KOLBENSCHMIDT

PIERBURG

TRW EngineComponents

SERVICE INFORMATION

ENGINE INSTALLATION AND INITIAL START-UP

CHECKLIST FOR AVOIDING CONSEQUENTIAL FAULTS

SITUATION

Severe damage often occurs following an engine repair. Faults that are not resolved in the periphery of the engine, whether mechanical or electrical, can lead to costly consequential faults.

With the following checklist, the majority of possible sources of trouble can be eliminated during engine installation.

Engine mechanics		
Components	**Activity**	**Background**
Intake system	Check, clean	There may still be fragments, metal chips or other soiling in the intake system from engine damage. If these are not removed, they can cause more engine damage or premature wear.
Charge air cooler	Clean or replace	Following engine damage, there are often large quantities of engine oil in the charge air cooler. If a new engine is connected, this can lead directly to engine damage.
Turbocharger connecting lines	Check, clean, replace	Supply and return lines are blocked with carbon due to thermal influences, the resulting inadequate oil supply leads to turbocharger damage. Mechanically clean the lines (with a metal brush), or replace them. Blowing out lines with compressed air is not recommended.
Turbocharger	Check, replace	The turbine and compressor impellers must be in impeccable condition, they must not be deformed or cracked, or have ground against the housing.
Oil filter, oil cooler and oil lines	Clean or replace	Metal chips resulting from engine damage can be flushed to the clean side of the oil filter. Thoroughly wash out and clean the oil cooler and filter housing. Blowing out lines with compressed air is not recommended. The oil cooler and connecting lines should be replaced completely.
Oil system	Fill	After you have connected it to all components supplied with pressure oil (oil cooler, turbocharger, hydraulic pumps, etc.), fill the engine with pressure oil to prevent dry running and damage to bearings. This process is described in detail in Service Information SI 0012.
Exhaust system	Check, clean, replace	As a result of engine damage, fragments of pistons, valves and the turbocharger, as well as fuel and oil, enter the exhaust system and cause further damage on the catalytic converter or particulate filter.
Fuel filter and filter housing	Check, clean	Injectors and high-pressure pumps in diesel engines are extremely sensitive to fuel contamination. It is therefore advisable to also check these following engine reconditioning and to clean or replace them if necessary.
Fuel/ contents of the fuel tank	Check, replace if necessary	Filling the tank with the incorrect fuel frequently leads to engine damage. If there is any uncertainty regarding the composition of the existing contents of the tank, empty the tank completely and fill with the specified fuel.
Cooling system	Clean	Before installing the engine, rinse cooling system components remaining in the vehicle with clean water.
Coolant agent	Replace	Only use specified coolant agent in the correct dilution. Do not start up the engine, even briefly, without filling the cooling system. If the water pump runs dry, the sliding ring seal burns immediately and the pump starts to leak.

All content including pictures and diagrams is subject to change. For assignment and replacement, refer to the current catalogues or systems based on TecAlliance.

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Before starting the new engine

Components	Activity	Background
Electric Cables and hose connections	Check	Check correct connections using a circuit diagram of all vacuum lines and electrical plug-in connections. This also applies to earth cables between the engine and the body/starter battery. This prevents damage to electrical components and cables due to overstressing.
Engine	Start	Before starting up the engine, oil pressure must be built up. If necessary, take suitable action to ensure that the engine does not start up before oil pressure has built up.
Engine	After start-up	After start-up, do not damage the engine through repeated early acceleration. The oil system needs some time until it has vented completely and all components are supplied with fresh oil.

Electronic components

Components	Activity	Background
Engine control unit(s)	Fault check	Read out the fault code memory, note the diagnostic trouble codes and then delete the fault code memory.
Engine electronics with components	Actuator test	The actuator test is used to check the function of the relevant components. This is helpful for flagging up interchanged plugs and faulty actuators, for example.
Carry out adaptation	Adapt, teach in	Today, many components have to be adapted following replacement. These include, for example: Air mass sensors, stepper motors, throttle valves, regulating throttles and EGR valves. Also see Pierbug Service Information SI 0090 and SI 0092.
Common rail injectors	Programming	After being swapped or replaced, common rail injectors must be programmed in the control unit separately for each cylinder. This is essential in order to compensate for manufacturing tolerances. To this aim, a code is printed on every injector, which must be saved/entered in the control unit using a diagnostic tester. The injectors from some manufacturers do not have a code, and programming is not necessary. These injectors program themselves via an installed invariable resistor. They can be identified via a 4-pin plug and the lack of an imprint.

Test run/finishing work/final inspection

Components	Activity	Background
Test run	Note OBD driving cycle	The test run should incorporate a cold start, warm-up, urban traffic, driving on a highway and a motorway. In addition, please bear in mind that in passenger cars, for example, some components are no longer monitored by the OBD at velocities in excess of 120 km/h.
Fault code memory	Check, delete	Always check and delete the fault code memory before and after the test run, even if the MIL (malfunction indicator lamp) does not light up during or after the test run. With OBD systems, the malfunction indicator lamp is often only activated after a fault has occurred twice. However, a diagnostic trouble code is stored in the fault code memory the first time this fault occurs.

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