

Extracted from RA 22 280/06.98

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Issue: 01.01

See Section 16 for applicable
Preferred/Spotlight part numbers
and unit price.

4/3-, 4/2- and 3/2-way Directional valves

Mechanical/Manual operation

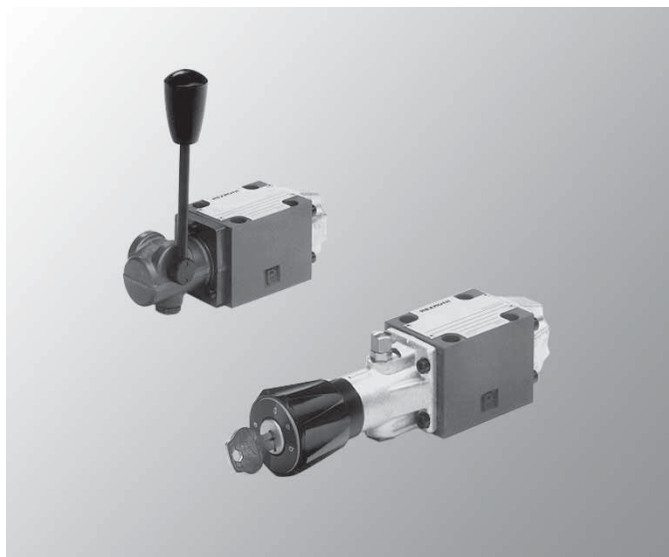
Model WM.6

Size 6, Series 5X

Maximum operating pressure 315 bar (4600 PSI)

Maximum flow 60 L/minn (16.0 GPM)

- Direct operated spool type directional control valves
- Mounts on standard ISO 4401-3, NFPA T3.5.1M R1 and ANSI B 93.7 D 03 interface
- For subplates, see data sheet RA 45 052



Mechanical/manual operation

Ordering code

			6		5X /			*
4 service ports	= 4						No code =	NBR seals, suitable for petroleum oils (HM, HL, HLP)
Hand lever	= WMM						No code =	without orifice insert
Rotary knob	= WMD						No code =	with spring return (available for WMM)
Size 6	= 6						F =	with detent (available for WMM, WMD)
Spool type e.g. C, D, E, H, J, W, Y								
Series 50 to 59 (50 to 59, externally interchangeable)					= 5X			

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 See Section 16 for applicable
 Preferred/Spotlight part numbers
 and unit price.

Technical data
General

Installation position		optional
Weight	kg (lbs.)	approx. 1.4 (3.1)

Hydraulic

Operating pressure max		
– Ports A, B, P	bar (PSI)	315 (4600)
– Port T:		
for WMM, WMD, WMDA	bar (PSI)	160 (2320)
for WMR, WMU	bar (PSI)	60 (900)
		With spool types A or B, port T must be used as a drain port if the operating pressure is higher than the permissible tank pressure.
Max. volume flow	L/min (GPM)	60 (16.0)
Flow section (Control position 0)		with spool type W 3% of nominal section
Hydraulic fluid		Petroleum oils (HM, HL, HLP); Phosphate ester fluids (HFD-R)
Fluid temperature range	°C (°F)	NBR seals: –30 to +80 (–22 to +176) FPM seals: –20 to +80 (–4 to +176)
Viscosity range	mm²/s (SUS)	2.8 to 500 (35 to 2320)
Maximum degree of fluid contamination		Class 18/15 according to ISO 4406. Therefore, we recommend a filter with a retention rate of $\beta_{10} \geq 75$.

Operating force/-torque

Valve type		WMM	WMD/WMDA
Operating torque max.	Ncm (lb-in)	–	150 (13.3)
Operating force			
– without tank pressure	kg (lbs)	20 (4.5)	–
with and without detent			
– 150 bar tank pressure	kg (lbs)	30 (6.7)	–

Extracted from RE 22282/07.02

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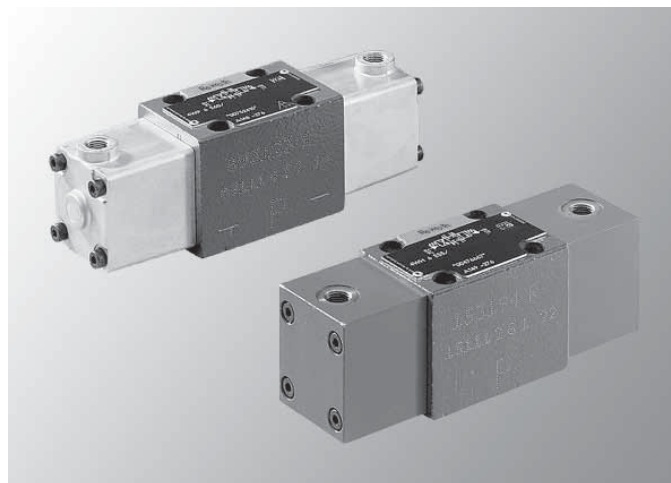
See Section 16 for applicable
Preferred/Spotlight part numbers
and unit price.**4/3-, 4/2- and 3/2-way Directional valves
with fluidic actuators
Model WP, WH**

Nominal size 6

Series 6X (WP), 5X (WH)

Maximum operating pressure 315 bar (4600 PSI)

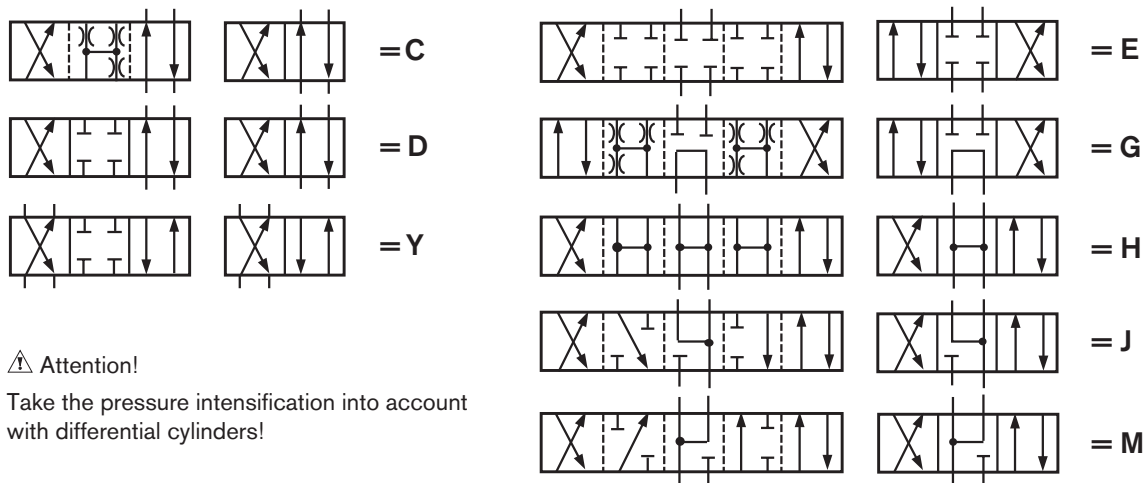
Maximum flow 60 L/min (16 GPM)



Fluidic actuators

Ordering code

	4		6		/		/		/	5	
4 actuator ports										5 =	NPT threaded connection
Fluidic actuation										No code =	NBR seals
Pneumatic				= WP						No code =	Without orifice insert
Hydraulic				= WH						No code =	Without manual override
Nominal size 6			= 6							No code =	With spring return
Symbols, e.g.				= C, D, E, G, H, J, M, Y							
(For symbols and examples see below)											
WP											
Series 60 to 69										= 6X	
(60 to 69: unchanged installation and connection dimensions)											
WH										= 5X	
Series 50 to 59											
(50 to 59: unchanged installation and connection dimensions)											

Symbols**⚠ Attention!**Take the pressure intensification into account
with differential cylinders!

Extracted from RE 22282/07.02

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Issue: 04.03

 See Section 16 for applicable
 Preferred/Spotlight part numbers
 and unit price.

Technical data
General

Valve type			WP	WH
Installation			Optional ¹⁾	
Ambient temperature range	°C (°F)		NBR seals: -30 to +80 (-22 to +176)	
			FKM seals: -20 to +80 (-4 to +176)	
Weight	1 operating cylinder	kg (lbs.)	Approx. 1.8 (4.0)	Approx. 2.0 (4.4)
Valve with:	2 operating cylinders	kg (lbs.)	Approx. 2.0 (4.4)	Approx. 2.2 (4.9)

Hydraulic

Max. operating pressure	Ports A, B, P	bar (PSI)	Up to 315 (4600)	
	Port T	bar (PSI)	Up to 160 (2300) (with symbols A and B, the port T must be used as leakage port when the operating pressure is above 160 bar (2300 PSI).	
Max. flow		L/min (GPM)	60 (16)	
Flow cross-section	With symbol Q		6 % of the nominal cross-section	
(switched position 0):	With symbol W		3 % of the nominal cross-section	
Min. control pressure		bar (PSI)	4 (60) (see char. curves on page 5)	6 to 10 (87 to 145) > tank pressure ²⁾
Max. control pressure		bar (PSI)	10 (145)	200 (2900)
Control volume		cm ³ (in ³)	1.23 (0.075)	
Pressure fluid			Mineral oil (HL, HLP) to DIN 51 524 ³⁾ ; Fast bio-degradable pressure fluids to VDMA24 568 (also see RE 90 221); HETG (rape seed oil) ³⁾ ; HEPG (polyglycols) ⁴⁾ ; HEES (synthetic ester) ⁴⁾ ; Other pressure fluids on request	
Pressure fluid temperature range		°C (°F)	NBR seals: -30 to +80 (-22 to +176)	
			FKM seals: -20 to +80 (-4 to +176)	
Viscosity range		mm ² /s (SUS)	2.8 to 500 (35 to 2318)	
Degree of contamination			Maximum permissible degree of contamination of the pressure fluid is to NAS 1638 class 9. We therefore recommend a filter with a minimum retention rate of $\beta_{10} \geq 75$.	

¹⁾ With version ../O.. (A, C, and D): horizontal

²⁾ Performance limits dependent on the minimum control pressure, see datasheet

³⁾ Suitable for NBR **and** FPM seals

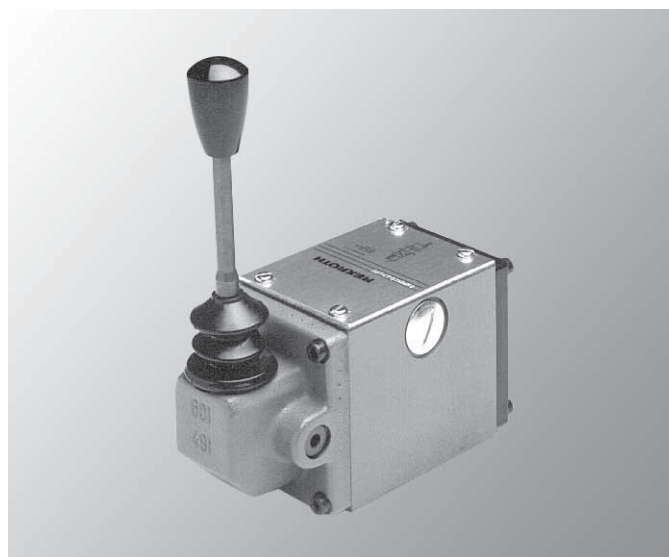
⁴⁾ **Only** suitable for FKM seals

See Section 16 for applicable Preferred/Spotlight part numbers and unit price.

4/3-, 4/2- and 3/2-way Directional valves
Manual or hydraulic operated
Models WMM, WMD, WP, WN, or WHD

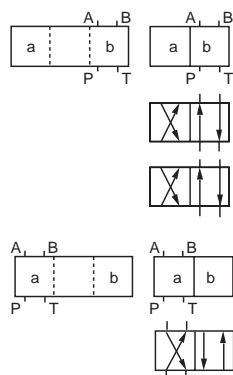
Maximum flow 120 L/min (32 GPM)

- Direct operated spool type directional control valves
- Mounts on standard ISO 4401-5, NFPA T3.5.1M R1 and ANSI B 93.7 D 05 interface
- For subplates, see data sheet RA 45 054
- Available operator options: Hand lever or hydraulic pilot

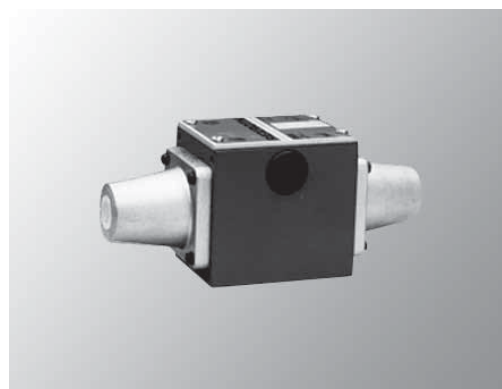


Manual operation

Symbols



3) **Note:** When ordering a spool with only two positions “o” & “a” or “o & b”, specify the desired position a or b after the spool code.
Example: Spool E with spool position “a”
Ordering Code **4 WMM10EA-3X**



Pilot fluid operation

Ordering code

[illegible]

Extracted from RA 22 331/06.98

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See Section 16 for applicable
Preferred/Spotlight part numbers
and unit price.

Technical data**Hydraulic**

Maximum operating pressure	Ports A, B, P	bar (PSI)	315 (4600)
	Port T	bar (PSI)	160 (2320) (For spool types A and B, port T must be use a drain port, if the operating pressure exceeds 160 bar (2320 PSI))
Maximum flow		L/min (GPM)	120 (32)
Hydraulic fluids			Petroleum oils (HM, HL, HLP) Phosphate ester fluids (HFD-R)
Fluid temperature range		°C (°F)	NBR seals: -30 to +80 (-22 to +176) FPM seals: -20 to +80 (-4 to +176)
Viscosity range		mm ² /s (SUS)	2.8 to 500 (35 to 2320)
Maximum degree of fluid contamination			Class 18/15 according to ISO 4406. Therefore, we recommend a filter with a retention rate of $\beta_{10} \geq 75$.

Extracted from RA 23 178/08.99

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See Section 16 for applicable
Preferred/Spotlight part numbers
and unit price.**4/3-, 4/2- and 3/2-way Directional control
valves with wet pin AC or DC solenoids
Model WE 6.. /E**

Size 6, Series 6X

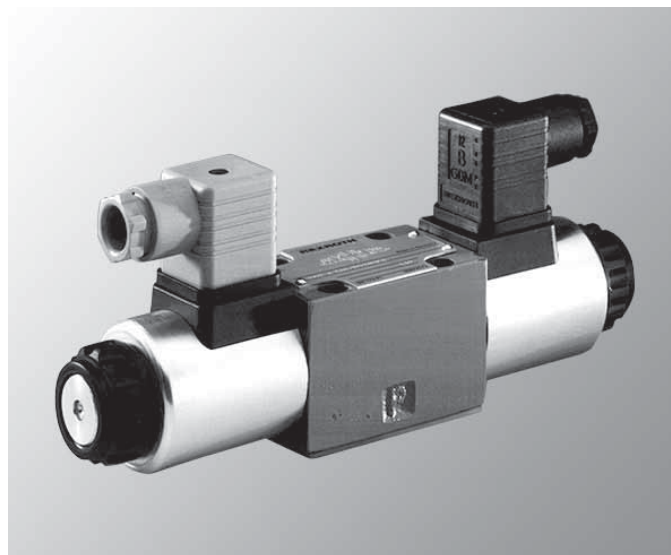
Maximum operating pressure 350 bar (5100 PSI)

Maximum flow 80 L/min (21 GPM)

- Direct operated, solenoid controlled directional spool valve, heavy duty construction
- Mounting pattern to ISO 4401-3, NFPA T3.5.1 M R1 and ANSI B93.7 D 03

Subplates, see datasheet RA 45 052

- Removable coils for quick replacement, or conversion, in AC or DC voltages
- Dual frequency solenoids AC voltage with 50 or 60 Hz operation
- Individual electrical connectors
- Wet pin core tubes, with high pressure tank capacity, standard



Model 4 WE 6...6X/EG 24 N9K4 with plug-in connector

Ordering code

	2	3	4	6	7	9	10	11	12	15	19	22	23
		WE	6		6X	/ OF	E		N9	/			*
3 service ports	= 3												
4 service ports	= 4												
Size 6		= 6											
Spool e.g. C, D, E, G, H, J, M, W, Y													
Series 60 to 69 (60 to 69: externally interchangeable)				= 6X									
Without spring return but with detent					= OF								
High performance solenoid wet pin (oil-immersed) with removable coil						= E							
Voltages													
DC – 12, 24, 96						Example	= G 24						
AC ¹⁾ – 110, 230						Example	= W110						
With protected manual override (Standard)								= N9					

¹⁾ AC Voltage and Frequency

110 = 110V–50Hz, 110V–60Hz, 120V–60Hz

230 = 220V–50Hz, 220V–60Hz, 240V–60Hz

Further details in clear text

No code = NBR seals for petroleum oil (HM, HL, HLP)

V = FPM seals for phosphate ester (HFD-R)

Type of electrical connection to data sheet RA 08 006

Direct solenoid connections**K4 =** Without angled plug connector(s)**Central solenoid connections****DA =** Terminal box with 2 1/2" NPT conduit conn**DAL =** Terminal box with two 1/2" NPT conduit connections and light(s)**ANSI B 93.55 M plug-pin type connectors (without female end)****DK23 =** Terminal box with 3-pin conn.**DK25 =** (single solenoid)**DK23L =** Terminal box with 5-pin conn.

(double solenoid)

DK25L = Terminal w/ 3-pin conn. & light(s)

(single solenoid)

DK24L2 = Terminal w/ 5-pin conn. & light(s)

(double solenoid)

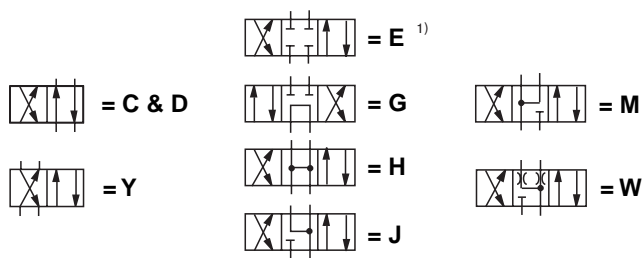
Terminal box with 4-pin conn., light(s), & surge suppression

Extracted from RA 23 178/08.99

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Issue: 01.01

 See Section 16 for applicable
 Preferred/Spotlight part numbers
 and unit price.

Symbols
¹⁾ Example: Spool E with switching position "a"

Order code 4 WE6 EA•6X/EW 110 NK4

Caution: Be aware of pressure intensification in differential cylinders

Technical data
General

Installation position				Optional
Weight	Single solenoid valve	<i>m</i>	kg (lbs.)	1.45 (3.2)
	Valve with 2 solenoids	<i>m</i>	kg (lbs.)	1.95 (4.3)

Hydraulic

Operating pressure	Port A, B, P	<i>p</i>	bar (PSI)	350 (5100)
	Port T	<i>p</i>	bar (PSI)	up to 210 (3050) DC, up to 160 (2320) AC Where symbols A and B occur, port T must be employed as a drain port if the operating pressure is above the permitted tank pressure .
Flow, max.	<i>q_v</i>	L/min (GPM)	up to 80 (21) DC, up to 60 (15.8) AC	

Electrical

Type of voltage			DC voltage	AC voltage
Available voltages	<i>V</i>	V	12, 24, 96	110, 230 50/60 Hz
Power consumption	<i>P</i>	W	30	–
Holding current	<i>P</i>	VA	–	50
In-rush current	<i>P</i>	VA	–	220
Duty cycle				continuous
Shifting time to ISO 6403	ON	<i>T</i>	ms	25 to 45
	OFF	<i>T</i>	ms	10 to 25
Shifting frequency			Sw/h	up to 15000
Insulation			Exceeds NEMA class B	
Coil temperature	<i>t</i>	°C (°F)	up to 150 (302)	up to 180 (356)

Extracted from RA 23 327/07.98

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 See Section 16 for applicable
 Preferred/Spotlight part numbers
 and unit price.

**4/3-, 4/2- and 3/2-way Directional control
 valves with wet pin AC or DC solenoids
 Model WE 10.. /C**

Nominal Size 10, Series 3X (DIN spade to 43650)

Series 4X (conduit box)

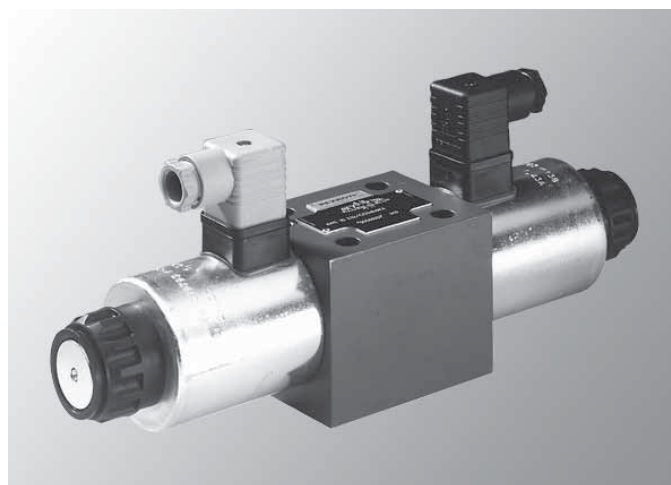
Maximum operating pressure 315 bar (4600 PSI)

Maximum flow 120 L/min (32 GPM)

- Direct solenoid actuated directional spool valve in the standard version
- Mounting pattern to ISO 4401-5, NFPA T3.5.1 M R1 and ANSI B93.7 D 05 interface

Subplates, see datasheet RA 45 054 (separate order)

- Wet pin AC or DC solenoids with removable coil
- Solenoid coil can be rotated through 90°
- Coils may be replaced without engaging fluid ports



Model 4WE 10 E3X/CG24N9K4 with plug-in connector

- Electrical connections available as either individual spade connections or as a conduit box connection
- Manual override, standard
- For soft switching version, see RA 23 183
- High flow body and spool design

Technical data
General

Installation		optional	
Weight		Central connection	Individual connection
	Valve with 1 solenoid	kg (lbs.)	DC 4.4 (9.7), AC 3.6 (7.93)
	Valve with 2 solenoids	kg (lbs.)	DC 4.3 (9.48), AC 3.5 (7.71)
			DC 6.0 (13.2), AC 4.4 (9.7)
			DC 5.9 (13), AC 4.3 (9.48)

Hydraulic data

Max. operating pressure	Ports A, B, P	bar (PSI)	315 (4600)
	Port T	bar (PSI)	DC 210 (3050), AC 160 (2320). For symbols A and B, Port T must be used as a drain line if the operating pressure is higher than the permissible tank pressure.
Max. flow		L/min (GPM)	120 (32)

Electrical data

Voltage model		DC	AC
Available voltages	V	12, 24, 96	110, 230 50/60 Hz
Voltage tolerance (nominal voltage)	%	±10	
Power consumption	W	35	–
Holding power	VA	–	90
Inrush current	VA	–	550
Duty		continuous	
Switching time to ISO 6403	ON	ms	45 to 60
	OFF	ms	15 to 25
Switching frequency		cycles/h	20 to 30
Protection to DIN 40 050			15,000
Insulation class VDE 0580			7,200
		IP 65	
		F	H

Extracted from RA 23 327/07.98

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 See Section 16 for applicable
 Preferred/Spotlight part numbers
 and unit price.

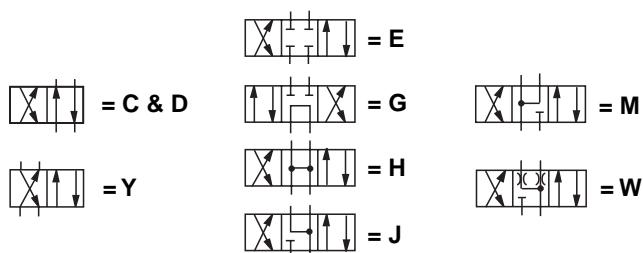
Ordering code

	2	3	4	6	7	9	10	11	12	15	16	19	22	23
		WE	10			/	C		N9			/		*
3 service ports	= 3													
4 service ports	= 4													
Directional control valve, electrically operated														
ISO Size 5, NFPA/ANSI D 05 interface			= 10											
Spool symbol e.g. E, G, H, J, M, W etc.														
Series 30 to 39 – spade connection (30 to 39: externally interchangeable)				= 3X										
Series 40 to 49 – conduit box connection (40 to 49: externally interchangeable)				= 4X										
With spring return				= No code										
Without spring return, with detent				= OF										
Wet pin solenoid (oil immersed) with removable coil						= C								
Voltages														
DC – 12, 24, 96						Example	= G 24							
AC ¹⁾ – 110, 220						Example	= W110							
With manual override (standard)								= N9						
Central solenoid connections														
1/2" NPT conduit connector in conduit box									= DA					
1/2" NPT conduit connector in conduit box with light(s)									= DAL					
ANSI B 93.55 M plug-in type connections (without female end)														
Terminal box with 3-pin connector (single solenoid)									= DK23					
Terminal box with 5-pin connector (double solenoid)									= DK25					
Terminal box with 3-pin connector and lights (single solenoid)									= DK23L					
Terminal box with 5-pin connector and lights (double solenoid)									= DK25L					
Terminal box with 4-pin connector, lights, and surge suppression									= DK24L2					
Individual solenoid plug connections														
Without plug in connector(s)									= K4					
NBR seals										= No code				
FPM seals										= V				
⚠ Attention! The compatibility of the seals and fluid must be taken into account!														
Further details in clear text														

¹⁾ AC Voltage and Frequency

110 = 110V–50Hz, 110V–60Hz, 120V–60Hz

230 = 220V–50Hz, 220V–60Hz, 240V–60Hz

Symbols


Extracted from RA 23 351/09.99

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See Section 16 for applicable
Preferred/Spotlight part numbers
and unit price.**4/3-, 4/2- and 3/2-way Directional valves
with switching time adjustment
Model 5-.WE 10**

Nominal Size 10

Series 3X

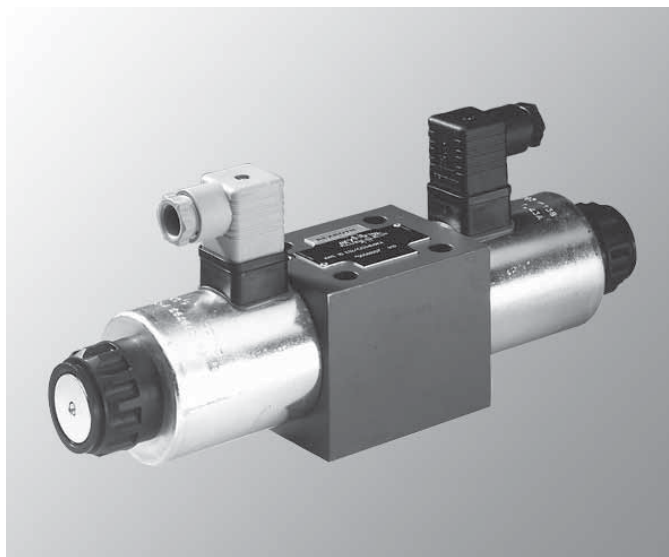
Maximum operating pressure 315 bar (4600 PSI)

Maximum flow 120 L/min (32 GPM)

- Direct solenoid operated spool type directional control valve
- With “5th chamber” for dampened adjustable spool shifting time
- Mounts on standard ISO 4401-5, NFPA/ANSI T3.5.1 M R1 **D 05**, and ANSI B93.7 **D 05** interface

Subplates, see datasheet RA 45 054 (separate order)

- Wet pin DC solenoids
- Removable coils for quick replacement



Model 5-.WE 10 E3X/CG24N9K4 with plug-in connector

Ordering code

	1	2	3	4	6	7	9	10	11	12	15	18	19	22	23
	5	–	WE	10		3X	/	C		N9	K4	/			*
4 actuator ports	= 4														
Nominal size 10			= 10												
Symbol e.g. C, D, E, G, H, J															
Series 30 to 39 (30 to 39: unchanged installation and connection dimensions)					= 3X										
With spring return					= No code										
Wet pin solenoid (oil immersed) with removable coil								= C							
24 V DC								= G24							
96 V DC								= G96							
With protected manual override (standard)									= N9						
Model of electrical connection										= K4					
Individual connection; with component plug DIN 43 650-AM2, without plug-in connector															
Without switching time adjustment										= No code					
With adjustable screw (throttle)										= C					
Orifice Ø 0.8 mm (0.031"), 1.0 mm (0.039"), 1.2 mm (0.047")										= A08, A10, A12					
Without cartridge throttle										= No code					
NBR seals													= No code		
⚠ Attention!															
The compatibility of the seals and pressure fluid has to be taken into account!															
Further details to be written in clear text															

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See Section 16 for applicable
Preferred/Spotlight part numbers
and unit price.**Technical data****General**

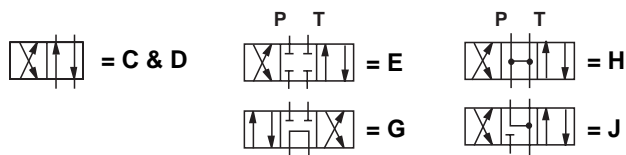
Installation	optional		
Max. ambient temperature	°C (°F)	50 (122)	
Weight	Valve with 1 solenoid	kg (lbs.)	4.7 (10.4)
	Valve with 2 solenoids	kg (lbs.)	6.3 (13.9)

Hydraulic data

Max. operating pressure	Ports A, B, P	bar (PSI)	315 (4600)
	Port T	bar (PSI)	210 (3050)
Max. flow		L/min (GPM)	120 (32)
Pressure fluid			Mineral oil (HL, HLP) to DIN 51 524 ¹⁾ ; Fast bio-degradable pressure fluids to VDMA 24 568 (also see RA 90 221); HETG (rape seed oil) ¹⁾
Pressure fluid temperature range		°C (°F)	NBR seals: −30 to +80 (−22 to +176)
			FPM seals: −20 to +80 (−4 to +176)
Viscosity range		mm²/s (SUS)	35 to 2318
Degree of contamination			Maximum permissible degree of contamination of the pressure fluid is to NAS 1638 class 9. We, therefore, recommend a filter with a minimum retention rate of $\beta_{10} \geq 75$.

Electrical data

Model of voltage			DC
Available voltages		V	24, 96
Voltage tolerance (nominal voltage)		%	±10
Power consumption		W	35
Duty			continuous
Switching time to ISO 6403 (without switching time adjustment)	ON	ms	45 to 70
	OFF	ms	35 to 45
Switching frequency		cycles/h	15000
Protection to DIN 40 050			IP 65
Insulation class VDE 0580			F
Max. coil temperature		°C (°F)	150 (302)

¹⁾ suitable for NBR and FPM seals**Symbols**

Extracted from RA 23 183/08.99

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See Section 16 for applicable
Preferred/Spotlight part numbers
and unit price.**Soft switching 4/2- and 4/3-way
Directional valves with DC solenoids,
Model WE...73-../A12..**

Nominal Sizes 6 and 10

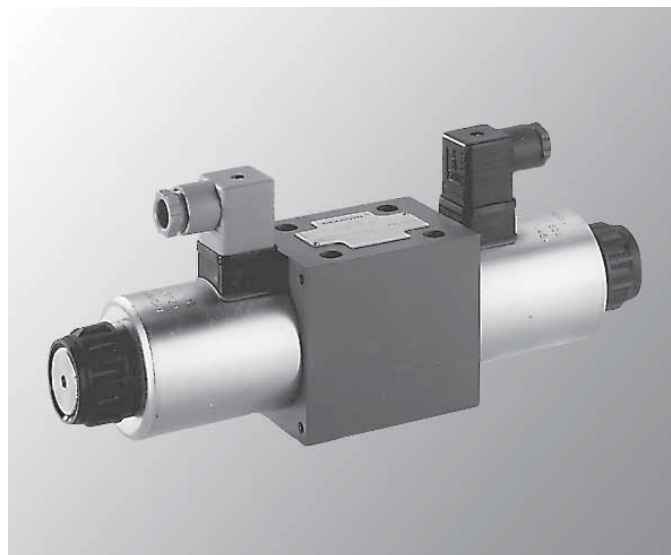
Series 6X (Size 6) and 3X (Size 10)

Maximum operating pressure

350/315 bar (5100/4600 PSI)

Maximum flow 60/100 L/min (15.85/26.42 GPM)

- Direct operated directional spool valve with solenoid operation
- Soft switching characteristics
- Porting pattern to DIN 24 340 form A, ISO 4401 and CETOP–RP 121 H
- Mounts on standard ISO 4401, NFPA T3.5.1 M R1 and ANSI B 93.7 D interfaces
- For subplates see catalog sheets RA 45 052 (size 6), and RA 45 054 (size 10), separate order
- Wet pin solenoids with removable coils
- Coils can be replaced without engaging fluid
- Individual electrical connections
- With manual override



Model 4WE 10 E73-3X/CG24N9K4/A12 with plug-in connector

Ordering code

	2	3	4	6	7	9	10	11	12	15	18	19	22	23	
		WE			-	/				N9	K4	/	A12		*
4 service ports	= 4														Further details in clear text
Nominal size 6		= 6													No code = NBR seals
Nominal size 10		= 10													V = FPM seals
Spool symbols e.g. D73, E73, G73, J73															⚠ Attention! The compatibility of the seals and pressure fluid has to be taken into account!
Size 6 Series 60 to 69 (60 to 69: unchanged installation and connection dimensions)															A12 = Switching time delay
Size 10 Series 30 to 39 (30 to 39: unchanged installation and connection dimensions)															K4 = Electrical connection types Single connection; with cover, without plug-in connector
Spring return															N9 = With concealed manual override
Nominal size 6															
Nominal size 10															
Voltages															
DC – 12, 24, 96															Example = 24

Extracted from RA 23 183/08.99

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See Section 16 for applicable
Preferred/Spotlight part numbers
and unit price.**Technical data****General**

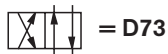
Nominal size		Size	6	10
Installation position			optional	
Weight	– Single solenoid valve	kg (lbs.)	1.45 (3.2)	4.5 (9.918)
	– Valve with 2 solenoids	kg (lbs.)	1.95 (4.3)	6.1 (13.44)

Hydraulic

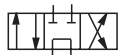
Max. operating pressure	Ports A, B, P	bar (PSI)	350 (5076)	315 (4600)
	Ports T	bar (PSI)	210 (3050)	210 (3050)

Electrical

Available voltages	V	12, 24, 96	12, 24, 96
Voltage tolerance (nominal voltage)	%	±10	±10
Power consumption	W	30	35
Duty cycle		continuous	
Switching time t _S to ISO 6403	ON/OFF	approx. 3 to 4 times longer than a standard valve	
Switching frequency	1/h	7200	7200
Protection to DIN 40 050		IP 65	IP 65
Insulation class VDE 0580		F	F

Symbols

= D73

= E73 ³⁾

= G73



= J73

³⁾ **Example:** Spool E73 with switching position "a"
ordering details ..E73A..