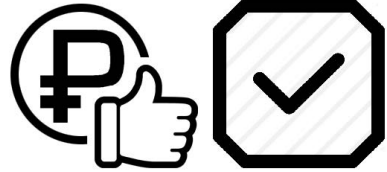
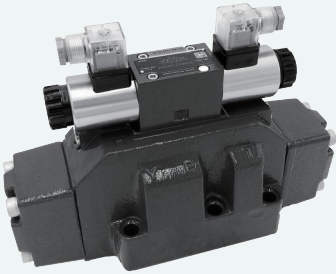


## Electro-hydraulic directional control valve

Type WEH/WH...4X/5X/7XJ



## ЦЕНА и НАЛИЧИЕ

- ◆ Size 10~32
- ◆ Max. working pressure 350bar
- ◆ Max. flow 1100L/min

### Contents

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### Features

- Valves used to control the start, stop and direction of a fluid flow
  - Electro-hydraulic operation (WEH)
  - Hydraulic operation (WH)
  - Subplate mounting
  - porting pattern conforms to DIN24340 form A and ISO4401
  - Spring or pressure centered, spring or hydraulic offset
  - Wet pin DC or AC solenoids, optional
  - Hand override, optional
  - Electrical connection as an individual or central connection
  - Shifting time adjustment, optional
  - Pre-load valve in the P-channel of the main valve, optional
  - Auxiliary equipment to data sheet
- Stroke adjustment at main spool, optional  
 Stroke adjustment and/or end position indicator, optional  
 Mechanical or inductive limit switch (proximity type) at the main spool, optional

## Function and configuration

### Type 4WEH Directional valve

Type WEH valves are directional spool valves with electro-hydraulic operation. They control the start, stop and direction of a flow. The valve mainly consists of main valve body(1), main valve spool(2), one or two return spring(3.1 and 3.2), and the pilot valve(4) with one or two solenoid(5.1 and 5.2).

Type 4WEH main valves are 4/3-way directional valve with spring centering of the control spool:

In this model, the main valve spool is held in the neutral or initial position by the springs. And two spring chambers(6 and 8) are connected with tank through the pilot valve in the initial position, the pilot valve(4) is supplied with pilot oil by the control line(7). The pilot oil supply can be implemented internal or external (external via port X). When one of the main control spool(2) is pressurised by the pilot valve(4), the spool(2) will be moved to the expected position. This gives free-flow from P to A and B to T or P to B and A to T, the pilot oil return is implemented internally or externally. An optional manual override(9) allows for moving of the pilot spool(10) without solenoid energization.

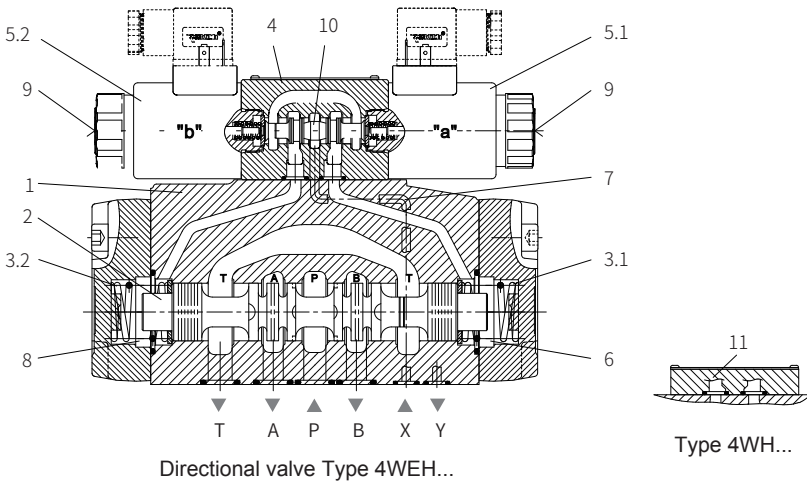
### Type 4WH Directional valve

Type WH valves are directional spool valves with hydraulic operation.

They control the start, stop and direction of a fluid flow. The valve consists of the valve body(1), main valve spool(2), one or two return spring(3.1 and 3.2) and in the case of valves with spring return or spring centering, and the pilot connecting plate(11). The spool(2) is operated directly by hydraulic pressure.

The spool is held in the neutral or initial position by springs or by means of pressure. Pilot oil supply and drain are external.

For the spring-centered valves, the spool(2) is held in the center position by the return springs, the two spring chambers(6 and 8) are connected to port X and Y via the connecting plate(11). When one of the two ends of the main spool(2) is pressurised, the spool is moved to the shifted position, the required ports in the valve are then opened to flow.



Type 4WH...

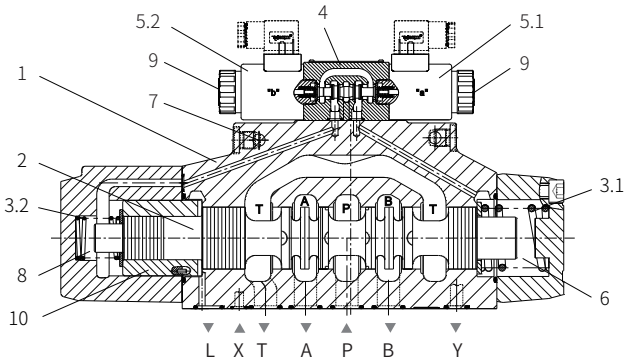
## Function and configuration

Type 4WEH...H main valves are 4/3-way directional valve with pressure centering of the control spool:

The main spool(2) in the main valve is held in the neutral position by pressurization of the two front faces. A centering sleeve(10) is supported in the housing and holds the spool(2) in position.

By removing the pressure from one of the spool ends, the main spool(2) is moved to the shifted position. The unloaded spool area displaces the returning pilot oil via the pilot valve(4) into the tank(external).

01



- 1 Main valve body
- 2 Main valve spool
- 3.1 Spring
- 3.2 Spring
- 4 Pilot solenoid valve
- 5.1 Solenoid
- 5.2 Solenoid
- 6 Spring chamber
- 7 Control oil inlet passage
- 8 Spring chamber
- 9 Manual button
- 10 Centering sleeve

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

### Pilot oil supply

● Type WEH10

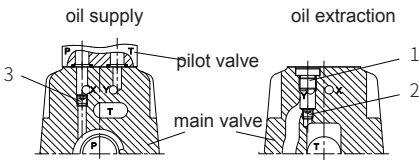
- ◆ Conversion between internal supply and external supply:  
P channel on the top of main valve body with M6 bolt(3) is external supply and with M6 bolt(3) dismounted is internal supply.
- ◆ Conversion between internal drain and external drain:

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

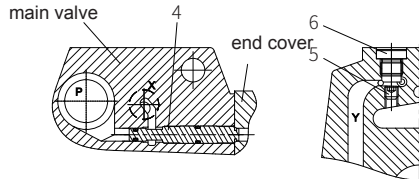
● Type WEH16

- ◆ Conversion between internal supply and external supply:  
The small end of pin(4) on the top of main valve is installed toward to end cover without plug(5).
- ◆ Conversion between internal drain and external drain:

The big end of pin(4) on the top of main valve is installed toward to end cover with plug(5).



Structure chart of type WEH10 supply and discharge



Structure chart of type WEH16 supply and discharge

## Function and configuration

### Pilot oil supply

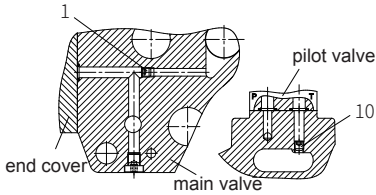
#### ● Type WEH25

◆ Conversion between internal supply and external supply:

P channel on the top of main valve body with M6 bolt(9) is external supply and with M6 bolt(9) dismantled is internal supply.

◆ Conversion between internal drain and external drain:

T channel on the top of main valve body with M6 bolt(10) is external drain and with M6 bolt(10) dismantled is internal drain.



Structure chart of type WEH25 supply and discharge

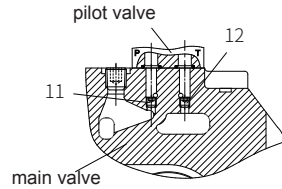
#### ● Type WEH32

◆ Conversion between internal supply and external supply:

P channel on the top of main valve body with M6 bolt(11) is external supply and with M6 bolt(11) dismantled is internal supply.

◆ Conversion between internal drain and external drain:

P channel on the top of main valve body with M6 bolt(12) is external drain and with M6 bolt(12) dismantled is internal drain.



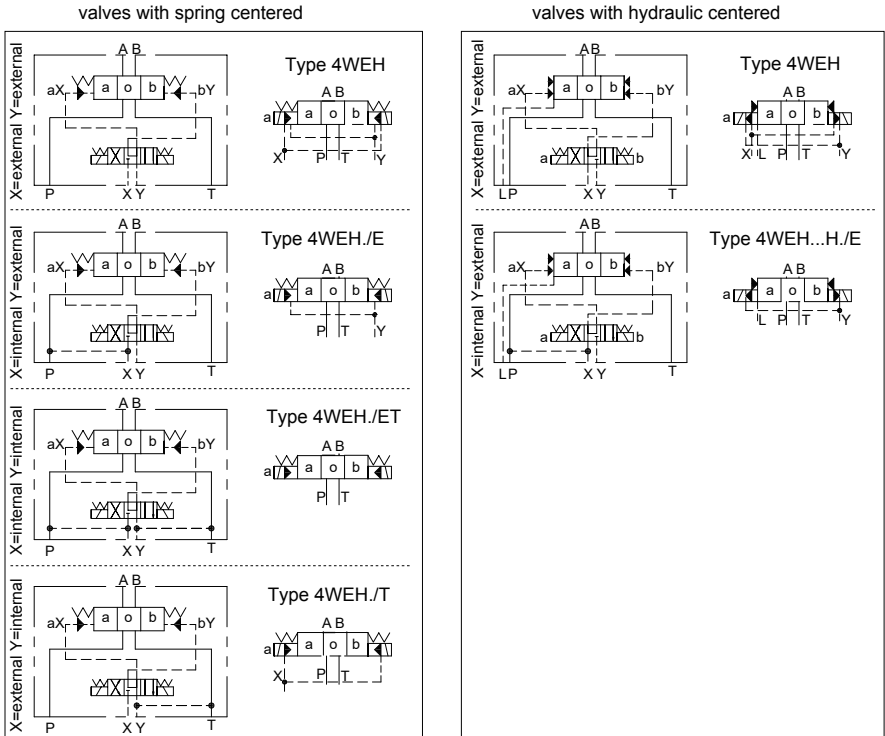
Structure chart of type WEH32 supply and discharge

## Ordering code

4	J /	/	*
working pressure			further details in clear text
350bar			
4 ways =4			
electro-hydraulic =WEH			No code =NBR seal
hydraulic =WH			V =FKM seal
size10 =10			No code =without pressure reducing valve
size16 =16			D3 =with pressure reducing valve
size22 =22			
size25 =25			
size32 =32			
spool return			No code =without pre-load valve
by means of spring =no code			P45 =with pre-load valve
hydraulic =H			
for symbols, see next page			No code =without throttle insert
series 40 to 49 =size10			B08 =throttle $\Phi$ 0.8mm
series 50 to 59 =size16/25/32			B10 =throttle $\Phi$ 1.0mm
series 70 to 79 =size 22			B12 =throttle $\Phi$ 1.2mm
			B15 =throttle $\Phi$ 1.5mm
Jiangsu jiyate hydraulic =J			Additional equipment NO.(see additional equipment)
when pilot valve use 2-position valve of 2 solenoids, main valve is hydraulic reset:			Type of electrical connection(see type of electrical connection dimensions)
without spring return =O			Z5L =square plug with lamp
without spring return with detent =OF			No code =without shifting time adjustment
			S =shifting time adjustment as meter-in control
pilot valve with wet-pin solenoids			S2 =shifting time adjustment as meter-out control
standard valve =A			control oil supply and drain type:
high-performance valve =E			no code =external supply and external drain
DC 24V =G24			E =internal supply and external drain
AC 220V, 50Hz =W220-50			ET =internal supply and external drain
other voltage see the directional valve WE6			T =external supply and internal drain
			Type 4WH only available as no code
			Versions ET and T as 3 position valve with pressure centering only possible if $P_{hydraulic\ pressure} \geq 2 \times P_{return}$
			oil+lowest control pressure
1) Pilot oil supply internal			no code = without manual override
*Minimum control pressure			N = with manual override
*In order to prevent inadmissibly high pressure peaks, a "B10" throttle insert has to be provided in port P of the pilot valve.			N9 =with concealed manual override
2) Only in connection with the "B10" throttle insert			

# Symbols

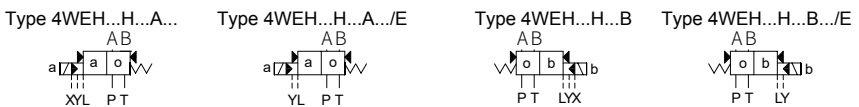
Detailed and simplified symbols for 3-position valves



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



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



## Symbols

### Spool of 3-position valve

#### 3-position valve

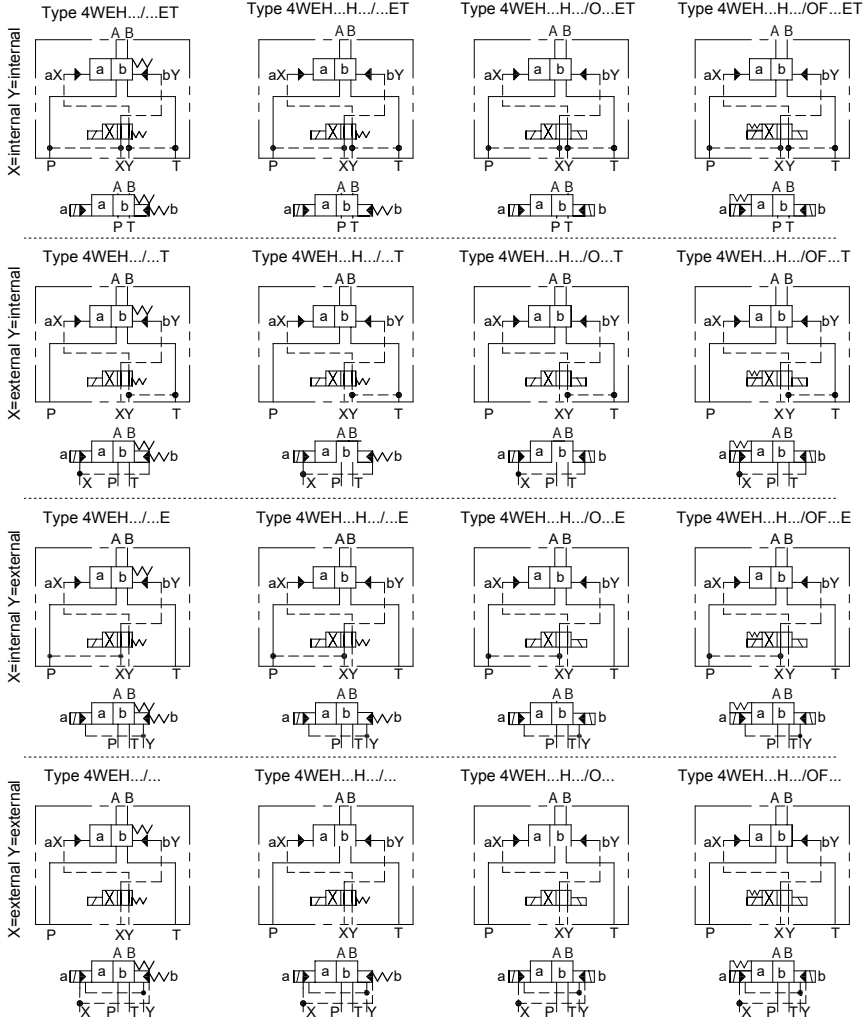
3-position valve type	symbol	crossover symbol
4WEH...E.../... E		
4WEH...F.../... F		
4WEH...G.../... G		
4WEH...H.../... H		
4WEH...J.../... J		
4WEH...L.../... L		
4WEH...M.../...M		
4WEH...P.../... P		
4WEH...Q.../... Q		
4WEH...R.../... R		
4WEH...S.../... S		
4WEH...T.../... T		
4WEH...U.../... U		
4WEH...V.../... V		
4WEH...W.../...W		

#### 2-position derivative from 3-position valve

2-position valve type	symbol (solenoid at A end)	2-position valve type (solenoid at B end)	symbol
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.../...	

# Symbols

Detailed and simplified symbols for 2-position valves



Spools of 2-position valves

spools:	C	D	K	Z	Y
spool symbols:					
transition symbols:					



## Technical data

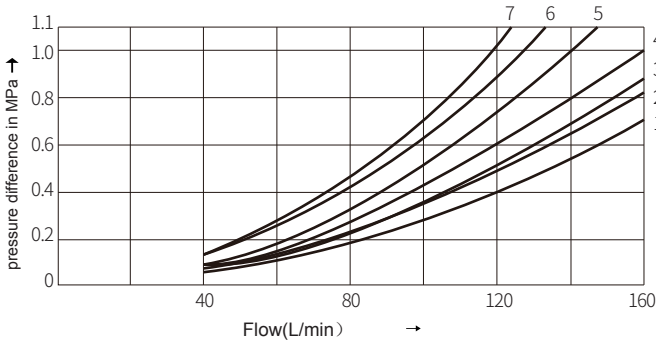
size	10	16	22	25	32	
max. working pressure type 4WEH (MPa)	28	28	28	28	28	
-port P, A, B type H-4WEH (MPa)	35	35	35	35	35	
-port T	pilot oil drain external (MPa)	31.5 <sup>5)</sup>	25	25	25	25
	pilot oil drain internal (MPa)			21 DC 16 AC		
-port Y pilot oil drain external	-DC solenoid (MPa)			166) /217)	DC	
	-AC solenoid (MPa)			108) /167)	AC	
	-type 4WH (MPa)	25 (type10, 16, 25, 32)			21 (type22)	
max. control pressure for higher pilot pressure, a reducing valve is required (MPa)		25 (type10, 16, 25, 32)			21 (type22)	
min. control pressure -externally piloted, internally drained (applicable with spools: C,F,G,H,P,T,V,Z) <sup>2)</sup>		H-4W...				
	spring centered 3- position valve (MPa)	1.0	1.4	1.25	1.3	0.85
	hydraulic centered 3-position valve (MPa)	-	1.4	1.05	1.8	0.85
	spring offset 2-position valve (MPa)	1.0	1.4	-	1.3	1.0
	hydraulic offset 2-position valve (MPa)	0.7	1.4	1.4	0.8	0.5
-internally piloted (applicable with spools: C,F,G,H,P,T,V,Z) <sup>2)</sup>		0.45 <sup>3)</sup>	0.45 <sup>4)</sup>	0.45 <sup>4)</sup>	0.45 <sup>4)</sup>	0.45 <sup>4)</sup>
1) In a 3-position valve, hydraulic centering is only possible if $p_{\text{pilot}} \geq x p_{\text{tank}} + p_{\text{pilot min}}$		4) For spools C, F, G, H, P, T, V, Z, S 2) (with pilot pressure insert or considerably high flows)				
2) spool S is only for size 16						
3) Internally piloted valves with spool types C, F, G, H, P, T, V, Z will only shift if the flow from P to T in the center position (3-position valves) or during spool crossover (2-position valves) is large enough that the pressure drop from P to T reaches a minimum of 95 P6.5 bar), which is required to shift the pilot valve.						
hydraulic fluid	petroleum oils, phosphate ester oil					
fluid temperature range (°C)	NBR seals:-30 to +80 FRM seal:-20 to +80					
viscosity range (mm <sup>2</sup> /s)	2.8 to 500					
max. degree of fluid contamination: Class 9 according to NAS1638. Therefore, we recommend a filter with a minimum retention rate of $\beta_{10} \geq 75$ .						
pilot fluid volume for valve operation						
-3-position valve, spring centered (cm <sup>3</sup> )	2.04	5.72	7.64	14.2	29.4	
-2 position valve <sup>3)</sup>	4.08	11.45	15.28	28.4	58.8	
-3-position valve, hydraulic centered <sup>3)</sup>	-	WH WEH	- -	WH WEH	WH WEH	
-from "0" position to working position "a" <sup>3)</sup>	-	2.83	2.83	- -	7.15 7.15	14.4 14.4
-from working position "a" to "0" position <sup>3)</sup>	-	5.72	5.72	- -	14.18 7.0	29.4 15.1
-from "0" position to working position "b" (cm <sup>3</sup> ) <sup>3)</sup>	-	5.72	5.72	- -	14.18 14.15	29.4 29.4
-from working position "b" to "0" position <sup>3)</sup>	-	8.55	8.55	- -	19.88 5.73	43.8 14.4
pilot fluid flow qv (approx.) for shortest shifting time (L/min)	35	35	35	35	45	
weight(approx.) valve with one solenoid (kg)	6.4	8.5	11.5	17.6	40.5	
valve with two solenoids, spring centered (kg)	6.8	8.9	11.9	18.0	41.0	
valve with two solenoids, hydraulic centered (kg)	6.8	8.9	11.9	19.0	41.0	
hydraulic operated (4WH...) (kg)		7.3	10.5	16.5	39.5	
pilot choke adjustment (kg)		approx.0.8				
pressure ratio valve (kg)		approx.0.4				
installation position	optional, valve with spool C, D, K, Z, Y horizontal.					

## Technical data

shifting time																		
Contacting at the pilot valve up to start of opening of the control land in the main valve																		
size 10	valve switching time from center to switched position (AC and DC solenoid)																	
	with a pilot pressure of (MPa)		~7=		~14=		~21=		~25=									
	-3-position valve (ms)		30	65	25	60	20	55	15	50								
	-2-position valve (ms)		35	80	30	75	25	70	20	65								
	valve switching time from switched position to center																	
	-3-position valve (ms)		30															
-2-position valve (ms)		35	40	30	75	25	30	20	25									
size 16	valve switching time from center to switched position (AC and DC solenoid)																	
	with a pilot pressure of (MPa)		~7=			~15=			~25=									
	-3-position valve, spring centered (ms)		25...30	40	25...30	40	25...30	40										
	-2-position valve (ms)		30...35	55	30...35	55	30...35		55									
	-3-position valve, solenoid operated (ms)		a	b	a	b	a	b	a	b	a	b						
	hydraulic centered (ms)		30	30	40	40	30	30	40	40	30	30	35	40				
	valve switching time from switched position to center																	
	-3-position valve (ms)		20 to 35 for ~; 30 for =															
-2-position valve (ms)		30...50	45	30...50	45	30...50		45										
-3-position valve, hydraulic centered (ms)		a	b	a	b	a	b	a	b	a	b							
(ms)		20...35	20	20...55	20	20...35		20										
size 25	valve switching time from center to switched position (AC and DC solenoid)																	
	with a pilot pressure of (MPa)		~7=			~14=			~21=		~25=							
	-3-position valve, spring centered (ms)		50	85	40	75	35	70	30	65								
	-2-position valve (ms)		120	160	100	130	85	120	70	105								
	-3-position valve, solenoid operated (ms)		a	b	a	b	a	b	a	b	a	b						
	hydraulic centered (ms)		20	35	55	65	30	35	55	65	25	30	50	60	25	30	50	60
	valve switching time from switched position to center																	
	-3-position valve (ms)		40 to 55 for ~; 40 for =															
	-2-position valve (ms)		120	125	85	100	85	90	75	80								
	-3-position valve, solenoid operated (ms)		a	b	a	b	a	b	a	b	a	b	a	b				
hydraulic centered (ms)		30...50	30	35	30...50	30	35	30...50	30	35	30...50	30	35					
size 32	valve switching time from center to switched position (AC and DC solenoid)																	
	with a pilot pressure of (MPa)		~5=			~15=			~25=									
	-3-position valve, spring centered (ms)		65	80	50	90	35	105										
	-2-position valve (ms)		100	130	75		100		60			115						
	-3-position valve, solenoid operated (ms)		a	b	a	b	a	b	a	b	a	b						
	hydraulic centered (ms)		55	35	100	105	40	45	85	95	35	40	85	95				
	valve switching time from switched position to center																	
	-3-position valve (ms)		60 to 75 for ~; 50 for =															
-2-position valve (ms)		115...130	90	85...100		70	65...80		65									
-3-position valve, solenoid operated (ms)		a	b	a	b	a	b	a	b	a	b							
hydraulic centered (ms)		30...65	30	40	60...90		30	40	105...155		50	50						

## Characteristic curves

Type 4WEH10... (measured at  $\vartheta_{oil} = 41\text{mm}^2/\text{s}$  and  $t=50^\circ\text{C}$ )



symbol	switching position				symbol	switching position		
	P-A	P-B	A-T	B-T		A-T	B-T	P-T
E, D, Y	2	2	4	5	F	3	-	6
F	1	4	1	4	G,T	-	-	7
G, T	4	2	2	6				
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	-	7	5
Q, V, W, Z	2	2	3	5	U	-	4	-
R	2	2	3	-				
U	3	3	3	4				
P	4	1	3	4				

## Performance limit

Type 4WEH10... (measured at  $\vartheta_{oil} = 41\text{mm}^2/\text{s}$  and  $t=50^\circ\text{C}$ )

symbol	pressure stage (MPa)		
	20	25	31.5
E, J, L, M, Q, R, U, V, W C, D, K, Z, Y	160		
H	160	150	120
G, T	160	160	140
F, P	160	140	120

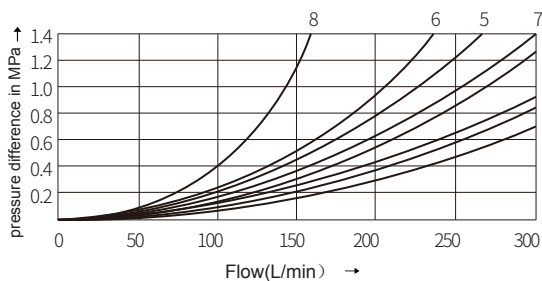
**Note:**

The shifting performance limits down are valid for applications with two directions of flow (e.g. from P to A and simultaneous return flow from B to T). As a result of the flow forces occurring within the valve with only one direction of flow (e.g. from P to A with port B blocked) the permissible performance limits may be considerably lower!

The performance limits were determined with the solenoid at operating temperature, 10% under voltage and with no tank pre-loading.

## Characteristic

Type 4WEH16... (measured at  $\vartheta_{oil} = 41\text{mm}^2/\text{s}$  and  $t=50^\circ\text{C}$ )



symbol	switching position				
	P-A	P-B	A-T	B-T	P-T
E, D, Y	1	1	1	3	-
F, P	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

## Performance limit

Type 4WEH16... (measured at  $\vartheta_{oil} = 41\text{mm}^2/\text{s}$  and  $t=50^\circ\text{C}$ )

Flow for 2-spool position valves(L/min)					
symbol	pressure stage (MPa)				
	7	14	21	28	25
spring offset 1)					
C, D, K, Z, Y	300	300	300	300	300
spring offset 2)					
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
HC, HD, HK	300	300	300	300	300
HZ, HY	300	300	300	300	300

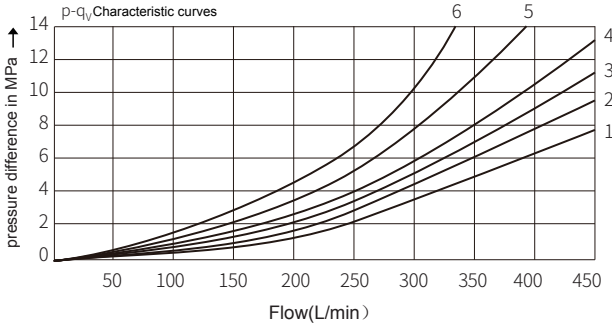
Flow for 3-spool position valves(L/min)						with pre-load valve, X=internal
symbol	pressure stage (MPa)					
	7	14	21	28	25	
spring offset 1)						spool F,G,H,P,S
E, H, J, L, MQ, U, W, R	300	300	300	300	300	
F, P	300	250	180	170	150	
G, T	300	300	240	210	190	
S	300	300	300	250	220	
V	300	250	210	200	180	
hydraulic centering (min.control pressure 16bar)						flow of spool up to 160l/min
symbol	300	300	300	300	300	

Note:

In the condition that working pressure of 3-position four-way directional valve of hydraulic centering exceeds specified performance limit, control pressure must be increased. When working pressure  $P=350\text{bar}$ , flow  $Q=300\text{L/min}$ , control pressure is needed to be 1.6MPa.

## Characteristic

Type 4WEH22... (measured at  $\vartheta_{oil} = 41\text{mm}^2/\text{s}$  and  $t=50^\circ\text{C}$ )



symbol	switching position			
	P-A	P-B	A-T	B-T
E, M, P, Q, U, V	2	2	1	4
F	1	2	1	2
G, T	2	2	2	4
H, J, W	2	2	1	3
L	2	2	1	2
R	1	2	1	-

symbol	switching position		
	A-T	B-T	P-T
F	-	-	4
G, P	-	-	6
H	-	-	2
L	4	-	-
T	-	-	5
U	-	6	-

## Performance limit

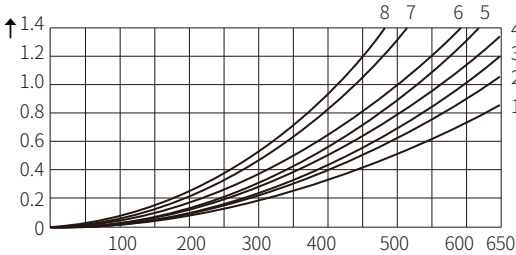
Type 4WEH22... (measured at  $\vartheta_{oil} = 41\text{mm}^2/\text{s}$  and  $t=50^\circ\text{C}$ )

Flow for 2-spool and 3-spool position valves(L/min)					
symbol	pressure stage (bar)				
	70	140	210	280	350
X external-spring return in the main valve (with $P_{pilot\ min}=11\text{bar}/14\text{bar}$ )					
C, D, K, Y, Z	450	450	450	450	450
X external-spring return in the main valve 1)					
C	450	450	320	250	200
D, Y	450	450	450	400	320
K	450	215	150	120	100
Z	350	300	290	260	160
X external-hydraulic centered					
HC, HD, HK, HZ, HY	450	450	450	450	450
HC../O..	450	450	450	450	450
HD../O..	450	450	450	450	450
HK../O..	450	450	450	450	450
HZ../O..	450	450	450	450	450
HC../OF..	450	450	450	450	450
HD../OF..	450	450	450	450	450
HK../OF..	450	450	450	450	450
HZ../OF..	450	450	450	450	450

Flow for 3-spool position valves(L/min)					
	pressure stage (bar)				
	70	140	210	280	350
X external-spring centered					
E, J, L, M, Q, U, W, R	450	450	450	450	450
H	450	450	300	260	230
G	400	350	250	200	180
F	450	270	175	130	110
V	450	300	240	220	160
T	400	300	240	200	160
P	450	270	180	170	110

## Characteristic curves

Type 4WEH25... (measured at  $\theta_{oil} = 41 \text{ mm}^2/\text{s}$  and  $t=50^\circ\text{C}$ )



symbol	switching position				symbol	switching position			
	P-A	P-B	A-T	B-T		P-A	P-B	A-T	B-T
E	1	1	1	3	P	4	1	1	5
F	1	4	3	3	Q	2	2	3	5
G	3	1	2	4	Z	1	1	1	-
H	4	4	3	4	U	2	1	1	6
J	2	2	3	5	V	4	4	3	6
L	2	2	3	3	W	1	1	1	3
M	4	4	1	4	T	3	1	2	4

## Performance limit

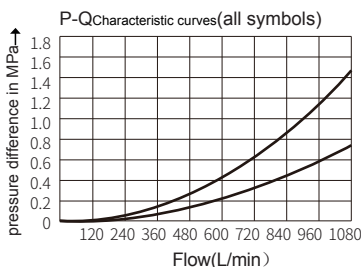
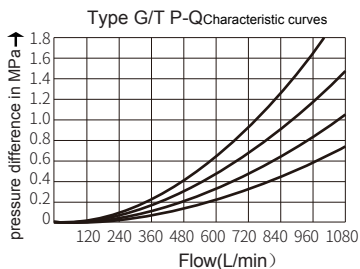
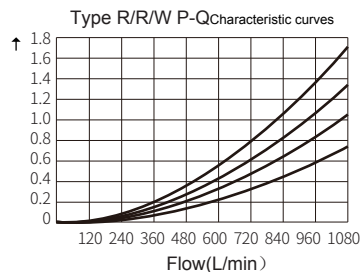
Type 4WEH25... (measured at  $\theta_{oil} = 41 \text{ mm}^2/\text{s}$  and  $t=50^\circ\text{C}$ )

Flow for 2-spool position valves(L/min)					with pre-load valve, X=internal
symbol	pressure stage				
spring return in the main 1)					flow of spool C and Z up to 180 L/min
C, D, K, Z, Y	700	700	700	700	
spring return in the main valve 2)					flow of spool HC and HZ up to 180 L/min
C	700	700	700	700	
	700	650	400	350	300
	700	650	420	370	320
Z	700	700	650	480	400
HC, HD, HK	700	700	700	700	700
HZ, HY	700	700	700	700	700
HC.../O	700	700	700	700	700
HD.../O	700	700	700	700	700
HK.../O	700	700	700	700	700
HZ.../O	700	700	700	700	700
HC.../OF	700	700	700	700	700
HD.../OF	700	700	700	700	700
HK.../OF	700	700	700	700	700
HZ.../OF	700	700	700	700	700

symbol	pressure stage (MPa)					with pre-load valve, X=internal
	7	14	21	28	35	
spring centered						flow of spool F G H P and T up to 180 L/min
E, L, M Q, U, W						
G/T	400	400	400	400	400	
F	650	550	430	330	300	
H	700	650	550	400	360	
J	700	700	650	600	520	
P	650	550	430	330	300	
V	650	550	400	350	310	
	700	700	700	650	680	
hydraulic centering (min.control pressure 18bar)						
	700	700	700	700	650	
	700	700	700	700	650	
	700	700	700	700	650	
	400	400	400	400	400	
hydraulic centering (min.control pressure 3bar)						
	700	700	700	700	700	

## Characteristic curves

Type 4WEH32... (measured at  $\vartheta_{oil} = 41\text{mm}^2/\text{s}$  and  $t=50^\circ\text{C}$ )



## Performance limit

Type 4WEH32... (measured at  $\vartheta_{oil} = 41\text{mm}^2/\text{s}$  and  $t=50^\circ\text{C}$ )

Flow for 2-spool position valves(L/min)					
symbol	pressure stage (MPa)				
	7	14	21	28	25
spring return in the main 1)					
C, D, K, Z, Y	1100	1040	860	750	680
spring return in the main 2)					
C	1100	1040	860	800	700
D, Y	1100	1040	540	480	420
K	1100	1040	860	500	450
Z	1100	1040	860	750	650
spring return in the main 1)					
HC, HD, HK	1100	1040	860	750	680
HZ, HY	1100	1040	860	750	680

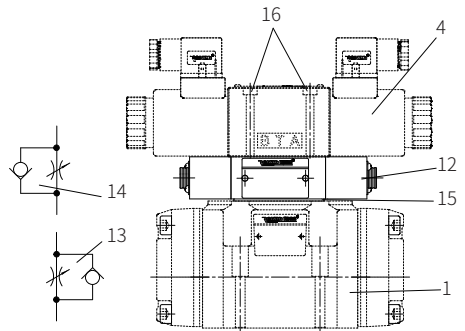
Flow for 3-spool position valves(L/min)						with pre-load valve, X=180
symbol	pressure stage (MPa)					
	7	14	21	28	25	
spring return in the main 1)						flow of spool F, G, H, P and T up to 180 L/min
E, H, J, L, M Q, U, W, R	1100	1040	860	750	680	
G, T, H, F, P	900	900	800	650	450	
V	1100	1000	680	500	450	
hydraulic centering (min.control pressure 8.5bar)						
symbol	1100	1040	860	750	680	

## Characteristic curves

### shifting time adjustment

In order to influence the shifting time of the main valve(1) a double throttle check valve(12) has to be fitted between pilot valve and main valve.

Change over from meter-in(13) to meter-out control(14): remove the pilot valve(4)(leave the O ring support plate(15) in place), rotate the throttle check valve around its longitudinal axis and then install pilot valve(4).

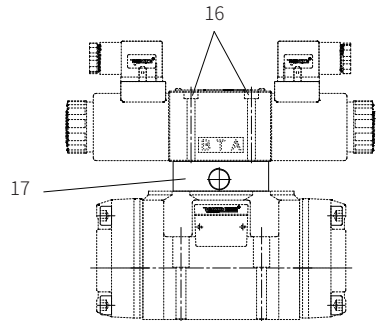


type 4WEH /S or S2

### pressure reducing valve "D3"

The pressure reducing valve(17) must be used if the pilot pressure is higher than 25 MPa. Thus, the secondary pressure is held constant at 4.5 MPa.

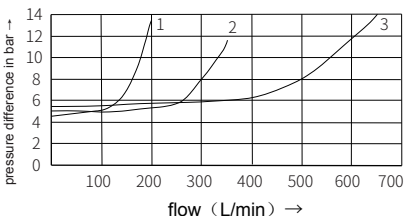
When using a pressure reducing valve "D3", a throttle insert "B10" must be installed in the P channel of the pilot valve.



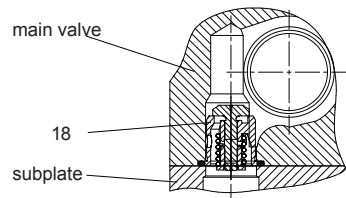
type 4WEH.../.../D3

### pre-load valve(not for size 10)

In valves with pressureless by-pass and internal pilot oil supply, a pre-load valve(18) must be installed in the P channel of the main valve to build up the minimum pilot pressure.



- 1 size 16
- 2 size 25
- 3 size 32



type

4WEH16...-5X/.../P4.5

4WEH25.../.../P4.5

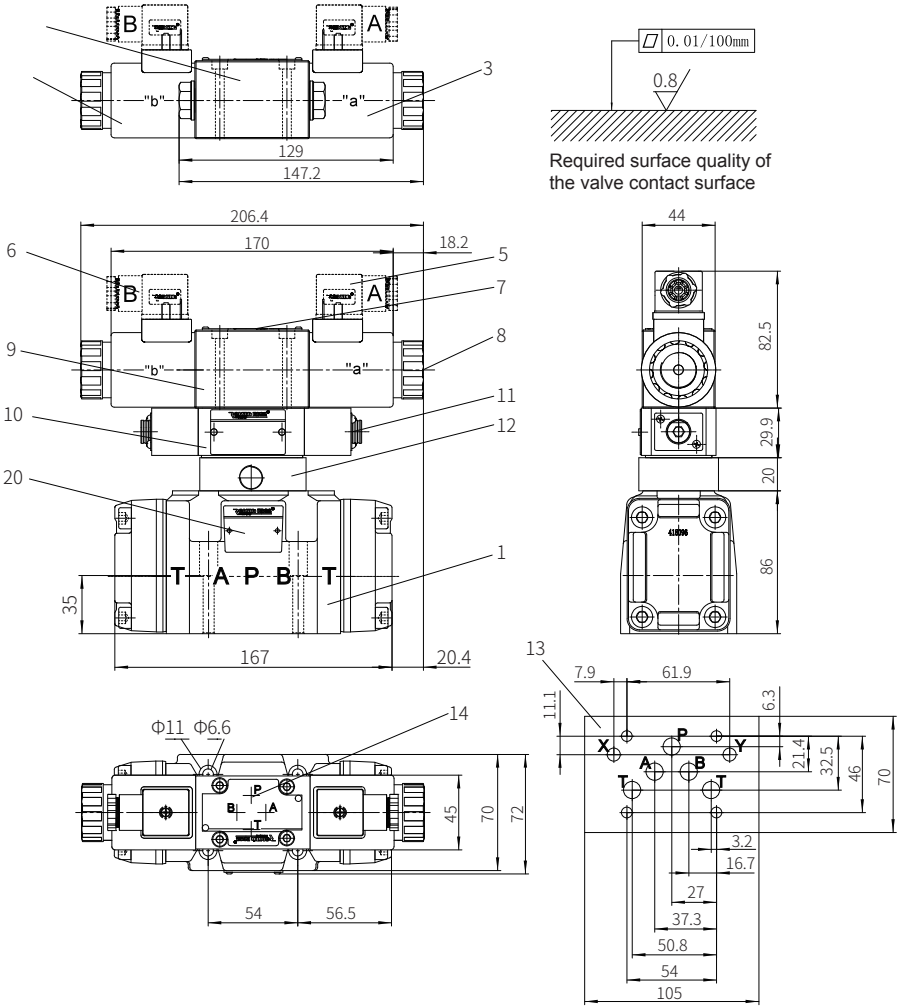
4WEH32.../.../P4.5



Unit dimensions

Dimensions in mm

type WEH10...4XJ/...



1 main valve

2 2-position valve with one solenoid and plug Z4

3 Solenoid a

4 Solenoid b

5 plug-in connector colour grey

6 plug-in connector colour black

7 name plate for pilot valve

8 manual override

9 2-position valve with two solenoids and plug Z4

3-position valve with two solenoids and plug Z4

10 switching time regulator

11 adjustable bolt

12 reducing valve

13 arrangement of main valve's oil outlets (attachment face of valve)

14 position of leading oil outlet

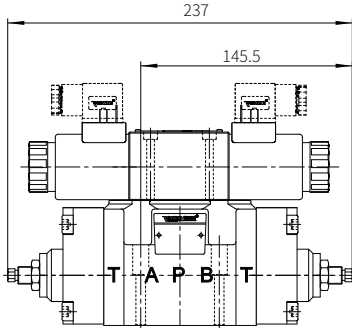
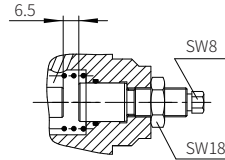
15 name plate

**Unit dimensions** **Dimensions in mm**

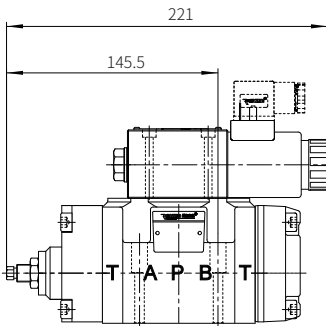
Dimension of additional devices of valve type WEH10

Range of stroke adjustment is 6.5mm to adjust main spool stroke. Loosen the lock-up nut and rotate the rod clockwise, thus, shorten the stroke of the main spool. (adjust can only be made under the condition that the controlling chamber has no pressure)

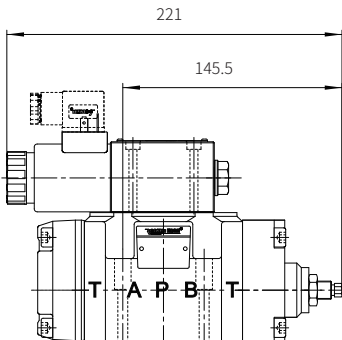
1 rotation=1mm stroke



- 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

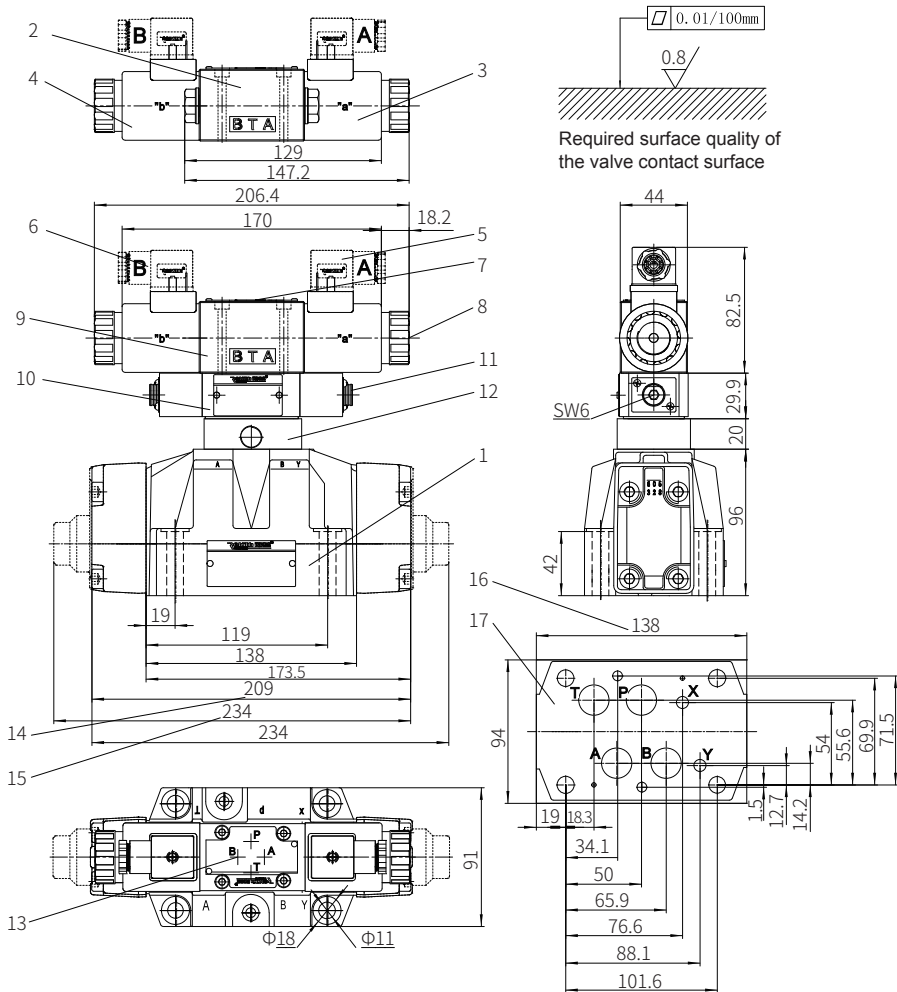


- stroke adjustment fixed on end B of main valve 12

Unit dimensions

Dimensions in mm

type WEH16...5XJ/...



- 1 main valve
- 2 2-position valve with one solenoid and plug Z4
- 3 Solenoid a
- 4 Solenoid b
- 5 plug-in connector colour grey
- 6 plug-in connector colour black
- 7 name plate for pilot valve
- 8 manual override
- 9 2-position valve with two solenoids and plug Z4
- 10 switching time regulator
- 11 adjustable bolt
- 12 reducing valve
- 13 arrangement of main valve's oil outlets (attachment face of valve)
- 14 size of spring centered 3-position valve
- 15 size of spring return 2-position valve
- 16 minimum size of process-required connection face of main valve
- 17 connection diagram of main valve

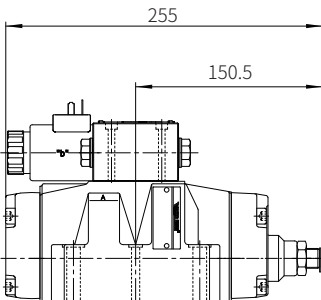
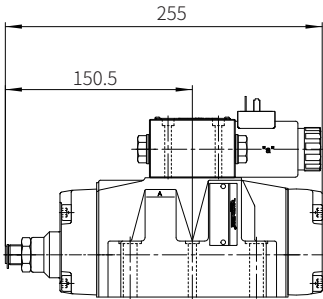
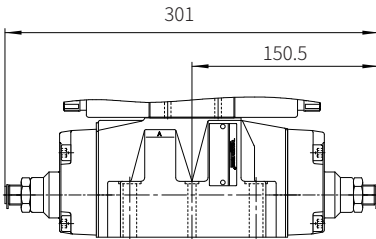
3-position valve with two solenoids and plug Z4

Unit dimensions

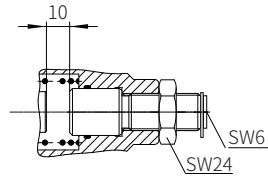
Dimensions in mm

Dimension of additional devices of valve type WEH16

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



1rotation=1.5mm stroke



- 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

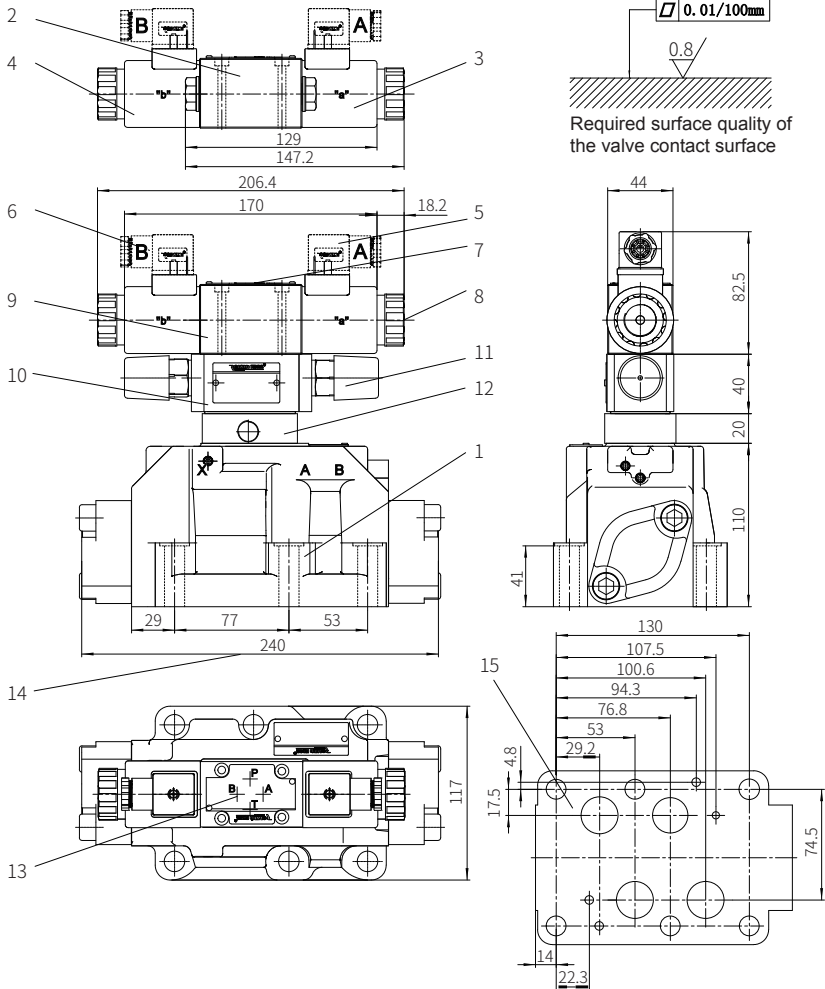
- stroke adjustment fixed on end A of main valve 11

- stroke adjustment fixed on end B of main valve 12

Unit dimensions

Dimensions in mm

type WEH22...7XJ/...

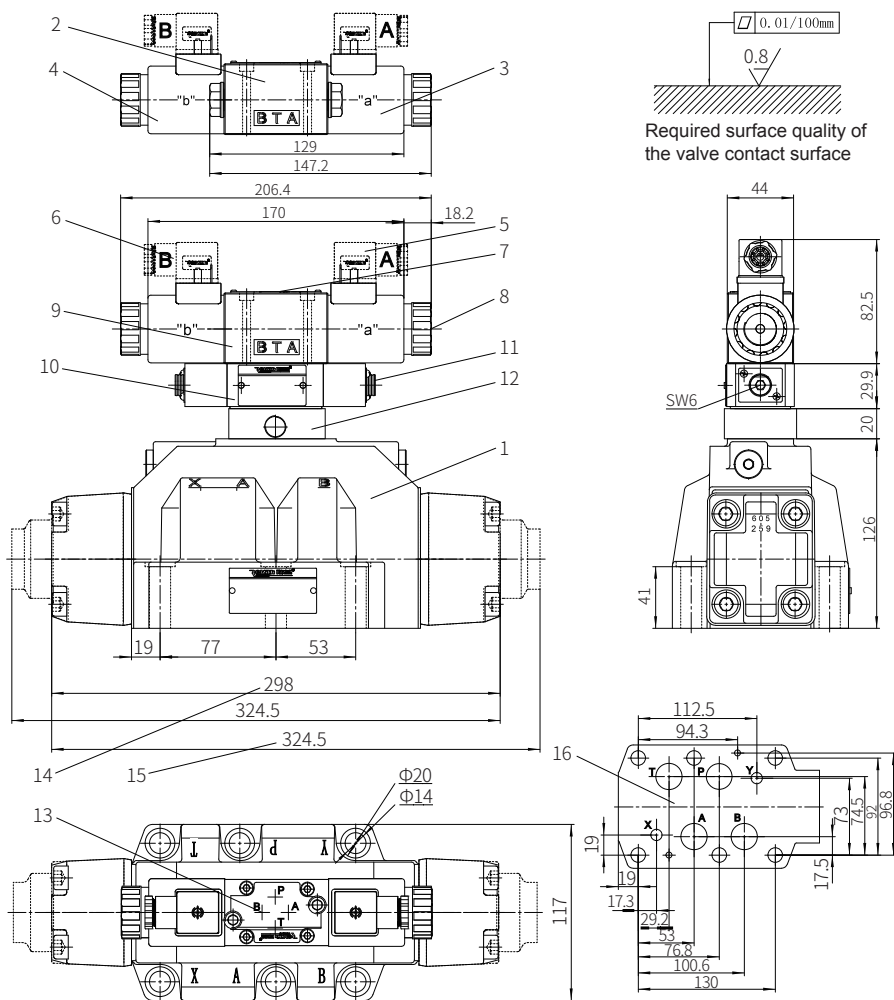


- |  |   |
|--|---|
| 1 main valve                                     | 9 2-position valve with two solenoids and plug Z4                     |
| 2 2-position valve with one solenoid and plug Z4 | 3 3-position valve with two solenoids and plug Z4                     |
| 3 Solenoid a                                     | 10 switching time regulator   |
| 4 Solenoid b                                     | 11 adjustable bolt  |
| 5 plug-in connector colour grey                  | 12 reducing valve   |
| 6 plug-in connector colour black                 | 13 arrangement of main valve's oil outlets (attachment face of valve) |
| 7 name plate for pilot valve                     | 14 size of spring centered 3-position valve                           |
| 8 manual override                                | 15 connection diagram of main valve                                   |

## Unit dimensions

## Dimensions in mm

type WEH25...5XJ/...



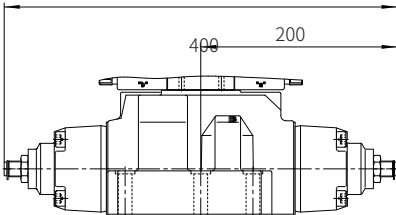
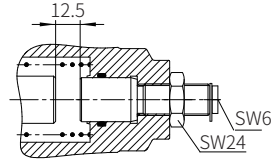
- |  |   |
|--|---|
| 1 main valve                                     | 9 2-position valve with two solenoids and plug Z4                     |
| 2 2-position valve with one solenoid and plug Z4 | 3 3-position valve with two solenoids and plug Z4                     |
| 3 Solenoid a                                     | 10 switching time regulator   |
| 4 Solenoid b                                     | 11 adjustable bolt  |
| 5 plug-in connector colour grey                  | 12 reducing valve   |
| 6 plug-in connector colour black                 | 13 arrangement of main valve's oil outlets (attachment face of valve) |
| 7 name plate for pilot valve                     | 14 size of spring centered 3-position valve                           |
| 8 manual override                                | 15 size of spring return 2-position valve                             |
|  | 16 connection diagram of main valve                                   |

**Unit dimensions** **Dimensions in mm**

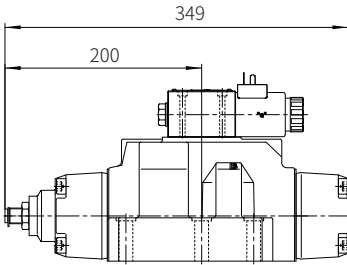
Dimension of additional devices of valve type WEH25

Range of stroke adjustment is 12.5mm to adjust main spool stroke. Loosen the lock-up nut and rotate the rod clockwise, thus, shorten the stroke of the main spool. (adjust can only be made under the condition that the controlling chamber has no pressure)

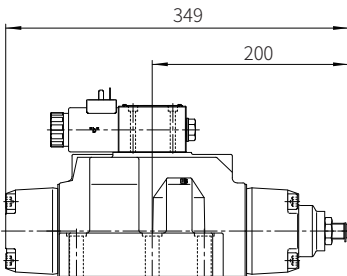
1 rotation=1.5mm stroke



- 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

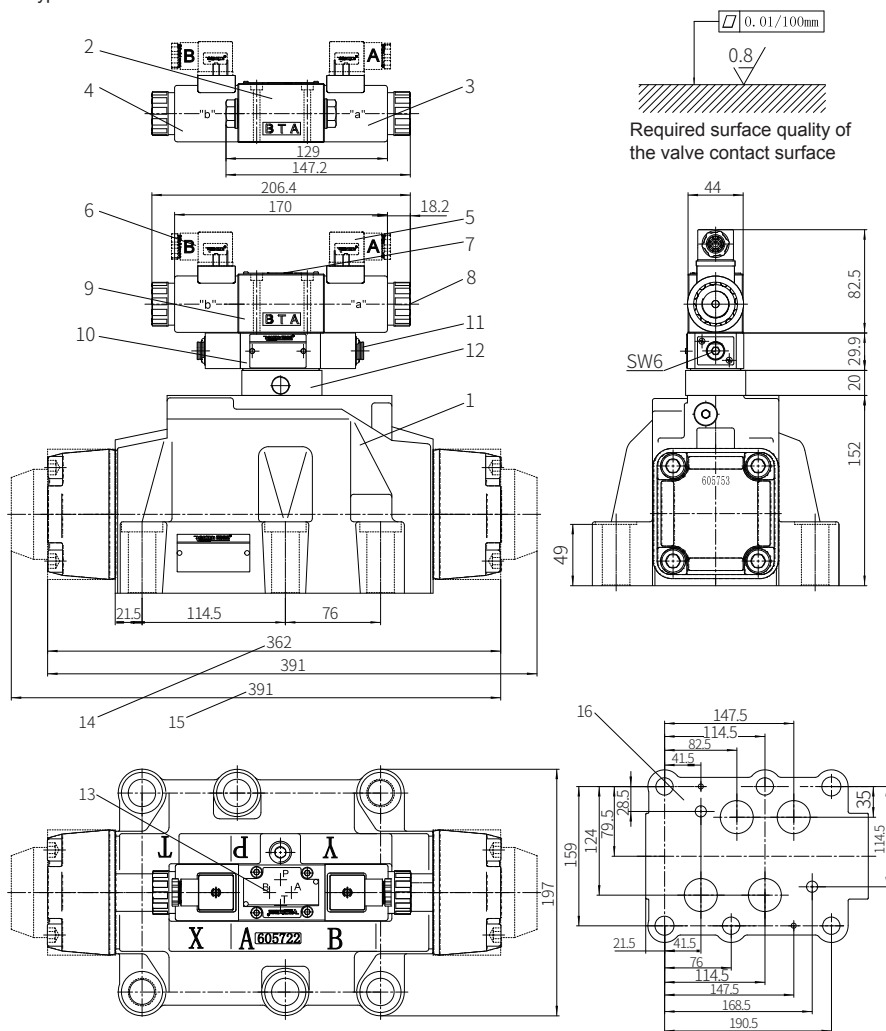


- stroke adjustment fixed on end B of main valve 12

## Unit dimensions

## Dimensions in mm

type WEH32...5XJ/...



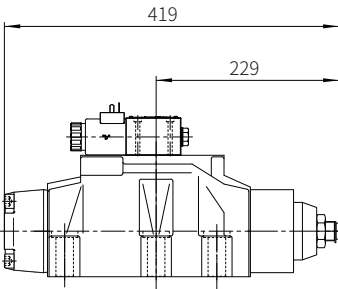
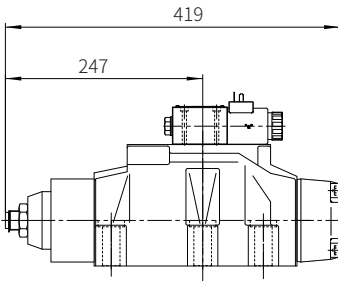
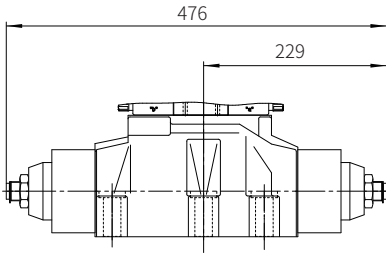
- |  |   |
|--|---|
| 1 main valve                                     | 9 2-position valve with two solenoids and plug Z4                     |
| 2 2-position valve with one solenoid and plug Z4 | 3-position valve with two solenoids and plug Z4                       |
| 3 Solenoid a                                     | 10 switching time regulator   |
| 4 Solenoid b                                     | 11 adjustable bolt  |
| 5 plug-in connector colour grey                  | 12 reducing valve   |
| 6 plug-in connector colour black                 | 13 arrangement of main valve's oil outlets (attachment face of valve) |
| 7 name plate for pilot valve                     | 14 size of spring centered 3-position valve                           |
| 8 manual override                                | 15 size of spring return 2-position valve                             |
|  | 16 connection diagram of main valve                                   |



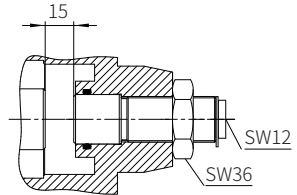
**Unit dimensions** **Dimensions in mm**

Dimension of additional devices of valve type WEH32

Range of stroke adjustment is 15mm to adjust main spool stroke. Loosen the lock-up nut and rotate the rod clockwise, thus, shorten the stroke of the main spool. (adjust can only be made under the condition that the controlling chamber has no pressure)



1 rotation = 1.5 mm stroke



- 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