62 SERIES
TWO STAGE SERVOVALVES

62 SERIES SERVO VALVES

The 62 Series flow control servovalves are throttle valves for 3- and preferably 4-way applications. They are a standard performance, two-stage design that covers the range of rated flows from 2.5 to 20 gpm at 1000 psi 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 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 electrohydraulic position, speed, pressure or force control systems with high dynamic response requirements.

**Principle of operation**

An electrical command signal (flow rate set point) 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 the 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 and 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
- High dynamics
- Low cost design
- Rugged, long-life design
- High resolution, low hysteresis
- Completely set-up at the factory

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:

\[
Q = Q_n \sqrt{\frac{\Delta p}{\Delta p_n}}
\]

- \( Q \) [gpm] = calculated flow
- \( Q_n \) [gpm] = rated flow
- \( \Delta p \) [psi] = actual valve pressure drop
- \( \Delta p_n \) [psi] = rated valve pressure drop

This catalog is for users with technical knowledge. To ensure that all necessary characteristics for function and safety of the system are given, the user has to check the suitability of the products described here. In case of doubt, please contact Moog Inc.
**62 SERIES**

**GENERAL TECHNICAL DATA**

- **Operating Pressure**
  - ports P, A and B up to 3,000 psi
  - port T up to 2,000 psi

- **Temperature Range**
  - Fluid: 0°F to 200°F
  - Ambient: 0°F to 200°F

- **Seal Material**: Viton, others on request

- **Operating Fluid**: Compatible with common hydraulic fluids, other fluids on request.
  - Recommended viscosity: 60-450 SUS @ 100°F

- **System Filtration**: High pressure filter (without bypass, but with dirt alarm) mounted in the main flow and if possible, directly upstream of the valve.

- **Class of Cleanliness**: The cleanliness of the hydraulic fluid greatly affects 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 µm absolute)
    - For longer life: $\beta_{5} \geq 75$ (5 µm absolute)

- **Installation Operations**: Any position, fixed or moveable.

- **Vibration**: 30 g, 3 axes

- **Weight**: 2.7 lb. (1.2 kg)

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

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**Valve Flow Diagram**

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

Model ... Type
Mounting Pattern
Valve Body Version

Pilot Stage
Pilot Connection
Rated Flow \((\pm 10\%) \text{~at~} \Delta p_n = 1,000 \text{~psi} \) [gpm] 2.5
Response Time* [ms] 60
Threshold* [%] < 1%
Hysteresis* [%] < 5%
Null Shift at \(\Delta T = 100^\circ\text{F} \) [%] < 5%
Null Leakage Flow* max. [gpm] 0.35 to 0.55

* Measured at 1,000 psi operating pressure

62 ..... ISO 10372 - 04 - 04 - 0 -92
4-way
2-stage with spool bushing design
Nozzle/Flapper, High flow
Internal only

Typical characteristic curves with \(\pm 5\%\) to \(\pm 100\%\)
input signal, measured at
1,000 psi operating pressure.
Null Adjust: Flow out of Control Port B will increase with clockwise rotation of null adjust screw (1/8 hex key).

The mounting manifold must conform to ISO 10372-04-04-0-92
Surface to which valve is mounted requires a $\sqrt[32]{\Delta}$ finish, flat within 0.002 [0.05] TIR.

Typical Subplate Manifold
62 SERIES
ELECTRICAL CONNECTIONS

**Rated current and coil resistance**
Two different coil designs are available for 62 Series Servovalves. See Table 1.

**Coil connections**
A four-pin electrical connector (that mates with an MS3106R14S-2S) is standard. All four torque motor leads are available at the connector so external connections can be made for series, parallel or differential operation.

**Servoamplifier**
The servovalve responds to input current, therefore 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.

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### Electrical Connections
(Example with typical 62 series coils)

<table>
<thead>
<tr>
<th>Connections for Valve Opening</th>
<th>Parallel</th>
<th>Series</th>
<th>Single</th>
</tr>
</thead>
<tbody>
<tr>
<td>P • B, A • T</td>
<td>A + C (+)</td>
<td>A (+), D (-)</td>
<td>A (+), B (-) or C (+), D (-)</td>
</tr>
</tbody>
</table>

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**Coil Resistance [Ω]**

<table>
<thead>
<tr>
<th>Coils</th>
<th>Parallel</th>
<th>Series</th>
<th>Single</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>14</td>
<td>56</td>
<td>28</td>
</tr>
</tbody>
</table>

**Rated Current [mA]**

<table>
<thead>
<tr>
<th>Coils</th>
<th>Parallel</th>
<th>Series</th>
<th>Single</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>±100</td>
<td>±50</td>
<td>±100</td>
</tr>
</tbody>
</table>

**Electrical Power [W]**

<table>
<thead>
<tr>
<th>Coils</th>
<th>Parallel</th>
<th>Series</th>
<th>Single</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>.14</td>
<td>.14</td>
<td>.28</td>
</tr>
</tbody>
</table>

**Approximate Coil Inductance [Henry]**

<table>
<thead>
<tr>
<th>Nominal Resistance Per Coil at 77°F (25°C) [Ω]</th>
<th>Recommended Rated Current-mA</th>
<th>Approximate Coil Inductance [Henry]</th>
</tr>
</thead>
<tbody>
<tr>
<td>28</td>
<td>100</td>
<td>50</td>
</tr>
<tr>
<td>300</td>
<td>30</td>
<td>15</td>
</tr>
</tbody>
</table>

* Measured at 50 Hz.

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Note: Before applying electrical signals, the pilot stage has to be pressured.
**ORDERING INFORMATION**

**SPARE PARTS AND ACCESSORIES**

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**Optional Feature**
- Series specification
- Intrinsically safe

**Model Designation**
- Assigned at the factory

**Factory Identification (Revision Level)**

**Value Version**
- Standard response

**Rated Flow**

<table>
<thead>
<tr>
<th>Flow Rate</th>
<th>gpm</th>
<th>ΔpN = 1,000 psi</th>
</tr>
</thead>
<tbody>
<tr>
<td>10</td>
<td>2.5</td>
<td></td>
</tr>
<tr>
<td>20</td>
<td>5.0</td>
<td></td>
</tr>
<tr>
<td>40</td>
<td>10.0</td>
<td></td>
</tr>
<tr>
<td>60</td>
<td>15.0</td>
<td></td>
</tr>
<tr>
<td>75</td>
<td>20.0</td>
<td></td>
</tr>
</tbody>
</table>

**Maximum Operating Pressure Pp and Body Material**
- 3,000 psi aluminum

**Main Spool Type**
- O 4-way / axis cut / linear
- D 4-way / +/-10% overlap / linear
- X Special*

**Signals for 100% Spool Stroke**
- Q +15 mA Series (+30 mA parallel)
- R +50 mA Series (+100 mA parallel)
- Y Special signal (see spec sheet)*

**Valve Connector**
- A Connector C1 (A) – side (RH)
- B Connector C2 (B) – side (LH)

**Seal Material**
- V Viton
- N NBR (Buna)
- Others on request*

**Pilot Connection and Pressure**
- Pressure [psi] Supply
- A 250 to 3,000 internal

**Spool Position without Electrical Signal**
- M Mid position

**Pilot Stage**
- F Standard dynamics

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*Optional designs are available with intrinsically safe coils (FM approved), and/or special spool bushing lap configuration. Available seal materials: VITON (Std.), BUNA or EPR.

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**SPARE PARTS AND ACCESSORIES**

<table>
<thead>
<tr>
<th>Item Description</th>
<th>Supplier Information</th>
</tr>
</thead>
<tbody>
<tr>
<td>O-Rings (included in delivery)</td>
<td>FPM 85 Shore 1D 0.426 x .070 Moog P/N 42082-022</td>
</tr>
<tr>
<td>Mating Connector, waterproof IP 65 (not included in delivery)</td>
<td>49054F14S2S (MS3106F14S-2S)</td>
</tr>
<tr>
<td>Flushing Block</td>
<td>23718-1K1</td>
</tr>
<tr>
<td>Mounting Bolts (not included in delivery)</td>
<td>5/16 - 18 N C x 1.0 long (4 pieces) A31324-216B</td>
</tr>
<tr>
<td>Orifice Assembly with Filter (2 required)</td>
<td>70714</td>
</tr>
<tr>
<td>Filter Replacement Kit</td>
<td>B52555RK36K1</td>
</tr>
</tbody>
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