MANNESMANN REXROTH

2-Way Flow Control Valve
Type 2 FRM 6, Series 2X.. - IN001

Size 6	Up to 315 bar [1])	Up to 32 L/min

REI 28 162/03.2001
Replaces: 06.92

- Mounting pattern to DIN 24340, form A, ISO 4401 and CETOP–RP 121 H, subplates to data sheet RE 45 052 (separate order),
- Optional external closing of pressure compensator,
- Optional check valve,
- Rotary knop with display,
- Optionally lockable

[1]) **When used with rectifier sandwich plate up to 210 bar**

Type 2 FRM 6.36-2X/..V - **IN001**

Functional Description, Section

Flow control valves type 2 FRM 6 are 2-way flow control valves.

They are used for maintaining a flow constant, independent of pressure and temperature.

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

Flow control valve, type 2 FRM 6B..-2X/..MV - IN001
(Without external closing, without check valve)

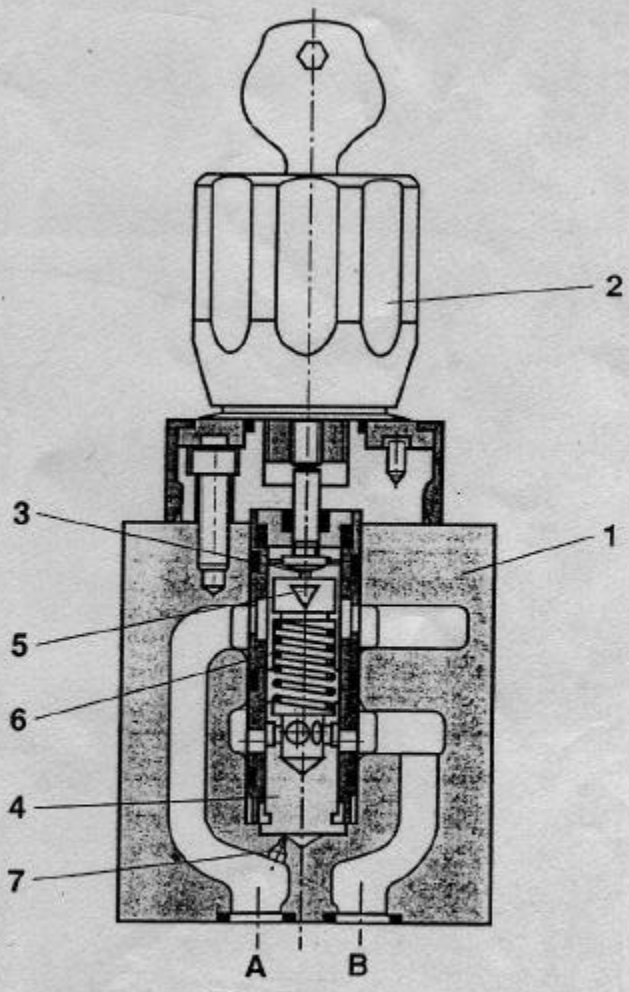
Flow from port A to port B is throttled at throttle position (5). The throttle opening is varied by turning rotary knob (2).

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

Compression spring (6) presses orifice (3) and pressure compensator (4) 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, existing pressure in port A applies force to pressure compensator (4) via orifice (7).

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

In order to control a flow through the valve in both directions of flow, a rectifier sandwich plate, type Z4 S 6 may be fitted below this flow control valve.



Type 2 FRM 6B 36-2X/.MV - **IN001**

Functional Description, Section

Flow control valve, type 2 FRM 6A..-2X/..RV - IN001

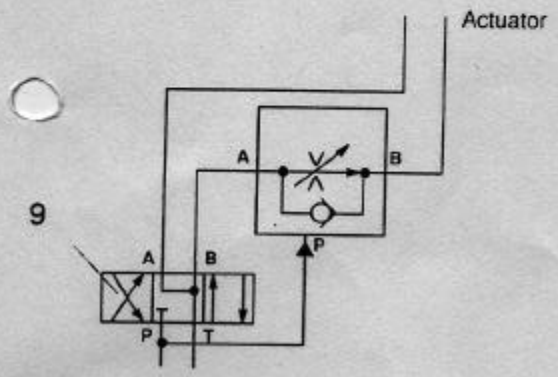
(with external closing, with check valve)

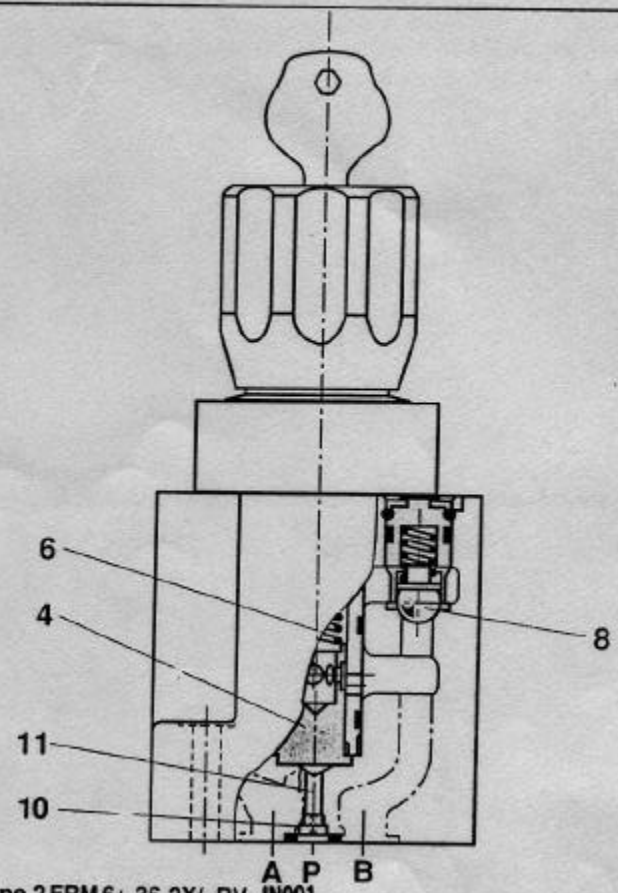
The function of this valve is basically the same as that of valve, type 2 FRM 6B..-2X/..MV.

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

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

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

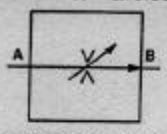




Type 2 FRM 6A..36-2X/..RV - IN001

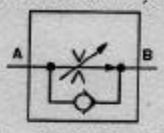
Symbols: 2-way flow control valve (simplified/detailed)

Flow control valve: simplified (**without** check valve; **without** external closure)



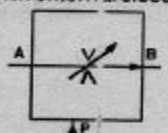
Type 2 FRM 6B..-2X/..MV

Flow control valve: simplified (**with** check valve; **without** external closure)



Type 2 FRM 6B..-2X/..RV

Flow control valve: simplified (**without** check valve; **with** external closure)

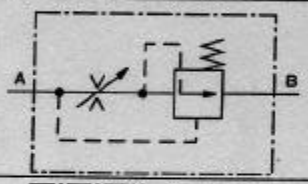


Type 2 FRM 6A..-2X/..MV

Flow control valve: simplified (**with** check valve; **with** external closure)

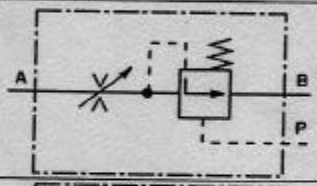
Type 2 FRM 6A..-2X/..RV

Flow control valve: detailed (**without** check valve; **without** external closure)



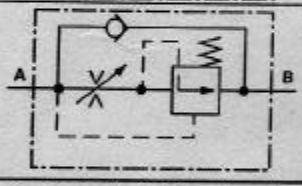
Type 2 FRM 6B..-2X/..MV

Flow control valve: detailed (**without** check valve; **with** external closure)



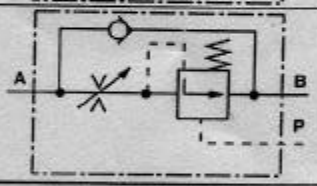
Type 2 FRM 6A..-2X/..MV

Flow control valve: detailed (**with** check valve; **without** external closure)



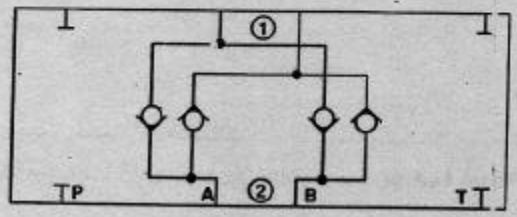
Type 2 FRM 6B..-2X/..RV

Flow control valve: detailed (**with** check valve; **with** external closure)



Type 2 FRM 6A..-2X/..RV

Symbol: Rectifier sandwich plate (① = device side, ② = subplate side)



Ordering Code: 2-Way Flow Control Valve

2FRM	6			6 –2X /		V	IN001	*

2-way flow control valve

Size 6 =6

With external closing of pressure compensator =A
(repression of jump at start)

Without external closing of pressure compensator =B

Control devices

Lockable rotary knob with scale [1] =3

Rotary knob with scale =7

Zero position of scale with respect to port P =6

Zero position of scale with respect to port A =7

Zero position of scale with respect to port T =8

Zero position of scale with respect to port B =9

Series 20 to 29 =2X
(20 to 29: externally interchangeable)

[1]) H key with ordering code 008 158 is included in supply

Further details in clear text

Modification number

V = Viton seals
suitable for mineral oil (HL,HLP) to DIN51524 and phosphate ester (HFD-R)
(other seals like NBR, EPDM on enquiry)

R = With check valve

M = Without check valve

0,2 Q =	Up to 0,2 L/min
0,6 Q =	Up to 0,6 L/min
1,5 Q =	Up to 1,5 L/min
3 Q =	Up to 3,0 L/min
6 Q =	Up to 6,0 L/min
10 Q =	Up to 10,0 L/min
16 Q =	Up to 16,0 L/min
25 Q =	Up to 25,0 L/min
32 Q =	Up to 32,0 L/min

Ordering code: Rectifier sandwich plate

Z4S	6 – 1X / V	*

Rectifier sandwich plate

Size 6 =6

Series 10 to 19 =1X
(10 to 19: externally interchangeable)

V= Viton seals, suitable for mineral oil (HL, HLP) to DIN 51 524 and phosphate ester (HFD-R)
(other seals such as NBR, EPDM on enquiry)

Further details in clear text

Technical data (BFor operation outside these parameters, please consult us!)

2-way flow control valve

Fluid		Mineral oil (HL, HLP) to DIN 51 524, phosphate ester (HFD-R)							
Fluid temperature range	°C	–20 to +80							
Viscosity range	mm²/s	10 to 800							
Fluid cleanliness		Maximum permissible degree of contamination of fluid to NAS 1638 Class 9. We therefore recommend a filter with a minimum retention rate of $\beta_{10} \geq 75$.							
Flow									
Q_{max}	L/min	0,2	0,6	1,5	3,0	6,0	10,0	16,0	25,0	32,0
Q_{min} up to 100 bar	cm³/min	15	15	15	15	25	50	70	100	250
up to 315 bar	cm³/min	25	25	25	25	25	50	70	100	250
Pressure drop Δp for free return flow B → A		See curves on page 4								
Minimum pressure difference	bar	6 to 14								
Pressure stability up to Δp = 315 bar	%	±2 (Q_{max})								
Operating presssure, port A	bar	Up to 315								
Weight	kg	Approx. 1,3								

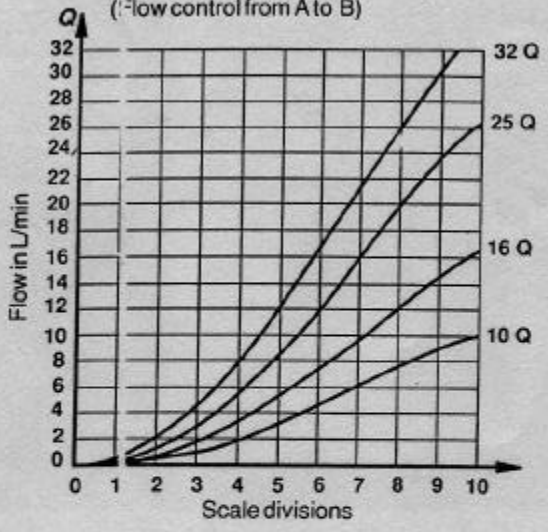
Rectifier sandwich plate

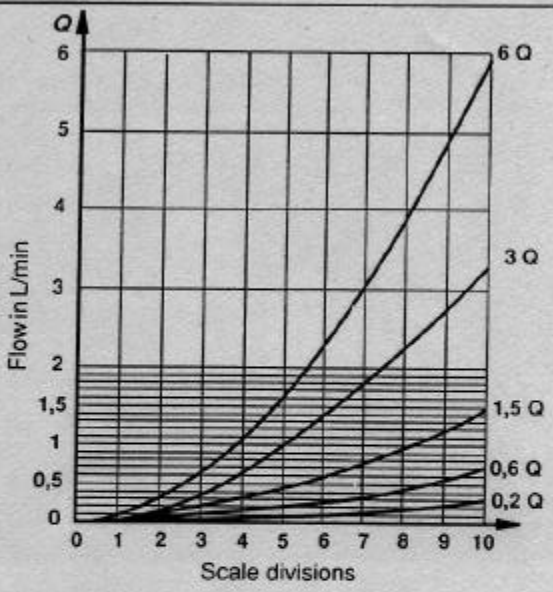
Nominal flow	L/min	32
Operating pressure	bar	Up to 210
Cracking pressure	bar	0,7
Weight	kg	ca. 0,9

Note: 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.

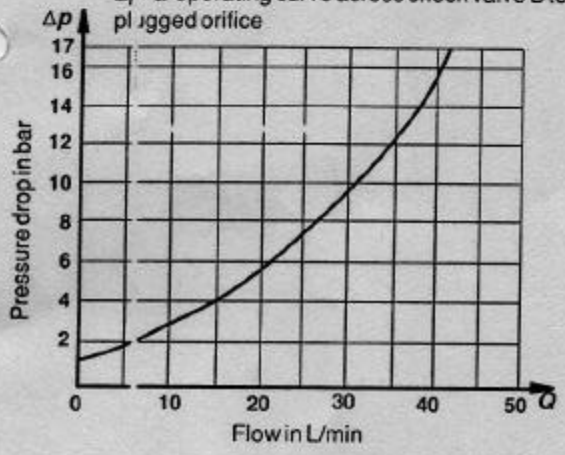
Operating Curves (measured at $\nu = 41\ mm^2/s$ and $t = 50\ °C$)

Flow dependent on scale setting
(Flow control from A to B)

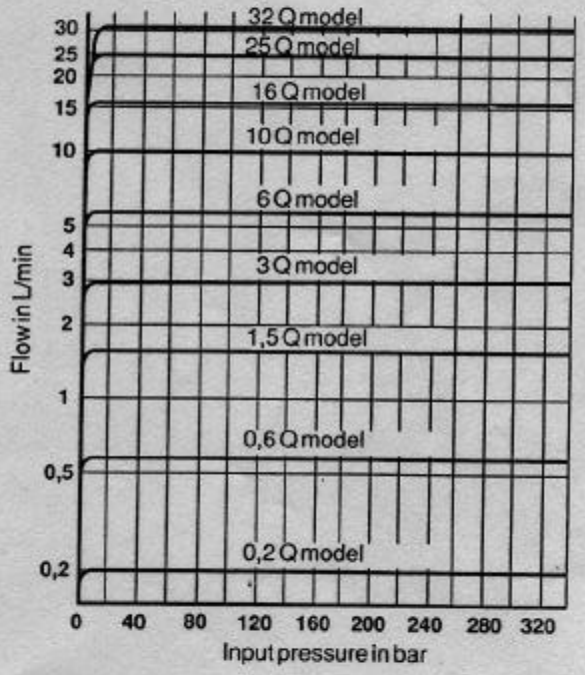




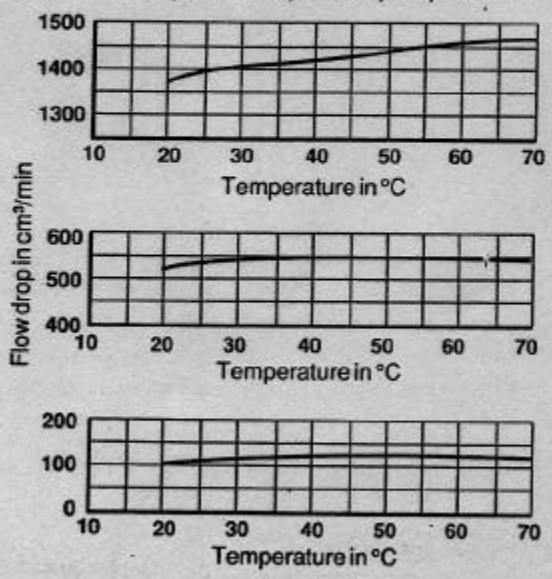
Δp-Q operating curve across check valve B to A;
plugged orifice



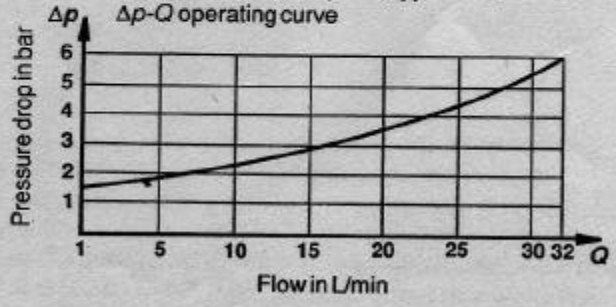
Flow dependency



Temperature dependency at $\Delta p = 20$ bar

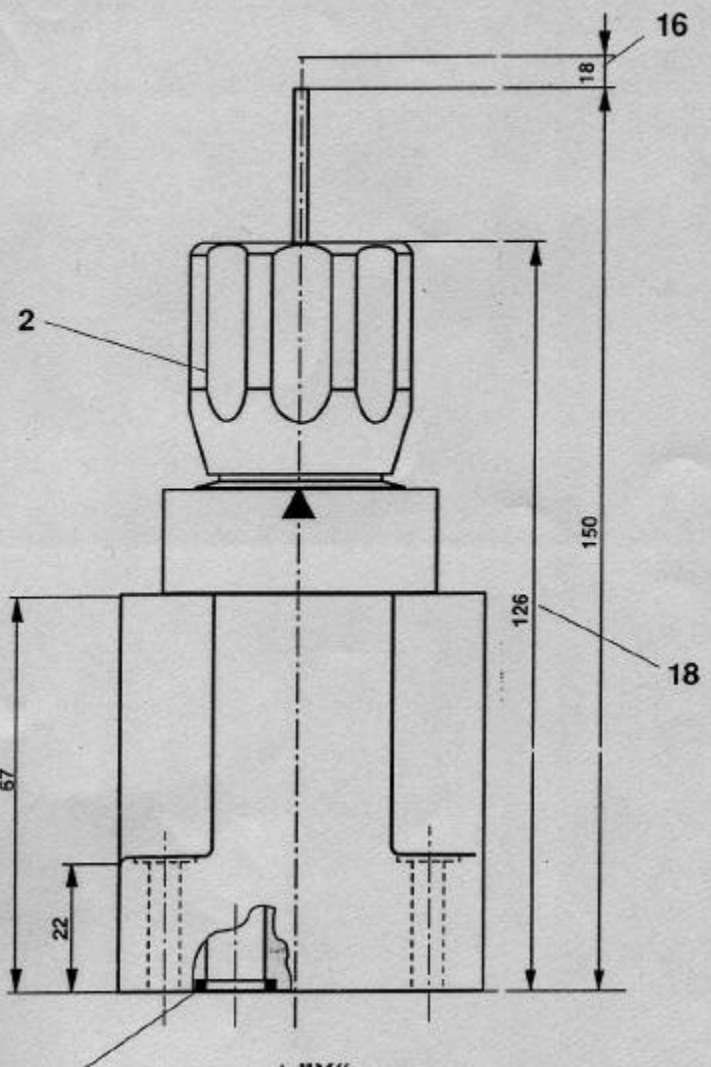


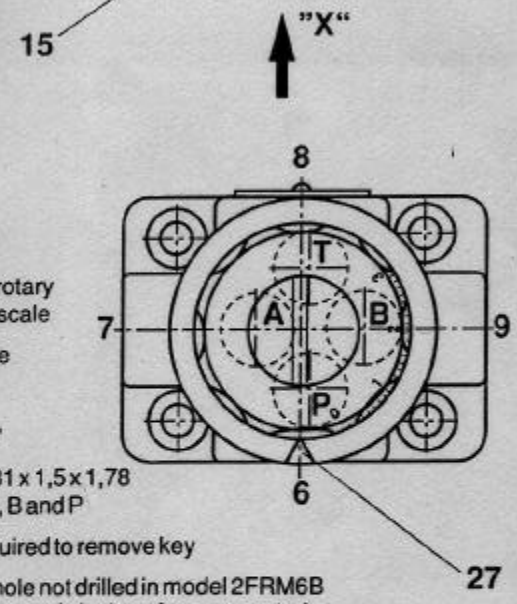
Rectifier sandwich plate, type Z 4 S6
Δp-Q operating curve

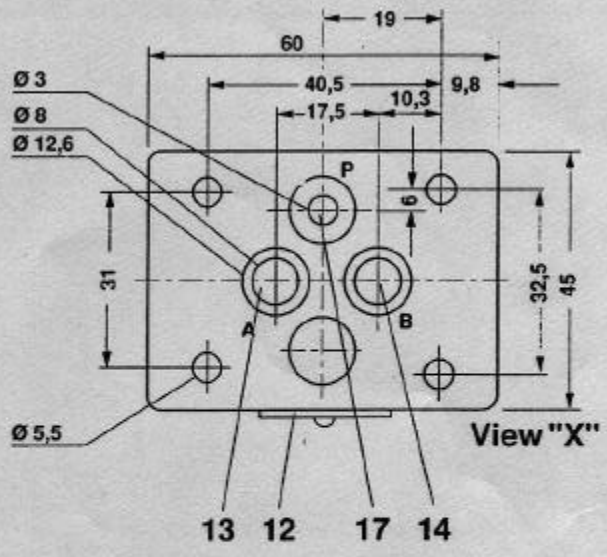


Unit dimensions

(dimensions in mm)







2 Lockable rotary knob with scale

12 Nameplate

13 Input "A"

14 Output "B"

15 R rings 9,81 x 1,5 x 1,78 for ports A, B and P

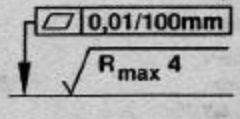
16 Space required to remove key

17 3mm dia. hole not drilled in model 2FRM6B (without external closing of compensator)

18 Adjustment element "7"

27 Position of marking of port P, A, T or B

Required surface finish of mating piece



Subplate to data sheet RE 45 052 and valve fixing screws must be ordered separately.

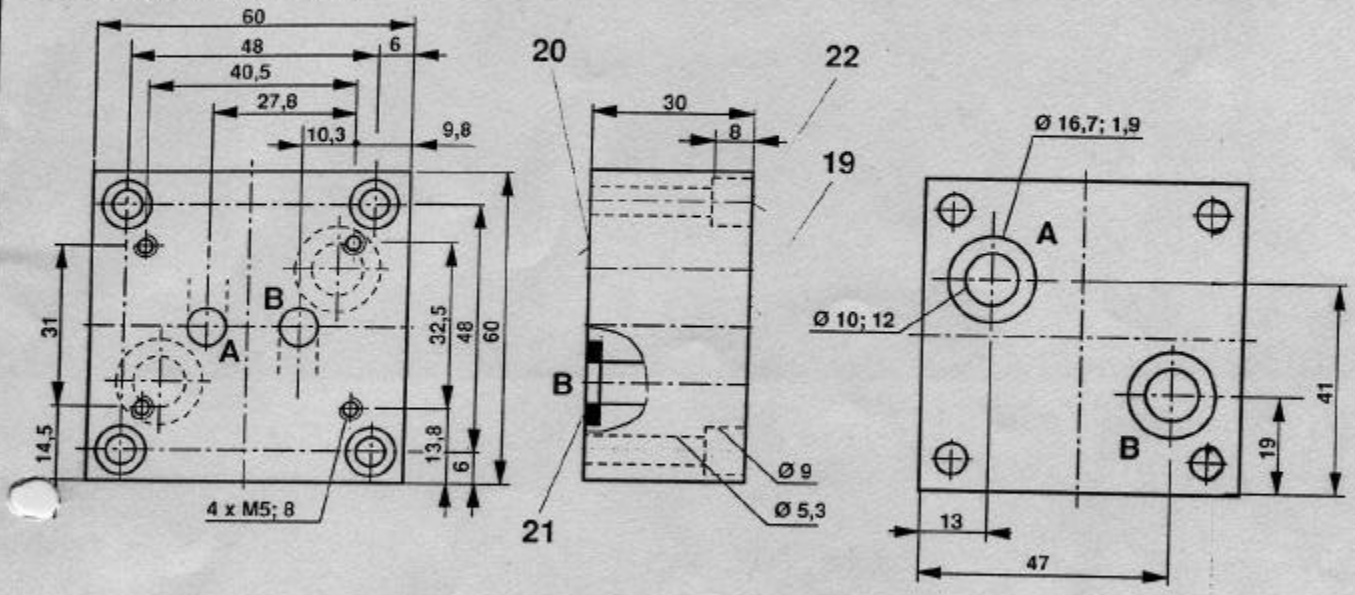
Subplates:
Type G 341/01 (G 1/4" BSP)
Type G 342/01 (G 3/8" BSP)
Type G 502/01 (G 1/2" BSP)

Valve fixing screws:
Without rectifier sandwich plate
M5 x 30 DIN 912–10.9
(tightening torque M_A = 8,9 Nm)
With rectifier sandwich plate
M5 x 70 DIN 912–10.9
(tightening torque M_A = 8,9 Nm)

Unit dimensions: Adaptor plate AG5075

(dimensions in mm)

Note:
Adaptor plate AG 5075 is designed for mounting flow control valve, type 2 FRM 6 B..-2X/.. on to an existing mounting pattern for flow control valve, type 2 FRM 5-3X/..



19 Mounting surface for flow control valve, type 2 FRM 6

20 Mounting surface for mounting pattern for flow control valve, type 2 FRM 5

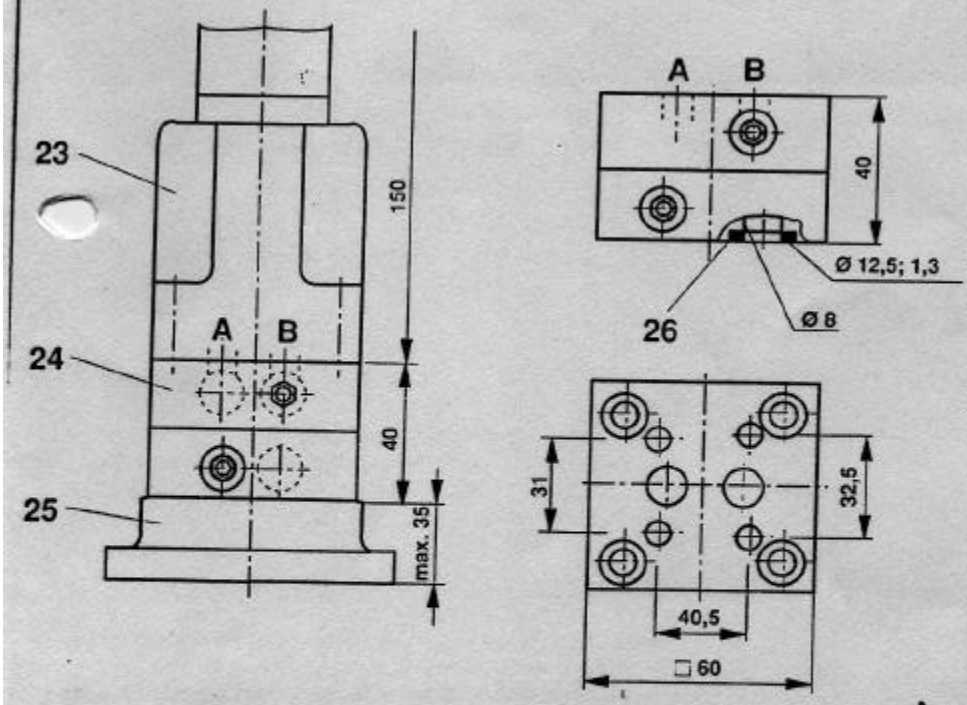
21 R ring 12,81 x 2,4 x 2,62

22 Cylinder screws M5 x 30 DIN 912-8.8, (tightening torque M_A = 6,1 Nm)

Adaptor plates and valve fixing screws must be ordered separately.

Unit dimensions: Rectifier sandwich plate, type Z4 S6-1X/V

(dimensions in mm)



Warning:
Rectifier sandwich plate type Z 4 S6-1X/V may not be used in conjunction with flow control valve type 2 FRM 6 A..-2X/.. with built-in external closing of the pressure compensator.

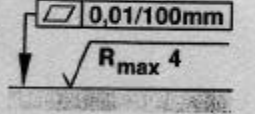
23 2-way flow control valve

24 Rectifier sandwich plate

25 **Subplate** to data sheet RE 45052 and **valve fixing screws** see page 5

26 R ring 9,81 x 1,5 x 1,78

Required surface finish of mating piece



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