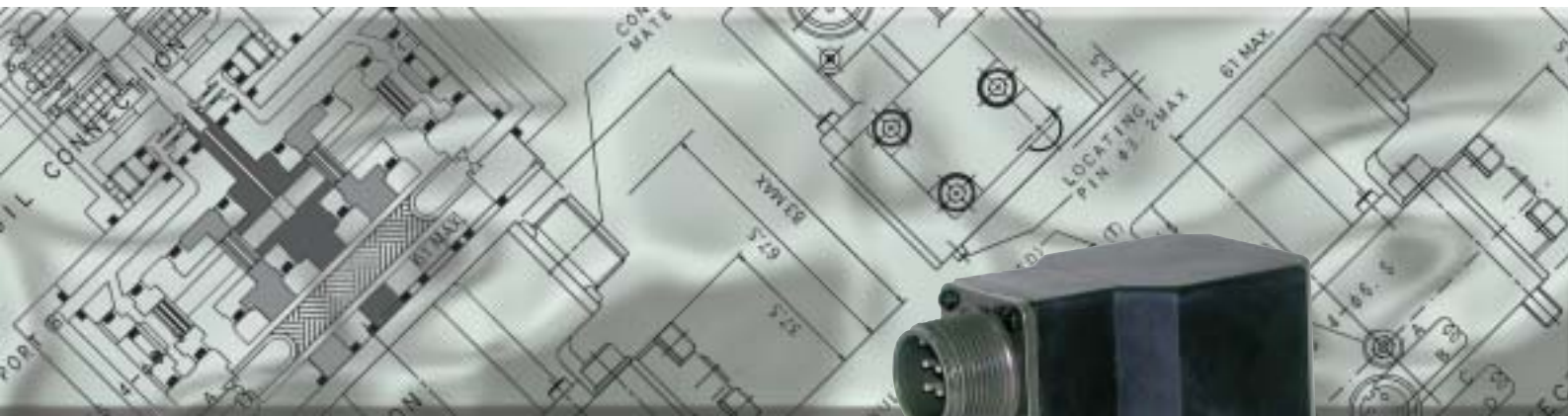


# MOOG

## Flow Control Servovalves J869 Series



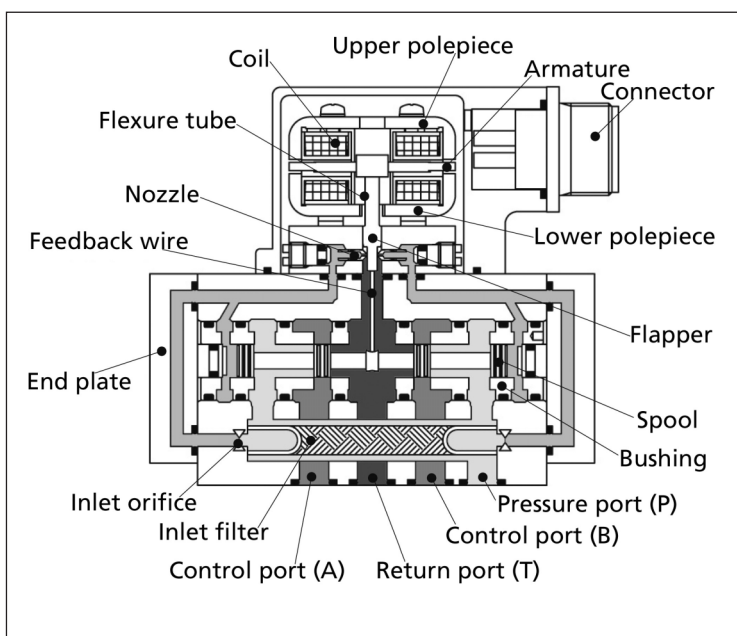
## J869 Series

### Two Stage Servovalves for Industrial applications

J869 Series flow control servovalves 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 3.2 to 64 L/min at 7.0MPa 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. Mechanical feedback of the spool position is provided by a cantilever spring. The valve design is simple and rugged for dependable, long life operation. These valves are suitable for Industrial Robots and Manipulators application with high stability and high repeatability.

### 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 cantilever spring, creating a restoring torque on the armature/flapper assembly.
- \* Once the restoring torque becomes equal to the torque from the magnetic forces, the armature/flapper assembly moves back to the neutral position, 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
- Low friction double nozzle pilot stage
- High spool control forces
- Rugged, long-life design
- High resolution, low hysteresis
- High stability

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

$\Delta P$  MPa = actual valve pressure drop

$\Delta P_N$  MPa = rated valve pressure drop

# J869 Series

## 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

### Operating Fluid

Compatible with common hydraulic fluids, other fluids on request.

Recommended Viscosity 10~400mm<sup>2</sup>/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 servovalve.

**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  $\mu\text{m}$  absolute)  
 For longer life :  $\beta_5 \geq 75$  (5  $\mu\text{m}$  absolute)

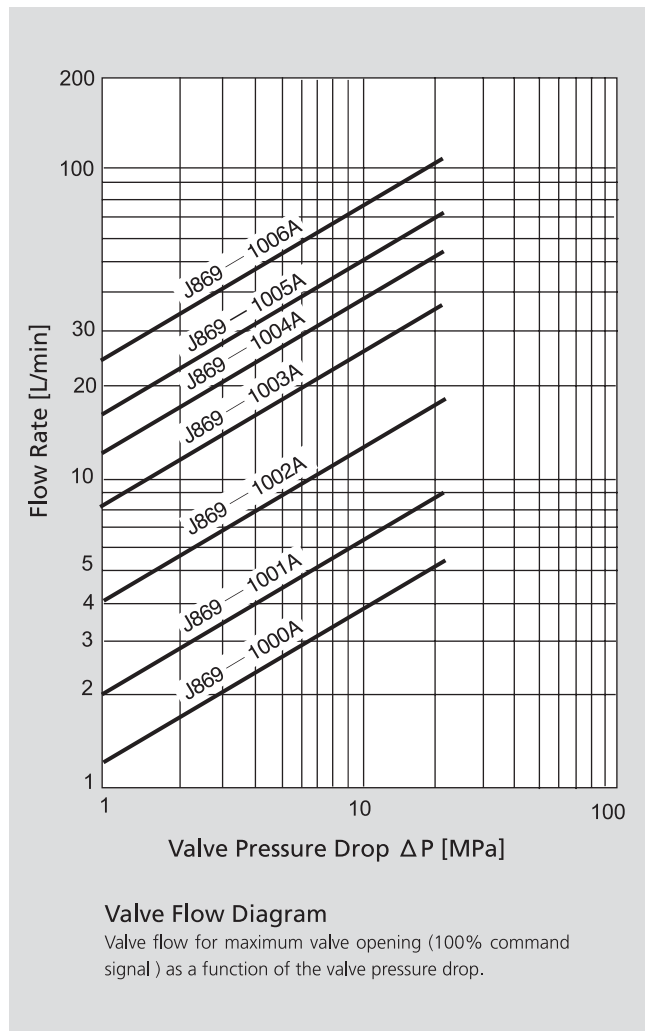
**Installation Operations** Any position, fixed or movable

**Vibration** 10 g, 3 axes

**Weight** 1.1 kg

**Shipping Plate** Delivered with an oil sealed shipping plate.

\* Other seal material upon request

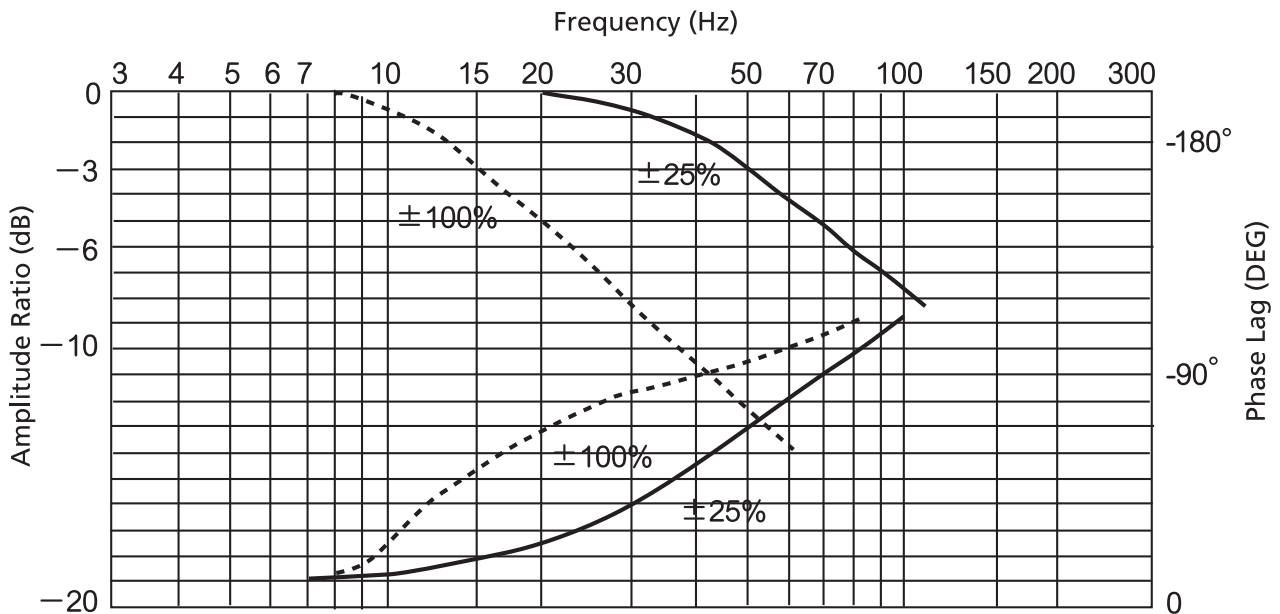


# J869 Series

## Technical Data

	Condition	Unit	Specification
Rated Supply Pressure		MPa	21.0
Operating Pressure Range		MPa	1~21.0
Proof Pressure (Supply)		MPa	31.5
Proof Pressure (Return)		MPa	21.0
Rated Current (Series connection)		mA	15
Nominal Coil Resistance		Ω/coil	200
Null Bias		%	<± 2%
Null Shift	Temperature (ΔT=30°C: 30°C~60°C)	%	<1.0
	Acceleration (1G)	%	<0.5
	Supply Pressure (30% of Rated Pressure)	%	<0.5
	Back Pressure (0%~20% of Rated Pressure)	%	<2.0
Hysteresis		%	<2.5
Threshold		%	<0.1
Frequency Response	Amplitude Ratio -3dB	Hz	>40
	90° phase lag	Hz	>50
Temperature Range		°C	-10~80
Operating Fluid	petroleum base hydraulic fluid	mm <sup>2</sup> /s	10~400
Required Filtration			$\beta_{10} \geq 75$
Weight		kg	1.1

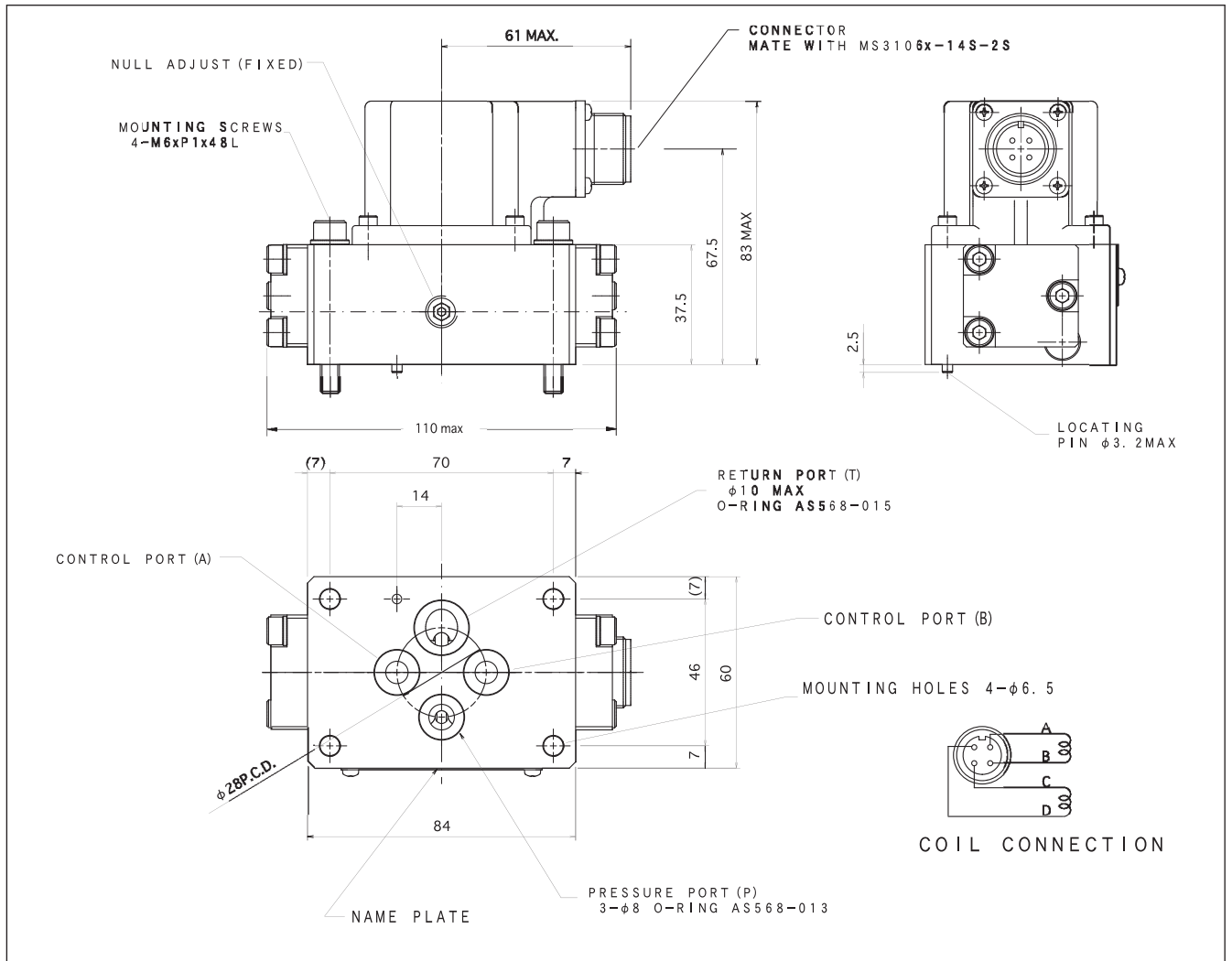
### ■ Frequency Response



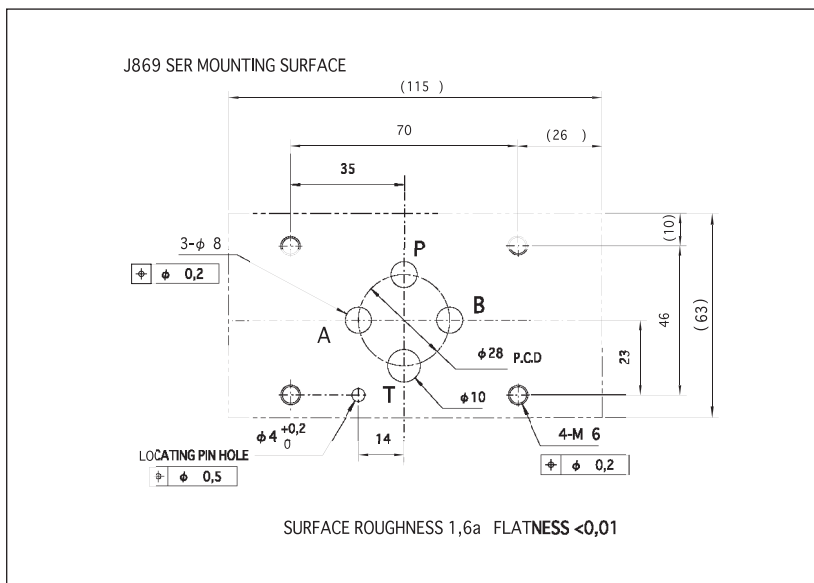
#### Test Condition

- ※ Input Current : ± 25%, ± 100%
- ※ Temperature : 40°C
- ※ Supply Pressure : 21.0MPa

# Installation Drawing



# Mounting Manifold



# Electrical Connections

■ **Rated current and coil resistance**

A variety of coils are available for J869 Series Servovalves.

■ **Coil connections**

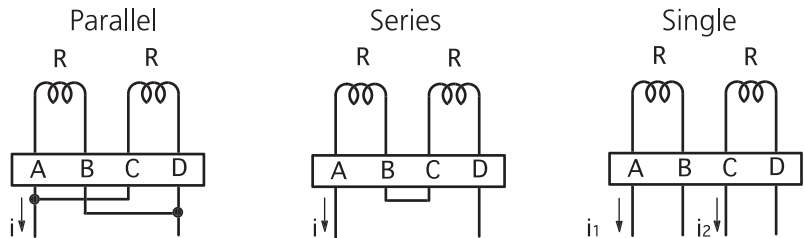
A four-pin electrical box connector (that mates with an MS3106A-14S-2S cable connector) is standard. All four torque motor leads are available at the connector so external connection can be made for series, parallel or single coil operation.

■ **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 and will minimize changes due to coil resistance variations.

## Electrical Connections

(Examples with typical J869 Series coil)



Coil Resistance	[Ω]	100	400	200
Rated Current	[mA]	±30	±15	±30
Coil Inductance	[H]	0.7	2.1	0.7
Electrical Power	[W]	0.09	0.09	0.18
Polarity for valve opening		A and C(+)	A(+),D(-)	A(+),B(-) or
P→A,B→T		B and D(-)		C(+),D(-)

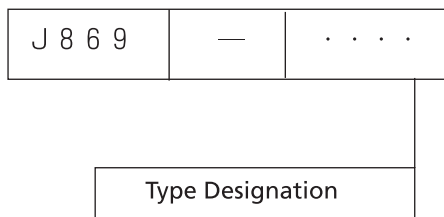
# J869 Series

## Ordering Information

### Standard Models

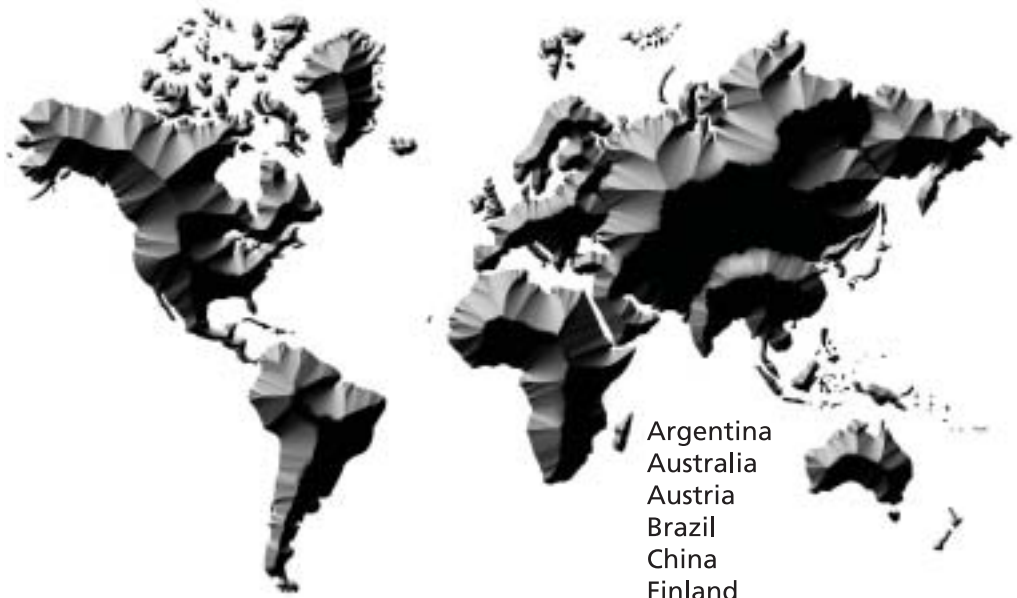
Model	Rated Flow (Valve Drop 7.0MPa)	Internal Leakage (System Pressure 21.0MPa)	Rated Current (Series Connection)	Nominal Coil Resistance
	(L/min)	(L/min)	(mA)	(Ω)
J869-1000A	3.2	1.1	15	200
J869-1001A	5.3	1.2	15	200
J869-1002A	10.6	1.4	15	200
J869-1003A	21.0	1.8	15	200
J869-1004A	32.0	2.1	15	200
J869-1005A	42.0	2.5	15	200
J869-1006A	64.0	3.2	15	200

### Model Number



### Spare parts and Accessories

Part	Size	Part Number
O-Rings (included in delivery) P, A, B T	AS568-013	A47622-022
	AS568-015	A47622-008
Mounting Bolts (included in delivery)	M6×48mm (4pieces)	A04001-006-048
Mating Connector (not included in delivery)		MS3106A14S2S (MS3106A-14S-2S)
Clamp for Mating Connector (not included in delivery)		MS3057-6A
Flushing Block (not included in delivery)		C63761-001 (P-T ONLY)
		C63904-001 (P→B、A→T)
		C63904-002 (P→A、B→T)



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