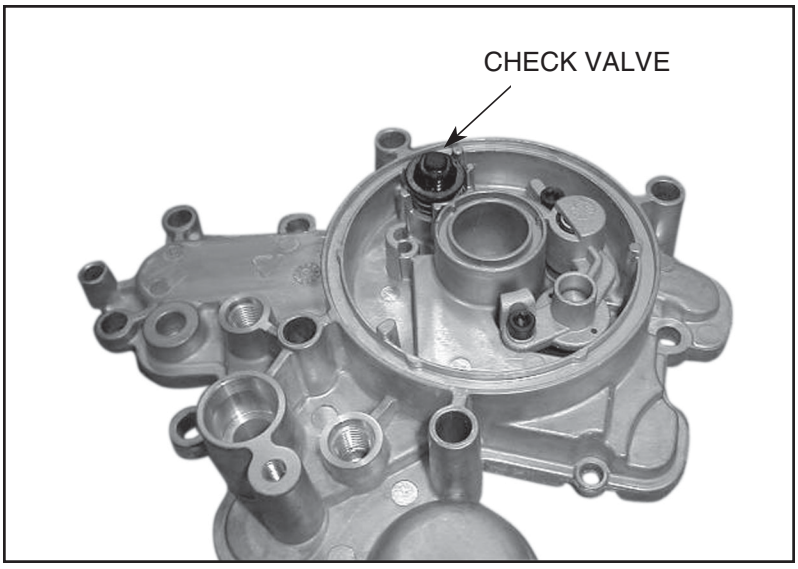
FILTRATION SYSTEMS

Dealing with Some Unique Filter Concerns

Imagine changing the oil and filter on a customer's vehicle and the engine developing a low or no oil pressure condition. To correct the problem requires several hundred dollars to cover the cost of parts and labor. Is it possible for this to happen during a routine oil and filter change? Unfortunately, it can happen. While changing the oil filter on a 2003 or newer 6.0L Ford diesel engine, be aware that there is a spring-loaded check valve positioned at the bottom of the oil filter reservoir (see illustration). If the check valve is dislodged from its mounting, a low or no oil pressure condition is inevitable.

The purpose of the check valve is to allow the oil to drain from the reservoir when changing the oil filter. When the filter is installed, the check valve is held in the closed position by the oil filter, allowing the reservoir to fill with oil and retain its capacity. Removing the oil filter releases the check valve, allowing the oil to drain from the reservoir back into the oil pan.



We have had reports of the check valve popping out of its mounted position during an oil filter replacement. The spring loaded valve is held into position by three legs/latches. If one of the latches is broken, the valve cannot be properly secured in the housing and may dislodge. If this should occur, a low or no oil pressure condition at idle is inevitable. It is possible that the oil pressure will increase as the engine is throttled-up and the reservoir fills with oil, but the engine should not be operated under these conditions. After removing the oil filter, always observe to see if the valve is in its proper position. If the valve is out of position and the latches are not broken, reinstall it. Do not remove the valve for an inspection. Trust me, satisfying your curiosity is not worth the risk of damaging the valve.

The check valve is not a replacement item. If the valve is broken, the repair involves replacing the combination housing assembly that contains the oil filter and fuel filter. The assembly comes fitted with a new check valve. This can be a costly endeavor in parts and labor, but not as much as an engine replacement, due to a loss of oil pressure.

PERFORMANCE AIR FILTERS

Some aftermarket performance air filters are of the oiled re-useable type. One vehicle manufacturer has taken a position regarding the use of the filter in their vehicles, warning that the filter may promote poor engine performance and transmission related problems. They have instructed their dealers not to perform warranty repairs when an excessively oiled aftermarket air filter has been installed. The vehicle manufacturer does not identify excessive. In my

opinion, if the vehicle is equipped with one of the mentioned filters, there is a good possibility they will not honor the warranty. The following describes how contaminates can render the system inoperable.

Measuring Mass Air-Flow… The mass air-flow sensor (MAF) measures the amount of air passing through the sensor and provides the data to the powertrain control module (PCM). The sensor signal provided is a critical measurement in determining the volume of fuel to be added to the individual cylinders for a given throttle condition. The amount of fuel added is in direct relation to the amount of air flowing through the MAF sensor. A large volume of air reflects an acceleration mode, while a small volume of air reflects an idle speed or deceleration mode. At a constant rpm, the sensor value, rated in grams per second, should remain fairly stable and change quickly on acceleration or deceleration.

Contamination of the MAF sensor can affect the grams per second reading, preventing the sensor from accurately measuring the air flow. Precautions should be taken when handling the MAF sensor to prevent permanent damage. Do not touch the sensing element. Any debris or contaminate that comes in contact with the sensing element can render the sensor inaccurate or inoperative. Take special precautions to prevent cleaners, solvents and lubricants from coming in contact with the sensing element.

Excessively Oiled Reusable Air Filters… Aftermarket performance air filters are commonly installed as an engine performance update. In addition to improving airflow, the filter is designed to be cleaned, oiled and put back into service. The problem stems from excess oil being put on the filter when servicing. The oil vapors pass through the air duct and contaminate the MAF sensor. When this condition occurs, the grams per second signal from the MAF sensor may be low, resulting in driveability problems, in addition to an illuminated SES lamp.

The MAF sensor oil contamination concern has been addressed by GM, advising its dealers not to warranty transmissions or any engine component damaged due to an excessively oiled aftermarket performance air filter. GM has documented numerous complaints of poor acceleration, loss of power, erratic transmission shifting, slipping and damaged transmission clutches, in addition to an illuminated SES lamp, all due to the mentioned filters. Any vehicle manufacturer's engine equipped with a MAF sensor is susceptible to the same conditions.

SEALED SYSTEM

Normally, when servicing an air filter, the technician would be focused on obstructions and accumulations of debris that could restrict air flow into the engine. Further, it is imperative that the technician examine the integrity of the related housings, making certain they are properly sealed to prevent foreign material from entering the system and engine. This is especially important with a mass air-flow sensed system, to prevent contamination of the mass air-flow sensor. For proper fuel system operation, air entering the engine must pass through the mass air-flow sensor where it can be measured.

If the vehicle is equipped with a turbo-diesel engine, the technician should pay special attention to the sealing of the air box and any evidence of filter deformation. Many of the diesel truck applications pull the fresh air from the inner fender well. During wet conditions, the engine may pull water into the fresh air system. This is usually evidenced by a deformed air filter that appears to have had a vacuum pulled on it. The water seals the filter media and the engine tries to ingest the filter. It is not uncommon for turbo-chargers to be destroyed due to these conditions.

While filters are assumed to be a basic service item, they can have a detrimental effect on other engine components.

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