



Norval



Pressure
Regulators



Norval

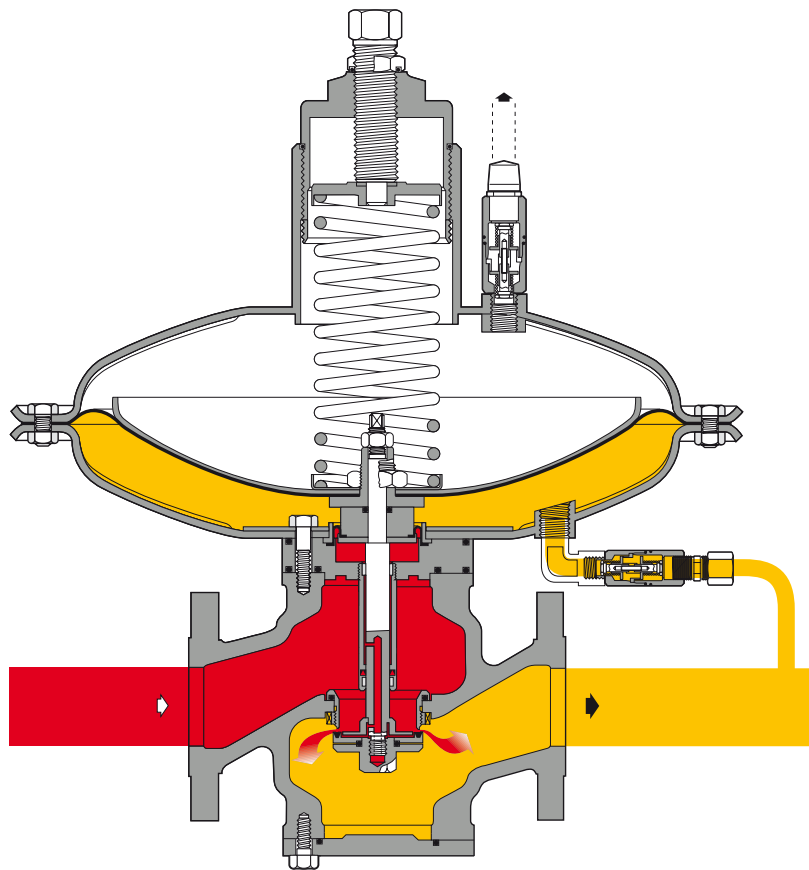


> Pressure regulators

Introduction

NORVAL pressure regulators are direct acting devices for low and medium pressure applications controlled by a diaphragm and counter spring.

These regulators are suitable for use with previously filtered, non corrosive gases.



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Main Features

Modular design of pressure regulator **Norval** allows application of slam shut or device for use as “in line monitor” on the same body without changing the face-to-face dimension.

Furthermore the truly “top entry design” allows an easy periodical maintenance without removing body from the line.

The features of **Norval** regulators make of it a product suitable for any application.

The fast response time makes it ideal for burner or industrial applications or whenever sudden changes of flowrate are part of the process. The high accuracy against any inlet pressure variation makes of **Norval** an optimum product also for gas district systems, an application generally not suitable for direct acting regulators.

An extremely easy maintenance an reduced number of parts are the background of low cost operation.



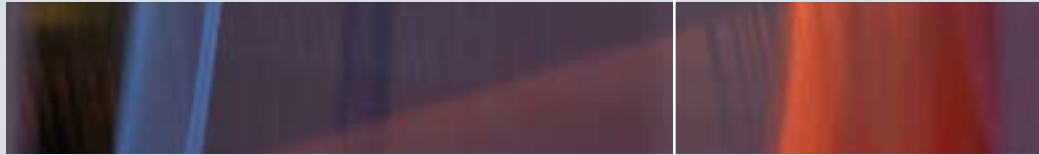
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Norval...+SN

Designed
With Your
Needs In Mind

- Compact Design
- Easy Maintenance
- Top Entry
- Fast Response Time
- High Turn Down Ratio
- High Accuracy
- Low Operation Cost
- Wide Range of Applications



Main Features

- Design pressure: up to 275 Psi (19 bar)
- Design temperature: - 4 to + 140 °F (-20 °C to +60 °C)
- Max inlet pressure bpe: Size 1" TO 3" 232 Psi (16 Bar) Size 4" to 8" 116 Psi (8 Bar)
- Range of outlet pressure Wh: Size 1" to 4" 3" W.c to 63.8 Psig (8 to 4400 mbar)
Size 6" to 8" 5"W.c. to 26,1 Psig (12 to 1800 mbar)
- Available size : 1" -1" ¹/₄ - 1" ¹/₂ - 2" - 2" ¹/₂ - 3" - 4" - 6" - 8"
- Flanging: class 150-300-600 RF or RTJ according to ANSI B16.5

Materials

Body	Cast steel ASTM A216 WCB for all sizes Nodular cast iron GS 400-18 ISO 1083 for Size ≤ 6"
Head covers	Drop-forged carbon steel
Diaphragm	Rubberized canvas
Valve seat	Stainless steel
Seals	Nitrile rubber
Compression fittings	SS Dual Lock Compression type

The characteristics listed above are referred to standard products. Special characteristics and materials for specific applications may be supplied upon request.

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> Pressure regulators

This formula is applicable to natural gas having a gas specific gravity 0.61 (air = 1) and a regulator gas inlet temperature of 60 °F. For gases having different specific gravity S and regulator inlet temperature t_f in °F, the value of the flow rate, calculated as above, must be multiplied by a correction factor, as follows:

$$F_c = \sqrt{\frac{317.20}{S \times (460 + t_f)}}$$

Table 2 lists the correction factors F_c for a number of gases at 60 °F.

Table 2: Correction factors F_c

Type of gas	Specific gravity	F_c Factor
Air	1.0	0.78
Propane	1.53	0.63
Butane	2.0	0.55
Nitrogen	0.97	0.79
Oxygen	1.14	0.73
Carbon dioxide	1.52	0.63

Caution:

In order to get optimal performance, avoid premature diaphragm failure and limit noise emissions, it is recommended that the gas speed at the outlet flange does not exceed 492 ft/sec (150m/s). The gas speed at the outlet flange may be calculated by means of the following formula:

$$V = 10.02 \times \frac{Q}{DN^2} \times \frac{1}{1 + (0.06895 \times Pd)}$$

where:

V = gas speed in ft./sec

Q = gas flow rate in SCFH

DN = nominal size of regulator in inches

Pd = outlet pressure in psig (pressure gauge)

Control Heads

Outlet pressure range is determined by the control head installed. Table 3 sums up the heads available for every size and the ranges of outlet pressure expressed in W.c and Psig.

Table: 3

Inches	1"	1"1/4	1"1/2	2"	2"1/2	3"	4"	6"	8"
ø 817								5"W.c. ÷ 1.1	5"W.c. ÷ 1.1
ø 658								1.1 ÷ 5.9	1.1 ÷ 5.9
ø 630					4"W.c. ÷ 1.2	6"W.c. ÷ 1.2	6"W.c. ÷ 1.2	3.2 ÷ 9.4	3.2 ÷ 9.4
ø 495	6"W.c. ÷ 1.2	6"W.c. ÷ 1.2	6"W.c. ÷ 1.2	6"W.c. ÷ 1.2	81 ÷ 530	81 ÷ 530	81 ÷ 530	5.9 ÷ 26.1	5.9 ÷ 26.1
ø 375	1.2 ÷ 16	1.2 ÷ 16	1.2 ÷ 16	1.2 ÷ 16	6.8 ÷ 40.6	6.8 ÷ 40.6	6.8 ÷ 40.6		
ø 375TR	13.3 ÷ 63.8	13.3 ÷ 63.8	13.3 ÷ 63.8	13.3 ÷ 63.8	13.3 ÷ 63.8	13.3 ÷ 63.8	13.3 ÷ 63.8		

Slam-Shut Valve

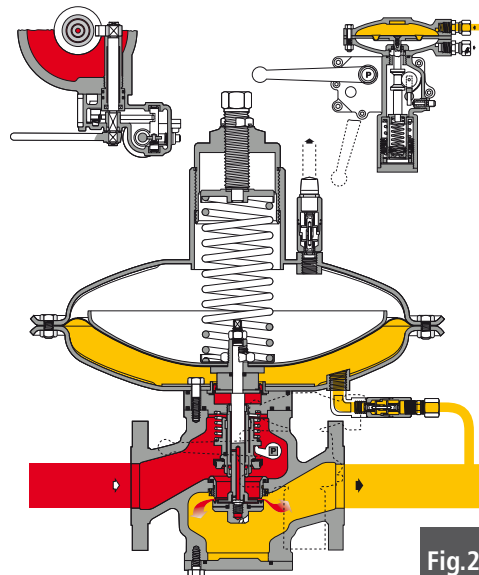
This is a device stopping immediately gas flow (SAV) when, whatsoever downstream pressure exceeds given set-point. Device can be actuated also manually.

Incorporated SN Slam-Shut

SN Slam shut (see figure 2) can be incorporated on the standard regulator and on the in-line monitor. The regulator with the incorporated slam-shut has Cg coefficients equal to 95% of those of the basic regulator. A further advantage of the incorporated slam-shut valve is that it can be retro fitted at any time on a previously installed **Norval** (size ≤ 3" only) without modifying the regulating unit.

The main features of this slam-shut device are:

- design pressure 232 Psig (16 Bar) for all the components;
- accuracy (AG): ±1% of the pressure set-point for pressure increase; ±5% for pressure decreasing;
- internal by-pass;
- intervention for over pressure and/or under pressure;
- manual push-button control;
- possibility of pneumatic or electromagnetic remote control;
- compact overall dimensions;
- easy maintenance;
- possibility of application of devices for remote signal (contact or inductive microswitches).



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Table 3 shows the available pressure switches

Table: 3 Slam-Shut pressure switches

Pressure switch	SN 91	SN 92
Set point range for Overpressure (OPSO)	10" W.c. ÷ 17.4	29" W.c. ÷ 80
Set point range for Underpressure (UPSO)	1/4" ÷ 3.5	10" W.c. ÷ 39

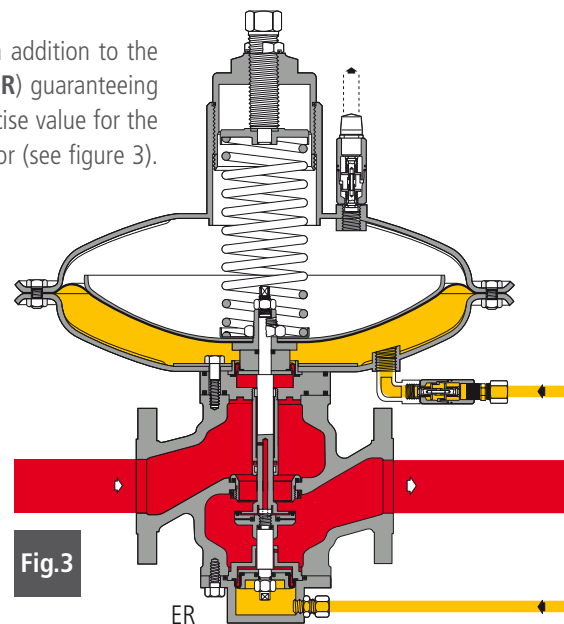
Working pressure in W.c. and Psi

Functioning as Monitor

The monitor is an emergency regulator which comes into operation in place of the main regulator if, in the event of failure, the latter allows the downstream pressure to reach the monitor set-point.

Operation of the Norval functioning as Monitor

NORVAL functioning as an in-line monitor is a regulator which, in addition to the standard version, has a further mobile assembly balancing device (**ER**) guaranteeing greater accuracy of regulated pressure and therefore an equally precise value for the intervention pressure without risk of interference with main regulator (see figure 3). This device can be retro fitted on a standard existing regulator.

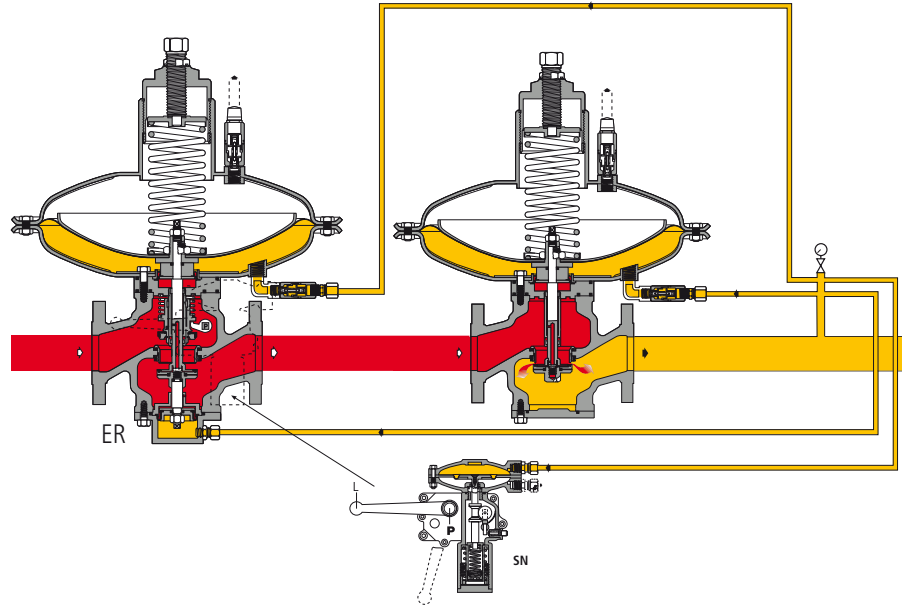


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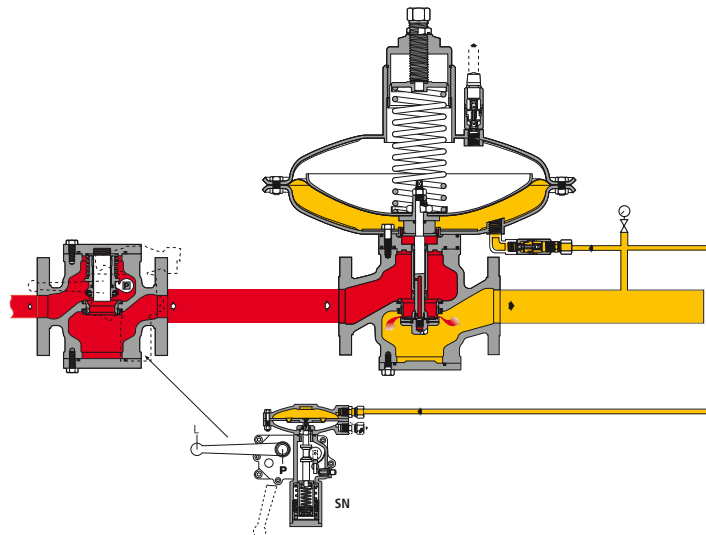


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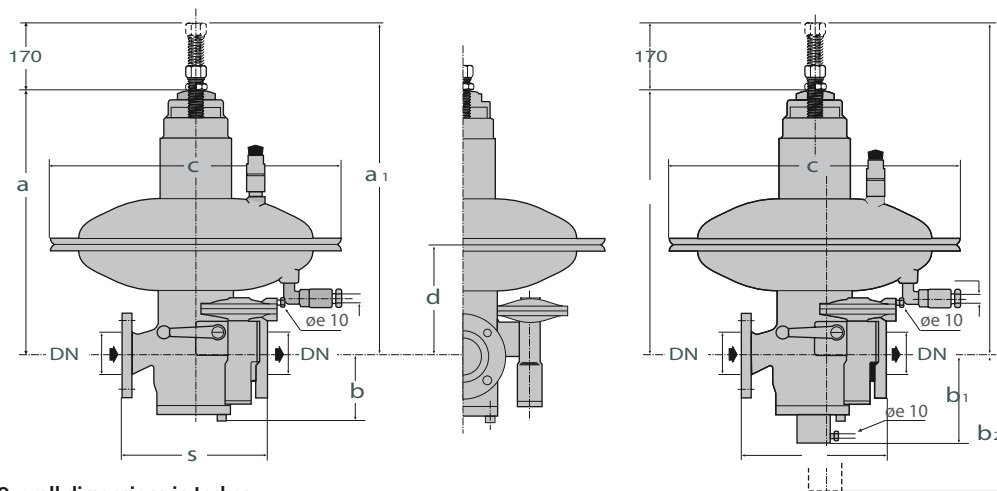
NORVAL + ER monitor NORVAL + SN SLAM-SHUT



NORVAL + SCN SLAM-SHUT



Norval with slam shut SN and Monitor



Overall dimensions in Inches

Inches	c				ø 495			ø 375			ø 375TR		
	s*	b	b1	b2	a	a1	d	a	a1	d	a	a1	d
1"	7.25	3.94	7.87	9.84	18.11	24.80	6.89	16.34	23.03	5.91	16.73	23.43	6.10
1 1/4"	7.88	3.94	7.87	9.84	18.11	24.80	6.89	16.34	23.03	5.91	16.73	23.43	6.10
1 1/2"	8.75	4.72	8.66	10.63	18.70	25.39	7.48	17.13	23.82	6.50	17.52	24.21	6.69
2"	10	4.72	8.66	10.63	18.70	25.39	7.48	17.13	23.82	6.50	17.52	24.21	6.69

Inches	c				ø 630			ø 495			ø 375			ø 375		
	s*	b	b1	b2	a	a1	d	a	a1	d	a	a1	d	a	a1	d
2 1/2"	10.88	9.45	9.45	11.42	21.26	27.95	8.66	19.69	26.38	8.27	17.91	24.61	7.48	18.31	25	7.68
3"	11.75	9.45	9.45	11.42	21.26	27.95	8.66	19.69	26.38	8.27	17.91	24.61	7.48	18.31	25	7.68
4"	13.88	11.02	11.02	12.99	25.20	31.89	12.20	23.62	30.31	11.81	21.85	28.54	10.83	22.24	28.94	11.02

Inches	c				ø 817			ø 658			ø 630			ø 495		
	s*	b	b1	b2	a	a1	d	a	a1	d	a	a1	d	a	a1	d
6"	17.75	8.66	12.60	14.57	29.92	36.61	15.75	28.35	35.04	14.96	26.57	33.27	14.96	26.38	33.07	14.76
8"	21.38	10.24	14.17	16.14	33.86	40.55	19.69	32.28	38.98	18.90	30.51	33.27	18.90	30.31	37.01	18.70

(*) ANSI 150

Weights in pounds

Inches	1"	1 1/4"	1 1/2"	2"	2 1/2"	3"	4"	6"	8"
Norval	93	93	106	110	170	203	267	454	642
Norval with slam-shut/in	104	104	117	121	181	214	278	465	653
Norval with monitor	106	106	121	128	187	220	284	476	666
Norval with slam-shut/SN and monitor	117	117	132	139	198	231	295	487	677

The Norval regulator conform to ISA 4.1 standard



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