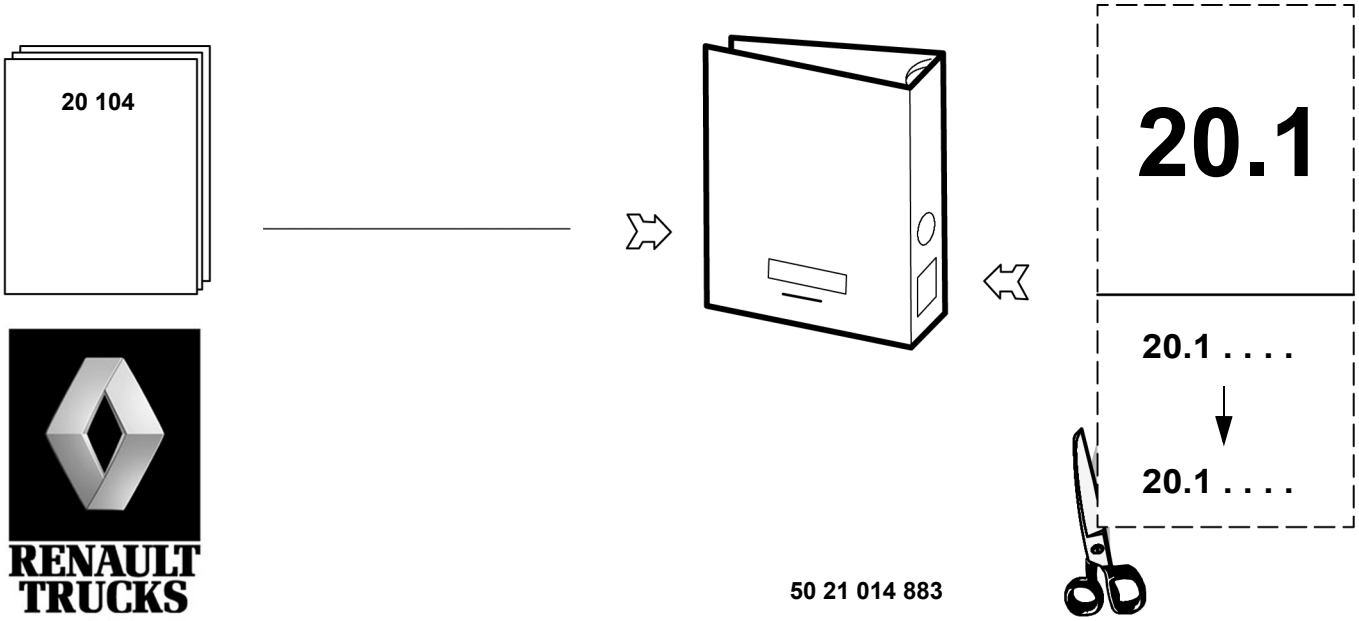
20 104 - GB - 09/2004

ENGINE AND EQUIPMENTS REMOVAL / FITTING

RANGE	FAMILY	VARIANT
MASCOTT DXi	54A	120AX+122BJ/44
	54B	

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.



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GENERALITIES

APPLICABILITY

Range	Family	Title	Variant	Applicability date		Updating	Page N°
				Start	End		
MASCOTT DXi	54A	Warnings	120AX+122BJ/44	01/03/2004		31/03/2003	A-3
	54B		120AX+122BJ/44	01/03/2004			
MASCOTT DXi	54A	Conventional symbols	120AX+122BJ/44	01/03/2004		23/05/2002	A-4
	54B		120AX+122BJ/44	01/03/2004			

Warnings

In this document, safety instructions are symbolized as follows:

DANGER! NON-OBSERVANCE OF THE PROCEDURE DESCRIBED OR LACK OF CARE OR ATTENTION, RISK CAUSING SERIOUS INJURY OR EVEN DEATH.

WARNING! Any different or inappropriate working method risks causing damage to the product.

NOTE! Draws attention to particular or important points of the method.

Comply without fail with the regulations in force relative to the recovery and treatment of used parts and waste.

Conventional symbols

Fitting

	Tighten to torque (Nm) (left-hand thread)		Tighten by indicated value
	Tighten to torque (Nm) (right-hand thread)		Loosen by indicated value
	Tightening torque with lubricated threaded hardware		

Dimensioning

	Tightening		... Greater than or equal to ...
	Equal to		Wear limit
	... Less than ...		Machining limit or dimension
	... Greater than ...		Maximum out-of-true
	... Less than or equal to ...		Maximum parallelism error

Repair

	Force to be exerted in the direction shown (hammer - press)		Smear or coat (see "Consumables" table)
	Heat or cool: Temperature in degrees Celsius (e.g. + 80 °C)		Fill to level (see "Technical Data" and "Consumables" table)
	Weld bead		Grease or oil (see "Consumables" table)
	Repair time - Heating time		Mark - Assemble according to marking

Adjustment

	Rotating friction torque		Turn anti-clockwise
	Turn in alternate directions		Turn anti-clockwise (the figure shows the number of turns)
	Turn clockwise		Turn clockwise (the figure shows the number of turns)
	Place in contact		Move in the direction shown
	Dimension to be assured (mm)		

Various information

	Exhaust - Outlet		Operation with a sequence
	Intake - Inlet		Involves
	Weight in kg (example: 275 kg)		Return to numbered operation - Connected with numbered operation
	Depending on versions or options		Withdraw - Delete
	Wrong		Direction of disassembly (the arrow shows the direction)
	Correct		Direction of assembly (the arrow shows the direction)
	Injection		... to ...
	Repair dimension		Inspect - Check condition of part
	Part to be replaced		Danger for persons, vehicle or equipment

TECHNICAL DATA

APPLICABILITY

Tightening torques

Range	Family	Title	Variant	Applicability date		Updating	Page N°
				Start	End		
MASCOTT DXi	54A	Definitions	120AX+122BJ/44	01/03/2004		27/02/2003	B1-6
	54B		120AX+122BJ/44	01/03/2004			
MASCOTT DXi	54A	Standard nut and bolt tightening torques table	120AX+122BJ/44	01/03/2004		06/06/2003	B1-7
	54B		120AX+122BJ/44	01/03/2004			

Tightening torques for engine ZD30

Range	Family	Title	Variant	Applicability date		Updating	Page N°
				Start	End		
MASCOTT DXi	54A	Definitions	120AX+122BJ/44	01/03/2004		23/02/2004	B2-1
	54B		120AX+122BJ/44	01/03/2004			
MASCOTT DXi	54A	Standard nut and bolt tightening torques table	120AX+122BJ/44	01/03/2004		23/02/2004	B2-1
	54B		120AX+122BJ/44	01/03/2004			

Specific tightening torques

Range	Family	Title	Variant	Applicability date		Updating	Page N°
				Start	End		
MASCOTT DXi	54A	Alternator	120AX+122BJ/44	01/03/2004		03/12/2003	B3-1
	54B		120AX+122BJ/44	01/03/2004			
MASCOTT DXi	54A	Gearbox	120AX+122BJ/44	01/03/2004		07/11/2003	B3-1
	54B		120AX+122BJ/44	01/03/2004			
MASCOTT DXi	54A	Bodywork	120AX+122BJ/44	01/03/2004		04/12/2003	B3-1
	54B		120AX+122BJ/44	01/03/2004			
MASCOTT DXi	54A	Cylinder head	120AX+122BJ/44	01/03/2004		04/09/2003	B3-1
	54B		120AX+122BJ/44	01/03/2004			
MASCOTT DXi	54A	Air conditioning compressor or idler pulley	120AX+122BJ/44	01/03/2004		09/09/2003	B3-2
	54B		120AX+122BJ/44	01/03/2004			
MASCOTT DXi	54A	Timing	120AX+122BJ/44	01/03/2004		05/09/2003	B3-2
	54B		120AX+122BJ/44	01/03/2004			
MASCOTT DXi	54A	Starter	120AX+122BJ/44	01/03/2004		03/12/2003	B3-3
	54B		120AX+122BJ/44	01/03/2004			
MASCOTT DXi	54A	Fuel-injection	120AX+122BJ/44	01/03/2004		09/09/2003	B3-3
	54B		120AX+122BJ/44	01/03/2004			
MASCOTT DXi	54A	Vacuum pump	120AX+122BJ/44	01/03/2004		03/12/2003	B3-3
	54B		120AX+122BJ/44	01/03/2004			
MASCOTT DXi	54A	Steering pump	120AX+122BJ/44	01/03/2004		03/12/2003	B3-3
	54B		120AX+122BJ/44	01/03/2004			
MASCOTT DXi	54A	High pressure pump	120AX+122BJ/44	01/03/2004		09/09/2003	B3-4
	54B		120AX+122BJ/44	01/03/2004			
MASCOTT DXi	54A	Oil pressure	120AX+122BJ/44	01/03/2004		05/03/2004	B3-4
	54B		120AX+122BJ/44	01/03/2004			
MASCOTT DXi	54A	Engine cooling	120AX+122BJ/44	01/03/2004		01/12/2003	B3-4
	54B		120AX+122BJ/44	01/03/2004			
MASCOTT DXi	54A	Engine suspension	120AX+122BJ/44	01/03/2004		01/12/2003	B3-4
	54B		120AX+122BJ/44	01/03/2004			
MASCOTT DXi	54A	Belt tensioner	120AX+122BJ/44	01/03/2004		02/12/2003	B3-4
	54B		120AX+122BJ/44	01/03/2004			
MASCOTT DXi	54A	Turbocharger	120AX+122BJ/44	01/03/2004		03/12/2003	B3-5
	54B		120AX+122BJ/44	01/03/2004			
MASCOTT DXi	54A	Preheat plugs	120AX+122BJ/44	01/03/2004		15/01/2004	B3-5
	54B		120AX+122BJ/44	01/03/2004			

Weights

Range	Family	Title	Variant	Applicability date		Updating	Page N°
				Start	End		
MASCOTT DXi	54A	Engine	120AX+122BJ/44	01/03/2004		04/12/2003	B4-1
	54B		120AX+122BJ/44	01/03/2004			

Consumables

Range	Family	Title	Variant	Applicability date		Updating	Page N°
				Start	End		
MASCOTT DXi	54A	Use	120AX+122BJ/44	01/03/2004		10/11/2003	B5-1
	54B		120AX+122BJ/44	01/03/2004			

Tightening torques

Definitions

There are several types of tightening:
- Tightening to torque (in **Nm**)
- Tightening to angle (in °)
- Tightening to torque-angle (en **Nm + °**)

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

Tightening precision classes:
- **Class I:** Special threaded hardware (tolerances ± 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 the following page(s).

"FIH" type (Nylstop) locknuts must be replaced whenever removed. "DRH" type (oval) locknuts can be re-used. If locknuts (DRH, FIH or other) are re-used, make absolutely certain that the screw-thread of the bolt protrudes least two threads above the top edge of the nut.

Standard nut and bolt tightening torques table

The tightening torque values given in the table are based on standard 01.50.4002 and apply to new nuts and bolts fitted dry and re-used nuts and bolts with oil applied to the screw-threads. If any nuts and bolts are replaced, ***it is absolutely essential to use nuts and bolts recommended by the RENAULT TRUCKS Spare Parts Department (coefficient of friction in compliance with standard 01.50.4002)****.*

Tightening torque values in Nm for conventional "metric system" threaded hardware based on standard 01.50.4002 (H: normal and HE: with flange)		
dia. and pitch of nuts and bolts	**Quality class III**	
	Quality class 8.8	**Quality class 10.9**
6 x 1.00	7.5 ± 1.5	11 ± 2.2
7 x 1.00	15 ± 3	20 ± 4
8 x 1.00	20 ± 4	30 ± 6
8 x 1.25	20 ± 4	27 ± 5.4
10 x 1.00	40 ± 8	60 ± 12
10 x 1.25	40 ± 8	60 ± 12
10 x 1.50	40 ± 8	50 ± 10
12 x 1.25	70 ± 14	100 ± 20
12 x 1.50	65 ± 13	95 ± 19
12 x 1.75	60 ±12	90 ± 18
14 x 1.50	105 ± 21	155 ± 31
14 x 2.00	100 ± 20	145 ± 29
16 x 1.50	160 ± 32	220 ± 44
16 x 2.00	150 ± 30	220 ± 44
18 x 1.50	240 ± 48	340 ± 68
18 x 2.50	210 ± 42	310 ± 62
20 x 1.50	330 ± 66	480 ± 96
20 x 2.50	300 ± 60	435 ± 87
22 x 1.50	450 ± 90	650 ± 130
22 x 2.50	410 ± 82	595 ± 119
24 x 2.00	560 ± 112	820 ± 164
24 x 3.00	510 ± 102	750 ± 150

Tightening torques for engine ZD30

Definitions

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).
For standard nuts and bolts, use the following table.
For other torques, see the next page(s).

"FIH" type (Nylstop) locknuts must be replaced whenever removed. "DRH" type (oval) locknuts can be re-used. If locknuts (DRH, FIH or other) are re-used, make absolutely certain that the screw-thread of the bolt protrudes least two threads above the top edge of the nut.

Standard nut and bolt tightening torques table

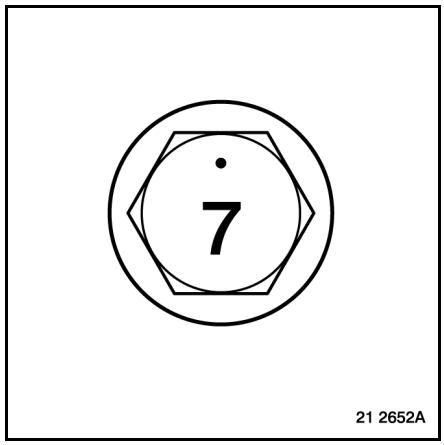
*The tightening torque values given in the table apply to new nuts and bolts fitted dry on the **ZD30** engine.*

Tightening torque values in Nm for conventional "metric system" threaded hardware based on standard 01.50.4002 (H: normal and HE: with flange)		
dia. and pitch of nuts and bolts	**Tightening class for H: normal bolts**	
	Quality class 7T	**Quality class 9T**
6 x 1.00	9 ± 1.5	11 ± 0.5
8 x 1.00	22 ± 3	28 ± 1.5
8 x 1.25	22 ± 3	28 ± 1.5
10 x 1.25	45 ± 7	55 ± 3
10 x 1.50	45 ± 7	55 ± 3
12 x 1.25	80 ± 12	100 ± 5
12 x 1.75	80 ± 12	100 ± 5
14 x 1.50	130 ± 20	170 ± 9
dia. and pitch of nuts and bolts	**Tightening class for HE: flanged bolts**	
	Quality class 7T	**Quality class 9T**
6 x 1.00	11 ± 1.6	13.5 ± 0.7
8 x 1.00	28 ± 4	35 ± 2
8 x 1.25	28 ± 4	35 ± 2
10 x 1.25	55 ± 8	80 ± 4
10 x 1.50	55 ± 8	80 ± 4
12 x 1.25	100 ± 15	130 ± 7
12 x 1.75	100 ± 15	130 ± 7
14 x 1.50	170 ± 25	210 ± 11

Tightening precision class:
- Class 7T: Reserved for standard tightening (tolerance ± 15 % of the nominal torque)
- Class 9T: Reserved for precise tightening (tolerance ± 5 % of the nominal torque)

The tightening class of the bolts is indicated on the bolt head.

Bolt head marking	Class
7	7T
9	9T



Specific tightening torques

Alternator

Alternator to lower bracket securing bolts	**45 Nm**
Alternator to upper bracket securing bolts	**22 Nm**

Gearbox

Nuts and bolts securing gearbox to engine	**67 $^{\pm 10}$ Nm**

Bodywork

Front grille to bumper securing bolts	**3$^{\pm 0.3}$ Nm**

Cylinder head

Preheat plugs electrical power supply securing nuts	**1 → 1.5 Nm**
Preheat plugs wiring harness bracket securing bolts	**22 Nm**
Preheat plugs	**17.5 Nm**
Common rail securing bolts	**26.5 Nm**
Cylinder head cover securing bolts	**11 Nm**
Oil filler neck securing bolts	**8 Nm**
Injector flanges securing bolts	**24.5 Nm**
Camshaft upper bearings securing bolts. Tighten in 2 phases: - 1st phase: - 2nd phase:	 **12.3 Nm** **21.6 Nm**
Timing case securing bolts	**26.5 Nm**
Idling pinion shaft securing bolts	**53.4 Nm**
Front and rear lifting rings securing bolts	**28 Nm**
Top section lubrication pipe securing bolts	**24.5 Nm**
Coolant tube clamp securing nuts	**22 Nm**

Air conditioning compressor or idler pulley

Air conditioning compressor or idler pulley bracket to cylinder block securing bolts	**45 Nm**
Air conditioning compressor or idler pulley bracket to timing case securing bolts	**22 Nm**
Air conditioning compressor or idler pulley to bracket securing bolts	**45 Nm**

Timing

Chain cover securing bolts	**26.5 Nm**
Camshaft speed sensor sleeve securing bolts	**9 Nm**
Coolant temperature sensor	**24.5 Nm**
Chain tensioner securing bolts	**26.5 Nm**
Chain shoe securing bolts	**17.2 Nm**
Chain tension guide securing bolts	**26.5 Nm**
Left-hand camshaft chain sprocket securing bolts	**63.3 Nm**
Right-hand camshaft chain sprocket securing bolts	**63.3 Nm**
Idling pinion shaft securing bolts	**53.4 Nm**
Timing case securing bolts	**26.5 Nm**
Engine speed sensor target to cylinder block guard plate securing bolts	**22 Nm**
Crankshaft pulley securing nut	**387.5 Nm**
Engine speed sensor securing bolts	**22 Nm**
Balancing shafts securing bolts	**22.1 Nm**
Idling pinion securing bolts	**30.9 Nm**
Drive chain sprocket to high pressure pump pinion securing bolts	**38 Nm**
Spacer between high pressure pump and timing plate securing nuts	**28 Nm**
High pressure pump drive pinion securing nut	**105 Nm**
Timing plate securing bolts	**26.5 Nm**

Starter

Starter securing bolts	**$44^{\pm 6}$ Nm**
Power cable securing nut	**9 Nm**
Starter control wire securing nut	**3 Nm**

Fuel-injection

Injector flanges securing bolts	**24.5 Nm**
High pressure pipes to common rail and injectors securing nuts	**29.5 Nm**
Common rail securing bolts	**26.5 Nm**
Common rail supply pipe brackets securing bolts	**22 Nm**
Common rail supply pipe securing nuts	**29.5 Nm**
Fuel temperature sensor bracket	**23.5 Nm**
Fuel return piping brackets securing bolts	**22 Nm**
Injector end high pressure pipe brackets securing bolts	**22 Nm**
Injectors end high pressure pipes securing bolts	**11 Nm**
Common rail end high pressure pipe brackets securing bolts	**22 Nm**
Injector end high pressure pipe bracket flange securing bolts	**28 Nm**

Vacuum pump

Union	**32 Nm**
Vacuum pump securing bolts	**25 Nm**

Steering pump

Steering pump securing bolts	**25 Nm**

High pressure pump

Drive chain sprocket to high pressure pump pinion securing bolts	**38 Nm**
High pressure pump drive pinion securing nut	**105 Nm**
Spacer between high pressure pump and timing plate securing nuts	**28 Nm**
High pressure pump securing bolts	**30 Nm**

Oil pressure

Oil pressure sensor	**$14.8^{\pm 2.5}$ Nm**

Engine cooling

Air radiator to coolant radiator securing bolts	**$18^{\pm 2}$ Nm**
Radiator bracket to water radiator collector securing bolts	**$9^{\pm 2}$ Nm**
Coolant radiator drain plug	**$2^{\pm 2}$ Nm**
Securing clamp dia. **32-52**	**3 Nm**
Securing clamp dia. **60-80**	**5 Nm**
Viscous coupling to water pump nut	**$18^{\pm 4}$ Nm**
Water pump to timing case securing nuts and bolts	**26 Nm**
Water pump pulley securing bolts	**9 Nm**

Engine suspension

Mounting to engine bracket securing bolts	**$80^{\pm 16}$ Nm**

Belt tensioner

Tensioner bracket securing pin	**73 Nm**
Shock absorber upper securing bolts	**27 Nm**

Turbocharger

Turbocharger to exhaust manifold securing nuts	**31 Nm**
Exhaust outlet pipe to turbocharger securing nuts	**31 Nm**
Turbocharger air aspiration pipe securing bolts	**17 Nm**
Turbocharger bracket securing bolts	**45 Nm**
Turbocharger oil supply pipe union	**19 Nm**
Turbocharger oil return pipe flanges securing bolts	**9 Nm**

Preheat plugs

Preheat plugs	**18 Nm**

Weights

Engine

Type	Weight without oil (in kg)	Weight with oil (in kg)
ZD30	263	-

Consumables

Use

Oil capacities and specifications (see Driving & Servicing Handbook)

LIST OF CONSUMABLES

Automotive reference	Industrial reference
12F008	7711219706

TOOLS

APPLICABILITY

Range	Family	Title	Variant	Applicability date		Updating	Page N°
				Start	End		
MASCOTT DXi	54A	Generalities	120AX+122BJ/44	01/03/2004		12/12/2001	C-3
	54B		120AX+122BJ/44	01/03/2004			

Generalities

RENAULT TRUCKS divide tools into three categories:

- **General-purpose tools:** proprietary tools.
  - **50 00 26 .... reference number** (possibility of purchasing through the RENAULT TRUCKS Spare Parts department).
  - **4-figure reference number** (tools classified by RENAULT TRUCKS but available from the supplier).

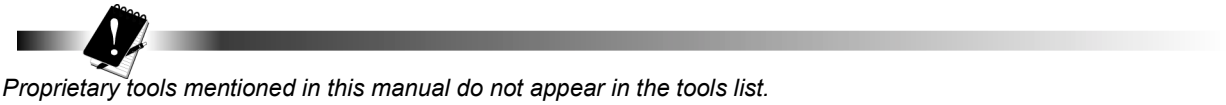
- **Special tools:** specifically created tools distributed by the RENAULT TRUCKS Spare Parts Department.

- **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 amount of skill is needed to make these tools.

Three levels (or echelons) determine their assignment:
- **Level 1:** tools for servicing, maintenance and minor tasks.

- **Level 2:** tools for major repairs.

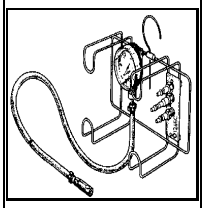
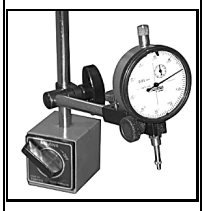
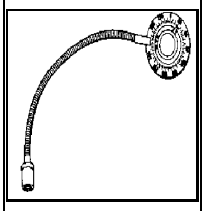
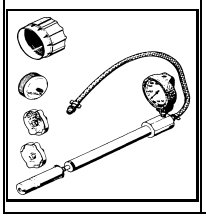
- **Level 3:** tools for refurbishment.



Proprietary tools mentioned in this manual do not appear in the tools list.
These tools are identified in the standard tools manual (MO) by a 4-figure number.

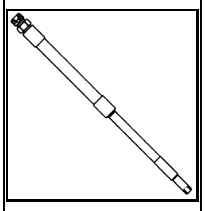
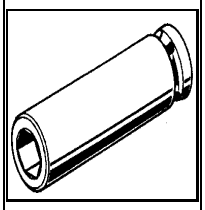
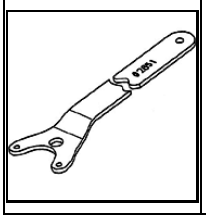
LIST OF TOOLS

General-purpose tools

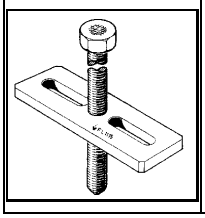
Illustration	RENAULT TRUCKS Ref.	Designation	Manufacturer Reference	Manufacturer code	Level	Qty
	**5000261246**	PRESSURE GAUGE			1	1
	**9661**	COMPARATOR + MAGNETIC FOOT		AQ	1	1
	**5000269776**	ANGULAR DIAL			1	1
	**5000260938**	TESTER			1	1

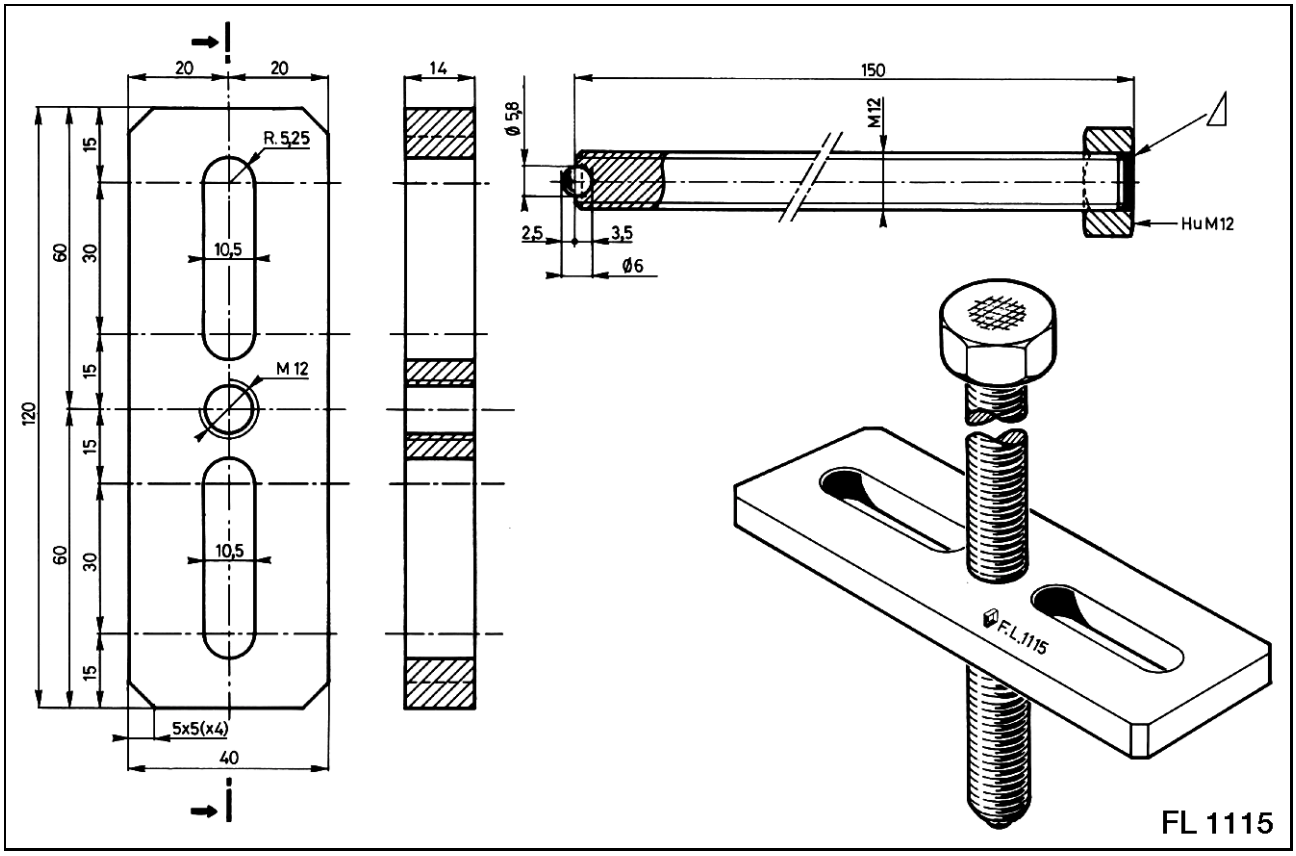
AQ	**BROWN SHARP ROCH**		
	13-15, avenue Georges de la Tour BP 45		
	54303 LUNEVILLE CEDEX		FRANCE
	03 83 76 83 76	03 83 74 13 16	

Special Tools

Illustration	RENAULT TRUCKS Ref.	Designation	Manufacturer Reference	Manufacturer Code	Level	Qty
	**1724**	DUMMY PREHEAT PLUG			1	1
	**9649**	COMPRESSION METER			1	1
	**5000262749**	LONG SOCKET			1	1
	**5000262851**	RETAINER			1	1

Locally manufactured tools

Illustration	RENAULT TRUCKS Ref.	Designation	Manufacturer Reference	Manufacturer Code	Level	Qty
	**1115**	FLANGE			1	1



PRACTICAL ADVICE

APPLICABILITY

Range	Family	Title	Variant	Applicability date		Updating	Page N°
				Start	End		
MASCOTT DXi	54A	Generalities	120AX+122BJ/44	01/03/2004		10/11/2003	D-3
	54B		120AX+122BJ/44	01/03/2004			

Generalities

Practical advice
Prior to any work:
- Clean the major unit and its surrounds (See Driving Servicing Handbook, "Vehicle washing").
- Disconnect the batteries, starting with the negative terminal.
- Mark the pipes and wiring harnesses, if necessary.
- Protect all ports to prevent the ingress of foreign matter.
- Before disconnecting an air pipe, drop the circuit pressure.
- If liquid is splashed onto the bodywork, clean quickly with a cleaning product recommended by RENAULT TRUCKS.

Raising a vehicle on lifts or elevators
- For tyres with size less than or equal to **16** inches, place fork reducers on each lift column.
- Position and centre the lift columns.
- Release the parking brake.
- Raise the vehicle and put safety trestles into place.

Preparation prior to assembly:
Carefully clean and inspect all the parts.
Disassembled seals, circlips and lock-plates must always be discarded and new ones fitted.
Never force fit parts using copper or brass punches or drifts. Use a specially adapted pusher each time so as to prevent ingress of metallic particles into the casings and bearings. Always oil all parts prior to force fitting them.
The inside of the lips of seal rings are to be smeared with grease.

Fastening, locking, sealing and adhesive products:
Prior to assembly, carefully clean the product application surfaces of the parts. Old product residue is to be removed. Threaded portions are to be brushed, tapped and, if necessary, cleaned with a suitable product.
Using the product:
Always adapt the recommended product while observing the utilization conditions appearing on the pack:
- Surface finish,
- Working temperature,
- Reaction, drying, etc. time,
- Shelf life.

Observe the assembly method so as to guarantee the quality of the repair.

BODYWORK

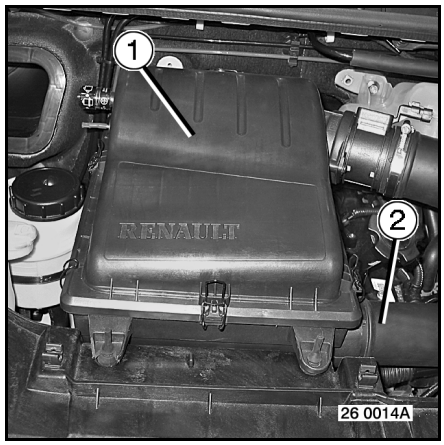
APPLICABILITY

Range	Family	Title	Variant	Applicability date		Updating	Page N°
				Start	End		
MASCOTT DXi	54A	Removal/Fitting	120AX+122BJ/44	01/03/2004		10/12/2003	E-3
	54B		120AX+122BJ/44	01/03/2004			

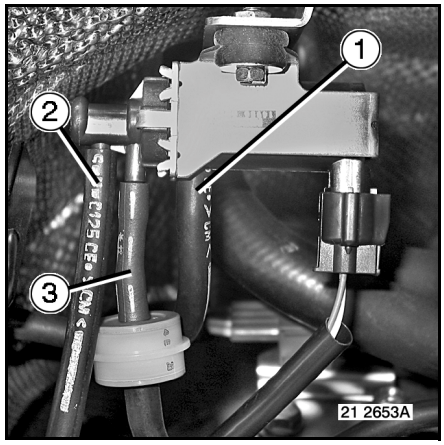
Removal/Fitting

Removal
Before commencing removal, refer to "Generalities".
See page(s) D-3.

Remove air filter **(1)**.
Remove hose **(2)**.



Vehicle **160 DXi**
Disconnect air pipe **(1)**.

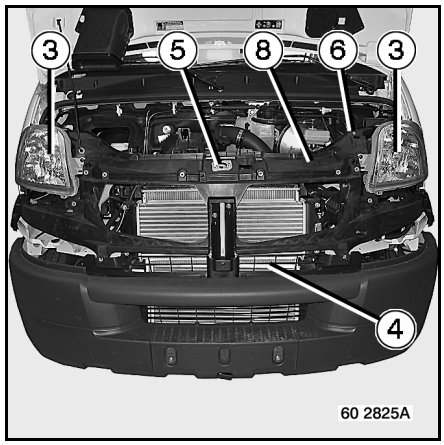


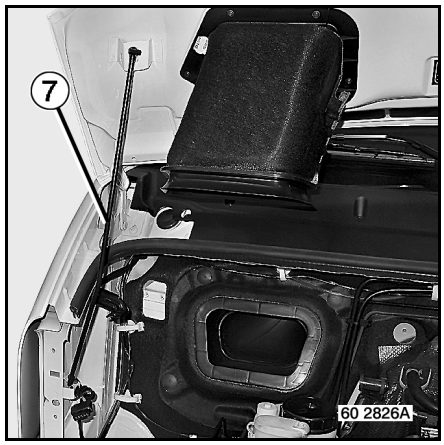
Remove flashing lamps **(1)**.
Remove front grille **(2)**.

Remove front headlamps **(3)**.
Remove the grille **(4)**.
Mark the position then remove engine bonnet lock **(5)**.
Remove switch **(6)**.

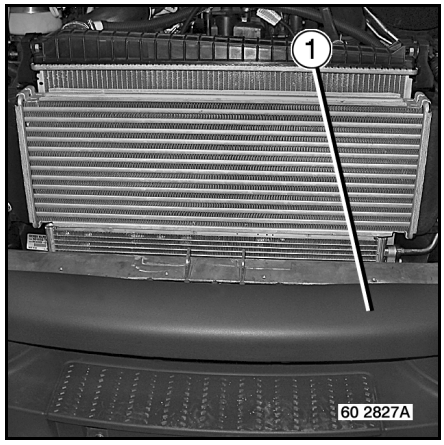
POSITION OF BONNET RETAINING STRUT (7) AS SHOWN IN THE DRAWING BEFORE REMOVING TECHNICAL FRONT END (8).

Remove technical front end **(8)**.





Remove front bumper **(1)**.

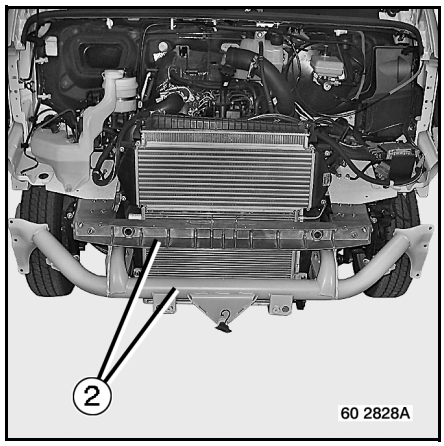


Remove cross-members **(2)**.

Fitting
To fit, proceed in the reverse sequence to removal.

Reposition the engine bonnet lock taking care that the operating cable is correctly in place on the lock. Check that it operates correctly before closing the bonnet.

Tighten to torque.
See pages B-1-7 ; B-3-1.



ENGINE

APPLICABILITY

Range	Family	Title	Variant	Applicability date		Updating	Page N°
				Start	End		
MASCOTT DXi	54A	Checking cylinder compressions	120AX+122BJ/44	01/03/2004		06/07/2004	F-3
	54B		120AX+122BJ/44	01/03/2004			
MASCOTT DXi	54A	Removal	120AX+122BJ/44	01/03/2004		06/01/2004	F-4
	54B		120AX+122BJ/44	01/03/2004			
MASCOTT DXi	54A	Fitting	120AX+122BJ/44	01/03/2004		21/01/2004	F-8
	54B		120AX+122BJ/44	01/03/2004			
MASCOTT DXi	54A	Checking the oil pressure	120AX+122BJ/44	01/03/2004		04/03/2004	F-9
	54B		120AX+122BJ/44	01/03/2004			

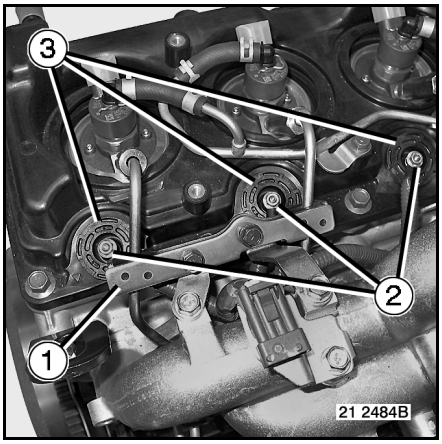
Checking cylinder compressions

Removal
Run the engine to bring it to the operating temperature.
Disconnect the batteries, starting with the negative terminal.
Remove air filter.

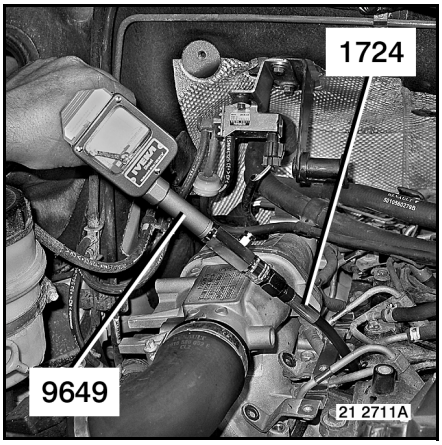
Disconnect the wiring harness from the injectors.

Insulate the injectors wiring harness connectors. There is a risk of short-circuit that may lead to destruction of the ECU.

Remove flanges **(1)** securing injector pipes.
Disconnect the preheat plugs wiring harness **(2)**.
Remove gaskets **(3)**.
Remove the preheat plugs.



Testing
Install tool **1724** + **9649**.
Reconnect the battery.
Actuate the starter until the needle on the compression meter is stable.
Repeat the operation on each cylinder.
Compression pressure
- Normal: **28.4 bars**
- Minimal: **23.5 bars**
- Maximum deviation between cylinders: **3 bars**



Fitting
Disconnect the batteries, starting with the negative terminal.
To fit, proceed in the revere sequence to removal.
Reconnect the battery.
After the work, erase the fault codes using the RENAULT TRUCKS diagnostics tool.

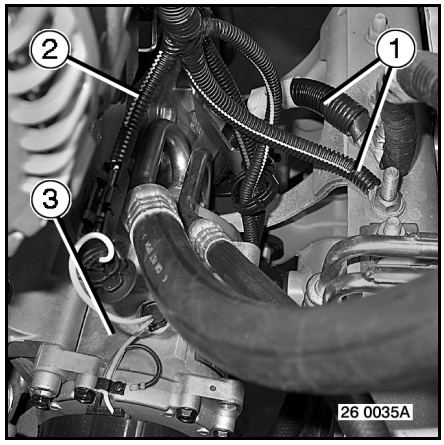
Removal

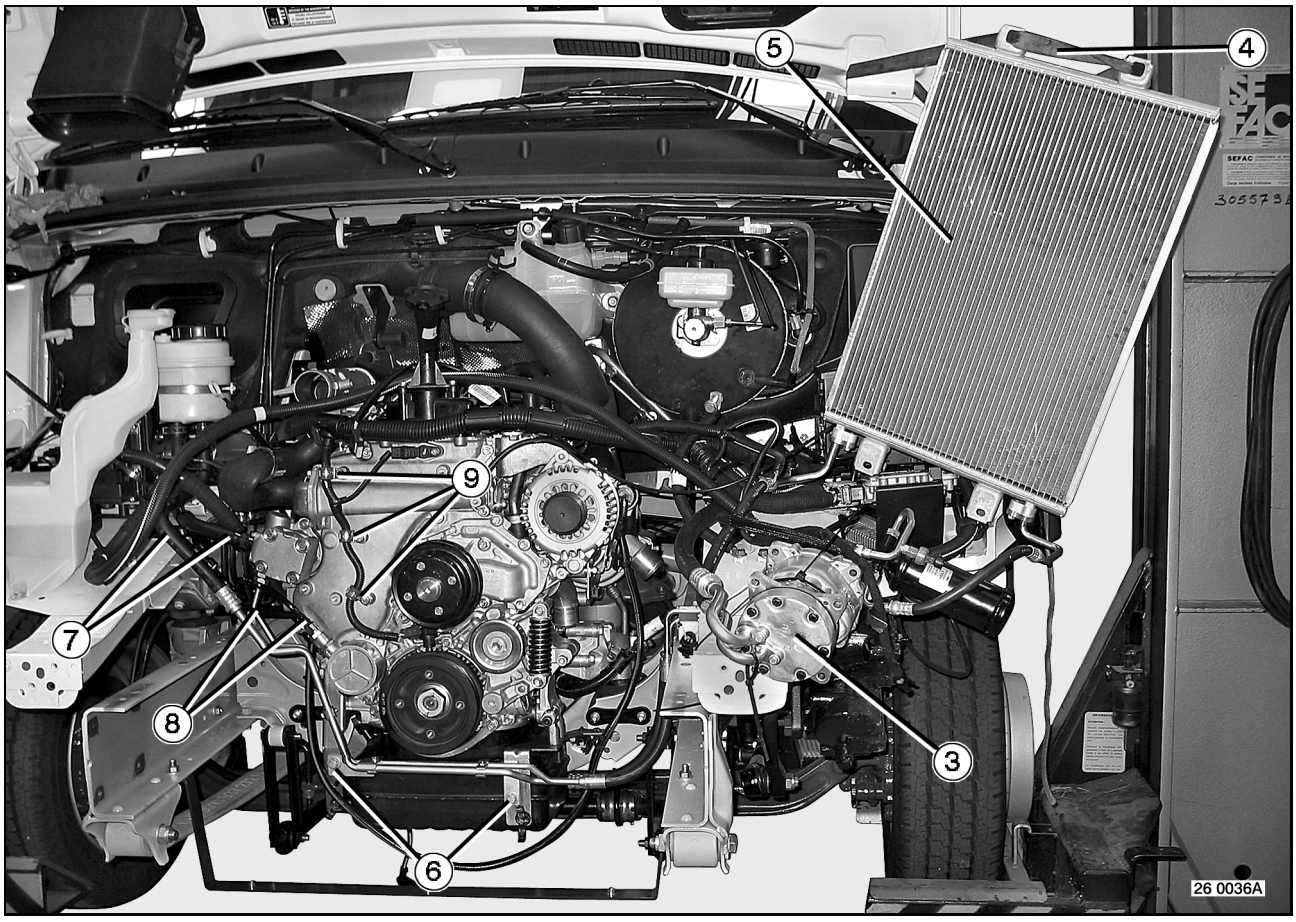
Before commencing removal, refer to "Generalities.
See page(s) D-3.

Refer to "Recommendations" before carrying out any work on the "COMMON RAIL" fuel-injection system (see page(s)I-1-3).

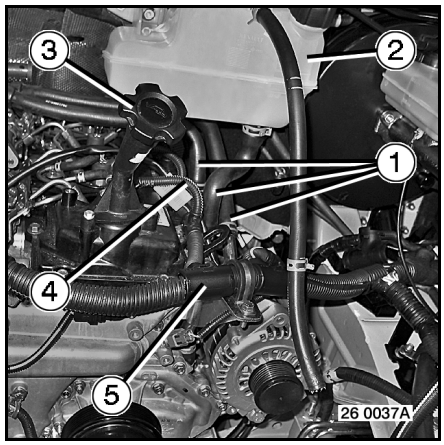
Remove technical front end.
Remove the set of front cross-members.
See page(s) E-3.
Remove radiator.
See page(s) J-1-4.
Remove the engine charge air hoses.
Vehicle **160 DXi**
Disconnect the charge air pressure sensor.
Disconnect the piloting pipe from the turbocharger.

Disconnect earth cables **(1)**.
Vehicle equipped with air conditioning
Disconnect wiring harness **(2)** from the air conditioning compressor.
Remove the drive belt.
See page(s) L-5-1.





Remove air conditioner compressor **(3)** from its bracket without disconnecting the piping and lash it to disengage it from the engine.
Using a strap **(4)**, hold air conditioning compressor **(5)**.
Put a drain pan into place.
Remove bolts **(6)**.
Disconnect hoses **(7)**.
Disconnect pipes **(8)**.
Remove clamps **(9)** .

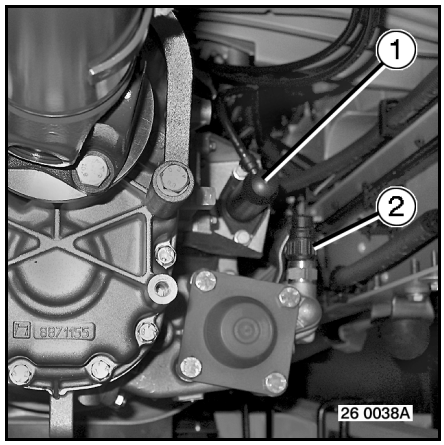


Disconnect hoses **(1)**.
Remove expansion chamber **(2)**.
Remove oil filler spout **(3)**.
Disconnect the wiring harness from the injectors **(4)**.
Disconnect engine speed sensor.
Disconnect camshaft speed sensor.
Disconnect the engine oil pressure sensor.
Disconnect the coolant temperature sensor.
Disconnect the fuel pressure sensor.
Disconnect the high-pressure output regulation solenoid valve.
Disconnect the fuel temperature sensor.
Disconnect the oil minimum level sensor.
Disconnect the EGR solenoid valve.
Disconnect the alternator.
Disconnect the fuel supply and return pipes.

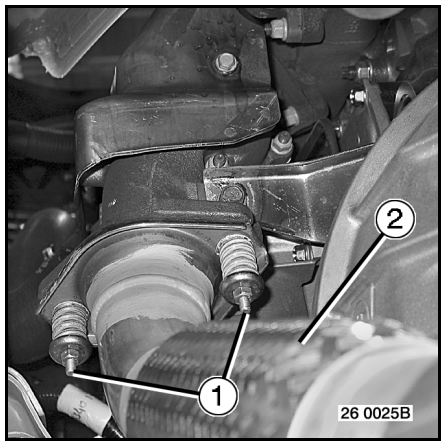
Install clean blanking plugs in all the openings in the fuel system.

Disconnect and remove the starter.
See page(s) L-4-1.

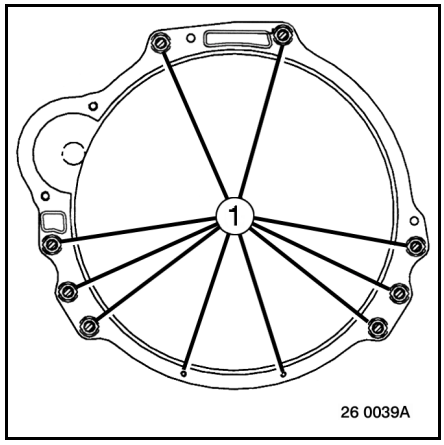
Without disconnecting the hydraulic flexible pipe, remove clutch slave cylinder **(1)** complete with bracket.
Unplug connector **(2)**.



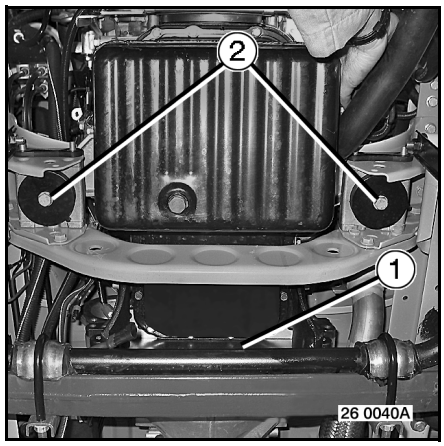
Remove bolts **(1)**.
Disconnect exhaust pipe **(2)**.



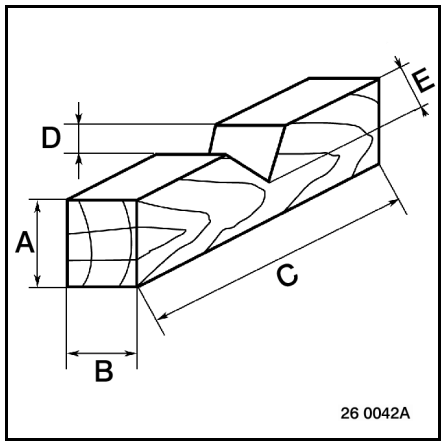
Remove bolts and nuts **(1)** securing the gearbox to the engine.



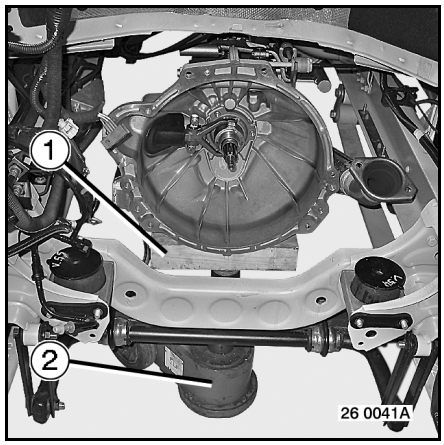
Take off sheet metal guard plate **(1)** from the engine flywheel.
Remove bolts **(2)** securing the engine brackets.



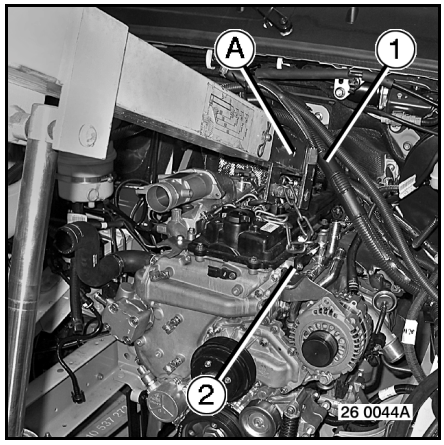
Make a wooden wedge complying with the following dimensions:
- **A** = 70 mm
- **B** = 55 mm
- **C** = 300 mm
- **D** = 40 mm
- **E** = 40 mm



Position wooden wedge **(1)** under the gearbox as shown. Using a jack **(2)**, raise up the gearbox.

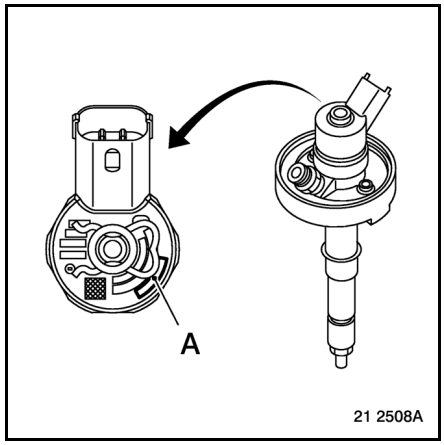


Withdraw wiring harness **(1)** from the engine.
Using lifting tackle **(A)**, remove the engine.
Make use of engine lifting rings **(2)**.

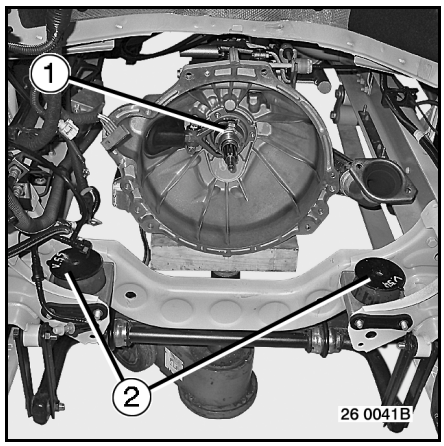


Fitting

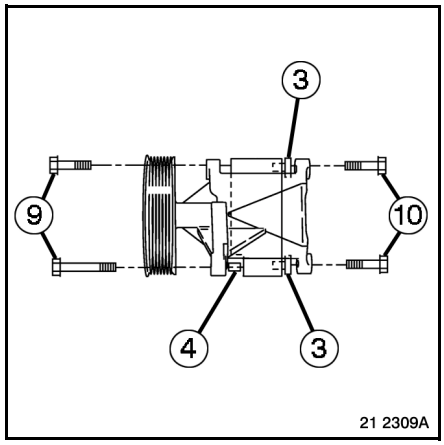
If the engine is being replaced, note down the "IMA" number (A) on each new fuel injector taking care that the cylinder number corresponds to the "IMA" number with which it is associated (N° 1 cylinder, timing end). Using the RENAULT TRUCKS testing tool, re-programme the parameters of the fuel-injection ECU.



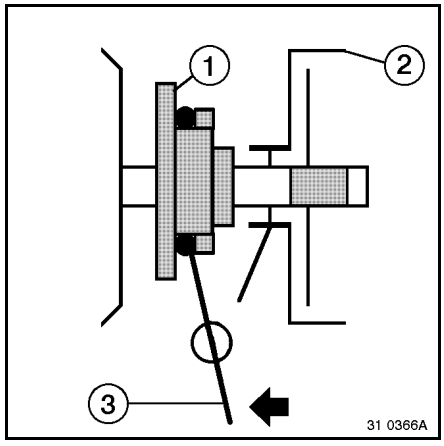
Install clutch release bearing **(1)** to the release bearing carrier.
Fit washer **(2)**.
Engage any gear.
Install the engine.



Vehicle equipped with air conditioning
Install spacers **(3 - 4)**.
Tighten bolts **(9)** followed by bolts **(10)**.



Move operating fork **(3)** rearwards to lock release thrust bearing **(1)** to clutch mechanism **(2)**.
Move operating fork **(3)** forwards to check correct locking of release thrust bearing **(1)**.
Disengage the gear.
To fit, proceed in the reverse sequence to removal.
Tighten to torque.
For values, see "Technical data" chapter".
Fill the cooling system (see "Driving and Servicing" handbook).
Fill the steering system with oil.
Fill the engine with oil.
(See Driving & Servicing handbook)

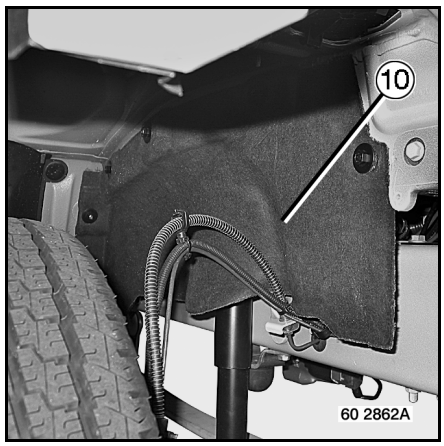


Bleeding the fuel system
See page(s) I-1-3.
Start the engine and test for leaks.

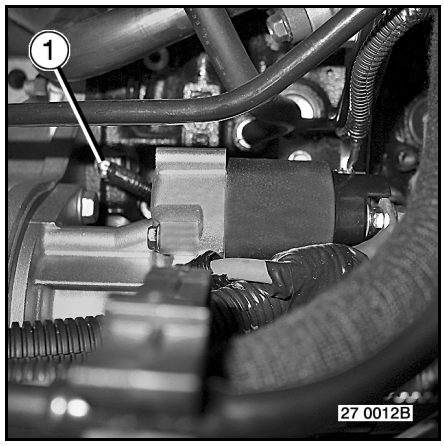
Checking the oil pressure

Before commencing removal, refer to "Generalities".
See page(s) D-3.

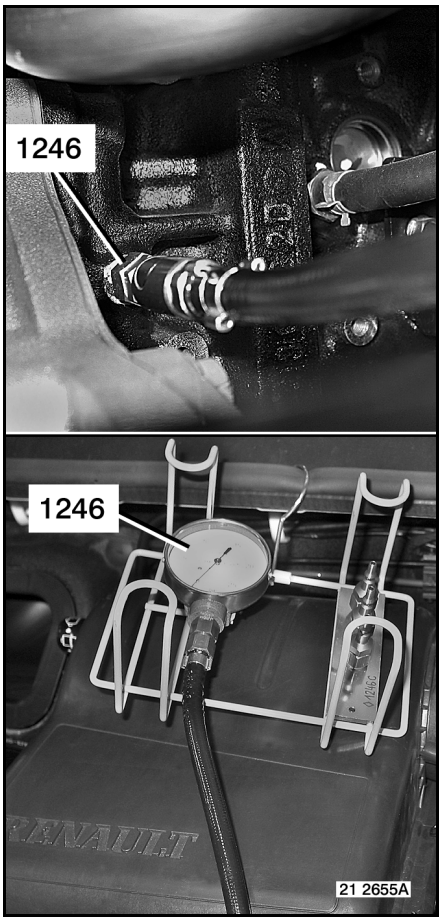
Remove guard screen **(10)**.



Remove engine oil pressure sensor **(1)**.



Install tool **1246**.
Start the engine.
For the values, see the table hereafter.



Engine speed in rpm	Engine block gallery	
	Temperature in °C	Pressure in bar(s)
750	80	1.21
2 000		3.37
3 600		4.65

If the lubrication values do not correspond, check out the engine lubrication system.
See workshop manual section MR **20 662**.
Withdraw tool N° **1246**.
To fit, proceed in the reverse sequence to removal.
Tighten to torque.
See page(s) B-3-4.
Start the engine and test for leaks.

CYLINDER HEAD

APPLICABILITY

Range	Family	Title	Variant	Applicability date		Updating	Page N°
				Start	End		
MASCOTT DXi	54A	Removal	120AX+122BJ/44	01/03/2004		26/01/2004	G-3
	54B		120AX+122BJ/44	01/03/2004			
MASCOTT DXi	54A	Testing	120AX+122BJ/44	01/03/2004		16/06/2004	G-9
	54B		120AX+122BJ/44	01/03/2004			
MASCOTT DXi	54A	Fitting	120AX+122BJ/44	01/03/2004		05/02/2004	G-11
	54B		120AX+122BJ/44	01/03/2004			

Removal

Before commencing removal, refer to "Generalities.
See page(s) D-3.

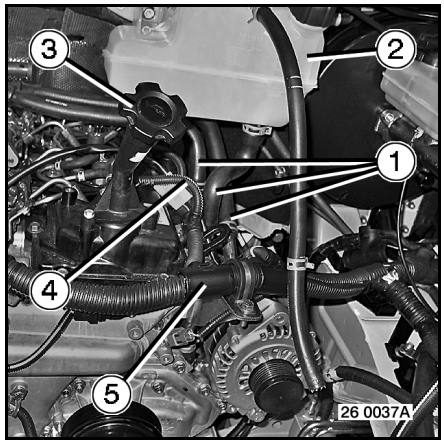
Refer to "Recommendations" before carrying out any work on the "COMMON RAIL" fuel-injection system (see page(s)I-1-3).

Remove radiator.
See page(s) J-1-4.
Remove the drive belt.
See page(s) L-5-1.
Remove viscous coupling / fan assembly; separate the fan from the viscous coupling.

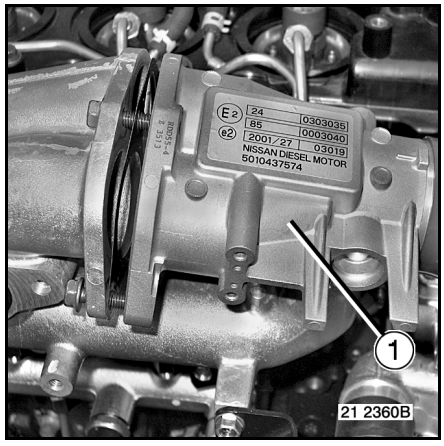
It is vital to keep the viscous coupling in a vertical position during its storage.

See page(s) J-2-1.
Vehicle **160 DXi**
Disconnect the charge air pressure sensor.
Remove the engine charge air hoses.

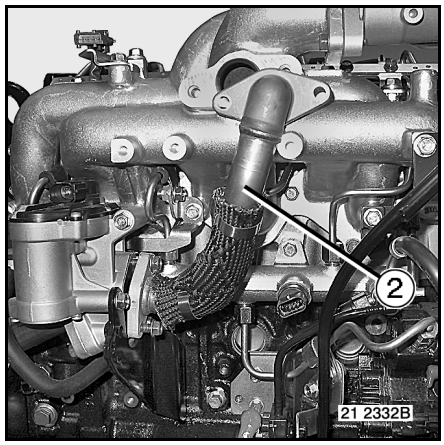
Disconnect hoses **(1)**.
Remove expansion chamber **(2)**.
Disconnect fuel injectors **(4)**.
Disengage wiring harness **(5)**.
Remove the turbocharger.
See page(s) K-3.



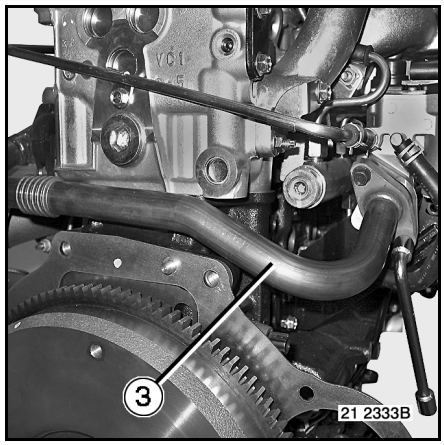
Remove air intake distributor **(1)**.
Disconnect the fuel pressure sensor.
Disconnect the EGR solenoid valve.
Disconnect the fuel temperature sensor.
Disconnect the preheat plugs wiring harness.
Disconnect the piloting pipe from the turbocharger.



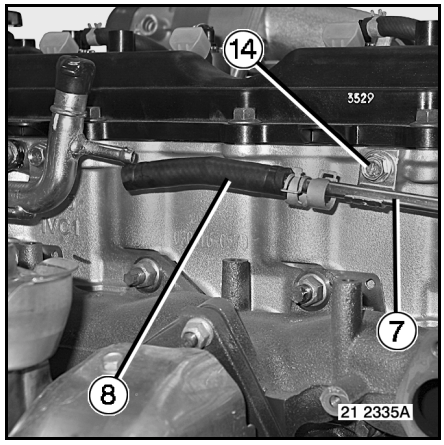
Remove EGR tube **(2)**.

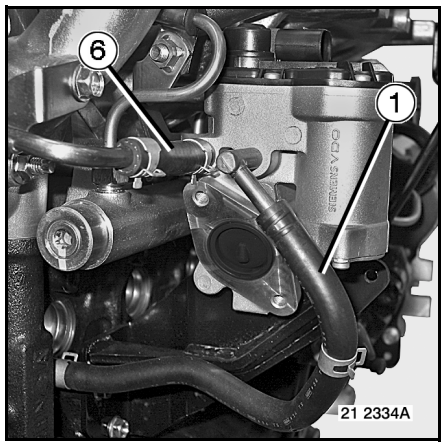


Remove exhaust gas recycling (EGR) pipe **(3)**.

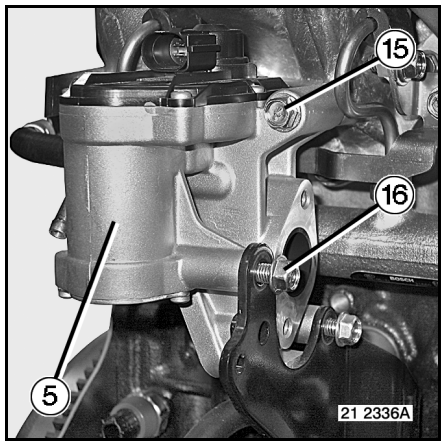


Remove bolt **(14)**.
Disconnect hoses **(1 - 6 - 8)**.
Remove pipe **(7)**.

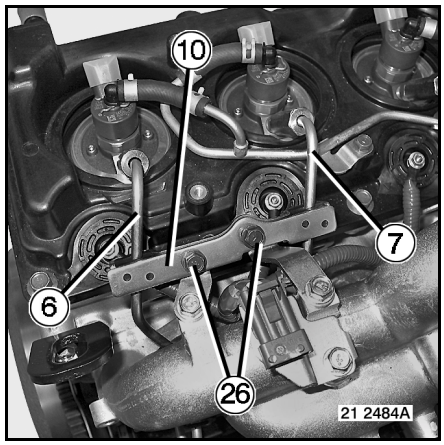


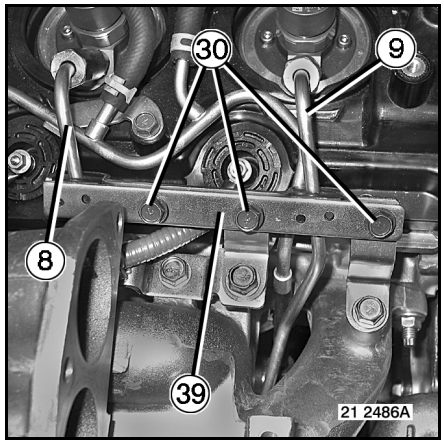


Remove bolts **(15 - 16)**.
Remove EGR solenoid valve **(5)**.
Remove the oil dipstick well.

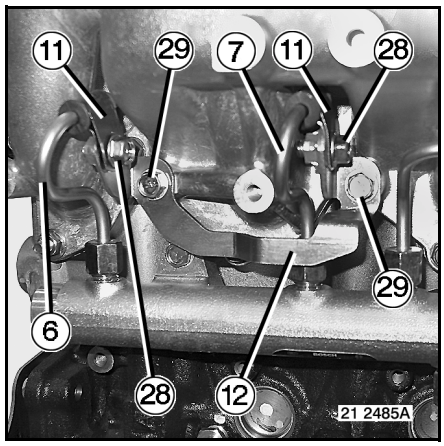


Remove bolts **(26 - 30)**.
Remove retainers **(10 - 39)**.



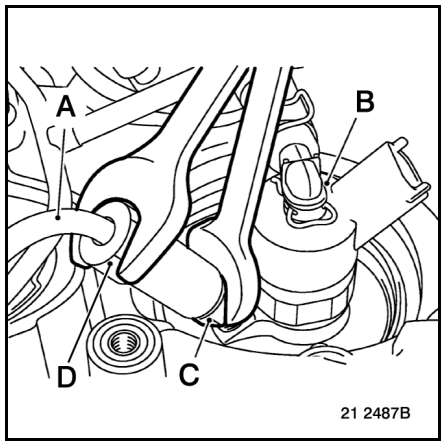


Remove bolts **(28 - 29)**.
Remove flanges **(11)** securing injector pipes **(6 - 7)**.
Remove bracket **(12)**.

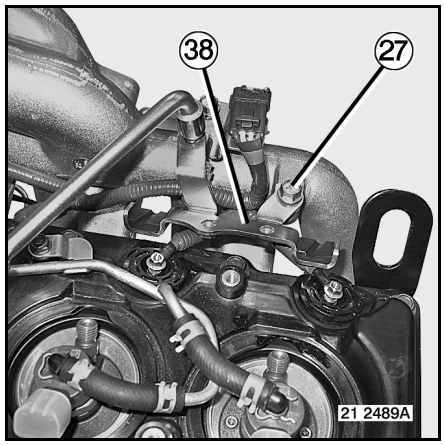


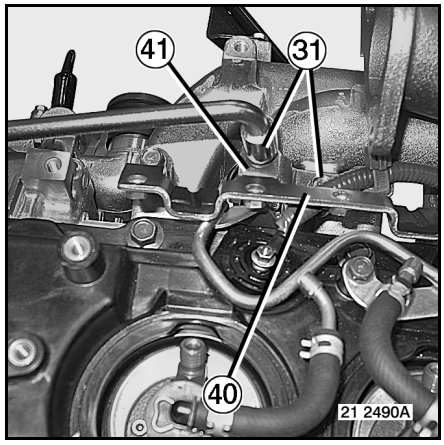
Remove injector pipes **(A)**.
Loosen nut **(D)** on injector pipe **(A)** while holding union **(C)** with an open-ended wrench.

- **A**: injector pipe,
- **B**: injector nozzle-holder,
- **C**: injector union.

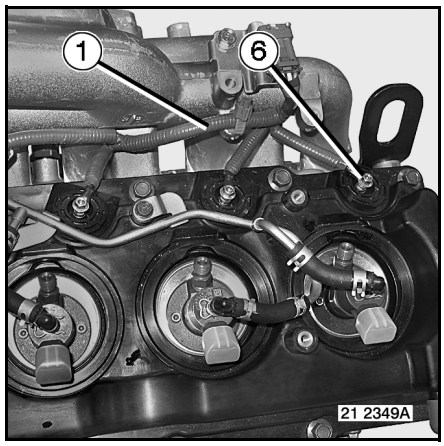


Remove brackets **(38 - 40)**.

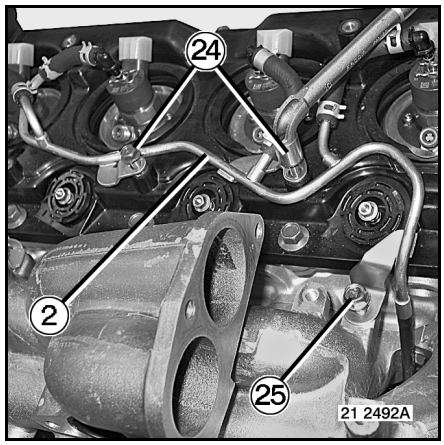




Disconnect the preheat plugs wiring harness **(6)**.

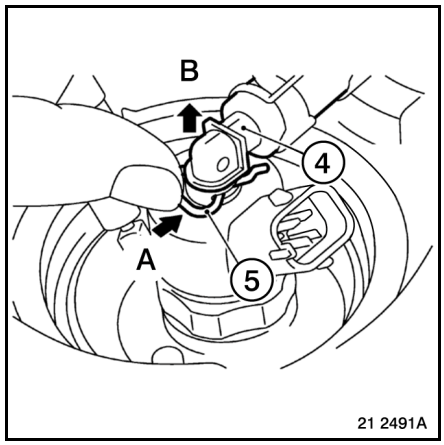


Remove bolts **(24 - 25)**.



Remove the fuel return unions from the injectors by following the procedure hereafter:
- **Action A**: push,
- **Action B**: lift up,
- **Item 4**: fuel return union,
- **Item 5**: key.

Do not remove keys. In the event of accidental removal, systematically replace them.



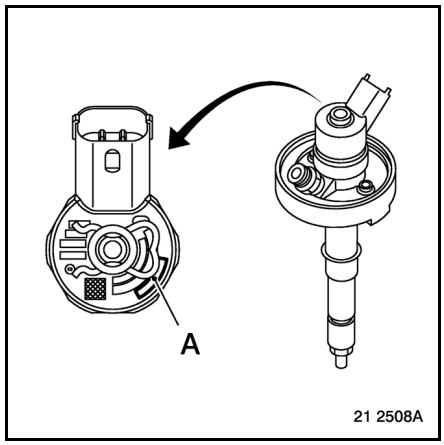
Remove fuel return pipe assembly **(2)**.
Carefully remove the preheat plugs.

Handle the preheat plugs very gently - take special care to not knock or bump them.

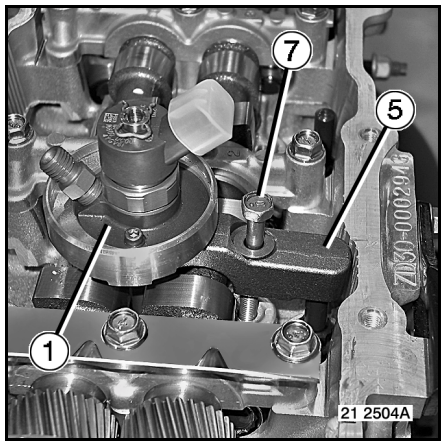
See page(s) L-7-1.
Remove the securing bolts from the cylinder head cover following the reverse sequence to tightening.
See page(s) G-15.
Remove the cylinder head cover.

Mark the location of each injector **(A)** on the engine.

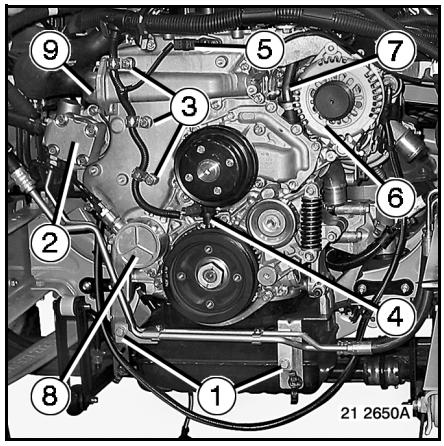
Note down the "IMA" number (A) on each fuel injector taking care that the cylinder number corresponds to the "IMA" number with which it is associated (N°1 cylinder, timing end).



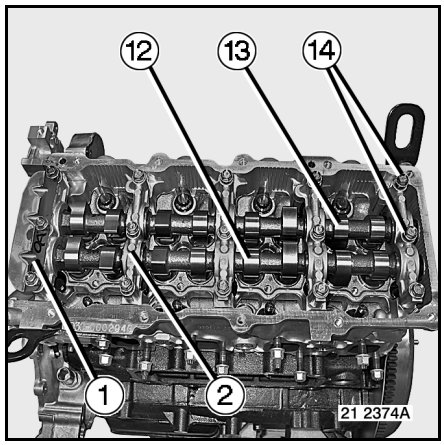
Remove bolt **(7)**.
Remove flange **(5)**.
Remove injector **(1)**.



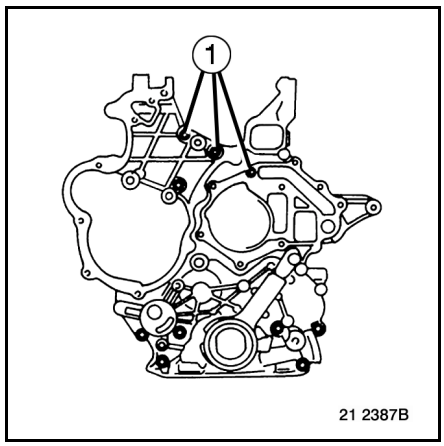
Remove securing nuts and bolts **(1)**.
Remove steering pump **(2)** without disconnecting the pipes and lash it to the chassis.
Remove clamps **(3)**.
Disconnect engine speed sensor **(4)**.
Disconnect camshaft speed sensor **(5)**.
Remove pipe **(7)**.
Remove vacuum pump **(8)**.
Remove duct **(9)**.
Remove the timing chain.
See page(s) H-3.



Remove bolts **(14)** by loosening them in the reverse sequence to tightening.
See page(s) G-13.
Check for the presence of main bearing cap marks.
Remove grease catcher **(1)**.
Remove bearing caps **(2)**.
Mark the position of camshafts **(12 - 13)**.
Remove the camshafts.



Remove bolts **(1)**.
Remove the cylinder head bolts in the reverse sequence to tightening.
See page(s) G-12.
Use tool **2749**.
Remove the cylinder head.



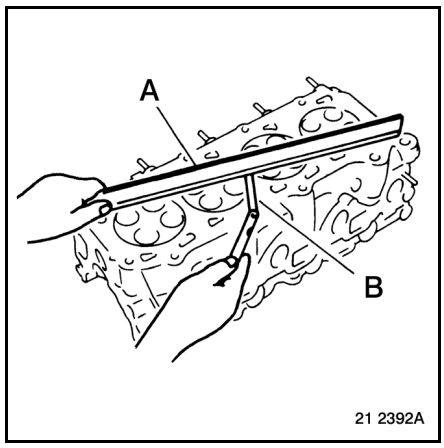
Testing

Carefully clean and inspect all the parts.

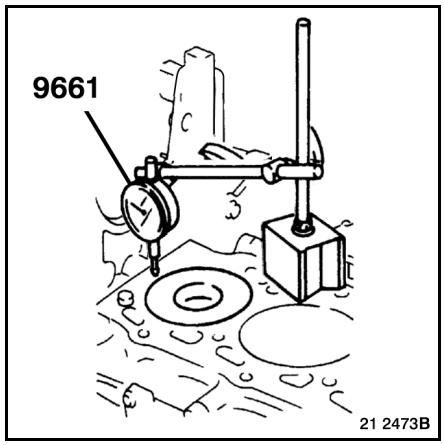
Checking the cylinder head flatness

Use a straight edge **(A)** and a feeler gauge **(B)**.
Tolerance limit: 0.2 mm

Replace the cylinder head if the flatness is outside the tolerances.

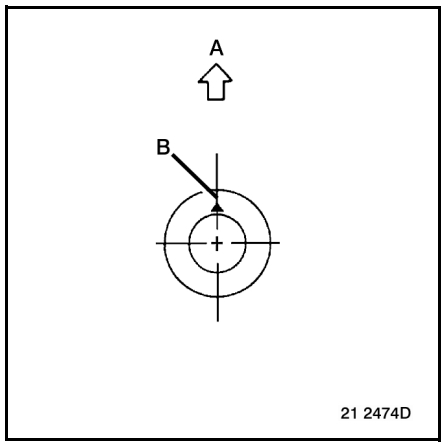


Cylinder head gasket thickness
Calculate the piston setback to define the thickness of the cylinder head gasket (gasket tightened).
Use tool **9661**.
Set the dial gauge to "**0**" using the cylinder block joint face as reference plane.



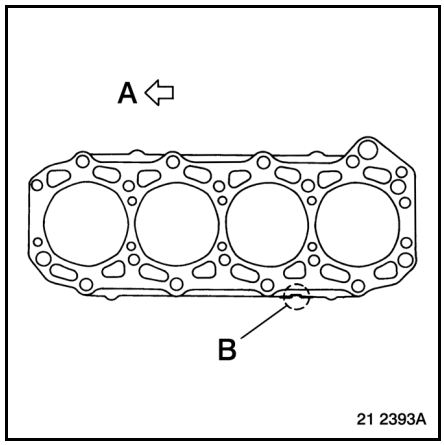
– **A**: engine front,
– **B**: gauging point.

Move the dial gauge support over the joint face in order to place the stylus on the gauging point **(B)**.
Bring the piston to TDC.
Note down the piston setback value showing on the dial gauge.
Select the suitable cylinder head gasket by comparing the measured piston set-back with the values given in the table below.



Piston set-back	Cylinder head gasket thickness (cylinder head tightened)	Number of notches
> 0.079 mm	0.65 mm	1
< 0.079 mm	0.70 mm	2

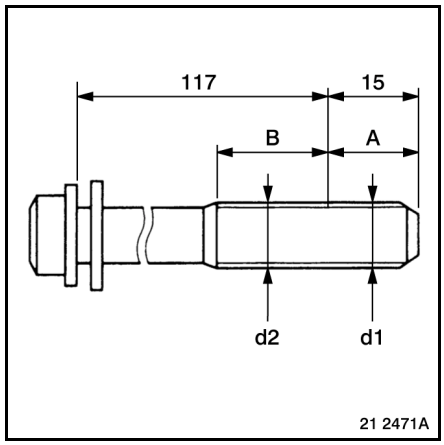
– **A**: engine front,
– **B**: notch(es).



Cylinder head bolts

– **A**: gauging band **d1**,
– **B**: gauging band **d2**.

Measure outside diameters **d1-d2**.
Set the necking point at the measuring point **d2**, if it cannot be determined.
Calculate the difference between **d1 - d2**.
Tolerance limit: 0.15 mm

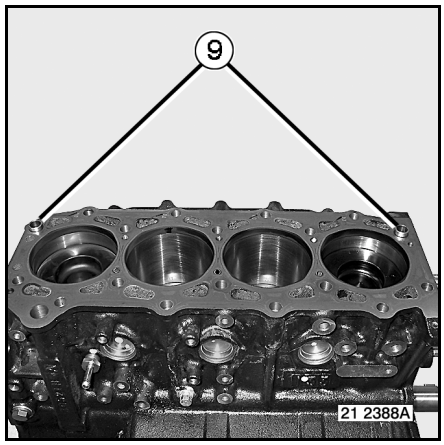


Replace any bolts that are outside the tolerances.

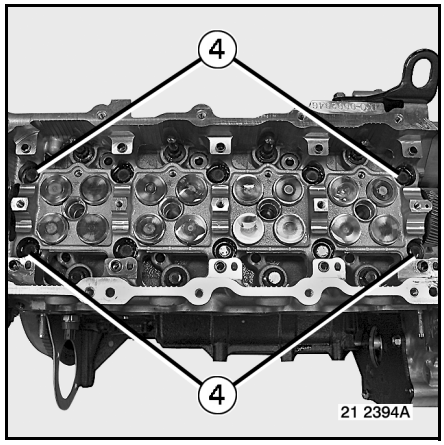
Fitting

Before commencing fitting, refer to "Generalities".
See page(s) D-3.
Replace seals.

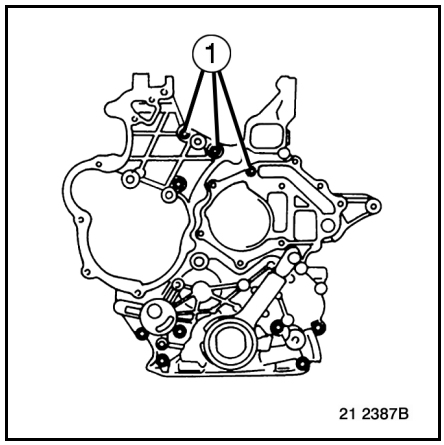
Check that locating dowels **(9)** are in place.
Fit a new cylinder head gasket.
Fit the cylinder head.



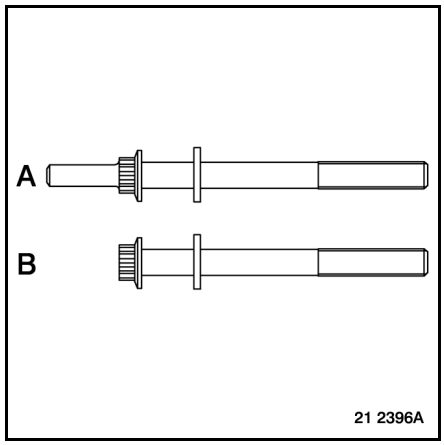
To tighten down the cylinder head(s)
Fit bolts **(4)**.
Tighten to a torque of **44 Nm**.
Loosen bolts **(4)**.



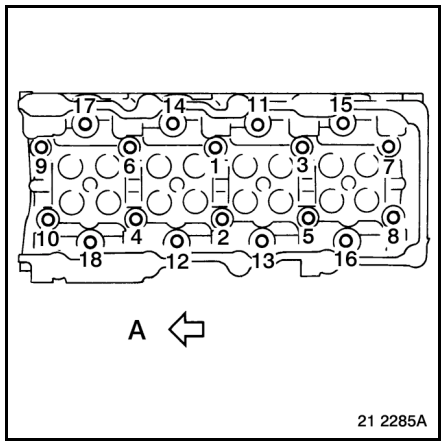
Fit bolts **(1)**.
Tighten to a torque of **9.8 Nm**.



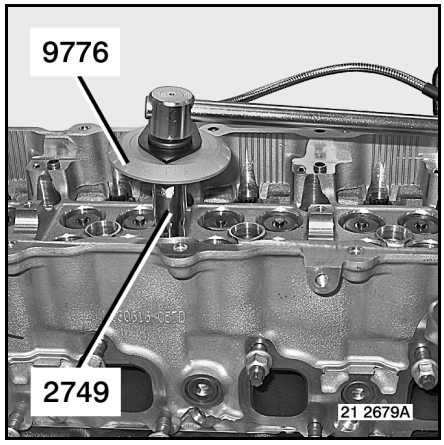
Apply oil to the washers and bolts.
Install bolts **(A)** serving as support for the injector nozzle-holder flanges in locations **(12 - 13 - 16 - 18)**.
Install bolts **(B)** in locations **(1 → 6 - 11 - 14 - 15 - 17)**.
A: engine front.



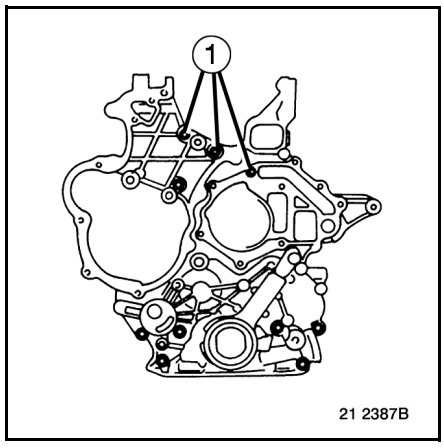
Tighten **1st** to a torque of **100 Nm** in the sequence shown.
In the reverse sequence to tightening, loosen the bolts and bring them back into contact with the cylinder head without forcing.
In the sequence shown:
- Tighten the bolts to a torque of **42 Nm**.
- Tighten **1st** to an angle of **90 °**.
- Tighten **2nd** to an angle of **90 °**.



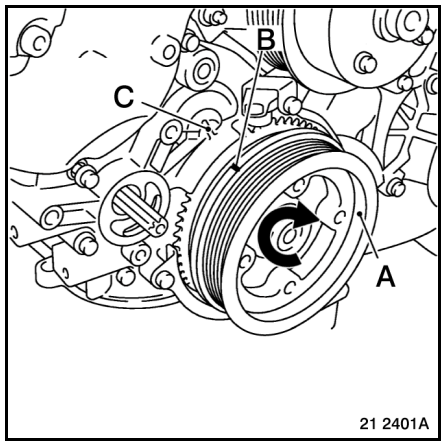
Use tool **2749** + **9776**



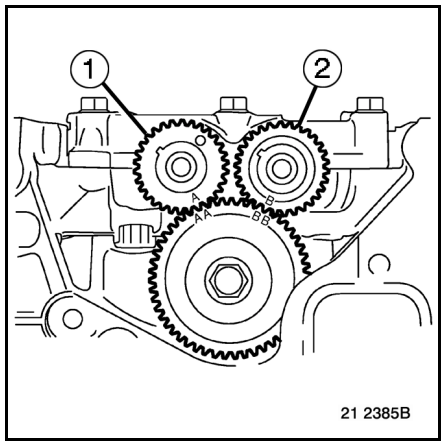
Loosen bolts **(1)**.
Retighten bolts **(1)**.
Tighten to a torque of **9.8 Nm**.



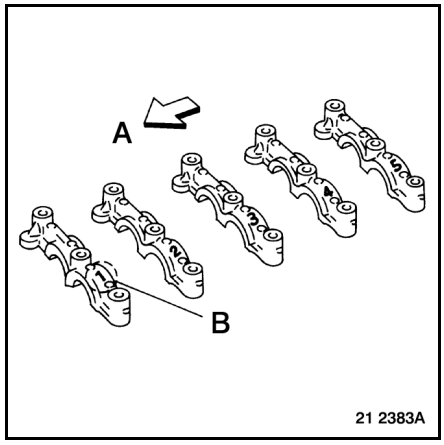
Line up marks **(B)** and **(C)**.



Install camshafts **(1 - 2)** in their original locations.
Line up marks **(A)** and **(B)**.

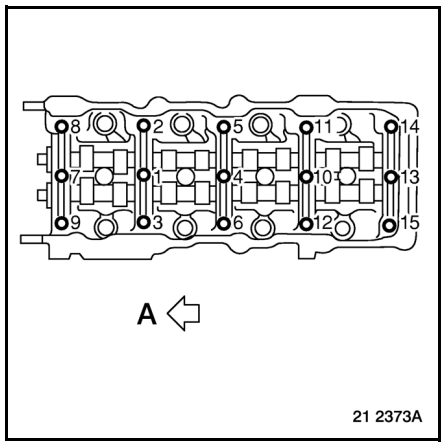


Fit the bearing caps.
Ensure the position **(B)**.
- **A**: engine front.

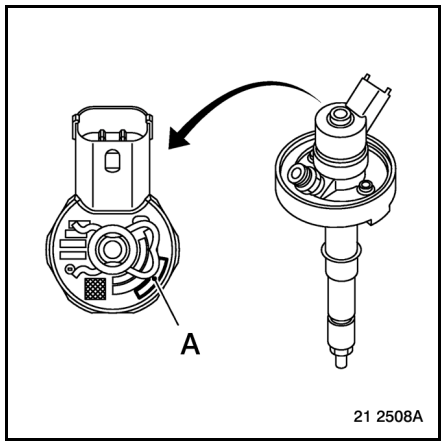


Progressively tighten the bolts to torque in two phases.
Follow the tightening sequence.
See page(s) B-3-1.
Check the camshaft end float.
See workshop manual section MR **20662**.
Fit the timing chain.
See page(s) H-7.
Check the valve clearances.
See workshop manual section MR **20662**.

Fit each fuel injector in their original locations.

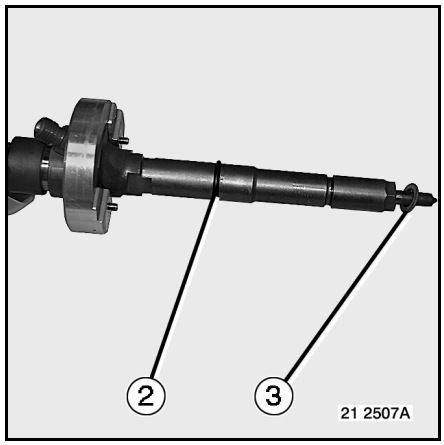


If the engine is being replaced, note down the "IMA" number (A) on each new fuel injector taking care that the cylinder number corresponds to the "IMA" number with which it is associated (N° 1 cylinder, timing end). Using the RENAULT TRUCKS testing tool, re-programme the parameters of the fuel injection ECU.



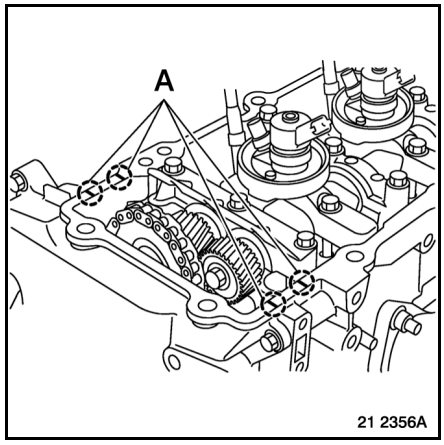
Replace seals **(2 - 3)**.
Grease gasket **(2)**.

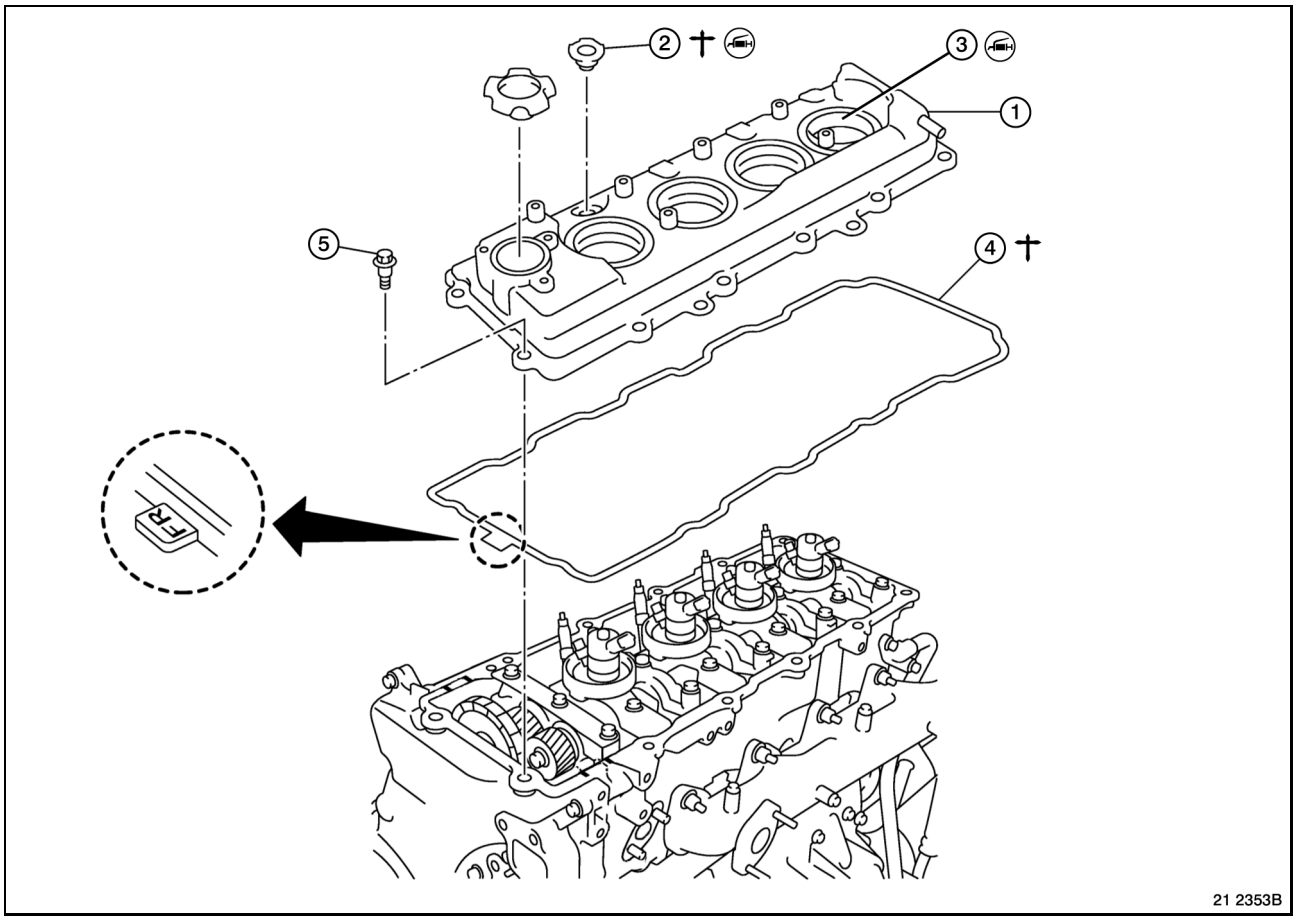
*Watch that O-ring **(2)** remains in its groove during installation of the fuel injector.*



Tighten to torque.
See page(s) B-3-1.
Fit the preheat plugs.
See page(s) L-7-1.

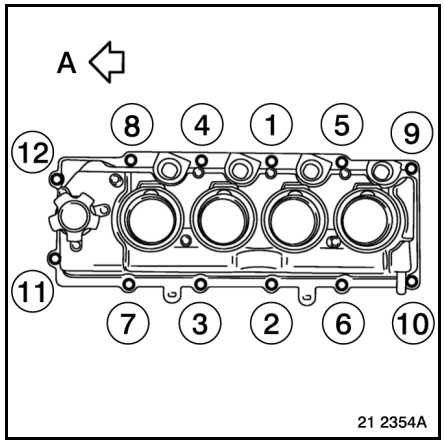
Apply sealing compound **12F008** to block up interstices **(A)**.



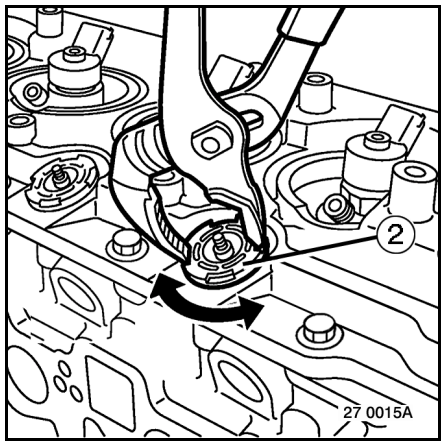


Install seal **(4)**.
Direct the mark **(FR)** to the top.

Fit the rocker cover.
Tighten bolts **(5)** to torque, following the tightening sequence.
See page(s) B-3-1.

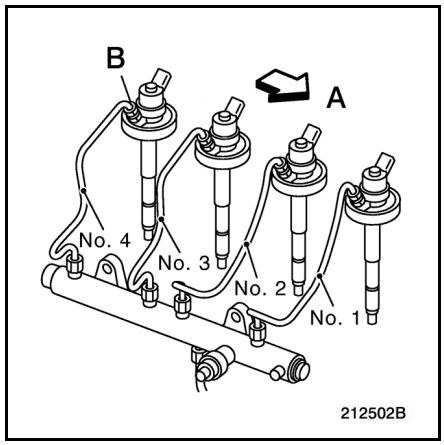


Apply oil to seals **(2)**.
Install seals **(2)**.

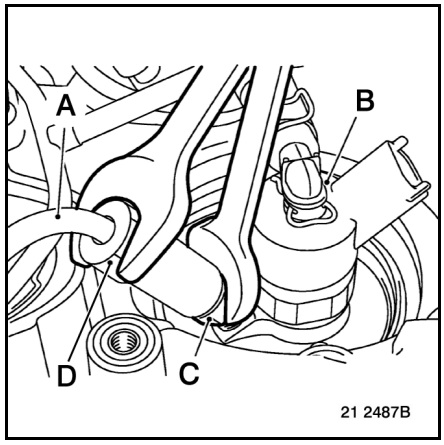


Replace the injector pipes.
– **A**: engine front.

*Fit injector pipe with black coloured nut **(B)** to N° **4** cylinder injector.*



Tighten nut **(D)** on injector pipe **(A)** to torque, while holding union **(C)** with an open-ended wrench.
See page(s) B-3-3.
For the rest of the fitting operations, proceed in the reverse sequence to removal.
Tighten to torque.
Bleed the fuel system.
See page(s) I-1-3.
Fill the cooling system.
(See Driving & Servicing handbook)
Start the engine and test for leaks.

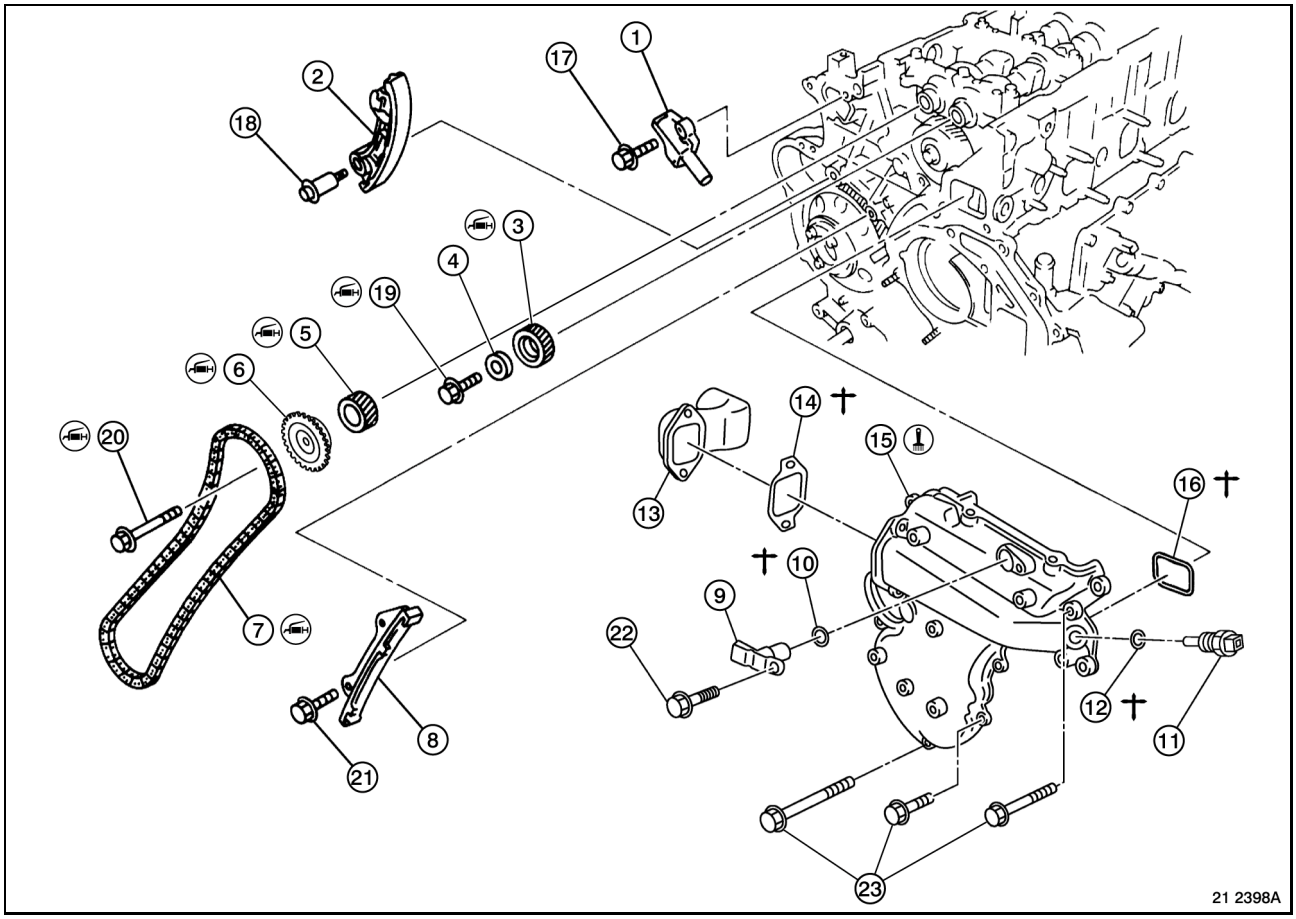


TIMING CHAIN

APPLICABILITY

Range	Family	Title	Variant	Applicability date		Updating	Page N°
				Start	End		
MASCOTT DXi	54A	Exploded view	120AX+122BJ/44	01/03/2004		23/10/2003	H-3
	54B		120AX+122BJ/44	01/03/2004			
MASCOTT DXi	54A	Removal/Fitting	120AX+122BJ/44	01/03/2004		28/01/2004	H-3
	54B		120AX+122BJ/44	01/03/2004			

Exploded view

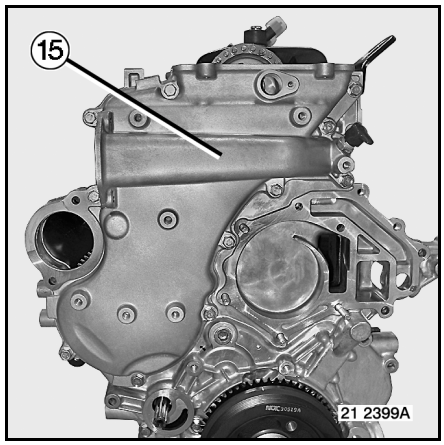


Removal/Fitting

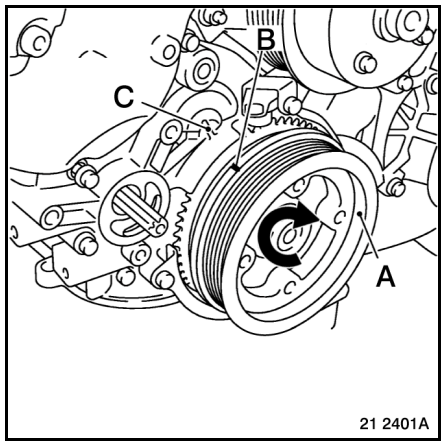
Removal
To gain access to the timing chain.
See page(s) G-3.
The item numbers indicated in the text refer to the drawing on page H-3.

Remove the chain cover **(15)**.
Use a lever to dislodge the chain cover from the locating dowels.

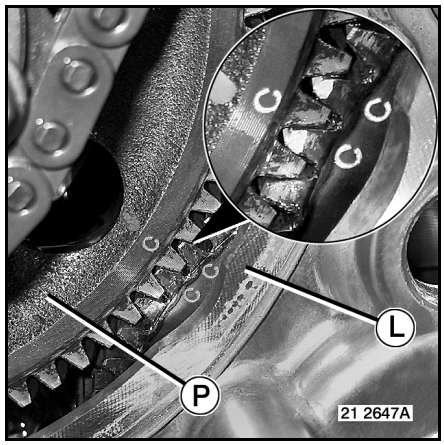
Take all necessary precautions to prevent the ingress of dust and foreign matter when the casing cover is removed.



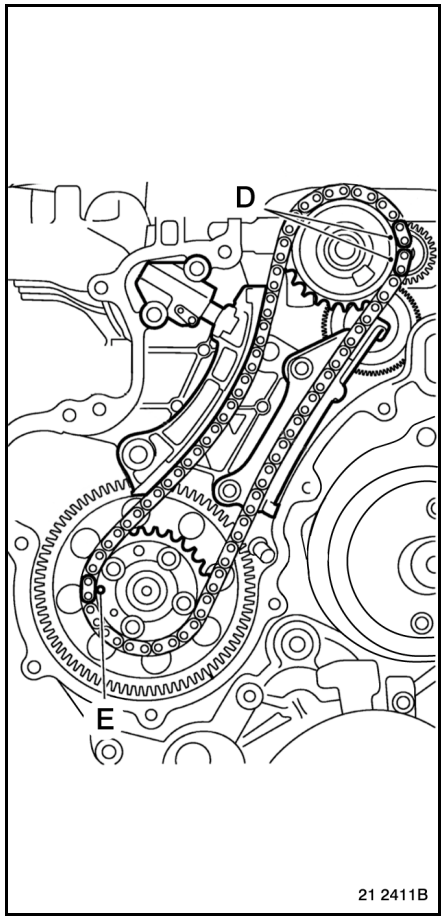
Direction of rotation **clockwise**
Turn the engine in the direction of normal running, as far as compression**TDC** of **N° 1** cylinder (valves of cylinder in balance with valves of **N° 4** cylinder).
Line up marks **(B)** and **(C)**.



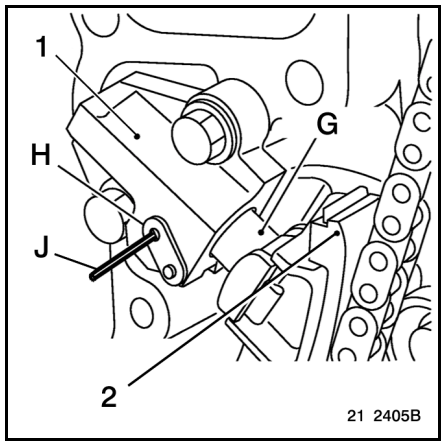
If necessary, turn the engine through several revolutions so that the marks **(C - CC)** on the high pressure pump driving pinions **(P - L)** are in the position shown.



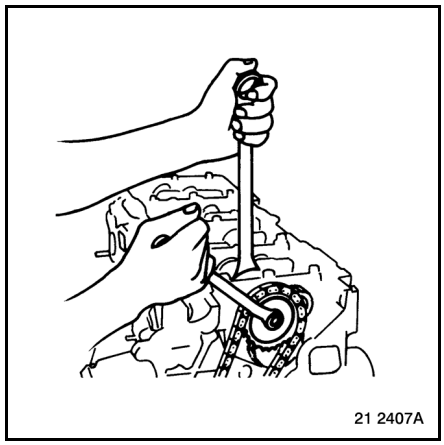
Ensure that the marks **(D - E)** on the timing chain driving sprockets are in the position shown.



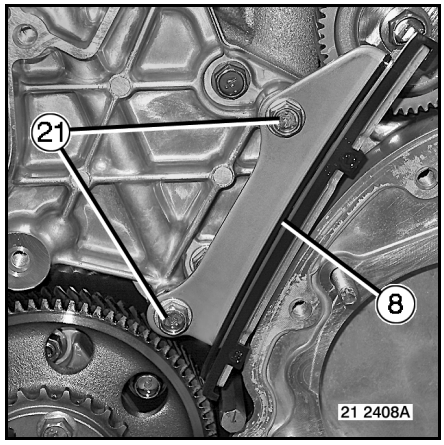
Lift up lever **(H)**, compress piston **(G)** of tensioner **(1)** so as to free chain shoe **(2)**. In this position, retain piston **(G)** against motion using a locking pin **(J)**.
Remove chain tensioner **(1)**.
Remove chain shoe **(2)**.



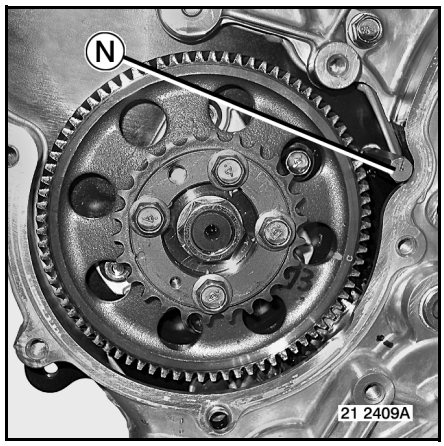
Hold the camshaft.
Loosen bolt **(20)**.
Remove timing chain driving sprocket **(6)**.
Remove timing chain **(7)**.



Remove bolts **(21)**.
Remove chain tension guide **(8)**.

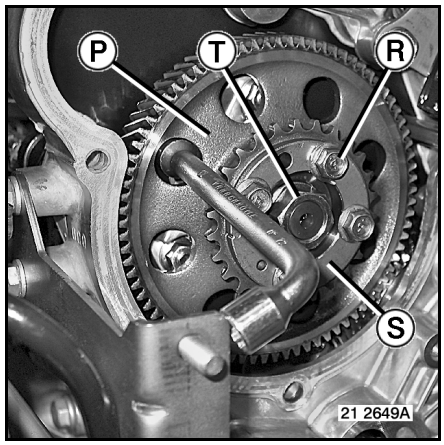


Remove chain lubricator **(N)**.

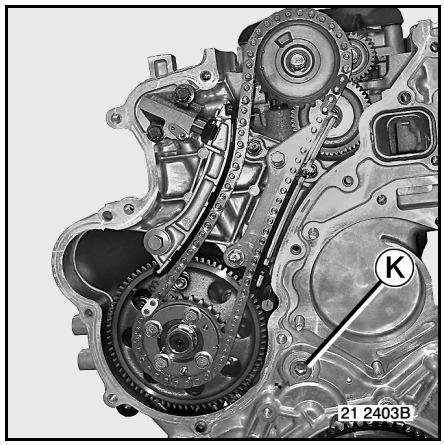


*Perform the following operations only if you have removed high pressure pump driving pinion **(P)**.*

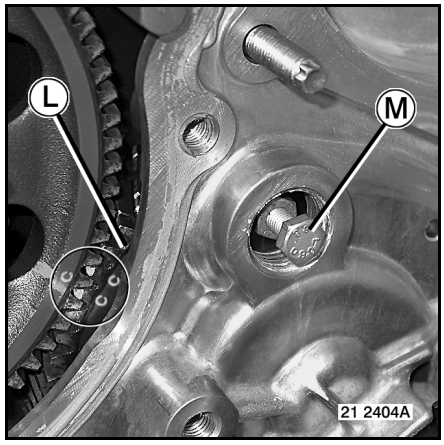
Retain pinion **(P)** against motion, using a tube wrench.
Loosen high-pressure pump pinion nut **(T)**.
Loosen bolts **(R)**.
Remove timing chain driving sprocket **(S)**.
Mark the direction of assembly of timing chain sprocket **(S)**.



Remove plug **(K)**.

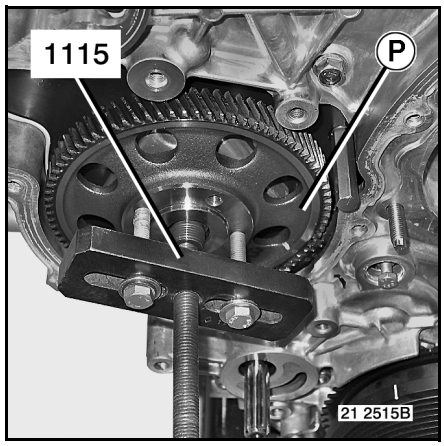


Check the position of marks **(C - CC)**.
Insert a bolt **(M)** to neutralize the timing pinion play take-up system **(L)**.
Insert a bolt **(M)** to retain the pinion: **M6x100, length 20 mm**.

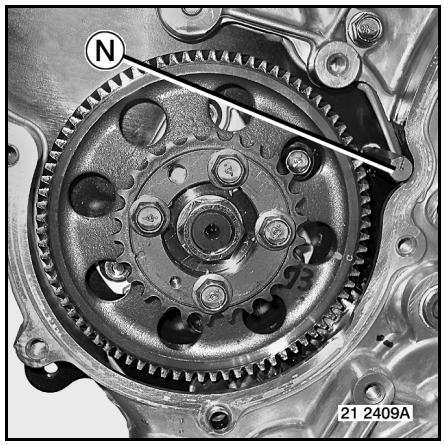


Remove high-pressure pump driving pinion **(P)** using puller **1115**.

Do not remove bolt (M) neutralizing the timing pinion play-take up system (L).

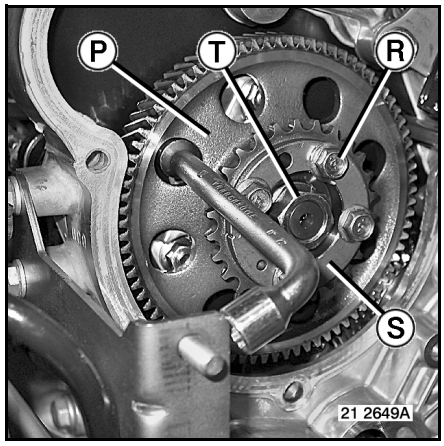


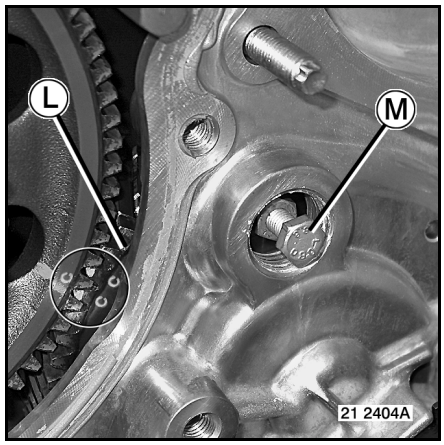
Fitting
Carefully clean and inspect all the parts.
Replace, if necessary.
Replace seals.
Tighten to torque.
See page(s) B-3-2.
Check that chain lubricator **(N)** is not obstructed.
Fit chain lubricator **(N)**.



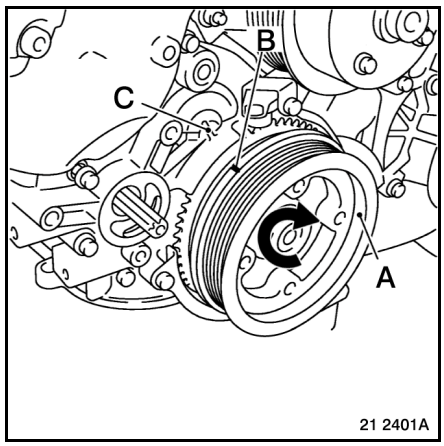
Position chain lubricator (N) with the mark facing upwards so that the timing chain is lubricated correctly.

Fit high-pressure pump driving pinion **(P)** lining up the position of marks **(C - CC)**.
Fit timing chain sprocket **(S)** ensuring its direction of assembly.
Screw up nut **(T)**.
Remove bolt **(M)**.
Tighten nut **(T)** to torque.
Tighten bolts **(R)** to torque.
See page(s) B-3-2.

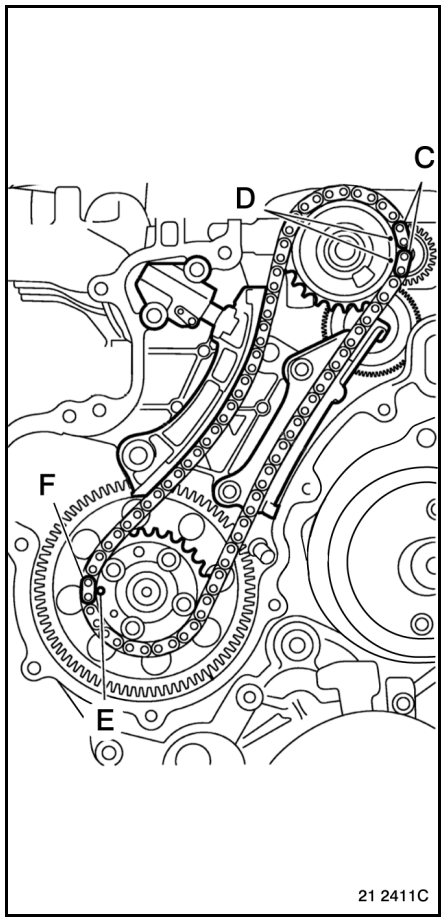




Line up marks **(B)** and **(C)**.



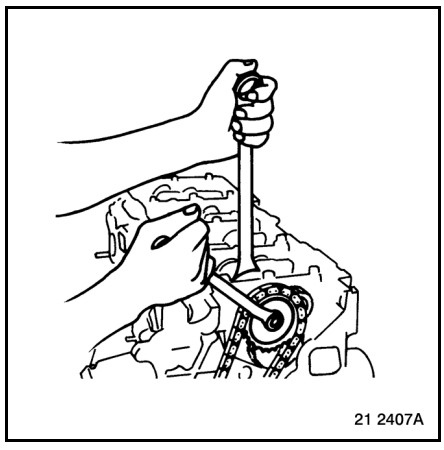
Install the timing chain so that blue coloured marks **(C)** and yellow coloured mark **(F)** are in line with marks **(D - E)** on the driving pinions.



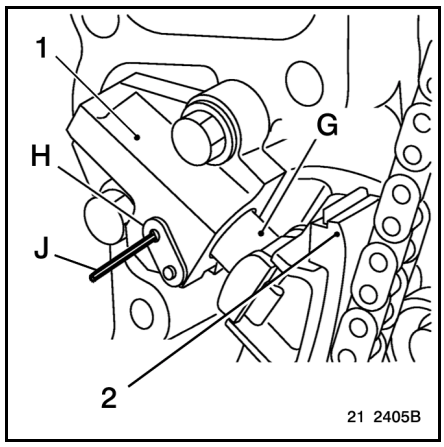
Hold the camshaft.

Do not tighten bolt (20) securing the sprocket (6) to the camshaft to help tension the timing chain.

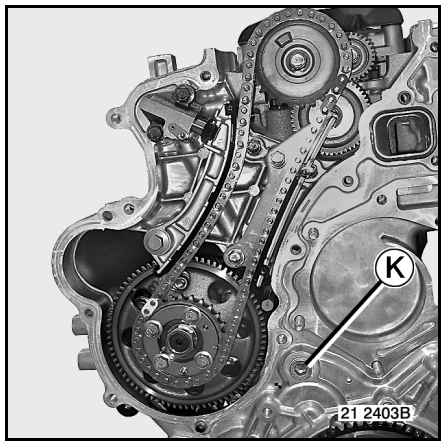
Tighten to torque.
See page(s) B-3-2.



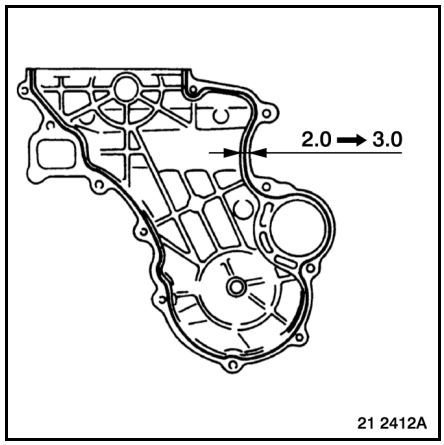
Fit chain tensioner **(1)**.
Remove locking pin **(J)** to free lever **(H)** of tensioner **(1)**. Withdraw shoe **(2)** in the direction of the timing chain to lock piston **(G)**.
See page(s) B-3-2.
Turn the engine through 2 revolutions in the normal direction of rotation to check whether there is any interference between valves and pistons.



Fit plug **(K)**.
Apply sealing compound "**12F008**" to give a tight seal.

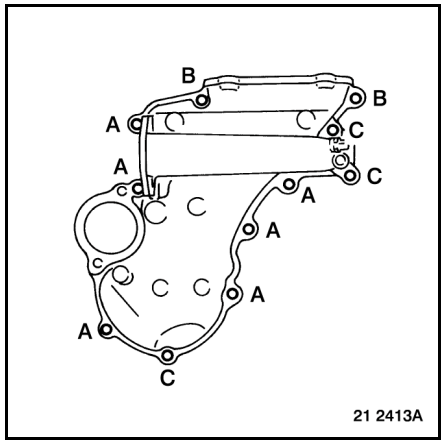


Apply sealing compound **12F008** to the case joint face as shown in the diagram.
Fit timing case **(15)**.



Timing case bolts
- **A**: bolt length **20 mm**,
- **B**: bolt length **50 mm**,
- **C**: bolt length **60 mm**.

Tighten to torque.
See page(s) B-3-2.
For the rest of the fitting operations, proceed in the reverse sequence to removal.
Tighten to torque.
Fill the cooling system (see "Driving and Servicing" handbook).
Bleed the fuel system.
See page(s) I-1-3.
Start the engine and test for leaks.



FUEL-INJECTION

APPLICABILITY

Generalities

Range	Family	Title	Variant	Applicability date		Updating	Page N°
				Start	End		
MASCOTT DXi	54A	Precautions	120AX+122BJ/44	01/03/2004		16/01/2004	I1-3
	54B		120AX+122BJ/44	01/03/2004			

High pressure pump

Range	Family	Title	Variant	Applicability date		Updating	Page N°
				Start	End		
MASCOTT DXi	54A	Removal	120AX+122BJ/44	01/03/2004		13/02/2004	I2-1
	54B		120AX+122BJ/44	01/03/2004			
MASCOTT DXi	54A	Fitting	120AX+122BJ/44	01/03/2004		13/02/2004	I2-2
	54B		120AX+122BJ/44	01/03/2004			

Fuel injectors

Range	Family	Title	Variant	Applicability date		Updating	Page N°
				Start	End		
MASCOTT DXi	54A	Removal	120AX+122BJ/44	01/03/2004		18/02/2004	I3-1
	54B		120AX+122BJ/44	01/03/2004			
MASCOTT DXi	54A	Fitting	120AX+122BJ/44	01/03/2004		20/02/2004	I3-1
	54B		120AX+122BJ/44	01/03/2004			

Generalities

Precautions

The "COMMON RAIL" system is a high-performance fuel-injection system
Since this system is more sensitive to cleanliness than in-line injection pump systems, risks of damage are all the more important. Hence, it is essential to comply with the fitting of genuine spare parts guaranteed by the manufacturer and observe operating, maintenance and repair instructions for the system.

Work on the "COMMON RAIL" system
The system works with very high injection pressures (up to **1600 bars**) and with medium voltage current (control of injectors by discharge of capacitors).
Prior to dismantling, carefully clean the surrounds then take all necessary precautions to prevent the ingress of foreign matter. Use a clean thinner then blow through with compressed air.
Using the RENAULT TRUCKS test tool DIAGNOSTICA, ensure that the circuit pressure has dropped completely.
In fact, under normal operating conditions, the pressure drops rapidly in the high pressure circuit after the vehicle has stopped (between 1 & 3 minutes). In extreme cases of malfunction, high pressure may prevail for a long time, even not drop. In such case, create a fuel leak by loosening a rail supply pipe union while protecting your hand and keeping it as far away as possible from the point of leak.
Any work on the fuel-injection system must be carried out with the engine shut-down (check: injectors, voltage, resistance, tightening, etc.).

Upon dismantling
Repairs must be carried out in a clean room, free from dust and using suitable tools.
The wearing of gloves made from fibrous material is to be banned.
Carefully clean the parts with a clean solvent, then inspect. Use top quality small brushes that are perfectly clean and in very good condition. Use unsoiled lint-free cloths.
The spare parts department supplies cleaning cloths, blanking plugs and storage bags suitable for one-way use.
Blank off the ports with plugs as soon as the pipes are dismantled.
Avoid using compressed air.
Cleaned components must be protected to avoid any trace of corrosion in the circuit.
The injector nozzle-holder cannot be repaired. Systematically replace the unit in the event of malfunction.
Do not expose yourself to sprayed fuel when testing injector sprays or high pressure circuit dribble.
Follow the chronological disassembly / assembly sequence outlined in the workshop manual.
Reassembly must be carried out without any modification or stress (torsion, welding, distortion, connecting arrangement, fastening, routing, etc...). Replace the part, if necessary. Tighten to the recommended torque.

Circuits are to bleed without using the starter.
Switch on the ignition to actuate the electric feed pump. When the pump stops, switch off the ignition and wait for about **10** seconds before switching it on again. Repeat this operation 3 times. The circuit is bled automatically.
All these recommendations guarantee you "COMMON RAIL" system quality and reliability.

High pressure pump

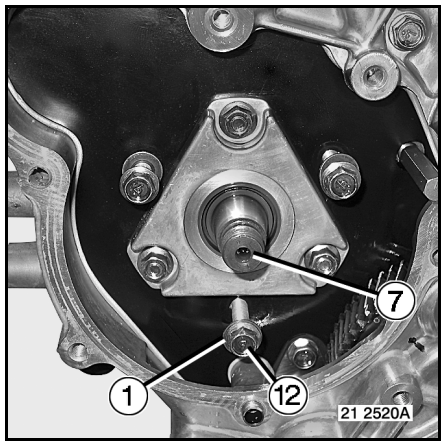
Removal

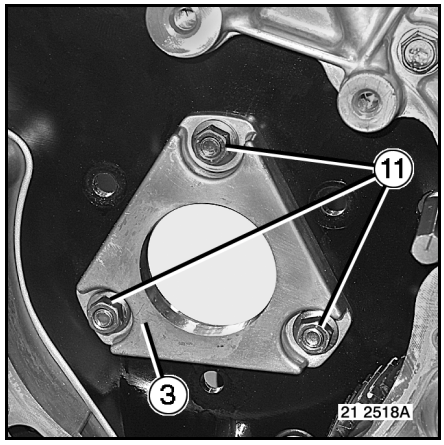
Before commencing removal, refer to "Generalities.
See page(s) D-3.

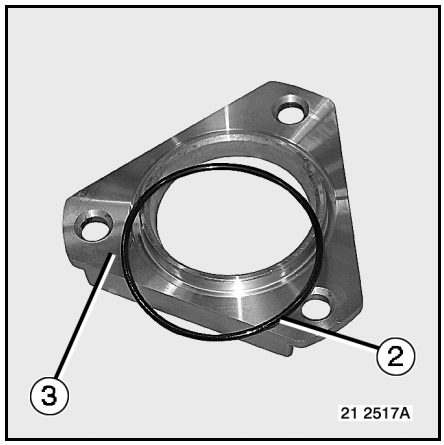
Refer to "Recommendations" before carrying out any work on the "COMMON RAIL" fuel-injection system (see page(s) I-1-3).

Remove the cylinder head cover.
See page(s) G-3.
Remove the chain cover.
Remove the timing chain.
Remove timing chain driving sprocket.
See page(s) H-3.

Tighten nuts **(12)**.
Save seal **(1)**.
Remove high pressure pump **(7)**.
Remove nuts **(11)**.
Remove spacer **(3)**.



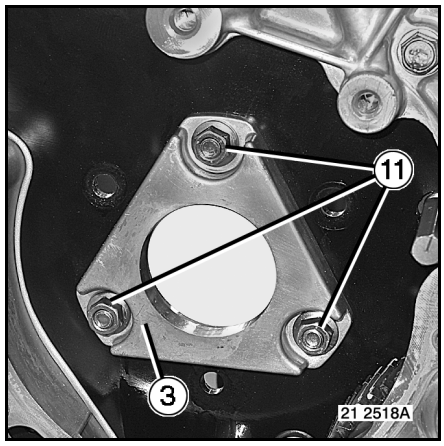




Fitting

Carefully clean and inspect all the parts.
Before commencing fitting, refer to "Generalities".
See page(s) D-3.
Replace seals.

Fit spacer **(3)**.
Start nuts **(11)** but do not tighten them.

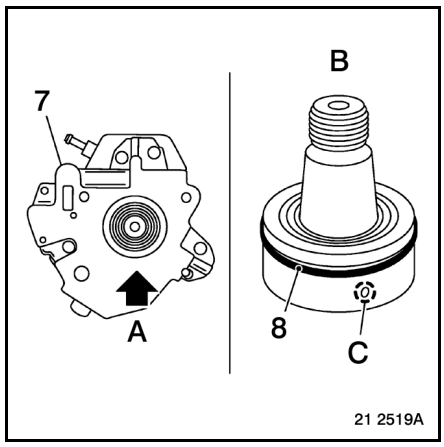


A: engine front.
Smear gasket **(8)** with grease.

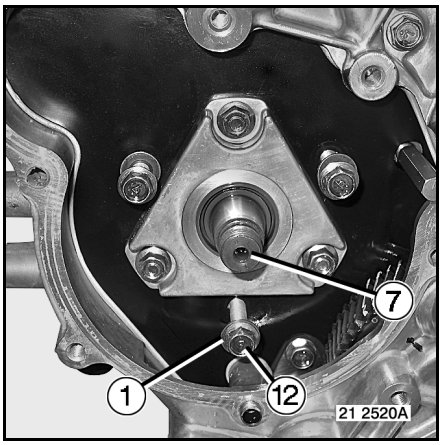
*Be careful to not allow grease to penetrate into fuel delivery port **(C)**.*

Install high-pressure pump **(7)**.

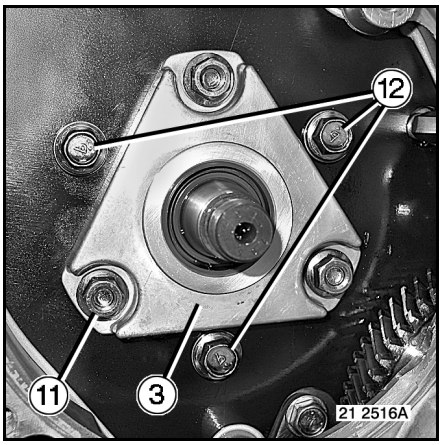
*Take care not to damage gasket **(8)** when fitting the high-pressure pump.*



Replace seal washers **(1)**.
Start bolts **(12)** but do not tighten them.



Tighten nuts **(11)** to torque.
Tighten bolts **(12)** to torque.
See page(s) B-3-4.
For the rest of the fitting operations, proceed in the reverse sequence to removal.
Tighten to torque.
Fill the cooling system.
Bleed the fuel system.
See page(s) I-1-3.
Start the engine and test for leaks.



Fuel injectors

Removal

Before commencing removal, refer to "Generalities".
See page(s) D-3.

Refer to "Recommendations" before carrying out any work on the "COMMON RAIL" fuel-injection system (see page(s)I-1-3).

Remove the injectors.
See page(s) G-3.

Fitting

Before commencing fitting, refer to "Generalities".
See page(s) D-3.

Refer to "Recommendations" before carrying out any work on the "COMMON RAIL" fuel-injection system (see page(s)I-1-3).

Replace seals.
Fit the injectors.
Tighten to torque.
See page(s) G-13.

ENGINE COOLING

APPLICABILITY

Coolant radiator

Range	Family	Title	Variant	Applicability date		Updating	Page N°
				Start	End		
MASCOTT DXi	54A	Removal	120AX+122BJ/44	01/03/2004		05/12/2003	J1-4
	54B		120AX+122BJ/44	01/03/2004			
MASCOTT DXi	54A	Fitting	120AX+122BJ/44	01/03/2004		17/12/2003	J1-6
	54B		120AX+122BJ/44	01/03/2004			
MASCOTT DXi	54A	Testing for leaks	120AX+122BJ/44	01/03/2004		09/12/2003	J1-6
	54B		120AX+122BJ/44	01/03/2004			

Viscous coupling

Range	Family	Title	Variant	Applicability date		Updating	Page N°
				Start	End		
MASCOTT DXi	54A	Removal/Fitting	120AX+122BJ/44	01/03/2004		10/12/2003	J2-1
	54B		120AX+122BJ/44	01/03/2004			

Water pump

Range	Family	Title	Variant	Applicability date		Updating	Page N°
				Start	End		
MASCOTT DXi	54A	Removal	120AX+122BJ/44	01/03/2004		11/12/2003	J3-1
	54B		120AX+122BJ/44	01/03/2004			
MASCOTT DXi	54A	Fitting	120AX+122BJ/44	01/03/2004		11/12/2003	J3-2
	54B		120AX+122BJ/44	01/03/2004			

Thermostat

Range	Family	Title	Variant	Applicability date		Updating	Page N°
				Start	End		
MASCOTT DXi	54A	Removal/Fitting	120AX+122BJ/44	01/03/2004		12/12/2003	J4-1
	54B		120AX+122BJ/44	01/03/2004			
MASCOTT DXi	54A	Testing	120AX+122BJ/44	01/03/2004		15/12/2003	J4-2
	54B		120AX+122BJ/44	01/03/2004			

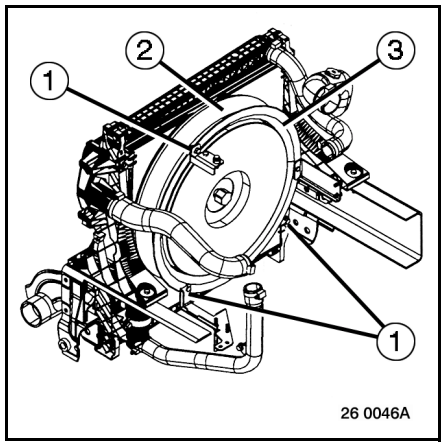
Coolant radiator

Removal

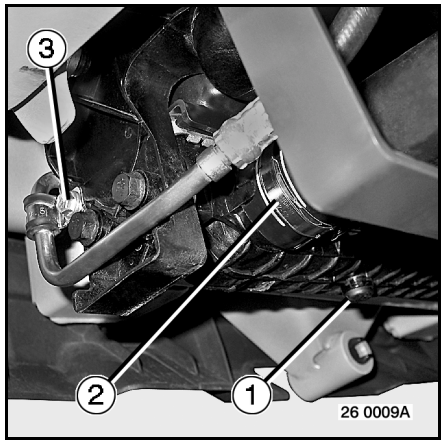
Before commencing removal, refer to "Generalities".
See page(s) D-3.
Remove technical front end.
Remove the set of front cross-members.
See page(s) E-3.

To gain access to the underside of the engine, remove the soundproofing screen or engine protection plate **(1)**.

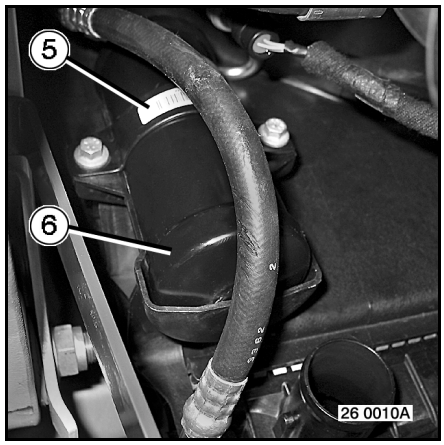
Vehicle **160 DXi**
Remove bolts **(1)** securing radiator cowl **(3)**.
Compress cowl gasket **(2)** against the radiator.



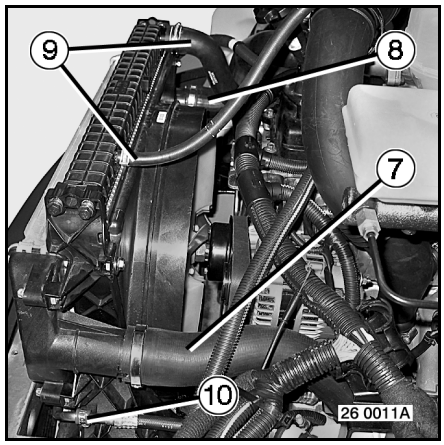
Drain the cooling system through plug port **(1)**.
Disconnect hose **(2)**.
Vehicle equipped with air conditioning
Remove clamp **(3)**.



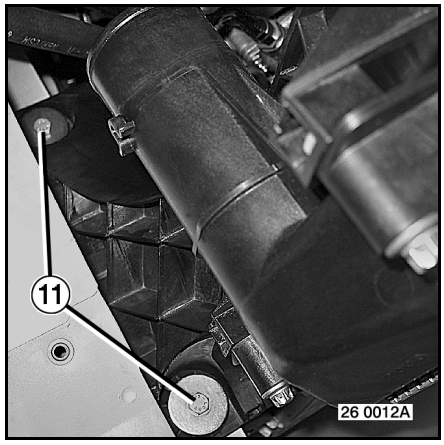
Vehicle equipped with air conditioning
Remove fastening **(5)** from dehydrator **(6)** and disengage it from its bracket.



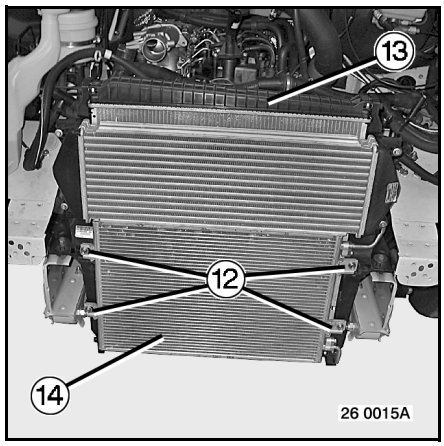
Disconnect engine charge air hoses **(7 - 8)**.
Disconnect hoses **(9)**.
Vehicle equipped with air conditioning
Remove clamp **(10)**.



Remove bolts **(11)** securing the right-hand and left-hand radiator brackets.



Remove radiator **(13)**.
Vehicle equipped with air conditioning
Remove bolts **(12)** securing air conditioning condenser **(14)**.
Disengage air conditioning condenser **(14)** on the right-hand side and pull out radiator **(13)** from the left-hand side.
Remove the radiator cowl.
Remove the after cooler.

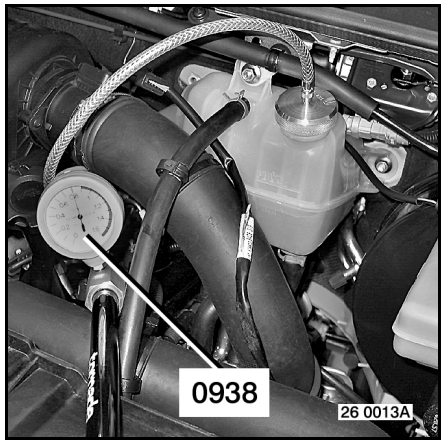


Fitting

For fitting, proceed in the reverse sequence to removal.
Tighten the nuts and bolts to torque.
See page(s) B-3-4.
Fill the cooling system.
(See Driving & Servicing handbook)
Start the engine and test for leaks.

Testing for leaks

Remove the filler cap from the expansion chamber.
Install tool **0938**.
Using tool **0938**, pressurize the cooling system to a pressure of **1 bar**. Wait for **2** minutes for the pressure to stabilize. After this time, if the pressure falls, check that there are no leaks from the cooling system.

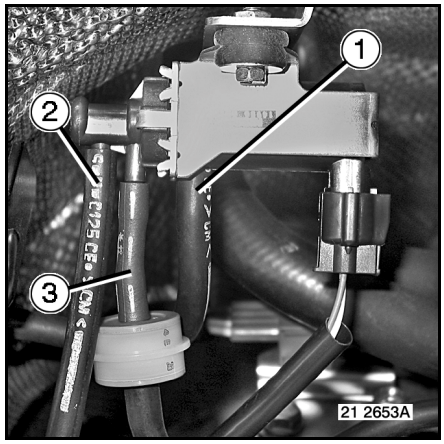


Viscous coupling

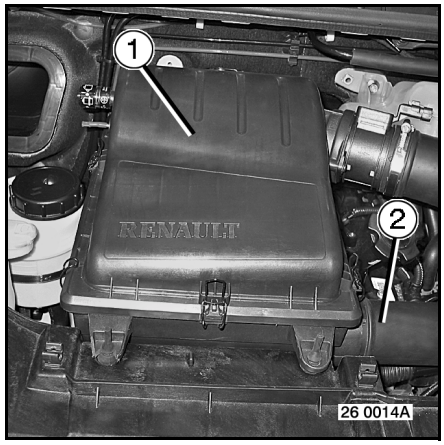
Removal/Fitting

Removal
Before commencing removal, refer to "Generalities".
See page(s) D-3.

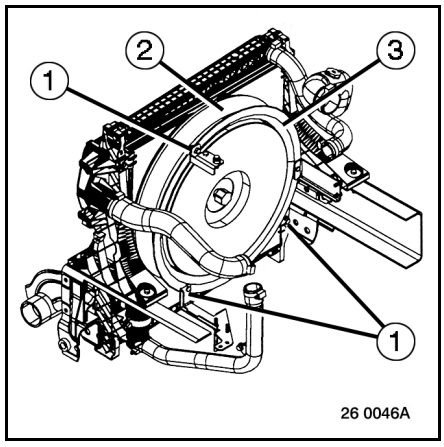
Vehicle **160 DXi**
Disconnect air pipe **(1)**.



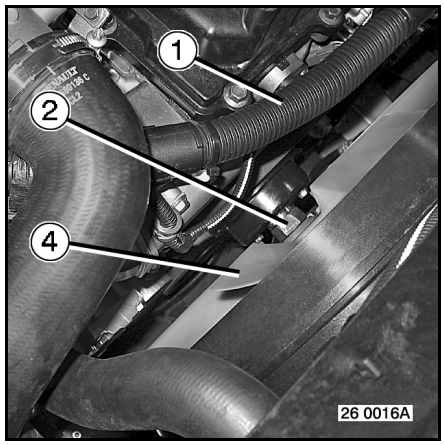
Remove air filter **(1)**.
Remove hose **(2)**.
Remove the drive belt.
See page(s) L-5-1.



Vehicle **160 DXi**
Remove bolts **(1)** securing radiator cowl **(3)**.
Compress cowl gasket **(2)** against the radiator.



Disengage wiring harness **(1)**.

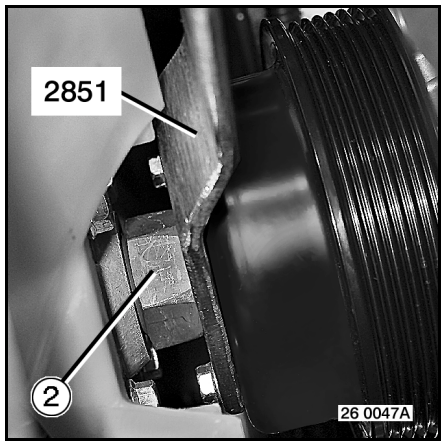


Loosen viscous coupling nut **(2)**. Retain the water pump pulley against motion with tool **2851**.

*Nut **(2)** is provided with a left-hand screw thread.*

Remove viscous coupling / fan assembly **(4)**; separate the fan from the viscous coupling.

It is vital to keep the viscous coupling in a vertical position during its storage.



Fitting

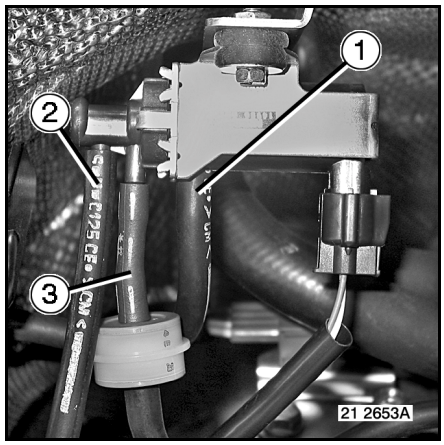
To fit, proceed in the reverse sequence to removal.
Tighten to torque.
See page(s) B-3-4.

Water pump

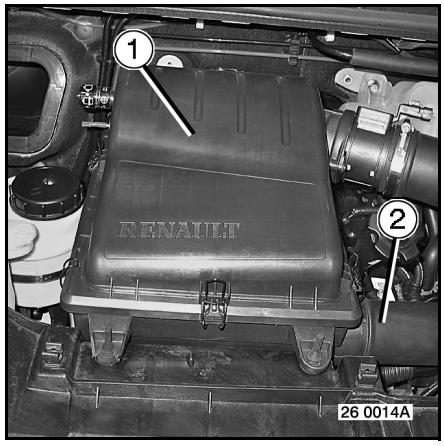
Removal

Before commencing removal, refer to "Generalities".
See page(s) D-3.

Vehicle **160DXi**
Disconnect air pipe **(1)**.



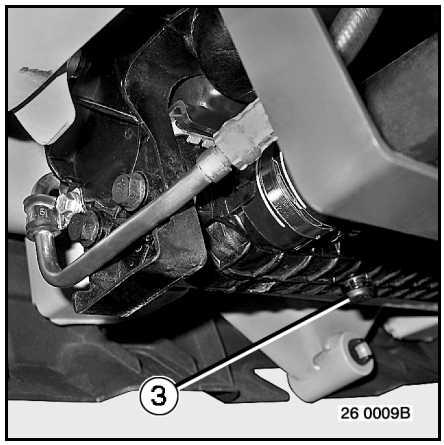
Remove air filter **(1)**.
Remove hose **(2)**.
Remove the drive belt.
See page(s) L-5-1.
Remove alternator.
See page(s) L-3-1.



Drain the cooling system through plug port **(3)**.
Remove the viscous coupling / fan assembly.

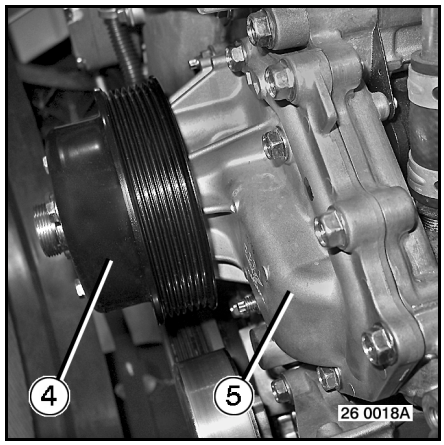
It is vital to keep the viscous coupling in a vertical position during its storage.

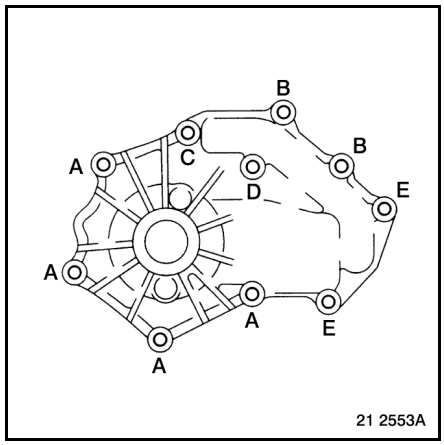
See page(s) J-2-1.



Remove pulley **(4)**.
Remove nuts **(A)**.
Remove bolts **(B - C - D - E)**.
Remove water pump **(5)**.

The water pump cannot be repaired.

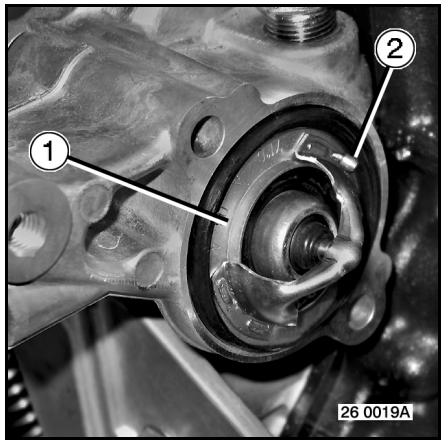




Fitting

Before commencing fitting, refer to "Generalities".
See page(s) D-3.
Carefully clean and inspect all the parts.
Check the mating surface.
Replace seals.

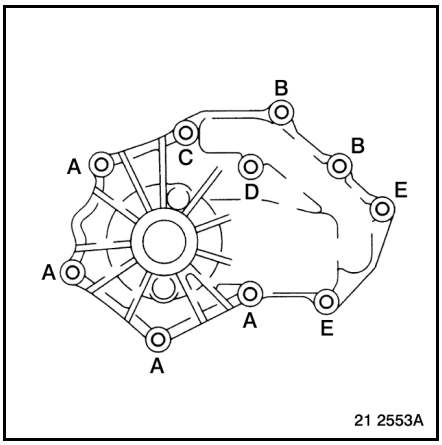
Fit thermostat **(1)** to coolant return pipe, watching that sized de-aeration hole **(2)** is facing upwards.



Fit the water pump.

Ensure the position of securing nuts **(A)** and bolts **(B - C - D - E)**.
- **A**: nuts,
- **B**: bolt length **30 mm**,
- **C**: bolt length **50 mm**,
- **D**: bolt length **60 mm**,
- **E**: bolt length **90 mm**.

To fit, proceed in the reverse sequence to removal.
Tighten to torque.
See page(s) B-3-4.
Fill the cooling system (see "Driving and Servicing" handbook).
Start the engine and test for leaks.

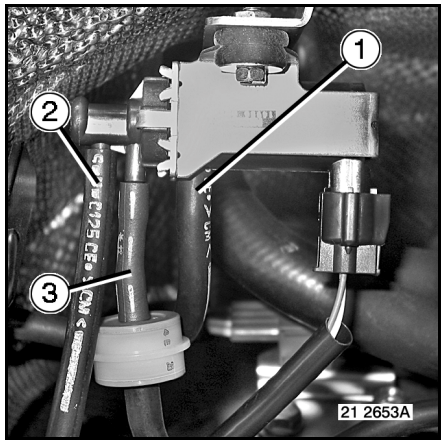


Thermostat

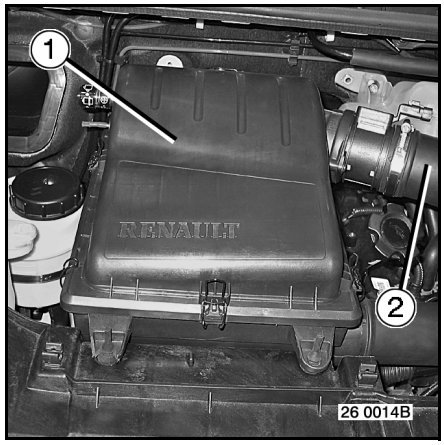
Removal/Fitting

Removal
Before commencing removal, refer to "Generalities".
See page(s) D-3.

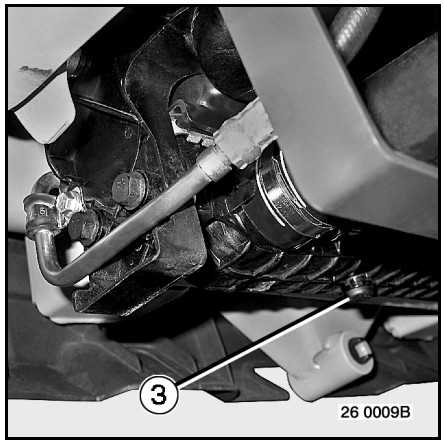
Vehicle **160 DXi**
Disconnect air pipe **(1)**.



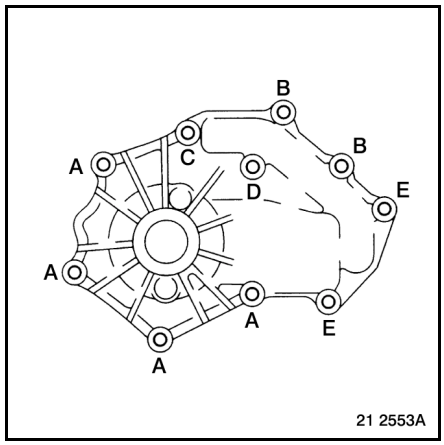
Remove air filter **(1)**.
Remove hose **(2)**.
Remove the drive belt.
See page(s) L-5-1.
Remove alternator.
See page(s) L-3-1.



Drain the cooling system through plug port **(3)**.

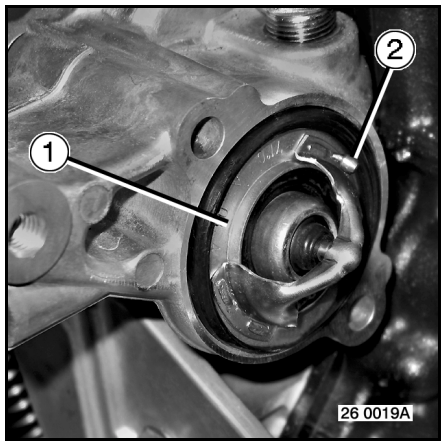


Remove bolts **(E)**.
Remove thermostat.
Carefully clean and inspect all the parts.
Check the mating surface.



Fitting
Replace gasket.

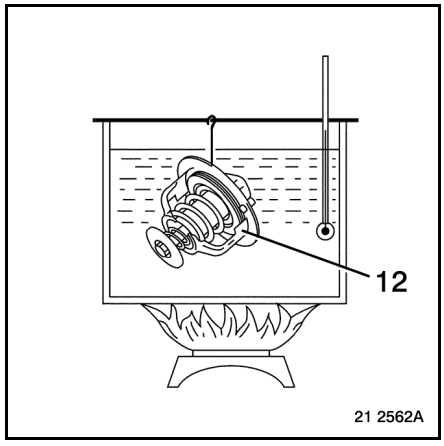
Fit thermostat **(1)** to coolant return pipe, watching that sized de-aeration hole **(2)** is facing upwards.
To fit, proceed in the reverse sequence to removal.
Tighten to torque.
See page(s) B-3-4.
Fill the cooling system (see "Driving and Servicing" handbook).
Start the engine and test for leaks.



Testing

Immerse thermostat **12)** in a bath filled with water. Gradually heat the water and stir. The beginning of opening temperature should be between **69** and **73 °C**. For the maximum thermostat opening dimension of **10 mm**, the temperature should be between **83** and **87 °C**.
Let the water cool down and check the temperature at which thermostat **(12)** closes. Closing temperature: **66 °C**.

*Replace thermostat **(12)** if the values measured are outside the tolerances.*



TURBOCHARGER

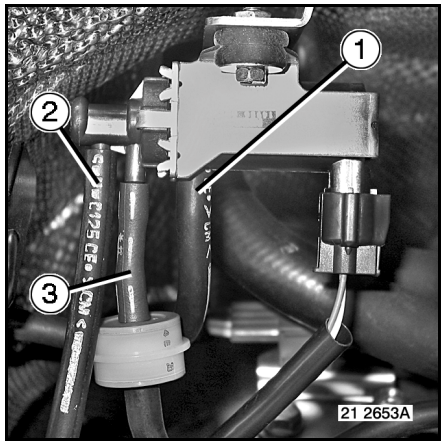
APPLICABILITY

Range	Family	Title	Variant	Applicability date		Updating	Page N°
				Start	End		
MASCOTT DXi	54A	Removal	120AX+122BJ/44	01/03/2004		22/12/2003	K-3
	54B		120AX+122BJ/44	01/03/2004			
MASCOTT DXi	54A	Testing	120AX+12244	01/03/2004		23/12/2003	K-5
	54B		120AX+12244	01/03/2004			
MASCOTT DXi	54A	Testing	120AX+122BJ	01/03/2004		25/02/2004	K-7
	54B		120AX+122BJ	01/03/2004			
MASCOTT DXi	54A	Fitting	120AX+122BJ/44	01/03/2004		23/12/2003	K-8
	54B		120AX+122BJ/44	01/03/2004			

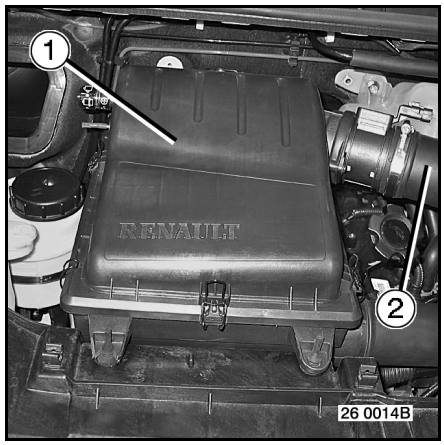
Removal

Before commencing removal, refer to "Generalities".
See page(s) D-3.

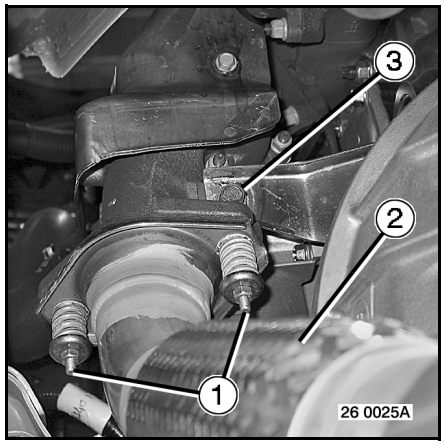
Vehicle **160 DXi**
Disconnect air pipe **(1)**.



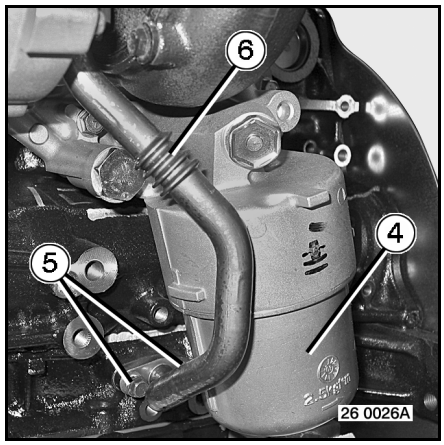
Remove air filter **(1)**.
Remove hose **(2)**.
Remove alternator.
See page(s) L-3-1.



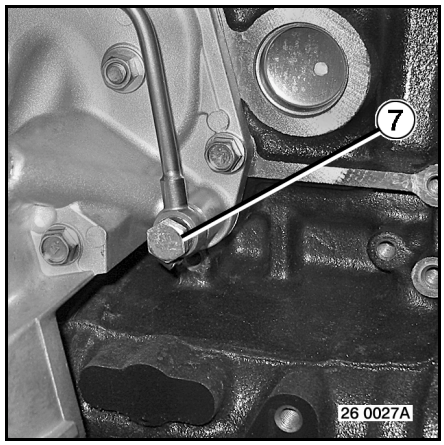
Remove bolts **(1)**.
Disengage exhaust pipe **(2)**.
Remove bolt **(3)**.



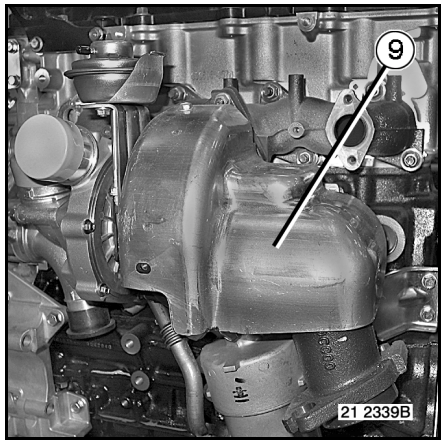
Put a drain pan into place.
Remove the oil filter sediment bowl.
Remove bolts **(5)** securing turbocharger oil return pipe **(6)**.

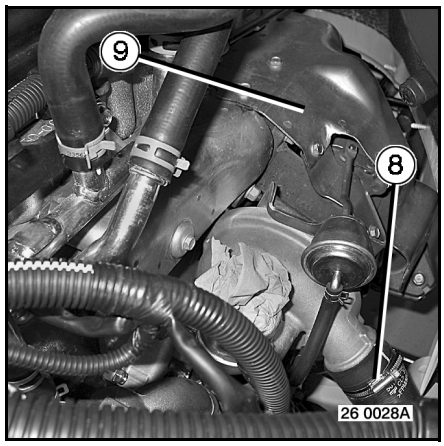


Loosen banjo union **(7)** on the turbocharger lube tube .

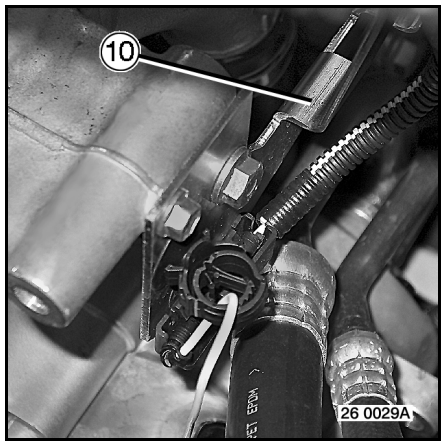


Vehicle **160 DXi**
Remove heat shield **(9)**.
Remove hose **(8)**.

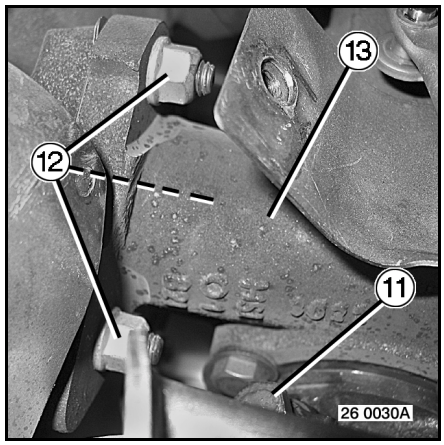




Remove wiring harness bracket **(10)**.



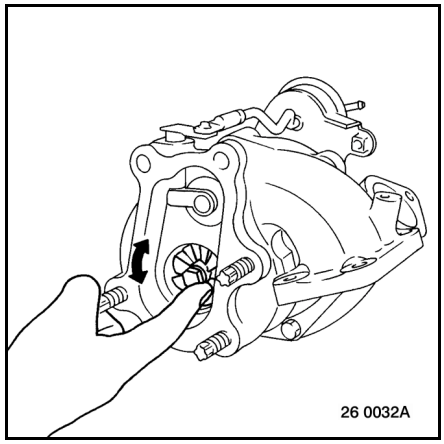
Remove banjo union **(11)** from the turbocharger lube tube.
Remove nuts **(12)** securing the turbocharger to the exhaust manifold.
Remove turbocharger **(13)**.
Undress turbocharger **(13)**.



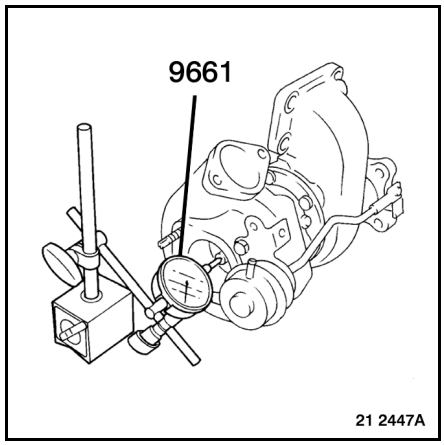
Testing

Vehicle **120 DXi**

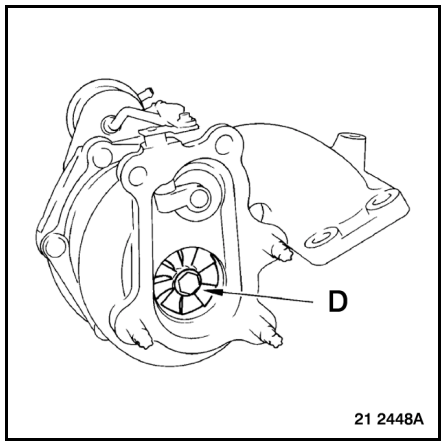
Check that the turbocharger shaft rotates freely when it is turned by hand.



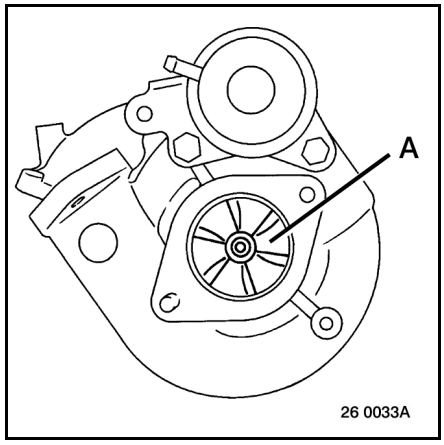
Measure the turbocharger shaft endplay.
Use tool **9661**.
The play reading should be between **0.02** and **0.06 mm**.



Check:
- there are no oil traces on the turbine wheel **(D)**,
- there are no heavy carbon deposits on the turbine wheel **(D)**,
- there is no contact between turbine wheel **(D)** and the turbocharger body,
- there is no damage to the turbine wheel blades **(D)**.

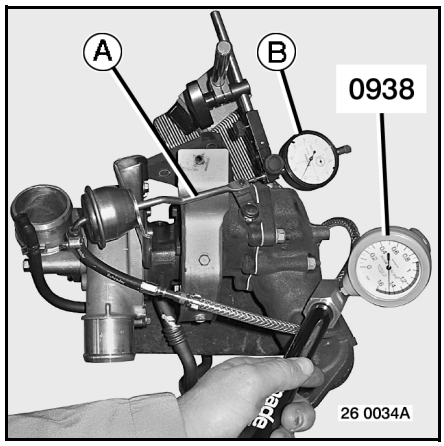


Check:
- there are no oil traces on the compressor wheel blades **(A)**,
- there is no contact between the compressor wheel blades **(A)** and the casing,
- there is no damage to the compressor wheel blades **(A)**.



Wastegate
Position dial gauge **(B)** so that the centre-lines of dial gauge stylus **(B)** and control rod **(A)** form the same straight line.
Use tool **0938**.
The travel of the waste gate control rod is **1.5 mm** for a control pressure of **$1.47^{\pm 0.03}$ bar(s)**.

Replace the turbocharger if you find any irregularities.

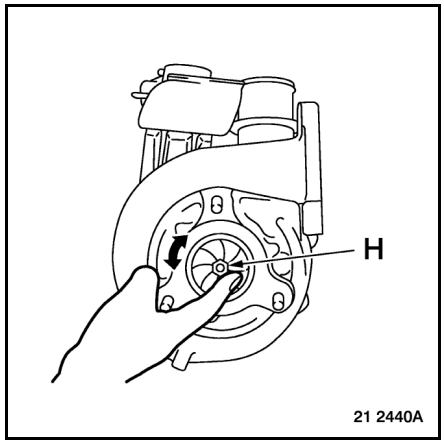


Testing

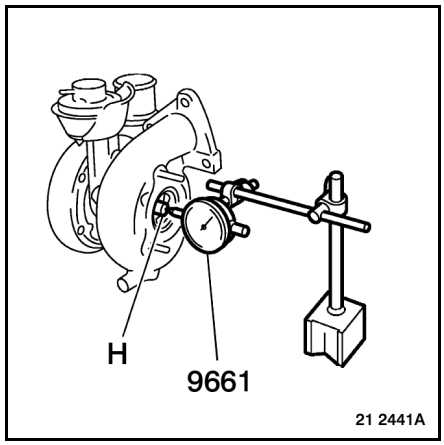
Vehicle **160 DXi**

Do not try to dismantle or adjust the turbocharger: engine performance and conformity might be affected.

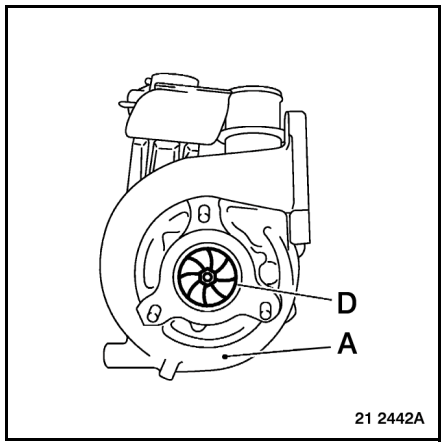
Check that the turbocharger shaft **(H)** rotates freely when it is turned by hand.



Measure the turbocharger shaft endplay **(H)**.
Use tool **9661**.
The play reading should be between **0.05** and **0.08 mm**.

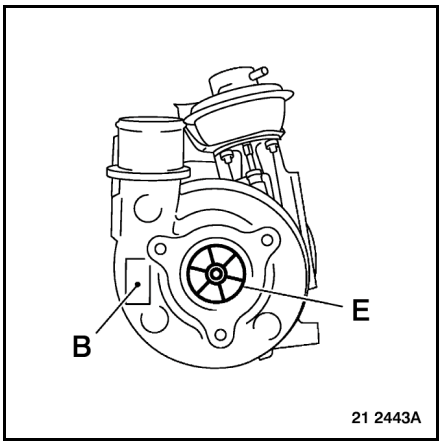


Check:
- there are no oil traces on the turbine wheel **(D)**,
- there are no heavy carbon deposits on the turbine wheel **(D)**,
- there is no contact between turbine wheel **(D)** and the turbocharger body **(A)**,
- there is no damage to the turbine wheel blades **(D)**.



Check:
- there are no oil traces on the compressor wheel blades **(E)**,
- there is no contact between the compressor wheel blades **(E)** and the casing,
- there is no damage to the compressor wheel blades **(E)**.

Replace the turbocharger if you find any irregularities.



Fitting

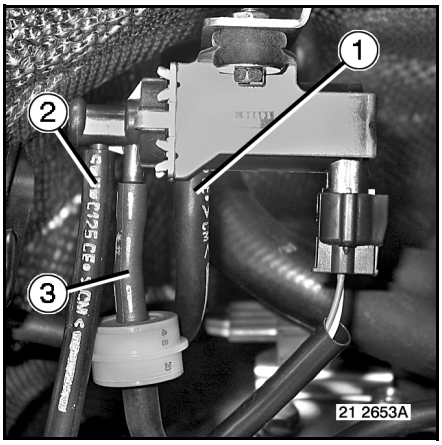
Before commencing fitting, refer to "Generalities".
Clean all the air conduits and make sure there is no foreign matter left. Before tightening the exhaust manifold bolts, smear the screw threads with high temperature-resistant grease (Renault Trucks Oils Gripcott NF grease) or equivalent).

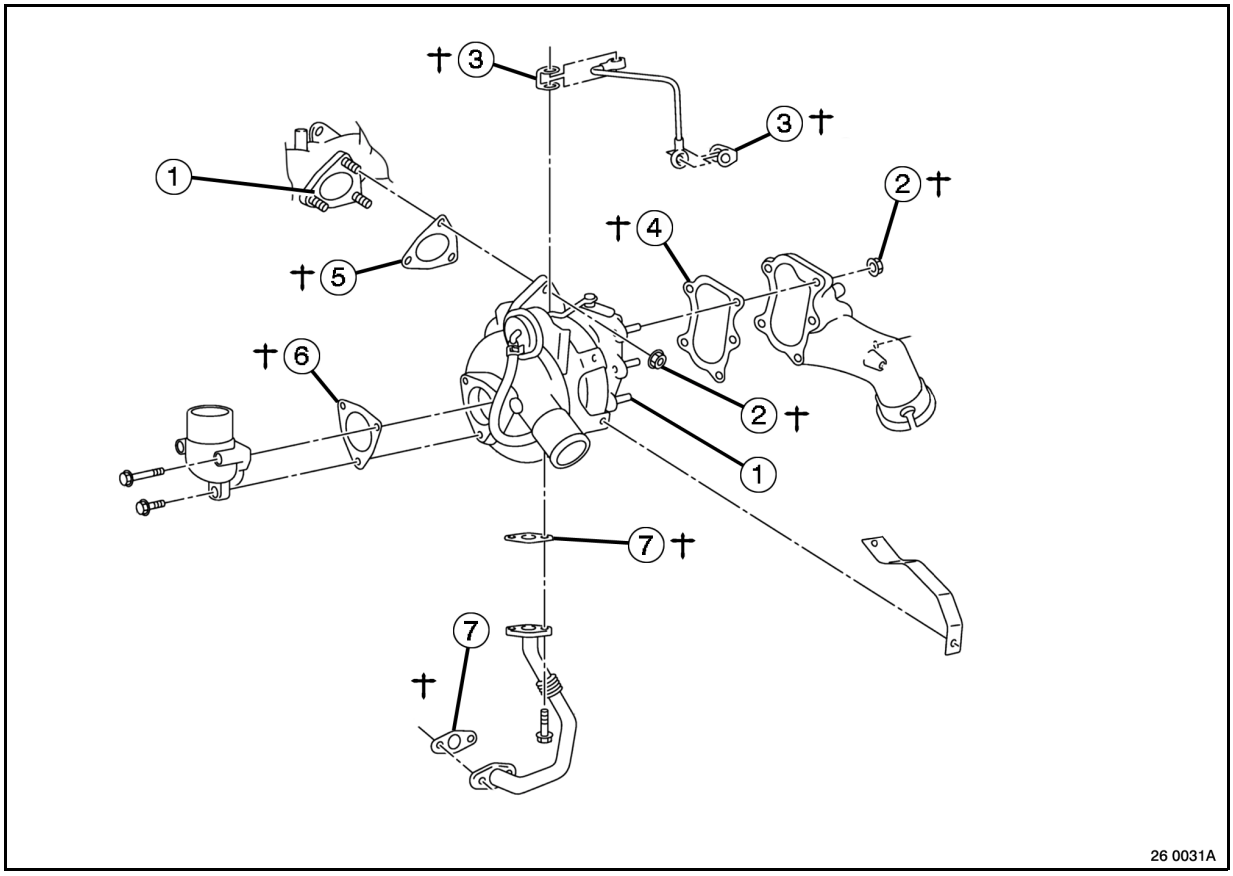
Any turbocharger replacement, where the cause of damage has not been defined, may lead to new incidents and serious engine damage.
Do not use jointing compound on the turbocharger lubrication pipe fastening flanges. Before installing the turbocharger, pour fresh oil through the oil inlet port and turn 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.

Vehicle **160 DXi**

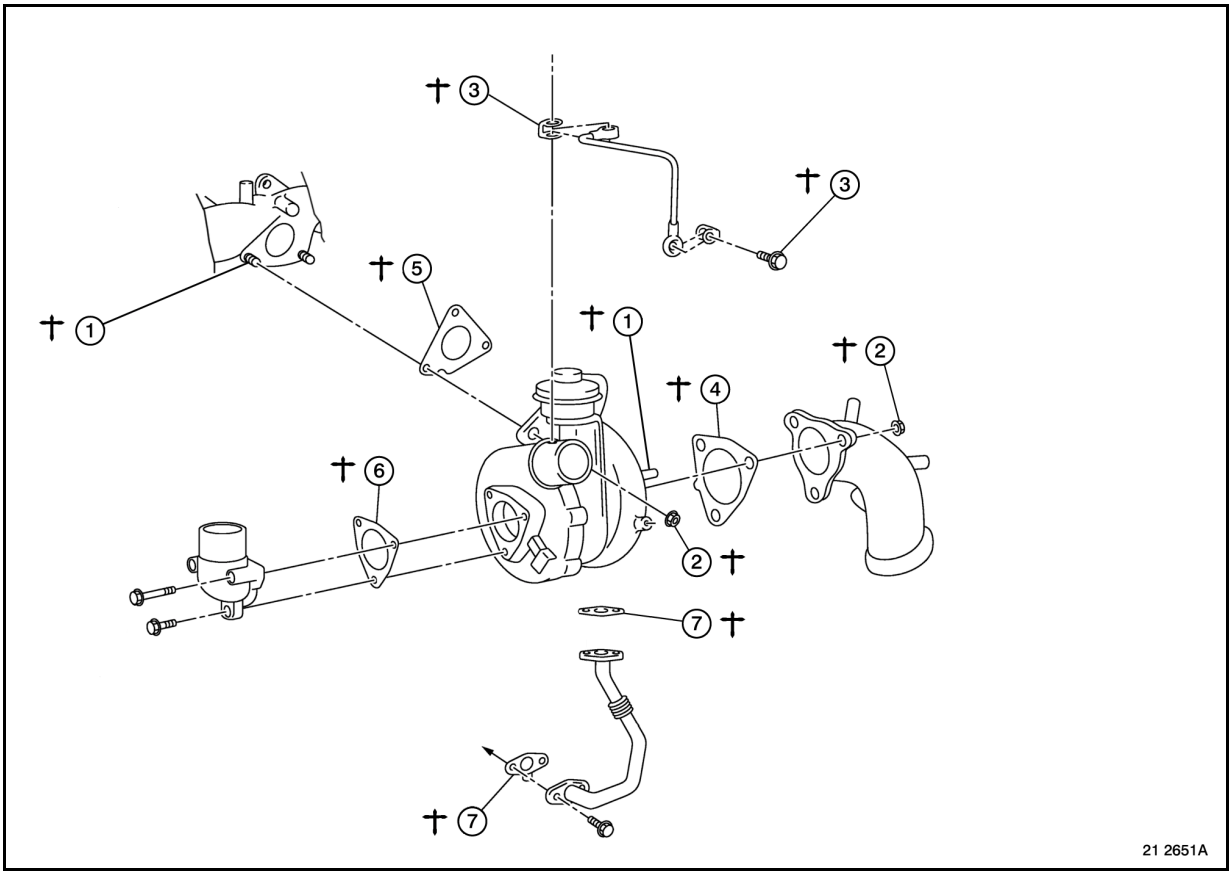
Check that pipe (1) connecting the solenoid valve to the air filter is not cracked, obstructed or disconnected.

Check that pipes **(2 - 3)** piloting the turbocharger are not cracked or disconnected.





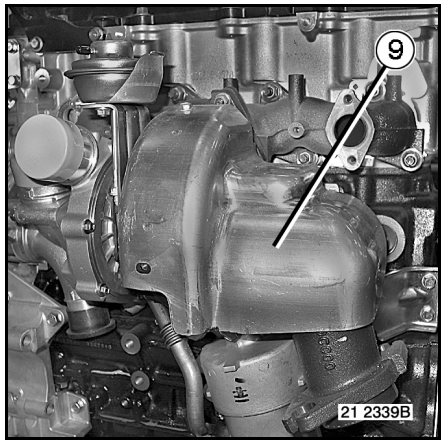
Vehicle **120 DXi**.



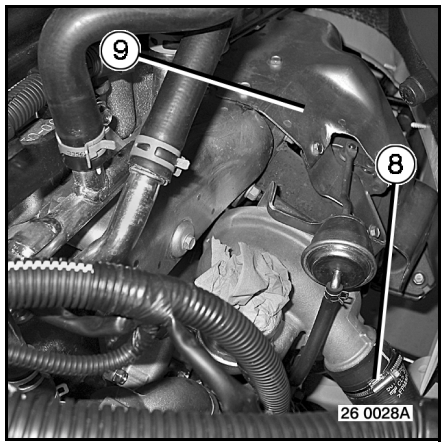
Vehicle **160 DXi**.

Carefully clean and inspect all the parts.
Replace studs **(1)** and locknuts **(2)**.
Replace seals **(3 → 7)**.

Vehicle **160 DXi**.
Fit heat shield **(9)**.



Vehicle **120 DXi**.
Fit heat shield **(9)**.
For fitting, proceed in the reverse sequence to removal.
Tighten to torque.
See page(s) B-3-5.
Restore the engine oil level.
Start the engine and test for leaks.



EQUIPMENT

APPLICABILITY

Steering pump

Range	Family	Title	Variant	Applicability date		Updating	Page N°
				Start	End		
MASCOTT DXi	54A	Removal	120AX+122BJ/44	01/03/2004		15/12/2003	L1-4
	54B		120AX+122BJ/44	01/03/2004			
MASCOTT DXi	54A	Fitting	120AX+122BJ/44	01/03/2004		16/12/2003	L1-6
	54B		120AX+122BJ/44	01/03/2004			

Vacuum pump

Range	Family	Title	Variant	Applicability date		Updating	Page N°
				Start	End		
MASCOTT DXi	54A	Removal/Fitting	120AX+122BJ/44	01/03/2004		16/12/2003	L2-1
	54B		120AX+122BJ/44	01/03/2004			

Alternator

Range	Family	Title	Variant	Applicability date		Updating	Page N°
				Start	End		
MASCOTT DXi	54A	Removal/Fitting	120AX+122BJ/44	01/03/2004		17/12/2003	L3-1
	54B		120AX+122BJ/44	01/03/2004			

Starter

Range	Family	Title	Variant	Applicability date		Updating	Page N°
				Start	End		
MASCOTT DXi	54A	Removal/Fitting	120AX+122BJ/44	01/03/2004		17/12/2003	L4-1
	54B		120AX+122BJ/44	01/03/2004			

Drive belt

Range	Family	Title	Variant	Applicability date		Updating	Page N°
				Start	End		
MASCOTT DXi	54A	Removal/Fitting	120AX+122BJ/44	01/03/2004		18/12/2003	L5-1
	54B		120AX+122BJ/44	01/03/2004			

Belt tensioner

Range	Family	Title	Variant	Applicability date		Updating	Page N°
				Start	End		
MASCOTT DXi	54A	Removal/Fitting	120AX+122BJ/44	01/03/2004		22/12/2003	L6-1
	54B		120AX+122BJ/44	01/03/2004			

Preheat plugs

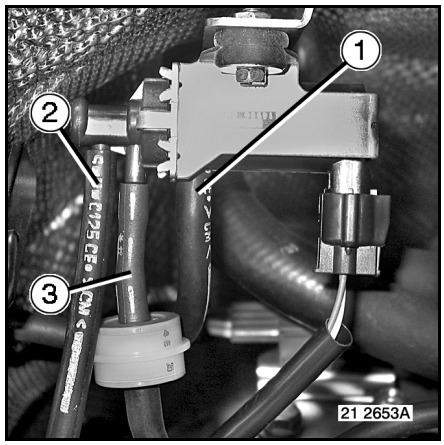
Range	Family	Title	Variant	Applicability date		Updating	Page N°
				Start	End		
MASCOTT DXi	54A	Removal/Fitting	120AX+122BJ/44	01/03/2004		15/01/2004	L7-1
	54B		120AX+122BJ/44	01/03/2004			

Steering pump

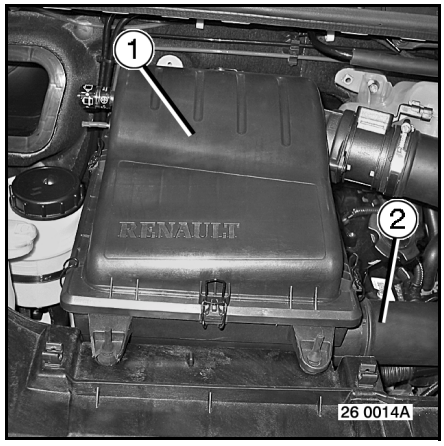
Removal

Before commencing removal, refer to "Generalities".
See page(s) D-3.

Vehicle **160 DXi**
Disconnect air pipe **(1)**.

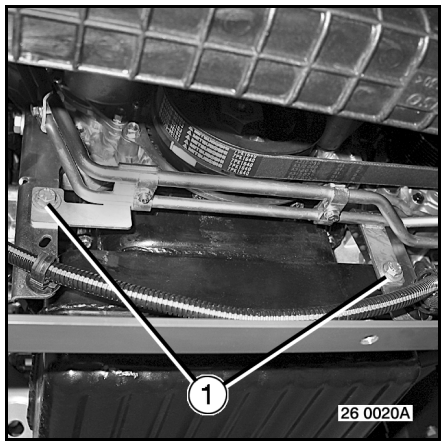


Remove hose **(2)**.
Remove air filter **(1)**.

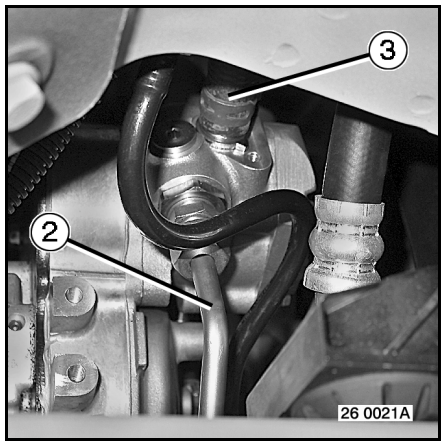


Depending on the assembly.
To gain access to the underside of the engine, remove the sound-proofing screen or engine protection plate **(1)**.

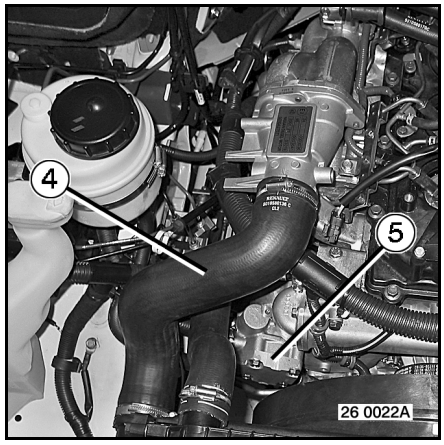
Remove bolts **(1)**.



Put a drain pan into place.
Disconnect tubes **(2)**.
Disconnect hose **(3)**.

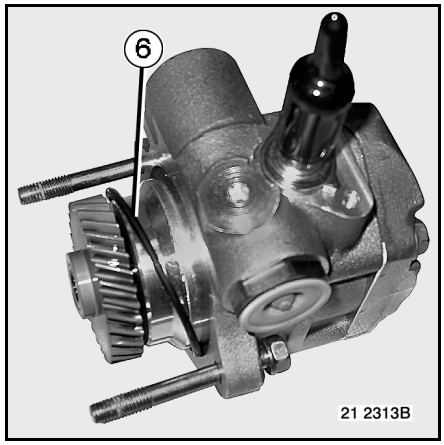


Vehicle **160 DXi**
Disconnect the charge air pressure sensor.
Remove hose **(4)**.
Remove hydraulic pump **(5)** securing bolts.
Remove hydraulic pump **(5)**.



Fitting

Replace gasket **(6)**.
To fit, proceed in the reverse sequence to removal.
Tighten the bolts to torque.
See page(s) B-3-3.
Fill with oil.
Start the engine and test for leaks.



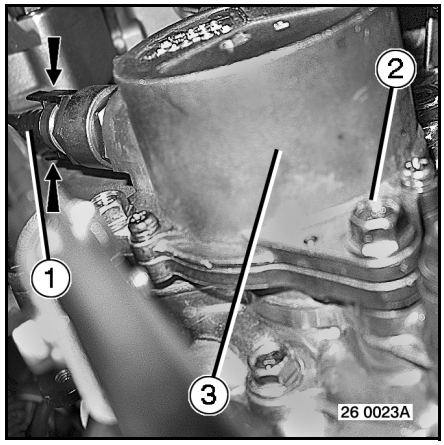
Vacuum pump

Removal/Fitting

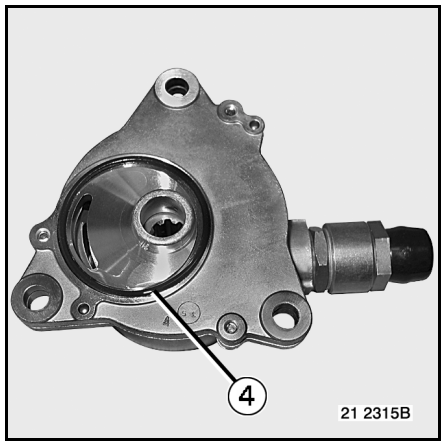
Removal
Before commencing removal, refer to "Generalities".
See page(s) D-3.

Depending on vehicle's equipment
To gain access to the underside of the engine, remove the sound-proofing screen or engine protection plate **(1)**.

Disconnect tubes **(1)**.
Remove securing nuts and bolts **(2)**.
Remove vacuum pump **(3)**.
Perform removal from below.



Fitting
Replace gasket **(4)**.
To fit, proceed in the reverse sequence to removal.
Tighten to torque.
See page(s) B-3-3.
Start the engine and test for leaks.

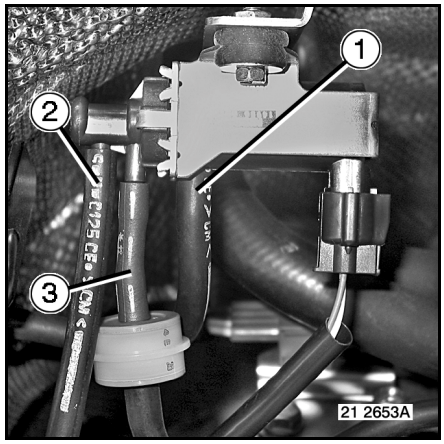


Alternator

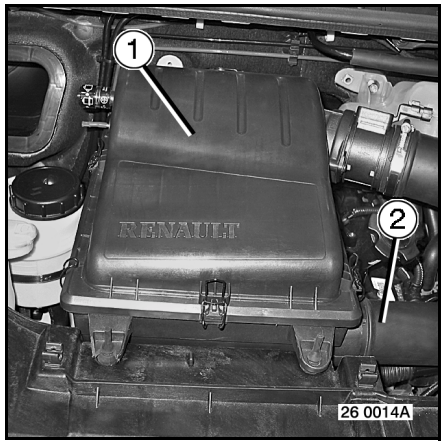
Removal/Fitting

Removal
Before commencing removal, refer to "Generalities".
See page(s) D-3.

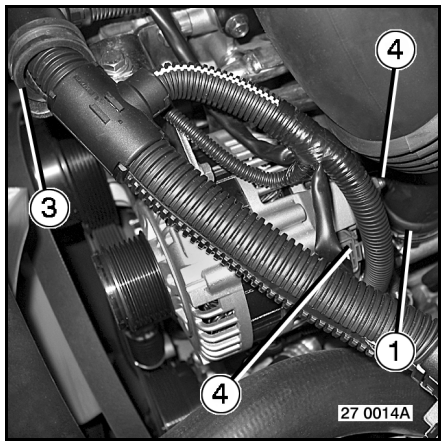
Vehicle **160 DXi**
Disconnect air pipe **(1)**.



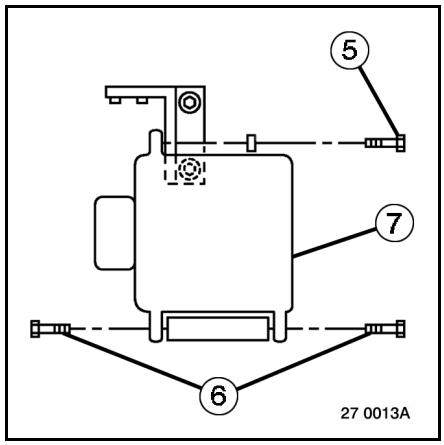
Remove hose **(2)**.
Remove air filter **(1)**.
Remove the drive belt.
See page(s) L-5-1.



Remove hose **(1)**.
Remove clamp **(3)**.
Disconnect wires **(4)**.



Remove securing nuts and bolts **(5 - 6)**.
Remove alternator **(7)**.



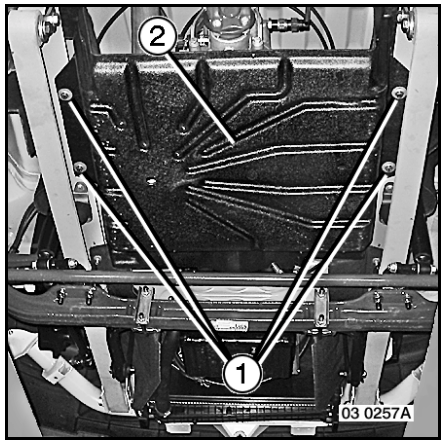
Fitting
To fit, proceed in the reverse sequence to removal.
Tighten bolts **(6 - 5)** to torque, following this sequence without fail.
See page(s) B-3-1.

Starter

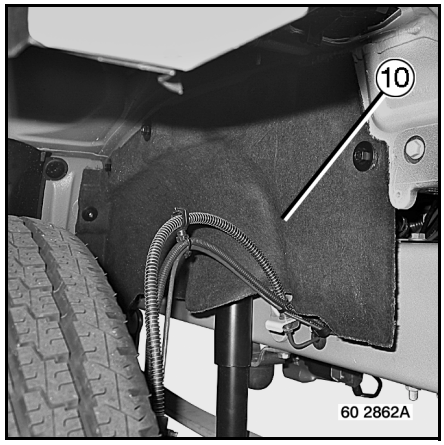
Removal/Fitting

Removal
Before commencing removal, refer to "Generalities".
See page(s) D-3.

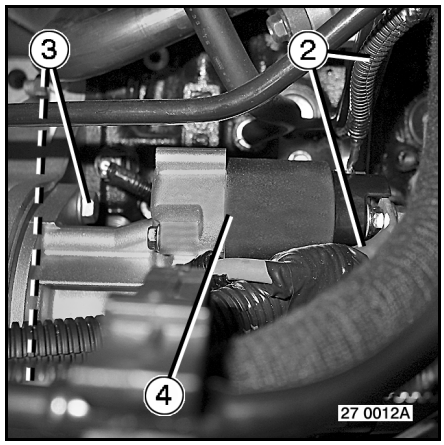
To gain access to the underside of the gearbox, withdraw bolts **(1)** and remove soundproofing screen **(2)**.
After completing your work, correctly reassemble the soundproofing screen in the right place.



Remove soundproofing screen **(10)**.



Disconnect wires **(2)**.
Remove securing nuts and bolts **(3)**.
Remove starter motor **(4)**.
Perform removal from below.



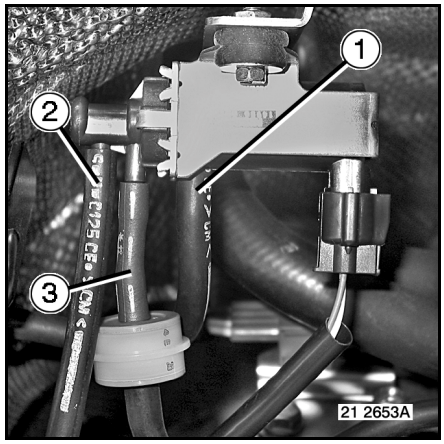
Fitting
To fit, proceed in the reverse sequence to removal.
Tighten to torque.
See page(s) B-3-3.

Drive belt

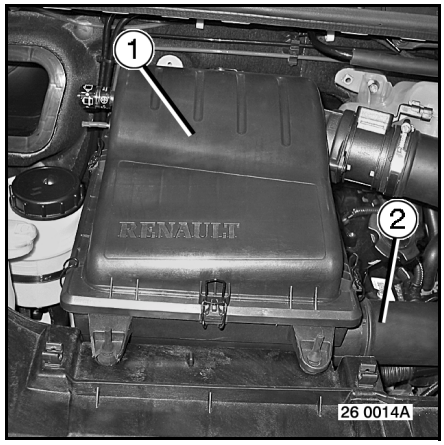
Removal/Fitting

Removal
Before commencing removal, refer to "Generalities".
See page(s) D-3.

Vehicle **160 DXi**
Disconnect air pipe **(1)**.

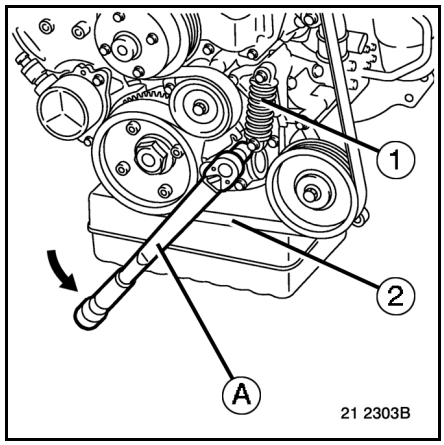


Remove air filter **(1)**.
Remove hose **(2)**.



Depending on the assembly.
Remove guard plate **(1)**.

Using a torque wrench **(A)**, compress the spring on tensioned roller **(1)** and disengage it from drive belt **(2)**.



Set the torque wrench to a loading of 190 Nm. It is vital to match the direction of rotation of the torque wrench to compress the automatic tensioned spring. Perform this operation very slowly (about 6 seconds).

Relax the effort exerted on the torque wrench **(A)** in order to let down the spring of tensioned roller **(1)**.
Remove the drive belt **(2)**.

Handle the drive belt carefully to avoid all contact with lubricant and coolant. Do not bend it or twist it too much.

Fitting

To fit, proceed in the reverse sequence to removal.
Check the state and the cleanliness of the grooves of the different pulleys. Clean or replace, if necessary.

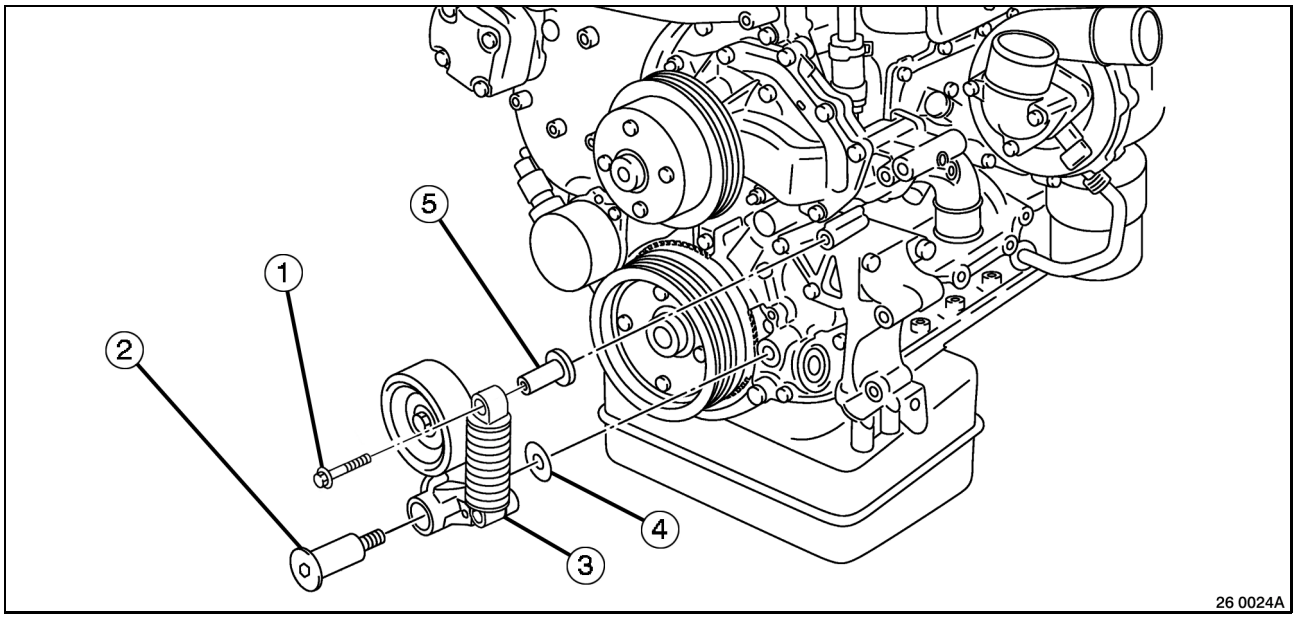
Ensure that the drive belt ribs engage properly in the pulley grooves.

The belt tensioned automatically adjusts the drive belt tension.

Belt tensioner

Removal/Fitting

Removal
Before commencing removal, refer to "Generalities".
See page(s) D-3.
Remove the drive belt.
See page(s) L-5-1.



Remove bolt **(1)**.
Remove pin **(2)**.
Remove the tensioned roller complete with bracket **(3)**.
Save washer **(4)**.
Remove spacer **(5)**.

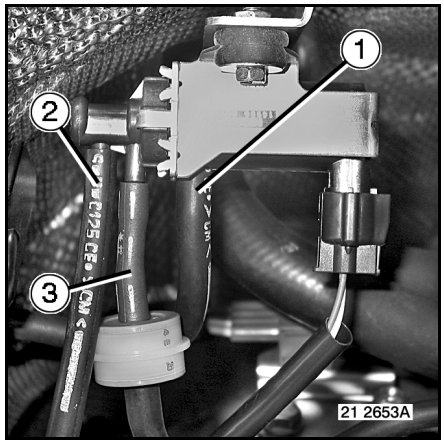
Fitting
To fit, proceed in the reverse sequence to removal.
Tighten to torque.
See page(s) B-3-4.
Fit the drive belt.
See page(s) L-5-1.

Preheat plugs

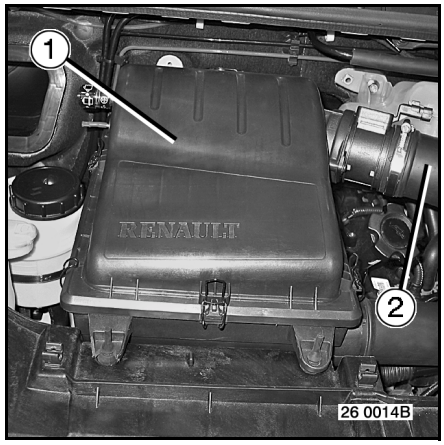
Removal/Fitting

Removal
Before commencing removal, refer to "Generalities".
See page(s) D-3.

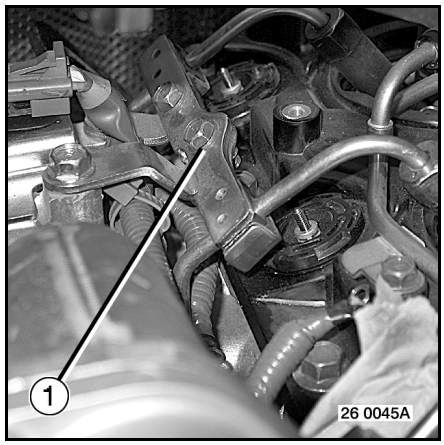
Vehicle **160 DXi**
Disconnect air pipe **(1)**.



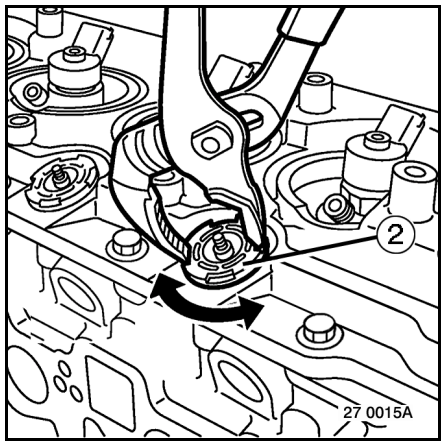
Remove air filter **(1)**.
Remove hose **(2)**.
Disconnect the preheat plugs wiring harness.



To remove the seal rings from preheat plugs for cylinder N° **3** and **4**, remove flange **(1)** securing the injector pipes.



Remove gaskets **(2)**.
Carefully remove the preheat plugs.



Handle the preheat plugs very gently - take special care to not knock or bump them.

Fitting
Replace seals **(2)**.
Carefully clean and inspect all the parts.
Proceed in the reverse sequence to disassembly.
Tighten to torque.
See page(s) B-3-5.