Multistage Electro-hydraulic Pilot Relief Valve

Model: DB2U...5X

- Size 10 to 32
- Maximum working pressure 350 bar
- Maximum working flow 600 L/min

Contects

Features

- Subplate mounting
- Threaded connection
- Cartridge connection
- Two-stage pressure setting
- Controlled by solenoid directional valve
- Pressure adjusting forms:
  Rotary knob
  Internal hexagon screw with protective cap
  Lockable rotary knob with scale

Function description, sectional drawing

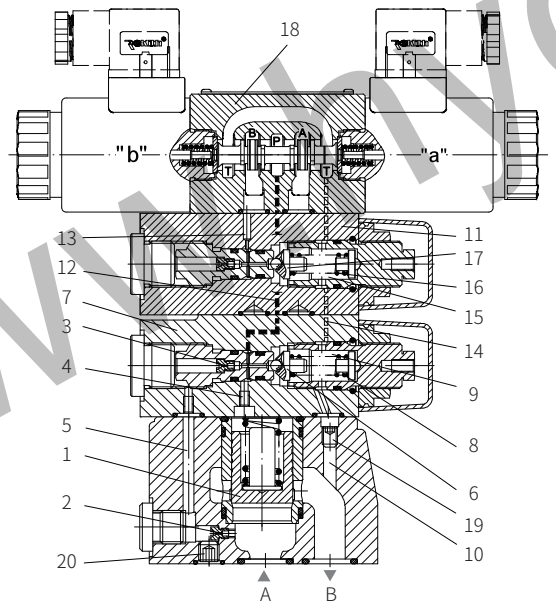
The DB2U...-5X/ valve is pilot controlled two-stage concentric type multistage relief valve (two-stage). The main valve and pilot valve are both seat valve. The valve is used to control the system pressure, and it may switch the system pressure to the secondary pressure by the solenoid directional valve.
DB2U valve mainly consists of main valve, 4/3-way(H type) or 4/2-way(D type) solenoid directional valve (size 6), and two pilot valves, the pilot valve (11) is a direct operated relief valve.

Model DB2U...H...-5XJ

When the solenoid is de-energized, the fluid at port A of main valve acts on bottom of main spool (1), and via orifice (2), channel (5), orifice (3), channel (12), port P and T of pilot solenoid valve (18), spring chamber (15) of pilot valve (11), channel (14), spring chamber (9) of pilot valve (7), channel (10) back to tank (pilot oil drain internal), or via external outlet back to tank (pilot oil drain external). Thus, a differential pressure is formed on the main spool when the pressure oil flow through the orifices (2 and 3) and it opens the main spool to make the relief valve unloading.
When solenoid "b" is energized, the fluid of pilot solenoid valve (18) flows from P to A and B to T, at this time the pressure oil of the secondary pilot valve (11) via channel (13), port B and T of pilot solenoid valve, spring chamber (15), channel (14), spring chamber (9) and channel (10) back to tank, then the secondary pilot valve is unloading. The pressure oil of the pilot valve (7) acts on the valve spool (6) through orifice (3). When the system pressure exceeds the setting pressure of the spring (8), the valve spool (6) is opened, and the pressure oil at the upper end of the main spool flows back to the oil tank through channels (4 and 10) and spring chamber (9). In this way, a differential pressure is formed on the main spool and opens the main spool (1). The pressure oil flows from A to B at a set pressure as the primary pressure regulation.
When solenoid "a" is energized, it is a secondary pressure regulation under the same principle (note: the setting pressure of the secondary pilot valve should be less than the setting pressure of the primary pilot valve).

Model DB2U...D...-5XJ

It is the primary pressure regulation when solenoid is de-energized, but the secondary pressure regulation when solenoid is energized. This valve doesn't have solenoid unloading function. The switch of different supply and drain modes can be achieved by assembling the conical plugs (19 and 20).



Model DB2U10-H-2-5XJ/

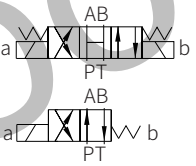
Models and specifications

DB | 2U | | | - | - 5X | / | | | | | | | | | *

- electro-hydraulic relief valve =no code
- pilot valve with main valve spool assembly (plug-in) =C
- two-staged pressure regulation
- size — ordering code

subplate mounting		threaded connection
10	10	10 (G1/2") or 22X1.5
15	-	15 (G3/4") or 27X2
20	20	20 (G1") or 33X2
25	-	25 (G1/4") or M42X2
32	32	30 (G1/2") or M48X2

- subplate mounting =no code
- threaded connection =G



=H

=D

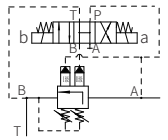
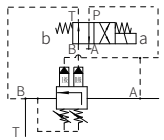
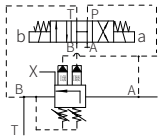
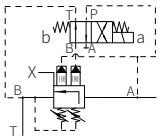
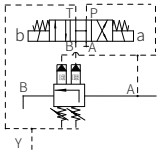
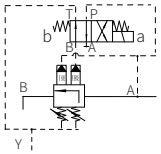
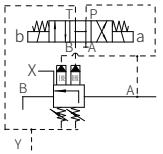
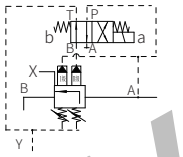
- adjusting element
- rotary knob =1
- internal hexagon screw with protective cap =2
- lockable rotary knob with scale =3

- 50 to 59 series =5X
(50 to 59 series installation and connection size unchanged)

- more information in text
- sealing material
  - No code= NBR seals
  - V= FKM seals
  - (consult for other seals)
- Z4= standard plug
- Z5L= large right angle lamp plug
- no code= no manual emergency operation
- N9= with hidden manual emergency operation
- CW220-50= AC voltage 220V-50Hz
- CG24= DC24V
- CW220R= rectified solenoid
- no code=pilot oil supply and drain internal
- X=pilot oil supply external and drain internal
- Y=pilot oil supply internal and drain external
- XY= pilot oil supply and drain external
- 50= pressure setting up to 5MPa
- 100= pressure setting up to 10MPa
- 200= pressure setting up to 20MPa
- 315= pressure setting up to 31.5MPa
- 350= pressure setting up to 35MPa

02

Functional symbols

Supply and drain internal	DB2U...H.../... 	DB2U...D.../... 
Supply external and drain internal	DB2U...H.../...X 	DB2U...D.../...X 
Supply internal and drain external	DB2U...H.../...Y 	DB2U...D.../...Y 
Supply and drain external	DB2U...H.../...XY 	DB2U...D.../...XY 

Technical parameters

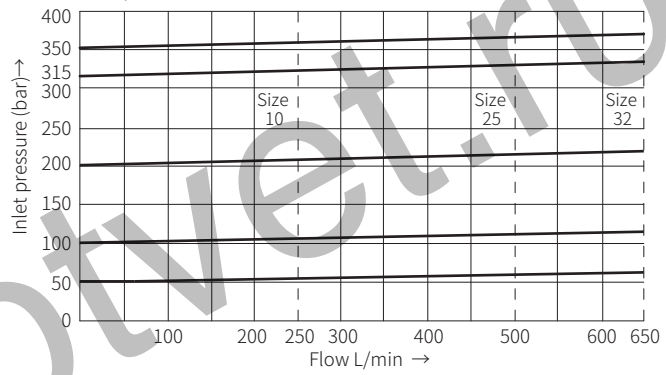
Size		10	15	20	25	30
Flow (L/min)	threaded connection valve	200		400		600
	subplate mounting valve	200	—	400	—	600
Working pressure	Mpa	Port A, B, X to 35				
Port Y back pressure	Mpa	to 31.5				
Minimum setting pressure	Mpa	Related to flow, see characteristic curve				
Maximum setting pressure	Mpa	35				
Medium		Mineral hydraulic oil or phosphate hydraulic oil				
Viscosity range	mm^2/s	10 to 800				
Working medium temperature range	°C	-30 to +80 (NBR seal) -20 to +80 (FKM seal)				
Solenoid valve characteristic		See 4WE6 solenoid valve				

Characteristic curve

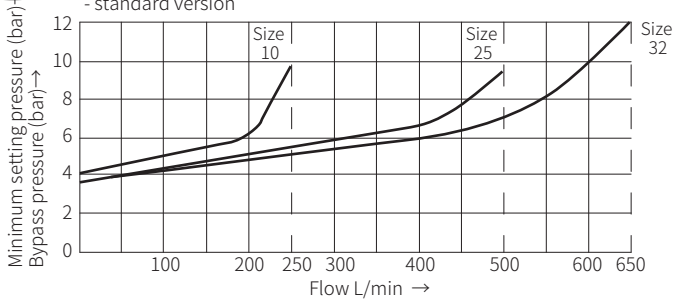
(Measured when using HLP46, ϑ_{oil}=40°C ± 5°C)

The curve was measured at zero pressure for externally controlled oil leakage.
For internal control oil return, the pressure at port B is added to the command value.

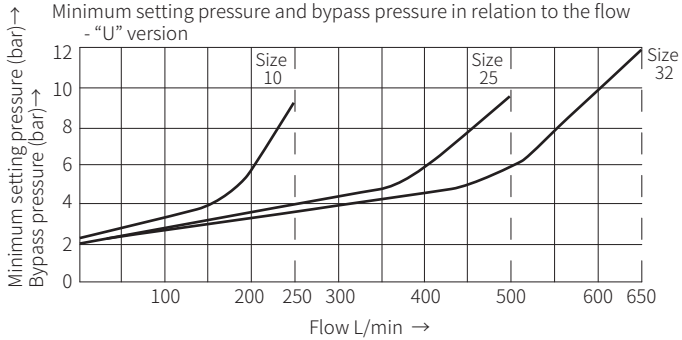
Inlet pressure in relation to the flow



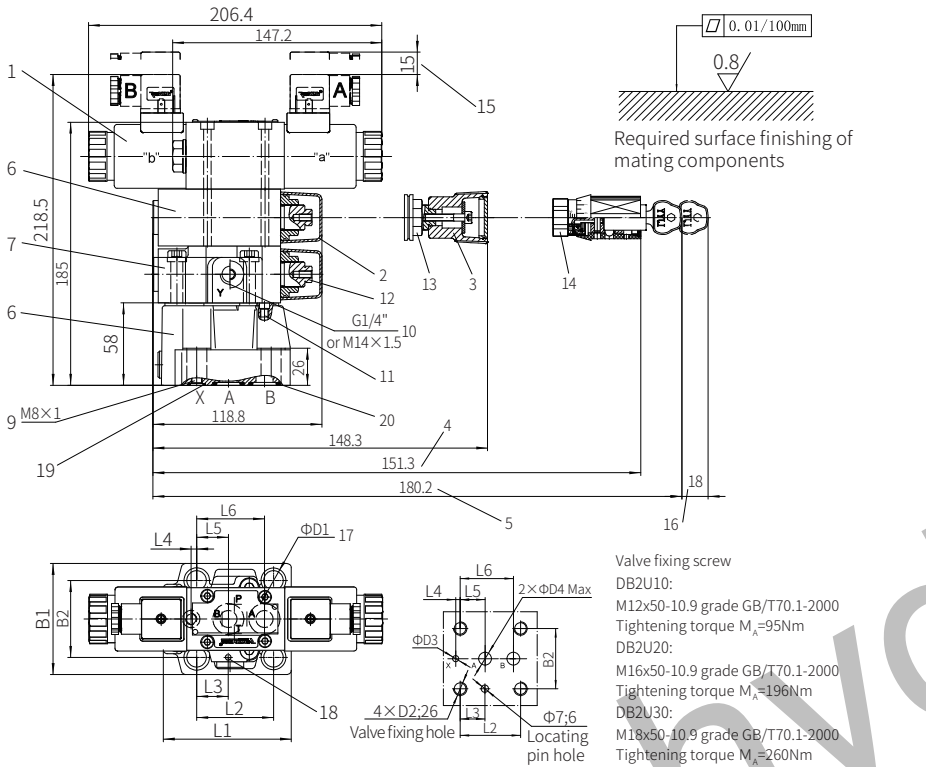
Minimum setting pressure and bypass pressure in relation to the flow
- standard version



Minimum setting pressure and bypass pressure in relation to the flow
- "U" version



Subplate mounting valve model DB2U...-5XJ/...



Valve fixing screw
DB2U10:
M12x50-10.9 grade GB/T70.1-2000
Tightening torque M_A=95Nm
DB2U20:
M16x50-10.9 grade GB/T70.1-2000
Tightening torque M_A=196Nm
DB2U30:
M18x50-10.9 grade GB/T70.1-2000
Tightening torque M_A=260Nm

Size	L1	L2	L3	L4	L5	L6	B1	B2	D1	D2	D3	D4
10	90	53.8	22.1	0	22.1	47.5	78	53.8	14	M12	6	12
20	117	66.7	33.4	23.8	11.1	55.6	100	70	18	M16	6	22
30	149.3	88.9	44.5	31.8	12.7	76.2	115	82.6	20	M18	7	30

1 Solenoid directional valve (type H, type D, optional)
2 Adjustment form "2"
3 Adjustment form "1"
4 Adjustment form "3"
5 Adjustment form "7"
6 Secondary pilot valve
7 Primary pilot valve
8 Main valve
9 Port X for external pilot oil supply
10 Port Y for external pilot oil drain (G1/4" and M14x 1.5, optional)
11 Omitted with internal pilot oil drain
12 External hexagon screw S=10
13 Hexagon nut S=24
14 External hexagon screw S=24
15 Space required to remove the plug
16 Space required to remove the key
17 Valve screw fixing holes
18 Locating pin hole
19 O ring 9.25x1.78(for port X)
20 DB2U10:
O ring 17.12x2.62(for port A, B)
DB2U20:
O ring 28.17x3.53(for port A, B)
DB2U30:
O ring 34.52x3.53(for port A, B)

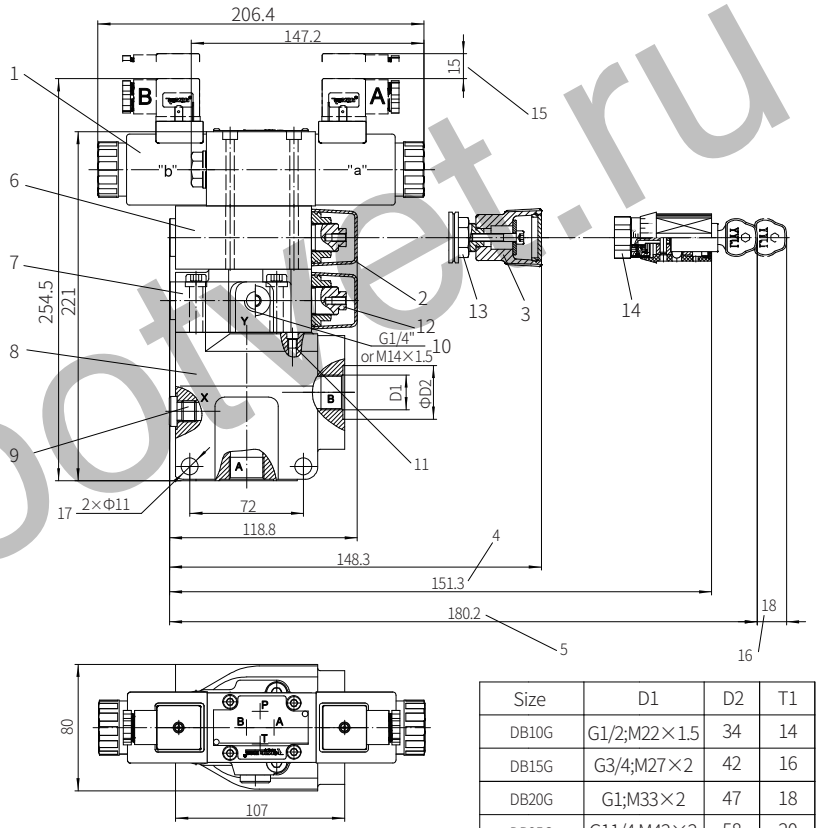
It must be ordered separately if connection subplate is needed

DB2U10 Subplate model:
G545/01(G3/8") ; G545/02 (M18x1.5)
G546/01(G1/2") ; G546/02(M22x1.5)

DB2U20 Subplate model:
G408/01(G3/4") ; G408/02 (M27x2)
G409/01(G1") ; G409/02 (M33x2)

DB2U30 Subplate model:
G410/01(G11/4") ; G410/02 (M42x2)
G411/01(G11/2"); G411/02(M48x2)

Threaded connection valve model DB2U...G...-5XJ/...



Size	D1	D2	T1
DB10G	G1/2;M22×1.5	34	14
DB15G	G3/4;M27×2	42	16
DB20G	G1;M33×2	47	18
DB25G	G11/4;M42×2	58	20
DB30G	G11/2;M48×2	65	22

1 Solenoid directional valve (type H, type D, optional)
2 Adjustment form "2"
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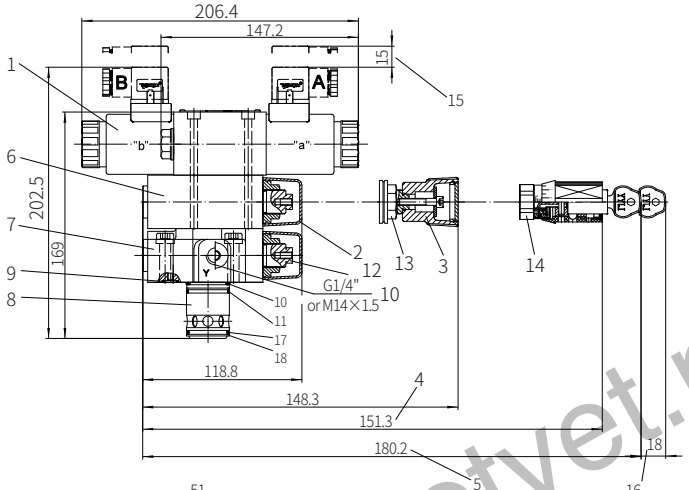
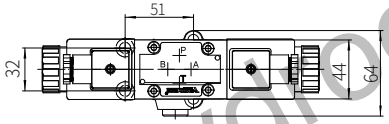
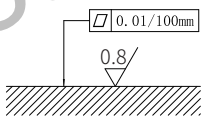
6 Secondary pilot valve
7 Primary pilot valve
8 Main valve
9 Port X for external pilot oil supply
10 Port Y for external pilot oil drain (G1/4" and M14x 1.5, optional)
11 Omitted with internal pilot oil drain
12 External hexagon screw S=10
13 Hexagon nut S=24
14 External hexagon screw S=24
15 Space required to remove the plug
16 Space required to remove the key
17 Valve screw fixing holes

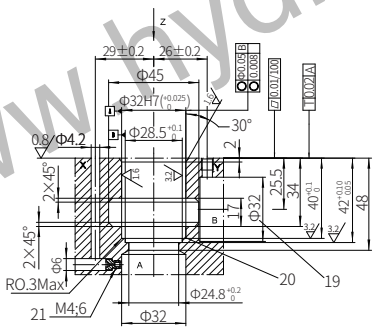
with (DBC2U10 or 30) or without (DBC2U)

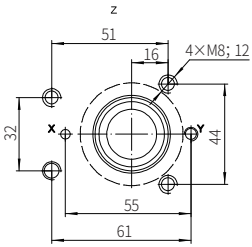






Required surface finishing of mating components





1 Solenoid directional valve (type H, type D, optional)
2 Adjustment form "2"
3 Adjustment form "1"
4 Adjustment form "3"
5 Adjustment form "7"
6 Secondary pilot valve
7 Primary pilot valve
8 Main spool
9 O ring 9.25x1.78
10 O ring 28x2.65
11 O ring 28x1.8
12 External hexagon screw S=10
13 Hexagon nut S=24
14 External hexagon screw S=24
15 Space required to remove the plug
16 Space required to remove the key
17 O ring 27.3x2.4
18 Retainer ring 32x28.4x0.8
19 The Φ32 hole can intersect Φ45 hole at any position
Be careful not to damage oil port X and fixing holes
20 The retainer ring and O-ring should be installed in this hole before install main spool
21 Throttle must be ordered separately

Valve fixing screw
M8x40-10.9 grade GB/T70.1-2000
Tightening torque M_A=34.3Nm
it must be ordered separately
if connection subplate is needed
G51/01(G1/4") ; G51/02 (M14x1.5)