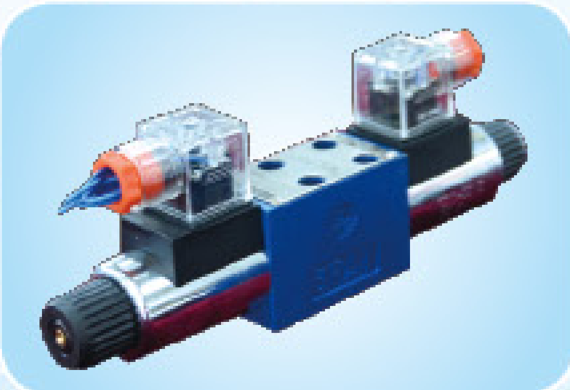
Huade



Hydraulic valves

Directional Valves

Catalogue

BEIJING HUADE HYDRAULIC INDUSTRIAL GROUP CO.,LTD.

CONTENTS

Directional Valves

CONTENTS

Directional Valves

"*": New products, for ordering, please consult us, telephone: +86-10-69083290

Other Huade Hydraulics Catalogues for Valves

- Pressure Valves
- Flow Control Valves
- Proportional Valves
- Cartridge Valves

BEIJING HUADE HYDRAULIC INDUSTRIAL GROUP CO.,LTD.	**Check valve type S**			RE 20375/12.2004
	Size 6 to 30	up to 31.5 MPa	up to 400L/min	Replaces：RE 20375/05.2001

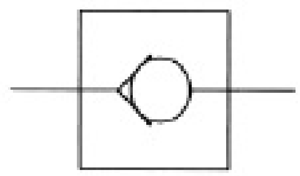
Features:

- For threaded connection (screw-in connection)
- Subplate mounting
- Leakage-free closure in one direction
- Various cracking pressures, optional (see ordering details)

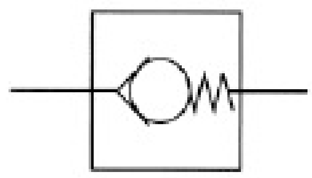
Function,section,symbols

The check valve type S has the task of, preferably closing a flow leak free in one direction and to permit free flow in the opposite direction. The stroke of the poppet , which is guided on its outside diameter, is limited by a mechanical stop. The built-in compression spring supports the closing movement. Furthermore the compression spring holds the poppet in the closed position even when there is no flow through the valve.

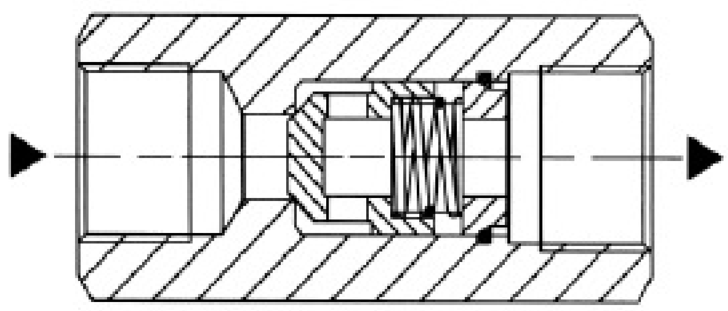
symbol



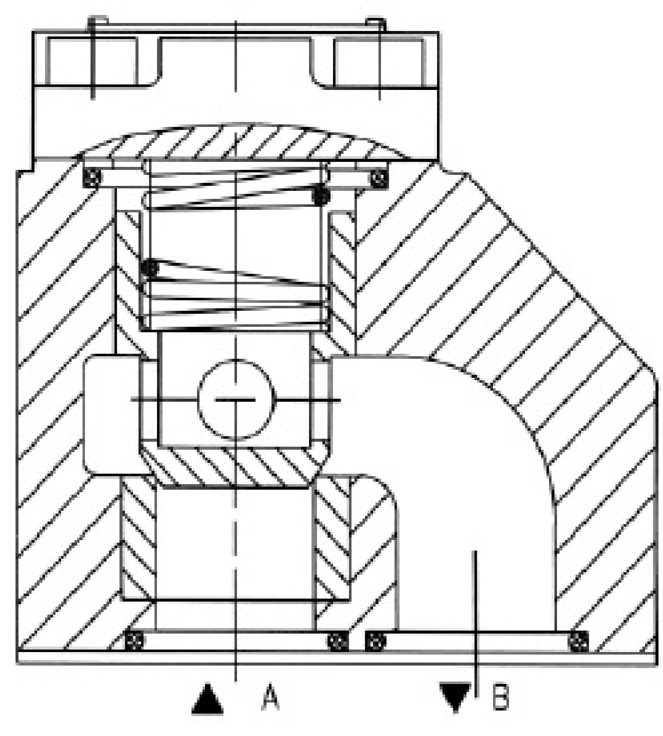
without spring



with spring

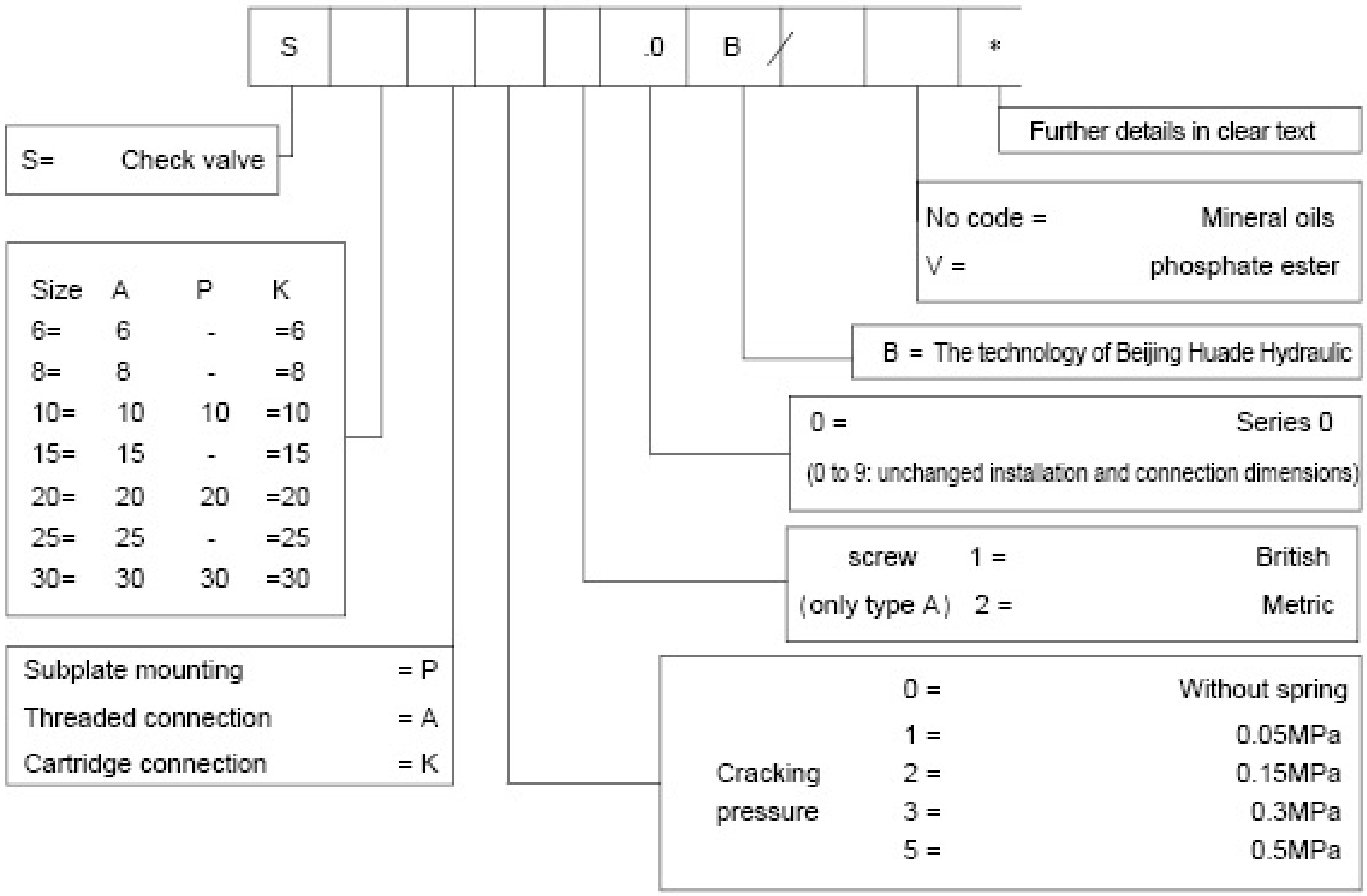


Threaded connection



Subplate mounting

Ordering details



The model of check valve cartridge

A straight-through cartridge

	K1	K2	K3
6	301889	301896	301903
8	301890	301897	301904
10	301891	301898	301905
15	301892	301899	301906
20	301893	301900	301907
25	301894	301901	301908
30	301895	301902	301909

A straight-angled cartridge

	K1	K2	K3
6	301910	301917	301924
8	317701	317702	317703
10	301912	301919	301926
15	317704	317705	317706
20	301914	301921	301928
25	301915	301922	301929
30	301916	301923	301930

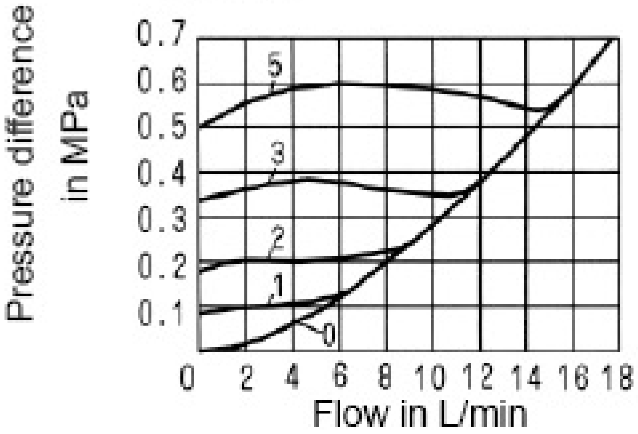
For example, Booked valve inserted of size 6 with opening pressure 0.05MPa, the ordering code is: S6K1-301889

Technical data (For applications outside these parameters, please consult us!)

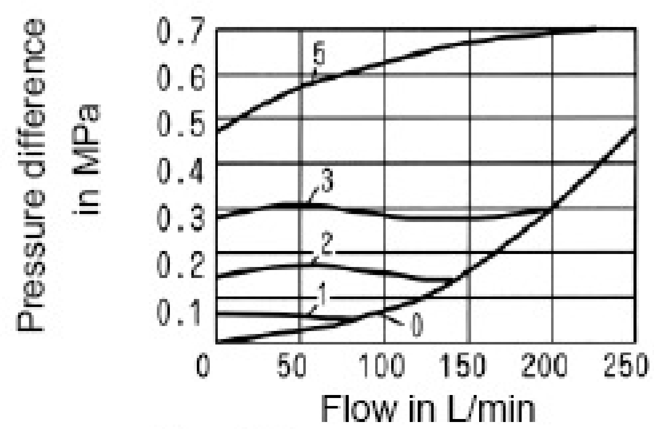
Pressure fliud		mineral oils or phosphate ester
Pressure fluid - temperature range	(℃)	-30～+80
Viscosity range	(mm²/s)	2.8～500
Max.operating pressure	(MPa)	31.5
Cracking pressure	(MPa)	See characteristic curves below
Maximum flow	(L/min)	

Characteristic curves (measured at v = 41 mm²/s and t = 50℃)

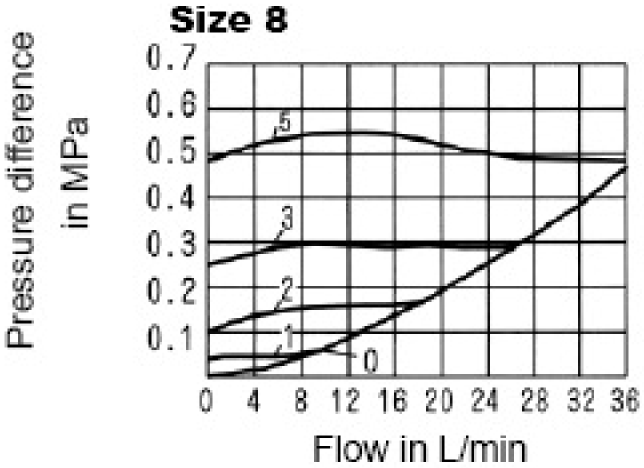
Size 6



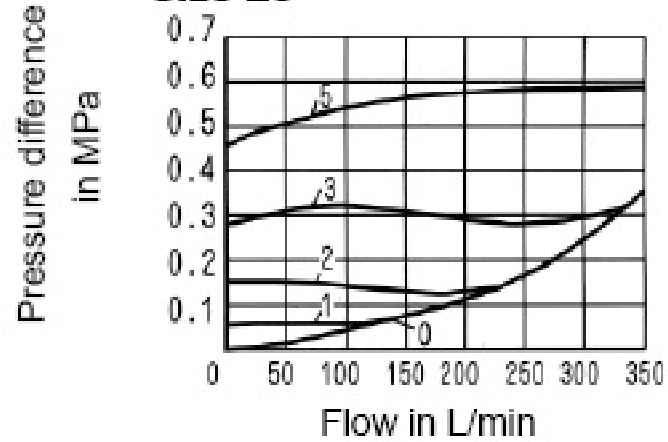
Size 20



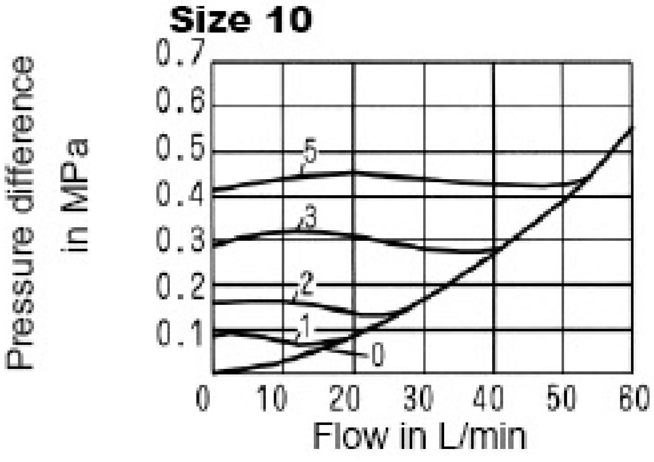
Size 8



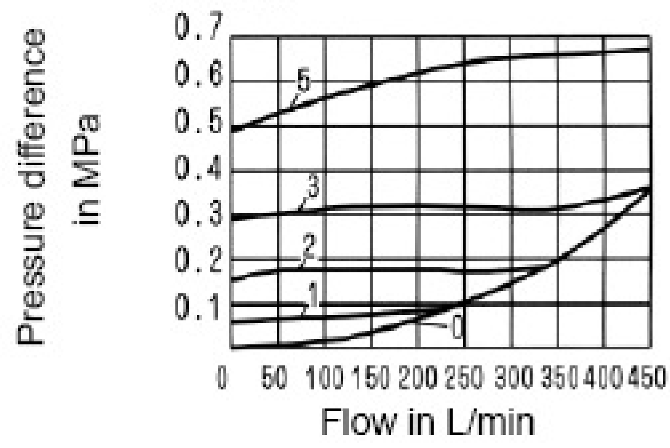
Size 25



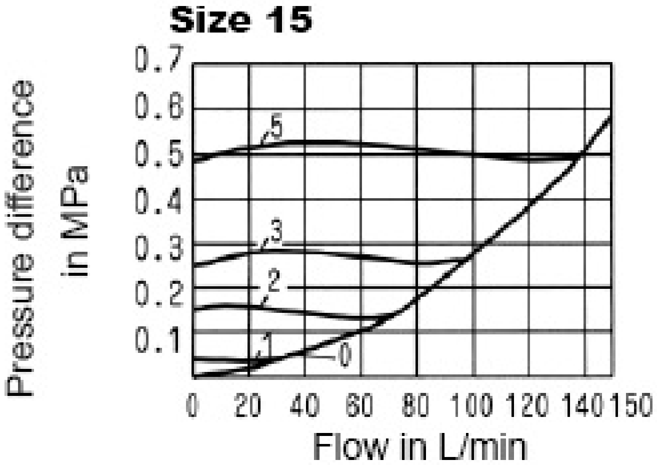
Size 10



Size 30



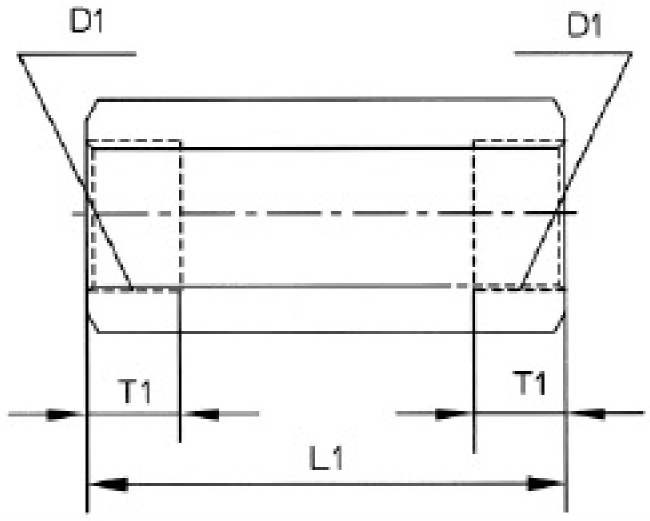
Size 15

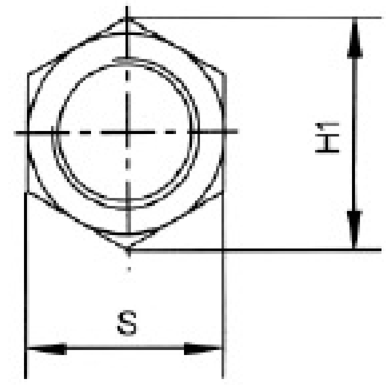


Pressure difference △p related to the flow q_v at the cracking pressure

Unit dimensions (Dimensions in mm)

Threaded connection：

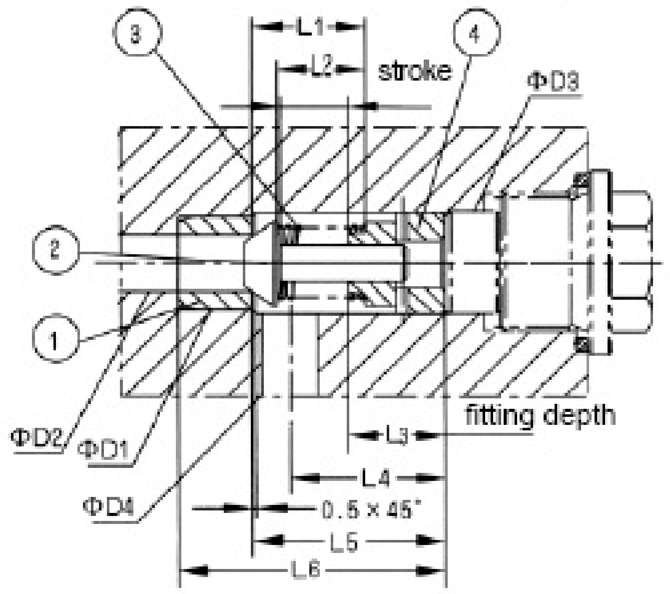




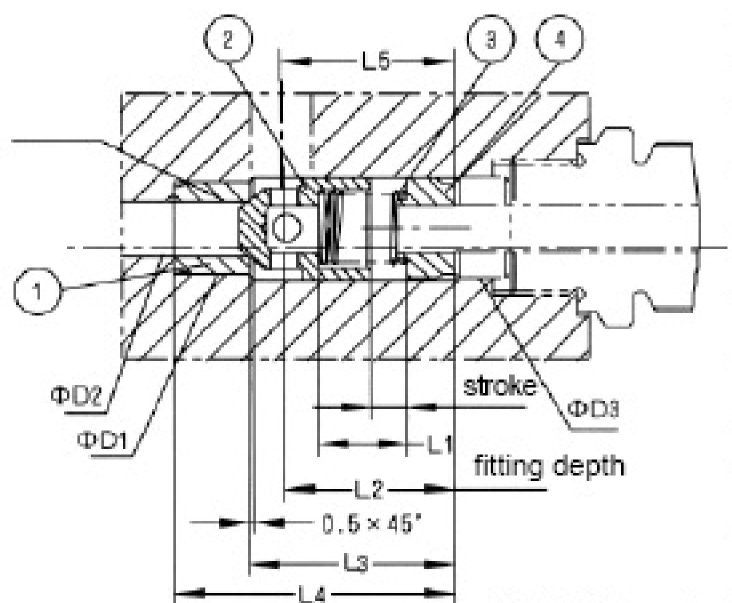
Size	6	8	10	15	20	25	30
D1	G1/4"	G3/8"	G1/2"	G3/4"	G1"	G1¹/4"	G1¹/2"
	M14X1.5	M18X1.5	M22X1.5	M27X2	M33X2	M42X2	M48X2
H1	22	28	34.5	41.5	53	69	75
L1	58	58	72	85	98	120	132
T1	12	12	14	16	18	20	22
S	19	24	30	36	46	60	65
Weight（Kg）	0.1	0.2	0.3	0.5	1	2	2.5

Valve cartridge

Straight-angled check valve



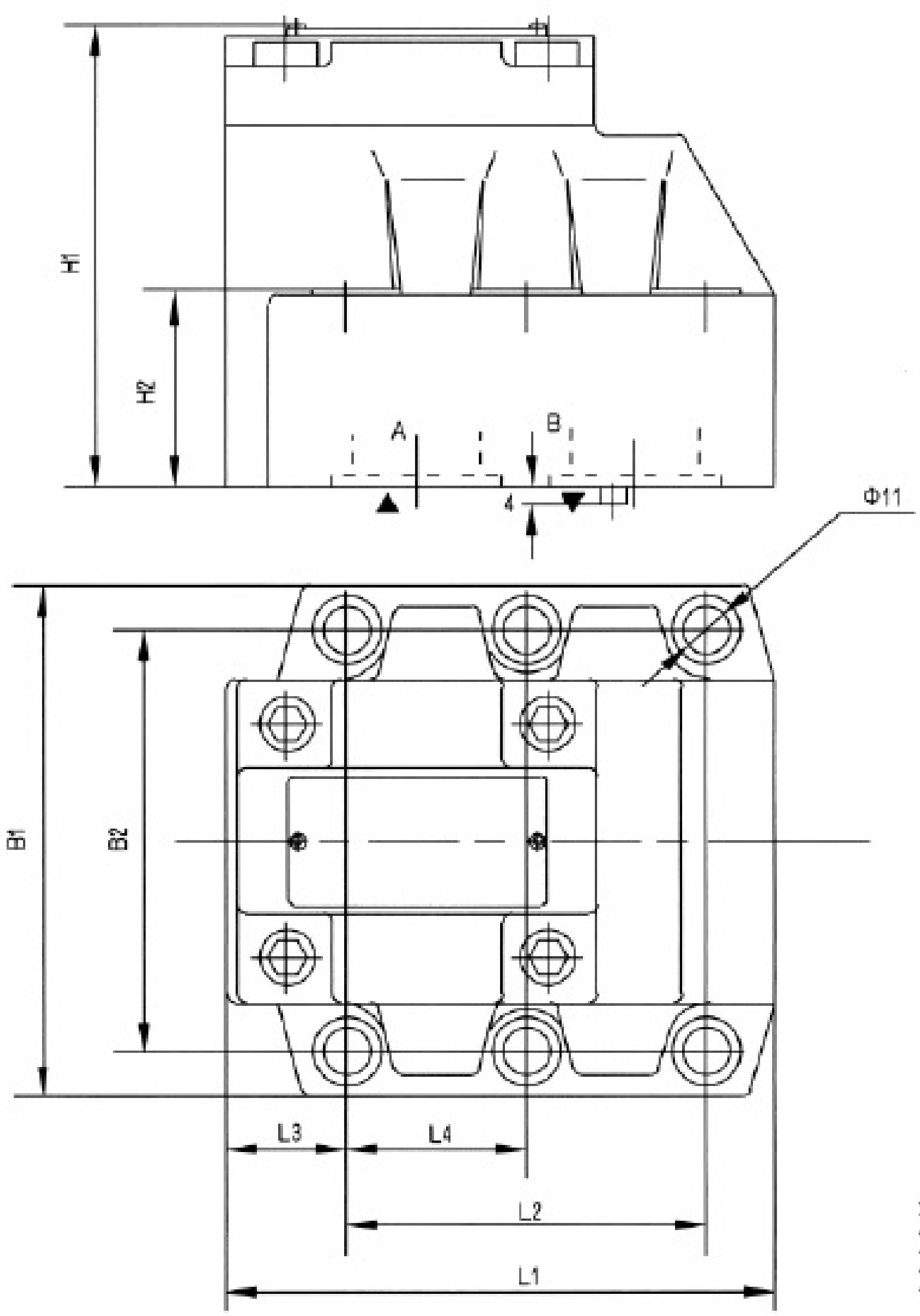
NG	6	8	10	15	20	25	30
Φ D1H7	10	13	17	22	28	36	42
Φ D2	6	8	10	15	20	25	30
Φ D3H8	11	14	18	24	30	38	44
Φ D4	6	8	10	15	20	25	30
Journey	4	4	4	5	5	7	7
L1	11.2	11.9	14.3	18	18.8	28.5	28.5
L2	9.5	9.5	11.5	14.5	16	24.5	25
L3	10	16	16	18	23	31	37
L4	16.5	21.5	23.5	25.5	30	43	47.5
L5	20.5	26.5	29.5	34	40.5	57.5	63.5
L6	28.5	36.5	39.5	46	55.5	75.5	83.5
Weight	0.05Kg	0.05Kg	0.05Kg	0.1Kg	0.2Kg	0.25Kg	0.3Kg



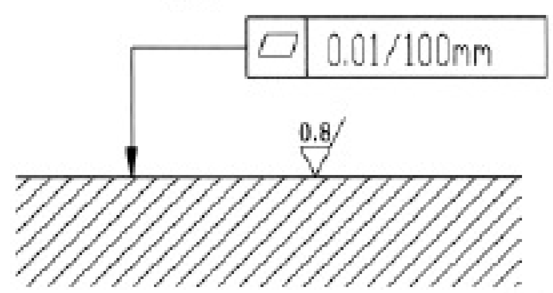
Straight-through check valve

NG	6	8	10	15	20	25	30
Φ D1H7	10	13	17	22	28	36	42
Φ D2	6	8	10	15	20	25	30
Φ D3H8	11	14	18	24	30	38	44
Journey	4	4	4	5	5	7	7
L1	9.5	9.5	11.5	14.5	16	24.5	25
L2	19	18	21	27	29	29	42
L3	21.8	22.8	28.8	36.4	44	55	63
L4	29.8	32.8	38.8	48.4	59	73	83
L5	18	18	23	28	33	41	47
Weight	0.05Kg	0.05Kg	0.05Kg	0.1Kg	0.2Kg	0.25Kg	0.3Kg

Subplate mounting:



Required surface finish of mating piece



Size	The valve fixing screws (GB/T70.1-2000)	O-ring for ports A,B
10	4-M10 × 40 -10.9	17.12 × 2.62
20	4-M10 × 50 -10.9	28.17 × 3.53
30	4-M10 × 70-10.9	34.52 × 3.53

Subplate：NG10：

G460/01 G460/02

G461/01 G461/02

NG20：

G412/01 G412/02

G413/01 G413/02

NG30：

G414/01 G414/02

G415/01 G415/02

must be ordered separately, see page 204

NG	B1	B2	L1	L2	L3	L4	H1	H2
10	85	66.7	78	42.9	17.8	-	66	21
20	102	79.4	101	60.3	23	-	93.5	31.5
30	120	96.8	128	84.2	28	42.1	106.5	46

Notice

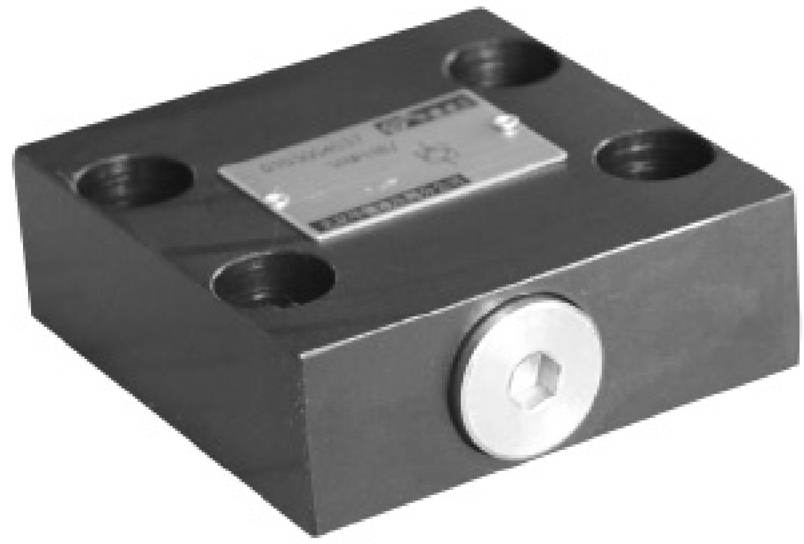
1. The fluid must be filtered. Minimum filter fineness is 20 μm.
2. The tank must be sealing up and an air filter must be installed on air entrance.
3. Products without subplate when leaving factory, if need them, please ordering specially.
4. Valve fixing screws must be high intensity level (class 10.9). Please select and use them according to the parameter listed in the sample book.
5. Roughness of surface linked with the valve is required to $\overset{0.8}{\checkmark}$.
6. Surface finish of mating piece is required to 0.01/100mm.

Features:

-Leakage-free closure in one direction

-5 cracking pressure

-Subplate mouting

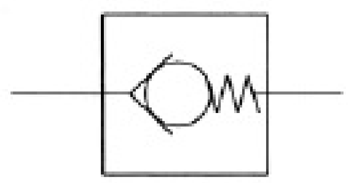


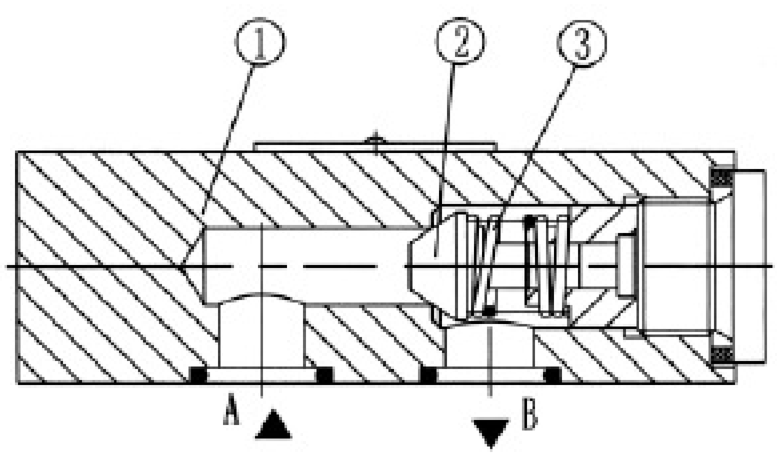
Function,section,symbol

The check valve type S has the task of, preferably closing a flow leakfree in one direction and to permit free flow in the opposite direction.It basically comprises of the housing (1), poppet (2) and the compression spring (3).

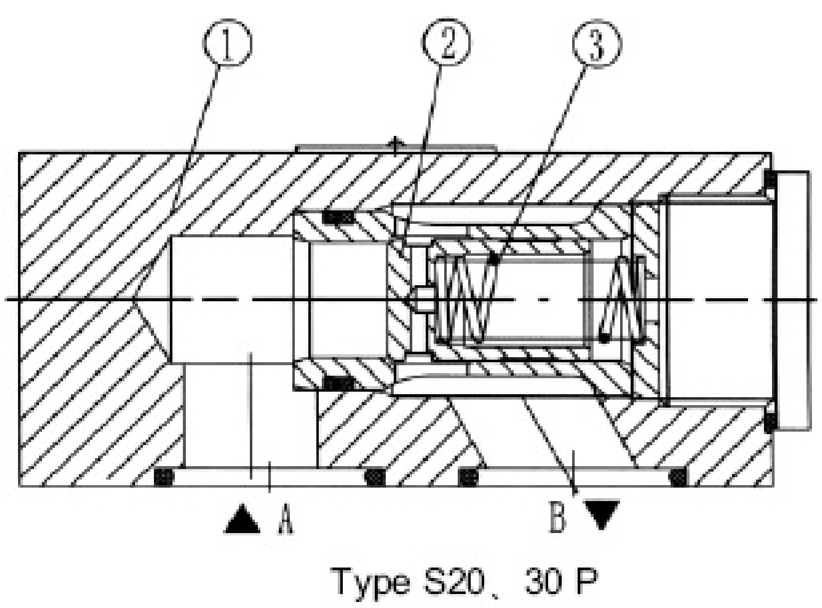
The stroke of the poppet (2), which is guided on its outside diameter,is limited by a mechanical stop. The built-in compression spring (3)supports the closing movement. Furthermore the compression spring (3) holds the poppet (2) in the closed position even when there is no flow through the valve.

symbol





Type S10P



Type S20、30 P

Ordering details

S		P		1	B	/	*

Check valve =S

Size
10 =10
20 =20
30 =30

Subplate mouting = P

Cracking pressure 0.02 MPa = 1
Cracking pressure 0.05 MPa = 2
Cracking pressure 0.15 MPa = 3
Cracking pressure 0.3 MPa = 4
Cracking pressure 0.5 MPa = 5

Further details in clear text

No code = Mineral oils
V = phosphate ester

B = The technology of Beijing Huade Hydraulic

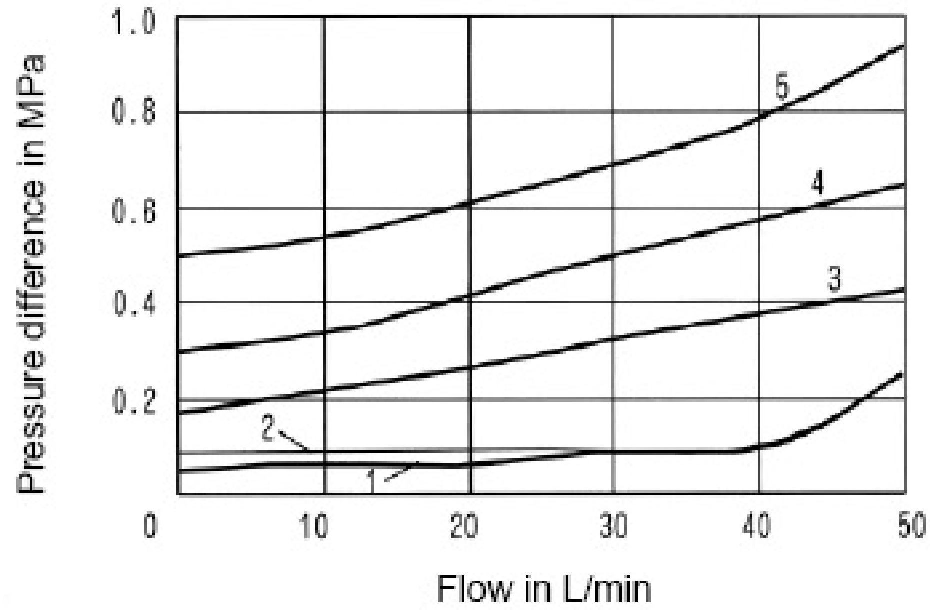
1= Series 1
(1 to 9: unchanged installation and connection dimensions)

Technical data

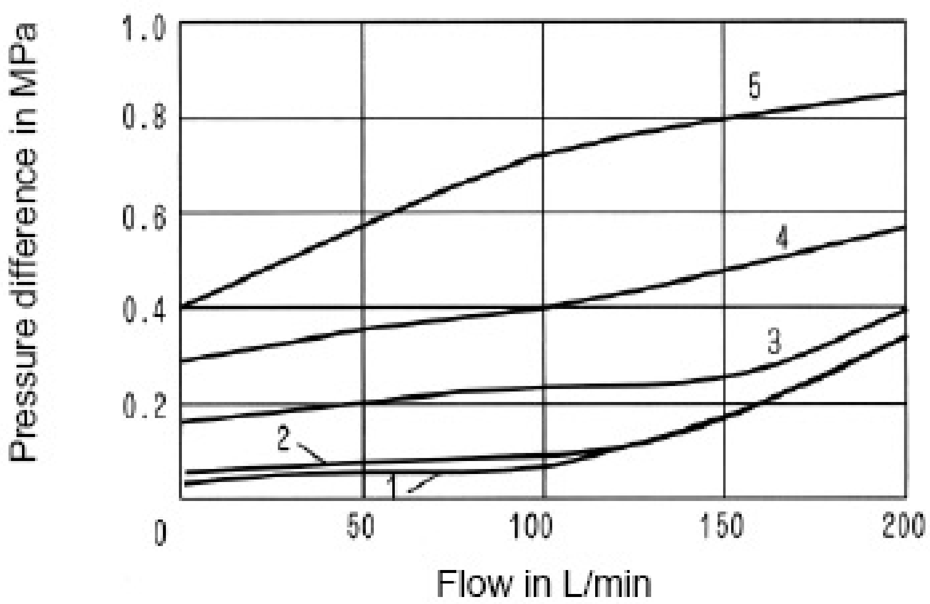
Operating fliud		mineral oils or phosphate ester
Operating pressure	(MPa)	up to 31.5
Viscosity range	(mm^2/s)	2.8~500
Maximum flow	(L/min)	See curves
Cracking pressure	(MPa)	
Pressure fluid - temperature range	(°C)	-30～+80
Degree of contamination		maximum permissible degree of contamination of the pressure fluid is to NAS 1638 class 9. We, therefore, recommend a filter with a minimum retention rate of $\beta_{10} \geqslant 75$.

Characteristic curves (measured at $v = 41\ mm^2/s$ and $t = 50\ ^\circ C$)

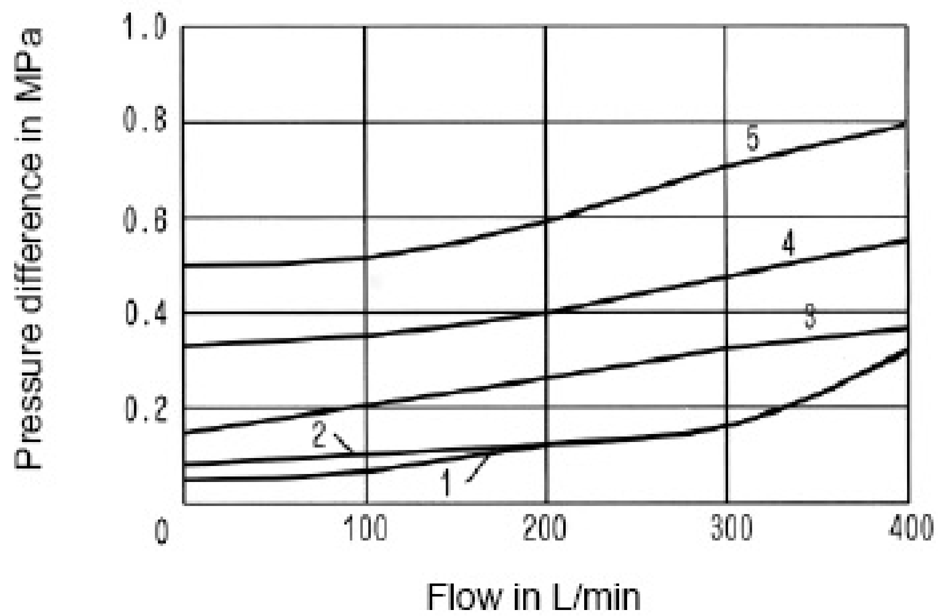
size10



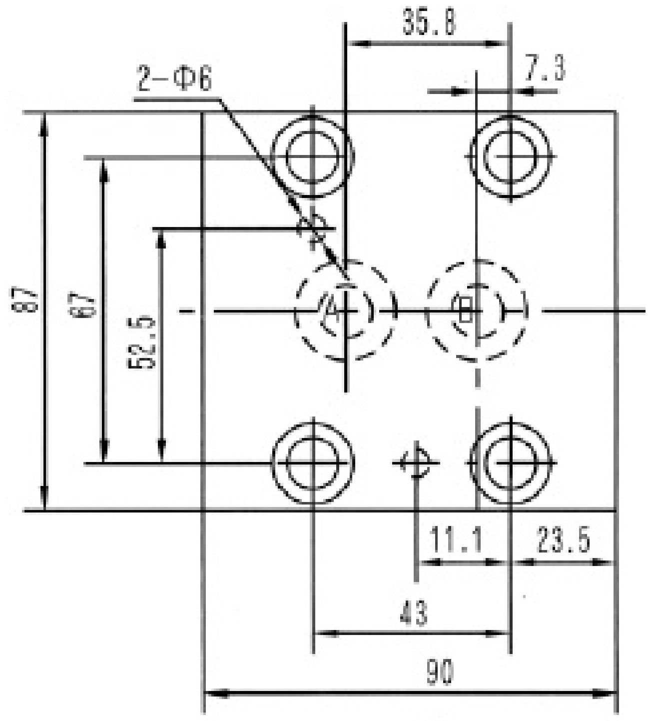
size20



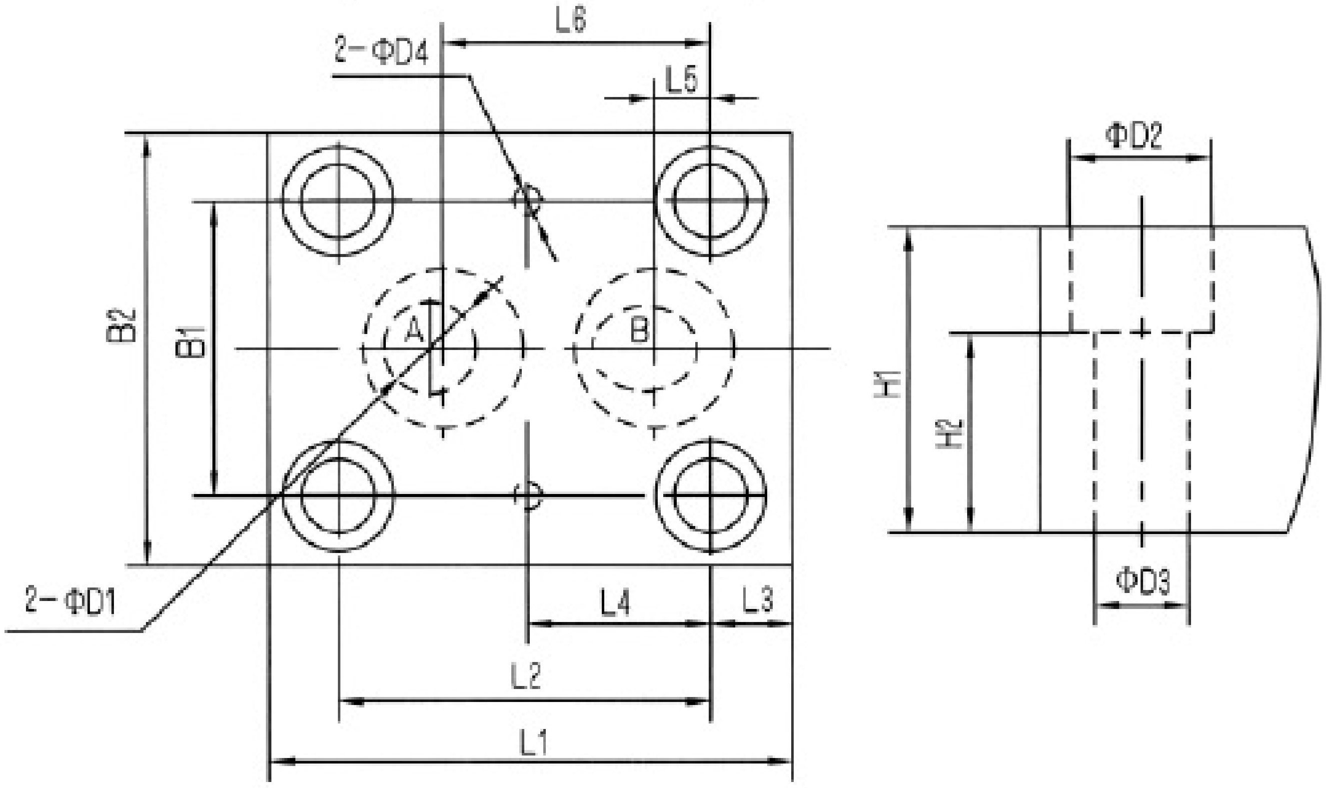
size30



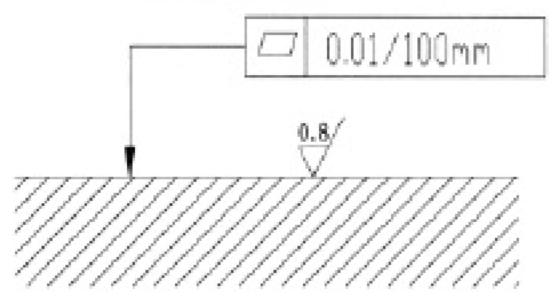
S 10 P



S 20.30 P



Required surface finish of mating piece

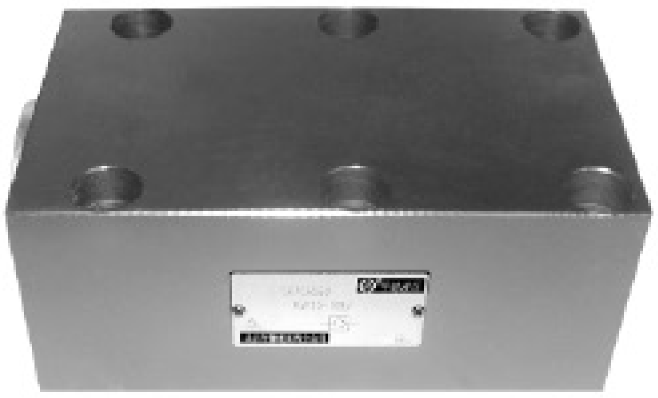


Size	Valve fixing screws (GB/T70.1-2000)	O-ring for ports A ,B
10	4-M10X35-10.9	17.12X2.62
20	4-M14X55-10.9	28.17X3.53
30	4-M18X60-10.9	34.52X3.53

Size	B1	B2	L1	L2	L3	L4	L5	L6	H1	H2	Φ D1	Φ D2	Φ D3	Φ D4
20	65	95	114	81	18	40.5	13	59	52	35	20	24	16	6
30	92	130	154	92	43.5	46	20.5	71.5	70	36	28	29	20	6

BEIJING HUADE HYDRAULIC INDUSTRIAL GROUP CO.,LTD.	check valve Type Rvp			RE 20400/12.2004
	Size 6 to 40	up to 31.5 MPa	up to 600L/min	Replaces：RE 20400/05.2001

Features:
- Subplate connection
- Leakage-free closure in one direction

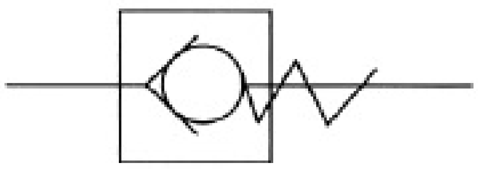


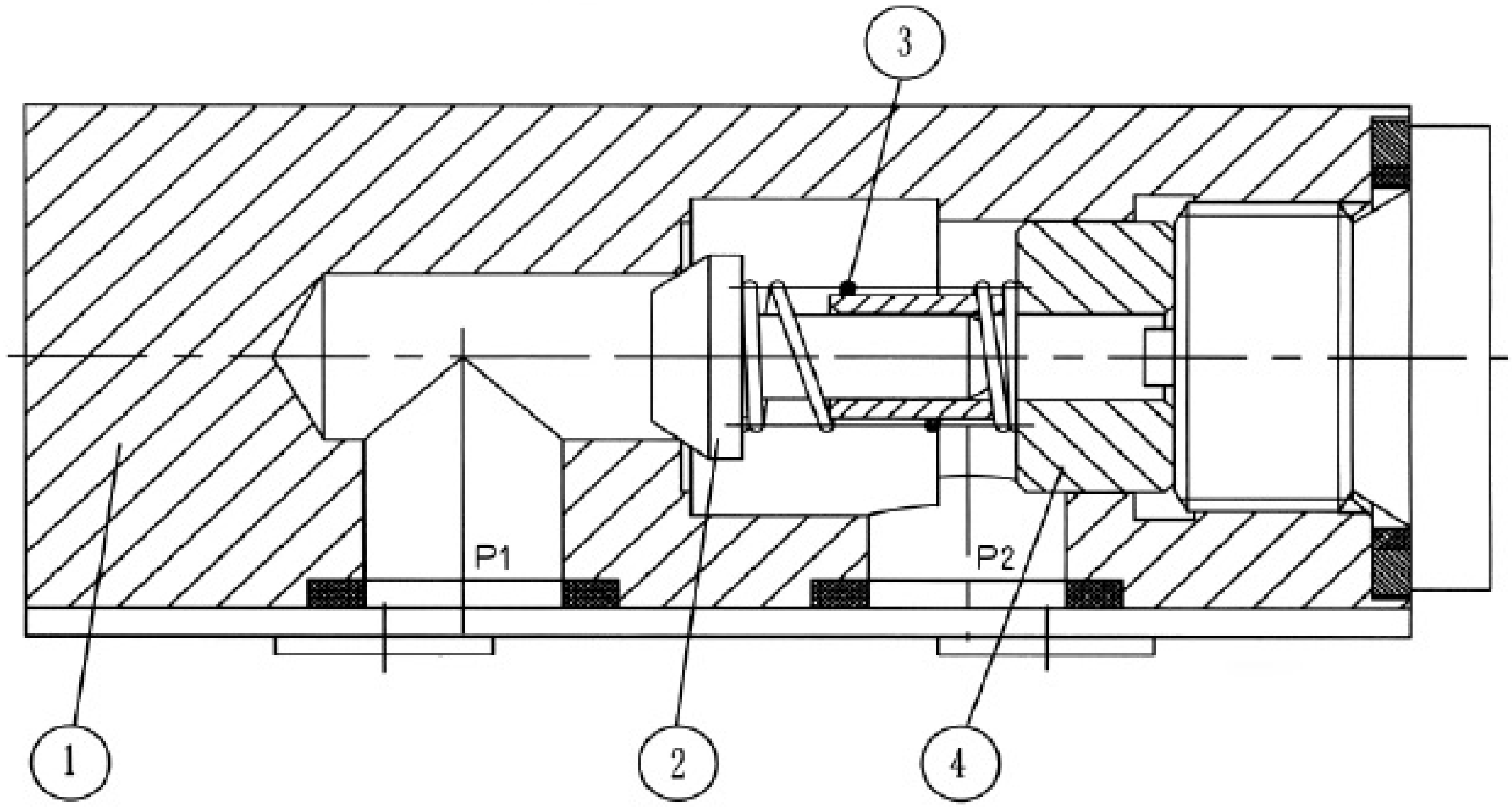
Description,section,symbol

The check valve type RVP has the task of, preferably closing a flow leakfree in one direction and to permit free flow in the opposite direction.It basically comprises of the housing (1), poppet (2) compression spring (3),and spring seat(4).

The stroke of the poppet (2), which is guided on its outside diameter,is limited by a mechanical stop. The built-in compression spring (3)supports the closing movement. Furthermore the compression spring (3) holds the poppet (2) in the closed position even when there is no flow through the valve.

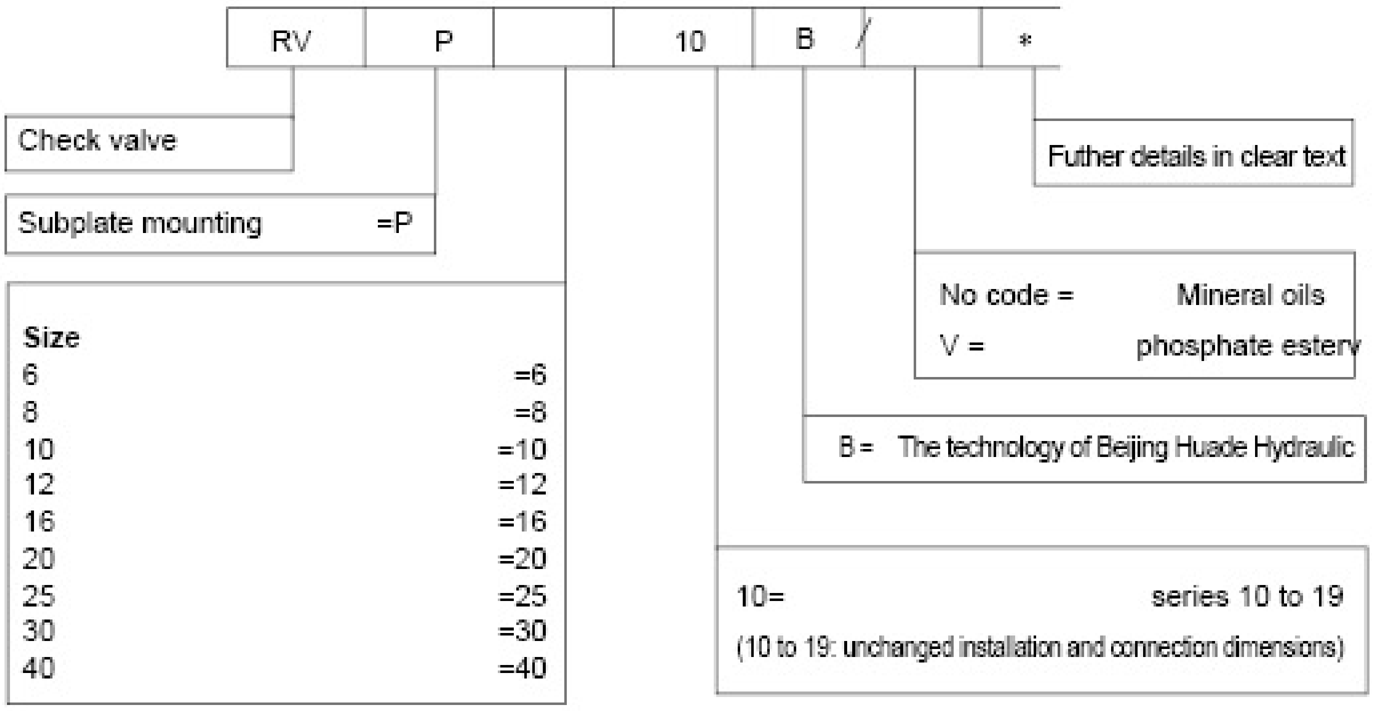
Symbol





1. Housing 2.Poppet 3. Spring 4. Spring seat

Ordering details

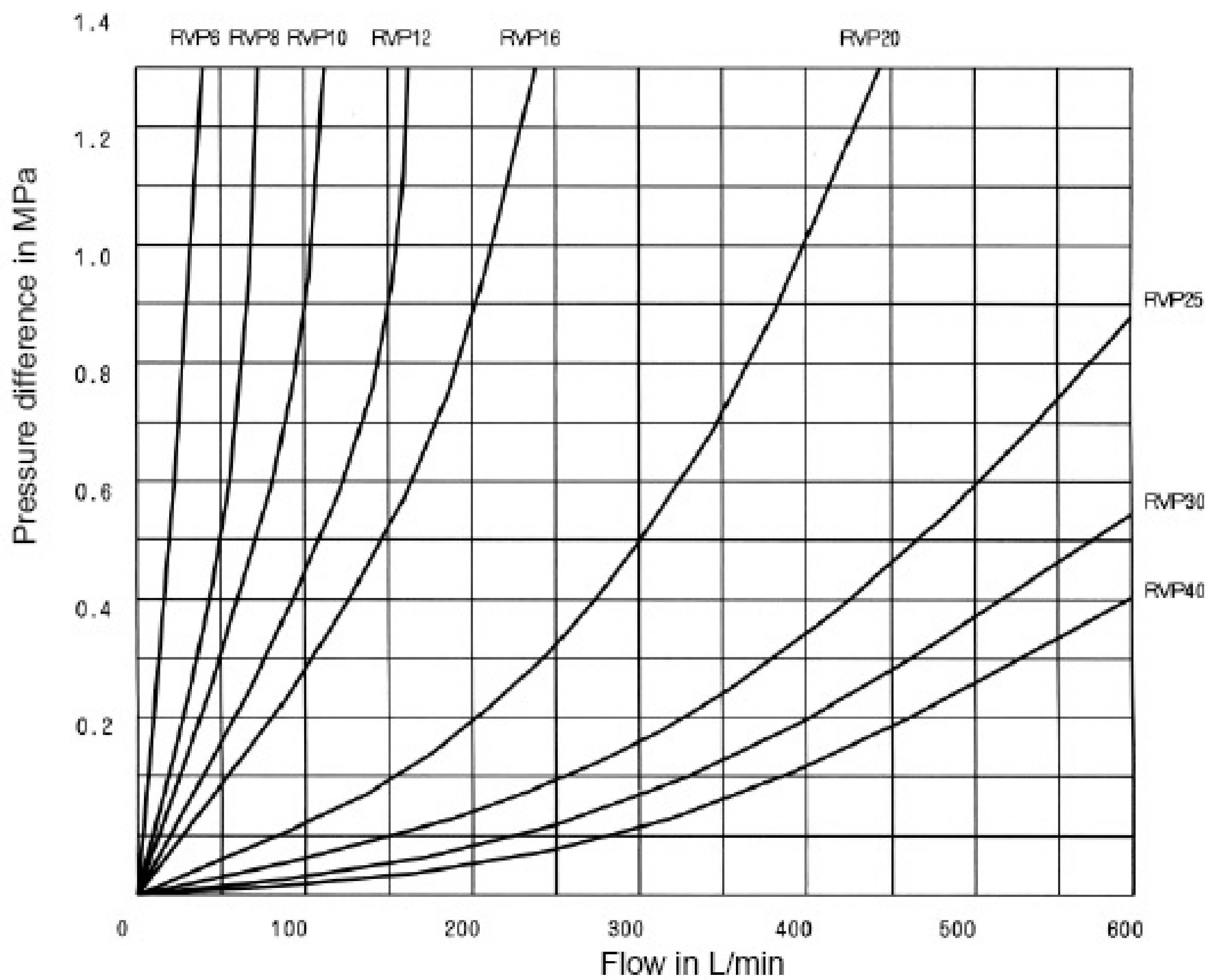


Technical data

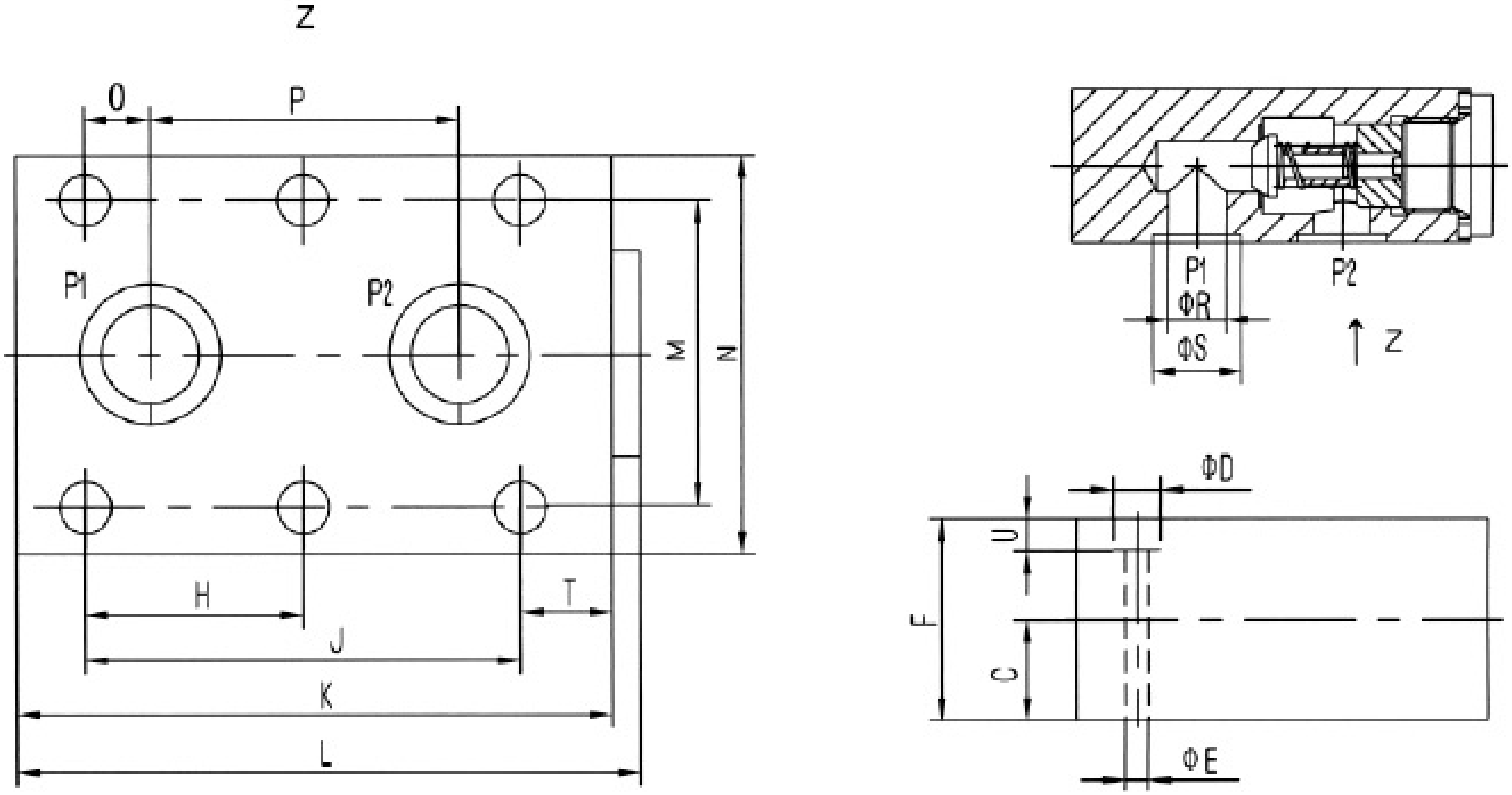
Size	6	8	10	12	16	20	25	30	40
Operating pressure, max. (MPa)	31.5								
Opening pressure (MPa)	0.05								
Pressure fluid	mineral oils or phosphate ester								
Pressure fluid temperature range (℃)	- 30 to + 80								
Viscosity range (mm^2/s)	2.8 to 500								
Fixing position	optional								

Characteristic curves (measured at ν =41mm^2 /s and temperature t=50℃)

Direction of flow: P1 to P2 The relationship between pressure differental △ p and flow Q



Unit dimensions (Dimensions in mm)



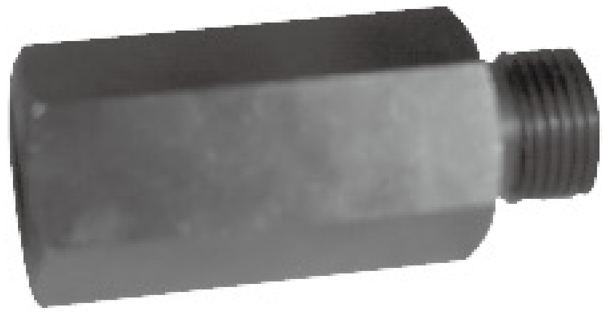
Size	C	φD	φE	F	H	J	K	L	
RVP-6	11.5	11	6.6	23	-	19	41.5	46	
RVP-8	13	11	6.6	24	-	35	63.5	67	
RVP-10	13.5	11	6.6	27	-	33.5	70	74	
RVP-12	16	11	6.6	32	-	38	80	84	
RVP-16	22.5	14	9	45	38	76	104	109	
RVP-20	26	14	9	50	47.5	95	127	132	
RVP-25	29	18	11	58	60	120	165	170	
RVP-30	37.5	20	14	75	71.5	143	186	192	
RVP-40	50	20	14	100	67	133.5	192	198	
Size	M	N	O	P	Φ R	Φ S	T	U	Weight(Kg)
RVP-6	28.5	41.5	1.6	16	6	12.2	16.1	8	0.26
RVP-8	33.5	46	4.5	25.5	8	13.7	14.3	10	0.50
RVP-10	38	51	4	25.5	10	15.7	18.5	7	0.80
RVP-12	44.5	57.5	4	30	13	21.8	21	7	1.10
RVP-16	54	70	11.4	54	17	24.5	16	12	2.25
RVP-20	60	76.5	19	57	22	31.5	16	12	3.90
RVP-25	76	100	20.6	79.5	28.5	39.2	30	13	6.70
RVP-30	92	115	23.8	95	31	41	28	13	11.0
RVP-40	111	140	25.5	89	45	54	42.5	18	17.0

Notice

1. The fluid must be filtered. Minimum filter fineness is 20 µm.
2. The tank must be sealing up and an air filter must be installed on air entrance.
3. Products without subplate when leaving factory, if need them, please ordering specially.
4. Valve fixing screws must be high intensity level (class 10.9). Please select and use them according to the parameter listed in the sample book.
5. Roughness of surface linked with the valve is required to $\overset{0.8}{\surd}$.
6. Surface finish of mating piece is required to 0.01/100mm.

BEIJING HUADE HYDRAULIC INDUSTRIAL GROUP CO.,LTD.	Check valve with damp Type SZ8A			RE 22000/12.2004
	Size 8	up to 31.5MPa	up to 32 L/min	

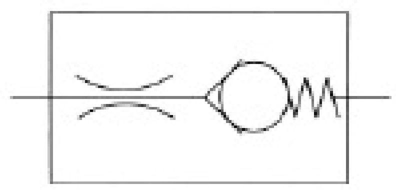
Features:
- For threaded connection
- Five cracking pressures, optional(see ordering details)

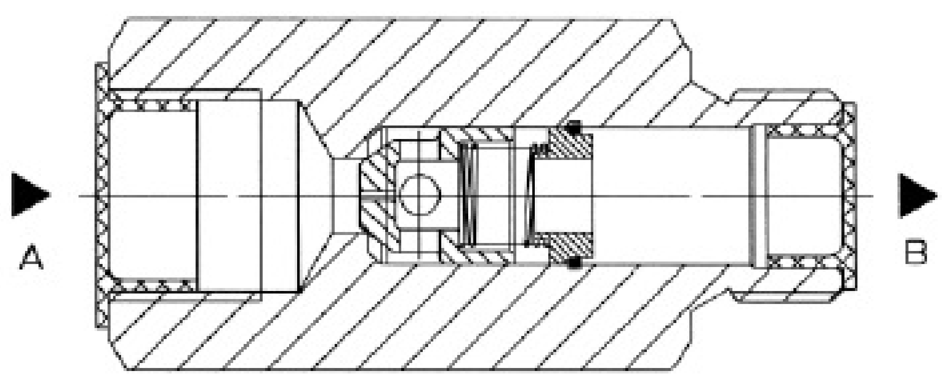


Function, section,symbol

The Check valve with damp type SZ8A valve allow free flow in one direction and limit the flow in the opposite direction .The stroke of the poppet , which is guided on its outside diameter, is limited by a mechanical stop. The built-in compression spring supports the closing movement.
The Check valve with damp mainly used in the outlet of pump as back pressure and side through valve.

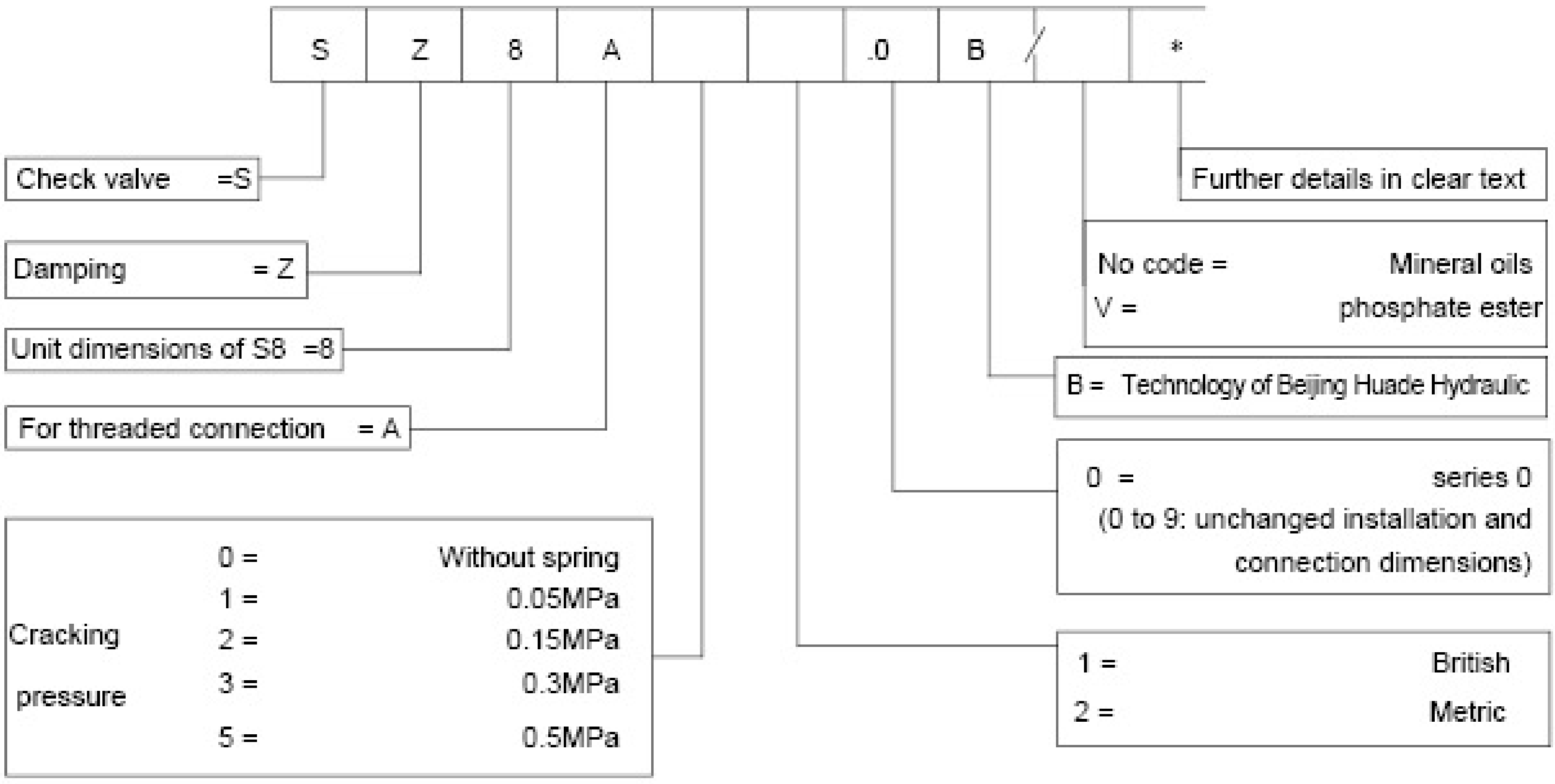
Symbols





Type SZ8A

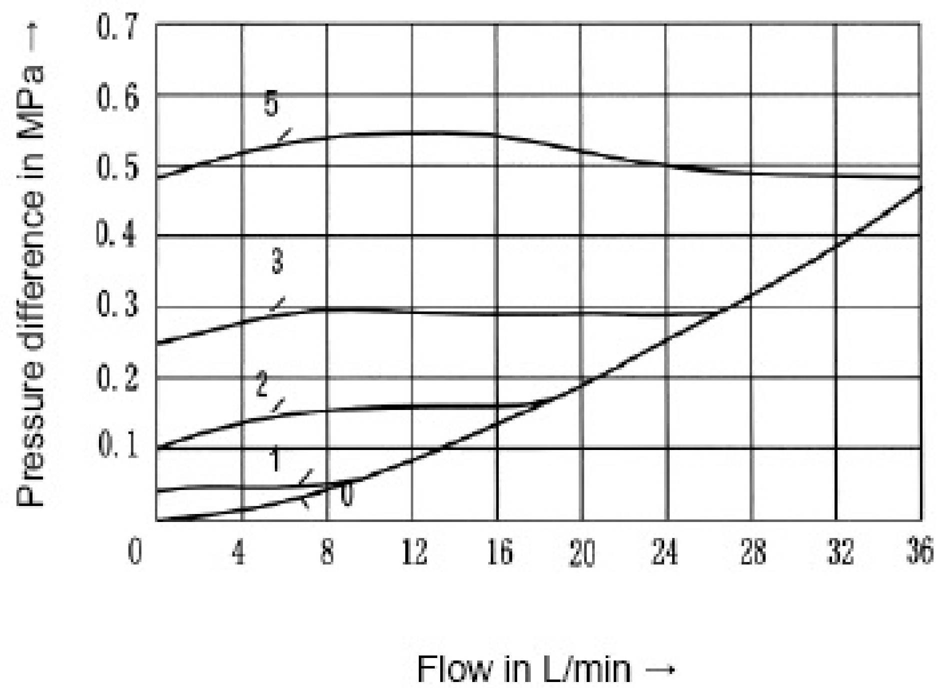
Ordering details



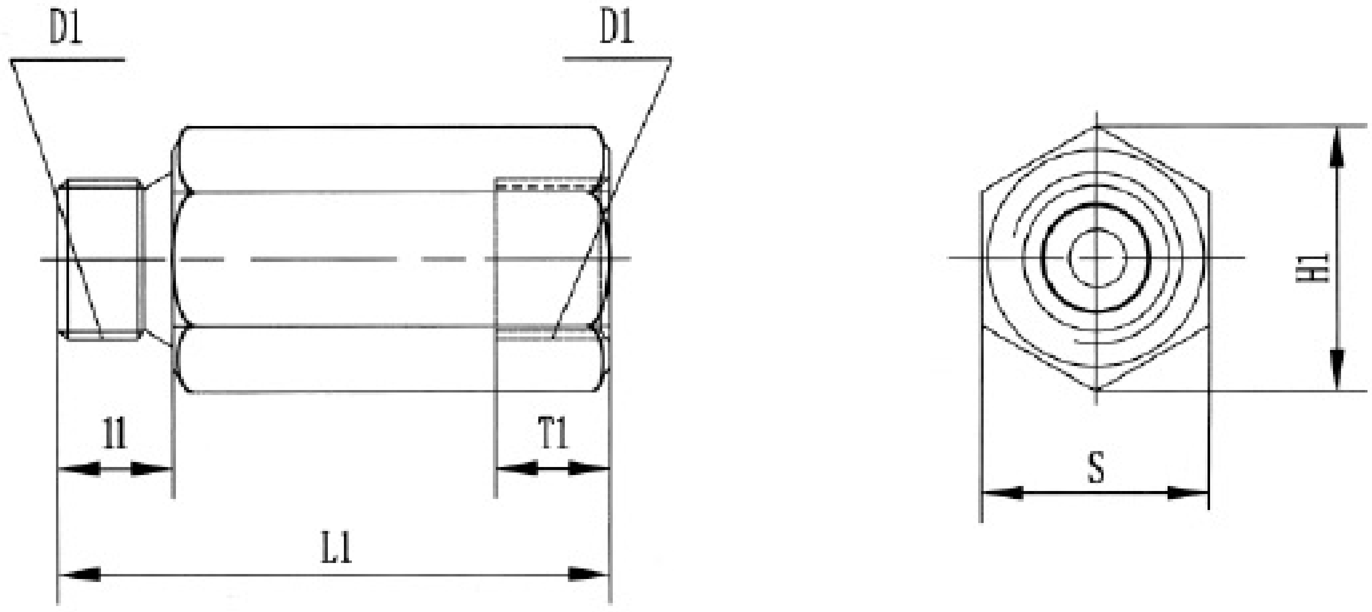
Technical data (For applications outside these parameters, please consult us !)

Hydraulic fluid		Mineral oils or phosphate ester
Temperature range	(℃)	– 30～ + 80
Viscosity range	(mm^2/s)	2.8～500
Operating pressure	(MPa)	up to31.5
Cracking pressure	(L /min)	See below Characteristic curves
Flow q_v max	(L /min)	

Characteristic curves (measured at v = 41 mm^2/s and t = 50℃)



Unit dimensions (Dimensions in mm)



Size	Φ D1	H1	L1	T1	S	Weight（Kg）
8	3/8"	28	58	12	24	0.2

Notice

1. The fluid must be filtered. Minimum filter fineness is 20 µm.
2. The tank must be sealing up and an air filter must be installed on air entrance.
3. Products without subplate when leaving factory, if need them, please ordering specially.
4. Valve fixing screws must be high intensity level (class 10.9). Please select and use them according to the parameter listed in the sample book.
5. Roughness of surface linked with the valve is required to $\overset{0.8}{\checkmark}$.
6. Surface finish of mating piece is required to 0.01/100mm.

BEIJING HUADE HYDRAULIC INDUSTRIAL GROUP CO.,LTD.	Check valve cartridge Type M-SR			RE 23000/12.2004
	Size 8 to 30	up to 31.5 MPa	up to 400L/min	

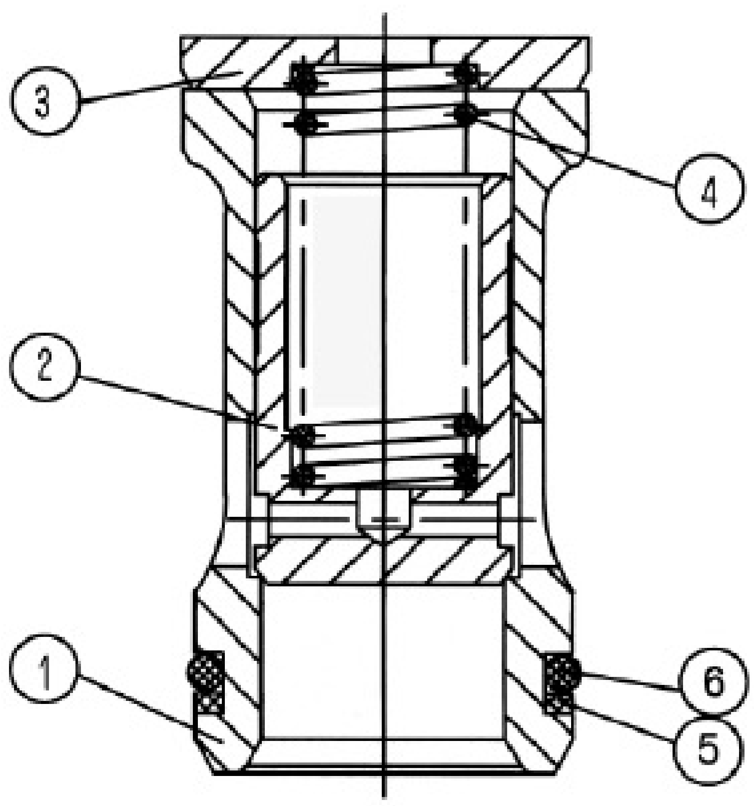
Features:
- For installation in manifold blocks as right angled check valve cartridge
- Leakfree closure in one direction
- 6 opening pressures, optional

Functions,section,symbols

The check valve type M-SR has the task of, prefer ably closing a flow in one direction and to permit free flow in the opposite direction.

The valve including valve sleeve(1),spool (2),spring seat(3) and springs(4).

It is mainly used in the outlet of pump as back pressure and side through valves.



Symbols

(With spring) (Without spring)

Ordering details

M-SR		KE	-	10	B	/	*

Check valve =M-SR

Size 8	=8
Size 10	=10
Size 15	=15
Size 20	=20
Size 25	=25
Size 30	=30

Right angled check valve cartridge = KE

Without spring (not with straight line check valve)		=00
Cracking pressure see operating curves		=02
	(standard)	=05
		=15
		=30
		=50

10= Series 10 to 19 (10 to 19 = unchanged installation and connection dimensions)

B = The technology of Beijing Huade Hydraulic

No code = Mineral oils
V = Phosphate ester

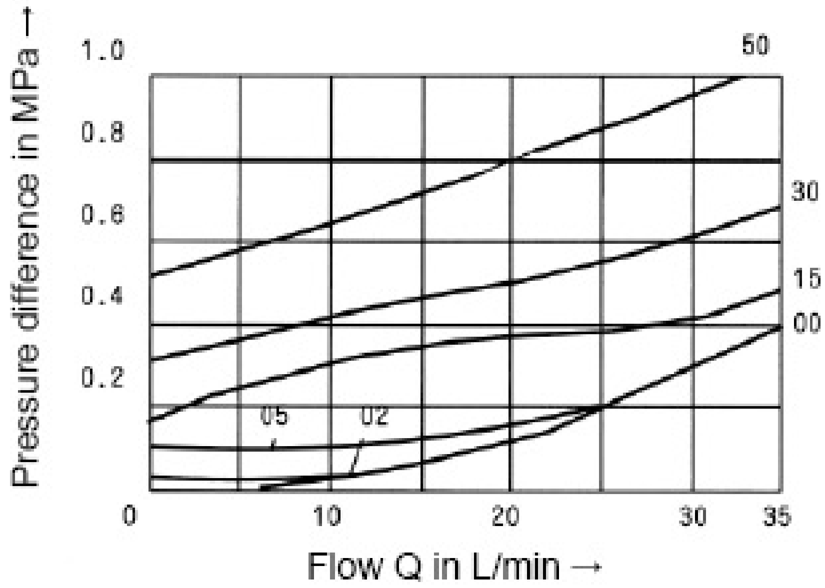
Further details in clear text

Technical data (for applications outside these parameters, please consult us!)

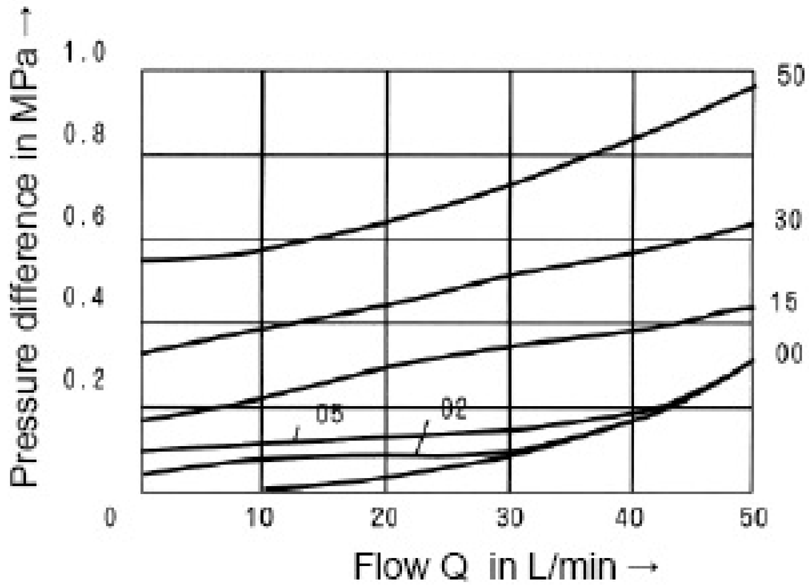
Max.pressure	(MPa)	Up to 31.5
Cracking pressure	(MPa)	See characteristic curves
Max.flow	(L/min)	See characteristic curves
operating fliud		Mineral oil or phosphate ester
Pressure fluid temperature range	(℃)	-30 to +80
Viscosity range	(mm^2/s)	2.8 to 500
Fluid cleanliness		Maximum permissible degree of contamination of the pressure fluid is to NAS 1638 class 9. We therefore recommend a filter with a minimum retention rate of $\beta_{10} \geqslant 75$.

Characterical Curves (measured at $v = 41mm^2/S$ and $t = 50^{\circ}C$)

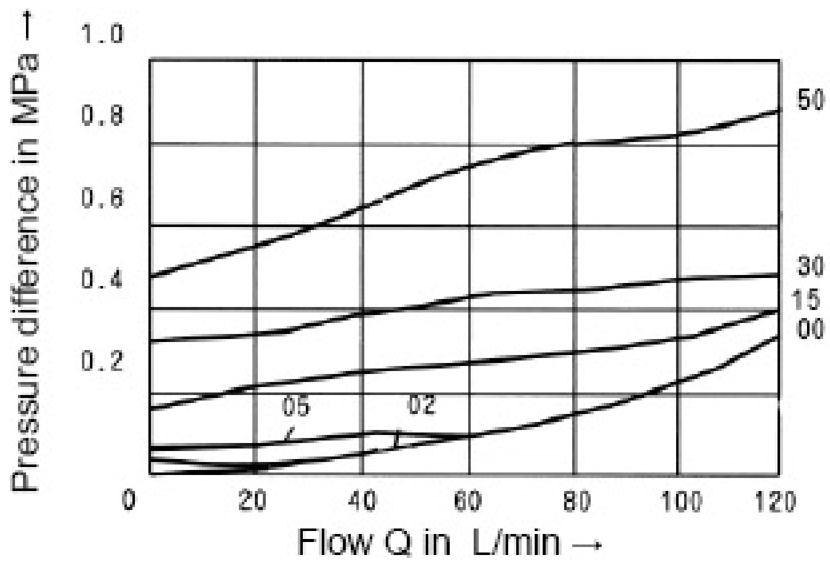
Size 8



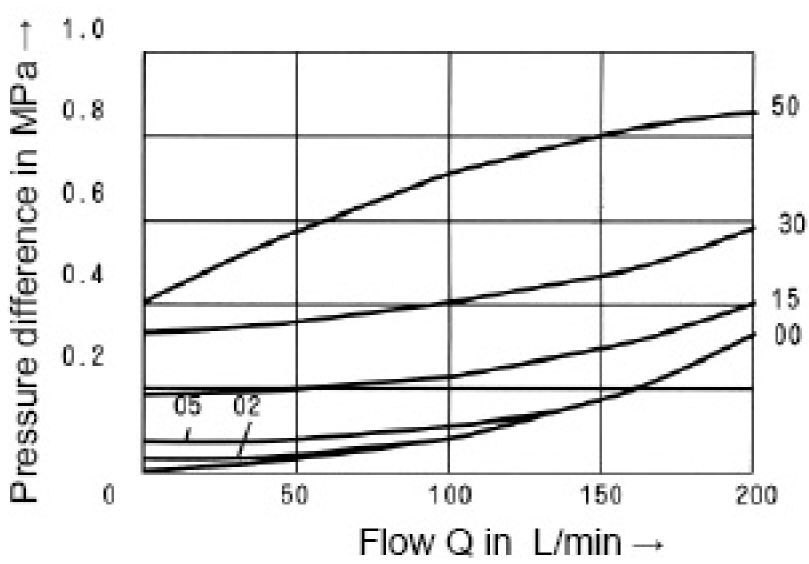
Size 10



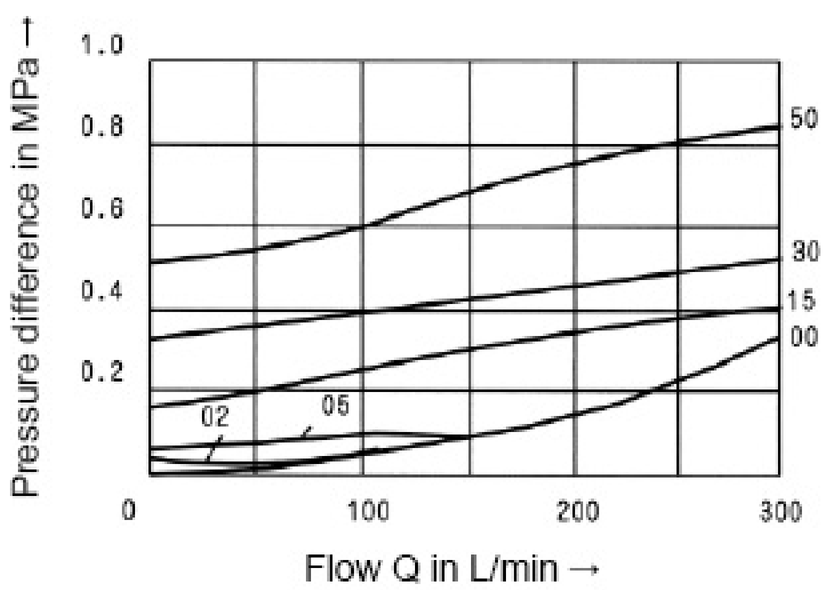
Size 15



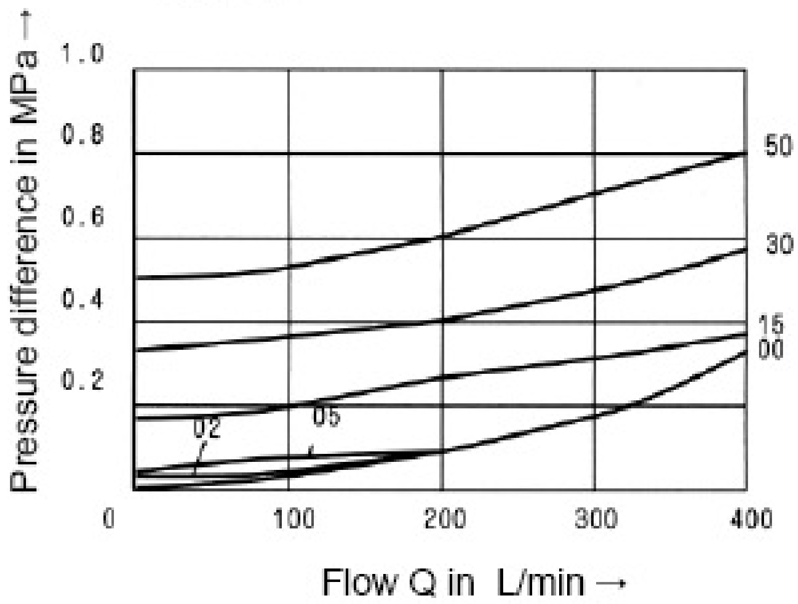
Size 20



Size 25

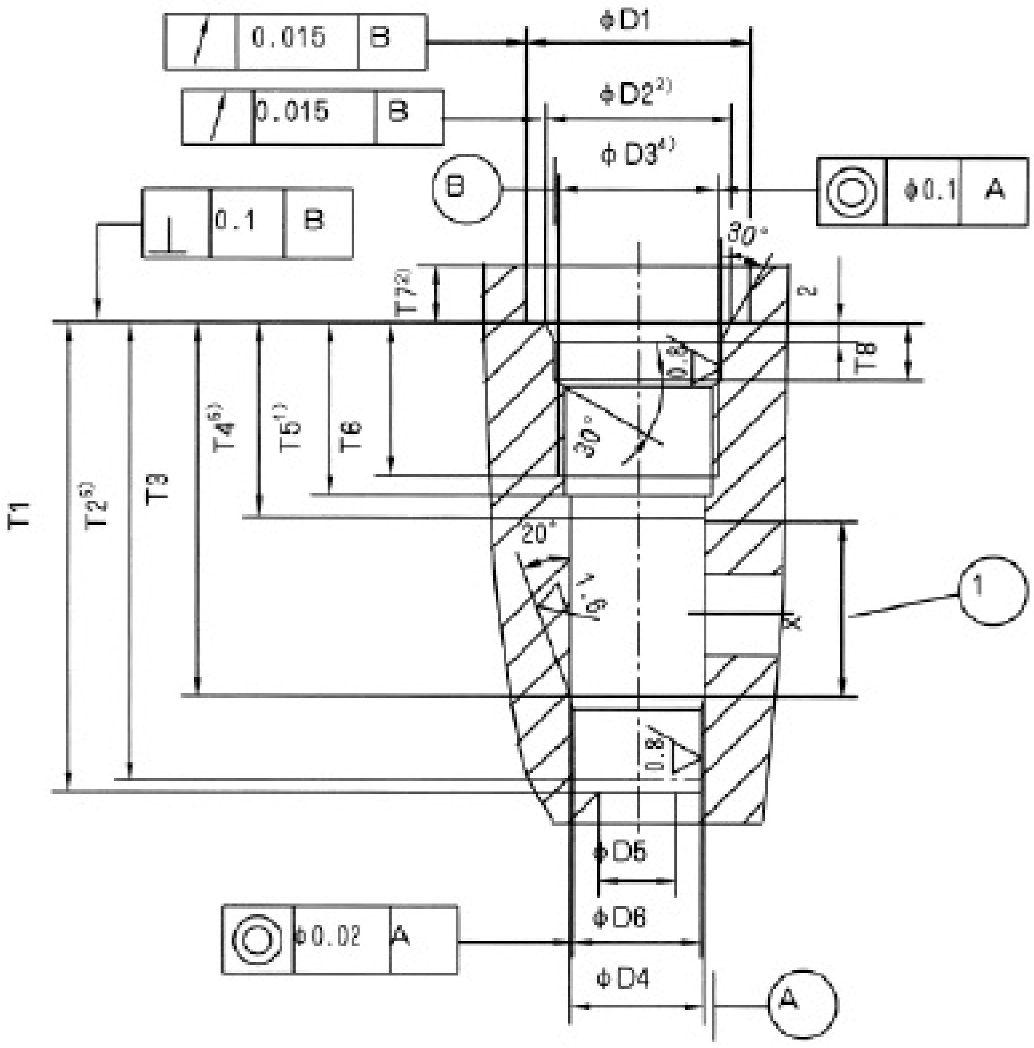


Size 30



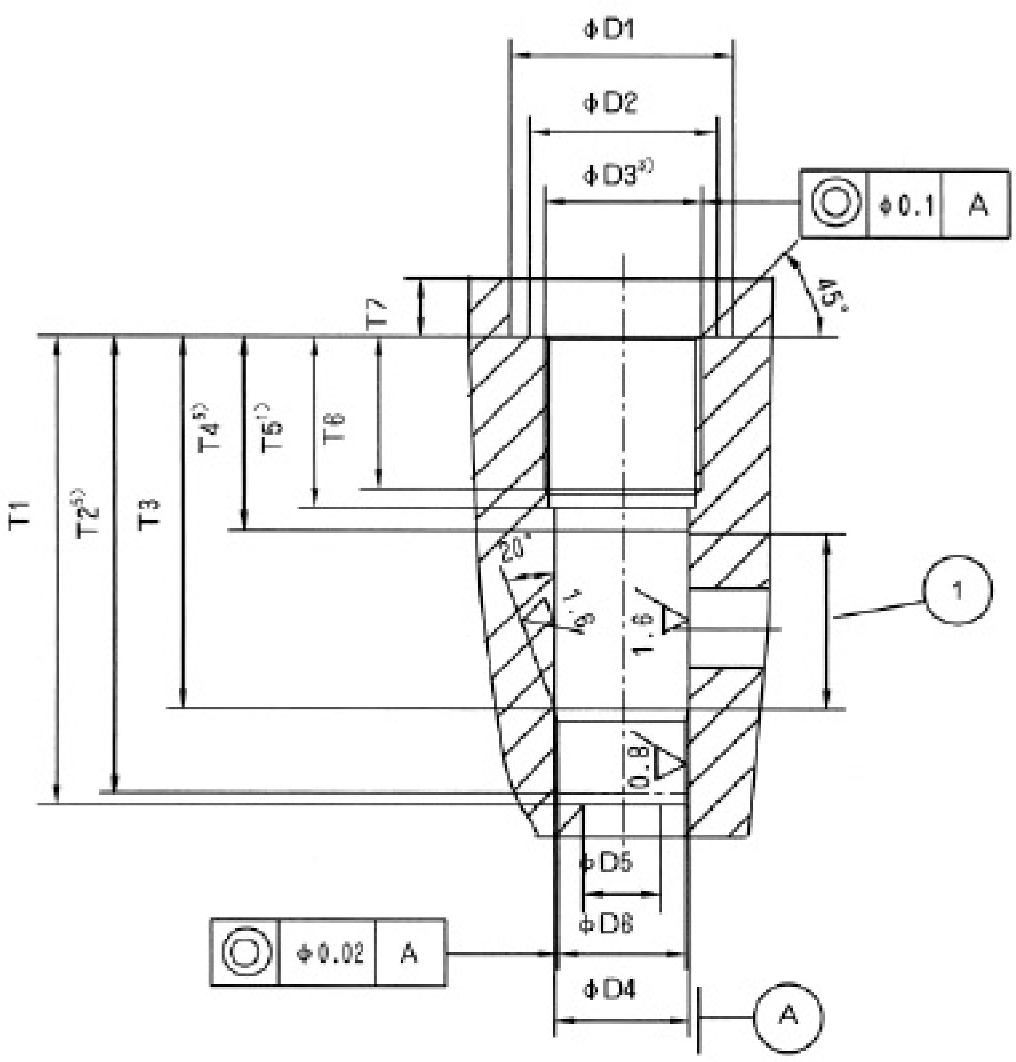
Installation bore：Right angled check valve cartridge

screwed plug to RN143.28



1 The area for downstream bore

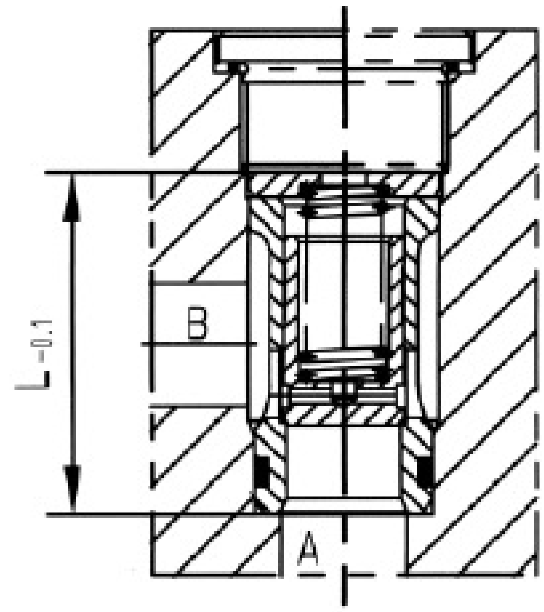
screwed plug to RN143.21



1）As the cartridge descent,T5 dimensions are enlarged accordingly.
2）With NBR seal
3）Pipe screw "G..." accord to ISO 228/1
4）Metric ISO-fine thread to DIN13
5）The deepth of clearance

Installation bore: Right angled check valve cartridge (Dimensions in mm)

Size	L-0.1
8	36.3
10	39.3
15	45.8
20	55.3
25	74.3
30	83.3



Right angled check valve cartridge

Installation bore: Right angled check valve cartridge (Dimensions in mm)

Size	P (MPa)	ϕ D1	ϕ D2	D3	ϕ D4 H8	ϕ D5	ϕ D6 H7
8	31.5	23	17.1	G3/8"	14	8	13
10	31.5	28	21.4	G1/2"	18	10	17
15	31.5	33	26.8	G3/4"	24	15	22
20	31.5	41	33.8	G1"	30	20	28
25	31.5	51	42.5	G1 $^1/_4$"	38	25	36
30	31.5	56	48.5	G1 $^1/_2$"	44	30	42
25	31.5	56+0.5	44H8	M42 × 1.5	38	25	36
30	31.5	62+0.5	50H8	M48 × 1.5	44	30	42

Size	T1 +0.1	T2	T3	T4	T5	T6	T7	T8 +0.2	X	Weight Z (kg)
8	48.5	47.5	38.5	20	15	12	6	-	18	0.05
10	53.5	52.5	43.5	24	18	14	6	-	19	0.05
15	62	60.5	50	26	20.5	16	6	-	24	0.05
20	71.5	70	56.5	26	20.5	16	7	-	30	0.05
25	90.5	88	72.5	28	22	16	7	-	43	0.1
30	99.5	96.5	79.5	31	22	16	7	-	48	0.1
25	106.5	104	88.5	45	39	33	5	12	43	-
30	115.5	112.5	95.5	48	39	33	5	12	48	-

Notice

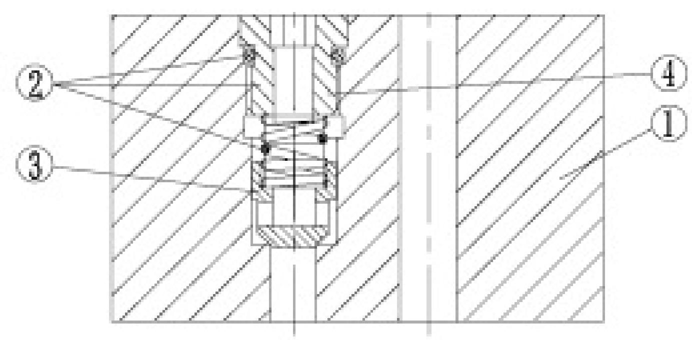
1. The fluid must be filtered. Minimum filter fineness is 20 μm.
2. The tank must be sealing up and an air filter must be installed on air entrance.
3. Products without subplate when leaving factory, if need them, please ordering specially.
4. Valve fixing screws must be high intensity level (class 10.9). Please select and use them according to the parameter listed in the sample book.
5. Roughness of surface linked with the valve is required to $\overset{0.8}{\surd}$.
6. Surface finish of mating piece is required to 0.01/100mm.

BEIJING HUADE HYDRAULIC INDUSTRIAL GROUP CO.,LTD.	**Check valve sandwich plate Type Z1S...30B/**			RE 21533/12.2004
	Size 6,10	up to 31.5 MPa	up to 100L/min	Replaces： RE 21533/05.2001

Features:

- Sandwich plate valve for use in vertical stacking assemblies
- 8 different isolating functions

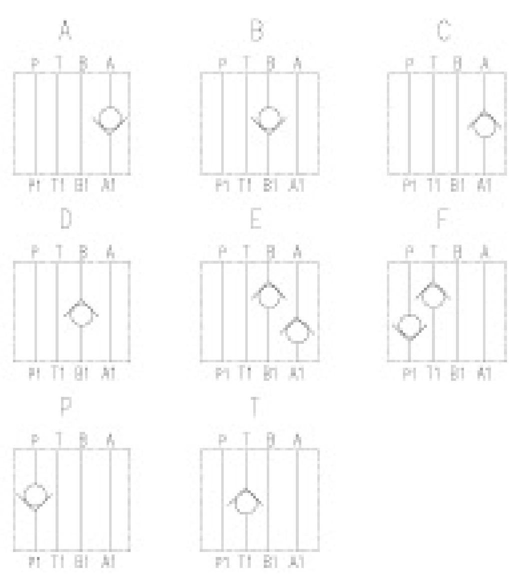
The Z1S 6 valve is a direct operated check valve in sandwich plate design.
It is used for the leak-free closure in one direction and allows free-flow in the counter direction.
This valve type has a metallic seal between poppet (3) and housing (1). Valves of this type are especially suitable for applications with operating pressures above 10.0 MPa and flow velocities over 4 m/s.



Ordering details

Z1S			30	B /	*

Size 6 = 6
Size10 = 10



Further details in clear text

No code = Mineral oils
V = phosphate ester

B = The technology of Beijing Huade Hydraulic

30 = Series 30 to 39
(30 to 39: unchanged installation and connection dimensions)

1= Cracking pressure 0.05 MPa
2= Cracking pressure 0.3 MPa
3= Cracking pressure 0.5 MPa

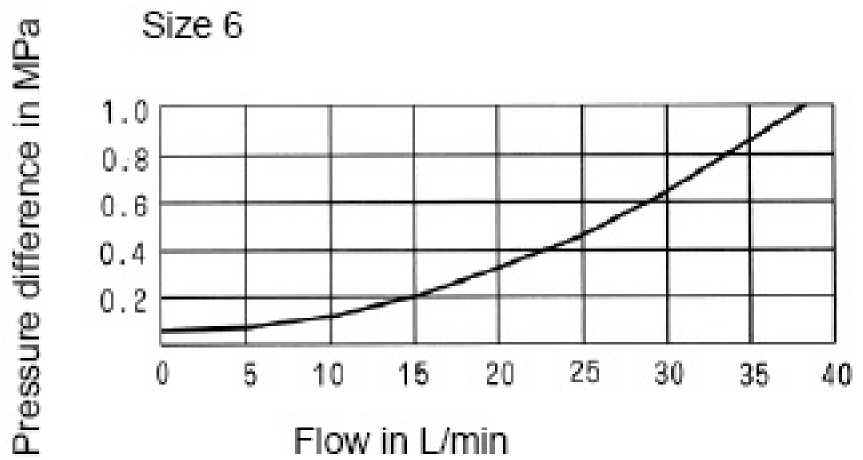
Technical data

Size	6	10
Max. flow (L/min)	40	100
Max. operating pressure (MPa)	31.5	
Cracking pressure	See the ordering details	
Pressure fluid	Mineral oils(for NBR seal) or phosphate ester(for FPM seal)	
Pressure fluid temperature range (˚C)	-30 to +80	
Viscosity range (mm^2/s)	2.8 to 500	
Weight (kg)	0.8	2.3

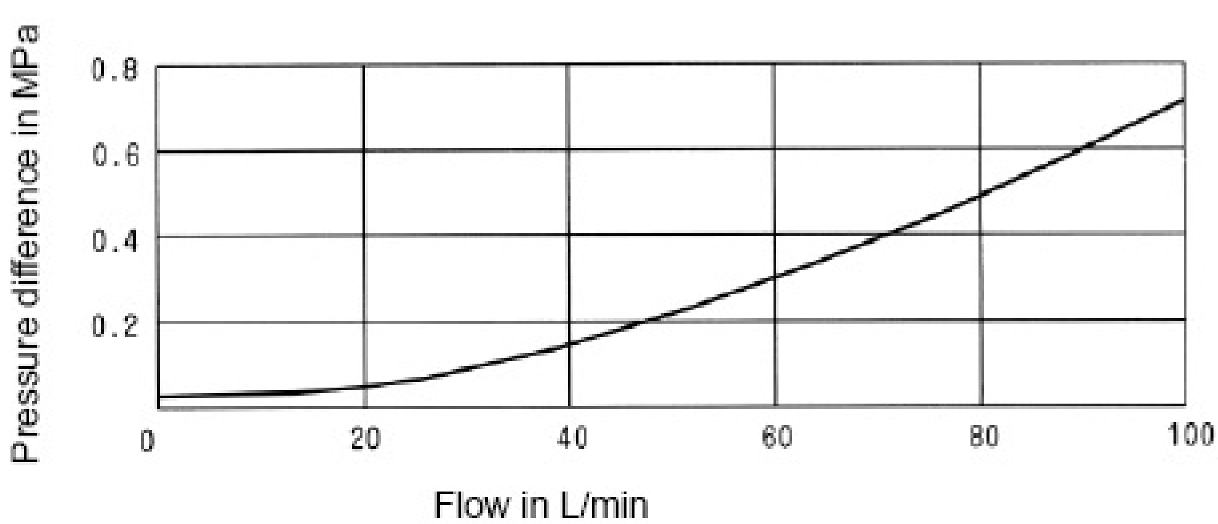
* For application outside these parameter, please consult us!

Characteristic curves (measured at v = 41 mm^2/s and t = 50 ˚C)

Size 6

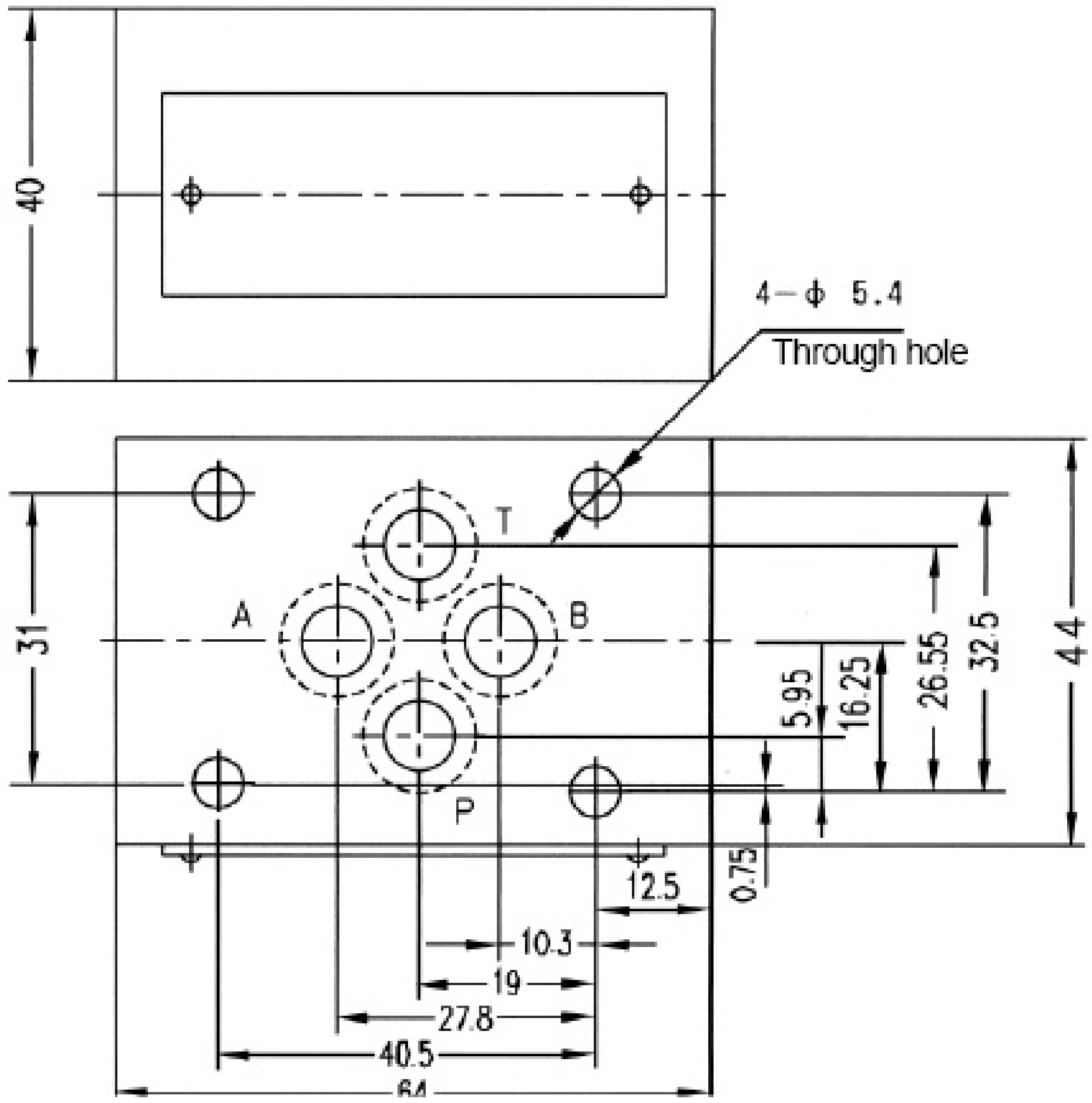


Size10



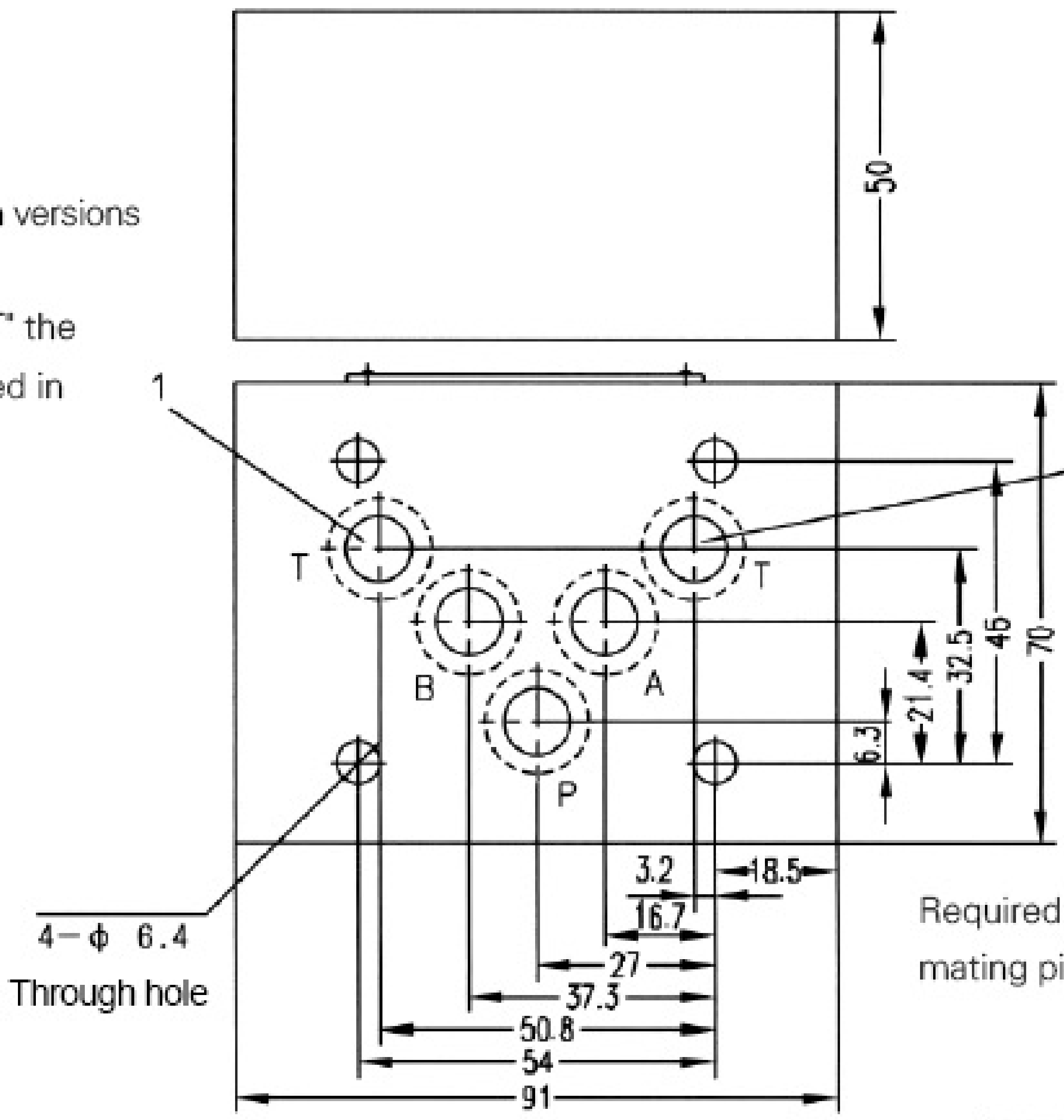
Unit dimensions **(Dimensions in mm)**

Size 6
O-ring 4-9.25X1.78

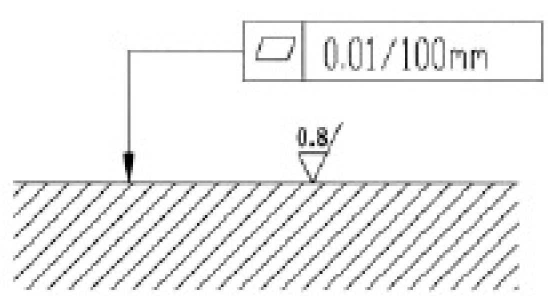


Size10

O-ring 5-12X2
1 This port is blocked in versions "F" and "T".
2 In versions "F" and "T" the check valve is installed in this channel.



Required surface finish of mating piece



Notice

1. The fluid must be filtered. Minimum filter fineness is 20 µm.
2. The tank must be sealing up and an air filter must be installed on air entrance.
3. Products without subplate when leaving factory, if need them, please ordering specially.
4. Valve fixing screws must be high intensity level (class 10.9). Please select and use them according to the parameter listed in the sample book.
5. Roughness of surface linked with the valve is required to $\overset{0.8}{\surd}$.
6. Surface finish of mating piece is required to 0.01/100mm.

BEIJING HUADE HYDRAULIC INDUSTRIAL GROUP CO.,LTD.	**Pilot operated Check valve sandwich plate Type Z2S**			RE 21600/12.2004
	size 6 、10 16、22	up to 31.5 MPa	up to 360L/min	Replace: RE： 21547/05.2001 21551/05.2001 21556/05.2001 21560/05.2001

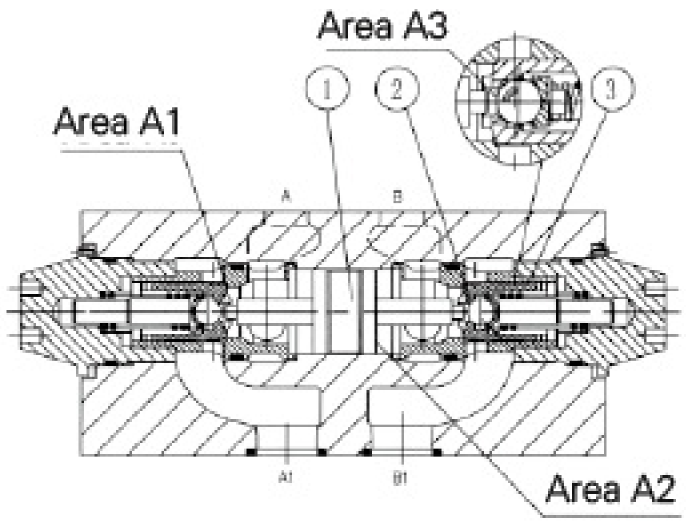
Features:

- For the leak free closure of one or two service ports
- Mounting pattern to DIN 24 340 form A,ISO 4401 and ETOP-RP 121H for use in vertical stacking assemblies

Functional, section

Hydraulic pilot operated check valves type Z2S are of sandwich plate design.
They are used for the leak-free closure of one or two service ports, even for long periods of time.
Free flow occurs from A1 to A2 or B1 to B2. Flow in the opposite direction is blocked.

In order to ensure correct closing of the valve, the service ports of the directional valve must be connected to tank in the neutral position.



Z2S22···30B/···Sandwich plate valve

Ordering details

Z2S			–	/	B	*

Further details in clear text

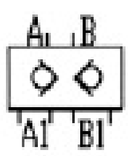
No code =	Mineral oils
V =	Phosphate ester

B= The technology of Beijing Huade Hydraulic

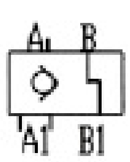
20 =	Series 20 to 29 (Apply to size 10)
(20 to 29: unchanged installation and connection dimensions)	
30 =	Series 30 to 39 (Apply to size 16, 22)
(30 to 39: unchanged installation and connectiondimensions)	
40 =	Series 40 to 49 (Apply to size 6)
(40 to 49: unchanged installation and connection dimensions)	

	(only for size10)
1=	Cracking pressure 0.15 MPa
2=	Cracking pressure 0.3 MPa
3=	Cracking pressure 0.6 MPa

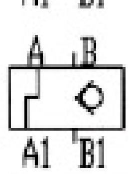
Size 6	= 6
Size 10	= 10
Size 16	= 16
Size 22	= 22

Leak free closure of ports A and B 

= No code

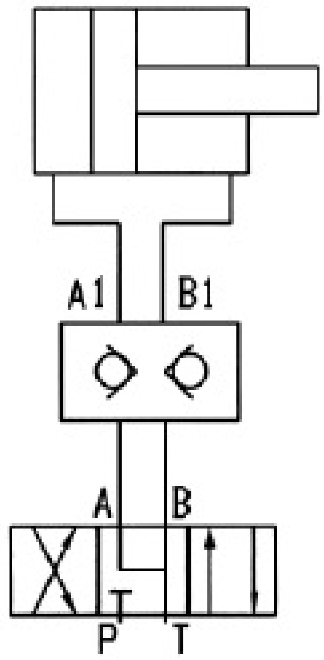
Leak free closure of port A 

=A

Leak free closure of port B 

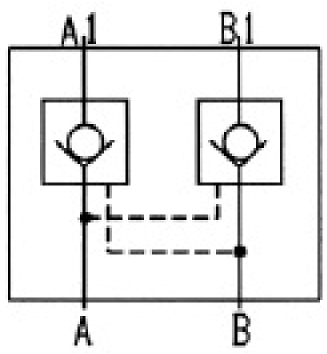
=B

Typical circuit example

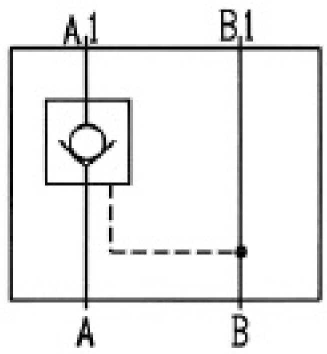


Symbols

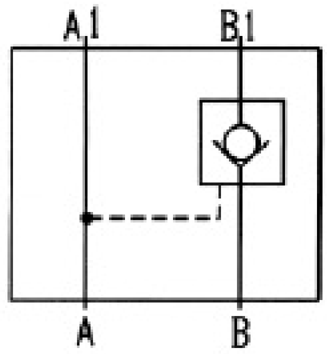
Z2S.../



Z2S...A.../



Z2S...B.../



Technical data

Size		6	10			16	22
Max. flow L/min	(L/min)	to 60	to 120			to 200	to 360
Max. operating pressure	(MPa)	31.5					
Cracking pressure	(MPa)	0.15	0.15	0.3	0.6	0.25	0.25
Directions		Flow freely via check valve from A to A1 or B to B1 pilot operated from B1 to B or A1 to A					
Area ratio		A1/A2=1:3	A1/A2=1:2.86 A3/A2=1:11.45			A1/A2=1:11.8 A3/A2=1:2.8	A1/A2=1:13.6 A3/A2=1:2.8
Pressure fluid		Mineral oils(for NBR seal) or phosphate ester(for FPM seal)					
Pressure fluid temperature range	(℃)	-30 to +80					
Viscosity range	(mm^2/s)	2.8 to 500					
Weight	(kg)	0.8	2			7	11.7

Characteristic curves (measured at ν = 41 mm^2/s and t = 50℃)

Type Z2S6

—— = A →A1;B→B1

------- = A1 →A;B1→B

1、Normal cracking

2、Check valve cartridge

3、Flow freely

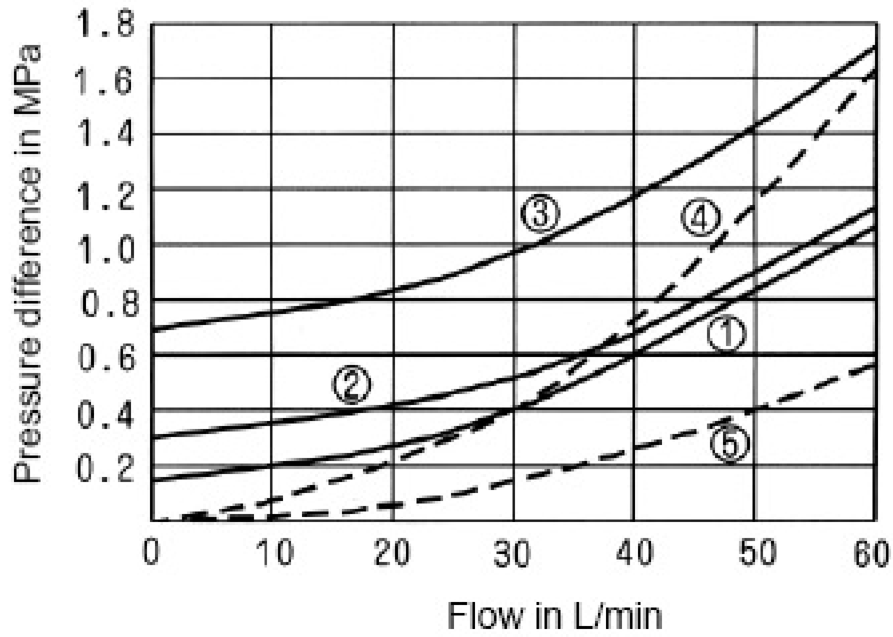
(without check valve)

4、Through check valve cartridge

5、Flow freely

(without check valve cartridge

Type "A" and type"B")



Type Z2S10

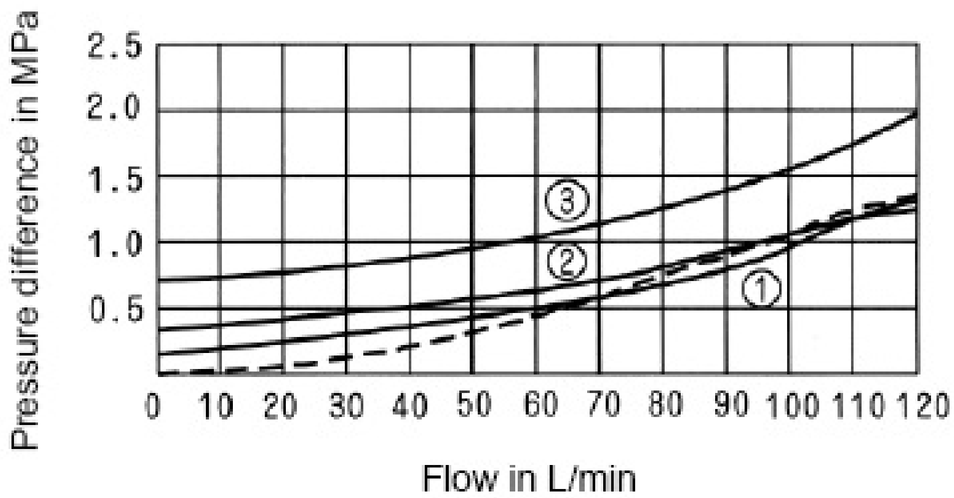
—— = A →A1; B→B1

------- = A1 →A; B1→B

1、Cracking pressure 1 =0.15MPa

2、Cracking pressure 2 =0.3MPa

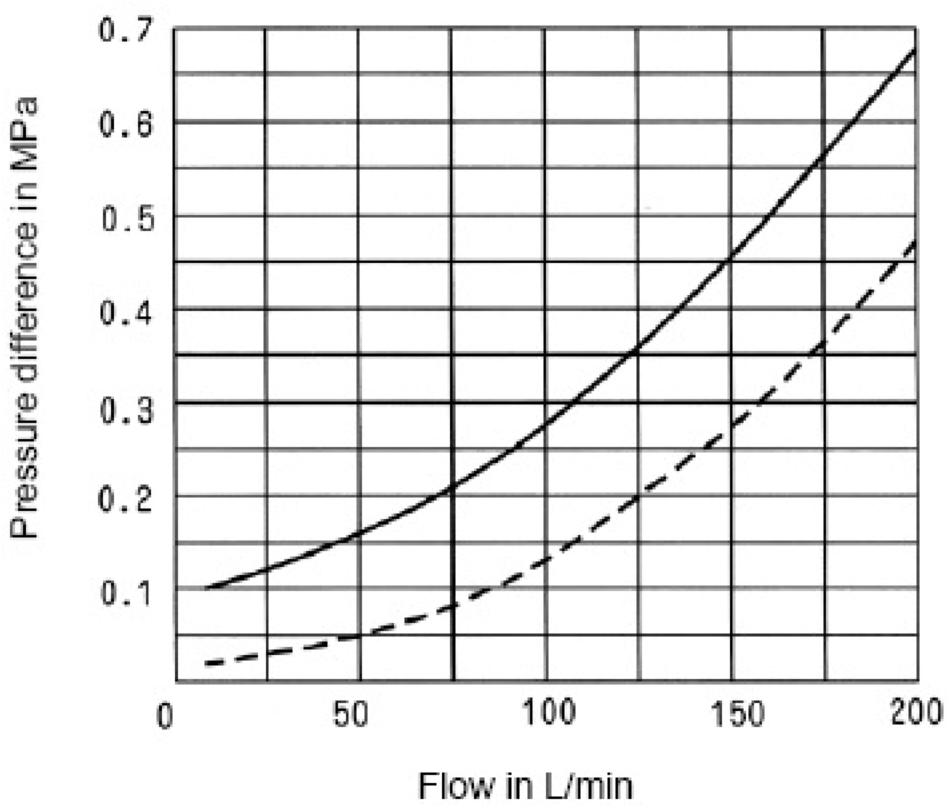
3、Cracking pressure 3 =0.6MPa

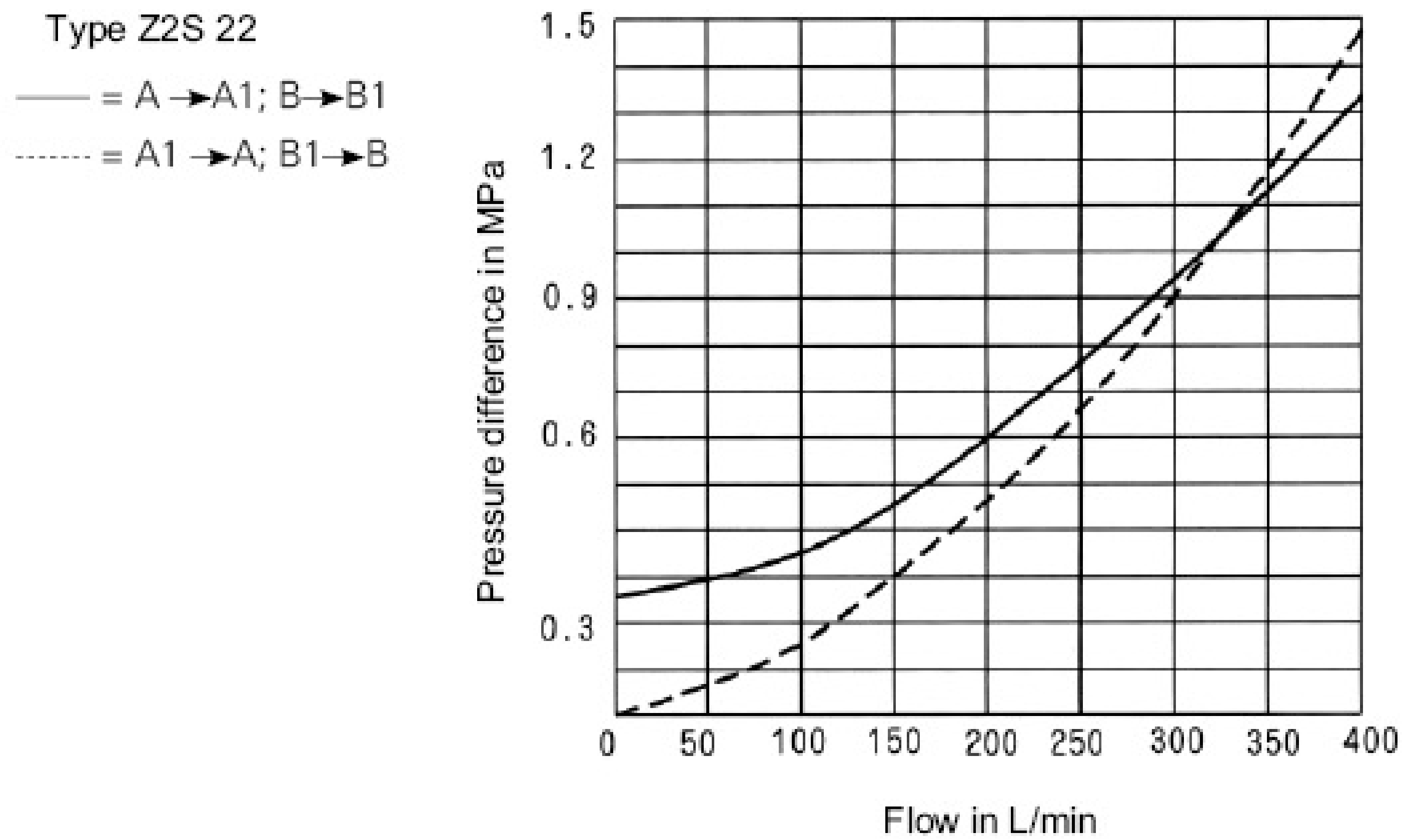


Type Z2S16

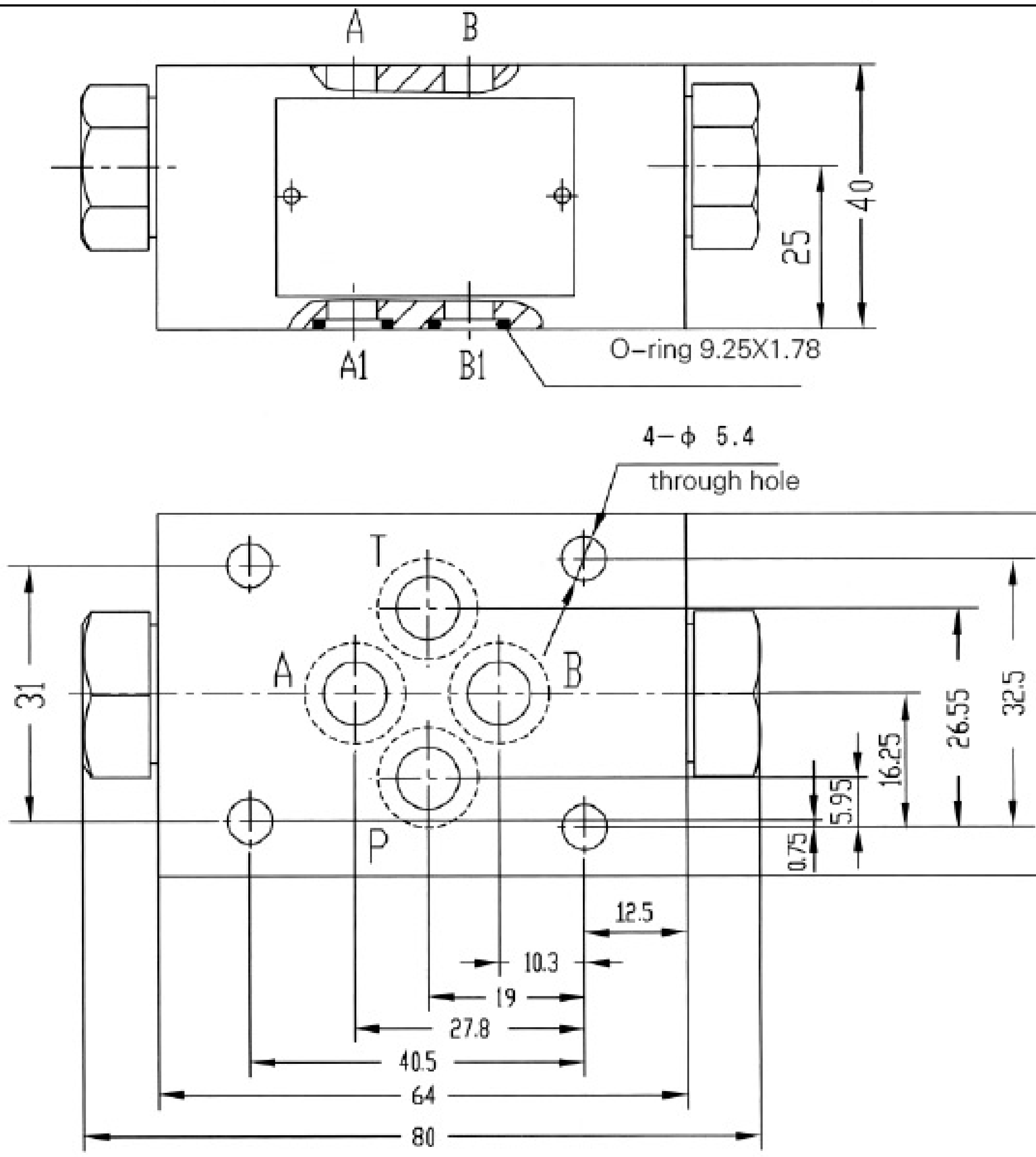
—— = A →A1; B→B1

------- = A1 →A; B1→B

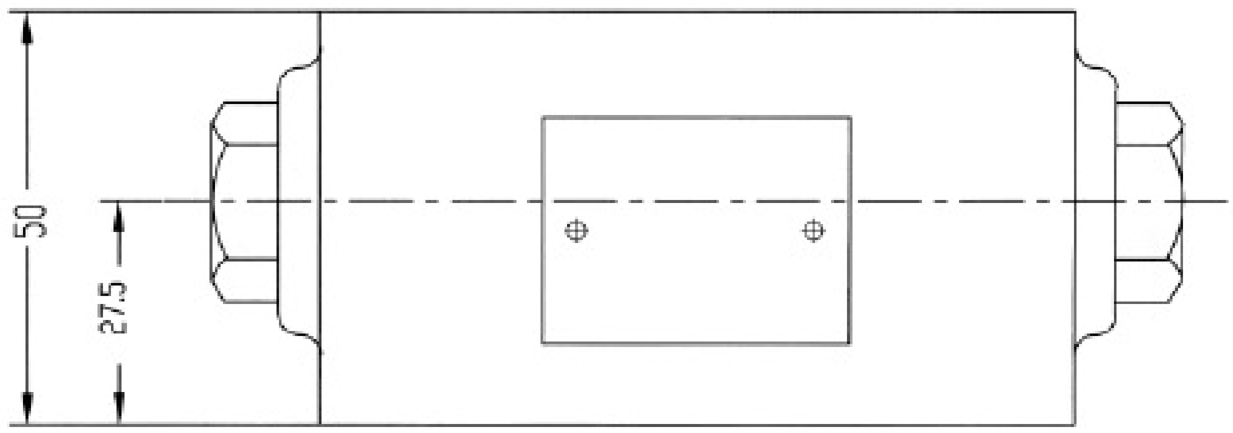


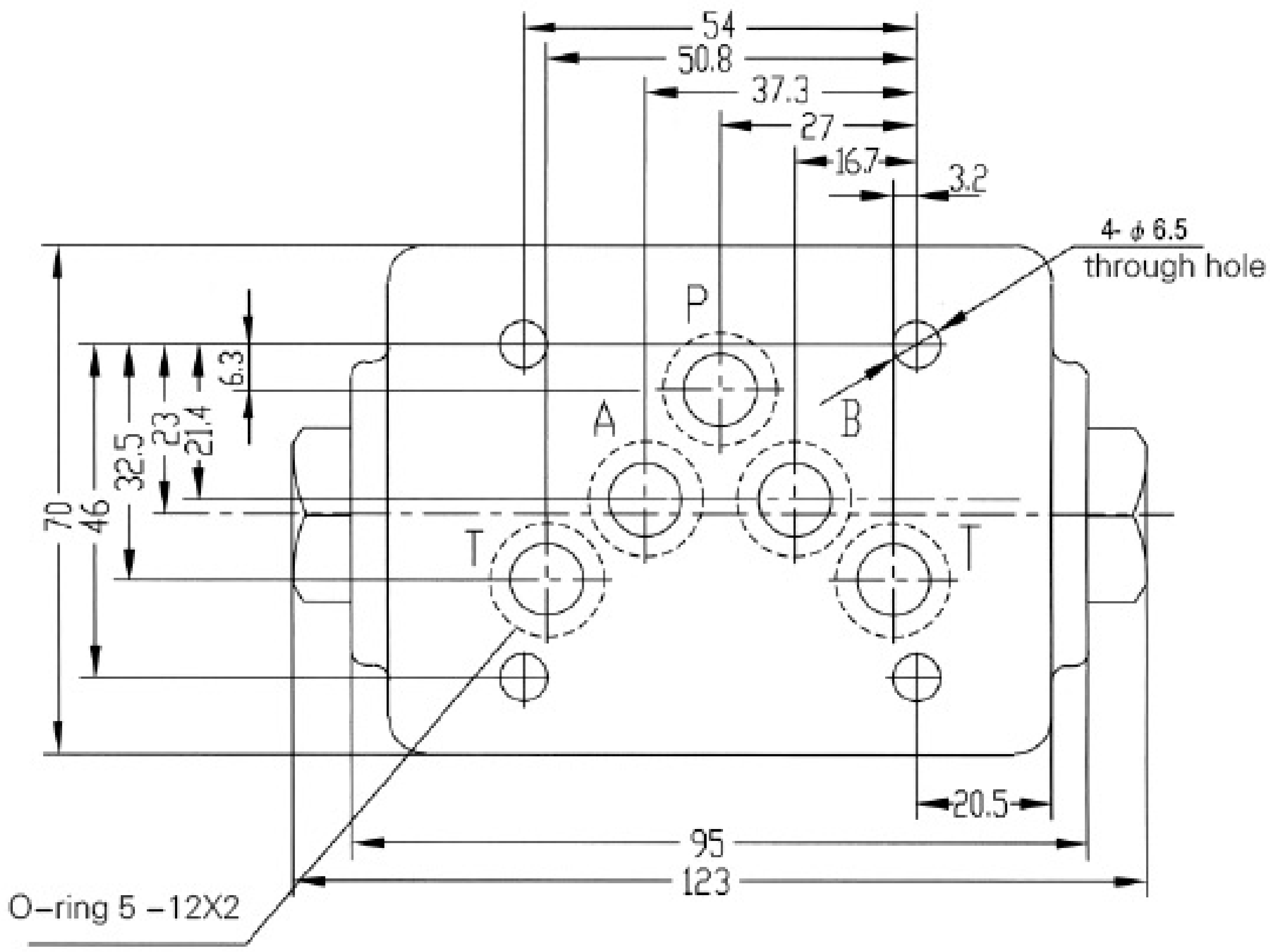


Unit dimensions : (Size6) **(Dimensions in mm)**

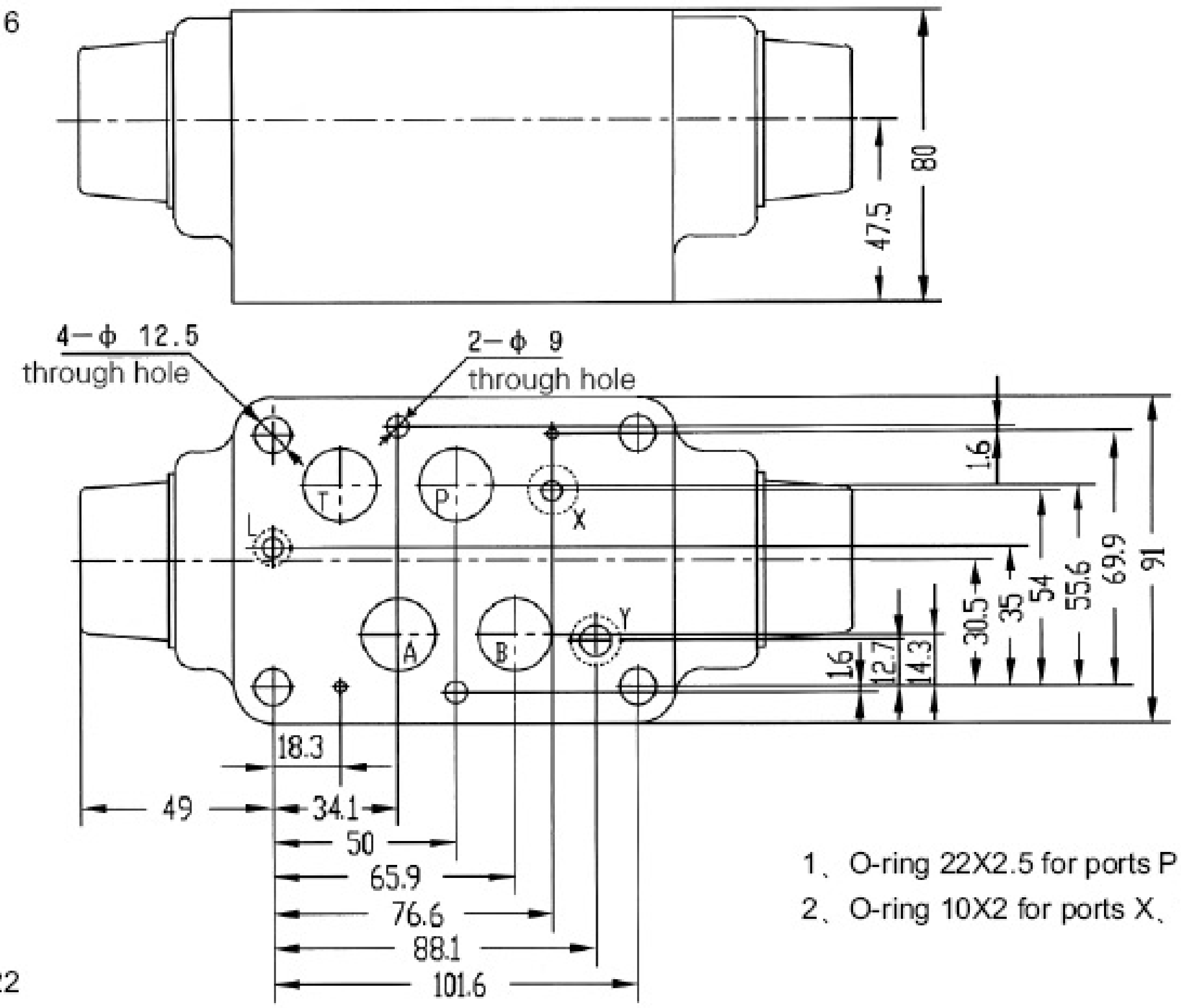


Unit dimensions：(Size10) **(Dimensions in mm)**





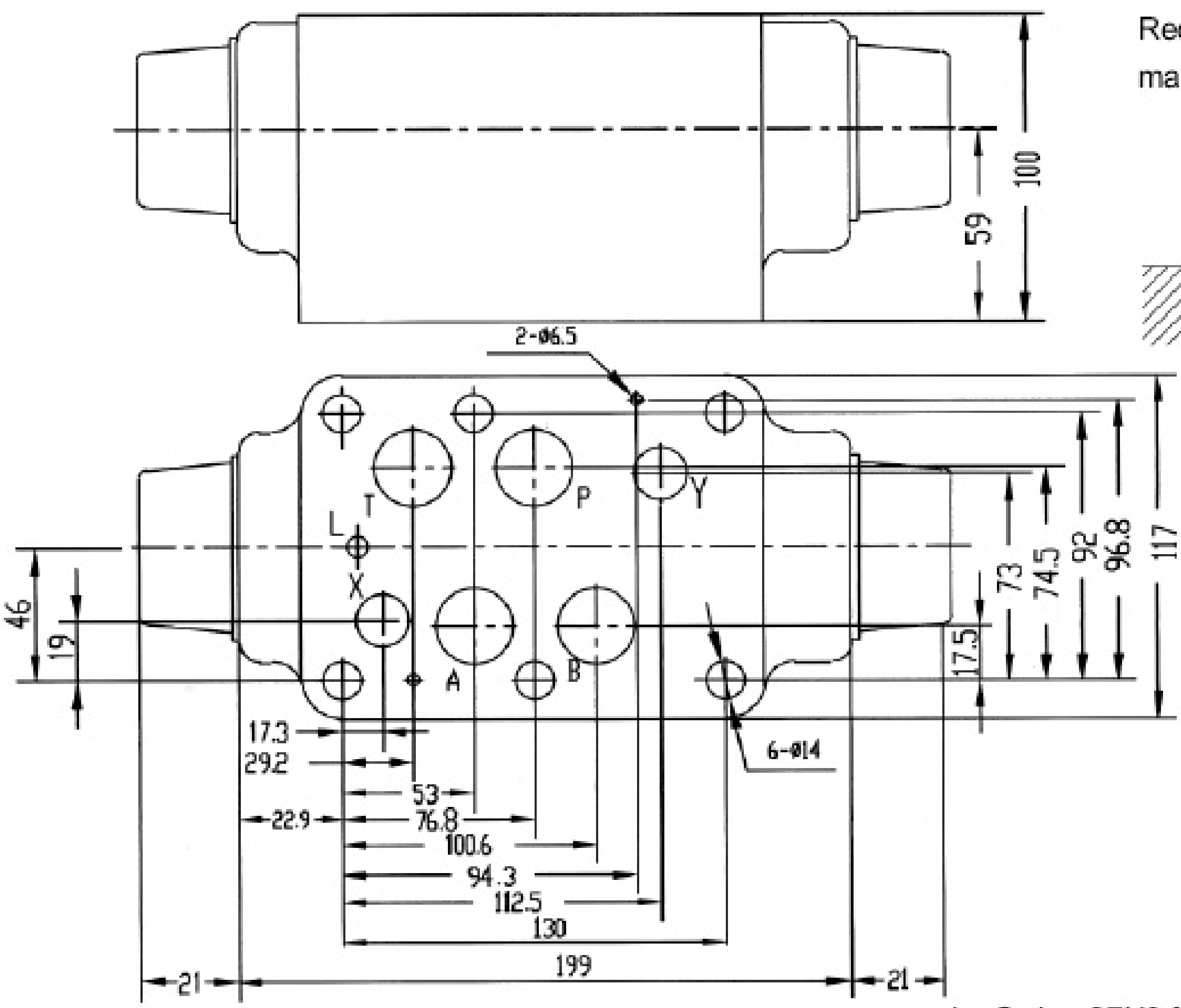
Size16



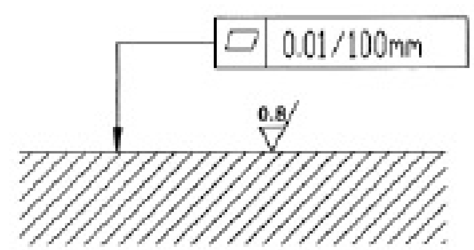
1、O-ring 22X2.5 for ports P、A、B、T

2、O-ring 10X2 for ports X、Y、L

Size22



Required surface finish of mating piece



1、O-ring 27X3 for ports P、A、B、T

2、O-ring 19X3 for ports X、Y、L

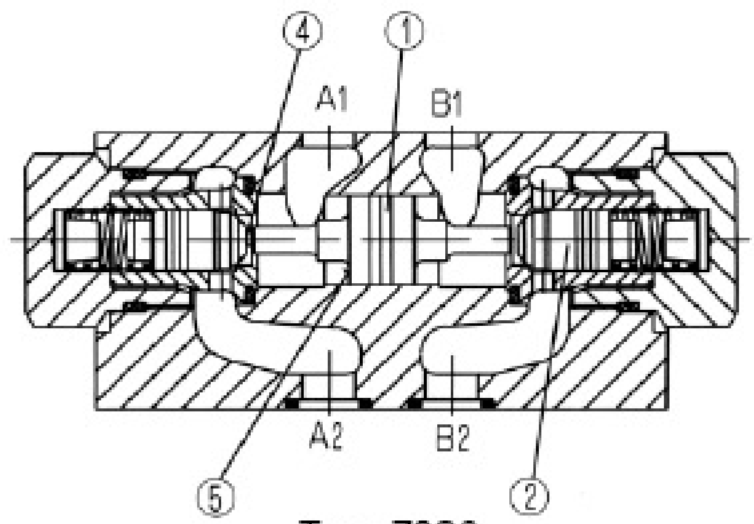
BEIJING HUADE HYDRAULIC INDUSTRIAL GROUP CO.,LTD.	Pilot operated Check valve sandwich plate Type Z2S (New Series)			RE 21601/12.2004
	Size 6、10 16、22	up to 31.5 MPa	up to 450L/min	

Features:

- For use in vertical stacking assemblies
- For the leak free closure of one or two service ports
- Porting pattern to Din 24 340 form A, ISO 4401 and CETOP-RP 121H

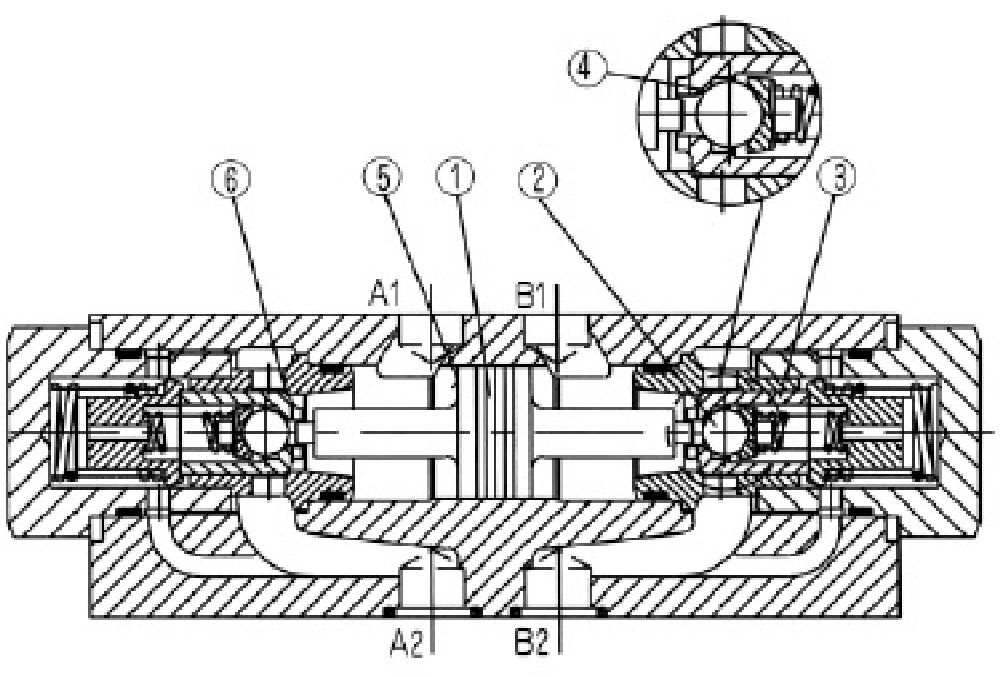
Functional, section

Hydraulic pilot operated check valves type Z2S are of sandwich plate design.
They are used for the leak-free closure of one or two service ports,even for long periods of time.
Free flow occurs from A1 to A2 or B1 to B2. Flow in the opposite direction is blocked.
When fluid flows from A1 to A2, the spool (1) is pressured and is pushed to the right, thereby opening the ball poppet valve (2) which then opens the poppet(3).
In order to ensure correct closing of the valve, the service ports of the directional valve must be connected to tank in the neutral position.



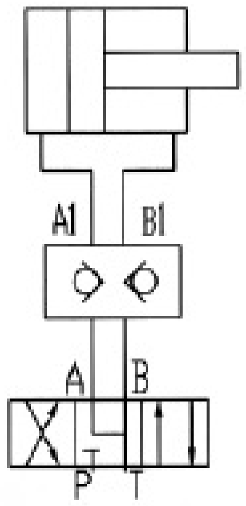
Type Z2S6

1 Spool
2 Ball poppet valve
3 Poppet
4 Area A1
5 Area A2
6 Area A3



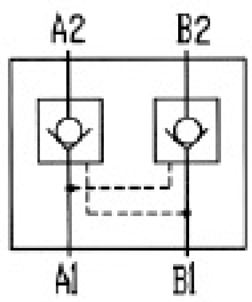
Type Z2S10

Typical circuit example

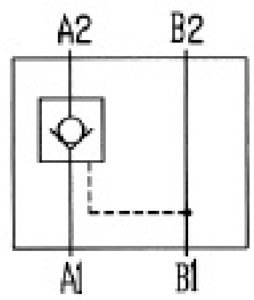


Symbols

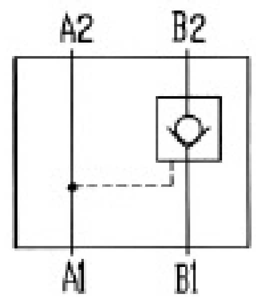
Z2S.../



Z2S...A.../



Z2S...B.../



Ordering details

Z2S					B /	*

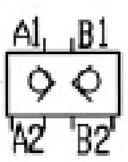
Further details in clear text

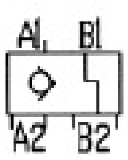
No code =	Mineral oils
V =	Phosphate ester

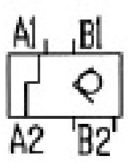
B =The technology of Beijing Huade Hydraulic

Size6	= 6
Size10	= 10
Size16	= 16
Size22	= 22

30 = Series 30 to 39 (Apply to size 10)
(30 to 39: unchanged installation and connection dimensions)
50 = Series 50 to 59 (Apply to size 16,22)
(50 to 59: unchanged installation and connection dimensions)
60 = Series 60 to 69 (Apply to size 6)
(60 to 69: unchanged installation and connection dimensions)

Leak free closure of ports A and B  = No code

Leak free closure of port A  = A

Leak free closure of port B  = B

1 = Cracking pressure 0.15MPa（only for size6、10）
Cracking pressure 0.3MPa（only for size16、22）
2 = Cracking pressure 0.3MPa
Cracking pressure 0.5MPa (only for size 16,22)
3 = Cracking pressure 0.6MPa（only for size10）
Cracking pressure 0.7MPa（only for 6）
Cracking pressure 0.75MPa（only for 16、22）
4 = Cracking pressure 1.0MPa（only for 10、16、22）

Technical data

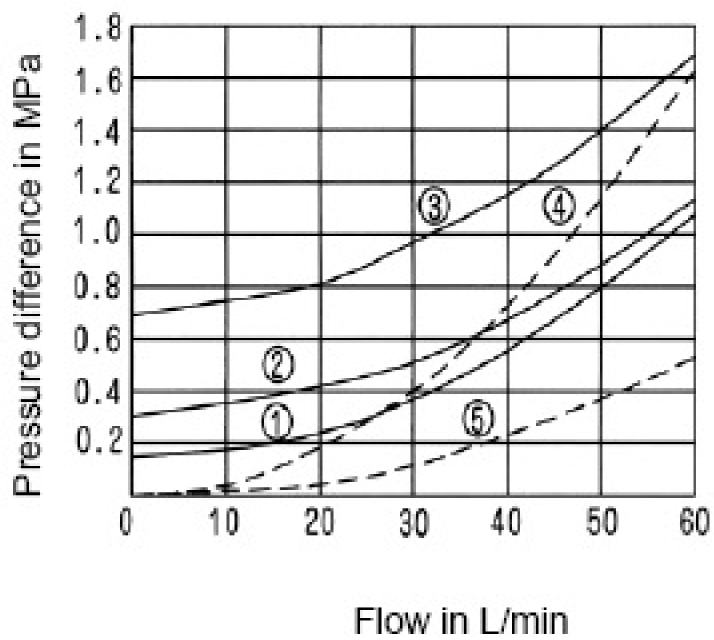
Size		6	10	16	22
Max. flow L/min	(L/min)	to 60	to 120	to 300	to 450
Max. operating pressure	(MPa)	31.5			
Cracking pressure	(MPa)	see curve			
Directions		see symbols			
Area ratio		A1/A2=1:3	A1/A2=1:11.45	A1/A2=1:11.8	A1/A2=1:13.6
			A3/A2=1:2.86	A3/A2=1:2.8	A3/A2=1:2.8
Pressure fluid		Mineral oils(for NBR seal) or phosphate ester(for FPM seal)			
Pressure fluid temperature range	(℃)	-30 to +80			
Viscosity range	(mm^2/s)	2.8 to 500			
Weight	(kg)	approx. 0.8	approx. 3	approx. 6.5	approx. 12

Characteristic curves (measured at ν = 41 mm^2/s and t = 50 ℃)

Type Z2S6

—— = A1→A2; B1→B2
······· = A2→A1; B2→B1

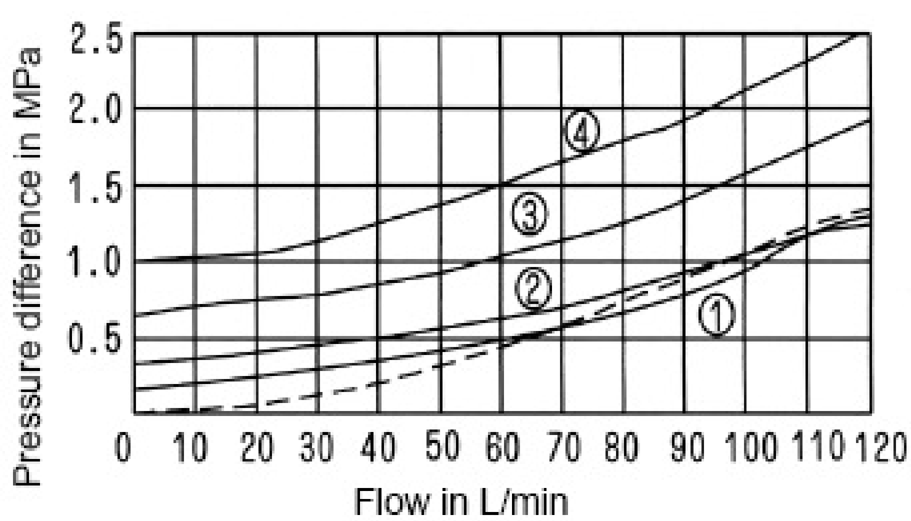
1、Cracking pressure 1=0.15MPa
2、Cracking pressure 2=0.3MPa
3、Cracking pressure 3=0.7MPa
4、Through check valve cartridge
5、Flow freely
(Without check valve cartridge type"A" and type"B")



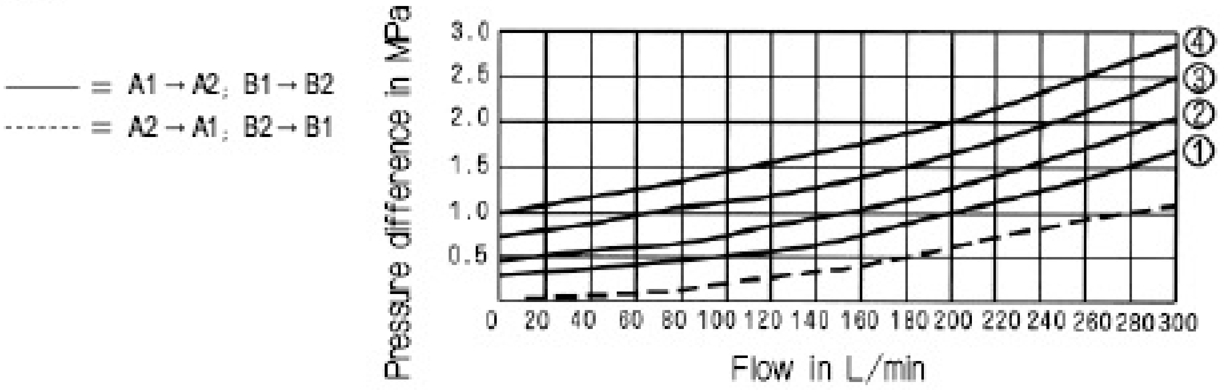
Type Z2S10

—— = A1→A2; B1→B2
······· = A2→A1; B2→B1

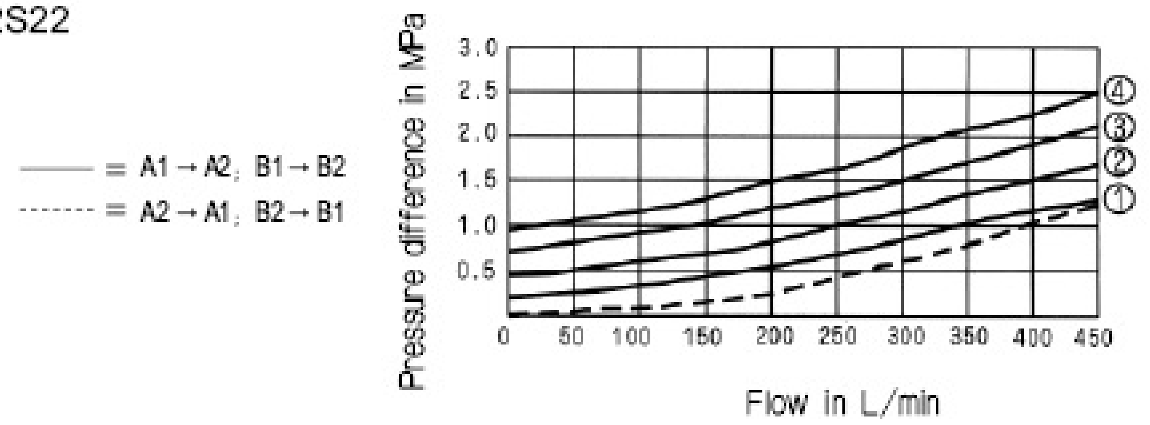
1、Cracking pressure 1 =0.15MPa
2、Cracking pressure 2 =0.3MPa
3、Cracking pressure 3 =0.6MPa
4、Cracking pressure 4 =1.0MPa



Type Z2S16

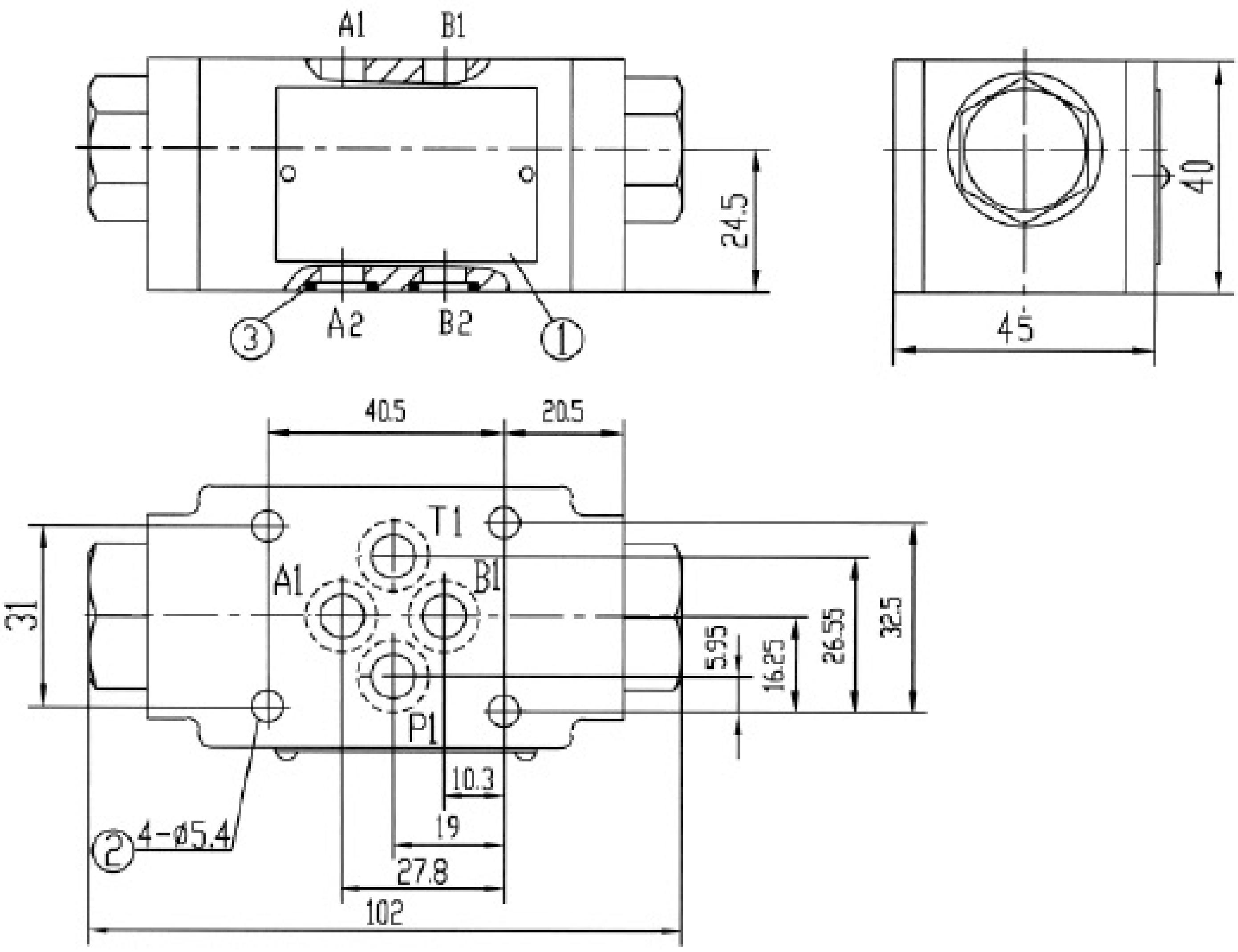


Type Z2S22



Unit dimensions **(Dimensions in mm)**

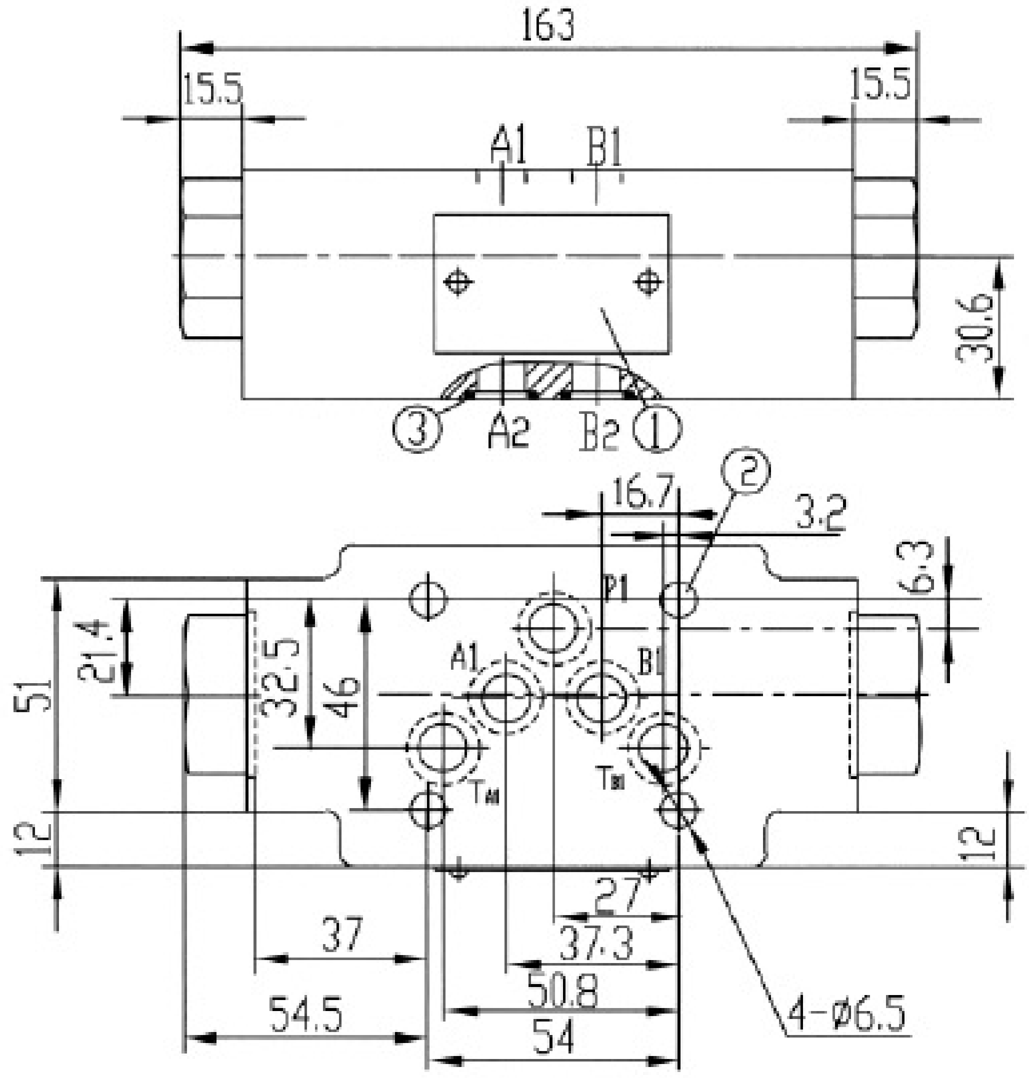
Size6

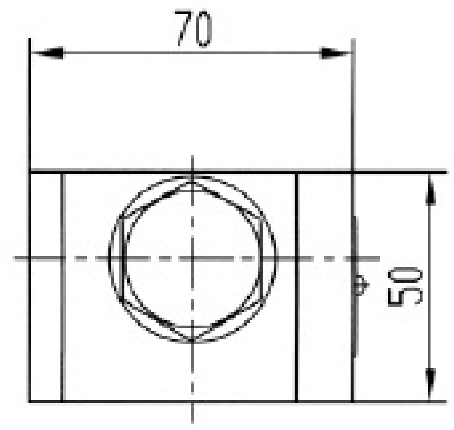


1. Name plate
2. Holes for mounting
3. O-rings 9.25 x 1.78 for four ports
   Valve fixing screws 4 - M5 -10.9
   (GB/T70.1-2000)
   Screw torque:M_A=8.9Nm

Unit dimensions **(Dimensions in mm)**

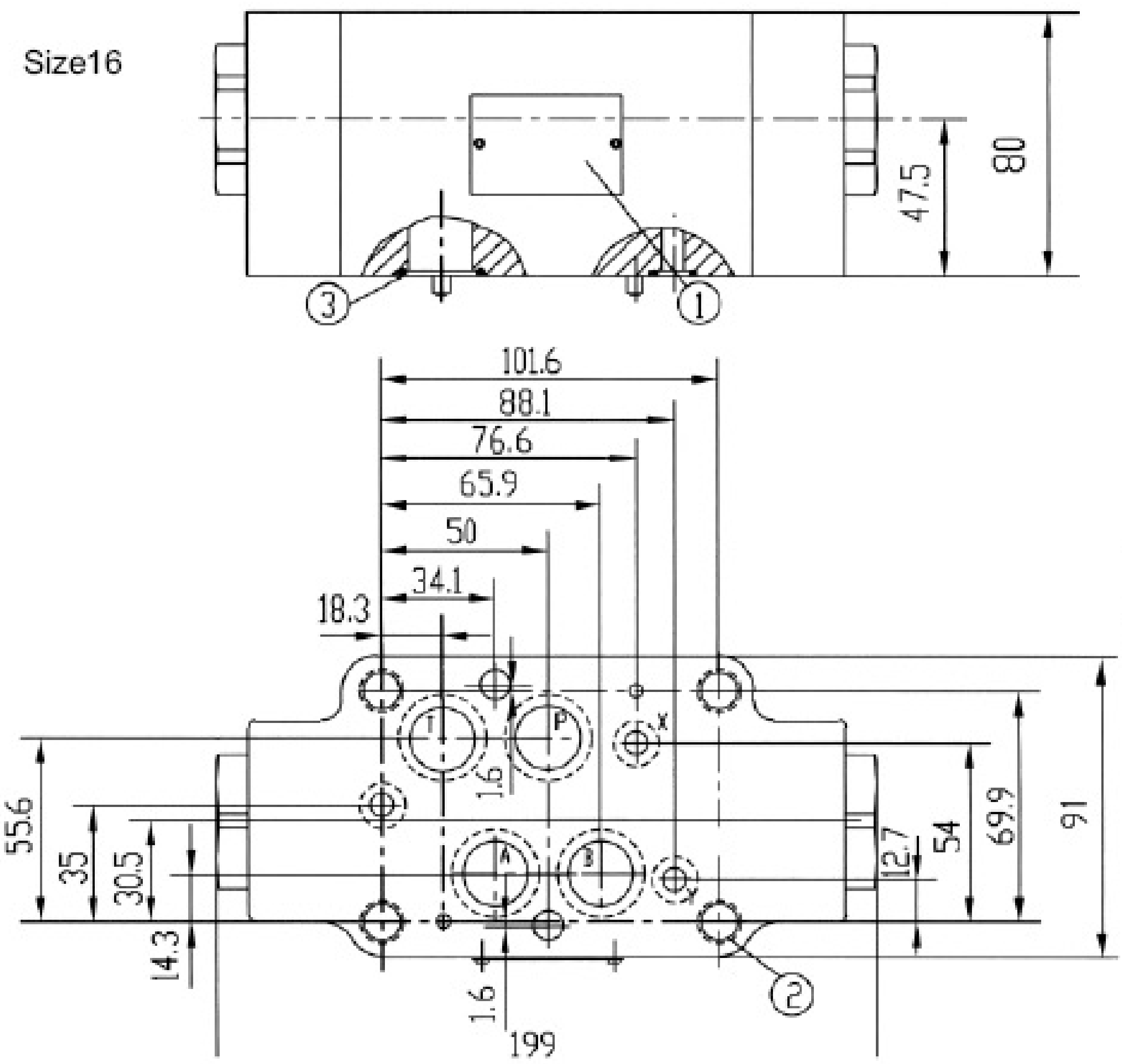
Size10





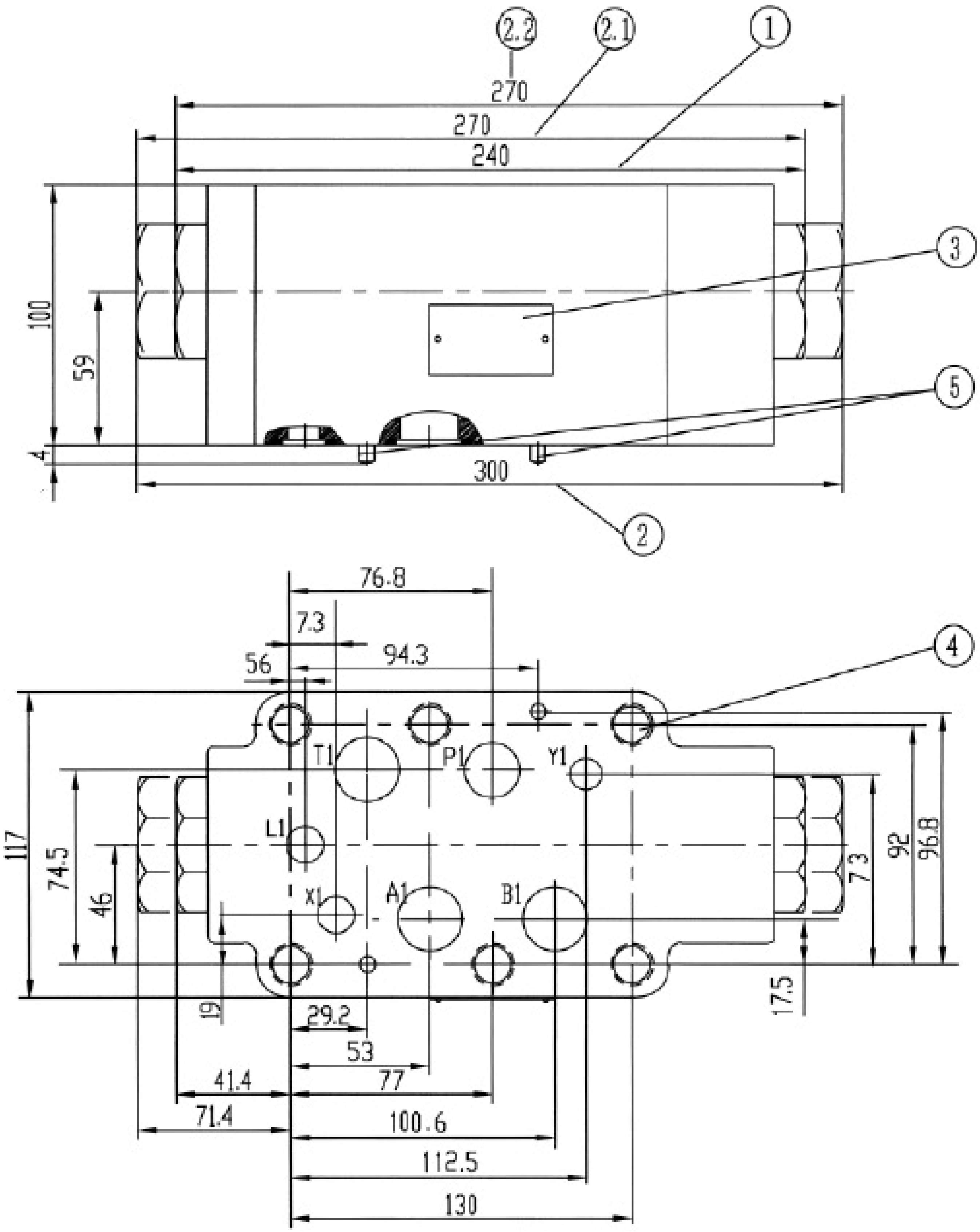
1. Nameplate
2. Holes for mounting
   4 － Φ6.5
3. O-rings 12x 2 for 5 ports
   P、A、B、T_{A1}、T_{B1}
   Valve fixing screws
   4-M6 -10.9
   (GB/T70.1-2000)
   Screw torque：M_A=15.5Nm

Size16



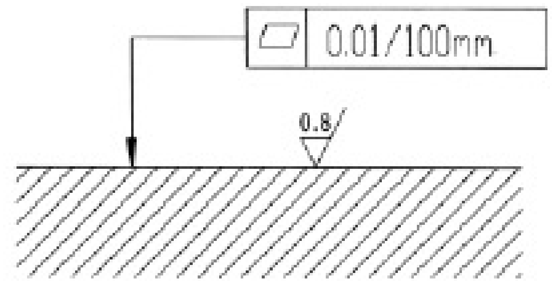
1. Nameplate
2. Holes for mounting
3. O-rings 22x 2.5 for ports
   P、A、B、T
   10X2 for ports X、Y、L
   Valve fixing screws:
   ① 4-M10 -10.9
   (GB/T70.1-2000)
   Screw torque:M_A=75Nm
   ② 2-M6 -10.9
   (GB/T70.1-2000)
   Screw torque：M_A=15.5Nm

Size22



1 Cracking pressure 0.3MPa or 0.5MPa，Leak free closure of ports A and B
2 Cracking pressure 0.75MPa or 1.0MPa，Leak free closure of ports A and B
2.1 Cracking pressure 0.75MPa or 1.0MPa，Leak free closure of port A
2.2 Cracking pressure 0.75MPa or 1.0MPa，Leak free closure of port B
3 Label plate
4 Valve fixing screws:
6- M14-10.9 (GB/T70.1-2000)，
Screw torque:M_A=205Nm
5 Fixing pin

Required surface finish of mating piece



BEIJING HUADE HYDRAULIC INDUSTRIAL GROUP CO.,LTD.	Pilot operated check valves, Types SV and SL...30B/			RE 21467/12.2004
	size 10 to 30	up to 31.5 MPa	up to 400L/min	Replaces: RE 21467/05.2001

Features:

- Check valve controlled by fluid
- For subplate mounting,Mounting pattern to DIN 24 340
- Subplate or screw threaded connection
- With or without leakage port
- With or without pre-opening
- Type with pre-opening,dampened decompression
- 3 opening pressures

Function,section

SV and SL valves are hydraulic pilot operated check valves in poppet type design which may be opened to allow flow in either direction.

These valves are used for the isolation of operating circuits under pressure, as safeguard against the lowering of a load when a line break occurs or against creeping movements of hydraulically locked-in actuators.

Basically these valves consist of housing (1), poppet (2), compression spring (3), control spool (4) as well as a pre-opening, as poppet valve (5), optionally.

The valve enables free flow from A to B, in the counter direction the poppet (2) is held on its seat by the system pressure, additionally to the spring force.

Through the pressure connection at control port X the control piston (4) is moved to the right. This pushes the poppet (2) from the seat. Now the valve may also have a flow from B to A.

In order to ensure the proper opening of the valve via the control piston (4) a certain minimum control pressure is necessary

Type SV..A.. and SL..A.. (with pre-opening, section 1)

This valve has a additional pre-opening. Through pressure connection at control port X the control piston (4) is pushed to the right.

This first pushes the poppet (5) and then the poppet (2) from the seat. Now the valve may also have a flow from B to A.

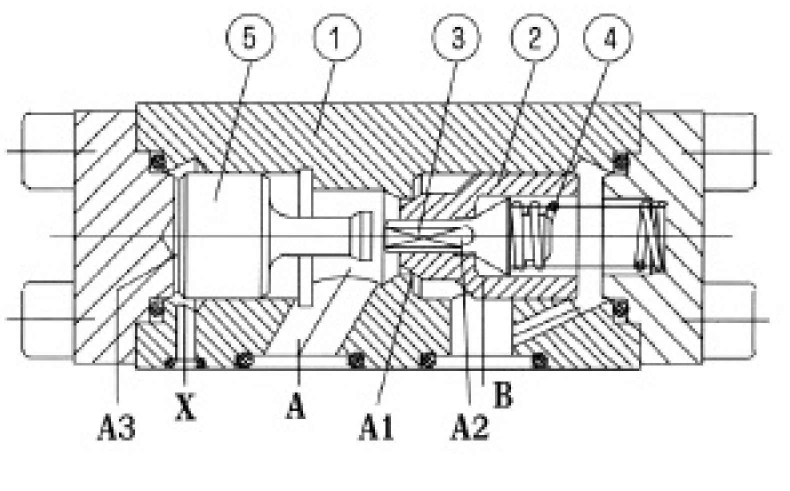
Because of the pre-opening there is a dampened decompression of the fluid under pressure. Through this possible pressure shocks are avoided.

Type SL... (with leakage port, section 2)

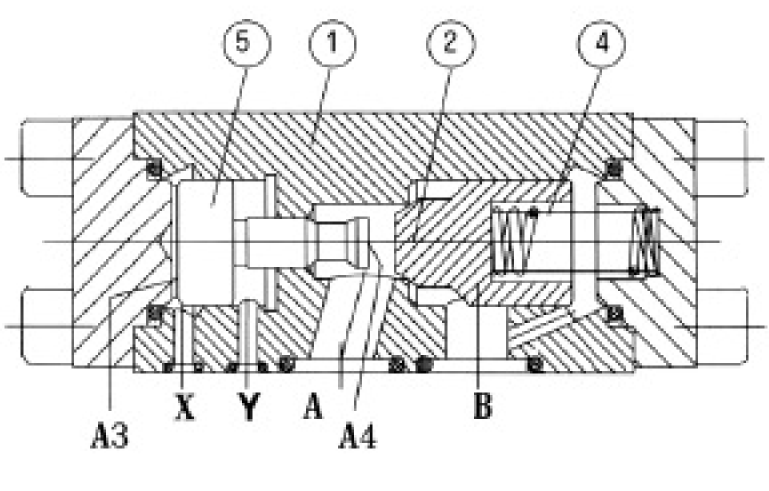
The function of this valve is principally the same as the valve SV.

The difference is the additional leakage port Y. With this the annulus area of the control piston (4) is separated from port A.

The pressure present at port A only effects area A_4 of the control piston (4).



SV...PA（with pre-opening）

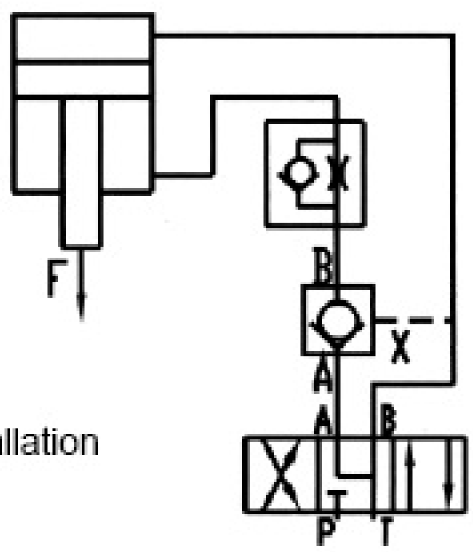


SL...PB（without pre-opening）

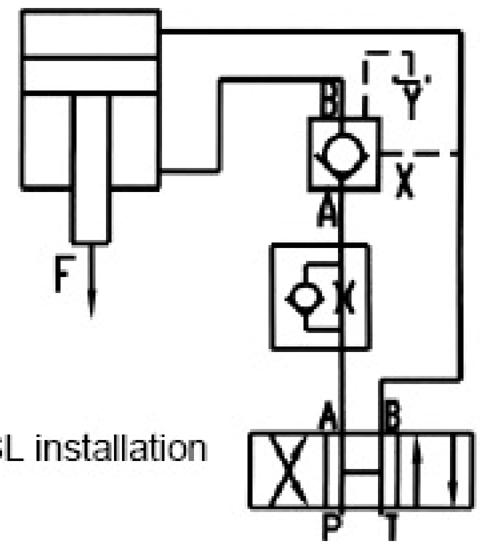
Type	A1 (cm^2)	A2 (cm^2)	A3 (cm^2)	A4 (cm^2)
SV/SL10	1.13	0.28	3.15	0.50
SV/SL20	3.14	0.78	9.62	1.13
SV/SL30	5.30	1.33	15.9	1.54

Typical Circuit Example

Type SV installation



Type SL installation



Ordering details

S | | | | | - 30 | B / | | *

Without drain port	=V
With drain port	=L

Style	SV		SL	
Connection	G	P	G	P
ordering code				
Size10	=10	=10	=10	=10
Size15	=15	-	=15	-
Size20	=20	=20	=20	=20
Size25	=25	-	=25	-
Size30	=30	=30	=30	=30

Plate mounting	=P
Thread connection	=G

A=	With pilot valve
B=	Without pilot valve

1= / 2= / 3= Cracking pressure. See curve A to B

30 = Series 30 to 39
(30 to 39: unchanged installation and connection dimensions)

B = The technology of Beijing Huade Hydraulic

No code =	Mineral oils
V =	phosphate ester

Further details in clear text

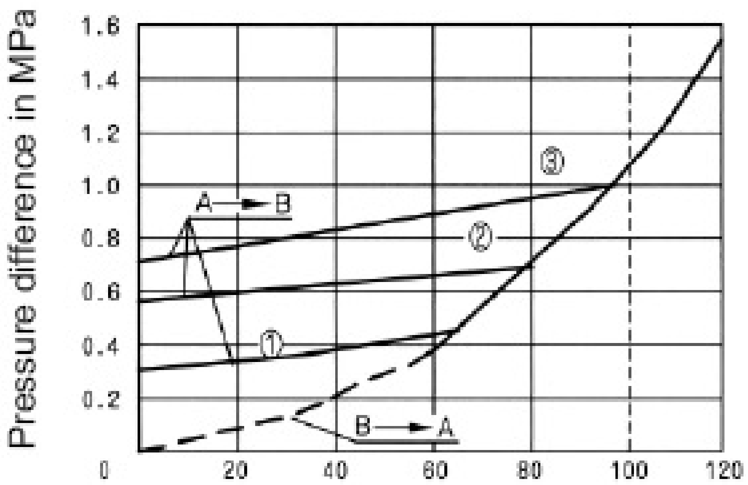
Technical data

Type	SV10	SL10	SV15、20	SL15、20	SV25、30	SL25、30
Control volume - port X (cm³)	2.2		8.7		17.5	
Control volume - port Y (cm³)	–	1.9	-	7.7	-	15.8
Direction of flow	From A to B free, from B to A when pilot operated					
Operating pressure, max. (MPa)	to 31.5					
Control pressure, max. (MPa)	0.5～31.5					
Pressure fluid	Mineral oils(for NBR seal) or phosphate ester(for FPM seal)					
Pressure fluid temperature range (℃)	-30 to+80					
Viscosity range (mm^2/s)	2.8 to500					
Weight (kg)	SV10	SL10	SV15、20	SL15、20	SV25、30	SL25、30
	2.5		4.0	4.5	8.0	

Characteristic curves (measured at ν = 41 mm ^{2} /s and t = 50 ℃)

Pressure difference / flow curves

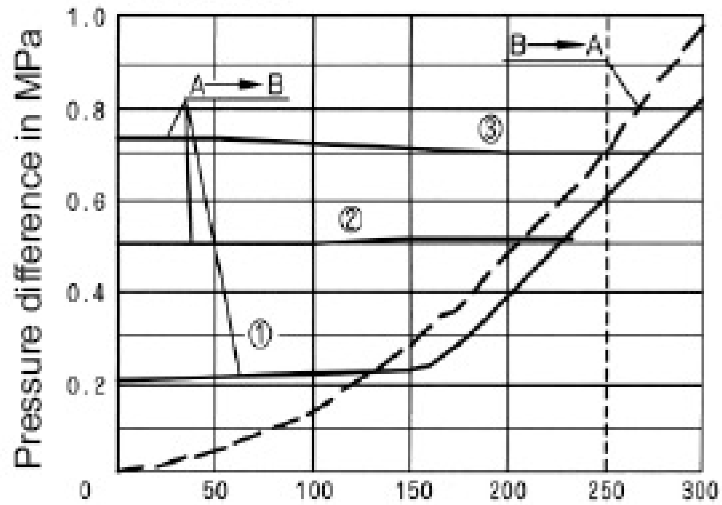
SV/SL10



Flow in L/min

Power limit

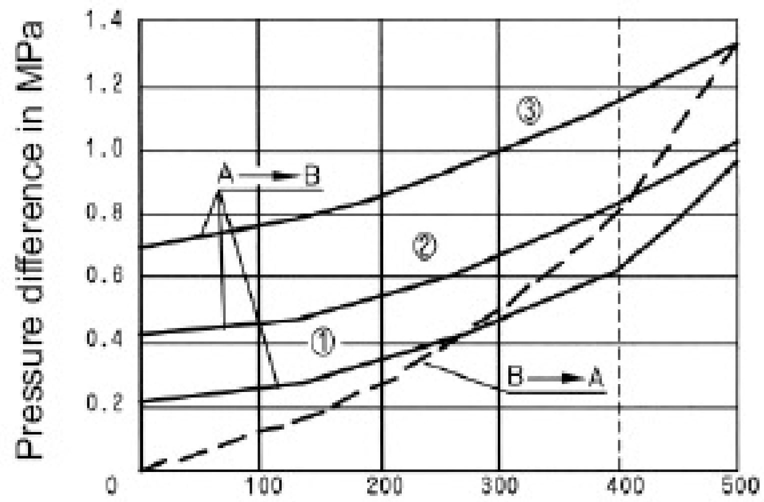
SV/SL20



Flow in L/min

Power limit

SV/SL30



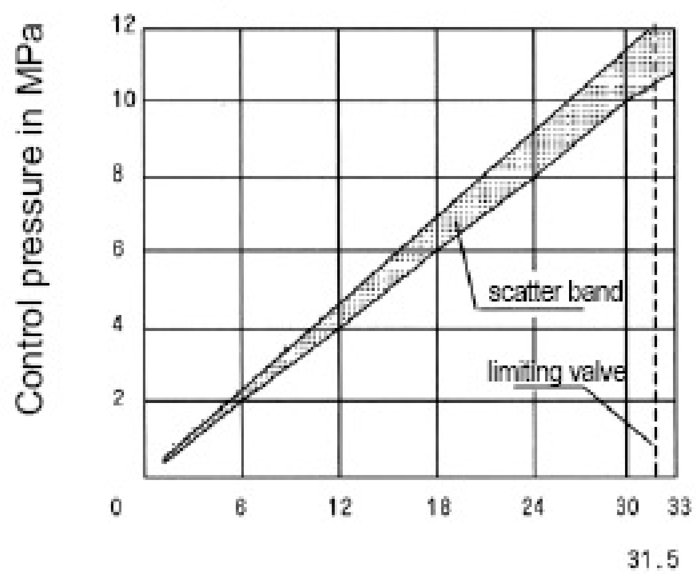
Flow in L/min

Power limit

Curve one ,two and three are corresponding to one, two and three in the ordering code

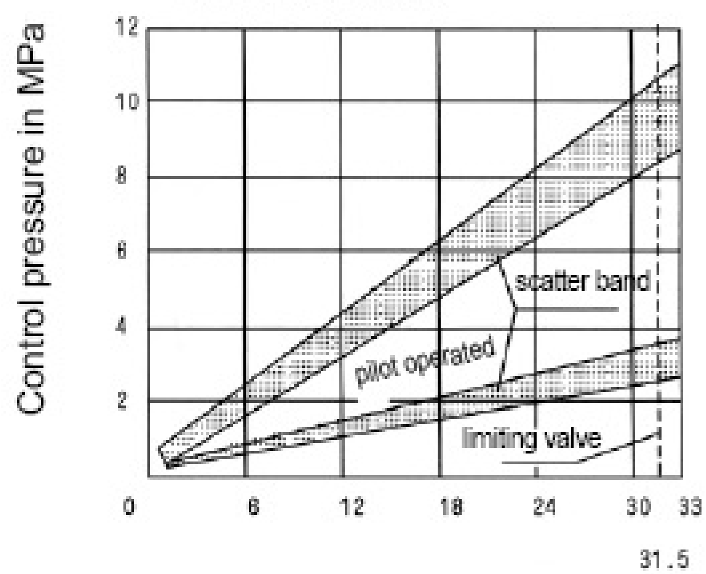
Control pressure / Load pressure curves

SV/SL...PB...



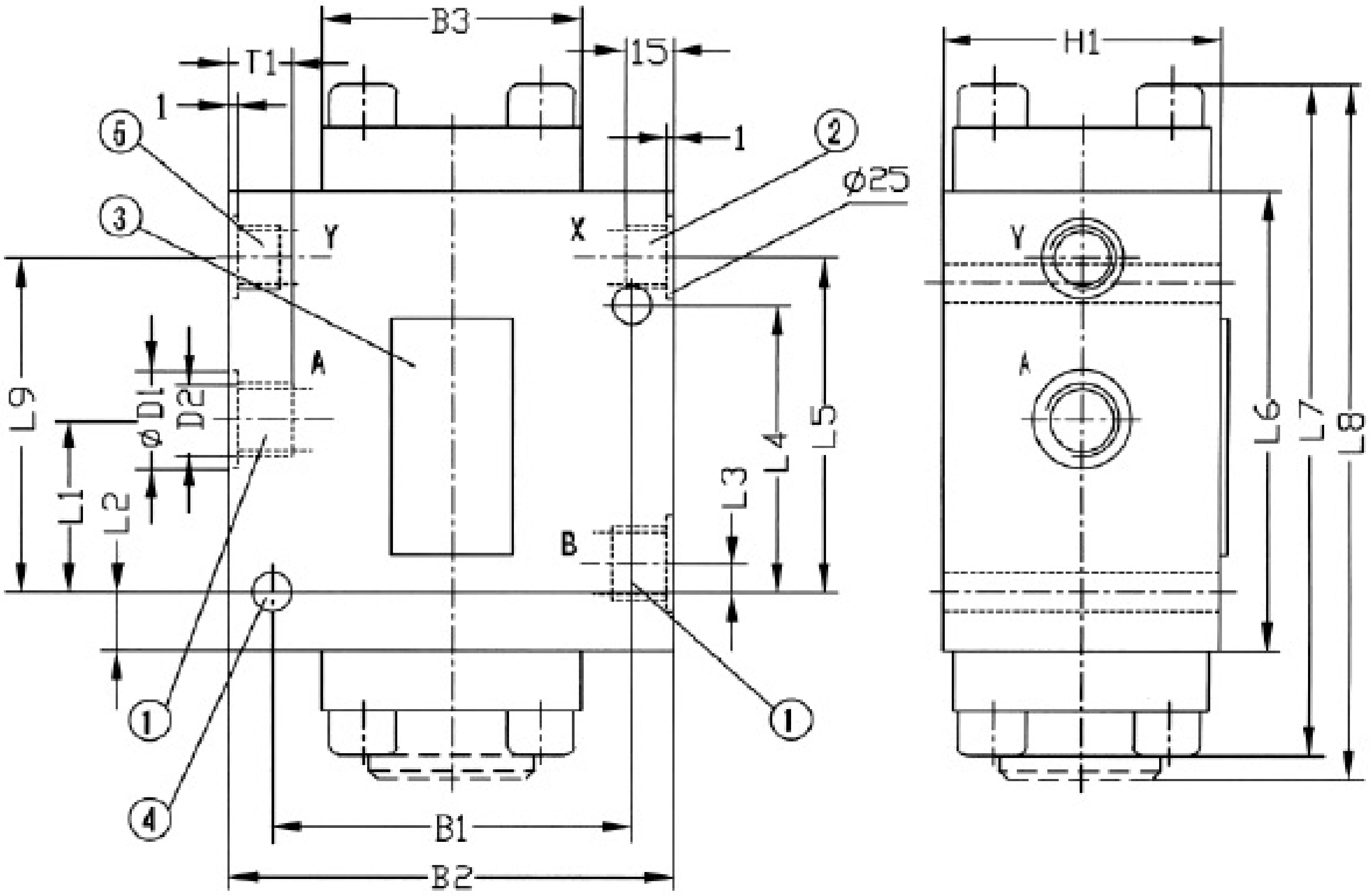
Load pressure in MPa

SV/SL...PA...



Load pressure in MPa

Unit dimensions: for threaded connection (Dimensions in mm)

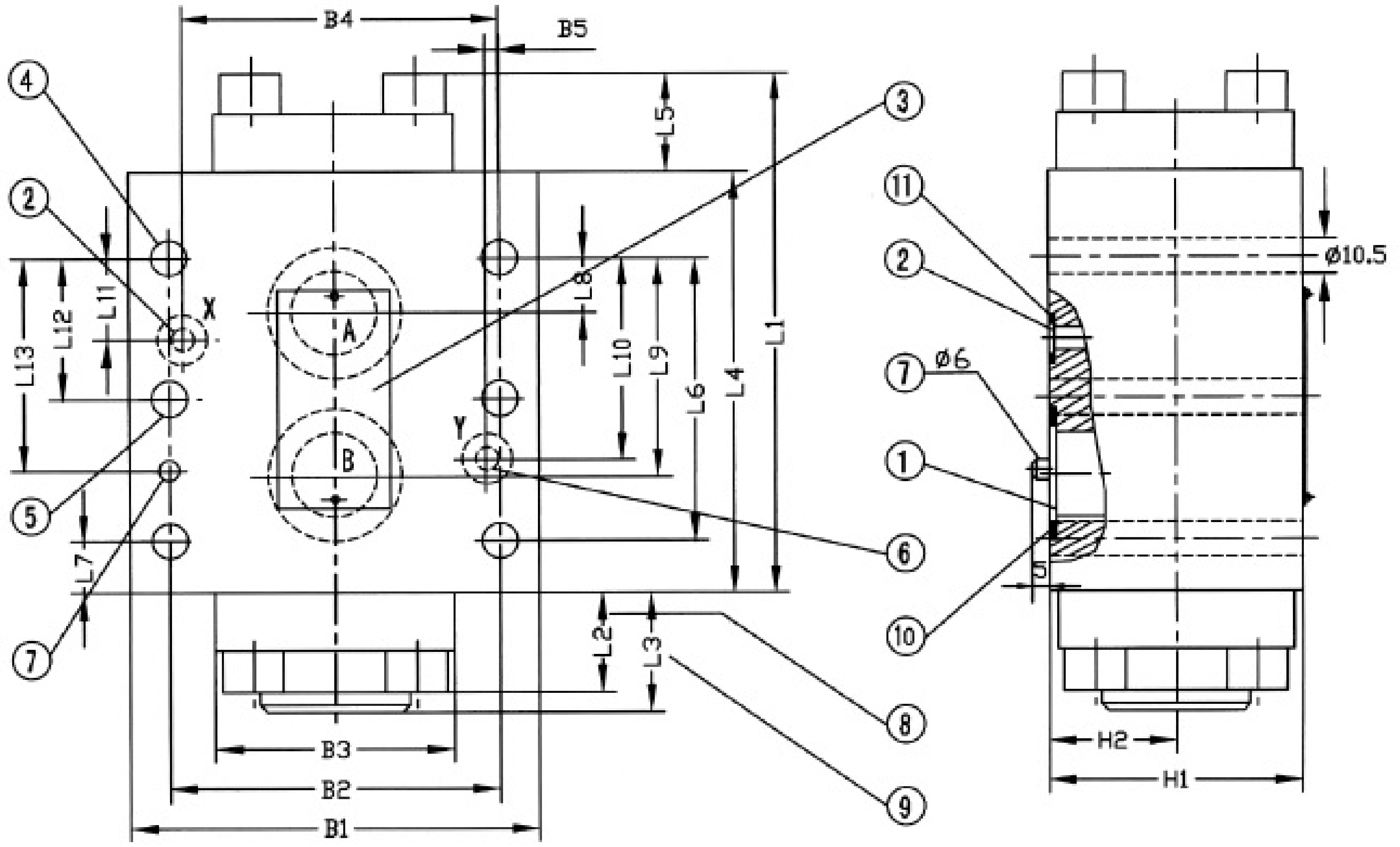


Type		B1	B2	B3	Φ D1	D2
SV	10	66.5	85	40	34	G1/2"or M22X1.5
	15	79.5	100	55	47	G3/4"or M27X2
	20	79.5	100	55	47	G1"or M33X2
	25	97	120	70	65	G11/4"or M42X2
	30	97	120	70	65	G11/2"or M48X2
SL	10	66.5	85	40	34	G1/2"or M22X1.5
	15	79.5	100	55	47	G3/4"or M27X2
	20	79.5	100	55	47	G1"or M33X2
	25	97	120	70	65	G1 1/4"or M42X2
	30	97	120	70	65	G1 1/2"or M48X2

1、Ports A and B
2、Port X，G1/4 "or M14X1.5
3、Name plate
4、Valve fixing holes Φ 10.5
5、Port Y，G1/4 "or M14X1.5
* Valve with cracking pressure "1" and "2" (dimension L7)
* Valve with cracking pressure "3" (dimension L8)

Type		H1	L1	L2	L3	L4	L5	L6	L7	L8	L9	T1
SV	10	42	27.5	18.5	10.5	33.5	49	80	116	116	-	14
	15	57	36.5	17.5	13	50.5	67.5	95	135	146	-	16
	20	57	36.5	17.5	13	50.5	67.5	95	135	146	-	18
	25	75	54.5	15.5	20.5	73.5	89.5	115	169	179	-	20
	30	75	54.5	15.5	20.5	73.5	89.5	115	169	179	-	22
SL	10	42	22.5	18.5	10.5	33.5	49	80	116	116	51.5	14
	15	57	30.5	17.5	13	50.5	72.5	100	140	151	72.5	16
	20	57	30.5	17.5	13	50.5	72.5	100	140	151	72.5	18
	25	75	51	15.5	20	84	99.5	125	179	189	99.5	20
	30	75	51	15.5	20	84	99.5	125	179	189	99.5	22

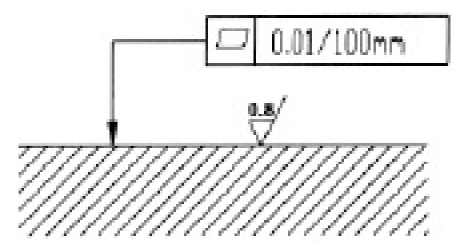
Unit dimensions: for subplate mounting (Dimensions in mm)



1. Inlet ports A and B
2. Port X
3. Nameplate
4. 4 fixing holes with type SV/SL 10 SV/SL 20 valve
5. 6 fixing holes with type SV/SL 30 valve
6. Port Y with valve type "SL"
   (with valve type "SV" this port is closed)
7. Fixing pin
8. Valve with cracking pressure types "1" and "2" (dimension L2)
9. Valve with cracking pressure types "3" (dimension L3)
10. O-ring
    For ports A and B
    O-ring 15 × 3 (size10)
    O-ring 24 × 3 (size20)
    O-ring 34 × 3 (size30)

11 For ports X and Y
O-ring 10 × 2.5
(size10,20,30)

Required surface finish of mating piece



Type	Size	L1	L2	L3	L4	L5	L6	L7	L8	L9	L10
SV	10	98	18	18	80	18	43	18.5	7.2	35.8	-
	20	115	20	31	95	20	60.5	17.3	11.1	49.2	-
	30	144	29	35	115	29	84	15.5	16.5	67.5	-
SL	10	98	18	18	80	18	43	18.5	7.2	35.8	21.5
	20	115	20	31	100	20	60.5	17.3	11.1	49.2	39.7
	30	144	29	35	125	29	84	15.5	16.5	67.5	59.5

Type	Size	L11	L12	L13	B1	B2	B3	B4	B5	H1	H2
SV	10	21.5	-	$32^{0}_{-0.3}$	85	66.5	40	58.5	-	42	21
	20	20.6	-	$44.5^{0}_{-0.2}$	100	79.5	55	73	-	57	28.5
	30	24.5	42	$63^{0}_{-0.3}$	120	97	70	92.8	-	75	37.5
SL	10	21.5	-	$32^{0}_{-0.3}$	85	66.5	40	58.5	7.9	42	21
	20	20.6	-	$44.5^{0}_{-0.2}$	100	79.5	55	73	6.4	57	28.5
	30	24.5	42	$63^{0}_{-0.3}$	120	97	70	92.8	3.8	75	37.5

Valve fixing screw
(included in goods)
Size10
4 - M10 × 50-10.9 (GB/T70.1-2000)
Screw torque:M_A=75Nm
Size20
4 - M10 × 70-10.9 (GB/T70.1-2000)
Screw torque:M_A=75Nm
Size30
6 - M10 × 85-10.9 (GB/T70.1-2000)
Screw torque:M_A=75Nm
Subplate:
Size10 G460/01(G3/8") G460/02(M18 × 1.5)
G461/01(G1/2") G461/02(M22 × 2)
Size20 G412/01(G3/4") G412/02(M27 × 2)
G413/01(G1") G413/02(M33 × 2)
Size30 G414/01(G1$^1/_4$") G414/02(M42 × 2)
G415/01(G1$^1/_2$") G415/02(M48 × 2)
must be ordered separately order:
see page 204

Notice

1. The fluid must be filtered. Minimum filter fineness is 20 μm.
2. The tank must be sealing up and an air filter must be installed on air entrance.
3. Products without subplate when leaving factory, if need them, please ordering specially.
4. Valve fixing screws must be high intensity level (class 10.9). Please select and use them according to the parameter listed in the sample book.
5. Roughness of surface linked with the valve is required to $\overset{0.8}{\surd}$.
6. Surface finish of mating piece is required to 0.01/100mm.

BEIJING HUADE HYDRAULIC INDUSTRIAL GROUP CO.,LTD.	Pilot operated check valves, Types SV and SL...40B/ (new series)			RE 21500/12.2004
	Size 10 to 32	up to 31.5 MPa	up to 550L/min	

Features:

- check valve controlled by fluid
- For subplate mounting,Mounting pattern to DIN 24 340
- Subplate or screw threaded connection
- With or without leakage port
- With or without pre-opening
- Type with pre-opening,dampened decompression
- 4 opening pressures
- Porting pattern to Din 24 340 form A, ISO 4401 and CETOP-RP 121H

Function,section,symbols

SV and SL valves are hydraulic pilot operated check valves in poppet type design which may be opened to allow flow in either direction.

These valves are used for the isolation of operating circuits under pressure, as safeguard against the lowering of a load when a line break occurs or against creeping movements of hydraulically locked-in actuators.

Basically these valves consist of housing (1), poppet (2), compression spring (3), control spool (4) as well as a preopening, as ball poppet valve (5), optionally.

The valve enables free flow from A to B, in the counter direction the poppet (2) is held on its seat by the system pressure, additionally to the spring force.

Through the pressure connection at control port X the control piston (4) is moved to the right. This pushes the poppet (2) from the seat. Now the valve may also have a flow from B to A.

In order to ensure the proper opening of the valve via the control piston (4) a certain minimum control pressure is necessary

Type SV..A.. and SL..A.. (with pre-opening, section 1)

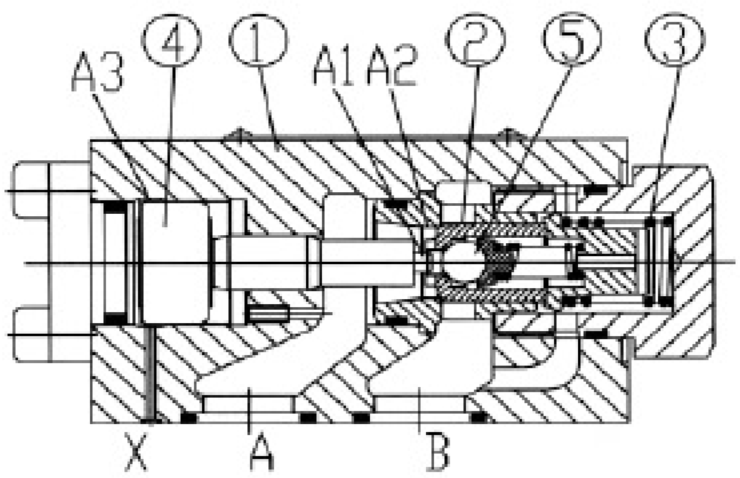
This valve has a additional pre-opening. Through pressure connection at control port X the control piston (4) is pushed to the right.

This first pushes the ball (5) and then the poppet (2) from the seat. Now the valve may also have a flow from B to A.

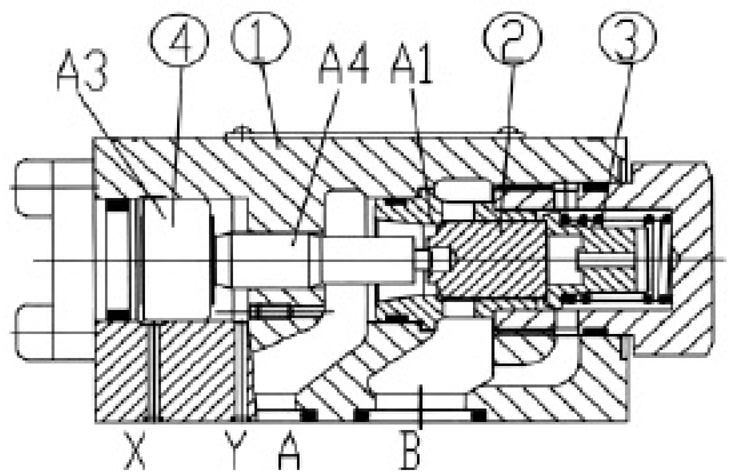
Because of the pre-opening there is a dampened decompression of the fluid under pressure. Through this possible pressure shocks are avoided.

Type SL... (with leakage port, section 2)

The function of this valve is principally the same as the valve SV.The difference is the additional leakage port Y. With this the annulus area of the control piston (4) is separated from port A. The pressure present at port A only effects area A_4 of the control piston (4).

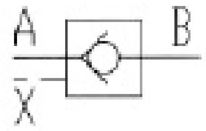


Type SV..PA(without leakage port, with pre-opening)

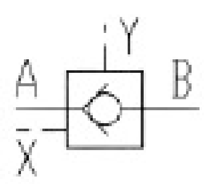


Type SL..PB(with leakage port, without pre-opening)

Symbols:
Type SV



Type SL



Ordering details

S					- 40	B /		*

Without leakage port	=V
With leakage port	=L

Style	SV		SL	
Connection	G	P	G	P
Ordering code				
Size10	=10	=10	=10	=10
Size16	=15	-	=15	-
Size20	=20	=20	=20	=20
Size25	=25	-	=25	-
Size32	=30	=30	=30	=30

Plate mounting	=P
Thread connection	=G

A=	With pre-opening
B=	Without pre-opening

1=
2=
3=
4=
Cracking pressure
See curve A to B

40 = Series 40 to 49
(40 to 49: unchanged installation and connection dimensions)

B = The technology of Beijing Huade Hydraulic

No code =	Mineral oils
V =	phosphate ester

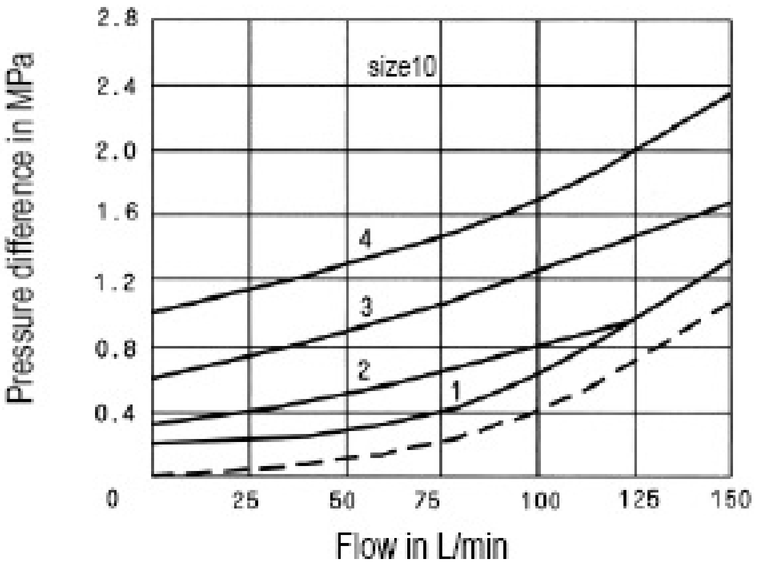
Further details in clear text

Technical data

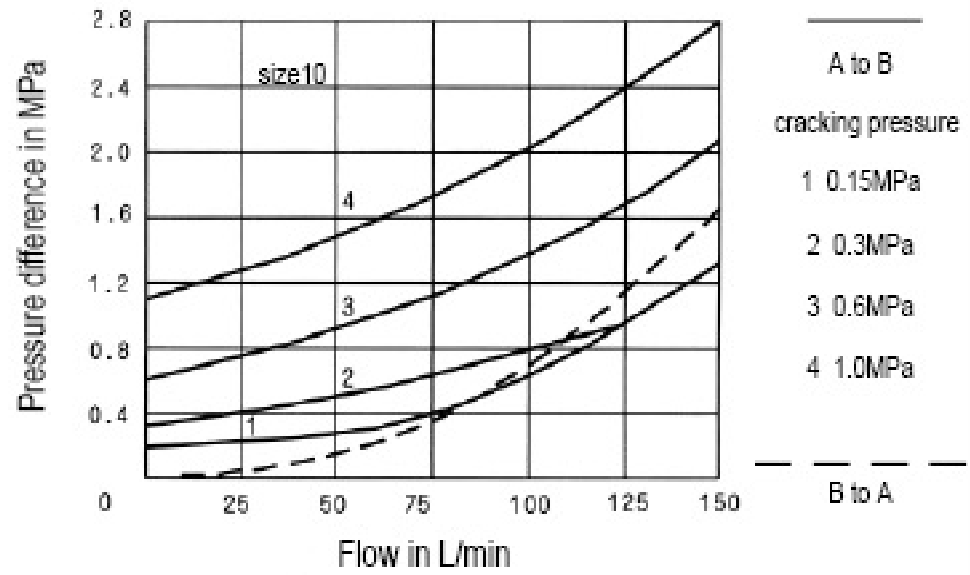
Style		10	16	20	25	30
Weight	- subplate mounting (kg)	1.8	-	4.7	-	7.8
	- threaded connection (kg)	2.1	5.4	5.4	10	10
Installation position (MPa)		Optional				
Direction of flow (MPa)		From A to B free, from B to A through opening				
Operating pressure, max. (MPa)		0.5~31.5				
Control pressure, max. (MPa)		0.5~31.5				
Control volume - port X (cm^3)		2.5	10.8	10.8	19.27	19.27
Control volume - port Y (cm^3)		2.0	9.6	9.6	17.5	17.5
Control areas	- area A1 (cm^2)	1.3	3.46	3.46	5.72	5.72
	- area A2 (cm^2)	0.33	0.7	0.7	1.33	1.33
	- area A3 (cm^2)	3.8	10.17	10.17	16.61	16.61
	- area A4 (cm^2)	0.79	1.13	1.13	1.54	1.54
Pressure fluid		Mineral oils(for NBR seal) or phosphate ester(for FPM seal)				
Pressure fluid temperature range (℃)		- 30 to + 80				
Viscosity range (mm^2/s)		2.8 to 500				

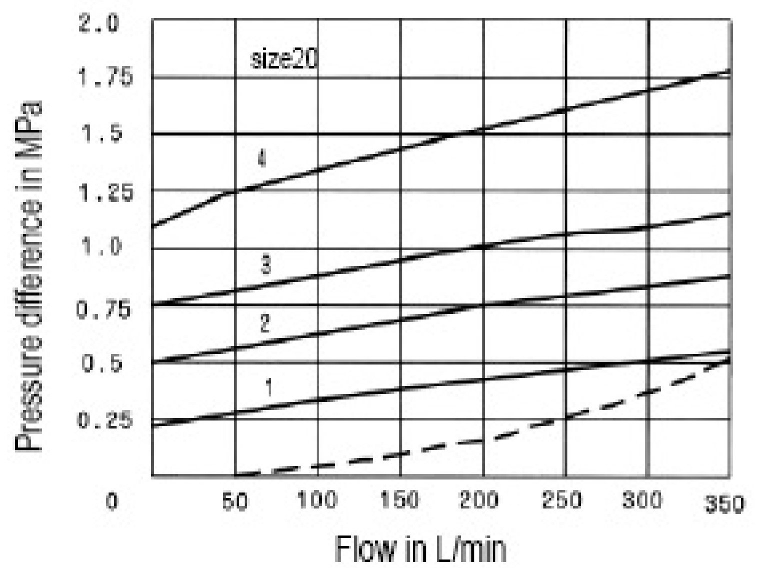
Characteristic curves (measured at ν = 41 mm ^{2} /s and t = 50 ℃)

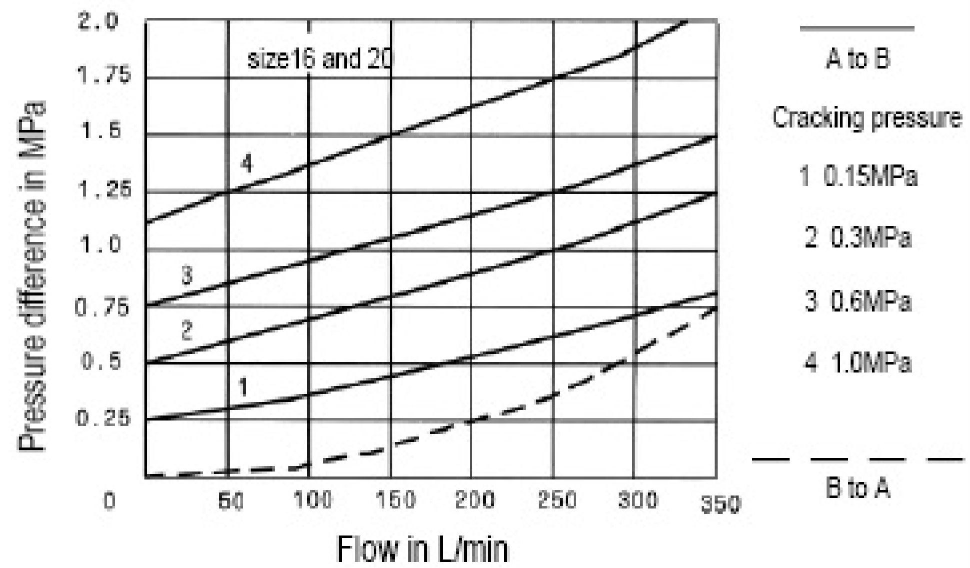
△p-q_v-operating curver-subplate mounting

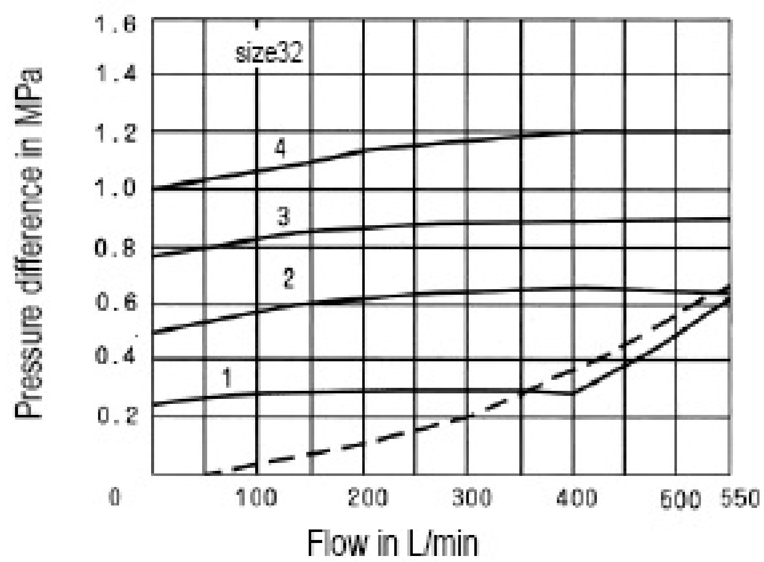


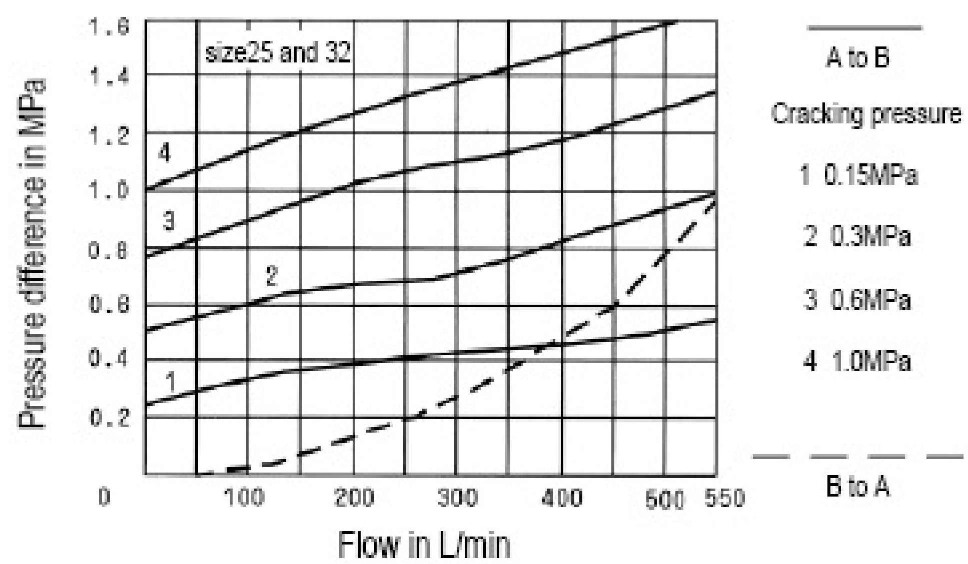
△p-q_v-operating curver-threaded connection





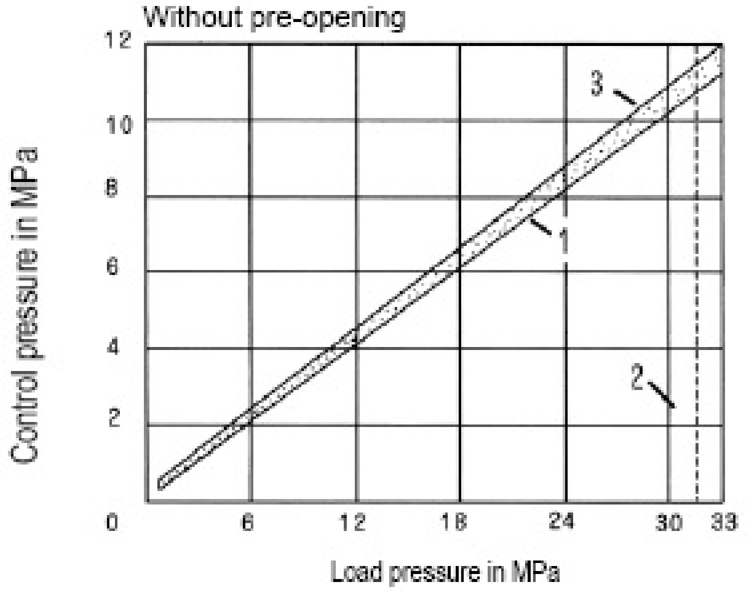




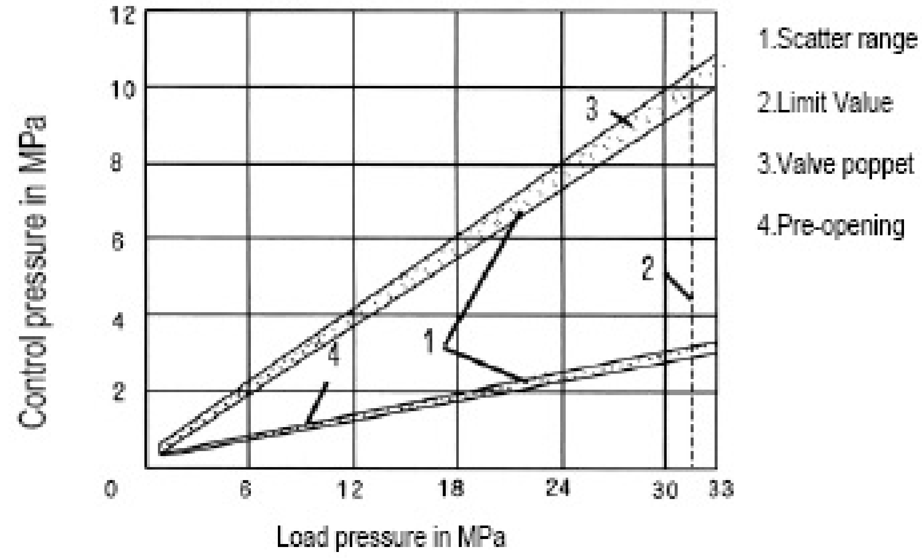


Control pressure-load pressure-operating curves

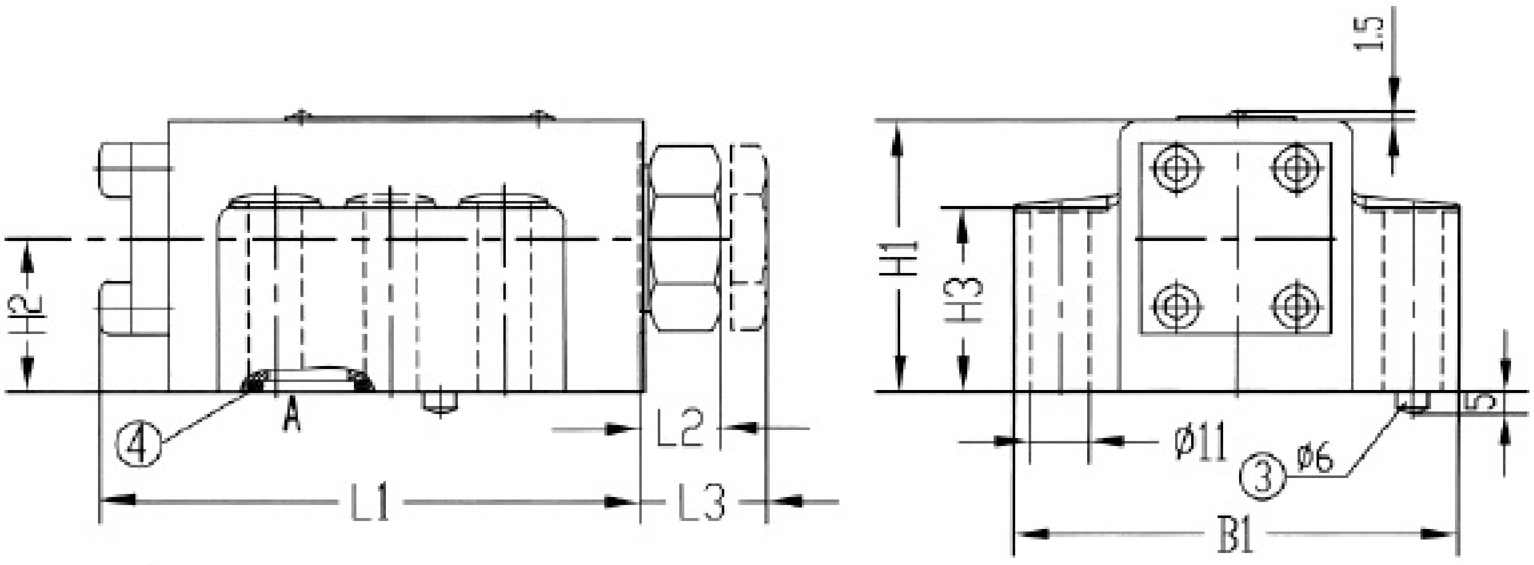
Without pre-opening

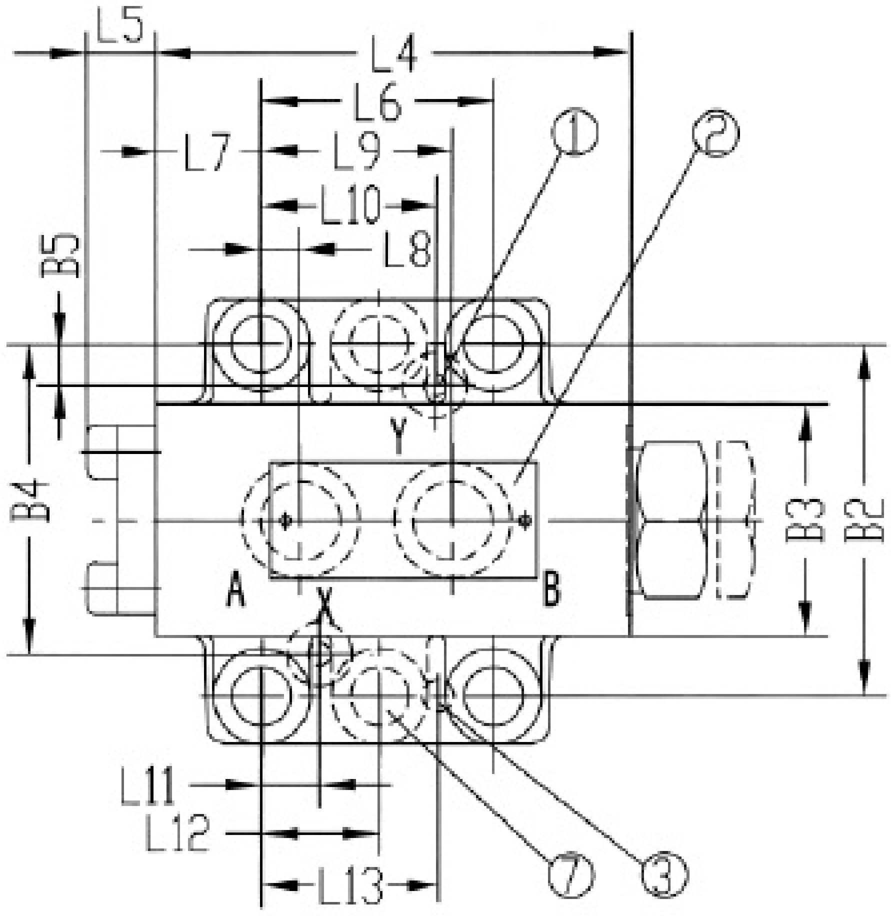


With pre-opening



Unit dimensions: for subplate mounting (Dimensions in mm)





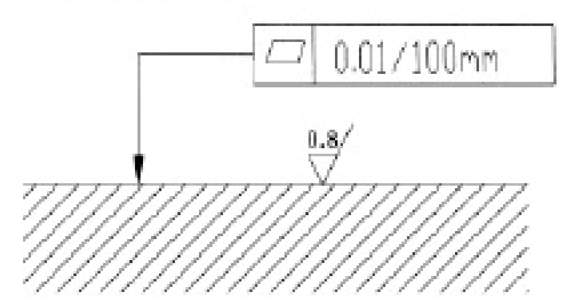
1 Port Y with valve type "SL"
(with valve type "SV" this port is closed)
2 Name plate
3 Fixing pin
4 O-ring
Size10
--portsA and B17.12X2.62
--portsX and Y9.25X1.78
Size20
--portsA and B28.17X3.53
--portsX and Y9.25X1.78
Size32
--portsA and B34.52X3.53
--portsX and Y9.25X1.78
5 Valve with opening pressure
types "1" and "2" (dimension L2)
6 Valve with opening pressure
types "3" and "4" (dimension L3)
7 6 valve fixing holes with type SV/SL 30 (valves fitting screws included in goods)
Size10
4 M10 × 50-10.9 (GB/T70.1-2000) M_A=75N.m
Size20
4 M10 × 70-10.9 (GB/T70.1-2000) M_A=75N.m
Size30
6 M10 × 85-10.9 (GB/T70.1-2000) M_A=75N.m

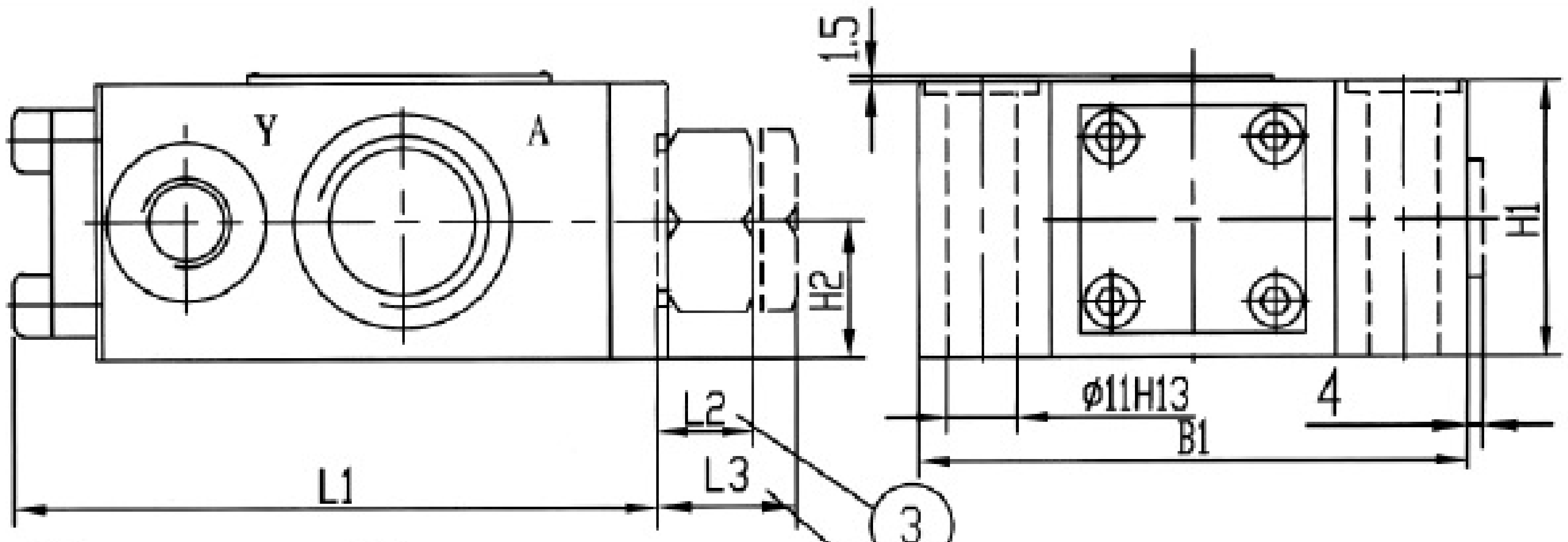
Valve type	Size	L1	L2	L3	L4	L5	L6	L7	L8	L9	L10
SV	10	100.8	15.5	15.5	87.8	13	42.9	18.5	7.2	35.8	-
	20	135	17.7	47.7	117	18	60.3	27.5	11.1	49.2	-
	30	156.1	36.1	46.1	134	22.1	84.2	39	16.7	67.5	-
SL	10	100.8	15.5	15.5	87.8	13	42.9	18.5	7.2	35.8	21.5
	20	135	17.7	47.7	117	18	60.3	27.5	11.1	49.2	39.5
	30	156.1	36.1	46.1	134	22.1	84.2	39	16.7	67.5	59.5

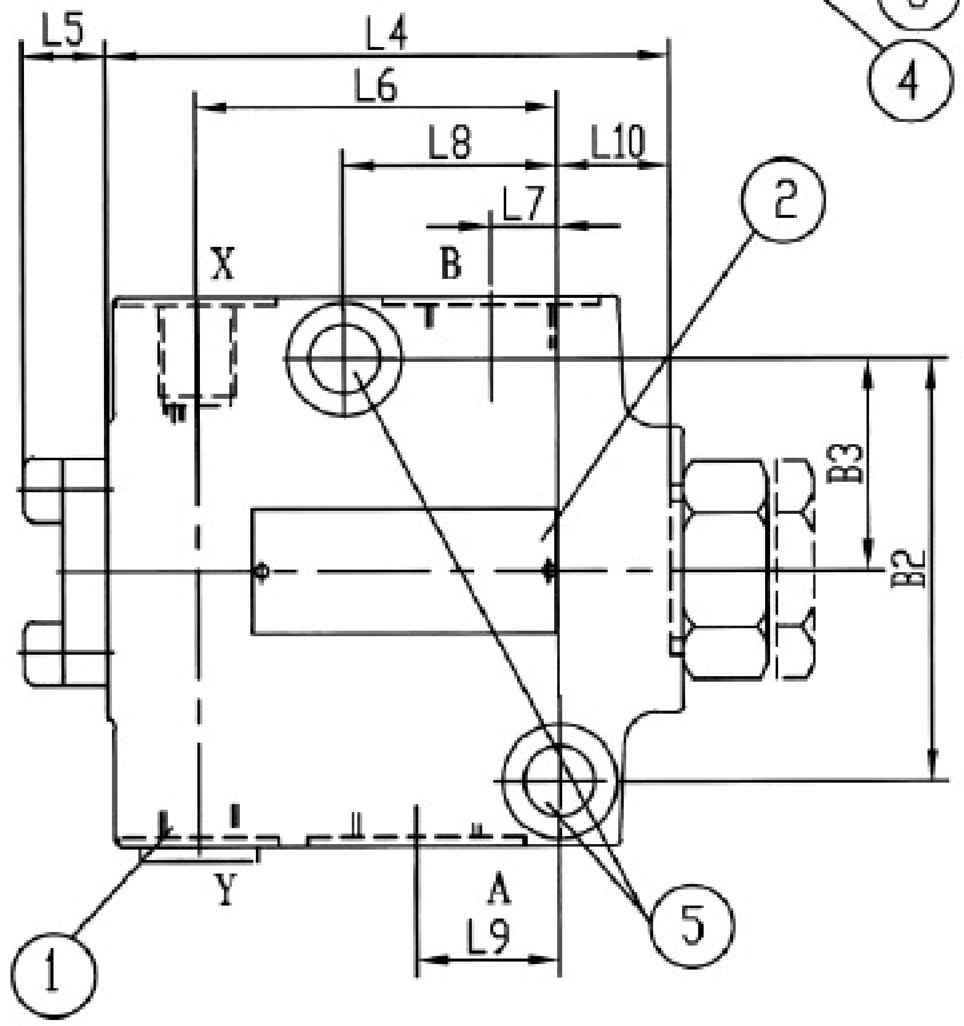
Valve type	Size	L11	L12	L13	B1	B2	B3	B4	B5	H1	H2	H3
SV	10	21.5	-	31.8	84	66.7	44	58.8	-	51	29	36
	20	20.6	-	44.5	100	79.4	61	73	-	70	37	55
	30	24.6	42.1	62.7	118	96.8	75	92.8	-	85	42.5	70
SL	10	21.5	-	31.8	84	66.7	44	58.8	7.9	51	29	36
	20	20.6	-	44.5	100	79.4	61	73	6.4	70	37	55
	30	24.6	42.1	62.7	118	96.8	75	92.8	3.8	85	42.5	70

Subplate:
must be ordered separately.see page204
Size10 G460/01(G3/8") G461/01(G1/2")
Size20 G412/01(G3/4") G413/01(G1")
Size30 G414/01(G1$^1/_4$) G415/01(G1$^1/_2$")

Required surface finish of
mating piece







1 Port Y with valve type "SL"
(with valve type "SV" this port is closed)
2 Name plate
3 Valve with opening pressure
types "1" and "2" (dimension L2)
4 Valve with opening pressure
types "3" and "4" (dimension L3)
5 2 valve fixing holes

Type	Size	PortsA、B	PortsX、Y
SV	10	G1/2"	G1/4"
	16	G3/4"	G1/4"
	20	G1"	G1/4"
	25	G11/4"	G1/4"
	30	G11/2"	G1/4"
SL	10	G1/2"	G1/4"
	16	G3/4"	G1/4"
	20	G1"	G1/4"
	25	G11/4"	G1/4"
	30	G11/2"	G1/4"

Valve type	Size	L1	L2	L3	L4	L5	L6	L7	L8	L9	L10	B1	B2	B3	H1	H2
SV	10	100.8	15.5	15.5	87.8	13	56.5	10.5	33.5	22.5	17.3	87	66.7	33.4	44	22
	16;20	133	17.7	47.7	115	18	74.5	17	50.5	36	27	105	79.4	39.7	68	34
	25;32	156.1	35.7	45.7	134	22.1	101	24	84	49	18	130	96.8	48.4	85	42.5
SL	10	100.8	15.5	15.5	87.8	13	56.5	10.5	33.5	22.5	17.3	87	66.7	33.4	44	22
	16;20	133	17.7	47.7	115	18	74.5	17	50.5	36	27	105	79.4	39.7	68	34
	25;32	156.1	35.7	45.7	134	22.1	101	24	84	49	18	130	96.8	48.4	85	42.5

Notice

1. The fluid must be filtered. Minimum filter fineness is 20 µm.
2. The tank must be sealing up and an air filter must be installed on air entrance.
3. Products without subplate when leaving factory, if need them, please ordering specially.
4. Valve fixing screws must be high intensity level (class 10.9). Please select and use them according to the parameter listed in the sample book.
5. Roughness of surface linked with the valve is required to 0.8.
6. Surface finish of mating piece is required to 0.01/100mm.

BEIJING HUADE HYDRAULIC INDUSTRIAL GROUP CO.,LTD.	Directional control valves, manual operation, Type WMD			RE 23500/12.2004
	Size 6,10	up to 31.5 MPa	up to 120L/min	Replaces：RE 22279/05.2001

Features:

- Direct controlled directional spool valve
- subplate mounting
- Porting pattern to Din 24 340 form A, ISO 4401 and CETOP-RP 121H

Functional , section

Directional valves type WMD are manual operated directional spool valves. They control the start, stop and direction of a volume flow.

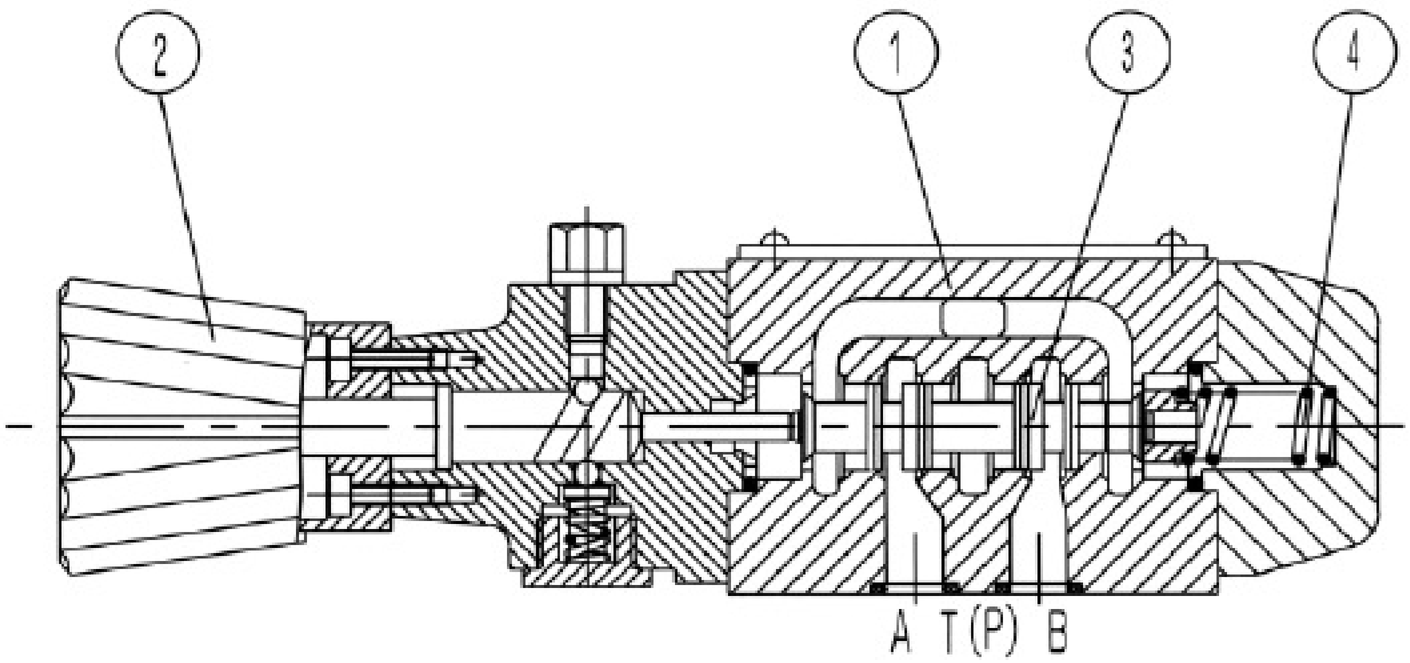
The valves consist basically of the housing (1), an operating rotary knob(2), the control spool (3), and one return springs (4). In an unoperated condition, the control spool (3) is held in the neutral or starting position by the return springs (4) - or by a detent .The control spool (3) is pushed into the required control position by means of the operating element.

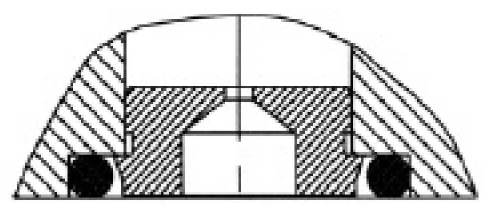
Detent

Directional valves with rotary knob operation are supplied with detent as standard. it is possible to fix any control position.

Cartridge throttle

Use of the cartridge throttle is necessary when operating conditions are such, that during the switching process larger flows can occur than the performance limits of the valve allow. It is fitted in the P-line of the directional valve or in the control circuit.





Cartridge throttle

Ordering detail

	WMD				B /	*

3 service ports =3
4 service ports =4

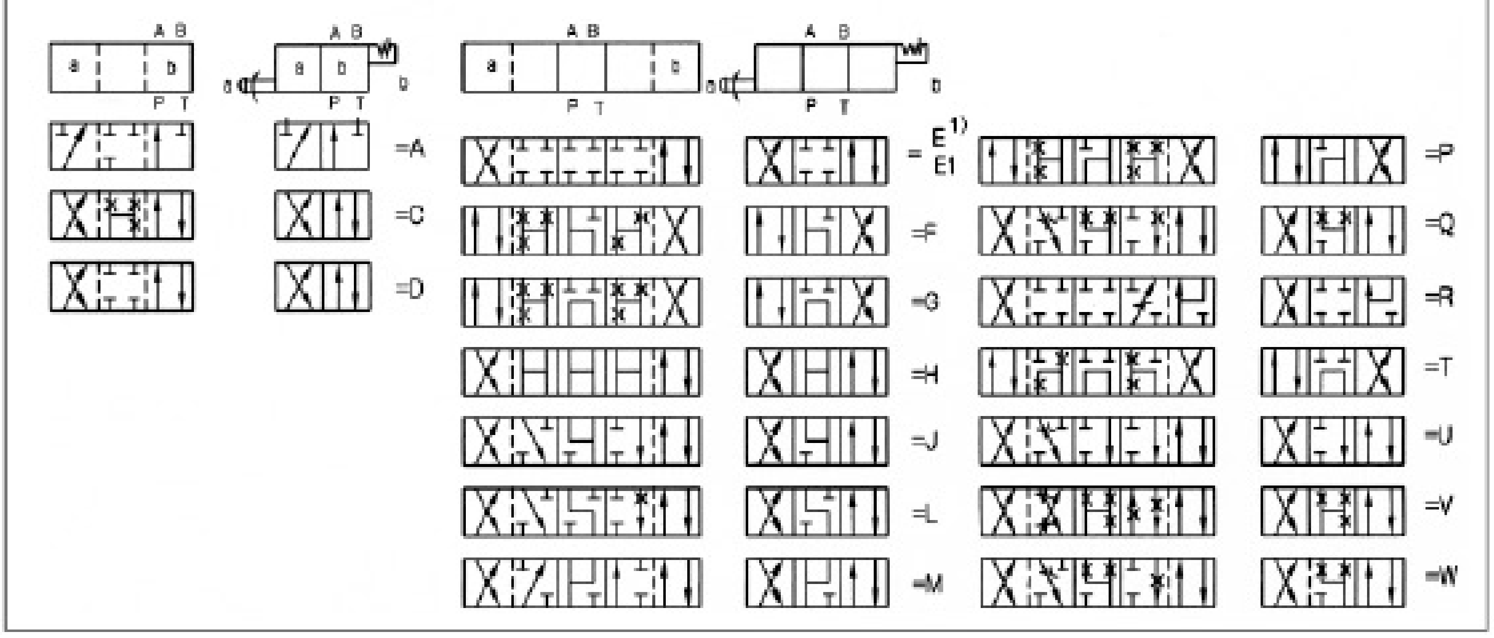
Size 6 =6
Size 10 =10

Further details in clear text

No code = Mineral oils
V = Phosphate ester

B = The technology of Beijing Huade Hydraulic

50 = Series 50 to 59 (50 to 59 = unchanged installation and connection dimensions) (size 6)
30 = Series 30 to 39 (30 to 39 = unchanged installation and connection dimensions) (size 10)



Symbol E1: P A/B pre-opening (only for size 6)

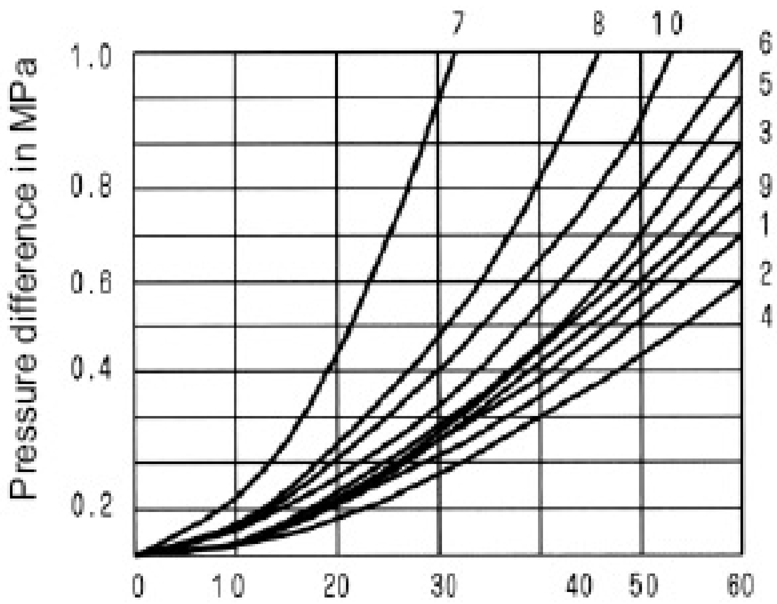
Example:
Spool type E with switched position "a",Ordering code ..EA..
Spool type E with switched position "b",Ordering code ..EB..

Technical data (For applications outside these parameters, please consult us!)

Size		6	10
Operating pressure	ports A、B、P (MPa)	up to 31.5	
	ports T (MPa)	Up to 6	Up to 16
for symbols A or B, port T must be used as a drain port if the operating pressure is higher than the permissible tank pressure.			
Flow.max	(L/min)	Up to 60	Up to 120
Flow cross section (control position O)		for symbol Q, 6% of nominal cross section	
		for symbol W ,3% of nominal cross section	
Pressure fluid		Mineral oils(for NBR seal) or phosphate ester(for FPM seal)	
Pressure fluid - temperature range (°C)		-30 to +80	
Viscosity range	(mm^2/s)	2.8 to 500	
Weights	(Kg)	Approx.1.4	Approx.3.3
Operating force	(N)	Approx.150	Approx.250

Characteristic curves (measured at ν = 41 mm²/s and t = 50℃)

Pressure difference flow curves, type WMD6

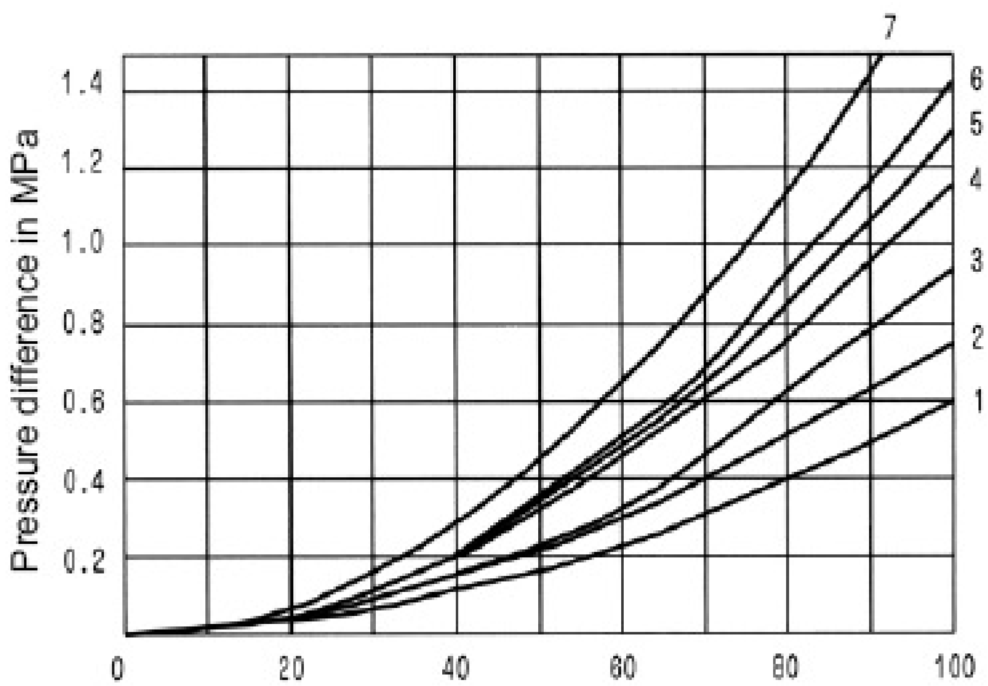


7.Symbol "R" in switched positions A-B
8.Symbol "G" and "T" in neutral position P-T

Symbol	Flow direction			
	P → A	P → B	A → T	B → T
A	3	3	-	-
C	1	1	3	1
D	5	5	3	3
E	3	3	1	1
F	1	3	1	1
G	6	6	9	9
H	2	4	2	2
J	1	1	2	1
L	3	3	4	9
M	2	4	3	3
P	3	1	1	1
Q	1	1	2	1
R	5	5	4	-
T	10	10	9	9
U	3	3	9	4
V	1	2	1	1
W	1	1	2	2

Pressure difference flow curves , type WMD10

4.Symbol "G" and "T" in neutral position P-T
7.Symbol "R" in switched positions A-B



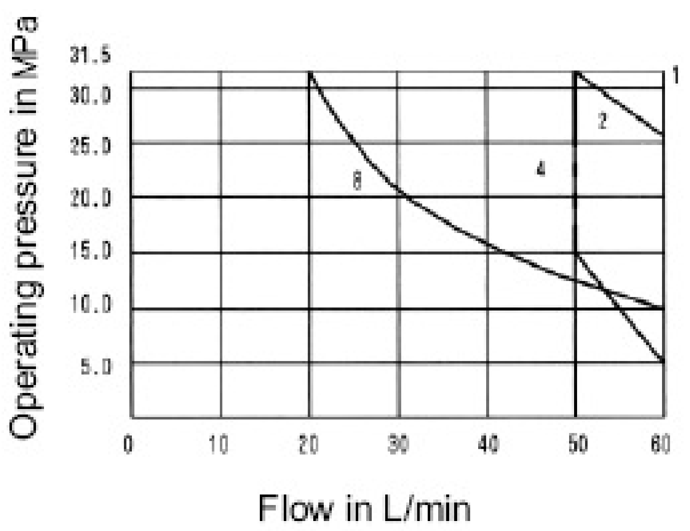
Symbol	Flow direction			
	P → A	P → B	A → T	B → T
A	2	2	-	-
C	2	2	3	3
D	2	2	3	3
E	2	2	4	4
F	2	3	3	5
G	3	3	4	6
H	1	1	4	5
J	2	2	3	3
L	2	2	3	5
M	1	1	5	5
P	3	2	5	3
Q	2	2	4	4
R	2	4	3	-
T	3	5	5	6
U	2	2	3	5
V	2	2	4	4
W	2	2	5	5

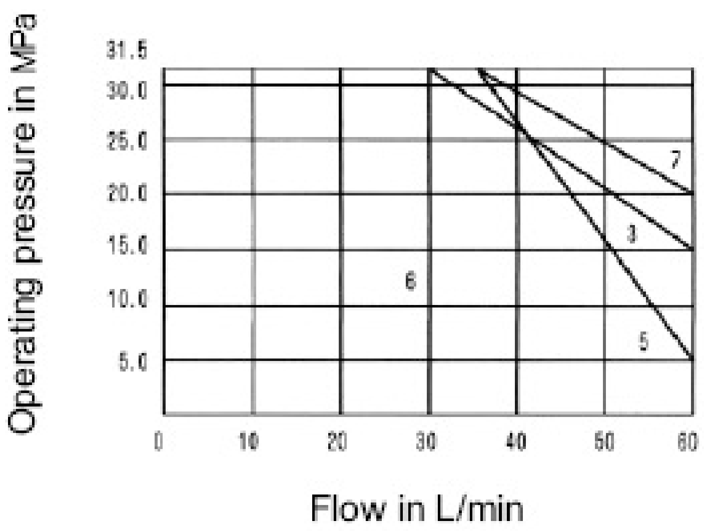
Performance limits (measured at v = 41 mm²/s and t = 50 ℃)

The performance limits shown apply when the valve is subject to simultaneous flow in two directions (e.g. from P to A and from B to T).
Due to the flow forces occuring within the valve, the permissible performance limits for one path(e.g. from P to A and with B blocked) may be considerably reduced!
(Pleade consult us in such cases.)

Type WMD6

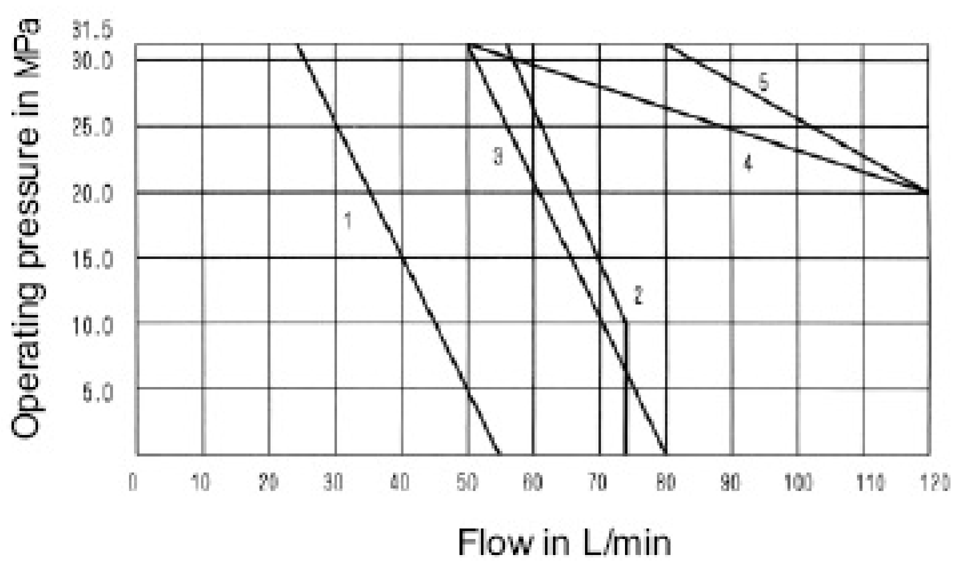
Curve	Symbol
1	E、E1、H、C、D、M、Q、U、W
2	J、L
3	A
4	G、P
5	F
6	V
7	R
8	T





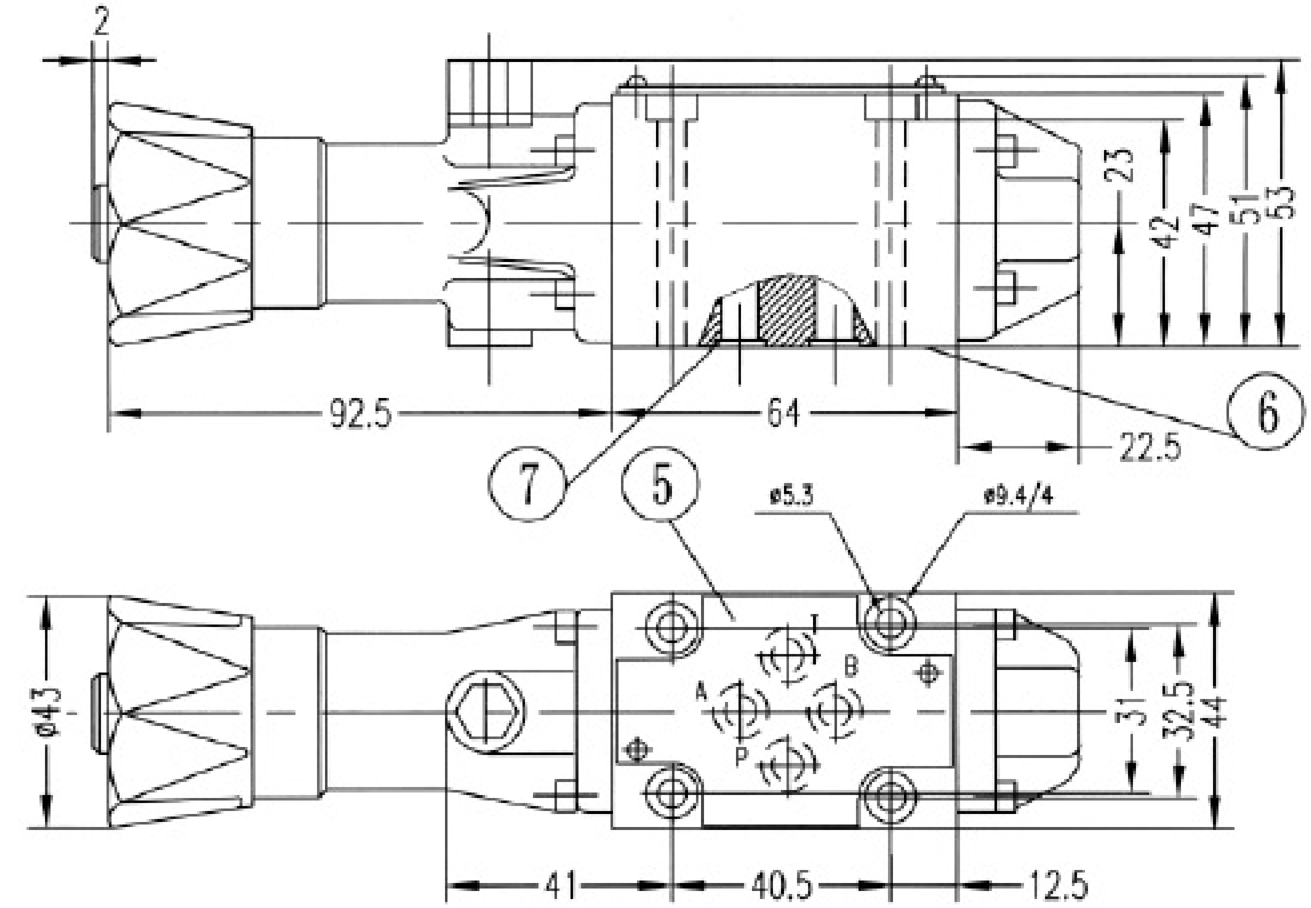
Type WMD10

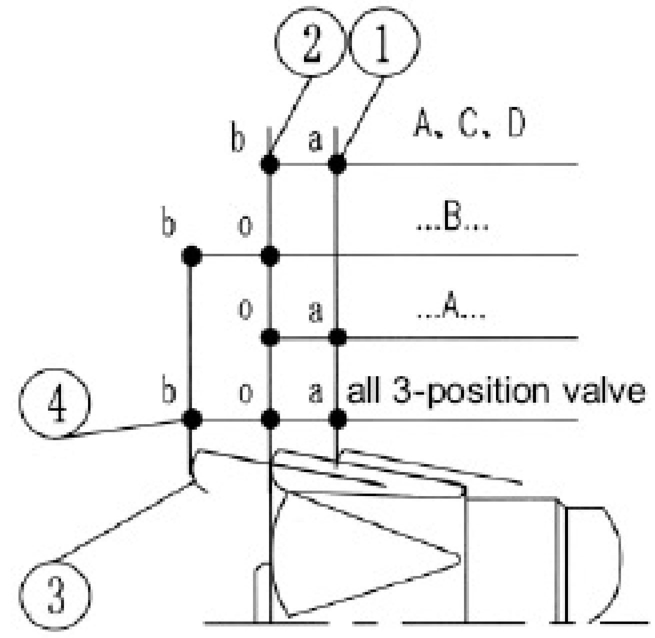
Curve	Symbol
1	A
2	H
3	F、G、P、R、T
4	J、L、Q、U、W
5	C、D、E、M、V

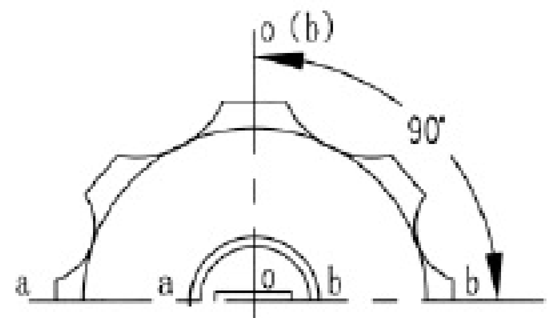


Unit dimensions **(Dimensions in mm)**

Type WMD6







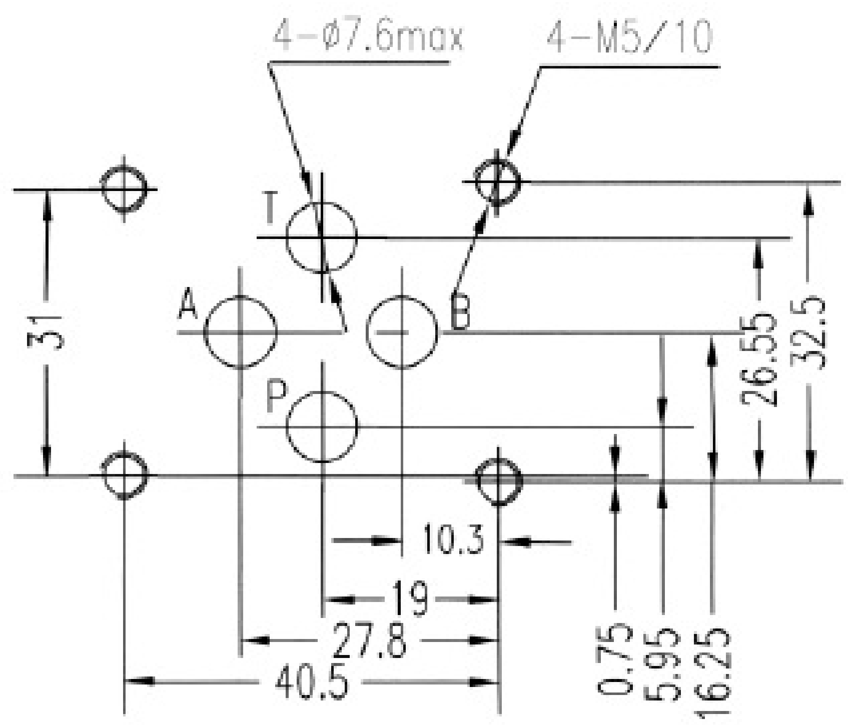
Unit dimensions for ports

Subplates:see page 205

G341/01 (G1/4"); G341/02 (M14X1.5)

G342/01 (G3/8"); G342/02 (M18X1.5)

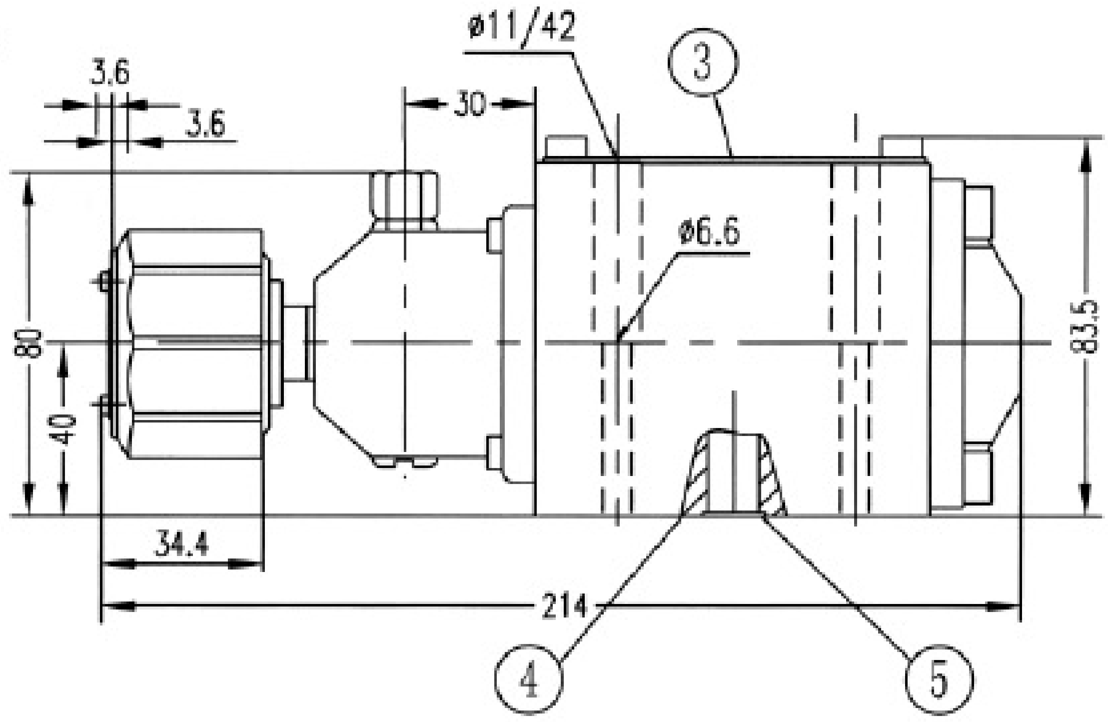
G502/01 (G1/2"); G502/02 (M22X1.5)

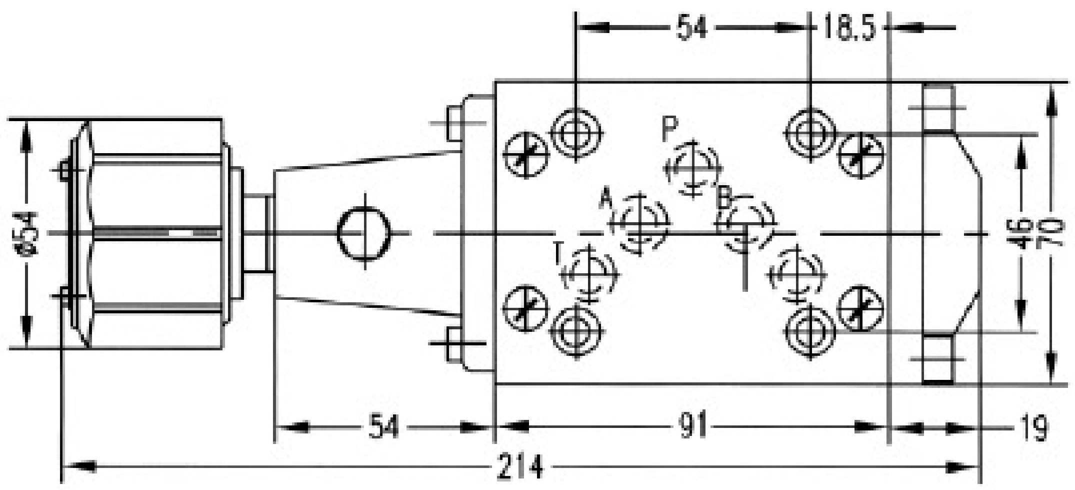


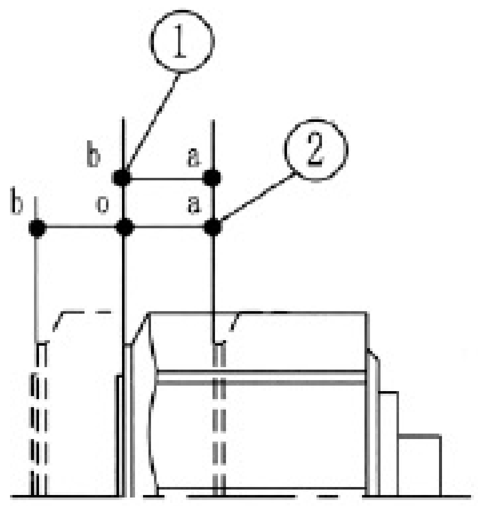
1.Switched position a
2.Switched position 0 and b
(b for 2-position valves)
3.Switched position b
4.Operating valve 90° clockwise and
90° anti-clockwise 3-position valve
5.Nameplate
6.Valve connecting surface
7.O-ring 9.25X1.78(for ports A,B,P,and T)

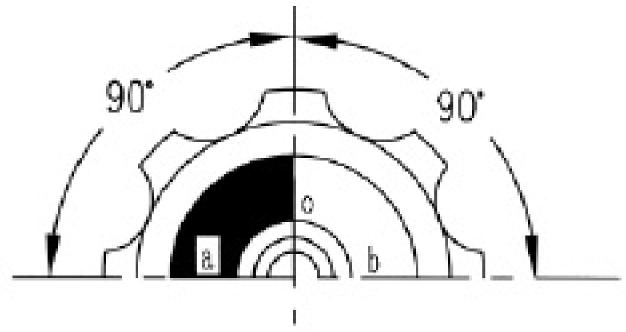
Unit dimensions **(Dimensions in mm)**

Type WMD10









Unit dimensions for ports

Sub-plates:see page 206

G66/01（G3/8"）; G66/02（M18X1.5）

G67/01（G1/2"）; G67/02（M22X1.5）

G534/01（G3/4"）; G534/02（M27X2）

1、2-position valves: A、C、D、...EA...

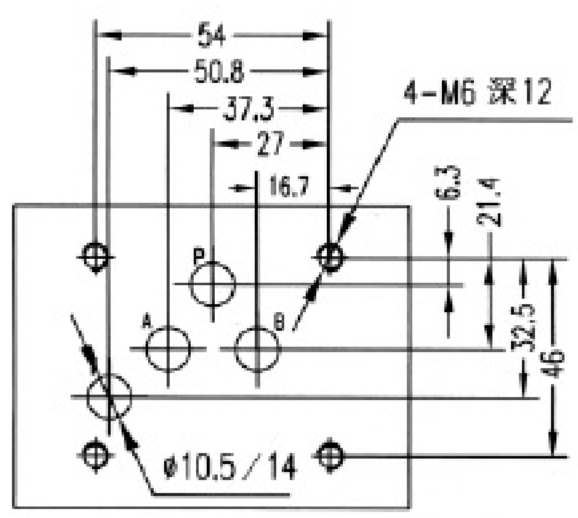
2、3-position

3、Nameplate

5、Connecting surface

6、O-ring 9.25X1.78

(for ports A、B、P、and T)



BEIJING HUADE HYDRAULIC INDUSTRIAL GROUP CO.,LTD.	**4/3 and 4/2 directional control valves with hand lever，Type WMM**			RE 22277/12.2004
	Size 6、10、16 、25	up to35MPa	up to 450L/min	Replaces：RE 22275/05.2001

Features:
- Direct actuated directional spool valve with hand lever
- With spring return or detent, optional
- For subplate mounting
- Porting pattern to Din 24 340 form A, ISO 4401 and CETOP-RP 121H

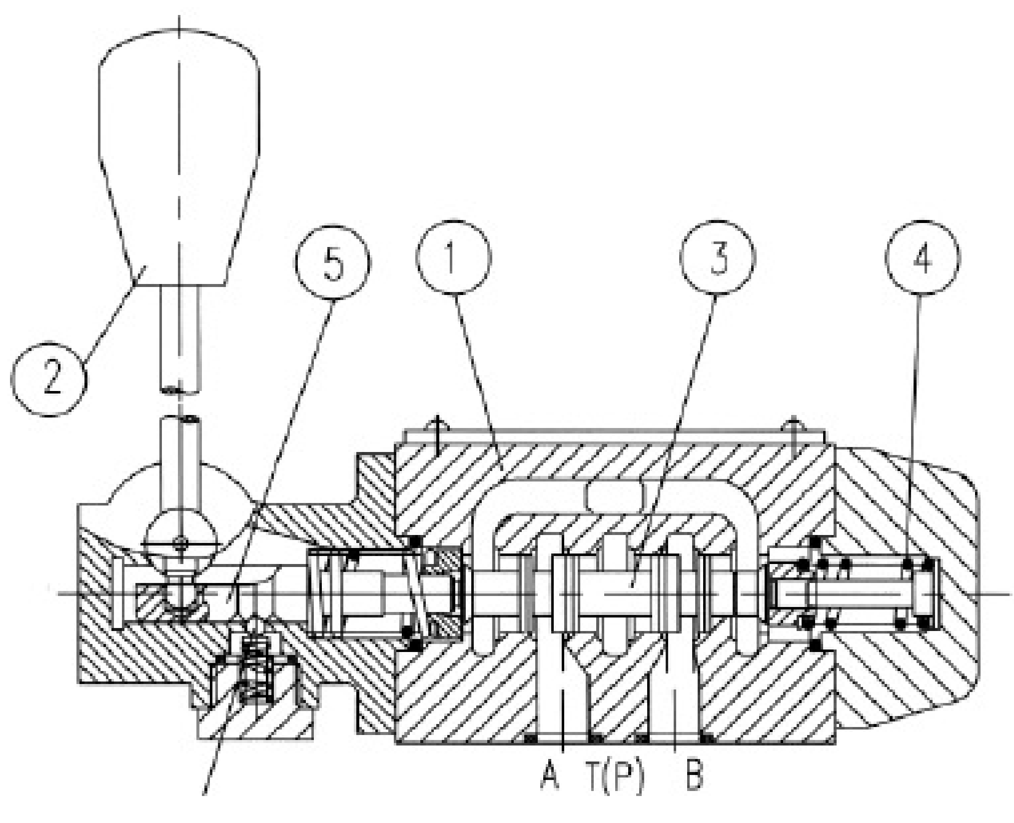
Function, section

The type WMM valves are hand lever actuated directional spool valves.They control the start, stop and direction of a flow.

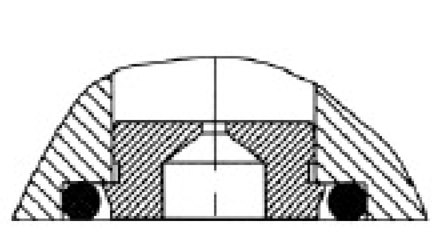
The directional valves basically comprise of a housing (1), hand lever(2), control pool (3), as well as one or two return springs (4).In the unoperated condition the control spool (3) is held in the neutral or its initial position by the return springs (4). The control spool(3) is actuated via the hand lever (2), this acts via a joint and the pin(5) directly onto the control spool (3). The spool is thereby moved out of its rest postion into its required switched position.After the hand lever (2) has been returned to the switched position zero, the spool (3) is returned to the neutral position via the return springs (4).

Type H-4WMM../F.. (with detent)

These valves are either 2 or 3 position directional control valves which are fitted with a detent (6), which operates in all of the switched positions.



Type 4WMM6



Cartridge throttle

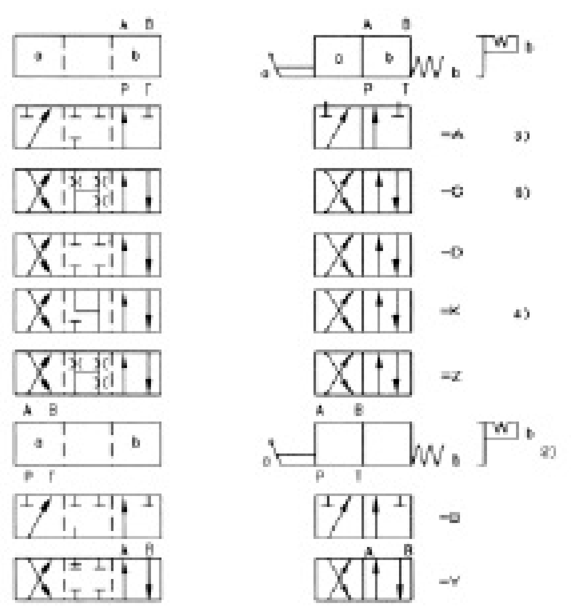
Ordering details

H-		WM			B /			*

35MPa (Only Size 16、25)

3 service ports = 3
4 service ports = 4

Size 6 = 6
Size 10 = 10
Size 16 = 16
Size 25 = 25



Further etails in clear text

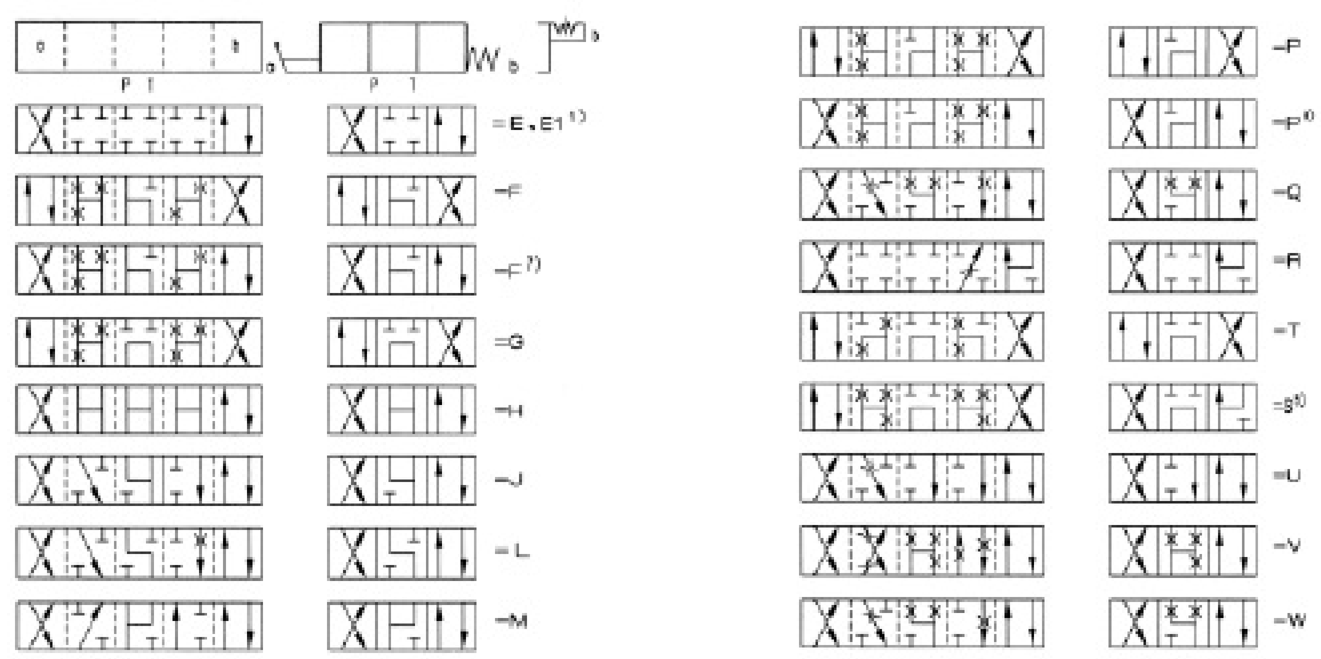
No code = Mineral oils
V = phosphate ester

Only for Size 6 and 10
No code = Without throttle insert
B08 = Throttle Φ 0.8 mm
B10 = Throttle Φ 1.0 mm
B12 = Throttle Φ 1.2 mm
Note:Size16.25 without throttle

No code = with spring return, without detent
F = without spring return, with detent

B = Technology of Beijing Huade Hydraulic

50 = Series 50 (50 to 59: unchanged installation and connection dimensions)(For Size 6、16、25)
10 = Series 10(10 to 19: unchanged installation and connection dimensions) (For Size 10)



Example:Spool E on side"a".
Order example:...EA...
Spool E on side"b".
Order example:...EB...

1) Spool E1：P 、A/B，preview port（only for Size 6）.
2) For Size 10,Spool B、Y, hand lever on side B.
3) Spool A and B only for Size 6 and 10.
4) Spool K and Z only for Size16 and 25.
5) Spool S only for Size16.
6) For Size16 and 25,spool C is the same as spool H .
For Size16 and 25,spool D is the same as spool E.
7) Only for Size16 and 25.
8) Only for Size16 and 25.

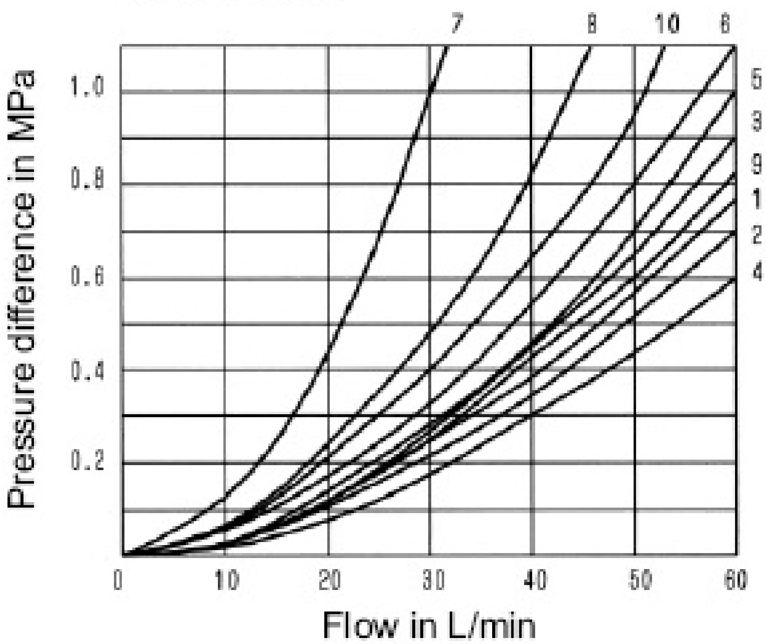
Technical data (For applications outside these parameters, please consult us!)

Size		6	10	16	25
Maximum	port A、B、P (MPa)	to31.5		to35	
Working pressure port T	(MPa)	to16	to15	to25	to25
Maximum fluid	(L/min)	to60	to100	to300	to450
Flow cross section (control position 0)		for symbol Q, 6% of nominal cross section for symbol W, 3% of nominal cross section		for symbol Q、V,16% of nominal cross section for symbol W, 3% of nominal cross section	
Pressure fluid		Mineral oil or Phospate ester			
Fluid temperature range	(℃)	-30~ + 80			
Viscosity range	(mm^2/s)	2.8~ + 500			
Weight	(Kg)	approx.1.4	approx3.3	approx8	approx17
Control power of push lever	(N)	Without return pressure approx20 Without return pressure approx30	with detent approx.16~23 without detent approx. 20~27	approx75	approx120

Characteristic curves (measured at ν = 41 mm^2 /s and t = 50 ℃)

Characteristic curves:

Type WMM6



Spool	Shifted position			
	P → A	P → B	A → T	B → T
A	3	3	-	-
B	3	3	-	-
C	1	1	3	1
D	5	5	3	3
E	3	3	1	1
F	1	3	1	1
G	6	6	9	9
H	2	4	2	2
J	1	1	2	1
L	3	3	4	9
M	2	4	3	3
P	3	1	1	1
Q	1	1	2	1
R	5	5	4	1
T	10	10	9	9
U	3	3	9	4
V	1	2	1	1
W	1	1	2	2
Y	5	5	3	3

7 Spool "R" at controller position A to B

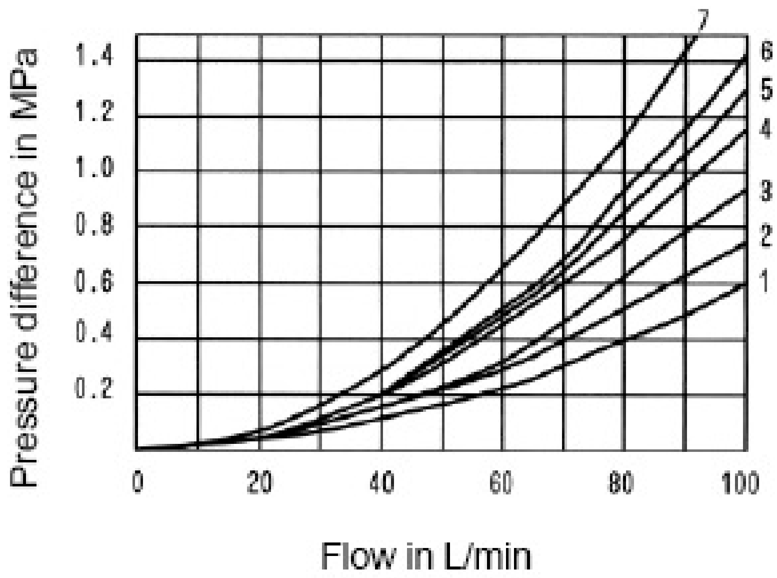
8 Spool "G" and "T"at middle position P to T

Characteristic curves: Type WMM10

Spool	Shifted position			
	P → A	P → B	A → T	B → T
A	2	2	-	-
B	2	2	-	-
C	2	2	3	3
D	2	2	3	3
E	2	2	4	4
F	2	3	3	5
G	3	3	4	6
H	1	1	4	5
J	2	2	3	3
L	2	2	3	5
M	1	1	5	5
P	3	2	5	3
Q	2	2	4	4
R	2	4	3	-
T	3	5	5	6
U	2	2	3	5
V	2	2	5	5
W	2	2	5	5
Y	2	2	5	3

4 Spool "G" and "T" at middle position P to T

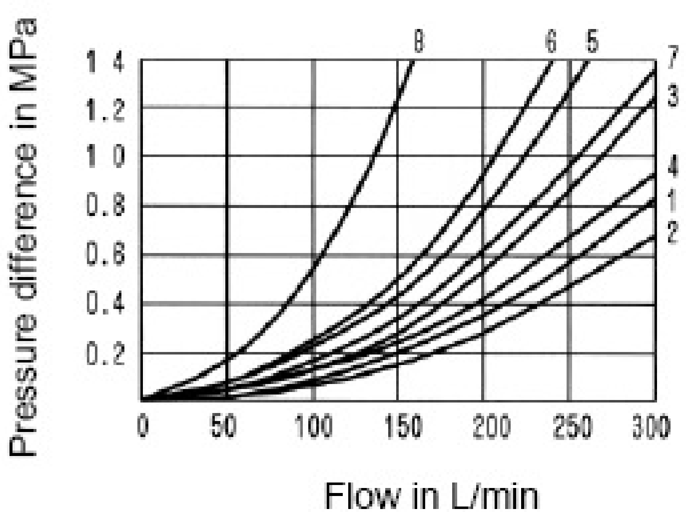
7 Spool "R" at switch position A to B



Characteristic curves: Type WMM16

4 Spool "G" and "T" at middle position P to T

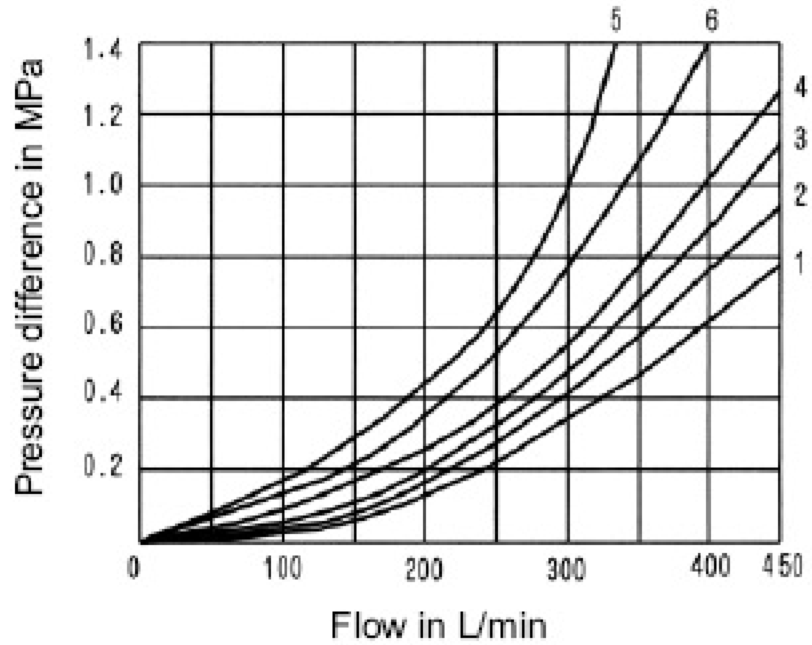
7 Spool "S" at middle position P to T



Spool	Shifted position			
	P → A	P → B	A → T	B → T
E,D、Y	1	1	1	3
F	2	2	3	3
G、T	5	1	3	7
H、C、Q	2	2	3	3
V、Z	2	2	3	3
J、K、L	1	1	3	3
M、W	2	2	4	-
R	2	2	4	-
U	1	1	4	7
S	4	4	4	-

Characteristic curves: Type WMM25

4 Spool "L" at A to T
6 Spool "U" at B to T



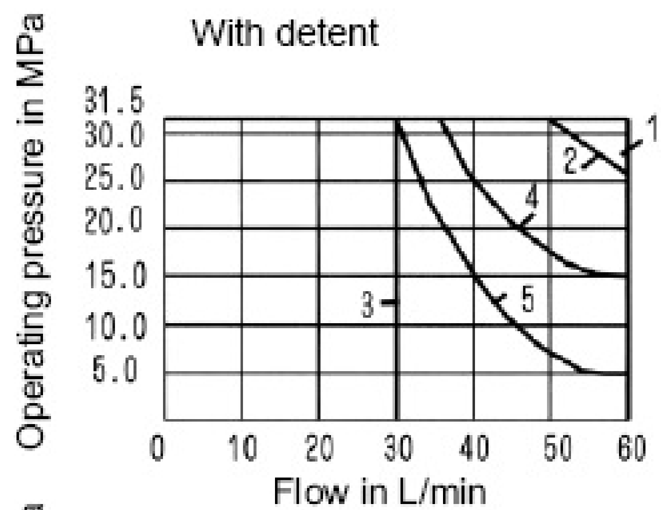
Spool	Shifted position			
	P→A	P→B	A→T	B→T
E	2	2	1	4
F	1	2	1	2
G	2	2	2	4
H	2	2	1	3
J	2	2	1	3
L	2	2	1	2
M	2	2	1	4
P	2	2	1	4
Q	2	2	1	4
R	1	2	1	-
T	2	2	2	4
U	2	2	1	4
V	2	2	1	4
W	2	2	1	3

Performance limits:

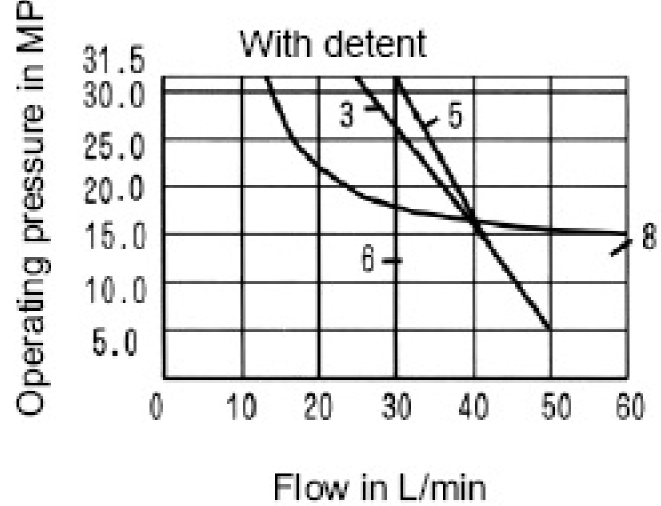
The switching function of the valve is, due to the sticking effect,dependent on the filtration. The flow forces acting within the valve also affects the flow performance limits.

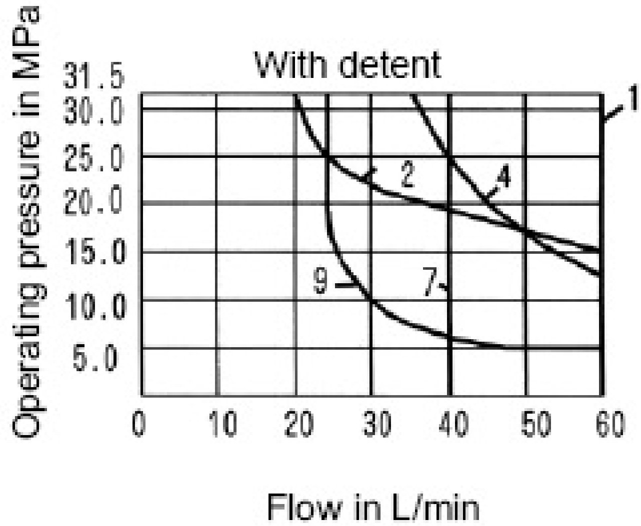
For 4-way valves the stated flow data is valid for the normal application case of 2 directions of flow (e.g. from P to A and at the same time return flow from B to T) (see table). If there is only one direction of flow then the permissible flow can be considerably lower, (e.g. when using a 4-way directional valve as a 3-way directional valve with ports A or B plugged).

Performance limits of WMM6:



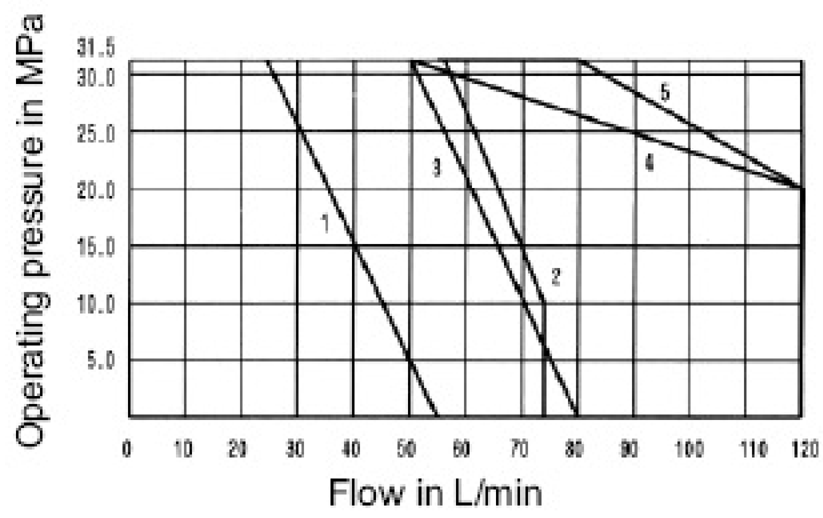
Characteristic curves		Spool	Characteristic curves		Spool
without detent	1	E、E1、H、C、D、M、Q、U、W、G、J、L、R、Y	with detent	1	E1、M、H、C、D、Y
				2	E、J、Q、L、U、W
	2	A、B		3	A、B
	3	V		4	G、T
	4	F、P		5	F
	5	T		6	V
				7	P
				8	R
				9	T





Characteristic curves: Type WMM10

Characteristic curves:	Spool
1	A、B
2	H
3	F、G、P、R、T
4	J、L、Q、U、W
5	C、D、E、M、V、Y



Characteristic curves: Type WMM16

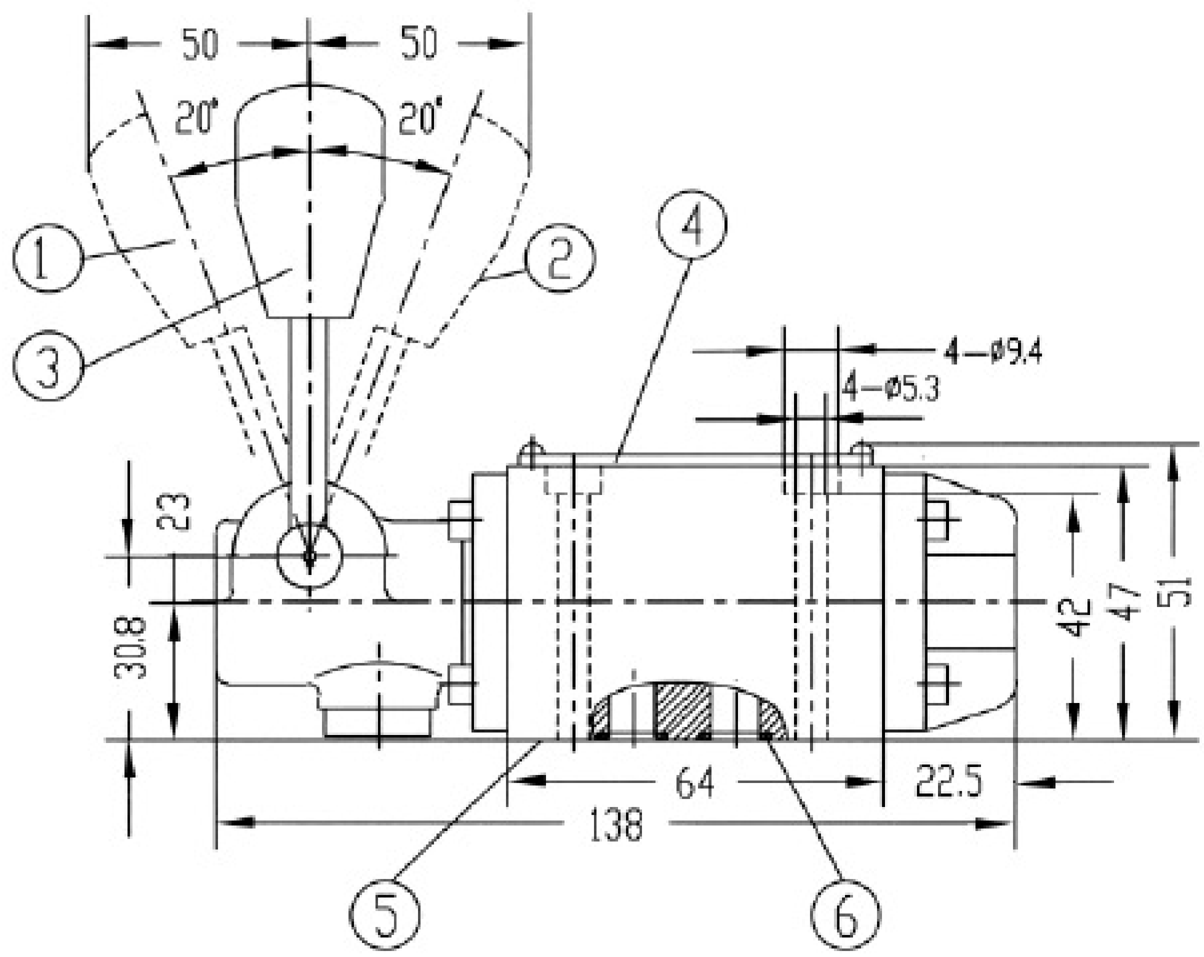
2-position valves , without detent					
flow q_v in L/min	Operating pressure max(MPa)				
Spool	7	14	21	28	35
C	300	300	300	260	220
D	300	300	210	190	160
K	300	300	200	150	130
Z	300	240	190	170	150
3-position valves without detent					
flow q_v in L/min	Operating pressure max(MPa)				
Spool	7	14	21	28	35
E、H、J、L、M Q、R、U、W	300	300	300	300	300
F、P	300	300	210	190	170
G、S、T	300	300	220	210	180
V	300	260	200	180	170

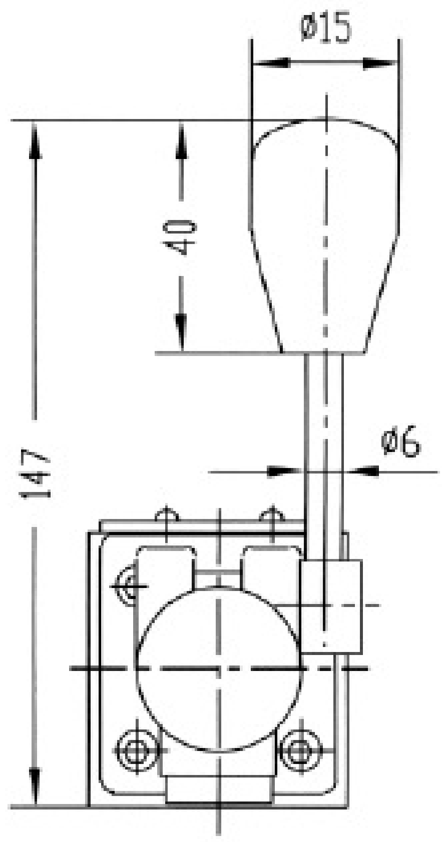
Characteristic curves: Type WMM25

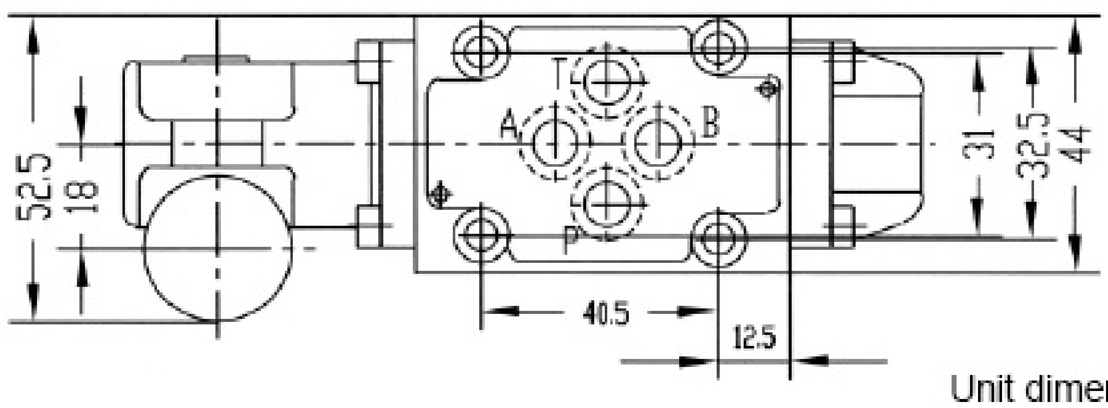
2-position valves , with detent					
flow q_v in L/min	Operating pressure max(MPa)				
Spool	7	14	21	28	35
C、D、K、Z	300	300	300	300	300
3-position valves with detent					
flow q_v in L/min	Operating pressure max(MPa)				
Spool	7	14	21	28	35
E、H、J、L、M Q、R、U、W	300	300	300	300	300
F、P	300	300	280	230	230
G、T、S	300	300	230	230	230
V	300	300	250	230	230

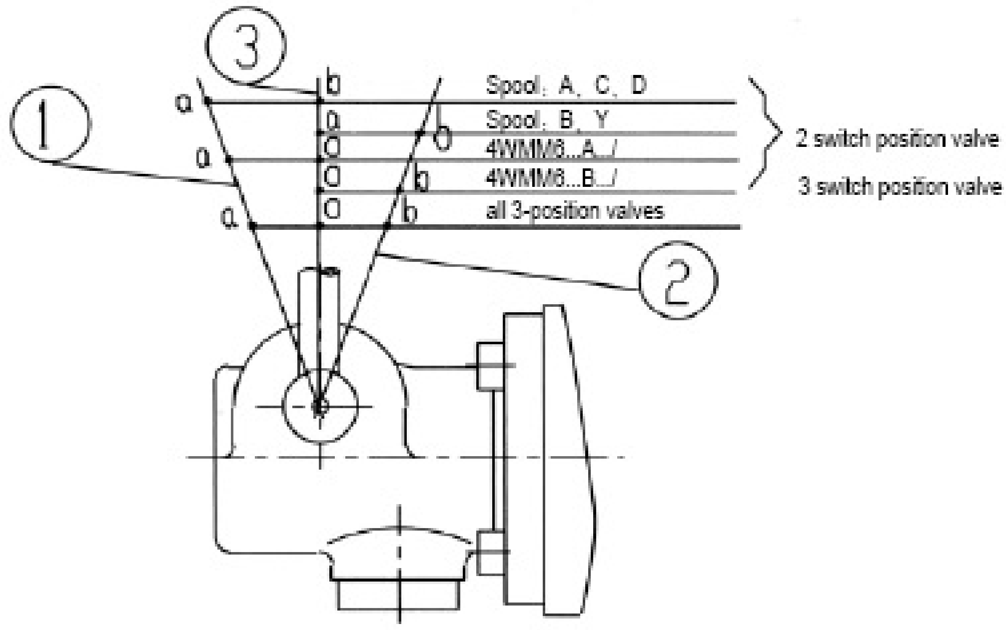
2-position valves without detent					
flow q_v in L/min	Operating pressure max(MPa)				
Spool	7	14	21	28	35
C	450	300	250	200	180
D	350	300	275	250	200
K	200	150	140	130	120
Z	300	270	240	220	200
3-position valves without detent					
flow q_v in L/min	Operating pressure max(MPa)				
Spool	7	14	21	28	35
E、J、L、M Q、R、U、W	450	450	450	450	450
F	450	250	200	135	110
G、T	450	330	290	230	180
H	450	450	400	400	350
P	450	310	240	215	150
V	450	310	280	270	200

2-position valves with detent					
flow q_v in L/min	Operating pressure max(MPa)				
Spool	7	14	21	28	35
C、D、K、Z	450	450	450	450	450
3-position valves with detent					
flow q_v in L/min	Operating pressure max(MPa)				
Spool	7	14	21	28	35
E、F、G、H、J L、M、P、R、T U、W	450	450	450	450	450
V	450	450	400	350	300

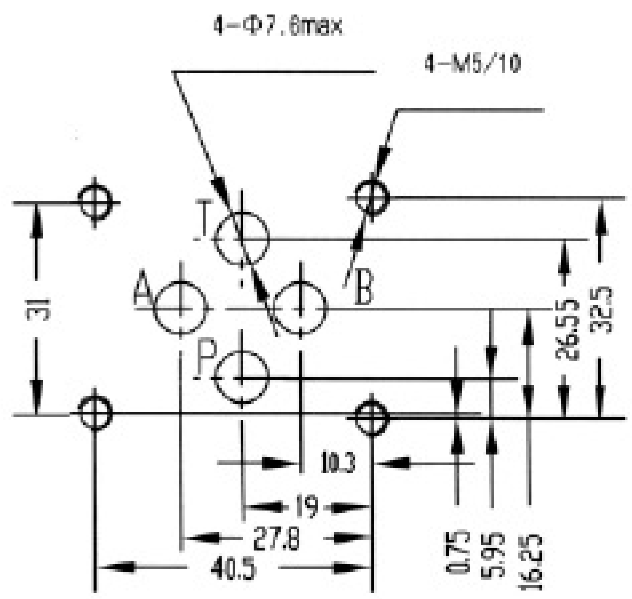








Unit dimensions of ports:



Subplates: see page 205

G341/01 (G1/4"); G341/02 (M14X1.5)

G342/01 (G3/8"); G342/02 (M18X1.5)

G502/01 (G1/2"); G502/02 (M22X1.5)

1 Switched position a

2 Switched position b

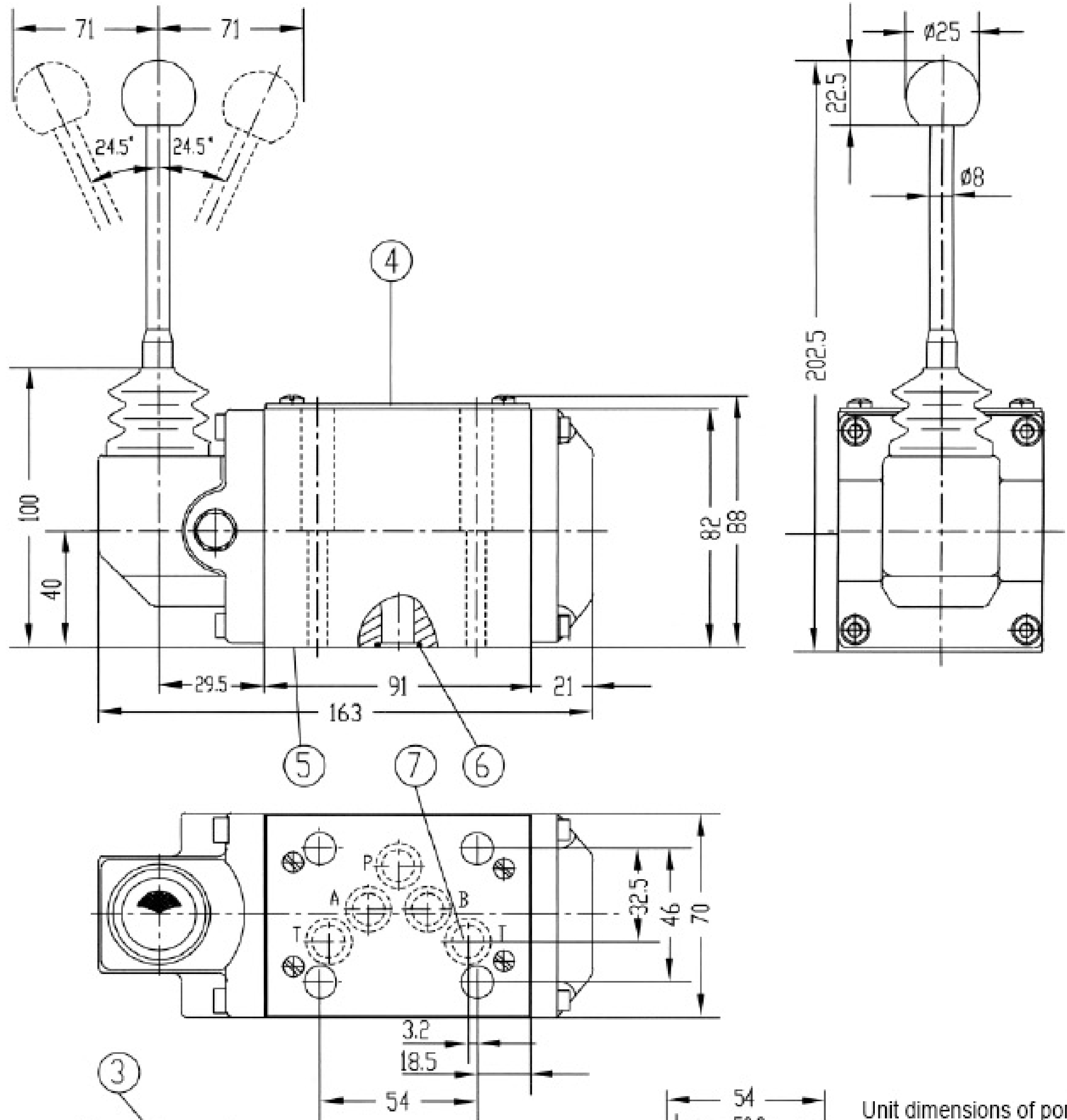
3 Switched position 0、a、b
(a and b on 2-position valve)

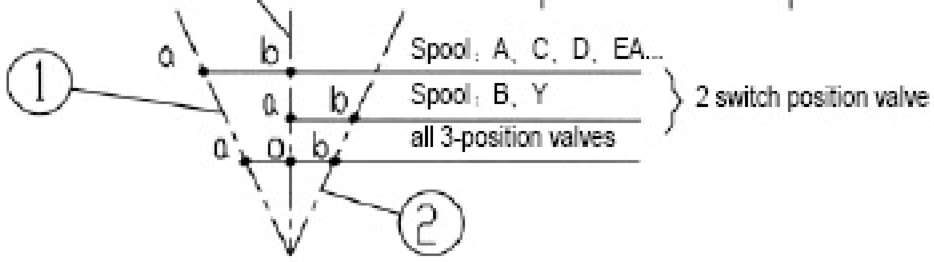
4 Nameplate

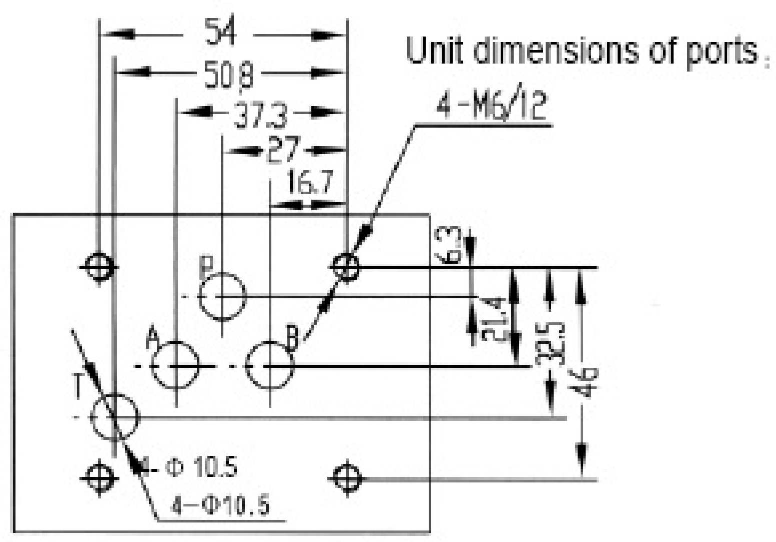
5 Connection surface

6 O-ring 9.25 x 1.78 (for ports A, B, P and T)

Unit dimensions: Type WMM10(with detent) (Dimensions in mm)







Subplates: see page 206

G66/01（G3/8"）； G66/02（M18X1.5）

G67/01（G1/2"）； G67/02（M22X1.5）

G534/01（G3/4"）； G534/02（M27X2）

1 Switched position a

2 Switched position b

3 Switched position 0、a、b
（a and b on 2-position valve ）

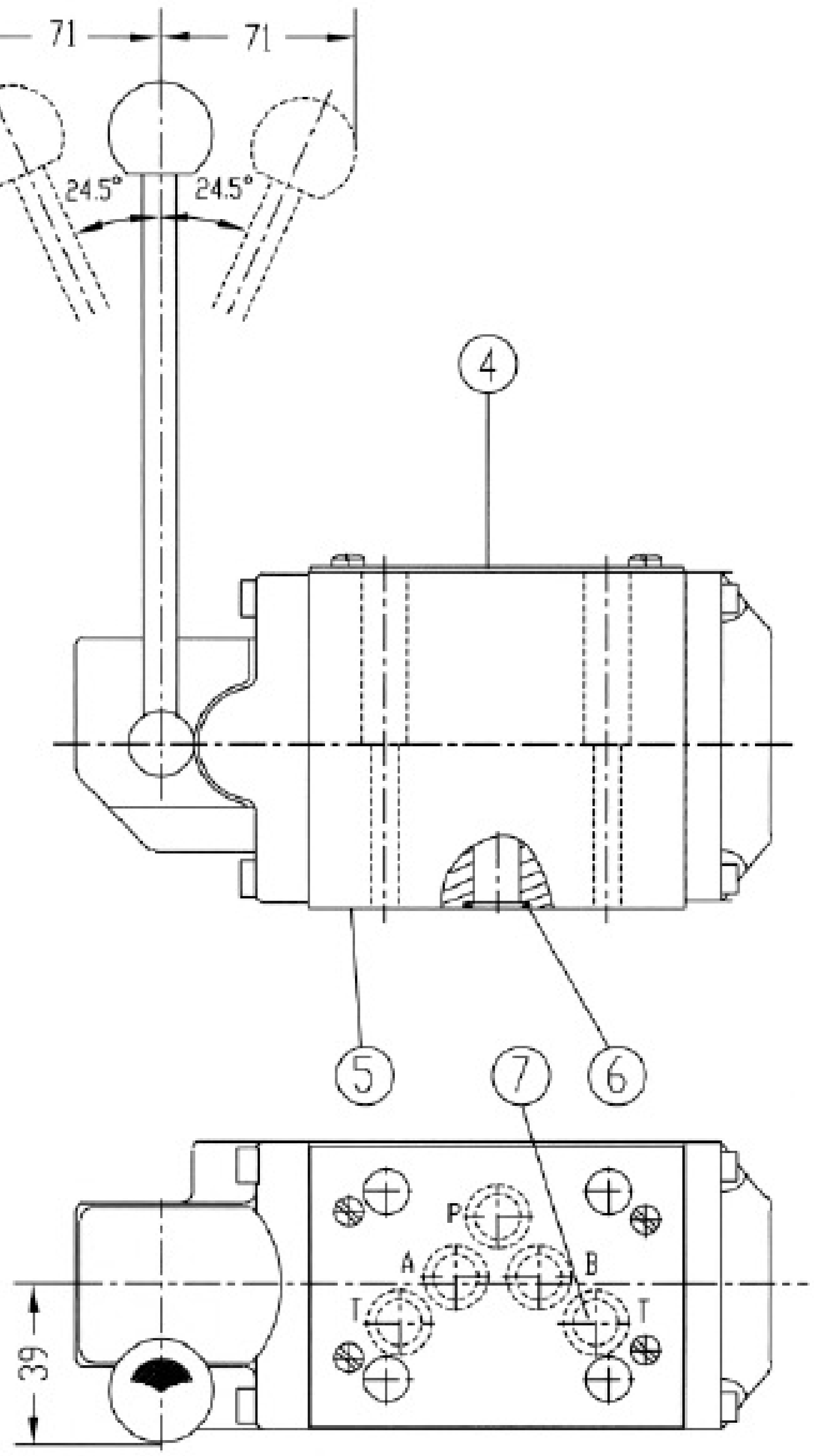
4 Nameplate

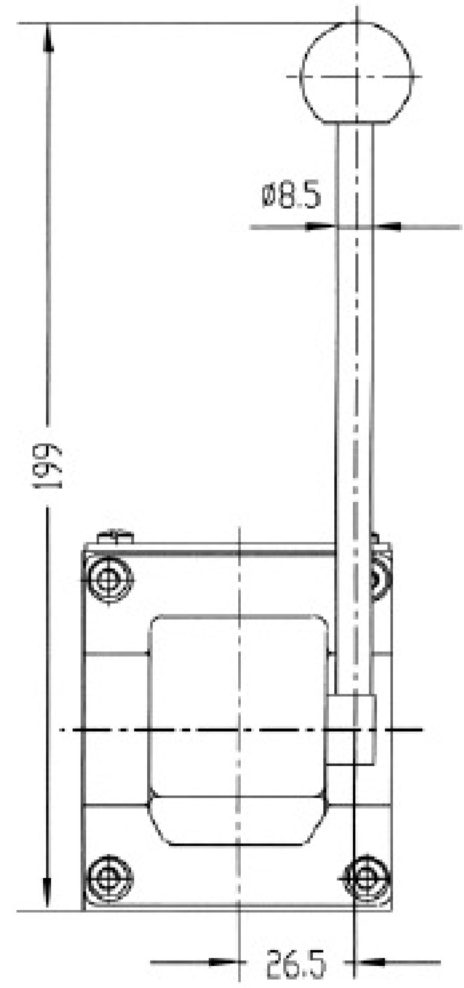
5 Connection surface

6 O-ring 12 x 2(for ports A, B, P and T)

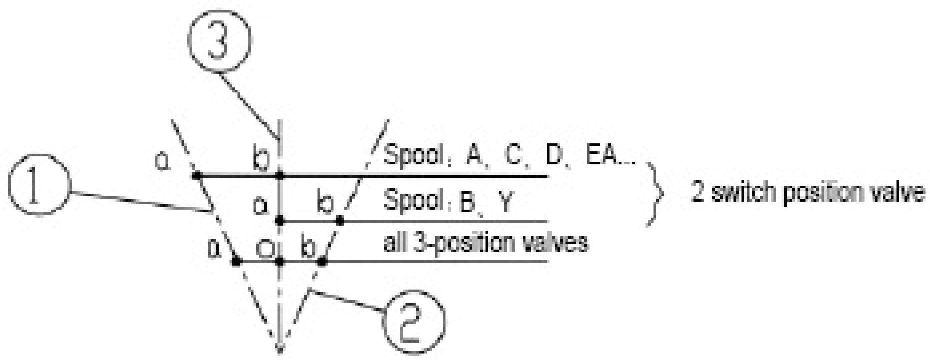
7 When using control piece,may regarded as assistant return port

Unit dimensions: Type WMM10(without detent)   (Dimensions in mm)



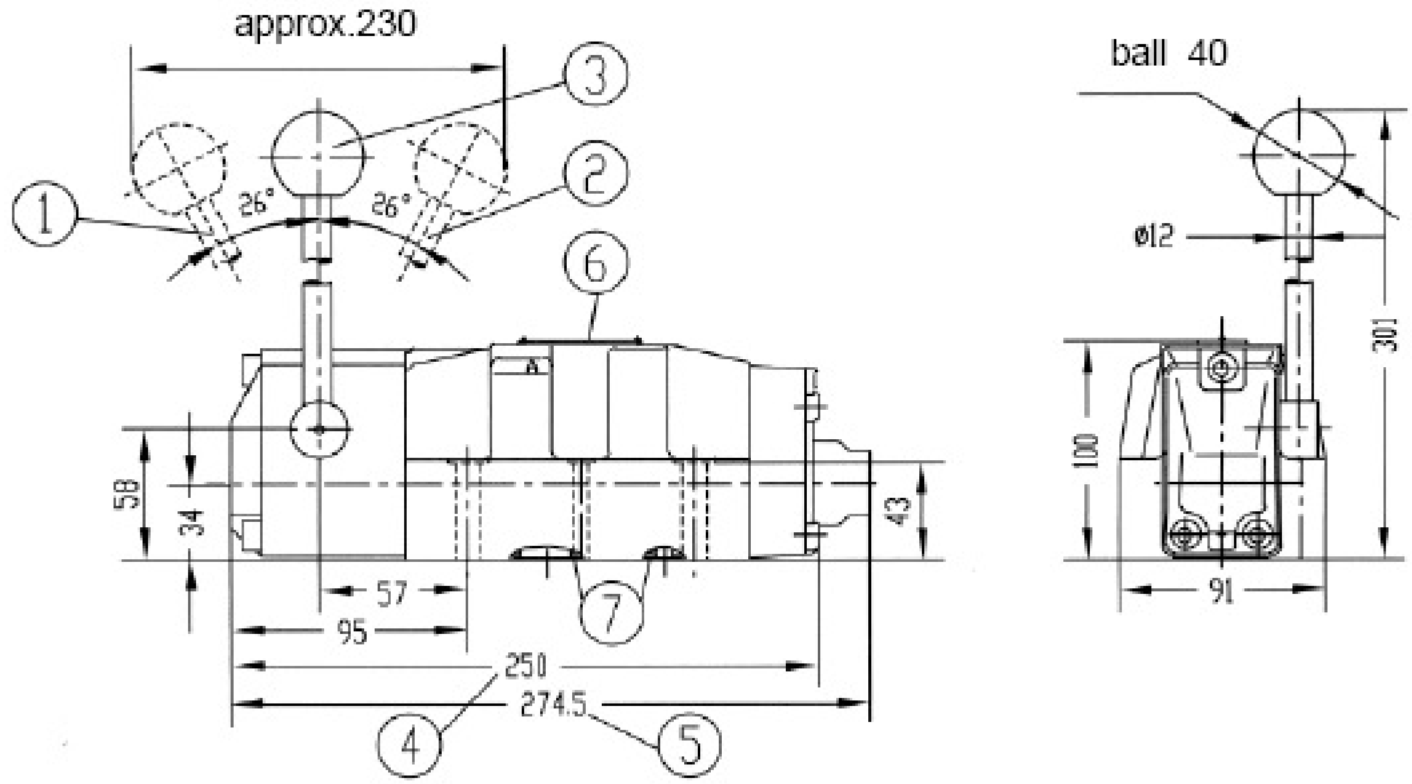


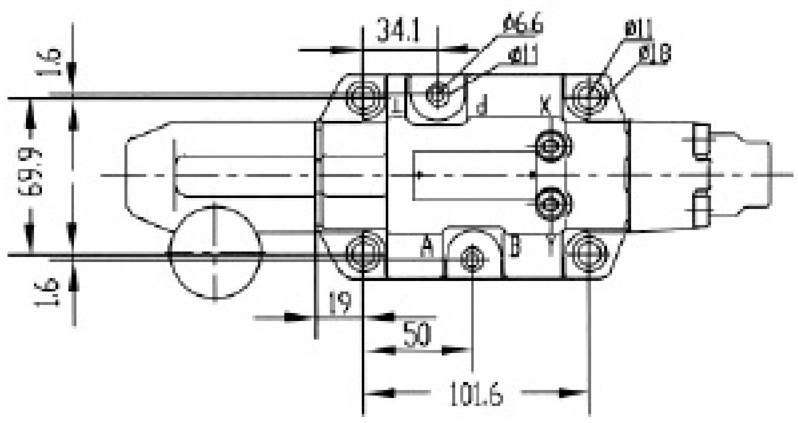
The other Unit dimensions see "with detent"

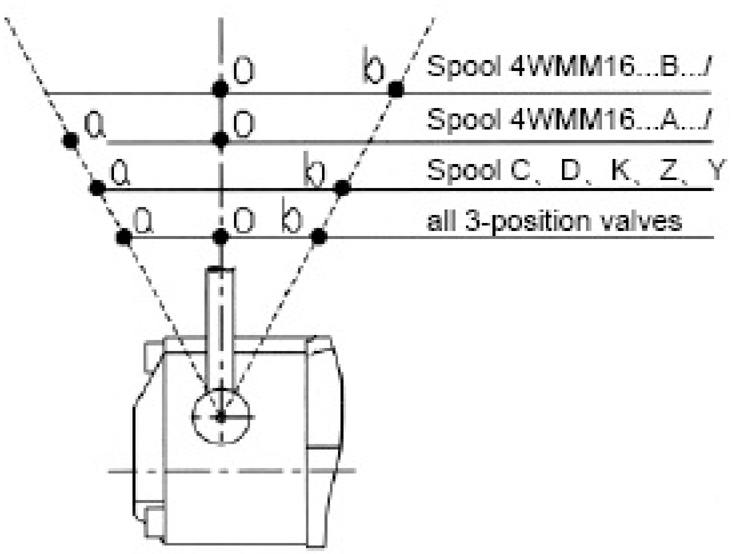


1 Switched position a
2 Switched position b
3 Switched position 0、a、b
(a and b on 2-position valve)
4 Nameplate
5 Connection surface
6 O-ring 12 x 2(for ports A, B, P and T)
7 When using control piece,may regarded as assistant return port

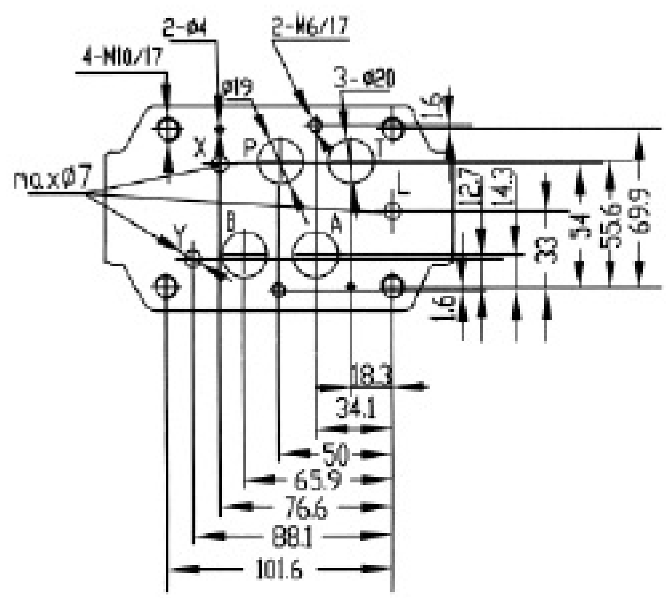
Unit dimensions: Type WMM16 **(Dimensions in mm)**







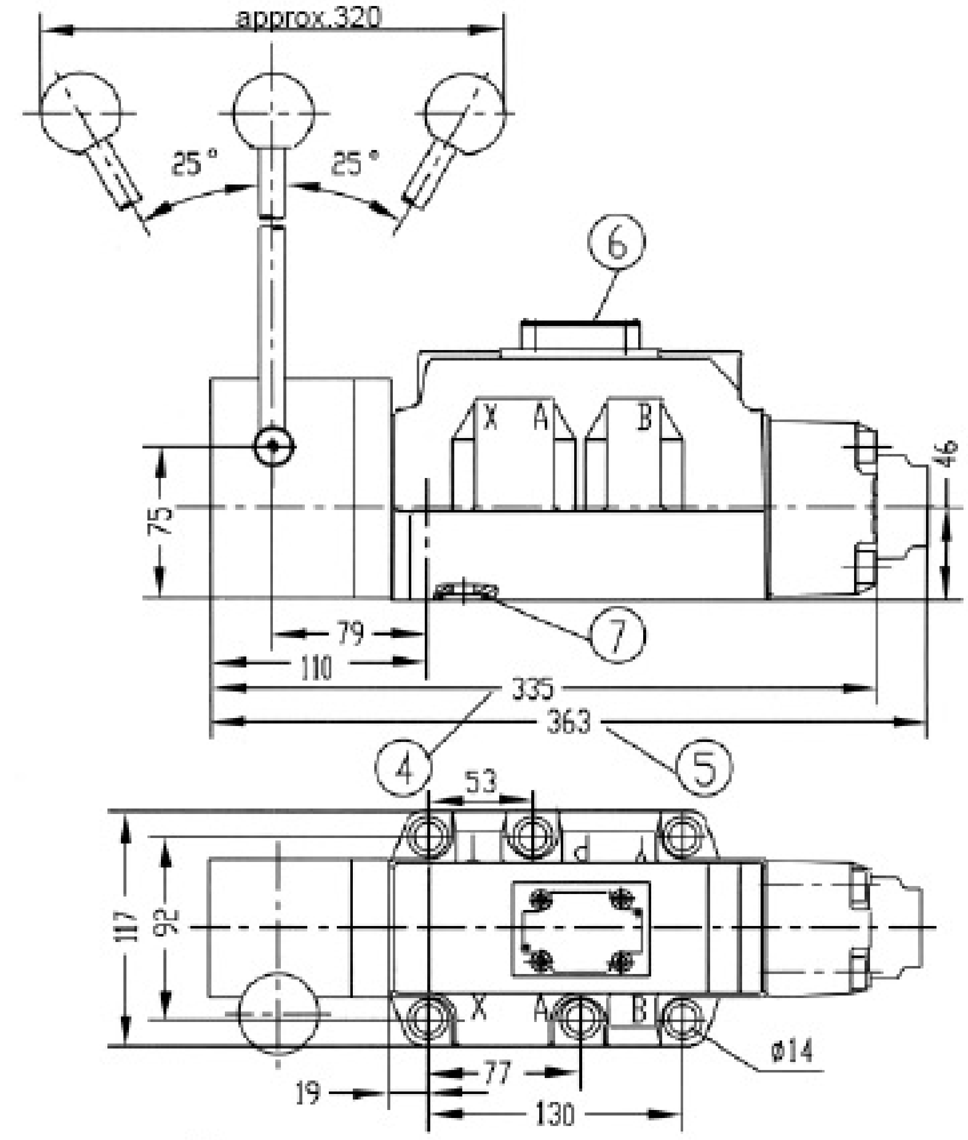
Unit dimensions of ports：

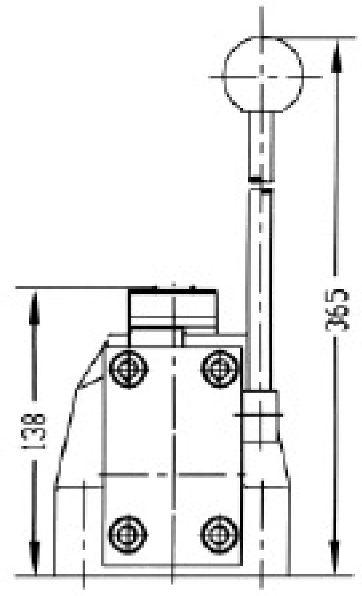


Subplates (see page207、208)
G172/01；G172/02
G174/01；G174/02
G174/08

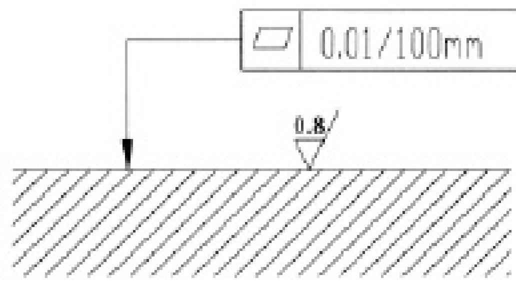
1 Switched position a
2 Switched position b
3 Switched position 0 （a and b on 2-position valve ）
4 2-position valve and 3-position valves , with detent.
3-position valve, spring-centred
5 2-position valve，without detent
6 Nameplate
7 O-ring 22 x 2.5（For ports A, B, P and T）
O-ring 10 x 2 （For ports X 、Yand L）

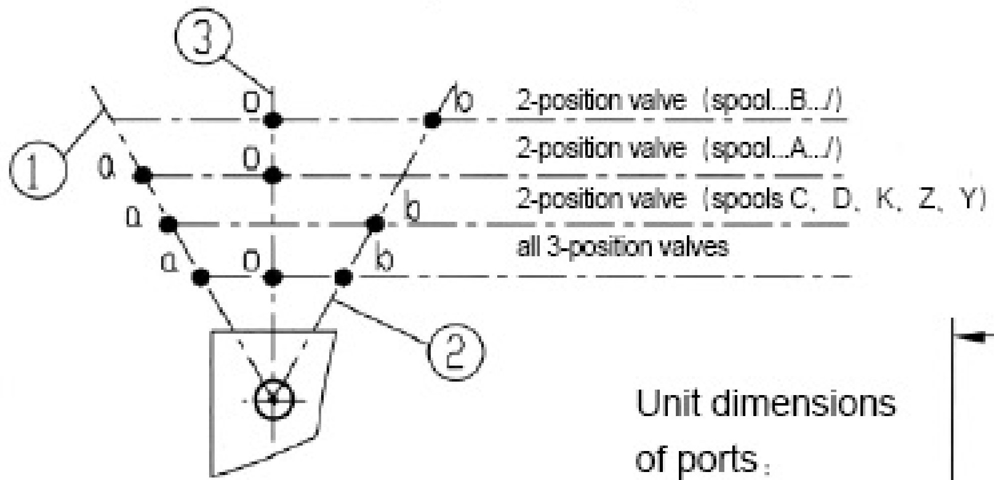
Unit dimensions: Type WMM25 (Dimensions in mm)



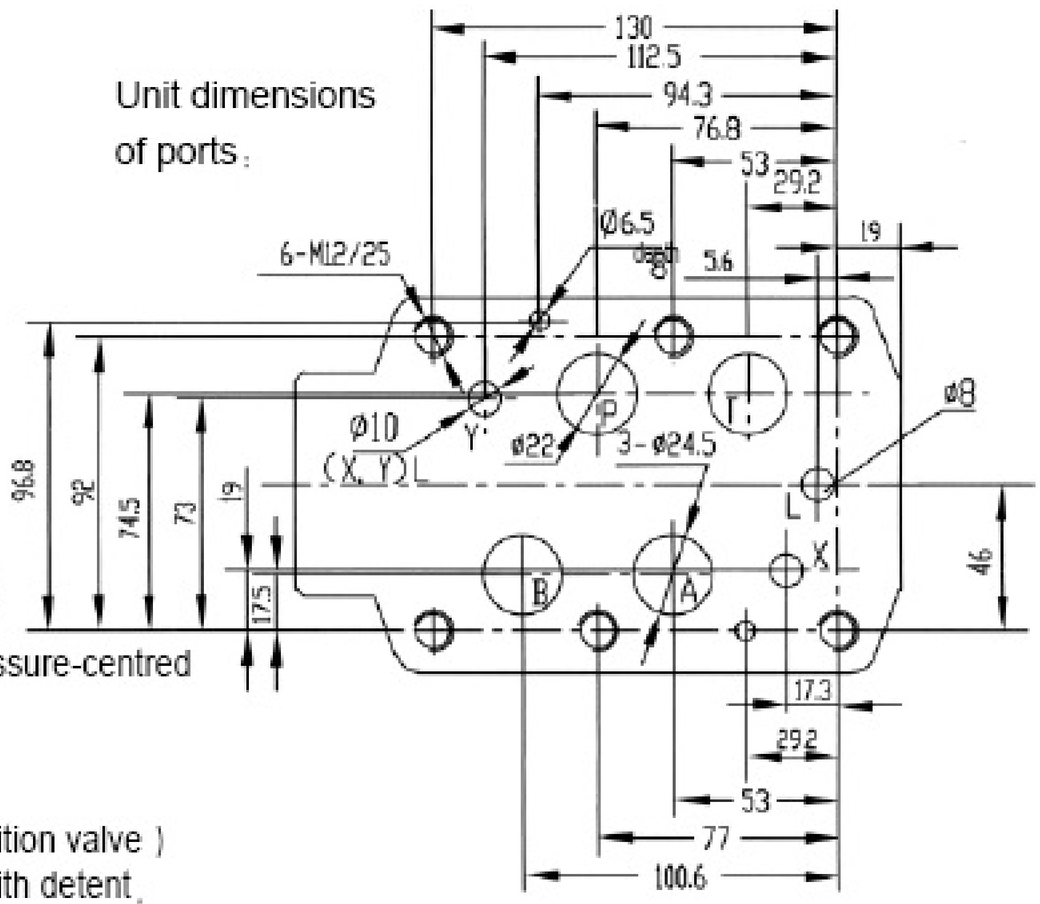


Required surface finish of mating piece





Unit dimensions of ports:



Subplates (see page 209)
G151/01 (G1"); G151/02 (M33X2)
G153/01 (G1"); G153/02 (M33X2)
G154/01 (G1 1/4"); G154/02 (M42X2)
G156/01 (G1 1/2"); G156/02 (M48X2)
G153 only used on valves which are pressure-centred

1 Switched position a
2 Switched position b
3 Switched position 0 (a and b on 2-position valve)
4 2-position valve and 3-position valve with detent, 3-position valve, spring-centred
5 2-position valve, without detent
6 Nameplate
7 O-ring 27 x 3 (for ports A, B, P and T)
O-ring 19 x 3 (for ports X, Y and L)

Notice

1. The fluid must be filtered. Minimum filter fineness is 20 μm.
2. The tank must be sealing up and an air filter must be installed on air entrance.
3. Products without subplate when leaving factory, if need them, please ordering specially.
4. Valve fixing screws must be high intensity level (class 10.9). Please select and use them according to the parameter listed in the sample book.
5. Roughness of surface linked with the valve is required to $\sqrt[0.8]{}$.
6. Surface finish of mating piece is required to 0.01/100mm.

BEIJING HUADE HYDRAULIC INDUSTRIAL GROUP CO.,LTD.	**4/3 and 4/2 directional control valves with hand lever, Type WMM (New Series)**			RE 22331/12.2004
	Size10	up to 31.5 MPa	up to 120L/min	

Features:
- Direct actuated directional spool valve with hand lever
- With spring return or detent, optional
- For subplate mounting
- Porting pattern to Din 24 340 form A, ISO 4401 and CETOP-RP 121H

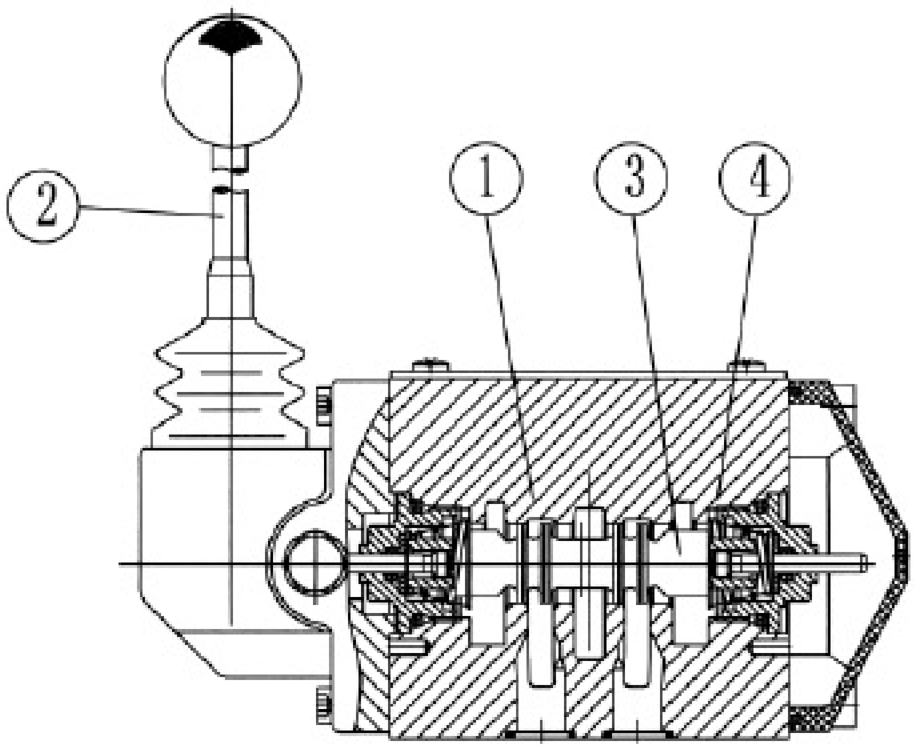
Function,section

The type WMM valves are hand lever actuated directional spool valves.They control the start, stop and direction of a flow.

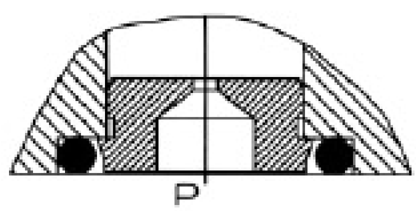
The directional valves basically comprise of a housing (1), hand lever(2), control pool (3), as well as one or two return springs (4).In the unoperated condition the control spool (3) is held in the neutral or its initial position by the return springs (4). The control spool(3) is actuated via the hand lever (2), this acts via a joint and the pin(5) directly onto the control spool (3). The spool is thereby moved out of its rest postion into its required switched position.After the hand lever (2) has been returned to the switched position zero, the spool (3) is returned to the neutral position via the return springs (4).

Type H-4WMM../F.. (with detent)

These valves are either 2 or 3 position directional control valves which are fitted with a detent , which operates in all of the switched positions.



Type 4WMM



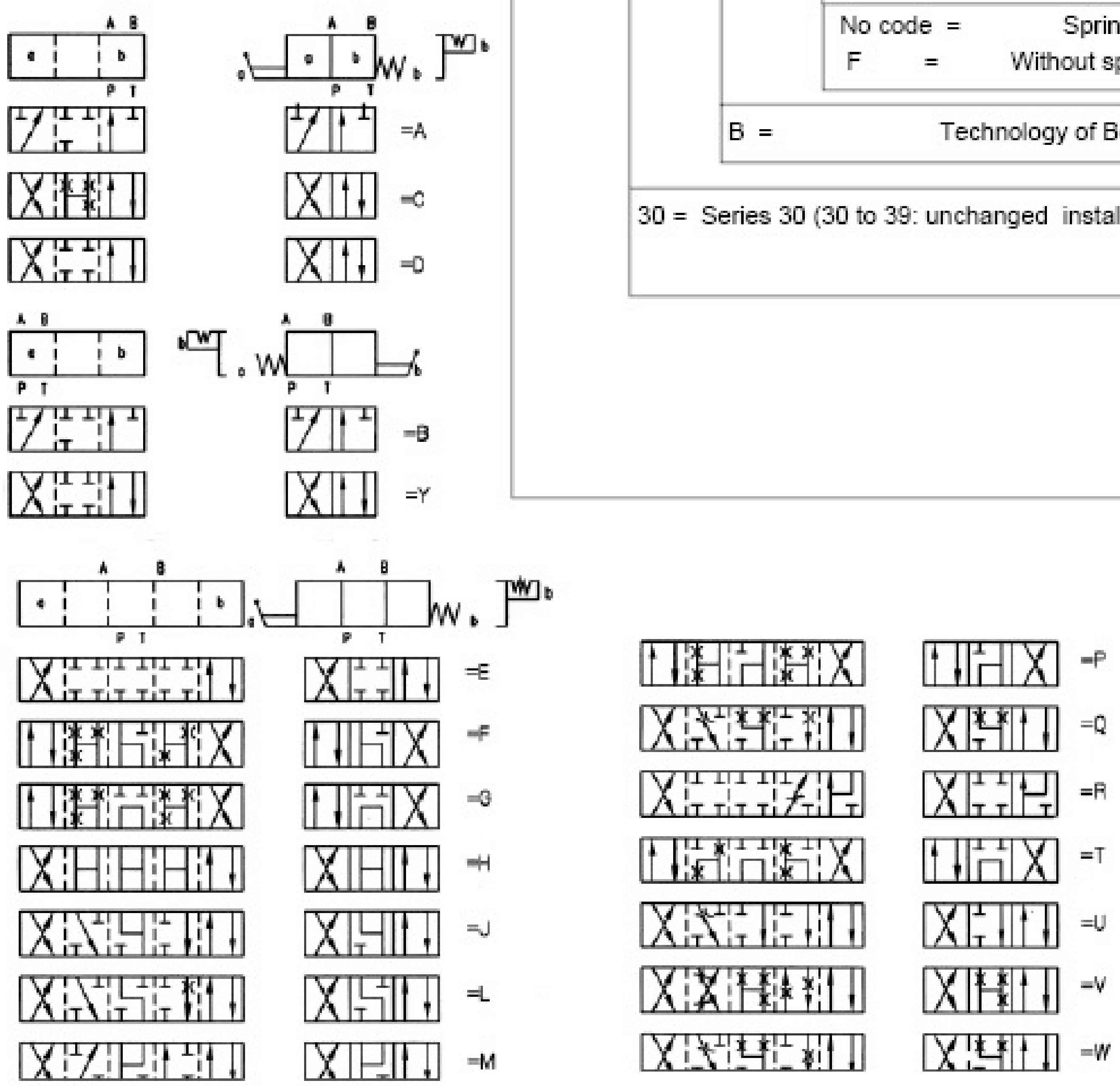
Cartridge throttle

Ordering details

	WMM			30	B /			*

3-way = 3
4-way = 4

Size 10 =10



30 = Series 30 (30 to 39: unchanged installation and connection dimensions)

B = Technology of Beijing Huade Hydraulic

No code = Spring return,without detent
F = Without spring return,with detent

No code = Without throttle insert
B08 = Throttle Φ 0.8 mm
B10 = Throttle Φ 1.0 mm
B12 = Throttle Φ 1.2 mm

No code = mineral oils
V = phosphate ester

Further etails in clear text

Example:

Spool E on side"a", Order example:...EA...

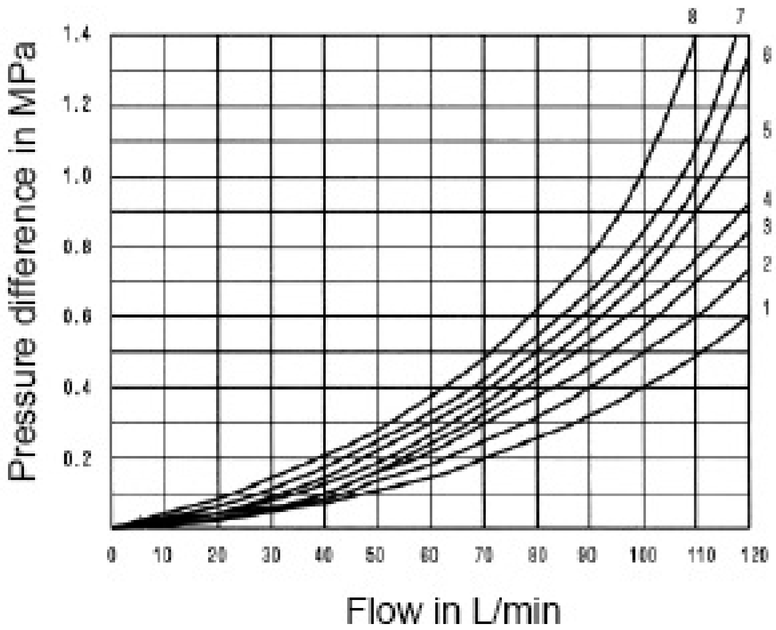
Spool E on side"b", Order example:...EB...

Technical data (For applications outside these parameters, please consult us!)

Size		10
Maximum working pressure	port A、B、P (MPa)	to 31.5
	port T (MPa)	to 15
Maximum flow (L/min)		to 120
Flow cross section (control position 0)		for symbol Q, 6% of nominal cross section for symbol W, 3% of nominal cross section
Pressure fluid		Mineral oils(for NBR seal) or phosphate ester(for FPM seal)
Fluid temperature range (℃)		-30~+80
Viscosity range (mm^2/s)		2.8~500
Weight (kg)		approx.3.3
Control power on handle (N)		with detent approx.16~23 without detent approx.20~27

Characteristic curves (measured at ν = 41 mm^2/s and t = 50 ℃)

Characteristic curves:



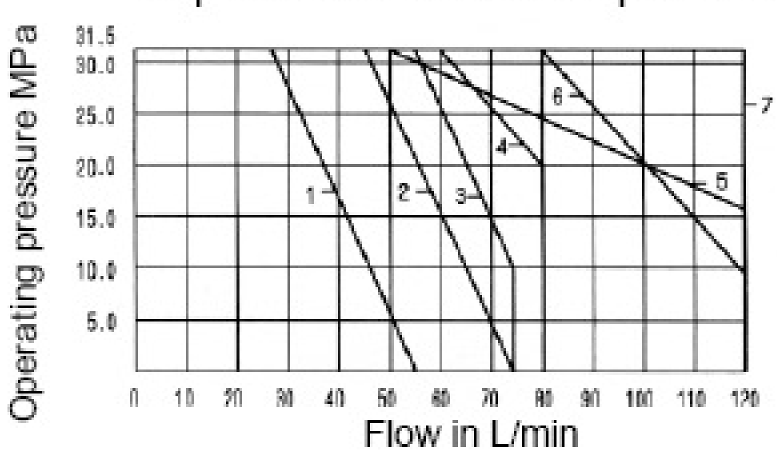
Spool	Shifted position			
	P→A	P→B	A→T	B→T
A	4	3	-	-
B	3	4	-	-
C	3	3	4	4
D	3	3	5	5
Y	4	4	6	6
E	2	2	4	4
F	1	2	3	4
G、T	4	4	7	7
H	1	1	5	5
J	2	2	3	3
L	3	3	2	4
M	1	1	4	4
P	3	1	5	5
Q	2	2	2	2
R	3	4	3	-
U	3	3	5	2
V	2	2	3	3
W	3	3	3	3

7 Spool "R" at controller position A to B

8 Spool "G" and "T"at middle position P to T

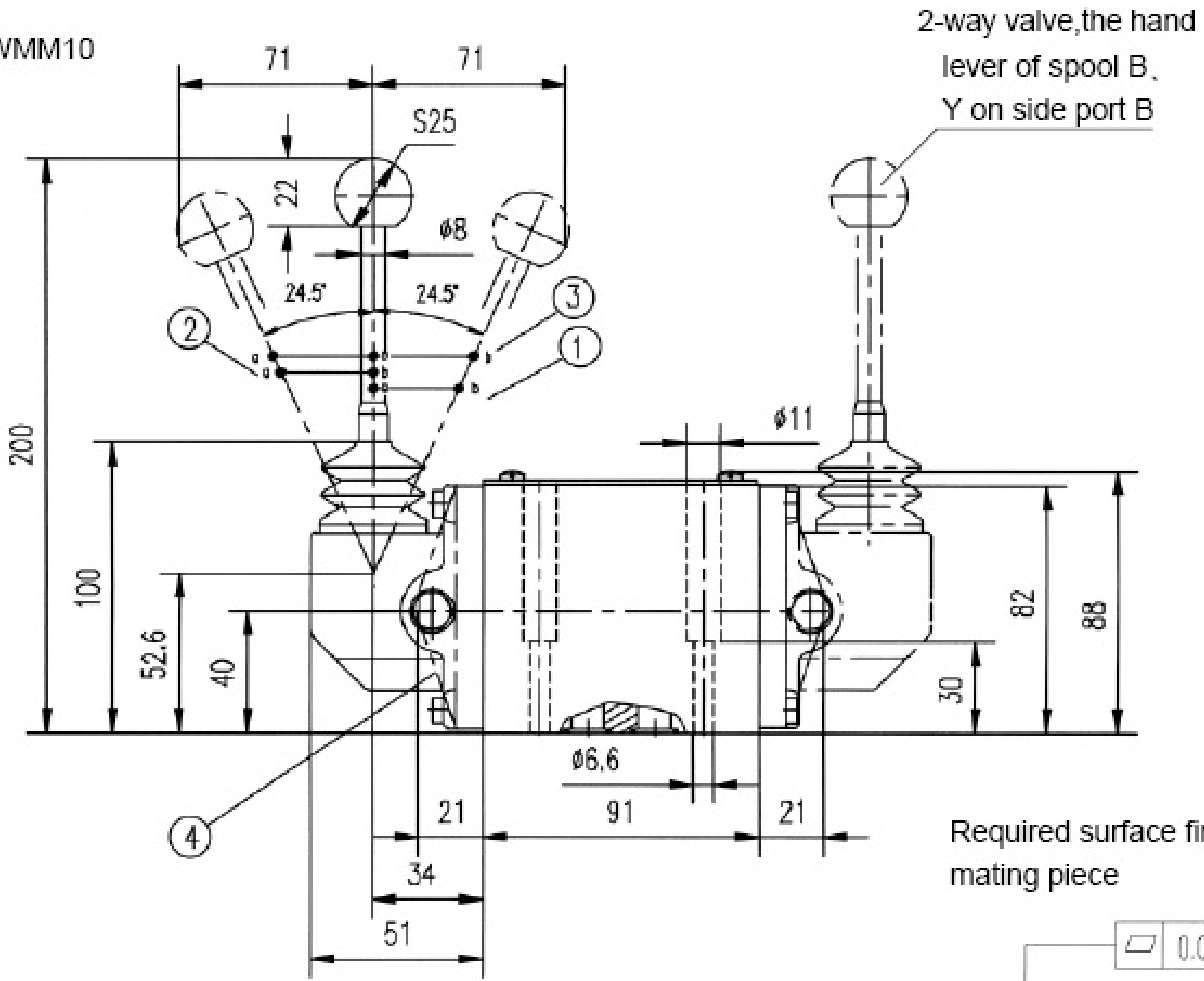
Characteristic curves:

Characteris-tic curves:	Spool
1	A、B
2	A/O
3	H
4	F、G、P、R、T
5	J、L、Q、U、W
6	C、D、E、M、V、Y
7	C/O、C/OF、D/O/D/OF

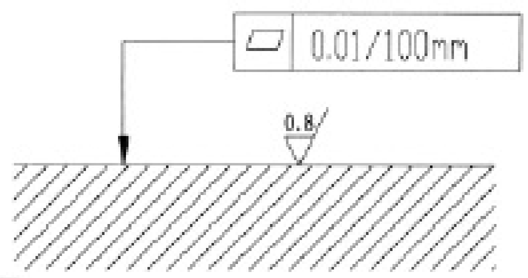


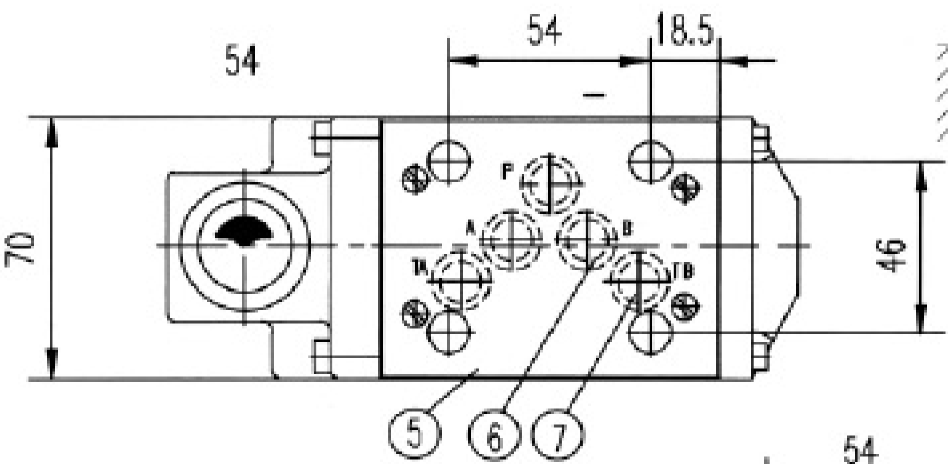
Unit dimensions: (Dimensions in mm)

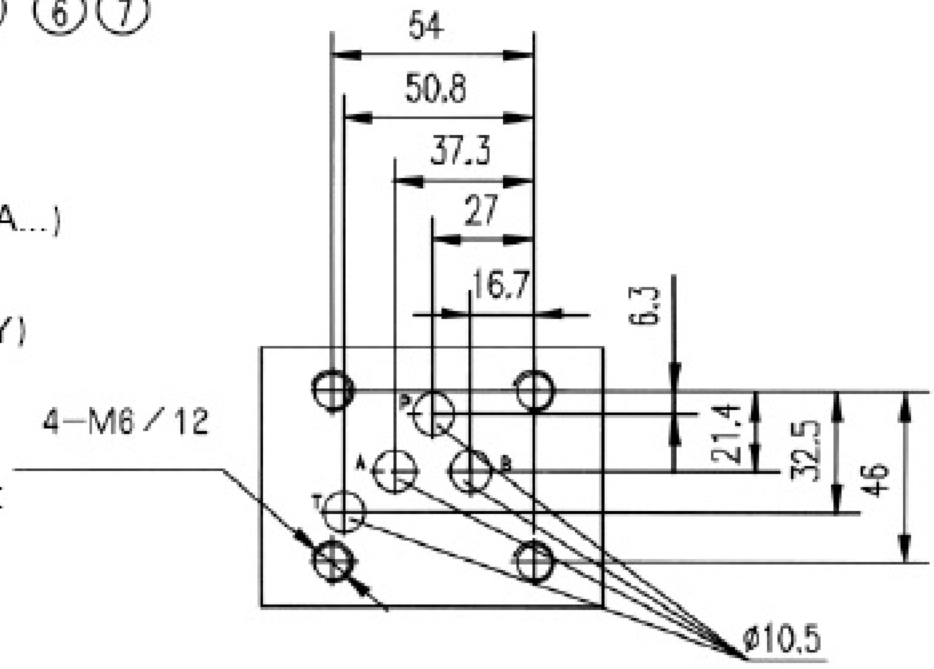
Type WMM10



Required surface finish of mating piece







1、2-position valve(spool B,Y,EB...)
2、2-position valve(spool A、C、D、EA...)
3、3-position valve
4、2-position valve cover(spool B and Y)
5、Nameplate
6、O-Ring（12X2）
7、Additional port T(TB), could connect with pressure reducing valve type ZDR10D...

Subplate:see page 206

G66/01（G3/8"）; G66/02（M18X1.5）
G67/01（G1/2"）; G67/02（M22X1.5）
G534/01（G3/4"）; G534/02（M27X2）

Features:

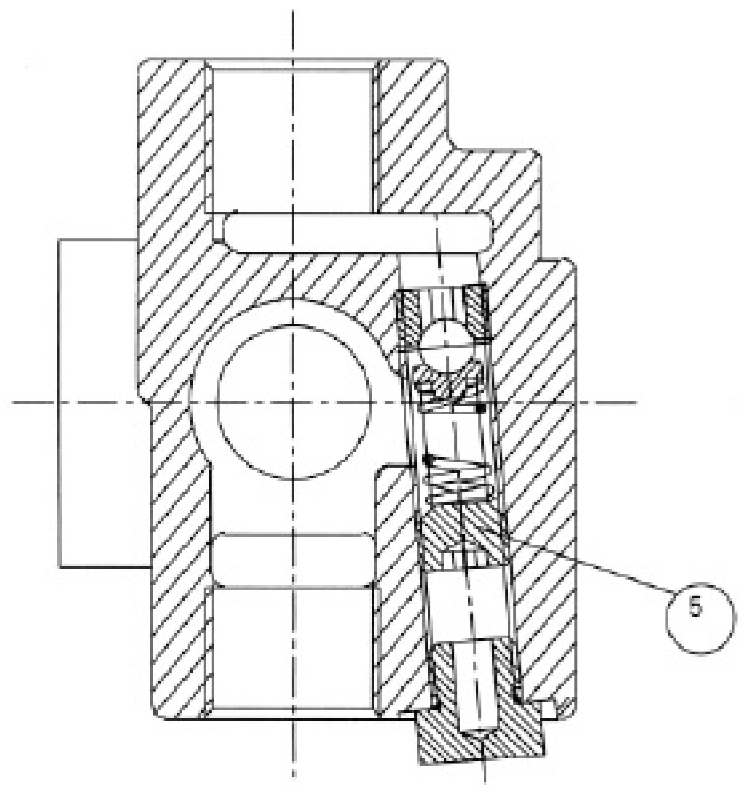
- Direct actuated directional spool valve with hand lever
- With spring return or detent, optional
- Pipe installation

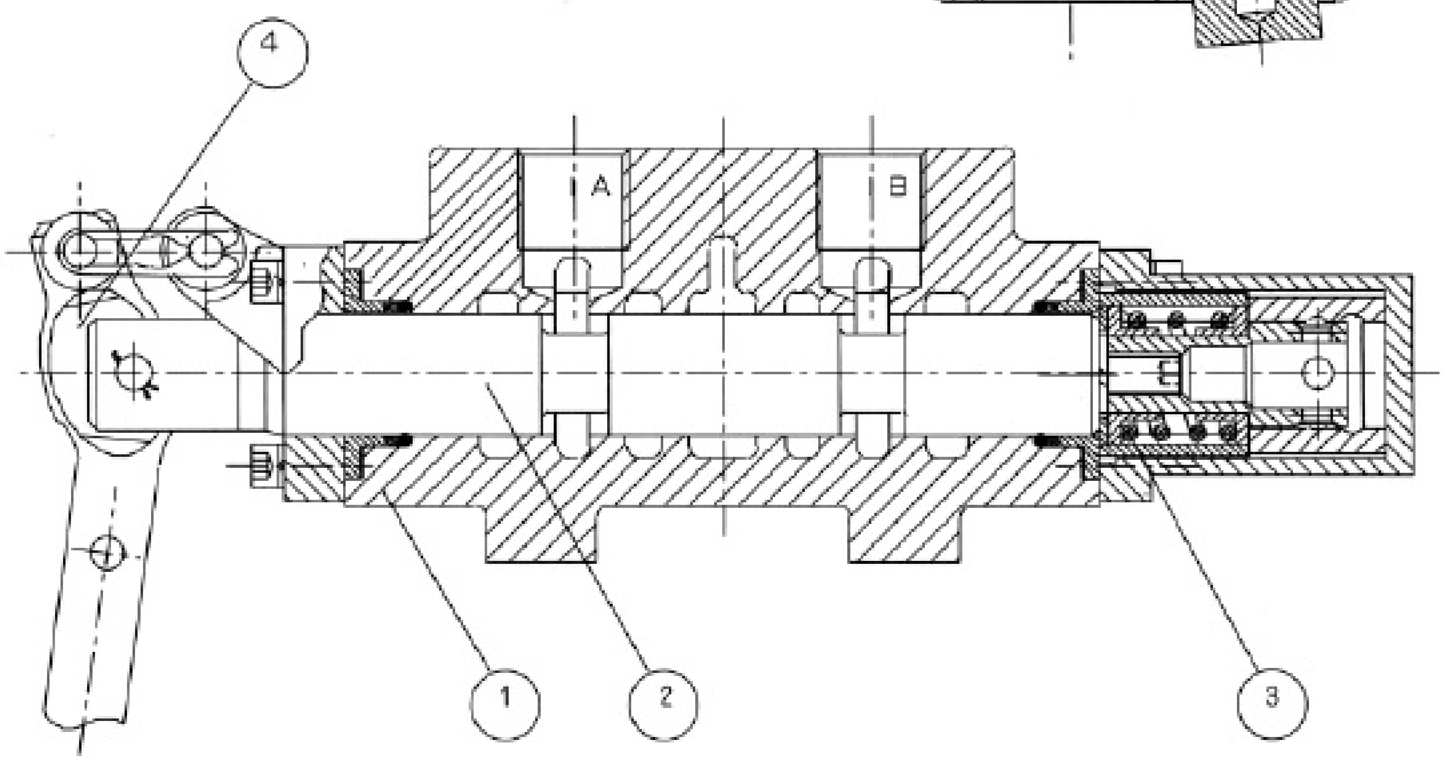
Function, section

The type B-H10 valves are hand lever actuated directional spool valves.

They control the start, stop and direction of a flow.

The directional valves basically comprise of a housing (1), hand lever(4), control spool (2), as well as one return springs (3).In the unoperated condition the control spool (2) is held in the neutral or its initial position by the return springs (3). The control spool(2) is actuated via the hand lever (4), this acts via a joint and the pin directly onto the control spool (2). The spool is thereby moved out of its rest position into its required switched position.After the hand lever (4) has been returned to the switched position zero, the spool (2) is returned to the neutral position via the return springs (3).





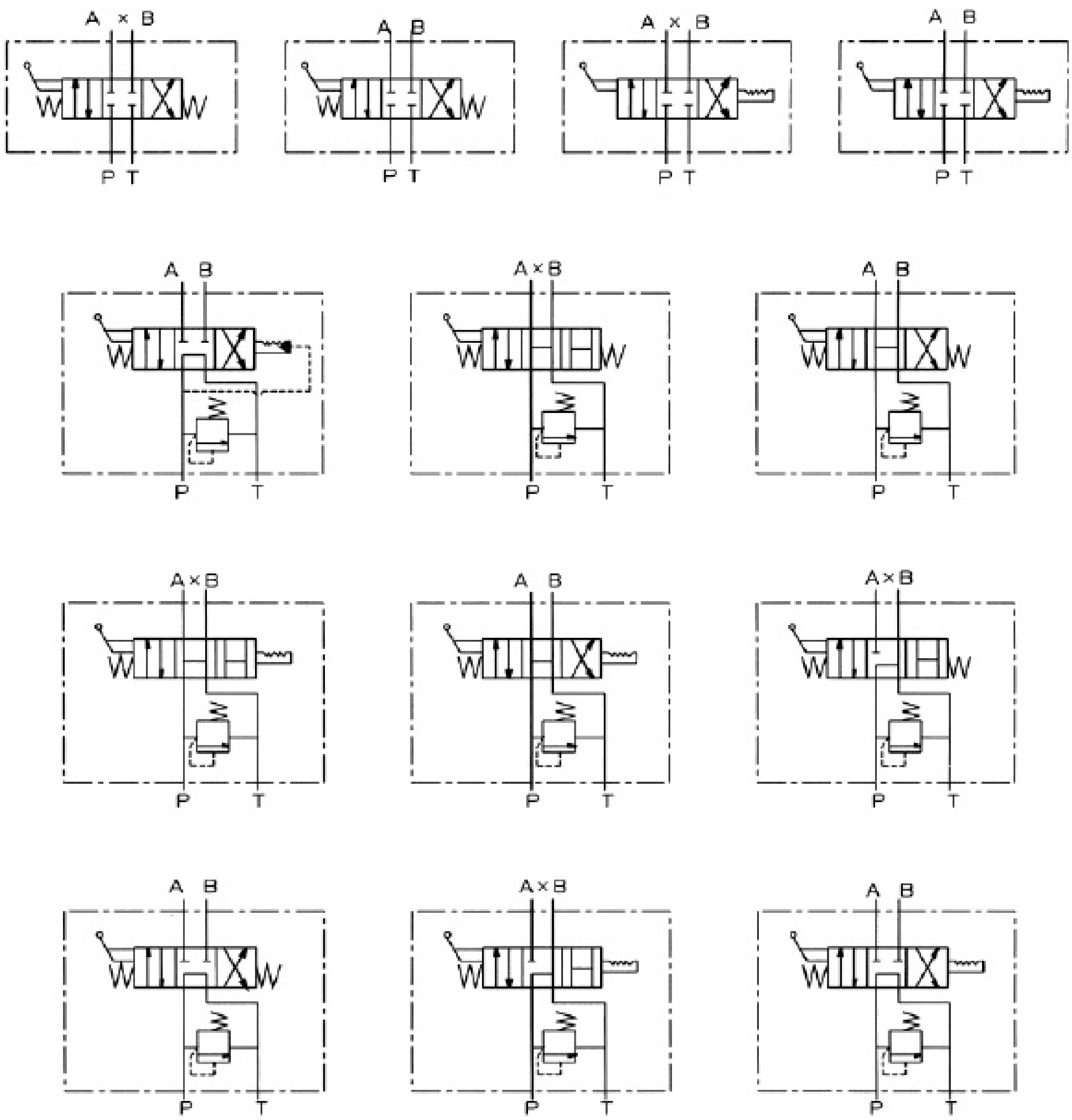
Ordering details

B–H10 – | B | *

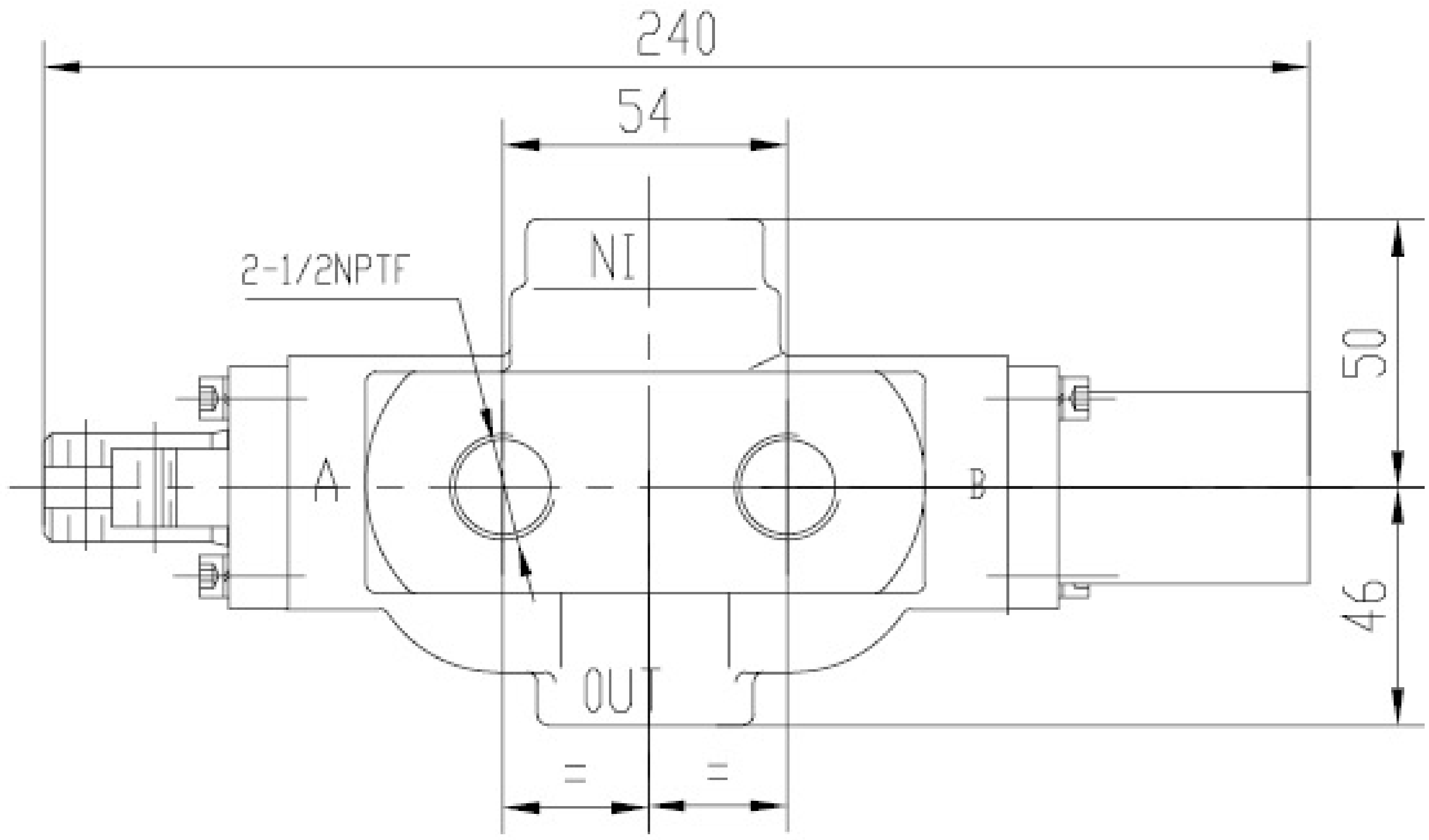
Manual operaion direction valve

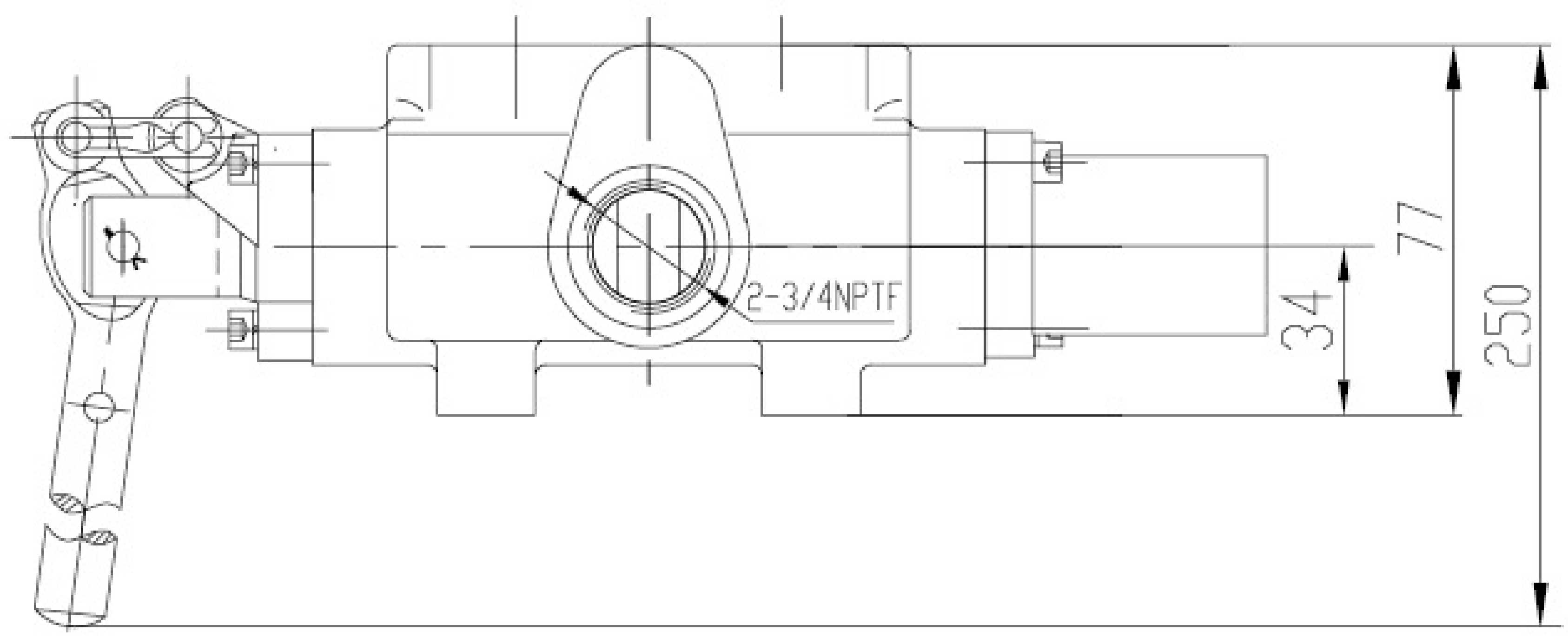
Further details in clear text

B= The technology of Beijing Huade Hydraulic



Unit dimensions **(Dimensions in mm)**





Notice

1. The fluid must be filtered. Minimum filter fineness is 20 µm.
2. The tank must be sealing up and an air filter must be installed on air entrance.
3. Products without subplate when leaving factory, if need them, please ordering specially.
4. Valve fixing screws must be high intensity level (class 10.9). Please select and use them according to the parameter listed in the sample book.
5. Roughness of surface linked with the valve is required to $\sqrt{0.8}$.
6. Surface finish of mating piece is required to 0.01/100mm.

BEIJING HUADE HYDRAULIC INDUSTRIAL GROUP CO.,LTD.	**Directional control valves mechanical operation Type 4WMU/R**			RE 22275/12.2004
	Size 6 、 10	up to 31.5 MPa	up to 120L/min	Replaces：RE 22275/05.2001

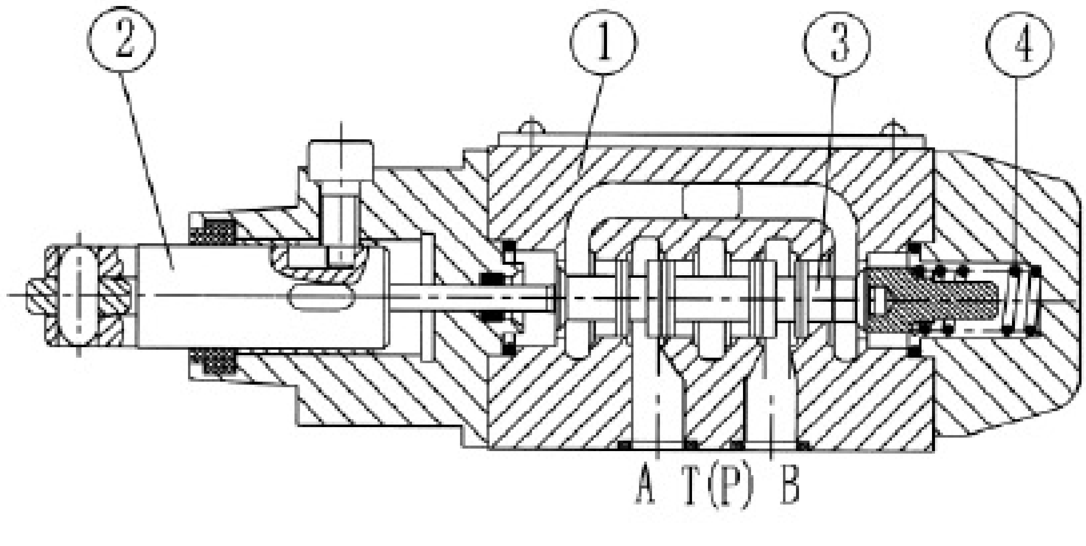
Features:

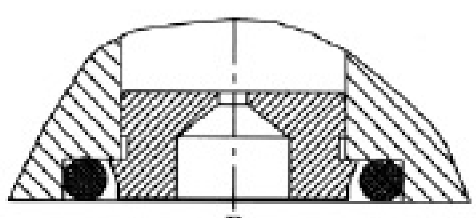
- Direct operated directional spool valve with adjustable roller operation
- Roller lever assembly may be stepped in 90°
- Radial forces absorb reliably (up to 30°)
- 19 kinds standard spool function

Funtion,section

Directional valves type WMR are roller operated directional valves.
They basically consist of the housing（1）, the roller lever（2）, the control spool（3）and the return spring（4）.
A plug-in throttle is required if flow greater than the permitted value may occur while the valve spool is being from one position to another.The plug-in orifice is fitted in the P port of the directional valve.

Type 4WMR6





Cartridge throttle

Ordering details

	WM					B	/		*

Further details in clear text

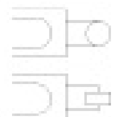
No code = mineral oils
V = phosphate ester

No code = Without throttle insert
B08 = Throttle Φ 0.8 mm
B10 = Throttle Φ 1.0 mm
B12 = Throttle Φ 1.2 mm

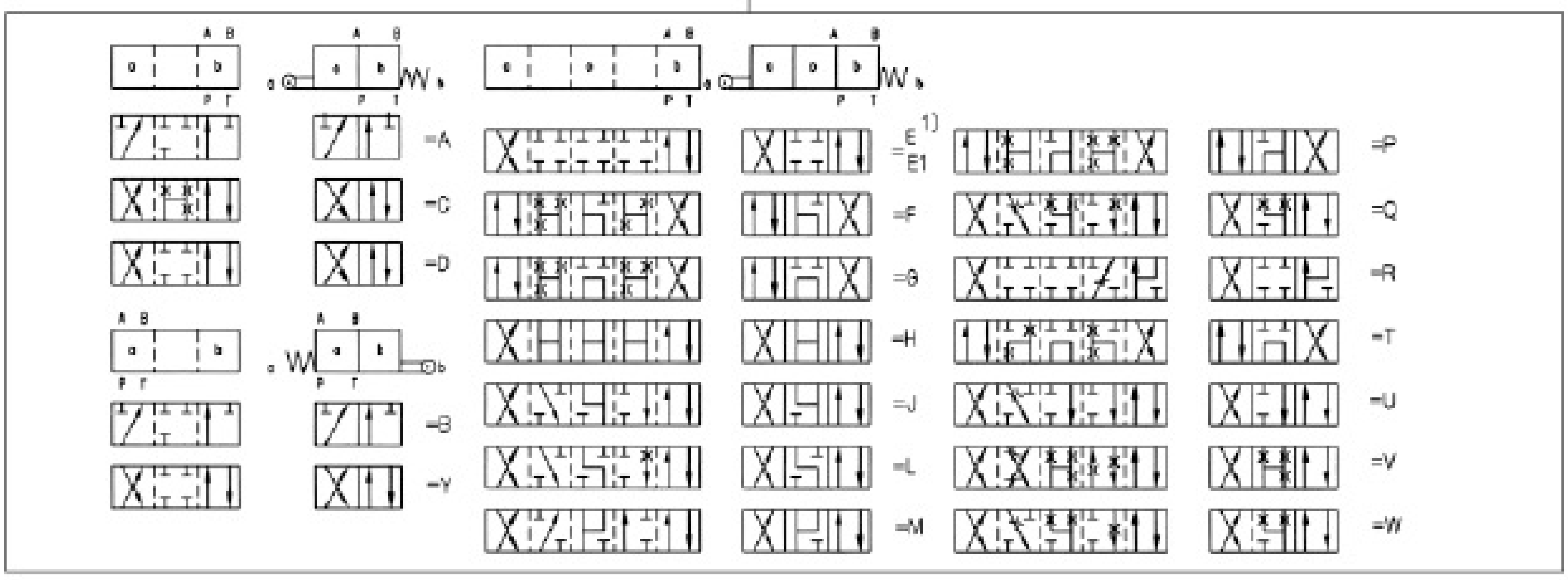
B = The technology of Beijing Huade Hydraulic

50 = Series 50 to 59
(50 to 59: unchanged installation and connection dimensions)
(for size 6)
30 = Series 30 to 39
(30 to 39: unchanged installation and connection dimensions)
* (for size10)

3 service ports = 3
4 service ports = 4


= U
= R

Size 6 = 6
Size 10 = 10



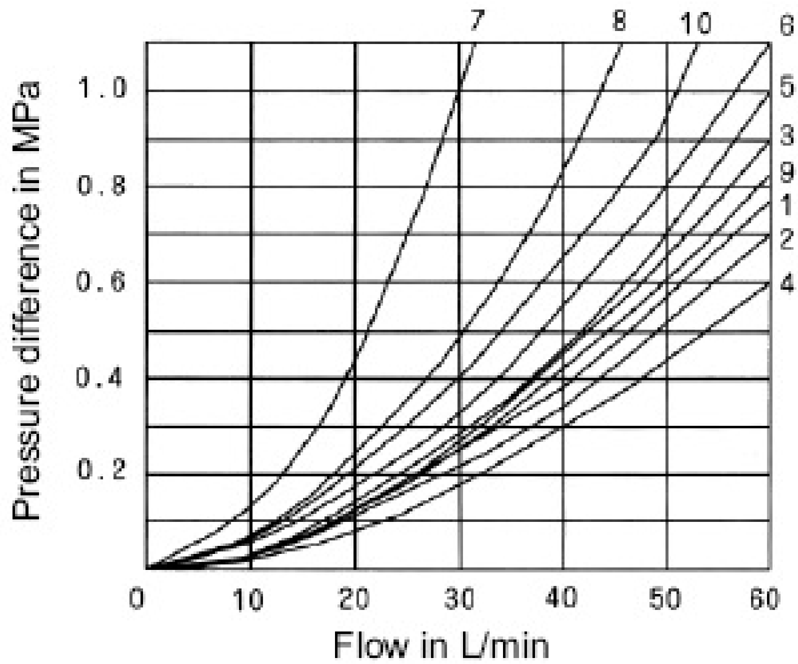
1)Symbol E1:P to A and B with pre-opening
Warning:please consider pressure intensification with single rod cylinders

Technical data

Size		6		10	
Operating ports A、B、P (MPa)		up to 31.5			
Pressure port T (MPa)		up to 6		up to16	
In symbols A and B,the T port must be used as a drain connection if the operating pressure is above the pressure permitted at the T port					
Max.flow (L/min)		up to 60		up to120	
Flow cross section (control position 0)		for symbol Q, 6% of nominal cross section			
		for symbol W, 3% of nominal cross section			
Pressure fluid		Mineral oils(for NBR seal) or phosphate ester(for FPM seal)			
Pressure fluid temperature range (° C)		- 30 to + 80			
Viscosity range (mm²/s)		2.8 to 500			
Weight (kg)		approx.1.4		approx.3.3	
Operating force at roller lever	at zero tank pressure	100 to 121	two positions valve	70 to140	
(N)	at a pressure	184 to 205	three positions valve	70 to175	

Characteristic curves (measured at ν = 41 mm^2/s and t = 50 ℃)

$WM^{R}_{U}6$

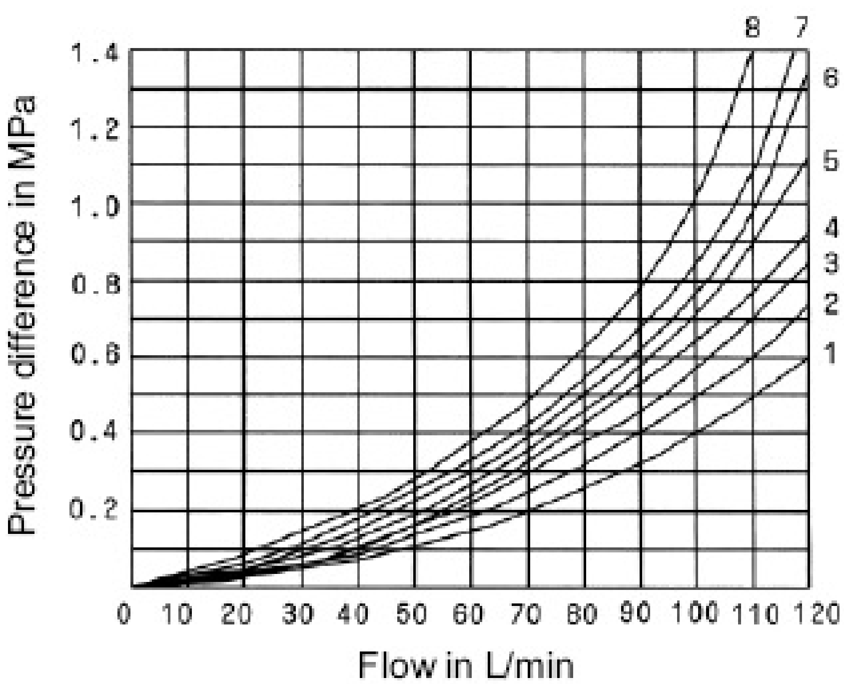


Symbols	Direction of flow			
	P→A	P→B	A→T	B→T
A	3	3	-	-
B	3	3	-	-
C	1	1	3	1
D	5	5	3	3
E	3	3	1	1
F	1	3	1	1
G	6	6	9	9
H	2	4	2	2
J	1	1	2	1
L	3	3	4	9
M	2	4	3	3
P	3	1	1	1
Q	1	1	2	1
R	5	5	4	-
T	10	10	9	9
U	3	3	9	4
V	1	2	1	1
W	1	1	2	2
Y	5	5	2	3

7、Symbol "R" with position A-B

8、Symbols "G" and "T" with mid position P-T

$WM^{R}_{U}10$



Symbols	Direction of flow			
	P→A	P→B	A→T	B→T
A	4	3	-	-
B	3	4	-	-
C	3	3	4	4
D	3	3	5	5
Y	4	4	6	6
E	2	2	4	4
F	1	2	3	4
G、T	4	4	7	7
H	1	1	5	5
J	2	2	3	3
L	3	3	2	4
M	1	1	4	4
P	3	1	5	5
Q	2	2	2	2
R	3	4	3	-
U	3	3	5	2
V	2	2	3	3
W	3	3	3	3

7、Symbol "R" with position A-B

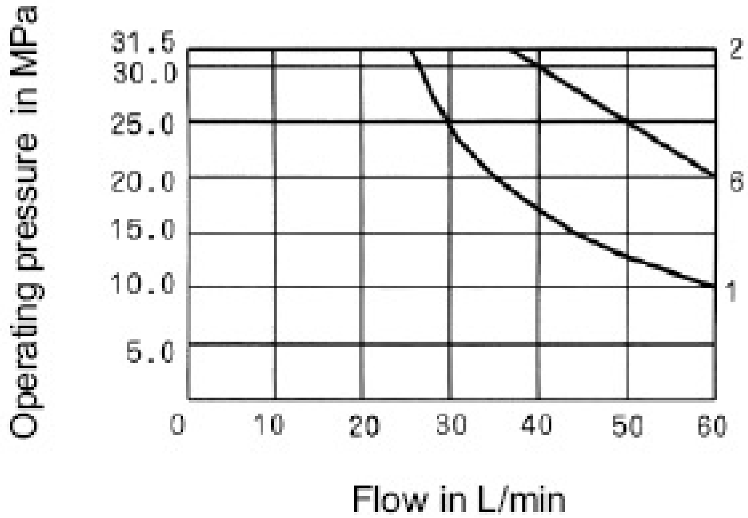
8、Symbols "G" and "T" with mid position P-T

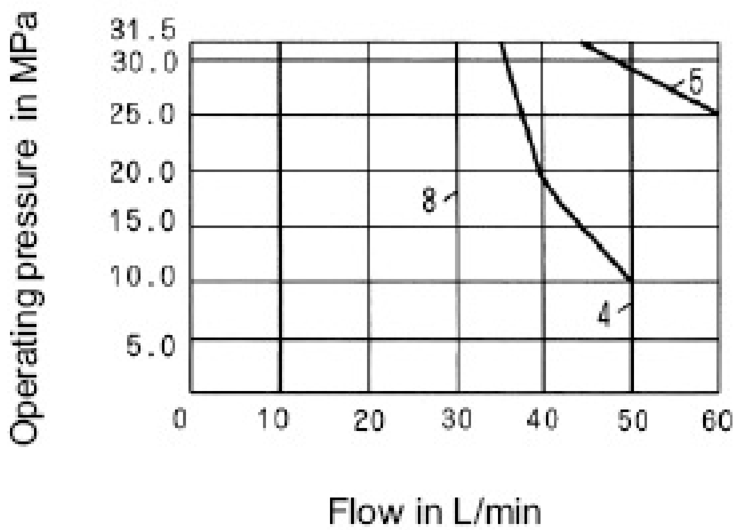
Performance limits (measured at v=41mm^2 /s and t=50 ˚c)

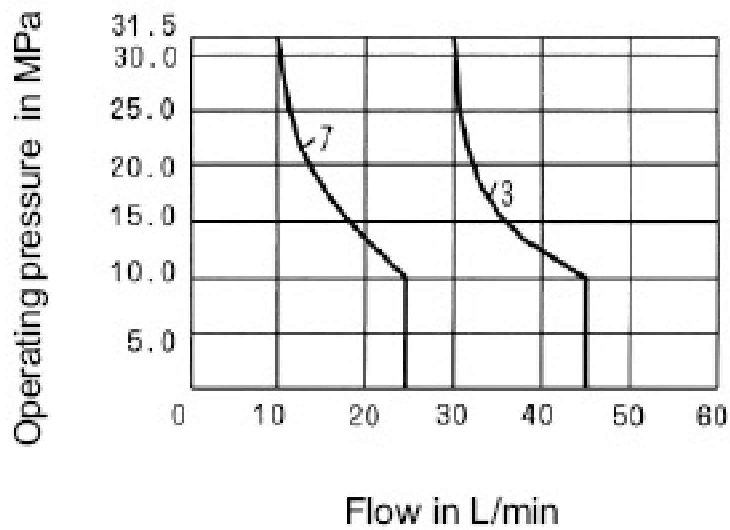
The operation of the valve is dependent upon the effect of filtration .In order to achieve the given permissible flow rates,full flow filtration 20μm is required.The flow forces operating within the valve influence the valve performance .For 4 way valves,the flows given are valid for normal operation with 2 directions of flow (e.g.from P to A and from B to T) If only one flow path is operative e.g.if port A or B is blocked and the valve is used as a 3 way valve ,the permissible flows can be very much lower.

WM $\genfrac{}{}{0pt}{}{R}{U}$ 6

Curve	symbol
1	A、B
2	C、D、Y、E、E1、H、M、Q、U、W
3	F、P
4	G
5	J、L
6	R
7	T
8	V

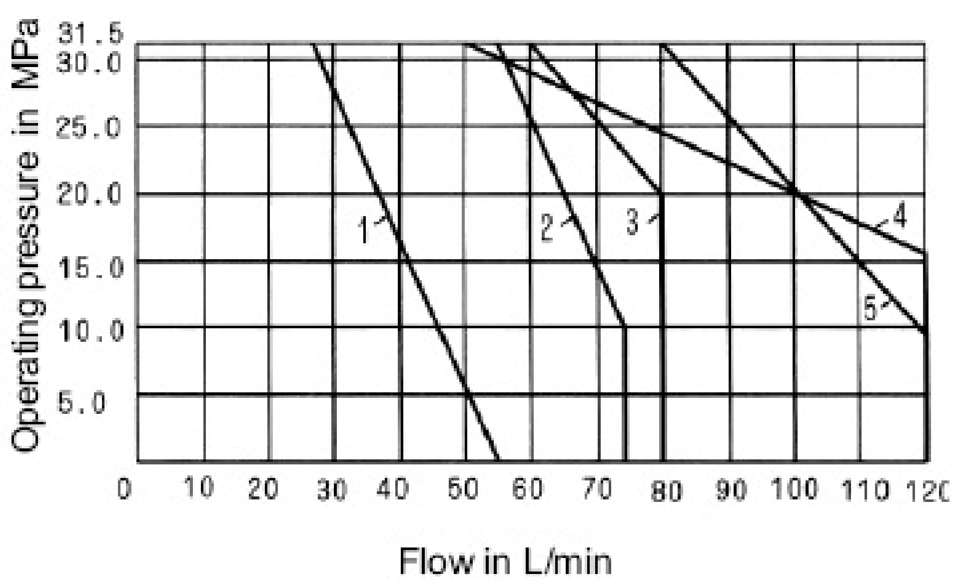




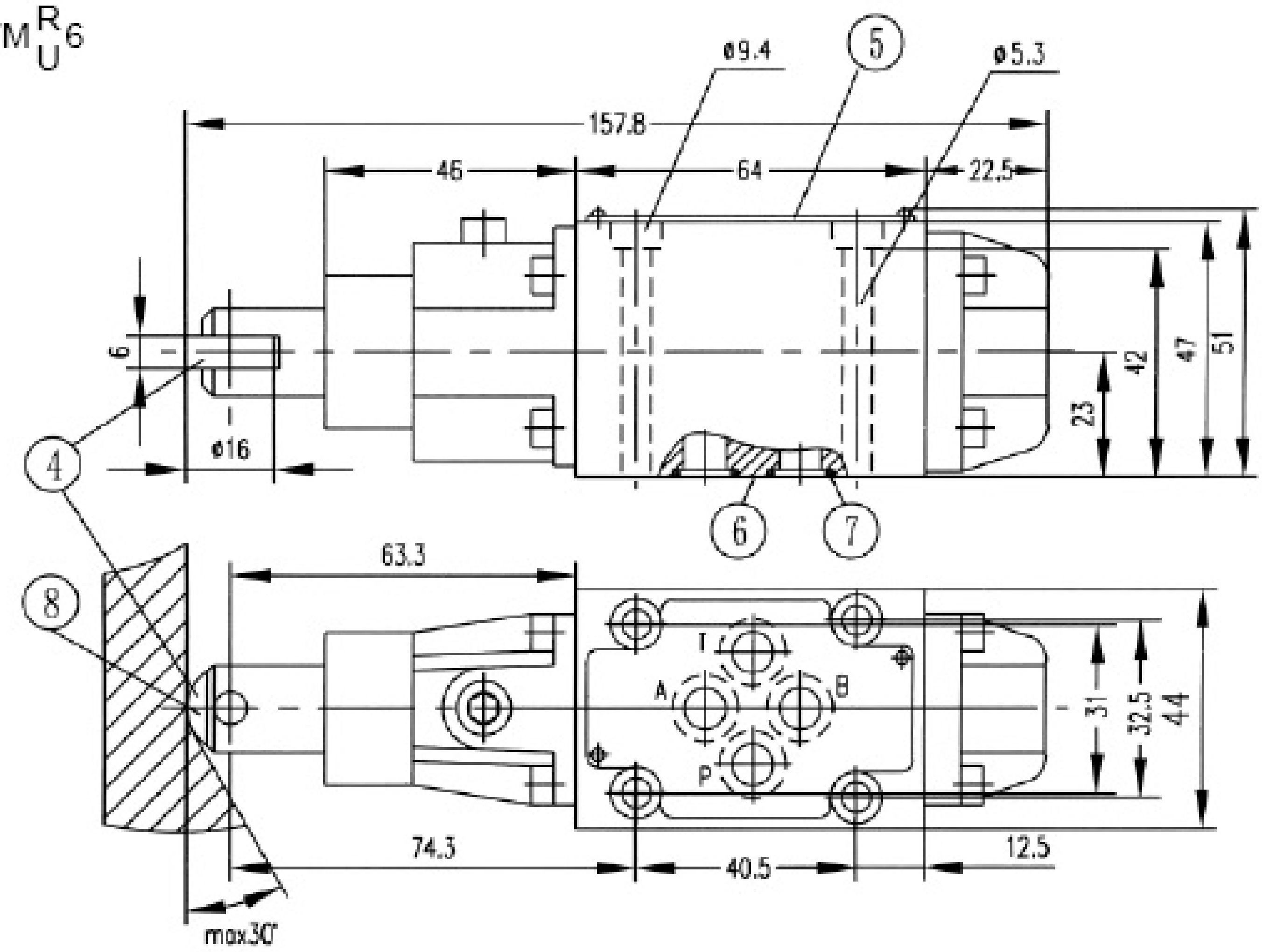


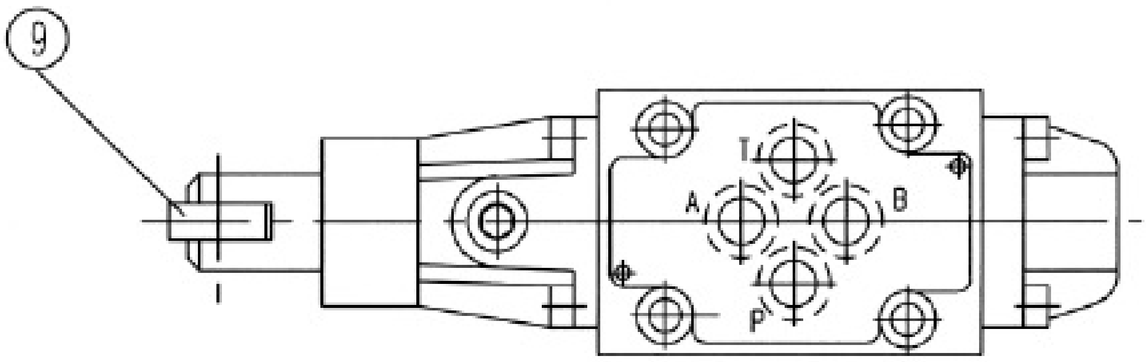
WM $\genfrac{}{}{0pt}{}{R}{U}$ 10

Curve	Symbol
1	A、B
2	H
3	F、G、P、R、T
4	J、L、Q、U、W
5	C、D、E、M、V、Y

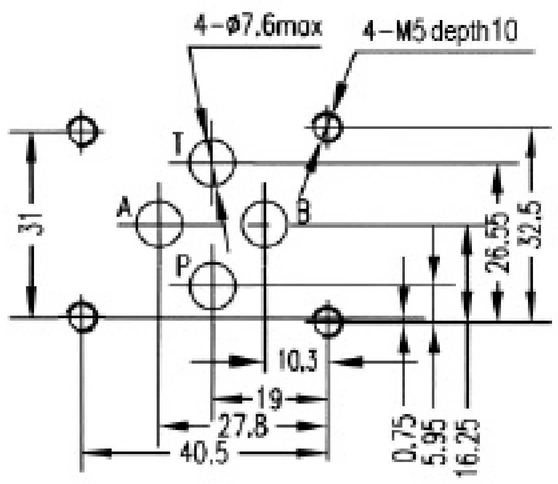


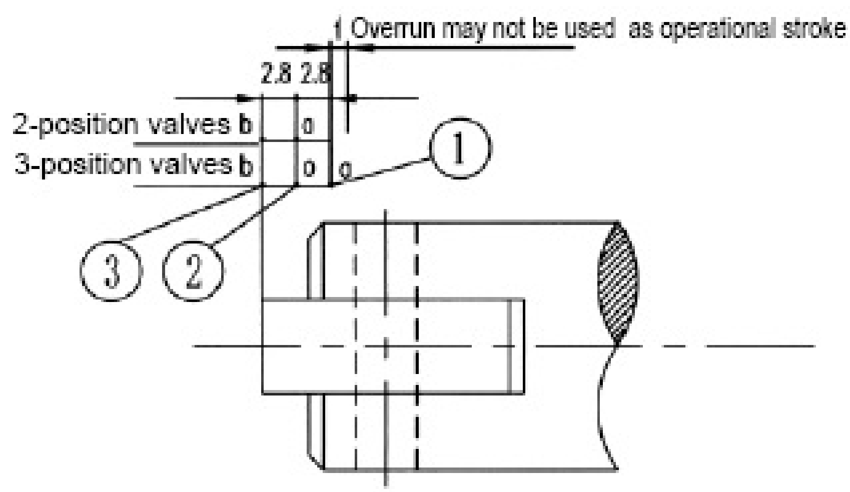
WM$^{R}_{U}$6





Rorler lever assemblied next to B end in 2-position valves of spools B.Y





Subplates: see page 205

G341/01 (G1/4"); G341/02 (M14X1.5)

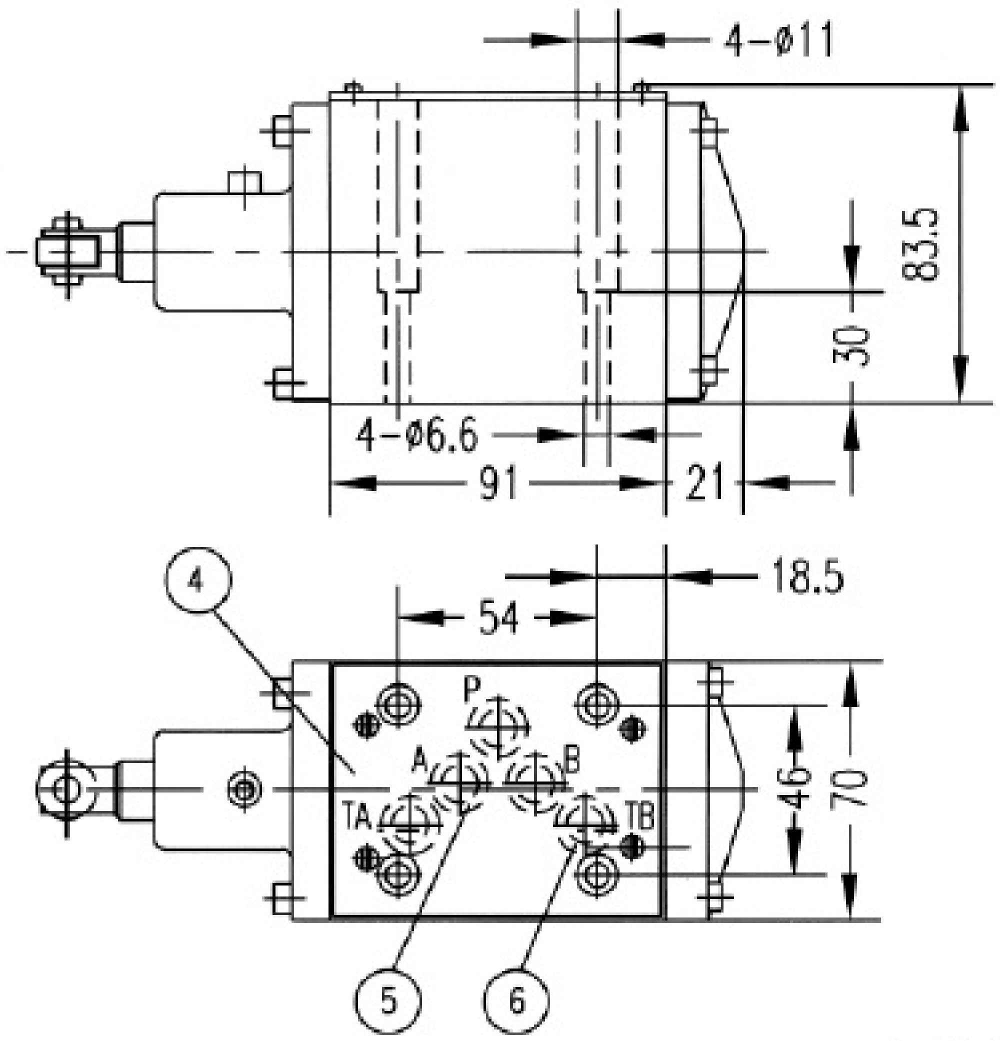
G342/01 (G3/8"); G342/02 (M18X1.5)

G502/01 (G1/2"); G502/02 (M22X1.5)

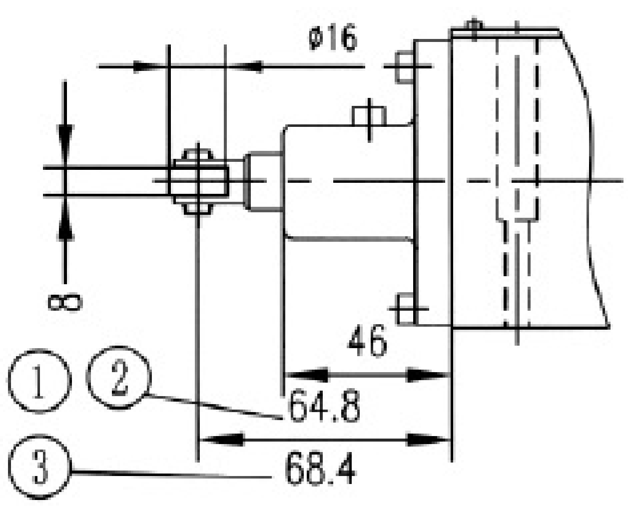
1、Spool position"a"
2、Spool position"o"and"a" (for 2- position valve)
3、Spool position"b"
4、Roller lever assembly may be stepped in 90°
5、Nameplate
6、Connection surface
7、O-ring9.25X1.78 (for ports A、B、P、and T)
8、WMR, the code"R"
9、WMU, the code"U"

Unit dimensions (Dimensions in mm)

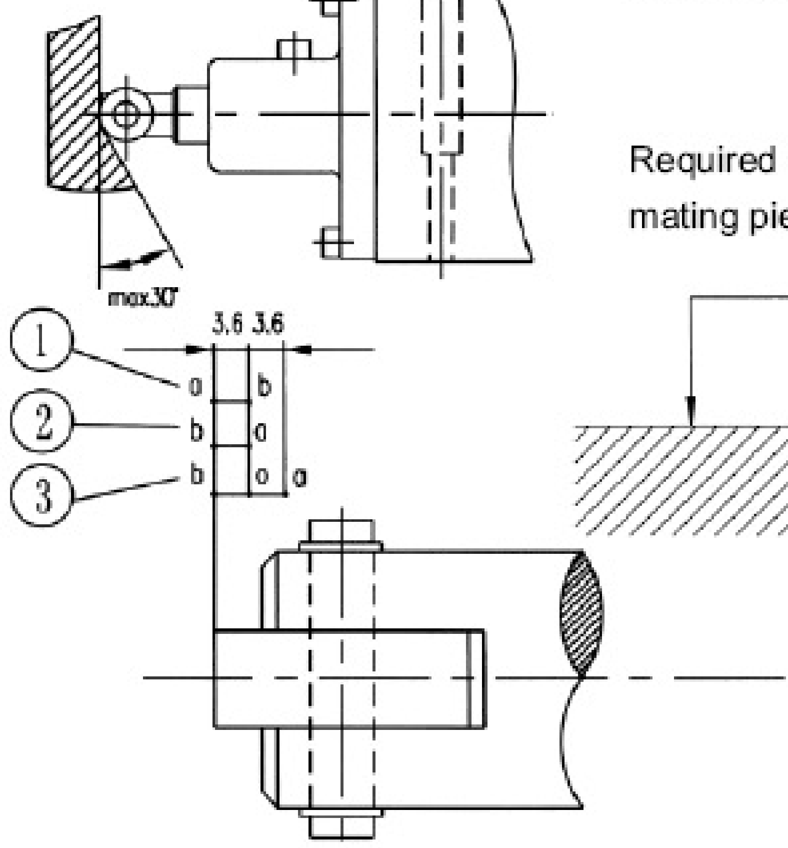
WM $^{R}_{U}$10



WMR

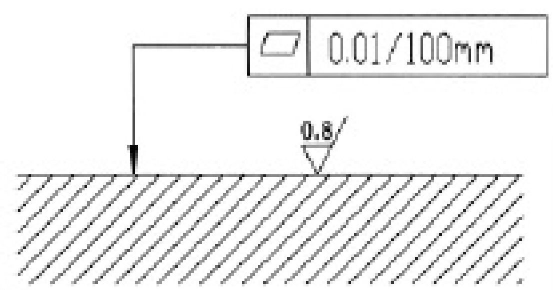


WMU



Rorler lever assemblied next to B end in 2-position valves of spools B.Y

Required surface finish of mating piece



Subplates: see page 206
G66/01（G3/8"）; G66/02（M18X1.5）
G67/01（G1/2"）; G67/02（M22X1.5）
G534/01（G3/4"）; G534/02（M27X2）

1、Two position valve（B、Y）
2、Two position valve（A、C、D）
3、Three position valve
4、Nameplate
5、O-ring12X2（for ports A、B、P、and T）
6、Adjunctive port T can be connected with ZDR10D... in special condition

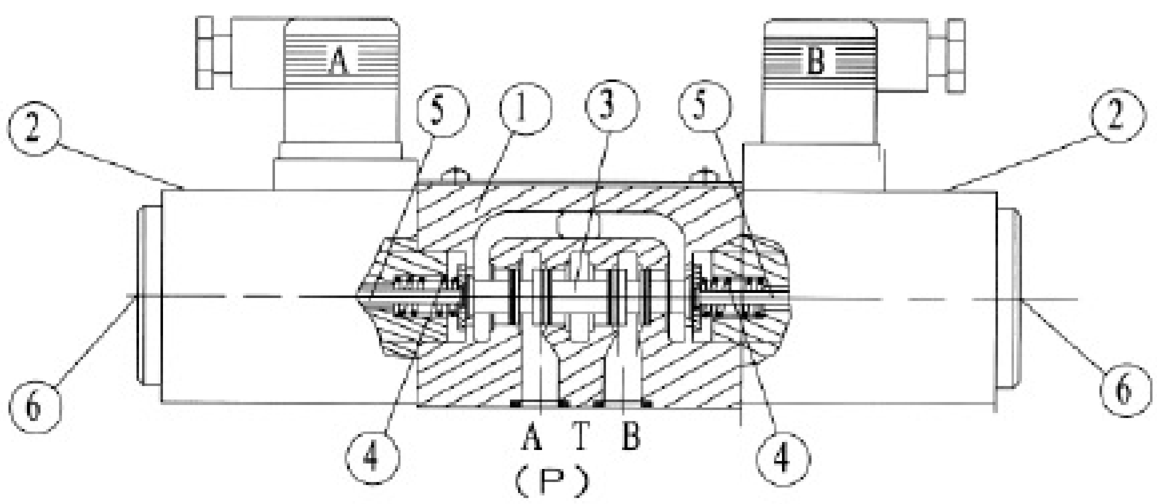
BEIJING HUADE HYDRAULIC INDUSTRIAL GROUP CO.,LTD.	**Directional control valves, electrically operated Type WE 4**			RE23140/12.2004
	size 4	up to 21 MPa	up to 25 L/min	Replaces： RE23140/05.2001

Features:

- Directional valves of type WE4 are solenoid operated directional spool valves
- Wet pin solenoids of direct or alternating current
- Porting pattern to ISO 4401 and CETOP-RP 121H

Function,section

Type 4WE4E 10B/



Directional valves of type WE4 are solenoid operated directional spool valves. They control the start, stop and direction of a fluid flow.
These directional valves basically consist of the housing (1), one or two solenoids (2), the control spool (3), and one or two return springs(4).
The control spool (3) is held by the return spring (4) in the central or in the initial position (except for detented spools).The control spool (3) is actuated via wet pin solenoids (2). In the energized condition.The force of the solenoid (2) acts via the plunger (5) on the control spool (3) and shifts the same from its rest position to the desired end position.Thus, the required flow pattern from P to A and B to T or P to B and A to T is selected. When the solenoid (2) is de-energized, the control spool (3) is returned to its neutral position by the return spring (4).A covered manual override is provided so that the control spool (3)can be operated without energizing the solenoid.

A

Type 4WE4 C 10B/O...
D

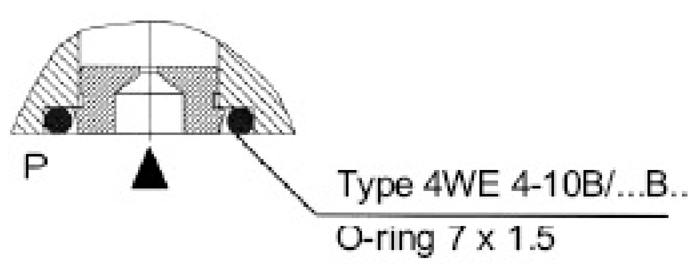
This version is a directional valve with 2 switching positions and 2 solenoids without detent and springs. There is no defined switching position in the de-energized condition.

A
Type 4WE4 C 10B/OF...
D

This version is a directional valve with 2 switching position,2 solenoids and a detent.Thus, the relevant switching positions are fixed and continuous energization of the solenoid is not necessary

Throttle inserts

The use of throttle inserts is only required, if, due to the operating conditions,flows are to be expected,which are higher than the stated maximum performance limits of the valve.
It is inserted in the P channel of the directional valve.



Ordering details

	WE	4		10	B /		A						*

3 service ports = 3
4 service ports = 4

Nominal size 4 = 4

Symbols see below

Series 10 to 19 = 10
(10 to 19 unchanged installation and connection dimentions)

The technology of Beijing Huade Hydraulic = B

Spring return = No code
Without spring return = O
Without spring return with detent = OF

Standard solenoid = A

12 V DC =12
220 V AC 50 Hz = W220-50
24 V DC =G24
DC solenoid commuting automatically =W110/220R

N9= With covered hand override
No = Without covered hand override

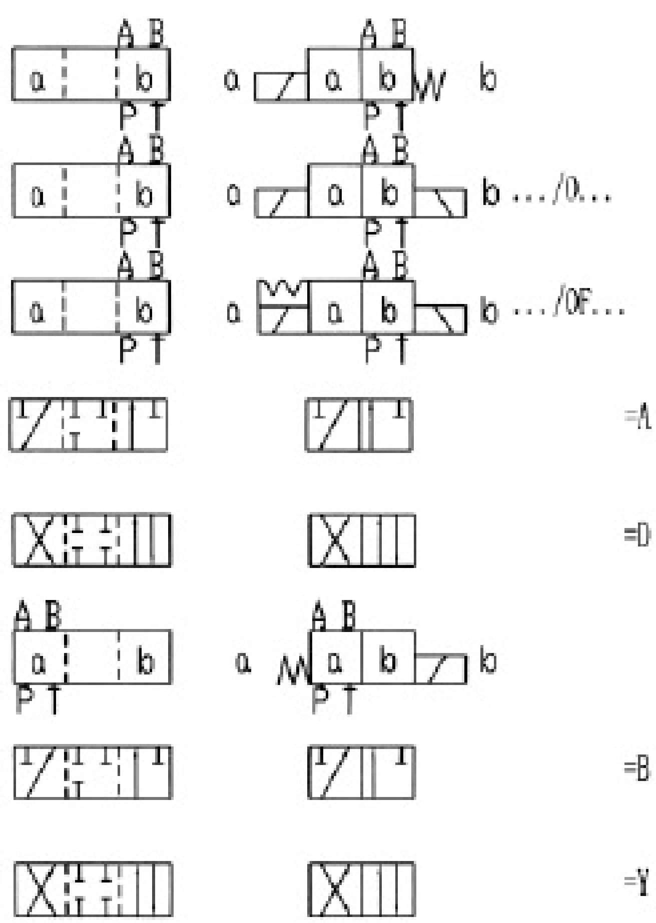
Z4 = normal plug
Z5 = Large angled plug
Z5L= Large angled plug with indicator light

No code = without cartridge throttle
B08 = throttle Φ 0.8 mm
B10 = throttle Φ 1.0 mm
B12 = throttle Φ 1.2 mm

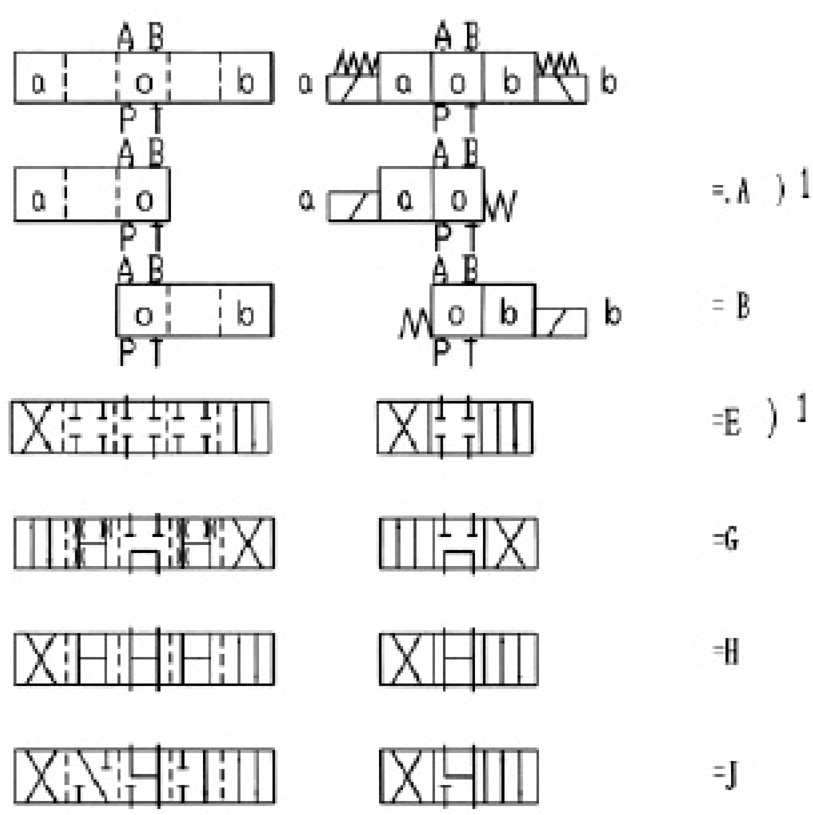
No code = mineral oils
V = phosphate ester

Further details in clear text

Symbols



1) Example: Spool E with switching position "a" ordering details..EA

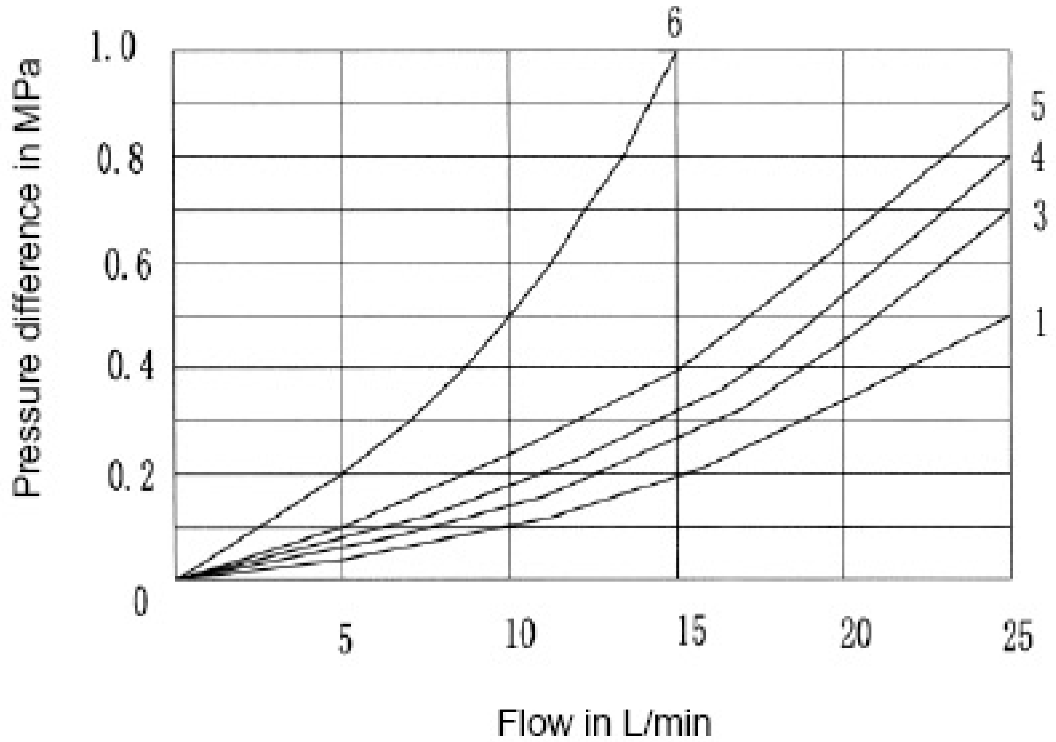


Technical data

Hydraulic technical data			
Max. operating pressure - Ports A, B, P		(MPa)	up to21.0
- Port T		(MPa)	10.0 ,With symbols A or B port T must be used as leakage port when the operating pressure is above the permissible tank pressure
Max. flow		(L/min)	up to 25
Pressure fluid			Mineral oil phospate ester
Viscosity range		(mm^2/s)	2.8 to 500
Pressure fluid temperature range		(℃)	- 30 to + 80
Degree of contamination		(um)	Maximum permissible degree of contamination of the hydraulic fluid to NAS 1638 class 9. We therefore recommend a filter with a minimum retention rate of $\beta 10 \geq 75$.
Weight		(Kg)	- Valve with 1 solenoid 0.9 - Valve with 2 solenoids 1.3
Electrical technical data			
Available voltages		(V)	12、24、220、110R、220R
Power consumption		(W)	22
Duty			continuous
Switching time	ON	(ms)	20 to 30
	OFF	(ms)	10 to 20
Max. ambient temperature		(℃)	+50
Max. coil temperature		(℃)	+150
Protection to DIN 40 050			IP65
Switching frequency		(cycles/h)	15000

With electric connection the protective conductor (PE) must be connected according to the relevant regualtions.

Characteristic curves (measured at ν = 41 mm^2/s and t = 50 ℃)



Symbol	Flow direction				
	P→A	P→B	A→T	B→T	P→T
A	5	5	-	-	-
B	5	5	-	-	-
D,Y	5	5	4	4	-
E	4	4	3	3	-
G	3	3	4	4	6
H	1	1	1	1	-
J	5	5	3	3	-

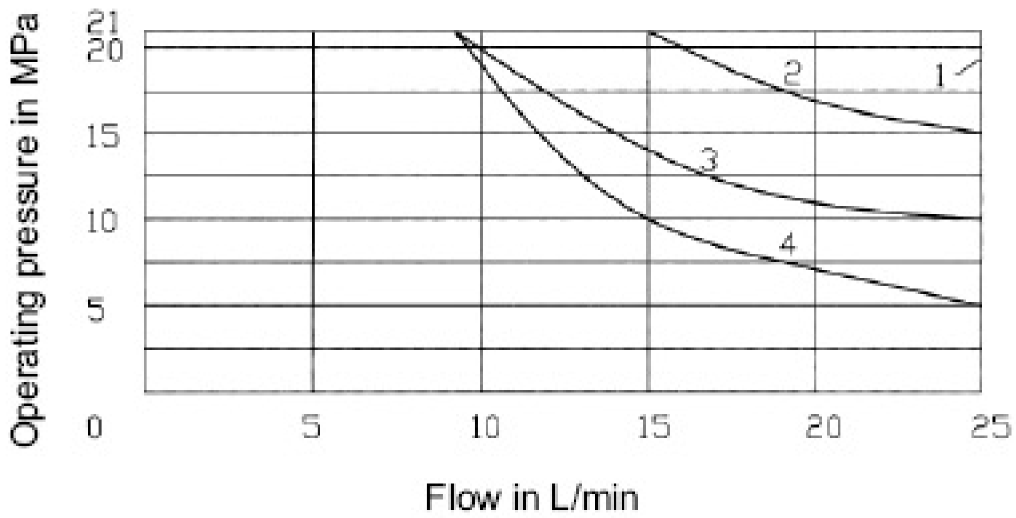
Characteristic curves (measured at ν = 41 mm²/s and t = 50˚C)

Attention!

The given operating limits are valid for the use with two flow directions (e.g. from P to A and simultaneous return flow from B to T).

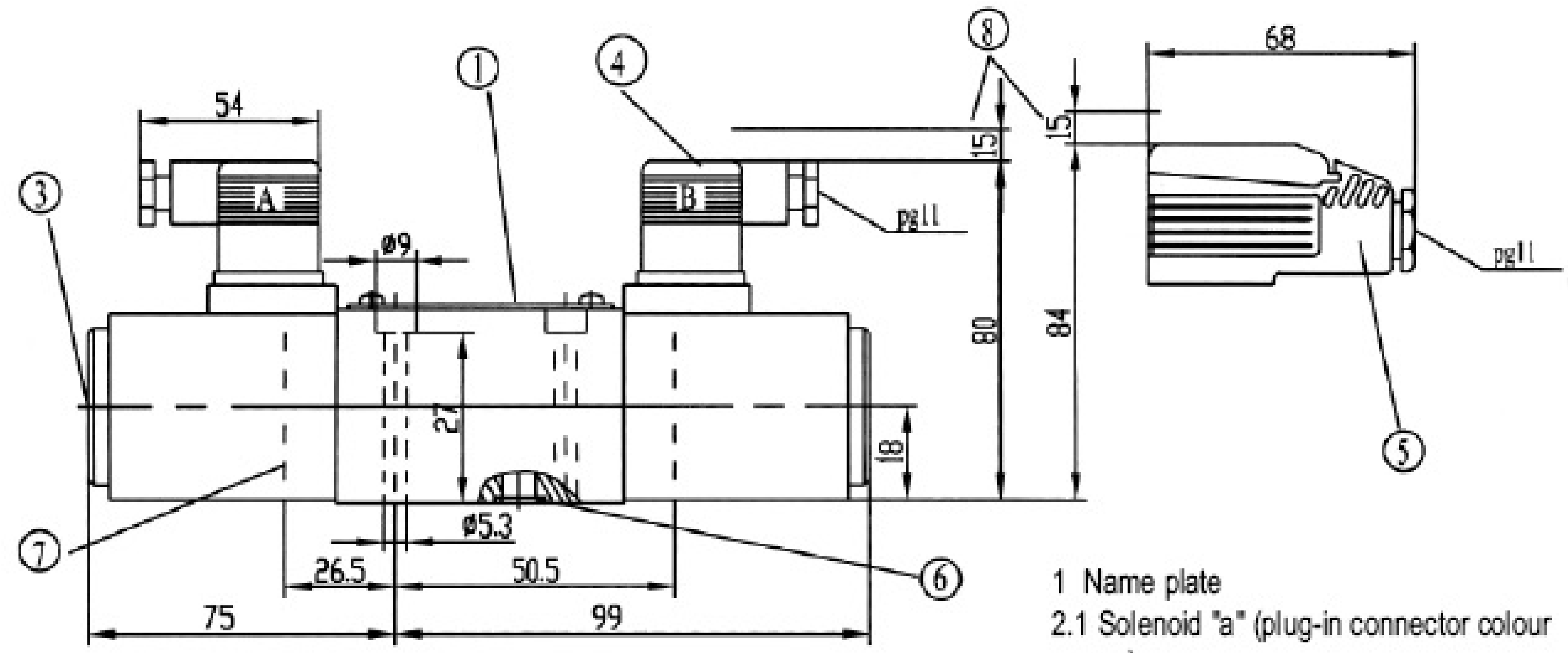
Due to the flow forces active inside the valves the permissible operating limit may be significantly lower if only one flow direction from P to A and closed port B) is used!

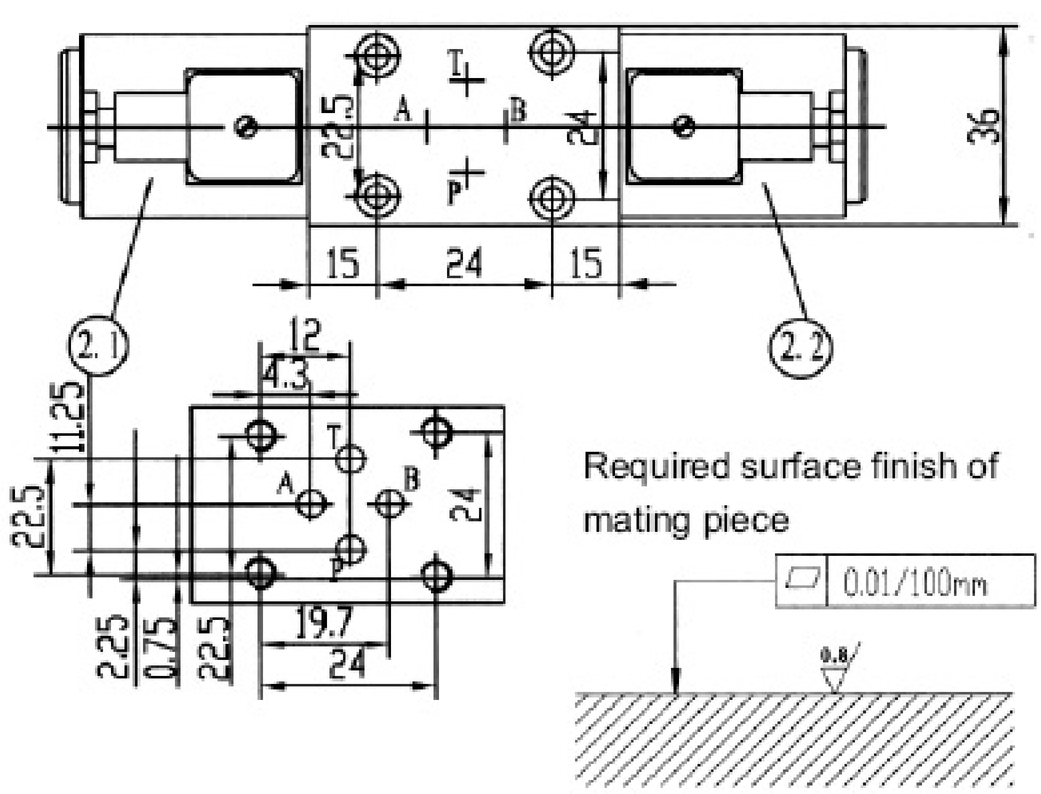
The operating limits were measured with solenoids at operating temperature,10% under voltage and without tank back pressure.



Char. curve	Symbol
1	D,D/O,D/OF,H,Y
2	E,J
3	G
4	A,B

Unit dimensions (Dimensions in mm)



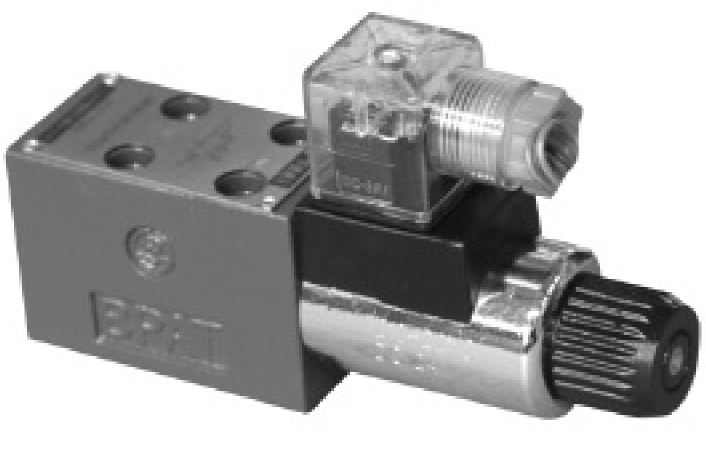


Required surface finish of mating piece

1 Name plate
2.1 Solenoid "a" (plug-in connector colour grey)
2.2 Solenoid "b" (plug-in connector colour black)
3 Hand override "N9"
4 Plug-in connector Z4
5 Plug-in connector Z5, Z5L
6 O-ring 7 x 1.5
7 Cover for valves with one solenoid
9 Space required to remove plug-in connector
Valve fixing screws
M5 x 35 -10.9
(GB/T70.1-2000)
M_A = 6 Nm,
Subplates: see page 212
G647/01
G647/02

BEIJING HUADE HYDRAULIC INDUSTRIAL GROUP CO.,LTD.	**Directional control valves, electrically operated Type WE 5**			RE 23166/12.2004
	Size5	up to 25 MPa	up to14L/min	Replaces：RE23166/05.2001

Features:
- Direct solenoid actuated directional spool valve
- Wet pin DC or AC solenoids



Function, section

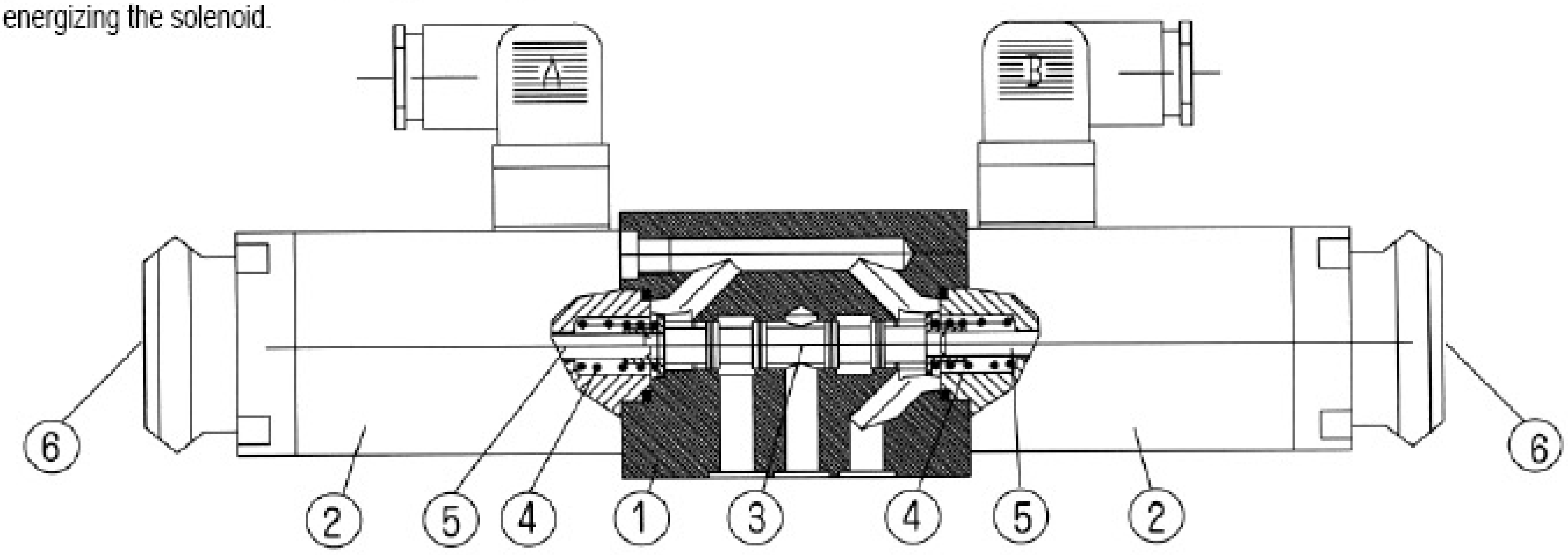
Directional valves of type WE5 are solenoid operated directional spool valves. They control the start, stop and direction of a fluid flow.
These directional valves basically consist of the housing (1), one or two solenoids (2), the control spool (3), and one or two return springs(4).
The control spool (3) is held by the return spring (4) in the central or in the initial position (except for detented spools).The control spool (3) is actuated via wet pin solenoids (2). In the energized condition.The force of the solenoid (2) acts via the plunger (5) on the control spool (3) and shifts the same from its rest position to the desired end position.Thus, the required flow pattern from P to A and B to T or P to B and A to T is selected. When the solenoid (2) is de-energized, the control spool (3) is returned to its neutral position by the return spring (4).A covered manual override is provided so that the control spool (3)can be operated without energizing the solenoid.

Type 4WE5 N 6.0B/O...

This version is a directional valve with 2 switching positions and 2 solenoids without detent and springs. There is no defined switching position in the de-energized condition.

Type 4WE5 N 6.0B/OF...

This version is a directional valve with 2 switching position,2 solenoids and a detent.Thus, the relevant switching positions are fixed and continuous energization of the solenoid is not necessary



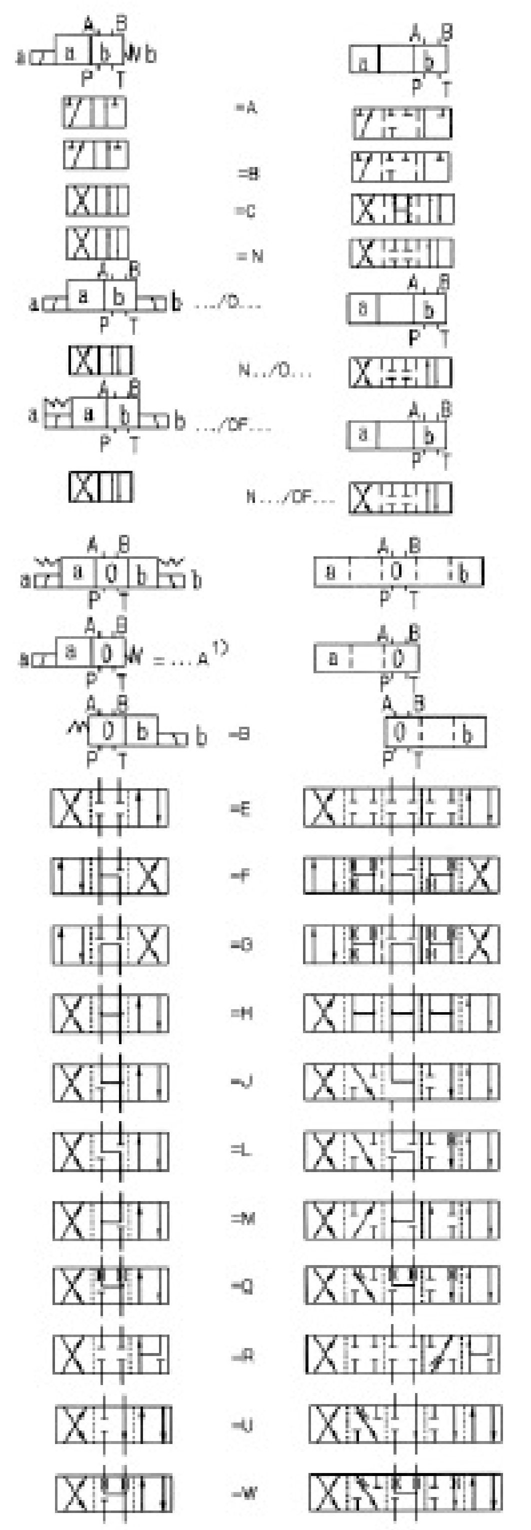
Type WE5

Ordering details

	WE	5		6.0	B /	A					*

3 Service ports = 3
4 Service ports = 4

Nominal size 5 = 5



1) Example: Spool E with switching position "a" ordering details..EA
Spool E with switching position "b" ordering details..EB

Series 6.0 to 6.9 = 6.0
(6.0 to 6.9: unchanged installation and connection dimentions)

B = Technology of Beijing Huade Hydraulic

No= Standard,with spring return
OF= Without spring return, with detent
O = Without spring return

A= wet pin solenoid

W220-50= 220 V AC 50 Hz
G24= 24 V DC
W220R = DC solenoid commuting automatically

N= With manual override
No = Without manual override

Z4 = normal plug
Z5 = large right-Angle plug
Z5L= large right-angle plug with indicator

No code = mineral oils
V = phosphate ester

Further details in cleartext

* With spool types A and B port T must be used as a drain port when operating pressure exceeds 6 MPa

Technical data

Hydraulic			
Hydraulic fluid	mineral oils or phosphate ester		
Fluid temperature range (℃)	-30～+80		
Viscosity range (mm^2/s)	2.8～500		
Operating pressure, max. (MPa)	Port A, B, P	Port T	
	up to 25	up to 6	
Flow area (switching position 0):	With symbol W	With symbol Q	
	approx. 3% of nominal cross section	approx. 6% of nominal cross section	
Weight (kg)	valve	subplate G115/01	subplate G96/01
	approx.1.4	approx.0.7	approx.0.5

Electrical			
AC Voltage (V)		110、220、in 50Hz	
DC Voltage (V)		12、24、110	
Voltage type		AC	DC
Power requirement (W)		26	
Holding power (VA)		-	46
Switch-on power (VA)		-	130
Duty cycle		continue	
Switching time	ON (ms)	40	25
	OFF (ms)	30	20
Environment temperature (℃)			+50
Coil temperature (℃)			+150
Switching frequency cycles (cycles /h)		15000	7200
Type of protection to DIN 40 050		IP65	

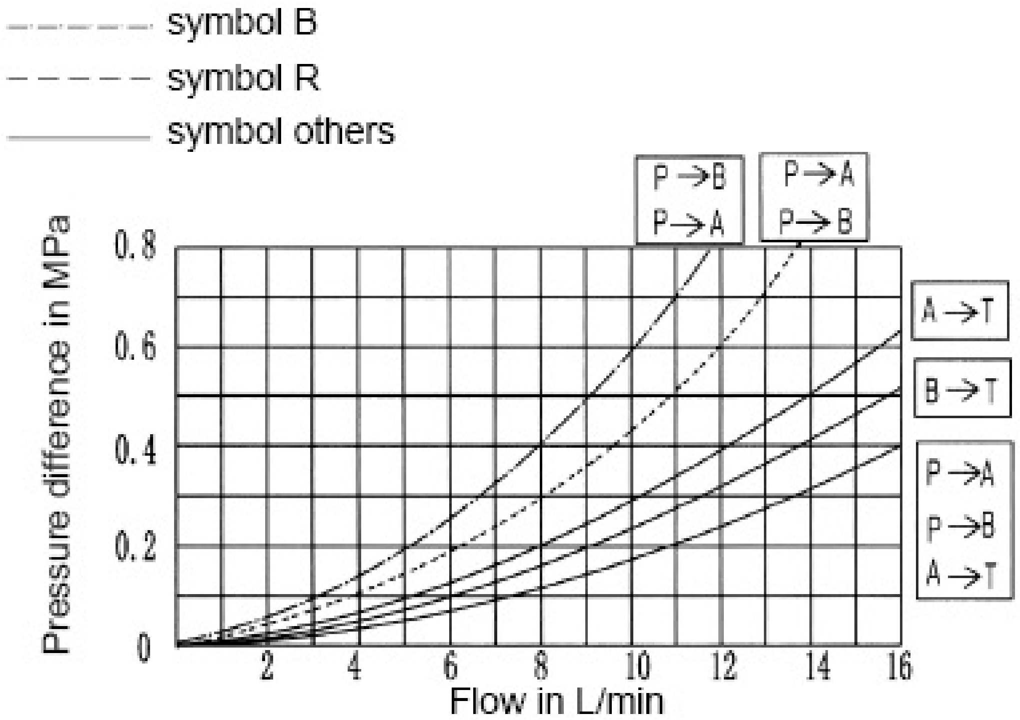
Performance limits

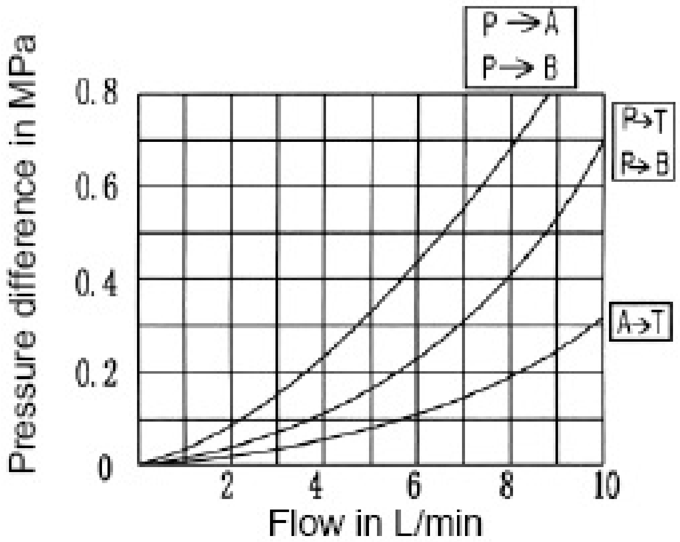
Attention!

The given operating limits are valid for the use with two flow directions (e.g. from P to A and simultaneous return flow from B to T).Due to the flow forces active inside the valves the permissible operating limit may be significantly lower if only one flow direction from P to A and closed port B) is used! The operating limits were measured with solenoids at operating temperature,10% under voltage and without tank back pressure.

symbol / flow in L/min / operating pressure in MPa	5	10	25
A、B、C、N、E、F、H、J、L、M、Q、R、V、W	14	14	12
G	10	10	9

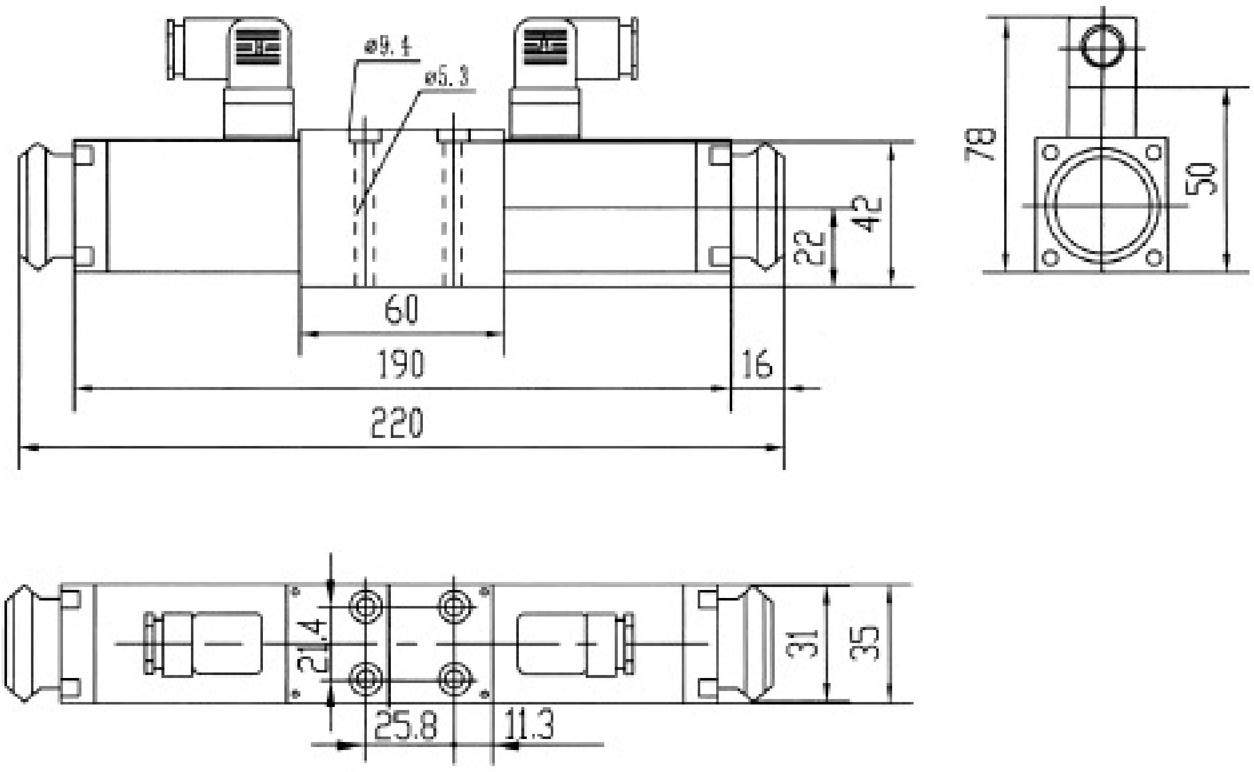
Characteristic curves (measured at ν = 41 mm²/s and t = 50 ℃)



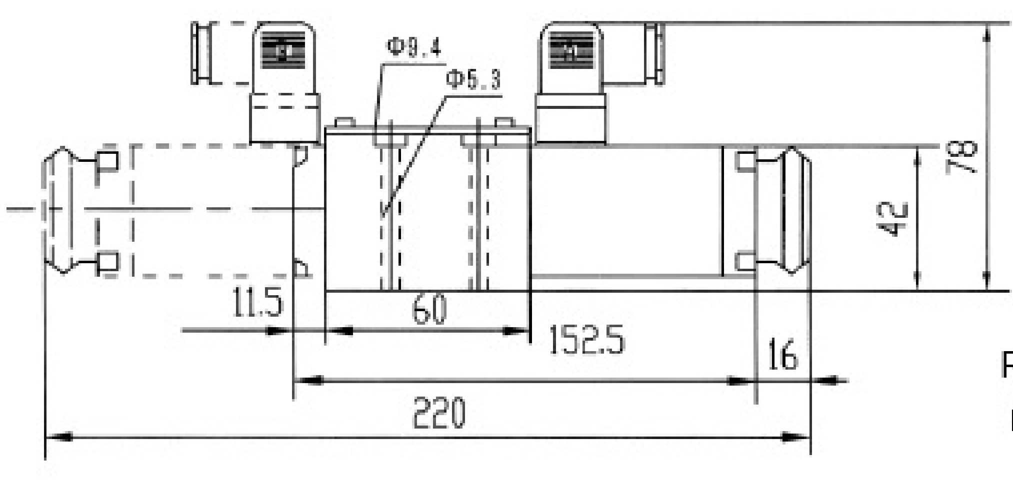


Unit dimensions **(Dimensions in mm)**

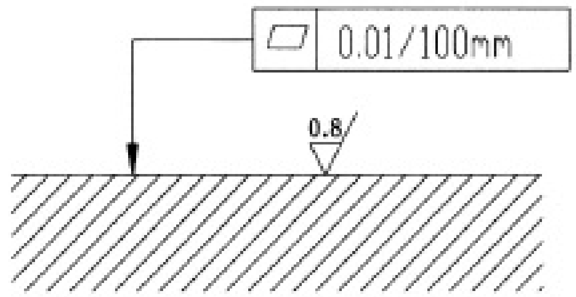
3-position valve.



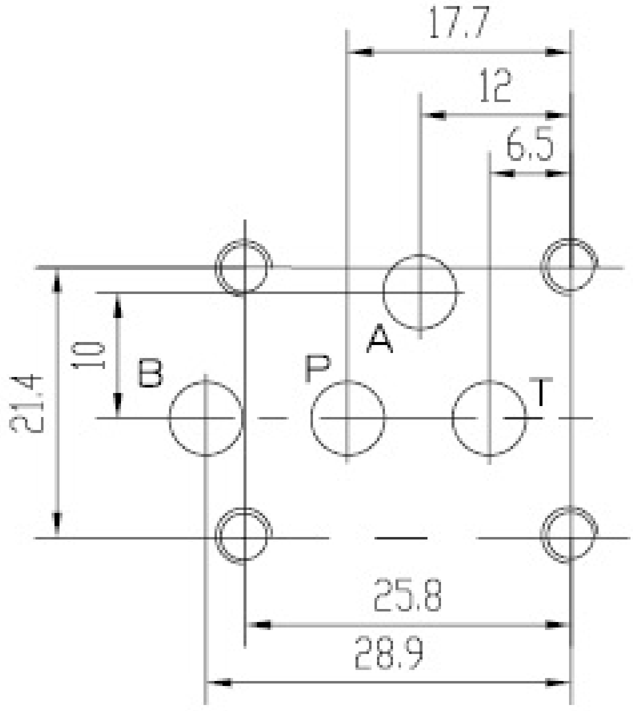
2-position valve.



Required surface finish of mating piece



The connection dimensions of service ports

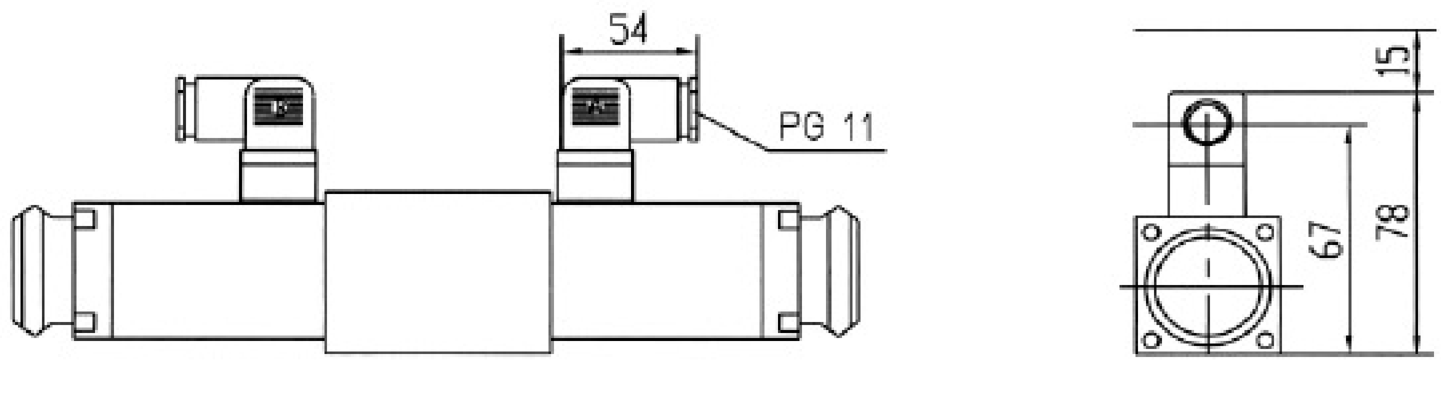


O-ring	7X1.5
Valve fixing screws	4-M5X50-10.9（GB/T70.1-2000）M_A=9N.m

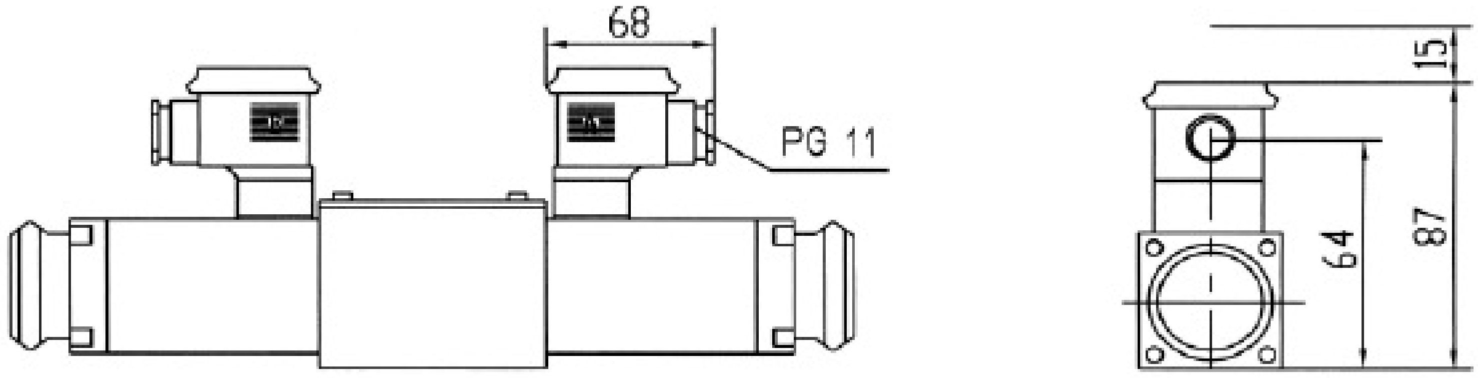
Subplates：
G115/01；G96/01
G115/02；G96/02
see page 212

Dimensions of the electrical connection **(Dimension in mm)**

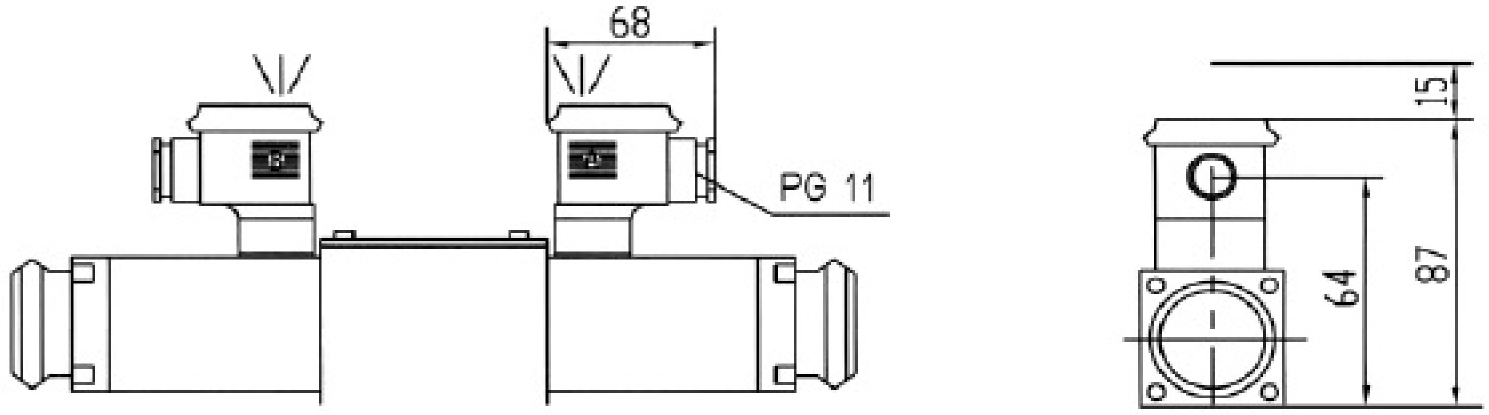
Z4 normal plug to DIN43850



Z5 large right-angle plug



Z5L large right-angle plug with indicator light



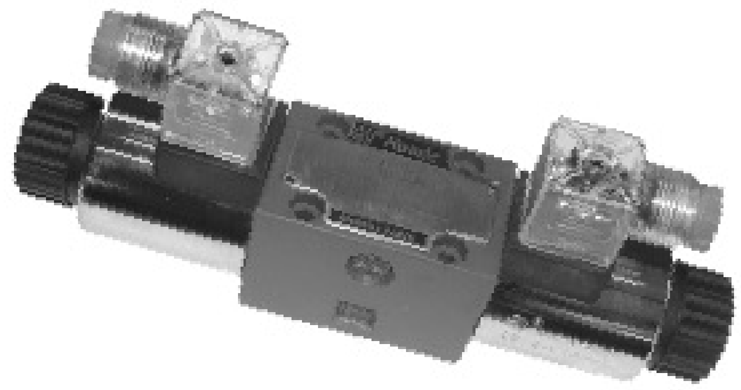
Notice

1. The fluid must be filtered. Minimum filter fineness is 20 μm.
2. The tank must be sealing up and an air filter must be installed on air entrance.
3. Products without subplate when leaving factory, if need them, please ordering specially.
4. Valve fixing screws must be high intensity level (class 10.9). Please select and use them according to the parameter listed in the sample book.
5. Roughness of surface linked with the valve is required to $\sqrt{0.8}$.
6. Surface finish of mating piece is required to 0.01/100mm.

BEIJING HUADE HYDRAULIC INDUSTRIAL GROUP CO.,LTD.	**Directional control valves, electrically operated Type WE 6...50B/...**			RE 23177/12.2004
	Size 6	up to 31.5 MPa	up to 80L/min	Replaces： RE23177/05.2001

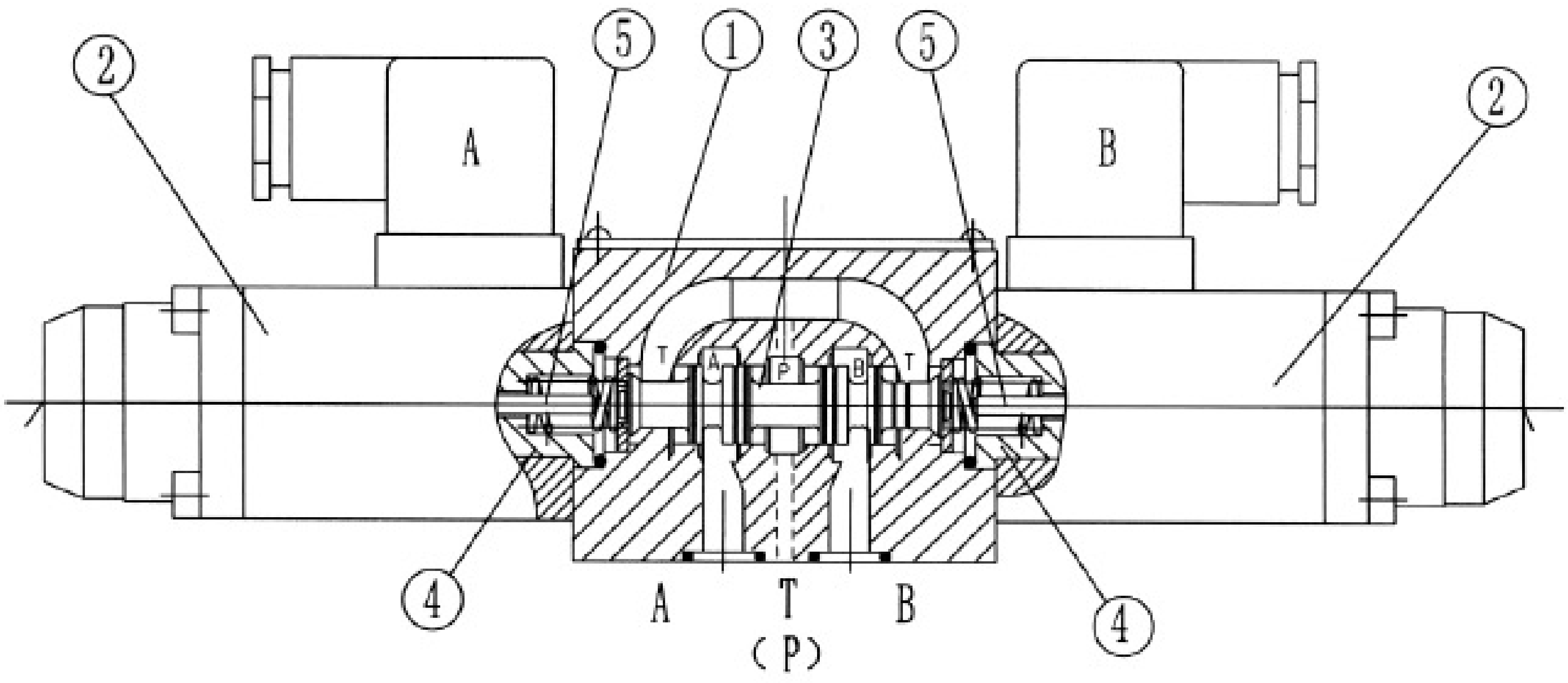
Features:

- Direct operated directional spool valve with solenoid operation in standard design
- Wet pin DC or AC solenoids
- high-power solenoid
- 53 kinds spool function
- Porting pattern to Din 24 340 form A, ISO 4401 and CETOP-RP 121H



Functional, section

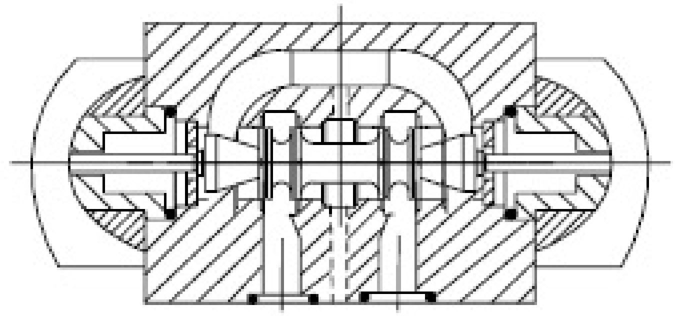
Directional valves of type WE6 are solenoid operated directional spool valves. They control the start, stop and direction of a fluid flow.
These directional valves basically consist of the housing (1), one or two solenoids (2), the control spool (3), and one or two return springs (4).
In the de-energized condition, the control spool (3) is held by the return springs (4) in the central or in the initial position (except for detented spools). The control spool (3) is actuated via wet pin solenoids(2). The force of the solenoid (2) acts via the plunger (5) on the control spool (3) and shifts the same from its rest position to the desired end position. Thus, the required flow pattern from P to A and B to T or P to B and A to T is selected.
When the solenoid (2) is de-energized, the control spool (3) is returned to its neutral position by the return spring (4).
A manual override (6), optional, is provided for emergency operation of the control spool (3) without energization of the solenoid.



Type 4WE6...50B/...

4WE6··· 50B/O：

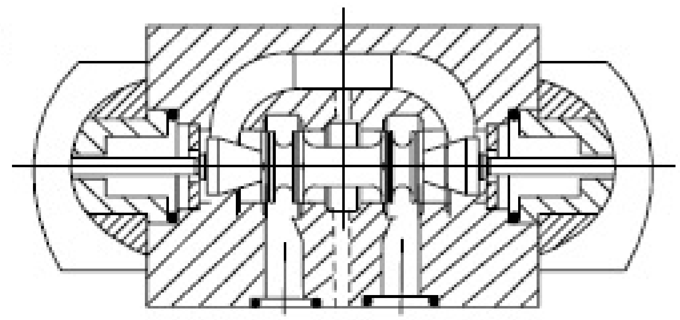
This version is a directional valve with 2 switching positions and 2 solenoids without detent. There is no defined switch ing position in the de-energized condition.



WE6···50B/O

WE6··· 50B/OF：

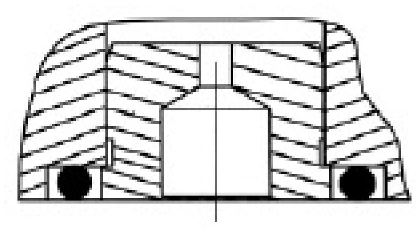
This version is a directional valve with 2 switching position, 2 solenoids and a detent. Thus, the relevant switching positions are fixed and continuous energization of the solenoid is not necessary.



WE6···50B/OF

Throttle inserts:

The use of throttle inserts is only required, if, due to the operating conditions, flows are to be expected, which are higher than the stated maximum performance limits of the valve. It is inserted in the P channel of the directional valve.



Solenoid

Wet pin solenoid life is much longer because gag bit moves in the oil ,just lessening hydraulic impact and abrasion , improving the speed of emanating heat.

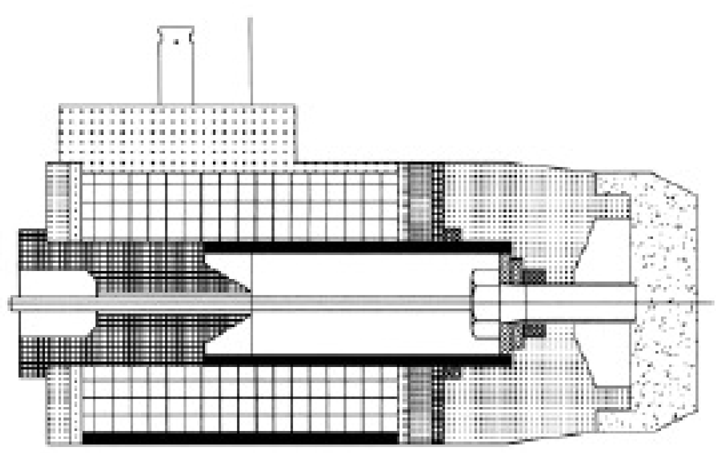
The characteristics of DC solenoids：

—— Switching gently ,high frequency。

—— Coils are all safety wherever gag bit stays at any position of the solenoid .

—— Its response is not rapid for lower voltage ,go beyond voltage instantly,over loading or jamming of mechanism .

AC power supply can be used through commuting.



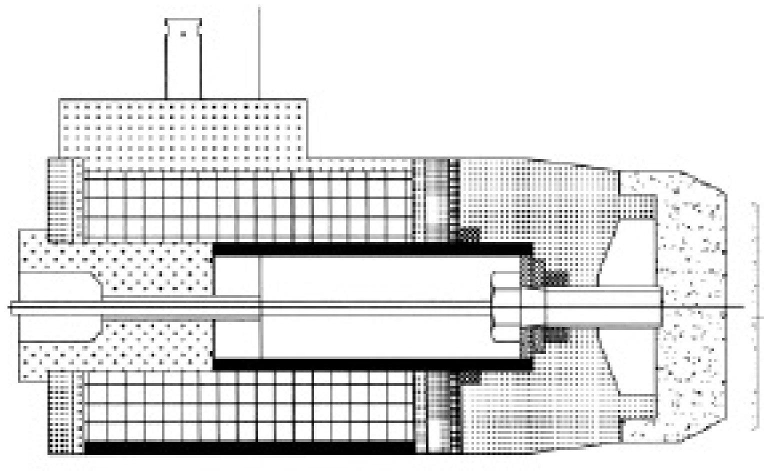
DC solenoid

The characteristic of AC solinoids：

—— The circuit of electrical control is easy.

—— Action time is short.

—— It is not necessary of special protect device for on-off.



AC solenoid

Ordering details

	WE	6		50	B /							*

3 Service ports	= 3
4 Service ports	= 4

Nominal size 6	=6

Further details in clear text

No code =	mineral oils
V =	phosphate ester

No code =	without throttle insert
B08=	Throttle, Φ 0.8 mm
B10 =	Throttle, Φ 1.0 mm
B12=	Throttle, Φ 1.2 mm

Electrical connection see the follow page

N=	With manual override
No code=	Without manual override

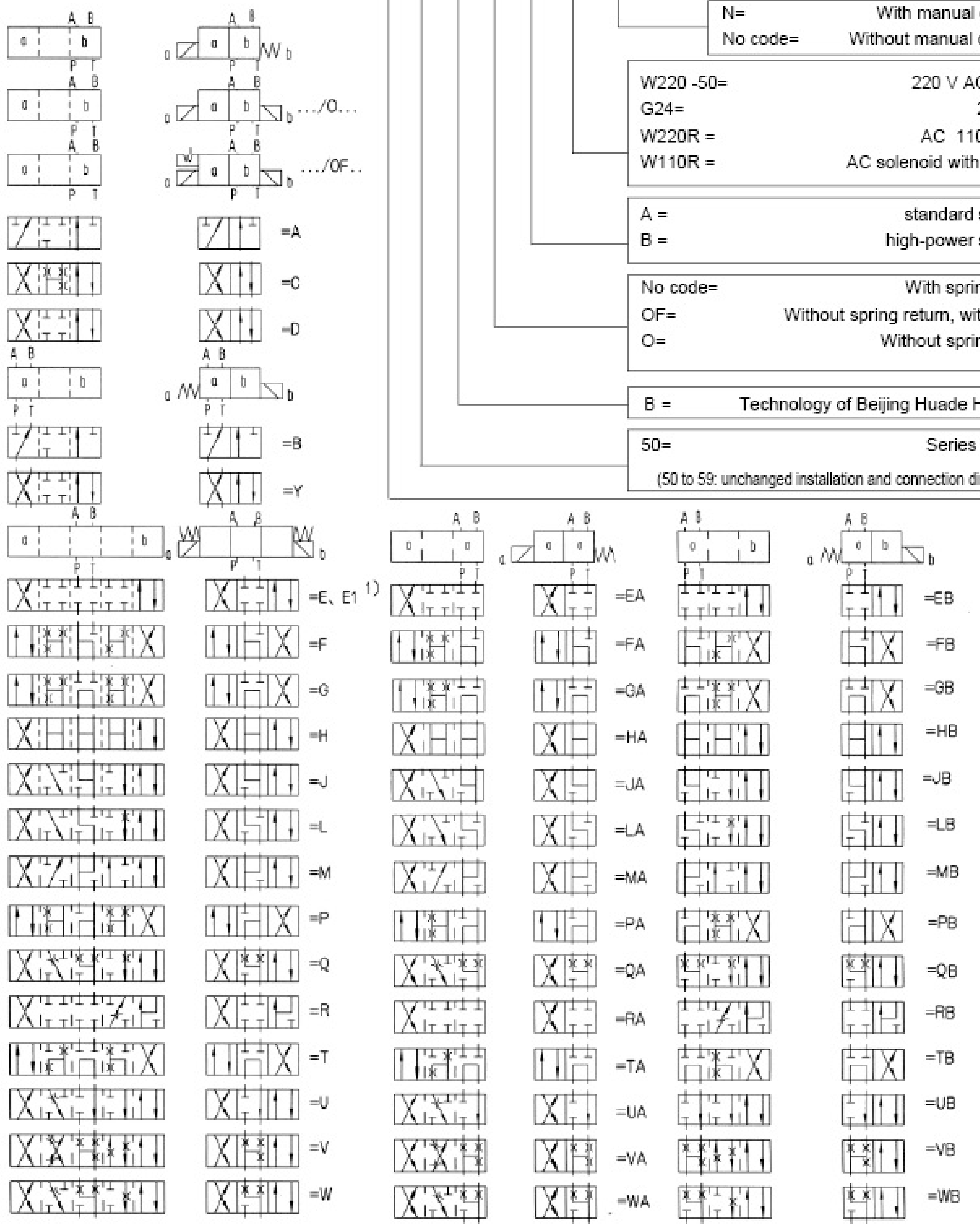
W220 -50=	220 V AC, 50 Hz
G24=	24 V DC
W220R =	AC 110V 220V
W110R =	AC solenoid with plug Z5

A =	standard solenoid
B =	high-power solenoid

No code=	With spring return
OF=	Without spring return, with detent
O=	Without spring return

B =	Technology of Beijing Huade Hydraulic

50=	Series 50 to 59
(50 to 59: unchanged installation and connection dimentions)	



Technical data

Hydraulic

Solenoid		Standard solenoid A	High-power solenoid B
Operating press., max.	Port A、B、P (MPa)	up to 31.5	up to 35
	Port T (MPa)	up to 16 (=) up to 10 (~)	up to 16
Flow, max. q_v (L/min)		up to 60	up to 80 (=); up to 60 (~)
Flow area (switching position 0):		for symbol Q, 6% of nominal cross section for symbol W, 3% of nominal cross section	
Hydraulic fluid		mineral oils or phosphate ester	
Fluid temperature range (℃)		- 30 to + 80	
Viscosity range (mm^2/s)		2.8 to 500	
Weight (Kg)	Valve with 1 solenoid	1.2	1.35
	Valve with 2 solenoids	1.6	1.6

With symbol A and B, port T must be used as drain port,if the operating pressure is higher than the permissible tank pressure.

Electrical

Solenoid		Standard solenoid A		High-power solenoid B	
		–	~	–	~
Available voltages (V)		12, 24,110	110,220/50Hz	12,24,110	110, 220/50Hz
Power requirement (W)		26	–	30	–
Holding power (VA)		–	46		35
Switch-on (VA)		–	130		220
Duty cycle		continuous	continuous	continuous	continuous
Switching time	ON (ms)	20–45	10–25	20–45	10–20
	OFF (ms)	10–25	10–25	10–25	15–40
Environment temperature (℃)		+ 50			
Coil temperature (℃)		+ 150			
Switching frequency (cycles/h)		15000	7200	15000	7200
Type of protection to			DIN 40 050 IP65		

When connecting the electrics, the protective conductor (PE) must be connected according to relevant regulations.

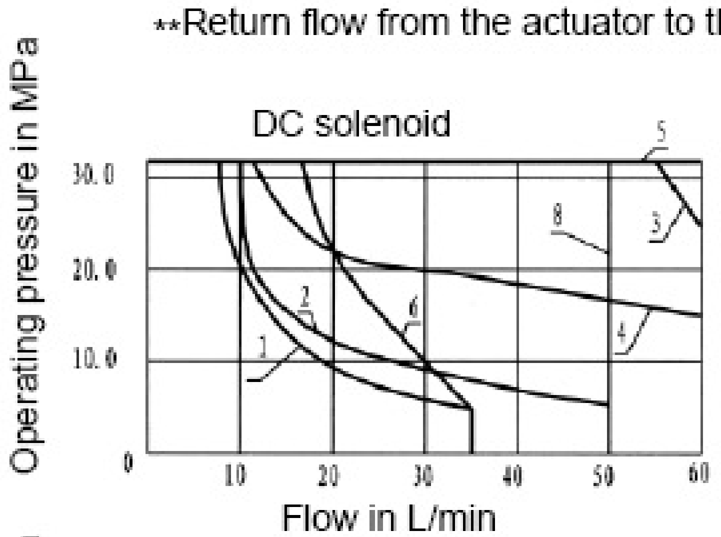
Switching limits

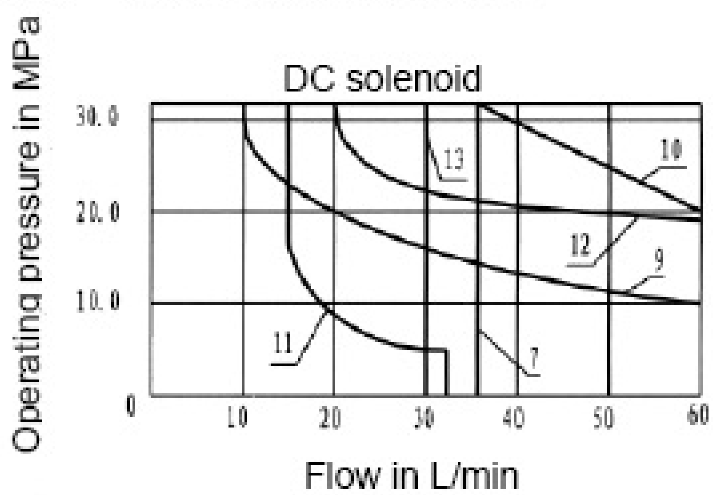
The switching limits are valid for use with two directions of flow (e.g.from P to A with simultaneous return flow from B to T).
Due to the flow forces within the valve, the permissible switching capacity limits can be much lower with only one direction of flow (e.g. from P to A, and port B blocked)!

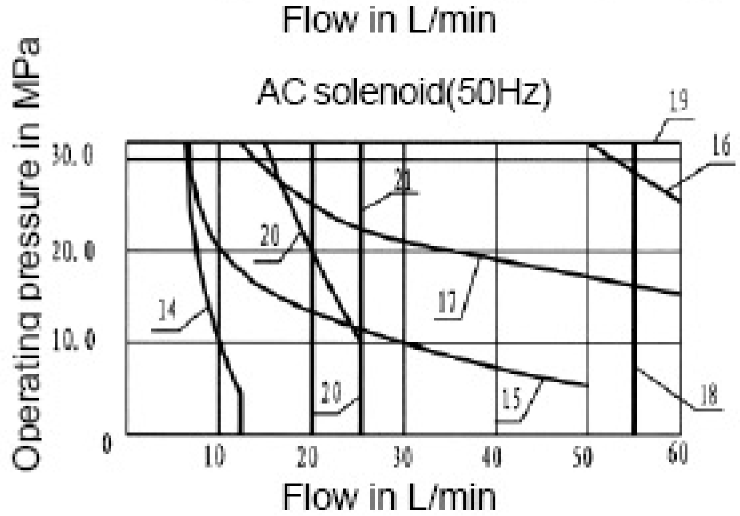
Switching limits of the solenoid type A

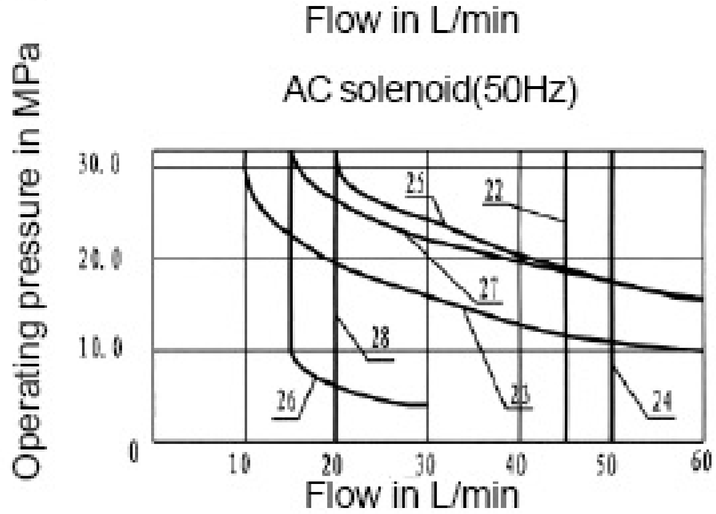
DC solenoid				AC solenoid (50Hz)			
Char. curve	Symbol	Char. curve	Symbol	Char. curve	Symbol	Char. curve	Symbol
1	A,B***	7	G	14	A,B***	22	H
2	A,B	8	H	15	A,B	23	J,L,Q,U,W
3	C,D,Y	9	J,L,Q,U,W	16	C,D,Y	24	M
4	E	10	R**	17	E	25	R**
5	M,C/O,E1	11	V	18	E1	26	V
	D/O,C/OF,D/OF	12	A/O,A/OF	19	C/O.D/O	27	A
6	F,P	13	T	20	F,P	28	T
				21	G		

**Return flow from the actuator to the tank-T; ***Without manual override







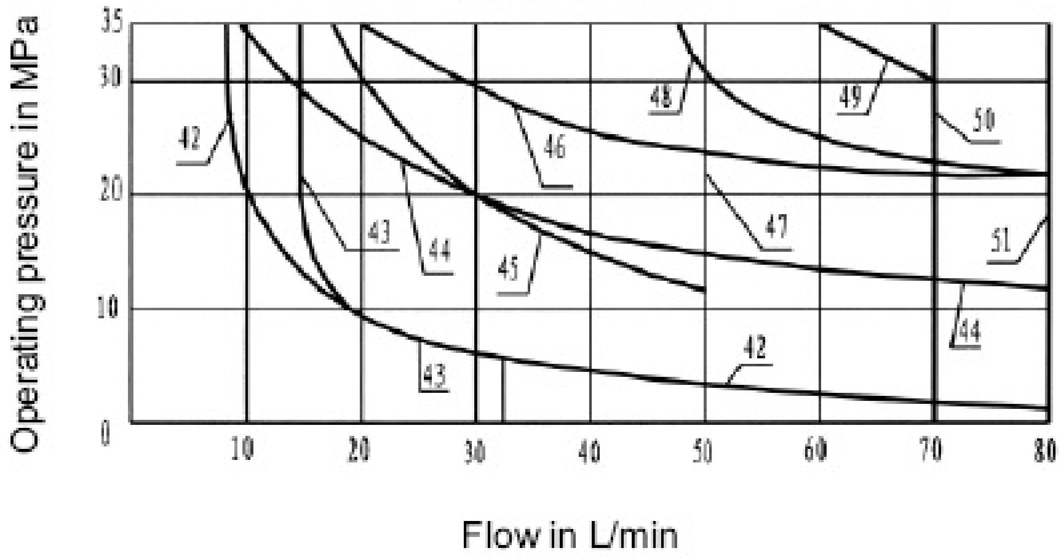


Switching limits of the solenoid type B

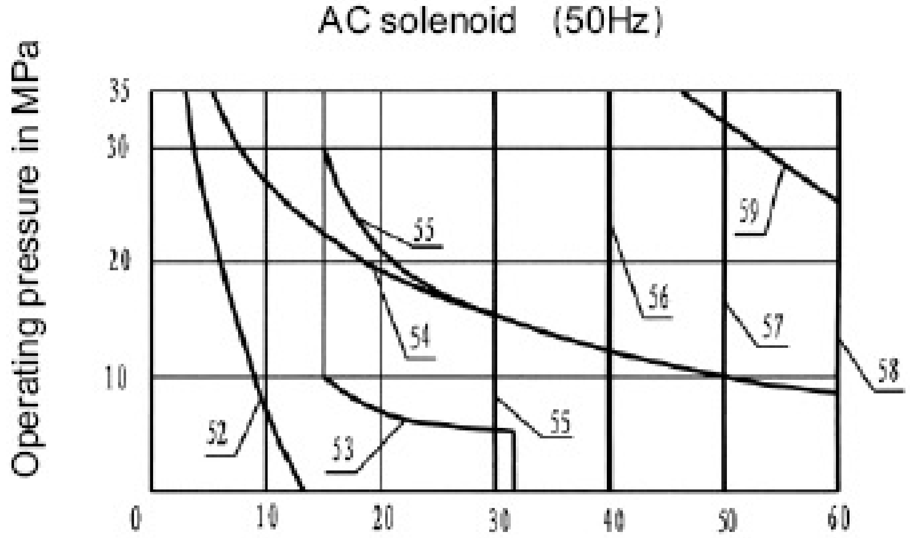
DC solenoid		AC solenoid (50Hz)	
Char. curve	Symbol	Char. curve	Symbol
42	A,B***	52	A,B***
43	V	53	V
44	A,B	54	A,B
45	F,P	55	F,P
46	J,L,U	56	G,T
47	G,H,T	57	H
48	A/O,A/OF,Q,W	58	A/O,D/OF,C/O,C/OF
49	G,D,Y		D/O,D/OF,E,J,L,E1
50	M		M,Q,R**,U,W
51	E,R**,C/D,C/OF,E1	59	C,D,Y
	D/O,D/OF		

**Return flow from the actuator to the tank-T; ***Without manual override

DC solenoid

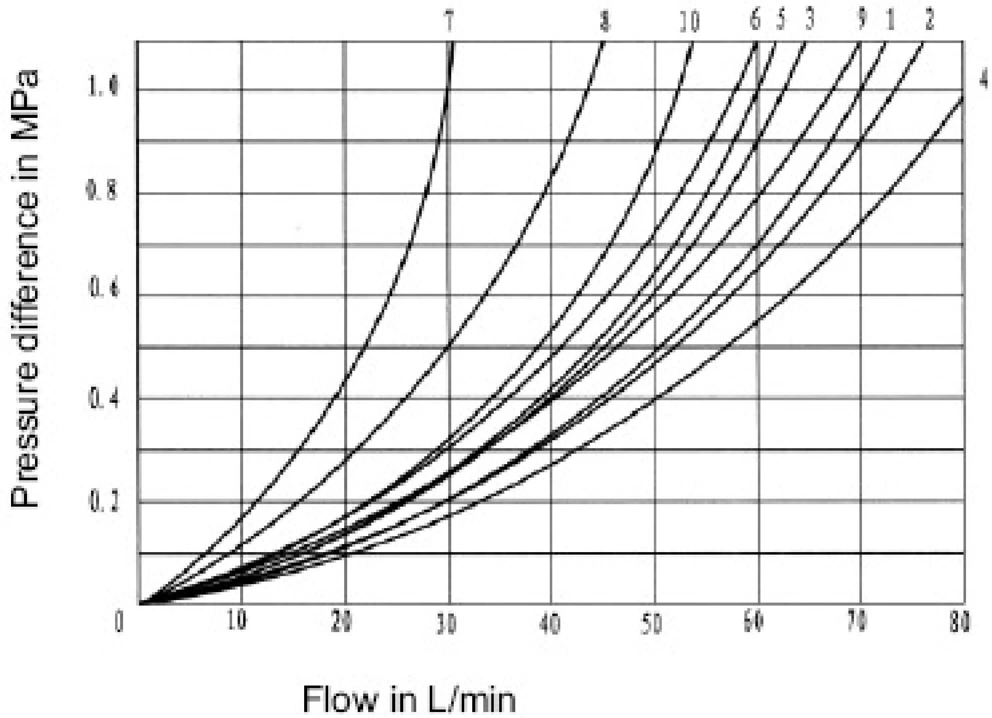


AC solenoid (50Hz)



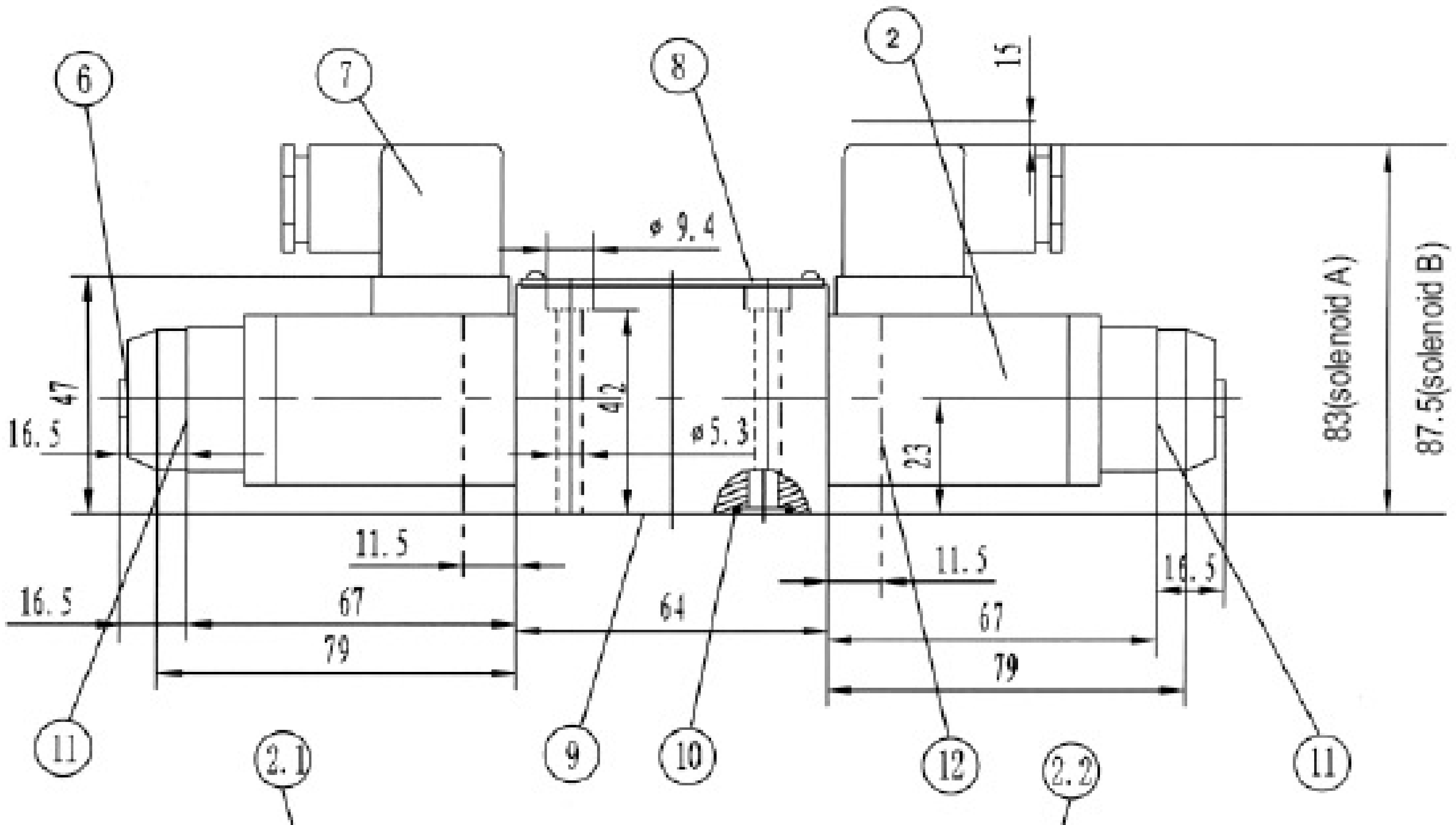
Characteristic curves (measured at ν = 41 mm²/s and t = 50 ℃)

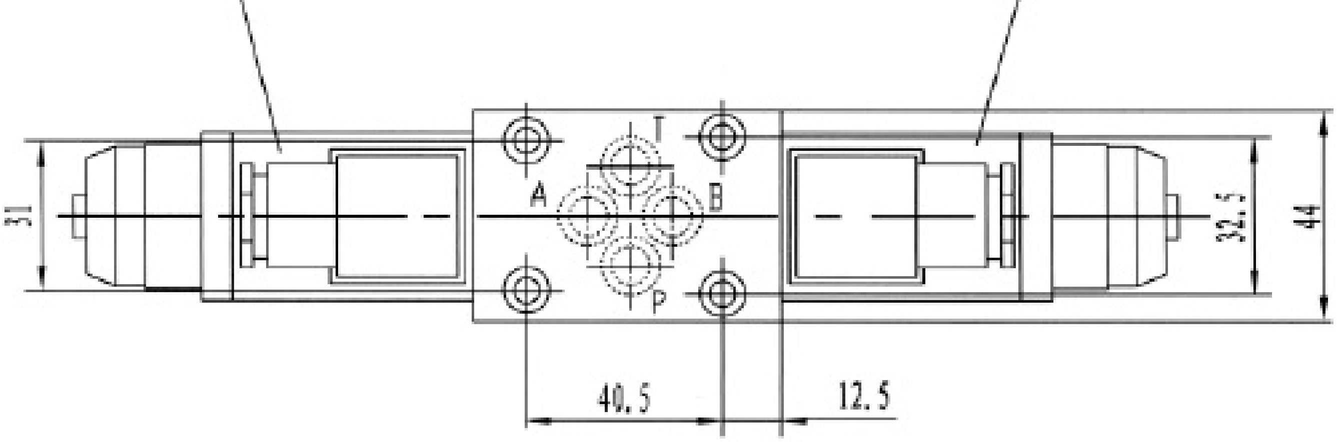
7 Symbol "R" in switching position A → B
8 Symbol "G" and "T" in central position P → T



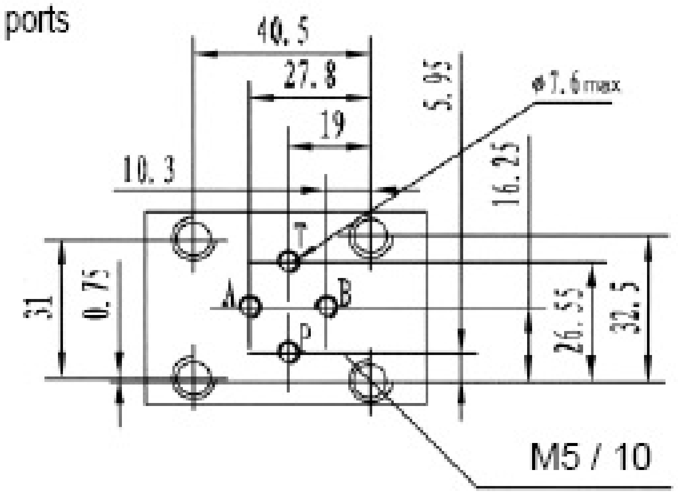
Symbol	Direction of flow			
	P → A	P → B	A → T	B → T
A,B	3	3	-	-
C	1	1	3	1
D,Y	5	5	3	3
E	3	3	1	1
F	1	3	1	1
T	10	10	9	9
H	2	4	2	2
J,Q	1	1	2	1
L	3	3	4	9
M	2	4	3	3
P	3	1	1	1
R	5	5	4	-
V	1	2	1	1
W	1	1	2	2
U	3	3	9	4
G	6	6	9	9

Unit dimensions **(Dimensions in mm)**

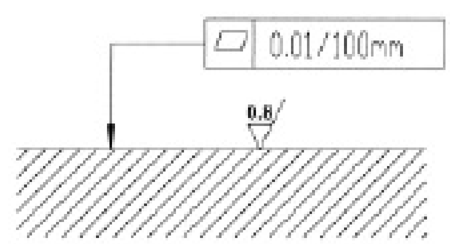




The connection dimensions of service ports



Required surface finish of mating piece



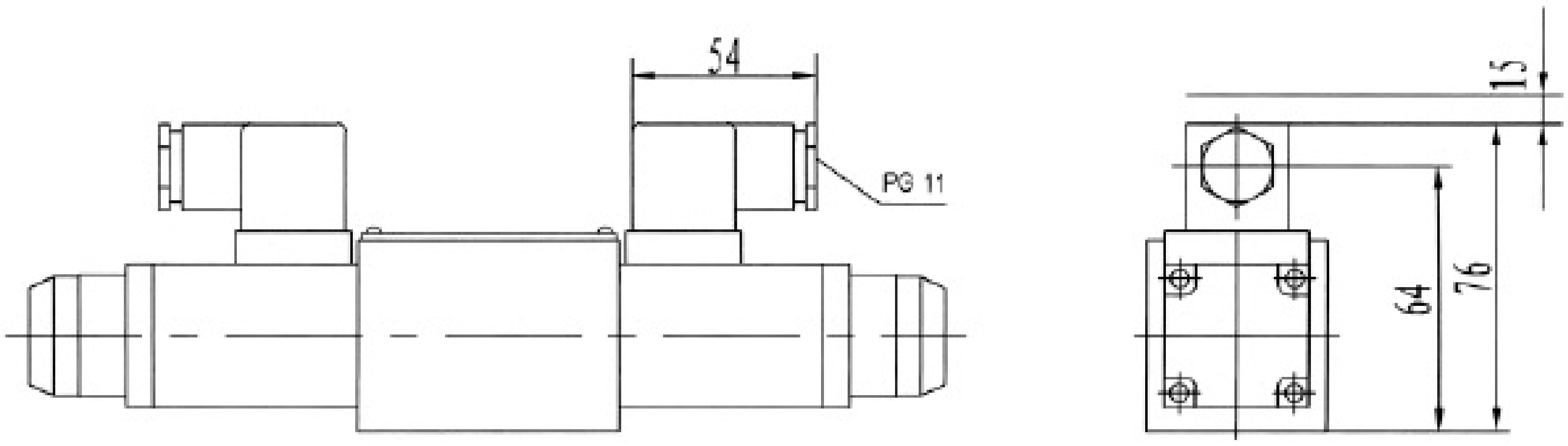
1.1 Solenoid "a" (colour of the plug-in connector: grey)
1.2 Solenoid "b" (colour of the plug-in connector: black)
2 Manual override "N"
7 Plug Z4
8 Nameplate
9 Service port
10 O-ring 9.25x1.78
11 Solenoid without manual override
12 Cover for valve with one solenoid

Valve fixing screws
4-M5x50-10.9（GB/T70.1-2000）
M_A=9N.m

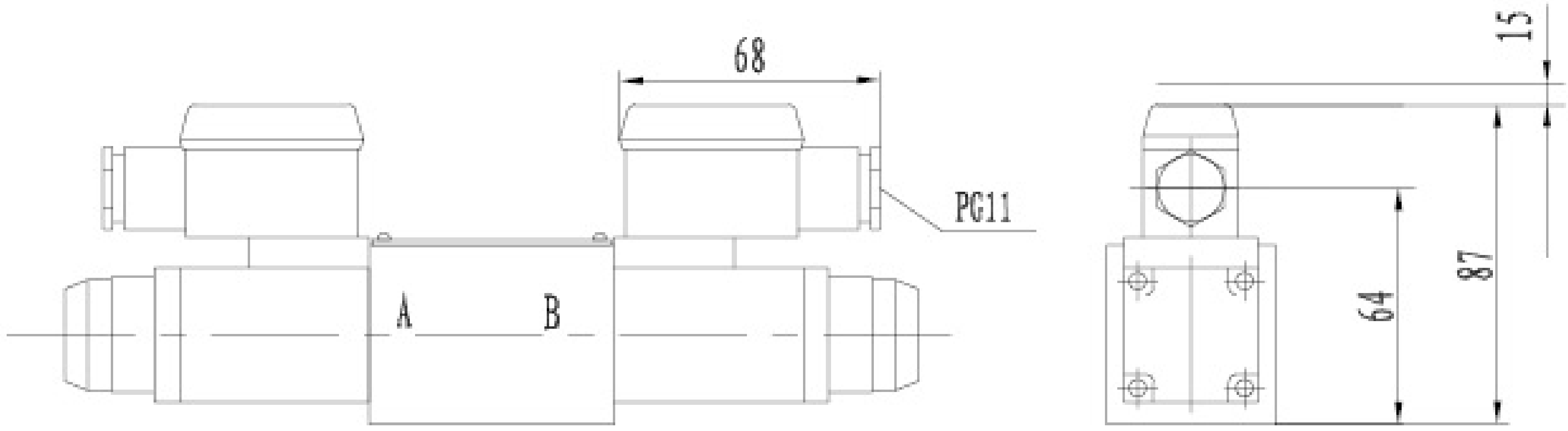
Subplates：
G341/01(G1/4 ") G341/02(M14x1.5)
G342/01(G3/8 ") G342/02(M18x1.5)
G502/01(G1/2 ") G502/02(M22x1.5)
see page 205

The dimensions of electrical connection: **(Dimensions in mm)**

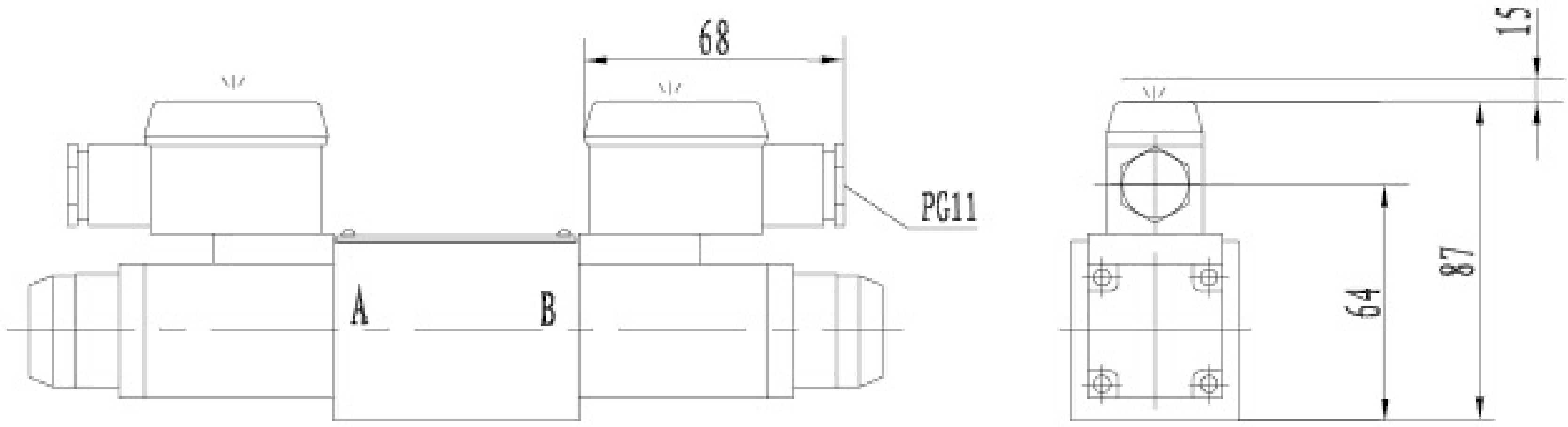
Z4 Individual connections



Z5 large right-angle plug(rectifier can be selected)



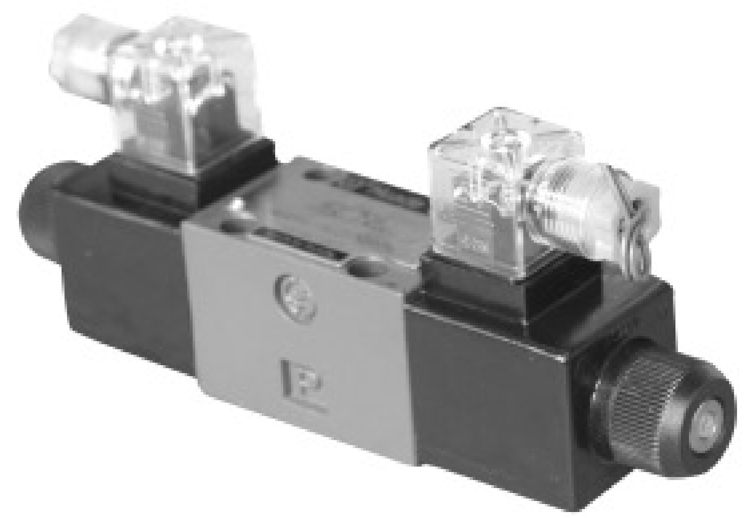
Z5L large right-angle plug with indicator light



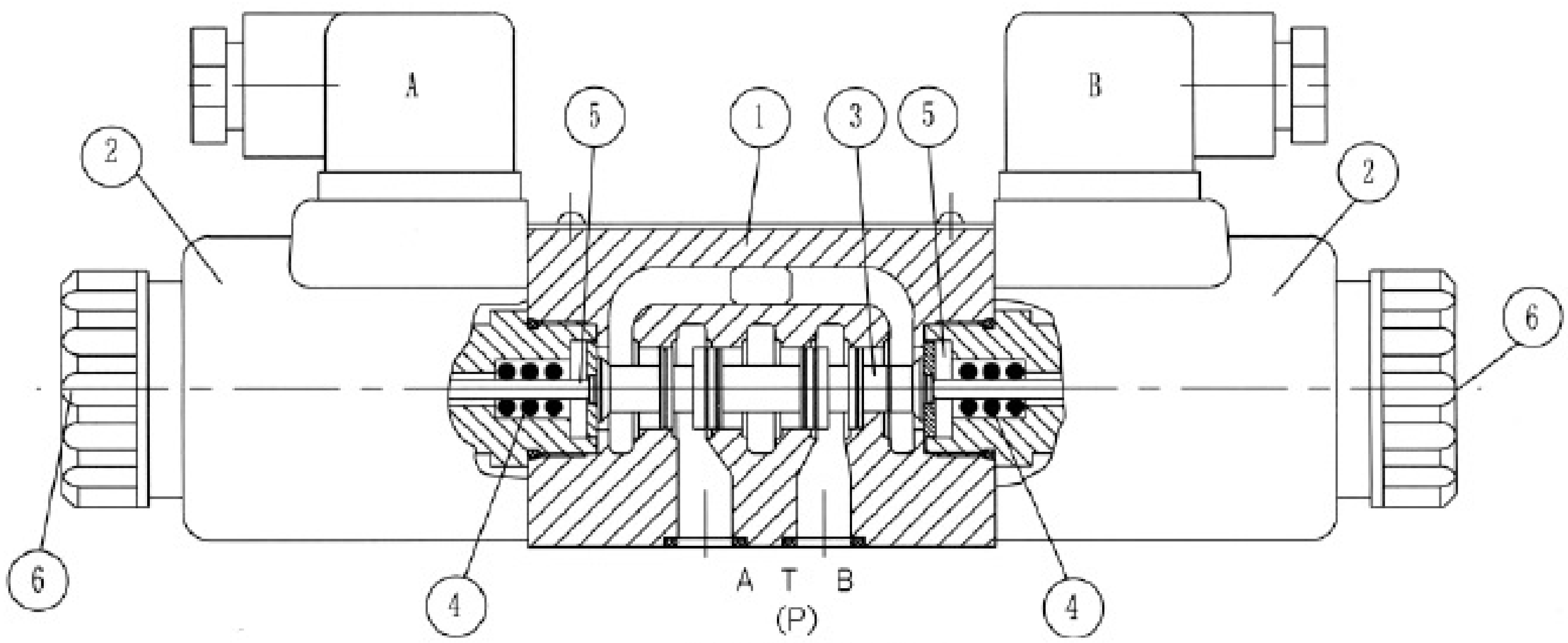
BEIJING HUADE HYDRAULIC INDUSTRIAL GROUP CO.,LTD.	Directional control valves Type WE 6...61B/... (new series)			RE 23188/12.2004
	Size 6	up to 31.5 MPa	up to 80L/min	Replaces：23188/05.2001 RE: 23316/05.2001

Features:

- Direct solenoid actuated directional spool valve high performance version
- Wet pin DC or AC solenoids with removable coil
- Solenoid coil can be rotated through 90 °
- It is not necessary to open the pressure tight chamber when changing the coil
- Electrical connections either as individual or central connections
- Hand override,optional
- Porting pattern to Din 24 340 form A, ISO 4401 and CETOP-RP 121H



Function, section



Type WE6...61B/

Essentially the directional control valves consist of housing (1),one or two solenoids (2),the control spool (3),and one or two return springs (4)

In the de-energized condition the control spool (3)is held in the neutral or initial position by means of return springs (4) (except for impulse spools).The control spool (3)is actuated via wet pin solenoids (2)

The force of the solenoids (2)acts via the plunger (5)on the control spool (3)and pushes this from its neutral position to the required end position.This gives free-flow from P toA and B to T or P to B andA to T.

When solenoid (2)is de-energized,the control spool (3)is returned to its neutral position by means of the return springs (4).

An optional hand override (6),allows movement of the control spool (3)without energising the solenoid.

Ordering details.

	WE	6		61	B	/	E						*

3 service ports = 3
4 service ports = 4

Nominal size 6 =6

Symbols see below

Series 60 to 69 = 61
(60 to 69:unchanged installation and connection dimensions)

Technology of Beijing Huade Hydraulic = B

Spring return = No code
Without spring return = O
Without spring return with detent = OF

High power solenoid = E
Wet pin (oil immersed)with removable coil

12 V DC =G12
220 V AC 50 Hz = W220-50
24 V DC =G24
DC solinoid commuting automatically = W220R

Further details in clear text

No code = mineral oils
V = phosphate ester

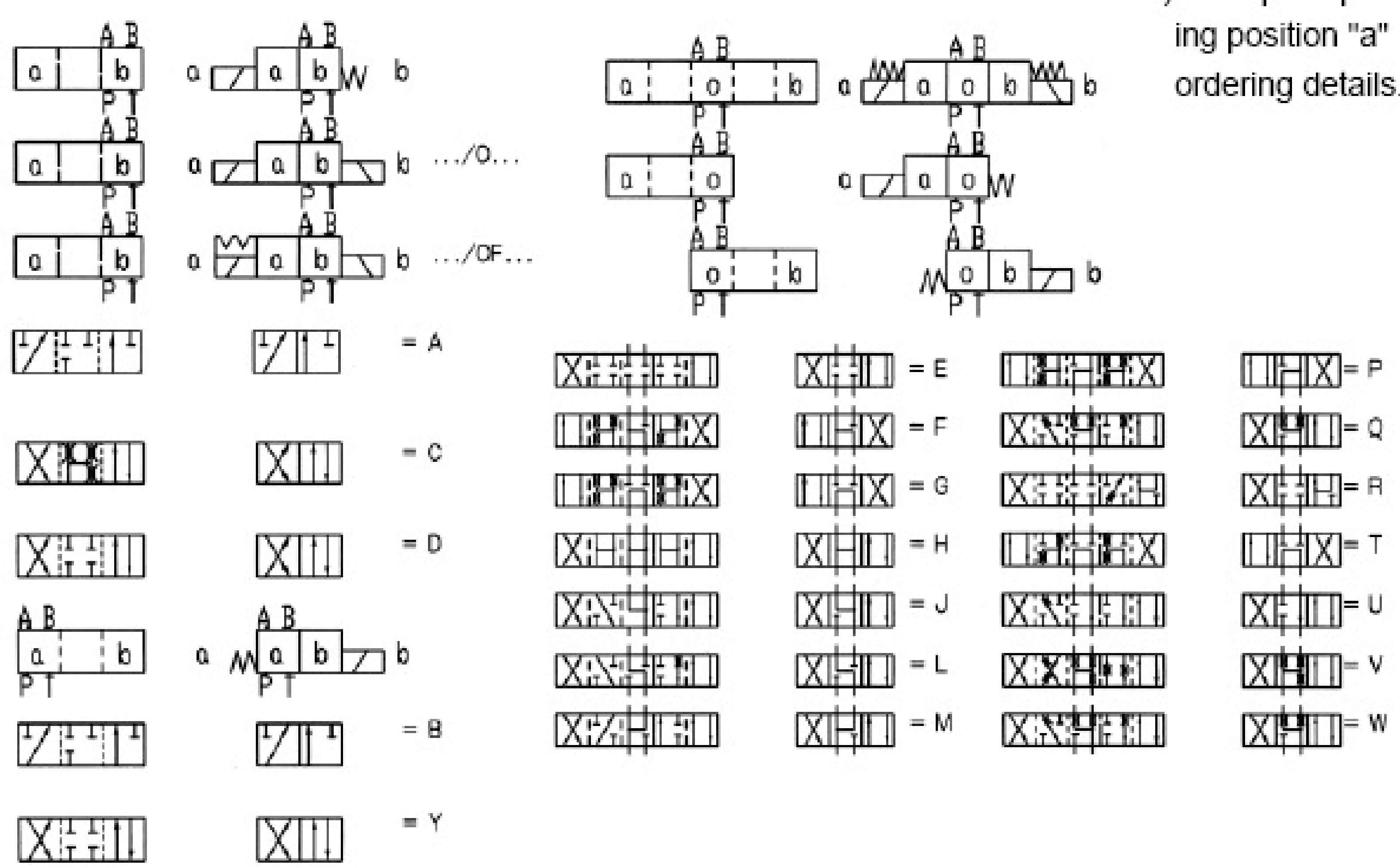
No code = Without cartridge throttle
B08 = Throttle Φ 0.8 mm
B10 = Throttle Φ 1.0 mm
B12 = Throttle Φ 1.2 mm

Individual connections,
K4= With sealing cover, without plug
Z4 = normal plug
Z5L = Large right-angle plug with indicator
Central connections,
DKL = Central connection on cover with indicator light (without angled plug-in connector)

N9= With protected hand override (standard)
N= With hand override
No code= Without hand override

Symbols

1) Example: Spool E with switch ing position "a"
ordering details..EA "b"



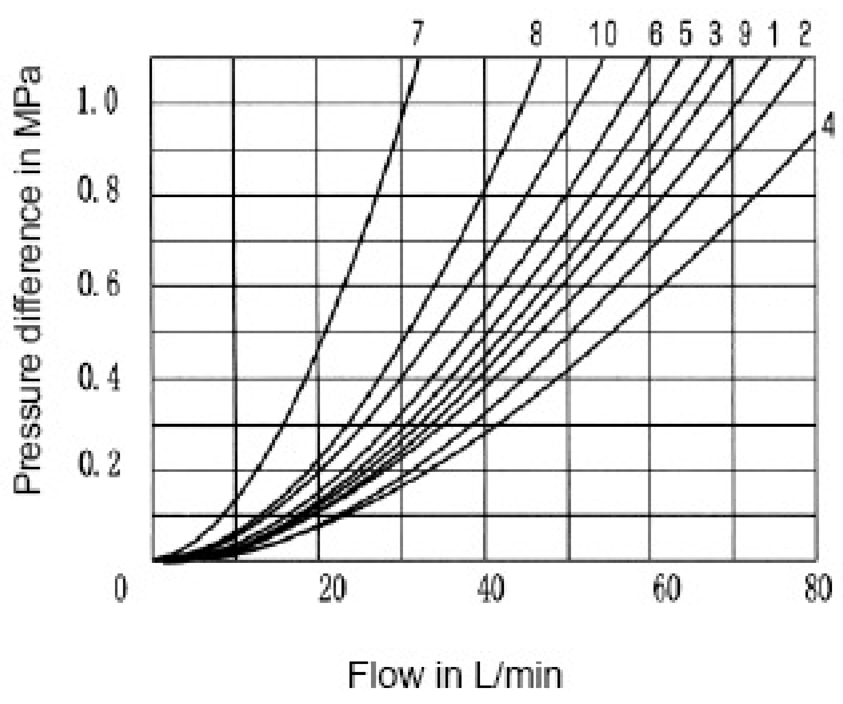
Technical data

Hydraulic			
Max.operating pressure Ports A,B,P (MPa)	up to 35.0		
Port T (MPa)	21 (-);16 (~)		
	with symbols A and B,port T must be used as adrain port if the operating pressure is above the permitted tank pressure.		
Max.flow (L/min)	80 (-);60 (~)		
Pressure fluid	mineral oils or phosphate ester		
Viscosity range (mm^2/s)	2.8 ~ 500		
Pressure fluid temperature range (℃)	-30 ~ +80		
Degree of contamination	Maximum permissible degree of contamination of the hydraulic fluid to NAS 1638 class 9. We therefore recommend a filter with a minimum retention rate of $\beta 10 \geq 75$.		
Electrical			
Voltage type	DC	AC 50/60 Hz	
Available voltages (V)	12、24、42、60、96、	42、110、120、230	
	110、180、205、220	50/60Hz	
Power consumption (W)	30		
Holding power (VA)	-	50	
Switch-on power (VA)	-	220	
Duty	continuous	continuous	
Switching time to ISO 6403	ON (ms)	25 to 45	10 to 20
	OFF (ms)	10 to 25	15 to 40
Protection to DIN	IP 65		
Switching frequency (cycles/h)	up to 15000	up to 7200	

With electrical connections the protective conductor (PE)
must be connected according to the relevant regulations.

Characteristic curves (measured at v = 41 mm^2/s and t = 50℃)

7 Symbol "R " in switched position A → B
8 Symbols "G " and "T " in mid position P → T



Symbols	Flow direction			
	P→A	P→B	A→T	B→T
A, B	3	3	-	-
C	1	1	3	1
D, Y	5	5	3	3
E	3	3	1	1
F	1	3	1	1
T, G	10	10	9	9
H	2	4	2	2
J, Q	1	1	2	1
L, U	3	3	4	9
M	2	3	3	3
P	3	1	1	1
R	5	5	4	-
V	1	2	1	1
W	1	1	2	2

Performance limits (measured at $v = 41\ mm^2/s$ and $t = 50\ ^\circ C$)

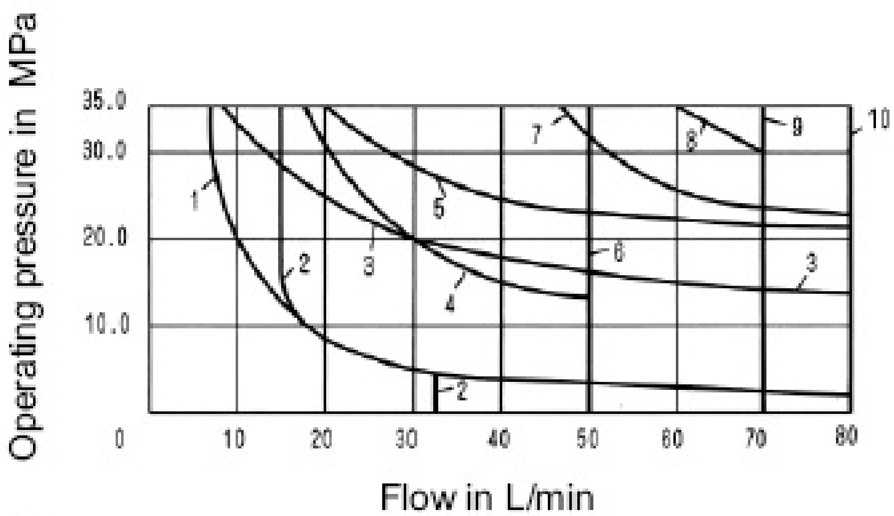
The given switching power limits are for applications with two flow directions (e.g.from P to A and simultaneous return flow from B to T).

Due to the flow forces active within the valves the permissible switching power limit may be significantly less if there is only one direction of flow (e.g.from P to A and port B blocked)!

(Please consult us for applications of this kind.)

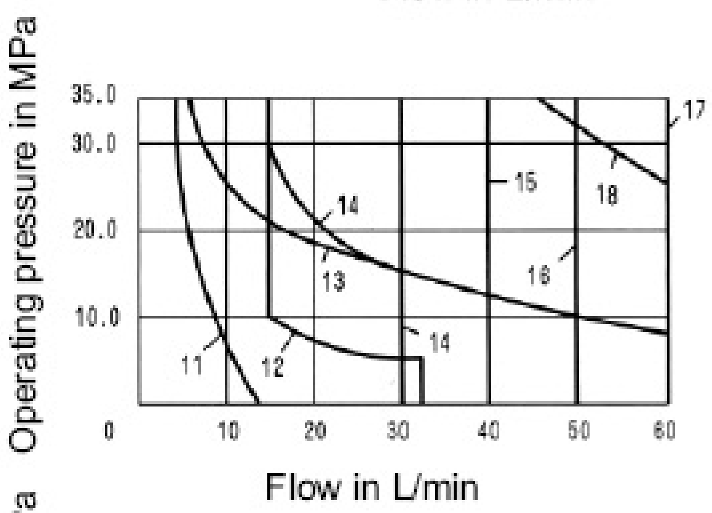
The switching power limits were measured with the solenoids at operating temperature, 10% under voltage and without tank back pressure.

DC solenoid G24;24V		AC solenoid - W220:220V,50Hz		AC solenoid - 60Hz W220:220V,60Hz	
Char. curve	Symbol	Char. curve	Symbol	Char. curve	Symbol
1	A, B [1]	11	A, B [1]	19	A, B [1]
2	V	12	V	20	V
3	A, B	13	A, B	21	A, B
4	F, P	14	F, P	22	F, P
5	J	15	G, T	23	G, T
6	G, H, T	16	H	24	J,L,U
7	A/O, A/OF, L, U	17	A/O, A/OF, C/O, C/OF	25	A/O, A/OF, Q,W
8	C, D, Y		D/O, D/OF, E, E1 [2], J, L	26	C, D, Y
9	M		M, Q, R [3], U, W	27	H
10	E, E1 [2], R [3], C/O	18	C, D, Y	28	C/O, C/OF, D/O, D/OF,
	C/OF, D/O, D/OF, Q, W				E, E1 [2], M, R [2]

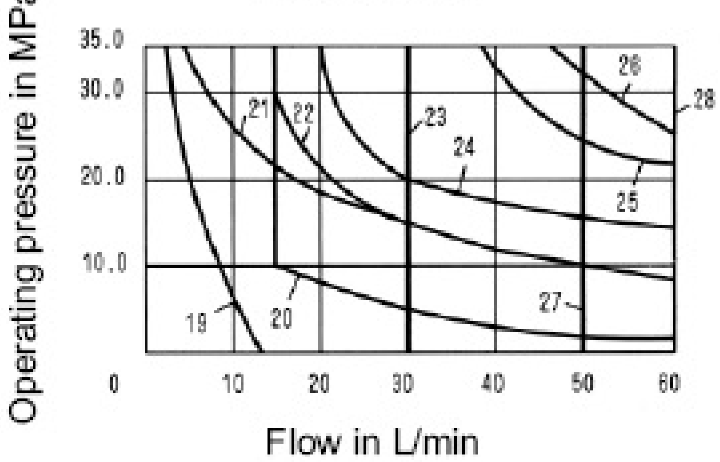


1) With hand override
2) P → A/B pre-opening
3) Return flow from actuator to tank

DC solenoid
Char. curve
1 to 10



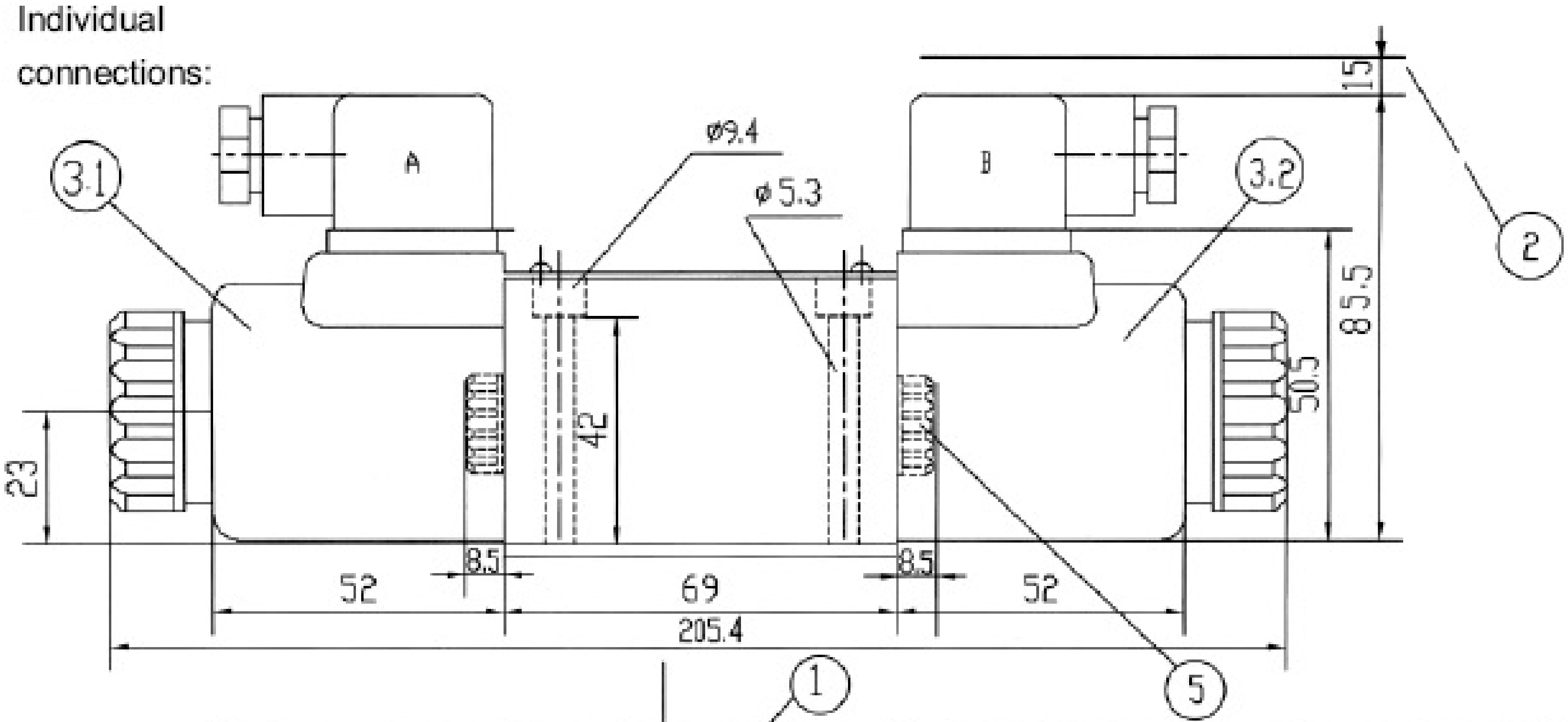
AC solenoid		
Char. curve	Solenoid voltage	
11 to 18	W42	42V, 50Hz
	W110	110V, 50Hz
		120V, 60Hz
	W220	220V, 50Hz

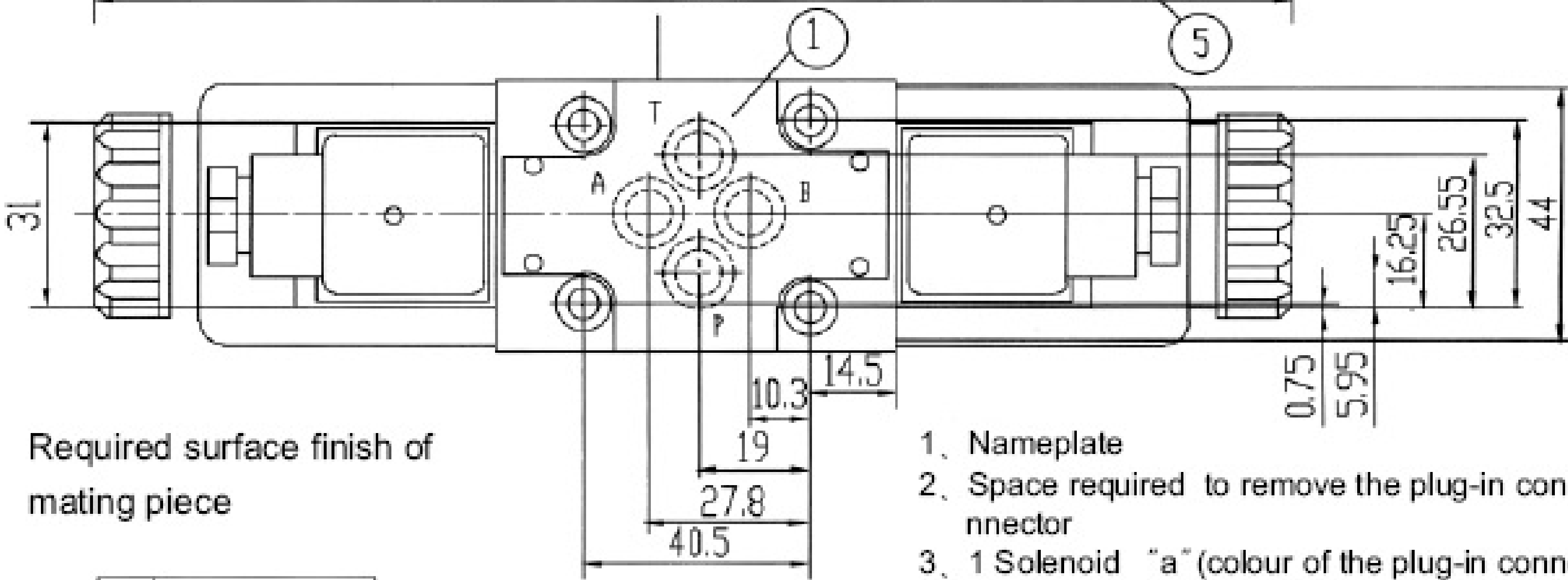


AC solenoid		
Char. curve	Solenoid voltage	
19 to 20	W42	42V, 60Hz
	W110	110V, 60Hz
	W220	220V, 60Hz

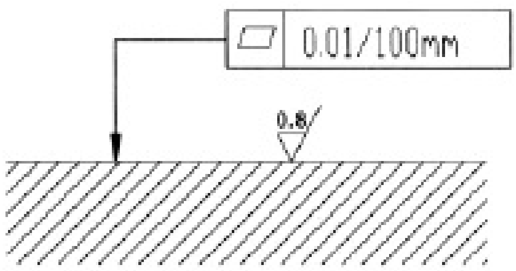
Unit dimensions: valve with DC solenoid

Individual connections:



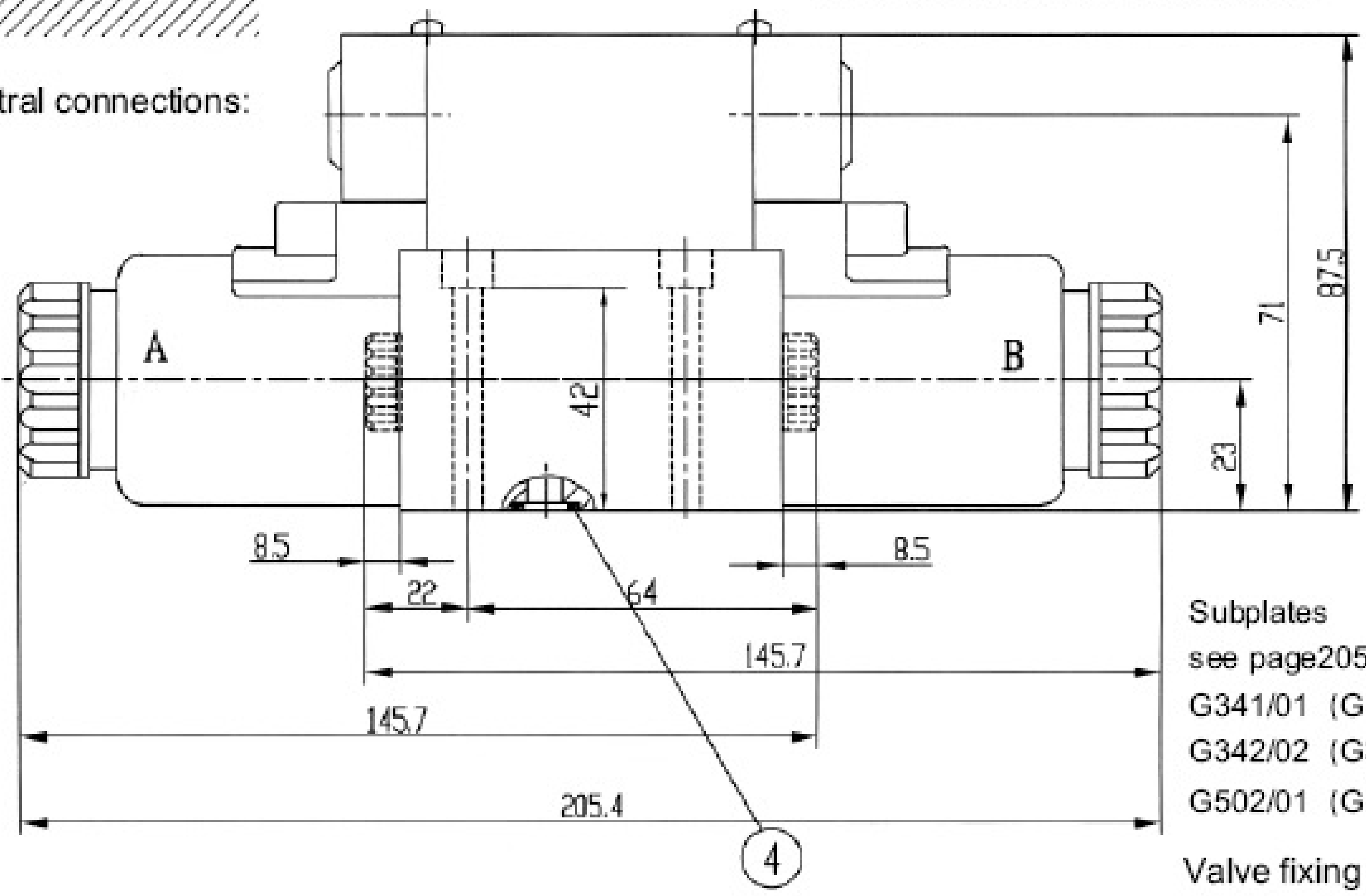


Required surface finish of mating piece



1、Nameplate
2、Space required to remove the plug-in con nnector
3、1 Solenoid "a" (colour of the plug-in connector. grey)
3、2 Solenoid "b" (colour of the plug-in connector. black)
4、O-ring：9.25X1.78
5、Cover for valve with one solenoid

Central connections:

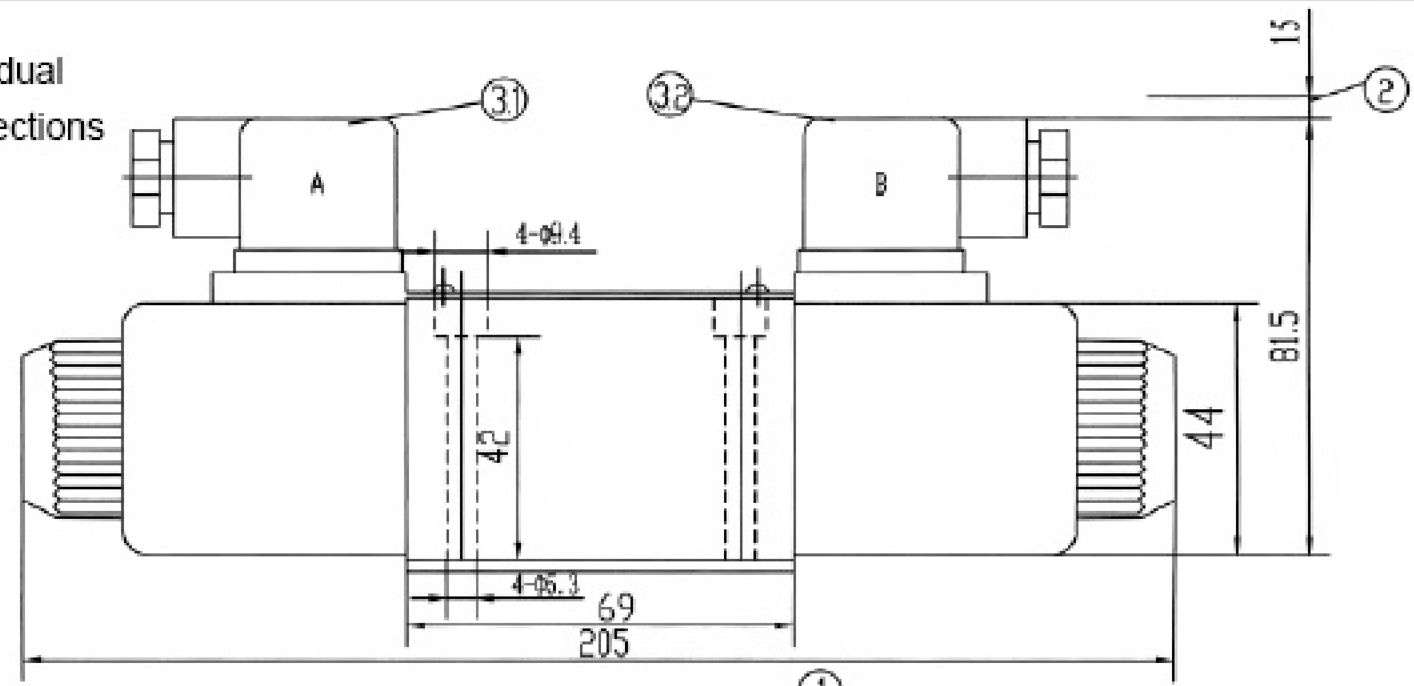


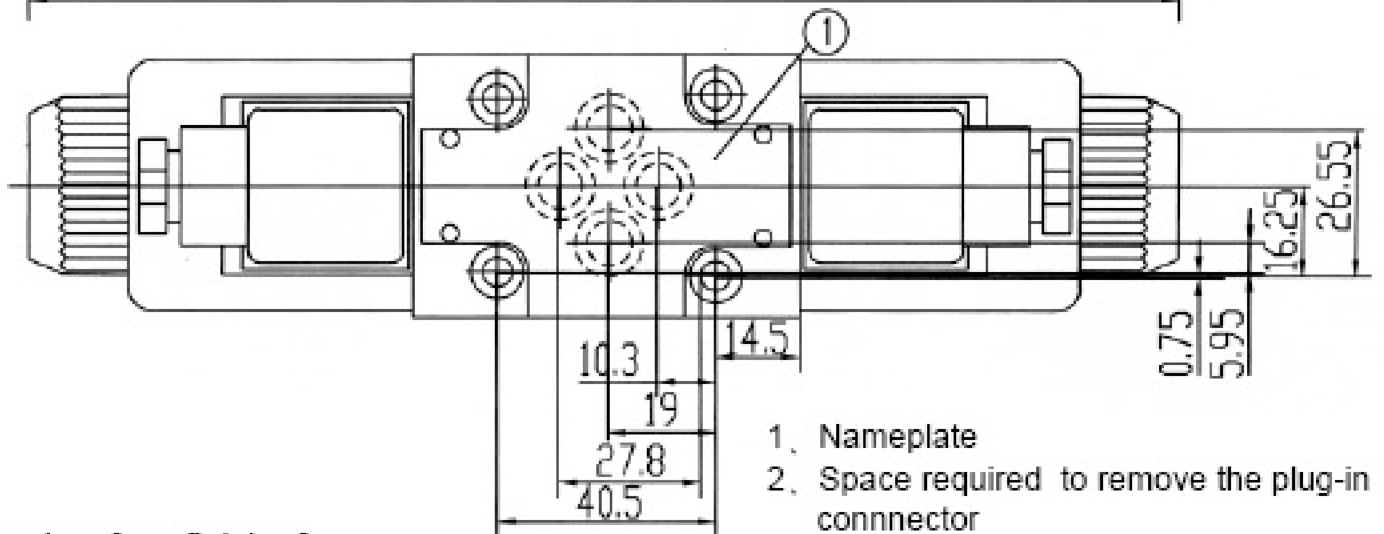
Subplates
see page205
G341/01 （G1/4"）;
G342/02 （G3/8"）;
G502/01 （G1/2"）;

Valve fixing screws
M5X50 -10.9
（GB/T70.1-2000）
M_A=8.9Nm

Unit dimensions: valve with AC solenoid

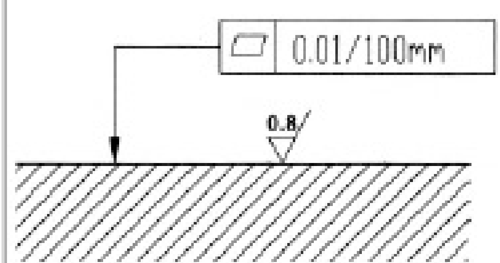
Individual connections



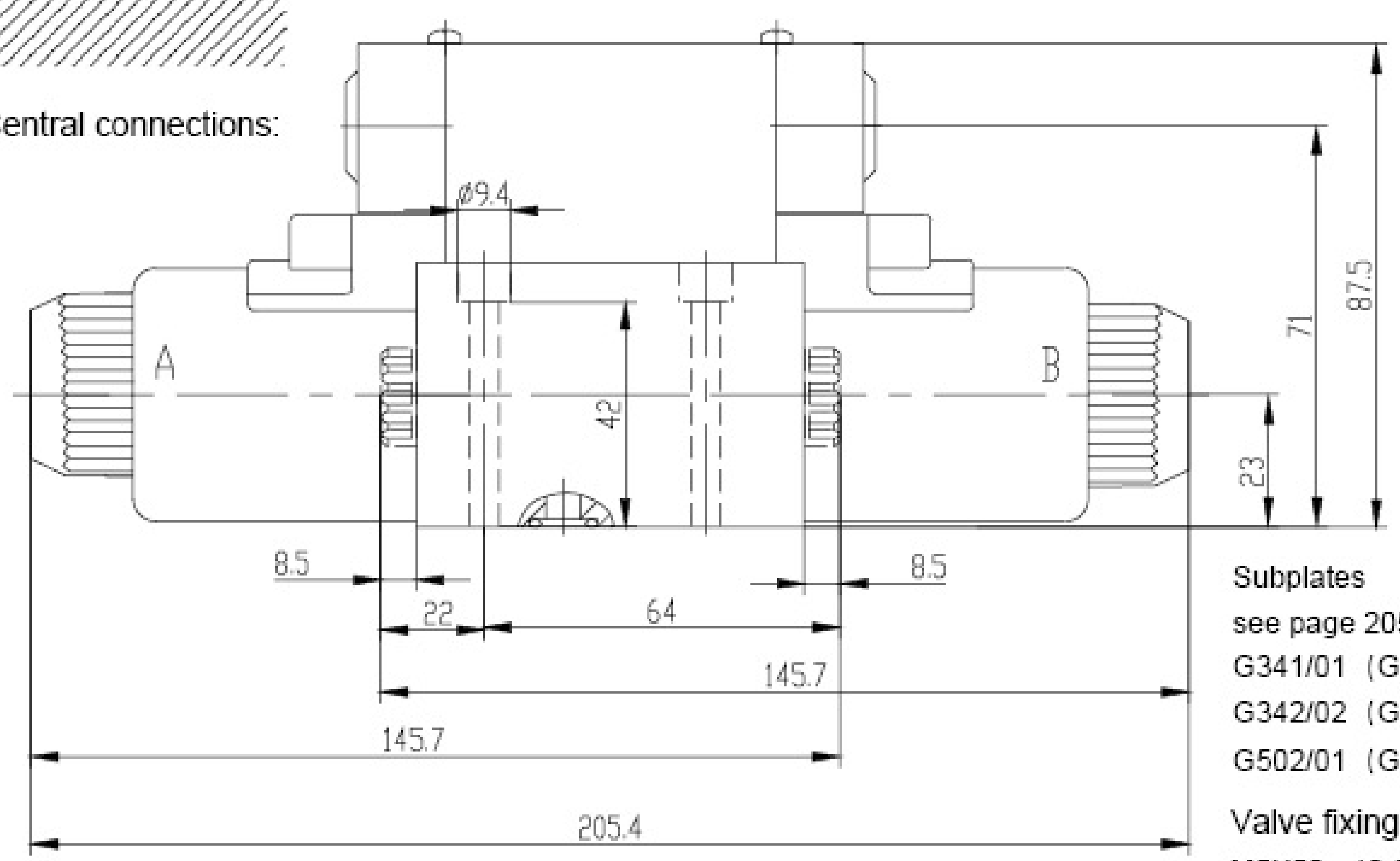


1、Nameplate
2、Space required to remove the plug-in connnector
3、1 Solenoid "a"(colour of the plug-in connector. grey)
3、2 Solenoid "b"(colour of the plug-in connector. black)
4、O-ring，9.25X1.78

Required surface finish of mating piece



Central connections:



Subplates
see page 205
G341/01 （G1/4"）;
G342/02 （G3/8"）;
G502/01 （G1/2"）;

Valve fixing screws
M5X50 -10.9
（GB/T70.1-2000）
M_A=8.9Nm

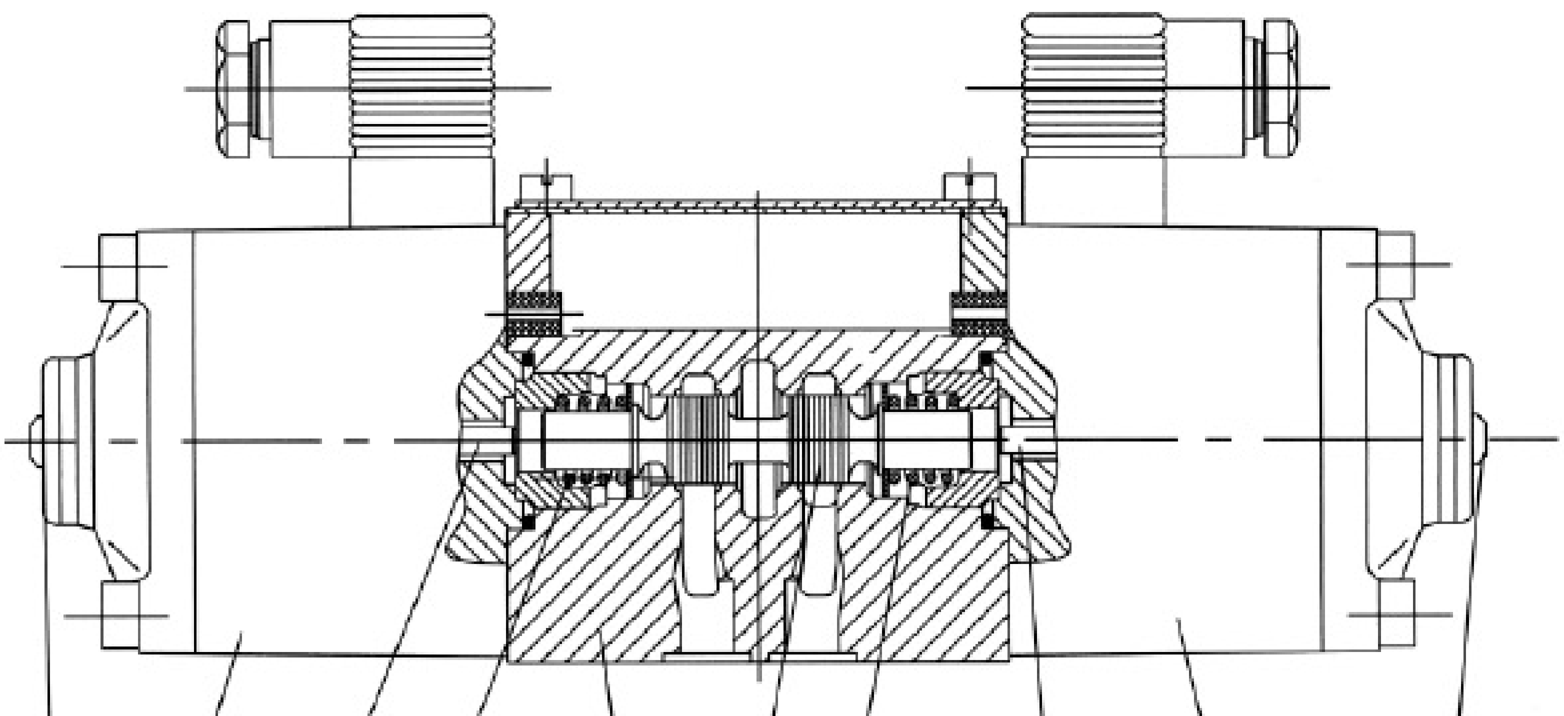
BEIJING HUADE HYDRAULICS INDUSTRIAL GROUP CO.,LTD.	**Directional control valves Type WE 10...20B/**			RE 23314/12.2004
	Size 10	up to 31.5 MPa	up to 100L/min	Replaces: RE 23314/05.2001

Features:

- Direct solenoid operated directional spool valve as standard version
- 53 kinds spool function
- Porting pattern to Din 24 340 form A, ISO 4401 and CETOP-RP 121H

Functional,section

Directional valves of type WE are solenoid operated directional spool valves. They control the start, stop and direction of a fluid flow.
These directional valves basically consist of the housing (1), one or two solenoids (2), the control spool (3), and one or two return springs (4).
In the de-energized condition, the control spool (3) is held by the return springs (4) in the central or in the initial position (except for detented spools). The control spool (3) is actuated via wet pin solenoids(2).
The force of the solenoid (2) acts via the plunger (5) on the control spool (3) and shifts the same from its rest position to the desired end position. Thus, the required flow pattern from P to A and B to T or P to B and A to T is selected.
When the solenoid (2) is de-energized, the control spool (3) is returned to its neutral position by the return spring (4).
A manual override (6), optional, is provided for emergency operation of the control spool (3) without energization of the solenoid.



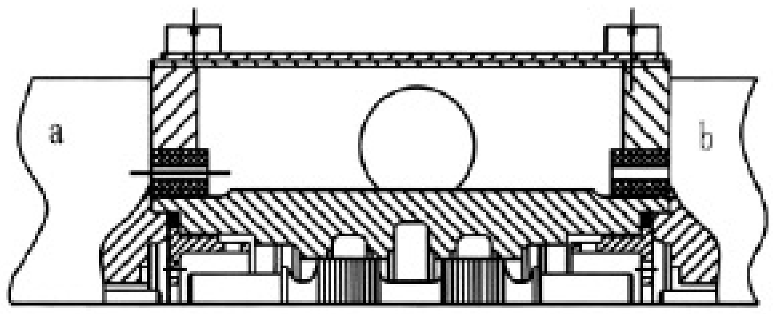
Type WE10…20B/A…

A

Type WE 10 C 20B/OA :

D

This version is a directional valve with 2 switching positions and 2 solenoids without detent. and spring return There is no defined switching position in the de-energized condition.



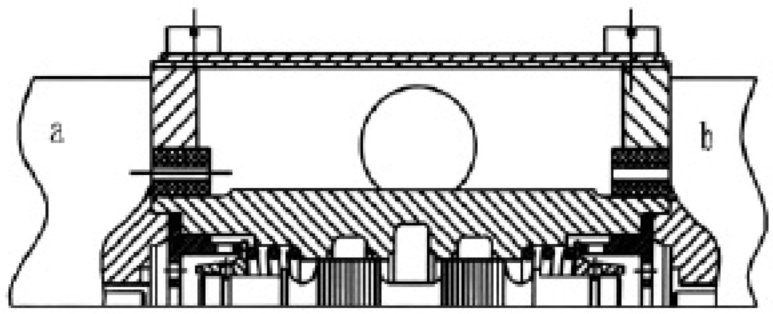
Type WE10...20B/OA

A

Type WE 10 C 20B/O FA :

D

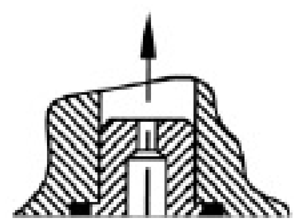
This version is a directional valve with 2 switching position, 2 solenoids and a detent without spring return. Thus, the relevant switching positions are fixed and continuous energization of the solenoid is not necessary.



Type WE10...20B/OFA

Throttle inserts

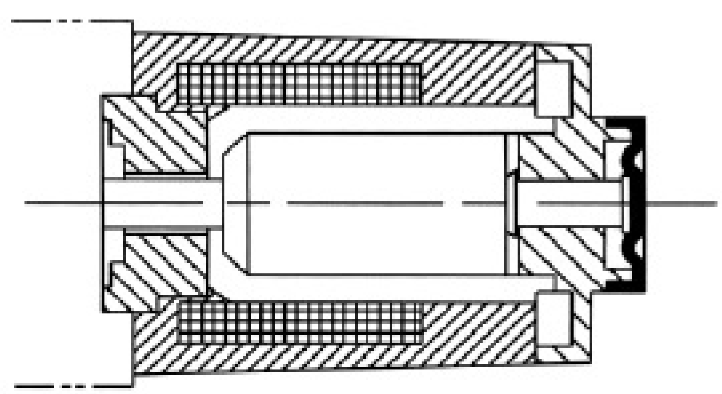
The use of throttle inserts is only required, if, due to the operating conditions, flows are to be expeced, which are higher than the stated maximum performance limits of the valve.
It is inserted in the P channel of the directional valve.



cartridge throttle

Solenoid

Wet pin solenoid life is much longer because gag bit moves in the oil ,just lessening hydraulic impact and abrasion ,i mproving the speed of emanating heat.



The characteristics of DC solenoids:

—— Switching gently ,high frequency。

—— Coils are all safety wherever gag bit stays at any position of the solenoid .

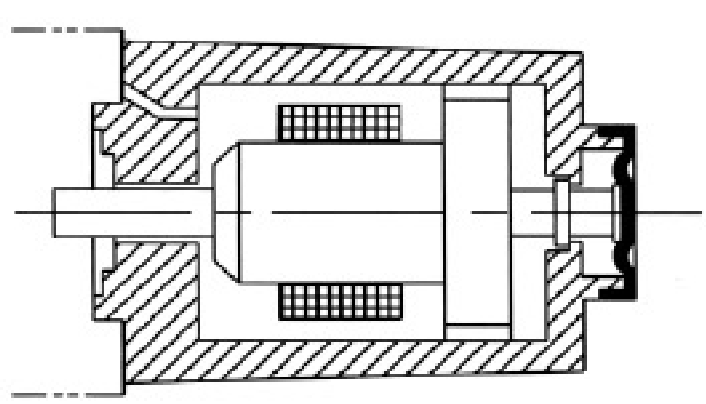
—— Its response is not rapid for lower voltage ,go beyond voltage instantly,over loading or jamming of mechanism . AC power supply can be used through commuting.

The characteristic of AC solenoids:

—— The circuitry of electrical control is easy.

—— Action time is short.

—— It is not necessary of special protect device for on-off.



Ordering code

	WE	10		20	B /		A					*

3 Service ports	= 3
4 Service ports	= 4

Nominal size 10	=10

Further details in clear text	
No code =	mineral oils
V =	phosphate ester
No code =	Without cartridge throttle
B08 =	Throttle, Φ 0.8 mm
B10 =	Throttle, Φ 1.0 mm
B12=	Throttle, Φ 1.2 mm

Electrical connection see page 105

N=	With manual override
No code=	Without manual override

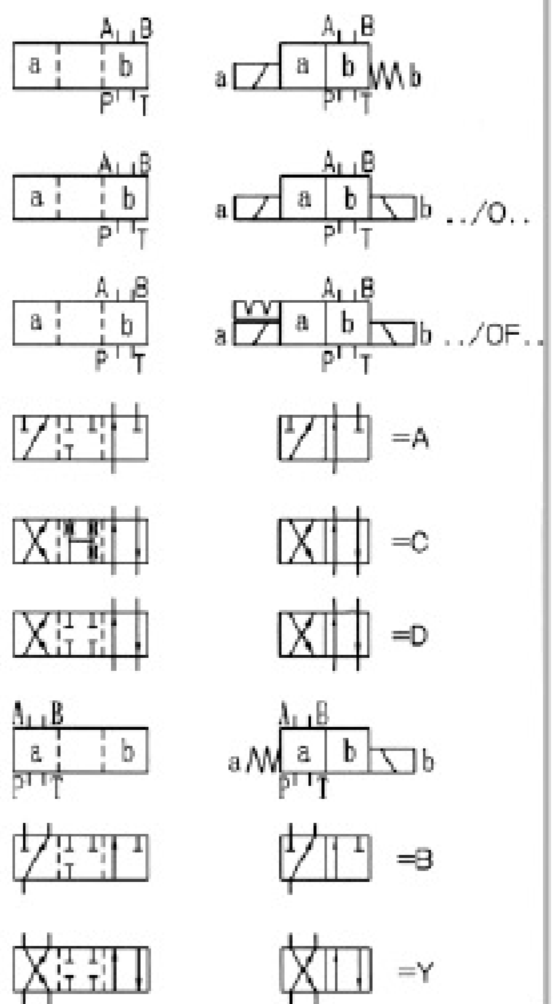
W220-50=	220 V AC 50 Hz
G24=	24 V DC
W220R =	AC 110V 220V
W110R =	AC solenoid with plug Z5

No code=	With spring return
OF=	Without spring return, with detent
O=	Without spring return

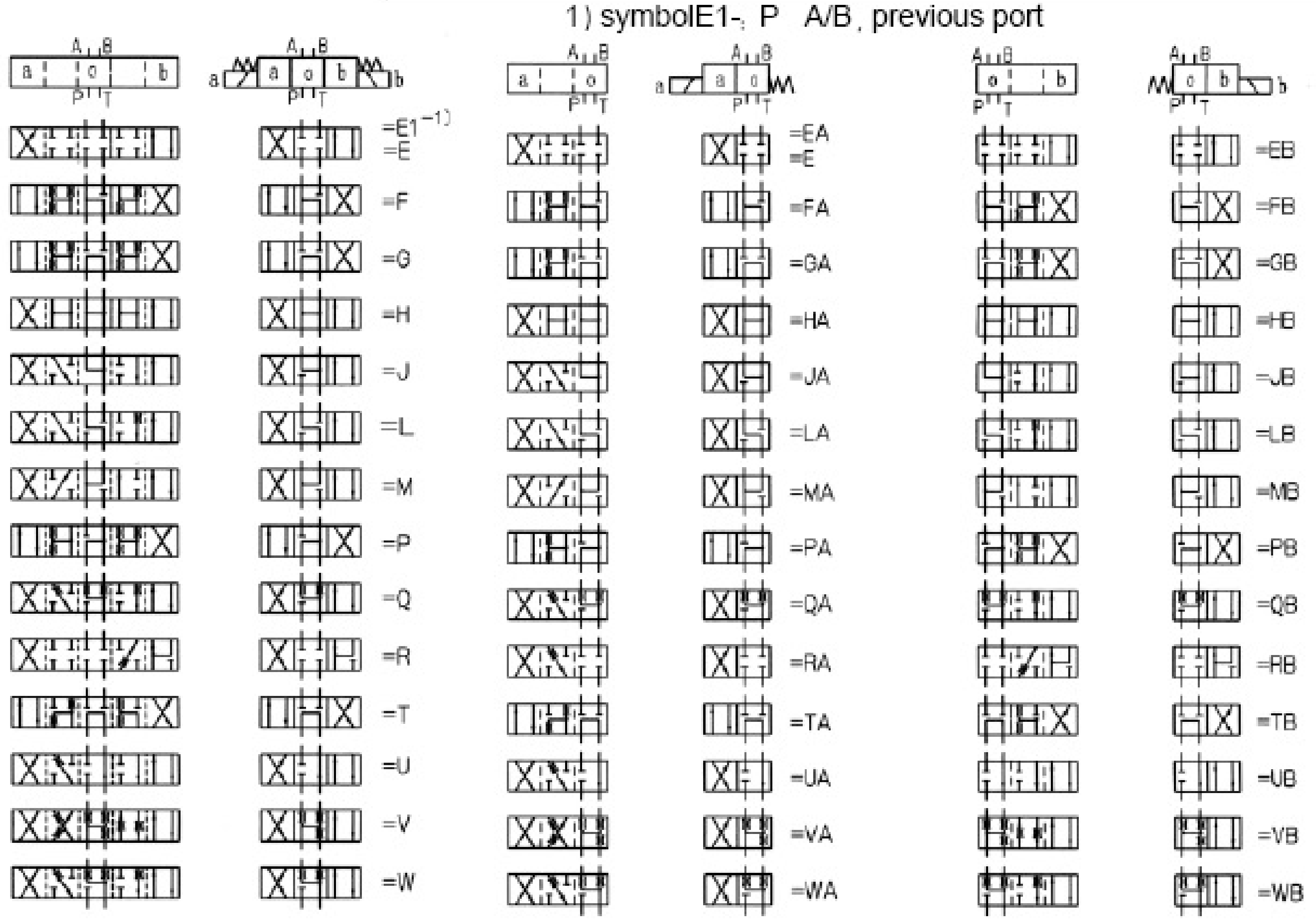
B =	Technology of Beijing Huade Hydraulic

20 =	Series 20 to 29

(20 to 29: unchanged installation and connection dimensions)



1) symbolE1-: P A/B, previous port



Technical data

Hydraulic operation part

Operating press., max.	Port A, B, P (MPa)	up to 31.5
	Port T (MPa)	up to 16
Flow, max. q_V (L/min)		up to 100
Flow area (switching position 0)		With symbol Q approx. 6 % of the nominal area With symbol W approx. 3 %
Hydraulic fluid		mineral oils or phosphate ester
Fluid temperature range (℃)		-30～+80
Viscosity range (mm²/s)		2.8～500
Weight (Kg)	Valve with 1 solenoid	4.7（DC）；4.2（AC）
	Valve with 2 solenoids	6.6（DC）；5.6（AC）

Note: With symbol A and B, port T must be used as drain port, if the operating pressure is higher than the permissible tank pressure.

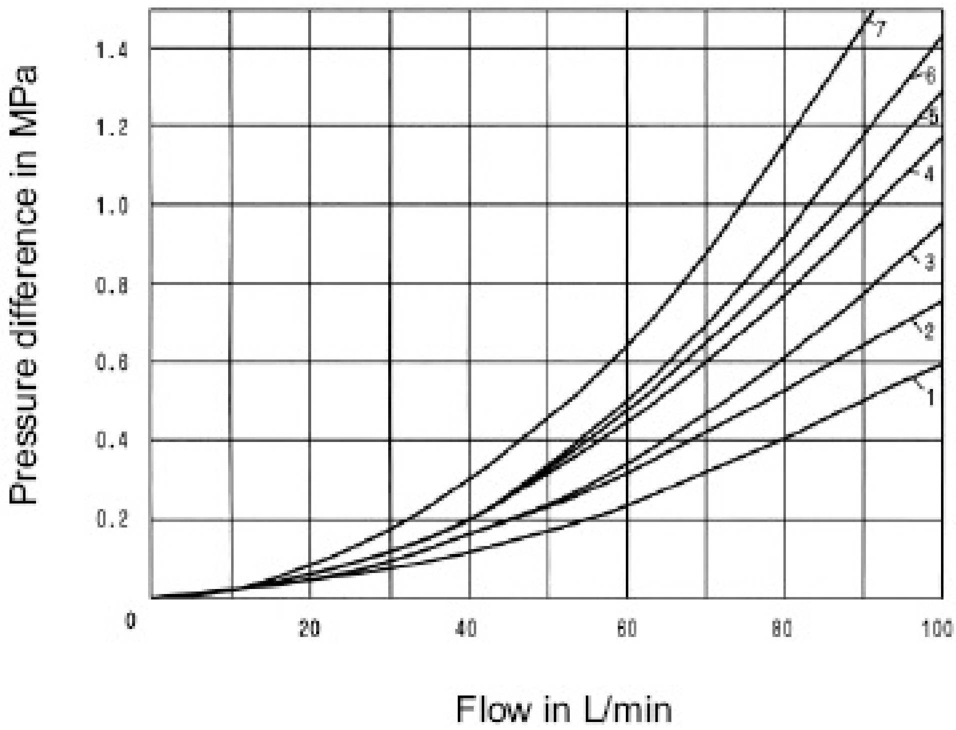
Electrical operation part

Voltage type	AC	DC
Voltages available (V)	110、220/50Hz	12、24、110
Power consumption (W)	-	35
Holding power P (VA)	65	-
Making current P (VA)	480	-
Duty cycle	Continuous	
Switching time ON (ms)	15～25	50～60
Switching time OFF (ms)	40～60	50～70
Environment temperature (℃)	+50	
Coil temperature (℃)	+150	
Switching frequency (cycles/h)	7200	15000
Insulation to DIN 40 050	IP65	

Note: When connecting the electrics, the protective conductor (PE) must be connected according to relevant regulations.

Characteristic curves (measured at ν = 41 mm²/s and t = 50 ˚C)

7 Symbol "R" in switched position A → B
8 Symbols "G" and "T" in mid position P → T

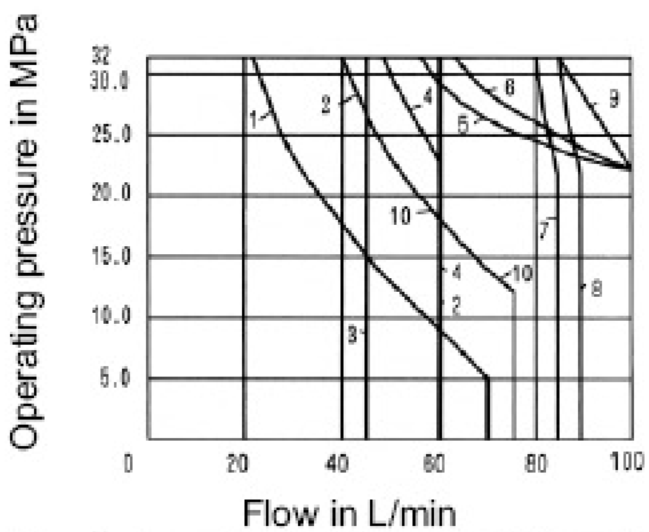


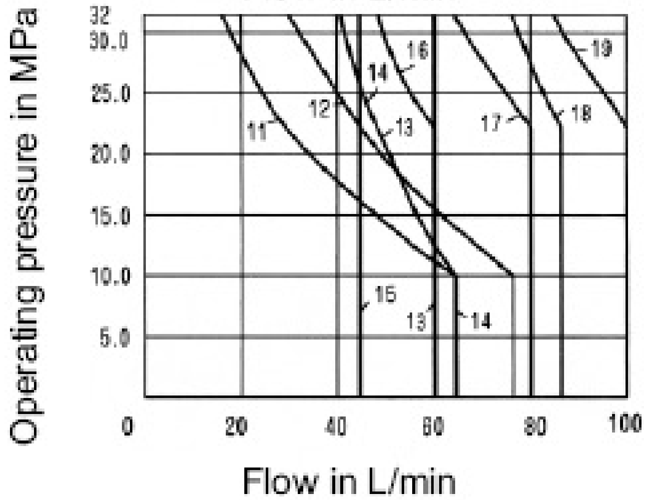
Symbol	Flow direction			
	P - A	P - B	A - T	B - T
A,B	2	2	-	-
C,D,Y,J	2	2	3	3
E,Q,V	2	2	4	4
F	2	3	3	5
G	3	3	4	6
H	1	1	4	5
L,U	2	2	3	5
M	1	1	5	5
P	3	2	5	3
R	2	4	3	-
T	3	5	5	6
W	2	2	5	5

Switching power limits (measured at ν = 41 mm²/s and t = 50 ˚C)

Because gluing effect influence valves switching,for attaining the biggest recomendatory value ,suggest adopting the whole flux filter of 20μm in system the hydraulic impetus also affects the flux ability of valve,so different spool valve contain different work curve.for the valve of size 4,the value is given in the condition that two passages work nomally(e.g from P to A at the same time B to T) due to the flow forces active within the valves the permissible switching power limit may be significantly less if there is only one direction of flow.

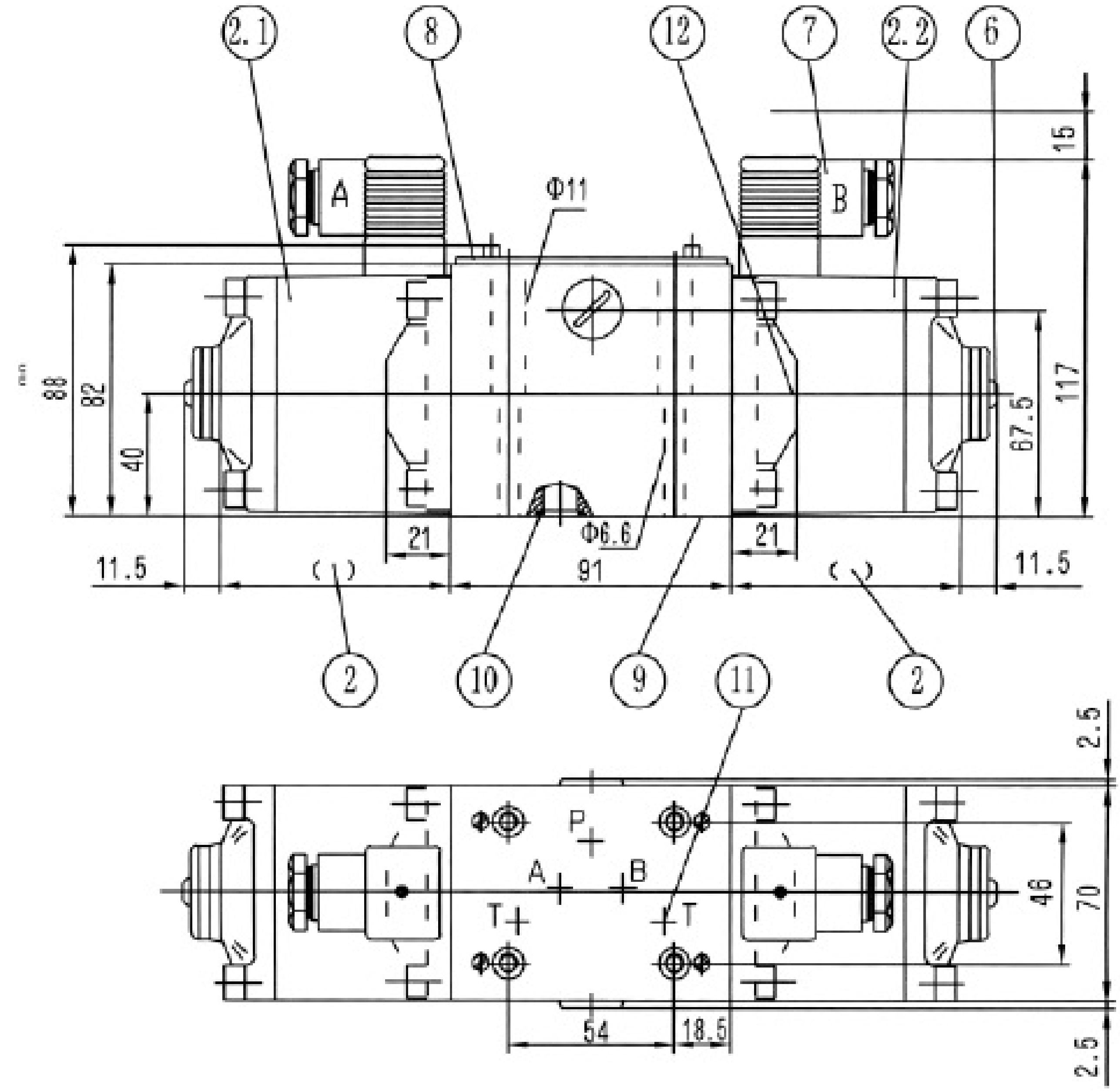
The switching power limits were measured with the solenoids at operating temperature, 10% under voltage and without tank back pressure.



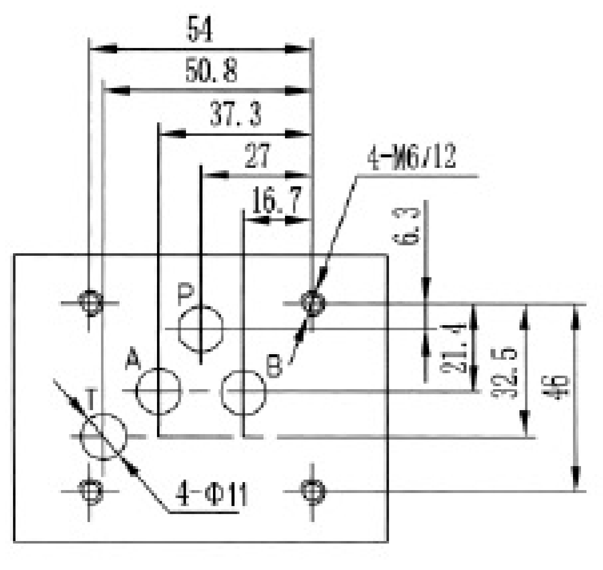


DC solenoid		AC solenoid	
Char. curve	Symbol	Char. curve	Symbol
1	A,B	11	A,B
2	F,P,T	12	H
3	V	13	F,P,T
4	G	14	A/O
5	E,L,Q,U,W	15	V
6	J	16	G
7	D,Y	17	J,L,U
8	G,R	18	C,D,Y,Q,R,W
9	M,C/O,D/O	19	C/O,D/O,E,M
10	H,A/O		

Unit dimensions

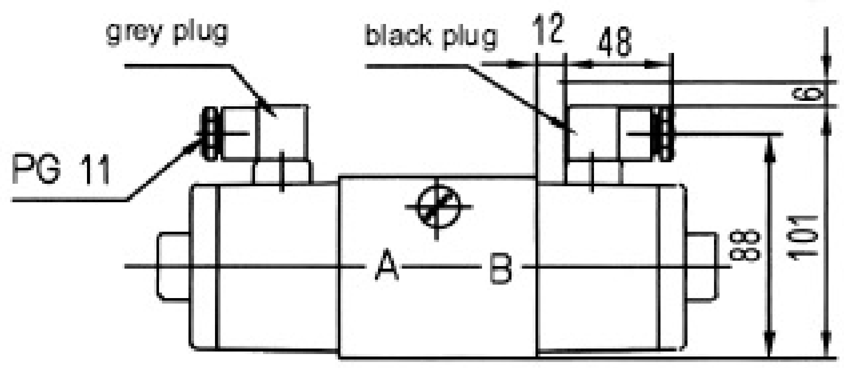


the connection dimensions of service ports

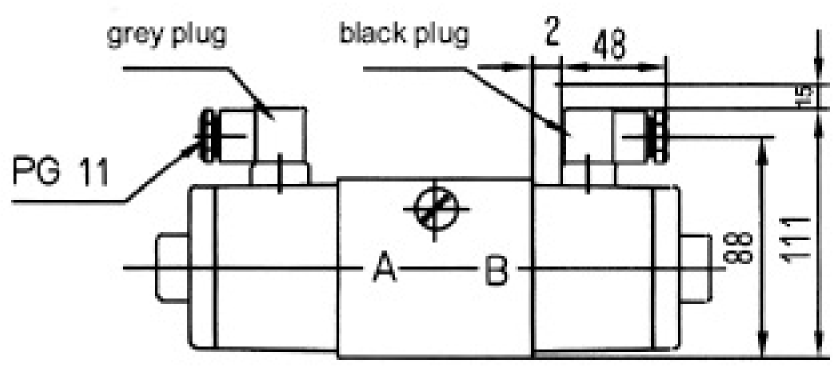


2 DC solinoid(without manual override) 94mm
AC solinoid(without manual override) 75mm
2 .1 Solenoid "a" (colour of the plug-in connector: grey)
2 .2 Solenoid "b" (colour of the plug-in Connector: black)
6 Manual override "N"
7 Plug Z4
8 Nameplate
9 Service port
10 O-ring12x2
11 Accessional T must be used(except for ZDR10D...)if making a hole at subplate
12 Cover for valve with one solenoid
Subplates：see page206
G66/01(G3/8¨) G66/02(M18 × 1.5)
G67/01(G1/2¨) G67/02(M22 × 1.5)
G534/01(G3/4¨) G534/02(M27 × 2)
※ Valve fixing screws
4-M6 × 50-10.9（GB/T70.1-2000）
M_A=15 N.m

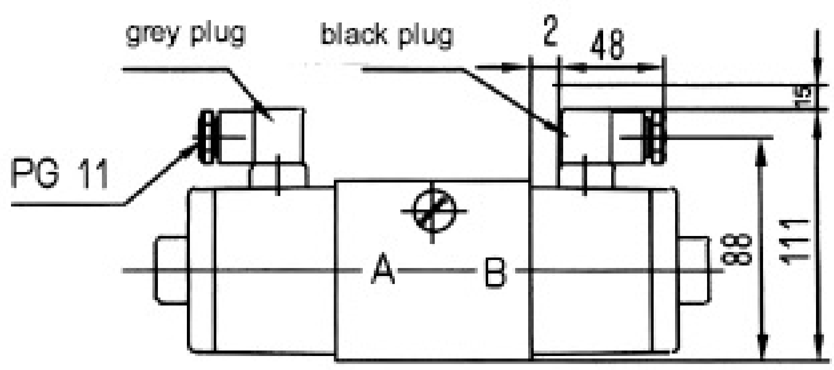
Z4 angled plug



Z5 large angled plug



Z5L Large angled plug with light



Notice

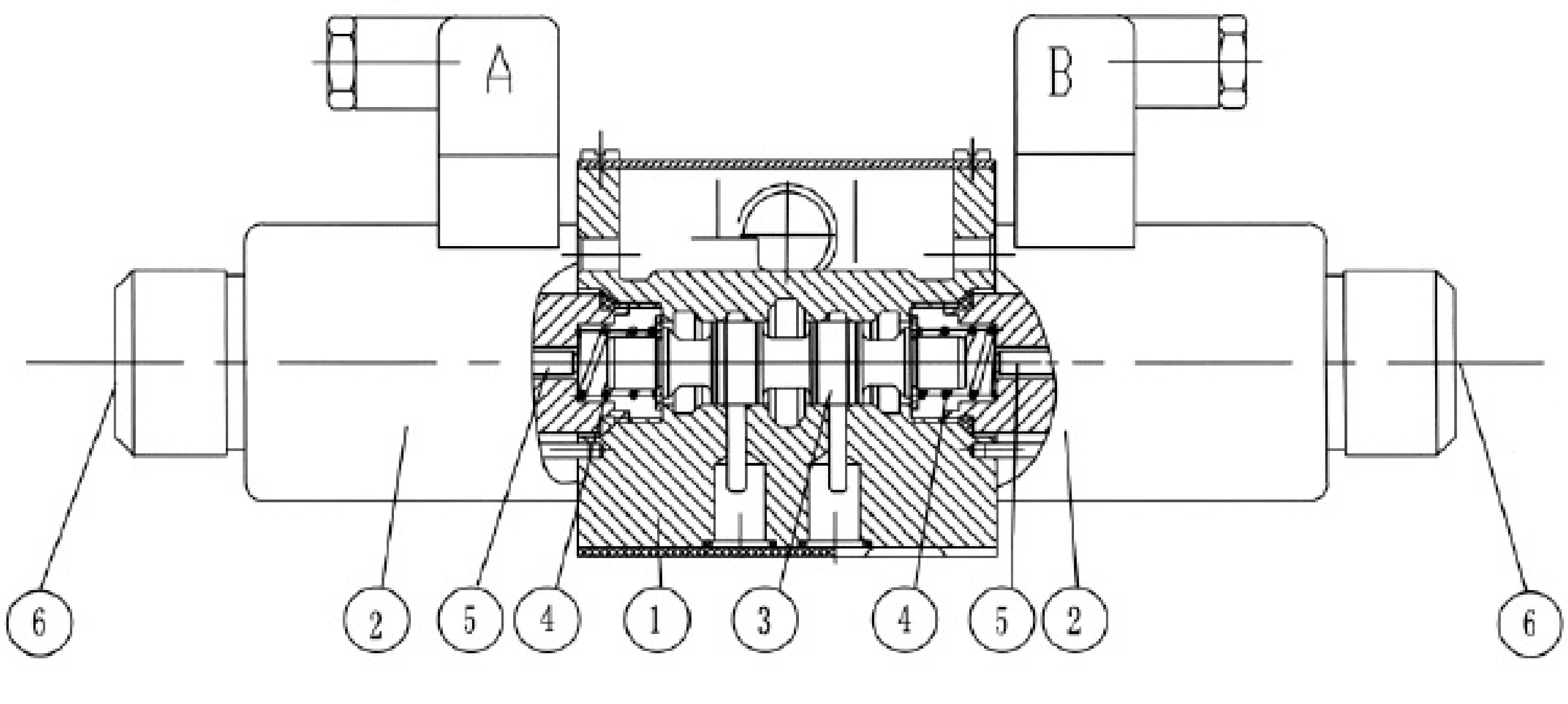
1. The fluid must be filtered. Minimum filter fineness is 20 μm.
2. The tank must be sealing up and an air filter must be installed on air entrance.
3. Products without subplate when leaving factory, if need them, please ordering specially.
4. Valve fixing screws must be high intensity level (class 10.9). Please select and use them according to the parameter listed in the sample book.
5. Roughness of surface linked with the valve is required to $\overset{0.8}{\checkmark}$.
6. Surface finish of mating piece is required to 0.01/100mm.

BEIJING HUADE HYDRAULIC INDUSTRIAL GROUP CO.,LTD.	**Directional control valves Type WE 10...30B/**			RE 23316/12.2004
	Size 10	up to 31.5 MPa	up to 120L/min	Replaces：RE 23316/05.2001

Features:
-Direct solenoid operated directional spool valve as standard version
-Wet pin DC or AC solenoids with removable coils
-perfect outline
-Coils may be replaced without opening the pressure-tight chamber
-Choice of either central or individual electrical connections
-Optional hand over-ride
-long life
-Porting pattern to Din 24 340 form A, ISO 4401 and CETOP-RP 121H

Functional, section

Directional valves basically comprise the housing (1), one or two solenoids (2), control spool (3), and one or two return springs (4).At rest, control spool (3) is held in its central or initial position by means of return springs (4) (except in the case of impulse spools). Control spool (3) is operated by wet pin solenoids (2).The force of solenoid (2) acts on control spool (3) and moves it from its rest position to the desired end position. This permits free flow from P to A and B to T or P to B and A to T.
On de-energizing solenoid (2) control spool (3) is returned to its initial position by return spring (4).
Optional hand over-ride (5) permits control spool (3) to be moved without the solenoids being energized.



Type 4WE 10 ...30B/...C

Ordering code

	WE	10		31	B /		C						*

3 service ports = 3
4 service ports = 4

Size 10 = 10

Symbols see below

Series 30 to 39 = 31
(30 to 39: unchanged installation and connection dimensions)

Technology of Beijing Huade Hydraulic =B

With spring return = No code
Without spring return, but with detent = OF
Without spring return = O

Wet pin solenoid with removable coil = C

W220= 220 V AC 50 or 240V AC 60 Hz
G24= 24 V DC
W220R = DC solinoid commuting automatically

With protected hand override (standard) = N9
Without hand override = No code
With hand override = N

Individual connections：
With component plug without plug-in connector =K4
Normal plug =Z4
Large angled plug =Z5
Large angled plug with indicator light =Z5L
Central connection:
Cable entry at side = No code
Cable entry in cover, with lamp = DL
Central connection in cover, with lamp (without angled plug-in connector) = DKL

No code = Without cartridge throttle
B08= Throttle, Φ 0.8 mm
B10 = Throttle, Φ 1.0 mm
B12= Throttle, Φ 1.2 mm

No code = mineral oils
V = phosphate ester

Further details in clear text

Symbols

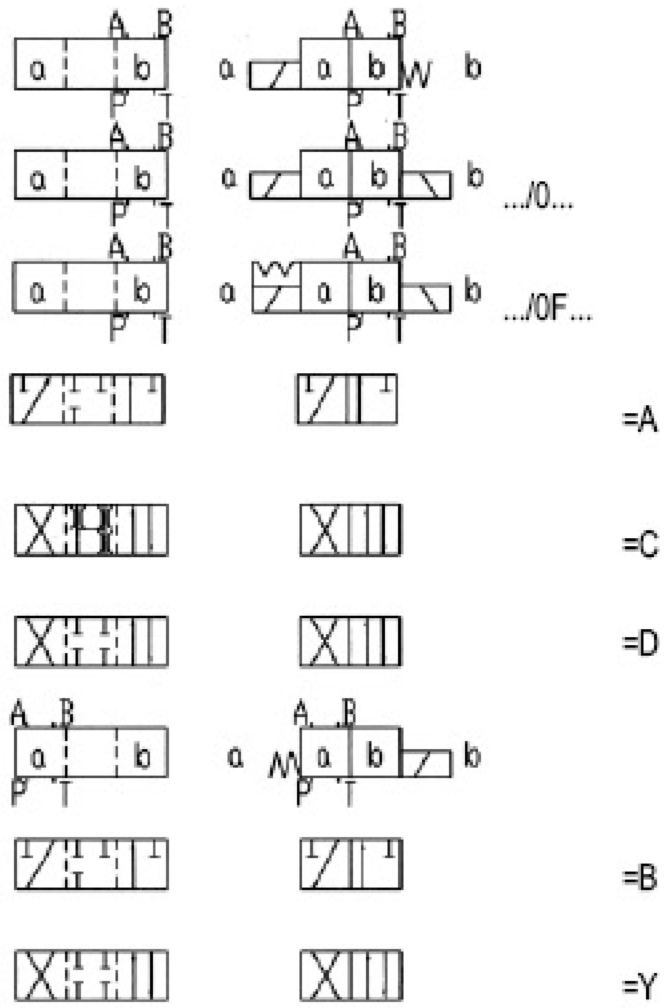
4) Example:

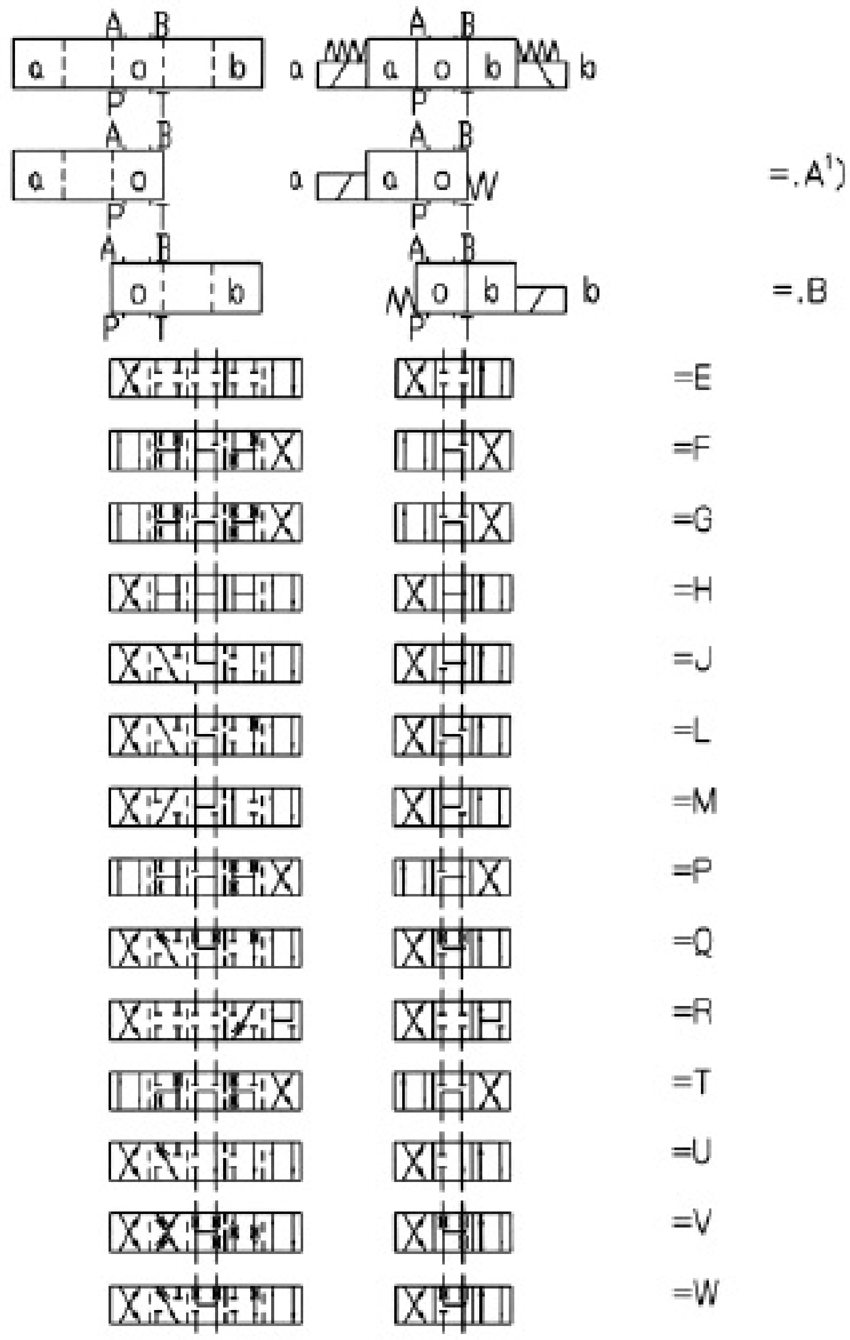
Spool E with switching position "a"

Ordering code ..EA..

Spool E with switching position ˝b˝

Ord

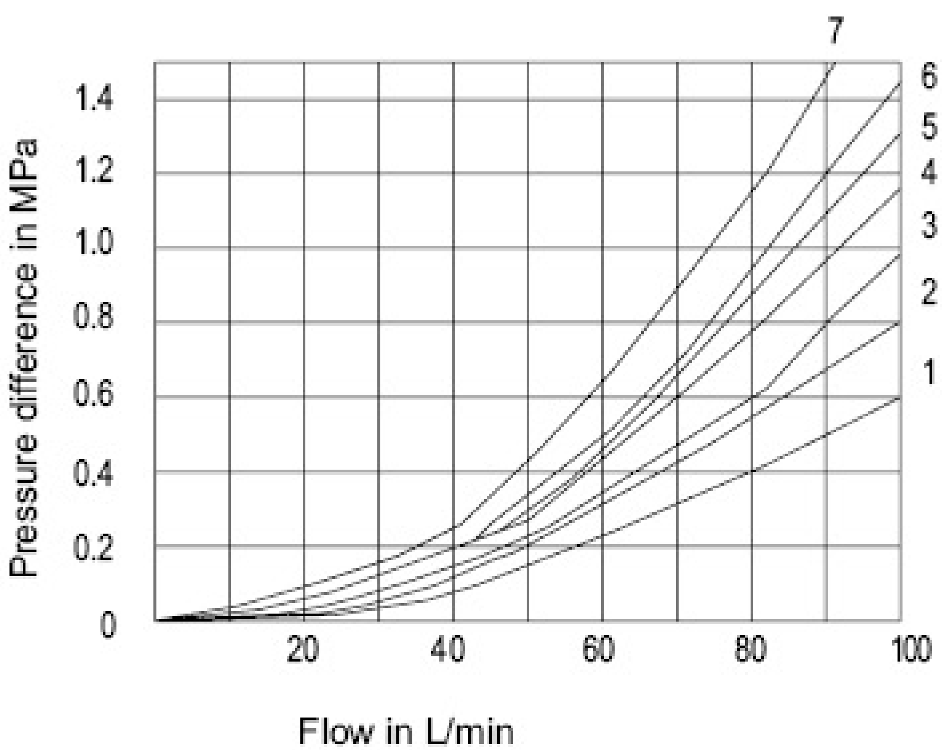




Characteristic curves (measured at v= 41 mm²/s and t = 50˚C)

7 Symbol "R " in switched position A → B

8 Symbols "G " and "T " in mid position P → T

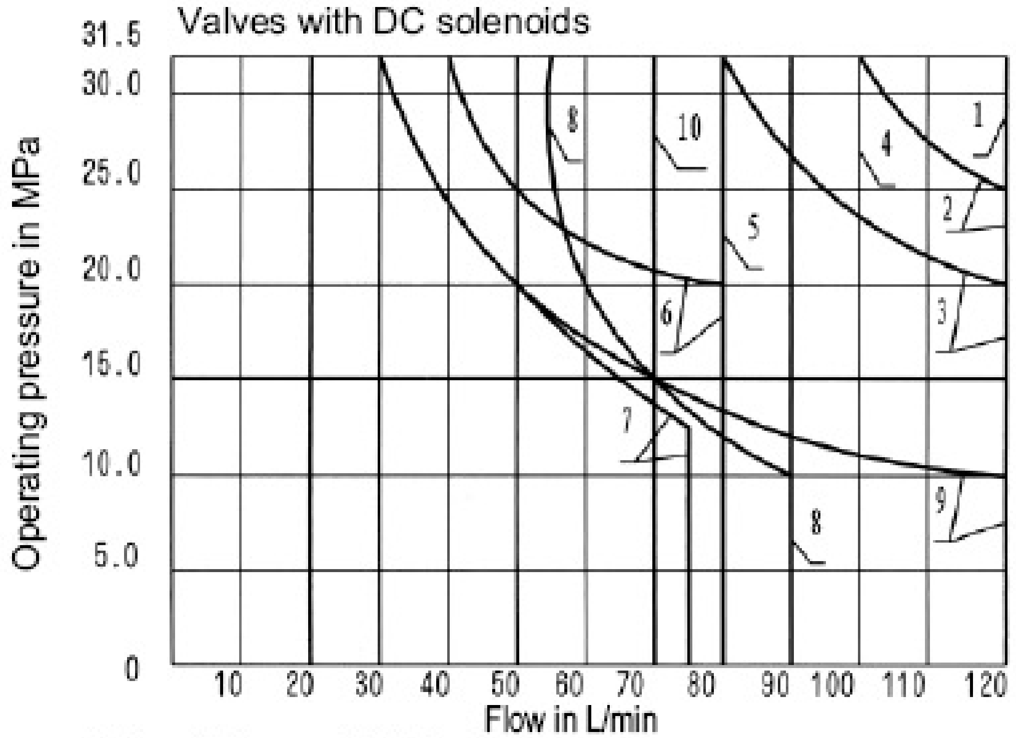


Symbols	Direction of flow			
	P-A	P-B	A-T	B-T
A、B	2	2	-	-
C、D、Y、J	2	2	3	3
E、Q、V	2	2	4	4
F	2	3	3	5
G	3	3	4	6
H	1	1	4	5
L,U	2	2	3	5
M	1	1	5	1
P	3	2	5	3
R	2	4	3	-
T	3	5	5	6
W	2	2	5	5

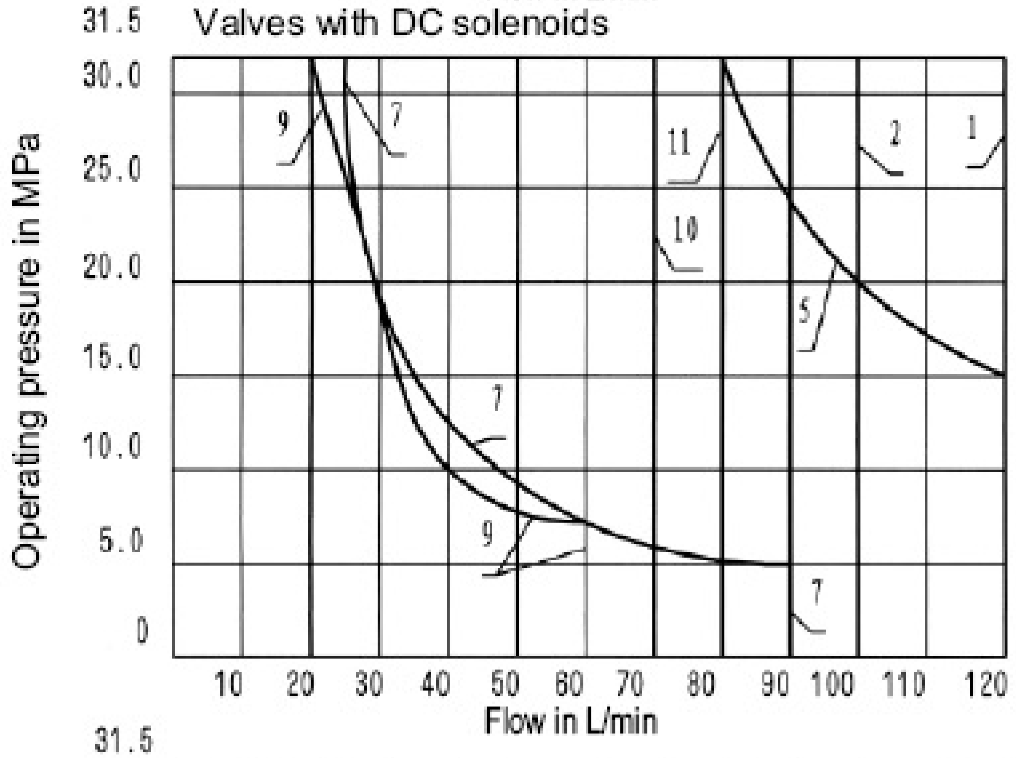
Switching power limits (measured at v = 41 mm²/s and t = 50°C)

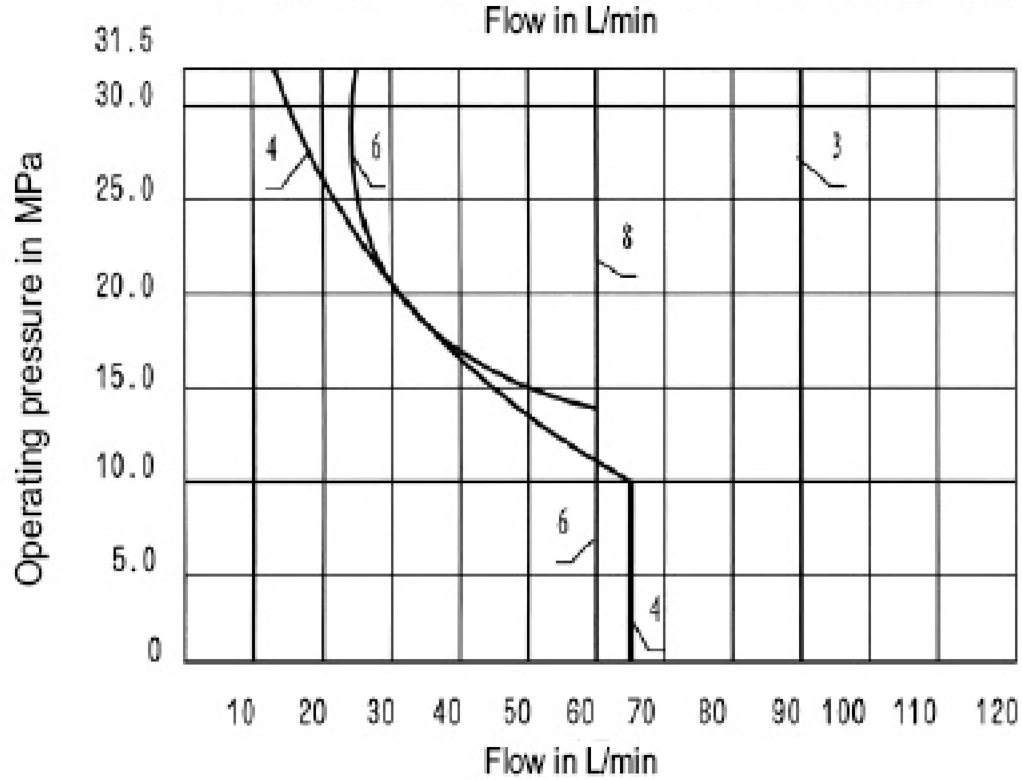
The given switching power limits are for applications with two flow directions (e.g.from P to A and simultaneous return flow from B to T).
Due to the flow forces active within the valves the permissible switching power limit may be significantly less if there is only one direction of flow (e.g.from P to A and port B blocked)!
(Please consult us for applications of this kind.)

The switching power limits were measured with the solenoids at operating temperature, 10% under voltage and without tank back pressure.



Curve	Symbols
1	C,D/0,C/0F
	D,D/0,D/0F
	Y,M
2	E
3	A/0,A/0F
	L,U,J,Q,W
4	H
5[1]	R
6	G
7	T
8	F,P
9	A,B
10	V

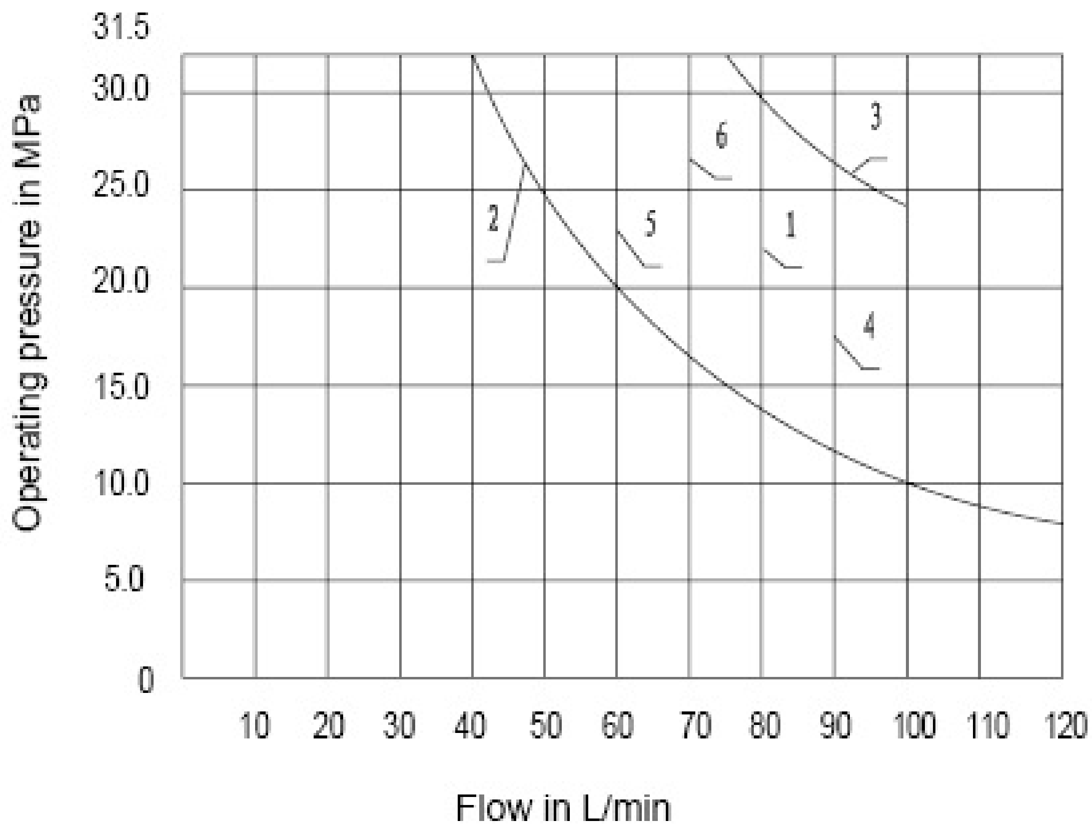




42V,50Hz;110V,50Hz;120V,60Hz;
127V,50Hz;220V,50Hz;240V,60Hz

Curve	Symbols
1	C,C/O,C/0F
	D,D/O,D/0F
	Y
2	E,L
	U,Q,W
3	M
4	A,B
5	A/O,A/OF,J
6	G
7	F,P
8	V
9	T
10	H
11	R

Switching power limits (measured at v = 41 mm^2/s and t = 50°C)



42V,60Hz,110V,60Hz 127V,60Hz,220V,60Hz	
Curve	Symbols
1	C,C/O,C/OF D,D/O,D/OF Y
2	A/O,A/OF
3	E
4	M
5	V
6	H
	Switching power limits for other spools on enquiry!

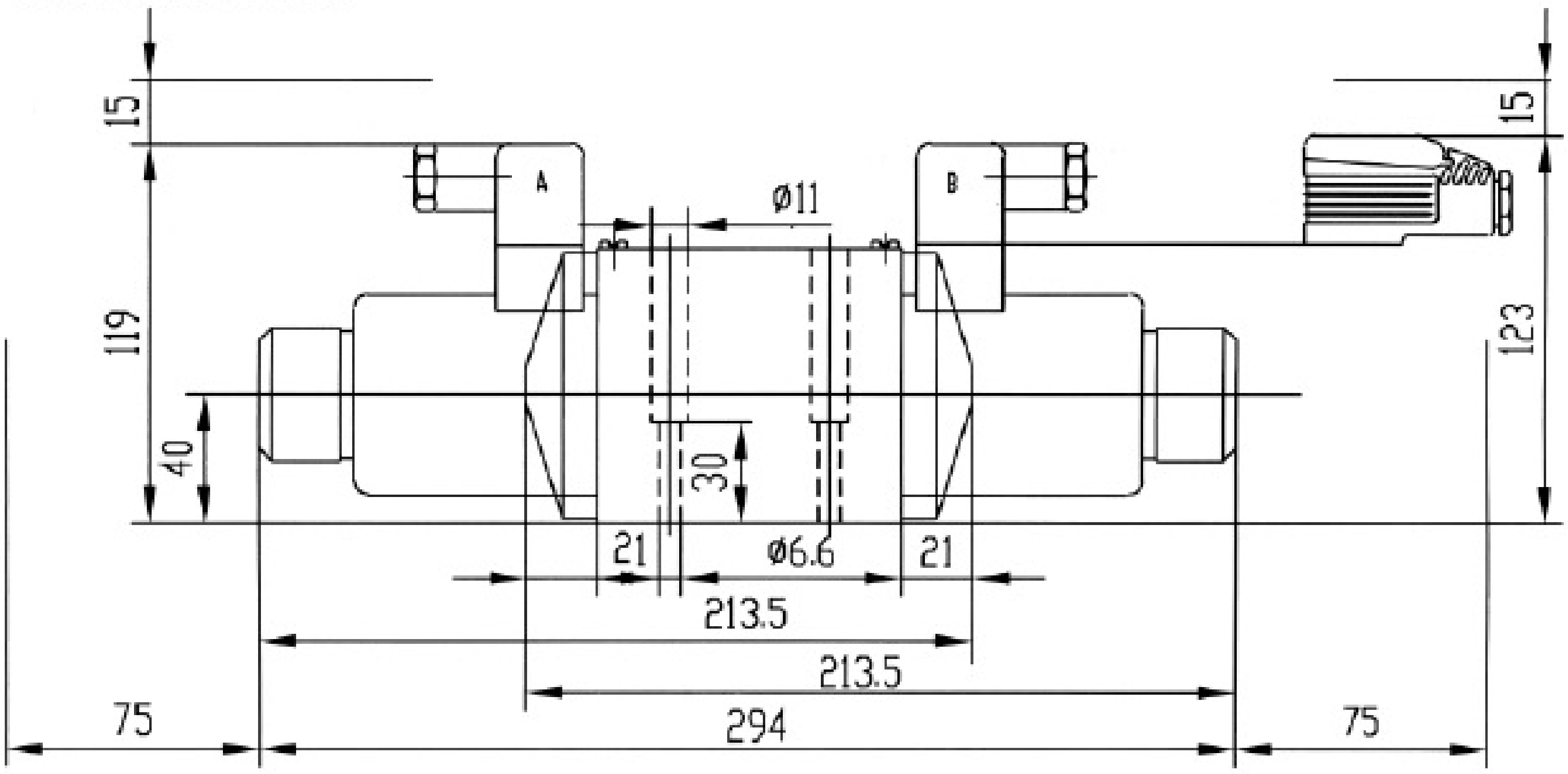
Technical data

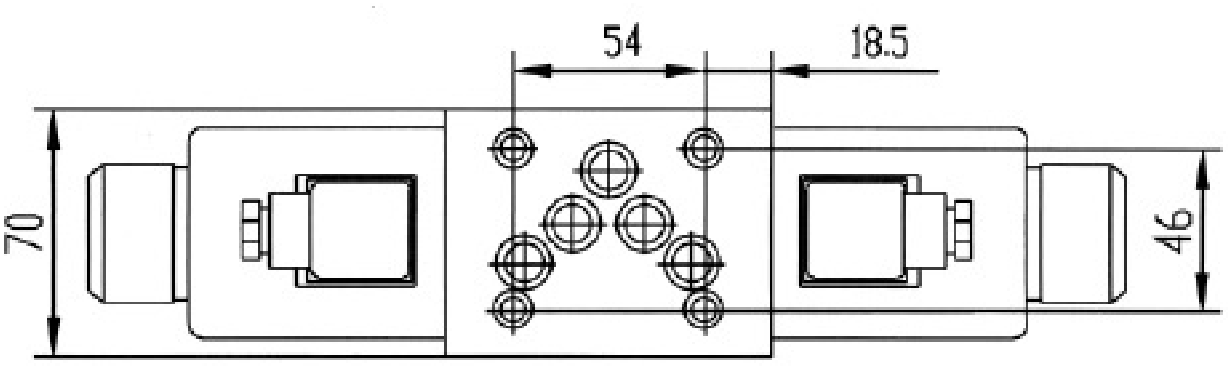
Operating pressure max.	Ports A, B, P (MPa)	31.5
	Ports T (MPa)	16
Flow max. (L/min)		120
Cross section (switching position 0):		With symbol Q approx. 6 % of the nominal area With symbol W approx. 3 %
Pressure fluid		Mineral oils(for NBR seal) or phosphate ester(for FPM seal)
Pressure fluid temperature range (°C)		-30～＋80
Viscosity range (mm^2/s)		2.8～500
Weight (kg)	Valve with 1 solenoid	5.1(DC)，4.3(AC)
	Valve with 2 solenoids	6.7(DC)，5.1(AC)

For symbols A and B, port T must be used as a drain line, if the operating pressure is higher than the permissible tank pressure.

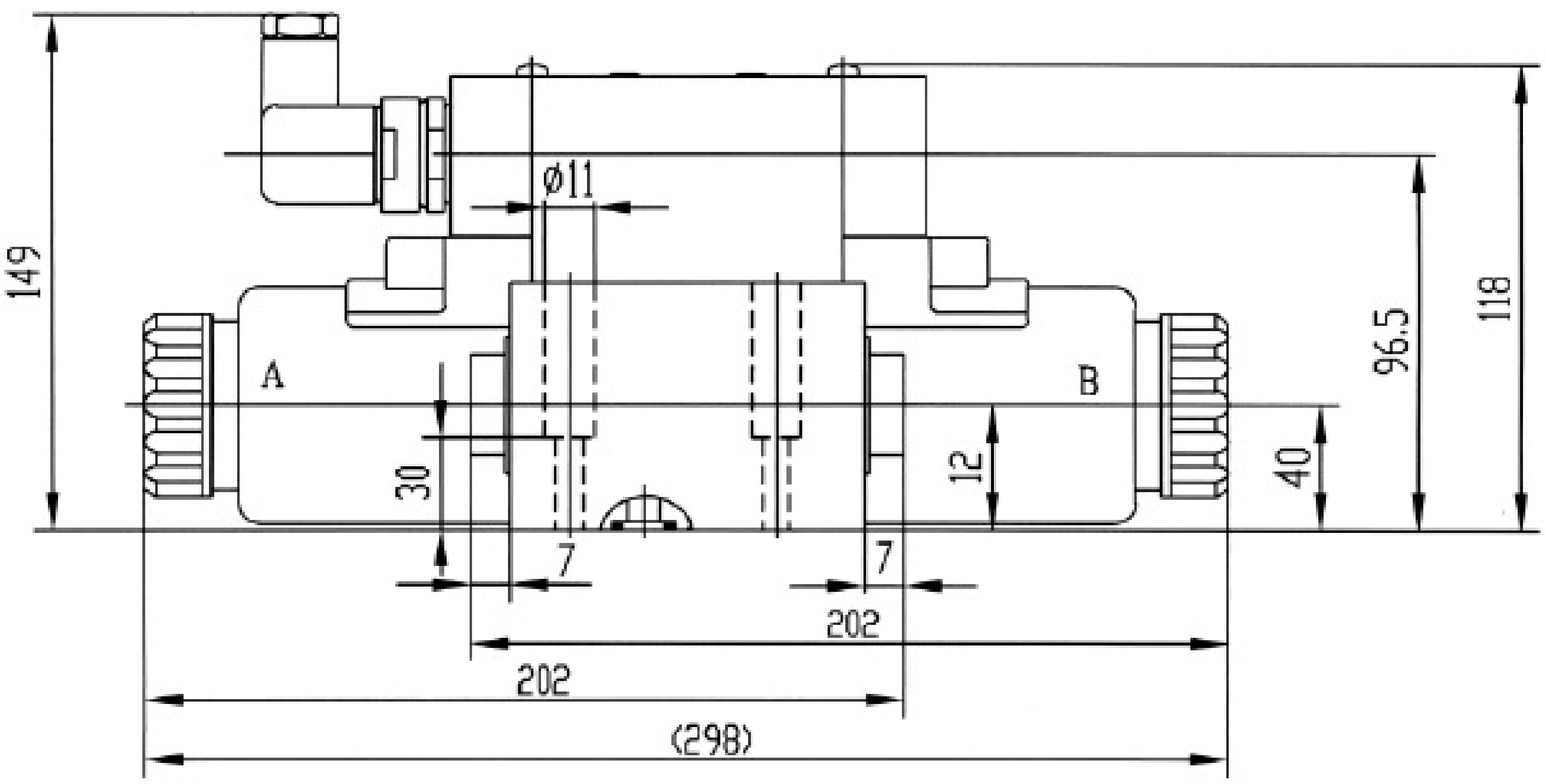
Unit dimensions with DC solenoids

Individual connection





Central connection



Valve fixing screws: 4-M6x40-10.9（GB/T70.1-2000）

M_A=15N.m

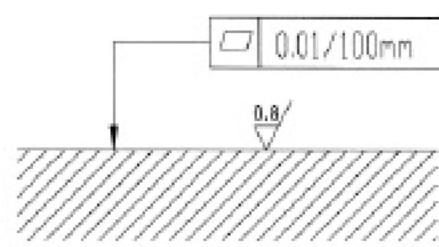
Subplate：G66/01(G3/8＂) G66/02(M18x1.5)

G67/01(G1/2＂) G67/02(M22x1.5)

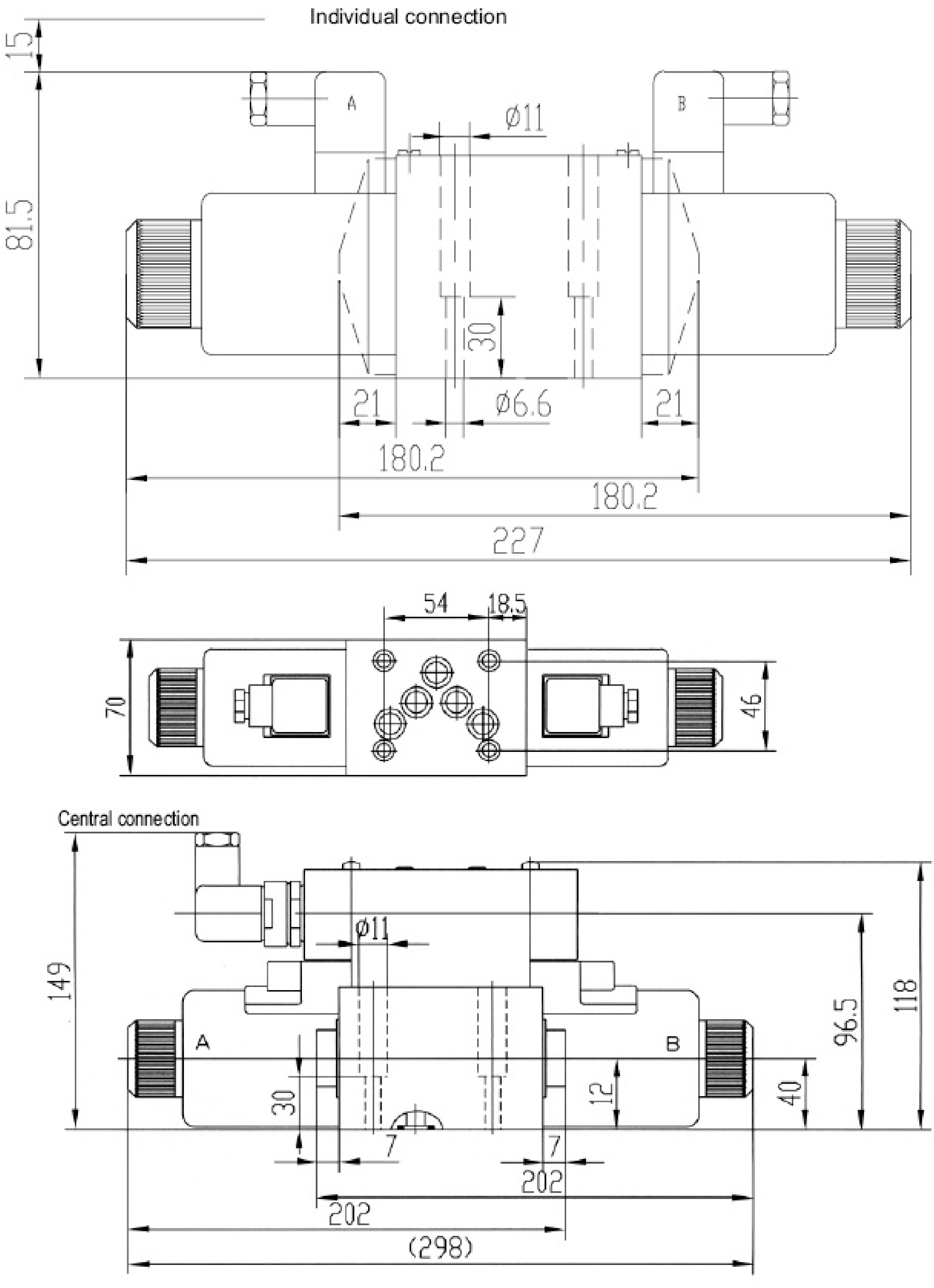
G534/01(G3/4＂) G534/02(M22x1.5)

(see page 206)

Required surface finish of mating piece



Unit dimensions with AC solenoids



Valve fixing screws：4-M6x40-10.9（GB/T70.1-2000）

M_A=15N.m

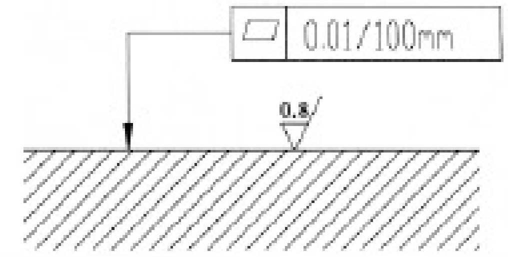
Subplate：G66/01(G3/8 ") G66/02(M18x1.5)

G67/01(G1/2 ") G67/02(M22x1.5)

G534/01(G3/4 ") G534/02(M22x1.5)

(see page 206)

Required surface finish of mating piece

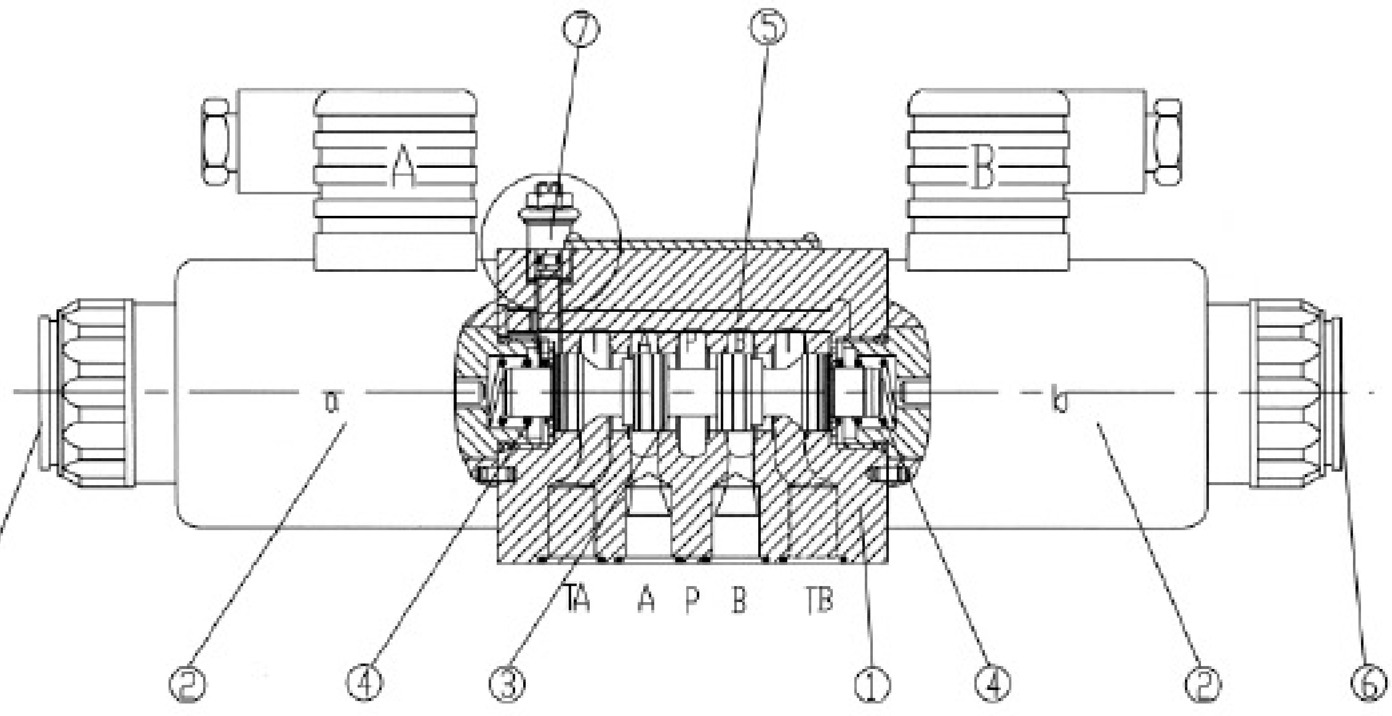


Notice

1. The fluid must be filtered. Minimum filter fineness is 20 μm.
2. The tank must be sealing up and an air filter must be installed on air entrance.
3. Products without subplate when leaving factory, if need them, please ordering specially.
4. Valve fixing screws must be high intensity level (class 10.9). Please select and use them according to the parameter listed in the sample book.
5. Roughness of surface linked with the valve is required to $\overset{0.8}{\surd}$.
6. Surface finish of mating piece is required to 0.01/100mm.

Features:
- Direct solenoid actuated directional spool valve
- Wet pin DC solendois with removable coil (AC voltages possible via a rectifier)
- Solenoid coil can be rotated through 90°
- The coil can be replaced without opening the pressure-tight chamber
- Individual electrical connections
- Hand override, optional
- Adjustable spool switching time, optional
- Porting pattern to Din 24 340 form A, ISO 4401 and CETOP-RP 121H

Function, section



Type 5-4WE10J30B/...C...

5-chamber directional valves of type 5-.WE are solenoid operated directional spool valves. They control the start, stop and direction of flow with the additional option of adjusting the spool switching time.These directional valves basically consist of the housing (1), one or two solenoids (2), the control spool (3), as well as one or two return springs (4).The two spring chamber are connected by a connecting bore (5). As the spool switches, the flow is displaced from one spring chamber to the other via this passage. If the area of this connecting bore is reduced by an orifice, the switching time changes accordingly.The T channels are isolated from the spring chambers. This means that switching pulses do not affect the control spool (3) and thus,soft switching of the spool can be achieved.In the de-energizedcondition, the control spool (3) is held in the central or initial position by return springs (4) (except for impulse spools). The control spool (3) is actuated by wet pin solenoids (2).

In order to ensure correct functioning, care must be taken to ensure that the pressure chamber of the solenoid is filled with oil.

The force of the solenoid (2) acts on the control spool (3) and switches it from its rest position to the required end position. This then permits flow from P to A and B to T or P to B and A to T.When the solenoid (2) is de-energizedthe control spool (3) is returned to its rest position by the return spring (4).A hand override (6), optional, enables the control spool (3) to be moved without energization of the solenoids.

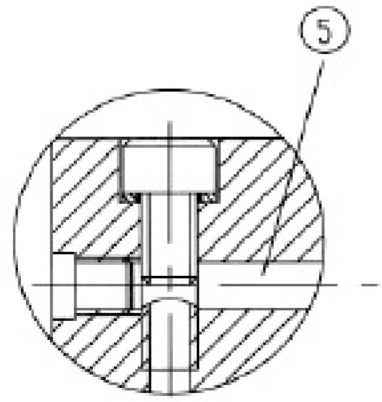
Adjustable spool switching time (only with DC solenoids)

The optional installation of an orifice screw (7) or orifice (8) - see below - offers the possiblity of increasing switching time
- with orifice screws type 5-.WE 10 ../..CG../C..
- with throttle type 5-.WE 10 ../..CG../A..

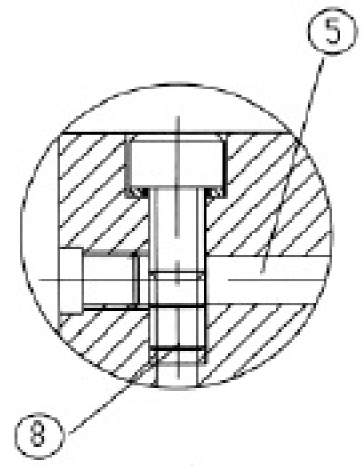
Funtion,secion

With the installation of orifices, the spool switching time may be lengthened by more than 100 ms. The actual time is dependent upon the individual system (e.g. pressure, flow and viscosity).

When reto-fitting or modifying a throttling system, care must be taken that the fluid volume in the spring chambers and the connecting bore (5) is retained, as this is a prerequisite for the smooth operation of the switching time adjustment.



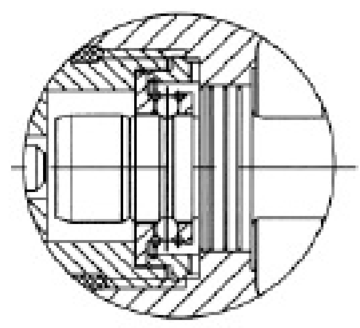
Without spool throttle



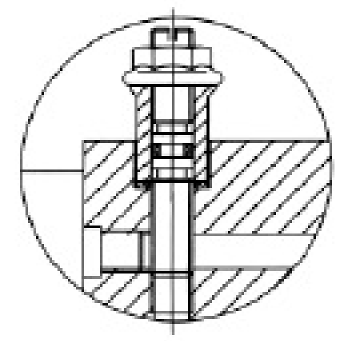
with orifice

Type 5-.WE 10.30/OC....
(only possible with symbols A, C and D)
This version is a directional valve with 2 switched positions and 2 solenoids without detent. There is no defined spool postiion in the de-energizedcondition.

Type 5-.WE 10.30/OFC... (impulse spool), with detent
(only possible with symbols A, C and D)
This version is a directional valve with 2 detented switched postions and 2 solenoids. Thus, the spool is held in the last switched position, permanent energisation of the solenoid is not required.

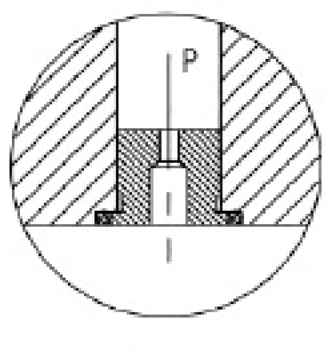


With detent



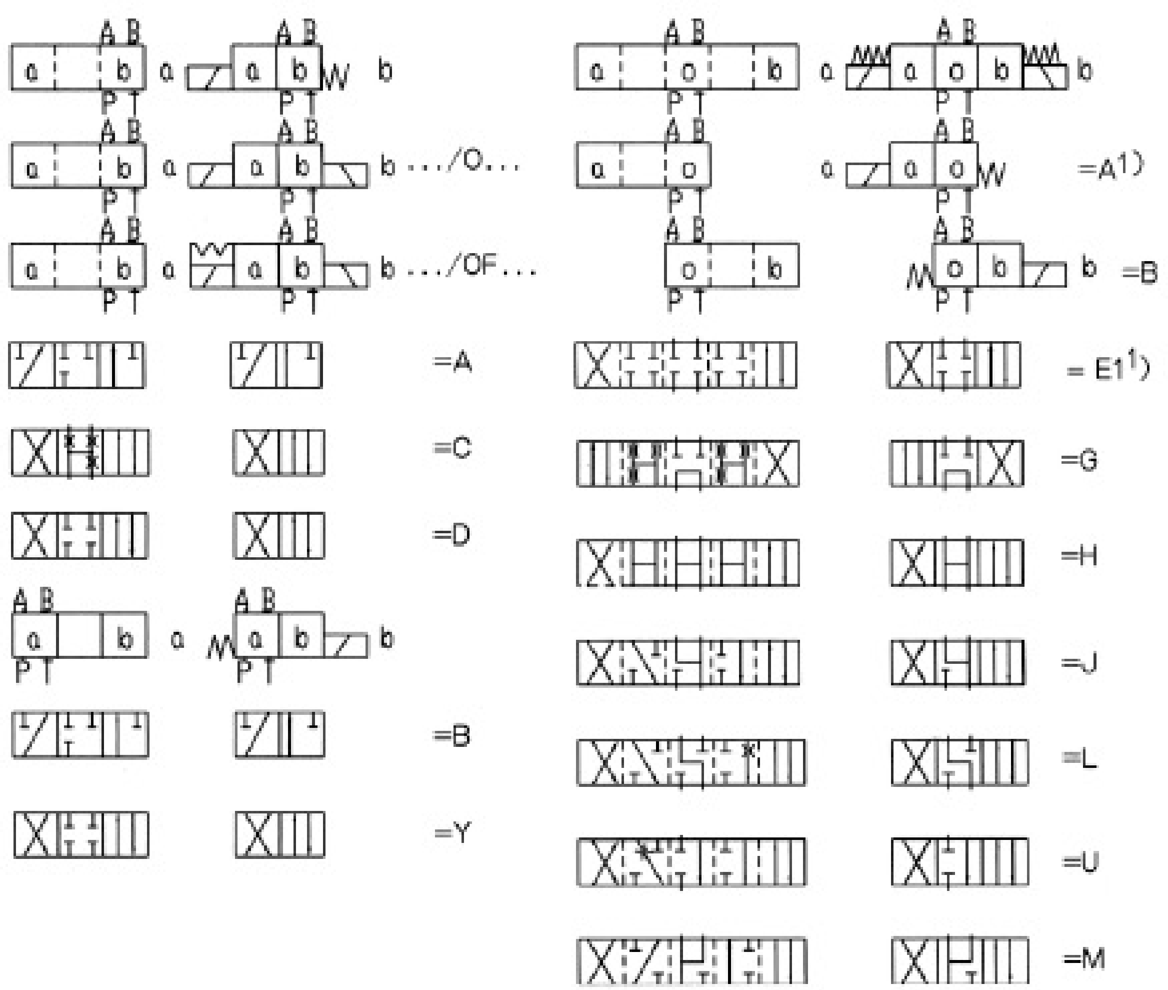
With throttle screw (without throttle bore)

Throttle insert (type 5-.WE 10.30/.../B..)
The use of a throttle insert is required if, due to the operating conditions, flows can occur during the switching process which are larger than the perfomance limits of the valve allow.
The orifice is to be inserted into the P channel of the directional valve.

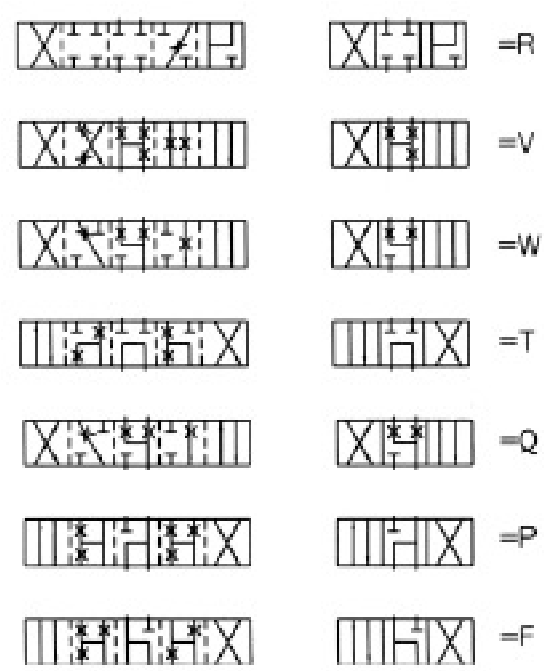


Throttle insert

Symbols



1) Example:
Spool E with switched position "a",ordering detail ..EA..



Ordering details

5-	WE	10		31	B		/	/						*

3 service ports = 3
4 service ports = 4

Nominal size 10 = 10

Symbol e.g. C, E, EA, EB etc.
- for possible versions, see sheet below

Series 30 to 39 = 31
(30 to 39: unchanged installation and connection dimensions)

Technology of Beijing Huade Hydraulic = B

With spring return = No code
Without spring return with detent = OF
Without spring return = O

Wet pin solenoid (oil immersed) with removable coil = C

24VDC = G24
220VAC, 50Hz or 240VAC, 60Hz = W220
DC soleniod commuting automaticaly = W220R

With protected manual override (standard) = N9
Without hand override = No code
Hand override with protective cap = N

Further details in clear text

No code = mineral oils
V = phosphate ester

No code= Without cartridge throttle
B08 = Throttle Φ 0.8 mm
B10= Throttle Φ 1.0 mm
B12= Throttle Φ 1.2 mm
B15= Throttle Φ 1.5 mm
B30= Throttle Φ 3.0 mm

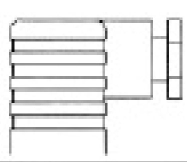
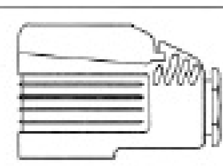
No code = without spool throttle
C= With throttle screw
A06= Orifice Φ 0.6 mm
A07= Orifice Φ 0.7 mm
A08= Orifice Φ 0.8 mm
A10= Orifice Φ 1.0 mm

individual connection
Z4 = normal plug to DIN43850
Z5 = large right-angle plug (rectifier can be selected)
Z5L = large right-angle plug with indicator light

DC (permissible voltage ±10%)	Standard voltage of DC electromagnet when use AC power connector	Order details
110V — 50/60Hz 120V — 60Hz	96v	G96
230V — 50/60Hz	205v	G205

1) Plug-in connector must be ordered seprately (see table below).
2) It is necoessary to go through DC electromagnet controlled by rectifier when using AC power connector.
3) For individual connections, may use large plug with retifier (Order separatelly ,see table below for order details)

Ordering details: plug(individual connection)

		DIN43650-Plug to DIN43650 ISO 4400 	large plug 			
			without indicator light	with indicator light	without indicator light	with indicator light and inhibitory circuits
valve side a colour:grey	Order symbol	074 6830	08 616	313 923/24V 313 926/180−240V	313313 932	310 994
valve side a colour:black		074 684	009 129	313928/24V 313 931/180−240V	313 933	310 995

Technical data (For applications outside these perameters, please consult us!)

General		
Installation		optional
Max. ambient temperature (℃)		-30~+50
Weight	Valve with 1 solenoid (kg)	5.1(DC) ; 4.3(AC)
	Valve with 2 solenoids (kg)	6.7(DC) ; 5.1(AC)
Hydraulic data		
Max. operating pressure	Ports A, B, P (MPa)	31.5
	Ports T (MPa)	21 (DC); 16 (AC)
Flow area		with symbols A and B, port T must be used as drain port, if the operating pressure is higher than the permissible tank pressure.
Max. flow (L/min)		120
Pressure fluid		mineral oils or phosphate ester
Fluid temperatur range (℃)		- 30 to + 80
Viscosity range (mm^2/s)		2.8～500
Degree of contamination		We, therefore, recommend a filter with a minimum retention rate of $\beta_{10} \geqslant 75$.
Flow cross-section (switched position 0)	For symbol V (mm^2)	11 of nominal cross section (A/B → T); 10.3of nominal cross section (P → A/B)
	For symbol W (mm^2)	2.5 of nominal cross section (A/B → T)
	For symbol Q (mm^2)	5.5 of nominal cross section (A/B → T)

Electrical data

Type of voltage		DC	AC
Available voltages (See blew when ordering AC solenoids)		12、24、42、60、96、110、180、205、220	42、110、220、230、240 50/60Hz
Power consumption (W)		35	-
Holding power (VA)		-	90
Swithching power (VA)		-	550
Duty continuous		Continuous	Continuous
Switching time to ISO 6403	ON (ms)	45 to 60	15 to 25
	OFF (ms)	20 to 30	20 to 30
Switching frequency (cycles/h)		15000	7200
Protection to DIN 40 050		IP65	
Insulation class VDE 0580		F	H
Max. coil temperature (℃)		150	180

1) special voltages on request

When connecting the electrics, the protective conductor (PE ⏚) must be connected according to the relevant regulations.

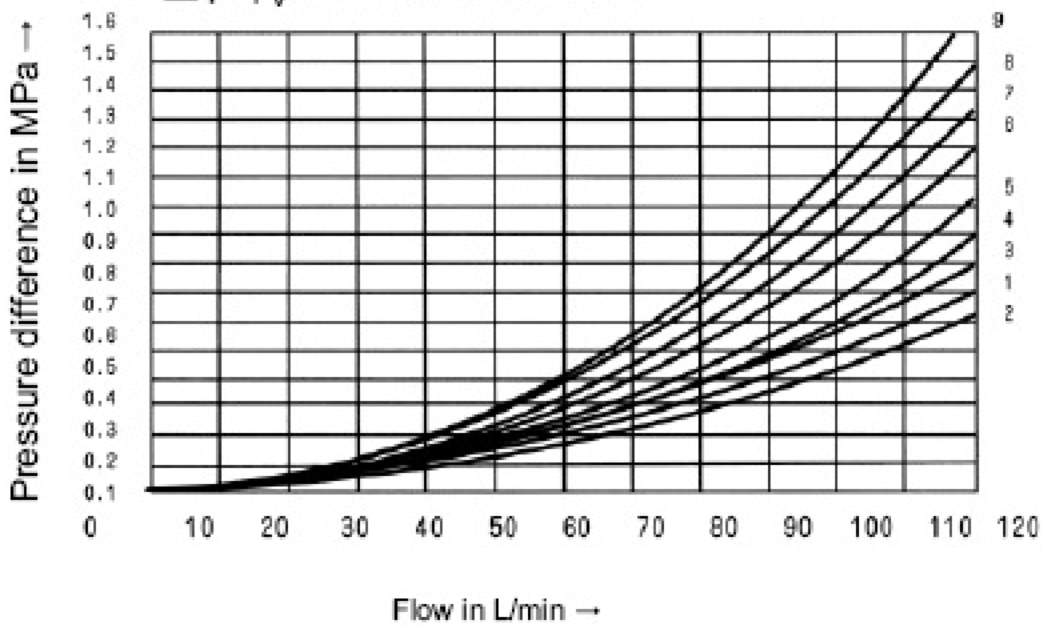
Note:
These solenoids may be used for 2 types of supply:
e.g. solenoid type W110 for:
110V, 50Hz
120V, 60Hz

Order Type		
	W42	42V, 50Hz
		42V, 60Hz
	W110	110V, 50Hz
		120V, 60Hz
		110V, 60Hz

Order Type		
	W230	230V, 50Hz
		230V, 60Hz
	W220	220V, 50Hz
		220V, 60Hz

Characteristic curves (measured at v = 41 mm^2 /s and t = 50˚C)

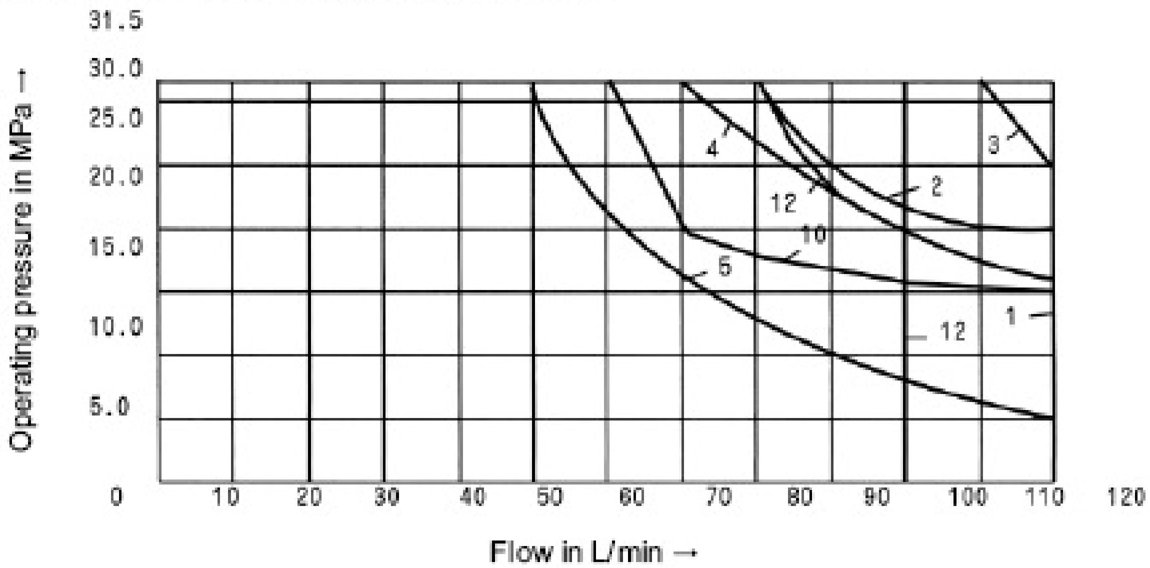
△ p-q_v -characteristic curves



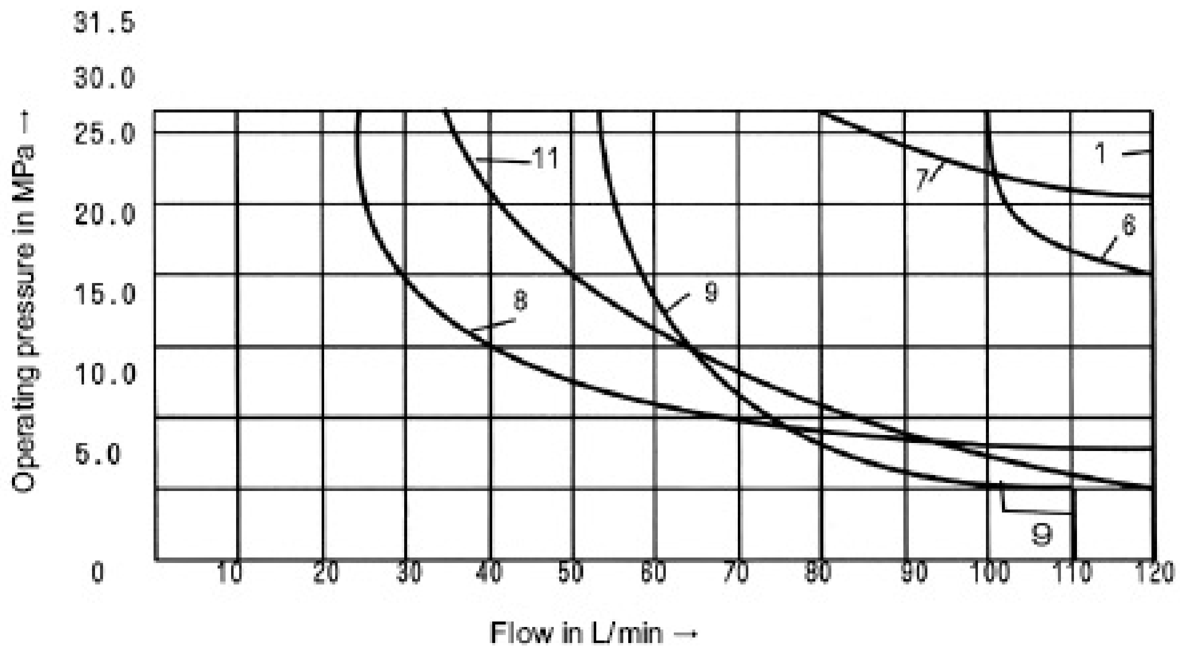
Symbols	Direction of flow			
	P-A	P-B	A-T	B-T
A,B	1	1	-	-
D,Y	2	2	1	3
E	2	2	3	4
F	2	1	4	7
G	4	4	6	8
H	2	2	1	3
J,L	1	1	4	4
M	2	2	3	4
P	2	1	1	7
Q,V	1	1	3	4
R	1	4	3	-
T	4	4	5	7
U	11	1	3	5
Centr. position		B-T	A-T	P-T
F	–	-	5	4
G	-	-	-	8
P	-	7	-	6
T	-	-	-	8
Choice. position		B-A		
R		9		-

Performance limits: (measured at v = 41 mm^2/s and t = 50 ˚C)

The performance limits shown are valid when the valve is used with two directions of flow (e.g. from P to A with simultaneous return flow from B to T).
Due to the flow forces occurring within the valves, the permissible switching performance limits can be significantly lower with only one direction of flow (e.g. from P to A and with port B blocked)! (For these applications, please consult us.)
The performance limits were determined with the solenoid at operating temperature, 10 % under voltage and with no preloading of the tank.



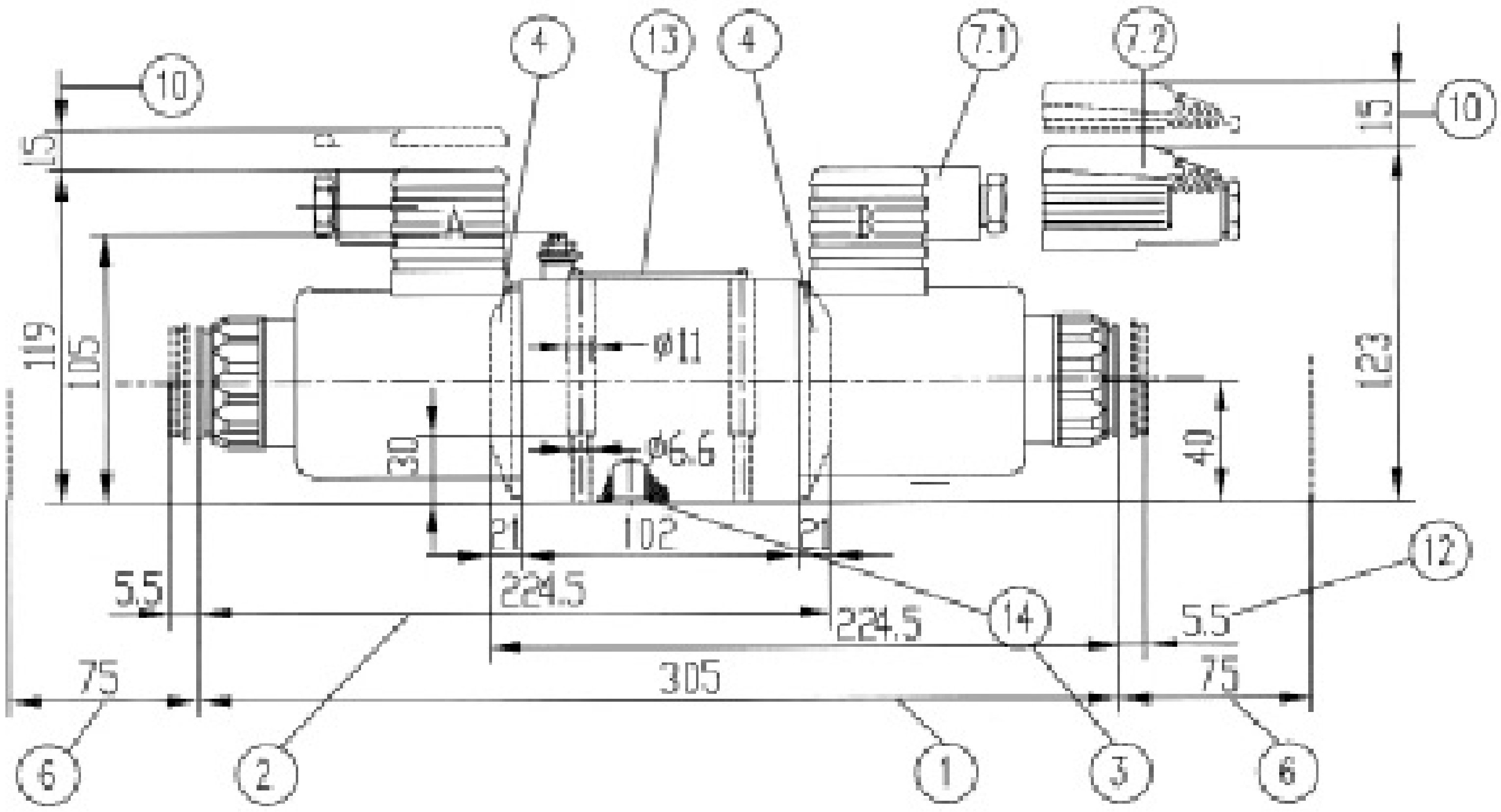
Char. curve	Symbols
With orifice Φ 0.6 mm ("A06")	
3	D,Y
12	C
With or without orifice	
1	C/O,C/OF
	D/O,D/OF,M
2	A/O,A/OF,E
	J,L,U,Q,W
4	G
5	F,P
10	H



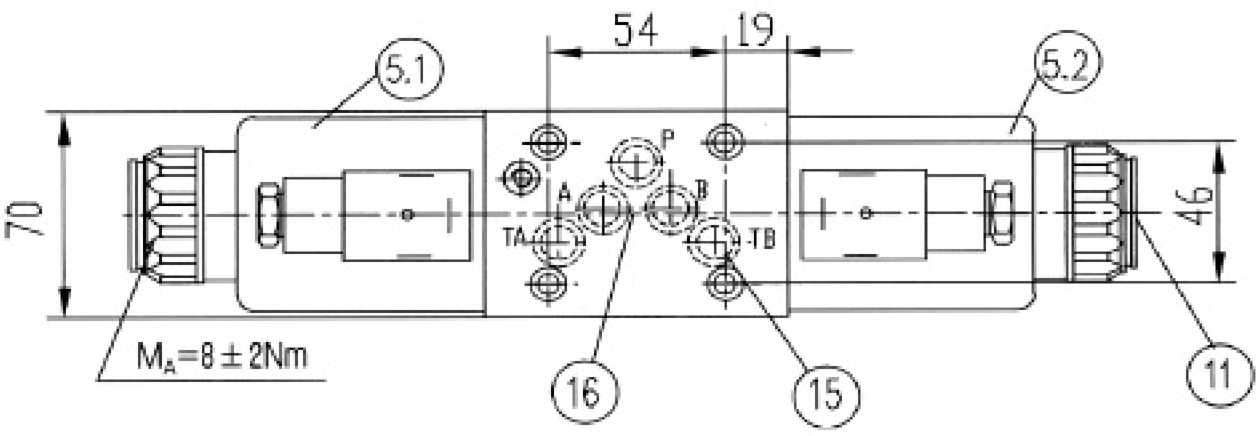
Char. curve	Symbols
Without orifice	
1	D,Y
6	C
7	R
8	T
9	V
11	A,B

Unit dimensions (Dimensions in mm)

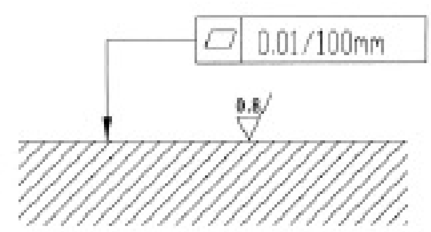
Individual connections



Central connection



Required surface finish of mating piece



1 3-Position valve
2 2-Position valve
With 1solenoid（A、C、D、EA...）
3 2-Position valve
With 1solenoid（B、Y、EB...）
4 Plug for valve with 1 solenloid
5.1 Solenloid "a"（Plug-inconnector colour grey）
5.2 solenoid "b"（Plug-inconnector colour black）
6 Spece required to remove solenoid
7.1 Plug-in connector (may be rotated by 90°)
7.2 Plug-in connector of large code（may be rotated by 90°）
10 Spece required to remove plug in connection（A、C、D、EA...）
11 Hand override "N9"
12 Dimension of hand override "N"
13 Namplate
14 O-rings 12X2
15 Addtional T port (TB) may optionally be used in conjunction with drilled blocks
16 Porting pattern to Din 24340 form A ISO44101 and CETOP-RP121H
Subplates:
C66/01(G3/8)
C67/01(G1/2)
G534/04(G3/4)
Valve fixing screws
M6X40DIN912-10.9
（GB/T70.1-2000）
M_A=15.5Nm
must be ordered separately (see page 206)

BEIJING HUADE HYDRAULIC INDUSTRIAL GROUP CO.,LTD.	**Directional control valves, hydraulically operated Type WH**			RE22282/12.2004
	Size 6、10	up to 31.5 MPa	up to 120L/min	Replaces：RE22282/05.2001

Features:

- Direct operated directional spool valve
- Two position valve with stroke limit optional
- Subplate mounting
- Mounting pattern to Din 24 340 form A, ISO 4401 and CETOP-RP 121H

Function,section

WH valves are hydraulic operated directional spool valves.They are used for the control of stop, start and direction of a flow.

The directional valves mainly consist of housing (1), one or two operating elements (2) (hydraulically, pneumatically operating cylinder), the control spool (3), as well as one or two return springs (4).

At rest the control spool (3) is kept in the centre or starting position by the return springs (3) (except impulse valve).

The control spool (3) is pushed into the required switching position by the operating elements.

With detent, type ..OF/..

Hydraulically or pneumatically operated directional valves are also available as 2-position valves with detent (5). When the operating elements with detent are used every switching position may be locked.

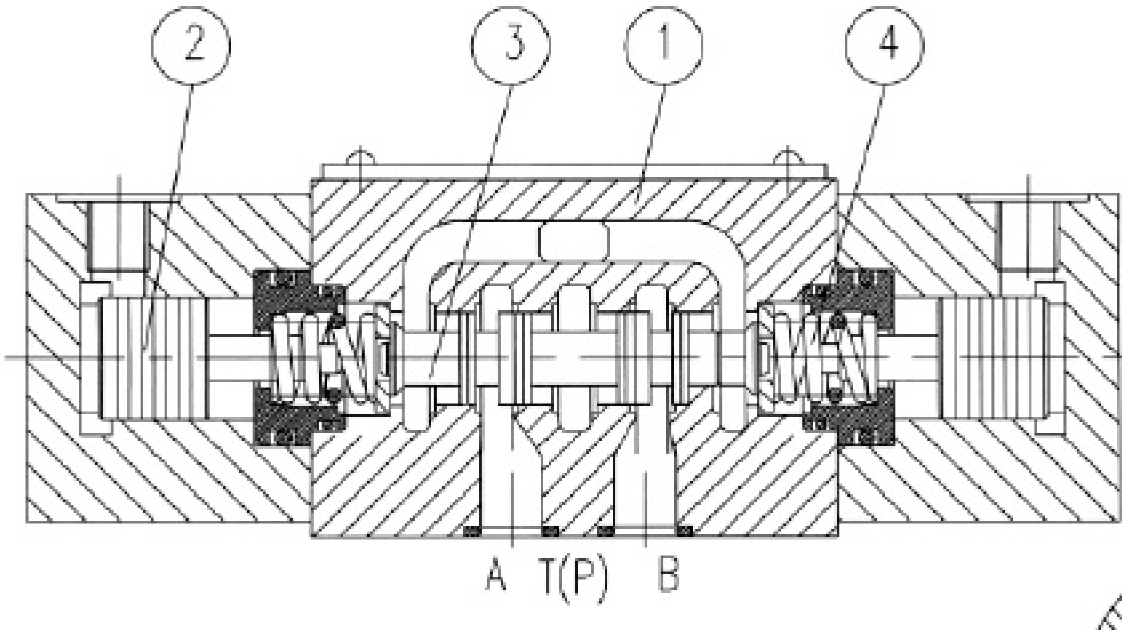
Without return spring, without detent, type ..O/..

When using operating elements without return spring and without detent there is no defined switching position at rest.

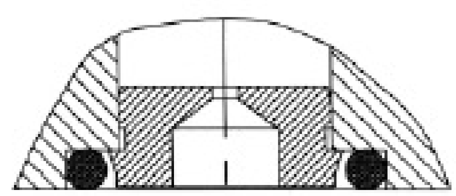
Cartridge throttle

The use of a cartridge throttle throttle is then necessary when during the switching procedures in the given operating conditions flows occur which exceed the performancelimits of the valve.

It is plugged into the P-channel of the directional valve.



Type 4WH6...



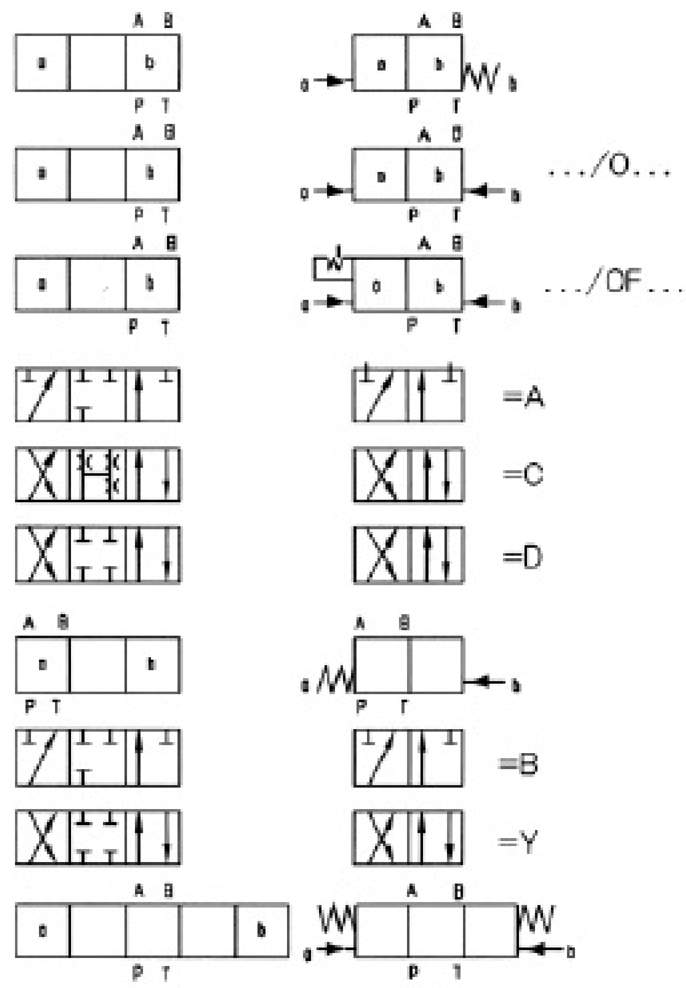
Cartridge throttle

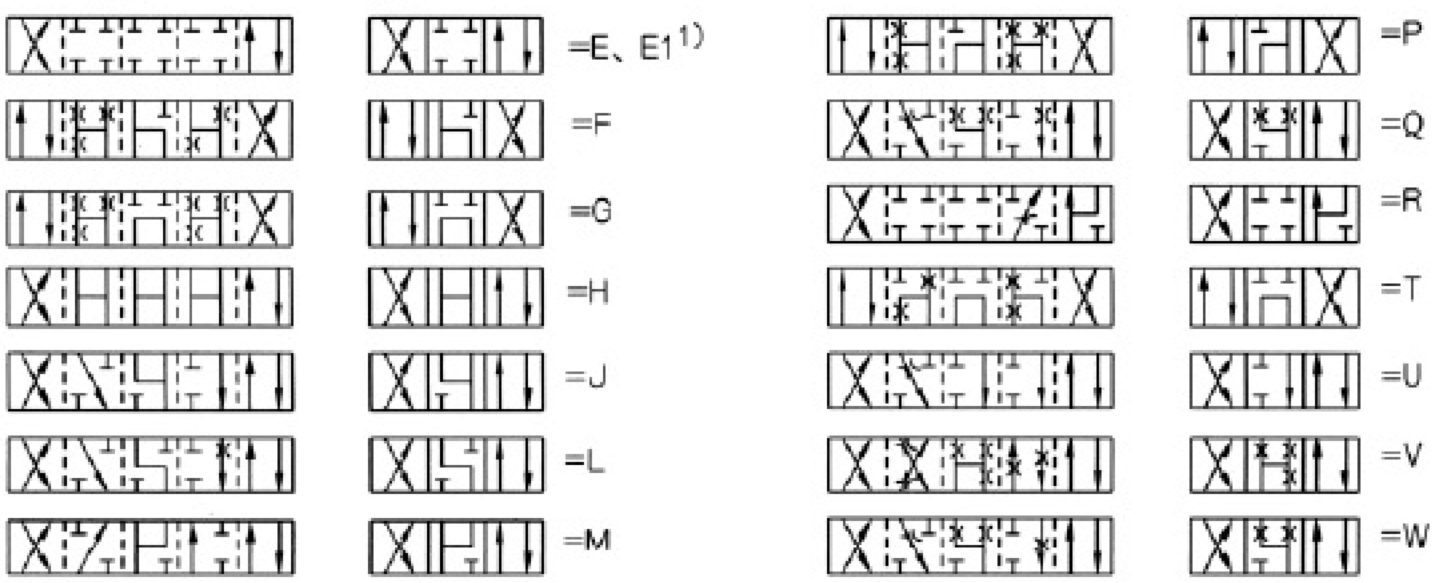
Ordering code

	WH				B /			*

3 service ports = 3
4 service ports = 4

Size 6 = 6
Size 10 = 10





50 = Series 50(50 to 59: unchanged installation and connection dimensions)(only Size 6)
30 = Size 30(30 to 39: unchanged installation and connection dimensions) (only size 10)

B= Technology of BeiJing Huade Hydraulic

No code.= with spring return
O = without spring return
OF = without spring return, with detent

No code = without plug-in throttle
B08 = Throttle Φ 0,8 mm
B10 = Throttle Φ 1,0 mm
B12 = Throttle Φ 1,2 mm

No code = mineral oils
V = phosphate ester

Further details in clear text

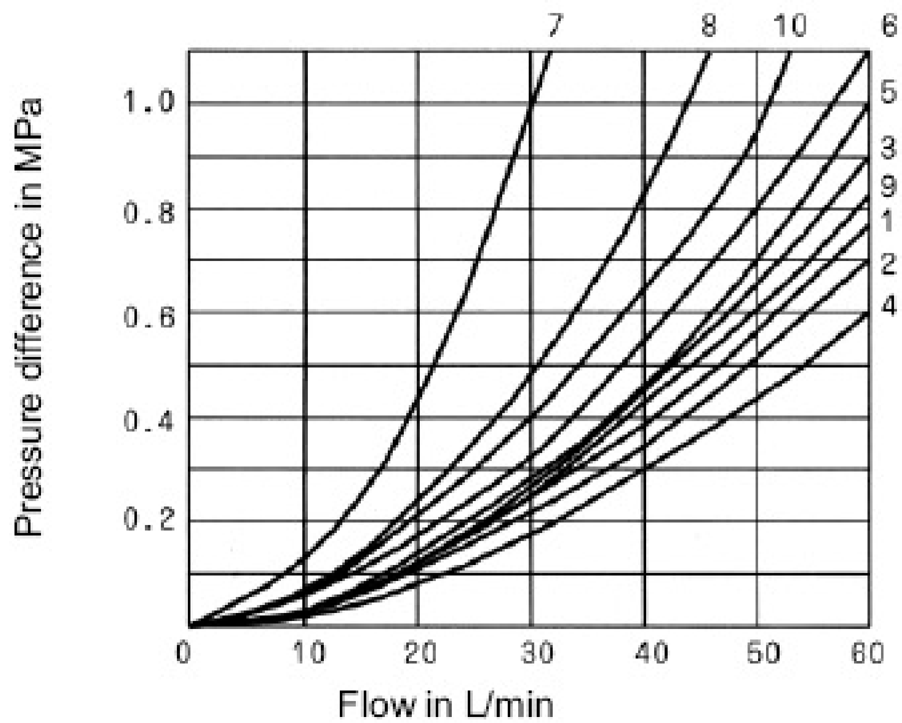
Example:
Spool E in switching position "a", ordering code ..EA..
Spool E in switching position "b", ordering code ..EB..
1) Symbol E1: P → A/B, pre-opening(only for size 6)

Technical data

Size		6	10
Max.operating pressure	Ports A, B, P (MPa)	to 31.5	
	Port T (MPa)	to 16	
With symbols A and B ,port T must be used as a leakage port if the operating pressure is greater than 16.0 MPa.			
Flow max. (L/min)		up to 60	up to120
Operating to flow (Spool position 0)		Symbol Q ,6% of nomical cross-sectional area	
		Symbol W, 3% of nomical cross-sectional area	
Fluid		Mineral oil or phosphate ester	
Fluid temperature range (˚C)		-20 to +80	
Viscosity range (mm^2/s)		2.8 to 500	
Weight (kg)	1 operating cylinder	approx.2	approx.3.5
	2 operating cylinder	approx.2.2	approx.4.5
Pilot pressure (MPa)	min.	0.6 to 1> tank pressure	0.5
	max.	20	6

Operating curves (measured at v = 41 mm²/s and t = 50˚C)

△p-q_v operating curves, type WH6

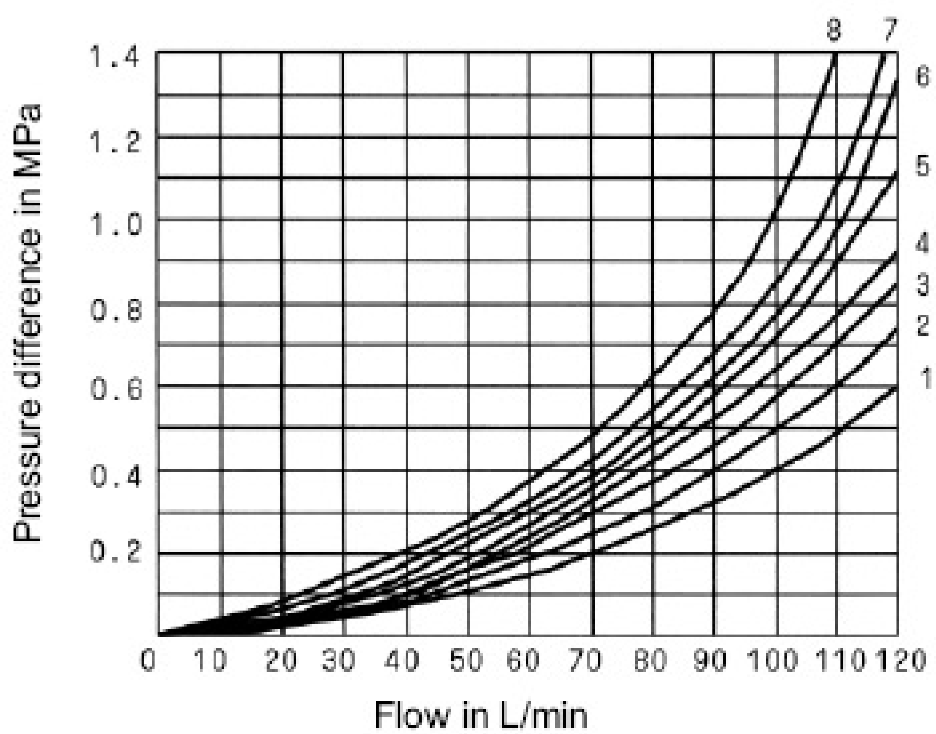


Symbol	Flow direction			
	P → A	P → B	A → T	B → T
A	3	3	-	-
B	3	3	-	-
C	1	1	3	1
D	5	5	3	3
E	3	3	1	1
F	1	3	1	1
G	6	6	9	9
H	2	4	2	2
J	1	1	2	1
L	3	3	4	9
M	2	4	3	3
P	3	1	1	1
Q	1	1	2	1
R	5	5	4	-
T	10	10	9	9
U	3	3	9	4
V	1	2	1	1
W	1	1	2	2
Y	5	5	3	3

7.Symbol "R" in switching position A → B

8.Symbol "G" and "T" in neutral position P → T

△p-q_v operating curves, type WH10



Symbol	Flow direction			
	P → A	P → B	A → T	B → T
A	4	3	-	-
B	3	4	-	-
C	3	3	4	4
D	3	3	5	5
Y	4	4	6	6
E	2	2	4	4
F	1	2	3	4
G、T	4	4	7	7
H	1	1	5	5
J	2	2	3	3
L	3	3	2	4
M	1	1	4	4
P	3	1	5	5
Q	2	2	2	2
L	3	4	3	-
U	3	3	5	2
V	2	2	3	3
W	3	3	3	3

7.Symbol "R" in switching position A → B

8.Symbol "G" and "T" in neutral position P → T

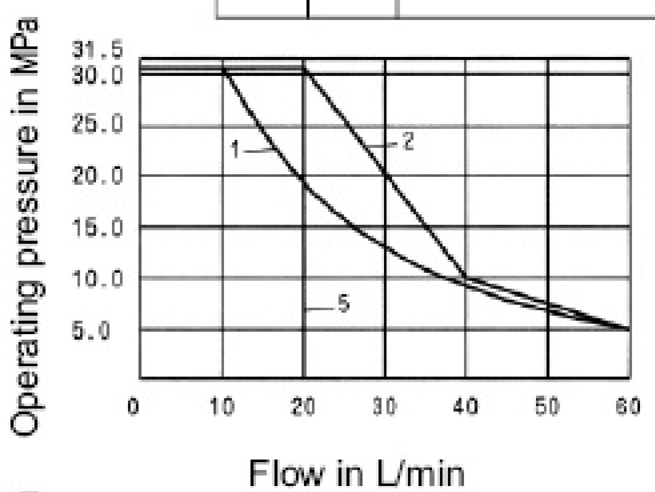
Performance limits:

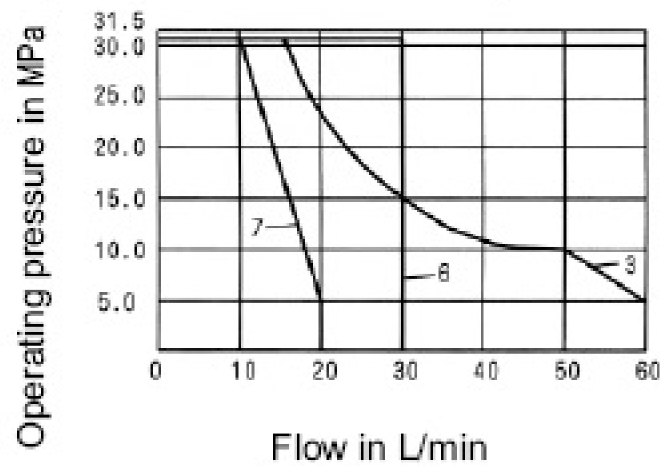
The function of the valves is dependent on the filtering due to the sticking effect. In order to achieve the given permissible flow.
Values a full flow volume filtration rate of 20μm is recommended.
The flow forces effective inside the valves also influence the flow performance.

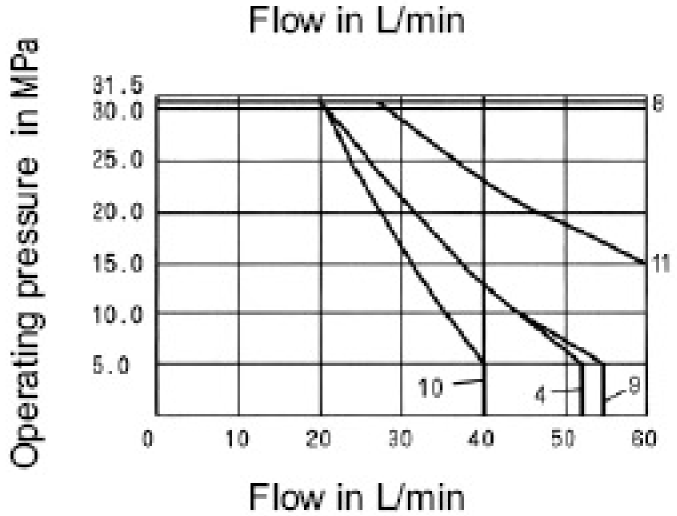
With 4-way valves the given flow data is therefore valid for the normal use with 2 flow directions (e.g. from P to A and at the same time return flow from B to T) (see table).
If only one flow direction is available the permissible flow may be much lower in critical cases (e.g. when using a 4-way directional valve with blocked port A or B as 3-way directional valve).

Type WH6

Control pressure 0.6 Mpa > T-pressure			Control pressure 1 Mpa > T-pressure		
Operating curve		Symbol	Spring return		Symbol
Spring return	1	A、B	Spring return	1	A、B
	2	C、D、Y		8	C、D、Y、E、G
	3	E、J、L、U、M Q、V、W、E		1	H、J、L、U、M Q、V、W、E1
	4	F、P		9	F、P
	5	T		10	R
	7	R		11	T
…/O …/OF	8	A、C、D	…/O …/OF	8	A、C、D

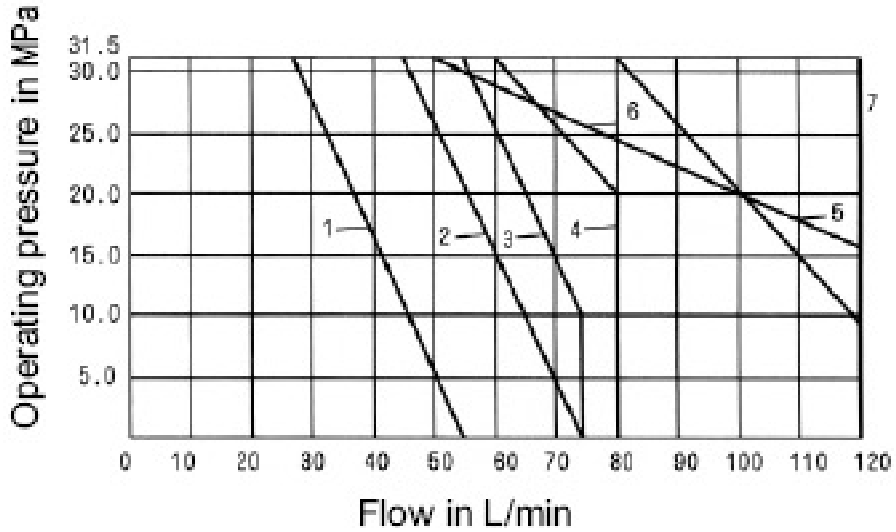




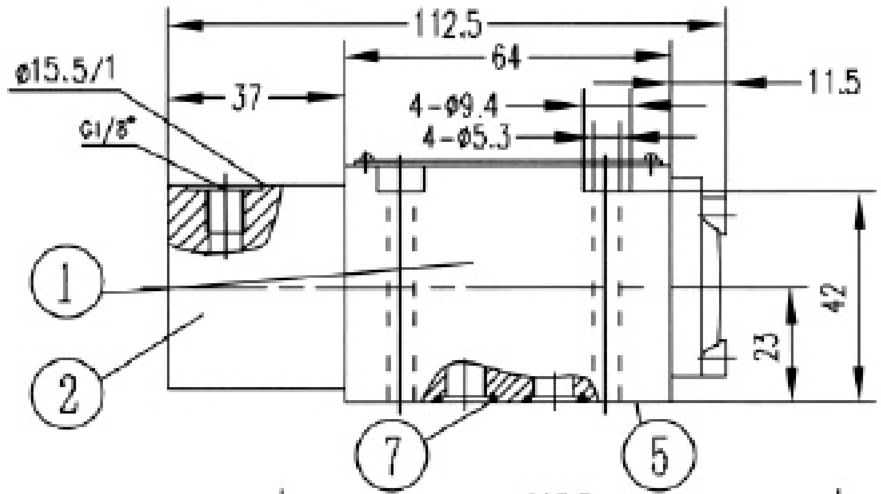


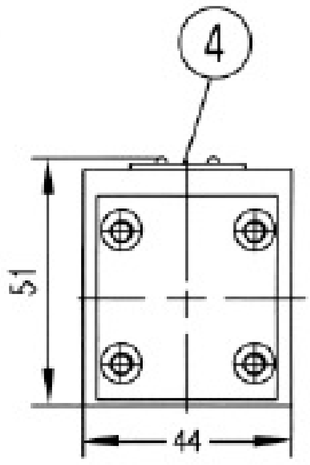
Type WH10

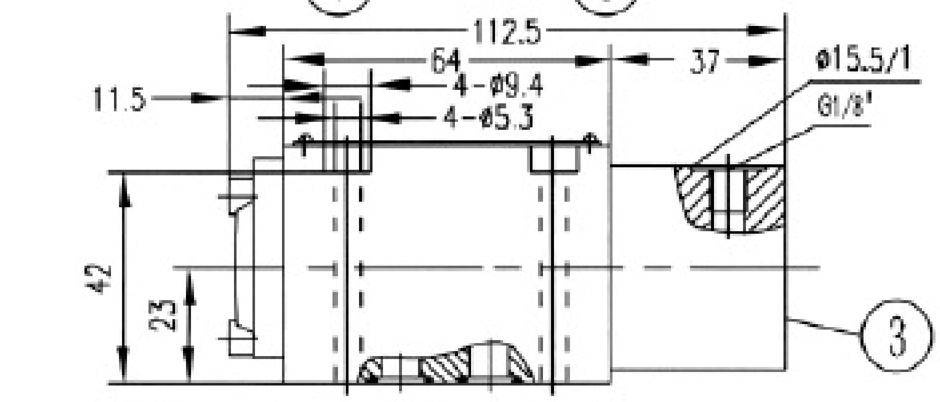
curves	symbols
1	A、B
2	A/O
3	H
4	F、G、P、R、T
5	J、L、Q、U、W
6	C、D、E、M、V、Y
7	CV/O、C/OF、D/O/D/OF



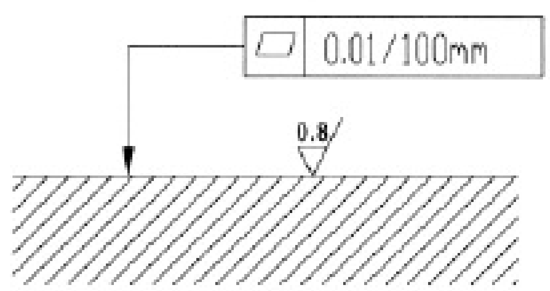
Type WH6

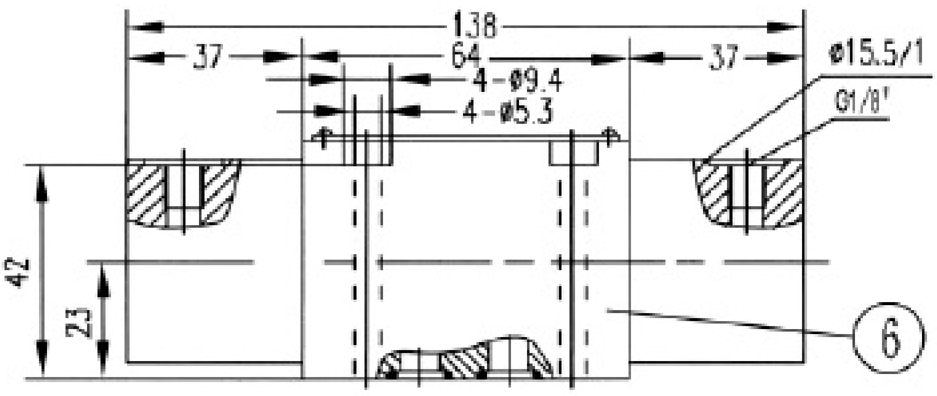




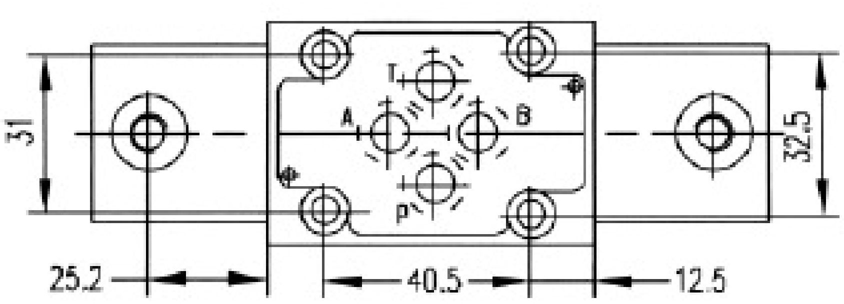


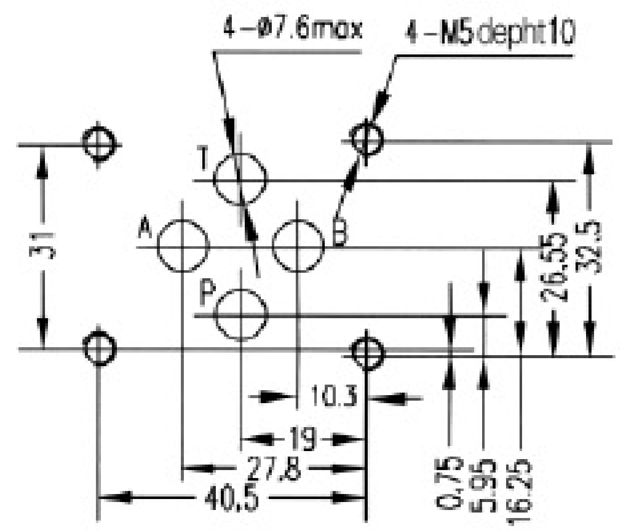
Required surface finish of mating piece





Dimensions of ports`s connecting surface





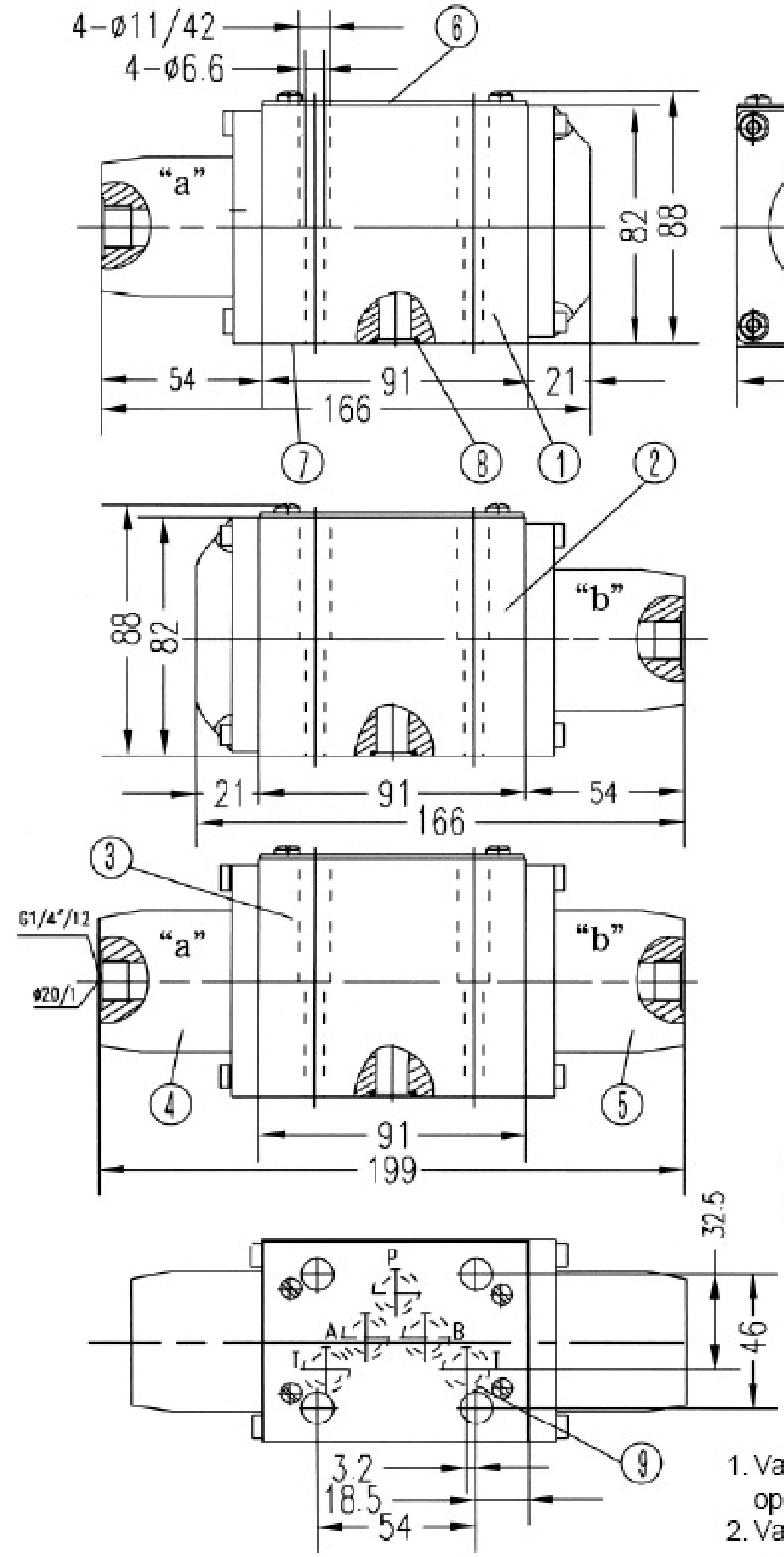
1. Valve with 2 switching positions and 1 operating cylinders
2. Operating cylinder "a"
3. Operating cylinder "b"
4. Nameplate
5. Connecting surface
6. Valve with 2 switching positions and 2 operating cylinders
   Valve with 3 switching positions and 2 operating cylinders
7. O-ring 9.81 x 1.78 with ports A, B, P, T

Subplate(see page 205)

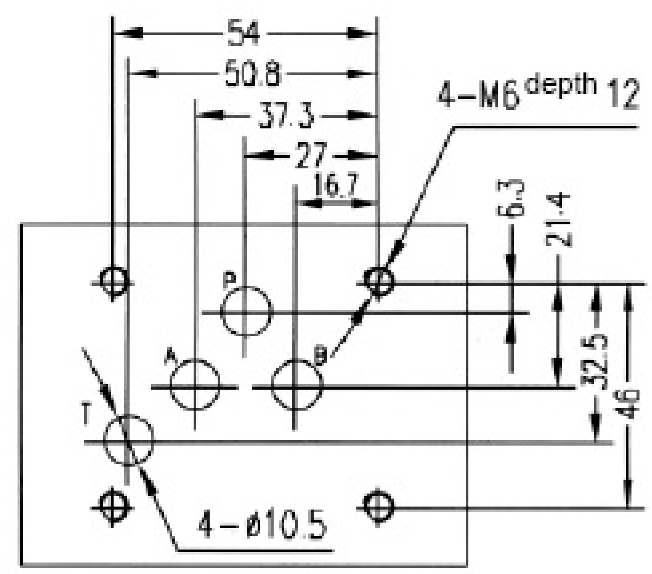
G341/01 (G1/4"); G341/02 (M14X1.5)
G342/01 (G3/8"); G342/02 (M18X1.5)
G502/01 (G1/2"); G502/02 (M22X1.5)

Unit dimensions **(Dimensions in mm)**

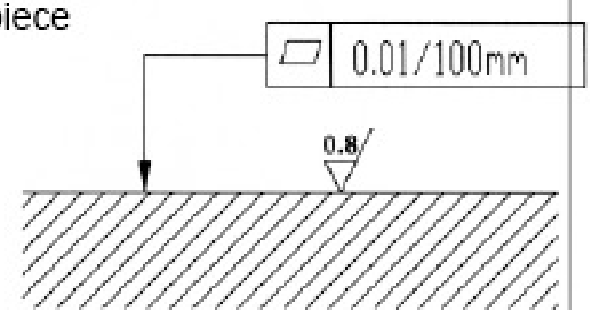
Type WH10



Dimensions of ports`s connecting surface



Required surface finish of mating piece



Subplate(see page 206)

G66/01 (G3/8"); G66/02 (M18X1.5)

G67/01 (G1/2"); G67/02 (M22X1.5)

G534/01 (G3/4"); G534/02 (M27X2)

1. Valve with 2 switching positions and operating cylinder"a"
2. Valve with 2 switching positions and operating cylinder"b"
3. Valve with 3 switching positions and 2 operating cylinders
4. Operating cylinder "a"
5. Operating cylinder "b"
6. Nameplate
7. Valve connecting surface
8. O-ring 12 x 2 with ports A, B, P, T
9. If use control block , it used as assistant port

Notice

1. The fluid must be filtered. Minimum filter fineness is 20 µm.
2. The tank must be sealing up and an air filter must be installed on air entrance.
3. Products without subplate when leaving factory, if need them, please ordering specially.
4. Valve fixing screws must be high intensity level (class 10.9). Please select and use them according to the parameter listed in the sample book.
5. Roughness of surface linked with the valve is required to $\overset{0.8}{\checkmark}$.
6. Surface finish of mating piece is required to 0.01/100mm.

BEIJING HUADE HYDRAULIC INDUSTRIAL GROUP CO.,LTD.	2/2-, 3/2- and 4/2-way poppet directional valves, solenoid actuated Type M-.SEW 6			RE 22058/12.2004
	Size 6	up to 42/63 MPa	up to 25 L/min	Replaces：RE22058/05.2001

Features:

- Direct actuated directional poppet valve, solenoid actuated
- Closed port is leak-free
- Switching is ensured even after long periods of being under pressure
- Solenoid coil can be rotated by 90°
- Individual electrical connection
- With protected hand override, optional
- Porting pattern to Din 24 340 form A, ISO 4401 and CETOP-RP 121H

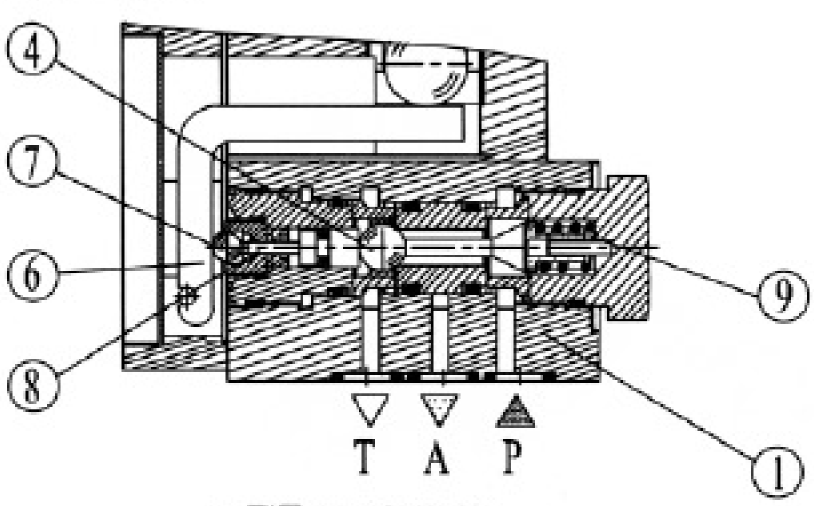
Type
M-3SEW6U30B/420MG24N9K4
with plug-in connector

Function,section

General:
The 2 type M-.SEW directional valve is a solenoid actuated directional poppet valve.They control the start, stop and direction of a flow.They basically consist of a housing (1),the solenoids (2),the hardened valve system (3) and the ball(s) (4) as the closing element.

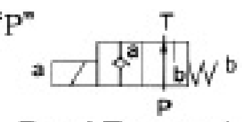
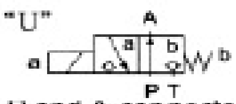
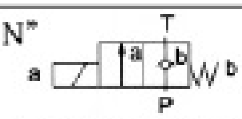
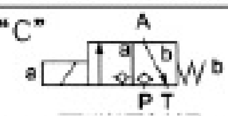
Basic principle:
In the initial position the ball (4) is pressed onto the seat by the spring (9), and in the switched position by the solenoid (2). The solenoid (2) force acts via the lever (6) and the ball (7) on the actuator pin (8), which is sealed on two sides.The chamber between the two sealing elements is connected with port P. The valve system (3) is thereby pressure balanced with regard to the actuating forces (sole-noid or return spring). The valves can, therefore, be used up to a pressure of 63 MPa.

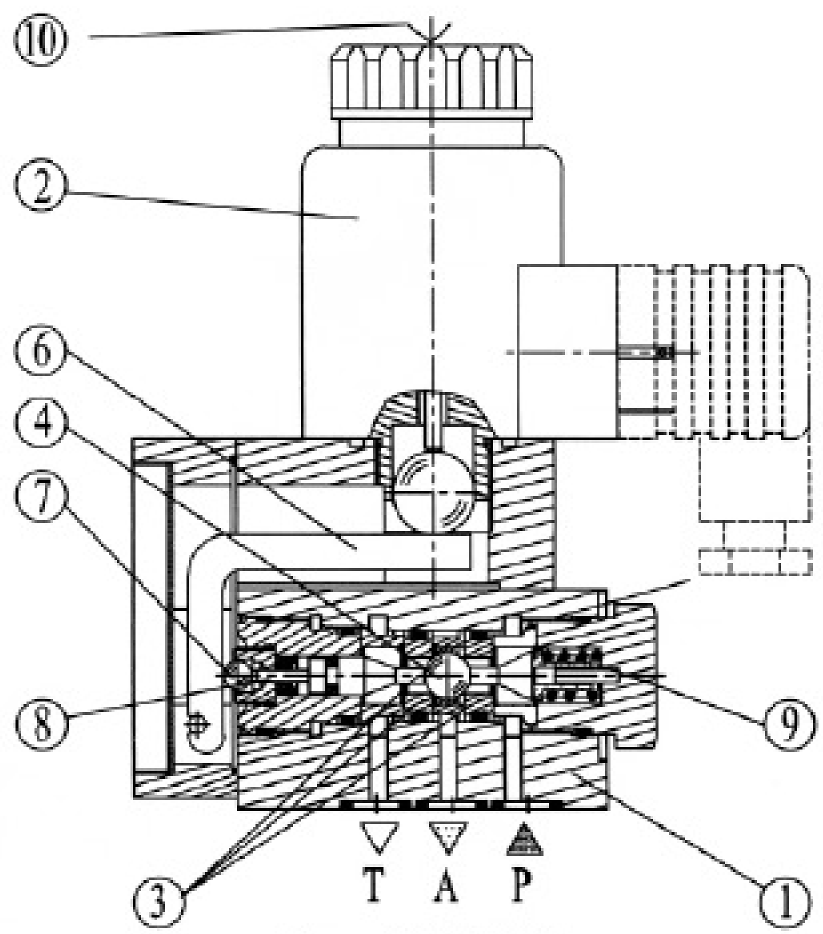
Note:
The 3/2-way poppet valves have a "negative switching overlap". Therefore,portT must always be connected.This means that during the switching procedure from the start of opening one valve seat to the closing of the other seat - all of the ports P-A-T are connected with each other. This, however, takes place in such a short space of time that in most applications it is irrelevant.
The hand override (10) makes it possible to switch the valve without energizing the solenoids.
Care has to be taken to ensure that the stated maximum flows are not exceeded! If necessary a cartridge throttle for flow limitation has to be fitted (see below).



Type M-2SEW6N...

The following possibilities are obtainable via the seat orientation:

	2/2-way poppet valve	3/2-way poppet valve
Symbol	"P" 	"U" 
Initial position	P and T connected	P and A connected, T closed leak-free
Switched position	P closed leak-free	P closed leak-free, A and T connected
Symbol	"N" 	"C" 
Initial position	P closed leak-free	P closed leak-free, A and T connected
Switched position	P and T connected	P and A connected, T closed leak-free



Type M-3SEW6U...

Illustration: 4/2-way poppet valve

In conjunction with a sandwich plate, a plus-1 plate, under the 3/2-way poppet valve this valve can be used as 4/2-way poppet valve.

Function of the plus-1 plate:

Initial position:

The main valve is not actuated.The spring (9) holds the ball (4.1) on the seat (11). Port P is closed and A is connected to T. In addition, a control line runs from A to the large area of the control spool (12),which is thus unloaded to tank.The pressure pplied via P now moves the ball (13) onto seat (14).Thus, P is connected to B and A to T.

Transition position:

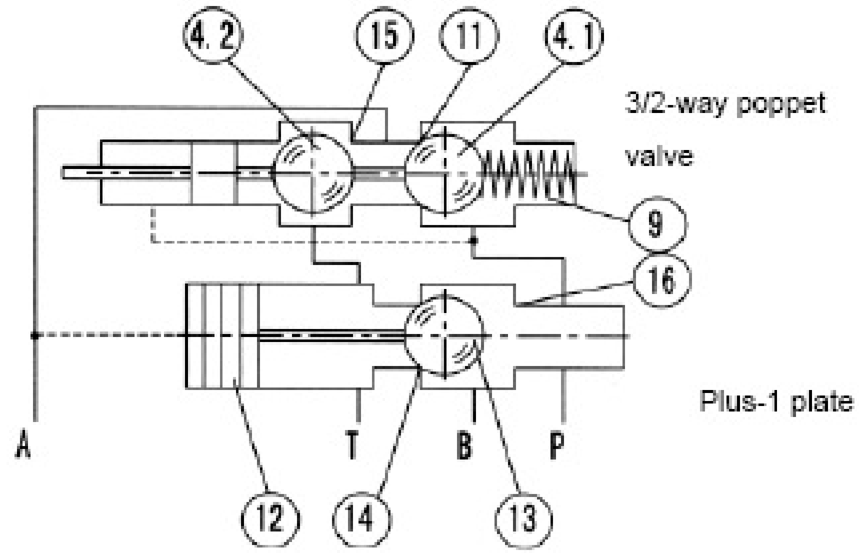
When the main valve is operated, the ball (4.2) is pushed against the spring (9) and then pressed onto the seat (15).Port T is then blocked, P,A and B are connected to each other for a short time.

Switched position:

P is connected to A. As the pump pressure acts via A on the large area of the control spool (12), ball (13) is pushed onto seat (16).Thus, B is connected to T and P to A. Ball (13) in the plus-1 plate has a "positive switching overlap".

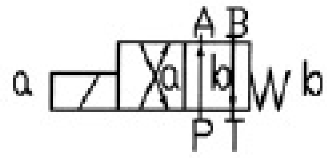
In order to avoid pressure intensification when single rod cylinders are used, the annulus area of the cylinder must be connected to A.

Schematic illustration: initial position

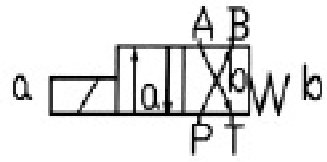


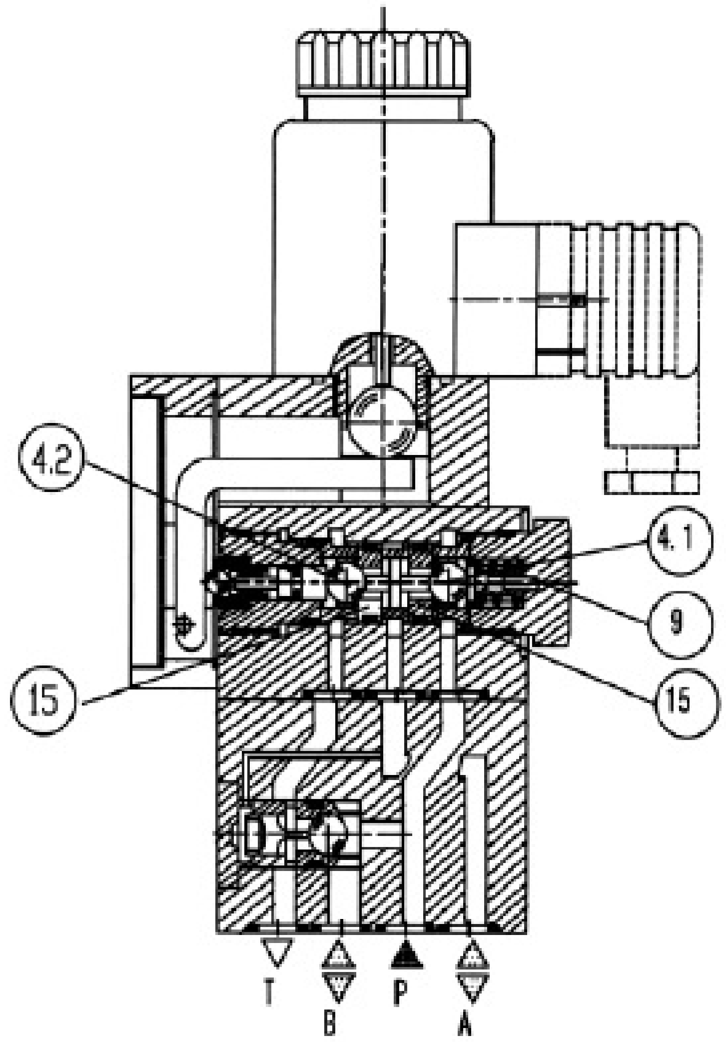
Due to the use of the plus-1 plate and the arrangement of the seats,the following combinations are possible:

Symbol "D":



Symbol "Y":



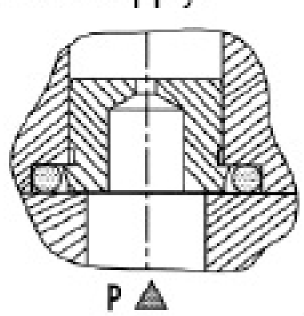


Type M-4SEW6Y...

Cartridge throttle

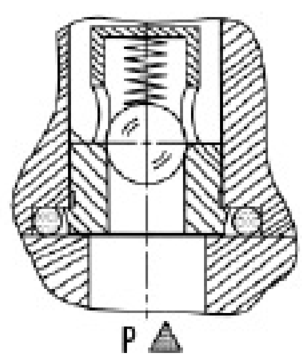
The use of the cartridge throttle is necessary when, due to operational conditions during the switching process, flows can occur that exceed
the valve performance limits.
Example:
- Accumulator operation,
- Use as a pilot valve with internal pilot oil supply.

3/2-way poppet valve
The cartridge throttle is fitted into port P of the poppet valve.
4/2-way poppet valve (see next page)
The cartridge throttle is fitted into port P of the plus-1 plate.



Cartridge check valve

The cartridge check valve allows free flow from P to A and provides leak-free closure from A to P.
For examples, see page 11.
3/2-way poppet valve
The cartrdige check valve is inserted into port P of the poppet valve. 4/2-way poppet valve (see next page)
The cartrdige check valve is inserted into port P of the plus-1 plate.

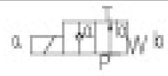
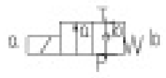
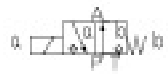
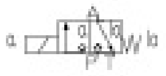
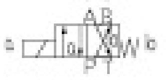


Ordering details

M -		SEW	6		30	B /		M						*

2 service ports	=2
3 service ports	=3
4 service ports	=4

Nominal size 6	= 6

Service ports	2	3	4	
	•	–	–	=P
	•	–	–	=N
	•	•	–	=U
	•	•	–	=C
	–	–	•	=D
	–	–	•	=Y

• = Available

Series 30 to 39 (30 to 39: unchanged installation and connection dimensions)	= 30
Technology of Beijing Huade Hydraulic	=B
Operating pressure up to 42 MPa (fixing screws M5)	= 420
Operating pressure up to 63 MPa (fixing screws M6)	= 630

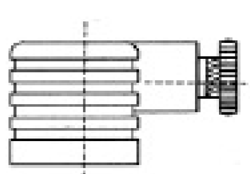
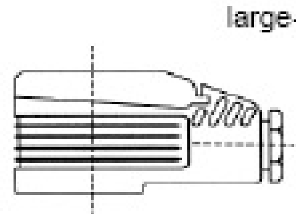
M =	Solenoid (air gap) with removable coil
G24 =	24VDC
G205[2] =	205VDC
N9 =	With protected manual override
No Code =	Without manual override
K4[1] =	Electrical connection Individual connection without plug, with protection cover
No code =	Without cartridge check valve, without throttle insert
P =	With cartridge check valve
B12 =	Throttle ø 1.2 mm
B15 =	Throttle ø 1.5 mm
B18 =	Throttle ø1.8 mm
B20 =	Throttle ø2.0 mm
B22 =	Throttle ø 2.2 mm
No code =	mineral oils
V =	phosphate ester
*	Further details in clear text

AC supply (permissible voltage tolerance ± 10%)	Nominal voltage of the DC solenoid when used with an AC voltage	Order detail
110V-50/60Hz 120V-60Hz	96V	G96
230V-50/60Hz	205V	G205

Note: Other types of actuators e.g.pneumatic,hydraulic, rotary knob,rotary knob with lock,plunger,lever,roller lever) on request!

1) Plug-in connectors have to be ordered separately (see below).
2) For the connection to an AC supply a DC solenoid must be used which is controlled via a rectifier (see table on the left).
For individual connections a large plug-in connector with integrated rectifier can be used (separate order, see below).

Ordering details: plug-in connector

		Plug-in connections DIN 43 650 ISO 4400	large-size connector			
						
			Without indicator light	With indicator light	Without rectifier	With indicator light and Z-diode protective circuit
a grey	Material no.	074 683	008 616	313 923/24V 313 926/180-240V	313 932	310 994

Performance limits (measured at v = 41 mm ^{2} /s and t= 50 ℃)

	Symbol	Comments	Operating pressure in MPa				Flow
			P	A	B	T	L/min
2- way circuit	"P"	Pressure to P ≥ T	42/63			10	25
	"N"		42/63			10	25
3- way circuit	"U"	Pressure to P ≥ A ≥ T	42/63	42/63		10	25
	"C"		42/63	42/63		10	25
2- way circuit (only for unloading function)	"U"	Before witching from the initial position to the switched position,pressure must be present in port A. Pressure at A ≥ T		42/63		10	25
	"C"	Pressure at A ≥ T		42/63		10	25
4- way circuit	"D"	Single ball valve (symbol "U") in conjunction with a plus-1plate P ≥ A ≥ B ≥ T	42/63	42/63	42/63	10	25
	"Y"	Two ball valve (symbol "C") in conjunction with a plus-1 plate P ≥ A ≥ B ≥ T	42/63	42/63	42/63	10	25

General guidelines

-In order to operate the valve safely and to hold it safely in the switched position, the pressure in P must be ≥ A ≥ T (for design reasons).

-The ports P, A and T (3/2-way poppet valve) as well as P, A, B and T (4/2-way poppet valve) are positively assigned to their individual functions. They must not be interchanged or plugged.Flow is only permitted in the direction of the arrow.

-When using the plus-1 plate (4/2-way function) the following lower operating values must be taken into account:p_{min} = 0.8 MPa; q_V > 3 L/ min.

-The specified maximum flow must not be exceeded.

The performance limit was determined with the solenoids at operating temperature, 10% under voltage and with the tank not pressurized.

Recommended type (Could Supplied in short time)

Ordering Type：

M-3SEW6 C 30/ 420 MG24 N9 K4

M-3SEW6 C 30/ 630 MG24 N9 K4

M-3SEW6 U 30/ 420 MG24 N9 K4

M-3SEW6 U 30/ 630 MG24 N9 K4

Technical data (For applications outside these parameters, please consult us!)

General			
Installation			optional
Max. ambient temperature		(℃)	50
Weight	2/2-way poppet valve	(kg)	1.5
	3/2-way poppet valve	(kg)	1.5
	4/2-way poppet valve	(kg)	2.3

Hydraulic data		
Max. operating pressure	(MPa)	see table on page 140
Max. flow	(L/min)	25
Pressure fluid		mineral oils or phosphate ester
Pressure fluid temperature range	(℃)	- 30 to + 80
Viscosity range	(mm²/s)	2.8 to 500
Degree of contamination	μ m	Maximum permissible degree of contamination of the hydraulic fluid to NAS 1638 class 9. We therefore recommend a filter with a minimum retention rate of $\beta 10 \geq 75$.

Electrical data			
Type of voltage		DC	AC
Available voltages[1]	(V)	12、24、42、96、110、205、220	only possible via rectifier
Voltage tolerance (nominal voltage)	(%)	± 10	
Power consumption	(W)	30	
Duty		100%	
Switching time to ISO 6403		see table below	
Switching frequency	(cycle s/h)	15000	
Protection to DIN 40 050		IP65	
Max. coil temperature	(℃)	to150	

1) Special voltages on request

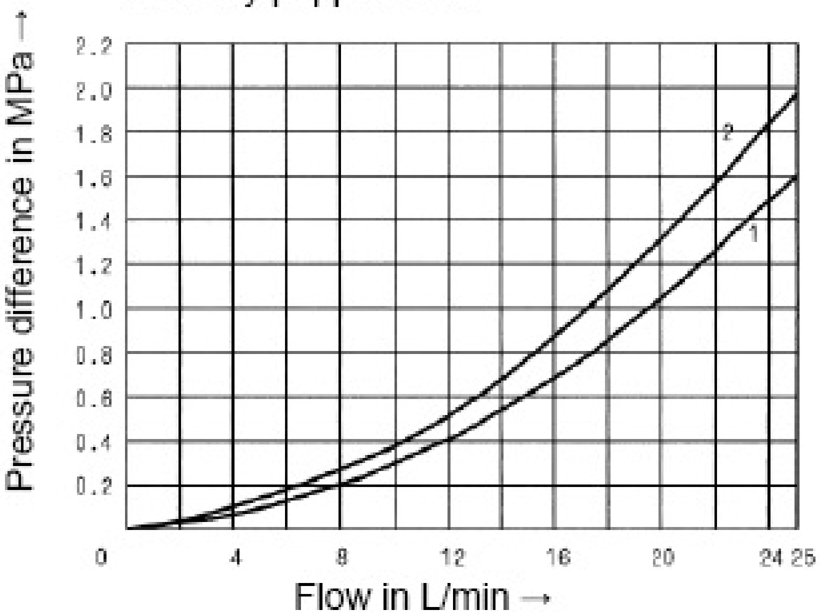
When connecting the electrics, the protective conductor (PE⏚) must be connected according to the relevant regulations.

<table>
<tr><td colspan="8">Switching time in ms (installation: solenoid vertical)</td><td colspan="6"></td></tr>
<tr><td rowspan="5">Pressure in MPa</td><td rowspan="5">Flow q_V in L/min</td><td colspan="6">DC solenoid</td><td colspan="6">DC solenoid + rectifier</td></tr>
<tr><td colspan="6">Symbols U、C、D、Y</td><td colspan="6">Symbols U、C、D、Y</td></tr>
<tr><td colspan="4">t_{on}</td><td colspan="2">t_{off}</td><td colspan="4">t_{on}</td><td colspan="2">t_{off}</td></tr>
<tr><td colspan="4">Without tank pressure</td><td>U</td><td>D</td><td colspan="4">Without tank pressure</td><td>U</td><td>D</td></tr>
<tr><td>U</td><td>C</td><td>D</td><td>Y</td><td>C</td><td>Y</td><td>U</td><td>C</td><td>D</td><td>Y</td><td>C</td><td>Y</td></tr>
<tr><td>14</td><td rowspan="6">25</td><td rowspan="6">25</td><td rowspan="2">30</td><td rowspan="6">25</td><td rowspan="2">30</td><td rowspan="6">10</td><td rowspan="6">10</td><td>30</td><td>40</td><td>30</td><td>40</td><td>35</td><td>35</td></tr>
<tr><td>28</td><td rowspan="2">35</td><td>45</td><td rowspan="2">35</td><td>45</td><td rowspan="2">40</td><td rowspan="2">40</td></tr>
<tr><td>32</td><td rowspan="2">35</td><td rowspan="2">35</td><td rowspan="2">50</td><td rowspan="2">50</td></tr>
<tr><td>42</td><td rowspan="3">40</td><td rowspan="3">40</td><td rowspan="2">50</td><td rowspan="2">50</td></tr>
<tr><td>50</td><td rowspan="2">40</td><td rowspan="2">40</td><td rowspan="2">55</td><td rowspan="2">55</td></tr>
<tr><td>60</td><td>55</td><td>55</td></tr>
</table>

Characteristic curves (measured at ν = 41 mm^2/s and t =50℃)

Δp-q_v-characteristic curves

2/2-way poppet valve

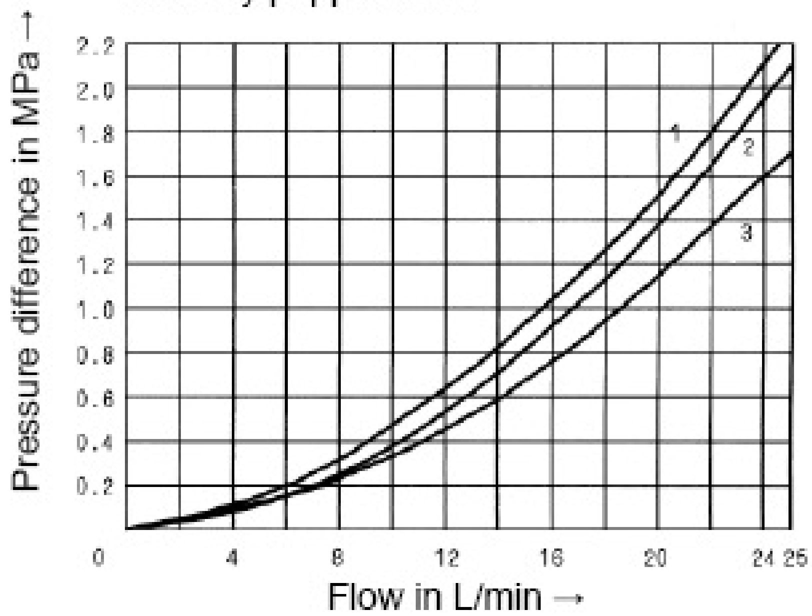


1 M-2SEW 6 N ... P to T

2 M-2SEW 6 P ... P to T

Δp-q_v-characteristic curves

3/2-way poppet valve



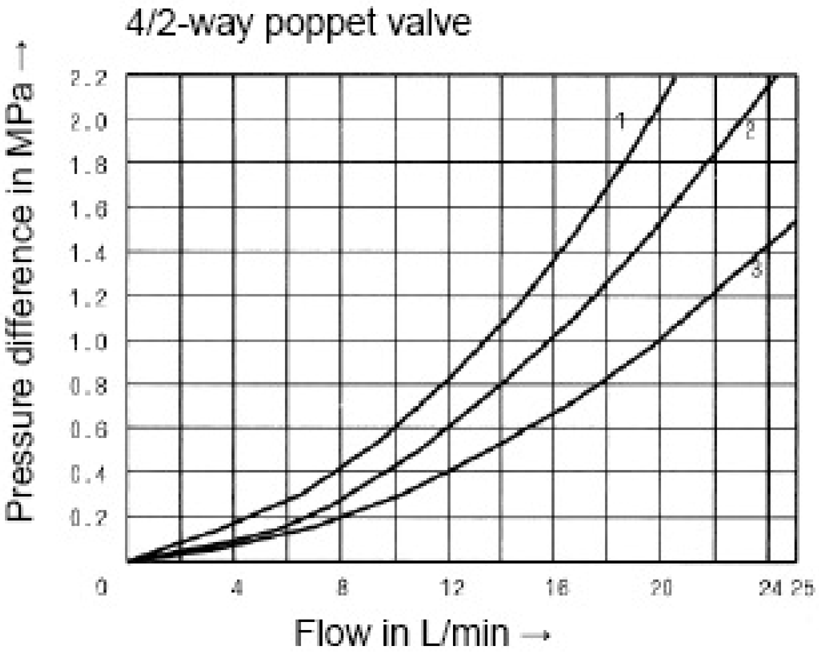
1 M-3SEW 6 $^{U}_{C}$ ..., A to T

2 M-3SEW 6 U... P to A

3 M-3SEW 6 C ... P to A

Δp-q_v-characteristic curves

4/2-way poppet valve



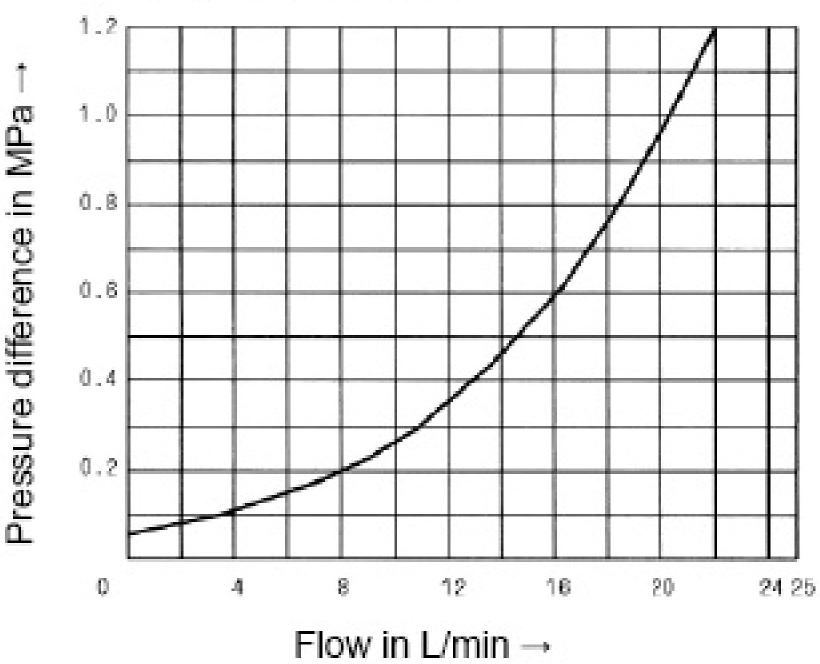
1 M-4SEW 6 $^{D}_{Y}$ ...,A to T

2 M-4SEW 6 $^{D}_{Y}$ ..., P to A

3 M-4SEW 6 $^{D}_{Y}$ ..., P toB, B to T

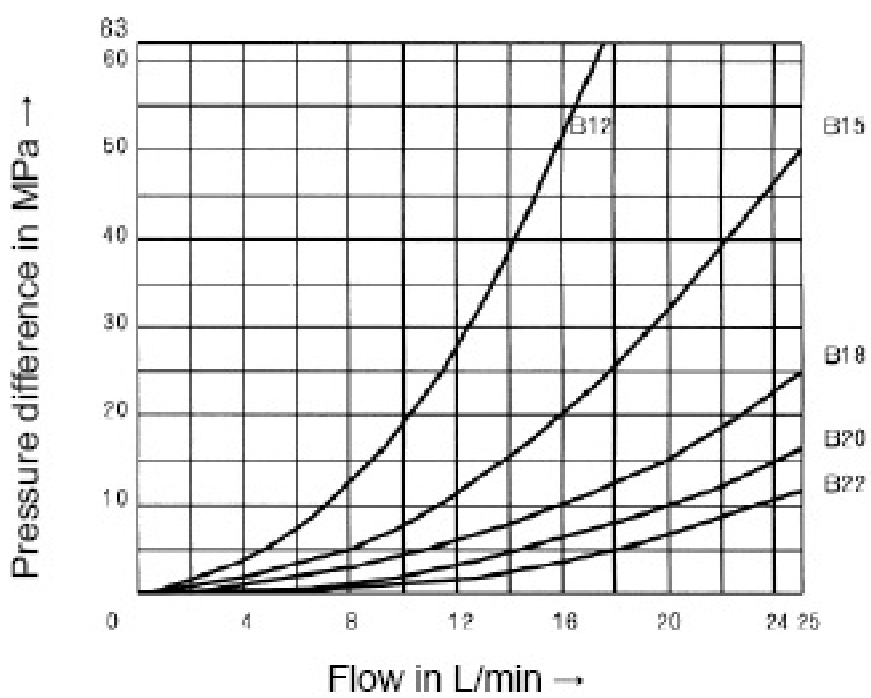
Δp-q_v-characteristic curve

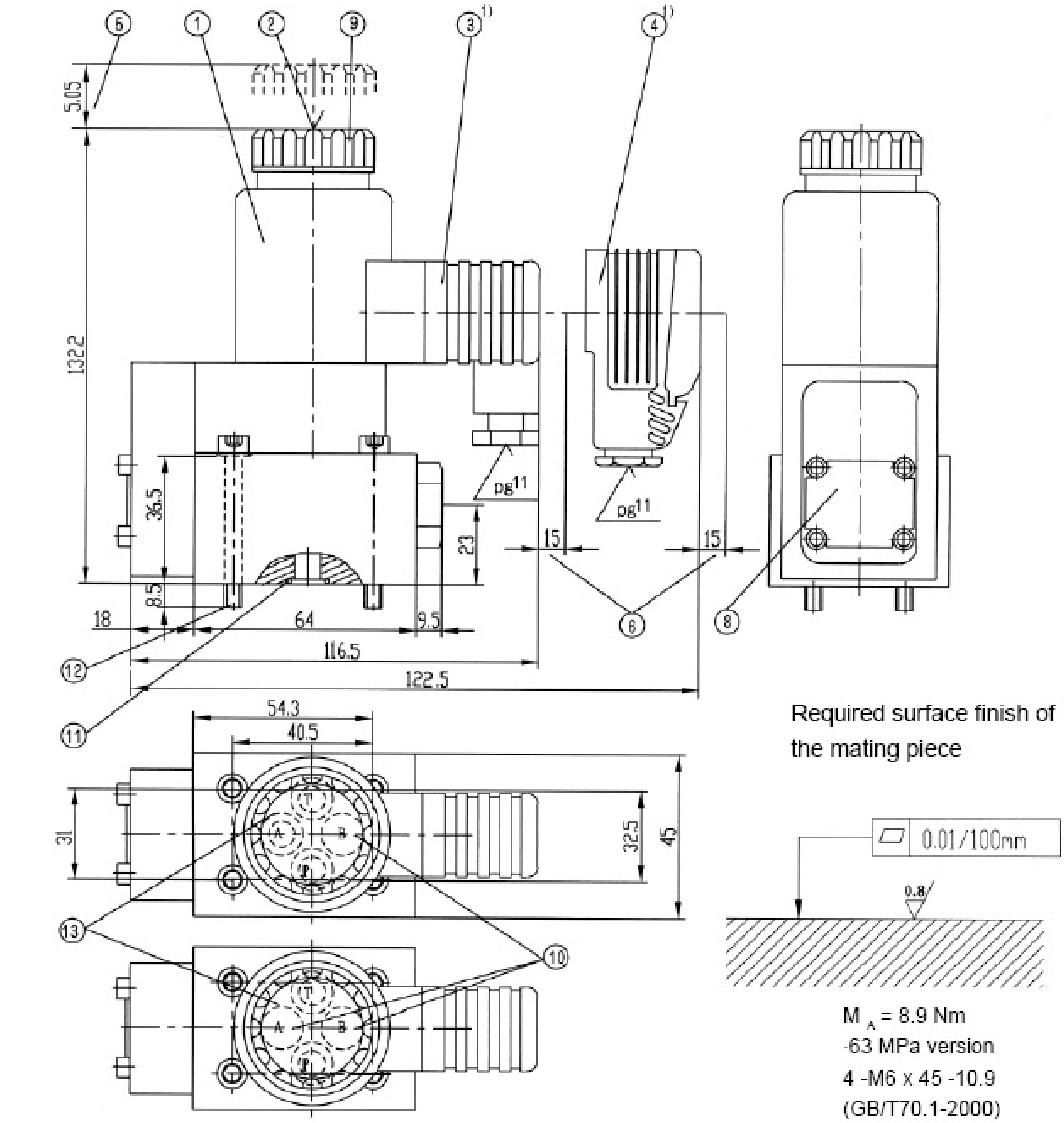
Cartridge check valve



Δp-q_v-characteristic curves

Throttle insert





Required surface finish of the mating piece

1 Solenoid "a" (plug-in connector colour grey)
2 Protected hand override "N9"
3 Plug-in connector to DIN 43 650 1) (may be rotated by 90°)
4 Large plug-in connector to DIN 43650 1) may be rotated by 90°)
5 Space required to remove the coil
6 Space required to remove the plug-in connector
8 Nameplate
9 Fixing nut,tightening torque M_A = 4 Nm

1) Must be ordered separately, see page 141.

10 Attention!
On 3/2-way poppet valves (42 MPa version), port B is a blind counter bore.
On 2/2-way poppet valves (42 MPa version) ports A and B are blind counter bores.

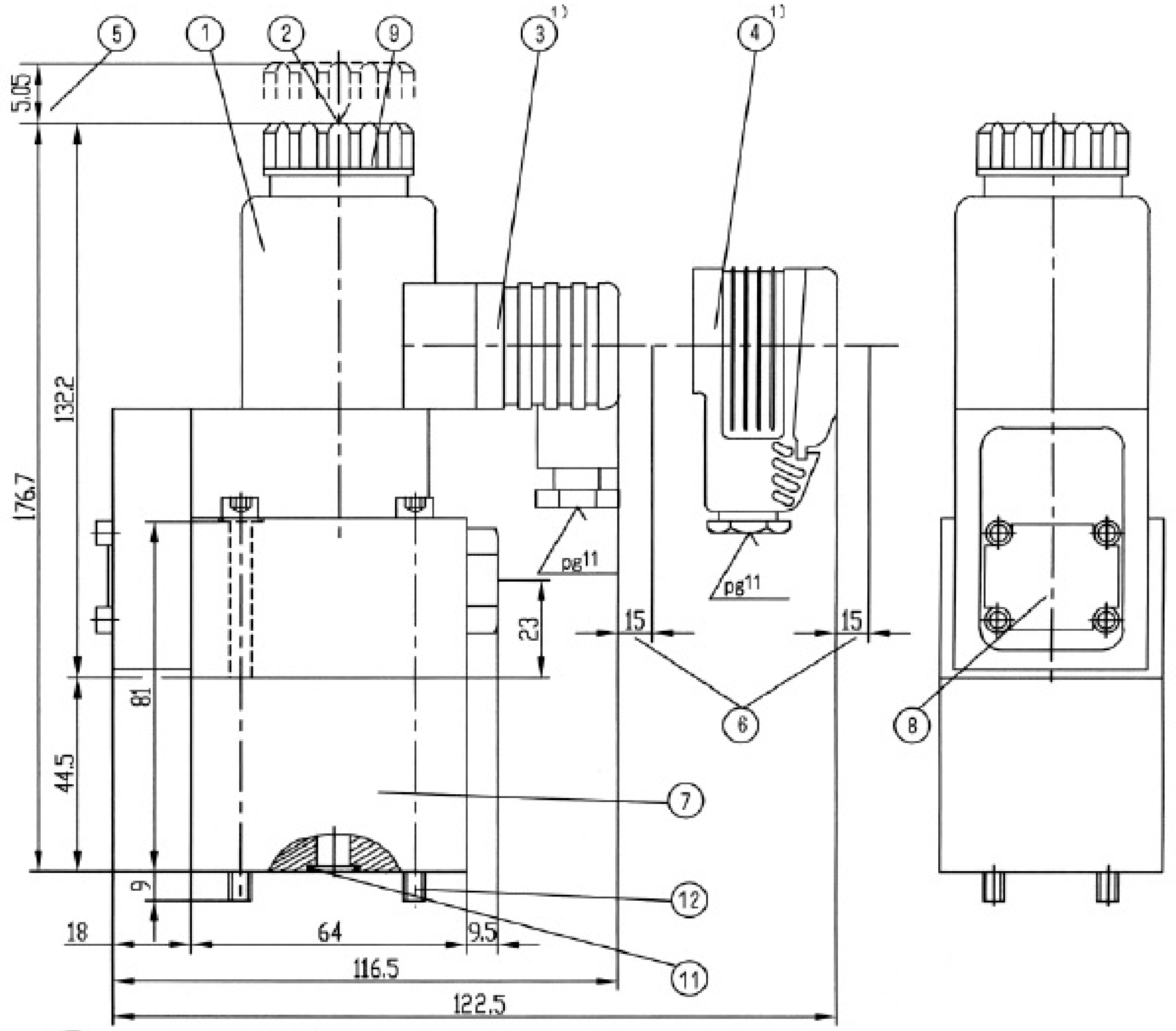
11 O-rings 9.25 x1.78 for ports A, B and T
O-ring 10.82 x1.78 for port P

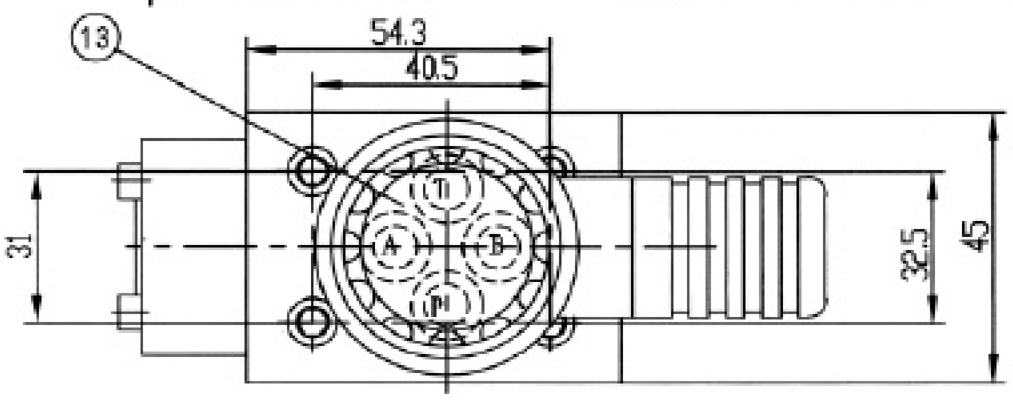
12 Valve fixing screws
-42 MPa version
4 - M5 x 45 -10.9 (GB/T70.1-2000)
M_A = 8.9 Nm
-63 MPa version
4 -M6 x 45 -10.9 (GB/T70.1-2000)
M_A = 15.5 Nm
are included within the scope of supply.

13 Porting pattern to DIN 24 340 form A,ISO 4401 and CETOP-RP 121 H

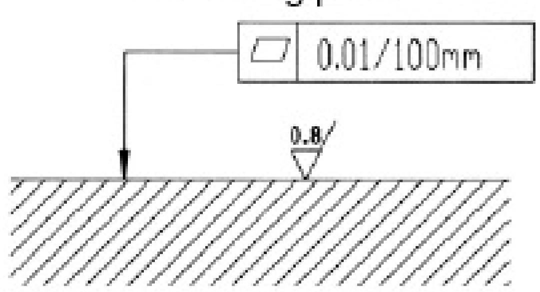
Subplates:(see page 205)
42 MPa version
G341/01(G1/4")
G342/01(G3/8")
G502/01(G1/2")
63 MPa version
G576/01(G1/4")
G577/01(G3/8")
must be ordered separately.

Unit dimensions: 4/2-way poppet valve (Dimensions in mm)





Required surface finish of the mating piece



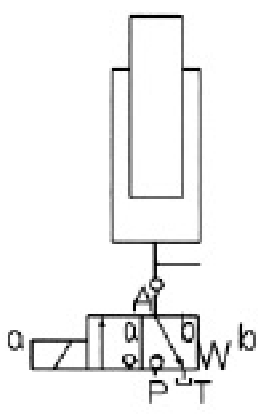
1 Solenoid "a" (plug-in connector colour grey)
2 Protected hand override "N9"
3 Plug-in connector to DIN 43 650 1) (may be rotated by 90°)
4 Large plug-in connector to DIN 43650 1) (may be rotated by 90°)
5 Space required to remove the coil
6 Space required to remove the plug-in connector
7 Plus-1 plate
8 Name plate
9 Fixing nut, tightening torque M_A = 4 Nm
11 O-rings 9.25x 1.78 for ports A, B and T O-ring 10.82 x 1.78 for port P
12 Valve fixing screws
· 42 MPa version 4 -M5 x 90 -10.9 (GB/T70.1-2000), M_A = 8.9 Nm
· 63 MPa version 4 -M6 x 90 -10.9 (GB/T70.1-2000), M_A = 15.5 Nm
are included within the scope of supply.
13 Porting pattern to DIN 24 340 form A, ISO 4401 and CETOP-RP 121 H
Subplates (see page 205)
· 42 MPa version
G341/01(G1/4″)
G342/01(G3/8″)
G502/01(G1/2″)
63 MPa version
G576/01(G1/4″)
G577/01(G3/8″)
must be ordered separately.

1) must be ordered separately,see page 141

Application examples

These examples serve only to explain the possibilities offered by the poppet valve.They do not include the complete function.

Symbol "C"



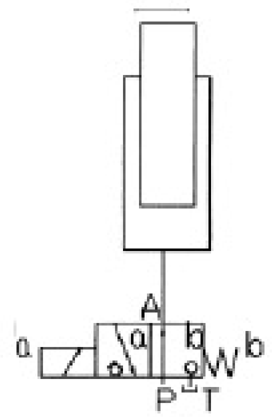
2/2-way circuit with a two poppet valve and check valve at port A

The check valve must be installed in the pipe work.

Initial position: Flow blocked, maximum pressure permissible. Pressure is held in the actuator, even when the pump is switched off, due to the check valve at port A.

Switched position: Free-flow, maximum pressure permissible. Leakage drained via port T. The only leakage occurring is that which flows to T during the switching process.

Symbol "C"



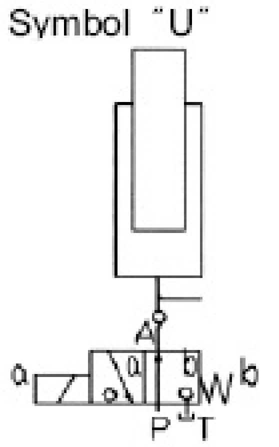
3/2-way circuit with a single poppet valve

Initial position: Lifting

Holding only due to limitation of travel and pressure in port P.

Switched position: Lowering

Symbol "U"



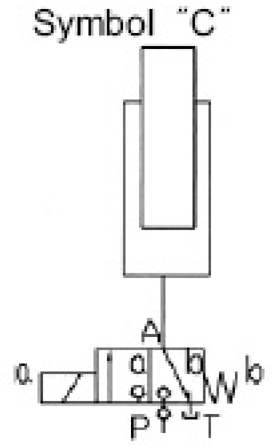
2/2-way circuit with a single poppet valve and check valve at port A

The check valve must be fitted in the pipe work.

Initial position: Free-flow, maximum pressure permissible. Pressue is held in the actuator, even when the pump is switched off, due to the check valve at port A.

Switched position: Flow blocked, maximum pressure permissible. Leakage drained via port T. The only leakage occurring is that which flows to T during the switching process.

Symbol "C"



3/2-way circuit with a two poppet valve and cartridge check valve in port P

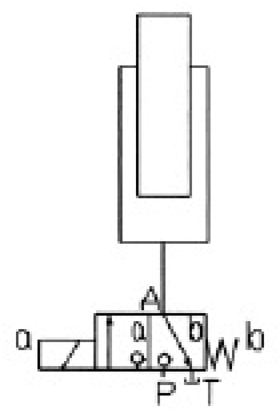
The check valve is fitted in the P port of the 3/2-way poppet valve.

Initial position: Lowering

Switched postion: Lifting

The load can be held in any position while the pump is switched off and the solenoid energized.

Symbol "C"



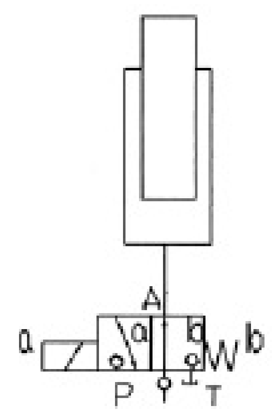
3/2-way circuit with a two poppet valve

Initial position: Lowering

Switched position: Lifting

Holding only due to limitation of travel and pressure in port P.

Symbol "U"



3/2-way circuit with a single poppet valve and cartridge check valve in port P

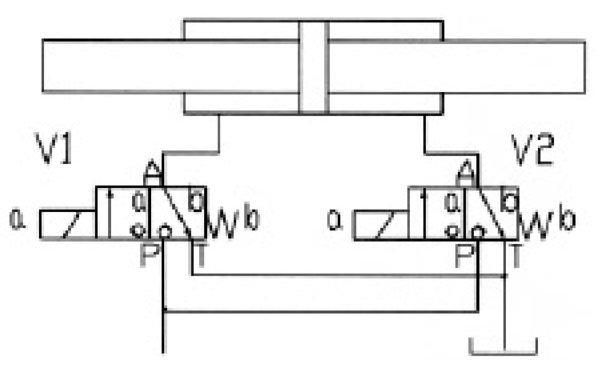
The check valve is fitted into the P port of the 3/2-way poppet valve.

Initial position: Lifting

The load can be held in any position while the pump is switched off.

Switched position: Lowering

Symbol "C"



4/3- (4/4-) way circuit with a 2 two poppet valves

V1 and V2 in the initial position: Both cylinder sides are connected to the tank port.

V2 in the switched position: The piston moves to the left

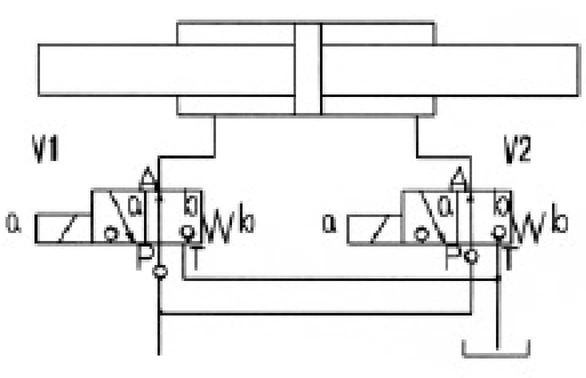
V1 in the switched position: The piston moves to the right

V1 and V2 in the switched position: Both cylinders sides are connected to the pump port. Rapid traverse is possible when a single rod cylinder with an area ratio of 2 : 1, is used.

Attention!

When using single rod cylinders, the performance limit (double flow) and the maximum permissible operating pressure (pressure intensification) of the valve must be taken into account.

Symbol "U"



4/3- (4/4-) way circuit with a 2 two poppet valves and cartridge check valve in port P of the 3/2-way poppet valves

V1 and V2 in the initial position: The piston is locked externally to prevent movement.

V2 in the switched position: The piston moves to the right

V1 in the switched position: The piston moves to the left

V1 and V2 in the switched position: Both cylinder sides are connected to the tank port.

Attention!

When using single rod cylinders, the performance limit (double flow) and the maximum permissible operating pressure (pressure intensification) of the valve must be taken into account!

Notice

1. The fluid must be filtered. Minimum filter fineness is 20 μm.
2. The tank must be sealing up and an air filter must be installed on air entrance.
3. Products without subplate when leaving factory, if need them, please ordering specially.
4. Valve fixing screws must be high intensity level (class 10.9). Please select and use them according to the parameter listed in the sample book.
5. Roughness of surface linked with the valve is required to $\overset{0.8}{\surd}$.
6. Surface finish of mating piece is required to 0.01/100mm.

BEIJING HUADE HYDRAULIC INDUSTRIAL GROUP CO.,LTD.	3/2- and 4/2-way poppet directional valves, solenoid actuated Type M-.SEW 10			RE 22059/12.2004
	Size 10	up to 42/63MPa	up to 40L/min	

Features:

- Direct actuated directional poppet valve, solenoid actuated
- Closed port is leak-free
- Switching is ensured even after long periods of being under pressure
- Air gap DC solenoids with removable coil (AC voltages possible via rectifier)
- Solenoid coil can be rotated by 90°
- Individual electrical connection
- With protected hand override, optional
- Porting pattern to Din 24 340 form A, ISO 4401 and CETOP-RP 121H

Function,section

General:

The 2 type M-.SEW directional valve is a solenoid actuated directional poppet valve.They control the start, stop and direction of a flow.They basically consist of a housing (1),the solenoids (2), the hardened valve system (3) and the ball(s) (4) as the closing element.

Basic principle:

In the initial position the ball (4) is pressed onto the seat by the spring (9), and in the switched position by the solenoid (2). The solenoid (2) force acts via the lever (6) and the ball (7) on the actuator pin (8), which is sealed on two sides.The chamber between the two sealing elements is connected with port P. The valve system (3) is thereby pressure balanced with regard to the actuating forces (sole-noid or return spring). The valves can, therefore, be used up to a pressure of 63 MPa.

Note:

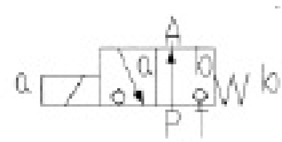
The 3/2-way poppet valves have a "negative switching overlap". Therefore, port T must always be connected.This means that during the switching process - from the start of opening one valve seat to the closing of the other seat - all of the ports P-A-T are connected with each other. This, however, takes place in such a short space of time that in most applications it is irrelevant.

The hand override (10) makes it possible to switch the valve without energizing the solenoids.

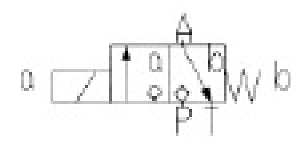
Care has to be taken to ensure that the stated maximum flows are not exceeded! If necessary a cartridge throttle for flow limitation has to be fitted (see below).

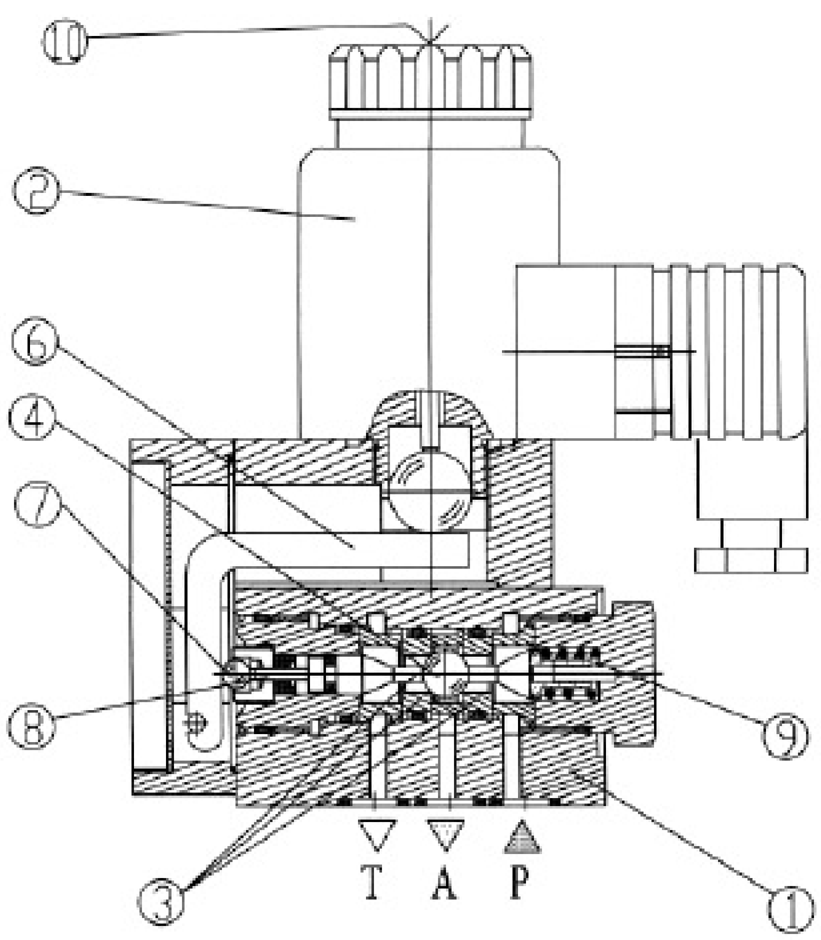
The following possibilities are obtainable via the seat orientation:

Symbol¨ U¨



Symbol¨ C¨





Type M-3SEW10U...

Illustration: 4/2-way poppet valve

In conjunction with a sandwich plate, a plus-1 plate, under the 3/2-way poppet valve this valve can be used as 4/2-way poppet valve.

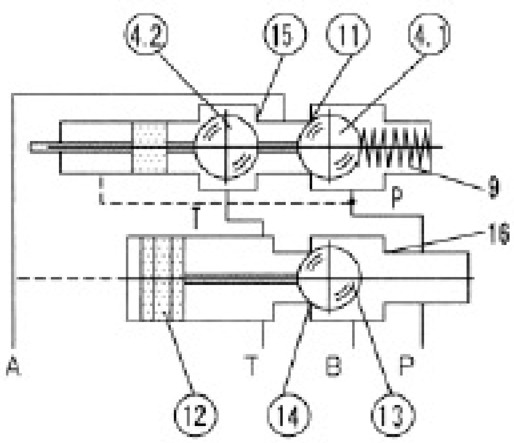
Function of the plus-1 plate:

Initial position:
The main valve is not actuated.The spring (9) holds the ball (4.1) on the seat (11). Port P is closed and A is connected to T. In addition, a control line runs from A to the large area of the control spool (12), which is thus unloaded to tank.The pressure applied via P now moves the ball (13) onto seat (14).Thus, P is connected to B and A with T.

Transition position:
When the main valve is operated, the ball (4.2) is pushed against the spring (9) and then pressed onto the seat (15).Port T is then blocked,P,A and B are connected to each other for a short time.

Switched postion:
P is connected to A. As the pump pressure acts via A on the large area of the control spool (12), the ball (13) is pushed onto seat (16). Thus, B is connected to T and P to A. Ball (13) in the plus-1 plate has a "positive switching overlap".
In order to avoid pressure intensification when single rod cylindes are used, the annulus area of the cylinder must be connected to A.

Schetatic illustration: initial position

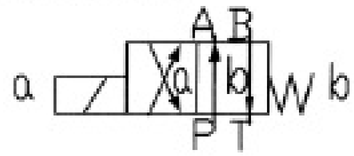


3/2-way poppet valve

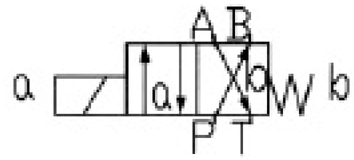
Plus-1 plate

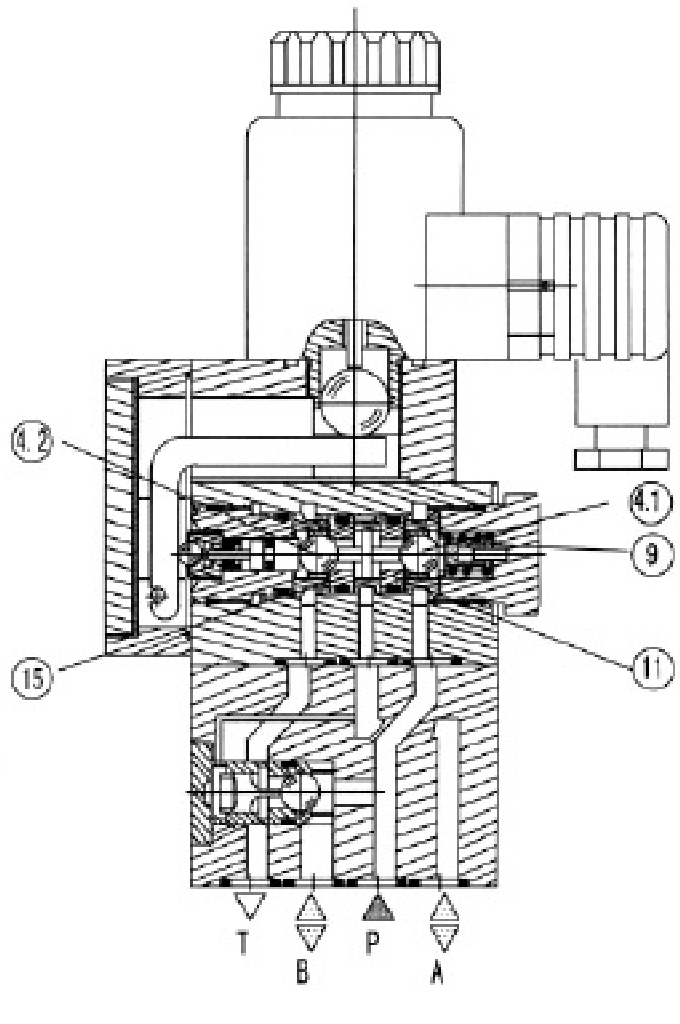
Due to the use of the plus-1 plate and the arrangement of the seats, the following combinations are possible:

Symbol" D"



Symbol" Y"





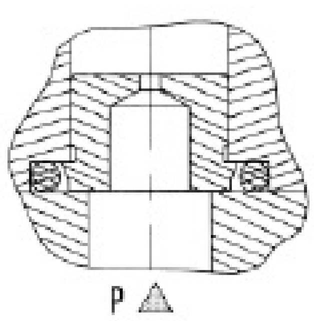
Type M-4SEW10Y...

Cartridge throttle

The use of the cartridge throttle is necessary when, due to operational conditions during the switching process, flows can occur that exceed the valve performance limits.
Example:
- Accumulator operation,
- Use as a pilot valve with internal pilot oil supply.

3/2-way poppet valve
The cartridge throttle is fitted into port P of the poppet valve.

4/2-way poppet valve
The cartridge throttle is fitted into port P of the plus-1 plate.

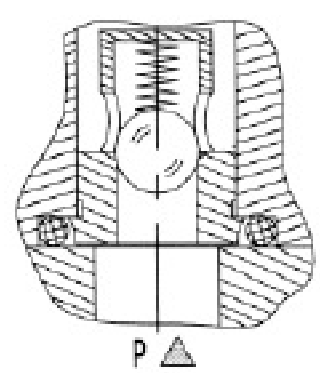


Cartridge check valve

The carteige check valve allows free flow from P to A and provides leak-free closure from A to P.
For examples.

3/2-way poppet valve
The cartridge check valve is inserted into port P of the poppet valve.

4/2-way poppet valve
The cartridge check valve is inserted intoport P of the plus-1 plate.

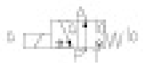


Ordering details

M -		SEW	10		10	B /		M			K4 /			*

3 service ports	= 3
4 service ports	= 4

Nominal size 10	= 10

Service ports	3	4	
	·	–	=U
	·	–	=C
	–	·	=D
	–	·	=Y
· = available			

Series 10 to 19 (10 to 19: unchanged installation and connection dimensions)	= 10

Technology of Beijing Huade Hydraulic	=B

Operating pressure up to 42 MPa (fixing screws M6)	= 420
Operating pressure up to 63 MPa (fixing screws M8)	= 630

M =	Solenoid (air gap) with removable coil

G24	= 24VDC
G205 2)	= 205VDC

N9	= With protected manual override
No Code	= Without manual override

Electrical connection
Individual connection
K4 1,2) = without plug, with protection cover

No code =	Without cartridge check valve,without throttle insert
P =	With cartridge check valve
B12 =	Throttle Φ1.2 mm
B15 =	Throttle Φ1.5 mm
B18 =	Throttle Φ1.8 mm
B20 =	Throttle Φ2.0 mm
B22 =	Throttle Φ2.2 mm

No code =	mineral oils
V =	phosphate ester

Further details in clear text

AC supply (permissible voltage tolerance ± P10%)	Nominal voltage of the DC solenoid when used with anAC voltage	Order detail
110V-50/60HZ 120V-60HZ	96V 110V	G96
230V-50/60HZ	205V	G205

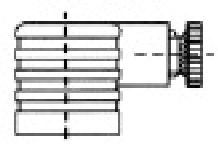
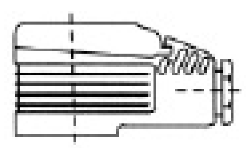
Note: Other types of actuators e.g.pneumatic,hydraulic, rotary knob,rotary knob with lock,plunger,lever,roller lever on request!

1) Plug-in connectors have to be ordered separately (see below).

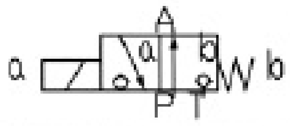
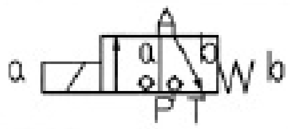
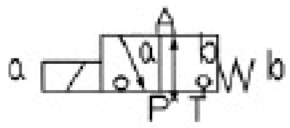
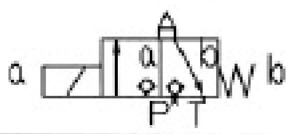
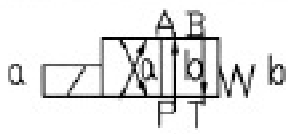
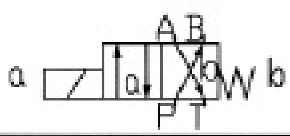
2) For the connection to an AC supply a DC solenoid must be used which is controlled via a rectifier (see table on the left).

For individual connections a large plug-in connector with integrated rectifier can be used (separate order, see below).

Ordering details: plug-in connector

		Plug-in connections DIN 43 650 ISO 4400 	 Without indicator light	With indicator light	Without indicator light	With indicator light and Z-diode protective circuit
a grey	Material no.	074 683	008 616	313 923/24V 313 926/180-240V	313 932	310 994

Performance limits (measured at v = 41 mm²/s and t= 50°C)

	Symbol	Comments	Operating pressure in MPa				Flow in L/min
			P	A	B	T	
3- way circuit	"U" 	Pressure at P ≥ A ≥ T	42/63	42/63		10	40
	"C" 		42/63	42/63		10	40
2- way circuit (only for unloading function)	"U" 	Before switching from the initial position to the switched position, pressure must be present in port A. Pressure at A ≥ T		42/63		10	40
	"C" 	Pressure at A ≥ T		42/63		10	40
4- way circuit	"D" 	Single ball valve (symbol "U")in conjunction with a plus-1 plate P > A \ ≥ B > T	42/63	42/63	42/63	10	40
	"Y" 	Two ball valve (symbol "C") in conjunction with a plus-1 plate P ≥ A ≥ B > T	42/63	42/63	42/63	10	40

General guidelines

In order to operate the valve safely and to hold it safely in the switched position, the pressure in P must be ≥A ≥ T (for design reasons).

The ports P, A and T (3/2-way poppet valve) as well as P, A, B and T (4/2-way poppet valve) are positively assigned to their individual functions. They must not be interchanged or plugged.Flow is only permitted in the direction of the arrow.

When using the plus-1 plate (4/2-way function) the following lower operating values must be taken into account:p min = 0.8 MPa; q_v > 3 L/min.

The specified maximum flow must not be exceeded.

The performance limit was determined with the solenoids at operating temperature, 10% under voltage and with the tank not pressurized.

Technical data (for applications outside these parameters, please consult us!)

Installation			optional
Max. ambient temperature		(°C)	-30—+50
Weight	3/2-way poppet valve	(kg)	2.0
	4/2-way poppet valve	(kg)	3.5
Hydraulic data			
Max. operating pressure		(MPa)	see table above
Max. flow		(L/min)	40
Pressure fluid			Mineral oils(for NBR seal) or phosphate ester(for FPM seal)
Pressure fluid temperature range		(°C)	- 30 to + 80
Viscosity range		(mm²/s)	2.8 to 500
Degree of contamination		(μm)	Maximum permissible degree of contamination of the pressure fluid is to NAS 1638 class 9. We, therefore, recommend a filter with a minimum retention rate of β_{10} ≥ 75.

Technical data

Electrical data			
Type of voltage		DC	AC
Available voltages[1]	(V)	12、24、42、96、110、205、220	only possible via rectifier 205, 220 (see ordering details)
Voltage tolerance (nominal voltage)	(%)	± 10	
Power consumption	(W)	30	
Duty		100%	
Switching time to ISO 6403		see table below	
Switching frequency cycle	(s/h)	15000	
Protection to DIN 40 050		IP65	
Max. coil temperature	(°C)	t0150	

1) Special voltages on request

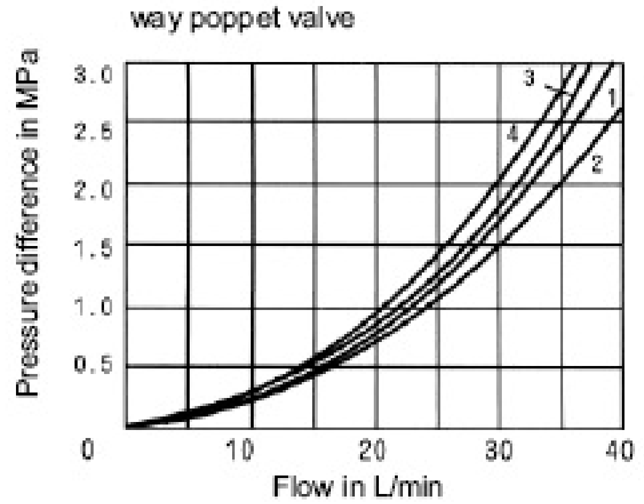
When connecting the electrics, the protective conductor (PE⏚) must be connected according to the relevant regulations.

Switching time in ms (installation: solenoid vertical)

Pressure	Flow	DC solenoid						DC solenoid + rectifier							
in	q_V	t_{ON} Without tank pressure				t_{OFF}		t_{OFF} Without tank pressure				t_{OFF}			
MPa	L/min	U	C	D	Y	U、C	D、Y	U	C	D	Y	U	C	D	Y
14	40	20	40	20	40	12	17	20	40	20	40	60	45	40	50
28	40	25	45	20	45	12	17	20	45	25	45	60	45	45	55
32	40	25	45	20	45	12	17	25	45	25	45	60	45	45	55
42	40	30	45	20	50	12	17	25	45	25	50	60	45	45	55
50	40	30	45	20	50	12	17	30	50	30	50	65	50	60	60
60	40	30	50	20	50	12	17	30	50	30	50	65	50	60	60

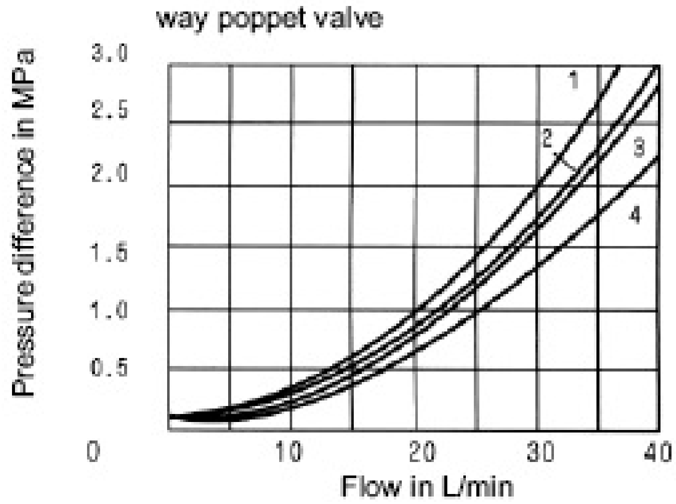
Characteristic curves (measured at v = 41 mm²/s and t = 50°C)

Δp- q_V -characteristic curves - 3/2-way poppet valve



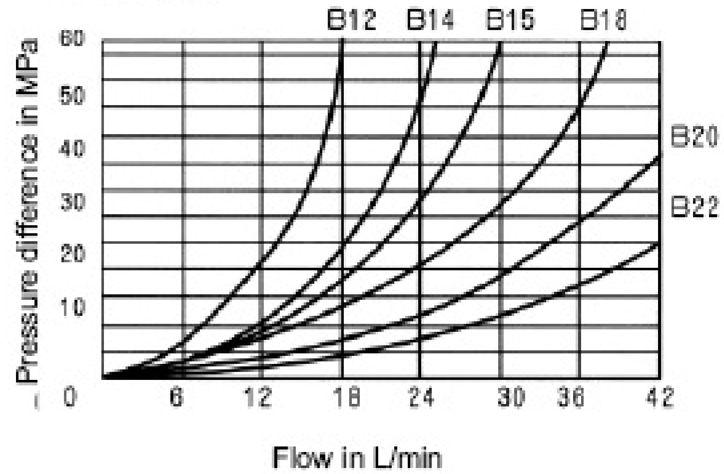
1 M-3SEW 10 C... P to A
2 M-3SEW 10 C... A to T
3 M-3SEW 10 U... P to A
4 M-3SEW 10 U...A to T

Δp-q_V -characteristic curves - 4/2-way poppet valve

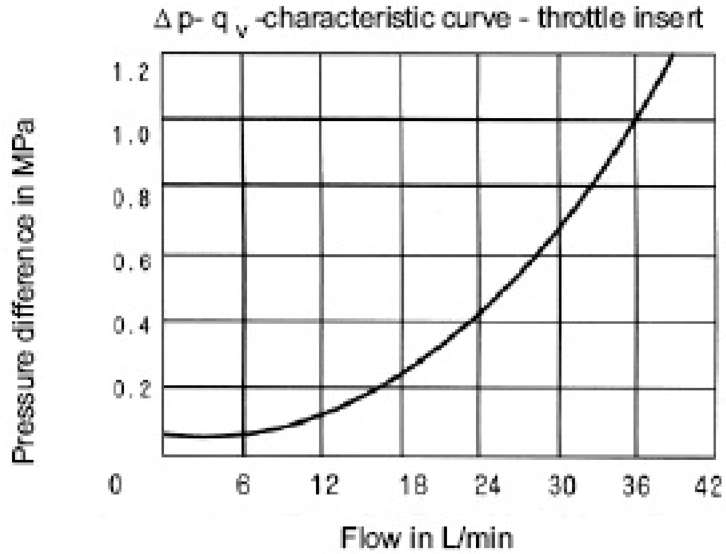


1 M-4SEW 10$^{D}_{Y}$...,A to T
2 M-4SEW 10$^{D}_{Y}$..., P to A
3 M-4SEW 10$^{D}_{Y}$..., P to B
4 M-4SEW 10$^{D}_{Y}$..., B to T

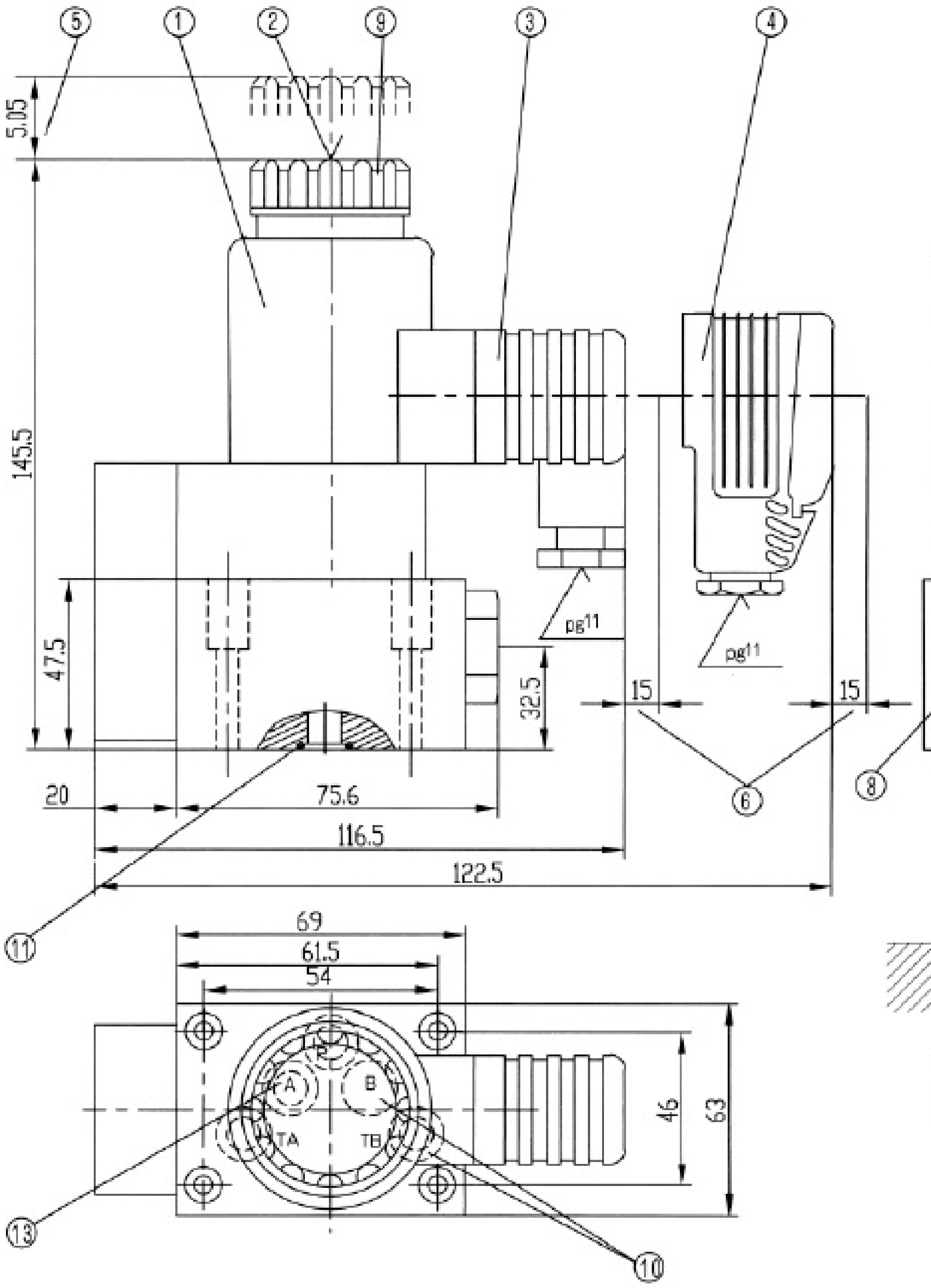
Δp- q_V -characteristic curve - cartridge check valve

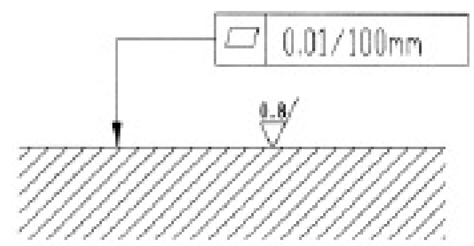


Δp- q_V -characteristic curve - throttle insert



Unit dimensions: 3/2-way poppet valve(42 MPa version) **(Dimensions in mm)**





Required surface finish of the mating piece

1 Solenoid "a" (plug-in connector colour grey)

2 Protected hand override "N9"

3 Plug-in connector to DIN 43 650 1) (may be rotated by 90°)

4 Large plug-in connector to DIN 43650 1) (may be rotated by 90°)

5 Space required to remove the coil

6 Space required to remove the plug-in connector

8 Nameplate

9 Fixing nut, tightening torque M_A = 4 Nm

10 Attention! On 3/2-way poppet valves ports B and TB for the 42MPa version are blind counter bores and are not present in the 63MPa version.

11 O-rings 12 x 2 for ports A, B, TA and TB; O-ring 14 x 1.78 for port P

12 Valve fixing screws

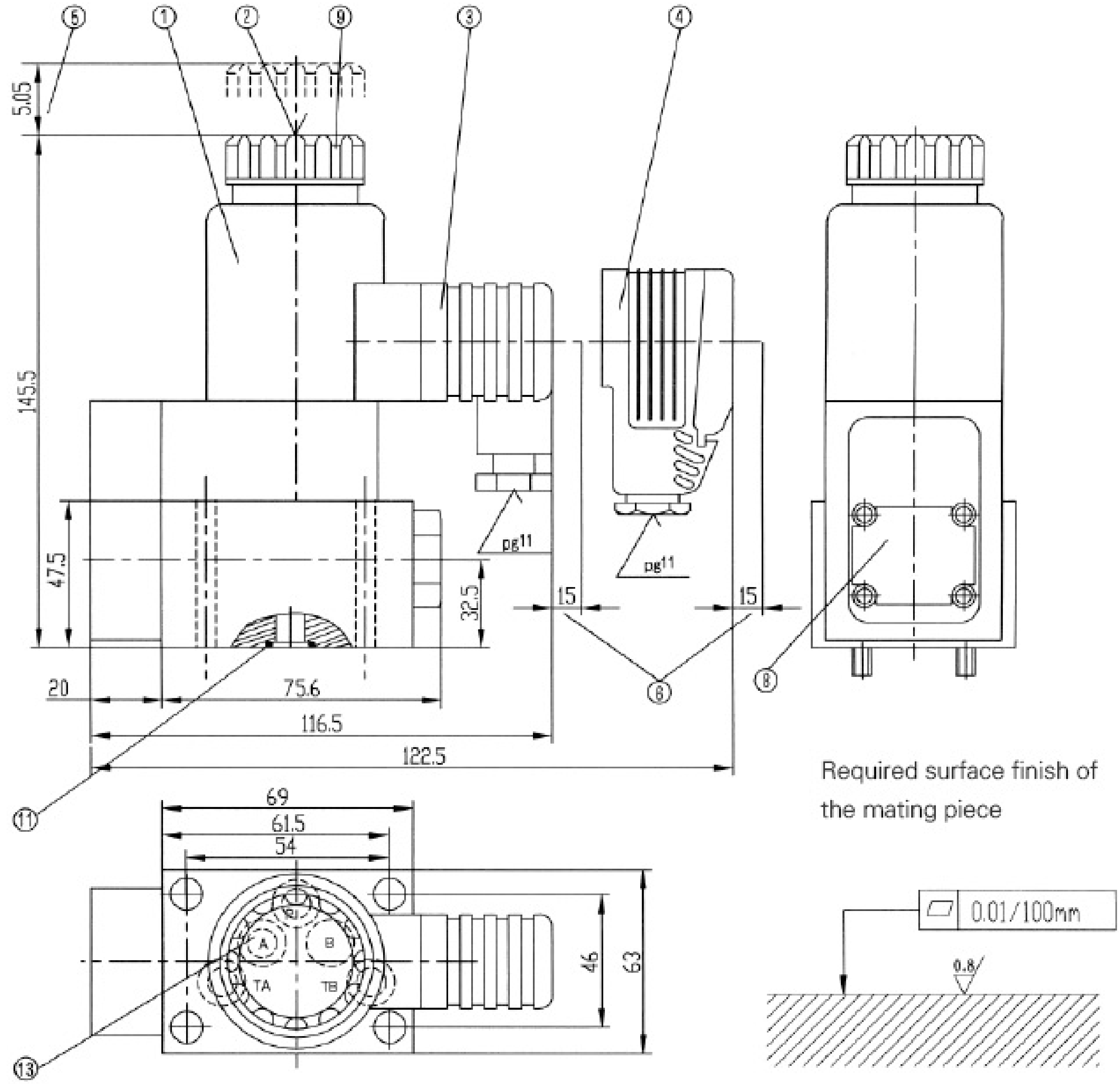
4 - M6 x 40 DIN 912-10.9 (GB/T70.1-2000), M_A = 15.5 Nm

13 Porting pattern to DIN 24 340 form A, must be ordered separately. ISO 4401 and CETOP-RP 121 H

Subplates:(see page 206)
G66/01(G1/4")
G67/01(G3/8")
must be ordered separately.

1) must be ordered separately, see page 151.

Unit dimensions: 3/2-way poppet valve (63 MPa version) (Dimensions in mm)



1 Solenoid "a" (plug-in connector colour grey)

2 Protected hand override "N9"

3 Plug-in connector to DIN 43 650 1) (may be rotated by 90°)

4 Large plug-in connector to DIN 43650 1) (may be rotated by 90°)

5 Space required to remove the coil

6 Space required to remove the plug-in connector

8 Nameplate

9 Fixing nut, tightening torque M_A = 4 Nm

11 O-rings 12 x 2 for ports A and TA O-ring 14x 1.78 for port P

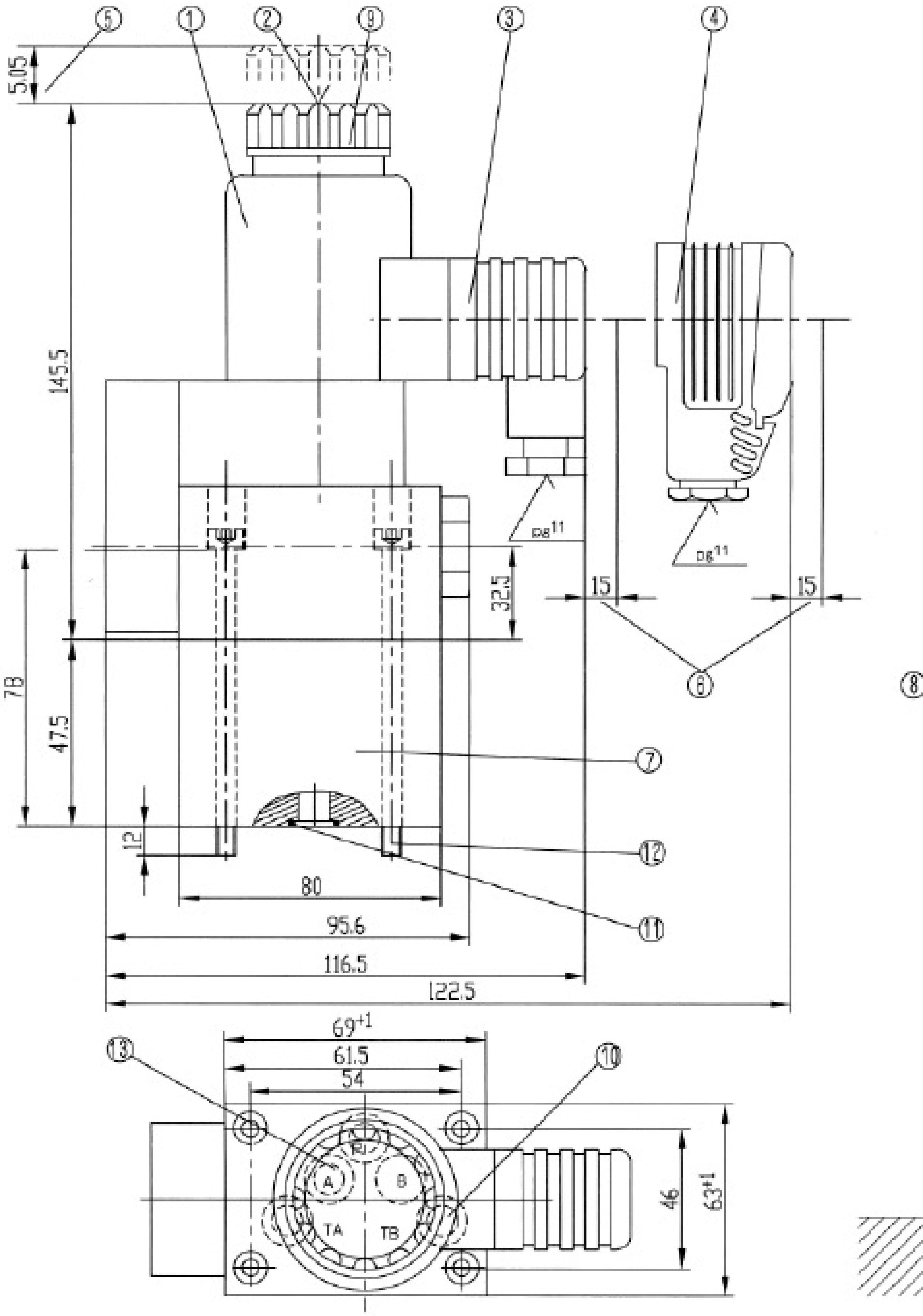
12 Valve fixing screws 4 - M8 × 60-10.9 （GB/T70.1-2000）; M_A = 37 Nm are included within the scope of supply.

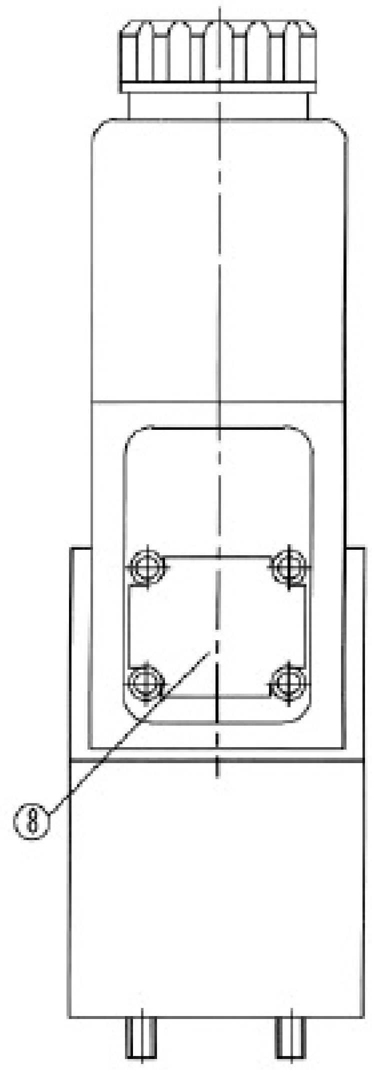
13 Porting pattern to DIN 24 340 form A,ISO 4401 and CETOP-RP 121 H

Subplates
G377/01(G3/8″)
G378/01(G1/2″)
must be ordered separately.

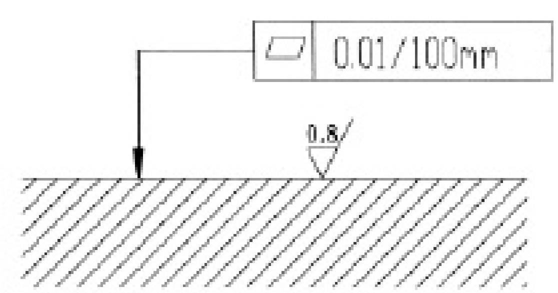
1) must be ordered separately, see page 151.

Unit dimensions: 4/2-way poppet valve (42 MPa version) (Dimensions in mm)





Required surface finish of the mating piece



1 Solenoid "a" (plug-in connector colour grey)

2 Protected hand override "N9"

3 Plug-in connector to DIN 43 650 1) (may be rotated by 90°)

4 Large plug-in connector to DIN 43650 1) (may be rotated by 90°)

5 Space required to remove the coil

6 Space required to remove the plug-in connector

7 Plus-1-Platte

8 Nameplate

9 Fixing nut,tightening torque M_A = 4 Nm

10 Attention! On the 4/2-way poppet valves port TB is a blind counterbore.

11 O-rings 12 x 2 for ports A, B, TA and TB
O-ring 14 x 1.78 for port P

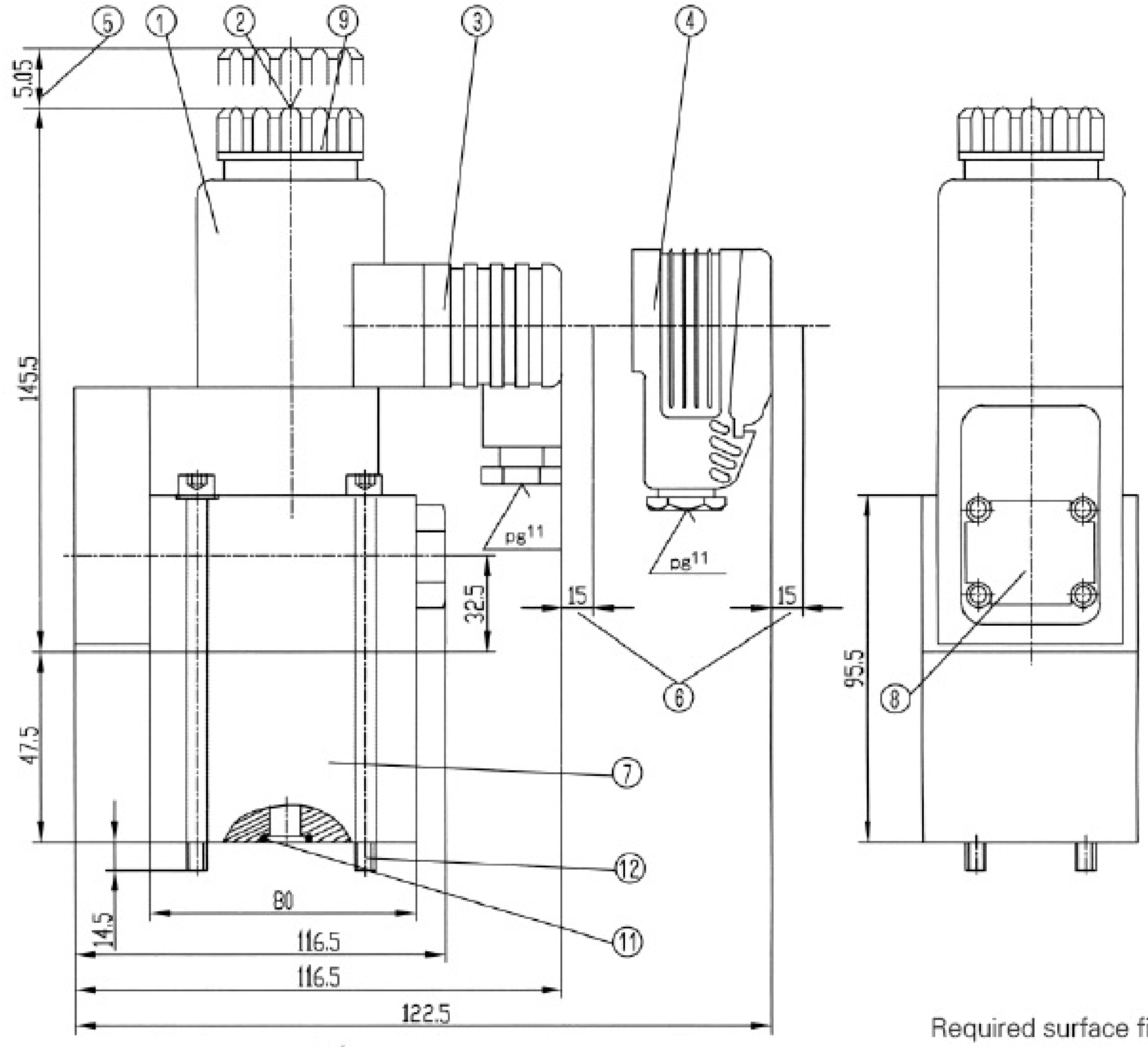
12 Valve fixing screws 4 - M6 x 90 - 10.9 (GB/T70.1-2000), M_A = 15.5 Nm are included within the scope of supply.

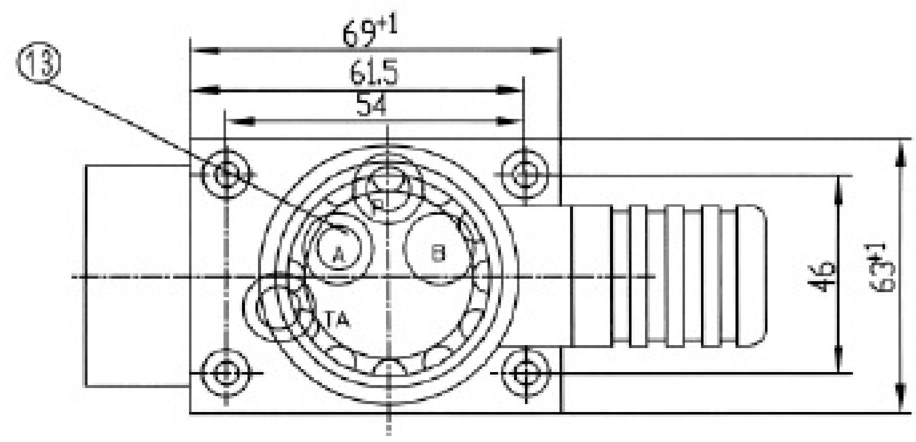
13 Porting pattern to DIN 24 340 form A,ISO 4401 and CETOP-RP 121 H

Subplates
G377/01(G3/8″)
G378/01(G1/2″)
must be ordered separately.

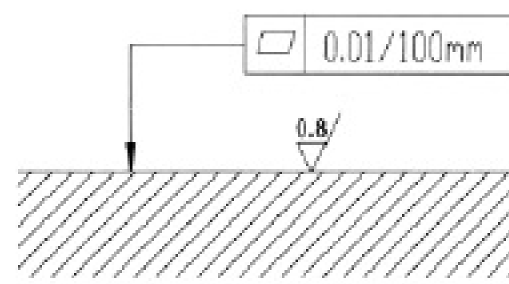
1) must be ordered separately, see page 151.

Unit dimensions: 4/2-way poppet valve (63 MPa version) **(Dimensions in mm)**





Required surface finish of the mating piece



1 Solenoid "a" (plug-in connector colour grey)

2 Protected hand override "N9"

3 Plug-in connector to DIN 43 650 1) (may be rotated by 90°)

4 Large plug-in connector to DIN 43650 1) (may be rotated by 90°)

5 Space required to remove the coil

6 Space required to remove the plug-in connector

7 Plus-1 plate

8 Nameplate

9 Fixing nut, tightening torque M_A = 4 Nm

11 O-rings 12 x 2 for ports A,B and TA O-ring 14 x 1.78 for port P

12 Valve fixing screws 4 - M8 x 110-10.9 (GB/T70.1-2000), M_A = 37 Nm are included within the scope of supply.

13 Porting pattern to DIN 24 340 form A, ISO 4401 and CETOP-RP 121 H

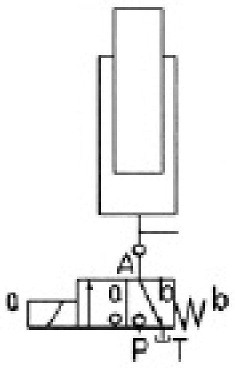
Subplates
G 377/01 (G3/8″)
G 378/01 (G1/2″)
must be ordered separately.

1) must be ordered separately, see page 2.

Application examples

These examples serve only to explain the possibilities offered by the poppet valve.They do not include the complete function.

Symbol "C"



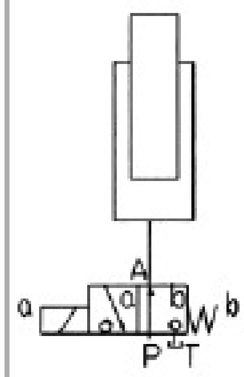
2/2-way circuit with a two poppet valve and check valve at port A

The check valve must be installed in the pipe work.

Initial position: Flow blocked, maximum pressure permissible. Pressure is held in the actuator, even when the pump is switched off, due to the check valve at port A.

Switched position: Free-flow, maximum pressure permissible. Leakage drained via port T. The only leakage occurring is that which flows to T during the switching process.

Symbol "C"



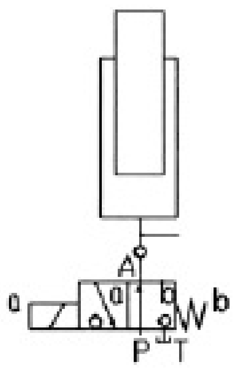
3/2-way circuit with a single poppet valve

Initial position: Lifting

Holding only due to limitation of travel and pressure in port P.

Switched position: Lowering

Symbol "U"



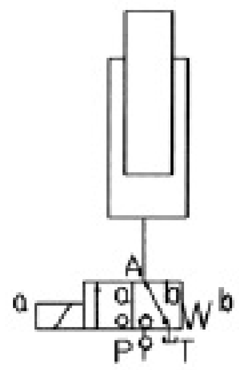
2/2-way circuit with a single poppet valve and check valve at port A

The check valve must be fitted in the pipe work.

Initial position: Free-flow, maximum pressure permissible. Pressue is held in the actuator, even when the pump is switched off, due to the check valve at port A.

Switched position: Flow blocked, maximum pressure permissible. Leakage drained via port T. The only leakage occurring is that which flows to T during the switching process.

Symbol "C"



3/2-way circuit with a two poppet valve and cartridge check valve in port P

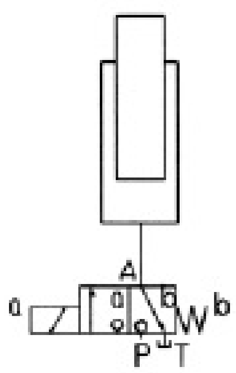
The check valve is fitted in the P port of the 3/2-way poppet valve.

Initial position: Lowering

Switched postion: Lifting

The load can be held in any position while the pump is switched off and the solenoid energized.

Symbol "C"



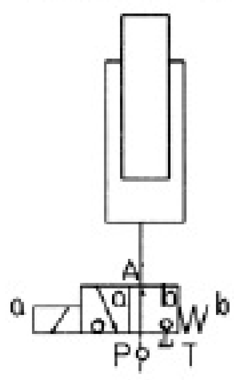
3/2-way circuit with a two poppet valve

Initial position: Lowering

Switched position: Lifting

Holding only due to limitation of travel and pressure in port P.

Symbol "U"



3/2-way circuit with a singlepoppet valve and cartridge check valve in port P

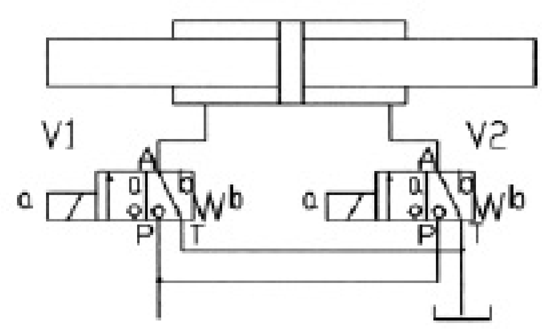
The check valve is fitted into the P port of the 3/2-way poppet valve.

Initial position: Lifting

The load can be held in any position while the pump is switched off.

Switched position: Lowering

Symbol "C"



4/3- (4/4-) way circuit with a 2 two poppet valves

V1 and V2 in the initial position: Both cylinder sides are connected to the tank port.

V2 in the switched position: The piston moves to the left

V1 in the switched position: The piston moves to the right

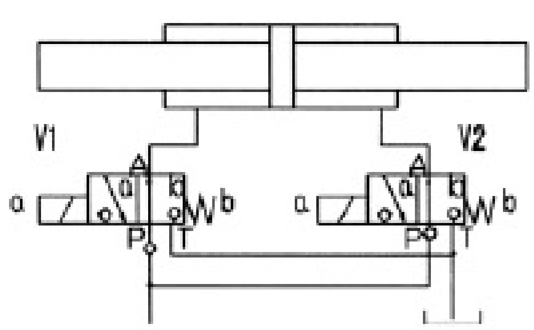
V1 and V2 in the switched position: Both cylinders sides are connected to the pump port.

Rapid traverse is possible when a single rod cylinder with an area ratio of 2 : 1, is used.

Attention!

When using single rod cylinders, the performance limit (double flow) and the maximum permissible operating pressure (pressure intensification) of the valve must be taken into account.

Symbol "U"



4/3- (4/4-) way circuit with a 2 two poppet valves and cartridge check valve in port P of the 3/2-way poppet valves

V1 and V2 in the initial position: The piston is locked externally to prevent movement.

V2 in the switched position: The piston moves to the right

V1 in the switched position: The piston moves to the left

V1 and V2 in the switched position: Both cylinder sides are connected to the tank port.

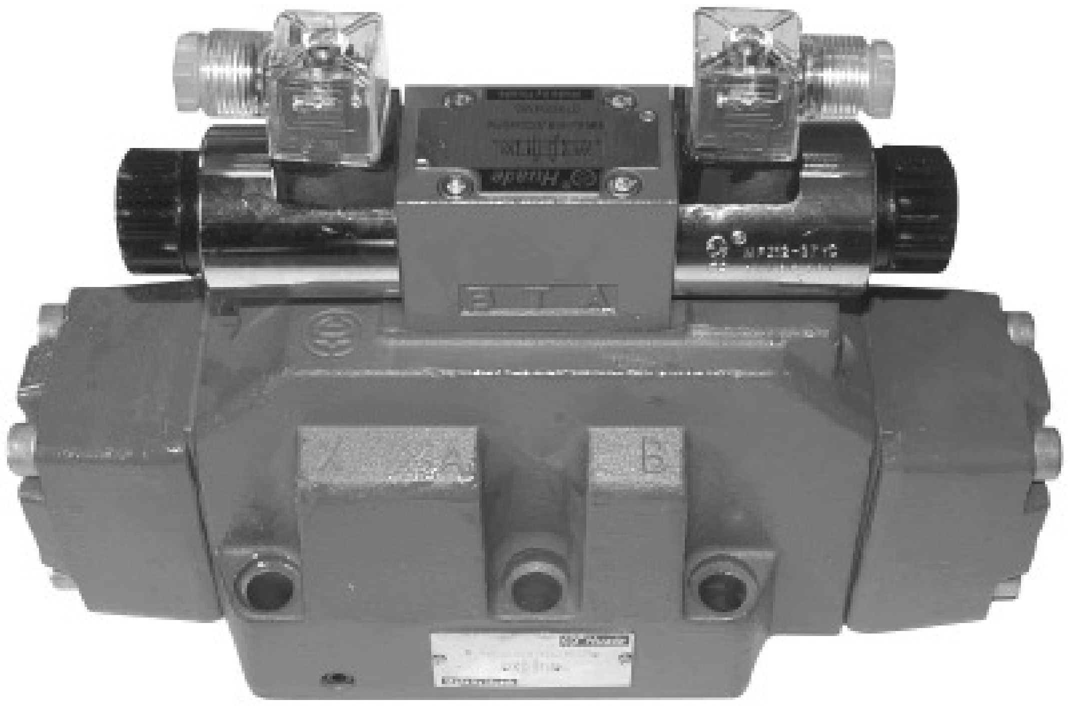
Attention!

When using single rod cylinders, the performance limit (double flow) and the maximum permissible operating pressure (pressure intensification) of the valve must be taken into account!

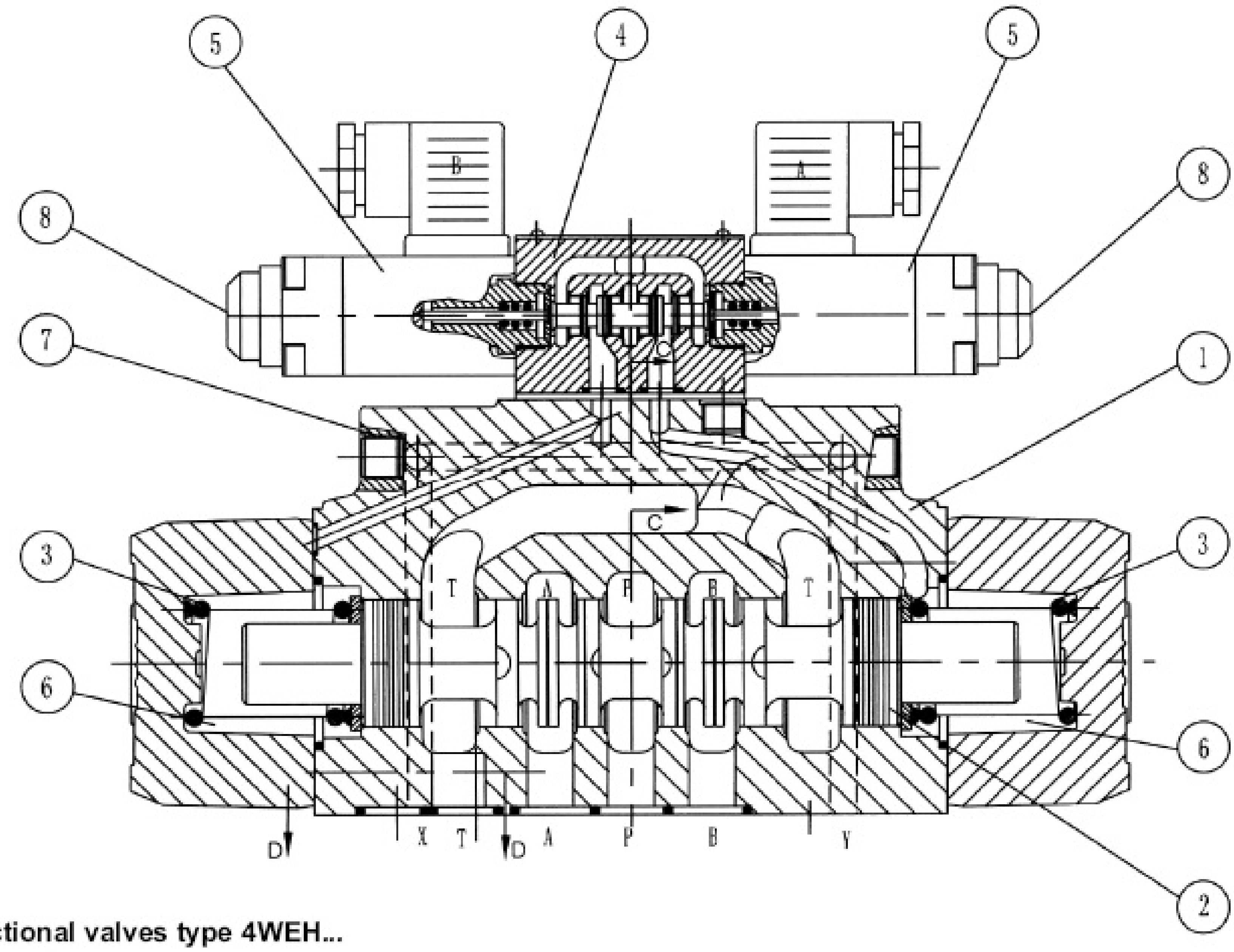
BEIJING HUADE HYDRAULIC INDUSTRIAL GROUP CO.,LTD.	**Directional valves electro-hydraulically operated**			RE24750/12.2004
	Size10 to 32	up to 28/35 MPa	up to 1100 L/min	Replaces：RE 24750/05.2001

Features:

- Valves used to control the start, stop and direction of a fluid flow
- Electro-hydraulic operation (WEH), hydraulic operation (WH)
- For subplate mounting
- Spring or pressure-centred,spring or hydraulic offset
- Wet-pin DC or AC solenoids, optional
- Manual override, optional
- Electrical connection as 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
- Porting pattern to Din 24 340 form A, ISO 4401 and CETOP-RP 121H



Functional description, section



Directional valves type 4WEH...

Valves of type WEH are directional spool valves with electro-hydraulic operation.

The directional valves basically consist of the main valve with housing (1), main control spool (2), one or two return springs, and the pilot valve (4) with one or two solenoids.

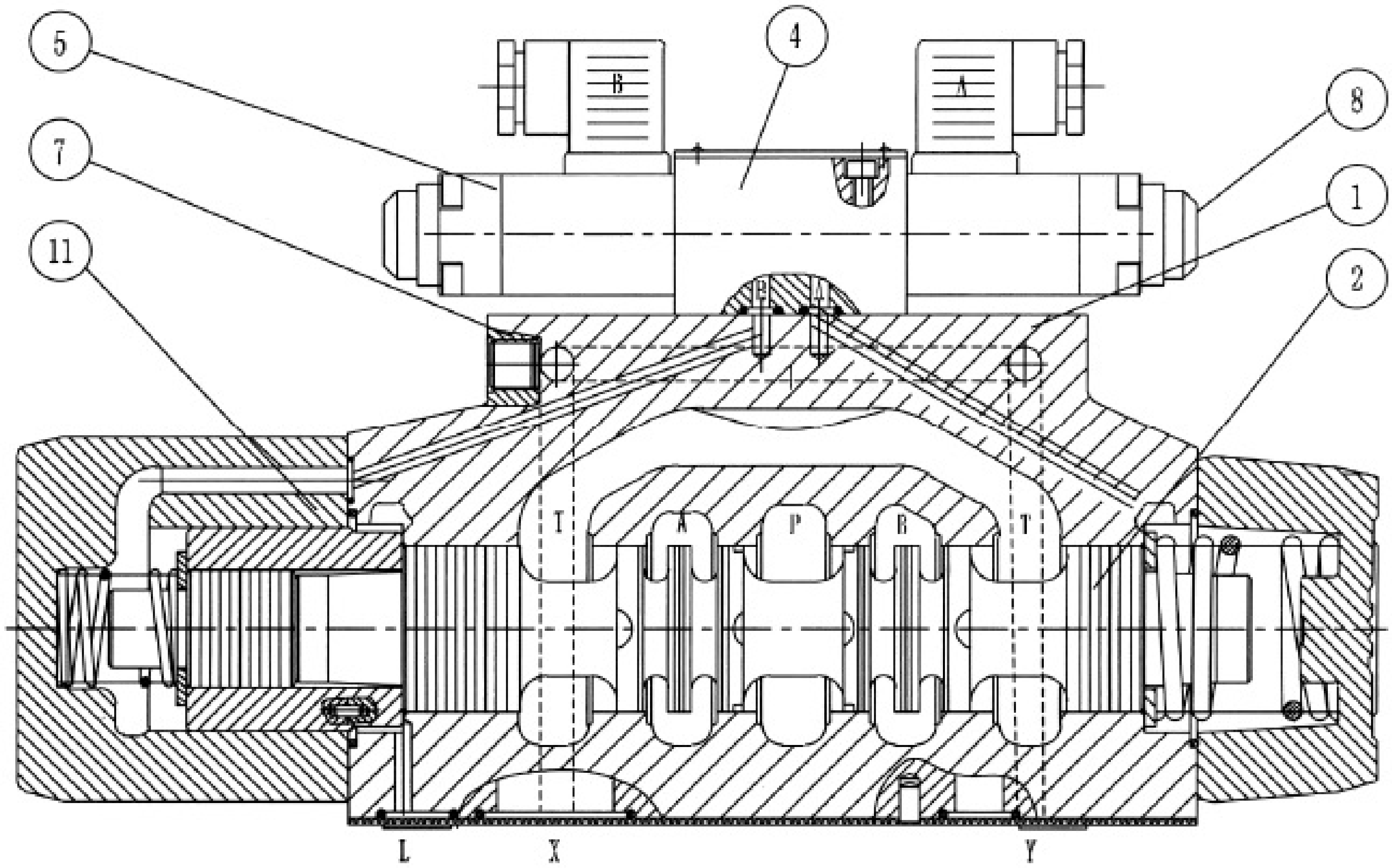
The main control spool (2) in the main valve is held in the neutral or in the initial position either by the springs or by means of pressure.The pilot oil supply can be either internal or external (external via port X).The pilot oil is expelled from the spring chamber via the pilot valve into the Y channel.The pilot oil supply and drain are internal or external (external via port Y).

4/3-way directional valve with spring centring of the control spool, type 4WEH...

In this model, the main control spool (2) is held in the neutral position by two return springs. The two spring chambers (6) are connected to ports X and Y via the connector plate .When one of the two ends of the main control spool (2) is pressurized with pilot pressure, the spool is moved to the shifted 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.

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 pressurization of the two front faces. A centring sleeve 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 re-turning pilot oil via the pilot valve into the Y channel (external).



Type WEH...H.../...

Directional valves type 4WH...

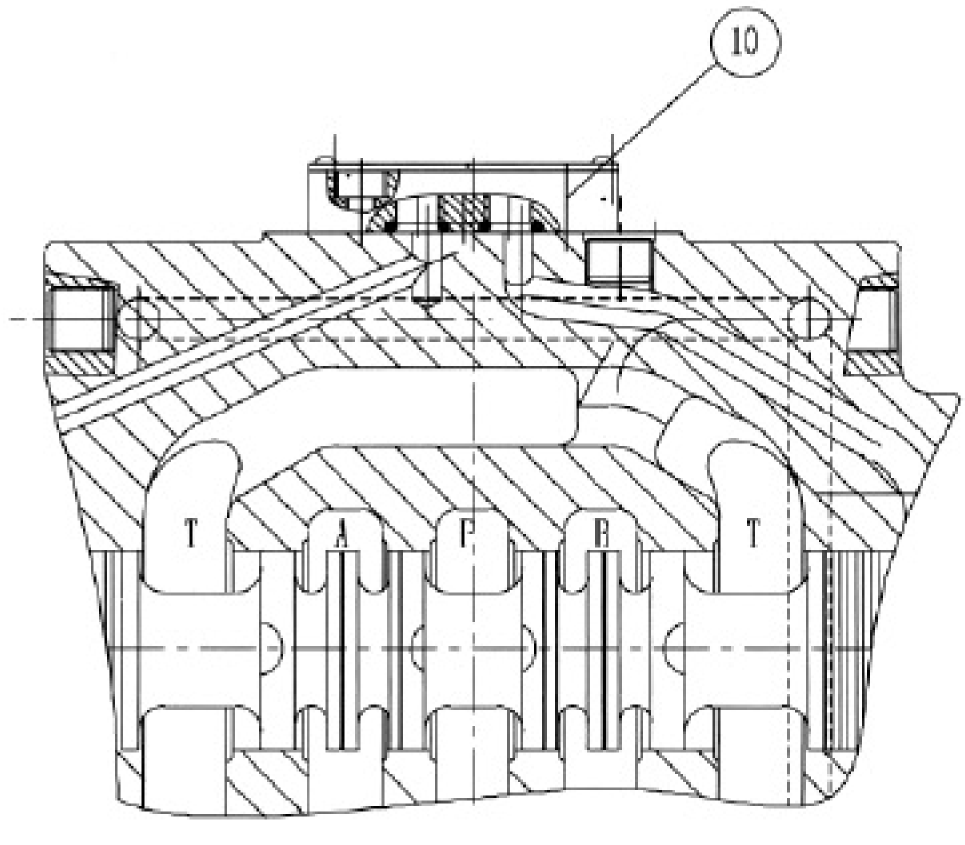
Valves of type WH are directional spool valves with hydraulic operation.

They control the start, stop and direction of a fluid flow.

The directional valves basically consist of the valve housing(1),the main control spool(2), one or two return springs(3) and in the case of valves with spring return or spring centring,and the pilot connecting plate .

The control spool(2) is operated directly by means hydraulic pressure.

The control spool(2) is held in the neutral or in the initial position either by springs or by means of pressure. Pilot oil supply and pilot oil drain are external .



Type WH...

Pilot oil supply

4WEH- ...and 4WH...

The pilot oil supply is sourced externally via channel X from a separate circuit.
The pilot oil drain is led externally via channel Y to tank.

4WEH...E...

The pilot oil supply is sourced internally from channel P of the main valve.
The pilot oil drain is led externally via channel Y to tank. Port X in the subplate is plugged.
Change over from external to internal or from internal to external pilot oil supply (size 16): Remove the cover on the solenoid side "a", remove the plugs and turn end-for-end, insert plugs and re-place the cover.

4WEH...ET...

The pilot oil supply is sourced internally from channel P of the main valve.
The pilot oil drain is led internally via channel T to tank. Ports X and Y in the supblate are plugged.

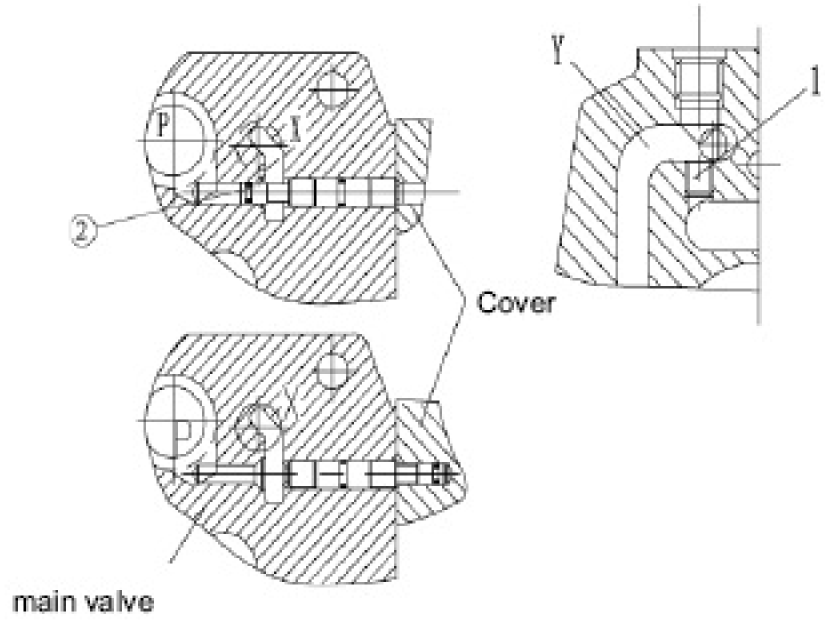
4WEH...T...

The pilot oil supply is sourced externally via channel X from a separate circuit. The pilot oil drain is led internally via channel T to tank. Port Y in the subplate is plugged.
1 Plug screw M6-8.8 pilot oil drain
2 Plug screws M6-8.8 pilot oil supply
3 Plug screws M8-8.8 for external sealing
Tightening torques M_A for cover fixing screws:
Size 16: 35 Nm
Size 25: 68 Nm
Tightening torque M_A for pilot valve fixing screws:
Sizes 10 to 32: 9 Nm

Size 10 main valve
Pilot oil supply
external: 2 plugged
internal: 2 open
Pilot oil drain
external: 1 plugged
internal: 1 open

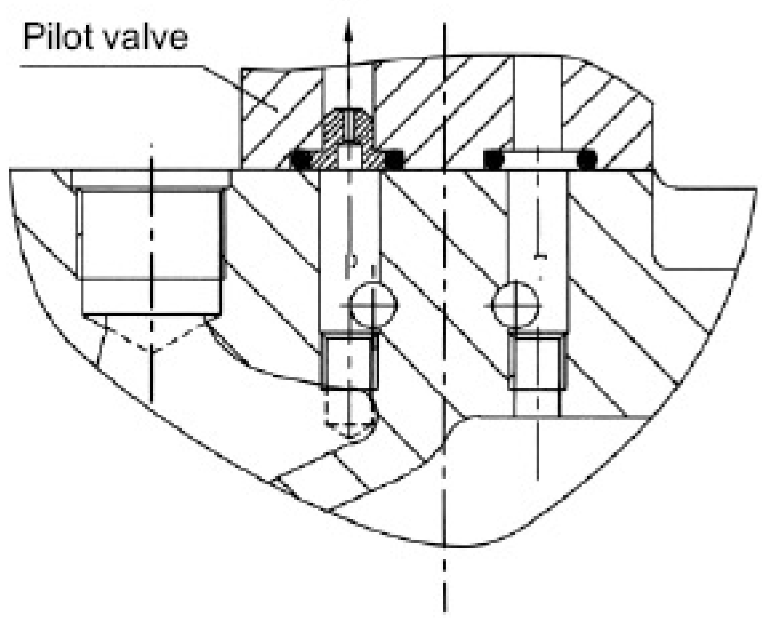
Size 16

Pilot oil supply	Pilot oil drain
external: 2 plugged	external 1 plugged
internal: 2 open	1 open



Size 25
Pilot oil supply
external: 2 plugged
internal: 2 open
Pilot oil drain
external: 1 plugged
internal: 1 open

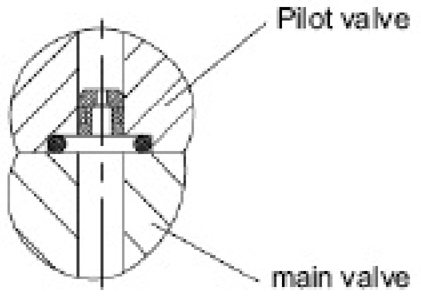
Size 32



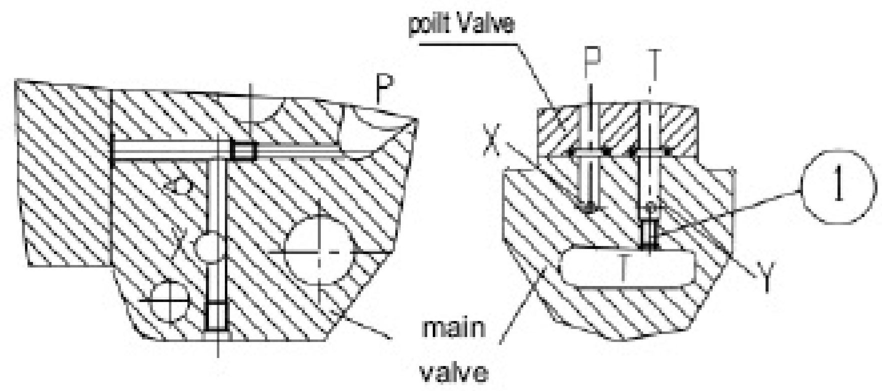
Pilot oil supply	**Pilot oil drain**
external: 2 plugged	external: 1 plugged
internal: 2 open	internal: 1 open

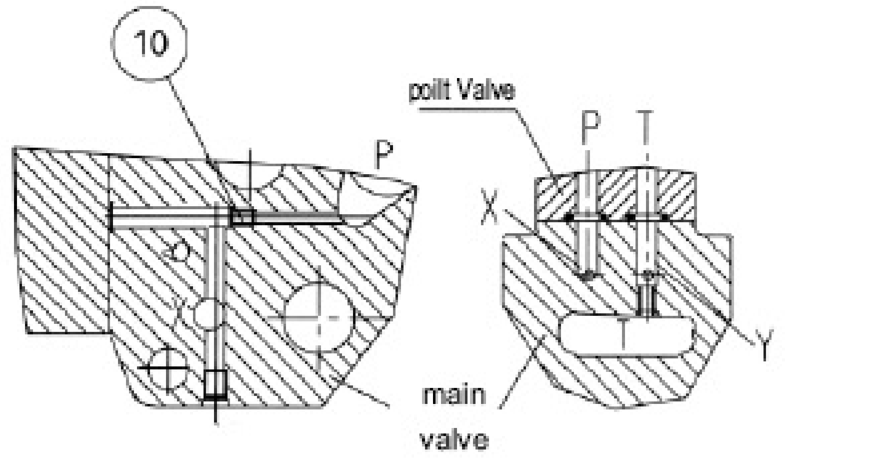
Throttle insert

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.



Throttle insert

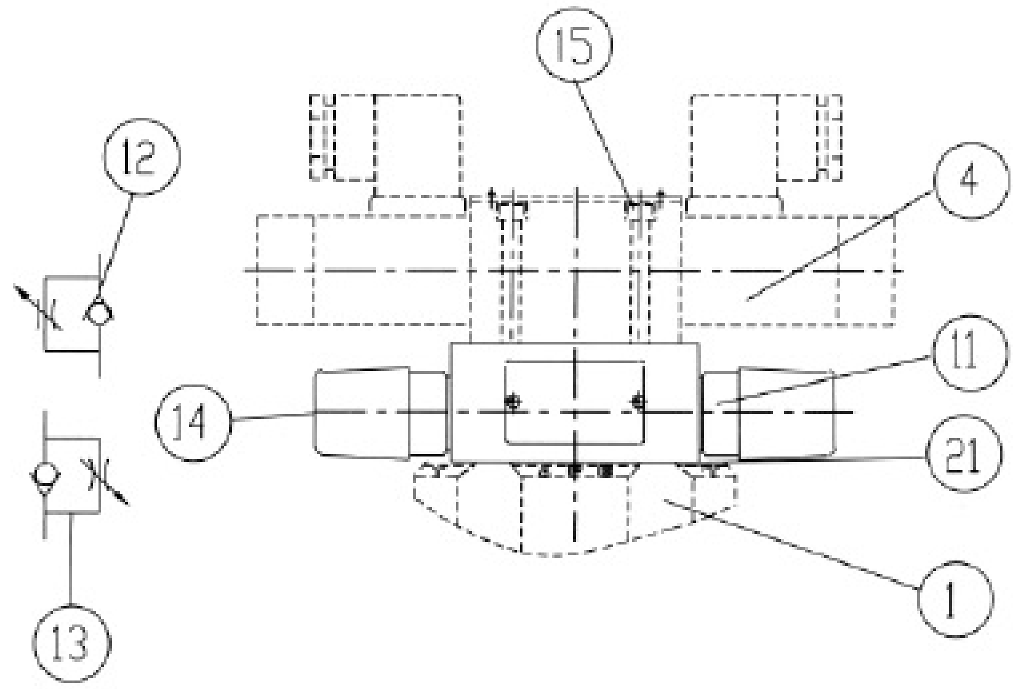




Shifting time adjustment

In order to influence the shifting time of the main valve a double throttle check valve (type Z2 FS 6) is installed.

Change over from meter-in (13) to meter-out control (12):Remove the pilot valve (4) (leave the O-ring support plate (21) in place), rotate the throttle check valve (11) about its longitudinal axis and refit it, replace the pilot valve (4).



Type WEH.../...S

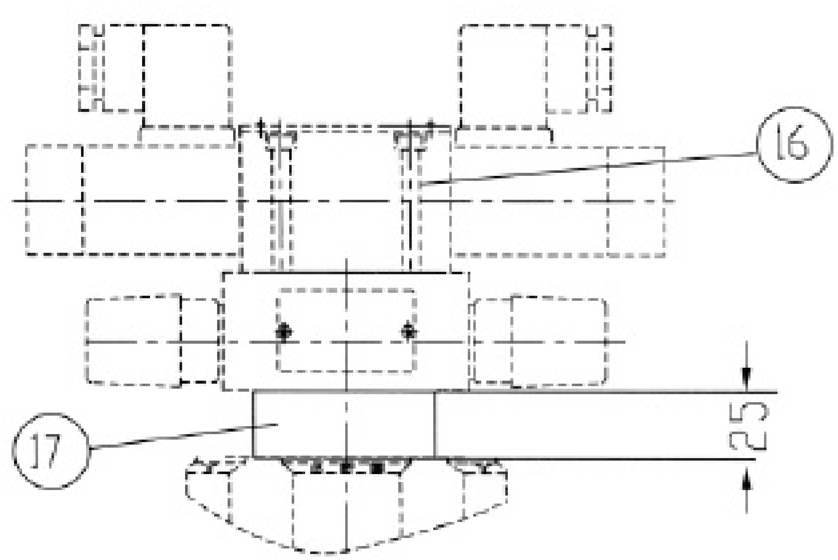
Pressure reducing valve "D3"

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.

Attention!

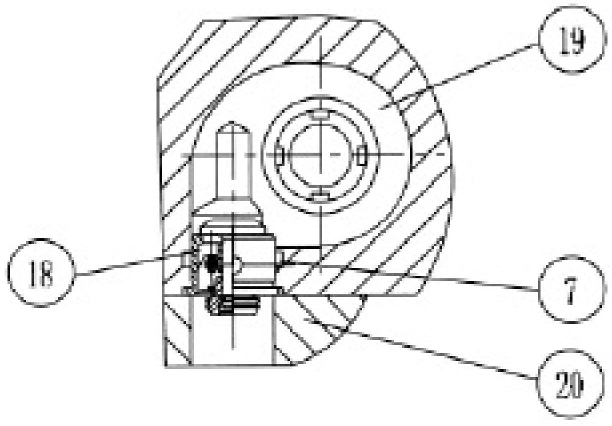
When using a pressure reducing valve "D3" (17), a throttle insert "B10" must be installed in the P channel of the pilot valve.



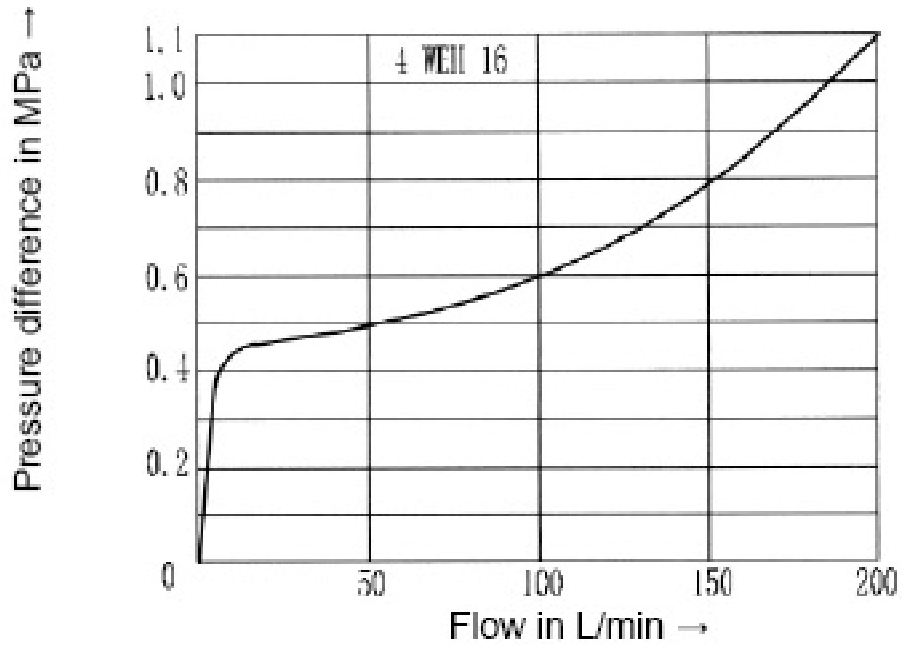
Type WEH../...S..D3

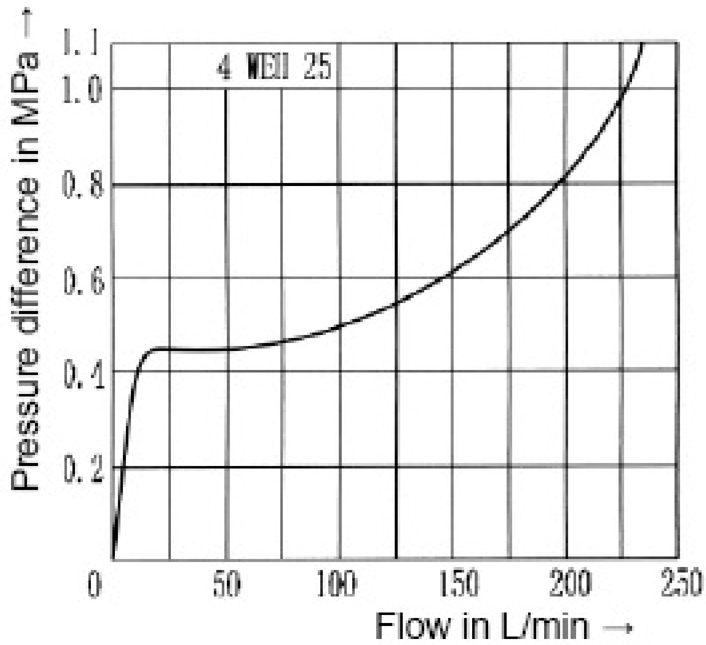
Pre-load valve (not for size 10)

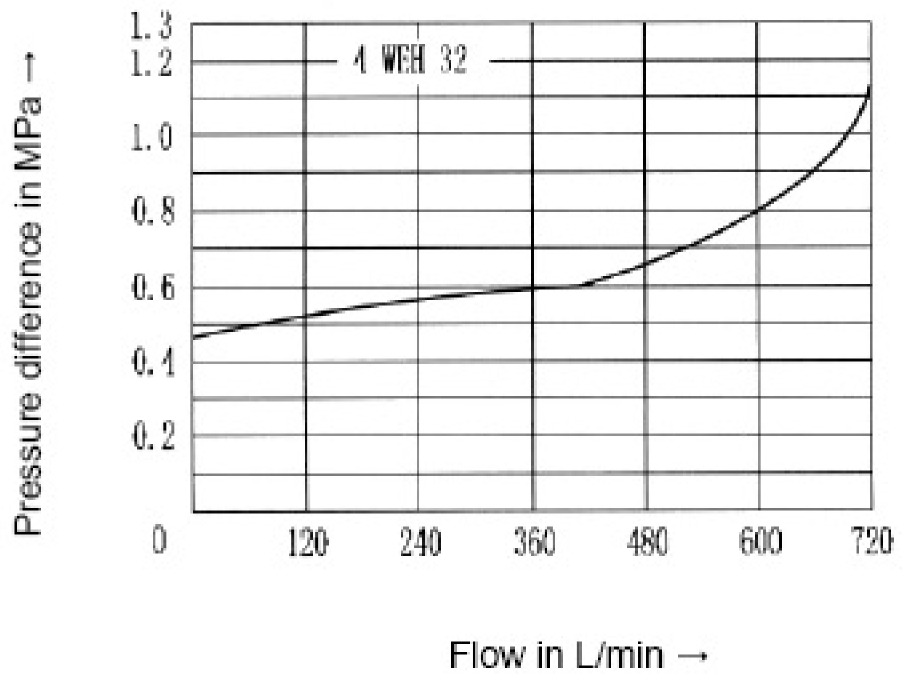
In valves with pressureless by-pass and iternal pilot oil supply, a pre-load valve (18) must be installed in the P channel of the mainvalve to build up the minimum pilot pressure.The pressure difference of the pre-load valve must be added to the pressure difference of the main valve (see characteristic curve) in order to determine the actual value.The cracking pressure of this valve is approx. 0.45 MPa.



Dp/q $_v$ characteristic curve







Ordering code

	4						B/	6						/					*

Up to 28 MPa = No code
Up to 35 MPa = H

4-way design = 4

Electro-hydraulic = WEH
Hydraulic = WH

Size 10 = 10
Size 16 = 16
Size 25 = 25
Size 32 = 32

Spool return
By means of springs = No code
Hydraulic = H

For symbols, see next page

Series 20(NG10) = 20 (20 to 29 unchanged installation and connection dimensions)
Series 50(NG16、25、32) = 50 (50 to 59 unchanged installation and connection dimensions)

Technology of Beijing Huade Hydraulic =B

Spool return in the pilot valve for 2-position valve and 2 solenoids only possible with spools C, D, K, Z and hydraulic spool return in the main valve:
Without spring return = O
Without spring return with detent = OF

Pilot valve with wet-pin solenoids
Standard valve = A
High-performance valve = E

DC 24V = G24
AC 220V, frequency 50Hz = W220-50
Used DC solenoids which are noting with frequency,
AC: 110V = W110R
220V = W220R
(* :use plug Z5 only)
see the other volts in Electric date,please.

Further details in clear text

No code= mineral oils
V= phosphate ester

No code = Without pressure reducing valve
D1 = With pressure reducing valve

No code = Without pre-load valve
P 4,5 = With pre-load valve
(P_{crack} = 0.45 MPa)

No code= Without throttle insert
B08 = Throttle Φ 0.8 mm
B10 = Throttle Φ 1.0 mm
B12 = Throttle Φ 1.2 mm
B15 = Throttle Φ 1.5 mm

Additional equipment NO.
(see Additional equipment)

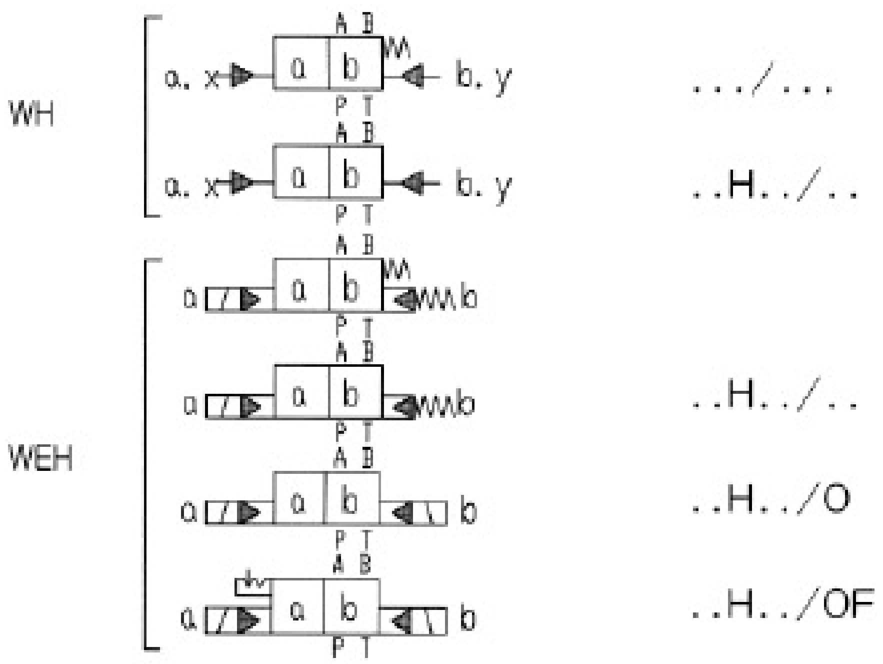
Type of Electrical connection (see type of Electrical connection dimensions)

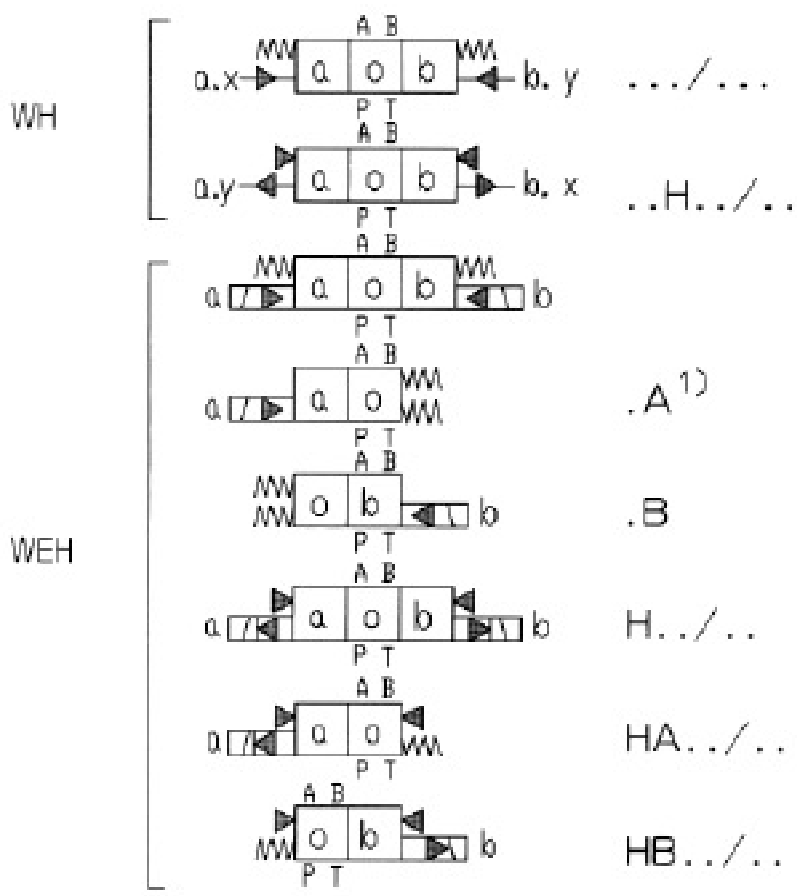
No code = Without shifting time adjustment
S = Shifting time adjustment as meter-in control
S_2 = Shifting time adjustment as meter-out control

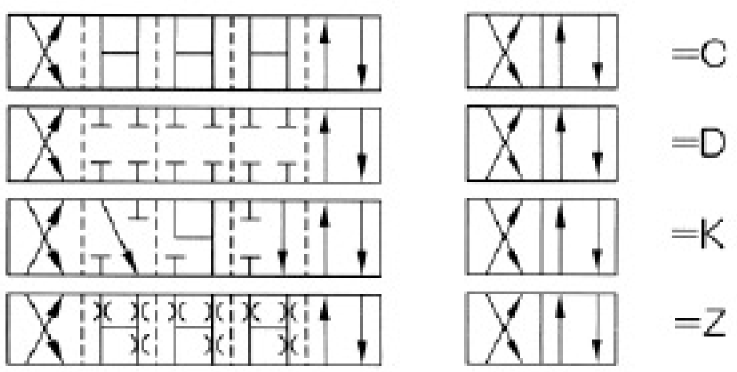
No code= Pilot oil supply external, drain external
E= Pilot oil supply internal, drain external
ET= Pilot oil supply internal, drain internal
T= Pilot oil supply external, drain internal
Type 4WH...only available as No code!
Versions ET and T as 3-position valve with pressure centring only possible if $p_{pilot} \geqslant 2 \times p_{tank} + p_{pilot\,min}$!

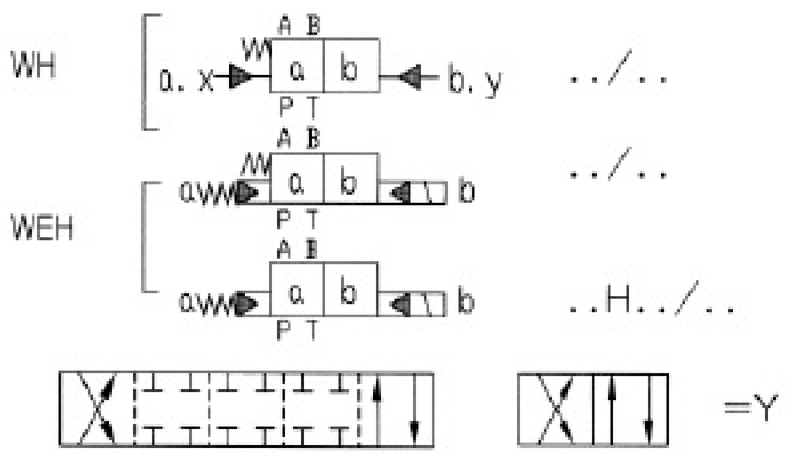
No code = Without manual override
N= With manual override

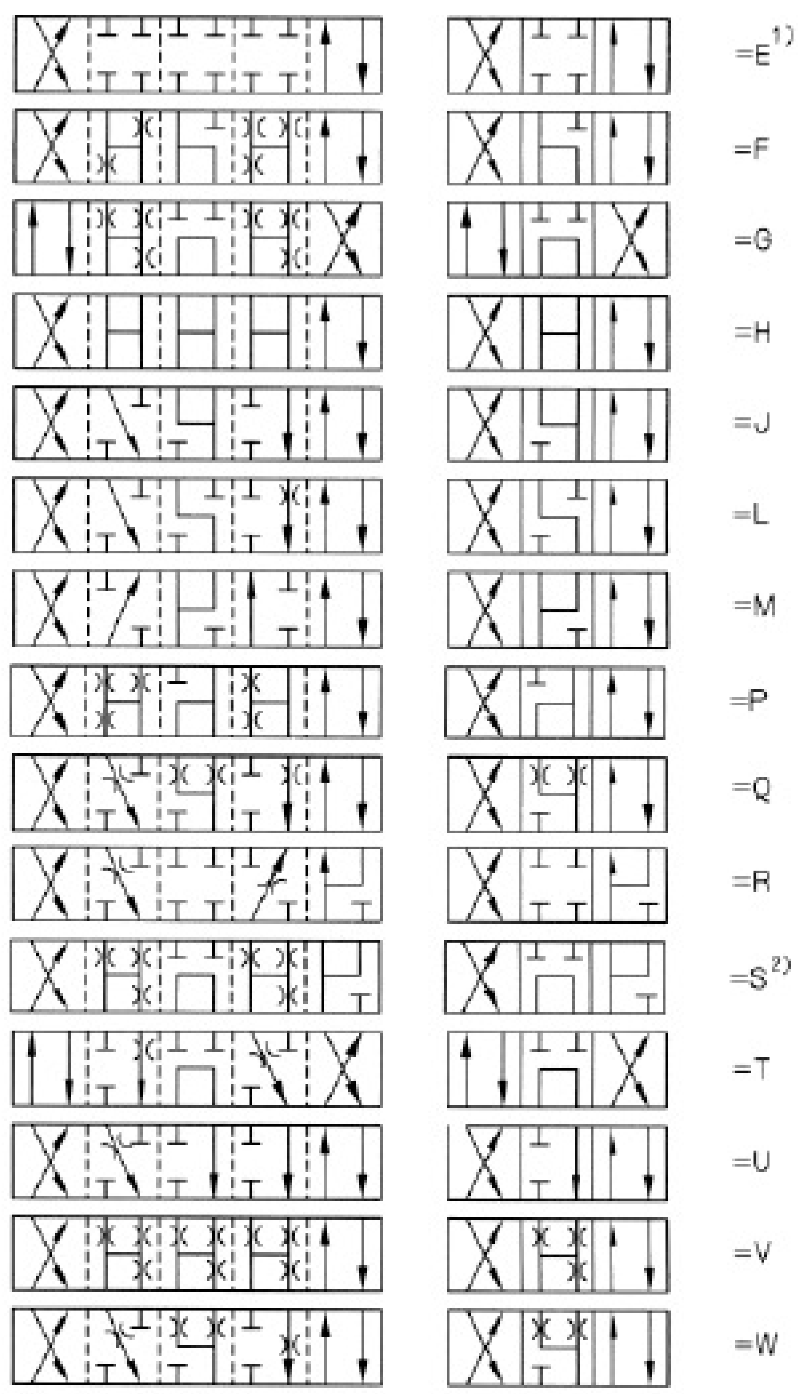
Symbols











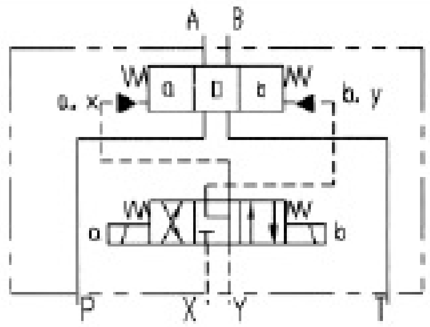
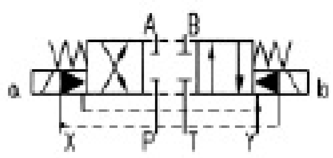
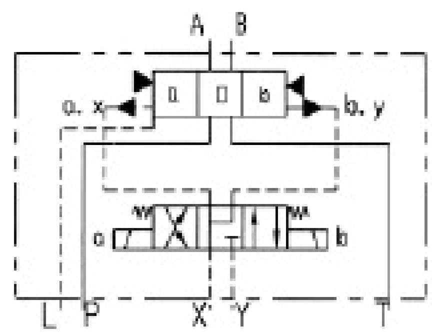
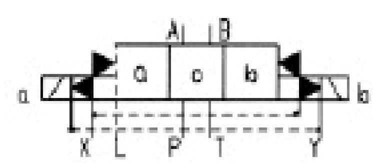
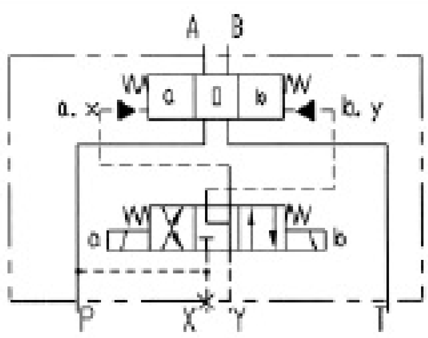
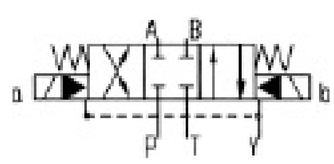
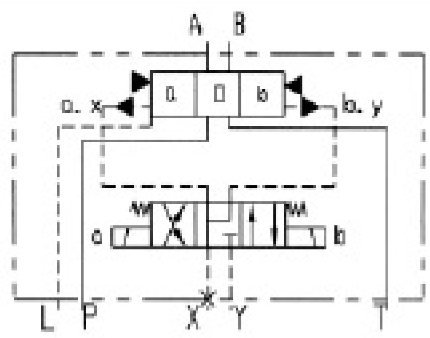
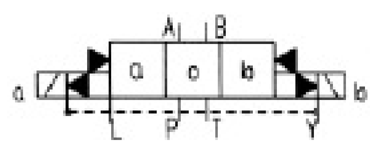
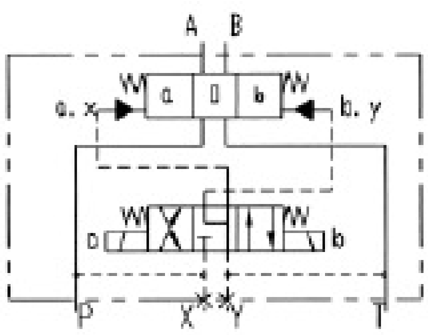
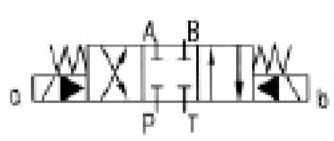
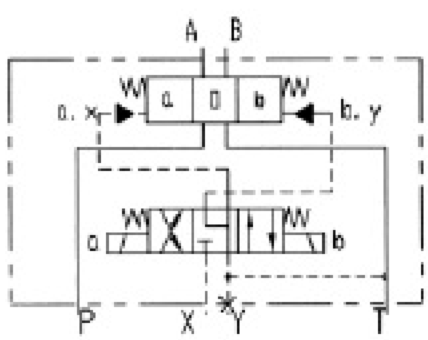
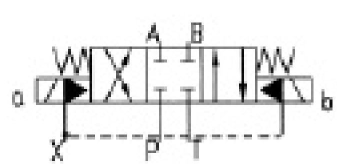
1) Example: Spool E, solenoid on side "a" Order example:
H-4WEH 16 HEA6X/6AG24N9ETSK4..B10..V..

2) Spool S only used for size 16

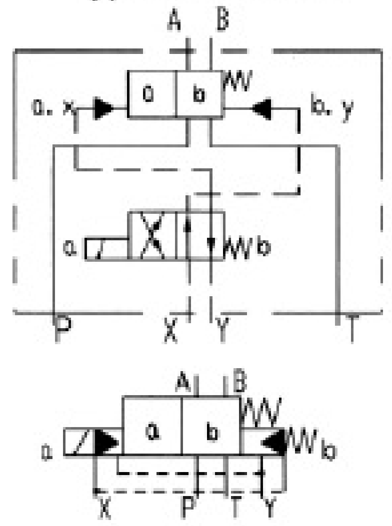
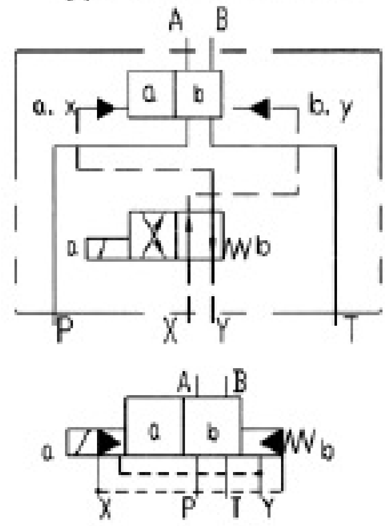
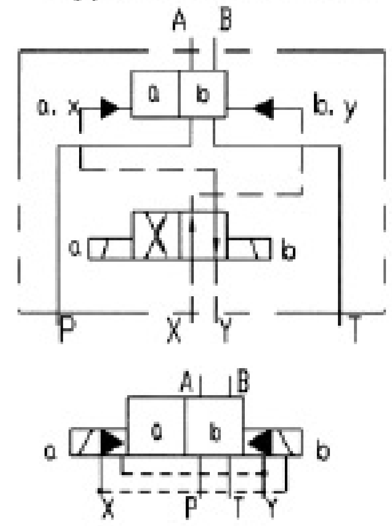
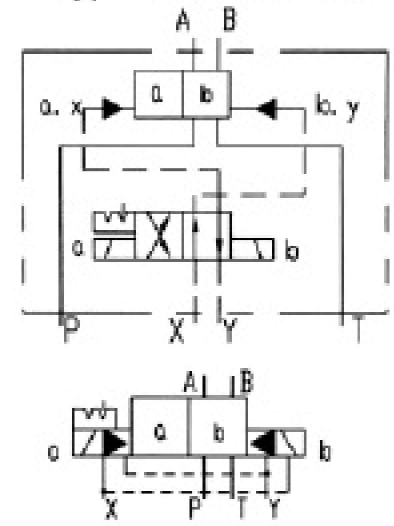
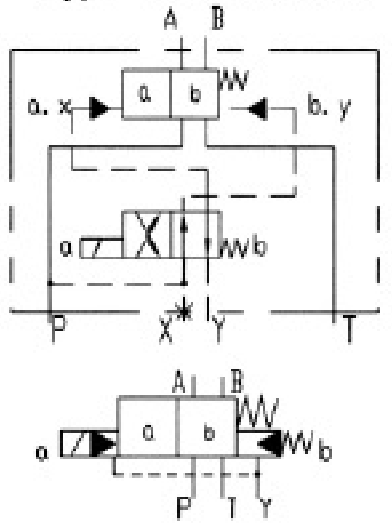
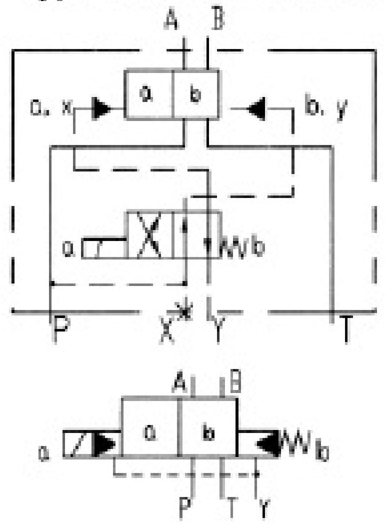
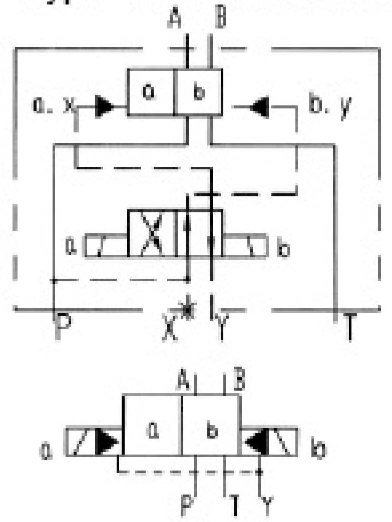
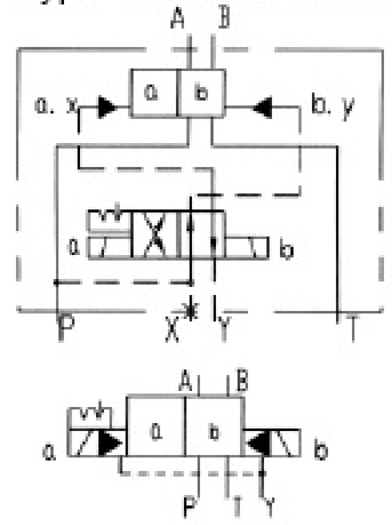
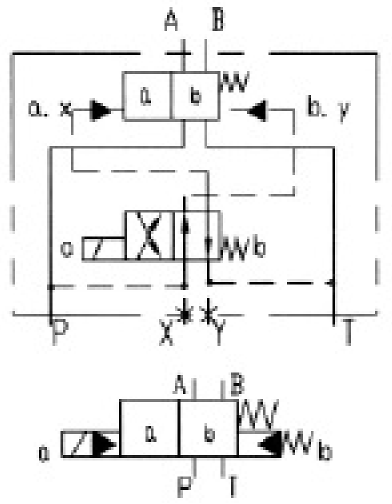
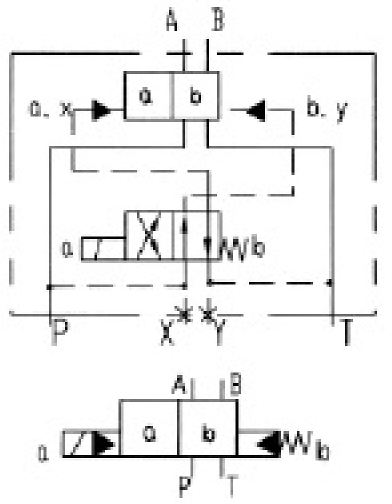
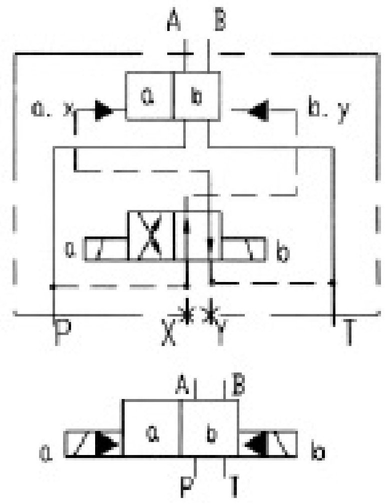
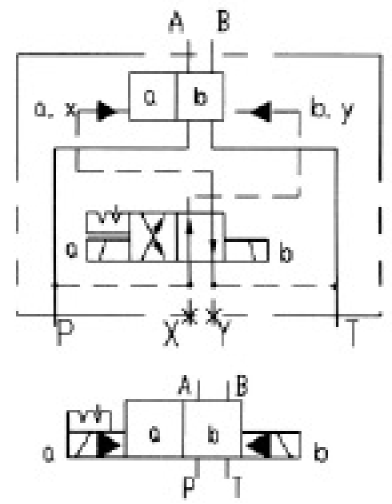
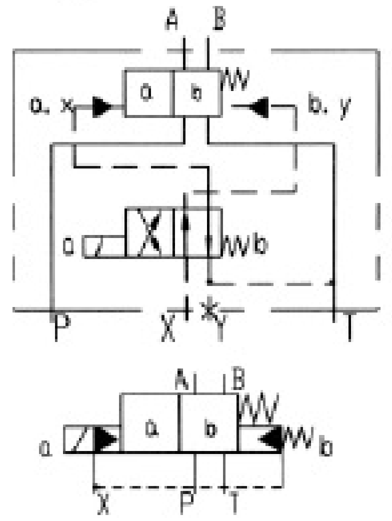
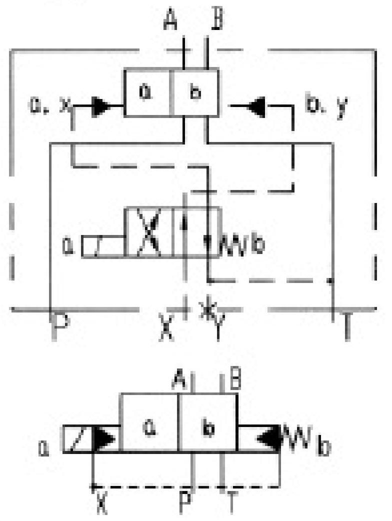
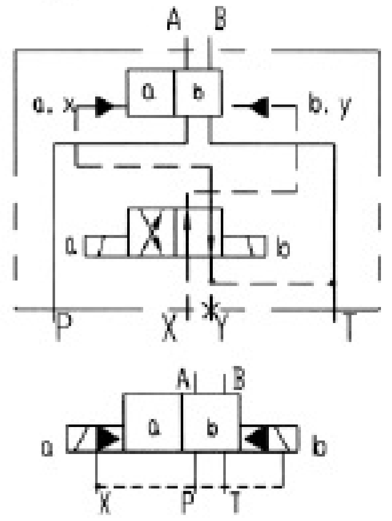
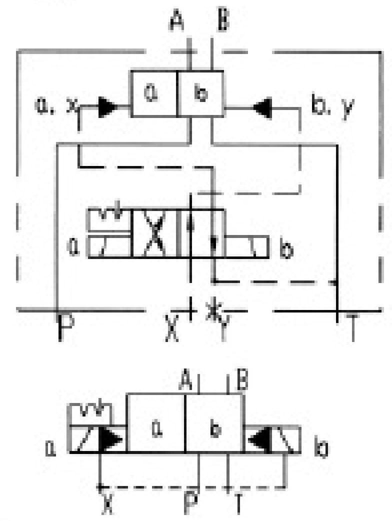
Valve opening in neutral position for spools Q, V and W

Spool	Size	Valve opening in neutral position (Size in mm²) 10	16	25 (type 4W.H 25.50B/)	32
Q	P-A	-	-	-	-
	P-B	-	-	-	-
	A-T	13	32	83	78
	B-T	13	32	83	78
V	P-A	13	32	83	73
	P-B	13	32	83	73
	A-T	13	32	83	84
	B-T	13	32	83	84
W	P-A	-	-	-	-
	P-B	-	-	-	-
	A-T	2.4	6	14	20
	B-T	2.4	6	14	20

Detailed and simplified symbols for 3-position valves

	Valve with spring-centred neutral position	Valve with spring-centred neutral position {only sizes 16, 25 (type 4W.H 25 .50B/... and 32}
X = external; Y =external	 Type 4WEH../.. 	 Type 4WEH..H../.. 
X = internal; Y = external	 Type 4WEH../..E.. 	 Type 4WEH..H../..E.. 
X = internal; Y = internal	 Type 4WEH../ET 	3-position valves, pressure-centred, preferrably with external pilot oil supply and/or drain (No code, E) For the preconditions for internal pilot oil supply and/or drain (ET, T) see page 6 or 10.
X =external; Y = internal	 Type 4WEH../..T.. 	

Detailed and simplified symbols for 2-position valves

	Valves with spring offset	Valves with hydraulic offset		
X = external; Y = external	Type 4WEH.../... 	Type 4WEH..H.../... 	Type 4WEH..H/O... 	Type4WEH..H/OF... 
X = internal; Y = external	Type 4WEH.../...E... 	Type 4WEH..H.../...E... 	Type 4WEH..H/O...E... 	Type 4WEH..H/OF...E... 
X = internal; Y = internal	Type 4WEH.../...ET... 	Type 4WEH..H.../...ET... 	Type 4WEH..H/O...ET... 	Type 4WEH..H/OF...ET... 
X = external; Y = internal	Type 4WEH.../...T... 	Type 4WEH..H/...T... 	Type 4WEH..H/O...T... 	Type 4WEH..H/OF...T... 

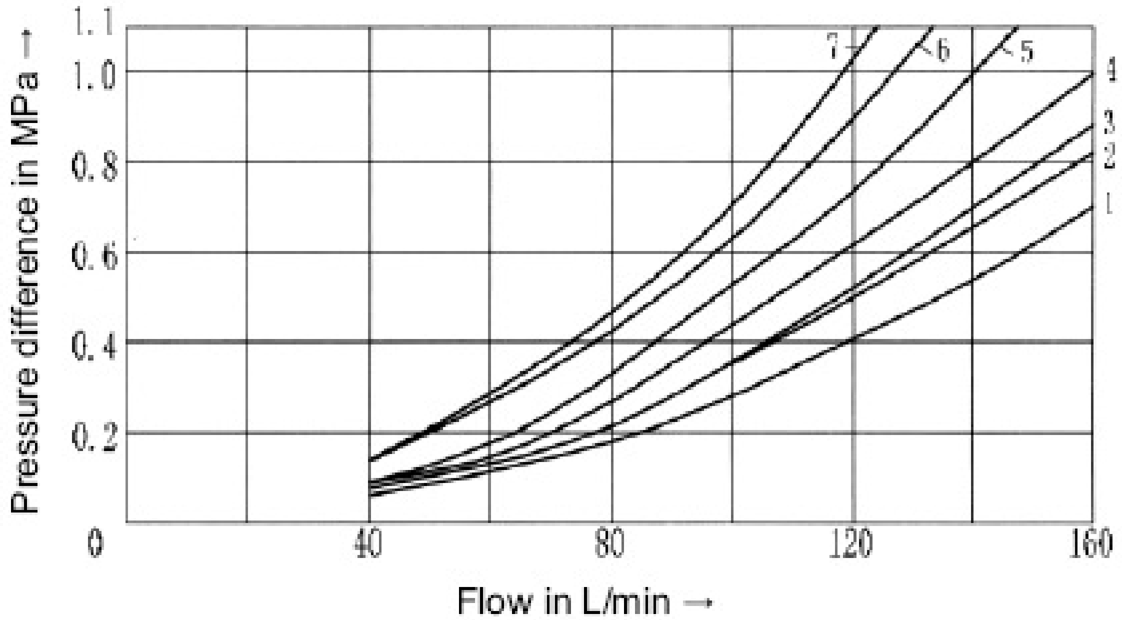
Characteristic curves (measured at v = 41 mm²/s and t = 50˚C)

Type WEH10：

Spool	Neutral position		
	A → T	B → T	P → T
F	3	-	6
G	-	-	7
H	1	3	5
P	-	7	5

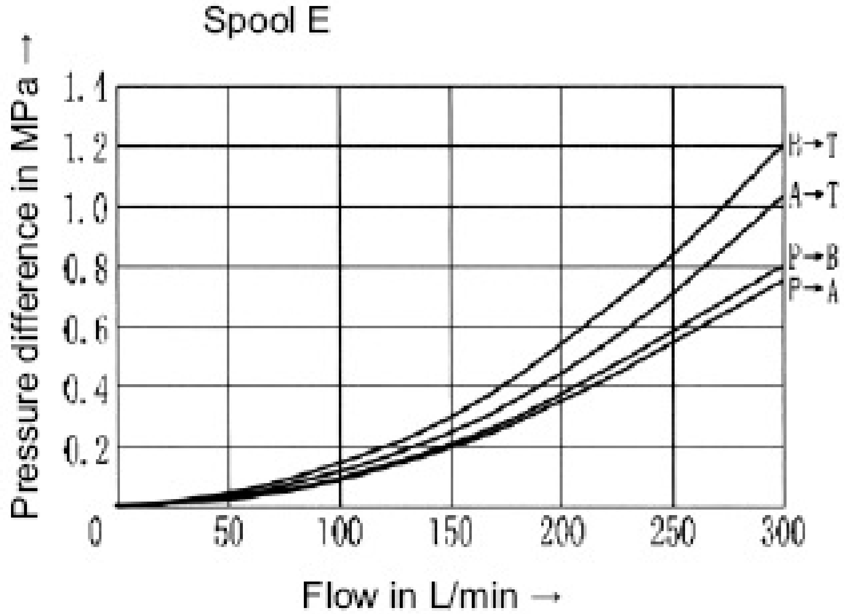
Spool	Neutral position		
	A → T	B → T	P → T
T	-	-	7
L	3	-	-
U	-	4	-

Spool	Shifted position			
	P → A	P → B	A → T	B → T
E	1	2	4	5
F	1	4	1	4
G	4	2	2	6
H	4	4	1	4
J	1	2	1	3
L	2	3	1	4
M	4	4	3	4
P	4	1	3	4
Q	2	2	3	5
R	2	3	3	5
U	3	3	3	4
V	2	2	3	5
W	2	2	3	5
T	4	2	2	6

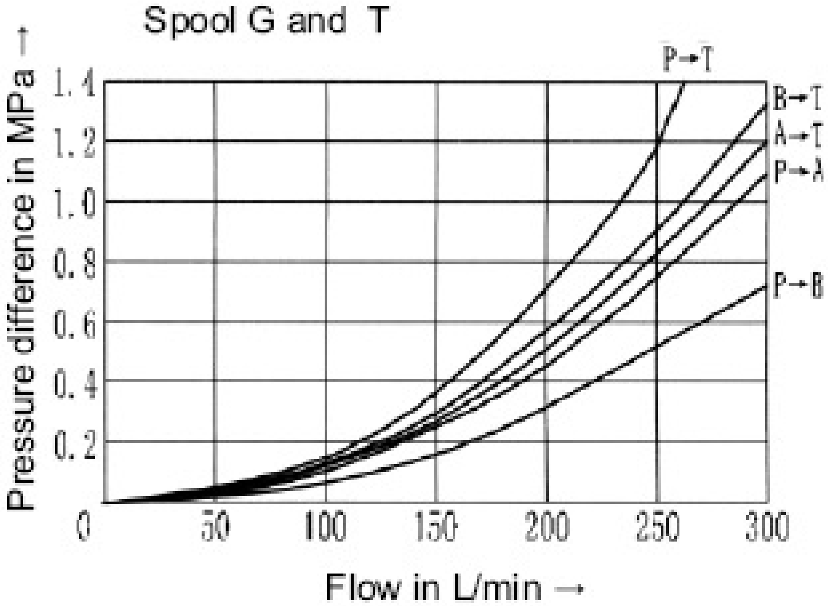


Type WEH16：

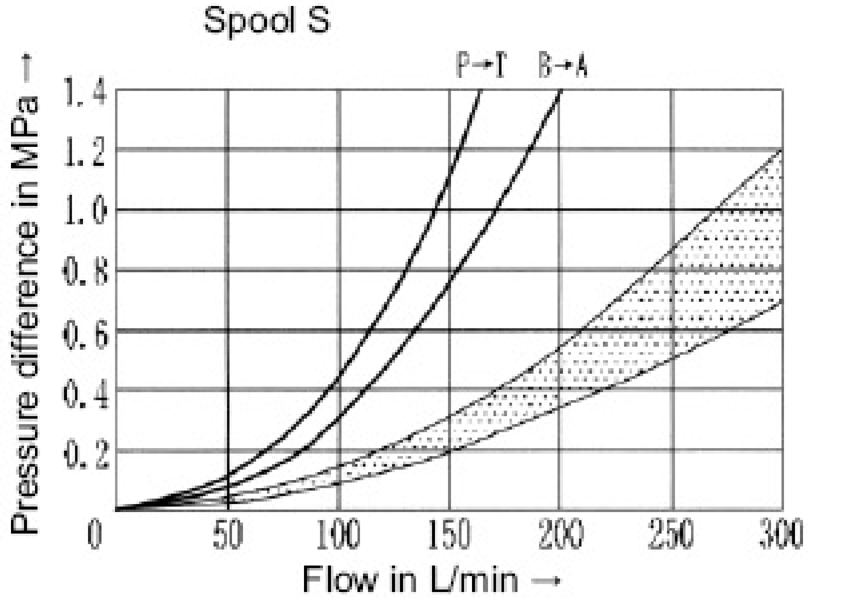
Spool E



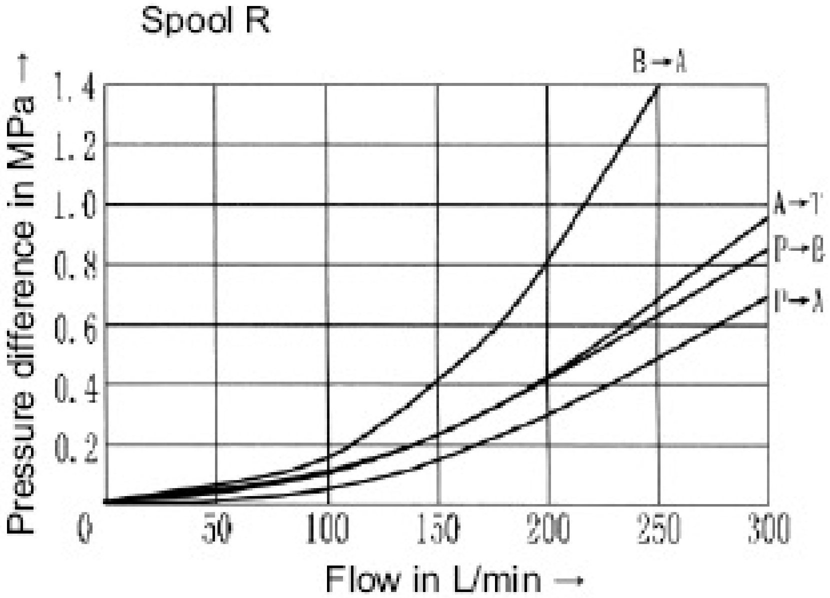
Spool G and T



Spool S



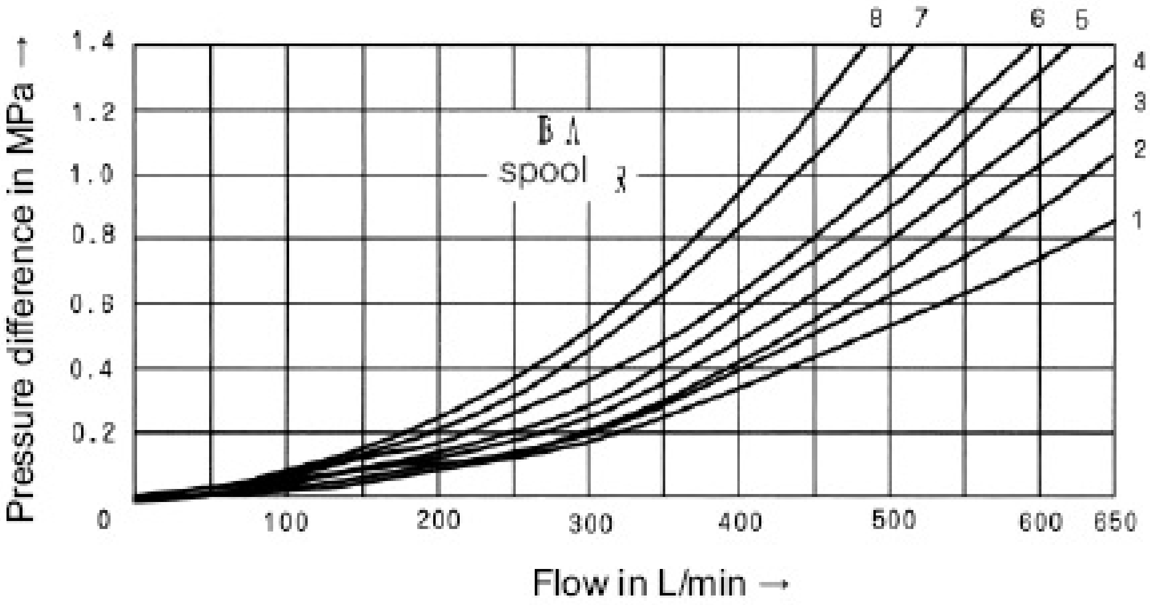
Spool R



Type WEH25：

7 spool G central position P - T

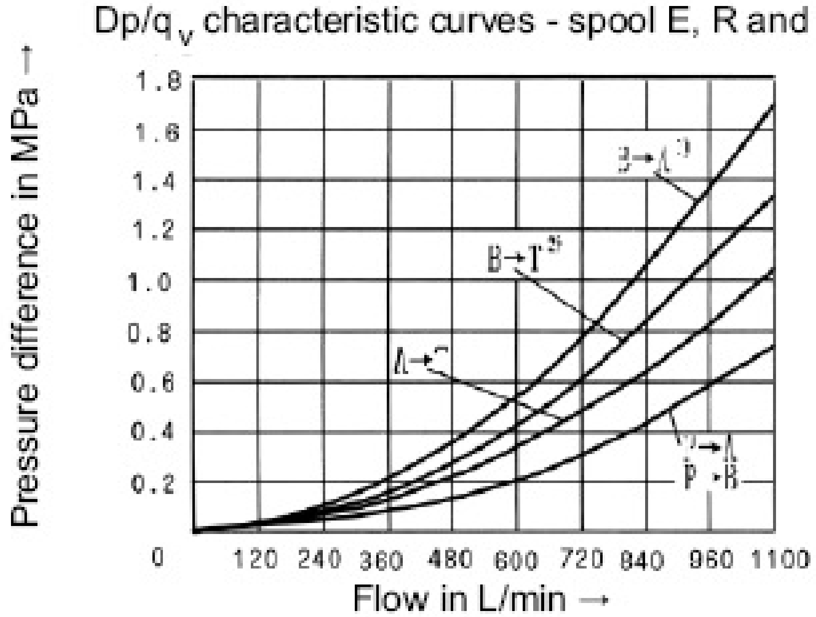
8 spool T central position P - T



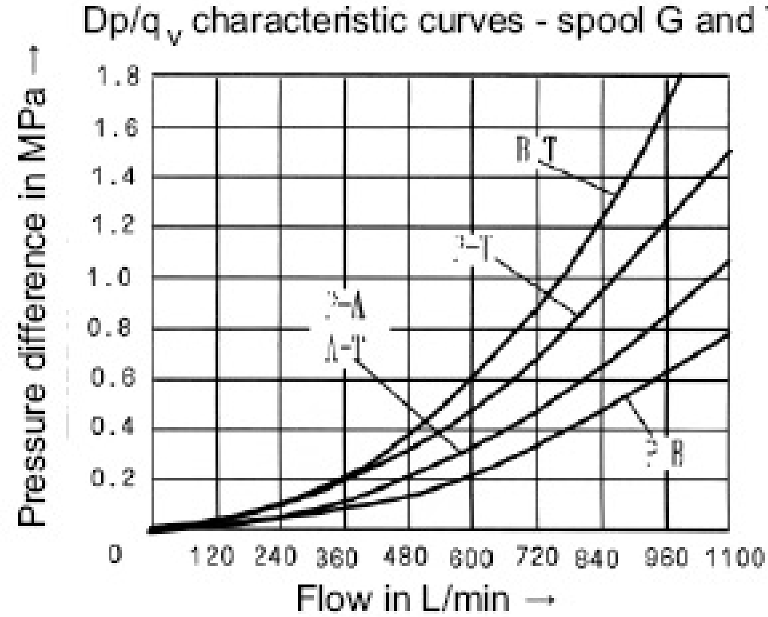
Spool	Shifted position			
	P → A	P → B	A → T	B → T
E	1	1	1	3
F	1	4	3	3
G	3	1	2	4
H	4	4	3	4
J	2	2	3	5
L	2	2	3	3
M	4	4	1	4
P	4	1	1	5
Q	2	2	3	5
R	2	1	1	-
U	2	1	1	6
V	4	4	3	6
W	1	1	1	3
T	3	1	2	4

Type WEH32：

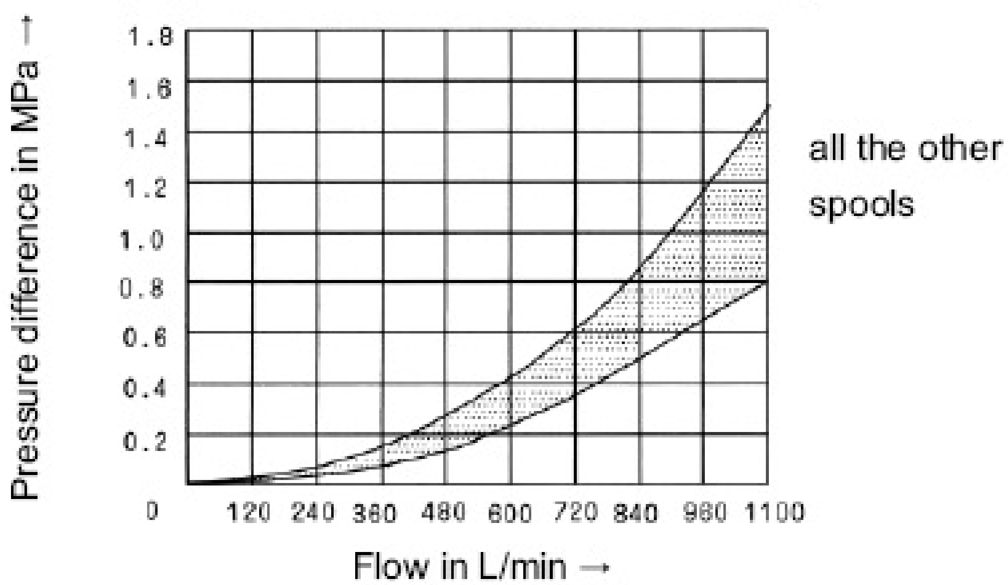
Dp/q_v characteristic curves - spool E, R and W



Dp/q_v characteristic curves - spool G and T



Dp/q_v characteristic curves - all the other spools



1) only with spool R

2) not with spool R

Technical data (For applications outside these parameters, please consult us!)

Hydraulic data

1、Type 4WEH10

Operating pressure, max.		(MPa)	H-4WEH10				4WEH10			
- Port P、A、B			to 35				to 28			
- Port T	Pilot oil drain internal	(MPa)	to 16 (DC)				to 10 (AC)			
- Port Y	Pilot oil drain external	(MPa)	to 16 (DC)				to 10 (AC)			
Pilot pressure, min.	Pilot oil drain external	(MPa)	1.0 2-position valve, 3-position valve,with spring offset							
	Pilot oil supply internal	(MPa)	0.7 2-position valve with hydraulic offset (not with spools: C、Z、F、G、H、P、T、V)							
	Pilot oil supply internal (with spools:C、Z、F、G、H、P、T、V)	(MPa)	0.65 { if the flow from P to T in the neutral position (in a 3-position valve) or when the valve is moving through the neutral position (in a 2-position valve) is large enough to ensure a minimum pressure difference of 0.65 MPa from P to T.							
Operating pressure, max.		(MPa)	to 25							
Hydraulic fluid			Mineral oils or phosphate ester							
Viscosity range		(mm^2/s)	2.8 ~ 500							
Fluid temperature range		(°C)	-30 ~ +80							
Pilot oil volume for shifting operation										
- 3-position valve, spring-centred		(cm^3)	2.04							
- 2-position valve		(cm^3)	4.08							
from "O" position to shifted position (AC and DC solenoid):										
at pilot pressure		(MPa)	~7=		~14=		~21=		~28=	
- 3-position valve, spring-centred		(ms)	30	65	25	60	20	55	15	50
- 2-position valve		(ms)	30	80	30	75	25	70	20	65
from shifted position to "O" position (AC and DC solenoid):										
- 3-position valve, spring-centred			30							
- 2-position valve		(ms)	35	40	30	35	25	30	20	25
Pilot oil flow for shortest shifting time		(L/min)	approx.35							
Installation position			optional; valve with hydraulic spool return "H"(spools C, D, K, Z, Y) horizontal							
Weight (Kg)	Valve with one solenoid		6.4							
	Valve with two solenoids		6.8							
	Shifting time adjustment		0.8							
	Pressure reducing valve		0.5							

2、Type 4WEH16

			H - 4WEH16	4WEH16
Operating pressure, max. - Port P、A、B		(MPa)	to 35	to 28
- Port T	Pilot oil drain external	(MPa)	to 25	to 25
	Pilot oil drain internal	(MPa)	solenoid（DC） –	solenoid（AC） ~
			to 16	to 10
			It's impossible for pressure centred 3-position valve to pilot oil drain internal	
- Port Y	Pilot oil drain external	(MPa)	= 16	~ 10
Pilot pressure, min.	Pilot oil drain external Pilot oil supply internal	(MPa) (MPa)	3-position valve,1.2 2-position valve,with spring offset 1.2 2-position valve with hydraulic offset 1.2	
	Pilot oil supply internal	(MPa)	For spools C, F, G, H, P, T, V, Z, S (by means of a pre-load valve or a sufficiently large flow) 0.45	
Operating pressure, max.		(MPa)	to 25	
Hydraulic fluid			Mineral oils or phosphate ester	
Fluid temperature range		(℃)	- 30 ~ + 80	
Viscosity range		(mm^2/s)	10 ~ 800	
Pilot oil volume for shifting operation				
- 3-position valve, spring-centred		(cm^3)	5.72	
- 2-position valve		(cm^3)	11.45	
- 3-position valve, pressure-centred			WH	WEH
from "O" position to shifted position "a"		(cm^3)	2.83	2.83
from shifted position "a" to "O" position		(cm^3)	2.9	5.73
from "O" position to shifted position "b"		(cm^3)	5.72	5.73
from shifted position "b" to "O" position		(cm^3)	2.83	8.55

from "O" position to shifted position（AC and DC solenoid）：													
at pilot pressure	(MPa)	~ 5 =				~ 15 =				~ 25 =			
- 3-position valve, spring-centred	(ms)	35		65		30		60		30		58	
- 2-position valve	(ms)	45		65		35		55		30		50	
- 3-position valve, pressure-centred	(ms)	a	b	a	b	a	b	a	b	a	b	a	b
		30		65		25		55	63	20	25	55	60
from shifted position to "O" position：													
- 3-position valve, spring-centred		30···45 for ~ ；30 for =											
- 2-position valve	(ms)	45···60		45		35···50		35		30···45		30	
- 3-position valve, pressure-centred	(ms)	a	b	a	b	a	b	a	b	a	b	a	b
		20···30		20		20···35		20		20···35		20	
Installation position		optional; valve with hydraulic spool return (spools C, D, K, Z, Y) horizontal											
Pilot oil flow for shortest shifting time	(L/min)	approx.35											
Weight		approx.8.6 WH approx.7.3											

*Shifting time = Contacting at the pilot valve up to start of opening of the control land in the main valve

3、Type 4WEH 25 :

Operating pressure, max.- Port P, A, B (MPa)		to 35 (H-4WHE25); to 28 (4WEH25)	
- Port T	Pilot oil drain external (MPa)	t0 25	
	Pilot oil drain internal (MPa)	solenoid (DC) –	solenoid (AC) ~
		t0 16	t0 10
		It's impossible for pressure centred 3-position valve to pilot oil drain internal	
- Port Y	Pilot oil drain external solenoid (DC) – (MPa)	16	
	solenoid (AC) ~ (MPa)	10	
	for Type 4WH (MPa)	25	
Pilot pressure, min.	Pilot oil supply external (MPa) Pilot oil supply internal (MPa)	3-position valve, spring-centred 1.3 3-position valve, pressure-centred 1.8 2-position valve, with spring offset 1.3 2-position valve, with hydraulic offset 0.8	
	Pilot oil supply internal (MPa)	For spools F, G, H, P, T, V, C and Z (by means of a pre-load valve or a sufficiently large flow) 0.45	
Operating pressure, max. (MPa)		to 25	
Hydraulic fluid		Mineral oils or phosphate ester	
Viscosity range (℃)		- 30 ~ + 80	
Fluid temperature range (mm^2/s)		10 ~ 800	
Pilot oil volume for shifting operation			
- 3-position valve, spring-centred (cm^3)		14.2	
- 2-position valve, with spring offset (cm^3)		28.4	
- 3-position valve, pressure-centred		WH	WEH
from "O" position to shifted position "a" (cm^3)		7.15	7.15
from shifted position "a" to "O" position (cm^3)		14.18	7.0
from "O" position to shifted position "b" (cm^3)		14.18	14.15
from shifted position "b" to "O" position (cm^3)		19.88	5.73

from "O" position to shifted position (AC and DC solenoid):																
at pilot pressure (MPa)	~ 7 =				~ 14 =				~ 21 =				~ 25 =			
- 3-position valve, spring-centred (ms)	50		85		40		75		35		70		30		65	
- 2-position valve, with spring offset (ms)	120		160		100		130		85		120		70		105	
- 3-position valve, pressure-centred (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
from shifted position to "O" position:																
- 3-position valve, spring-centred	40···55 for ~; 40 for =															
- 2-position valve, with spring offset (ms)	120		125		95		100		85		90		75		80	
- 3-position valve, pressure-centred (ms)	a	b	a	b	a	b	a	b	a	b	a	b	a	b	a	b
	30···35		30	35	30···35		30	35	30···35		30	35	30···35		30	35

Installation position	optional; valve with hydraulic spool return (spools C, D, K, Z, Y) horizontal
Pilot oil flow for shortest shifting time (L/min)	approx. 35
Weight (Kg)	the whole valve approx. 18 WH approx. 17.6

* Shifting time = Contacting at the pilot valve up to start of opening of the control land in the main valve

4、Type 4WEH32：

Operating pressure, max.	(MPa)	H-4WHE25						4WEH25					
- Port P、A、B		to 35						to 28					
- Port T, Pilot oil drain external	(MPa)	to 25											
- Port T, Pilot oil drain internal	(MPa)	solenoid（DC） –						solenoid（AC） ~					
		to 16						to 10					
		It's impossible for pressure centred 3-position valve to pilot oil drain internal											
- Port Y, Pilot oil drain external	(MPa)	solenoid（DC） – ：16，solenoid（AC） = ：10											
Pilot pressure, min. Pilot oil supply external / Pilot oil supply internal	(MPa)	3-position valve,0.8 2-position valve,with spring offset 1 2-position valve with hydraulic offset 0.5											
Pilot pressure, min. pilot oil supply internal	(MPa)	For spools F, G, H, P, T, V,C and Z (by means of a pre-load valve or a sufficiently large flow) 0.45											
Operating pressure, max.	(MPa)	to 25											
Hydraulic fluid		mineral oils or phosphate ester											
Fluid temperature range	(℃)	- 30 ~ + 80											
Viscosity range	(mm^2/s)	2.8 ~ 500											
Pilot oil volume for shifting operation													
- 3-position valve, spring-centred	(cm^3)	29.4											
- 2-position valve, spring-centred	(cm^3)	58.8											
- 3-position valve, pressure-centred													
from "O" position to shifted position "a"	(cm^3)	14.4											
from shifted position "a" to "O" position	(cm^3)	15.1											
from "O" position to shifted position "b"	(cm^3)	29.4											
from shifted position "b" to "O" position	(cm^3)	14.4											
from "O" position to shifted position（AC and DC solenoid）：													
at pilot pressure	(MPa)	~ 5 =				~ 15 =				~ 25 =			
- 3-position valve, spring-centred	(ms)	75		105		55		90		45		80	
- 2-position valve, spring-centred	(ms)	120		155		100		135		90		125	
- 3-position valve, pressure-centred	(ms)	a	b	a	b	a	b	a	b	a	b	a	b
		50	60	100	105	40	45	85	95	35	40	85	95
*from shifted position to "O" position：													
- 3-position valve, spring-centred		60···75 for ~；50 for =											
- 2-position valve, spring-centred	(ms)	115···130		90		85···100		70		65···80		65	
- 3-position valve, pressure-centred	(ms)	a	b	a	b	a	b	a	b	a	b	a	b
		35···65		30	40	60···90		30		105···185		50	
Installation position		optional; valve with hydraulic spool return (spools C, D, K, Z, Y) horizontal											
Pilot oil flow for shortest shifting time	(L/min)	approx. 50											
Weight (kg), Valve with one solenoid		approx. 40.5											
Weight (kg), Valve with two solenoids		approx. 41 WH approx. 39.5											

* Shifting time = Contacting at the pilot valve up to start of opening of the control land in the main valve

Electrical data

kinds of volt	DC	AC
Volt (V)	12、24、42、60、96、110、180、195 、220	42、110、127、220/50Hz 110、120、220/60Hz
Consume power (W)	26	-
Absorb power (VA)	-	46
Starup power (VA)	-	130
Duty	Continuous	
Circumstance temperature (℃)	+50	
Coil temperature (℃)	+50	
Protective setting	IP65	

Performance limits: (measured at v = 41 mm^2/s and t= 50℃)

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 ccurring 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!(In the case of applications of this kind, please consult us.)
The performance limits were determined with the solenoid at operating temperature, 10% undervoltage and with no tank pre-loading.

Type WEH 10

Way	Kinds of spring keeping	spool	Operating pressure in MPa		
			20	25	32
4/2-way	main valve without spring	HC-HD-HK-HZ-HY	160		
		HC../O-HD../O HK../O..-HZ.O	160		
		HC../OF-HD../OF.. HK../OF..-HZ.O.F	160		
	spring offset	C.D.K.Z.Y	160		
4/3-way	spring-centred	E.J.L.M.Q.U.W.R.V	160		
		H	160	150	120
		G.T	160		140
		F.P	160	160	160

Type WEH 16

Way	Kinds of spring keeping	spool	Operating pressure in Mpa					description
			7	14	21	28	35	
4/2-way	spring offset	C	300	300	300	300	300	Spool H .F .P .G .S, Pre-load valve, required for X = internal
		D.Y	300	270	260	250	230	
		K	300	250	240	230	210	
		Z	300	260	190	180	160	
	spring offset	for all spools	300	300	300	300	300	at pilot pressure of 1.2 MPa
	hydraulic offset	C.D.K.Z.Y	300	300	300	300	300	
4/3-way	spring-centred	D.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	
	pressure-centred	for all spools	300	300	300	300	300	at pilot pressure of 1.6 MPa

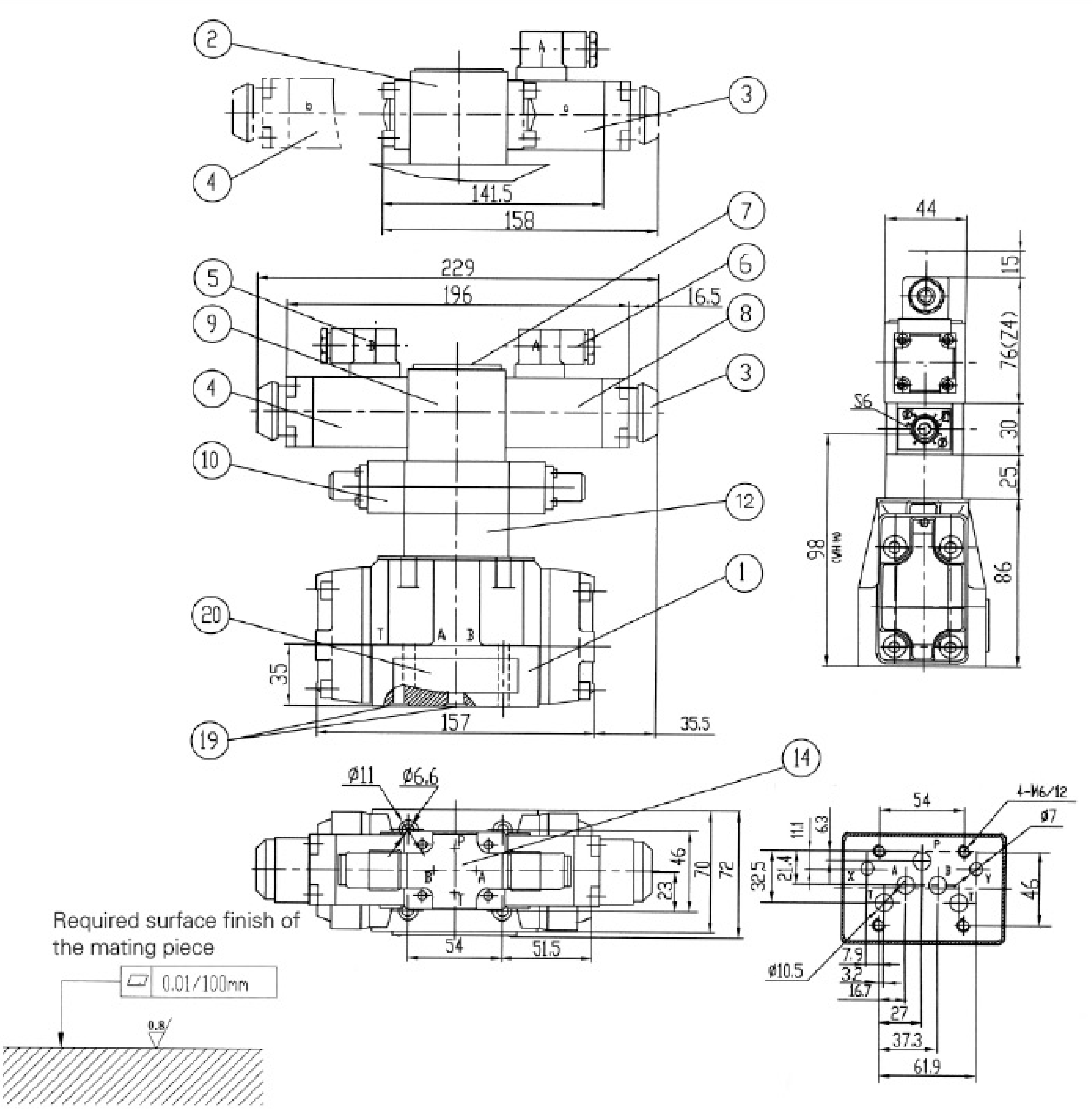
Type WEH 25

Way	Kinds of spring keeping	spool	Operating pressure in Mpa					description
			7	14	21	28	35	
4/2-way	spring offset	C	650	650	650	650	650	Spools C、Z in general,Pre-load valve, required for X=inter, flow up to approx.180 L/min
		D.Y	650	650	400	350	300	
		K	650	650	420	370	320	
		Z	650	650	650	480	400	
	spring offset	for all spools	650	650	650	650	650	min.at pilot pressure of 1.3 MPa
	without spring	C.D.K.Y	650	650	650	650	650	Spools C、Z in general,Pre-load valve, required for X=inter, flow up to approx.180 L/min
	detent	C.D.K.Y	650	650	650	650	650	
4/3-way	spring-centred	E.L.M.Q.U.W	650	650	650	650	650	Spools C、T、F、P、H in general,Pre-load valve, required for X=inter flow up to approx.180 L/min
		H.	650	650	550	400	360	
		F.	650	550	430	330	300	
		G.T	400	400	400	400	400	
		P	650	550	430	330	300	
		J	650	650	650	600	520	
		R	650	650	650	650	580	
		V	650	500	400	350	310	
	pressure-centred	E.F.H.J.L.M P.Q.R.U.V.W	650	650	650	650	650	at pilot pressure of 1.8 MPa
		G.T	400	400	400	400	400	
		G.T	650	650	650	650	650	at pilot pressure of 3 MPa

Type WEH 32

Way	Kinds of spring keeping	spool	Operating pressure in MPa					description
			7	14	21	28	35	
4/2-way	spring offset	D.Y	1100	1040	540	480	420	
		C	1100	1040	860	800	700	
		Z	1100	1040	860	700	650	
		K	1100	1040	860	500	450	
	hydraulic offset	for all spools	1100	1040	860	750	680	at pilot pressure of 1 MPa
4/3-way	spring-centred	E.J.L.M.Q.R.U.W	1100	1040	860	750	680	Spools C、T、F、P、H in general,Pre-load valve, required for X=inter flow up to approx.180 L/min
		H.G.F.T.P.	900	900	800	650	450	
		V	1000	1000	680	500	450	
	pressure-centred	for all spools (at pilot pressure of 0.85 MPa)	1100	1040	860	750	680	

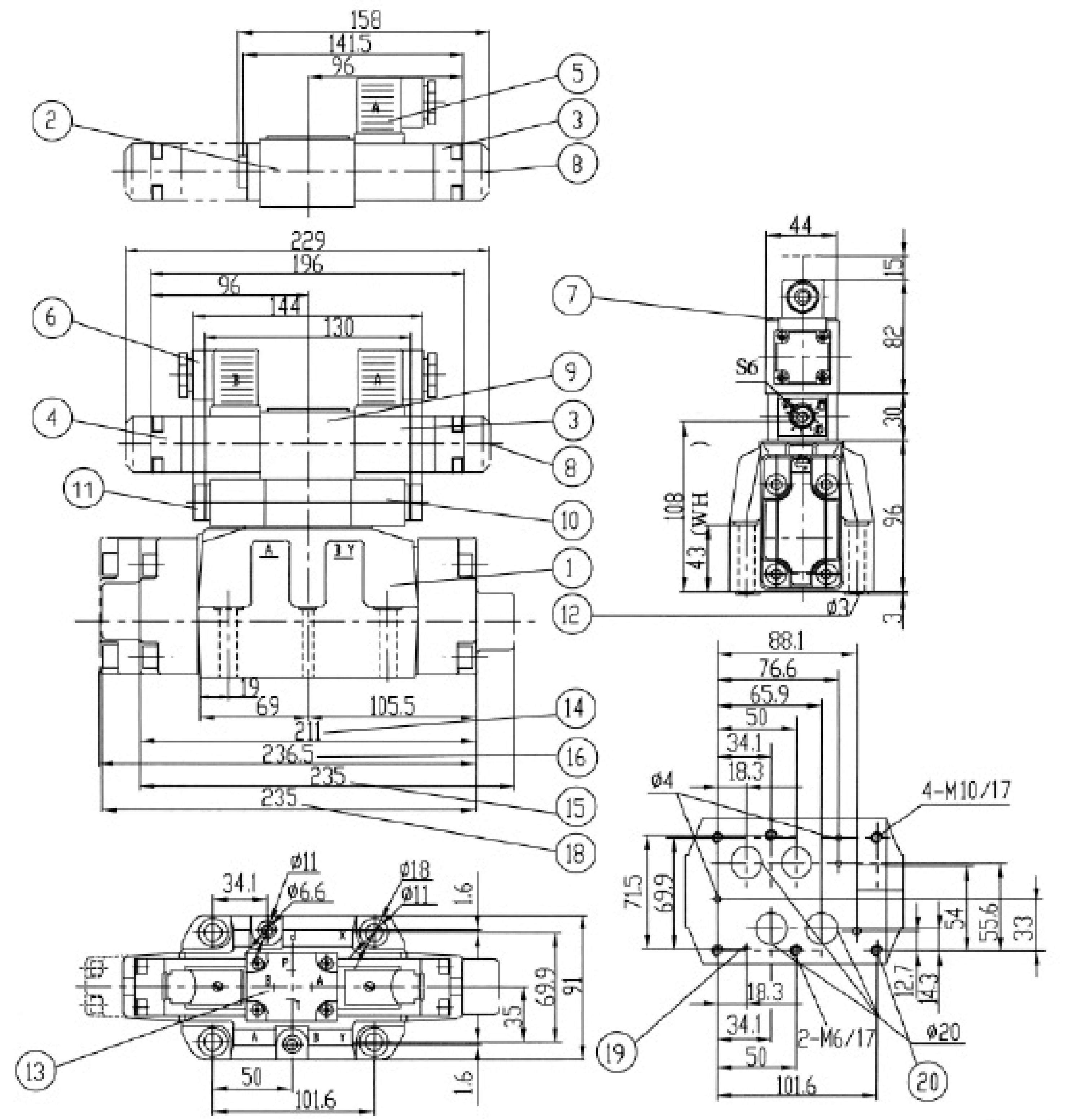
Unit dimensions: Type 4WEH 10 ... (Dimensions in mm)



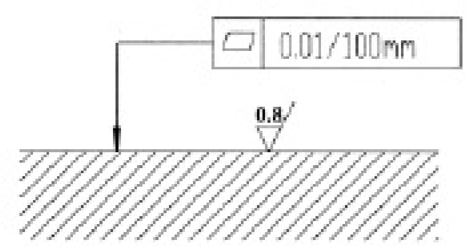
Subplates G535/01 (G3/4") ; G536/01 (G1"); G534/01 (G3/4");
G535/02 (M27x2) ; G536/02 (M33x2); G534/02 (M27x2) see Page 206、207

1 Main valve
2 2-position valve with one solenoid and plug-in Z4
3 Solenoid "a"
4 Solenoid "b"
5 Plug-in connector colour grey
6 Plug-in connector colour black
7 Nameplate
8 Manual override "N", optional
9 2 positions (2 solenoids) and plug-in Z4
3 positions (2 solenoids) and plug-in Z4
10 Double throttle/check valve
11 Reducing valve
14 The position for port A、B、P and T of pilot valve
19 O-Ring 12 x 2 for port A、B、P and T; O-Ring 10.82 x 1.78 for port X and Y
20 Nameplate
valves fixing screws
4 - M6 x 45 - 10.9
(GB/T70.1-2000)

Unit dimensions: Type 4WEH 16 ... (Dimensions in mm)



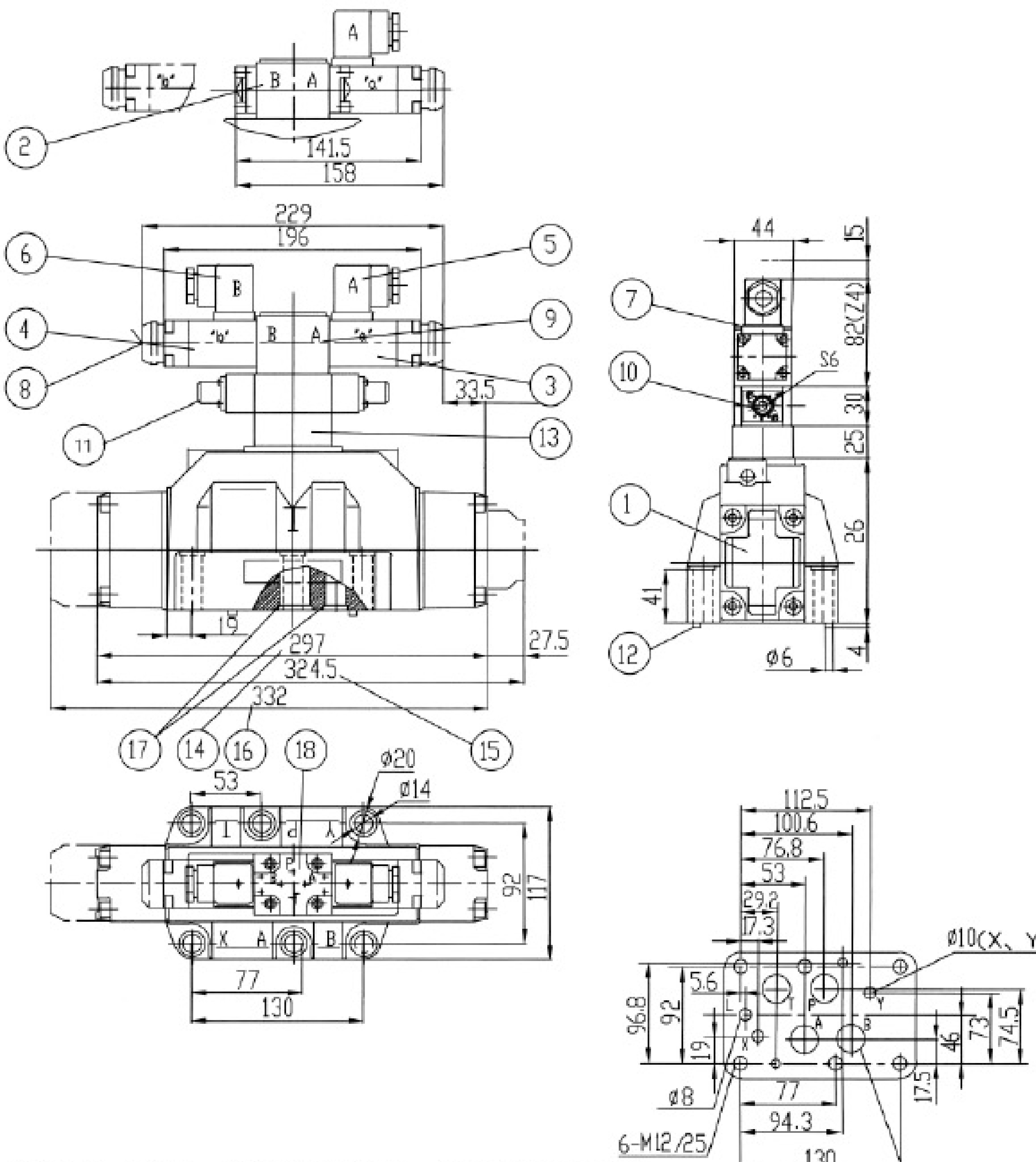
Required surface finish of the mating piece



Subplates G172 / 01 （G3/4"）; G172 / 02 （M27x2）; G174 / 01 （G1"）;
G174 / 02 （M33x2）; G174 / 08 see Page 206、207

1 Main valve
2 2-position valve with one solenoid
3 Solenoid "a"
4 Solenoid "b"
5 Plug-in connector colour grey
6 Plug-in connector colour black
7 Nameplate for the pilot valve
8 Manual override "N", optional
9 2-position valve with two solenoids and plug Z4
3-position valve with two solenoids and plug Z4
10 Double throttle/check valve
12 Two fixing pins
13 The position for port A、B、P and T of pilot valve
14 3-position valve, spring-centred
2-position valve, pressure-centred
15 2-position valve, with spring offset （C .D .K .Z）
16 3-position valve, pressure-centred
18 2-position valve, with spring offset(Y)
19 Fixing pin hole (Φ 4H12 depth 8)
20 Tightening screws for valves
4 - M10 x 60 -10.9 （GB/T70.1-2000）
2 - M 6 x 60 -10.9 （GB/T70.1-2000）

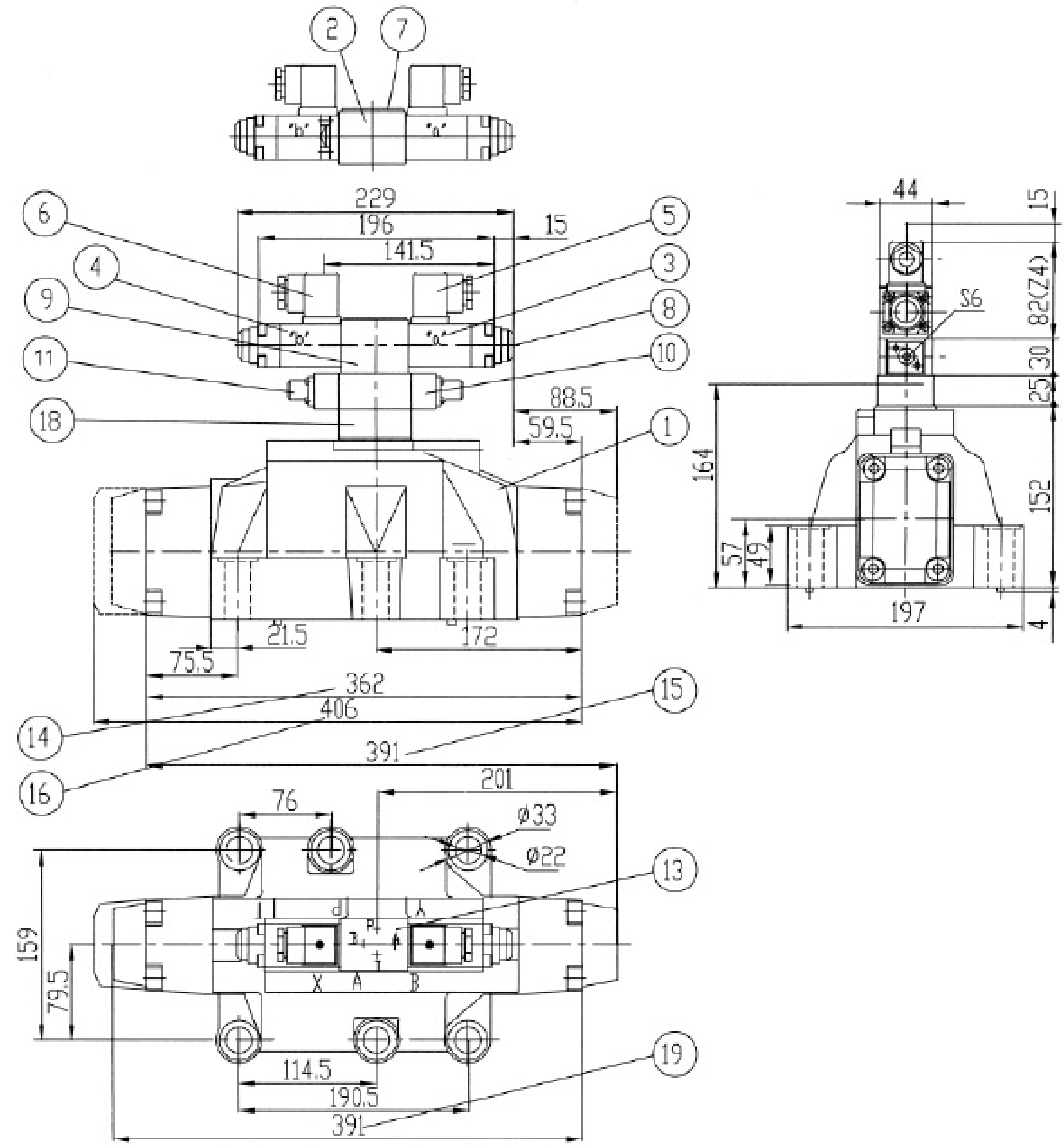
Unit dimensions: Type 4WEH 25 ... (Dimensions in mm)



Subplates G151/ 01（G1"）；G153 / 01（G1"）；G154 / 01（G11/4"）；
G151 / 02（M33x2）；G153 / 02（M33x2）；G154 / 02（M42x2）；
G156 / 01（G11/2"）；G156 / 02（M48x2）；see Page 209

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 Nameplate for the pilot valve
8 Manual override "N", optional
9 2 positions (2 solenoids)
3 positions (2 solenoids)
10 Double throttle/check valve
12 Two fixing pins
13 Reducing valve
14 3-position valve, spring-centred
2-position valve, hydraulic offset
15 2-position valve, spring-centred
spring offset （C、D、K、Z）
16 3-position valve, pressure-centred
17 O-Ring 27 x 3 for port A、B、P and T；O-Ring 19 x 3 for port X and Y
18 The position for port A、B、P of pilot valve
fixing screws
6 - M 12 x 60 -10.9（GB/T70.1-2000）

Unit dimensions: Type 4WEH 32 ... (Dimensions in mm)



Subplates G157/ 01（G1/2"）；G157 / 02（M48x2)；G158 / 10)； see Page 210、211

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 Nameplate for the pilot valve

8 Manual override "N", optional

9 2 positions (2 solenoids)
3 positions (2 solenoids)

10 Double throttle/check valve

12 Two fixing pins

13 The position for port A、B、P and T of pilot valve

14 3-position valve, spring-centred
2-position valve, hydraulic offset

15 2-position valve, spring offset (C、D、K、Z)

16 3-position valve, pressure-centred

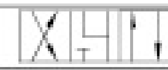
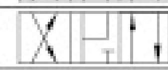
18 Reducing valve

19 2-position valve, with spring offset
O-Ring 42 x 3 for port A、B、P and T；O-Ring 19 x 3 for port X and Y
fixing screws
6 - M 20 x 80 -10.9（GB/T70.1-2000）

Pilot valve:

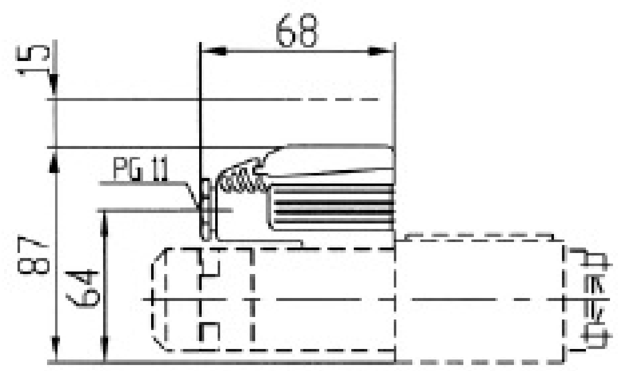
WEH used 4WE6 as pilot valve, the control spool is held in the neutral or initial position by means of reture spring, is held in the working position by solenoids or detent.

All spool of pilot valve see below table.

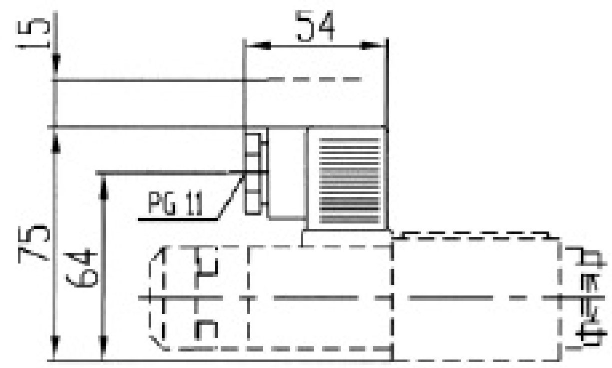
Main valve	Polit valve	
3-position valve, spring-centred	spool J ,3-position valve	
3-position valve, pressure-centred	spool M ,3-position valve	
2-position valve Y · · · / · · · and HY · · · / · · ·	spool Y ,2-position valve（with spring offset）	
2-position valve C、D、K、Z and HC、HD、HK、HZ	spool D ,2-position valve Type of polit valve：with spring offset without spring offset without spring offset,but with detent	

Dimensions of electrical connection (Dimensions in mm)

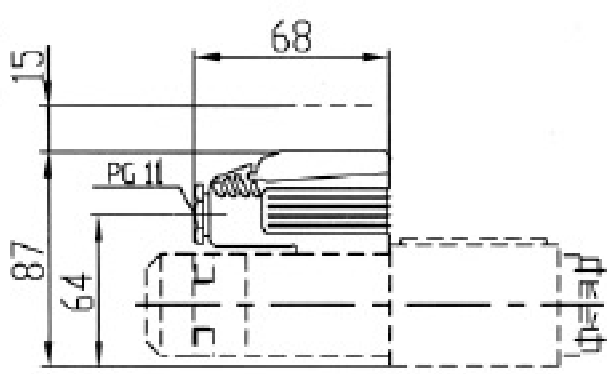
Z5
large plug-in connector



Z4
plug-in connector

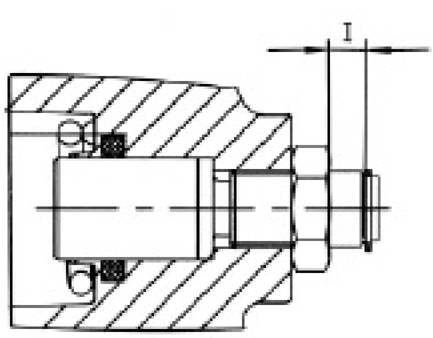


Z5 L
plug-in connector with indicator lamp



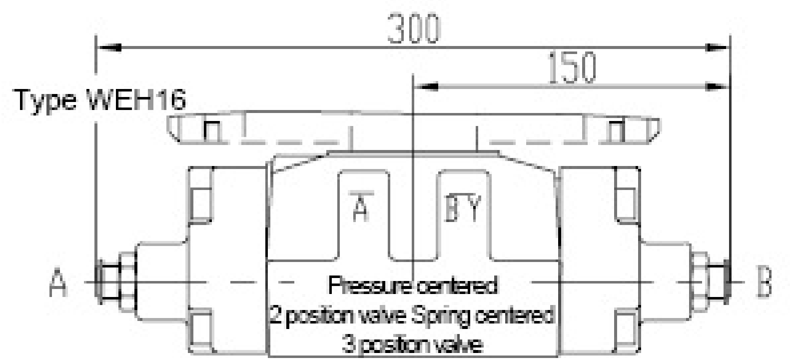
Additional equipment：The stroke limiter

The stroke limiter limits the stroke of the control spool installed in the cover of main valve,change the moment time of form or spool by adjusting yard of valve orifice,must be without pressure.

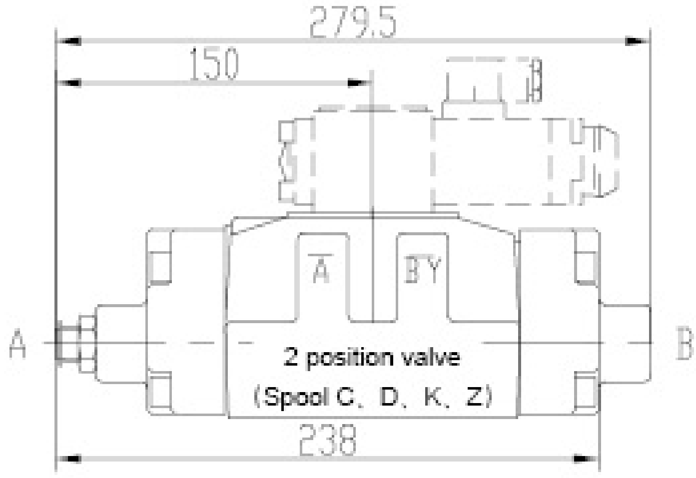


Adjustment range (Dimensions in mm)

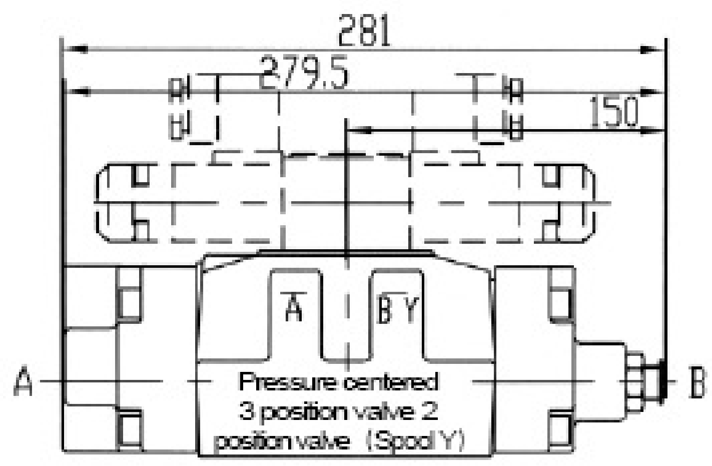
Size	Adjustment range	
WEH16	10	1 turn = 1.5 mm adjustment travel
WEH25	12	
WEH32	13	



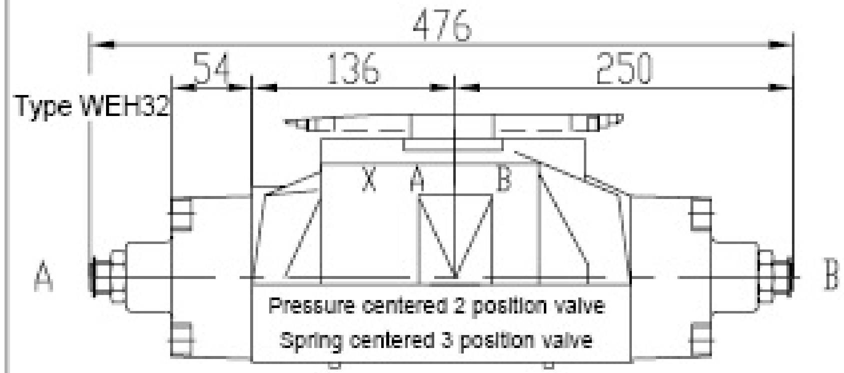
Stroke limiter on sides A and B end of main valve | Stroke limiter on valve side A Stroke limiter on valve side B



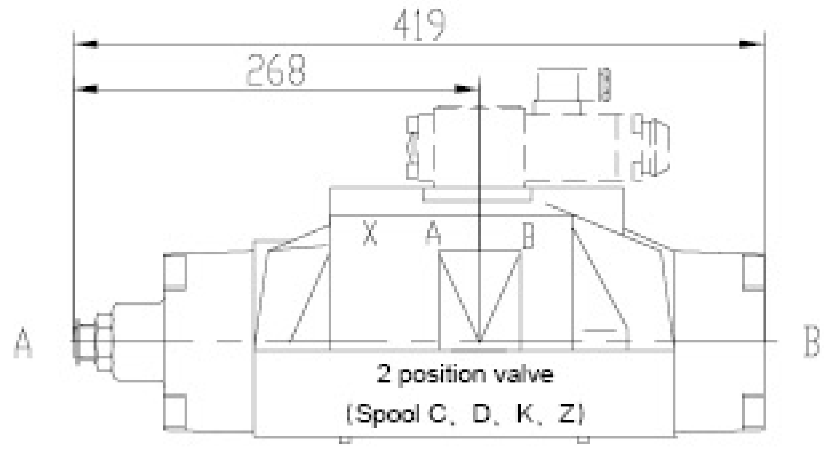
Stroke limiter on side A of valve



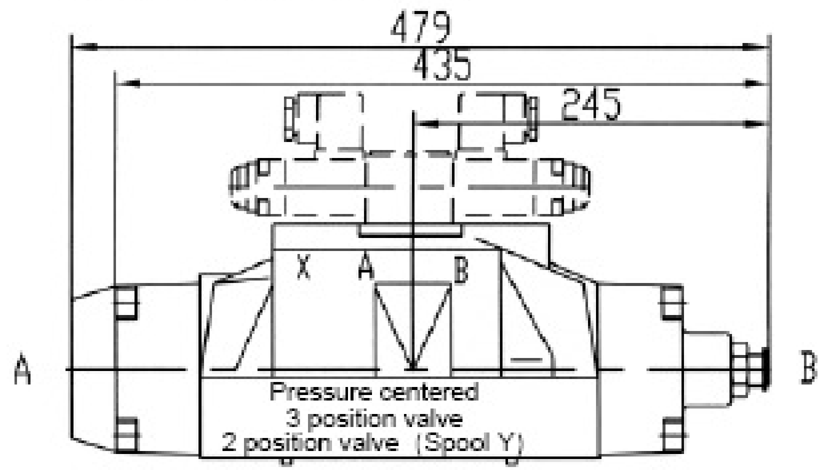
Stroke limiter on side B of valve



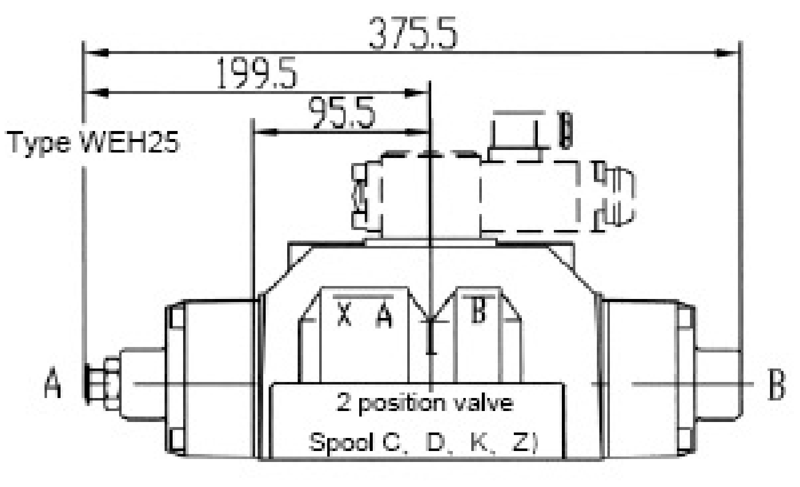
Stroke limiter on sides A and B end of main valve | Stroke limiter on valve side A Stroke limiter on valve side B



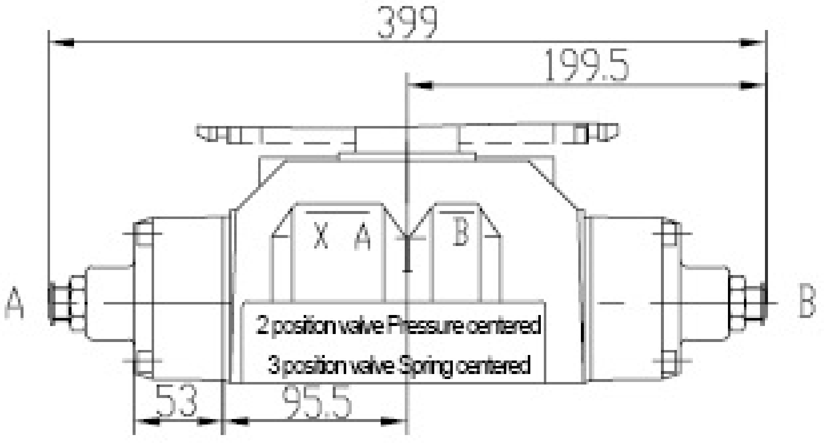
Stroke limiter on side A of valve



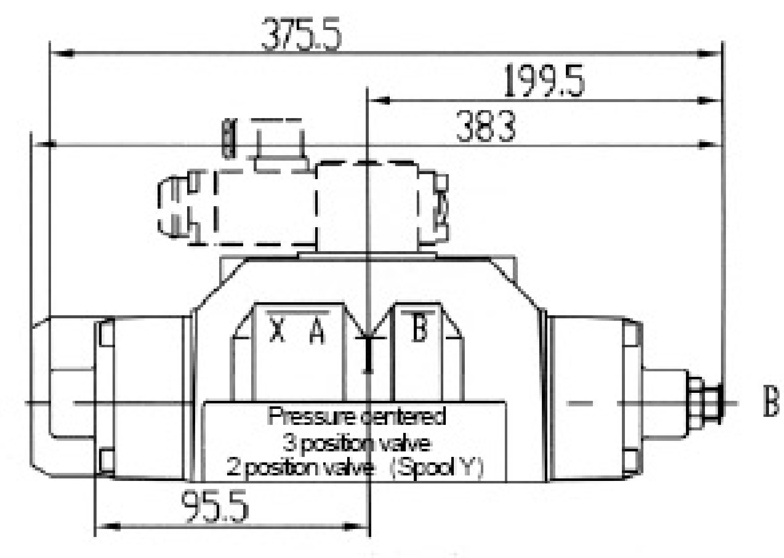
Stroke limiter on side B of valve



Stroke limiter on valve side A



Stroke limiter on sides A and B end of main valve | Stroke limiter on valve side A Stroke limiter on valve side B

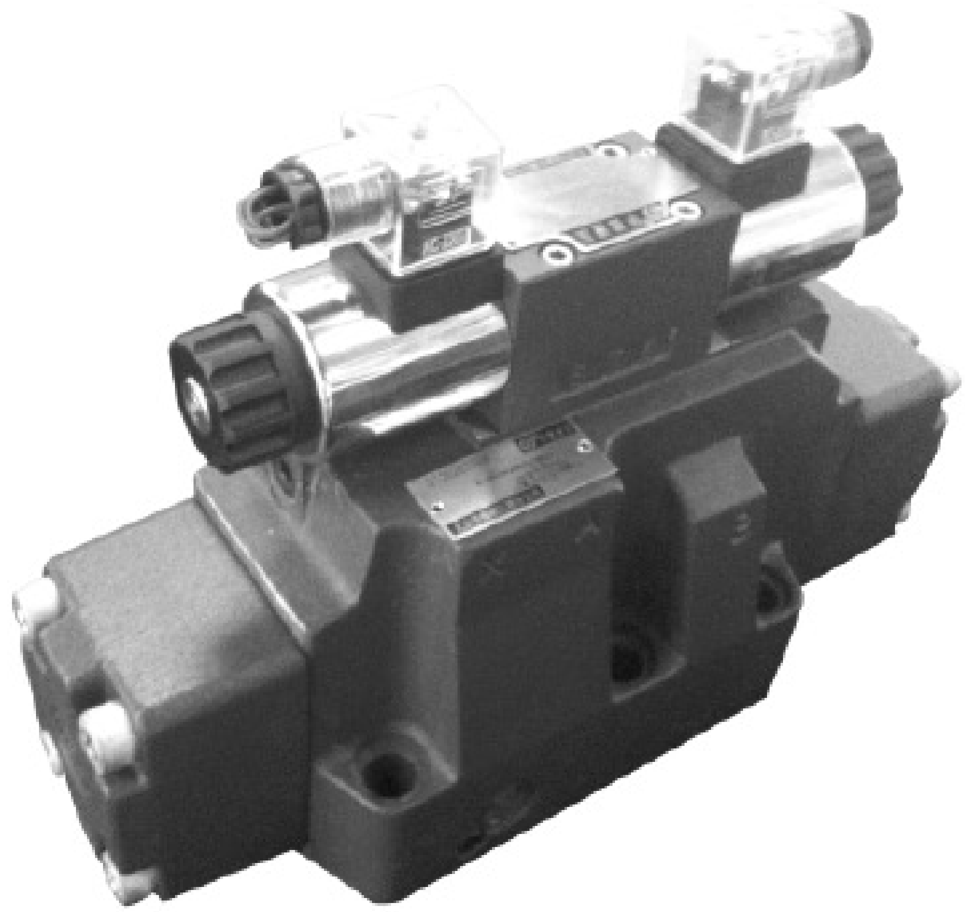


Stroke limiter on valve side B

BEIJING HUADE HYDRAULIC INDUSTRIAL GROUP CO.,LTD.	**Directional valves electro-hydraulically operated (new series)**			RE 24751/12.2004
	Size 10 to 32	up to 35 MPa	up to 1100 L/min	

Features:

- Valves used to control the start, stop and direction of a fluid flow
- Electro-hydraulic operation (WEH), hydraulic operation (WH)
- For subplate mounting
- Spring or pressure-centred,spring or hydraulic offset
- Wet-pin DC or AC solenoids, optional
- Manual override, optional
- Electrical connection as individual or central connection
- Shifting time adjustment, optional
- Pre-load valve in the P-channel of the main valve, optional
- Auxiliary equipment:
  · 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
- Porting pattern to Din 24 340 form A, ISO 4401 and CETOP-RP 121H



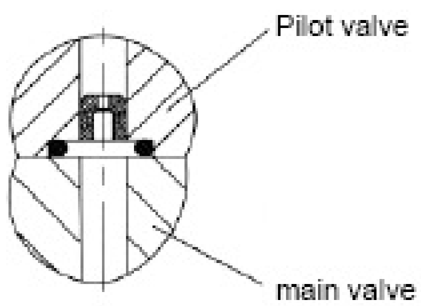
Pilot oil supply

4WEH · · · and 4WH · · ·
The pilot oil supply is sourced externally via channel X from a separate circuit.
The pilot oil drain is led externally via channel Y to tank.

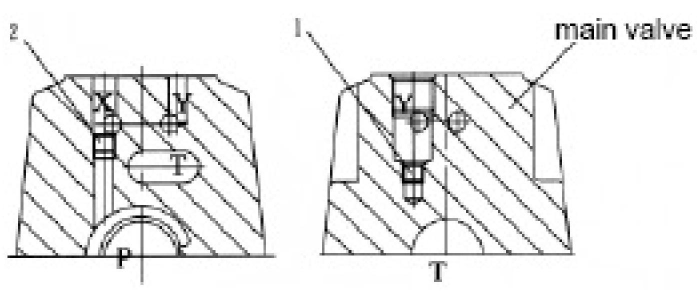
4WEH · · · E · · ·
The pilot oil supply is sourced internally from channel P of the main valve.
The pilot oil drain is led externally via channel Y to tank. Port X in the subplate is plugged.
Change over from external to internal or from internal to external pilot oil supply (size 16): Remove the cover on the solenoid side "a", remove the plugs and turn end-for-end, insert plugs and re-place the cover.

4WEH · · · ET · · ·
The pilot oil supply is sourced internally from channel P of the main valve.
The pilot oil drain is led internally via channel T to tank. Ports X and Y in the supblate are plugged.

4WEH · · · T · · ·
The pilot oil supply is sourced externally via channel X from a separate circuit. The pilot oil drain is led internally via channel T to tank. Port Y in the subplate is plugged.
1 Plug screw M6-8.8 - pilot oil drain
2 Plug screws M6-8.8 - pilot oil supply
3 Plug screws M8-8.8 - for external sealing
Tightening torques M_A for cover fixing screws:
Size 16: 35 Nm
Size 25: 68 Nm
Tightening torque M_A for pilot valve fixing screws:
Sizes 10 to 32: 9 Nm
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 (see page 188) .
This throttle is inserted in the P channel of the pilot valve.



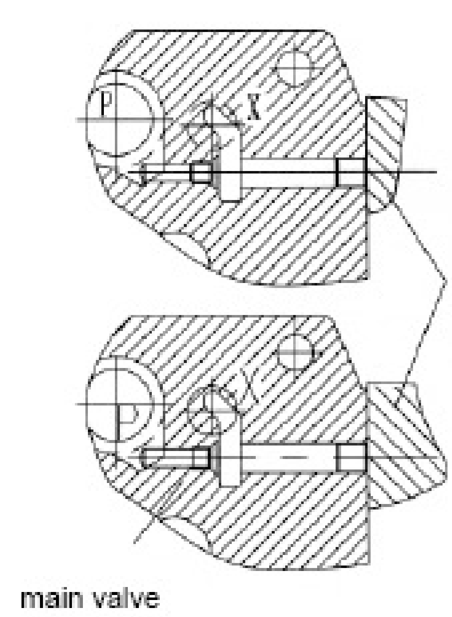
Size 10

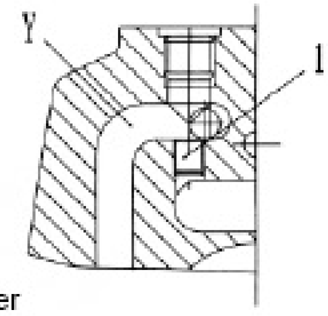


Pilot oil supply
external: 2 plugged
internal: 2 open

Pilot oil drain
external: 1 plugged
internal: 1 open

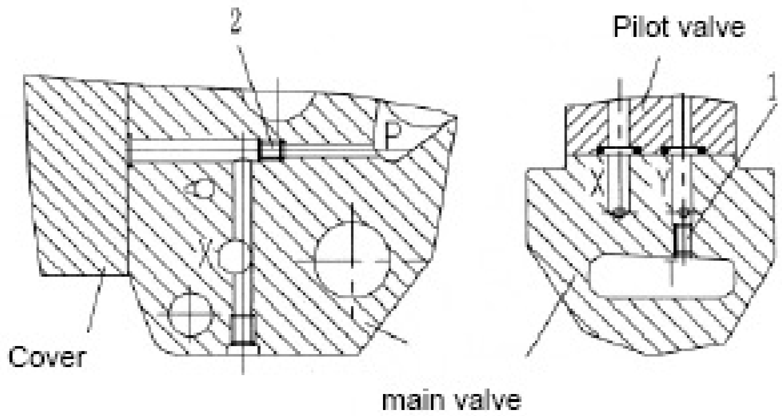
Size 16





Pilot oil supply
external: P plugged
internal: P open
Pilot oil drain
external: 1 plugged
internal: 1 open

Size 25

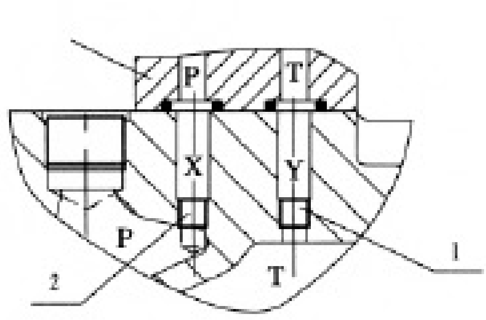


Pilot oil supply
external: 2 plugged
internal: 2 open

Pilot oil drain
external: 1 plugged
internal: 1 open

Size 32

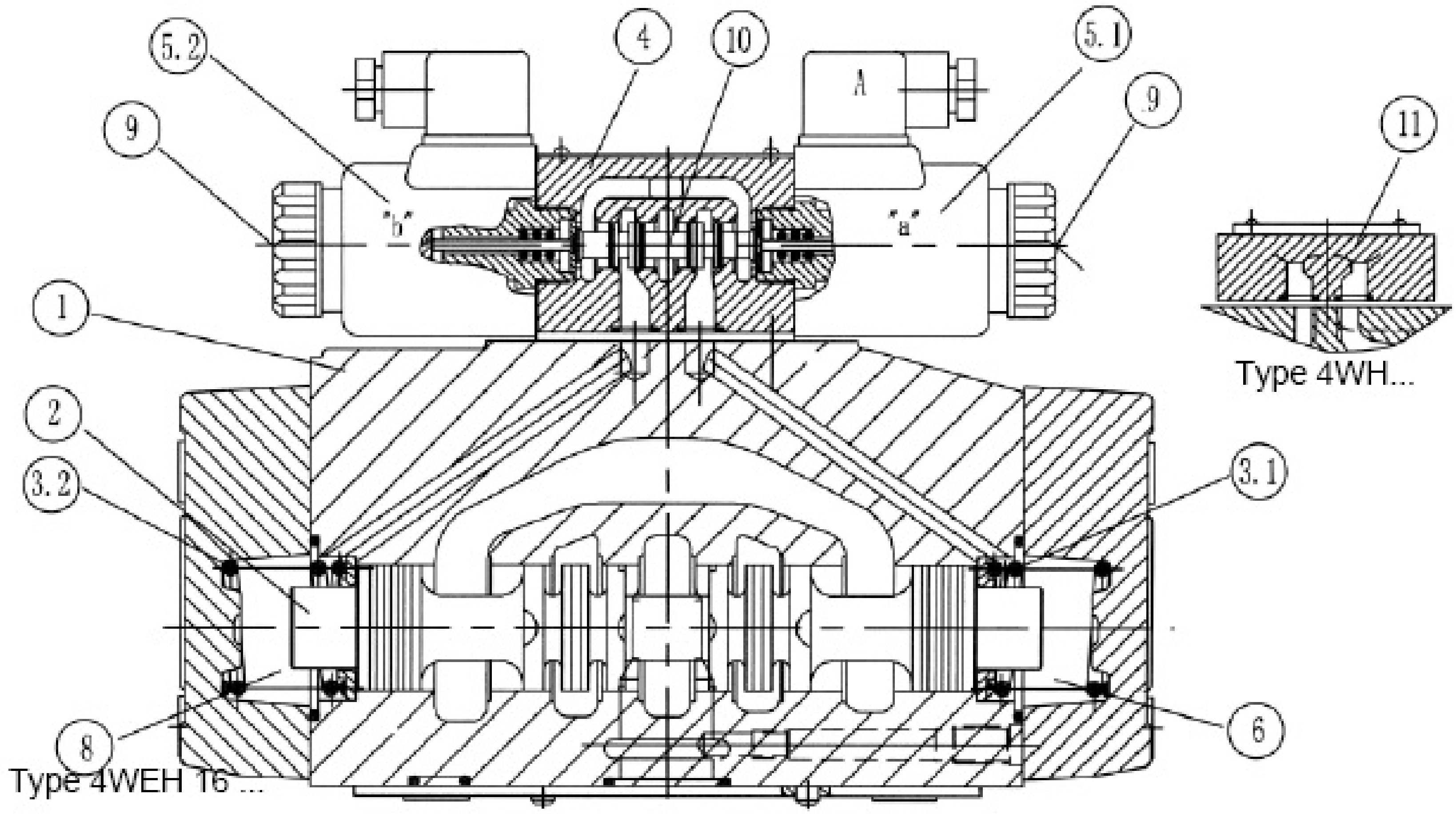
Pilot valve



Pilot oil supply
external: 2 plugged
internal: 2 open

Pilot oil drain
external: 1 plugged
internal: 1 open

Functional,section



Directional valves type 4WEH...

Valves of type WEH are directional spool valves with electro-hydraulic operation.

They control the start, stop and direction of a fluid flow.

The directional valves basically consist of the main valve with housing (1), main control spool (2), one or two return springs (3.1) and (3.2), and the pilot valve (4) with one or two solenoids "a" (5.1) and/or "b" (5.2).

The main control spool (2) in the main valve is held in the neutral or in the initial position either by the springs or by means of pressure.

In the initial position, the two spring chambers (6) and (8) are connected to the tank without pressure via the pilot valve (4).

The pilot valve is supplied with pilot fluid via the pilot line. The pilot oil supply can be either internal or external (external via port X).

When the pilot valve is operated, e.g. solenoid "a", the pilot spool (10) is shifted to the left and thus spring chamber (8) is pressurized with pilot pressure. Spring chamber (6) remains un-pressurized.

The pilot pressure acts on the left side of the main control spool (2) and pushes it against the spring (3.1). As a consequence, the ports P to B and A to T are connected in the main valve.

When the solenoid is de-energized, the pilot spool returns to its initial position (exception: detented spool). The spring chamber (8) is unloaded to tank.

The pilot oil is expelled from the spring chamber via the pilot valve into the Y channel.

The pilot oil supply and drain are internal or external (external via port Y).

An optional manual override (9) permits pilot spool (10) to be operated without energizing the solenoid.

Directional valves type 4WH...

Valves of type WH are directional spool valves with hydraulic operation.

They control the start, stop and direction of a fluid flow.

The directional valves basically consist of the valve housing (1), the main control spool (2), one or two return springs (3.1) and (3.2) in the case of valves with spring return or spring centring, and the pilot connecting plate (11).

The control spool (2) is operated directly by means hydraulic pressure.

The control spool (2) is held in the neutral or in the initial position either by springs or by means of pressure. Pilot oil supply and pilot oil drain are external (see page 2).

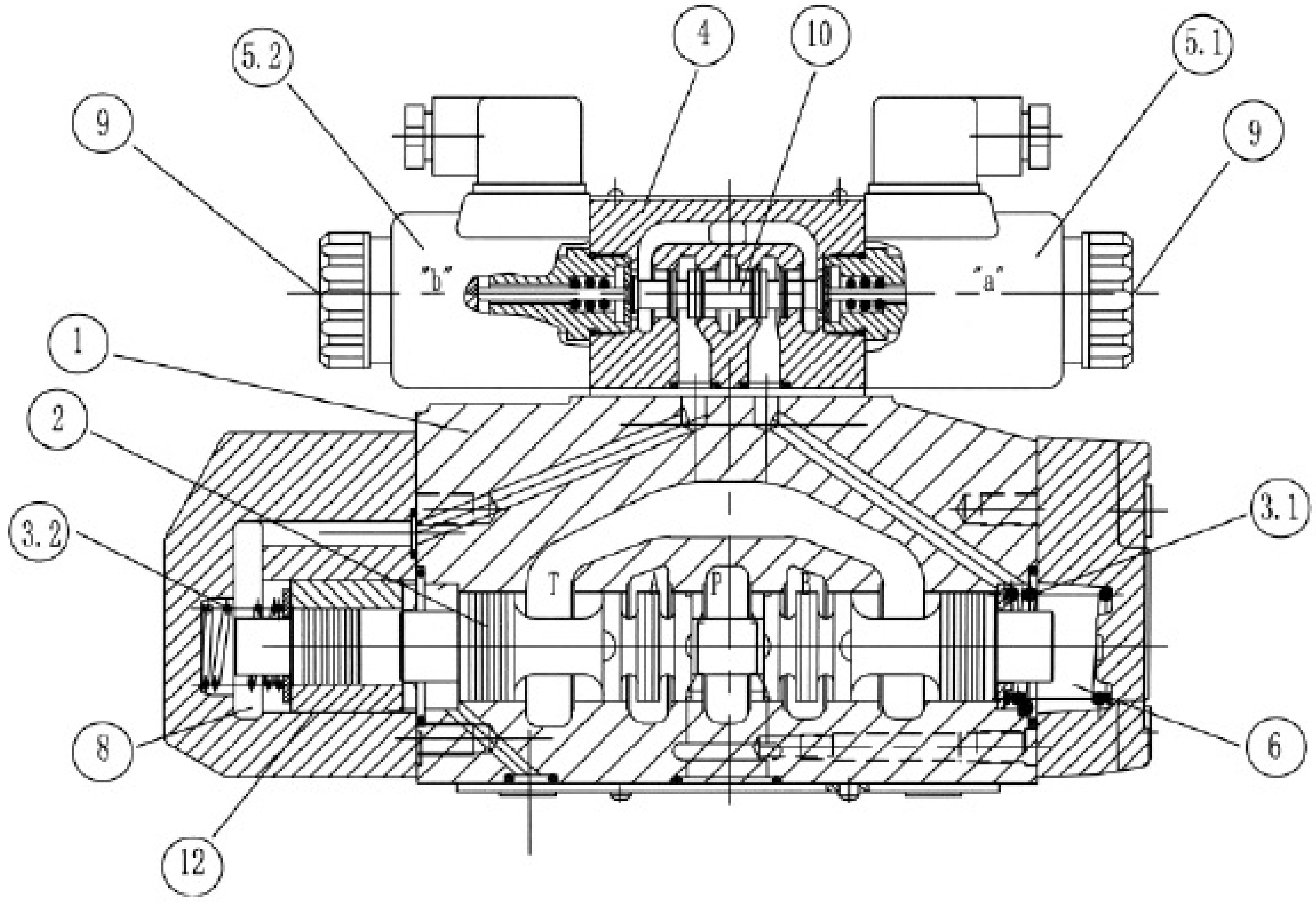
4/3-way directional valve with spring centring of the control spool

In this model, the main control spool (2) is held in the neutral position by two return springs (3.1) and (3.2). The two spring chambers (6) and (8) are connected to ports X and Y via the connector plate (11).

When one of the two ends of the main control spool (2) is pressurized with pilot pressure, the spool is moved to the shifted 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 pressurized spool area causes the spool to return to its neutral or initial position.

Functional,section



Type 4WEH 16 H...

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 pressurization of the two front faces. A centring sleeve (12) 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 Y channel (external).

Shifting time adjustment, pressure reducing valve, pre-load valve

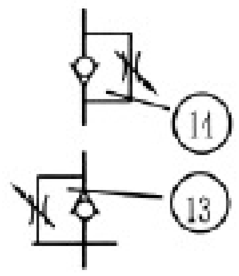
Shifting time adjustment

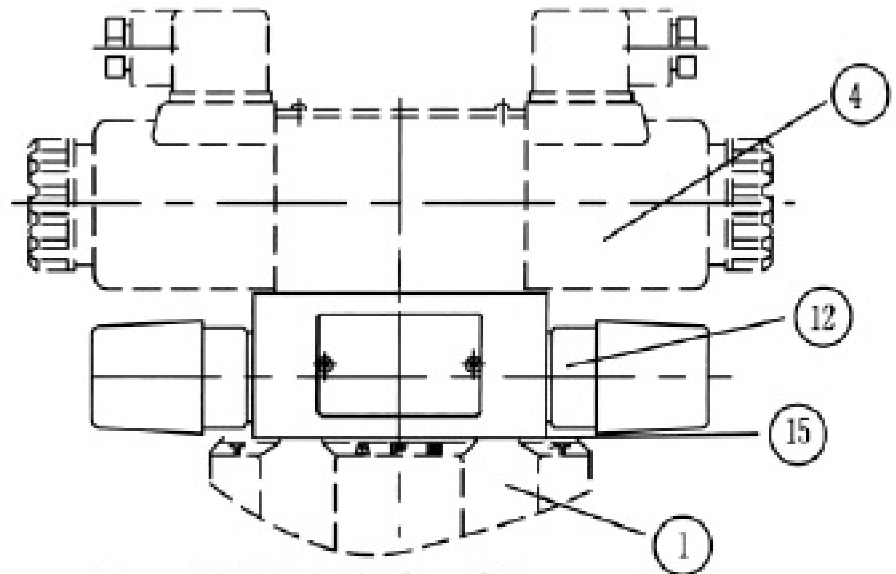
In order to influence the shifting time of the main valve (1) a double throttle check valve(12) is installed.

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 (12) about its longitudinal axis and refit it, replace the pilot valve (4).

Tightening torque for screws (16)

M_A = 9 Nm.



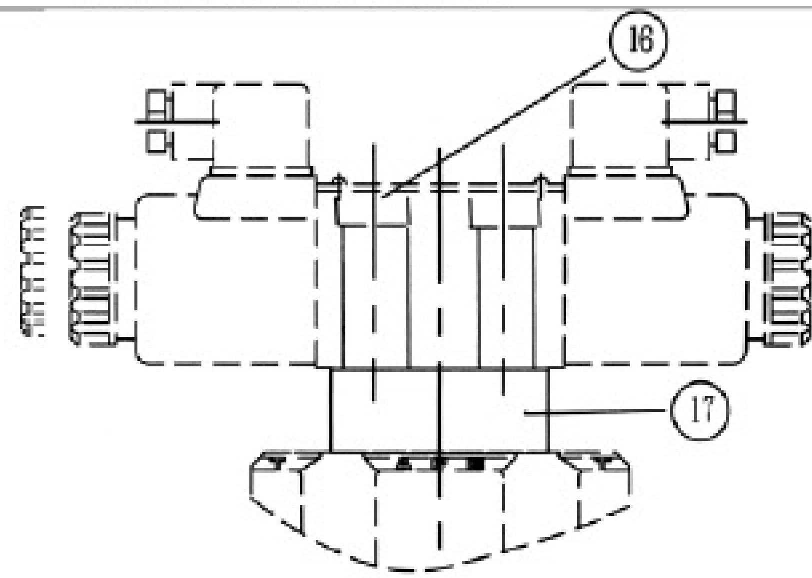


Type 4WEH..60/...S or S2

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" (17), a throttle insert "B10" must be installed in the P channel of the pilot valve.

Tightening torque for screws (16) M_A = 9 Nm.



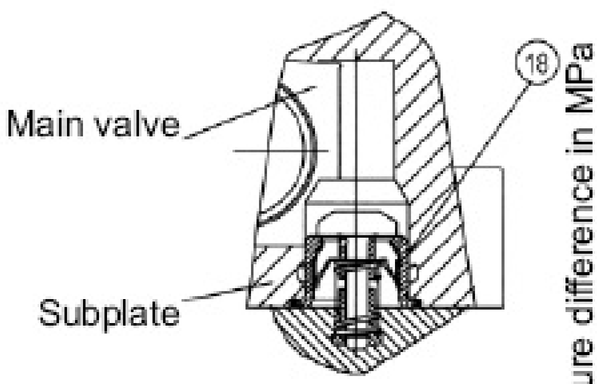
Type 4WEH..60/.../..D3

Pre-load valve (not for size 10)

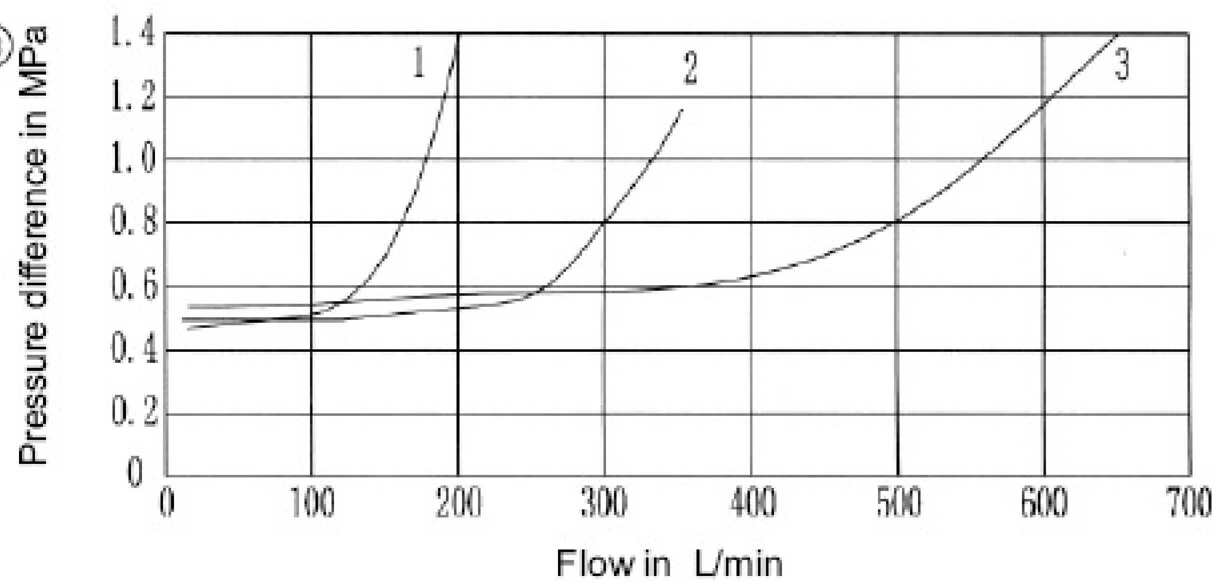
In valves with pressureless by-pass and iternal pilot oil supply, a pre-load valve (18) must be installed in the P channel of the main valve to build up the minimum pilot pressure.

The pressure difference of the pre-load valve must be added to the pressure difference of the main valve (see characteristic curve) in order to determine the actual value.

The cracking pressure of this valve is approx. 0.45 MPa.



△p/qv characteristic curve (measured at v = 41 mm^2/s and t = 50˚C)



1 Size 16

2 Size 25

3 Size 32.

Ordering code

	4						B /							/					*

pressure of operation
Up to 28 MPa = No code
Up to 35 MPa = H -

4-way design = 4

Types of operation
Electro-hydraulic = WEH
Hydraulic = WH

Size
Size 10 = 10
Size 16 = 16
Size 25 = 25
Size 32 = 32

Spool return
By means of springs = No code
Hydraulic = H

For symbols,see page 189

Series 40 to 49 (size 10) [1] = 40
Series 60 to 69 (sizes16.25.32) [1] = 60

Technology of Beijing Huade Hydraulic =B

Spool return in the pilot valve for 2-position valve and 2 solenoids only possible with spools C、D、K、Z and hydraulic spool return in the main valve:
Without spring return = O
Without spring return with detent = OF

Pilot valve with wet-pin solenoids
Standard valve = A
High-performance valve = E

12 V DC =G12
220 V AC 50 Hz =W220-50
24 V DC =G24
DC solinoid commuting automatically =W220R

Further details in clear text

No code = mineral oils
V = phosphate ester

No code = Without pressure reducing valve
D3 [2] = With pressure reducing valve

Pre-load valve (not for size 10)
No code = Without pre-load valve
P 4.5 = With pre-load valve

No code = Without throttle insert
B08 = Throttle Φ 0.8 mm
B10 = Throttle Φ 1.0 mm
B12 = Throttle Φ 1.2 mm
B15 = Throttle Φ 1.5 mm

Additional equipment NO. (see Additional equipment)

Type of electrical connection
(see dimensions of electrical connection on page 181)

No code = Without shifting time adjustment
S = Shifting time adjustment as meter-in control
S2 = Shifting time adjustment as meter-out control

No code= Pilot oil supply external, drain external
E= Pilot oil supply internal, drain external
ET [3] = Pilot oil supply internal, drain internal
T= Pilot oil supply external, drain internal
Type 4WH...only available as No code!
Versions ET and T as 3-position valve with pressure centring only possible if $p_{pilot} \geqslant 2 \times p_{tank} + p_{pilot\ min}$!

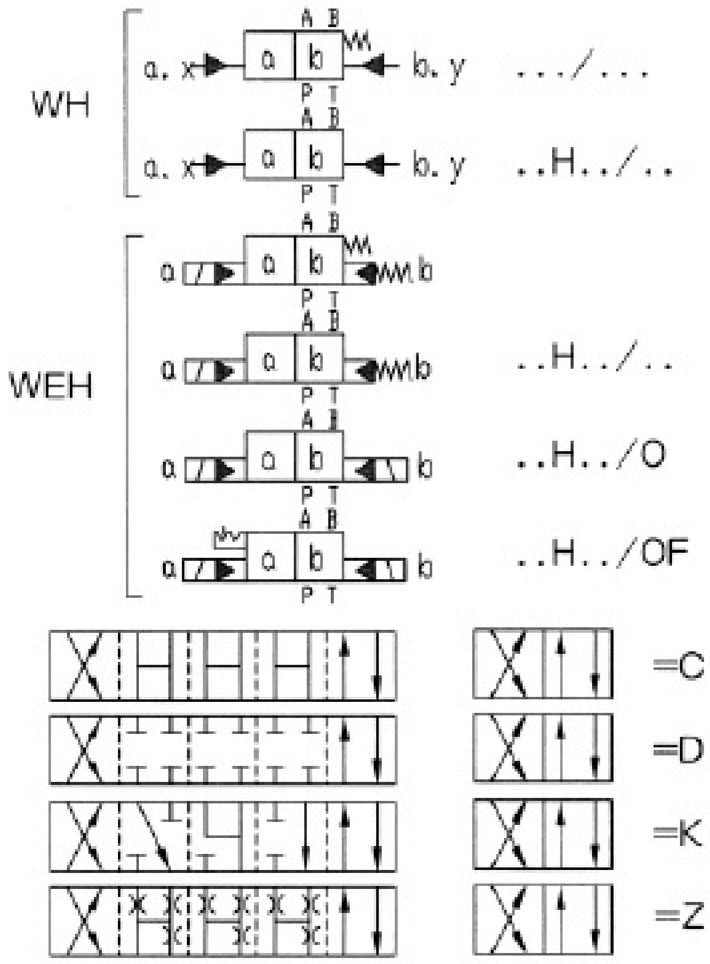
No code= Without manual override
N= With manual override
N9= With protected manual override

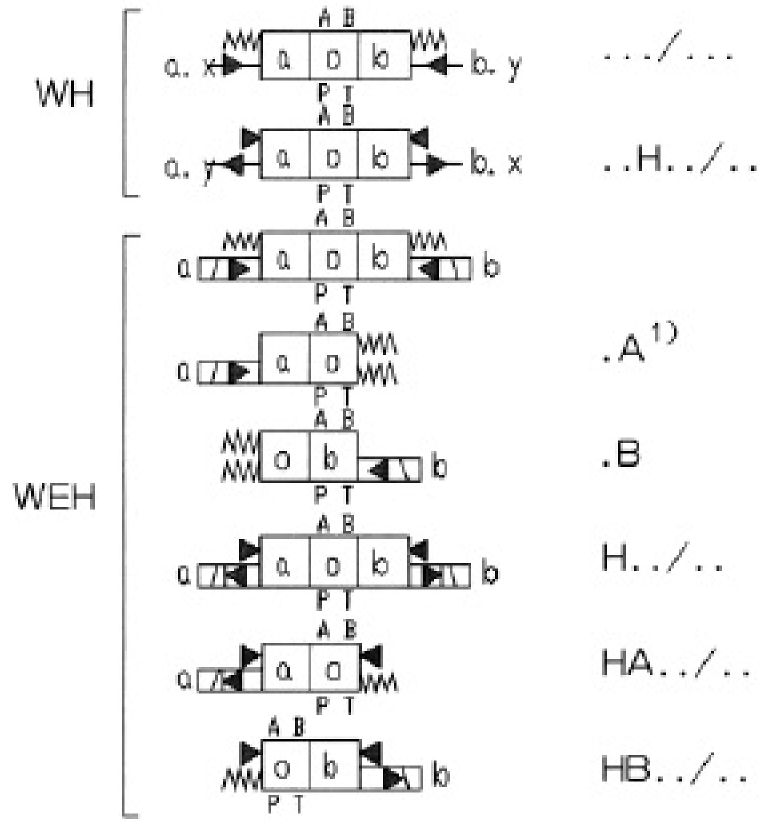
1) Unchanged installation and connection dimensions
2) Only in conjuction with throttle insert "B10"
3) With internal pilot oil supply:
Minimum pilot pressure: Please note page 192!

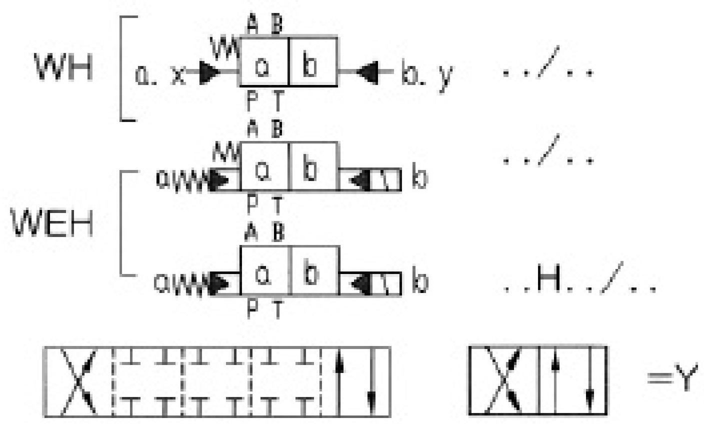
In order to avoid excessive pressure peaks, a throttle insert (B10) should be provided in the P port of the pilot valve .

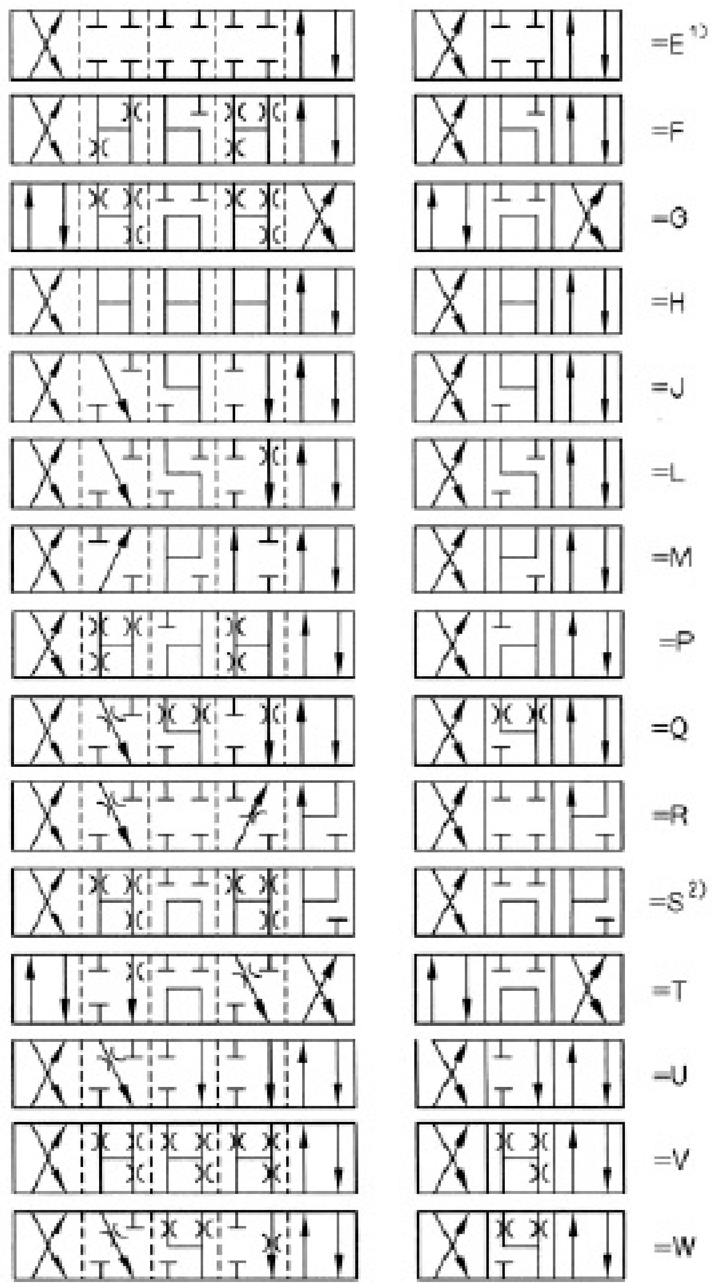
4) Plug-in onnectors have to be ordered separately

Symbols









1) Example: Spool E, solenoid on side "a"
Order example:
H-4WEH 16 HEA60/6AG24N9ETSK4..B10..V..

2) Spool S only for size 16

Valve opening in neutral position for spools Q, V and W

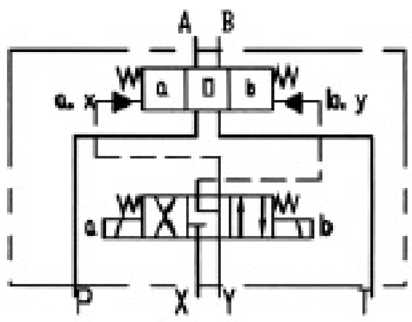
Spool		Valve opening in neutral position (in mm²) 10	16	25 (type 4W.H 25.60B/...)	32
Q	P-A	-	-	-	-
	P-B	-	-	-	-
	A-T	13	32	83	78
	B-T	13	32	83	78
V	P-A	13	32	83	73
	P-B	13	32	83	73
	A-T	13	32	83	84
	B-T	13	32	83	84
W	P-A	-	-	-	-
	P-B	-	-	-	-
	A-T	2.4	6	14	20
	B-T	2.4	6	14	20

Detailed and simplified symbols for 3-position valves

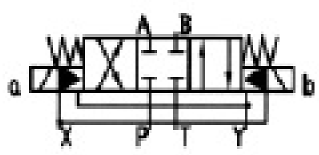
Valve with spring-centred neutral position

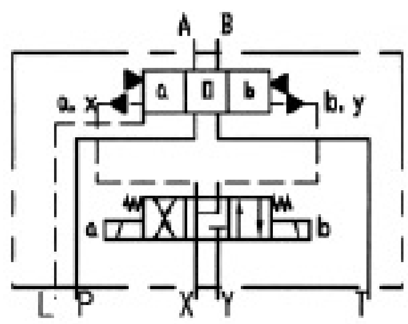
Valve with pressure-centred neutral position only sizes 16, 25 (type 4W.H 25 .60/... and 32)

X = external; Y = external

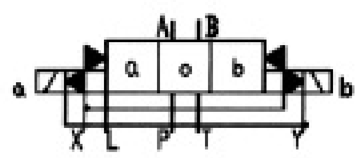


Type 4WEH../..

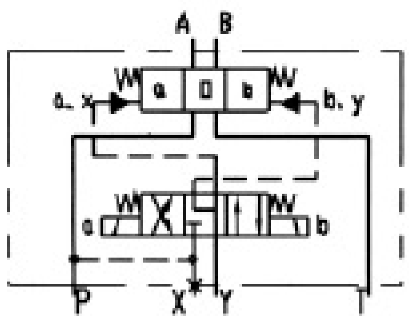




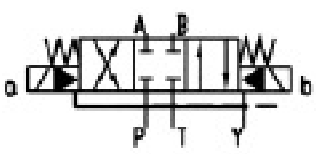
Type 4WEH..H../..

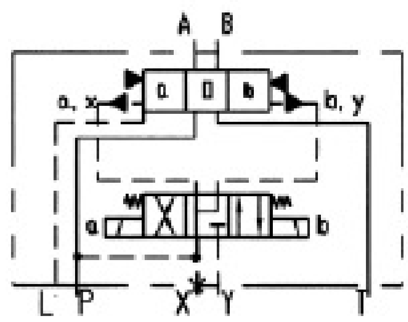


X = internal; Y = external

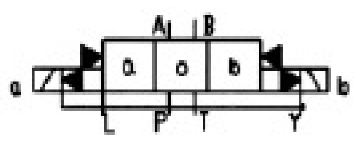


Type 4WEH../..E..

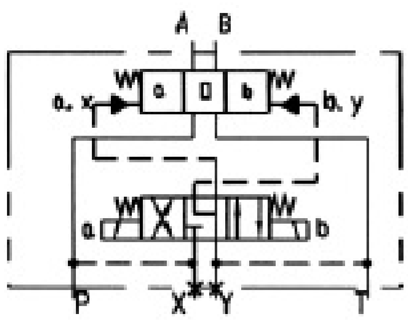




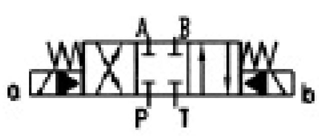
Type 4WEH..H../..E..



X = internal; Y = internal

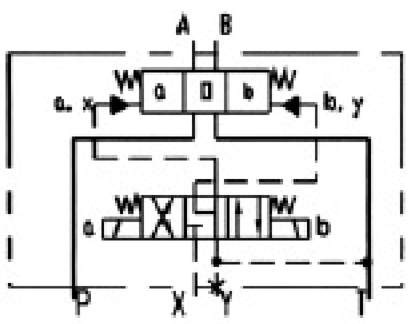


Type 4WEH../..ET..

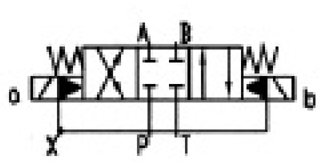


3-position valves, pressure-centred, preferrably with external pilot oil supply and/or drain (No code, E)
For the preconditions for internal pilot oil supply and/or drain (ET, T) see page 188 or 192.

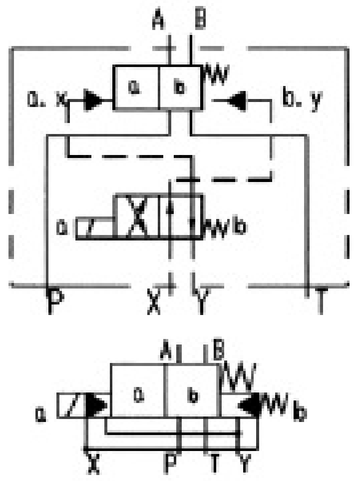
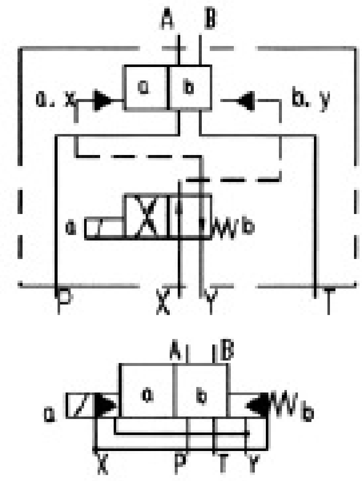
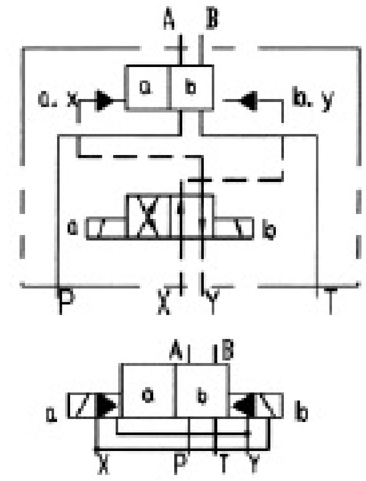
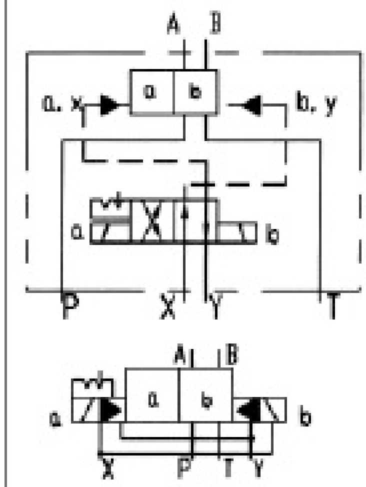
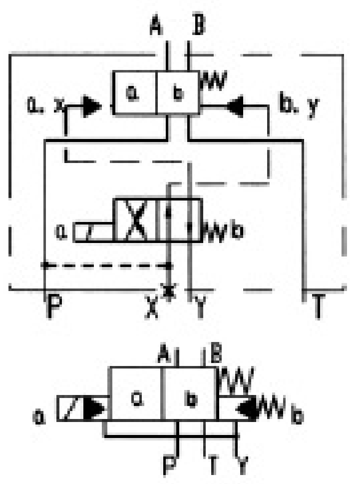
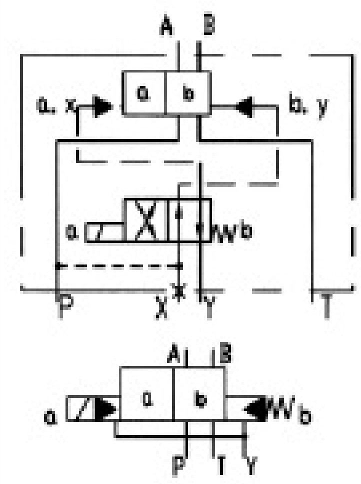
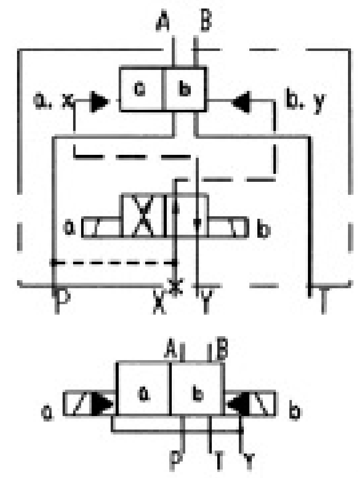
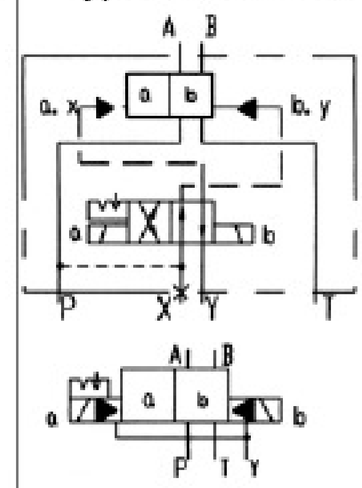
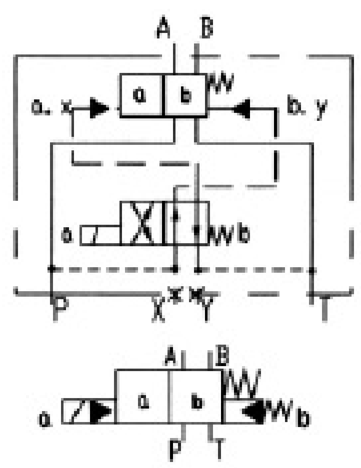
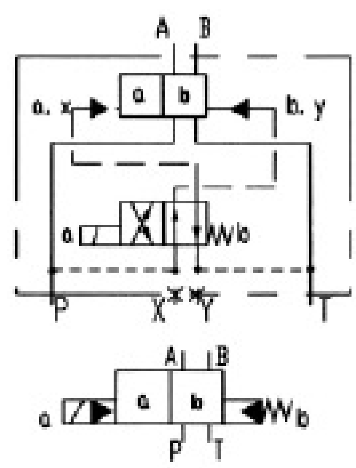
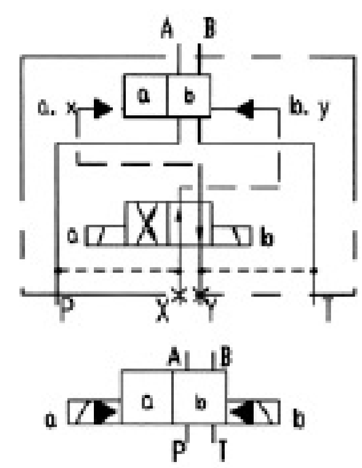
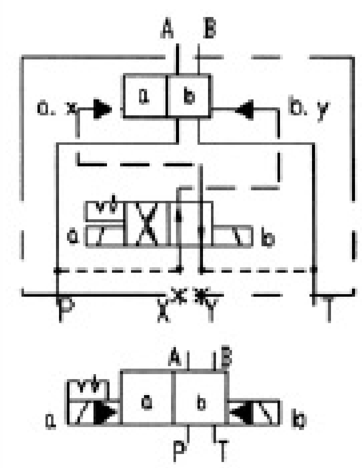
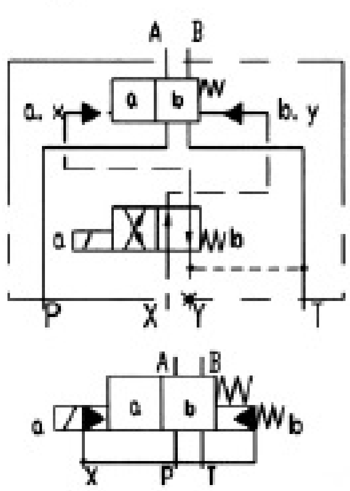
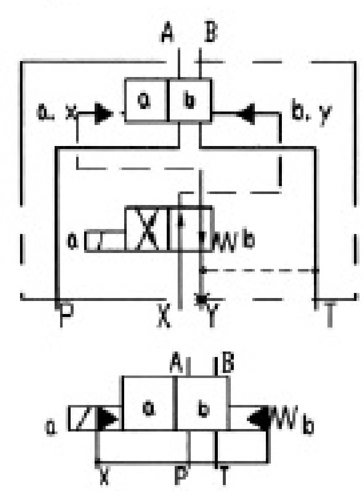
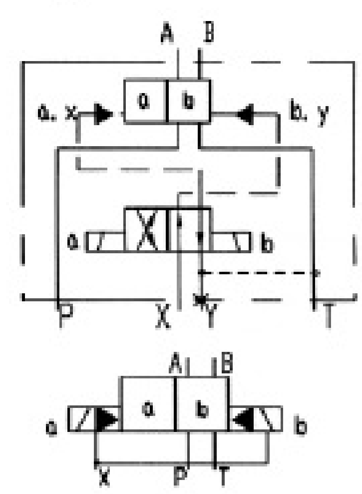
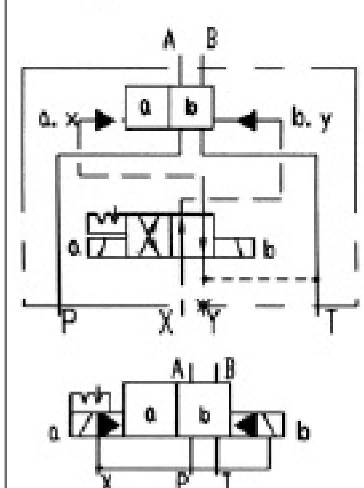
X = external; Y = internal



Type 4WEH../..T..



Detailed and simplified symbols for 2-position valves

	Valves with spring offset	Valves with hydraulic offset		
X = external; Y = external	Type 4WEH.../... 	Type 4WEH..H.../... 	Type 4WEH..H/O... 	Type4WEH..H/OF... 
X = internal; Y = external	Type 4WEH.../...E... 	Type 4WEH..H.../...E... 	Type 4WEH..H/O...E... 	Type 4WEH..H/OF...E... 
X = internal; Y = internal	Type 4WEH.../...ET... 	Type 4WEH..H../...ET... 	Type 4WEH..H/O...ET... 	Type 4WEH..H/OF...ET... 
X = external; Y = internal	Type 4WEH.../...T... 	Type 4WEH..H/...T... 	Type 4WEH..H/O...T... 	Type 4WEH..H/OF...T... 

Technical data (For applications outside these parameters, please consult us!)

Sizes (ordering code)			10	16	25	32
Operating pressure, max.	Type 4WEH	(MPa)	28	28	28	28
- Port P, A, B	Type H-4WEH	(MPa)	35	35	35	35
- Port T	Pilot oil drain Y external	(MPa)	31.5[5]	25	25	25
	Pilot oil drain Y internal[1]		16[6]/21[7] DC 10[6]/16[7] AC			
- Port Y	- DC	(MPa)	16[6]/21[7] DC			
Pilot oil drain external:	- AC	(MPa)	10[6]/16[7] AC			
	with version 4WH	(MPa)	25			
Pilot pressure, max. (With higher pilot pressures, a pressure reducing valve is required.)		(MPa)	25			
Pilot pressure, min. - Pilot oil supply X external, pilot oil supply X internal (not with spools: C, F, G, H, P, T, V, Z, S[2])			H-4W....			
	3-position valve, spring-centred	(MPa)	1.0	1.4	1.3	0.85
	3-position valve, pressure-centred	(MPa)	-	1.4	1.8	0.85
	2-position valve, with spring offset	(MPa)	1.0	1.4	1.3	1.0
	2-position valve, with hydraulic offset	(MPa)	0.7	1.4	0.8	0.5
- pilot oil supply X internal (with spools C, F, G, H, P, T, V, Z, S[2])		(MPa)	4.5[3]	4.5[4]	4.5[4]	4.5[4]

1) As 3-position valve with spring-centring only possible if $p_{pilot} \geqslant 2 \times p_{tank} + p_{pilot\,min}$.
2) Spool S only for size 16
3) For symbols C, F, G, H, P, T, V, Z internal pilot oil supply is only possible, if the flow from P to T in the neutral position (in a 3-position valve) or when the valve is moving through the neutral position (in a 2-position valve) is large enough to ensure a minimum pressure difference of 0.65 MPa from P to T.
4) For spools C, F, G, H, P, T, V, Z, S (by means of a pre-load valve or a sufficiently large flow)
5) Type 4WEH 10...: 28 MPa
Type H-4WEH 10...: 31.5 MPa
6) Standard valve "6A"
7) High-performance valve "6E"

Hydraulic fluid		Mineral oil (for NBR seal) or Phospate ester (for FPM seal)						
Fluid temperature range	(℃)	- 30 to + 80						
Viscosity range	(mm²/s)	2.8 to 500						
Cleanliness		Maximum permissible degree of contamination of the hydraulic fluid to NAS 1638 class 9. We therefore recommend a filter with a minimum retention rate of $\beta_{10} \geqslant 75$.						
Pilot oil volume for shifting operation : - 3-position valve, spring-centred	(cm³)	2.04	5.72		14.2		29.4	
- 2-position valve	(cm³)	4.08	11.75		28.4		58.8	
- 3-position valve, pressure-centred			WH	WEH	WH	WEH	WH	WEH
From neutral position to shifted position "a"	(cm³)		2.83	2.83	7.15	7.15	14.4	14.4
From shifted position "a" to neutral position	(cm³)		2.9	5.73	14.18	7.0	29.4	15.1
From neutral position to shifted position "b"	(cm³)		5.72	5.73	14.18	14.15	29.4	29.4
From shifted position "b" to neutral position	(cm³)		2.83	8.55	19.88	5.73	43.8	14.4
Pilot oil flow for shortest shifting time	(L/min)	approx.35	approx.35		approx.35		approx.45.0	
weight: Valve with one solenoid	(kg)	approx.6.4	approx.8.5		approx.17.6		approx.40.5	
weight: Valve with two solenoids, spring-centred	(kg)	approx.6.8	approx.8.9		approx.18.0		approx.41.0	
weight: Valve with two solenoids, pressure-centred	(kg)	approx.6.8	approx.8.9		approx.19.0		approx.41.0	
weight: Valve with hydraulic operation (4WH...)	(kg)	approx.5.5	approx.7.3		approx.16.5		approx.39.5	
weight: Shifting time adjustment	(kg)	approx.0.8						
weight: Pressure reducing valve	(kg)	approx.0.4						
Installation position		optional; valve with hydraulic spool return "H"(spools C, D, K, Z, Y) horizontal						

Shifting times

Shifting time = Contacting at the pilot valve up to start of opening of the control land in the main valve

Size 10 – Pilot valve series 50/ A

Shifting time of the valve from neutral position to shifted position with AC (~) and DC (=) operation									
at pilot pressure	(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
Shifting time of the valve from shifted position to neutral position									
- 3-position valve	(ms)	30							
- 2-position valve	(ms)	35	40	30	75	25	30	20	25

Size 16 – Pilot valve series 60/ E

Shifting time of the valve from neutral position to shifted position with AC (~) and DC (=) operation																	
at pilot pressure	(MPa)	~7=				~14=				~21=				~25=			
- 3-position valve, spring-centred	(ms)	25...30		40		25...30		40		25...30		40		20...25		40	
- 2-position valve	(ms)	30...35		55		30...35		55		30...35		55		25...30		50	
- 3-position valve	Solenoid operated	a	b	a	b	a	b	a	b	a	b	a	b	a	b	a	b
pressure-centred	(ms)	30	30	40	40	30	30	40	40	30	30	35	40	30	30	35	40
Shifting time of the valve from shifted position to neutral position																	
- 3-position valve	(ms)	20 to 35 for ~ ; 30 for =															
- 2-position valve	(ms)	35...50		45		35...50		45		30...45		40		30...45		35	
- 3-position valve	from -	a	b	a	b	a	b	a	b	a	b	a	b	a	b	a	b
pressure-centred	(ms)	20...35		20		20...35		20		20...35		20		20...35		20	

Size 25 – (4W. H 25 .60)

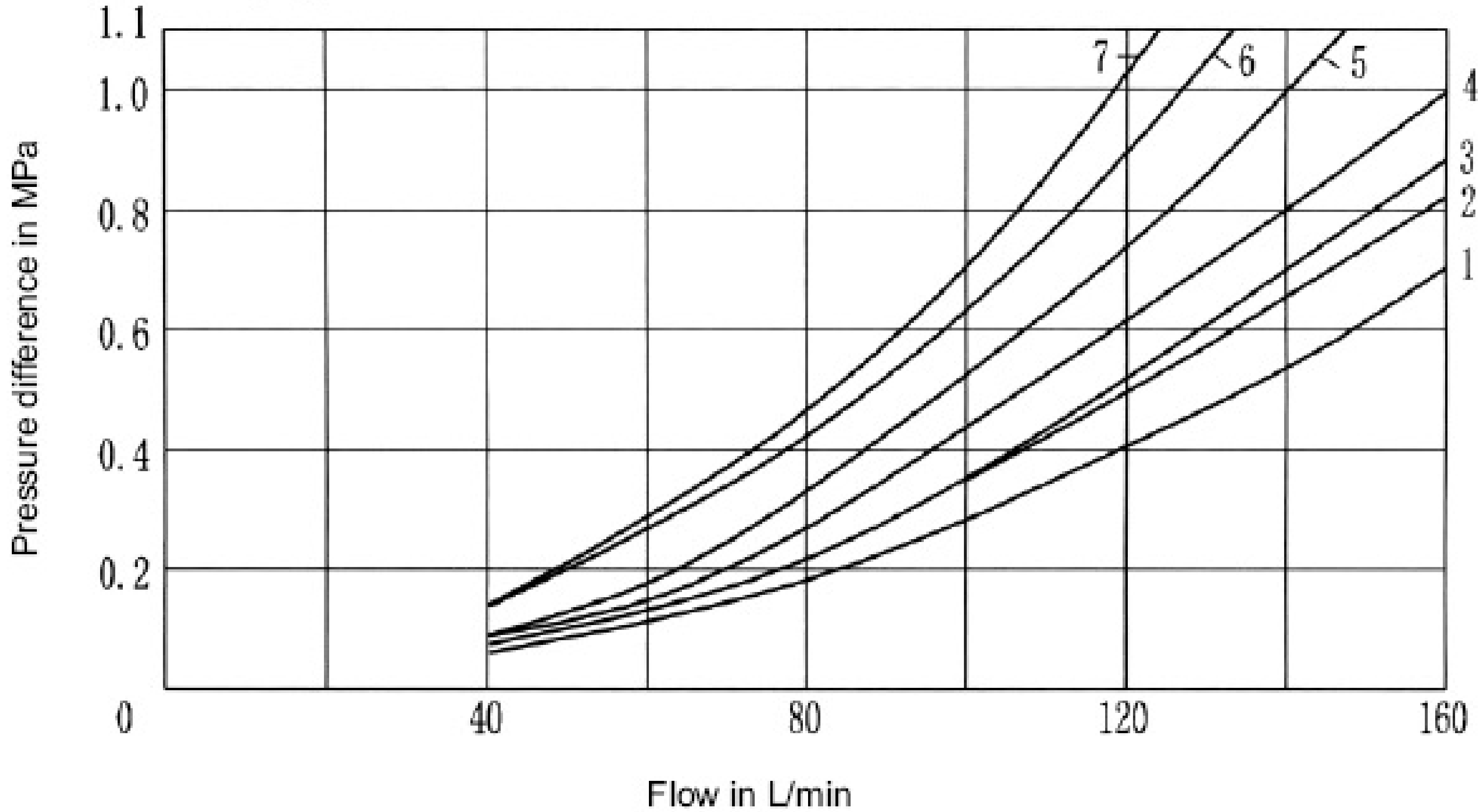
Shifting time of the valve from neutral position to shifted position with AC (~) and DC (=) operation																	
at pilot pressure	(MPa)	~7=				~14=				~21=				~25=			
- 3-position valve, spring-centred	(ms)	50		85		40		75		35		70		30		65	
- 2-position valve	(ms)	120		160		100		130		85		120		70		105	
- 3-position valve	Solenoid operated	a	b	a	b	a	b	a	b	a	b	a	b	a	b	a	b
pressure-centred	(ms)	30	35	55	65	30	35	55	65	25	30	50	60	25	30	50	60
Shifting time of the valve from shifted position to neutral position																	
- 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	from -	a	b	a	b	a	b	a	b	a	b	a	b	a	b	a	b
pressure-centred	(ms)	30...50		30	35	30...50		30	50	30...50		30	35	30...50		30	35

Size 32 – Pilot valve series 50/ A

Shifting time of the valve from neutral position to shifted position with AC (~) and DC (=) operation													
at pilot pressure	(MPa)	~5=				~15=				~25=			
- 3-position valve, spring-centred	(ms)	65		80		50		90		35		105	
- 2-position valve	(ms)	100		130		75		100		60		115	
- 3-position valve	Solenoid operated	a	b	a	b	a	b	a	b	a	b	a	b
pressure-centred	(ms)	55	60	100	105	40	45	85	95	35	40	85	95
Shifting time of the valve from shifted position to neutral position													
- 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	from -	a	b	a	b	a	b	a	b	a	b	a	b
pressure-centred	(ms)	30...65		30	40	60...90		30	30	105...155		50	50

Characteristic curves: Type 4WEH 10...(measured at v = 41 mm²/s and t = 50˚C)

△ p/q_V characteristic curves



Spool	Shifted position				Spool	Neutral position		
	P-A	P-B	A-T	B-T		A-T	B-T	P-T
E,D,Y2	2	4	5					
				F	3	-	6	
F	1	4	1	4				
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	3	- -
L	2		3	1	4			
					P	-	7	5
M	4	4	3	4				
Q,V,W,Z	2	2	3	5				
R	2	2	3	-	U	-	4	-
U	3	3	3	4				
P	4	1	3	4				

Shifting performance limits: Type 4WEH 10...(measured at v = 41 mm² /s and t = 50˚C)

2 and 3-position valves (Permissible flow q_V in L/min)			
Spool	Operating pressure p_{max} in 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

General:

Attention!

The shifting performance limits shown are valid for applications with two directions of flow (e.g. from P to A and simultaneous return flow from B to T).

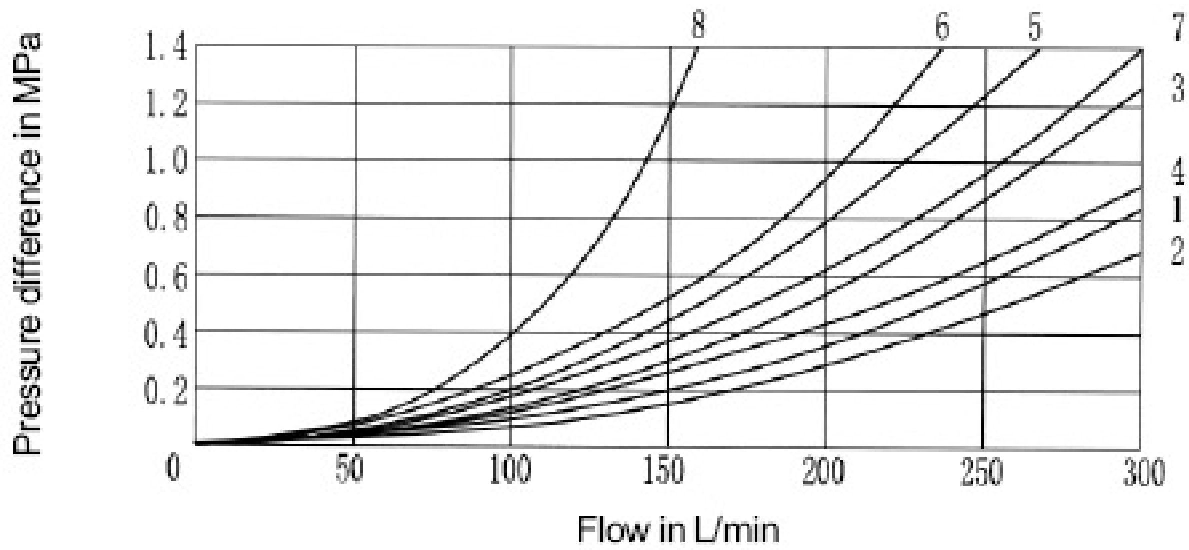
As a result of the flow forces occurring within the valve with only one direction of flow (e.g. from P to A with port B blocked) the permissible performance limits may be considerably lower!

(In the case of applications of this kind, please consult us.)

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

Characteristic curves: Type 4WEH 16...(measured at v = 41 mm²/s and t = 50˚C)

Δ p/q_V-characteristic curves-Spool E



Spool	Shift 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 limits: Type 4WEH 16...(measured at v = 41 mm²/s and t = 50˚C)

2-position valves Permissible flow q_V in L/min						Pre-load valve, required for X = internal
Spool	Operating pressure p_{max} in MPa					
	7	14	21	28	35	
with spring offset in the main valve[1)]						
C、D、K、Z、Y	300	300	300	300	300	
with spring offset in the main valve[2)]						Spool C and Z up to approx. 160L/min
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	
with hydraulic offset in the main valve						Spool HC and HZ up to approx. 160L/min
HC、HD、HK	300	300	300	300	300	
HZ、HY	300	300	300	300	300	

3-position valves Permissible flow q_V in L/min						Pre-load valve, required for X = internal
Spool	Operating pressure p_{max} in MPa					
	7	14	21	28	35	
spring-centred						
E、H、J、L、M、QUWR	300	300	300	300	300	Spools F, G, H, P and S in general
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	
pressure-centred (at min. pilot pressure of 1.6 MPa)						Spool V up to ca. 160 L/min
for all spools	300	300	300	300	300	

1) The flow values given are achieved when the minimum pilot pressure of 1.2 MPa is present.

2) The flow values given are limiting values at which the return spring can return the valve when the pilot pressure fails.

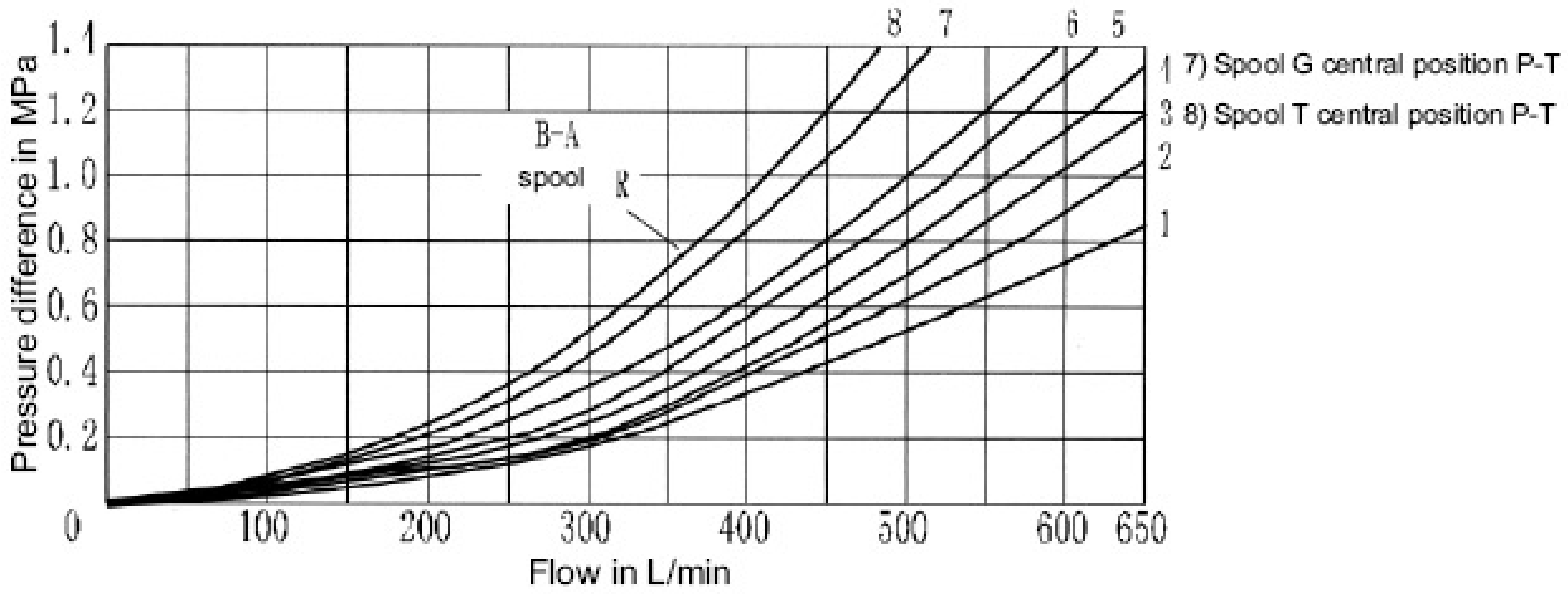
Attention!

When using 4/3-way directional valves with spring-centring of the control spool in the main valve, which exceeds the given performance limits, a higher pilot pressure is required.

Example: At an operating pressure of p_{max} = 35 MPa and a flow of q_V = 300 L/min, a pilot pressure of 1.6 MPa is required.

The maximum flow for those valves is therefore only dependent on the △p value which is acceptable for the system.

Characteristic curves: Type 4WEH 25...(measured at v = 41 mm²/s and t = 50˚C)



Spool	Shifted position P-A	Shifted position P-B	Shifted position A-T	Shifted position B-T	Spool	Neutral position P-A	Neutral position P-B	Neutral position A-T	Neutral position 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	R	2	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 limits: Type 4WEH 25...(measured at v = 41 mm²/s and t= 50˚C)

2-position valves Permissible flow q_v in L/min						Pre-load valve, required for X = internal
Spool	Operating pressure △p in MPa 7	14	21	28	35	
with spring offset in the main valve[1]						
C,D,K,Z,Y	700	700	700	700	650	Spool C and Z up to approx. 180 L/min
with spring offset in the main valve[2]						
C	700	700	700	700	700	
D、Y	700	650	400	350	300	
K	700	650	420	370	320	
Z	700	700	650	480	400	
with hydraulic offset in the main valve						Spool HC and HZ up to approx. 180 L/min
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	

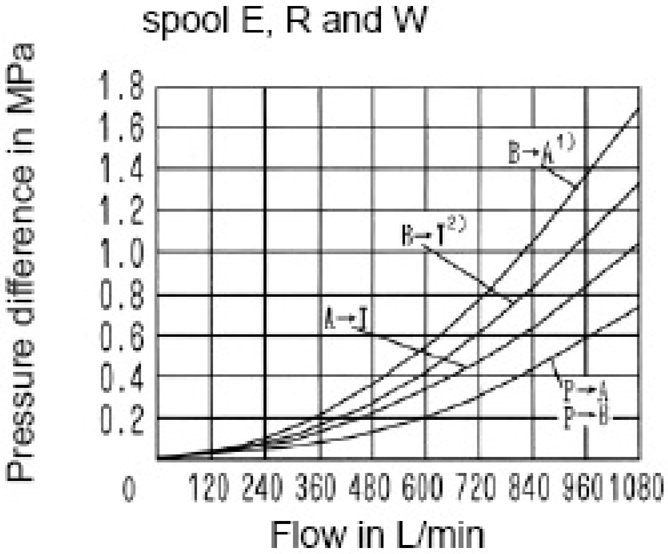
3-position valves Permissible flow q_v in L/min						Pre-load valve, required for X = internal
Spool	Operating pressure △p in MPa 7	14	21	28	35	
spring-centred						
E、L、M、Q、U、W	700	700	700	700	650	Spools F, G, H, P and T in general, spool V up to approx. 180 L/min
G、T	400	400	400	400	400	
F	650	550	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	
R	700	700	700	650	580	
pressure-centred (at min. pilot pressure of 1.8MPa)						
E、F、H、J	700	700	700	700	650	
L、M、P、Q	700	700	700	700	650	
R、U、V、W	700	700	700	700	650	
G、T	700	700	700	700	400	
at > 3MPa pilot pressure						
G、T	700	700	700	700	700	

1) The flow values given are achieved when the minimum pilot pressure of 1.3 MPa is present.

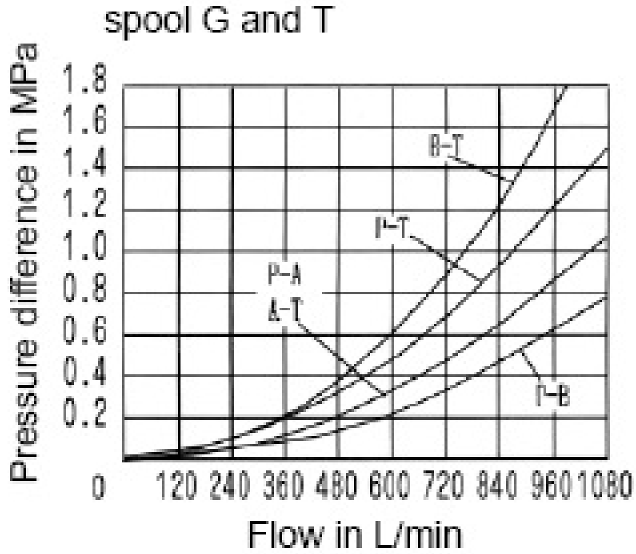
2) The flow values given are limiting values at which the return spring can return the valve when the pilot pressure fails.

Characteristic curves: Type WEH 32...(measured at v = 41 mm²/s and t = 50℃)

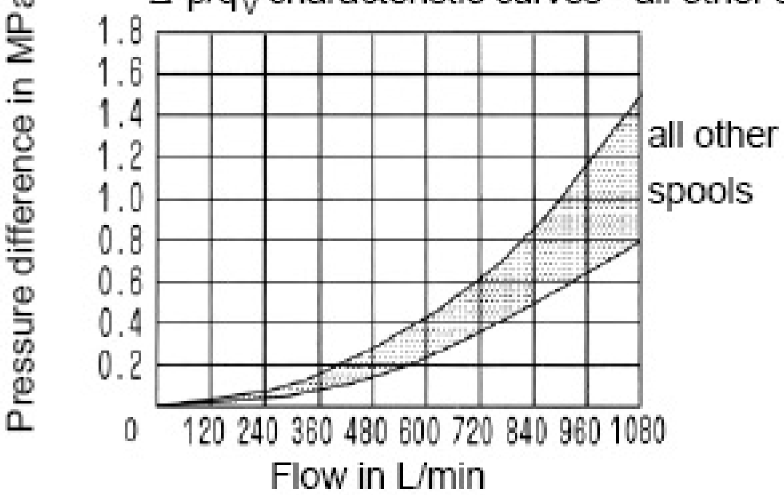
Δ p/q_v characteristic curves - spool E, R and W



Δ p/q_v characteristic curves - spool G and T



Δ p/q_v characteristic curves - all other spools



1) only with spool R
2) not with spool R

Performance limits: Type WEH 32...(measured at v = 41 mm²/s and t = 50℃)

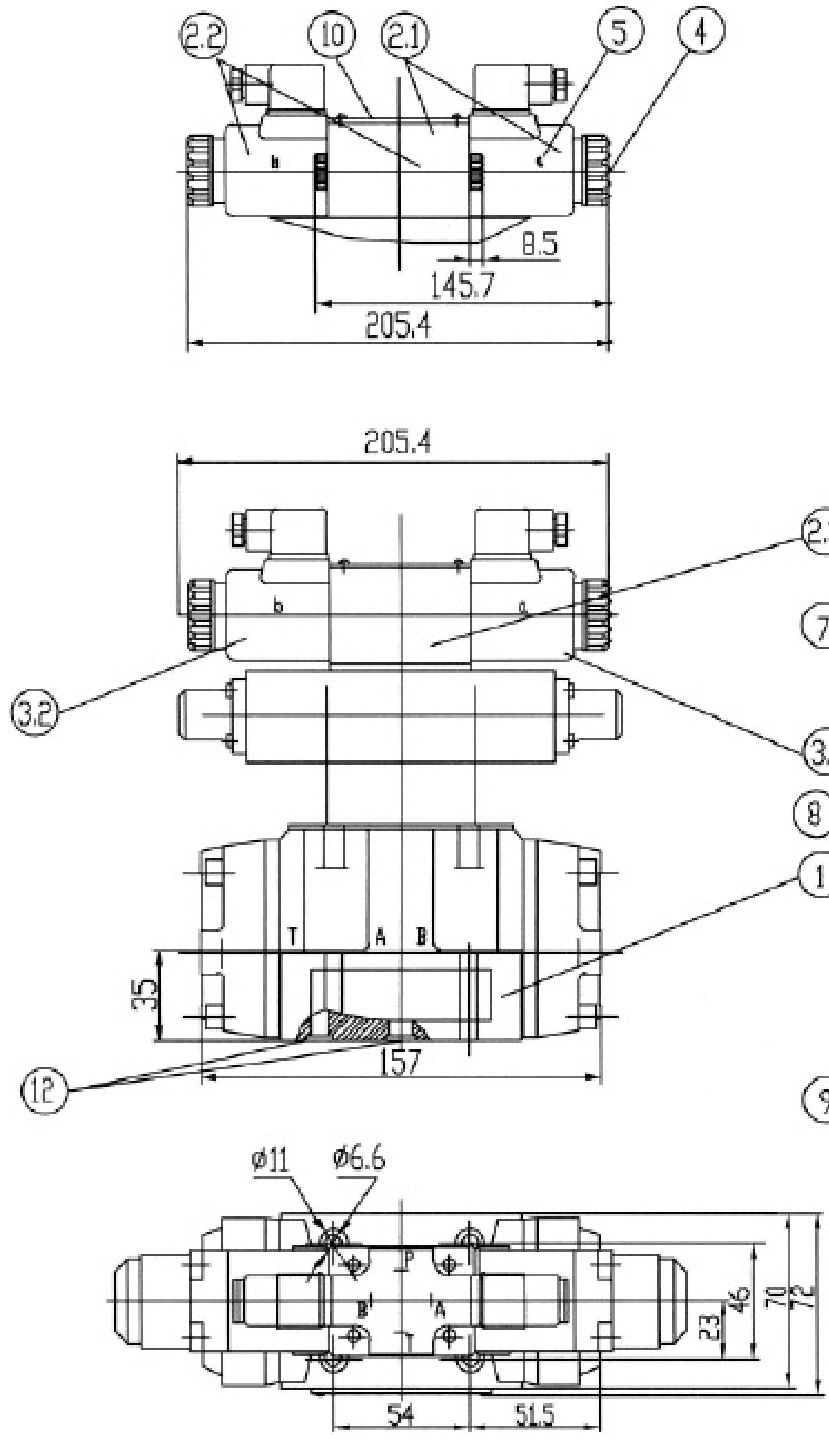
2-position valves Permissible flow q_v in L/min						Pre-load valve, required for X = internal
Spool	Operating pressure p_{max} in MPa					
	7	14	21	28	35	
with spring offset in the main valve 1)						
C、D、K、Z、Y	1100	1040	860	750	680	spool C in general, spool Z up to approx. 180 L/min
with spring offset in the main valve 2)						
C	1100	1040	860	800	700	
D、Y	1100	1040	540	480	420	
K	1100	1040	860	500	450	
Z	1100	1040	860	700	650	
with hydraulic offset in the main valve						spool C in general, spool Z up to approx. 180 L/min
HC、HD、HK	1100	1040	860	750	680	
HZ、HY	1100	1040	860	750	680	

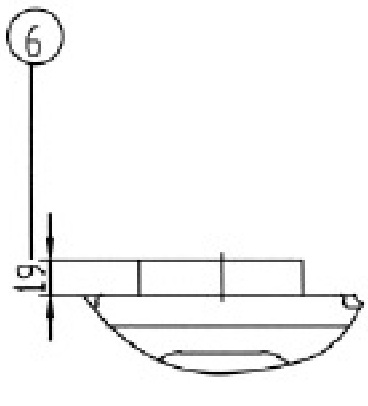
3-position valves Permissible flow q_v in L/min						Pre-load gvalve, required for X = internal
Spool	Operating pressure p_{max} in MPa					
	7	14	21	28	35	
spring-centred1)						
E、J、L、M、Q、U、W、R	1100	1040	860	750	680	Spools F, G, H,P and T in general, spool V up to 180 L/min
G、T、H、F、P	900	900	800	650	450	
V	1100	1000	680	500	450	
pressure-centred (at min. pilot pressure of 0.85MPa)						
for all spools	1100	1040	860	750	680	

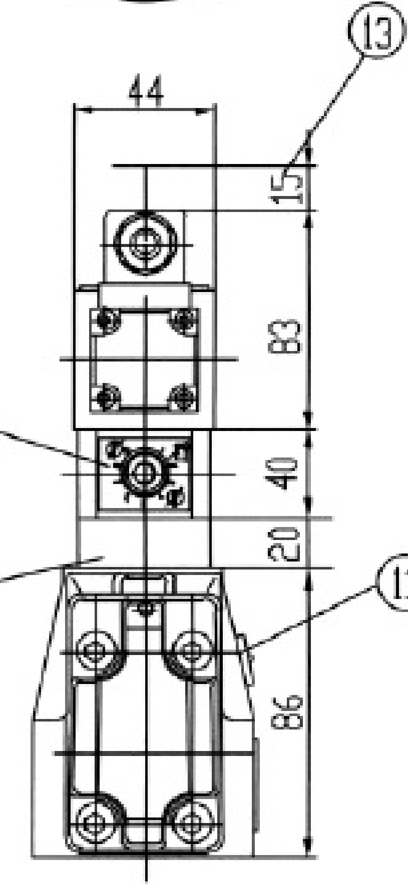
Attention!
When using 4/3-way directional valves with spring-centring of the control spool in the main valve, which exceeds the given performance limits, a higher pilot pressure is required.
Example: At an operating pressure of p max = 35 MPa and a flow of q_v = 1100 L/min, a pilot pressure of 1.5 MPa is required.
The maximum flow for those valves is therefore only dependent on the Δ p value which is acceptable for the system.

1) The flow values given are achieved when the minimum pilot pressure of 1MPa is present.
2) The flow values given are limiting values at which the return spring can return the valve when the pilot pressure Spools.

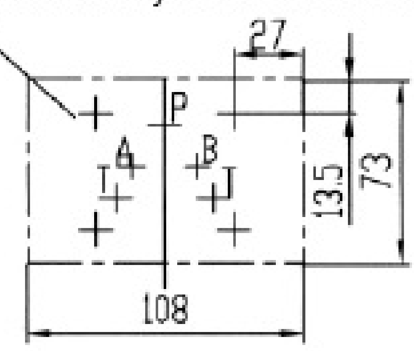
Unit dimensions: Type 4WEH 10... **(Dimensions in mm)**



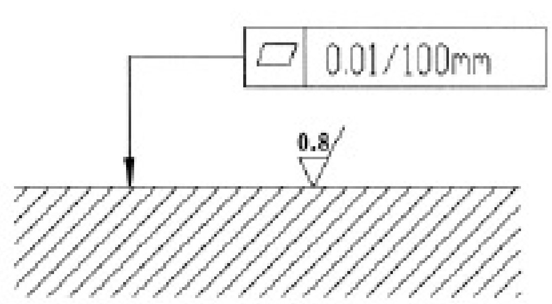




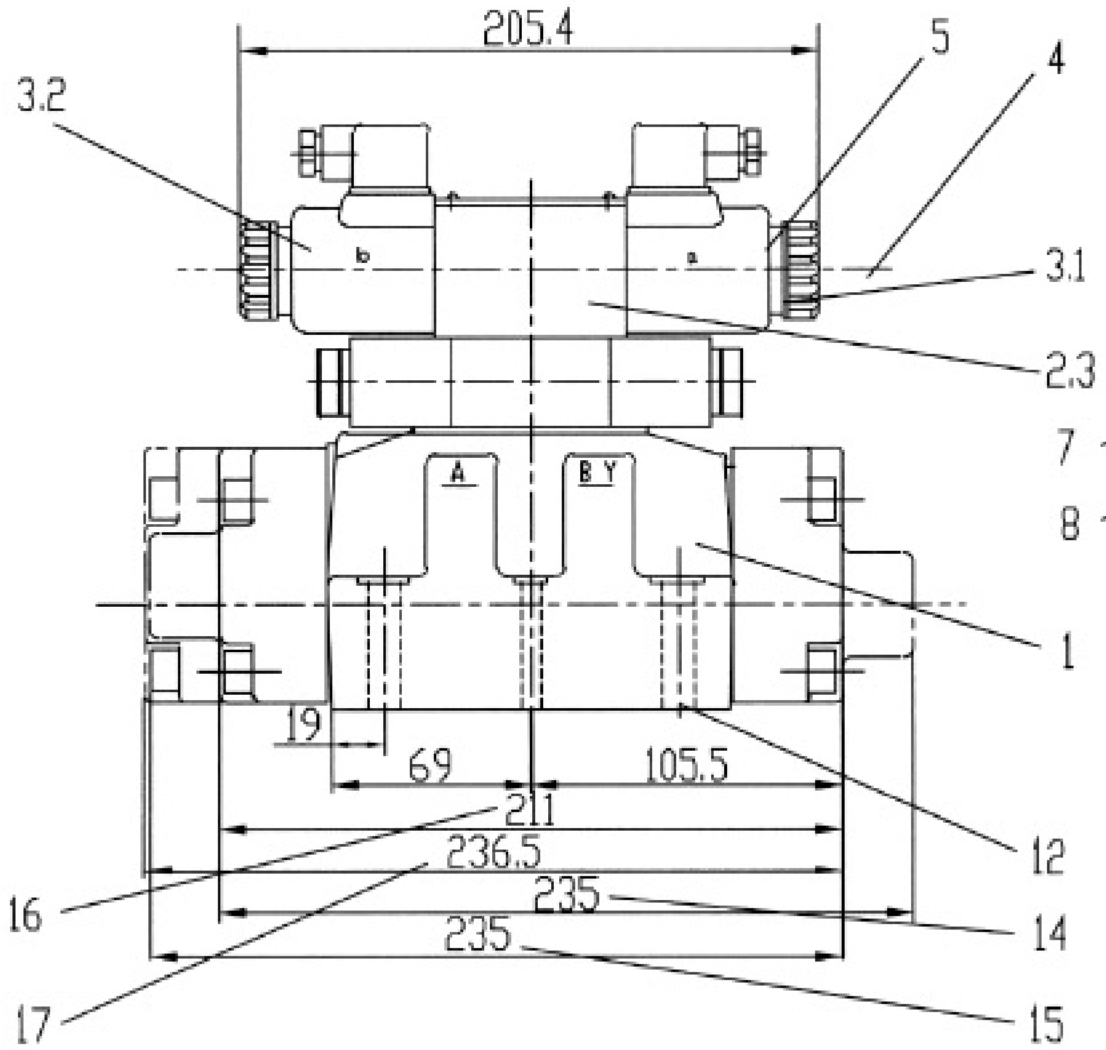
Dimension of ports' connective face is same as style:WEH10...20/

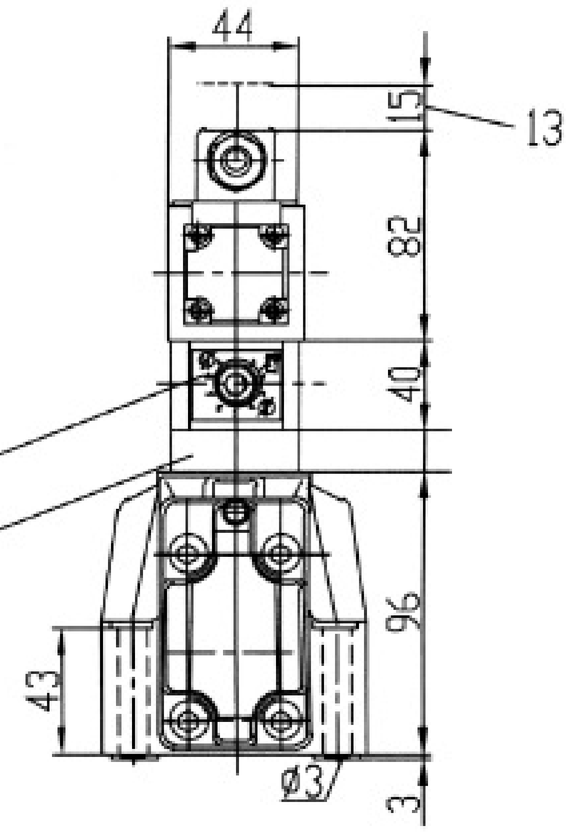


Subplate
G 534/01 (G 3/4˝), —— without port X, Y
G 535/01 (G 3/4˝), > with port X, Y
G 536/01 (G 1˝)
Valve fixing screws 4- M6 × 45 -10.9
(GB/T70.1-2000)
M_A = 15.5 Nm
must be ordered separately.
For items list, see page 206,207.

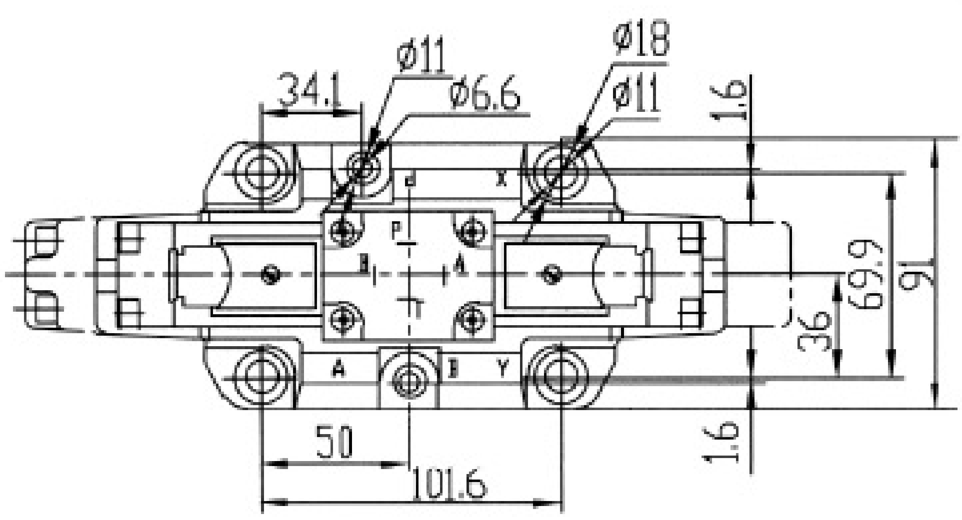


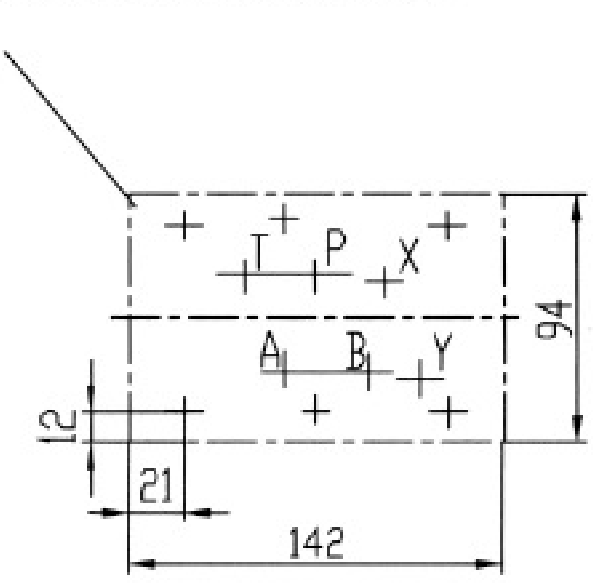
Required surface finish of the mating piece





Dimension of ports' connective face is same as style:WEH16...50/





Subplates

G 172/01 (G 3/4˝), G 172/02 (M27 x 2),

G 174/01 (G 1˝), G 174/02 (M33 x 2), G 174/08 (flange)

Valve fixing screws

4 - M10 x 60-10.9（GB/T70.1-2000）

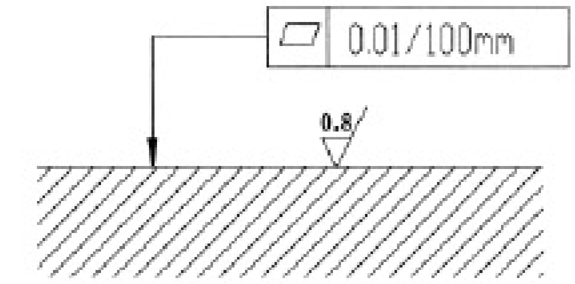
M_A = 75 Nm

2 - M6 x 60-10.9（GB/T70.1-2000）

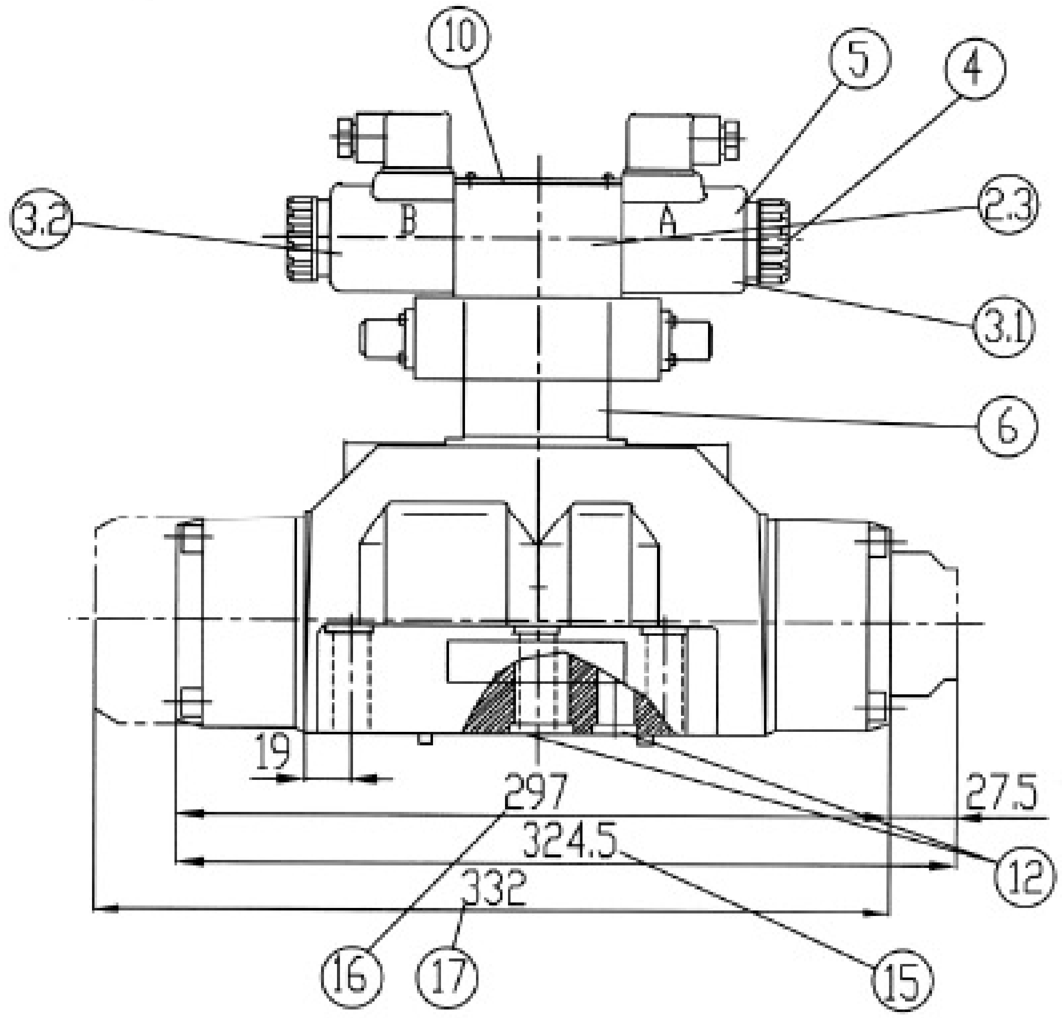
M_A = 15.5 Nm

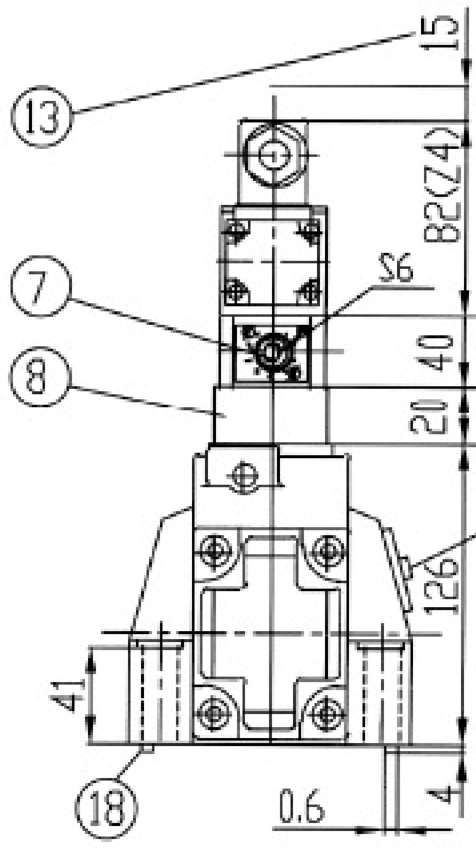
must be ordered separately.

For items list, see page 207,208.

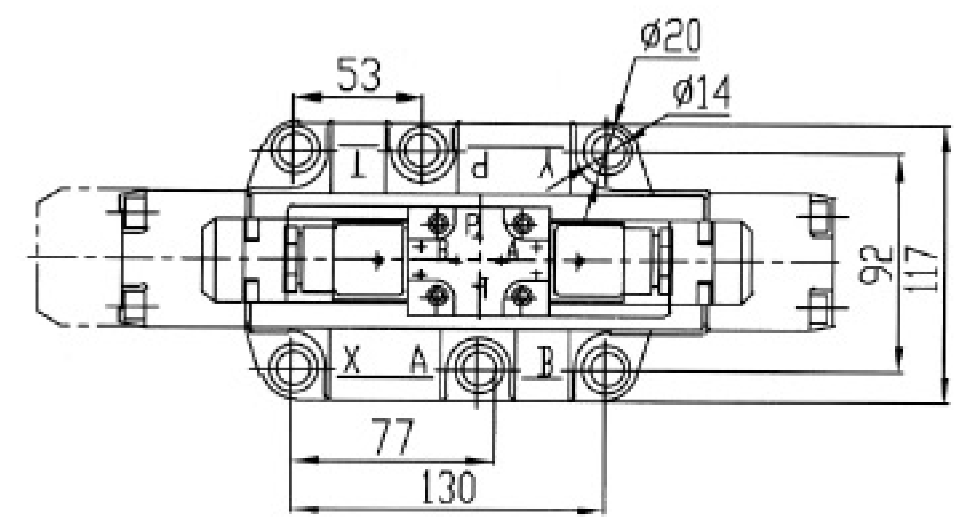


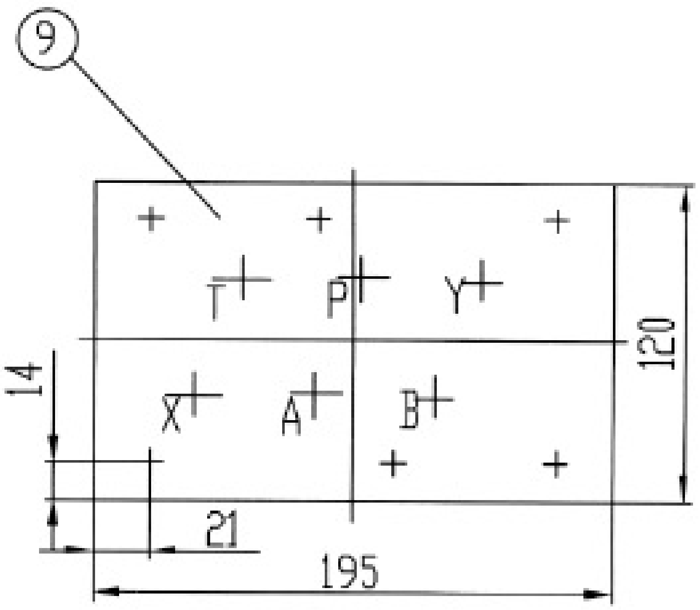
Required surface finish of the mating piece



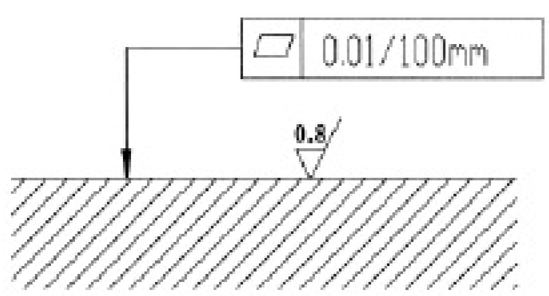


dimension of ports connective flate is the same as style:WEH25...50/



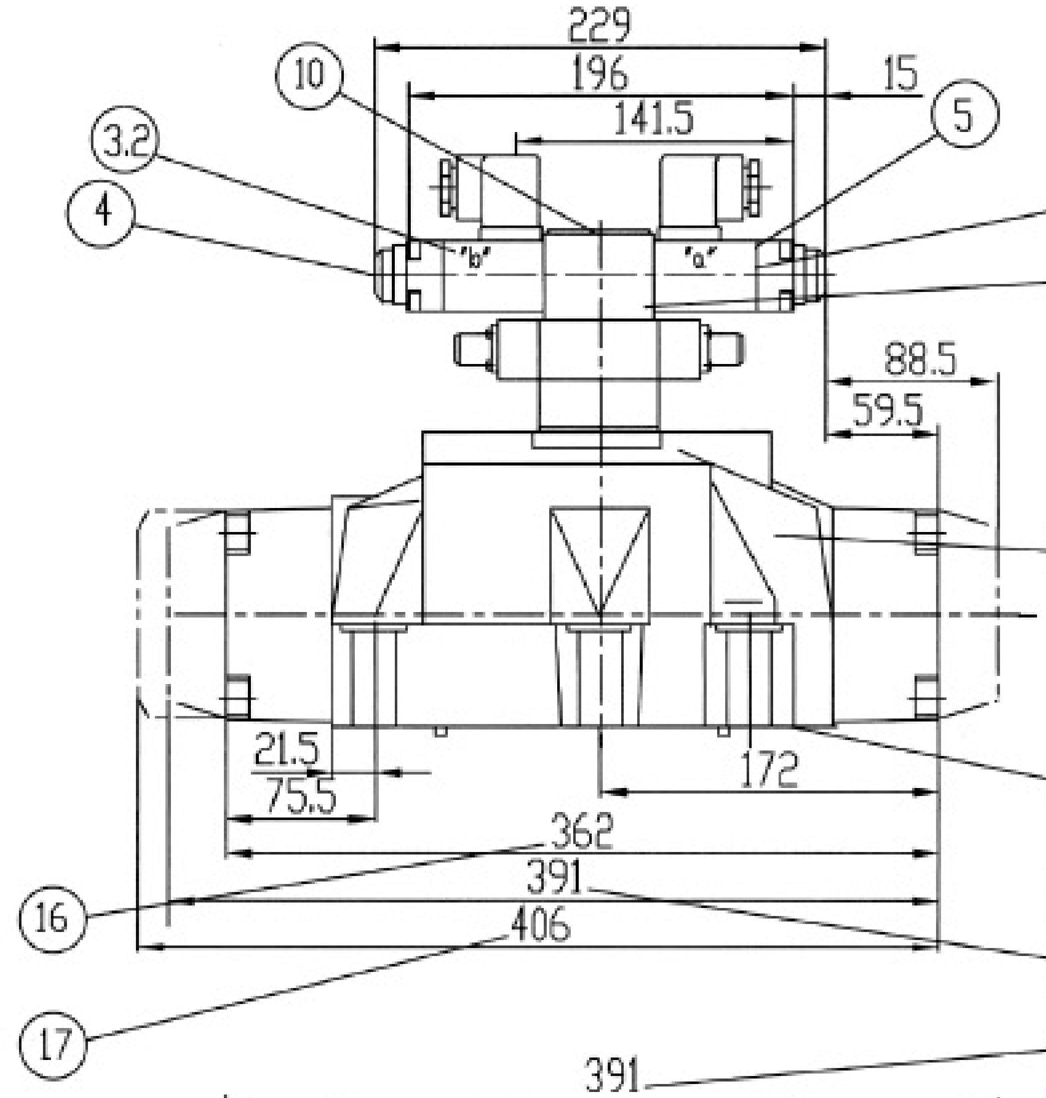


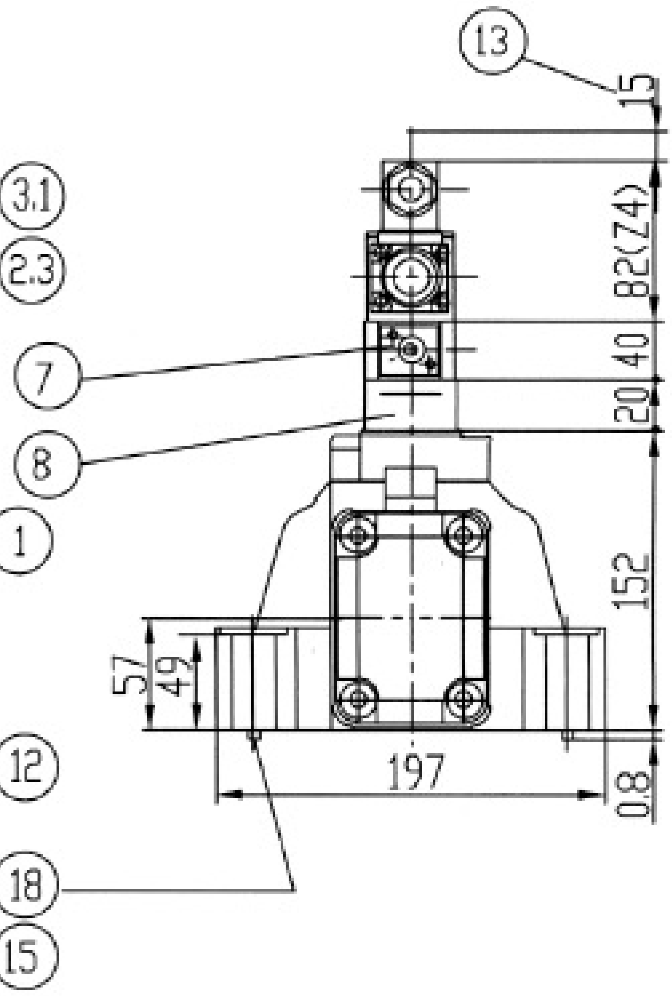
Subplates
G 151/01 (G 1¨),
G 153/01 (G 1¨), for valves with pressure-centred neutral position
G 154/01 (G 1 1/4¨), G 154/08 (flange)
G 156/01 (G 1 1/2¨)
Valve fixing screws
6 - M12 x 60 -10.9 （GB/T70.1-2000）
M_A = 130 Nm
must be ordered separately.
For items list, see page 209,210.



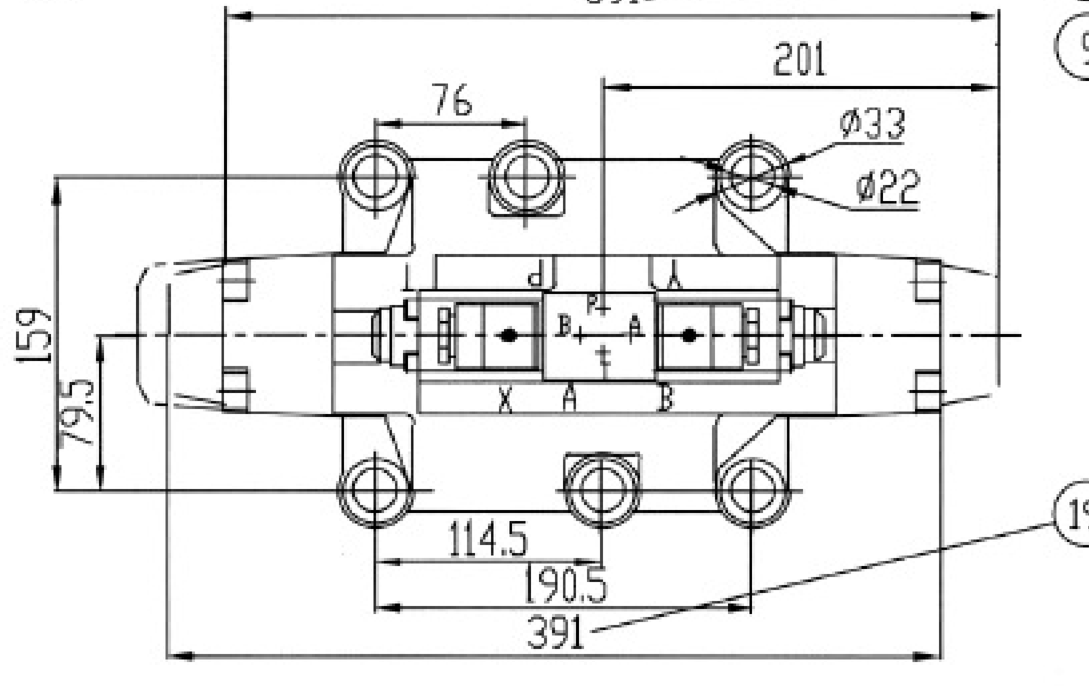
Required surface finish of the mating piece

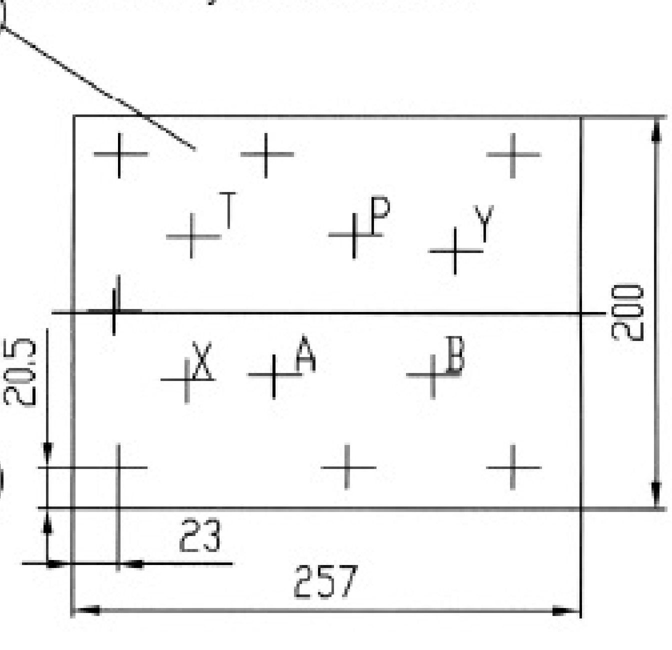
Unit dimensions: Type 4WEH 32... **(Dimensions in mm)**



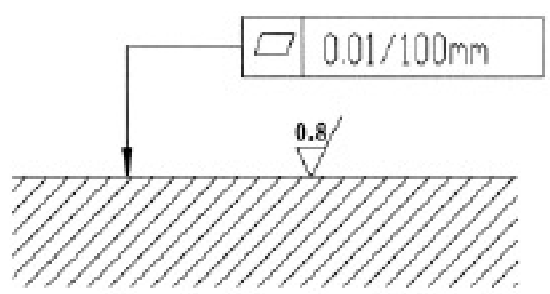


Dimension of ports' connective face is same as style:WEH32...50/





Subplates
G 157/01 (G 1 1/2"),
G 157/02 (M48 x 2),
G 158/10 (flange)
Valve fixing screws
6 - M20 x 80-10.9 (GB/T70.1-2000)
M_A = 430 Nm
must be ordered separately.
For items list, see page 210,211



Required surface finish of the mating piece

List of items：

1 Main valve

2 Pilot valve type 4WE 6 ...

2.1 · Pilot valve type 4WE 6 D(1 solenoid) for main valves with spools C, D, K, Z
spools HC, HD, HK, HZ
· Pilot valve type 4WE 6 J...(1 solenoid "a") for main valves with spools EA, FA, etc., spring return
· Pilot valve type 4WE 6 M...(1 solenoid "a") for main valves with spools HEA, HFA, etc., hydraulic spool return

2.2 · Pilot valve type 4WE 6 Y...(1 solenoid) for main valves with spool Y spool HY
· Pilot valve type 4WE 6 J...(1 solenoid "b") for main valves with spools EB, FB, etc.,spring return
· Pilot valve type 4WE 6 M...(1 solenoid "b") for main valves with spools HEB, HFB, etc., hydraulic spool return

2.3 · Pilot valve type 4WE 6 J...(2 solenoids) for main valves with 3 positions, spring-centred
· Pilot valve type 4WE 6 M...(2 solenoids) for main valves with 3 positions, pressure-centred

3.1 Solenoid "a" (grey plug-in connector)

3.2 Solenoid "b" (black plug-in connector)

4 Manual override "N", optional

- The manual override can only be operated up to a tank pressure of up to approx. 5MPa.
Take care not to damage the manual override bore!

5 Solenoid without manual override

6 Height of the connector plate for hydraulic operation (type 4WH...)

7 Shifting time adjustment (A/F 6), optional

8 Pressure reducing valve, optional

9 Machined valve mounting surface, position of ports

10 Nameplate for the pilot valve

11 Nameplate for the entire valve

12 O-rings

13 Space required to remove the plug-in connector

14 2-position valves with spring offset in the main valve (C, D, K, Z)

15 2-position valves with spring offset in the main valve (Y)

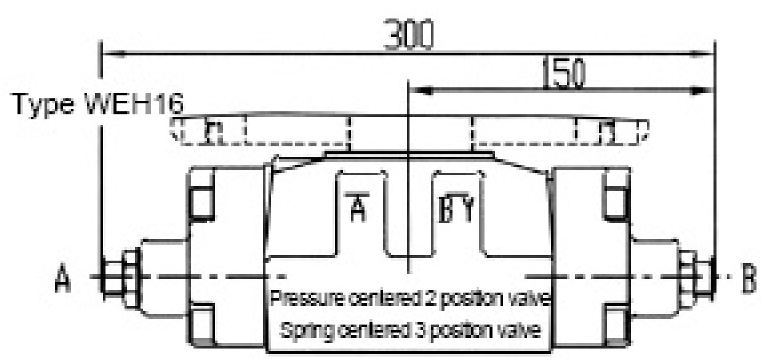
16 3-position valves, spring-centred;
2-position valves with hydraulic offset in the main valve

17 3-position valves, pressure-centred

18 Locating pin

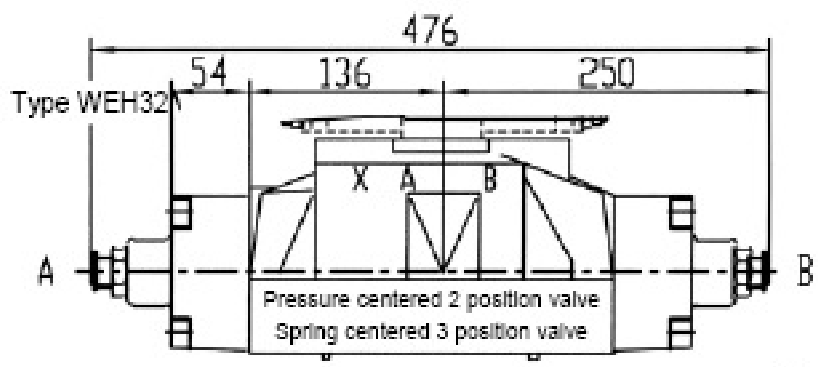
O-Ring uesd at the bottom of the housing:

Order no.	A、B、P、T	X、Y、L
10	12 × 2	10.82 × 1.78
16	22 × 2.5	10 × 2
25	27 × 3	19 × 3
32	42 × 2	12 × 2



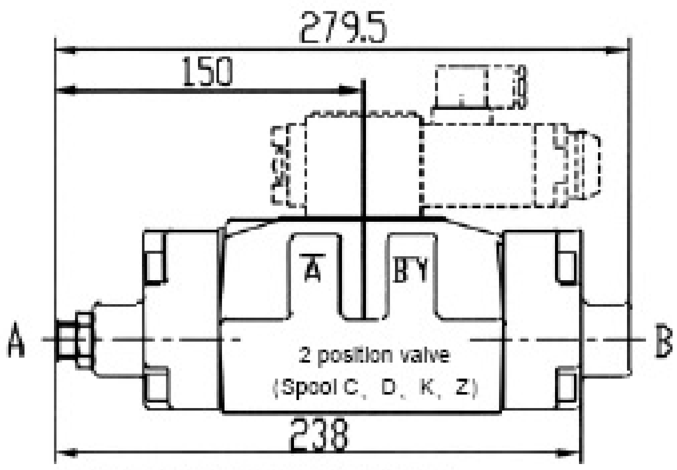
Stroke limiter on main valve sides A and B

Stroke limiter on valve side A
Stroke limiter on valve side B

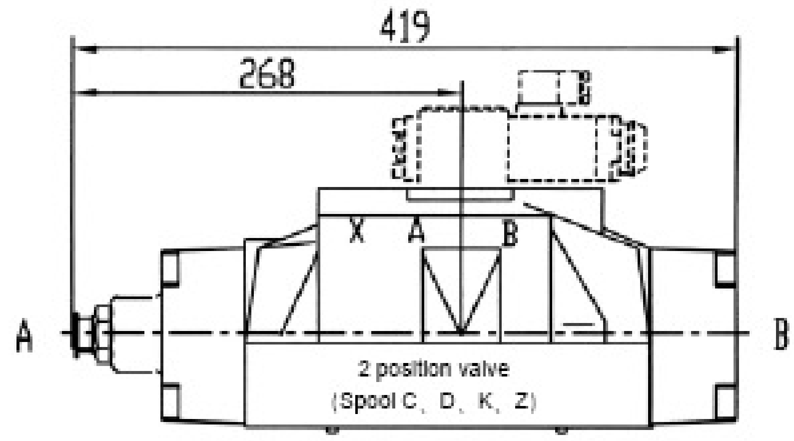


Stroke limiter on main valve sides A and B

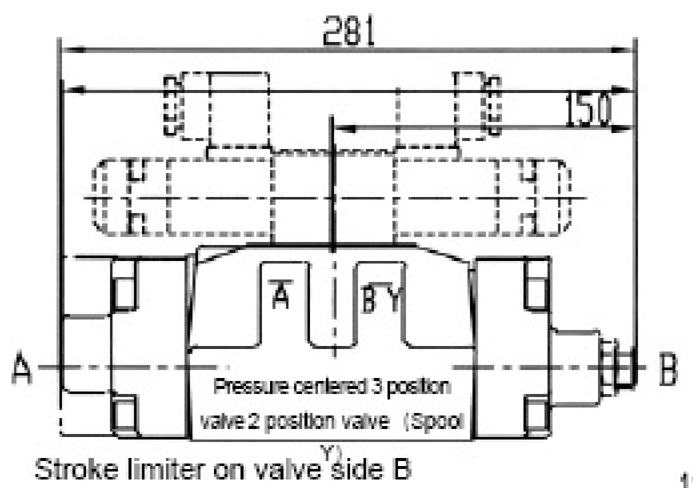
Stroke limiter on valve side A 11
Stroke limiter on valve side B 12



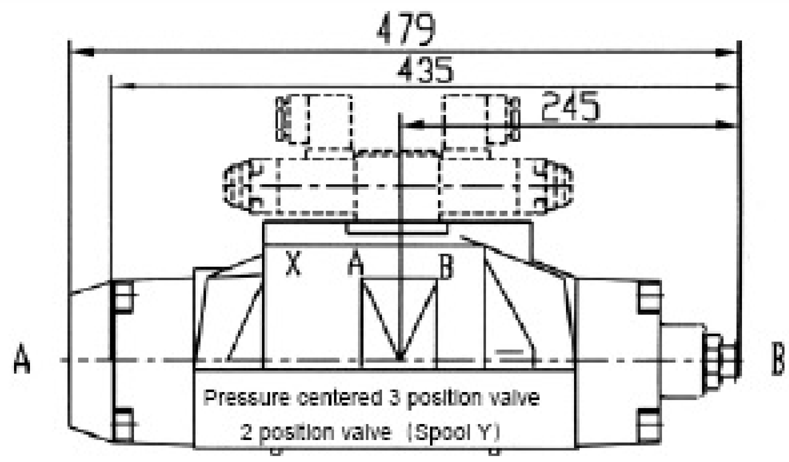
Stroke limiter on valve side A 11



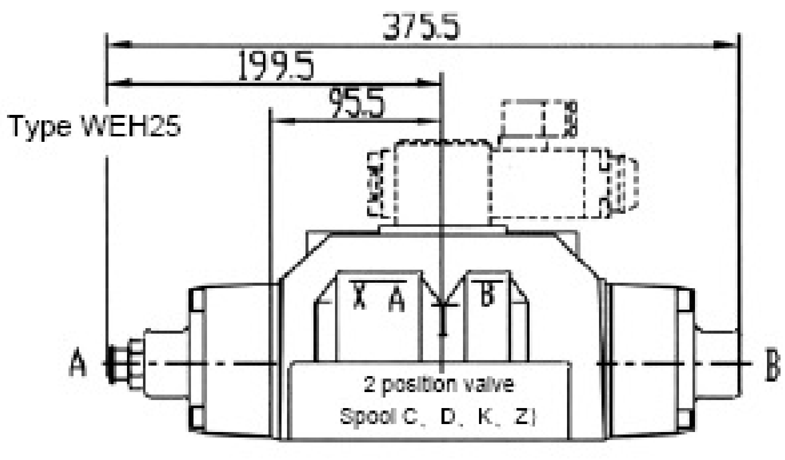
Stroke limiter on valve side A 11



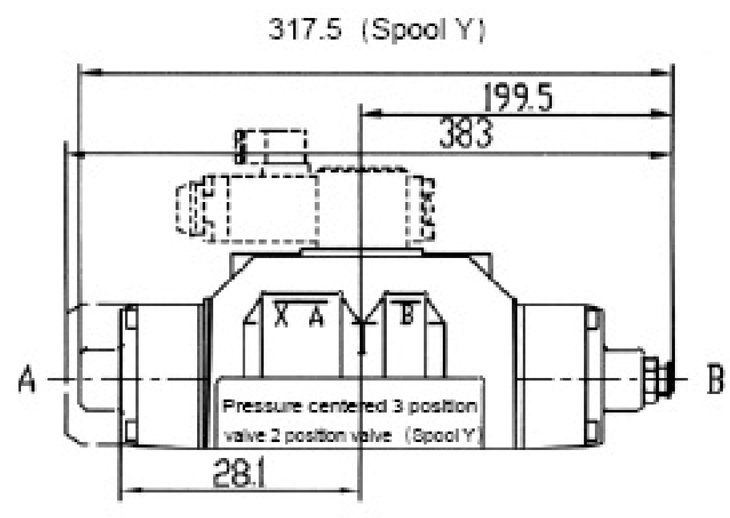
Stroke limiter on valve side B 12



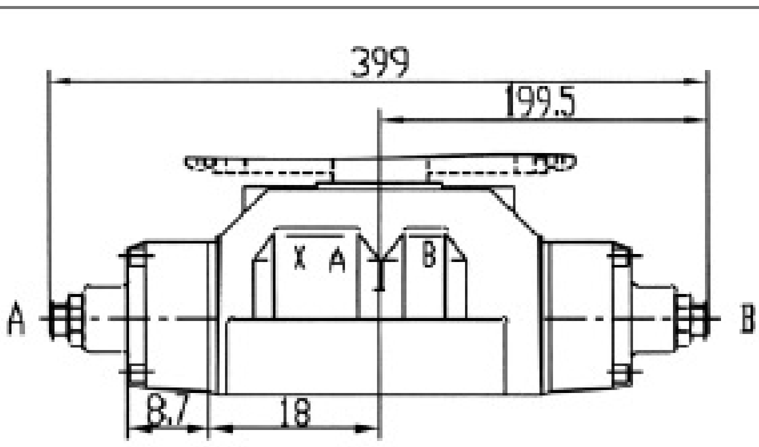
Stroke limiter on valve side B 12



Stroke limiter on valve side A 11



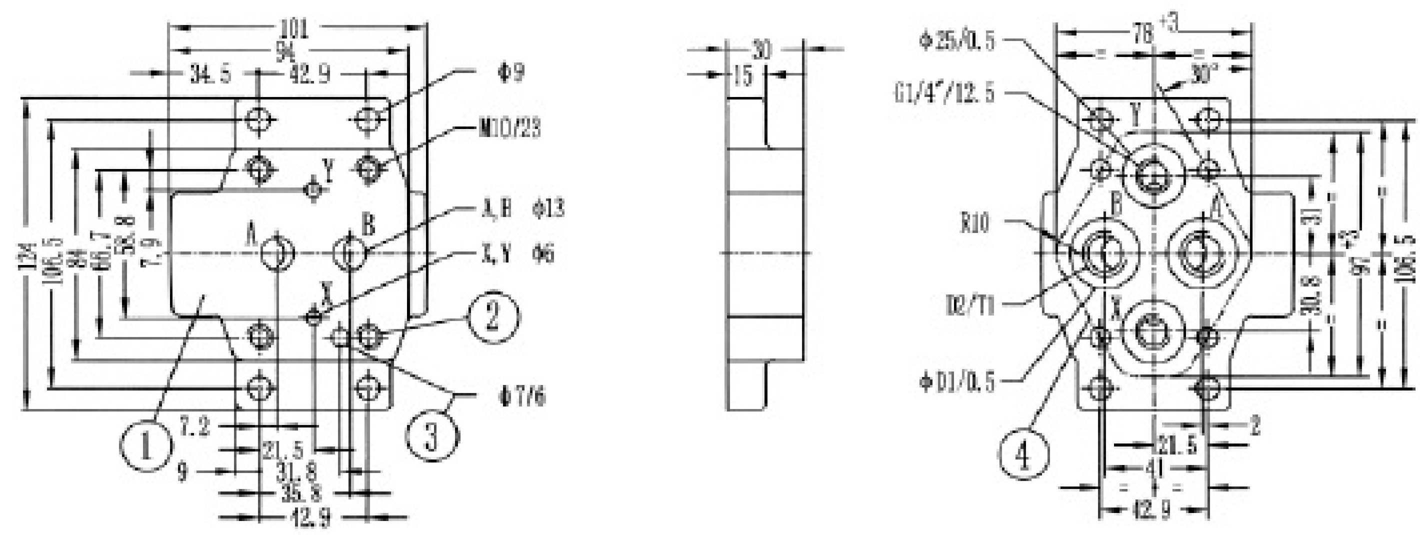
Stroke limiter on valve side B



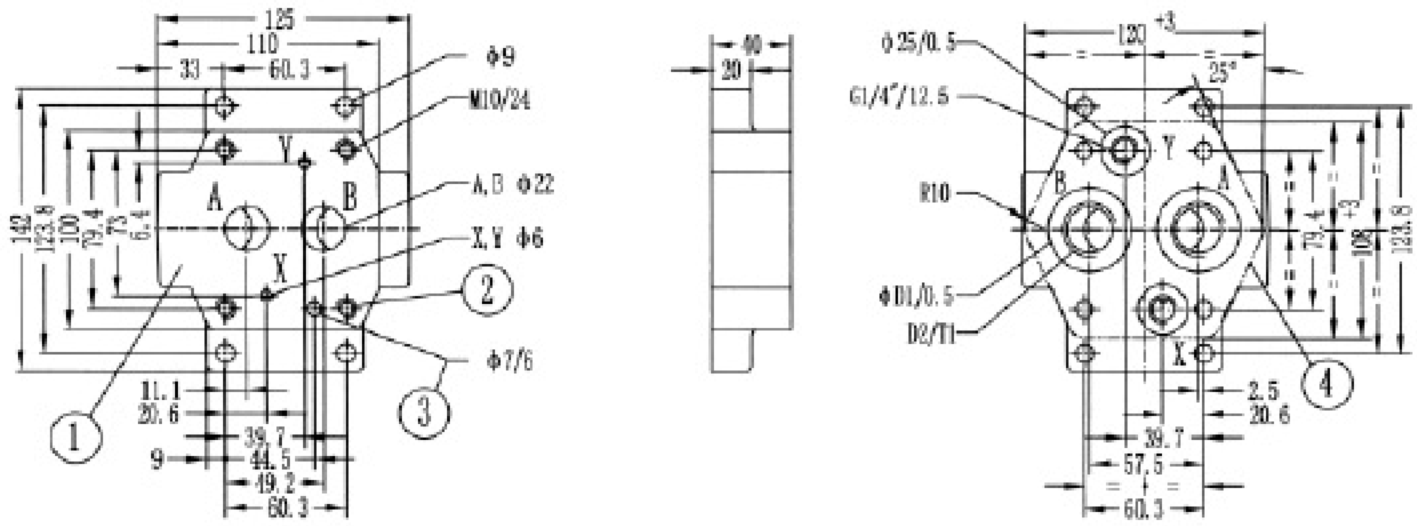
Stroke limiter on main valve sides A and B

Stroke limiter on valve side A
Stroke limiter on valve side B

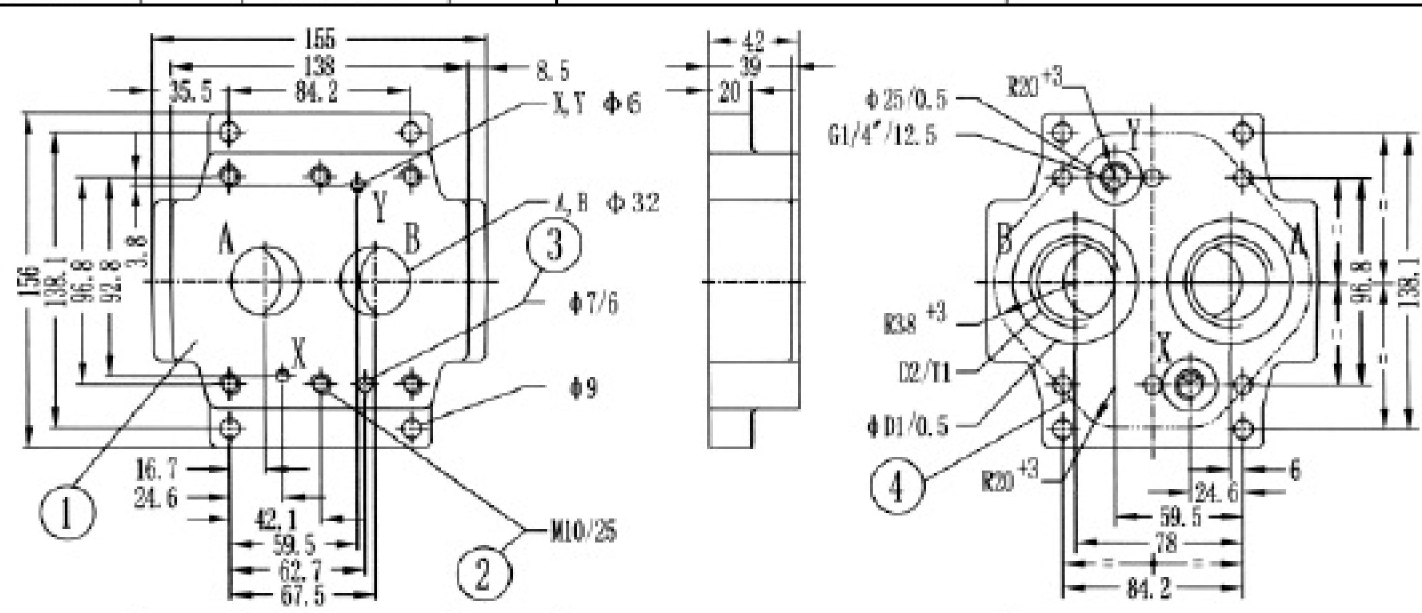
Subplates



Size	Type	D1	D2	T1	Valve fixing screws	Tightening torque for screws	Weight
NG10	G460/01	28	G3/8"	13	4 - M10 × 40 -10.9 (GB/T70.1-2000)	69Nm	1.7kg
	G460/02		M18 × 1.5				
	G461/01	34	G1/2"	16			
	G461/02		M22 × 1.5				



Size	Type	D1	D2	T1	Valve fixing screws	Tightening torque for screws	Weight
NG25	G412/01	42	G3/4"	17	4 - M10 × 50 -10.9 (GB/T70.1-2000)	69Nm	3.3kg
	G412/02		M27 × 2				
	G413/01	47	G1"	20			
	G413/02		M33 × 2				

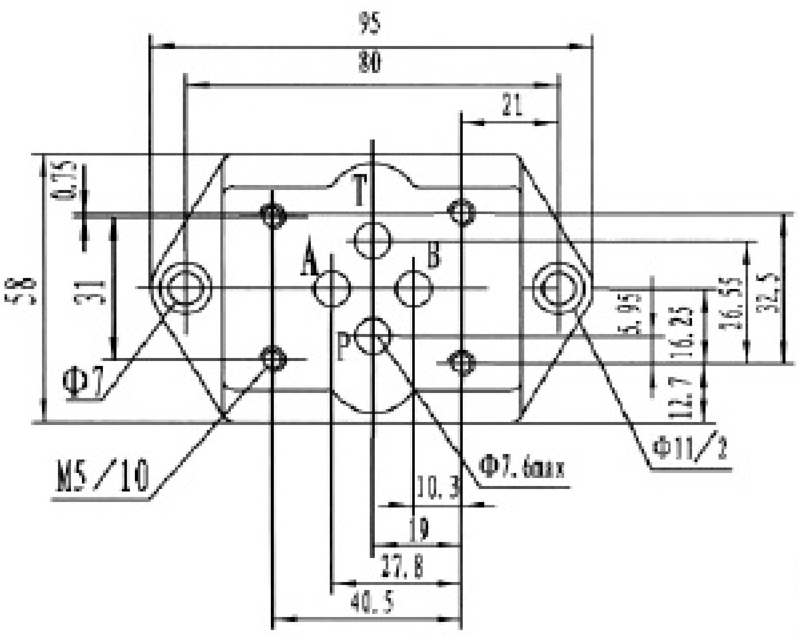


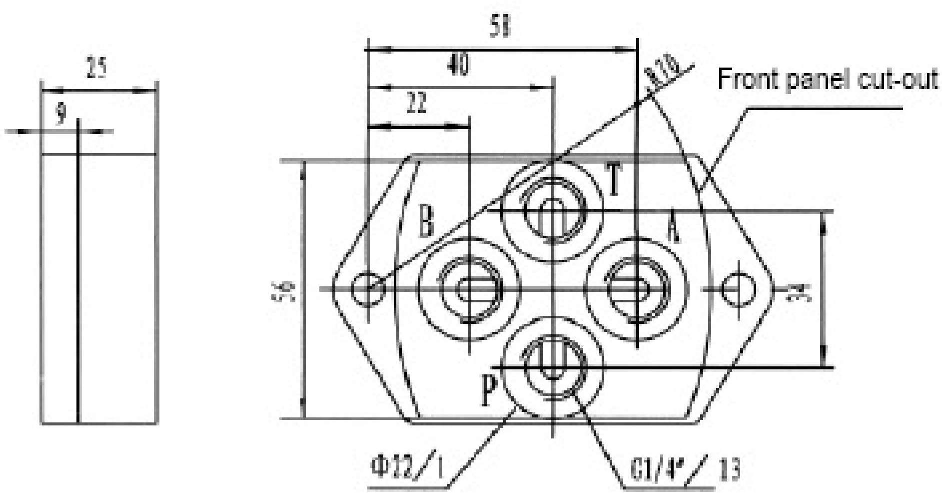
Size	Type	D1	D2	T1	Valve fixing screws	Tightening torque for screws	Weight
NG32	G414/01	56	G1 1/4"	20.5	6 - M10 × 60 -10.9 (GB/T70.1-2000)	69Nm	5kg
	G414/02		M42 × 2				
	G415/01	61	G1 1/2"	22.5			
	G415/02		M48 × 2				

1 mating piece of valve 2 Valve fixing screws 3 locating pin 4 Front panel cut-out

Subplates

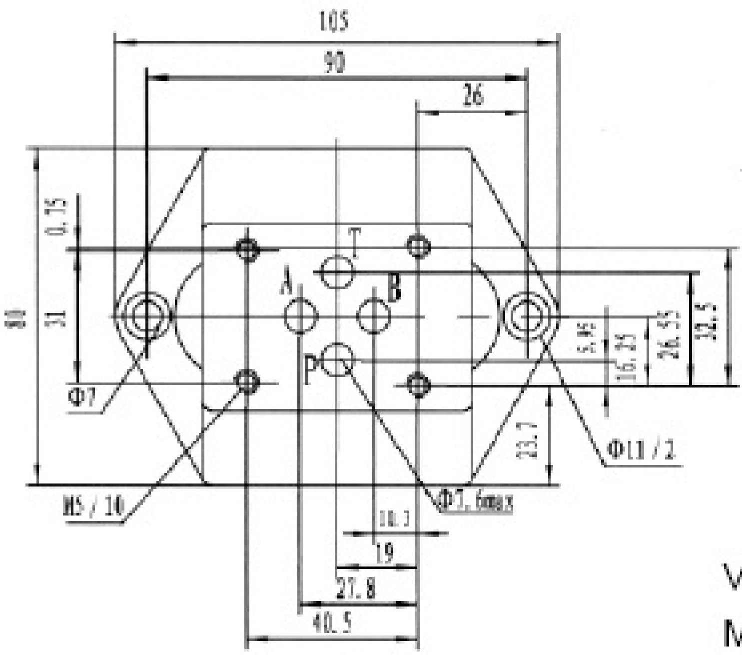
G341/01（G1/4″） G341/02（M14x1.5） Weight ≈ 0.6kg **(Dimensions in mm)**

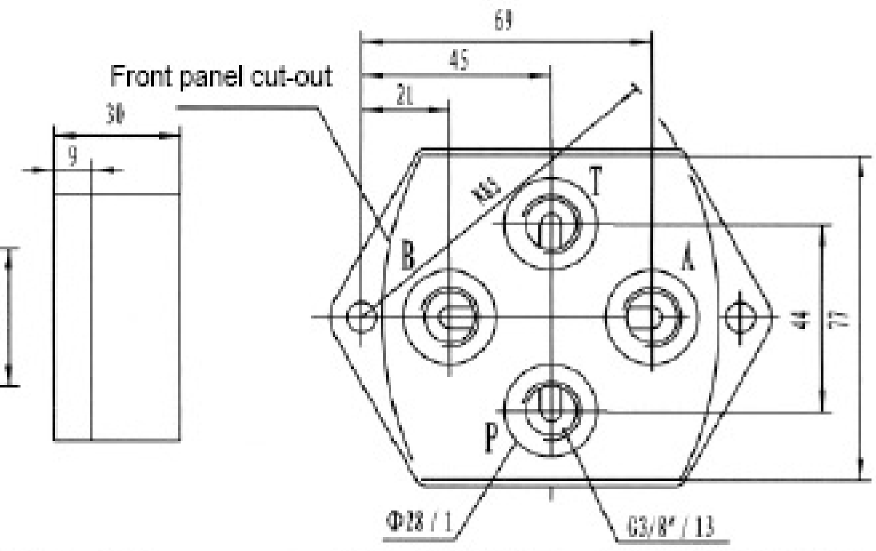




Valve fixing screws, M5 x 50 -10.9（GB/T70.1-2000），
M_A = 9 Nm

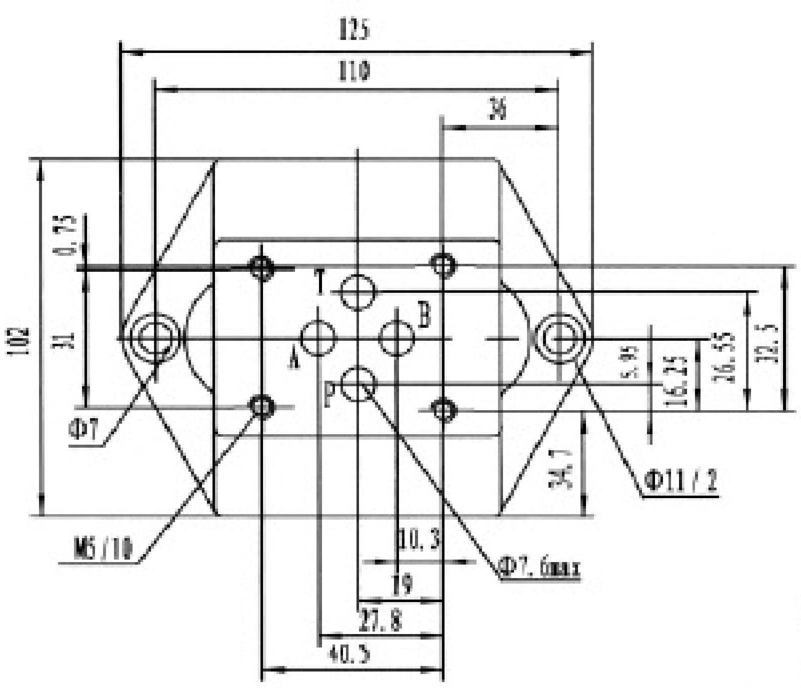
G342/01（G3/8″） G342/02（M18x1.5） Weight ≈ 1.1kg **(Dimensions in mm)**

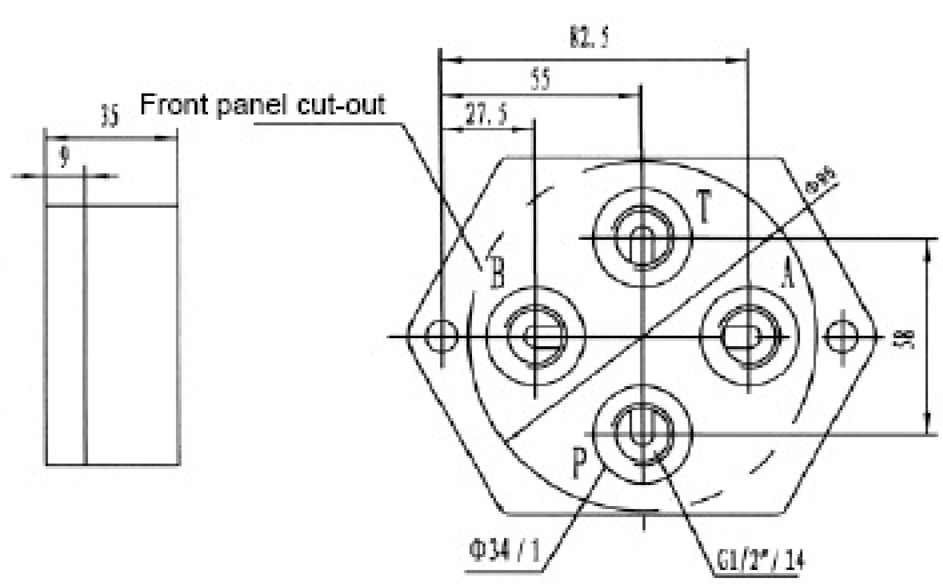




Valve fixing screws, M5 x 50 -10.9（GB/T70.1-2000），
M_A = 9 Nm

G502/01（G1/2″） G502/02（M22x1.5） Weight ≈ 1.9kg **(Dimensions in mm)**

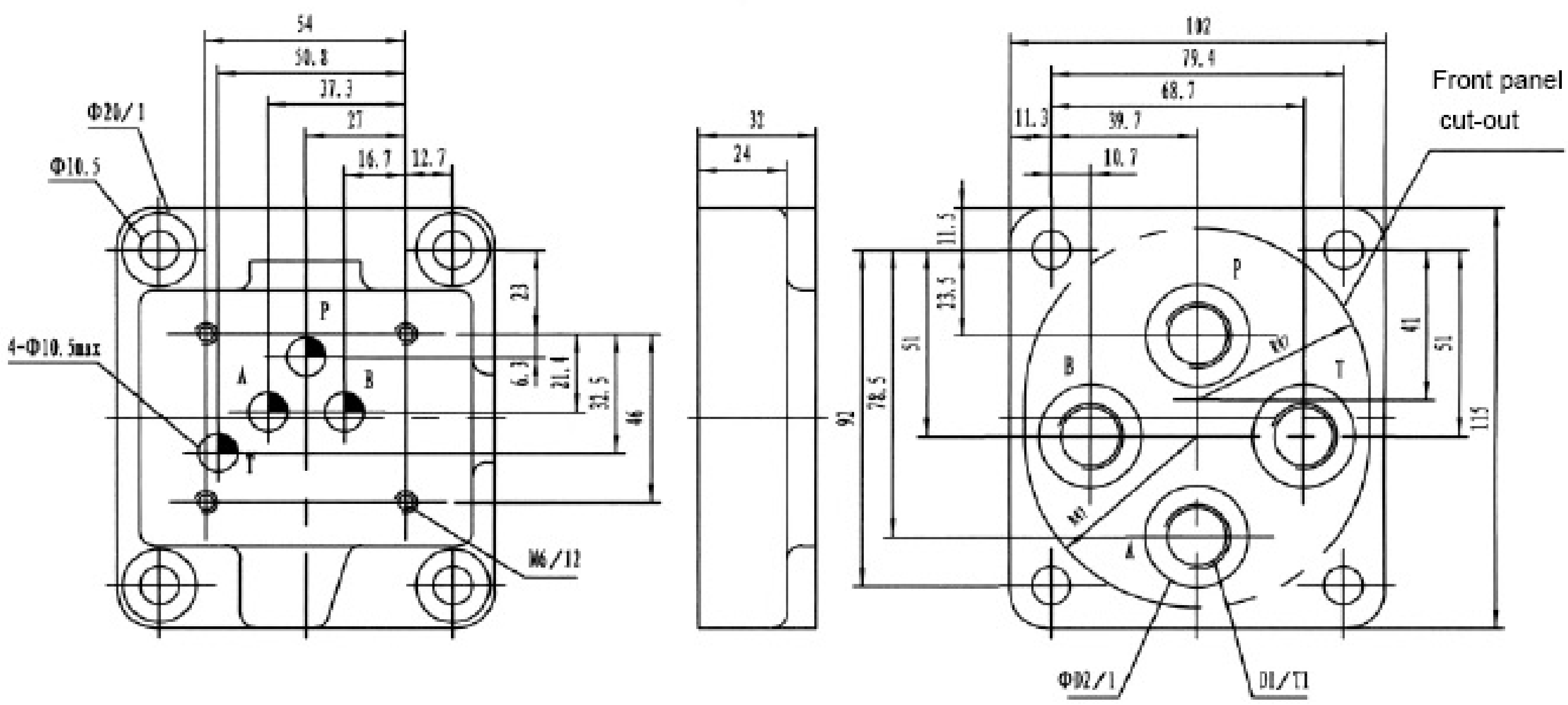




Valve fixing screws, M5 x 50 -10.9（GB/T70.1-2000），
M_A = 9 Nm

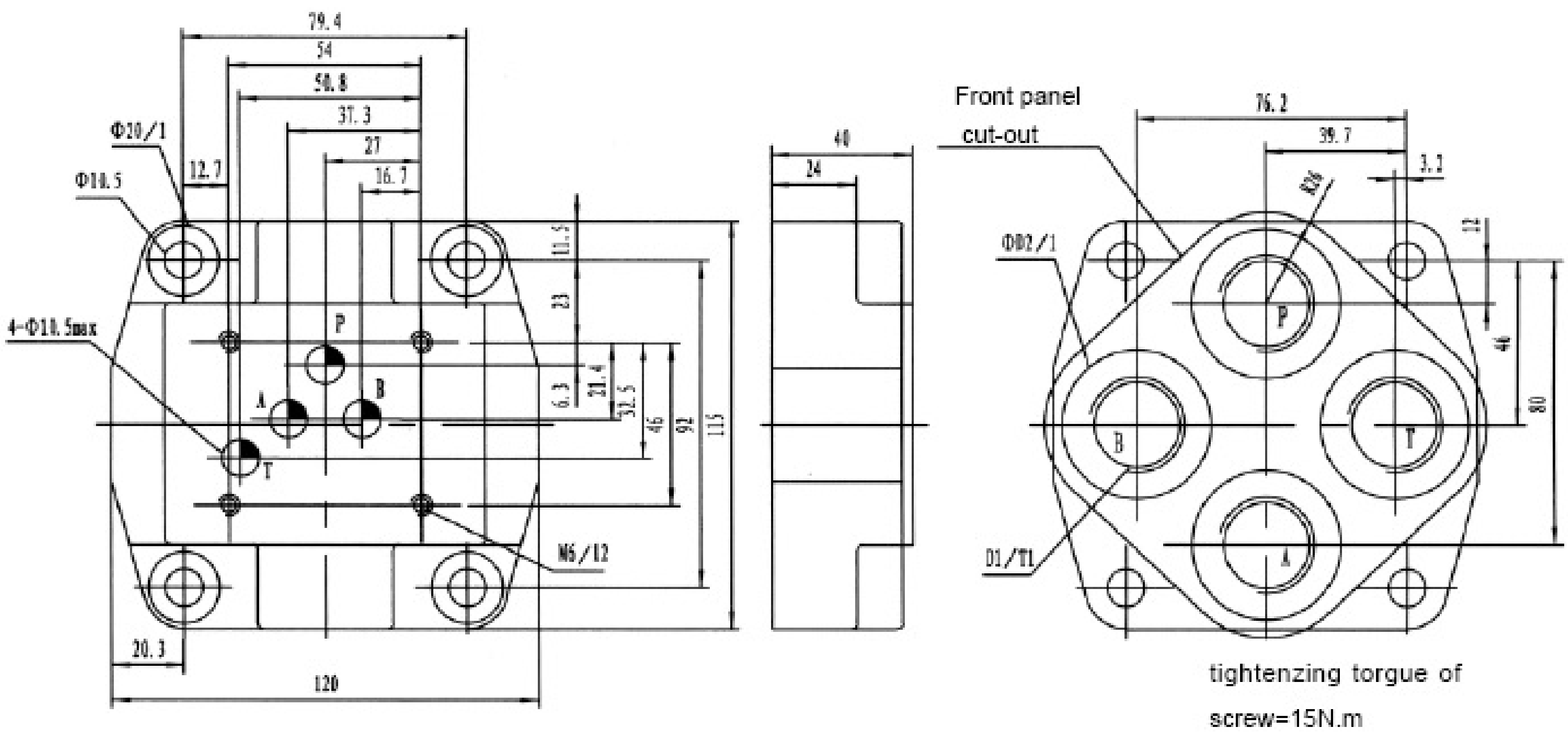
Subplates

G66/01 G66/02 G67/01 G67/02 (Dimensions in mm)



Type	D1	T1	Φ D2	Weight	Valve fixing screws	Tightening torque for screws
G66/01	G3/8"	12	28	approx. 2.3Kg	4 - M6 × 50 -10.9 (GB/T70.1-2000), Should be ordered seperately.	15N.m
G66/02	M18x1.5					
G67/01	G1/2"	14	34			
G67/02	M22x1.5					

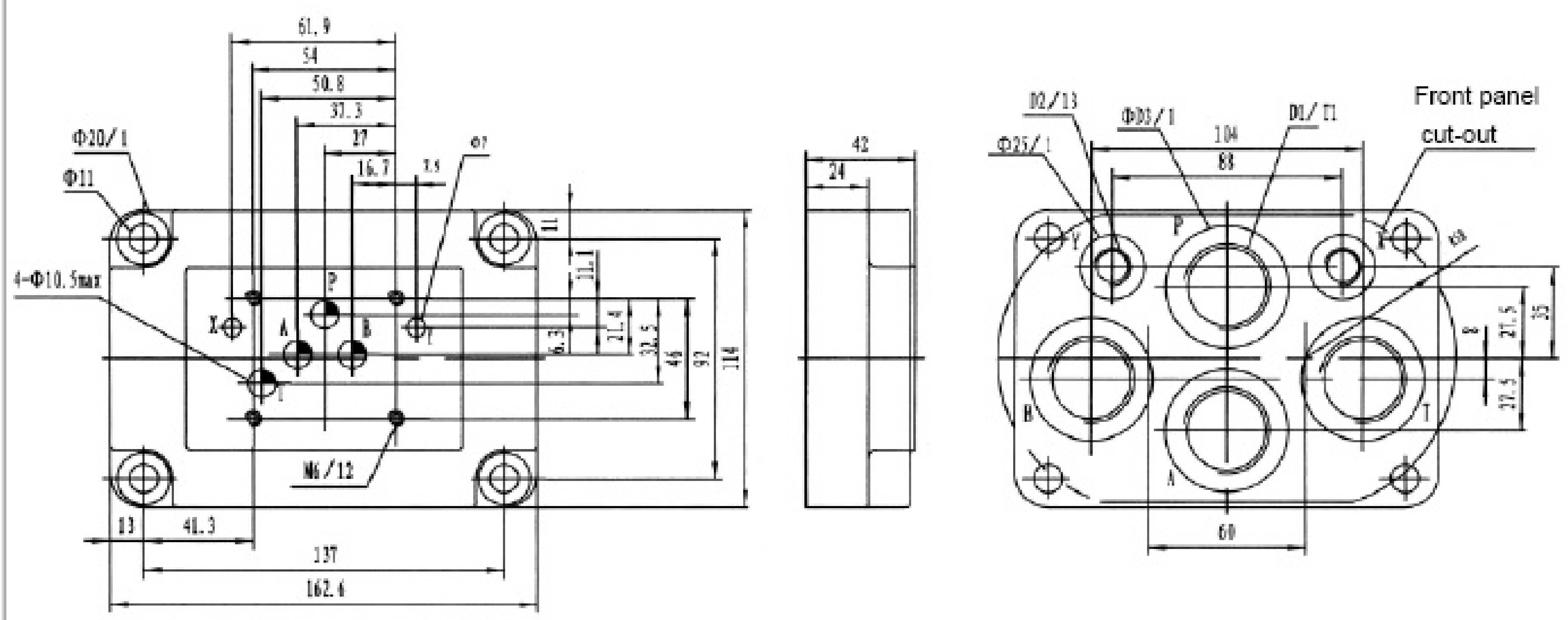
G534/01 G534/02 (Dimensions in mm)



Type	D1	T1	Φ D2	Weight	Valve fixing screws	Tightening torque for screws
G534/01	G3/4"	17	42	approx. 2.5Kg	4 - M6 × 50-10.9 (GB/T70.1-2000), Should be ordered seperately.	15N.m
G534/02	M27x2					

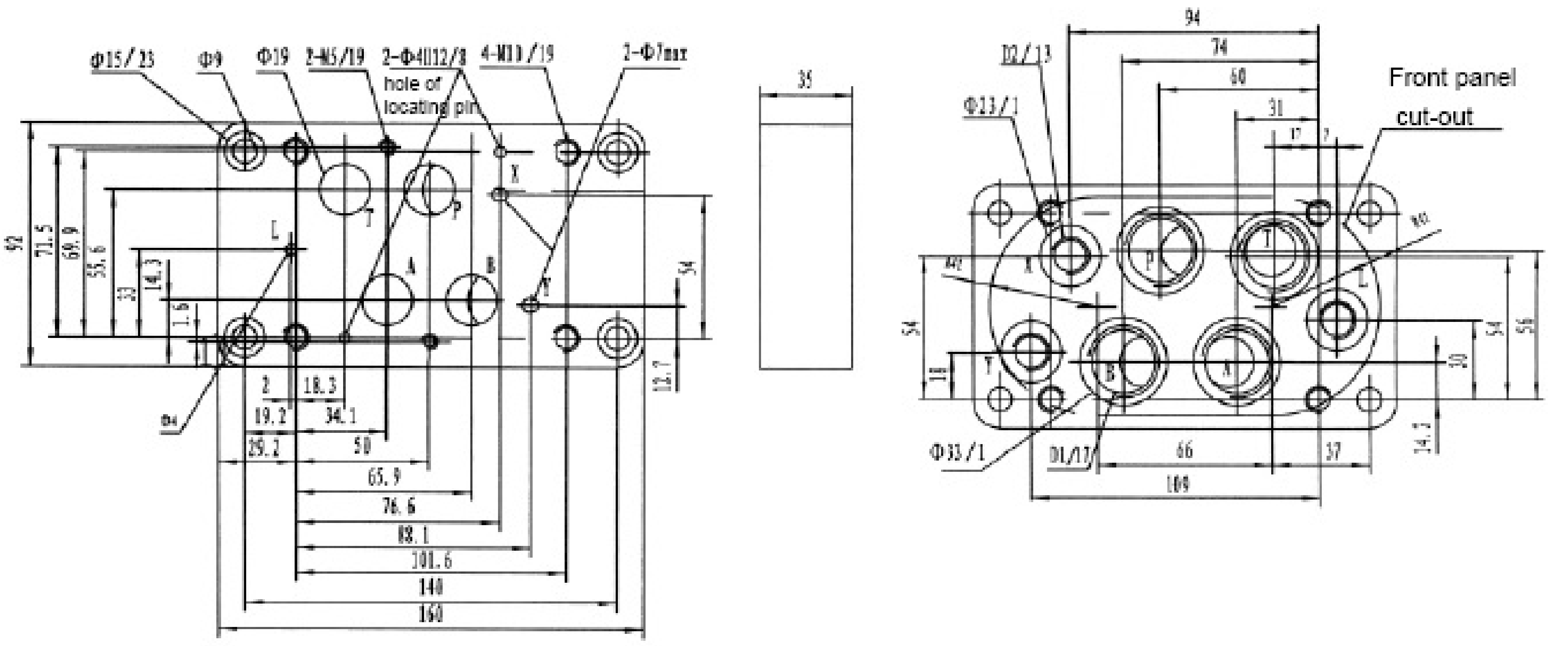
Subplates

G535/01 G535/02 G536/01 G536/02 (Dimensions in mm)



Type	D1	T1	D2	ϕ D3	Weight	Valve fixing screws	Tightening torque for screws
G535/01	G3/4″	16	G1/4″	42	approx. 3.6Kg	4 - M6 × 45 -10.9 (GB/T70.1-2000) Should be ordered seperately.	15N.m
G535/02	M27x2		M14x1.5				
G536/01	G1″	18	G1/4″	47			
G536/02	M33x2		M14x1.5				

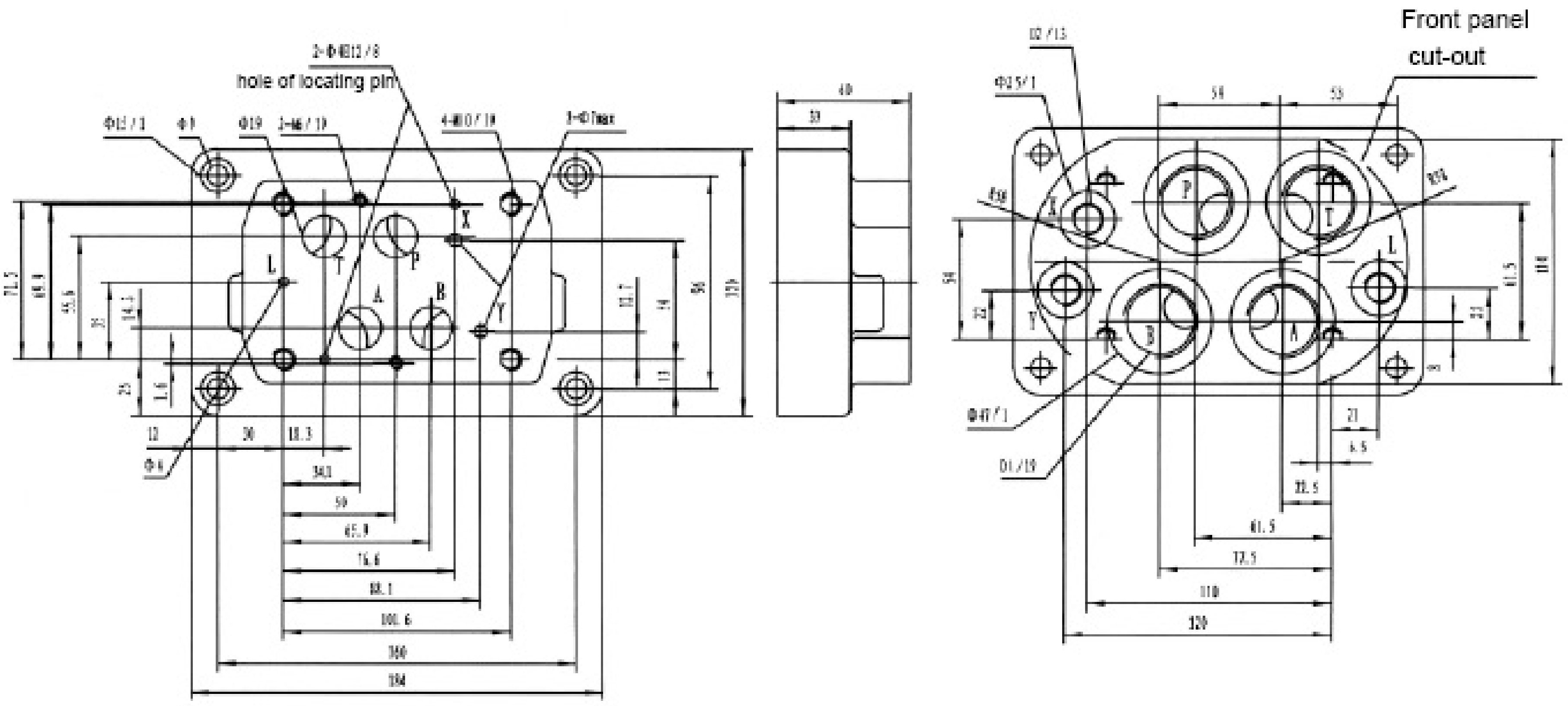
G172/01 G172/02 (Dimensions in mm)



Type	D1	D2	Weight	Valve fixing screws	Tightening torque for screws
G172/01	G3/4″	G1/4″	approx. 2.8kg	4 - M10 × 60 -10.9 (GB/T70.1-2000),Should be ordered seperately.	62N.m
G172/02	M27x2	M14x1.5		2 - M6 × 60 –10.9 (GB/T70.1-2000),Should be ordered seperately.	12.5N.m

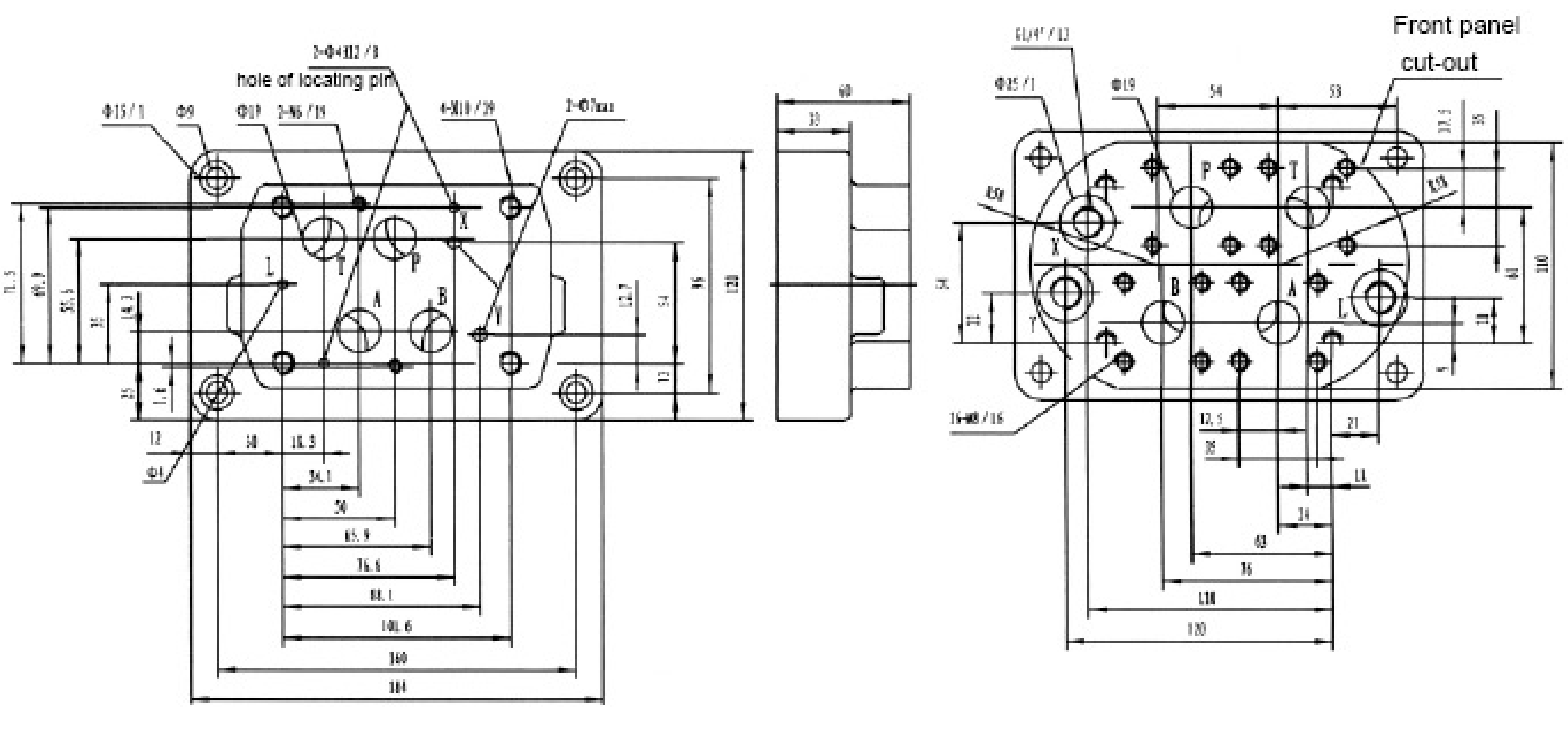
Subplates

G174/01 G174/02 (Dimensions in mm)



Type	D1	D2	Weight	Valve fixing screws	Tightening torque for screws
G174/01	G1″	G1/4″	approx.	4 - M10 × 60-10.9 (GB/T70.1-2000),Should be ordered seperately.	62N.m
G174/02	M33x2	M14x1.5	5.5kg	2 - M6 × 60-10.9 (GB/T70.1-2000),Should be ordered seperately.	12.5N.m

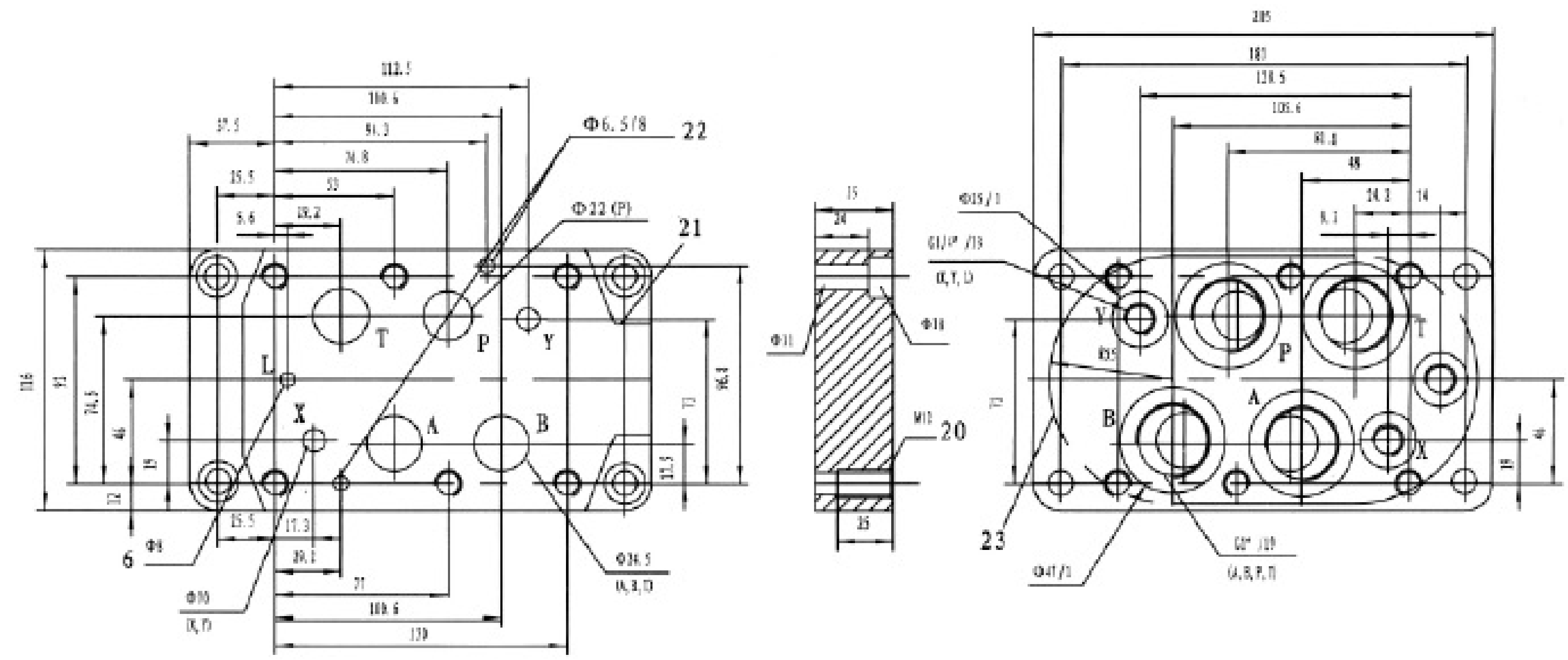
G174/08 (Dimensions in mm)



Type	Pressure	Type	Weight	Valve fixing screws	Tightening torque for screws
G174/08	25MPa	009 271	approx.	4 - M10 × 60-10.9 (GB/T70.1-2000),Should be ordered seperately.	62N.m
	40MPa	009 272	5.5kg	2 - M6 × 60-10.9 (GB/T70.1-2000),Should be ordered seperately.	12.5N.m

Subplates

G151/01(G1")G151/02(M33x2):G153/01(G1") G153/02(M33x2) (Dimensions in mm)

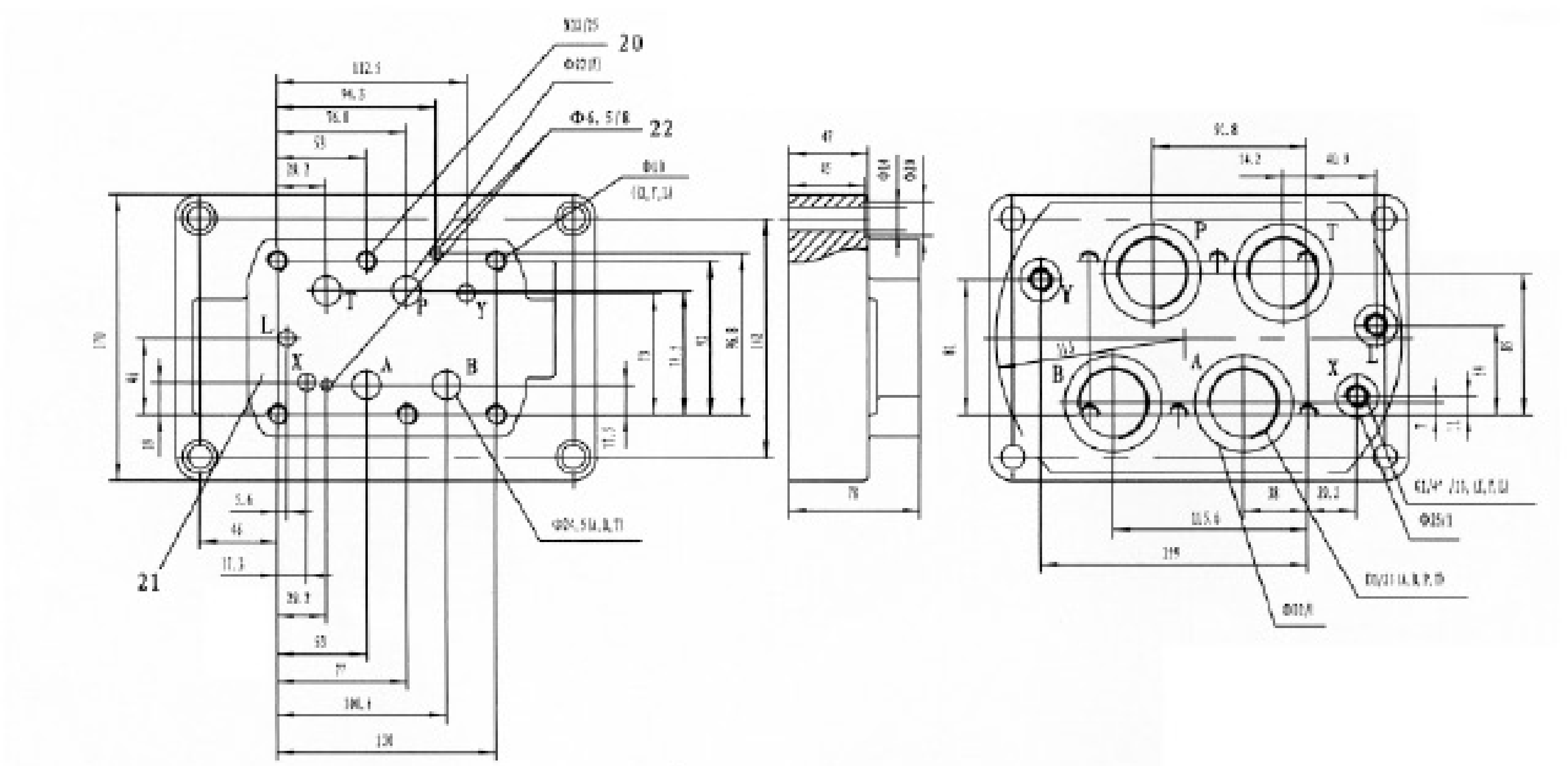


L of ϕ 8 only used on G153/01

Size	Type	Weight	Valve fixing screws	Tightening torque for screws
NG25	G151/01	5kg	6 - M12x60-10.9 (GB/T70.1-2000),	105Nm
	G151/02			
	G153/01			
	G153/02			

1) Only used on valves which are pressure-centred

G154/01(G11/4");G154/02(M42x2):G156/01 G156/02(M48x2) (Dimensions in mm)



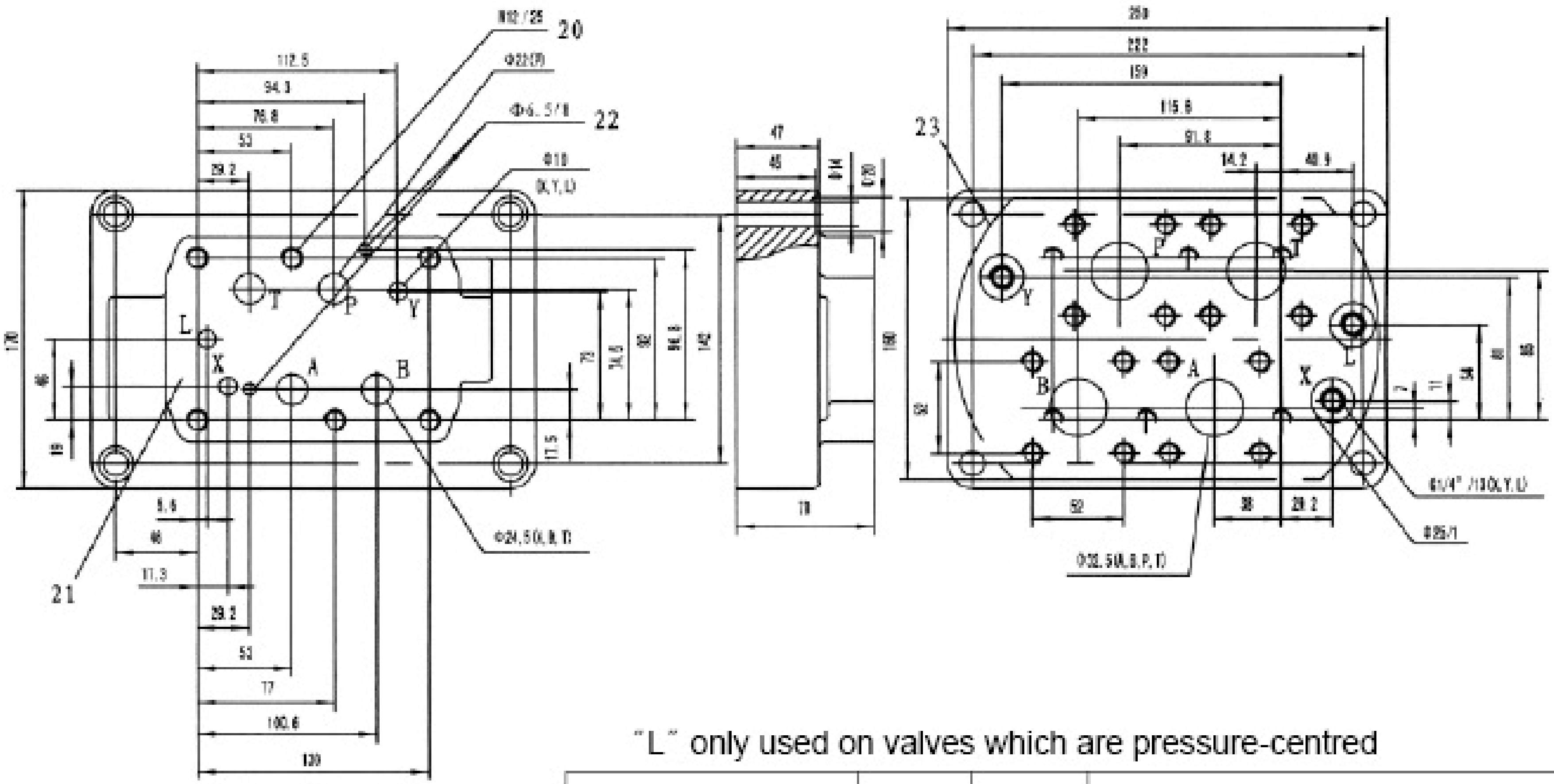
L only used on valves which are pressure-centred

Size	Type	Weight	D1	D2	Valve fixing screws	Tightening torque for screws
NG25	G154/01	5kg	G1 1/4"	58	6 - M12x60 -10.9 (GB/T70.1-2000)	105Nm
	G154/02		M42x2			
	G156/01		G1 1/2"	65		
	G156/02		M48x2			

20 Valve fixing screws 21 mating piece of valve 22 locating pin 23 Front panel cut-out

Subplates

G154/08 flange connection (Dimensions in mm)

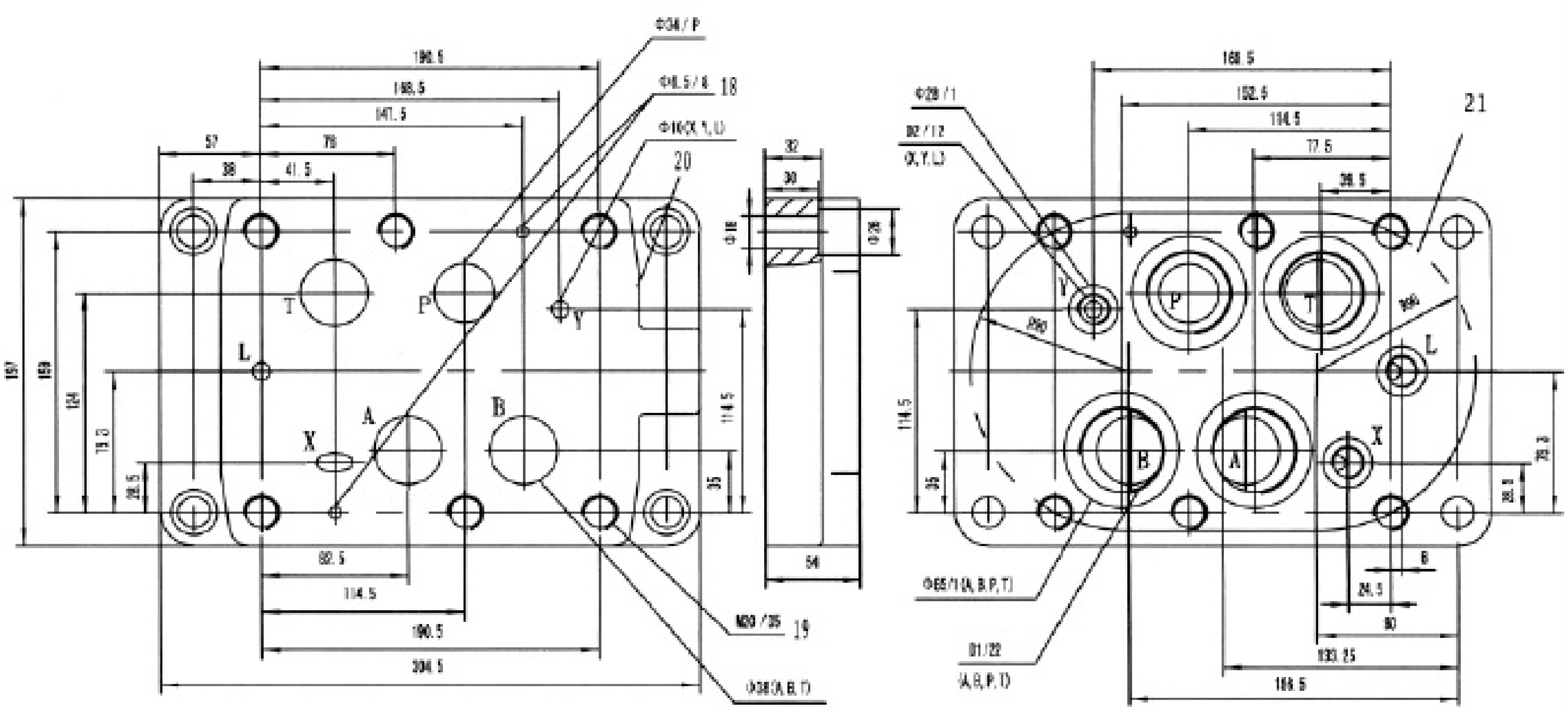


"L" only used on valves which are pressure-centred

	Type	Pressure	Valve fixing screws
flange conneting	009176	25MPa	6 - M12x60 -10.9 (GB/T70.1-2000),
	009177	40MPa	

20 Valve fixing screws 21 mating piece of valve 22 locating pin 23 Front panel cut-out

G157/01(G1 1/2″);G157/02(M48 × 2) (Dimensions in mm)



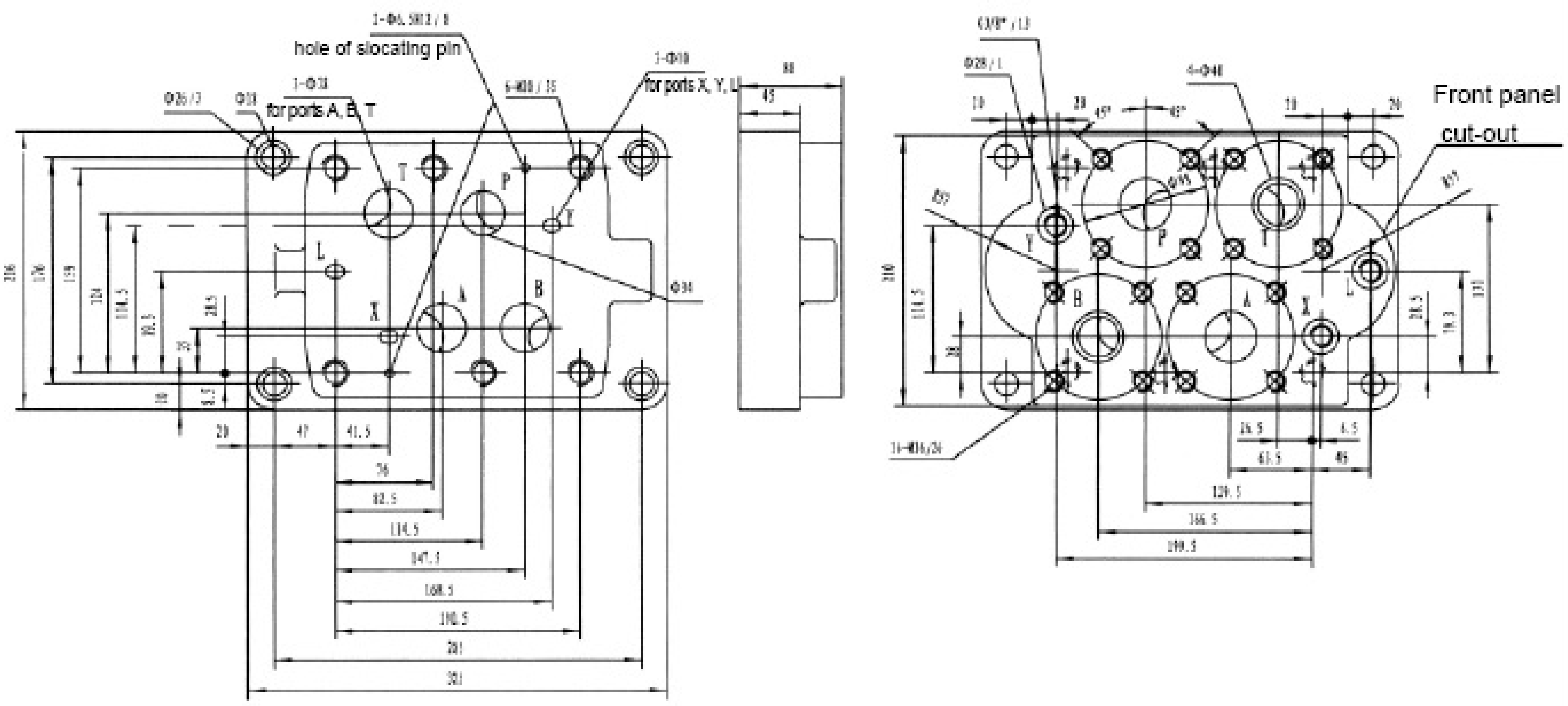
"L" only used on valves which are pressure-centred

Type	Weight	D1	D2	Valve fixing screws	Tightening torque for screws
G157/01	18kg	G1 1/2"	G3/2"	6 - M12x60-10.9	105Nm
G157/02		M48x2	M18x1.5	(GB/T70.1-2000)	

18 locating pin 19 Valve fixing screws 20 mating piece of valve 21Front panel cut-out

Subplates

G158/10 flange connection (Dimensions in mm)



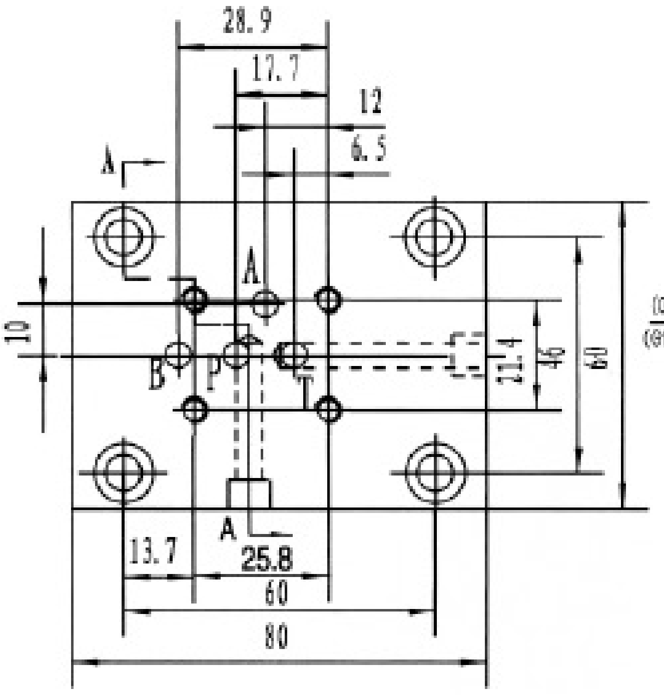
"L" only used on valves which are pressure-centred

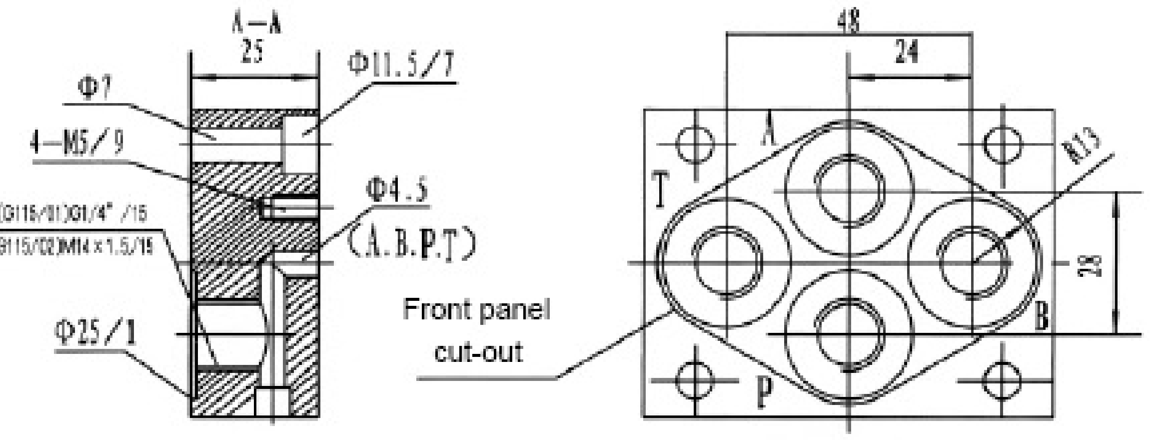
Type	Pressure	Type	Weight	Valve fixing screws	Tightening torque for screws
G158/10	165MPa	303 901	approx. 30.5kg	6 - M20 × 80 -10.9（GB/T70.1-2000）, Should be ordered seperately.	580N.m
	to 25MPa	303 902			
	to 40MPa	303 903			

Subplates

For applications outside these parameters, please consult us!

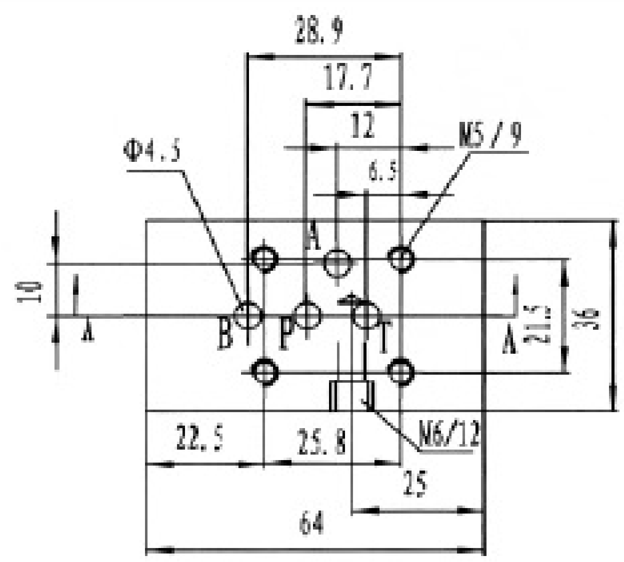
G115/01（G1/4″） G115/02（M14x1.5） **(Dimensions in mm)**

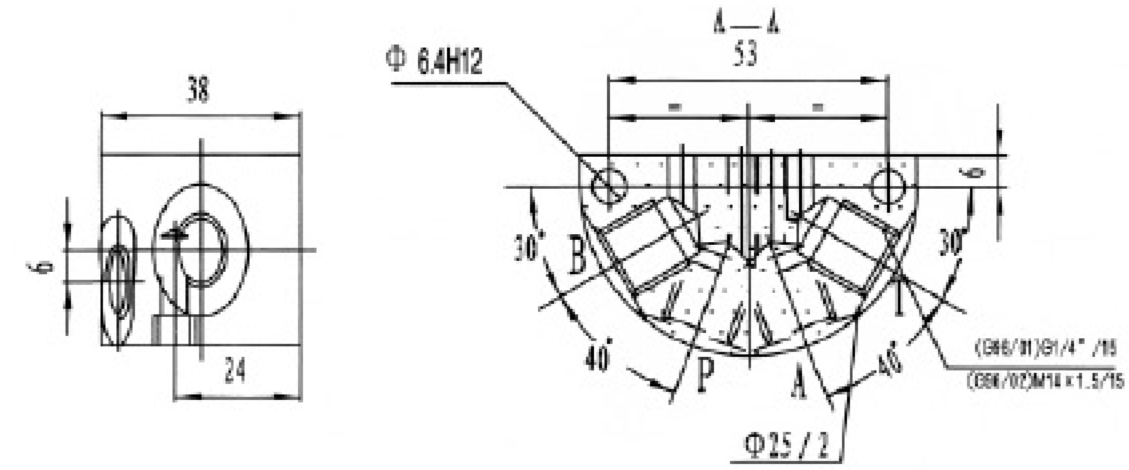




Valve fixing screws, M5 x 50 -10.9（GB/T70.1-2000）,
M_A = 9 Nm

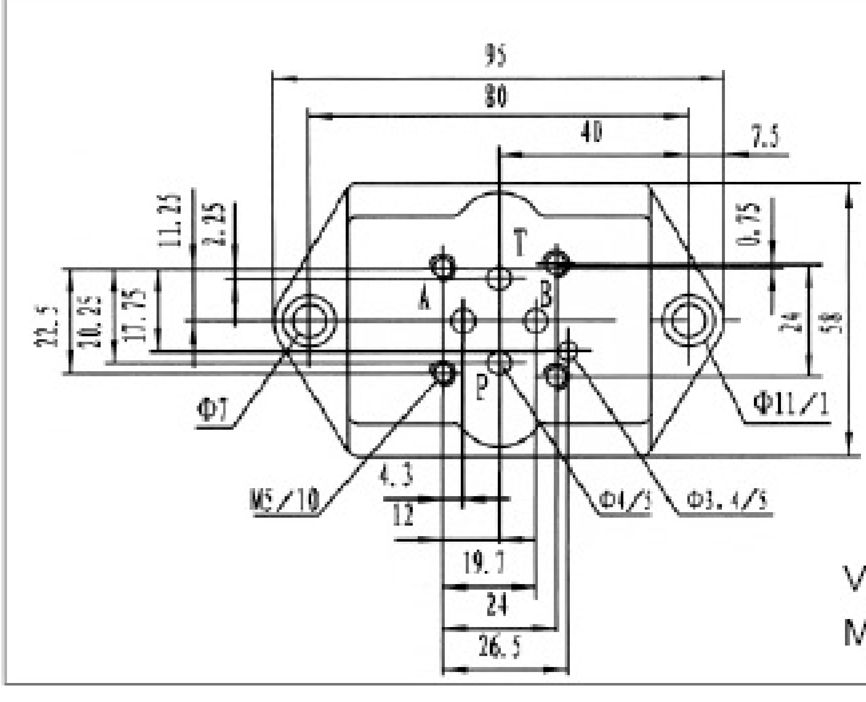
G96/01（G1/4″） G96/02（M14x1.5） **(Dimensions in mm)**

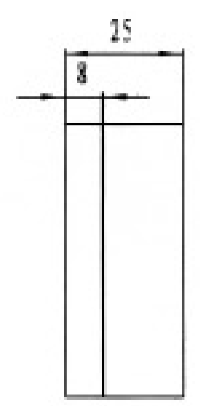


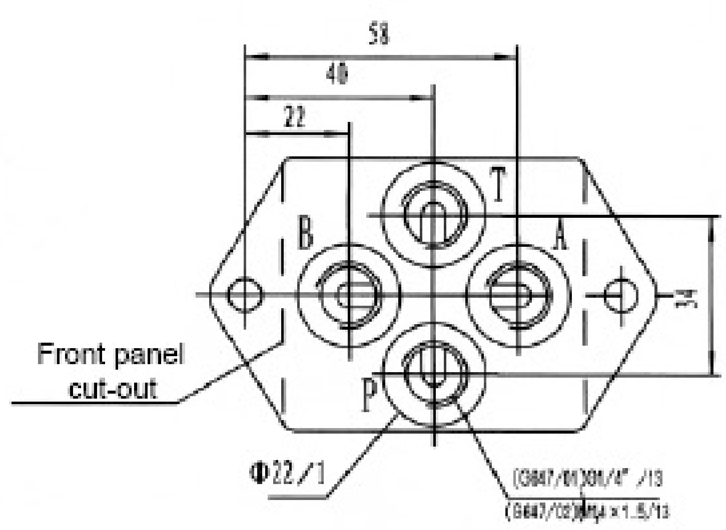


Valve fixing screws, M5 x 50 -10.9（GB/T70.1-2000）,
M_A = 9 Nm

G647/01（G1/4″） G647/02（M14x1.5） **(Dimensions in mm)**







Valve fixing screws, M5 x 50 -10.9（GB/T70.1-2000
M_A = 9 Nm

Tel: 400-000-6987

Our company has passed:

- ISO9001 Quality Managing System Certificate
- ISO14001 Environment Managing System Certificate
- OH SAS18001 Occupational Health Safety Managing System Certificate
- CE Certificate

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Compiled in Oct.2012