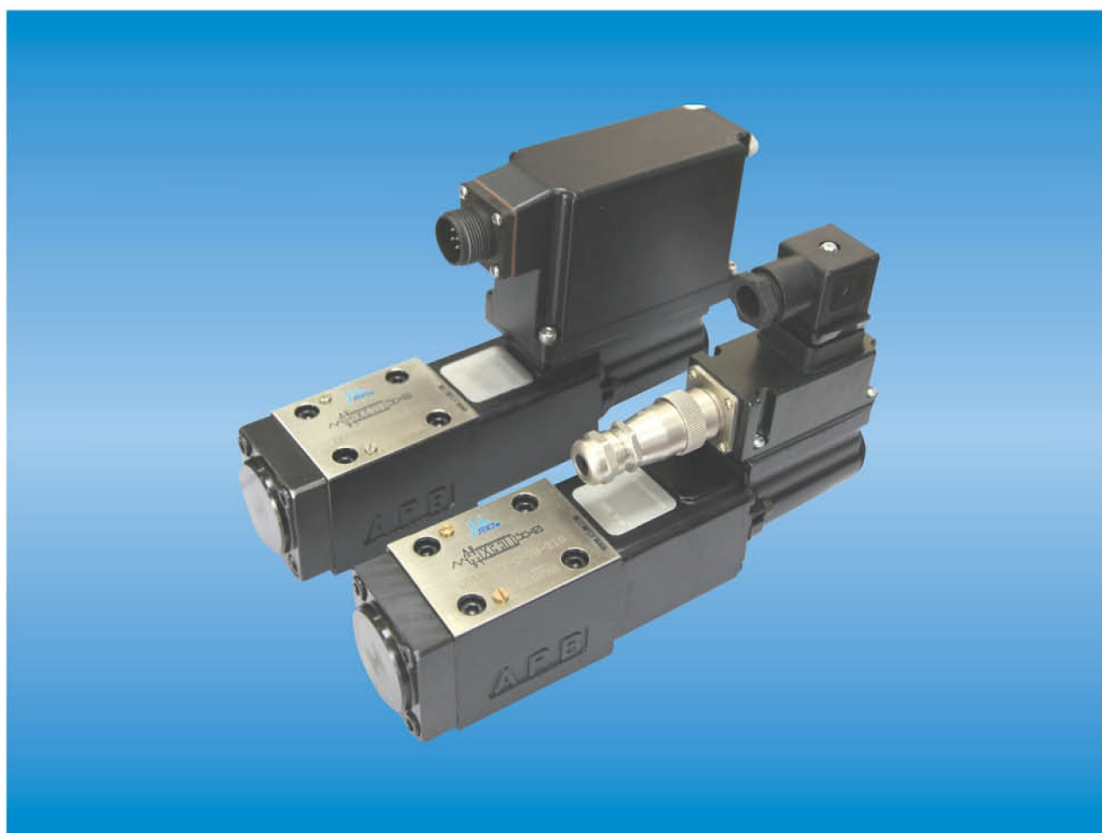


QDYB6 Series Electro-hydraulic Servo Proportional Valve



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BMTI PRECISION MECHATRONICS CO.,LTD.

QDYB6 series electro-hydraulic servo proportional valve

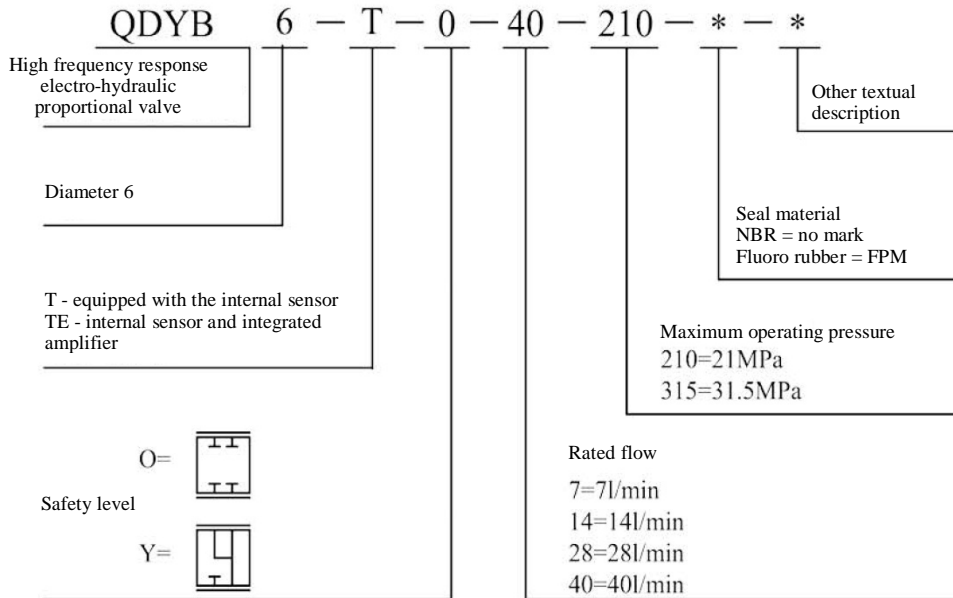
Overview

QDYB6 series electro-hydraulic servo proportional valve adopts the high-performance proportional electromagnet as the electric-mechanical converter, which is equipped with the high-precision valve core, valve sleeve and built-in displacement sensor, and allocated with the internal or external high-performance proportional amplifier. Compared with the traditional electro-hydraulic proportional valve, it has high control precision and good dynamic characteristics, and is close to the control performance of the electro-hydraulic servo valve. Meanwhile, it has strong anti-pollution capacity and high reliability, and is a hydraulic control valve with high quality and high cost performance. It is widely applied in machine tool, metallurgy, hydropower, petroleum, shipping and other industries.

The series of electronic-hydraulic servo proportional valve products are appraised by the experts organized by China Hydraulics Pneumatics & Seals Association, various performance indicators reach the level of foreign similar advanced products, and it obtains the third prize in technological progress of 2015 hydraulic and pneumatic sealing industry.



Model description



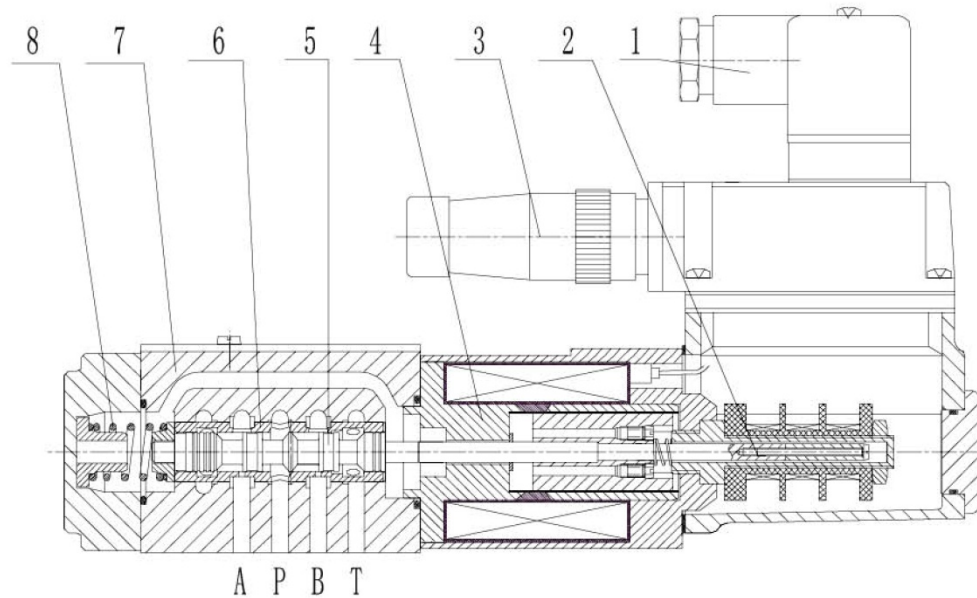
Main features

- It has very high anti-pollution capacity, and has low requirements for oil fluid cleanliness.
- Good dynamic characteristic and high response frequency
- Stable performance, high reliability and simple repair and maintenance
- The high-performance direct acting proportional electromagnetic motor directly drives the valve core.
- Built-in displacement sensor, which realizes adjustment of the valve core displacement in the form of closed loop, with small hysteresis loop and high control precision.
- Precision valve core, valve sleeve coordination, small null dead zone and high pressure gain
- Power failure protection function, the core is automatically located at the safety position at the power off period.
- Standard connecting interface, it can be exchanged with the foreign servo proportional valve.

Function description

● Structure composition

QDYB6 series electronic-hydraulic servo proportional valve mainly consists of several parts of valve core (5), valve sleeve (6), valve body (7), proportional electromagnet (4), displacement sensor (2), reset spring (8) and so on.

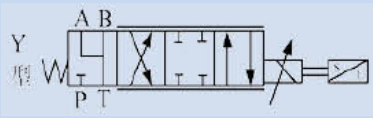
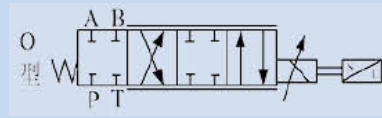


● Working principle

The characteristic of proportional electromagnet is that the output force is proportional to the control current. When the electromagnet output force is balanced with the spring force, the valve core can be located at the fixed position. When the electromagnet is powered off, the valve core is moved to the rightmost under the function of spring (8) (the rightmost position in the figure). At the moment, the valve core is at the safety protection position. When the proportional valve is powered on, a fixed control current shall be input firstly, and the fixed thrust generated by the electromagnet enables that the valve core is at the neutral position of the valve. At the moment, four oil ports of A, B, P and T are not connected. When a control signal is input to the valve (controller), the output force of the proportional electromagnet is changed, and the valve core position is also changed. When the control signal is increased, the valve core is moved leftward, P port is connected with A port, and B port is connected with T port. When the control signal is reduced, the valve core is moved rightward, P port is connected with B port, and A port is connected with T port. The electromagnet output force can be changed by adjusting the control signal, so as to control the liquid flow direction and rate of the valve.

The gap and covering amount of the valve core (5) and valve sleeve (6) shall be accurately controlled during manufacturing, which has the characteristics same with the servo valve. The high-precision position sensor (2) is configured as the feedback signal at the valve core position, so as to guarantee accurate, stable and reliable valve core position.

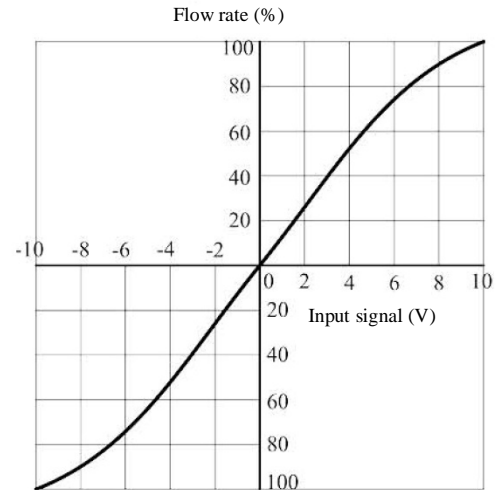
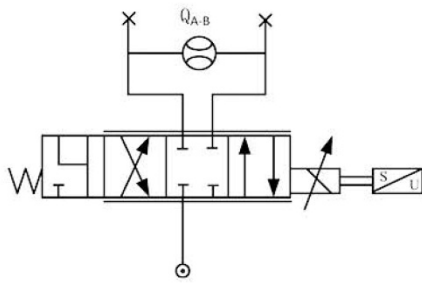
Technical parameters

Basic parameters				
Structural style	Direct acting, high precision valve core and valve sleeve, with LVDT displacement sensor			
Control mode	It has the proportional electromagnet with the position feedback function, external / internal electrical amplifier.			
Installation mode	Plate-type connection NG6 mounting hole (ISO4401-03-02-0-94)			
Mounting position	Any position, close to the actuating mechanism as far as possible			
Ambient temperature	-20t to +50°C			
Hydraulic parameters				
Medium category	Petroleum-based hydraulic oil or other media selected as required			
Medium viscosity	Conforming to ISO11158-2009 At 40°C, the recommended value is 15-100mm ² /s			
Medium cleanliness	Conforming to ISO4406 (GB/T14039) standard 18/15			
Medium temperature	-20°C to +70°C			
Electrical parameters				
Model of the matching controller	BVT-3001			
Power supply	DC24V/3A, V _{rm} =21-33 (pulse peak value 2V _{pp})			
Protection class	Conforming to GB4208-1993, IP65			
Controller signal mode	-10 to +10V			
Maximum coil current	2.7A			
Coil resistance	3.2Ω			
Maximum power consumption of the controller	<40W			
Operating mode	100% continuous operation			
Power supply of the displacement sensor	±15V			
Displacement demodulation output	-5V to +5V			
Dynamic and static parameters				
Rated flow Q _n (valve pressure drop of 7MPa)	7L/min	14L/min	28L/min	40L/min
Slide valve function				
Maximum operating pressure	P, A, B: 31.5Mpa T: 16MPa			
Zero position leakage QL	0.2L/min	0.3L/min	0.4L/min	0.5L/min
Step response 0-100%	≤ 10ms			
Resolution	≤ 0.5%			
Hysteresis loop	≤ 1%			
Temperature drift ΔT=40°C	≤ 2%			

Characteristic curve

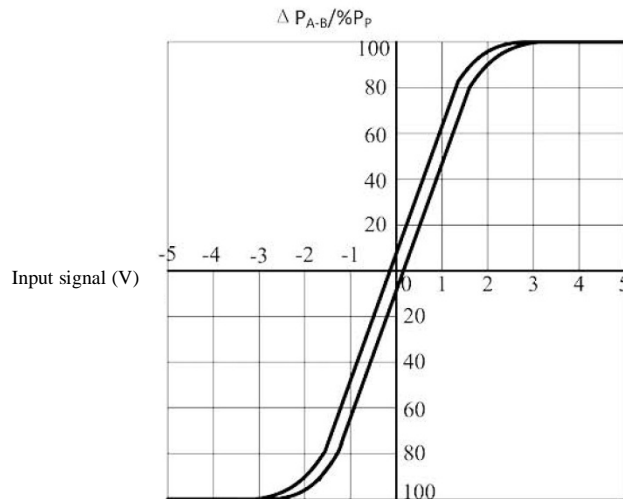
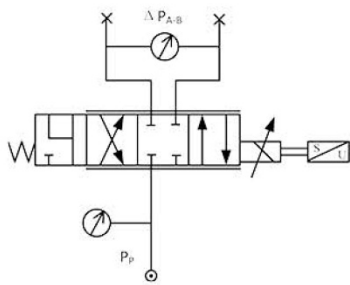
- **Input signal - flow curve**

(The curve is measured at the conditions of oil supply pressure of 7MPa, oil fluid viscosity of $32\text{mm}^2/\text{s}$ and temperature of $40\pm 5^\circ\text{C}$)



- **Input signal - pressure curve**

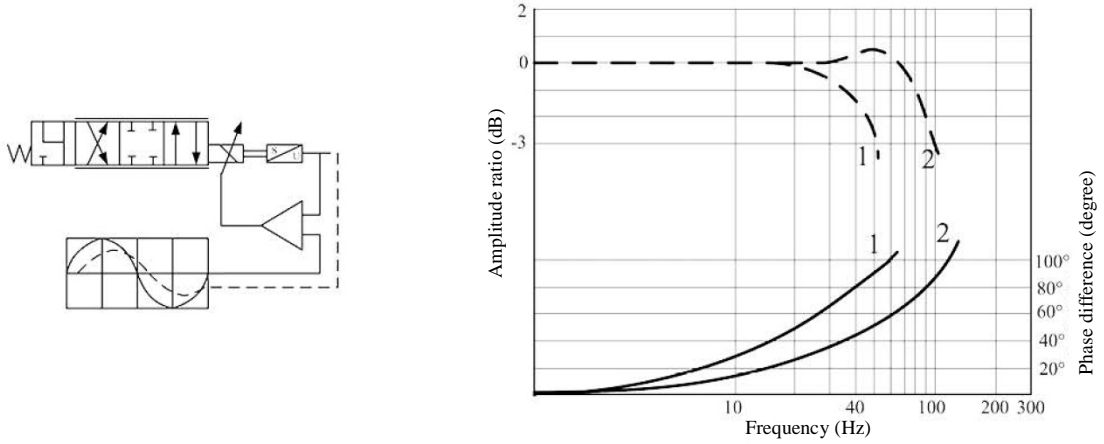
(The curve is measured at the conditions of oil supply pressure of 10MPa, oil fluid viscosity of $32\text{mm}^2/\text{s}$ and temperature of $40\pm 5^\circ\text{C}$)



● **Dynamic response**

1 is $\pm 50\%$ rated stroke, and 2 is $\pm 5\%$ rated stroke.

(The curve is measured at the conditions of oil supply pressure of 10MPa, oil fluid viscosity of $32\text{mm}^2/\text{s}$ and temperature of $40\pm 5^\circ\text{C}$)



Appearance and mounting dimensions

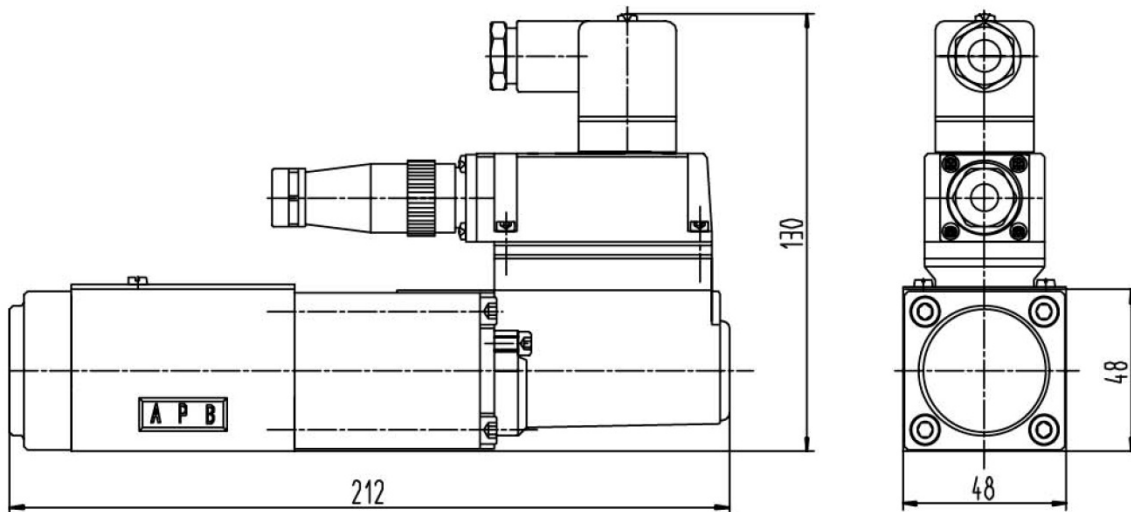


Diagram of external dimensions QDYB6-T

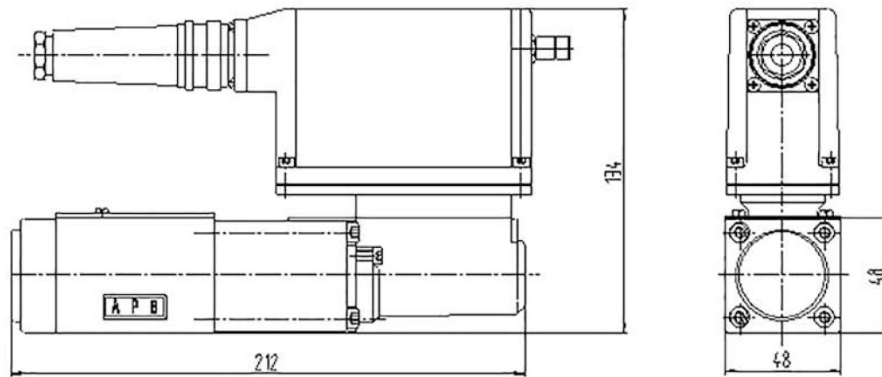


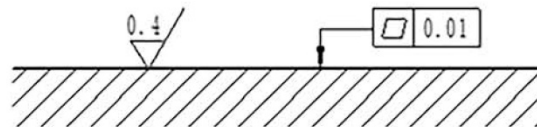
Diagram of external dimensions QDYB6-TE

Fastening bolt: M5×45 hexagon cylinder head screw, tightening torque 6-8Nm.

Oil port dimensions: $\phi 7.5$ mm, P is the oil inlet, A and B are the operating port, and T is the oil return port.

Oil port sealing ring: O ring 8.5x1.9

Quality requirements for mounting plate surface in contact with the bottom surface



The installation dimensions of the valve bottom surface conforms to the plate-type connection NG6 mounting hole (IS04401-03-02-0-94):

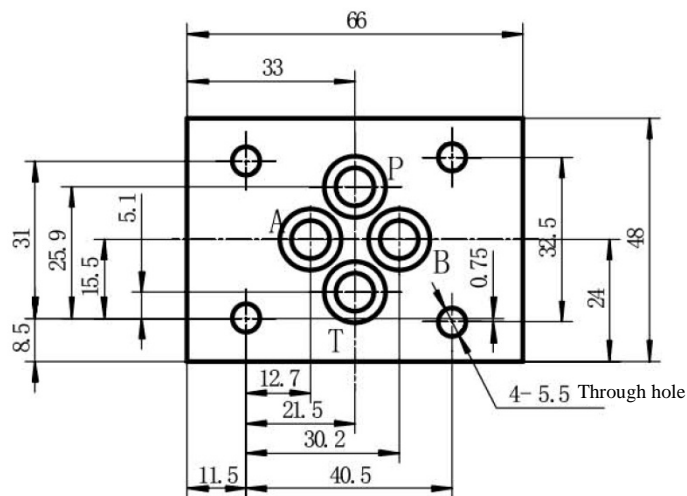


Diagram of mounting dimensions of the valve bottom surface

Precautions

● Installation

- ◇ When the servo proportional valve is installed, one must ensure that the valve and installation area are clean, the oil tank must be of the seal structure, so as to prevent external pollutant from entering the oil tank, causing oil fluid pollution.
- ◇ The connecting pipeline between the servo proportional valve and the actuator shall be as short as possible, and the hose shall not be used for connection.
- ◇ The mounting surface machining accuracy shall conform to the sample requirements.
- ◇ The servo proportional valve shall be installed horizontal at best. If the valve is installed on the actuator, the valve core direction shall not be parallel to the acceleration direction of the actuator.

● Use

- ◇ During use of the servo proportional valve, the oil fluid cleanliness shall reach ISO4406(GB/T14039) standard 18/15.
- ◇ During use of the servo proportional valve, the oil fluid temperature shall be controlled within -20°C to +70°C.

● Maintenance

- ◇ In case of any failure, the valve must be returned to the original factory for repair. During rework, the valve bottom surface shall be protected from pollution, and it shall be packed meticulously, so as to prevent any damage possibly caused during the transportation process.
- ◇ The valve must be stored at the dry place free of dust, corrosion and steam.

Electro-hydraulic servo proportional controller BVT-3001

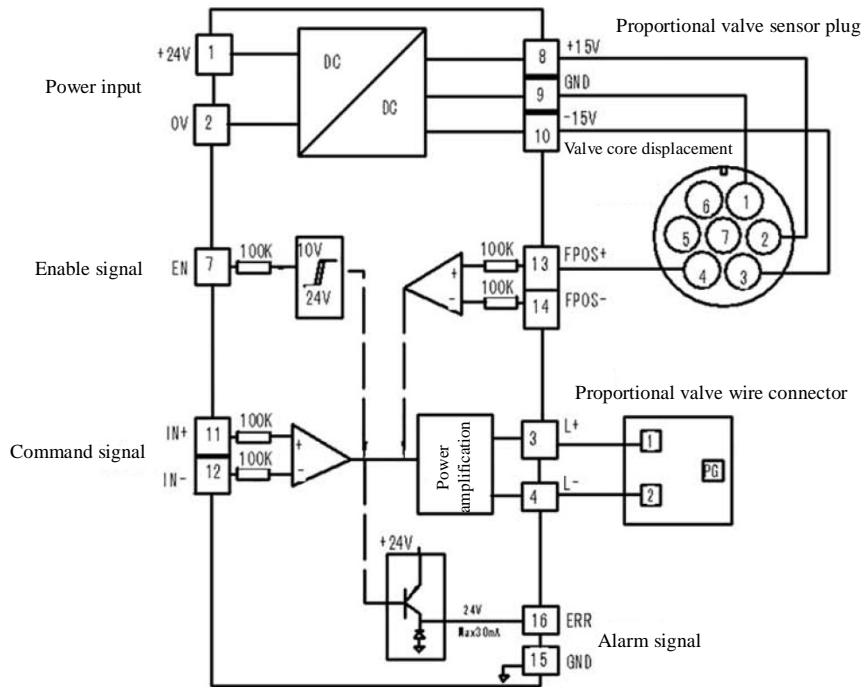
BVT-3001 servo proportional valve controller is adopted for the electro-hydraulic servo proportional valve for closed loop control, so as to realize proportional control at the valve core position according to the input signal, and realize accurate control of the flow.

● Features of BVT-3001 servo valve proportional valve controller

- ◇ Closed loop control function at the valve core position with PID
- ◇ Enable function with the output level enabling
- ◇ Short circuit protection output function
- ◇ Zero adjustment function
- ◇ Feedback signal breakage alarm function
- ◇ Conforming to European board analog controller standard, which can be installed on 19" rail rack

● Block diagram of principle of BVT-3001 servo proportional spring controller



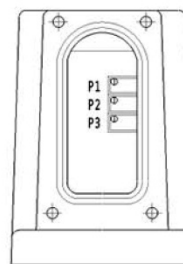
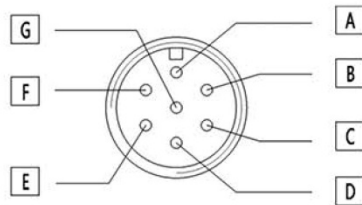


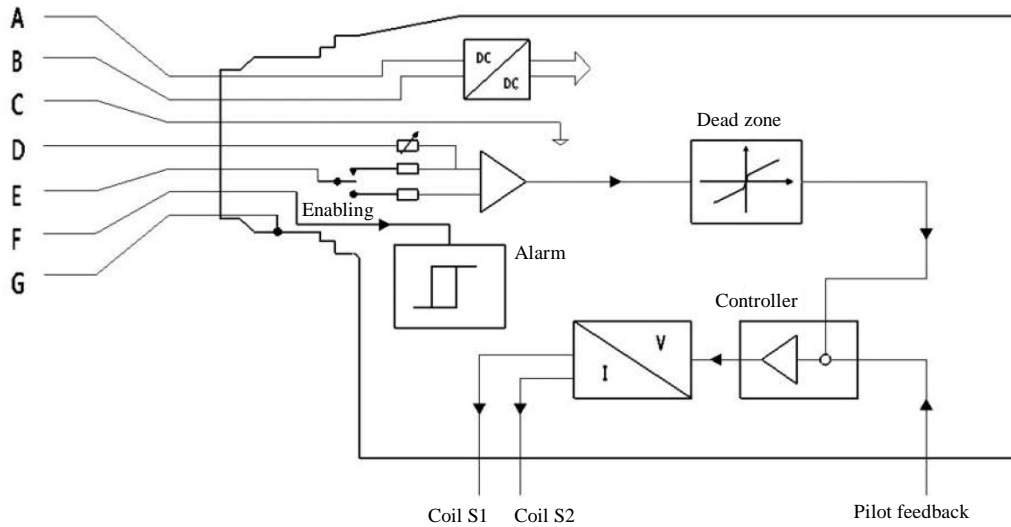
Integrated electronic-hydraulic servo proportional controller

Main characteristics:

- ◇ Closed loop control function at the valve core position with PID
- ◇ Standard power seven-core plug, used for connecting power supply and input signal
- ◇ Enable function with the output level enabling
- ◇ Zero adjustment function
- ◇ Integrated controller and valve, protection level IP67

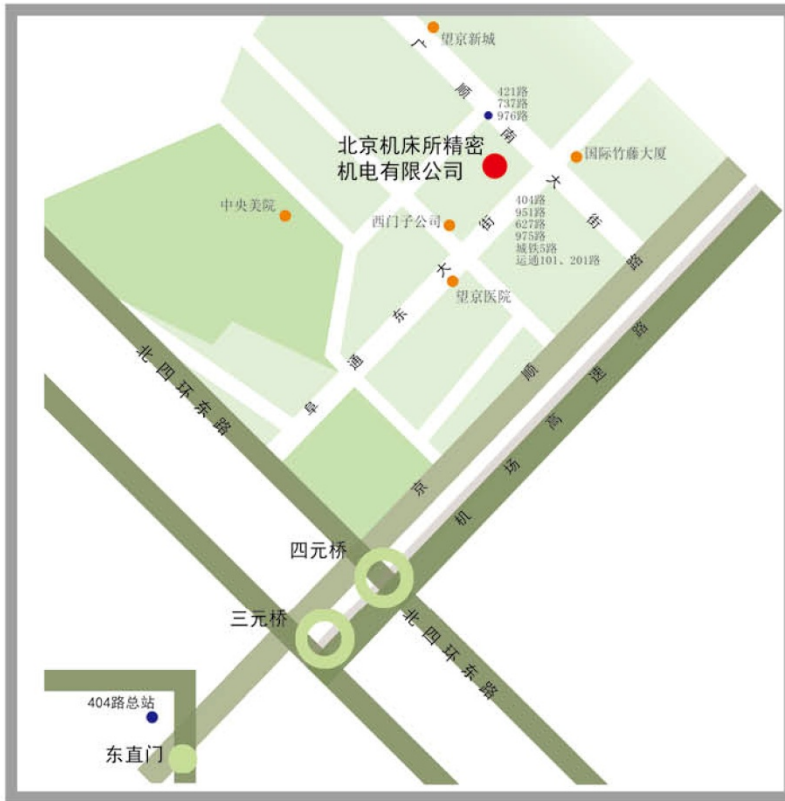
Wiring block diagram:





Electrical wiring - 7-core plug definition

Terminal No.	Definition	Technical description
A	+24V	Positive terminal of power supply
B	0V	Power ground
C	SGND	Signal ground (reference 0V)
D	IN+	Positive terminal of input signal
E	IN-	Negative terminal of input signal
F	EN	Enable signal (normal operation +24V)
G	PE	Shell protective grounding



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