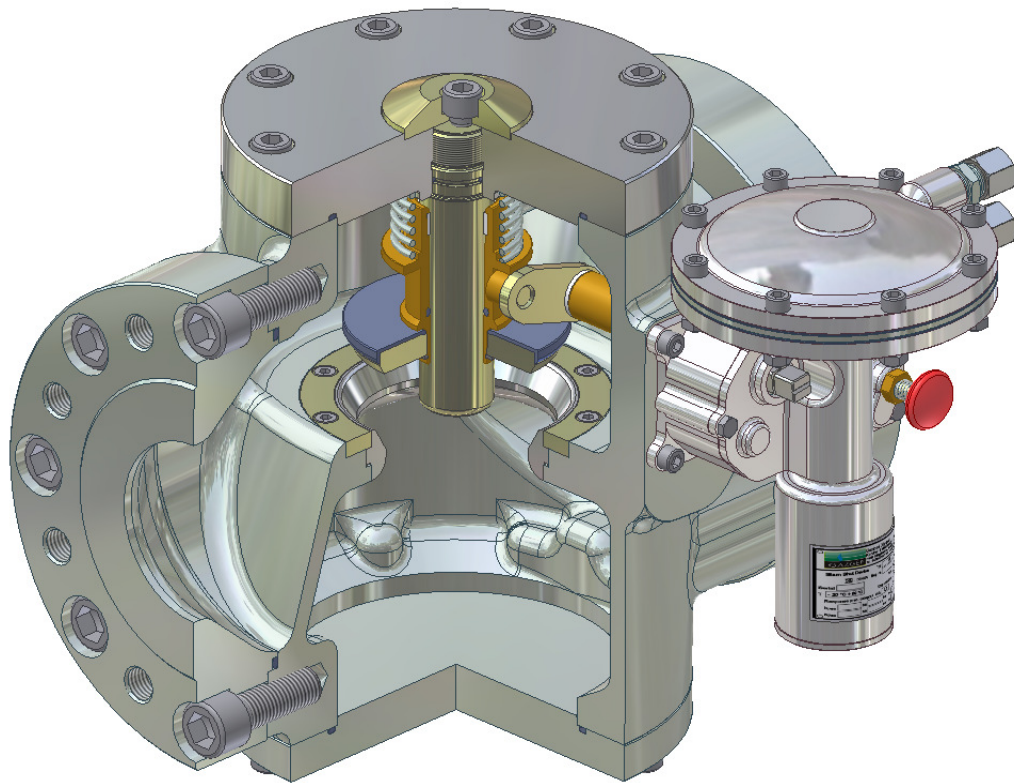




Manual for operation and maintenance

CITYSTOP CS



Safety shut-off valve The Experts in Energy Supply



Code: N40-000A.02k

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Marking, Type:

HEAT contract No.:

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1. INITIAL REMARKS

This manual serves for operation, maintenance, shipping, storage, installation, and commission of gas pressure regulator. The user and the operating staff should be aware of it.

The GÁZGÉP Ltd. does not take the responsibility for damages caused by disregard of manual for operation and maintenance.

This operation and maintenance manual is needed not only as a basic for the operation but together with all of the accompanying drawings data is an addendum for the contract of services. The instructions applied over here are based on our experiences excludes the full description of safety operation of equipment. Therefore, the user is obliged to do an adequate jeopardy analysis for the application of the gas pressure regulator.

In case of disruption or doubt emerges regarding the instructions of technical, organizational or legal, please, contact with the manufacturer. It refers to the designed application as well. In conformity with it, the GAZGÉP Ltd. place itself at the equipment owner or user's service.

The sufficient training of the operation of the gas pressure regulator / equipment should be organized and its execution with the names of the participants shall be fixed in written form. This operation and maintenance manual assumes that only well trained and experienced staff can implement well the planned work. Only professional staff is allowed to do all the installation, operation processes on the pressure device.

This operation and maintenance manual does not absolve the user/owner/manufacturer of the gas pressure regulator from the responsibility of safe operation of the equipment.

The user/owner/manufacturer of the gas pressure regulator shall meet the requirements of the relevant legal regulations, and trade-corporations, environment protection, guidelines of prevention of accidents and the operational manual as well.

Changes and repairs during the warranty time can be executed only by negotiation and the prior written consent of the GÁZGÉP Ltd. Exemption is the case of emergency and if with the intervention bigger damages can be prevented.

The gas pressure regulator can be used only for the purposes, which are determined by essential data included in the contract of service on valid drawings.

We do not take it to a potential ignition source, during its normal operation by meeting the requirements of the contract of service/description / drawing / limit values of the data plate. Its basic condition to avoid the occurrence of air / air-gas mixture during the operation in the inside space, and the flushing the pressure device with neutral gas prior to opening it and neutralizing all connecting parts by bringing them to the same potential with the equipment.

The accessories installed by other manufacturer can be the potential source of ignition so they have to be subjected of new analyses of risk, according to the TEX.

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2. GENERAL

The slam shut device **CITYSTOP** was specially developed for communal and industrial applications. It is suitable for safety shut-off of non aggressive gases from up to 20 bar pressures, independently of variations of pressure and gas flow.

Due to its high flexibility regarding pressure ranges, K_G values, design alternatives and connection possibilities, it is also suitable for dynamic control applications, such as burners in furnaces.

During the arrangement and dimensioning of the gas pressure regulator among others, we applied the following standards:

**EN 334, EN 14382
DIN 3840**

2.1. The advantages:

- Pressure range up to 40 bar
- Set ranges 0,005 – 6,0 bar
- Inlet- and outlet flange is variable See Table 1
- Service friendly application

3. THE GAS PRESSURE EQUIPMENT DESCRIPTION

3.1. Designation:

Proper usage: preparation of gases with conformance to the operation conditions inside the determined limits. The regulator is designed according to the 97/23/EG, in accordance with the pressure equipment directives and designed, built up and tested by the Standard the D-2000.

3.2. Data for the gas pressure equipment:

Spring loaded, with controll-device operated gas safety shut-off valve SSV

3.3. Marking:

See on the equipment

3.4. Shipping size:

- Safety shut-off valve
- acceptance declaration
- operation – and maintenance equipments

4. DESIGN PARAMETERS

4.1. Operation conditions:

See a service contract

4.2. Special design parameters:

See in service contract

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5. TECHNICAL DETAILS

Max. operation pressure:	40	bar
Device connection:	PN 16/PN25/PN40	EN1092-1
Optionally:	class 150 RF, class 300RF	ANSI B 16.5
Details are in Table 1.		

Safety shut-off valve set ranges:

who:	0,013 ÷ 6,0	barg
whu:	0,005 ÷ 3,5	barg

SSV- accuracy group:

Upper limit (who)	AG 2,5
Lower limit (whu)	AG 5

Material quality:

Body:	steel cast,	G20Mn5 - EN 10213-3
Connections:	steel	P265GH - EN 10028-2
Inside parts:	steel	aluminium, brass alloy
Diaphragm:		EFFBE 7010 N AG 550-0.7 AF
Seals:		NBR70, B2/H3 EN 549

Medium : non aggressive gases non - compensating on operation pressure temperature, natural gas, odorized natural gas and propane gas.

Medium temperature: 0 ÷ +30 °C

Temperature range: -20 ÷ +60 °C

Optionally: -30 ÷ +60 °C

Connection sizes: See Table 1.

Installation position:

The plain of the diaphragm is horizontal

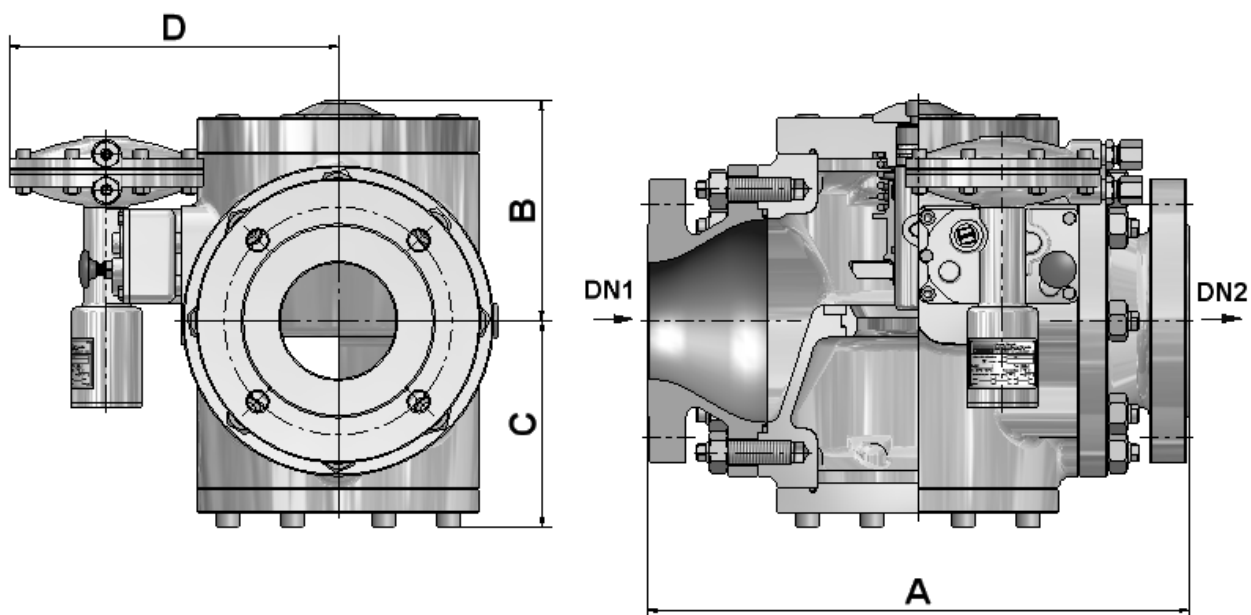


Figure 1. (Sizes See: Table 1.)

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Table 1

Type	KG	Conn. size	DN1 / DN2	Length		Height		D
				PN16	PN 25/40	B	C	
				A				
CS 15	200	1	25 / 25	184	197	65	65	180
		2	25 / 40	203	216			
		3	25 / 50	219	232			
		4	25 / 80	241	257			
		5	40 / 40	222	235			
		6	40 / 50	238	251			
		7	40 / 80	260	276			
		8	50 / 50	254	267			
		9	50 / 80	276	292			
		10	80 / 80	298	317			
CS 25	450	1	25 / 25	184	197	95	93	189
		2	25 / 40	203	216			
		3	25 / 50	219	232			
		4	25 / 80	241	257			
		5	40 / 40	222	235			
		6	40 / 50	238	251			
		7	40 / 80	260	276			
		8	50 / 50	254	267			
		9	50 / 80	276	292			
		10	80 / 80	298	317			
CS 40	1150	1	40 / 40	222	235	110	103	197
		2	40 / 50	238	251			
		3	40 / 80	260	276			
		4	50 / 50	254	267			
		5	50 / 80	276	292			
		6	50 / 100	303	317			
		7	80 / 80	298	317			
		8	80 / 100	325	343			
		9	100 / 100	352	368			
CS 80	4500	1	80 / 80	298	317	150	135	221
		2	80 / 100	325	343			
		3	100 / 100	352	368			
		4	80 / 150	374	395			
		5	100 / 150	401	421			
		6	150 / 150	451	473			
CS 100	6000	1	100/100	352	368	160	145	233
		2	80/150	401	395			
		3	100/150	448	421			
		4	150/150	451	473			
		5	150/200	497	521			
		6	200/200	543	568			

Table 2

Type	d (mm)
CS 15	19
CS 25	35
CS 40	48
CS 80	82
CS 100	98

Table 3

Type	h (mm)
CS 15	5,5
CS 25	9
CS 40	12
CS 80	17,5
CS 100	22

5.1. Structure and operation of the safety shut-off valve

Table 5, 6. indicate the controller of the safety shut-off valve. The safety shut-off valve diaphragm is located between the upper and lower diaphragm house (1,2). The outlet pressure (pd) connecting to the straight cutting ring screw (3) through a steel pipe (8 x 1 mm). This connection leads the gas into the house over the diaphragm. The space between the lower diaphragm house (2) and the diaphragm connects to the atmospheric pressure space. For safety reasons, this space connects with a cutting ring screw (4) through a steel pipe (8x1) to the vent line of the pressure reducing station. At the build up of the breathing line, the regulation should be applied referring to the installation.

The safety shut-off valve can be opened only manually. It takes place with a lifting arm, fixed onto the 5. component. On the latch hose (5) there is resetting equipment, which hinders the safety valve getting into open position until the outlet pressure achieves the allowed adjusted value.

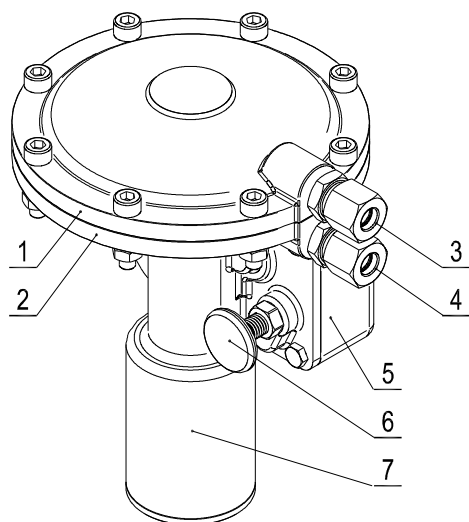


Figure 2.

connected to the valve rod (8) with a bolt (7). The bushing (9) slides the valve rod in axial direction. The force affected on diaphragm, through the valve rod, puts forth onto the spring block (14). The spring block in the spring guide (13) can move freely – but it has a back up part which blocks the valve rod in extensive axial movement. The check springs (12,15) are located in side and outside of the spring guide. The value of the upper releasing can be adjusted by an adjusting bolt (11, outside). The releasing value in case of lack of pressure is adjusted by another adjusting bolt (16, inside). If the pretensions of the springs are increased by the adjusting bolts, then the releasing values grow as well.

In case of necessity, by pushing the button of the safety shut-off valve (6) it instantly can be released and lock.

In the cylindrical spring house (7) there are two springs to adjust the upper and lower safety shut-off valve values. The sectional drawing of the device is shown by Figure 3.

The safety shut-off valve controller hinders the closing movement until the releasing takes place because of the exceeding or too low adjusted nominal value. The safety shut-off valve seat segregates from the valve seat of the gas pressure regulator. The safety shut-off valve-mechanisms closing movement has no mechanical connection with the gas pressure regulator valve (valve rod). Both equipments operate separately.

As we have already described, the upper diaphragm house cap (1) and the lower diaphragm house cap (2) there is a diaphragm. The diaphragm disc (6) is

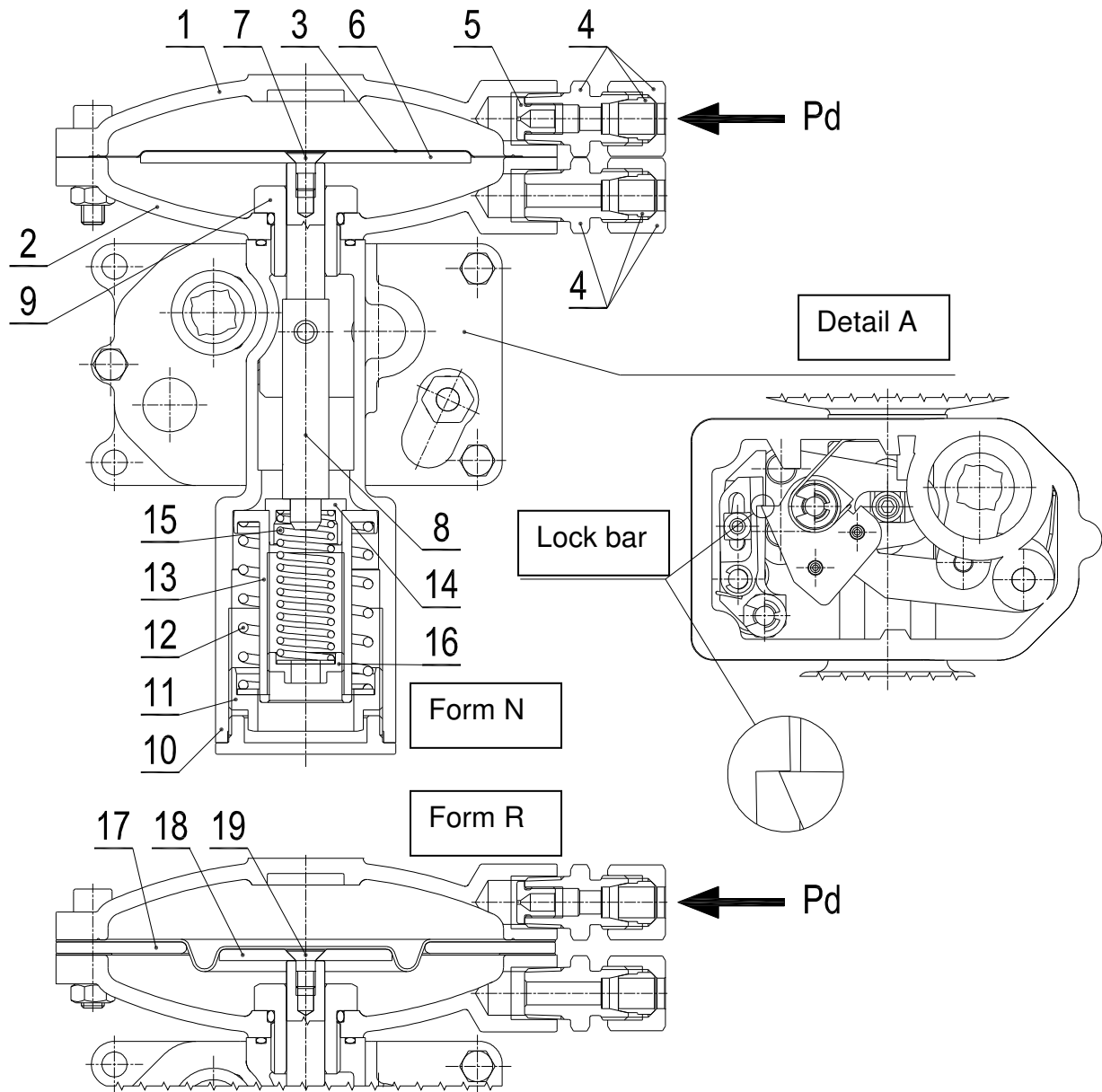


Figure 3.

Based on the releasing values to be chosen, the actuator can be manufactured in two designs N- or R. In this way the following switching limits are arisen:

Table 4 – Switching limits

Draw variation	Switching limit (mbar)	
	Lower	Upper
N	5 ÷ 270	13 ÷ 900
R	150 ÷ 3500	700 ÷ 6000

5.2. The operation of the safety shut-off valve controller

There is outlet pressure (pd) over the space of the diaphragm. The force originated on the on diaphragm disc shows downward. Opposite there is the force of the springs (12,15) originated from the pretension, showing upward vertically. If the pressure (pd) changes, the valve rod moves in vertical direction. The releasing load transmission on Figure 3. (The detail) can be seen. If pressure higher or lower than the permitted one, then the displacing valve rod (8) releases the latching, the roller holding the locking device (Figure 4, 4) discharges. The closing spring closes the closing element to the valve seat.

The upper and lower nominal value of the safety shut-off valve is resulted by „harmonic” spring setting (12,15). We should pay attention to the followings:

- If the outlet pressure increases, then the spring block (14) and the spring guide (13) displaces – both springs press. Thereby – to achieve the proper adjustment of the upper limit value - both springs have to be prestressed.
- If the outlet pressure decreases, then the valve rod moves vertically upward. The spring guide (13) butts on the house of the actuator (10). The further upward movement is activated by the stressing force of the inside spring (12). The safety shut-off valve lower nominal value setting is taken place by the pretension of the smaller spring (12).

Figure 4. demonstrates the safety shut-off valve and the lever in opened position. Figure 4. – with the help of the axonometric image –it makes more understandable the pervious operation description:

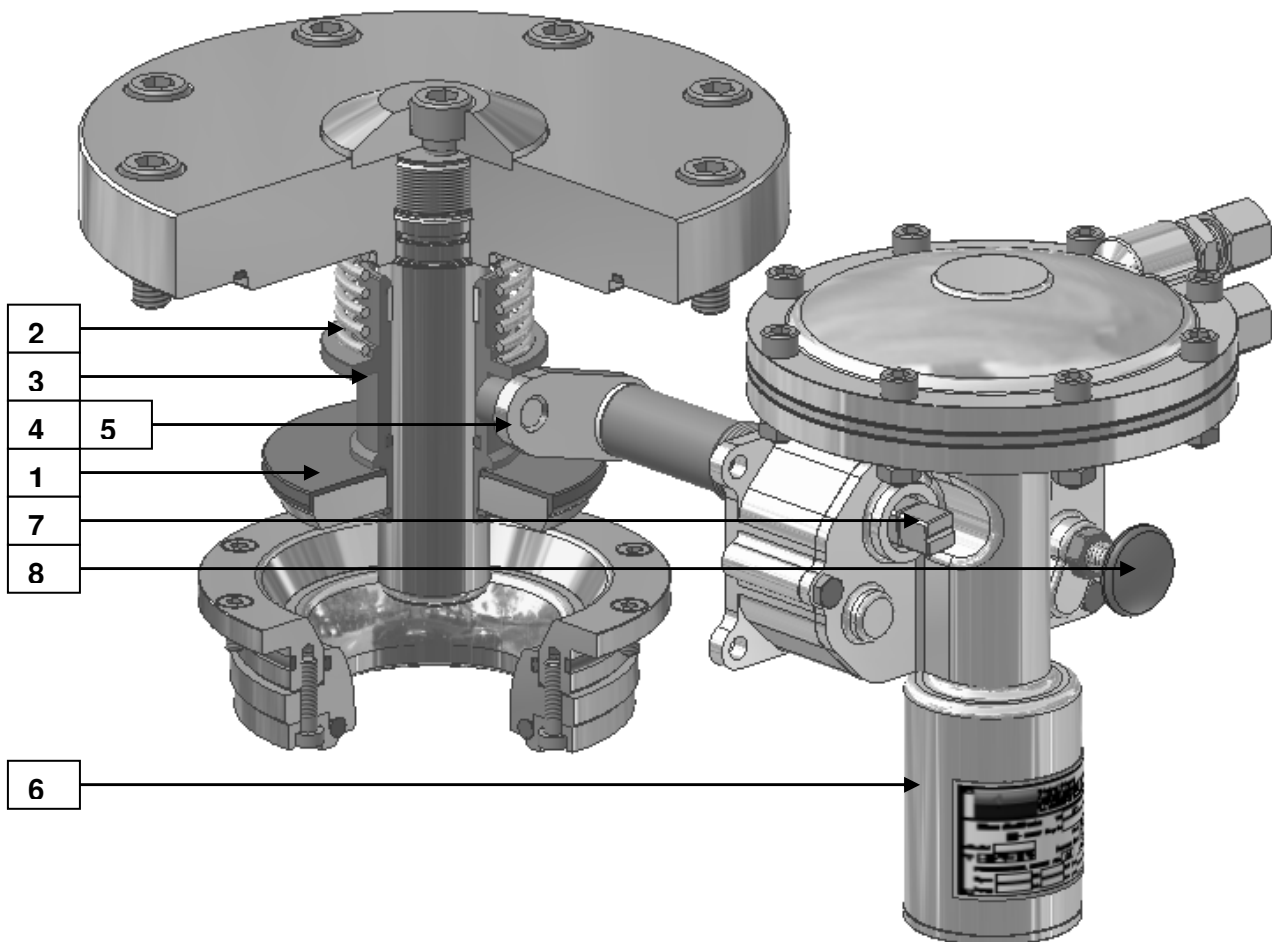


Figure 4.

The power of the closing spring affects (2) through the closing bush (3) onto the disc of the safety shut-off valve (1) in closing direction. The closing is blocked by the roller (4) until the safety shut-off valve latched. If a safety shut-off valve releases, the exe turns the way so the roller leaves the blocking position and the closing of the valve disc happen without any outside effect. Turning of the tap could be taken by pushing of the releasing button (8) manually from outside.

For the repeated opening of the safety shut-off valve there is a lever (7).

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6. ASSEMBLING

6.1. Conditions of assembling

The equipment should be set up the way, so as not to endanger any persons and other equipment. The necessary safety distance shall be kept according to the legal regulations of the given country.

Prior to the first commissioning, the bolts of the flanges and other screw connections, shall be checked anyway, as they may loosen during the shipment.

The gas pressure equipment shall be set up and assembling so that:

- During the necessary checking and inspections it shall be accessible and visible from each side, adjustable and maintainable.
- The data plate shall be recognizable.
- The handling of the accessories of the device from one place shall be possible.

The gas pressure equipment shall be protected from outside mechanical exposures so that damages not to emerge.

The gas pressure equipment and its accessories shall be protected unauthorized persons.

The data of the equipment (outside parameters) shall be compared with the data being on the data plate. **If there are significant differences between the dimensioning data, e.g. design pressure p_s , temperature t_s , etc. the equipment shall not be installed.**

The CS gas pressure equipment shall be built in the pipe line so that the diaphragm be in horizontal position.

A gas filter shall be installed in front of the gas pressure regulator with the fineness of min. $3 \mu\text{m} / 99,9 \%$. If there is no filter, then the purity of the inlet gas shall meet the above requirements.

The space under the gas pressure regulator diaphragm and the space over the safety shut-off valve diaphragm shall be connected such a pipeline section in which the gas flow is ordered and there is a stable outlet pressure.

The impulses lines shall be kept rust free and other contamination. The impulses lines should be connected preferably in one point at least 3-5 DN2 distance on the outlet side (recommended: 4D).

According to the legal regulations of certain countries, the application of bypass pipeline with the inherent closing valve is forbidden or can be used with determined conditions. The safety blows off valve is needed for the leaking gas volume to be reduced, shall or can be installed according to the legal regulation of the given country. Safety blow off, breather and pressure reducing pipelines basically can be led outdoor but only to safe place. The vent pipelines connected to the safety shut-off valve and regulator cannot be led together in other ones.

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6.2. Connection of gas pressure equipment

The gas pressure equipment shall be connected to the designed stubs and joining. Accessory forces, bending - torsion moment and resonance cannot be allowed on connection stubs.

6.3. Installation of the gas pressure equipment

The gas pressure equipment shall be supplied in each case with safety devices (e.g. safety shut-off valve, safety valve, safety blow off valve, etc.) or MSR – which are important from the view of safety.

7. SHIPPING AND STORAGE

The gas pressure equipment can be shipped only in stress-free and safe conditions.

The applied packing it should be ensured to protect it from mechanical exposure and condense water.

Each opening e.g. impulses lines, stubs, flanges etc. shall be closed with the appropriate means and only skilled person remove them.

ATTENTION: Sealing surfaces, gripping ring -, cutting ring connections cannot suffer any injuries, so they shall be checked!

8. COMMISSONING

The commissioning can only be executed, if the gas pressure equipment is:

- Supplied with the adequate safety devices, the lay off conditions were taken into consideration and regarding the safe operation, they were checked.

During operation with gas, the leakage test is recommended on operational pressure or with the max. 1,1 times of the design pressure (or max 1,1 ps) followed by the mounting, if it is needed, with the all apparatus.

- it is connected to clear non-contaminated pipeline and/or the above described filter is built in
- it has been built in the allowed position
- checked , followed by its setting. The gas pressure equipment is adjusted in advance as well as the safety shut-off valve.

In case of double line equipment (operating-/ spare one) at first, the stand-by section start is recommended on lower nominal outlet pressure. It should be followed by the commissioning of the working one on higher value.

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Prior to the commissioning of the gas pressure regulator, it has to be ensured that the inlet- and outlet equipments and the bypass line should be closed and the gas temperature shall be appropriate (condensation /ice formation).

ATTENTION!

Only skilled worker is allowed to do the commissioning, in case of the first unclear situation, the gas pressure equipment shall be stopped at once and the inlet device shall be closed, followed by the outlet one and through the vent/releasing line shall be depressurized.

Noticing any leakage, the equipment shall be put out of service at once and the leakage has to be eliminated.

The operator of the equipment is responsible for the test prior to the commissioning and the instructions referring to the commissioning shall be complied.

If there is any uncertainty prior to the commissioning test the manufacturer or the recommended service shall be involved.

8.1. General instructions

The operator of the gas pressure equipment can operate it with its accessories with the help of skilled and trained staff, and inspect it, so that the employee or third person not to be endangered. All protection zones have to be taken into consideration. The operator shall make instructions for the operator's staff and maintenance staff as well about the safe operation of the gas pressure equipment, containing the necessary instructions.

The valid legal regulations of the given country referring to the commissioning and operation shall be complied.

8.2. Unprofessional usage

If any danger emerges during the operation e.g. unforeseeable reaction flow or other outside dangerous exposure, then the necessary counter arrangements shall be brought and may put out of operation of the gas pressure equipment.

The special examination of the gas pressure equipment is necessary, if during the operation or in case of operating trouble (registered, or probably) the permitted pressure exceeds significantly, or the operating temperature remarkably increases, or drops, or the gas pressure equipment or its any parts suffer damages.

In this case, please, make contact with the manufacturer or the authorized service.

9. MAINTENANCE

9.1. General data

All of the necessary arrangements regarding the inspection, maintenance shall be complied with the legal regulations of the given country.

9.2. The maintenance and the inspection of the gas pressure equipment

The gas pressure equipment shall be regularly maintained by the skilled staff so that it should keep its tightness during its operation with the expected mechanical, chemical and thermic loads. Correspondently with the operational conditions and experiences, the operator with the help of the operational instructions can determine the necessary maintenance and inspection arrangements.

The inspectoral and maintenance works include:

- The checking of the gas pressure equipment and its safety devices with the connecting cables prior to and during the operation, according to the frequency of the maintenance intervallums. The tightness (outside/inside), the releasing values, the setting, the validity shall be checked by one examination.

Specially

- tightness
- installation conditions and protecting zones
- marking
- safety and maintenance equipment proper operation mode
- in case of corrosion the wall thickness inspection.

In addition to, repeated exams and inspections can be necessary demanded by the national standards and legal regulations and directives.

9.3. Repairments

All damaged closing element e.g. worn out, cracked, and twisted bolts, plated bolts, broken out or other way damaged nut, twisted fasteners or straps, damaged seals are not allowed to use and shall be changed for the same type.

Actually, all parts which seem to be damaged visually, or its operation indicates any kind of damages shall be changed for an original new one. It is the only way to keep the warranty and the whole operation – from the view of safety.

Each damaged element, which seems to be necessary for the safe operation of the gas pressure equipment, shall be repaired. In individual cases, information for replacement can be asked from the manufacturer.

10. LIST OF THE QUICK WEARING COMPONENTS

The Figure 5. as well as Tables 5-6. contain the details of the needed components of the safety shut-off valve.

In case of order of quick wearing components, the following data are needed:

- type description
- production serial No.
- production Year

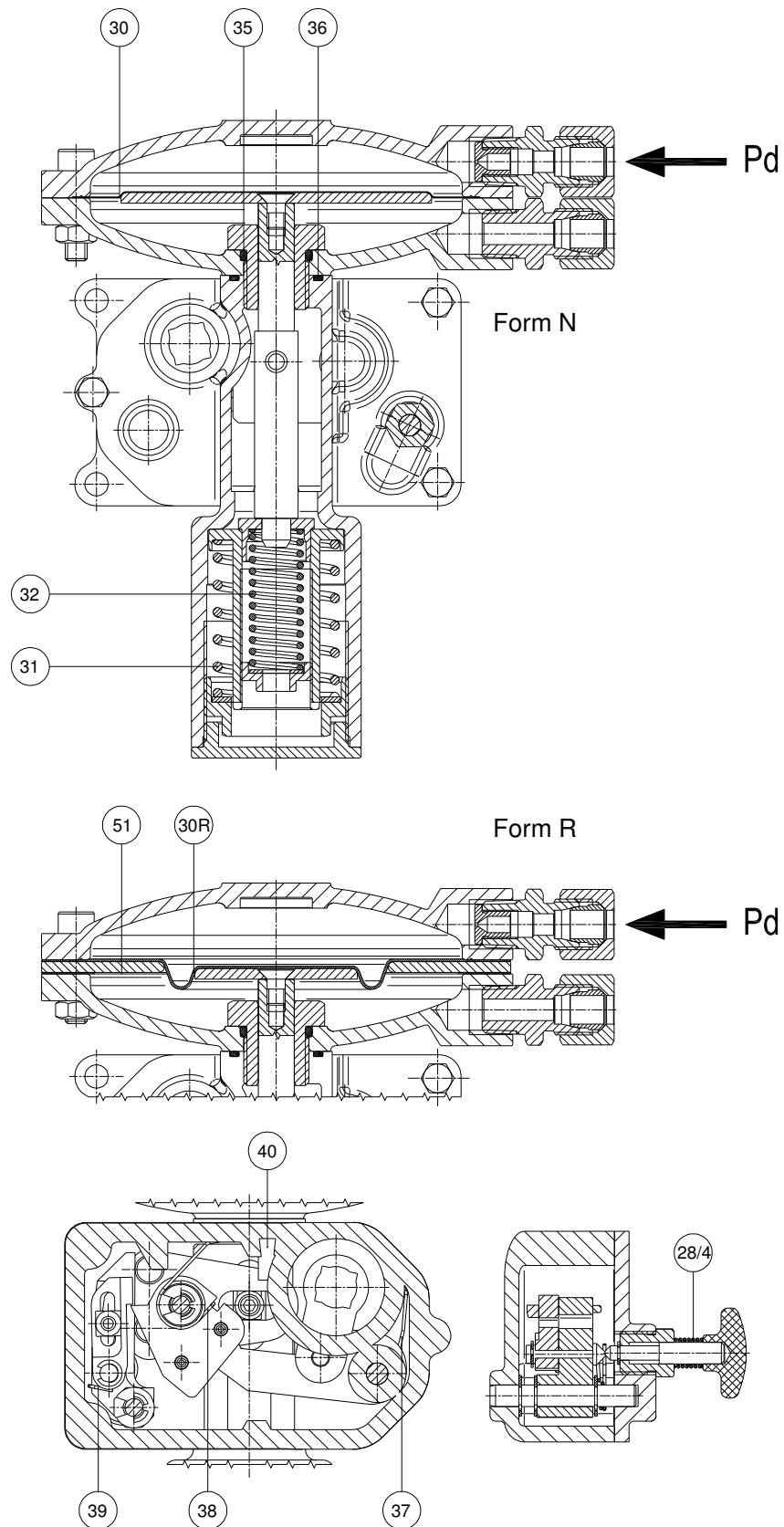


Figure 5

TABLE 5

Safety shut-off valve component list			E83-00-00-3 N	E83-00-00-3 R
I No.	Pcs	Item	Draw No. - PO No.	Draw No. - PO No.
28/4	1	Releasing spring	299-00-36-2	
30	1	Diaphragm	E83-00-30-0	—
30R	1		—	E83-0R-30-0
31	1	Spring	E83-0A OK-31-0, See Table 6.	
32	1	Spring	E83-0A OH-32-0, See Table 6.	
35	1	O ring	5656-1803-3020-1	
36	1	O ring	5656-1804-3079-1	
37	1	Cylindrical spring	E83-00-37-0	
38	1	Cylindrical spring	E83-00-38-0	
39	1	Cylindrical spring	E83-00-39-1	
40	1	Stop	5 x 15 x 12, NBR	
51R	1	Seal ring	—	E83-00-51-1

TABLE 6

Table of the Safety shut-off valve spring							
No.	Order No. 31. item	Outside Ø	Unloaded length	Wire Ø	Total thread No.	Upper releasing (Who) mbar	
						N form	R form
1	E83-0A-31-0	35	50	2,0	5,25	13 - 33	
2	E83-0B-31-0			2,2	4,40	25 - 50	
3	E83-0C-31-0			2,5	5,00	40 - 85	
4	E83-0D-31-0			2,5	3,50	65 - 145	
5	E83-0E-31-0			3,0	5,25	100 - 180	
6	E83-0F-31-0			3,2	4,50	150 - 270	
7	E83-0G-31-0			3,5	4,50	200 - 350	
8	E83-0H-31-0			3,8	4,50		700 - 1500
9	E83-0I-31-0			4,0	4,50	300 - 550	900 - 2000
10	E83-0J-31-0			4,0	3,50	500 - 900	1300 - 2800
11	E83-0K-31-0			5,0	4,50	850 - 1200	2500 - 6000

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No	Order No. 32. item	Outside Ø	Unload d length	Wire Ø	Total thread No.	Lower releasing (Whu) mbar	
						N Form	Form R
1	E83-0A-32-0	15	40	1,30	8,75	5 - 19	
2	E83-0B-32-0			1,50	8,50	15 - 50	
3	E83-0C-32-0			1,80	10,00	45 - 100	
4	E83-0D-32-0			2,00	8,50	70 - 140	
5	E83-0E-32-0			2,25	7,75	120 - 270	
6	E83-0F-32-0			2,50	6,00	250 - 600	150 - 1550
7	E83-0G-32-0	35	35	3,00	6,00	500 - 900	1000 - 2500
8	E83-0H-32-0			3,50	6,25		1800 - 3500

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11. REFERRED DOCUMENTS

**PED 73/23/EC
AD 2000
EN 334, EN 14382**

Austria:

Inspection manual for Safety Shut-off valves
Technical rules of pressure vessels (TRB)

ÖVGW - rules
Applicable ATEX - directive
and VEXAT directive

Germany:

DVGW - rules
Applicable ATEX - directive
and VEXAT directive

Other EU - countries:

97/23/EG No. Harmonized variations of pressure vessels.

Other countries:

For gas pressure regulators, safety devices etc. all other law, directives and important norm, and all important standard explosion-proof protection (among them applicable ATEX directive and VEXAT directive) can be applied.

GÁZGÉP Ltd.. HU - 8800 Nagykanizsa, Erdész utca 28.

www.gazgep.hu

Tel: + 36 93 537 140 , Fax: + 36 93 537 142

ATTENTION: Besides this operational manual, all of the necessary arrangements regarding the commissioning, operation, inspection, repairs and recommissioning, maintenance shall be complied.