

Turbocharging: Precautions for the repair

D4F or K9K

One by one, clean the pipes removed with the **parts washer** :

- brush as much of the inside of the pipe as possible (only use brushes with plastic bristles),
- wash plenty of cleaning product from the cleaning station through the pipe,
- allow the cleaned pipe to drain by standing it upright,
- ensure the cleaning product has drained out completely (check areas where liquid may be retained, e.g. gaiters, resonators etc.).



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Dry the pipes one by one using a compressed air spray gun.

For pipes comprising several components:

- assemble the components, taking note of their correct fitting position **(10)** .

Refit:

- the air pipe (between the air filter unit and the turbocharger) **(A)** ,
- the air pipe **(B)** (between the turbocharger and the intercooler).

Refit the intercooler, if fitted to the vehicle (see **12B, Turbocharging, Intercooler: Removal - Refitting**, page **12B-21**) .

V - LUBRICATION CIRCUIT**: INSTRUCTIONS FOLLOWING MECHANICAL DAMAGE TO THE TURBOCHARGER

Note:

(**) These instructions relating to the lubrication circuit must always be followed in all cases of mechanical damage as listed above.

Drain the engine oil (see **10A, Engine and cylinder block assembly, Engine oil: Draining - Refilling**, page **10A-13**) .

Replace the oil filter (see **10A, Engine and cylinder block assembly, Oil filter: Removal - Refitting**, page **10A-20**) .

Only fill the engine with a suitable oil type (see **Engine oil: Specifications**) (Technical Note 6013A, 04A, Lubricants).

VI - GENERAL INSTRUCTIONS TO BE FOLLOWED WHEN REMOVING A TURBOCHARGER

Always replace:

- the oil supply pipe:
 - if the pipe is blocked, even partially (due to scale, carbonised oil etc.),
 - if the pipe is fitted with self-retaining seals.
- the oil return pipe:
 - if the pipe is blocked, even partially (due to scale, carbonised oil etc.),
 - if the pipe is fitted with self-retaining seals.
- all seals that have been removed,
- all fittings that have been removed.

WARNING

Failure to observe the following procedure may lead to destruction of the turbocharger.

When starting the engine:

- do not accelerate,
- allow the engine to run for **1 minute**, the time taken for the oil circuit pressure to increase (until the oil pressure warning light on the instrument panel goes out),
- accelerate several times at no load,
- check the air circuit and the oil circuit for leaks.

TURBOCHARGING

Turbocharger: Removal - Refitting

12B

K9K, and 750 or 752 or 764 or 766 or 768

Equipment required

Diagnostic tool

Tightening torques

turbocharger studs on the exhaust manifold	9 N.m
turbocharger stud on the turbocharger	9 N.m
turbocharger lower nut on the exhaust manifold	28 N.m
turbocharger upper nuts on the exhaust manifold	28 N.m

REMOVAL

I - REMOVAL PREPARATION OPERATION

- ☐ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (MR 392, 02A, Lifting equipment).
- ☐ Remove:
 - the engine cover,
 - the battery (see **Battery: Removal - Refitting**) (MR 392, 80A, Battery),
 - the tray under the battery (see **Battery tray: Removal - Refitting**) (MR 392, 80A, Battery),
 - the scuttle panel grille (see **Scuttle panel grille: Removal - Refitting**) (MR 393, 56A, Exterior equipment),
 - the catalytic converter (see **19B, Exhaust, Catalytic converter: Removal - Refitting**, page 19B-27) ,
 - the turbocharger oil pipes (see **12B, Turbocharging, Turbocharger oil pipe: Removal - Refitting**, page 12B-15) .

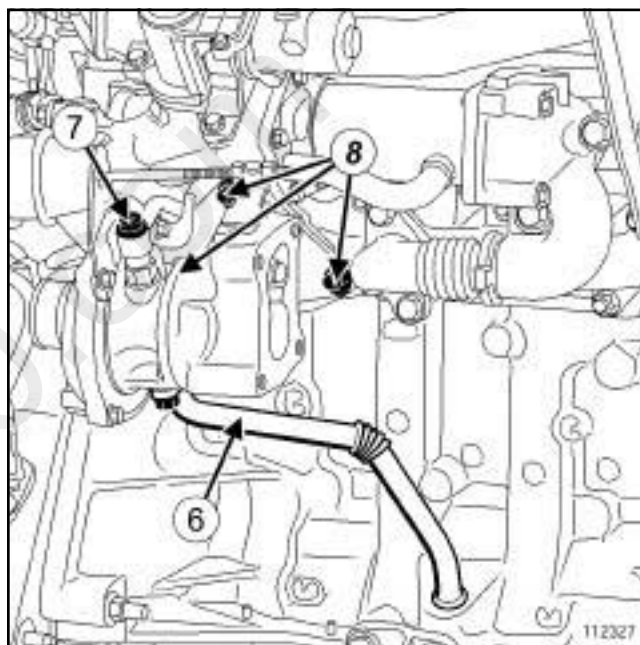
K9K, and 764

- ☐ Remove the damper valve (see **12A, Fuel mixture, Damper valve: Removal - Refitting**, page 12A-31) (if equipped).

K9K, and 764 or 766 or 768

- ☐ Remove the exhaust gas recirculation solenoid valve (see **14A, Antipollution, Exhaust gas recirculation solenoid valve: Removal - Refitting**, page 14A-3) .

II - REMOVAL OF THE PART CONCERNED



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- ☐ Remove:
 - the turbocharger mounting nuts (8) ,
 - the turbocharger.

REFITTING

I - REFITTING PREPARATION OPERATION

- ☐ parts always to be replaced: seal between exhaust manifold and turbocharger (10,09,01,07)

parts always to be replaced: Turbocharger oil supply pipe bolt (10,09,03,04)

parts always to be replaced: Turbocharger oil pipe (10,09,03,03)

TURBOCHARGING

Turbocharger: Removal - Refitting

12B

K9K, and 750 or 752 or 764 or 766 or 768

□

WARNING

- Ensure that no foreign bodies enter the turbine or compressor during the refitting operation.
- Check that the turbocharger oil return pipe is not completely or partially blocked by scale. Check that it is not leaking; if it is, replace it.
- Always replace:
 - all of the O-rings and both copper seals on the turbocharger oil supply pipe,
 - the exhaust flange seal.
 - any damaged heat shield.

- If there has been a fault in the turbocharger, check that the intercooler is not full of oil. If it is, remove and rinse it with the cleaning agent, then let it drip dry.

- Clean the bearing faces using **ABRASIVE PADS** on:

- the exhaust manifold in contact with the turbocharger,
- the catalytic converter in contact with the turbocharger.

- Next, degrease these bearing faces using **SURFACE CLEANER** (see **Vehicle: Parts and consumables for the repair**) (04B, Consumables - Products) and clean cloths.

- If a replacement has been carried out, torque tighten:

- the **turbocharger studs on the exhaust manifold (9 N.m)**,
- the **turbocharger stud on the turbocharger (9 N.m)**.

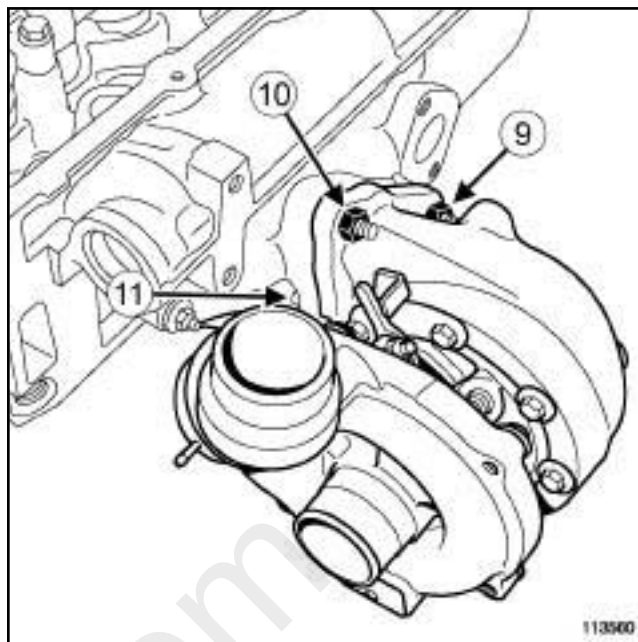
II - REFITTING OPERATION FOR PART CONCERNED

□

WARNING

Ensure that no foreign bodies enter the turbine or compressor during the refitting operation.

Check that the turbocharger oil return pipe is not partially or completely blocked by scale. Check that there are no leaks. If there are, replace the part.



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- Fit the turbocharger with new seals on the exhaust manifold.

- Bolt without tightening the turbocharger nuts using an open-jawed spanner (the turbocharger must rest on the manifold and the spanner must no longer turn without effort).

- Put a paint mark on the turbocharger coinciding with a crest of the turbocharger lower nut (**11**) .

- Tighten the turbocharger lower nut until the next nut crest coincides with the paint mark made on the turbocharger (the final angle achieved is **60°**).

- Torque tighten:

- the **turbocharger lower nut on the exhaust manifold (28 N.m) (9)** ,
- the **turbocharger upper nuts on the exhaust manifold (28 N.m) (10)** .

III - FINAL OPERATION

- Refit:

- the turbocharger oil pipes (see **12B, Turbocharging, Turbocharger oil pipe: Removal - Refitting, page 12B-15**) ,
- the catalytic converter (see **19B, Exhaust, Catalytic converter: Removal - Refitting, page 19B-27**) .

TURBOCHARGING

Turbocharger: Removal - Refitting

12B

K9K, and 750 or 752 or 764 or 766 or 768

K9K, and 764

- ☐ Refit the damper valve (see **12A, Fuel mixture, Damper valve: Removal - Refitting**, page **12A-31**) (if equipped).

K9K, and 764 or 766 or 768

- ☐ Refit the exhaust gas recirculation solenoid valve (see **Exhaust gas recirculation assembly: Removal - Refitting**) .

- ☐ Refit:

- the scuttle panel grille (see **Scuttle panel grille: Removal - Refitting**) (MR 393, 56A, Exterior equipment),

- the battery tray (see **Battery tray: Removal - Refitting**) (MR 392, 80A, Battery).

- ☐ Connect the air flowmeter connector.

- ☐ Refit:

- the air inlet duct,

- the battery (see **Battery: Removal - Refitting**) (MR 392, 80A, Battery),

- the engine cover.

Check

- ☐ Disconnect the connector from the crankshaft position sensor.
- ☐ Run the starter motor until the oil pressure warning light goes out (wait for a few seconds).
- ☐ Switch off the ignition.
- ☐ Make sure that there are no oil leaks.
- ☐ Connect the crankshaft position sensor.
- ☐ Connect the **Diagnostic tool** and clear the stored faults.
- ☐ Refit the engine undertray.

TURBOCHARGING

Turbocharger: Removal - Refitting

12B

K9K, and 772

Special tooling required	
Ms. 583	Pipe clamps.
Mot. 1448	Remote operation pliers for hose clips.

Equipment required
Diagnostic tool

Tightening torques 	
turbocharger studs on the exhaust manifold	9 N.m
turbocharger stud on the turbocharger	9 N.m
nut for the exhaust gas temperature sensor upstream of the turbocharger	32 N.m
turbocharger lower nut on the exhaust manifold	26 N.m
turbocharger upper nuts on the exhaust manifold	26 N.m

PARTS AND CONSUMABLES FOR THE REPAIR WORK

- ☐ Parts always to be replaced:
 - seal between the exhaust manifold and the turbocharger,
 - seal between the turbocharger and the catalytic pre-converter,
 - seal for the oil turbocharger return pipe on the cylinder block,
 - turbocharger oil return pipe seal on the turbocharger,
 - turbocharger oil supply pipe,
 - oil supply hollow bolt on the turbocharger.
- ☐ Consumables:
 - **ABRASIVE PAD**
 - **SURFACE CLEANER**
 - **COPPER ANTI-SEIZE AGENT**
 - **COPPER-ALUMINIUM LUBRICANT**

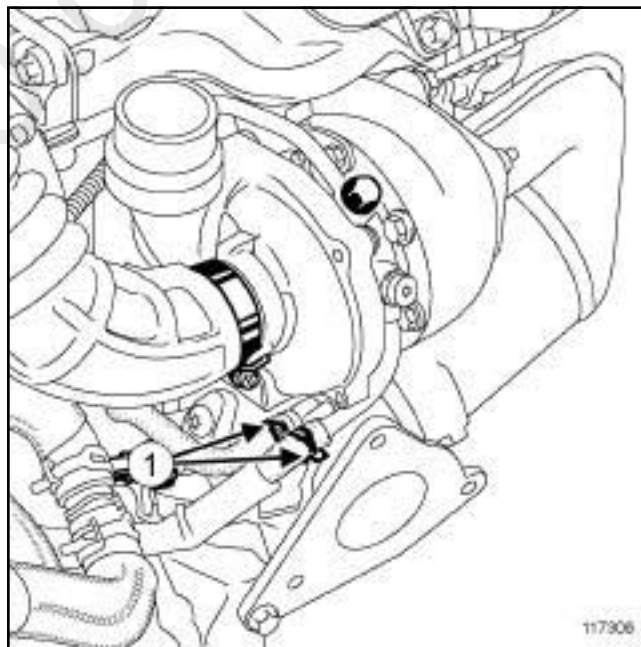
REMOVAL

I - REMOVAL PREPARATION OPERATION

- ☐ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (MR 392, 02A, Lifting equipment).
- ☐ Disconnect the battery (see **Battery: Removal - Refitting**) (MR 392, 80A, Battery).
- ☐ Remove:
 - the engine cover,
 - the catalytic pre-converter (see **19B, Exhaust, Catalytic pre-converter: Removal - Refitting**, page **19B-21**).

II - OPERATION FOR REMOVAL OF PART CONCERNED

- ☐ Disconnect the turbocharging pressure regulation valve control hose .



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- ☐ Position the (**Ms. 583**) or a hose clamp on the turbocharger cooling hoses.
- ☐ Move the clips (**1**) on the turbocharger cooling hoses to one side, using the (**Mot. 1448**).
- ☐ Disconnect the turbocharger cooling hoses.

Note:

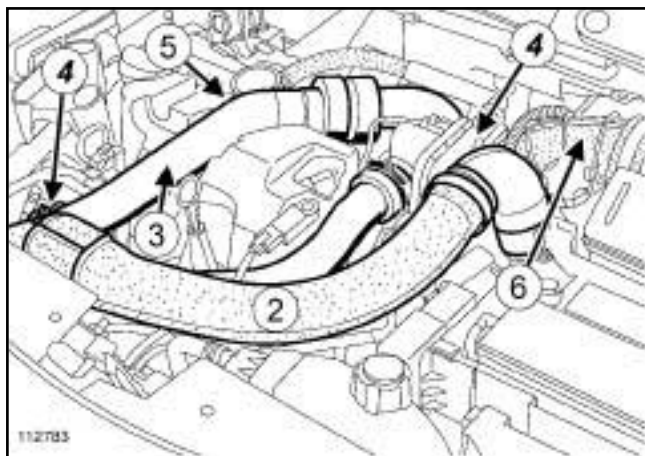
Prepare for coolant outflow when the cooling hoses are disconnected from the turbocharger.

TURBOCHARGING

Turbocharger: Removal - Refitting

12B

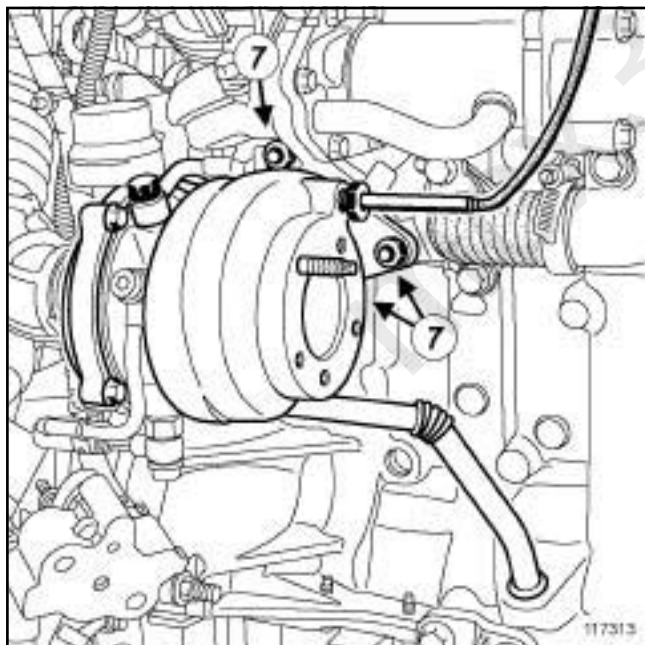
K9K, and 772



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☐ Remove:

- the air duct (2) from the air filter unit inlet,
- the upper section (3) of the air inlet duct between the turbocharger and the intercooler by moving the clips to one side (4) and by removing the bolt (5) ,
- the air inlet duct (6) between the air filter unit outlet and the turbocharger inlet.



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☐ Remove the turbocharger oil pipes (see **12B, Turbocharging, Turbocharger oil pipe: Removal - Refitting**, page 12B-15) .

☐ Remove:

- the nuts (7) from the turbocharger on the exhaust manifold,
- the turbocharger by moving the engine forwards,

- the seal between the exhaust manifold and the turbocharger,
- the turbocharger oil supply pipe and discard it.

- ☐ If the turbocharger is being replaced, remove the turbocharger temperature sensor.

REFITTING

I - REFITTING PREPARATION OPERATION

- ☐ **parts always to be replaced: seal between exhaust manifold and turbocharger (10,09,01,07)**

parts always to be replaced: Turbocharger oil supply pipe bolt (10,09,03,04)

parts always to be replaced: Turbocharger oil pipe (10,09,03,03)

- ☐ Following a turbocharger fault, check that the inter-cooler and the air circuit assembly are not full of oil. In this case, remove them and clean them using a cleaning container or a cleaning fountain and then dry them using a compressed air gun.

Note:

If the turbocharger is to be re-used, clean it completely using a cleaning container or a cleaning fountain and then dry it using a compressed air gun and let it drip dry.

- ☐ Using a buffer pad, clean the pressure faces of the:
- the manifold and the turbocharger,
 - turbocharger and the catalytic converter.
- ☐ Afterwards, degrease these bearing faces using **SURFACE CLEANER** and clean cloths.
- ☐ If a replacement has been carried out, torque tighten:
- the **turbocharger studs on the exhaust manifold (9 N.m)**,
 - the **turbocharger stud on the turbocharger (9 N.m)**.

TURBOCHARGING

Turbocharger: Removal - Refitting

12B

K9K, and 772

☐ If the turbocharger is being replaced:

- clean the exhaust gas temperature sensor upstream of the turbocharger using a clean, dry and lint-free cloth, if the turbocharger is to be re-used
- coat the temperature sensor threading with high temperature **COPPER ANTI-SEIZE AGENT** grease or **COPPER-ALUMINIUM LUBRICANT**,
- Insert the exhaust gas temperature sensor upstream of the turbocharger in its housing on the turbocharger,
- refit the nut for the exhaust gas temperature sensor upstream of the turbocharger,
- tighten to torque the **nut for the exhaust gas temperature sensor upstream of the turbocharger (32 N.m)** using an open-ended spanner.

Note:

The new exhaust gas temperature sensors upstream of the turbocharger supplied by the Parts Department are sold pre-coated. In this case, do not coat them but refit them directly, respecting the tightening torque.

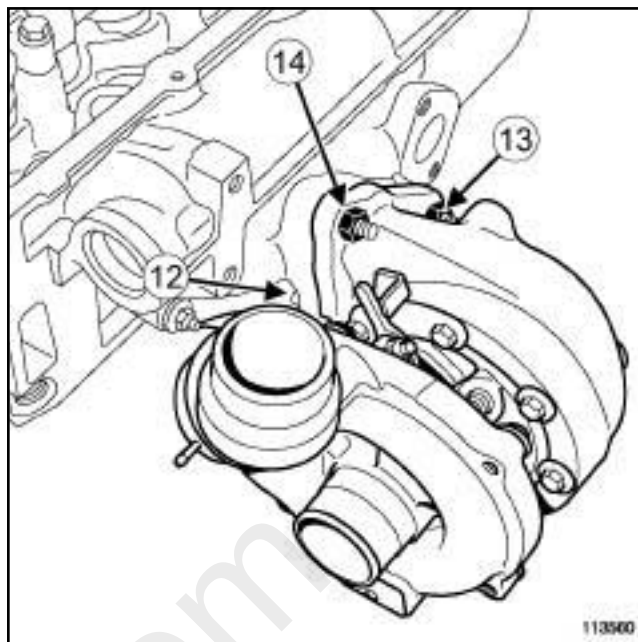
II - REFITTING OPERATION FOR PART CONCERNED

☐ Refit:

- a new seal to the exhaust manifold,
- the turbocharger by moving the engine forwards,
- the upper and lower turbocharger nuts on the exhaust manifold.

WARNING

Ensure that no foreign bodies enter the turbine or compressor during the refitting operation.



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- ☐ Fit the turbocharger with new seals on the exhaust manifold.
- ☐ Bolt without tightening the turbocharger nuts using an open-jawed spanner (the turbocharger must rest on the manifold and the spanner must no longer turn without effort).
- ☐ Put a paint mark on the turbocharger coinciding with a crest of the turbocharger lower nut (12) .
- ☐ Tighten the turbocharger lower nut until the next nut crest coincides with the paint mark made on the turbocharger (the final angle achieved is 60°).
- ☐ Torque tighten:
 - the **turbocharger lower nut on the exhaust manifold (26 N.m) (13)** ,
 - the **turbocharger upper nuts on the exhaust manifold (26 N.m) (14)** .
- ☐ Connect the cooling hoses to the turbocharger.
- ☐ Fit the clips using the **(Mot. 1448)**.
- ☐ Remove the hose clamp.
- ☐ Connect the turbocharging pressure regulation valve control hose.

WARNING

Check that the turbocharger oil return pipe is not partially or completely blocked. Check that there are no leaks. If there are, replace the pipe.

TURBOCHARGING

Turbocharger: Removal - Refitting

12B

K9K, and 772

- ☐ Refit the turbocharger oil return pipe with its new seals, starting at the inlet in the cylinder block.

WARNING

During this operation, make sure that the turbocharger oil return pipe does not fold.

WARNING

Respect the direction of fitting of the turbocharger oil return pipe seal.

- ☐ Refit the turbocharger oil pipes (see **12B, Turbocharging, Turbocharger oil pipe: Removal - Refitting**, page **12B-15**) .
- ☐ Connect the turbocharging pressure regulation valve control hose.

III - FINAL OPERATION

- ☐ Refit the catalytic pre-converter (see **19B, Exhaust, Catalytic pre-converter: Removal - Refitting**, page **19B-21**) .

WARNING

Make sure that the recommendations for refitting the catalytic pre-converter are always followed closely.

- ☐ Refit:
 - the air inlet duct between the air filter unit outlet and the turbocharger inlet,
 - the upper section of the air inlet duct between the turbocharger and the intercooler,
 - the air duct at the air filter unit inlet.

1 - Check

- ☐ Disconnect the crankshaft position sensor connector.
- ☐ Connect the battery (see **Battery: Removal - Refitting**) (MR 392, 80A, Battery).
- ☐ Run the starter motor until the oil pressure warning light goes out (wait for a few seconds).
- ☐ Switch off the ignition.
- ☐ Make sure that there are no oil leaks.
- ☐ Connect the **Diagnostic tool** and clear the stored faults.
- ☐ Connect the crankshaft position sensor connector.

2 - Final operation

- ☐ Bleed the cooling system (see **19A, Cooling, Cooling system: Draining - Refilling**, page **19A-16**) .
- ☐ Refit:
 - the engine undertray,
 - the engine cover.

TURBOCHARGING

Turbocharger: Removal - Refitting

12B

D4F, and 784

Special tooling required

Ms. 583	Pipe clamps.
Mot. 1448	Remote operation pliers for hose clips.

Equipment required

set of feeler gauges

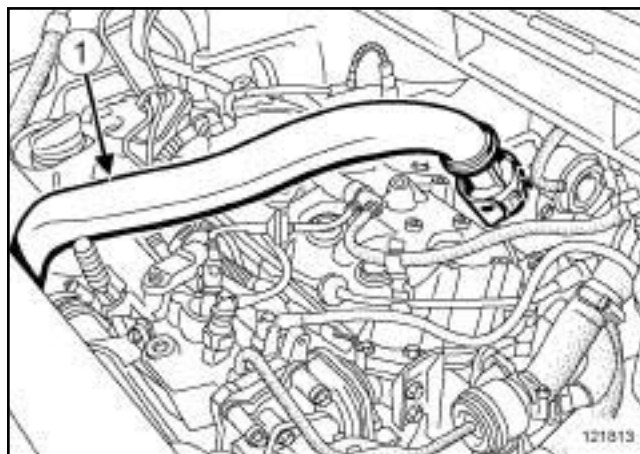
Tightening torques

turbocharger nuts	21 N.m
turbocharger cooling pipe hollow bolts	30 N.m
turbocharger cooling pipe bracket bolts	10 N.m

REMOVAL

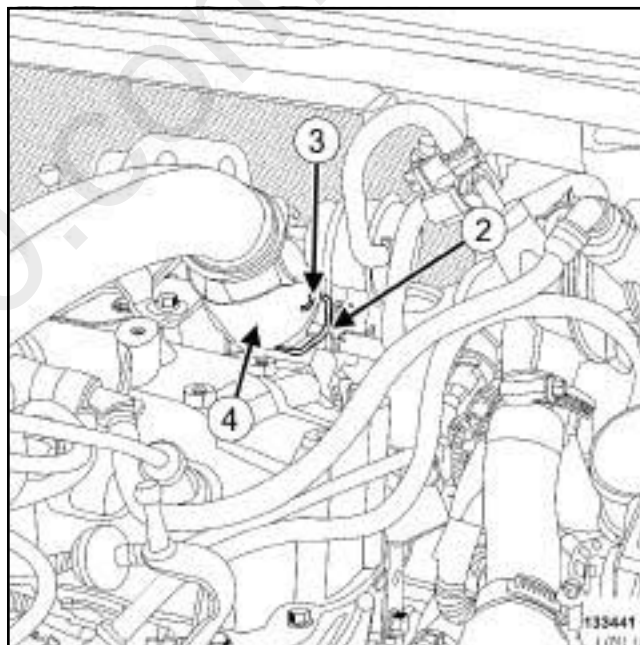
I - REMOVAL PREPARATION OPERATION

- ☐ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (02A, Lifting equipment).
- ☐ Disconnect the battery (see **Battery: Removal - Refitting**) (80A, Battery).
- ☐ Remove:
 - the engine cover,
 - the engine undertray,
 - the front right-hand wheel driveshaft (see **Front right-hand driveshaft: Removal - Refitting**) (29A, Driveshafts),
 - the catalytic pre-converter (see **19B, Exhaust, Catalytic pre-converter: Removal - Refitting**, page **19B-21**) ,
 - the turbocharger oil pipes (see **12B, Turbocharging, Turbocharger oil pipe: Removal - Refitting**, page **12B-15**) .



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- ☐ Remove the bolt (1) from the turbocharger air outlet pipe on the inlet distributor.



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- ☐ Separate the clip (2) from the turbocharger air outlet pipe.

Note:

If the clip (3) is removed from the flexible heat shield (4) , the latter must be replaced.

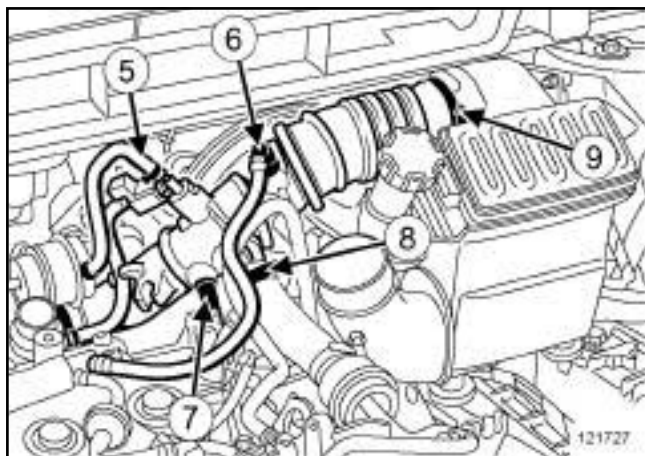
- ☐ Move aside the turbocharger air outlet pipe.

TURBOCHARGING

Turbocharger: Removal - Refitting

12B

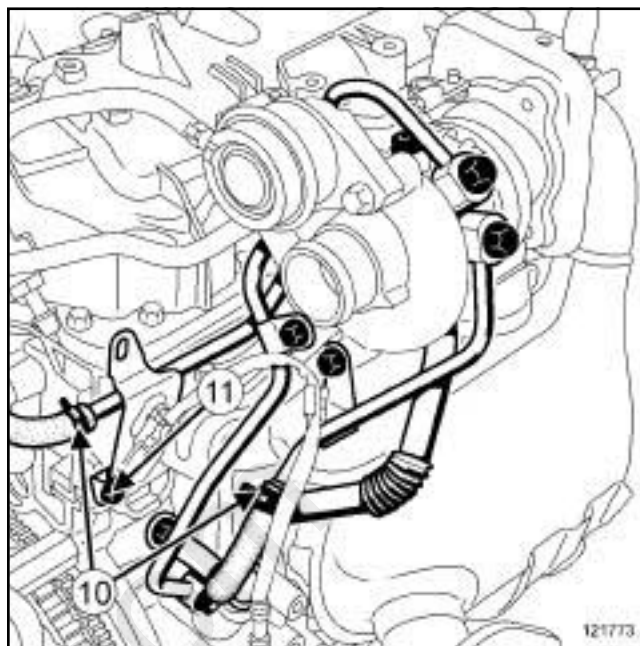
D4F, and 784



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- ❑ Disconnect:
 - the turbocharging pressure release valve (5) ,
 - the oil vapour rebreathing pipe (6) ,
 - the fuel vapour recirculation pipe (7) .
- ❑ Undo:
 - the clip (8) of the compressor discharge air pipe,
 - the clips (9) of the air outlet pipe of the air filter unit.
- ❑ Disconnect the air outlet pipe from the air filter unit.

II - OPERATION FOR REMOVAL OF PART CONCERNED



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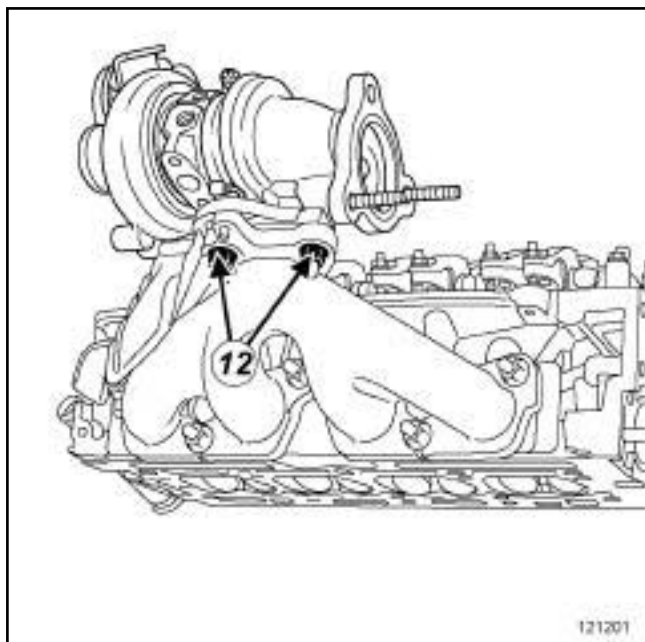
- ❑ Position the tool (**Ms. 583**) on the turbocharger cooling hoses (10) .
- ❑ Remove the turbocharger cooling hose clips using the tool (**Mot. 1448**).
- ❑ Disconnect the turbocharger cooling hoses.
- ❑ Remove the turbocharger cooling pipe strut bolt (11)

TURBOCHARGING

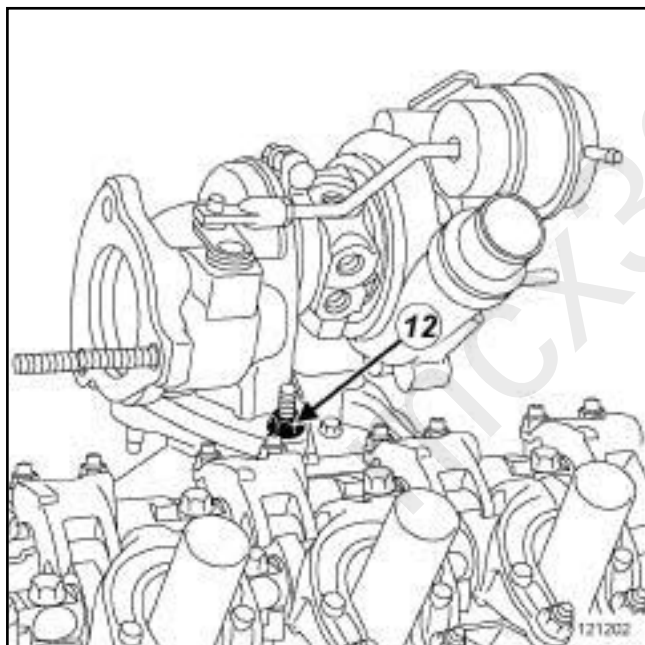
Turbocharger: Removal - Refitting

12B

D4F, and 784



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❑ Remove:

- the turbocharger nuts (**12**) ,
- the turbocharger,
- the turbocharger seal.

If replacing the turbocharger

- ❑ Undo the turbocharging pressure relief valve pipe clips.
- ❑ Disconnect the turbocharging pressure relief valve pipes.

❑ Remove

- the turbocharger cooling pipe bracket bolt,
- the turbocharger cooling hollow pipe bolts,
- the turbocharger cooling pipes.

REFITTING

I - REFITTING PREPARATION OPERATION

- ❑ parts always to be replaced: Turbocharger nut (**10,09,01,03**).
- ❑ parts always to be replaced: seal between turbocharger and catalytic converter (**10,09,01,08**).
- ❑ parts always to be replaced: Turbocharger coolant pipe (**10,09,05,03**).

II - REFITTING OPERATION FOR PART CONCERNED

❑ Refit:

- a new turbocharger seal,
- the turbocharger,
- new turbocharger nuts.

- ❑ Torque tighten the **turbocharger nuts (21 N.m)**.

1 - If the turbocharger is not being replaced

- ❑ Refit the turbocharger cooling pipe strut bolt.
- ❑ Connect the turbocharger cooling hoses.
- ❑ Fit the turbocharger cooling hose clips.
- ❑ Remove the tool (**Ms. 583**).

2 - If replacing the turbocharger

- ❑ Refit the turbocharger cooling pipes.