

2-way flow control valve

RE 28163/02.09
Replaces: 02.03

1/12

Type 2FRM

Size 6
Component series 3X
Maximum operating pressure 315 bar ¹⁾
Maximum flow 32 L/min



Table of contents

Contents	Page
Features	1
Order details	2
Symbols	3
Function, section	4 to 6
Technical data	7
Characteristic curves	8
Unit dimensions	9 to 12

Features

- Location of the ports according to DIN 24340 form A
- Subplates see data sheet RE 45052 (separate order)
- external closing of the pressure compensator, optional
- as threaded connection for panel mounting with connection thread G3/8
- Check valve, optional
- 2 adjustment types, optional:
 - Rotary knob with scale
 - lockable rotary knob with scale

Information on available spare parts:
www.boschrexroth.com/spc

¹⁾ For use of the component with a rectifier sandwich plate up to 210 bar

Order details: 2-way flow control valve

2FRM	6			6	3X		V	*
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2-way flow control valve

Size 6 = 6

With closing of the pressure compensator = A
(suppression of the start-up jump)

Without closing of the pressure compensator = B

Without closing of the pressure compensator = SB

For panel mounting

Adjustment type

Lockable rotary knob with scale ¹⁾ = 3

Rotary knob with scale = 7

Zero position of the marking at port P = 6

Component series 30 to 39 = 3X

(30 to 39: unchanged installation and connection dimensions)

¹⁾ Key with the material no. **R900008158** is included in the delivery.

**Preferred types and standard units are contained in the
EPS (standard price list).**

Further details in the clear text

Seal material

FKM seals

(other seals upon request)

Attention!

Observe compatibility of seals with the
hydraulic fluid used!

V =

R =

M =

With check valve

Without check valve

Flow (A → B)

0.2Q = up to 0.2 l/min

0.6Q = up to 0.6 l/min

1.5Q = up to 1.5 l/min

3Q = up to 3.0 l/min

6Q = up to 6.0 l/min

10Q = up to 10.0 l/min

16Q = up to 16.0 l/min

25Q = up to 25.0 l/min

32Q = up to 32.0 l/min

Order details: Rectifier sandwich plate (only for version "B")

Z4S	6	1X	V	*
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Rectifier sandwich plate

Size 6 = 6

Component series 10 to 19 = 1X

(10 to 19: unchanged installation and connection dimensions)

Further details in the clear text

Seal material

FKM seals

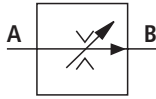
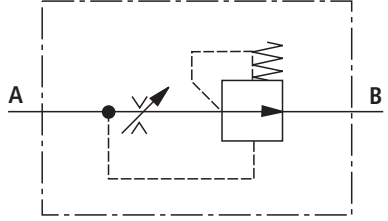
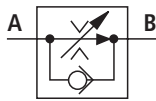
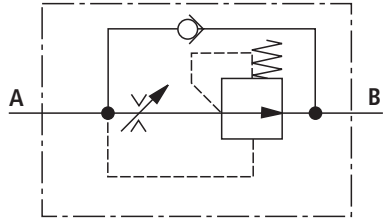
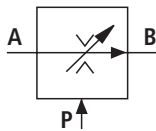
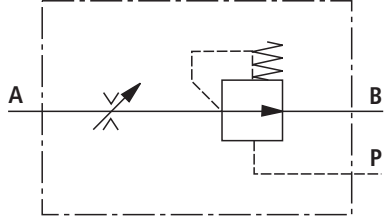
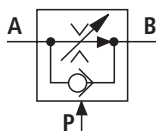
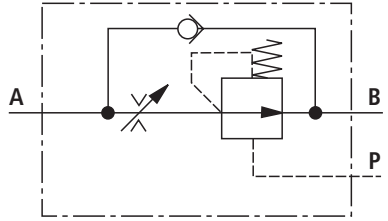
(other seals upon request)

Attention!

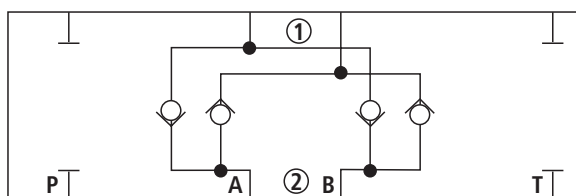
Observe compatibility of seals with the hydraulic fluid
used!

V =

Symbols: 2-way flow control valves

	Simplified	Detailed
Without check valve; without external closing Type 2FRM 6 B...MV Type 2FRM 6 SB...MV		
With check valve; without external closing Type 2FRM 6 B...RV Type 2FRM 6 SB...RV		
Without check valve; with external closing Type 2FRM 6 A...MV		
With check valve; with external closing Type 2FRM 6 A...RV		

Symbol: Rectifier sandwich plate (① = component side, ② = 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 a housing (1), a rotary knob (2), orifice bush (3), pressure compensator (4) and an optional check valve.

Flow control valve type 2FRM 6 B...MV

(without external closing, without check valve)

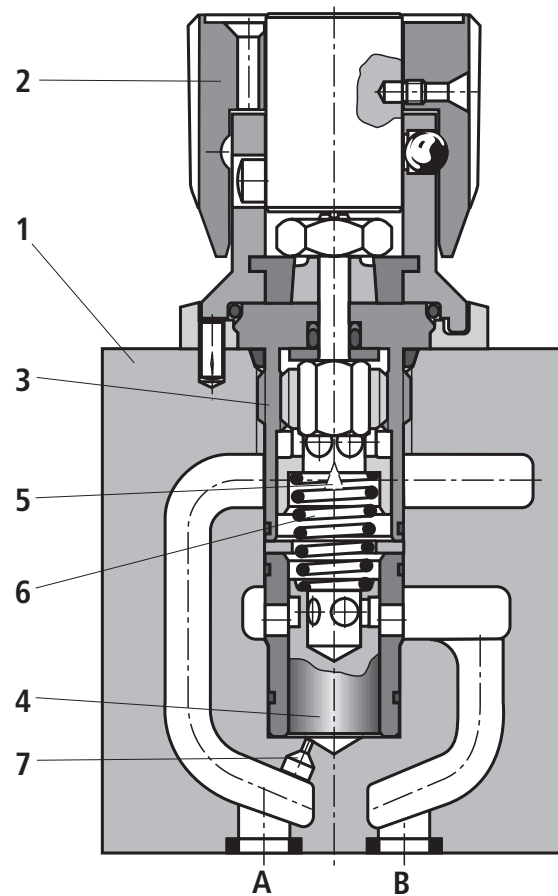
The flow from channel A to channel B is throttled at the throttling point (5). The throttle cross-section is set by turning the rotary knob (2).

In order to keep the flow in channel B constant, independent of the pressure, a pressure compensator (4) is fitted downstream of the throttling point (5).

The compression spring (6) presses the pressure compensator (4) downwards against its stop and keeps the pressure compensator (4) in the open position when there is no flow through the valve. When fluid flows through the valve, the pressure present in port A applies a force to the pressure compensator (4) via orifice (7).

The pressure compensator (4) moves to the control position until the forces are in balance. When the pressure in channel A rises, the pressure compensator (4) moves in the closing direction until a balance of forces is once again attained. Due to this continuous compensation of the pressure compensator (4), 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...

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 a housing (1), a rotary knob (2), orifice bush (3), pressure compensator (4) and an optional check valve (8).

Flow control valve type 2FRM 6 SB...RV

(**without** external closing, **with** check valve, with threaded connection **for panel mounting**)

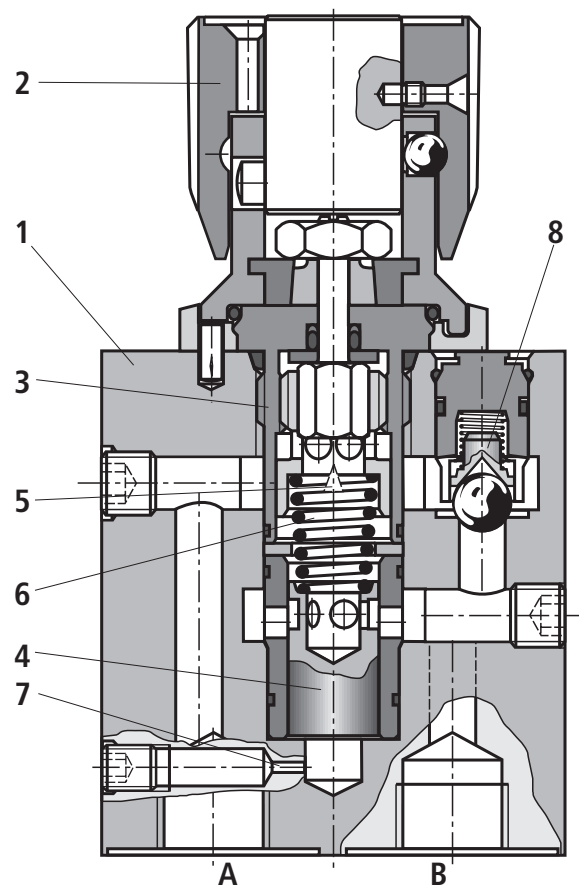
The flow from channel A to channel B is throttled at the throttling point (5). The throttle cross-section is set by turning the rotary knob (2).

In order to keep the flow in channel B constant, independent of the pressure, a pressure compensator (4) is fitted downstream of the throttling point (5).

The compression spring (6) presses the pressure compensator (4) downwards against its stop and keeps the pressure compensator (4) in the open position when there is no flow through the valve. When fluid flows through the valve, the pressure present in port A applies a force to the pressure compensator (4) via orifice (7).

The pressure compensator (4) moves to the control position until the forces are in balance. When the pressure in channel A rises, the pressure compensator (4) moves in the closing direction until a balance of forces is once again attained. Due to this continuous compensation of the pressure compensator (4), a constant flow is obtained.

The free return flow from channel B to channel A is directed via the check valve (8).



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

Function, section, sample circuit: Type 2FRM 6 A...

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 a housing (1), a rotary knob (2), orifice bush (3), pressure compensator (4) and an optional check valve (8).

Flow control valve type 2FRM 6 A...RV (with external closing, with check valve)

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

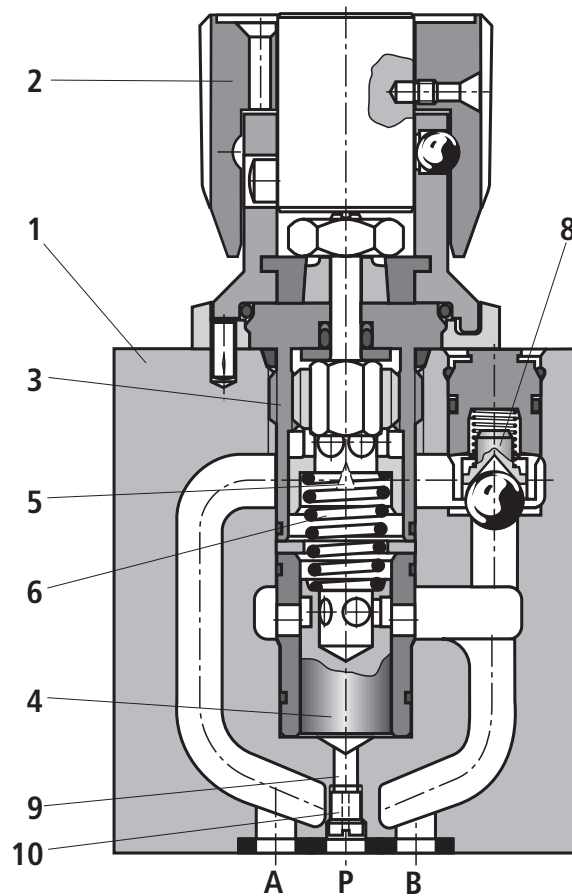
However, the flow control valve features external closing of the pressure compensator (4) via channel P (9). The external pressure acting in channel P (9) via orifice (10), holds the pressure compensator (4) closed against the compression spring (6). When the connected directional valve (11) is actuated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

The version with closing of the pressure compensator can only be used for meter-in control.

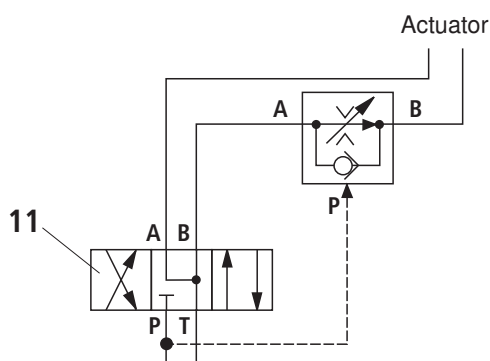
The free return flow from channel B to channel A is directed via the check valve (8).

Attention!

The pressure loss of port P upstream of the directional valve to port A upstream of the flow control valve makes itself felt by a reduced flow.



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



Technical data: 2-way flow control valve

(For applications of the component outside the specified values, please contact us!)

general

Weight	– Version “A” and “B”	kg	ca. 1.3
	– Version “SB”	kg	ca. 1.5
Installation position			Any
Ambient temperature range		°C	–20 to +50

hydraulic

Maximum operating pressure (port A)		bar	315								
Pressure differential Δp with free return flow B → A		bar	See characteristic curves page 8								
Minimum pressure differential		bar	6 to 14								
Pressure stability up to $\Delta p = 315$ bar		%	$\pm 2 (q_{V \max})$								
Maximum flow		l/min	0.2	0.6	1.5	3.0	6.0	10.0	16.0	25.0	32.0
Minimum flow	– up 100 bar	cm ³ /min	15	15	15	15	25	50	70	100	250
	– up 315 bar	cm ³ /min	25	25	25	25	25	50	70	100	250
Hydraulic fluid			Mineral oil (HL, HLP) according to DIN51524; other hydraulic fluids upon request								
Hydraulic fluid temperature range		°C	–20 to +80								
Viscosity range		mm ² /s	10 to 800								
Maximum permitted degree of contamination of the hydraulic fluid - cleanliness class according to ISO 4406 (c)			Class 20/18/15 ¹⁾								

¹⁾ The cleanliness classes specified for the components must be adhered to in hydraulic systems. Efficient filtration prevents malfunctions and at the same time prolongs the service life of components.

For the selection of the filters, see data sheets RE 50070, RE 50076, RE 50081, RE 50086, RE 50087, and RE 50088.

Technical data: Rectifier sandwich plate

(For applications of the component outside the specified values, please contact us!)

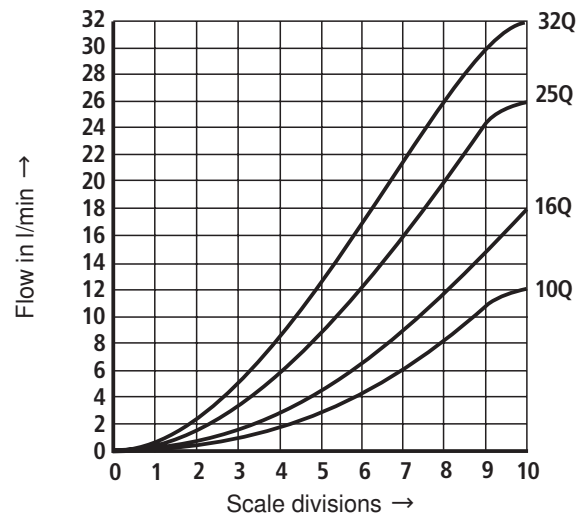
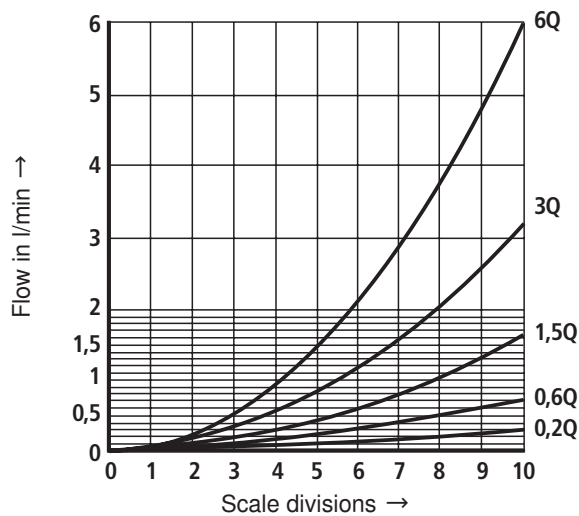
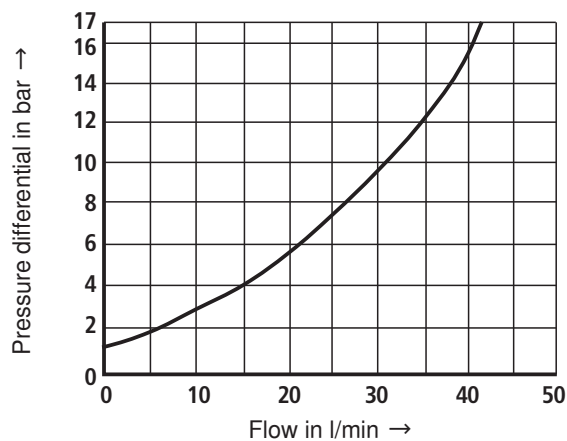
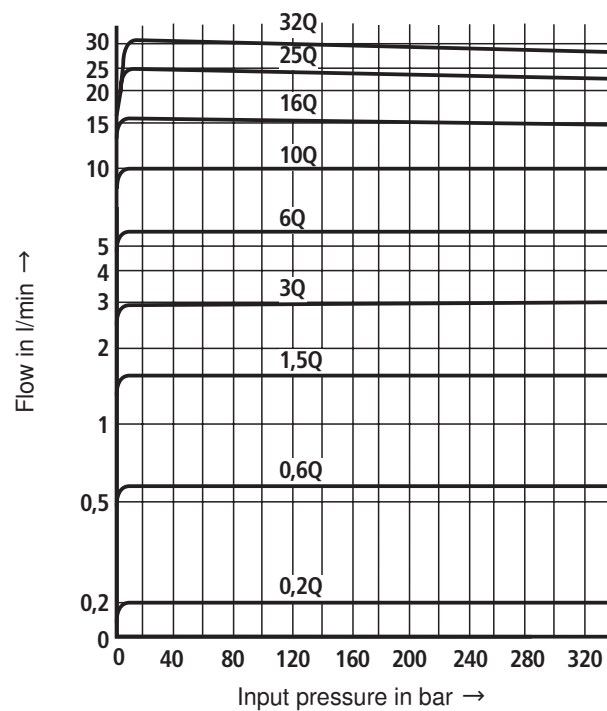
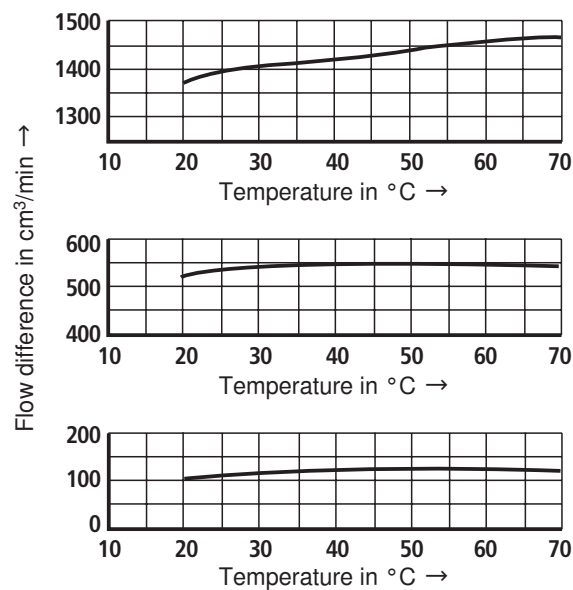
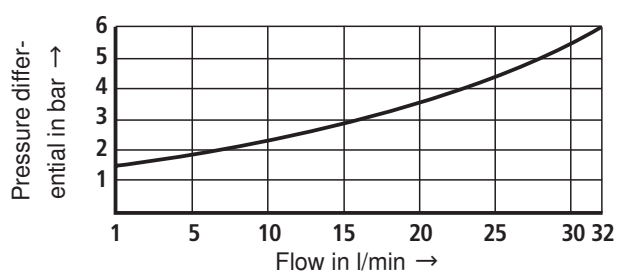
general

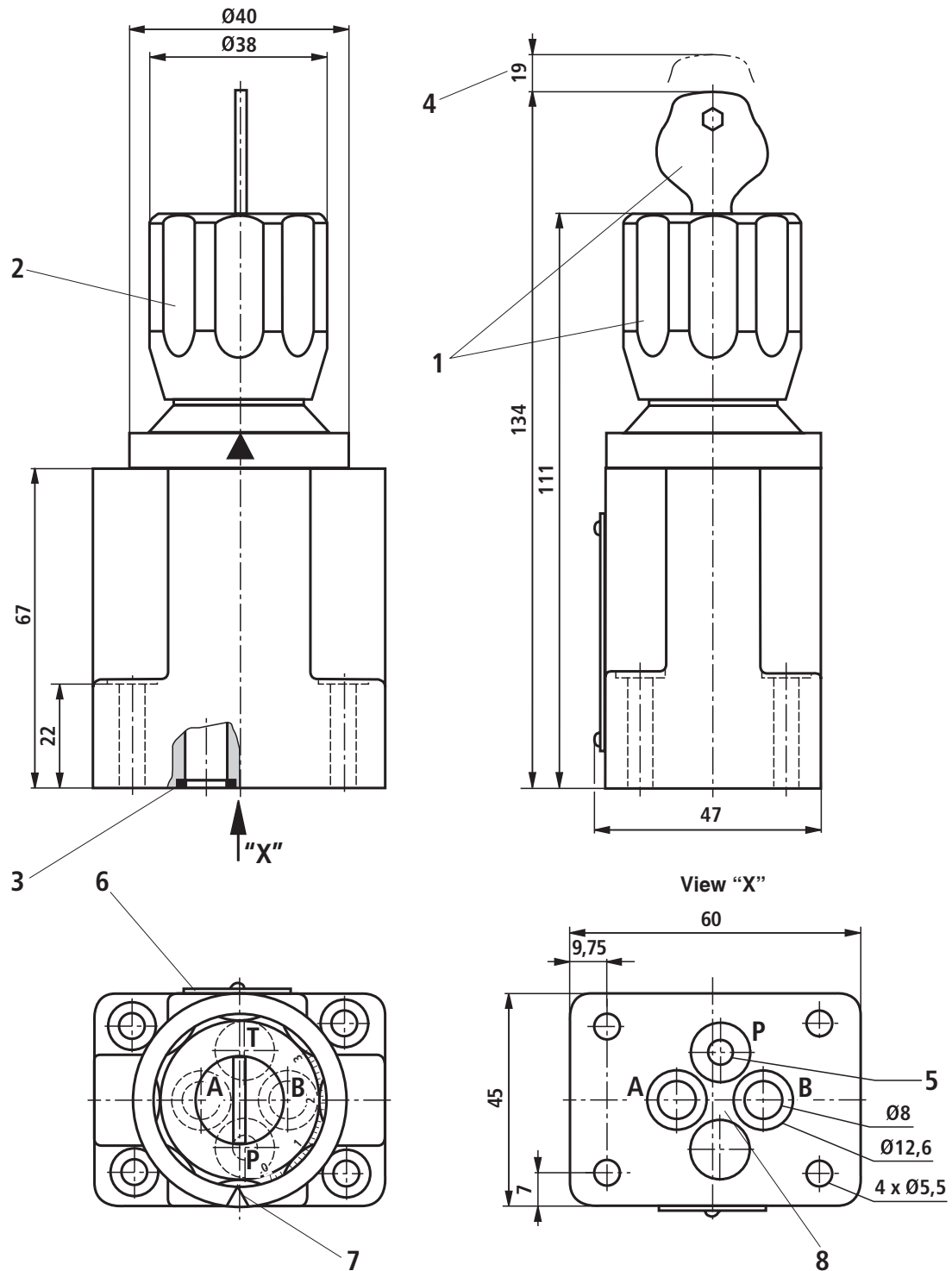
Weight	kg	ca. 0.9
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hydraulic

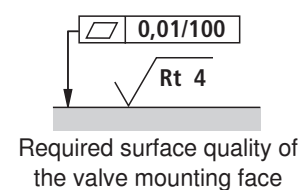
Maximum operating pressure	bar	210
Cracking pressure	bar	0.7
Maximum flow	l/min	32

Characteristic curves (measured with HLP46, $\vartheta_{oil} = 40 \pm 5^\circ\text{C}$)

Flow dependency on the scale setting (flow control A \rightarrow B)

 Δp - q_V characteristic curve via check valve B \rightarrow A;
Orifice closed

 p_E - q_V characteristic curve

Temperature dependency at $\Delta p = 20$ bar

Rectifier sandwich plate
 Δp - q_V characteristic curve


Unit dimensions: Subplate mounting – Version “A” and “B” (dimensions in mm)


For explanation of items, subplates, and valve mounting bolts, see page 11.



Unit dimensions

- 1 Adjustment type "3" (lockable rotary knob with scale)
- 2 Adjustment type "7" (rotary knob with scale)
- 3 Identical seal rings for ports A, B, P, and T
- 4 Space required to remove the key
- 5 Ø3 bore in version "B" not bored (without external closing)
- 6 Nameplate
- 7 Position of the marking at port P
- 8 Porting pattern according to DIN 24340 form A
- 9 Connection thread G3/8 according to ISO 228-1
- 10 Position of the marking vis-à-vis nameplate

Panel mounting (version "SB"):

Valve mounting screws (separate order)

4 hexagon socket head cap screws
ISO 4762 - M5 - 8.8-f1Zn-240h-L

with friction coefficient $\mu_{\text{total}} = 0.09$ to 0.14 ,
tightening torque $M_T = 7 \text{ Nm} \pm 10\%$,
(minimum useable thread depth = 6.5 mm)

Subplate mounting (version "A" and "B"):

Subplates according to data sheet RE 45052
(separate order)

Type G 341/01 (G1/4)

Type G 342/01 (G3/8)

Type G 502/01 (G1/2)

Valve mounting screws (separate order)

– without rectifier sandwich plate

4 hexagon socket head cap screws

ISO 4762 - M5 x 30 - 10.9-f1Zn-240h-L

with friction coefficient $\mu_{\text{total}} = 0.09$ to 0.14 ,

tightening torque $M_T = 7 \text{ Nm} \pm 10\%$,

Material no. **R913000316**

– with rectifier sandwich plate

4 hexagon socket head cap screws

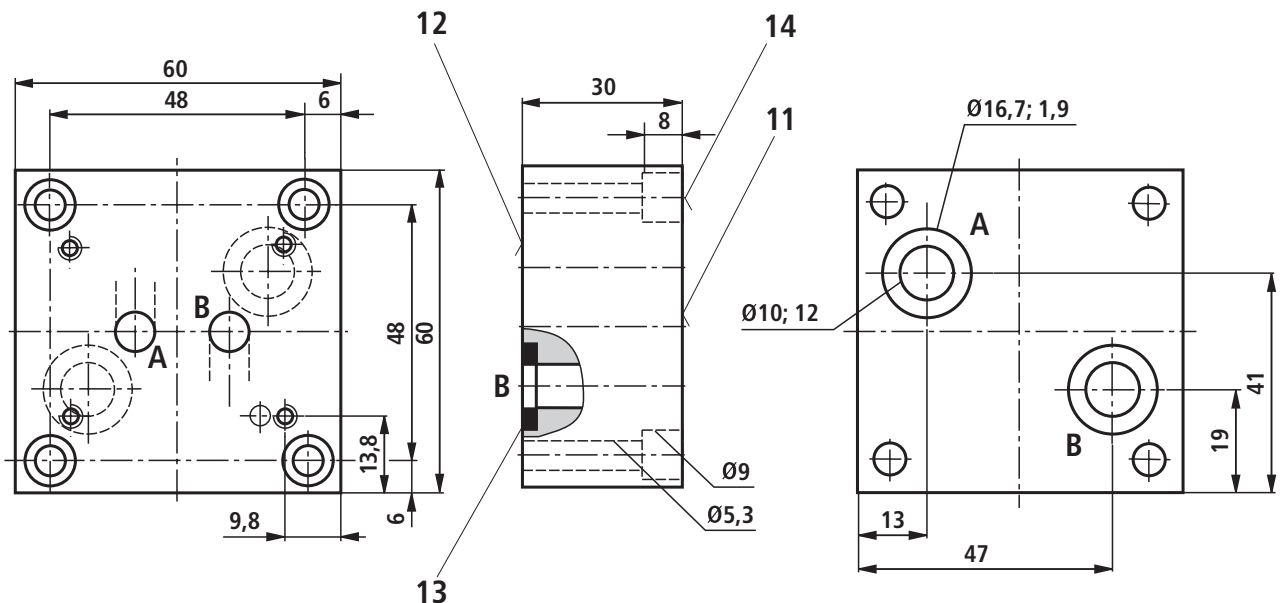
ISO 4762 - M5 x 70 - 10.9-f1Zn-240h-L

with friction coefficient $\mu_{\text{total}} = 0.09$ to 0.14 ,

tightening torque $M_T = 7 \text{ Nm} \pm 10\%$,

Material no. **R913000325**

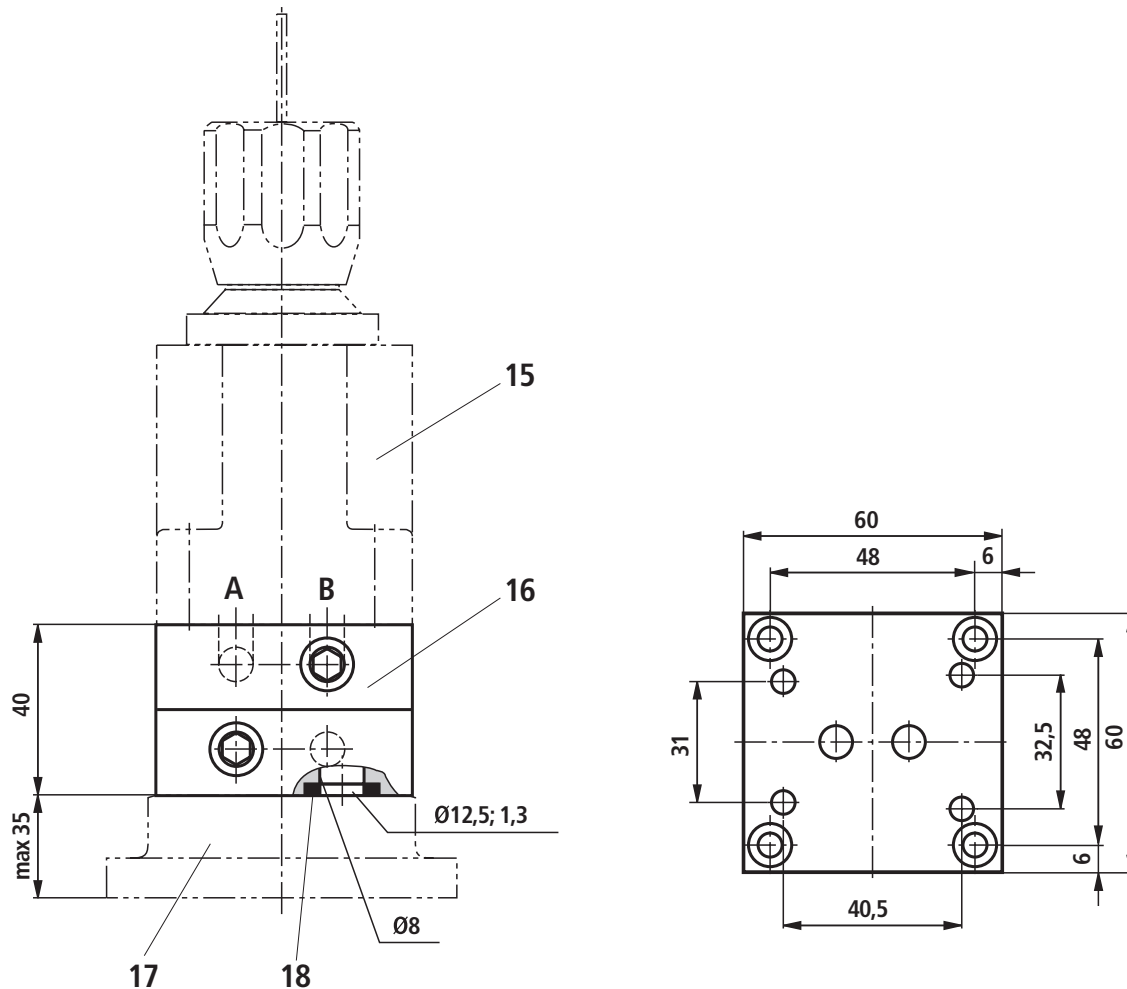
Unit dimensions: Adapter plate HSE 05 G06A001-3X/V00 (dimensions in mm)



- 11 Connection surface for flow control valve type 2FRM 6
- 12 Connection surface for flow control valve type 2FRM 5
- 13 Seal ring
- 14 Mounting screws for adapter plate,
4 cylinder bolts
ISO 4762 - M5 x 30 - 10.9-f1Zn-240h-L
with friction coefficient $\mu_{\text{total}} = 0.09$ to 0.14 ,
tightening torque $M_T = 7 \text{ Nm} \pm 10\%$,
are included in the delivery.

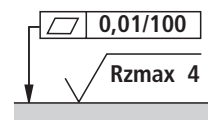
Note!

The adapter plate (**Material no. R900496121**) is required for mounting a flow control valve type 2FRM 6 B...-3X/.. to an existing flow control valve type 2FRM 5 -3X/...

Unit dimensions: Rectifier sandwich plate type Z4S 6-1X/V (dimensions in mm)

Attention!

The rectifier sandwich plate type Z4S 6-1X/V can **only** be used in connection with the flow control valve type 2FRM 6 B...-3X/.. (without closing of the pressure compensator)!

- 15 2-way flow control valve
- 16 Rectifier sandwich plate
- 17 Subplate according to data sheet RE 45052 and valve mounting screws, see page 11.
- 18 Seal ring



Required surface quality of the valve mounting face