series 558
2-Stage Servovalve
Rated flows up to 75 l/m

Features
Standard & high response versions
Maximum operating pressure 315 bar
ISO 10372-04-04-0-92 mounting pattern
Field configurable pilot supply (4 or 5 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

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ST-558-2016.1-En
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 failsafe
- 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

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

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

### Hydraulic

<table>
<thead>
<tr>
<th>Nominal flow ratings [±10%] at 70 bar Δp</th>
<th>2, 4, 10, 20, 40, 60, 75 l/m</th>
</tr>
</thead>
<tbody>
<tr>
<td>standard response</td>
<td>4, 10, 20, 40 l/m</td>
</tr>
<tr>
<td>high response</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Operating pressure (max) Ports</th>
<th>P, C1, C2, X, R</th>
</tr>
</thead>
<tbody>
<tr>
<td>Seal material</td>
<td>NBR, FPM 315 bar 315 bar</td>
</tr>
<tr>
<td></td>
<td>EPDM 280 bar 210 bar</td>
</tr>
</tbody>
</table>

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

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

### Operational parameters

<table>
<thead>
<tr>
<th>Hysteresis</th>
<th>≤ 3.0% without dither</th>
</tr>
</thead>
<tbody>
<tr>
<td>Threshold</td>
<td>≤ 0.5% without dither</td>
</tr>
<tr>
<td>Null shift</td>
<td>ΔT 40°C ≤ 2.0%</td>
</tr>
<tr>
<td>Internal leakage 140 bar supply (0.5% overlap)</td>
<td>≤ 1.2 l/m ≤ 1.6 l/m</td>
</tr>
<tr>
<td>2, 4, 10 l/m</td>
<td></td>
</tr>
<tr>
<td>20, 40, 60, 75 l/m</td>
<td></td>
</tr>
<tr>
<td>Load pressure difference 1% input</td>
<td>≥ 30% of supply pressure can be as high as 100%</td>
</tr>
<tr>
<td>Response time 0-100% rated spool stroke</td>
<td></td>
</tr>
<tr>
<td>standard response 2, 4, 10, 20, 40 l/m</td>
<td>8 ms</td>
</tr>
<tr>
<td>60 l/m</td>
<td>13 ms</td>
</tr>
<tr>
<td>75 l/m</td>
<td>15 ms</td>
</tr>
<tr>
<td>high response 4, 10, 20 l/m</td>
<td>4.5 ms</td>
</tr>
<tr>
<td>40 l/m</td>
<td>6 ms</td>
</tr>
</tbody>
</table>

### Mounting pattern

ISO 10372-04-04-0-92 with X port (field configurable)

### 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
## Electrical

<table>
<thead>
<tr>
<th></th>
<th>single (differential)</th>
<th>8</th>
<th>15</th>
<th>30</th>
<th>40</th>
<th>100</th>
<th>200</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rated input ± (mA)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other coil rates available</td>
<td>series</td>
<td>4</td>
<td>7.5</td>
<td>15</td>
<td>20</td>
<td>50</td>
<td>100</td>
</tr>
<tr>
<td></td>
<td>parallel</td>
<td>8</td>
<td>15</td>
<td>30</td>
<td>40</td>
<td>100</td>
<td>200</td>
</tr>
<tr>
<td>Coil resistance (Ω)</td>
<td>per coil</td>
<td>1000</td>
<td>200</td>
<td>300</td>
<td>80</td>
<td>28</td>
<td>22</td>
</tr>
<tr>
<td>Power (W)</td>
<td>single</td>
<td>0.064</td>
<td>0.045</td>
<td>0.27</td>
<td>0.128</td>
<td>0.280</td>
<td>0.88</td>
</tr>
<tr>
<td></td>
<td>series</td>
<td>0.032</td>
<td>0.023</td>
<td>0.135</td>
<td>0.064</td>
<td>0.140</td>
<td>0.440</td>
</tr>
<tr>
<td></td>
<td>parallel</td>
<td>0.032</td>
<td>0.023</td>
<td>0.135</td>
<td>0.064</td>
<td>0.140</td>
<td>0.440</td>
</tr>
</tbody>
</table>

### Connector pin out identification

- **A**
- **B**
- **C**
- **D**

### 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

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**Technical data**
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

![Graph 1: Std response Qn 2, 4, 10, 20, 40 l/m at 25% In, 210 bar]

- Frequency (Hz)
- Phase Lag (deg)
- Amplitude Ratio (dB)

![Graph 2: Std response Qn 2, 4, 10, 20, 40 l/m at 100% In, 210 bar]

- Frequency (Hz)
- Phase Lag (deg)
- Amplitude Ratio (dB)

![Graph 3: Std response Qn 60 l/m at 25% In, 210 bar]

- Frequency (Hz)
- Phase Lag (deg)
- Amplitude Ratio (dB)

![Graph 4: Std response Qn 60 l/m at 100% In, 210 bar]

- Frequency (Hz)
- Phase Lag (deg)
- Amplitude Ratio (dB)

![Graph 5: Std response Qn 75 l/m at 25% In, 210 bar]

- Frequency (Hz)
- Phase Lag (deg)
- Amplitude Ratio (dB)

![Graph 6: Std response Qn 75 l/m at 100% In, 210 bar]

- Frequency (Hz)
- Phase Lag (deg)
- Amplitude Ratio (dB)
Technical data

High response Qn 4, 10, 20 l/m at 25% In, 210 bar

High response Qn 4, 10, 20 l/m at 100% In, 210 bar

High response Qn 40 l/m at 25% In, 210 bar

High response Qn 40 l/m at 100% In, 210 bar
**558 series**

**INSTALLATION DETAILS**

<table>
<thead>
<tr>
<th>Mounting screws</th>
<th>Skt head cap screws M8 x 50 - 10.9 ISO 4762</th>
</tr>
</thead>
</table>
| Null adjust (Mechanical) | - 2.5 hex skt & 10 A/F lock nut  
- slacken lock nut (cw) half-turn with 10 A/F ring spanner  
- insert 2.5 hex key into socket and rotate to obtain required null / offset value  
- hold hexagon key in desired position then tighten lock nut to 2 Nm |
| Porting details | P, C1, C2, R ports \( \varnothing 9.0 \) \( \varnothing 14.25 \) \( \varnothing 1.40 \) on 22.2 P.C.D.  
X port \( \varnothing 3.0 \) \( \varnothing 14.25 \) \( \varnothing 1.40 \) |
| Interface seals | Ports P, C1, C2, R, X - ID \( \varnothing 10.82 \) x \( \varnothing 1.78 \) O-Ring |

Mounting interface conforms to ISO 10372-04-04-0-92

<table>
<thead>
<tr>
<th>P</th>
<th>C1</th>
<th>C2</th>
<th>R</th>
<th>X</th>
<th>F1</th>
<th>F2</th>
<th>F3</th>
<th>F4</th>
<th>G</th>
</tr>
</thead>
<tbody>
<tr>
<td>size</td>
<td>( \varnothing 9 )</td>
<td>( \varnothing 9 )</td>
<td>( \varnothing 9 )</td>
<td>( \varnothing 3 )</td>
<td>M8</td>
<td>M8</td>
<td>M8</td>
<td>M8</td>
<td>( \varnothing 3 ) ( \varnothing 5 )</td>
</tr>
<tr>
<td>x</td>
<td>22.25</td>
<td>11.14</td>
<td>33.35</td>
<td>22.25</td>
<td>33.35</td>
<td>0</td>
<td>44.50</td>
<td>44.50</td>
<td>0</td>
</tr>
<tr>
<td>y</td>
<td>21.39</td>
<td>32.50</td>
<td>32.50</td>
<td>43.61</td>
<td>8.70</td>
<td>0</td>
<td>0</td>
<td>65</td>
<td>65</td>
</tr>
</tbody>
</table>

Surface flat within 0.01 / 100 : finish better than 0.8 µm
#### INSTALLATION DETAILS

**INTERNAL / EXTERNAL PILOT MODE**

External pilot port 'X' can be activated as follows:-
- Remove M5 cap screws (1).
- Remove cover plate (2).
- Remove indicator plate (4).
- Flip indicator plate with tab next to #5 (as shown right).
- Reinstall parts in reverse order.
- Torque M5 screws to 4 Nm.

**FILTER ASSEMBLY REPLACEMENT**

- Remove M5 cap screws (1).
- Remove cover plate (2).
- Remove indicator plate (4).
- Remove & discard filter (6).
- Install new filter & seals (ensure appropriate material and shore hardness are used).
- Reinstall parts in reverse order.
- Torque M5 screws to 4 Nm.

⚠️ **WARNING** do not attempt any changes whilst the valve is pressurized!

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
<th>Part Number / Size</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Socket low head cap screws</td>
<td>M5 x 12</td>
</tr>
<tr>
<td>2</td>
<td>Cover plate</td>
<td>SRS2390</td>
</tr>
<tr>
<td>3</td>
<td>O Ring</td>
<td>200-006-xxxx</td>
</tr>
<tr>
<td>4</td>
<td>Indicator plate</td>
<td>SRS2391</td>
</tr>
<tr>
<td>5</td>
<td>O Ring</td>
<td>200-016-xxxx</td>
</tr>
<tr>
<td>6</td>
<td>Filter assembly</td>
<td>SRS2392</td>
</tr>
<tr>
<td>7</td>
<td>O Ring</td>
<td>200-014-xxxx</td>
</tr>
</tbody>
</table>