BEIJING HUADE HYDRAULIC INDUSTRIAL GROUP CO.,LTD.	Proportional flow control valve 2-way version, Type 2FRE 6...RC			RC29188/9.2006
	Size 6	up to 21 MPa	up to 25 L/min	Replaces: RC29188/08.2000

Features:

- Valve with a pressure compensator for the pressure compensated control of a flow
- Actuation via a proportional solenoid
- With electrical position feedback of the control orifice
- The position transducer coil can be axially moved making the zero point adjustment of the control orifice easy, without having to touch the electronics (electrical-hydraulic)
- Flow control is possible in both directions by using a rectifier sandwich plate

Functional , section , symbol

The type 2FRE ...proportional flow control valves have a 2-way function. They can, from a applied electrical command value, regulate flow which is pressure and temperature compensated.

They basically comprise of the housing (1), proportional solenoid with inductive position transducer (2), measuring orifice (3), pressure compensator (4) as well as the optional check valve (5).

Proportional flow control valve 2FRE 6 B:

The setting of the flow is determined (0 to 100 %) at the command value potentiometer. The applied command value adjusts, via the amplifier as well as the proportional solenoid, the measurement orifice(3). The position of the measurement orifice (3) is obtained by the inductive position transducer. Any deviations from the command value are compensated for by the feedback control.

The pressure compensator (4) holds the pressure drop at the measurement orifice (3) at a constant value. The flow is, therefore load compensated.

The small temperature drift is achieved due to the design of the measurement orifice.

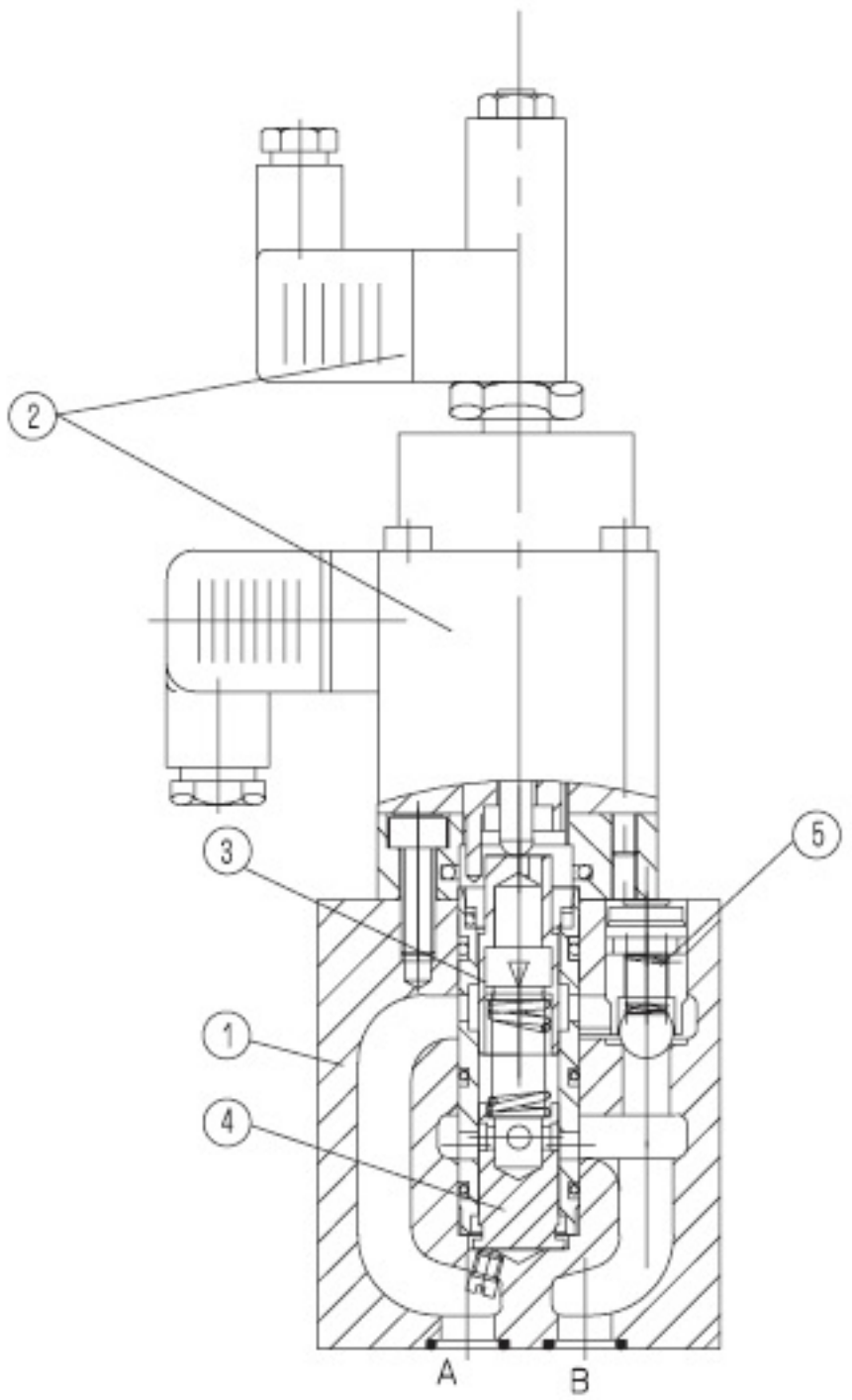
At a 0 % command value the measurement orifice is closed.

In the case of a loss of power or a cable break at the position transducer the measurement orifice closes.

From a 0 % command value a jump free start is possible.

Via two ramps within the electrical amplifier, it is possible to delay the opening and closing of the measurement orifice.

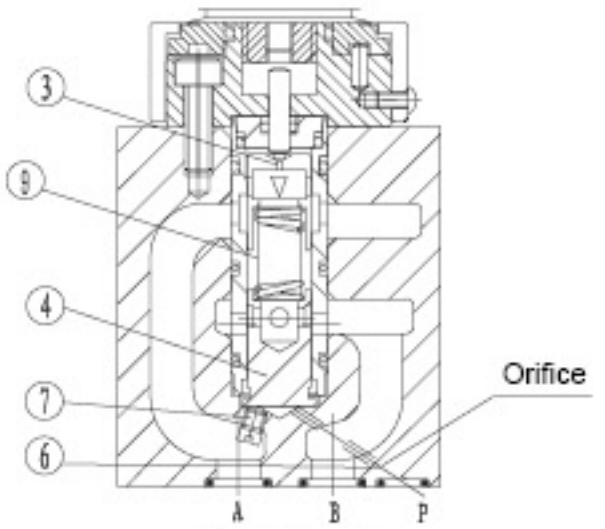
Via the check valve (5) a free flow is possible from B to A.



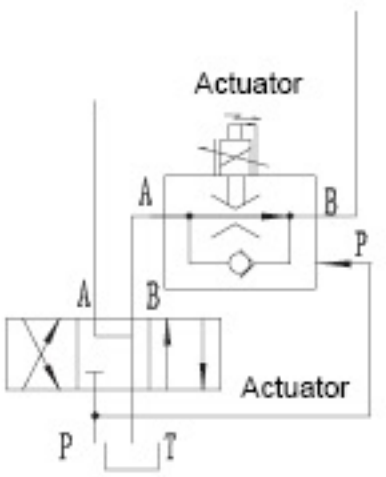
Proportional flow control valve type 2FRE 6 A:

The function of this valve is in principle the same as valve type 2FRE 6 B:

To suppress the start-up jump when the measurement orifice (3)(command value > 0 %) is open, there is provision for the pressure compensator (4) to be held closed via port P (6). The internal connection (7) between port A and the pressure compensator (4) is plugged. Via the external port P (6) the pressure in port P, before the directional valve (8) acts on the pressure compensator (4) and holds it against the spring force (9) in the closed position. If the directional valve (8) is switched over from P to B, then the pressure compensator(4) moves from the closed position into the regualting position and the start-up jump is thereby avoided.



Type 2FRE6A...



Ordering details

2FRE6		20	B				*

With external closing of the pressure compensator = A
Without external closing of the pressure compensator = B

Series 20 to 29 = 20
(20 to 29: unchanged installation and connection dimensions)

Technology of Beijing Huade Hydraulic =B

Flow range A → B
up to 3 L/min = 3Q
up to 6 L/min = 6Q
up to 10 L/min = 10Q
up to 16 L/min = 16Q
up to 25 L/min = 25Q
Progressive with fast feed
Fine control range up to 2 L/min = 2QE

Further details in clear text

No code= Mineral oil
V= phosphate ester

R= with check valve
M= without check valve

Rectifier sandwich plate

Z4S6		10	B			*

Rectifier sandwich plate
Nominal size 6 = 6

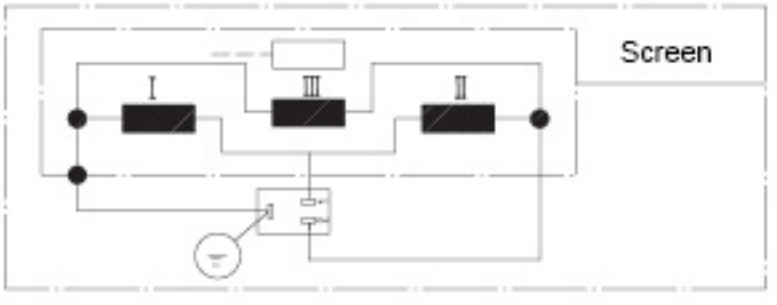
Technology of Beijing Huade Hydraulic =B

Further details in clear text

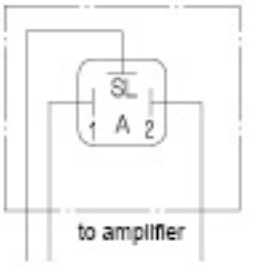
No cade=Mineral oil
V= Phosphate ester

Electrical connections ---- Inductive position transducer

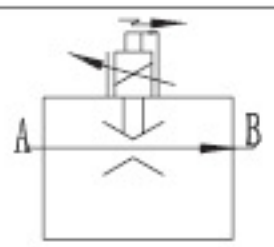
Connections on loops



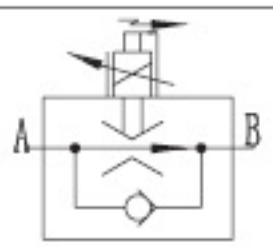
Connections on plug-in connector



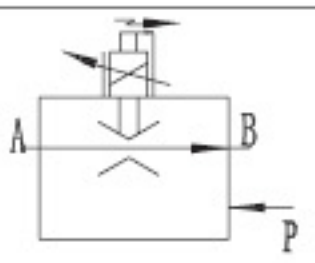
Symbols：Proportional flow control valve (simplified, complete)



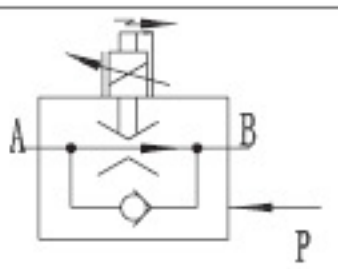
Type 2FRE6B-...M



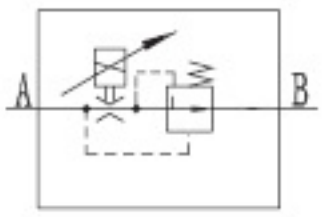
Type 2FRE6B-...R

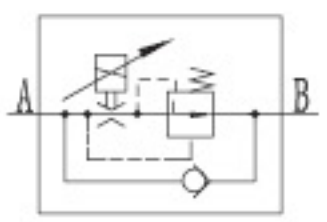


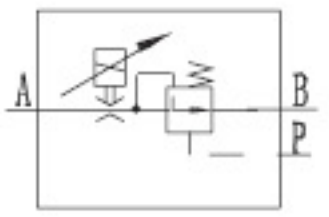
Type 2FRE6A-...M

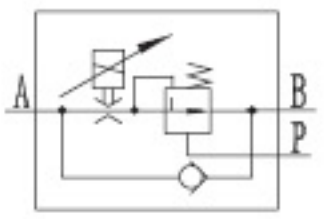


Type 2FRE6A-...R

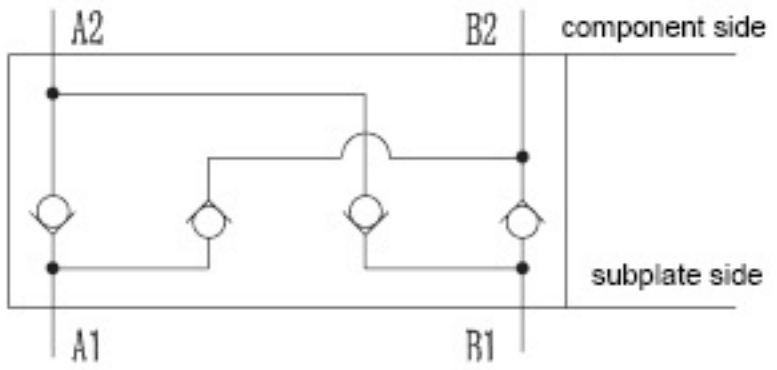








Rectifier sandwich plate：



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

Hydraulic

Max. permissible operating pressure, port A		21 (port A)					
Flow q_V max. (L/min)	Type	2QE	3Q	6Q	10Q	16Q	25Q
		2	3	6	10	16	25
Flow q_V min. (L/min)	to 10MPa	0.015	0.015	0.025	0.05	0.07	0.1
	to 21MPa	0.025	0.025	0.025	0.05	0.07	0.1
Max. leakage flow at Δ P (A → B)							
command value 0%(L/min)	5MPa	0.004	0.004	0.004	0.006	0.007	0.01
(measured at υ =36^{-6}	10MPa	0.005	0.005	0.005	0.008	0.01	0.015
× 10m²/s and t=50°C	21MPa	0.007	0.007	0.007	0.012	0.015	0.022

Minimum pressure differential (MPa)	0.6 to 1
$\triangle$p free return flow (B → A)	see diagram on page 69
Pressure flow relationship: inlet/outlet pressure	see diagram on page 69
Flow stability	see diagram on page 69
Hysteresis	$< \pm$ 1%Q_{max}
Repeatability	$<$ 1%Q_{max}
Degree of contamination (μm)	$\leqslant$ 20 (We recommend a filter with a minimum retention rate of 10)
Pressure fluid	Mineral oil(for NBR seal),Phosphate ester (for FPM seal)
Viscosity range (mm²/S)	2.8 to 380
Pressure fluid temperature range (°C)	-20 to +70
Installation	optional

Electrical

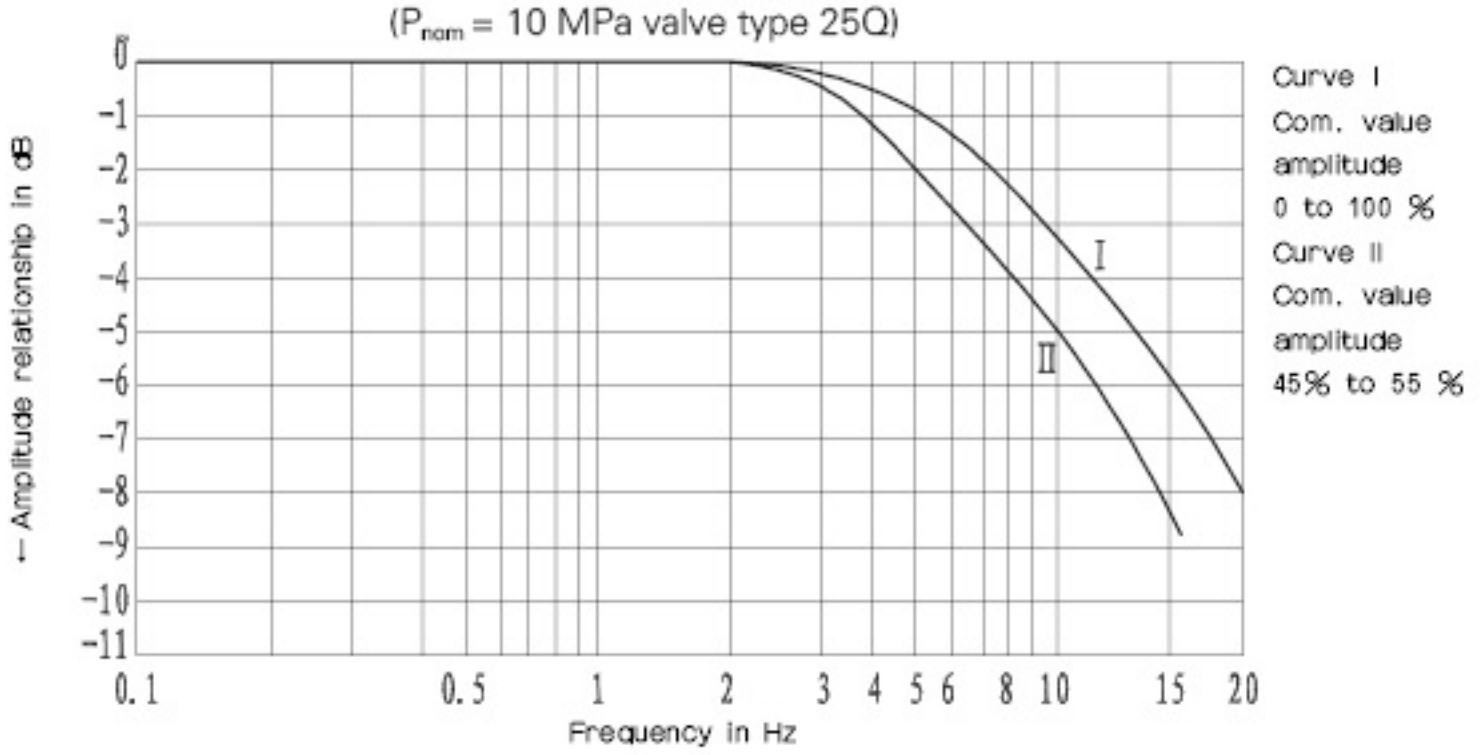
Voltage type	DC
Coil resistance of solenoid (Ω)	Cold value at 20°C 5.4 , Max. warm value 8.2
Coil resistance of transducer (Ω)	at 20°C Ⅰ -56、Ⅱ -56、Ⅲ -112
Max. Power (VA)	50
Inductivity (mH)	6 to 8
Oscillator frequency (KHz)	2.5
Surroundubgs temperature (°C)	Max.50
Amplifier	VT-5010S30 Demand of insulation IP65

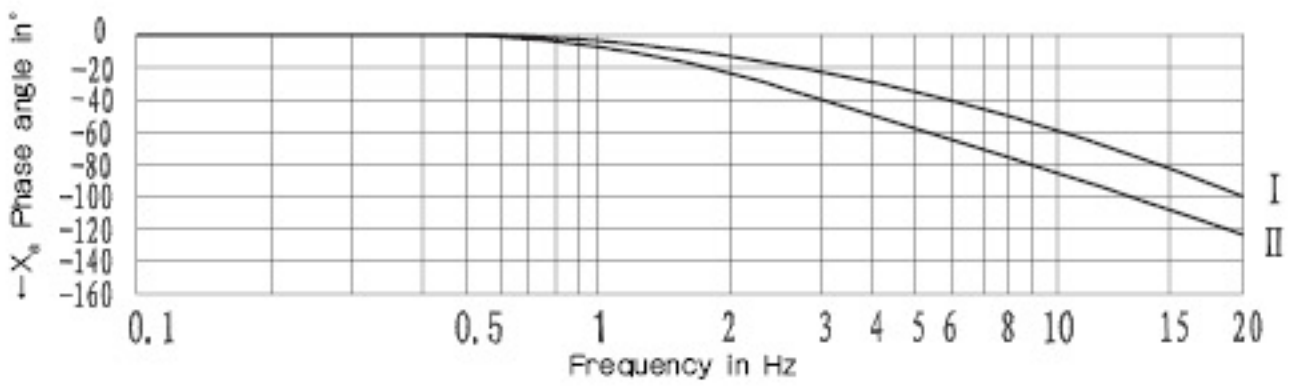
Characteristic curves (measured at v=36 × $10^{-6}m^2/S$; t=50°C)

Frequency response characteristic curve

Input signals (%)	Qmin to Qmax Tu+Tg(ms)	Qmax to Qmin Tu+Tg(ms)
0-100	50	60
10-90	45	50
25-75	40	45

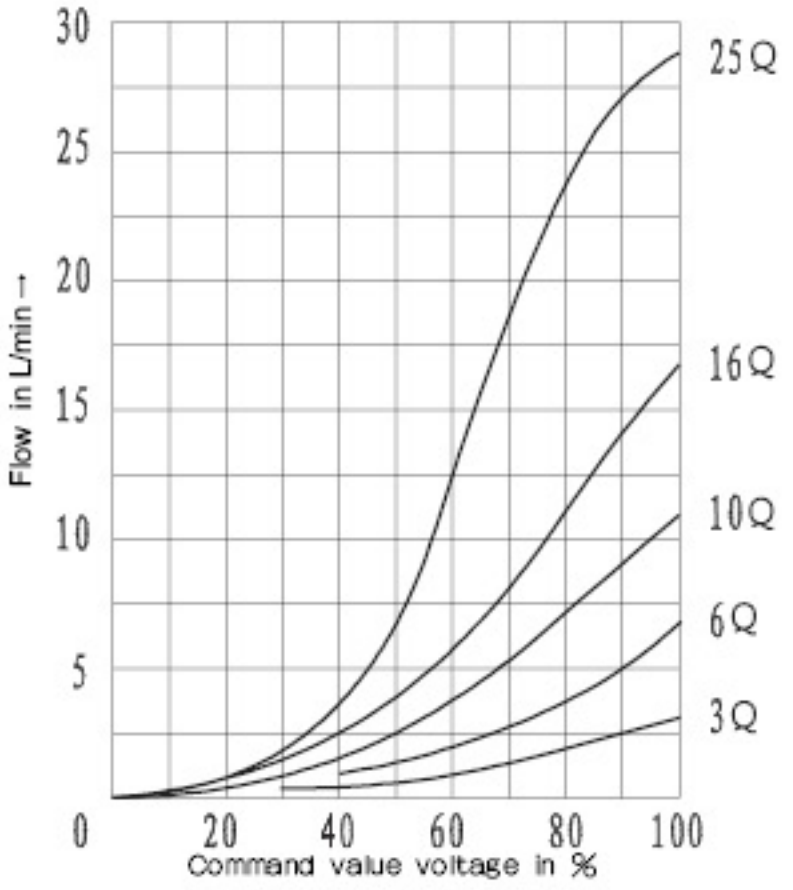
(P_{nom} = 10 MPa valve type 25Q)



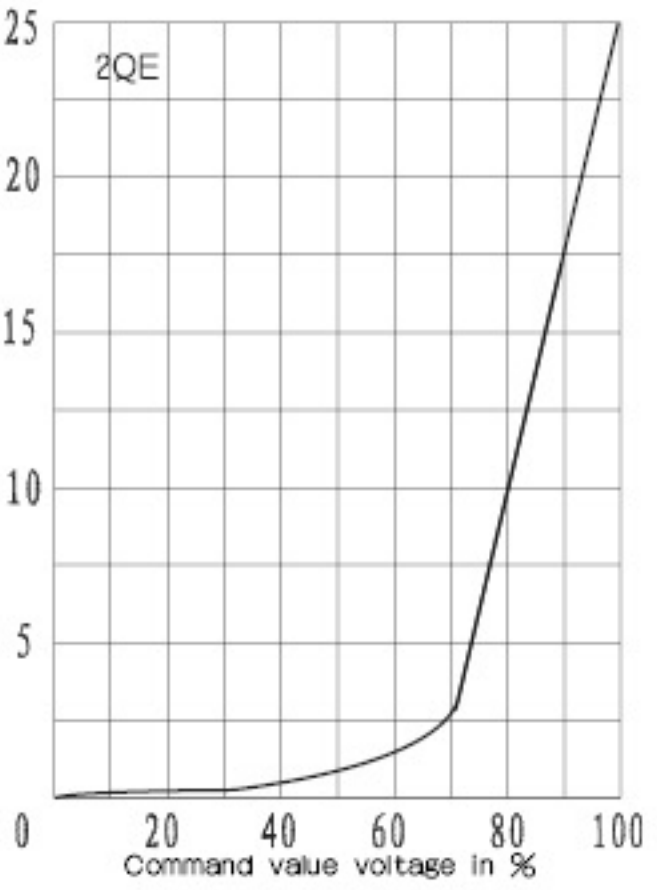


Relationship of the flow to the command value(P_{nom} =50 MPa)

(flow control from A → B)

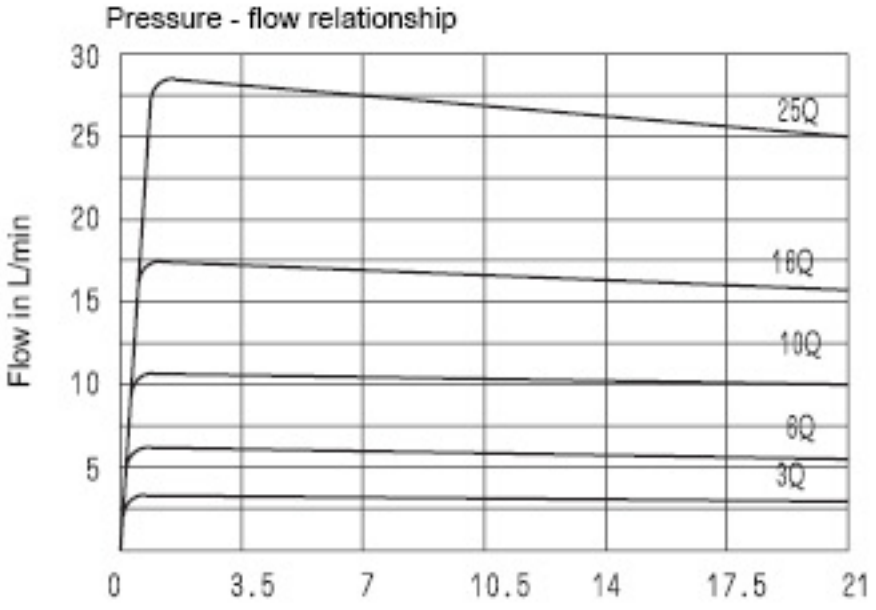


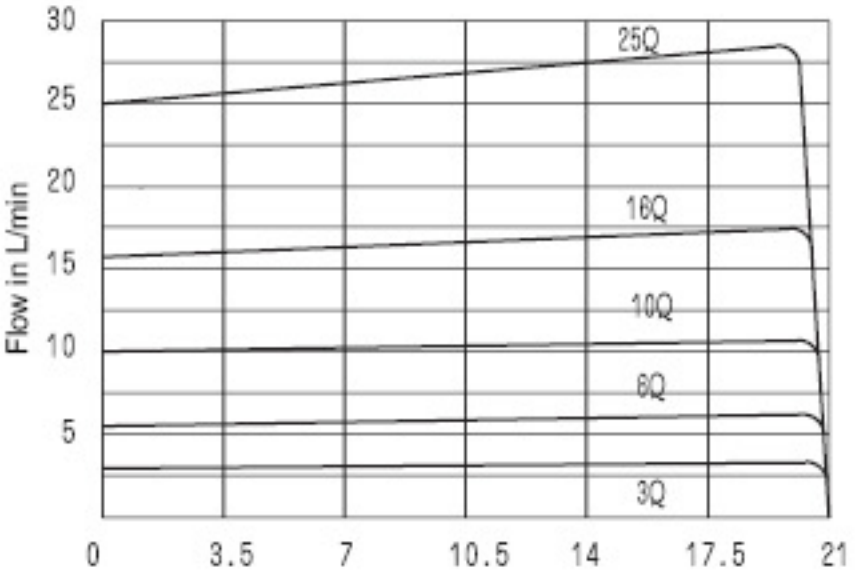
(flow control from A → B)



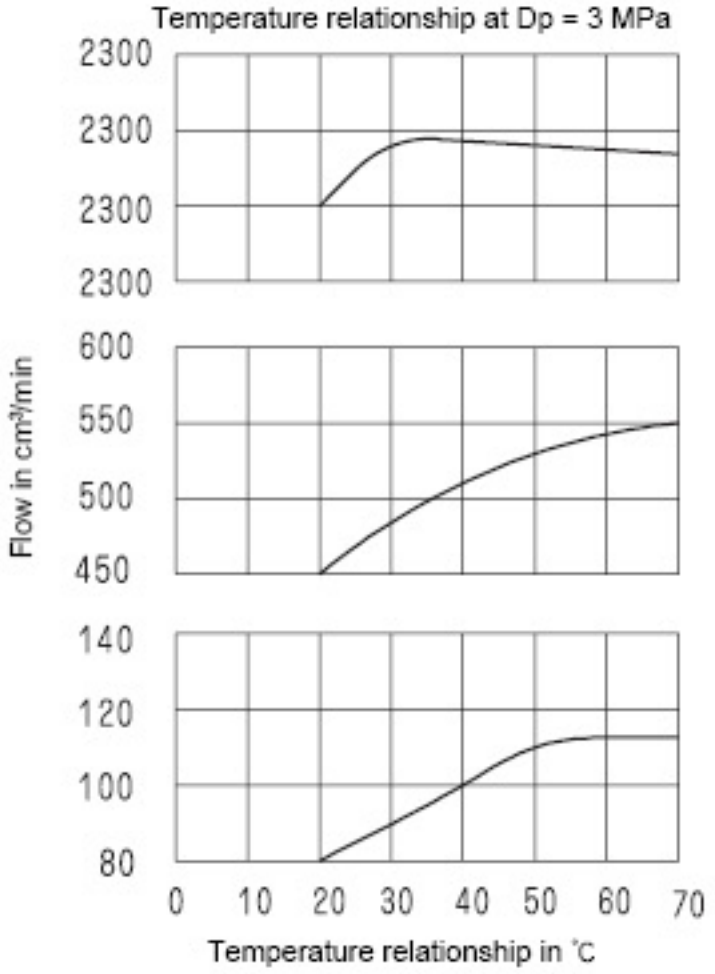
Proportional flow control valve

Pressure - flow relationship

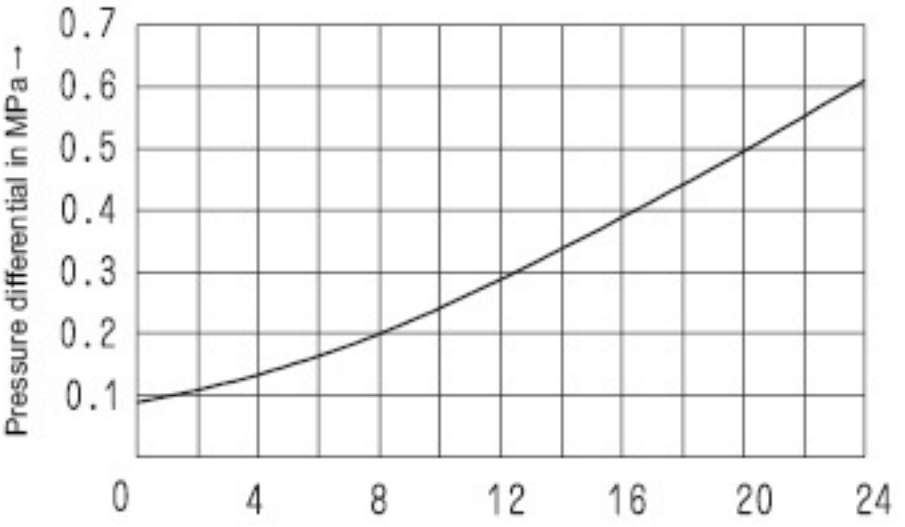




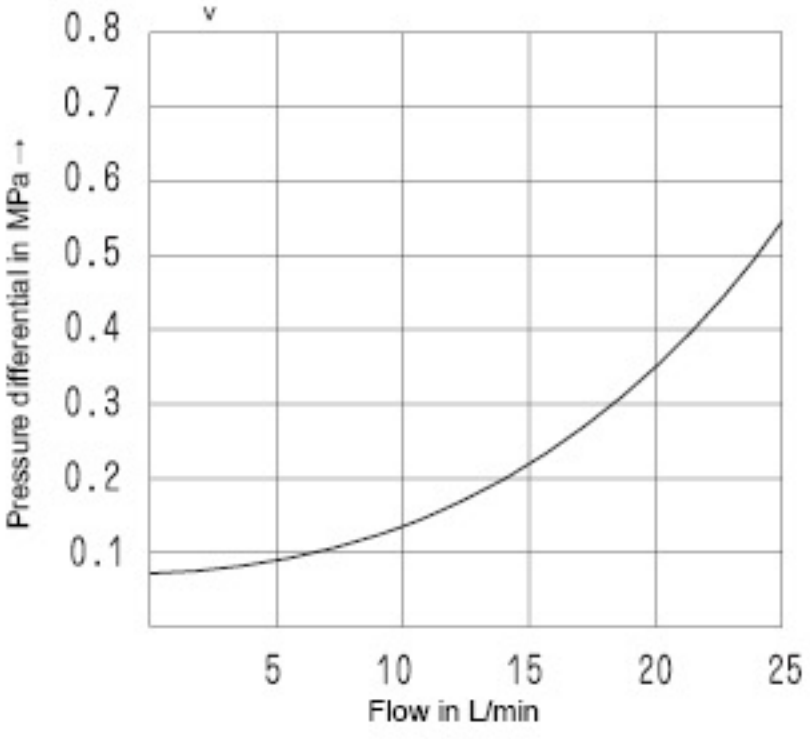
Temperature relationship at Dp = 3 MPa



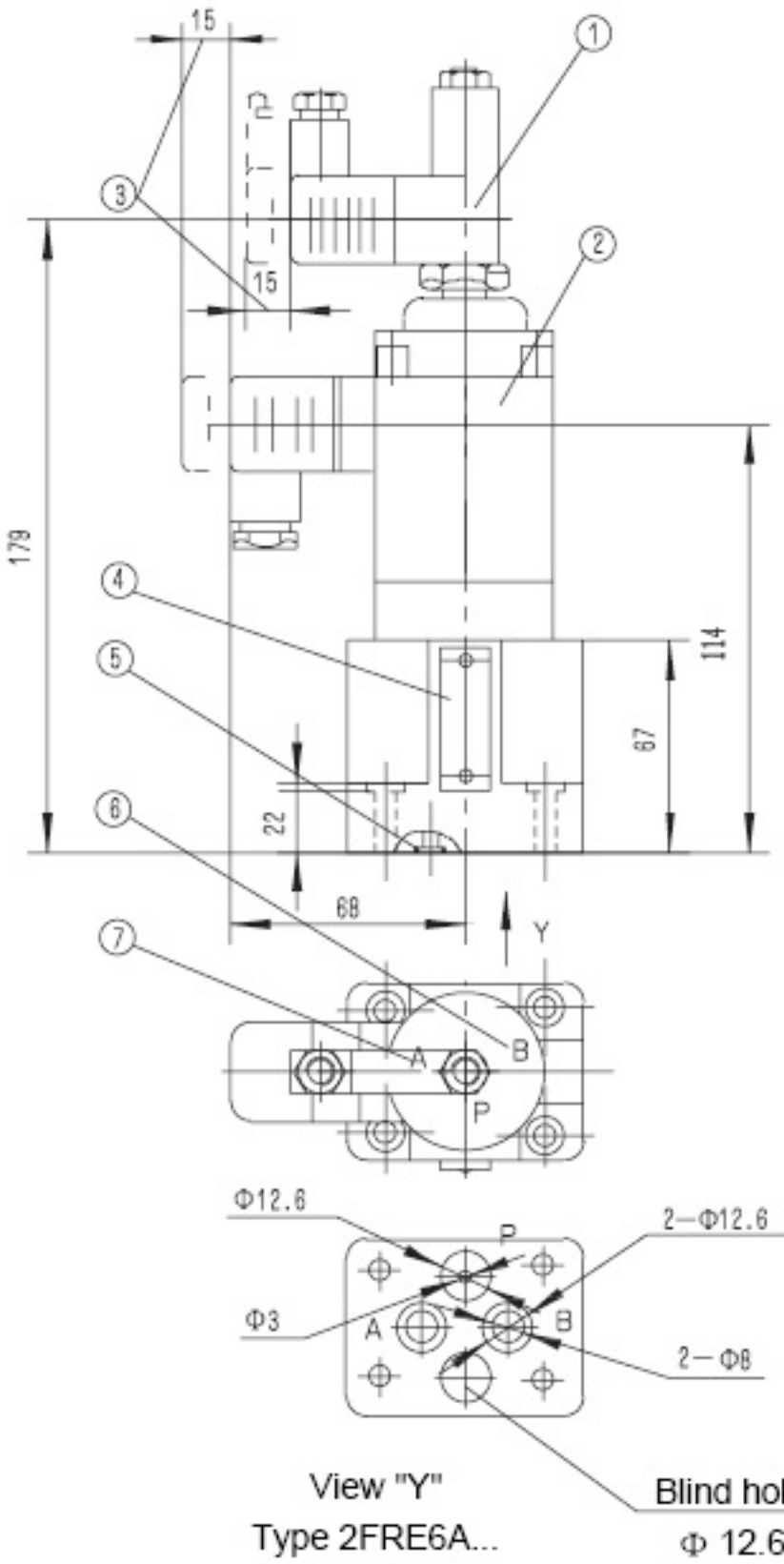
Pressure differential over check valve B → A
Orientation closed



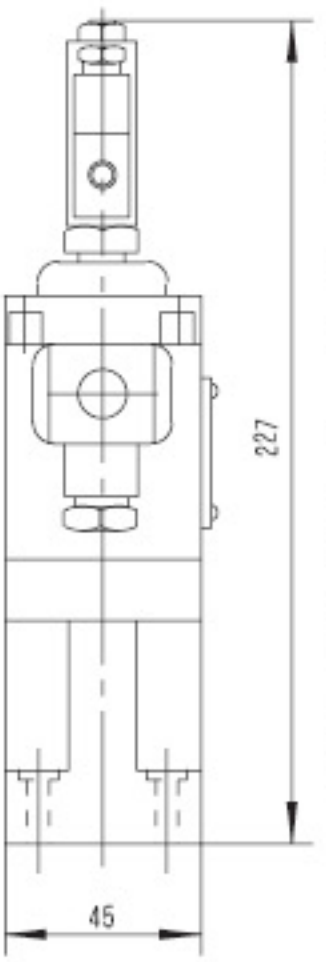
Rectifier sandwich plate
△ p- q -characteristic curve - cartridge check valve



Unit dimensions: **(Dimensions in mm)**

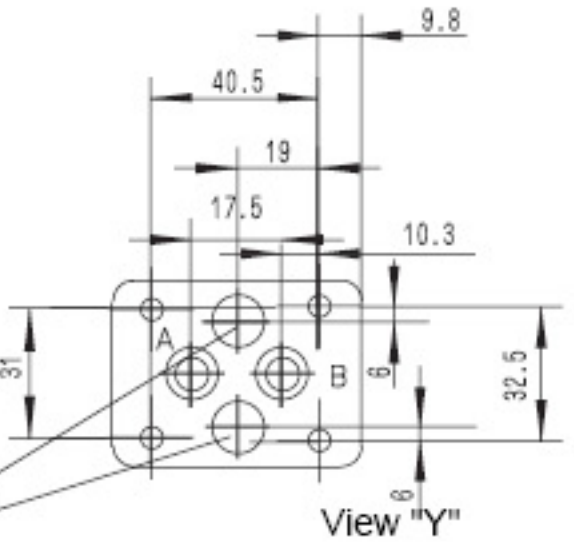


View "Y"
Type 2FRE6A...



1 Inductive position transducer
2 Solenoid
3 Space required to remove plug-in connector
4 Nameplate
5 O-Ring 9.25 x1.78(for ports A, B, P,T and blind hole)
6 Port B
7 Port A

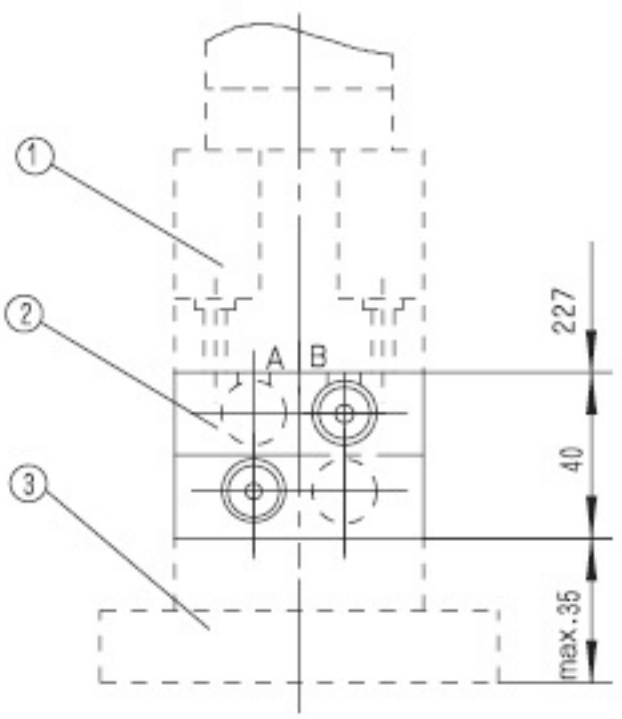
Subplates:
G 341/01 (G 1/4")
G 342/01 (G 3/8")
G 502/01 (G 1/2")
See page 80

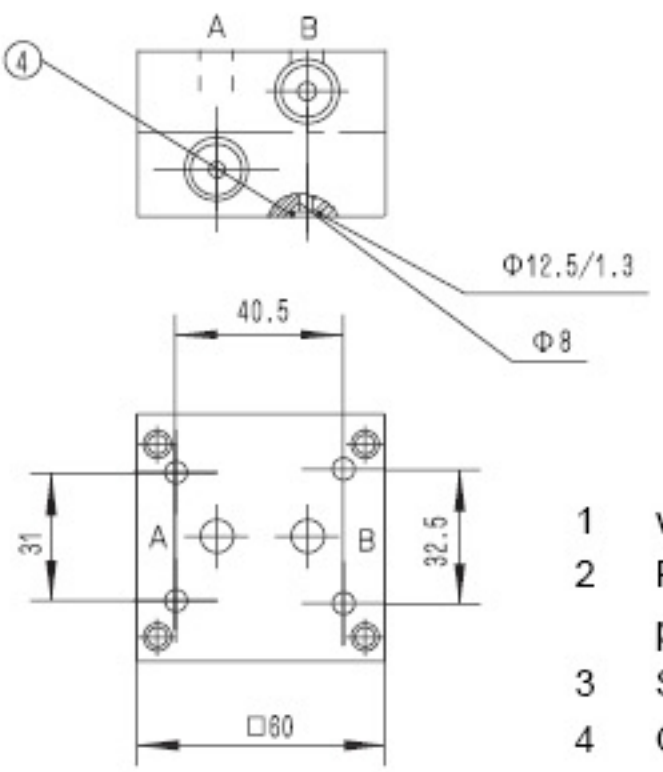


Blind hole
Φ 12.6

View "Y"
Type 2FRE6B...

Rectifier sandwich plate





1 valve 2FRE6
2 Rectifier sandwich plate Z4S6
3 Subplates
4 O-ring 9.25 x 1.78