

# Self-operated Pressure Regulators

## Steam Pressure Reducing Valve Type 39-2



ANSI version

### Application

Set points from **0.3 psi** to **230 psi (0.02 bar to 16 bar)** · Valves in **NPS ½ to 2** · Pressure rating **Class 125** and **Class 150**  
Suitable for steam up to max. **660 °F (350 °C)**

Valve **closes** when the downstream pressure rises



The Type 39-2 Steam Pressure Reducing Valve regulates the steam pressure downstream from the valve to an adjusted set point.

### Special features

- Low-maintenance proportional regulators requiring no auxiliary energy
- Actuator and springs are exchangeable
- Single-seated valve with balanced valve plug and a frictionless plug stem sealing by means of a stainless steel bellows
- All wetted parts are free of non-ferrous metal

### Versions

Type 39-2 Steam Pressure Reducing Valve:

Valve body made of cast iron A 126 B or carbon steel A 216 WCC · Actuator (with EPDM rolling diaphragm) · With condensation chamber and screw fitting · For steam temperatures up to 660 °F (350 °C)

### Special version

With St I flow divider for especially low-noise operation. For details, see Data Sheet T 8081 EN. When the flow divider St I is retrofitted, the valve seat must be replaced.

### Accessories (refer to T 2595 EN)

Screw fitting for the control line connection

Condensation chamber with funnel tube for collecting condensate and as a temperature safeguard



Fig. 1 · Type 39-2 Steam Pressure Reducing Valve

### Principle of operation (Fig. 2)

The process medium flows through the valve in the direction indicated by the arrow. The position of the valve plug determines the flow rate between the free area between the plug (3) and seat (2).

The downstream pressure ( $p_2$ ) to be controlled is transmitted via a control line (14) to the operating diaphragm (13) where it is converted into a positioning force. This force adjusts the valve plug as a function of the spring force. The spring force can be adjusted using the set point adjuster (6).

The balanced valves are equipped with a stainless steel bellows (4). The upstream pressure ( $p_1$ ) is applied to the outside bellows surface. As a result, the forces created by the upstream pressure and acting on the valve plug are balanced out. The downstream pressure is balanced via the diaphragm area in the actuator.

### Installation

Install the valves in horizontal pipelines with a slight downward slope on both sides of the valve for drainage of the condensate (refer to EB 2506 EN for more details).

- The direction of medium flow must correspond with the arrow on the valve body.
- The actuator must be suspended downwards.
- Pressure tapping approx. 3.3 feet (1 meter) downstream of the valve. The control line (3/8" pipe) is mounted on site and not included in the scope of delivery.



### Flow coefficients

$C_{V1}$ ,  $K_{VS1}$  and  $C_{V2}$ ,  $K_{VS2}$  for installation of a flow divider St I as a noise-reducing component.

Flow characteristic differences between valves with and valves without flow dividers do not occur until the valve has passed through approx. 80 % of its travel range.

**Terms for control valve sizing** according to DIN EN 60534, Parts 2.1 and 2.2:

$$F_L = 0.95$$

$$X_T = 0.75$$

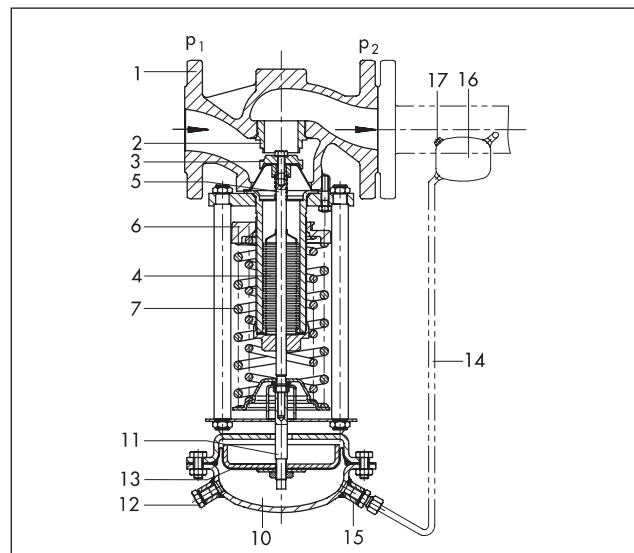


Fig. 2 · Functional diagram of Type 39-2

- |    |   |
|----|---|
| 1  | Valve body  |
| 2  | Valve seat  |
| 3  | Plug  |
| 4  | Bellows   |
| 5  | Plug stem   |
| 6  | Set point adjuster  |
| 7  | Positioning springs   |
| 10 | Actuator  |
| 11 | Actuator stem   |
| 12 | Venting (only for actuator area $A = 100 \text{ in}^2/640 \text{ cm}^2$ ) |
| 13 | Operating diaphragm   |
| 14 | Control line (attached on site)   |
| 15 | Control line connection   |
| 16 | Condensation chamber  |
| 17 | Filler plug   |

### Valve-specific correction terms

$\Delta L_G$  with gases and vapors. Values as specified in the diagram

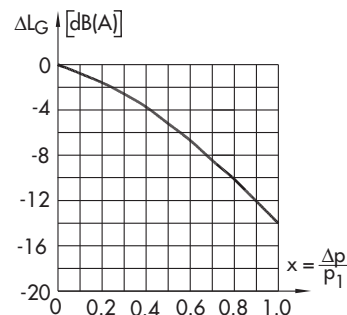


Fig. 3 · Diagram for valve-specific correction terms

**Table 1 · Technical data** · All pressures specified as gauge pressures

Nominal size	NPS ½ to 2
Nominal pressure	Class 125 and 150
Temperature range	See pressure-temperature diagram
Valve plug	Metal sealing · Up to 660 °F (350 °C)
Actuator with condensation chamber	Steam · Up to 660 °F (350 °C)
Max. perm. differential pressure $\Delta p$	360 psi (25 bar)
Set point ranges	0.3 to 3.5 psi · 1.5 to 8.5 psi · 3 to 17 psi · 10 to 35 psi · 30 to 75 psi · 65 to 145 psi 115 to 230 psi
	0.02 to 0.25 bar · 0.1 to 0.6 bar · 0.2 to 1.2 bar · 0.8 to 2.5 bar · 2 to 5 bar · 4.5 to 10 bar · 8 to 16 bar
Leakage rate	$\leq 0.05\%$ of $C_V$ ( $K_{VS}$ )
Valve spring force F and actuator area A	See Table 4 · Dimensions in mm and weights

**Table 2 · Materials** · Material number according to ASTM und DIN EN

Valve	Material	
Pressure rating	Class 125	Class 150
Max. perm. temperature	570 °F · 300 °C	660 °F · 350 °C
Body	Cast iron A126B	Carbon steel A216 WCC
Seat and plug	Stainless steel	
Bellows	Stainless steel	
Sealing ring	Graphite with metal core	
<b>Actuator</b>		
Diaphragm cases	Sheet steel 1.0037 (St 37-2)	
Diaphragm	EPDM with fabric reinforcement · Max. perm. ambient temperature 175 °F (80 °C)	

**Table 3 ·  $C_V$  and  $K_{VS}$  coefficients**

Nominal size		Seat $\varnothing$		Flow coefficients <sup>1)</sup>			
NPS	DN	inch	mm	Standard version		With flow divider St I	
				$C_V$	$K_{VS}$	$C_{Vl}$	$K_{VS}l$
½	15	0.87	22	5	4	3.4	3
¾	20	0.87	22	7.5	6.3	6	5
1	25	0.87	22	9.4	8	7	6
1½	40	1.57	40	23	20	18	15
2	50	1.57	40	37	32	26.5	23

<sup>1)</sup> Terms for noise level calculation according to VDMA 24422 (edition 1.89) ·  $C_{Vl}$  or  $K_{VS}l$  =  $C_V$  or  $K_{VS}$  with flow divider St I installed

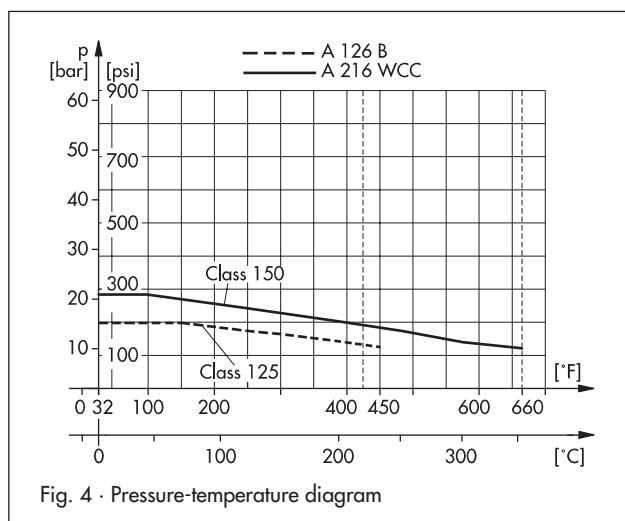


Fig. 4 · Pressure-temperature diagram

**Pressure-temperature diagram** – Material acc. to ASTM –

The permissible pressures, differential pressures and temperatures are restricted by the specifications in the pressure-temperature diagram.

**Table 4 · Dimensions and weights**

Nominal size		NPS	1/2	3/4	1	1 1/2	2
Length L	Class 125	inch	–	–	7.25	8.75	10
		mm	–	–	184	222	254
	Class 150	inch	7.25	7.25	7.25	8.75	10
		mm	184	184	184	222	254
Set point ranges in psi and bar	0.3 to 3.5 psi 0.02 to 0.25 bar	Height H	16.7"/425 mm			18.9"/480 mm	
		Diaphragm case	∅ D = 15.0"/380, A = 100 in <sup>2</sup> /640 cm <sup>2</sup>				
		Valve spring force F	1750 N				
	1.5 to 8.5 psi 0.1 to 0.6 bar	Height H	16.7"/425 mm			18.9"/480 mm	
		Diaphragm case	∅ D = 15.0"/380 mm, A = 100 in <sup>2</sup> /640 cm <sup>2</sup>				
		Valve spring force F	4400 N				
	3 to 17 psi 0.2 to 1.2 bar	Height H	16.1"/410 mm			18.3"/465 mm	
		Diaphragm case	∅ D = 11.2"/285 mm, A = 50 in <sup>2</sup> /320 cm <sup>2</sup>				
		Valve spring force F	4400 N				
	10 to 35 psi 0.8 to 2.5 bar	Height H	16.1"/410 mm			18.3"/465 mm	
		Diaphragm case	∅ D = 8.9"/225 mm, A = 25 in <sup>2</sup> /160 cm <sup>2</sup>				
		Valve spring force F	4400 N				
	30 to 75 psi 2 to 5 bar	Height H	15.4"/390 mm			17.5"/445 mm	
		Diaphragm case	∅ D = 6.7"/170 mm, A = 12 in <sup>2</sup> /80 cm <sup>2</sup>				
		Valve spring force F	4400 N				
	65 to 145 psi 4.5 to 10 bar	Height H	15.4"/390 mm			17.5"/445 mm	
		Diaphragm case	∅ D = 6.7"/170 mm, A = 6 in <sup>2</sup> /40 cm <sup>2</sup>			∅ D = 6.7"/170 mm, A = 12 in <sup>2</sup> /80 cm <sup>2</sup>	
		Valve spring force F	4400 N			8000 N	
	115 to 230 psi 8 to 16 bar	Height H	15.4"/390 mm			17.5"/445 mm	
		Diaphragm case	∅ D = 6.7"/170 mm, A = 6 in <sup>2</sup> /40 cm <sup>2</sup>				
Valve spring force F		8000 N					
0.3 to 8.5 psi	Weight for Class 125 <sup>1)</sup> , approx.	lb	47	49	49	67	75
0.02 to 0.6 bar		kg	21	22	22	30	34
1.5 to 17 psi		lb	36	38	38	54	63
0.1 to 1.2 bar		kg	16	17	17	24	28
10 to 35 psi		lb	32	34	34	49	57
0.8 to 2.5 bar		kg	14	15	15	22	26
30 to 230 psi		lb	27	30	30	48	54
2 to 16 bar		kg	12	13	13	21	24

<sup>1)</sup> +10 % for Class 150

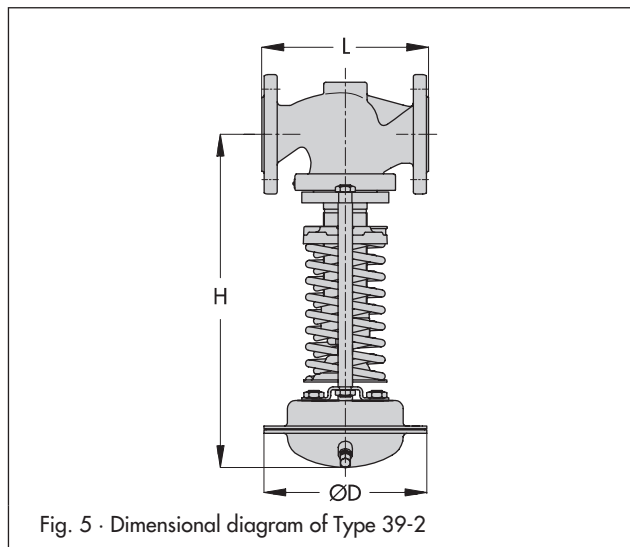


Fig. 5 · Dimensional diagram of Type 39-2

**Ordering text**

Steam Pressure Reducing Valve Type 39-2  
 Nominal size NPS ...  
 Class ...  
 Set point range ... psi (bar)  
 Optionally, accessories ...  
 Special version ...

Specifications subject to change without notice

