

## BFFW Feedback Oransal Yön Kontrol Valfi

### BFFW Proportional Directional Valve



The 4/2-and 4/3-way directly operated proportional directional valves, Spool with electrical position feedback. Type BFWE and BFWNE

Nominal size 6 and 10  
Component series 2X  
Maximum operating pressure 315bar  
Maximum flow 80L/min DN 6 (DN6)  
Maximum flow 80L/min DN 10 (DN10)

#### Technical data (For application outside these parameters please consult with us)

Specification		DN 6	DN 10
Installation position		optional, preferably horizontal	
Storage temperature range	(°C)	-20~80	
Ambient temperature range (°C)	BFWE	-20~70	
	BFWNE	-20~50	
Weight (kg)	BFWE	2.2	6.3
	BFWNE	2.4	6.5

#### Tested under the condition of (P=100bar, Mineral oil HLP4+, 40C±5C )

Operating pressure ( bar )	PortsA, B, P	to 315	
	Port T	to 210	
Nominal flow When $q_{vnom}$ Max at p=10 bar ( L/min )		8	25
		16	50
		32	75
Flow (Max. Permissible) ( L/min )		80	180
Pressure fluid	Mineral oil (HL, HLP) to DIN 51 524;For other fluid please consult with us.		
Fluid temp. Range (°C)	-20~80( +40~+50 is preference )		
Viscosity range ( mm²/s )	20~380( 30~46is preference )		
Hysteresis ( % )	≤0.1		
Reversal span ( % )	≤0.05		
Response sensitivity ( % )	≤0.05		
Zero displacement will vary in pressure oil temperature and working temperature.	%/100 ( K )	0.15	
	%/100 ( bar )	0.1	
Cleanliness	Filter is recommended for the highest fluid pollution degree; the lowest specific filtration resistance according to ISO 4406 (C) 20/18/15.		

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### Electrical

Voltage type		direct-current voltage DC	
Command signal BFWNE	Voltage input "A1" (V)	$\pm 10$	
	Current input "F1" (mA)	4~20	
Solenoid coil Resistance ( $\Omega$ )	Numerical value of cooling	2.7	3.7
	Numerical value of the warmth	4.05	5.55
Duty cycle (%)		100	
Coil temperature (max) <sup>2)</sup> (°C)		to 150	
Electrical connection see	BFWNE	( Plug to connect ) DIN 175 301-803 ISO 4400	( Ocket to connect ) DIN 175 301-803 ISO 4400 <sup>3)</sup>
	BFWNE	( Plug to connect ) DIN EN175 201-804	( Ocket to connect ) DINEN175 201-804 <sup>3)</sup>
Type of insulation to DIN 40 050		IP65 has got installed and locked up plug-in connector	

1 ) To have a long service life for the component, we strongly suggest the fluid should be well-filtered frequently.

2 ) Please comply with European Standards DIN EN 563 and DIN EN 982 must be taken into account!

3 ) With HOYEAMachinery Manufacture CO. LTD. control electronics

### Model description

**BFW** \* **E** \* \* \* \* **2X-G24** \* \* \* \*

Proportional  
directional valve

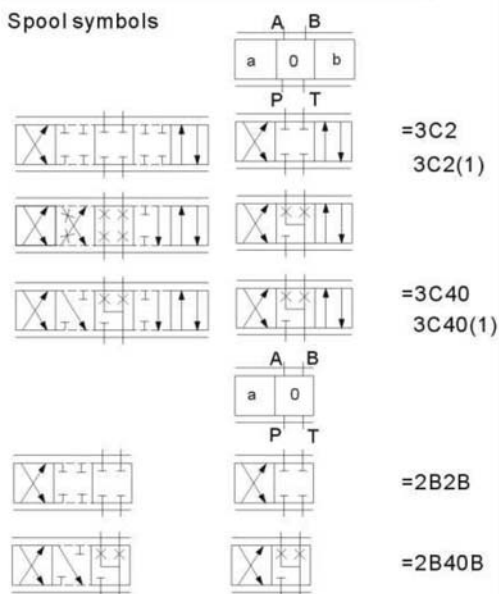
No code Without integrated electronics  
N With integrated electronics

Spool with displacement sensor

02 DN 6

03 DN 10

Spool symbols



With spool symbols: 3C2(1) and 3C40(1)

P→A:  $q_{vmax}$  B→T:  $q_v/2$

P→B:  $q_v/2$  A→T:  $q_{vmax}$

Note:

With spools 3C40 and 2B40B, there is a flow from A to T and B to T with approx. 3 % of the corresponding nominal cross section in zero position.

Further details in clear text

Omit NBR seal  
V FPM seals suitable for mineral oil  
(HL, HLP) to DIN 51 524

No code BFW BFWN  
A1 Command value input  $\pm 10V$   
F1 Command value input 4~20mA

<sup>2)</sup>K4 Electrical connection For BFW (type)  
with plug component DIN EN 175301-803

<sup>2)</sup>K31 with plug component DIN 43 650-AM2

2X= 24V 24 VDC

2X Component series 20 to 29 (20 to 29  
unchanged installation and connection dimensions)

Nominal flow at valve differential pressure  $\Delta p = 10$  bar

DN 6	
08	8 L/min
16	16 L/min
32	32 L/min
DN 10	
25	25 L/min
50	50 L/min
75	75 L/min

# BFFW Feedback Oransal Yön Kontrol Valfi

## BFFW Proportional Directional Valve

### Model description

Directional Proportional valve without integrated electronics

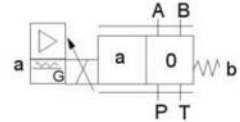
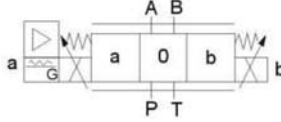
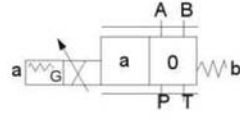
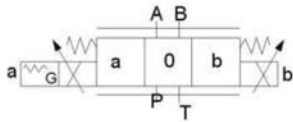
Directional Proportional valve with integrated electronics

Model BFWE...

Model BFWE...2B2B ( 2B40B )

Model BFWNE...

Model BFWNE...2B2B ( 2B40B )



### Structure and function description, section

The 4/2-way and 4/3-way proportional directional valves are designed as direct-operated components for subplate mounting. They are actuated by means of proportional solenoid with central removable coil. The solenoid are controlled either by external control electronics (type BFWE) or integrated control electronics (type BFWNE)

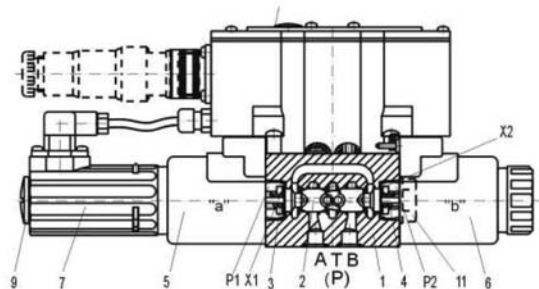
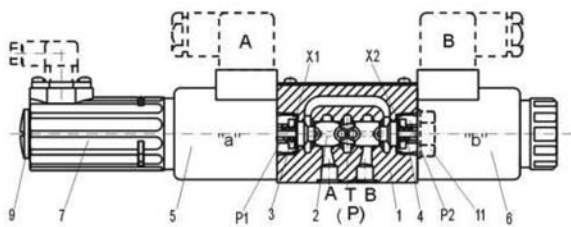
#### Design:

The valves basically consist of:

- Body (1) with mounting surface
- Control spool (2) with compression springs (3 and 4)
- Solenoids (5 and 6) with central coil
- Optional integrated electronics (7)

#### Function:

- When solenoids (5 and 6) do not work, the control spool (2) is held in the central position by compression springs (3 and 4)
- Direct actuation of the control spool (2) by energising a proportional solenoid E.g. When the solenoid "b" power is on (6)
  - The control spool (2) is moved to the left in proportion to the electrical input signal
  - connection from P to A and B to T via orifice-like crosssections with progressive flow characteristics
- When the solenoid power is off (6)
  - The control spool (2) is returned to the central position by compression spring (3)



### Valve with 2 spool positions:

In theory, the function of this valve is the same to the valve with 3 positions. However, the valves with 2 positions are only fitted with solenoid "a" ( 5 ). Instead of the 2nd proportional solenoid a plug (11) is fitted with a cover for DN 6 or for DN 10 (11).

Note for type BFW-02...2X/...:

Draining of tank line is to be avoided. With the appropriate installation conditions, a back pressure valve is to be installed (back pressure approx. 2 bar).

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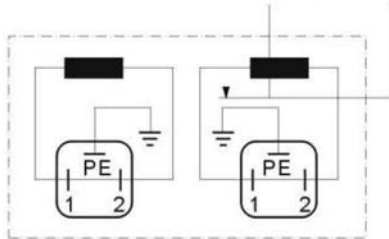
## BFFW Proportional Directional Valve

### Electrical connection, plug-in connectors

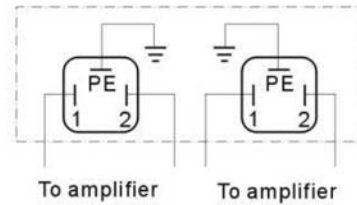
BFFE type (Without integrated electronics not for version "J"=sea water resistant)

Plug-in connector: CECC 75 301-803-A002FA-H3D08-G/DIN EN 175 301-803 (and) ISO 4400

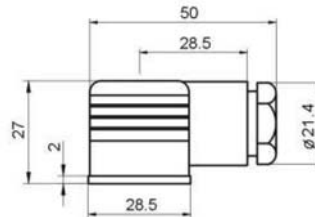
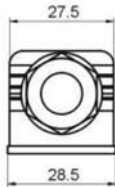
Connection on component plug



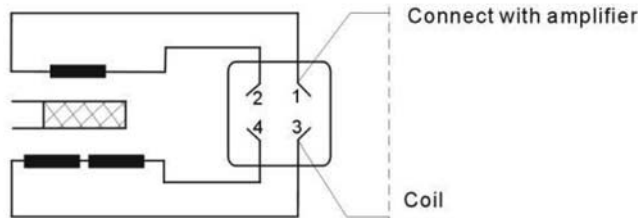
Connection on plug-in connector



### Outlook size of plug-in connector

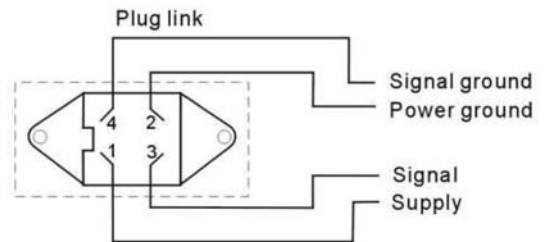


### The wiring of the coil of the inductive displacement pick-up

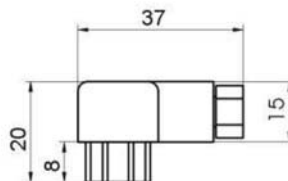
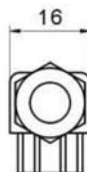


Four-square plug  
Link

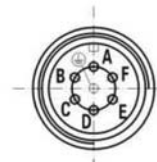
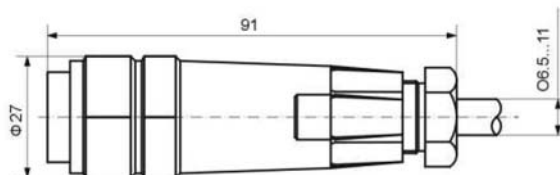
Suggestion: the length of the wire is expected to be 50 meters, type LiYCY 4\*0.25mm<sup>2</sup>



### Outlook size of plug-in connector



Plug-in connector: the plug-in connector should be met with the standard: DIN EN 175 201-804



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## BFFW Proportional Directional Valve

### Pin allocation of the component plug

	Plug-in connector	A1 Connector type A1	Connector type F1
Supply	A	24VDC( $u(t)=19.4\sim 35V$ ); $I_{max}=2A$	
voltage	B	0V	
Reference potential(actual value)	C	Link to F; $R_s > 50K\Omega$	Link to F; $R_s < 10\Omega$
Differential amplifier input	D	Com. Value $\pm 10V$ ; $R_s > 50K\Omega$	Com. Value $4\cdots 20mA$ ; $R_s > 100\Omega$
	E	Reference potential set value	
Measuring the output (actual value)	F	Actual value $\pm 10V$ , (Current limiter 5mA)	
	PE	Link to the valve body and low-temperature subjects	

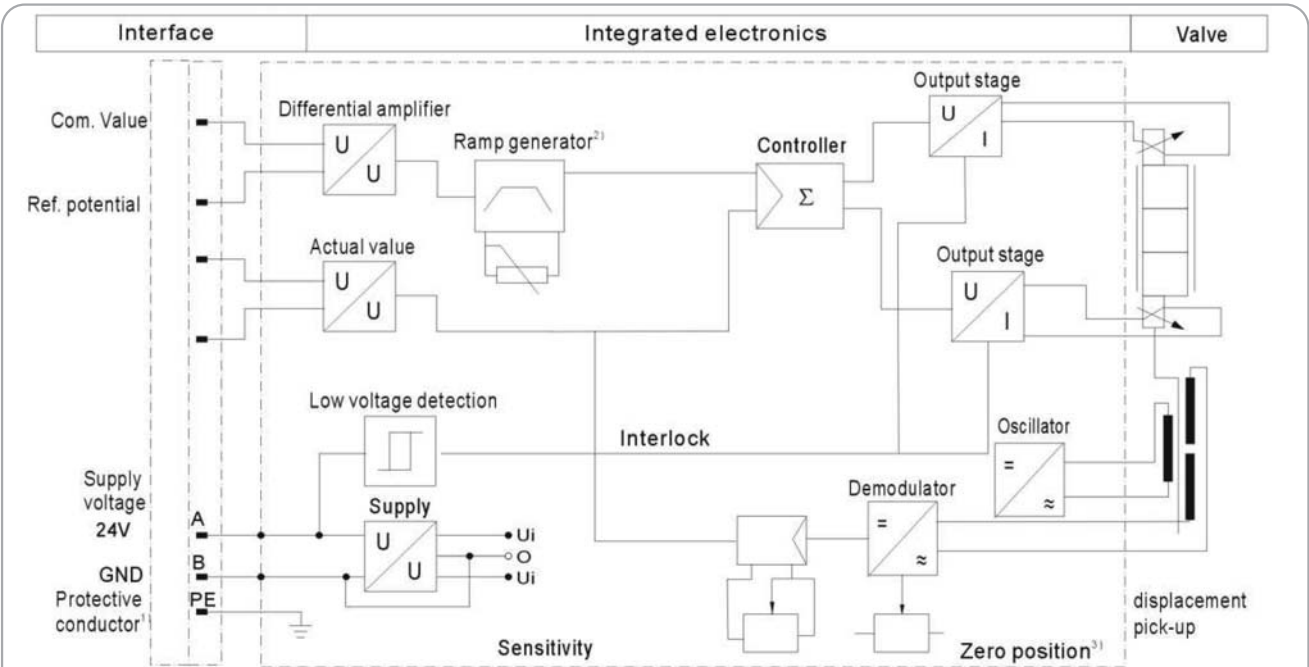
**Com. value :** Positive command value (0 to 10 V or 12 to 20 mA) at D and reference potential to E causes flow from P to A and B to T. Negative command value (0 to 10 V or 12 to 4 mA) at D and reference potential to E causes flow from P to B and A to T. For valves with a solenoid on side "a" (spool variants EA and WA) a positive command value at D and reference potential to E (NS 6: 4 to 20 mA and NS 10: 12 to 20 mA) causes flow from P to B and A to T.

**Actual value :** The actual value (0~10V or 12mA) on the F.C enables the connection from port P to port A.

**Connection cable :** Recommendation:

- up to 25 m cable length type LiYCY 5 x 0.75 mm<sup>2</sup>
- up to 50 m cable length type LiYCY 5 x 1.0 mm<sup>2</sup> External diameter 6.5 to 11 mm
- Connect screen to PE only on the supply side

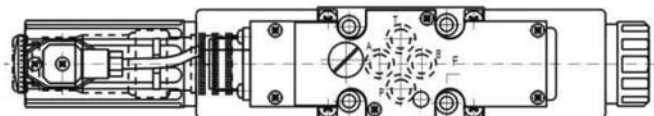
### Block circuit diagram / connection allocation



#### Introductions:

The electrical signal launched from controlled amplifier (e.g.actual value) must not be used for the safety protection of the switch device.

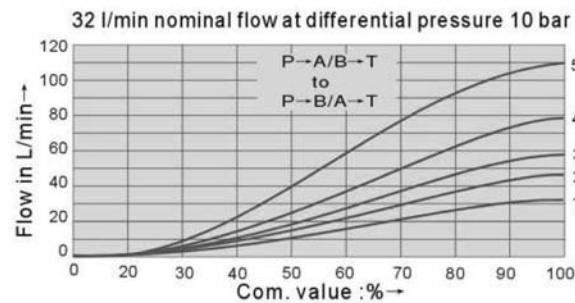
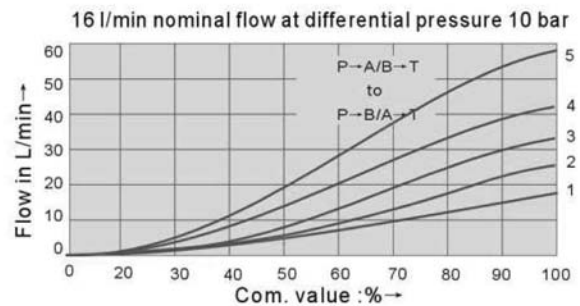
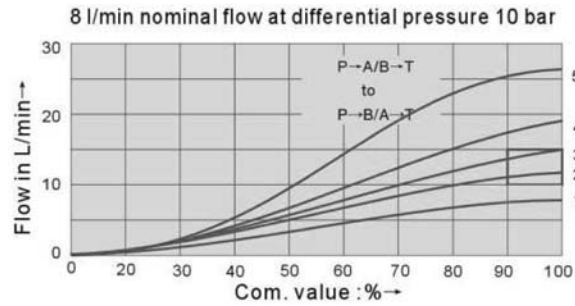
- 1.Contacts PE should be linked to the low-temperature subject and valve body.
- 2.Ramp time could be adjustable within the scope 0~02.5s outside, as well as  $T_{up}$  and  $T_{down}$ .
- 3.Zero point outside is adjustable.



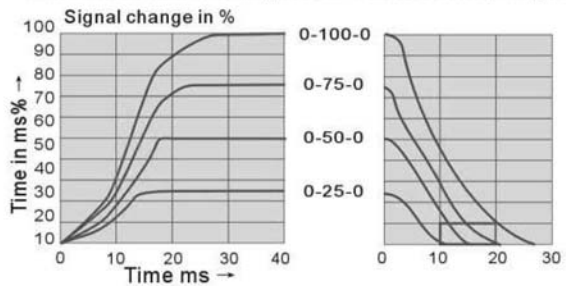
# BFFW Feedback Oransal Yön Kontrol Valfi

## BFFW Proportional Directional Valve

**Characteristic curves** (measured with HLP46, Qoil = 40 ± 5°C) DN6



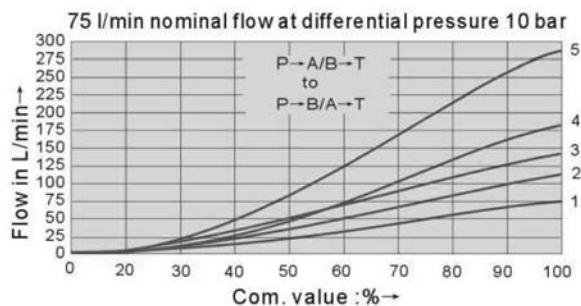
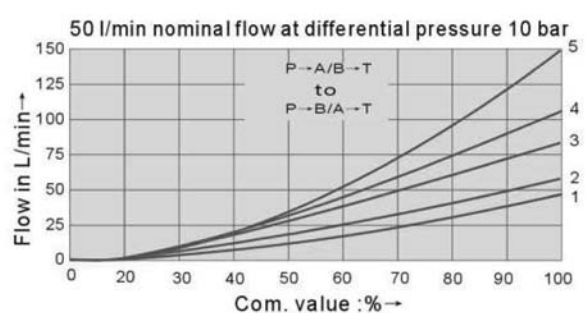
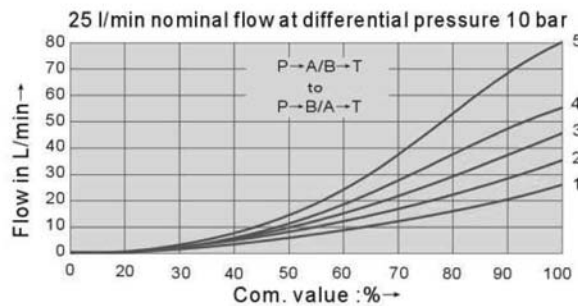
Transient function with stepped form of electrical input signal



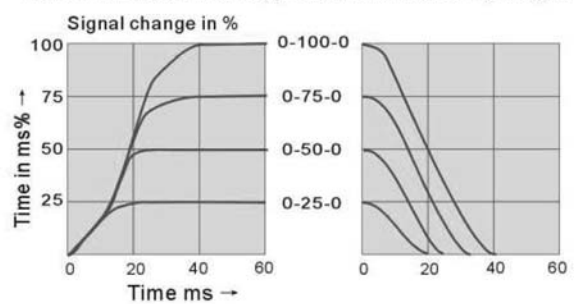
- 1  $\Delta p = 10$  bar Constant
- 2  $\Delta p = 20$  bar Constant
- 3  $\Delta p = 30$  bar Constant
- 4  $\Delta p = 50$  bar Constant
- 5  $\Delta p = 100$  bar Constant

$\Delta p$  = Valve differential pressure  
(inlet pressure  $P_s$  minus load  
pressure  $P_L$  and minus return pressure  $P_T$ )

**Characteristic curves** (measured with HLP46, Qoil = 40 ± 5°C) DN10



Transient function with stepped form of electrical input signal



- 1  $\Delta p = 10$  bar Constant
- 2  $\Delta p = 20$  bar Constant
- 3  $\Delta p = 30$  bar Constant
- 4  $\Delta p = 50$  bar Constant
- 5  $\Delta p = 100$  bar Constant

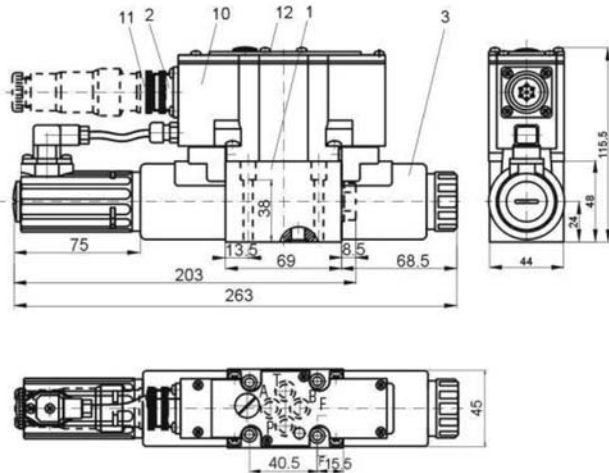
$\Delta p$  = Valve differential pressure  
(inlet pressure  $P_s$  minus load  
pressure  $P_L$  and minus return pressure  $P_T$ )

## BFFW Feedback Oransal Yön Kontrol Valfi

### BFFW Proportional Directional Valve

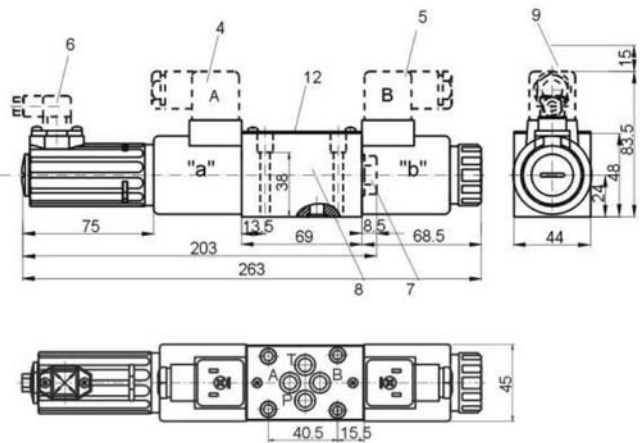
## Unit dimensions

**BFWNE-02**



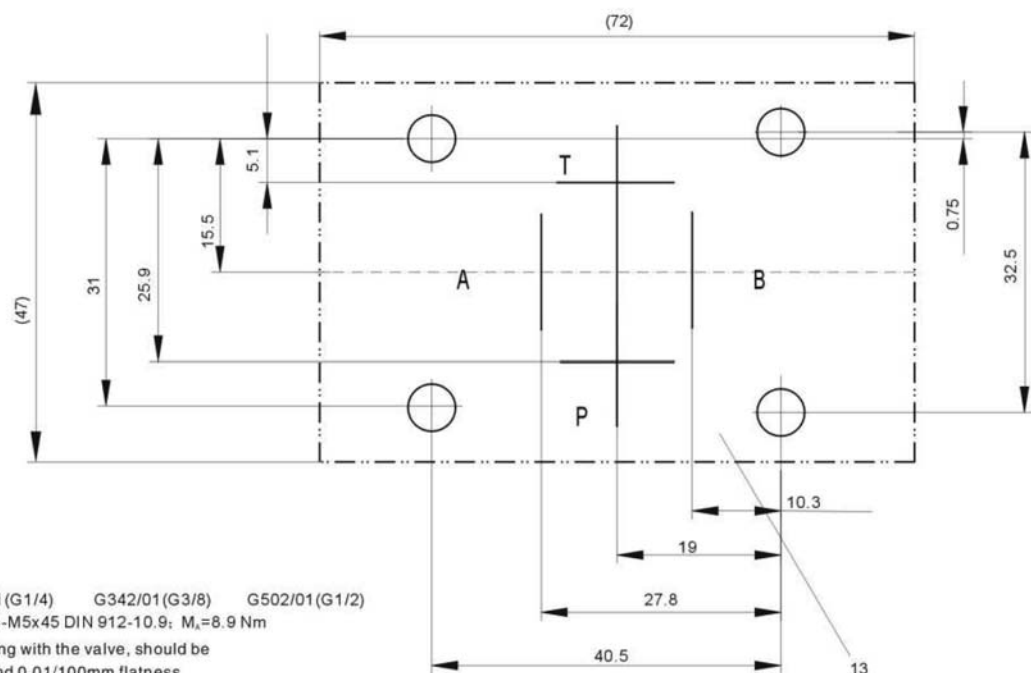
- 1.Valve body
- 2.Proportional solenoid "a" with inductive displacement pick-up
- 3.Proportional solenoid "b"
- 4.Gray plug-in connector "A" according to the standard of DIN EN 175 301-803
- 5.Black plug-in connector "B" according to the standard of DIN EN 175 301-803
- 6.Socket with inductive displacement pick-up

**BFWE-02**



7. Used for the end closure of electro-pneumatic valve with single solenoid, the function symbol is 2B2B or 2B40B
8. Identical seal ring 8.73\*1.78 (used for ports A, B, P, T)
9. Space for taking off the plug-in connector
10. Built-in amplifier
11. The socket corresponds with DIN EN 175 201-804
12. Nameplate
13. Machined valve mounting surface, Connection location to DIN 24 340A, IS04401 (and) CETOP-RP 121 H

### Subplate Size



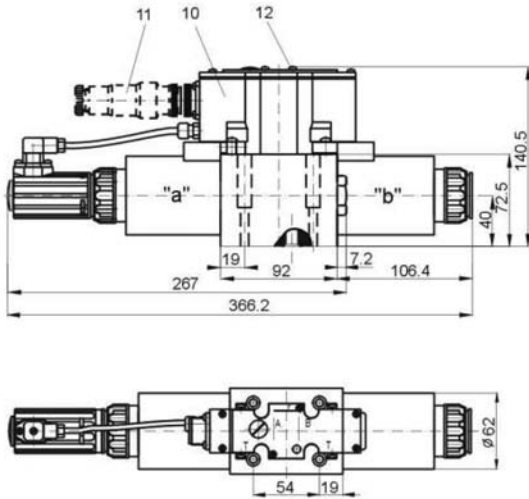
Subplates: G341/01(G1/4)      G342/01(G3/8)      G502/01(G1/2)  
Valve fixing screws: 4-M5x45 DIN 912-10.9;  $M_t=8.9 \text{ Nm}$   
The surface, connecting with the valve, should be  
Ra0.8 roughness, and 0.01/100mm flatness.

# BFFW Feedback Oransal Yön Kontrol Valfi

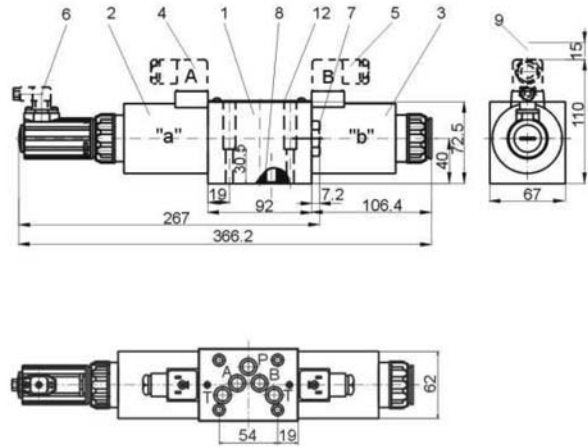
## BFFW Proportional Directional Valve

### Unit dimensions

**BFWNE-03**



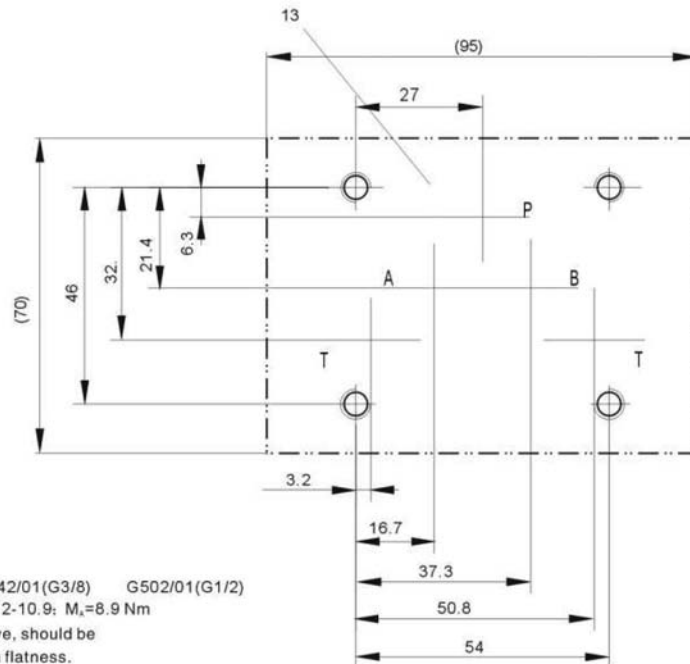
**BFWE-03**



1. Valve body
2. Proportional solenoid "a" with inductive displacement pick-up
3. Proportional solenoid "b"
4. Gray plug-in connector "A" according to the standard of DIN EN 175 301-803, place another order
5. Black plug-in connector "B" according to the standard of DIN EN 175 301-803, place another order
6. Socket with inductive displacement pick-up

7. Used for the end closure of electro-pneumatic valve with single solenoid, the function symbol is 2B2B or 2B40B
8. Identical seal ring 12\*2 (used for ports A, B, P, T)
9. Space for taking off the plug-in connector
10. Built-in amplifier
11. The socket corresponds with DIN EN 175 201-804
12. Nameplate
13. Machined valve mounting surface, Connection location to DIN 24 340A, ISO4401 (and) CETOP-RP 121 H

### Subplate Size



Subplates: G341/01(G1/4) G342/01(G3/8) G502/01(G1/2)

Valve fixing screws: 4-M6x40 DIN 912-10.9; M<sub>t</sub>=8.9 Nm

The surface, connecting with the valve, should be Ra0.8 roughness, and 0.01/100mm flatness.