

20 094 – AN – 11.2001

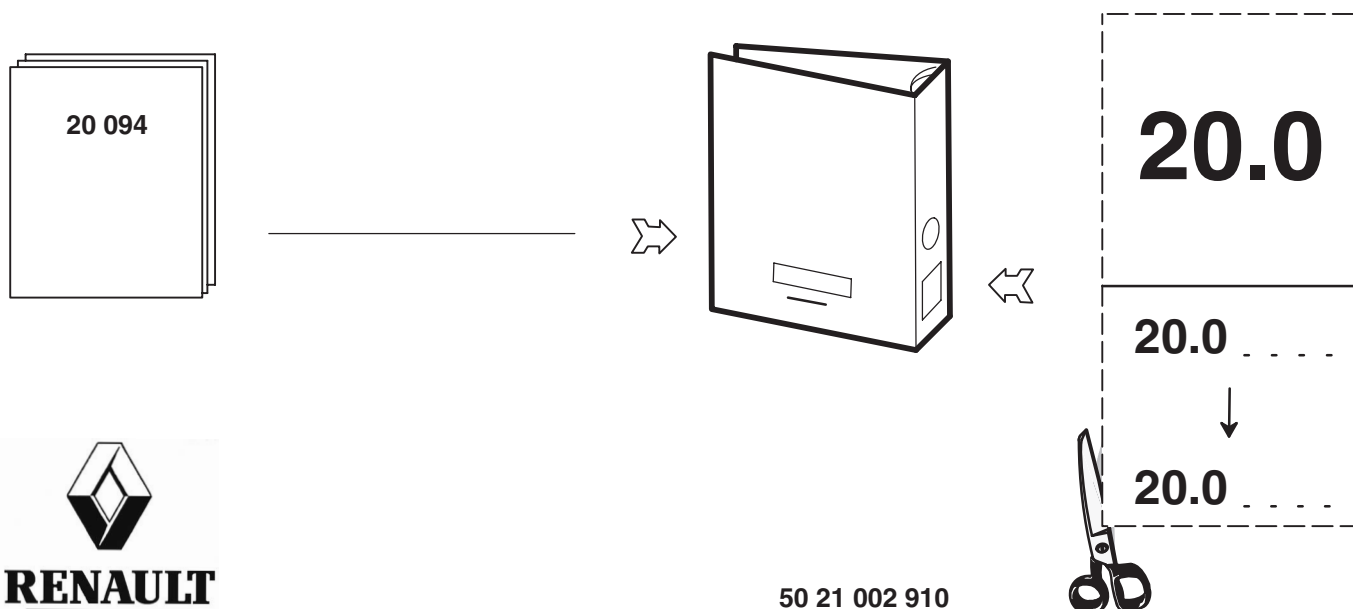
ENGINE

ENGINE	FAMILY	VEHICLE
DCI 11 EQUIPMENT	2152	RENAULT KERAX RENAULT PREMIUM

NOTE

The above information may change in the course of time.

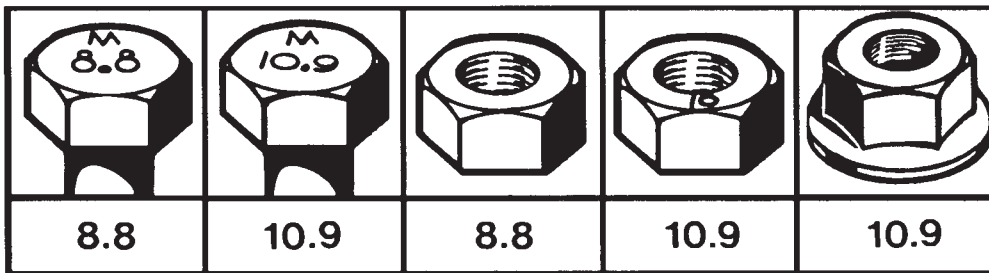
Only the "Consult" section of the workshop manuals repertory in standard N° 10320 serves as reference.



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VOLUMES	DESIGNATION	PAGES
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TECHNICAL DATA



21 0122

Tightening torques

There are several types of tightening

- Tightening to torque (in **Nm.**)
- Tightening to angle (in °)
- Tightening to torque–angle (in **Nm. + °**)

Torques given in **Nm.** are nominal torques (average value calculated on the basis of the minimum torque and the maximum torque).

The tightening accuracy class defines the tolerance of this torque in percent as a function of the nominal torque applied.

Tightening accuracy classes

- **Class I:** Special threaded hardware (tolerance $\pm 10\%$ of the final torque)
- **Class II:** Reserved for precise tightening (tolerance $\pm 10\%$ of the nominal torque)
- **Class III:** Reserved for normal standard tightening (tolerance $\pm 20\%$ of the nominal torque)

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

For other torques, see page **A3**.

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

Kerax engine

Nuts securing engine rear brackets to chassis	340 ± 68 Nm
Nuts securing engine front brackets to chassis	237 ± 46 Nm

Premium engine

Nuts securing engine rear brackets to chassis	340 ± 68 Nm
Engine front brackets to chassis setscrews	155 ± 30 Nm

Cooling

Engine aspiration hose spring clamp	5 ± 0.5 Nm
Heat exchanger tube coolant drain plug	40 ± 5 Nm

Air compressor

Air compressor pinion securing nut	137 ± 30 Nm
Coolant pipe union nut	25 ± 5 Nm
Air compressor securing nut	40 ± 8 Nm
Air compressor securing stud	(+ Loctite Frenétanch) 20 ± 4 Nm
Air compressor attaching screw	(+ Loctite Frenétanch) 40 ± 8 Nm

Hydraulic pump

Hydraulic pump pinion securing nut	60 ± 12 Nm
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Water pump

Water pump setscrew	(+ Loctite Frenétanch) 20 ± 4 Nm
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Turbocharger

Exhaust brake to turbocharger securing nut	(+ GRIPCOTT N.F.) 20 ± 4 Nm
Exhaust brake to turbocharger securing stud	(+ GRIPCOTT N.F.) 10 ± 2 Nm
Turbocharger lubrication pipe union	24 ± 4.8 Nm
Turbocharger to exhaust manifold setscrew	60 ± 12 Nm

Consumables

Fixing, locking and sealing products	
Industrial reference	Automotive reference
Loctite 542	Frenétanch
High temperature grease	GRIPCOTT NF

Consumables and oil capacity (see servicing handbook).

Weight:

– Undressed engine	≈ 1000 kg
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CONVENTIONAL SYMBOLS

Depending on versions or options



Mark – Assemble as per marking

ENGINE

Practical advice

Before commencing any work

- Clean the major unit and its surrounds (see “Washing the vehicle” in the servicing handbook).
- Ensure the batteries are disconnected.
- Bleed the gas supply system.
- Mark the pipes and wiring harnesses, where applicable.
- Protect all ports and openings to prevent the ingress of foreign matter.
- Before disconnecting an air pipe, drop the circuit pressure.
- In the event of fluid splashing onto the bodywork, quickly clean using a cleaning product recommended by RENAULT V.I.

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 1400 bars) and with medium voltage current (control of injectors by discharge of capacitors).

Prior to disassembly, 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 V.I. test tool, 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 (several or all the flow limiters jammed), high pressure may prevail for a long time, even not drop. In such case, create a fuel leak by loosening an injector 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 disassembly

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.

Observe 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 be bled without using the starter.

All these recommendations guarantee you “COMMON RAIL” system quality and reliability.

To remove

NOTE

The method below applies to all power units. It principally covers important engine removal / fitting points.

Disconnect the set of batteries. Always commence with the negative (–) terminal.

Place the vehicle over a pit or on elevators.

Over a pit, chock the roadwheels.

On elevators, release the parking brake, raise the vehicle and install axle stands.

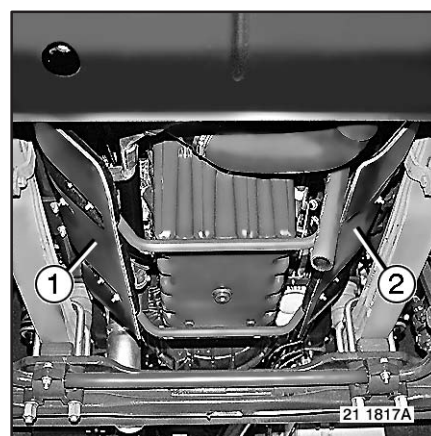
IMPORTANT

With air suspension: Move the suspension to the “down” position.

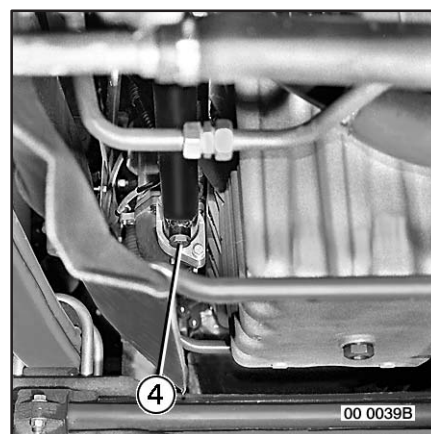
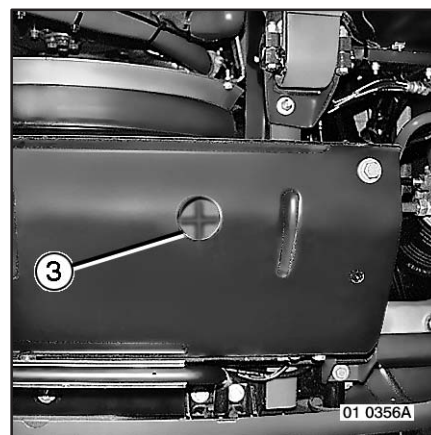
Open the front grille. Tilt the cab.

Remove the gearbox.
(See MR : **32 065**)

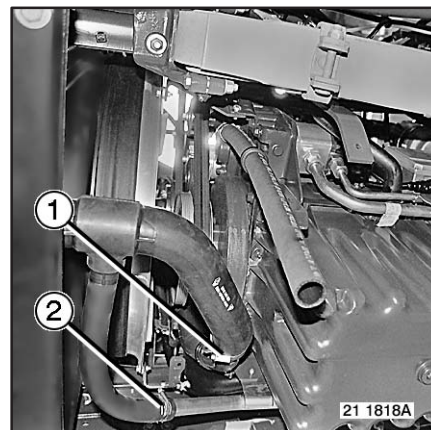
Remove the soundproofing (1–2).



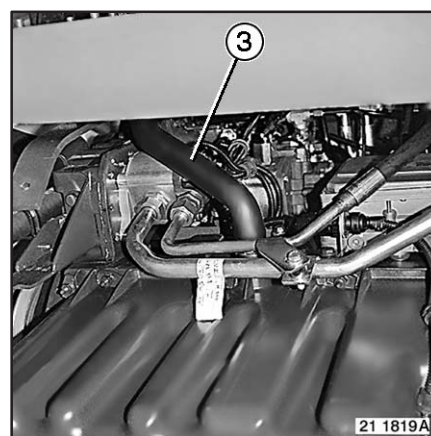
Drain the cooling system.
Remove drain plugs (3–4).



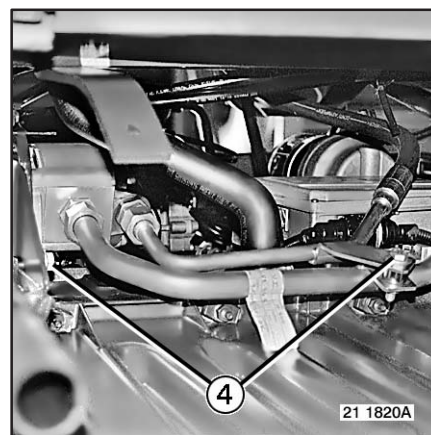
Disconnect hoses (1-2).



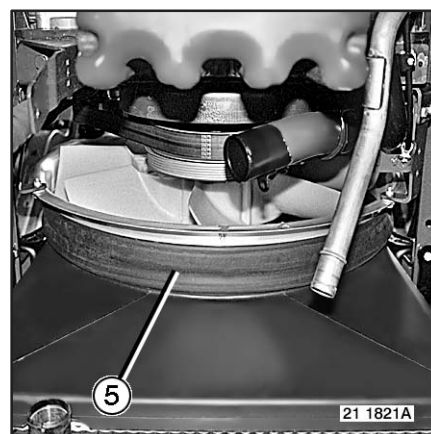
Disconnect oil filler spout (3) .



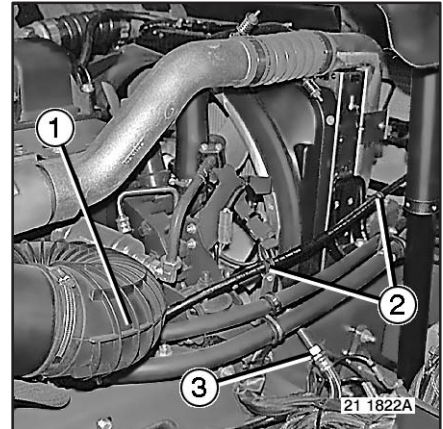
Remove the screws (4).
Remove the steering pump.



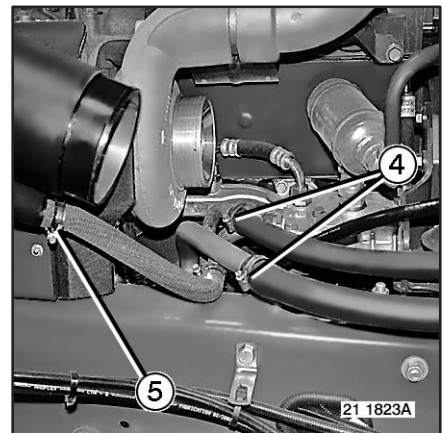
Dislodge seal (5) from radiator cowl.



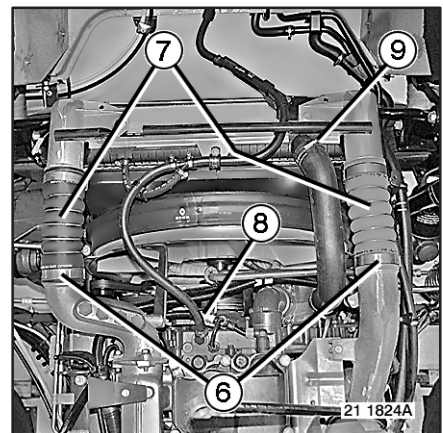
Remove air aspiration pipe (1).
 Disconnect flexible air pipe (3).
 Withdraw clamps (2).



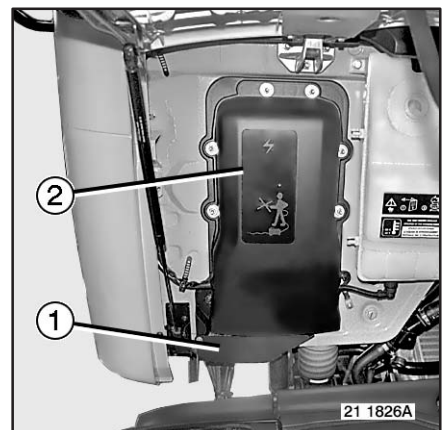
Withdraw the clamps and disengage the hoses (4).
 Remove air aspiration tube (5).
 Remove the turbo heat shield.



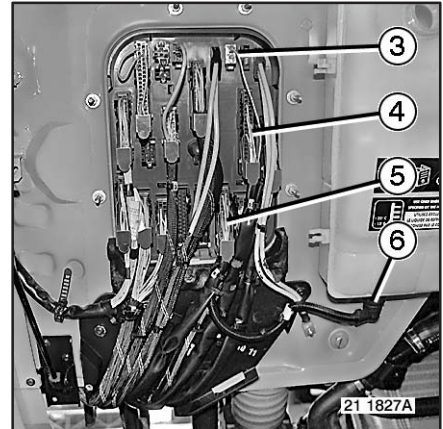
Withdraw the clamps (6).
 Disconnect hoses (7).
 Disconnect hose (8).
 Disconnect hose (9).



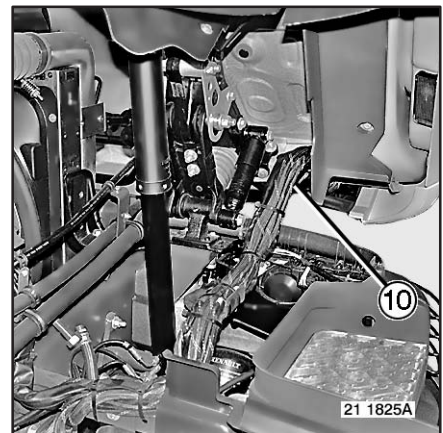
Remove guards (1-2).



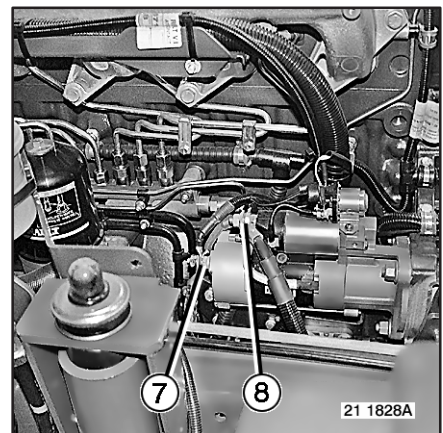
Disconnect the engine wiring harnesses (3-4-5-6) in the cab.



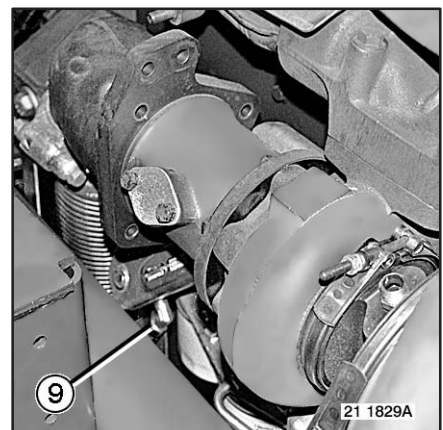
Withdraw engine wiring harness (10).



Disconnect starter motor (7-8).



Remove the hose (9).

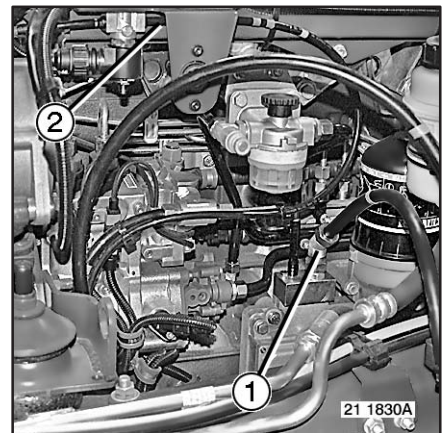


Assembly with air conditioner.

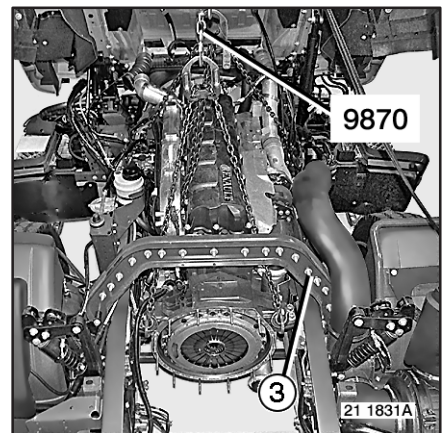
Remove the drive belt.

Remove the air conditioner compressor from its support without disconnecting the piping and lash it to disengage it from the engine.

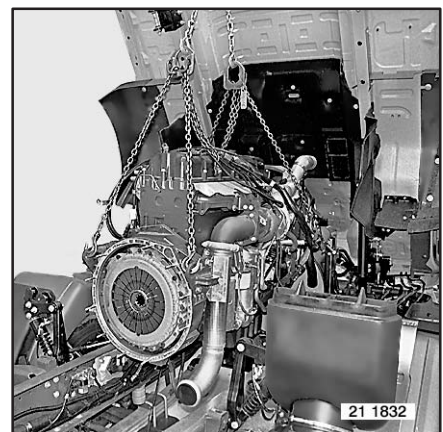
Disconnect the fuel pipes (1-2).
Blank of the ports.

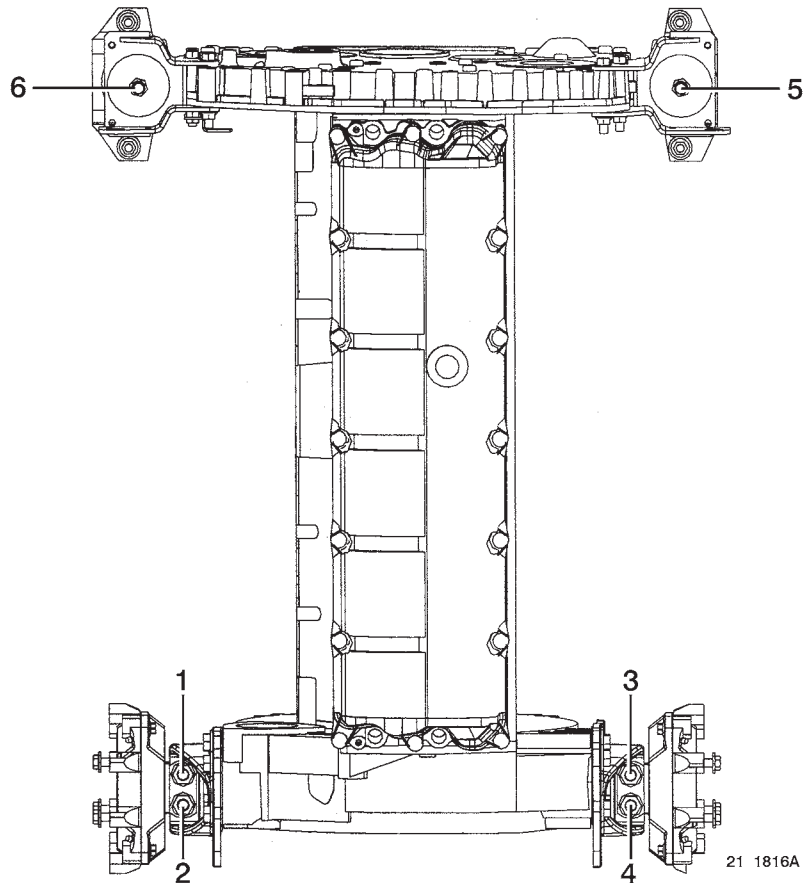


Position the special tool 9870.
Apply slings to the engine at 4 points.
Remove the cross-member (3)*.



Lift up and remove the engine.
During the operation, make sure that no pipe, tube, wiring harness,
etc...remains hooked to the engine.





To fit

Install the engine.

Fit cross-member (3)*.

Tighten at the recommended torque.

With the engine hanging, position it so that the rear mountings are in contact with their brackets but without taking up the load.

In this position, tighten the engine brackets to torque in the following sequence (1-2-3-4-5-6).

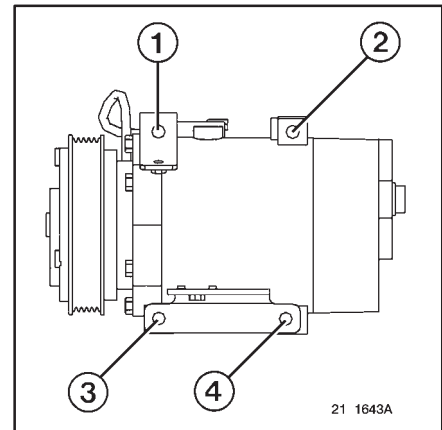
Withdraw the tool **9870**.

Assembly with air conditioner.

Fit the air conditioner compressor to its bracket.
In the indicated sequence.
Tighten at the recommended torque.

IMPORTANT

For vehicles registered before the 01/12/2001, screw (2) is a special screw that serves to position the compressor on the engine block.



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

AIR COMPRESSOR

To remove

Disconnect the batteries, starting with the negative terminal.

Place the vehicle over a pit or on elevators.

Over a pit, chock the roadwheels.

On elevators, release the parking brake, raise the vehicle and install axle stands.

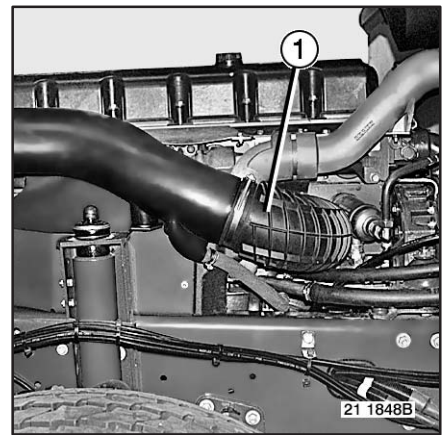
IMPORTANT

With air suspension: move the suspension to the "down" position.

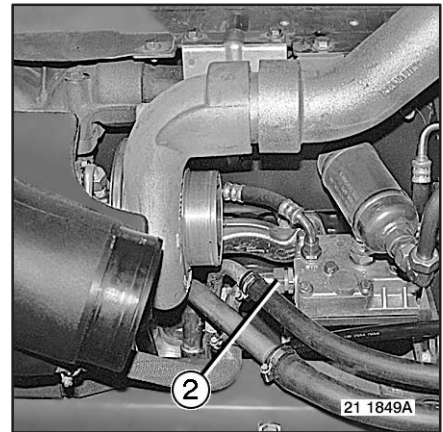
Open the grille and tilt the cab.

Disconnect the hose (1).

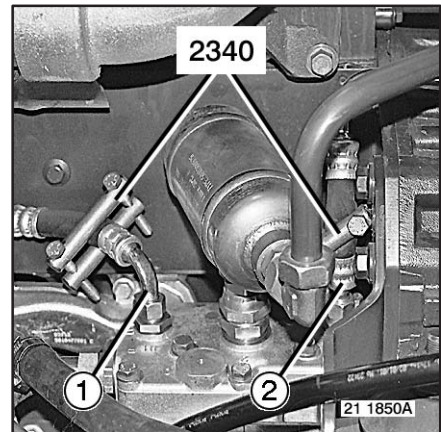
Blank off the ports.



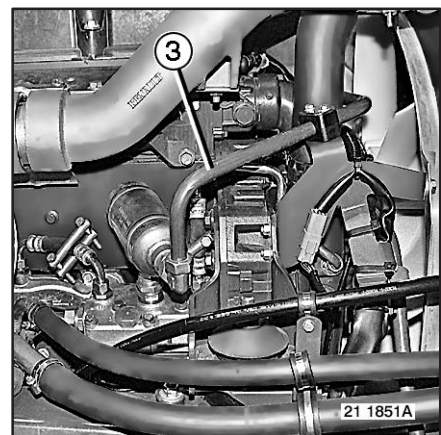
Disconnect union (2).



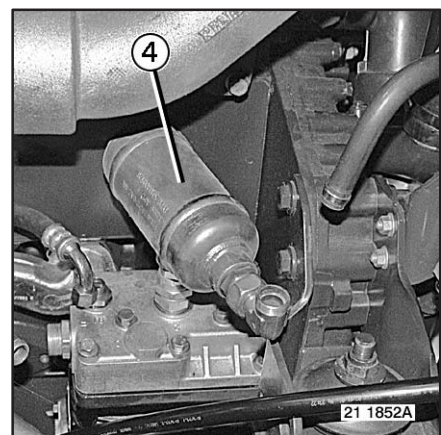
Install tool **2340**.
Disconnect the flexible pipes (**1-2**).



Withdraw the clamps.
Withdraw the pipe (**3**).



Remove exhaust muffler (**4**).
Remove the compressor.



To disassemble

In a vice.

Use a protective device (1-2).

Loosen nut (3) by a few turns.

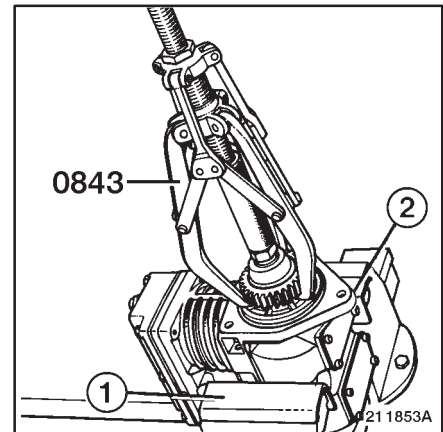
Extract pinion (5).

Use tool(s) 0843.

Remove nut (3).

Withdraw the washer (4).

Withdraw pinion.



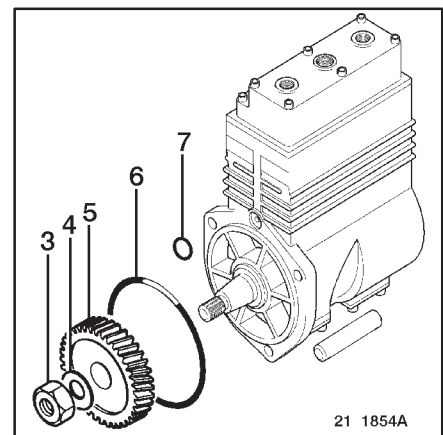
To assemble

Degrease the tapers.

Proceed in the reverse sequence to disassembly.

Tighten at the recommended torque.

Replace all seals without fail (6-7).



To fit

For fitting, proceed in the reverse sequence to removal.

Tighten the screws at the recommended torque.

Ensure a tight seal with a Loctite type threadlocking and sealing product "LT 542".

(See chapter: A).

Check the coolant level.

Start the engine and check for leaks.

HYDRAULIC PUMP

To remove

Disconnect the batteries, starting with the negative terminal.

Place the vehicle over a pit or on elevators.

Over a pit, chock the roadwheels.

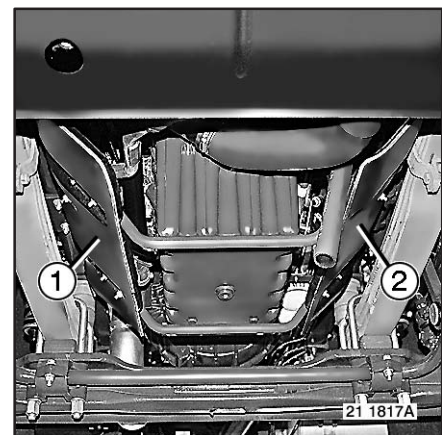
On elevators, release the parking brake, raise the vehicle and install axle stands.

IMPORTANT

With air suspension: move the suspension to the "down" position.

Open the grille and tilt the cab.

Remove soundproofing screens (1–2).



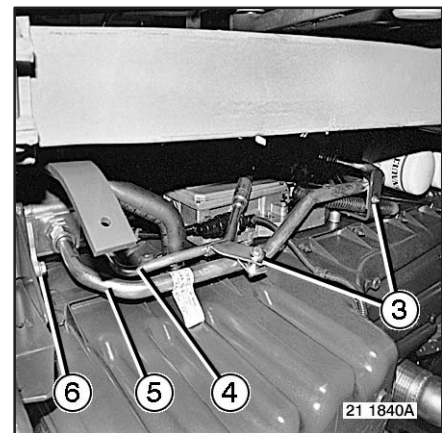
Put a drain pan into place.

Remove screws (3).

Withdraw the pipes (4–5).

Remove screws (6).

Remove hydraulic pump.



To disassemble

In a vice.

Use a protective device (1-2).

Loosen nut (3) by a few turns.

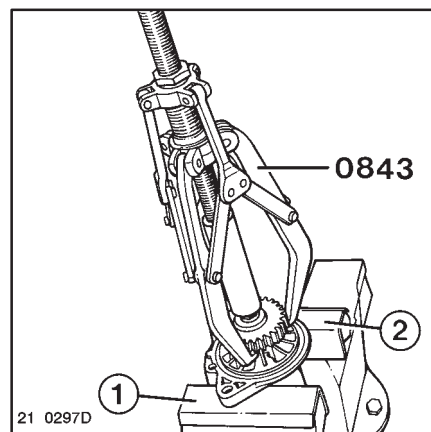
Extract pinion (6).

Use tool(s) 0843.

Remove nut (3).

Withdraw washer (4).

Withdraw pinion.



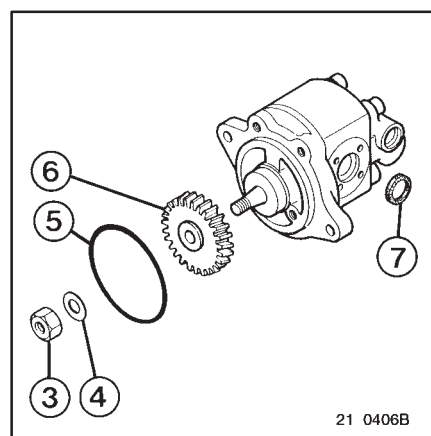
To assemble

Degrease the tapers.

Proceed in the reverse sequence to disassembly.

Tighten at the recommended torque.

Replace all seals without fail (6-7).



To fit

For fitting, proceed in the reverse sequence to removal.

Tighten the screws at the recommended torque.

Ensure a tight seal with a Loctite type threadlocking and sealing product "LT 542".

(See chapter: **A**).

Fill the steering system with oil.

(See servicing handbooks)

Start the engine and check for leaks.

WATER PUMP

To remove

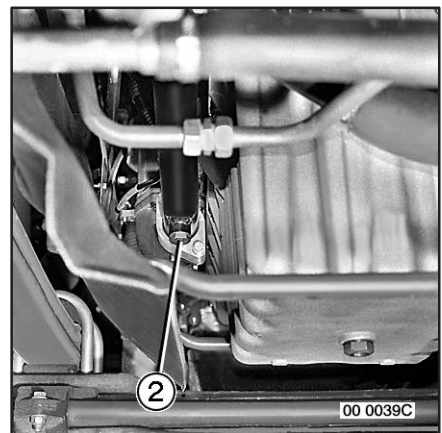
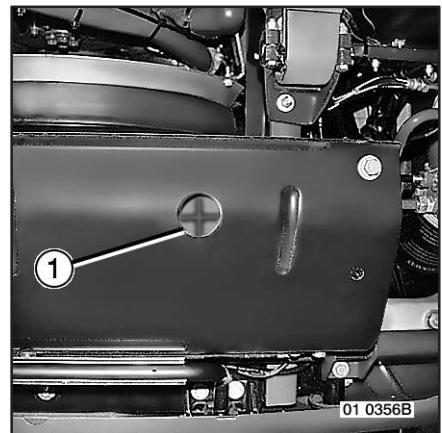
Disconnect the batteries, starting with the negative terminal.
Place the vehicle over a pit or on elevators.
Over a pit, chock the roadwheels.
On elevators, release the parking brake, raise the vehicle and install axle stands.

IMPORTANT

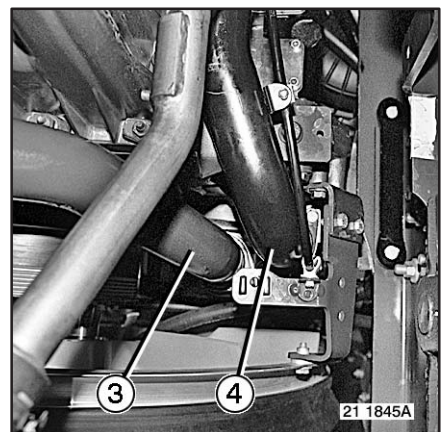
With air suspension: move the suspension to the "down" position.

Open the grille and tilt the cab.

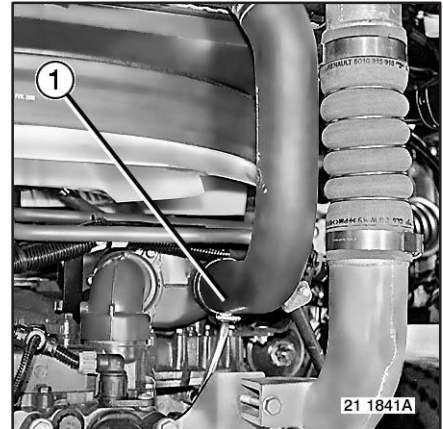
Drain the cooling system.
Remove plugs (1–2).



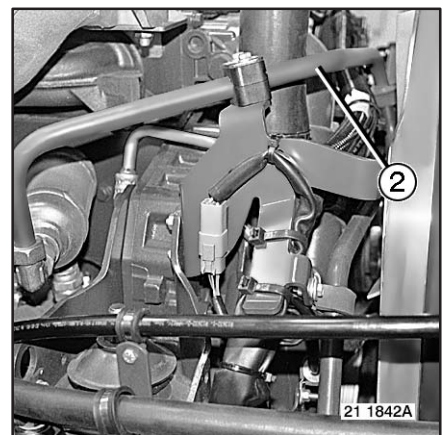
Withdraw the pipes (3–4).
Take out the seals.



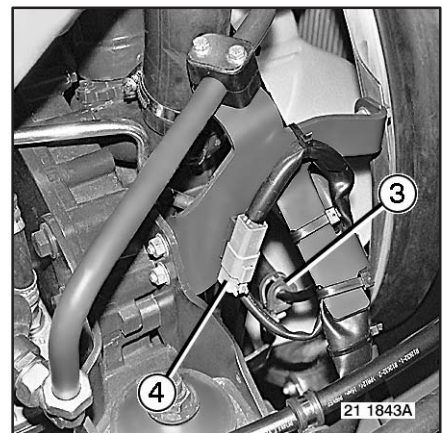
Disconnect the hose (1).



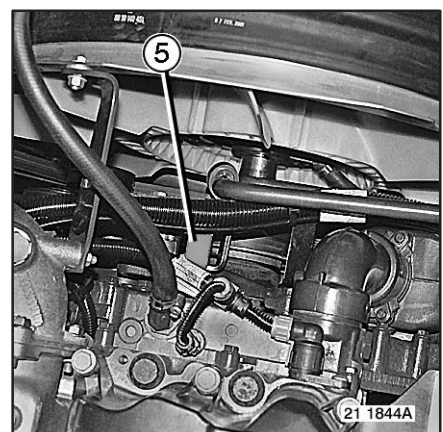
Withdraw the pipe (2).



Remove the clamp (3).
Disconnect wiring harness (4).

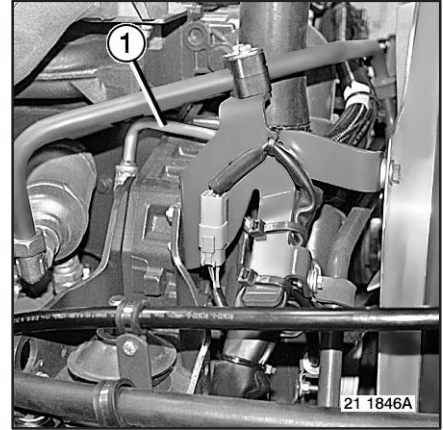


Remove mounting (5).



Withdraw the pipe (1).

Remove the water pump volute.
Remove the water pump.



To fit

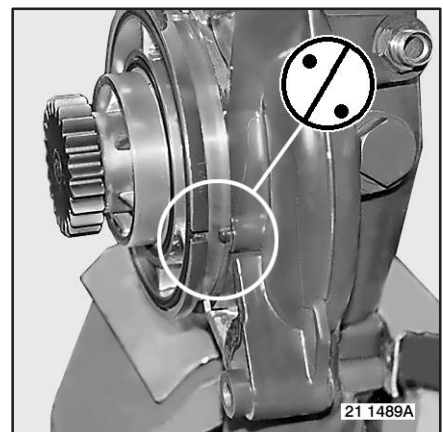
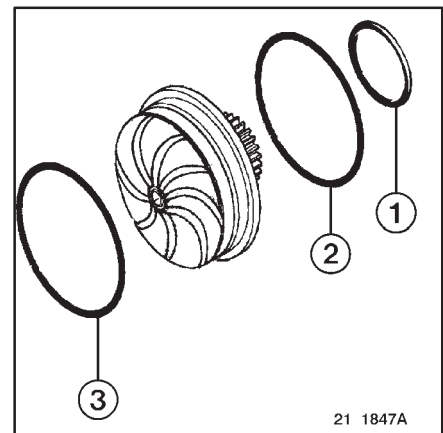
Change seals (1-2-3) without fail.
Install seal (3).
Lubricate the outside of seal (3) with soapy water.
Check for the presence of dowel.
Fit the coolant pump.
Respect the orientation.

Install seals (1-2).
Fit the coolant pump volute.

For the rest of the fitting operations, proceed in the reverse sequence to removal.

Tighten the screws at the recommended torque.
Ensure a tight seal with a Loctite type threadlocking and sealing product "LT 542".
(See chapter: A).

Fill the cooling system with coolant.
(See servicing handbooks)
Start the engine and check for leaks.



RADIATOR

To remove

Disconnect the batteries, starting with the negative terminal.

Place the vehicle over a pit or on elevators.

Over a pit, chock the roadwheels.

On elevators, release the parking brake, raise the vehicle and install axle stands.

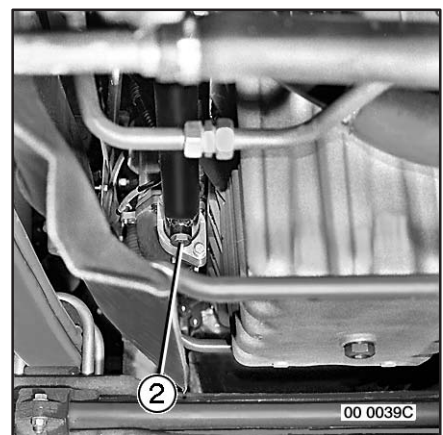
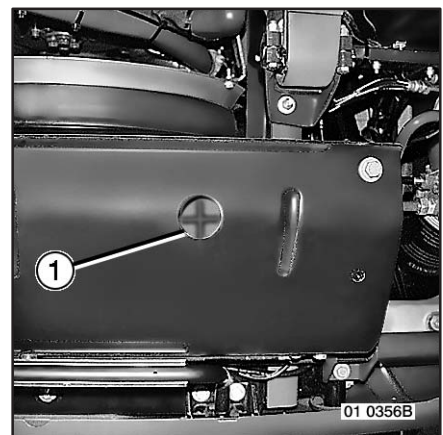
IMPORTANT

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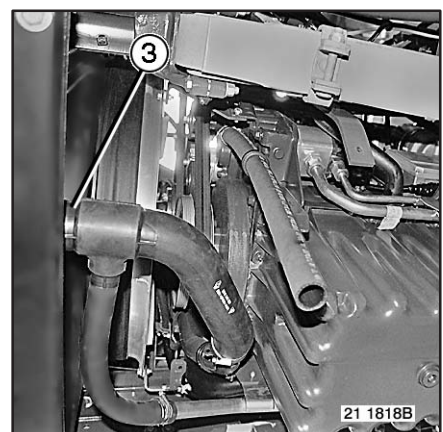
Open the grille and tilt the cab.

Drain the cooling system.

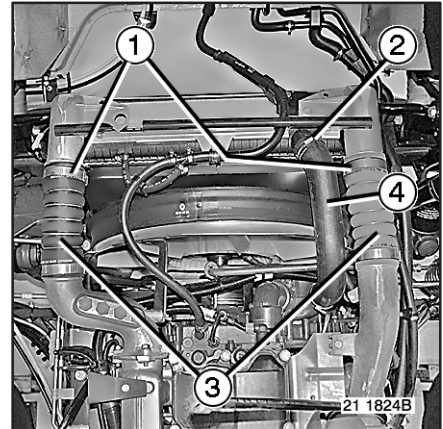
Remove plugs (1–2).



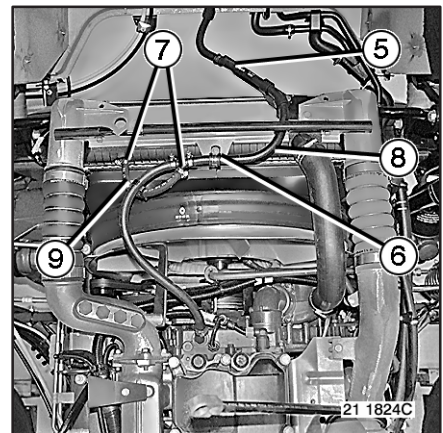
Disconnect the hose (3).



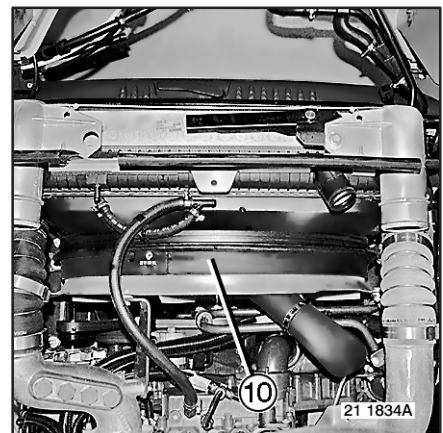
Withdraw clamps (1–2) and disengage hoses (3–4).



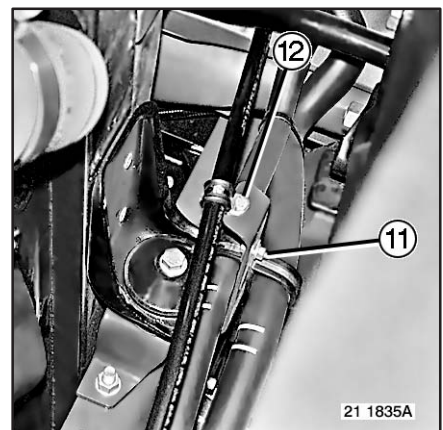
Withdraw the clamps (5–6).
Withdraw clamps (7) and disengage hoses (8–9).



Unhook the gasket (10) from the radiator cowl.

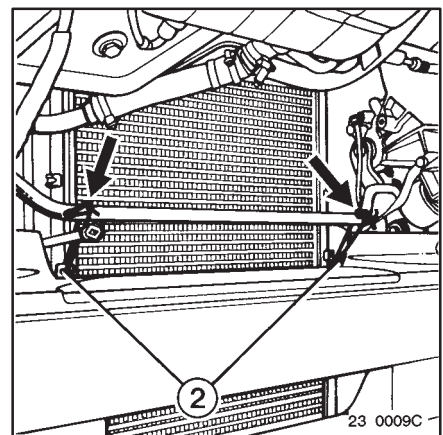
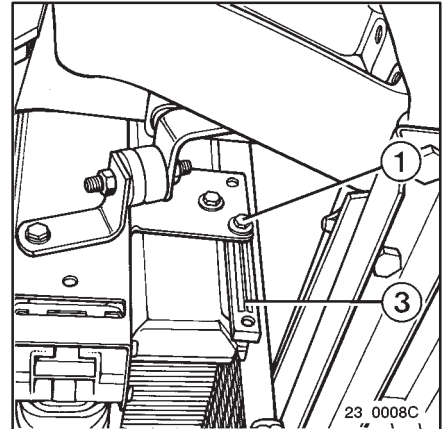


Withdraw clamps (11–12)

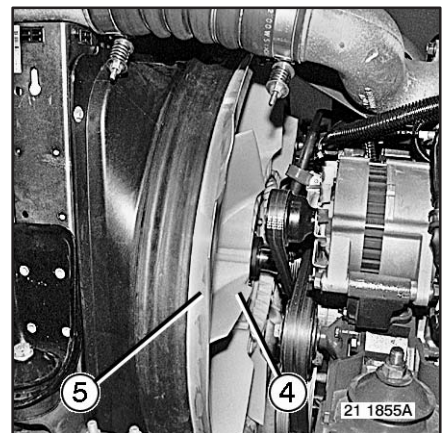


Assembly with air conditioning.

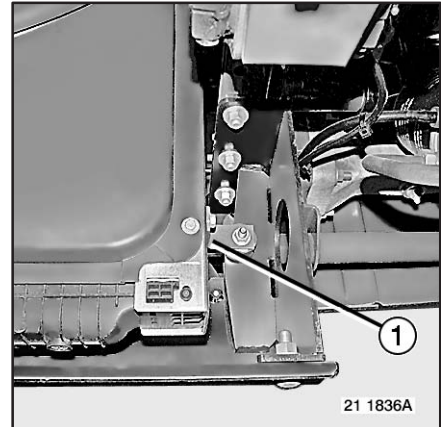
Remove screws (1-2) and hold condenser (3) in place with a piece of string.



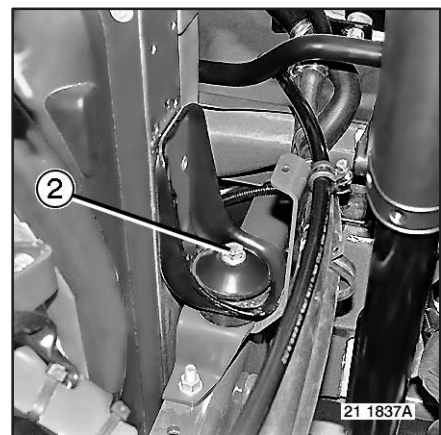
If necessary
Remove fan (4) and place it inside the cowl.
Remove ferrule (5).
Remove fan (4).



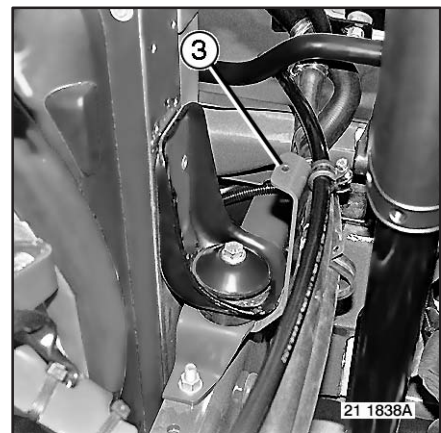
Remove mountings (1).



Remove screws (2).



If necessary
Remove the bracket (3).



Use a protective device (4).
Put a sling into place and remove the radiator assembly.
This operation requires special care.



To fit

For fitting, proceed in the reverse sequence to removal.
Tighten at the recommended torque.
(See chapter: **A**).

Fill the cooling system with coolant.
(See servicing handbooks)
Start the engine and check for leaks.

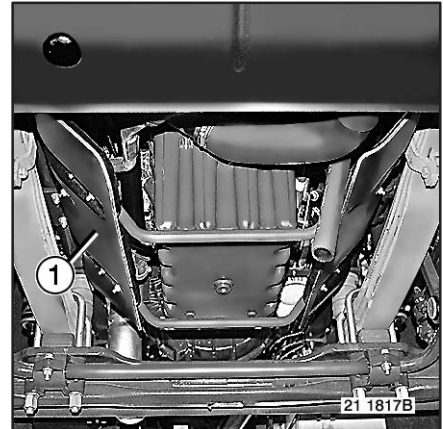
TURBOCHARGER

To remove

Disconnect the batteries, starting with the negative terminal.

Open the grille and tilt the cab.

Remove soundproofing screen (1).

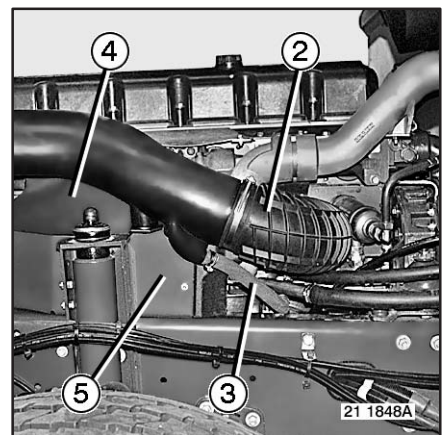


Remove hose (2).

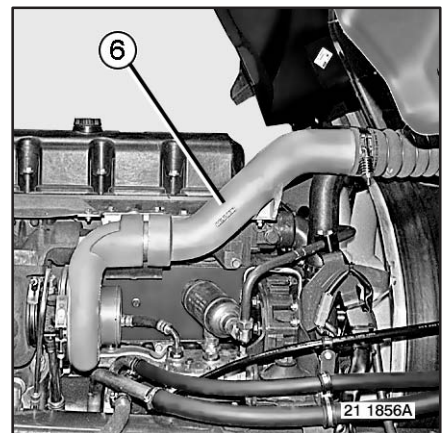
Disconnect the hose (3).

Remove soundproofing screen (4).

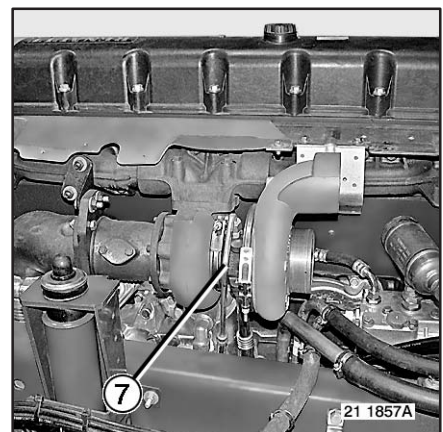
Remove guard plate (5).



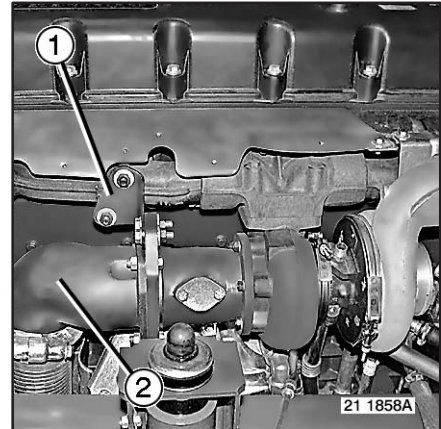
Remove tube (6).



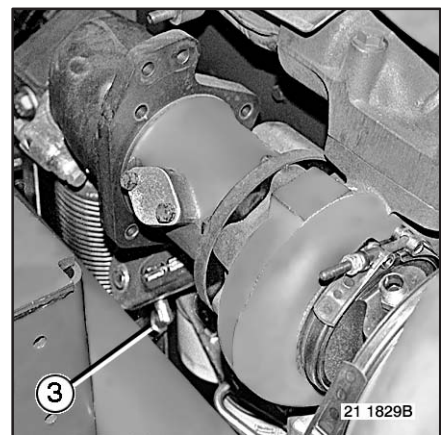
Withdraw the pipe (7).



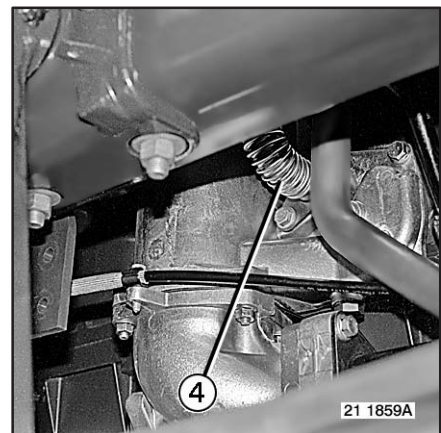
Remove fixing lug (1).
Disconnect tubes (2).
Withdraw the seal.



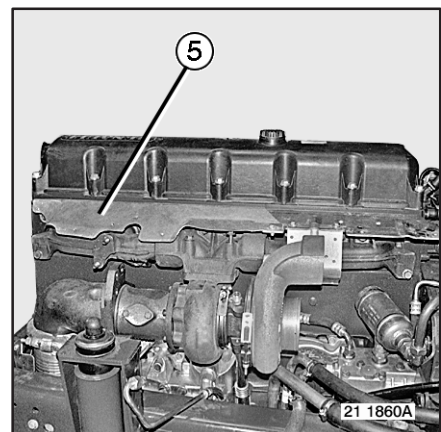
Disconnect flexible pipe (3).



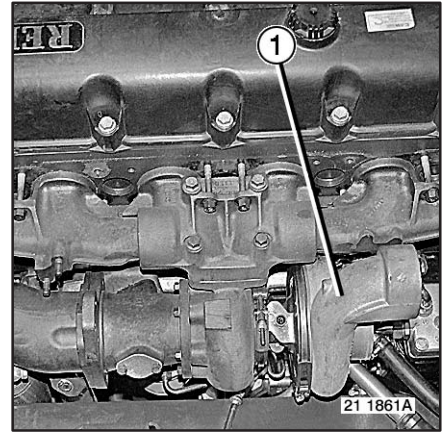
Disconnect oil return tube (4).



Remove the heat shield (5).



Remove the turbocharger (1).



To fit

Thoroughly clean the contact faces.
Check the mating surface.
Replace gaskets.

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

IMPORTANT

Any turbocharger replacement, where the cause of damage has not been defined, may lead to new incidents 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.

For the rest of the fitting operations, proceed in the reverse sequence to removal.
Tighten at the recommended torque.
(See chapter: **A**).

Top up the engine oil level.
Start the engine and check for leaks.

TOOLS

RENAULT TRUCKS divide tools into 3 categories

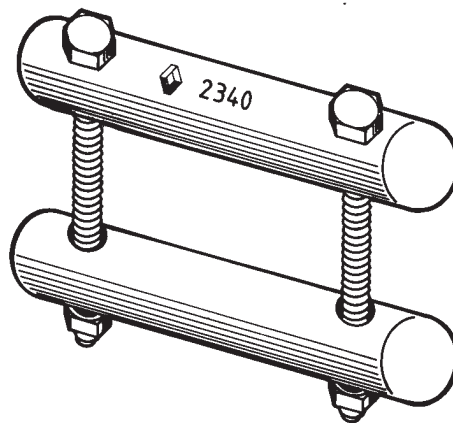
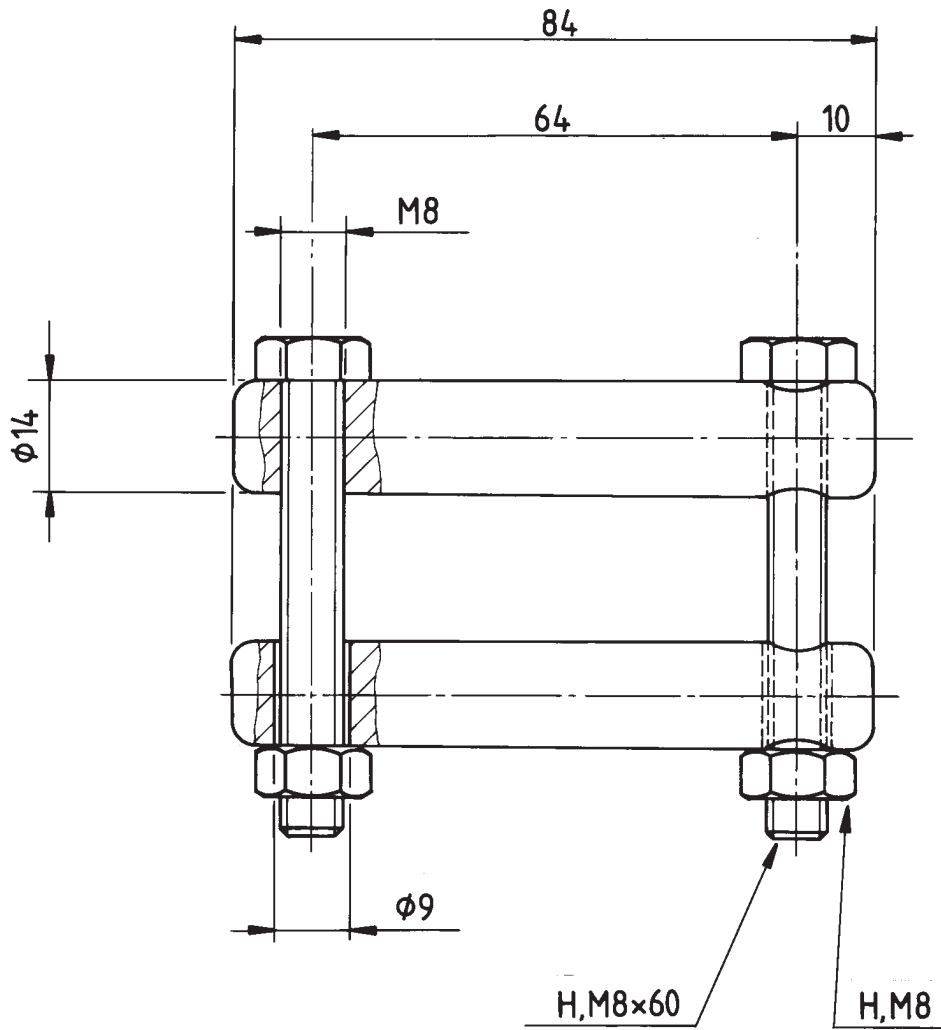
- **General-purpose tools:** Commercially available tools.
 - . **50 00 26 reference number** (possibility of purchasing through the RENAULT TRUCKS Spare Parts department).
 - . **4-figure reference number** (tools with RENAULT TRUCKS reference number, but available from the supplier).
- **Special tools:** Specially created tools, distributed by the RENAULT TRUCKS spare parts division.
- **Locally manufactured tools:** these tools are classified differently according to their degree of sophistication
 - . **4-figure reference number** (represented by a drawing): tools that are simple to make without need for special qualification.
 - . **50 00 26 reference number** (possibility of purchasing through the RENAULT TRUCKS Spare Parts department): a certain skill is needed to make these tools.

Three levels (or echelons) determine their assignment

- **LEVEL 1:** Tools for servicing and minor tasks.
- **LEVEL 2:** Tools for major repairs.
- **LEVEL 3:** Tools for refurbishment.

General-purpose tools				
Ref. RENAULT TRUCKS	Designation	Level	Quantity	Page
50 00 26 0843	Puller	1	1	C4 – D3

Locally manufactured tools				
Ref. RENAULT TRUCKS	Designation	Level	Quantity	Page
FL 2340	Clamp	1	2	C3



FL 2340