

DESCRIPTION

The RS 2500 BP Regulator is designed for use in distribution networks with low to medium inlet pressures.

They are direct acting regulator, where the spring housing/regulator head (1) is mounted directly to the screwed body (2).

The RS 2510 BP versions include an optional SAV (Over-Pressure [OPSO] and/or Under-Pressure [UPS0]) Shut-Off facility, which take the place of the lower body plug (3).

MODEL

There are four models in the range, depending on the required inlet/outlet pressures:

Model BP (Low pressure version): For outlet pressures from 2 to 10 kPa (20 to 100 mbar).
(This technical sheet)

Model MP (Medium pressure version): For outlet pressures from 8 to 35 kPa (80 to 350 mbar).
(Please refer to technical datasheet RS 2500 MP)

Model AP1 (High pressure version): For outlet pressures from 30 to 150 kPa (300 to 1500 mbar)
(Please refer to technical datasheet RS 2501 AP)

Model AP2 (High pressure version): For outlet pressures from 140 to 250 kPa (1400 to 2500 mbar)
(Please refer to technical datasheet RS 2502 AP)

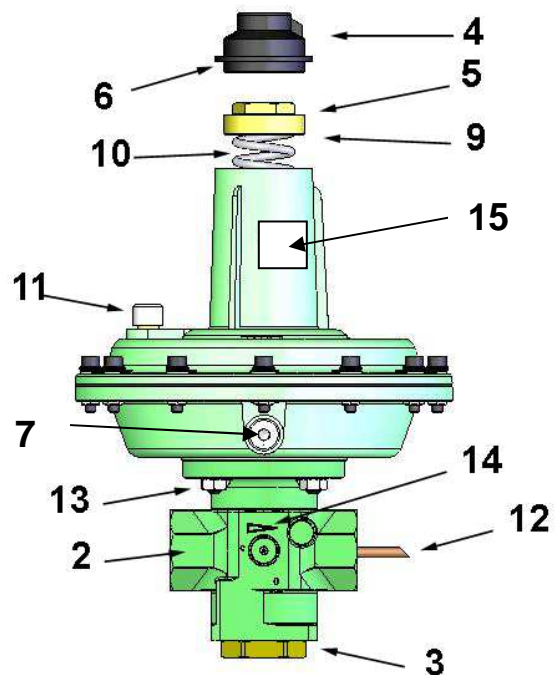
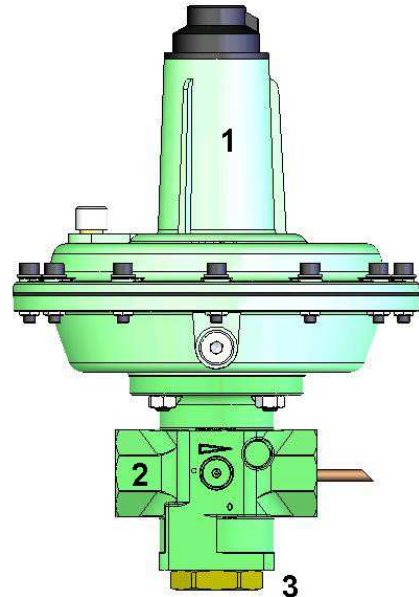
CONNECTIONS

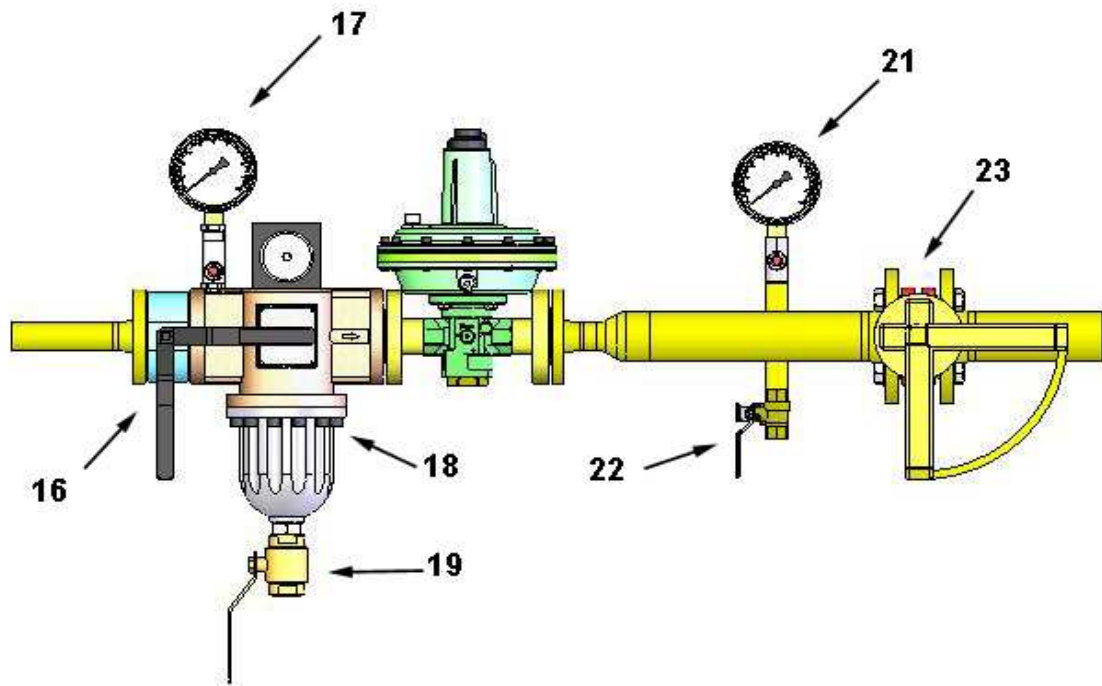
1" RP

1" NPT (optional)

ASSEMBLY

- Prior to installing the regulator, please verify the pressure and connection details required correspond with the information on the label (15).
- Assure that the fluid flows in the direction that the arrow (14) indicates.
- The sense line (12) for regulation is already assembled in the outlet of the regulator; this should be totally exempted of any type of obstruction or deformation.
- The location of the regulator at the installation should be adequate to allow maintenance labors and outlet pressure adjustments.
- The Optional SAV (OPSO/UPS0 Device) is mounted on the lower section of the regulator. It monitors the downstream pressure independently of the main section of the regulator. The SAV (OPSO/UPS0 device) can be ordered with the regulator, or can be fitted separately, later if required.





STARTUP PROCEDURE

- Open the bleed valve (22) to provide a slight flow of gas when the inlet valve is turned on.
- Slightly and slowly, open the inlet valve (16), located immediately upstream of the regulator.
- Check that the inlet pressure (17) is correct.
- Verify that the outlet pressure (21) has stabilized.
- The main inlet valve (16), found at the inlet of the filter (18), can now be fully opened.
- Slowly open the outlet valve (23).
- If the regulator is fitted with a SAV (OPSO/UPS), this should be kept in mind.

REGULATOR SETUP

Outlet Pressure Adjustment:

- Remove plastic cap (4), located on the top of the regulator.
- To increase outlet pressure, turn the main spring adjustment bolt (5) CLOCKWISE with a Tube Spanner 30mm.
- Turning this bolt anti-clockwise will decrease the outlet pressure.
- Place plastic cap (4) back onto the regulator top, make sure to put the O-ring (6).

The spring used in these regulators have been designed to provide specific outlet pressure ranges. For outlet pressures outside the specified range, a spring change will be required.

Causes of abnormal operation:

- Sense lines (12) blocked or turbulence in the zone.
- Pressure required is outside the range of the spring installed.
- Flow capacity requires exceeds regulator capacity.
- Atmospheric Vent (11) blocked or restricted.

If regulator does not close perfectly, this may be caused by:

- A worn, damaged, filth, or pitted Valve Seat Disc.
- Orifice may be worn.
- O-ring may be worn.
- Deterioration of the diaphragms.

If the SAV (OPSO/UPS) does not close perfectly:

- Please refer to the Technical Data Sheet relevant to the SAV (OPSO/UPS) device concerned.

To avoid particle damage of the internal working parts of the regulator, it is necessary to install a filter (18) of not less than 5 microns prior to the regulator.

CHANGING THE MAIN SPRING:

Removing the main spring:

- Close inlet valve (16) and the outlet valve (23).
- Depressurize the inlet and outlet side of the regulator via purge valves 19 and 22.
- Remove main regulator cap (4) to access the bolt (5).
- Wind the adjustment bolt (5) ANTI-CLOCKWISE, until all pressures is taken off the main spring, remove.
- Extract the spring.

Re-assembly:

- Insert the spring of appropriate outlet pressure range (view spring table).
- Re-assemble the main spring housing in reverse order to the above instructions.
- **Please ensure only spring of appropriate size are fitted and properly install the Teflon washer (9) previously greased, as failure to do so may cause regulator damage or failure.**








REMOVAL OF THE MOBILE DEVICE:

- Close inlet Valve (16) and outlet Valve (23).
- Depressurize the inlet and outlet side of the regulator via purge valves 19 and 22.
- Using a 13mm Open-end spanner, loosen and remove the four body bolts (13).
- The regulator head can now be safely removed.

Re-assembly

- Insert the seat disc with a little bit of pressure.
- To re-fit the regulator head, reverse the above procedure.

TOOLS REQUIRED FOR THE MAINTAINANCE OF THE RS 2500 BP REGULATORS

		
O-ring Extractor	Allen Key 4 - 5 mm	Tube Spanner 13 - 24 mm
		
Open-end Spanner 13 - 19 - 27	Screwdriver 10 x 1,6 mm	Tweezers
		
		Hook-Spanner 60-90

OUTLET PRESSURE ADJUSTMENT SPRINGS FOR THE RS 2500 BP REGULATORS

Spring Code	Spring Color	Ø Wire (mm)	Length (mm)	Ø Outside (mm)	n° Turns	Spring Range in kPa (mbar)
ZM337134251	Red	2.5	134	37	12.0	2 ÷ 3.5 (20 ÷ 35)
ZM337134281	White	2.8	134	37	12.0	3 ÷ 5 (30 ÷ 50)
ZM337134301	Yellow	3.0	134	37	12.0	4 ÷ 7 (40 ÷ 70)
ZM337130321	Blue	3.2	130	37	11.5	5.5 ÷ 9 (55 ÷ 90)
ZM337130351	Black	3.5	130	37	10.0	8 ÷ 17 (80 ÷ 170)

FLOWFlow regulator (n)m³/h N.G. with different holes

The gas regulator should work within the range indicated in the tables, with the maximum inlet pressure of the resulting variable output pressure and the orifice mounted, whichever does not exceed the limits described in the table.

Accuracy class AC 20

RS 2500 BP Orifice Ø 4 mm

P _a (mbar)	P _e (bar)											
	0.5	1.0	1.5	2.0	2.5	3.0	3.5	4.0	5.0	6.0	7.0	8.0
20	11	16	20	24	27	31	36	39	47	55	55	55
40	11	16	20	24	27	31	36	39	47	55	55	55
60	11	16	20	24	27	31	36	39	47	55	55	55
80	10	15	20	24	27	31	36	39	47	55	55	55
100	10	15	20	24	27	31	36	39	47	55	55	55

RS 2500 BP Orifice Ø 6 mm

P _a (mbar)	P _e (bar)											
	0.5	1.0	1.5	2.0	2.5	3.0	3.5	4.0	5.0	6.0	7.0	8.0
20	25	37	49	57	60	66	70	65	61	61	61	61
40	22	36	48	60	71	82	92	102	106	106	106	106
60	22	35	46	57	71	82	92	104	123	123	123	123
80	22	35	45	57	68	78	88	102	123	123	123	123
100	21	34	45	55	66	77	88	98	123	123	123	123

RS 2500 BP Orifice Ø 8 mm

P _a (mbar)	P _e (bar)											
	0.5	1.0	1.5	2.0	2.5	3.0	3.5	4.0	5.0	6.0	7.0	8.0
20	31	48	51	55	55	54	54	54	54	54	54	54
40	30	48	64	80	91	99	102	111	113	113	113	113
60	30	48	64	80	94	116	122	136	133	133	133	133
80	29	48	64	78	94	108	121	139	151	151	151	151
100	28	47	62	77	92	108	120	134	145	145	145	145

RS 2500 BP Orifice Ø 10 mm

P _a (mbar)	P _e (bar)											
	0.5	1.0	1.5	2.0	2.5	3.0	3.5	4.0	5.0	6.0	7.0	8.0
20	39	37	41	47	45	36	36	36	36	36	36	36
40	57	71	63	74	61	62	62	62	61	61	61	61
60	57	75	87	88	104	105	102	103	102	102	102	102
80	58	77	91	101	109	108	108	109	109	109	109	109
100	54	91	105	116	122	120	124	121	122	122	122	122

Flow in (n)m³/h natural gas

Flow with other gases

In the tables above, the flow is in (n)m³/h natural gas with a density 0.61 and temperature 15° C

To convert to other gas flow, using the following formula:

$$Q \text{ (n)m}^3/\text{h natural gas} \times F_c = Q \text{ (n)m}^3/\text{h n gas}$$

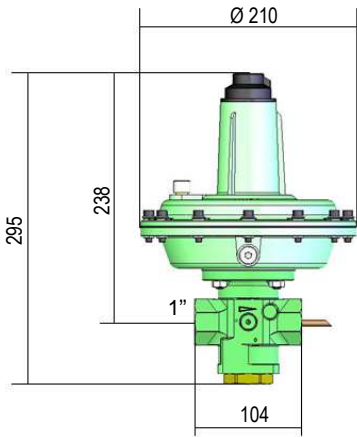
Example:

$$Q \text{ (n)m}^3/\text{h natural gas} \times 0.78 = Q \text{ (n)m}^3/\text{h air}$$

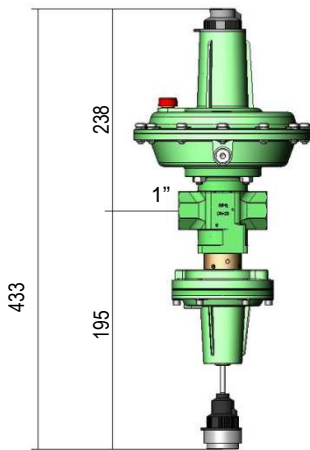
$$1 \text{ (n)m}^3/\text{h natural gas} = 0.78 \text{ (n)m}^3/\text{h air}$$

Correction factor Fc at 15°C	
Butane	0.55
Propane	0.64
Oxygen	0.76
Air	0.78
Nitrogen	0.81
Biogas	0.85
Town gas	1.23
Hydrogen	3.04

DIMENSIONS AND WEIGHTS



RS 2500 BP



RS 2510 BP

Technical features of RS 2500 BP

bpu	0.2 ÷ 10 bar	(inlet pressure range)
Ps	10 bar	(design pressure)
Pu	10 bar	(maximum inlet pressure)
Wd		(outlet pressure range)
RS 2500 BP	20 ÷ 100 mbar	
Wdo	40 ÷ 240 mbar	(OPSO range)
Wdu	10 ÷ 115 mbar	(UPSO range)
Wrv	+10 ÷ +20% Pd	(Relief valve range)
Ac	until 10 %	(accuracy class)
Sg	until 20 %	(accuracy class)
T	-20°C ÷ 60°C	(working temperature)

Inlet connection	1" RP
Outlet connection	1" RP
Connections position	Axial
Weight RS 2500 BP	5.0 Kg
Weight RS 2510 BP	5.5 Kg

BUILT-IN RELIEF VALVE

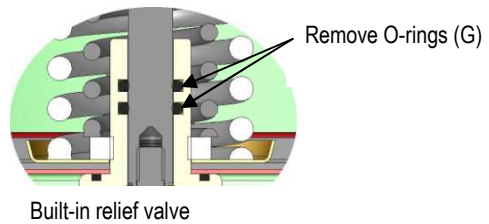
The regulator has an internal relief valve, which allows a certain quantity of free gas in case of abrupt changes of flow or by heating the tubes with no flow.

To activate the relief valve must be removed, the two O-rings (G) mounted on the fitting assembly of the membrane.

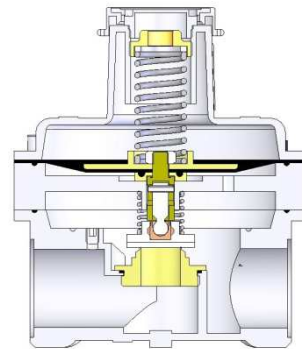
For installations ON-OFF, the output of the regulator should be sufficiently large lungs to absorb water hammer. It is recommended that lung mounted external relief valve capable of removing pressure peaks.

The quantity of gas released by pressure relief valve is related to the difference of inlet pressure and his calibrated. In the attached image is shown as an example, the relief valve VS 25 model. In which its operation is based on the confrontation of forces on both sides of the membrane.

On one side of the membrane, the gas pressure acts, on the opposite side and the spring force adjustment.

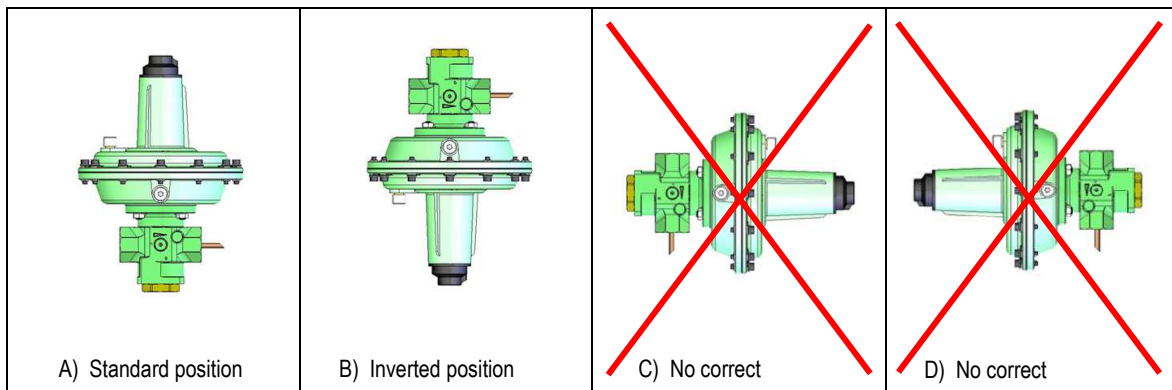


Built-in relief valve

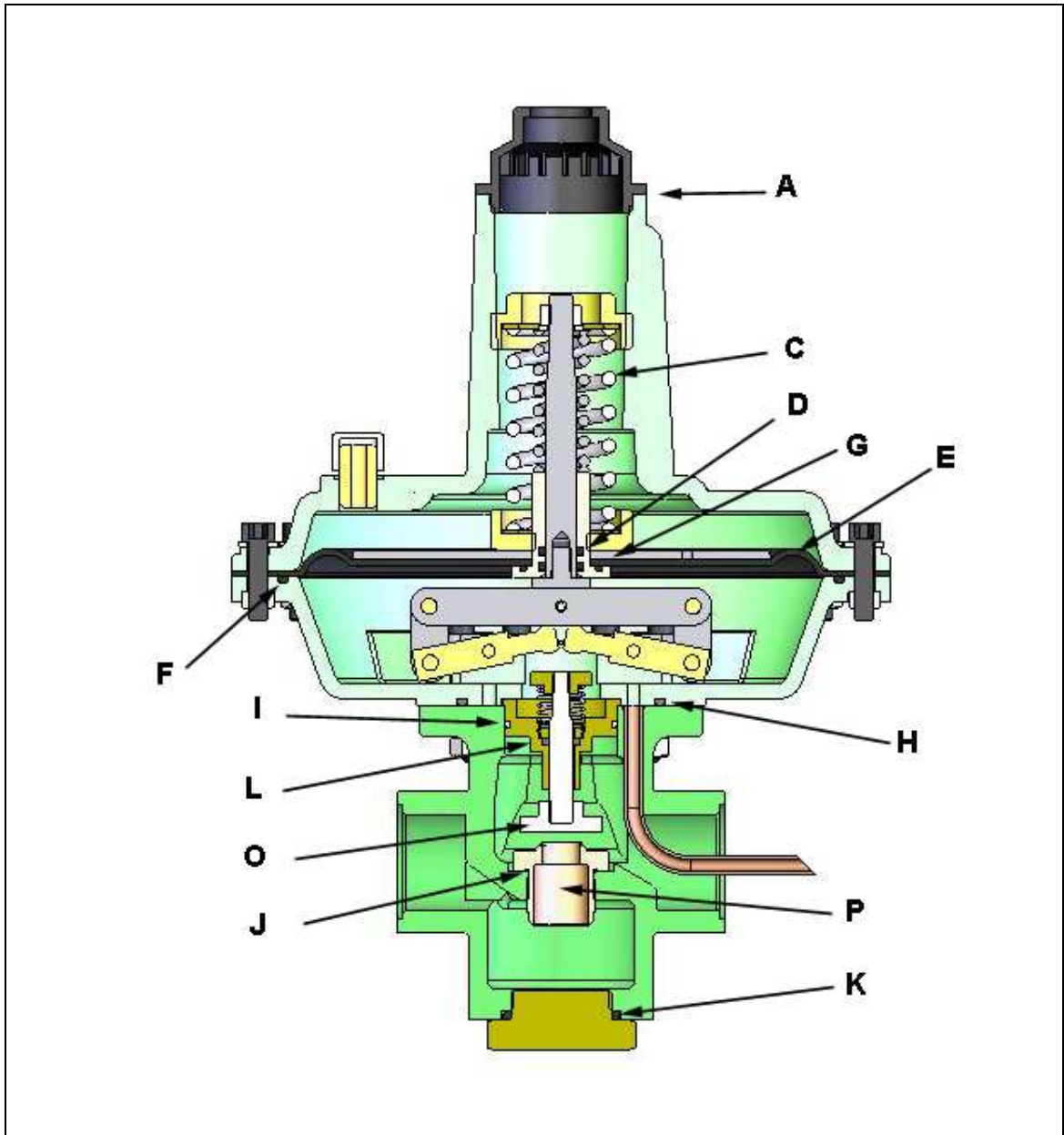


External relief valve VS-25



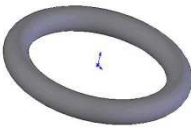

MOUNTING POSITION



For correct operation, the regulator must be mounted according to the above figures; the first image (A) is the usual position of mounting. There should be enough space for the maintenance work.



SPARE PARTS FOR RS 2500 BP

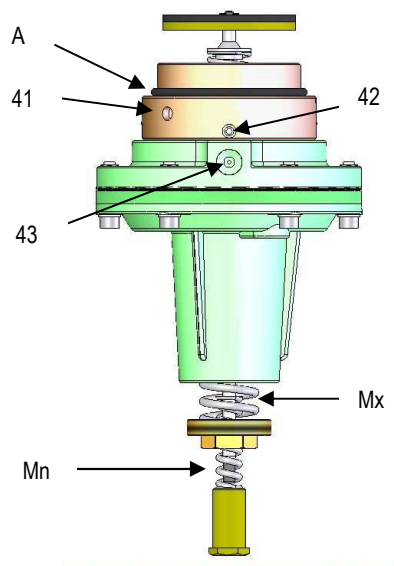
 <p>Seat Disc (O) Code ZM.1.00.070615</p>	 <p>Orifice (P)</p>	 <p>Construction O-rings</p>																														
 <p>Diaphragm (E) Code ZM.1.00.1157</p>	<table border="1"> <thead> <tr> <th>Ø Orifice (mm)</th> <th>Code</th> </tr> </thead> <tbody> <tr> <td>4</td> <td>ZM.1.00.0657</td> </tr> <tr> <td>6</td> <td>ZM.1.00.0659</td> </tr> <tr> <td>8</td> <td>ZM.1.00.0660</td> </tr> <tr> <td>10</td> <td>ZM.1.00.0661</td> </tr> </tbody> </table>	Ø Orifice (mm)	Code	4	ZM.1.00.0657	6	ZM.1.00.0659	8	ZM.1.00.0660	10	ZM.1.00.0661	<table border="1"> <thead> <tr> <th>Item</th> <th>Code</th> </tr> </thead> <tbody> <tr> <td>A</td> <td>ZM.1.00.1440</td> </tr> <tr> <td>D</td> <td>ZM.1.00.0974 V</td> </tr> <tr> <td>F</td> <td>ZM.1.00.0508</td> </tr> <tr> <td>G</td> <td>ZM.1.00.0893</td> </tr> <tr> <td>H</td> <td>ZM.1.00.0509</td> </tr> <tr> <td>I</td> <td>ZM.1.00.0048</td> </tr> <tr> <td>J</td> <td>ZM.1.00.0047</td> </tr> <tr> <td>K</td> <td>ZM.1.00.3488</td> </tr> <tr> <td>L</td> <td>ZM.1.00.2325V</td> </tr> </tbody> </table>	Item	Code	A	ZM.1.00.1440	D	ZM.1.00.0974 V	F	ZM.1.00.0508	G	ZM.1.00.0893	H	ZM.1.00.0509	I	ZM.1.00.0048	J	ZM.1.00.0047	K	ZM.1.00.3488	L	ZM.1.00.2325V
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L	ZM.1.00.2325V																															

SAFETY SHUT-OFF DEVICE (SAV)

The RS 2500 BP regulator, is available with built-in safety valve (SAV), or can also be mounted in the future if the installation conditions vary. In the future if you want to mount the SAV, request the set RI.ORG.0251 and instead on the cap (3)

SAV installation

- With the Open-end spanner, loosen and remove the cap (3)
- Insert the RI.ORG.0251, threading clockwise, taking care to reassemble the O-ring (A). Tighten the neck of the SAV with the spanner hook inserted into the holes (41)
- Loosen the screws (42) with a 2.5 mm Allen key and turn the SAV to connect the pressure tubing between the fitting (43) and exit the lung.
- Tighten the screws (42) with 2.5 mm Allen key.
- Connect with 10 mm diameter tube, the fitting (43) and the lung that are located at the exit, a distance at least 5 times the diameter of the lung output, taking care not to ride in this tube, gas valves that can break up the gas.



UPSO ADJUSTMENT SPRINGS

Spring code	Spring color	Ø Wire (mm)	Length (mm)	Ø Outside (mm)	Spring Range in kPa (mbar)
ZM.3.10.060.121	White	1.2	60	10	1.0 ÷ 3.2 (10 ÷ 32)
ZM.3.13.055.151	Yellow	1.5	55	13	2.4 ÷ 3.7 (24 ÷ 40)
ZM.3.13.055.201	Blue	2.0	55	13	3.0 ÷ 11.5 (30 ÷ 115)

OPSO ADJUSTMENT SPRINGS

Spring code	Spring color	Ø Wire (mm)	Length (mm)	Ø Outside (mm)	Spring Range in kPa (mbar)
ZM.3.30.060.221	Silver	2.2	60	30	4.0 ÷ 13.0 (40 ÷ 130)
ZM.3.30.060.251	Green	2.5	60	30	6.0 ÷ 19.0 (60 ÷ 190)
ZM.3.30.060.271	Reed	2.7	60	30	9.0 ÷ 24.0 (90 ÷ 240)

WARNING! It is potentially dangerous to manipulate a gas installation and its components. Therefore all start-up, adjustments and maintenance of the regulator must be carried out by duly authorized people with sufficient technical knowledge.