Gas Pressure Regulator

R Serie 1’’- 2’’



Main Features

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

- **Fail Open regulator**
- **Balanced valve or Ratio System**
- **Rugged construction for durability**
- **Wide pressure regulation range**
- **Full seal at zero flow**
- **Easy maintenance**
- **Optional minimum and/or maximum pressure slam-shut device**
- **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	BP 0.1 – 16 bar MP – AP 0.1 – 20 bar
Outlet pressure range –Wd[4]	15 - 4400 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	1’’ x 1’’ | 1’’ x 11/2’’ | 11/2’’ x 11/2 ‘’ | 2’’ x 2’’
Connections[3]	Threaded Rp EN or NPT ASME

[1] Low temperature version -40°C: available on request
[2] Depending on working conditions
[3] On request for other connection class
[4] with differant versions

Metarials

Body[1]	EN-GJS 500-7
Main Actuator[2]	Ø 185 mm Aluminium cast alloys (for service box) Ø 210 mm Aluminium cast alloys Ø 280 mm Aluminium cast alloys
Seat[2]	Brass
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

Standards and certificates

Applied directives:

Pressure Equipment Directive –PED (EU) EU/2014/68

Compliance with the regulations of the applied directives is verified by the adherence to the following standards / regulations:

- Gas pressure regulators for inlet pressure up to 100 bar EN 334:2019
- Gas safety shut-off devices for inlet pressures 100 bar EN 14382:2019
- EU Desing Examination Certificate 2195-PED-20081-T
- UkrSepro Tecnical Regulations for Pressure Equipment UA.TR.012C.0368

The relevant valid edition of the standards can be found in the declaration of conformity!

Use

General Gases :

Natural gas, town gas, propane, butane, air, nitrogen or all non-corrosive gases

Suitable for use with previously filtered gaseous fluids, it is mainly used for medium and low pressure natural gas distribution networks.

Hydrogen Ready :

Suitability of natural gas-hydrogen mixtures or pure hydrogen.
When using the R series, a manufacturer's declaration and nofied body reports can be provided on request.

Biogas or Biomethane Version :

Suitable for biogases and recycling gases
– up to maximum 1% by volume H2S, dry
– up to maximum 1% by volume NH3,
dry No non-ferrous metals (except in very small quantities found in the plastic components)

Biogas version of R Series are also designed for slightly aggressive, dry gases.

Gases according such as biogases, landfill gases, sewage gases, other recycled gases, process gases, and air. The chemical composition and aggressiveness of each biogas or recycled gas is different, not constant, and dependent on several factors.

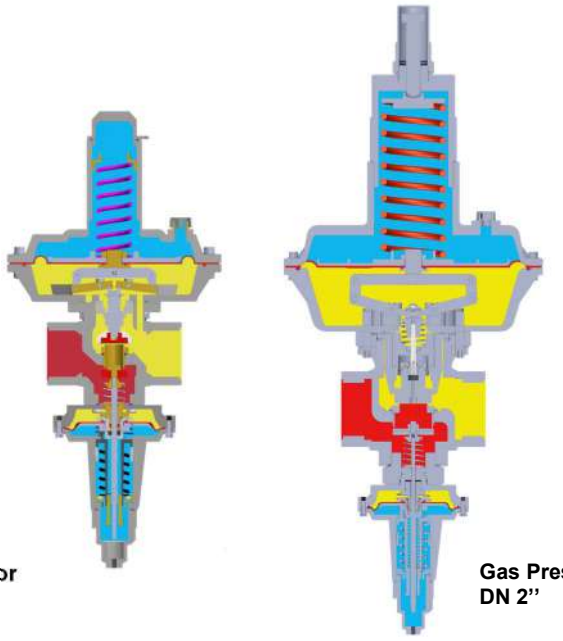
The aggressiveness of the gas notably increases:
- as the hydrogen sulfide content H2S increases
- with the moisture content of the gas, condensation is not permitted inside the regulator

In consultation with Gastech, users must decide whether the materials used for the R Series are suitable for the intended types of recycling gas. These gases can vary in terms of both their composition and the respective concentration of the components.

As a result, it is not possible to make any warranties or definitive statements regarding service life. An assessment should be carried out to determine the suitability of the gas used.

⚠ For safety reasons, we strongly recommend
- the installation of a safety relief Valve and SSV device
- a visual inspection of the R Serie regulator at intervals of 3 to 6 months
- Function and leakage tests

Desing,
Operational Diagram



Gas Pressure Regulator
DN 1''

Gas Pressure Regulator
DN 2''

Configurations



Gas Pressure Regulator

R25-40-40H



Gas Pressure Regulator
with Slum Shut Valve
R25-40-40H/S Serie



Gas Pressure Regulator
with Slum Shut Valve + Monitor
R25-40-40H-M/S Serie



Gas Pressure Regulator

R 50



Gas Pressure Regulator
with Slum Shut Valve
R 50/S Serie



Gas Pressure Regulator
with Slum Shut Valve + Monitor
R 50M/S Serie

Slum Shut Valve

The R series of regulators can be fitted with safety shut-off valve for overpressure (OPSO) or combined under-and-over pressure (UPSO/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 AG 5
Lock-up pressure class –SG[2]	up to SG 10
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 6

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.

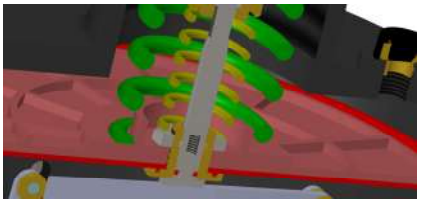
Monitor regulator is generally installed upstream of the active regulator. Although the function of the monitor regulator is different, the two regulator s are virtually identical from the point of view of the ir mechanical components. Flow coefficients of the regulator puls line monitor system are about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

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.

Internal Relief Valve

R series can be equipped with an incorporated internal relief valve (SRV) that discharges a limited amount of gas into the atmosphere when the regulator outlet pressure exceeds the set value.

If the outlet pressure rises for any reason, discharge to the atmosphere starts. The discharge stops when the outlet pressure drops to the normal level.



⚠ The discharge outlet must be transported to a safe open environment via a pipe.

Accessories
(to be ordered separately)



Switch for SSV of R Serie - EExd II CT6 - IP65

Article No	Type	DN Size
2.80.0622	M-BP/MP/AP	DN25-40-50
2.80.0623	M-BP/MP/AP	DN65-80-100-150



Switch for SSV of R Serie - **EN 50041 - IP66**

Article No	Type	DN Size
2.80.0624	M-BP/MP/AP	DN25-40-50
2.80.0625	M-BP/MP/AP	DN65-80-100-150



3 way solenoid valve for SSV of R Serie -EExd II CT6 - IP65

Article No	Type	DN Size
2.80.0699	M-BP/MP/AP	DN25-40-50-65-80-100-150



Pnömatic Actuator for R Serie –Air supplay pressure 2-6bar

Article No	Type	DN Size
2.81.1143	N.O or NC	1'' – 11/2''
2.81.1144	N.O or NC	2''



Sensing Line Kit for F Serie

Article No	Type	DN Size
2.80.1122	All Type	All size

⚠ Consisting of: 2pcs x 1mt dia.10mm steel pipe – 2pcs x pipe connection for 10 mm dia. ¼''

Flow Calculations

For a 0.6 specific gravity gas, sizing of regulators is usually made on the basis of Cg valve and KG flow rate coeffcients . Flow rates at the fully open position and the various operating conditions are related by the following formula

Sub-critical flow behaviour (Pu -Pd) ≤ 0.5 Pu

$$Q = 0{,}52 \times Cg \times Pu \times \operatorname{sen}\left(K1 \times \sqrt{\frac{Pu - Pd}{Pd}}\right) \qquad Q = K_G \times \sqrt{Pd \times (Pu - Pd)}$$

Critical flow behaviour (Pu -Pd) > 0.5 Pu

$$Q = 0{,}52 \times Cg \times Pe \qquad Q = \frac{K_G}{2} \times Pe$$

Acronyms

Q	volumetric flow rate in (m3 /h)
Pu	absolute inlet pressure in (bar)
Pd	absolute outlet pressure in (bar)

Flow rate coefficient

Size	1''	11/2'' x 11/2''	1''x11/2''	2'' x 2''
Cg	197	248	248	650
K_G	207	260	260	683

Select the diameter of the regulator with Cg higher than calculated value .
After finding the DN of the regulator, check that gas speed on the seat does not exceed 100 m/sec, using 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 (Stm3/h)
DN	Regulator nominal diameter (mm)
Pd	absolute outlet pressure in (bar)

Correction factor for non-natural gas applications

The flow rates are indicated for a 0.6 specific gravity gas. To determine the volumetric flow rate for gases other than natural gas, multiply or calculate the values in the capacity tables using the sizing equations with a correction factor. The table below lists correction factors for some common gases:

Gas Type	Density ratio to air	Conversion factor
Air	1.00	0.77
Butane	2.00	0.55
Propane	1.52	0,63
Propane+Air Mix	1.2	0,71
Hydrogen	0.07	2.94
Nitrogen	0.97	0.79
Carbondioxide	1.52	0.63

Use the following formula to calculate the correction factor for gases not listed above. In the formula, d is the specific gravity of the gas.

$$\text{Conversion factor} = \sqrt{\frac{0.6}{d}}$$

	Stm3 /h /hreference conditions 15 °C, 1 barg
Stm3 /h x 0.94795 = Nm3 /h	Nm3 /h reference conditions 0 °C, 1 barg

Capacity Tables

R 25 – 1'' x 1'' AC 10

Inlet pressure (bar)	Outlet Pressure (mbar)								
	Actuator 185 or 210 Ø								
	20	50	80	100	300	500	1000	2000	4000
0.5	88	88	92	91	68	-	-	-	-
1	140	142	142	144	131	89	-	-	-
2	188	192	193	193	156	171	166	-	-
3	188	192	193	193	256	247	221	221	-
4	188	192	193	193	275	321	257	257	-
6	188	192	193	193	288	345	287	287	287
8	188	192	193	193	288	360	363	363	363
10	188	192	193	193	288	360	285	285	285
12	188	192	193	193	288	360	402	402	402
16	188	192	193	193	288	360	402	402	402
20	-	-	-	-	288	360	402	402	402

R 40 – 11/2'' x 11/2'' AC 10

Inlet pressure (bar)	Outlet Pressure (mbar)								
	Actuator 185 or 210 Ø								
	20	50	80	100	300	500	1000	2000	4000
0.5	122	124	124	118	110	-	-	-	-
1	175	175	176	178	165	168	-	-	-
2	290	292	295	296	285	289	187	-	-
3	310	311	312	406	398	420	420	420	-
4	310	311	312	444	448	442	442	442	442
6	310	311	312	446	448	442	442	442	442
8	310	311	312	446	448	442	442	442	442
10	310	311	312	446	448	442	442	442	442
12	310	311	312	446	448	442	442	442	442
16	310	311	312	446	448	442	442	442	442
20	-	-	-	446	448	442	442	442	442

⚠ In order to limit the noise emission it is recommended not to exceed a gas velocity of 100 m/s at the regulator outlet. The reason why the flow rates repeat without increasing at high inlet pressure is the high sound emission and high gas velocities. Not recommended for use even though regulators provide higher capacities.

Capacity Tables

R 40H – 1'' x 11/2'' AC 10

Inlet pressure (bar)	Outlet Pressure (mbar)								
	Actuator 185 or 210 Ø								
	20	50	80	100	300	500	1000	2000	4000
0.5	122	124	124	118	110	-	-	-	-
1	175	175	176	178	165	168	-	-	-
2	290	292	295	296	285	289	187	-	-
3	310	311	312	406	398	420	420	420	-
4	310	311	312	444	448	442	442	442	442
6	310	311	312	446	448	442	442	442	442
8	310	311	312	446	448	442	442	442	442
10	310	311	312	446	448	442	442	442	442
12	310	311	312	446	448	442	442	442	442
16	310	311	312	446	448	442	442	442	442
20	-	-	-	446	448	442	442	442	442

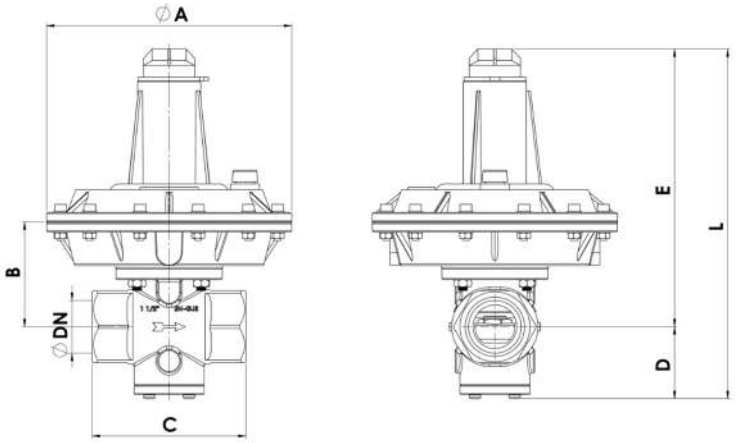
R 50 – 2'' x 2'' AC 10

Inlet pressure (bar)	Outlet Pressure (mbar)								
	Actuator 280 Ø					Actuator 210 Ø			
	20	50	80	100	300	500	1000	2000	4000
0.5	342	337	335	333	306	-	-	-	-
1	512	507	505	504	468	374	-	-	-
2	818	811	808	805	790	694	683	-	-
3	1091	1087	1086	1083	1074	1086	1086	-	-
4	1222	1215	1213	1212	1200	1372	1361	1196	-
6	1222	1215	1213	1212	1200	1940	1995	1824	2491
8	1222	1215	1213	1212	1200	1940	1995	1824	2491
10	1222	1215	1213	1212	1200	1940	1995	2954	3207
12	1222	1215	1213	1212	1200	1940	1995	2954	3207
16	1222	1215	1213	1212	1200	1940	1995	2954	3207
20	1222	1215	1213	1212	1200	1940	1995	2954	3207

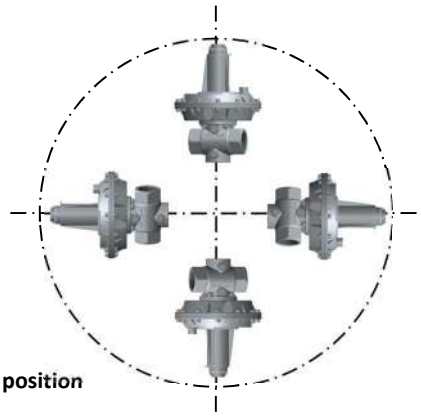
⚠ In order to limit the noise emission it is recommended not to exceed a gas velocity of 100 m/s at the regulator outlet. The reason why the flow rates repeat without increasing at high inlet pressure is the high sound emission and high gas velocities. Not recommended for use even though regulators provide higher capacities.

Dimensions and Weights

R Serie -without SSV



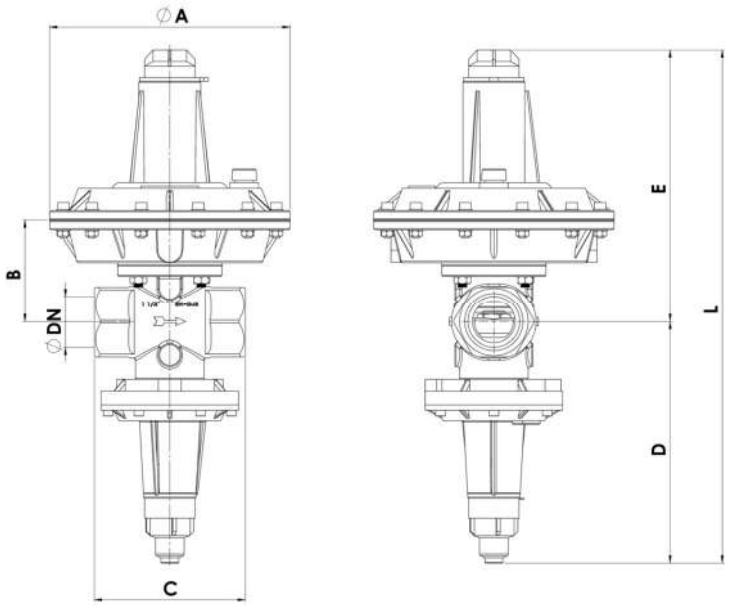
DN	A	B	C	D	E	L	**Wgt** kg
1'' x 1''	185	90	102	63	240	303	
1'' x 1'' BP-MP	210	90	102	63	240	303	
1'' x 1'' AP	210	100	102	63	250	313	
11/2'' x 11/2''	185	90	132	63	240	303	
11/2'' x 11/2'' BP-MP	210	90	132	63	240	303	
11/2'' x 11/2'' AP	210	100	132	63	250	313	
1'' x 11/2''	185	100	132	63	250	313	
1'' x 11/2'' BP-MP	210	100	132	63	250	313	
1'' x 11/2'' AP	210	100	132	63	250	313	
2'' x 2'' BP-MP	280	155	156	80	440	510	
2'' x 2'' AP	210	145	156	80	400	480	



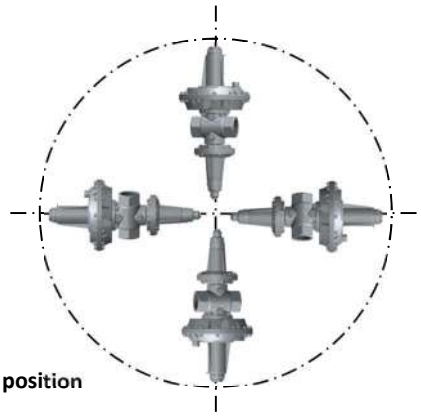
Mounting position

Dimensions and Weights

R Serie -with SSV



DN	A	B	C	D	E	L	**Wgt** kg
1'' x 1''	185	90	102	215	240	455	
1'' x 1'' BP-MP	210	90	102	215	240	455	
1'' x 1'' AP	210	100	102	215	250	465	
11/2'' x 11/2''	185	90	132	215	240	455	
11/2'' x 11/2'' BP-MP	210	90	132	215	240	455	
11/2'' x 11/2'' AP	210	100	132	215	250	465	
1'' x 11/2''	185	100	132	215	250	465	
1'' x 11/2'' BP-MP	210	100	132	215	250	465	
1'' x 11/2'' AP	210	100	132	215	250	465	
2'' x 2'' BP-MP	280	155	156	245	440	685	
2'' x 2'' AP	210	145	156	255	400	655	



Mounting position

Outlet Pressure Range and Setting Springs

The spring setting ranges for R25 – R40 – R40H regulator are shown in the tables below

Pressure Range (mbar)	Actuator (ø)	Color	Diameter (mm)	Order Code
20 – 35	185 or 210 BP	Grey	2.5	2.13.0277
30 – 50	185 or 210 BP	Yellow	2.8	2.13.0668
40 – 70	185 or 210 BP	Blue	3.0	2.13.0701
50 – 130	185 or 210 BP	Black	3.2	2.13.0702
110 – 200	185 or 210 MP	Orange	3.5	2.13.0703
140 – 250	185 or 210 MP	Purple	3.7	2.13.0704
200 – 360	185 or 210 MP	Pink	4.0	2.13.0004
250 – 450	185 or 210 AP	Red	4.5	2.13.0667
400 – 600	185 or 210 AP	Green	5.0	2.13.0666
500 – 900	185 or 210 AP	Silver	5.5	2.13.0705
700 – 1200	185 or 210 AP	Black+White	6.0	2.13.0416
1000 – 1600	185 or 210 AP	Purple+White	6.5	2.13.0657
1400 – 2500	185 or 210 AP	Grey+White	7.5	2.13.0658
2200 – 3600	210 AAP	White	12.0	2.13.0700
3400 – 5000	210 AAP	Orange	13.0	2.13.0414

The spring setting ranges for R50 regulator are shown in the tables below

Pressure Range (mbar)	Actuator (ø)	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

Shut Off Range and Setting Springs

Over- Shut off setting ranges for the R25 – R40 – R40H – R50 are shown in the tables below

Pressure Range (mbar)	Actuator (ø)	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

Under - Shut off setting ranges for the R25 – R40 – R40H – R50 are shown in the tables below

Pressure Range (mbar)	Actuator (ø)	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 (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

Color of Products

Standard Colors

The colors of the regulator parts are painted as follows.

Part	RAL Code	Color
Body Rp EN ISO7/1	1021	
Body NPT ASME	3000	
Main Actuator All Versions	9005	
Slum Shut Covers All Versions	9005	

Optional Colors

You can choose one or more of the following colors.

Part	RAL Code	Color
All Parts	1021	
All Parts	3000	
All Parts	9005	
All Parts	6011	
All Parts	5010	

delivery times and price may vary in optional color options.

NOTES

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For more information, contact your local sales representative or agency.

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