

Self-operated Pressure Regulators

mbar Pressure Reducing Valve Type 2393 (ANSI version)

Valve closes when the downstream pressure rises

mbar Excess Pressure Valve Type 2398 (ANSI version)

Valve opens when the upstream pressure rises

Application

Pressure regulators for set points from 0.075 to 0.75 psi (5 to 50 mbar) · Valve nominal sizes DN 1/2" to 2" (DN 15 to 50) Nominal pressures Class 125 and 150 (PN 16 and PN 25)
· For protective (inert) gas up to 250 °F (120 °C)

Conversion of valve sizing coefficients:

$$C_v \text{ (in U.S.-gallons/min)} = 1.17 \cdot K_{vs} \text{ (in m}^3\text{/h)}$$

$$K_{vs} \text{ (in m}^3\text{/h)} = 0.86 \cdot C_v \text{ (in U.S.-gallons/min)}$$

As an effective sealing medium in industrial plants, inert gas is often applied, e.g. as a blanketing or covering gas to reaction and storage tanks containing material which is explosive, toxic or sensitive to oxidation. In this case, the pressure of the inert gas should only slightly exceed the atmospheric pressure when filling or draining these tanks in order to achieve a preferably low consumption of the gas. The Type 2393 Pressure Reducing Valve and Type 2398 Excess Pressure Valve are therefore especially designed for these particular conditions and feature set points adjustable between 0.075 to 0.75 psi (5 to 50 mbar).

Special features

- Low-maintenance, proportional regulators requiring no auxiliary energy (controlled by the process fluid)
- Excellent control characteristics; small steady-state deviation (offset) and exceptionally accurate control results
- Suitable for protective (inert) gas
- Wide set point range adjustable from 0.075 to 0.75 psi (5 to 50 mbar); easy adjustment at the actuator
- Single-seated valve providing balancing of the upstream and downstream pressure by means of a durable stainless steel bellows

Type 2393 · mbar Pressure Reducing Valve

Accurately maintains the downstream pressure to the adjusted set point.

Type 2398 · mbar Excess Pressure Valve

Accurately maintains the upstream pressure to the adjusted set point.

Versions

Control valve with plug with soft sealing · Body made of cast iron A 126 B, cast steel A 216 WCB or stainless steel A 351 CF8M · Actuator with EPDM rolling diaphragm, effective diaphragm area $A = 640 \text{ cm}^2$.

The pressure of the process medium to be maintained at a constant value is transmitted to the spring-loaded diaphragm of the actuator via the control line and, consequently, to the valve plug.

Special version

– Type 2393: smaller C_v (K_{vs}) values - on request -



Fig. 1 · Type 2393 mbar Pressure Reducing Valve

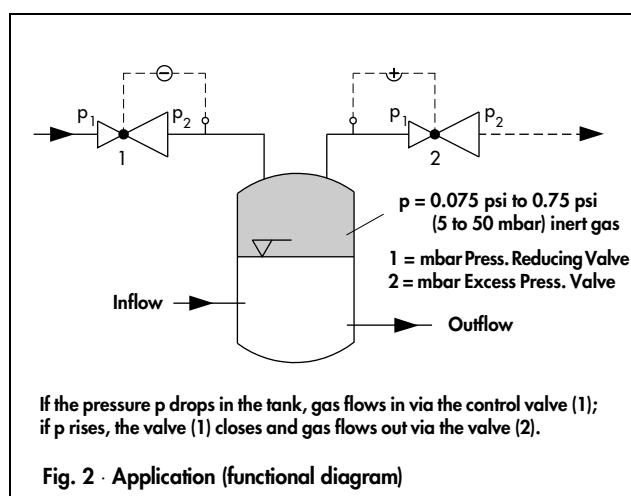


Fig. 2 · Application (functional diagram)

Principle of operation (Fig. 3)

The process medium flows through the valve in the direction indicated by the arrow. Here, the cross-sectional area between the valve plug (3) and the seat (2) determines the rate of flow.

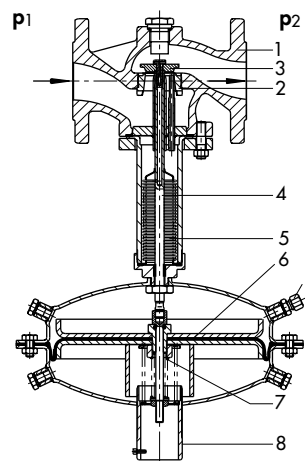
Depending on the version (pressure reducing valve or excess pressure valve as shown in Fig. 3), the valve closes or opens, resp. when the pressure to be controlled rises. This pressure is transmitted to the operating diaphragm (6) via the control line and respective connection (9), where it is converted into a positioning force. This force adjusts the plug stem (3) as a function of the operating spring force and can be adjusted using the set point adjustment.

Valve action of the two pressure regulator versions:

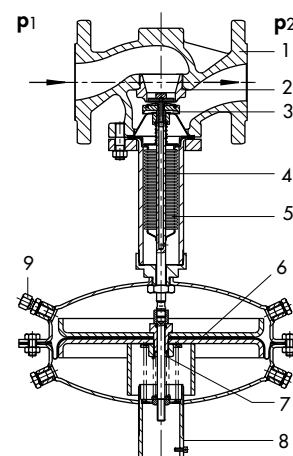
- Type 2393 Pressure Reducing Valve: The downstream pressure, p_2 , of the medium to be controlled closes the valve.
- Type 2398 Excess Pressure Valve: The upstream pressure, p_1 , of the medium to be controlled opens the valve.

Installation

- Only install the regulator in horizontal pipelines.
- If the gas to be controlled contains moisture, condensate could possibly form in the control line. As a consequence, the actuator and valve could become damaged. In order to ensure adequate run-back in the tank, slope the control line approximately 10% to the pressure tap on the tank.
- The direction of flow must coincide with the arrow on the body.
- Valve extension, incl. actuator, must be vertically suspended.
- Minimum distance "pressure tap - regulator" at least 10 DN.



Type 2393 Pressure Reducing Valve



Type 2398 Excess Pressure Valve

Fig. 3 · Type 2393 Pressure Reducing and Type 2398 Excess Pressure Valve

1	Valve body	6	Operating diaphragm
2	Valve seat (exchangeable)	7	Set point spring
3	Plug	8	Set point adjustment
4	Plug stem	9	Control line connection, 8 mm
5	Balancing bellows		

Table 1 · Technical data · All pressures in psig (bar, gauge)

Nominal size	DN	inch	1/2"	3/4"	1"	40	50
		mm	15	20	25	40	50
Nominal pressure	Class	125 ¹⁾ or 150					
	PN	16 or 25					
C _v value		3,7	6	9.4	23	37	
	Special version ²⁾	0.5 or 1.2				-	
K _{vs} value		3,2	5	8	20	32	
	Special version ²⁾	0.4 or 1.0				-	
Set point ranges	psi	0.075 ... 0.42			0.15...0.42		
		0.35 ... 0.75			0.35 ... 0.75		
	mbar	5 ... 30			10 ... 30		
		25 ... 50			25 ... 50		
Leakage rate	< 0.001% of the C _v (K _{vs}) value						
Max. perm. temperature	250 °F (120 °C)						
Max. perm. differential pressure Δp	120 psi/8 bar				90 psi/6 bar		
Perm. pressure (actuator)	30 psi/2 bar						
Effective diaphragm area	99.2 in ² /640 cm ²						

¹⁾ Body material A 126 B, Class 125: DN 1" and larger

²⁾ Only for Type 2393: smaller C_v values on request

Table 2 · Materials (WN = Material Number according to DIN)

Nominal pressure	Class 125	Class 150
Body	A 126 B ¹⁾	A 351 CF8M A 216 WCB
Seat	WN 1.4006	WN 1.4571
Plug	WN 1.4104	WN 1.4571
	With EPDM soft sealing	
Bottom section	St 35-8	WN 1.4571
Balancing bellows	WN 1.4571	WN 1.4571
Cover plates	St 37-2	WN 1.4301
Diaphragm	EPDM	

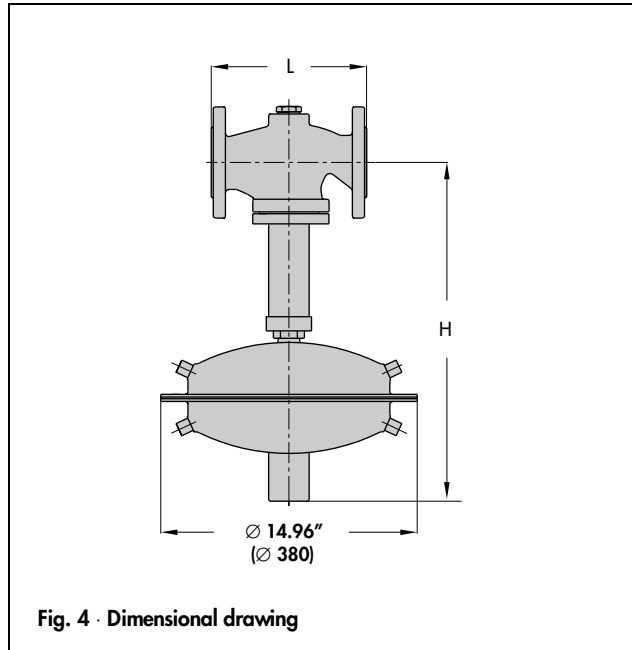
¹⁾ DN 1" and larger

Dimensions

Table 3 · Dimensions and weights

Nominal size DN	inch	1/2"	3/4"	1"	1 1/2"	2"	
	mm	15	20	25	40	50	
Overall length L	Class 125 ¹⁾ and 150	inch	7.25"	7.25"	7.25"	8.75"	10.0"
		mm	184	184	184	222	254
Overall height H		inch	15.94"			18.11"	
		mm	405			460	
Weight, approx. in		lb	44.1	46.3	48.5	61.7	66.1
		kg	20	21	22	28	30

¹⁾ Body material A 126 B, Class 125: DN 1" and larger



Ordering text

mbar Pressure Reducing Valve Type 2393

mbar Excess Pressure Valve Type 2398

DN ...

Body material ..., Class (PN) ...

C_v (K_{vS}) value ...

Set point range ... psi (mbar)

Optional special version ...

Specifications subject to change without notice.



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