

STAR 650 SERIES

SERVO PROPORTIONAL VALVE

FEATURES

- Maximum operating pressure of 315 bar
- ISO 10372-04-04-0-92 mounting pattern
- Internal pilot supply (4 port)
- Suitable for 3-way or 4-way applications
- High spool drive forces
- Spool in bushing design
- Dry torque motor with mechanical feedback



SAPPHIRE BALL IN SLOT DESIGN

- 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

SAFETY

- Flame proof
- Intrinsic safety
- Class, Div & Zone coverage
- Mechanical failsafe
- Double & triple coil redundancy

TECHNICAL DATA


| HYDRAULIC | | |
|-------------------------------------|----------------|--|
| Nominal flow ratings [$\pm 20\%$] | at 70 bar | 4, 10, 20, 40, 60, 80 lpm |
| Operating pressure (max) | Ports | P, C1, C2, R |
| Seal material | NBR, FPM | 315 bar |
| Fluid viscosity range (recommended) | | 10 to 100 mm ² /s (cSt) |
| Fluid type | | Mineral oil to ISO 11158, DIN 51524 or equivalent MIL-H-5606 Kerosene Water glycols |
| Filter rating (recommended) | Pressure line | Beta 10 = 200 (10 μ m abs), non by-pass & indicator |
| | Off-line | Beta 2 = 1000 (2 μ m abs) |
| Fluid cleanliness | ISO 4406: 1999 | 16/14/11 |

TECHNICAL DATA

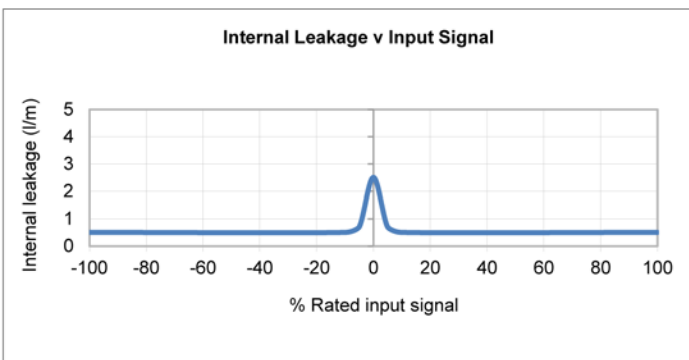
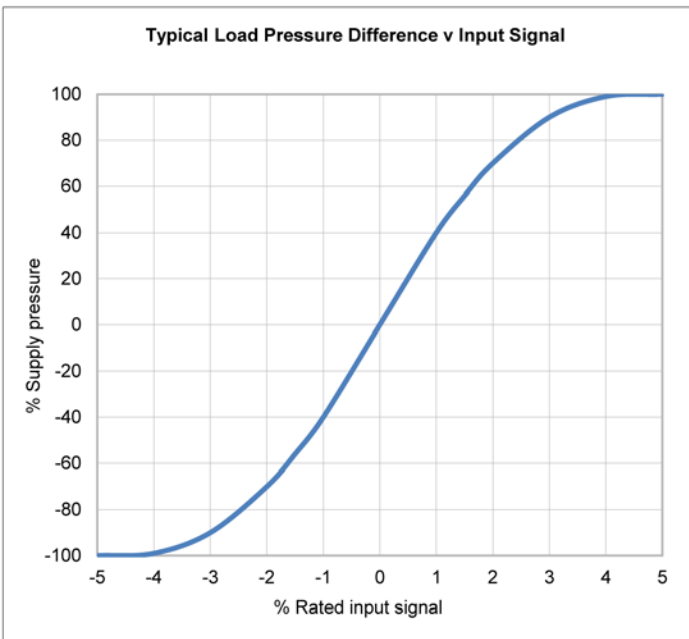
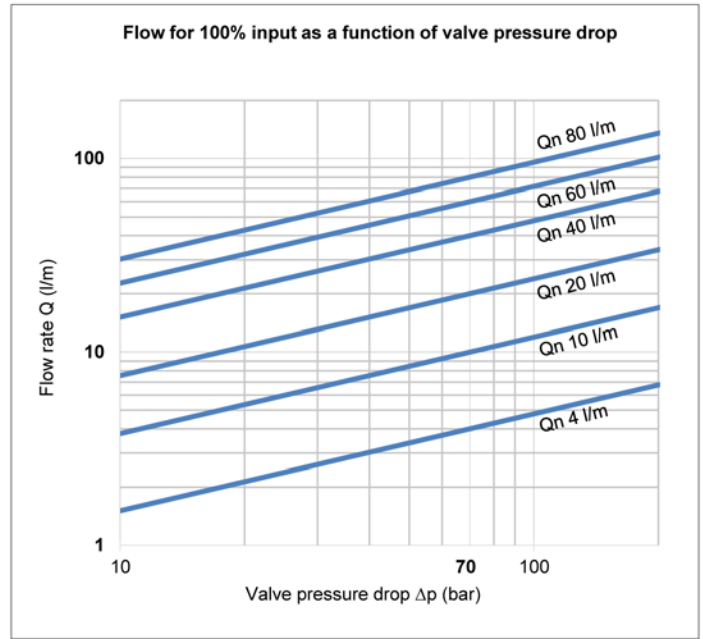
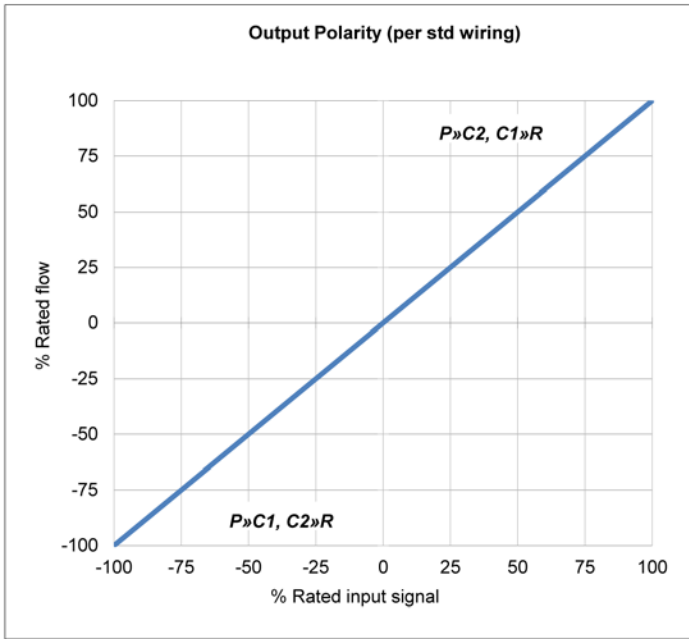
OPERATIONAL PARAMETERS

| | | |
|---------------------------------|-------------------------------|-------------------------------------|
| Hysteresis | | ≤ 5.0% without dither |
| Threshold | | ≤ 2.0% without dither |
| Null shift | ΔT 40°C | ≤ 3.0% |
| Internal leakage | 140 bar supply (0.5% overlap) | |
| | 4, 10 lpm | ≤ 1.5 lpm |
| | 20, 40, 60, 75 lpm | ≤ 2.5 lpm |
| Load pressure difference | 1% input | 40% of supply pressure |
| Response time | 0-100% rated spool stroke | 25 ms |
| Mounting pattern | | ISO 10372-04-04-0-92 without X port |
| Mounting position | | Any fixed or movable |
| Weight | Standard unit | 1.1 kg |
| Design protection | EN 60529 | IP65 |
| 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 |
| Temperature range | | -30 to 135°C |

ELECTRICAL

| | | | | | | | |
|---|---|--|-----------|-----------|-----------|------------|------------|
| Rated input ± (mA) | Single (Differential) | 8 | 15 | 30 | 40 | 100 | 200 |
| Other coil rates available | Series | 4 | 7.5 | 15 | 20 | 50 | 100 |
| | Parallel | 8 | 15 | 30 | 40 | 100 | 200 |
| Coil resistance (Ω) | per coil | 1000 | 200 | 300 | 80 | 28 | 22 |
| Power (W) | Single (Differential) | 0.064 | 0.045 | 0.27 | 0.128 | 0.280 | 0.88 |
| | Series | 0.032 | 0.023 | 0.135 | 0.064 | 0.140 | 0.440 |
| | Parallel | 0.032 | 0.023 | 0.135 | 0.064 | 0.140 | 0.440 |
| 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 <i>consult for more options</i> | | | | | |
| Standard connector orientation | | P port | | | | | |
| | also available over | C1, C2 or R port; please advise when ordering | | | | | |

TECHNICAL DATA



The flow tolerance for standard servovalves is $\pm 20\%$ of the rated flow at 100% rated input signal.

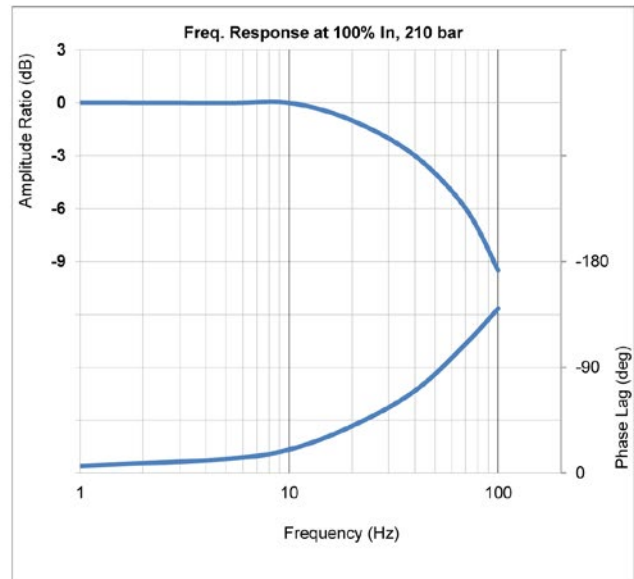
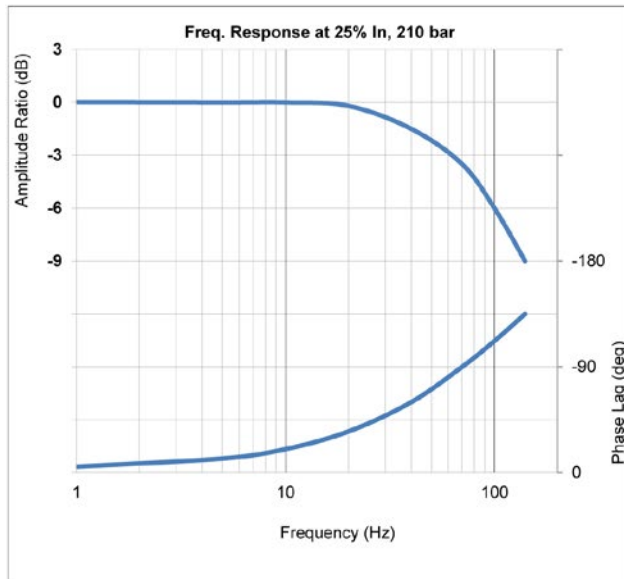
Rated Signal [In] is the specified input voltage or current of either polarity to produce rated flow. Rated input does not include null bias values.

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.

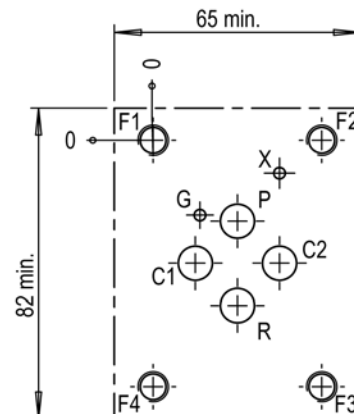
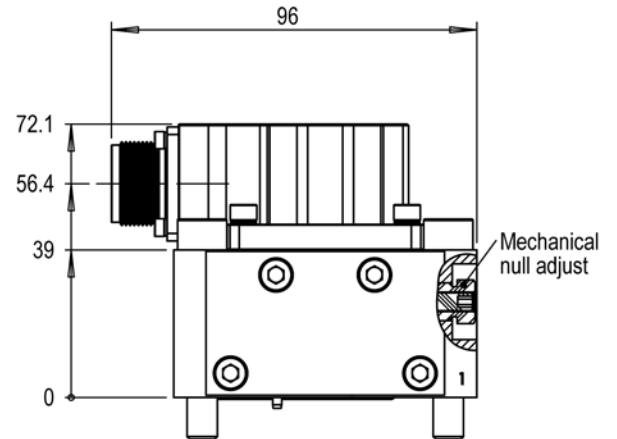
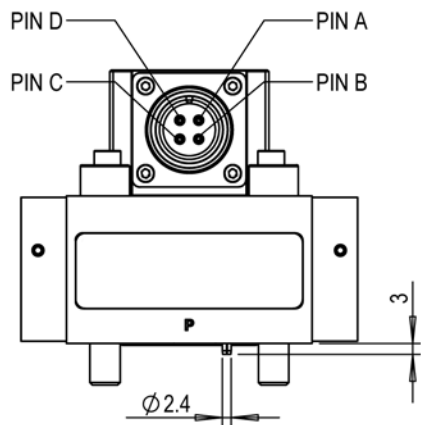
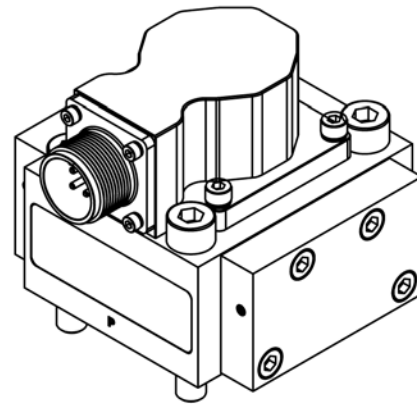
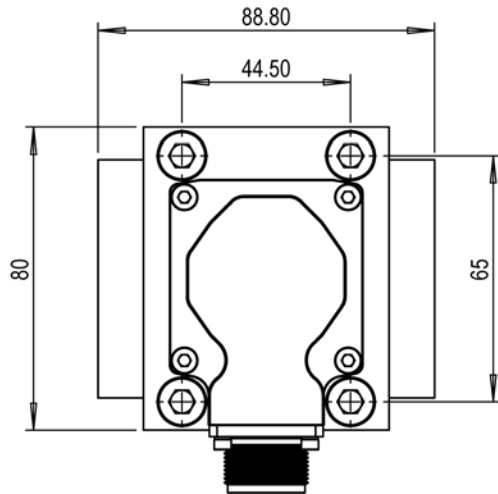
TECHNICAL DATA



DIMENSIONS

INSTALLATION DETAILS

| | |
|---------------------------------|--|
| Mounting Screws | Socket head cap screws M8 x 50 - 10.9 ISO 4762 |
| Null Adjust (Mechanical) | <ul style="list-style-type: none"> • 2.5 Hex socket & 10 A/F lock nut • Slacken/loosen lock nut (CCW) half-turn with 10 A/F ring spanner • Insert 2.5 Hex key into socket and rotate to obtain required null / offset value • Hold Hex key in desired position then tighten lock nut to 2 Nm |
| Porting Details | P, C1, C2, R ports $\varnothing 9.0$, $\perp \varnothing 14.25 \nabla 1.40$ on 22.2 P.C.D. |
| Interface Seals | Ports P, C1, C2, R - ID 10.82 x $\varnothing 1.78$ O-Ring |



MOUNTING INTERFACE CONFORMS TO ISO 10372-04 (X PORT MUST NOT BE USED)

| | P | C1 | C2 | R | F1 | F2 | F3 | F4 | G |
|-------------|-----------------|-----------------|-----------------|-----------------|----|-------|-------|----|--------------------------|
| SIZE | $\varnothing 9$ | $\varnothing 9$ | $\varnothing 9$ | $\varnothing 9$ | M8 | M8 | M8 | M8 | $\varnothing 3 \nabla 5$ |
| X | 22.25 | 11.14 | 33.35 | 22.25 | 0 | 44.50 | 44.50 | 0 | 12.35 |
| Y | 21.39 | 32.50 | 32.50 | 43.61 | 0 | 0 | 65 | 65 | 19.80 |

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



HYDRAULEX DETROIT
800.422.4279
586.949.4240
sales@hydraulex.com

HYDRAULEX JACKSON
800.962.2703
601.469.1987
sales@metarisusa.com

HYDRAULEX MEMPHIS
800.238.0155
901.794.2462
fhisales@hydraulex.com

HYDRAULEX SEATTLE
800.323.8416
253.604.0400
hrdsales@hydraulex.com

www.hydraulex.com

All manufacturers names, symbols, part numbers and descriptions in this document are used for reference purposes only, and it is not implied that any parts listed is the product of these manufacturers.