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WEH series electroohydraulic operated directional valves

MACHYDRA

CONTENT

1. WEH series electroohydraulic operated directional valves is controlled by solenoid valve as pilot, using plate connection and its size meets DIN2430 and ISO4401. It has many different properties and additional devices are available.
2. Solenoid valve, used as pilot control, has wet-type DC or AC series; the main valve adopts spring centralizing and spring-return, hydraulic centralizing and resetting; with or without reversing time regulator; with or without the main valve stroke regulator; pressure valve can be mounted in the main valve; cartridge damper can be mounted; pressure reducing valve can be mounted when operating pressure over 25Pa.



ORDERING DETAILS

4WEH 10 E 6X 6A D24 L

Operating pressure
No marks = 280 bar
H = 350 bar

Drift diameter
10 = 10 size **25** = 25 size
16 = 16 size **32** = 32 size

Spring return
No marks = The main valve spring-return or centralizing
H = The main valve hydraulic-return or centralizing (10 size two-position only)

Spool symbol

Series number
6X = Series 60-69

When pilot valve is two-position valve with two solenoid. The main valve serves as pilot valve when it is hydraulic resetting,
0 = No spring reset
OF = No spring reset, with locator
("H"must be noted befoe function 0 or OF DO NOT suitable for function Y)

Pilot valve
6A = Standard solenoid valve
6E = High performance solenoid valve

Voltage
D12 = DC12V **D24** = DC24V
A110 = AC110V-50HZ **A220** = AC220V-50HZ
R110 = RAC110V **R220** = RAC220V (R means AC with rectifier)

N = With manaul bottom

Additional Information

Hydraulic oil
No marks = Mineral hydraulic oil
V = Phosphate hydraulic oil

Reducing valve
No marks = Without constant ratio pressure reducing valve
D1 = With constant ratio pressure reducing valve (Pressure reducing ratio 1:0.66)

Pre-pressure valve
No marks = Without pre-pressure valve
P0.45 = With pre-pressure valve 4.5bar

Damper
No marks = Without cartridge damper
B08 = With damper 0.8mm
B10 = 1.0mm
B12 = 1.2mm
B15 = 1.5mm

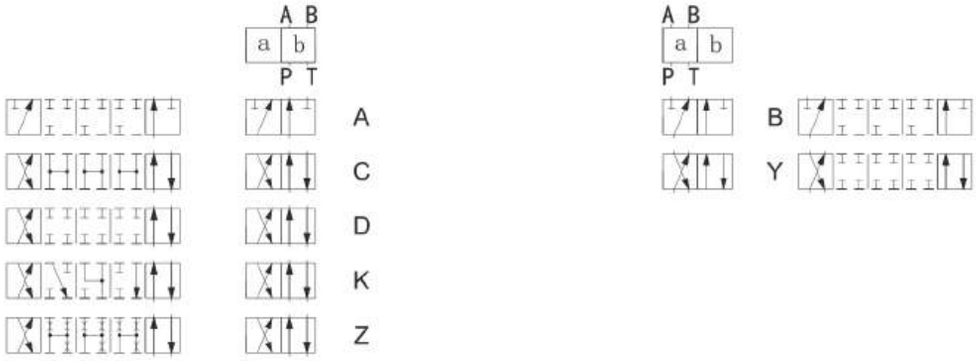
Plug
H = DIN43650 plug
L = DIN43650 plug with lamp

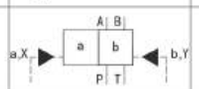
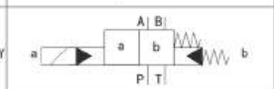
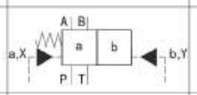
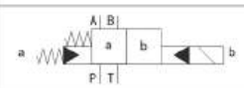
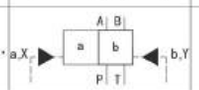
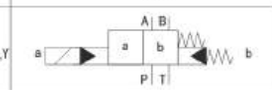
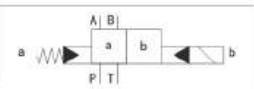
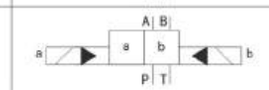
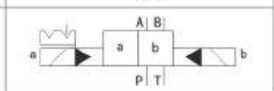
No marks = No commutation time regulator
S = With commutation time regulator, import throttling
S2 = With commutation time regulator, export throttling

No marks = Oil supply and drain type control, external supply external drain
E = internal supply external drain
ET = internal supply internal drain
S = External supply internal drain
(For the three-position hydraulic valve can not adapt to the T, ET form)

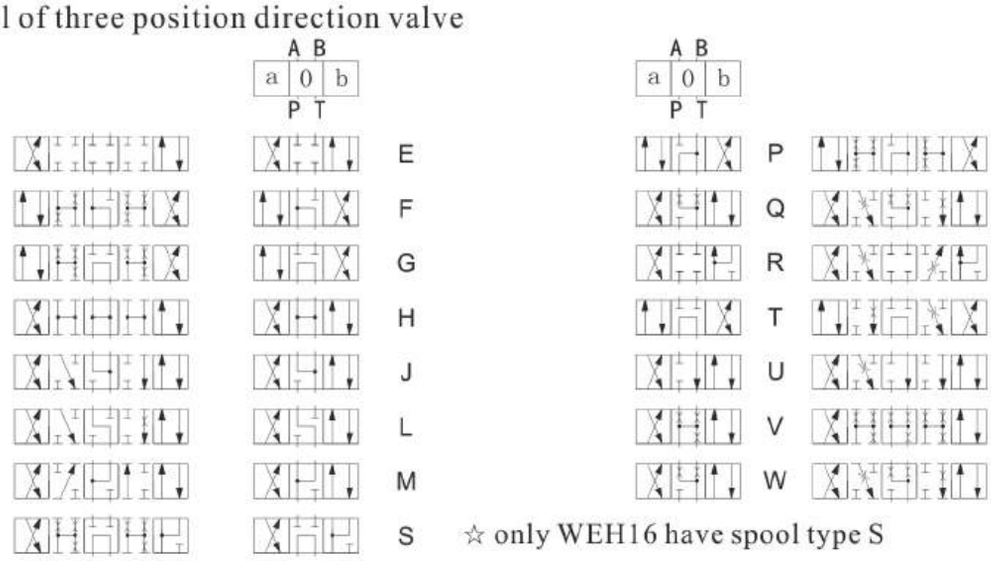
SYMBOLE

Spool symbol of two position direction valve

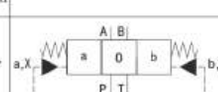
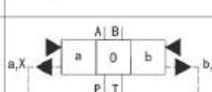
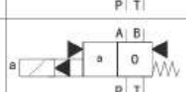
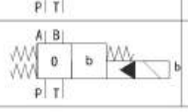
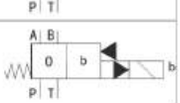


spool type	form	hydraulic drive	electro-hydraulic drive	spool type	form	hydraulic drive	electro-hydraulic drive
A, C, D, K, Z	../..			B, Y	../..		
	..H../..				..H../..		
	..H../O						
	..H/OF						

spool symbol of three position direction valve



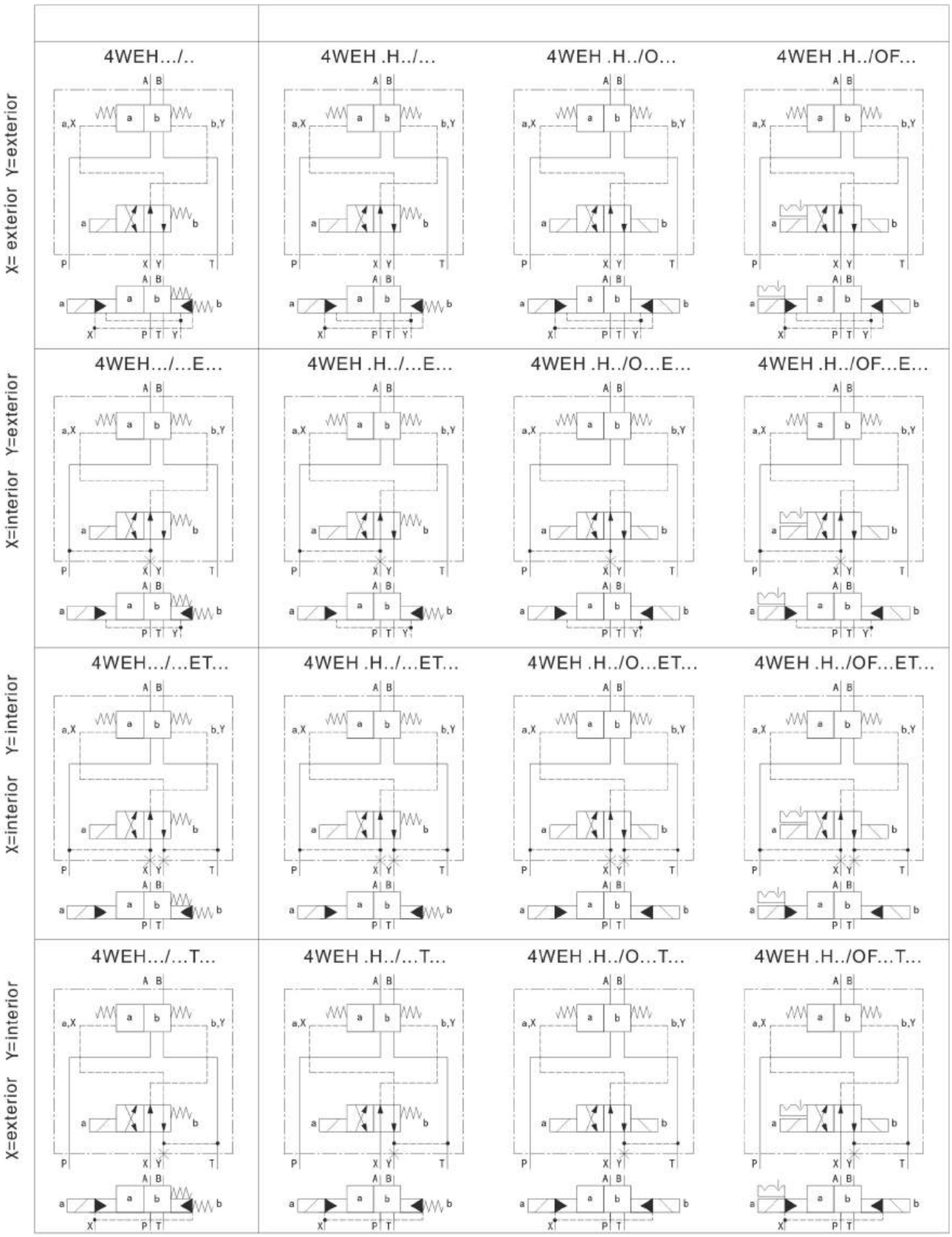
☆ only WEH16 have spool type S

spool type	direction	spool return	hydraulic drive	electro-hydraulic drive	direction	spool return	hydraulic drive	electro-hydraulic drive
E,F, G,H, J,L, M,Q, R,S, T,U, V,W		../..				..H../..		
		.A				H.A		
		.B				H.B		

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The detailed simplified spool symbol of two position direction valve

X= exterior Y=exterior	4WEH.../..	4WEH .H../...	4WEH .H../O...	4WEH .H../OF...
X=interior Y=exterior	4WEH.../...E...	4WEH .H../...E...	4WEH .H../O...E...	4WEH .H../OF...E...
X=interior Y=interior	4WEH.../...ET...	4WEH .H../...ET...	4WEH .H../O...ET...	4WEH .H../OF...ET...
X=exterior Y=interior	4WEH.../...T...	4WEH .H../...T...	4WEH .H../O...T...	4WEH .H../OF...T...



The detailed simplified spool symbol of three position direction valve

X= exterior Y=exterior	4WEH.../...	4WEH .H../...
X=interior Y=exterior	4WEH.../...E...	4WEH .H../...E...
X=interior Y= interior	4WEH.../...ET...	
X=exterior Y=interior	4WEH.../...T...	

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TECHNICAL DATA

WEH10 type of electro-hydraulic operated directional valve

Hydraulic Data

The highest working pressure: P, A, B		bar	315
T port	Controlling oil external drain	bar	315
	Controlling oil internal drain	bar	210(DC); 160(AC)
Y port	Controlling oil external drain	bar	210(DC); 160(AC)
Minimum Control pressure	Controlling oil external supply Controlling oil internal supply (not suitable to C/Z/F/G/H/P/T/V)	bar	Three-way valve 10
			Two-way valve with spring return 10
			Two-way valve with hydraulic return 7
T port	Controlling oil internal supply (not suitable to C/Z/F/G/H/P/T/V)	bar	4.5
Maximum control pressure		bar	250
Liquid medium			Mineral oil, organic phosphate oil
Oil temperature range		°C	-30~+80 (used to NBR seal)
			-20~+80 (used to rubber seal)
Viscosity range		mm²/s	2.8~500
Control flow when switch		cm³	Three-way valve 2.04 two-way valve 4.08

The total switch time of valve switching from zero position to switch position

Control pressure	bar	7		14		21		25	
		AC	DC	AC	DC	AC	DC	AC	DC
Three-way valve	ms	30	65	25	60	20	55	15	50
Two-way valve	ms	35	80	30	75	25	70	20	65

The total switch time of valve switching from zero position to switch position

Three-way valve	ms	30							
Two-way valve	ms	35	40	30	35	25	30	20	25
The flow of minimum time switching	L/min	~35							
Installation position		HC.HD.HK.HZ.HY with hydraulics return should be installed horizontally.							
Weight	Single solenoid valve	kg	6.4						
	Double solenoids valve	kg	6.8						
	The regulator for timing the switch time	kg	0.8						
	Constant ratio pressure reducing valve	kg	0.5						

Reversing time means the time which is taken between the solenoid of pilot valve pull-in and the main valve fully opening

WEH16 type of electro-hydraulic operated directional valve

Hydraulic Data

The highest working pressure: P, A, B		bar	H-WEH16...type	...WEH16...type
			350	280
Fluid Port T	Controlling oil internal drain	bar	250	250
	Controlling oil external drain	bar	210(DC)	160(AC)
			Three-way valve with hydraulic centre	Controlling oil internal drain is impossible
Fluid Port Y	Controlling oil external supply	bar	210(DC)	160(AC)
Minimum controlling pressure (Mpa)	Controlling oil external supply Controlling oil internal supply Controlling oil internal supply	bar	Three-way valve 14 Two-way valve with spring return 14 Two-way valve with hydraulics return 14 Using pre-pressure valve or when flow is big, if spool symbol with C, Z, F, G, H, P, S, T, V, it is 4.5	
Maximum control pressure		bar	250	
Liquid medium			Mineral oil, organic phosphate oil	
Oil temperature range		°C	-30~+80 (used to NBR seal)	
			-20~+80 (used to rubber seal)	
Viscosity range		mm²/s	2.8~500	

The maximum capacity of controlling oil when switch

Three-way with spring centralize	cm³	5.72
Two-way valve	cm³	11.45

Three-way valve with hydraulics centralize

From position “0” toworking position “a”	cm³	2.83
From working position “a” to position “0”	cm³	2.9
From position “a” to working position “b”	cm³	5.72
From working position “b” to “0”	cm³	2.83

The total switch time of valve switching from zero position to switch position

Pilot control pressure	bar	50				150				250			
		AC		DC		AC		DC		AC		DC	
Three-way valve with spring centralize	ms	35		65		30		60		30		58	
Two-way valve with spring return	ms	45		65		35		65		30		50	
Three-way valve with hydraulics centralize	ms	a	b	a	b	a	b	a	b	a	b	a	b
		300	300	650	650	250	250	550	630	200	250	550	600
Three-way valve with spring centralize	ms	30											
Two-way valve with spring return	ms	45		45		35		35		30		30	
Three-way valve with hydraulics centralize		a	b	a	b	a	b	a	b	a	b	a	b
		200		200		200		200		200		200	
Mounting position		Except C.D.K.Z.Y type valve with hydraulics return installed horizontally, others can installed as your will											
The flow of shorter time switching	L/min	About 35											
Whole valve weight	kg	About 8.6											

Reversing time means the time which is taken between the solenoid of pilot valve pull-in and the main valve fully opening

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WEH25 type of electro-hydraulic operated directional valve

Hydraulic Data

The highest working pressure: P, A, B		bar	H-WEH25...type	...WEH25...type
			350	280
Fluid Port T	Controlling oil internal drain	bar	250	250
	Controlling oil external drain	bar	210(DC)	160(AC)
			Three-way valve with hydraulic centre	Controlling oil internal drain is impossible
Fluid Port Y	Controlling oil external supply	bar	210(DC)	160(AC)
Minimum controlling pressure (Mpa)	Controlling oil external supply Controlling oil internal supply Controlling oil internal supply	bar	Three-way valve 14 Two-way valve with spring return 14 Two-way valve with hydraulics return 14 Using pre-pressure valve or when flow is big, if spool symbol with C, Z, F, G, H, P, S, T, V, it is 4.5	
			Mineral oil, organic phosphate oil	
Maximum control pressure		bar	250	
Liquid medium			Mineral oil, organic phosphate oil	
Oil temperature range		°C	-30~+80 (used to NBR seal), -20~+80 (used to rubber seal)	
Viscosity range		mm²/s	2.8~500	

The maximum capacity of controlling oil when switch

Three-way with spring centralize	cm³	14.2
Two-way valve	cm³	28.4

Three-way valve with hydraulics centralize

From position “0” toworking position “a”	cm³	7.15
From working position “a” to position “0”	cm³	7.0
From position “a” to working position “b”	cm³	14.15
From working position “b” to “0”	cm³	5.73

The time for switching from position"0" to working position (solenoid DC and AC)

Pilot control pressure	bar	50				150				210				250			
		AC		DC		AC		DC		AC		DC		AC		DC	
Three-way valve with spring centralize	ms	50		65		30		60		30		60		30		58	
Two-way valve with spring return	ms	120		125		95		100		85		90		75		80	
Three-way valve with hydraulics centralize	ms	a	b	a	b	a	b	a	b	a	b	a	b	a	b	a	b
Pilot control pressure	bar	300	350	550	650	300	350	550	650	250	300	500	600	250	300	550	600
Three-way valve with spring centralize	ms	40															
Two-way valve with spring return	ms	120		125		95		100		85		90		75		80	
Three-way valve with hydraulics centralize		a	b	a	b	a	b	a	b	a	b	a	b	a	b	a	b
		300	350	300	350	300	350	300	350	300	350	300	350	300	350	300	350
Mounting position		Except C.D.K.Z.Y type valve with hydraulics return installed horizontally, others can installed as your will															
The flow of shorter time switching	L/min	About 35															
Whole valve weight	kg	About 18															

Reversing time means the time which is taken between the solenoid of pilot valve pull-in and the main valve fully opening

WEH32 type of electro-hydraulic operated directional valve

Hydraulic Data

The highest working pressure: P, A, B		bar	H-WEH32...type	...WEH32...type
			350	280
Fluid Port T	Controlling oil internal drain	bar	250	250
	Controlling oil external drain	bar	210(DC)	160(AC)
			Three-way valve with hydraulic centre	Controlling oil internal drain is impossible
Fluid Port Y	Controlling oil external supply	bar	210(DC)	160(AC)
Minimum controlling pressure (Mpa)	Controlling oil external supply Controlling oil internal supply	bar	Three-way valve 8 Two-way valve with spring return 10 Two-way valve with hydraulics return 5	
	Maximum control pressure	bar	Using pre-pressure valve or when flow is big, if spool symbol with C, Z, F, G, H, P, S, T, V, it is 4.5	
Maximum control pressure		bar	250	
Liquid medium			Mineral oil, organic phosphate oil	
Oil temperature range		°C	-30~+80 (used to NBR seal), -20~+80 (used to rubber seal)	
Viscosity range		mm²/s	2.8~500	

The maximum capacity of controlling oil when switch

Three-way with spring centralize	cm³	29.4
Two-way valve	cm³	58.8

Three-way valve with hydraulics centralize

From position “0” toworking position “a”	cm³	14.4
From working position “a” to position “0”	cm³	15.1
From position “a” to working position “b”	cm³	29.4
From working position “b” to “0”	cm³	14.4

The time for switching from position"0" to working position (solenoid DC and AC)

Pilot control pressure	bar	50				150				250			
		AC		DC		AC		DC		AC		DC	
Three-way valve with spring centralize	ms	65		80		50		90		35		105	
Two-way valve with spring return	ms	100		130		75		100		60		115	
Three-way valve with hydraulics centralize	ms	a	b	a	b	a	b	a	b	a	b	a	b
		550	600	1000	1050	400	450	850	950	350	400	850	950
Pilot control pressure	bar	(DC:500) (AC:600)											
Two-way valve with spring return	ms	115		90		85		70		65		65	
Three-way valve with hydraulics centralize		a	b	a	b	a	b	a	b	a	b	a	b
		300	500	300	400	600	750	300	300	1050	1400	500	500
Mounting position		Except C.D.K.Z.Y type valve with hydraulics return installed horizontally, others can installed as your will											
The flow of shorter time switching	L/min	About 50											
Whole valve weight	kg	Valve with single solenoid is 40.5kg, with double solenoids is 41kg											

Reversing time means the time which is taken between the solenoid of pilot valve pull-in and the main valve fully opening

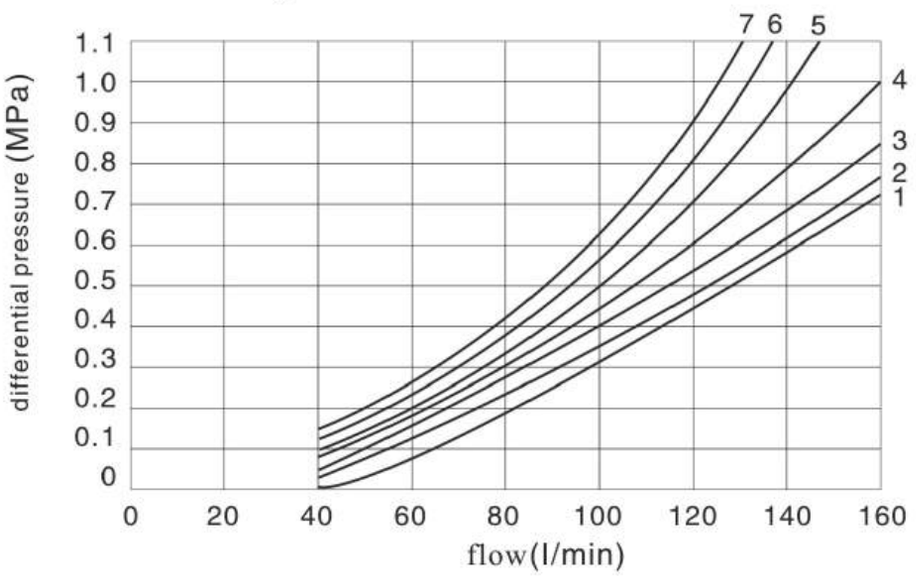
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Electric Data

Voltage type		DC	AC
Voltage	V	12, 24, 48, 96, 110, 220	110, 220
Power	W	30	-
Holding power(P)	W		36
Start voltage and current (VA)	VA		220
Running status		continuous	
Environment temperature range	°C	~+50	
Coil temperature range	°C	~+150	
Protectiondegreeofenclosure		IP65	

CHARACTERISTIC CURVE

4WEH10...type（result tested when using HLP46，t=40℃ ±50℃）

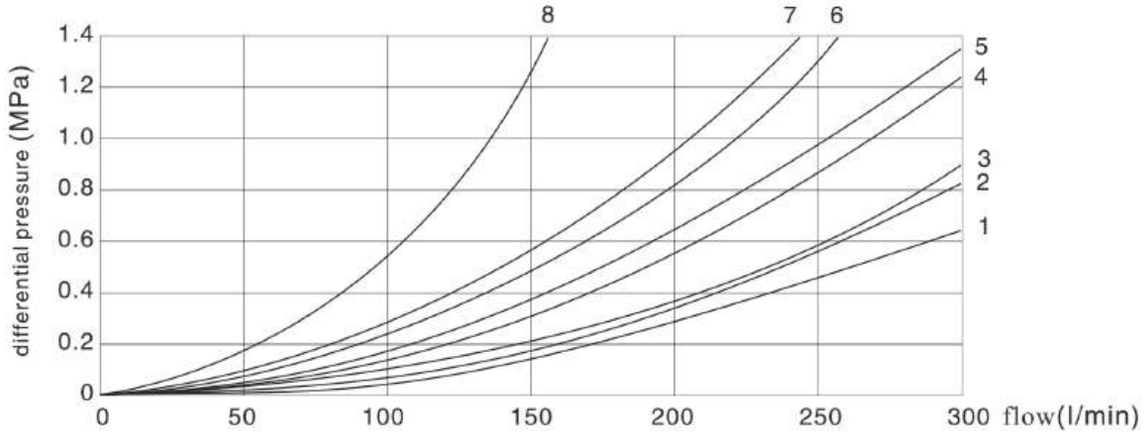


pressure loss curve of electro-hydraulic direction valve WEH10 type

spool symbol	switch position				spool symbol	meso-position		
	P—A	P—B	A—T	B—T		A—T	B—T	P—T
E、Y、D	2	2	4	5				
F	1	4	1	4	F	3	—	6
G、T	4	2	2	6	G、T	—	—	7
H、C	4	4	1	4	H	1	3	5
J、K	1	2	1	3				
L	2	3	1	4	L	3	—	—
M	4	4	3	4				
P	4	1	3	4	P	—	7	5
Q、V、W、Z	2	2	3	5				
R	2	2	3	–				
U	3	3	3	4	U	—	4	—

All original manufacturers'names,part numbers and description are for reference purposes only and it doesn't imply that any Part listed is the product of these manufacturers.

4WEH16...type（result tested when using HLP46，t=40℃±50℃）

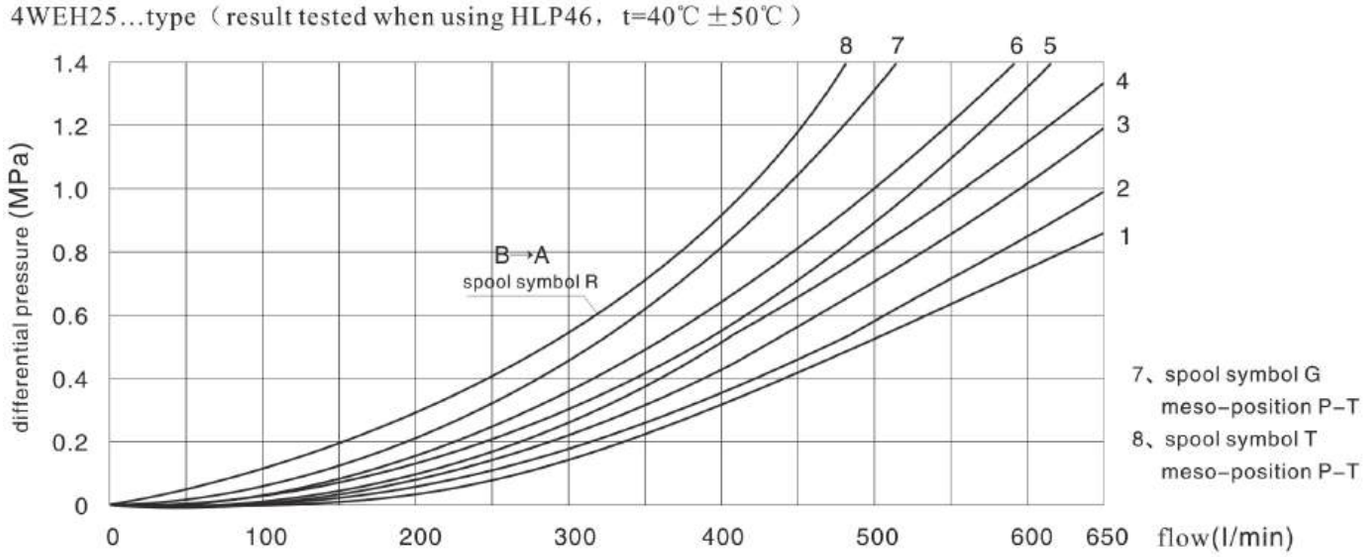


pressure loss curve of electro-hydraulic direction valve WEH16 type

spool symbol	switch position				
	P→A	P→B	A→T	B→T	P→T
E、Y、D	1	1	1	3	–
F	2	2	3	3	–
G、T	5	1	3	7	6
H、C、Q、V、Z	2	2	3	3	–
J、K、L	1	1	3	3	–

spool symbol	switch position				
	P→A	P→B	A→T	B→T	P→T
M、W	2	2	4	3	–
R	2	2	4	–	–
U	1	1	4	7	–
S	4	4	4	–	8

4WEH25...type（result tested when using HLP46，t=40℃±50℃）



pressure loss curve of electro-hydraulic direction valve WEH25 type

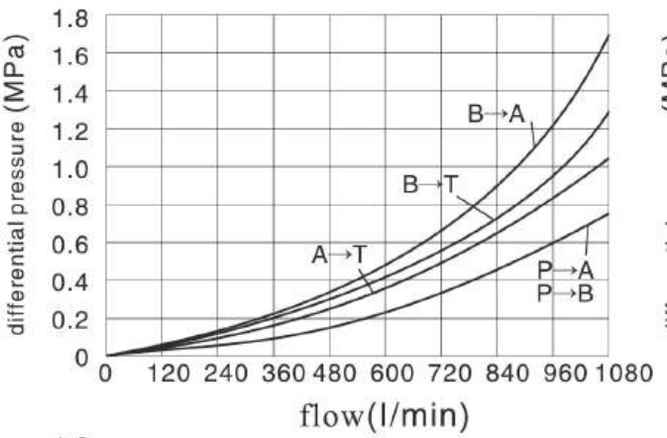
spool symbol	switch position			
	P→A	P→B	A→T	B→T
E	1	1	1	3
F	1	4	3	3
G	3	1	2	4
H	4	4	3	4
J、Q	2	2	3	5

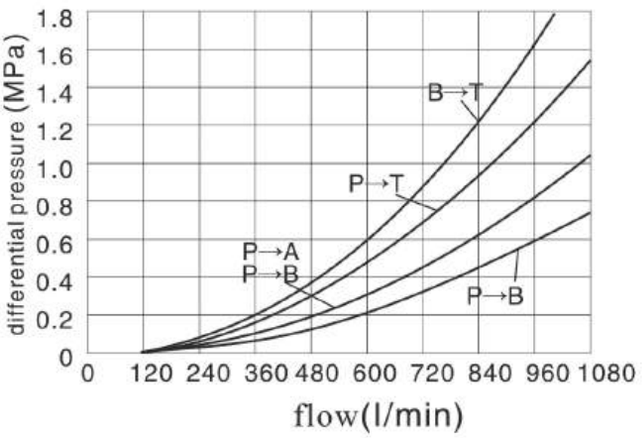
spool symbol	switch position			
	P→A	P→B	A→T	B→T
L	2	2	3	3
M	4	4	1	4
P	4	1	1	5
R	2	1	1	–

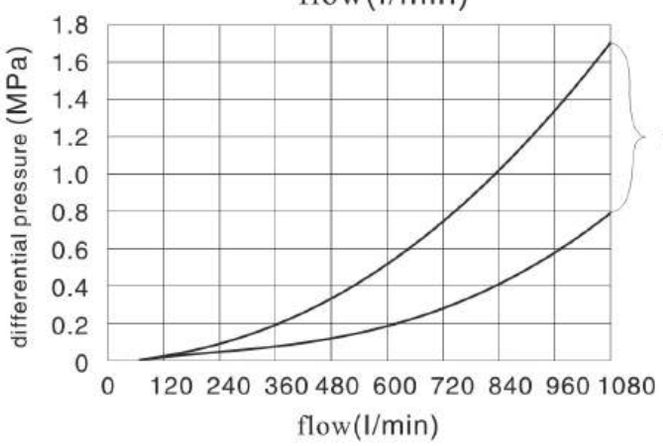
spool symbol	switch position			
	P→A	P→B	A→T	B→T
U	4	1	1	6
V	2	4	3	6
W	1	1	1	3
T	3	1	2	4

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4WEH16...type（result tested when using HLP46，t=40℃ ±50℃）







the curves of other spool symbol

pressure loss curve of electro-hydraulic direction valve WEH32 type

the open area of each flow direction when spool is in the centre position

Size	spool symbol	Open Area (mm^2)			
		P→A	P→B	A→T	B→T
WEH10	Q	–		13	13
	V	13	13	13	13
	W	–	–	2.4	2.4
WEH16	Q	–	–	32	32
	V	32	32	32	32
	W	–	–	6	6
WEH25	Q	–	–	83	83
	V	83	83	83	83
	W	–		14	14
WEH32	Q	–	–	78	78
	V	73	73	84	84
	W	–	–	20	20

【Power limit】

Due to the adhesion effect the valve's reversing function. In order to reach the allowed maximum flow and without affecting the performance, advise to use full flow filter of 25 microns in system. Fluid power of internal valve also influence on the reversing performance, thus different slide valve function have different power limit, if A flow direction, such as the port A or B of four-way valve closed, used as three way valve, in serious cases will greatly reduce the flow.

Function limit form of WEH10 type electro-hydraulic operated directional valve

Three-way valve， spring centralizing			
flow （1/min） spool symbol	Pressure stage （MPa）		
	20	25	31.5
E、J、L、M、Q、U W、R、V	160		
H	160	150	120
G、T	160		140
F、P	160	140	120
Three-way valve which its main valve with spring return			
G、D、K、Z、Y	160		

Two-way valve， main valve without spring			
flow （1/min） spool symbol	Pressure stage （MPa）		
	20	25	31.5
HC HD HK HZ HY	160		
HC.../O HD.../O HK.../O HZ.../O	160		
HC.../OF... HD.../OF... HK.../OF... HZ.../OF...	160		

Function limit form of WEH10 type electro-hydraulic operated directional valve

Three-way valve with spring centralizing						Two way valve					
flow （1/min）	Pressure stage （MPa）					flow （1/min）	Pressure stage （MPa）				
	7	14	21	28	35	spool symbol	7	14	21	28	35
E、J、L、M、Q、U W、R、H	300	300	300	300	300	C	300	300	300	300	300
						D、Y	300	270	260	250	230
F、P	300	250	180	170	150	K	300	250	240	230	210
G、T	300	300	240	210	190	Z	300	260	190	180	160
S	300	300	300	250	220	Two-way valve with hydraulics return					
V	300	250	210	200	180	HC、HZ、HK、HZ、HY	300	300	300	300	300
Three-way valve with hydraulics centralizing （minimum control pressure 1.6MPa）						When control oil is internal supply， and installed pre-pressure valve， the flow of spool symbol H,F,P,G,T,S,V,C,Z hit 160 l/min					
All spool symbol	300	300	300	300	300						

Remark: For three-way four channel directional valve with hydraulics centralizing, if its pressure exceeded regulation power limit, the controlling pressure have to be improved higher, when working pressure P=35Mpa, flow Q=300 L/min, controlling pressure need to be 1.6Mpa

Three-way valve with spring centralizing						Two way valve					
flow （1/min） spool symbol	Pressure stage （MPa）					flow （1/min） spool symbol	Pressure stage （MPa）				
	7	14	21	28	35		7	14	21	28	35
E、L、M U、W、Q	650	650	650	650	650	G、D、K、Z、Y	650	650	650	650	650
						Two-way valve with hydraulics return					
G、T	400	400	400	400	400	HC HD HK HZ HY	650	650	650	650	650
F	650	550	430	330	300						
H	650	650	550	400	360	HC.../O HC.../O HK.../O HZ.../O	650	650	650	650	650
J	650	650	650	600	520						
P	650	550	430	350	300						
V	650	550	400	350	310						
R	650	650	650	650	580	HC.../OF... HD.../OF... HK.../OF... HZ.../OF...	650	650	650	650	650
Three-way valve with hydraulics centralizing （minimum control pressure 1.8MPa）											
E、F、H、J、L、M P、Q、R、U、V、W	650	650	650	650	650						
G、T	400	400	400	400	400	When control oil is internal supply， and installed pre-pressure valve， the flow of spool symbol H,F,P,G,T,S,V,C,Z hit 180 l/min					
Three-way valve with hydraulics centralizing （minimum control pressure 3MPa）											
G、T	650	650	650	650	650						

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Function limit form of WEH10 type electro-hydraulic operated directional valve

<table>
<tr><td colspan="6">Three-way valve， spring centralizing</td><td colspan="6">Two way valve</td></tr>
<tr><td rowspan="2">flow（1/min)
spool symbol</td><td colspan="5">Pressure stage（MPa）</td><td>flow（1/min)</td><td colspan="5">Pressure stage（MPa）</td></tr>
<tr><td>7</td><td>14</td><td>21</td><td>28</td><td>35</td><td>spool symbol</td><td>7</td><td>14</td><td>21</td><td>28</td><td>35</td></tr>
<tr><td>E、J、L、M、R
U、W、Q</td><td>1100</td><td>1040</td><td>860</td><td>750</td><td>680</td><td>C、D、K、Z、Y</td><td>1100</td><td>1040</td><td>860</td><td>750</td><td>680</td></tr>
<tr><td>H、G</td><td>1100</td><td>1000</td><td>680</td><td>500</td><td>450</td><td colspan="6" rowspan="2">Two-way valve with hydraulics return</td></tr>
<tr><td>F、T、P</td><td>820</td><td>630</td><td>510</td><td>450</td><td>400</td></tr>
<tr><td colspan="6">Three-way valve with hydraulics centralizing（minimum control pressure 0.85MPa）</td><td>HC、HD、HK、HZ、HY</td><td>1100</td><td>1040</td><td>860</td><td>750</td><td>680</td></tr>
<tr><td>All spool symbol</td><td>1100</td><td>1040</td><td>860</td><td>750</td><td>680</td><td colspan="6">When control oil is internal supply， and installed pre-pressure valve， the flow of spool symbol H,F,P,G,T,S,V,C,Z hit 180 l/min</td></tr>
</table>

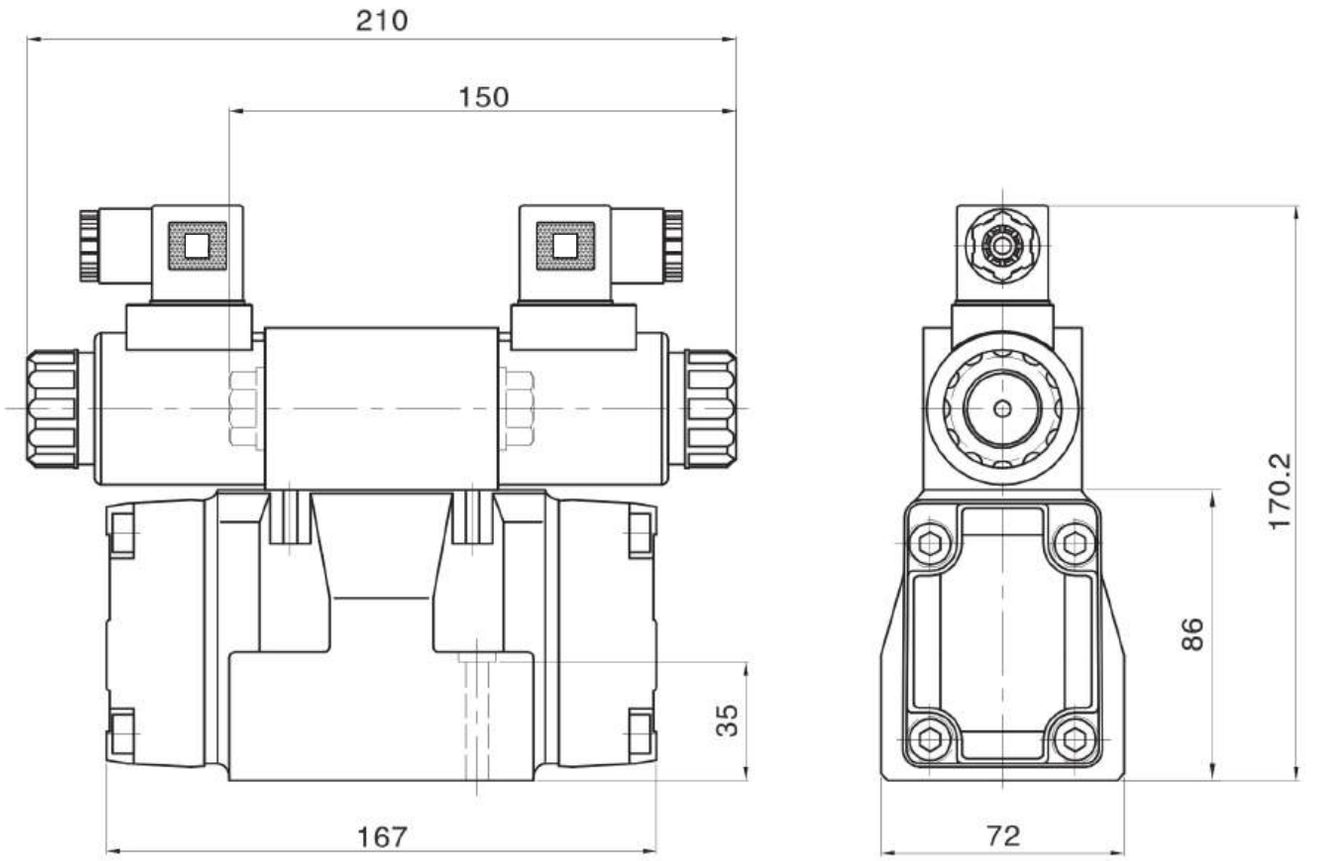
Pilot solenoid operated valve

Using 4-way direction valve with nominal diameter size 6 (4WE6) as pilot valve. Slide valve be kept in center or original position by spring, and according to solenoid or locator, slide valve kept in the working position.
The pilot valve adopt wet-type AC or DC solenoid, toward the spool symbol of the pilot valve be used on the main valve which with kinds of different spool symbol.

Main valve	Pilot solenoid operated valve
Valve with spring centralizing/ converted two position valve	Using 4WE6J-6X/…three position valve/ 4WE6JA… 4WE6JB…
Valve with spring centralizing/ converted two position valve	Using 4WE6J-6X/…three position valve/ 4WE6MA… 4WE6MB…
Structure of main valve with two position Y…/…and HY…/… B…/…and HB…/…	Using 4WE6Y-6X/…two position valve
Two position valve A, C, D, K and Z type spool HA, HC, HD, HK, HZ type valve	Using two position valve with spool type D Structure form of the pilot valve： With spring return, using 4WE6D-6X/… Without spring return, using 4WE6D-6X/O… Without spring return, but with locating device, using 4WE6D-6X/OF…

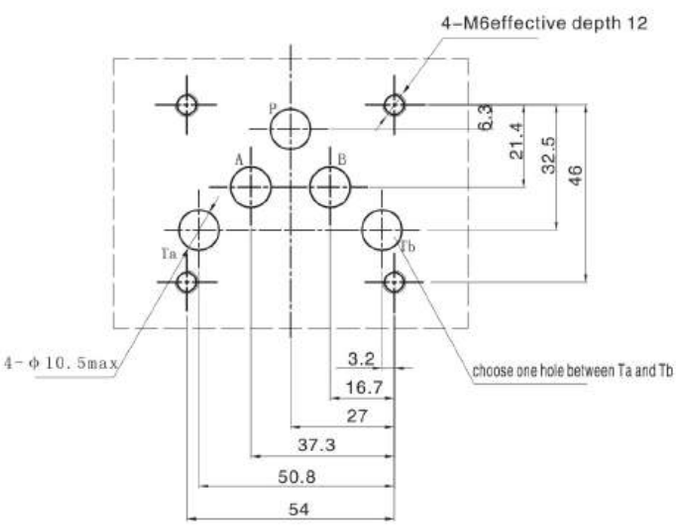
UNIT DIMENSIONS

WE-H10



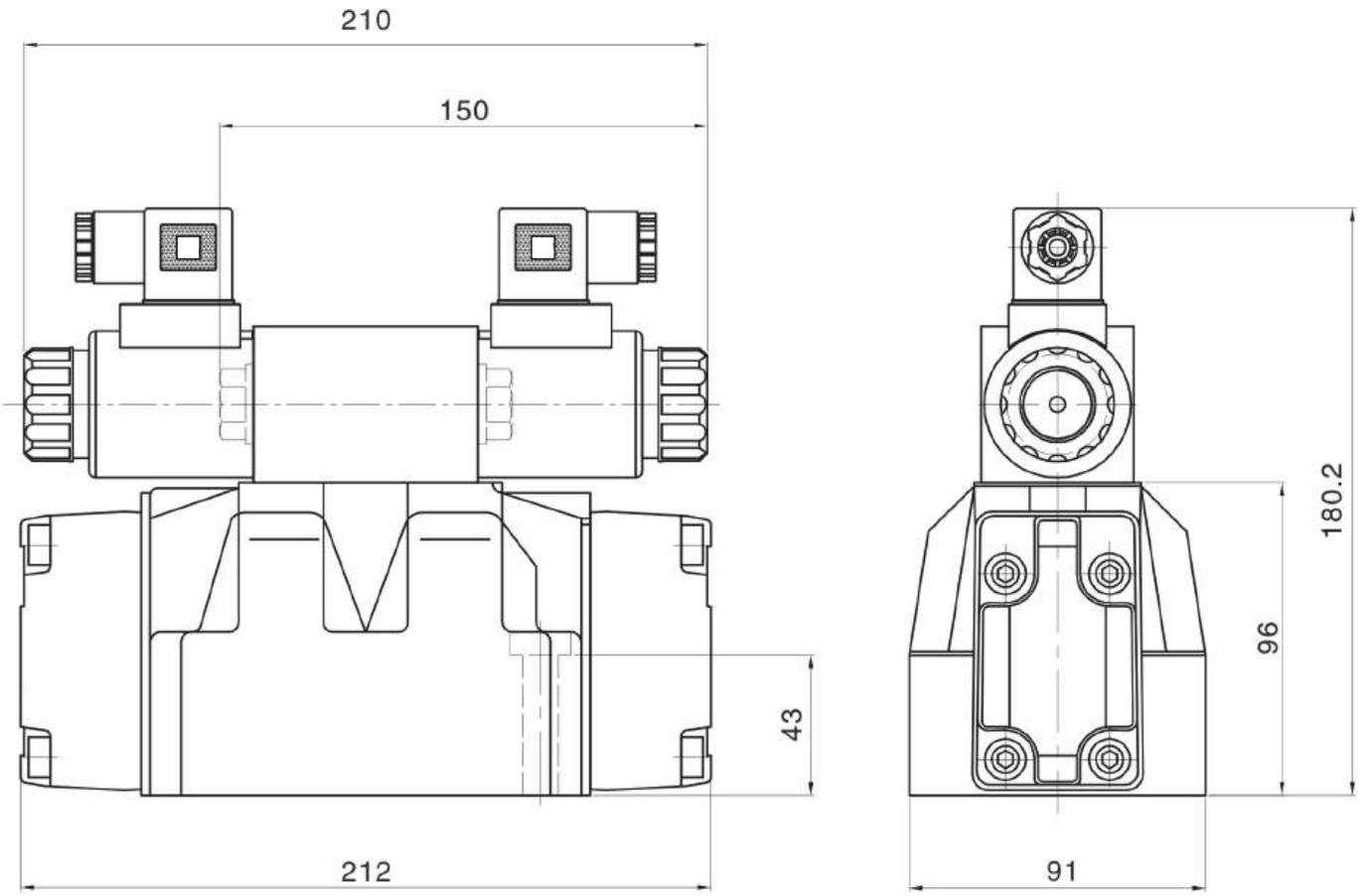


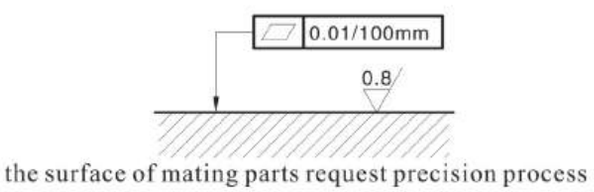
the surface of mating parts request precision process



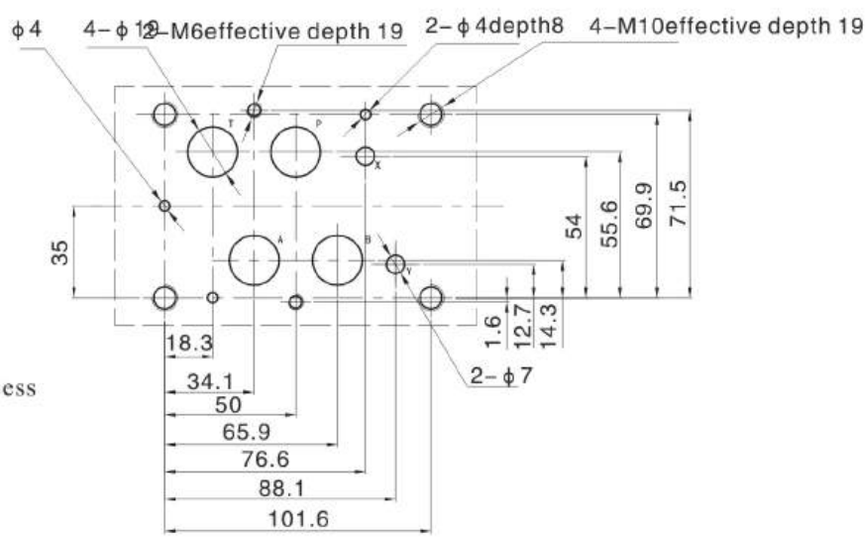
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WE-H16

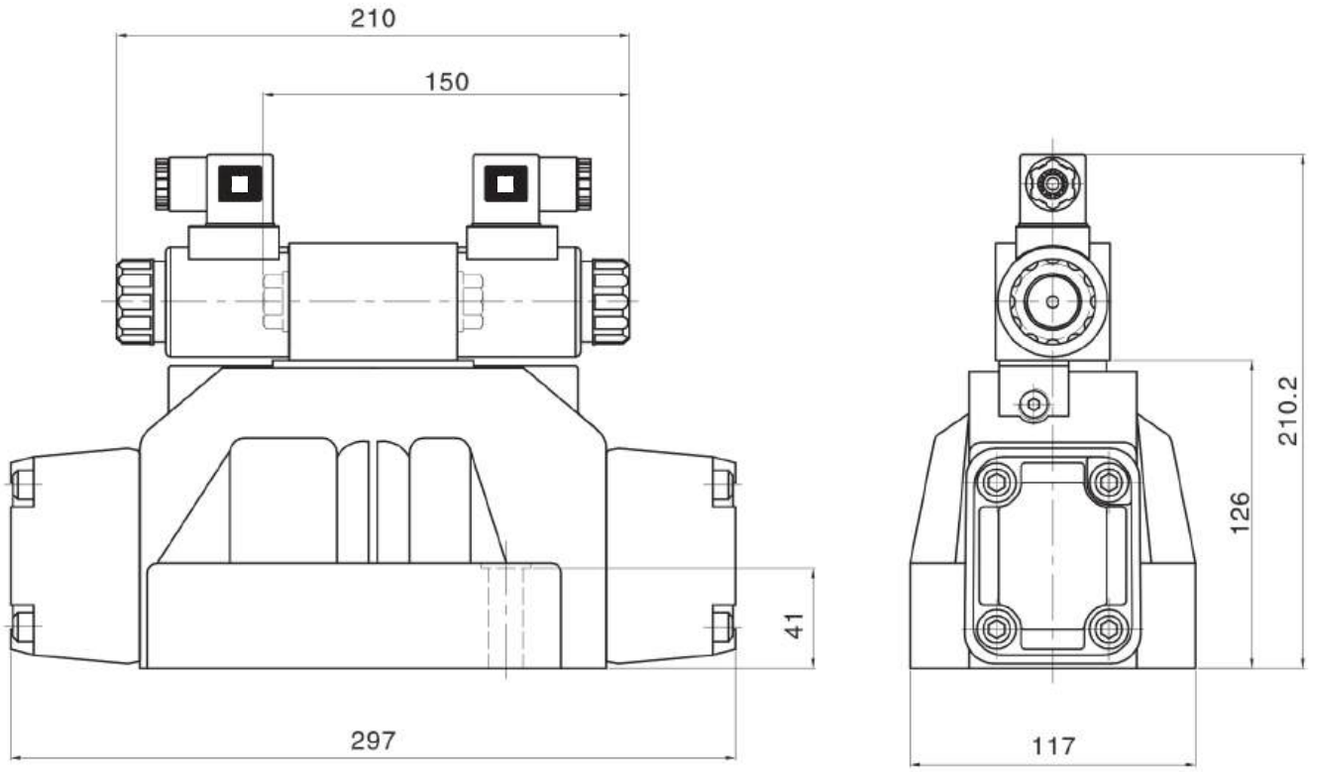


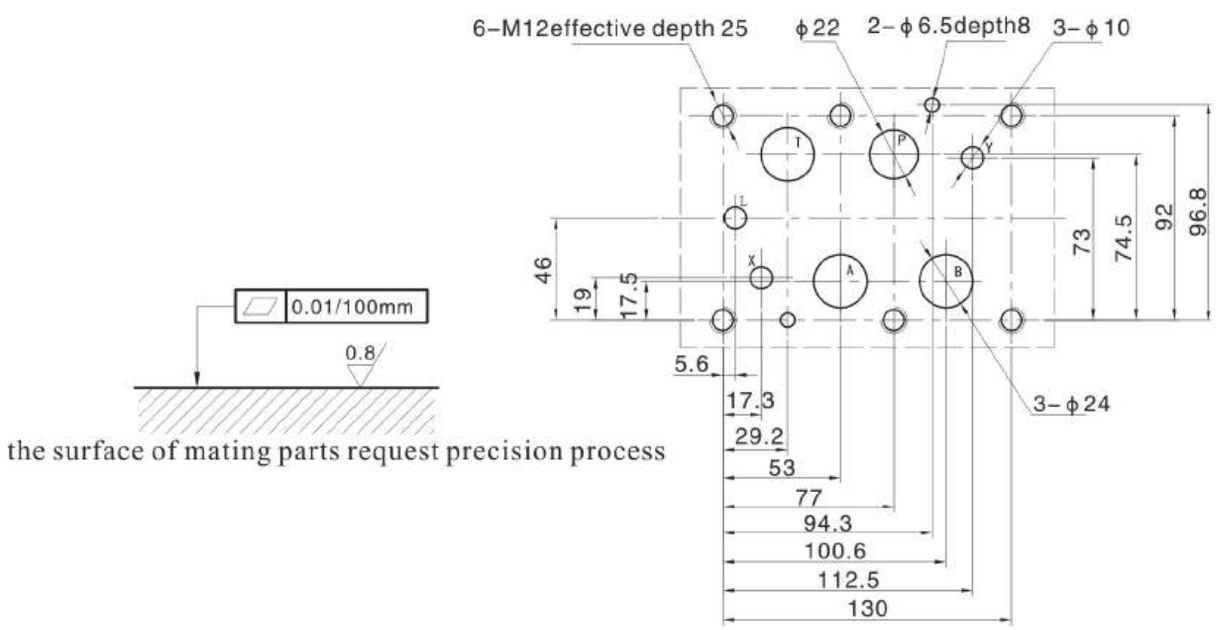


the surface of mating parts request precision process



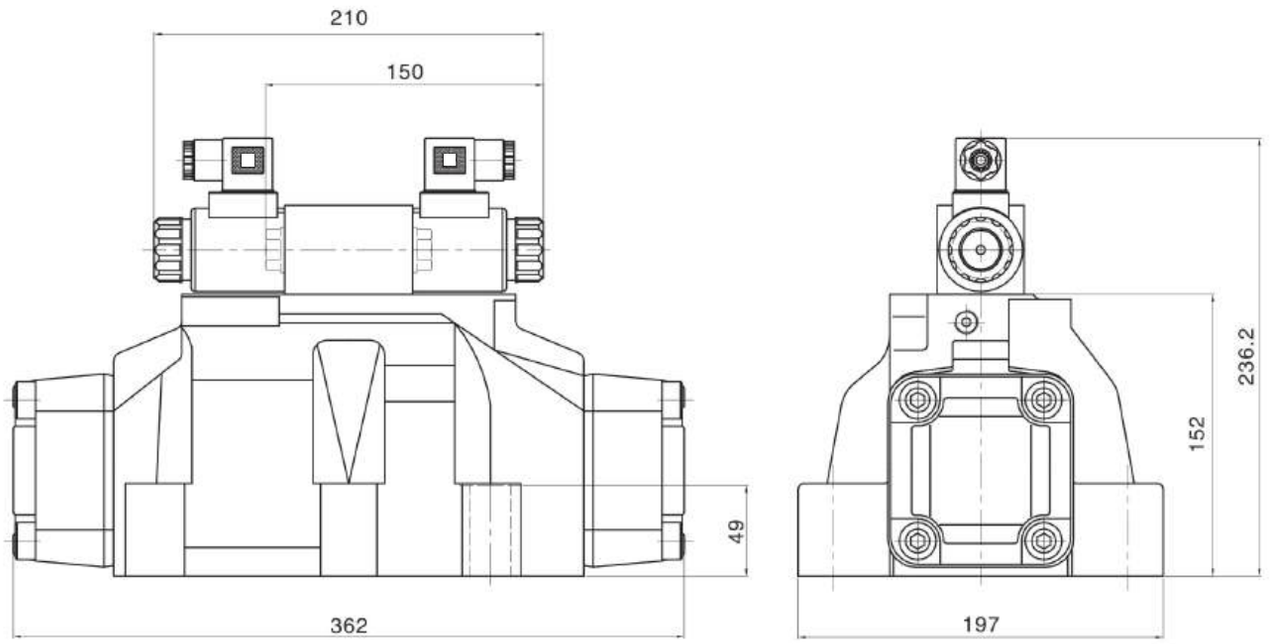
WE-H25

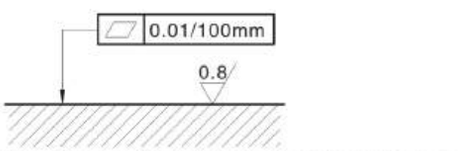

210
150
41
297
210.2
126
117


6–M12effective depth 25
ϕ22
2–ϕ6.5depth8
3–ϕ10
46
19
17.5
73
74.5
92
96.8
5.6
17.3
29.2
53
77
94.3
100.6
112.5
130
3–ϕ24
0.01/100mm
0.8
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WE-H32





the surface of mating parts request precision process

