



EVRM-NC
EVRM-6NC

Safety solenoid valves for gas
Manual reset - Normally closed
DN10 ... DN200

EVRM-NC

EVRM-6NC

Safety solenoid valves for gas
Manual reset - Normally closed

Contents

| | |
|--------------------------------------|----|
| Description | 2 |
| Features | 2 |
| Functioning and application | 3 |
| Special versions and optionals | 4 |
| Technical specifications | 4 |
| Gas flow chart (pressure drop) | 6 |
| Ordering information | 8 |
| Standards and approvals | 9 |
| Installation and servicing | 10 |

Description

The EVRM-NC /6NC type valve is a manual reset safety valve that is normally closed (open when energized). This type of device, connected to one or more gas leakage detectors, safety thermostat or alarm signals for the presence of carbon monoxide, is suitable to perform locking operations on the gas line.

Features

The valves are made of aluminum alloy die-cast (or hot-pressed brass for OT versions), with a wide range for inlet/outlet connections from DN10 up to DN 200.

Pipe connections meet group 2, according to EN161 requirements.

Suitable for use with air and non-aggressive gases included in the 1, 2 and 3 families (EN 437).

Two range of operating pressure: low pressure (0...600 mbar) and medium pressure (0...6 bar).

The valve is open only when energized: if, for any reason, power supply goes down, the valve closes immediately (intrinsic safe).

An incorporated fine mesh filter protects the valve seat and disc as well as downstream components and prevents dirty contamination (except brass models).

Provided with G1/4 pressure gauge on two sides in the inlet chamber (except brass models), to connect manometers, pressure switches, leakage tester or other gas equipments. Flanged models are provided with gauges also in the outlet chamber.

The coils are provided with ISO 4400 plug or with terminal box for DN100 and higher. Both systems are provided with suitable cable gland to avoid water and dirty contamination.

All components are designed to withstand any mechanical, chemical and thermal condition occurring during typical service. Effective impregnation and surface treatments have been used to improve mechanical sturdiness, sealing and resistance to corrosion of the components.

Valves are 100% tested by computerized testing machineries and are fully warranted.



WARNING

This control must be installed in compliance with the rules in force.

Functioning and application

The EVRM-NC type valve is a manual reset safety valve that is normally closed. When not in working position the spring works on the shutter keeping the gas orifice closed. Simply by energizing the coil the valve does not open. It is necessary to manually move the reset rod located at the top of the coil. Once opened, the valve can maintain this position until electric current circulates on the coil. In absence of electric current the valve closes rapidly and remains shut upon return of same. Once the causes for the lock have been eliminated, valve must be opened manually as described above.

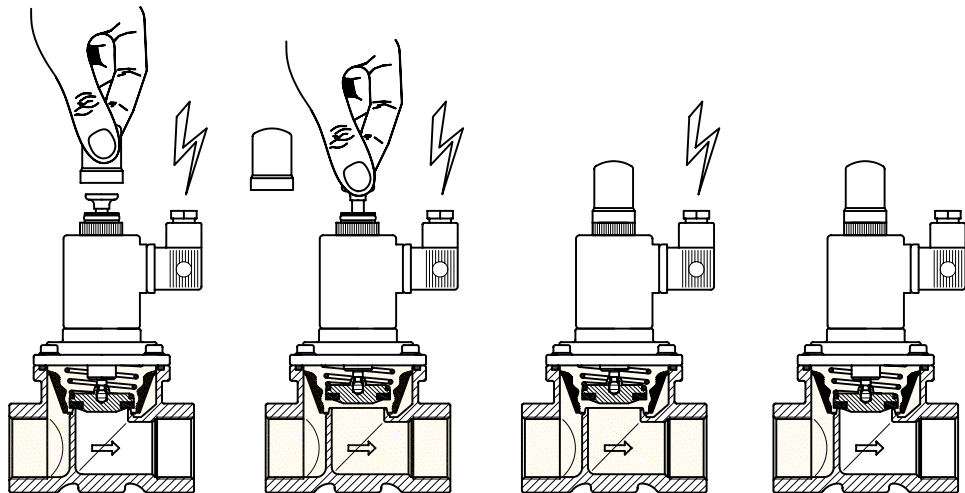


Fig.1



The /6NC versions are provided with a dual-shutter system for pressure compensation. To open the valve pull the knob for the first step, wait for pressure compensation, and then pull the knob completely up to full resetting (from 3/4" to 6").

This kind of device is normally installed downstream a manual shut-off valve and upstream of the gas regulating train. Figure 2 shows a example of installation.

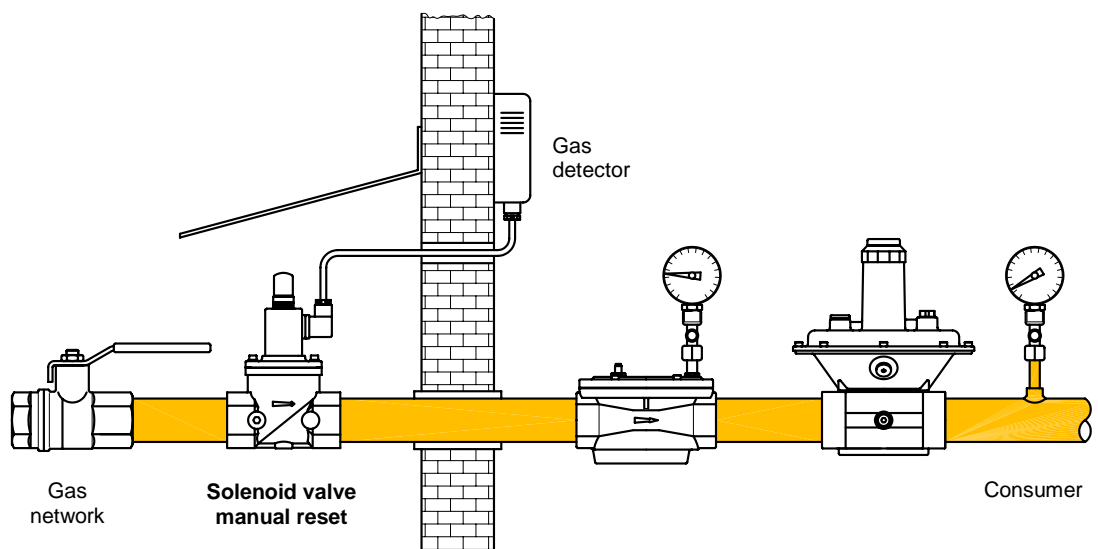


Fig.2



WARNING

Location and mode of installation must be in compliance with local rules in force.

Special versions and optionals

The sizes 1¹/₄, 1¹/₂ and 2" can be provided with G1/4 gauges also in the outlet chamber.

A closed position indicator micro-switch (CPI) can be installed. Models from DN65 to DN200 are provided with G1/8 connection on the bottom for these facilities -on request from 3/4" to 2" - (not available for 6 bar versions and brass models). To install the micro-switch the adapting kit must be required.

The threaded models Rp1¹/₂ and Rp2 can be provided with flanged connections using an optional kit.

Whole range can be provided with Ex-proof marking for use in Zone 2, according to 94/9/EC Directive (ATEX).

Technical specifications

Tab. 1

| | |
|--------------------------------------|---|
| Connections | Gas threaded ISO 7/1 from Rp3/8 to Rp2 Flanged PN16 – ISO 7005 from DN40 to DN200 |
| Voltage rating | 230 VAC 50/60 Hz 110 VAC 50/60 Hz 24 VAC/DC 12 VAC/DC |
| Voltage tolerance | -15% / +10% |
| Power consumption | see charts |
| Ambient temperature | -15°C / +60°C |
| Max. operating pressure | 600 mbar (60 kPa) 6 bar (600 kPa) |
| Flow capacity | see charts |
| Closing time | < 1 second |
| Filter (except brass models) | 600 µm, metal mesh |
| Protection class (EN 60529) | IP65 models with DIN plug DN10..DN80 IP54 models with terminal box DN100..DN200 (IP65 optional) |
| Cable gland | PG 9 |
| Coil winding insulation | Class H (200°C) |
| Coil thermal resistance | Class F (155°C) |
| Materials in contact with gas | Aluminium alloy Brass Stainless steel Plated steel Anaerobic adhesive Nitrile rubber (NBR) |

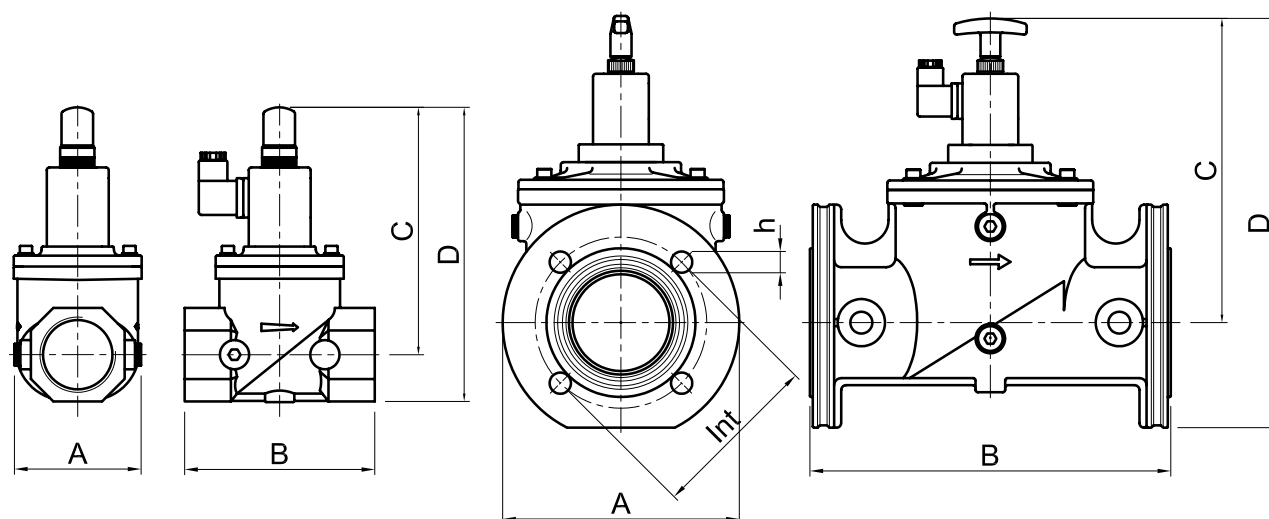


Fig.3

Tab. 2

| Material and connections | | Power consumption @230VAC [W] | Flow factor Kvs [m ³ /h] | Overall dimensions [mm] | | | | | | Weight [Kg] |
|--------------------------|----------------------|-------------------------------------|---|----------------------------|-----|--------------------|--------------------|-----|-------|----------------|
| CuZn | AlSi | | | A | B | C | D | Int | h | |
| Rp 3/8 | | 8 | 0,7 | 30 | 58 | 115 | 130 | - | - | 0,4 |
| Rp 1/2 | | 8 | 1,3 | 30 | 58 | 115 | 130 | - | - | 0,4 |
| G 3/4 | | 8 | 2,0 | 35 | 55 | 113 | 130 | - | - | 0,6 |
| G 1 | | 8 | 4,5 | 40 | 62 | 115 | 137 | - | - | 0,7 |
| | Rp 3/8 | 12 | 2,9 | 70 | 77 | 148 | 164 | - | - | 0,9 |
| | Rp 1/2 | 12 | 6,0 | 70 | 77 | 148 | 164 | - | - | 0,9 |
| | Rp 3/4 | 12 | 9,5 | 85 | 96 | 158 | 180 | - | - | 1,1 |
| | Rp 1 | 12 | 12,0 | 85 | 96 | 158 | 180 | - | - | 1,1 |
| | Rp 1 1/4 | 12 | 20,0 | 120 | 153 | 188 | 220 | - | - | 2 |
| | Rp 1 1/2 | 12 | 26,0 | 120 | 153 | 188 | 220 | - | - | 2 |
| | Rp 2 | 12 | 40,0 | 106 | 156 | 192 | 230 | - | - | 2,3 |
| | DN 40 ⁽¹⁾ | 12 | 26,0 | 150 | 193 | 188 | 262 | 110 | 4x18 | 3,7 |
| | DN 50 ⁽¹⁾ | 12 | 40,0 | 165 | 196 | 192 | 274 | 125 | 4x18 | 4,3 |
| | DN 65 | 25 | 63,0 | 200 | 305 | 262 ⁽²⁾ | 352 ⁽²⁾ | 145 | 4x18 | 7,6 |
| | DN 80 | 25 | 80,0 | 200 | 305 | 262 ⁽²⁾ | 352 ⁽²⁾ | 160 | 8x18 | 7,6 |
| | DN 100 | 45 | 148,0 | 252 | 350 | 305 ⁽²⁾ | 435 ⁽²⁾ | 180 | 8x18 | 17 |
| | DN 125 | 45 | 250,0 | 310 | 460 | 370 ⁽²⁾ | 540 ⁽²⁾ | 210 | 8x18 | 29 |
| | DN 150 | 45 | 315,0 | 310 | 460 | 370 ⁽²⁾ | 540 ⁽²⁾ | 240 | 8x23 | 31 |
| | DN 200 | 45 | 516,0 | 370 | 546 | 425 ⁽²⁾ | 635 ⁽²⁾ | 295 | 12x23 | 46 |

⁽¹⁾ Optional Kit ⁽²⁾ Valve open

Gas flow chart
(Pressure drop)

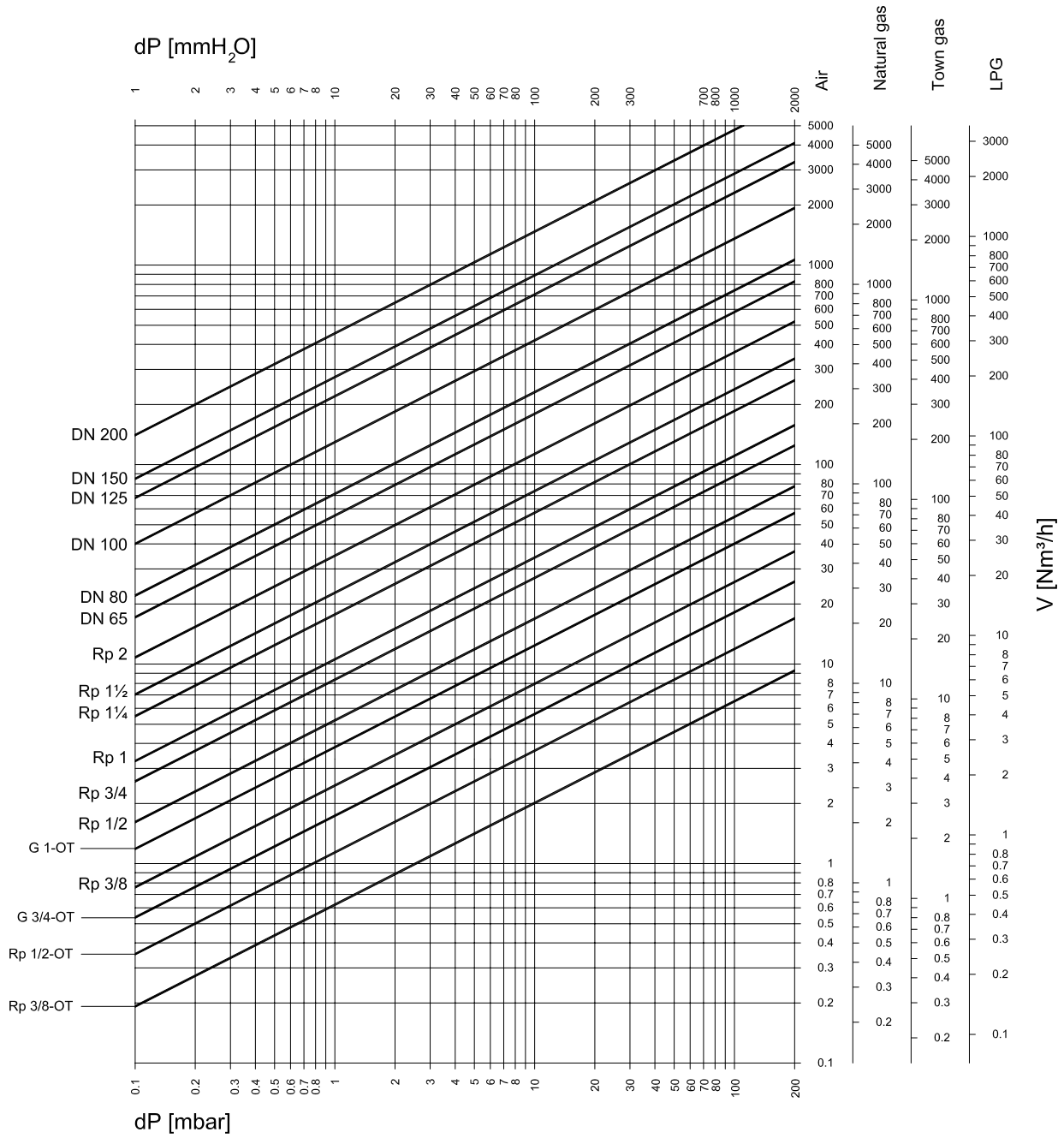


Fig. 4

**Formula of conversion
from air to other gases**

$$V_{GAS} = k \cdot V_{AIR}$$

Tab. 3

| Gas type | Specific gravity ρ [Kg/m³] | $k = \sqrt{\frac{1,25}{\rho_{GAS}}}$ |
|-------------|---------------------------------------|--------------------------------------|
| Air | 1,25 | 1,00 |
| Natural gas | 0,80 | 1,25 |
| Town gas | 0,57 | 1,48 |
| LPG | 2,08 | 0,77 |

15°C, 1013 mbar, dry

When the flow read on the diagram is referred to operating pressure instead of standard conditions, the pressure drop Δp read on the diagram must be multiplied for the factor: (1+ relative pressure in bar)

Example:

In the 2" solenoid valve with an air flow of 80 Nm³/h there is a pressure drop $\Delta p = 5$ mbar. If we consider that 80 m³/h is the flow at 200 mbar of inlet pressure, then the pressure drop to be consider is:

$$\Delta p = 5 \times (1 + 0,2) = 6 \text{ mbar}$$

Normally, pressure drop and flow rate for the valves are read from the gas flow diagram. However, the valves can also be chosen in accordance with the characteristic "Kvs value" which is shown in table 2.

The selection of the valve requires the calculation of the Kv under the operating conditions.

Considering only subcritical pressure drops:

$$\Delta p < \frac{p_1}{2}$$

Kv can be calculated with the formula:

$$Kv = \frac{V}{514} \sqrt{\frac{\rho(t + 273)}{\Delta p \cdot p_2}}$$

where

- V = flow rate [Nm³/h]
- Kv = flow factor [m³/h]
- ρ = density [Kg/m³]
- p₁ = absolute inlet pressure [bar]
- p₂ = absolute outlet pressure [bar]
- Δp = differential pressure p₁-p₂ [bar]
- t = media temperature [°C]

To the Kv value calculated from operating conditions we add an allowance of 20%, to obtain the minimum Kvs value which the valve should have:

$$Kvs > 1,2 Kv$$



Valve must be selected considering the following:

- Pressure drops $\Delta p \leq 0,1 p_1$ are recommended and $\Delta p > p_1/2$ are always undesirable
- Flow velocities $w \leq 15$ m/s are recommended and $w > 50$ m/s are always undesirable.

Ordering information

Tab.4

| Designation (230V) | | Connections | Additional code for special voltages | | |
|--------------------|------------|----------------------|--------------------------------------|------------|------------|
| | | | 110 VAC | 24 V AC/DC | 12 V AC/DC |
| 600 mbar | 6 bar | | | | |
| EVRMNC00 | EVRM6NC00 | Rp 3/8 brass | - | C | D |
| EVRMNC10 | EVRM6NC10 | Rp 1/2 brass | | | |
| EVRMNC20 | EVRM6NC20 | G 3/4 brass | | | |
| EVRMNC30 | EVRM6NC30 | G 1 brass | | | |
| EVRMNC0A | EVRM6NC0A | Rp 3/8 | B | | |
| EVRMNC1A | EVRM6NC1A | Rp 1/2 | | | |
| EVRMNC2A | EVRM6NC2A | Rp 3/4 | | | |
| EVRMNC3A | EVRM6NC3A | Rp 1 | | | |
| EVRMNC35A | EVRM6NC35A | Rp 1¼ | | | |
| EVRMNC4A | EVRM6NC4A | Rp 1½ | | | |
| EVRMNC6A | EVRM6NC6A | Rp 2 | | | |
| EVRMNC4AF | EVRM6NC4AF | DN 40 ⁽¹⁾ | | | |
| EVRMNC6AF | EVRM6NC6AF | DN 50 ⁽¹⁾ | | | |
| EVRMNC7A | EVRM6NC7A | DN 65 | | | |
| EVRMNC8A | EVRM6NC8A | DN 80 | | | |
| EVRMNC9 | EVRM6NC9 | DN 100 | | | |
| EVRMNC93 | EVRM6NC93 | DN 125 | | | |
| EVRMNC95 | EVRM6NC95 | DN 150 | | | |
| EVRMNC98 | - | DN 200 | | | |

NOTE: models up to DN80 are provided with DIN plug, models from DN100 up to DN200 are provided with terminal box.

⁽¹⁾ Optional kit



The versions with inlet pressure $p_1 \leq 6$ bar (600 kPa) may be order inserting the digit "6" in to the designation.
Different voltage than 230V may be order adding to the standard designation the additional code shown above. Other optionals must be order with their ordering code.

Example:

EVRM6NC3A.B for a valve with Rp1 connections, 110VAC, 6 bar



Manufacturer reserves the right to update or make technical changes without prior notice.

Standards and approvals

The valve design meets current European approval requirements regarding safety shut-off functions on gaseous fuels.

These products conform with the Pressure Equipment Directive (97/23/EC) and the certification has been issued by the notified body:

C.S.I. Spa
Viale Lombardia 20
I-20021 Bollate (MI)



The following standards/technical specifications have been fulfilled:

- Electromagnetic Compatibility (89/336/EC)
- Low Voltage Directive (73/23/EC)

Quality Management System is certified according to UNI EN ISO 9001 and the monitoring is carried out by the notified body:

Kiwa Gastec Italia Spa.
Via Treviso, 32/34
I- 31020 San Vendemiano (TV)



Installation and servicing

To assure a proper and safe operation, as well as a long life of the valve, the installation procedure and a periodical servicing are very important topics and the following instructions should be always fulfilled.

IMPORTANT: before proceeding with the installation, ensure that all the features of your system comply with the specifications of the valve (gas type, operating pressure, flow rate, ambient temperature, electrical voltage, etc.).



CAUTION

Shut off the gas supply at the main manual shut-off valve and disconnect electrical power to the valve before proceeding installation or servicing.

PIPING CONNECTION

- Check correspondence of flow direction with arrow printed on valve body.
- Check correct alignment of connecting pipes.
- Ensure that installing area is protected from rain and water splashes or drops.
- Remove the end caps and make sure no foreign body is entered into the valve during handling.

THREADED MODELS

- Put sealing agent onto the pipe thread. Avoid excessive quantities which could enter in the valve and damage the seal seat.
- Screw the pipes using proper tools only. Do not use unit as lever because damage to the valve stem could result.

FLANGED MODELS

- Position the gasket or sealing agent on the flanges and insert the bolts with washers.
- Screw the nuts tightening them crosswise and using proper tools only. Avoid overtightening and mount tension free.

Following chart shows the maximum values of bending moment (F_{max}), torque (T_{max}) and screws driving torque (C_{max}), according to EN161.

Tab. 5

| Connections | F_{max} (Nm) $t < 10$ s | T_{max} (Nm) | C_{max} (Nm) |
|-------------|------------------------------|-------------------|-------------------|
| Rp3/8 | 70 | 35 | - |
| Rp1/2 | 105 | 50 | - |
| Rp3/4 | 225 | 85 | - |
| Rp1 | 340 | 125 | - |
| Rp1¼ | 475 | 160 | - |
| Rp1½ DN40 | 610 | 200 | 50 |
| Rp2 DN50 | 1100 | 250 | 50 |
| DN65 | 1600 | - | 50 |
| DN80 | 2400 | - | 50 |
| DN100 | 5000 | - | 80 |
| DN125 | 6000 | - | 160 |
| DN150 | 7600 | - | 160 |
| DN200 | 7600 | - | 160 |

Fig. 5

Valve may be mounted with coil in horizontal or vertical position. Coil may be oriented 360 degrees in any direction.

ELECTRICAL CONNECTION (IEC 730-1)

Valve is provided with an ISO 4400 plug for the electrical connections. To connect the valve do the following:

- Using a screwdriver remove the plug from the coil.
- Unscrew the gland-nut (7) and remove the washer (6) and grommet (5).
- To remove the rectifier unit (1) from the plug housing (3), remove the gasket (2) and extract the screw (4) completely, then insert a flat screwdriver into the slot located on edge and pull it.
- Insert the cable in to the gland-nut, washer, grommet and then into the plug housing.
- Connect power cables to the rectifier terminals according to printed designation.
- Pull back the cable and insert the rectifier unit into the housing.
- Screw back the gland-nut, make sure that the grommet is locked on the cable.
- Insert the screw and gasket into the housing and screw back the plug on the coil.

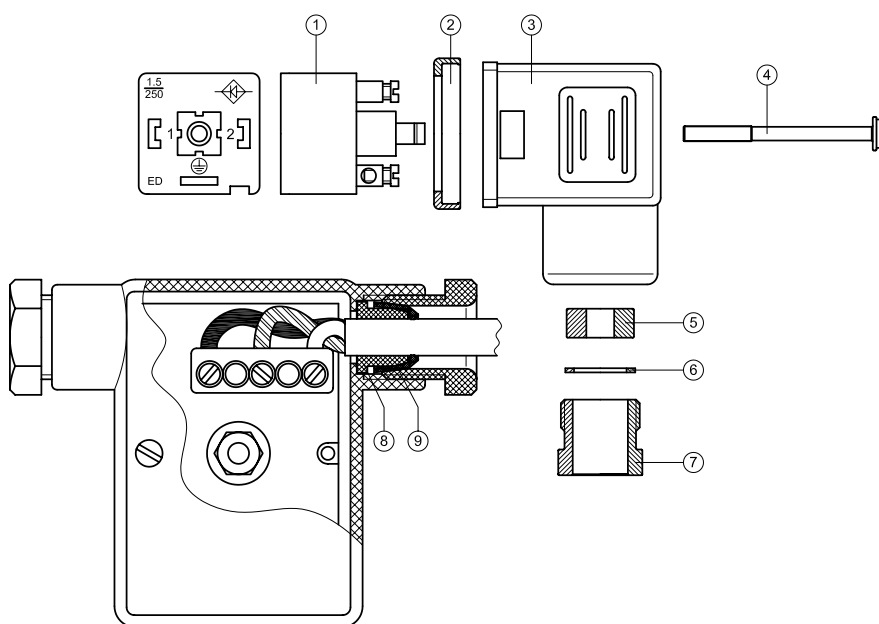


Fig. 6

If the solenoid valve is provided with terminal box, remove the cover and do as above for the electrical connections and cable fixing. In this case washer and grommet are replaced from a retaining ring (9) and a conical grommet (8).

When reassemble the cover, make sure the gasket is mounted properly.

**WARNING**

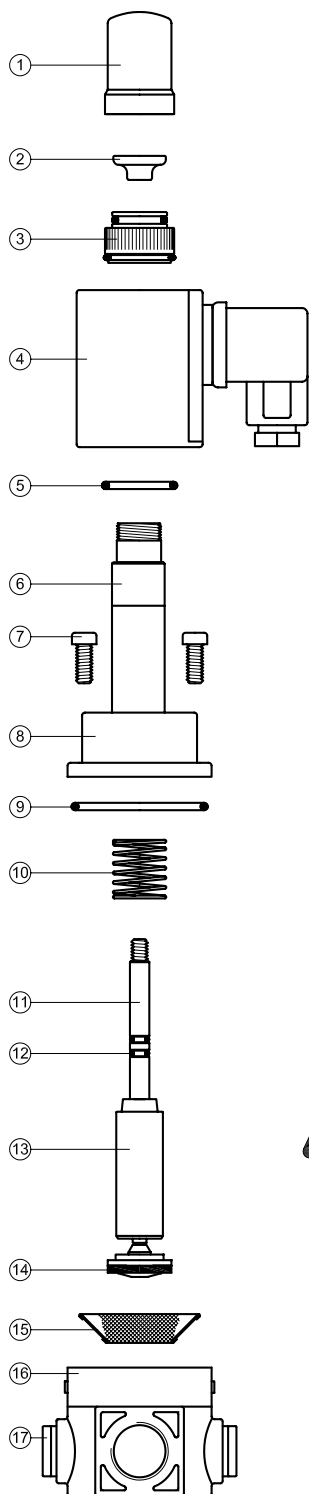
The continuous service (100% ED) causes inevitable coil heating, depending of working environment. This situation is absolutely normal and has not to worry. To improve the coil cooling, install the valve allowing free air circulation.



To maintain a good performance of the system, almost once a year, an external inspection of the valve is recommended.

EXTERNAL INSPECTION

- Turn off all power before servicing any part of the system.
- Check the conditions of the plug/box gasket. If gasket is deteriorated, replace it with a new one.
- Check the electrical connections are clean, dry and correctly tightened.
- Check the conditions of pipe connections: cover them with a soap solution and check for leakages.
- Check the proper operation of the valve: power the coil and verify that valve stay open, then, turn off power and check the closing function.



INTERNAL INSPECTION

Make this inspection when the valve does not work properly only.

To make an internal inspection of the valve, do the following:

- Shut ball valve upstream the system and make sure no pressure is inside the valve.
- Unscrew the knob (2) and locking nut (3). Remove the coil (4).
- Using an Allen key, remove the screws (7) on the upper flange (8), in cross way. The gas in the valve will come out during this step.
- Check the main O-ring (9) and rod O-rings (12). If it's necessary, replace them.
- Clean the internal side of the stem (6) with a clean cloth and compressed air.
- Remove the spring (10) and blow it with compressed air. Check the spring is corrosion free. Take attention to the assembly direction of the spring.
- Clean the plunger assembly (11, 13, 14) with a clean cloth and compressed air. Grease the rod O-rings.
- Check the conditions of the sealing gasket (14). If gasket is deteriorated, replace it with a new one.
- Clean the sealing lip with a clean cloth. Do not use tools, because a lip damage could result.
- Remove the filter (15) and blow it with compressed air.
- Reassemble the valve following the inverse sequence.

When reassembling, take attention to the correct position of the spring.

When the reassembly is finished, verify the correct sealing between the upper flange and the valve body:

- Open ball valve to restore pressure into the valve.
- Apply a soap solution between the upper flange and the valve body and check for leakages.
- Remove the soap solution with a clean cloth, before to reassemble the coil.

**WARNING**

To prevent product damage and dangerous situations, read the Installation and Service Instructions carefully.

Turn off all power before servicing any part of the system.

Make sure that the resetting rod is always free to move and no impediment hinders the valve closing.

Perform leak and functional tests after mounting (max. testing pressure 1,5 Pmax).

Use all gaskets properly (void warranty).

All wiring must be in compliance with local and national codes.

Make sure all works are performed by qualified technicians only.

Fig. 7