

K04 TURBO REPORT FROM NEUSPEED

The information below, gleaned from a B5 site, offers some insight into the limitations of the K04 turbo that I have not seen mentioned before. High temperatures and softening of the shaft could also be the root cause of some of the reported turbo problems and also may explain why Mazda intentionally pulls the plug on boost at 6k rpms. Is anyone measuring exhaust temp in the turbine housing?

-enganear

K04 TURBOCHARGER REPORT FROM NEUSPEED

For those readers unfamiliar with the background of the 3K-Warner K04 turbocharger here is a brief summary of past events. The K04 turbocharger (manufactured by 3K-Warner GmbH) is sold as an upgrade for 1.8T engines by several international tuners, including NEUSPEED. In the United States, NEUSPEED has sold the largest number of K04 turbochargers in the aftermarket for use on 1.8T engines. Over the past two years, we documented 8 K04 turbocharger failures and reported this information to 3K-Warner's United States importer, Dura Products Corporation in Bradley, Illinois.

After validating the statistical significance of the failure rate, NEUSPEED suspended its sales of the K04 turbocharger, and with the assistance of Dura Products Corporation performed extensive testing to determine the cause of the failures. Based on our joint findings, we prepared this report to brief current K04 users, and potential users, on the proper installation, operation and maintenance of the K04 turbocharger to maximize its service life.

1. INSTALLATION

Each re-seller of the K04 turbocharger is responsible for providing installation instructions. The following information is intended to supplement those instructions, not replace them.

A. Always drain engine oil and remove old oil filter prior to removing existing turbo from the vehicle.

B. Always inspect factory oil feed line to determine if line has become coked with oil residue. If the oil feed line has dark, hardened coating inside of it, discard the line and replace it with a new Audi or Volkswagen genuine part.

C. After the K04 turbocharger has been bolted onto the manifold and oil feed and return lines have been reconnected, install new oil filter and use synthetic engine oil only. Mobil 1 and Redline are the recommended brands. 20/50w is recommend for summer. 10/40w is recommended for winter.

D. Before restarting the engine for the first time, the engine, oil lines and turbocharger must be dry-primed with oil. To perform this procedure, first locate the Engine Control Computer (ECU) and disconnect the multipin connector from the ECU. Next turn the ignition to the RUN position and crank the starter motor in several 4-5 second bursts. (Your oil pump will circulate oil, however no spark or fuel will be introduced into the cylinder.) Next turn the ignition key to the

OFF/LOCK position and reconnect the multipin connector to the ECU. Next turn the ignition key to the ON/POWER position, but do not start the vehicle. Leave this key in this position for at least 30 seconds. (This sends power to the ECU, but the engine will not be running.) Finally turn the key to the START position to start the engine. Allow the vehicle to idle for several minutes, then shut down the engine and check the oil level. Top off if necessary.

2. OPERATION

The K04 is designed to provide reliable, long-term service as long as its performance parameters are not exceeded. Driving the car at engine speeds above 5800 rpm with 15psi or greater boost significantly increases the exhaust temperature measured inside the K04 turbine housing. This signals that the maximum efficiency of the turbocharger has been exceeded, and that the energy produced by the turbine housing is now converting to heat rather than accelerating the compressor wheel faster. Unless a careful and extended idle-down is performed at the end of every hard driving session, the rapid heat build-up from high boost/high rpm operation causes the turbine shaft to soften, and allows the inconel turbine head to droop. The result is an imbalance that ultimately leads to a shaft failure.

A. NEUSPEED has revised its ECU programming to reduce K04 boost pressure above 5800rpm. Current K04 users are encouraged to contact their ECU software supplier and request this change. Existing NEUSPEED K04 customers will be offered this software upgrade at no charge. Peak horsepower, measured at 5700 rpm, is unaffected by this change. The reduction in high-rpm boost pressure lowers the peak turbine exhaust temperature to approximately 875°C. As long as peak turbine exhaust temperatures do not exceed 875°C, the K04 turbocharger should continue to operate reliably.

B. We encourage K04 users to install an exhaust gas temperature probe directly in the turbocharger housing to monitor peak temperature during operation. Do not mount the probe in the exhaust manifold. Do not mount the probe in the exhaust downpipe. The measurements obtained in these two locations cannot be compared to the 875°C critical temperature.

We recommend using the HKS EGT gauge and thermocouple, it reads from 500°C-1200°C. It is easily purchased from any HKS distributor and incorporates a Peak Hold Warning feature. To install the HKS thermocouple, you will need to remove your turbocharger and drill a 5/16" hole into the turbine side housing. Use a 1/8" pipe tap and cutting oil to tap threads into the hole. (We used Sears Craftman tap #9-54531) Thoroughly clean the housing and hole of all cutting debris, coat the thermocouple threads with anti-seize compound, and install the thermocouple.

C. K04 users should always bring their vehicle to a complete stop and allow the engine to idle prior to shutting down the engine. Recommended idle times vary from 1 minute after mild driving, to 5 minutes after aggressive driving. The idle-down procedure circulates fresh oil and coolant through the turbocharger, allowing it to cool gradually, prior to shut-down.

D. NEUSPEED also now offers a 5 bar fuel pressure regulator to be used in conjunction with the factory 235 CC fuel per minute injectors. The 5 bar regulator does not materially affect the turbine housing temperature. However, our testing showed that it does provides a more consistant Air/Fuel ratio during high rpm operation.

3. MAINTENANCE

A. Engine oil and filter should be replaced every 3000 miles. Do not change engine oil without installing a new oil filter. Check your engine oil level frequently. The turbocharger shaft spins over 10 times faster than your engine's crankshaft, so an adequate oil supply is critical.

B. Periodically inspect the turbocharger to determine if the wastegate rod and hardware has been bent or damaged. The K04 wastegate rod comes from the 3K- Warner factory with a locking clip over the adjustment nuts. DO NOT attempt to recalibrate the wastegate by moving the adjustment nuts. Any tampering with the wastegate can dramatically alter the boost characteristic of the turbocharger and lead to serious engine damage.

C. In the event that any air intake hoses are removed or disconnected during service, thoroughly inspect every hose and remove any foreign objects or debris that may have fallen or collect inside the hose(s). Any loose objects inside the air intake tract may be sucked into the turbocharger upon start up, seriously damaging the compressor blades.