

**Extracted from RA 22 280/06.98**

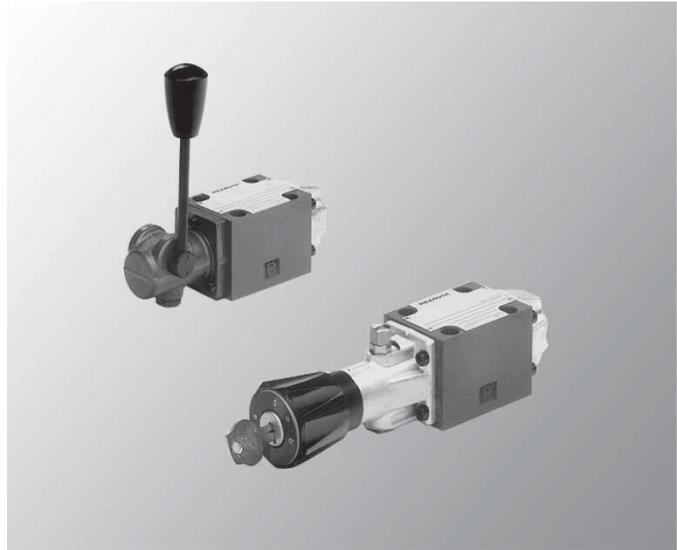
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Issue: 01.01

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**

		<b>6</b>	<b>5X /</b>			<b>*</b>
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) F = with detent (available for WMM, WMD)
Size 6	= 6					
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)	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.
for WMR, WMU	bar (PSI)	60 (900)	
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	mm <sup>2</sup> /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 with and without detent	kg (lbs)	20 (4.5)	–
– 150 bar tank pressure	kg (lbs)	30 (6.7)	–

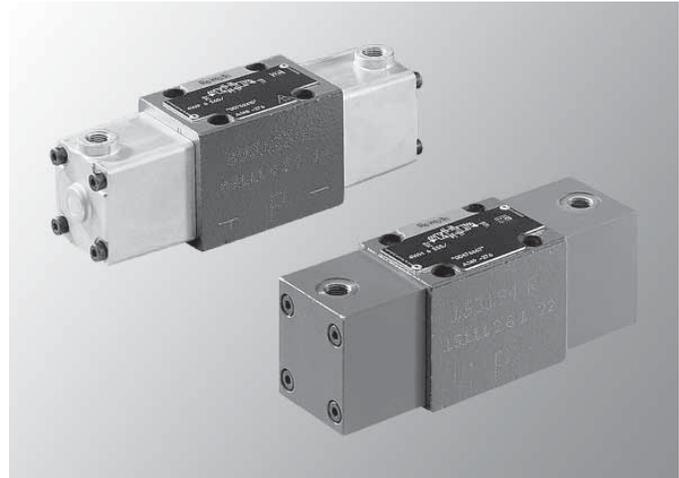
**Extracted from RE 22282/07.02**

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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)

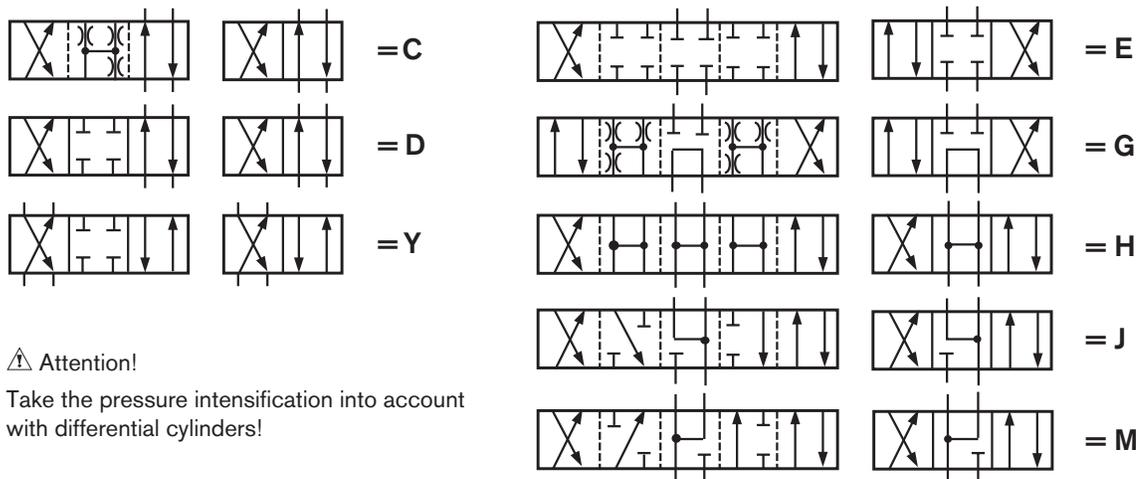


Fluidic actuators

**Ordering code**

	<b>4</b>	<b>6</b>	<b>/</b>	<b>/</b>	<b>/</b>	<b>5</b>	
4 actuator ports						<b>5 =</b>	NPT threaded connection
Fluidic actuation						<b>No code =</b>	NBR seals
Pneumatic	<b>= WP</b>					<b>No code =</b>	Without orifice insert
Hydraulic	<b>= WH</b>					<b>No code =</b>	Without manual override
Nominal size 6	<b>= 6</b>					<b>No code =</b>	With spring return
Symbols, e.g.	<b>= C, D, E, G, H, J, M, Y</b>						
(For symbols and examples see below)							
WP							
Series 60 to 69						<b>= 6X</b>	
(60 to 69: unchanged installation and connection dimensions)							
WH						<b>= 5X</b>	
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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 See Section 16 for applicable  
 Preferred/Spotlight part numbers  
 and unit price.

**Technical data**
**General**

Valve type			WP	WH
Installation			Optional <sup>1)</sup>	
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 <sup>2)</sup>
Max. control pressure	bar (PSI)		10 (145)	200 (2900)
Control volume	cm <sup>3</sup> (in <sup>3</sup> )		1.23 (0.075)	
Pressure fluid	Mineral oil (HL, HLP) to DIN 51 524 <sup>3)</sup> ; Fast bio-degradable pressure fluids to VDMA24 568 (also see RE 90 221); HETG (rape seed oil) <sup>3)</sup> ; HEPG (polyglycols) <sup>4)</sup> ; HEES (synthetic ester) <sup>4)</sup> ; 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 <sup>2</sup> /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 $\beta_{10} \geq 75$ .			

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

<sup>2)</sup> Performance limits dependent on the minimum control pressure, see datasheet

<sup>3)</sup> Suitable for NBR **and** FPM seals

<sup>4)</sup> **Only** suitable for FKM seals



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Preferred/Spotlight part numbers  
and unit price.**Technical data****Hydraulic**

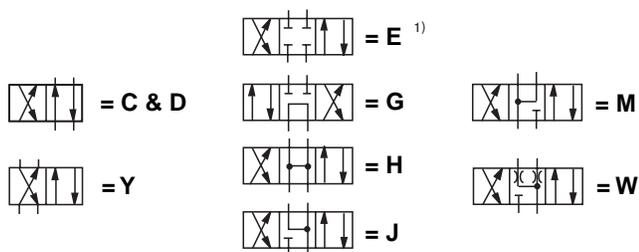
Maximum operating pressure	Ports A, B, P	bar (PSI)	315 (4600)
	Port T	bar (PSI)	160 (2320) (For spool types A and B, port T must be use a drain port, if the operating pressure exceeds 160 bar (2320 PSI))
Maximum flow		L/min (GPM)	120 (32)
Hydraulic fluids			Petroleum oils (HM, HL, HLP) Phosphate ester 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 <sup>2</sup> /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 $\beta_{10} \geq 75$ .



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

**Symbols**

<sup>1)</sup> 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	$p$	bar (PSI)	350 (5100)
	Port T	$p$	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.		$q_V$	L/min (GPM)	up to 80 (21) DC, up to 60 (15.8) AC

**Electrical**

Type of voltage				DC voltage	AC voltage
Available voltages	$V$	$V$		<b>12, 24, 96</b>	<b>110, 230</b> 50/60 Hz
Power consumption	$P$		W	30	–
Holding current	$P$		VA	–	50
In-rush current	$P$		VA	–	220
Duty cycle				continuous	continuous
Shifting time to ISO 6403	ON	$T$	ms	25 to 45	10 to 20
	OFF	$T$	ms	10 to 25	15 to 40
Shifting frequency			Sw/h	up to 15000	up to 7200
Insulation				Exceeds NEMA class B	Exceeds NEMA class B
Coil temperature	$t$		°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.

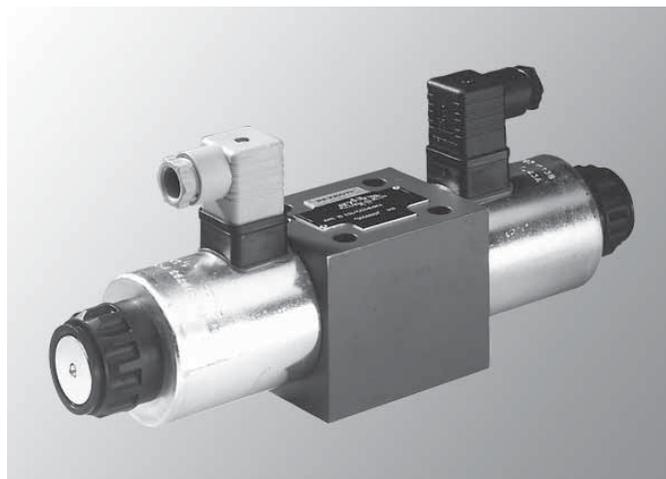
**4/3-, 4/2- and 3/2-way Directional control  
 valves with wet pin AC or DC solenoids  
 Model WE 10.. /C**

 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, NFFA 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)	DC 4.3 (9.48), AC 3.5 (7.71)
	Valve with 2 solenoids	kg (lbs.)	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	<b>12, 24, 96</b>	<b>110, 230</b> 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	20 to 30
Switching frequency		cycles/h	15,000
Protection to DIN 40 050	IP 65		
Insulation class VDE 0580			F H

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Preferred/Spotlight part numbers  
and unit price.

**Ordering code**

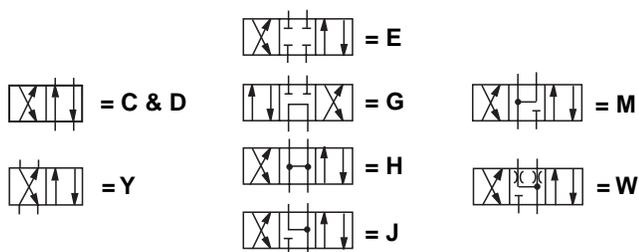
	2	3	4	6	7	9	10	11	12	15	16	19	22	23
		<b>WE</b>	<b>10</b>			/	<b>C</b>		<b>N9</b>			/		*
3 service ports	= 3													
4 service ports	= 4													
Directional control valve, electrically operated														
ISO Size 5, NFPA/ANSI D 05 interface			= 10											
Spool symbol e.g. <b>E, G, H, J, M, W</b> 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									
<b>With</b> spring return					= No code									
<b>Without</b> spring return, with detent					= OF									
Wet pin solenoid (oil immersed) with removable coil							= C							
<b>Voltages</b>														
<b>DC</b> – 12, 24, 96					<b>Example</b>		= G 24							
<b>AC</b> <sup>1)</sup> – 110, 220					<b>Example</b>		= W110							
<b>With manual override (standard)</b>									= N9					
<b>Central solenoid connections</b>														
1/2" NPT conduit connector in conduit box										= DA				
1/2" NPT conduit connector in conduit box with light(s)										= DAL				
<b>ANSI B 93.55 M plug-in type connections</b> (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				
<b>Individual solenoid plug connections</b>														
Without plug in connector(s)										= K4				
NBR seals											= No code			
FPM seals											= V			
<b>⚠ Attention!</b> The compatibility of the seals and fluid must be taken into account!														
Further details in clear text														

<sup>1)</sup> AC Voltage and Frequency

110 = 110V–50Hz, 110V–60Hz, 120V–60Hz

230 = 220V–50Hz, 220V–60Hz, 240V–60Hz

**Symbols**



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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**

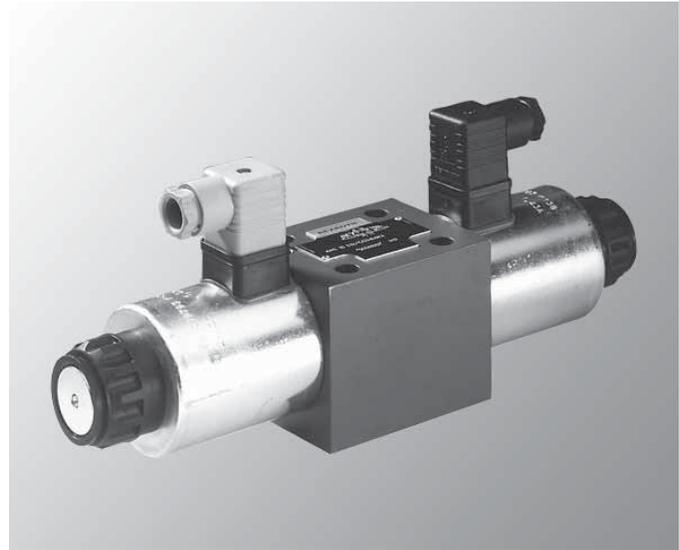
Nominal Size 10

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 Individual connection; with component plug DIN 43 650-AM2, without plug-in connector												= K4			
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)

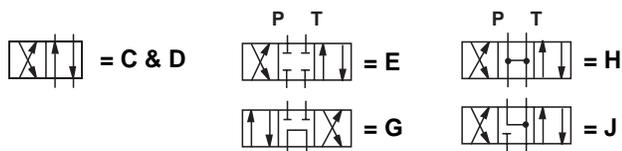
**Hydraulic data**

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 <sup>1)</sup> ; Fast bio-degradable pressure fluids to VDMA 24 568 (also see RA 90 221); HETG (rape seed oil) <sup>1)</sup>		
Pressure fluid temperature range	°C (°F)		NBR seals: -30 to +80 (-22 to +176)
			FPM seals: -20 to +80 (-4 to +176)
Viscosity range	mm <sup>2</sup> /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	<b>24, 96</b>	
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)

<sup>1)</sup> suitable for NBR and FPM seals

**Symbols**


**Extracted from RA 23 183/08.99**

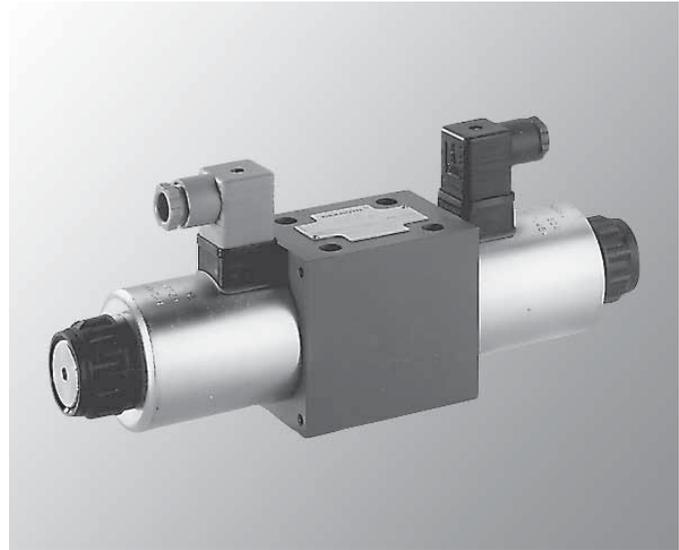
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See Section 16 for applicable  
Preferred/Spotlight part numbers  
and unit price.

**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													
Nominal size 6		= 6												
Nominal size 10		= 10												
Spool symbols e.g. D73, E73, G73, J73														
Size 6 Series 60 to 69 (60 to 69: unchanged installation and connection dimensions)														= 6X
Size 10 Series 30 to 39 (30 to 39: unchanged installation and connection dimensions)														= 3X
Spring return														= No code
Nominal size 6														= E
Nominal size 10														= C
<b>Voltages</b> DC - 12, 24, 96														<b>Example</b> = 24

Further details in clear text

No code = NBR seals  
V = FPM seals

**⚠ Attention!**  
The compatibility of the seals and pressure fluid has to be taken into account!

A12 = Switching time delay

K4 = Electrical connection types  
Single connection; with cover, without plug-in connector

N9 = With concealed manual override

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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 <sub>S</sub> 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**


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