

NEF SERIES STAGE IIIA

G_Drive application

NEF45

NEF45 SM1F

NEF45 TE1F

NEF45 TE2F

NEF67

NEF67 TM1F

NEF67 TE1F

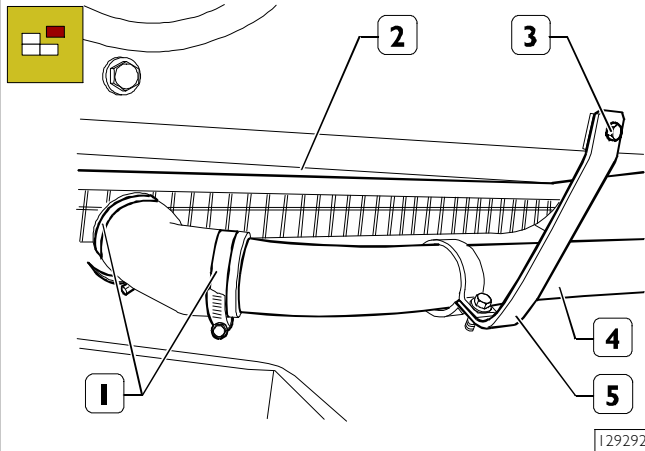
NEF67 TE2F

Technical repair manual

PROCEDURE FOR REMOVAL/REFITTING OF PROTECTION GRILLE

Removal

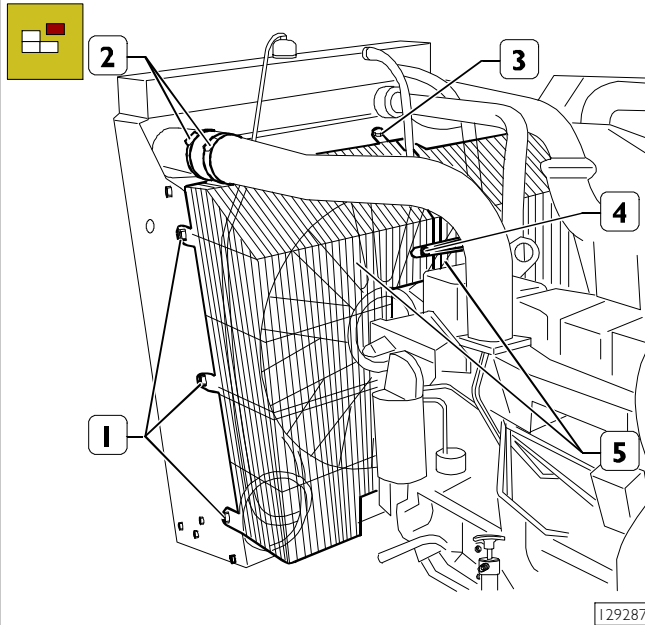
Figure 1



- Prepare a suitable container in correspondence with the pipe (4) for the recovery of the coolant. Disconnect the pipe (4) by acting on the relative clamps (1).
- Unscrew the screw (3) and detach the pipe (4) complete with bracket (5) from the radiator assembly (2).

Ref.	No.	Screws description
(3)	1	Screw M8x1.25x16

Figure 2

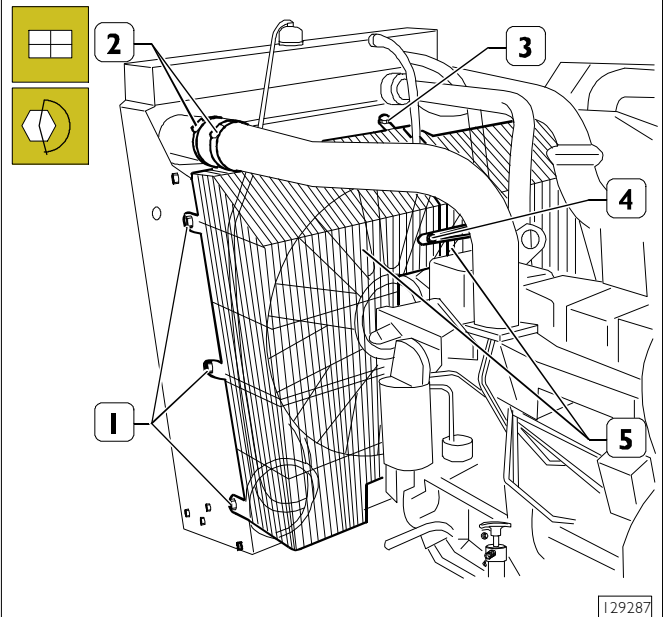


- Remove the fan protection grilles (5) by undoing the relative fastenings (1), (3) and (4).
- Open the clamps (2).

Ref.	No.	Screws description
(1)	6	Screw M6x1x16
(3)	1	Screw M8x1.25x16
(4)	1	Screw M6x1x16

Refitting

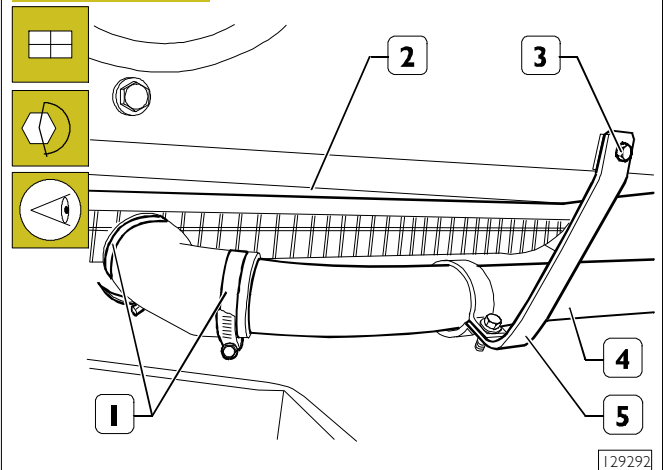
Figure 3



- Mount the protection grilles (5) of the fan
- Tighten the relative fasteners (1, 3 and 4).
- Close the clamps (2).

Ref.	No.	Screws description	Tightening torques
(1)	6	Screw M6x1x16	43 ± 6 Nm
(3)	1	Screw M8x1.25x16	43 ± 6 Nm
(4)	1	Screw M6x1x16	43 ± 6 Nm

Figure 4



- Connect the pipe (4) complete with hoses and bracket (5) to the radiator assembly (2)
- Close the relative clamps (1).
- Tighten the screw (3).

Ref.	No.	Screws description	Tightening torques
(3)	1	Screw M8x1.25x16	43 ± 6 Nm

NOTE Check the state of wear of the rubber sleeves.

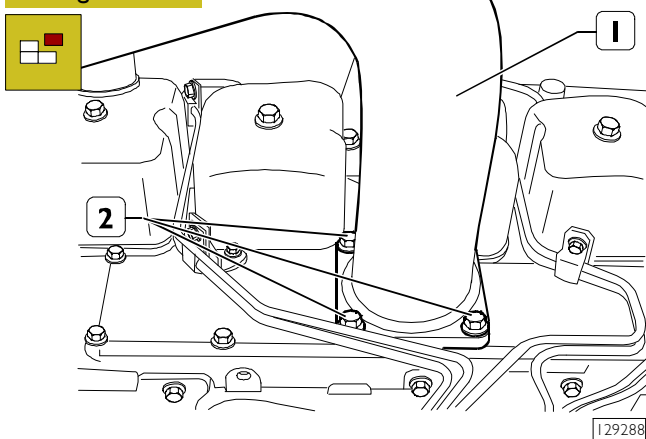
- Refill the cooling system with coolant.
- Bleed the air from the 'supply system as described in the relevant paragraph.
- Check the engine oil level

PROCEDURE RADIATOR REMOVAL/REFITTING

Removal

Remove the protection grille as described in the relative procedure.

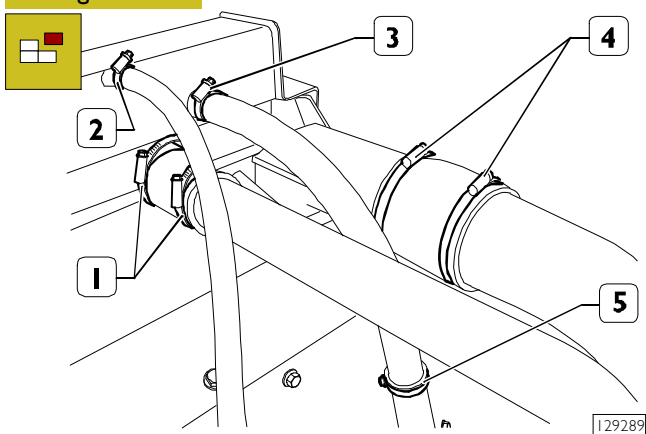
Figure 5



- Unscrew the screws (2) and remove the pipe (1) from the intake manifold.

Ref.	No.	Screws description
(2)	4	Screw M8x1.25

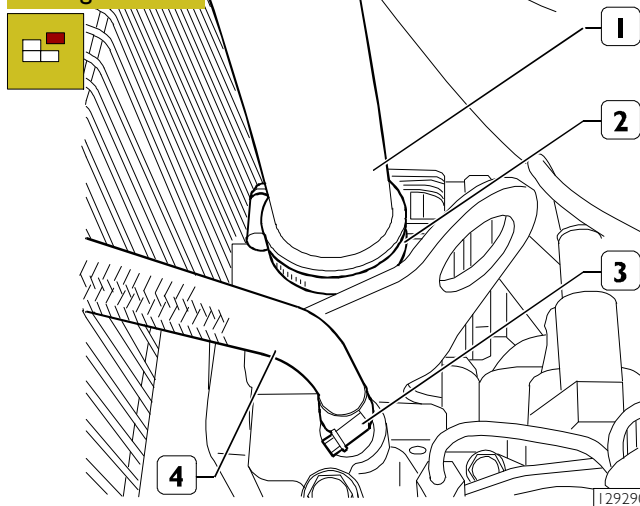
Figure 6



- Disconnect the air and water pipes from the radiator assembly.
- Unscrew the screws on the clamps (1, 2, 3 and 4) and on the fixing bracket (5).

Ref.	No.	Screws description
(5)	1	Screw M6x1x16

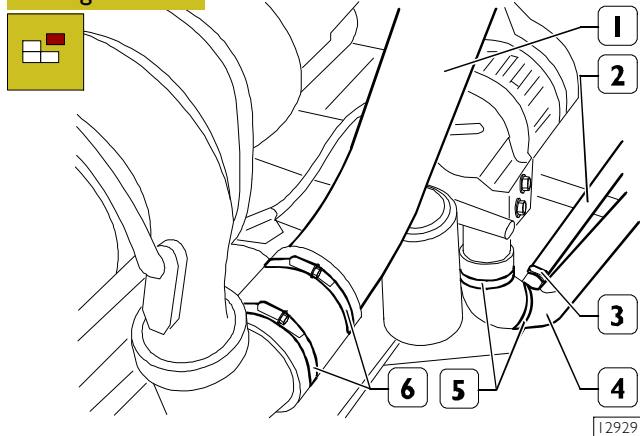
Figure 7



- Disconnect and remove the pipes (1 and 4), complete with sleeves, from the engine side.
- Unscrew the screws on clamps (2 and 3).

Ref.	No.	Screws description
(2)	1	Screw M6x1x16
(3)	1	Screw M8x1.25x16

Figure 8

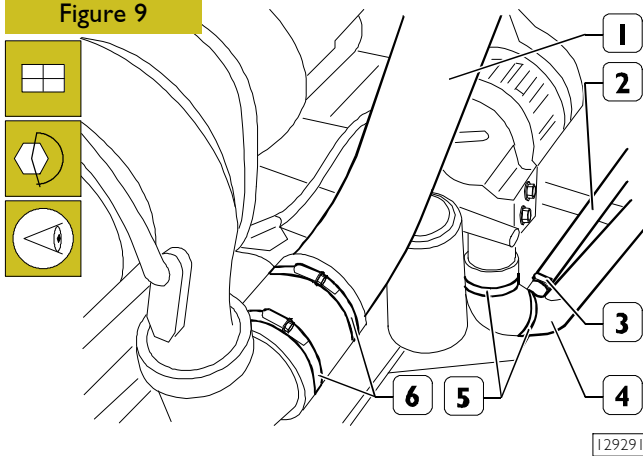


- Disconnect and remove the pipe (1), complete with sleeves, from the engine side, unscrewing the screws on the relative clamps (6).
- Disconnect and remove the pipe (2), unscrewing the screws on the relative clamp (3).
- Disconnect and remove the pipe (4), complete with sleeves, from the engine side, unscrewing the screws on the relative clamps (5).
- Properly lock the radiator unit, then release it from the base by adjusting the hardware on both sides.
- Remove the radiator unit from its seat.

Ref.	No.	Screws description
(3)	2	Screw M6x1x16
(5)	2	Screw M8x1.25x16
(6)	2	Screw M6x1x16

Refitting

Figure 9

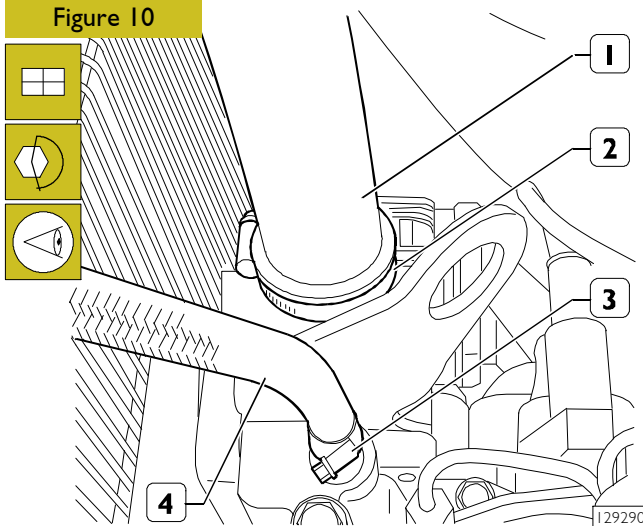


- Fit the pipe (4) complete with sleeves, from the engine side, acting on the relative clamps (5).
- Fit the pipe (2) complete with sleeves, from the engine side, acting on the relative clamps (3).
- Fit the pipe (1) complete with sleeves, from the engine side, acting on the relative clamps (6).

Ref.	No.	Screws description	Tightening torques
(3)	2	Screw M6x1x16	43 ± 6 Nm
(5)	2	Screw M8x1.25x16	43 ± 6 Nm
(6)	2	Screw M6x1x16	43 ± 6 Nm

NOTE Check the state of wear of the rubber sleeves.

Figure 10

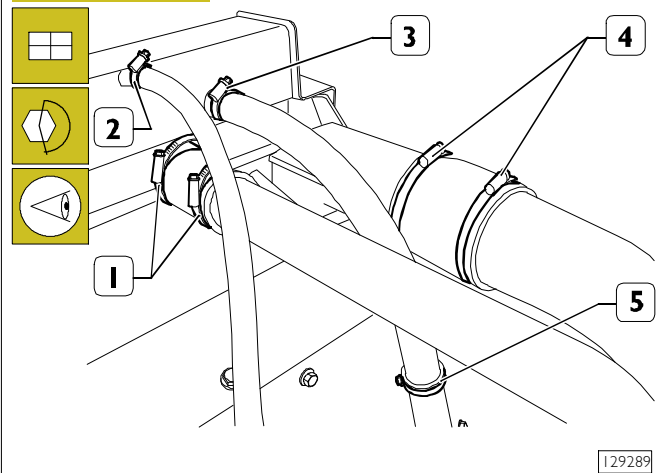


- Fit the pipes (1 and 4) complete with sleeves acting on the relative clamps (2 and 3).

Ref.	No.	Screws description	Tightening torques
(2)	1	Screw M6x1x16	43 ± 6 Nm
(3)	1	Screw M8x1.25x16	43 ± 6 Nm

NOTE Check the state of wear of the rubber sleeves.

Figure 11

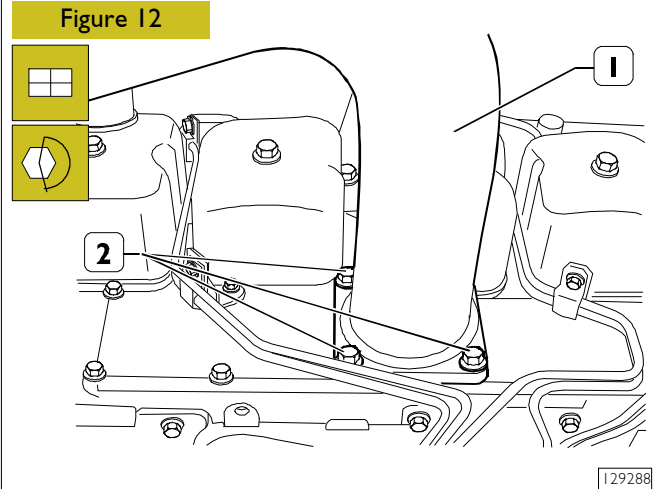


- Connect the air and water pipes to the radiator assembly using the clamps (1, 2, 3 and 4) and the mounting bracket (5).

Ref.	No.	Screws description	Tightening torques
(5)	1	Screw M6x1x16	43 ± 6 Nm

NOTE Check the state of wear of the rubber sleeves.

Figure 12



- Mount the pipe (1).
- Tighten the screws (2).
Fit the protection grille as described in the relative procedure.

Ref.	No.	Screws description	Tightening torques
(2)	4	Screw M8x1.25	24 ± 4 Nm

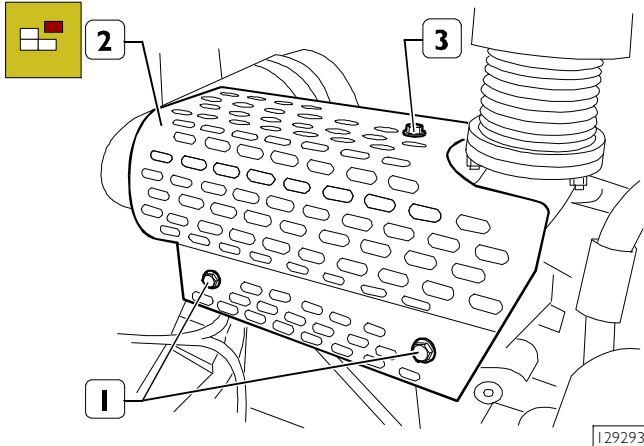
PROCEDURE FOR FAN REMOVAL/REFITTING

Removal

Remove the protection grille as described in the relative procedure.

Remove the radiator as described in the relevant section.

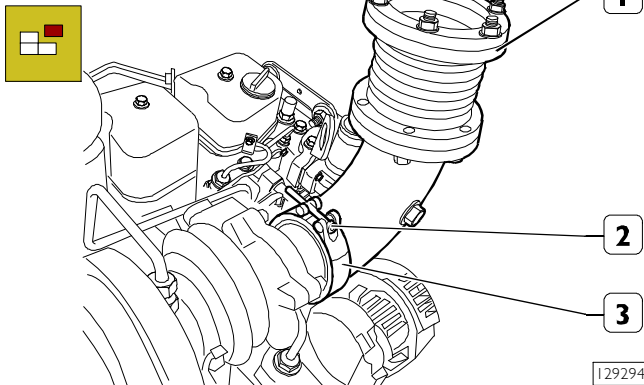
Figure 13



- Unscrew the screws (1 and 3).
- Remove the grille (2) protecting the turbine, if present.
- Then remove the mounting brackets.

Ref.	No.	Screws description
(1)	2	Screw M6x1x16
(3)	1	Screw M8x1.25x16

Figure 14

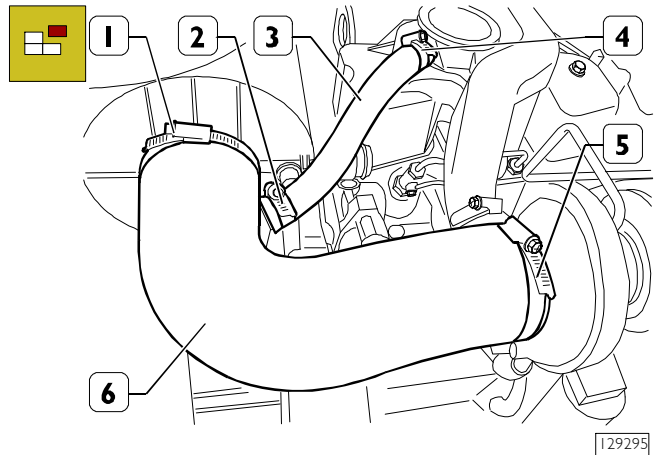


- Unscrew the screw (2) to open the clamp (3).
- Disconnect the exhaust pipe (1).

NOTE The shape and the size of the exhaust pipe will vary depending on use of the engine.
The illustrations provide a general path of the operation to be performed.
The procedures described are still applicable.

Ref.	No.	Screws description
(2)	1	Screw M7x1

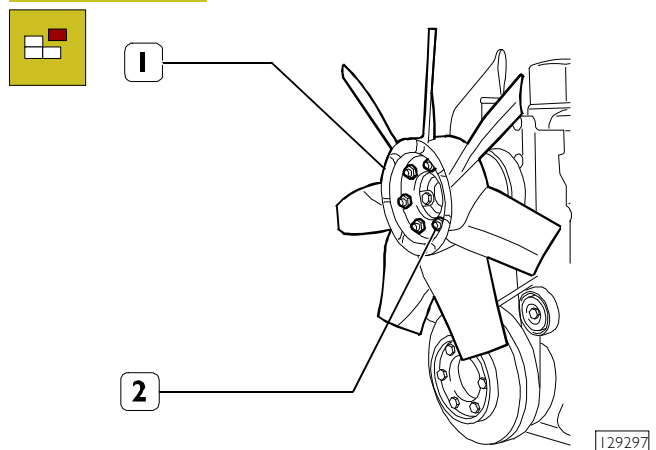
Figure 15



- Unscrew the screws on the relative clamps (2 and 4).
- Disconnect and remove the oil vapour recovery pipe (3).
- Unscrew the screws on the relative clamps (1 and 5).
- Disconnect and remove the air intake pipe (6).

Ref.	No.	Screws description
(1)	1	Screw M7x1
(5)	1	Screw M7x1

Figure 16



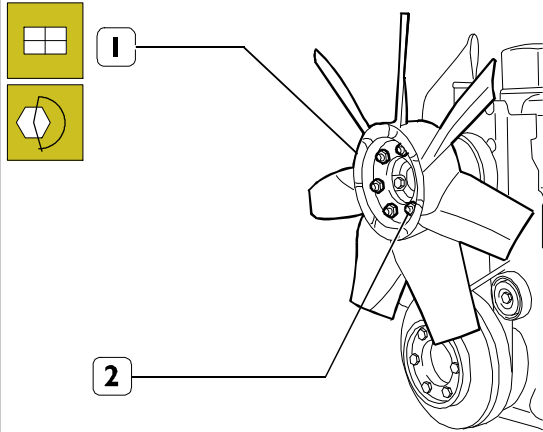
- Unscrew the screws (2).
- Remove the fan (1), complete with spacer.

NOTE The shape and the size of the fan varies according to the use of the engine.

The illustrations provide a general path of the operation to be performed.

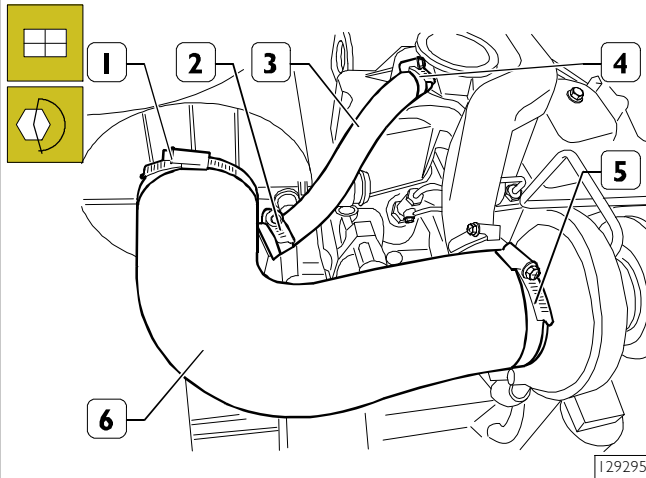
The procedures described are still applicable.

Ref.	No.	Screws description
(2)	6	Screw M8x1.25

Refitting**Figure 17**

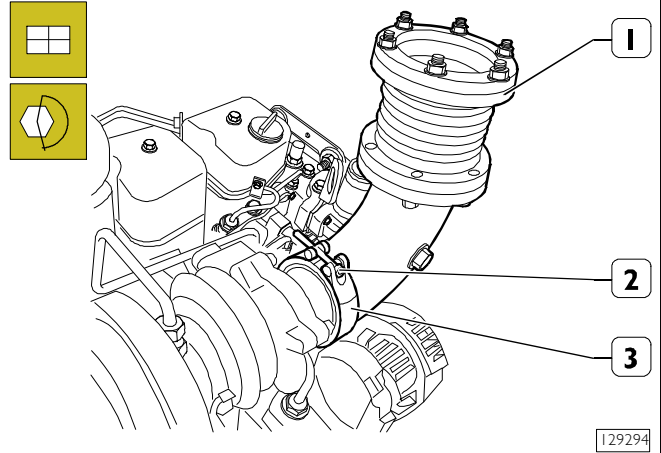
- Position the fan (2), complete with spacer.
- Tighten the screws (2).

Ref.	No.	Screws description	Tightening torques
(2)	6	Screw M8x1.25	24 ± 4 Nm

Figure 18

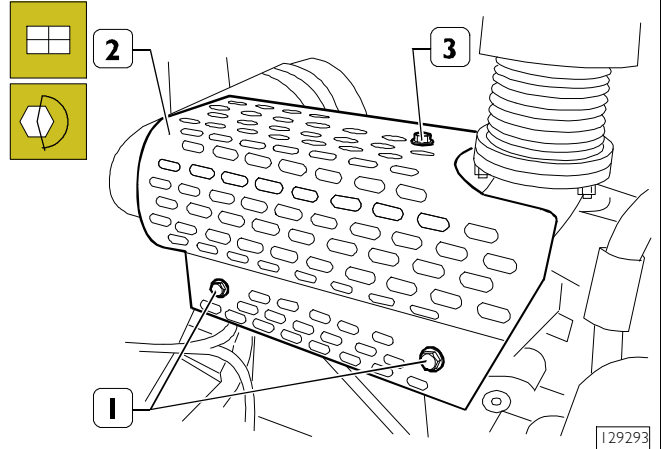
- Connect the air intake pipes (6), closing their clamps (1) and (5)
- Connect the oil vapour recovery pipes (3), closing their clamps (2) and (4).

Ref.	No.	Screws description	Tightening torques
(1)	1	Screw M7x1	13 ± 2 Nm
(5)	1	Screw M7x1	13 ± 2 Nm

Figure 19

- Connect the discharge pipe (1), tightening the screw (2) to close the clamp (3).

Ref.	No.	Screws description	Tightening torques
(2)	1	Screw M7x1	13 ± 2 Nm

Figure 20

- If present, refit the turbine protection grille (2), restoring the relative mounting brackets.
- Replace the radiator unit on the crankcase, making sure not to interfere with the fan.
- Tighten the fastening screws (1 and 3) on both sides.

Ref.	No.	Screws description	Tightening torques
(1)	2	Screw M6x1x16	43 ± 6 Nm
(3)	1	Screw M8x1.25x16	43 ± 6 Nm

Fit the radiator as described in the relevant section.

Fit the protection grille as described in the relative procedure.

PROCEDURE FOR ANCILLARY BELT REMOVAL/REFITTING

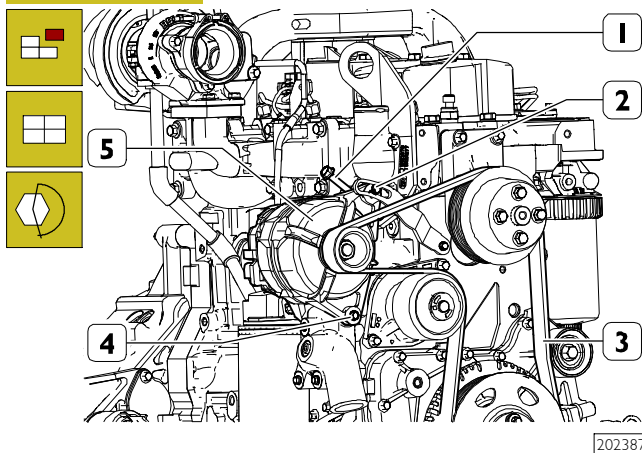
Removal NEF45 SM1F engines

Remove the protection grille as described in the relative procedure.

Remove the radiator as described in the relevant section.

Remove the fan as described in the relevant section.

Figure 21



- Remove the protective grille and the fan together with spacer by acting on the relative fasteners.
- Loosen the screws (2 and 4) anchoring the alternator (5) to its support and the screw (1) adjusting the position of the alternator.
- Remove the belt (3).

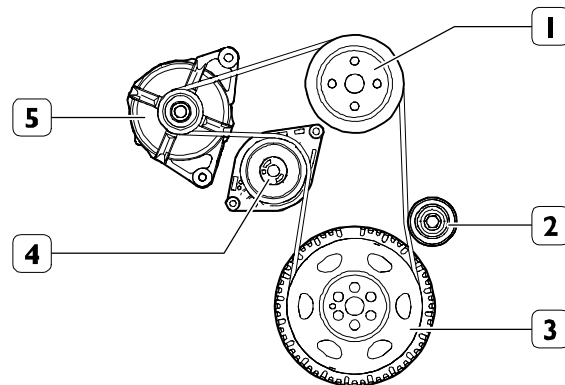
Ref.	No.	Screws description
(1)	1	Screw M8x1.25x100
(2)	1	Screw M10x1.5x40
(4)	1	Screw M10x1.5x110

Refitting

- Place the new belt (3) inside of the shoulders of all the pulleys.
- Tighten the screw (1) adjusting the alternator (5).
- Tighten the screws (2 and 4) anchoring the alternator to its support.

Ref.	No.	Screws description	Tightening torques
(1)	1	Screw M8x1.25x100	-
(2)	1	Screw M10x1.5x40	43 ± 6 Nm
(4)	1	Screw M10x1.5x110	43 ± 6 Nm

Figure 22



BELT ASSEMBLY DIAGRAM

1. Fan pulley - 2. Idler pulley - 3. Crankshaft pulley -
4. Water pump - 5. Alternator

Fit the fan as described in the relevant section.

Fit the radiator as described in the relevant section.

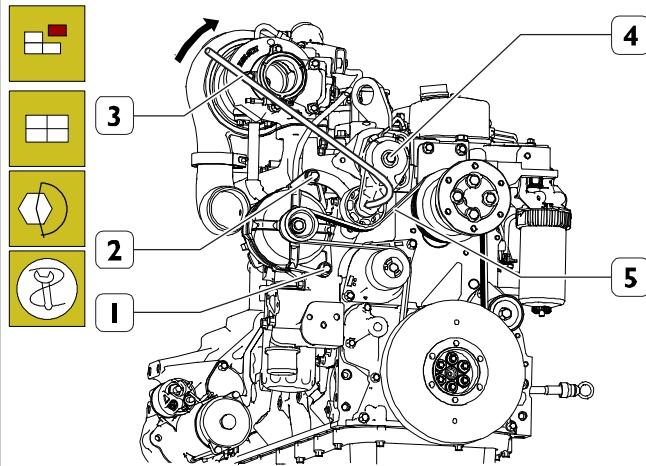
Fit the protection grille as described in the relative procedure.

Removal NEF45 TE1F/TE2F engine

Remove the protection grille as described in the relative procedure.

Remove the radiator as described in the relevant section.

Remove the fan as described in the relevant section.

Figure 23

202111

Only proceed when the engine is not turning and is at low temperature so as not to run the risk of burns.

- Unscrew the bolt (1) anchoring the alternator to its lower support and the screw (2) fixing the alternator to the bracket.

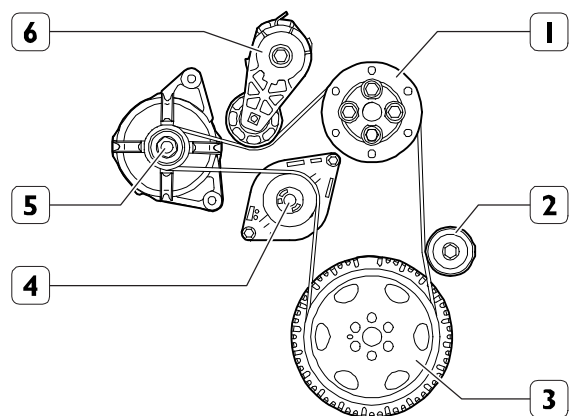
Ref.	No.	Screws description
(1)	1	Screw M10x1.5
(2)	2	Screw M10x1.5

- Use the special tool (3) to turn the automatic tensioner (4) in the direction of the arrow and remove the belt (5).

Refitting

- Use the special tool (3) to turn the automatic tensioner in the direction of the arrow (4) and reposition the belt (5) inside the shoulders of all the pulleys.
- Tighten the bolt (1) anchoring the alternator to its lower support and the screw (2) fixing the alternator to the bracket.

Ref.	No.	Screws description	Tightening torques
(1)	1	Screw M10x1.5	43 ± 6 Nm
(2)	2	Screw M10x1.5	43 ± 6 Nm

Figure 24

202112

BELT ASSEMBLY DIAGRAM

1. Fan pulley - 2. Idler pulley - 3. Crankshaft pulley -
4. Water pump - 5. Alternator -
6. Automatic belt tensioner

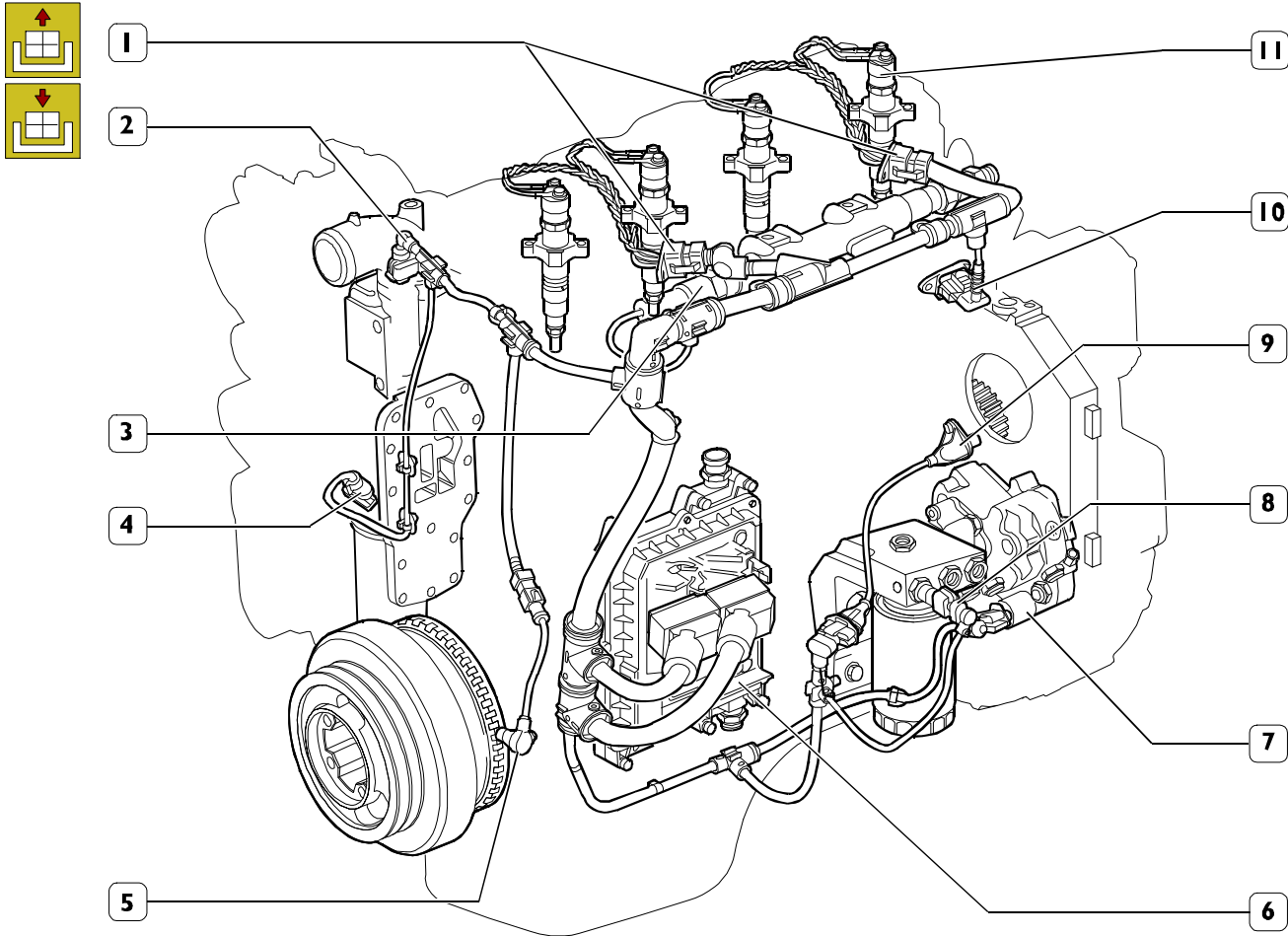
Fit the fan as described in the relevant section.

Fit the radiator as described in the relevant section.

Fit the protection grille as described in the relative procedure.

PROCEDURE FOR ENGINE CABLE REMOVAL/REFITTING**Removal** NEF45 TE1F/TE2F engines

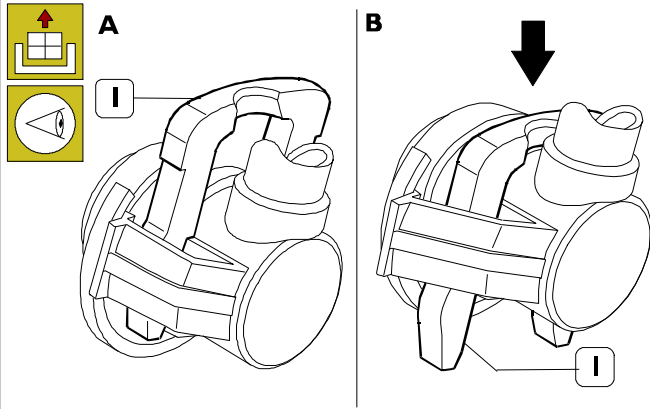
Figure 25



108501

1. Connections for electro-injectors - 2. Engine coolant temperature sensor - 3. Fuel pressure sensor cable - 4. Engine oil temperature and pressure sensor - 5. Crankshaft sensor - 6. EDC control unit - 7. Pressure regulator cable - 8. Fuel heater and fuel temperature sensor cable - 9. Timing phase sensor - 10. Air temperature and pressure sensor - 11. Electro-injector.

Figure 26



70126

To disconnect lower pressure fuel pipes from their couplings, press clip (1) as shown in figure B.

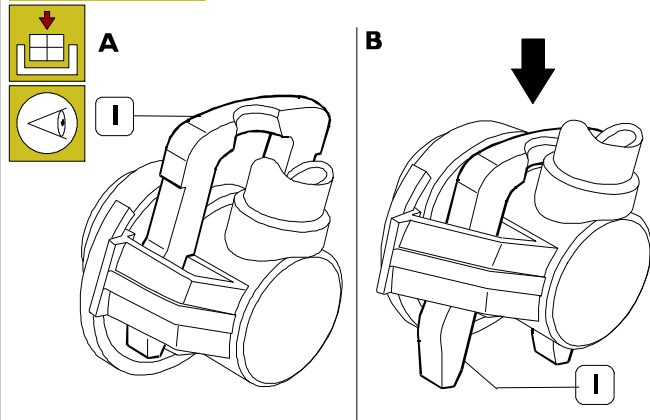
After removing the pipe, move the clip (1) to the locked position (Figure A) to prevent possible deformations.

Disconnect the engine cable from the connectors: electro-injector wiring (1); (10) air pressure/temperature sensor; (3) fuel pressure sensor; (6) control unit; (9) timing gear phase sensor; (2) engine coolant temperature sensor on thermostat; (5) engine rpm sensor.

Remove the clamps that hold it to the crankcase and remove it completely.

Refitting

Figure 27



70126

To connect lower pressure fuel pipes from their couplings, press clip (1) as shown in figure B.

After removing the pipe, move the clip (1) to the locked position (Figure A).

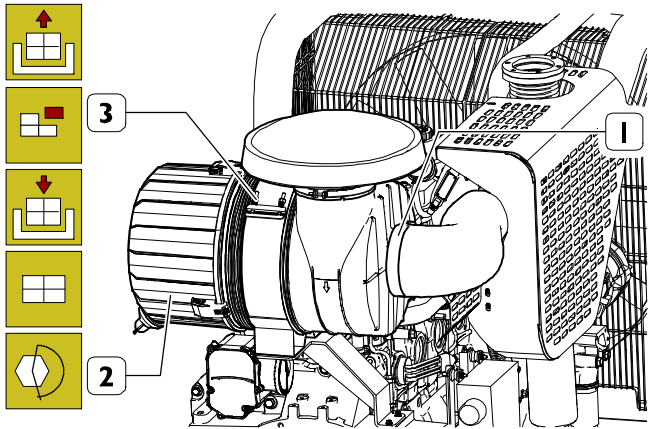
Connect the engine cable from the connectors: electro-injector wiring (1); (10) air pressure/temperature sensor; (3) fuel pressure sensor; (6) control unit; (9) timing gear phase sensor; (2) engine coolant temperature sensor on thermostat; (5) engine rpm sensor.

Insert the clamps that hold it to the crankcase.

PROCEDURE FOR AIR FILTER REMOVAL/REFITTING

Removal

Figure 28 (Demonstrative)



214289

- Remove the clamp (1).
- Unscrew the screws (3) and remove the air filter (2) from its support.

Ref.	No.	Screws description
(3)	2	Screw M8x1.25x100

Refitting

- Place the air filter (2) in the relative position.
- Tighten the screws (3) to the support clamp.
- Connect the clamp (1).

Ref.	No.	Screws description	Tightening torques
(3)	2	Screw M8x1.25x100	-

PROCEDURE FOR ALTERNATOR REMOVAL-REFITTING

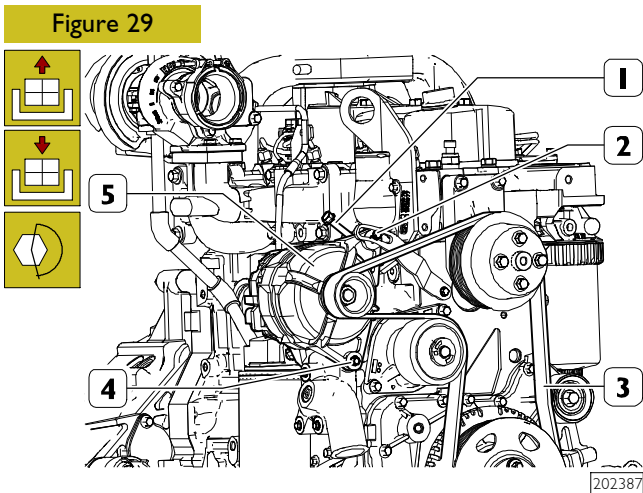
Removal NEF45 SM1F engine

Remove the protection grille as described in the relative procedure.

Remove the radiator as described in the relevant section.

Remove the fan as described in the relevant section.

Remove the belt as described in the relevant section.



- Unscrew the screws (2 and 4) anchoring the alternator (5) to its support and the screw (1) adjusting the position of the alternator.

Ref.	No.	Screws description
(1)	1	Screw M8x1.25x100
(2)	1	Screw M10x1.5x40
(4)	1	Screw M10x1.5x110

- Remove the alternator (5) from its housing.

Refitting

Position the alternator (5) in its housing.

- Place the new belt (3) inside of the shoulders of all the pulleys.
- Tighten the screw (1) adjusting the alternator (5).
- Tighten the screws (2 and 4) anchoring the alternator to its support.

Ref.	No.	Screws description	Tightening torques
(1)	1	Screw M8x1.25x100	-
(2)	1	Screw M10x1.5x40	43 ± 6 Nm
(4)	1	Screw M10x1.5x110	43 ± 6 Nm

Fit the fan as described in the relevant section.

Fit the radiator as described in the relevant section.

Fit the protection grille as described in the relative procedure.

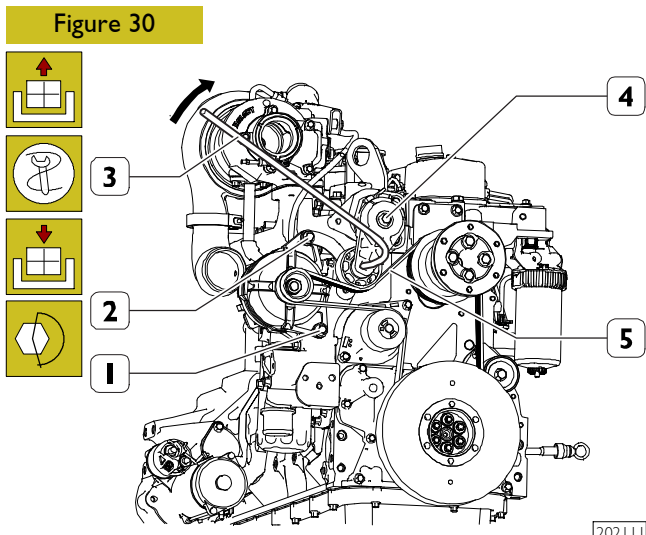
Removal NEF45 TE1F/TE2F engines

Remove the protection grille as described in the relative procedure.

Remove the radiator as described in the relevant section.

Remove the fan as described in the relevant section.

Remove the belt as described in the relevant section.



- Unscrew the screw (1) anchoring the alternator to its lower support and the screw (2) securing the bracket.

Ref.	No.	Screws description
(1)	1	Screw M10x1.5
(2)	2	Screw M10x1.5

- Remove the alternator from its housing.

Refitting

Position the alternator in its housing.

- Use the special tool (3) to turn the automatic tensioner in the direction of the arrow (4) and reposition the belt (5) inside the shoulders of all the pulleys.
- Tighten the bolt (1) anchoring the alternator to its lower support and the screw (2) fixing the alternator to the bracket.

Ref.	No.	Screws description	Tightening torques
(1)	1	Screw M10x1.5	43 ± 6 Nm
(2)	2	Screw M10x1.5	43 ± 6 Nm

Fit the fan as described in the relevant section.

Fit the radiator as described in the relevant section.

Fit the protection grille as described in the relative procedure.

PROCEDURE FOR WATER PUMP REMOVAL/REFITTING

Removal

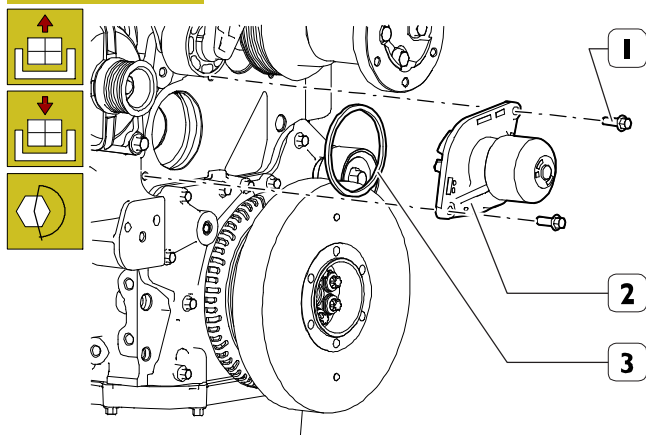
Remove the protection grille as described in the relative procedure.

Remove the radiator as described in the relevant section.

Remove the fan as described in the relevant section.

Remove the belt as described in the relevant section.

Figure 31



202113

- Loosen and remove the screws (1).
- Take the water pump (2) out of its housing.

Ref.	No.	Screws description
(1)	2	Screw M8x1.25

- Recover the gasket (3).

Refitting

- Insert the gasket (3) into the seat on the crankcase.
- Position the water pump (2) in its housing and tighten the screws (1).

Ref.	No.	Screws description	Tightening torques
(1)	2	Screw M8x1.25	24 ± 4 Nm

Fit the belt as described in the relevant section.

Fit the fan as described in the relevant section.

Fit the radiator as described in the relevant section.

Fit the protection grille as described in the relative procedure.

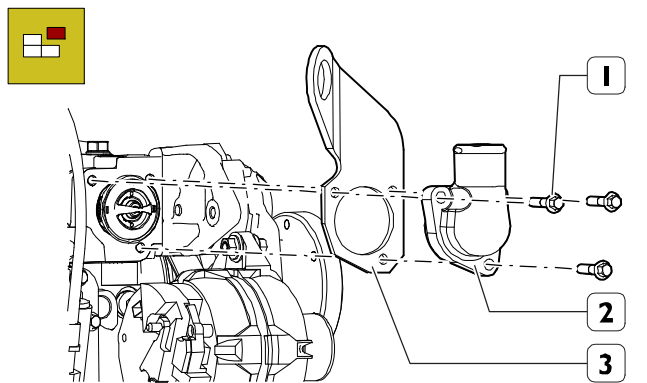
PROCEDURE FOR THERMOSTAT REMOVAL/REFITTING

Removal NEF45 SM1F engines

Remove the protection grille as described in the relative procedure.

Remove the radiator as described in the relevant section.

Figure 32

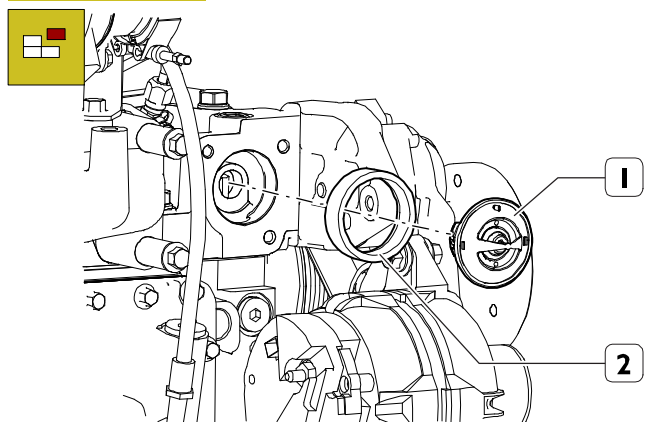


202114

- Unscrew the screws (1) securing the thermostat cover (2).
- Remove the thermostat cover (2).
- Remove the lifting eyelet (3).

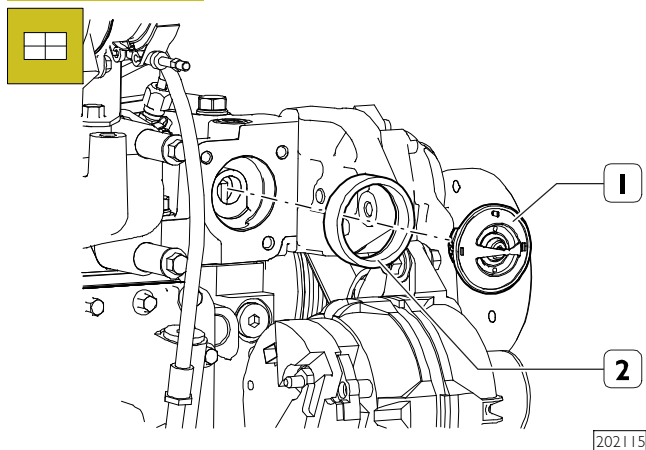
Ref.	No.	Screws description
(1)	3	Screw M6x1

Figure 33



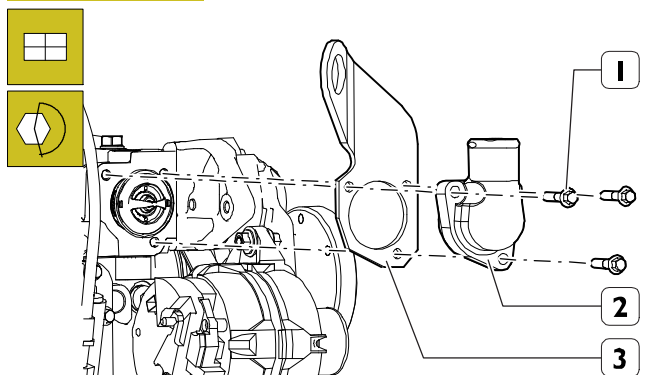
202115

- Remove the thermostat assembly (1).
- Remove the gasket (2) of the cover.

Refitting**Figure 34**

- Insert the gasket (2) of the cover in the specific seat.
- Insert the thermostat assembly (1).

202115

Figure 35

- Position the lifting eyelet (3).
- Position the thermostat cover (2).
- Tighten the screws (1).

202114

Ref.	No.	Screws description	Tightening torques
(1)	3	Screw M6x1	10 ± 2 Nm

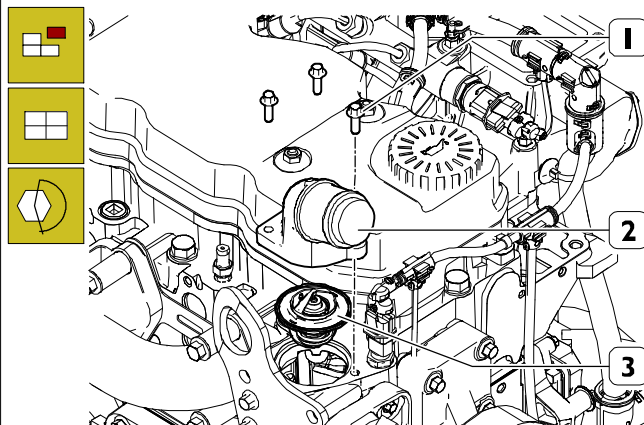
Fit the radiator as described in the relevant section.

Fit the protection grille as described in the relative procedure.

Removal NEF45 TE1F/TE2F engines

Remove the protection grille as described in the relative procedure.

Remove the radiator as described in the relevant section.

Figure 36

202395

- Unscrew the screws (1) securing the thermostat cover (2).
- Remove the thermostat cover (2).
- Remove the thermostat (3).

Ref.	No.	Screws description
(1)	3	Screw M6x1x20

Refitting

- Insert the thermostat assembly (3) into the relative seat.
- Position the thermostat cover (2) and tighten the screws (1).

Ref.	No.	Screws description	Tightening torques
(1)	3	Screw M6x1x20	10 ± 2 Nm

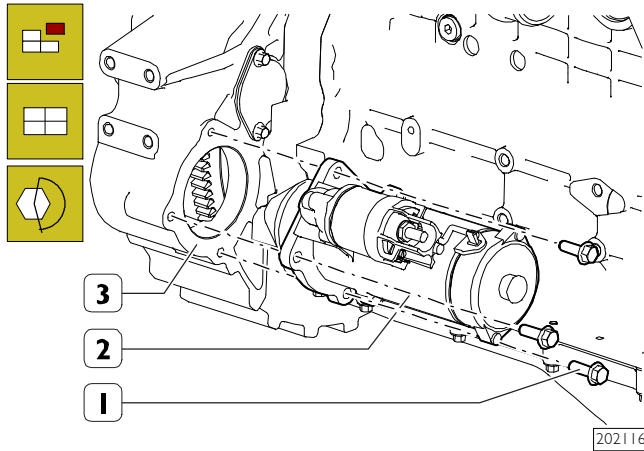
Fit the radiator as described in the relevant section.

Fit the protection grille as described in the relative procedure.

PROCEDURE FOR ELECTRIC STARTER MOTOR REMOVAL/REFITTING

Removal

Figure 37



- Unscrew the screws (1) securing the starter motor (2) to the flywheel housing (3).
- Remove the starter motor (2) from its seat.

Ref.	No.	Screws description
(1)	3	Screw M10x1.5

Refitting

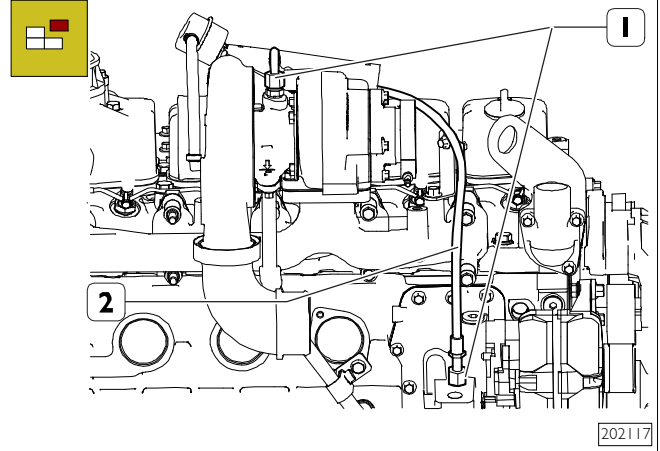
- Insert the starter motor (2) in its seat at the flywheel housing (3).
- Tighten the screws (1).

Ref.	No.	Screws description	Tightening torques
(1)	3	Screw M10x1.5	43 ± 6 Nm

PROCEDURE FOR TURBOCHARGER REMOVAL/REFITTING

Removal

Figure 38



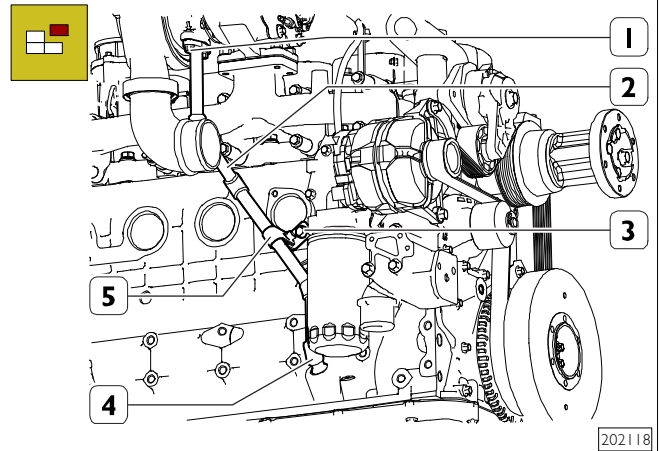
Only proceed when the engine is not turning and is at low temperature so as not to run the risk of burns.

Place a container for the oil recovery.

- Unscrew the delivery pipe (2) fittings (1).

Ref.	No.	Screws description
(1)	2	Coupling M16

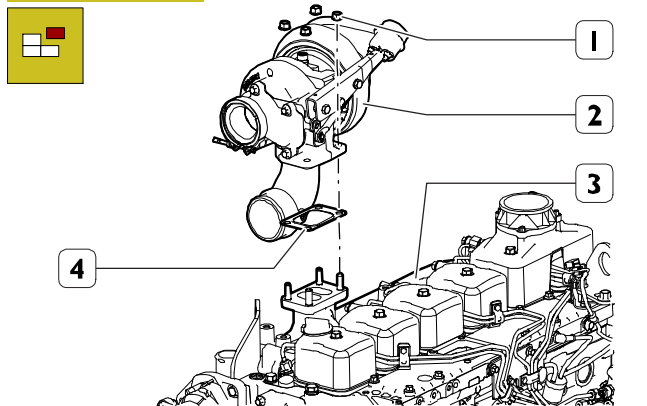
Figure 39



- Unscrew the screws (1) supporting the oil return pipe (2).
- Unscrew the screw (3) securing the pipe to the crankcase via the fastening collar (5).
- Unscrew the fitting (4).

Ref.	No.	Screws description
(1)	2	Screw M8x1.25
(3)	1	Screw M8x16
(4)	2	Fitting M16

Figure 40



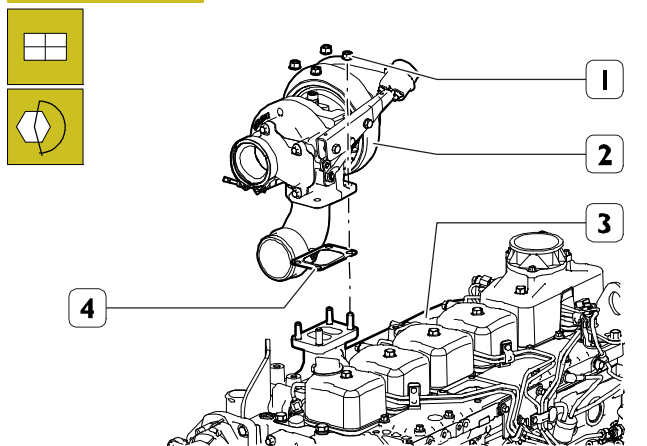
202119

- Unscrew the nuts (1) securing the turbocharger (2) to the exhaust manifold (3).
- Recover the gasket (4).

Ref.	No.	Screws description
(1)	4	Nut M10x1.5

Refitting

Figure 41

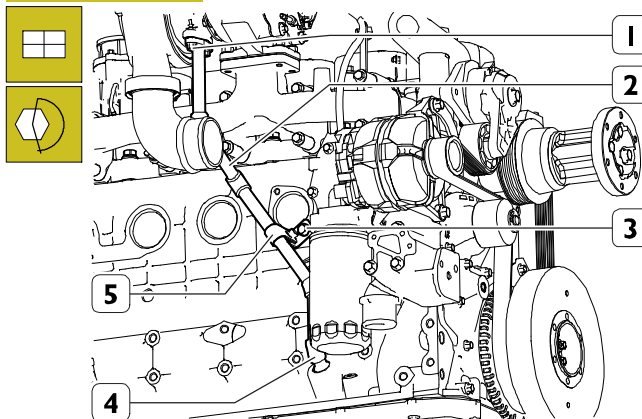


202119

- Position the gasket (4) on the exhaust manifold (3).
- Position the turbocharger (2) in correspondence to the specific seat.
- Tighten the nuts (1) securing the turbocharger (2) to the exhaust manifold (3).

Ref.	No.	Screws description	Tightening torques
(1)	4	Nut M10x1.5	43 ± 6 Nm

Figure 42

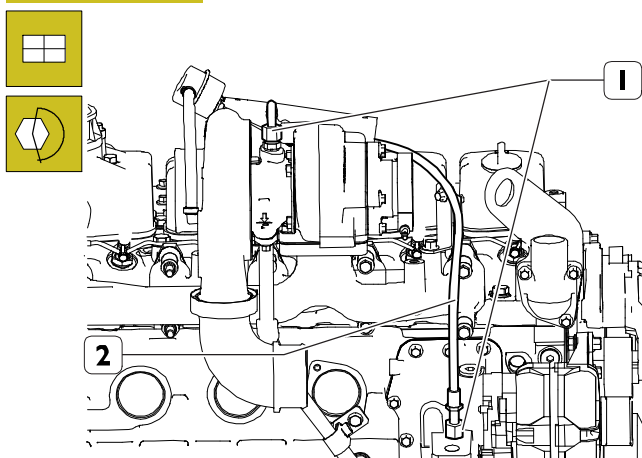


202118

- Connect the oil return pipe (2) from the turbocharger.
- Tighten the fastening screws (1).
- Tighten the screw (3) securing the pipe to the crankcase via the fastening collar (5).
- Tighten the fitting (4).

Ref.	No.	Screws description	Tightening torques
(1)	2	Screw M8x1.25	24 ± 4 Nm
(3)	1	Screw M8x16	24 ± 4 Nm
(4)	1	Fitting M16	36 ± 5 Nm

Figure 43



202117

- Connect the oil delivery pipe (2) to the turbocharger.
- Tighten the fittings (1).

Ref.	No.	Screws description	Tightening torques
(1)	2	M16 nut	36 ± 5 Nm

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