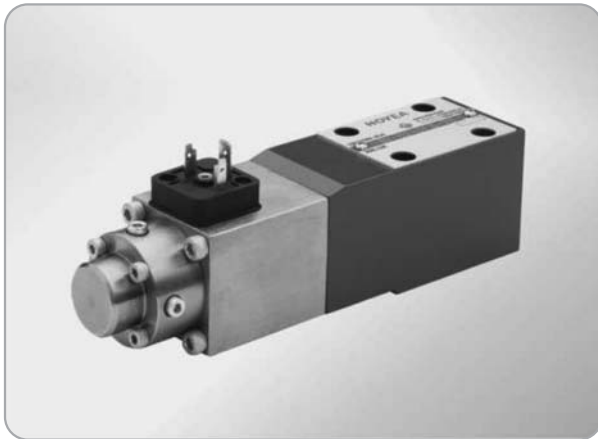


# BY Oransal Emniyet Valfi / Proportional Relief Valve



Model B ( D ) Y and B ( D ) YN  
 DN 6  
 Component series 1X  
 Maximum operating pressure 315bar  
 Maximum flow 30L/min

**Technical data** (If there is application beyond these parameters, please consult with us.)

Specification	DN6	
Installation position	optional, preferably horizontal	
Storage temperature range ( °C )	-20~80	
Ambient temperature range ( °C )	BY and BDY	-20~70
	BYN and BDYN	-20~50
Weight ( kg )	BY and BDY	2.4
	BYN and BDYN	2.5

**Measured at** (P=100bar, Mineral oil HLP4+, 40C±5C )

Operating pressure ( bar )	PortsP, P1-P2 A1-A2 ; B1-B2	Up to 315
	Port T	Up to 50
Highest setting pressure ( bar )	Pressure class 50	50
	Pressure class 100	100
	Pressure class 200	200
	Pressure class 315	315
The minimum set pressure at zero point ( bar )	Please see the performance curve	
Back pressure of port A ( bar )	Single zero pressure back to oil tank	
Flow of pilot oil ( L/min )	0.6~1.2	
Maximum flow ( L/min )	30	
Pressure fluid	Mineral oil (HL, HLP) to DIN 51 524; For other fluid please consult with us.	
Fluid temp. Range ( °C )	-20~80	
Viscosity range ( °C )	15+380	
Oil cleanliness ( mm <sup>2</sup> /s )	Filter is recommended for the highest fluid pollution degree; the lowest specific filtration resistance according to ISO 4406 (C) 20/18/15.	
Hysteresis ( % )	Plus-minus 1.5 of the highest adjustable pressure	
Repeatability ( % )	Less than plus-minus 2 of the highest adjustable pressure	
Linearity ( % )	Plus-minus 3.5 of the highest adjustable pressure	
Set value caused by the manufacturing errors - pressure characteristics curve derivation refer to the characteristics curve when pressure rising	BY and BDY ( % )	Plus-minus 2.5 of the highest adjustable pressure
	BYN and BDYN ( % )	Plus-minus 1.5 of the highest adjustable pressure
Phase step corresponding T <sub>v</sub> +T <sub>s</sub>	10%→90% ( ms )	Approximately 80
	90%→10% ( ms )	Approximately 50
Cleanliness	Filter is recommended for the highest fluid pollution degree; the lowest specific filtration resistance according to ISO 4406 (C) 20/18/15.	

# BY Oransal Emniyet Valfi / Proportional Relief Valve

## Electrical

Voltage type		Direct Voltage 24V	
Controlling current ( mA )		( Minimum ) 100, ( Maximum ) 1600	
Solenoid coil ( Ω )	20°C Measuring under	5.4	
	Maximum numerical value	7.8	
Resistance ( % )		100	
Electrical connection see	BY and BDY	Plug to connect DIN 175 301-803 and ISO 4400	Socket to connect DIN 175 301-803 and ISO 4400 <sup>31)</sup>
	BYN and BDYN	Plug to connect DIN EN175 301-803	Socket to connect DIN EN175 301-803 <sup>31)</sup>
Type of insulation to DIN 40 050		IP65 has got installed and locked up plug-in connector	

## Model description

**BY \* - \* - 02 - \* - \* - 1X - \* - \* - G24 - \* - \* - \***

Pressure-relief valve

No code Subplate installation  
D Stackable type

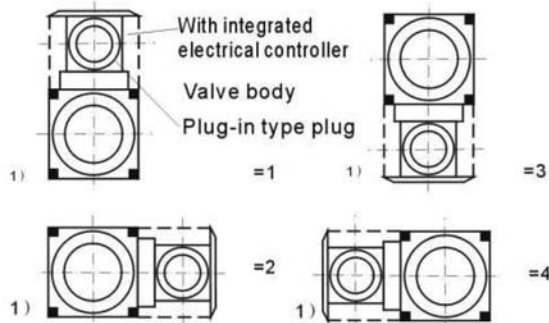
No code Circumscribed electrical controller  
N With integrated electrical controller

02 DN6

No code Subplate-installation valve  
P Stack to P and T

Type BDY the location of plug-in type plug

Type BDYN the location of the valve barrel with electrical controller



1) The mounting plane of the valve (the groove of the O-identical seal in the body)

Series 10~19 installation and connection size is invariable

50 Pressure rating 50bar  
100 pressure rating 100bar  
200 pressure rating 200bar  
315 pressure rating 315bar

Further details in clear text

No code NBR seal applicable for mineral oil (HL, HLP) to DIN 51 524  
V FPM seal applicable for phosphoester

Type BY: BDY wiring connecting  
K4 with socket in accordance with DIN EN 175 301-803 the plug not included, purchased specially  
K31 BDY: BDYN type wiring connection with plug, with socket in accordance with EDIN43 650-AM6-3 plug not included, purchased specially

G24 control power source 24VDC

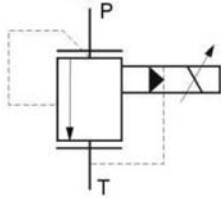
No code qvmax=15L/min)  
No code pilot oil internally discharge  
Y Pilot oil externally discharge

# BY Oransal Emniyet Valfi / Proportional Relief Valve

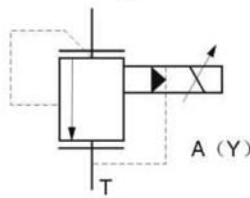
## Code symbol

Code(stackable) code:1 the surface of the component 2=subplate dimension

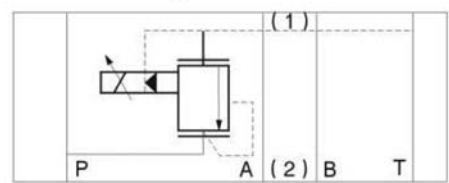
BY ( N ) type



BY ( N ) ...Y type



BDY ( N ) ...P type



## Principle of work section plan

Model BY and BDY :

Type proportional pressure relief valve is driven by proportional solenoid, used to limit systemic pressure. With this series valve, operated systemic pressure accurately is available according to the set value.

The valve is made up of proportional solenoid1, body2, valve subassembly, spool valve4 and pilot-operated poppet valve and pilot valve (8) .

Proportional solenoid changes the electrical current value proportionally into mechanical force. While the electrical current value increases, the mechanical force increases relatively.

The chamber of the solenoid, which is filled with oil, can keep balance of pressure. Systemic pressure is set by the setting value through solenoid 1, when the pressure of port P increases in accordance with systemic pressure, pressure exerts an impact on the right side of spool, meanwhile, systemic pressure functions on the spring loading side of the spool via controlling oil flow (6) with restrictive valve(5). Through restrictive valve(7), systemic pressure exerts effects on pilot-operated poppet(8) valve, to balance the force which is produced by the solenoid.

When the systemic pressure reaches the setting value, pilot-operated poppet valve departs the valve seating.

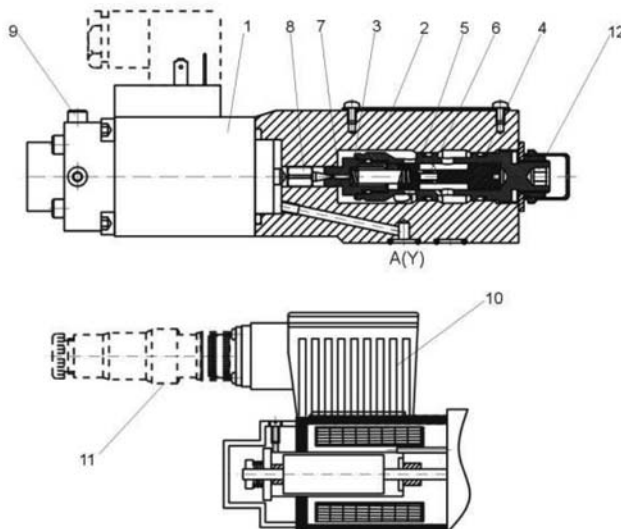
According to the model form, pilot oil can discharge externally or internally via port A (Y) to oil tank, so that limit the loading side pressure of the spring of the spool(4). If systemic pressure keeps increasing, the high pressure on the right side of the spool will push the spool to the right till the controlling port P relieving to the port T.

When the setting value is zero, the minimum pressure can be set by utilizing the minimum controlling current.

Attention!

To fully exert the function of the valve, the following measures should be taken to relieve the air:

- Unloading the air-relief scew (9),
- Injecting the hydraulic oil from the bolt hole 9
- Resettling the scew when the air bubbles disappeared. Draining of tank line is to be avoided.
- Under certain circumstance, a back-pressure valve should be installed in the outlet.(back pressure is approximately 25bar.)



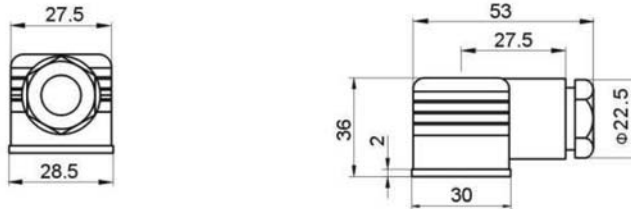
With regard to the design of function, these valves correspond with the model BY and BDY, but the proportional solenoid has housing (10), in which is the electrical controllers. Through the function of plug-in connector (11), supply can be received and the pressure can be set. The set value — pressure performance curve (plug-in module 12 connect zero point, and  $I_{max}$  adjust the augmentation of regulation resistance R30) is preestablished by the factory by applying the minimum manufacturing tolerance. When the pressure increases or decreases, the regulation resistance of ramptime could be adjusted separately.



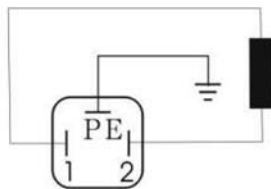
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## Electrical connection, plug-in connectors

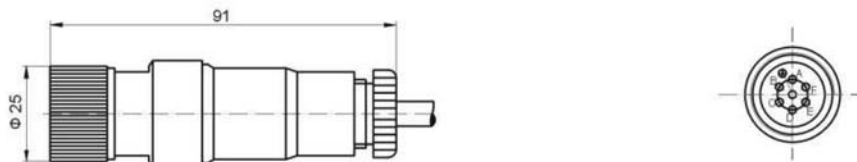
Refer to the model BY, BDY (externally connect to electrical controllers) plug-in connector corresponds with DIN EN 175 301-803



Connection on component plug



Refer to the model BYN, BDYN (with integrated electrical controllers) plug-in connector corresponds with DIN 43 563-BF6-3Pg11



## The integrated electrical controller of type BYN and BDYN

### Functions

Integrated circuit is controlled by the pipe-shape D and E of the differential amplifier.

Ramptime generator enables the time delay of electrical current of the solenoid to increase or decrease according to the phase step ( 10 to 10V or 10 to 0V) of the setting value. The time for the augmentation of the electrical current of the solenoid could be adjusted through the regulation resistance R14, and reversely through R13.

When input setting value is max, ramptime achieve the maximum value 5S. If it is decreasing, ramptime will be shortened relatively. The performance curve of the solenoid current, adjusts the setting value of the performance curve of the generator, making it reach required value.

Therefore, the setting value of the pressure performance curve could be acquired by compensating the non linear factor of the hydraulic pressure.

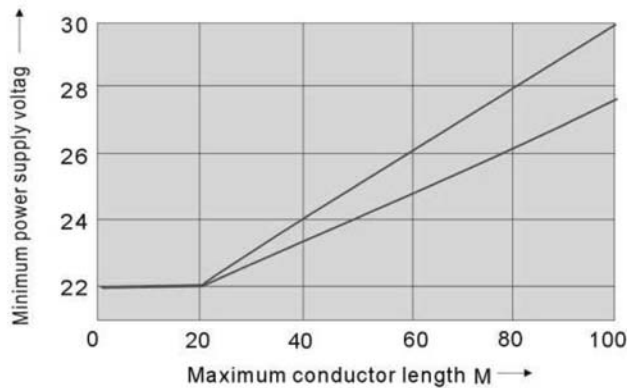
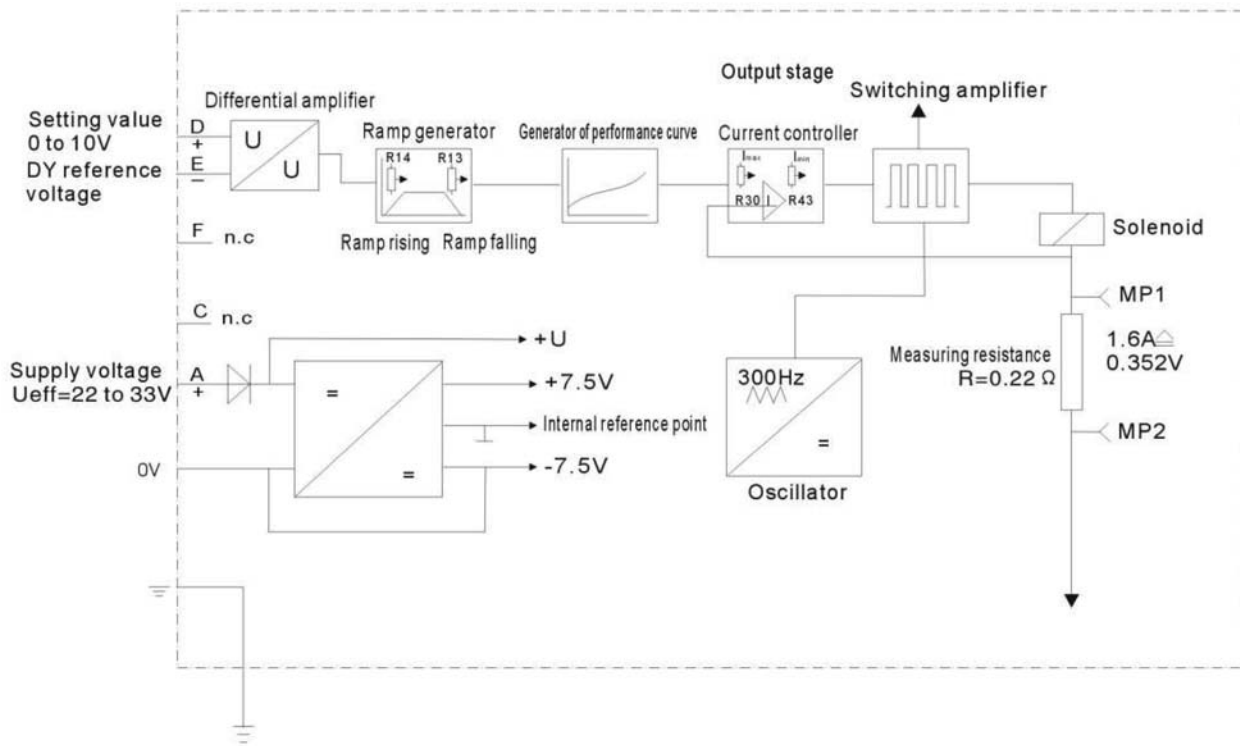
Current controller can remove the influence of the resistance of the solenoid current. The regulation resistance 30 could be used to change the setting value (the current performance curve) of the proportional pressure valve and the setting value (the augmentation of the pressure performance curve) .

The regulation R42 is used to set the fixed bias current. If necessary, the setting value of the valve seat could be set. ---the zero point of the pressure performance curve. The power class of the proportional solenoid could be formed or controlled by the switch amplifier, it could make impulse-width modulation through 300Hz impulse frequency.

Through measuring point MP1 and MP2, solenoid current could be tested . The 0.352V voltage reducing amount on the measured resistance is equal to the changes of 1.6A solenoid current.

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## Block diagram and wiring diagram of integrated electrical controllers



**Supplied voltage**

Volt with rectifier

Single rectified three-phase bridge circuit:  $U_{eff}=22to33V$

Power impulse index: less than 5%

Output current: -commend use five- wire with insulation

-External diameter 6.5~11 mm

-Be shielded when supplied voltage is 0V

-Maximum allowed length 100m

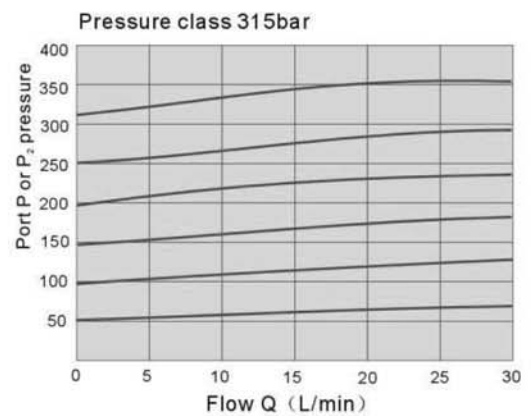
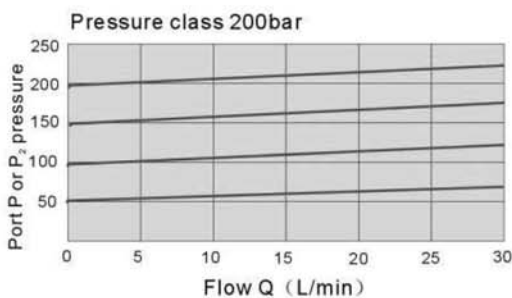
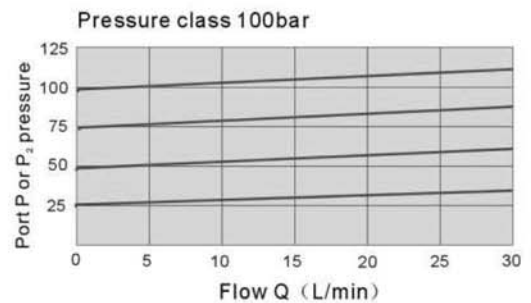
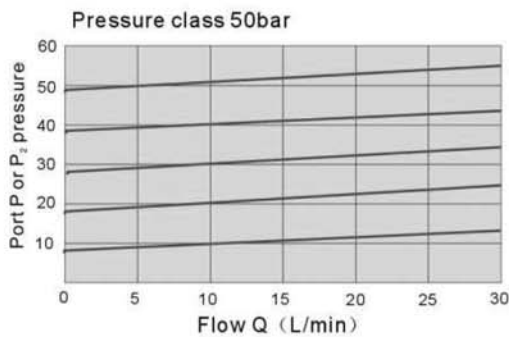
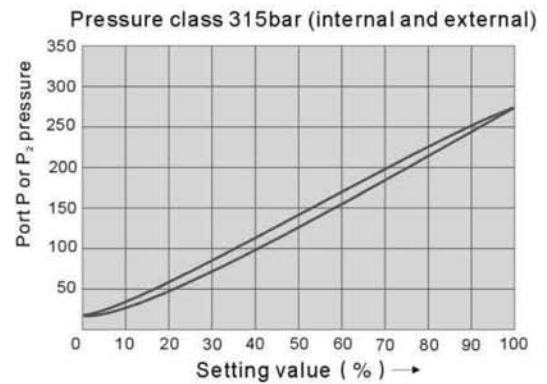
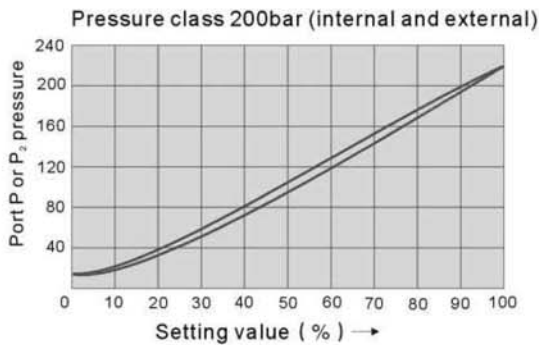
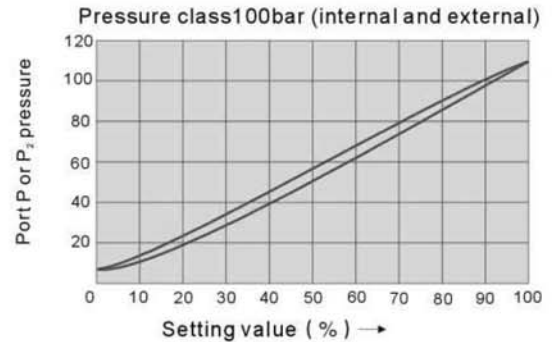
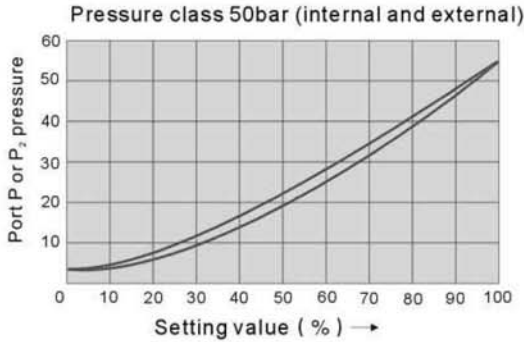
The maximum voltage is up to the length of the volt-supplied wire(refer to the appendix)

When the wire is longer than 50m, capacitance 2200  $\mu F$  must be installed beside the wire

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**Performance curves**(tested by HLP46)

Type P port P2 pressure-setting value relation curve (  $q_v=5L/min$  )

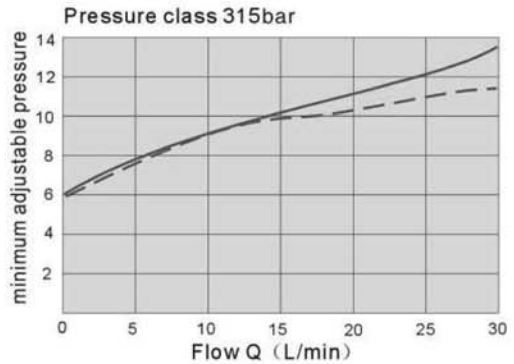
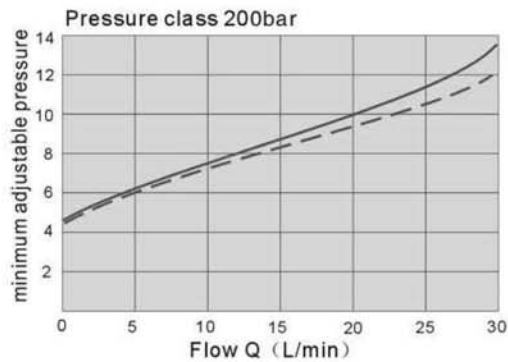
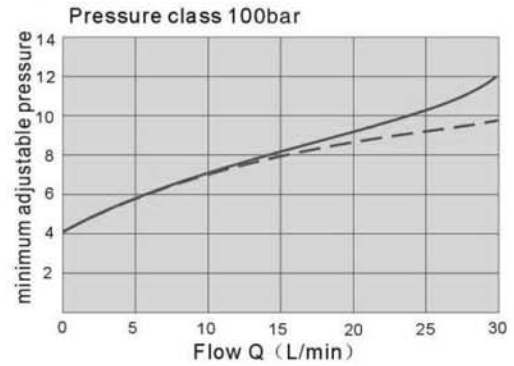
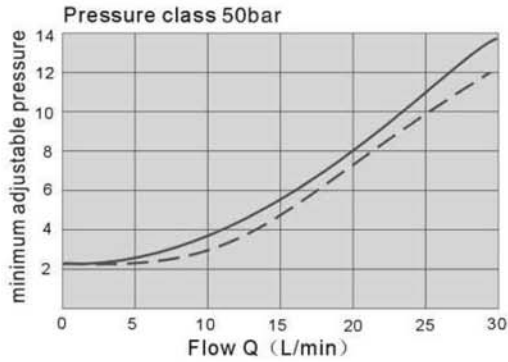


The performance curves are tested on the condition that port A (pilot oil externally discharge) and port T (pilot oil discharge internally) without back pressure. Due to pilot oil internally discharge, through the functioning on the port T, pilot oil discharge can increase the pressure of Port P or port P<sub>2</sub>.

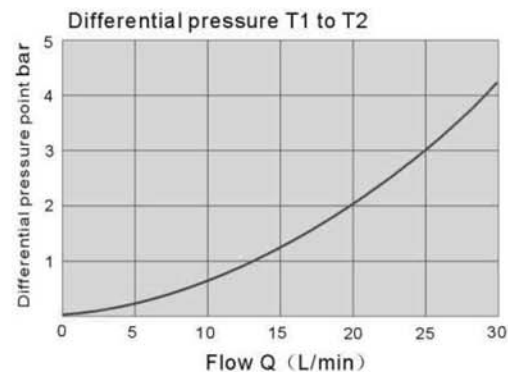
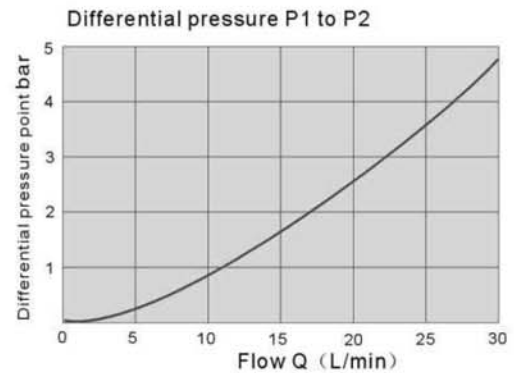
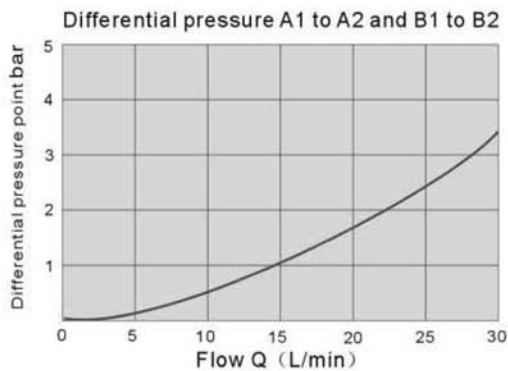
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## Performance curves (tested by HLP46)

The minimum adjustable pressure of port P or port P2 at zero input



The performance curves are tested on the condition that port A (pilot oil externally discharge) and port T (pilot oil discharge internally) without back pressure. Due to pilot oil internally discharge, through the functioning on the port T, pilot oil discharge can increase the pressure of Port P or port P<sub>2</sub>.



# BY Oransal Emniyet Valfi / Proportional Pilot-Operated Relief Valve



## Technical specification

Specification	03	06	10
Maximum pressure (MPa)	31.5	31.5	31.5
Maximum flow (L/min)	100	200	400
Minimum flow (L/min)	3		
Rated current (mA)	800		
Coil resistance ( $\Omega$ )	10~19.5		
Hysteresis (%)	< $\pm 1.5$		
Repeatability (%)	< $\pm 2$		
Weight (Kg)	5.6	6.3	10
Cleanliness	Filter is recommended for the highest fluid pollution degree; the lowest specific filtration resistance according to ISO 4406 (C) 20/18/15.		

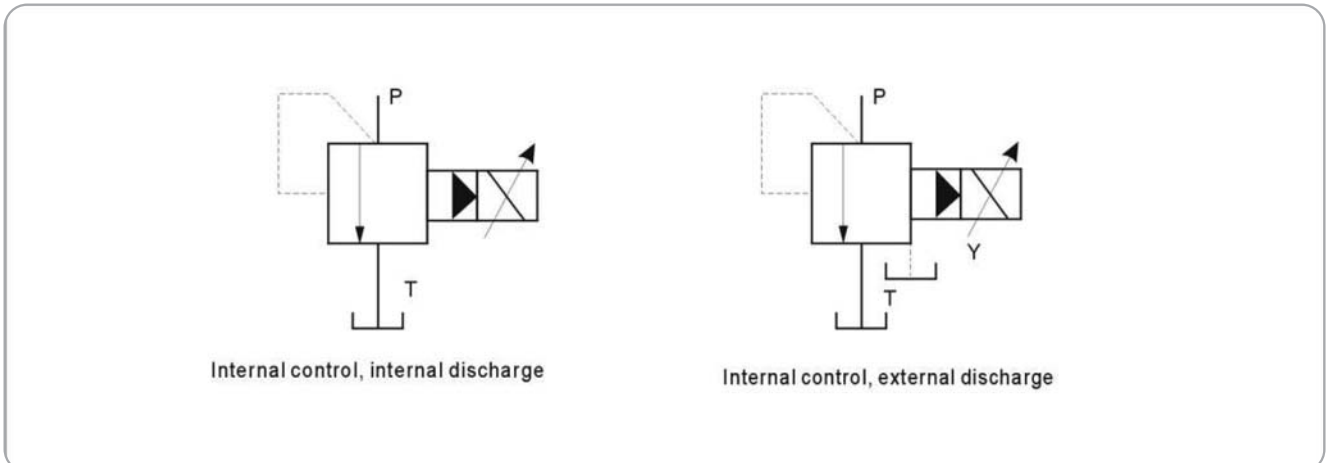
Comprised of proportional directly-operated relief valve, pressure limiting valve and low-noise relief valve.

## Model instruction

**BY** - \* - \* \* - \* \*

	Remarks
Proportional pilot-operated relief valve	
Specification 02 DN6 06 DN20 10 DN30	Design serial number
Working pressure: 7 7 MPa 16 16 MPa 25 25 MPa	Control oil Omit intl cntrl intl disch Y intl cntrl extl disch

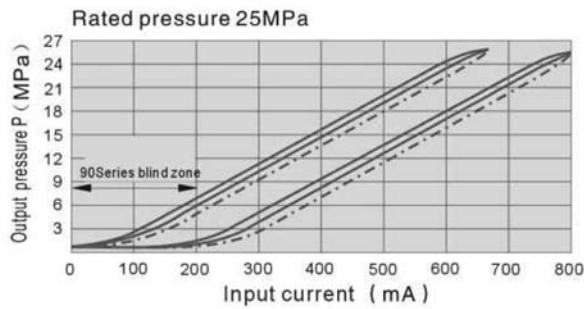
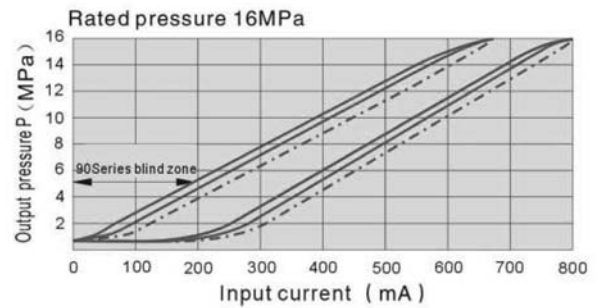
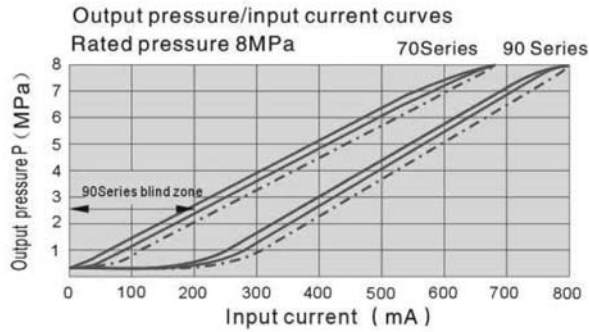
## Code symbol





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03, 06, 10 Model Characteristic Curves (Testing Condition  $v=36 \times 10^{-6} \text{ m}^2/\text{S}$   $t=50^\circ\text{C}$ )

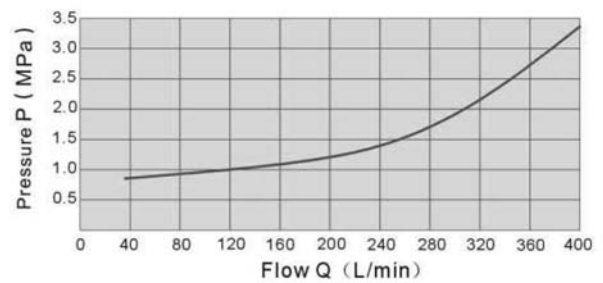
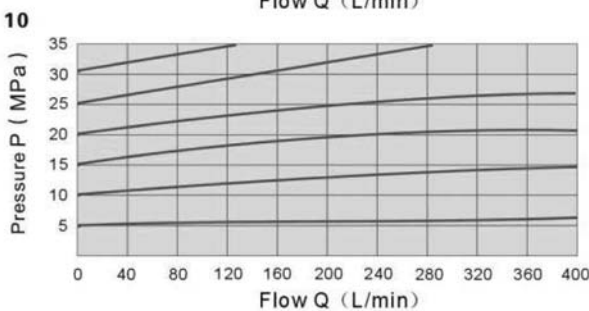
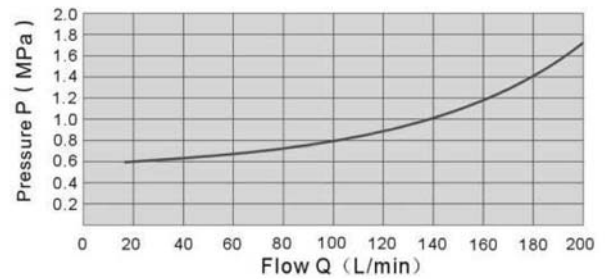
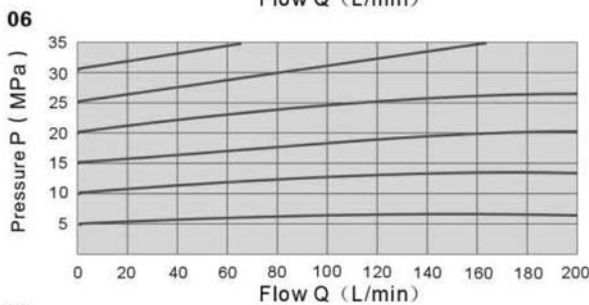
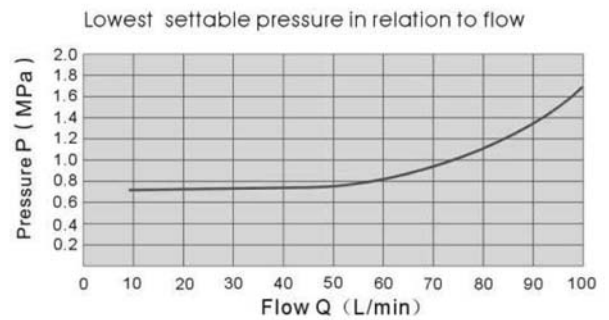
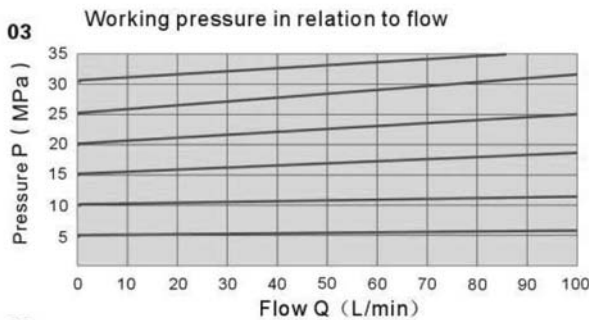


Delay:  
With shake dither ———  
No Shake - - - - -

BY03, 06, 10 The result is tested under 27l/min

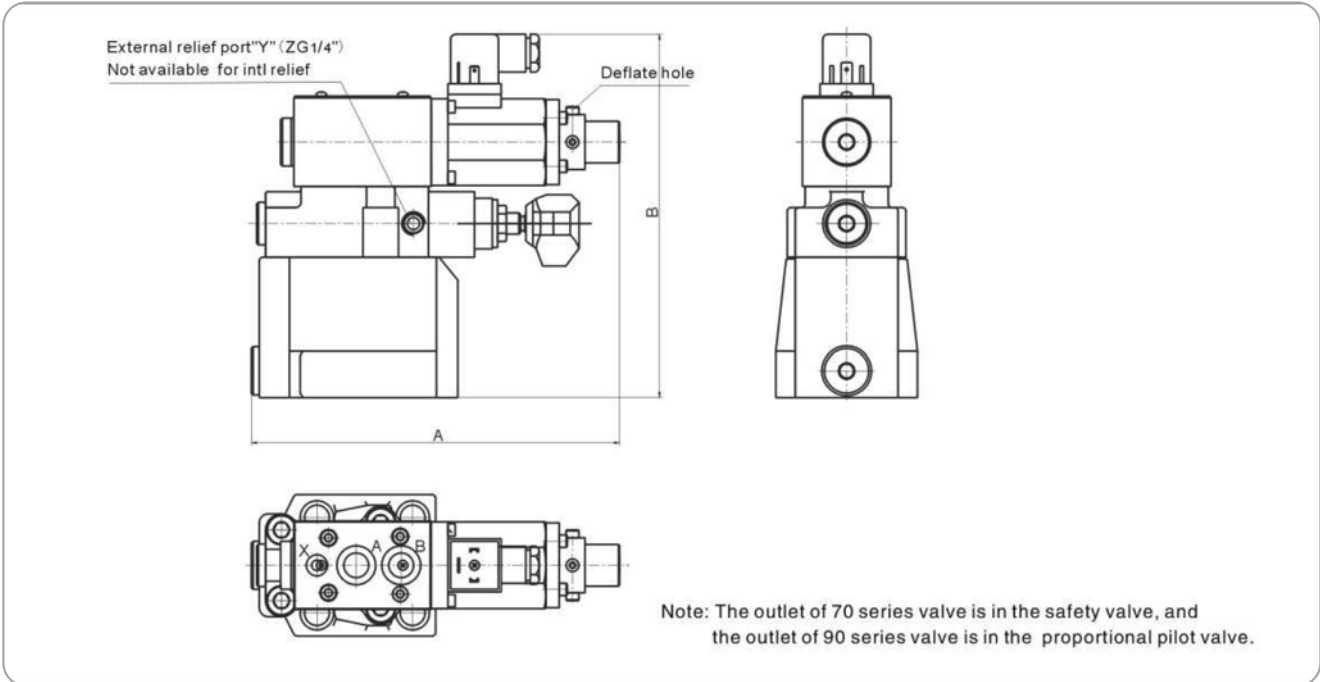
Note: In order to get the lowest settable pressure, 90 series initial current is not more than 0.1 A, 70series must be 0A.

Characteristic Curves (Testing Condition  $v=36 \times 10^{-6} \text{ m}^2/\text{S}$   $t=50^\circ\text{C}$ )

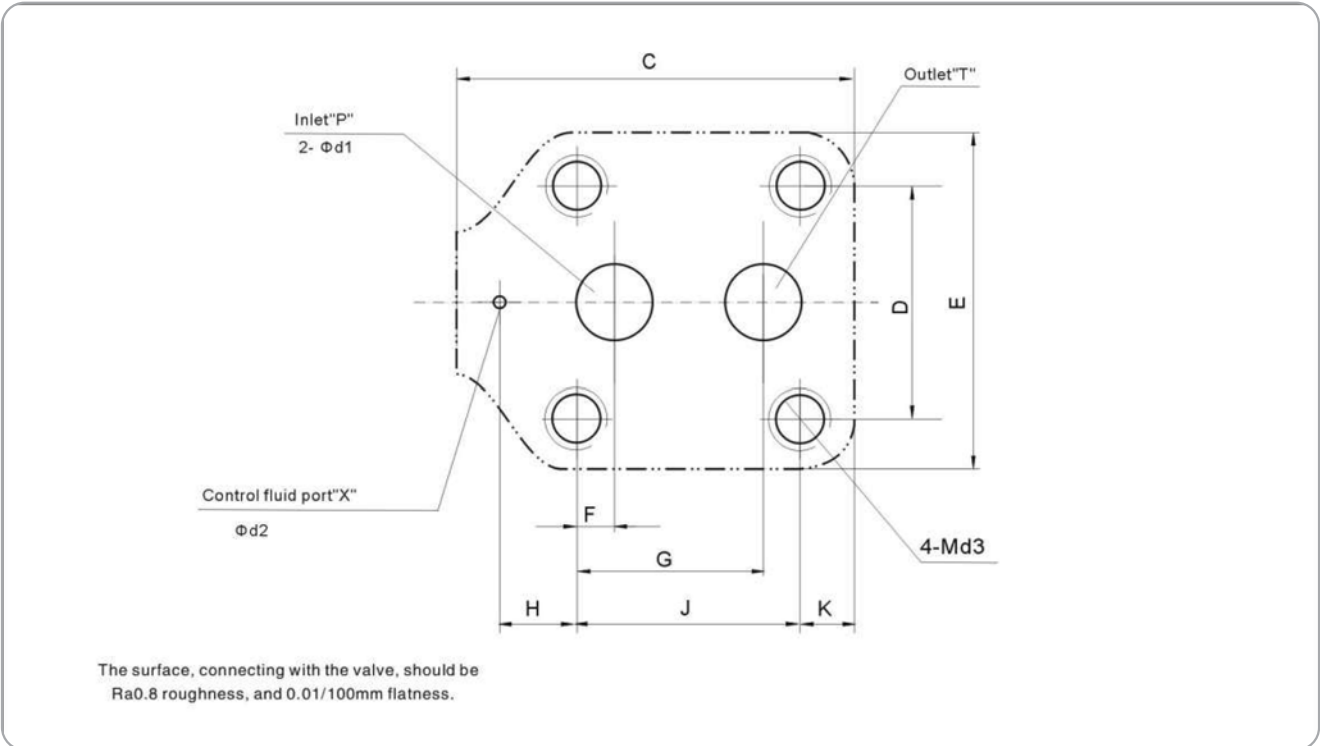


# BY Oransal Emniyet Valfi / Proportional Pilot-Operated Relief Valve

## External dimensions



## Plate size



Specification	A	B	C	D	E	F	G	H	J	K	d <sub>1</sub>	d <sub>2</sub>	d <sub>3</sub>
BY-03	197	193	112	54	80	22.2	47.6	0	54	25.8	14	6	12
BY-06	197	197	119	69.8	102	11.1	55.6	23.8	66.7	16.3	24	6	16
BY-10	197	200	150	82.5	116	12.7	76.2	31.7	89	18	32	6	18

Attention: set the deflate hole upward to exhaust air from the pipe