

### 4.3

## Fuel tank leakage diagnosis

When there is leakage in the fuel system or a missing fuel tank cap, harmful hydrocarbons (HC) would be emitted into the environment by the evaporation of fuel. The fuel tank leakage diagnosis (also referred to as “fuel tank diagnosis” or “leakage diagnosis”) monitors the fuel tank system for leakage.

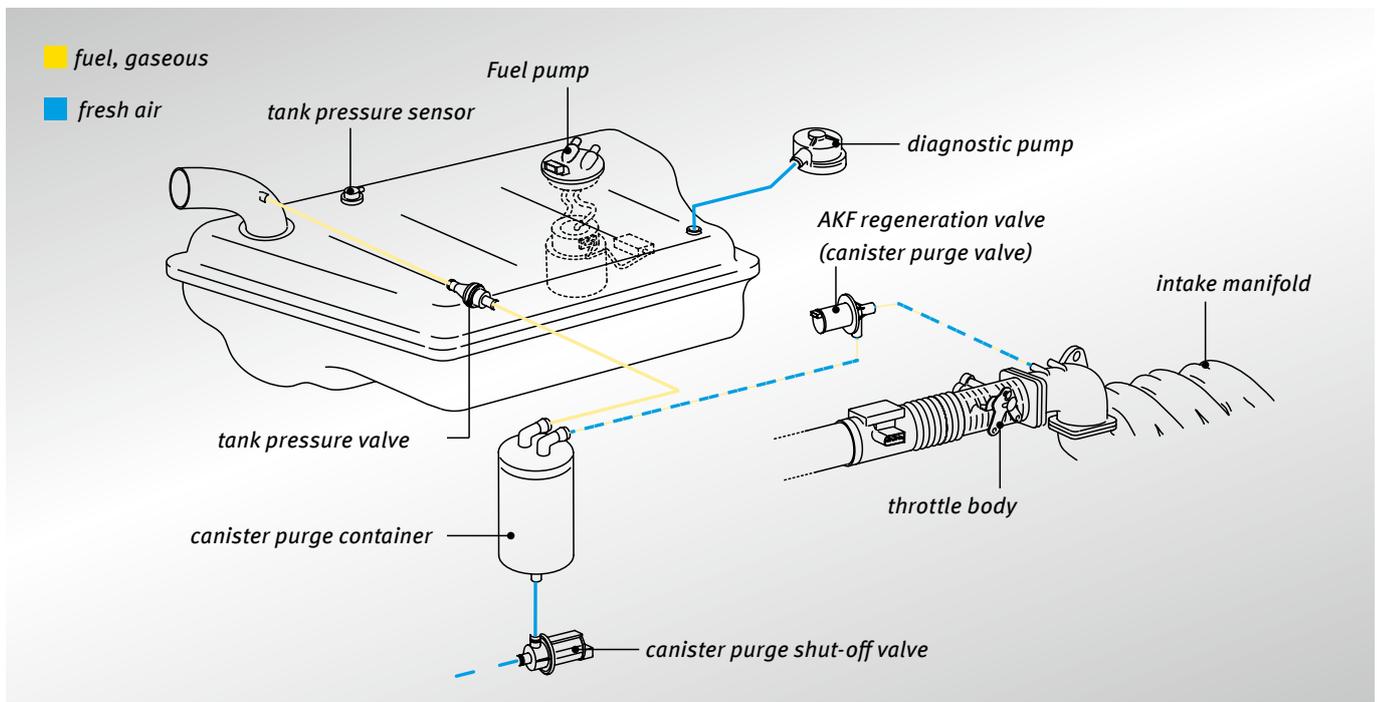


Fig. 18: fuel tank leakage diagnosis



Fig. 19: different valves (AKF-system)

For the tank leakage diagnosis, in addition to the components of the tank ventilation system (see Section 4.2), a canister purge shut-off valve and, depending on the test procedure, either a fuel tank pressure sensor or a diagnostic pump are necessary.



**Important note:**

The AKF regeneration valve is also referred to as the canister purge valve or regeneration valve.

### 4.3.1

#### Monitoring

For the test, two different procedures are used.

Only OBD II (USA) requires both types of fuel tank leakage diagnosis described. For EOBD (Europe) a tethered fuel tank cap to prevent loss and an electric component monitoring system are sufficient.

##### Testing with vacuum

The canister purge shut-off valve is closed. The AKF regeneration valve is open. This creates a vacuum in the intake manifold. If no vacuum is formed within a certain time, a leak (large leak up to approximately 1 mm) will be detected as an error.

If a specified vacuum is achieved within a specified time period, the AKF regeneration valve will close. If the pressure difference in this now closed system drops faster than specified, a small leak (up to approximately 0.5 mm) will be detected as an error.

##### Testing with overpressure

The canister purge valve and AKF regeneration valve are closed.

A diagnostic pump with integrated shut-off valve, required here, will create a defined pressure. If this pressure is reached, the pump will shut off automatically. If this pressure drops below a certain value, the pump will switch back on. Depending on the size of the leak, this will occur in shorter or longer intervals. When there are large leaks, no pressure can be built up. Depending on the procedure, the leak will be evaluated either by the power consumed or by the delivery time of the diagnostic pump.



##### Important note:

The AKF regeneration valve is also referred to as the canister purge valve, regeneration valve or tank ventilation valve.



Possible fault codes

P0440	evaporative emission control system	malfunction
P0441	evaporative emission control system	incorrect purge flow
P0442	evaporative emission control system	leak detected (small leak)
P0443	evaporative emission control system	purge control valve circuit
P0444	evaporative emission control system	purge control valve circuit open
P0445	evaporative emission control system	purge control valve circuit shorted
P0446	evaporative emission control system	vent control circuit
P0447	evaporative emission control system	vent control circuit open
P0448	evaporative emission control system	vent control circuit shorted
P0449	evaporative emission control system	vent valve/solenoid circuit
P0450	evaporative emission control system	pressure sensor
P0451	evaporative emission control system	pressure sensor range/performance
P0452	evaporative emission control system	pressure sensor low input
P0453	evaporative emission control system	pressure sensor high input
P0454	evaporative emission control system	pressure sensor intermittent
P0455	evaporative emission control system	leak detected (gross leak)
P0456	evaporative emission control system	leak detected (very small leak)
P0457	evaporative emission control system	leak detected (fuel cap lost/off)
P0460	fuel level sensor circuit	malfunction
⋮		
P0464	fuel level sensor circuit	intermittent
P0465	EVAP purge flow sensor circuit	malfunction
⋮		
P0469	EVAP purge flow sensor circuit	intermittent

Diagnostic instructions

In addition to electrical errors, that in any event are recorded and output as fault codes, there are other errors that can cause malfunctions. In the case of these errors the cause is not always diagnosed.

The following instructions are intended as a help in determining the causes of such errors.

If the OBD indicates a leak:

- Check the entire fuel tank system with all the connections to the fuel tank segments (for saddle tanks) and to the activated carbon filter for leaks.
- Especially the shut-off valve must be checked for leaks and for functioning.
- Other possible errors are stuck or soiled AKF regeneration valves and canister purge shut-off valves.

If this soiling of the valves is due to the activated carbon filter, it must be replaced. If the valves become stuck repeatedly, the entire system may have to be cleaned.



Important note:

An error message can also be triggered by a loose or missing fuel tank cap!