

The Drive & Control Company

**Rexroth**  
Bosch Group

## 3-way flow control valve

Type 3FRM

**RE 28862**

Edition 2015-11

Replaces: 08.08



### Features

- ▶ For subplate mounting
- ▶ Mechanical actuation
- ▶ Pressure relief valve (overload protection), optional
- ▶ Start-up jump reduction
- ▶ Bleed port for free circulation, optional

- ▶ Sizes 10 and 16
- ▶ Component series 2X
- ▶ Maximum operating pressure 315 bar
- ▶ Maximum flow 160 l/min

### Contents

Features	1
Ordering codes	2
Symbols	3
Function, section	4
Technical data	5
Characteristic curves	6
Dimensions	7
Additional information	8

RE 28862, Edition 2015-11, **Bosch Rexroth AG**

2/8 **3FRM** | Flow control valve

## Ordering codes

01	02	03	04	05	06	07	08	09
3FR	M		-	2X	/			*


01	3-way flow control valve	3FR
02	Mechanical actuation	M
03	Size 10	10
	Size 16	16
04	Component series 20 ... 29 (20 ... 29: unchanged installation and connection dimensions)	2X

### Flow range A to B, linear

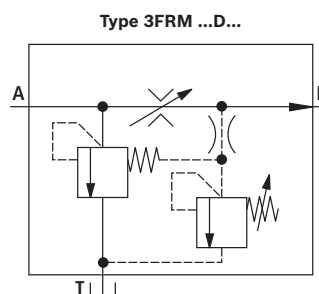
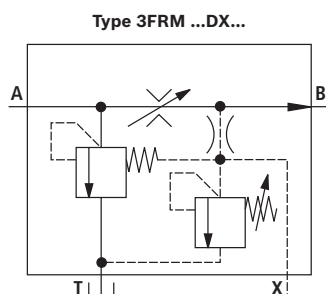
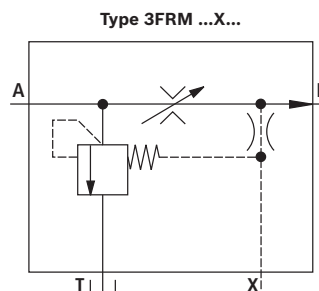
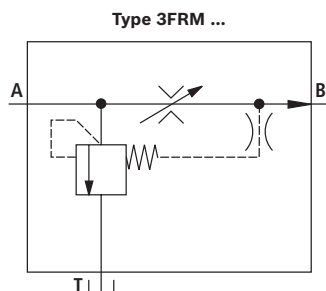
05	- Size 10	
	Up to 10 l/min	10L
	Up to 16 l/min	16L
	Up to 25 l/min	25L
	Up to 50 l/min	50L
	- Size 16	
	Up to 60 l/min	60L
	Up to 100 l/min	100L
	Up to 160 l/min	160L
06	Without pressure relief valve	no code
	With pressure relief valve	D
07	Without bleed port	no code
	With bleed port	X

### Seal material

08	NBR seals	no code
	FKM seals	V
	Observe compatibility of seals with hydraulic fluid used! (Other seals upon request)	
09	Further details in the plain text	*

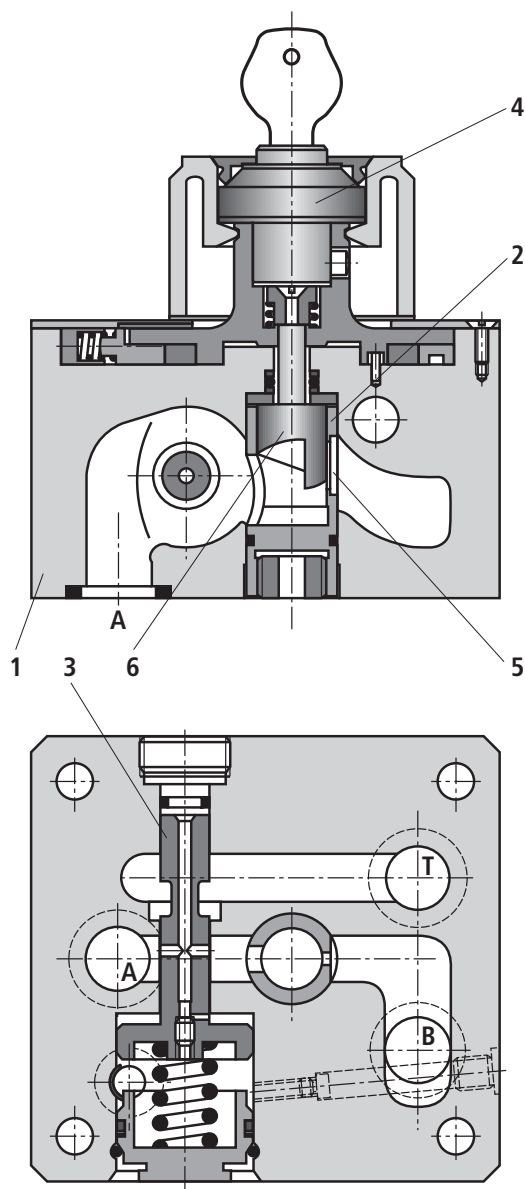
 **Notice:** Preferred types and standard units are contained in the EPS (standard price list).

## Symbols



4/8 **3FRM** | Flow control valve

## Function, section



The flow control valve type 3FRM is a 3-way flow control valve. It is used for maintaining a set constant flow, independent of changes in pressure and temperature. The valve basically consists of a housing (1), an orifice bush (2), a pressure compensator (3) and an adjustment type (4).

The flow from channel A to B is throttled at the throttling point (5). The throttle cross-section is set by mechanically turning the curved bolt (6) over the adjustment type (4). An upstream pressure compensator (3) is included to keep the flow at the throttling point (5) constant independent of temperature and pressure.

The pressure compensator limits excessive flow via an additional line to the reservoir. Consequently, these valves may be used on the supply line only!

In the case of 3-way flow control valves (as opposed to 2-way flow control valves), the measurement and control orifices are not connected in series, but in parallel.

Temperature independence is achieved thanks to the orifice design of the throttling point.

The differential between working pressure and operating pressure is limited to the pressure drop of the metering orifice, whereas for 2-way flow control valves, the hydraulic pump always has to produce the pressure set on the pressure relief valve. For this reason, the power loss of a 3-way flow control valve is smaller, resulting in better plant efficiency and less heat generation.

The flow control valves can be realized optionally with or without bleed port (for free circulation) and with or without pressure relief valve (overload protection).

## Technical data

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

General		
Size	Size 10	Size 16
Weight	kg 3.3	7.0
Installation position	Any	
Ambient temperature range	°C -30 ... +80 (NBR seals) -20 ... +80 (FKM seals)	

Hydraulic		
Maximum operating pressure	bar	315
Minimum pressure differential	bar	3 ... 7
Maximum flow	l/min	10 16 25 50 60 100 160
Flow control	<ul style="list-style-type: none"> <li>Thermally stable (-20 ... +80 °C)</li> <li>Pressure stable (up to <math>\Delta p = 315</math> bar)</li> </ul>	<ul style="list-style-type: none"> <li>% <math>\pm 2 (q_{V \max})</math></li> <li>% <math>\pm 2 (q_{V \max})</math></li> </ul>
Hydraulic fluid	See table below	
Hydraulic fluid temperature range	°C	-30 ... +80 (NBR seals) -20 ... +80 (FKM seals)
Viscosity range	mm <sup>2</sup> /s	2.8 ... 380 (30 ... 46 recommended)
Maximum admissible degree of contamination of the hydraulic fluid cleanliness class according to ISO 4406 (c)	Class 20/18/15 <sup>1)</sup>	

Hydraulic fluid	Classification	Suitable sealing materials	Standards	Data sheet
Mineral oils	HL, HLP	NBR, FKM	DIN 51524	90220
Bio-degradable	insoluble in water	HETG	NBR, FKM	90221
		HEES	FKM	
	soluble in water	HEPG	FKM	ISO 15380
Flame-resistant	water-free	HFDU	FKM	ISO 12922
	containing water	HFC (Fuchs Hydrotherm 46M, Petrofer Ultra Safe 620)	NBR	ISO 12922



### Important information on hydraulic fluids:

- For more information and data on the use of other hydraulic fluids, please refer to the data sheets above or contact us.
- There may be limitations regarding the technical valve data (temperature, pressure range, life cycle, maintenance intervals, etc.).
- The flash point of the hydraulic fluid used must be 50 K higher than the maximum surface temperature.

### Flame-resistant – containing water:

- Maximum pressure differential 210 bar, otherwise increased cavitation
- Life cycle as compared to operation with mineral oil HL, HLP 30 to 100 %; maximum hydraulic fluid temperature 60 °C
- Bio-degradable and flame-resistant:** When using hydraulic fluids that are simultaneously zinc-solving, up to 195 mg of zinc may accumulate.

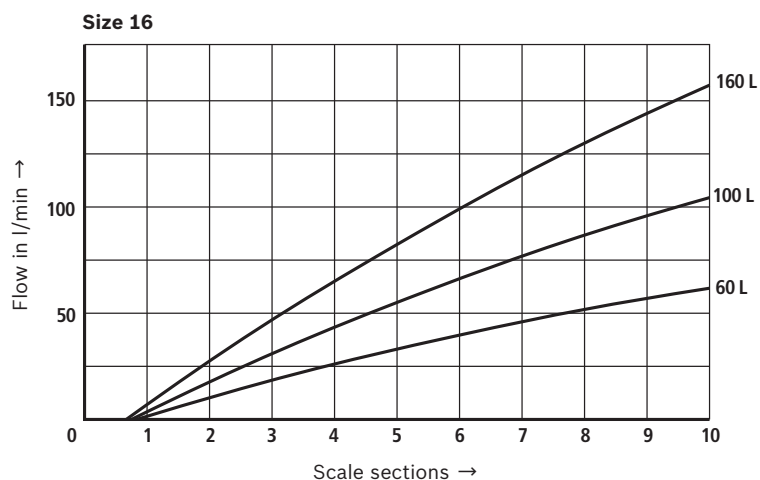
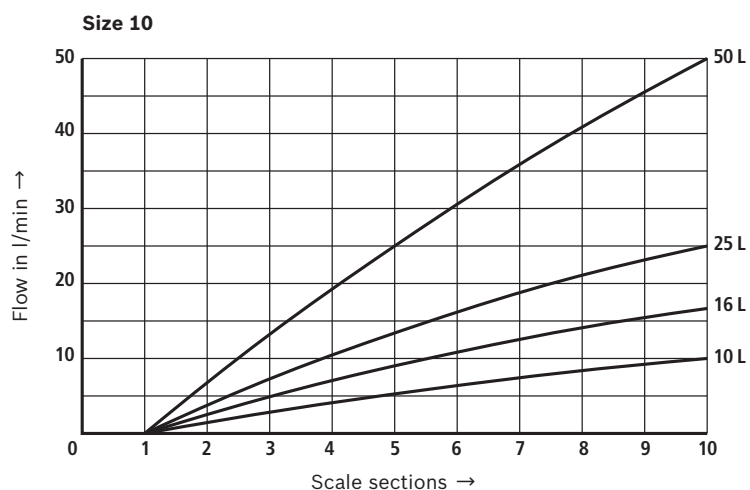
<sup>1)</sup> The cleanliness classes specified for the components must be adhered to in hydraulic systems. Effective filtration prevents faults and at the same time increases the life cycle of the components. Available filters can be found at [www.boschrexroth.com/filter](http://www.boschrexroth.com/filter).

6/8 **3FRM** | Flow control valve

## Characteristic curves

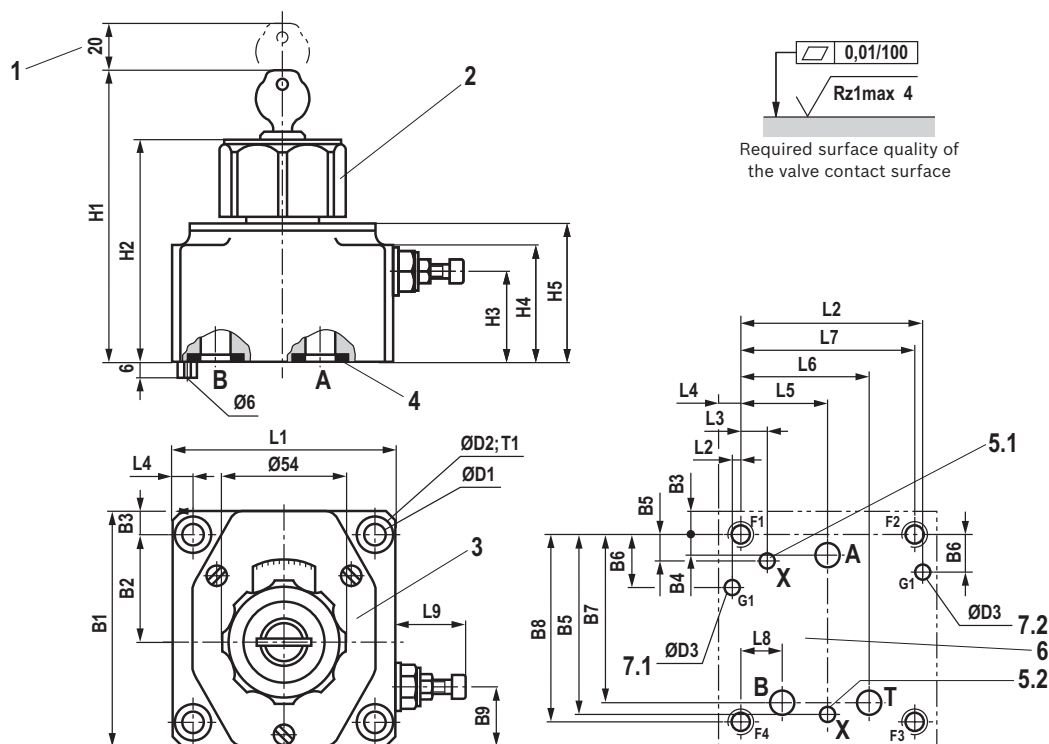
(measured with HLP46,  $\vartheta_{oil} = 40 \pm 5 \text{ }^{\circ}\text{C}$ )

Flow control (A → B)



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## Dimensions (dimensions in mm)



- 1 Space required to remove the key
- 2 Adjustment type, rotary knob security lock (all positions can be locked), rotation range 300 ° = 10 scale sections,  $M_d \approx 0.7 \text{ Nm}$
- 3 Name plate
- 4 Identical seal rings for ports A and B
- 5.1 Bleed port X (Size 10)
- 5.2 Bleed port X (Size 16)
- 6 Porting pattern (similar to ISO 6263)
- 7.1 Bore for locating pin (Size 10)
- 7.2 Bore for locating pin (Size 16)

### Subplates (upon request)

- Size 10: G 337/01 (G1/2)  
G 343/01 (G1/2)
- Size 16: G 340/01 (G1)  
G 346/01 (G1)

### Valve mounting screws (separate order)

- Size 10  
**4 x ISO 4762 - M8 x 50 - 10.9fIZn-240h-L**  
with friction coefficient  $\mu_{\text{total}} = 0.09 \dots 0.14$ ,  
tightening torque  $M_A = 30 \text{ Nm} \pm 10 \%$ ,  
material no. **R913000543**
- Size 16  
**4 x ISO 4762 - M10 x 80 - 10.9fIZn-240h-L**  
with friction coefficient  $\mu_{\text{total}} = 0.09 \dots 0.14$ ,  
tightening torque  $M_A = 60 \text{ Nm} \pm 10 \%$ ,  
material no. **R913000496**

Size	B1	B2	B3	B4	B5	B6	B7	B8	B9	ØD1	ØD2	ØD3	Port		
													X	A, B, T	
10	101.5	47	9.5	9.5	11.9	23.8	74.6	82.5	27	9	15	7.5	6.3 <sup>1)</sup>	14.7 <sup>1)</sup>	
16	123.5	60	11	12.5	95.1	28.6	88.8	101.5	76	11	18	7.5	7.9 <sup>1)</sup>	17.5 <sup>1)</sup>	

Size	H1	H2	H3	H4	H5	L1	L2	L3	L4	L5	L6	L7	L8	L9 min	L9 max	T1
10	123	95	39.5	51	60	95	3.2	11.9	9.5	38	57.2	76	18.8	21.3	29.5	13
16	145	117	58	72	82	123.5	102.3	-	11	50.75	77.8	101.5	23.8			12

<sup>1)</sup> Maximum dimension

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8/8

## Additional information

- ▶ Hydraulic fluid on mineral oil basis
- ▶ Environmentally compatible hydraulic fluids
- ▶ Flame-resistant, water-free hydraulic fluids
- ▶ Hydraulic valves for industrial applications
- ▶ General product information on hydraulic products
- ▶ Assembly, commissioning and maintenance of industrial valves
- ▶ Selection of filters
- ▶ Information on available spare parts

Data sheet 90220  
Data sheet 90221  
Data sheet 90222  
Data sheet 07600-B  
Data sheet 07008  
Data sheet 07300  
[www.boschrexroth.com/filter](http://www.boschrexroth.com/filter)  
[www.boschrexroth.com/spc](http://www.boschrexroth.com/spc)

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It must be remembered that our products are subject to a natural process of wear and aging.

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