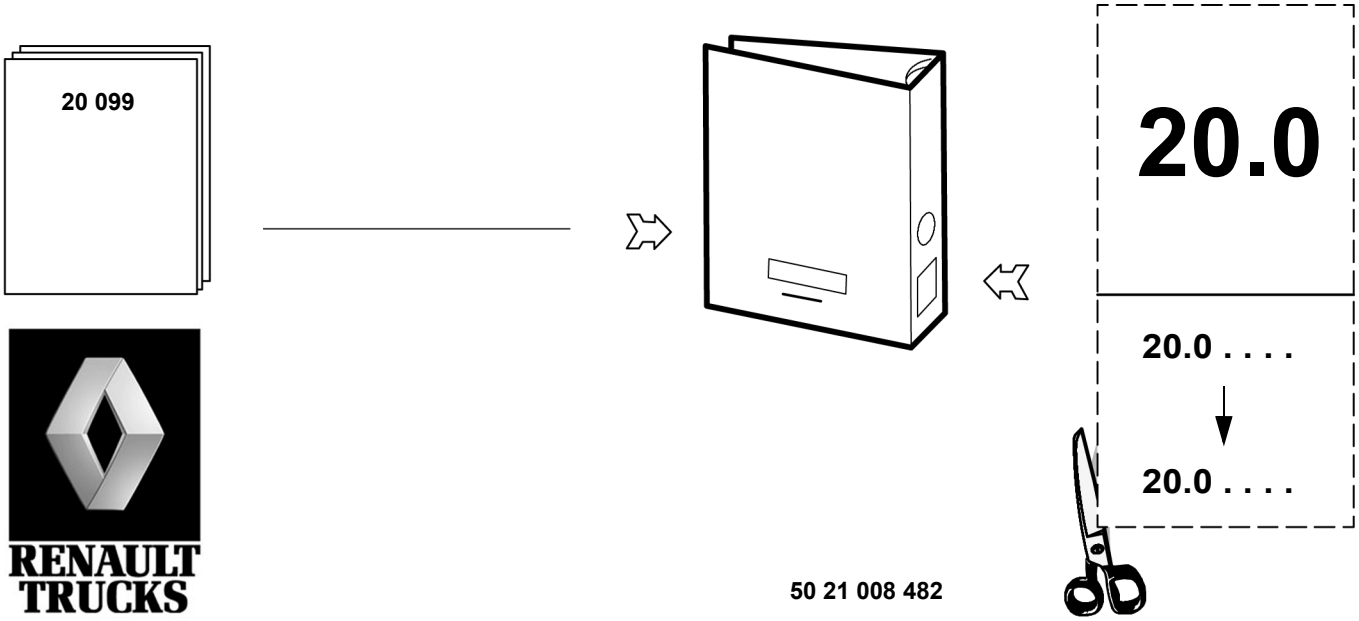
20 099 - GB - 07/2003

ENGINE E. TECH - EQUIPMENT

RANGE	FAMILY	VARIANT
MAGNUM	11H T 6X4	12923
	11F P 4X2/6X2	
	11E T 4X2/6X2	

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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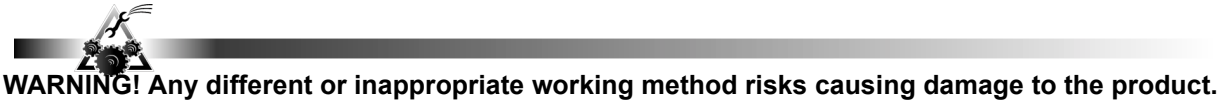
GENERALITIES

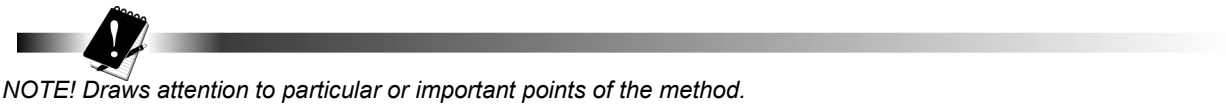
Warnings

In this document, safety instructions are symbolized as follows:

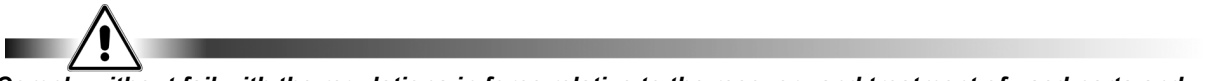
DANGER! NON-OBSERVANCE OF THE PROCEDURE DESCRIBED OR LACK OF CARE OR ATTENTION, RISK CAUSING SERIOUS INJURY OR EVEN DEATH.



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.

Precautions

Practical advice
Prior to any work:
- Clean the major unit and its surrounds (See Driving Servicing Handbook, "Vehicle washing").
- Ensure the batteries are disconnected.
- 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.

The "EUP" system is a high-performance fuel-injection system.
Since the "EUP" system is more sensitive to pollution than in-line pump systems, risks of damage are higher.
Hence, compliance of assembly of original parts guaranteed by the manufacturer and operating, maintenance and repair instructions for the system.
Work on the "EUP" system"
The system operates with very high fuel-injection pressures (up to 1,800 bar) and medium voltage electrical current.
Prior to disassembly, with the engine shut-down, carefully clean the surrounds then take all necessary precautions to prevent the ingress of impurities. Use a clean thinner, then blow through with compressed air.
Any work on the fuel-injection system should be carried out with the engine shut-down (check on: injectors, voltage, resistance, fixing tightness, etc...).
Upon disassembly
Repairs are to be carried out in a clean room, free from dust and using suitable tools.
The use of gloves made from fibrous material is strictly forbidden.
Carefully clean the parts with clean solvent and inspect. Use top quality brushes that are perfectly clean and in good condition. Do not use fluffy or soiled rags.
The Spare Parts department supplies cloths and plugs suitable for one-off use.
Blank off all ports with plugs as soon as the pipes are removed.
Avoid the use of compressed air.
Cleaned components must be protected to avoid any trace of circuit corrosion.
Systematically replace the injector unit.
Do not expose yourself to the fuel jet at the time of injector spray or high-pressure circuit leak tests.
Follow the chronological sequence of disassembly / assembly indicated 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.
All these recommendations guarantee you quality and reliability of the "EUP" system

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

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

Standard tightening torques table for union bolts with Cu gaskets and BS rings

Nominal tightening torque values for union bolts with CU gaskets and self-centring BS rings			
nominal dia.	Tightening torque	nominal dia.	Tightening torque
8	10 ± 2	16	40 ± 8
10	20 ± 4	18	50 ± 10
12	27 ± 5.4	22	80 ± 16
14	32 ± 6.4	24	80 ± 16

Specific tightening torques

Engine

Bolts securing engine rear brackets to chassis	**400 ± 40 Nm**

Cooling

Spring clamps on engine turbocharging air hoses	**7.5 ± 1 Nm**
Radiator coolant drain plug	**8 ± 1.5 Nm**
Engine coolant drain plug	**31 ± 6 Nm**
Radiator ferrule setscrew	**5 ± 1 Nm**

Air compressor

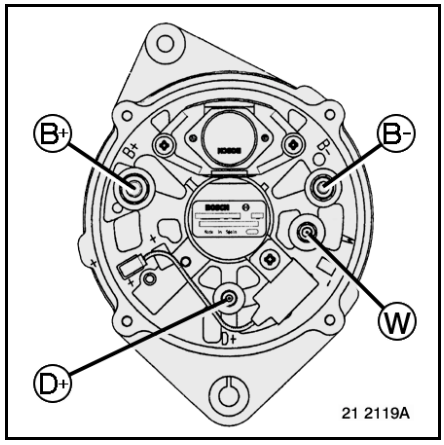
Coolant pipe union	**30 ± 6 Nm**
Air delivery union (oiled union)	**150 ± 30 Nm**
Banjo union	**32 ± 6 Nm**
Air aspiration tube setscrew	**17.9 Nm**

Turbocharger

Flexible lube pipe union	**40 ± 8 Nm**

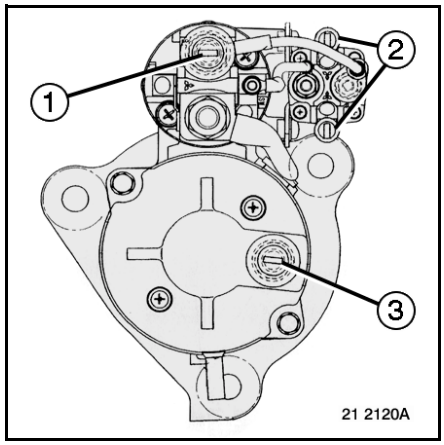
Alternator

Connection terminal nut **(B+)**	**8 ± 1 Nm**
Connection terminal nut **(B-)**	**6 ± 1 Nm**
Connection terminal nut **(W)**	**2 Nm**
Connection terminal nut **(D+)**	**2 Nm**



Starter

Connection terminal nut **(1)**	**25 ± 5 Nm**
Connection terminal nut **(2)**	**3 ± 0.5 Nm**
Connection terminal nut **(3)**	**25 ± 5 Nm**



TOOLS

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.

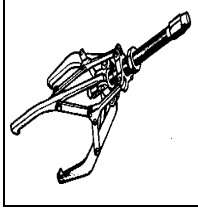
- **Level 2:** tools for major repairs.

- **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

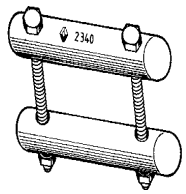
General-purpose tools

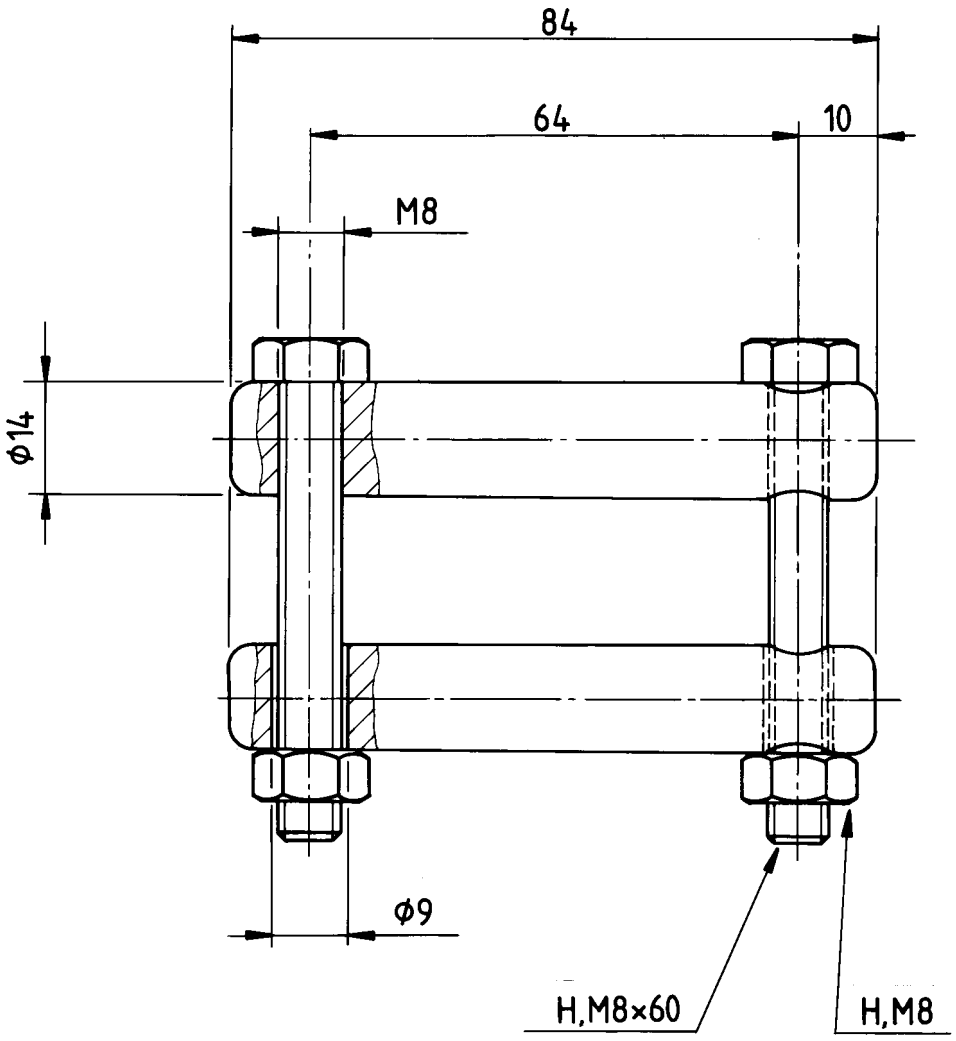
Illustration	RENAULT TRUCKS Ref.	Designation	Manufacturer reference	Manufacturer code	Level	Qty
	**5000260843**	PULLER			1	1

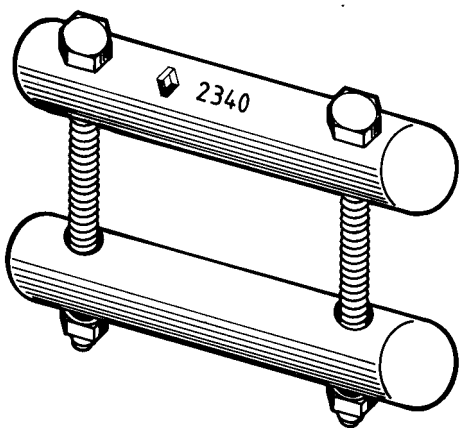
Special Tools

Illustration	RENAULT TRUCKS Ref.	Designation	Manufac-turer reference	Manufac-turer Code	Level	Qty
	5000262464	BOX OF RILAX 2000 PIPES			1	1

Locally manufactured tools

Illustration	RENAULT TRUCKS Ref.	Designation	Manufacturer reference	Manufacturer code	Level	Qty
	**2340**	CLAMP			1	1





FL 2340

ENGINE

Removal

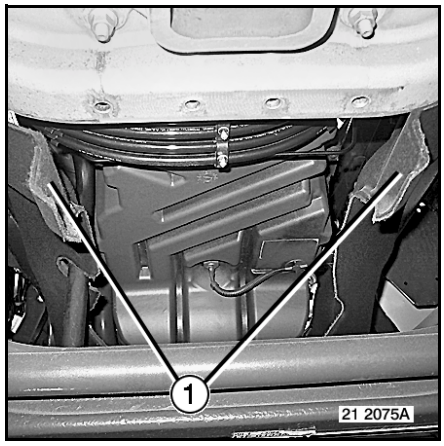
The method below applies to all power ratings. It mainly deals with the most important details of removal / fitting.

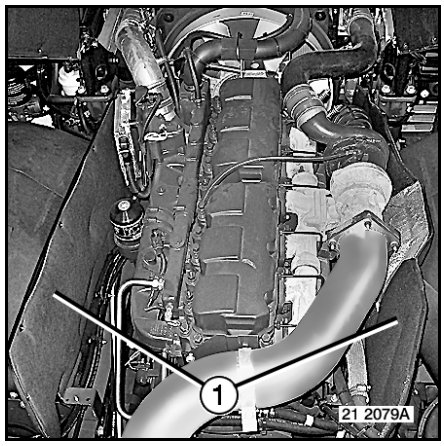
Disconnect the batteries, starting with the negative terminal.
Place the vehicle over a pit or on elevators.
Over a pit, chock the roadwheels.
On elevators, release the parking brake, raise the vehicle and install axle stands.

WITH AIR SUSPENSION: MOVE THE VEHICLE SUSPENSION TO THE "DOWN" POSITION.

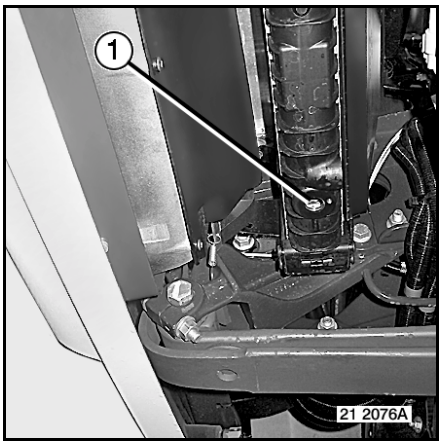
Tilt the cab.
Remove the gearbox.

Remove soundproofing screens **(1)**.

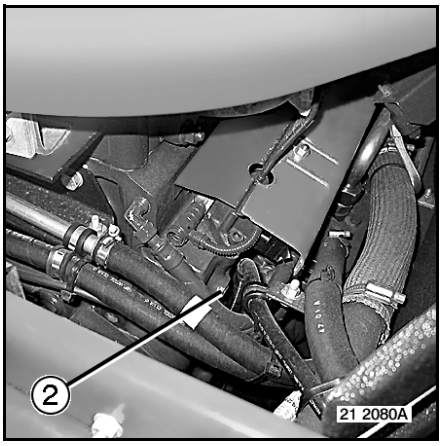




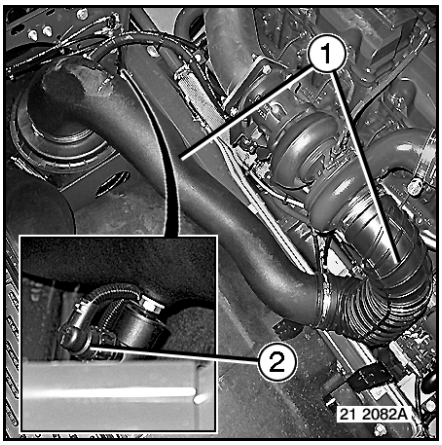
Drain the cooling system.
Remove radiator drain plug **(1)**.



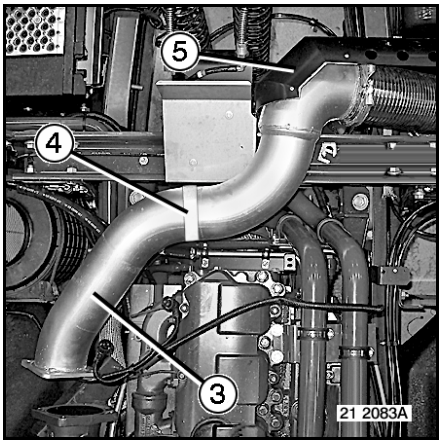
Remove plug **(2)**.



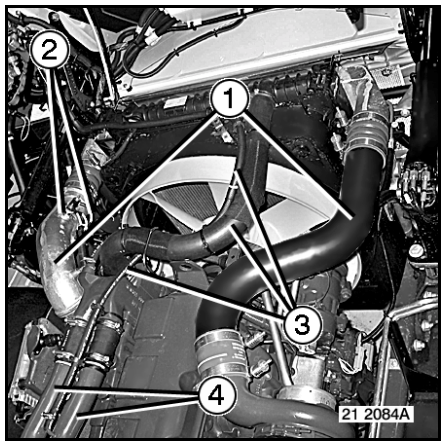
Remove air aspiration pipe **(1)**.
Unplug air filter clogging sensor connector **(2)**.



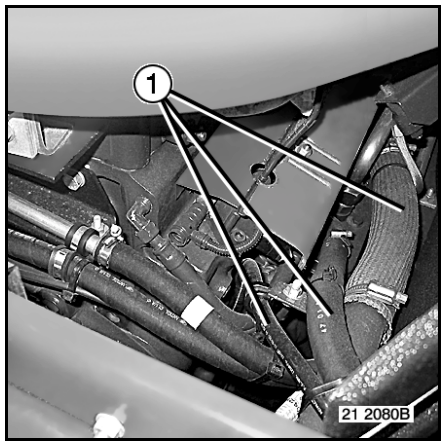
Remove heat shield **(5)**.
Remove clamp **(4)**.
Move exhaust pipe **(3)** aside to the rear.



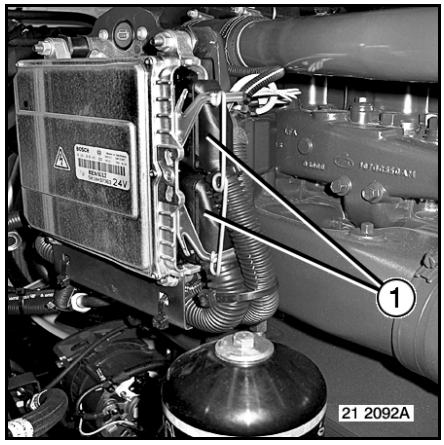
Remove preheat plug connections **(2)**.
Remove air intake tubes **(1)**.
Remove hoses **(3)**.
Remove coolant pipes **(4)**.

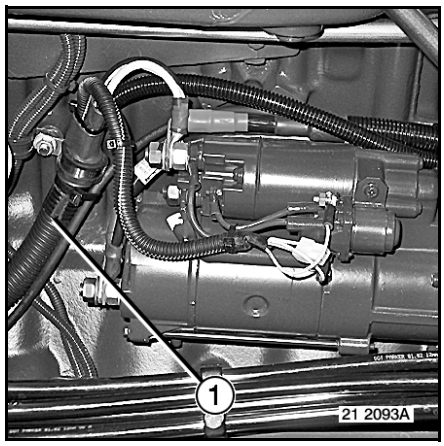


Disconnect pipes **(1)**.

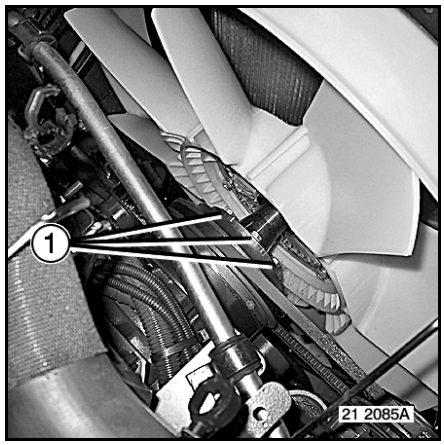


Disconnect wiring harness **(1)**.

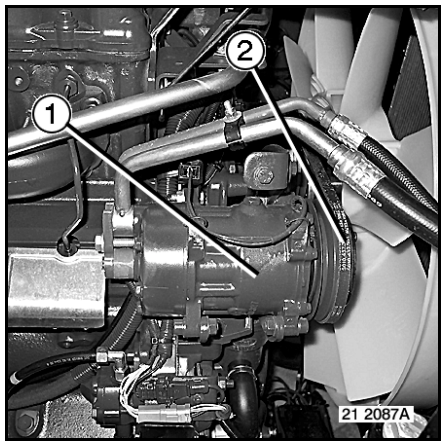




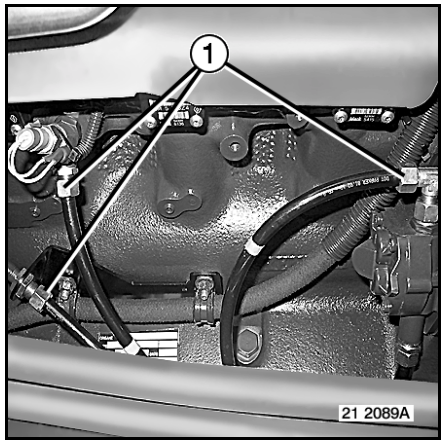
Remove securing bolts **(1)**.
Remove the fan and place it inside the shroud.



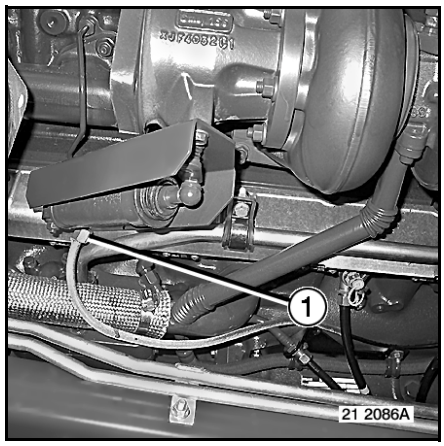
Assembly with air conditioner.
Remove drive belt **(2)**.
Remove the air conditioner compressor **(1)** from its support without disconnecting the piping and lash it to disengage it from the engine.



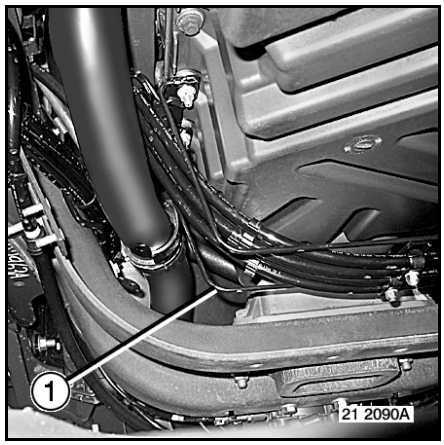
Mark and remove pipes **(1)**.
Blank off the ports.



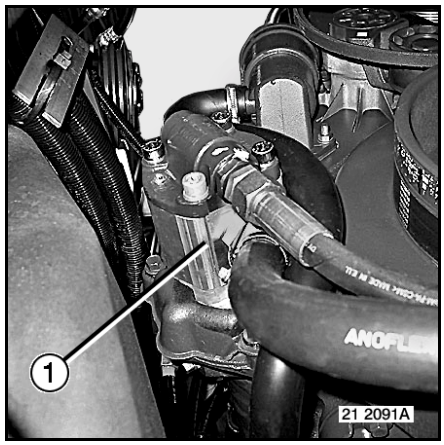
Disconnect air pipe **(1)**.



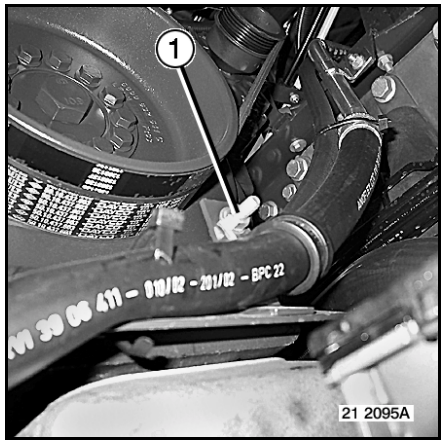
Remove piping bracket **(1)**.



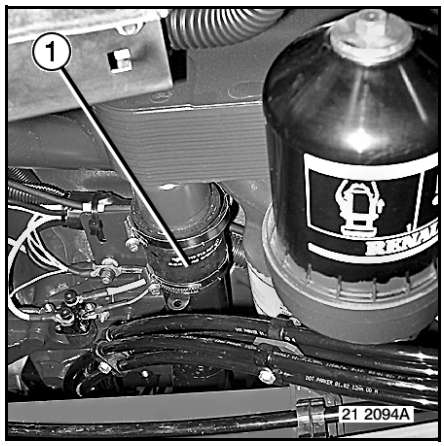
Remove steering pump **(1)** without disconnecting the pipes and lash it to the chassis.



Remove clamp **(1)**.

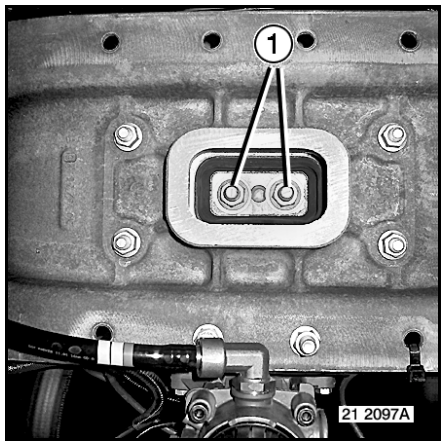


Disconnect hose **(1)**.

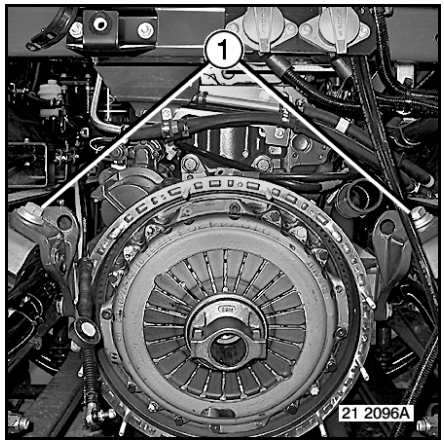


Disconnect air pipe **(1)**.

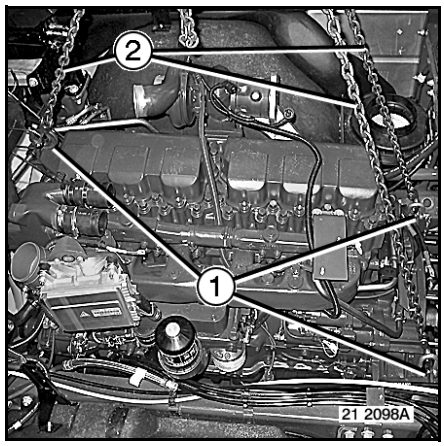
Remove bolts **(1)** from the engine front bracket.



Remove bolts **(1)** from the engine rear bracket.



EI Apply slings to the engine at four points **(1)**.
Using lifting tackle **(2)**, remove the engine.
During the operation, make sure that no pipe, tube, wiring harness, etc... remain hooked to the engine.



Fitting

Install the engine.
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.
Proceed in the reverse sequence to removal.
Ensure tightening torques.
Fill the cooling system with coolant.
(See Driving & Servicing Handbook)
Top up the oil level.
(See Driving & Servicing Handbook)

AIR COMPRESSOR

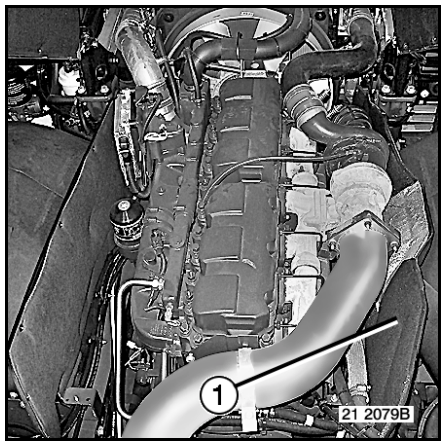
Removal

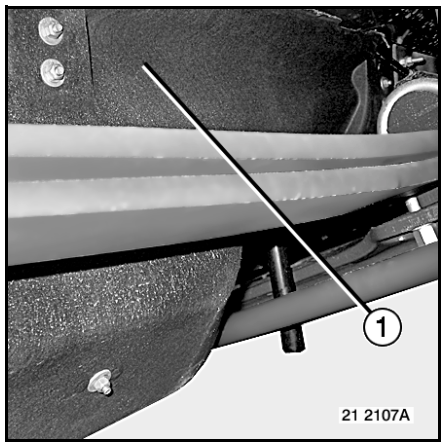
Disconnect the batteries, starting with the negative terminal.
Place the vehicle over a pit or on elevators.
Over a pit, chock the roadwheels.
On elevators, release the parking brake, raise the vehicle and install axle stands.

WITH AIR SUSPENSION: MOVE THE VEHICLE SUSPENSION TO THE "DOWN" POSITION.

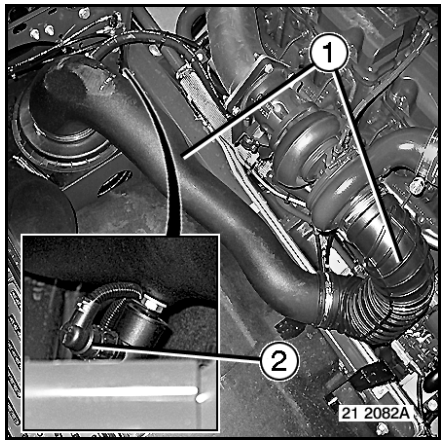
Tilt the cab.

Remove soundproofing screens **(1)**.

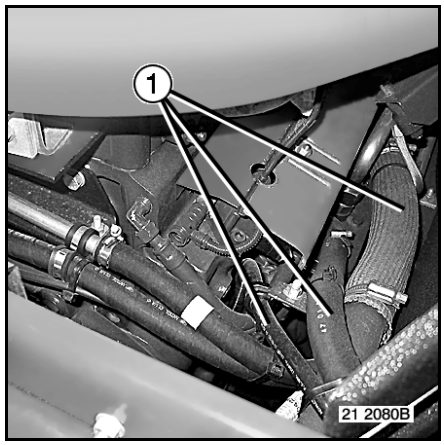




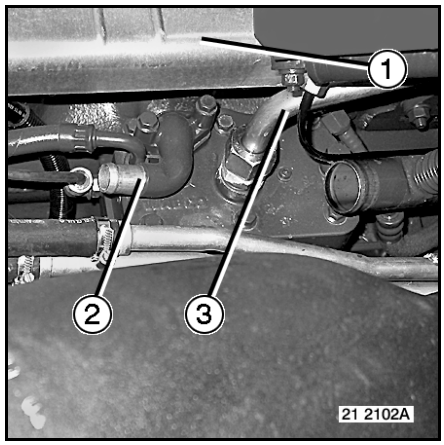
Remove air aspiration pipe **(1)**.
Unplug air filter clogging sensor connector **(2)**.
Blank off the ports.



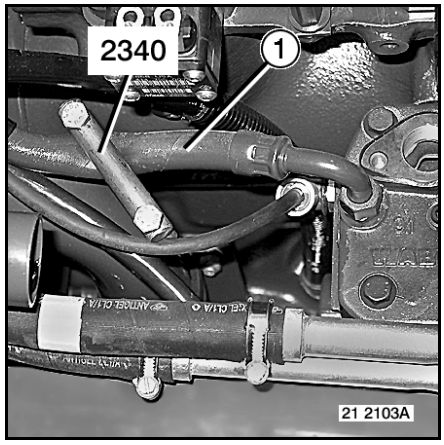
Disconnect pipes **(1)**.



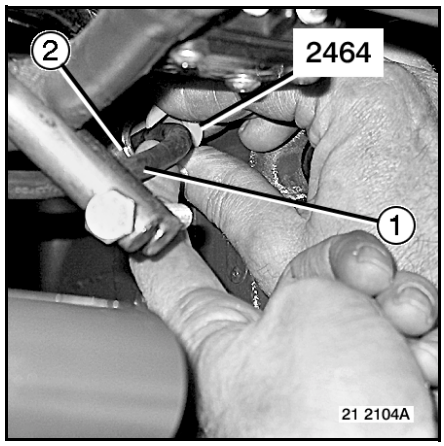
Remove guard plate **(1)**.
Remove air aspiration pipe **(2)**.
Remove air delivery pipe **(3)**.
Blank off the ports.



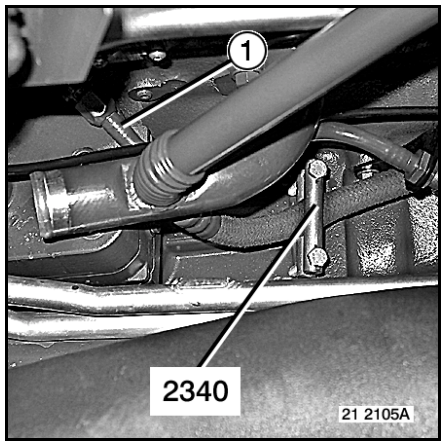
Install tool **2340**.
Remove pipe **(1)**.



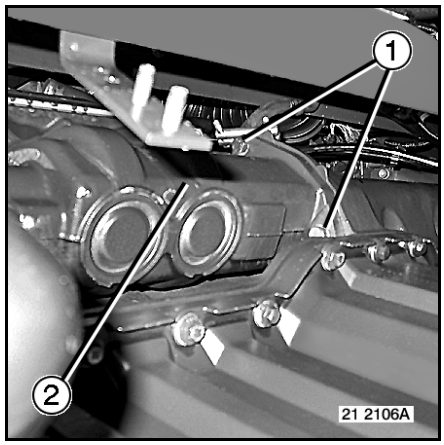
Disconnect air pipe **(1)**.
Use tool **2464**.
Remove the elbow union **(2)**.



Install tool **2340**.
Remove pipe **(1)**.



Remove securing nuts and bolts **(1)**.
Remove compressor **(2)**.



Fitting

For fitting, proceed in the reverse sequence to removal.
Tighten the nuts and bolts to torque.
Apply "**LT 542**" oiltight threadlocking compound to give a fluidtight seal.
Systematically replace all gaskets.
Check the coolant system level. Top up if necessary.
Check the engine oil level. Top up if necessary.
Start the engine and check for leaks.

HYDRAULIC PUMP

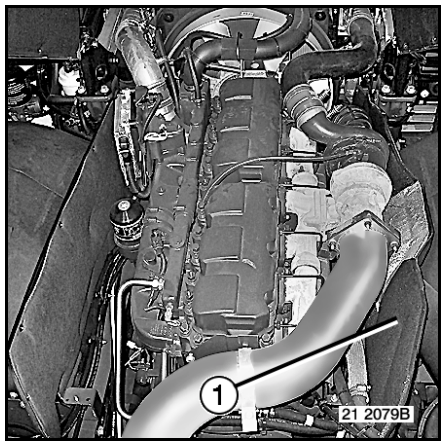
Removal

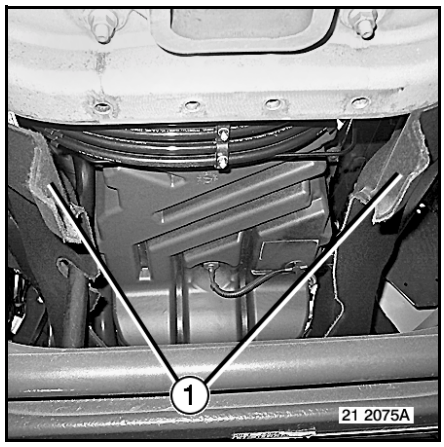
Disconnect the batteries, starting with the negative terminal.
Place the vehicle over a pit or on elevators.
Over a pit, chock the roadwheels.
On elevators, release the parking brake, raise the vehicle and install axle stands.

WITH AIR SUSPENSION: MOVE THE VEHICLE SUSPENSION TO THE "DOWN" POSITION.

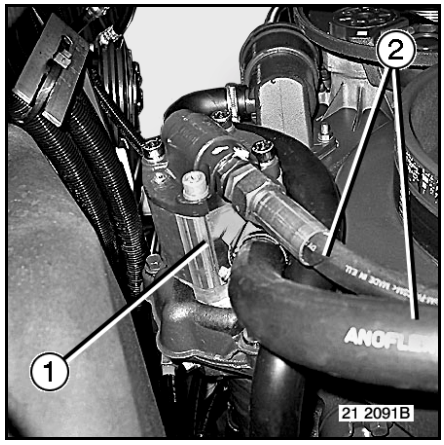
Tilt the cab.

Remove soundproofing screens **(1)**.



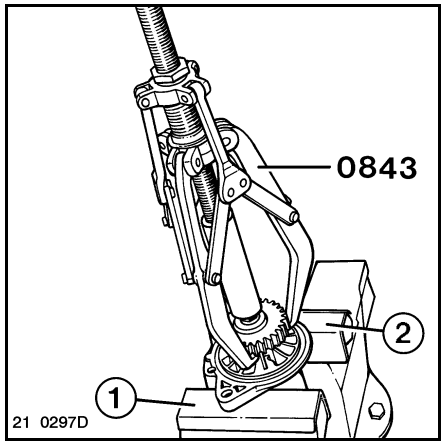


Put a drain pan into place.
Disconnect the pipes **(2)**.
Remove the hydraulic pump securing bolts .
Remove hydraulic pump **(1)**.



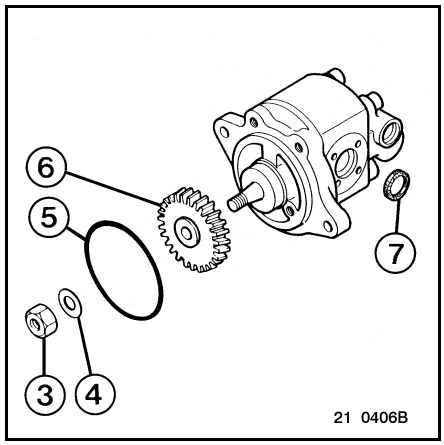
Disassembly

In a vice.
Use a protective device **(1 - 2)**.
Loosen nut **(3)** by a few turns.
Extract pinion **(6)**.
Use tool **0843**.
Remove nut **(3)**.
Withdraw the washer **(4)**.
Withdraw pinion **(6)**.



Assembly

Degrease the tapers.
Fit pinion **(6)**.
Fit washer **(4)**.
Tighten nut **(3)**.
Tighten to torque.



Fitting

For fitting, proceed in the reverse sequence to removal.
Connect tube **(5 - 7)**.
Apply "**LT 542**" oiltight threadlocking compound to give a fluidtight seal.
Tighten to torque.
Fill the steering system with oil.
(See Driving & Servicing Handbook)
Start the engine and check for leaks.

RADIATORS

Aftercooler

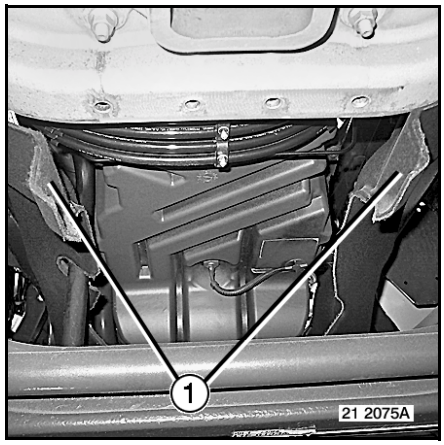
Removal

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.

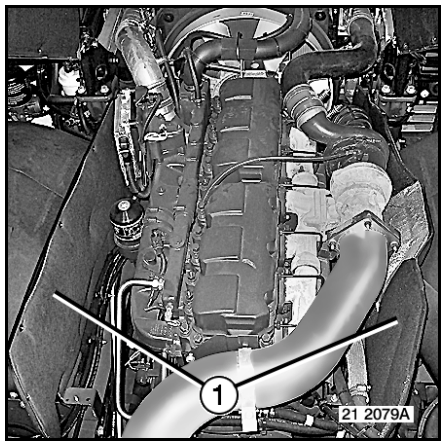
WITH AIR SUSPENSION: MOVE THE VEHICLE SUSPENSION TO THE "DOWN" POSITION.

Tilt the cab.

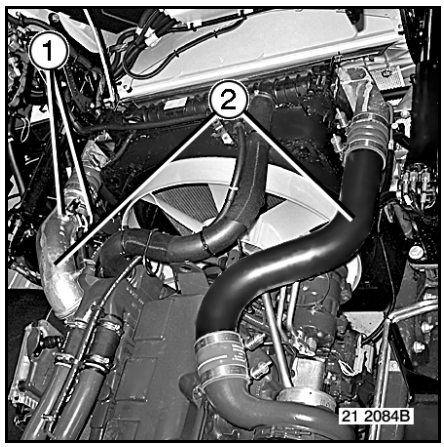
Remove soundproofing screens **(1)**.



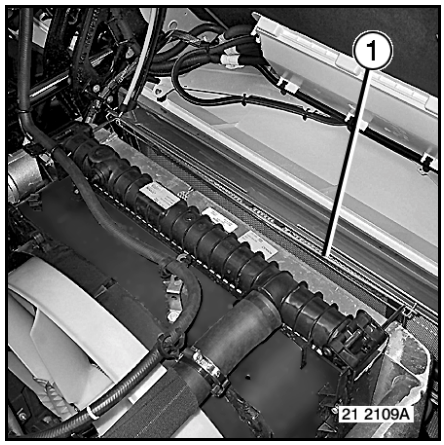
Remove the front grille.
(See MR **60 630**)



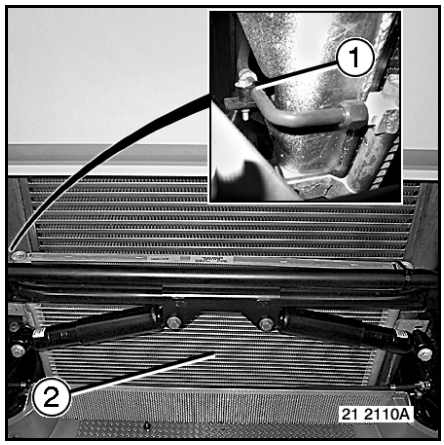
Remove preheat plug connections **(1)**.
Remove air intake tubes **(2)**.



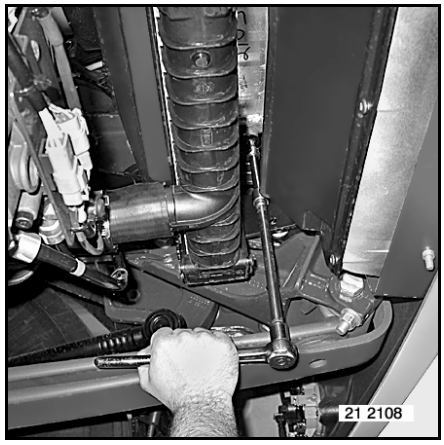
Remove the mosquito net.
Remove mosquito net bracket **(1)**.

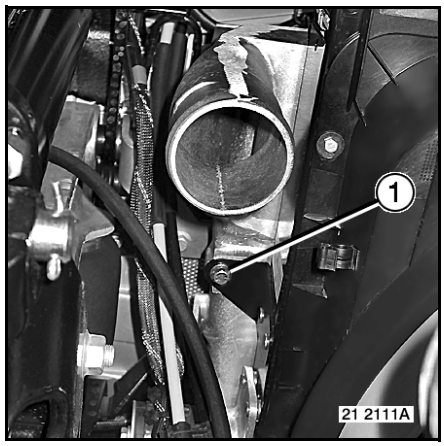


Remove clamp **(1)**.
Remove air conditioning radiator **(2)** without disconnecting the pipes and lash it to the chassis.

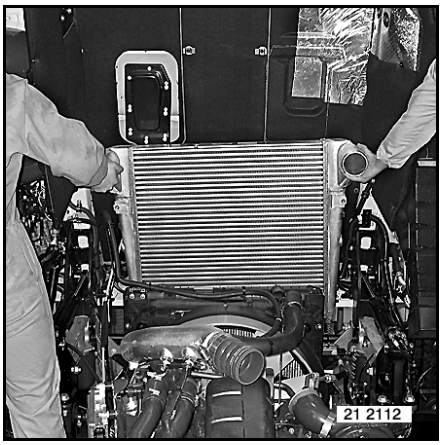


Remove securing nuts and bolts **(1)**.





With the help of one person, remove the heat exchanger.



Fitting

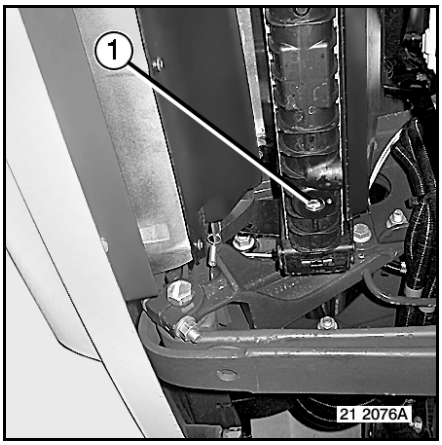
For fitting, proceed in the reverse sequence to removal.
Tighten the nuts and bolts to torque.
Start the engine and check for leaks.

Coolant radiator

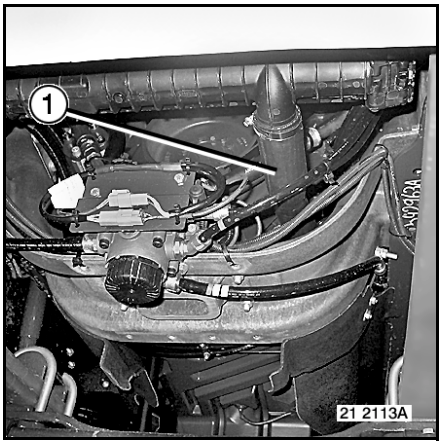
Removal

Remove the aftercooler.
See page(s) G-1-2.

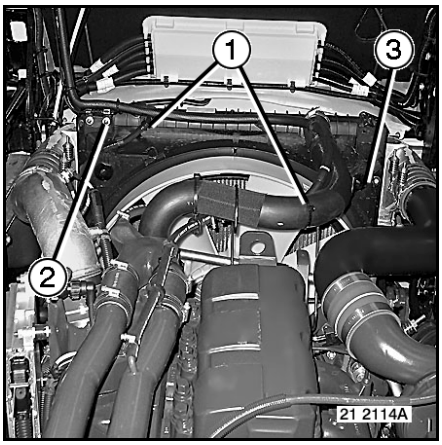
Drain the cooling system.
Remove radiator drain plug **(1)**.



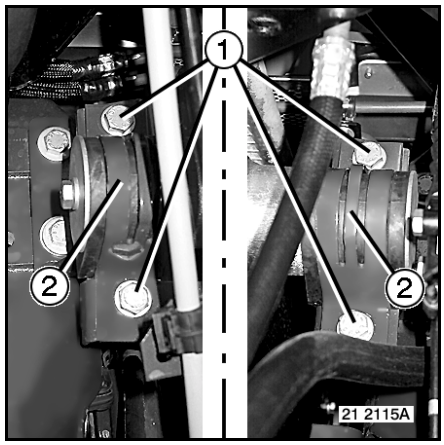
Remove hose **(1)**.



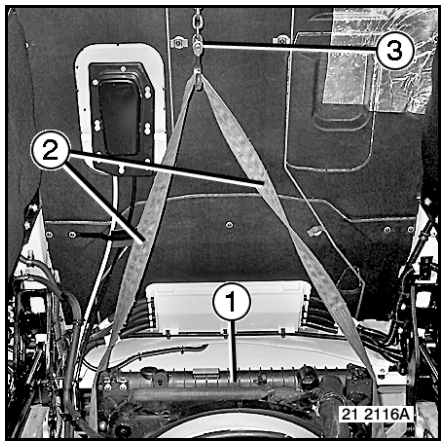
Remove hoses **(1)**.
Remove the fastening **(2)**.
Remove ferrule **(3)**.



Remove securing nuts and bolts **(1)**.
Using straps, take the weight off the radiator.
Remove the brackets **(2)**.



Remove the radiator **(1)** using straps **(2)** and lifting tackle **(3)**.



Fitting

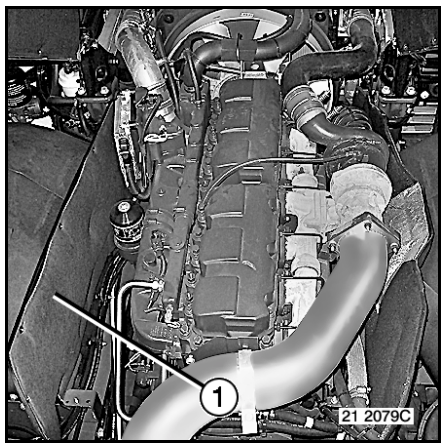
For fitting, proceed in the reverse sequence to removal.
Tighten the nuts and bolts to torque.
Fill the cooling system.
(See Driving & Servicing Handbook)
Start the engine and check for leaks.

ALTERNATOR

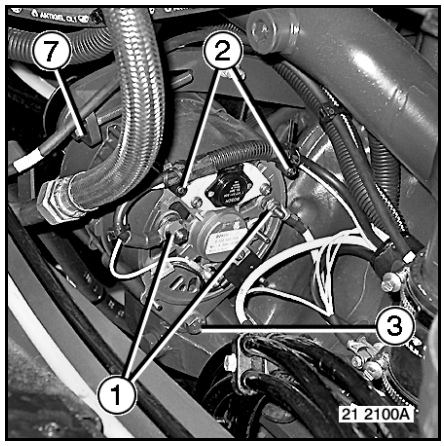
Removal

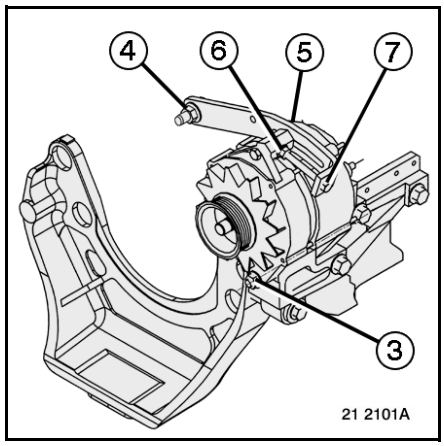
Disconnect the batteries, starting with the negative terminal.
Tilt the cab.

Remove soundproofing screen **(1)**.



Remove securing bolts **(1)**.
Withdraw the clamps **(2)**.
Loosen the bolts **(4 - 5 - 6 - 7)**.
Remove drive belt.
Remove securing bolts **(3 - 5 - 6 - 7)**.
Remove the alternator.





Fitting

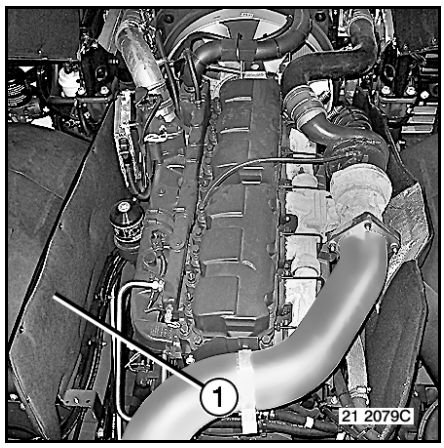
For fitting, proceed in the reverse sequence to removal.
Assemble and tension the drive belt.
(See Driving & Servicing Handbook)
Tighten the nuts and bolts to torque.

STARTER

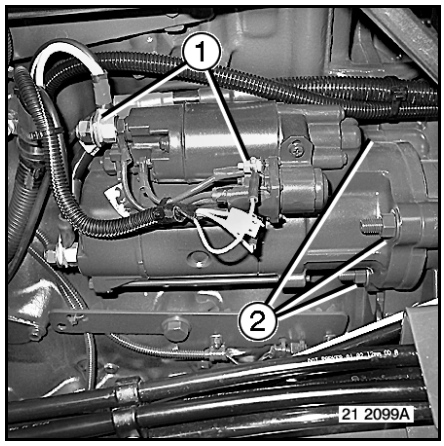
Removal

Disconnect the batteries, starting with the negative terminal.
Tilt the cab.

Remove soundproofing screen **(1)**.



Remove nuts **(1)** from the connection terminal.
Remove nuts **(2)**.
Remove the starter motor.



Fitting

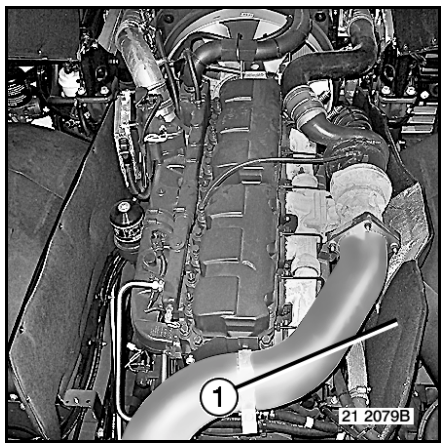
For fitting, proceed in the reverse sequence to removal.
Tighten the nuts and bolts to torque.

TURBOCHARGER

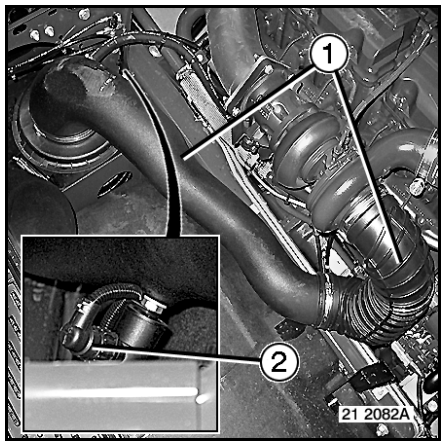
Removal

Disconnect the batteries, starting with the negative terminal.
Tilt the cab.

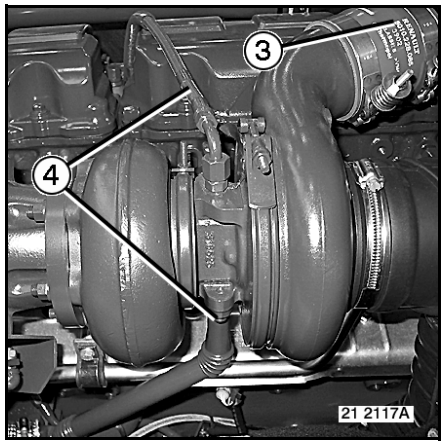
Remove soundproofing screen **(1)**.



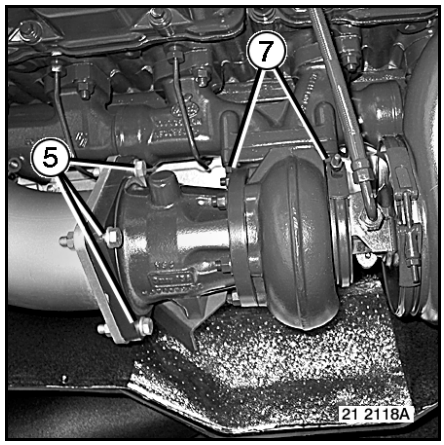
Remove air aspiration pipe **(1)**.
Unplug air filter clogging sensor connector **(2)**.
Blank off the ports.



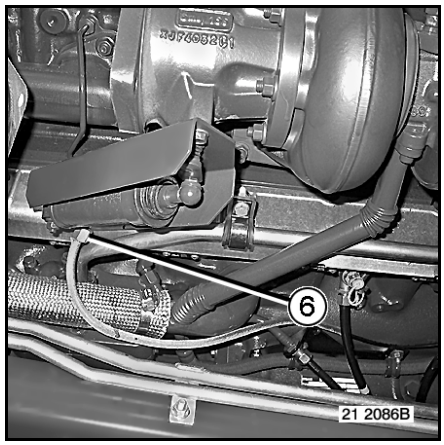
Remove pipes **(3 - 4)**.
Blank off the ports.



Remove nuts **(5 - 7)**.
Blank off the ports.



Disconnect air pipe **(6)**.
Remove the turbocharger.



Fitting

Clean contact facings thoroughly.
Check the mating surface.
Replace seals.
Clean all the air conduits and make sure there is no residual foreign matter. Before tightening the exhaust manifold setscrews, smear the screw-threads with high temperature-resistant grease (**GRAISSE GRIPCOTT NF** Renault Trucks Oils) 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 lube pipe fixing flanges. Before installing the turbocharger, lubricate it through theoil inlet portand turn the rotor by hand to lubricate the journals and the thrust bearing.
After fitting 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 to torque.
Restore the engine oil level.
Start the engine and check for leaks.