


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

 [www.khadamathydraulic.com](http://www.khadamathydraulic.com)  
Tell: 021-55882749  
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## 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 subplate 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

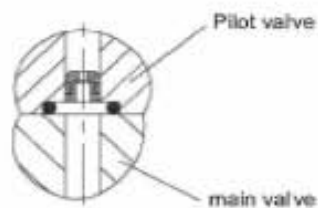
Tightening torque  $M_b$  for pilot valve fixing screws:

Sizes 10 to 32: 9 Nm

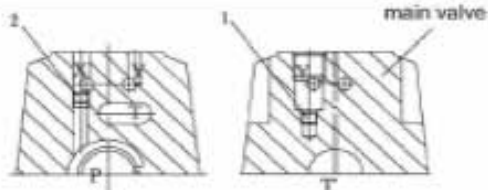
Throttle insert

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.



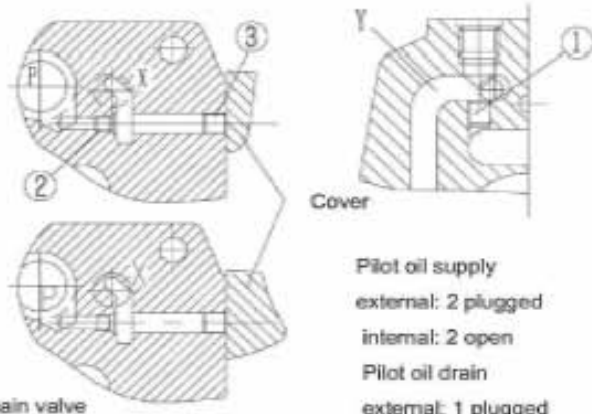
Size 10



Pilot oil supply  
external: 2 plugged  
internal: 2 open

Pilot oil drain  
external: 1 plugged  
internal: 1 open

Size 16

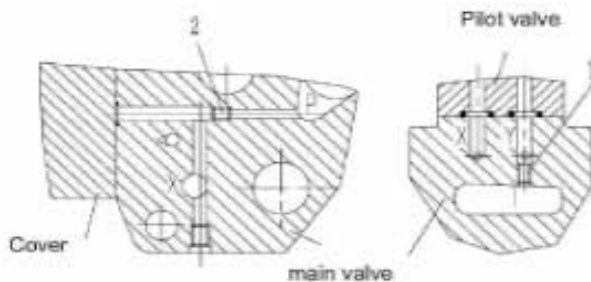


main valve

Cover

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

Size 25



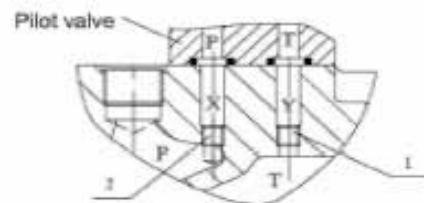
Cover

main valve

Pilot oil supply  
external: 2 plugged  
internal: 2 open

Pilot oil drain  
external: 1 plugged  
internal: 1 open

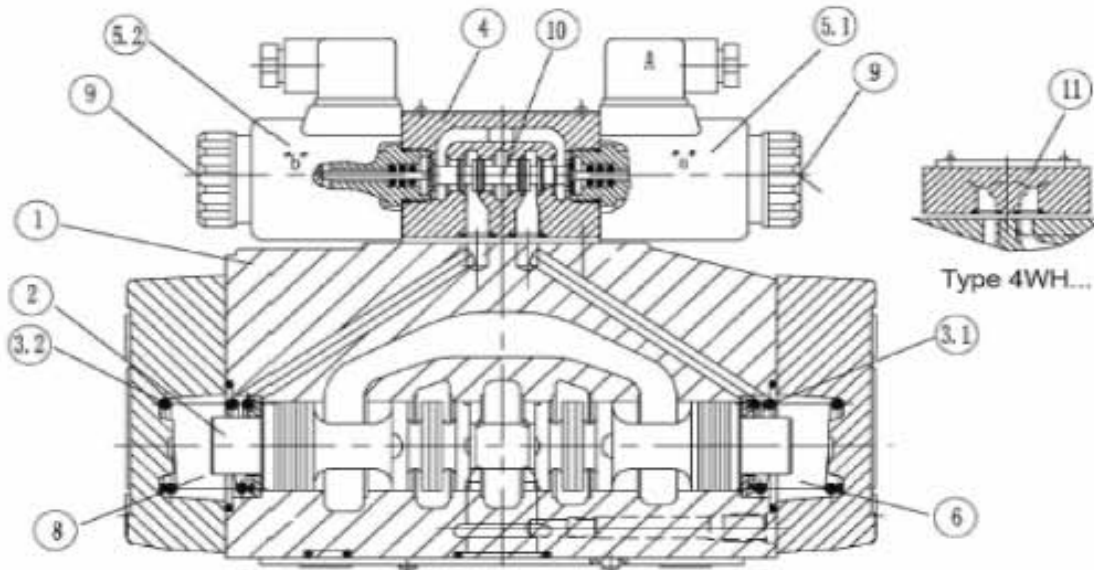
Size 32



Pilot oil supply  
external: 2 plugged  
internal: 2 open

Pilot oil drain  
external: 1 plugged  
internal: 1 open

## Functional, section



Type 4WEH 16 ...

### 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).

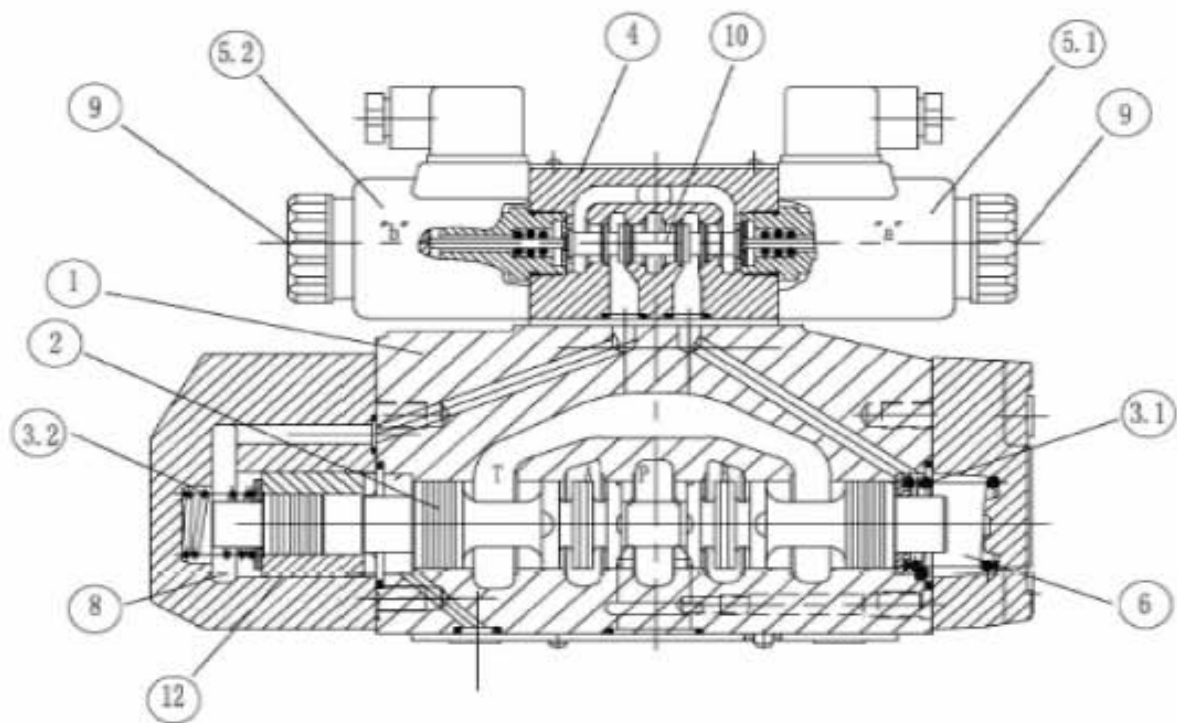
### 4/3-way directional valve with spring centring of the control spool

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

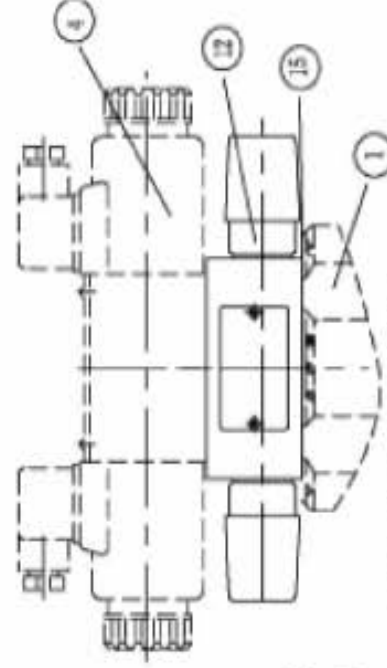
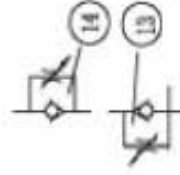
### Shifting time adjustment

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)

$M_a = 9 \text{ Nm}$ .

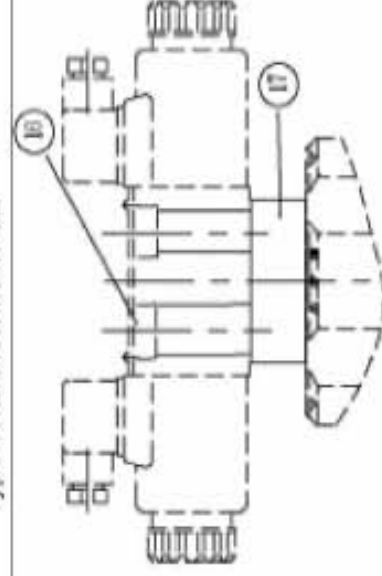


Type 4WEH..60/...S or S2

### 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.

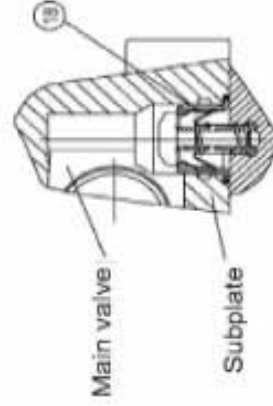
Tightening torque for screws (16)  $M_a = 9 \text{ Nm}$ .



Type 4WEH..60/.../..D3

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

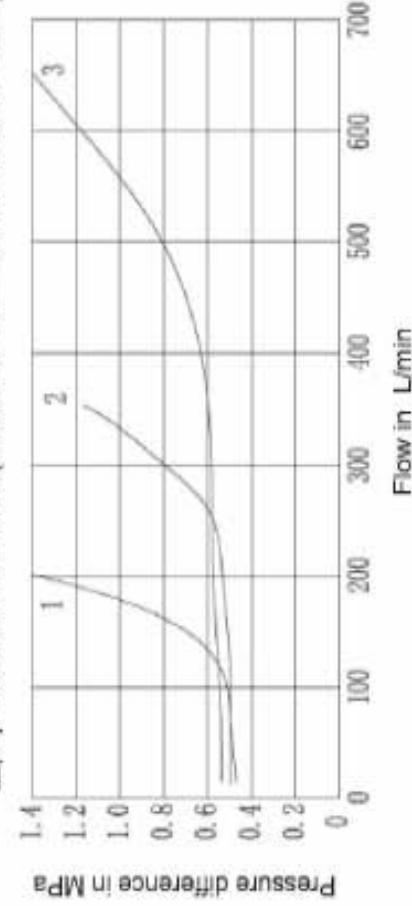
In valves with pressureless by-pass and internal pilot oil supply, a pre-load valve (18) must be installed in the P channel of the main valve to build up the minimum pilot pressure.



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.

$\Delta p/qv$  characteristic curve (measured at  $v = 41 \text{ mm}^2/\text{s}$  and  $t = 50^\circ\text{C}$ )



1 Size 16

2 Size 25

3 Size 32.

## Ordering code

4 / / \*

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)<sup>1)</sup> = 40  
Series 60 to 69 (sizes 16, 25, 32)<sup>1)</sup> = 60

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 solenoid commuting automatically =W220R

Further details in clear text

No code = mineral oils  
V = phosphate ester

No code = Without pressure reducing valve  
D3<sup>2)</sup> = 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  $\phi$  0.8 mm  
B10 = Throttle  $\phi$  1.0 mm  
B12 = Throttle  $\phi$  1.2 mm  
B15 = Throttle  $\phi$  1.5 mm

Additional equipment NO. (see Additional equipment)

K4<sup>4)</sup> = Electrical connections with component plug

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<sup>3)</sup> = 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  $p_{jdc} > 2 \times p_{swh} + p_{jdcmax}$ !

No code = Without manual override  
N = With manual override  
N9 = With protected manual override

1) Unchanged installation and connection dimensions

2) Only in conjunction with throttle insert "B10"

3) With internal pilot oil supply:

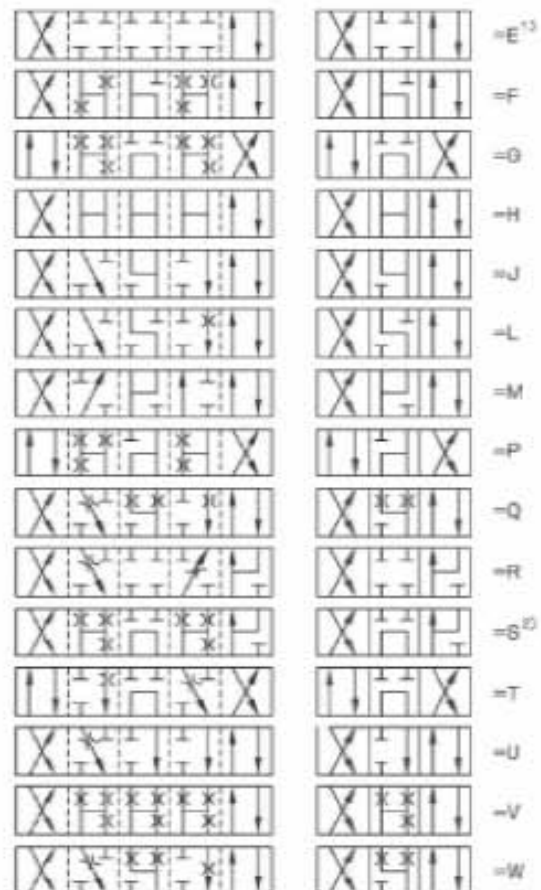
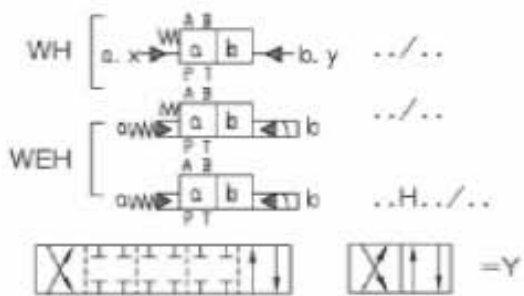
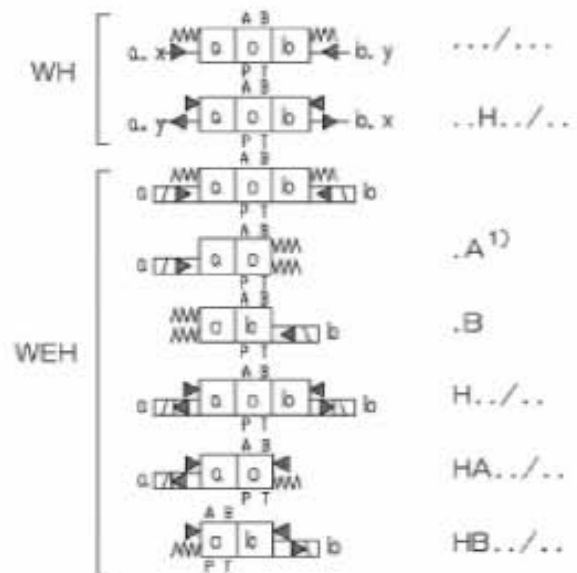
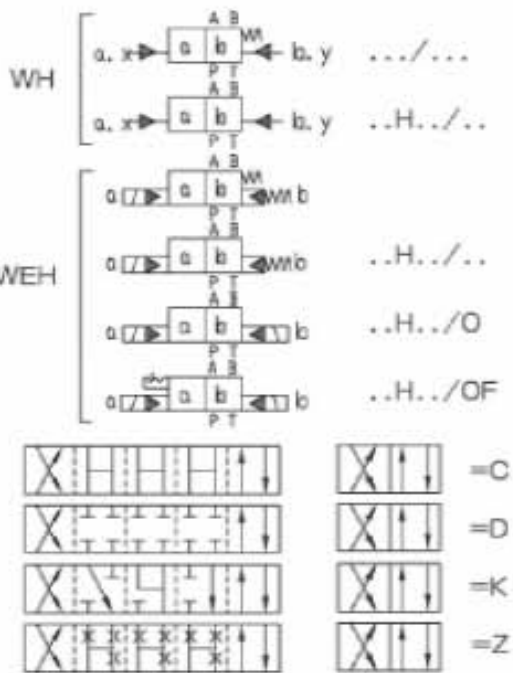
Minimum pilot pressure: Please note page 192!

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 connectors have to be ordered separately



# Symbols



- Example: Spool E, solenoid on side "a"  
Order example:  
H-4WEH 16 HEA60/6AG24N9ETSK4..B10..V..

- Spool S only for size 16

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

| Spool | Size | Valve opening in neutral position ( in mm <sup>2</sup> ) |    |                              |    |
|-------|------|--|----|------------------------------|----|
|       |      | 10   | 16 | 25<br>(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<br>only sizes 16, 25 (type 4W.H 25 .60/... and 32)  |
|----------------------------|--|--|
| X = external, Y = external | <p>Type 4WEH.../...</p>                    | <p>Type 4WEH...H.../...</p>  |
| X = internal, Y = external | <p>Type 4WEH.../...E..</p>                 | <p>Type 4WEH...H.../...E..</p>   |
| X = internal, Y = internal | <p>Type 4WEH.../...ET..</p>                | <p>3-position valves, pressure-centred, preferably with external pilot oil supply and/or drain (No code, E)<br/>For the preconditions for internal pilot oil supply and/or drain (E I, I) see page 188 or 192.</p> |
| X = external, Y = internal | <p>Type 4WEH.../...T..</p>                 |  |



### Detailed and simplified symbols for 2-position valves

|                            | Valves with spring offset    | Valves with hydraulic offset    |                               |                                |
|----------------------------|------------------------------|---------------------------------|-------------------------------|--------------------------------|
| X = external; Y = external | <p>Type 4WEH.../...T...</p>  | <p>Type 4WEH..H.../...T...</p>  | <p>Type 4WEH..H/O...T...</p>  | <p>Type 4WEH..H/OF...T...</p>  |
| X = internal; Y = external | <p>Type 4WEH.../...E...</p>  | <p>Type 4WEH..H.../...E...</p>  | <p>Type 4WEH..H/O...E...</p>  | <p>Type 4WEH..H/OF...E...</p>  |
| X = internal; Y = internal | <p>Type 4WEH.../...ET...</p> | <p>Type 4WEH..H.../...ET...</p> | <p>Type 4WEH..H/O...ET...</p> | <p>Type 4WEH..H/OF...ET...</p> |
| X = external; Y = internal | <p>Type 4WEH.../...T...</p>  | <p>Type 4WEH..H.../...T...</p>  | <p>Type 4WEH..H/O...T...</p>  | <p>Type 4WEH..H/OF...T...</p>  |

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

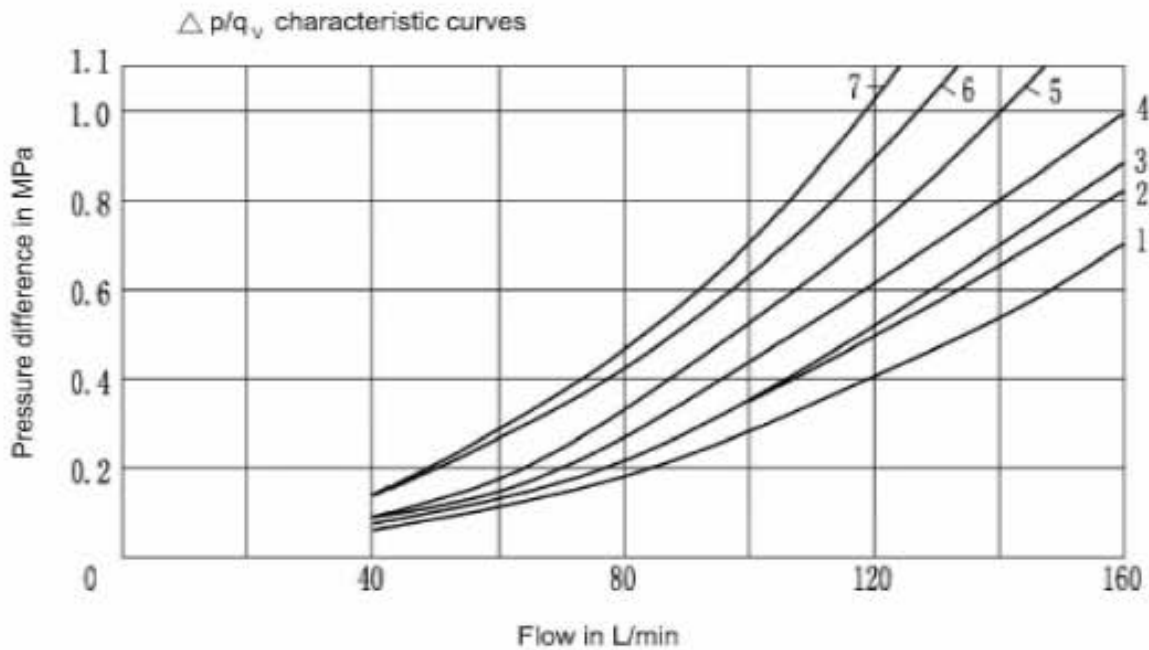
|  |   |   |  |                   |                   |       |      |      |
|--|---|---|--|-------------------|-------------------|-------|------|------|
| Sizes (ordering code)  |   | 10  | 16   | 25                | 32                |       |      |      |
| Operating pressure, max. Type 4WEH (MPa)   |   | 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 <sup>5)</sup>  | 25   | 25                | 25                |       |      |      |
|  | Pilot oil drain Y internal <sup>1)</sup>        |   | 16 <sup>2)</sup> /21 <sup>7)</sup> DC<br>10 <sup>2)</sup> /16 <sup>7)</sup> AC |                   |                   |       |      |      |
| - Port Y - DC (MPa)  |   |   | 16 <sup>2)</sup> /21 <sup>7)</sup> DC  |                   |                   |       |      |      |
| Pilot oil drain external: - AC (MPa)   |   |   | 10 <sup>2)</sup> /16 <sup>7)</sup> AC  |                   |                   |       |      |      |
|  | with version 4WH (MPa)                          |   | 25   |                   |                   |       |      |      |
| Pilot pressure, max. (MPa)   |   |   | 25   |                   |                   |       |      |      |
| (With higher pilot pressures, a pressure reducing valve is required.)  |   |   |  |                   |                   |       |      |      |
| Pilot pressure, min.   |   | H-4W....  |  |                   |                   |       |      |      |
| - Pilot oil supply X external, pilot oil supply X internal (not with spools: C, F, G, H, P, T, V, Z, S <sup>2)</sup> )   |   |   |  |                   |                   |       |      |      |
|  | 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 <sup>2)</sup> ) (MPa)   |   | 4.5 <sup>3)</sup>   | 4.5 <sup>4)</sup>  | 4.5 <sup>4)</sup> | 4.5 <sup>4)</sup> |       |      |      |
| <p>1) As 3-position valve with spring-centring only possible if <math>p_{max} &gt; 2 \times p_{back} + p_{pilot min.}</math></p> <p>2) Spool S only for size 16</p> <p>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</p> <p>4) For spools C, F, G, H, P, T, V, Z, S (by means of a pre-load valve or a sufficiently large flow)</p> <p>5) Type 4WEH 10...: 28 MPa<br/>Type H-4WEH 10...: 31.5 MPa</p> <p>6) Standard valve "6A"</p> <p>7) High-performance valve "6E"</p> |   |   |  |                   |                   |       |      |      |
| Hydraulic fluid  |   | Mineral oil (for NBR seal) or Phosphate ester (for FPM seal)  |  |                   |                   |       |      |      |
| Fluid temperature range (°C)   |   | - 30 to + 80  |  |                   |                   |       |      |      |
| Viscosity range (mm <sup>2</sup> /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 $\beta_{0.5} > 75$ . |  |                   |                   |       |      |      |
| Pilot oil volume for shifting operation :  |   |   |  |                   |                   |       |      |      |
| - 3-position valve, spring-centred (cm <sup>3</sup> )  |   | 2.04  | 5.72   | 14.2              | 29.4              |       |      |      |
| - 2-position valve (cm <sup>3</sup> )  |   | 4.08  | 11.75  | 28.4              | 58.8              |       |      |      |
| - 3-position valve, pressure-centred   |   |   | WH   | WEH               | WH                | WEH   |      |      |
| From neutral position to shifted position "a" (cm <sup>3</sup> )   |   |   | 2.83   | 2.83              | 7.15              | 7.15  | 14.4 | 14.4 |
| From shifted position "a" to neutral position (cm <sup>3</sup> )   |   |   | 2.9  | 5.73              | 14.18             | 7.0   | 29.4 | 15.1 |
| From neutral position to shifted position "b" (cm <sup>3</sup> )   |   |   | 5.72   | 5.73              | 14.18             | 14.15 | 29.4 | 29.4 |
| From shifted position "b" to neutral position (cm <sup>3</sup> )   |   |   | 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.41.0       |       |      |      |
|  | Valve with two solenoids, spring-centred (kg)   | approx.6.8  | approx.8.9   | approx.18.0       | approx.41.0       |       |      |      |
|  | Valve with two solenoids, pressure-centred (kg) | approx.6.8  | approx.8.9   | approx.19.0       | approx.41.0       |       |      |      |
|  | Valve with hydraulic operation (4WH... ) (kg)   | approx.5.5  | approx.7.3   | approx.16.5       | approx.39.5       |       |      |      |
|  | Shifting time adjustment (kg)                   |   | approx.0.8   |                   |                   |       |      |      |
|  | 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<br>Pilot valve series 60/ 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<br>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  |    |    |
|                                     | 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  |    |    |
| pressure-centred                    | (ms)  | 20...35           | 20                        | 20...35 | 20       | 20...35 | 20      | 20...35   | 20      | 20...35 | 20      | 20...35 | 20 | 20...35 | 20    |    |    |    |
| Size 25<br>(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  |    |    |
|                                     | 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  |    |    |
| pressure-centred                    | (ms)  | 30...50           | 30                        | 35      | 30...50  | 30      | 50      | 30...50   | 30      | 35      | 30...50 | 30      | 35 | 30...50 | 30    | 35 |    |    |
| Size 32<br>Pilot valve series 60/ 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       | 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       | a     | b  |    |    |
| pressure-centred                    | (ms)  | 30...65           | 30                        | 40      | 60...90  | 30      | 30      | 105...155 | 50      | 50      |         |         |    |         |       |    |    |    |

**Characteristic curves: Type 4WEH 10...**(measured at  $v = 41 \text{ mm}^2/\text{s}$  and  $t = 50^\circ\text{C}$ )



| 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   | -                | -   | 7   |
| G,T     | 4                | 2   | 2   | 6   | H     | 1                | 3   | 5   |
| H,C     | 4                | 4   | 1   | 4   | L     | 3                | -   | -   |
| J,K     | 1                | 2   | 1   | 3   | P     | -                | 7   | 5   |
| L       | 2                |     | 3   | 1   | U     | -                | 4   | -   |
| M       | 4                | 4   | 3   | 4   |       |                  |     |     |
| Q,V,W,Z | 2                | 2   | 3   | 5   |       |                  |     |     |
| R       | 2                | 2   | 3   | -   |       |                  |     |     |
| U       | 3                | 3   | 3   | 4   |       |                  |     |     |
| P       | 4                | 1   | 3   | 4   |       |                  |     |     |

**Shifting performance limits: Type 4WEH 10...**(measured at  $v = 41 \text{ mm}^2/\text{s}$  and  $t = 50^\circ\text{C}$ )

| 2 and 3-position valves (Permissible flow $q_v$ in L/min) |  |     |      |
|---|--|-----|------|
| Spool   | Operating pressure $p_{\text{max}}$ in MPa |     |      |
|   | 20   | 25  | 31.5 |
| E, J, L, M, Q, R, U,<br>V, W, C, D, K, Z, Y               | 160  |     |      |
| H   | 160  | 150 | 120  |
| G, T  | 160  | 160 | 140  |
| F, P  | 160  | 140 | 120  |

General:

Attention!

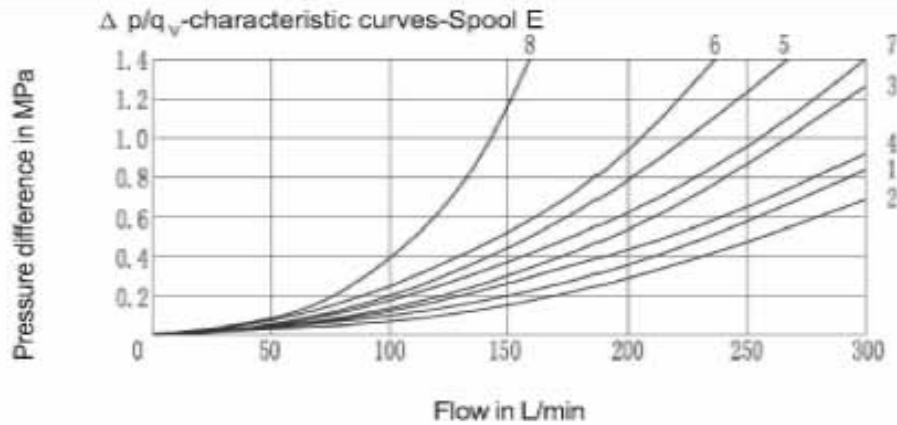
The shifting performance limits shown are valid for applications with two directions of flow (e.g. from P to A and simultaneous return flow from B to T).

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  $v = 41 \text{ mm}^2/\text{s}$  and  $t = 50^\circ\text{C}$ )



| 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  $v = 41 \text{ mm}^2/\text{s}$  and  $t = 50^\circ\text{C}$ )

| 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 <sup>1)</sup> |                                     |     |     |     |     | Spool C and Z up to approx. 160L/min      |
| C, D, K, Z, Y                                      | 300                                 | 300 | 300 | 300 | 300 |   |
| with spring offset in the main valve <sup>2)</sup> |                                     |     |     |     |     |   |
| 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                                       |                                     |     |     |     |     | Spools F, G, H, P and S in general        |
| E, H, J, L, M, QUWR                                  | 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 (at min. pilot pressure of 1.6 MPa) |                                     |     |     |     |     | Spool V up to ca. 160 L/min               |
| for all spools                                       | 300                                 | 300 | 300 | 300 | 300 |   |

**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.

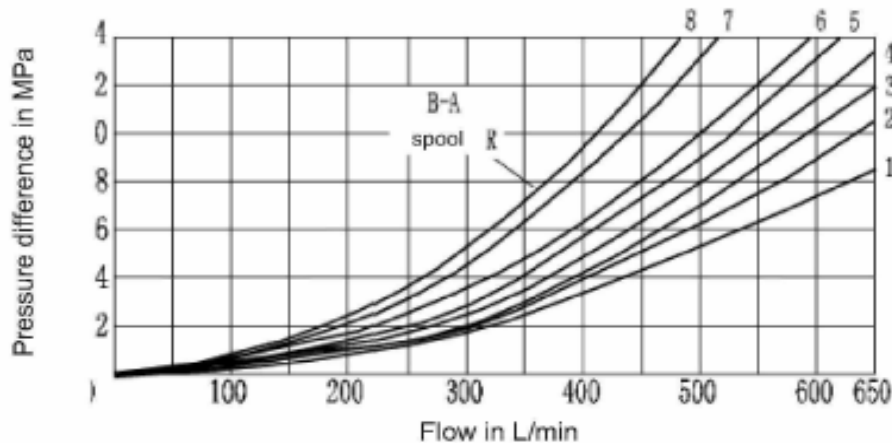
Example: At an operating pressure of  $p_{max} = 35 \text{ MPa}$  and a flow of  $q_v = 300 \text{ L/min}$ , a pilot pressure of 1.6 MPa is required.

The maximum flow for those valves is therefore only dependent on the  $\Delta p$  value which is acceptable for the system.

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.

**Characteristic curves: Type 4WEH 25...**(measured at  $v = 41 \text{ mm}^2/\text{s}$  and  $t = 50^\circ\text{C}$ )



- 7) Spool G central position P-T  
8) Spool T central position P-T

| Spool | Shifted position |     |     |     | Spool | Neutral position |     |     |     |
|-------|------------------|-----|-----|-----|-------|------------------|-----|-----|-----|
|       | P-A              | P-B | A-T | B-T |       | P-A              | P-B | A-T | B-T |
| E     | 1                | 1   | 1   | 3   | P     | 4                | 1   | 1   | 5   |
| F     | 1                | 4   | 3   | 3   | Q     | 2                | 2   | 3   | 5   |
| G     | 3                | 1   | 2   | 4   | 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  $v = 41 \text{ mm}^2/\text{s}$  and  $t = 50^\circ\text{C}$ )

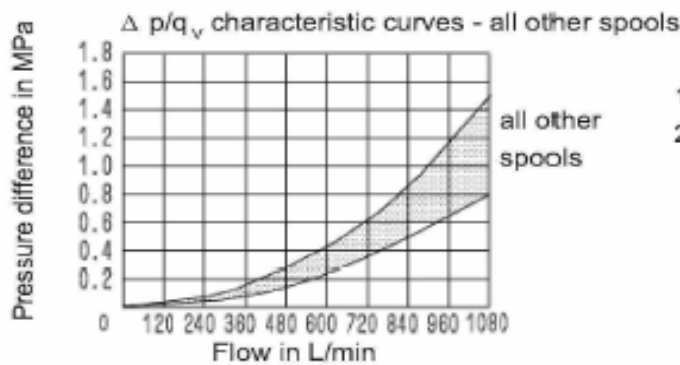
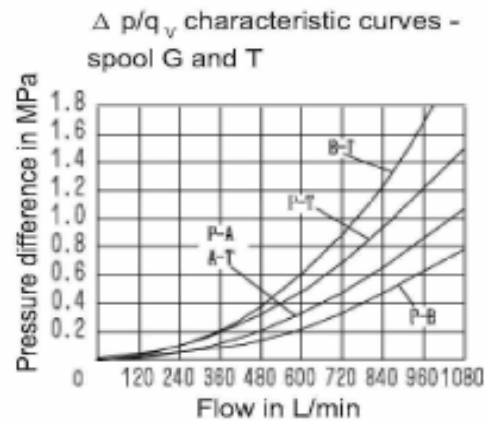
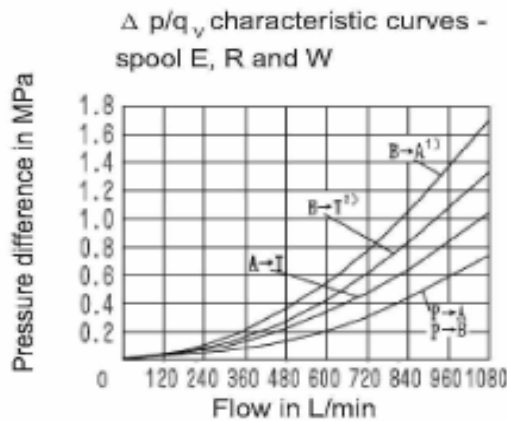
| 2-position valves Permissible flow $q_v$ in L/min  |                                      |     |     |     |     | Pre-load valve, required for X = internal |
|--|--------------------------------------|-----|-----|-----|-----|---|
| Spool  | Operating pressure $\Delta p$ in MPa |     |     |     |     |   |
|  | 7                                    | 14  | 21  | 28  | 35  |   |
| with spring offset in the main valve <sup>1)</sup> |                                      |     |     |     |     | Spool C and Z up to approx. 180 L/min     |
| C, D, K, Z, Y                                      | 700                                  | 700 | 700 | 700 | 650 |   |
| with spring offset in the main valve <sup>2)</sup> |                                      |     |     |     |     |   |
| 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 $\Delta p$ in MPa |     |     |     |     |   |
|   | 7                                    | 14  | 21  | 28  | 35  |   |
| spring-centred                                      |                                      |     |     |     |     | Spools F, G, H, P and T in general, spool V up to approx. 180 L/min |
| E, L, M, Q, U, W                                    | 700                                  | 700 | 700 | 700 | 650 |   |
| 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  $v = 41 \text{ mm}^2/\text{s}$  and  $t = 50^\circ\text{C}$ )



- 1) only with spool R
- 2) not with spool R

**Performance limits: Type WEH 32...**(measured at  $v = 41 \text{ mm}^2/\text{s}$  and  $t = 50^\circ\text{C}$ )

| 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 <sup>1)</sup> |                                     |      |     |     |     | spool C in general, spool Z up to approx. 180 L/min |
| C, D, K, Z, Y                                      | 1100                                | 1040 | 860 | 750 | 680 |   |
| with spring offset in the main valve <sup>2)</sup> |                                     |      |     |     |     |   |
| 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-centred <sup>1)</sup>                         |                                     |      |     |     |     | Spools F, G, H, P and T in general, spool V up to 180 L/min |
| E, J, L, M, Q, U, W, R                               | 1100                                | 1040 | 860 | 750 | 680 |   |
| G, T, H, F, P  | 900                                 | 900  | 800 | 650 | 450 |   |
| V  | 1100                                | 1000 | 680 | 500 | 450 |   |
| pressure-centred (at min. pilot pressure of 0.85MPa) |                                     |      |     |     |     |   |
| for all spools                                       | 1100                                | 1040 | 860 | 750 | 680 |   |

**Attention!**

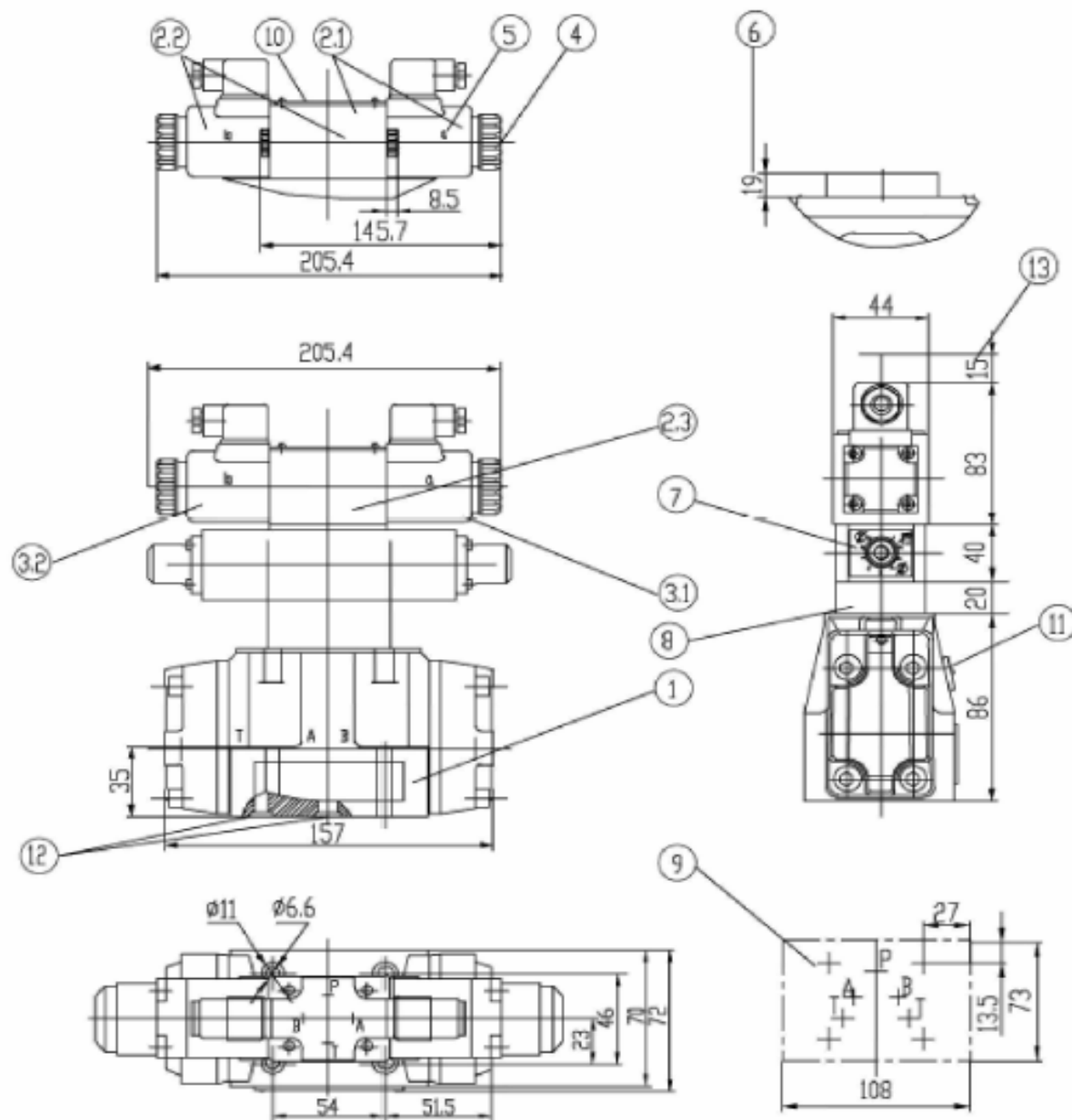
When using 4/3-way directional valves with spring-centring of the control spool in the main valve, which exceeds the given performance limits, a higher pilot pressure is required.

Example: At an operating pressure of  $p_{max} = 35 \text{ MPa}$  and a flow of  $q_v = 1100 \text{ L/min}$ , a pilot pressure of 1.5 MPa is required.

The maximum flow for those valves is therefore only dependent on the  $\Delta p$  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.





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")

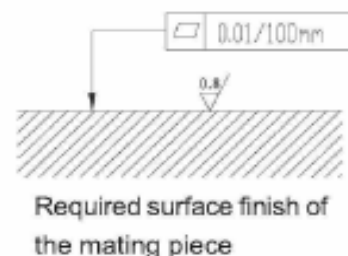
Valve fixing screws 4- M6 × 45 -10.9

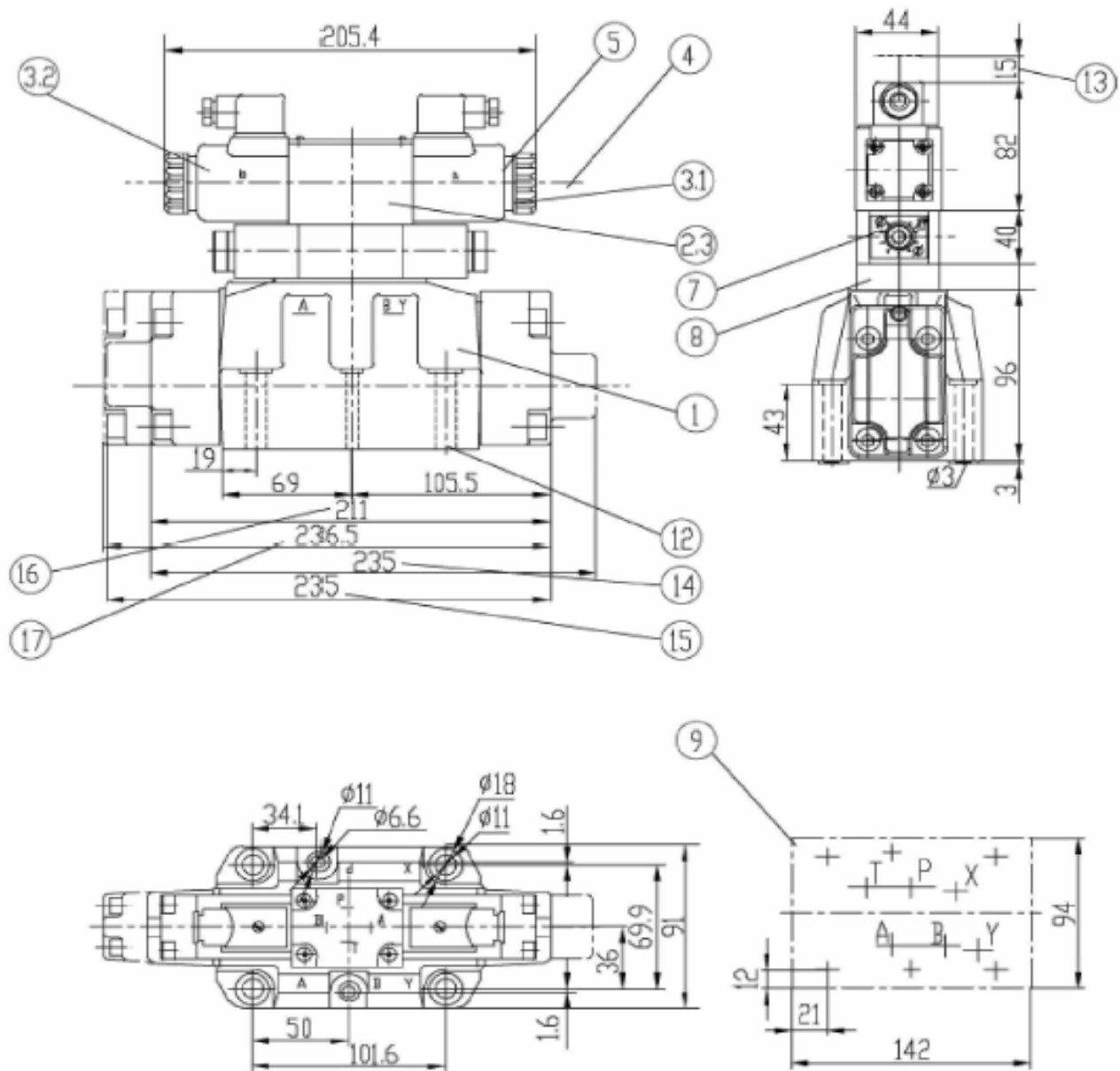
(GB/T70.1-2000)

$M_A = 15.5 \text{ Nm}$

must be ordered separately.

For items lists see page 202





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)

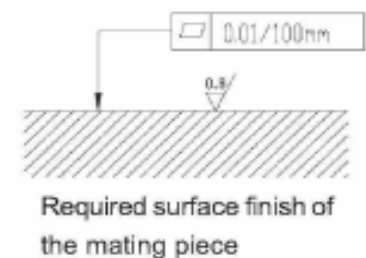
$M_A = 75 \text{ Nm}$

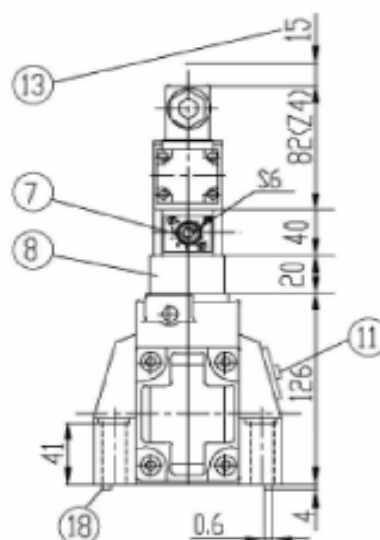
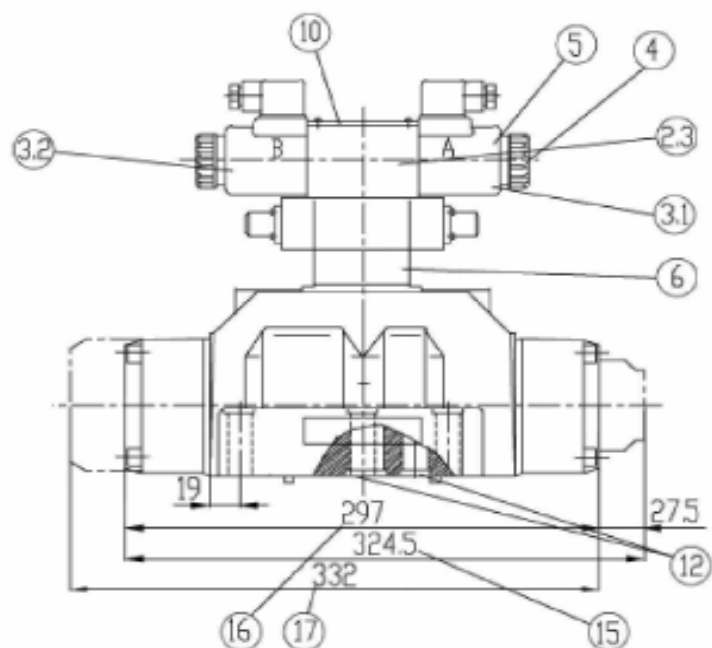
2 - M6 x 60-10.9 (GB/T70.1-2000)

$M_A = 15.5 \text{ Nm}$

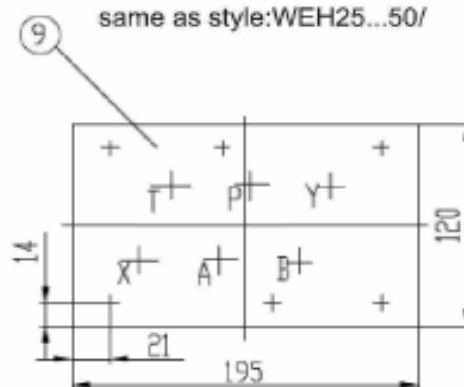
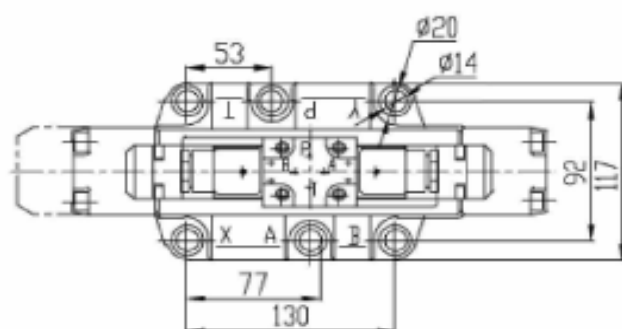
must be ordered separately.

For items list, see page202





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")

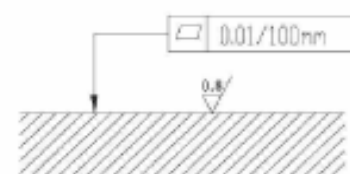
Valve fixing screws

6 - M12 x 60 -10.9 (GB/T70.1-2000)

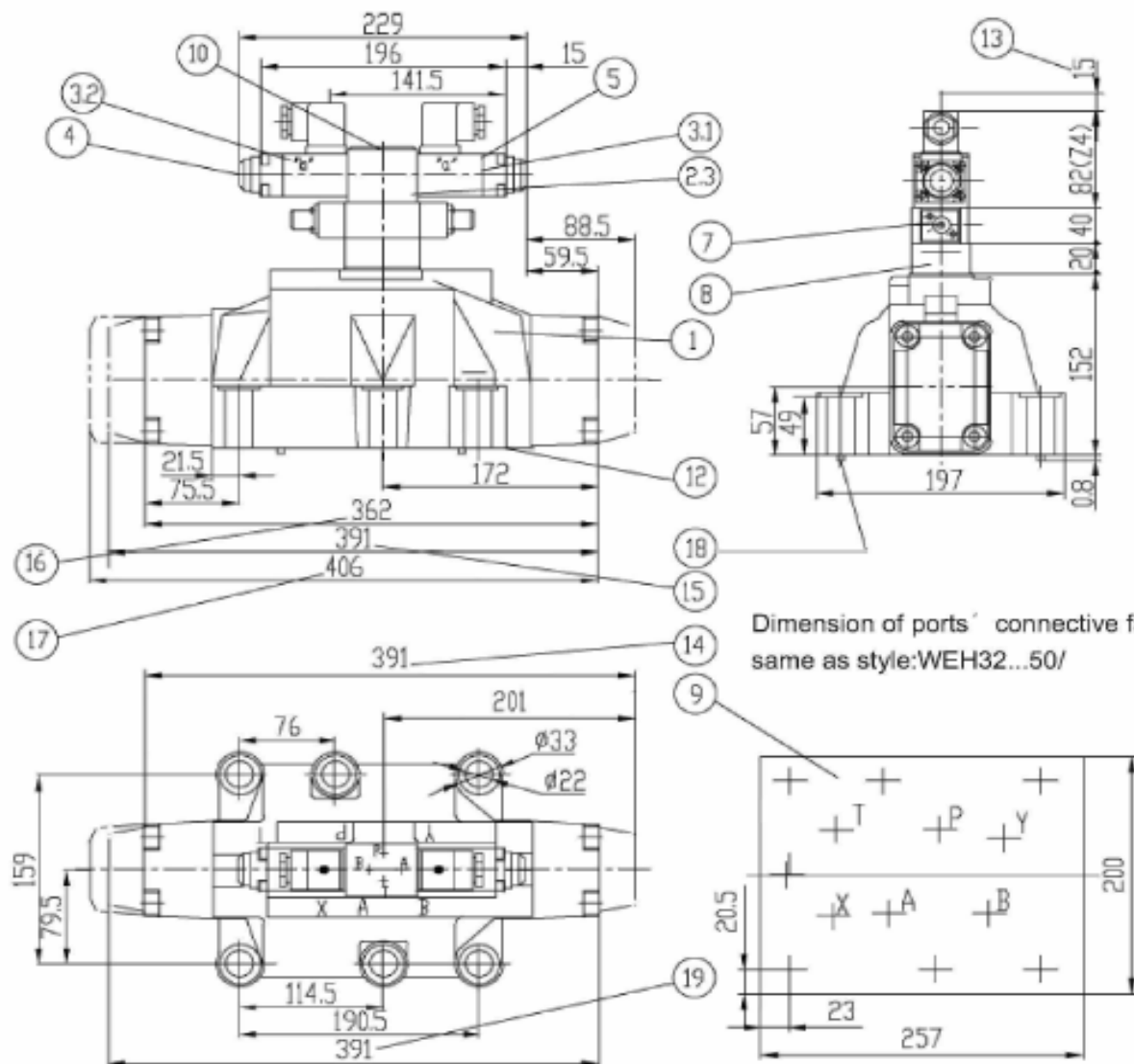
$M_A = 130 \text{ Nm}$

must be ordered separately.

For items list, see page 202



Required surface finish of the mating piece



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)

$M_A = 430 \text{ Nm}$

must be ordered separately.

For items list, see page 202



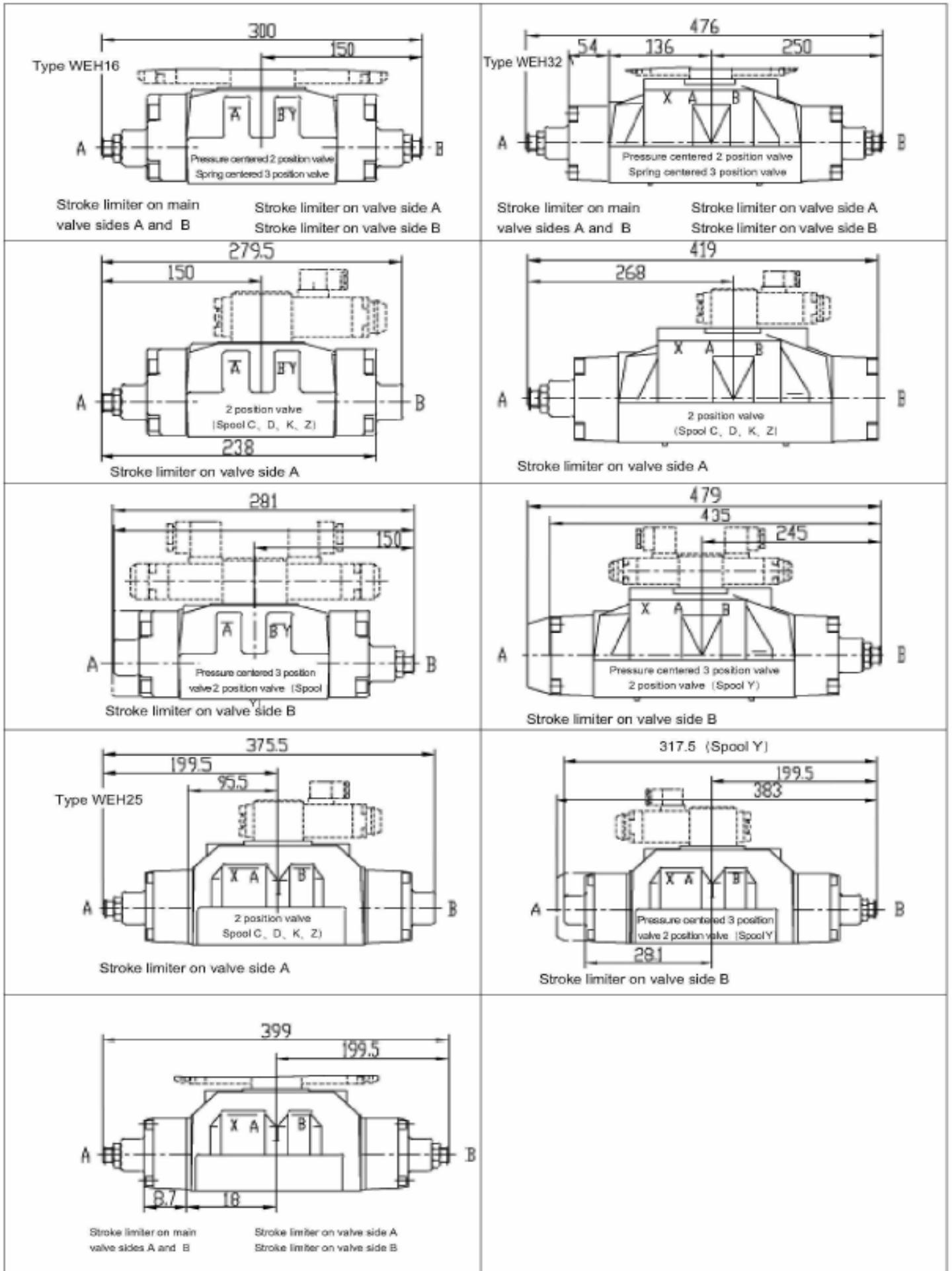
Required surface finish of the mating piece

## List of items:

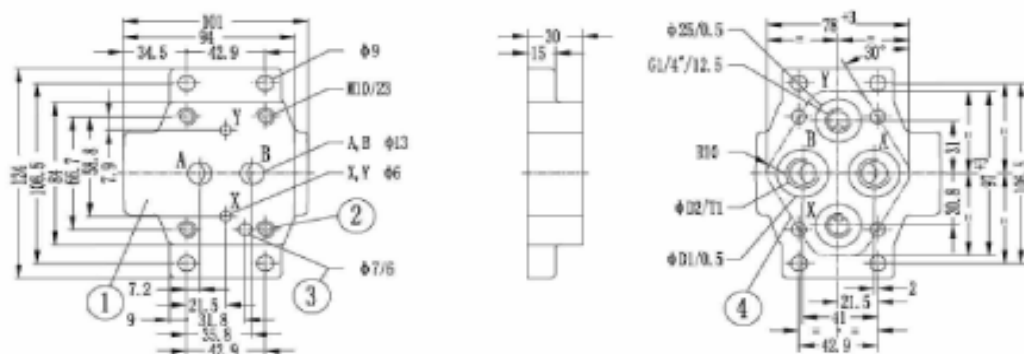
- |   |  |
|---|--|
| <p>1 Main valve</p> <p>2 Pilot valve type 4WE 6 ...</p> <p>2.1 · Pilot valve type 4WE 6 D(1 solenoid) for main valves with spools C, D, K, Z<br/>spools HC, HD, HK, HZ</p> <p>· Pilot valve type 4WE 6 J...(1 solenoid "a") for main valves with spools EA, FA, etc., spring return</p> <p>· Pilot valve type 4WE 6 M...(1 solenoid "a") for main valves with spools HEA, HFA, etc., hydraulic spool return</p> <p>2.2 · Pilot valve type 4WE 6 Y...(1 solenoid) for main valves with spool Y spool HY</p> <p>· Pilot valve type 4WE 6 J...(1 solenoid "b") for main valves with spools EB, FB, etc.,spring return</p> <p>· Pilot valve type 4WE 6 M...(1 solenoid "b") for main valves with spools HEB, HFB, etc., hydraulic spool return</p> <p>2.3 · Pilot valve type 4WE 6 J...(2 solenoids) for main valves with 3 positions, spring-centred</p> <p>· Pilot valve type 4WE 6 M...(2 solenoids) for main valves with 3 positions, pressure-centred</p> <p>3.1 Solenoid "a" (grey plug-in connector)</p> <p>3.2 Solenoid "b" (black plug-in connector)</p> <p>4 Manual override "N", optional</p> <p>- The manual override can only be operated up to a tank pressure of up to approx. 5MPa.<br/>Take care not to damage the manual override bore!</p> <p>5 Solenoid without manual override</p> <p>6 Height of the connector plate for hydraulic operation (type 4WH...)</p> <p>7 Shifting time adjustment (A/F 6), optional</p> <p>8 Pressure reducing valve, optional</p> | <p>9 Machined valve mounting surface, position of ports</p> <p>10 Nameplate for the pilot valve</p> <p>11 Nameplate for the entire valve</p> <p>12 O-rings</p> <p>13 Space required to remove the plug-in connector</p> <p>14 2-position valves with spring offset in the main valve (C, D, K, Z)</p> <p>15 2-position valves with spring offset in the main valve (Y)</p> <p>16 3-position valves, spring-centred;<br/>2-position valves with hydraulic offset in the main valve</p> <p>17 3-position valves, pressure-centred</p> <p>18 Locating pin</p> |
|---|--|

O-Ring used at the bottom of the housing:

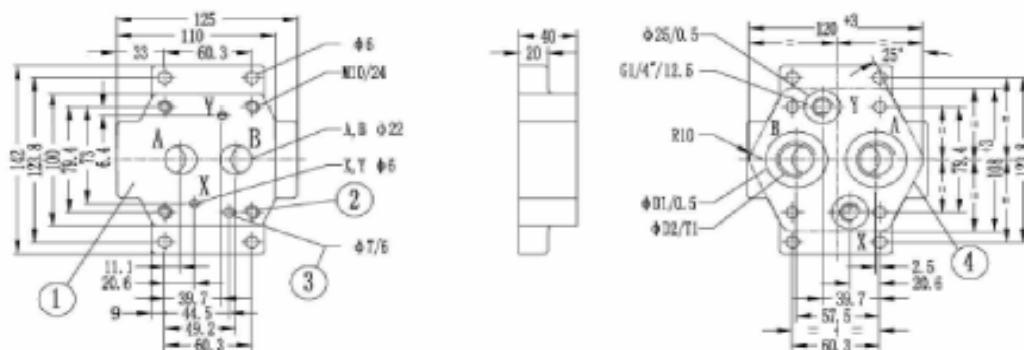
| Order no. | A, B, P, T | X, Y, L      |
|-----------|------------|--------------|
| 10        | 12 × 2     | 10.82 × 1.78 |
| 16        | 22 × 2.5   | 10 × 2       |
| 25        | 27 × 3     | 19 × 3       |
| 32        | 42 × 2     | 12 × 2       |



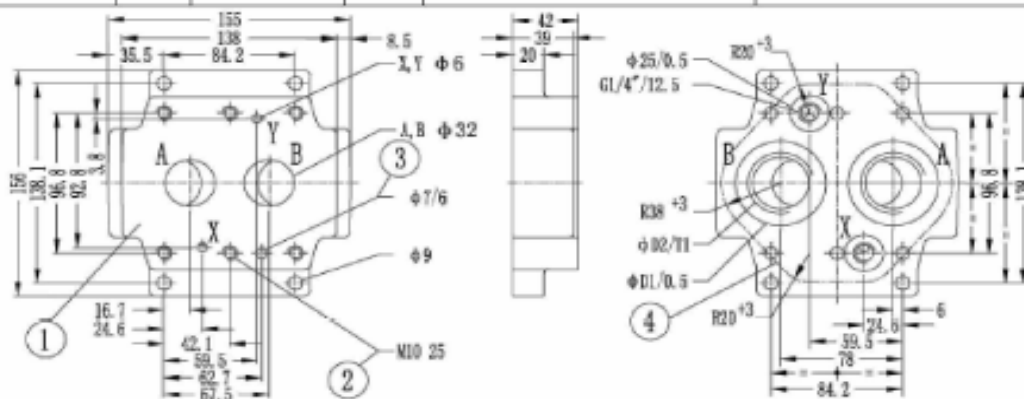
## Subplates



| 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<br>{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<br>{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<br>{GB/T70.1-2000} | 69Nm                         | 5kg    |
|      | G414/02 |    | M42 × 2 |      |                                       |                              |        |
|      | G415/01 | 61 | G1 1/2" | 22.5 |                                       |                              |        |
|      | G415/02 |    | M48 × 2 |      |                                       |                              |        |

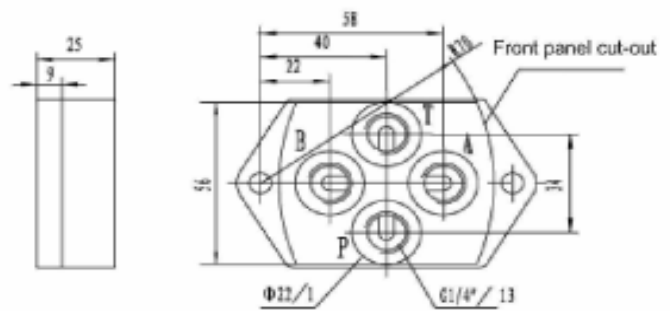
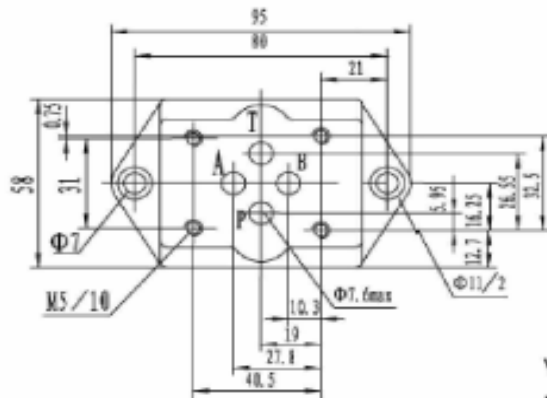
**1 mating piece of valve    2 Valve fixing screws    3 locating pin    4 Front panel cut-out**



**Subplates**

**G341/01 (G1/4" ) G341/02 (M14x1.5) Weight ≈ 0.6kg**

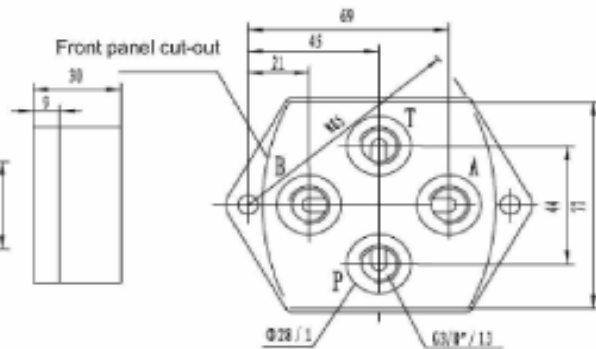
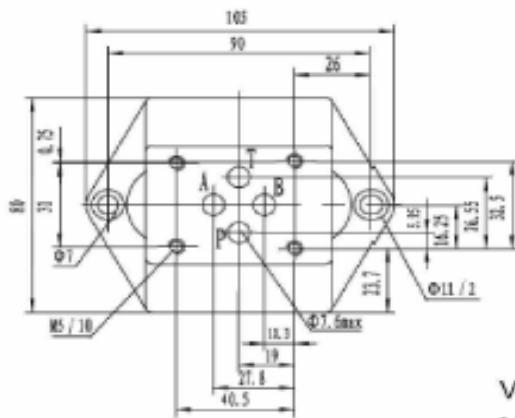
**(Dimensions in mm)**



Valve fixing screws, M5 x 50 -10.9 (GB/T70.1-2000),  
 $M_A = 9 \text{ Nm}$

**G342/01 (G3/8" ) G342/02 (M18x1.5) Weight ≈ 1.1kg**

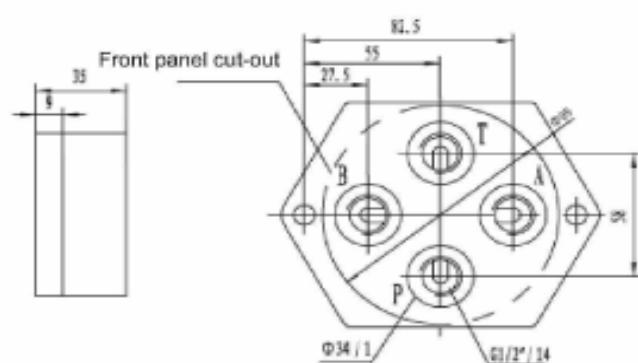
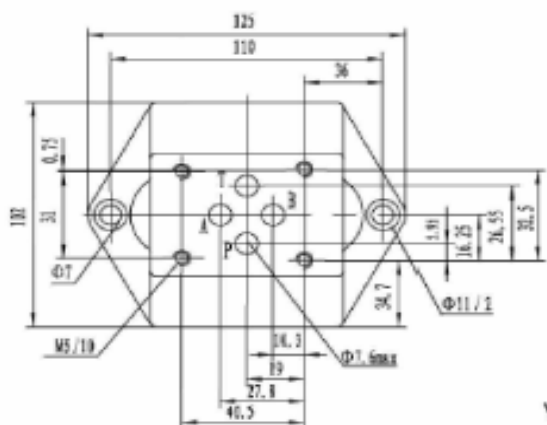
**(Dimensions in mm)**



Valve fixing screws, M5 x 50 -10.9 (GB/T70.1-2000),  
 $M_A = 9 \text{ Nm}$

**G502/01 (G1/2" ) G502/02 (M22x1.5) Weight ≈ 1.9kg**

**(Dimensions in mm)**

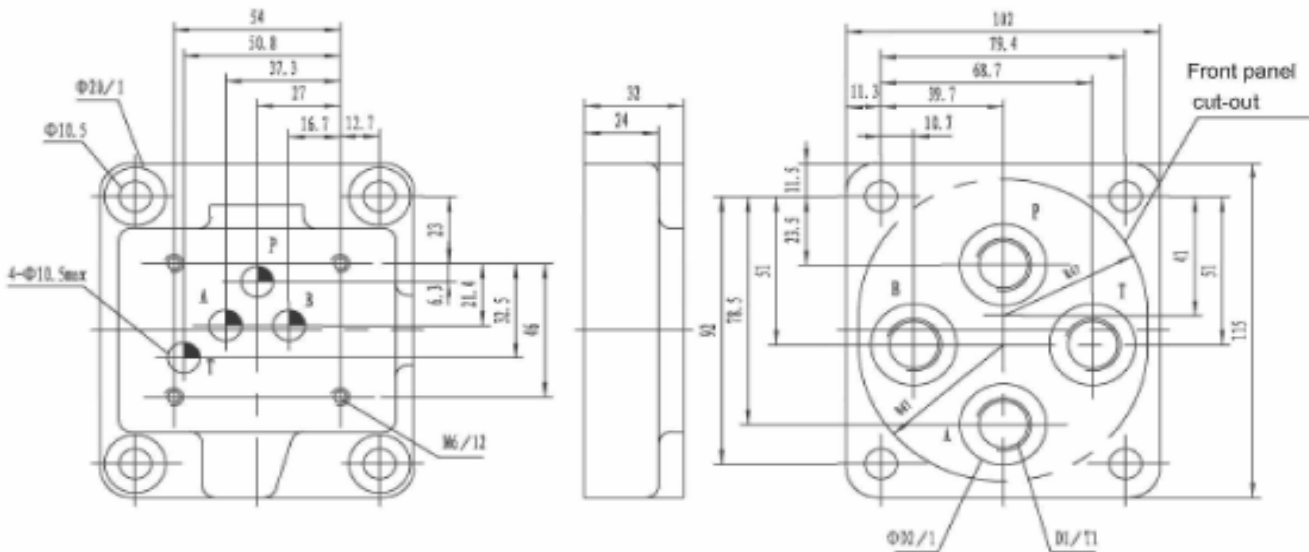


Valve fixing screws, M5 x 50 -10.9 (GB/T70.1-2000),  
 $M_A = 9 \text{ Nm}$

## Subplates

**G66/01 G66/02 G67/01 G67/02**

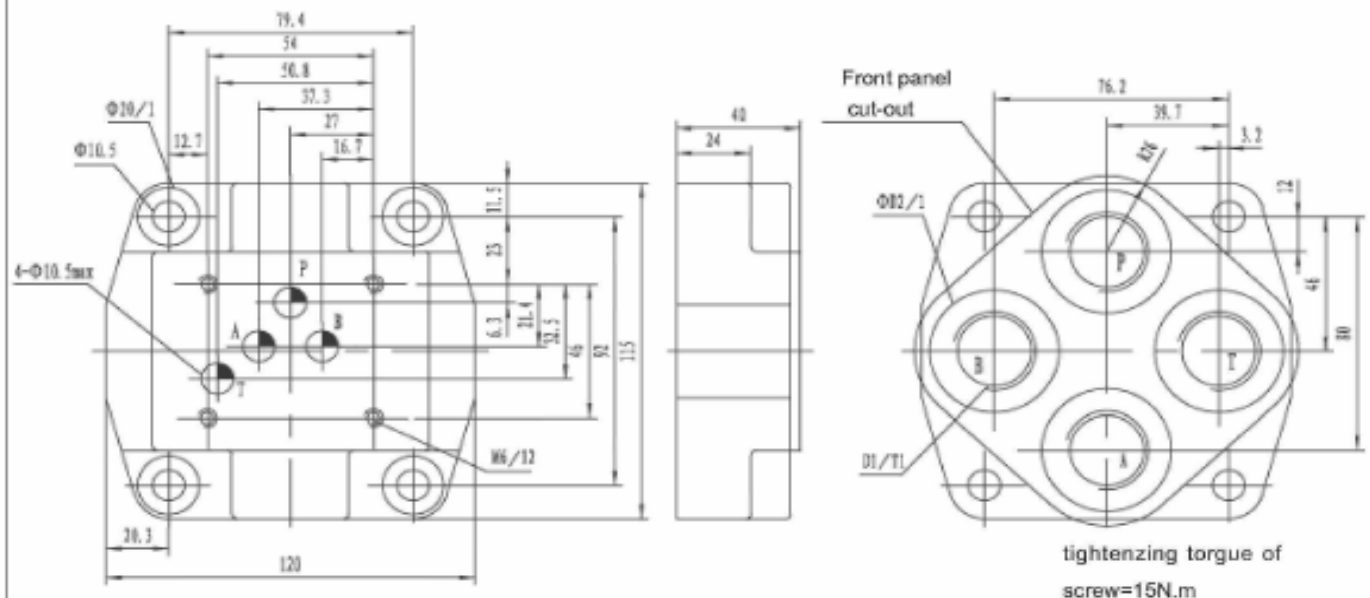
**(Dimensions in mm)**



| Type   | D1      | T1 | Φ D2 | Weight  | Valve fixing screws  | Tightening torque for screws |
|--------|---------|----|------|---------|--|------------------------------|
| G66/01 | G3/8"   | 12 | 28   | approx. | 4 - M6 × 50 -10.9 (GB/T70.1-2000), Should be ordered separately. | 15N.m                        |
| G66/02 | M18x1.5 |    |      |         |  |                              |
| G67/01 | G1/2"   | 14 | 34   | 2.3Kg   |  |                              |
| G67/02 | M22x1.5 |    |      |         |  |                              |

**G534/01 G534/02**

**(Dimensions in mm)**



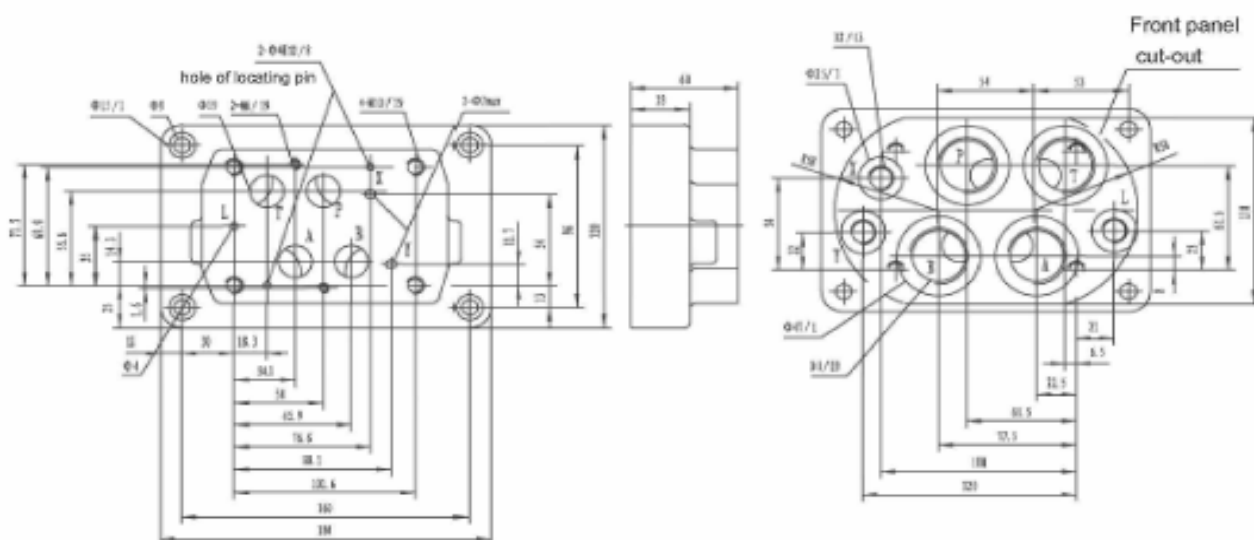
| Type    | D1    | T1 | Φ D2 | Weight  | Valve fixing screws   | Tightening torque for screws |
|---------|-------|----|------|---------|---|------------------------------|
| G534/01 | G3/4" | 17 | 42   | approx. | 4 - M6 × 50-10.9 [GB/T70.1-2000], Should be ordered separately. | 15N.m                        |
| G534/02 | M27x2 |    |      |         |   |                              |



## Subplates

G174/01 G174/02

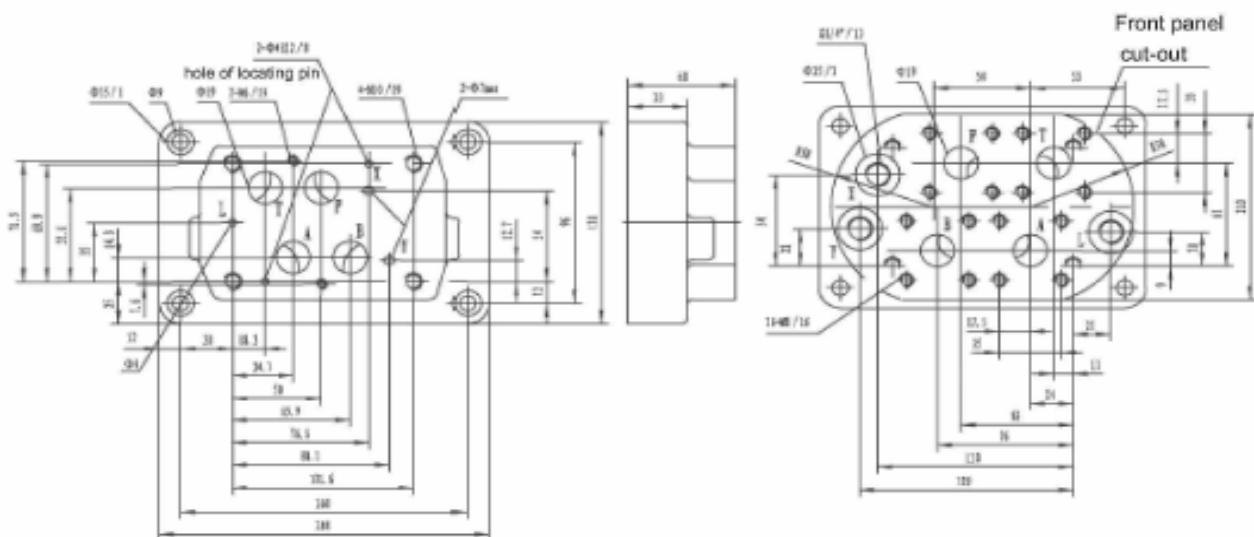
(Dimensions in mm)



| 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 separately. | 62N.m                        |
| G174/02 | M33x2 | M14x1.5 | 5.5kg   | 2 - M6 × 60-10.9 (GB/T70.1-2000), Should be ordered separately.  | 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.<br>5.5kg | 4 - M10 × 60-10.9 (GB/T70.1-2000), Should be ordered separately. | 62N.m                        |
|         | 40MPa    | 009 272 |                  | 2 - M6 × 60-10.9 (GB/T70.1-2000), Should be ordered separately.  | 12.5N.m                      |







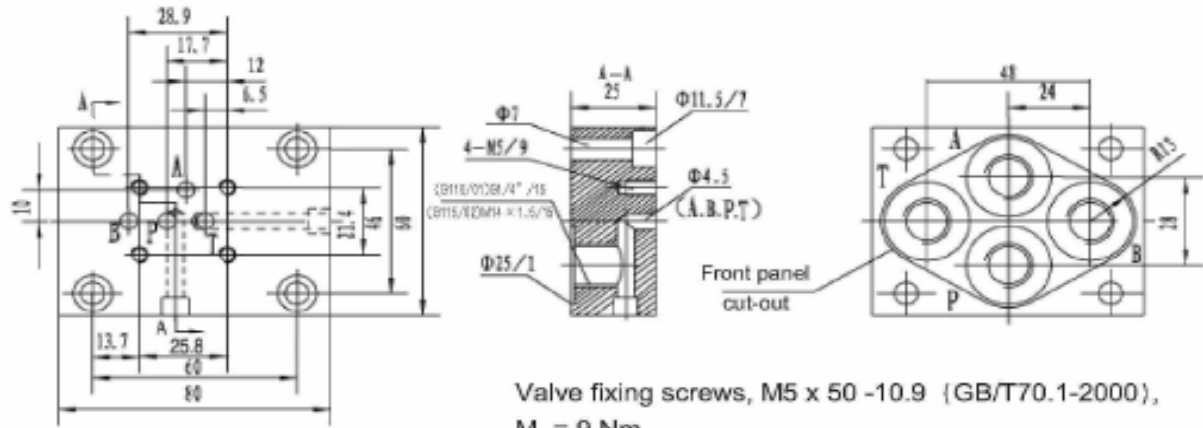


## Subplates

For applications outside these parameters, please consult us!

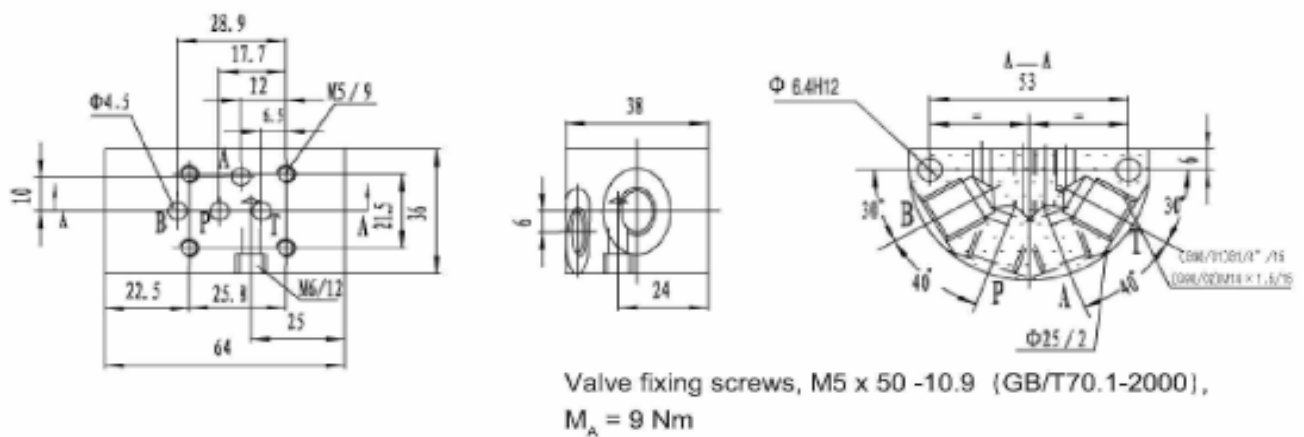
**G115/01 (G1/4" ) G115/02 (M14x1.5)**

**(Dimensions in mm)**



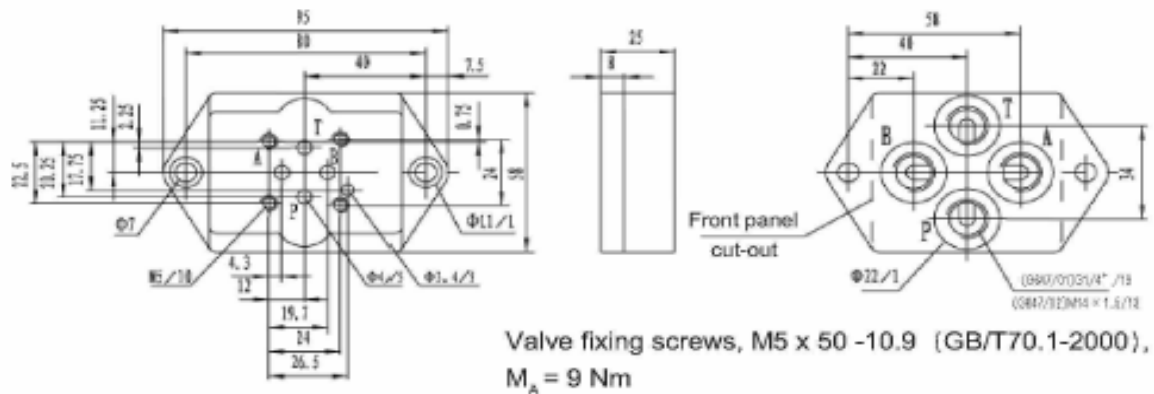
**G96/01 (G1/4" ) G96/02 (M14x1.5)**

**(Dimensions in mm)**



**G647/01 (G1/4" ) G647/02 (M14x1.5)**

**(Dimensions in mm)**



## Notice

1. The fluid must be filtered. Minimum filter fineness is 20  $\mu\text{m}$ .
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.