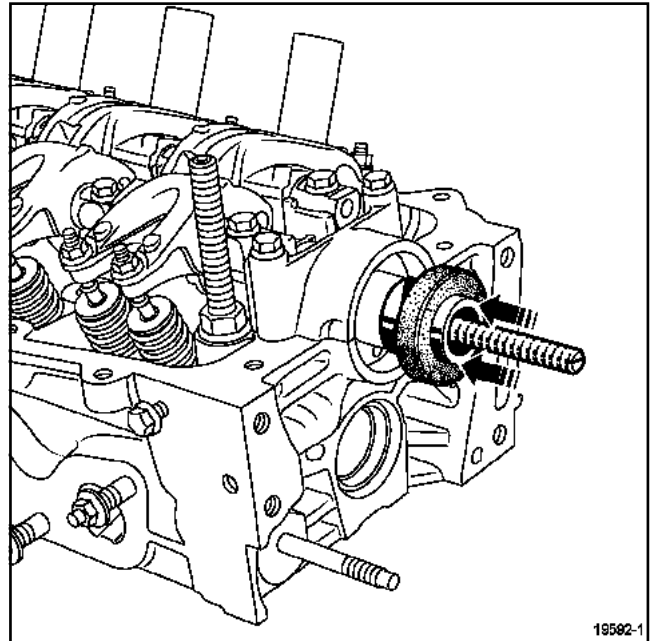
This type of seal is extremely FRAGILE. When handling it, it is essential to hold it by protector (1). It is strictly forbidden to touch seal (2) to prevent any oil from leaking out once the seal is fitted onto the engine.

The seal is fitted using tool (Mot. 1587).



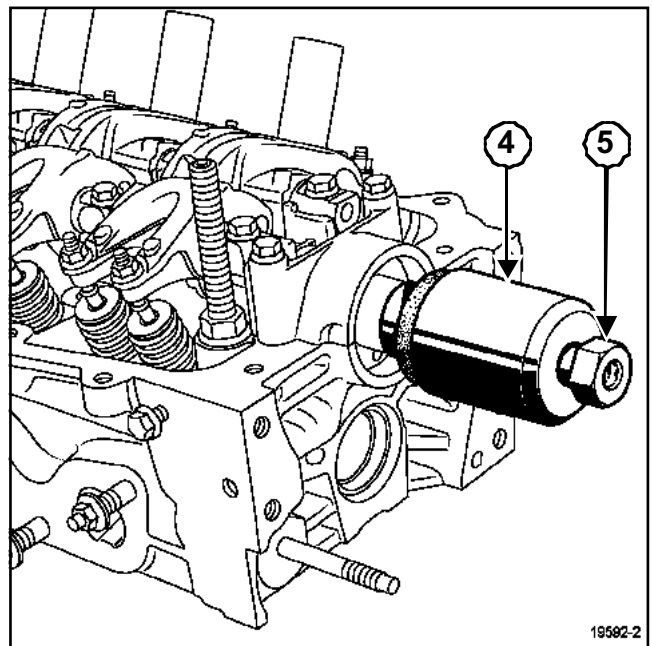
19592  
19592

- Tighten the threaded rod (3) of tool (Mot. 1587) in the camshaft.



19592-1  
19592-1

- Fit the seal gasket and protector on the camshaft. Be careful not to touch the seal.

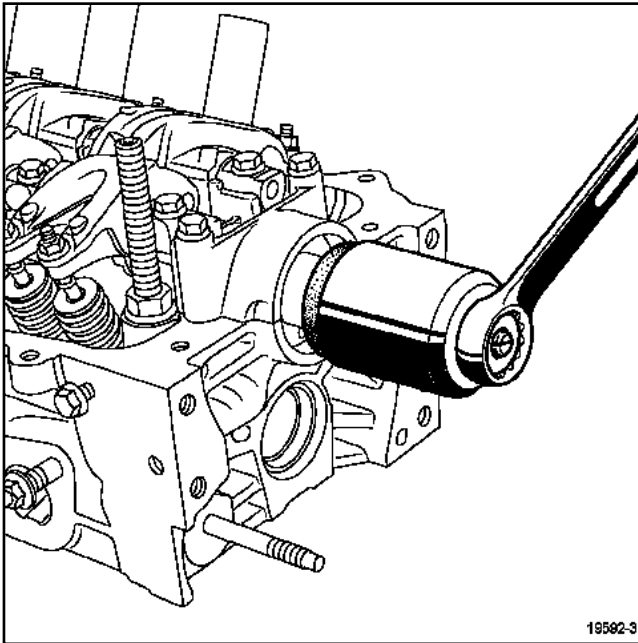


19592-2  
19592-2

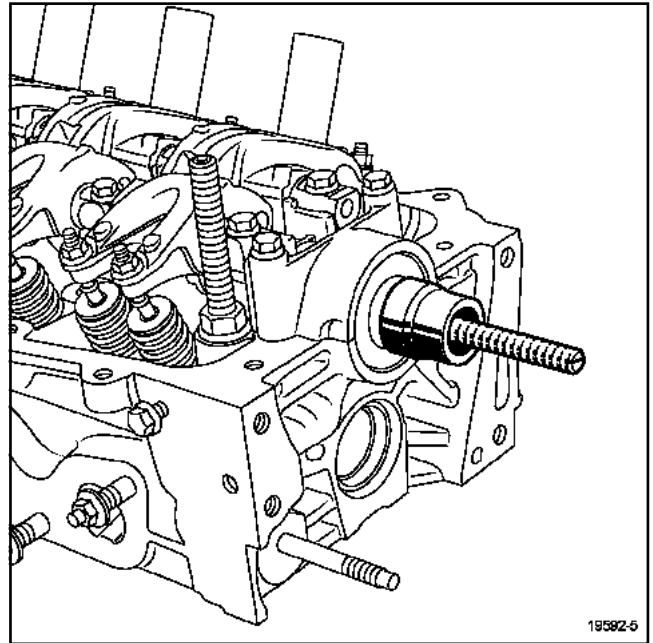
- Fit the cover (4) and collar nut (5) of tool (Mot. 1587).

## Rebuilding the cylinder head

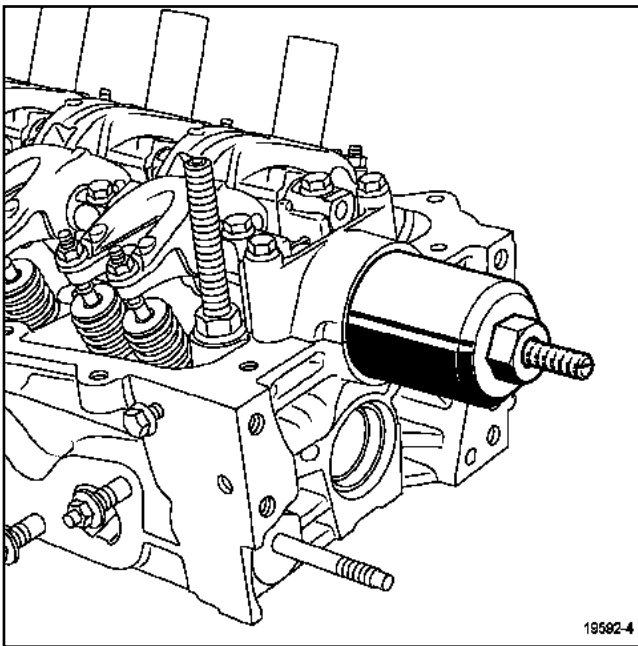
D4D, and 700 or 712 or 720 – D4F, and 702 or 706 or 708 or 712 or 714 or 716 or 722 or 728 or 730 or 740



19592-3  
19592-3



19592-5  
19592-5

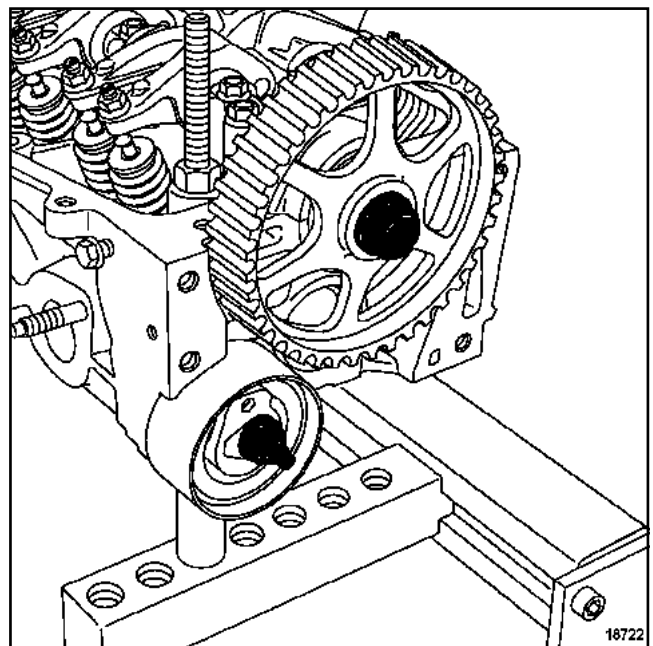


19592-4  
19592-4

- Screw on the collar nut until the cover touches the cylinder head.

Remove:

- the nut,
- the cover,
- the protector,
- the threaded rod.

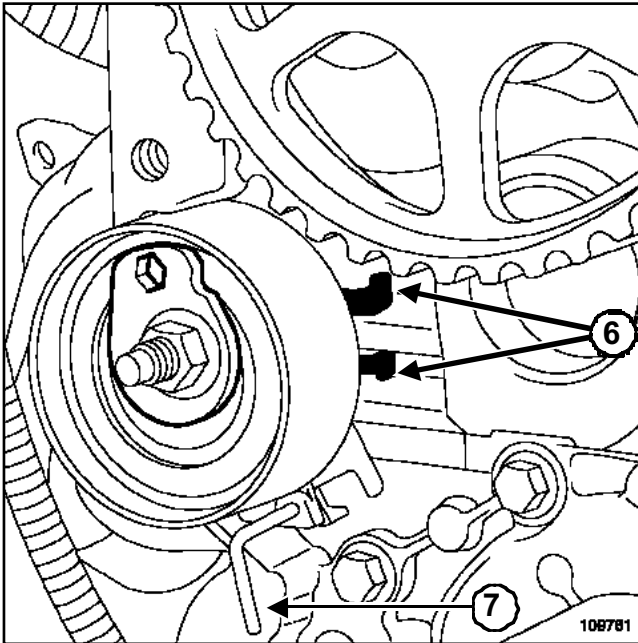


18722  
18722

- Refit the camshaft pulley with a new bolt.
- Tighten to torque the **camshaft pulley bolt (30 Nm + 45° ± 6°)** using tool (Mot. 799-01).

## Rebuilding the cylinder head

D4D, and 700 or 712 or 720 – D4F, and 702 or 706 or 708 or 712 or 714 or 716 or 722 or 728 or 730 or 740

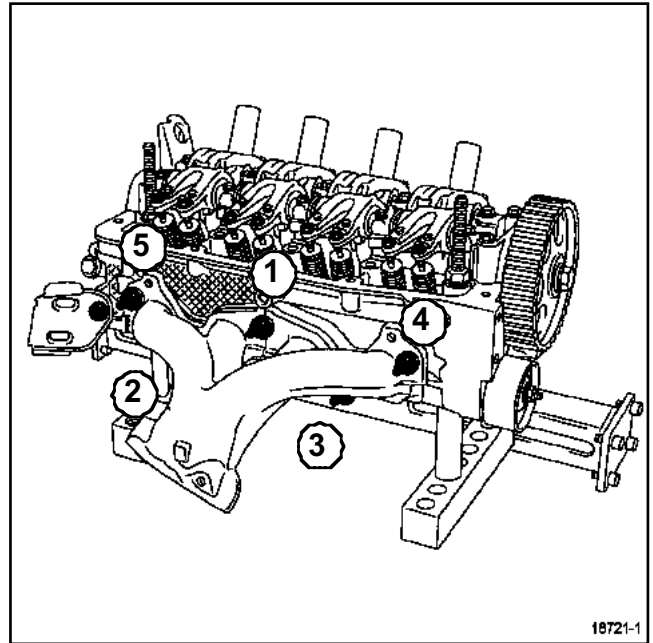


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- Refit a new tensioner wheel positioning the two indexes (6) between the cylinder head groove.

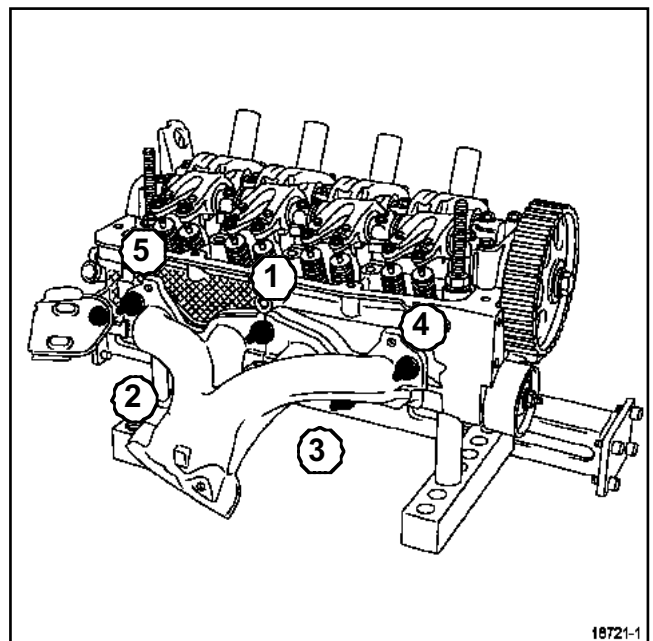
Note:

- Do not remove pin (7) before refitting the timing belt.



18721-1

- Refit the exhaust manifold with a new seal.
- Tighten to torque and in order the **exhaust manifold nuts (25 Nm)**.
- Refit the exhaust manifold strut (if fitted).
- Tighten to torque the **exhaust manifold strut bolt (21 Nm)**.



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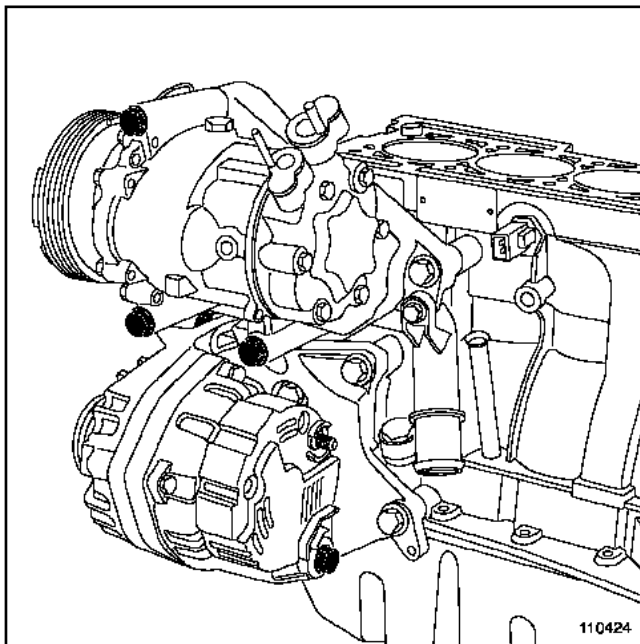
- Refit the exhaust heat shield.
- Tighten to torque the **exhaust heat shield bolt (15 Nm)**.

D4D, and 700 or 712 or 720 – D4F, and 702 or 706 or 708 or 712 or 714 or 716 or 722 or 728 or 730 or 740

### Essential special tooling

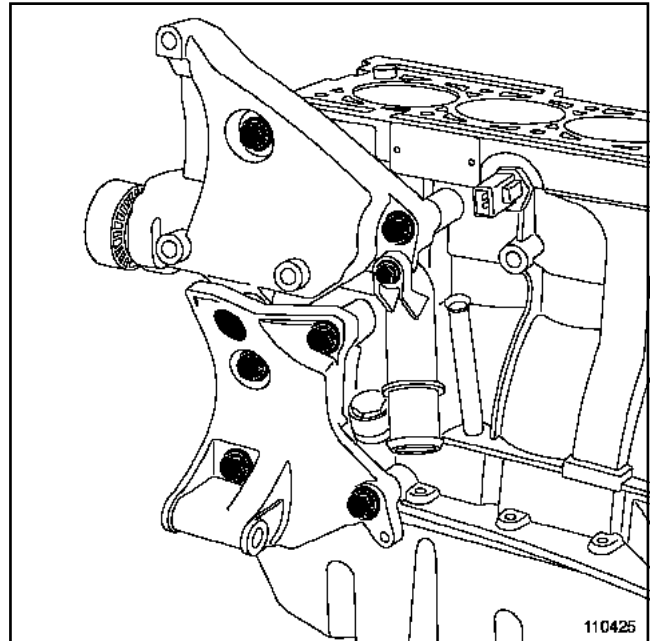
<b>Mot. 582-01</b>	Flywheel locking tool (K engines)
<b>Mot. 1716</b>	Removes housing with silicone seals.
<b>Mot. 1377</b>	Crankshaft oil seal removal tool, 80 x 70 x 8.
<b>Mot. 1374</b>	Oil pump seal removal tool
<b>Mot. 1330</b>	Oil filter removing tool - 66 mm diameter

### I - REMOVING THE ACCESSORIES FOR ENGINES FITTED AT THE CLUTCH END



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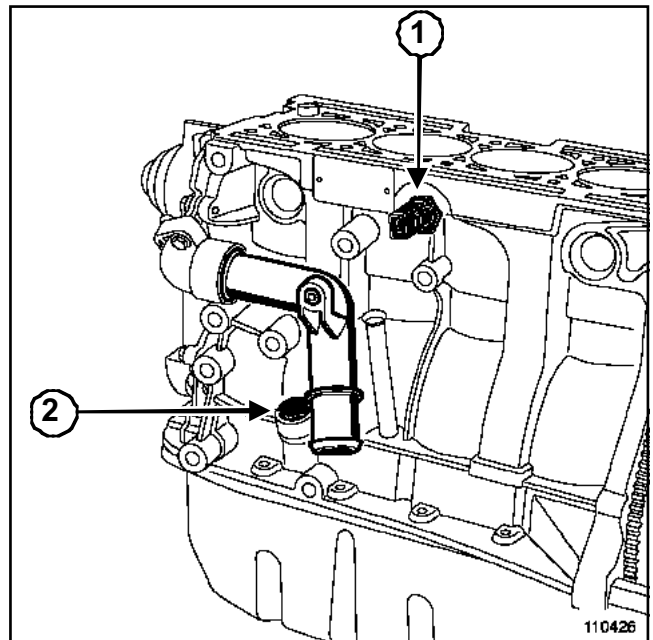
- Remove:
- the alternator ,
- the air conditioning compressor.



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- Remove the accessories mountings.

### II - REMOVING THE ENGINE PERIPHERALS

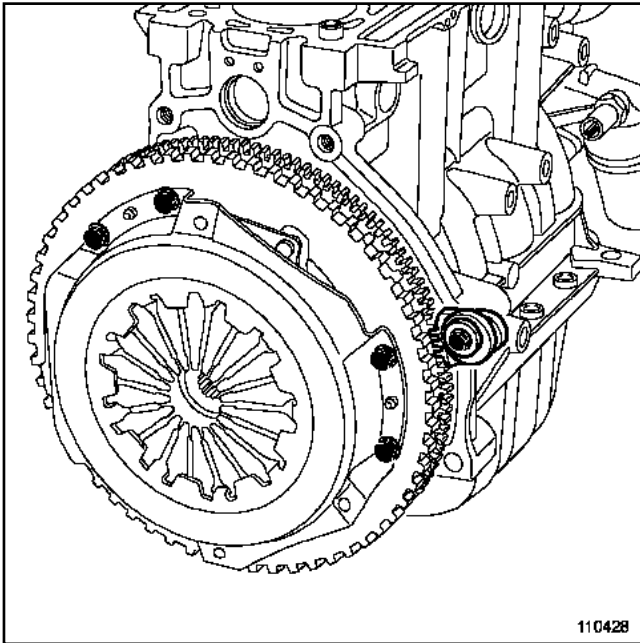


110426  
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- Remove:
- the coolant inlet pipe,
- pinking sensor (1),
- the oil level sensor or blanking cover cap (depending on the equipment) (2).

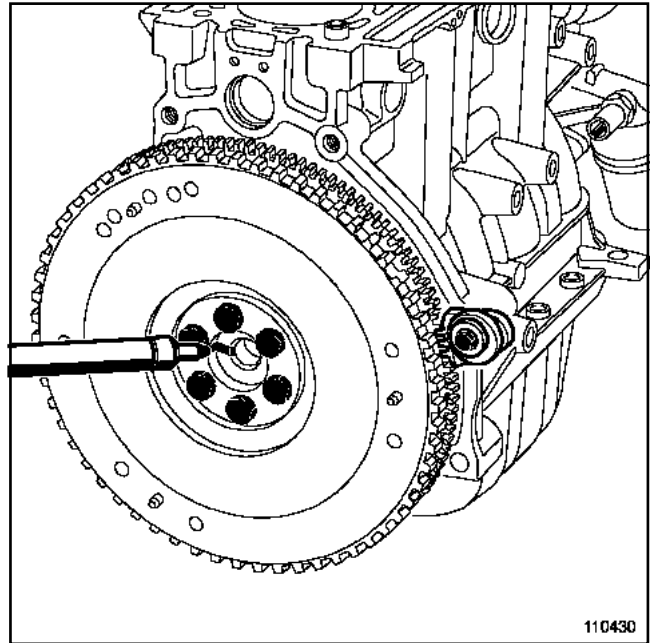
## Cylinder block: Dismantling

D4D, and 700 or 712 or 720 – D4F, and 702 or 706 or 708 or 712 or 714 or 716 or 722 or 728 or 730 or 740



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- ❑ Fit flywheel immobiliser tool (Mot. 582-01).
- ❑ Remove:
  - the clutch pressure plate,
  - the clutch plate (mark the direction of fitting).

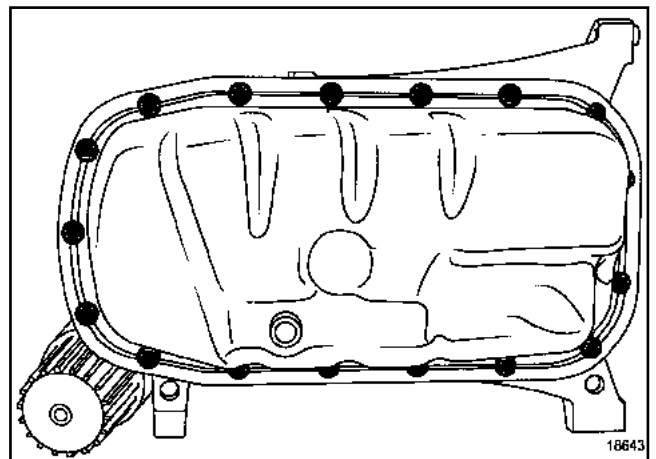


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❑

**Note:**

- The flywheel can only be mounted in one position.
- Make a mark to indicate the correct position using a permanent marker pen.

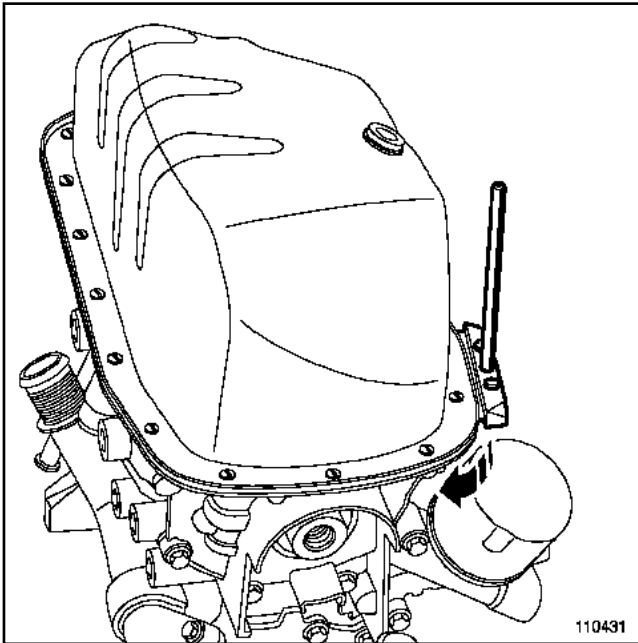


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- ❑ Remove the oil sump mounting bolts.

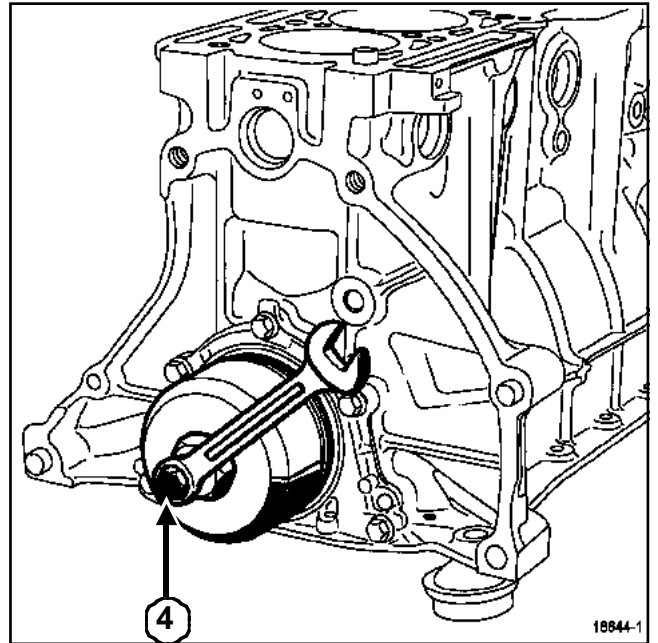
## Cylinder block: Dismantling

D4D, and 700 or 712 or 720 – D4F, and 702 or 706 or 708 or 712 or 714 or 716 or 722 or 728 or 730 or 740



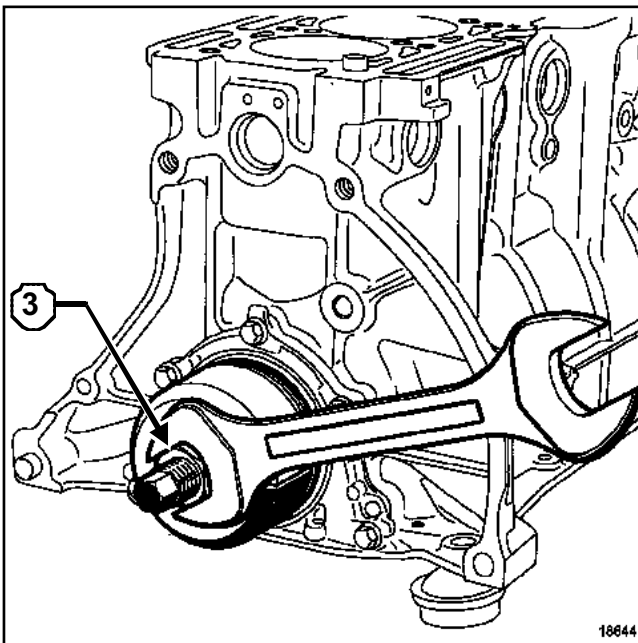
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- ❑ Remove the oil sump using tool (Mot. 1716).



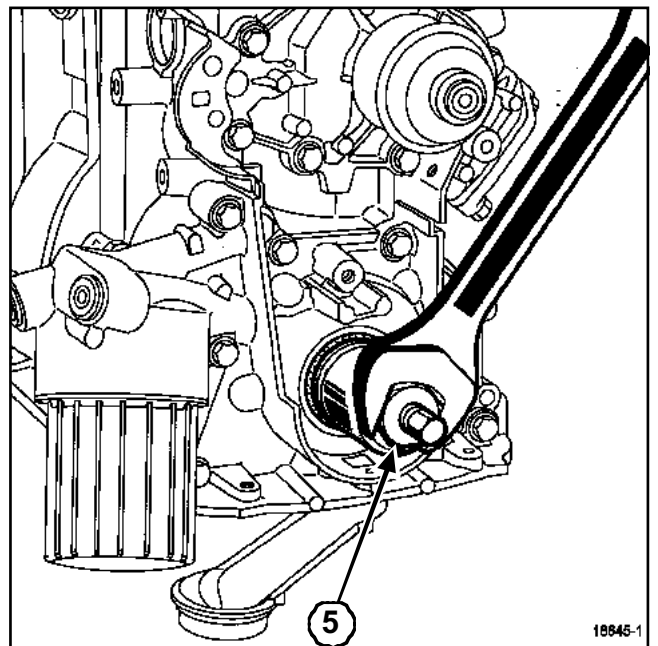
18644-1  
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- ❑ Remove the seal by tightening bolt (4) on tool (Mot. 1377).



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- ❑ Fit tool (Mot. 1377) to extract the flywheel end lip seal.
- ❑ Tighten nut (3).

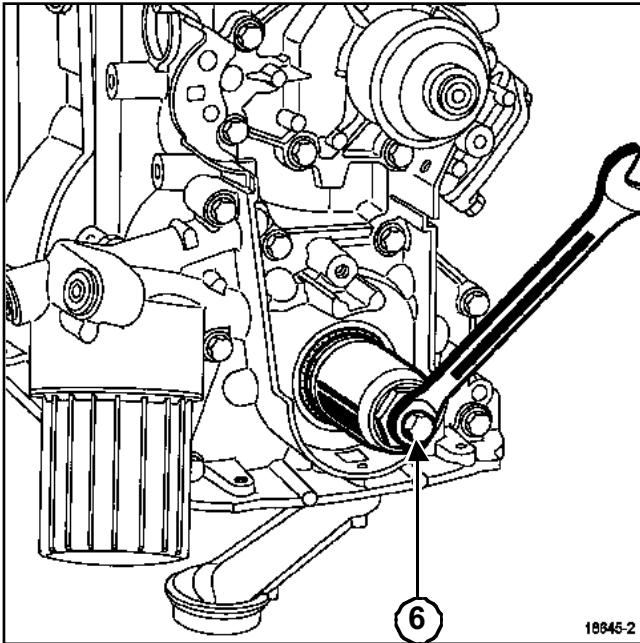


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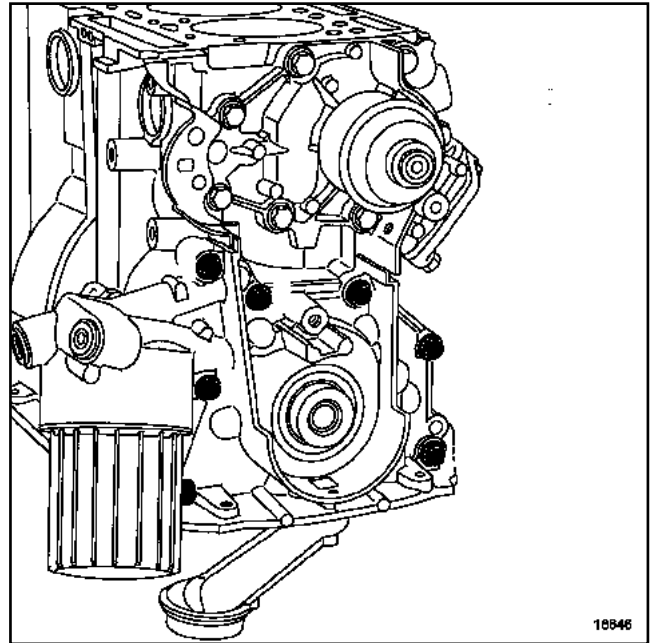
- ❑ Fit tool (Mot. 1374) to extract the timing end lip seal.
- ❑ Tighten nut (5).

## Cylinder block: Dismantling

D4D, and 700 or 712 or 720 – D4F, and 702 or 706 or 708 or 712 or 714 or 716 or 722 or 728 or 730 or 740



- Remove the seal by tightening bolt (6) on tool (Mot. 1374).



- Remove the oil filter.

Note:

The oil filter may be either of the following types:

- recyclable paper cartridge,
- non-recyclable paper cartridge to be removed using tool (Mot. 1330)

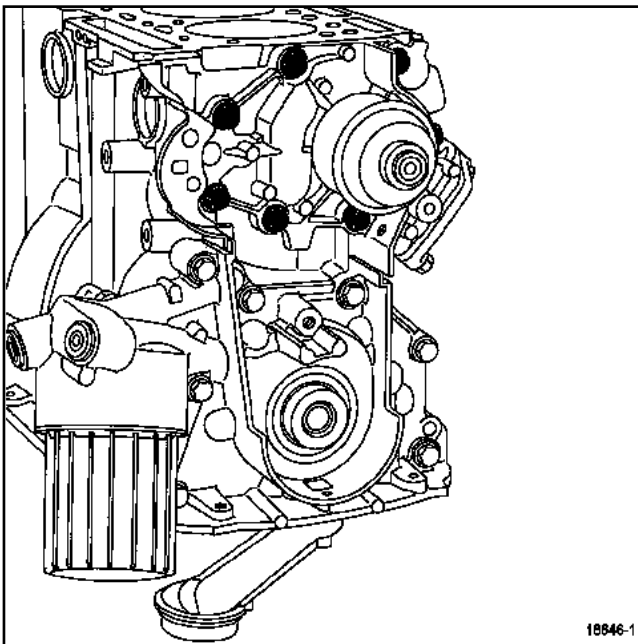
- Remove:
  - the screen and its seal (if fitted).
  - the oil pump.

Note:

The oil pump cannot be repaired.

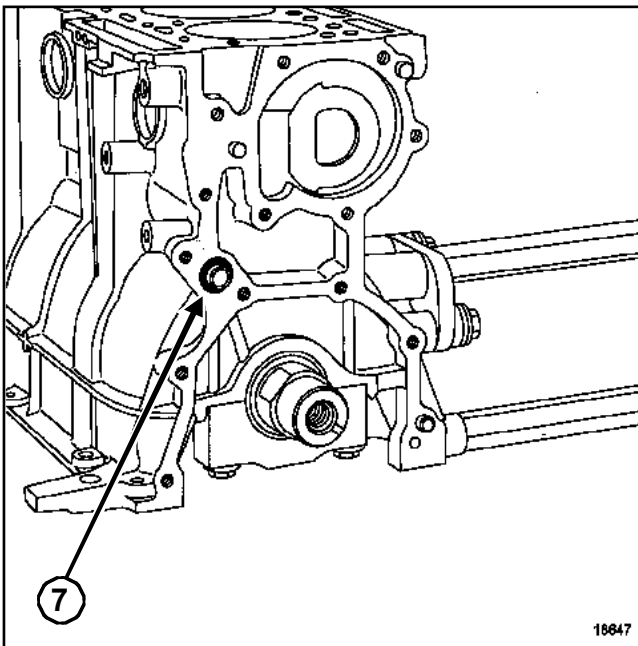
## Cylinder block: Dismantling

D4D, and 700 or 712 or 720 – D4F, and 702 or 706 or 708 or 712 or 714 or 716 or 722 or 728 or 730 or 740



18646-1  
18646-1

- Remove the water pump.



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- Remove oil pressure feed O-ring (7).

## Running gear:Removal

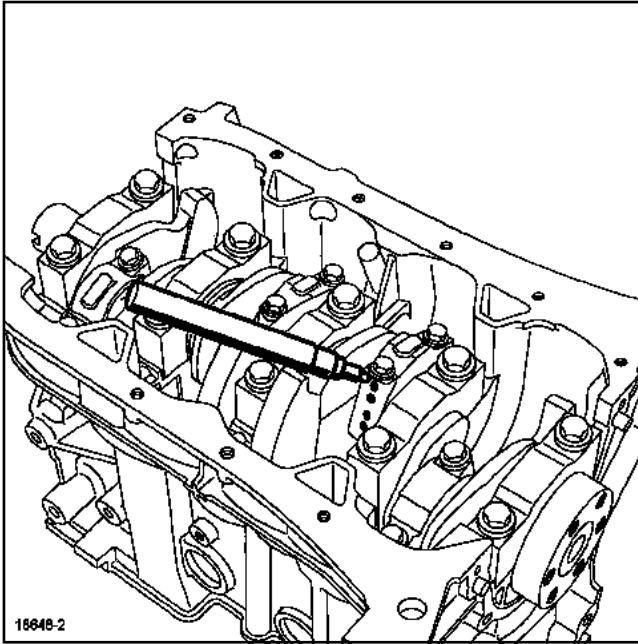
D4D, and 700 or 712 or 720 – D4F, and 702 or 706 or 708 or 712 or 714 or 716 or 722 or 728 or 730 or 740

### Essential special tooling

Mot. 574-22

Tooling for replacing gudgeon pins

### I-REMOVING THE ROTATING PARTS



18648-2

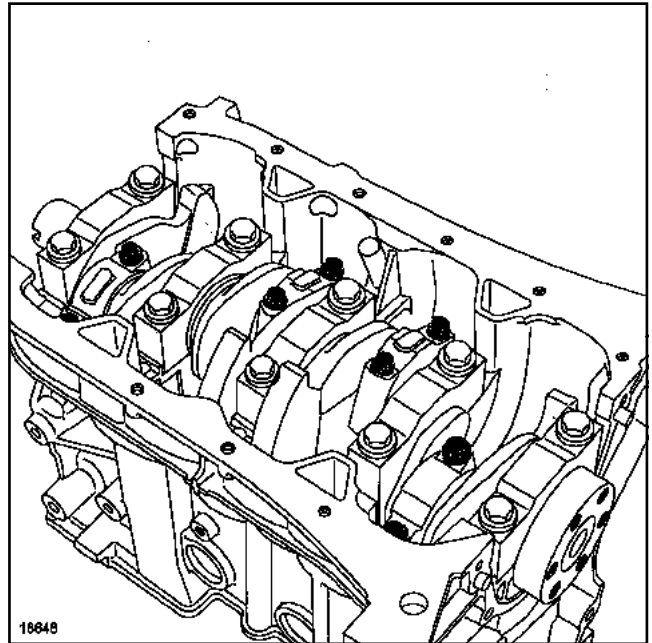
18648-2

□

#### WARNING

Do not use a punch or an etching tool to mark the con rod caps to match their bodies, to prevent incipient breakage of the con rod.

Use an indelible marker pen.

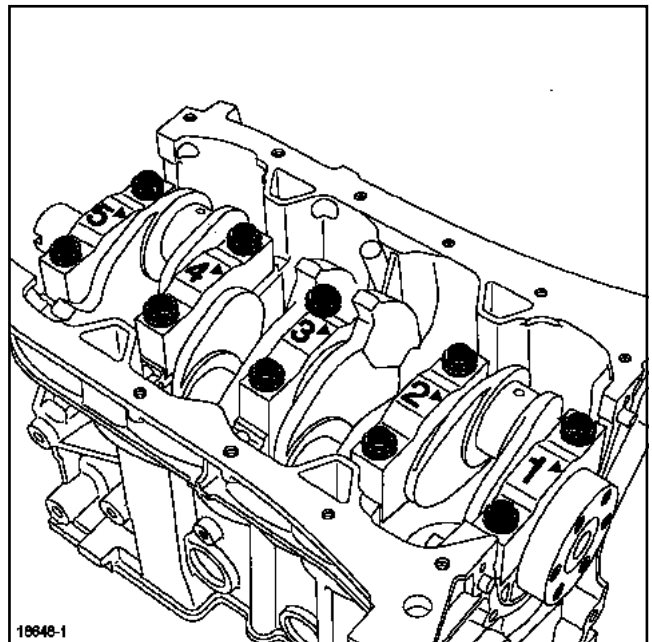


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□ Remove:

- the con rod cap bolts,
- the con rod caps,
- the con rod/piston assemblies,
- the con rod bearing shells.



18648-1

18648-1

□ Remove:

- the crankshaft bearing cap bolts,
- the crankshaft bearing caps,
- the crankshaft,

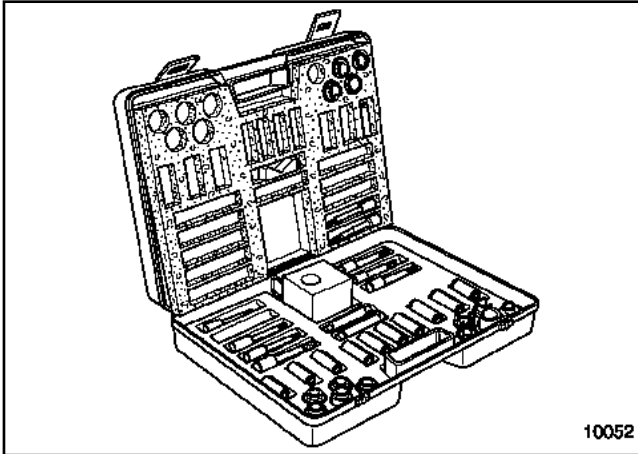
## Running gear:Removal

D4D, and 700 or 712 or 720 – D4F, and 702 or 706 or 708 or 712 or 714 or 716 or 722 or 728 or 730 or 740

- the crankshaft bearing shells.

### II - EXTRACTING THE GUDGEON PINS

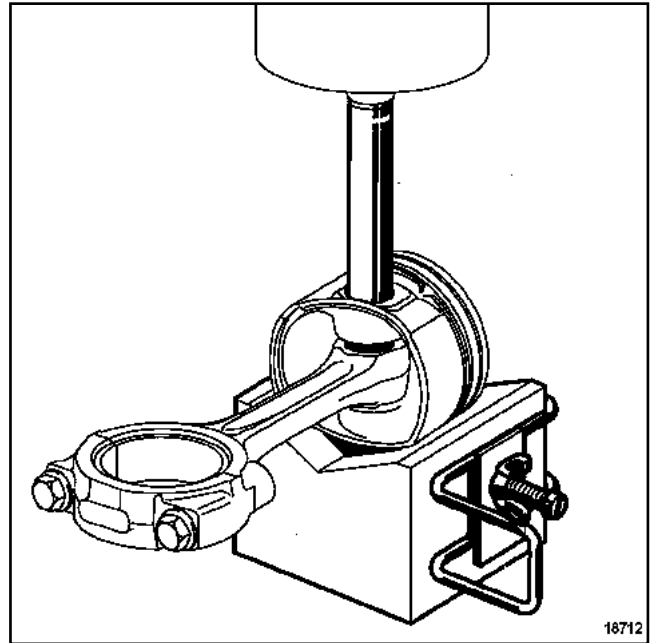
- Remove the piston rings using piston ring pliers.



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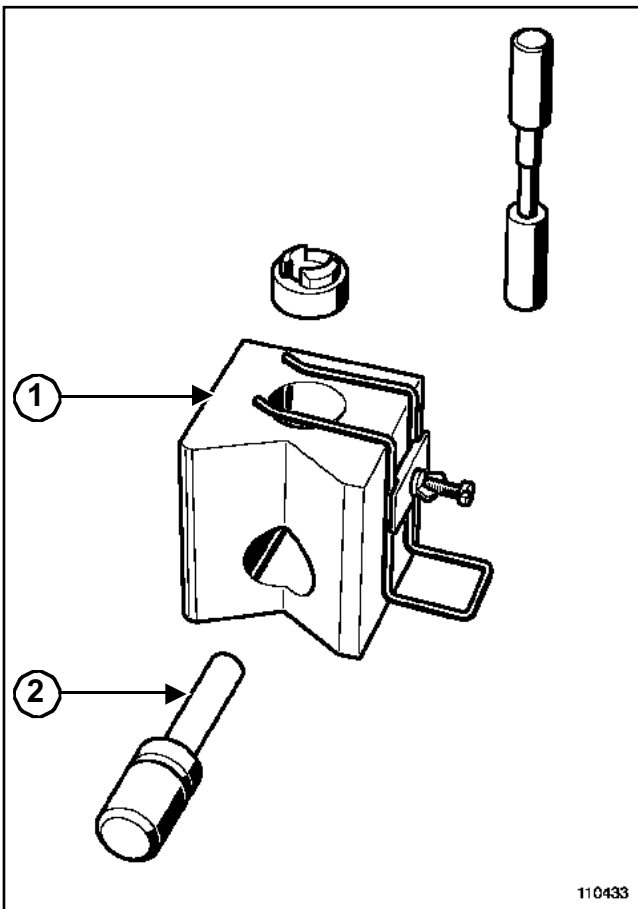
- Use tool kit (Mot. 574-22)



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18712

- Place the piston on the base.
- Align the gudgeon pin with the base clearance hole.
- Remove the gudgeon pin using the press and the extraction pin.



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- Use base (1) contained in kit (Mot. 574-22) and an extraction pin (2).

## Lower engine: Cleaning

D4D, and 700 or 712 or 720 – D4F, and 702 or 706 or 708 or 712 or 714 or 716 or 722 or 728 or 730 or 740

### CLEANING THE ENGINE PERIPHERALS

□ Clean:

- the cylinder block,
- the crankshaft,
- the oil sump,
- the crankshaft closure panels,
- the crankshaft bearing caps.

#### IMPORTANT

- Do not scratch the aluminium sealing surfaces
- Wear goggles.
- Wear gloves during the operation.
- Clean the sealing surfaces with DECAPJOINT compound to dissolve off any parts of the seal that are still attached.
- Apply this product to the cylinder head and rocker cover sealing faces; Wait around ten minutes, then remove the residue using a wooden spatula.

#### WARNING

- When cleaning parts, it is essential to not knock them against each other, or their mating faces may be damaged and their settings may be disrupted, which could damage the engine.
- Failure to observe this advice could rapidly destroy the engine.
- Do not allow this product to drip onto the paintwork.
- Carefully clean the cylinder block to prevent foreign bodies from entering the oil inlet and return pipes.
- Failure to follow this advice could lead to the blocking of the various oil inlet ducts, resulting in rapid destruction of the engine.

## Lower engine: Check

D4D, and 700 or 712 or 720 – D4F, and 702 or 706 or 708 or 712 or 714 or 716 or 722 or 728 or 730 or 740

### Essential special tooling

<b>Mot. 1493-02</b>	Crankshaft bearing centring tool - adapter for MOT 1493.
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### Essential equipment

Sliding calliper
Micrometer
Dial gauge
Dial gauge support
Cylinder head rule
Height gauge

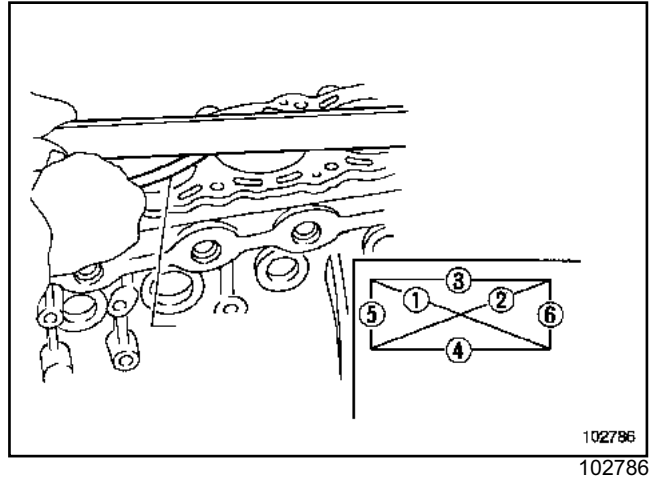
### Tightening torques

crankshaft bearing cap bolts	<b>20 Nm + 76° ± 6°</b>
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### I -CYLINDER BLOCK CHECK

- Essential measuring tools:
- Sliding calliper,
  - Micrometer,
  - Dial gauge,
  - Dial gauge support,
  - Cylinder head rule,
  - Height gauge.

### 1 - Checking the cylinder block surface

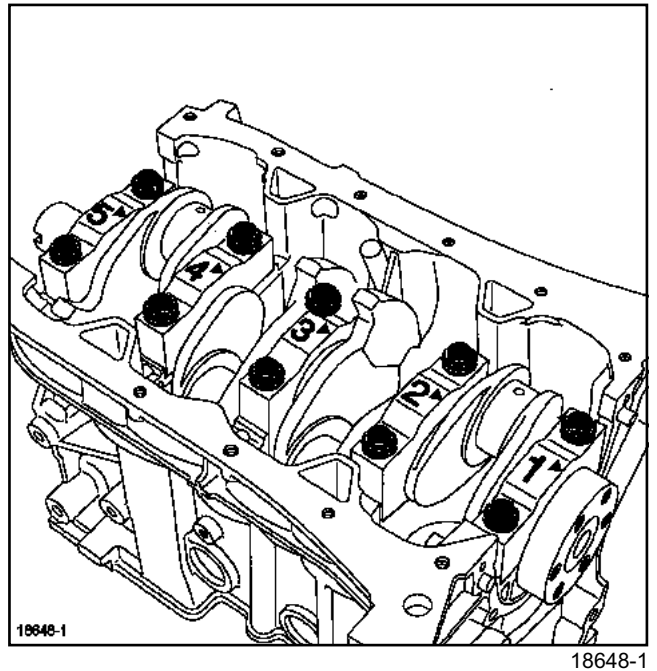


- Check using a cylinder head ruler and a set of shims that the gasket face bow does not exceed **0.03 mm**.

### WARNING

No regrinding of the cylinder block is authorised.

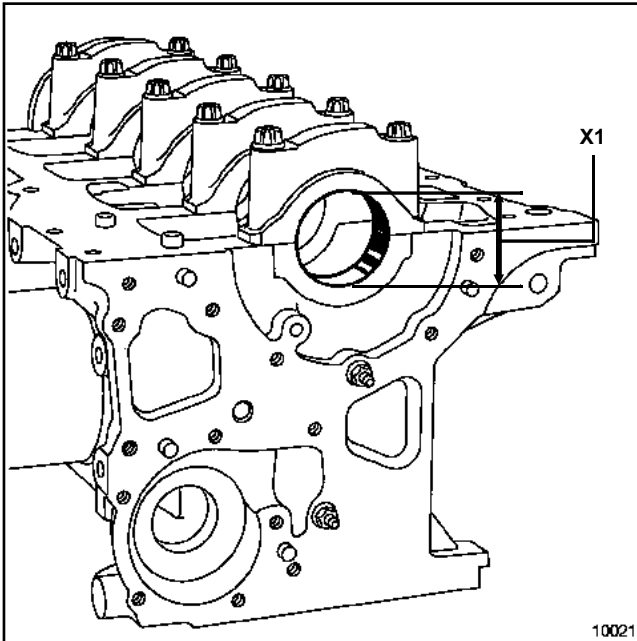
### 2 - Measuring the diameter of the crankshaft bearings on the cylinder block



- Refit the crankshaft bearing caps placing cap n°1 on the flywheel end.
- Tighten to torque and angle the **crankshaft bearing cap bolts (20 Nm + 76° ± 6°)**

## Lower engine: Check

D4D, and 700 or 712 or 720 – D4F, and 702 or 706 or 708 or 712 or 714 or 716 or 722 or 728 or 730 or 740

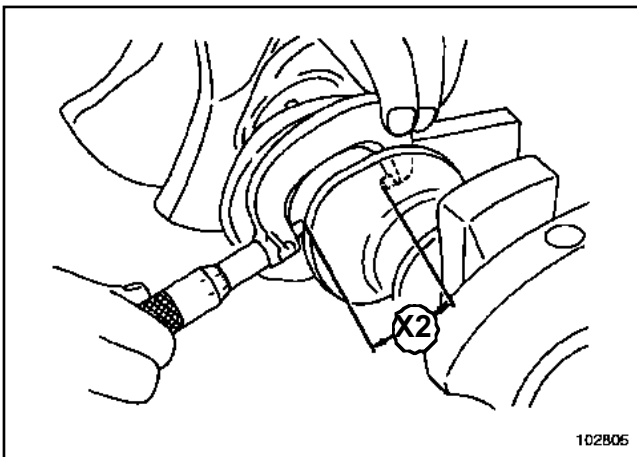


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- Measure the internal diameter of crankshaft bearings (X1) which should be between **47.612 and 47.625 mm**.
- Remove the crankshaft bearing caps.

### II - CRANKSHAFT CHECK

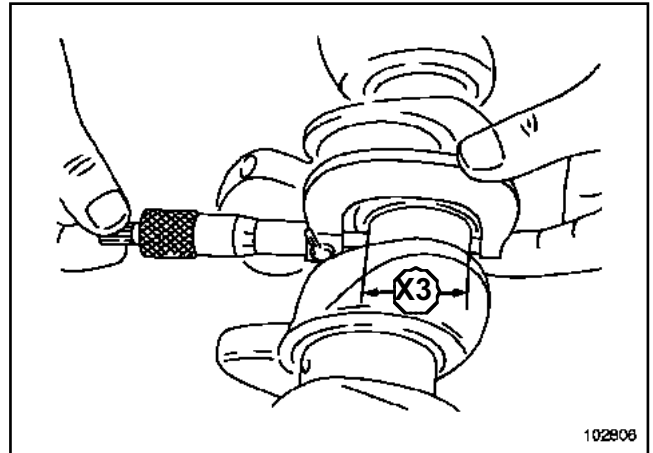
#### 1 - Measuring the journal diameters



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- Measure the diameter of crankshaft bushings (X2) which should be **44 ± 0.01 mm**.

#### 2 - Measuring the crankpin diameter

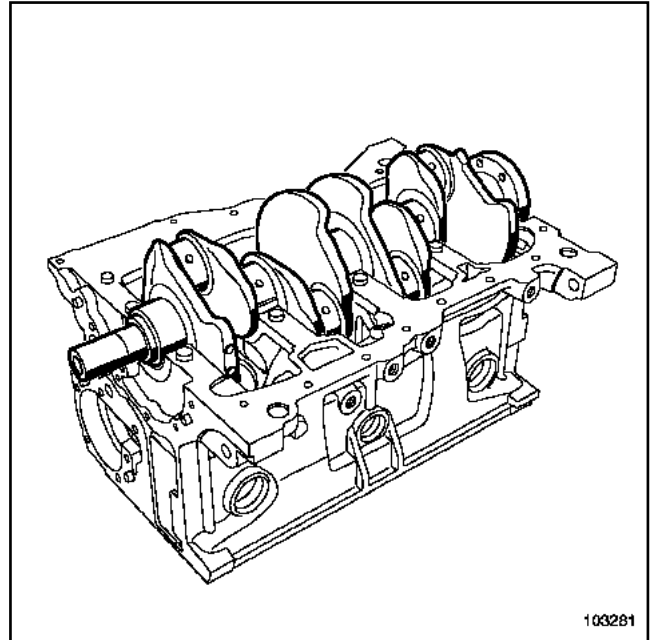


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- The diameter of crankpins (X3) must be between **39.984 and 40 mm**.

#### 3 - Checking the crankshaft diameter clearance

- Refit the crankshaft bearing shells using (Mot. 1493-02) (see **10A, Engine and peripherals, Rotating parts: Refitting**).



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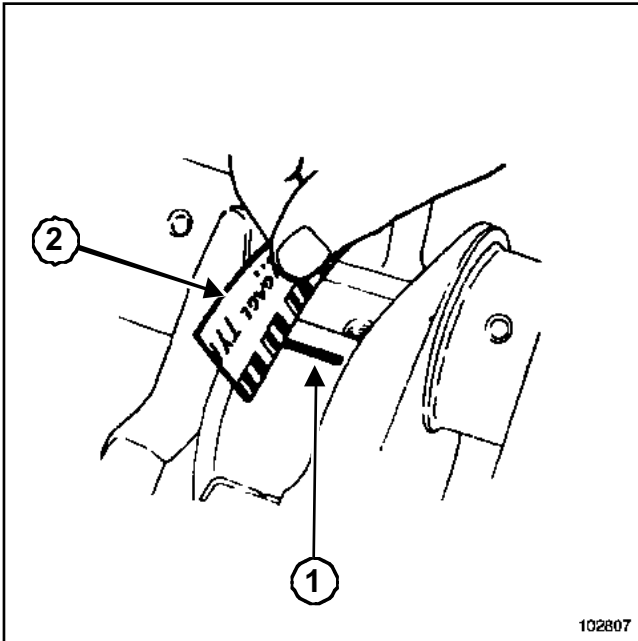
Note:

Never turn the crankshaft during the operation.

- Remove any oil that may be on the crankshaft journals and cylinder block bearings.
- Refit the crankshaft.

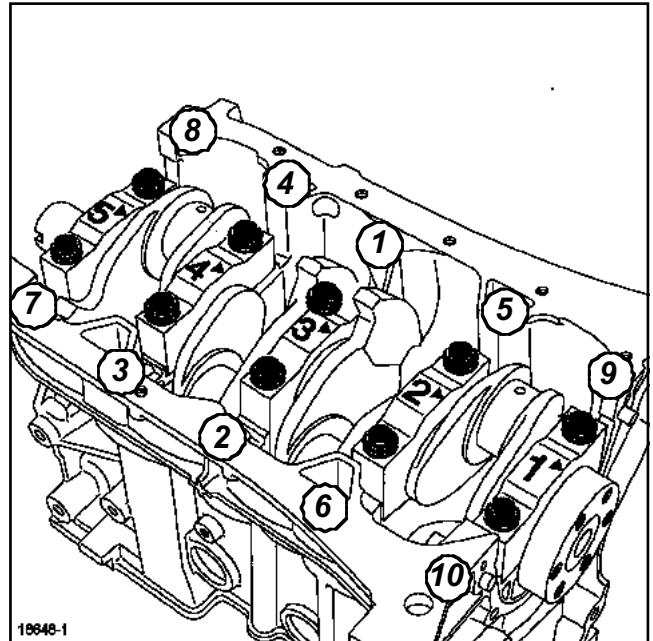
## Lower engine: Check

D4D, and 700 or 712 or 720 – D4F, and 702 or 706 or 708 or 712 or 714 or 716 or 722 or 728 or 730 or 740



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- Cut bits of wire (1) to measure the clearance.
- Insert the wire into the axis of the crankshaft journals (avoiding the bearing lubrication holes).



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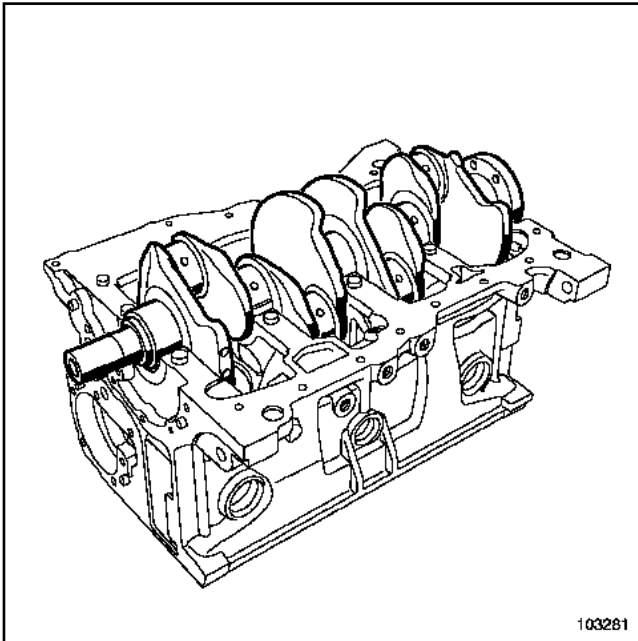
- Refit the crankshaft bearing caps, fitting n°1 at the flywheel end.
- Pretighten to torque and in order the **crankshaft bearing cap bolts to 20 Nm**.
- Tighten to angle and in order the **crankshaft bearing cap bolts by  $76^\circ \pm 6^\circ$** .
- Remove:
  - the crankshaft bearing caps,
  - the crankshaft.
- Measure the flattening of the clearance measuring wire using wrapping paper (2).
- Check the clearance value, which must be between **0.020 and 0.046 mm**.
- Clean any traces of measuring wire off the crankshaft and the bearing shells using **DECAPJOINT**.

#### 4 - Checking the crankshaft lateral clearance

- Oil the crankshaft bearings (only the surface that comes into contact with the crankshaft).

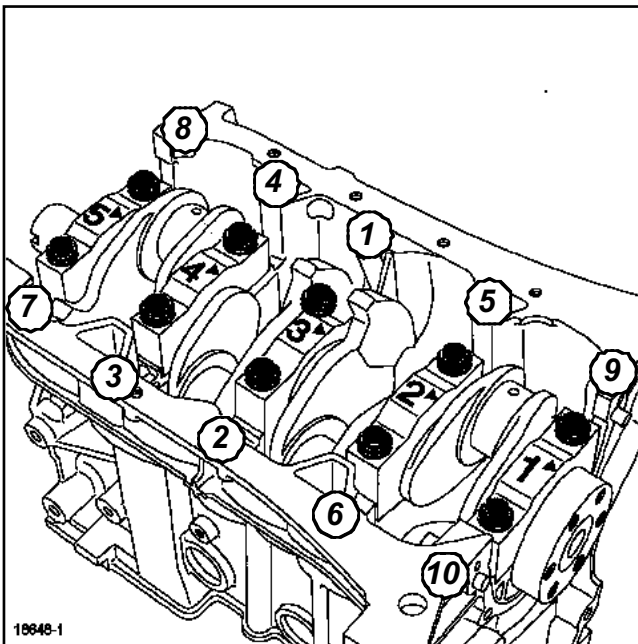
## Lower engine: Check

D4D, and 700 or 712 or 720 – D4F, and 702 or 706 or 708 or 712 or 714 or 716 or 722 or 728 or 730 or 740



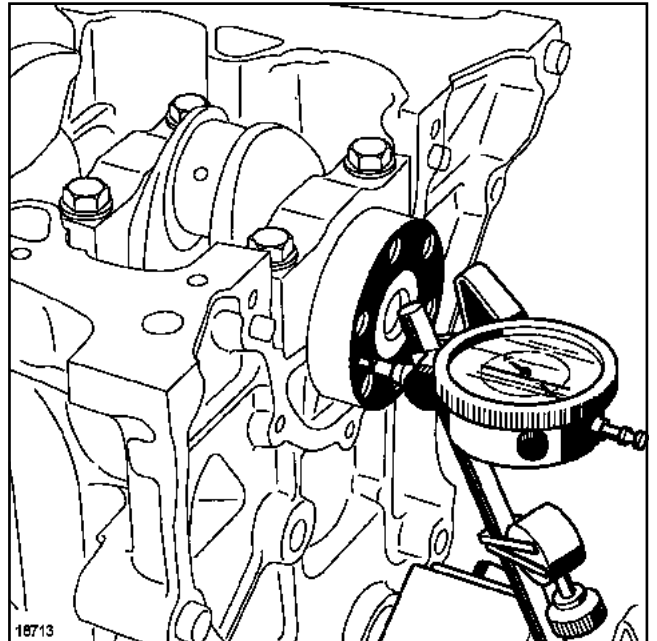
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- Refit the crankshaft.
- Lubricate the journals with engine oil.



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- Refit the crankshaft bearing caps, fitting n°1 at the flywheel end.
- Pretighten to torque and in order the **crankshaft bearing cap bolts to 20 Nm**.
- Tighten to angle and in order the **crankshaft bearing cap bolts by  $76^\circ \pm 6^\circ$** .



18713

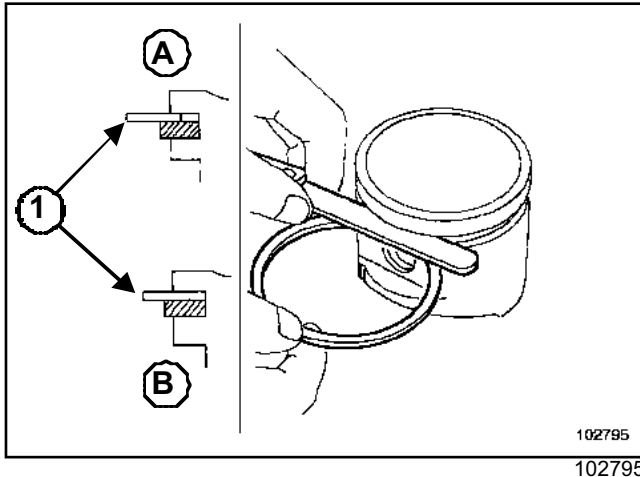
- Check the lateral clearance of the crankshaft, which must be:
  - without lateral shim wear: **0 to 0.275 mm**.
- Check that the crankshaft turns freely, with no hard point.
- Remove:
  - the crankshaft bearing caps,
  - the crankshaft.

## Lower engine: Check

D4D, and 700 or 712 or 720 – D4F, and 702 or 706 or 708 or 712 or 714 or 716 or 722 or 728 or 730 or 740

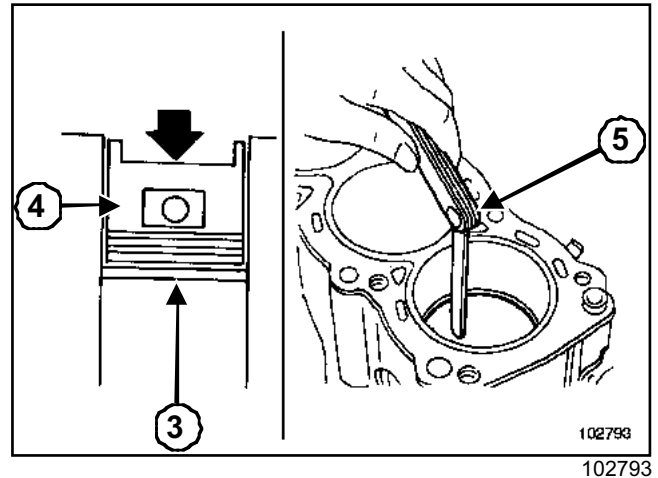
### III - CHECKING THE PISTONS AND PISTON RINGS

#### 1 - Checking the clearance between the piston grooves and piston rings



- Measure the clearance between the piston grooves and piston rings using a set of shims (1).
  - (A): Set of shims incorrectly positioned,
  - (B): Set of shims correctly positioned.
- For the upper piston ring the clearance must be **0.04 to 0.075 mm**.
- The sealing ring clearance must be between **0.03 and 0.065 mm**.
- The scraper ring clearance must be between **0.05 and 0.22 mm**.
- If the clearance value is outside tolerance, replace the piston-gudgeon pin assembly or the piston rings.

#### 2 - Checking the piston ring end gap



- Insert the piston ring (3) in the cylinder.
- Push the piston ring (3) to the centre of the cylinder using the piston (4).
- Measure the piston ring end gap using a set of shims (5).
  - Compression ring end gap must be **0.20 to 0.35 mm**
  - Sealing ring end gap must be between **0.35 and 0.50 mm**.
  - Scraper ring end gap must be between **0.2 to 0.9 mm**.

## Running gear Refitting

D4D, and 700 or 712 or 720 – D4F, and 702 or 706 or 708 or 712 or 714 or 716 or 722 or 728 or 730 or 740

### Essential special tooling

<b>Mot. 1493-02</b>	Crankshaft bearing centring tool - adapter for MOT 1493.
<b>Mot. 1492</b>	Tool for fitting linkage bearings
<b>Mot. 1492-04</b>	Tool for fitting main bearing shells - adapter for MOT1492.
<b>Mot. 574-22</b>	Tooling for replacing gudgeon pins
<b>Mot. 574-25</b>	Pin A19 and shim C19 for fitting gudgeon pins.

### Essential equipment

Circlip pliers

piston ring compressor

### Tightening torques

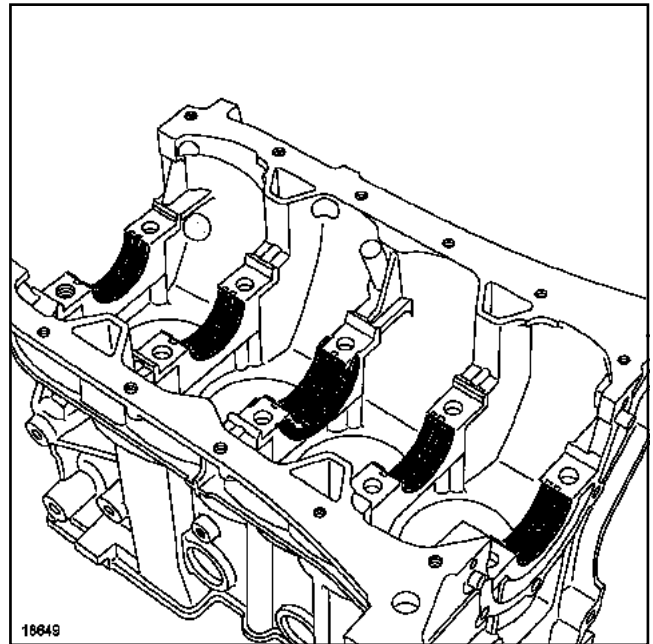
crankshaft bearing cap bolts	<b>20 Nm + 76° ± 6°</b>
con rod cap bolts	<b>14 Nm + 39° ± 6°</b>

## I -REFITTING THE CRANKSHAFT BEARING SHELLS

### 1 - Determining the crankshaft bearing shells

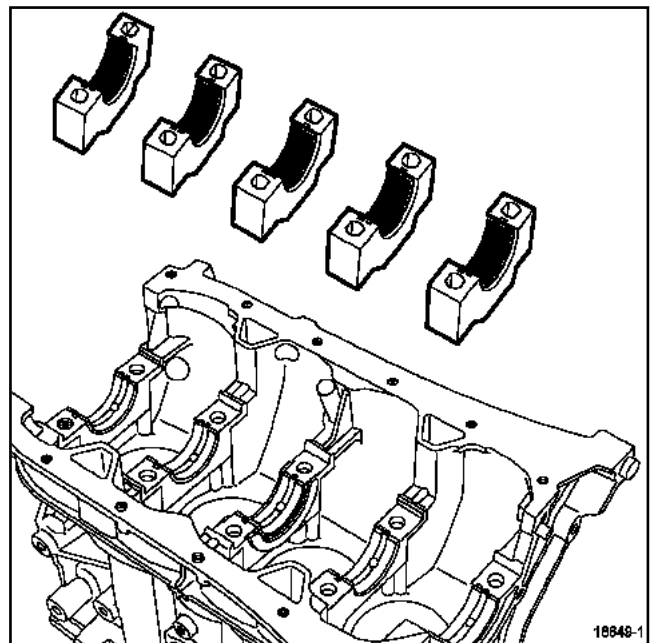
- ❑ To identify the crankshaft bearing shells (see **10A, Engine and peripherals, Engine peripherals: Specifications.**

### 2 - Direction of fitting for crankshaft bearing shells



- ❑ Fit the grooved bearing shells on all the cylinder block bearings.

The lateral shims are integrated into bearing shell n°3.

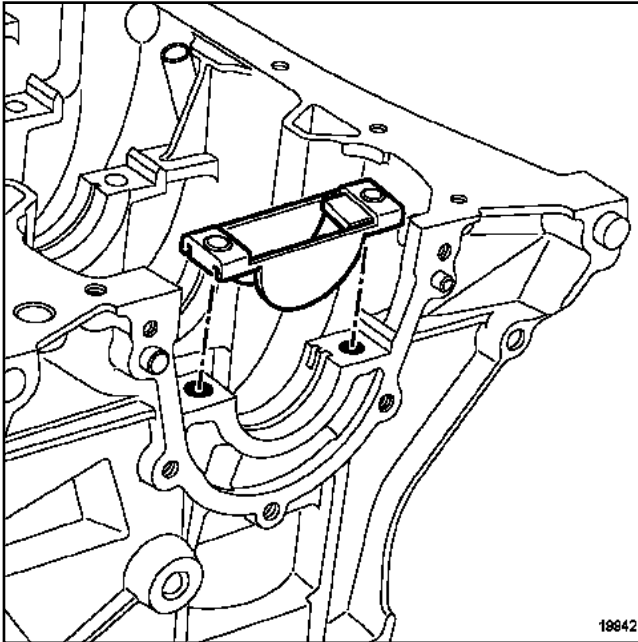


- ❑ On the bearing caps, fit the non-grooved bearing shells on all the bearings.

## Running gear Refitting

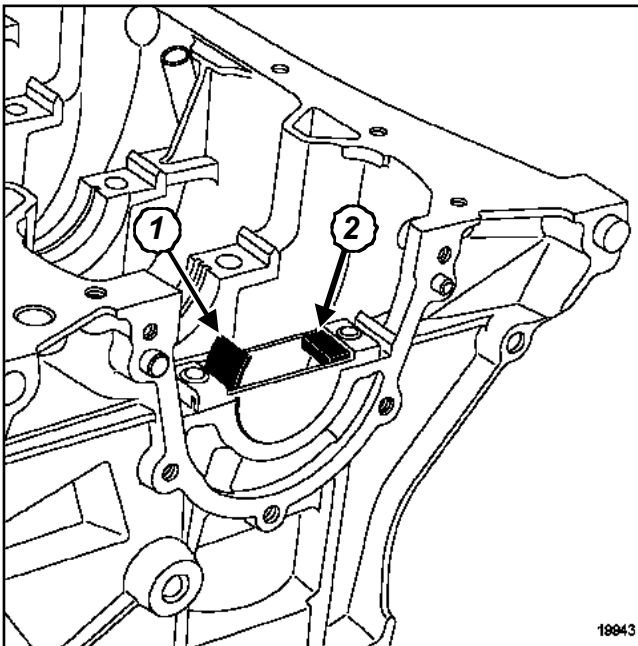
D4D, and 700 or 712 or 720 – D4F, and 702 or 706 or 708 or 712 or 714 or 716 or 722 or 728 or 730 or 740

### 3 - Fitting the bearing shells on the cylinder block



19942

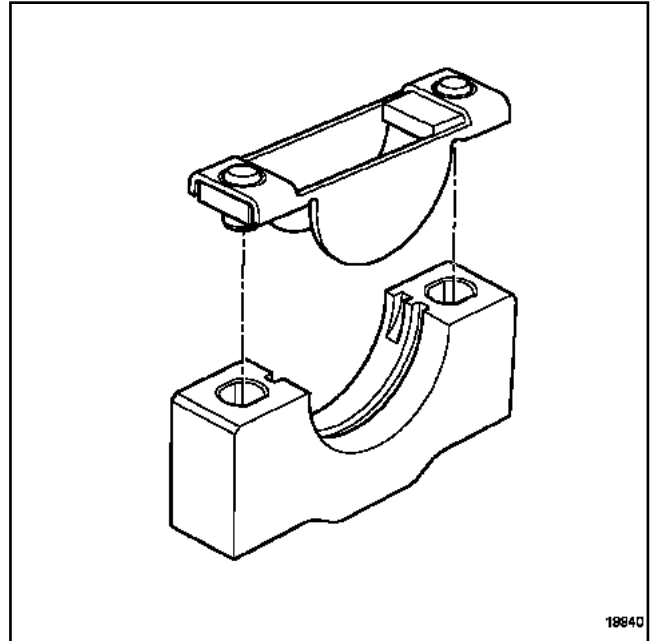
- Fit tool (Mot. 1493-02) on the cylinder block.



19943

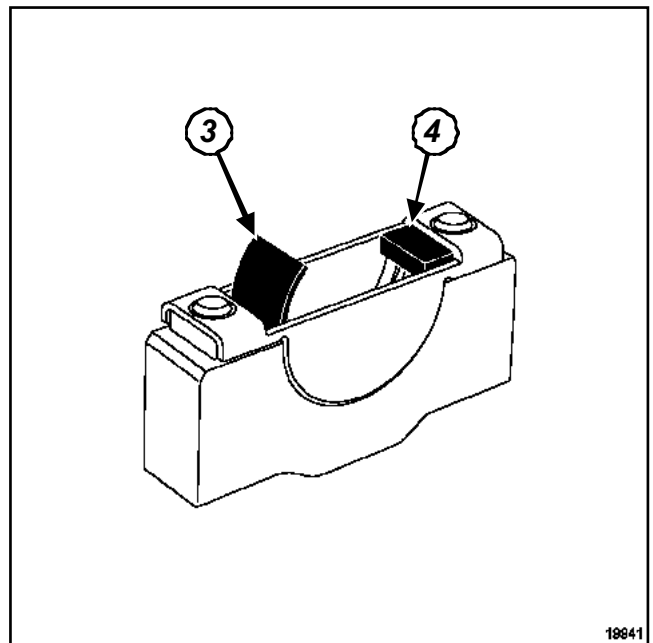
- Insert the grooved bearing shell into tool (Mot. 1493-02).
- Press down at (1) until the bearing shell comes into contact with tab (2).

### 4 - Fitting the bearing shells onto the bearing caps



19940

- Fit tool (Mot. 1493-02) on the bearing cap.



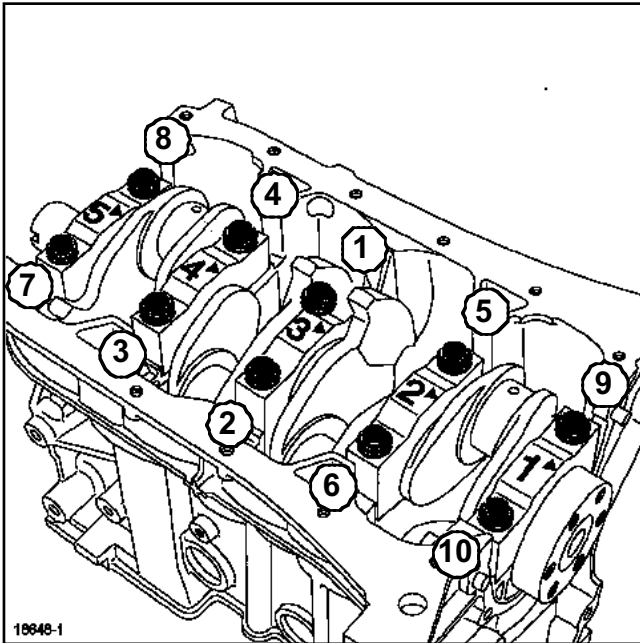
19941

- Insert the bearing shell into tool (Mot. 1493-02).
- Press down at (3) until the bearing shell comes into contact with tab (4).

### II - CRANKSHAFT REFITTING

- Oil the crankshaft bearing shells (only the surface that is in contact with the crankshaft).

D4D, and 700 or 712 or 720 – D4F, and 702 or 706 or 708 or 712 or 714 or 716 or 722 or 728 or 730 or 740

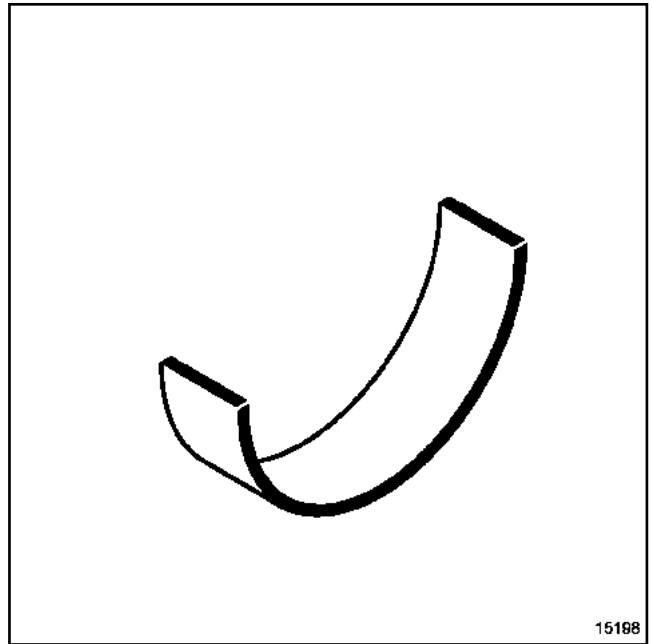


18648-1

18648-1

- ❑ Refit:
  - the crankshaft,
  - the crankshaft bearing caps, positioning n°1 and the arrows at the flywheel end.
- ❑ Tighten to torque, to angle and in order the **crankshaft bearing cap bolts (20 Nm + 76° ± 6°)**.
- ❑ Check that the crankshaft turns freely, with no hard point.

### III - FITTING THE CON ROD BEARING SHELLS

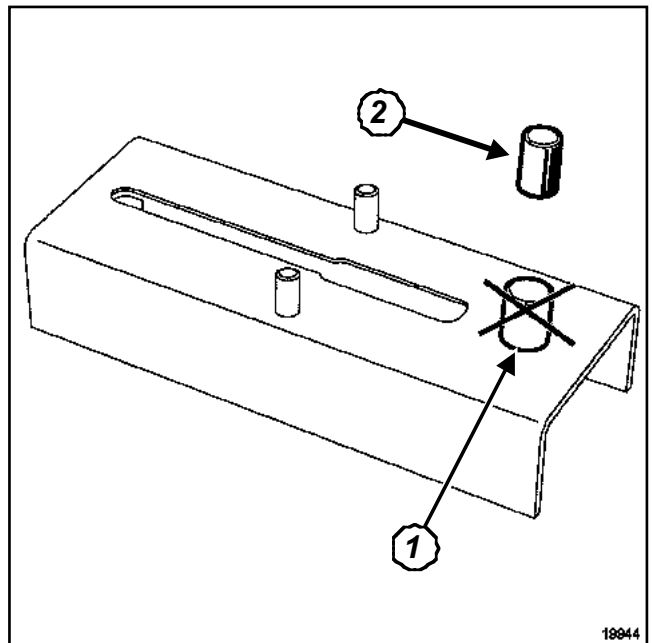


15198

15198

- ❑ The engine is fitted with bearing shells without fool-proofing.
- ❑ The con rod bearing shells are fitted using tools (Mot. 1492) and (Mot. 1492-04).

#### 1 - On the con rod body



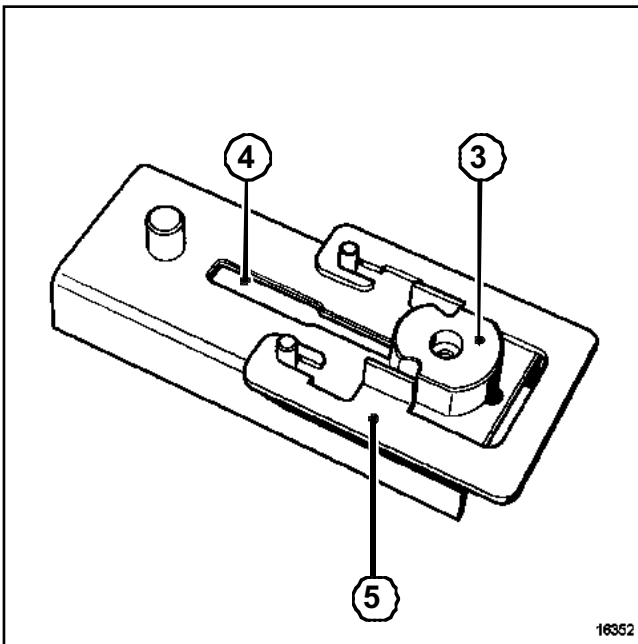
18944

19944

- ❑ Remove pin (1) from tool (Mot. 1492) (using a vice fitted with jaws).
- ❑ Replace the pin with pin (2) of tool (Mot. 1492-04).

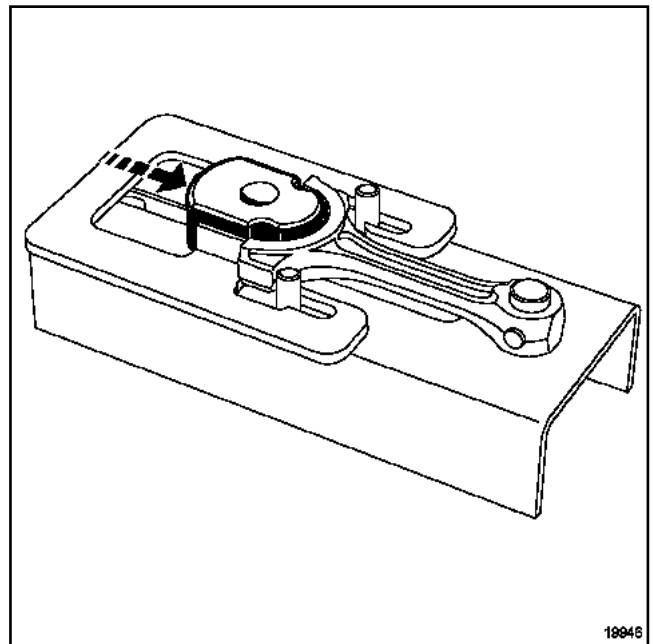
## Running gear Refitting

D4D, and 700 or 712 or 720 – D4F, and 702 or 706 or 708 or 712 or 714 or 716 or 722 or 728 or 730 or 740



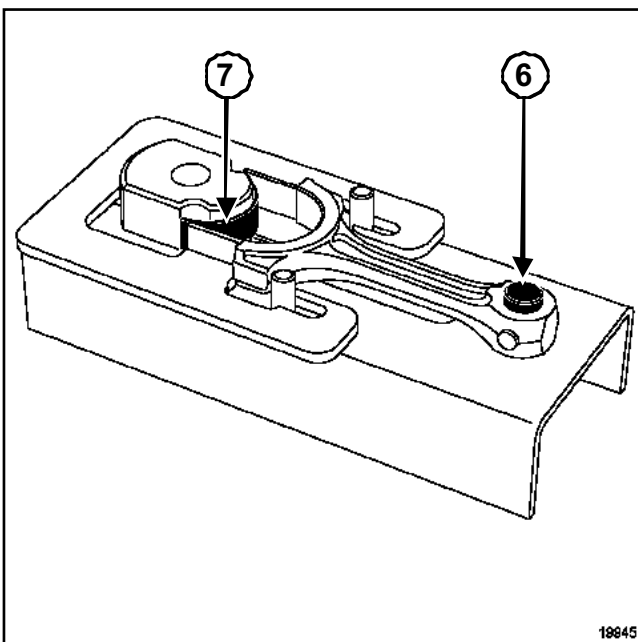
16352  
16352

- ❑ Slide bearing shell holder (3) of (Mot. 1492-04) into groove (4) in the base of (Mot. 1492).
- ❑ Position rail (5) of (Mot. 1492-04) on the base.



18946  
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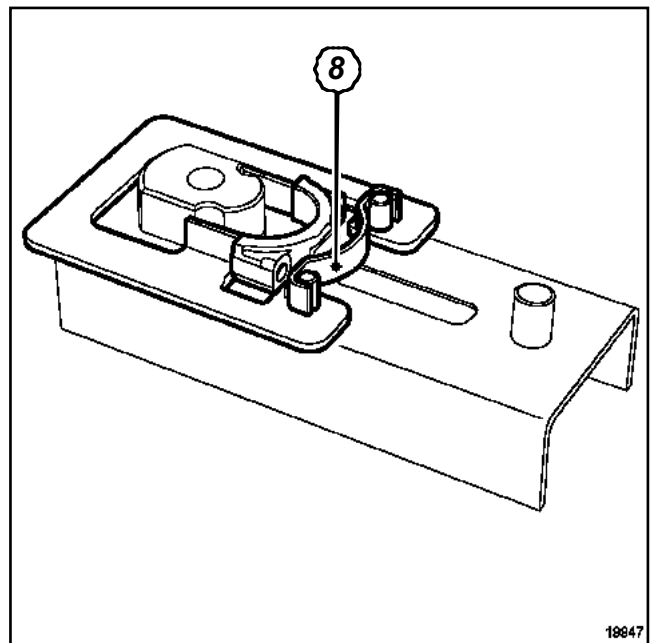
- ❑ Push the bearing shell holder (in the direction of the arrow) until it is fully inserted in the body of the connecting rod.
- ❑ Remove the con rod body support and then repeat the operation for the other con rods.



18945  
18945

- ❑ Fit the con rod body on the base.
- ❑ Check that the lower part (6) of the little end is in contact with the centring pin.
- ❑ Mount the bearing shell (7) on the bearing shell support.

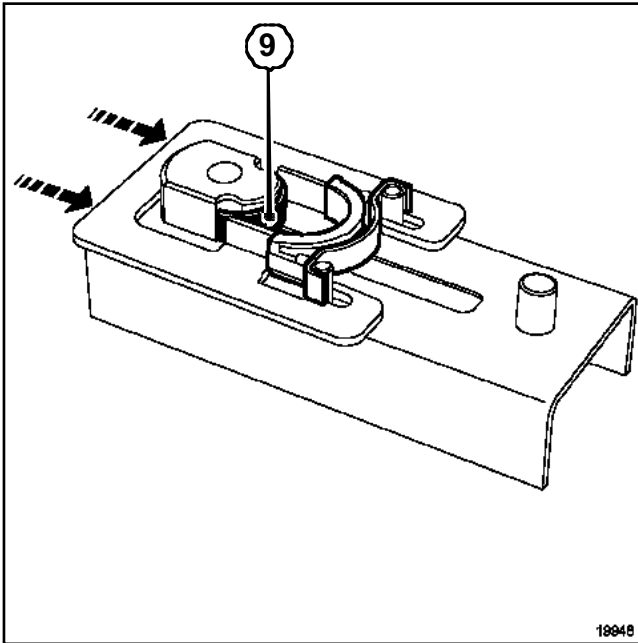
### 2 - On the con rod cap



18947  
18947

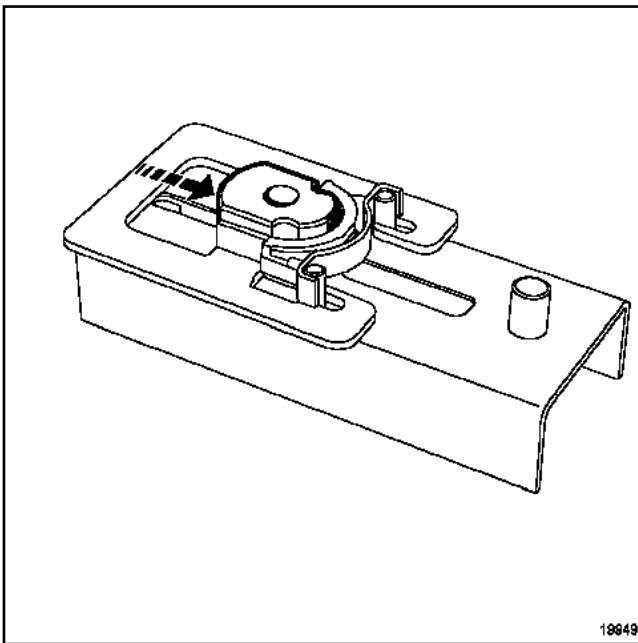
- ❑ Fit bar (8) and the con rod cap.

D4D, and 700 or 712 or 720 – D4F, and 702 or 706 or 708 or 712 or 714 or 716 or 722 or 728 or 730 or 740



19948  
19948

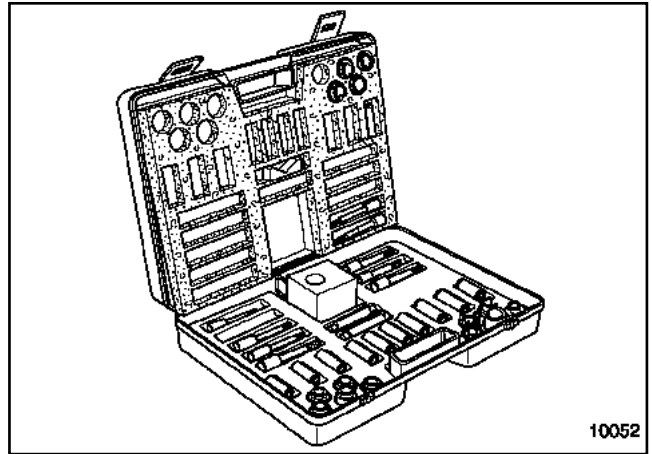
- Push the rail (in the direction of the arrow) until the con rod cap touches the bar.
- Mount the bearing shell (9) on the bearing shell support.



19949  
19949

- Push the bearing shell support (in the direction of the arrow) until it comes to the end of the con rod cap.
- Remove the con rod cap support and repeat the operation for the remaining con rod caps.

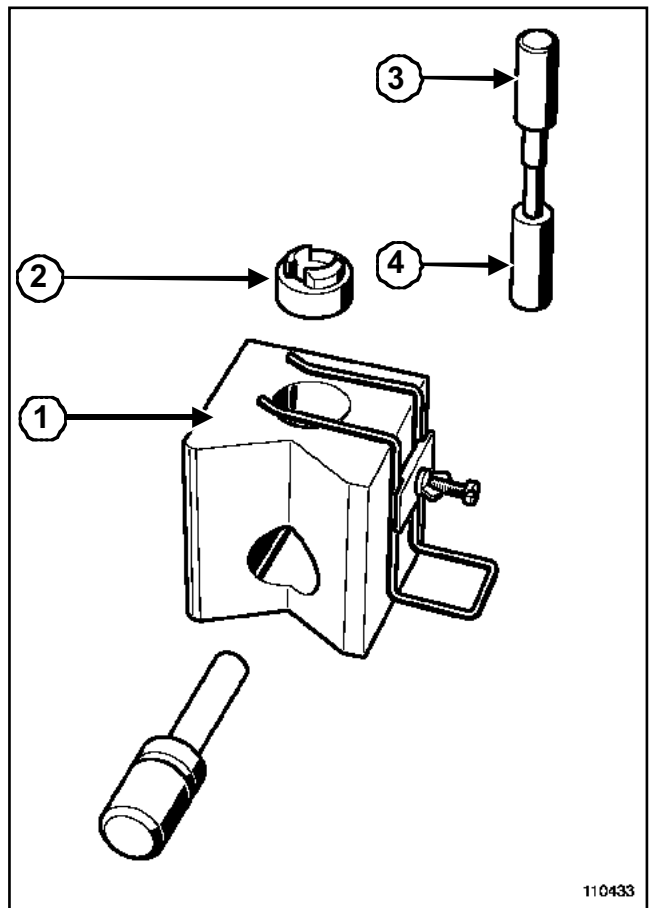
### IV - CON ROD/PISTON ASSEMBLY



10052

10052

- The gudgeon pins are tight in the con rods and are able to rotate in the pistons.



110433

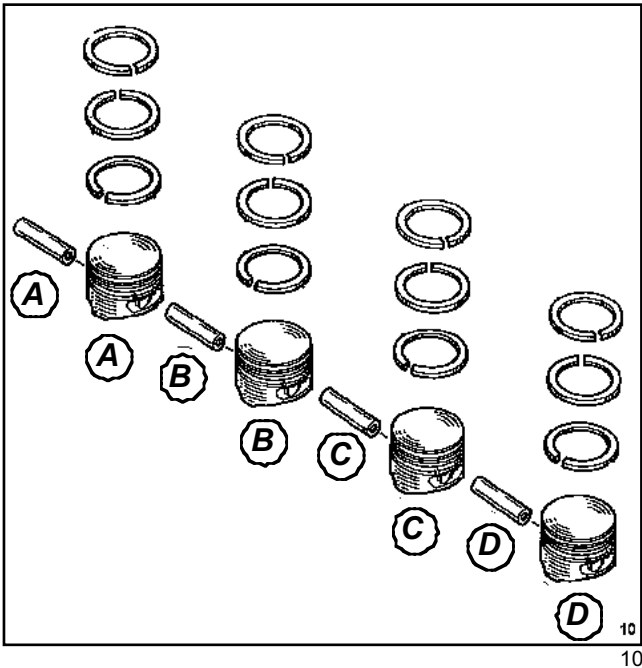
110433

- Use kit components (Mot. 574-22) and (Mot. 574-25).
  - base (1),
  - fitting ring **19 B**(2),
  - fitting shaft **A19**(3),
  - centring device **C19**(4).

## Running gear Refitting

D4D, and 700 or 712 or 720 – D4F, and 702 or 706 or 708 or 712 or 714 or 716 or 722 or 728 or 730 or 740

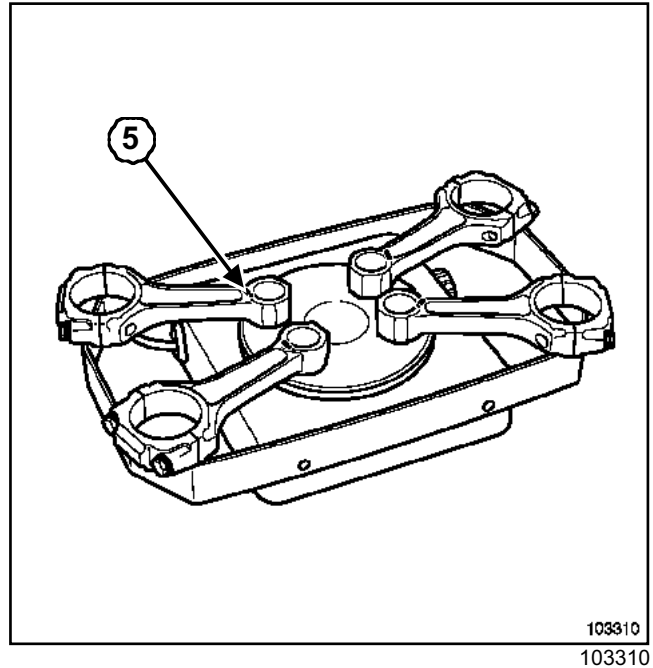
### 1 - Preparing the piston/gudgeon pin assembly



- The parts supplied in the set are identical.
- Mark all of the parts in each box from (A) to (D) to ensure that they remain matched.
- Completely dissolve the rust-proofing film without scratching the parts.

### 2 - Preparing the con rods

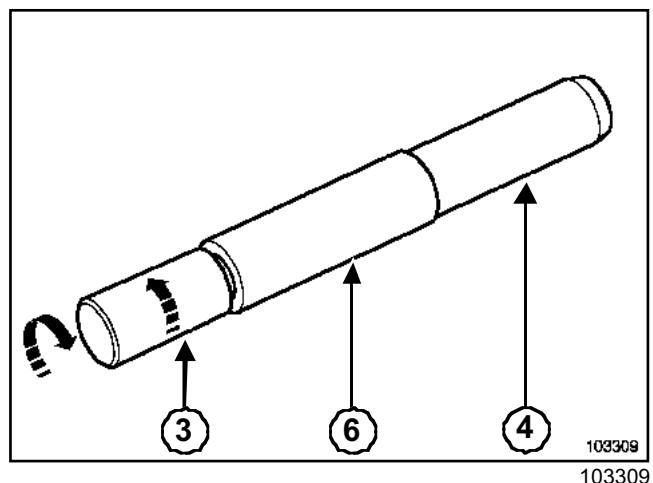
- Visually inspect:
  - the condition of the con rods (torsion and squaring),
  - the cleanliness of the con rod cap and body bearing surfaces.
- Use a **1500 W** heating plate.
- Put the small ends on the heating plate.
- Ensure that the whole small end surface is in contact with the plate.



- At (5) on each small end, place (as a temperature indicator) a piece of self-flux tin with a melting point of approximately **250° C**.
- Heat each small end until the self-fluxing solder melts.

### 3 - Preparing the gudgeon pins

- Check that the gudgeon pins rotate properly in the pistons.

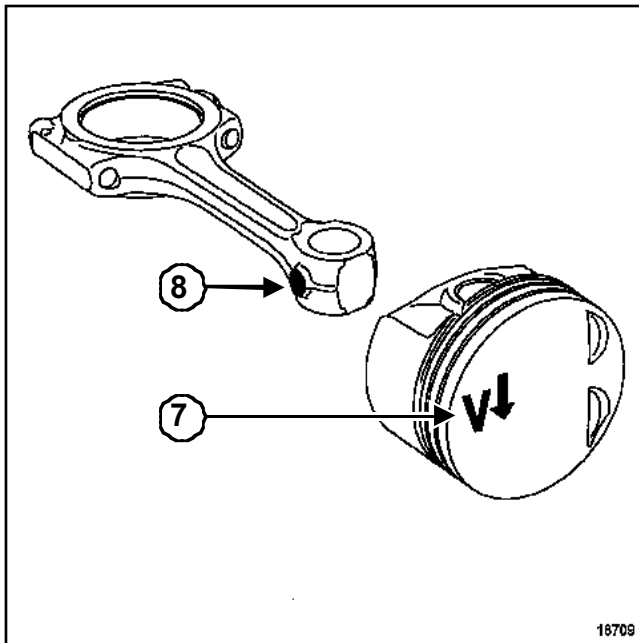


- Use fitting shaft **A19(3)** centring device **C19(4)** from kit (Mot. 574-25).
- Fit the gudgeon pin (6) onto the fitting shaft (3).
- Screw in the locator (4) until the assembly locks.
- Loosen by a quarter of a turn fitting shaft (3).

## Running gear Refitting

D4D, and 700 or 712 or 720 – D4F, and 702 or 706 or 708 or 712 or 714 or 716 or 722 or 728 or 730 or 740

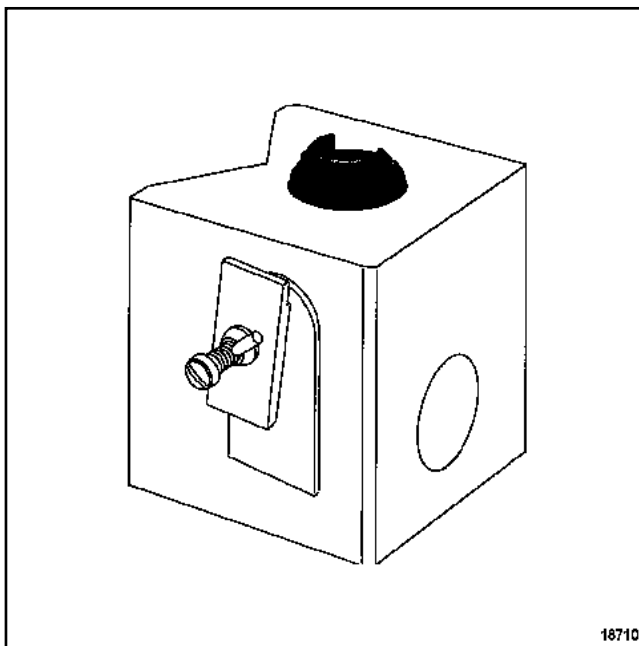
### 4 - Direction of fitting for pistons in relation to con rods



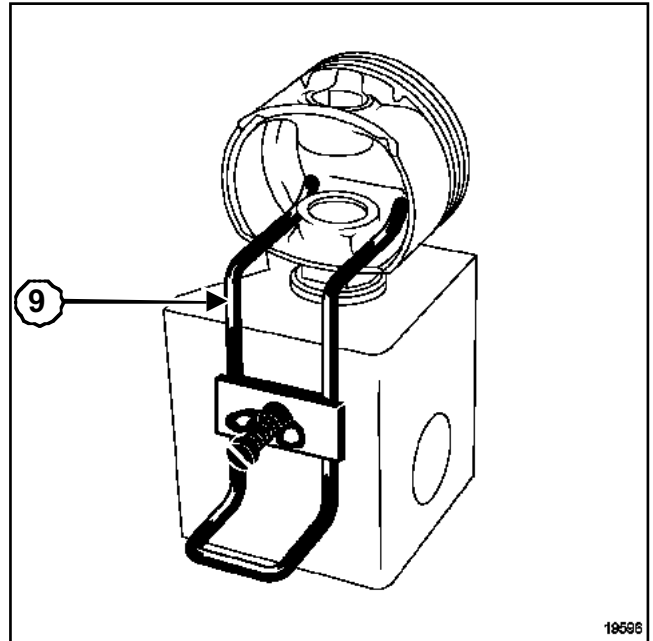
#### Fit:

- arrow (7) engraved on the piston crown facing downwards,
- con rod boss (8) as shown in the drawing (or next to the dipstick on the cylinder block).

### 5 - Follow these instructions when assembling the piston and con rod:



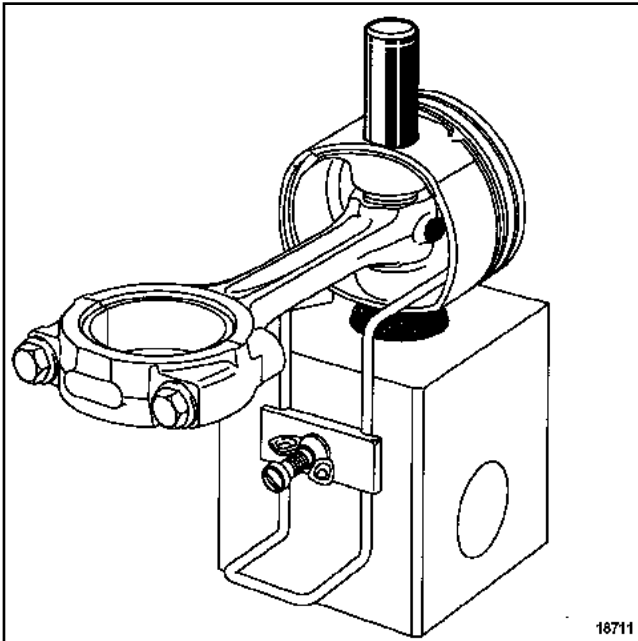
- Position ring **19 B** on the base.



- Secure the piston using pin (9).
- Check carefully that the gudgeon pin hole is aligned with the hole in ring **19 B** (the arrow in the piston should face downwards).
- Lubricate the locator and gudgeon pin with engine oil.
- Drive the gudgeon pin into the assembly to check that it can slide freely, and re-centre the piston if necessary.
- The following operations should be carried out quickly to prevent heat loss.

## Running gear Refitting

D4D, and 700 or 712 or 720 – D4F, and 702 or 706 or 708 or 712 or 714 or 716 or 722 or 728 or 730 or 740

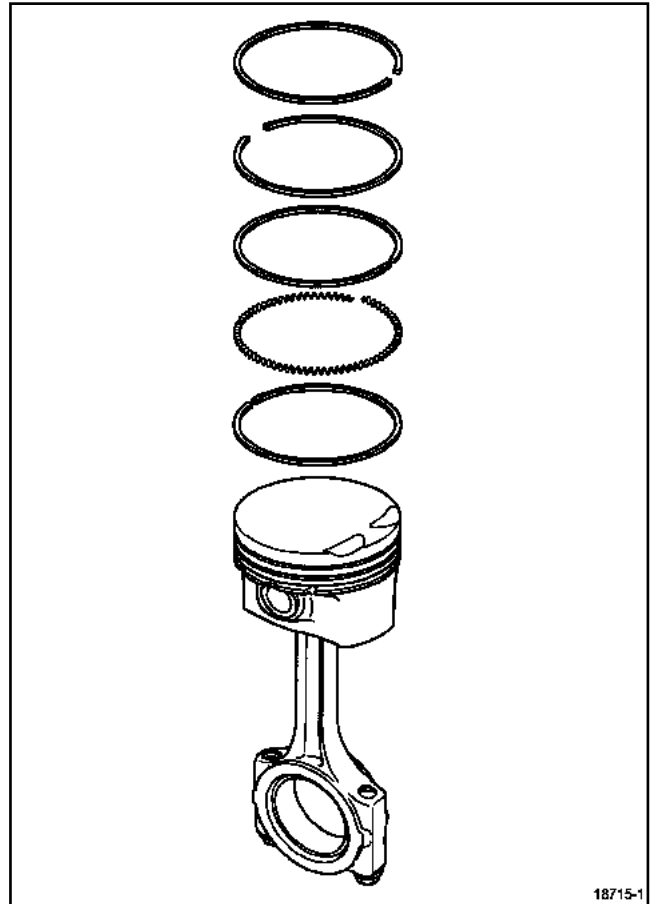


18711  
18711

- When the solder reaches welding point (becomes liquid):
  - wipe off the solder,
  - insert the locator into the piston,
  - insert the con rod (correctly positioned) in the piston,
  - quickly drive in the gudgeon pin until the locator reaches the end of the support base.
- Ensure that the gudgeon pin remains withdrawn from the piston diameter for all con rod positions in the piston.

### V - REFITTING THE PISTON RINGS

- The piston rings, at their original settings, must be free in their grooves.
- Ensure the rings are fitted in the correct direction, with the word TOP facing upwards.



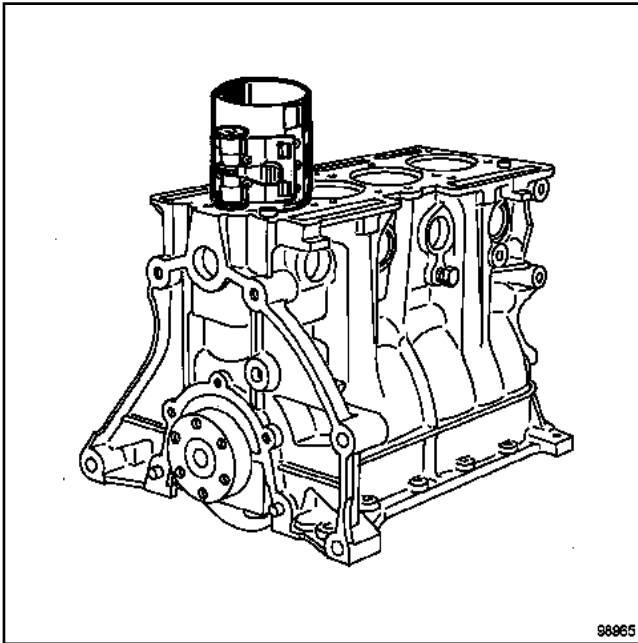
18715-1  
18715-1

- Observe the gap and direction of fitting for each piston ring.
- Refit the piston rings using a **Circlip pliers**.

### VI - REFITTING THE PISTONS AND CON RODS

- Before fitting, oil:
  - the cylinder block barrels,
  - the piston rings,
  - the piston skirts,
  - the crankshaft crankpins.

D4D, and 700 or 712 or 720 – D4F, and 702 or 706 or 708 or 712 or 714 or 716 or 722 or 728 or 730 or 740



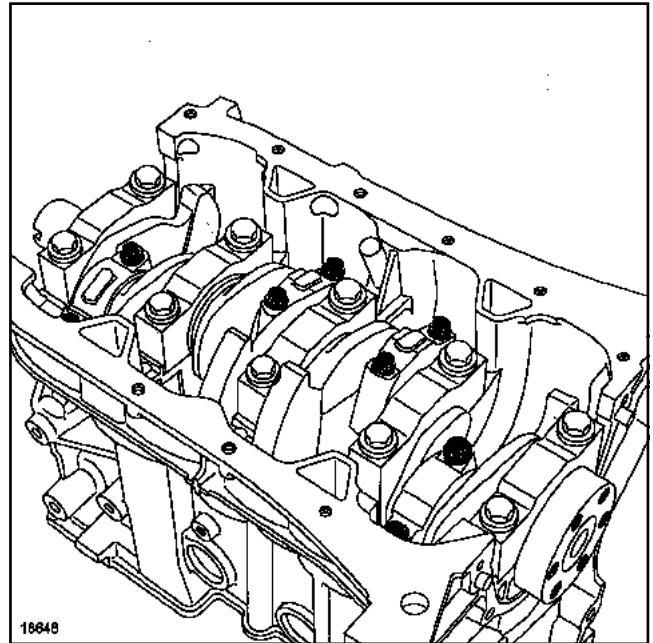
98965

- Refit the piston/con rod assemblies using the **piston ring compressor** , having first verified that:

- the piston matches the cylinder block barrel (**N°1** at flywheel end).

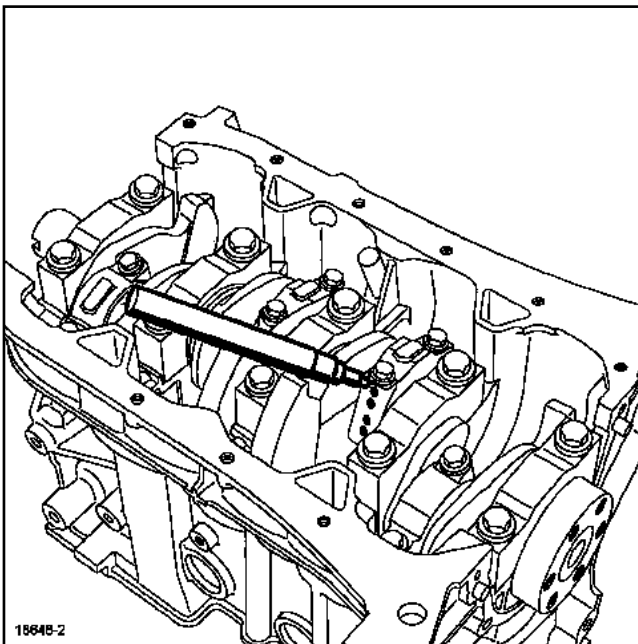
- the piston marking is in the correct place, with the arrow pointing towards the flywheel.

- Fit the con rods onto the crankshaft crankpins.



18648

- Tighten to torque and angle the **con rod cap bolts** (**14 Nm + 39° ± 6°**).




18648-2


- Refit the con rod caps corresponding to the con rod bodies.

D4D, and 700 or 712 or 720 – D4F, and 702 or 706 or 708 or 712 or 714 or 716 or 722 or 728 or 730 or 740

Essential special tooling	
<b>Mot. 1626</b>	Tool for fitting crankshaft "PTFE" seal, timing end.
<b>Mot. 1355</b>	Oil pump oil seal fitting tool 32 X 44 X 6
<b>Mot. 923</b>	Engine lifting ring.
<b>Mot. 1625</b>	Tool for fitting crankshaft "PTFE" seal, flywheel end.
<b>Mot. 1354</b>	Crankshaft oil seal fitting tool, 70 x 86 x 8.
<b>Mot. 582-01</b>	Flywheel locking tool (K engines)
<b>Emb. 1518</b>	Set of clutch plate centring mandrels

Essential equipment
Jacking point

Tightening torques 	
crankshaft closure cover bolts (flywheel end)	<b>9 Nm</b>
water pump bolts	<b>9 Nm</b>
water pipe bolts	<b>9 Nm</b>
oil pump bolts	<b>9 Nm</b>
oil pressure sensor	<b>32 ± 2 Nm</b>
oil pump screen bolts	<b>9 Nm</b>
oil sump bolts	<b>10 Nm</b>
pinking sensor	<b>20 ± 4 Nm</b>
oil level sensor or blanking cover cap	<b>30 ± 5 Nm</b>
flywheel bolts	<b>18 Nm + 110° ± 6°</b>
clutch pressure plate bolts	<b>25 Nm</b>
recyclable oil filter	<b>20 Nm</b>
non-recyclable oil filter	<b>10 Nm</b>

Tightening torques 	
Air conditioning compressor bolt	<b>25 Nm</b>
coolant inlet pipe bolt	<b>10 Nm</b>
alternator mounting bolts	<b>25 Nm</b>
Air conditioning compressor bolt	<b>50 Nm</b>
power assisted steering pump support bolts	<b>25 Nm</b>
power assisted steering pump bolts	<b>22 Nm</b>

### I -REFITTING THE ENGINE PERIPHERALS



#### WARNING

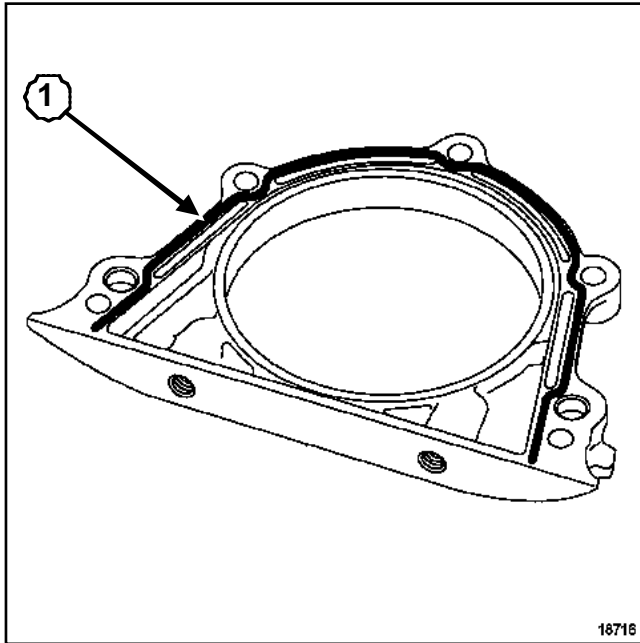
The sealing surfaces of the cylinder block and crankshaft closure cover must be clean, dry and free from grease (avoid finger marks).

#### WARNING

Excess sealant may be squeezed out when the parts are tightened. The sealing compound/fluid mixture can cause damage to certain components (engine, radiator, etc.).

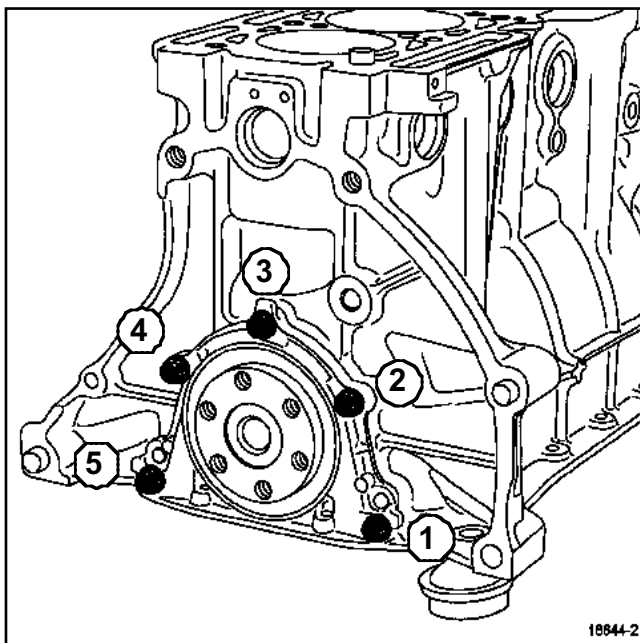
## Cylinder block: Refitting

D4D, and 700 or 712 or 720 – D4F, and 702 or 706 or 708 or 712 or 714 or 716 or 722 or 728 or 730 or 740



18716  
18716

- ❑ At (1), apply a bead of **RHODORSEAL 56611.3** mm wide to the crankshaft closure cover at the flywheel end.



18644-2  
18644-2

- ❑ Tighten to torque and in order the **crankshaft closure cover bolts (flywheel end) (9 Nm)**.

**Note:**

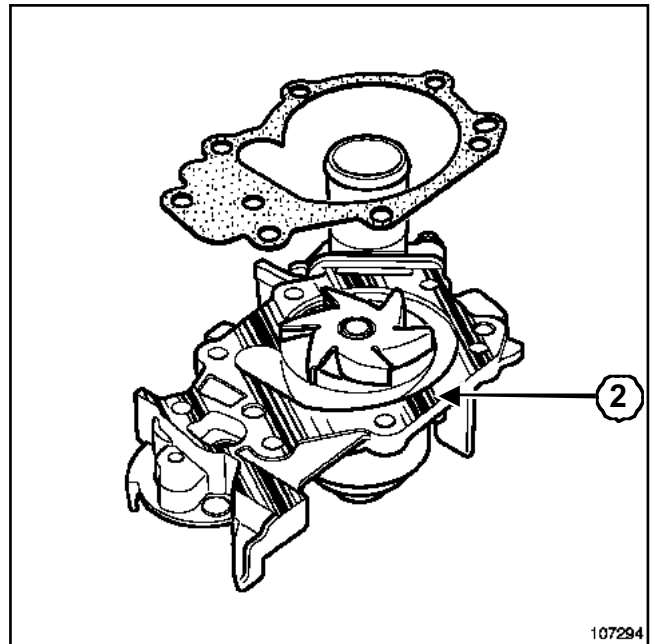
- There are two types of seal depending on the water pump.

### 1 - Water pump with gasket



**WARNING**

The cylinder block sealing surfaces and water pump must be clean, dry and free from grease (no finger marks).



107294  
107294

- ❑ Refit the water pump fitted with a new seal if the sealing face of the water pump is flat (2).

### 2 - Water pump sealing lug



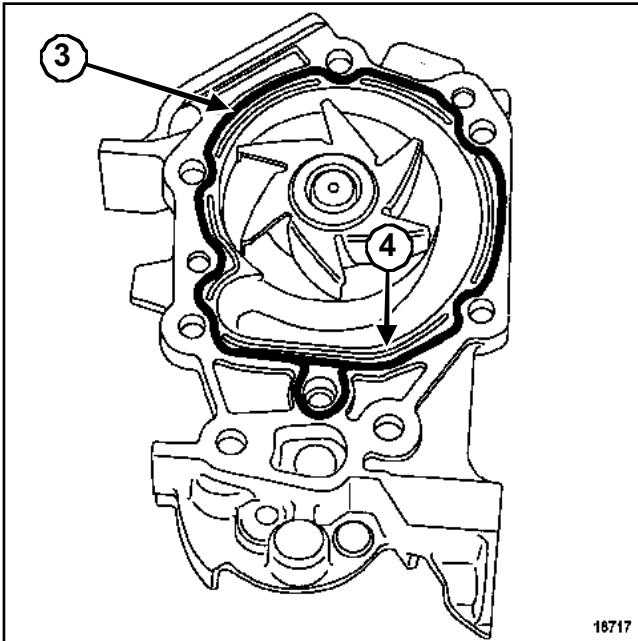
**WARNING**

The cylinder block sealing surfaces and water pump must be clean, dry and free from grease (no finger marks).

**WARNING**

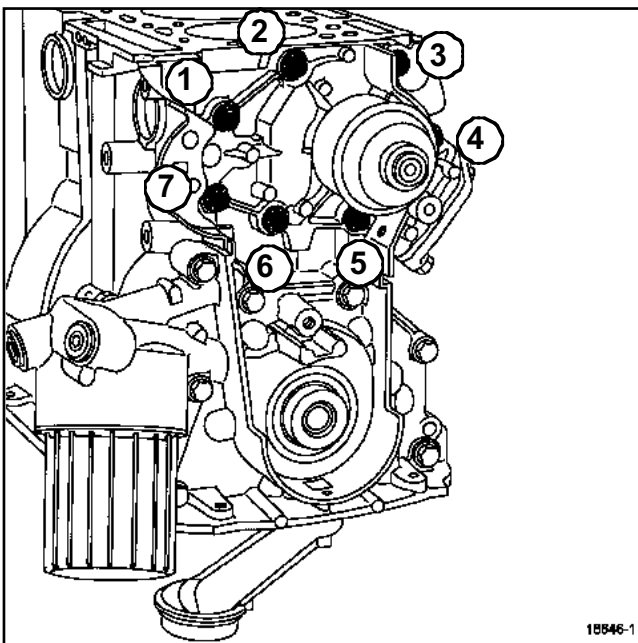
Excess sealant may be squeezed out when the parts are tightened. The sealing compound/fluid mixture can cause damage to certain components (engine, radiator, etc.).

D4D, and 700 or 712 or 720 – D4F, and 702 or 706 or 708 or 712 or 714 or 716 or 722 or 728 or 730 or 740



18717  
18717

- At (3), apply a bead of **RHODORSEAL 56611.3 mm** wide to the water pumps if the sealing face of the water pump has a groove (4).



18646-1  
18646-1

- Tighten to torque and in order the **water pump bolts (9 Nm)**.

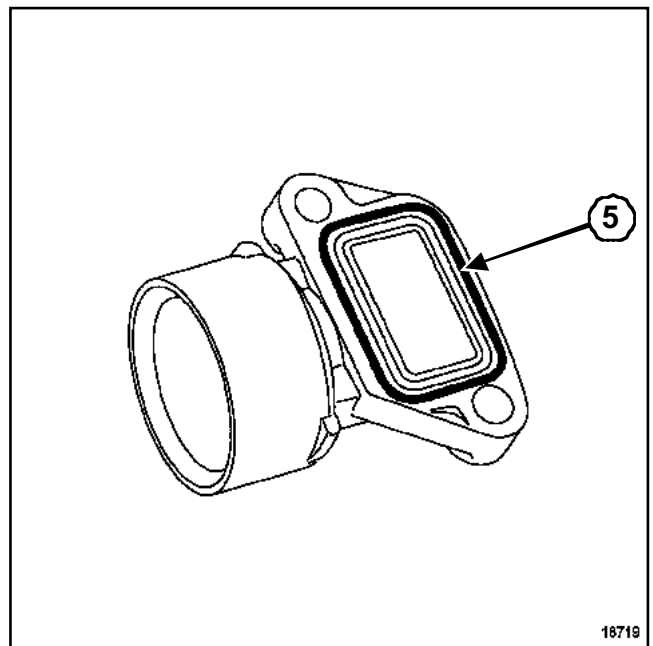
□

### WARNING

The water pipe sealing surfaces and water pump must be clean, dry and free from grease (no finger marks).

### WARNING

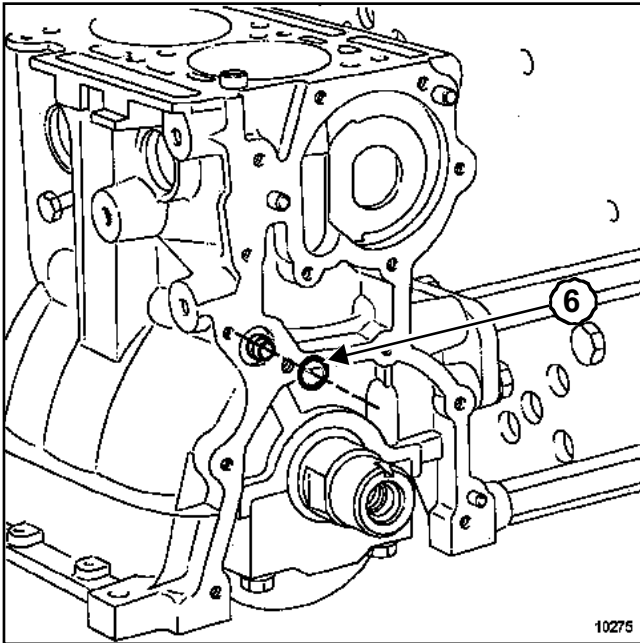
Excess sealant may be squeezed out when the parts are tightened. The sealing compound/fluid mixture can cause damage to certain components (engine, radiator, etc.).



18719  
18719

- At (5), apply a bead of **RHODORSEAL 56611.3 mm** wide to a water pipe that has been sealed using **RHODORSEAL 5661**.
- Replace the gasket on the water pipe that was sealed using a gasket.
- Tighten to torque the **water pipe bolts (9 Nm)**.

D4D, and 700 or 712 or 720 – D4F, and 702 or 706 or 708 or 712 or 714 or 716 or 722 or 728 or 730 or 740



10275

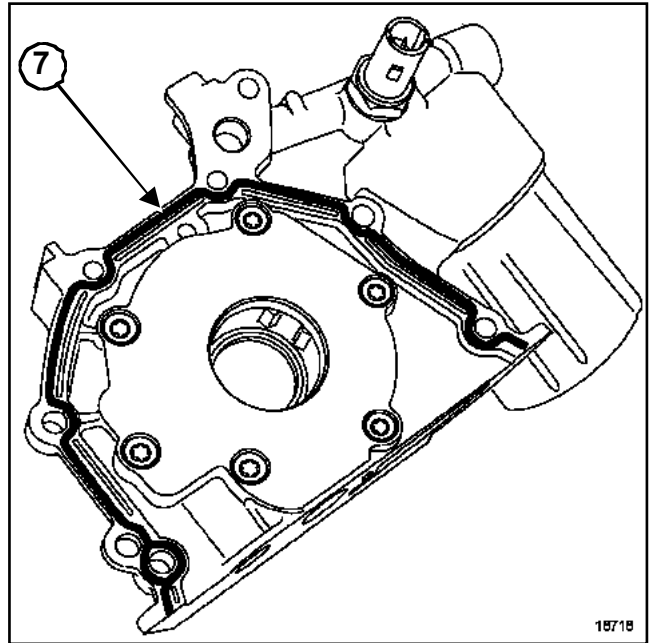
- Always replace oil pressure feed seal (6).

### WARNING

The cylinder block sealing surfaces and oil pump must be clean, dry and free from grease (no finger marks).

### WARNING

Excess sealant may be squeezed out when the parts are tightened. The sealing compound/fluid mixture can cause damage to certain components (engine, radiator, etc.).



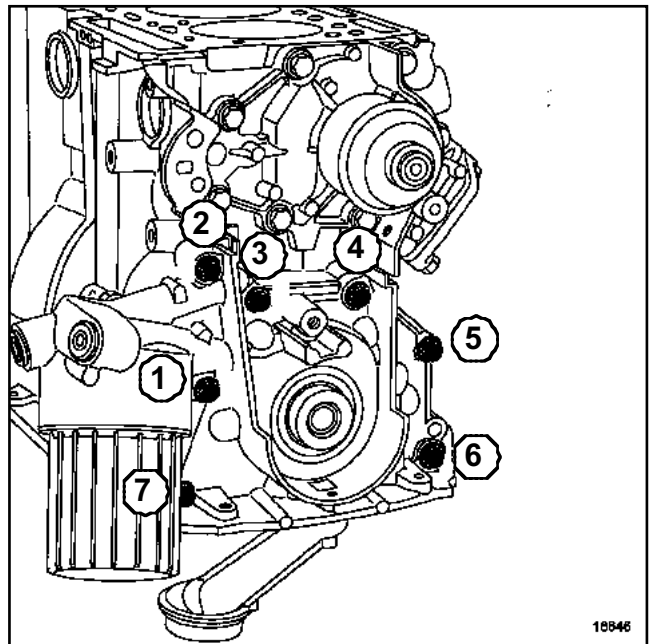
18718

18718

- At (7), apply a bead of **RHODORSEAL 56611.3 mm** wide to the oil pump.

### WARNING

The oil pump is driven by two studs located on the crankshaft.



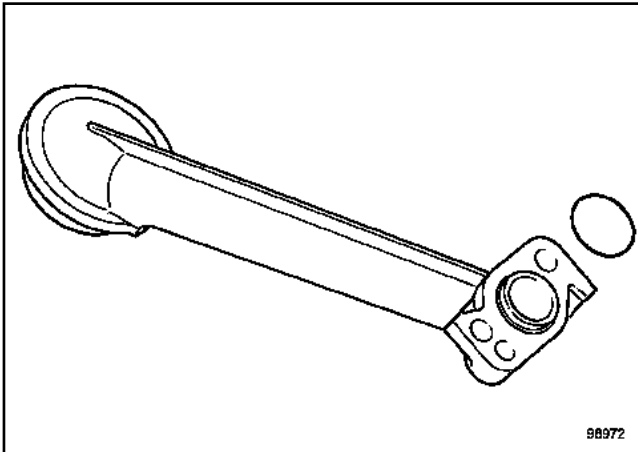
18846

18846

- Tighten to torque and in order the **oil pump bolts (9 Nm)**.
- Tighten to torque the **oil pressure sensor (32 ± 2 Nm)**.

## Cylinder block: Refitting

D4D, and 700 or 712 or 720 – D4F, and 702 or 706 or 708 or 712 or 714 or 716 or 722 or 728 or 730 or 740



98972

□

**Note:**

- The plastic screens are not fitted with O-rings.

Refit the screen fitted with its new O-ring (if fitted).

□ Tighten to torque the **oil pump screen bolts (9 Nm)**.

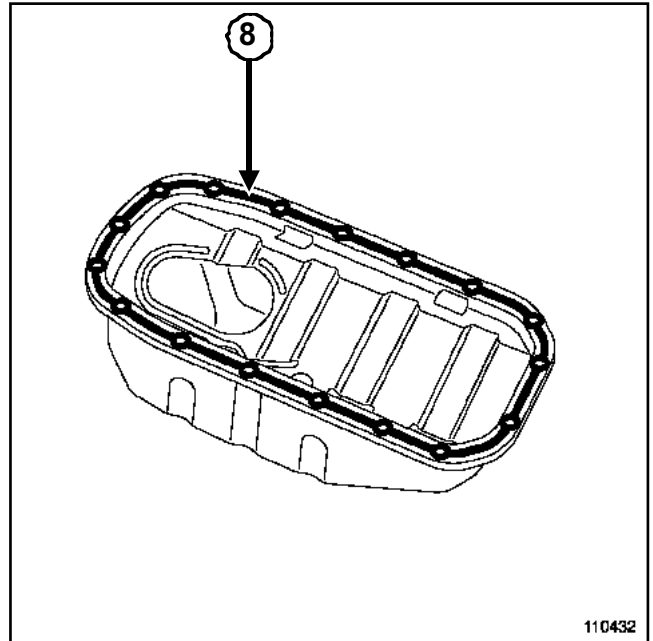
□

**WARNING**

The cylinder block and oil sump sealing surfaces must be clean, dry and free from grease (no finger marks).

**WARNING**

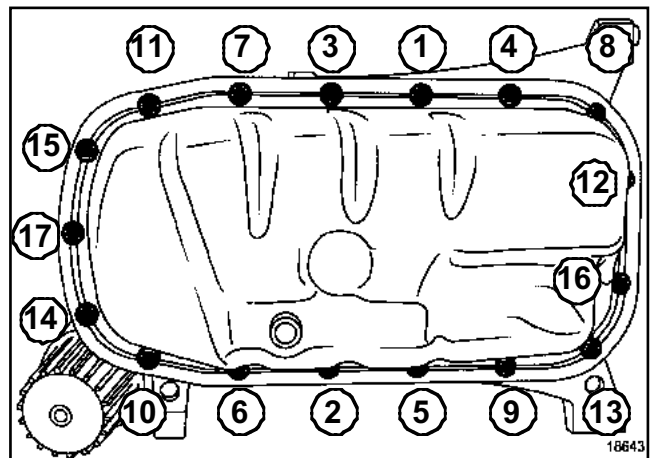
Excess sealant may be squeezed out when the parts are tightened. The sealing compound/fluid mixture can cause damage to certain components (engine, radiator, etc.).



110432

110432

□ At (8), apply a bead of **RHODORSEAL 56613 mm** wide to the oil sump.

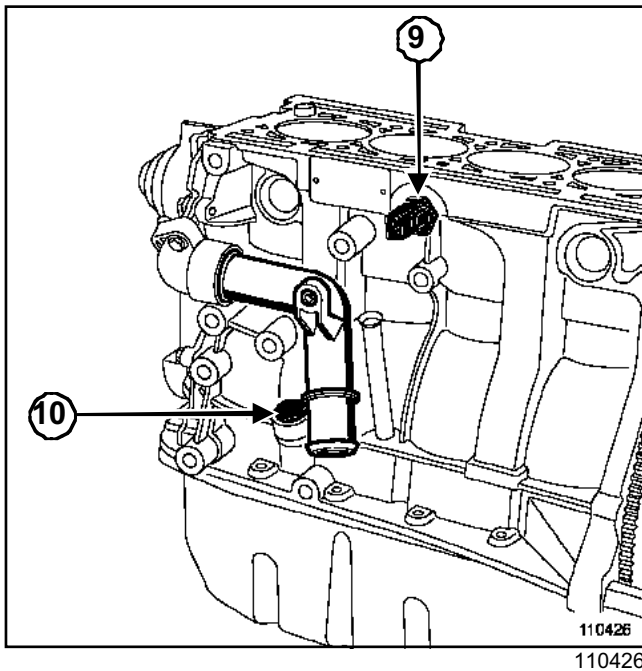


18643

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□ Tighten to torque and in order the **oil sump bolts (10 Nm)**.

D4D, and 700 or 712 or 720 – D4F, and 702 or 706 or 708 or 712 or 714 or 716 or 722 or 728 or 730 or 740



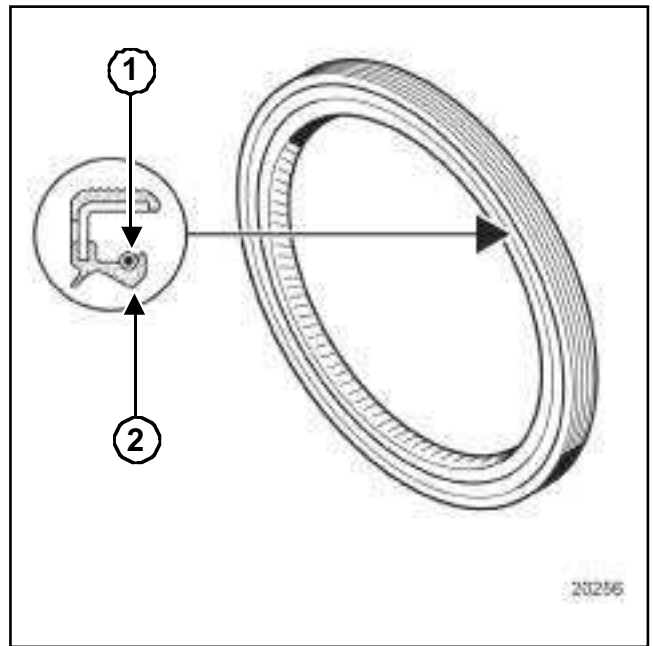
110426

- ❑ Refit:
  - the coolant inlet hose fitted with a new O-ring,
  - pinking sensor (9).
- ❑ Tighten to torque the **pinking sensor** ( $20 \pm 4$  Nm).
- ❑ Refit the oil level sensor or blanking cover cap (depending on the equipment) at (10).
- ❑ Tighten to torque the **oil level sensor or blanking cover cap** ( $30 \pm 5$  Nm).

## II - REFITTING THE SEALS

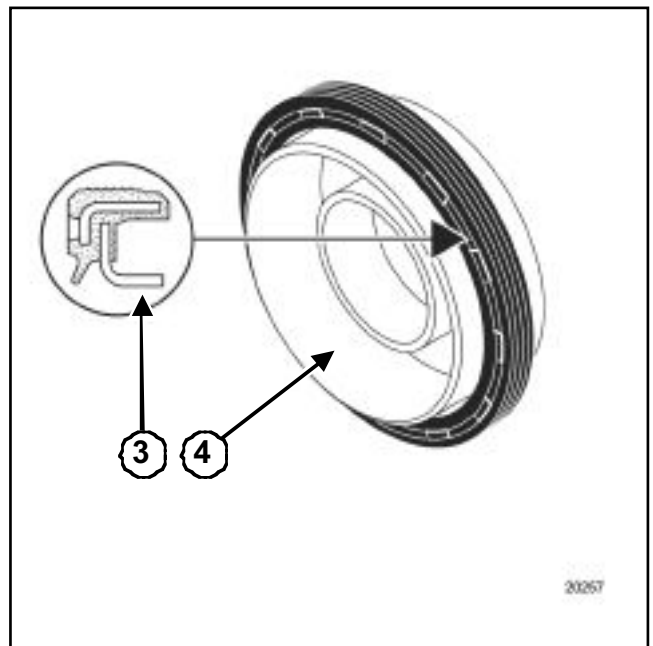
### 1 - GENERAL INFORMATION

- ❑ Developments in engine elastomer seals (fitted to the camshafts and crankshaft).
- ❑ Fitting and removing the new type elastomer seal from the engine requires new tools and precautions when compared to the old type seal.
- ❑ The old and new type of seal may both be used on the same engine. They are not interchangeable. An old type seal must be replaced with an old type seal (still available from the Parts Department), and a new type seal must be replaced with a new type seal.
- ❑ An old type seal may be replaced by a new type seal in the event of a crankshaft or camshaft replacement. This is possible if the engine is fitted with one during its lifetime in series production.
- ❑ Old and new seals are easily recognised.



20256

- ❑ The old elastomer seal is fitted with a spring (1) and a V-shaped sealing lip (2).



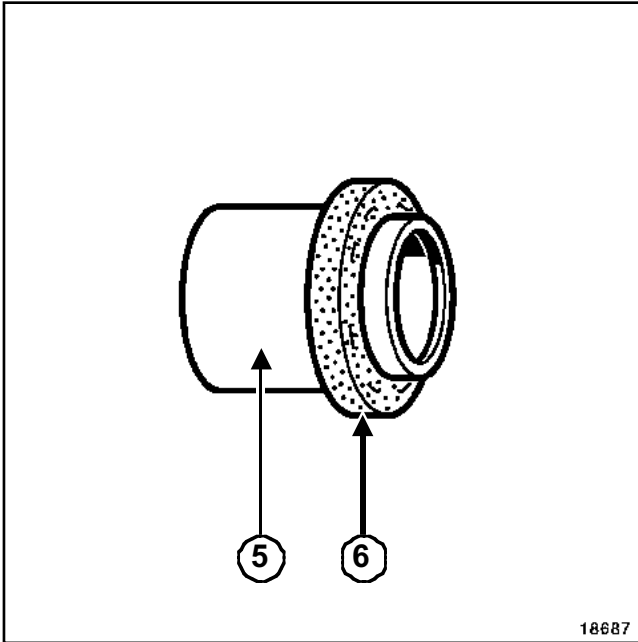
20257

- ❑ The new elastomer seal is fitted with a flat sealing lip (3) and a guard (4) which is also used for fitting the seal to the engine.

D4D, and 700 or 712 or 720 – D4F, and 702 or 706 or 708 or 712 or 714 or 716 or 722 or 728 or 730 or 740

### 2 - OIL PUMP SIDE

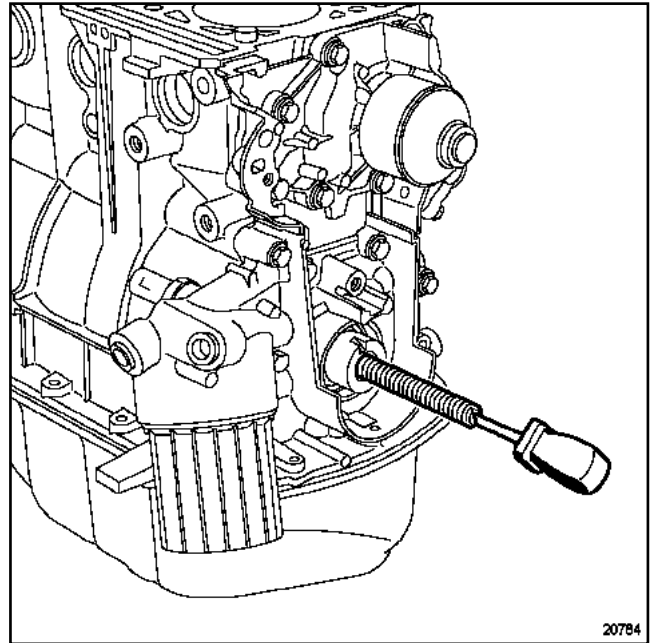
#### a - New elastomer seal



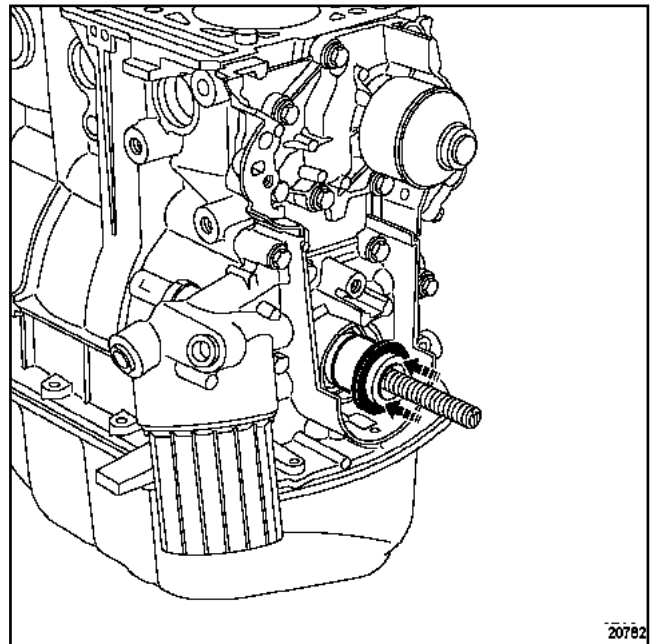
□

#### WARNING

This type of seal is extremely FRAGILE. During the operation, it is essential to hold protector (5). Touching seal (6) is strictly prohibited in order to prevent any oil leaks once the seal is fitted to the engine.



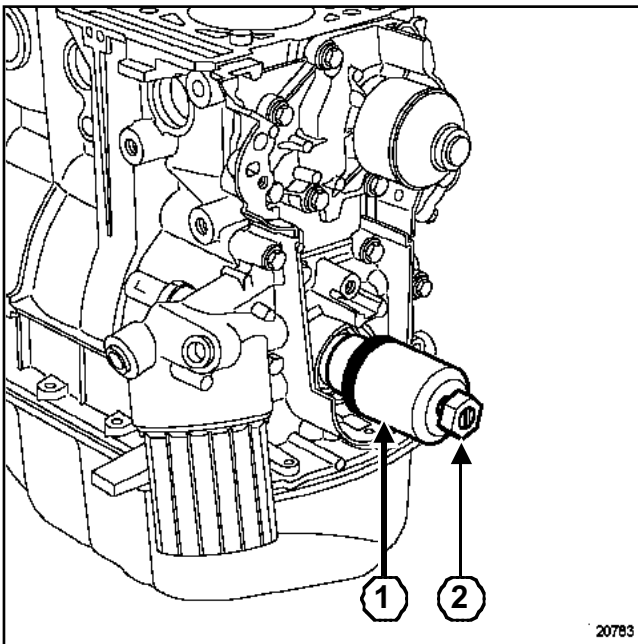
- Tighten the threaded rod of (Mot. 1626) in the crankshaft



- Fit the seal and protector on the crankshaft, taking care not to touch the seal.

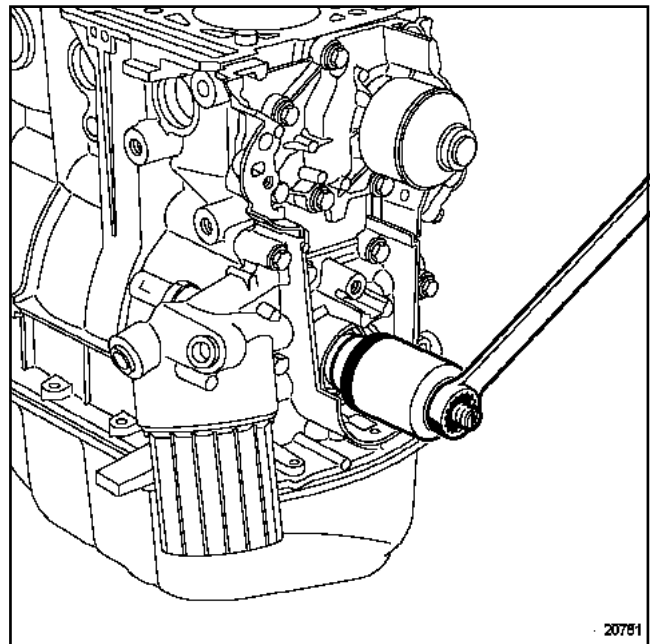
## Cylinder block: Refitting

D4D, and 700 or 712 or 720 – D4F, and 702 or 706 or 708 or 712 or 714 or 716 or 722 or 728 or 730 or 740

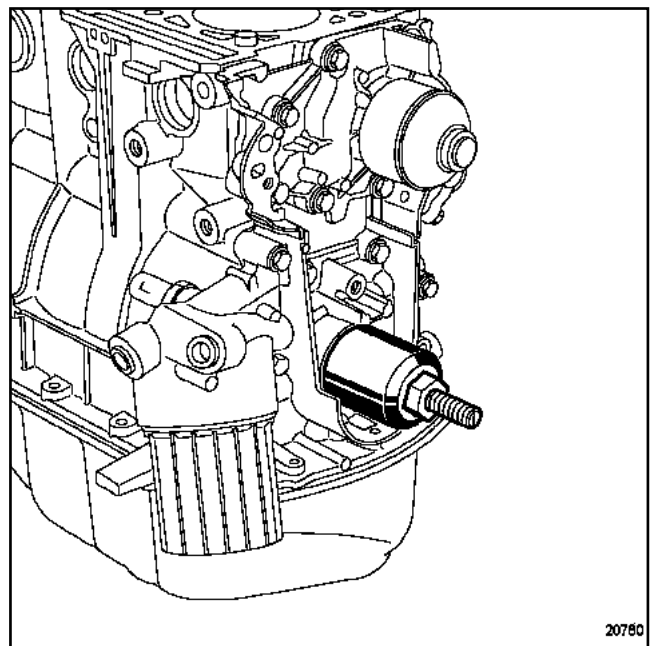


20783  
20783

- Fit cover (1) and collar nut (2) of (Mot. 1626).



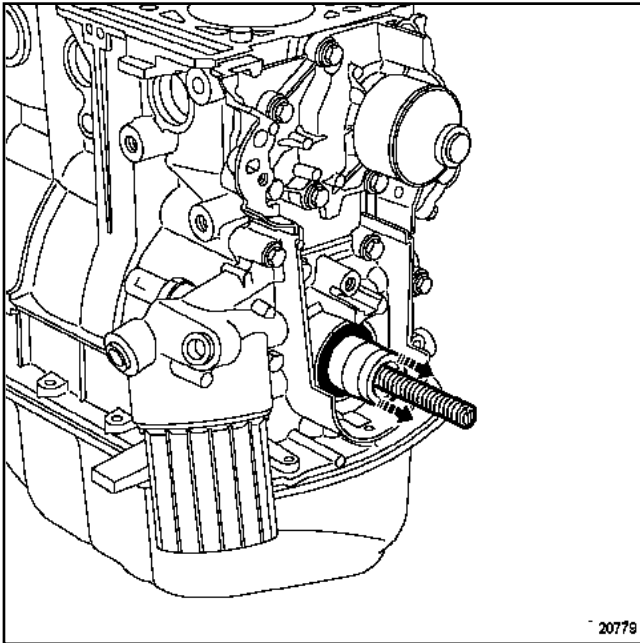
20781  
20781



20780  
20780

- Tighten the collar nut until the cup touches the crankshaft closure panel.

D4D, and 700 or 712 or 720 – D4F, and 702 or 706 or 708 or 712 or 714 or 716 or 722 or 728 or 730 or 740

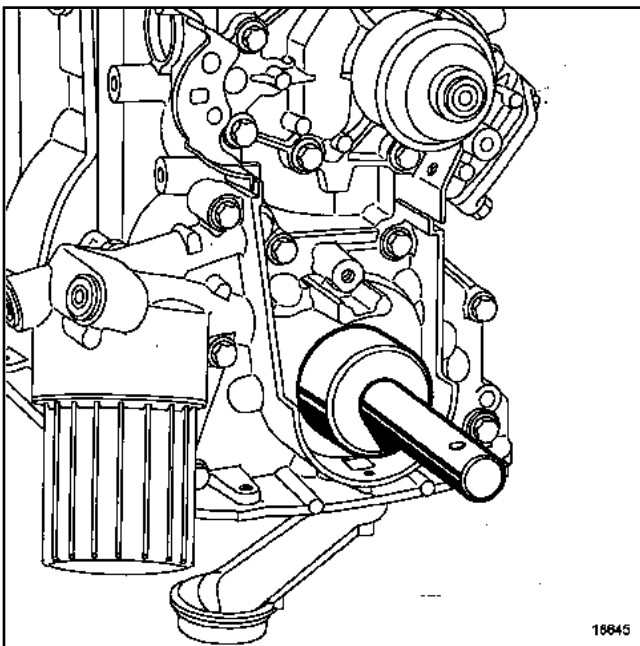


20779

Remove:

- the nut,
- the cover,
- the protector,
- the threaded rod.

**b - Old elastomer seal**



18645

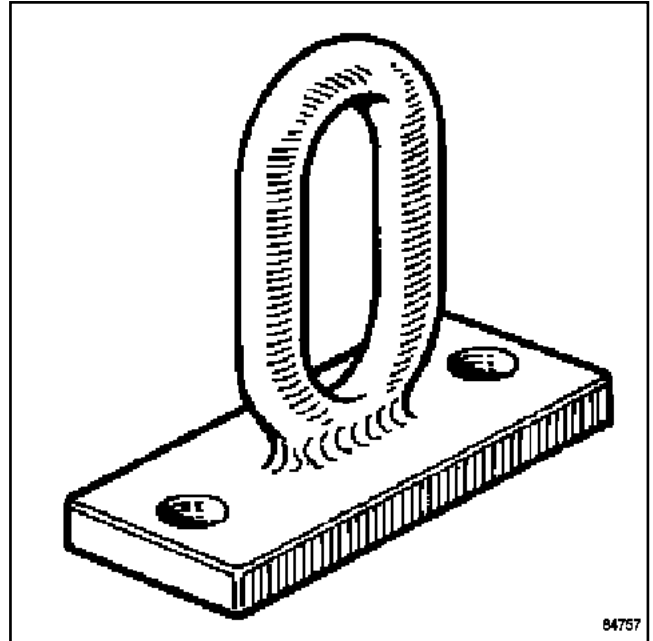
- Refit the seal on the oil pump side using tool (Mot. 1355).

**3 - FLYWHEEL END**



**WARNING**

It is essential to remove the engine from its mounting to refit the seal at the flywheel end.



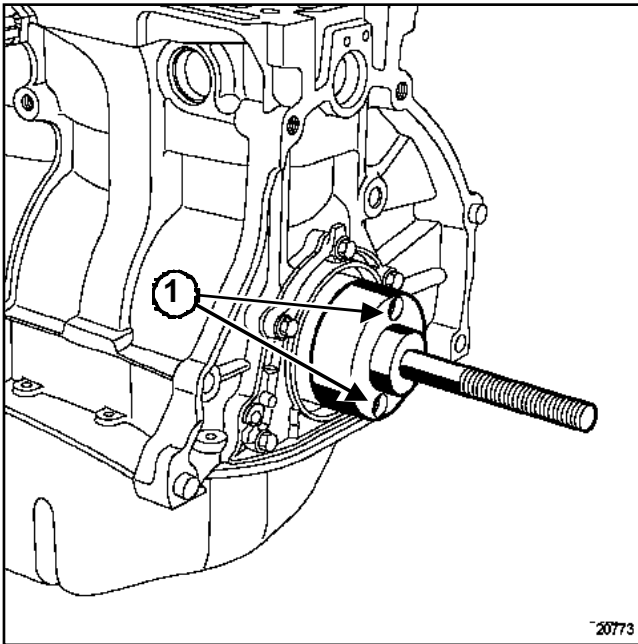
84757

84757

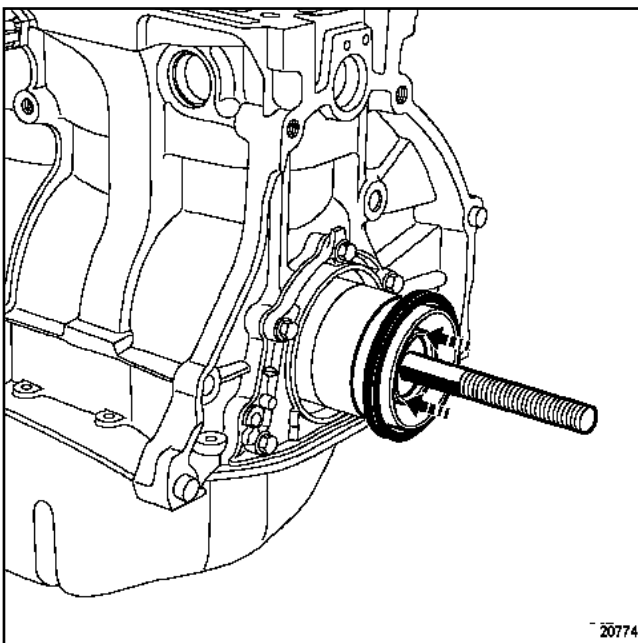
- Fit tool (Mot. 923) on the cylinder block sealing surface.
- Remove the engine from its mounting using **Jacking point**.

D4D, and 700 or 712 or 720 – D4F, and 702 or 706 or 708 or 712 or 714 or 716 or 722 or 728 or 730 or 740

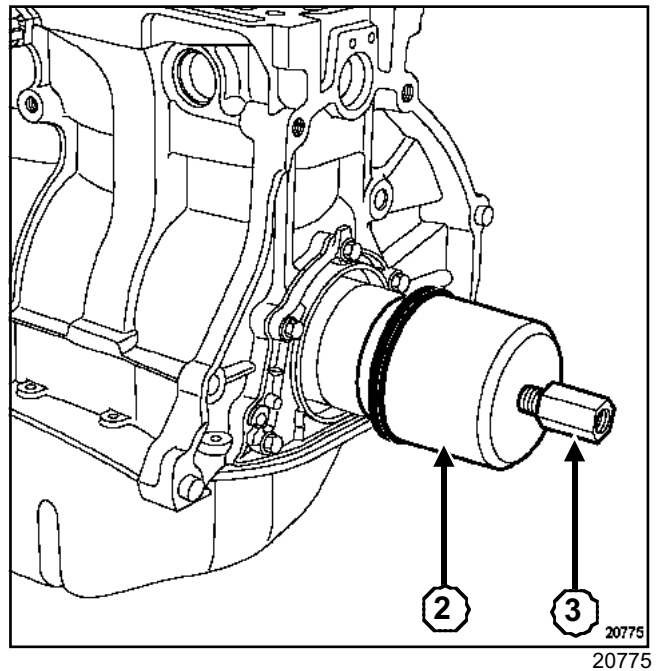
### a - New elastomer seal



- ❑ Position tool (Mot. 1625) on the crankshaft, securing it using bolts (1)

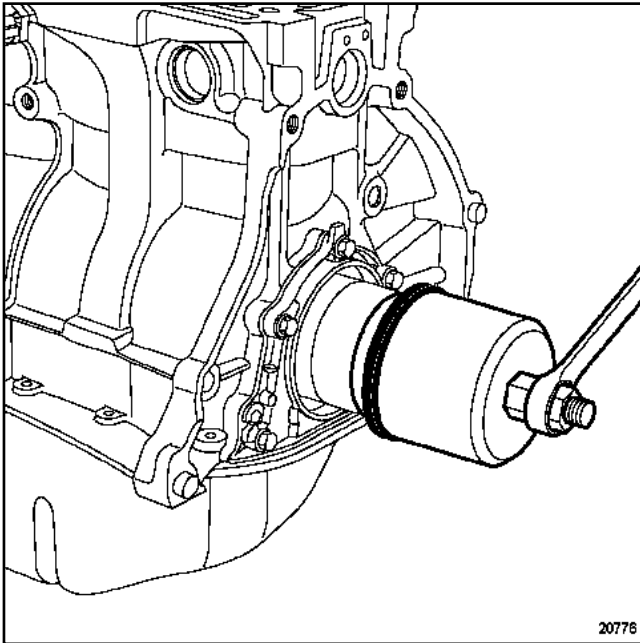


- ❑ Fit the protector with its seal in place on tool, taking care not to touch the seal.

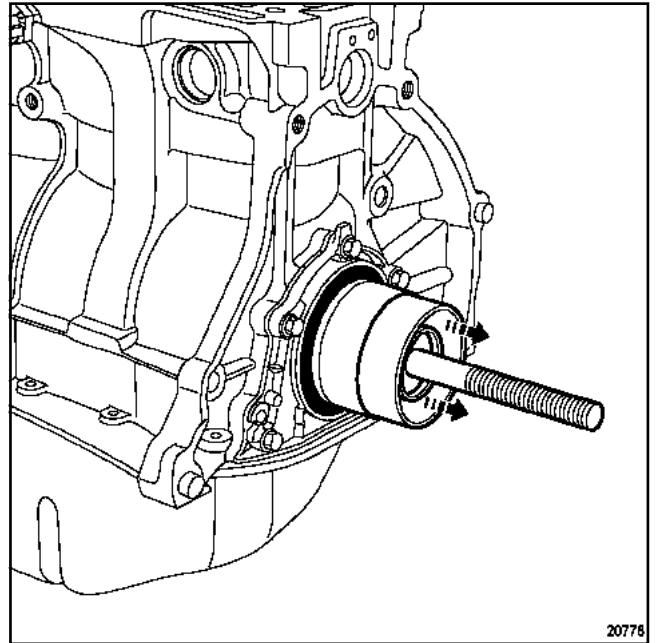


- ❑ Fit cover (2) and nut (3) (with the thread of the nut towards the outside of the engine).

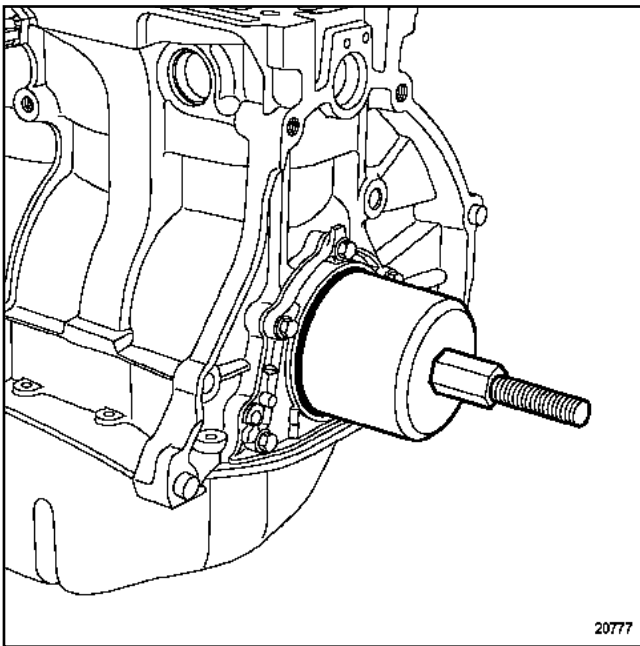
D4D, and 700 or 712 or 720 – D4F, and 702 or 706 or 708 or 712 or 714 or 716 or 722 or 728 or 730 or 740



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20776



20778  
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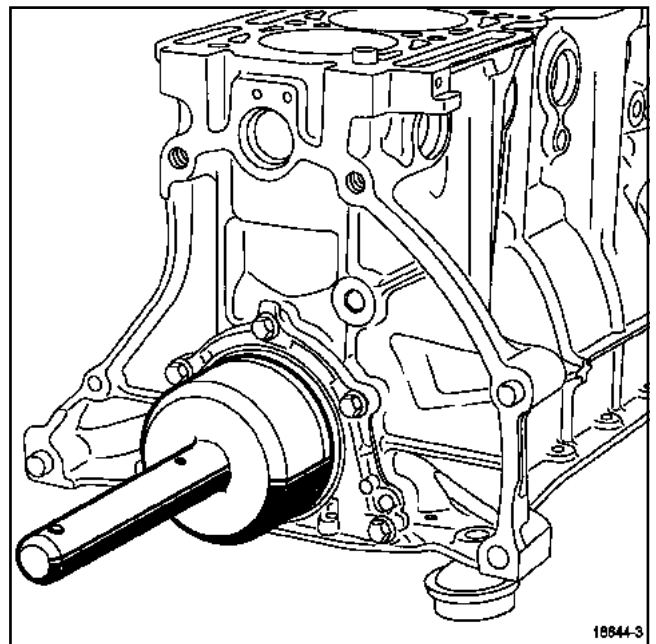
20777  
20777

- Screw on the nut until the cover touches the cylinder block.

Remove:

- the nut,
- the cover,
- the protector,
- the base.

**b - Old elastomer seal**

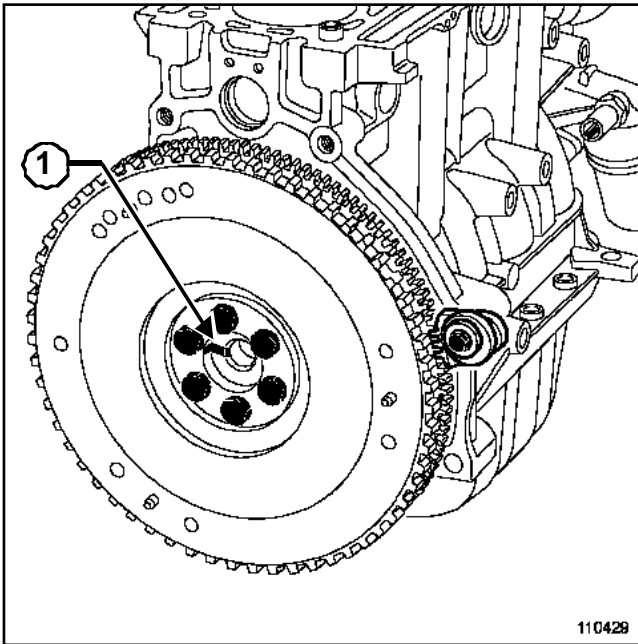


18644-3  
18644-3

- Refit the seal at the flywheel end using tool (Mot. 1354).

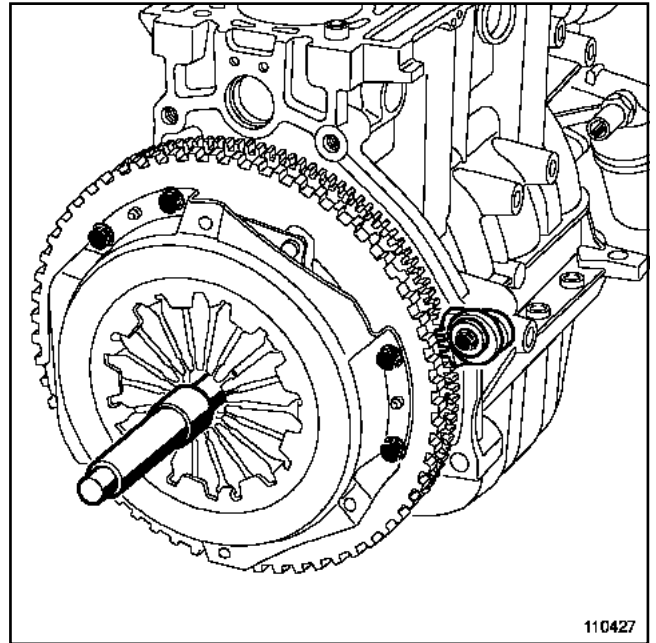
D4D, and 700 or 712 or 720 – D4F, and 702 or 706 or 708 or 712 or 714 or 716 or 722 or 728 or 730 or 740

## III - REFITTING THE FLYWHEEL



110429

- Refit the flywheel, aligning it with mark (1) made during removal.
- Replace the mounting bolts with new ones.
- Fit flywheel immobiliser tool (Mot. 582-01).
- Tighten to torque and angle the **flywheel bolts (18 Nm + 110° ± 6°)**.



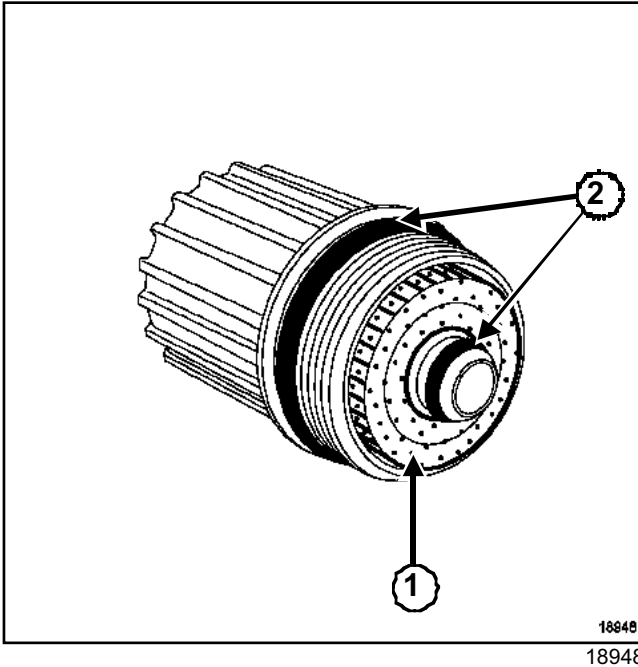
110427

- Refit:
  - the clutch plate,
  - the clutch pressure plate.
- Centre the clutch plate using tool (Emb. 1518).
- Tighten to torque the **clutch pressure plate bolts (25 Nm)**.
- Remove flywheel immobiliser tool (Mot. 582-01).

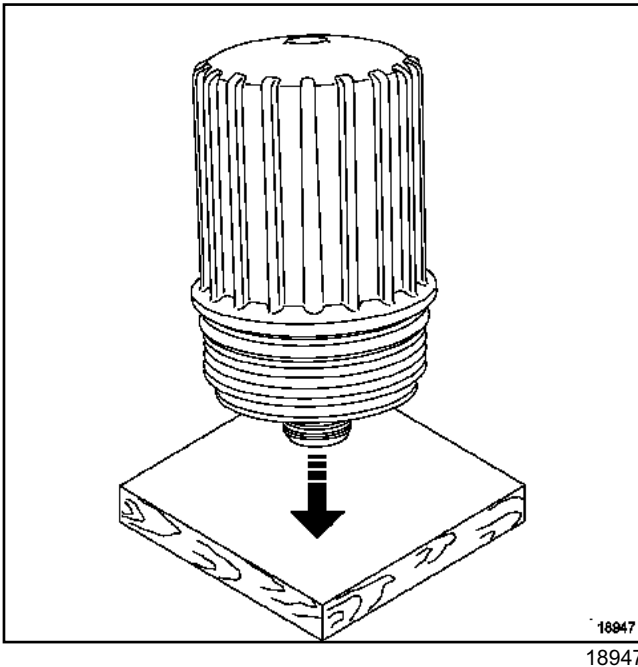
D4D, and 700 or 712 or 720 – D4F, and 702 or 706 or 708 or 712 or 714 or 716 or 722 or 728 or 730 or 740

### IV - REPLACING THE OIL FILTER

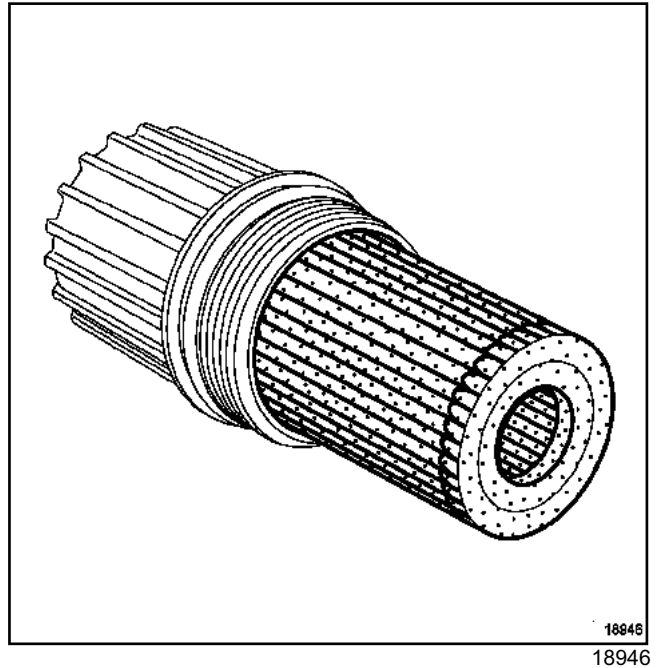
#### 1 - Recyclable cartridge



- When replacing oil filter (1), replace the two O-rings (2).



- Hold the filter upside down and tap it on a piece of wood to remove the filter element.



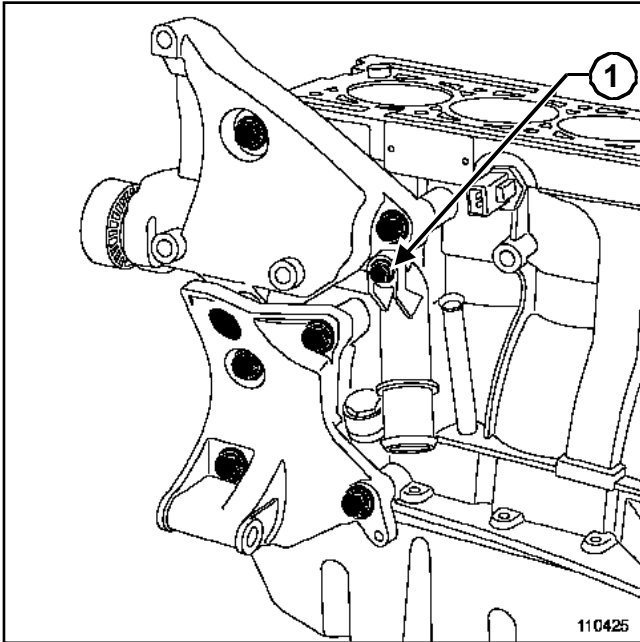
- Fit a new oil filter cartridge.
- Tighten to torque the **recyclable oil filter (20 Nm)**.

#### 2 - Non-recyclable cartridge

- Oil the oil filter seal.
- Tighten to torque the **non-recyclable oil filter (10 Nm)**.

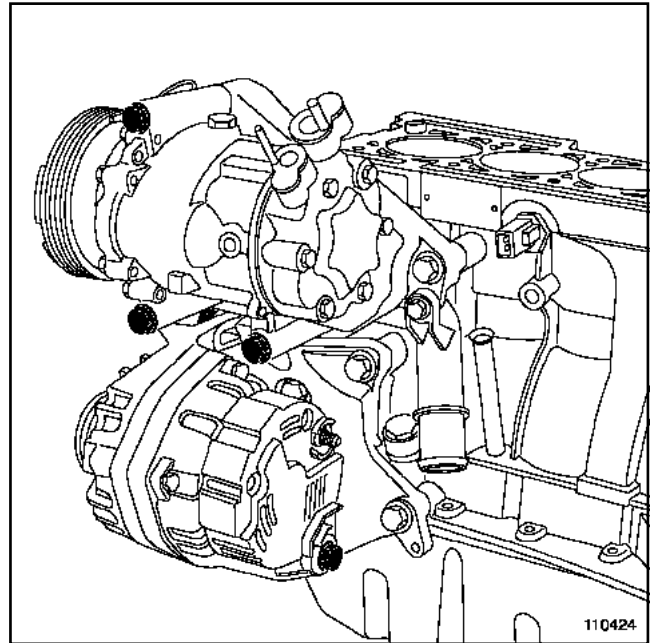
D4D, and 700 or 712 or 720 – D4F, and 702 or 706 or 708 or 712 or 714 or 716 or 722 or 728 or 730 or 740

### V - REFITTING THE ACCESSORIES



110425

- Refit the air conditioning compressor support.
- Tighten to torque the **Air conditioning compressor bolt (25 Nm)**.
- Tighten to torque the **coolant inlet pipe bolt (10 Nm)** at (1).
- Refit the alternator mounting.
- Tighten to torque the **alternator mounting bolts (25 Nm)**.



110424

110424

- Refit the alternator.
- Do not tighten the alternator mounting bolts.
- Refit the air conditioning compressor.
- Tighten to torque the **Air conditioning compressor bolt (50 Nm)**.
- Refit the power assisted steering pump support (if fitted to the engine).
- Tighten to torque the **power assisted steering pump support bolts (25 Nm)**.
- Tighten to torque the **power assisted steering pump bolts (22 Nm)**.

## Timing - cylinder head: Refitting

D4D, and 700 or 712 or 720 – D4F, and 702 or 706 or 708 or 712 or 714 or 716 or 722 or 728 or 730 or 740

### Essential special tooling

<b>Mot. 1054</b>	TDC setting pin
<b>Mot. 799-01</b>	Tool for locking sprockets on toothed timing belt
<b>Mot. 582-01</b>	Flywheel locking tool (K engines)
<b>Mot. 1715</b>	Belt tension setting tool (frequency meter)
<b>Mot. 1505</b>	Belt tension setting tool (frequency meter)

### Essential equipment

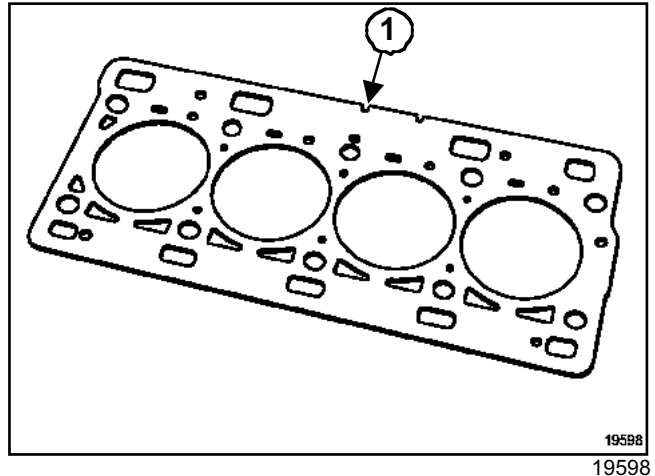
angular tightening wrench

### Tightening torques

timing tensioner,	<b>24 Nm</b>
rocker cover bolts	<b>12 Nm</b>
inlet manifold / cylinder head bolts	<b>10 Nm</b>
inlet manifold / rocker cover bolts	<b>8 Nm</b>
intermediate timing housing bolts	<b>10 Nm</b>
upper timing cover bolt	<b>33 Nm</b>
crankshaft accessories pulley bolts	<b>40 Nm + 70° ± 6°</b>
alternator upper bolt	<b>25 Nm</b>
alternator lower mounting bolt	<b>50 Nm</b>
tension wheel bolts	<b>37 Nm</b>

### I -REFITTING THE CYLINDER HEAD

- Position the pistons at mid-stroke.
- Degrease the cylinder head and cylinder block combustion surfaces.
- Check that the two centring dowels are present on the cylinder block.



- Fit the cylinder head gasket onto the cylinder block positioning mark (1) on the oil filter side.
- Refit the cylinder head.
- Tighten in the correct order to torque and angle the cylinder head bolts (refer to **10A, Top and lower engine assembly, Upper engine: Specifications**).

### II - REFITTING THE TIMING BELT

- 

#### WARNING

The following parts must be replaced with new ones if they have been removed:

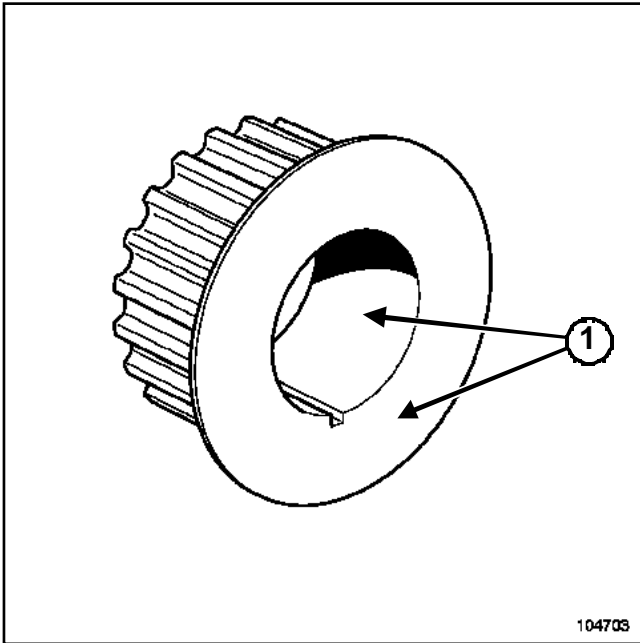
- the belt (timing and accessories),
- the crankshaft accessories pulley bolt.

#### WARNING

When replacing the belt, be sure to replace the tension wheels and idler pulleys.

## Timing - cylinder head: Refitting

D4D, and 700 or 712 or 720 – D4F, and 702 or 706 or 708 or 712 or 714 or 716 or 722 or 728 or 730 or 740



104703  
104703



**Note:**

Be sure to degrease:

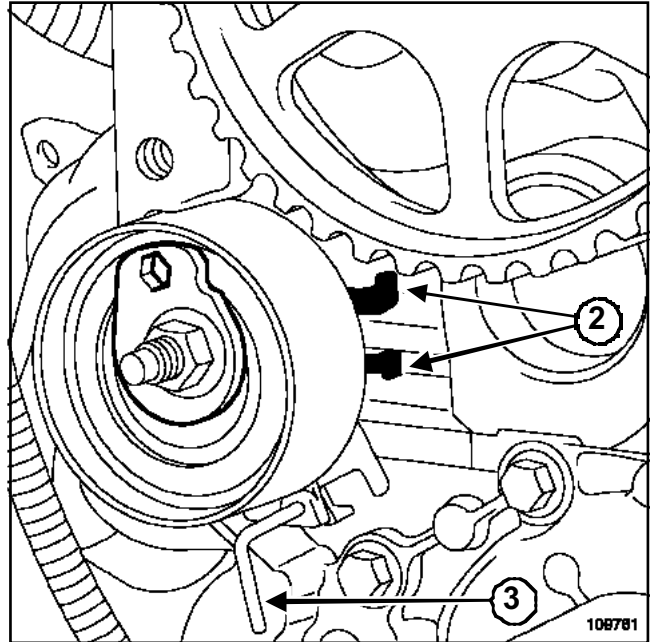
- the end of the crankshaft (timing end),
- the timing sprocket bearing faces and bore at (1),
- the contact surfaces of the crankshaft accessories pulley.

**WARNING**

Never turn the engine against its operating direction.

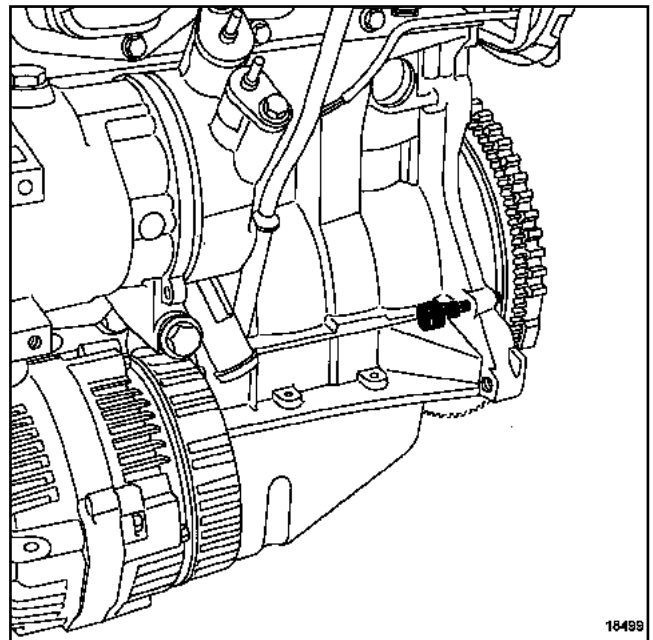
- Refit the crankshaft sprocket.

### 1 - Adjusting the timing



109781  
109761

- Check that the two indexes (2) are between the cylinder head rib.
- Do not remove pin (3) before refitting the timing belt.

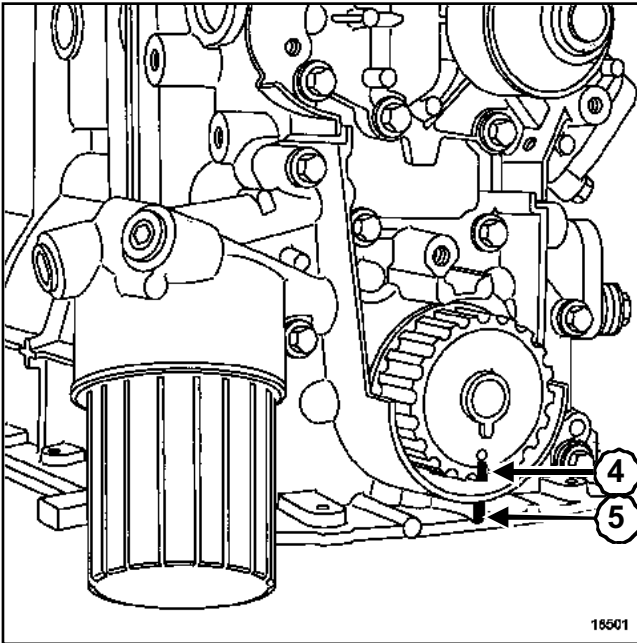


18499  
18499

- Insert the TDC pin (Mot. 1054);
- Turn the crankshaft to the setting point.

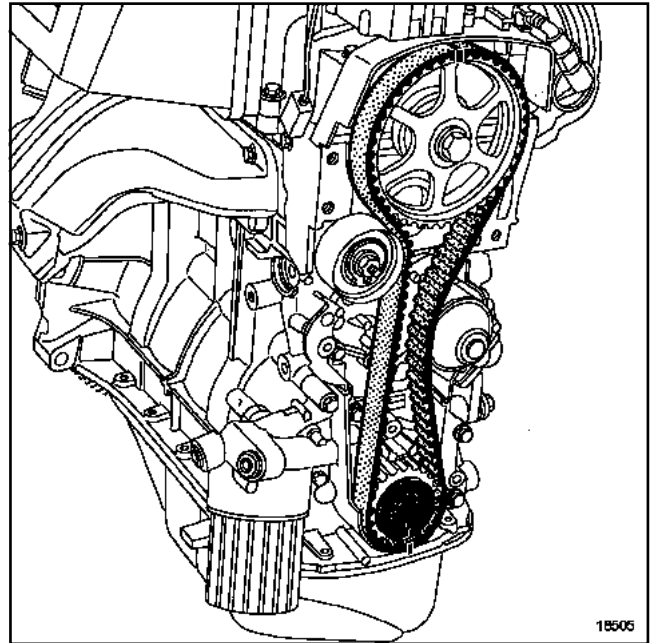
## Timing - cylinder head: Refitting

D4D, and 700 or 712 or 720 – D4F, and 702 or 706 or 708 or 712 or 714 or 716 or 722 or 728 or 730 or 740



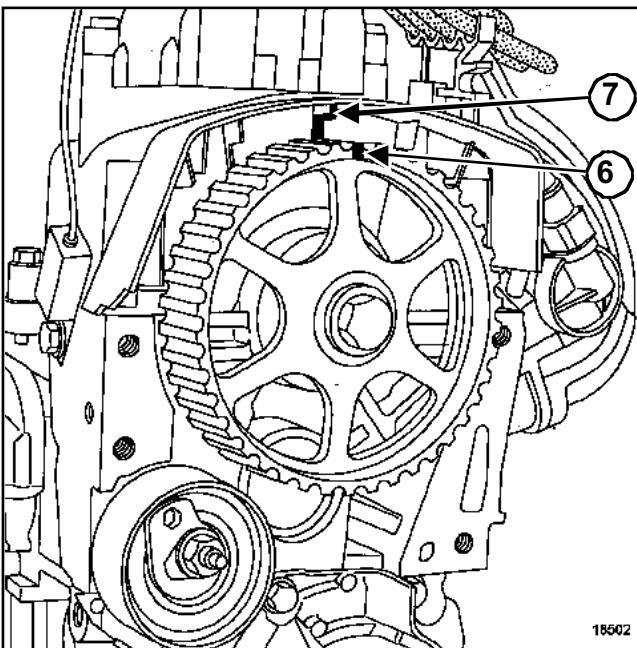
18501  
18501

- ❑ The crankshaft sprocket (4) should be aligned at fixed mark (5) on the oil pump body.



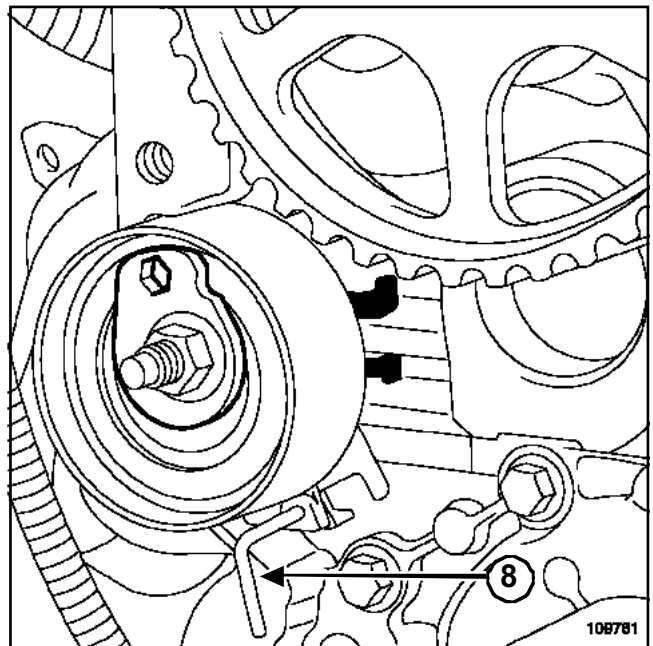
18505  
18505

- ❑ Fit the crankshaft accessories pulley and its retaining washer.
- ❑ Torque tighten the **crankshaft accessories pulley to 15 Nm**
- ❑ Fit the timing belt aligning the belt marks with the crankshaft sprocket and the camshaft pulley.
- ❑ Remove the TDC pin (Mot. 1054).



18502  
18502

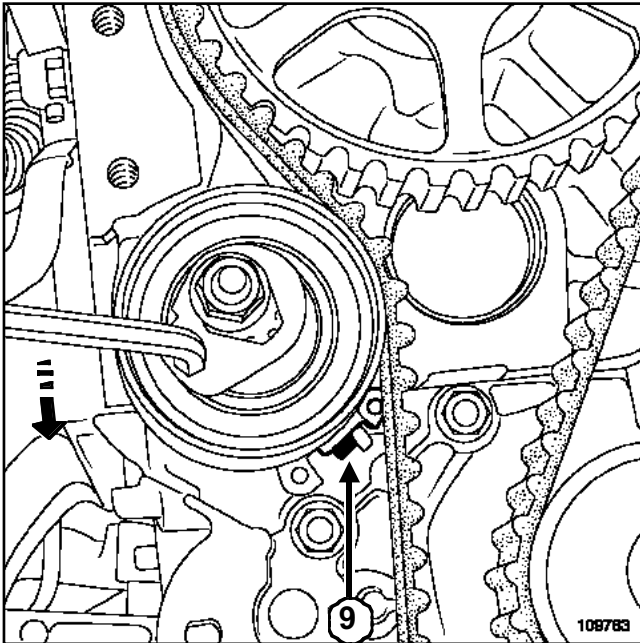
- ❑ Refit the rocker cover with four mounting bolts (to check the alignment with the camshaft pulley).
- ❑ Align the camshaft pulley mark (6) with fixed mark (7) on the rocker cover using tool (Mot. 799-01).



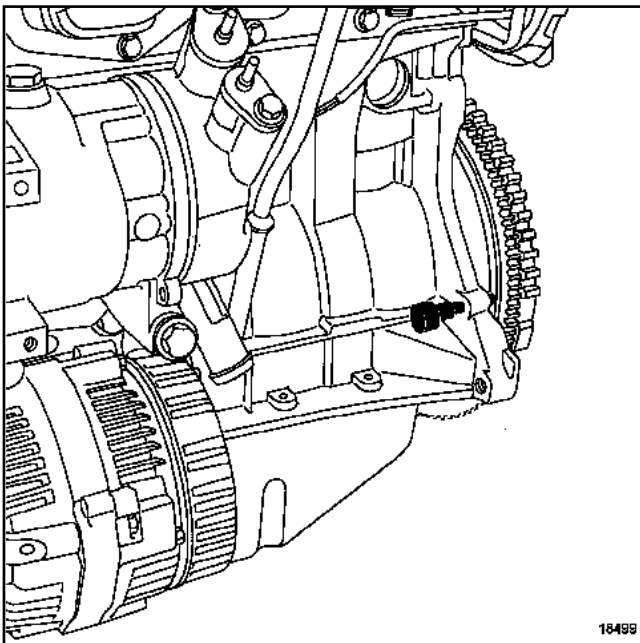
108781  
109761

- ❑ Remove the timing tensioner wheel pin (8).

D4D, and 700 or 712 or 720 – D4F, and 702 or 706 or 708 or 712 or 714 or 716 or 722 or 728 or 730 or 740

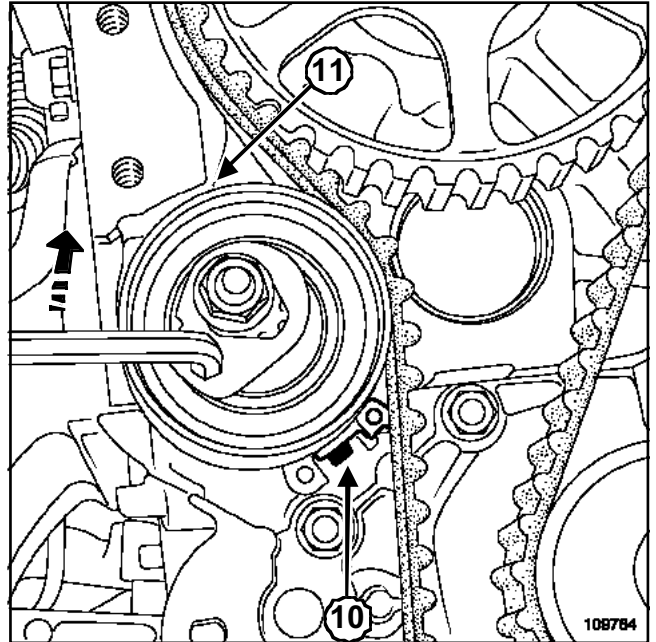


- Turn the tensioner wheel eccentric using a **6 mm** Allen key in an anti-clockwise direction.
- Move the moving tensioner wheel index (**9**) to the position indicated above.
- Tighten to torque the **timing tensioner, (24 Nm)**.
- Rotate the crankshaft through six revolutions in a clockwise direction (timing side).



- Insert the TDC pin (Mot. 1054).
- Turn the crankshaft to the setting point.

- Check that the camshaft and crankshaft markings are correctly aligned with the fixed markings.
- Remove the TDC setting rod. (Mot. 1054).



- Loosen the tensioner wheel nut holding it with a **6 mm** Allen key.
- Return the moving index (**10**) of the tensioner wheel in a clockwise direction to the position indicated above.

### WARNING

There should be a gap of approximately **5 mm** between the tensioner wheel and the edge of the cylinder head (**11**).

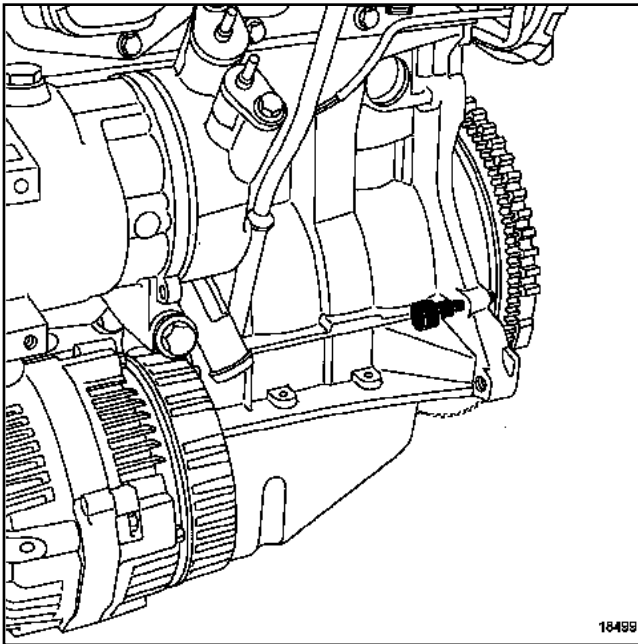
If the tensioner wheel is in contact with the edge of the cylinder head, restart the belt tensioning procedure.

- Torque tighten the **timing tensioner wheel to 24 Nm**.

## Timing - cylinder head: Refitting

D4D, and 700 or 712 or 720 – D4F, and 702 or 706 or 708 or 712 or 714 or 716 or 722 or 728 or 730 or 740

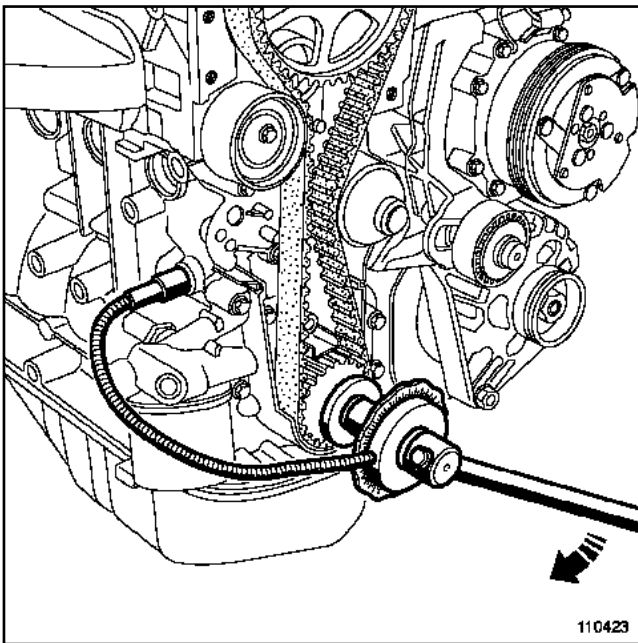
### 2 - Setting the valve clearances



18499

18499

- Check that the crankshaft is at its setting point with tool (Mot. 1054)
- Remove the rocker cover.

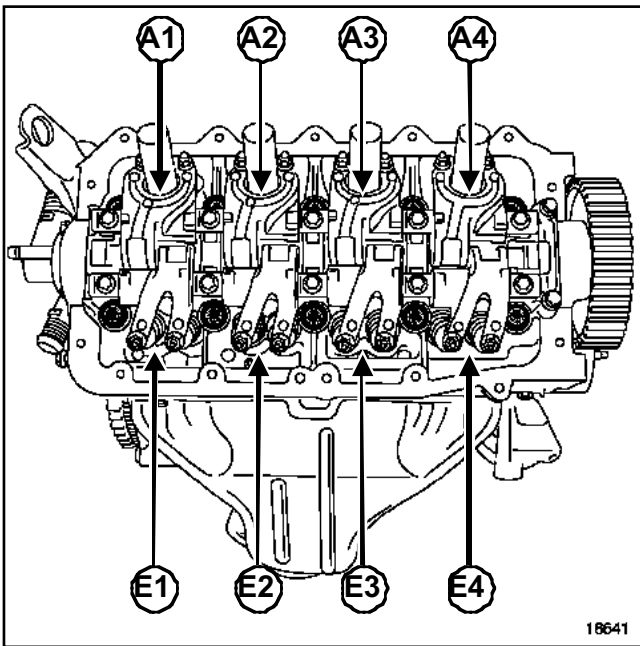


110423

110423

- Fit tool **angular tightening wrench** to the crankshaft accessories pulley bolt.

D4D, and 700 or 712 or 720 – D4F, and 702 or 706 or 708 or 712 or 714 or 716 or 722 or 728 or 730 or 740

18641  
18641

- (I1): Inlet cylinder 1,
  - (I2): Exhaust cylinder 2,
  - (I3): Exhaust cylinder 3,
  - (I4): Exhaust cylinder 4.
  - (E1): Exhaust cylinder 1,
  - (E2): Exhaust cylinder 2,
  - (E3): Exhaust cylinder 3,
  - (E4): Exhaust cylinder 4.
- Setting 1:
    - Position tool **angular tightening wrench** at  $0^\circ$ ,
    - Turn the crankshaft  $20^\circ$  in a clockwise direction (timing end),
    - Adjust the exhaust valve clearance **E1** and **E3** to  $0.15 \pm 0.05$  mm.
  - Setting 2:
    - Position tool **angular tightening wrench** to  $0^\circ$ ,
    - Turn the crankshaft  $240^\circ$  in a clockwise direction (timing end),
    - Adjust the inlet valve clearances **I1** and **I3** to  $0.10 \pm 0.05$  mm.
  - Setting 3:
    - Position tool **angular tightening wrench** at  $0^\circ$ ,
    - Rotate the crankshaft  $120^\circ$  in a clockwise direction (timing end),
    - Adjust the exhaust valve clearances **E2** and **E4** to  $0.15 \pm 0.05$  mm.

## □ Setting 4:

- Position tool **angular tightening wrench** at  $0^\circ$ ,
- Rotate the crankshaft  $240^\circ$  in a clockwise direction (timing end),
- Adjust the inlet valve clearances **I2** and **I4** to  $0.10 \pm 0.05$  mm.

## □

**WARNING**

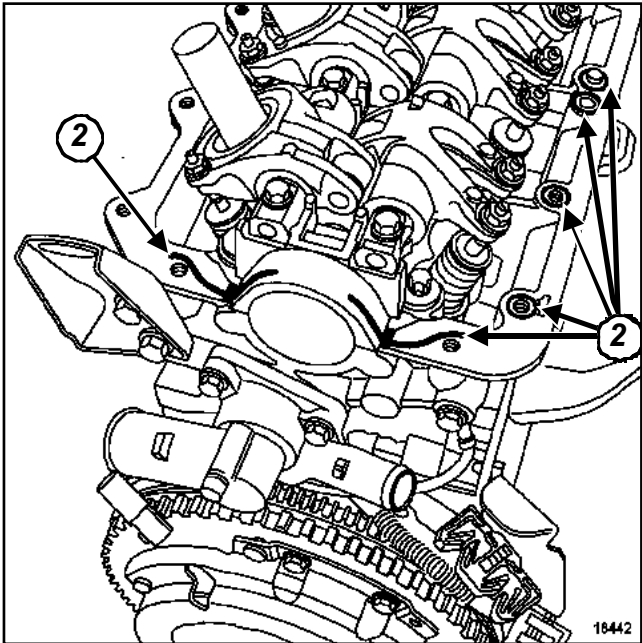
The cylinder head and rocker cover sealing faces must be clean, dry and free from grease (avoid finger marks).

**WARNING**

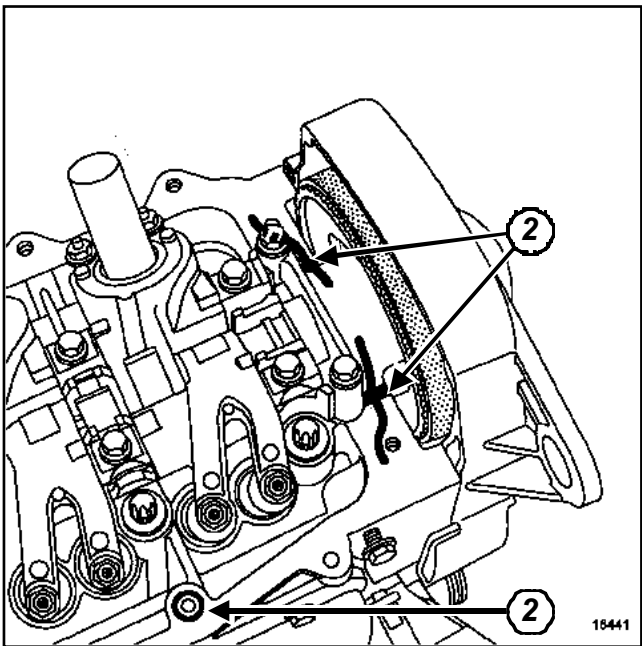
Excess sealant could be squeezed out when the parts are tightened. The sealing compound/fluid mixture can cause damage to certain components (engine, radiator, etc.).

## Timing - cylinder head: Refitting

D4D, and 700 or 712 or 720 – D4F, and 702 or 706 or 708 or 712 or 714 or 716 or 722 or 728 or 730 or 740



18442

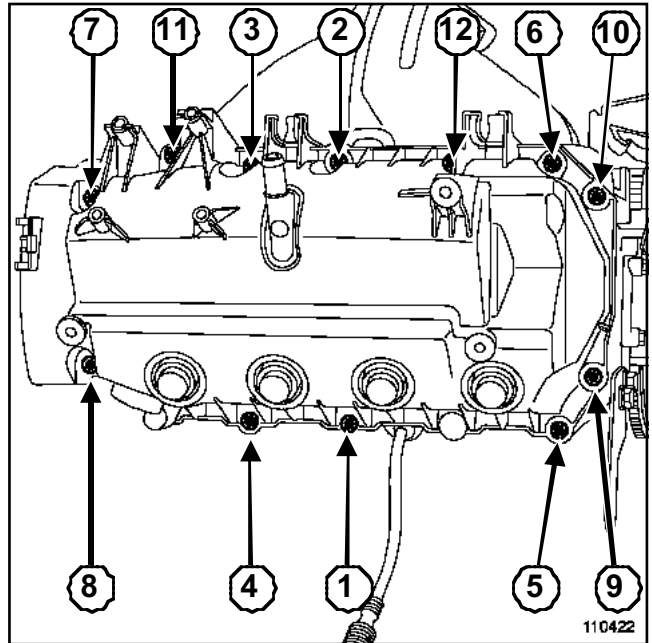


18441

- Apply beads (2) of **RHODORSEAL 5661** around the rocker cover mounting bolts and on bearings no. 1 and 5 of the camshaft.

- Refit the rocker cover, fitted with a new gasket.

D4F, and 708 or 722 or 740



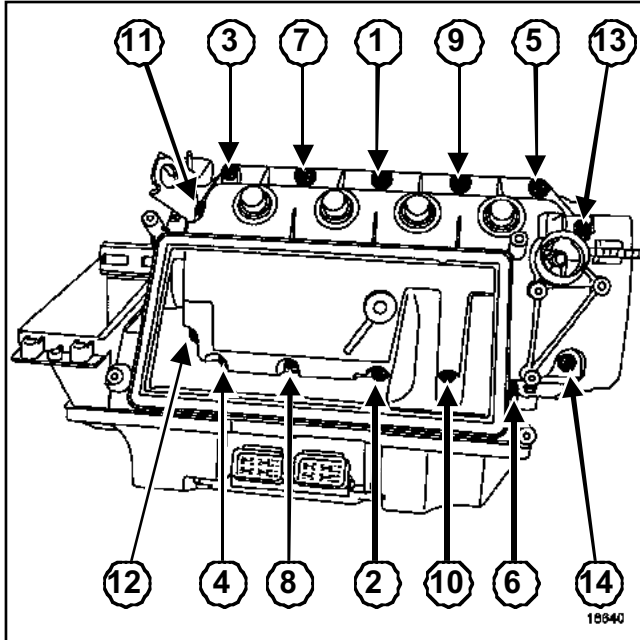
110422

- Tighten to torque and in order the **rocker cover bolts (12 Nm)**.

## Timing - cylinder head: Refitting

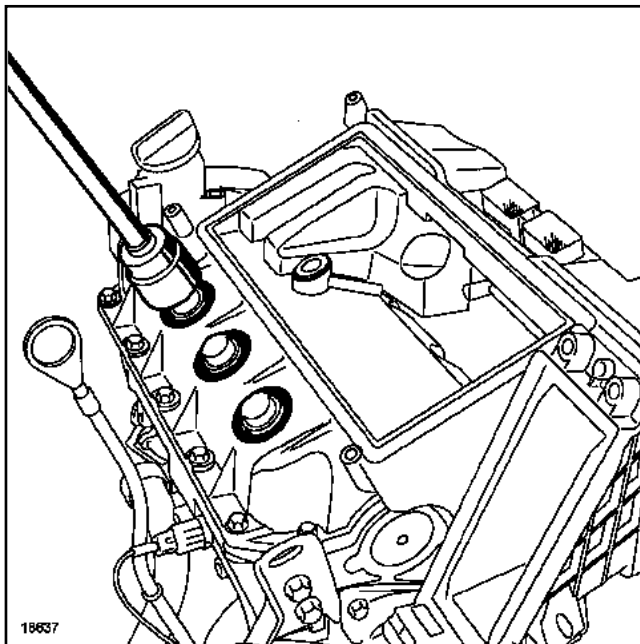
D4D, and 700 or 712 or 720 – D4F, and 702 or 706 or 708 or 712 or 714 or 716 or 722 or 728 or 730 or 740

D4D, and 712 – D4F, and 702 or 706 or 712 or 714 or 716 or 728 or 730



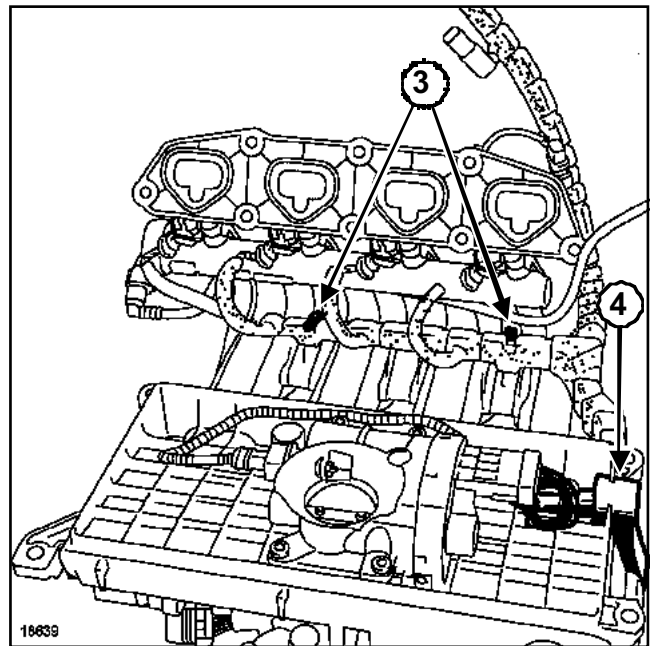
18640

- Tighten to torque and in order the **rocker cover bolt to 12 Nm**.



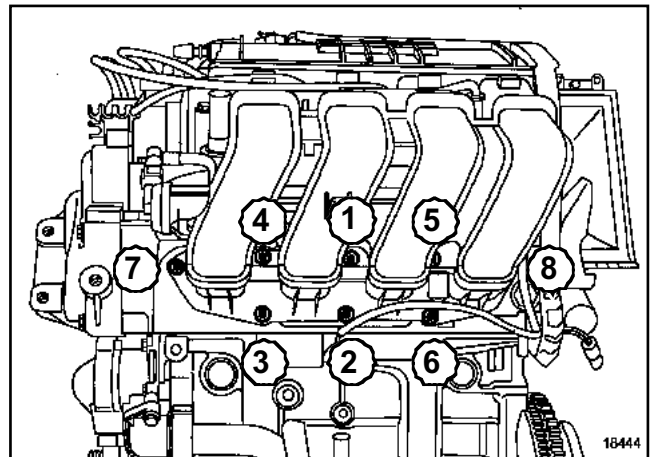
18637

- Refit the spark plug well seals using a socket with an external diameter of **41 mm (32 mm socket for example)**.



18639

- Before refitting the inlet manifold, check that the wiring harness is correctly positioned at (3) and (4).
- Replace the inlet manifold seals.
- Offer up the inlet manifold.
- Apply a bead of **LOCTITE FRENATANCH** on the inlet manifold bolts.



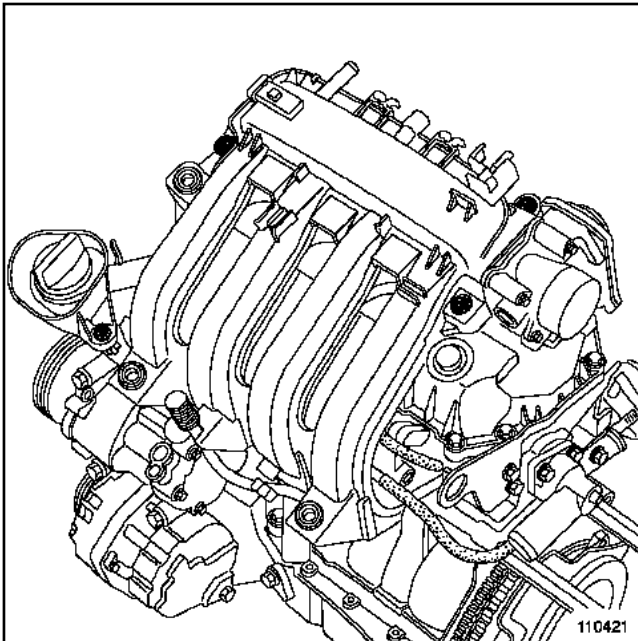
18444

- Screw in the eight bolts finger tight.
- Pretighten bolts (4) and (5) to **6 Nm**.
- Completely loosen bolts (4) and (5).
- Tighten to torque and in order the **inlet manifold / cylinder head bolts (10 Nm)**.

## Timing - cylinder head: Refitting

D4D, and 700 or 712 or 720 – D4F, and 702 or 706 or 708 or 712 or 714 or 716 or 722 or 728 or 730 or 740

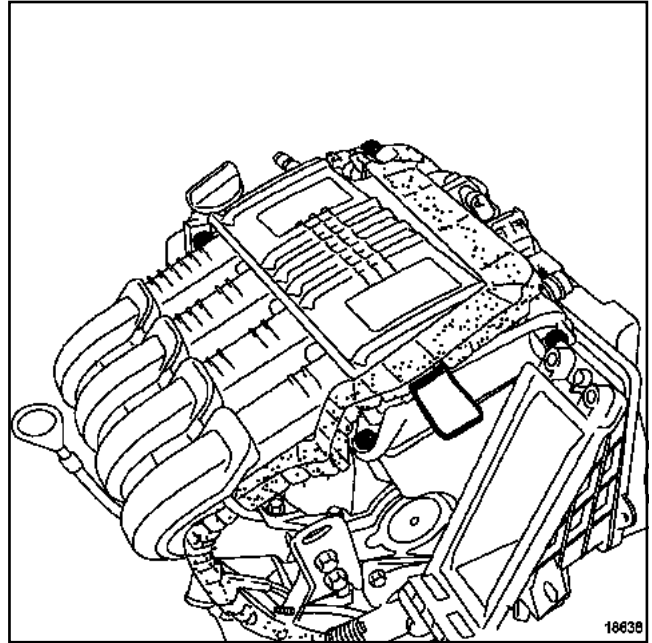
D4F, and 708 or 722 or 740



110421

- Cross tighten to torque the inlet manifold / rocker cover bolts (8 Nm).

D4D, and 712 – D4F, and 702 or 706 or 712 or 714 or 716 or 728 or 730

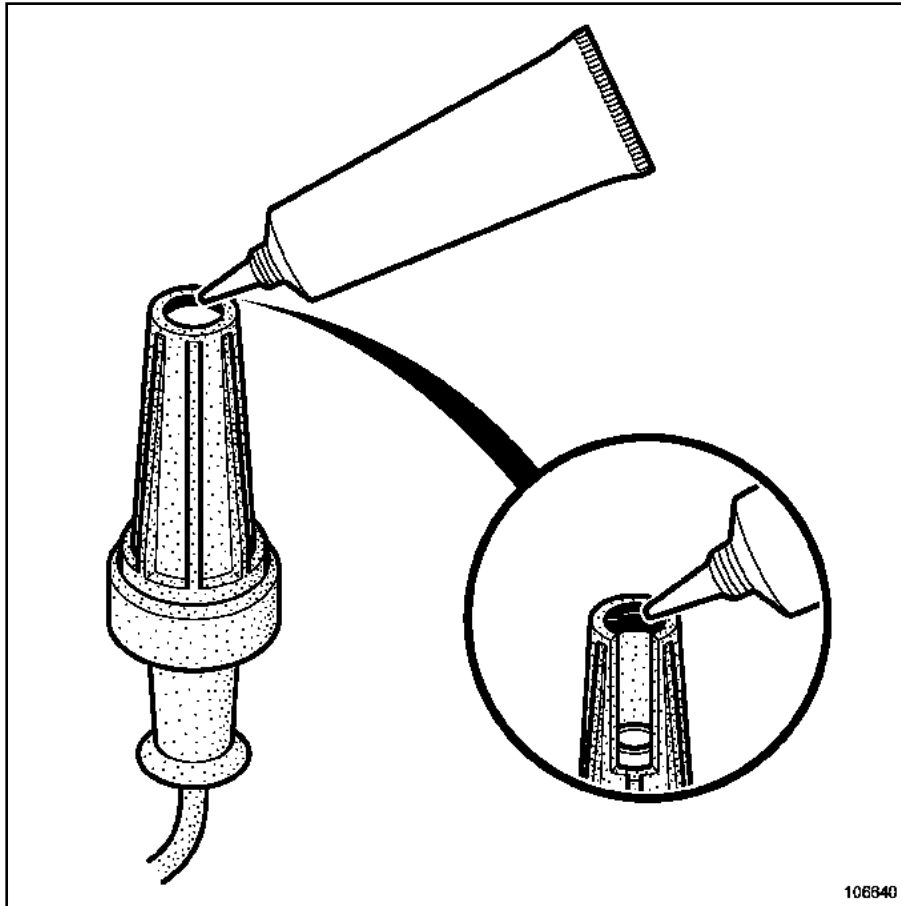


18638

18638

- Cross tighten to torque the inlet manifold / rocker cover bolts to 8 Nm.

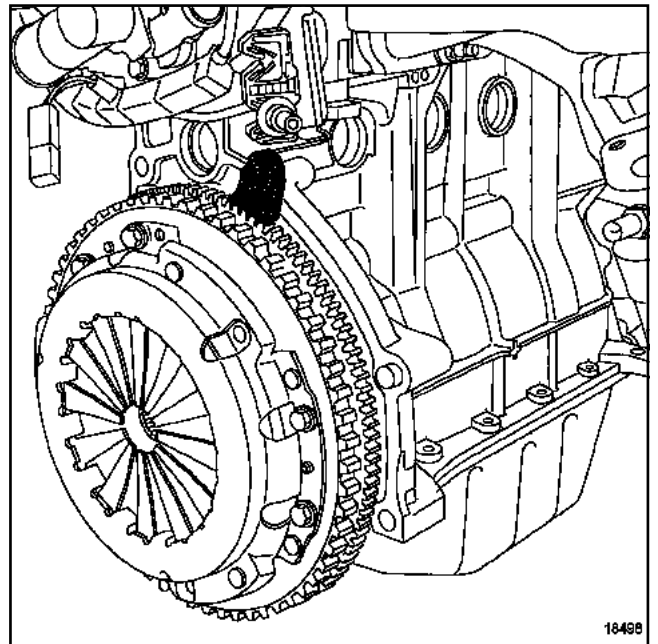
D4D, and 700 or 712 or 720 – D4F, and 702 or 706 or 708 or 712 or 714 or 716 or 722 or 728 or 730 or 740



106640

106640

- ❑ Place a bead of **fluoride grease** 2 mm in diameter on the periphery of the high voltage caps.
- ❑ Refit the ignition coil assembly with spark plug leads.
- ❑ Check that the spark plug leads are correctly paired with the ignition coil.



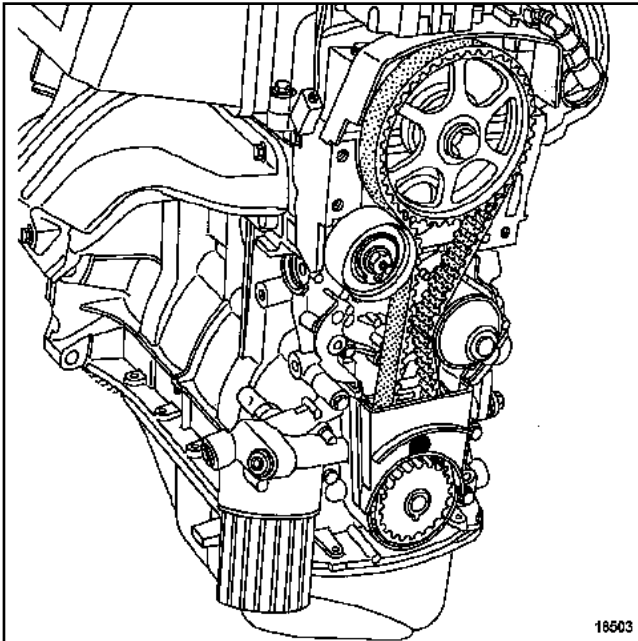
16498

18498

- ❑ Fit the flywheel immobiliser tool. (Mot. 582-01).

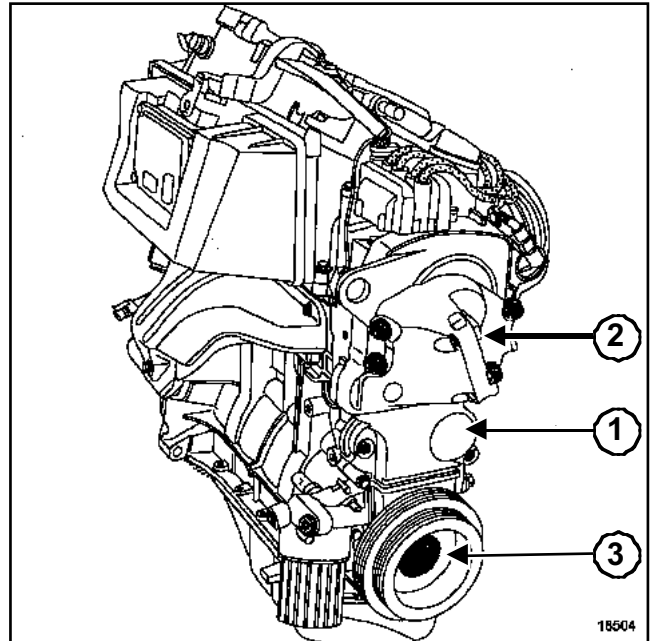
## Timing - cylinder head: Refitting

D4D, and 700 or 712 or 720 – D4F, and 702 or 706 or 708 or 712 or 714 or 716 or 722 or 728 or 730 or 740



18503

- Refit the lower timing cover.



18504

- Refit the timing intermediate housing (1).
- Tighten to torque the **intermediate timing housing bolts (10 Nm)**.
- Refit the upper timing cover (2)
- Tighten to torque the **upper timing cover bolt (33 Nm)**.
- Refit the crankshaft accessories pulley.
- Refit, using a new bolt, the crankshaft accessories pulley (3).
- Tighten to torque the **crankshaft accessories pulley bolts (40 Nm + 70° ± 6°)**.

### III - REFITTING THE ACCESSORIES BELT (ON ENGINES MOUNTED AT THE CLUTCH END)

- 

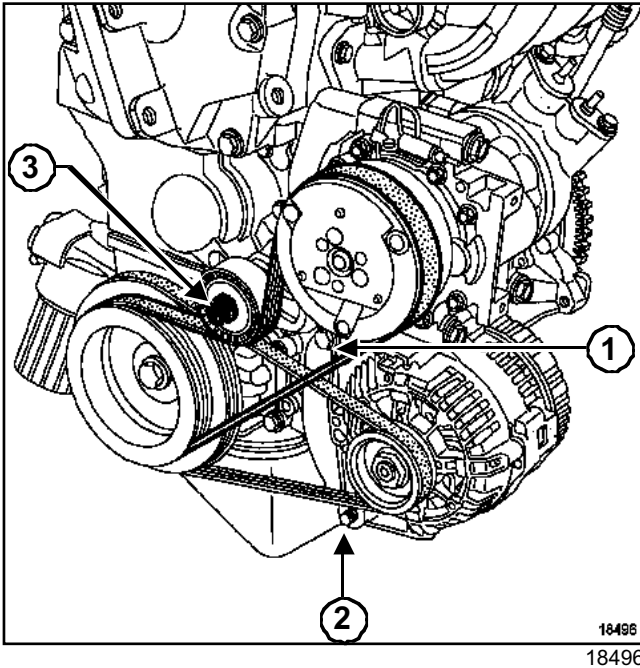
#### WARNING

Replace any belt removed with a new one.

#### WARNING

When replacing the belt, be sure to replace the tension wheels and idler pulleys.

D4D, and 700 or 712 or 720 – D4F, and 702 or 706 or 708 or 712 or 714 or 716 or 722 or 728 or 730 or 740



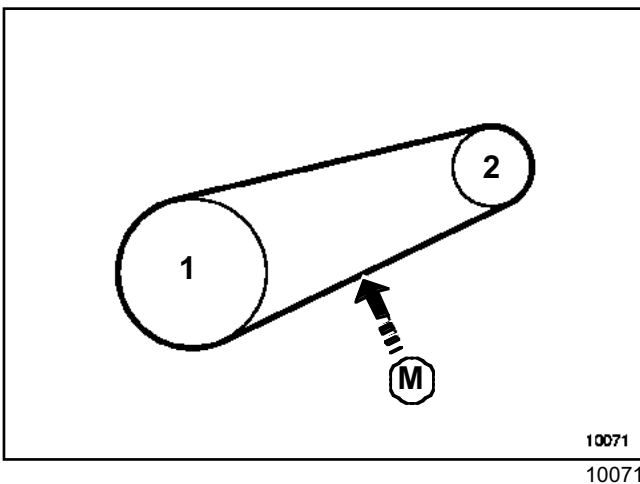
□ Refit:

- a new tensioner wheel
- a new tensioner wheel mounting bolt,
- new accessories belts.

- Apply and check the accessories belt tension using tool (Mot. 1715) or (Mot. 1505).

### Accessories belt tension values

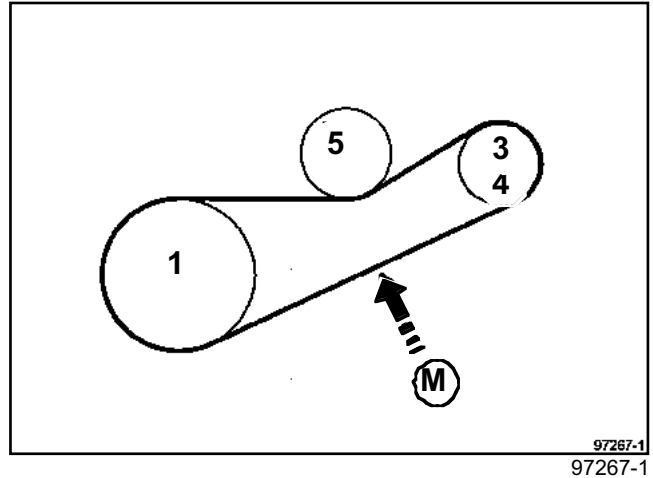
#### Alternator



- (1) Crankshaft  
 (2) Alternator  
 (M) Measuring point

- Fitting tension (Hertz): **260 ± 5**

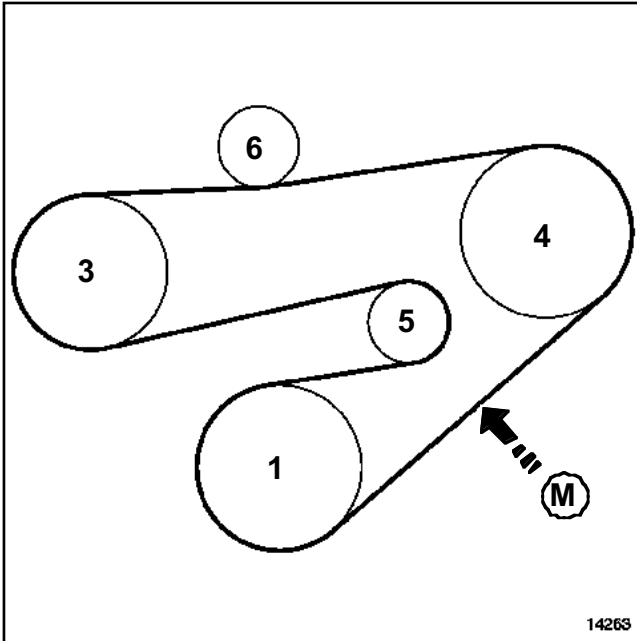
#### Air conditioning compressor / Power assisted steering pump



- (1) Crankshaft  
 (3) Power assisted steering pump  
 (4) Air conditioning compressor  
 (5) Tension wheel  
 (M) Measuring point  
 - Fitting tension (Hertz): **210 ± 5**

D4D, and 700 or 712 or 720 – D4F, and 702 or 706 or 708 or 712 or 714 or 716 or 722 or 728 or 730 or 740

## Air conditioning compressor / Power assisted steering pump

14263  
14263

- (1) Crankshaft
- (3) Power assisted steering pump
- (4) Air conditioning compressor
- (5) Tension wheel
- (6) Pulley
- (M) Measuring point
  - Fitting tension (Hertz):  $210 \pm 5$
- Tighten to torque:
  - the **alternator upper bolt (25 Nm)** at (1),
  - the **alternator lower mounting bolt (50 Nm)** at (2).
- Tighten to torque the **tension wheel bolts (37 Nm)** at (3).
- Rotate the crankshaft twice to correctly position the accessories belt.
- Check the accessories belt tension, readjust if necessary.

## Engine: Refitting

D4D, and 700 or 712 or 720 – D4F, and 702 or 706 or 708 or 712 or 714 or 716 or 722 or 728 or 730 or 740

### Essential special tooling

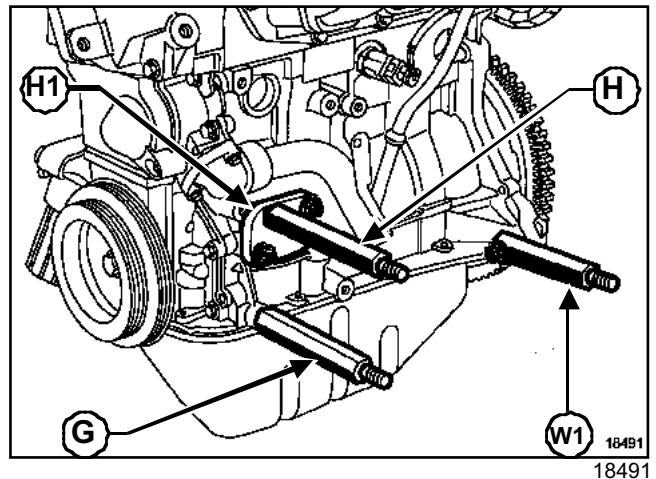
<b>Mot. 792-03</b>	Engine mounting plate for Desvil stand
<b>Mot. 1360-01</b>	W1 pin, replaces W pin of Mot.1360.
<b>Mot. 1715</b>	Belt tension setting tool (frequency meter)
<b>Mot. 1505</b>	Belt tension setting tool (frequency meter)

### Tightening torques

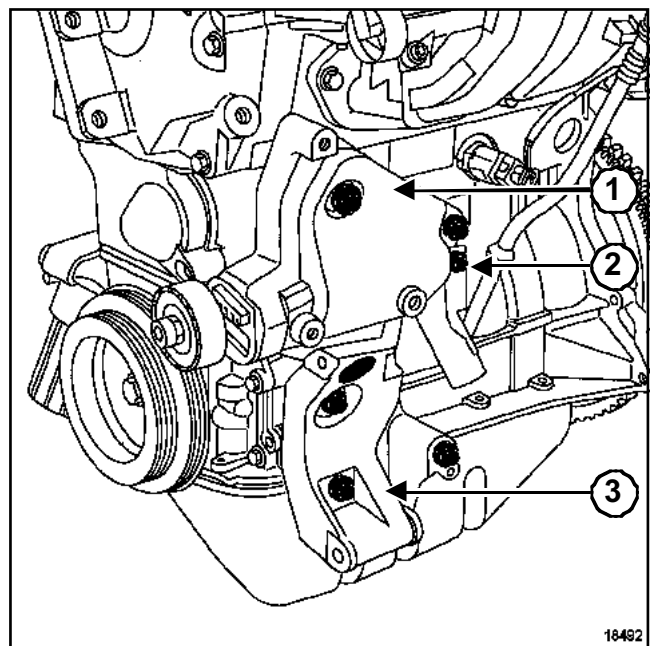
air conditioning compressor bolts	<b>25 Nm</b>
coolant inlet pipe bolt	<b>10 Nm</b>
alternator mounting bolt	<b>25 Nm</b>
air conditioning compressor bolts	<b>50 Nm</b>
power assisted steering mounting bolts	<b>25 Nm</b>
power assisted steering pump bolt	<b>22 Nm</b>
alternator upper bolt	<b>25 Nm</b>
alternator lower mounting bolt	<b>50 Nm</b>
tension wheel bolts	<b>37 Nm</b>

### I -ENGINE SECURED BY THE ACCESSORIES END

- Remove the engine from the support (Mot. 792-03).



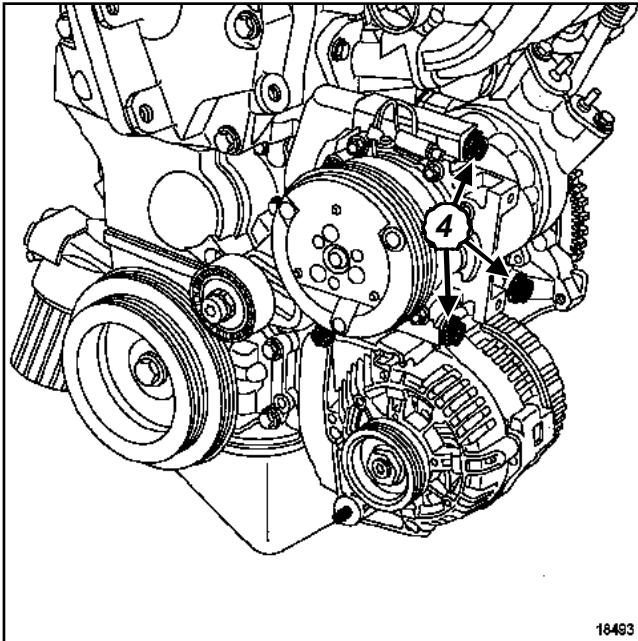
- Remove the studs **G,H** and **W1** and the plate **H1** of tool (Mot. 1360-01) (including the rod **W1** and the plate **H1**).



- Refit:
  - the coolant inlet pipe with a new O-ring,
  - the air conditioning compressor mounting (1).
- Tighten to torque.
- Tighten to torque:
  - the **air conditioning compressor bolts (25 Nm)**,
  - the **coolant inlet pipe bolt (10 Nm)** at (2).
- Refit the alternator mounting (3).
- Tighten to torque the **alternator mounting bolt (25 Nm)**.

## Engine: Refitting

D4D, and 700 or 712 or 720 – D4F, and 702 or 706 or 708 or 712 or 714 or 716 or 722 or 728 or 730 or 740



18493  
18493

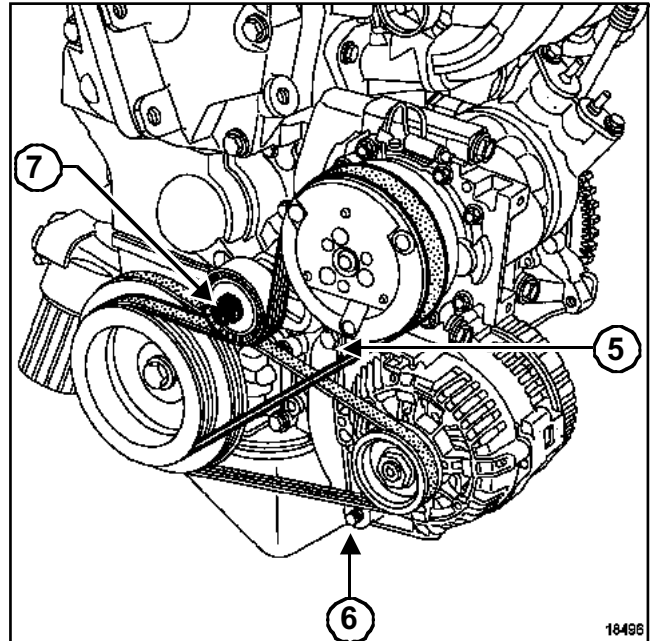
- Refit the alternator.
- Do not tighten the alternator mounting bolts.
- Refit the air conditioning compressor.
- Tighten to torque the **air conditioning compressor bolts (50 Nm)** at (4).
- Refit the power assisted steering mounting (if the engine has one).
- Tighten to torque:
  - the **power assisted steering mounting bolts (25 Nm)**,
  - the **power assisted steering pump bolt (22 Nm)**.

### WARNING

Replace any belt removed with a new one.

### WARNING

When replacing the belt, be sure to replace the tension wheels and idler pulleys.

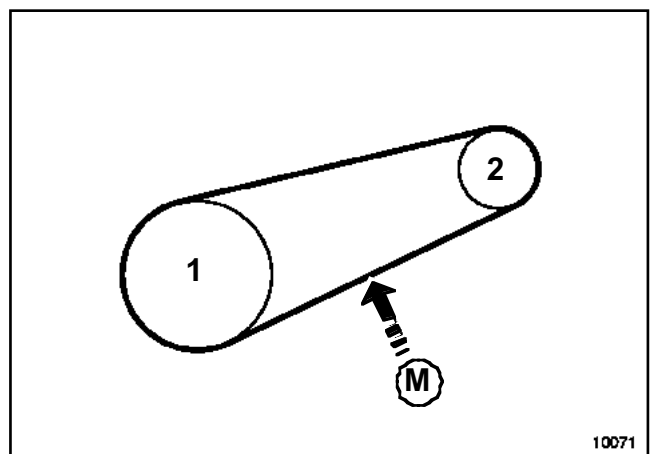


18496  
18496

- Refit:
  - a new tensioner wheel
  - a new tensioner wheel mounting bolt,
  - new accessories belts.
- Apply and check the accessories belt tension using tool (Mot. 1715) or (Mot. 1505).

### Accessories belt tension values

#### Alternator

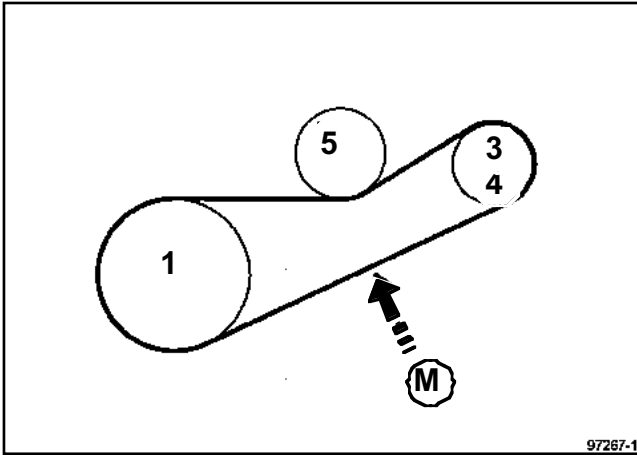


10071  
10071

- (1) Crankshaft
- (2) Alternator
- (M) Measuring point
- Fitting tension (Hertz): **260 ± 5**

D4D, and 700 or 712 or 720 – D4F, and 702 or 706 or 708 or 712 or 714 or 716 or 722 or 728 or 730 or 740

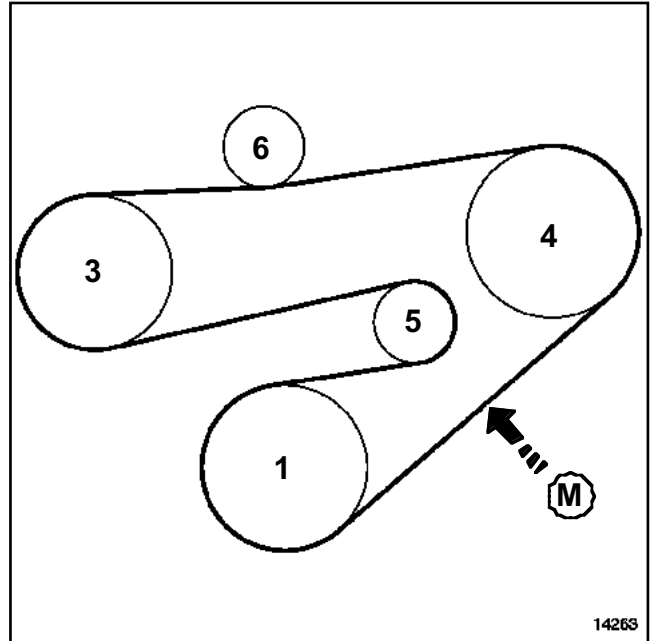
### Air conditioning compressor / Power assisted steering pump



97267-1  
97267-1

- (1) Crankshaft
- (3) Power assisted steering pump
- (4) Air conditioning compressor
- (5) Tension wheel
- (M) Measuring point
- Fitting tension (Hertz):  $210 \pm 5$

### Air conditioning compressor / Power assisted steering pump



14263  
14263

- (1) Crankshaft
- (3) Power assisted steering pump
- (4) Air conditioning compressor
- (5) Tension wheel
- (6) Pulley
- (M) Measuring point
- Fitting tension (Hertz):  $210 \pm 5$
- Tighten to torque:
  - the **alternator upper bolt (25 Nm)** at (5),
  - the **alternator lower mounting bolt (50 Nm)** at (6)
- Tighten to torque the **tension wheel bolts (37 Nm)** at (7)
- Rotate the crankshaft twice to correctly position the accessories belt.
- Check the accessories belt tension, otherwise, readjust.

### II - ENGINE SECURED AT THE CLUTCH END

- Remove:
  - the engine from the plate support tool (**Mot. 1723**).
  - the studs from the cylinder block.

## Timing belt: Removal

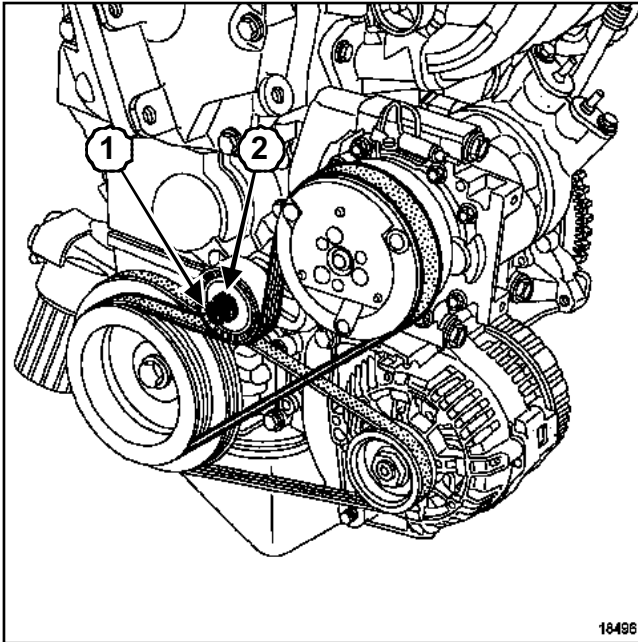
D4D, and 700 or 712 or 720 – D4F, and 702 or 706 or 708 or 712 or 714 or 716 or 722 or 728 or 730 or 740

### Essential special tooling

Mot. 1054

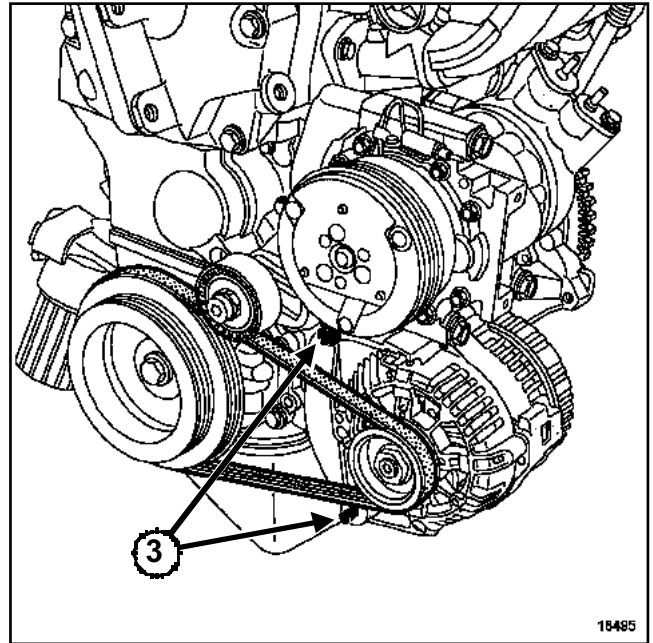
TDC setting pin

### I - REMOVING THE ACCESSORIES BELT



18496  
18496

- Loosen tensioner bolt (1).
- Turn the hexagon bolt (2) in a clockwise direction.
- Remove the air conditioning compressor accessories belt.

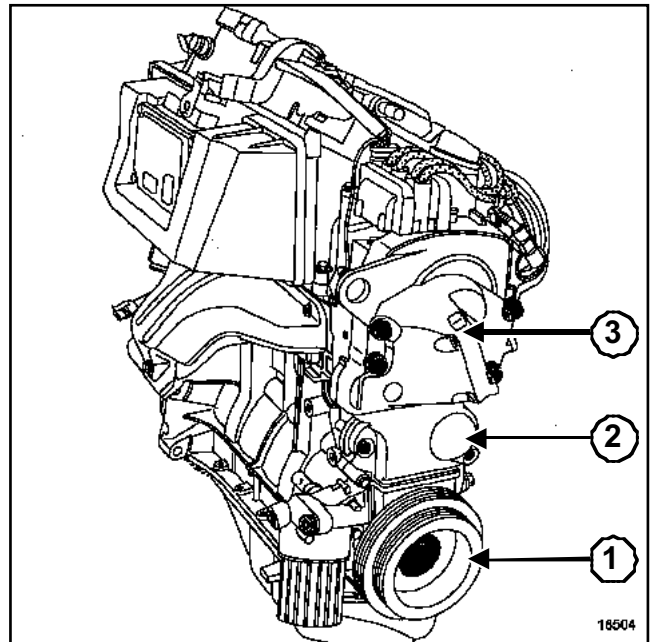


18495  
18495

- Loosen alternator bolts (3).
- Remove the alternator accessories belt.

### II - REMOVING THE TIMING

- Insert a large screwdriver to immobilise the flywheel.

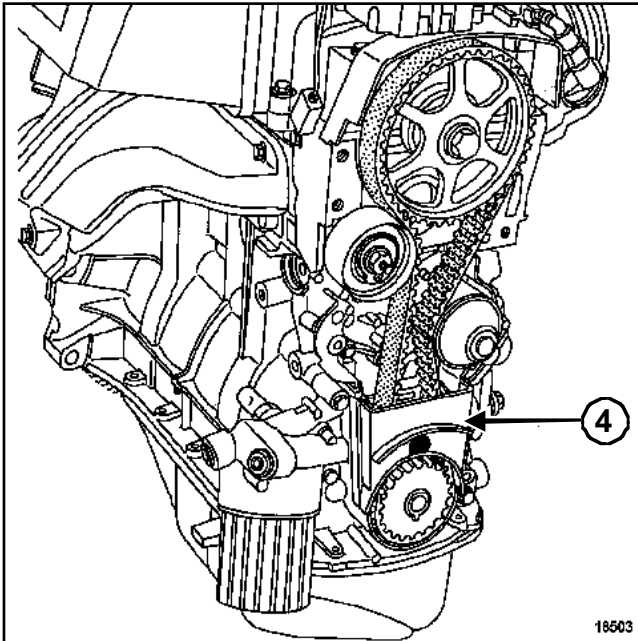


18504  
18504

- Remove:
  - the crankshaft accessories pulley (1),
  - the timing intermediate housing (2),
  - the timing upper housing (3)

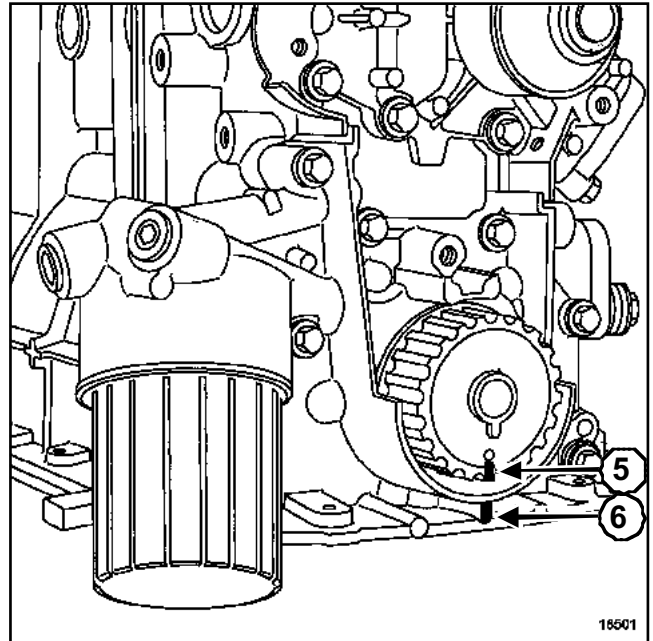
## Timing belt: Removal

D4D, and 700 or 712 or 720 – D4F, and 702 or 706 or 708 or 712 or 714 or 716 or 722 or 728 or 730 or 740



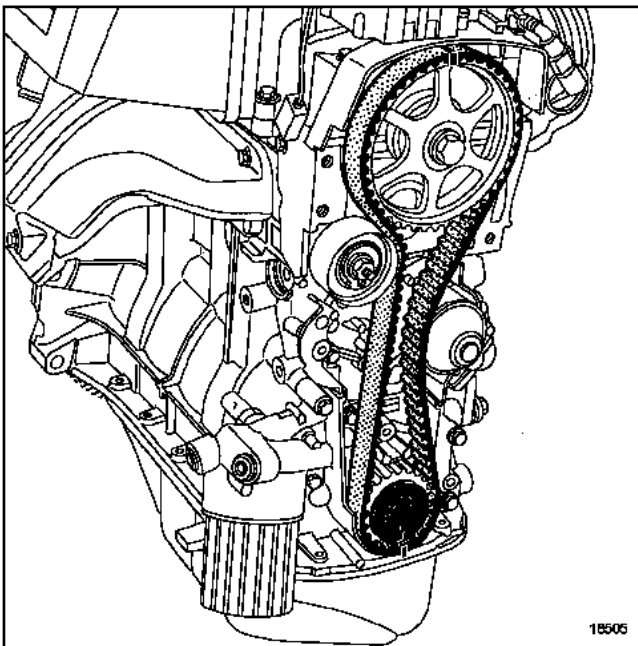
18503

- ❑ Remove the lower housing.(4)



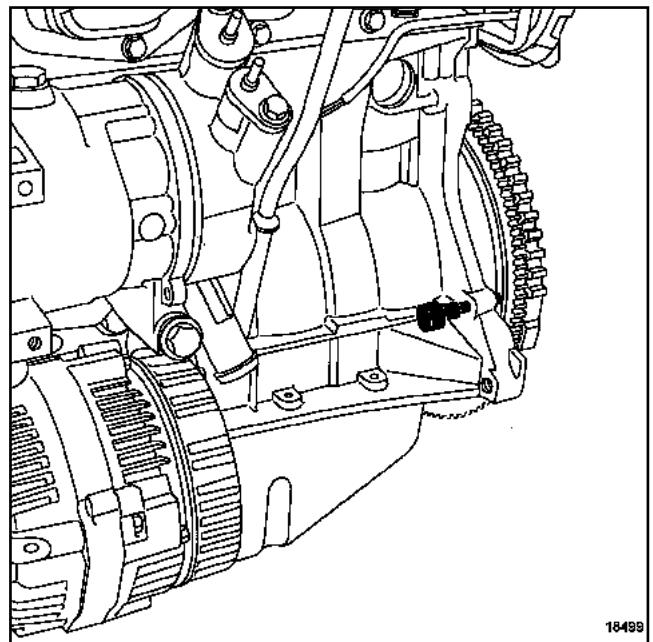
18501

- ❑ Rotate the crankshaft in its operating direction (clockwise, timing end) to position the crankshaft sprocket mark (5) one half-tooth before the alignment of fixed mark (6) on the oil pump body.



18505

- ❑ Refit the crankshaft accessories pulley bolt and its retaining washer.

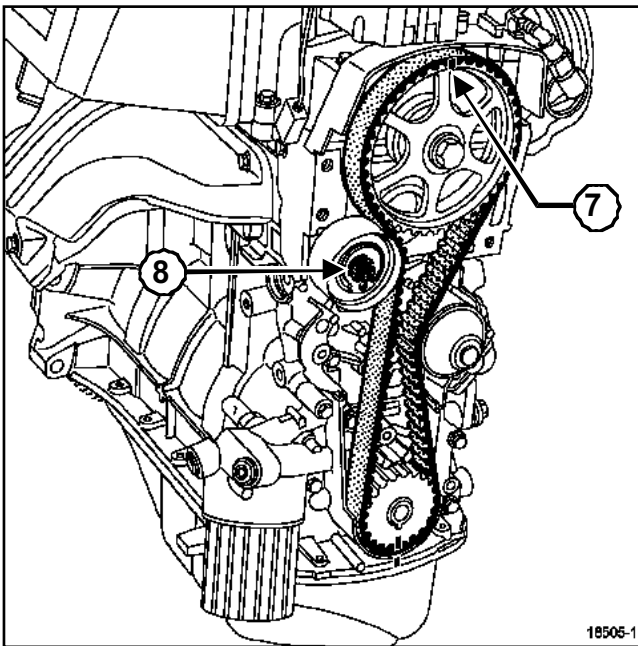


18499

- ❑ Insert the TDC pin (Mot. 1054).
- ❑ Rotate the crankshaft to the setting point.

## Timing belt: Removal

D4D, and 700 or 712 or 720 – D4F, and 702 or 706 or 708 or 712 or 714 or 716 or 722 or 728 or 730 or 740



18505-1

- Check that mark (7) of the camshaft pulley is vertical to the engine and aligned with the rocker cover mark.
- Loosen the timing tension wheel nut (8).
- Remove:
  - the timing belt,
  - the timing tension wheel,
  - the crankshaft sprocket,

## Timing belts: Refitting

There are three distinct tension procedures that must be observed, according to the engine family.

Some engines require:

- a pretensioning torque to be applied (using the special tooling for the engine type) to the belt section to be measured to compensate for all the belt play.
- a **pre-stress T1** slightly greater than the **final fitting tension T2** to be applied.

The purpose of these two operations is to stabilise the belt's internal voltage, to make a reliable tension measurement.

**WARNING**

Replace any removed belt.

**WARNING**


When replacing the timing belt specified by the manufacturer, the belt, tension wheel and pulley(s) must be replaced.

**I -NO PRETENSIONING TORQUE****II - WITH PRETENSIONING TORQUE****III - WITH PRETENSIONING TORQUE AND PRE-STRESS**

## Timing belts: Refitting

D4D, and 700 or 712 or 720 – D4F, and 702 or 706 or 708 or 712 or 714 or 716 or 722 or 728 or 730 or 740

Essential special tooling	
<b>Mot. 1054</b>	TDC setting pin
<b>Mot. 799-01</b>	Tool for locking sprockets on toothed timing belt
<b>Mot. 582-01</b>	Flywheel locking tool (K engines)
<b>Mot. 1715</b>	Belt tension setting tool (frequency meter)
<b>Mot. 1505</b>	Belt tension setting tool (frequency meter)

Tightening torques 	
timing tensioner,	<b>24 Nm</b>
intermediate timing housing bolts	<b>10 Nm</b>
upper timing cover bolt	<b>33 Nm</b>
crankshaft accessories pulley bolts	<b>40 Nm + 70° ± 6°</b>
alternator upper bolt	<b>25 Nm</b>
alternator lower mounting bolt	<b>50 Nm</b>
tension wheel bolts	<b>37 Nm</b>

### I -REFITTING THE TIMING BELT



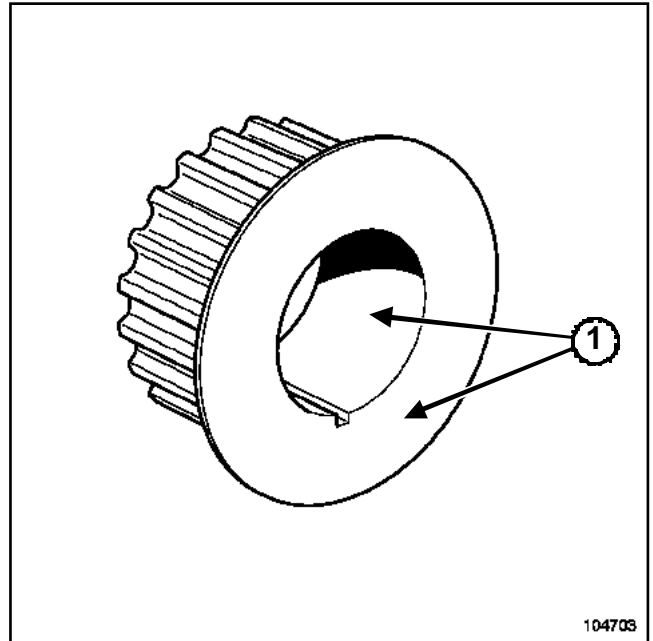
#### WARNING

The following parts must be replaced with new ones after being removed:

- the belt (distribution and accessories),
- the crankshaft accessories pulley bolt.

#### WARNING

When replacing the belt, be sure to replace the tension wheels and idler pulleys.



104703

104703



#### Note:

Be sure to degrease:

- the end of the crankshaft (timing end),
- the timing sprocket bearing faces and bore at (1),
- the contact surfaces of the crankshaft accessories pulley.

#### WARNING

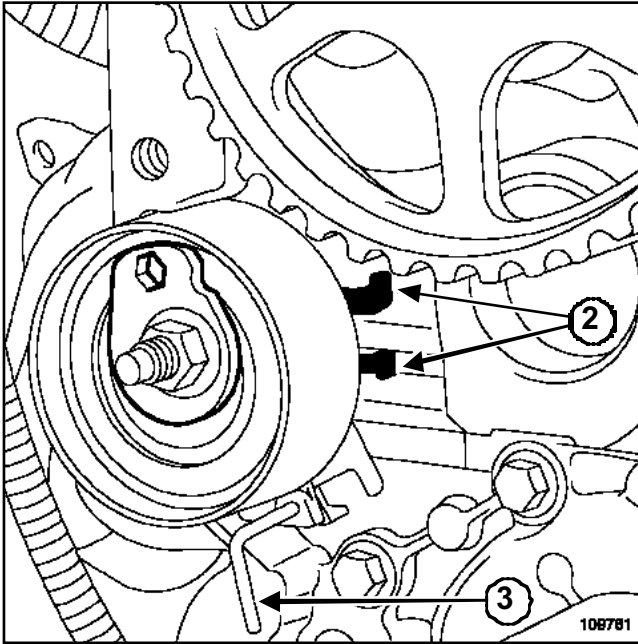
Never turn the engine against its operating direction.

- Refit the crankshaft sprocket.

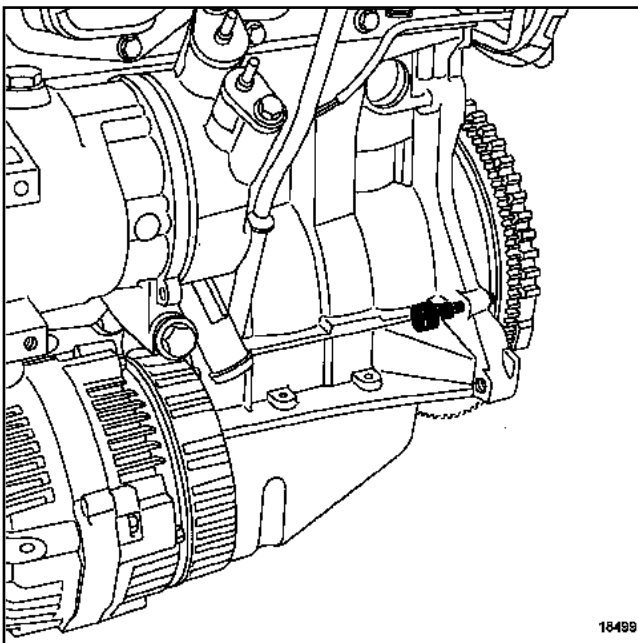
## Timing belts: Refitting

D4D, and 700 or 712 or 720 – D4F, and 702 or 706 or 708 or 712 or 714 or 716 or 722 or 728 or 730 or 740

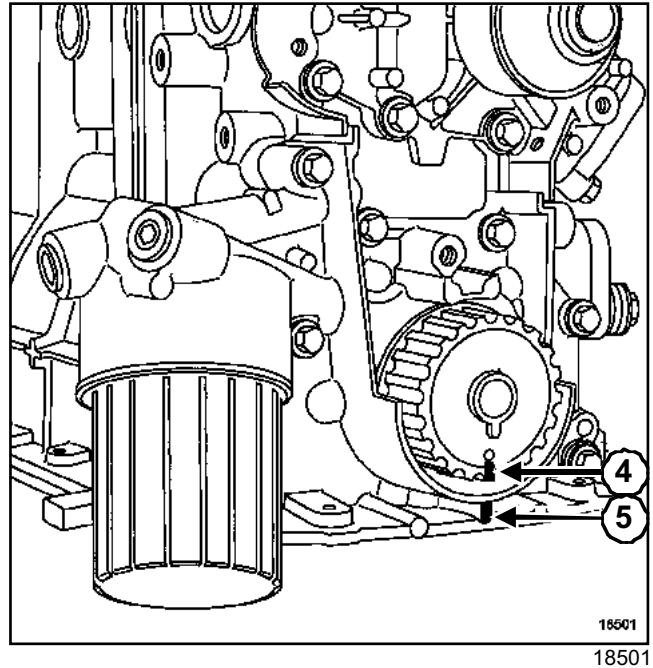
### Adjusting the timing



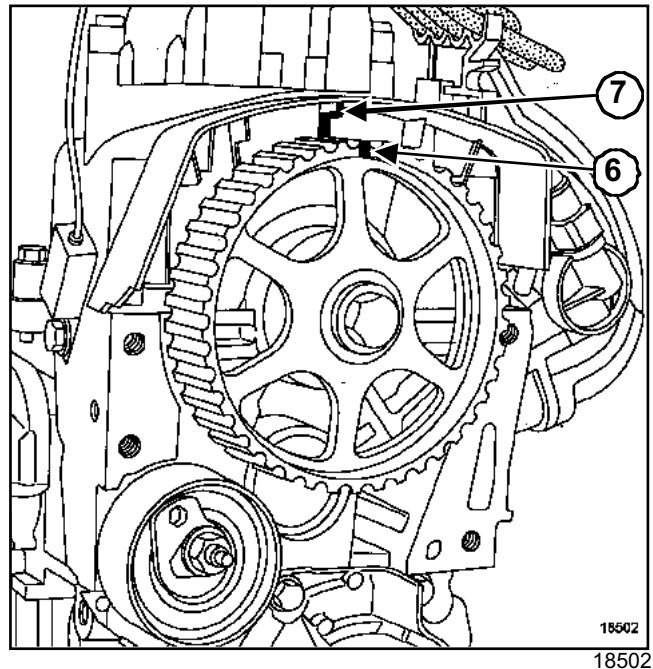
- Refit a new tensioner wheel.
- Position both indexes (2) between the cylinder head groove.
- Do not remove pin (3) before refitting the timing belt.



- Check that the crankshaft is at its setting point with the TDC setting rod (Mot. 1054).



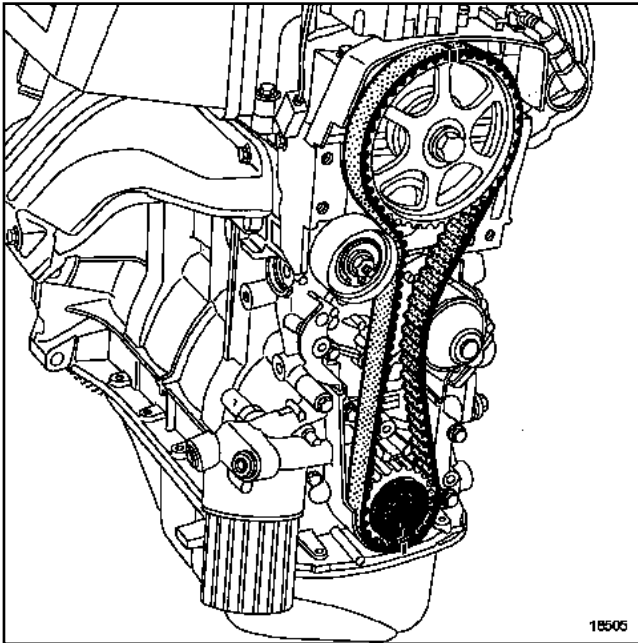
- The crankshaft sprocket (4) should be aligned at fixed mark (5) on the oil pump body.



- Align the camshaft pulley mark (6) with fixed mark (7) on the rocker cover using tool (Mot. 799-01).

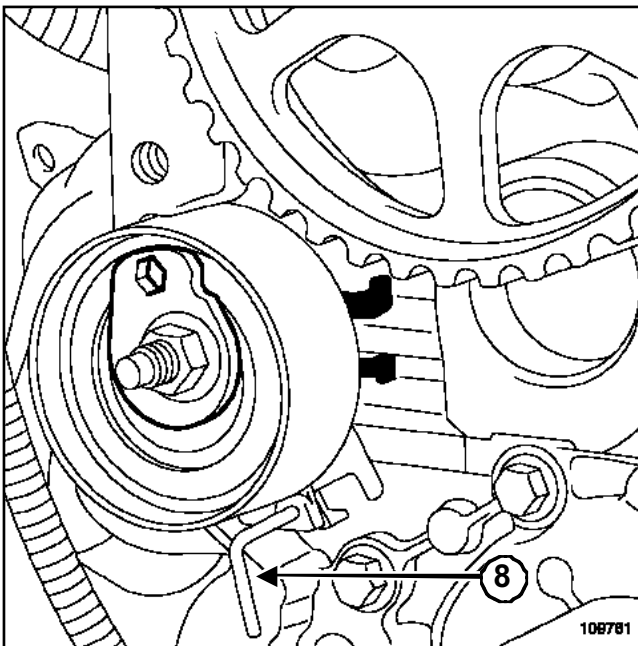
## Timing belts: Refitting

D4D, and 700 or 712 or 720 – D4F, and 702 or 706 or 708 or 712 or 714 or 716 or 722 or 728 or 730 or 740



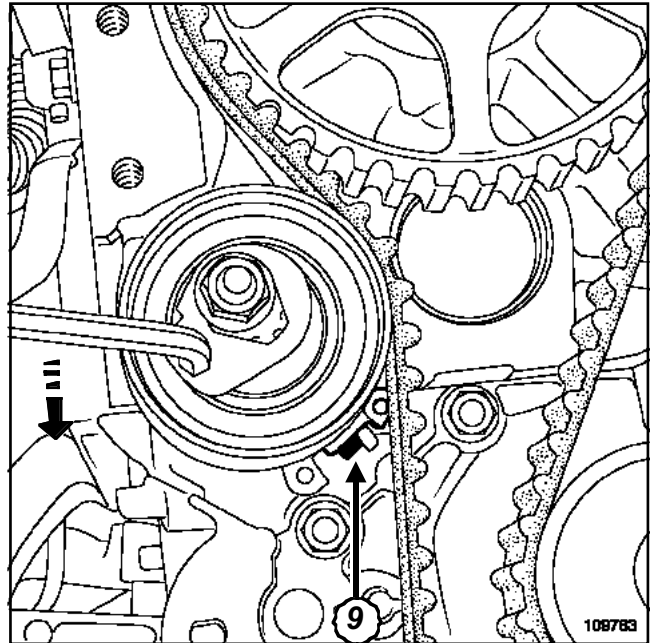
18505  
18505

- Fit the crankshaft accessories pulley and its retaining washer.
- Torque tighten the **crankshaft accessories pulley to 15 Nm**
- Fit the timing belt aligning the belt marks with the crankshaft sprocket and the camshaft pulley.
- Remove the TDC pin (Mot. 1054).



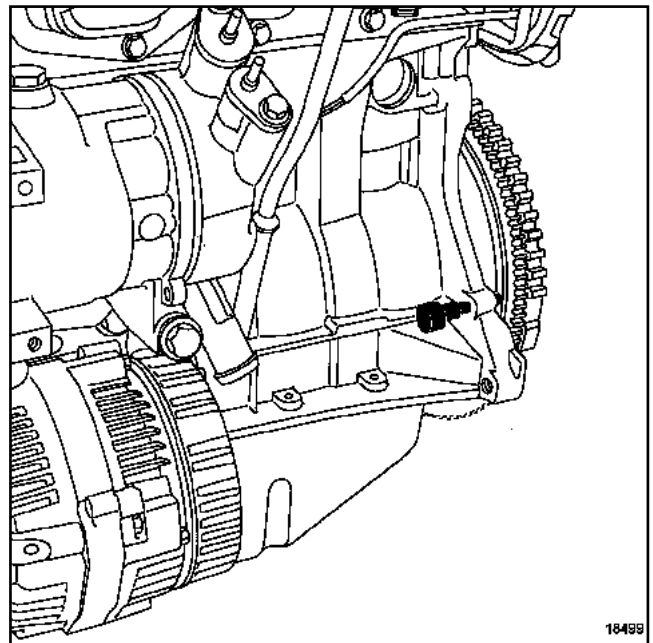
109761  
109761

- Remove the timing tensioner wheel pin. (8)



109763  
109763

- Turn the tensioner wheel eccentric using a **6 mm** Allen key in an anti-clockwise direction.
- Move the moving tensioner wheel index (9) to the position indicated above.
- Tighten to torque the **timing tensioner, (24 Nm)**.
- Rotate the crankshaft through six revolutions in a clockwise direction (timing side).



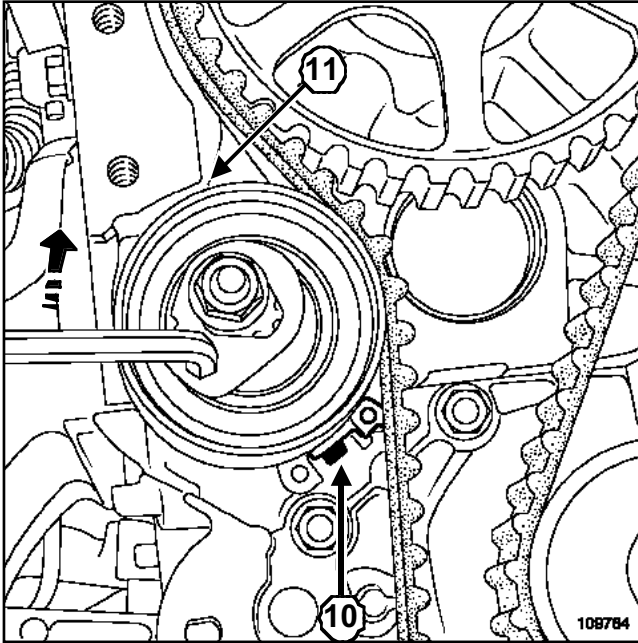
18499  
18499

- Insert the TDC pin (Mot. 1054).
- Turn the crankshaft to the setting point.

## Timing belts: Refitting

D4D, and 700 or 712 or 720 – D4F, and 702 or 706 or 708 or 712 or 714 or 716 or 722 or 728 or 730 or 740

- ❑ Check that the camshaft and crankshaft sprockets markings are correctly aligned with the fixed markings.
- ❑ Remove the TDC setting pin. (Mot. 1054).



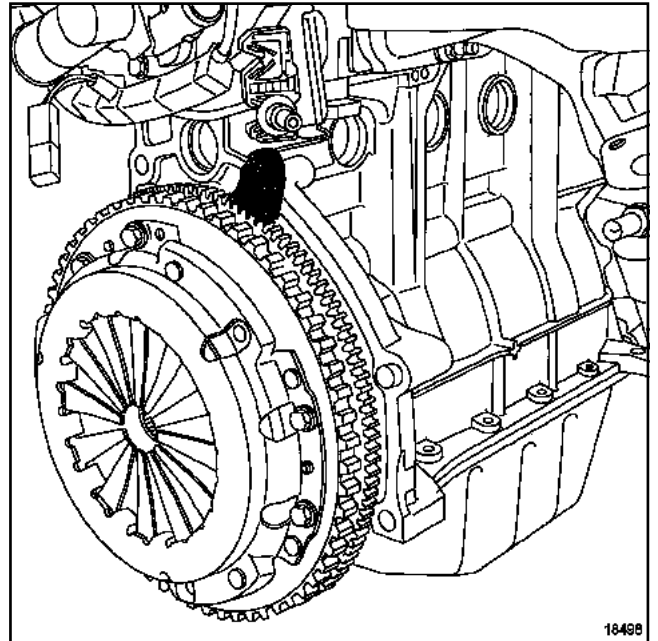
- ❑ Loosen the tensioner wheel nut holding it with a **6 mm** Allen key.
- ❑ Return the moving index (**10**) of the tensioner wheel in a clockwise direction to the position indicated above.

### WARNING

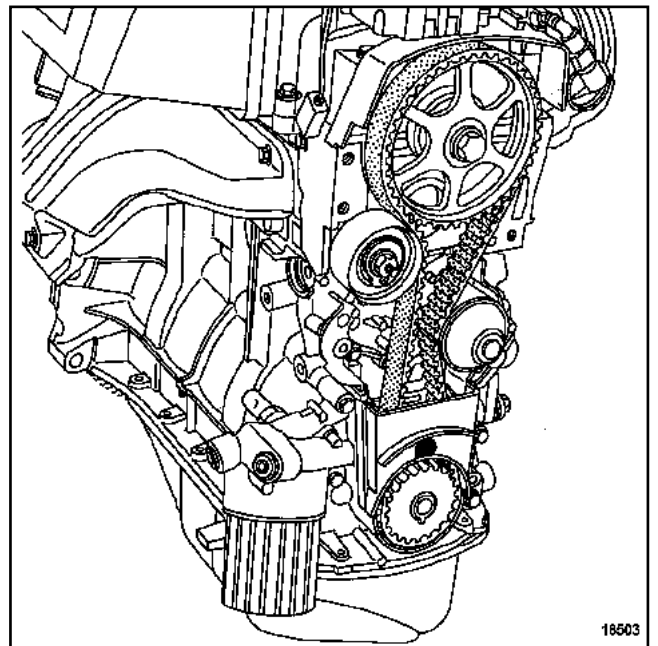
There should be a gap of approximately **5 mm** between the tensioner wheel and the edge of the cylinder head (**11**).

If the tensioner wheel is in contact with the edge of the cylinder head, restart the belt tensioning procedure.

- ❑ Torque tighten the **timing tensioner wheel** to **24 Nm**.



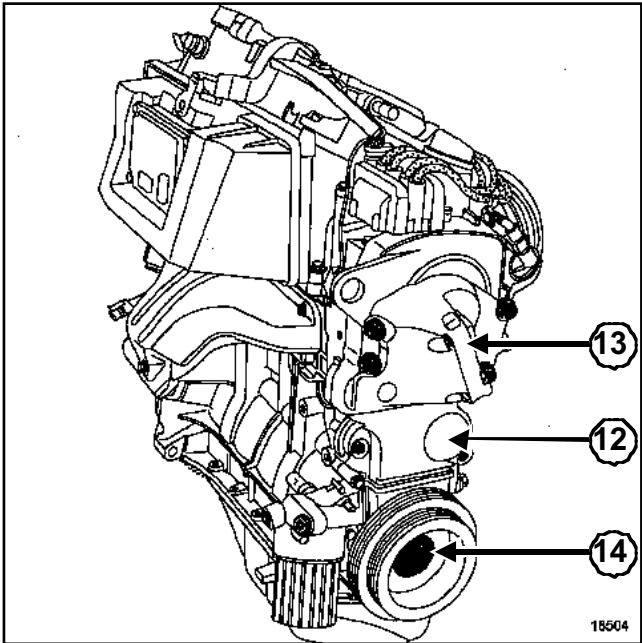
- ❑ Fit the flywheel immobiliser tool. (Mot. 582-01).



- ❑ Refit the lower timing cover.

## Timing belts: Refitting

D4D, and 700 or 712 or 720 – D4F, and 702 or 706 or 708 or 712 or 714 or 716 or 722 or 728 or 730 or 740



- Refit the timing intermediate housing (12).
- Tighten to torque the **intermediate timing housing bolts (10 Nm)**.
- Refit the upper timing cover (13)
- Tighten to torque the **upper timing cover bolt (33 Nm)**.
- Refit the crankshaft accessories pulley.
- Refit, using a new bolt, the crankshaft accessories pulley (14).
- Tighten to torque the **crankshaft accessories pulley bolts (40 Nm + 70° ± 6°)**.

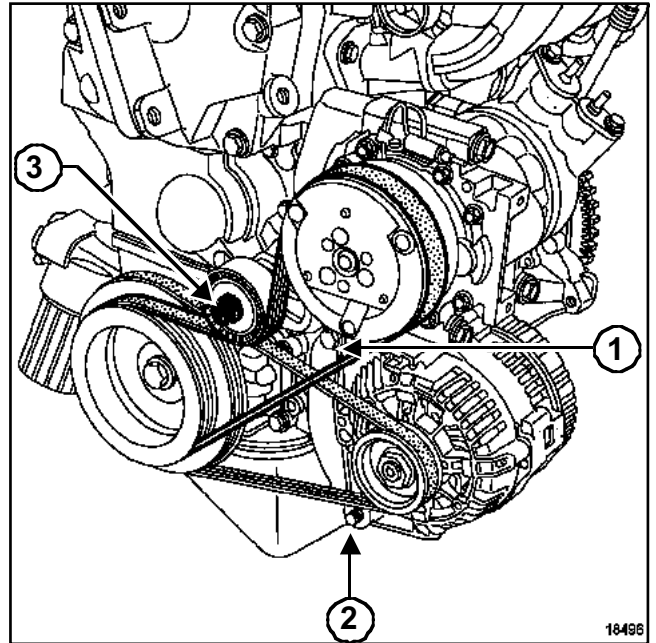
### II - REFITTING THE ACCESSORIES BELT (ON ENGINES MOUNTED AT THE CLUTCH END)

#### WARNING

Replace any belt removed with a new one.

#### WARNING

When replacing the belt, be sure to replace the tension wheels and idler pulleys.



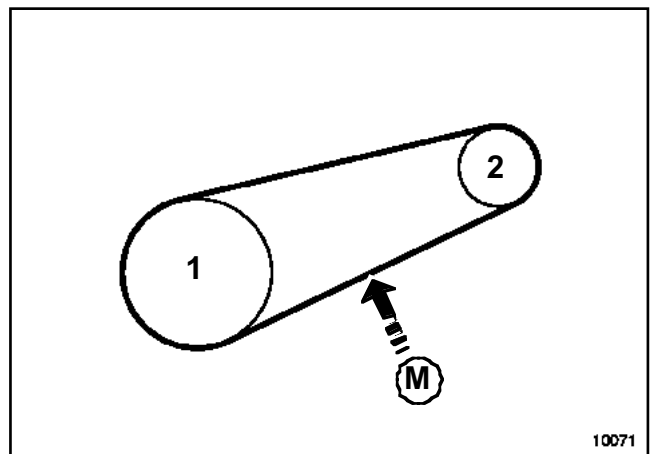
Refit:

- a new tensioner wheel
- a new tensioner wheel mounting bolt,
- new accessories belts.

Apply and check the accessories belt tension using tool (Mot. 1715) or (Mot. 1505).

### Accessories belt tension values

#### Alternator



(1) Crankshaft

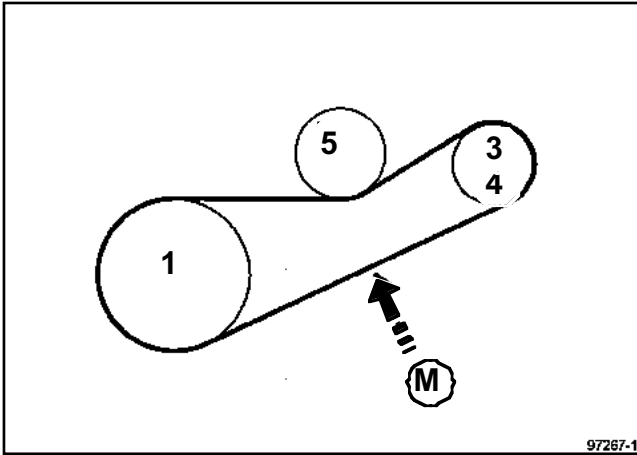
(2) Alternator

(M) Measuring point

- Fitting tension (Hertz): **260 ± 5**

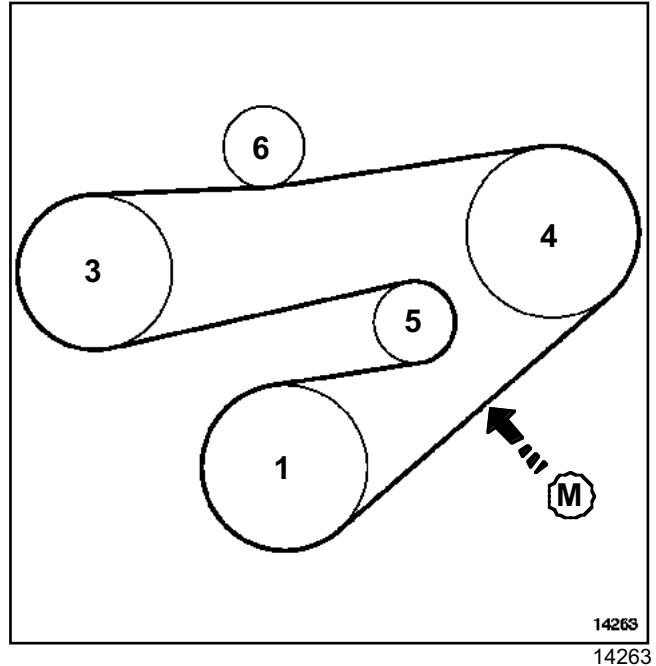
D4D, and 700 or 712 or 720 – D4F, and 702 or 706 or 708 or 712 or 714 or 716 or 722 or 728 or 730 or 740

### Air conditioning compressor / Power assisted steering pump



- (1) Crankshaft
- (3) Power assisted steering pump
- (4) Air conditioning compressor
- (5) Tension wheel
- (M) Measuring point
- Fitting tension (Hertz):  $210 \pm 5$

### Air conditioning compressor / Power assisted steering pump



- (1) Crankshaft
- (3) Power assisted steering pump
- (4) Air conditioning compressor
- (5) Tension wheel
- (6) Pulley
- (M) Measuring point
- Fitting tension (Hertz):  $210 \pm 5$
- Tighten to torque:
  - the **alternator upper bolt (25 Nm)** at (1),
  - the **alternator lower mounting bolt (50 Nm)** at (2)
- Tighten to torque the **tension wheel bolts (37 Nm)** at (3)
- Rotate the crankshaft twice to correctly position the accessories belt.
- Check the accessories belt tension, otherwise, readjust.