

**RE 28 163/10.97**

Replaces: 03.97

## 2-way flow control valve Type 2FRM 6

Nominal size 6

Series 3X

Maximum operating pressure 315 bar <sup>1)</sup>

Maximum flow 32 L/min

<sup>1)</sup> When used in conjunction with a rectifier plate up to 210 bar

H/A/D 5851/97 + H/A/D 5852/97



Types 2FRM 6 .36-3X/.V and 2FRM 6 SB36-3X/.V

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### Features

- Porting pattern to DIN 24340, form A, ISO 4401 and CETOP-RP 121 H, sub-plates to catalogue sheet RE 45 052 (separate order), see page 7
- External closing of the pressure compensator, optional
- Panel mounting with a G 3/8 connection thread
- Check valve, optional
- Rotary knob with scale
- Lockable, optional

**Ordering details: 2-way flow control valve**

<b>2FRM</b>	<b>6</b>		<b>6 - 3X/</b>		<b>V</b>	<b>*</b>
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2-way flow control valve	
Nominal size 6	= 6
<b>With</b> external closing of the pressure compensator (suppression of jump at start)	= <b>A</b>
<b>Without</b> external closing of the pressure compensator	= <b>B</b>
<b>Without</b> external closing of the pressure compensator	= <b>SB</b>
<b>For panel mounting</b>	
<b>Adjustment element</b>	
Lockable rotary knob with scale <sup>1)</sup>	= 3
Rotary knob with scale	= 7
Zero position of the markings at port P	= 6
Series 30 to 39 (30 to 39 unchanged installation and connection dimensions)	= 3X

<sup>1)</sup> H-key with material no. 00008158 is included within the scope of supply

**Preferred types and standar components are highlighted in the RPS (Rexroth Price list Standard).**

	Further details in clear text
<b>V =</b>	FPM seals (other seals on request)
	<b>⚠ Attention!</b> The compatibility of the seals and pressure fluid has to be taken into account!
<b>R =</b>	<b>with</b> check valve
<b>M =</b>	<b>without</b> check valve
	<b>Flow (A → B)</b>
<b>0.2Q =</b>	up to 0.2 L/min
<b>0.6Q =</b>	up to 0,6 L/min
<b>1.5Q =</b>	up to 1.5 L/min
<b>3Q =</b>	up to 3.0 L/min
<b>6Q =</b>	up to 6.0 L/min
<b>10Q =</b>	up to 10.0 L/min
<b>16Q =</b>	up to 16.0 L/min
<b>25Q =</b>	up to 25.0 L/min
<b>32Q =</b>	up to 32.0 L/min

**Ordering details: rectifier sandwich plate**

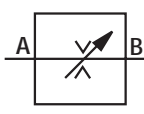
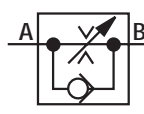
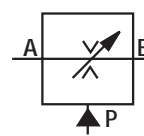
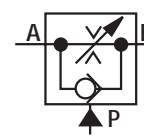
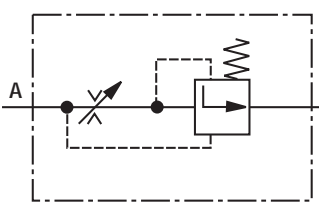
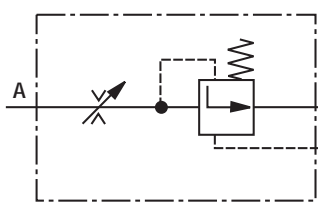
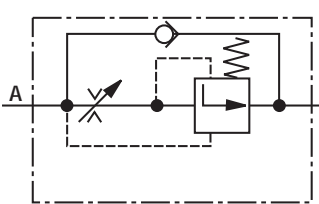
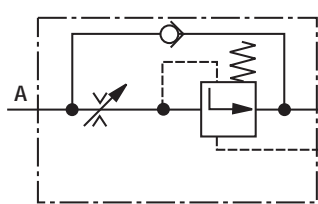
Not for panel mounting

<b>Z4S</b>	<b>6 - 1X/</b>	<b>V</b>	<b>*</b>
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Rectifier sandwich plate	
Nominal size 6	= 6
Series 10 to 19 (10 to 19 unchanged installation and connection dimensions)	= 1X
<b>Material no. 00489356</b>	

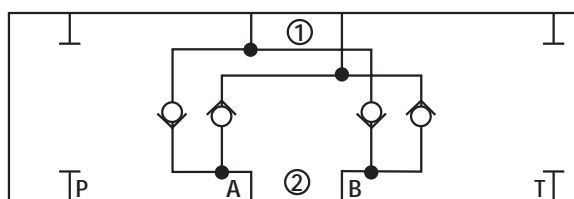
	Further details in clear text
<b>V =</b>	FPM seals (other seals on request)
	<b>⚠ Attention!</b> The compatibility of the seals and pressure fluid has to be taken into account!

**Symbols:** 2-way flow control valves (simplified, detailed)

<p>Flow control valve: simplified (<b>without</b> check valve; <b>without</b> external closing)</p>  <p>Type 2FRM 6 B..-3X/..MV Type 2FRM 6 SB..-3X/..MV</p>	<p>Flow control valve: simplified (<b>with</b> check valve; <b>without</b> external closing)</p>  <p>Type 2FRM 6 B..-3X/..RV Type 2FRM 6 SB..-3X/..RV</p>	<p>Flow control valve: simplified (<b>without</b> check valve; <b>with</b> external closing)</p>  <p>Type 2FRM 6 A..-3X/..MV</p>	<p>Flow control valve: simplified (<b>with</b> check valve; <b>with</b> external closing)</p>  <p>Type 2FRM 6 A..-3X/..RV</p>
<p>Flow control valve: detailed (<b>without</b> check valve; <b>without</b> external closing)</p>  <p>Type 2FRM 6 B..-3X/..MV Type 2FRM 6 SB..-3X/..MV</p>	<p>Flow control valve: detailed (<b>without</b> check valve; <b>with</b> external closing)</p>  <p>Type 2FRM 6 A..-3X/..MV</p>		
<p>Flow control valve: detailed (<b>with</b> check valve; <b>without</b> external closing)</p>  <p>Type 2FRM 6 B..-3X/..RV Type 2FRM 6 SB..-3X/..RV</p>	<p>Flow control valve: detailed (<b>with</b> check valve; <b>with</b> external closing)</p>  <p>Type 2FRM 6 A..-3X/..RV</p>		

**Symbols:** rectifier sandwich plate

(1) = component side, (2) = sub-plate side



**Function, section: type 2FRM 6 B...**

**General:**

The flow control valve type 2 FRM is a 2-way flow control valve. It is used for maintaining a constant flow, independent of pressure and temperature.

The valve basically comprises of housing (1), rotary knob (2), orifice (3), pressure compensator (4) and an optional check valve.

**Flow control valve type 2FRM 6 B.-3X/..MV (without external closing, without check valve)**

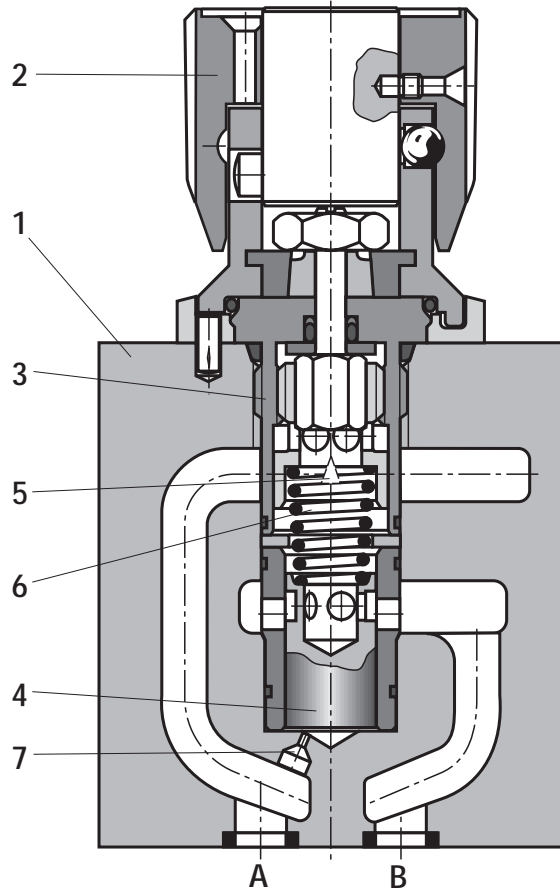
Flow from port A to B is throttled at throttle position (5). The throttle cross-section is varied by turning rotary knob (2).

In order to keep the flow constant, independent of pressure, a pressure compensator (4) is fitted in port B downstream of the throttle position (5).

The compression spring (6) presses orifice (3) and pressure compensator (4) outwards against their respective stops and thus keeps pressure compensator (4) in the open position when there is no flow through the valve. When fluid flows through the valve, the pressure acting in port A applies a force to pressure compensator (4) via orifice (7).

The pressure compensator (4) moves into the compensating position until the forces balance. If the pressure in port A rises, pressure compensator (4) moves in the closing direction, until a balance of forces is once more attained. Due to this continuous compensating action of the pressure compensator, a constant flow is obtained.

In order to control a flow through the valve in both directions, a rectifier sandwich plate type Z4S 6 may be fitted below this flow control valve.



Type 2FRM 6 B76-3X/..MV

**Function, section: type 2FRM 6 SB...**

**Flow control valve type 2FRM 6 SB.-3X/..RV (without external closing, with check valve, for panel mounting)**

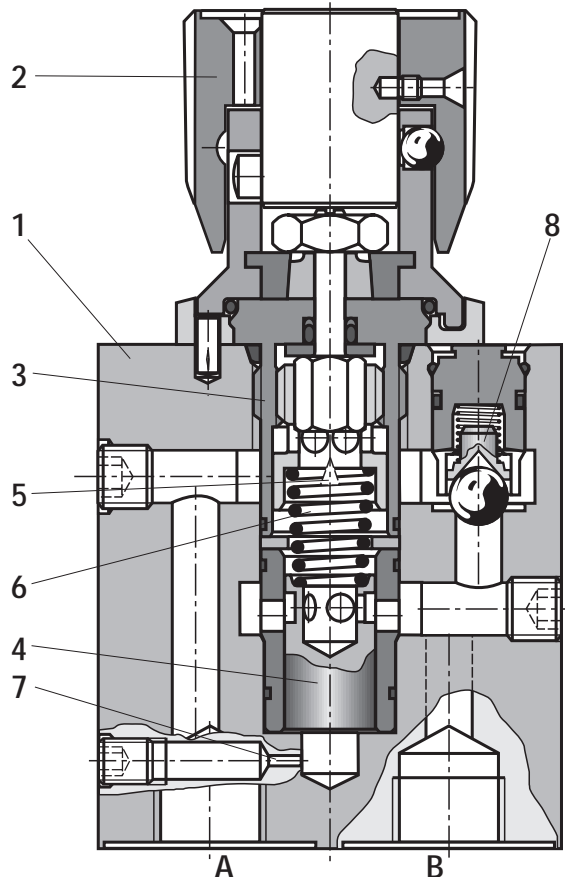
Flow from port A to B is throttled at throttle position (5). The throttle cross-section is varied by turning rotary knob (2).

In order to keep the flow constant, independent of pressure, a pressure compensator (4) is fitted in port B downstream of throttle the position (5).

The compression spring (6) presses orifice (3) and pressure compensator (4) outwards against their respective stops and thus keeps pressure compensator (4) in the open position when there is no flow through the valve. When fluid flows through the valve, the pressure acting in port A applies a force to pressure compensator (4) via orifice (7).

The pressure compensator (4) moves into the compensating position until the forces balance. If the pressure in port A rises, pressure compensator (4) moves in the closing direction, until a balance of forces is once more attained. Due to this continuous compensating action of the pressure compensator, a constant flow is obtained.

Free-flow from port B to A is via the check valve (8).



Type 2FRM 6 SB76-3X/..RV

**Function, section, circuit example:** type 2FRM 6 A...**Flow control valve type 2FRM 6 A...-3X/..RV**

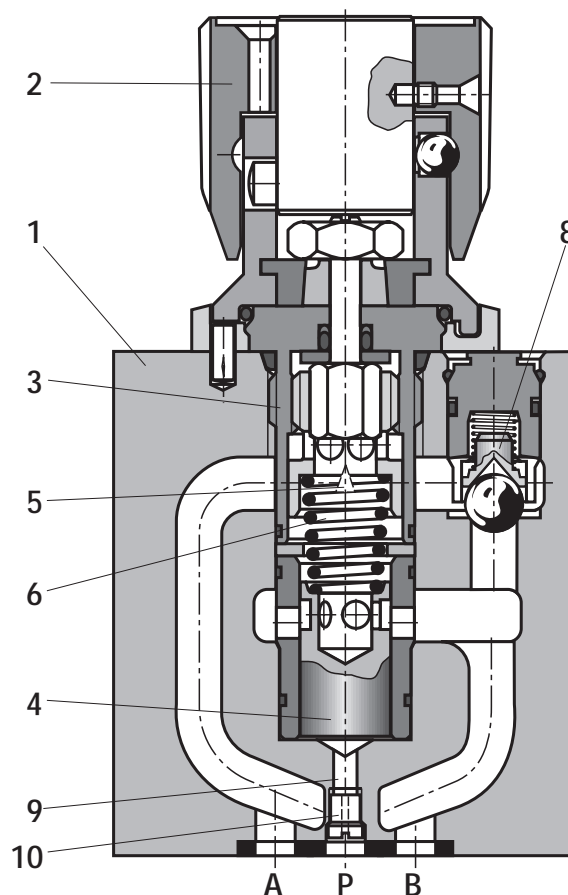
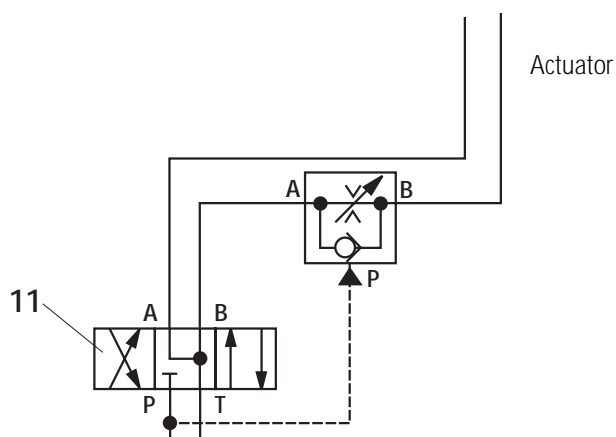
(with external closing, with check valve)

The function of this valve is basically the same as that of valve type 2FRM 6 B...-3X/..MV.

However, this type of flow control valve is provided with an external port permitting the pressure compensator (4) to be pressurised via port P (9). The external pressure acting in port P (9) via orifice (10) holds pressure compensator (4) closed against the force of compression spring (6). When the connected directional valve (11) is actuated to permit flow from P to B, control is achieved as with type 2FRM 6 B. Thus a jump on start-up is avoided.

**This version with external closing of the compensator may only be used for meter-in control.**

Free return flow from port B to A is via check valve (8).



Type 2FRM 6 A76-3X/..RV

**Technical data:** 2-way flow control valve

(for applications outside these parameters, please consult us!)

Weight	2FRM 6 A...; 2FRM 6 B...	kg	approx. 1.3									
	2FRM 6 SB	kg	approx. 1.5									
Ambient temperature range		°C	- 30 to + 50									
Maximum operating pressure at port A		bar	315									
Pressure fluid	mineral oil (HL, HLP) to DIN 51 524; fast bio-degradable pressure fluids to VDMA 24 568 (also see RE 90 221); HETG (rape seed oil); HEPG (polyglycole); HEES (synthetic ester); other fluids on request											
Pressure fluid temperature range		°C	- 20 to + 80									
Viscosity range		mm <sup>2</sup> /s	10 to 800									
Flow	$q_{V \max}$	L/min	0.2	0.6	1.5	3.0	6.0	10.0	16.0	25.0	32.0	
	$q_{V \min}$ bis 100 bar	cm <sup>3</sup> /min	15	15	15	15	25	50	70	100	250	
	$q_{V \min}$ bis 315 bar	cm <sup>3</sup> /min	25	25	25	25	25	50	70	100	250	
Degree of contamination	maximum permissible degree of contamination of the pressure fluid is to NAS 1638 class 9. We, therefore, recommend a filter with a minimum retention rate of $B_{10} \geq 75$ .											
Pressure differential $\Delta p$ for free return flow B → A	see characteristic curves on page 6											
Minimum pressure differential		bar	6 to 14									
Pressure stability up to $\Delta p = 315$ bar		%	$\pm 2 (q_{V \max})$									

**⚠ Attention!**

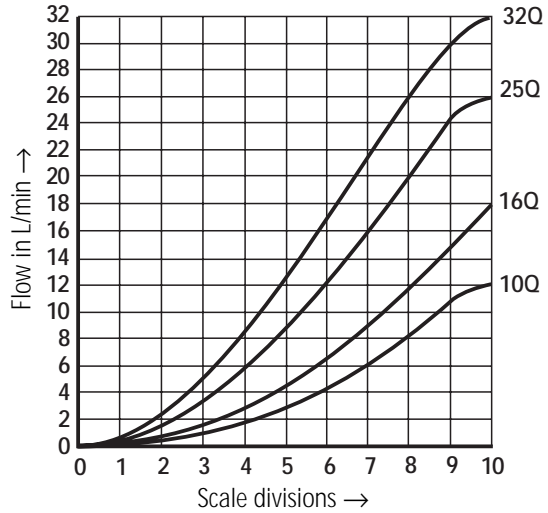
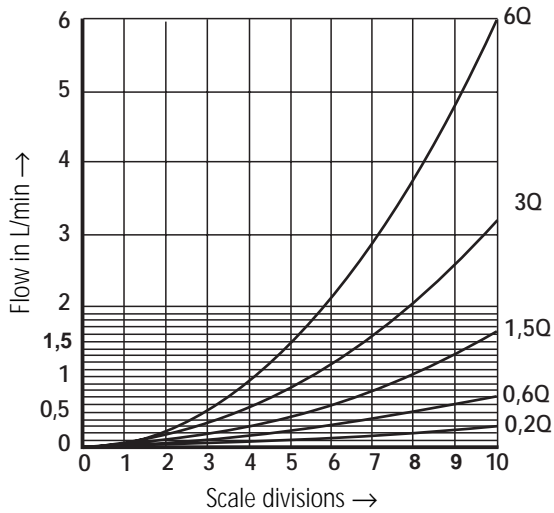
The pressure loss from P at the inlet of the directional valve to A at the inlet of the flow control valve is noticeable at low flows.

**Technical data:** rectifier sandwich plate (for applications outside these parameters, please consult us!)

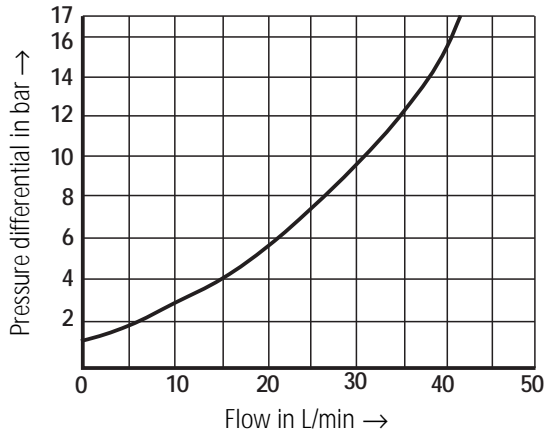
Nominal flow	L/min	32
Maximum operating pressure	bar	210
Cracking pressure	bar	0.7
Weight	kg	approx. 0.9

**Characteristic curves** (measured at  $v = 41 \text{ mm}^2/\text{s}$  and  $\vartheta = 50 \text{ }^\circ\text{C}$ )

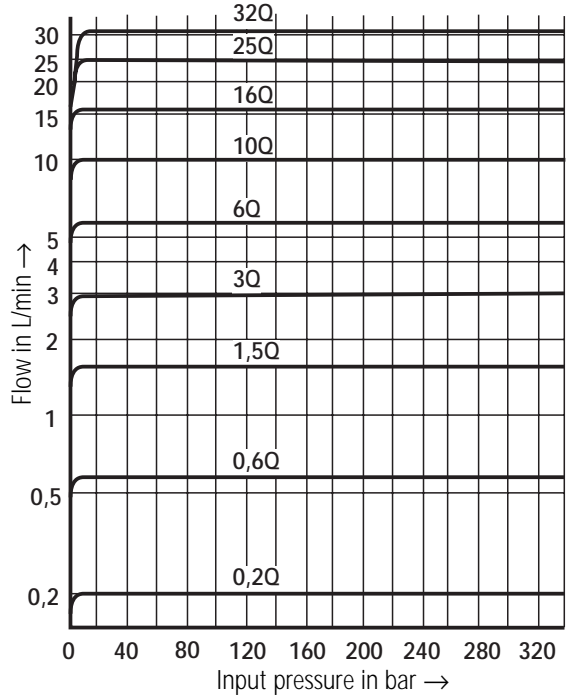
Flow in relationship to the scale setting (flow control from A to B)



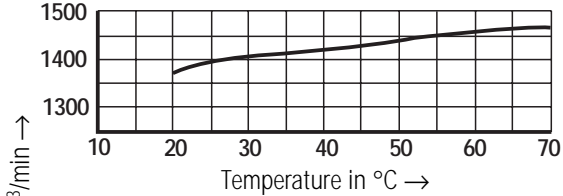
$\Delta p - q_v$ -characteristic curve B to A; closed orifice



Flow-pressure relationship

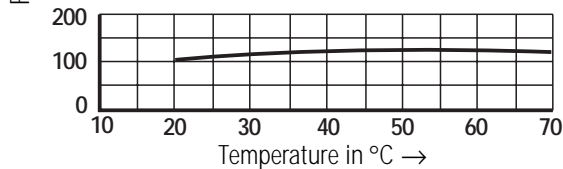
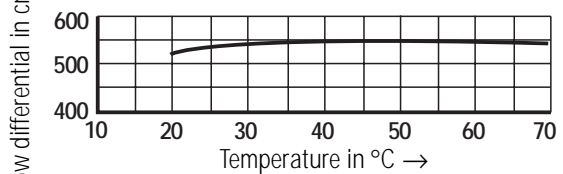
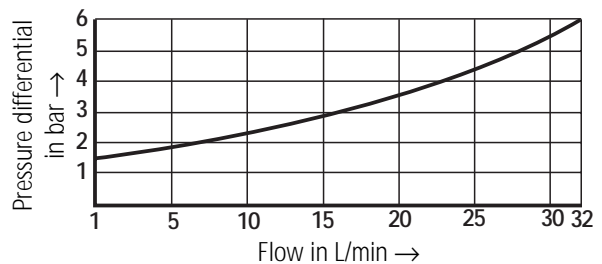


Temperature relationship at  $\Delta p = 20 \text{ bar}$



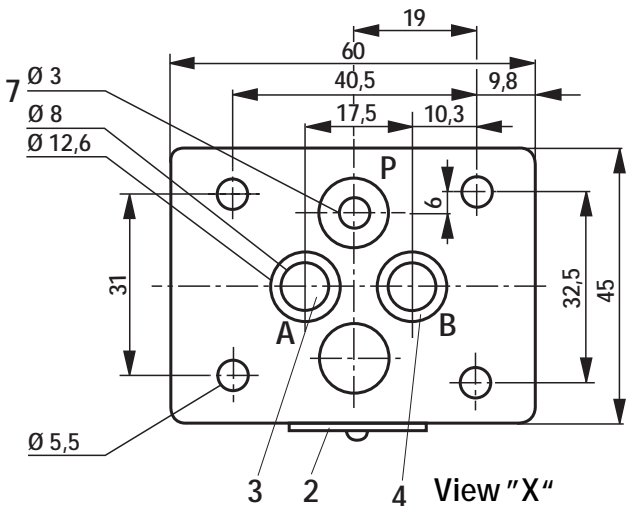
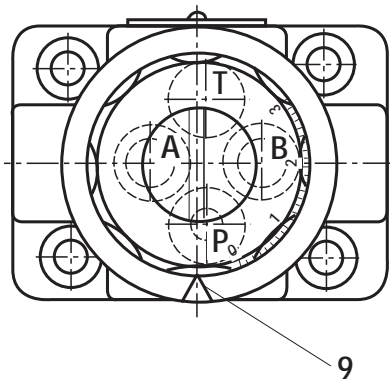
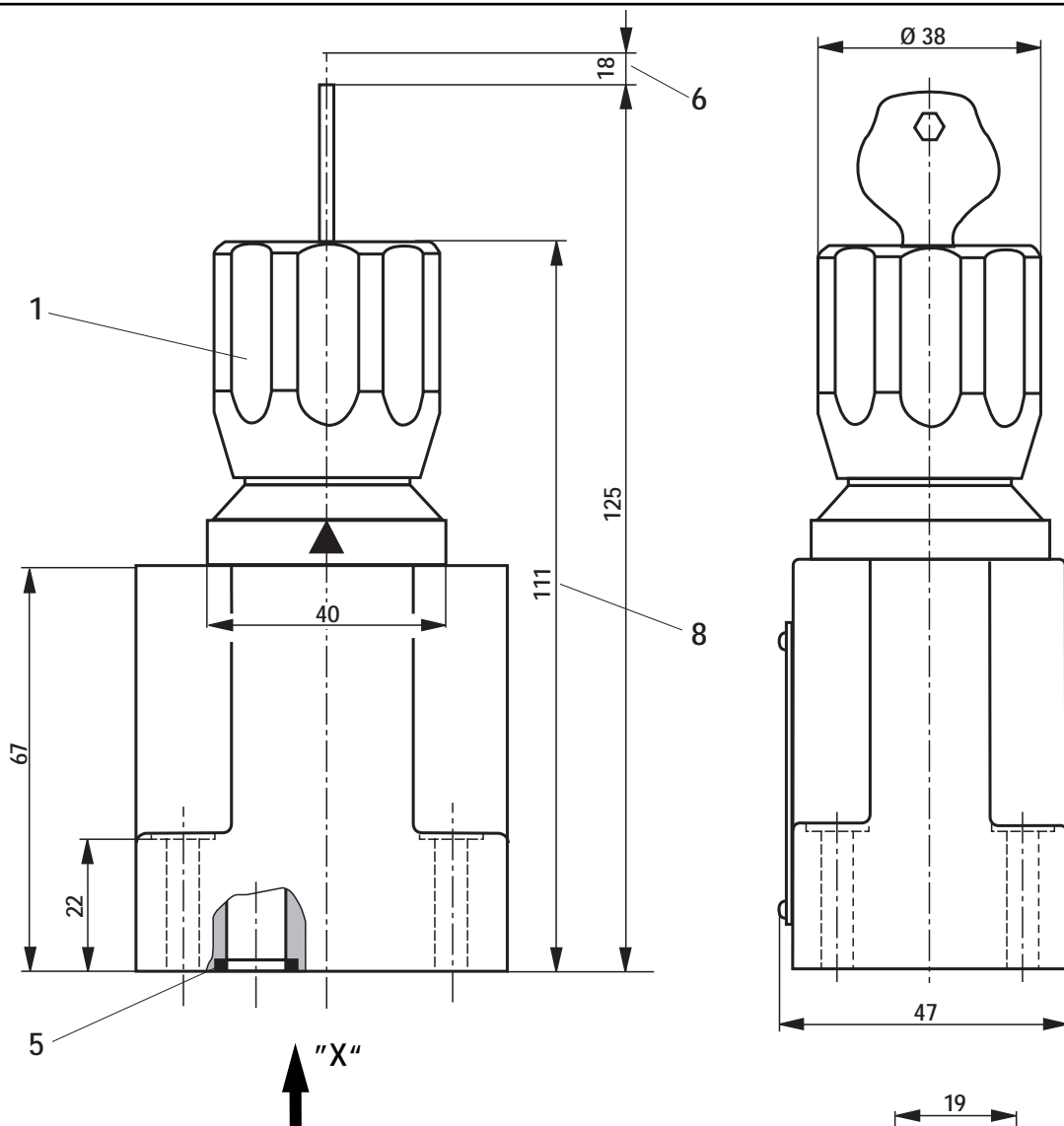
Rectifier sandwich plate type Z4S 6

$\Delta p - q_v$ -characteristic curve



Unit dimensions: types 2FRM 6 A... and 2FRM 6 B...

(Dimensions in mm)



- 1 Lockable rotary knob with scale (adjustment element "3")
- 2 Name plate
- 3 Inlet "A"
- 4 Outlet "B"
- 5 R-rings 9.81 x 1.5 x 1.78 for ports A, B, P and T
- 6 Space required to remove key
- 7 Hole Ø 3 for version 2FRM 6 B is not drilled. (without external closing)
- 8 Rotary knob with scale (adjustment element "7")
- 9 Position of marking at port P

Sub-plates to catalogue sheet RE 45 052 and valve fixing screws must be ordered separately.

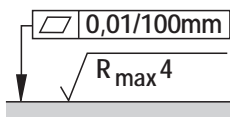
**Sub-plates:**

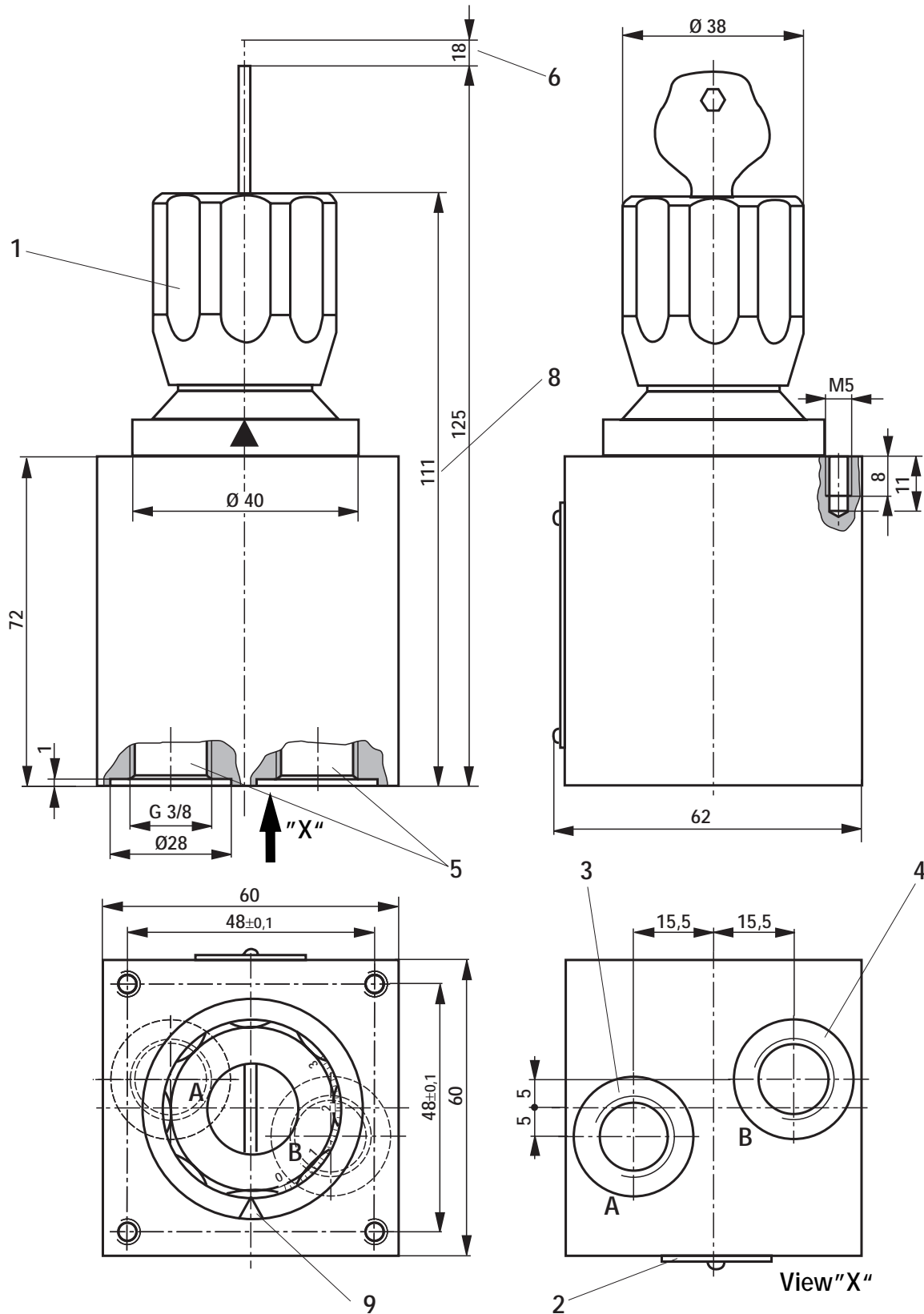
- Type G 341/01 (G 1/4)
- Type G 342 /01 (G 3/8)
- Type G 502/01 (G 1/2)

**Valve fixing screws:**

- without** rectifier sandwich plate  
M5 x 30 DIN 912-10.9;  $M_A = 8.9$  Nm
- with** rectifier sandwich plate  
M5 x 70 DIN 912-10.9;  $M_A = 8.9$  Nm

Required surface finish of mating piece





- 1 Lockable rotary knob with scale (adjustment element "3")
- 2 Name plate
- 3 Inlet "A"
- 4 Outlet "B"

- 5 Connection thread G 3/8 to ISO 228/1
- 6 Space required to remove key
- 8 Rotary knob with scale (adjustment element "7")
- 9 Position of marking is opposite the name plate

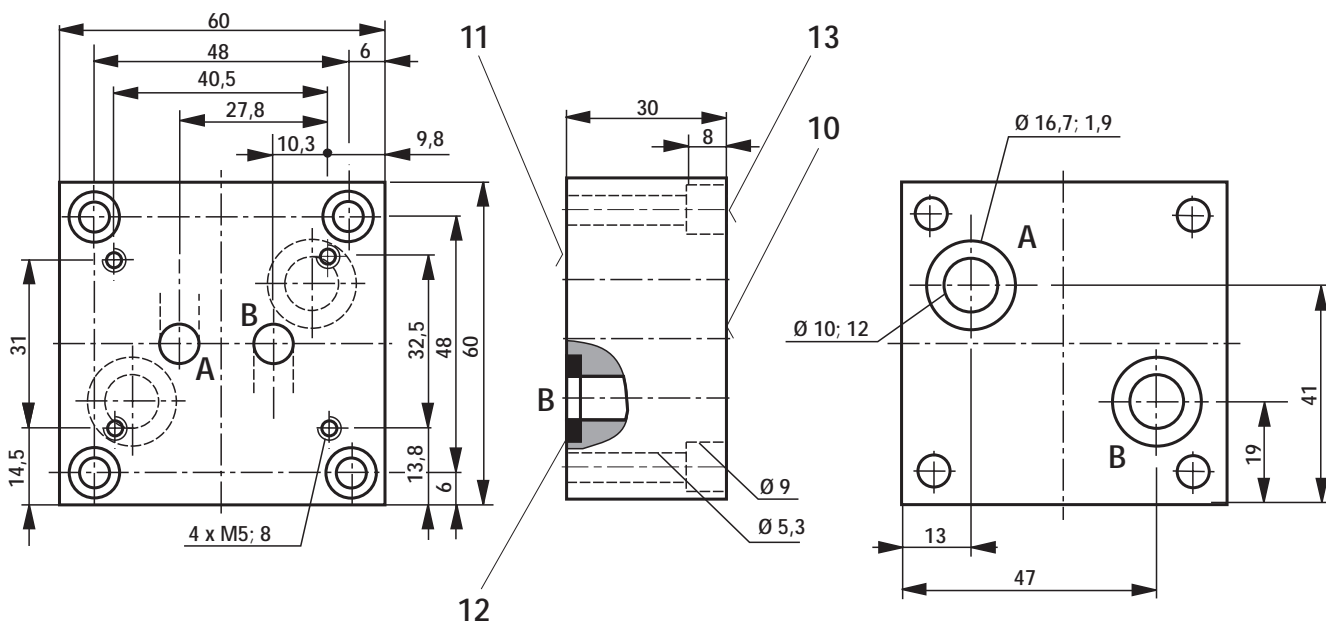


**Unit dimensions:** adaptor plate AG5075

(Dimensions in mm)

**Note:**

The adaptor plate AG 5075 (**Material no. 00496121**) is designed for mounting flow control valve type 2FRM 6 B...-3X/.. onto an existing porting pattern for flow control valve type 2FRM 5 -3X/...



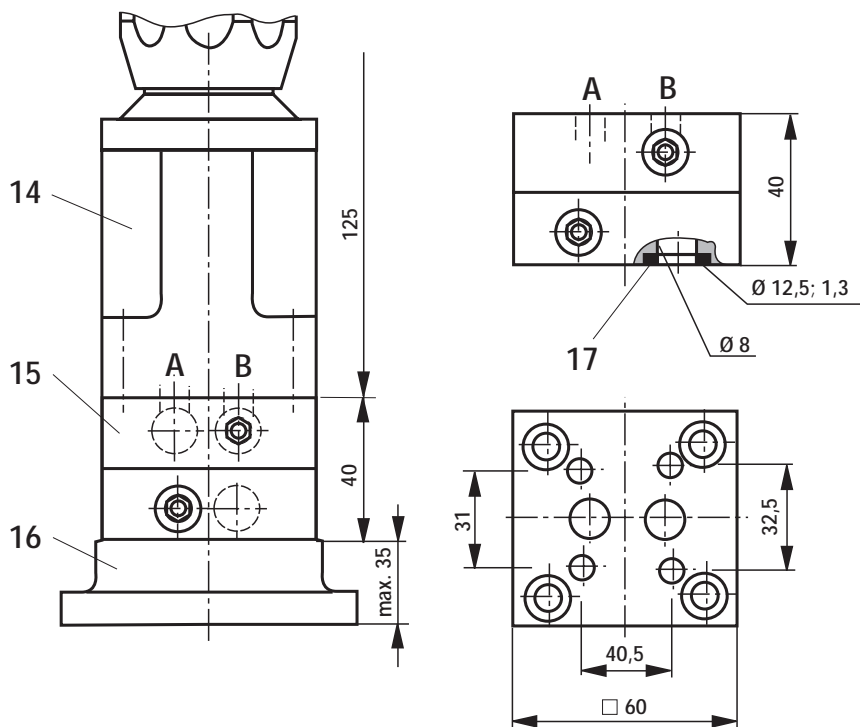
- 10 Mounting surface for flow control valve type 2FRM 6
- 11 Mounting surface for porting pattern for flow control valve type 2FRM 5

- 12 R-ring 12.81 x 2.4 x 2.62
- 13 S.H.C.S. M5 x 30 DIN 912-8.8,  $M_A = 6.1 \text{ Nm}$

**Adaptor plates and valve fixing screws must be ordered separately.**

**Unit dimensions:** rectifier sandwich plate type Z4S 6-1X/V

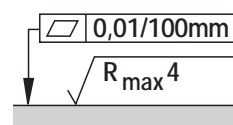
(Dimensions in mm)



**⚠ attention!**

Rectifier sandwich plate type Z4S 6 -1X/V may not be used in conjunction with flow control valve type 2FRM 6 A...-3X/.. with built-in external closing of the pressure compensator.

- 14 2-way flow control valve
- 15 Rectifier sandwich plate
- 16 Sub-plate to catalogue sheet RE 45 052 and valve fixing screws see page 7.
- 17 R-ring 9.81 x 1.5 x 1.78



Required surface finish of mating piece

## Notes

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