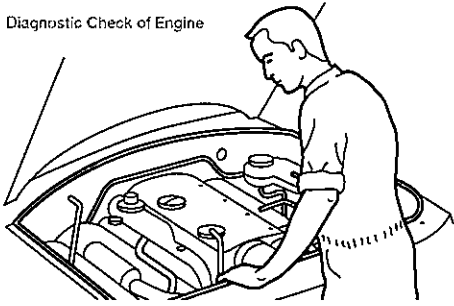


Diagnostic Check of Engine

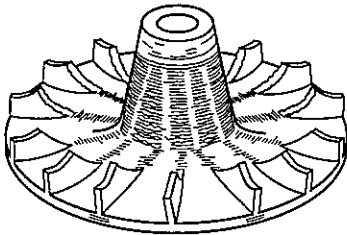


STEP 1: BEFORE REPLACING A TURBO

It is important to conduct a thorough diagnostic check of the engine system to determine if the "fault" is actually the turbocharger.

A lack of power, noisy operation, excessive smoke or oil consumption could result from a faulty fuel injection system, ECU or electrical problems, restricted or blocked air filter, a damaged exhaust system or a lubrication problem. If possible, check crankcase pressure according to the engine manufacturer's specification. A higher than normal crankcase pressure reading may lead to oil leakage from the turbo into the inlet and exhaust systems.

Damaged Compressor Wheel

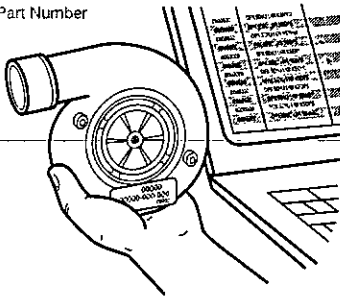


STEP 2: BEFORE REPLACING A TURBO

If the engine diagnostic check does not uncover any obvious cause, make sure that an extensive trouble shooting analysis is completed.

Key turbocharger areas for examination include foreign objects, lack of lubrication, oil contamination, over-speeding of the turbo and excessive temperature. This is important because turbo damage can often be a symptom of an underlying problem rather than the cause itself. Our website has more detailed information on this subject – please click here to learn more.

Check Part Number



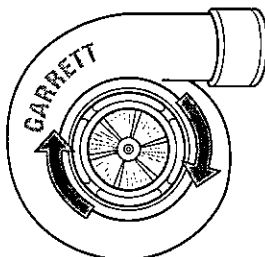
The following steps must be strictly followed.

Always consult the workshop manual for instructions which are specific to your engine or vehicle.

STEP 3: TURBO INSTALLATION

Check the part number to ensure that it is the right one for the engine. Installing the incorrect turbo to an engine may damage the turbo and/or the engine and will void the warranty. If in doubt, check with your Garrett by Honeywell Official Distributor.

High Speed Turbo Operation

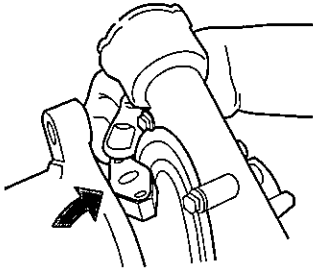


STEP 4: TURBO INSTALLATION

It is important that during the whole installation process, you prevent dirt or debris from entering any part of the turbo.

Any dirt or debris entering the turbo may cause catastrophic damage due to the very high speed of operation (up to 300,000rpm).

Choose Correct Gasket



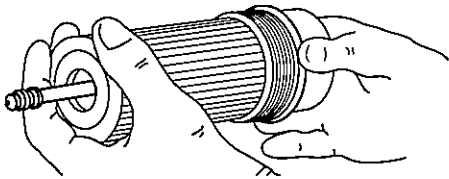
STEP 5: TURBO INSTALLATION

Ensure that correct gaskets are used.

For example - the center hole of any gasket must be perfectly aligned with the center hole of the turbo flange. Some turbos use a threaded connector and no gasket. Some turbos use a "banjo fitting" with "banjo bolt"; in these cases, use new sealing gaskets/washers.

Important Note: Do not use liquid gasket or sealants, particularly for the oil inlet or outlet since excessive material may enter the turbo, reducing or stopping oil flow.

Use New Oil Filter

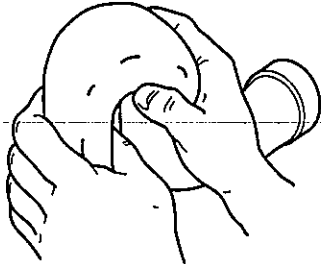


STEP 6: TURBO INSTALLATION

It is recommended that you use new air, oil and fuel filters and clean engine oil to the engine or vehicle maker's specification.

When installing the new oil filter, *if possible*, fill it with clean, fresh engine oil. Also, if it is accessible, back-fill the pressure line from the oil pump to the filter. This is particularly important on high mileage engines, where the oil pressure line may empty during oil changes!

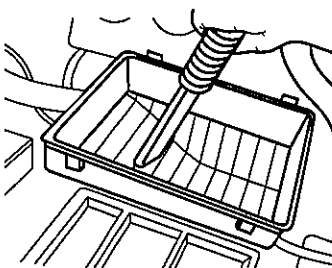
Inspect Air Hoses



STEP 7: TURBO INSTALLATION

Before installing the turbo, ensure that all air hoses connected to the turbo are totally clean and show no sign of any damage.

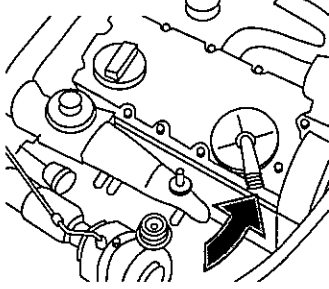
Clean Air Filter and Housing



STEP 8: TURBO INSTALLATION

The air filter and its housing must be completely clean and free from any debris.

Clean Engine Breather System

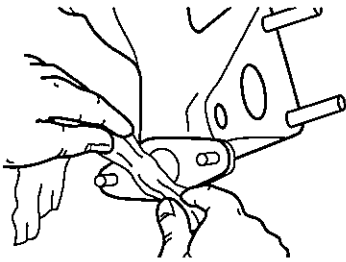


STEP 9: TURBO INSTALLATION

Clean the engine breather system (Positive Crankcase Ventilation system) and ensure that it functions properly.

Any blockages or malfunction may cause high crankcase pressure and lead to oil leakage from the turbo into the inlet and exhaust systems.

Clean Flange Surface

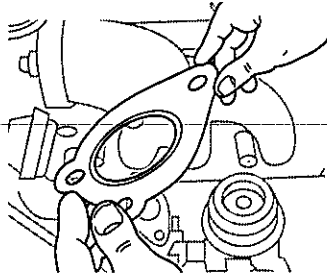


STEP 10: TURBO INSTALLATION

Remove any old gasket material from the exhaust manifold and pipe.

The surfaces of the flange must be clean and have no damage. Then remove plastic or foam blanking plugs from the turbo.

Use Correct Exhaust Gaskets

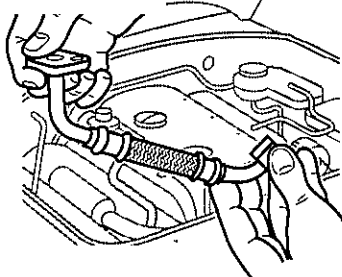


STEP 11: TURBO INSTALLATION

Position the turbo onto manifold or engine block using the correct new gasket or O ring, and then reconnect the exhaust pipe.

Tighten all nuts and bolts.*

Install Oil Drain Line

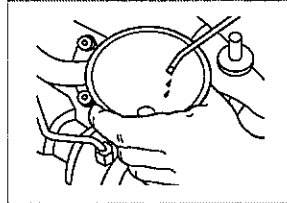
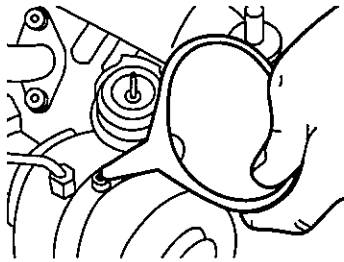


Important Note for Steps 12-15 Pay special attention to oil feed and drain lines, which must be totally clean and have no damage to ensure unrestricted oil flow. Make sure that flexible hose liners have not collapsed internally and that the oil feed line is not too close to source of heat which may have damaged the oil feed line internally. This is common on some vehicles and difficult to detect without cutting the pipe! For this reason, we recommend fitting a new oil inlet pipe when installing the new turbo.

STEP 12: TURBO INSTALLATION

Next, install oil drain line to the turbocharger.

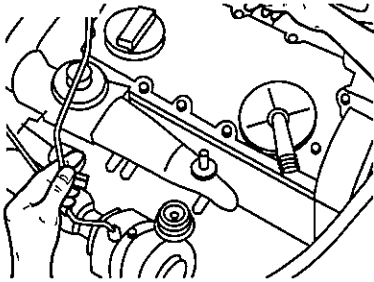
Fill Turbocharger with Oil



STEP 13: TURBO INSTALLATION

Pour new engine oil into the oil inlet hole of the turbocharger.

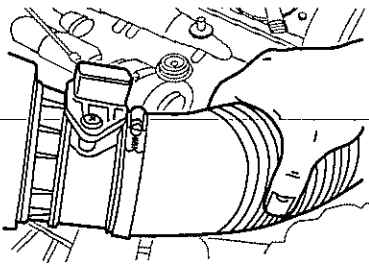
Fit Oil Feed Line



STEP 14: TURBO INSTALLATION

Next, fit the new oil feed line.

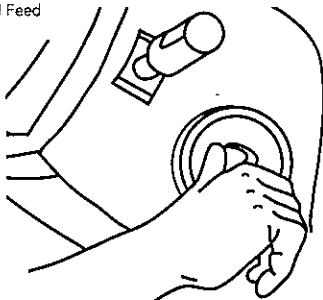
Install Air Hoses



STEP 15: TURBO INSTALLATION

Install inlet and outlet air hoses to turbocharger compressor housing. Make sure that the connections are airtight and hose clamps are correctly tightened.*

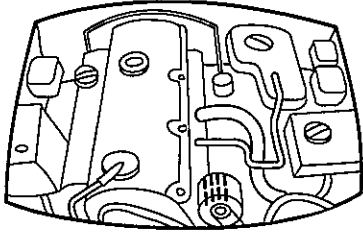
Prime Oil Feed



STEP 16: TURBO INSTALLATION

Crank the engine for 10 - 15 seconds without starting the engine. If possible, disable the fuelling/ignition or use compression test mode to allow this. This helps to prime the oil feed to the turbocharger by filling the oil pressure lines, oil filter and turbo with oil before start-up. Important Note: As soon as the engine starts, the turbo will run at high speed and a lack of lubrication in these vital first few seconds can destroy a brand new turbo.

Inspect Engine for Leakage

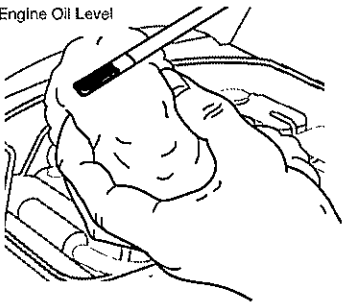


STEP 17: TURBO INSTALLATION

Then start the engine, and let it idle for 3 to 4 minutes to allow for proper inspection of oil, gas and air leakage.

If any leakage is detected during engine start up, fix the issue immediately.

Check Engine Oil Level



STEP 18: TURBO INSTALLATION

Stop the engine and re-check engine oil level.

Oil level should be between the minimum and maximum mark on the dipstick - it is important to make sure that oil level is not above the point where turbo oil drain pipe connects to the engine or this may lead to oil leakage from the turbo into the inlet and exhaust systems.

Important Note:

**For information on oil, tightening torques and installation details, always refer to the manufacturer's service manuals/data for your vehicle or engine to confirm the correct information.*