

Technical User Manual



Gas Pressure Regulator

F Serie DN25 - DN150

Main Features



Direct-acting F Serie Gas Pressure Regulators According to 2014/68/EU Directive, EN334 and EN 14382

- Fail Open regulator
- Balanced valve
- Rugged construction for durability
- Wide pressure regulation range
- Full seal at zero flow
- Easy maintenance
- Optional minimum and/or maximum pressure slam-shut device
- Optional silencer internal and/or external
- With or Without SSV
- With electric position indicator SSV closed by an inductive proximity switch
- Internal Relief Valve
- Combined monitoring system
- Bypass system for to activate ssv easily

Technical Features

Maximum allowable pressure –PS	20 bar
Inlet pressure range –bPu	DN up to 4" 0.1 – 20 bar
	6" 0.1 – 10 bar
Outlet pressure range –Wd	DN up to 4" 15 – 4400 mbar
	6" 15 – 2000 mbar
Allowable temperature –TS ⁽¹⁾	-20 °C to +60 °C
Inlet gas temperature	-20 °C to +60 °C
Accuracy class –AC ⁽²⁾	up to AC 5
Lock-up pressure class –SG ⁽²⁾	up to SG 10
Nominal size –DN	DN25 1" DN40 1 1/2" DN50 2" DN65 2 1/2"
	DN80 3" DN100 4" DN150 6"
Connections ⁽³⁾	PN16, PN20 according to ISO 7005
	Class 150 RF according to ASME B16.5 and



⁽¹⁾ Low temperature version -40°C: available on request

⁽²⁾ Depending on working conditions

⁽³⁾ On request for other connection class

Metarials

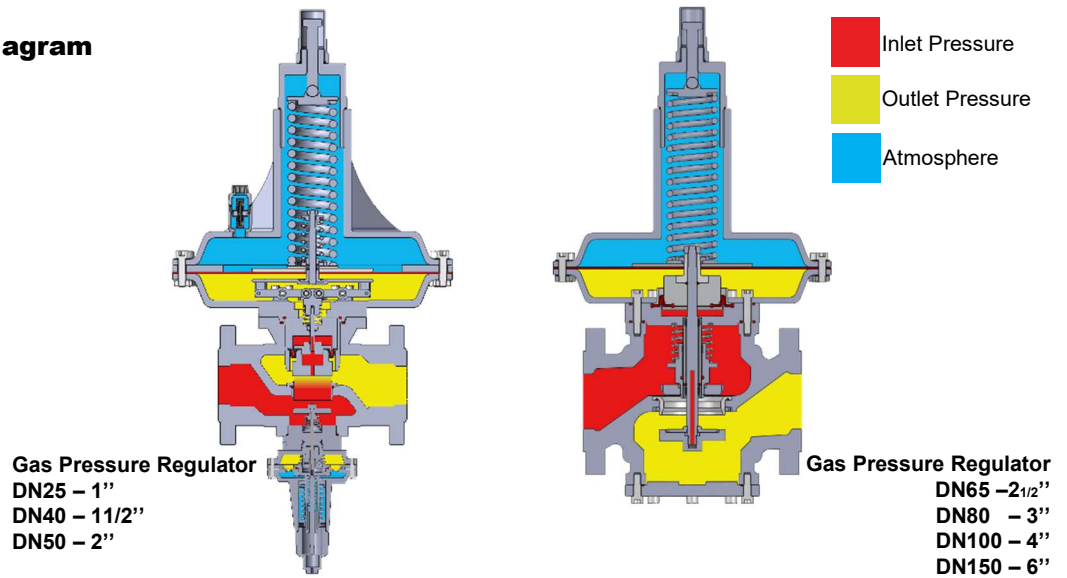
Body ⁽¹⁾	EN-GJS 500-7
Main Actuator ⁽²⁾	Ø210 – 280 mm Aluminium cast alloys
	Ø 380 mm Cast steel
	Ø 520 mm Aluminium cast alloys
Seat ⁽²⁾	DN up to 2" Brass
	DN up to 21/2" to 6" Stainless Steel
Internal Parts ⁽²⁾	Stainless steel and brass
Seals	NBR+canvas (powered by hot operation process)
Diaphragm	Synthetic rubber with fabric reinforcement

⁽¹⁾ A 216 WCB: available on request

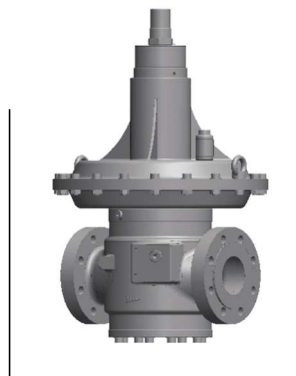
⁽²⁾ Other materials available on request

Gas Pressure Regulator, F Serie

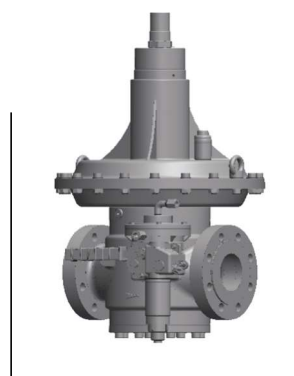
**Design,
Operational Diagram**



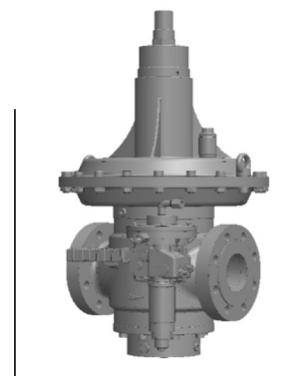
Configurations



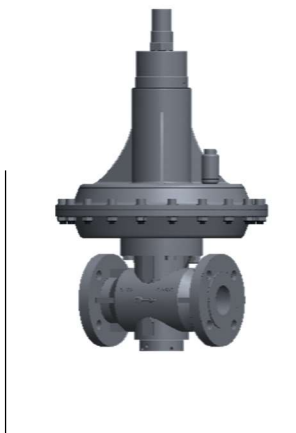
Gas Pressure Regulator
F65-150



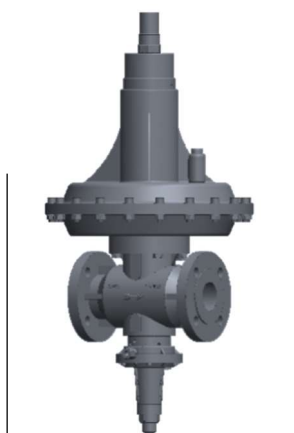
**Gas Pressure Regulator
with Slum Shut Valve**
F65-150/S Serie



**Gas Pressure Regulator
with Slum Shut Valve + Monitor**
F65-150M/S Serie



Gas Pressure Regulator
F25-50



**Gas Pressure Regulator
with Slum Shut Valve**
F25-50/S Serie



**Gas Pressure Regulator
with Slum Shut Valve + Monitor**
F25-50M/S Serie

Gas Pressure Regulator, F Serie

Change & revision history

Date	Page	Reason	Statement

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Safety and Safe Use

Warning Notes!

To safely use the equipment, observe the environmental conditions allowed and the data provided on the nameplate of the regulator and any accessories.

To avoid injury to persons, damage to property or the environment, the following warning notes must be observed!

Any opening of the valve, replacement of parts or modifications to the original product is the user's responsibility and is done at his own risk.

Caution!

- All activities (mounting, installation and service work, etc.) must be carried out by qualified staff.
- Ensure that the relevant national safety regulations are complied with.
- Any gas pressure regulator that experience a fall or shock must not be put into operation, as this can adversely affect the safety functions even if they do not exhibit any external signs of damage.
- Unsuitable gases or gas components lead to a loss of the safety shutoff function.
- It must not be possible for foreign bodies/particles to enter the gas pressure regulator, as this could have an adverse effect on the safety shutoff function.
- Gases with concentrations of >0.1% for H₂S and NH₃ are only permissible in connection with biogas version.
- Condensation is not permitted in the gas pressure regulator. If not observed, the safety functions are no longer ensured.
- In connection without slum shut valve, the gas pressure regulator must not be used as a safety device. Closing does not take place.
- The F serie gas pressure regulators are designed to withstand gas pressures up to 20 bar (DN150 is 10bar) in standby mode or working. At a pressure of 20 bar (DN150 is 10bar), the F serie gas pressure regulator remains safely closed or will safely work. If the maximum permissible operating pressure is exceeded, a valve shutdown must be initiated.
- The gas pressure regulator cannot be mounted or replaced while the gas valve is under pressure.
- The impulse pipe (pressure feedback) must be connected to the main outlet gas pipe, downstream from the gas pressure regulator observing a distance of at least 4 x the diameter of the main outlet pipe.
- The upstream and downstream pipes must be cleaned after being laid. Before commissioning, it is essential to ensure that no dirt particles have remained that could enter the gas pressure regulator.
- The slum shut valves supplied by Gastech may only be repaired by Gastech Repair Centers.

Summary of symbols, terms and units

The following table summarizes the symbols and relevant descriptions and unit considered in this chapter and/or used in this document. The symbols are listed in alphabetic order.

Symbol	Terms	Unit
AC	Accuracy class	%
AG	Accuracy group	%
bpu	Inlet pressure range	bar
d	Relative density of natural gas at actual conditions	/
DN	Nominal size	/
DS	Differential strength	/
Δp	Differential pressure	bar
Δp_{min}	Minimum operating differential pressure	bar
IS	Integral strength	/
KG	Flow coefficient	See definition
LpA	Sound pressure level	EN 61672-1
MIPd	Downstream maximum incidental pressure	Bar
p	Component operating pressure	Bar
pb	Atmospheric pressure (absolute pressure)	bar abs
pd	Outlet pressure	Bar
pdmax	Maximum outlet pressure	Bar
pds	Set point	Bar
pf	Lock-up pressure	Bar
pmax	Maximum component operating pressure	Bar
pn	Reference absolute pressure for normal conditions	bar abs
PS	Maximum allowable pressure	Bar
PSD	Specific maximum allowable pressure	Bar
pu	Inlet pressure	Bar
pumax	Maximum inlet pressure	Bar
pumin	Minimum inlet pressure	Bar
SG	Lock-up pressure class	%
SZ	Class of lock-up pressure zone	Lock-up time
TS	Maximum/minimum allowable temperature	°C
V	Gas velocity	m/s
Wd	Set range	Bar
Wds	Specific set range	Bar

General Description and Operation

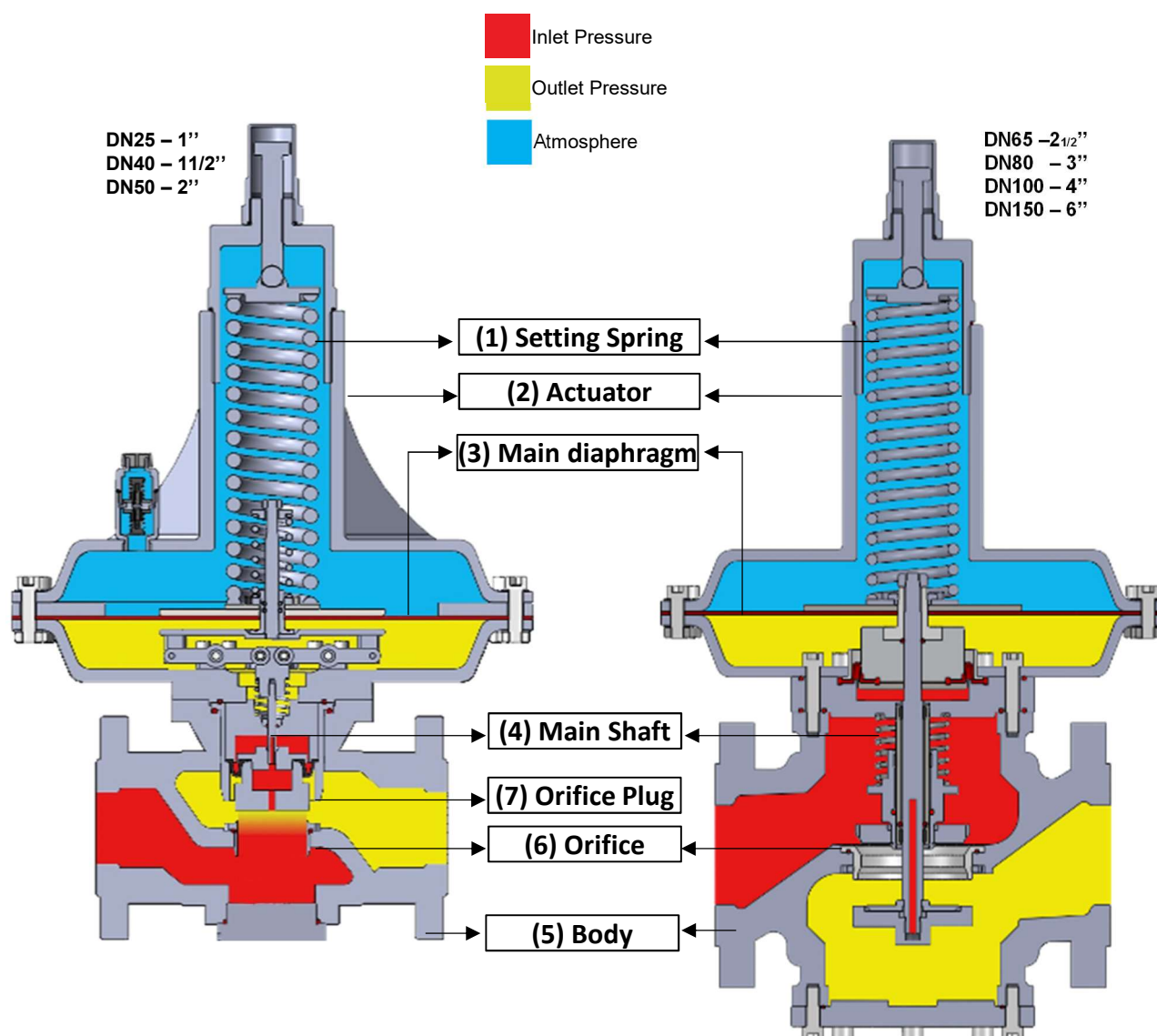
The main diaphragm (3) inside the actuator (2) is connected to the orifice plug (7) with the main shaft (4).

if outlet pressure exceeds the force of the set spring;

the main diaphragm (3) moves up, moves with the main shaft (4) orifice plug (7) attached to the main diaphragm (3) and closes the orifice (6), stopping the flow.

if the outlet pressure decreases further than the compression force of the regulating spring;

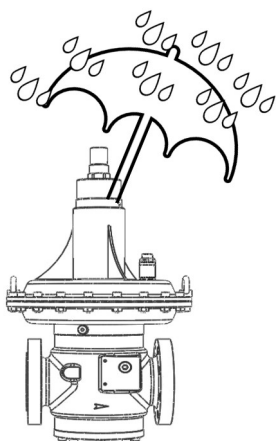
the main diaphragm (3) moves down, moves with the main shaft (4) orifice plug (7) attached to the main diaphragm (3) and opens the orifice (6), starting the flow.



Gas Pressure Regulator, F Serie

Environmental conditions

Gastech guarantees the product under the following storage and transportation conditions. All functions of products that are stored unused for more than 3 years should be checked.



Storage IEC 60721-3-1

Climatic conditions	Class 1K3
Mechanical conditions	Class 1M2
Temperature range	-20...60 °C
Humidity	< 95 % r.h.

Transport IEC 60721-3-2

Climatic conditions	Class 2K2
Mechanical conditions	Class 2M2
Temperature range	-15...60 °C
Humidity	< 95 % r.h.

Pipe installation

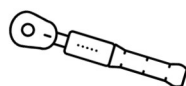
Maximum tightening torque of flange bolts



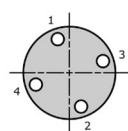
	25 1"	40 1 1/2"	50 2"	65 2 1/2"	80 3"	100 4"	150 6"
PN 16	40	120	120	120	120	120	200
ANSI 150	40	120	120	120	120	200	300

1. Clean flanges
2. Insert gasket between flanges
3. Insert screws, washers and nuts, tighten by hand
4. Tighten screws crosswise in three steps as per the order indicated.

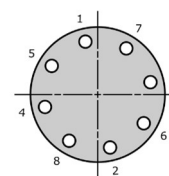
- Step 1: 25% M
- step 2: 50% M
- step 3: 100% M



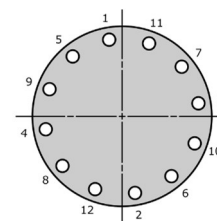
M = max. tightening torque



Circular 4-Bolt



Circular 8-Bolt



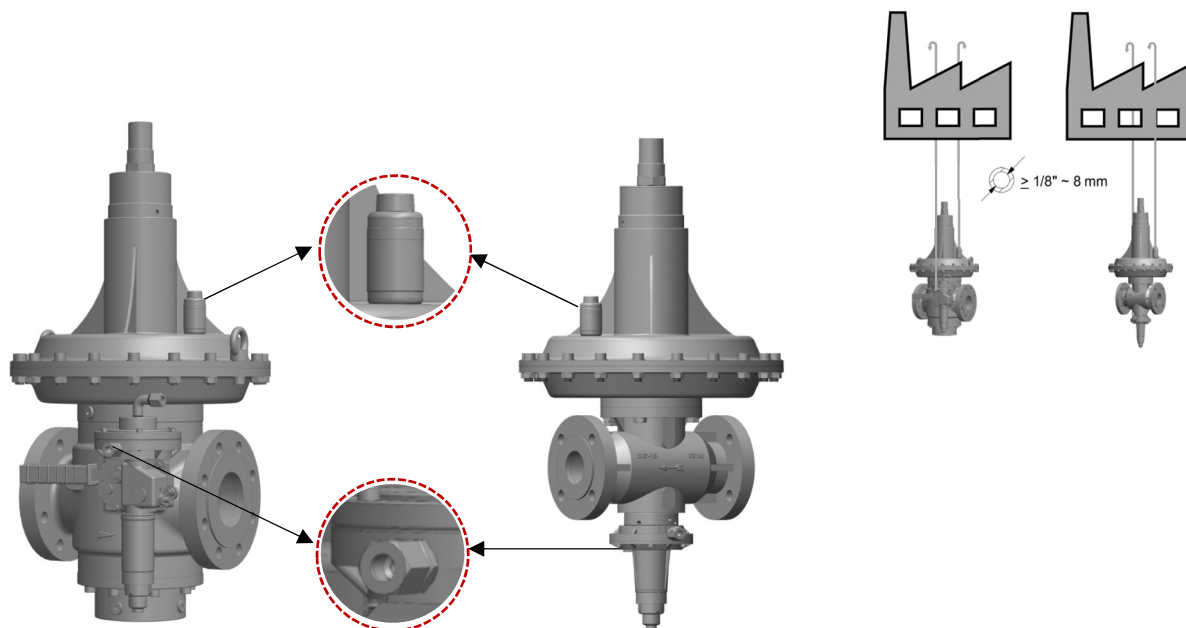
Circular 12-Bolt



use new sealing gaskets with every maintenance

Gas Pressure Regulator, F Serie**Vent Lines for Safety**

The discharge outlets on the regulator must be transported to the outside with a pipe. In indoor use, if the vent lines are not carried outside, gas may leak into the environment when the regulator fails. Creates a risk of fire and explosion.



Make sure the gas is conveyed to a non-hazardous area with the vent line. Natural gas will rise due to lower density than air, GPL will go down due to greater density than air. The density of the gas used should be analyzed and accumulations should be prevented.

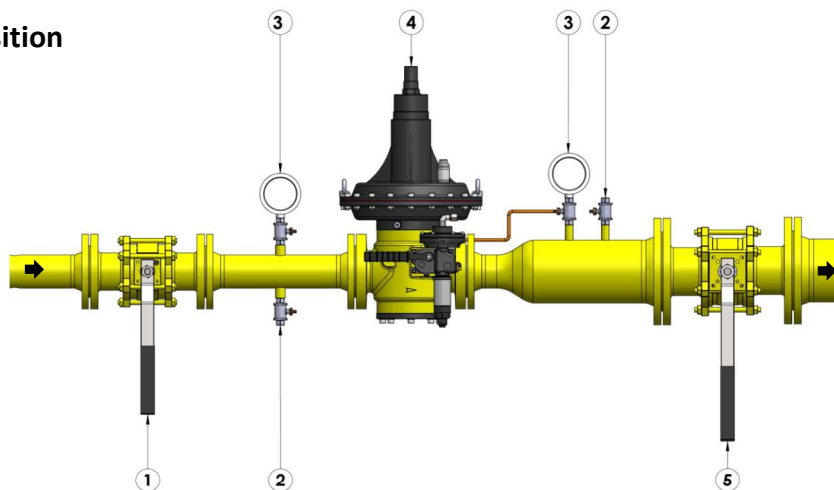
General Information for Connection

The bodies of the regulators have an arrow sign indicating the flow direction. The gas must flow in the same direction as the arrow on the body of regulator. Make sure that the flow direction is correct while the regulator is mounted to the installation. The gas must be filtered and must not contain particles larger than 5 microns.

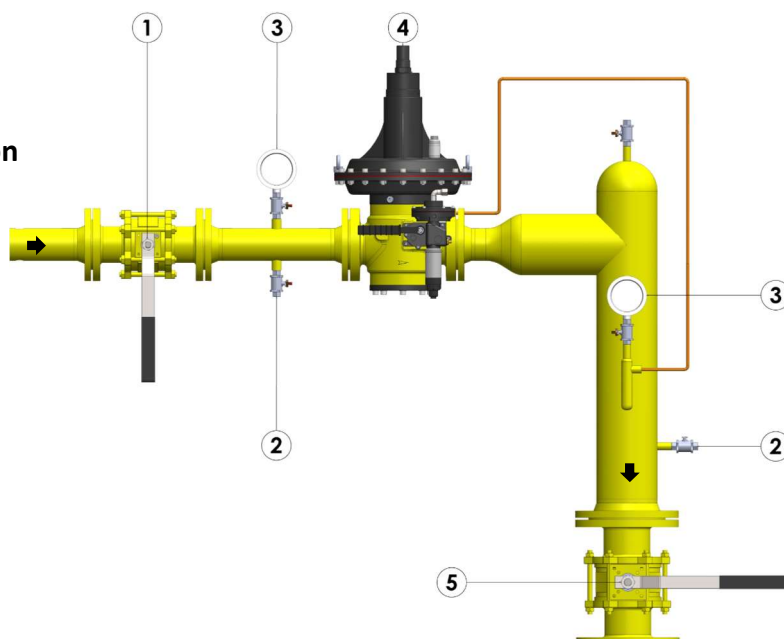
The simplest installation should include the following equipment;

Pos	Equipment
1	Upstream Main Shut off Valve
2	Manual Relief Valve –for upstream and downstream
3	Pressure Gauge –for upstream and downstream
4	Gas Pressure Regulator
5	Downstream Main Shut off Valve

Standard Position



Angle Position



Gas Pressure Regulator, F Serie

General Information for Connection

For a perfect pressure stabilization, follow the guidelines below;

- The impulse pipe (pressure feedback) must be connected to the main outlet gas pipe, downstream from the gas pressure regulator observing a distance of at least 4 x the diameter of the main outlet pipe.
- Do not install equipment (main ball valve, solenoid valve, gas meter, etc...) on the main pipe at the regulator outlet before the 6x distance after the regulator.
- Gas velocity can never exceed 40m/s in the main outlet pipe, recommended gas velocities are as follows;

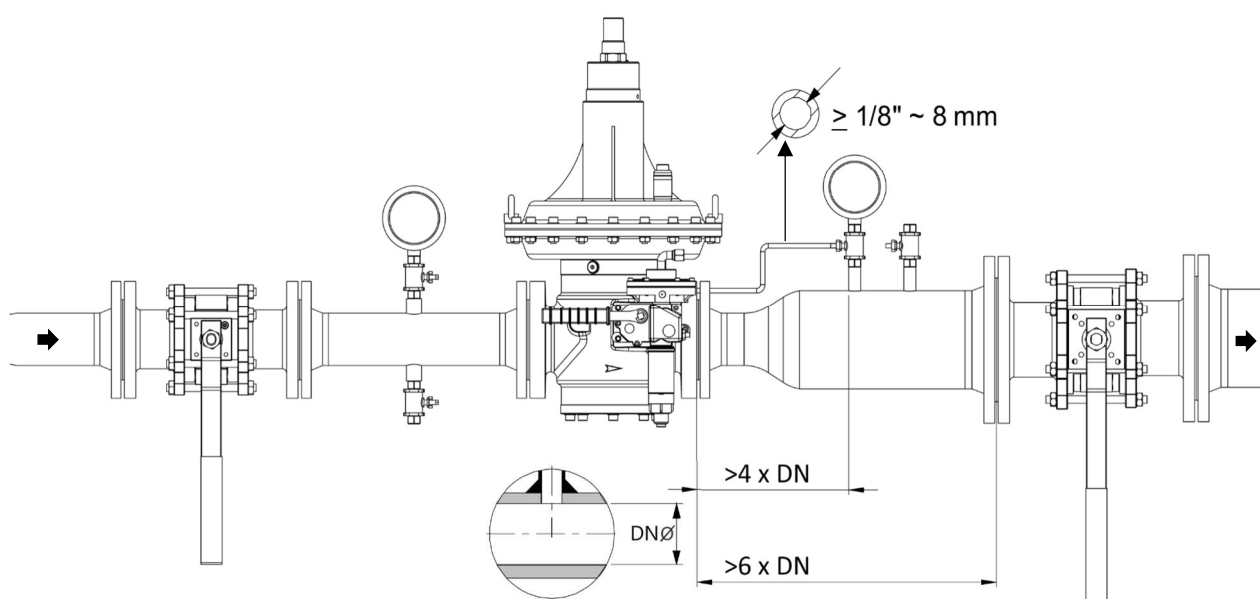
$V_{max} = 30 \text{ m/s}$ for $1,5 < P_d < 4 \text{ bar}$

$V_{max} = 25 \text{ m/s}$ for $0,15 < P_d \leq 1,5 \text{ bar}$

$V_{max} = 15 \text{ m/s}$ for $P_d \leq 0,15 \text{ bar}$

To prevent the impulse connections of the sensing lines from collecting dirt and condensation, the following is required:

- Impulse pipe fittings are always connected to the top or horizontal axis of the pipe.
- The slope of the impulse pipe is always 5-10% towards the main pipe connection.



All pipe of sensing line must have pipes with a minimum inside diameter of 8 mm, recommend not to put valve on the impulse line.

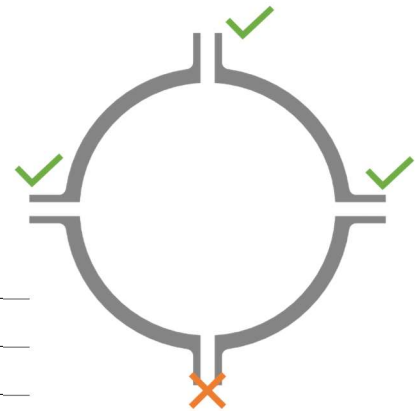
Gas Pressure Regulator, F Serie

General Information for Connection

Calculate the gas velocity with the following formula;

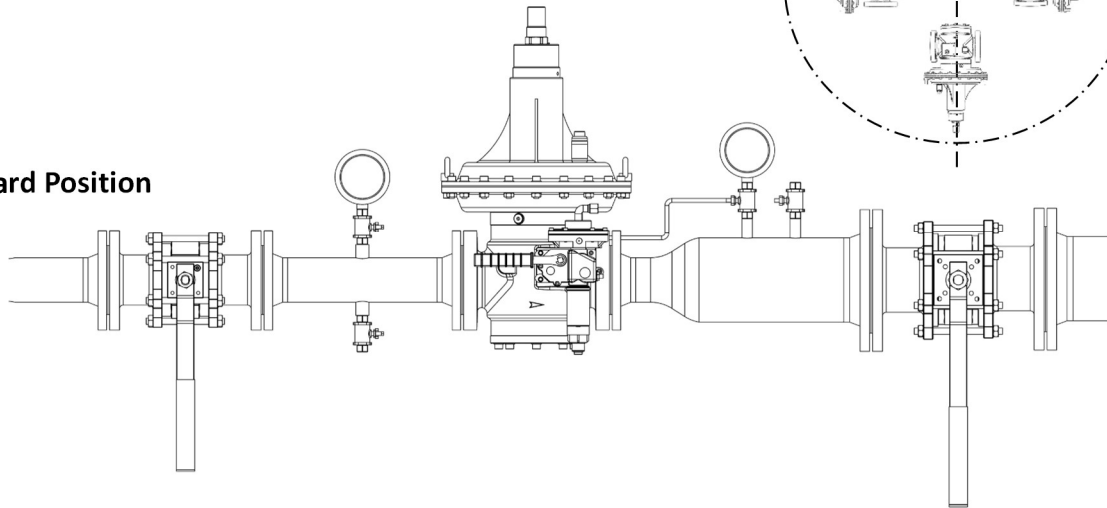
$$v = 345.92 \times \frac{Q}{DN^2} \times \frac{1 - 0.002 \times Pd}{1 + Pd}$$

V	Velocity (m/s)
345.92	Numerical constant
Q	Flow rate under standard conditions (Stm ³ /h)
DN	Regulator nominal diameter (mm)
Pd	absolute outlet pressure in (bar)

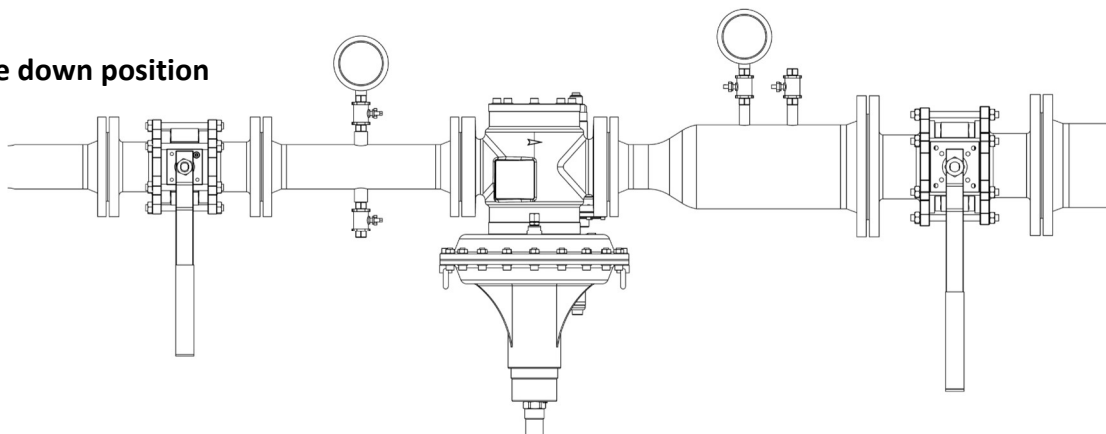


Mounting Position

Standard Position



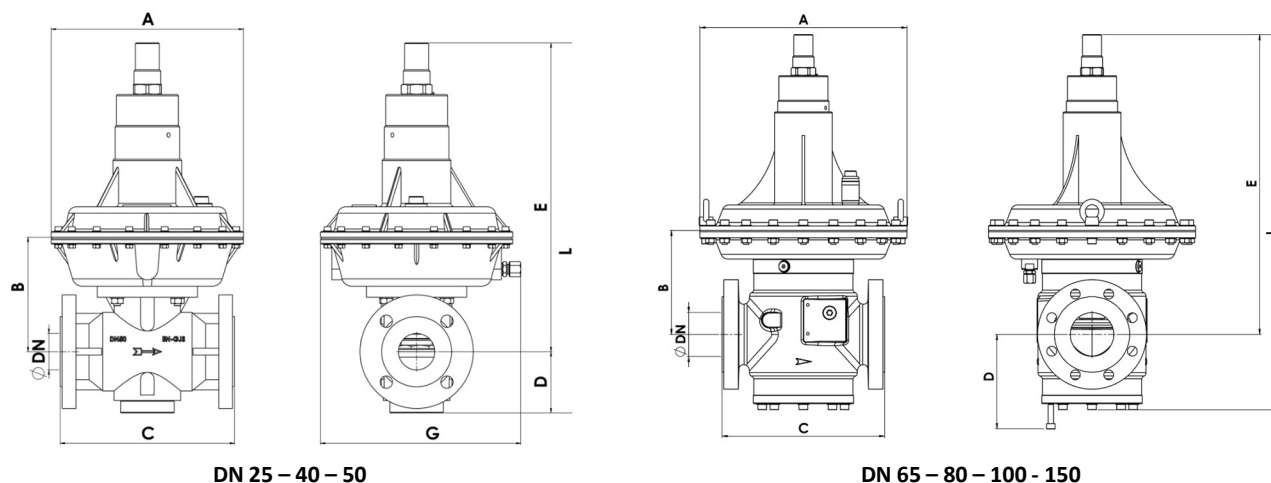
Upside down position



Gas Pressure Regulator, F Serie

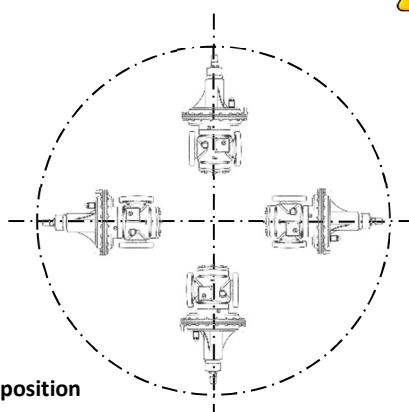
Dimensions and Weights

F Serie -without SSV



DN ⁽¹⁾	A	B	C	D	E	F	G	L	Wgt kg
25 1"	210	145	222	80	400	-	215	475	22
25 1"	280	155	222	80	440	-	290	520	24
40 1 1/2"	210	145	222	80	400	-	215	475	22
40 1 1/2"	280	155	222	80	440	-	290	520	25
50 2"	210	166	254	90	450	-	220	520	29
50 2"	280	166	254	90	450	-	290	540	30
50 2"	380	190	254	90	530	-	-	620	59
65 2 1/2"	380	190	298	175	560	-	-	700	75
65 2 1/2"	380	207	298	175	640	-	-	780	82
80 3"	380	190	298	175	560	-	-	700	77
80 3"	380	207	298	175	640	-	-	780	84
100 4"	380	190	352	175	560	-	-	700	92
100 4"	520	207	352	175	640	-	-	780	105
150 6"	520	270	451	220	700	-	-	850	165
150 6"	520	270	451	220	700	-	-	850	185

! Int silencer does not affect dimensions
 Flange holes on DN25 size are threaded M12x1,75
 Flange holes on DN65 size are threaded M16x2,0



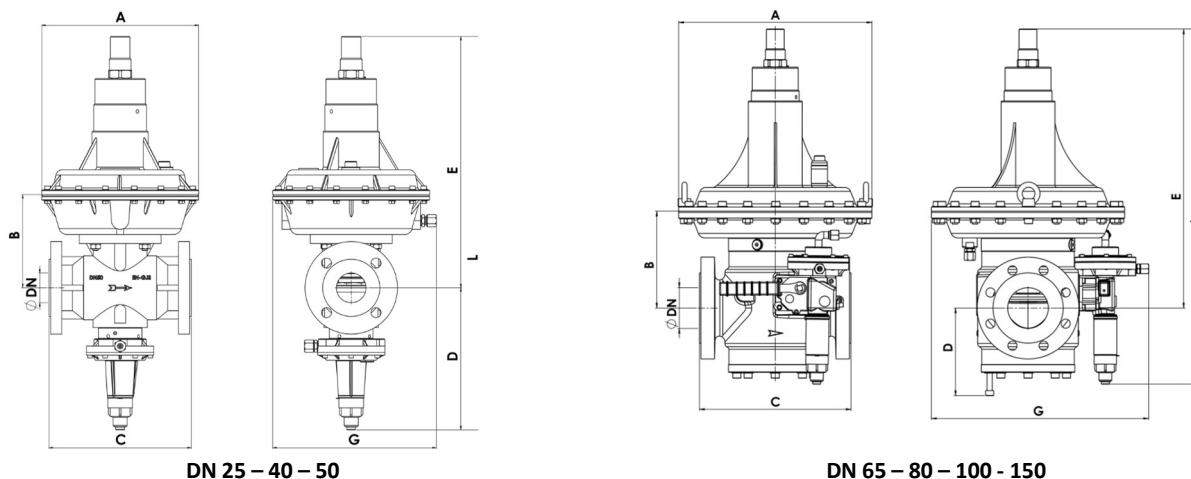
Mounting position



Gas Pressure Regulator, F Serie

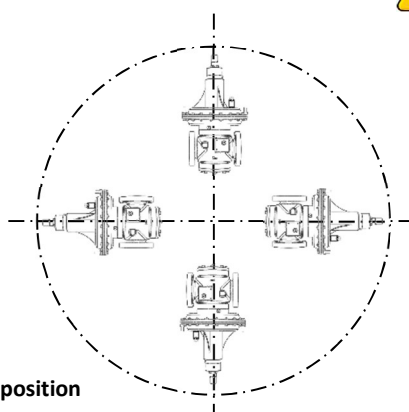
Dimensions and Weights

F Serie -with SSV



DN ⁽¹⁾	A	B	C	D	E	F	G	L	Wgt kg
25 1"	210	145	222	245	400	-	215	640	24
25 1"	280	155	222	245	440	-	290	680	26
40 1 1/2"	210	145	222	245	400	-	215	640	24
40 1 1/2"	280	155	222	245	440	-	290	680	26
50 2"	210	166	254	260	450	-	220	690	31
50 2"	280	166	254	260	450	-	290	700	32
50 2"	380	190	254	260	530	-	380	790	51
65 2 1/2"	380	190	298	175	560	-	400	700	77
65 2 1/2"	380	207	298	175	640	-	520	780	85
80 3"	380	190	298	175	560	-	400	700	80
80 3"	380	207	298	175	640	-	520	780	87
100 4"	380	190	352	175	560	-	430	700	95
100 4"	520	207	352	175	640	-	520	780	108
150 6"	520	270	451	220	700	-	520	850	168
150 6"	520	270	451	220	700	-	520	850	188

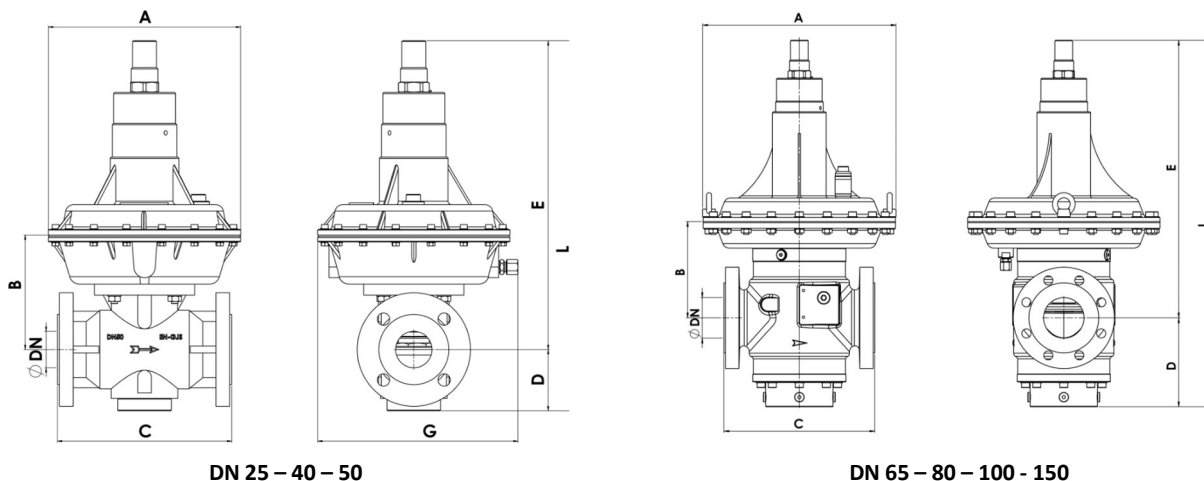
! Int silencer does not affect dimensions
 Flange holes on DN25 size are threaded M12x1,75
 Flange holes on DN65 size are threaded M16x2,0



Gas Pressure Regulator, F Serie

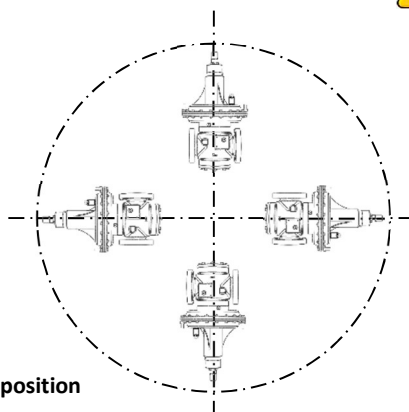
Dimensions and Weights

F Serie –with monitor unit, without ssv



DN ⁽¹⁾	A	B	C	D	E	F	G	L	Wgt kg
25 1"	210	145	222	80	400	-	215	475	22
25 1"	280	155	222	80	440	-	290	520	24
40 1 1/2"	210	145	222	80	400	-	215	475	22
40 1 1/2"	280	155	222	80	440	-	290	520	25
50 2"	210	166	254	90	450	-	220	520	29
50 2"	280	166	254	90	450	-	290	540	30
50 2"	380	190	254	90	530	-	-	620	59
65 2 1/2"	380	190	298	175	560	-	-	730	79
65 2 1/2"	380	207	298	175	640	-	-	820	86
80 3"	380	190	298	175	560	-	-	730	81
80 3"	380	207	298	175	640	-	-	820	88
100 4"	380	190	352	175	560	-	-	730	96
100 4"	520	207	352	175	640	-	-	820	108
150 6"	520	270	451	220	700	-	-	890	169
150 6"	520	270	451	220	700	-	-	890	189

! Int silencer does not affect dimensions
 Flange holes on DN25 size are threaded M12x1,75
 Flange holes on DN65 size are threaded M16x2,0

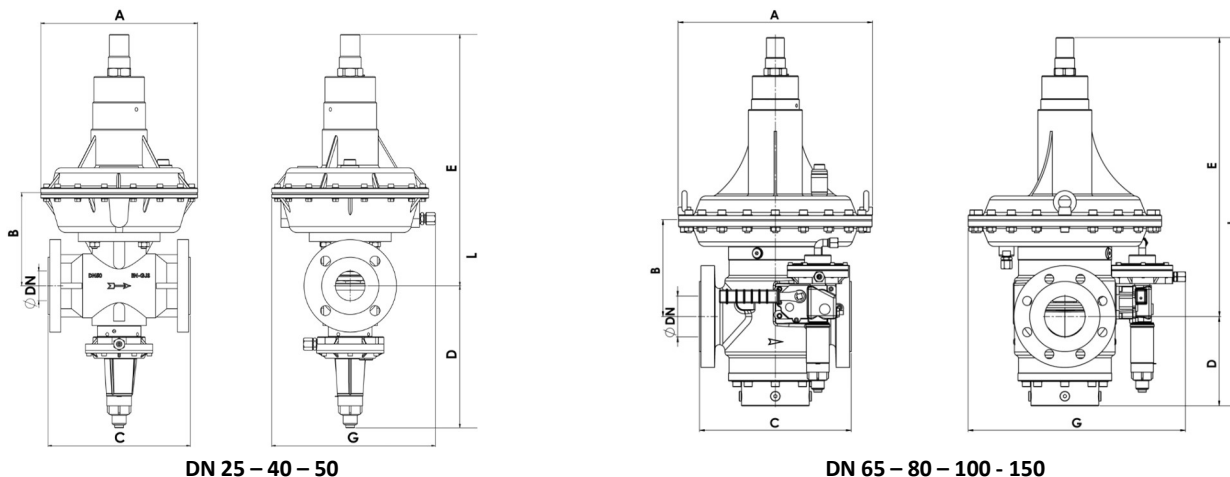


Mounting position


Gas Pressure Regulator, F Serie

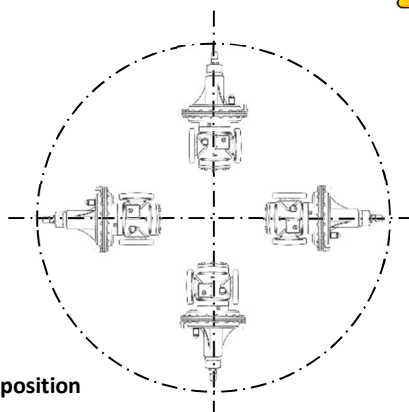
Dimensions and Weights

F Serie –with SSV + monitor unit



DN ⁽¹⁾	A	B	C	D	E	F	G	L	Wgt kg
25 1"	210	145	222	245	400	-	215	640	24
25 1"	280	155	222	245	440	-	290	680	26
40 1 1/2"	210	145	222	245	400	-	215	640	24
40 1 1/2"	280	155	222	245	440	-	290	680	26
50 2"	210	166	254	260	450	-	220	690	31
50 2"	280	166	254	260	450	-	290	700	32
50 2"	380	190	254	260	530	-	380	790	51
65 2 1/2"	380	190	298	175	560	-	400	730	82
65 2 1/2"	380	207	298	175	640	-	520	820	89
80 3"	380	190	298	175	560	-	400	730	84
80 3"	380	207	298	175	640	-	520	820	92
100 4"	380	190	352	175	560	-	430	730	101
100 4"	520	207	352	175	640	-	520	820	104
150 6"	520	270	451	220	700	-	520	890	174
150 6"	520	270	451	220	700	-	520	890	195

 Int silencer does not affect dimensions
Flange holes on DN25 size are threaded M12x1,75
Flange holes on DN65 size are threaded M16x2,0



Mounting position



SETTING

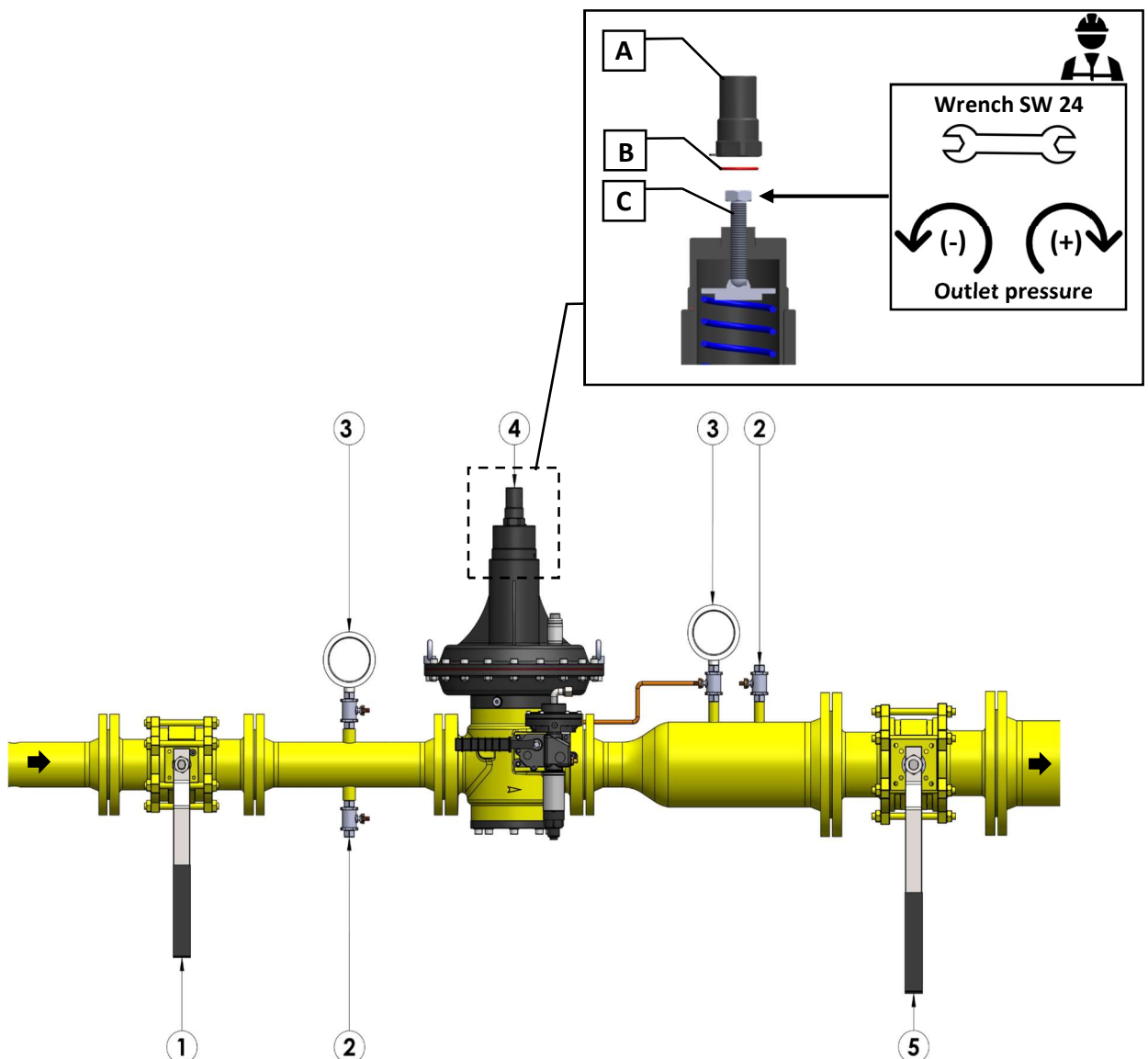
Gas Pressure Regulator, F Serie

Setting of the outlet pressure

 Make sure that all safety precautions (staff, environment, system) are taken before following the instructions below.

Operation







Pos	Practice
1	Remove the protective cap A.
2	Turn the adjusting screw C using an open-ended wrench SW 24 mm.
3	Turning clockwise: the preload of the setpoint spring is increased and the outlet pressure is increased (+).
4	Turning counter-clockwise: the setpoint spring is released and the outlet pressure reduced (-).
5	After the setting: screw on the protective cap A again.



Setting of the outlet pressure

 Make sure that all safety precautions (staff, environment, system) are taken before following the instructions below.

With All Details

Pos	Practice
1	Open the manual vent valve on the outlet side to 30% (2).
	 Remember the gas will discharge, check the safety requirements again
2	Make sure the main outlet valve is closed (5)
3	Open the main inlet valve (1) slowly and observe the outlet pressure gauge (3)
	 Check the inlet pressure on the inlet manometer. Check that the inlet pressure is at the system design value. If the inlet pressure is lower or higher than the design pressure, contact your gas supplier.
	 In the first pressurization, the outlet pressure may increase by 30-60%, since the outlet vent valve is open, the high pressure will be discharged and the regulator reflex will recover after a while.
	 Check the pressure gauge (3) on the outlet pressure side, if the outlet pressure rises unreasonably, close the inlet main valve (1).
4	Close the manual vent valve on the outlet side (2).
	 Check the outlet pressure gauge (3), the outlet pressure should not rise more than 10% from the outlet pressure (on the label Pd Value).
	If the outlet pressure is not at the required value;
5	Open the manual vent valve on the outlet side to 30% (2).
6	Remove the protective cap A.
7	Turn the adjusting screw C using an open-ended wrench SW 24 mm.
	Turning clockwise: the preload of the setpoint spring is increased and the outlet
7a	pressure is increased (+).
	Turning counter-clockwise: the setpoint spring is released and the outlet pressure
7b	reduced (-).
8	After the setting: screw on the protective cap A again.
9	Close the manual vent valve on the outlet side (2).
	 Check the outlet pressure gauge (3), the outlet pressure should not rise more than 10% from the calibrated outlet pressure
	Close all valves (1)(2)(5), check leakage control with inlet and outlet manometers (3) and foaming liquid
9	
10	If there is a leak, fix it and repeat step 9.
11	Return to step 1
12	Open the main outlet valve slowly and ensure gas supply to the system

















Gas Pressure Regulator, F Serie

Outlet Pressure Range and Setting Springs

The spring setting ranges for the F25 – F40 – F50 regulator are shown in the tables below

Pressure Range (mbar)	Actuator (∅)	Color		Diameter (mm)	Order Code
16 – 20	280 BP	Grey		3.5	2.13.0696
20 – 35	280 BP	Yellow		4.0	2.13.0670
30 – 50	280 BP	Blue		4.5	2.13.0281
50 – 80	280 BP	Black		5.0	2.13.0697
80 – 120	280 MP	Orange		5.5	2.13.0671
110 – 170	280 MP	Purple		6.0	2.13.0669
130 – 220	280 MP	Pink		6.5	2.13.0698
180 – 330	280 MP	Red		7.0	2.13.0594
200 – 350	280 MP	Green		7.5	2.13.0089
350 – 600	210 AP	Black		8.0	2.13.0695
600 – 1000	210 AP	Purple		9.0	2.13.0699
800 – 1600	210 AP	Grey		10.0	2.13.0412
1400 – 2400	210 AP	Pink		11.0	2.13.0662
2200 – 3600	210 AP	White		12.0	2.13.0700
3400 – 5000	210 AP	Orange		13.0	2.13.0414















The spring setting ranges for the F50SH – F65 – F80 regulator are shown in the tables below

Pressure Range (mbar)	Actuator (∅)	Color		Diameter (mm)	Order Code
20 – 50	380 BP	Pink+Black line		5.0	2.13.0740
40 – 70	380 BP	Grey		5.5	2.13.0706
70 – 120	380 MP	Blue		6.0	2.13.0741
110 – 170	380 MP	Yellow		7.0	2.13.0679
140 – 240	380 MP	Orange+Black l.		7.5	2.13.0692
190 – 330	380 MP	Purple		8.0	2.13.0287
300 – 530	380 MP	Green		9.0	2.13.0708
240 – 420	380 AP	Purple		8.0	2.13.0287
260 – 510	380 AP	Pink		8.5	2.13.0742
330 – 600	380 AP	Green		9.0	2.13.0708
600 – 990	380 AP	Black		10.0	2.13.0709
820 – 1600	380 AP	Silver		11.0	2.13.0312
1240 – 2220	380 AP	White		12.0	2.13.0710
2140 – 3650	380 AAP	Brown		13.0	2.13.0711
2350 – 4200	380 AAP	Orange		14.0	2.13.0322








Gas Pressure Regulator, F Serie

Outlet Pressure Range and Setting Springs

The spring setting ranges for the F100 regulator are shown in the tables below

Pressure Range (mbar)	Actuator (∅)	Color		Diameter (mm)	Order Code
10 – 30	520 BP	Grey		7.5	2.13.9999
20 – 40	520 BP	Yellow		8.0	2.13.9998
40 – 60	520 BP	Blue		8.5	2.13.9997
50 – 100	520 BP	Black		9.0	2.13.9996
100 – 210	520 MP	Orange		10.0	2.13.9995
150 – 300	520 MP	Purple		11.0	2.13.9994
200 – 380	520 MP	Pink		12.0	2.13.9993
330 – 600	380 AP	Green		9.0	2.13.0708
600 – 990	380 AP	Black		10.0	2.13.0709
820 – 1600	380 AP	Silver		11.0	2.13.0312
1240 – 2220	380 AP	White		12.0	2.13.0710
2140 – 3650	380 AAP	Brown		13.0	2.13.0711
2350 – 4200	380 AAP	Orange		14.0	2.13.0322

The spring setting ranges for the F150 regulator are shown in the tables below

Pressure Range (mbar)	Actuator (∅)	Color		Diameter (mm)	Order Code
10 – 30	520 BP	Grey		7.5	2.13.9999
20 – 40	520 BP	Yellow		8.0	2.13.9998
40 – 60	520 BP	Blue		8.5	2.13.9997
50 – 100	520 BP	Black		9.0	2.13.9996
100 – 210	520 MP	Orange		10.0	2.13.9995
150 – 300	520 MP	Purple		11.0	2.13.9994
200 – 380	520 MP	Pink		12.0	2.13.9993
330 – 600	380 AP	Green		9.0	2.13.0708
600 – 990	380 AP	Black		10.0	2.13.0709
820 – 1600	380 AP	Silver		11.0	2.13.0312
1240 – 2220	380 AP	White		12.0	2.13.0710
2140 – 3650	380 AAP	Brown		13.0	2.13.0711
2350 – 4200	380 AAP	Orange		14.0	2.13.0322



Minimum difference between regulator and SSV settings (ΔPw):
 BP-MP Model: 15% with a minimum difference of 10 mbar for UPSO, 20 mbar for OPSO
 AP-AAP Model : 20% with a minimum difference of 40 mbar for UPSO, 40 mbar for OPSO

Gas Pressure Regulator, F Serie

Slum Shut Valve

The F series of regulators can be fitted with safety shut-off valve for overpressure (OPSO) or combined under-and-over pressure (UPS0/OPSO) protection. Shutoff gas flow when the outlet pressure of the regulator increases or/and decreases. The Slum shut valve trip pressure can easily be adjusted independently of the regulator set point. Built internal bypass, for balancing pressure before relatching the safety shut-off valve, is operated by pulling the valve stem. Possibility of application of devices for remote signal and remote control.

Technical Features

Type	IS
Operation class	A
Response time	< 2 s
Allowable temperature –TS ⁽¹⁾	-20 °C to +60 °C
Accuracy –AG ⁽²⁾	up to 0.05 bar AG 30
	0.05 – 0.15 bar AG 10
	0.15 – 5.5 bar AG 5
Set Range OPSO ⁽³⁾	BP 20 -300mbar MP 50 - 500mbar AP 0.3 – 5.5bar
Set Range OPSO ⁽³⁾	BP 10 -280mbar MP 20 - 350mbar AP 0.2 – 3.2bar

⁽¹⁾ Low temperature version -40°C: available on request

⁽²⁾ Depending on working conditions

⁽³⁾ change differant springs Refer to page

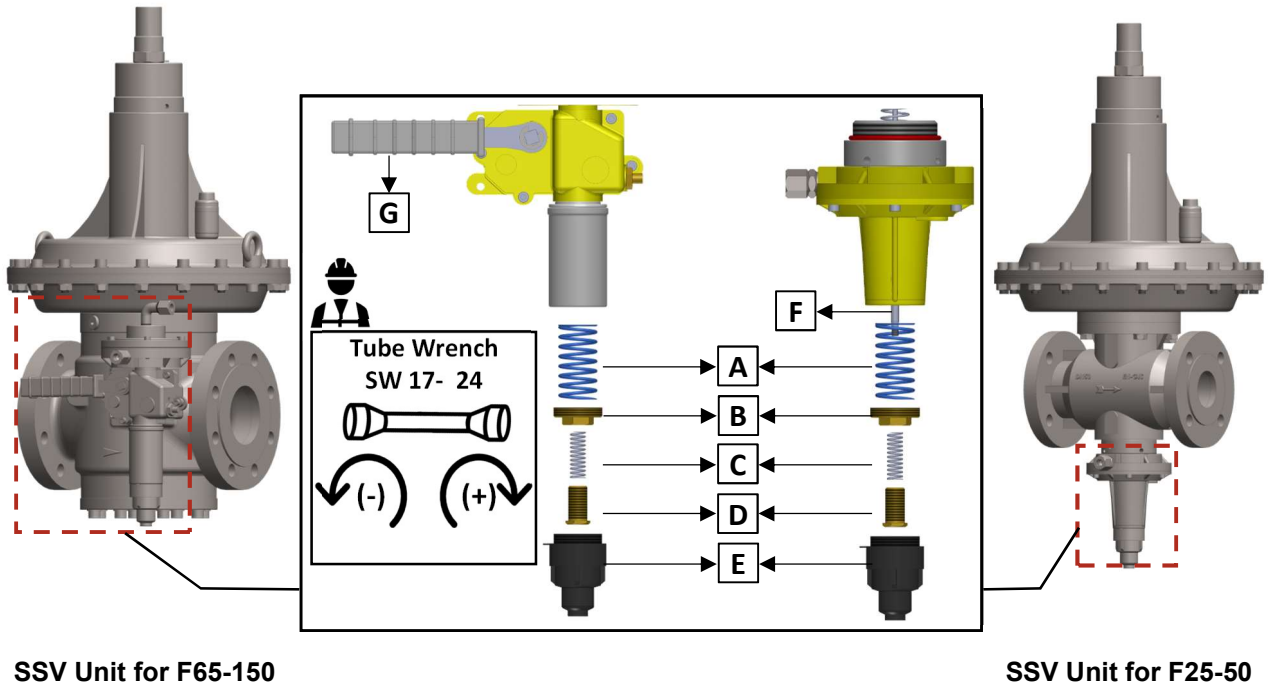
Slum Shut Unit for F Serie



Article No	Type	DN Size
2.80.0311	S-BP	DN25-40
2.80.0312	S-MP	DN25-40
2.80.0313	S-AP	DN25-40
2.80.0314	S-BP	DN50
2.80.0315	S-MP	DN50
2.80.0316	S-AP	DN50
2.80.0317	S-BP	DN65-80
2.80.0318	S-MP	DN65-80
2.80.0319	S-AP	DN65-80
2.80.0320	S-BP	DN100
2.80.0321	S-MP	DN100
2.80.0322	S-AP	DN100
2.80.0323	S-BP	DN150
2.80.0324	S-MP	DN150
2.80.0325	S-AP	DN150

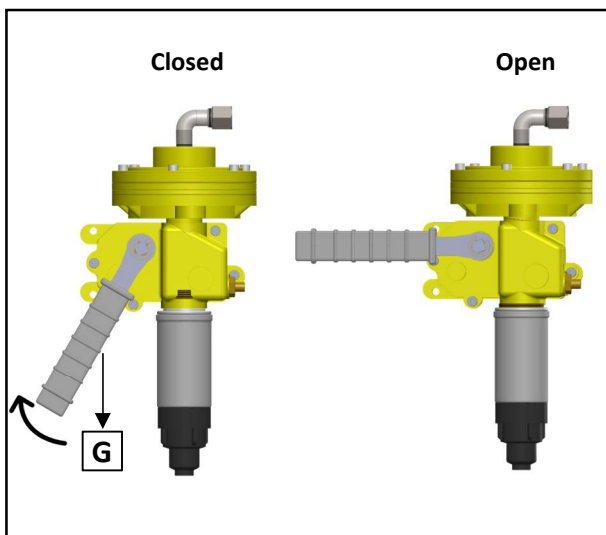
Please, select the springs (OPSO and UPSO Range, Refer to page xxxx

Setting Procedure of the Slum Shut Valve

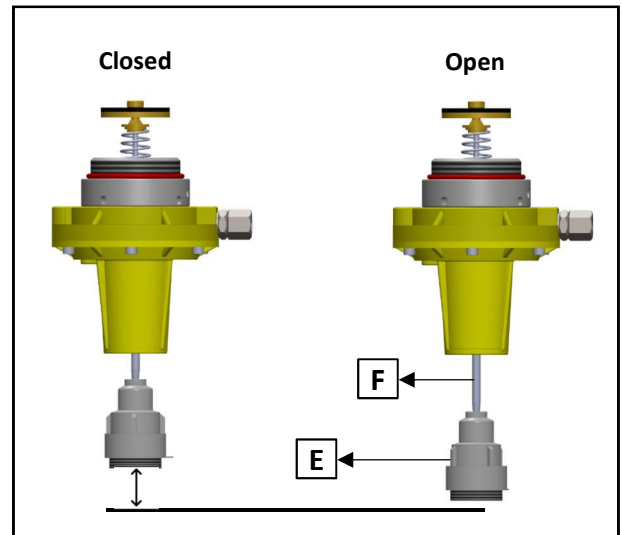


SSV Unit for F65-150

SSV Unit for F25-50



SSV Unit for F65-150



SSV Unit for F25-50

⚠ SSV units have a built-in bypass system for safety and easy installation. When you pull the cover, the bypass system is activated and the outlet is slowly pressurized. If the outlet main valve is not closed; It takes too long to fill out the exit and you cannot activate SSV.

Setting Procedure of the Slum Shut Valve (Maximum and Minimum)

Pos	Practice
1	Use ring nut (B) to completely load maximum pressure spring (A). Loosen adjusting screw (D) to completely relieve minimum pressure spring (C).
2	Use a small pump or other appropriate means to raise pressure to normal operating level on the downstream vent valve (2).
3	Relatch controller and allow pressure to drop to minimum pressure triggering level.
4	Using adjusting screw (D), slowly load minimum pressure spring (C) until actuator triggers.
5	Repeat steps 2 and 3 above, making any necessary adjustments in setting. Least three times
6	Bring pressure back to normal values.
7	Relatch controller and raise pressure until it reaches maximum pressure triggering level.
8	Using ring nut (B), slowly unload spring (A) until actuator triggers.
9	Repeat steps 6 and 7 above, making any necessary adjustments in setting. Least three times
10	Close the downstream vent valve (2) and disconnect the external pressure source.

 It is recommended that slam-shut controller efficiency be checked periodically.

Cut-off Test

Pos	Practice
1	Close inlet and outlet main valves (1) (5). The controller should trigger at minimum pressure (only if so set).
2	Using a small pump or other appropriate means on the downstream vent valve (2) , raise pressure in the line to normal operating level. Relatch controller in case it has triggered following on step 1 above.
3	Simulate pressure increase until maximum triggering pressure is reached.
4	Bring the line back to full operating conditions as described in Startup procedure.

Controller-seal Check

Pos	Practice
1	Slowly close the main outlet valve (5) located downstream.
2	Disable the ssv unit and close the stream
3	Loosen one fitting in the line downstream of the slam-shut valve and apply soapy water in order to make sure that there are no leaks. In case of any leak being detected, proceed with the necessary maintenance of the controller.

F 25 – 50 Startup of the Slum Shut Valve

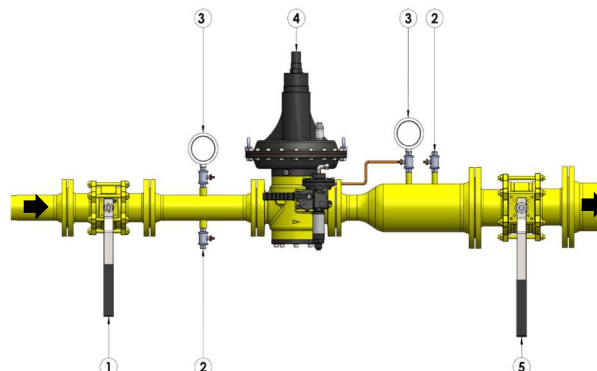
Previously calibrated

Pos	Practice
1	Make sure that the main inlet and outlet valves are closed.
2	Open the main inlet valve (1) slowly
3	Remove cap (E) reverse and screw it onto stem (F).
4	Pull cap (E) and keep it pulled several seconds until outlet pressure stabilizes, and SSV is easily activated.
	<p>☞ SSV units have a built-in bypass system for safety and easy installation. When you pull the cover, the bypass system is activated and the outlet is slowly pressurized. If the outlet main valve is not closed; it takes too long to fill out the exit and you cannot activate SSV.</p>
5	Open the main outlet valve slowly and ensure gas supply to the system
6	Repeat the above procedure, making sure that controller remains properly latched, then mount cap back in its original position

F65 – 150 Startup of the Slum Shut Valve

Previously calibrated

Pos	Practice
1	Make sure that the main inlet and outlet valves are closed.
2	Open the main inlet valve (1) slowly
3	Slowly lift the handle of SSV (G) up and keep it a few seconds until outlet pressure stabilizes, and SSV is easily activated.
	<p>☞ SSV units have a built-in bypass system for safety and easy installation. When you pull the cover, the bypass system is activated and the outlet is slowly pressurized. If the outlet main valve is not closed; it takes too long to fill out the exit and you cannot activate SSV.</p>
4	Open the main outlet valve slowly and ensure gas supply to the system






Shut Off Range and Setting Springs

Over- Shut off setting ranges for the all diameters are shown in the tables below

Pressure Range (mbar)	Actuator (∅)	Color		Diameter (mm)	Order Code
30 – 125	120 BP-MP	Red		2.2	2.13.0713
65 – 280	120 BP-MP	Blue		2.5	2.13.0280
80 – 370	120 BP-MP	Yellow		2.7	2.13.0714
280 – 490	120 BP-MP	Black		3.2	2.13.0066
480 – 1000	120 AP	Purple		3.5	2.13.0682
750 – 1250	120 AP	Silver		3.7	2.13.0683
1000 – 1750	120 AP	Pink		4.0	2.13.0744
1500 – 2500	120 AAP	White		4.5	2.13.0319
2000 – 5500	120 AAP	Orange		5.0	2.13.0324

Over- Shut off setting ranges for the all diameters are shown in the tables below

Pressure Range (mbar)	Actuator (∅)	Color		Diameter (mm)	Order Code
15 – 35	120 BP-MP	Red		1.2	2.13.0715
25 – 40	120 BP-MP	Blue		1.5	2.13.0283
30 – 100	120 BP-MP	Yellow		2.0	2.13.0716
60 – 240	120 BP-MP	Black		2.3	2.13.0069
70 – 450	120 BP-MP	Purple		2.5	2.13.0746
350 – 900	120 AP-AAP	Silver		2.8	2.13.0320
700 – 3200	120 AP-AAP	Pink		3.5	2.13.0745



Minimum difference between regulator and SSV settings (ΔP_w):
 BP-MP Model: 15% with a minimum difference of 10 mbar for UPSO, 20 mbar for OPSO
 AP-AAP Model : 20% with a minimum difference of 40 mbar for UPSO, 40 mbar for OPSO

Gas Pressure Regulator, F Serie

Monitor Unit

The Monitor or emergency regulator is used as a safety device in gas pressure reduction systems. The purpose of this device is to protect the system against possible overpressure, while keeping the reduction line in service. To perform a periodic test on a monitoring regulator, increase the outlet set pressure of the working regulator and watch the outlet pressure to determine if the monitoring regulator takes over at the appropriate outlet pressure.

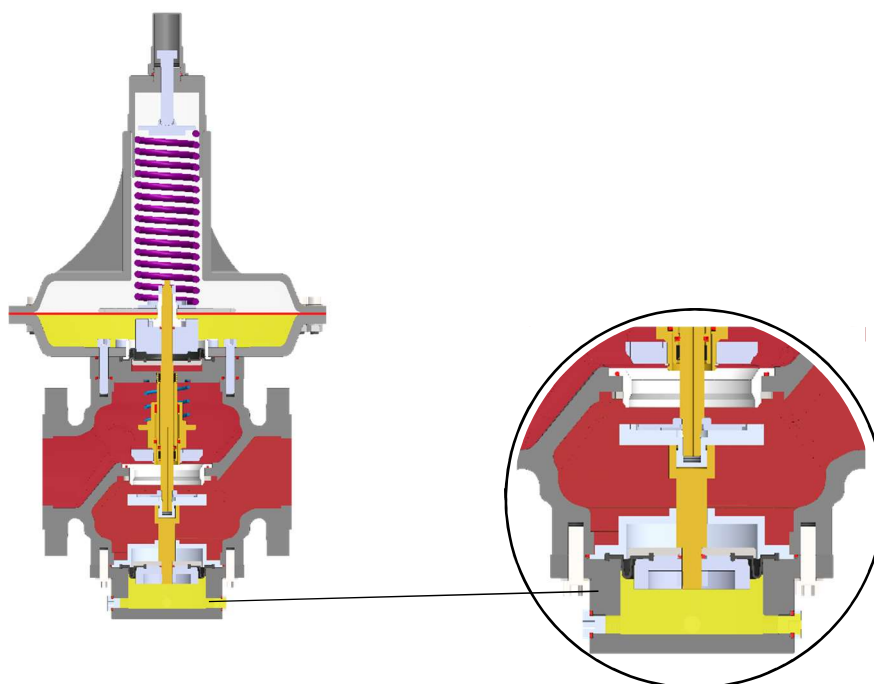
Monitor regulator is generally installed upstream of the active regulator. Although the function of the monitor regulator is different, the two regulators are virtually identical from the point of view of their mechanical components. Flow coefficients of the regulator puls line monitor system are about 15% lower than those of the active regulator alone.



Monitor Unit for F Serie

Article No	Type	DN Size
2.80.0420	M-BP/MP/AP	DN25-40
2.80.0421	M-BP/MP/AP	DN50
2.80.0422	M-BP/MP/AP	DN65-80
2.80.0423	M-BP/MP/AP	DN100
2.80.0424	M-BP/MP/AP	DN150

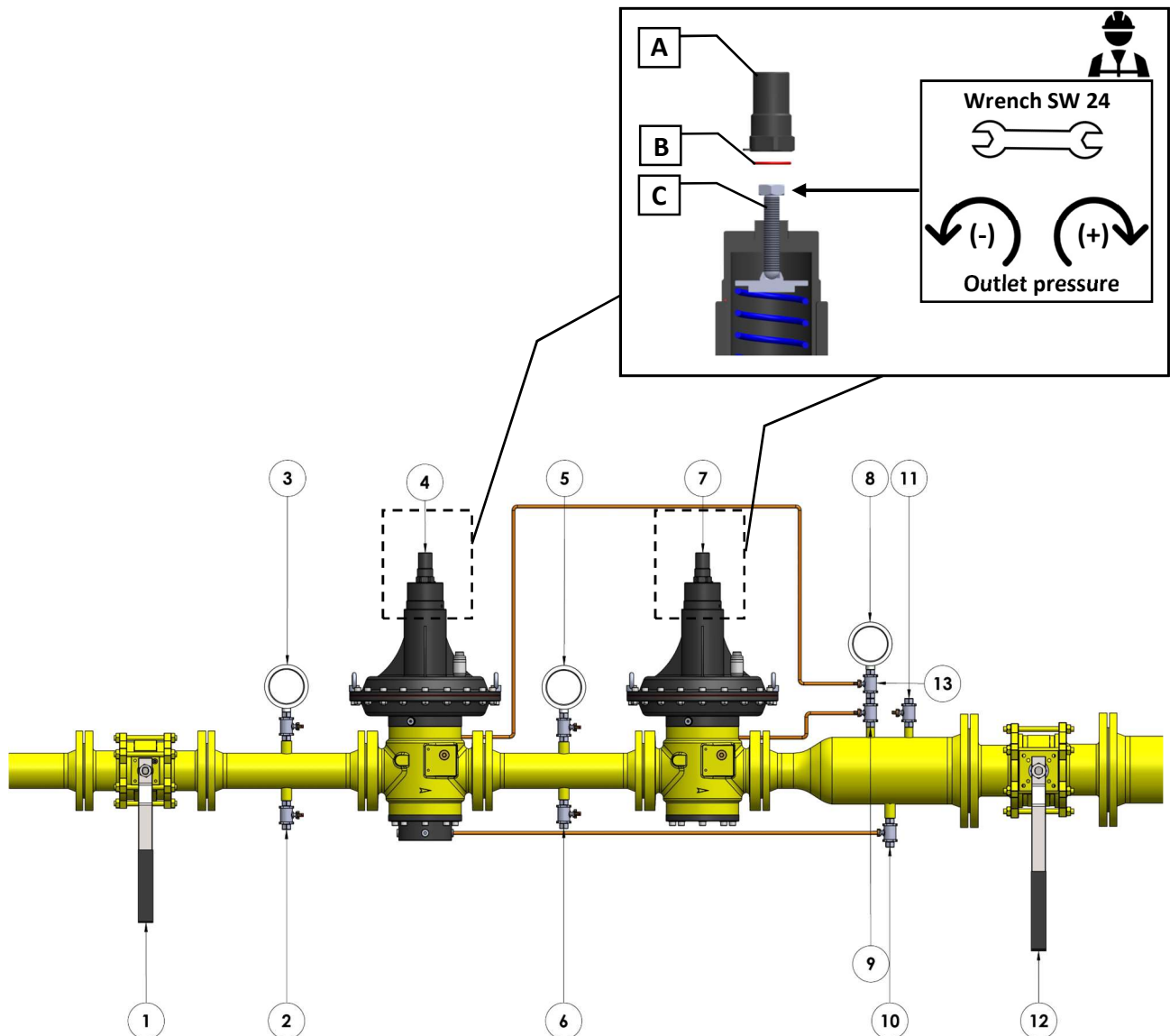
In order for the standard regulator to be a monitor regulator, it is necessary to add a few mechanical parts. This attachment is directly integrated into the body of the monitor regulator. Figure below is focused on the monitor unit



Monitor Unit for DN65 – 150

Setting of the outlet pressure for monitor system


 Make sure that all safety precautions (staff, environment, system) are taken before following the instructions below.



Setting of the outlet pressure for monitor system

 Make sure that all safety precautions (staff, environment, system) are taken before following the instructions below.

With All Details

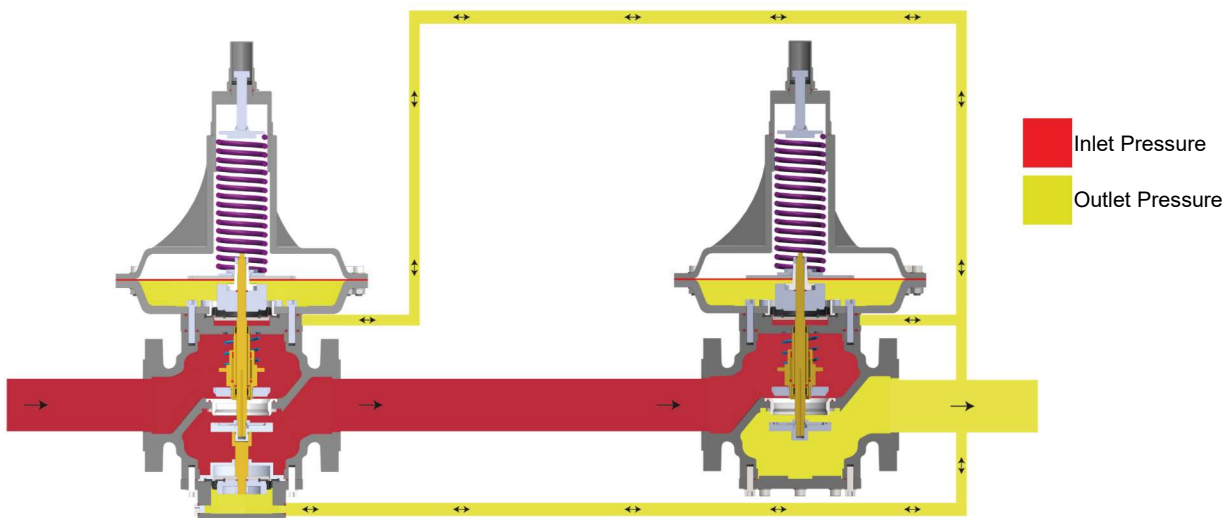
Pos	Practice
1	Open the manual vent valve on the outlet side to 30% (11). Remember the gas will discharge, check the safety requirements again
2	Make sure the main outlet valve is closed (12)
3	Remove the protective cap A of active regulator (7).
4	Turn the adjusting screw C using an open-ended wrench SW 24 mm.
5	Turning the part with symbol (C) clockwise, set the output pressure of the active regulator(7) to the highest level.
6	Remove the protective cap A of active regulator (4).
7	Turn the adjusting screw C using an open-ended wrench SW 24 mm.
8	Set the active regulator(4) 10% above the required outlet pressure of the system
9a	Turning clockwise: the preload of the setpoint spring is increased and the outlet pressure is increased (+).
9b	Turning counter-clockwise: the setpoint spring is released and the outlet pressure reduced (-).
	Check pressure gauge (8), verify pressure is 10% higher than required outlet pressure
10	Adjust the monitor regulator to the required outlet pressure of the system
11a	Turning clockwise: the preload of the setpoint spring is increased and the outlet pressure is increased (+).
11b	Turning counter-clockwise: the setpoint spring is released and the outlet pressure reduced (-).
12	Check pressure gauge (8), verify pressure is outlet pressure of the system
	Check pressure gauge (4), the inlet and outlet pressure of the monitor regulator must be equal.
13	Close the manual vent valve on the outlet side (11).
14	Check the outlet pressure gauge (8), the outlet pressure should not rise more than 10% from the calibrated outlet pressure of Monitor regulator.
15	Close all valves (1) (2) (6) (10) (12), check leakage control with inlet and outlet manometers (3) (5) (8) and foaming liquid
16	If there is a leak, fix it and repeat step 9.
17	Open the main inlet and outlet valve (1) (12) slowly and ensure gas supply to the system

Gas Pressure Regulator, F Serie

If active regulator working

The monitor controls downstream pressure at the same point as the main regulator and is set a little higher than the latter. Under normal duty, the monitor is fully open as it detects a pressure value lower than its set value.

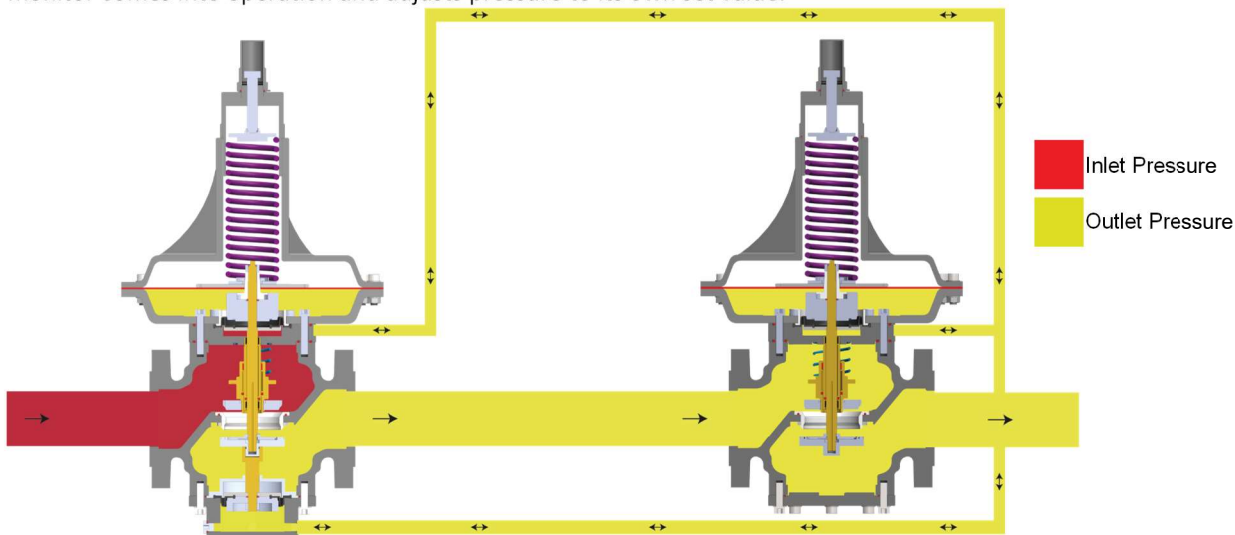
In normal operation of a wide-open configuration, the working regulator controls the system’s outlet pressure. With a higher outlet pressure setting, the monitor regulator senses a pressure lower than its setpoint and tries to increase outlet pressure by going wide open. If the working regulator fails, the monitoring regulator assumes control and holds the outlet pressure at its outlet pressure setting.



When the active regulator fails

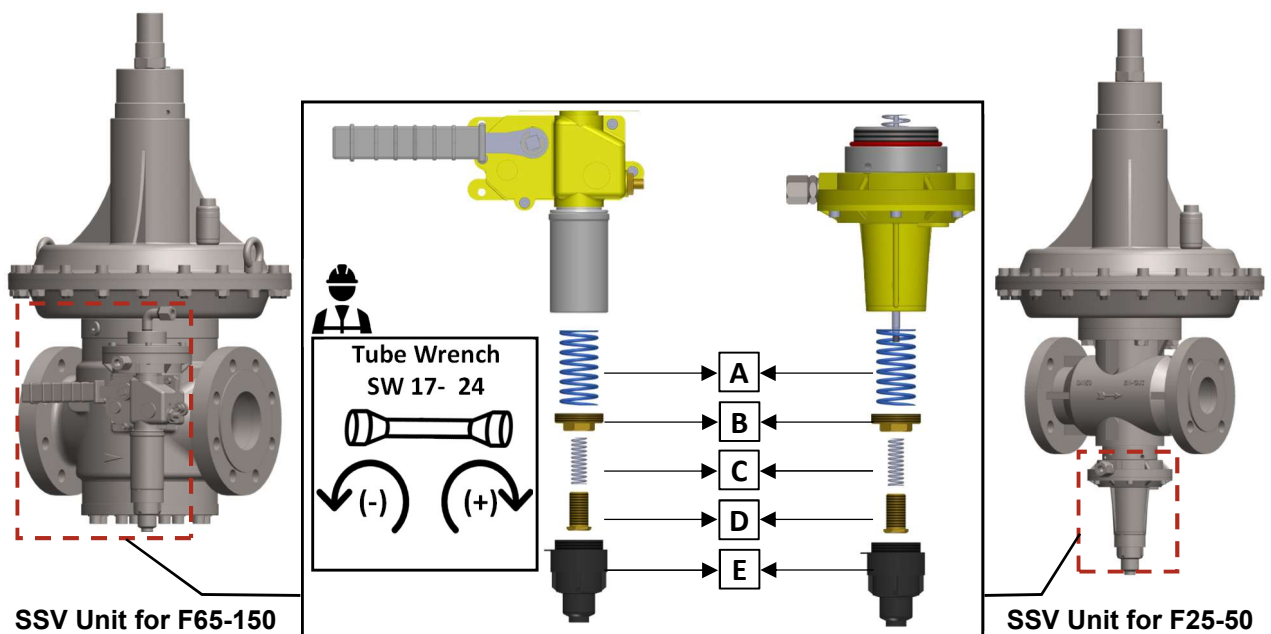
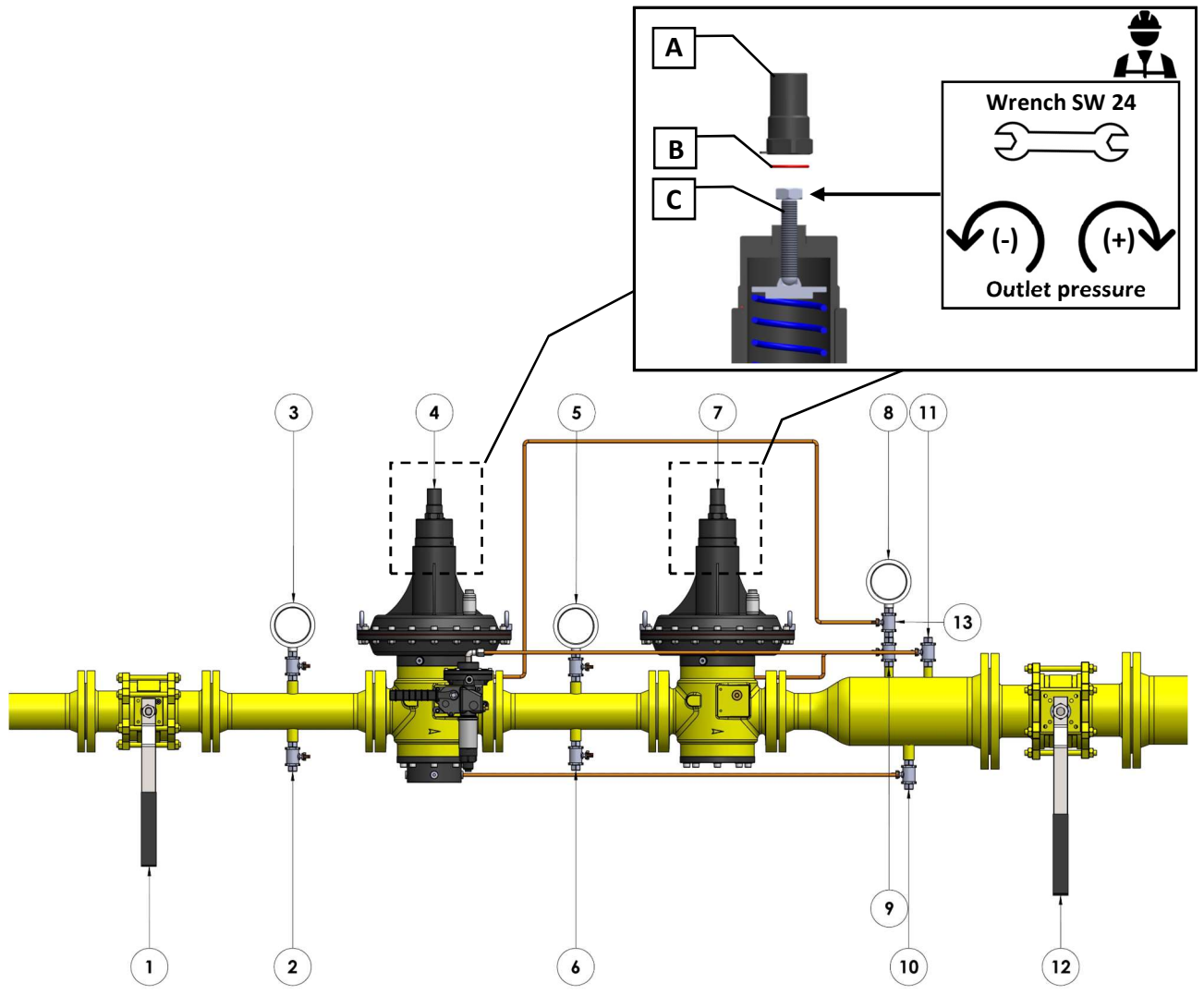
In normal operation, the working regulator controls the outlet pressure of the system. The monitoring regulator’s working actuator controls the intermediate pressure and the monitoring regulator senses the system’s outlet pressure. If the working regulator fails, the monitoring pilot will sense the increase in outlet pressure and take control.

If, due to any regulator fault, downstream pressure increases, when it exceeds the tolerated level, the monitor comes into operation and adjusts pressure to its own set value.




Gas Pressure Regulator, F Serie

Setting of the outlet pressure for monitor system with SSV




Setting of the outlet pressure for monitor system with SSV

With All Details

Pos	Practice
1	Use ring nut (B) to completely load maximum pressure spring (A). Loosen adjusting screw (D) to completely relieve minimum pressure spring (C).
2	Use a small pump or other appropriate means to raise pressure to normal operating level on the downstream vent valve (11).
3	Relatch controller and allow pressure to drop to minimum pressure triggering level.
4	Using adjusting screw (D), slowly load minimum pressure spring (C) until actuator triggers.
5	Repeat steps 2 and 3 above, making any necessary adjustments in setting. Least three times
6	Bring pressure back to normal values.
7	Relatch controller and raise pressure until it reaches maximum pressure triggering level.
8	Using ring nut (B), slowly unload spring (A) until actuator triggers.
9	Repeat steps 6 and 7 above, making any necessary adjustments in setting. Least three times
10	Close the downstream vent valve (11) and disconnect the external pressure source.
11	Open the manual vent valve on the outlet side to 30% (11).
	Remember the gas will discharge, check the safety requirements again
	Make sure the main outlet valve is closed (12)
12	Remove the protective cap A of active regulator (7).
13	Turn the adjusting screw C using an open-ended wrench SW 24 mm.
14	Turning the part with symbol (C) clockwise, set the output pressure of the active regulator(7) to the highest level.
15	Remove the protective cap A of active regulator (4).
16	Turn the adjusting screw C using an open-ended wrench SW 24 mm.
17	Set the active regulator(4) 10% above the required outlet pressure of the system
18a	Turning clockwise: the preload of the setpoint spring is increased and the outlet pressure is increased (+).
18b	Turning counter-clockwise: the setpoint spring is released and the outlet pressure reduced (-).
19	Check pressure gauge (8), verify pressure is 10% higher than required outlet pressure Adjust the monitor regulator to the required outlet pressure of the system

Setting of the outlet pressure for monitor system with SSV

With All Details









Pos	Practice
19a	Turning clockwise: the preload of the setpoint spring is increased and the outlet pressure is increased (+).
19b	Turning counter-clockwise: the setpoint spring is released and the outlet pressure reduced (-).
20	Check pressure gauge (8), verify pressure is outlet pressure of the system
	Check pressure gauge (4), the inlet and outlet pressure of the monitor regulator must be equal.
21	Close the manual vent valve on the outlet side (11).
22	Check the outlet pressure gauge (8), the outlet pressure should not rise more than 10% from the calibrated outlet pressure of Monitor regulator.
23	Close all valves (1) (2) (6) (10) (12), check leakage control with inlet and outlet manometers (3) (5) (8) and foaming liquid
24	If there is a leak, fix it and repeat step 9.
25	Open the main inlet and outlet valve (1) (12) slowly and ensure gas supply to the system


MAINTENANCE and REPAIR REGULATOR

Gas Pressure Regulator, F Serie

Equipment List for Maintenance and Repair

You must have the following hand tools for maintenance and repair. Check that the hand tools you use comply with the standards in your country.

Equipment	DN25 40 50	DN65 80 100	DN150	Images
Combination Wrench	10, 13, 17, 19, 24, 28, 42	7, 19, 24, 32, 42,	10, 19, 24, 32, 42,	
Hex Key Wrench T-Handle	5, 8	8	8, 12	
Screwdriver Sloted	8x150	-	-	
Hook Wrench	58/62, 80/90	58/62, 80/90	58/62, 80/90	
Double Ended Tubular Socket Wrench	17, 22, 27	17, 22, 27	17, 22, 27	
Circlip Pliers, External		19-60	19-60	
Adjustable Wrench	34	34	34	
O-ring Tool				









 the unit of all dimensions is mm

Abbreviations will be used in maintenance and repair instructions

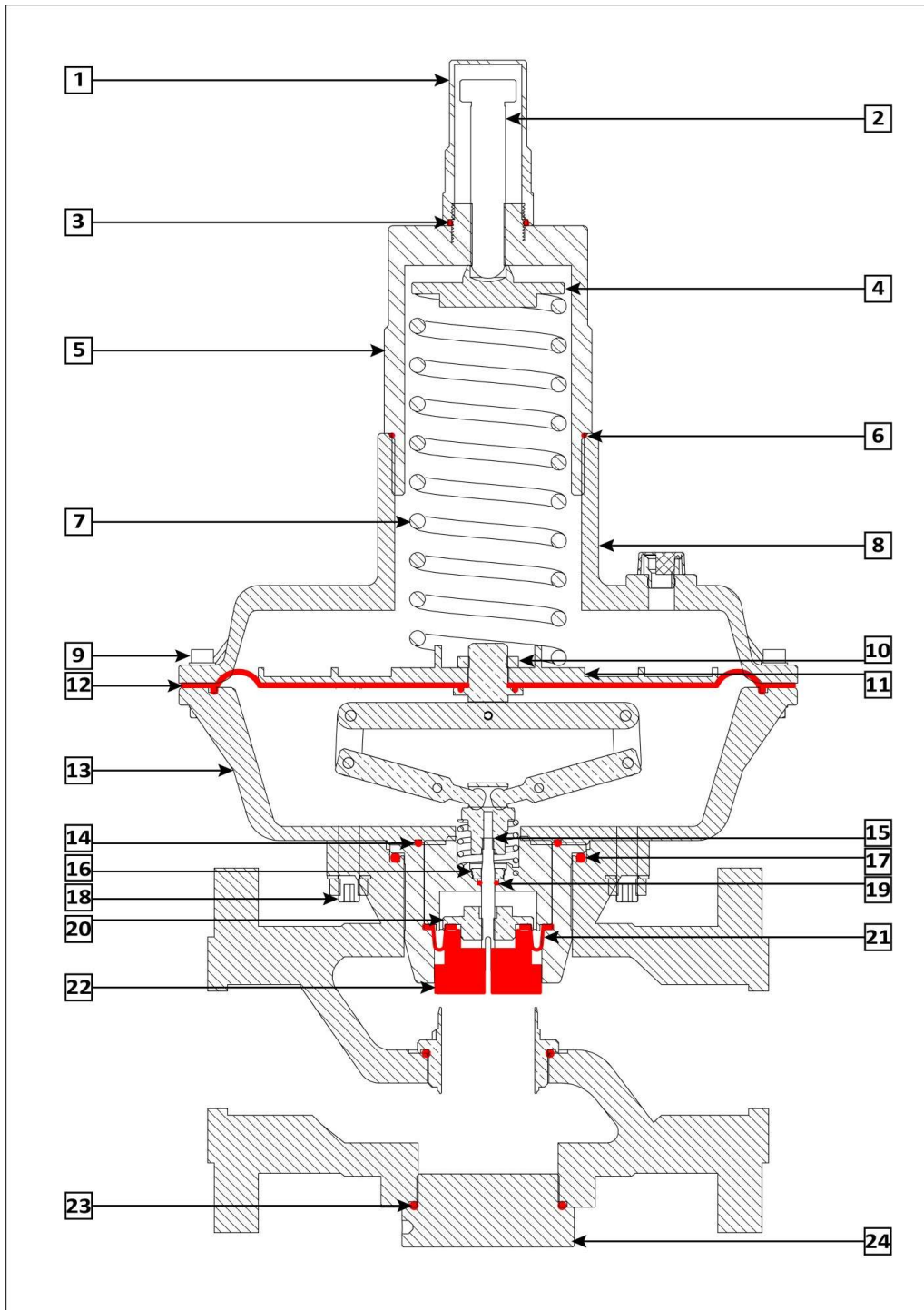
Equipment	Abbreviations
Combination Wrench	CW
Hex Key Wrench T-Handle	HK
Screwdriver Sloted	SS
Hook Wrench	HW
Double Ended Tubular Socket Wrench	SW
Circlip Pliers, External	CP
Adjustable Wrench	AW
O-ring Tool	OT

Personal Protective Equipmen List

All certified technical personnel must wear personal protective equipment. You must comply with the occupational safety rules of the local authorities you are in. You should use personal protective equipment that complies with the standards of the country you are in. Personal protective equipment must meet at least the following standards

Equipment	Standard	Images
Industrial safety helmet	EN 397:2012+A1:2012	
Safety goggles	EN 166:2001	
Ear muffs	EN 352-1:2002	
Protective coverall	EN 14605+A1	
Visibility vest	EN 20471 : 2013	
Safety shoes	EN 20345: 2004	
Protective mask	EN149:2001	
Safety glove	EN 1082-1:1996	

F Serie Regulator DN 1" – 2" Ø280 Actuator



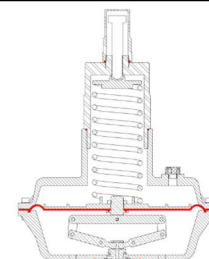
Before carrying out any work, it is important to ensure that the line on which the regulator is installed has been shut off upstream and downstream, and discharged.

Tighten all threaded parts with the correct torque.

Gas Pressure Regulator, Z Serie

F Serie Regulator DN 1" – 2" Ø280 Actuator

Reach the actuator part / change the main diaphragm

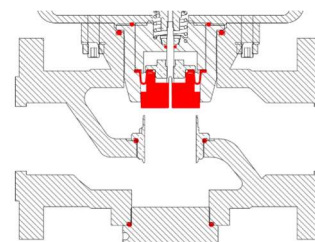


Step	Practice	Equipment and size
1	Unscrew and remove the locking protection cover (1)	CW42
2	Turn counterclockwise and remove the adjustment screw (2)	CW24
3	Remove the o-ring (3) from the spring cover (5). Clean the surface where the o-ring (3) is attached. Lubricate and replace new o-ring (3) with synthetic grease	OT
4	Turn counterclockwise and remove the spring cover (5)	HW80/90
5	Remove the o-ring (6) from the spring cover (5). Clean the surface where the o-ring (6) is attached. Lubricate and replace new o-ring (6) with synthetic grease	OT
6	Remove the spring disc (4) and remove the main spring (7)	
7	Undo and remove the nut and the screw (9)	HK5
8	Remove the main cover (8)	
9	Unscrew and remove the locking nut (10)	SW27
10	Remove the disc of the diaphragm (11) and remove the main diaphragm (12). Clean the surface where the main diaphragm (12) is attached.	
11	Fit the new main diaphragm (12).	
12	Fit the disc of the diaphragm (11).	
13	Insert the nut (9). Tork 40Nm	SW27
14	Fit the main cover (8). Please check; direction of the vent piece (8.1)	
15	Insert the nuts into the screws (9). Do not damage the main diaphragm (12) when installing the screws (9), check that the holes are in the center	HK5
16	Secure the screws (9) Tork 25Nm	HK5
17	Turn clockwise and screws the spring cover (5), check that the oring (6) is in place	HW80/90
18	Insert the the main spring (7) and spring disc (4)	
19	Insert the o-ring (3) on the spring cover (5).	
20	Turn clockwise and screws the adjustment screw (2).	CW24
21	Turn clockwise and locking protection cover (1)	CW42

Gas Pressure Regulator, Z Serie

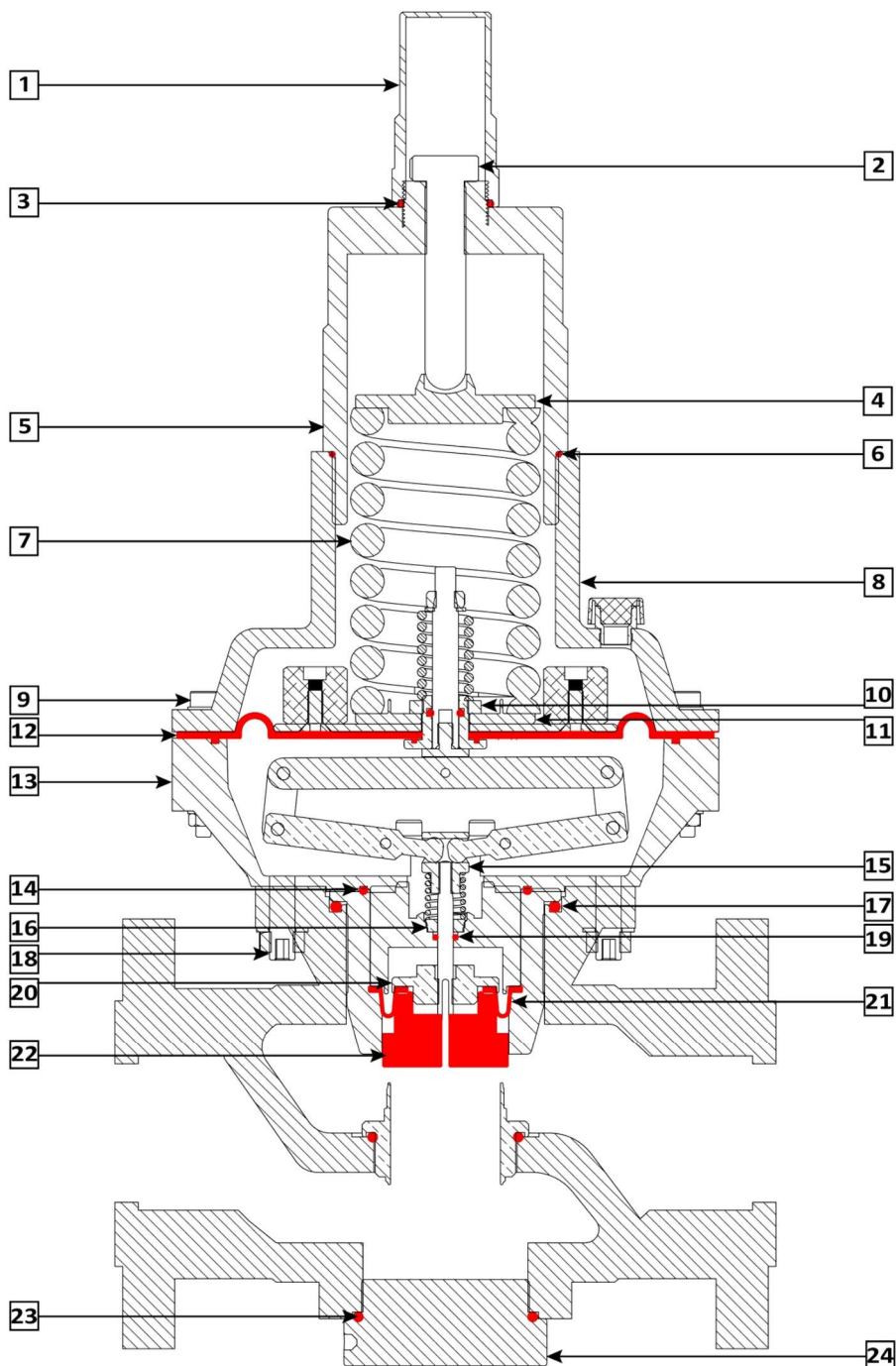
F Serie Regulator DN 1" – 2" Ø280 Actuator

Reach the body part / replace the compensation membrane and the closing plug



Step	Practice	Equipment and size
22	Unscrew and remove the nut (18).	CW17
23	Pulling up, separate the main actuator (13) from the regulator's.	
24	Disconnect the shaft (15) from the main actuator (13) by turning the block (28) counterclockwise	
25	Remove the o-ring (14) from the main actuator (13). Clean the surface where the o-ring (14) is attached. Lubricate and replace new o-ring (14) with synthetic grease	OT
26	Remove the o-ring (17) from the body (29). Clean the surface where the o-ring (17) is attached. Lubricate and replace new o-ring (17) with synthetic grease	OT
27	Detach it from the block (28) by pressing the closing plug (22) in reverse	
28	Unscrew the nut (16) to access the oring (19)	SS
29	Remove the o-ring (19). Clean the surface where the o-ring (19) is attached. Lubricate and replace new o-ring (19) with synthetic grease	OT
30	Unscrew and remove the special nut (20). Dont forget; hold the close plug (22) with hex key. Compensation diaphragm and closing plug will be separated	CW22, HK8
31	Reassemble the new compensation diaphragm and the new closing plug with the special nut	CW22, HK8
32	Put the closing plug (22) group back into the block (28)	
33	Turn clockwise the block (28) and screw on main actuator (13). Dont forget; check that new origin (14) main actuator is installed	
34	Insert the new o-ring (17) into its slot on the body.	
35	Mount the main actuator (13) with the block (28) on the body.	
36	Screw the nut (18).	CW17

F Serie Regulator DN 1" – 2" Ø210 Actuator

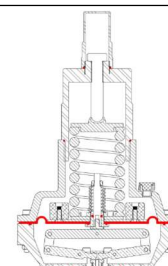


Before carrying out any work, it is important to ensure that the line on which the regulator is installed has been shut off upstream and downstream, and discharged.

Tighten all threaded parts with the correct torque.

Gas Pressure Regulator, Z Serie

F Serie Regulator DN 1" – 2" Ø210 Actuator



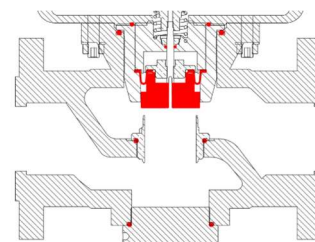
Reach the actuator part / change the main diaphragm

Step	Practice	Equipment and size
1	Unscrew and remove the locking protection cover (1)	CW42
2	Turn counterclockwise and remove the adjustment screw (2)	CW24
3	Remove the o-ring (3) from the spring cover (5). Clean the surface where the o-ring (3) is attached. Lubricate and replace new o-ring (3) with synthetic grease	OT
4	Turn counterclockwise and remove the spring cover (5)	HW80/90
5	Remove the o-ring (6) from the spring cover (5). Clean the surface where the o-ring (6) is attached. Lubricate and replace new o-ring (6) with synthetic grease	OT
6	Remove the spring disc (4) and remove the main spring (7)	
7	Undo and remove the nut and the screw (9)	HK5
8	Remove the main cover (8)	
9	Unscrew and remove the locking nut (10)	SW27
10	Remove the disc of the diaphragm (11) and remove the main diaphragm (12). Clean the surface where the main diaphragm (12) is attached.	
11	Fit the new main diaphragm (12).	
12	Fit the disc of the diaphragm (11).	
13	Insert the nut (10). Tork 40Nm	SW27
14	Fit the main cover (8). Please check; direction of the vent piece (8.1)	
15	Insert the nuts into the screws (9). Do not damage the main diaphragm (12) when installing the screws (9), check that the holes are in the center	HK5
16	Secure the screws (9) Tork 25Nm	HK5
17	Turn clockwise and screws the spring cover (5), check that the oring (6) is in place	HW80/90
18	Insert the the main spring (7) and spring disc (4)	
19	Insert the o-ring (3) on the spring cover (5).	
20	Turn clockwise and screws the adjustment screw (2).	CW24
21	Turn clockwise and locking protection cover (1)	CW42

Gas Pressure Regulator, Z Serie

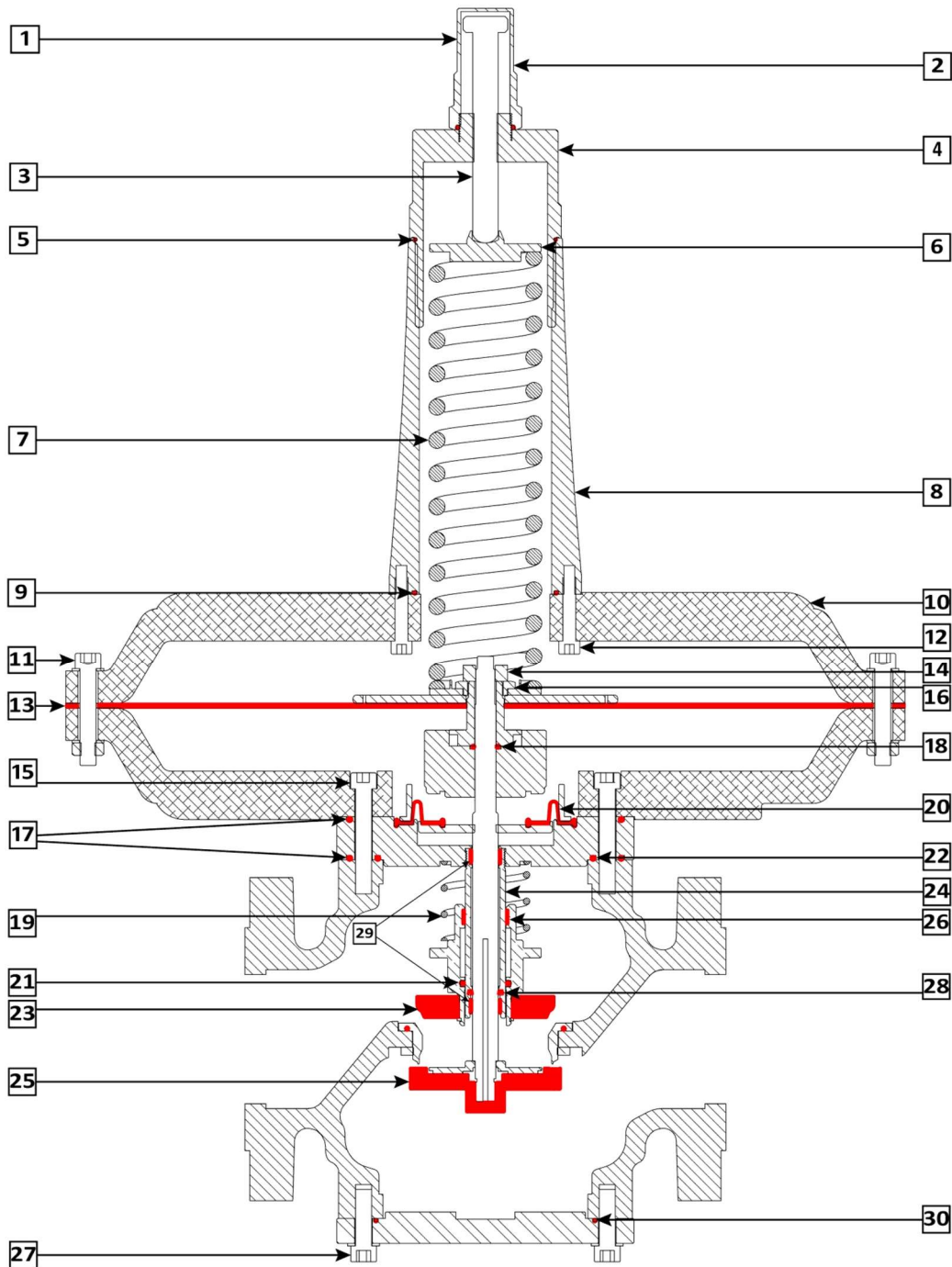
F Serie Regulator DN 1" – 2" Ø210 Actuator

Reach the body part / replace the compensation membrane and the closing plug



Step	Practice	Equipment and size
22	Unscrew and remove the nut (18).	CW17
23	Pulling up, separate the main actuator (13) from the regulator's.	
24	Disconnect the shaft (15) from the main actuator (13) by turning the block (28) counterclockwise	
25	Remove the o-ring (14) from the main actuator (13). Clean the surface where the o-ring (14) is attached. Lubricate and replace new o-ring (14) with synthetic grease	OT
26	Remove the o-ring (17) from the body (29). Clean the surface where the o-ring (17) is attached. Lubricate and replace new o-ring (17) with synthetic grease	OT
27	Detach it from the block (28) by pressing the closing plug (22) in reverse	
28	Unscrew the nut (16) to access the oring (19)	SS
29	Remove the o-ring (19). Clean the surface where the o-ring (19) is attached. Lubricate and replace new o-ring (19) with synthetic grease	OT
30	Unscrew and remove the special nut (20). Dont forget; hold the close plug (22) with hex key. Compensation diaphragm and closing plug will be separated	CW22, HK8
31	Reassemble the new compensation diaphragm and the new closing plug with the special nut	CW22, HK8
32	Put the closing plug (22) group back into the block (28)	
33	Turn clockwise the block (28) and screw on main actuator (13). Dont forget; check that new oring (14) main actuator is installed	
34	Insert the new o-ring (17) into its slot on the body.	
35	Mount the main actuator (13) with the block (28) on the body.	
36	Screw the nut (18).	CW17

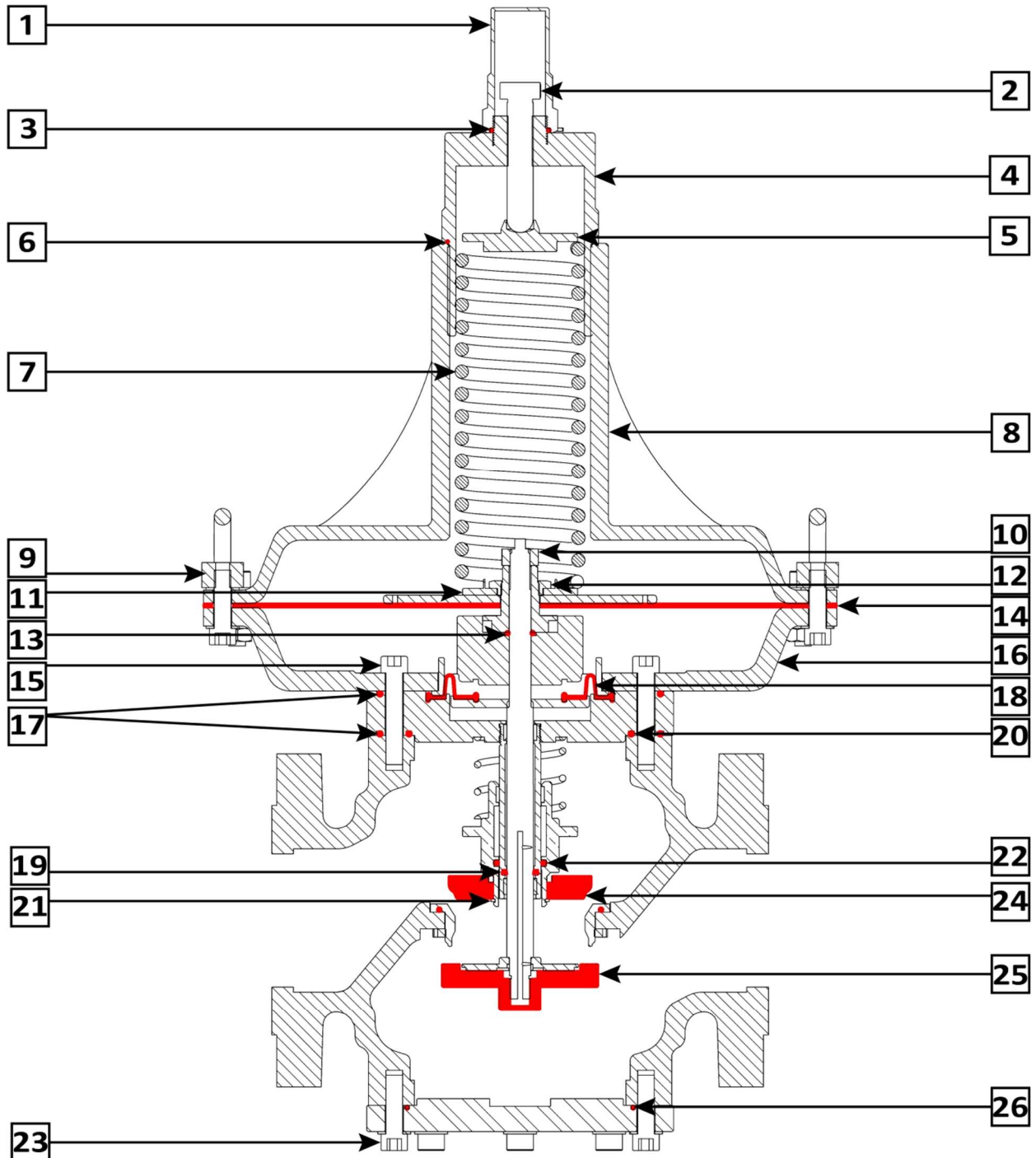
F Serie Regulator DN 21/2" – 3" BP or MP Ø520 Actuator



Before carrying out any work, it is important to ensure that the line on which the regulator is installed has been shut off upstream and downstream, and discharged.

Tighten all threaded parts with the correct torque.

F Serie Regulator DN 21/2" – 3" BP or MP Ø380 Actuator



Before carrying out any work, it is important to ensure that the line on which the regulator is installed has been shut off upstream and downstream, and discharged.

Tighten all threaded parts with the correct torque.

Gas Pressure Regulator, Z Serie
F Serie Regulator DN 21/2" – 3" BP or MP Ø380 Actuator

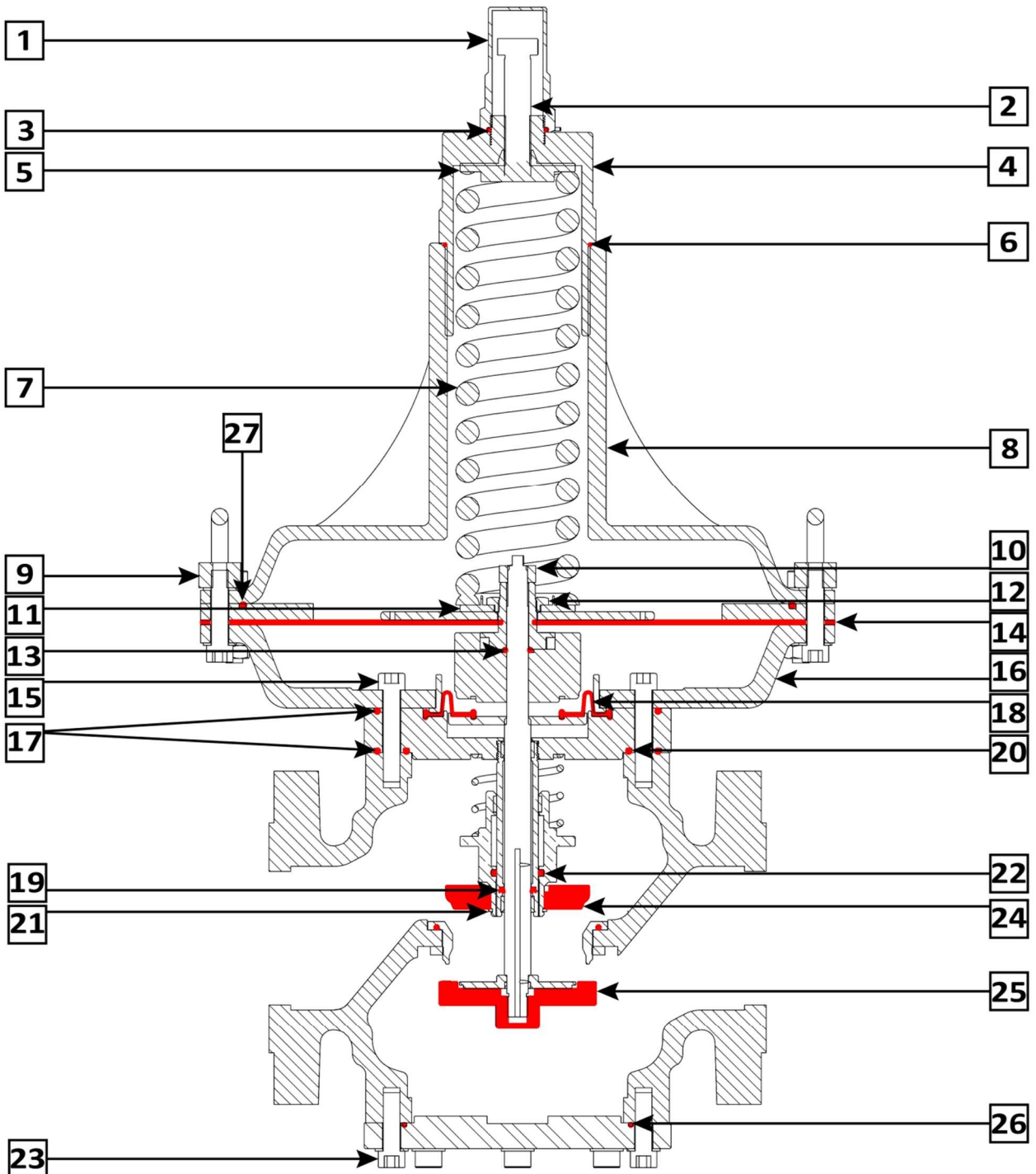
Step	Practice	Equipment and size
1	Unscrew and remove the locking protection cover (1)	CW42
2	Turn counterclockwise and remove the adjustment screw (2)	CW24
3	Remove the o-ring (3) from the spring cover (4). Clean the surface where the o-ring (3) is attached. Lubricate and replace new o-ring (3) with synthetic grease	OT
4	Turn counterclockwise and remove the spring cover (4)	HW80/90
5	Remove the o-ring (6) from the spring cover (4). Clean the surface where the o-ring (6) is attached. Lubricate and replace new o-ring (6) with synthetic grease	OT
6	Remove the spring disc (5) and remove the main spring (7)	
7	Undo and remove the bolt and the screw (9)	HK8
8	Remove the main cover (8)	
9	Unscrew and remove the locking nut (10)	CW19
10	Pull and remove the closing plug (25), replace new closing pad	CW7 and 24
11	Undo and remove the nut and the screw (12)	CW32
12	Pull up the spring disk (11), diaphragm disk (28) and main diaphragm (14)	
13	Undo and remove the bolt and the screw (23)	HK8
14	Remove the o-ring (26) from the body cover (27). Clean the surface where the o-ring (26) is attached. Lubricate and replace new o-ring (26) with synthetic grease	OT
15	Pull up the shaft bushing (41)	
16	Remove the o-ring (13) from the bearing of the compensation membrane (43). Clean the surface where the o-ring (13) is attached. Lubricate and replace new o-ring (13) with synthetic grease	OT
17	Pull up the bearing of the compensation membrane (43)	
18	Undo and remove the bolt and the screw (15)	HK8
19	Remove the main bottom cover (16)	
20	Pull up to ring of the compensation membrane (44) with compensation membrane (18)	
21	Remove the o-ring (17) and oring (19) from the body cover (45). Clean the surface where the o-ring (17) (19) is attached. Lubricate and replace new o-ring (17) (19) with synthetic grease	OT

F Serie Regulator DN 21/2" – 3" BP or MP Ø380 Actuator

Step	Practice	Equipment and size
22*	Pull up the closing pad group (19) (24) (22)	
23*	Remove the o-ring (22) from the closing pad group. Clean the surface where the o-ring (22) is attached. Lubricate and replace new o-ring (22) with synthetic grease	OT
24	Remove the lip seal (19) from the shaft. Clean the surface where the o-ring (19) is attached. Lubricate and replace new o-ring (19) with synthetic grease	OT
25*	Remove the collar of the closing pad (21)	CP19-60
26*	Remove and replace closing pad (24)	
27*	Fit the collar of the closing pad (21)	CP19-60
28*	Fit the closing pad group on the shaft	
29	Replace compensation membrane (18) and Fit ring of the compensation membrane (44) with	
30	Fit the main bottom cover (16)	
31	Turn clockwise and screw the bolt and the screw (15).Tork 25Nm	HK8
32	Fit the bearing of the compensation membrane (43)	
33	Fit the shaft bushing (41)	
34	Plug and fix the closing plug (25)	
35	Fix the locking nut (10) 40Nm	CW19
36	Remove the main cover (8)	
38	Insert the spring disk (11), diaphragm disk (28) and main diaphragm (14)	
39	Turn clockwise and screw nut and the screw (12). Tork 35Nm	CW32
40	Fit the main cover (8). Please check; direction of the vent piece (8.1)	
41	Turn clockwise and screw the bolt and the screw (9). Tork 25Nm	HK8
42	Insert the main spring (7) and spring disc (5)	
43	Insert the o-ring (3) on the spring cover (4).	OT
44	Turn clockwise and screws the adjustment screw (2).	CW24
45	Turn clockwise and locking protection cover (1)	CW42

* if the regulator contains ssv

F Serie Regulator DN 2 1/2" – 3" Ø380 AP or AAP Actuator



Before carrying out any work, it is important to ensure that the line on which the regulator is installed has been shut off upstream and downstream, and discharged.

Tighten all threaded parts with the correct torque.

Gas Pressure Regulator, Z Serie
F Serie Regulator DN 21/2" – 3" Ø380 AP or AAP Actuator

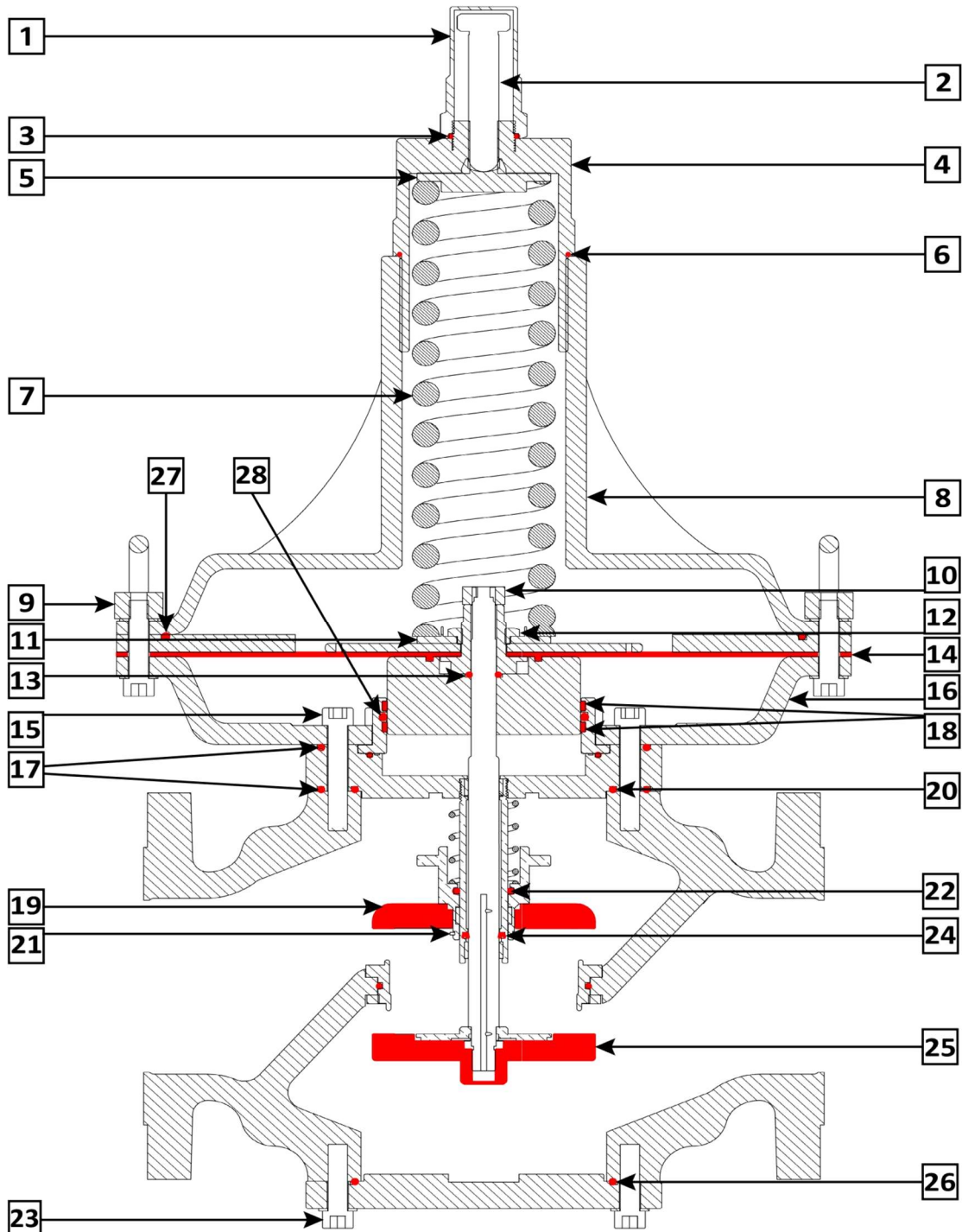
Step	Practice	Equipment and size
1	Unscrew and remove the locking protection cover (1)	CW42
2	Turn counterclockwise and remove the adjustment screw (2)	CW24
3	Remove the o-ring (3) from the spring cover (4). Clean the surface where the o-ring (3) is attached. Lubricate and replace new o-ring (3) with synthetic grease	OT
4	Turn counterclockwise and remove the spring cover (4)	HW80/90
5	Remove the o-ring (6) from the spring cover (4). Clean the surface where the o-ring (6) is attached. Lubricate and replace new o-ring (6) with synthetic grease	OT
6	Remove the spring disc (5) and remove the main spring (7)	
7	Undo and remove the bolt and the screw (9)	HK8
8	Remove the main cover (8)	
9	Remove the o-ring (27) from the disk of main diaphragm (32). Clean the surface where the o-ring (27) is attached. Lubricate and replace new o-ring (27) with synthetic grease	
10	Remove the disk of main diaphragm (32)	
11	Unscrew and remove the locking nut (10)	CW19
12	Pull and remove the closing plug (25), replace new closing pad	CW7 and 24
13	Undo and remove the nut and the screw (12)	CW32
14	Pull up the spring disk (11), diaphragm disk (28) and main diaphragm (14)	
15	Undo and remove the bolt and the screw (23)	HK8
16	Remove the o-ring (26) from the body cover (27). Clean the surface where the o-ring (26) is attached. Lubricate and replace new o-ring (26) with synthetic grease	OT
17	Pull up the shaft bushing (41)	
18	Remove the o-ring (13) from the bearing of the compensation membrane (43). Clean the surface where the o-ring (13) is attached. Lubricate and replace new o-ring (13) with synthetic grease	OT
19	Pull up the bearing of the compensation membrane (43)	
20	Undo and remove the bolt and the screw (15)	HK8
21	Remove the main bottom cover (16)	
22	Pull up to ring of the compensation membrane (44) with compensation membrane (18)	
23	Remove the o-ring (17) and oring (20) from the body cover (45). Clean the surface where the o-ring (17) (20) is attached. Lubricate and replace new o-ring (17) (20) with synthetic grease	OT

Gas Pressure Regulator, Z Serie
F Serie Regulator DN 21/2" – 3" Ø380 AP or AAP Actuator

Step	Practice	Equipment and size
24*	Pull up the closing pad group (19) (24) (22)	
25*	Remove the o-ring (22) from the closing pad group. Clean the surface where the o-ring (22) is attached. Lubricate and replace new o-ring (22) with synthetic grease	OT
26	Remove the lip seal (19) from the shaft. Clean the surface where the o-ring (19) is attached. Lubricate and replace new o-ring (19) with synthetic grease	OT
27*	Remove the collar of the closing pad (21)	CP19-60
28*	Remove and replace closing pad (24)	
29*	Fit the collar of the closing pad (21)	CP19-60
30*	Fit the closing pad group on the shaft	
31	Replace compensation membrane (18) and Fit ring of the compensation membrane (44) with	
32	Fit the main bottom cover (16)	
33	Turn clockwise and screw the bolt and the screw (15).Tork 25Nm	HK8
34	Fit the bearing of the compensation membrane (43)	
35	Fit the shaft bushing (41)	
36	Plug and fix the closing plug (25)	
37	Fix the locking nut (10) 40Nm	CW19
38	Fix the disk of main diaphragm (32)	
39	Fix the main cover (8)	
40	Insert the spring disk (11), diaphragm disk (28) and main diaphragm (14)	
41	Turn clockwise and screw nut and the screw (12). Tork 35Nm	CW32
42	Fit the main cover (8). Please check; direction of the vent piece (8.1)	
43	Turn clockwise and screw the bolt and the screw (9). Tork 25Nm	HK8
44	Insert the main spring (7) and spring disc (5)	
45	Insert the o-ring (3) on the spring cover (4).	OT
46	Turn clockwise and screws the adjustment screw (2).	CW24
47	Turn clockwise and locking protection cover (1)	CW42

* if the regulator contains ssv

F Serie Regulator DN 4" – 6" Ø380 Actuator



Before carrying out any work, it is important to ensure that the line on which the regulator is installed has been shut off upstream and downstream, and discharged.

Tighten all threaded parts with the correct torque.

Gas Pressure Regulator, Z Serie
F Serie Regulator DN 4" – 6" Ø380 Actuator

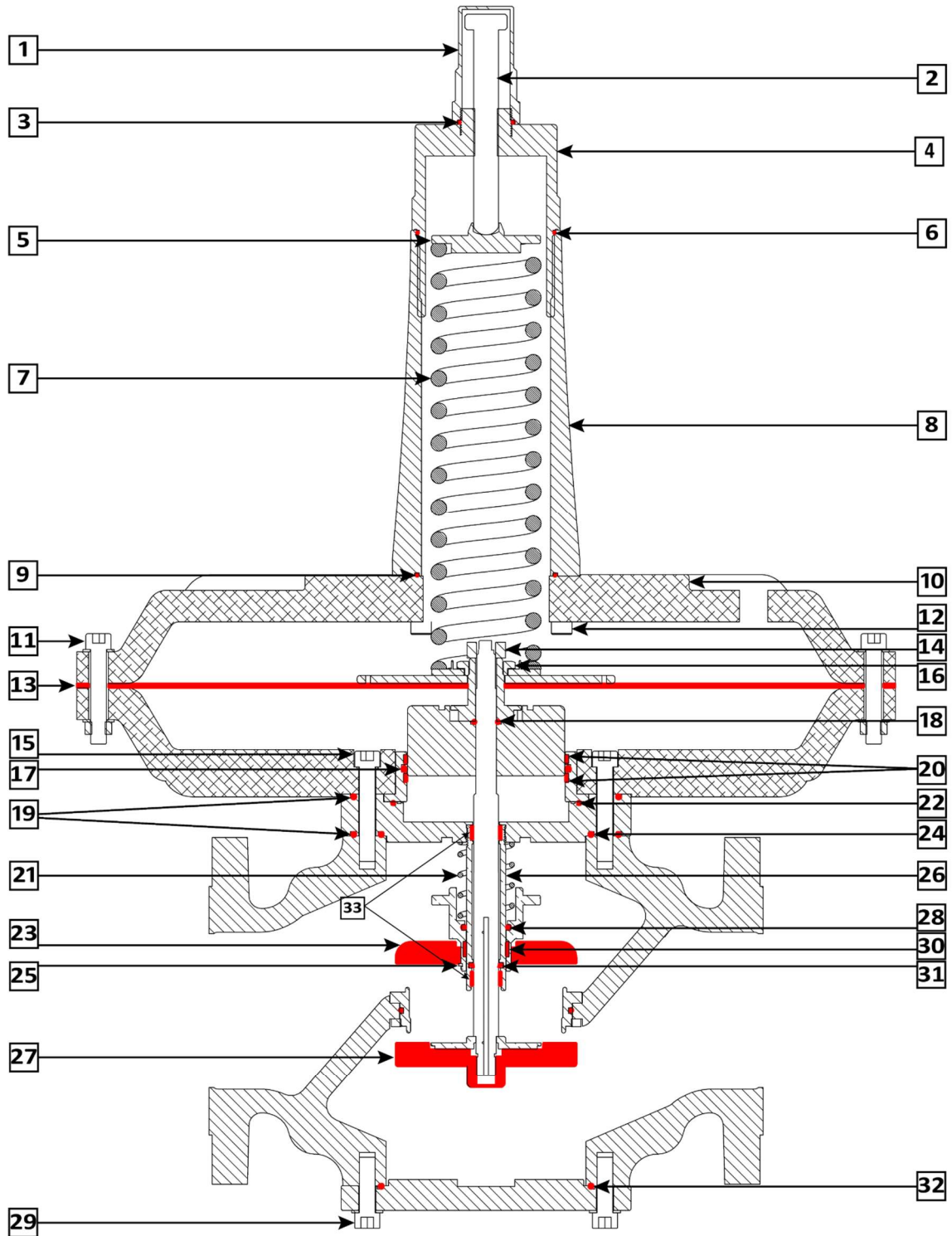
Step	Practice	Equipment and size
1	Unscrew and remove the locking protection cover (1)	CW42
2	Turn counterclockwise and remove the adjustment screw (2)	CW24
3	Remove the o-ring (3) from the spring cover (4). Clean the surface where the o-ring (3) is attached. Lubricate and replace new o-ring (3) with synthetic grease	OT
4	Turn counterclockwise and remove the spring cover (4)	HW80/90
5	Remove the o-ring (6) from the spring cover (4). Clean the surface where the o-ring (6) is attached. Lubricate and replace new o-ring (6) with synthetic grease	OT
6	Remove the spring disc (5) and remove the main spring (7)	
7	Undo and remove the bolt and the screw (9)	HK8
8	Remove the main cover (8)	
9	Remove the o-ring (27) from the disk of main diaphragm (32). Clean the surface where the o-ring (27) is attached. Lubricate and replace new o-ring (27) with synthetic grease	
10	Remove the disk of main diaphragm (32)	
11	Unscrew and remove the locking nut (10)	CW19
12	Pull and remove the closing plug (25), replace new closing pad	CW7 and 24
13	Undo and remove the nut and the screw (12)	CW32
14	Pull up the spring disk (11), diaphragm disk (28) and main diaphragm (14)	
15	Undo and remove the bolt and the screw (23)	HK8
16	Remove the o-ring (26) from the body cover (27). Clean the surface where the o-ring (26) is attached. Lubricate and replace new o-ring (26) with synthetic grease	OT
17	Pull up the shaft bushing (41)	
18	Remove the o-ring (13) from the bearing of the compensation membrane (43). Clean the surface where the o-ring (13) is attached. Lubricate and replace new o-ring (13) with synthetic grease	OT
19	Pull up the bearing of the compensation piston (43)	
20	Undo and remove the bolt and the screw (15)	HK8
21	Remove the main bottom cover (16)	
22	Pull up to ring of the compensation piston (44) with compensation piston (45)	
23	Remove the o-ring (17) and oring (20) from the body cover (45). Clean the surface where the o-ring (17) (20) is attached. Lubricate and replace new o-ring (17) (20) with synthetic grease	OT

Gas Pressure Regulator, Z Serie
F Serie Regulator DN 4" – 6" Ø380 Actuator

Step	Practice	Equipment and size
24	Remove the o-ring (18) and guiding element (28) from the bearing of the compensation piston (45). Clean the surface where the o-ring (18) (28) is attached. Lubricate and replace new o-ring (18) (28) with synthetic grease	OT
25*	Pull up the closing pad group (19) (24) (22)	
26*	Remove the o-ring (22) from the closing pad group. Clean the surface where the o-ring (22) is attached. Lubricate and replace new o-ring (22) with synthetic grease	OT
27	Remove the lip seal (19) from the shaft. Clean the surface where the o-ring (19) is attached. Lubricate and replace new o-ring (19) with synthetic grease	OT
28*	Remove the collar of the closing pad (21)	CP19-60
29*	Remove and replace closing pad (24)	
30*	Fit the collar of the closing pad (21)	CP19-60
31*	Fit the closing pad group on the shaft	
32	Replace compensation membrane (18) and Fit ring of the compensation membrane (44) with	
33	Fit the main bottom cover (16)	
34	Turn clockwise and screw the bolt and the screw (15).Tork 25Nm	HK8
35	Fit the bearing of the compensation membrane (43)	
36	Fit the shaft bushing (41)	
37	Plug and fix the closing plug (25)	
38	Fix the locking nut (10) 40Nm	CW19
39	Fix the disk of main diaphragm (32)	
40	Fix the main cover (8)	
41	Insert the spring disk (11), diaphragm disk (28) and main diaphragm (14)	
42	Turn clockwise and screw nut and the screw (12). Tork 35Nm	CW32
43	Fit the main cover (8). Please check; direction of the vent piece (8.1)	
44	Turn clockwise and screw the bolt and the screw (9). Tork 25Nm	HK8
45	Insert the main spring (7) and spring disc (5)	
46	Insert the o-ring (3) on the spring cover (4).	OT
47	Turn clockwise and screws the adjustment screw (2).	CW24
48	Turn clockwise and locking protection cover (1)	CW42

* if the regulator contains ssv

F Serie Regulator DN 4" – 6" Ø520 Actuator



Before carrying out any work, it is important to ensure that the line on which the regulator is installed has been shut off upstream and downstream, and discharged.

Tighten all threaded parts with the correct torque.

Gas Pressure Regulator, Z Serie
F Serie Regulator DN 4" – 6" Ø520 Actuator

Step	Practice	Equipment and size
1	Unscrew and remove the locking protection cover (1)	CW42
2	Turn counterclockwise and remove the adjustment screw (2)	CW24
3	Remove the o-ring (3) from the spring cover (4). Clean the surface where the o-ring (3) is attached. Lubricate and replace new o-ring (3) with synthetic grease	OT
4	Turn counterclockwise and remove the spring cover (4)	HW80/90
5	Remove the o-ring (6) from the spring cover (4). Clean the surface where the o-ring (6) is attached. Lubricate and replace new o-ring (6) with synthetic grease	OT
6	Remove the spring disc (5) and remove the main spring (7)	
7	Undo and remove the bolt and the screw (11)	HK8
8	Remove the main cover (8)	
11	Unscrew and remove the locking nut (14)	CW19
12	Pull and remove the closing plug (27), replace new closing pad	CW7 and 24
13	Undo and remove the nut and the screw (16)	CW32
14	Pull up the spring disk (41), diaphragm disk (42) and main diaphragm (13)	
15	Undo and remove the bolt and the screw (15)	HK8
16	Remove the o-ring (19) (24) from the body cover (44). Clean the surface where the o-ring (19) (24) is attached. Lubricate and replace new o-ring (19 (24)) with synthetic grease	OT
17	Pull up the shaft bushing (47)	
18	Remove the o-ring (18) from the bearing of the compensation piston (48). Clean the surface where the o-ring (18) is attached. Lubricate and replace new o-ring (18) with synthetic grease	OT
19	Pull up the bearing of the compensation piston (48)	
20	Undo and remove the bolt and the screw (15)	HK8
21	Remove the main bottom cover (50)	
22	Pull up to ring of the compensation piston (49) with compensation piston (48)	
23	Remove the o-ring (17) and oring (22) from the body cover (45). Clean the surface where the o-ring (17) (20) is attached. Lubricate and replace new o-ring (17) (22) with synthetic grease	OT

Gas Pressure Regulator, Z Serie
F Serie Regulator DN 4" – 6" Ø520 Actuator

Step	Practice	Equipment and size
24	Remove the o-ring (17) and guiding element (20) from the bearing of the compensation piston (49). Clean the surface where the o-ring (17) (20) is attached. Lubricate and replace new o-ring (17) (20) with synthetic grease	OT
25*	Pull up the closing pad group (23) (21) (28)	
26*	Remove the o-ring (31) from the closing pad group. Clean the surface where the o-ring (31) is attached. Lubricate and replace new o-ring (31) with synthetic grease	OT
27	Remove the lip seal (30) from the shaft. Clean the surface where the o-ring (30) is attached. Lubricate and replace new o-ring (30) with synthetic grease	OT
28*	Remove the collar of the closing pad (25)	CP19-60
29*	Remove and replace closing pad (23)	
30*	Fit the collar of the closing pad (25)	CP19-60
31*	Fit the closing pad group on the shaft	
32	Replace bearing of compensation piston (18) and Fit ring of the compensation piston (18)	
33	Fit the main bottom cover (50)	
34	Turn clockwise and screw the bolt and the screw (15).Tork 25Nm	HK8
35	Fit the bearing of the compensation piston (43)	
36	Fit the shaft bushing (41)	
37	Plug and fix the closing plug (27)	
38	Fix the locking nut (14) 40Nm	CW19
41	Insert the spring disk (41), diaphragm disk (42) and main diaphragm (13)	
42	Turn clockwise and screw nut and the screw (16). Tork 35Nm	CW32
43	Fit the main cover (8). Please check; direction of the vent piece (8.1)	
44	Turn clockwise and screw the bolt and the screw (11). Tork 25Nm	HK8
45	Insert the main spring (7) and spring disc (5)	
46	Insert the o-ring (3) on the spring cover (4).	OT
47	Turn clockwise and screws the adjustment screw (2).	CW24
48	Turn clockwise and locking protection cover (1)	CW42

* if the regulator contains ssv








MAINTENANCE and REPAIR


SLUM SHUT

Gas Pressure Regulator, F Serie

Equipment List for Maintenance and Repair

You must have the following hand tools for maintenance and repair. Check that the hand tools you use comply with the standards in your country.

Equipment	DN25 – 50 BP-MP	DN25 – 50 AP-AAP	DN65 – 150 BP-MP	DN65 – 150 AP-AAP	Images
Combination Wrench	30,10,17	42,10,17			
Hex Key Wrench T-Handle	4	5	5,6	5,6	
Screwdriver Slotted	8x150	8x150			
Hook Wrench	58/62, 80/90	58/62, 80/90			
Circlip Pliers, External	5-15mm	5-15mm	5-15mm		
Adjustable Wrench	34	34	34		
O-ring Tool					

 the unit of all dimensions is mm









Abbreviations will be used in maintenance and repair instructions

Equipment	Abbreviations
Combination Wrench	CW
Hex Key Wrench T-Handle	HK
Screwdriver Slotted	SS
Hook Wrench	HW
Double Ended Tubular Socket Wrench	SW
Circlip Pliers, External	CP
Adjustable Wrench	AW
O-ring Tool	OT

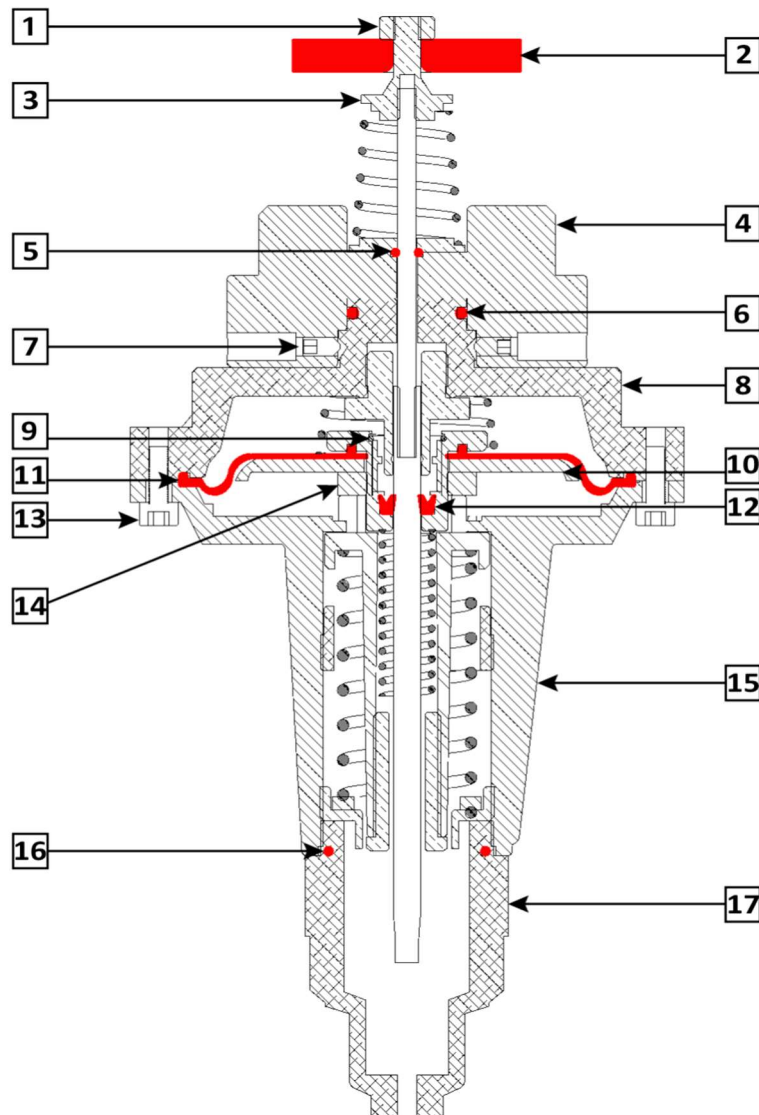
Gas Pressure Regulator, F Serie

Personal Protective Equipmen List

All certified technical personnel must wear personal protective equipment. You must comply with the occupational safety rules of the local authorities you are in. You should use personal protective equipment that complies with the standards of the country you are in. Personal protective equipment must meet at least the following standards

Equipment	Standard	Images
Industrial safety helmet	EN 397:2012+A1:2012	
Safety goggles	EN 166:2001	
Ear muffs	EN 352-1:2002	
Protective coverall	EN 14605+A1	
Visibility vest	EN 20471 : 2013	
Safety shoes	EN 20345: 2004	
Protective mask	EN149:2001	
Safety glove	EN 1082-1:1996	

Slum Shut DN 1" – 2" BP-MP Actuator



Before carrying out any work, it is important to ensure that the line on which the regulator is installed has been shut off upstream and downstream, and discharged.

Tighten all threaded parts with the correct torque.

Slam Shut DN 1" – 2" **BP-MP** Actuator

Step	Practice	Equipment and size
1	Undo and remove the screw (13)	CW42
2	pull off main cover (15)	CW24
3	pull out the diaphragm group (11)	OT
4	unscrew the nut (14)	HW80/90
5	remove the old diaphragm and replace it with a new one (11)	OT
6	replace and tighten the nut (14)	
7	replace the diaphragm assembly (11)	HK8
8	remove the circlip (9)	
11	Lubricate and replace new felt (12) with synthetic grease	CW19
12	Fix part (13) with the wrench and loosen part (1) and remove it	CW7 and 24
13	replace the shutdown disk with a new one	CW32
14	Fix part (13) with the wrench and tighten part (1) replace and fix the main cover (15)	
15	tighten the screws (13)	HK8

 It is recommended that slam-shut controller efficiency be checked periodically.

Cut-off Test

Pos	Practice
1	Close inlet and outlet main valves (1) (5). The controller should trigger at minimum pressure (only if so set).
2	Using a small pump or other appropriate means on the downstream vent valve (2) , raise pressure in the line to normal operating level. Relatch controller in case it has triggered following on step 1 above.
3	Simulate pressure increase until maximum triggering pressure is reached.
4	Bring the line back to full operating conditions as described in Startup procedure.

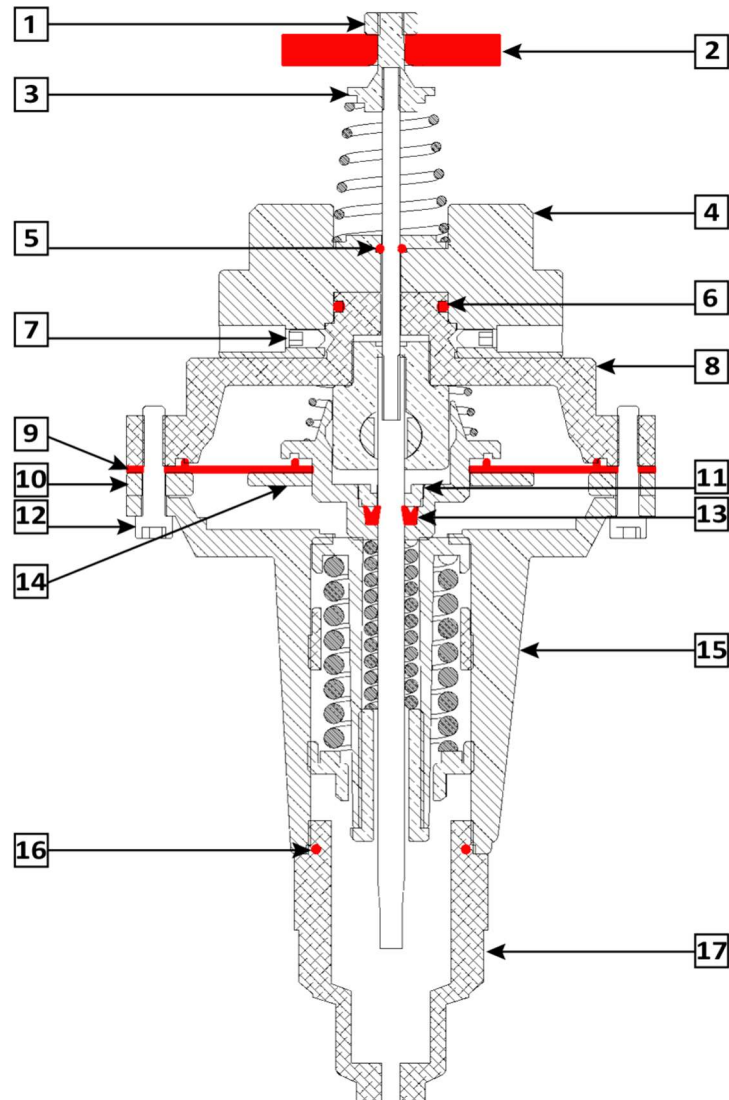
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Controller-seal Check

Pos	Practice
1	Slowly close the main outlet valve (5) located downstream.
2	Disable the ssv unit and close the stream
3	Loosen one fitting in the line downstream of the slam-shut valve and apply soapy water in order to make sure that there are no leaks. In case of any leak being detected, proceed with the necessary maintenance of the controller.

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Slum Shut DN 1" – 2" AP or AAP Actuator



Before carrying out any work, it is important to ensure that the line on which the regulator is installed has been shut off upstream and downstream, and discharged.

Tighten all threaded parts with the correct torque.

Slam Shut DN 1" – 2" AP or AAP Actuator

Step	Practice	Equipment and size
1	Undo and remove the screw (12)	CW42
2	pull off main cover (15)	CW24
3	pull out the diaphragm group (9)	OT
4	unscrew the nut (14)	HW80/90
5	remove the old diaphragm and replace it with a new one replace (9)	OT
6	and tighten the nut (14)	
7	replace the diaphragm assembly (14)	HK8
8	remove the circlip (11)	
11	Lubricate and replace new felt (13) with synthetic grease	CW19
12	Fix part (3) with the wrench and loosen part (1) and remove it	CW7 and 24
13	replace the shutdown disk (2) with a new one	CW32
14	Fix part (3) with the wrench and tighten part (1) replace and fix the main cover (15)	
15	tighten the screws (12)	HK8

 It is recommended that slam-shut controller efficiency be checked periodically.

Cut-off Test

Pos	Practice
1	Close inlet and outlet main valves (1) (5). The controller should trigger at minimum pressure (only if so set).
2	Using a small pump or other appropriate means on the downstream vent valve (2) , raise pressure in the line to normal operating level. Relatch controller in case it has triggered following on step 1 above.
3	Simulate pressure increase until maximum triggering pressure is reached.
4	Bring the line back to full operating conditions as described in Startup procedure.

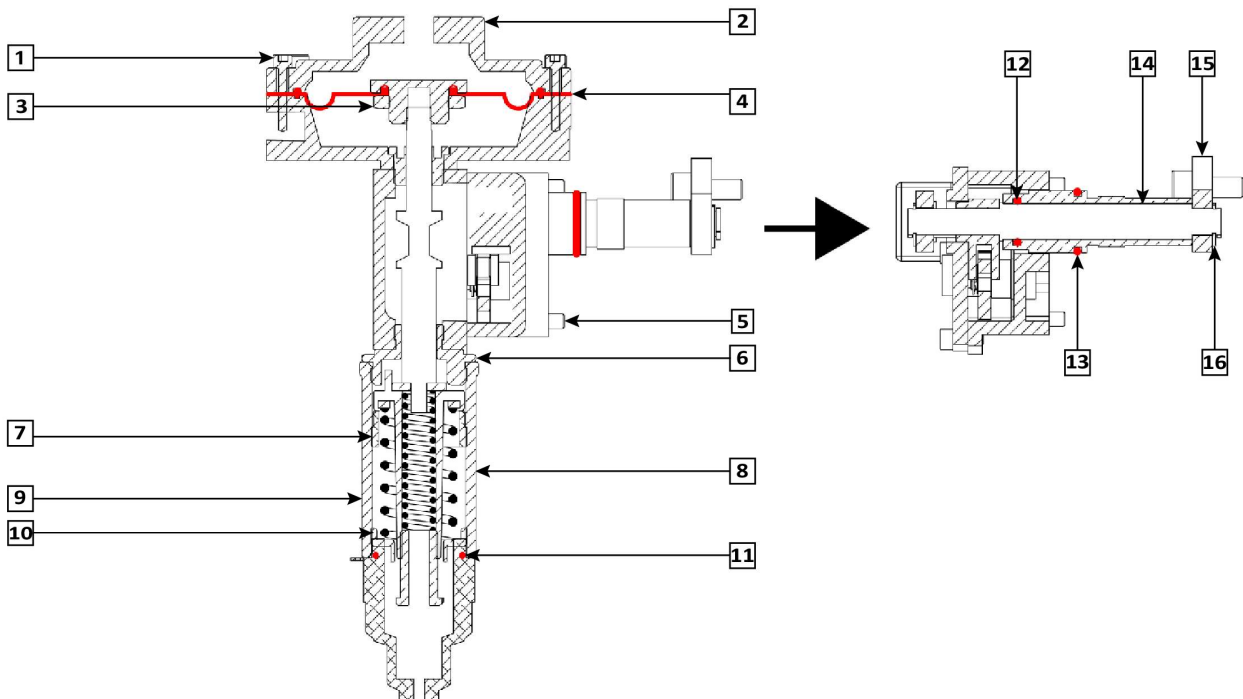
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Controller-seal Check

Pos	Practice
1	Slowly close the main outlet valve (5) located downstream.
2	Disable the ssv unit and close the stream
3	Loosen one fitting in the line downstream of the slam-shut valve and apply soapy water in order to make sure that there are no leaks. In case of any leak being detected, proceed with the necessary maintenance of the controller.

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Slum Shut DN 2 1/2" – 6" BP-MP-AP-AAP Actuator



Before carrying out any work, it is important to ensure that the line on which the regulator is installed has been shut off upstream and downstream, and discharged.

Tighten all threaded parts with the correct torque.

Slam Shut DN 21/2" – 6" BP-MP-AP-AAP Actuator

Step	Practice	Equipment and size
1	Undo and remove the screw (1)	CW42
2	pull off main cover (2)	CW24
3	pull out the diaphragm group (4)	OT
4	unscrew the nut (3)	HW80/90
5	remove the old diaphragm and replace it with a new one replace (4)	OT
6	and tighten the nut (3)	
7	replace the diaphragm assembly (3)	HK8
14	fix the main cover (2)	
15	tighten the screws (1)	HK8

 **It is recommended that slam-shut controller efficiency be checked periodically.**

Cut-off Test

Pos	Practice
1	Close inlet and outlet main valves (1) (5). The controller should trigger at minimum pressure (only if so set).
2	Using a small pump or other appropriate means on the downstream vent valve (2) , raise pressure in the line to normal operating level. Relatch controller in case it has triggered following on step 1 above.
3	Simulate pressure increase until maximum triggering pressure is reached.
4	Bring the line back to full operating conditions as described in Startup procedure.

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Controller-seal Check

Pos	Practice
1	Slowly close the main outlet valve (5) located downstream.
2	Disable the ssv unit and close the stream
3	Loosen one fitting in the line downstream of the slam-shut valve and apply soapy water in order to make sure that there are no leaks. In case of any leak being detected, proceed with the necessary maintenance of the controller.

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Gas Pressure Regulator, F Serie

NOTES

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