

FLOW CONTROL PROPORTIONAL VALVES

J866 SERIES



TWO STAGE PROPORTIONAL VALVES FOR INDUSTRIAL APPLICATIONS

J866 Series flow control proportional valves are throttle valves for 3- and preferably 4-way applications. They are a high performance, two-stage design that covers the range of rated flows from 10 to 80 L/min at 7.0 MPa valve drop. The output stage is a closed center, four-way, sliding spool. The pilot stage is a symmetrical double-nozzle and flapper, driven by a double air gap, dry torque motor. The spool position is proportional to the coil current. The valve design is simple and rugged for dependable, long life operation. These valves are suitable for Press Machines and other applications with high stability and high repeatability.

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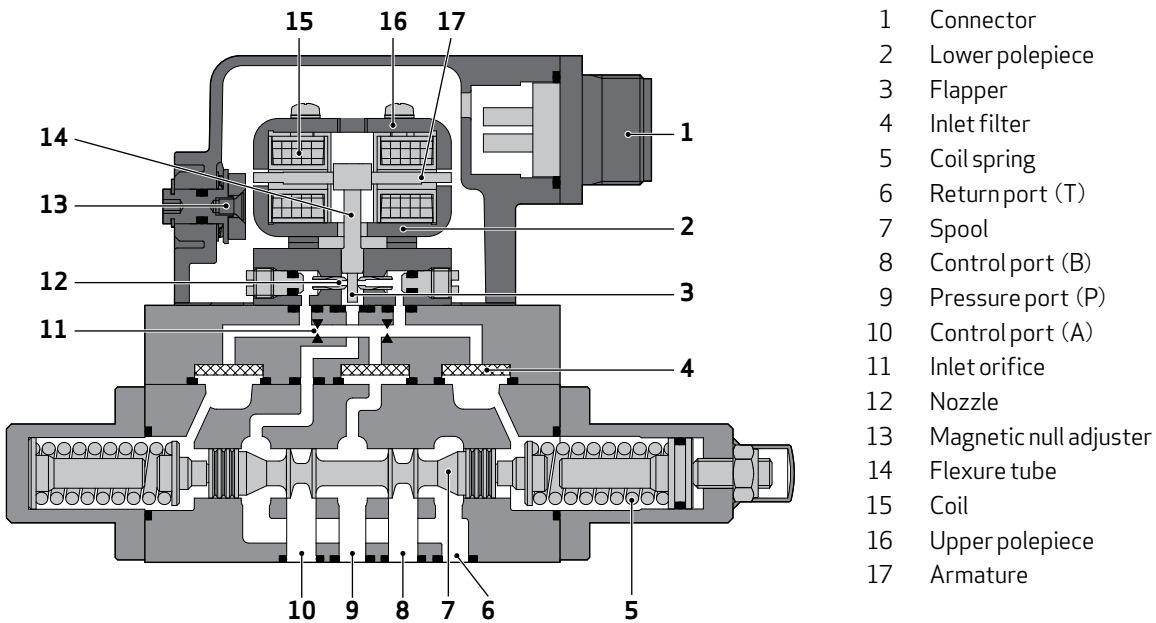


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Principle of operation

- An electrical command signal is applied to the torque motor coils and creates a magnetic force, which acts on the ends of the pilot stage armature.
- This causes a deflection of armature / flapper assembly within the flexure tube. Deflection of the flapper restricts fluid flow through one nozzle, which is carried through to one spool end, displacing the spool.
- Movement of the spool opens the supply pressure port (P) to one control port while simultaneously opening the tank port (T) to the other control port. The spool motion also applies a force to the coil spring.
- Once the coil spring force becomes equal to the nozzle pressure difference, and the spool is held open in a state of equilibrium until the command signal changes to a new level.

In summary, the spool position is proportional to the input current. With constant pressure drop across the valve, flow to the load is proportional to the spool position.



Valve Features

- 2-stage design with dry torque motor
- High resistance to contamination by larger internal clearance & longer spool stroke
- Low friction double nozzle pilot stage
- High spool control forces
- Rugged, long-life design

The actual flow is dependent upon electrical command signal and valve pressure drop. The flow for a given valve pressure drop can be calculated using the square root function for sharp edge orifices:

$$Q = Q_N \sqrt{\frac{\Delta P}{\Delta P_N}}$$

Q L/min = calculated flow

Q_N L/min = rated flow

ΔP MPa = actual valve pressure drop

ΔP_N MPa = rated valve pressure drop

General Technical Data

Proof Pressure

P, A and B port 31.5 MPa (Static pressure)
 T port 21.0 MPa (Static pressure)

Temperature Range

Fluid -10 ~ 80 °C
 Ambient -10 ~ 80 °C

Seal Material

NBR
 Other seal material upon request

Operating Fluid

Compatible with common hydraulic fluids,
 other fluids on request.

Recommended Viscosity

10 ~ 400 mm²/s

System Filtration

High pressure filter (without bypass, but with dirt alarm) mounted in the main flow and if possible, directly upstream of the valve. Refer to Moog filtration catalog for recommended filtration scheme.

Class of Cleanliness

The cleanliness of the hydraulic fluid greatly effects the performance (spool positioning, high resolution) and wear (metering edges, pressure gain, leakage) of the valve.

Recommended Cleanliness Class

For normal operation ISO 4406 < 14/11
 For longer life ISO 4406 < 13/10

Filter Rating

Recommended
 For normal operation $\beta_{10} \geq 75$ (10 μm absolute)
 For longer life $\beta_5 \geq 75$ (5 μm absolute)

Installation Operations

Any position, fixed or movable

Vibration

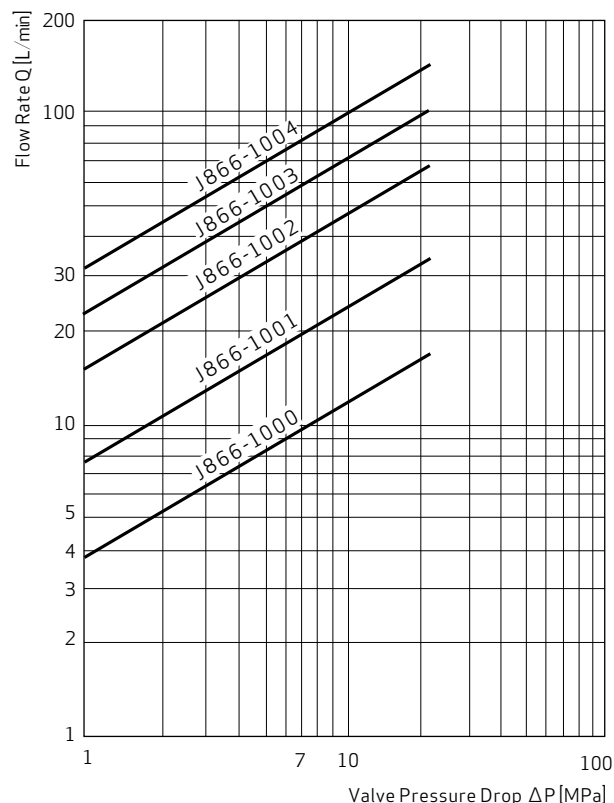
10g, 3 axes

Weight

2.1 kg

Shipping Plate

Delivered with an oil sealed shipping plate.



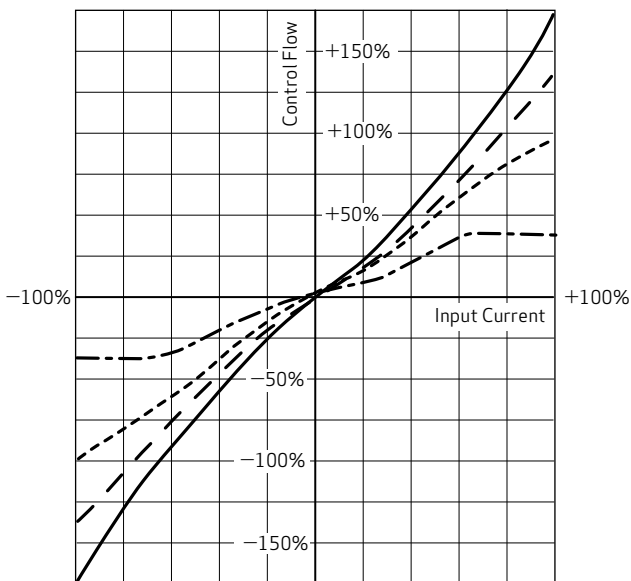
Valve Flow Diagram

Valve flow for maximum valve opening (100% command signal) as a function of the valve pressure drop.

Technical Data

| | | Specification | Condition |
|---|------------------------------|-----------------------------|---|
| Rated Supply Pressure | | 21.0 MPa | |
| Operating Pressure Range | | 7 ~ 21.0 MPa | |
| Proof Pressure (Supply) | | 31.5 MPa | |
| Proof Pressure (Return) | | 21.0 MPa | |
| Rated Current (Series connection) | | ±10 mA | |
| Nominal Coil Resistance | | 200 Ω / coil | |
| Null Bias | | < ±3% | Test Pressure 21 MPa |
| Null Shift | | < 3.0% | Temperature (ΔT = 30 °C : 25 ~ 55 °C) |
| | | < 3.0% | Supply Pressure (30% of Rated Pressure) |
| Hysteresis | | < 4.0% | @ 200 Hz 20% p-p |
| Frequency Response | Amplitude Ratio - 3dB | > 30 Hz | Supply Pressure 21 MPa, ± 25% input |
| | 90° phase lag | > 50 Hz | |
| Temperature Range | | -10 ~ 80 °C | |
| Operating Fluid | | | Petroleum base hydraulic fluid |
| Viscosity Range of Operating Fluid | | 10 ~ 400 mm ² /s | Petroleum base hydraulic fluid |
| Connector Direction | | B Port | |
| Weight | | 2.1 kg | |

No-Load Flow Gain Characteristic



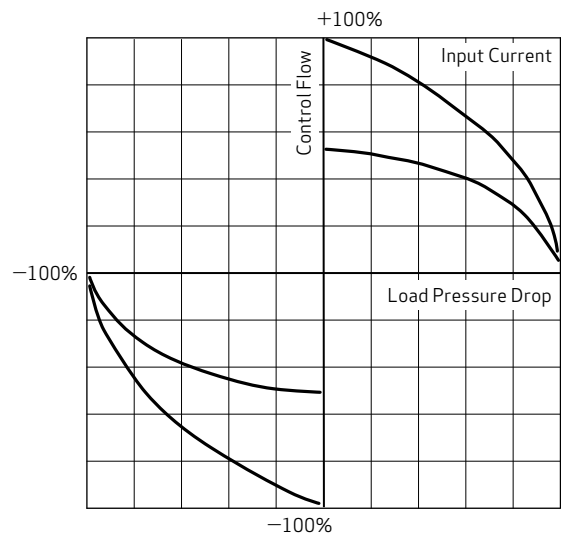
Supply Pressure

— 21 MPa - - - 14 MPa - - - - 7 MPa
 - · - · - 3.5 MPa

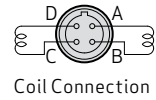
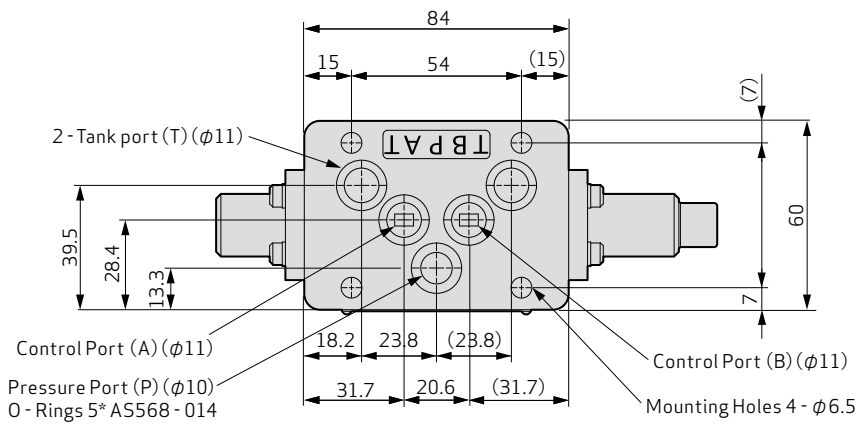
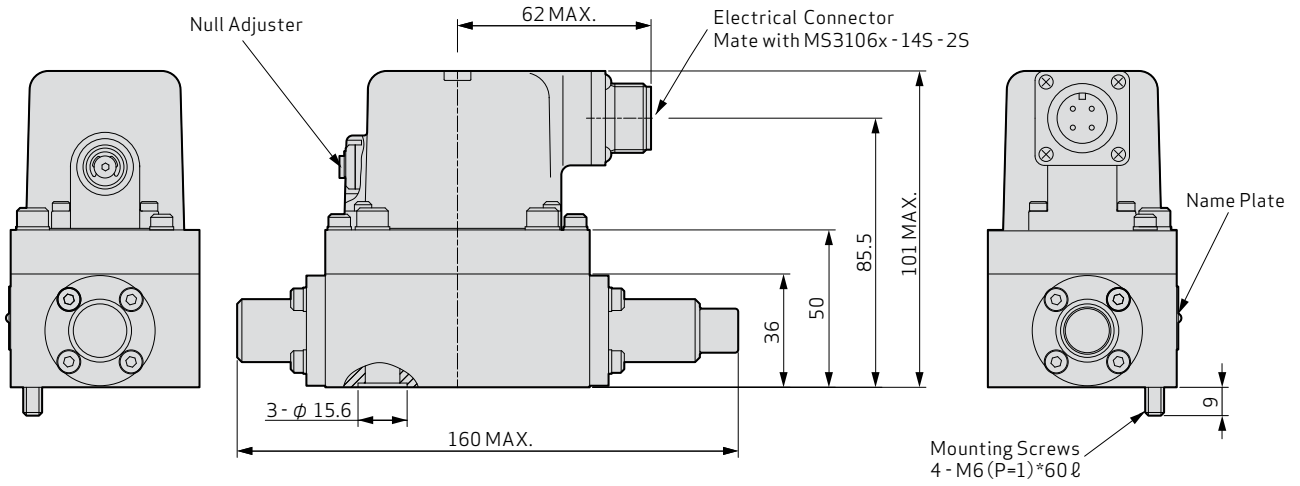
Dither Signal

200 Hz, 4 mA p-p

Change in Control Flow with Current and Load Pressure

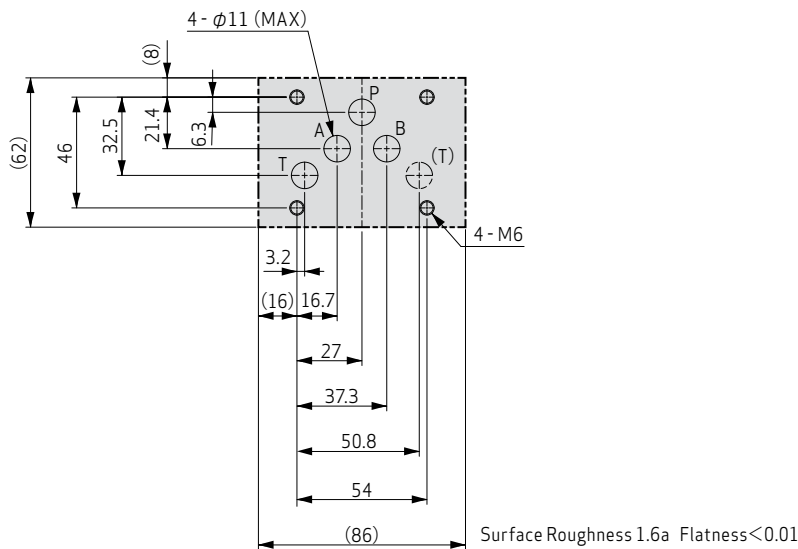


Installation Drawing



Note: The mounting manifold must conform to DIN 24340 A 10

Mounting Manifold



Electrical Connections

Rated current and coil resistance

Only one type is available for J866 Series Proportional valves.

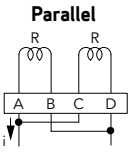
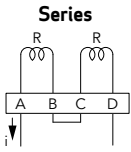
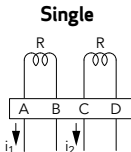
Coil connections

A four-pin electrical box connector (that mates with an MS31 06A - 14S - 2S cable connector) is standard. All four torque motor leads are available at the connector so external connection can be made for series, parallel or single coil operation.

Servoamplifier

The servoamplifier responds to input current, so a servoamplifier that has high internal impedance (as obtained with current feedback) should be used. This will reduce the effects of coil inductance.

Electrical Connections (Examples with typical J866 Series coil)

| | Parallel | Series | Single |
|-----------------------------------|---|---|---|
| |  |  |  |
| Coil Resistance | 100 Ω | 400 Ω | 200 Ω |
| Rated Current | ±20 mA | ±10 mA | ±20 mA |
| Coil Inductance | 1.5 H | 4.7 H | 1.6 H |
| Electrical Power | 0.04 W | 0.04 W | 0.08 W |
| Polarity for valve opening | P → A, B → T A and C (+), B and D (-) | P → A, B → T A (+), D (-) | P → A, B → T A (+), B (-) or C (+), D (-) |

Ordering Information

Standard Models

| Model | Rated Flow Valve Drop 7.0MPa | Internal Leakage System Pressure 21.0MPa | Rated Current (Series Connection) | Nominal Coil Resistance |
|-------------|---------------------------------|---|--------------------------------------|-------------------------|
| J866 - 1000 | 10 L/min | 1.3 L/min | 10 mA | 200 Ω |
| J866 - 1001 | 20 L/min | 1.6 L/min | 10 mA | 200 Ω |
| J866 - 1002 | 40 L/min | 2.2 L/min | 10 mA | 200 Ω |
| J866 - 1003 | 60 L/min | 2.8 L/min | 10 mA | 200 Ω |
| J866 - 1004 | 80 L/min | 3.4 L/min | 10 mA | 200 Ω |

Spare parts and Accessories

| Part | Size | Part Number |
|---|-----------------------|-----------------------------------|
| O-Rings (included in delivery) P, A, B, T | AS568 - 014 | A47622 - 004 |
| Mounting Bolts (included in delivery) | M6 × 60 mm (4 pieces) | A04001 - 006 - 060 |
| Mating Connector | | MS3106A14S2S (MS3106A - 14S - 2S) |
| Clamp for Mating Connector | | MS3057 - 6A |
| Flushing Block | | C92092 - 001 |

Model Number

J866 -

| | | | |
|--|--|--|--|
| | | | |
|--|--|--|--|

Type Designation

FOR MORE SPECIFIC INFORMATION

For more specific information regarding Moog products, solutions or services, please Email us, or visit our website. You may also directly contact your local Moog office.

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