TECHNICAL INFORMATION

ELECTRIC VALVES

The recirculation of exhaust gas it's a way to reduce toxins in emissions. The intension of exhaust gas recirculation is reduce the temperature of the combustion induce lower production of Nitric Oxides (NOx). This exhaust gas recirculation will be efficiently only with a exactly control. The recirculation valves could be controlled pneumatic or in an electronic way, it depends of each version.

Each new vehicle has different kind of electric valves, these are small and are located in places with difficult access in the engine.

These valves come in a very wide range of versions and designations. We provide information on the most common of these valves:

- EUV: ON/OFF Electrical Switch Valves:
  3-way electrovalves with 2 positions. Fully open/closed.
- EDW: Progressive electrovalves.
  Solenoid type with pressure regulator.
  They open or close by the amount needed.

ELECTROVALVES IN AUTOMOBILES

EUV – ON/OFF ELECTRICAL SWITCH VALVE

A 3-way electrovalve with two positions that can work with a vacuum or pressure depending on the use, and in open or closed mode (ON/OFF), or controlled by frequency (entering a vacuum or pressure value proportional to the variable electrical power level at which it is controlled.
The vacuum normally comes from an electrical vacuum pump inside the engine. Vacuum pumps manage to reach negative pressure values of up to -950 mbar.

OFF POSITION: NOT POWERED
The spring pressures the mobile core which, by way of a small valve, cuts off the connection with the vacuum pump. The atmosphere intake is connected with the unit and allows the passage of air flow from the atmosphere into the unit.

ON POSITION: POWERED
The magnetic field generated by the coil moves the mobile core against the spring, closing the air intake by way of the small valve. The unit is connected to the vacuum pump.

ON/OFF electrovalves may be found anywhere in the vehicle in which parts of the engine (adjustors/actuators) must be operated pneumatically.
- Valve which adjusts load pressure (Wastegate) in many TDI engines.
- Butterfly valve for recollecting exhaust gases (EGR) in some SDI engines.
- Engine-water cooler unit in BMW diesel engines.
- Hydraulic engine support in the VW Phaeton.
- Exhaust gas flap in the muffler on the exhaust pipe in BMW internal combustion engines.

EDW – PROGRESSIVE ELECTROVALVES (TGV)

This is an electrovalve that adjusts the vacuum of air which provides a vacuum level proportional to the variable electrical powering value at which it is controlled. The electrovalve has two intakes: one with a high vacuum value and another with atmospheric pressure and one outlet, which is the intermediate vacuum that it regulates. The vacuum normally comes from an electrical vacuum pump inside the engine. This vacuum pump manages to reach negative pressure values of up to -950 mbar.

The TGV's regulated vacuum outlet is always connected to a pneumatic actuator. In the pneumatic actuator, the vacuum value is turned into a force through the membrane that separates the 2 chambers, the vacuum chamber and the atmospheric chamber. This force counteracting that of a spring allows the actuator's axis to go into different positions in proportion with the vacuum which regulates our EV.

The abbreviation TGV comes from the French or Spanish words for Turbo with Variable Geometry. It is a type of Turbo compressor in which the operation can be controlled by varying the intake of exhaust gases into the turbine through the motion of a mechanical geometry.
In English, it is usually known by the abbreviation VNT, for "Variable Nozzle Turbo."
These are used for:
- Exhaust gas recirculation systems (EGR).
- VTG turbo intakes (Turbo with Variable Geometry).

Variants:
- Type and length of electrical connection (varying types of terminals, contacts).
- Position of couplings.
- Type of attachment (support).
- Nominal curve.
- With/without temperature compensation.
- Controlled by electricity or cycles.
- Dynamic (air exhaust/intake time).
- With/without filter at air intake connection (ATM).

TECHNICAL INFORMATION

SYMPTOMS OF BREAKDOWN

Because electrovalves are a unit found in many systems within a vehicle, the symptoms which indicate that a valve has deteriorated or broken may be quite varied:

- Lack of power.
- “Lapses” in turbo compressors.
- Black smoke.
- Shaking.
- Emergency gear (in the event of breakage of the valve in the exhaust gas recirculation system).

In the OBD (On Board Diagnostics) test, the electrovalves do not monitor their operation except for flow, short-circuit and mass contact. This is why breakdowns are not recognised reliably and anomalies are often attributed to other components.

Possible Causes:

- The most frequent causes for which a breakdown or failure occurs in an electrovalve are that water and dirt get into the pressure control system. This may be the result of hose couplings not being airtight or connections with broken hoses.
- High ambient temperatures may cause sporadic abnormalities.
- On rare occasions, a breakdown may be the result of having confused the connection hoses.
- A damaged vacuum pump may supply very little negative pressure for proper control and adjustment.

Therefore, in such an instance a specialist is required with knowledge of the system who does not blindly trust a failure message and simply limits himself to changing a (possibly) mistaken part, but instead examines the failure indicated and searches for its causes.

Verification:

The airtightness of an electrovalve can be verified simply using a manual vacuum pump. A simple electrical check of an electrovalve is feasible in many cases using a typical multimeter.