

**Features:**

- Porting pattern to DIN 24 340, from A,ISO 4401 and CETOP-RP 121H
- Pressure compensator stroke limiter, optional
- Decrease of start-up jump
- Flow control in both directions using a rectifier sandwich plate
- Lockable rotary knob

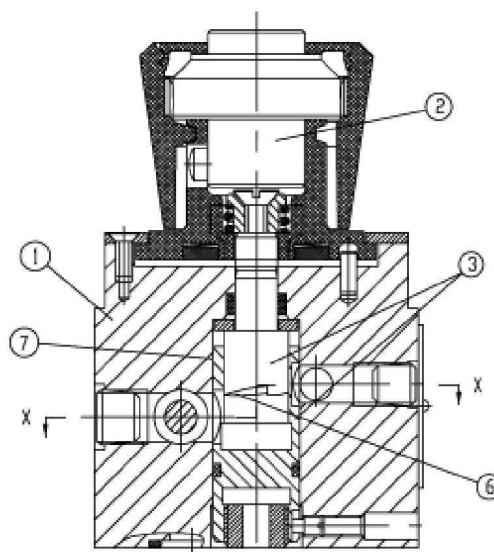
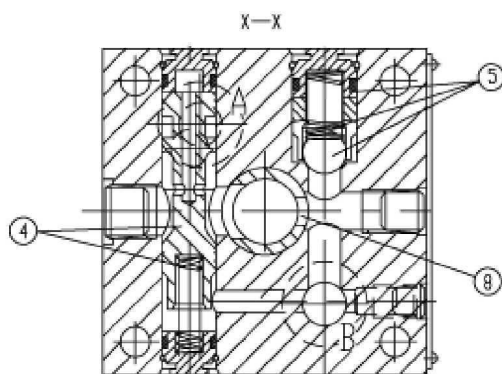

**Function , section**

The 2FRM flow valve is a 2-way flow control valve. It mainly consists of housing(1), setting element(2), orifice(3), pressure compensator(4) optionally with stroke limiter as well as check valve(5) and is used for the throttling of a flow at low pressure and temperature dependency.

The throttling cross section is set by the rotation of the curve bolt(7). To keep the flow constant independent from the pressure at the throttling point(8) a pressure compensator (4) is connected. The temperature independence is the result of the throttling point being constructed as an orifice.

The free flow return from B to A is via the check valve(5).

In order to reach a controlled through flow of the valve in either direction there is the possibility to install a rectifier sandwich plate type Z4S below the flow control valve.



## Ordering code: 2-way flow control valves

	2FRM5-30	B	/				*
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Series 30 (30 to 39: unchanged installation and connection dimensions) =30

Further details in clear text

No code = Mineral oil  
V = Phosphate ester  
(other seals on enquiry)

No code = without pressure compensator stroke limiter  
B = with pressure compensator stroke limiter

Progressive	Progressive
0.2L/min=0.2Q	10L/min=10Q
0.6L/min=0.6Q	15L/min=15Q
1.2L/min=1.2Q	
3L/min=3Q	
6L/min=6Q	

flow direction  
A → B

## Technical data: (for applications outside these parameters, please consult us!)

General		Rectifier sandwich plate	
Hydraulic fluid	Mineral oil (for NBR seal) or Phosphate ester (for FPM seal)	Flow, max (L/min)	15
Temperature range (°C)	-30 ~ + 80	Operating pressure (MPa)	up to 21
Viscosity range (mm <sup>2</sup> /s)	10 ~ 800	Cracking pressure (MPa)	0.1
		Weight (Kg)	0.6

Flow $q_v$ , max (L/min)	0.2	0.6	1.2	3.0	6.0	10.0	15.0
$\Delta p$ with free return flow B → A, $q_v$ -dependent (MPa)	0.05	0.05	0.06	0.09	0.18	0.36	0.67
Flow control	temperature-stable	± 5%	± 3%	± 2%			
	pressure-stable (up to $\Delta p = 21.0$ MPa)	± 2%				± 4%	
Operating pressure, max. - port A (MPa)	to 21						
Minimum pressure difference range (MPa)	0.3 to 0.5					0.6 ~ 0.8	
Degree of contamination (μm)	25 (Q < 5L/min)			10 (Q < 0.5L/min)			
Weight (Kg)	1.6						

## Ordering code: Rectifier sandwich plate

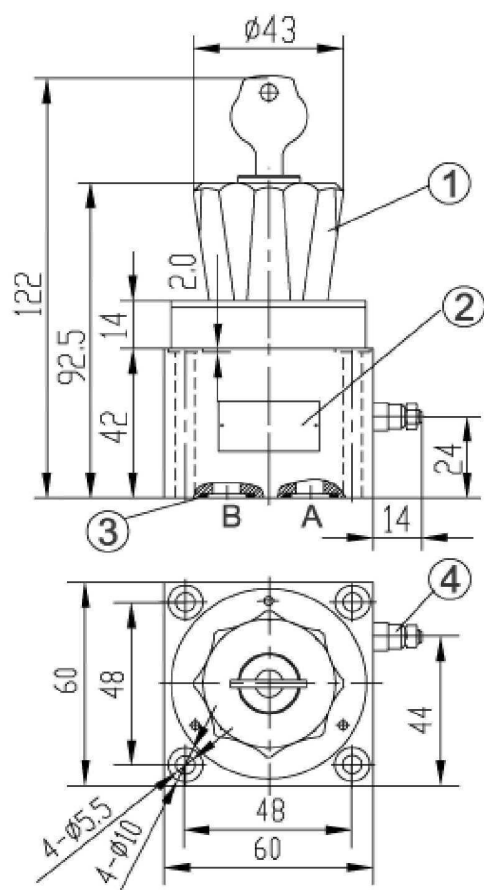
	Z4S5-10	/		*
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Series 10 (10 to 19: : unchanged installation and connection dimensions) = 10

Further details in clear text

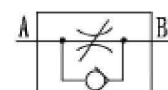
No code = Mineral oil  
V = Phosphate ester

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

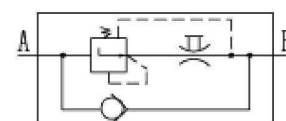


## Symbols

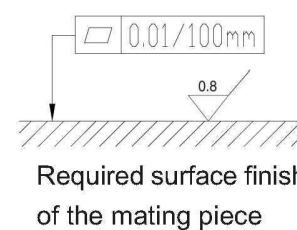
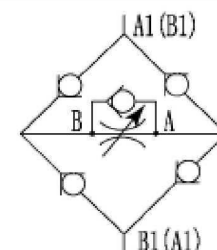
Flow control valve  
simplified



Flow control valve  
detailed



Rectifier sandwich plate



- |   |             |
|---|-------------|
| 1.Adjustment element, lockable rotary knob(may be locked in any position) |             |
| Turning range 300° = 10 scale divisions                                   |             |
| Tighting torque M <sub>A</sub> = 0.5 Nm                                   |             |
| 2.Nameplate   | Subplates   |
| 3.O-ring 12 x 2   | G 44/01 (C) |
| 4.Pressure compensator stroke limiter                                     | G 45/01 (C) |

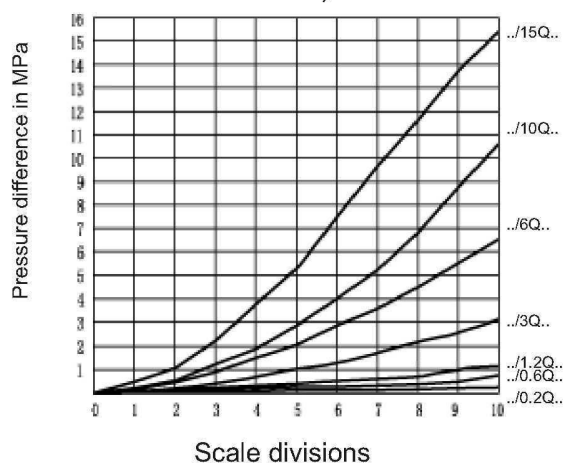
Subplates for: see page 69

G 44/01 (G 1/4") G 44/02 (M14 × 1.5)

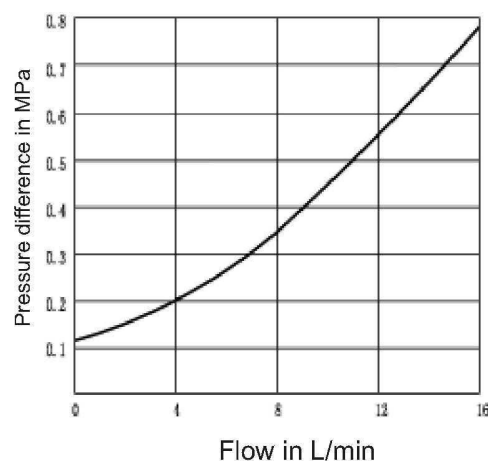
G 45/01 (G 1/2") G 45/02 (M22 × 1.5))

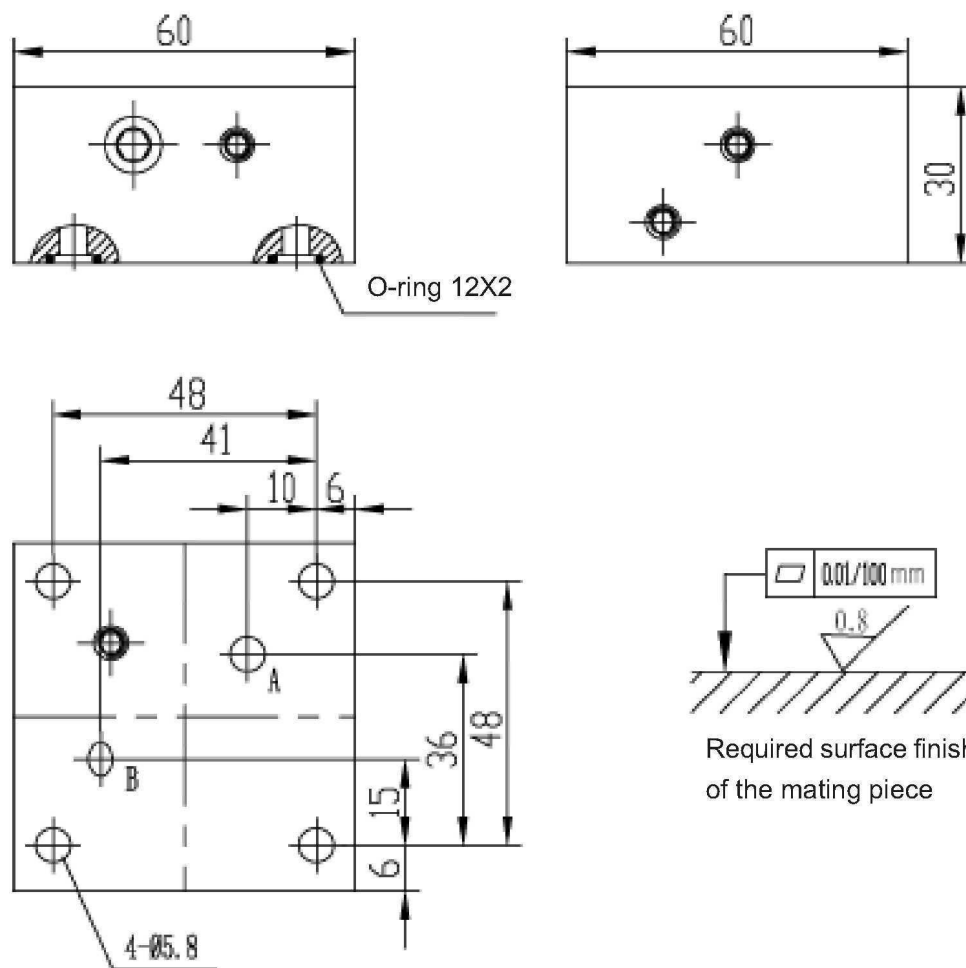
**Characteristic curves: 2-way flow control valve** (measured at  $v = 41 \text{ mm}^2/\text{s}$  and  $t = 50^\circ\text{C}$ )

Flow  $q_v$  dependent on scale (flow control from A to B):



### Operating curve of rectifier sandwich plate





Required surface finish  
of the mating piece

## NOTICE

1. The fluid must be filtered. Minimum filter fineness is 20  $\mu\text{m}$ .
2. The tank must be sealing up and an air filter must be installed on air entrance.
3. Products without subplate when leaving factory, if need them, please ording specially.
4. Vavle fixing screws must be high intensity level (class 10.9). Please select and use them according to the parameter listed in the sample book.
5. Roughness of surface linked with the valve is required to  $0.8 \sqrt{\text{R}}$ .
6. Surface finish of mating piece is required to 0.01/100mm.