

## Check Valve (Backflow Prevention) Type 42-10 RS

### ANSI version

#### Application

For safeguarding nitrogen and compressed air networks against backflow from directly connected systems · Differential pressure set point  $\Delta p = 3 \text{ psi (0.2 bar)}$  · Valve size **NPS ½ to 6 (DN 15 to 150)** · Pressure rating **Class 150** and **Class 300** Compressed air and nitrogen **up to 175 °F (80 °C)**

The regulator controls the differential pressure to the set point adjusted and prevents backflow from directly connected systems.

The regulator is open, provided the upstream pressure is at least 3 psi (0.2 bar) greater than the downstream pressure. It closes automatically when the downstream pressure rises to or above the value of the upstream pressure.

The regulator closes reliably to prevent backflow from the plant into the compressed air or nitrogen network. The soft-seated plug and seat trim complies with leakage class VI.

#### Special features

- Low-noise, self-operated P-regulators requiring little maintenance
- If the operating diaphragm ruptures, the second operating diaphragm takes over the function of the damaged diaphragm
- Reliable functioning even in the event of a power failure or when other instruments in the control circuit malfunction
- Diaphragm rupture indication
- Fixed set point
- Regulators delivered ready-to-install without supplementary devices, meaning no additional installations or start-ups are necessary
- Low purchase and installation costs
- Valve body optionally available in carbon steel A216 WCC or stainless cast steel A351 CF8M
- All wetted parts are free of non-ferrous metal
- External adjustment is not possible
- In the event of backflow, only a minimum amount of leakage (leakage class VI) is possible owing to the soft-seated plug
- A rising backpressure supports tight shut-off of the valve

#### Versions

Check valve in supply pipelines

**Type 42-10 RS** · Class 125 to 300 · Type 2421 RS Valve in NPS ½ to 6 (DN 15 to 150) · Type 2420 RS Actuator with two diaphragms · Fixed set point at 3 psi (0.2 bar) · Version suitable for steam available on request

**Option:** Diaphragm rupture indication with pressure switch



Fig. 1 · Type 42-10 RS Check Valve

## Principle of operation

The medium flows through the valve in the direction indicated by the arrow. The position of the valve plug (3) determines the differential pressure across the free area between the plug (3) and the seat (2). The valve is closed by the springs in the normal position.

At a differential pressure of 3 psi (0.2 bar), the valve begins to open; at 5 psi (0.35 bar) the valve is completely open. At this point, the upstream pressure  $p_1$  (compressed air or nitrogen network pressure) must be greater than the downstream pressure  $p_2$ . The valve closes automatically when the downstream pressure rises to or above the value of the upstream pressure.

The valve plug with soft sealing is standard to ensure tight shut-off and to prevent backflow from the plant into the compressed air or nitrogen network.

The mounted control lines (14) transmit the high (+) pressure and low (-) pressure to the actuator.

The actuator with two diaphragms (11) provides increased functioning reliability. The operating diaphragm for high pressure (11.1) is connected to the valve inlet pressure, whereas the operating diaphragm for low pressure (11.2) is connected to the valve outlet pressure. There is a bore with a mechanical diaphragm rupture indication (12) in the intermediate ring located between the two diaphragms. The pressure of response of the diaphragm rupture indication is approximately 22 psi (1.5 bar). If the diaphragm ruptures, the pressure between the diaphragms will increase and cause the pin of the diaphragm rupture indication to move outward until the red marking appears to indicate the diaphragm rupture. The undamaged operating diaphragm will then take over the function of the damaged operating diaphragm.

A pressure switch (15) can be optionally attached to the actuator to trigger an alarm (refer to Fig. 3.1). If a diaphragm rupture is indicated, it is recommended that both diaphragms be replaced.

## Installation

The regulator is delivered ready for installation.

On installing the regulator, observe the following instructions:

- Install the valve in a horizontal pipeline free of stress with the actuator suspended downwards.
- Make sure the medium flows through the valve in the direction indicated by the arrow on the valve body.
- Install a strainer upstream of the valve.

## Typical application

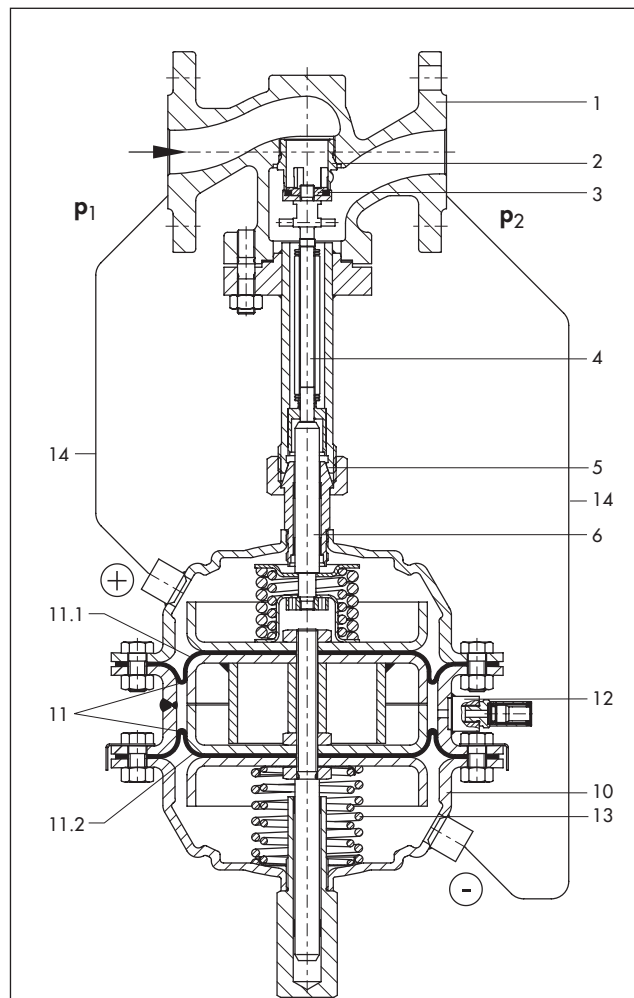
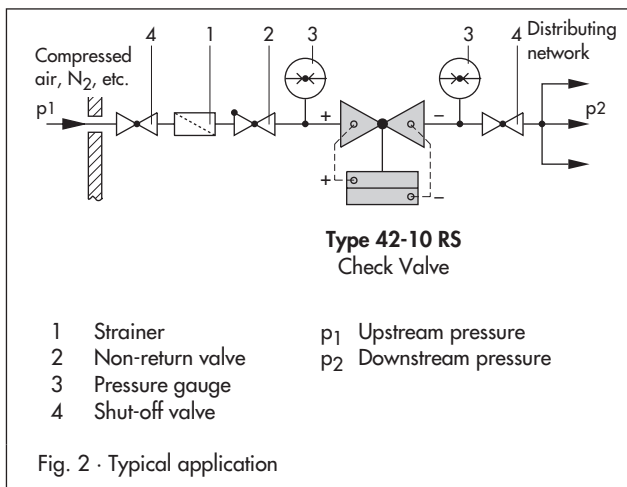


Fig. 3 · Functional diagram



Fig. 3.1 · Actuator with pressure switch (foreground)

- |      |  |
|------|--|
| 1    | Valve body                                 |
| 2    | Seat                                       |
| 3    | Plug                                       |
| 4    | Plug stem                                  |
| 5    | Threaded connection for diaphragm actuator |
| 6    | Actuator stem                              |
| 10   | Actuator housing                           |
| 11   | Two diaphragms                             |
| 11.1 | Operating diaphragm for high pressure      |
| 11.2 | Operating diaphragm for low pressure       |
| 12   | Diaphragm rupture indication               |
| 13   | Set point spring(s)                        |
| 14   | Control line 0.3" x 0.04" (8 x 1 mm)       |
| 15   | Pressure switch (optional)                 |

**Table 1 · Technical data**

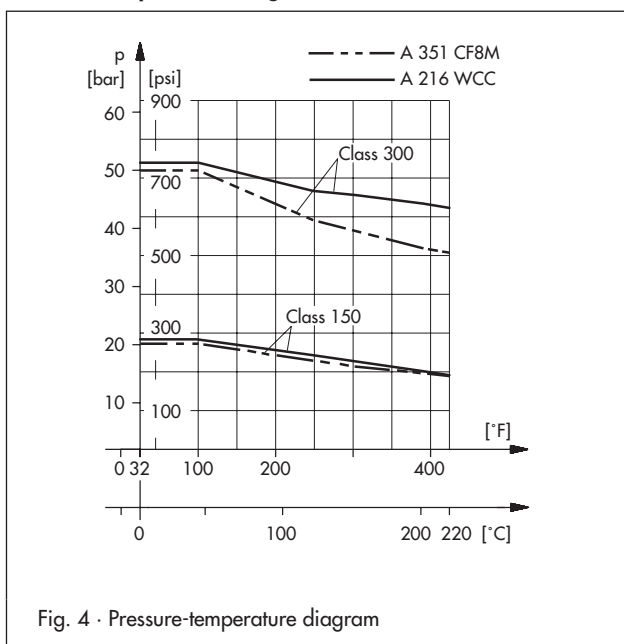
Type 2421 RS Valve										
Size	NPS	½	¾	1	1½	2	2½	3	4	6
	DN	15	20	25	40	50	65	80	100	150
C <sub>v</sub> and K <sub>vS</sub> coefficients	C <sub>v</sub> (US gal/min)	4.5	7.5	9.4	23	37	60	94	145	330
	K <sub>vS</sub> (m <sup>3</sup> /h)	4	6.3	8	20	32	50	80	125	280
Pressure rating	Class 150 or 300									
Max. constant operating pressure	360 psi · 25 bar									
Max. perm. pressure on one side	650 psi · 45 bar									
Max. permissible temperature	See Fig. 4 · Pressure-temperature diagram									
Type 2420 RS Actuator										
Diaphragm area of actuator	50 in <sup>2</sup> · 320 cm <sup>2</sup>					100 in <sup>2</sup> · 640 cm <sup>2</sup>				
Δp set point, fixed	3 psi · 0.2 bar									
Max. perm. temperature	Air and gases up to 175 °F · 80 °C									

Terms for valve sizing according to DIN EN 60534: F<sub>L</sub> = 0.95; x<sub>T</sub> = 0.75

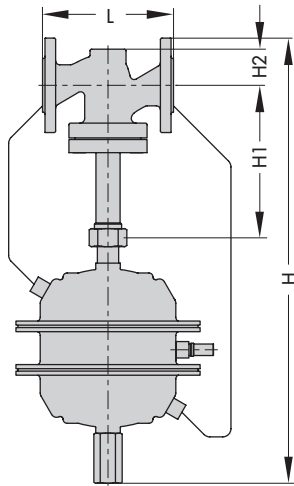
**Table 2 · Materials · Material number acc. to DIN EN**

Type 2421 RS Valve				
Pressure rating	Class 150	Class 300	Class 150	Class 300
Valve body	Carbon steel A216 WCC		Stainless cast steel A351 CF8M	
Seat and plug	Stainless steel with EPDM soft sealing			
	1.4104		1.4571	
Plug stem	Stainless steel 1.4310			
Lower part of body	P265GH		1.4571	
Body gasket	Graphite on metal core			
Type 2420 RS Actuator				
Diaphragm cases	Sheet steel DD11		1.4301	
Diaphragm	EPDM with fabric reinforcement			
Guide bushing	DU bushing		PTFE	
Housing	1.4301			
Coupling pin	1.4301			
Seals	EPDM			
Guide bushing	DU bushing		PTFE	

**Pressure-temperature diagram – ASTM materials –**



## Dimensions



Type 42-10 RS

**Table 3** · Dimensions and weights

Size	NPS	½	¾	1	1½	2	2½	3	4	6	
	DN	15	20	25	40	50	65	80	100	150	
Length L	Cl 150	inch	7.25			8.75	10	10.9	11.75	13.9	17.75
		mm	184			222	254	276	298	352	451
	Cl 300	inch	7.5	7.6	7.75	9.25	10.5	11.5	12.5	14.5	18.6
		mm	191	194	197	235	267	292	318	368	473
Height H	inch	19.7			23.6		31.5		32.7	39.4	
	mm	550			600		800		830	1000	
Height H1	inch	8.6					11.8		14	23.2	
	mm	225					300		355	590	
Height H2	inch	1.8			2.8		3.9		4.5	6.9	
	mm	45			72		98		113	175	
Actuator	ANSI	Ø D = 11.2" · A = 50 in <sup>2</sup>					Ø D = 15.4" · A = 100 in <sup>2</sup>				
	DIN	Ø D = 285 mm · A = 320 cm <sup>2</sup>					Ø D = 390 mm · A = 640 cm <sup>2</sup>				
Weight, approx.	Cl 150	lb	57	58	62	78	87	131	144	165	360
		kg	26	26.5	28	35.5	39.5	59.5	65.5	75	165
	Cl 300	lb	60	61	65	82	91	137	151	173	376
		kg	27	27.5	29.5	37	41.5	62	68.5	78.5	170.5

Fig. 5 · Dimensions

**Table 4** · Regulator configurations with order specifications

Order number · Type 42-10 RS Regulator = Valve 4210 RS + Actuator 2420 RS + Mounting kit M 4210 RS					
Type 4210 RS Valve					Mounting kit M4210 RS
NPS	A 216 WCC		A 351 CF8M		
	Cl 150	Cl 300	Cl 150	Cl 300	
½	1268793	1268814	1282830	1282832	1282856
¾	1268792	1268812	1282834	1282833	1282857
1	1268783	1268811	1282837	1282836	1282858
1½	1268794	1268810	1282838	1282839	1276829
2	1268795	1268809	1282841	1282840	1282860
2½	1268796	1268808	1282842	1282843	1282862
3	1268797	1268807	1282846	1282844	1282863
4	1268798	1268805	1282847	1282848	1275692
6	1268799	1268800	1282850	1282849	1282865
Type 2420 RS Actuator					
A = 320 cm <sup>2</sup>	1272321	1272321	1282855	1282855	-
A = 640 cm <sup>2</sup>	1272322	1282853	1467649	1282854	

Refer to TV-SK 17001 (valve characteristics for Type 42-10 RS Check Valve) for selection table.

**Ordering text**

Check Valve **Type 42-10 RS**

Fixed set point 3 psi (0.2 bar)

NPS (DN) ...

Body material ..., Class ...

Special version

Refer to Table 4 for regulator configuration with order numbers

Type 42-10 RS Regulator = Valve 42-10 RS + Actuator

42-10 RS + Mounting kit M 4210 RS

Specifications subject to change without notice.

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