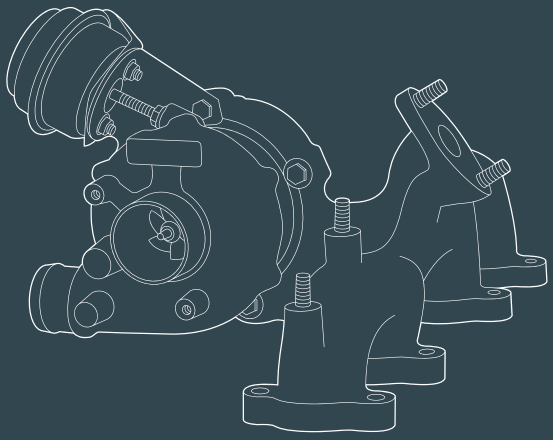
CAR PARTS INDUSTRIES

TROUBLESHOOTING GUIDELINES - TURBOCHARGER



INSTALLATION STEPS

Determine the cause of the breakdown.	Before fitting a new turbocharger, please determine what has caused the old turbo to break down. The problem, that caused the breakdown of the turbo, will likely also be able to damage the new turbo.
Check the intake.	Clean the intake system and check for leaks / damages, change air filter and intercooler if needed. If the compressor wheel is damaged, the cause of the damage must be found. Charge air hoses and the intercooler must also be checked for leaks, bends, and oil. Leaks between the turbo and the intake can force the turbo to overspeed.
Check the fuel system.	Check the fuel system – if the build up of soot is excessive in the intake manifold– this could be a sign of problems with the fuel system – check the air mass sensor, EGR, injection, or possible oil consumption from the engine.
Check the exhaust.	Check the DPF or the catalytic converter for clogging. Check manifold and exhaust for tightness. Check the old turbine wheel for damage, that could be caused by debris from the engine or EGR valve, if damaged you need to find the problem, that caused it.
Check the oiling system.	Replace the oil feed pipe, and clean or replace the oil return pipe. Check that the crank pressure is within the car manufacturer specification – too high pressure could result in lack of lubrication of the turbocharger. Check the old oil for excessive soot build up – check the oil pan for contamination with soot or metal debris from wear of crank or rod bearings. If problems are found here, they need to be taken care of before the turbo is replaced.
Check the actuator.	Check the vacuum lines to the turbo for tightness and bends, that could prevent the vacuum from reaching the actuator. If the actuator is electric – please check the connector.
Flush the oiling system.	It is recommended to flush the oiling system and clean the oil pan when replacing the turbocharger. A contaminated oiling system can lead to premature failure of the new turbocharger.
Change oil.	Before starting up the new turbo, change the oil and the oil filter on the engine.
Fit new gaskets.	When installing the new turbo – make sure to use the new gaskets – observe, that some gaskets may be possible to fit in a wrong position, which will allow the gasket to partly cover the exhaust intake of the turbo, so make sure to fit in the correct position. Avoid using any liquid sealant – this can close the oil supply to the turbo or damage internal components of the turbo. Make sure to use the correct torque on all parts when reassembling.
Pre-oil the turbo.	Please use the turbo oil inlet to pre-oil the turbo with the recommended oil for the engine before cranking the engine. Spin the axle carefully by hand to distribute the oil. When starting up, disconnect the ignition or diesel pump, and engage the starter for a while to build up oil pressure. When connecting the ignition or diesel pump and starting up – please allow the engine to idle for a couple of minutes.
Return the old turbocharger correctly.	Return the old turbocharger in the same box as the new turbocharger came in. Plug the lubrication holes to avoid leakage and contamination of the box. Note that we don't accept dissembled turbochargers or with missing components.

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POSSIBLE ERRORS

Problem	Cause	How to identify	Why the problem occurs	Solution	Preventive actions
Oil leak.	Crank ventilation not working.	When lifting the dipstick – check if pressure is released.	Increased pressure from the crank case is preventing oil return from the turbo.	Replace PCV.	Check before fitting a new turbo, that the PCV is ok.
Oil leak.	Oil return line blocked by use of liquid sealant.	Unscrew the oil return line, check if oil is flowing back.	Liquid sealant is blocking the flow of oil.	Avoid using sealant.	Clean surfaces, and use only gaskets to seal.
Oil leak.	Increased pressure in crankcase caused by engine wear.	PCV working, but pressure is high.	Blow by is causing too high pressure in crank case.	Replace valve guides or pistons/rings as needed.	Never exceed service intervals. Check for pressure in crankcase before turbo replacement.
Lack of power.	Lack of intake air.	Clogged air filter/ damaged hoses.	Air filter not changed, hoses pinched of during installation.	Replace filter or hoses.	Fit new air filter, inspect hoses.
Lack of power.	Lack of charge air.	Leak between turbo and intake manifold.	Wear on parts.	Replace leaking parts.	Check tightness before installation.
Lack of power.	Exhaust leaks in manifold or joints.	Exhaust leaking into engine bay.	Cracks in manifold, bolts not torqued.	Replace manifold, torque bolts down, and replace gaskets.	Check for tightness before installation, use correct torque.
Lack of power.	Blockage in DPF/ Catalyst.	Black smoke, engine light on.	Soot build up in exhaust.	Clean/replace.	Examine why the soot builds up – injection, EGR, airmass, etc.
Lack of power.	Vacuum lines not tight, or bent.	Actuator is not moving, or not moving enough.	Lines worn or bent.	Replace vacuum line.	Before replacement, check tightness of lines, if they cannot hold vacuum, replace.
Lack of power.	Vacuum solenoid valve not working.	The lines are tight, but vacuum doesn't reach the actuator.	The valve is worn out.	Replace the vacuum valve.	Before replacement of the turbo, check, that vacuum is present at the actuator.
Lack of power.	EGR valve stuck open.	If you unplug the EGR valve at some revs, Airmass doesn't change on diagnostic tester.	Due to soot, EGR valve is stuck in open position.	Replace EGR valve.	Check fuel system to avoid buildup of soot.
Lack of power.	MAP or Airmass sensor not working.	Check with diagnostic tester, that the expected value at idle is ok.	MAP or airmass sensor are failing.	Replace sensor.	Check Sensors before replacing the turbo.
Lack of power.	Intake throttle not working correctly.	Check that the throttle moves freely.	Throttle failing, or build up of soot.	Replace or clean throttle.	Check throttle before replacing the turbo.
Lack of power.	Intake manifold contaminated.	Visual inspection.	Buildup of soot.	Replace or clean.	Check fuel system to avoid buildup of soot.
Black smoke.	Airfilter contaminated.	Visual inspection.	Lack of service.	Replace.	If in doubt of when the filter was last replaced, replace it at turbo replacement.

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Black smoke.	Air intake hose collapsed or restricted.	Visual inspection.	Damaged when working on other items.	Remove restriction or replace hose.	Visual inspection before replacement of turbo.
Black smoke.	Leak between compressor and intake.	Inspection of hoses, intercooler, gaskets, manifold.	Wear of parts, damaged parts.	Replace or tighten clamps/gaskets/ hoses as needed.	See/hear/feel for any leaks.
Black smoke.	Intake manifold contaminated.	Visual inspection.	Buildup of soot.	Replace or clean.	Check fuel system to avoid buildup of soot.
Black smoke.	Damage to compressor wheels.	Visual inspection.	Object from airside damaged the wheel.	Inspect intake – find out where the object came from and fix the problem, and install new turbo.	Inspect all intake parts at replacement of turbo.
Black smoke.	Problem in fuel injectors or pump(S).	Diagnostic tester.	Parts worn.	Replace needed parts.	Check the fuel system before fitting a new turbo.
Black smoke.	Problem with MAP or Airmass sensor.	Check with diagnostic tester, that the expected value at idle is ok.	MAP or airmass sensor are failing.	Replace sensor.	Check Sensors before replacing the turbo.
Black smoke.	Blockage in DPF/ Catalyst.	Black smoke, engine light on.	Soot build up in exhaust.	Clean/replace.	Examine why the soot builds up – injection, EGR, airmass, etc.
White/Blueish smoke.	Engine oil consumption too high.	Check oil consumption.	Wear on pistons/ rings, liners valvetrain, gaskets.	Repair problem as needed.	Check oil consumption before fitting a new turbo.
White/Blueish smoke	Crank ventilation not working.	When lifting the dipstick – check if pressure is release.	Increased pressure from the crank case is preventing oil return from the turbo, and increasing consumption.	Replace PCV.	Check before fitting a new turbo, that the PCV is ok.
White/Blueish smoke.	Leak between compressor and intake.	Inspection of hoses, intercooler, gaskets, manifold.	Wear of parts, damaged parts.	Replace or tighten clamps/gaskets/ hoses as needed.	See/hear/feel for any leaks.
White/Blueish smoke.	Lack of intake air.	Clogged airfilter/ damaged hoses.	Airfilter not changed, hoses pinched of during installation.	Replace filter or hoses.	Fit new airfilter, inspect hoses.
White/Blueish smoke.	Oil return line blocked by use of liquid sealant.	Unscrew the oil return line, check if oil is flowing back.	Liquid sealant is blocking the flow of oil.	Avoid using sealant.	Clean surfaces, and use only gaskets to seal.
White/Blueish smoke.	Residue from the old turbo.	If the old turbo was leaking oil.	Oil from the old turbo left in exhaust.	If the amount of oil is not excessive, let it burn off.	If the amount is excessive at disassembly, wipe it off as far as possible.
Noise.	Whistling noise.	Compressor wheel damaged by foreign object.	Visual inspection.	Replace turbo.	Before fitting a new turbo, make sure, that air ducts, and all intake parts are in good shape.

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Problem	Cause	How to identify	Why the problem occurs	Solution	Preventive actions
Noise.	Leaks from intake, charge side or exhaust.	Check the intake hose, charge hoses, intercooler, manifold, turbo & exhaust for leaks.	Wear on parts, or incorrect gaskets or torque has been used.	Tighten screws or replace needed gaskets, hoses or cracked manifold or exhaust parts.	Inspect intake, charge hoses and exhaust parts before fitting a new turbo.
Noise.	Metallic noise – compressor- or turbinewheel damaged by foreign object.	Visual inspection.	Parts from intake or engine has entered the turbo and damaged the wheel.	Identify where the part has come from and correct the problem, and replace the turbo.	Inspect intake well before installing a new turbo. If the old turbo has damaged turbine or compressor wheel, clarify why.