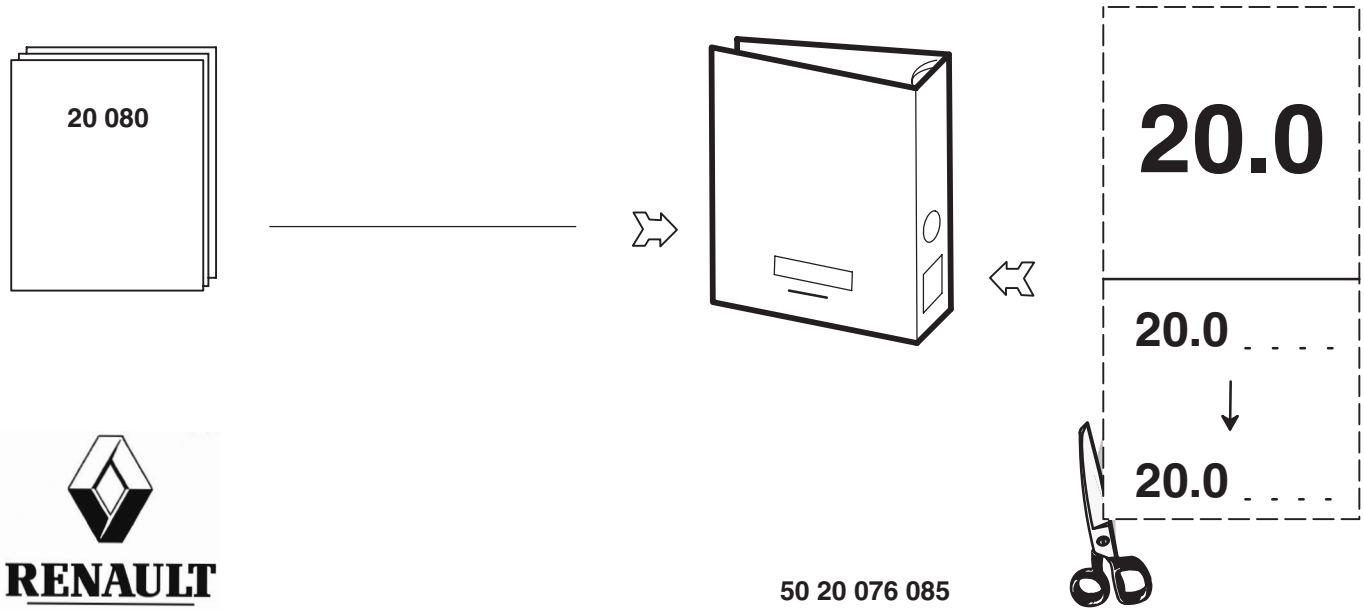
20 080 – AN – 06.1998

ENGINE

ENGINE	VEHICLE
MIDR 06.20.45 **MIDR 06.23.56** **EQUIPMENT** Air compressor Injection pump Steering hydraulic pump Coolant pump Radiator Turbocharger	**KERAX**

NOTE
The above information may change in the course of time.
Only the “Consult” section of the workshop manuals repertory in standard N° 10320 serves as reference.



RENAULT

CONTENTS

CONVENTIONAL SYMBOLS

Tighten at indicated torque (Nm) (left–hand thread)

Tighten at indicated torque (Nm) (right–hand thread)

Tighten by the indicated value

Loosen by the indicated value


Interference fit


Force to be exerted in direction of arrow (hammer–press)


Rotational load

Heat or cool. Temperature in degrees Centigrade (e.g.: 80 ° C)


Weld bead


Repair time


Exhaust – Outlet


Intake – Inlet

Weight in kg (e.g.: 275 kg)


Smear (see “Consumables” table)


Grease or oil (see “Consumables” table)


Fill to level (see “Specifications” and “Consumables” table)


Depending on versions or options


Mark – Assemble as per marking


Adjust – Place in contact


Clearance – Dimension to be assured or noted down (mm)


Axial – Vertical


Radial – Horizontal


Maximum out–of–true


Maximum static toe–in error


Machining tolerance


... to ...


Equal – One or the other


... Smaller than ...


... Greater than ...


... Less than or equal to ...


... Greater than or equal to ...


Repair dimension


Part to be replaced


Wear limit


Inspect – Check the condition of parts


Danger for persons, the vehicle or the equipment

TECHNICAL DATA

MIDR 06.20.45 – MIDR 06.23.56 engine

Consumables and oil capacity (see servicing handbook).

Rocker arm adjustment :
Settings: engine cold
– Exhaust: **0.50 mm**.
– Inlet: **0.40 mm**.

Tightening torques
There are several types of tightening
– Tightening to torque (in **Nm.**)
– Tightening to angle (in °)
– Tightening to torque–angle (in **Nm. +** °)

Torques given in **Nm.** are nominal torques (average value calculated on the basis of the minimum torque and the maximum torque).
The tightening accuracy class defines the tolerance of this torque in percent as a function of the nominal torque applied.

Tightening accuracy classes
– **Class I**: Special threaded hardware (tolerance ± 10% of the final torque)
– **Class II**: Reserved for precise tightening (tolerance ± 10% of the nominal torque)
– **Class III**: Reserved for normal standard tightening (tolerance ± 20% of the nominal torque)

For standard threaded hardware indicated in the table below, use tightening class **III**.

For other torques, see page **A2**.

Tightening torques for conventional nut and bolt hardware to "METRIC system" standard 01.50.4002		
Dia. and pitch of nuts and bolts (in mm)	**Quality class 8.8**	**Quality class 10.9**
	Tightening class III (± 20 %)	**Tightening class III (± 20 %)**
6 x 1.00	7.4	10.8
7 x 1.00	12.1	17.8
8 x 1.00	19.2	28.2
8 x 1.25	17.9	26.3
10 x 1.00	39.4	58
10 x 1.25	37.4	55
10 x 1.50	35.4	52
12 x 1.25	67	98
12 x 1.50	64	94
12 x 1.75	61	90
14 x 1.50	105	155
14 x 2.00	98	143
16 x 1.50	161	237
16 x 2.00	151	222
18 x 1.50	235	346
18 x 2.50	210	308
20 x 1.50	328	481
20 x 2.50	296	435
22 x 1.50	444	652
22 x 2.50	406	596

Tightening torques (in Nm)
The tolerance indicated after the nominal tightening torque corresponds to the tightening class.

Automatic timing–advance
Injection pump timing–advance device securing nut . . . . . **200 ± 20**
Engine gearwheel setscrew . . . . . **7 ± 07**
Injection pump gearwheel setscrew . . . . . **12 ± 12**

Air compressor
Air compressor attaching screw . . . . . **45 ± 5**
Air compressor pinion securing nut . . . . . **140 ± 14**

Cylinder heads
Rocker cap setscrew . . . . . **20 ± 4**

Fuel–Injection
Injection pump securing nut . . . . . **40 ± 4**
Injection pump attaching screw . . . . . **40 ± 8**
Injector pipe union (see page) . . . . . **25 ± 4**
Fuel leak–off gallery union . . . . . **20 ± 4**

Hydraulic pump
Hydraulic pump pinion securing nut . . . . . **80 ± 8**

Cooling
Engine aspiration hose spring clamp . . . . . **6^{+1}**

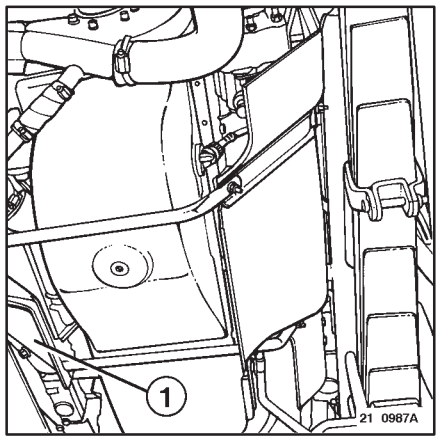
Turbocharger
Turbocharger to exhaust manifold securing nut . . . . . **285 ± 12**

AIR COMPRESSOR

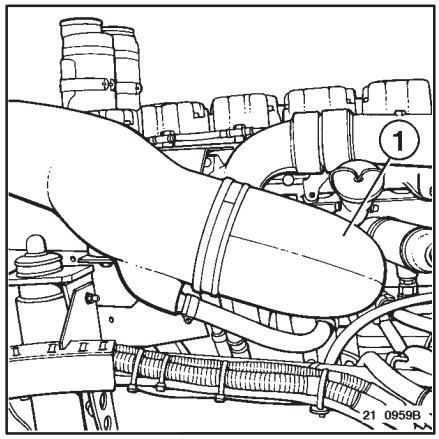
To remove

Position the vehicle over a pit or on lifts.
Over a pit, chock the roadwheels.
On lifts, put safety trestles under the axles.
Tilt the cab.
Disconnect the batteries, starting with the negative terminal.

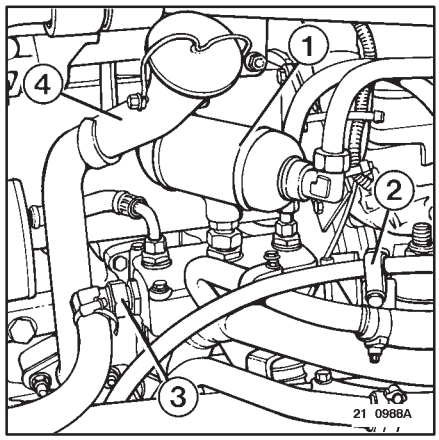
Remove soundproofing screen (**1**).

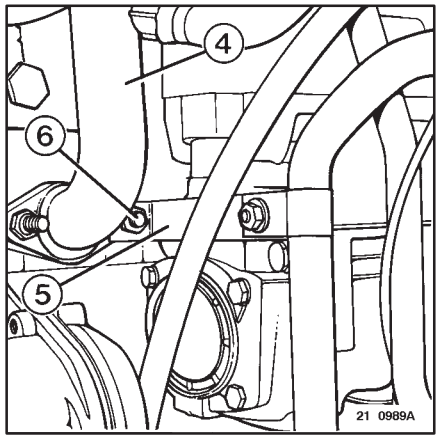


Remove hose (**1**).

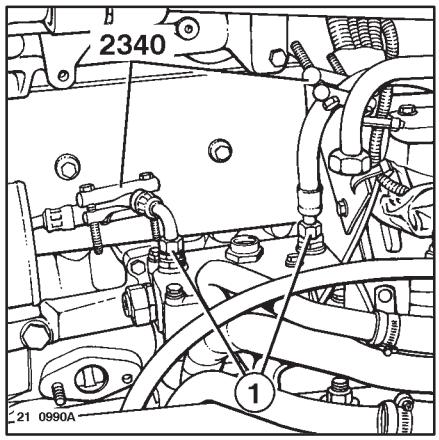


Remove the tank (**1**).
Disconnect flexible pipe (**3**).
Remove the clamp (**2**).
Remove fixing lug (**5**).
Remove spout (**4**)
Remove the pin (**6**).

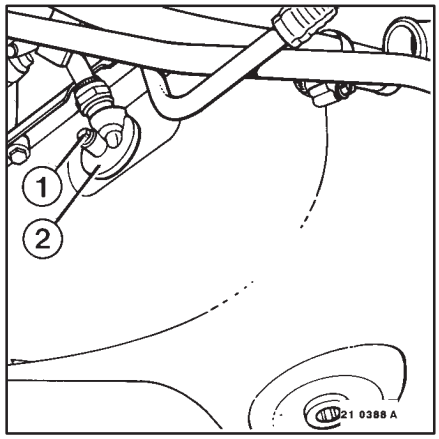




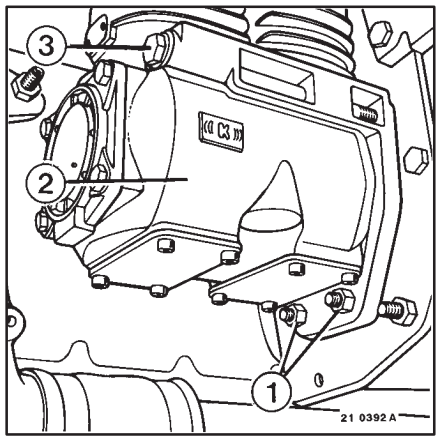
Install tool **2340** .
Disconnect pipes (**1**).



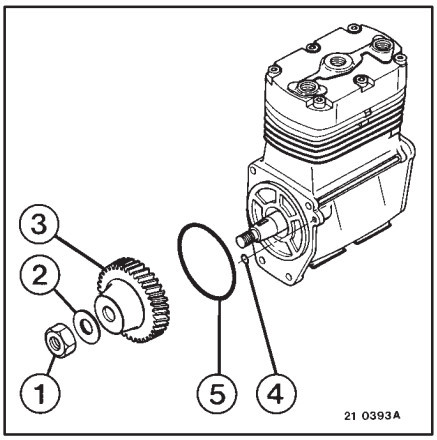
Withdraw the engine oil dipstick.
Remove screw (**1**).
Disconnect disptick guide tube (**2**).
Withdraw the seal.



Remove nuts (**1**).
Remove screws (**3**).
Remove the compressor (**2**).



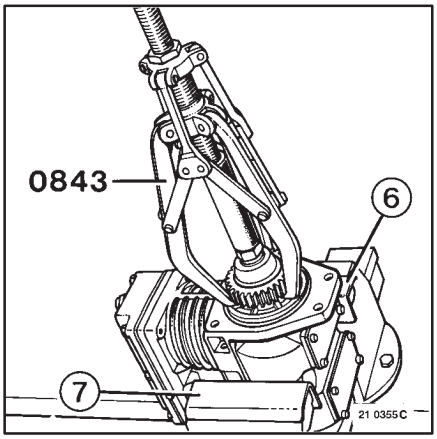
If necessary
In a vice.
Use a protective device (**6–7**).
Loosen nut (**1**).
Extract pinion (**3**).
Use tool(s) **0843**.



Withdraw tool **0843**.
Remove nut (**1**).
Withdraw washer (**2**).
Withdraw pinion (**3**).

Upon assembly

Degrease the tapers.
Tighten the nut (**1**) at the recommended torque.
Change seals (**4–5**) without fail.



To fit

For fitting, proceed in the reverse sequence to removal.
Tighten at the recommended torque.

Check the coolant level.
Start the engine and check for leaks.

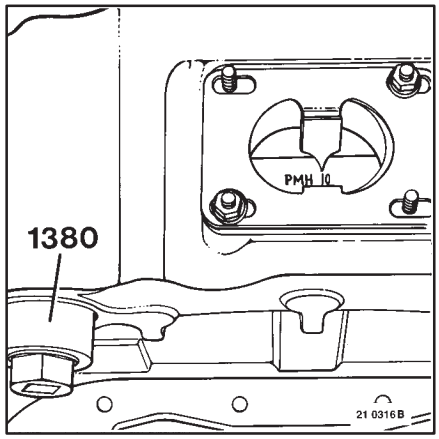
INJECTION PUMP

Engines MIDR 06.20.45 – MIDR 06.23.56.

To remove

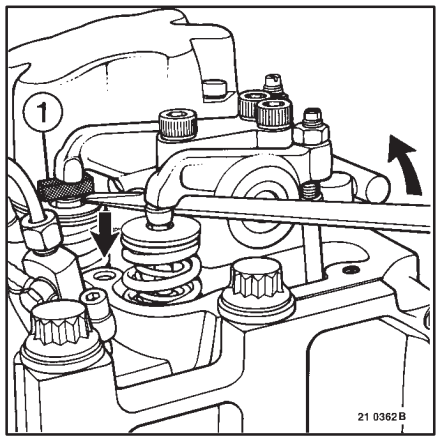
Tilt the cab.
Disconnect the batteries, starting with the negative terminal.
Remove the cylinder head cover.
(N° **1** cylinder at flywheel end).
Check the setting of the TDC pointer.

To check the TDC pointer :
Use tool **1380** to rotate the crankshaft.
- Turn the crankshaft clockwise to bring the n° **1** cylinder valves into balance (end of exhaust/start of induction).
- Place a locally manufactured pointer (**2**) on the flywheel damper end of the timing case.
- Turn the cranskshaft clockwise through 3/4 turn.
- Insert a shim (**1**) with parallel sides (thickness 7 mm) between the inlet valve of n° **1**. cylinder and its rocker arm
- Slowly turn the crankshaft clockwise to bring the piston into contact with the valve.



Do not apply too much force

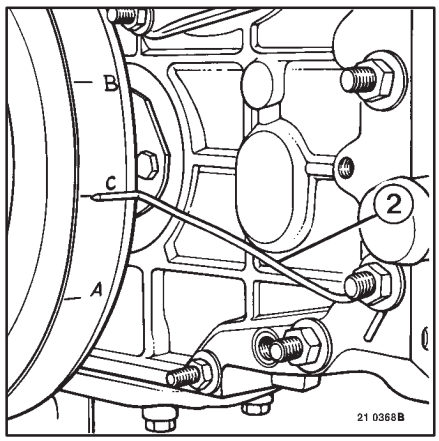
- Make a mark (**A**) opposite the locally manufactured pointer (**2**).
- Turn the crankshaft anti–clockwise through a few degrees.
- Withdraw the shim (**1**).
- Turn the crankshaft clockwise through 1/4 turn.
- Insert the shim (**1**) once again between the inlet valve of n° **1**. cylinder and its rocker arm
- Slowly turn the crankshaft clockwise to bring the piston into contact with the valve.



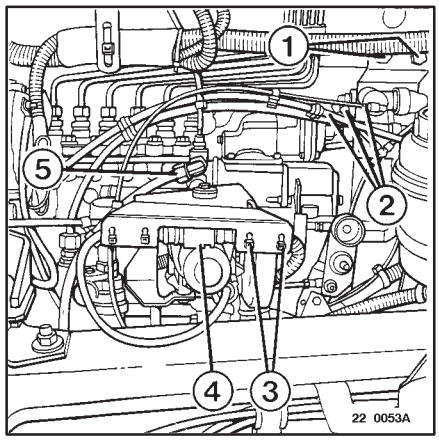
Do not apply too much force

- Make a mark (**B**) opposite the locally manufactured pointer (**2**).
- Turn the crankshaft anti–clockwise through a few degrees.
- Withdraw the shim (**1**).
- Scribe the mid–point (**C**) of the quadrant (**A–B**).
- Turn the crankshaft anti–clockwise to bring the mid–point mark (**C**) opposite the locally manufactured pointer (**2**).

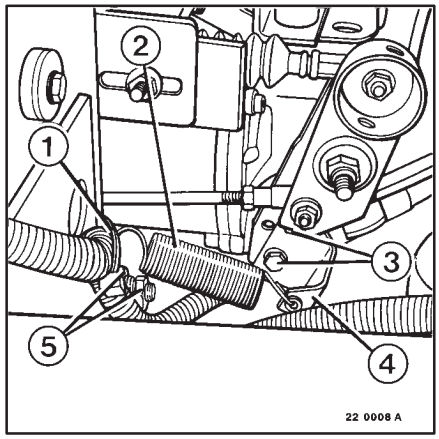
Check that the pointer lines up with the flywheel TDC mark. Correct, if necessary.
Withdraw tool **1380**.



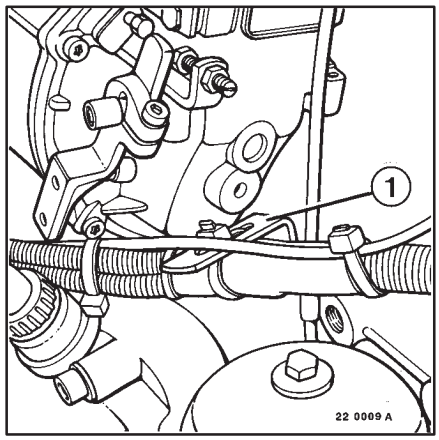
Cut clamps (**3**).
Disconnect wiring harness (**4**).
Disconnect pipes (**2–5**).
Remove screws (**1**).
Disengage solenoid valve/support bracket assembly (**1**).



Cut clamp (**1**).
Take off spring (**2**).
Remove screws (**3**).
Remove mounting (**4**).
Withdraw nuts and bolts (**5**).
Disengage the speed limiter/accelerator control assembly.



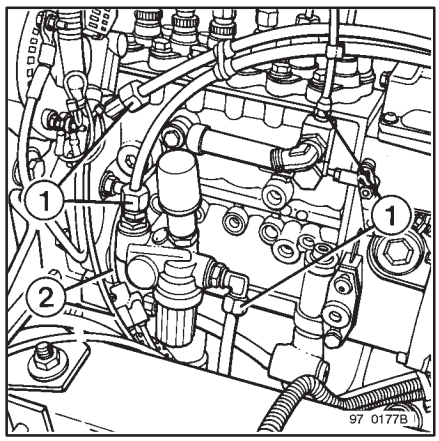
Remove the bracket (**1**).



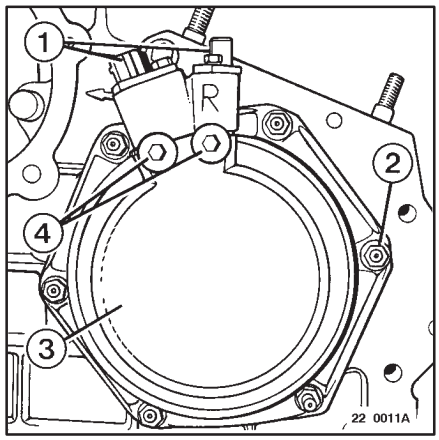
Disconnect pipes (**1–2**).

Disconnect the high–pressure pipe bundle.
Blank off the ports.

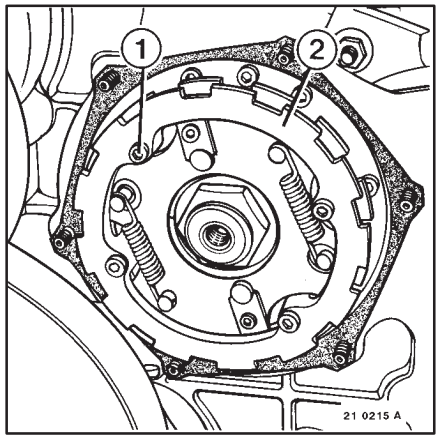
Remove the drive belt.
Remove the alternator from its support bracket without disconnecting it.



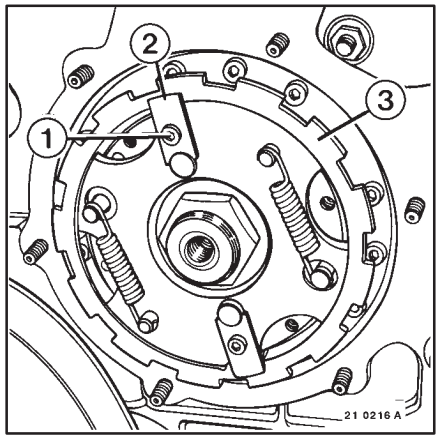
Disconnect the sensors (**1**)*.
Remove plugs (**4**)*.
Remove nuts (**2**).
Withdraw the cover/sensors assembly (**3**).



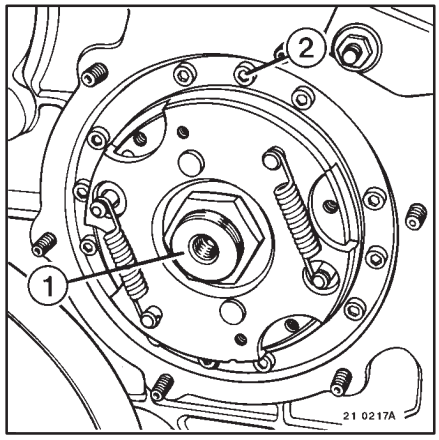
Remove the screws (**1**)*.
Withdraw notched wheel (**2**).



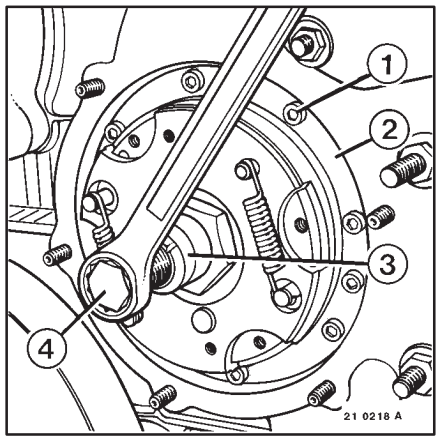
Remove the screws (**1**)*.
Remove fixing flanges (**2**)*.
Withdraw notched wheel (**3**)*.



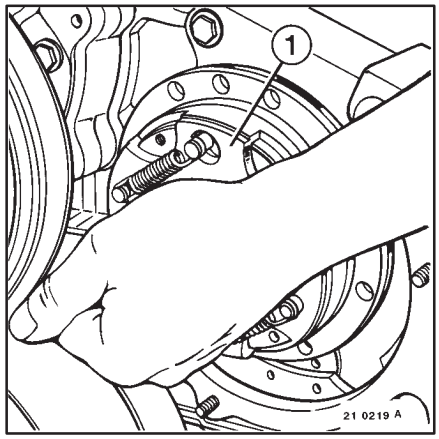
Remove screws (**2**).
Loosen nut (**1**).



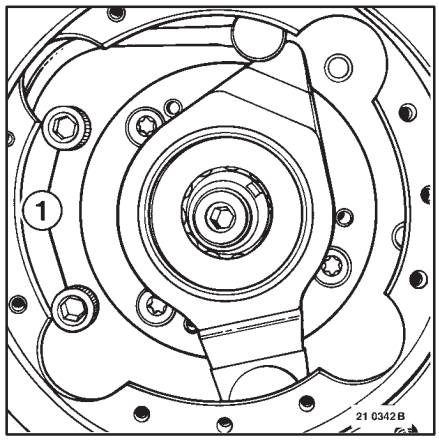
Remove nut (**3**).
Turn nut (**3**) round and screw it onto automatic timing–advance device.
Extract the automatic timing–advance device using a screw (**4**),.
Screw (**4**) : ø: **14** mm, length: **90** mm. Threaded over **80** mm.
Remove screws (**1**).
Withdraw washer (**2**).



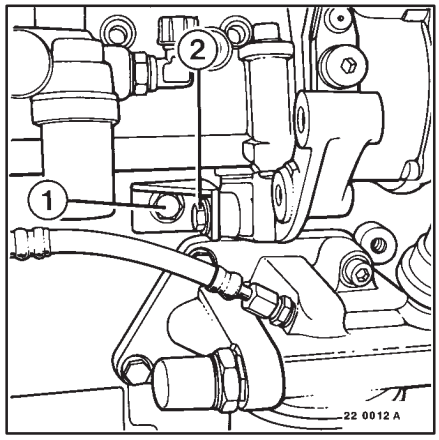
Remove the automatic timing–advance device (**1**).



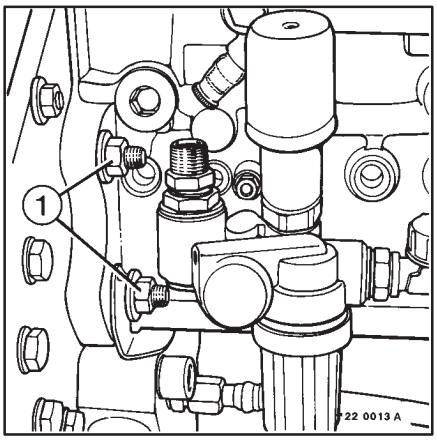
Remove screws (**1**).



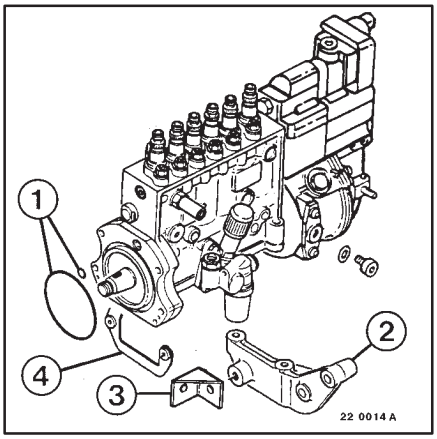
Loosen screw (**2**).
Remove screw (**1**).

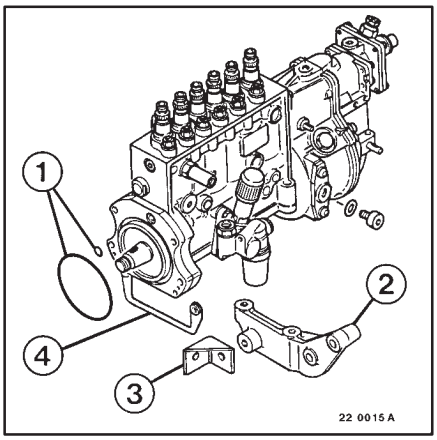


Remove nuts (**1**).



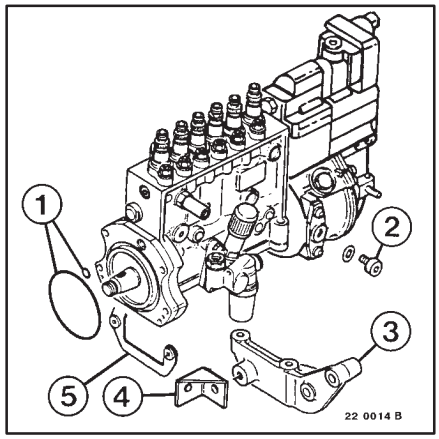
Remove flange (**4**).
Remove the injection pump.
Take out the O–rings (**1**).
Remove mounting (**3**).



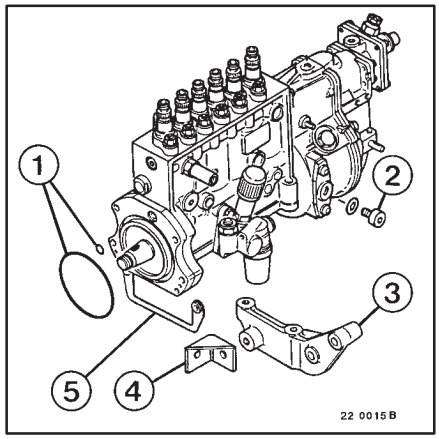


To fit

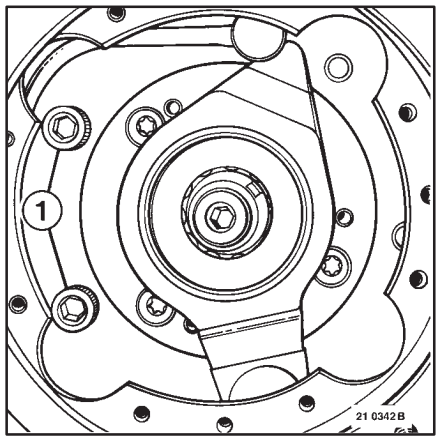
Remove plug (**2**).
Fit support (**3**).
Fit the screws.
Tighten at the recommended torque.
Fasten mounting (**4**).



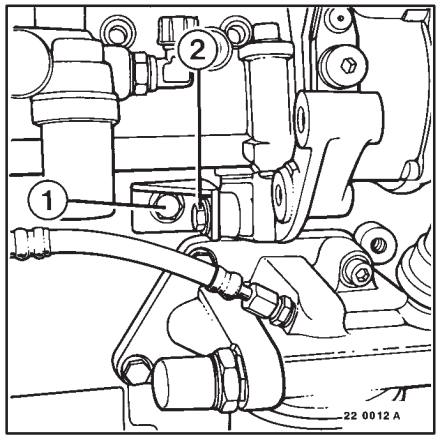
Replace all seals without fail.
Smear seals (**1**) with grease.
Install O–rings (**1**).
Fit the injection pump.
Fit flange (**5**).
Fit the nuts.



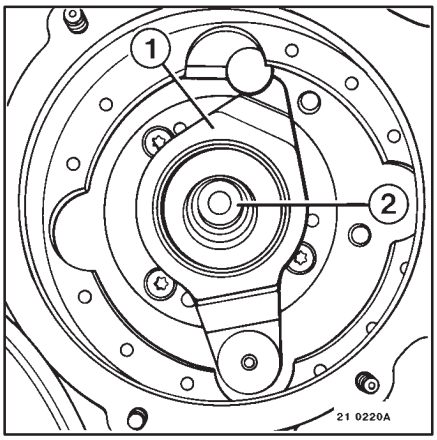
Fit the screws (**1**).
Tighten the screws at the recommended torque.
Tighten the nuts at the recommended torque.



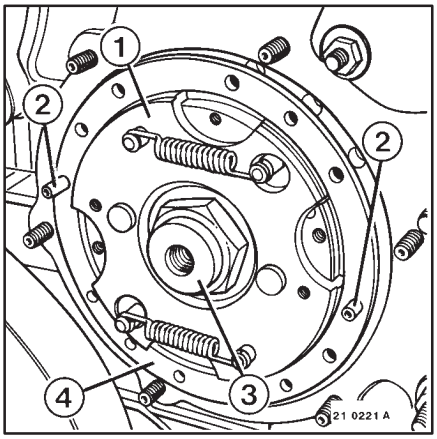
Fit the screw (**1**) .
Tighten screws (**1–2**).
Tighten at the recommended torque.



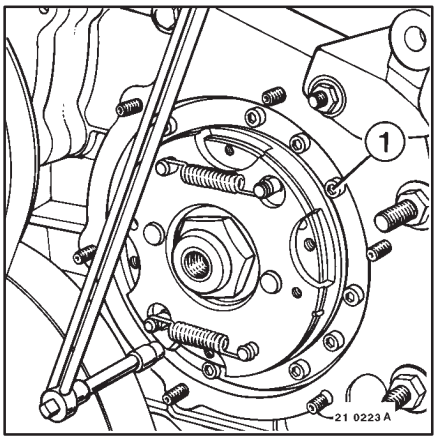
Centre link rod (**1**) on shaft (**2**).



Degrease the tapers.
Fit the automatic timing–advance device (**1**).
Use **2** headless screws (**2**) Ø : **6** mm, length : **60** mm.
Screw up nut (**3**).
Screw up without tightening.
Fit washer (**4**).
Centre the pinion fixing holes in relation to the timing–advance holes.

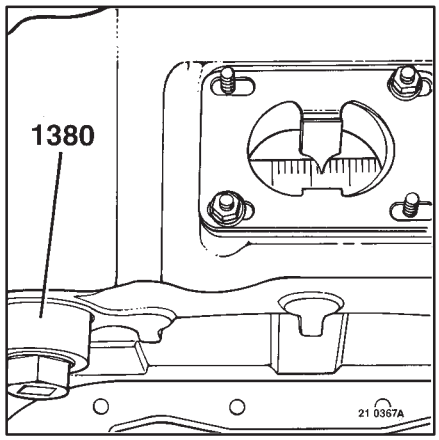


Fit the screws (**1**).
Tighten at the recommended torque.



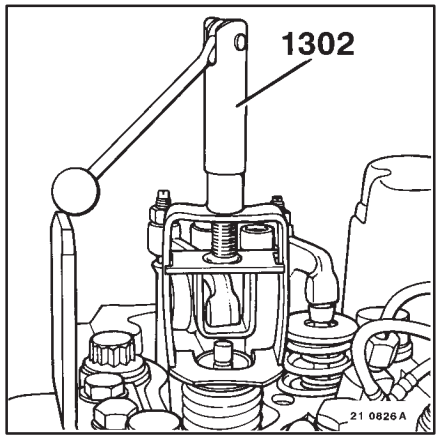
To time

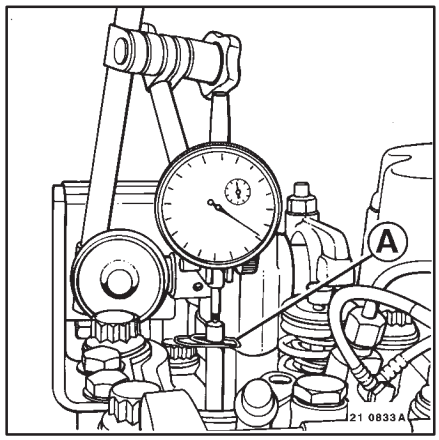
Engine MIDR 06.20.45 C4, timing setting **11° ± 30' / 1.75 ± 0.15 mm**.
Engine MIDR 06.20.45 D41, timing setting **10.5° ± 30' / 1.60 ± 0.15 mm**.
Engine MIDR 06.20.45 E41, timing setting **8° ± 30' / 0.93 ± 0.11 mm**.
Engine MIDR 06.23.56 A41 , timing setting **7.5° ± 30' / 0.90 ±0.11 mm**.
Engine MIDR 06.23.56 B41, timing setting **8° ± 30' / 1.02 ± 0.12 mm**.
Engine MIDR 06.23.56 B41B, timing setting **8° ± 30' / 1.02 ± 0.12 mm**.



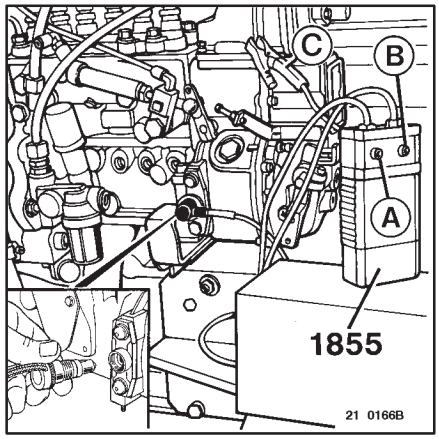
Engine with graduated flywheel.
Turn the engine in the normal direction of rotation to bring it to the timing point (cylinder **6** compression stroke).
Use tool(s) **1380**.

Engine without graduated flywheel.
Remove the cylinder head cover and bring N° **6** cylinder to compression top dead centre (tool **1380**).
Free the inlet valve using tool **1302**.
Place a safety pin (**A**) on the valve stem.
Bring the engine to the timing value using a dial gauge.

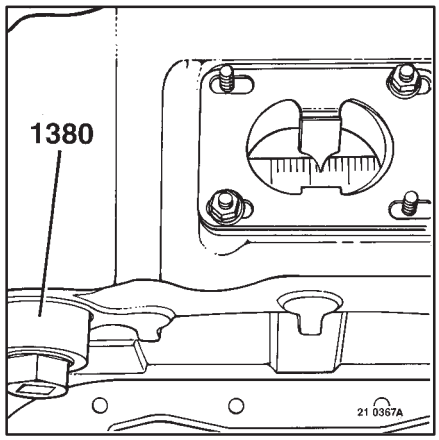




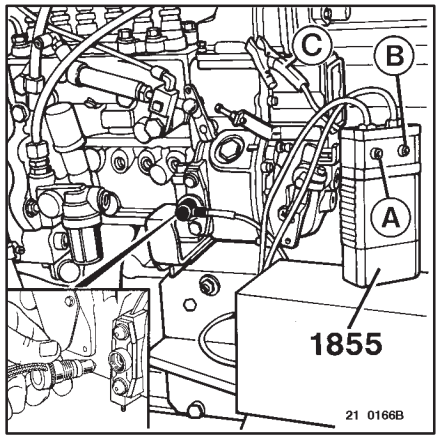
Install tool **1855**.
Position the spline of the sensor in the slot and screw the knurled nut to abutment.
Connect the earth clamp (**C**).
Turn the injection pump shaft a few degrees in the opposite direction to normal rotation.
Slowly turn the injection pump shaft in the normal direction of rotation.
Timing light (**A**) should come on.
Continue turning slowly until timing light (**B**) comes on.
The timing is correct when timing light (**A–B**) are on.



Tighten nut (**2**) while holding the injection pumps shaft.
Tighten at the recommended torque.



Engine with graduated flywheel.
To check the timing
Turn the engine in the opposite direction to normal rotation until the timing lights (**A–B**) go out.
Turn the engine slowly in the direction of normal rotation until timing light (**A**) comes on. Continue turning the engine slowly in the same direction until timing light (**B**) comes on.
This position represents the commencement of fuel–injection.
Read out the static timing value in degrees on the engine fiywheel by means of the stationary pointer.
Continue turning slowly in the same direction. Timing light (**A**) should go out at minus **0.5** of a degree of rotation of the flywheel. If this is not so, check the sensor (position, cleanliness, ...). After remedying the defect, repeat the checking operation.
To validate the check: two reliable timing readings are necessary. The difference between two reading should not exceed **0.25** of a degree. Take into account the second value measured and compare it with the tolerance announced for the corresponding engine setting.
If necessary, loosen screws (**1**) and correct the timing setting.
Tighten screws (**1**).
Tighten at the recommended torque.

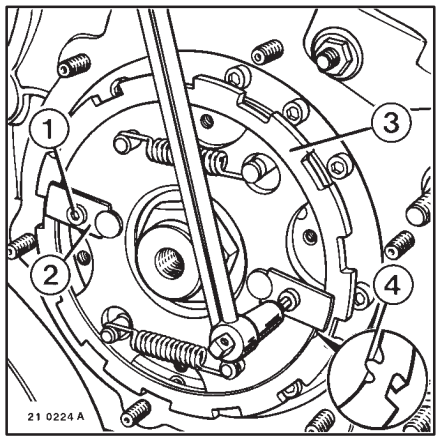


After checking:
– Withdraw the tool,
– Fit the engine TDC pointer closing plate.

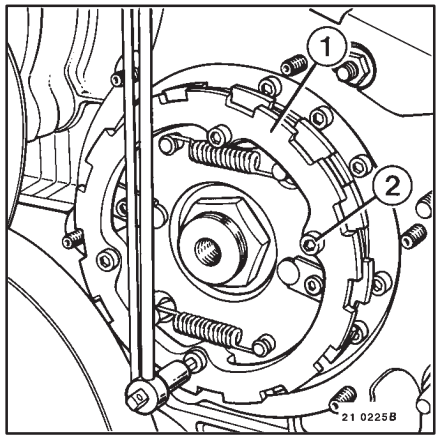
Engine without graduated flywheel.
To check the timing
Turn the engine in the opposite direction to normal rotation until the timing lights (**A–B**) go out.
Turn the engine slowly in the direction of normal rotation until timing light (**A**) comes on. Continue turning the engine slowly in the same direction until timing light (**B**) comes on.
This position represents the commencement of fuel–injection.
Read out the static timing value on the dial gauge.
Continue turning slowly in the same direction. Timing light (**A**) should go out at minus 0.1 mm from the timing point. If this is not so, check the sensor (position, cleanliness...). After remedying the defect, repeat the checking operation.
To validate the check: two reliable timing readings are necessary. The difference between two readings should not exceed 0.1 mm. Take into account the second value measured and compare it with the value announced for the corresponding engine setting.
If necessary, loosen screws (**1**) and correct the timing setting.
Tighten screws (**1**).
Tighten at the recommended torque.
Bring the piston of N° **6** cylinder to compression top dead centre.
Re–rig the inlet valve.
Adjust the valve rocker clearance.
Fit the cylinder head cover.

After checking:
– Withdraw the tool,
– Fit the engine TDC pointer closing plate.

Fit engine notched wheel (**3**)*.
Position spline (**4**) in the slot.
Fit fixing flanges (**2**)*.
Tighten screws (**1**)* at the recommended torque.



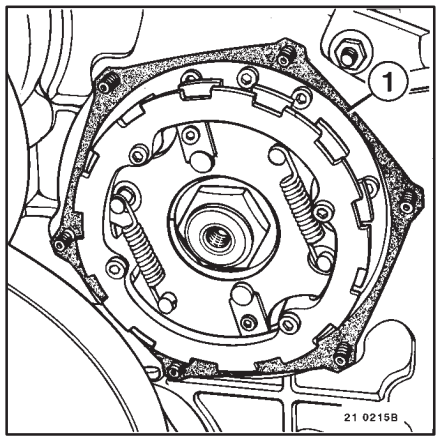
Fit pump notched wheel (**1**)*.
Fit the screws (**2**)*.
Tighten at the recommended torque.



Install gasket (**1**).

Fit the cover.
Fit the nuts.
Tighten at the recommended torque.

Fit the cover* sensors assembly.
Fit the nuts.
Screw up without tightening.

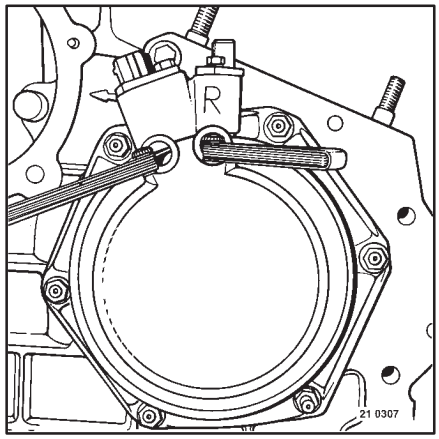


IMPORTANT
Any work on sensors or mechanical timing–advance elements requires sensor air gaps to be adjusted.

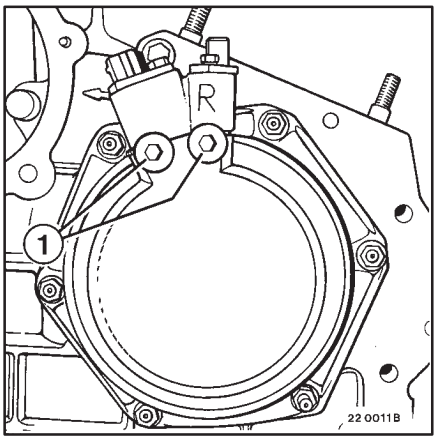
Speed sensors air gap*

To adjust

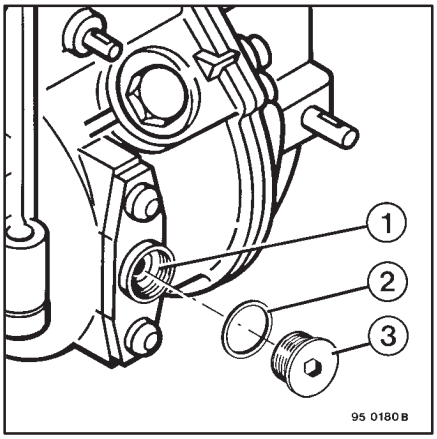
Rotate the engine to bring the tip of one land of each notched wheel opposite its respective sensor .
Inser two feeler gauges, thickness : **1.8** mm into the ports.
With the feelers taking support on the teeth, act on the cover to bring the sensors into contact with the feelers.
Tighten the nuts. Check that the sensors are correctly adjusted. Readjust, if necessary.
Tighten at the recommended torque.



Fit plugs (**1**).
Tighten at the recommended torque.
Connect the speed sensors.
NOTA
Connect the red ringed wire to the sensor with the mark **R** on the cover.



Pour **0.5 L**. of engine oil through port (**1**).
Install seal (**2**).
Fit plug (**3**).



Connect the high–pressure pipe bundle.
Fit the equipment.
Connect the pipes.
Fit the alternator.
Assemble and tension the drive belt.
Couple up the controls.
Bleed the fuel system.
For the rest of the fitting operations, proceed in the reverse sequence to removal.

Connect the batteries, starting with the positive terminal.

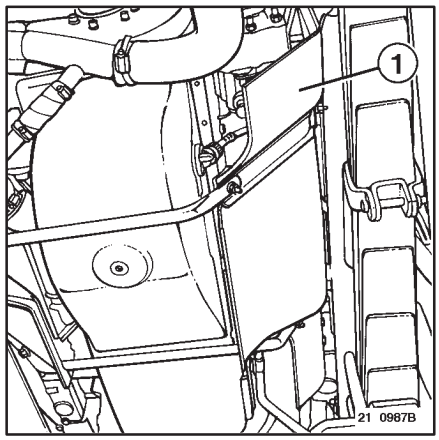
Run the engine and check the“ITC” system for correct operation.
Use RENAULT V.I. testing tool **“DIAGNOSTICA”** .

HYDRAULIC PUMP

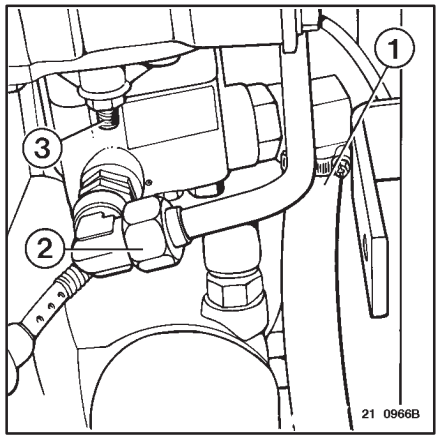
To remove

Position the vehicle over a pit or on lifts.
Over a pit, chock the roadwheels.
On lifts, put safety trestles under the axles.
Disconnect the batteries, starting with the negative terminal.

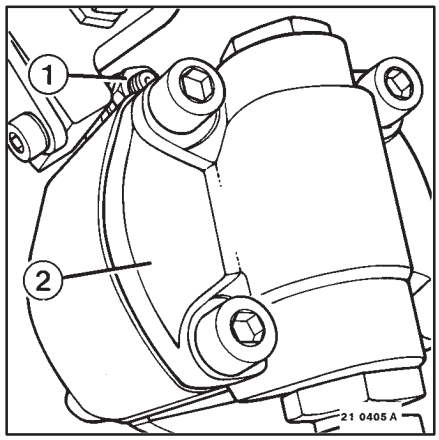
Remove soundproofing screen (**1**).
Put a drain pan into place.



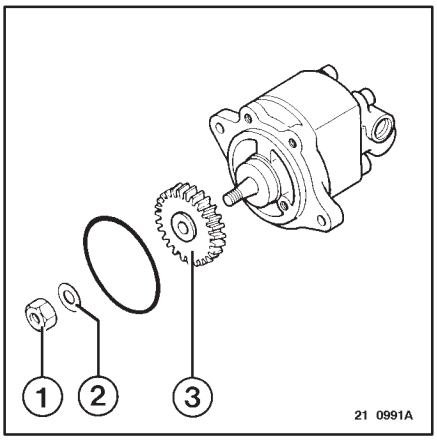
Disconnect tubes (**2**).
Disconnect the hose (**1**).
Remove nut and bolt (**3**).



Remove nut (**1**).
Withdraw the washer.
Remove hydraulic pump (**2**).



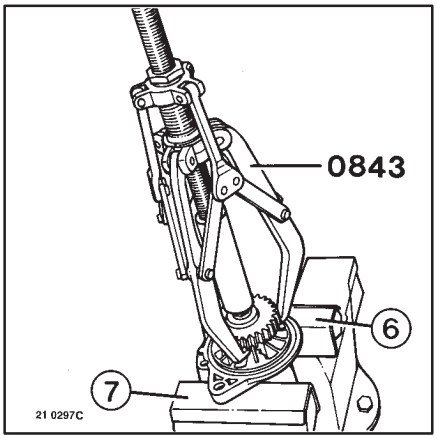
If necessary
In a vice.
Use a protective device (**6–7**).
Loosen nut (**1**).
Extract pinion (**3**).
Use tool(s) **0843**.



Withdraw tool **0843**.
Remove nut (**1**).
Withdraw washer (**2**).
Withdraw pinion (**3**).

Upon assembly

Degrease the tapers.
Tighten the nut (**1**) at the recommended torque.
Change seals without fail.



To fit

For fitting, proceed in the reverse sequence to removal.
Tighten at the recommended torque.

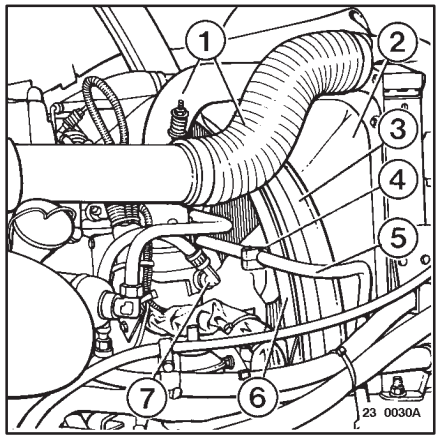
Fill the steering system with oil.
(See servicing handbook **3783**).
Connect the batteries, starting with the positive terminal.

COOLANT PUMP

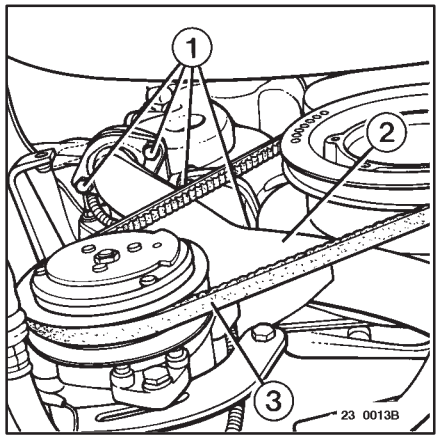
To remove

Position the vehicle over a pit or on lifts.
Over a pit, chock the roadwheels.
On lifts, put safety trestles under the axles.
Tilt the cab.
Disconnect the batteries, starting with the negative terminal.
Drain the cooling system.
(See servicing handbook**3783**).

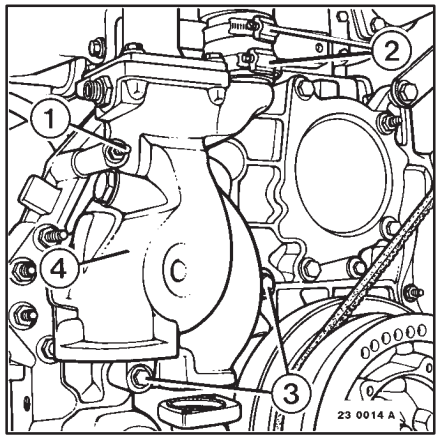
Disconnect hoses (**1**).
Remove tube (**5**).
Remove fan (**4**) and place it inside the cowl (**2**).
Unhook the gasket (**3**) from the radiator cowl.
Remove ferrule (**6**).
Disconnect flexible pipe (**7**).



Remove the drive belt (**3**).
Remove screws (**1**).
Unclamp tube (**2**).

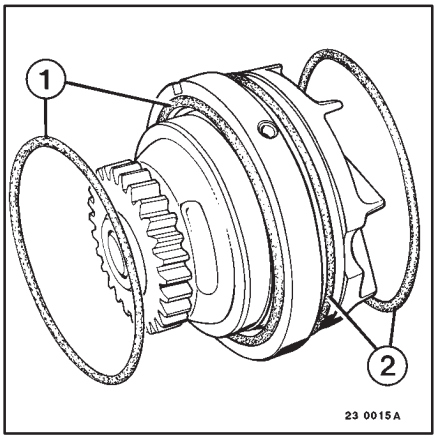


Loosen clamps (**2**).
Remove nut and bolt (**1**).
Remove screws (**3**).
Remove the water pump volute (**4**).
Remove the water pump.

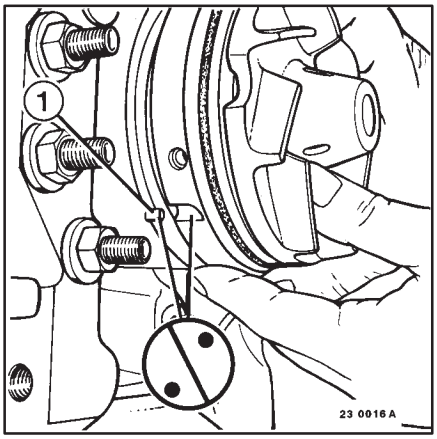


To fit

Change seals (**1–2**) without fail.
Smear seals (**1–2**) with grease.

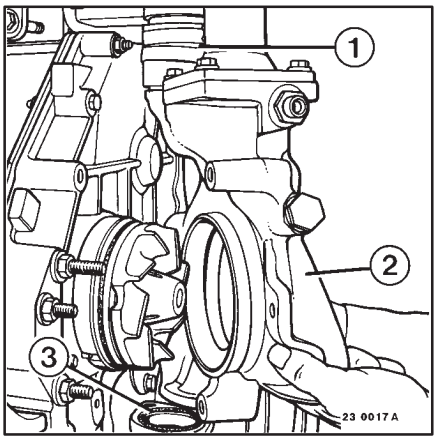


Check for the presence of dowel (**1**).
Fit the coolant pump.
Respect the orientation.



Replace gaskets (**3**).
Connect hose (**1**).

Fit water pump volute (**2**).
This operation requires special care.



For the rest of the fitting operations, proceed in the reverse sequence to removal.
Tighten at the recommended torque.
Fill the cooling system with coolant.
(See servicing handbook**3783**).

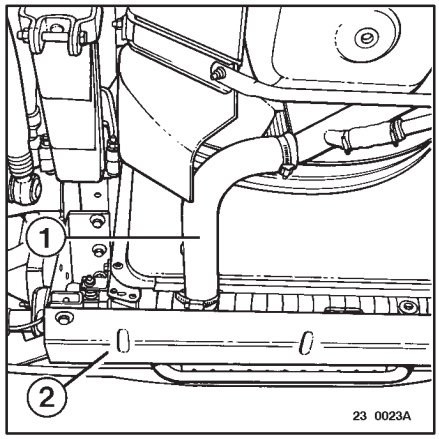
RADIATOR(S)

To remove

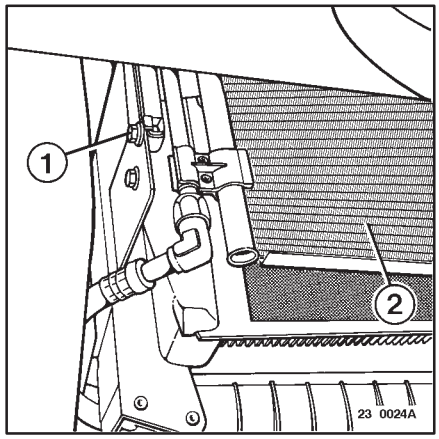
Position the vehicle over a pit or on lifts.
Over a pit, chock the roadwheels.
On lifts, put safety trestles under the axles.
Disconnect the batteries, starting with the negative terminal.
Open the grille and tilt the cab.

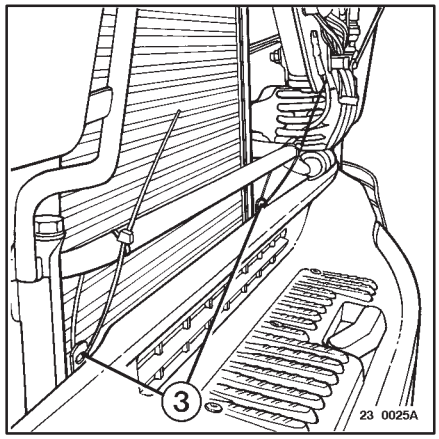
Remove guard plate(**2**).
Drain the cooling system.
(See servicing handbook**3783**).

Disconnect the hose (**1**).

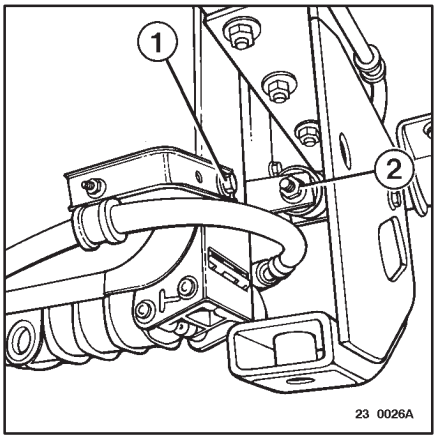


Assembly with air conditioning.
Remove screws (**1–3**) and hold condenser (**2**) in place with a piece of string.

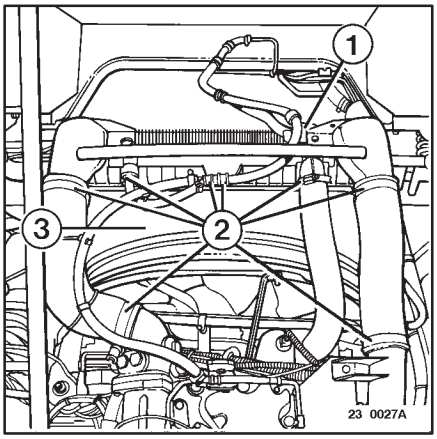




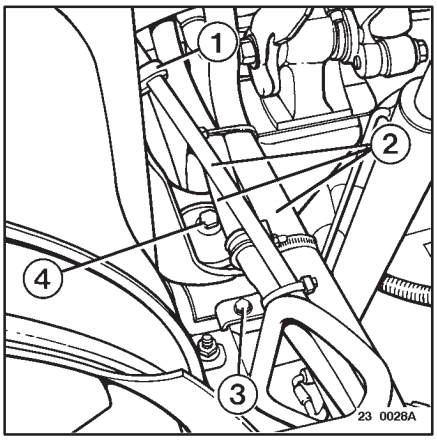
Loosen nuts (**2**).
Remove screws (**1**).



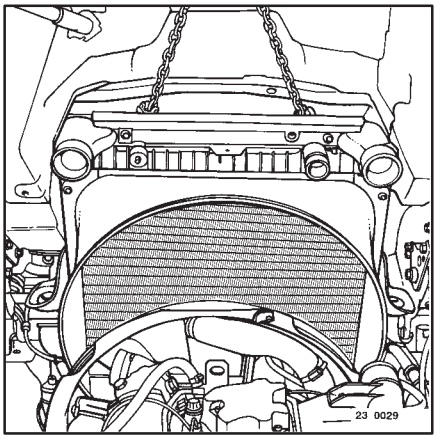
Remove mounting (**1**).
Withdraw clamps (**2**) and disengage hoses.
Unhook the gasket (**3**) from the radiator cowl.



Remove the clamp (**1**).
Remove screw (**3**).
Disengage hoses (**2**).
Remove screws (**4**).



Disconnect the gearshift control at the gearbox end (see MR **32 055**.
Withdraw the rear part and lash the tube to the cab.
Put a sling into place and remove the radiator assembly.
This operation requires special care.



To fit

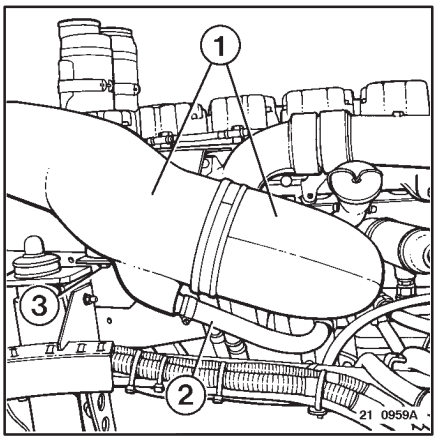
For fitting, proceed in the reverse sequence to removal.
Tighten at the recommended torque.

Fill the cooling system with coolant.
(See servicing handbook**3783**).

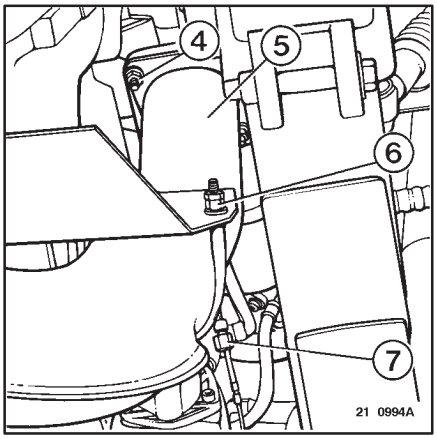
TURBOCHARGER

To remove

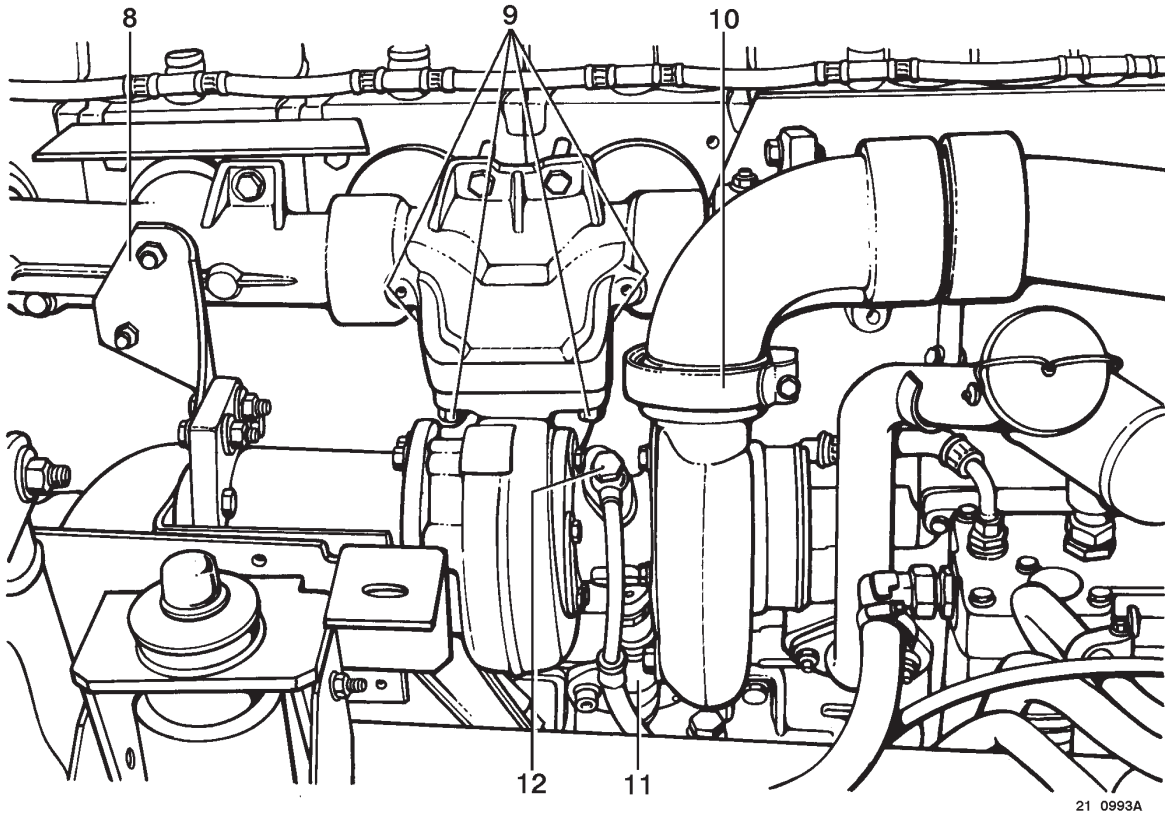
Disconnect flexible pipe (**2**).
Remove screw (**3**).
Remove tube (**1**).



Disconnect union (**7**).
Remove nuts (**4**).
Loosen nuts (**6**).
Disconnect tubes (**5**).
Withdraw the seal.



Remove the heat shield.
Remove the clamp (**10**).
Uncouple fastening (**8**).
Disconnect union (**12**).
Disconnect oil return tube (**11**).
Remove nuts (**9**).
Remove the turbocharger.



To fit

Clean the air conduits and make sure there is no foreign matter left. Before tightening the exhaust manifold set-screws, smear the screw–threads with high temperature–resistant grease (Huiles Renault Diesel Gripcott NF grease) or equivalent.

IMPORTANT
Any turbocharger replacement, where the cause of damage has not been defined, may lead to new incidents ans serious engine damage.
Do not use jointing compound on the turbocharger lubrification pipe fastening flanges. Before installing the turbocharger, ***pout fresh oil through*** *the oil inlet port and turn the rotor by hand to lubricate the journals and the thrust bearing.*
After installing the turbocharger, run the engine and wait for 30 seconds before accelerating.

Replace all seals without fail.

For the rest of the fitting operations, proceed in the reverse sequence to removal.
Tighten at the recommended torque.
Top up the engine oil level.
Start the engine and check for leaks.

TOOLS

RENAULT TRUCKS divide tools into 3 categories

– **General–purpose tools:** Commercially available tools.
  . **50 00 26 .... reference number** (possibility of purchasing through the RENAULT TRUCKS Spare Parts department).
  . **4–figure reference number** (tools with RENAULT TRUCKS reference number, but available from the supplier).

– **Special tools:** Specially created tools, distributed by the RENAULT TRUCKS spare parts division.

– **Locally manufactured tools:** these tools are classified differently according to their degree of sophistication

  . **4–figure reference number** (represented by a drawing): tools that are simple to make without need for special qualification.

  . **50 00 26 .... reference number** (possibility of purchasing through the RENAULT TRUCKS Spare Parts department): a certain skill is needed to make these tools.

Three levels (or echelons) determine their assignment

– **LEVEL1:** Tools for servicing and minor tasks.

– **LEVEL 2:** Tools for major repairs.

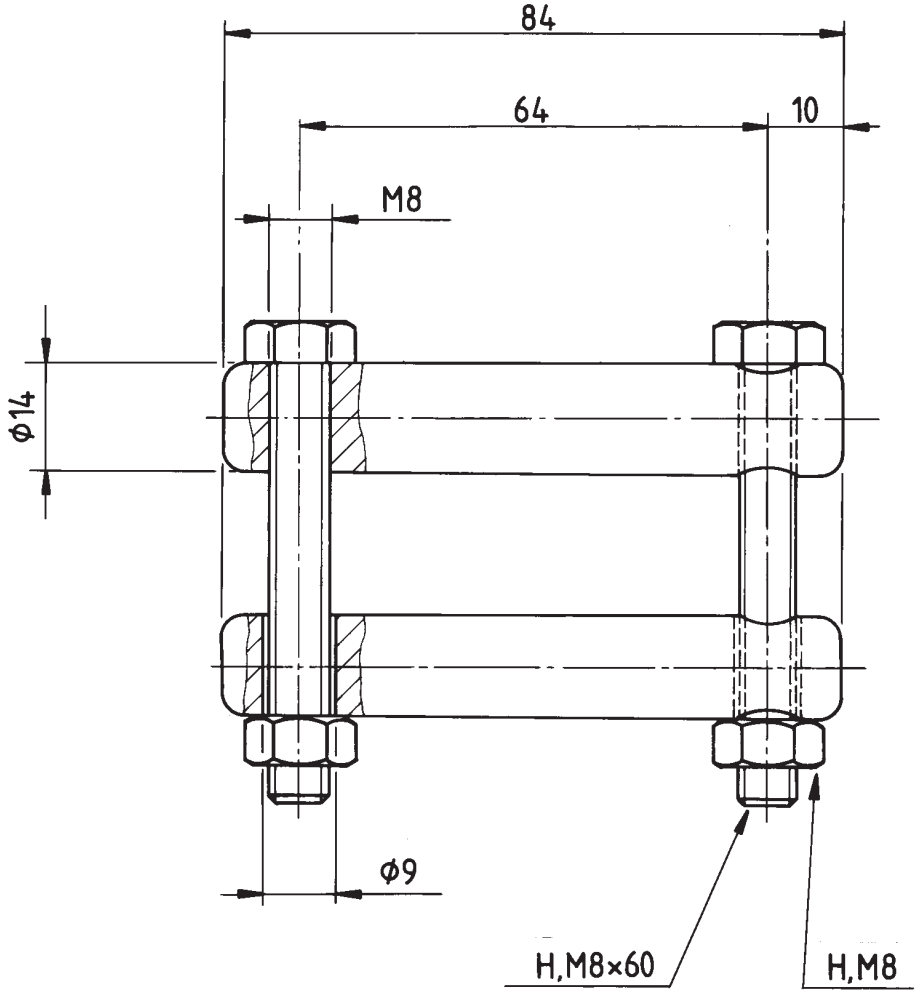
– **LEVEL 3:** Tools for refurbishment.

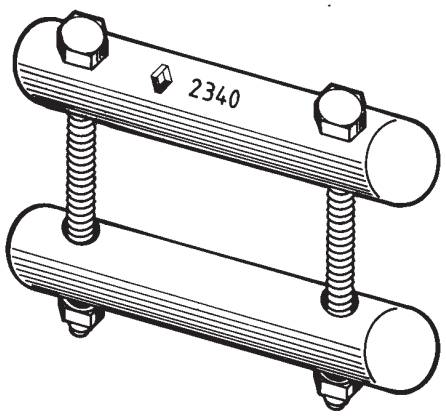
General–purpose tools				
Ref. RENAULT TRUCKS	**Designation**	**Level**	**Quantity**	**Page**
50 00 26 **0843**	Puller	1	1	B3/D2
50 00 26 **1855**	Sensor	1	1	C8
50 00 26 **1302**	Compressing device	1	1	C8

Special tools				
Ref. RENAULT TRUCKS	**Designation**	**Level**	**Quantity**	**Page**
50 00 26 **1380**	Control	1	1	C1/C8

Locally manufactured tools				
Ref. RENAULT TRUCKS	**Designation**	**Level**	**Quantity**	**Page**
2340	Clamp	1	2	B2

Locally manufactured tools





FL 2340