

series  
**455**  
2-Stage Servovalve  
Rated flows up to 40 l/m



### Features

- Standard & high response versions
- Maximum operating pressure 315 bar
- ISO 10372-03-03-0-92 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



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ST-455-2016.1-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



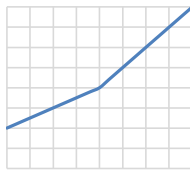
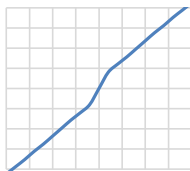
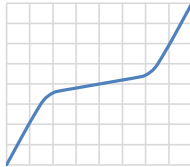
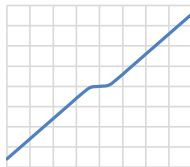
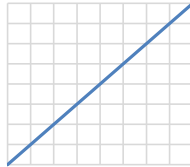
## Quality



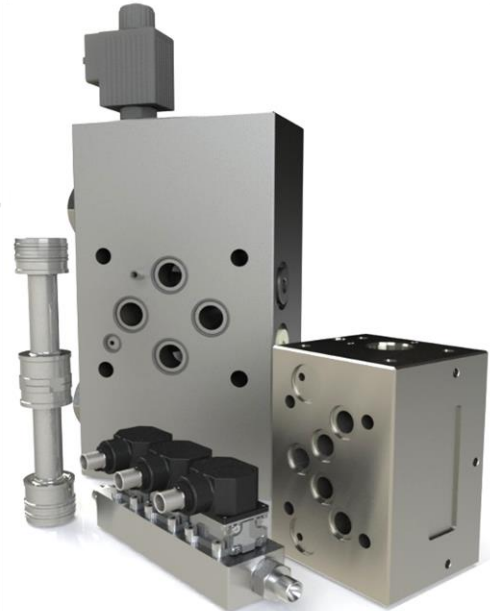
- Independent audit process is our commitment on quality
- Focus on customer needs and expectations
- Delivery schedules on time
- Continual improvements on products and services
- Maintaining design and manufacturing integrity

## Custom spool lap & bushing port geometries

- Zero overlap
- Overlap (closed center)
- underlap (open center)
- Dual gain
- Asymmetric gain



A +, D -



## Special projects

- Compact servo designs
- Special interfaces
- Modular components



## Sealing materials

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

## Sapphire flow

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



## Special connectors

- MIL-C-5015
- MIL-DTL-38999
- Conduit style male/female
- Hermetic

## Technical data

### Hydraulic

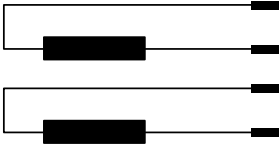
|                                     |                      |   |
|-------------------------------------|----------------------|---|
| Nominal flow ratings [ $\pm 10\%$ ] | at 70 bar $\Delta p$ |   |
|                                     | standard response    | 2, 4, 10, 20, 40 l/m  |
|                                     | high response        | 4, 10, 20, 40 l/m   |
| Operating pressure (max)            | Ports                | P, C1, C2, R  |
| Seal material                       | NBR, FPM             | 315 bar   |
| Fluid viscosity range (recommended) |                      | 10 to 100 mm <sup>2</sup> /s (cSt)  |
| Fluid type                          |                      | Mineral oil to ISO 11158, DIN 51524 or equivalent<br>MIL-H-5606<br>Kerosene<br>Water glycols<br>others on request |
| Filter rating (recommended)         | Pressure line        | Beta 10 = 200 (10 $\mu\text{m}$ abs), non by-pass & indicator   |
|                                     | Off-line             | Beta 2 = 1000 (2 $\mu\text{m}$ abs)   |
| Fluid cleanliness                   | ISO 4406: 1999       |   |
|                                     | minimum              | 16/ 14/ 11  |
|                                     | recommended          | 15/ 13/ 10  |

### Operational parameters

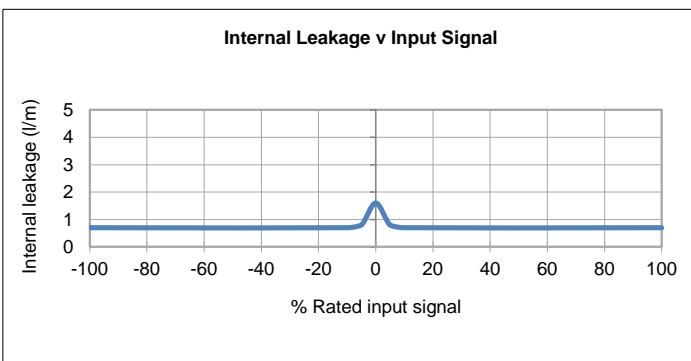
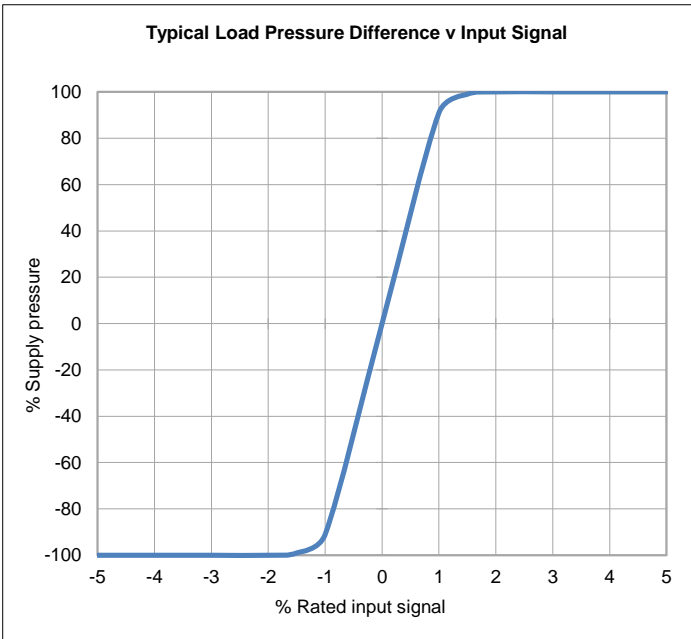
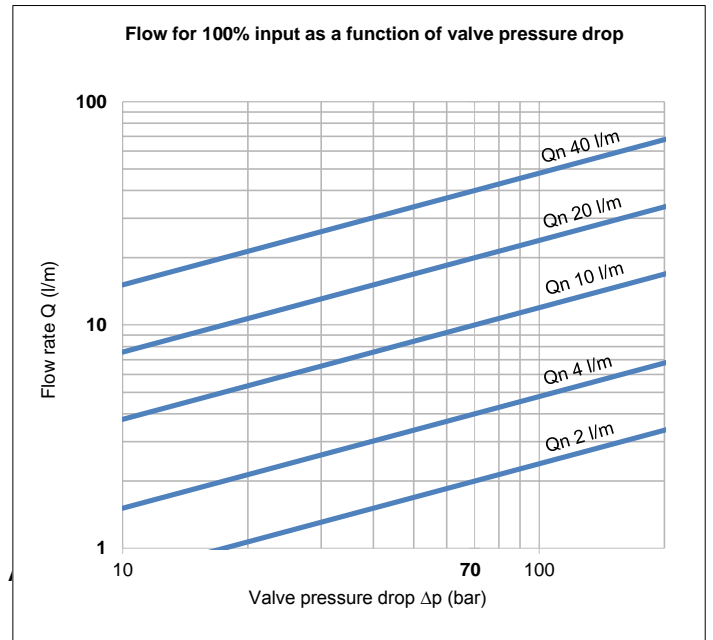
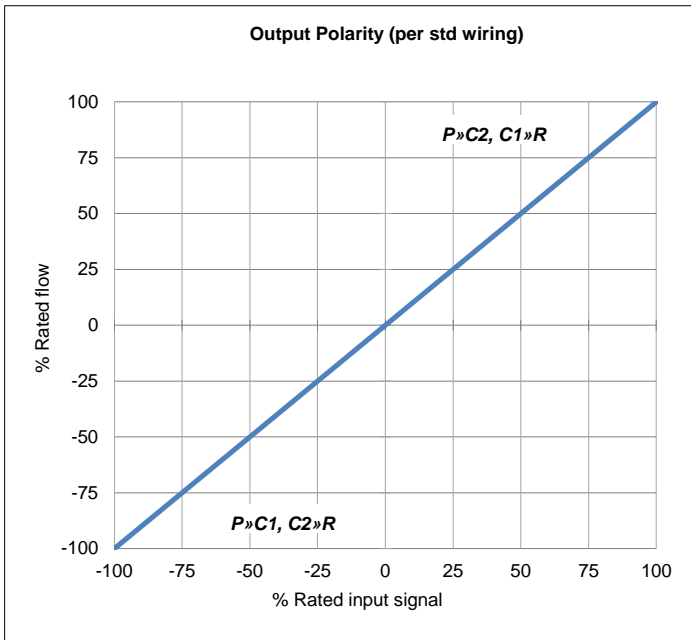
|                          |                               |   |        |
|--------------------------|-------------------------------|---|--------|
| Hysteresis               |                               | $\leq 3.0\%$ without dither                           |        |
| Threshold                |                               | $\leq 0.5\%$ without dither                           |        |
| Null shift               | $\Delta T$ 40°C               | $\leq 2.0\%$  |        |
| Internal leakage         | 140 bar supply (0.5% overlap) |   |        |
|                          | 2, 4, 10 l/m                  | $\leq 1.2$ l/m  |        |
|                          | 20, 40 l/m                    | $\leq 1.6$ l/m  |        |
| Load pressure difference | 1% input                      | $\geq 30\%$ of supply pressure can be as high as 100% |        |
| Response time            | 0-100% rated spool stroke     |   |        |
|                          | standard response             | 2, 4, 10, 20, 40 l/m                                  | 8 ms   |
|                          | high response                 | 4, 10, 20 l/m   | 4.5 ms |
|                          |                               | 40 l/m  | 6 ms   |
| Mounting pattern         |                               | ISO 10372-03-03-0-92                                  |        |
| Mounting position        |                               | Any, fixed or movable                                 |        |
| Weight                   | std unit                      | 0.8 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  |        |
| Temperature range        |                               | -30 to 135 °C   |        |

## Technical data

### Electrical

|                                  |   |  |           |           |           |            |            |
|----------------------------------|---|--|-----------|-----------|-----------|------------|------------|
| Rated input ± (mA)               | single (differential)   | <b>8</b>   | <b>15</b> | <b>30</b> | <b>40</b> | <b>100</b> | <b>200</b> |
| 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  | 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<br>Consult factory for more options |           |           |           |            |            |
| Standard connector orientation   |   | N/A  |           |           |           |            |            |
|                                  | also available over   | C2, C1 port; please advise when ordering                                     |           |           |           |            |            |

# Technical data



The flow tolerance for standard servovalves is  $\pm 10\%$  of the rated flow at 100% rated input signal.

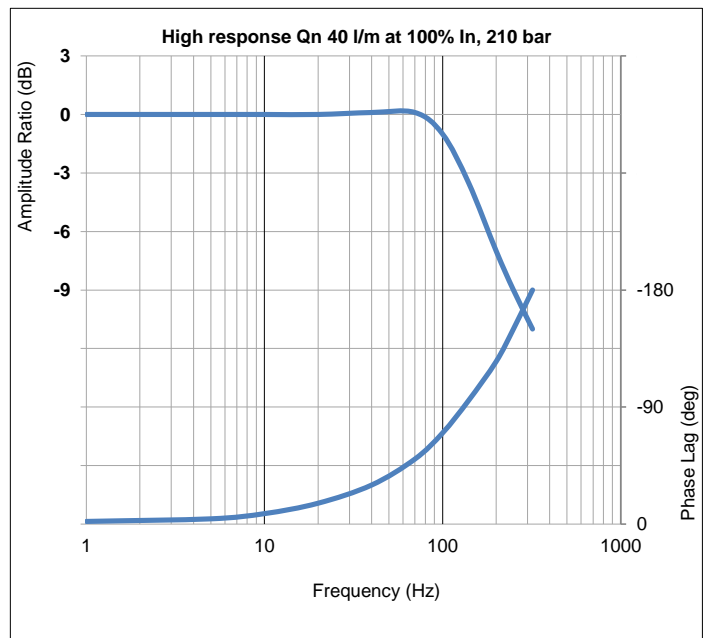
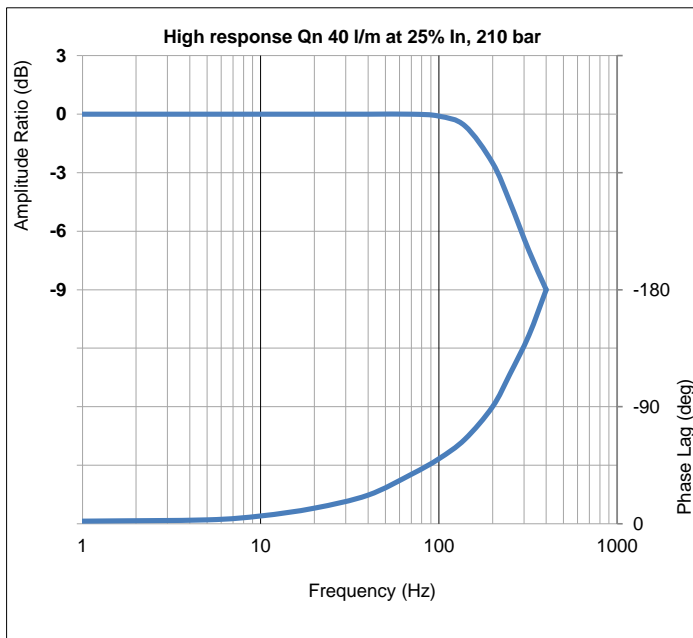
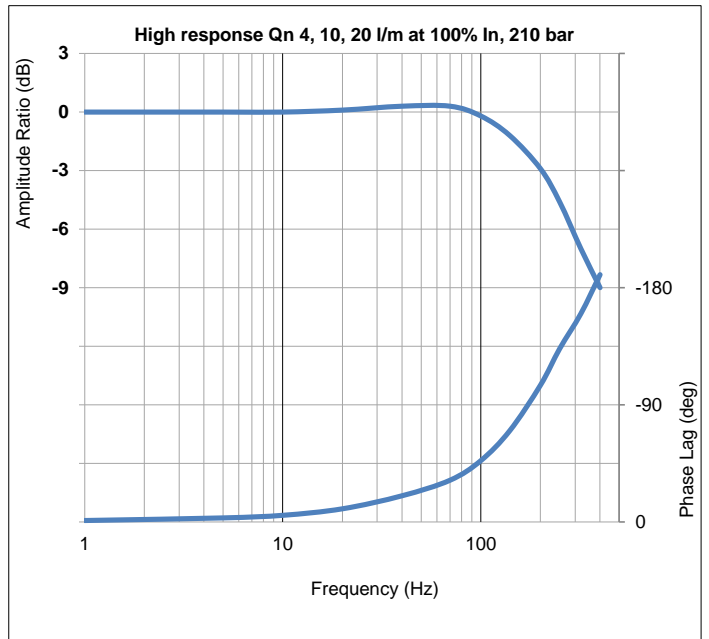
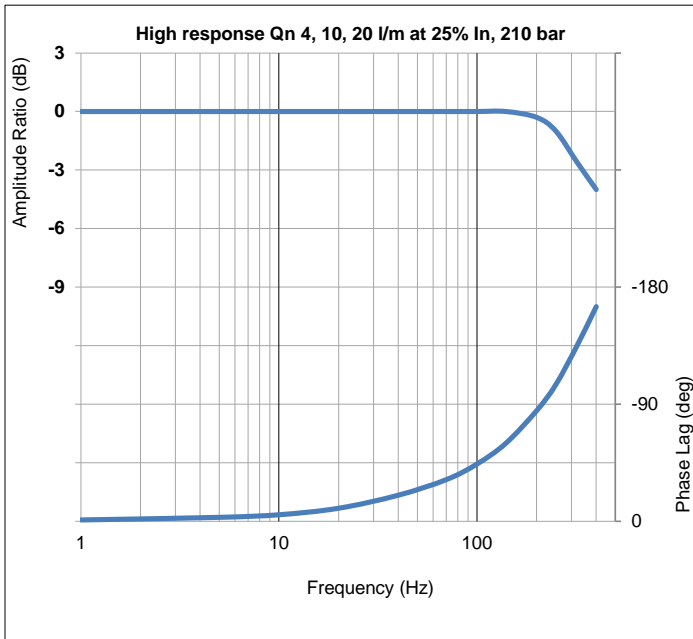
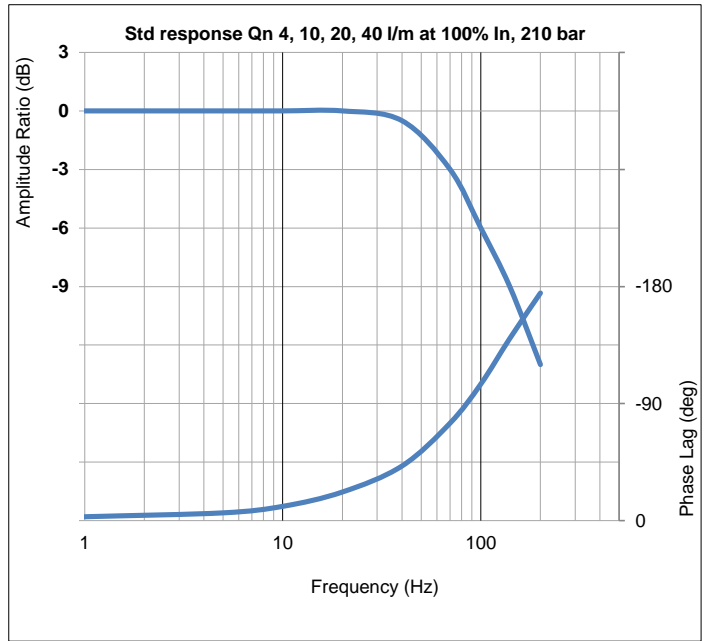
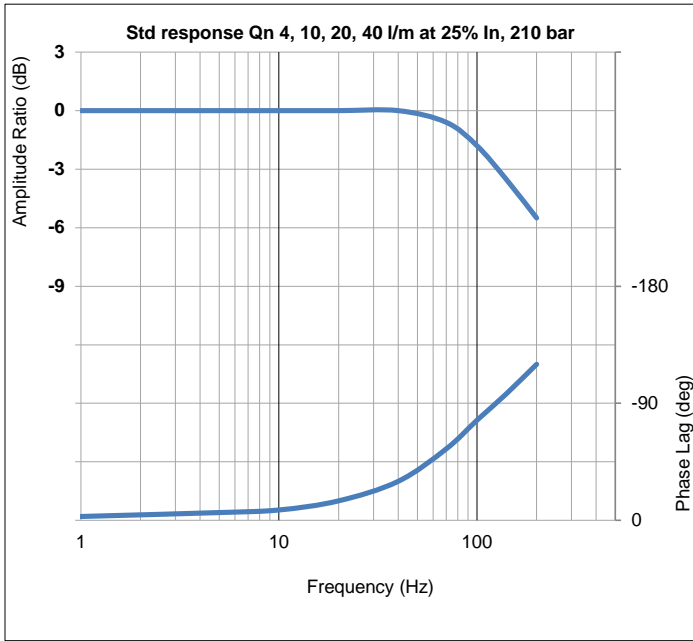
Rated Signal [In] is the specified input voltage or current of either polarity to produce rated flow. Rated input does not include null bias values.

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.

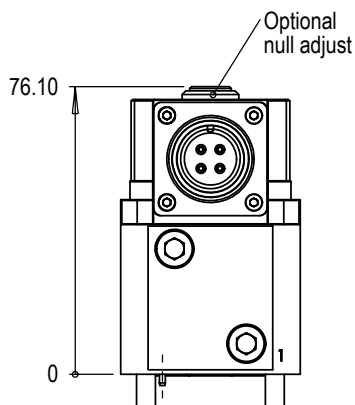
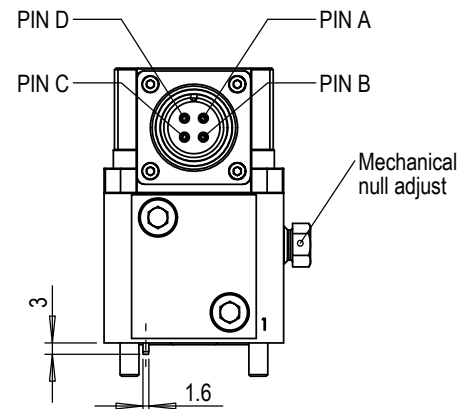
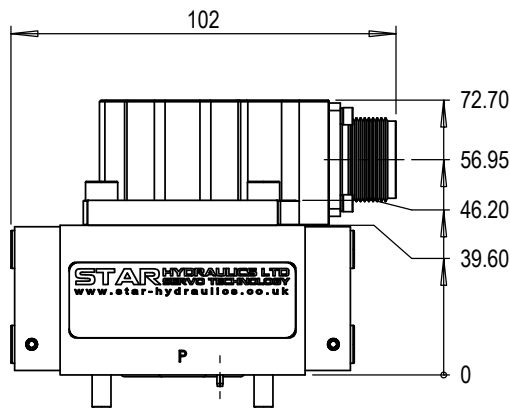
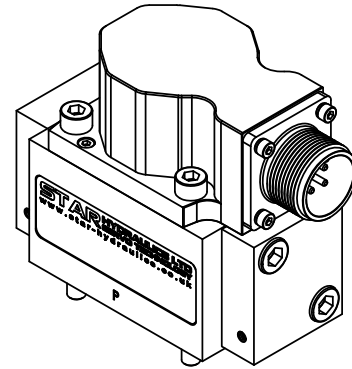
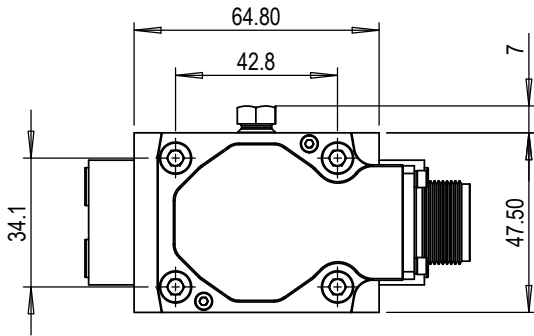
Technical data



455 series  
INSTALLATION DETAILS



|                          |  |
|--------------------------|--|
| Mounting screws          | Skt head cap screws M5 x 55 10.9 ISO 4762  |
| Null adjust (Mechanical) | - 2.5 hex skt & 10 A/F lock nut<br>- slacken lock nut (ccw) half-turn with 10 A/F ring spanner<br>- insert 2.5 hex key into socket and rotate to obtain required null / offset value<br>- hold hexagon key in desired position then tighten lock nut to 2 Nm |
| Optional null adjust     | - 2.5 hex skt<br>- insert 2.5 hex key into socket and rotate to obtain required null / offset value  |
| Porting details          | P, C1, C2, R ports $\varnothing 7.5$ , $\perp$ $\varnothing 12.70$ $\nabla 1.40$ on 19.8 P.C.D.  |
| Interface seals          | Ports P, C1, C2, R - ID 9.25 x $\varnothing 1.78$ O-Ring   |



| Mounting interface conforms to ISO 10372-03-03-0-92                   |                   |                   |                   |                   |    |       |       |       |                          |
|---|-------------------|-------------------|-------------------|-------------------|----|-------|-------|-------|--------------------------|
|   | P                 | C1                | C2                | R                 | F1 | F2    | F3    | F4    | G                        |
| size  | $\varnothing 7.5$ | $\varnothing 7.5$ | $\varnothing 7.5$ | $\varnothing 7.5$ | M5 | M5    | M5    | M5    | $\varnothing 3 \nabla 5$ |
| x   | 21.40             | 11.50             | 31.30             | 21.40             | 0  | 42.80 | 42.80 | 0     | 11.50                    |
| y   | 7.20              | 17.10             | 17.10             | 27                | 0  | 0     | 34.20 | 34.20 | 4.40                     |
| Surface flat within 0.01 / 100 : finish better than 0.8 $\mu\text{m}$ |                   |                   |                   |                   |    |       |       |       |                          |

