590-1
2-Stage Servovalve
Rated flows up to 20 l/m

Features

- Very high response
- Maximum operating pressure 315 bar
- ISO 10372-04-04-0-92 mounting pattern
- Internal pilot supply (4 port)
- Suitable for 3-way or 4-way applications
- Low hysteresis & zero point drift
- High spool drive forces
- Spool in bushing design
- Dry torque motor with mechanical feedback
- Long life Sapphire Technology
**Benefits and Features**

**Sapphire ball in slot design**
- Incorporated into Star designs since 1988
- Many billions of cycles per service life
- Increased spool life due to spool rotation
- Ultra low coefficient of friction sapphire to steel
- Feedback mechanism unhindered by spool rotation
- Extended warranties available

**Safety**
- Flame proof
- Intrinsic safety
- Class, Div & Zone coverage
- Mechanical fail safe
- Double & triple coil redundancy

**Quality**
- Independent audit process is our commitment on quality
- Focus on customer needs and expectations
- Delivery schedules on time
- Continual improvements on products and services
- Maintaining design and manufacturing integrity

**Custom spool lap & bushing port geometries**
- Zero overlap
- Overlap (closed center)
- Underlap (open center)
- Dual gain
- Asymmetric gain

**Sapphire flow**
- Ensuring first stage stability
- Precisely matched flow properties
- Long life in extreme environments

**Special projects**
- Compact servo designs
- Special interfaces
- Modular components

**Sealing materials**
- Nitrile
- Fluorocarbon (Viton)
- Ethylene-Propylene
- Fluorosilicone

**Special connectors**
- MIL-C-5015
- MIL-DTL-38999
- Conduit style male/female
- Hermetic
Technical data

Hydraulic

Nominal flow ratings [±10%] at 70 bar Δp | 4, 10, 20 l/m

Operating pressure (max) | Ports P, C1, C2 | R

Seal material | NBR, FPM 315 bar | 315 bar
            | EPDM 280 bar | 210 bar

Fluid viscosity range (recommended) | 10 to 100 mm²/s (cSt)

Fluid type | Mineral oil to ISO 11158, DIN 51524 or equivalent
            | MIL-H-5606
            | Skydrol
            | Kerosene
            | Water glycols
            | others on request

Filter rating (recommended) | Pressure line Beta 10 = 200 (10 µm abs), non by-pass & indicator
                               | Off-line Beta 2 = 1000 (2 µm abs)

Fluid cleanliness | ISO 4406: 1999
                   | minimum 16/ 14/ 11
                   | recommended 15/ 13/ 10

Operational parameters

Hysteresis | ≤ 3.0% without dither

Threshold | ≤ 0.5% without dither

Null shift | ΔT 40°C ≤ 2.0%

Internal leakage | 140 bar supply (0.5% overlap) ≤ 1.8 l/min

Load pressure difference | 1% input ≥ 30% of supply pressure can be as high as 100%

Response time | 0-100% rated spool stroke 3-4 ms

Mounting pattern | ISO 10372-04-04-0-92 without X port

Mounting position | Any, fixed or movable

Weight | std unit 1.1 kg

Design protection | EN 60529 IP 65

Shipping protection | Sealed base plate

Vibration | 30 g all axis, 5 Hz to 2,000 Hz

Shock | 30 g all axis

Seal material options | NBR, FPM, EPDM

Temperature range | -30 to 135 °C
## Technical data

### Electrical

<table>
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<tr>
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<th>single (differential)</th>
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<th>30</th>
<th>40</th>
<th>100</th>
<th>200</th>
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<td>40</td>
<td>100</td>
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<tr>
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### Connector pin out identification

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<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
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</table>

Polarity P=C2, C1=R

- single: A +, B - or C +, D -
- series: A +, D -, B & C linked
- parallel: A & C linked +, B & D linked -

### Valve connector type

- MIL-C-5015
- MS3102E-14S-2P mates with MS3106F-14S-2S
- Consult factory for more options

### Standard connector orientation

- P port also available over C1, C2 or R port; please advise when ordering
The flow tolerance for standard servovalves is ±10% of the rated flow at 100% rated input signal.

Rated Signal [In] is the specified input voltage or current of either polarity to produce rated flow. Rated input does not include null bias values.

Rated flow corresponds to the flow at rated input at 10 bar or 70 bar, with no load, therefore in 4-way valves there will be a pressure drop of 5 bar or 35 bar respectively across each land.

Load pressure difference versus input signal indicates typical differential pressure gain between ports C1 (A) and C2 (B) for standard lap spools. Negative and positive overlap change this characteristic significantly.

Internal leakage comprises of tare first stage and laminar leakage between spool and sleeve. With critical lap conditions in 4-way designs the leakage peaks through the null region.
Technical data

Freq. Response at 25% In, 210 bar

Freq. Response at 100% In, 210 bar

Amplitude Ratio (dB)

Phase Lag (deg)

Frequency (Hz)
Mounting interface conforms to ISO 10372-04-0-0-92 (X port must not be used)

<table>
<thead>
<tr>
<th>P</th>
<th>C1</th>
<th>C2</th>
<th>R</th>
<th>X</th>
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<th>F2</th>
<th>F3</th>
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Surface flat within 0.01 / 100 : finish better than 0.8 μm