

Air Filter and Housing Inspection

Damaged Housing or Filter Seal Prompts Low Efficiency Catalyst Codes

When low efficiency catalyst codes PO420 and PO430 appear, the last place that most technicians would consider would be a defective air filter seal or damaged/distorted air box, allowing air filter by-pass. Often, the mentioned codes result in oxygen sensors and the catalytic converter getting replaced, which may be a short term expensive fix, especially when the condition recurs. Considerations for the stored codes normally include: engine misfires, excessive oil consumption, lean fuel mixture, rich fuel mixture, weak ignition, damaged or defective oxygen sensors, any of which could result in the aforementioned codes. Contaminated air is seldom considered.

AIR FILTER BY-PASS

Damage to the oxygen sensors or catalytic converter may result from debris contaminating the components due to air filter by-pass. When you consider that approximately 100,000 cubic feet of air passes through the filter and housing for every 1,000 miles driven, it is easy to understand how a minor air by-pass condition can result in damage to the oxygen sensors, the catalytic converter and the mass air flow sensor. And these same contaminants can do catastrophic damage to the engine. In fact, permanent engine damage may result before the mentioned codes appear. Naturally, vehicles that are operated under extreme conditions such as: gravel or dirt roads, construction sites, road building, farming or any condition that may promote a lot of debris are most susceptible. Contaminated air is especially a concern for diesel applications due to the volume of intake air. Following are some checks to make certain the system is properly sealed and only filtered air is being drawn into the engine:

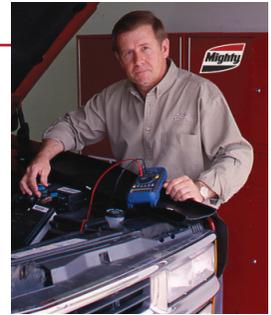
- 1) Inspect the filter housing and air filter sealing surface for evidence of dust trails that would indicate an improper seal.
- 2) Check the clean air side of the filter and housing for any debris that may have accumulated due to a condition referred to as dusting. Dusting results when the debris has been pulled through the filter media.

- 3) Look for evidence of cracks, splits, broken or missing housing latches, all of which prevent a complete seal.
- 4) Examine all duct work for splits, tears or any damage that will allow filter by-pass or un-measured air to enter the system. Un-measured air affects the mass airflow sensor calculations, which affects the fuel calibration, prompting driveability issues.
- 5) Look for a damaged or distorted filter housing due to excessive heat. Police vehicles, taxis, or delivery vehicles that operate during periods of prolonged idling in high temperatures are susceptible to distortion, which affects the sealing of the air filter in the housing.

Considering the service life of a vehicle today, it is not uncommon to identify a damaged housing or missing latches. If either condition is present, this should be brought to the vehicle owner's attention and documented on the repair order. Maintain a copy for your records. It would not be in the shop's best interest to replace the air filter on a damaged housing, as major damage to the engine or other components may have already occurred.

COMMON CHARACTERISTICS

Many filters share common characteristics and dimensionally they may appear to be the same. And in those cases there is usually a difference in the efficiency of the filter or a structural difference. Installing a filter designed for a gas engine in a diesel application is a recipe for a disaster. The filter is usually pulled from the air box and in some cases consumed by the turbocharger or engine, taking out some expensive components. Just because a filter fits the filter housing, it does not mean it's acceptable for the application. Often, we see technicians making the assumption that the filter for a new vehicle model is a carry-over from the previous year. Do not make that assumption, as the porosity of the media for the previous model may not be compatible for the new application, resulting in dusting. These conditions may elude an entry-level technician who may assume that all filter media is the same.



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