

Electrical exhaust gas recirculation valve | HELLA

Failure causes and troubleshooting

General information

EGR valves are installed in a bypass channel between the intake manifold and the exhaust manifold.

Recirculating part of the exhaust gas volume can reduce emissions of nitrogen oxides (NO_x).

The EGR valve is activated by the engine control unit.

The exhaust gas recirculation rate is controlled depending on the engine speed, coolant temperature and engine load.



Impact of failure

A failure of the exhaust gas recirculation may be noticed as follows:

- The engine control lamp turns on, error code is saved
- Black smoke (diesel)
- Rough idling
- Poor engine performance
- Jolting when accelerating

Causes of failure

Causes of failure may be:

- EGR valve blocked or constantly open
- Defective activation from control unit, grounding
- Defective, blocked lines
- Defective, blocked vacuum line
- Defective proportional valve
- Defective cables, poor contact at connections

Troubleshooting

The following points should be considered:

(if supported by system)

- Read out the keep alive memory
- Perform an actuating mechanism test
- Check system parameters (measured value blocks)

FAULT CODE: P1405
EGR SYSTEM

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EGR SYSTEM

- Incorrect function

Example diagnostics

In the following, we would like to present the testing options on a removed exhaust gas recirculation valve.

The example we will use is the EGR valve from a Opel Corsa C, model year 2002

Electrical test

The resistance between the contact pins in the valve connector is measured at room temperature using a multimeter. Please always observe the information provided by the vehicle manufacturer when performing these tests.

Measurement:

1. connectors A and E = resistance 5.25 - 5.85 Ω
2. connectors B and D = resistance 2.10 – 4.90 k Ω
3. connectors B and C = resistance > 500 Ω



Solenoid voltage test

Solenoid to a fused voltage supply, battery or power supply, connect with 12.0 to 13.5 volts.

Contact pin E to battery plus.

Cycle contact pin A to ground (max. 5x for 0.5 secs).

The valve must audibly operate and should open and fully close without disturbance.



Result

Although the electrical tests reveal no defects, it was clear to see that the valve is defective during the mechanical test. The valve pintle jams when open and cannot be moved by the tensile force of the solenoid.

Combustion residue deposits are the cause. As the vehicle grows older or in the event of a mechanical engine fault, the ingress of engine oil into the combustion chamber may intensify this contamination, potentially resulting in blockage of the valve (arrow). In this case, the cause should be remedied prior to replacing the EGR valve to prevent a further failure after a brief period.



Comparison with a new EGR valve

As can clearly be seen in the image, the contaminated EGR valve (1) is already open in de-energized state.

The new valve closes perfectly at the pintle (2).



Note

More information on exhaust gas recirculation can be found at:

www.hella.com/techworld