

RE 22 280/02.03

Replaces: 01.96

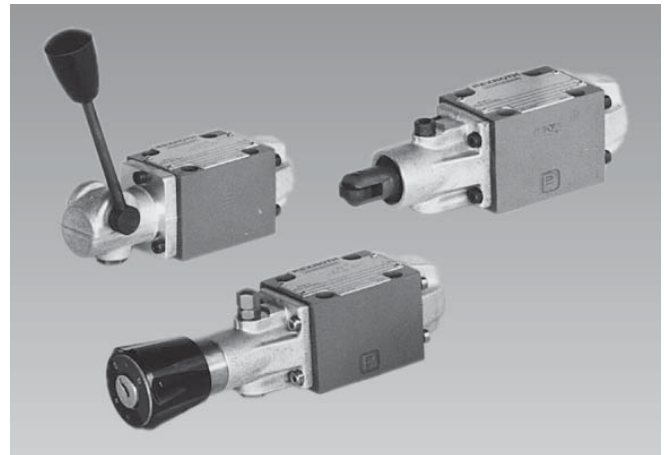
**4/3-, 4/2- and 3/2-way directional valves
with mechanical, manual operation
Types WMR, WMU, WMM and WMD(A)**

Nominal size 6

Series 5X

Maximum operating pressure 315 bar

Maximum flow 60 L/min



Mechanical, manual operation

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Features

- Direct operated directional spool valve
- Operating elements:
 - Roller/plunger
 - Hand lever
 - Rotary knob
- Porting pattern to DIN 24 340 Form A, **without** locating pin hole (standard)
- Porting pattern to ISO 4401 and CETOP–RP 121 H, **with** locating pin hole (ordering details .../60 at the end of the valve type code)
- Subplates to catalogue sheet RE 45 052 (separate order)



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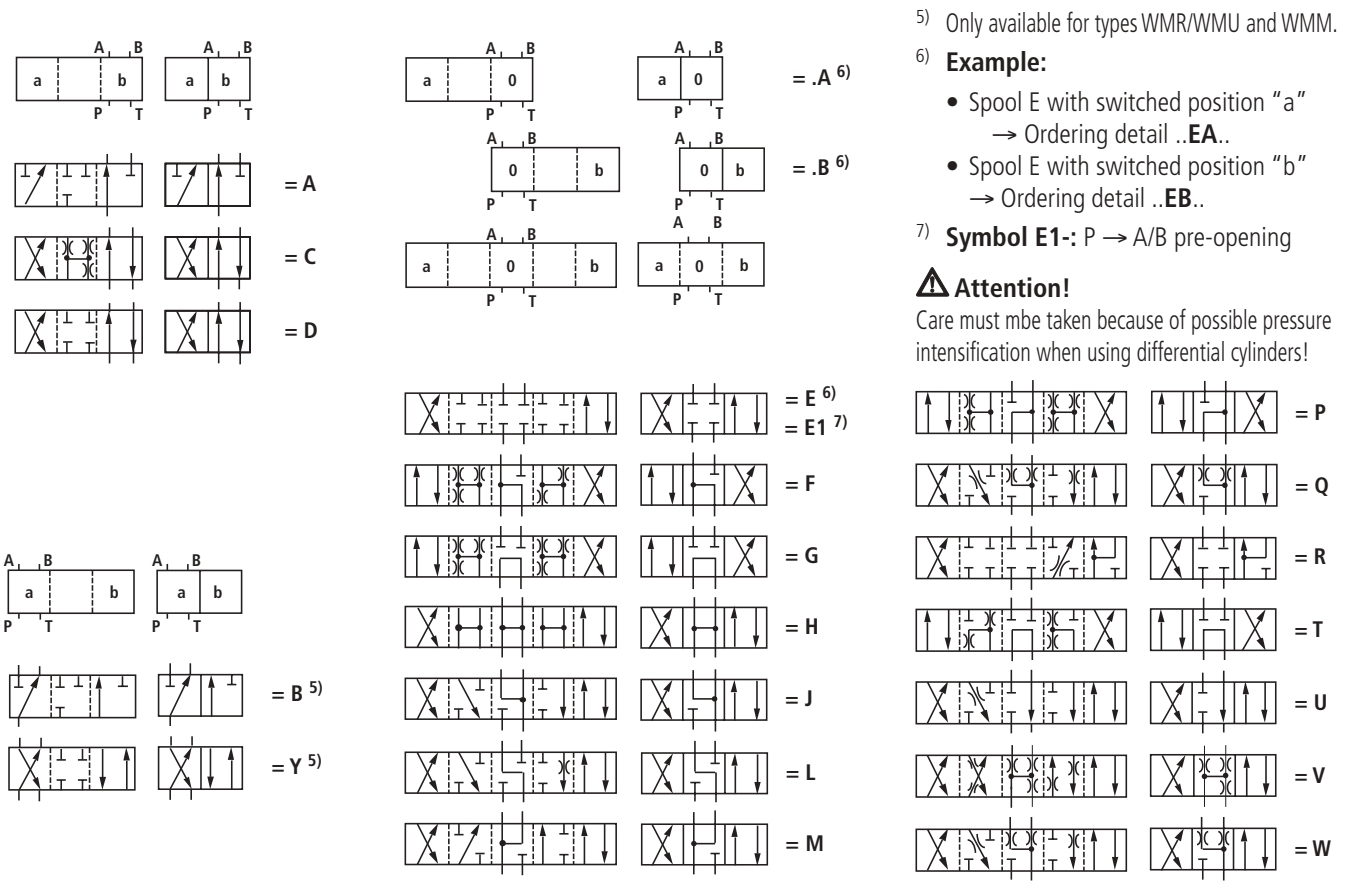
Ordering details

		6	5X/			*
3 actuator ports	= 3					
4 actuator ports	= 4					
Operation						
Roller/plunger } see	= WMR					
Roller/plunger } page 7	= WMU					
Hand lever	= WMM					
Rotary knob	= WMD					
Rotary knob, lockable ¹⁾	= WMDA					
Nominal size 6	= 6					
Symbols, e. g. C, E, EA, EB etc. ²⁾						
Series 50 to 59			= 5X			
(50 to 59: unchanged installation and connection dimensions)						
With spring return				= No code		
(available for WMR, WMU, WMM)						
With detent					= F	
(available for WMM, WMD, WMDA)						
						Further details in clear text
						No code = Without locating pin hole
						/60 ⁴⁾ = With locating pin hole
						No code = NBR seals
						V = FKM seals
						(other seals on request)
						⚠ Attention!
						The compatibility of the seals and pressure fluid has to be taken into account!
						No code = Without throttle insert
						B08 ³⁾ = Throttle Ø 0.8 mm
						B10 ³⁾ = Throttle Ø 1.0 mm
						B12 ³⁾ = Throttle Ø 1.2 mm

Preferred types, see page 3, are readily available!

- 1) Key with Material No. **R900006980** for series 50 to 52
R900008158 for series 53
are included within the scope of supply.
- 2) For symbols and examples, see below and page 3.
- 3) Use if volume flow is > valve performance limit, fitted in the P line.
- 4) Locating pin 3 x 8 DIN EN ISO 8752.
Material No. **R900005694** (separate order)

Symbols



Actuator types

Ordering details		WMR, WMU (roller/plunger)	Valve types	
Spool	Detent		WMM (hand lever)	WMD, WMDA (rotary knob)
A, C, D	../F..			
B, Y	../F..			
E1-, E, F, G, H, J, L, M, P, Q, R, T, U, V, W	Switched position "a" ²⁾ = .A			
	Switched position "b" ²⁾ = .B	../F..		
		../F..		

²⁾ See symbols on page 2

Preferred types (readily available)

Type WMR / WMU	Material number	Type WMM	Material number
3WMR 6 A5X/	R900471414	4WMM 6 D5X/	R900468328
4WMR 6 D5X/	R900465984	4WMM 6 E5X/	R900467936
4WMR 6 J5X/	R900477994	4WMM 6 G5X/	R900471209
3WMU 6 A5X/	R900401031	4WMM 6 H5X/	R900467370
4WMU 6 D5X/	R900479282	4WMM 6 J5X/	R900469302

Type WMD	Material number
4WMD 6 C5X/F	R900476226
4WMD 6 D5X/F	R900476880
4WMD 6 E5X/F	R900475573
4WMD 6 J5X/F	R900471013

Further preferred types and standard units can be found in the EPS (Standard Price List).

Function, section

Valve types WM.. are mechanical, manual operated directional spool valves.

They control the start, stop and direction of a flow.

The directional valves basically consists of the housing (1), an operating element (2) (roller/plunger, hand lever, rotary knob), the control spool (3), and one or two return springs (4).

In an unoperated condition, the control spool (3) is held in the neutral or initial position by the return springs (4) – or by a detent with rotary knob operation.

The control spool (3) is pushed into the required control position by means of the operating element.

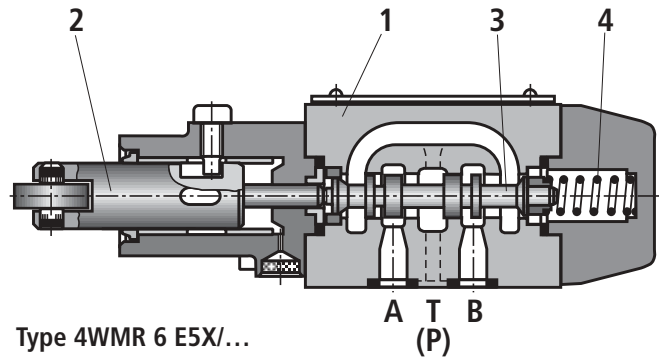
Detent

Directional valves with rotary knob operation are supplied with a detent as standard. Directional valves with hand lever operation are available as 2 or 3 position valves with detent. Directional valves with roller/plunger are supplied without detent as standard. When using an operating element with detent, it is possible, according to the valve type, to fix any switched position.

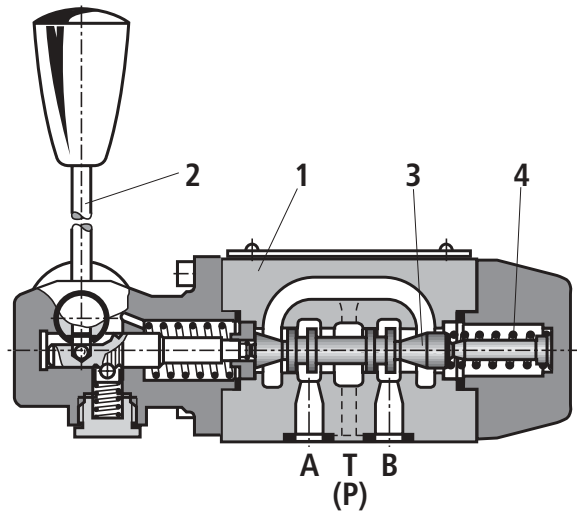
Throttle insert

Use of the throttle insert is necessary when operating conditions are such, that during the switching process larger flows can occur than the performance limits of the valve allow.

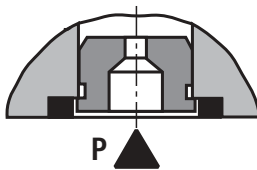
It is fitted in the P line of the directional valve.



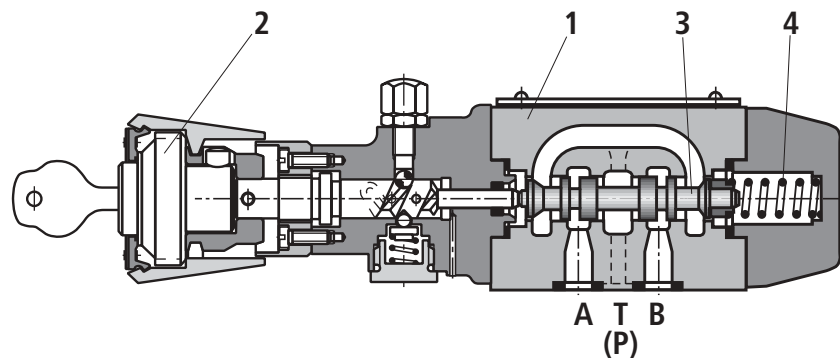
Type 4WMR 6 E5X/...



Type 4WMM 6 D5X/F



Type 4WM. 6 ..5X/..B..



Type 4WMDA 6 E5X/F

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

General

Installation		Optional
Ambient temperature range	°C	– 30 to + 80 (NBR seals) – 20 to + 80 (FKM seals)
Weight	kg	Approx. 1.4

Hydraulic

Maximum operating pressure	Ports A, B, P	bar	Up to 315
	Port T:		
	• For WMM, WMD, WMDA	bar	160 For symbols A or B, port T must be used as a drain port if the operating pressure, is higher than the permissible tank pressure.
	• For WMR, WMU	bar	60
Maximum flow		L/min	60
Flow cross-section	For symbol Q		6 % of the nominal cross-section
(switching position 0):	For symbol W		3 % of the nominal cross-section
Pressure fluid			Mineral oil (HL, HLP) to DIN 51 524 ¹⁾ ; Fast bio-degradable pressure fluids to VDMA 24 568 (also see RE 90 221); HETG (rape seed oil) ¹⁾ ; HEPG (polyglycols) ²⁾ ; HEES (synthetic ester) ²⁾ ; Other pressure fluids on request
Pressure fluid temperature range		°C	– 30 to + 80 (NBR seals) – 20 to + 80 (FKM seals)
Viscosity range		mm ² /s	2.8 to 500
Cleanliness class to ISO code			Maximum permissible degree of contamination of the pressure fluid is to ISO 4406 (C) class 20/18/15 ³⁾

¹⁾ Suitable for NBR **and** FPM seals

²⁾ **Only** suitable for FKM seals

³⁾ The cleanliness class stated for the components must be adhered too in hydraulic systems. Effective filtration prevents faults occurring and at the same time increases the component service life.

For the selection of filters see catalogue sheets RE 50 070, RE 50 076 and RE 50 081.

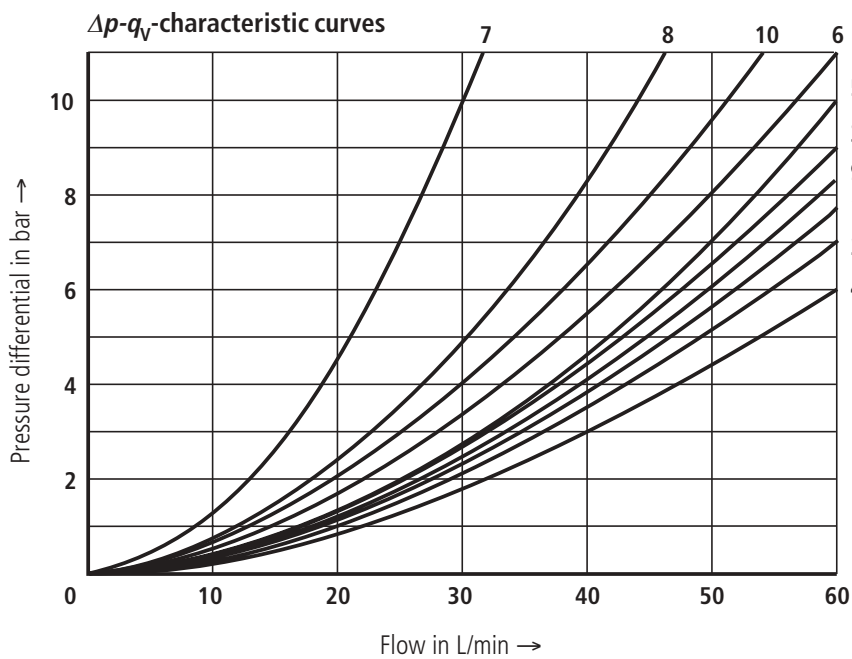
Operating force/torque

Type		WMR/WMU			WMM	WMD
Operating pressure	Ports A, B, P	bar	100	200	315	
Operating force on roller/plunger	Without tank pressure	N	100	112	121	
	With tank pressure	N	184	196	205	
	($p_T = \max 60 \text{ bar}$)		$\triangleq 1.4 \text{ N per bar tank pressure}$			
Operating torque max:		Ncm			–	150
Operating force	Without tank pressure, with and without detent	N			20	–
	150 bar tank pressure	N			30	–

Formula for calculating operating force on roller/plunger (F_R) when there is a tank pressure

$$F_R = F_{o.T\text{-pressure}} + p_T \times 1,4 \frac{\text{N}}{\text{bar}}$$

Characteristic curves (measured with HLP 46, $\vartheta_{oil} = 40\text{ °C} \pm 5\text{ °C}$)



Symbols	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

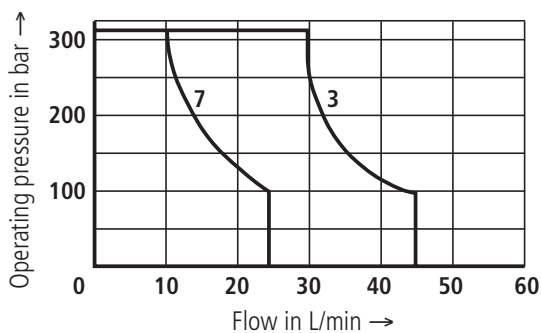
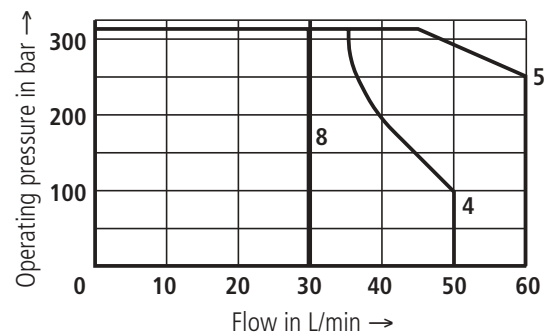
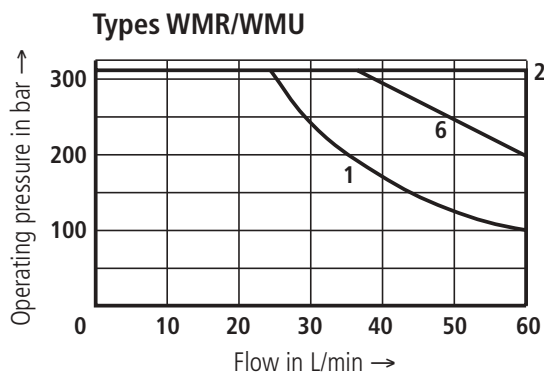
7 Symbol "R" in switched position "b" (A → B)

8 Symbols "G" and "T" in neutral position (P → T)

Performance limits (measured with HLP 46, $\vartheta_{oil} = 40\text{ °C} \pm 5\text{ °C}$)

The performance limits shown apply when the valve is subject to simultaneous flow in two directions (e.g. from P to A and to B to T). Due to the flow forces occurring within the valve, the permissible performance limit for one flow path (e.g. from P to A and with B

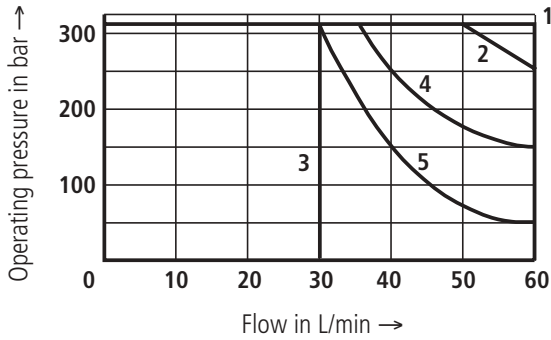
blocked) may be considerably reduced! (Please consult us in such cases.)



Char. curves	Symbol
1	A, B
2	C, D, Y, E, E1-, H, M, Q, U, W
6	R
4	G
5	J, L
8	V
3	F, P
7	T

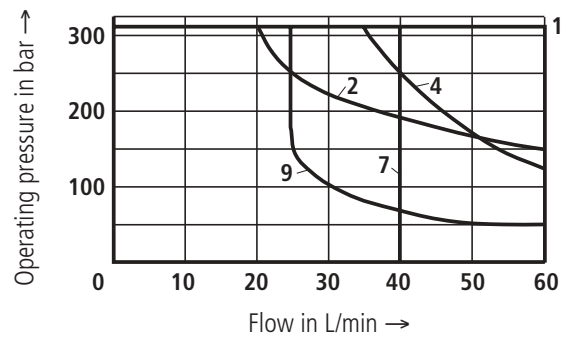
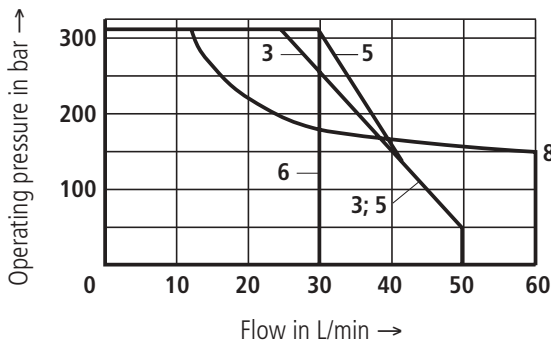
Performance limits (measured with HLP 46, $\vartheta_{oil} = 40\text{ °C} \pm 5\text{ °C}$)

Type WMM - Spring return



Char. curves	Symbol
1	E, E1-, M, J, L, Q, U, W, C, D, Y, G, H, R
2	A, B
3	V
4	F, P
5	T

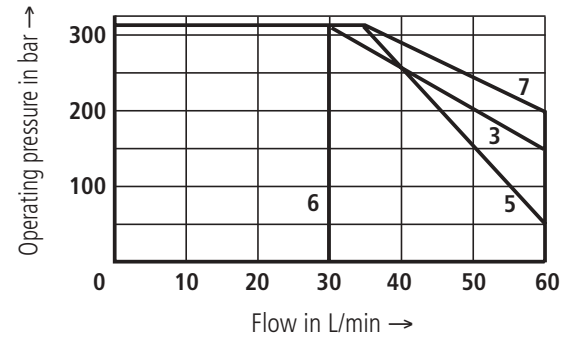
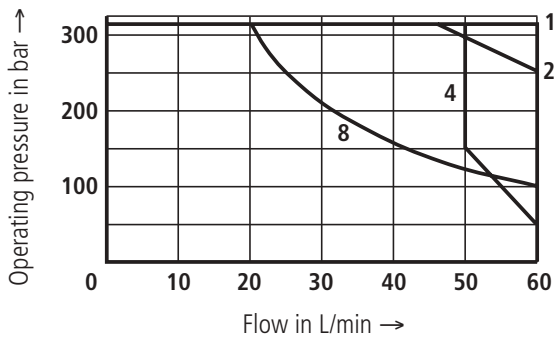
Type WMM - With detent



Char. curves	Symbol
3	A, B
5	F
6	V
8	R

Char. curves	Symbol
1	E1-, M, H, C, D, Y
2	E, J, Q, L, U, W
4	G, T
7	P
9	T

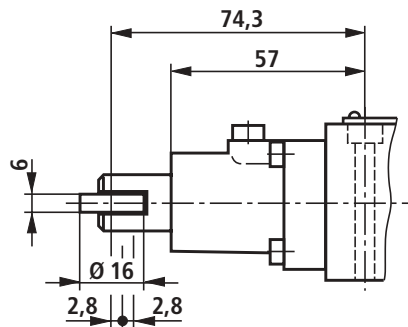
Types WMD/WMDA



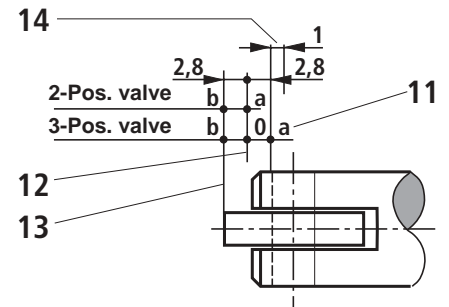
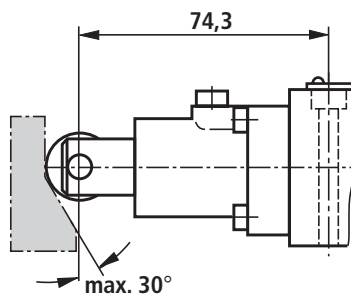
Char. curves	Symbol
1	E, E1-, M, H, C, D, Y, Q, U, W
2	J, L
4	G, P
8	T

Char. curves	Symbol
3	A, B
5	F
6	V
7	R

Type WMR



Type WMU



Type WMR/WMU

- 11 Switched position a
- 12 Switched position 0 and a
(a for 2-Pos. valves)
- 13 Switched position b
- 14 Overrun can not be used as an operational stroke

Subplates

(without locating pin hole)	G 341/01 (G 1/4)
	G 342/01 (G 3/8)
	G 502/01 (G 1/2)
(with locating pin hole)	G 341/60 (G 1/4)
	G 342/60 (G 3/8)
	G 502/60 (G 1/2)

to catalogue sheet RE 45 052 and

Valve fixing screws

M5 x 50 DIN 912-10.9,
 $M_A = 8,9 \text{ Nm}$, must be ordered separately

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