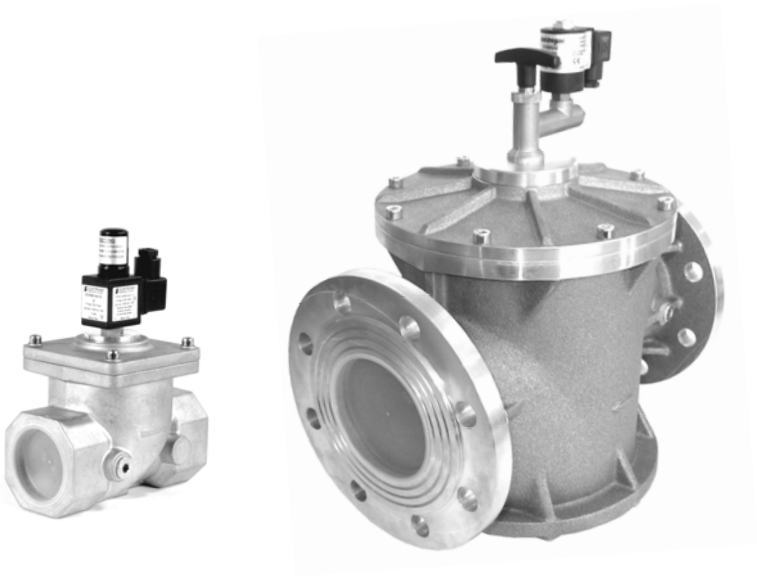
elektrogas
SOLENOID VALVES



EVRM-NA
EVRM-6NA

Safety solenoid valves for gas
Manual reset - Normally open
DN10 … DN200

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Contents

Description

The EVRM-NA /6NA type valve is a manual reset safety valve that is normally open. The closing function is electrically activated. 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.

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

The valves are normally not powered allowing a remarkable energy saving.

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). Flanged models are provided with gauges in the outlet chamber too. Other gauge points on request.

Provided with G1/8 connection on the bottom for closed position indicator micro switch from DN65 to DN200 (on request from 3/4" to 2").

The encapsulated coil is provided with ISO 4400 plug and suitable cable gland to avoid water and dirty contamination, allowing a safe outdoor installation.

Pipe connections meet group 2, according to EN161 requirements.

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-NA /6NA type valve is a manual reset safety valve that is normally open. A manual operation is therefore necessary to open the valve and to reset the mechanism consenting to maintain this state. The powering by means of line current and/or condenser discharge, induced by the leakage detector, safety thermostat or alarm system causes driving of the mechanism and consequent closing of the gas orifice. If energizing of the sensor persists because of the presence of gas, the valve remains under power and does not allow reset. When the causes for locking have been eliminated, valve must be opened manually.

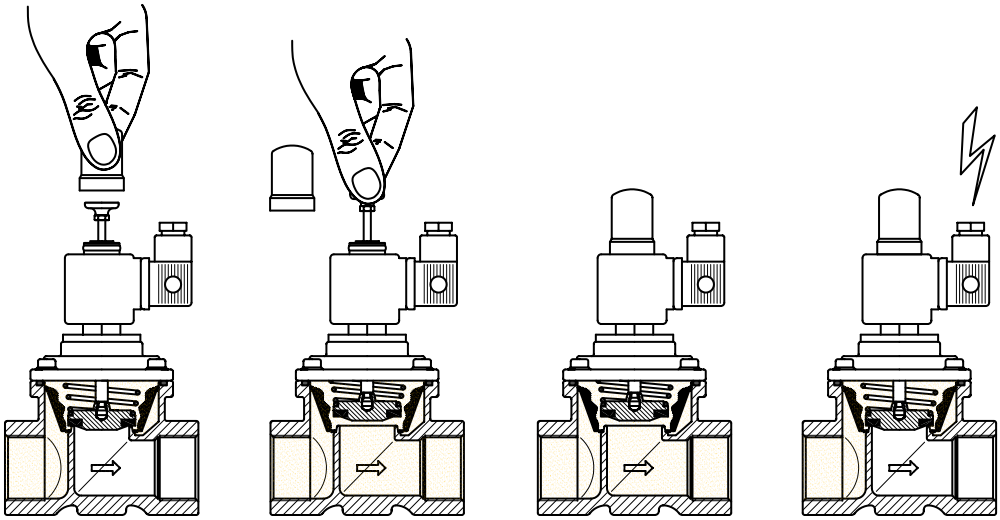


Fig.1

The /6NA 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.

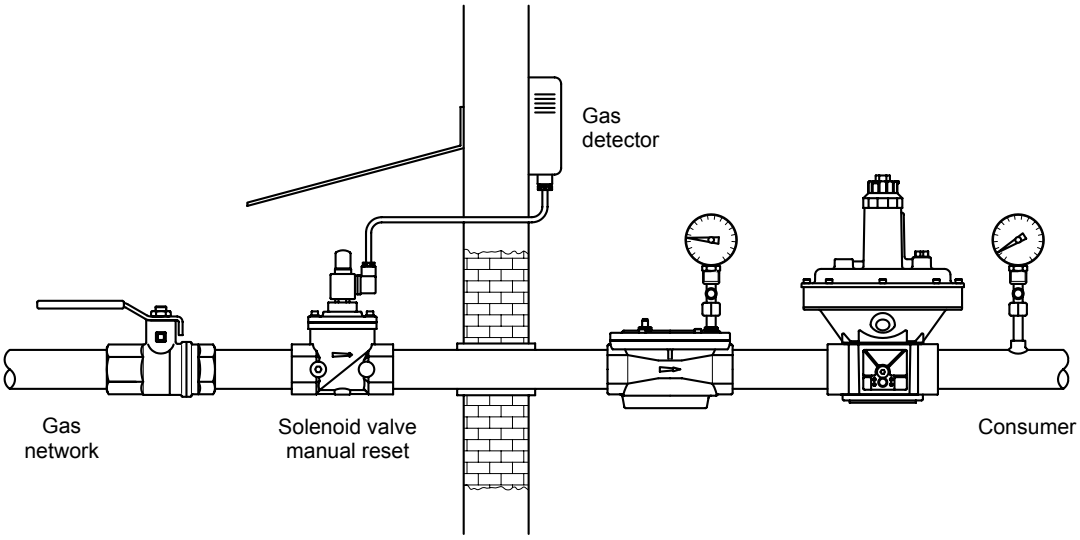


Fig.2

WARNING

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

Accessories and optionals

A fine mesh filter is provided, to prevent dirty contamination of the seal seat. However, an external strainer must be installed upstream of the valve. Brass models are available without internal filter only.

Inlet pressure chamber is provided with bilateral G1/4 gauges, to connect manometers, pressure switches, leakage tester or other gas equipments. Flanged models are provided with gauges in the outlet chamber too. Brass models are available without gauges only.

Models from DN65 to DN200 are provided with G1/8 connection on the bottom for closed position indicator micro-switch (on request from 3/4" to 2"). To install the micro-switch the installing kit must be required.

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

All the valves may be provided with Ex-proof marking in accordance with the 94/9/EC Directive, for use in Zone 2.

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; 24 VDC 12 VDC
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	IP54 (EN 60529)
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) Polytetrafluoroethylene (PTFE)

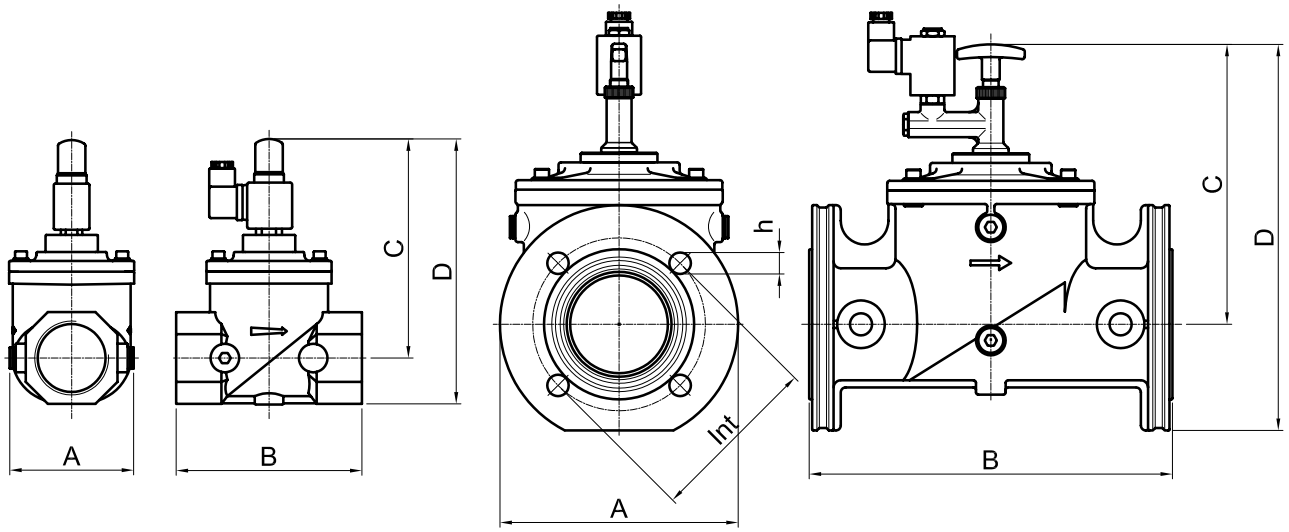


Fig.3

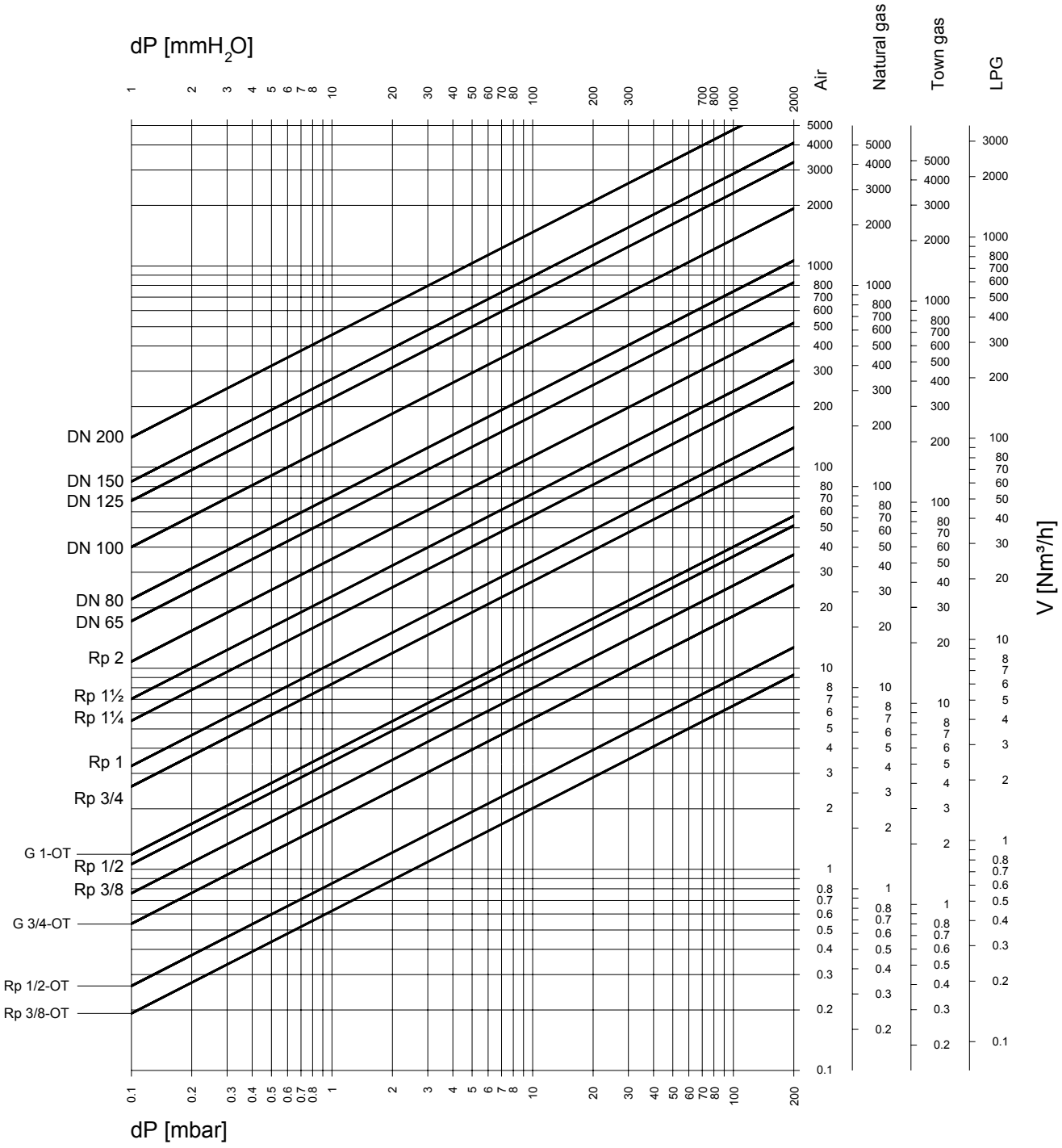
Tab. 2

Material and Connections		Power Consump. @230VAC	Flow factor Kvs	Overall dimensions [mm]						Weight
CuZn	AlSi	[W]	[m³/h]	A	B	C	D	Int	h	[Kg]
Rp 3/8		16	0,7	30	58	115	130	-	-	0,4
Rp 1/2		16	1,0	30	58	115	130	-	-	0,4
G 3/4		16	2,0	35	55	113	130	-	-	0,6
G 1		16	4,5	40	62	115	137	-	-	0,7
	Rp 3/8	16	2,9	70	77	130	148	-	-	0,6
	Rp 1/2	16	4,0	70	77	130	148	-	-	0,6
	Rp 3/4	16	9,5	85	96	138	165	-	-	0,8
	Rp 1	16	12,0	85	96	138	165	-	-	0,8
	Rp 11/4	16	20,0	120	153	170	203	-	-	1,6
	Rp 11/2	16	26,0	120	153	170	203	-	-	1,6
	Rp 2	16	40,0	106	156	175	213	-	-	1,9
	DN 40 ([1])	16	26,0	150	193	170	245	110	4x18	3,3
	DN 50 ([1])	16	40,0	165	196	175	257	125	4x18	3,9
	DN 65	19	63,0	200	305	260 ([2])	350 ([2])	145	4x18	8,2
	DN 80	19	80,0	200	305	260 ([2])	350 ([2])	160	8x18	8,2
	DN 100	19	148,0	252	350	280 ([2])	410 ([2])	180	8x18	16
	DN 125	19	250,0	310	460	330 ([2])	500 ([2])	210	8x18	28
	DN 150	19	315,0	310	460	330 ([2])	500 ([2])	240	8x23	30
	DN 200	19	516,0	370	546	380 ([2])	590 ([2])	295	12x23	45

([1]) Optional kit ([2]) Valve open

Gas flow chart

(Pressure drop)



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 Nm^3/h there is a pressure drop Δp = 5 mbar.
If we consider that 80 m^3/h is the flow at 200 mbar of inlet pressure, then the pressure drop to be consider is:

$\Delta p = 5x(1+0,2) = 6$ 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 [Nm^3/h]
Kv = flow factor [m^3/h]
ρ = density [Kg/m^3]
p_1 = absolute inlet pressure [bar]
p_2 = absolute outlet pressure [bar]
Δp = differential pressure p_1-p_2 [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 unadvisable
- Flow velocities w ≤ 15 m/s are recommended and w > 50 m/s are always unadvisable.

Ordering information

Tab.4

Designation (230VAC)		Connections	Additional code for special voltages				
600 mbar	6 bar		110 VAC	24 V AC/DC ([2])	24 VDC-22W	12 VDC-12W ([3])	12 VDC-22W
EVRMNA0O	EVRM6NA0O	Rp 3/8 brass	B	C	GW	H	HW
EVRMNA1O	EVRM6NA1O	Rp 1/2 brass					
EVRMNA2O	EVRM6NA2O	G 3/4 brass					
EVRMNA3O	EVRM6NA3O	G 1 brass					
EVRMNA0	EVRM6NA0	Rp 3/8					
EVRMNA1	EVRM6NA1	Rp 1/2					
EVRMNA2	EVRM6NA2	Rp 3/4					
EVRMNA3	EVRM6NA3	Rp 1					
EVRMNA35	EVRM6NA35	Rp 1¼					
EVRMNA4	EVRM6NA4	Rp 1½					
EVRMNA6	EVRM6NA6	Rp 2					
EVRMNA4F	EVRM6NA4F	DN 40 ([1])					
EVRMNA6F	EVRM6NA6F	DN 50 ([1])					
			110 VAC		**24 VDC**	**12 VDC**	
EVRMNA7	EVRM6NA7	DN 65	B	–	G	H	–
EVRMNA8	EVRM6NA8	DN 80					
EVRMNA9	EVRM6NA9	DN 100					
EVRMNA93	EVRM6NA93	DN 125					
EVRMNA95	EVRM6NA95	DN 150					
EVRMNA98	-	DN 200					

([1]) Optional kit ([2]) DC operation with impulse only ([3]) Provided with different mechanical parts (not interchangeable)

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.

Example:

EVRM**6**NA3.**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 are 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 (Fmax), torque (Tmax) and screws driving torque (Cmax), according to EN161.

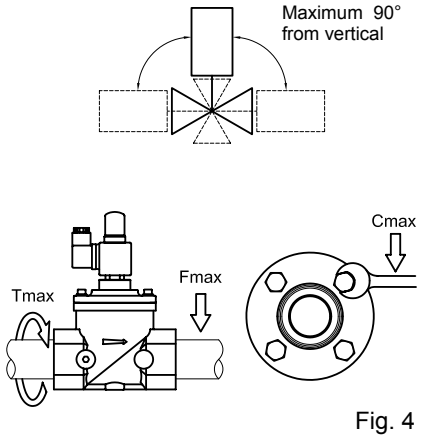


Fig. 4

Tab. 5

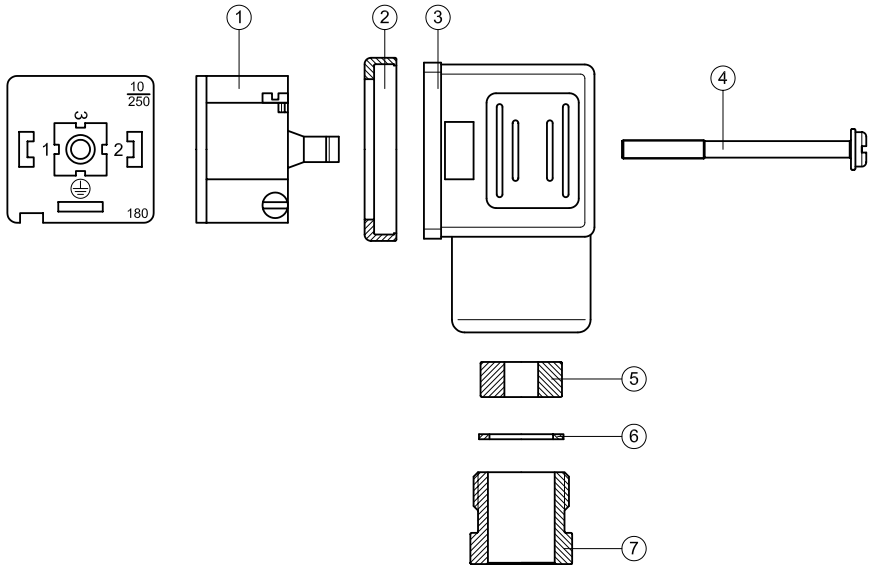
Connections	Fmax (Nm) t<10 s	Tmax (Nm)	Cmax (Nm)
Rp3/8	70	35	-
Rp1/2	105	50	-
Rp3/4	225	85	-
Rp1	340	125	-
Rp1¼	475	160	-
Rp1½ DN40	610	200	50
Rp2 DN50	1100	250	50
DN65	1600	-	50
DN80	2400	-	50
DN100	5000	-	80
DN125	6000	-	160
DN150	7600	-	160
DN200	7600	-	160

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 terminal block (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 board terminals according to printed designation.
- Pull back the cable and insert the terminal block 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.



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 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 the closing function.

INTERNAL INSPECTION

If the valve does not work properly, do not dismount the resetting mechanism, but replace it with a new one.

THREADED MODELS

- Shut ball valve upstream the system and make sure no pressure is inside the valve.
- Reset the valve (valve open).
- Unscrew the knob, but do not remove the nut below. This is to avoid the accidental dismounting of the resetting mechanism.
- Remove the locking nut and the coil.
- Using an Allen key, remove the screws on the upper flange, in cross way. The gas in the valve will come out during this step.
- Check the main O-ring. If necessary, replace it.
- Blow the spring with compressed air and check it is corrosion free.
- Check the conditions of the sealing gasket. 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 and blow it with compressed air.
- Reassemble the valve following the inverse sequence.

FLANGED MODELS

- Shut ball valve upstream the system and make sure no pressure is inside the valve.
- Unscrew the knob.
- Using an Allen key, remove the screws on the upper flange, in cross way. The gas in the valve will come out during this step.
- Check the main O-ring and the rod O-ring. If necessary, replace them.
- Remove the spring and blow it with compressed air. Check the spring is corrosion free.
- Clean the disc assembly with a clean cloth and compressed air. Grease the rod O-ring.
- Check the conditions of the sealing gasket. 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 and blow it with compressed air.
- Reassemble the valve following the inverse sequence.

To insert the rod inside the flange assembly, power the coil and, using a screw driver, move the pin to allow the rod inserting.

When the reassembly is completed, check the proper 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 and compressed air.

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.

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.