
Aspiration system

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General description

The turbocharger, which is fitted between the exhaust and induction manifolds, is driven by exhaust gases and supplies air to the engine at more than atmospheric pressure. It is lubricated by oil from the main pressure rail. The oil passes through the bearing housing of the turbocharger and returns to the lubricating oil sump.

Turbocharger

To remove and to fit

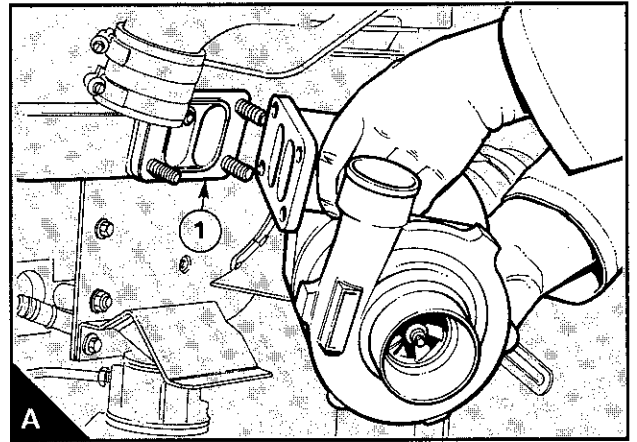
18A-01

To remove

- 1 Thoroughly clean the turbocharger.
- 2 Remove the air cleaner hose at the compressor inlet.
- 3 Remove or disconnect the support bracket for the turbocharger. If necessary, remove the heat shield for the fuel lift pump. Release the nuts and remove the exhaust elbow and its gasket from the turbocharger.
- 4 Release the hose clips and push the hose of the compressor outlet up the elbow of the induction manifold.
- 5 Release the setscrews from the flange of the oil supply pipe at the top of the bearing housing of the turbocharger. Lift off the pipe and remove the flange joint.
- 6 Release the setscrews from the flange of the oil drain pipe at the bottom of the bearing housing. If necessary, release the hose clip(s) from the oil drain pipe and push the hose down. Remove the oil drain pipe and the joint from the flange.
- 7 Release the nuts at the turbocharger to exhaust manifold flange and remove the turbocharger and the gasket. Cover the openings in the manifolds and the pipes to ensure that dirt, etc. will not enter.
- 8 Check the air hoses and the oil drain hose for cracks or other damage and renew them, if necessary.

To fit

- 1 Remove the covers from the pipes and manifolds.
- 2 Check that the turbocharger inlets and outlets are clean and free from restriction and that the turbocharger shaft rotates freely. Also check that the openings in the manifolds and the exhaust pipe are clean and free from restriction.
- 3 Fit a new gasket to the exhaust manifold to turbocharger flange (A1). If the original nuts are to be used, ensure that the threads of the studs are clean and apply a suitable compound to the studs to prevent seizure. The threads of new nuts are phosphated to prevent seizure. Fit the turbocharger. Fit the nuts and tighten them to 44 Nm (33 lbf ft) 4,5 kgf m.
- 4 Lubricate the bearing housing of the turbocharger with clean engine lubricating oil. Fit the oil supply pipe together with a new joint and tighten the flange setscrews.
- 5 Fit the oil drain pipe together with a new joint and tighten the flange setscrews, but do not connect the hose.
- 6 If the original nuts are to be used, clean the threads of the studs of the turbocharger to exhaust pipe flange and apply a suitable compound to prevent seizure. The threads of new nuts are phosphated to prevent seizure. Put a new gasket in position over the studs. Fit the exhaust elbow to the turbocharger and fit and tighten the nuts. Fit or connect the support bracket for the turbocharger. If necessary, fit the heat shield for the fuel lift pump.
- 7 Slide the hose on the induction manifold elbow onto the compressor outlet and tighten the hose clips.
- 8 Check that there is no restriction in the air filter to turbocharger hose. Fit the hose and tighten the clip.
- 9 Operate the stop control or, where fitted, disconnect the electrical stop control. Operate the starter motor until there is a flow of lubricating oil from the oil drain pipe of the turbocharger. Connect the oil drain pipe. Where fitted, connect the electrical stop control.



To clean the impeller and the compressor casing

Generally, it is not necessary to remove the turbocharger to remove the compressor casing, except for engine types AB and AD used in vehicle applications. On these engines, the compressor casing is held by a circlip and access to the circlip is not always possible.

1 Release the clip and remove the hose from the compressor inlet. Release the clips and push the hose on the compressor outlet up the elbow of the induction manifold.

2 Make a reference mark on the compressor casing (A1) and the bearing housing to ensure correct location later. Release the setscrews and lock plates. For engine types AB and AD used in vehicle applications: Remove the turbocharger, make reference marks as above and release the circlip.

Remove carefully the compressor casing from the turbocharger (A). If the casing is tight, lightly hit it with a soft faced hammer. Be careful not to damage the impeller blades. If the impeller is damaged, the turbocharger must be renewed.

3 Put the compressor casing in a suitable container that contains a non-caustic solution. Allow the dirt to become soft and then clean the casing with a hard brush and/or a soft scraper. Dry the casing with clean, compressed air at low pressure.

4 Clean the impeller with a soft brush.

5 Push carefully the compressor impeller towards the bearing housing and turn the impeller by hand. Check that there is no restriction of movement and that there is no noise which can indicate a fault. If there is a fault, remove the turbocharger for inspection by a specialist.

6 Fit the casing to the turbocharger and align the mark on the casing with the mark on the bearing housing. Fit the lock plates and the setscrews and tighten the setscrews.

For engine types AB and AD used in vehicle applications: If the circlip has been removed, fit it loosely on the bearing housing. Ensure that the chamfered face of the circlip is towards the exhaust end of the turbocharger. Carefully fit the turbocharger assembly into the compressor casing. Align the two location marks and fit the circlip in the groove.

7 Fit the hoses to the compressor inlet and outlet and tighten the clips.

8 If necessary, fit the turbocharger to the engine, operation 18A-01.

