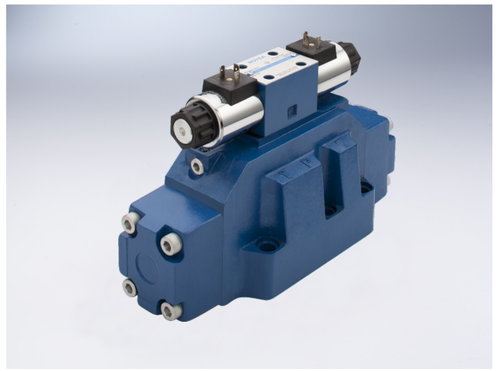
# Electro–hydraulic Directional Control Valve



Electro–hydraulic directional control valve is a control valve which can use the pressure of the hydraulic circuit to pull the spool and change the hydraulic oil direction.

Electro–hydraulic directional control valve is the combination of the electrical operated directional control valve and the hydraulic operated directional control valve. It uses the electrical operated directional control valve to control the hydraulic operated directional control valve, and change the hydraulic oil direction.

Electro–hydraulic directional control valve and hydraulic operated directional control valve are used mostly in hydraulic systems when electrical operated directional control valve can not afford the flow. It may control the movement of the power elements, or control the direction of the flowing oil.

## Technical specification

| Specification | | 03 | | 04 | | 06 | | 10 | |
|---|---|---|---|---|---|---|---|---|---|
| Model | | FWH–03 | HFWH–03 | FWH–04 | HFWH–04 | FWH–06 | HFWH–06 | FWH–16 | HFWH–16 |
| Max. Working pressure (MPa) | P、A、B Port | 28 | 35 | 28 | 35 | 28 | 35 | 28 | 35 |
| | T port (internal leakage of control oil) | 10 | | 10 | | 10 | | 10 | |
| | Y port (external leakage of control oil) | 10 | | 10 | | 10 | | 10 | |
| Minimum control pressure (MPa) | | 1.0 Spring–Return 4/3 valve 4/2 valve | | 1.2 Spring–Return 4/3 valve 4/2 valve | | 1.3 Spring–Return 4/3 valve 4/2 valve | | 0.8 Spring–Return 4/3 valve 4/2 valve | |
| Maximum control pressure (MPa) | | to25 | | | | | | | |
| Max. Flow (L/min) | | 160 | | 300 | | 650 | | 1100 | |
| Working fluid | | Mineral oil;phosphate–ester | | | | | | | |
| Fluid temp. (℃) | | –20~70 | | | | | | | |
| Viscosity ($mm^2/s$) | | 2.8~380 | | | | | | | |
| Cleanliness | | The maximum allowable cleanliness of the oil should be according to 9th degree of Standard NAS1638.It is suggested that the minimum filter rating should be β 10≥75. | | | | | | | |





# Electro–hydraulic Directional Control Valve

## Model description

＊FWH/FH – ＊ ＊ –＊ – ＊ ＊ ＊ / ＊ ＊ ＊ ＊ ＊ ＊ 50 ＊

Working pressure
Omit 28MPa
H 35MPa

FWH Electro–hydraulic directional control valve
FH Hydraulic operated directional control valve

Specification
03 DN10
04 DN16
06 DN25
10 DN32

Main valve return type
Omit Spring return
H Hydraulic centration

Function code
Details as following symbol table

Working voltage
D12 DC12V
D24 DC24V
A110 AC110V
A220 AC220V
B110 AC110V Rectified
B220 AC220V Rectified

Z5L Square connector with light
Z6 Wire box type

Omit without hand emergency
N9 with concealed hand emergency

Omit without stroke adjusting device
A Head A of main valve with stroke adjustment
B Head B of main valve with stroke adjustment
W Both heads with stroke adjustment

Omit without shifting time adjustment
S With shifting time adjustment: Inlet flow control
S1 shifting time adjustment: Outlet flow control

Omit without damping
08 Φ0.8 Damping
10 Φ1.0 Damping
12 Φ1.2 Damping

Omit Intl cntrl intl disch
XY Extl cntrl extl disch
X Extl cntrl intl disch
Y Intl cntrl extl disch

[2] Omit No reducing valve
D3 With reducing valve

[1] Omit Without pre–load valve
P4.5 With pre–load valve

Remarks

Serial number

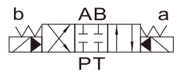
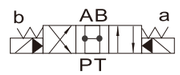
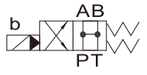
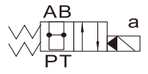
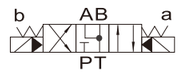
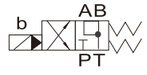
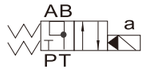
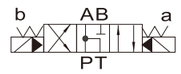
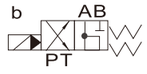
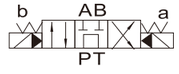
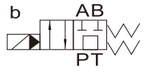
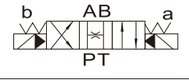
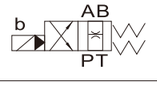
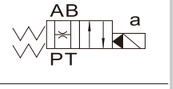
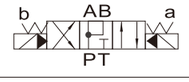
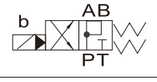
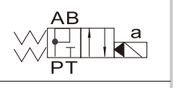
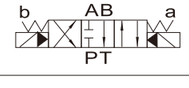
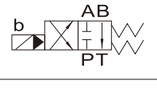
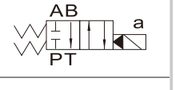
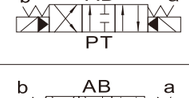
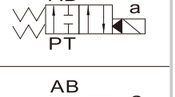
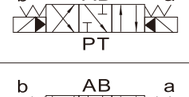
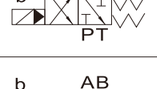
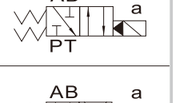
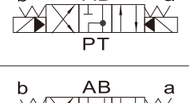
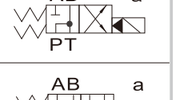
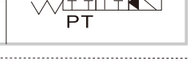
Seal material
Omit NBR Seals
V FPM Seals

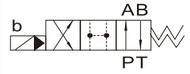
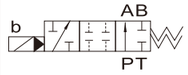
Explaination
1.For neutral unloaded directional control valve it must be ordered separately.
There is no model (FWH–03)Electro–hydraulic directional control valve NS10.
2.Only applied when the controlling pressure is higher than 25MPa

# Electro–hydraulic Directional Control Valve

## Code symbol

Spring return

| | | | | | |
|---|---|---|---|---|---|
| 3C2 |  | 2B2B |  | 2B2BL |  |
| 3C3 |  | 2B3B |  | 2B3BL |  |
| 3C4 |  | 2B4B |  | 2B4BL |  |
| 3C5 |  | 2B5B |  | 2B5BL |  |
| 3C6 |  | 2B6B |  | 2B6BL |  |
| 3C7 |  | 2B7B |  | 2B7BL |  |
| 3C9 |  | 2B9B |  | 2B9BL |  |
| 3C10 |  | 2B10B |  | 2B10BL |  |
| 3C11 |  | 2B11B |  | 2B11BL |  |
| 3C12 |  | 2B12B |  | 2B12BL |  |
| 3C25 |  | 2B25B |  | 2B25BL |  |
| 3C29 |  | 2B29B |  | 2B29BL |  |

| | |
|---|---|
| 2B2 |  |
| 2B3 |  |
| 2B8 |  |

| | |
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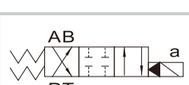
| 2B2L |  |
| 2B3L |  |
| 2B8L |  |

| | |
|---|---|
| FWH–... |  |
| FWH–... X/... |  |
| FWH–... Y/... |  |
| FWH–... XY/... |  |





# Electro–hydraulic Directional Control Valve

## Name of solenoid




1. aWhen movement a, P→A B→T
2. bWhen movement b, P→B A→T
3. 3C6 Oil flow in the opposite direction with the above–mentioned movement.
   Foor 3C29, when solenoid “a” works , P → A,B

## 03 Specification Performance curve ( Measured at υ =41mm²/s and t=50℃ )




| Function | Switching position | | | |
|---|---|---|---|---|
| Symbol | P→A | P→B | A→T | B→T |
| 3C2 | 1 | 2 | 4 | 5 |
| 3C5 | 1 | 4 | 1 | 1 |
| 3C6 | 4 | 2 | 2 | 6 |
| 3C3 | 4 | 4 | 1 | 4 |
| 3C4 | 1 | 2 | 1 | 3 |
| 3C12 | 2 | 3 | 1 | 4 |
| 3C9 | 4 | 4 | 3 | 4 |
| 3C25 | 4 | 1 | 3 | 4 |
| 3C29 | 2 | 3 | 3 | 5 |
| 3C10 | 3 | 3 | 3 | 4 |
| 3C7 | 2 | 2 | 3 | 5 |

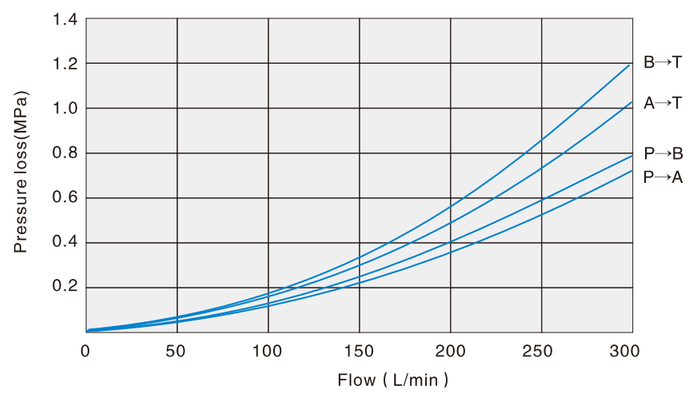
| Function | Neutral | | |
|---|---|---|---|
| | A→T | B→T | P→T |
| 3C5 | 3 | – | 6 |
| 3C6 | – | – | 7 |
| 3C3 | 1 | 3 | 5 |
| 3C25 | – | 7 | 5 |

| Function | Neutral | | |
|---|---|---|---|
| | A→T | B→T | P→T |
| 3C12 | 3 | – | – |
| 3C10 | – | 4 | – |

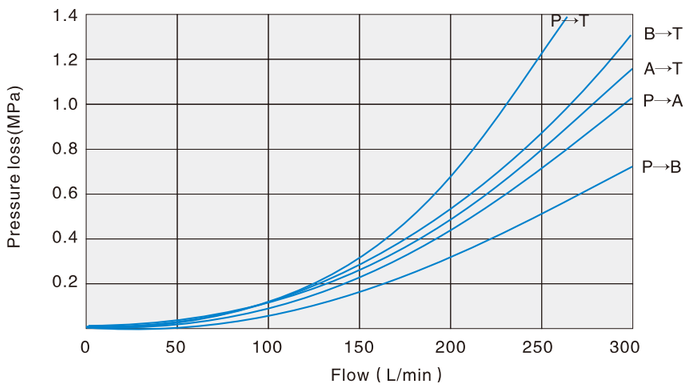
# Electro–hydraulic Directional Control Valve

**04 Specification** Performance curve ( Measured at υ =41mm²/s and t=50℃ )

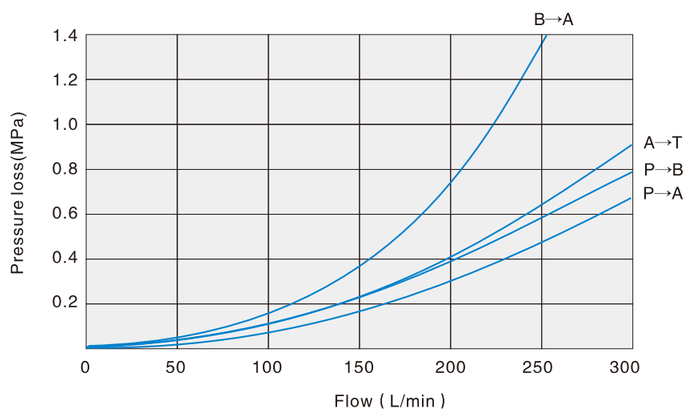
3C2




3C6




3C29

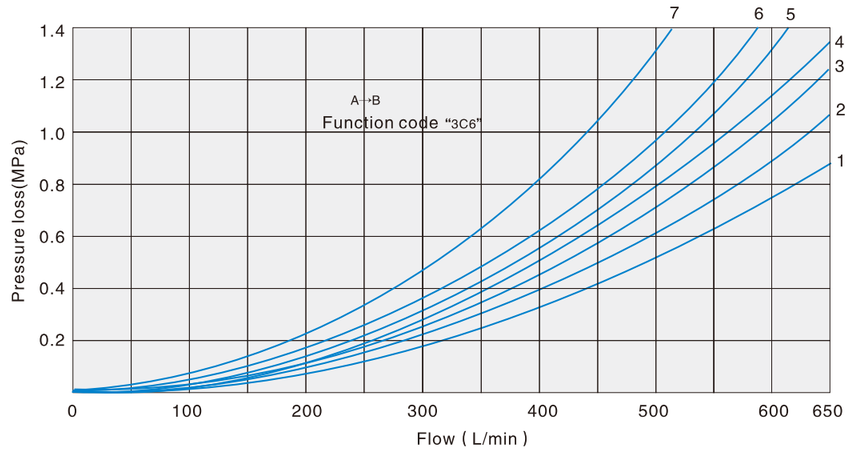







# Electro–hydraulic Directional Control Valve

**06 Specification** Performance curve ( Measured at υ =41mm²/s and t=50℃ )

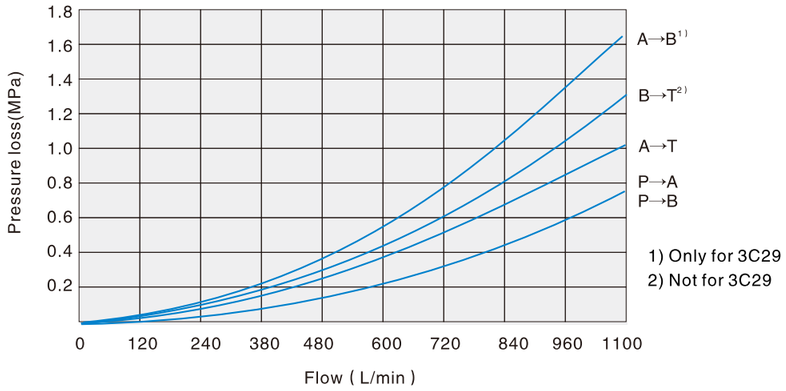



| Function | Switching position | | | |
|---|---|---|---|---|
| | P→A | P→B | A→T | B→T |
| 3C2 | 1 | 1 | 1 | 3 |
| 3C5 | 1 | 4 | 3 | 3 |
| 3C6 | 3 | 1 | 2 | 4 |
| 3C3 | 4 | 4 | 3 | 4 |
| 3C4 | 2 | 2 | 3 | 5 |
| 3C12 | 2 | 2 | 3 | 3 |
| 3C9 | 4 | 4 | 1 | 4 |
| 3C25 | 4 | 1 | 1 | 5 |
| 3C29 | 2 | 1 | 1 | – |
| 3C10 | 2 | 1 | 1 | 6 |
| 3C7 | 4 | 4 | 3 | 6 |

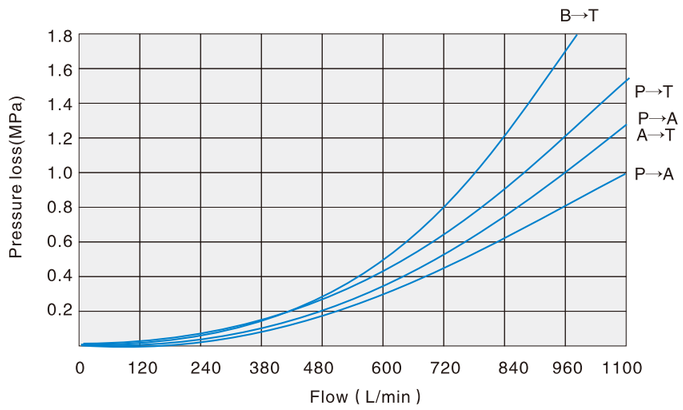
7.Function code "3C6" type, neutral position P→T
8.Function code "3C29" type, control position A→B

## 10 Specification Performance curve ( Measured at υ=41mm²/s and t=50℃ )

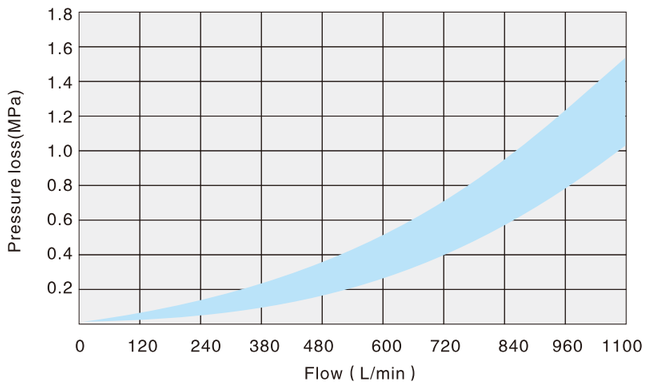
3C2、3C4、3C29




3C6



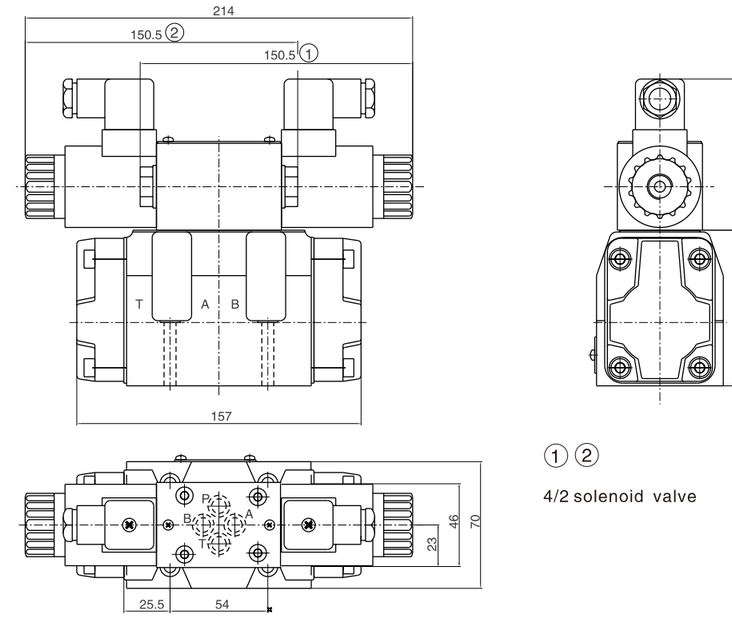

Other spool types



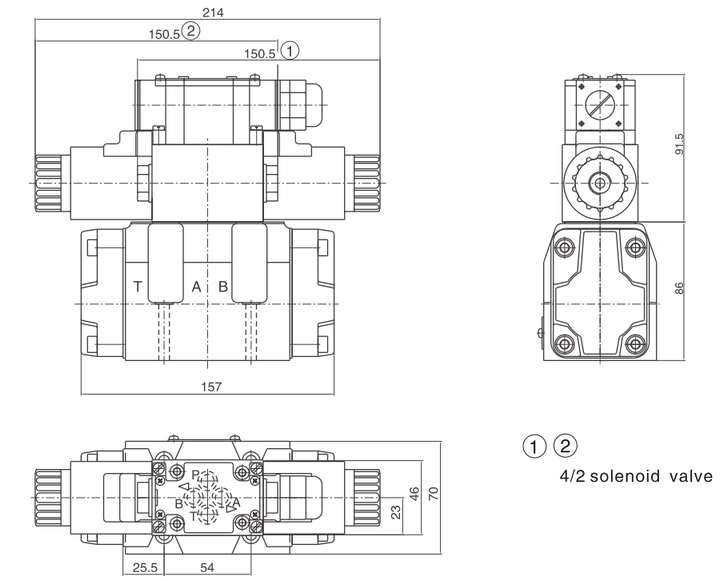





## External dimensions ( 03 Direct current plug type )

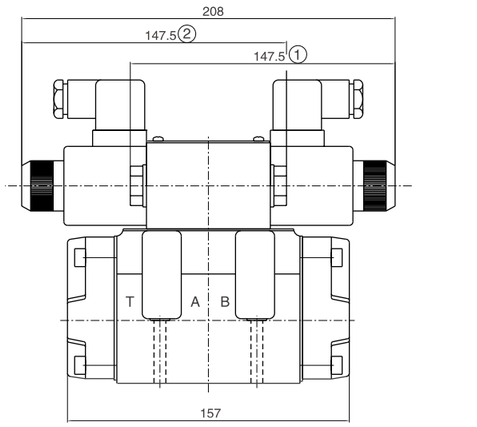


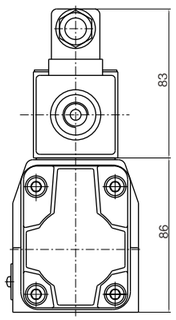

## External dimensions ( 03 Direct current wire box type )



# Electro–hydraulic Directional Control Valve

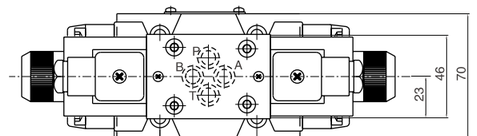
## External dimensions ( 03 Alternating current plug type )



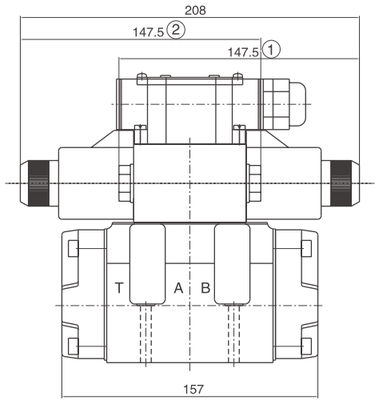



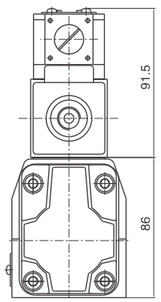

① ②

4/2 solenoid valve



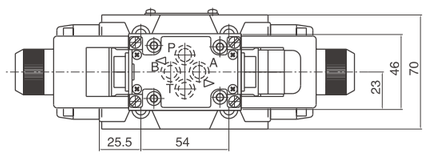

## External dimensions ( 03 Alternating current wire box type )




① ②

4/2 solenoid valve

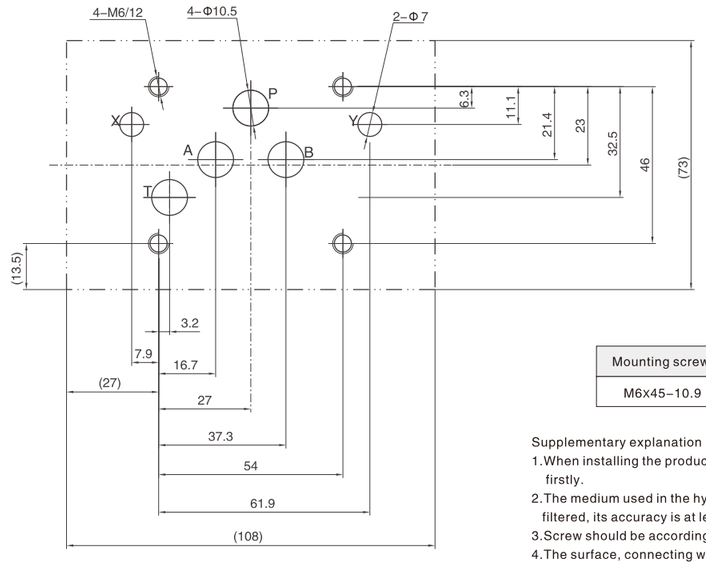







# Electro–hydraulic Directional Control Valve

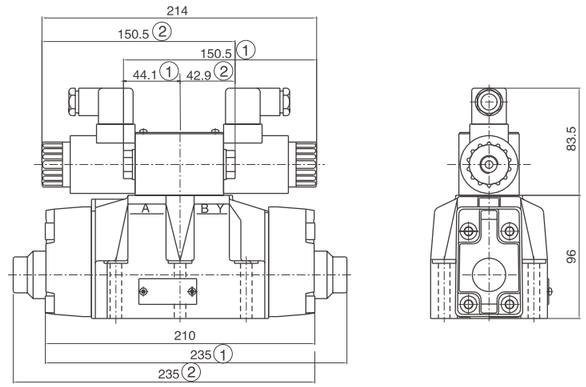
## 03 Size of subplate oil port




| Mounting screw | Amount | Tighten torque |
|---|---|---|
| M6x45–10.9 | 4 | 15Nm |

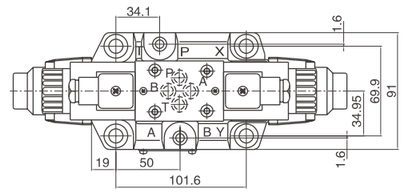
Supplementary explanation
1.When installing the product, considering horizontal position firstly.
2.The medium used in the hydraulic system must be filtered, its accuracy is at least 20 μ m.
3.Screw should be according to the parameters in catalogue.
4.The surface, connecting with the valve, should be Ra0.8 roughness, and 0.01/100mm flatness.

## External dimensions ( 04 Direct current plug type )







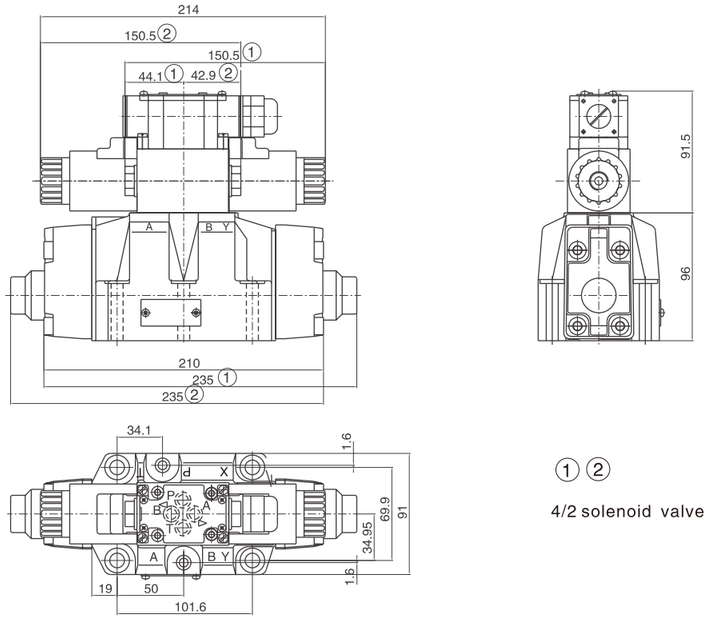



① ②

4/2 solenoid valve

# Electro–hydraulic Directional Control Valve

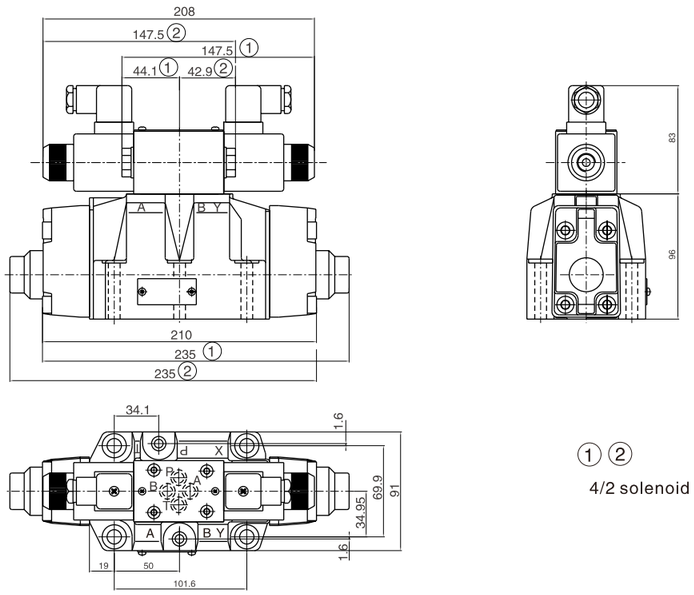
## External dimensions ( 04 Direct current wire box type )




① ②

4/2 solenoid valve

## External dimensions ( 04 Alternating current plug type )




① ②

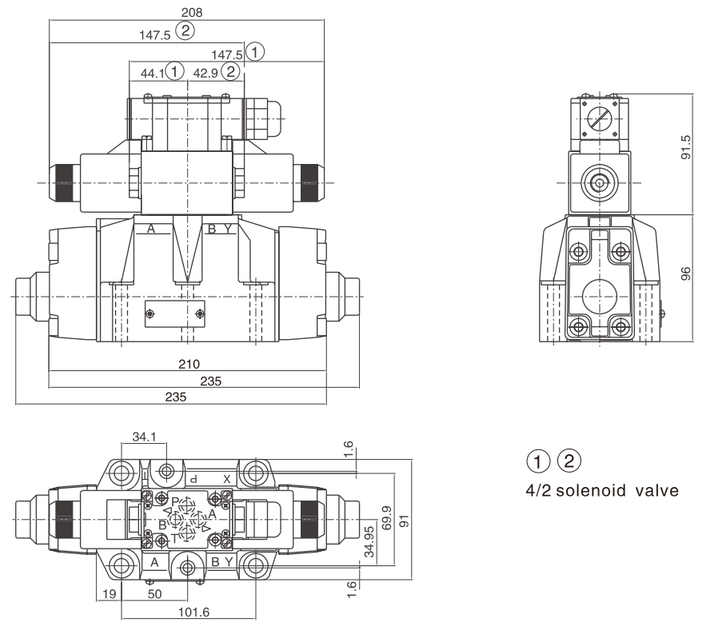
4/2 solenoid valve





# Electro–hydraulic Directional Control Valve

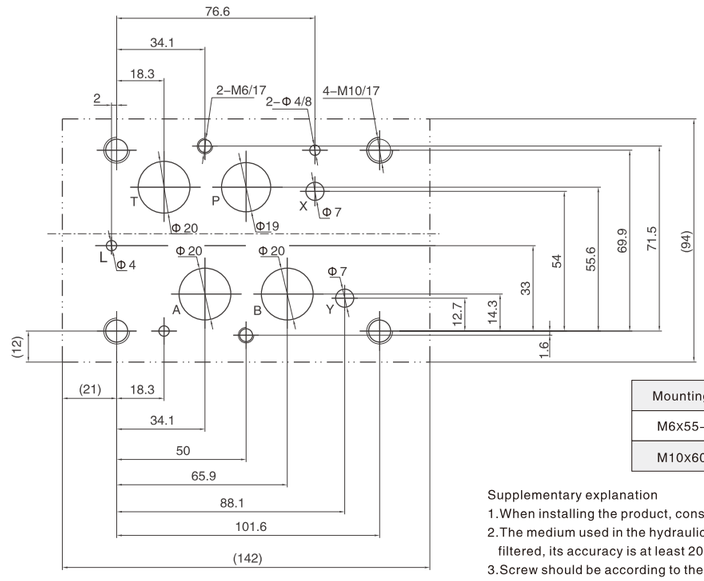
## External dimensions ( 04 Alternating current wire box type )




① ②

4/2 solenoid valve

## 04 Size of subplate oil port



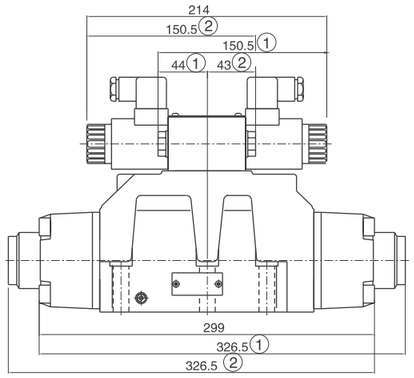

| Mounting screw | Amount | Tighten torque |
|---|---|---|
| M6x55–10.9 | 2 | 15Nm |
| M10x60–10.9 | 4 | 75Nm |

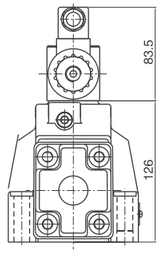
Supplementary explanation

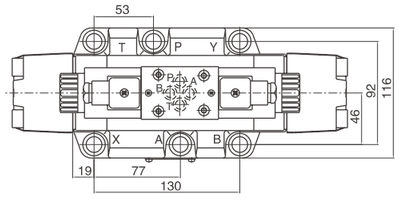
1.When installing the product, considering horizontal position firstly.
2.The medium used in the hydraulic system must be filtered, its accuracy is at least 20 μ m.
3.Screw should be according to the parameters in catalogue.
4.The surface, connecting with the valve, should be Ra0.8 roughness, and 0.01/100mm flatness.

# Electro–hydraulic Directional Control Valve

## External dimensions ( 06 Direct current plug type )



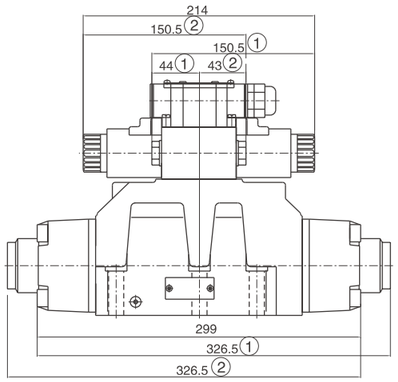



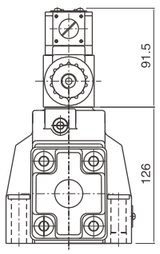



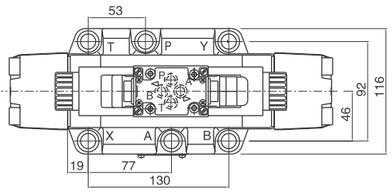

① ②

4/2 solenoid valve

## External dimensions ( 06 Direct current wire box type )




① ②

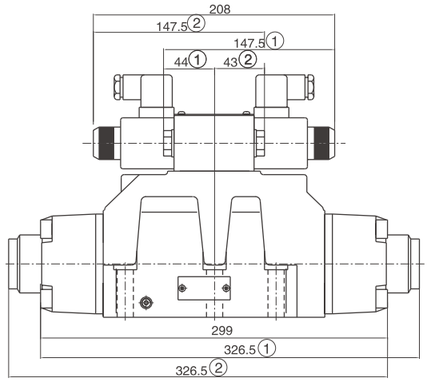
4/2 solenoid valve

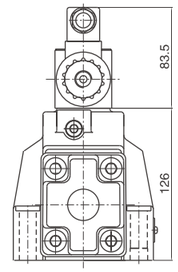


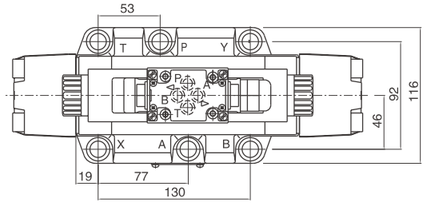


# Electro–hydraulic Directional Control Valve

## External dimensions ( 06 Alternating current plug type )



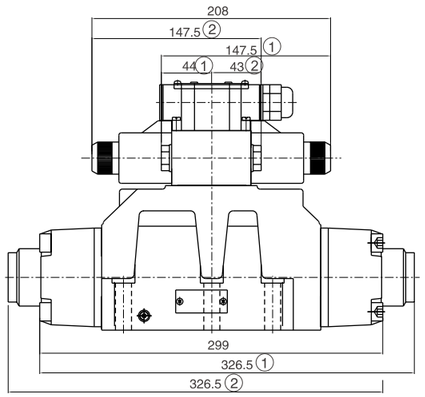



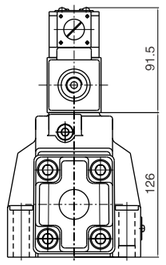



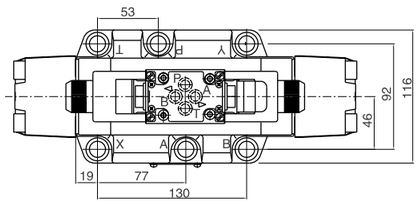

① ②

4/2 solenoid valve

## External dimensions ( 06 Alternating current wire box type )



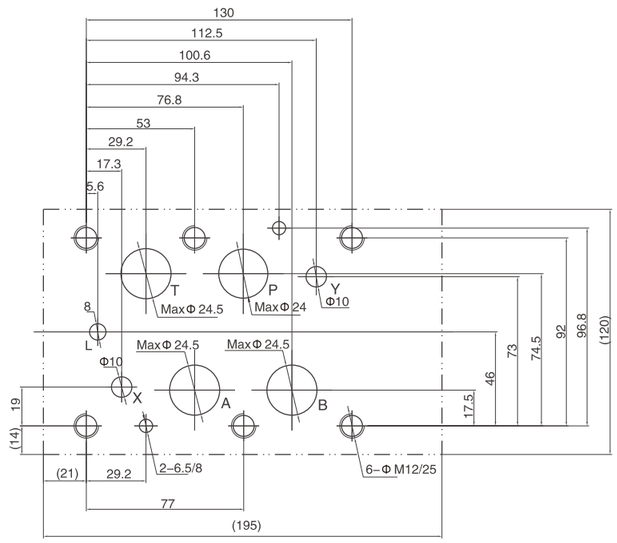




① ②

4/2 solenoid valve

# Electro–hydraulic Directional Control Valve

## 06 Size of subplate oil port

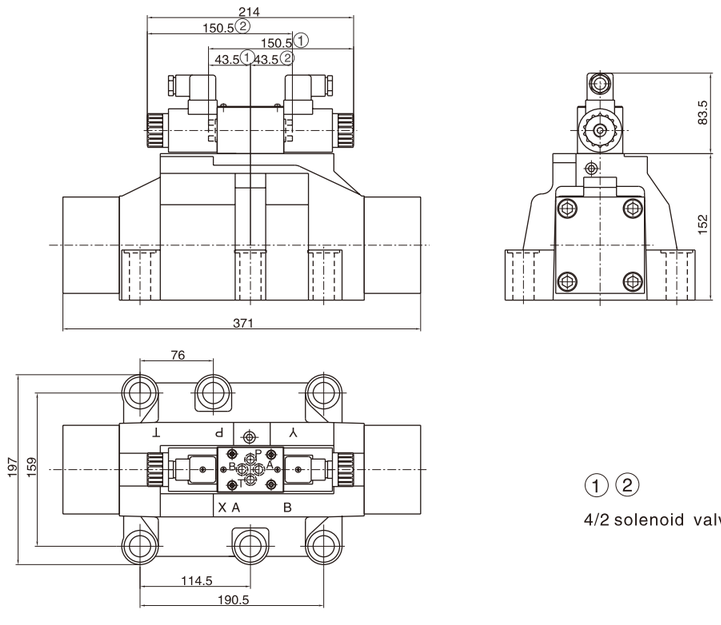



| Mounting screw | Amount | Tighten torque |
|---|---|---|
| M12x60–10.9 | 6 | 130Nm |

Supplementary explanation

1. When installing the product, considering horizontal position firstly.
2. The medium used in the hydraulic system must be filtered, its accuracy is at least 20 μ m.
3. Screw should be according to the parameters in catalogue.
4. The surface, connecting with the valve, should be Ra0.8 roughness, and 0.01/100mm flatness.

## External dimensions ( 10 Direct current plug type )




① ②

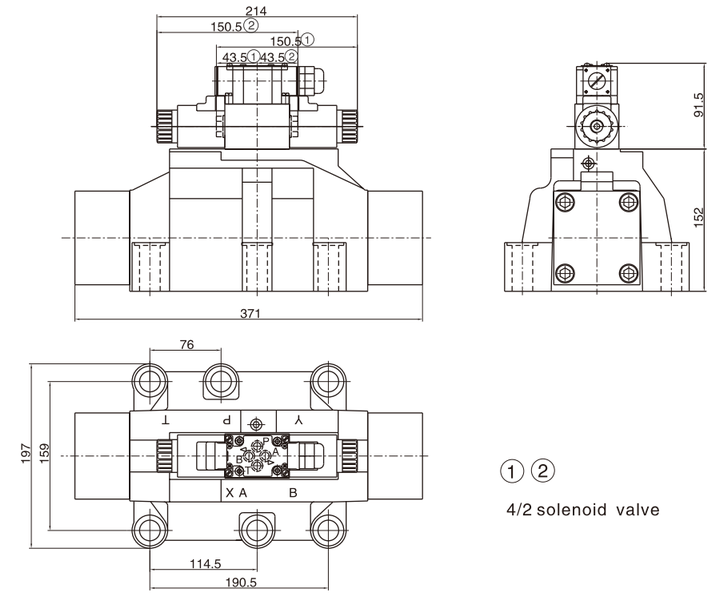
4/2 solenoid valve





# Electro–hydraulic Directional Control Valve

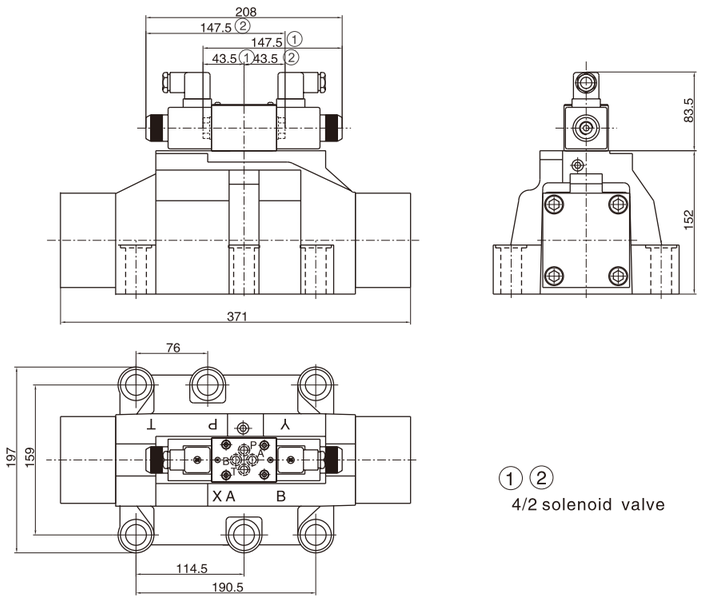
## External dimensions ( 10 Direct current wire box type )




① ②

4/2 solenoid valve

## External dimensions ( 10 Alternating current plug type )

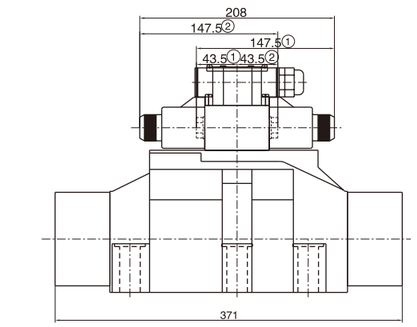


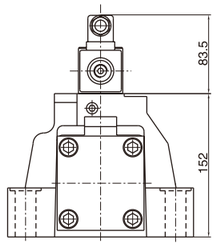

① ②

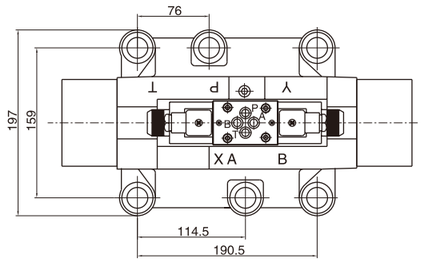
4/2 solenoid valve

# Electro-hydraulic Directional Control Valve

## External dimensions ( 10 Alternating current wire box type )

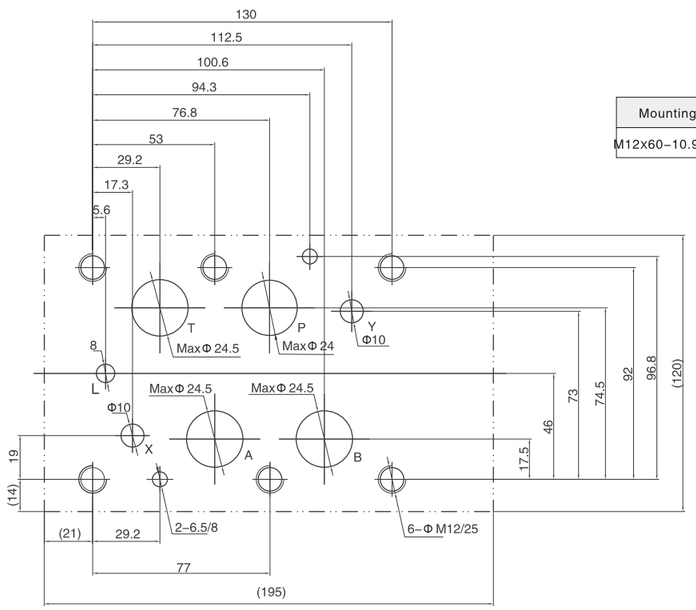



① ②
4/2 solenoid valve

## 10 Size of subplate oil port




| Mounting screw | Amount | Tighten torque |
|---|---|---|
| M12x60-10.9 | 6 | 130Nm |

Supplementary explanation
1. When installing the product, considering horizontal position firstly.
2. The medium used in the hydraulic system must be filtered, its accuracy is at least 20 μ m.
3. Screw should be according to the parameters in catalogue.
4. The surface, connecting with the valve, should be Ra0.8 roughness, and 0.01/100mm flatness.





# Manual operated Directional Control Valve

## Technical specification

| Specification | | 02 | 03 | 04 | 06 |
|---|---|---|---|---|---|
| Working pressure ( MPa ) | Port P、A、B | 31.5 | | | |
| | Port T | 10 | | | |
| Max. Flow | (L/min) | 60 | 100 | 300 | 450 |
| Working fluid | | Mineral oil;phosphate-ester | | | |
| Fluid temp. | (℃) | -20~70 | | | |
| Viscosity | ($mm^2/s$) | 2.8~380 | | | |
| Weight | (kg) | About 1.4 | About 3.3 | About 8 | About 17 |
| Cleanliness | | The maximum allowable cleanliness of the oil should be according to 9th degree of Standard NAS1638.It is suggested that the minimum filter rating should be β 10≥75. | | | |

Manual operated directional control valve is a directional control valve, by operating the handle, the spool moves in the axial direction to achieve oil loop switching.

Manual operated directional control valve and electrical operated directional control valve are played the same role in the hydraulic system. Easy operation, reliable work, and without the need for electricity.

## Model description

FS - ＊ - ＊ / ＊ ＊ ＊ 50 ＊

Manual operated directional control valve

Specification
02 DN6
03 DN10
04 DN16
06 DN25

Function code
Details as following symbol table

Omit Spring return
OF With detent

Seal material
Omit NBR Seals
V FPM Seals

Omit without damping
08 Φ0.8 Damping
10 Φ1.0 Damping
12 Φ1.2 Damping

Remarks

Serial number