

Manual Directional Valve

Model: WMM...



- ◆ Size 6, 10, 16, 25, 32
- ◆ Maximum working pressure 350 bar
- ◆ Maximum working flow 1100 L/min

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Features

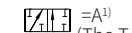
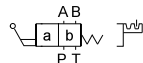
- Direct operated directional spool valve with handle
- With reset spring or detent, optional
- Subplate mounting

Functional symbols

Transition
function



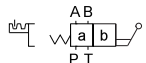
Spool valve
function



Transition
function



Spool valve
function



(The T port serves
as the drain port)

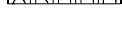
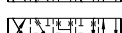
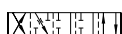
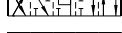
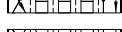
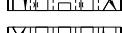
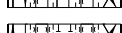
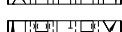
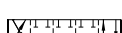
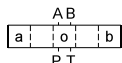
=C

=D

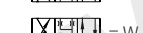
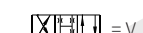
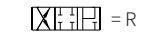
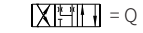
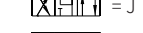
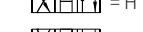
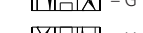
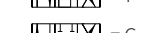
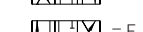
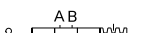
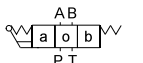
(The T port serves
as the drain port)

=Y

Transition
function



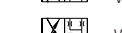
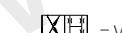
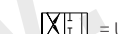
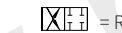
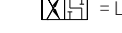
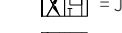
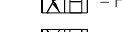
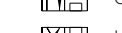
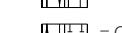
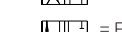
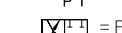
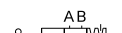
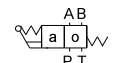
Spool valve
function



Transition
function



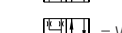
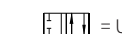
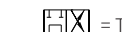
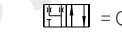
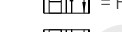
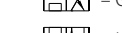
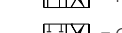
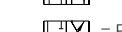
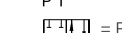
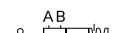
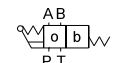
Spool valve
function



Transition
function



Spool valve
function



Explanation:

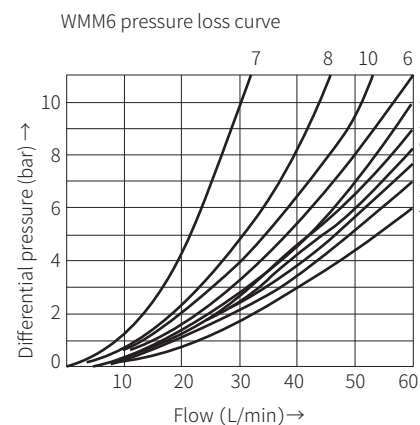
(1) Symbol A and B only for size 6 and 10

Technical parameters

Size	6	10	16	25	32
Working pressure	to 315		to 350		
Oil port A, B, P (bar)	to 160	to 150	to 250	to 250	to 250
Oil port T (bar)					
Flow (L/min)	to 60	to 100	to 300	to 450	to 1100
Flow cross-section (middle position)	Q-type, 6% of nominal cross-section W-type, 3% of nominal cross-section		Q, V-type, 16% of nominal cross-section W-type, 3% of nominal cross-section		
Medium	Mineral oil(HL,HLP) in accordance with DIN 51524; fast living organisms Degraded oil according to VDMA 24568; HETG(Rapeseed oil); HEPG(Polyethylene glycol); HEES(synthetic ester);				
Oil temperature range (°C)	-30 to +80				
Viscosity range (mm²/s)	2.8 to +500				
Weight (kg)	about 1.4	about 3.3	about 8	about 17	about 45
Operating force (N)	Without return pressure about 20 Without return pressure about 30 (at 150 bar)	With detent: about 16 to 23 Without detent: about 20 to 27	about 75	about 120	about 170

Characteristic curve

(Measured when using HLP46, $\vartheta_{oil} = 40^\circ\text{C} \pm 5^\circ\text{C}$)



Function symbol	Flow direction			
	P→A	P→B	A→T	B→T
A	3	3	-	-
B	3	3	-	-
C	1	1	3	1
D	5	5	3	3
E	3	3	1	1
F	1	3	1	1
G	6	6	9	9
H	2	4	2	2
J	1	1	2	1
L	3	3	4	9
M	2	4	3	3
P	3	1	1	1
Q	1	1	2	1
R	5	5	4	-
T	10	10	9	9
U	3	3	9	4
V	1	2	1	1
W	1	1	2	2
Y	5	5	3	3

7. Symbol "R" in control position A to B

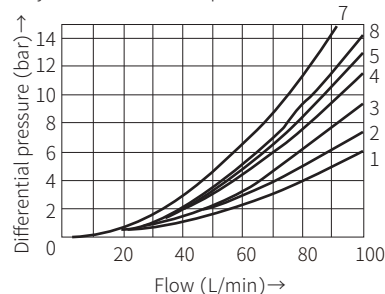
8. Symbols "G" and "T" in the middle position P to T

Characteristic curve

(Measured when using HLP46, $t_{oil} = 40^{\circ}\text{C} \pm 5^{\circ}\text{C}$)

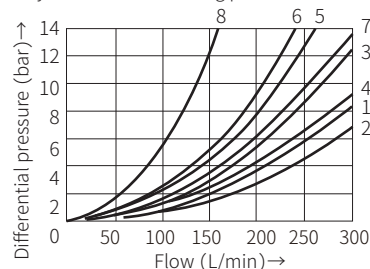
WMM10 pressure loss curve

- Symbols "G" and "T" in the middle position P to T
- Symbol "R" in control position A to B



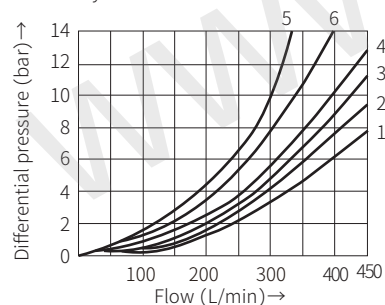
WMM16 pressure loss curve

- Symbols "G" and "T" in the middle position P to T
- Symbol "S" in switching position P to T



WMM25 pressure loss curve

- Symbol "L" in A to T
- Symbol "U" in B to T



Function symbol	Flow direction			
	P→A	P→B	A→T	B→T
A	2	2	-	-
B	2	2	-	-
C	2	2	3	3
D	2	2	3	3
E	2	2	4	4
F	2	2	3	5
G	3	3	4	6
H	1	1	4	5
J	2	2	3	3
L	2	2	3	5
M	1	1	5	5
P	3	2	5	3
Q	2	2	4	4
R	2	4	3	-
T	3	5	5	6
U	2	2	3	5
V	2	2	4	4
W	2	2	5	5
Y	2	2	5	3

Function symbol	Flow direction			
	P→A	P→B	A→T	B→T
E, D, T	1	1	1	3
F	2	2	3	3
G, T	5	1	3	7
H, C, Q	2	2	3	3
V, Z	2	2	3	3
J, K, L	1	1	3	3
M, W	2	2	4	-
R	2	2	4	-
U	1	1	4	7
S	4	4	4	-

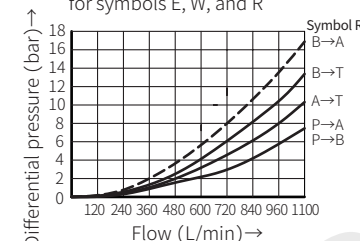
Function symbol	Flow direction			
	P→A	P→B	A→T	B→T
E	2	2	1	4
F	1	2	1	2
G	2	2	2	4
H	2	2	1	3
J	2	2	1	3
L	2	2	1	2
M	2	2	1	4
P	2	2	1	4
Q	2	2	1	4
R	1	2	1	-
T	2	2	2	4
U	2	2	1	4
V	2	2	1	4
W	2	2	1	3

Characteristic curve

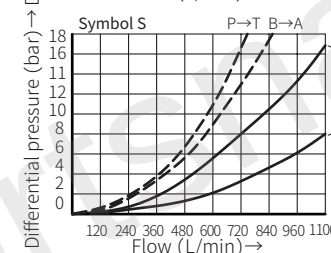
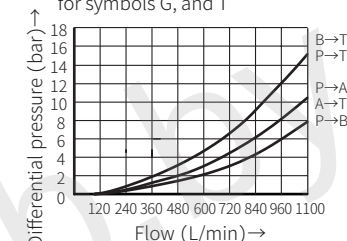
(Measured when using HLP46, $t_{oil} = 40^{\circ}\text{C} \pm 5^{\circ}\text{C}$)

WMM32 pressure loss curve

Δp -Q characteristic curve applicable for symbols E, W, and R



Δp -Q characteristic curve applicable for symbols G, and T



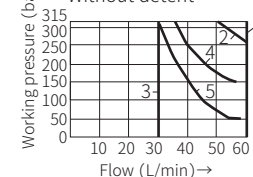
Characteristic curves of other symbols

Characteristic limit

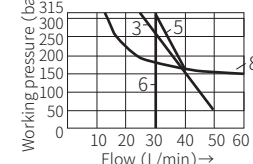
Due to blockage, the switching function of the valve is related to filtration. In order to obtain the specified maximum flow, it is recommended to use a 20um full-flow filtration. The various forces acting on the valve also affect the flow characteristics.

For a four-way valve, the specified flow data is valid for normal operation with two flow directions (i.e. from P to A and return flow from B to T at the same time)(see table). If only one direction of flow is needed, e.g. when the four-way valve with chamber A or B blocked is used as three-way valve, the maximum flow rate will greatly decrease in severe cases.

WMM6 characteristic limit Without detent

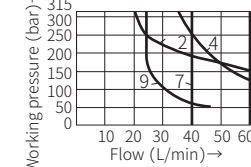


With detent



Characteristic curve	Spool valve symbol	Characteristic curve	Spool valve symbol
Without detent	1	With detent	E, E1, H, C, D
	2		M, Q, U
	3		W, G, J
	4		L, R, Y
	5		A, B
			V
			F, P
			T

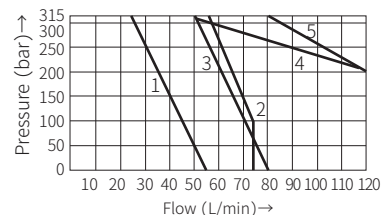
With detent



Characteristic limit

WMM10 characteristic limit

Characteristic curve	Spool valve symbol
1	A, B
2	H
3	F, G, P, R, T
4	J, L, Q, U, W
5	C, D, E, M, V, Y



WMM16 characteristic limit

Permitted flow qv L/min, 2-position valve						Permitted flow qv L/min, 3-position valve					
Function symbol	Working pressure P bar					Function symbol	Working pressure P bar				
	70	140	210	280	315		70	140	210	280	315
Spring reset						Spring reset					
C	300	300	300	260	220	E, H, J, L, M, Q, R, U, W	300	300	300	300	300
D	300	300	210	190	160	F, P	300	300	210	190	170
K	300	300	200	150	130	G, S, T	300	300	220	210	180
Z	300	240	190	170	150	V	300	260	200	180	170
With detent						With detent					
C, D, K, Z	300	300	300	300	300	E, H, J, L, M, Q, R, U, W	300	300	300	300	300
						F, P	300	300	280	230	230
						G, S, T	300	300	230	230	230
						V	300	300	250	230	230

WMM25 characteristic limit

Permitted flow qv L/min, 2-position valve						Permitted flow qv L/min, 3-position valve					
Function symbol	Working pressure P bar					Function symbol	Working pressure P bar				
	70	140	210	280	315		70	140	210	280	315
Spring reset						Spring reset					
C	450	300	250	200	180	E, J, L, M, Q, R, U, W	450	450	450	450	450
D	350	300	275	250	200	F	450	250	200	135	110
K	200	150	140	130	120	G, T	450	330	290	230	180
Z	300	270	240	220	200	H	450	450	400	400	350
						P	450	310	240	215	150
						V	450	310	280	270	200
With detent						With detent					
C, D, K, Z	450	450	450	450	450	E, F, G, H, J, L, M, P, Q, R, T, U, W	450	450	450	450	450
						V	450	450	400	350	300

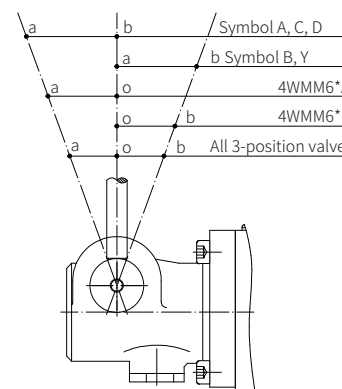
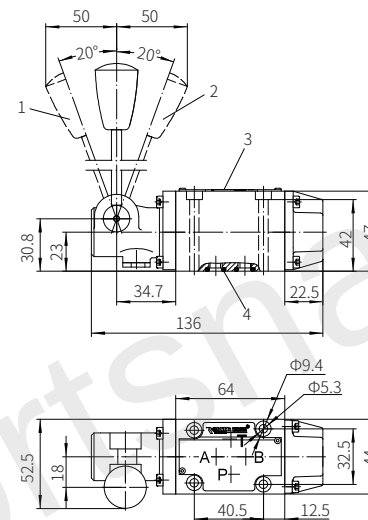
WMM32 characteristic limit

2-position and 3-position valves with spring reset					
Flow L/min	Under pressure of ... (bar)				
Function symbol	70	140	210	280	315
E, J, L, M, Q, R, V, U, W	1100	1050	860	750	680
F, G, H, S, T, C, D, K, Z	650	450	370	320	280
2-position and 3-position valves with detent					
All symbols	1100	1050	860	750	680

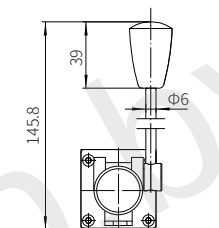
Component size

Size unit: mm

Model 4WMM6...5XJ/...



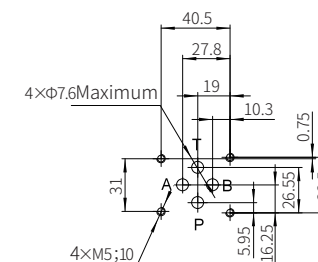
- 1 Switching position b→a and o→a
- 2 Switching position a→b and o→b
- 3 Name plate
- 4 O-ring 9.25x1.78 (for oil port A, B, P, T)



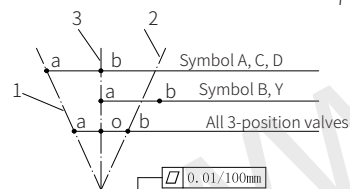
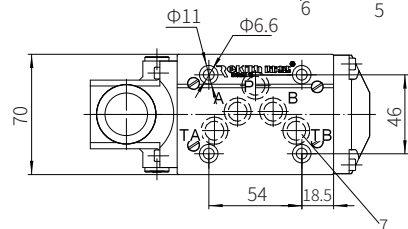
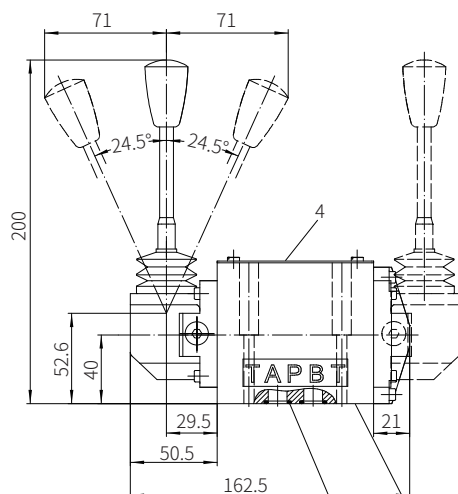
Required surface finishing of mating components

Valve fixing screw
M5x50-10.9 grade GB/T70.1-2000
Tightening torque $M_A=7.8\text{Nm}$

It must be ordered separately if connection subplate is needed.
Subplate model:
G341/01 (G1/4"); G341/02 (M14x1.5)
G342/01 (G3/8"); G342/02 (M18x1.5)
G502/01 (G1/2"); G502/02 (M22x1.5)



Model 4WMM10...1XJ/F...



Required surface finishing of mating components

- 1 Switching position a
- 2 Switching position b
- 3 Switching position o, a and b
- 4 Name plate
- 5 Valve connection surface
- 6 O-ring 12x2 (for oil port A, B, P, T)
- 7 When using control block,
port TB serve as assistant return port

Valve fixing screw

M6x40-10.9 grade GB/T70.1-2000

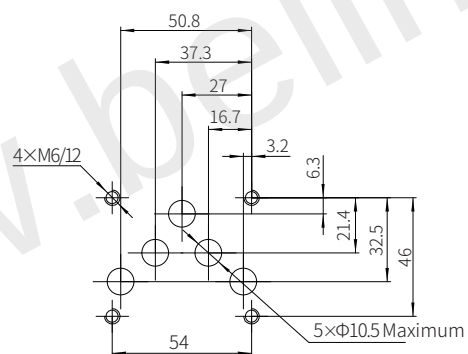
Tightening torque $M_A = 13.7 \text{ Nm}$

It must be ordered separately if connection subplate is needed.
Subplate model:

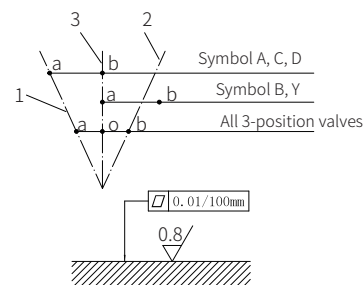
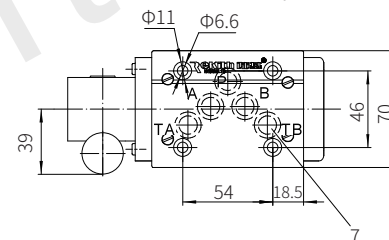
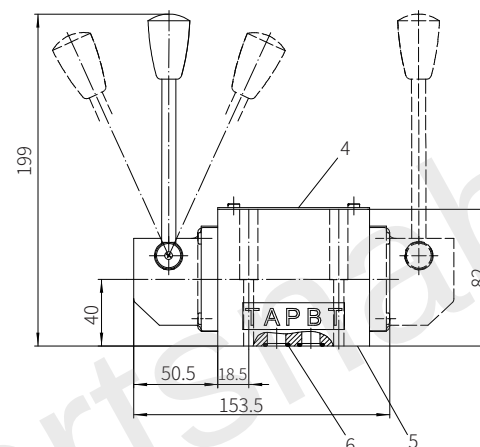
G66/01 (G3/8"); G66/02 (M18x1.5)

G67/01 (G1/2"); G67/02 (M22x1.5)

G534/01 (G3/4"); G534/02 (M27x2)



Model 4WMM10...1XJ/...



Required surface finishing of mating components

- 1 Switching position a
- 2 Switching position b
- 3 Switching position o, a and b
- 4 Name plate
- 5 Valve connection surface
- 6 O-ring 12x2 (for oil port A, B, P, T)
- 7 When using control block, port TB serve as assistant return port

Valve fixing screw

M6x40-10.9 grade GB/T70.1-2000

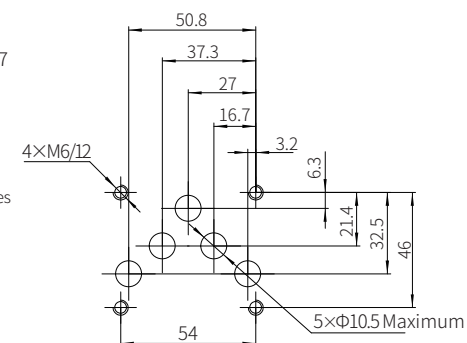
Tightening torque $M_A = 13.7 \text{ Nm}$

It must be ordered separately if connection subplate is needed.
Subplate model:

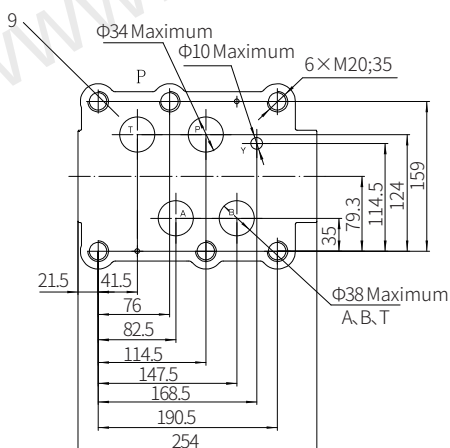
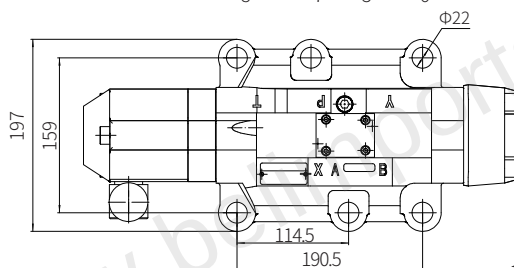
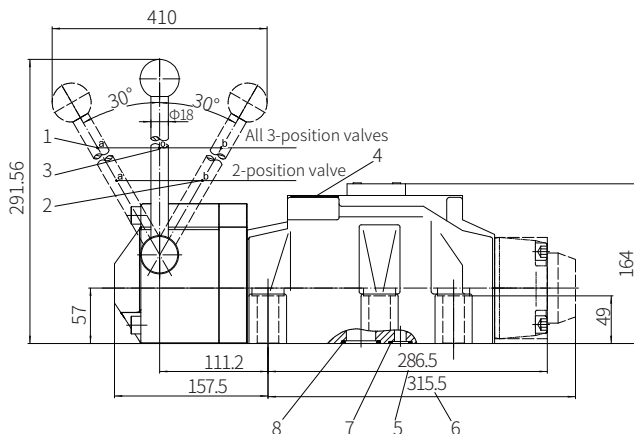
G66/01 (G3/8"); G66/02 (M18x1.5)

G67/01 (G1/2"); G67/02 (M22x1.5)

G534/01 (G3/4"); G534/02 (M27x2)



Model 4WMM32...6XJ/...



0.01/100mm

0.8

Required surface finishing of mating components

- 1 Switching position a
- 2 Switching position b
- 3 Switching position o
- 4 Name plate
- 5 Size of 3-position valve
- 6 Size of 2-position valve
- 7 O-ring 19x3 (for oil port X, Y)
- 8 O-ring 42x3 (for oil port P, A, B, T)
- 9 Valve mounting surface

Valve fixing screw

6-M20x80-10.9 grade GB/T70.1-2000

Tightening torque $M_A = 373 \text{ Nm}$

It must be ordered separately if connection subplate is needed.

Subplate model:

G157/01 (G1-1/2"); G157/02 (M48x2)