RE 22334
Edition: 2021-05
Replaces: 2013-04

rexroth
A Bosch Company

Directional spool valves, direct operated, with manual and fluidic operation

Type WMM, WN and WP


H8099+8100

- Size 10
- Component series 5X
- Maximum operating pressure 350 bar
- Maximum flow 160 l/min

Features

- 4/3-, 4/2- or 3/2-way version
- Porting pattern according to ISO 4401-05-04-0-05
- Types of actuation:
  - Hand lever
  - Pneumatic
  - Hydraulic

Contents

Ordering code

01	02	03	04	05		06		07	08	09	10	11
		10		**5X**	**/**		**/**					*****

01	3 main ports	**3**
	4 main ports	**4**

Types of actuation

02	**– Manual**	
	Hand lever	**WMM**
	– Fluidic	
	Pilot pressure 1.5 ... 10 bar	**WN**
	Pilot pressure 8 ... 160 bar	**WP**

03	Size 10	**10**

04	Symbols; possible version see page 3... 5	

05	Component series 50 ... 59 (50 ... 59: unchanged installation and connection dimensions)	**5X**

06	**With** spring return	**no code**
	Without spring return (not for valves with 3 switching positions and version "WMM")	**O**
	With detent (not for versions "WN" and "WP")	**F**
	Without spring return with detent (not for valves with 3 switching positions and version "WMM")	**OF**

Corrosion resistance (outside)

07	None (valve housing primed)	**no code**
	Improved corrosion protection (720 h salt spray test according to EN ISO 9227); (only version "WMM")	**J5**

Throttle insert [1)]

08	**Without** throttle insert			**no code**
	With throttle insert:			
	Connection	Throttle Ø in mm		
		0.8	1.0	1.2
	P	**= B08**	**= B10**	**= B12**
	A	**= H08**	**= H10**	**= H12**
	B	**= R08**	**= R10**	**= R12**
	A and B	**= N08**	**= N10**	**= N12**
	T [2)]	**= X08**	**= X10**	**= X12**
	Further throttle insert diameters upon request.			

Seal material (observe compatibility of seals with hydraulic fluid used, see page 8)

09	NBR seals (standard with version "WN" and "WP")	**M**
	FKM seals	**V**

Pilot oil port

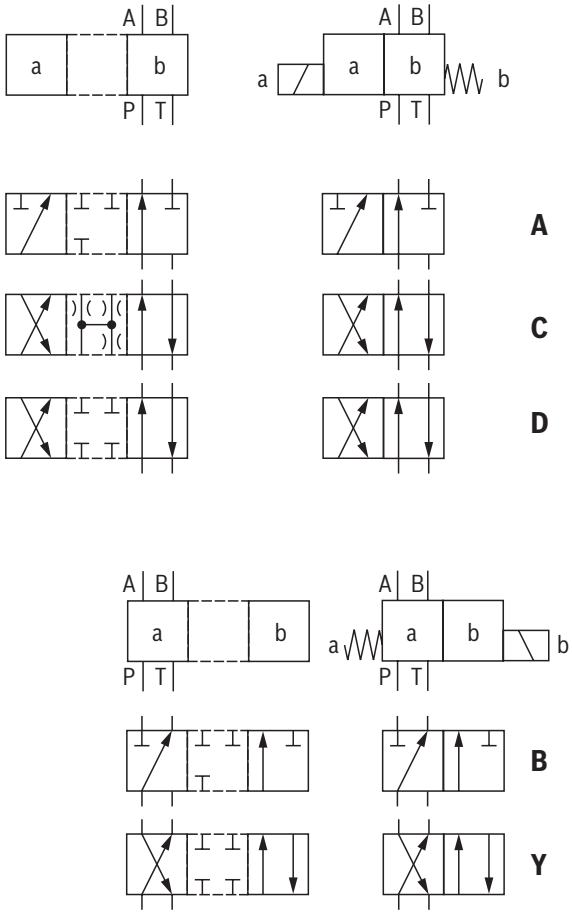
10	Whitworth pipe thread G1/4	**–**
	UNF thread 7/16" - 20 UNF (only versions "WN" and "WP")	**/12**

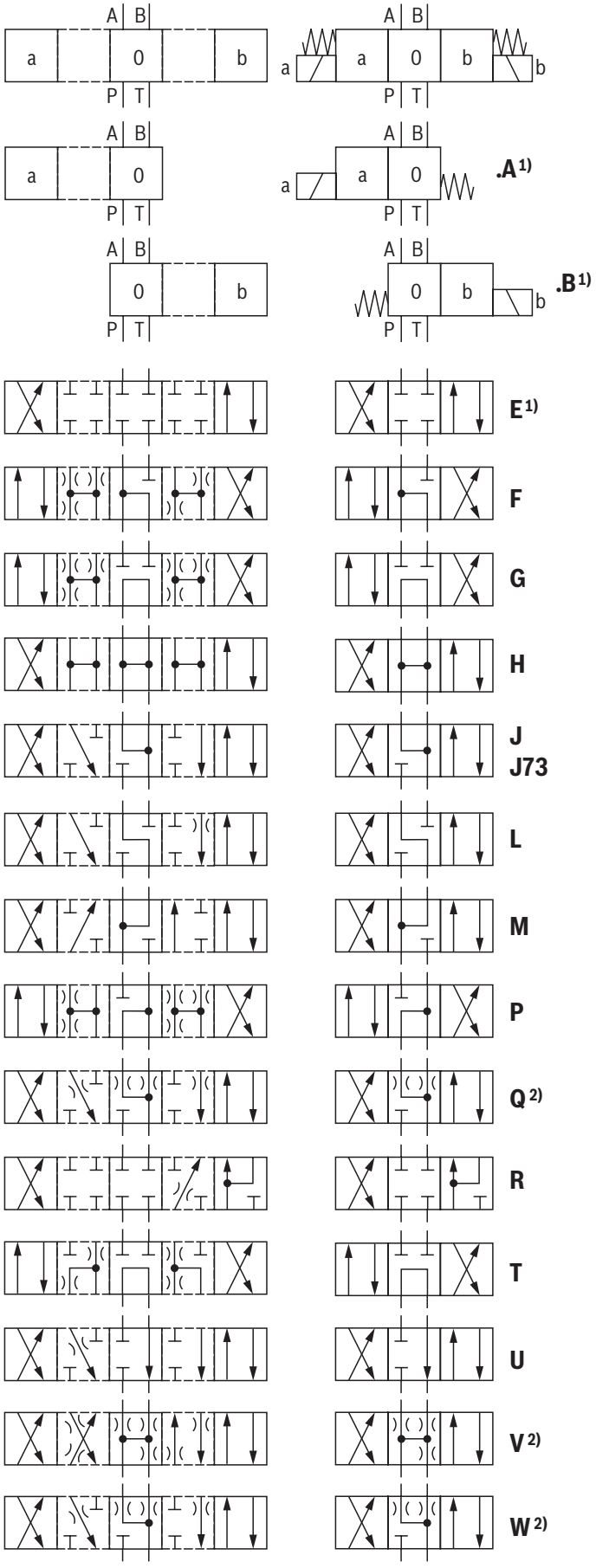
11	Further details in the plain text	

1) When the admissible valve performance limits are exceeded, installation of throttle inserts is to be intended (performance limits see page 10).

2) When throttle inserts are used in channel T, the pressure in the working ports and in case of connection to the tank chambers must not exceed 210 bar.

Symbols



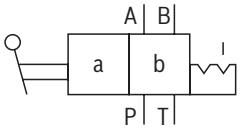
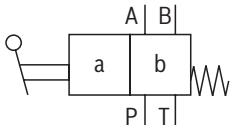
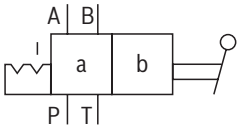
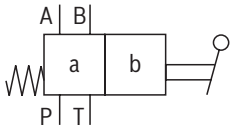
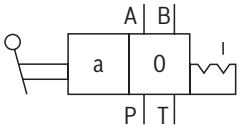
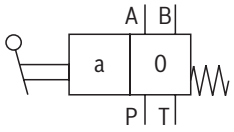
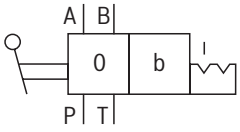
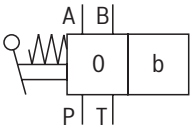
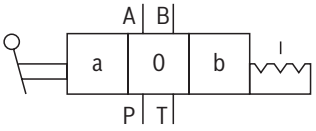
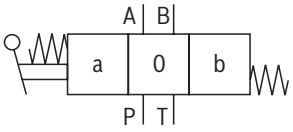


1) **Example:**
– Symbol E with spool position "a": ordering code ..**EA**..
– Symbol E with switching position "b": ordering code ..**EB**..

2) Flow cross-section see page 7

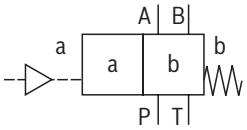
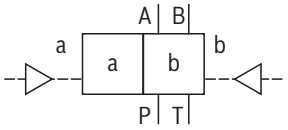
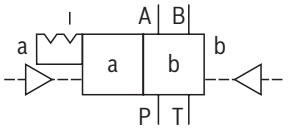
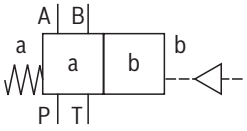
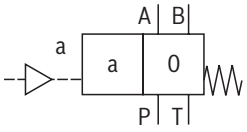
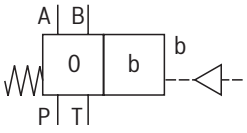
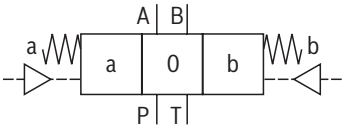
☞ **Notice:**
Representation according to DIN ISO 1219-1.
Hydraulic interim positions are shown by dashes.

Types of actuation: Type WMM

Ordering code			Type of actuation	
Symbol	Actuating side	Detent	Hand lever	
A, C, D		**../F..**		2)
				2)
B, Y		**../F..**		3)
				3)
E, F, G, H, J, J73, L, M, P, Q, R, T, U, V, W	"a" [1] **= .A**	**../F..**		2)
				2)
	"b" [1] **= .B**	**../F..**		3)
				3)
		../F..		4)
				4)

[1] See symbols page 3
[2] See pos. 2, page 12
[3] See pos. 1, page 12
[4] See pos. 3, page 12

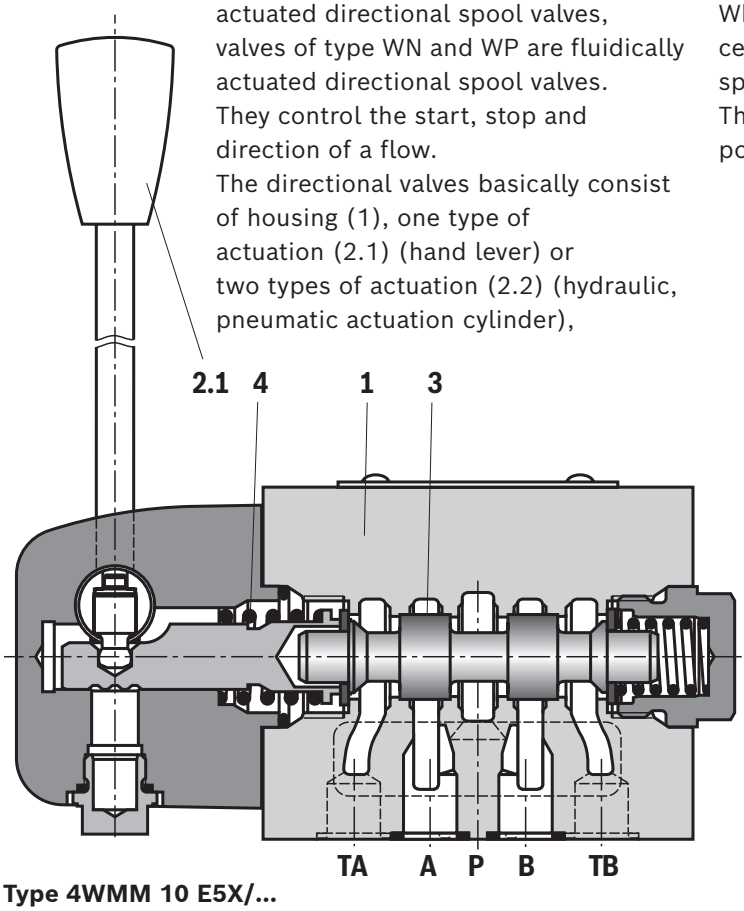
Types of actuation: WN and WP

Symbol	Ordering code Actuating side	Detent	Type of actuation fluidic
A, C, D			
		../O..	
		../OF..	
B, Y			
E, G, H, J, L, U	"a" [1] **= .A**		
	"b" [1] **= .B**		
			

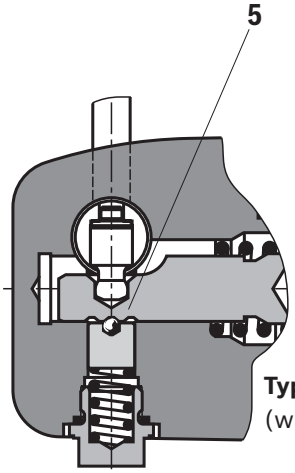
[1] See symbols page 3

Function, section

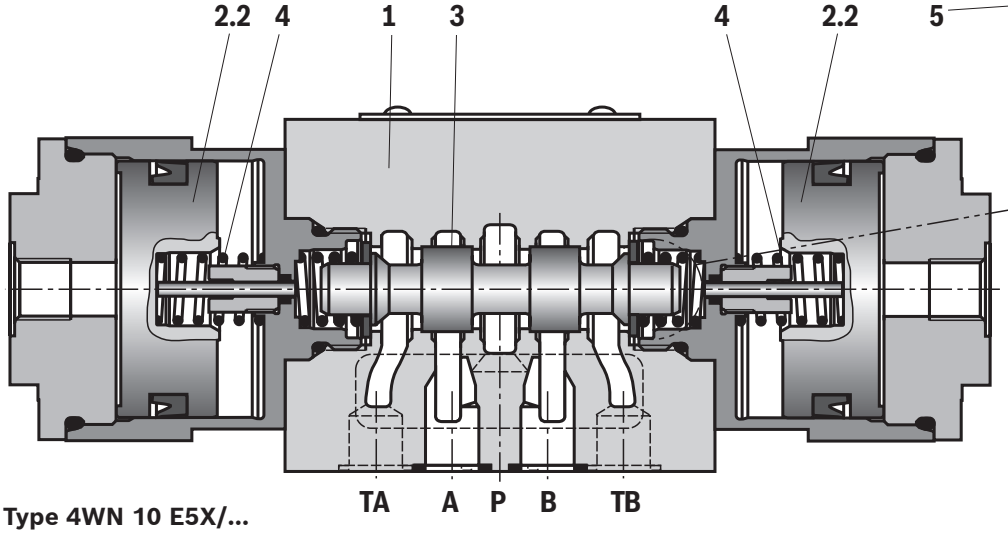
Valves of type WMM are manually actuated directional spool valves, valves of type WN and WP are fluidically actuated directional spool valves.
They control the start, stop and direction of a flow.
The directional valves basically consist of housing (1), one type of actuation (2.1) (hand lever) or two types of actuation (2.2) (hydraulic, pneumatic actuation cylinder), control spool (3), and one or two return springs (4).
When de-energized, the control spool (3) is held in the central position or in the initial position by the return springs (4) (except for version "O").
The control spool (3) is moved to the desired spool position by means of the types of actuation.



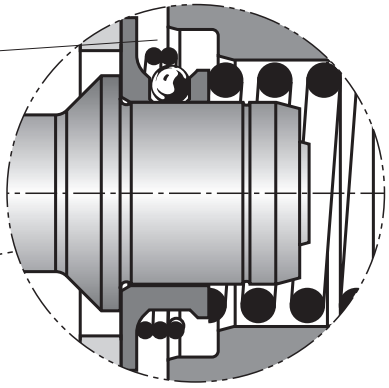
Type 4WMM 10 E5X/...



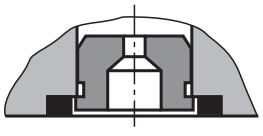
Type 4WMM 10 D5X/F/...
(with detent)



Type 4WN 10 E5X/...



Type 4WN 10 D5X/OF...



Throttle insert
The use of a throttle insert is required when, due to prevailing operating conditions, flows occur during the switching processes which exceed the performance limit of the valve.

Technical data

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

General					
Type			WN	WP	WMM
Weight	▶ 1 actuation cylinder	kg	3.4	2.9	3.6
	▶ 2 actuation cylinders	kg	4.8	3.7	
Actuating force	▶ With detent "F"	N	–	–	30 ... 40
	▶ With spring return	N	–	–	18 ... 20
Installation position			any		
Ambient temperature range		°C	–20 ... +70 (NBR seals) –15 ... +70 (FKM seals)		
Storage temperature range		°C	–20 ... +50		
$MTTF_d$ values according to EN ISO 13849		Years	150 (for further details see data sheet 08012)		

Hydraulic					
Maximum operating pressure	▶ Ports A, B, P	bar	350		
	▶ Port T	bar	210 With symbols A or B, port T must be used as leakage oil connection if the operating pressure exceeds the admissible tank pressure.		
Pilot pressure [1]		bar	1,5 ... 10	8 ... 160	–
Maximum flow		l/min	160		
Flow cross-section (spool position 0)	▶ Symbol Q	mm^2	11 (A/B → T); 10.3 (P → A/B)		
	▶ Symbol V	mm^2	2.5 (A/B → T)		
	▶ Symbol W	mm^2	5.5 (A/B → T)		
Pilot volume		cm^3	23.7	6.9	–
Hydraulic fluid			see table page 8		
Hydraulic fluid temperature range (at the valve working ports)		°C	–20 ... +80 (NBR seals) –15 ... +80 (FKM seals)		
Viscosity range		mm^2/s	2.8 ... 500		
Maximum admissible degree of contamination of the hydraulic fluid, cleanliness class according to ISO 4406 (c)			Class 20/18/15 [2]		
Switching time	▶ ON	ms	10 ... 35	10 ... 25	15 ... 30
	▶ OFF	ms	20 ... 45	10 ... 25	15 ... 30

[1] The information given only applies if the actuation pressure is applied directly to the valve.

[2] The cleanliness classes specified for the components must be adhered to in hydraulic systems. Effective filtration prevents faults and simultaneously increases the life cycle of the components.

For the selection of filters, see www.boschrexroth.com/filter.

Technical data

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

Hydraulic fluid		Classification	Suitable sealing materials	Standards	Data sheet
Mineral oils		HL, HLP, HLPD, HVLP, HVLPD	NBR, FKM	DIN 51524	90220
Bio-degradable	▶ Insoluble in water	HETG	FKM	ISO 15380	90221
		HEES	FKM		
	▶ Soluble in water	HEPG	FKM	ISO 15380	
Flame-resistant	▶ Water-free	HFDU (glycol base)	FKM	ISO 12922	90222
		HFDU (ester base)	FKM		
		HFDR	FKM		
	▶ Containing water	HFC (Fuchs: Hydrotherm 46M, Renosafe 500; Petrofer: Ultra Safe 620; Houghton: Safe 620; Union: Carbide HP5046)	NBR	ISO 12922	90223

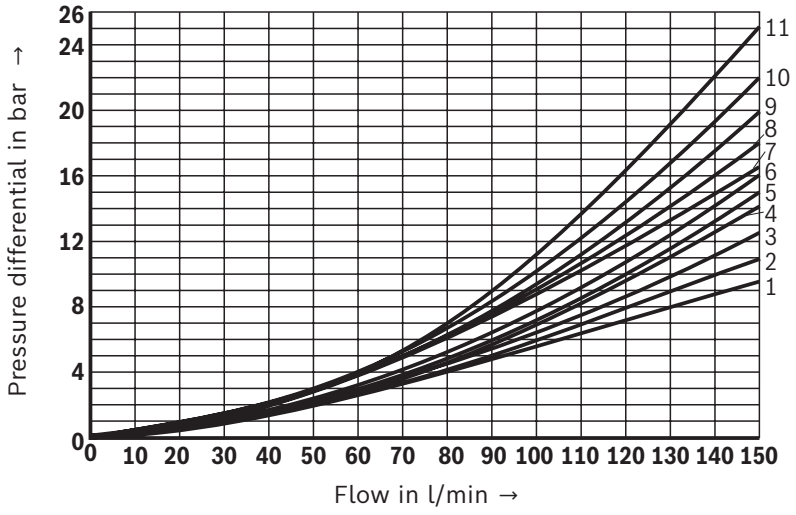
☞ **Important information on hydraulic fluids:**

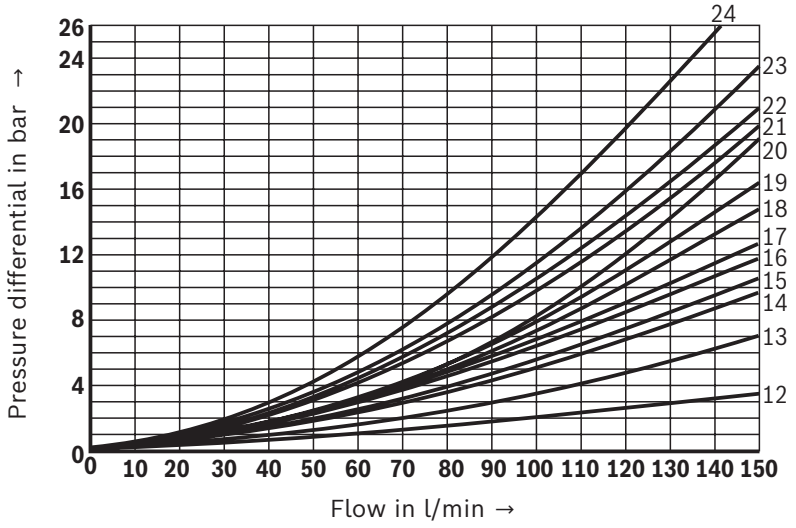
- For further information and data on the use of other hydraulic fluids, please refer to the data sheets above or contact us.
- There may be limitations regarding the technical valve data (temperature, pressure range, life cycle, maintenance intervals, etc.).
- The ignition temperature of the hydraulic fluid used must be 50 K higher than the maximum surface temperature.
- **Bio-degradable and flame-resistant – containing water:**
  If components with galvanic zinc coating (e.g. version "J3" or "J5") or parts containing zinc are used, small amounts of dissolved zinc may get into the hydraulic system and cause accelerated aging of the hydraulic fluid. Zinc soap may form as a chemical reaction product, which may clog filters, nozzles and solenoid valves – particularly in connection with local heat input.
- **Flame-resistant – containing water:**
  - Due to the increased cavitation tendency with HFC hydraulic fluids, the life cycle of the component may be reduced by up to 30% as compared to the use with mineral oil HLP. In order to reduce the cavitation effect, it is recommended – if possible specific to the installation – backing up the return flow pressure in ports T to approx. 20% of the pressure differential at the component.
  - Dependent on the hydraulic fluid used, the maximum ambient and hydraulic fluid temperature must not exceed 50 °C. In order to reduce the heat input into the component, a maximum duty cycle of 50% in continuous operation has to be set for on/off valves (measuring time 300 s). If this is impossible due to the function, an energy-reducing control of these components is recommended, e.g. via a PWM plug-in amplifier.

Characteristic curves

(measured with HLP46, ϑ_{oil} = 40 ±5 °C)

Δp-q_V characteristic curves





Symbol	Direction of flow			
	P – A	P – B	A – T	B – T
A; B	6	6	–	–
C	1	2	5	7
D	2	2	5	7
E	17	16	19	21
F	2	3	22	23
G	4	4	24	24
H	14	14	20	21
J	3	3	9	11
J73	22	21	23	24
L	3	3	9	9
M	14	14	6	8
P	17	14	20	23
Q	16	17	4	8
R	18	21	18	24
T	18	4	10	24
U	3	3	6	11
V	17	17	18	20
W, Y	upon request			

Central position:

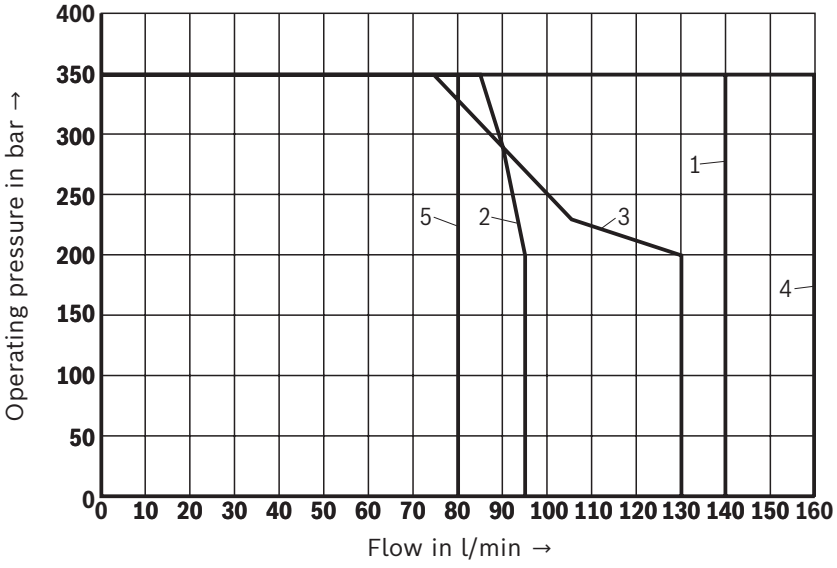
Symbol	Direction of flow				
	P – A	P – B	B – T	A – T	P – T
H	12	12	13	13	15

Performance limits

(measured with HLP46, ϑ_{oil} = 40 ±5 °C)

☞ **Notice:**
The specified performance limits are valid for operation with two directions of flow (e.g. from P to A and simultaneous return flow from B to T).
Due to the flow forces acting within the valves, the achievable performance limit may be considerably lower with only one direction of flow (e.g. from P to A while port B is blocked)!
In such cases of use, please consult us.

Type WMM



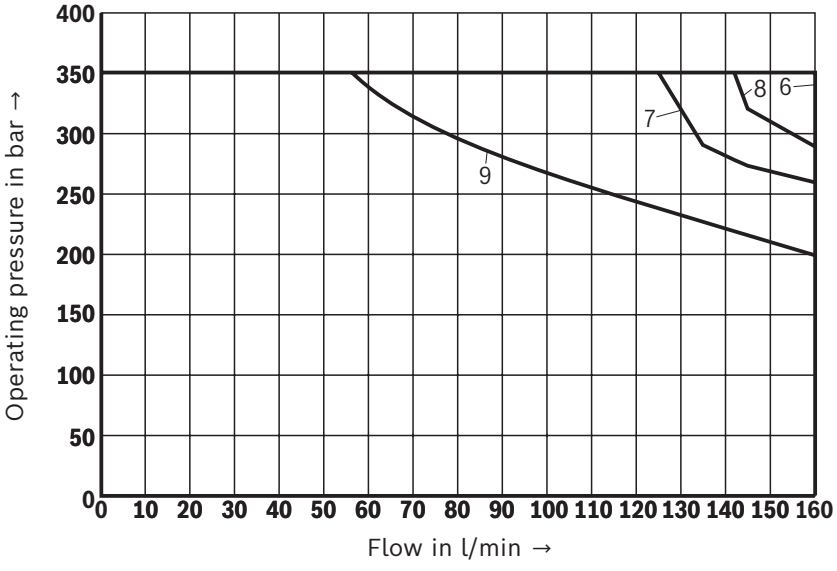
With spring return "–"

Characteristic curve	Symbol
1	C, D, E, J, J73, L, M, Q, U, V, W
2	H
3	T, G

With detent "F"

Characteristic curve	Symbol
4	C, D, E, J, J73, L, M, Q, U
5	T, G, H

Type WN



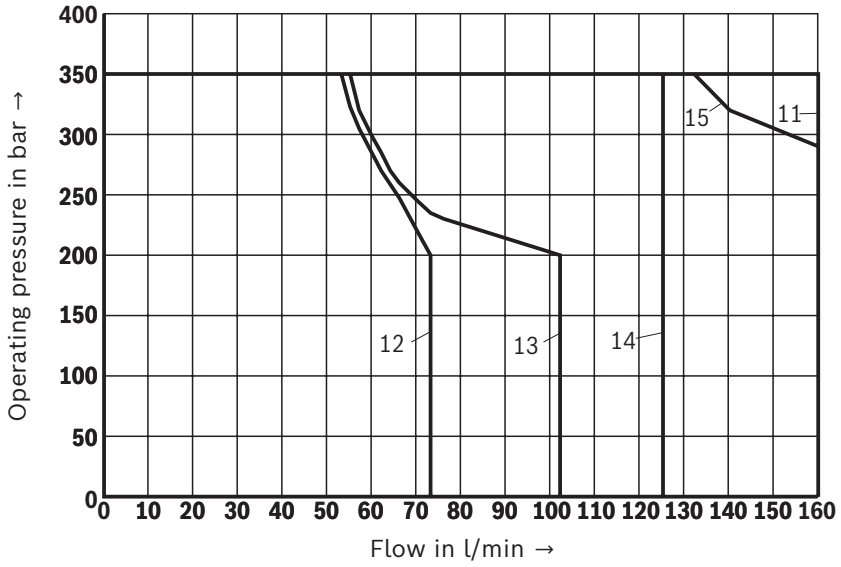
Characteristic curve	Symbol
6	C, C/OF, D, D/OF, E, J, L, M, U
7	G
8	H
9	A, B

Performance limits

(measured with HLP46, ϑ_{oil} = 40 ±5 °C)

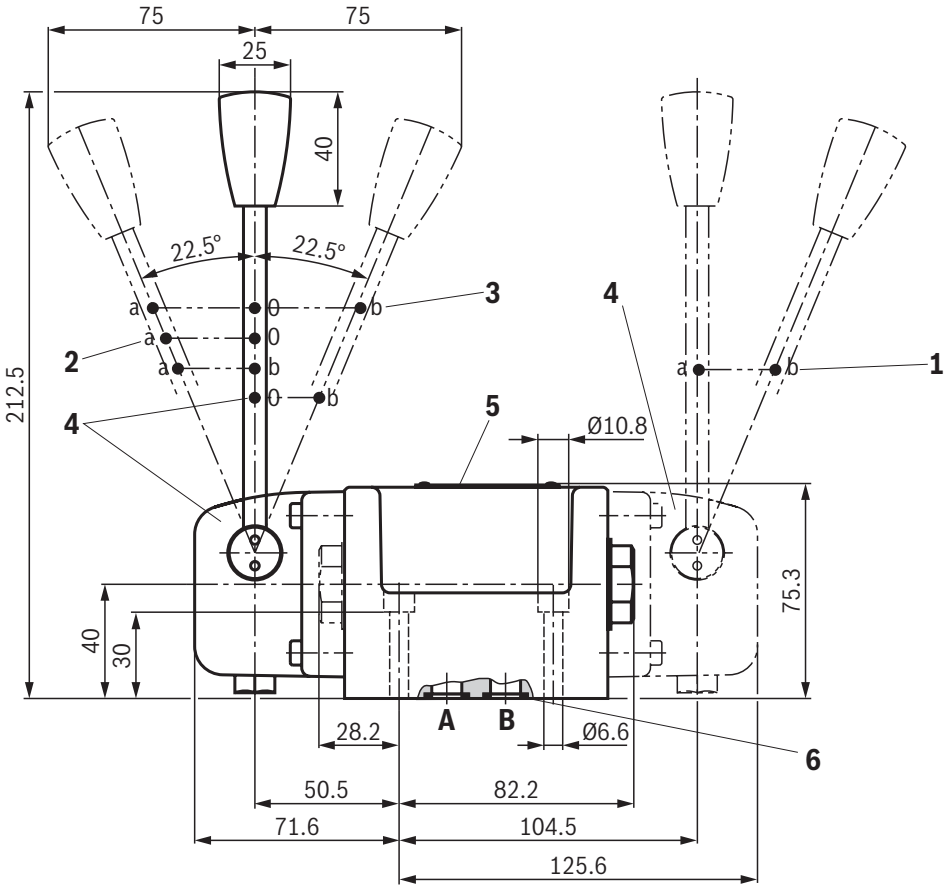
☞ **Notice:**
The specified performance limits are valid for operation with two directions of flow (e.g. from P to A and simultaneous return flow from B to T).
Due to the flow forces acting within the valves, the achievable performance limit may be considerably lower with only one direction of flow (e.g. from P to A while port B is blocked)!
In such cases of use, please consult us.

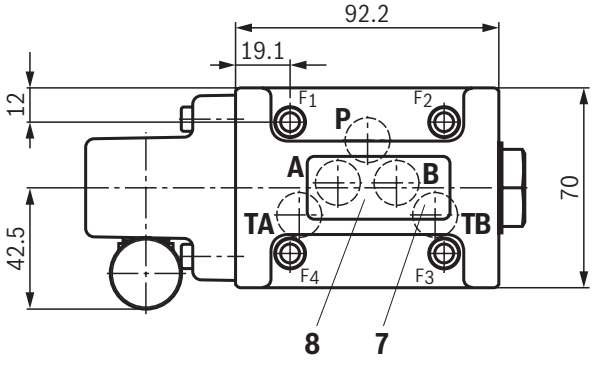
Type WP

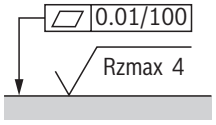


Characteristic curve	Symbol
11	C, C/OF, D, D/OF, E, J, L, M, U
12	B
13	A
14	G
15	H

Dimensions: Type WMM
(dimensions in mm)







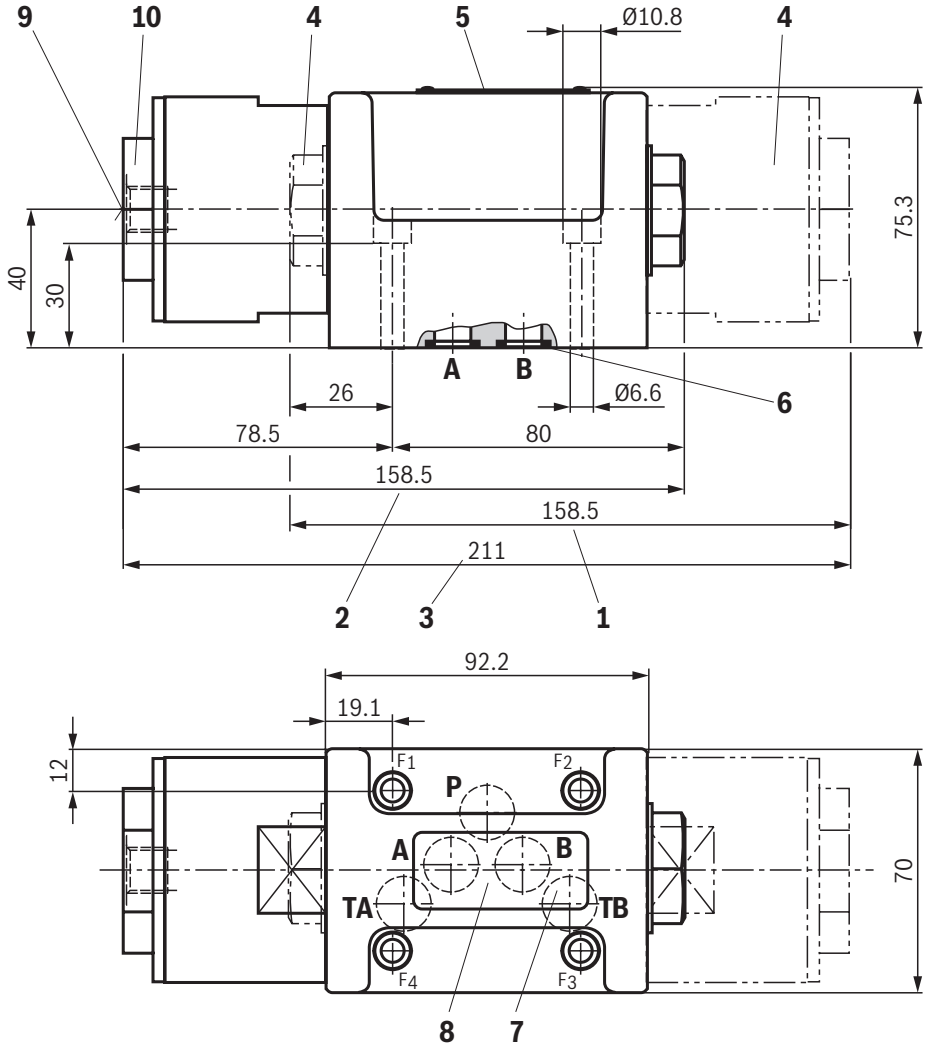
Required surface quality of the valve contact surface

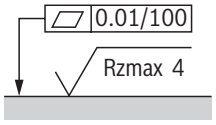
1 Valves with 2 switching positions, symbol B and .B
2 Valves with 2 switching positions, symbol A, C, D .A
3 Valves with 3 switching positions
4 Cover and hand lever
5 Name plate
6 Identical seal rings for port A, B, P, TA, TB
7 Additional port TB can optionally be used
8 Porting pattern according to ISO 4401-05-04-0-05

Notices:
- Deviating from ISO 4401, port T is called TA and port T1 is called TB in this data sheet.
- For valves with 2 switching positions and symbols B and Y, the hand lever is installed on valve side B.
- The dimensions are nominal dimensions which are subject to tolerances.

Valve mounting screws and **subplates,** see page 15.

Dimensions: Type WN
(dimensions in mm)





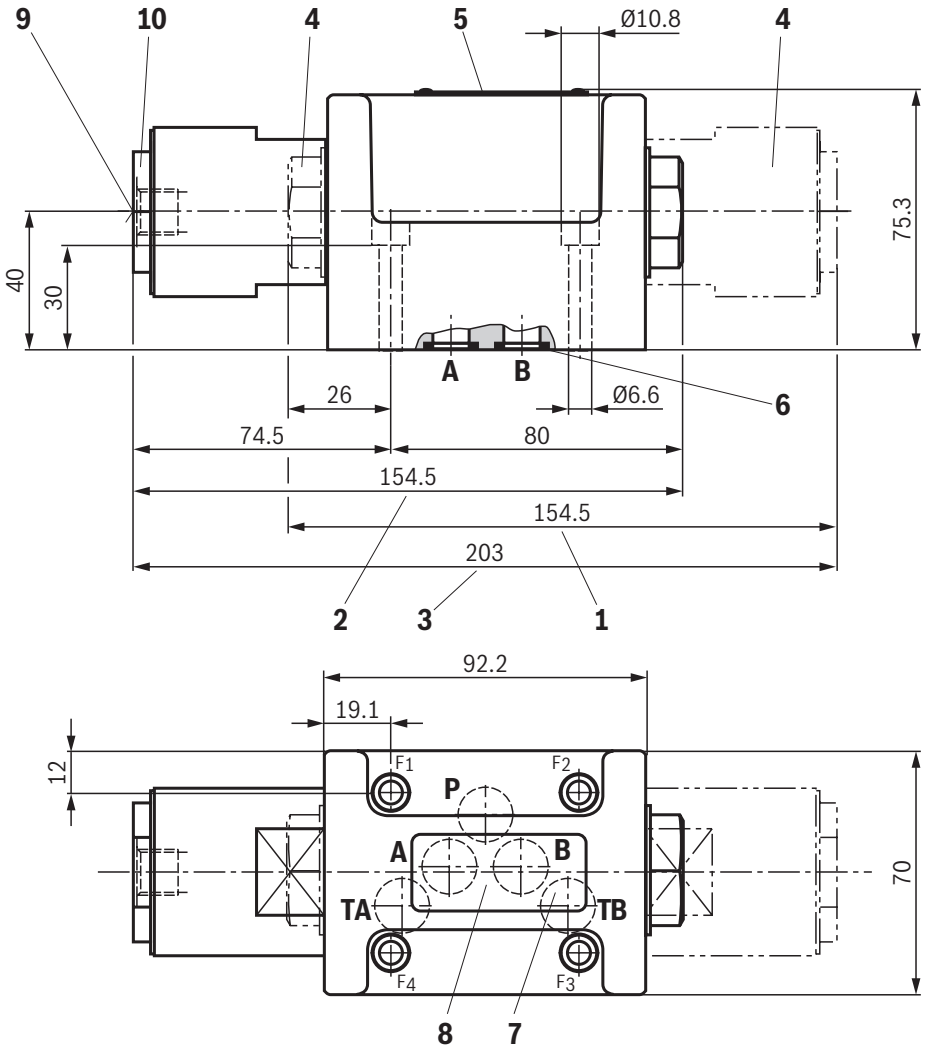
Required surface quality of the valve contact surface

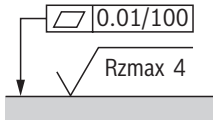
1 Valves with 2 switching positions, symbol B and .B
2 Valves with 2 switching positions, symbol A, C, D .A
3 Valves with 3 switching positions
4 Cover and plug screw
5 Name plate
6 Identical seal rings for port A, B, P, TA, TB
7 Additional port TB can optionally be used
8 Porting pattern according to ISO 4401-05-04-0-05
9 Pilot oil port G1/4 (version "–")
Pilot oil port 7/16" - 20 UNF (version "/12")
10 Socket

☞ **Notices:**
- Deviating from ISO 4401, port T is called TA and port T1 is called TB in this data sheet.
- The dimensions are nominal dimensions which are subject to tolerances.
- When screwing in/releasing the connection tube on the pilot oil port (9), the bushing (10) must be secured against twisting by using an open-end wrench.

Valve mounting screws and **subplates,** see page 15.

Dimensions: Type WP
(dimensions in mm)





Required surface quality of the valve contact surface

1 Valves with 2 switching positions, symbol B and .B
2 Valves with 2 switching positions, symbol A, C, D, EA...
3 Valves with 3 switching positions
4 Cover and plug screw for valves with 2 switching positions, symbol B, Y, EB...
5 Name plate
6 Identical seal rings for port A, B, P, TA, TB
7 Additional port TB can optionally be used
8 Porting pattern according to ISO 4401-05-04-0-05
9 Metric pilot oil port: G1/4
UNC pilot oil port: 7/16" - 20 UNF
10 Socket

Notices:
- Deviating from ISO 4401, port T is called TA and port T1 is called TB in this data sheet.
- The dimensions are nominal dimensions which are subject to tolerances.
- When screwing in/releasing the connection tube on the pilot oil port (9), the bushing (10) must be secured against twisting by using an open-end wrench.

Valve mounting screws and **subplates,** see page 15.

Dimensions

Valve mounting screws (separate order)

Size	Quantity	Hexagon socket head cap screws	Material number
10	4	**ISO 4762 - M6 x 40 - 10.9-flZn-240h-L** Friction coefficient μ_{total} = 0.09 ... 0.14; tightening torque M_A = 12.5 Nm ±10%	**R913000058**
	or		
	4	**ISO 4762 - M6 x 40 - 10.9** Friction coefficient μ_{total} = 0.12 ... 0.17; tightening torque M_A = 15.5 Nm ±10%	Not included in the Rexroth delivery range
	or		
	4	**1/4-20 UNC x 1-1/2" ASTM-A574** Friction coefficient μ_{total} = 0.19 to 0.24; tightening torque M_A = 25 Nm ±15% Friction coefficient μ_{total} = 0.12 to 0.17; tightening torque M_A = 19 Nm ±10%	**R978800710**

☞ **Notice:**
In case of different friction coefficients, the tightening torques are to be adjusted accordingly.

Subplates (separate order) with porting pattern according to ISO 4401, see data sheet 45100.

Further information

▶ Subplates	Data sheet 45100
▶ Hydraulic fluids on mineral oil basis	Data sheet 90220
▶ Environmentally compatible hydraulic fluids	Data sheet 90221
▶ Flame-resistant, water-free hydraulic fluids	Data sheet 90222
▶ Flame-resistant hydraulic fluids - containing water (HFAE, HFAS, HFB, HFC)	Data sheet 90223
▶ Reliability characteristics according to EN ISO 13849	Data sheet 08012
▶ Hydraulic valves for industrial applications	Operating instructions 07600-B
▶ Selection of filters	www.boschrexroth.com/filter
▶ Information on available spare parts	www.boschrexroth.com/spc

Notices

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Bosch Rexroth AG, RE 22334, edition: 2021-05