



GENERIC GUIDE FOR ALL VEHICLE MODELS, DIESEL AND GASOLINE ENGINES

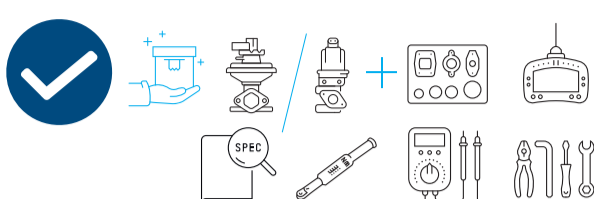


CAUTION! Only automotive professionals are allowed to install this product! If installation is performed by other than professionals (i.e. other than auto repair shop operators) and/or outside auto repair shops, the warranty will be voided.

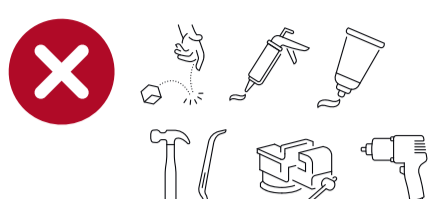
The short pictographic installation guide (A) should be considered as a supplemental guide to the detailed guide (B) describing the recommended installation process. Both guides are generic installation guides for EGR valves. Some specific fitting instructions issued for a given vehicle make and models may overrule these recommendations. **For more information, refer to the vehicle manufacturer documentation and OE data.**

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THINGS TO USE

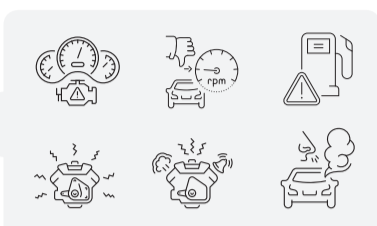


THINGS TO AVOID



STEP 1 PREPARATION

A Recognize common signs of an EGR valve malfunction



B **Warning!** Avoid burns and make sure the engine is cooled down before starting the troubleshooting and fitting procedure.

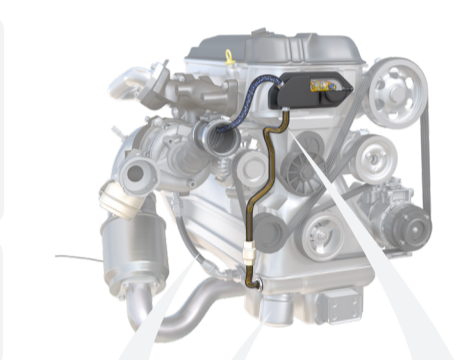
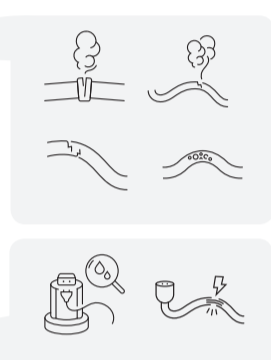
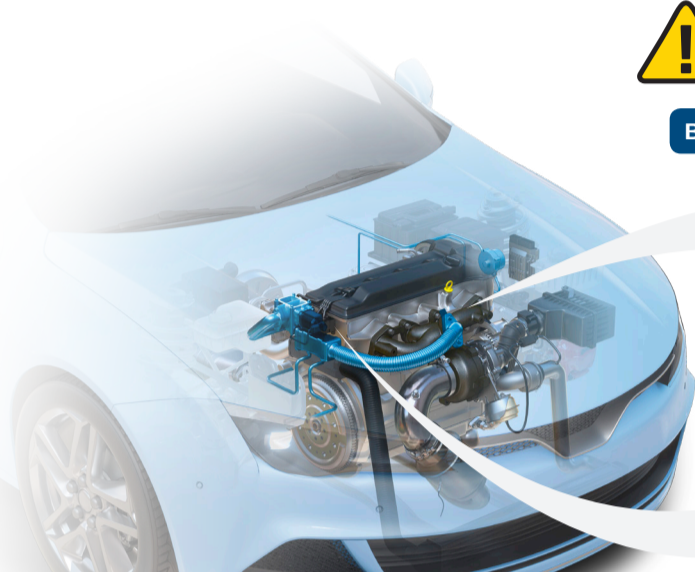


STEP 2 TROUBLESHOOTING

A Understand what caused the EGR valve failure



B Perform a thorough EGR system troubleshooting

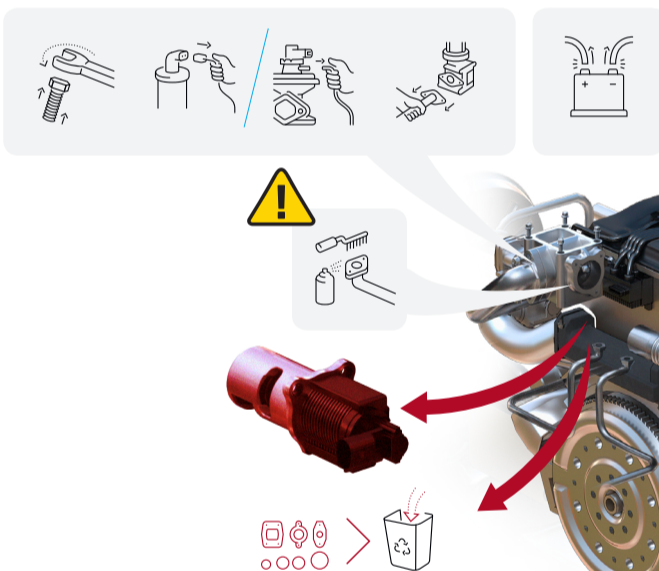


P0401 EGR – Insufficient flow detected
P0402 EGR – Excessive flow detected
P0404 EGR – Circuit Range/Performance
P0103 - Air mass too high
P0102 - Air mass too low

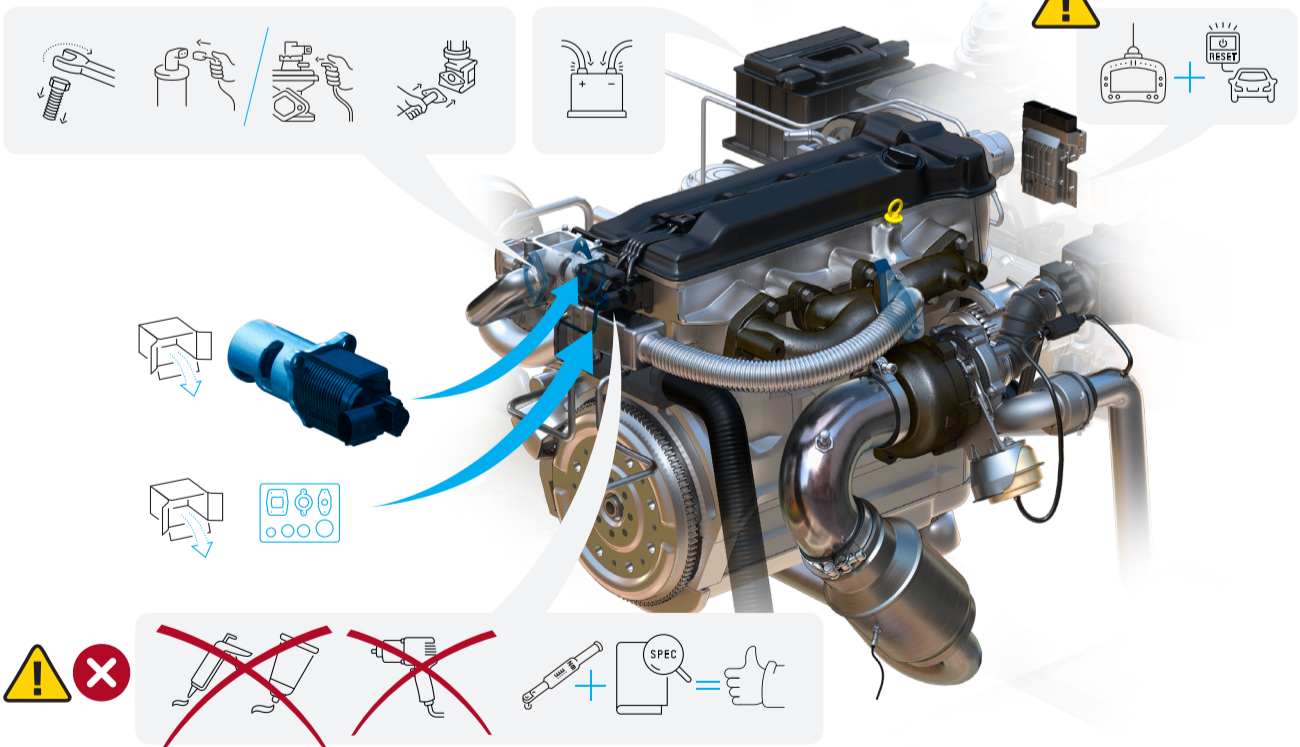
With any failure or defect suspicion, the controlled components should be replaced and recycled.

STEP 3 INSTALLATION PROCEDURE

A Dismantling the faulty EGR valve

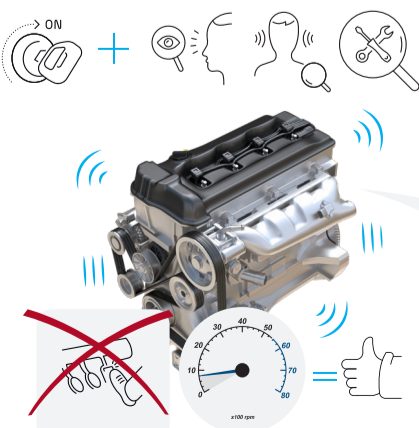


B Fitting the new EGR valve



STEP 3 TESTING

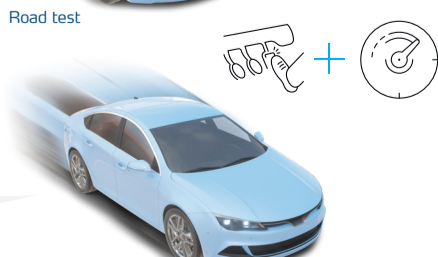
A Inspect the engine operation



B Final OBD diagnose



C Road test



Any failure, leakage or defect spotted should be controlled and eliminated immediately.



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The short pictographic installation guide (A) should be considered as a supplemental guide to the detailed guide (B) describing the recommended installation process. Both guides are generic installation guides for EGR valves. Some specific fitting instructions issued for a given vehicle make and models may overrule these recommendation.
For more information, refer to the vehicle manufacturer documentation and OE data.



THINGS TO DO - Buy new, dedicated to the vehicle model EGR valve including gaskets set. Find out if the car manufacturer has issued a service bulletin for changing the valve. If so, read it carefully. Certain cars require the replacement of specific parts or implementation of special procedures when the turbo is changed. Make sure you have proper tools needed during the valve installation: standard workshop tools such as wrenches, screwdrivers, pliers as well as OBD tester, multimeter and torque wrench.

NB! Handle the product with proper care. Avoid dirt, impurities, moisture getting inside the valve and its electrical/pneumatic connections.



THINGS TO AVOID - Do not drop the EGR valve. Never use improper tools during installation. Avoid specifically use of hammers, crowbars, vice-bench to hold the valve, air-impact wrench to fix the mounting screws. Never use silicon gaskets, exhaust gums and other liquid-based agents to seal the EGR valve connections.

STEP 1 PREPARATION

The EGR valve is an integral part of the vehicles emission control system as well as influences operation of the engine and its combustion process. Failure, malfunction or removal of the EGR valve will cause the engine to operate improperly. Furthermore, the valve failure can provoke malfunction of the exhaust emission control and cause severe failures of the emission control devices such as the DPF filter, catalytic converter or turbocharger. **Keep in mind - impaired control of the vehicle exhaust emissions will seriously affect the environment and may breach the local law regulations.**

A. Common signs of EGR valve malfunction

- Engine check control lighting on the dashboard
- ECU setting the engine into limp mode
- Reduced engine power
- Significant changes in fuel consumption
- Engine emitting pinging and knocking sounds
- Rough, uneven idling
- Stalling and hesitation during acceleration
- Exhaust gases escaping within the engine compartment

B. Safety

EGR valves are often located in the engine compartment and close to heat-generating components, so the valve can get very hot. For the replacing operator's safety, before starting the diagnostics and fitting procedure, make sure the vehicle has cooled down to a safe, low temperature level enabling proper service.

STEP 2 TROUBLESHOOTING

A. Understand what can damage the EGR valve

As the valve operates in harsh conditions including thermal stress and direct influence of the exhaust gases flow, there are many factors that can cause its premature failure. The following are the most common failures of the EGR. Their root causes must be recognized and eliminated effectively.

1. Excessive contamination by carbon build up

The most frequently occurring failure of the EGR valve is the valve getting stuck in open or closed position. This happens because of unusually massive deposits of carbon formation. The reason for the contamination must be eliminated and typically is linked to one of the following aspects:

- Aspect 1:** Improper, unclean combustion in the engine
 - > Improper air-fuel ratio of combustion
 - > Excessive oil intake/burning by the engine
 - > Engine overcharge
 - > ECU/Engine management errors incl. software version problems
- Aspect 2:** Frequent short-distance drives - specifically at lower ambient temperatures (cold seasons) due to higher humidity of the intake air impacting the crankcase ventilation thus leading to sludge, soot and carbon formation.

2. Thermal stress

Too high temperatures of the exhaust gas and the engine overheating. These impact the EGR valve leading to its housing cracking or inner elements getting melted.

3. EGR system Leaks

Ducts, hoses and connection leaks of the EGR system expose the valve to an abnormal working conditions and quickly can cause breakdowns.

B. Diagnosis

Perform a thorough EGR system diagnosis. Keep in mind, the EGR valve is not a stand-alone part and operates in a system with other components. Most of the critical valve breakdowns are caused by other factors than the failures within the component itself.



IMPORTANT: A PROPER AND THOROUGH TROUBLESHOOTING OF THE EGR AND RELATED SYSTEM IS AN ESSENTIAL PART OF THE VALVE REPLACEMENT PROCESS.

Properly performed EGR diagnosis enables you to determine and thus eliminate the root cause of the previous valve breakdown:

- It prevents the same failure to occur again after the new valve has been installed
 - It is a warranty term required by the majority EGR valve manufacturers
1. Using proper, dedicated tools and recommended methods as well as by means of a simple visual inspection, check that all connection, flanges, duct and hoses are free of cracks, damages or inner flow restrictions.
 - > Exhaust lines related to the EGR
 - > Vacuum pump connection and lines
 - > EGR electrical connections
 - > EGR air connection (pressure/vacuum)
 - > Coolant connections to EGR cooler (if applicable)

2. Perform the vehicle OBD diagnostics to specify the failures related to the EGR. Keep in mind, that the engine error codes for a specific sensor or a specific malfunction may not reveal the root cause of the problem. Often, the errors are stored due to another problem in a related system/component causing the inspected sensor/device to send improper readings. It is, therefore, important to thoroughly analyze and recognize the real cause of the malfunction before replacing parts in the engine. Deeper problem research and contact with make-specialized professionals may be needed to find the proper solution.

Possible OBD error codes

- P0401** Exhaust Gas Recirculation – Insufficient flow detected
- P0402** Exhaust Gas Recirculation – Excessive flow detected
- P0404** Exhaust Gas Recirculation – Circuit Range/Performance
- P0103** Air mass too high
- P0102** Air mass too low

3. Control other systems, components and aspects that might have impact on the EGR function. Pay specifically attention to:

- A. Vacuum pump operation or its connection/ducts problems
- B. Crankcase ventilation system issues including PCV valve function and improper oil separation
- C. Too high tolerances within the engine inner parts (high mileage engines) causing excessive blow-by gases formation
- D. Turbocharger failures, specifically bearing and seals issues, blocked oil return line
- E. Improper engine oil filtration – worn filter, exceeding service intervals
- F. Improper grade/poor quality oil engine oil applied
- G. Improper oil level, mainly too high
- H. Wear of the valve seals/washers/guides causing excessive oil transfer to the intake port



IMPORTANT! IF ANY FAILURES ARE SPOTTED, THEY MUST BE REPAIRED AND ELIMINATED BEFORE INSTALLING THE NEW EGR VALVE.

STEP 3 INSTALLATION PROCEDURE

A. Dismantling the faulty EGR valve

1. Disconnect battery
2. Remove all electrical connections to the valve
3. Disconnect exhaust/air duct
4. Remove fitting bolts
5. Remove the valve and applied gaskets
6. Thoroughly clean all gasket surfaces and flanges
7. Control the vacuum supply pipes condition. They must be free from cracks or inner flow restrictions. Replace if necessary
8. Check if the valve electrical control plug is clean and free from corrosion. Replace if necessary

B. Fitting the new EGR valve

1. Install all new gaskets (if applicable) for the EGR valve connections
2. Fit the valve using original fixings / screws. Use a torque wrench when tightening
For information on tightening torques, refer to the vehicle manufacturer specifications
Warning! Do not use an air impact wrench. It can cause irreversible damage to the valve mounting brackets and housing
3. Reconnect electrical fittings
4. Reconnect vacuum line fittings
5. Reconnect battery
6. Reset ECU / check software version by means of an OBD controller

A. For some vehicle models it may be necessary to reset the ECU unit in order to clear any stored fault codes relating to the previous EGR failure. Furthermore, it is advisable to check the ECU software version by application of any electric-operated EGR valves

B. In some cases, after installation of a new electric EGR valve, the new part may not be detected properly by the ECU thus causing the valve will not operate. This can repeat some further OBD faults for the EGR. Reason for that is need for mapping of the new valve. Modern ECU apply so-called adaptive memory modules with mapping, i.e. a learning process where instructions for the component steering must be acquired by the ECU. Mapping can be performed by the ECU tester/OBD controller. For a specific mapping guide consult the device manual or vehicle technical documentation.

STEP 4 TESTING

- A. Inspect the engine operation.** Start the engine. Let it idle and warm up to the normal operation temperature of around 90 C. Pay attention to the engine operation. It should idle smoothly and evenly. Inspect for any leakages of air, exhaust gas or coolant (by water-cooled valves). If any are spotted, they must be fixed immediately
- B. Final OBD diagnose.** Perform an OBD inspection once again for any EGR-related errors. If possible, examine the exhaust gases emission
- C. Road test.** Finally, take the car out for a drive and check if the engine operates properly, running smoothly in all rev ranges and generates the proper power



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