



Technology Solutions

TEK-HYDRO 4500A-G

Gauge Pressure Level Transmitter



LEVEL



Introduction

Tek-Hydro 4500A-G series Gauge Pressure Level Transmitter is a commonly used instrument which measures the level of a liquid in a tank. It is a simple device used in a wide range of liquids, including corrosive, non-corrosive and abrasive liquids and slurries in tanks of any size. It can handle broad temperature and pressure ranges under different process conditions. It is a multi-variable instrument which measures not only the liquid level, but also other parameters such as the flow rate and density.

Working Principle

The device does not measure the liquid level directly, but infers it based on the liquid's hydrostatic pressure which is the pressure exerted by the liquid in the tank.

It is calculated using the following formula:

$$P_g = h \times \rho g$$

Where,

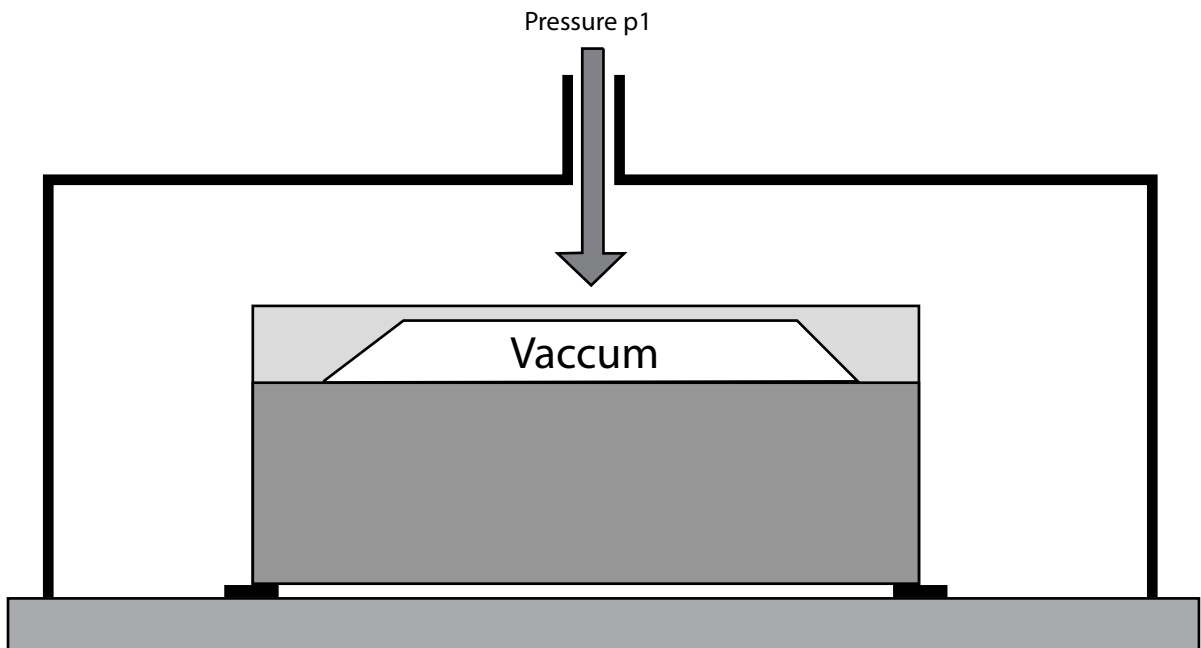
P_g = Hydrostatic pressure of the liquid

h = Liquid level

ρg = Specific gravity of the liquid

The liquid level is thus derived as follows:

$$h = P_g / \rho g$$



A diaphragm which comes into direct contact with the liquid in the tank constitutes the sensing element of the transmitter. Some transmitters use remote seals in case of corrosive or abrasive liquids. A remote seal protects the sensor from the liquid and enables the pressure to be measured from a distance. It consists of a diaphragm that senses pressure and a capillary that connects to the transmitter. When the liquid in the tank exerts pressure against the remote seal diaphragm, it deflects and exerts a force on the liquid inside the capillary. This force is then transferred to the diaphragm in the transmitter, causing it to deflect. The liquid pressure is measured depending on this deflection. The above mentioned equation shows that the liquid level is directly proportional to the hydrostatic pressure.

Benefits

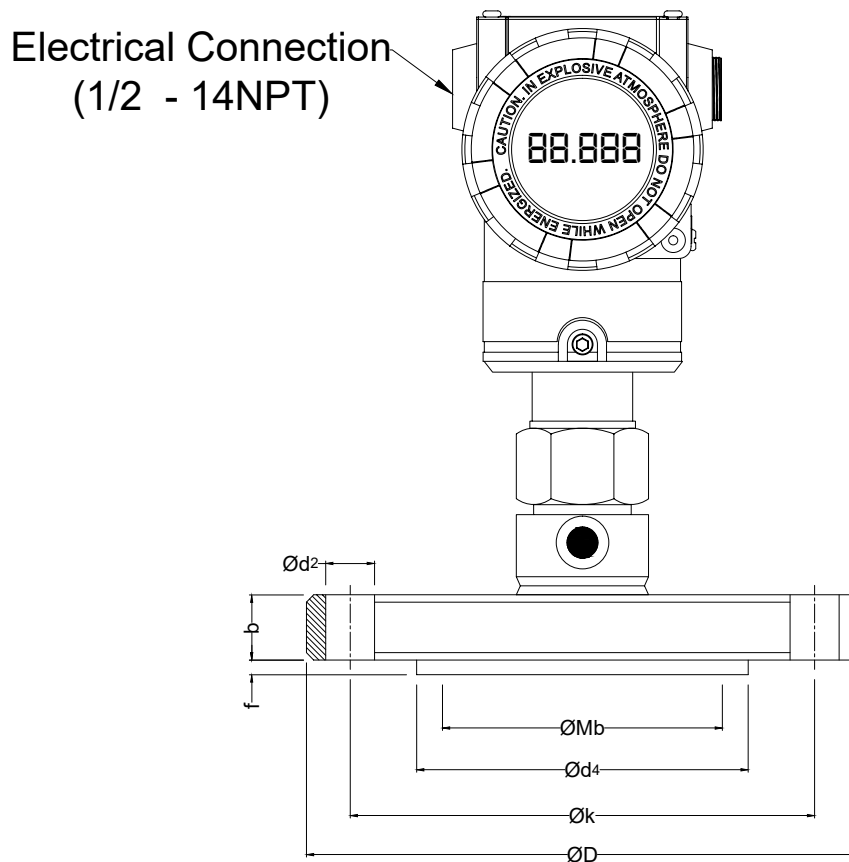
- Operator can calibrate device using zero/span button, no hand-held calibrator required.
- Digital communication HART protocol.
- Fail-safe mode process function for detecting any abnormal condition occurred.
- High accuracy up to $\pm 0.075\%$.
- Automatic ambient temperature compensation improves performance of device.
- Various Output: 4-20 mA, digital signals.
- The mounting bracket rotated up to 360° and LCD display up to 270° .
- EEPROM write protection.
- Wide range of certifications and approval.

Application

- It is used in level monitoring applications.

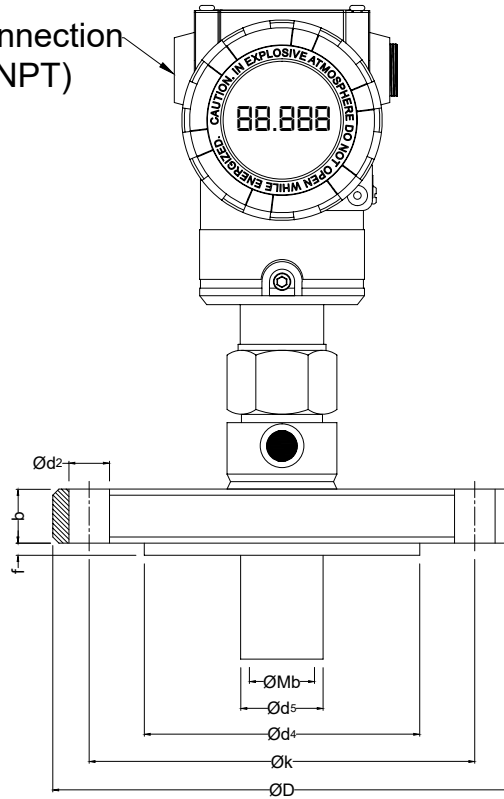
Dimensional Drawing

Tek-Hydro 4500A-G-LFD

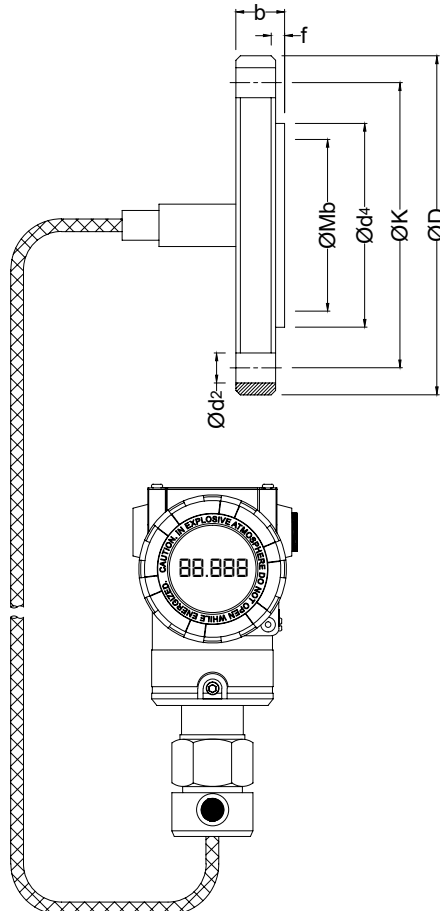


Tek-Hydro 4500A-G-LED

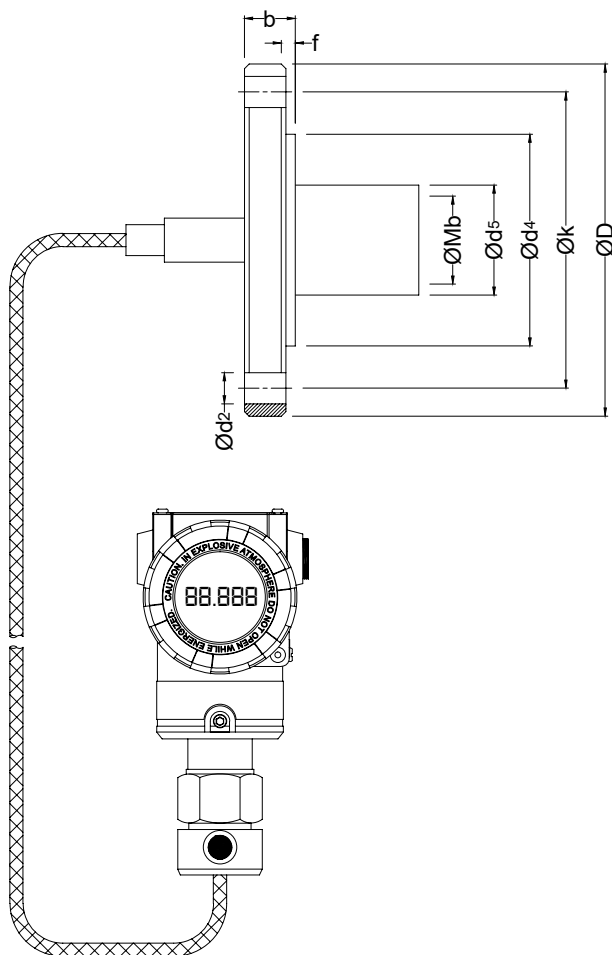
Electrical Connection
(1/2 - 14NPT)



Tek-Hydro 4500A-G-LFS



Tek-Hydro 4500A-G-LES



Dimensions

Dimensions for Extended Diaphragm Seal

Flange Size: 3" (0.25 ft)

| Size | Flange Rating | Mb | D | b | d ² | k | f | d ⁴ | X |
|-----------------|-------------------|-------------------|--------------------|--------------------|--------------------|--------------------|---------------------|------------------|--------------------|
| 3" (0.25 ft) | ANSI Class 150 | 3.5" (0.29 ft) | 7.48" (0.62 ft) | 0.94" (0.07 ft) | 0.74" (0.06 ft) | 6" (0.5 ft) | 0.05" (0.004 ft) | 5" (0.41 ft) | 0.15" (0.01 ft) |
| 3" (0.25 ft) | ANSI Class 300 | | 8.26" (0.68 ft) | 1.14" (0.09) | 0.86" (0.07 ft) | 6.63" (0.55 ft) | | | 0.31" (0.02 ft) |
| 2" (0.16 ft) | ANSI Class 150 | 2.4" (0.2 ft) | 5.98" (0.49 ft) | 0.74" (0.06 ft) | 0.74" (0.06 ft) | 4.74" (0.39 ft) | 0.05" (0.004 ft) | 3.6" (0.3 ft) | 0.15" (0.01 ft) |
| 2" (0.16 ft) | ANSI Class 300 | | 6.49" (0.54 ft) | 0.86" (0.07 ft) | | 5" (0.41 ft) | | | 0.31" (0.02 ft) |

| Size | Flange Rating | Mb | D | b | d ² | k | f | d ⁴ | d ⁵ | X |
|-----------------|-------------------|--------------------|--------------------|--------------------|--------------------|--------------------|---------------------|-------------------|--------------------|--------------------|
| 3" (0.25 ft) | ANSI Class 150 | 2.99" (0.24 ft) | 7.48" (0.62 ft) | 0.94" (0.07 ft) | 0.74" (0.06 ft) | 6" (0.5 ft) | 0.05" (0.004 ft) | 5" (0.41 ft) | 2.99" (0.24 ft) | 0.15" (0.01 ft) |
| 3" (0.25 ft) | ANSI Class 300 | | 8.26" (0.68 ft) | 1.14" (0.09 ft) | 0.86" (0.07 ft) | 6.63" (0.55 ft) | | | | 0.31" (0.02 ft) |
| 2" (0.16 ft) | ANSI Class 150 | 1.88" (0.15 ft) | 5.98" (0.49 ft) | 0.74" (0.06 ft) | 0.74" (0.06 ft) | 4.74" (0.39 ft) | 0.05" (0.004 ft) | 3.6" (0.03 ft) | 1.88" (0.15 ft) | 0.15" (0.01 ft) |
| 3" (0.25 ft) | ANSI Class 300 | | 8.26" (0.68 ft) | 1.14" (0.09 ft) | | 6.63" (0.55 ft) | | | | 0.31" (0.02 ft) |

Specifications

Pressure Sensor Ranges

| Code | Min/Max Span | LRV/URV |
|------|-----------------|------------------|
| 3 | 0.217 to 21 psi | 14.5 to 21 psi |
| 4 | 2.17 to 217 psi | -14.5 to 217 psi |
| 5 | 7.25 to 725 psi | 0 to 725 psi |
| 6 | 36 to 3625 psi | 0 to 3625 psi |
| 7 | 87 to 8700 psi | 0 to 8700 psi |

Electrical Specification

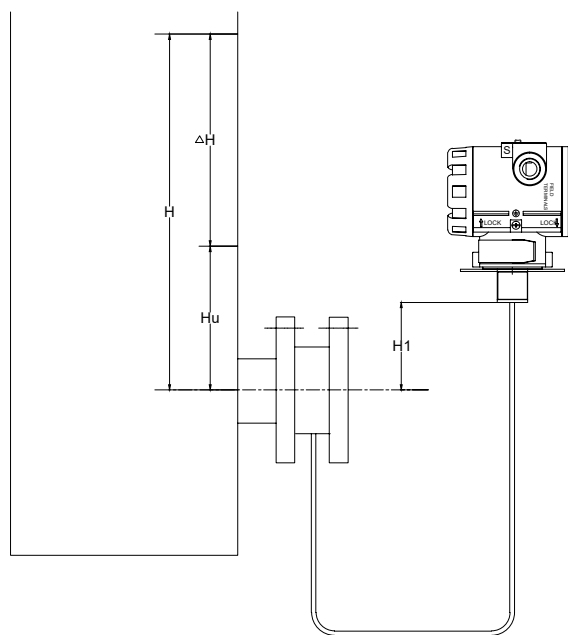
| | |
|----------------------|----------------------|
| Power Supply | 12 to 45 VDC |
| HART loop resistance | 250 to 550 ohm |
| Output Signal | 4 to 20 mA DC / HART |
| Isolation | 500 Vrms (707 VDC) |

Performance Specifications

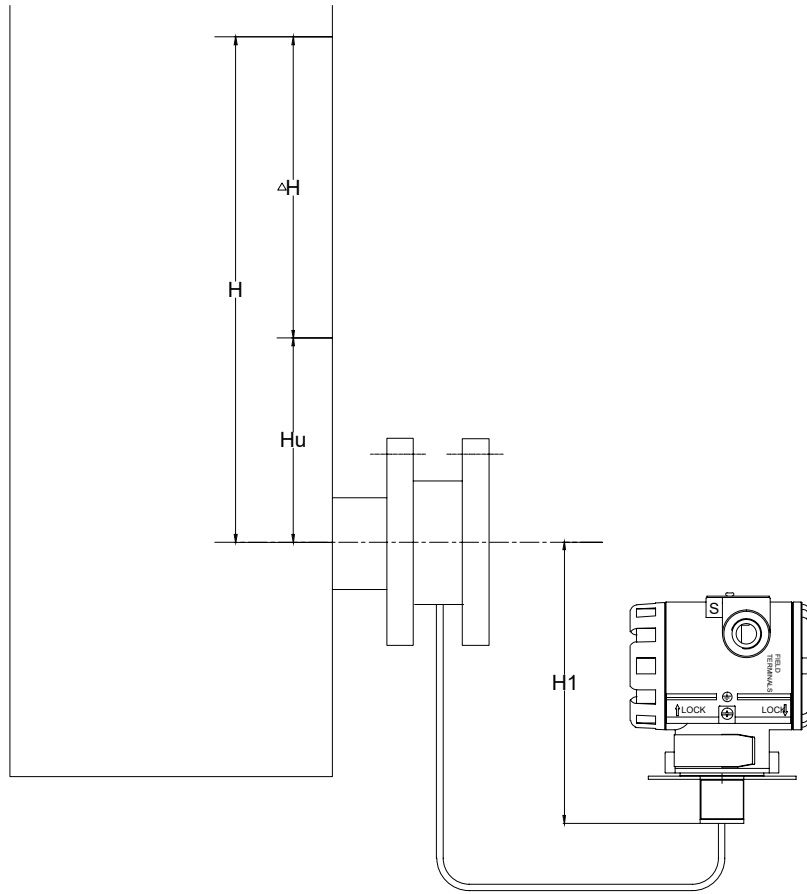
| | |
|---------------------------------|-------------------------------------|
| Reference Accuracy | ± 0.075% of Span |
| Ambient Temperature Effect | ±[0.025%URL+0.125% Span]/28°C |
| Stability | ±0.1% URL for 12 Months |
| Operating Temperature | -40 °F to 185 °F (-40 °C to 85 °C) |
| LCD Meter Operating Temperature | -22 °F to 176 °F (-30 °C to 80 °C) |
| Humidity Limits | 5% to 98% RH |
| Process Temperature Limit | -40 °F to 248 °F (-40 °C to 120 °C) |
| Power Supply Effect | ±0.005% of Span per Volt |

| Physical Specifications | |
|-------------------------------|---|
| Isolating Diaphragm | 316L SST |
| Drain and Vent Valve | 316 SST |
| Flange and Adapter | 316 SST |
| O-ring | Viton, PTFE |
| Bolts & Bolting Flange | 316 SST |
| Fill Fluid | Silicon 200 |
| | Neobee |
| Capillary Length | 5 ft |
| Electrical Connection Housing | ½" - 14 NPTF Conduit/Epoxy Coated-Aluminum |
| | G1/2 Conduit/Epoxy Coated-Aluminum |
| Enclosure Rating | General Purpose (IP67/ NEMA4X) |
| Approvals | KOSHA Flameproof Approval: Ex d IIC T6 |
| | KTL Intrinsic Safety Approval: Ex ia IIC |
| | ATEX (KEMA) Flameproof: Ex d IIC T6 or T5 |
| | ATEX (DEKRA) Intrinsic Safety |
| | FM/FMC Explosion proof (for USA and Canada) |
| | Class I/II/III, Division ½, Group A-D/E-G |

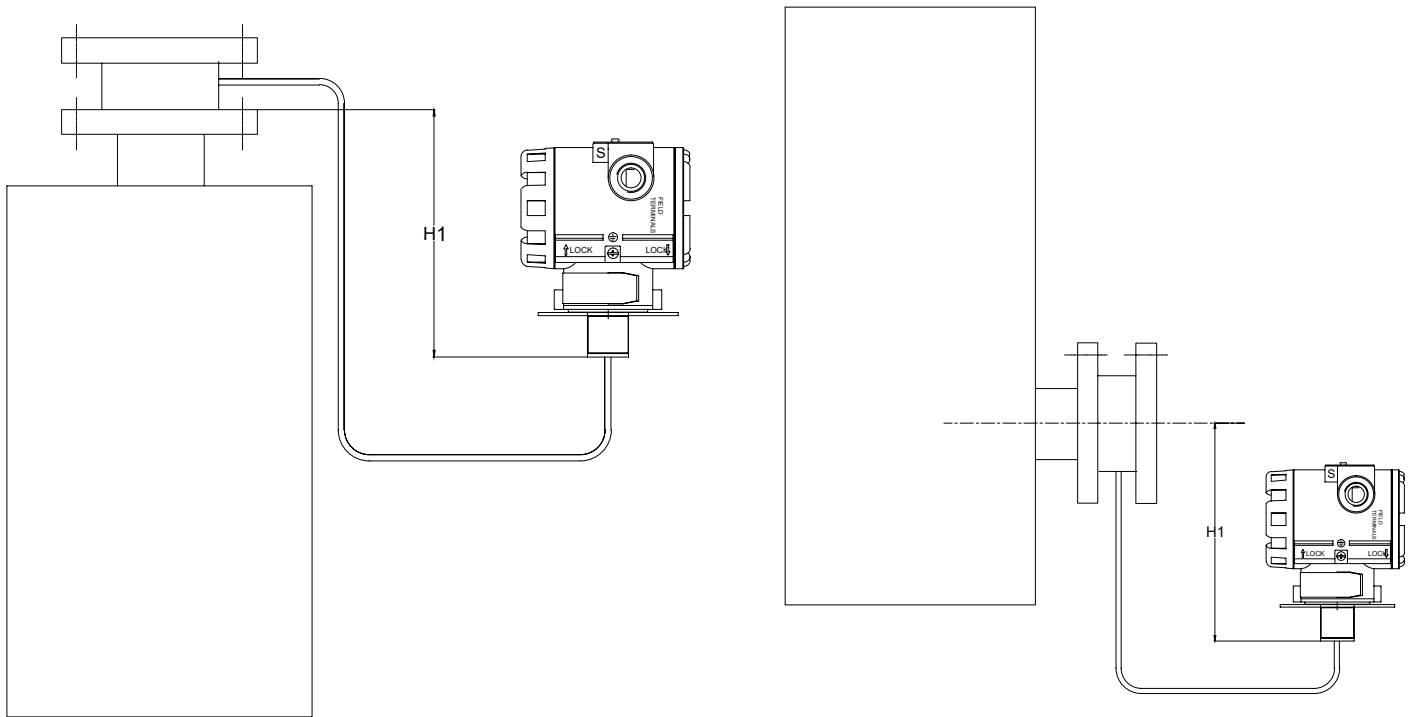
Installation



Pressure transmitter above the measuring point



Pressure transmitter below the measuring point



Pressure transmitter for absolute pressure always below the measuring point

Model Chart

| EXAMPLE | Tek-Hydro 4500A-G | 1 | WP | X | 1 | LED | S2 | A1 | 0 | S | 2 | X | FC | 4500A-G-1-WP-X-1-LED-S2-A1-0-S-2-X-FC |
|----------------------------|-------------------|---------------------------------|-------------------------|---|---|--------------------------|----------|--|--------------------|------------------|---|---|-----|---|
| Series | Tek-Hydro 4500A-G | | | | | | | | | | | | | Hydrostatic Gauge Pressure Level Transmitter |
| Range | | 1 2 3 4 5 6 7 | | | | | | | | | | | | 0-5.8 psig (40:1 Turndown, Adj. Range: -14.5 to 5.8psig) 0-36 psig (40:1 Turndown, Adj. Range: -14.5 to 36psig) 0-145 psig (40:1 Turndown, Adj. Range: -14.5 to 145psig) 0-435 psig (40:1 Turndown, Adj. Range: -14.5 to 435psig) 0-1450 psig (40:1 Turndown, Adj. Range: -14.5 to 1450psig) 0-3000 psig (4:1 Turndown, Adj. Range: 0 to 3000psi) 0-6000 psig (8:1 Turndown, Adj. Range: -14.5 to 6000psig) 0-10000 psig (2:1 Turndown, Adj. Range: 0 to 10000psi) |
| Approval Rating | | | FM ATEX CSA WP | | | | | | | | | | | FM Approval ATEX Approved CSA Class I Div I Explosion-Proof General Purpose NEMA 4X/IP66 |
| Process Connection | | | | X | | | | | | | | | | Diaphragm Seal |
| Electrical Connection | | | | | 1 | | | | | | | | | ½" NPT female |
| Diaphragm Seal Type | | | | | | LED LES LFD LFS | | | | | | | | Extended Diaphragm Seal direct mount Extended Diaphragm Seal capillary type (up to 5ft) Flush Diaphragm Seal direct mount Flush Diaphragm Seal capillary type (up to 5ft) |
| Mounting Flange | | | | | | | S2 S3 | | | | | | | 2" (50mm) 316L Stainless Steel (No Extended Diaphragms) 3" (80mm) 316L Stainless Steel |
| Mounting Flange Rating | | | | | | | | A1 A2 A3 D1 D2 J1 J2 | | | | | | ANSI Class 150 ANSI Class 300 ANSI Class 600 DIN pn 10/16 DIN pn 25/40 JIS 10k JIS 20k |
| Extension Length | | | | | | | | | 0 5 10 15 | | | | | No Extension Standard Option for Flush Mount 2" (50 mm) 4" (100 mm) 6" (150 mm) |
| Wetted Parts | | | | | | | | | | H P S T | | | | Hastelloy C-276 Diaphragm PTFE and 316L Stainless Steel Diaphragm 316L Stainless Steel Diaphragm Tantalum Diaphragm |
| Fill Fluid | | | | | | | | | | | 2 | | | D.C. Silicon 200 (-40-400° F) |
| Capillary Length High Side | | | | | | | | | | | | X | | Capillary length 0-30' (whole numbers only) (over 5ft) |
| Options | | | | | | | | | | | | | CC | Custom Calibration with 5 point Calibration Certificate |
| | | | | | | | | | | | | | FC | Factory Conguration, No Certificate |
| | | | | | | | | | | | | | BA | Stainless Steel Bracket (Angel Type) with SS Bolts |
| | | | | | | | | | | | | | BF | Stanless Steel Bracket |
| | | | | | | | | | | | | | TAG | Stainless Steel Hang Tag |

Customer Service & Support



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