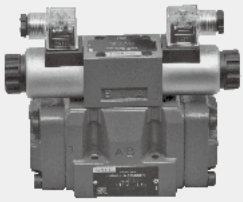
2.15

4/3, 4/2 and 3/2 directional valves of pilot operated

Type WEH 10, 16, 25 and 32

Sizes 10 ～ 32
Up to 280/350 bar
Up to 1100L/min



Contents

Features

- Valves used to control the start, stop and direction of a fluid flow
- Electro-hydraulic operation (WEH)
- Porting pattern conforms to DIN 24 340 form A, ISO 4401 and CETOP-RP 121 H
- Wet pin DC or AC solenoids, optional
- Hand override, optional
- Electrical connections as an individual or central connection
- Spring or pressure centered, spring or hydraulic offset.

Function and configurations

Valves of type WEH are directional spool valves with electro-hydraulic operation. They control the start, stop and direction of a flow.

Solenoid valves used for pilot control are with wet AC or DC solenoid available; Main valves apply spring centering and spring reset or hydraulic centering and hydraulic reset; with or without Switching time adapters; with or without stroke regulators for main valves; back pressure valves may be installed in main valves; throttle may be installed; pressure reducing valves may be installed when working pressure exceeds 250bar.

The valve mainly consists of main valve body(1), main valve spool(2), one(or two)reset spring (3) with one(or two) pilot solenoid valve of solenoid. Main valve spools(2) is held in the neutral or in the initial position either by the springs or by means or pressure. Pilot solenoid valves (4) may select wet-type AC or DC solenoids(5) and pilot solenoid valves are able to control the switching of main valves.

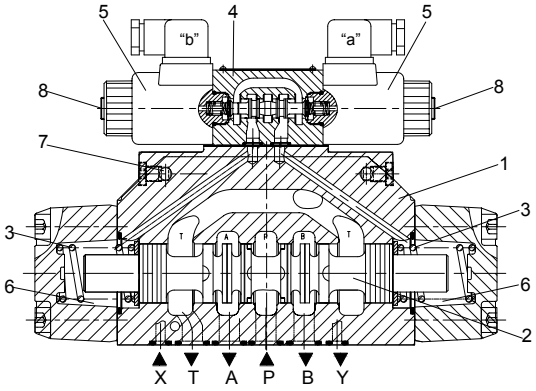
There are four patterns on supply and drain of control oil, see the function diagram. Following are descriptions of various types of valves:

1. Main valves are 4/3-way directional valve with spring centring of the control spool.

Main valve spool(2) is held in the neutral position by means of two return springs. And two spring chambers(6) are connected with tank through pilot solenoid valves.

When one of the two ends of the main control spool (2) is pressurised with pilot pressure, the spool is moved to the switched position. The required ports in the valve are then opened to flow.

When the pilot pressure is removed, the spring on the opposite side to the pressurised spool area causes the spool to return to its neutral or initial position.



Structure chart of spring centering electro-hydraulic directional valve

1- Main valve body

2- Main valve spool

3- Reset spring

4- Pilot solenoid valve

5- Solenoid

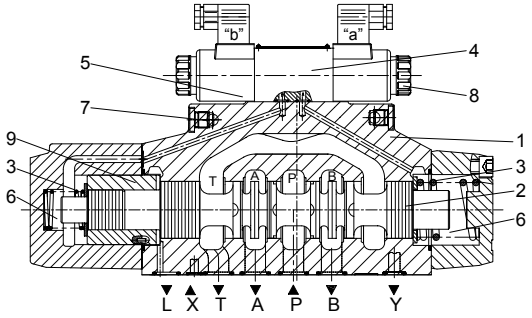
6- Spring chamber

7- Control oil inlet passage

8-Manual button

Function and configurations

2. Main valves are 4/3-way directional valve with pressure centring of the main control spool, type 4WEH...H
The main control spool (2) in the main valve is held in the neutral position by pressurisation of the two end faces. A centring sleeve(9) is supported in the housing and holds the spool in position.
By removing the pressure from one of the spool ends, the main control spool (2) is moved to the shifted position.
The unloaded spool area displaces the returning pilot oil via the pilot valve into the tank(external connetction).



Structure chart of electro-hydraulic directional valves of hydraulic pressure centering

1- Main valve body
2- Main valve spool
3- Spring
4- Pilot solenoid valve
5- Solenoid
6- Spring chamber
7- Control oil inlet passage
8- Manual button
9- Centering sleeve

2/4 way directional valves

(this kind of valve has four different structures and Types)

1. Type WEH.../...
This kind of pilot valve and main valve have a reset spring each, resetting by spring force.

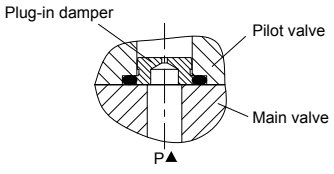
2. Type WEH...H.../...
This kind of valve has a reset spring, making pilot valve spool stay in initial position. Main valve spools change directions under effect of pressure oil.

3. Type WEH...H.../O...
This kind of valve has two solenoids. There are no reset springs in pilot valves and main valves, thus using solenoids and pressure oil to make pilot valves and main valve spools change directions. Therefore, at least one solenoid shall be under working sate.

4. Type WEH...H.../OF...
This kind of valve has two solenoids and locators which makes pilot valve spools stay in working position(impulse valves). Main valve spools have no locating devices , moving downward to corresponding working positions under effect of pressure oil.
Structure 2, 3 and 4 aforesaid are hydraulic reset. Main valve spools can stay in the working position only under the effect of pressure oil.

Throttle insert:

The use of a throttle insert is required if the pilot oil supply in the P channel of the pilot valve is to be limited . This throttle is inserted in the P channel of the pilot valve.



Structure chart of plug-in dampers

Function and configurations

Pilot oil supply:

1. Type WEH10

(1) Conversion between internal supply and external supply:

P channel on the top of main valve bodies with M6 bolt(2) is external supply and with M6 bolt (2) dismounted is internal supply.

(2) Conversion between internal drain and external drain:

Dismounting plug screws(1) and installing M6 bolt(2) is external drain; dismounting M6 bolt(2) is internal drain.

2. Type WEH16

(1)Conversion between internal supply and external supply:

Dismounting plug screw(10) form P channel on the sidesurface of main valves and installing M6 bolt(9) is internal supply. Dismounting M6 plug bolt(9) is internal supply.

(2)Conversion between internal drain and external drain:

Dismounting plug screw(10) form T hole on the top of main valves and installing M6 plug bolt(9) is internal drain. Dismounting M6 bolt(9) is external drain.

3. Type WEH25

(1)Conversion between internal supply and external supply:

P channel on the top of main valve bodies with M6 bolt(6) is external supply and with M6 bolt (6) dismounted is internal supply.

(2)Conversion between internal drain and external drain:

Dismounting plug bolt(6) form T hole on the top of main vlaves and installing M6 plug bolt(9) is internal drain. Dismounting M6 bolt(9) is external drain.

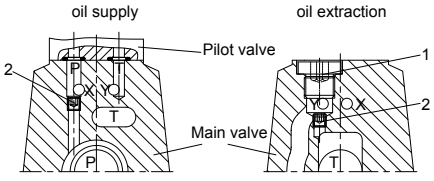
4. Type WEH32

(1)Conversion between internal supply and external supply:

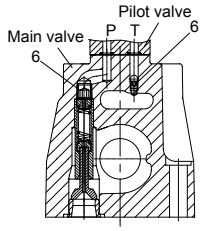
Dismounting plug screw(9) form P hole on the undersurface of main valves and installing M6 bolt(9) is internal supply. Dismounting M6 plug bolt(9) id internal supply.

(2)Conversion between internal drain and external drain:

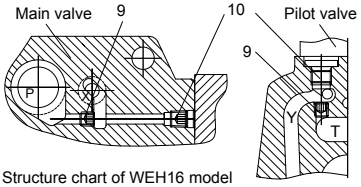
Dismounting plug screw(9) form T hole on the top of main valves and installing M6 plug bolt(9) is internal drain. Dismounting M6 bolt(9) is external drain.



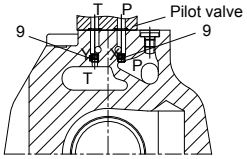
Structure chart of WEH10 model supply and discharge



Structure chart of WEH25 model supply and discharge



Structure chart of WEH16 model supply and discharge



Structure chart of WEH32 model supply and discharge

Attention:

X port on base plates must be blocked when internal supply occurs and Y port on base plates must be blocked when internal drain occurs.

Function and configurations

Switching time adjustment:

In order to influence the switching time of the main valve a double throttle check valve has to be fitted between pilot valves and mian valves to control oil supply from pilot valves into main valve spools, thus adjusting the switching time of main valves.

Regulating bolt rotation clockwise, the time for switching of main valves is long, otherwise the time is short.

The throuttle check valve has two kinds: meter-in throttling and meter-out throttling. If there is a need of changing meter-in throttling into meter-out throttling, just install the valve after rotating 180° around the longitudinal axis again and then install pilot valves.

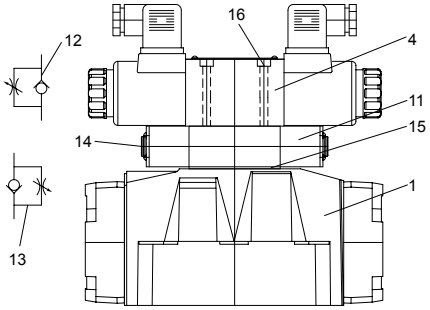


Figure of WEH……S or S2 type
commutating time regulator for valve installation

1- Main valve
4- Pilot valve
11- Switching time regulator(Z2FS6)
12- Meter-out throttling
13- Meter-in throttling
14- Adjustable bolt
15- Seal ring support plate
16- Set screw M5×L GB/T70.1-10.9 grade, the length of L is determined by height stacked, tightening torque 8.9 Nm.

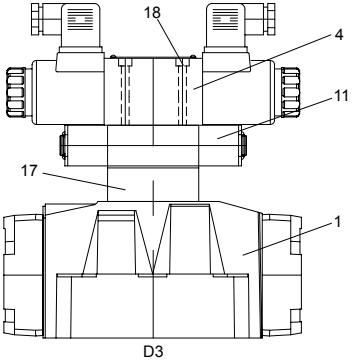
Pressure reducing valves:

The pressure reducing valve (8) must be used it the pilot pressure is higher than 250 bar (for type 4WEH 22 ...: 210 bar).Pressure reducing ratio of constant-ratio pressure reducing valves(D1)1:0.66.

Pressure reducing pressure of constant-ratio pressure reducing valves shall not exceed 40bar.

Minimum control pressure of technical specifications shall improve 1/0.66=1.515 after installing bottom plate pressure reducing valves.

Constant-ratio pressure reducing valves shall not be used when controlling internal oil drain and using back pressure valves(P0.45) with control pressure decreased to 3bar.



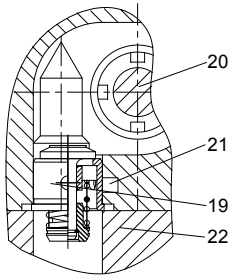
Structure chart of WEH…/…S…D1 or D3 type
valve with pressure reducing valves

1- Main valve
4- Piolt valve
11- Switching time regulator
17- Pressure reducing valve
18- Bolt M5×L GB/T70.1-10.9

Function and configurations

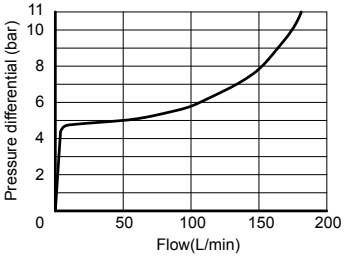
Back pressure valve:

Valves controlling oil inner supply with unloading passages, such as C, Z, G, H, P, S, T and V, In valves with zero pressure circulation and internal pilot oil supply,a back pressure valve (9) must be installed in the P-channel of the main valve to build up the minimun pilot pressure. The pressure differential of the back pressure valve must be added to the pressure differential of the main valve (see characteristic curves) in order to determine the acutal value. The opening pressure of this valve is approx. 4.5 bar. NG10 valves do not have back pressure valves.

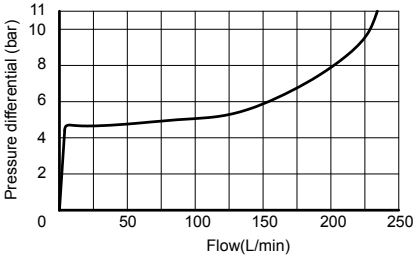


WEH16(32).../.../...PO.45 type Structure chart of back pressure valve of electro-hydraulic directional valve

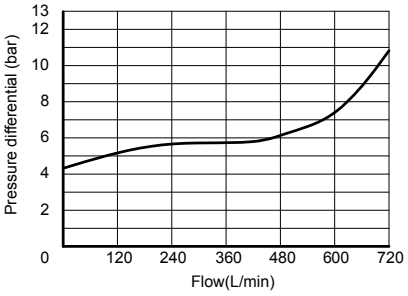
19- Back pressure valve
20- Main valve
21- Control oil chamber(X)
22- Connecting plate



Pressure loss curve of **WEH16** type electro-hydraulic directional valves passing through back pressure valves (Test condition:use HLP46, ϑ_{oil}=40°C ±5°C)

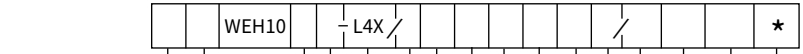


Pressure loss curve of **WEH25** type electro-hydraulic directional valves passing through back pressure valves (Test condition:use HLP46, ϑ_{oil}=40°C ±5°C)



Pressure loss curve of **WEH32** type electro-hydraulic directional valves passing through back pressure valves (Test condition:use HLP46, ϑ_{oil}=40°C ±5°C)

Ordering code



Working pressure
280bar = no code
Working pressure
350bar = H-

3 ways = 3
(For spool A and B)
4 ways = 4

Spring centering or reset =No code
Hydraulic reset = H
(only 2-position valve A,B,C,D,K,Z,Y)

See function symbols

Series L40 to L49 = L4X
(L40 to L49:unchanged installation
and connection dimensions)

When pilot valves 2-position valves of 2 solenoid and main valves are 2-position valves of hydraulic reset, "H" shall be indicated clearly, at this time, when pilot valves
Without spring return = O
Without spring return with detent = OF
(O and OF do not apply to B,Y)

High-performance solenoid pilot valve = 6E
Low power solenoid pilot valve(onlyDC24V) = 6H

DC24V = G24
The integer110V = W110R
220V = W220R
Other voltage see electric part

With manual override buttons = N

Control oil supply and drain Type:
external supply external drain = No code
internal supply external drain = E
internal supply and internal drain = ET
(Not available for function C, Z, F, G, H, P, T, V)
external supply internal drain = T

Further details
in clear text

No code = NBR seals
V = FKM seals

No code= without
pressure reducing valves
D1= with constant-ratio
pressure reducing valves
(pressure reducing 1:0.66)
D3= with constant-value
pressure reducing valves

No code = without
cartridge dampers
B08= with dampers 0.8mm
B10= 1.0mm
B12= 1.2mm
B15= 1.5mm

Z4 = square plugs
(not applicable for the integer)
Z5L = square plugs with lamps
K4 =DIN4365sockets without plugs
K7 = Deutsch connector
assembly, without plugs
DL =Junction boxes with lead wires
and lamps (M22×1.5 interface)

No code = Without switching time
adjustment
S = Switching time
adjustment as meter-in control
S2 = Switching time
adjustment as meter-out control

Note:
1.For function of WEH10 such as C,Z,F,G,H,P,T,V , etc, if applying control oil internal supp, please try to use external add enough back pressure on return port T(port Y shall not have back pressure) to ensure valves can reverse properly.
2.Pressure reducing valves shall be applied when control pressure exceeds 250bar.

Ordering code

Working pressure
280bar =No code
Working pressure
350bar = H-

3 ways = 3
(For spool A and B)
4 ways = 4

Sizes: 16 = 16
25 = 25
32 = 32

Main valve spring reset or centering=no code
Main valve hydraulic reset or centering =H

See slide valve function marks

Series L70 to L79 = L7X
(L70 to L79:unchanged installation
and connection dimensions)

When pilot valves use 2-position valves of 2 solenoid, main valves are hydraulic reset, "H" must be indicated clearly before Type code at this time when pilot valves:
Without reset spring = O
Without reset spring,with detent = OF
(O and OF not applicable to B and Y function)

High-performance solenoid pilot valve = 6E
Low power solenoid pilot valve(onlyDC24V) = 6H

DC24V = G24
The integer110V = W110R
220V = W220R
Other voltage see electric part

With manual override buttons = N

Control oil supply and drain Type:
external supply external drain = No code
internal supply and drain = ET
internal supply external drain = E
external supply internal drain = T
3-position valves of hydraulic centering applying E1 Type and E2 Type must meet the condition:
P control pressure ⩾ 2×P return oil+lowest control pressure

Further details in clear text

No code = NBR seals
V = FKM seals

No code= without pressure reducing valves
D1= with constant-ratio pressure reducing valves (pressure reducing 1:0.66)
D3= with constant-value pressure reducing valves

No code= without back pressure valves
P0.45=with back pressure valves: cracking pressure 4.5bar
P0.70=with back pressure valves: cracking pressure 7bar

No code= without throttle insert
B08= with throttle 0.8mm
B10= with throttle 1.0mm
B12= with throttle 1.2mm
B15= with throttle 1.5mm

Additional device number
(see location plan of additional devices, in Page 24, 26, 28)

Z4 = square plugs (not applicable for the integer)
Z5L= square plugs with lamps
K7 = Deutsch connector assembly, without plugs
DL = Junction boxes with lead wires and lamps (M22×1.5 interface)

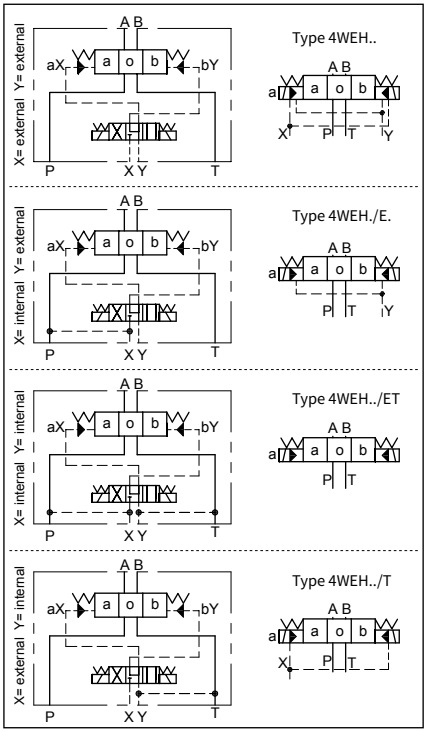
No code = Without switching time adjustment
S = Switching time adjustment as meter-in control
S2 = Switching time adjustment as meter-out control

Note:
1. For function of WEH16-32 such as C, Z, F, G, H, P, T, V, etc, if applying control oil internal supp, please try to use external add enough back pressure on return port T(port Y shall not have back pressure) to ensure valves can reverse properly.
2. Pressure reducing valves shall be applied when control pressure exceeds 250bar.

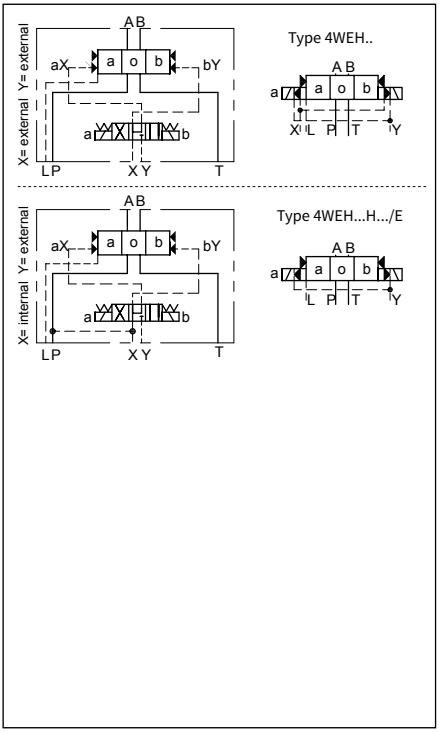
Symbols

Detailed and simplified symbols for 3-position valves

Valves with spring centred

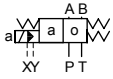


Valves with hydraulic centred

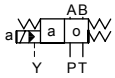


Valves with spring offset (At position A or B of 2-position valve derived from 3-position)

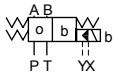
Type 4WEH...A...



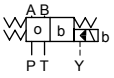
Type 4WEH...A.../E



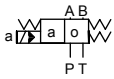
Type 4WEH...B...



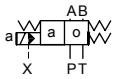
Type 4WEH...B...E



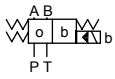
Type 4WEH...A...ET



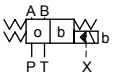
Type 4WEH...A.../T



Type 4WEH...B...ET

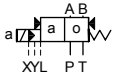


Type 4WEH...B...T

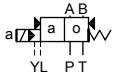


Valves with hydraulic offset (At position A or B of 2-position valve derived from 3-position)

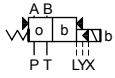
Type 4WEH...H...A.../...



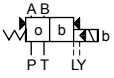
Type 4WEH...H...A.../...E



Type 4WEH...H...B.../...



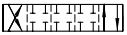
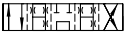
Type 4WEH...H...B.../...E



Symbols

Spools of 3-position valves

3-position valve

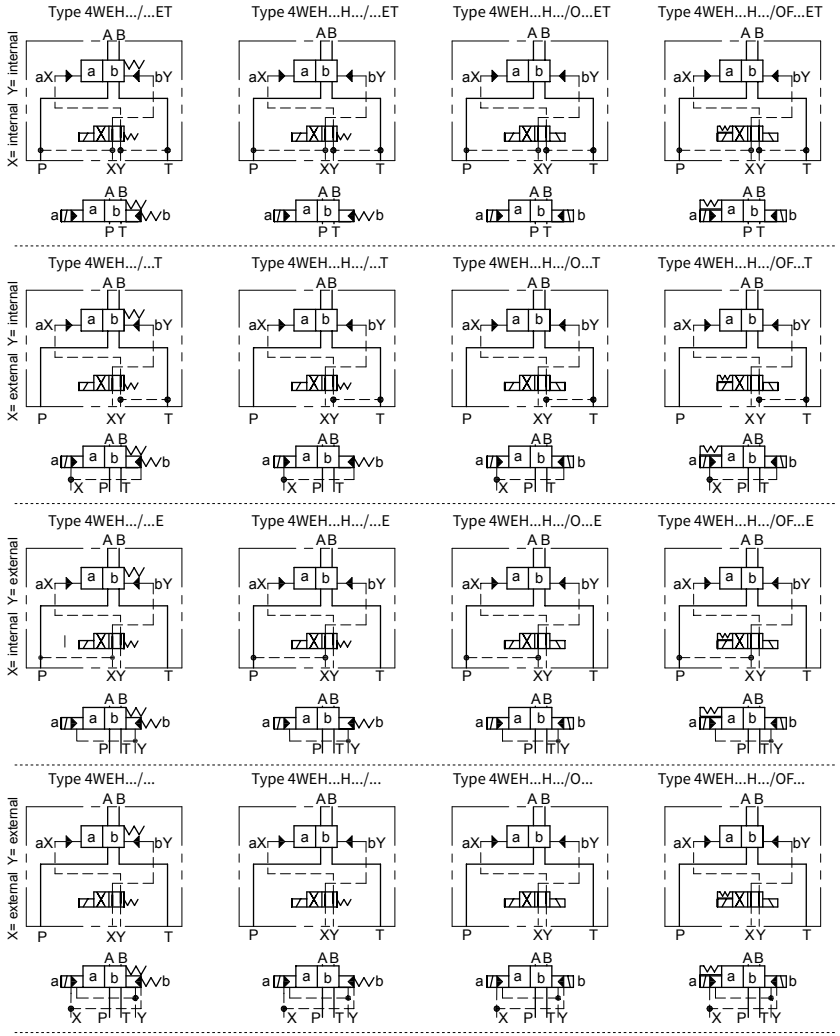
3-position valve type		Symbol	Crossover Symbol
4WEH...E.../...	E		
4WEH...F.../...	F		
4WEH...G.../...	G		
4WEH...H.../...	H		
4WEH...J.../...	J		
4WEH...L.../...	L		
4WEH...M.../...	M		
4WEH...P.../...	P		
4WEH...Q.../...	Q		
4WEH...R.../...	R		
4WEH...S.../...	S		
4WEH...T.../...	T		
4WEH...U.../...	U		
4WEH...V.../...	V		
4WEH...W.../...	W		
4WEH...M1.../...	M1		
4WEH...M2.../...	M2		
4WEH...J2.../...	J2		

2-positon derivative from 3-position

2-position valve type	Symbol (solenoid at A end)	2-position valve type	Symbol (solenoid at B end)
4WEH...EA.../...		4WEH...EB.../...	
4WEH...FA.../...		4WEH...FB.../...	
4WEH...GA.../...		4WEH...GB.../...	
4WEH...HA.../...		4WEH...HB.../...	
4WEH...JA.../...		4WEH...JB.../...	
4WEH...LA.../...		4WEH...LB.../...	
4WEH...MA.../...		4WEH...MB.../...	
4WEH...PA.../...		4WEH...PB.../...	
4WEH...QA.../...		4WEH...QB.../...	
4WEH...RA.../...		4WEH...RB.../...	
4WEH...SA.../...		4WEH...SB.../...	
4WEH...TA.../...		4WEH...TB.../...	
4WEH...UA.../...		4WEH...UB.../...	
4WEH...VA.../...		4WEH...VB.../...	
4WEH...WA.../...		4WEH...WB.../...	
4WEH...M1A.../...		4WEH...M1B.../...	
4WEH...M2A.../...		4WEH...M2B.../...	
4WEH...J2A.../...		4WEH...J2B.../...	

Symbols

Detailed and simplified symbols for 2-position valves



Spools of 2-position valves

Spools:	A	C	D,DE	K	Z	B	Y,YE
Spool symbols:	a b Port T for draining	a b	D a b DE a b	a b	a b	a b Port T for draining	Y a b YE a b
Transition symbols:							

Technical details

1. Hydraulic section

1). WEH10 Type electro-hydraulic directional valve

Maximum working pressure: P, A, B (bar)		Type H-WEH10				Type WEH10			
		350				280			
Port T (bar)	With external pilot oil drain	315							
	With internal pilot oil drain	DC210 AC160							
Port Y (bar)	With external pilot oil drain	DC210 AC160							
Min. control pressure (bar)	With external pilot oil supply With internal pilot oil supply (not apply to C, Z, F, G, H, P, T, V)	3-position valve 10							
		Spring-return 2-position valve 10							
		Hydraulic-return 2-position valve 7							
	With internal pilot oil supply (apply to C, Z, F, G, H, P, T, V)	6.5							
Max. control pressure (bar)		250							
Hydraulic fluid		Mineral oil, phosphate oil							
Temperature range of Hydraulic fluid (°C)		-30 to+80 (NBR seals)							
		-20 to+80 (FKM seals)							
Viscosity range (mm^2/s)		2.8 to 500							
Switching pilot oil volume (cm^3)		3-position valve 2.04 2-position valve 4.08							
Switching times (= Valve switching time from the neutral position to the switched position) (AC and DC)									
Control pressure (bar)		70		140		210		250	
		AC	DC	AC	DC	AC	DC	AC	DC
3-position valve (ms)		30	65	25	60	20	55	15	50
2-position valve (ms)		35	80	30	75	25	70	20	65
Switching times (= Valve switching time from the neutral position to the switched position)									
3-position valve (ms)		30							
2-position valve (ms)		35	40	30	35	25	30	20	25
Flow of shortest switching time (L/min)		About 35							
Installation position		HC, HD, HK, HZ and HY of hydraulic return shall installed horizontally. The rest are arbitrary							
Weight (kg)	Single solenoid valve	6.7							
	Double solenoid valve	7.1							
	Switching time regulator	1.0							
	Reducing valve	0.5							

Technical details

1. Hydraulic section

2). WEH16 Type electro-hydraulic directional valve

Maximum working pressure: P, A, B (bar)		Type H-...WEH16... 350	Type ...WEH16... 280
Port T (bar)	With external pilot oil drain	250	250
	With internal pilot oil drain	DC 210	AC 160
		Hydraulic-centering 3-position valve With internal pilot oil drain is impossible	
Port Y (bar)	With external pilot oil drain	DC210	AC160
Min. control pressure (bar)	With external pilot oil supply	3-position valve	14
	With internal pilot oil supply	Spring-return 2-position valve	14
		Hydraulic-return 2-position valve	14
	With internal pilot oil supply	When applying prepressing or the flow is large correspondingly ,enginery of spool valve is 4.5 as C, Z, F, G, H, P, S, T and V	

Max. control pressure (bar)	250
Hydraulic fluid	Mineral oil, phosphate oil
Temperature range of Hydraulic fluid (°C)	-30 to + 80 (NBR seals)
	-20 to + 80 (FKM seals)
Viscosity range (mm^2/s)	2.8 to 500
Switching pilot oil volume	
- Spring-centering 3-position valve(cm^3)	5.72
-2-position valve(cm^3)	11.45
Hydraulic-centering 3-position valve	
-From"0"position to working position"a" (cm^3)	2.83
-From working position"a" to "0"position (cm^3)	2.9
-From"a"position to working position"b" (cm^3)	5.72
-From working position"b" to "0"position (cm^3)	2.83

* Switching times (= Valve switching time from the neutral position to the switched position) (AC and DC)

Control pressure (bar)	50				150				250			
	AC		DC		AC		DC		AC		DC	
-Spring-centering 3-position valve (ms)	35		65		30		60		30		58	
-2-position valve (ms)	45		65		35		55		30		50	
-Hydraulic-centering 3-position valve (ms)	a	b	a	b	a	b	a	b	a	b	a	b
	30	30	65	65	25	25	55	63	20	25	55	60

*Switching times (= Valve switching time from the neutral position to the switched position)

-Spring-centering 3-position valve (ms)	30											
-2-position valve (ms)	45		45		35		35		30		30	
-Hydraulic-centering 3-position valve(ms)	a	b	a	b	a	b	a	b	a	b	a	b
	20		20		20		20		20		20	

Installation position	C, D, K, Z, Y Type hydraulic-return valves are installed horizontally, the rest can be installed arbitrarily
Flow of shortest switching time (L/min)	About 35
Weight of the valve (kg)	About 9.5

*Switching times refers to time from drawing of solenoid of pilot valve to full opening of main valve.

Technical details

1. Hydraulic section

3). WEH25 Type electro-hydraulic directional valve

Maximum working pressure: P, A, B (bar)		Type H-...WEH25...	Type ...WEH25...
		350	280
Port T (bar)	With external pilot oil drain	250	250
	With internal pilot oil drain	DC 210	AC 160
		Hydraulic-centering 3-position valve With internal pilot oil drain is impossible	
Port Y (bar)	With external pilot oil drain	DC210	AC160
Min. control pressure (bar)	With external pilot oil supply With internal pilot oil supply	Spring-centering 3-position valve	13
		Hydraulic-centering 3-position valve	18
		Spring-return 2-position valve	13
		Hydraulic-return 2-position valve	8
	With internal pilot oil supply	When applying prepressing or the flow is large correspondingly ,enginery of spool valve is 4.5 as C,Z,F,G,H,P,S,T and V	
Max. control pressure (bar)		250	
Hydraulic fluid		Mineral oil, phosphate oil	
Temperature range of Hydraulic fluid (°C)		-30 to + 80 (NBR seals)	
		-20 to + 80 (FKM seals)	
Switching pilot oil volume			
- Spring-centering 3-position valve (cm^3)		14.2	
-2-position valve (cm^3)		28.4	
Hydraulic-centering 3-position valve			
-From"0"position to working position"a" (cm^3)		7.15	
-From working position"a" to "0"position (cm^3)		7.0	
-From"a"position to working position"b" (cm^3)		14.15	
-From working position"b" to "0"position (cm^3)		5.73	

*Valve switching time from the neutral position to the switched position (DC and AC solenoid)

Pilot control pressure (bar)	50		140		210		250	
	AC	DC	AC	DC	AC	DC	AC	DC
-Spring-centering 3-position valve (ms)	50	85	40	75	35	70	30	65
-2-position valve (ms)	120	160	100	130	85	120	70	105

-Hydraulic-centering 3-position valve (ms)	a	b	a	b	a	b	a	b	a	b	a	b	a	b	a	b
	30	35	55	65	30	35	55	65	25	30	50	60	25	30	50	60

*Valve switching time from the neutral position to the switched position

-Spring-centering 3-position valve (ms)	40							
-2-position valve (ms)	120	125	95	100	85	90	75	80

-Hydraulic-centering 3-position valve (ms)	a	b	a	b	a	b	a	b	a	b	a	b	a	b	a	b
	20	35	30	35	30	35	30	35	30	35	30	35	30	35	30	35

Installation position	C,D,K,Z,Y Type hydraulic-return valves are installed horizontally, the rest can be installed arbitrarily
Flow of shortest switching time (L/min)	About 35
Weight of the valve (kg)	About 18

*Switching time refers to time from drawing of solenoidof pilot valve to full opening of main valve.

Technical details

1. Hydraulic section

4). WEH32 Type electro-hydraulic directional valve

Maximum working pressure: P, A, B cavities (bar)		Type H-...WEH32...				Type ...WEH32...							
		350				280							
Port T (bar)	With external pilot oil drain	250				250							
	With internal pilot oil drain	DC210				AC160							
		Hydraulic-centering 3-position valve With internal pilot oil drain is impossible											
Port Y (bar)	With external pilot oil drain	DC210				AC160							
Min. control pressure (bar)	With external pilot oil supply	3-position valve 8.5											
	With internal pilot oil supply	Spring-return 2-position valve 10											
		Hydraulic-return 2-position valve 5											
	With internal pilot oil supply	When applying prepressing or the flow is large correspondingly ,enginery of spool valve is 4.5 as C, Z, F, G, H, P, S, T and V											
Max. control pressure (bar)		250											
Hydraulic fluid		Mineral oil, phosphate oil											
Temperature range of Hydraulic fluid (°C)		-30 to + 80 (NBR seals)											
		-20 to + 80 (FKM seals)											
Viscosity range (mm^2/s)		2.8 to 500											
Switching pilot oil volume													
- Spring-centering 3-position valve (cm^3)		29.4											
-2-position valve (cm^3)		58.8											
Hydraulic-centering 3-position valve													
-From"0"position to working position"a" (cm^3)		14.4											
-From working position"a" to "0"position (cm^3)		15.1											
-From"a"position to working position"b" (cm^3)		29.4											
-From working position"b" to "0"position (cm^3)		14.4											
*Valve switching time from the neutral position to the switched position (DC and AC solenoid)													
Pilot valve pressure (bar)		50				150				250			
		AC		DC		AC		DC		AC		DC	
-Spring-centering 3-position valve (ms)		65		80		50		90		35		105	
-2-position valve (ms)		100		130		75		100		60		115	
-Hydraulic-centering 3-position valve (ms)		a	b	a	b	a	b	a	b	a	b	a	b
		55	60	100	105	40	45	85	95	35	40	85	95
*Valve switching time from the neutral position to the switched position													
-Spring-centering 3-position valve (ms)		(DC:50, AC:60)											
-2-position valve (ms)		115		90		35		70		65		65	
-Hydraulic-centering 3-position valve (ms)		a	b	a	b	a	b	a	b	a	b	a	b
		30	50	30	40	60	75	30	30	105	140	50	50
Installation position		C, D, K, Z, Y Type hydraulic-return valves are installed horizontally, the rest can be installed arbitrarily											
Flow of shortest switching time (L/min)		About 50											
Weight of the valve (kg)		About 36											

*Switching time refers to time from drawing of solenoidof pilot valve to full opening of main valve.

Technical details

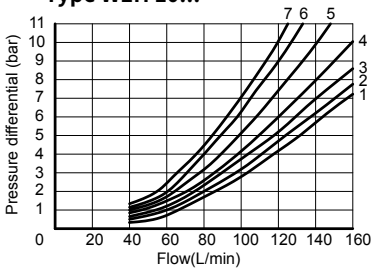
2. Electrical data

Type of voltage	Direct voltage		Alternating voltage
Voltage (allowable fluctuation of ±10%)	12, 24, 28 [1], 48, 96 110, 205, 220		110, 127, 220
Power(W)	High-performance solenoid valve 30	Low-powered solenoid valve 16	
Holding power (VA)			50
Starting power (VA)			220
Operating state	Continuous		
Temperature range of environment (°C)	～ +50		
Temperature range of coil (°C)	～ +150		
Protection class to DIN40050	IP65		

1) Usually used for engineering machinery.
for other voltage, please consult the company.

Characteristic curves (Measured at ϑ_{oil}=40℃ ±5℃ , using HLP46)

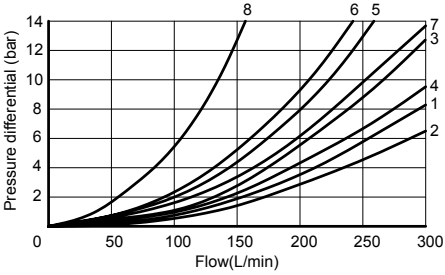
Type WEH 10...



Pressure loss curve graph of **WEH10** Type electro-hydraulic directional control valve

Enginery symbol	Switching position				Enginery symbol	Neutral 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	-

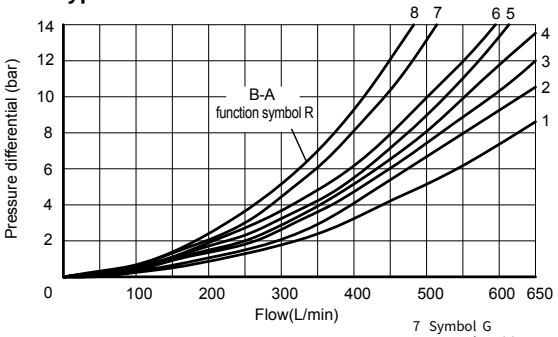
Type WEH 16...



Pressure loss curve graph of **WEH16** Type electro-hydraulic directional control valve

Symbol	Switching 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	-
M, W	2	2	4	3	-
R	2	2	4	-	-
U	1	1	4	7	-
S	4	4	4	-	8

Type WEH 25...



Pressure loss curve graph of **WEH25** Type electro-hydraulic directional control valve

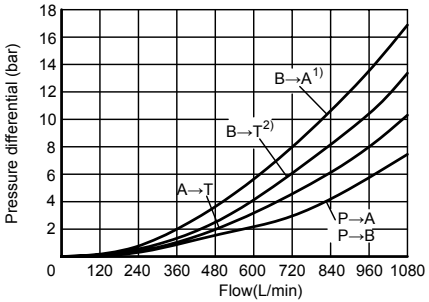
7 Symbol G
Neutral position P-T
8 Symbol T
Neutral position P-T

Symbol	Switching 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
L	2	2	3	3
M	4	4	1	4
P	4	1	1	5
R	2	1	1	-
U	4	1	1	6
V	2	4	3	6
W	1	1	1	3
T	3	1	2	4

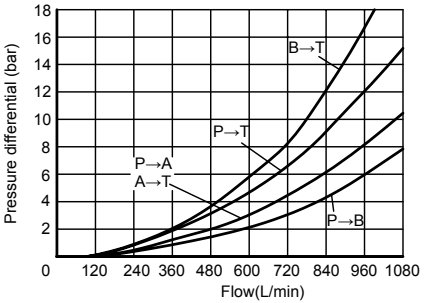
Characteristic curves (Measured at ϑ_{oil}=40°C ±5°C , using HLP46)

Type WEH 32...

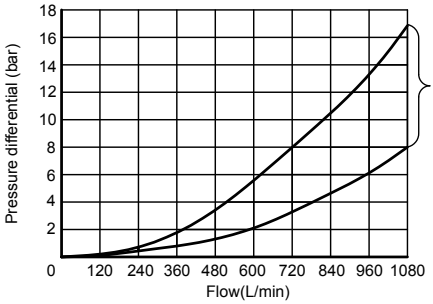
Δp-qv Characteristic curve-Symbol E, R and W



Δp-qv Characteristic curve-Symbol G and T



Δp-qv Characteristic curve-All Symbols



Characteristic curve of other engineries

1) Only apply to Symbol R
2) Not apply to Symbol R

Pressure loss curve graph of **WEH32** Type electro-hydraulic directional control valve

When valve is at the middle position,open area of all flow directions

Size	Enginery	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

Performance limit

The switching function of valves depends on filtration due to adhesive effects. To achieve the specified permissible flow values, we recommend full-flow filtration with 25 µm. The flow forces acting within the valves also have an influence on the flow performance. With 4-way directional valves, the specified flow data are therefore valid for normal applications with 2 directions of flow
(e.g. from P to A and simultaneous return flow from B to T) (see table).
If the fluid flows in only one direction, the permissible flow may be significantly lower in critical cases (e.g. use of a 4-way directional as 3-way directional valve with port A or B blocked).

Type: WEH10 electro-hydraulic directional control valve

3-position valve, spring centering			
Flow(L/min)	Pressure stage(bar)		
Symbol	200	250	315
E, J, L, M, Q, U, W, R, V	160		
H	160	150	120
G, T	160		140
F, P	160	140	120
2-position valve whose main valve has a returning spring			
C, D, K, Z, Y	160		

2-position valve, main valve without spring			
Flow(L/min)	Pressure stage(bar)		
Symbol	200	250	315
HC HD HK HZ HY	160		
HC.../O HD.../O	160		
HK.../O HZ.../O			
HC.../OF... HD.../OF... HK.../OF... HZ.../OF...	160		

Type: WEH16 electro-hydraulic directional control valve

Spring-centering 3-position valve					
Flow(L/min)	Pressure stage(bar)				
Symbol	70	140	210	280	350
E, H, J, L, M, Q, U, W, R	300	300	300	300	300
F, P	300	250	180	170	150
G, T	300	300	240	210	190
S	300	300	300	250	220
V	300	250	210	200	180
Hydraulic-centering 3-position valve (min.control pressure 16 bar)					
All functions	300	300	300	300	300

2-position valve					
Flow(L/min)	Pressure stage(bar)				
Symbol	70	140	210	280	350
C	300	300	300	300	300
D, Y	300	270	260	250	230
K	300	250	240	230	210
Z	300	260	190	180	160
Hydraulic-return 2-position valve					
HC, HD, HK, HZ, HY	300	300	300	300	300
When control oil is supplied internally and pressure valve is equipped, the flow of spool valve's enginery of H, F, P, G, T, S, V, C and Z Types reaches 160L/min.					

Note: in the condition that working pressure of 3-position four-way directional control valve of hydraulic centering exceeds specified Performance limit, control pressure must be increased. When working pressure P=350bar, flow Q=300L/min, control pressure is needed to be 16bar.

Performance limit

Type: WEH25 electro-hydraulic directional control valve

3-position valve of spring centering						**2-position valve**					
Flow(L/min)	Pressure stage(bar)					Flow(L/min)	Pressure stage(bar)				
Symbol	70	140	210	280	350	Symbol	70	140	210	280	350
E, L, M	650	650	650	650	650	G, D, K, Z, Y	650	650	650	650	650
U, W, Q						**Hydraulic-return 2-position valve (main valve without spring)**					
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	650	650	650	650	650
J	650	650	650	600	520	HD.../O					
P	650	550	430	330	300	HK.../O					
V	650	550	400	350	310	HZ.../O					
R	650	650	650	650	580	HC.../OF...	650	650	650	650	650
Hydraulic-centering 3-position valve (minimum control pressure 18bar)						HD.../OF...					
E, F, H, J, L, M P, Q, R, U, V, W	650	650	650	650	650	HK.../OF...					
						HZ.../OF...					
G, T	400	400	400	400	400	When control oil is supplied internally and pressure valve is equipped, the flow of spool valve's enginery of G, Z, V, F, H, P, T Types reaches 180L/min.					
Hydraulic-centering 3-position valve (minimum control pressure 30bar)											
G, T	650	650	650	650	650						

Type: WEH32 electro-hydraulic directional control valve

3-position valve of spring centering						**2-position valve**					
Flow(L/min)	Pressure stage(bar)					Flow(L/min)	Pressure stage(bar)				
Symbol	70	140	210	280	350	Symbol	70	140	210	280	350
E, J, L, M, R U, W, R	1100	1040	860	750	680	C, D, K, Z, Y	1100	1040	860	750	680
H, G	1100	1000	680	500	450	**Hydraulic-return 2-position valve**					
F, T, P	820	630	510	450	400						
Hydraulic-centering 3-position valve (minimum control pressure 8.50bar)						HC, HD, HK, HZ, HY	1100	1040	860	750	680
All functions	1100	1040	860	750	680	When control oil is supplied internally and pressure valve is equipped, the flow of spool valve's enginery of C, G, T, F, P, H, V and Z Types reaches 180L/min.					

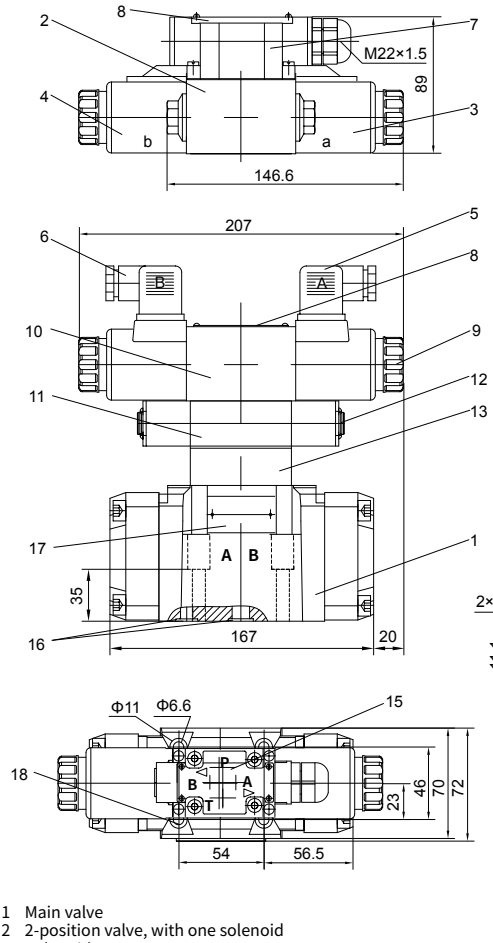
Pilot-operated solenoid valve

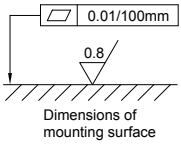
Use a four-way directional control valve with size of 6 to be a pilot valve. Spool valve is kept at the middle position or initial position by a spring and working position by the solenoid or positioner.
This valve applies wet DC or AC solenoid. Enginery of pilot-operated solenoid valve applied for main valve with different engineries are as the table below:

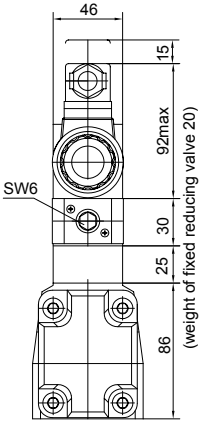
Main valve	**Pilot-operated solenoid valve**
Spring-centering 3-position valve/ transformed 2-position valve	Use 4WE6J-6X/...3-position valve/ 4WE6JA... 4WE6JB...
Hydraulic-centering 3-position valve/ transformed 2-position valve	Use 4WE6M-6X/...3-position valve/ 4WE6MA... 4WE6MB...
Structure of 2-position main valve: Y.../...and HY.../... B.../...and HB.../...	Use 4WE6Y-6X/...2-position valve
2-position valve: A, C, D, K and Z Type functions HA, HC, HD, HK, HZ Type valves	Use 2-position valve with D Type enginery Types of main valve's structure: spring return 4WE6D6X/.. No returning spring 4WE6D-6X/O... No returning spring, with a positioner 4WE6D-6X/OF...

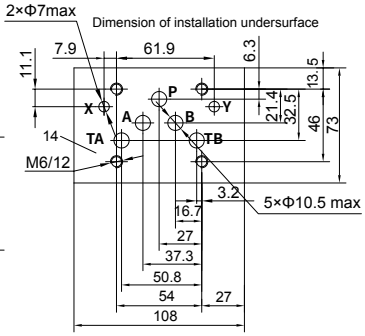
Unit dimensions

Unit dimensions of WEH 10 electro-hydraulic directional control valve









TA and TB can be selected to be an oil returning arbitrarily

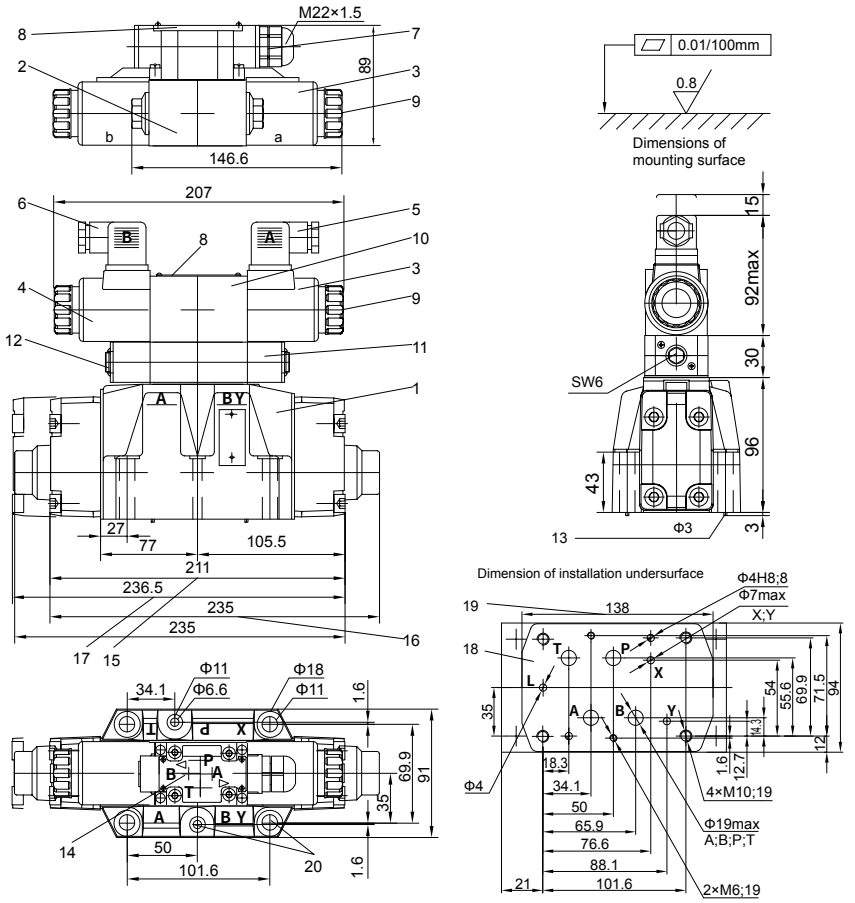
1 Main valve
2 2-position valve, with one solenoid
3 Solenoid a
4 Solenoid b
5 Plug of solenoid a
6 Plug of solenoid b
7 Junction box with lead and light, M22×1.5 interface
8 Label of pilot valve
9 Manual button
10 Double-solenoid 2-position valve, double-solenoid 3-position valve
11 Switching time regulator
12 Section flow of Switching time regulator "full open"
13 Reducing valve
14 Arrangement of main valve's oil outlets (attachment face of valve)
15 Position of leading oil outlet
16 O-ring of A, B, P and T outlets: 12×2; O-ring of X and Y: 10.82×1.78
17 Nameplate
18 Bolt4-M6×45 GB/T70.1-2000-10.9 grade Moment M_A=15.5Nm (bolt of vertical stack components combined with electro-hydraulic directional valve is selected according to actual height)

If you need connecting baseplate, must order separately.

Types: G534/01; G534/02; G535/01; G535/02; G536/01; G536/02

Unit dimensions

Unit dimensions of WEH 16 electro-hydraulic directional control valve



Note: L port only applies to hydraulic-centering 3-position valve and its derived 2-position valve

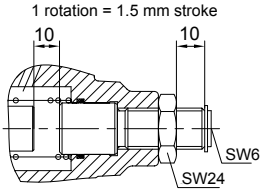
1 Main valve
2 2-position valve with one solenoid
3 Solenoid a
4 Solenoid b
5 Plug of solenoid a
6 Plug of solenoid a
7 Junction box with lead and light, M22×1.5 interface
8 Label of pilot valve
9 Manual button
10 Double-solenoid 2-position valve, Double-solenoid 3-position valve
11 Switching time regulator
12 Adjustable bolt
13 2 locating pins
14 Locating diagram of connector of pilot-operated solenoid valve
15 Size of spring-centering 3-position valve and hydraulic-return 2-position valve
16 Spring-return 2-position valve (icon sizes are C, D, K, Z engineries)
17 Hydraulic-centering 3-position valve
18 Connection diagram of main valve
19 Minimum size of process-required connection face of main valve
20 Bolt4-M10×60 GB/T70.1-2000-10.9 grade(M_A=75Nm)
Bolt 2-M6×55 GB/T70.1-2000-10.9grade (M_A=15.5Nm)
(bolt of vertical stack components combined with electro-hydraulic directional valve is selected according to actual height) must order separately.
O-ring for P, T, A, B outlets: 22×2.5; O-ring for X, Y, L outlets: 10×2

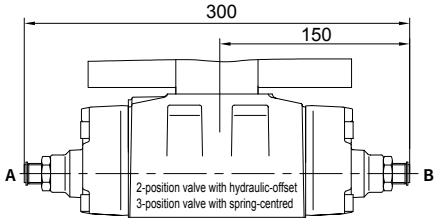
If you need connecting baseplate, must order separately.
Types: G172/01; G172/02/02; G174/01; G174/02; G174/08

Unit dimensions

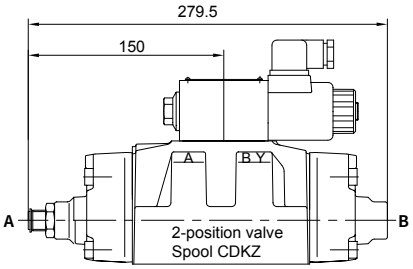
Dimension of additional devices of valve type WEH16

Range of stroke adjustment is 10 mm to adjust main spool stroke. Loosen the lock-up nut and rotate the rod clockwise, thus, shorten the stroke of the main spool.
(Note: adjust can only be made under the condition that the controlling chamber has no pressure)

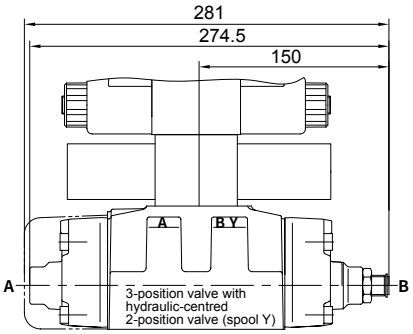




Stroke adjustment fixed on end "A"and "B" of main valve 10
Stroke adjustment fixed on end "A" of main valve 11
Stroke adjustment fixed on end "B" of main valve 12



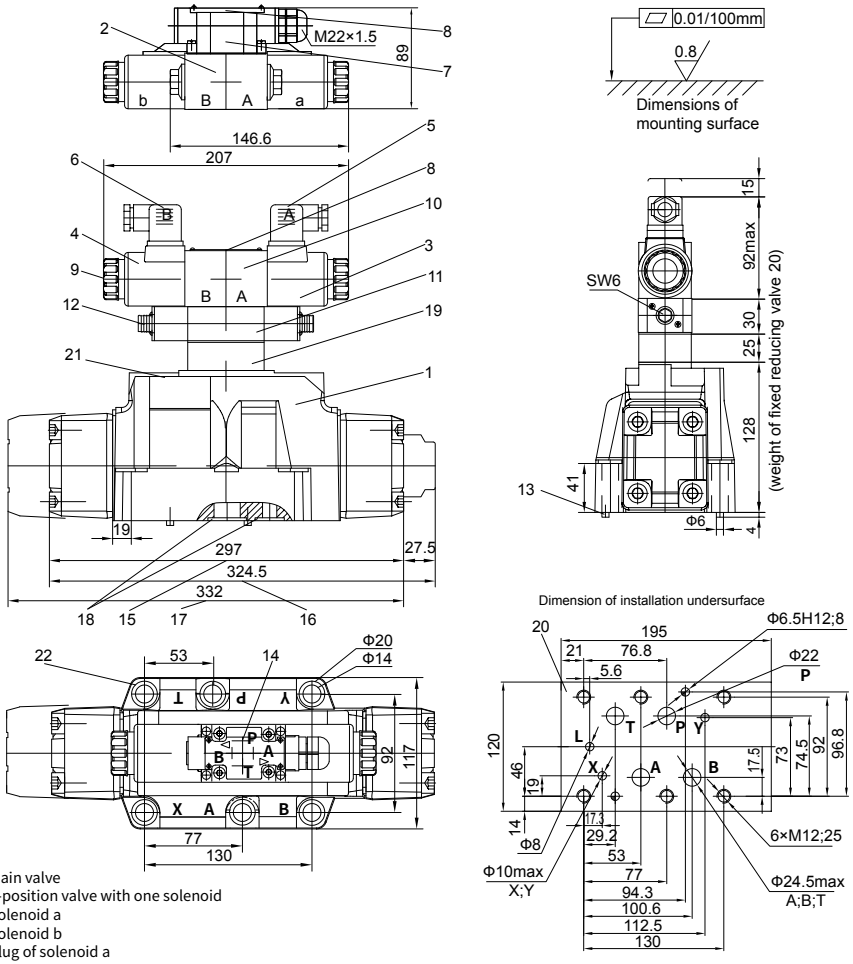
Stroke adjustment fixed on end "A" of main valve 11



Stroke adjustment fixed on end "B" of main valve 12

Unit dimensions

Unit dimensions of WEH 25 electro-hydraulic directional control valve



1 Main valve
2 2-position valve with one solenoid
3 Solenoid a
4 Solenoid b
5 Plug of solenoid a
6 Plug of solenoid b
7 Junction box with lead and light, M22×1.5 interface
8 Label of pilot valve
9 Manual button
10 Double-solenoid 2-position valve, Double-solenoid 3-position valve
11 Switching time regulator
12 Adjustable bolt
13 2 locating pins
14 Locating diagram of connector of pilot
15 Size of spring-centering 3-position valve and hydraulic-return 2-position valve
16 Spring-return 2-position valve (icon sizes are C, D, K, Z functions)
17 Hydraulic-centering 3-position valve
18 O-ring: 27×3(A, B, P and T); 19×3(X, Y)

Note: L port only applies to hydraulic-centering 3-position valve and its derived 2-position valve

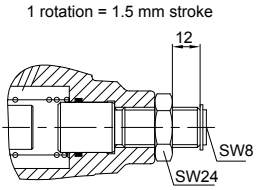
19 Reducing valve
20 Diagram of connector of main valve
21 Labels
22 Bolt6-M12×60 GB/T70.1-2000-10.9 grade (M_A=130Nm) (bolt of vertical stack components combined with electro-hydraulic directional valve is selected according to actual height) must order separately.

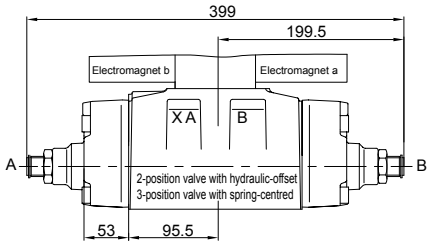
If you need connecting baseplate,must order separately.
Types:
G151/01; G151/02; G153/01;G153/02;
G154/01;G154/02; G156/01;G156/02; G154/08

Unit dimensions

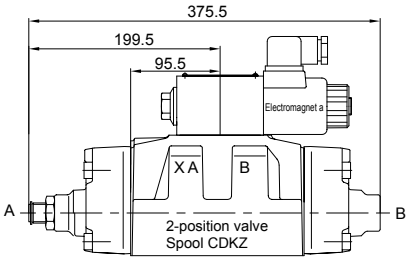
Dimension of additional devices of valve type WEH25.

Range of stroke adjustment is 12 mm to adjust main spool stroke. Loosen the lock-up nut and rotate the rod clockwise, thus, shorten the stroke of the main spool.
(Note: adjust can only be made under the condition that the controlling chamber has no pressure)

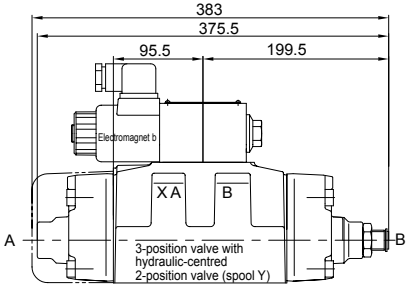




Stroke adjustment fixed on end "A"and "B" of main valve 10
Stroke adjustment fixed on end "A" of main valve 11
Stroke adjustment fixed on end "B" of main valve 12



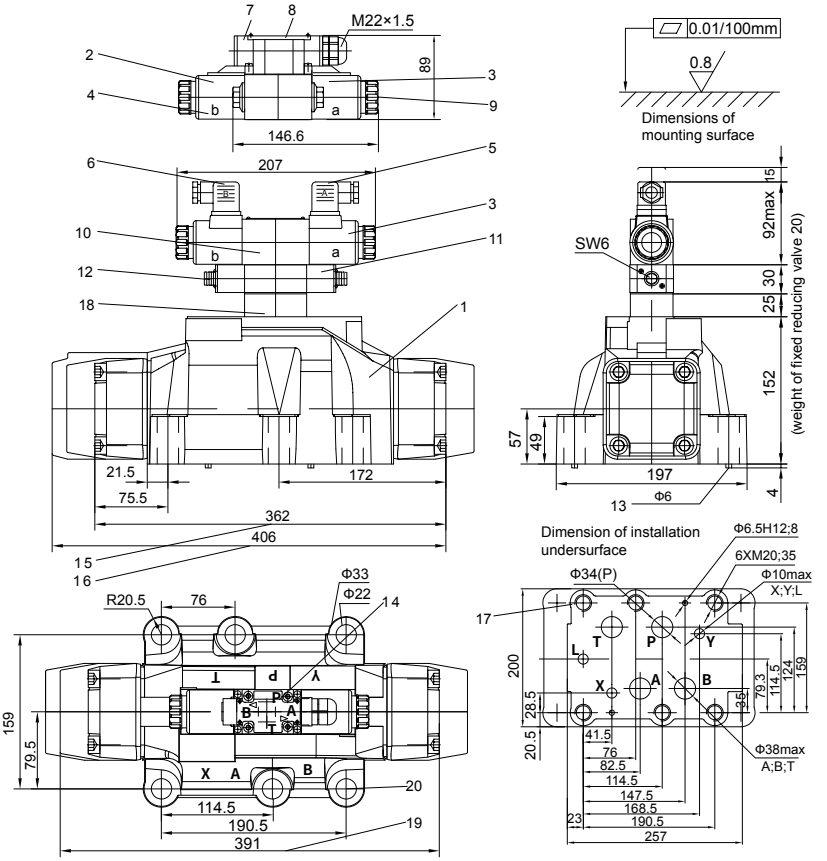
Stroke adjustment fixed on end "A" of main valve 11



Stroke adjustment fixed on end "B" of main valve 12

Unit dimensions

Unit dimensions of WEH 32 electro-hydraulic directional control valve



Note: L port only applies to hydraulic-centering 3-position valve and its derived 2-position valve

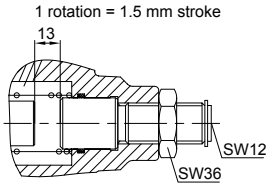
1 Main valve
2 2-position valve with one solenoid
3 Solenoid a
4 Solenoid b
5 Plug of solenoid a
6 Plug of solenoid a
7 Junction box with lead and light, M22×1.5 interface
8 Label of pilot valve
9 Manual button
10 Double-solenoid 2-position valve, Double-solenoid 3-position valve
11 Switching time regulator
12 The location when section flow full open
13 2 locating pins
14 Locating diagram of connector of pilot-operated solenoid valve
15 Size of spring-centering 3-position valve and hydraulic-return 2-position valve
16 Hydraulic-centering 3-position valve
17 Locating diagram of connector of main valve
18 Reducing valve
19 Spring-return 2-position valve (Icon size is Y Type enginery. For C, D, K, Z on the right head protruding function)
20 Bolt6-M20×80 GB/T70.1-2000-10.9 (M_A=430Nm) (bolt of vertical stack components combined with electro-hydraulic directional valve is selected according to actual height)
P, T, A, B port O-rings: 42×3
X, Y, L port O-rings: 19×3

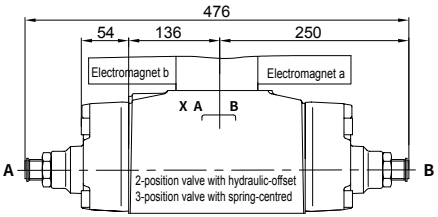
If you need connecting baseplate, must order separately.
Types: G157/01; G157/02; G158/10

Unit dimensions

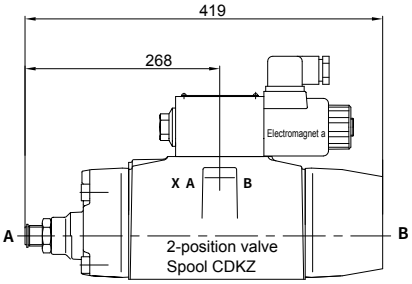
Dimension of additional devices of valve type WEH32

Range of stroke adjustment is 13 mm to adjust main spool stroke. Loosen the lock-up nut and rotate the rod clockwise, thus, shorten the stroke of the main spool.
(Note: adjust can only be made under the condition that the controlling chamber has no pressure)

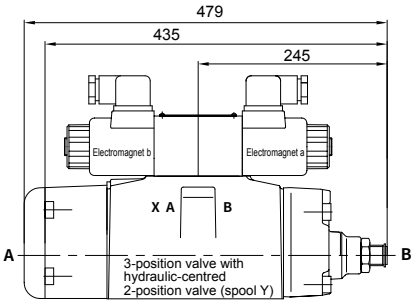




Stroke adjustment fixed on end "A"and "B" of main valve 10
Stroke adjustment fixed on end "A" of main valve 11
Stroke adjustment fixed on end "B" of main valve 12



Stroke adjustment fixed on end "A" of main valve 11



Stroke adjustment fixed on end "B" of main valve 12