

FLOW

Variable Area Flowmeters- Plastic-Indication Only

- 5** MR3000 Molded Variable Area Flowmeter, 1/8" Pipe, Air Ranges to 100 ccm, Water to 300 ccm
- 6,7,8** 2500 Series Acrylic Variable Area Flowmeters, 1/8 to 1" Pipe, Air Ranges to 100 l/m, Water to 3.7 l/m
- 9,10,11** DS15 Flow Indicator, Switch & Transmitter, F.S. Ranges From 24 lph to 50,000 lph

Variable Area Flowmeters- Glass/Metal- Indication Only

- 12-21** 1350 Glass Tube Flowmeters 1350 Constant Diff. Pressure Regulators, Air to 63 lpm, Water to 2 lpm

Variable Area Flowmeters - Plastic-Indication/Alarm/Analog Out

- 9,10,11** DS15 Flow Indicator, Switch & Transmitter, F.S. Ranges From 24 lph to 50,000 lph

Variable Area Flowmeters - Glass/Metal-Indication/Alarm/Analog Out

- 22,23** DS01 Flow Meter With Switch Output, 1/4" to 1-1/4" Pipe, Ranges to 150 l/min Water, 4500 lpm Air, Pressure to 16 Bar
- 24,25** DS02 Flow Switch, 1/4" to 1-1/4" Pipe, Ranges to 150 l/min Water, 4500 lpm Air
- 26,27** DS03 Flow Meter With Switch Output, 1/4" to 1" Pipe, Ranges to 50 l/min Water, 1600 lpm Air, Pressure to 10 Bar
- 28,29** DS04 Flow Meter With Switch Output, 1/4" to 1" Pipe, Ranges to 150 l/min Water, 3000 lpm Air, Pressure to 300 Bar
- 30,31** DS05 Flow Meter With Switch Output, 1/4" to 1-1/4" Pipe, Ranges to 250 l/min Water, Pressure to 10 Bar
- 32,33** DS06 Flow Meter With Switch Output, 1/4" to 1-1/4" Pipe Ranges to 250 l/min Water, Pressure to 300 Bar
- 34,35** DS07 Viscosity Compensated Flow Meter With Switch Output, 1/4" to 1" Pipe, Ranges to 90 l/min, Pressure to 16 Bar
- 36,37** DS08 Viscosity Compensated Flow Meter With Switch Output, 1/4" to 3/4" Pipe, Ranges to 90 l/min, Pressure to 350 Bar
- 38,39** DS20 Variable Area Flowmeter with Analog & Alarm Output, 1/4" to 4" Pipe, Ranges to 250 lpm & 8000 Slph
- 40-43** DS25 Variable Area Flowmeter with Analog & Alarm Output, 1/2" to 4" Pipe, Ranges to 440 GPM & 1100 SCFM

Single-Jet & Multi-Jet Totalizing Water Meters- Indication/Alarm Output

- 44,45** CLXC-C1, 1/2" & 3/4" Brass Singlejet Totalizing Water Meters , Range 0.25 to 22 GPM
- 46,47,48** CLXC-P, 1/2" & 3/4" Plastic Singlejet Totalizing Water Meters , Range 0.25 to 22 GPM
- 49,50,51** MJ-SDC 5/8" x 3/4" Brass Multijet Totalizing Water Meters , Range 0.25 to 22 GPM
- 52,53,54** MJ-SDC 5/8" x 3/4" Plastic Multijet Totalizing Water Meters , Range 0.25 to 22 GPM
- 55,56,57** MJ-SDC 1", 1-1/2", 2" Brass Multijet Totalizing Water Meters , Ranges to 160 GPM

Orifice Type Flowmeters- Indication/ alarm & Analog Outputs

- 58-63** Series 7000/8000 Orifice Flowmeter with Analog & Alarm Output, 1/4" to 8" Pipe Ranges to 3000 GPM/20000 SCFM
- 64,65** Series 1000 & 2000 Flo-Gard Differential Pressure, Orifice Type Flow Switch, 1/4" to 8" Pipe

Turbine Flowmeters- Plastic

- 66,67** PFA Turbine Flow Sensor, 1/8", 1/4", 1/2" pipe, F.S. ranges 2, 20 & 40 lpm
- 68,69** PFAD Disposable Turbine Flow Sensor, 4.5 mm, 8.5 mm, 12.5 mm pipe, F.S. ranges 2 & 20 40 lpm
- 70,71** PVDF Disposable Turbine Flow Sensor, 4.5 mm, 8.5 mm, 12.5 mm pipe, F.S. ranges 2 & 20 lpm
- 72** 0045 & 0085 Disposable Flowmeter Tube Holder System, F.S. ranges 2 & 20 lpm

FLOW

Turbine Flowmeters- Plastic/Metal- Analog/Freq. Outputs

- 73,74** SS Stainless Steel Flow Sensor, 1/8", 1/4", 1/2" pipe, F.S. ranges 2, 20 & 40 lpm
- 75** CFS Series Low Cost OEM Turbine Flow Sensors, 1/4", 3/8", 1/2", flow 0.8 to 25 LPM
- 76-90** Precision Turbine Flow Meter Series G, 1/2 to 2" pipe Sizes, Stainless Steel, Display & Signal Conditioning Options
- 91-94** Series WP Totalizing Turbine Water Meters, 2" to 8" Pipe Size, Total Display and Pulse Output

Impeller & Paddle Type Flowmeters- Plastic/Metal- Analog/Freq. Outputs

- 95,96** FSI-T00 Impeller Type Flow Sensor, 1", 1 1/2" & 2" Pipe, Pulse Output
- 97,98** FSI-S00 Saddle Mount Impeller Type Flow Sensor, 3" & 4" Pipe, Pulse Output
- 99,100** LS Series Insertion Flowmeter, 1/2" to 24" Pipe, Frequency/Pulse Output
- 101-104** DP 490 & DP 525 Stainless Steel Insertion Impeller Flow Transmitter, 1.5" to 100" Pipe
- 105,106** LSS Series Insertion Flowmeter, 1/2" to 24" Pipe, Display, Total, Freq., Analog & Alarm Outputs
- 107,108** TK Series Paddle Wheel Flowmeter, 1/2 to 4" Pipe, Display, Total, Pulse, Analog & Alarm Output

Electromagnetic Type Flowmeters-Analog/Freq. Outputs

- 109,110** WMX101 Liquid Magnetic Flowmeter, Mounted on 4", 6", 8" or 10" Pipe, F.S. 500-800 GPM
- 111** DM01D Magnetic Inductive Flow Transmitter, F.S. Ranges From 100 ml/min to 200 lpm

Gear/Rotor Type Flowmeters-Analog/Freq. Outputs

- 112** DV01 Gear-Wheel Flowmeter, For Viscous liquids, 20-4000cSt, to 65 lpm, Frequency Output
- 113-133** Gear Wheel Flowmeter Series OM, Aluminum, PPS, Stainless Steel, 1/8" to 4" Pipe, Display & Signal Conditioning Options

Vortex Type Flowmeters-Analog/Freq. Outputs

- 134-139** 200 Series Plastic Liquid Vortex Flow Transmitter, 1/4" to 1" Pipe, Frequency Output
- 140-145** 210 Series Plastic Liquid Vortex Flow Transmitter, 1/4" to 1" Pipe, Frequency & Analog Output
- 146-151** 212 Series Plastic Liquid Vortex Flow Transmitter, 1/4" to 1" Pipe, Display, Frequency & Analog Output
- 152-155** 236 Series Brass Liquid Vortex Flow Transmitter, 1/4" to 1-1/4" Pipe, Frequency & Analog Output
- 156-158** RVL Series Vortex Flowmeters Technical Information, Application, Design, Installation
- 159-162** RVL Series Vortex Flowmeters, PVC, CPVC, or PVDF Construction, 1/2" to 3" Pipe Size

Flow Switches

- 24,25** DS02 Flow Switch Output, Ranges to 150 l/min Water, 4500 lpm Air
- 163** 2100 Series Polysulfone Flow Switches, 1/8" & 1/4" Pipe
- 164,165** 1100 Series Bronze & Stainless Steel Flow Switches, 3/4" to 3"
- 166** 1800 Series 1" PVC Flow Switches
- 167** 2600 Series 2" PVC Flow Switches
- 62,63** Series 1000 & 2000 Flo-Gard Differential Pressure, Orifice Type Flow Switch, 1/4" to 8" Pipe

Flow Monitors, Totalizers & Controllers

- 168,169** DS1000 & DS1000X Loop Powered Rate Meter
- 170,171** DS2000 & DS2000X Loop Powered Rate Meter & Totalizer
- 172,173** DS 3000A & DS3000P Dual-line Rate/Totalizer, Analog or Pulse input
- 174,175** DS 5000 Universal Process Controller- Up to 8 Inputs/Outputs

VELOCITY & LIGHT

- 176** CS-800 Portable Air Velocity Meter also measures Temperature, Humidity and Light Intensity
- 177** CS-810 Economical Portable Air Velocity Meter, range 80 to 5910 ft/min

PRESSURE

Transmitters- Gage Pressure

- 178,179** Series 525 Pressure Transmitter, Voltage, Current, Ratiometric Outputs, F.S Ranges to 10 PSI
- 180** Series 100 Pressure Transmitters, 2-Wire, 4-20 mA Output, Ranges Vacuum to 15,000 PSI
- 181,182** 615 Pressure Transmitters, High Accuracy, Vacuum to 120,000 psig & 300 psia
- 183,184** 625 Pressure Transmitters, Hazardous Environments, Vacuum to 120,000 psig & 300 psia
- 185** Series 110 Sanitary Pressure Transmitters, 2-Wire, 4-20 mA Output, Ranges Vacuum to 400 PSI
- 186,187** 506 Series 303 SS Pressure Transmitters for OEM Refrigeration Applications, Ranges to 870 PSI
- 188,189** Series 511 Pressure Transmitter, FS Ranges -14.7 to 7500 PSI

Transmitters- Differential Pressure

- 190,191** Series 401 Differential Pressure Transmitter, Voltage Output, Ranges 1.0-3.1" w.c.
- 192,193** Series 694 Differential Pressure Transmitter, 2-Wire, 4-20 mA Output, Ranges $\pm 0.2"$ to 4.0" w.c.
- 194,195** Series 652 Differential Pressure Transmitter, Voltage & Current Output, Ranges 20" to 15 PSID
- 196,197** Series 692 Differential Pressure Transmitter, 2-Wire, 4-20 mA Output, Ranges 20 to 150 PSID
- 198,199,200** Series 699 Differential Pressure Transmitter/Indicator, F.S Ranges 0.1 to 20" w.c.

Sensors

- 201,202,203** Series 513 Ceramic Pressure Sensor, F.S. Ranges From -14.5 to 2,320 PSI
- 204,205,206** Series 516 Ceramic Pressure Sensor, F.S. Ranges From -14.5 to 232 PSI

Gages

- 207,208** Series 400/500 Stainless Steel Pressure Gages, Vacuum to 30,000 PSI
- 209** Series 2000 Differential Pressure Gage, Ranges 0.25 " w.c. to 30 PSID

Switches

Low Pressure

- 210,211** Series 604 Differential Pressure Switch, Switch points From 0.05 to 4.0 " w.c.
- 212,213** Series 605 OEM Differential Pressure Switch, Switch points from 0.05 to 1.6" w.c.
- 214** Series 1950 Explosion Proof Differential Pressure Switch, Set Points From 0.07 to 85" w.c.
- 215,216** Model 24 Differential Pressure Switch, 1-45 PSID
- 217,218** Model J21K Differential Pressure Switch, 30" Hg Vac. to 90 PSID

Process

- 219-229** Series 120 Adjustable Explosion Proof Pressure/Diff. Pressure Switches, Ranges From Vacuum to 6000PSI
- 230-237** One Series, 2-Wire Electronic Pressure Switch, Adjustable Deadband & Setpoint, Vac. to 4500 PSI
- 238-243** Series 100 Adjustable Pressure/Diff. Pressure Switches, Ranges From Vacuum to 5000PSI
- 244-250** Series 12 Pressure, Diff. Pressure & Temp Switch, 30" VAC to 6000PSI, explosion proof, -130 to 650^oF
- 251-256** Series 400 Adjustable, 1-3 outputs, Pressure/Diff. Pressure Switches, Ranges Vacuum to 6000PSI

OEM

- 257,258** Model SM Pressure Switch, Factory Preset, Set Point Range 2-120 PSI
- 259,260** Model MM Pressure Switch, Factory Preset, Set Point Ranges From 10 To 120 PSI
- 261,262** Model LM Pressure Switch, Factory Preset, Set Point Range 2-300 PSI
- 263** Model SQ Pressure Switch, Field Adjustable, Set Point Ranges From 10 To 120 PSI
- 264,265** Model CJ Pressure Switch, Field Adjustable, Set Point Ranges From 3 To 120 PSI
- 266,267** Model XM Pressure Switch, Field Adjustable, Set Point Ranges From 4 To 4,000 PSI
- 268,269** Model CD Pressure Switch, Field Adjustable, Set Point Ranges From 10 To 4500 PSI
- 270,271** Model CF Pressure Switch, Factory Preset, Set Point Range From 10 To 4500 PSI
- 272,273** Model WX Pressure Switch, Field Adjustable, Set Point Ranges From 50 To 5000 PSI
- 274,275** Model VP Vacuum Switch, Field Adjustable, Set Point Range 1 to 30" Hg
- 276,277** Model VM Vacuum Switch, Factory Preset, Set Point Range 4 to 30" Hg
- 278,279** Model NV Vacuum Switch, Field Adjustable, Set Point Range 3 to 30" Hg

TEMPERATURE

- 280** Therm 2420-1L Portable Temperature Measurement, thermocouple types K, N, L, J, U, T, S
- 281,282** Model TT Bi-Metal Temperature Switch, Immersion Type, Factory Preset, Set Point Range 40-300°
- 244-250** Series 12 Temp Switch, explosion proof, -130 to 650°F
- 219-229** Series 120 Adjustable Explosion Proof Temperature Switches, Ranges From -180 to 650°F
- 230-237** One Series, 2-Wire Electronic Temperature Switch, Adjustable Deadband & Setpoint, -50 to 450°
- 238-243** Series 100 Adjustable Temperature Switches, Ranges From -180 to 650°F
- 251-256** Series 400 Adjustable, 1-3 outputs, Temperature Switches, Ranges From -180 to 650°F
- 283,284** Model HT Bellows Temperature Switch, Immersion Type, Factory Preset Set Point Range 40-300°
- 285,286** Model TM Bellows Temperature Switch, Immersion Type, Factory Preset Set Point Range 40-300°
- 287,288** Model TD Snap-Disc Thermostat Temperature Switch, Factory Preset Set Point Range 150-300°F

LEVEL

- 289** Series L007 Horizontal Mount Float Level Switches, Pressures to 300 PSIG
- 290** Series L070 Horizontal Mount Float Level Switches, Pressures to 1500 PSIG
- 291,292** Series L312 & L500 Custom Float Level Switches
- 293** Series U00X Ultrasonic Level Switch, Level From 1" to 100"
- 294** Echopod Ultrasonic Level Switch/Transmitter/Control, Range to 49.2" (1.25 m)
- 295** Model FS00Z Float Level Switch for Heavily Polluted Media & Potable Water
- 296,297,298** 712 Submersible Pressure Transmitter, Voltage, Current & Ratiometric Outputs, to 3 bar (100 ft)
- 299** Model 612 Submersible Pressure Transmitter, 4-20 mA Output, Ranges Vacuum to 15,000 PSI

CONTROLLERS

- 300-303** PXR Single Loop Controller, Thermocouple, RTD, & Analog Input, Alarm & Analog Output

304 CLARK COMMERCIAL TERMS & CONDITIONS

CLARK SOLUTIONS

MR3000 Molded Variable Area Flowmeter

Air ranges from 50 to 100 CCM, water 4 CCM to 40 GPH

DESCRIPTION

MR3000 series molded flowmeters are available with 24 different air and water ranges. These units are supplied with scales in LPM Air, SCFH Air, CCM Water and GPH Water, all with 10:1 turn-down ratios. Molded of high-impact polycarbonate, the MR3000 has been designed to maintain maximum pressures to 100 PSIG and temperatures to 150°F.

These economically engineered units have been designed to provide the highest quality with precision accuracy. The standard unit is supplied with a black body. Custom colored bodies can be ordered upon request. The flowmeters are fitted with 1/8" FNPT inlet and outlet connections. An optional inlet or outlet control valve can be specified.



MR3000

- MOLDED HIGH IMPACT POLYCARBONATE
- HIGH QUALITY CONSTRUCTION
- ECONOMY COMBINED WITH ACCURACY
- MONITOR OR CONTROL AIR AND WATER FLOWS
- SUPPLIED WITH EASY-TO-READ 10:1 TURN-DOWN DIRECT-READING SCALES
- IDEALLY SUITED FOR O.E.M. APPLICATIONS

ACCURACY: ±4% FULL SCALE
 BODY & TUBE: POLYCARBONATE
 FLOATS: BLACK GLASS, CARBIDE OR STAINLESS STEEL
 TEMPERATURE: 150° F / 65° C MAXIMUM
 PRESSURE: 100 P.S.I.G. MAXIMUM
 FITTINGS: BRASS OR STAINLESS STEEL
 VALVE: (OPTIONAL) BRASS OR STAINLESS STEEL CARTRIDGE TYPE
 SEAL MATERIAL: BUNA-N WITH BRASS FITTINGS; VITON® WITH STAINLESS STEEL

SERIES MR3000 FLOW RATES

| RANGE SCFH AIR | MODEL CODE | RANGE LPM AIR | MODEL CODE |
|----------------|------------|---------------|------------|
| .1-1 | 3A00 | .05-.5 | 3A12 |
| .2-2.5 | 3A01 | .1-1.2 | 3A13 |
| .4-5 | 3A02 | .4-5 | 3A14 |
| 1-11 | 3A03 | .2-2.5 | 3A23 |
| 1-22 | 3A04 | 1-10 | 3A15 |
| 4-60 | 3A06 | 2-30 | 3A16 |
| 10-110 | 3A07 | 4-50 | 3A17 |
| 20-200 | 3A08 | 10-100 | 3A18 |
| GPH WATER | | CCM WATER | |
| .2-2.5 | 3L28 | 4-50 | 3L09 |
| .4-5 | 3L19 | 5-110 | 3L10 |
| 1-10 | 3L20 | 20-300 | 3L11 |
| 2-25 | 3L21 | | |
| 4-40 | 3L22 | | |

ORDERING INFORMATION

ABCDE

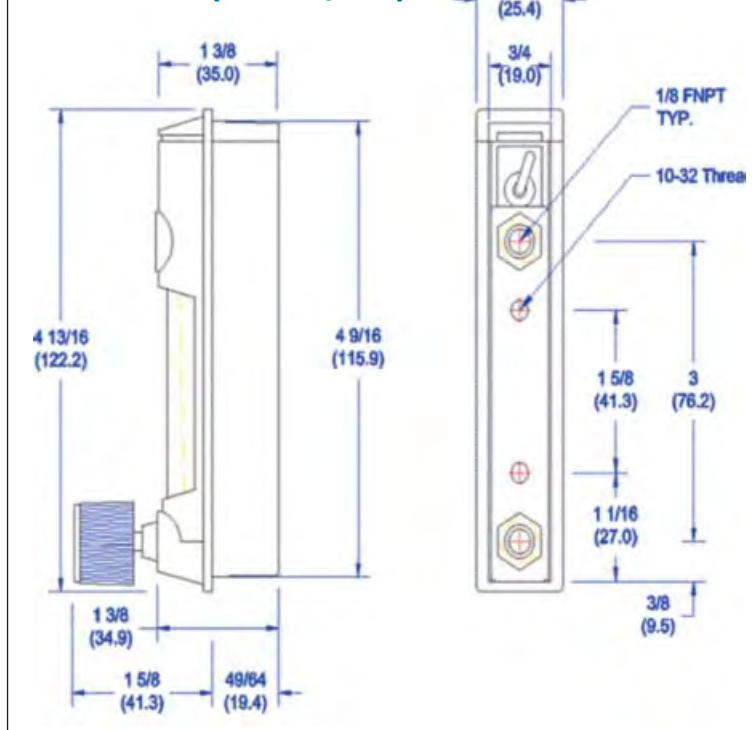
EXAMPLE: MR3A08BVBN

| A | B | C | D | E |
|-------|------------|-------------------------|---|---------------------|
| Model | Model Code | Fittings | Valve | Seals |
| MR | See Table | B= Brass S=Stainless | N=None V=Valve Inlet O=Valve Outlet | BN=Buna VT=Viton |

Most Popular Models:

MR3A00BVBN- 0.1-1.0 SCFH air, brass valve, buna seals
 MR3A01BVBN- 0.2-2.5 SCFH air, brass valve, buna seals

DIMENSIONS (INCHES, MM)



VITON® is a registered trademark of DuPont Dow Elastomers

BROOKS

2500 Series Acrylic Variable Area Flowmeters

Liquids & Gases, 1/8" to 1" Pipe, F.S Ranges 0.5-100 l/m Air, 0.1 to 3.7 l/m H₂O

DESCRIPTION

Series 2500 is a standard precision-machined acrylic flow meter for liquids and gases, with direct reading air or water scales and is available in either English or metric scales. Models 2510/2520/2530 can be configured with a control valve on the inlet or no valve.

Fittings and valve can be specified in either brass or stainless steel. O-rings are available in Buna-N, Viton® fluoroelastomer or other optional elastomers.

Model 2540 flowmeters have standard 1" FNPT PVC fittings with either an in-line Model 2540-I or panel mount Model 2540-S configuration. The panel mount version is available with an integral valve on the inlet Model 2540-V or no valve.



Typical applications include:

- Air sampling equipment aquaculture
- Gas analyzers
- Photo processing equipment
- Desalinization equipment
- Medical systems
- Water treatment and distribution systems

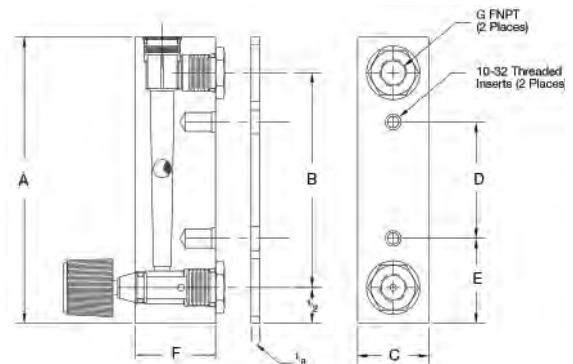
Features:

- Easy-to-read English or metric scales
- Air ranges from 40 ccm to 4000 LPM
- Easy disassembly/assembly for maintenance
- Durable one-piece clear acrylic construction
- Stable easy-to-read float
- Water ranges from 4 ccm to 20 GPM
- Threaded brass inserts for quick installation
- Superior clarity and strength

| SPECIFICATIONS | Model | | | |
|----------------|--|----------------|-------------|------------------|
| | 2510 | 2520 | 2530 | 2540 |
| Accuracy | ±5% full scale | ±3% full scale | | ±2% full scale |
| Flow Rates | See Table A | See Table B | See Table C | See Tables D & E |
| Floats | Black Glass, 316 Stainless Steel, Delrin® Acetal Resins | | | |
| Body | Clear Acrylic | | | |
| Seals | Buna-N O-rings with Brass fittings; Viton® O-rings with 303 Stainless Steel fittings | | | |
| Pressure | 100 psig max. | | | |
| Temperature | 150°F/65°C Max. | | | |
| Fittings | Brass, 303 Stainless Steel | | | |
| Valves | Brass or Stainless Steel | | | |

| Model | Dimensions inches (mm) 2510, 2520 & 2530 | | | | | | |
|-------|--|--------------|---------------|---------------|----------------|---------------|-----------|
| | A | B | C | D | E | F | G |
| 2510 | 4" (102) | 3" (76.2) | 1" (25.4) | 1-5/8" (41.3) | 1-3/16" (30.2) | 1-1/8" (28.6) | 1/8" FNPT |
| 2520 | 6-1/2" (165) | 5-1/2" (140) | 1-3/8" (34.9) | 3-1/2" (88.9) | 1-1/2" (38.1) | 1-1/8" (28.6) | 1/8" FNPT |
| 2530* | 6-5/8" (168) | 5-1/2" (140) | 1-1/8" (28.6) | 3-1/2" (88.9) | 1-1/2" (38.1) | 1-3/8" (34.9) | 1/4" FNPT |

* Does not include 1/8" back plate



| Model 2510 Flow Rates - Table A | | | |
|---------------------------------|-----------|------------------|-----------|
| Range SCFH of Air | Tube Code | Range LPM of Air | Tube Code |
| .1-1 | 2A00 | 0.04-0.5 | 2A12 |
| .2-2 | 2A01 | .1-1 | 2A13 |
| .4-5 | 2A02 | .2-2.5 | 2A29 |
| 1-10 | 2A03 | .4-5 | 2A14 |
| 4-50 | 2A06 | 1-10 | 2A15 |
| 10-100 | 2A07 | 2-25 | 2A16 |
| 20-200 | 2A08 | 6-50 | 2A17 |
| - | - | 10-100 | 2A18 |
| CCM of Water | Tube Code | GPH of Water | Tube Code |
| 10-100 | 2L10 | .2-2 | 2L28 |
| 20-240 | 2L11 | .4-5 | 2L19 |
| - | - | 1-10 | 2L20 |
| - | - | 2-20 | 2L21 |
| - | - | 4-40 | 2L22 |

| Model 2520 Flow Rates - Table B | | | |
|---------------------------------|-----------|--------------------|-----------|
| Range SCFH of Air | Tube Code | Range CCM of Water | Tube Code |
| .4-5 | 4A30 | 4-50 | 4L38 |
| 1-10 | 4A31 | 10-120 | 4L56 |
| 4-40 | 4A33 | 25-225 | 4L51 |
| 10-100 | 4A34 | 40-400 | 4L50 |
| 20-200 | 4A36 | 40-660 | 4L52 |
| | | 100-1500 | 4L53 |
| CCM of Air | Tube Code | 200-3000 | 4L54 |
| 10-1000 | 4A39 | 300-3700 | 4L55 |
| LPM of Air | Tube Code | GPH of Water | Tube Code |
| .4-5 | 4A40 | 1-10 | 4L45 |
| 1-10 | 4A41 | 2-25 | 4L48 |
| 2-20 | 4A42 | 6-60 | 4L46 |
| 3-30 | 4A43 | SCFM of Air | Tube Code |
| 4-50 | 4A44 | .3-3 | 4A37 |
| 10-100 | 4A47 | | |

| Model 2530 Flow Rates - Table C | | | |
|---------------------------------|-----------|---|-----------|
| Range SCFM | Tube Code | Range GPM of Water | Tube Code |
| .5-5 | 4A67 | 02-2.5 | 4L64 |
| 1-10 | 4A65 | .5-5 | 4L66 |
| 4-20 | 4A68 | LPM of Water | Tube Code |
| LPM of Air | Tube Code | 1-10 | 4L69 |
| 14-140 | 4A72 | 2-20 | 4L71 |
| 30-300 | 4A70 | Dual Scales: SCFM/SCFH, GPM/GPH and LPM/LPH | |
| 100-560 | 4A73 | | |

ORDERING INFORMATION

TYPICAL MODEL CODE FOR MODELS 2510, 2520 & 2530

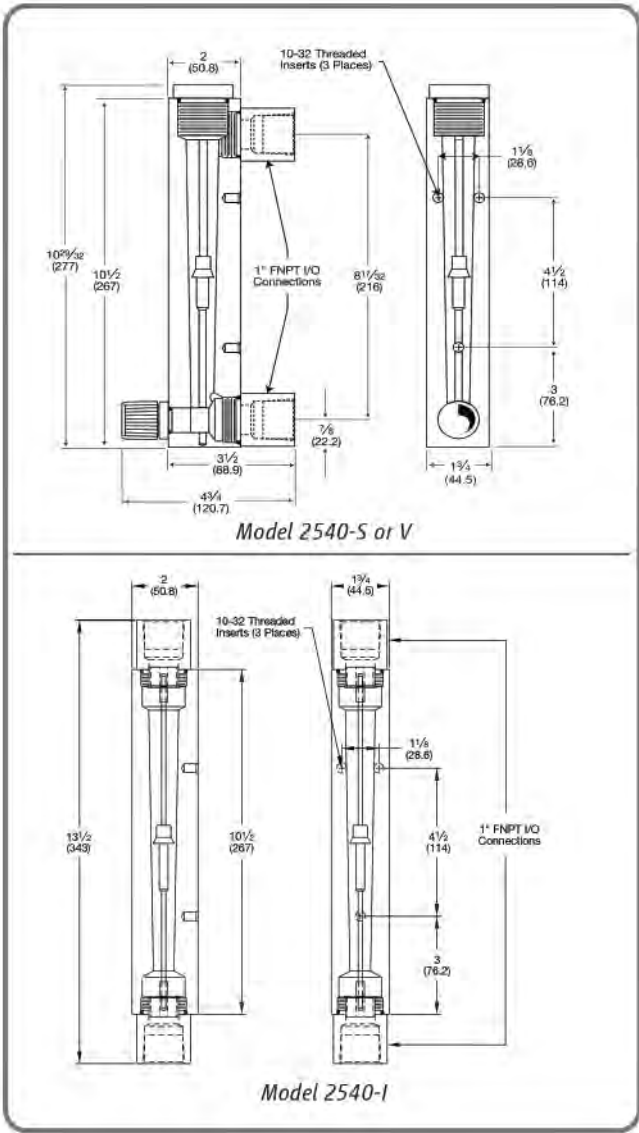
ABCDEF-G

EXAMPLE: 2520A4A33SVVT

| A Model | B Revision | C Tube Code | D Fittings | E Valves | F Seals | *G Options |
|--|---------------------|----------------------|--------------------------------|--|---|-------------|
| 2510= Acrylic Flowmeter: ±5% Full Scale 2520= Acrylic Flowmeter: ±3% Full Scale 2530= Acrylic Flowmeter: ±3% Full Scale | A= Revision Level A | From Table A, B or C | B= Brass S= Stainless Steel | N= No Valve V= Standard Inlet Valve O= Outlet Valve (Vacuum service 2510 & 2520 only) | BN= Buna N (Standard with brass fittings) VT= Viton® fluoroelastomer (Std. with Stainless Steel) | NL= No Logo |
| Additional Options <ul style="list-style-type: none"> • Certificate of Conformance <ul style="list-style-type: none"> • ICC • Paper Tag • Stainless Steel Tag • Degrease for O2 Cleaning | | | | | | |

| Model 2540 - S or V Flow Rates - Table D | | | |
|--|-----------|--------------------|-------------|
| Range SCFM | Tube Code | Range GPM of Water | Tube Code |
| 3-25 | 5A50 | .4-5 | 5L56 |
| 4-50 | 5A51 | 1-10 | 5L57 |
| 10-100 | 5A52 | 2-20 | 5L58 |
| LPM of Air | Tube Code | LPM of Water | Tube Code |
| 100-700 | 5A53 | 1-19 | 5L59 |
| 100-1400 | 5A54 | 4-36 | 5L60 |
| 400-3000 | 5A55 | 5-75 | 5L61 |

| Model 2540 - I Flow Rates - Table E | | | |
|-------------------------------------|-----------|--------------------|-------------|
| Range SCFM | Tube Code | Range GPM of Water | Tube Code |
| 3-25 | 5A50 | .4-5 | 5L56 |
| 4-50 | 5A51 | 1-10 | 5L57 |
| 10-100 | 5A52 | 2-20 | 5L58 |
| LPM of Air | Tube Code | LPM of Water | Tube Code |
| 100-700 | 5A53 | 1-19 | 5L59 |
| 100-1400 | 5A54 | 4-36 | 5L60 |
| 400-4000 | 5A55 | 5-75 | 5L61 |



ORDERING INFORMATION

**TYPICAL MODEL CODE FOR MODELS 2540 S, V OR I
ABCDE-F**

EXAMPLE: 2540A5A52PS

| A Model | B Revision | C Tube Code | D Fitting Material | E Fitting/Valve | F Options |
|---|---------------------|-------------------|---|--|--------------|
| 2540= Acrylic Flowmeter: ±2% Full Scale | A= Revision Level A | From Table D or E | P= PVC (Standard) S= Stainless Steel | S= Back Connections (Standard) I= End Connection V= Valve (Back connection only) | NL= No Logo |
| Additional Options • Certificate of Conformance • ICC • Paper Tag • Stainless Steel Tag • Degrease for O2 Cleaning | | | | | |

PKP

DS15 Flow Indicator, Switch, Transmitter

F.S. Flow Ranges from 24 lph to 50,000 lph Water

DESCRIPTION

The model DS15 flow meters work according to the proven variable area principle. The float is moved upward in a tapered tube by the flowing medium and its upper edge indicates the flow rate by means of a scale affixed on to the measuring tube.

By using a float with an integrated magnet, optional alarm contacts or an analog output transducer may be added.

All flow meters have a male thread on the measuring tube and are supplied with two schedule 80 PVC-U pipe couplings. Please call for coupling materials other than PVC .

The variety of materials used and the simple to exchange measuring scales make these meters universally suitable for most liquid and gaseous media.

Applications are in the water treatment industry, wastewater, plating and surface finishing, chemical and food industries and many more.

SPECIFICATIONS

Measuring Tube Material- PVC-U transparent, Polyamide, Polysulfone or PVDF (for use with alarm contacts or analog output transducer only)

Float Material-PVDF, optionally st. steel AISI 304 and PVDF with integrated magnet

O-Rings- EPDM, Viton optional

Pipe Connections- PVC, optionally PP, PVDF

Max Pressure- 10 bar @ 20°C

Max Temperature Flow Tube Only-

PVC: 60°C

Polyamide: 75°C

Polysulfone: 100°C

PVDF: 110°C

Max Temperature with connectors made of:

PVC: 60°C

PP: 80°C Max

PVDF: 110°C

Mounting Position- vertically, flow from bottom to top

Mounting- with straight pipe, 5-7 x pipe dia. upstream and downstream of meter



DS15 Flow Indicator

DS15 Flow Indicator With Alarm Outputs

DS15 Flow Indicator with Analog Output

Measuring Accuracy- $\pm 4\%$ F.S.

Scales-water scales (in LPH) and air scales (in m^3/h) referenced to 0, 1, 2, or 3 bar above atmosphere and 20 °C are standard. For other media, i.e. gases with higher pressures, HCL (30%), NaOH (30 %) as well as other units of measurement (m^3/h , l/sec, GPM) special scales can be supplied.

Accessories

Alarm Contacts- bistable, N/C or N/O contact function on rising flow

Mounting: adjustable on measuring tube

Contact Rating: Max 220 VAC, 0.5A

Max 10A/10VA

Operating Temperature: 0...+55°C

Hysteresis: 3 mm of float height

Electrical Connection: Two wire, independent of polarity

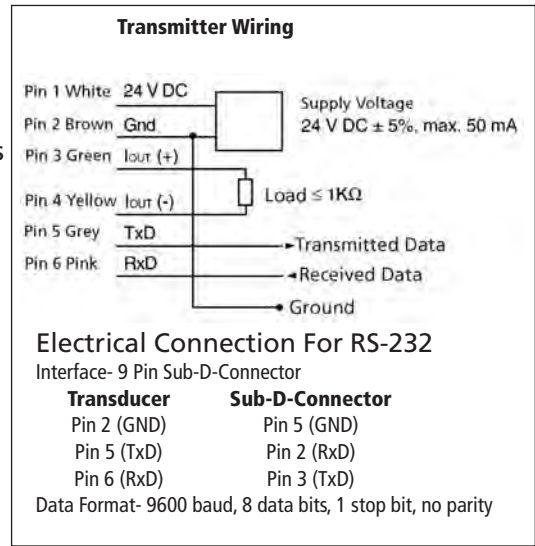
SPECIFICATIONS CONT'D

Analog & RS-232 output-

The optional analog output transducer is mounted onto the measuring tube of the DS15 flowmeter and registers the height of the float by means of an analog Hall sensor. The integrated electronics converts this signal to a 4-20 mA output. Additionally a digital value is available via an RS-232 interface.

To utilize the analog output transducer, the standard float must be exchanged for a float with an integral magnet.

The transducer is equipped with an EPROM which is programmed especially for the application. Therefore it is not possible to field adjust the transducers without consulting the manufacturer.



Electrical connection: 6-pin plug per DIN 45322 (included)

| Tube | Range Number | Range l/h water | Range Air m³/h Outlet Atmospheric | Range Air m³/h Outlet 1bar | Range Air m³/h Outlet 2 bar | Range Air m³/h Outlet 3 bar |
|------|--------------|-----------------|-----------------------------------|----------------------------|-----------------------------|-----------------------------|
| 1 | 101 | 3-24 | 0.2-1 | 0.2-1.2 | 0.25-1.55 | 0.3-1.75 |
| | 102 | 5-60 | 0.2-2.5 | 0.4-3.2 | 0.2-3.8 | 0.3-4.4 |
| | 103 | 10-100 | 0.6-3.6 | 0.6-5.0 | 0.75-6.0 | 0.8-7.0 |
| | 104 | 25-250 | 0.5-9.0 | 1.0-13.0 | 1.0-16.0 | 1.5-19.5 |
| 2 | 201 | 5-50 | 0.4-2.8 | 0.2-3.2 | 0.4-3.6 | 0.3-4.0 |
| | 202 | 15-150 | 0.8-6.2 | 1.0-9.0 | 1.0-11.0 | 1.5-12.0 |
| | 203 | 5-250 | 0.9-9.5 | 1.0-13.0 | 1.0-16.0 | 2.0-20.0 |
| | 204 | 40-400 | 2.0-15.0 | 2.0-20.0 | 3.0-26.0 | 3.0-30.0 |
| 3 | 301 | 15-150 | 0.5-5.5 | 1.0-9.0 | 1.0-11.0 | 1.0-10.5 |
| | 302 | 40-400 | 2.0-14.0 | 2.0-20.0 | 3.0-26.0 | 3.0-30.0 |
| | 303 | 60-600 | 2.5-22.0 | 4.0-31.0 | 4.0-38.0 | 5.0-45.0 |
| | 304 | 100-1000 | 4.0-34.0 | 5.0-45.0 | 6.0-58.0 | 7.5-67.5 |
| 4 | 401 | 25-250 | 1.0-8.0 | 1.5-13.0 | 1.5-16.0 | 1.5-19.5 |
| | 402 | 40-400 | 2.0-14.0 | 2.0-20.0 | 3.0-26.0 | 3.0-30.0 |
| | 403 | 100-1000 | 4.0-34.0 | 5.0-45.0 | 5.0-55.0 | 6.0-66.0 |
| | 404 | 150-1500 | 5.0-50.0 | 6.0-70.0 | 7.5-86.0 | 7.5-98.0 |
| 5 | 501 | 15-150 | 0.7-5.0 | 1-7.5 | 1-9 | 1.6-10 |
| | 502 | 60-600 | 2.5-20 | 3.5-28 | 4-35 | 5-40 |
| | 503 | 100-1000 | 4-34 | 5-50 | 8-60 | 8-70 |
| | 504 | 200-2000 | 8-70 | 12-90 | 10-120 | 15-130 |
| | 505 | 300-3000 | 10-90 | 15-140 | 20-160 | 20-190 |
| | 506 | 600-6000 | 22-190 | 30-260 | 40-380 | 40-400 |
| | 507 | 1000-10000 | 35-300 | 50-420 | 60-510 | 70-600 |
| | 508 | 2500-25000 | 80-720 | 115-1050 | 140-1240 | 166-1400 |
| | 509 | 10000-50000 | 400-1500 | 500-2100 | 600-2500 | 700-2900 |
| 6 | 601 | 15-150 | 0.7-5.5 | 1-7.5 | 1-9 | 1.6-10 |
| | 602 | 30-300 | 1-10 | 1.5-14 | 2-18 | 2.8-20 |
| | 603 | 60-600 | 2.5-20 | 3.5-28 | 4-35 | 5-40 |
| | 604 | 100-1000 | 4-34 | 5-50 | 8-60 | 8-70 |
| | 605 | 150-1500 | 5-50 | 7.5-67 | 9.5-83 | 11-96 |
| | 606 | 250-2500 | 8.5-76 | 10-115 | 14-131 | 17-152 |
| | 607 | 400-4000 | 14-125 | 10-170 | 24-210 | 28-245 |
| | 608 | 600-6000 | 22-190 | 30-260 | 40-380 | 40-400 |
| | 609 | 1000-10000 | 35-300 | 50-420 | 60-510 | 70-600 |
| | 610 | 1500-15000 | 50-500 | 80-700 | 85-760 | 102-880 |
| | 611 | 2500-25000 | 80-720 | 115-1050 | 140-1240 | 166-1400 |
| | 612 | 10000-50000 | 400-1500 | 500-2100 | 600-2500 | 700-2900 |

Note: Arbitrary scales and other units of measurement available on request

| | |
|-----------|-------------------------|
| For GPH: | Multiply l/h by 0.264 |
| For GPM: | Divide l/h by 227 |
| For SCFH: | Multiply m³/h by 35.315 |
| For SCFM: | Multiply m³/h by 0.5886 |

DIMENSIONS(MM)

Table 2: Dimensions

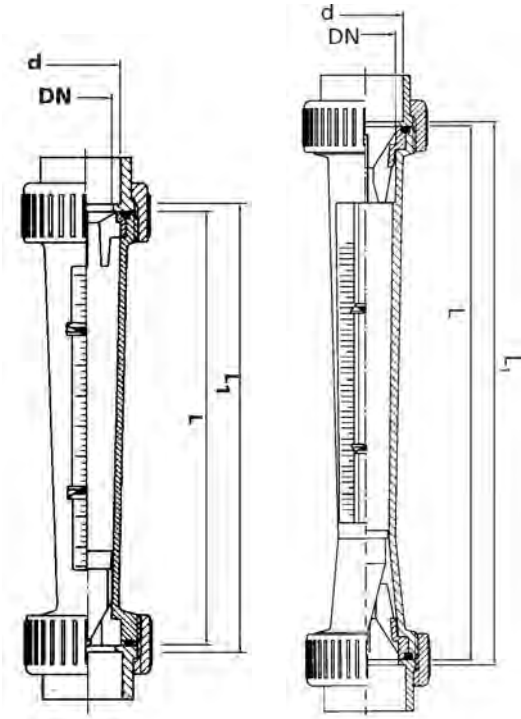
| Tube | Range Number | Flow Tube Male Thread (BSP) | *PVC Pipe Adapter | L | L ₁ | **d | **DN |
|------|--------------|-----------------------------|-------------------|-----|----------------|-----|------|
| 1 | 101...104 | 3/4" | 3/8" | 165 | 171 | 16 | 10 |
| 2 | 201...204 | 1" | 1/2" | 170 | 176 | 20 | 15 |
| 3 | 301...304 | 1 1/4" | 3/4" | 185 | 191 | 25 | 20 |
| 4 | 401...404 | 1 1/2" | 1" | 200 | 206 | 20 | 25 |
| 5 | 501...503 | 1 1/2" | 1" | 335 | 341 | 32 | 25 |
| | 504...505 | 2 1/4" | 1 1/2" | 335 | 341 | 50 | 40 |
| | 506...507 | 2 3/4" | 2" | 335 | 341 | 63 | 50 |
| | 508...509 | 3 1/2" | 2 1/2" | 335 | 341 | 75 | 65 |
| 6 | 601...604 | 1 1/2" | 1" | 350 | 356 | 32 | 25 |
| | 605...606 | 2" | 1 1/4" | 350 | 356 | 40 | 32 |
| | 607...609 | 2 3/4" | 2" | 350 | 356 | 63 | 50 |
| | 610...612 | 3 1/2" | 2 1/2" | 350 | 356 | 75 | 65 |

*Two schedule 80 PVC-U pipe adapters/couplings are included with each flow meter. As the thread on the flowmeter body is metric, care in fitting selection must be taken if connectors other than the PVC connectors supplied are to be used.

**Dimension of metric pipe coupling which can be supplied in materials other than PVC. Please consult factory.

MEASURING TUBE 1...4

MEASURING TUBE 5...6



2 ea. Schedule 80 PVC -U pipe adapters/couplings are supplied with each flowmeter. The adapters are for pipe sizes according to table 2.

ORDERING INFORMATION

DS15-A-B-C-D-E-F

EXAMPLE: DS15-1-1-101-PVC-1-00

| A= Flow Tube Material | B= Scale | C=Range Number | D=Process Connections | E=Float Material | F=Options |
|---|--|---------------------|--|---|---|
| 1=PVC-U (standard) 2= Polyamide 3=Polysulfone 4=PVDF | 1= Water 2=Air @ Atmos 3=Air@1 bar 4= Air@2 bar 5= Air@3 bar 9= Special Scale | Select From Table 1 | PVC= Schedule 80 PVC pipe termination per table 2 N= None S= Special | 1= PVDF (standard) 2= 304 SS 3= PVDF with integrated magnet (for meters with alarm or analog outputs) | 00= none 11= 1 alarm contact (N.C.) 21= 2 alarm contacts (N.C.) 12= 1 alarm contact (N.O.) 22= 2alarm contacts (N.O.) 50= analog , 4..20 mA & RS232 output |

BROOKS

1350G & 1355G Glass Tube Variable Area Flowmeters

Low Flow, 65 & 150 mm Tubes, Optional Constant Diff. Pressure Regulators

DESCRIPTION

The Brooks® Sho-Rate™ 1350 & 1355 Series glass tube variable area flow meter has been the industry standard glass tube variable area meter for decades. This glass tube meter is ideal for a variety of gas and liquid applications. These meters are particularly well suited for purge applications.

The base configuration uses a borosilicate glass tube installed in an aluminum frame with 316SS end blocks, adaptors, and valve. Additional material options, valve options, and flow controllers are available to provide the appropriate configuration for a wide variety of applications.

Features:

- Standard direct read scales on tube
- Standard millimeter scales with flow curves for all fluids and fluid conditions (user selected)
- Scale length (approximate) 65mm, 150mm
- Magnifier built into front shield
- Flowmeter options:
 - No valve, cartridge valve and precision control valve
 - Inlet & outlet valves
 - Integral flow controller, upstream & downstream
 - Multiple connection fittings to fit all applications
 - Multiple approval certifications for world wide usage



| SPECIFICATIONS | Model | |
|---------------------------|---|---|
| | 1350 | 1355 |
| Accuracy | ±5% (Direct Reading Scales @ Standard Conditions) | ±3% (Direct Reading Scales @ Standard Conditions) |
| Repeatability | 0.25% F.S. | |
| Pressure/Temperature | 200 psig (33-250°F)/ 13.8 bar (1-121°C) | |
| Materials of Construction | Borosilicate glass, Brass, Aluminum, 316 Stainless Steel, Clear Polycarbonate, Milk White Polycarbonate, Teflon® | |
| End Block Options | Stainless Steel & Brass | |
| Elastomer Seals | Viton® fluoroelastomers, Teflon®, Buna, Kalrez® perfluoroelastomers | |
| Float Materials | Glass, Sapphire, Stainless Steel, Carboloy®, Tantalum | |
| Connection Materials | Stainless Steel | |
| Connection Options | 1/8" NPT (w/wo locknuts) 1/4" NPT (w/wo locknuts) 1/8" Compression (w/wo locknuts) 1/4" Compression (w/wo locknuts) 6 mm Compression (w/wo locknuts) 1/4" Rc (BSPT), w/wo locknuts 3/8" Rc (BSPT), w/wo locknuts 1/4" VCR® 1/4" ID Hose Swagelok® Converters | |
| Valve Options | Cartridge III Valve and NRS™ | |
| Valve Materials | Stainless Steel | |
| Flow Controller | Optional Model 8800 Constant Differential Pressure Regulator Available | |

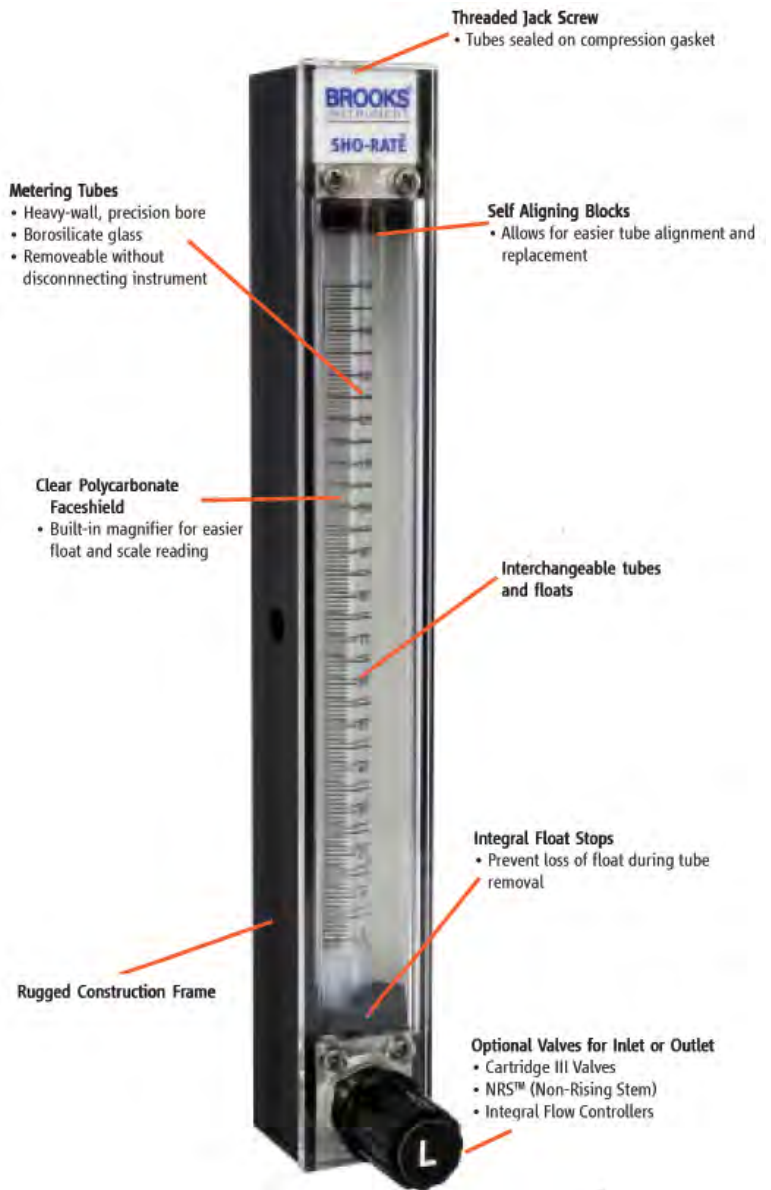
Product Specifications - Capacities; 1350G, Rib Guided, Spherical Floats, 65 mm Flow Tubes

| Meter Size | Tube No. | Float Material | Water | | | | *Air | | | |
|------------|------------|----------------|-------|------|-------|------|------|------|------|------|
| | | | GPH | Code | LPH | Code | SCFH | Code | NLPH | Code |
| 2 | R-2-65-A G | Glass | 0.010 | JB6 | 0.041 | JB9 | 0.12 | JB7 | 3.2 | JB8 |
| | | Saphire | 0.021 | JC4 | 0.079 | JC2 | 0.19 | JC6 | 5.0 | JC1 |
| | | STN. STL. | 0.049 | JC8 | 0.18 | JC5 | 0.37 | JC7 | 9.8 | JC6 |
| | | Carboloy | 0.10 | JB4 | 0.36 | LB5 | 0.68 | JB2 | 17 | JB3 |
| | | Tantalum | 0.10 | JD2 | 0.40 | JC9 | 0.71 | JD1 | 18 | JD3 |
| | R-2-65-B G | Glass | 0.014 | KB8 | 0.06 | KB2 | 0.16 | KB7 | 4.4 | KB9 |
| | | Saphire | 0.028 | KC1 | 0.10 | KD3 | 0.25 | KC2 | 6.7 | KC3 |
| | | STN. STL. | 0.07 | KC5 | 0.25 | KC6 | 0.48 | KC7 | 12 | KC8 |
| | | Carboloy | 0.12 | KB4 | 0.48 | KB5 | 0.80 | KB3 | 21 | KB6 |
| | | Tantalum | 0.14 | KD2 | 0.53 | KD5 | 0.87 | KD4 | 22 | KD1 |
| | R-2-65-C G | Glass | 0.12 | LB9 | 0.47 | LB7 | 0.99 | LB6 | 26 | LB8 |
| | | Saphire | 0.22 | LC1 | 0.83 | LC2 | 1.3 | LC3 | 35 | LC4 |
| | | STN. STL. | 0.41 | LC7 | 1.5 | LC8 | 2.1 | LC9 | 55 | LC6 |
| | | Carboloy | 0.65 | LB3 | 2.4 | LB2 | 3.1 | LB4 | 81 | LB5 |
| | | Tantalum | 0.70 | LD1 | 2.6 | LD2 | 3.3 | LD3 | 87 | LD4 |
| | R-2-65-D G | Glass | 0.68 | MB9 | 2.5 | MB7 | 3.9 | MB8 | 100 | MC1 |
| | | Saphire | 0.99 | MC2 | 3.7 | MC3 | 5.1 | MC4 | 130 | MC5 |
| | | STN. STL. | 1.6 | MC7 | 6.3 | MD1 | 7.9 | MC6 | 200 | MC8 |
| | | Carboloy | 2.5 | MB5 | 9.5 | MB2 | 11 | MB3 | 290 | MB4 |
| | | Tantalum | 2.7 | MD5 | 10.0 | MD6 | 12 | MD2 | 310 | MD4 |
| 6 | R-6-65-A G | Glass | 2.4 | NB8 | 9.2 | NB7 | 14 | NC1 | 370 | NB9 |
| | | Saphire | 3.6 | NC4 | 13 | NC3 | 18 | NC6 | 480 | NC5 |
| | | STN. STL. | 6.0 | ND1 | 22 | ND3 | 27 | NC9 | 710 | ND2 |
| | | Carboloy | 8.9 | NB2 | 33 | NB3 | 38 | NB5 | 1000 | NB6 |
| | | Tantalum | 9.5 | ND6 | 36 | ND5 | 41 | ND7 | 1000 | ND4 |
| | R-6-65-B G | Glass | 9.9 | PB9 | 37 | PB8 | 52 | PC1 | 1300 | PB7 |
| | | Saphire | 14.0 | PC5 | 53 | PC3 | 67 | PC4 | 1700 | PC2 |
| | | STN. STL. | 22.0 | PD1 | 85 | PC9 | 97 | PC8 | 2500 | PC6 |
| | | Carboloy | 32.0 | PB3 | 120 | PB2 | 130 | PB6 | 3500 | PB4 |
| | | Tantalum | 34.0 | PD7 | 130 | PD6 | 140 | PD5 | 3700 | PD4 |

*AIR FLOWS ARE AT 14.7 PSIA AND 70 DEGREES F/1.01 BAR AND 21.1 DEGREES C

| Product Specifications - Capacities: 1235G, Rib Guided, Spherical Floats, 150 mm Flow Tubes | | | | | |
|---|-------------|----------------|----------------|------------|------|
| Meter Size | Tube No. | Float Material | Water (CC/Min) | * Air | Code |
| 2 | R-2-15-AAAA | Glass | 0.59 | 50 SCC/M | JA6 |
| | | Sapphire | 1.1 | 79 SCC/M | JA8 |
| | | STN. STL. | 2.6 | 150 SCC/M | JA7 |
| | | Carboly | 5.2 | 280 SCC/M | JA9 |
| | | Tantalum | 5.8 | 310 SCC/M | JB1 |
| | R-2-15-D | Glass | 5.5 | 370 SCC/M | FA6 |
| | | Sapphire | 10 | 520 SCC/M | FA8 |
| | | STN. STL. | 20 | 830 SCC/M | FA7 |
| | | Carboly | 34 | 1200 SCC/M | FA9 |
| | | Tantalum | 36 | 1300 SCC/M | FB1 |
| | R-2-15-A | Glass | 17 | 0.82 SLPM | AA6 |
| | | Sapphire | 26 | 1.0 SLPM | AA8 |
| | | STN. STL. | 46 | 1.6 SLPM | AA7 |
| | | Carboly | 70 | 2.4 SLPM | AA9 |
| | | Tantalum | 75 | 2.5 SLPM | AB1 |
| | R-2-15-B | Glass | 53 | 2.3 SLPM | DA6 |
| | | Sapphire | 80 | 3.0 SLPM | DA8 |
| | | STN. STL. | 130 | 4.6 SLPM | DA7 |
| | | Carboly | 200 | 6.7 SLPM | DA9 |
| | | Tantalum | 210 | 7.1 SLPM | DB1 |
| R-2-15-C | Glass | 90 | 4.0 SLPM | EA6 | |
| | Sapphire | 130 | 5.2 SLPM | EA8 | |
| | STN. STL. | 220 | 7.9 SLPM | EA7 | |
| | Carboly | 340 | 11 SLPM | EA9 | |
| | Tantalum | 360 | 11SLPM | EB1 | |
| 6 | R-6-15-A | Glass | 210 | 9.5 SLPM | GA6 |
| | | Sapphire | 320 | 12 SLPM | GA8 |
| | | STN. STL. | 540 | 18 SLPM | GA7 |
| | | Carboly | 790 | 25 SLPM | GA9 |
| | | Tantalum | 840 | 26 SLPM | GB1 |
| | R-6-15-B | Glass | 560 | 23 SLPM | HA6 |
| | | Sapphire | 820 | 29 SLPM | HA8 |
| | | STN. STL. | 1300 | 43 SLPM | HAT |
| | | Carboly | 1900 | 60 SLPM | HA9 |
| | | Tantalum | 2000 | 63 SLPM | HB1 |

*AIR FLOWS ARE AT 14.7 PSIA AND 70 DEGREES F/1.01 BAR AND 21.1 DEGREES C



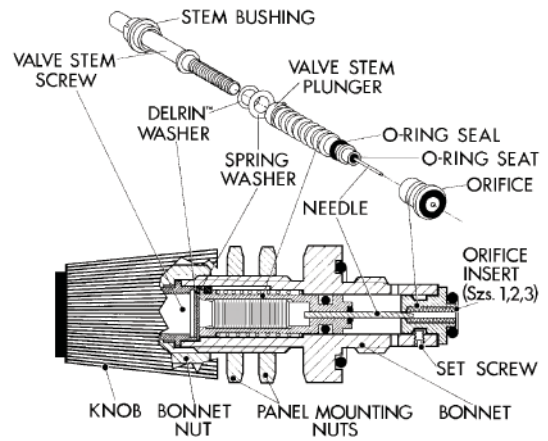
VALVE OPTIONS

The Brooks® NRS™ (non-rising stem) control valves are designed specifically for extremely low flow gas and liquid applications. Straight and 90° angle pattern models in stainless steel are available. They feature a means of adjusting a sliding tapered needle which prevents sticking due to foreign matter in the fluid. These valves are particularly suitable for precise control requirements and possess a high turns to lift ratio. The flow is constant for any given stem position.

Six needles with different tapers provide a wide choice of flow ranges. Needles and orifices can be changed without removing the valve body from the line (two different orifices are used, one for needle sizes 1-3, another for sizes 4-6). Fifteen turns full open to full close provides high turn to lift ratio for excellent resolution

Materials of Construction:

Body 316 stainless steel
 Orifice Size 1-3: Stainless steel and Teflon®; Sizes 4-6: Stainless Steel
 Valve Needle 316 stainless steel
 Plunger Stainless steel
 O-rings Viton® fluoroelastomers



| Needle Taper No. | Orifice Type | Maximum Capacity (Std. cc/min.) | | |
|------------------|--------------|---------------------------------|--------|-------|
| | | Helium | Air | Water |
| 1 | - | 300 | 150 | 4 |
| 2 | Small | 700 | 350 | 10 |
| 3 | (.041") | 1,400 | 600 | 20 |
| 4 | - | 6,000 | 2,400 | 80 |
| 5 | Larger | 18,000 | 6,800 | 200 |
| 6 | (.093") | 655,000 | 22,000 | 650 |

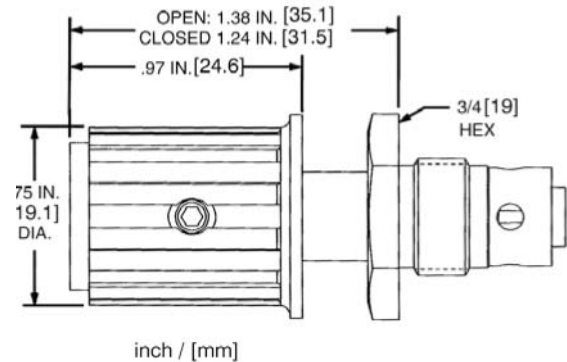
Capacities measured with 10 psig supply and an atmospheric pressure exhaust. Flow capacities will vary for different gases, liquids and pressures. Consult factory for further information.

The Cartridge III Valve is a multipurpose valve, designed for gas and liquid flow applications. It is interchangeable with previous versions of Brooks valves. These valves come in three different sizes – low, medium and high flow. The stem is conical tapered at the end and it has two orifice sizes that provide a wide choice of flow ranges for all models. A Teflon piece is crimped into the valve body which gives better setability, repeatability and feel of operation.

The valve has eight turns open-to-close.

Materials of Construction:

Valve Body and Stem- 316 Stainless Steel
 Orifice- PEEK Arlon® 1126 15% glass filled
 Valve Ring- Teflon® (PTFE)
 O-Rings Standard: Viton® fluoroelastomers; Optional: Buna, Kalrez®, EPR, Teflon®, Butyl
 Knob- Phenolic (Thermoset)



| Size | Maximum Capacity | | |
|--------|------------------|-------------|-------|
| | Air (slpm) | Water (lpm) | Cv |
| Low | 5.7 | 0.176 | 0.015 |
| Medium | 19.7 | 0.712 | 0.050 |
| High | 75.6 | 2.04 | 0.193 |

Capacities measured with 10 psig supply and atmospheric pressure exhaust. Flow capacities will vary for different gases, liquids and pressures. Standard temperature 70°F, standard pressure 14.7 psia.

FLOW CONTROLLER OPTIONS

Brooks® flow controllers are designed to maintain a constant differential pressure across an integral manual flow regulating valve. The incoming fluid pressure on one side of the diaphragm, and outlet pressure plus spring action on the other side, position an integral diaphragm-actuated control valve. Variations in the supply or discharge pressure disturb the balance of forces on the diaphragm, causing the internal control valve to open or close, thus maintaining a fixed differential pressure across the integral, manual flow regulating valve resulting in constant flow.

Series FC 8800 controllers are used for accurately adjusting and maintaining liquid and gas flows with variable upstream pressures. Use Model FC 8800 with Cartridge valves & FC8840 with NRS™ (non-rising stem) control valves.

Series FC 8900 controllers are used for accurately adjusting and maintaining liquid and gas flows with variable downstream pressures. Use Model FC 8900 with Cartridge valves & FC8940 with NRS™ (non-rising stem) control valves.

Materials of Construction:

Controller Body- 316 Stainless Steel, Brass

Controller Diaphragm- Buna-N, Teflon® or Viton® fluoroelastomers.

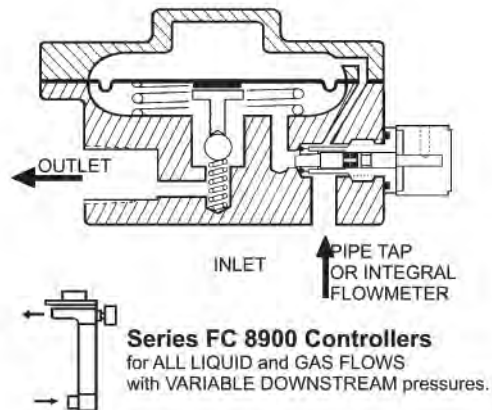
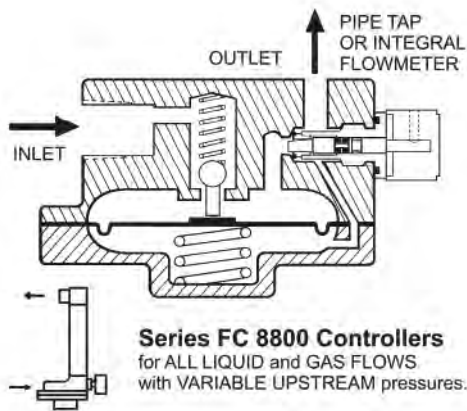
O-rings- Viton® fluoroelastomers, Buna-N, Kalrez® (SS body only), EPR (SS body only), Kalrez/Teflon (SS body only).

Material Certification- Certification to NACE MR-01-75; (Stainless Steel body only) Certification to EN 10204-2.2; Certification to EN 10204-3.1

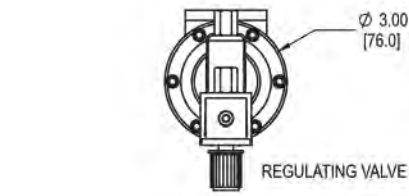


Model 1350G with FC 8800

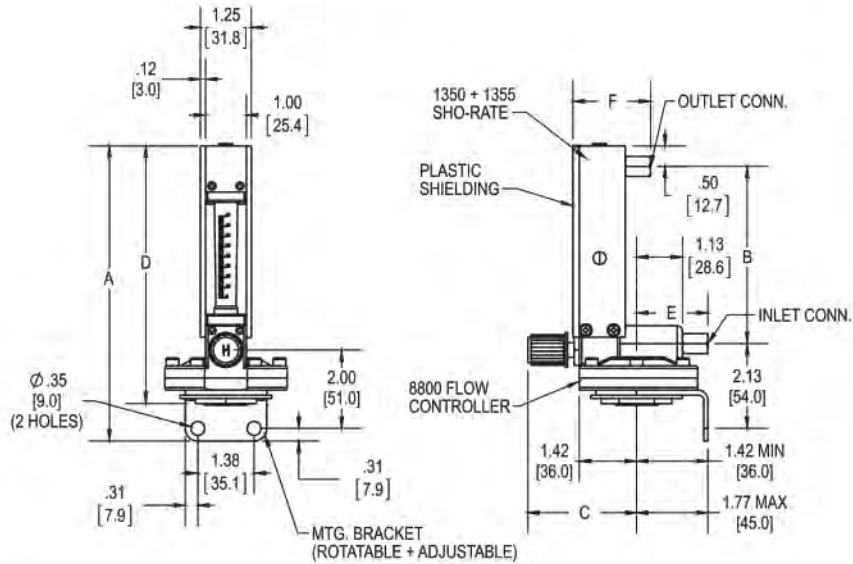
Cutaway View, Principle of Operation



Flowmeter Dimensions with Flow Controller

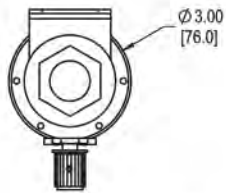


| MODEL NO | SCALE LENGTH | A | A | B | B | C | C | C | C | D | D |
|----------|--------------|-------|-------|------|-------|------|------|------|------|-------|-------|
| | | INCH | MM | INCH | MM | INCH | MM | INCH | MM | INCH | MM |
| 1350 | 65 | 7.31 | 185.7 | 4.34 | 110.3 | 2.5 | 63.5 | 2.17 | 55.2 | 6.38 | 162.0 |
| 1355 | 150 | 11.72 | 297.7 | 8.75 | 222.2 | 2.50 | 63.5 | 2.17 | 55.2 | 10.78 | 273.8 |

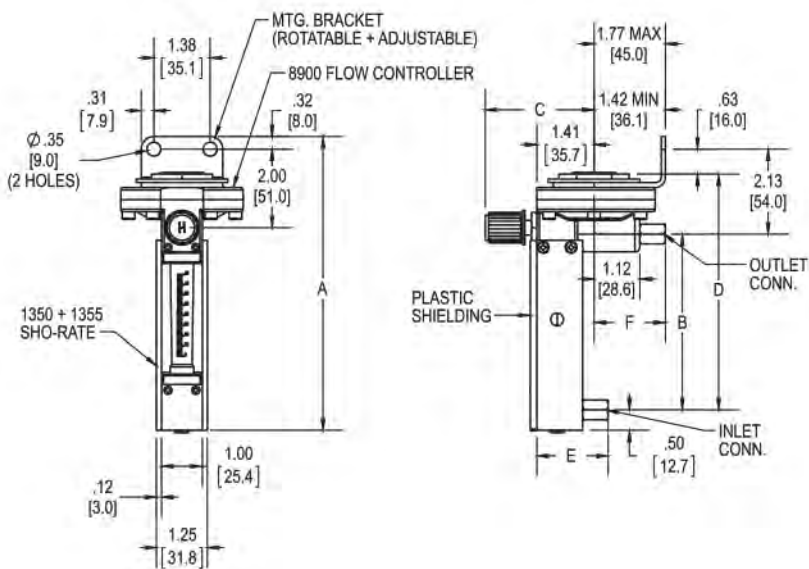


| | INLET CONN. | INLET CONN. | OUTLET CONN. | OUTLET CONN. |
|---------------|-------------|-------------|--------------|--------------|
| CONN. SIZE | E | E | F | F |
| | INCH | MM | INCH | MM |
| 1/8 NPT | 1.72 | 43.7 | 1.62 | 41.1 |
| 1/4 NPT | 1.12 | 28.6 | 1.71 | 46.0 |
| 1/8 COMP. | 1.91 | 48.5 | 1.71 | 46.0 |
| 1/4 COMP. | 2.04 | 51.8 | 1.94 | 49.3 |
| 1/4 I.D. HOSE | 1.82 | 46.2 | 1.72 | 43.7 |
| 1/4 VCR (M) | N/A | N/A | 2.06 | 52.3 |
| 1/8 Rc | 1.91 | 48.5 | 1.62 | 41.1 |
| 1/4 Rc | 1.91 | 48.5 | 1.81 | 46.0 |
| 3/8 Rc | 2.35 | 53.1 | 2.09 | 53.1 |

Model 1350G/1355G with Model 8800 Flow Controller on Inlet

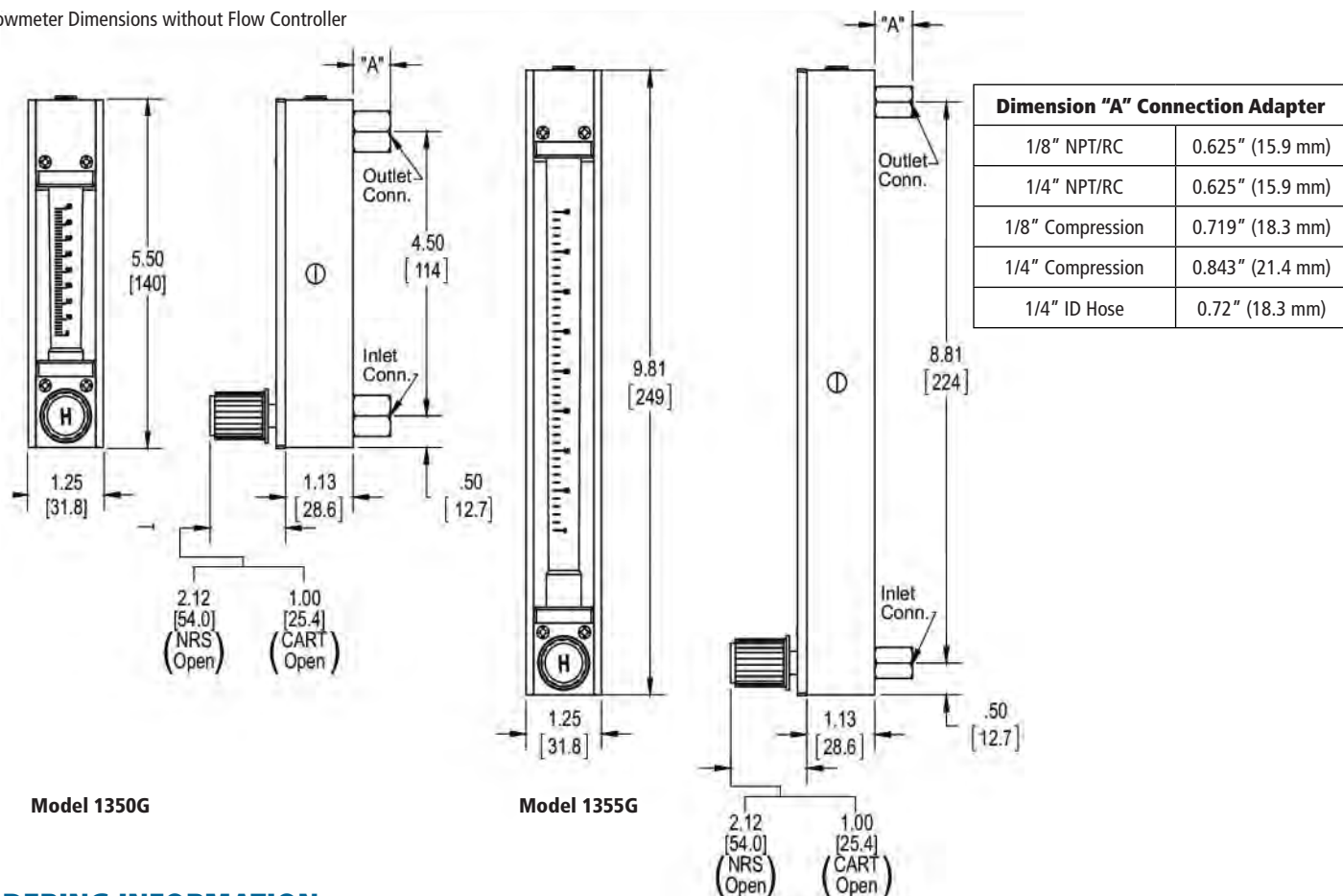


| MODEL NO | SCALE LENGTH | A | A | B | B | C | C | C | C | D | D |
|----------|--------------|-------|-------|------|-------|------|------|------|------|-------|-------|
| | | INCH | MM | INCH | MM | INCH | MM | INCH | MM | INCH | MM |
| 1350 | 65 | 7.31 | 185.7 | 4.34 | 110.3 | 2.5 | 63.5 | 2.17 | 55.2 | 6.38 | 162.0 |
| 1355 | 150 | 11.72 | 297.7 | 8.75 | 222.2 | 2.50 | 63.5 | 2.17 | 55.2 | 10.78 | 273.8 |



| | INLET CONN. | INLET CONN. | OUTLET CONN. | OUTLET CONN. |
|---------------|-------------|-------------|--------------|--------------|
| CONN. SIZE | E | E | F | F |
| | INCH | MM | INCH | MM |
| 1/8 NPT | 1.62 | 41.1 | 1.72 | 43.7 |
| 1/4 NPT | 1.81 | 46.0 | 1.12 | 28.6 |
| 1/8 COMP. | 1.81 | 46.0 | 1.91 | 48.5 |
| 1/4 COMP. | 1.94 | 49.3 | 2.04 | 51.8 |
| 1/4 I.D. HOSE | 1.72 | 43.7 | 1.82 | 46.2 |
| 1/4 VCR (M) | 2.06 | 52.3 | N/A | N/A |
| 1/8 Rc | 1.63 | 41.1 | 1.91 | 48.5 |
| 1/4 Rc | 1.81 | 46.0 | 1.91 | 48.5 |
| 3/8 Rc | 2.09 | 53.1 | 2.35 | 59.7 |

Model 1350G/1355G with Model 8800 Flow Controller on Outlet



ORDERING INFORMATION

General

The "Capacities" tables for models 1350G & 1355G include range codes for direct reading scales for water and air. These scales are for air at standard conditions. For non-standard operating conditions and for fluids other than air or water a number of scale options and calibrations are offered.

The options include direct reading scales calibrated for the fluid and operating conditions and mm scales provided with a calibration chart for the fluid and operating conditions. The mm calibration charts are offered with a standard factory calibration or as a NIST certified calibration at higher accuracy.

The following information is needed for flowmeters with non-standard operating conditions or fluids other than air or water:

1. Model
2. Size, connections, type
3. Quantity required
4. Fluid
5. Minimum, normal and maximum operating temperature
6. Minimum, normal and maximum operating pressure (inlet and outlet)
7. Minimum, normal and maximum flow rate
8. Materials of construction
 - a. End fittings
 - b. Side plates
 - c. Bezel
 - d. Elastomers
9. Fluid
10. Fluid specific gravity
11. Fluid viscosity
12. Unusual system conditions (For ranges and pressure drops other than those listed, consult factory).
13. Optional equipment
 - a. Valve type and location
 - b. Flow controller and type

| Code-Description | Code Option | Description | |
|------------------------------------|---|--|---------------------------------------|
| I- Basic Model Number | 1350G | 65mm Sho-Rate Size 1-6 Flow Indicator | |
| | 1355G | 150mm Sho-Rate Size 1-6 Flow Indicator | |
| II- Model Revision Level | G | Revision G | |
| III-End Block Material | A | 316 Stainless Steel | |
| | B | Brass | |
| | C | Kynar | |
| IV-Tube | | 1350 | 1355 |
| | A | - | R-2-15-A G |
| | B | - | R-2-15-B G |
| | C | - | R-2-15-C G |
| | D | - | R-2-15-D G |
| | E | - | R-6-15-A G |
| | F | - | R-6-15-B G |
| | G | R-2-65-A G | R-2-15-AAA G |
| | H | R-2-65-B G | |
| | I | R-2-65-C G | |
| | K | R-2-65-D G | |
| | L | R-6-65-A G | |
| | M | R-6-65-B G | |
| | N- | NO TUBE | |
| | *V- Float & Direct Read Scale Selection CONSULT US FOR APPLICATIONS FOR NON-STANDARD OPERATING CONDITIONS AND FLUIDS OTHER THAN AIR OR WATER ARBITRARY SCALE/PERCENT SCALES AND CUSTOM SCALES ARE AVAILABLE | Code (XXX(W,L)- Add Scale code from "Capacities" Tables) | Float |
| 3A-XXX(Water,Air) | | GLASS | 5%/3% |
| 3B-XXX (Water,Air) | | STAINLESS STEEL | 5%/3% |
| 3C-XXX (Water,Air) | | SAPPHIRE | 5%/3% |
| 3D-XXX (Water,Air) | | CARBOLOY | 5%/3% |
| 3E-XXX (Water,Air) | | TANTALUM | 5%/3% |
| VI Tube Packing & O-ring Materials | Code | Tube Packing | O-ring Meter/Valve |
| | A | Buna | Buna |
| | B | Viton | Viton |
| | C | Viton | Teflon (mtr), Kalrez (vlv,Jack Screw) |
| | D | Viton | EPR |
| | E | Viton | Kalrez |
| | F | Teflon | Buna |
| | G | Teflon | Viton |
| | H | Teflon | Teflon (mtr), Kalrez (vlv,Jack Screw) |
| | I | Teflon | EPR |
| | K | Teflon | Kalrez |
| | L | EPR | EPR |
| | M | Butyl | Butyl |

| Code-Description | Code Option | Description | |
|--|--|--|------------------------------------|
| VII- End Fittings | Code | Fitting Material | CONNECTION SIZE & TYPE |
| | C | 316 SS | 1/8" NPT |
| | *F | 316 SS | 1/8" Thd. W/Locknut |
| | I | 316 SS | 1/4" NPT |
| | *K | KYNAR | 1/4" NPT |
| | *N | 316 SS | 1/8" THD. W/Locknut |
| | R | 316 SS | 1/8" Compression |
| | *U | 316 SS | 1/8" Compression W/Locknut (2 pcs) |
| | W | 316 SS | 1/4" F-Rc Thd W/Locknut |
| | X | 316 SS | 1/4" Compression |
| | *1 | 316 SS | 1/4" Compression W/Locknut (2 pcs) |
| | 3 | 316 SS | 3/8" F-Rc Thd W/Locknut |
| | 4 | 316 SS | 1/4" ID Hose |
| | *6 | 316 SS | Integral 5/16-24 Thd |
| | *7 | 316 SS | 1/4" VCR |
| | 8 | 316 SS | 6 mm Thd |
| | * Cannot be specified with 8800/8900 series flow controllers | | |
| *VIII- Valve Type/Controler Option | Code | ValveType | |
| | A | Valve Plug | |
| | B | Non-Rising Stem- 316SS #1 | |
| | C | Non-Rising Stem- 316SS #2 | |
| | D | Non-Rising Stem- 316SS #3 | |
| | E | Non-Rising Stem- 316SS #4 | |
| | F | Non-Rising Stem- 316SS #5 | |
| | G | Non-Rising Stem- 316SS #6 | |
| | H | Non-Rising Stem- 316SS #7 | |
| | J | Integrally Mounted 88/8900 316 SS Flow controller-Viton Diaphragm | |
| | K | Integrally Mounted 88/8940 316 SS Flow controller-Viton Diaphragm | |
| | L | Integrally Mounted 88/8900 Brass Flow controller-Viton Diaphragm | |
| | M | Integrally Mounted 88/8940 Brass Flow controller-Viton Diaphragm | |
| | N | Integrally Mounted 88/8900 316 SS Flow controller-Teflon Diaphragm | |
| | P | Integrally Mounted 88/8940 316 SS Flow controller-Teflon Diaphragm | |
| | Q | Integrally Mounted 88/8900 Brass Flow controller-Buna Diaphragm | |
| | R | Integrally Mounted 88/8940 Brass Flow controller-Buna Diaphragm | |
| | S | Std Valve Cavity- No Valve Assy. or Plug | |
| | T | Cartridge II/III Valve- Low Flow- 316SS | |
| U | Cartridge II/III Valve- Medium Flow- 316SS | | |
| V | Cartridge II/III Valve- High Flow- 316SS | | |
| * See separate data sheets for Non Rising Stem valves, Cartridge valves & 88/8900 Series Constant Differential Pressure Flow Controllers | | | |

| Code-Description | Code Option | Description | | |
|---|--|---|------------------------|------|
| IX- Valve Cavity/Controller Location & Connection Orientation | Code | Valve/Controller Location | Connection Orientation | |
| | 1 | Inlet | Back | Back |
| | 5 | Outlet | Back | Back |
| | 9 | N/A | Back | Back |
| X- Accessories | A | None | | |
| | H | Aluminum Flush Bezel for Stainless Meters | | |
| | J | Flush Panel Mtg. for Kynar Meters | | |
| | K | Panel Mount Screws | | |
| XI- Options | A | None | | |
| | B | 316 SS Frame | | |
| | C | Circular Base Plate (Aluminum) | | |
| | D | No Brooks Identification | | |
| | E | 316 SS Frame & No Brooks Identification | | |
| | F | Circular Base Plate (Aluminum) & No Brooks Identification | | |
| | G | 316 SS Frame & Baseplate | | |
| | H | 316 SS Frame & Baseplate & No Brooks Identification | | |
| | J | Stainless Steel Tag & 316 SS Frame | | |
| | K | Stainless Steel Tag & Circular Base Plate (Aluminum) | | |
| | L | Stainless Steel Tag & No Brooks Identification | | |
| | M | Stainless Steel Tag & 316 SS Frame & No Brooks Identification | | |
| | N | Stainless Steel Tag & Circular Base Plate (Aluminum) & No Brooks Identification | | |
| | P | Stainless Steel Tag & 316 SS Frame & Base Plate | | |
| Q | Stainless Steel Tag & 316 SS Frame & Base Plate & No Brooks Identification | | | |
| R | Stainless Steel Tag | | | |
| XII-Certifications | A | None | | |
| | D | Degrease for Oxygen Service (not MIL spec. | | |

| Sample Model Code | | | | | | | | | | | |
|-------------------|----|-----|----|--------|----|-----|------|----|---|----|-----|
| I | II | III | IV | V | VI | VII | VIII | IX | X | XI | XII |
| 1350 | G | A | G | 3AJB6W | B | C | BQ | 1 | A | A | A |

TRADEMARKS

Brooks Brooks Instrument, LLC
 Carboly General Electric Co.
 Kalrez DuPont Performance Elastomers
 Kynar Pennwalt Corp.
 NRS Brooks Instrument, LLC
 Sho-Rate Brooks Instrument, LLC
 Swagelok Swagelok Co.
 Teflon E.I. DuPont de Nemours & Co.
 VCR Swagelok Co.
 Viton DuPont Performance Elastomers
 All other trademarks are the property of their respective owners

PKP

DS01 Flow Meter/Switch

F.S. Ranges From 60ml to 150l/min water, 1.8 to 4500 lpm air

DESCRIPTION

The flow meter and switch model DS01 works according to a modified variable area principle. The float is guided in a cylindrical measuring glass by means of a spring. The flowing medium moves the float in the flow direction. The upper edge of the float shows the momentary flow via an etched scale on the measuring glass.

A reed contact is mounted outside the meter in a sealed housing. The float contains a magnet. When the float reaches the position of the reed contact the switch will close. With higher flows the float moves further upward until it reached a built-in float stop, still keeping the switch closed. This ensures a bistable switch function at any time. The reed contact is adjustable over the full switching range of the meter.

APPLICATION

The variable area flow meter and switch model DS01 is used for measuring and monitoring the flow of low viscosity liquids and gases, i.e., in cooling loops of welding machines and laser systems, for pump monitoring, compressors and many other applications.

By careful selection of the reed contacts the switch hysteresis can be reduced to only 0.5-1.5 mm float movement.

SPECIFICATIONS

Max Pressure:

DS01.1, DS01.2- 16 bar (232 PSIG)

DS01.3, DS01.4- 10 bar (145 PSIG)

Pressure Drop:

DS01.1- 0.02-0.2 bar (0.3 -2.9 PSI)

DS01.2- 0.02-0.3 bar (0.3-4.3 PSI)

DS01.3, DS01.4- 0.02-0.4 bar (0.3-5.8 PSI)

Max Temperature: 120°C (optionally 160°C) for liquids, 90°C for gases

Materials:

Measuring Glass- Duran 50

Housing- Aluminum

Connections- Brass or Stainless

O-rings- Buna (optionally:Viton,EPDM)

Electrical Connections- DIN 43650 plug

Accuracy- $\pm 10\%$ f.s.

Ranges:

Water- 6-60 ml/min to 60-150 l/min

Air- 0.15-1.8 l/min to 18-4500 l/min
(at 1.013 bar absolute and 20°C)



DS01 Flow Meter/ Switch

FEATURES

SMALL MOUNTING DIMENSIONS

BRASS OR STAINLESS STEEL CONNECTION

SCALES FOR WATER AND AIR

UNIVERSAL MOUNTING POSITION

HIGH SWITCHING ACCURACY

LOW SWITCHING HYSTERESIS

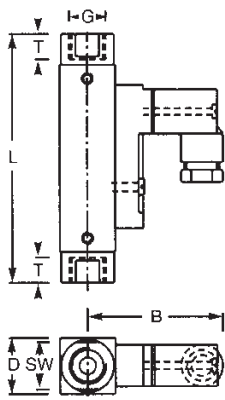
CONTACTS:

| Function | DS01.1 | DS01.2 | DS01.3 / DS01.4 |
|----------|-----------------|-------------------|-------------------|
| N/O | 200 V, 1A, 20VA | 220 V, 1A, 100 VA | 250 V, 3A, 20 VA |
| SPDT | 200 V, 1A, 20VA | 250V, 1,5A, 50 VA | 250V, 1,5A, 50 VA |
| *NO | | | 250V, 2A, 60VA |
| *SPDT | | | 250V, 1A, 30VA |

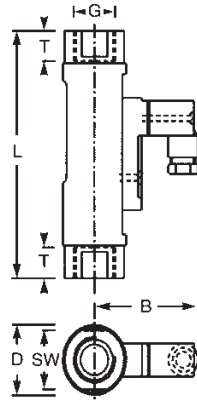
*Per ATEX 100aEXII 2 G, EEx m II T6

DIMENSIONS:

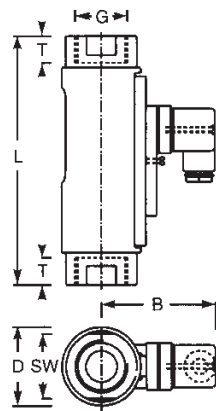
| Model | Dimensions in mm | | | | | | weight (g) |
|--------|------------------|----|----|---------|----|-----|------------|
| | SW | D | B | G | T | L | |
| DS01.1 | 17 | 20 | 49 | 1/4 NPT | 10 | 90 | 140 |
| DS01.2 | 27 | 32 | 53 | 1/2 NPT | 14 | 114 | 300 |
| DS01.3 | 41 | 50 | 72 | 3/4 NPT | 21 | 139 | 1000 |
| DS01.4 | 41 | 50 | 72 | 1.0 NPT | 17 | 158 | 1000 |



DS01.1

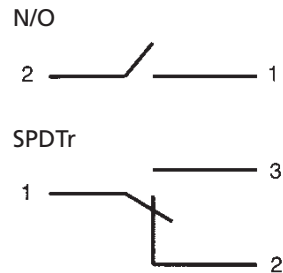


DS01.2



DS01.3 / DS01.4

Electrical Connection



ORDERING INFORMATION:

Order Number
Miniature variable area
flow meter and switch

DS01.1N. 1. 1.W13. 1. 1.

Connection:

1N= 1/4 "female NPT
2N= 1/2" female NPT
3N= 3/4" female NPT
4N= 1" female NPT

Material:

1= brass with 301 stainless steel spring
2= all 316 stainless steel

Scale:

1= for water
2= for air

Measuring Ranges:

| | Water | Air | |
|-----------------------|---------------------|----------------------|----------------------|
| DS01.1: | W101= 5-60 ml/min | L1001= 0.2-1.3 slpm | |
| | W102= 25-130 ml/min | L1002= 0.5-2.0 slpm | |
| | W106= 0.1-0.6 l/min | L1003= 0.8-3.0 slpm | |
| | W11= 0.2-1.2 l/min | L1005= 1.5-5.0 slpm | |
| | W12= 0.4-2.0 l/min | L1008= 2.0-8.0 slpm | |
| | W13= 0.5-3.0 l/min | L1012= 3.0-12.0 slpm | |
| | W15= 1.0-5.0 l/min | L1014= 3.5-14.0 slpm | |
| | | L1020= 5.5-20 slpm | |
| | | L1024= 7.0-24.0slpm | |
| | | L1035= 10-35 slpm | |
| | | L1042= 10-42 slpm | |
| | DS01.2 | W205= 0.1-0.5 l/min | L2012= 3.0-12.0 slpm |
| | | W21= 0.2-1.0 l/min | L2030= 7.0-30 slpm |
| | | W22= 0.4-1.6 l/min | L2040= 12-40 slpm |
| | | W24= 1.0-4.0 l/min | L2125= 28-125 slpm |
| W28= 2.0-8.0 l/min | | L2200= 50-200 slpm | |
| W215= 4.0-15 l/min | | L2420= 100-420 slpm | |
| W220= 5.0-22 l/min | | L2480= 120-480 slpm | |
| W228= 6.0-28 l/min | | | |
| DS01.3, DS01.4 | W3030= 8.0-30 l/min | L30080= 22.5-80 slpm | |
| | W3045= 15-45 l/min | L30130= 50-130 slpm | |
| | W3090= 30-90 l/min | L30420= 130-420 slpm | |
| | | L30625= 200-625 slpm | |
| DS01.4 | W3150= 60-150 l/min | | |

No. of Contacts:

1= 1 Contact
2= 2 Contacts

Contact Function:

1= N/O
2= SPDT
3S= Ex-N/O (EEx m II T6), DS01.3, DS01.4
3U= Ex-SPDT (EEx m II T6), DS01.3, DS01.4

PKP

DS02 Flow Switch

F.S. Ranges From 60 ml to 150 l/min water, 2.2 to 650 l/min air

DESCRIPTION

The flow switch model DS02 works according to a modified variable area principle. The float is guided in a cylindrical measuring tube by means of a spring. The flowing medium moves the float in the flow direction.

A reed contact is mounted outside the meter in a sealed housing. When the float reaches the position of the reed contact the switch will close. With higher flows the float moves further upward until it reaches a built-in float stop, still keeping the switch closed. This ensures a bistable switch function at any time. The reed contact is adjustable over the full switching range of the meter.

APPLICATION

The variable area flow switch model DS02 is used for monitoring the flow of low viscosity liquids and gases, i.e., in cooling loops of welding machines and laser systems, for pump monitoring, compressors and many other applications.

By careful selection of the reed contacts the switch hysteresis can be reduced to only 0.5-1.5 mm float movement.

SPECIFICATIONS

Max Pressure:

DS02.1- 300 bar (4,350 PSIG)

DS02.2/3/4- 250 bar (3,625 PSIG)

Pressure Drop:

DS02.1- 0.02-0.2 bar (0.3-2.9 PSI)

DS02.2- 0.02-0.3 bar (0.3-4.3 PSI)

DS02.3, DS02.4- 0.02-0.4 bar (0.3-5.8 PSI)

Max Temperature: 100°C (160°C optional)

Materials:

Housing:

Brass Version- nickel plated brass

Stainless Version- 316Ti SS

Electrical Connections- DIN 43650 plug

Mounting- Vertical (upward flow) or horizontal

Accuracy- $\pm 10\%$ f.s.

Ranges:

Water- 5-60 ml/min to 60-150 l/min

Air- 0.6-2.2 l/min to 200-650 l/min

(at 1.013 bar absolute and 20°C)



DS02 Flow Switch

FEATURES

SMALL MOUNTING DIMENSIONS

BRASS OR STAINLESS STEEL CONNECTION

SCALES FOR WATER AND AIR

HIGH SWITCHING ACCURACY

LOW SWITCHING HYSTERESIS

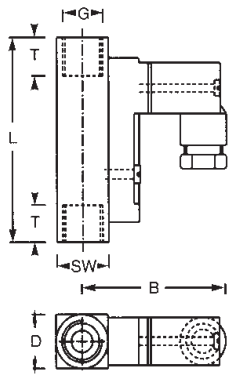
CONTACTS:

| Function | DS02.1 | DS02.2 | DS02.3 / DS02.4 |
|----------|-----------------|-------------------|--------------------|
| N/O | 200 V, 1A, 20VA | 220 V, 1A, 100 VA | 250 V, 3 A, 20 VA |
| SPDT | 200 V, 1A, 20VA | 250V, 1,5A, 50 VA | 250V, 1,5 A, 50 VA |
| *NO | | | 250V, 2A, 60VA |
| *SPDT | | | 250V, 1A, 30VA |

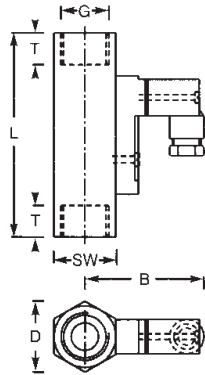
*Per ATEX 100aEXII 2 G, EEx m II T6

DIMENSIONS:

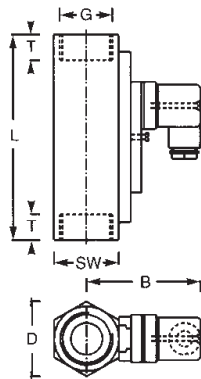
| Model | Dimensions in mm | | | | | | weight (g) |
|--------|------------------|----|----|---------|----|-----|------------|
| | SW | D | B | G | T | L | |
| DS02.1 | 17 | 17 | 47 | 1/4 NPT | 10 | 65 | 140 |
| DS02.2 | 27 | 31 | 52 | 1/2 NPT | 14 | 90 | 350 |
| DS02.3 | 41 | 47 | 72 | 3/4 NPT | 21 | 152 | 1100 |
| DS02.4 | 41 | 47 | 72 | 1 NPT | 17 | 130 | 1000 |



DS02.1

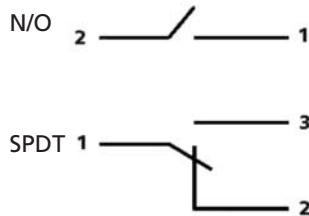


DS02.2



DS02.3 / DS02.4

Electrical Connection



ORDERING INFORMATION

Order Number DS02. 1. 1. 1. 06. 1. 1.
Miniature variable area flow switch

Connection:

1N= 1/4 G*
 2N= 1/2 G*
 3N= 3/4 G*
 4N= 1 G*

Material:

1= brass with 301 stainless steel spring
 2= all 316 stainless steel

Scale:

1= for water
 2= for air

Measuring Ranges:

Water

DS02.1:

W101= 5-60 ml/min
 W102= 40-130 ml/min
 W106= 0.1-0.6 l/min
 W11= 0.2-1.2 l/min
 W12= 0.4-2.0 l/min
 W13= 0.5-3.0 l/min
 W15= 1.0-5.0 l/min

Air

L1002= 0.6-2.2 slpm
 L1006= 1.7-6.0 slpm
 L1008= 2.5-8 slpm
 L1012= 3.0-12 slpm
 L1022= 3.0-22 slpm
 L1024= 7.0-24.0 slpm
 L1034= 12-34 slpm
 L1056= 16-56 slpm
 L1080= 20-80 slpm

DS02.2

W202= 0.02-0.2 l/min
 W206= 0.2-0.6 l/min
 W21= 0.4-1.8 l/min
 W23= 0.8-3.2 l/min
 W27= 2.0-7.0 l/min
 W213= 3.0-13 l/min
 W220= 4.0-20 l/min
 W230= 8.0-30 l/min

L2010= 2.5-10 slpm
 L2020= 5.5-20 slpm
 L2030= 8.0-30 slpm
 L2035= 10-35 slpm
 L2090= 24-90 slpm
 L2220= 55-220 slpm
 L2240= 65-240 slpm
 L2300= 80-300 slpm
 L2525= 140-525 slpm

DS02.3 or DS02.4

W3030= 11-30 l/min
 W3045= 15-45 l/min
 W3060= 20-60 l/min
 W3090= 30-90 l/min

L30180= 60-180 slpm
 L30300= 100-300 slpm
 L30650= 200-650 slpm

DS02.4 Only

W3150= 60-150 l/min

No. of Contacts:

1= 1 Contact
 2= 2 Contacts

Contact Function:

1= N/O
 2= SPDT
 3S= Ex-N/O (EEx m II T6), DS02.3, DS02.4 only
 3U= Ex-SPDT (EEx m II T6), DS02.3, DS02.4 only

Options:

0= Without
 1= Please List

*Connections are a straight thread as a retaining ring is threaded to the base of the connection as part of the flowmeter assembly process. Contact Clark to discuss your connection requirements and we will recommend fittings or adaptors.

PKP

DS03 Flow Meter/Switch

F.S. Ranges From 1.5 to 50 l/min water, 30 to 1600 l/min air

DESCRIPTION

The flow meter and switch model DS03 works according to a modified variable area principle. The float is guided in a cylindrical measuring glass by means of a slotted nozzle. The flowing medium moves the float in the flow direction. The upper edge of the float shows the momentary flow via an etched scale on the measuring glass.

A reed contact is mounted outside the meter in a sealed housing. When the float reaches the position of the reed contact the switch will close. With higher flows the float moves further upward until it reaches a built-in float stop, still keeping the switch closed. This ensures a bistable switch function at any time. The reed contact is adjustable over the full switching range of the meter.

APPLICATION

The variable area flow meter and switch model DS03 is used for measuring and monitoring the flow of low viscosity liquids and gases, i.e., in cooling loops of welding machines and laser systems, for pump monitoring, compressors and many other applications.



DS03 Flow Meter/ Switch

SPECIFICATIONS

Max Pressure: 10 bar (145 PSIG)

Pressure Drop: 0.01-0.2 bar (0.2-2.9 PSI)

Max Temperature: 120°C (160°C optionally) for liquids, 90°C for gases

Materials:

Measuring Glass- Duran 50

Housing- Aluminum

Connections- Brass or Stainless

O-rings-

Brass Version- Buna

Stainless Version- Viton

Electrical Connections- DIN 43650 plug

Accuracy- $\pm 5\%$ f.s.

Ranges:

Water- 0.1-1.5 l/min to 10-150 l/min

Air- 3.0-30 l/min to 350-2750 l/min

(at 1.013 bar absolute and 20°C)

FEATURES

SMALL MOUNTING DIMENSIONS

BRASS OR STAINLESS STEEL CONNECTIONS

SCALES FOR WATER AND AIR

HIGH SWITCHING ACCURACY

LOW SWITCHING HYSTERESIS

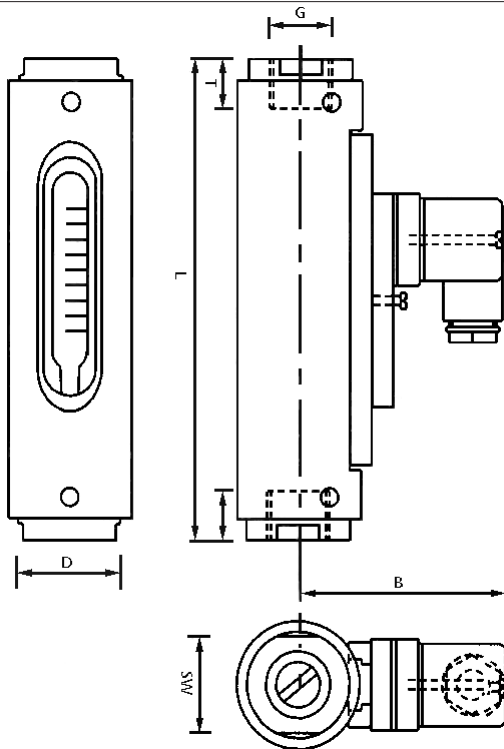
CONTACTS:

N/O: 250V, 3A, 100VA
 SPDT: 250V, 1.5A, 50VA
 *EX-N/O: 250V, 2A, 60 VA
 *EX-SPDT: 250V, 1A, 30VA

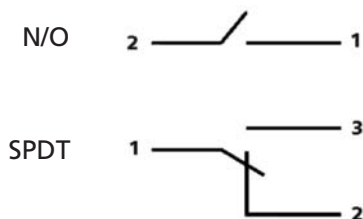
*Per ATEX 100aEXII 2 G, EEx m II T6

DIMENSIONS:

| Dimensions in mm | | | | | | | |
|------------------|----|----|----|-----------|----|-----|------|
| Model | SW | D | B | G | T | L | (g) |
| DS03.1.x.x.x | 32 | 43 | 67 | 1/4 NPT | 14 | 132 | 625 |
| DS03.2.x.x.x | 32 | 43 | 67 | 1/2 NPT | 15 | 135 | 625 |
| DS03.2.x.x.05 | 32 | 43 | 67 | 1/2 NPT | 15 | 163 | 650 |
| DS03.3.x.x.05 | 32 | 43 | 67 | 3/4 NPT | 16 | 167 | 650 |
| DS03.3.x.x.06/07 | 41 | 50 | 70 | 3/4 NPT | 18 | 164 | 1000 |
| DS03.4.x.x.06/07 | 41 | 50 | 70 | 1.0 NPT | 19 | 184 | 1000 |
| DS03.4.x.x.08 | 41 | 50 | 70 | 1.0 NPT | 20 | 200 | 1100 |
| DS03.5.x.x.x | 46 | 55 | 75 | 1 1/4 NPT | 21 | 222 | 1300 |



Electrical Connection



ORDERING INFORMATION:

Order Number DS03.1.N 1. 1. WA01.1.1.0
Miniature variable area flow meter and switch

Connection:

1N= 1/4 " female NPT
 2N= 1/2" female NPT
 3N= 3/4" female NPT
 4N= 1" female NPT
 5N= 1 1/4 " female NPT

Material:

1= brass with 301 stainless steel spring
 2= all 316 stainless steel

Scale:

1= for water
 2= for air

Measuring Ranges:

| Water | | Air |
|-----------------------------|---------------------|--------------------|
| DS03.1 & DS03.2: | WA01= 0.1-1.5 l/min | LA01= 3.0-30 slpm |
| | WA02= 0.2-3.0 l/min | LA02= 6.0-60 slpm |
| | WA03= 0.3-8.0 l/min | LA03= 6.0-160 slpm |
| | WA04= 1.0-12 l/min | LA04= 20-220 slpm |

DS03.2 & DS03.3

WA05= 2.0-18 l/min LA05= 40-360 slpm

DS03.3 or DS03.4

WA06= 3-35 l/min LA06=60-700 slpm
 WA07= 4-50 l/min LA07=60-825 slpm

DS03.4 Only

LA08= 200-1600 slpm

No. of Contacts:

1= 1 Contact
 2= 2 Contacts

Contact Function:

1= N/O
 2= SPDT
 3S= Ex-N/O (EEx m II T6)
 3U= Ex-SPDT (EEx m II T6)

Options:

0= Without
 1= Please List

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PKP

DS04 Flow Meter/Switch

F.S. Ranges From 1.5 to 150 l/min water, 1 to 1400 l/min air

DESCRIPTION

The flow meter and switch model DS04 works according to a modified variable area principle. The float is guided in a cylindrical measuring tube by means of a slotted nozzle. The flowing medium moves the float in the flow direction. An externally mounted pointer indicator is magnetically coupled to the float. It follows the float position and indicates the flow rate on a scale.

A reed contact is mounted outside the meter in a sealed housing. When the float reaches the position of the reed contact the switch will close. With higher flows the float moves further upward until it reaches a built-in float stop, still keeping the switch closed. This ensures a bistable switch function at any time. The reed contact is adjustable over the full measuring range of the meter.

APPLICATION

The variable area flow meter and switch model DS04 is used for measuring and monitoring the flow of low viscosity liquids and gases, i.e., in cooling loops of welding machines and laser systems, for pump monitoring, compressors and many other applications.

SPECIFICATIONS

Max Pressure:

Brass- 200 bar (2900 PSIG)

Stainless Steel- 300 bar (4,350 PSIG)

Pressure Drop: 0.02-0.4 bar (0.3-5.8 PSI)

Max Temperature: 120°C (160°C optionally) for liquids, 90°C for gases

Materials:

Wetted Parts- Nickel plated brass or 316Ti SS

O-rings-

Brass Version- Buna

SS Version- Viton

Electrical Connections- DIN 43650 plug

Accuracy- $\pm 5\%$ f.s.

Ranges:

Water- 0.1-1.5 l/min to 10-150 l/min

Air- 1.0-28 l/min to 20-1400 l/min

(at 1.013 bar absolute and 20°C)



DS04 Flow Meter/ Switch

FEATURES

SMALL MOUNTING DIMENSIONS

BRASS OR STAINLESS STEEL CONNECTION

SCALES FOR WATER AND AIR

HIGH SWITCHING ACCURACY

LOW SWITCHING HYSTERESIS

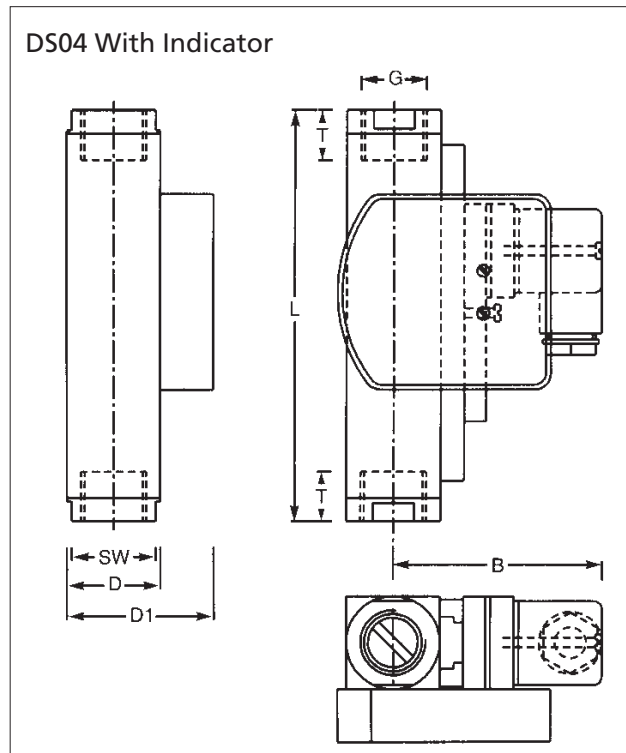
CONTACTS:

N/O: 250V, 3A, 100VA
 SPDT: 250V, 1.5A, 50VA
 *EX-N/O: 250V, 2A, 60 VA
 *EX-SPDT: 250V, 1A, 30VA

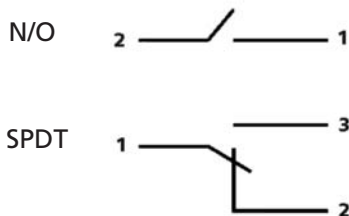
*Per ATEX 100aEXII 2 G, EEx m II T6

DIMENSIONS:

| Model | Dimensions in mm | | | | | | | Weight | |
|------------------|------------------|----|----|----|---------|----|-----|------------|------|
| | SW | D | D1 | B | G | T | L | with | w/O |
| | | | | | | | | Indication | |
| DS04.1.x.x.x | 27 | 30 | 47 | 65 | 1/4 NPT | 14 | 130 | 800 | 850 |
| DS04.2.x.x.x | 27 | 30 | 47 | 65 | 1/2 NPT | 15 | 130 | 800 | 850 |
| DS04.2.x.x.05 | 27 | 30 | 47 | 65 | 1/2 NPT | 15 | 148 | 850 | 900 |
| DS04.3.x.x.x | 34 | 40 | 57 | 70 | 3/4 NPT | 18 | 152 | 1350 | 1400 |
| DS04.4.x.x.06/07 | 40 | 40 | 57 | 70 | 1.0 NPT | 19 | 156 | 1050 | 1100 |
| DS04.4.x.x.08 | 50 | 50 | 67 | 75 | 1.0 NPT | 20 | 200 | 2750 | 2800 |
| DS04.5.x.x.x | 50 | 50 | 67 | 75 | 1.0 NPT | 21 | 200 | 2950 | 3000 |



Electrical Connection



ORDERING INFORMATION:

Order Number DS04.1.N 1. 1. WA01.1.1. 2 . 0
Miniature variable area flow meter and switch

Connection:

1N = 1/4" female NPT
 2N = 1/2" female NPT
 3N = 3/4" female NPT
 4N = 1" female NPT
 5N = 1 1/4" female NPT

Material:

1= brass with 301 stainless steel spring
 2= all 316 stainless steel

Scale:

1= for water
 2= for air

Measuring Ranges:

| Water | Air |
|-----------------------------|--------------------|
| DS04.1 & DS04.2: | |
| WA01= 0.1-1.5 l/min | LA01= 1.0-28 slpm |
| WA02= 0.2-3.0 l/min | LA02= 4.0-60 slpm |
| WA03= 0.3-8.0 l/min | LA03= 6.0-160 slpm |
| WA04= 1.0-12 l/min | LA04= 20-240 slpm |

DS04.2 & DS04.3

WA05= 2.0-18 l/min LA05= 40-360 slpm

DS04.3 & DS04.4

WA06= 3.0-35 l/min LA06= 60-700 slpm
 WA07= 4.0-50 l/min LA07= 80-1000 slpm

DS04.4 Only

LA08= 200-1400 slpm

Version:

0= Switch only, without flow indication
 1= Flow meter and switch, with side indicator

No. of Contacts:

1= 1 Contact
 2= 2 Contacts

Contact Function:

1= N/O
 2= SPDT
 3S= Ex-N/O (EEx m II T6)
 3U= Ex-SPDT (EEx m II T6)

Options:

0= Without
 1= Please List

PKP

DS05 Flow Meter/Switch

F.S. Ranges From 4 to 250 l/min water

DESCRIPTION

The flow meter and switch model DS05 works according to a modified variable area principle. The float is guided in a cylindrical measuring glass by means of a slotted nozzle. The flowing medium moves the float in the flow direction. The upper edge of the float shows the momentary flow via an etched scale on the measuring glass.

A reed contact is mounted outside the meter in a sealed housing. When the float reaches the position of the reed contact the switch will close. With higher flows the float moves further upward until it reached a built-in float stop, still keeping the switch closed. This ensures a bistable switch function at any time. The reed contact is adjustable over the full switching range of the meter.

APPLICATION

The variable area flow meter and switch model DS05 is used for measuring and monitoring the flow of low viscosity liquids, i.e.. in cooling loops of welding machines and laser systems, for pump monitoring, compressors and many other applications.



DS05 Flow Meter/ Switch

SPECIFICATIONS

Max Pressure: 10 bar (145 PSIG)

Pressure Drop: 0.02-0.5 bar (0.3-7.2 PSI)

Max Temperature: 120°C (160°C optionally) for liquids, 90°C for gases

Materials:

Measuring Glass- Duran 50

Housing- Aluminum

Connections- Brass or Stainless

O-rings-

Brass Version- Buna

SS Version- Viton

Electrical Connections- DIN 43650 plug

Accuracy- $\pm 5\%$ f.s.

Ranges:

Water- 0.2-4.0 l/min to 30-250 l/min

FEATURES

SMALL MOUNTING DIMENSIONS

BRASS OR STAINLESS STEEL CONNECTIONS

SCALES FOR WATER

HIGH SWITCHING ACCURACY

LOW SWITCHING HYSTERESIS

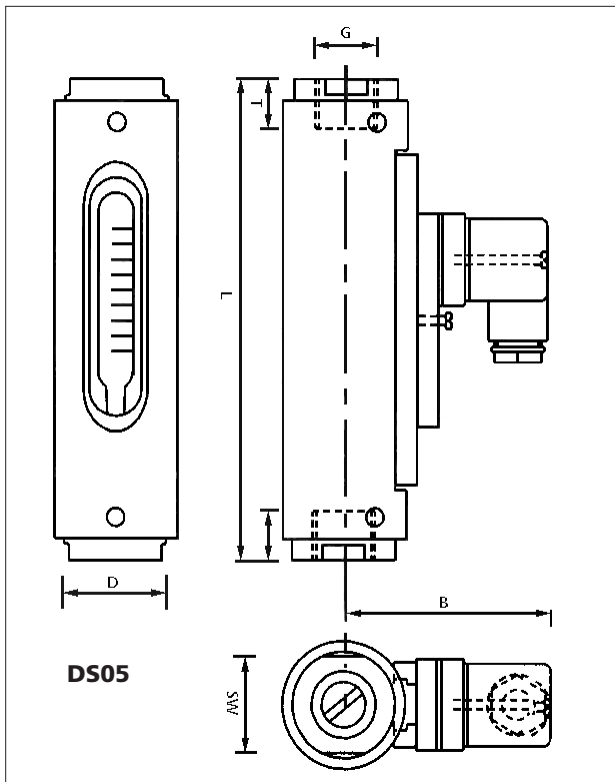
CONTACTS:

N/O: 250V, 3A, 100VA
 SPDT: 250V, 1.5A, 50VA
 *EX-N/O: 250V, 2A, 60 VA
 *EX-SPDT: 250V, 1A, 30VA

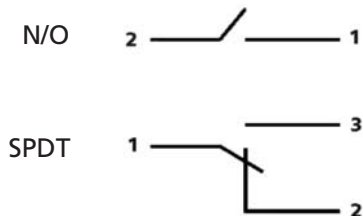
*Per ATEX 100aEXII 2 G, EEx m II T6

DIMENSIONS:

| Model | Dimensions in mm | | | | | | Weight (grams) |
|------------------|------------------|----|----|-----------|----|---------|----------------|
| | SW | D | B | G | T | L | |
| DS05.1.x.x.x | 32 | 43 | 67 | 1/4 NPT | 14 | 132 | 625 |
| DS05.2.x.x.x | 32 | 43 | 67 | 1/2 NPT | 15 | 135 | 625 |
| DS05.2.x.x.05 | 32 | 43 | 67 | 1/2 NPT | 15 | 163 | 650 |
| DS05.3.x.x.06 | 32 | 43 | 67 | 3/4 NPT | 18 | 167 | 850 |
| DS05.3.x.x.07 | 41 | 50 | 70 | 3/4 NPT | 18 | 152 | 1000 |
| DS05.4.x.x.07 | 41 | 50 | 70 | 1.0 NPT | 19 | 184 | 1000 |
| DS05.4.x.x.08/09 | 41 | 50 | 70 | 1.0 NPT | 19 | 184/200 | 1000 |
| DS05.5.x.x.10 | 46 | 60 | 75 | 1 1/4 NPT | 21 | 200 | 1400 |
| DS05.5.x.x.11 | 46 | 55 | 73 | 1 1/4 NPT | 21 | 222 | 1400 |



Electrical Connection



ORDERING INFORMATION:

Order Number DS05. 1.1.N 1. 03. 1. 1.
Miniature variable area flow meter and switch

Connection:

1N= 1/4 "female NPT
 2N= 1/2" female NPT
 3N= 3/4" female NPT
 4N= 1" female NPT
 5N= 1 1/4 " female NPT

Material:

1= brass with 301 stainless steel spring
 2= all 316 stainless steel

Scale:

1= for water

Measuring Ranges:

DS05.1 and DS05.2:

01= 0.2 - 4 l/min Water
 02= 0.5 - 6 l/min Water
 03= 0.5 - 8 l/min Water
 04= 0.5 - 14 l/min Water

DS05.2 only:

05A= 2 - 22 l/min Water
 05= 1-28 l/min Water

DS05.3 only:

06= 2 - 45 l/min Water

DS05.3 and DS05.4:

07= 2 -80 l/min Water
 07A= 6-90 l/min Water

DS05.4 only

08= 6-110 l/min Water

DS05.5 only:

09= 15-150 l/min Water
 10= 30 - 220 l/min Water
 11= 35 - 250 l/min Water

No. of contacts:

0= without contacts
 1= 1 contact
 2= 2 contacts

Contact function:

1= N/O
 2= SPDT
 3S= Ex-N/O (EEx m II T6)
 3U= Ex-SPDT (EEx m II T6)

Options:

0- Without
 1= Please List

PKP

DS06 Flow Meter/Switch for Water

F.S. Ranges From 4 to 250 l/min water

DESCRIPTION

The flow meter and switch model DS06 works according to a modified variable area principle. The float is guided in a cylindrical measuring tube by means of a spring and slotted nozzle. The flowing medium moves the float in the flow direction. An externally mounted pointer indicator is magnetically coupled to the float. It follows the float position and indicates the flow rate on a scale.

A reed contact is mounted outside the meter in a sealed housing. When the float reaches the position of the reed contact the switch will close. With higher flows the float moves further upward until it reaches a built-in float stop, still keeping the switch closed. This ensures a bistable switch function at any time. The reed contact is adjustable over the full measuring range of the meter.

The built in spring and magnetic float are very reliable. As the spring opposes the float and the flow it is possible to mount the flow meter in any orientation.

APPLICATION

The variable area flow meter and switch model DS06 is used for measuring and monitoring the flow of low viscosity liquids and gases, i.e., in cooling loops of welding machines and laser systems, for pump monitoring, compressors and many other applications.

SPECIFICATIONS

Max Pressure:

Brass- 200 bar (2,900 PSIG)

Stainless Steel- 300 bar (4,350 PSIG)

Pressure Drop: 0.02-0.4 bar (0.3-5.8 PSI)

Max Temperature: 100°C (160°C available as option)

Materials:

Wetted Parts- Nickel plated brass or 316Ti SS

O-rings-

Brass Version- Buna

SS Version- Viton

Electrical Connections- DIN 43650 plug

Accuracy- $\pm 5\%$ f.s.

Ranges:

Water- 0.2-4.0 l/min to 30-250 l/min



DS06 Flow Switch



DS06 Flow Meter/ Switch

FEATURES

SMALL MOUNTING DIMENSIONS

BRASS OR STAINLESS STEEL CONNECTION

SCALES FOR WATER

UNIVERSAL MOUNTING POSITION

HIGH SWITCHING ACCURACY

LOW SWITCHING HYSTERESIS

CONTACTS:

N/O: 250V, 3A, 100VA

SPDT: 250V, 1.5A, 50VA

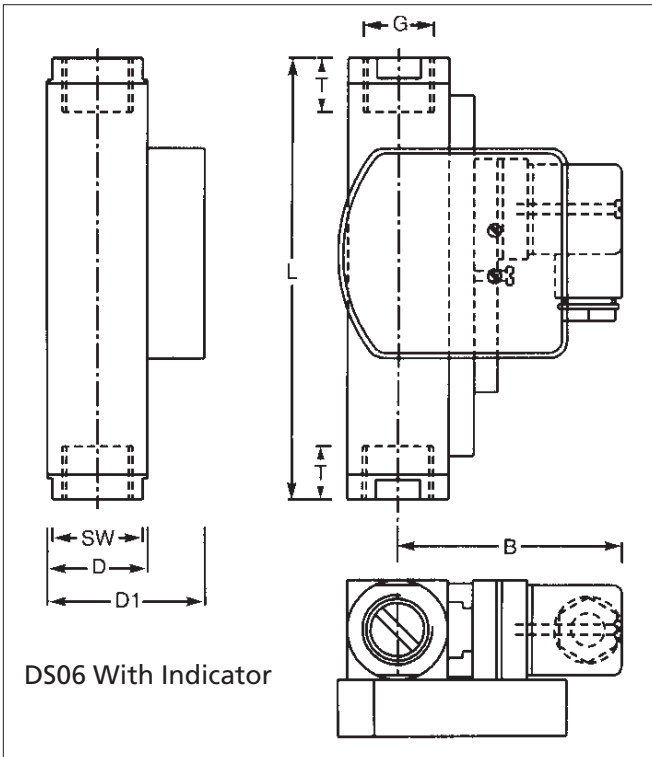
*EX-N/O: 250V, 2A, 60 VA

*EX-SPDT: 250V, 1A, 30VA

*Per ATEX 100aEXII 2 G, EEx m II T6

DIMENSIONS:

| Model | Dimensions in mm | | | | | | | Weight | |
|------------------|------------------|----|----|----|-----------|----|-----|--------|------|
| | SW | D | D1 | B | G | T | L | with | W/O |
| DS06.1.x.x.x | 27 | 30 | 47 | 65 | 1/4 NPT | 14 | 130 | 800 | 850 |
| DS06.2.x.x.x | 27 | 30 | 47 | 65 | 1/2 NPT | 14 | 130 | 850 | 900 |
| DS06.2.x.x.07/08 | 27 | 30 | 47 | 65 | 1/2 NPT | 14 | 148 | 900 | 950 |
| DS06.3.x.x.x | 34 | 40 | 57 | 70 | 3/4 NPT | 18 | 152 | 1400 | 1450 |
| DS06.4.x.x.9-11 | 36 | 36 | 53 | 68 | 1.0 NPT | 19 | 156 | 1100 | 1150 |
| DS06.4.x.x.12 | 40 | 40 | 55 | 72 | 1.0 NPT | 20 | 200 | 2700 | 2750 |
| DS06.5.x.x.x | 50 | 50 | 67 | 75 | 1 1/4 NPT | 21 | 200 | 3000 | 3050 |
| DS06.6.x.x.x | 60 | 60 | 75 | 80 | 1 1/2 NPT | 24 | 200 | 3800 | 3850 |



ORDERING INFORMATION:

Order Number DS06. 1N. 1. 1. 06. 1. 1. 2 .
Miniature variable area flow meter and switch

Connection:

1N= 1/4 "female NPT

2N= 1/2" female NPT

3N= 3/4" female NPT

4N= 1" female NPT

5N= 1 1/4 " female NPT

6N= 1 1/2" female NPT

Material:

1= brass with 301 stainless steel spring

2= all 316 stainless steel

Scale:

1= for water

Measuring Ranges: Water

DS06.1 und DS06.2:

01= 0.2 -4 l/min Water

02= 0.4 -4.5 l/min Water

03= 0.6 -5 l/min Water

04= 0.5 -8 l/min Water

05= 1 -14 l/min Water

06= 1 -28 l/min Water

DS06.2 only:

07= 2 -40 l/min Water

08= 4 -55 l/min Water

DS06.3 and DS06.4:

09= 1 -70 l/min Water

10= 8 -90 l/min Water

11= 5 -110 l/min Water

DS06.5 only:

12= 10 -150 l/min Water

DS06.5 & DS06.6 only:

13= 30 -220 l/min Water

14= 30 -250 l/min Water

Version:

0= switch only, without flow rate indication

1= flow meter and switch, with side indicator

No. of contacts:

0= without contacts

1= 1 contact

2= 2 contacts

Contact function:

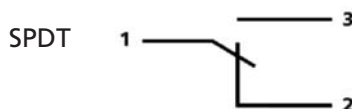
1= N/O

2= SPDT

3S= Ex-N/O (EEx m II T6)

3U= Ex-SPDT (EEx m II T6)

Electrical Connection



PKP

DS07 Viscosity Compensated Flow Meter/Switch

F.S. Ranges From 0.8 to 90 l/min

DESCRIPTION

The flow meter and switch model DS07 works according to a modified variable area principle. The float is guided in a cylindrical measuring glass by means of a spring. The flowing medium moves the float in the flow direction. The upper edge of the float shows the momentary flow via an etched scale on the measuring glass.

A reed contact is mounted outside the meter in a sealed housing. When the float reaches the position of the reed contact the switch will close. With higher flows the float moves further upward until it reached a built-in float stop, still keeping the switch closed. This ensures a bistable switch function at any time. The reed contact is adjustable over the full measuring range of the meter.

The built in spring and magnetic float are very reliable. As the spring opposes the float and the flow, it is possible to mount the flow meter in any orientation. The strong spring, combined with an orifice in the float, limit the effects of viscosity changes to an absolute minimum compared to regular variable area flow meters.

APPLICATION

The variable area flow meter and switch model DS07 is used for measuring and monitoring the flow of viscous liquids, i.e., in central lubricating systems, lubricating circuitry, hydraulics, transformer oils, etc..

SPECIFICATIONS

Max Pressure:

DS07.2- 16 bar (232 PSIG)

DS07.3/4- 10 bar (145 PSIG)

Pressure Drop:

DS07.2- 0.02-0.2 bar (0.3-2.9 PSI)

DS07.3/4- 0.02-0.04 bar (0.3- 5.8 PSI)

Max Temperature: 120°C (160°C available as option)

Materials:

Measuring Glass- Duran 50

Wetted Parts- Nickel plated brass or 316Ti SS

O-rings-

Brass Version- Buna

SS Version- Viton

Electrical Connections- DIN 43650 plug

Accuracy- $\pm 4\%$ f.s.

Ranges: 0.2-0.8 l/min to 30-90 l/min
viscosities to 600 cSt



DS07 Flow Meter/ Switch

FEATURES

FOR VISCOUS MEDIA TO 600 CST

SMALL MOUNTING DIMENSIONS

BRASS OR STAINLESS STEEL CONNECTION

HIGH SWITCHING ACCURACY

LOW SWITCHING HYSTERESIS

UNIVERSAL MOUNTING POSITION

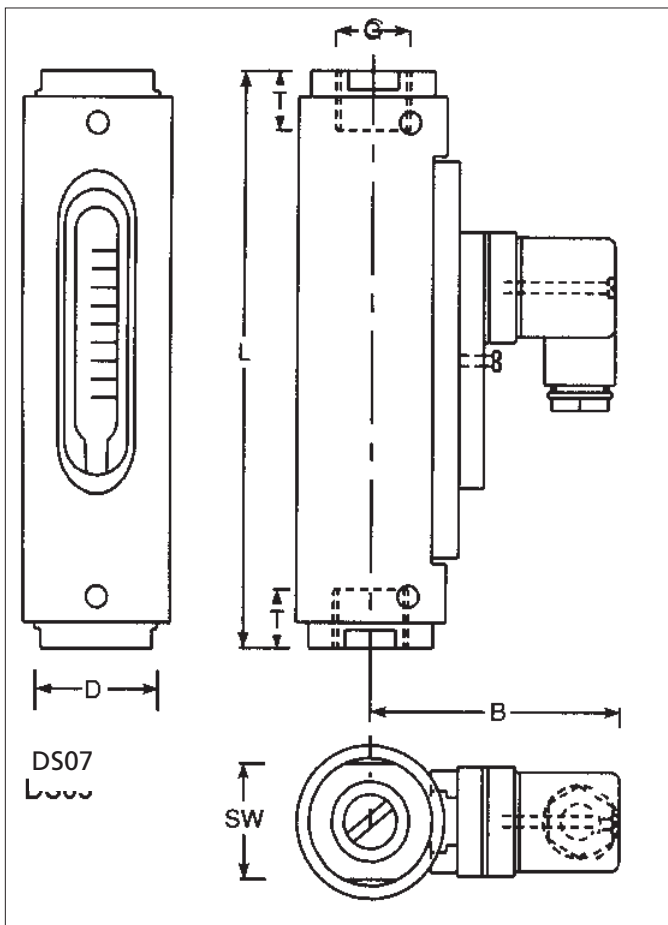
CONTACTS:

N/O: 250V, 3A, 100VA
 SPDT: 250V, 1.5A, 50VA
 *EX-N/O: 250V, 2A, 60 VA
 *EX-SPDT: 250V, 1A, 30VA

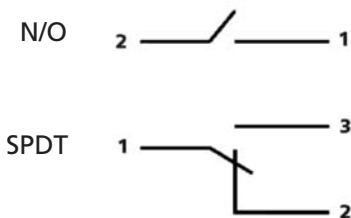
*Per ATEX 100aEXII 2 G, EEx m II T6

DIMENSIONS:

| Model | Dimensions in mm | | | | | | Weight (g) |
|--------------|------------------|----|----|---------|----|-----|------------|
| | SW | D | B | G | T | L | |
| DS07.2.x.x.x | 27 | 32 | 50 | 1/2 NPT | 14 | 114 | 300 |
| DS07.3.x.x.x | 41 | 50 | 72 | 3/4 NPT | 17 | 139 | 850 |
| DS07.4.x.x.x | 41 | 50 | 72 | 1.0 NPT | 17 | 158 | 850 |



Electrical Connection



ORDERING INFORMATION:

Order Number **DS07.** 1N. 1. 1. 03. 1. 1.
 Viscosity compensated variable area flow meter and switch

Connection:

2N= 1/2" female NPT
 3N= 3/4" female NPT
 4N= 1" female NPT

Material:

1= brass with 301 stainless steel spring
 2= all 316 stainless steel

Scale:

1= for viscous media

Measuring Ranges:

DS07.2 only:

01= 0.2 - 0.8 l/min
 02= 0.2 - 1 l/min
 03= 0.5 - 1.7 l/min
 04= 1.3 - 4 l/min
 05= 2.5 - 8 l/min

DS07.2, DS07.3 and DS07.4:

06= 0.1 - 0.8 l/min
 07= 0.5 - 1.5 l/min
 08= 1 - 4 l/min
 09= 2 - 8 l/min
 10= 3 - 10 l/min
 11= 5 - 15 l/min
 12= 8 - 24 l/min

DS07.3 and DS07.4:

13= 10 - 30 l/min
 14= 15 - 45 l/min
 15= 20 - 60 l/min
 16= 30 - 90 l/min

No. of contacts:

0= without contacts
 1= 1 contact
 2= 2 contacts

Contact function:

1= N/O
 2= SPDT
 3S= Ex-N/O (EEx m II T6)
 3U= Ex-SPDT (EEx m II T6)

PKP

DS08 Viscosity Compensated Flow Meter/Switch

F.S. Ranges From 0.8 to 90 l/min

DESCRIPTION

The flow meter and switch model DS08 works according to a modified variable area principle. The float is guided in a cylindrical measuring tube by means of a spring. The flowing medium moves the float in the flow direction. An externally mounted pointer indicator is magnetically coupled to the float and thus, following the float position, indicates the flow rate on a scale.

A reed contact is mounted outside the meter in a sealed housing. When the float reaches the position of the reed contact the switch will close. With higher flows the float moves further upward until it reaches a built-in float stop, still keeping the switch closed. This ensures a bistable switch function at any time. The reed contact is adjustable over the full measuring range of the meter.

The built in spring and magnetic float are very reliable. As the spring opposes the float and the flow, it is possible to mount the flow meter in any orientation. The strong spring, combined with an orifice in the float, limit the effects of viscosity changes to an absolute minimum compared to regular variable area flow meters.

APPLICATION

The variable area flow meter and switch model DS08 is used for measuring and monitoring the flow of viscous liquids, i.e., in central lubricating systems, lubricating circuitry, hydraulics, transformer oils, etc..

SPECIFICATIONS

Max Pressure:

DS08.2 brass- 250 bar (3,625 PSIG)

DS08.4 brass- 250 bar (3,625 PSIG)

DS08.2 stainless- 300 bar (4,350 PSIG)

DS08.4 stainless- 300 bar (4,350 PSIG)

Pressure Drop:

DS08.2- 0.02-0.4 bar (0.3-5.8 PSI)

DS08.4- 0.02-0.2 bar (0.3-2.9 PSI)

Max Temperature: 120°C (160°C available as option)

Materials:

Wetted Parts- Nickel plated brass or 316Ti SS
O-rings-

Brass Version- Buna

SS Version- Viton

Electrical Connections- DIN 43650 plug

Accuracy- $\pm 4\%$ f.s.

Ranges: 0.1-0.8 l/min to 30-90 l/min
viscosities to 600 cSt



DS08 Flow Meter/ Switch

FEATURES

FOR VISCOUS MEDIA TO 600 CST

SMALL MOUNTING DIMENSIONS

BRASS OR STAINLESS STEEL CONNECTION

UNIVERSAL MOUNTING POSITION

HIGH SWITCHING ACCURACY

LOW SWITCHING HYSTERESIS

CONTACTS:

N/O: 250V, 3A, 100VA

SPDT: 250V, 1.5A, 50VA

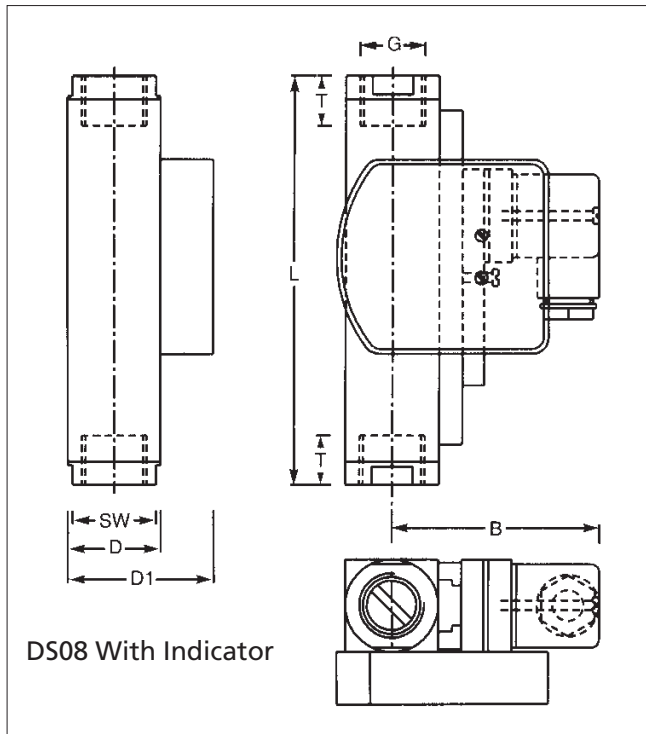
*EX-N/O: 250V, 2A, 60 VA

*EX-SPDT: 250V, 1A, 30VA

*Per ATEX 100aEXII 2 G, EEx m II T6

DIMENSIONS:

| Model | Dimensions in mm | | | | | | | Weight (g) | |
|----------------------------|------------------|----|----|----|---------|----|-----|----------------|---------------|
| | SW | D | D1 | B | G | T | L | With Indicator | W/O Indicator |
| DS08.M | 27 | 31 | 48 | 48 | 1/2 NPT | 14 | 90 | 350 | --- |
| DS08.S | 40 | 40 | 57 | 68 | 1.0 NPT | 17 | 130 | 1000 | 1050 |
| Special Connections | | | | | | | | | |
| DS08.M | | | | | 1/4 NPT | 14 | 98 | 400 | --- |
| | | | | | 3/8 NPT | 14 | 108 | 450 | --- |
| DS08.S | | | | | 1/4 NPT | 21 | 152 | 1100 | 1150 |
| | | | | | 1/2 NPT | 21 | 152 | 1100 | 1150 |
| | | | | | 3/4 NPT | 21 | 152 | 1100 | 1150 |



ORDERING INFORMATION:

Order Number DS08.M. 2N.1. 1. 03. 1. 1. 0
Viscosity compensated variable area flow meter and switch

Size:

M= Miniature

S= Standard

Connection:

2N= 1/2" female NPT

4N= 1" female NPT

Material:

1= brass with 301 stainless steel spring

2= all 316 stainless steel

Scale:

1= for viscous media

Measuring Ranges:

DS08.2 only:

01= 0.1 - 0.8 l/min

03= 0.5 - 1.6 l/min

04= 0.8 - 3 l/min

05= 2 - 7 l/min

DS08.4 only:

06= 0.1 - 0.8 l/min

07= 0.5 - 1.5 l/min

08= 1 - 4 l/min

09= 2 - 8 l/min

10= 3 - 10 l/min

11= 5 - 15 l/min

12= 8 - 24 l/min

13= 10 - 30 l/min

14= 15 - 45 l/min

15= 20 - 60 l/min

16= 30 - 90 l/min

17= 35 - 110 l/min

12A= 1-20 l/min

13A= 4-40 l/min

14A= 5-50 l/min

15A= 8-60 l/min

16A= 12-70 l/min

17A= 15-80 l/min

No. of contacts:

0= without contacts

1= 1 contact

2= 2 contacts

Contact function:

0= without contact

1= N/O

2= SPDT

3S= Ex-N/O, not for DS08.M

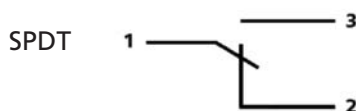
3U= Ex-SPDT, not for DS08.M

Flow Indicator

0= No Flow Indicator

1= Flow Indicator (available for 1", 4N connection size only)

Electrical Connection



PKP

DS20 Compact Variable Area Flowmeter

F.S. Ranges From 1.0 to 250 l/h, Alarm & Analog Output Options

DESCRIPTION

The flowmeter Model DS20 works according to the proven variable area principle.

A float is guided in a cylindrical measuring tube. The flowing medium moves the float in the flow direction. An externally mounted pointer indicator is magnetically coupled to the float and thus, following the float position, indicates the flow rate on a scale.

This indicator assembly is equipped with a scale calibrated to the operating conditions in the system and additionally may contain alarm contacts or an analog output.

Model DS20 is used for measuring and monitoring the flow of low viscosity liquids and gases, i. e. in cooling circuits of welding machines and laser systems, for pump monitoring, compressors and many other applications.

By using only stainless steel AISI 316 Ti for the wetted parts the meter is especially suited for aggressive media.

SPECIFICATIONS

Materials:

Wetted Parts: st. steel AISI 316 Ti

Housing: stainless steel

Mounting Position: vertical, flow from bottom to top
Rated Pressure: 40, 100, or 160 bar depending on process connection

Max. Temperature:

Local Indication: -80°C...+200°C

With Alarm Contacts: -40°C...+150°C

Analog Output: -40°C...+150°C

Electrical Protection: IP 65

Accuracy: +/- 4% of full scale

Alarm Contacts: SJ 3.5-N (NAMUR), inductive
Voltage Rating: 8 VDC (R_i = 1 kOhm)

Supply Voltage: 5...25 VDC

Analog Output:

Output Signal: 4...20 mA

Supply Voltage: 14...30 VDC

Load: Supply voltage-13.5V
.02 A



DS20 Flow Meter

FEATURES

- For Liquids & Gases
- Pressure to 160 bar (2322 PSI)
- Temperature to 200°C
- AISI 316 Ti Stainless Steel Construction
- Individually Calibrated
- Alarm & Analog Outputs Available

VERSIONS

- DS20.1 Flowmeter with local indication
 - DS20.2 Flowmeter with local indication, 1 min. contact
 - DS20.3 Flowmeter with local indication, 1 max.contact
 - DS20.4 Flowmeter with local indication, 1 min. contact and 1 max. contact
 - DS20.5 Flowmeter with local indication and analog output 4-20 mA
- Optionally: valve on inlet or outlet(process connections on back)

PROCESS CONNECTIONS

Flowmeter Supplied Without Needle Valve:

All screw connections are in accordance with model code, 100 bar rated pressure is standard.

Flowmeter Supplied With Needle Valve:

All screw connections in accordance with model code, 40 bar rated pressure (standard) or 100 bar rated pressure. Flange connections are not possible.

MEASURING RANGES

| Range No. | Water Flow 20°C (l/h) | Air Flow @20°C, 1.013 bar abs. (l/h) | Pressure Drop (mbar) |
|-----------|-----------------------------|--|-------------------------|
| 1 | 0.1...1 | 4...40 | 6 |
| 2 | 0.16...1.6 | 6...60 | 6 |
| 3 | 0.25...2.5 | 10...100 | 6 |
| 4 | 0.4...4 | 15...150 | 6 |
| 5 | 0.6...6 | 20...200 | 6 |
| 6 | 1...10 | 32.5...325 | 8 |
| 7 | 1.6...16 | 50...500 | 8 |
| 8 | 2.5...25 | 80...800 | 8 |
| 9 | 4...40 | 140...1400 | 11 |
| 10 | 6...60 | 200...2000 | 11 |
| 11 | 10...100 | 325...3250 | 11 |
| *12 | 16...160 | 500...5000 | 13 |
| *13 | 25...250 | 800...8000 | 13 |

* Supplied with 3/8" connections unless provided with needle valve when 1/4" connections are provided

Note: All flowmeters are calibrated for the actual working conditions. Virtually any units of measurement can be rendered on the flowmeter scale at no cost addition.

Some commonly ordered units include:

| | |
|--------|------|
| ml/min | ml/h |
| gph | gpm |
| scfh | scfm |
| lpm | lpd |

ORDERING INFORMATION:

Order number DS20. 41T6. 03. 1. 5. 0.
Variable area flowmeter

Process connection:

41G4 = G 1/4 female (Pressure rating 40 bar)
41G6 = G 1/4 female (Pressure rating 100 bar)
41G7 = G 1/4 female (Pressure rating 160 bar)
41T4 = 1/4" NPTF (Pressure rating 40 bar)
41T6 = 1/4" NPTF (Pressure rating 100 bar)
41T7 = 1/4" NPTF (Pressure rating 160 bar)
*42T4 = 3/8" NPTF (Pressure rating 40 bar)
*42T6 = 3/8" NPTF (Pressure rating 100 bar)
*42T7 = 3/8" NPTF (Pressure rating 160 bar)

*Range code 12 & 13 only

01A1 = ANSI Flange, 1/2", 150 lbs
02A1 = ANSI Flange, 1.0", 150 lbs
01A2 = ANSI Flange, 1/2", 300 lbs
02A2 = ANSI Flange, 1.0", 300 lbs

Measuring ranges:

1...13 = measuring range no. acc. to table
99 = other (please indicate in writing)

Valve (only for PN40):

0 = without
1 = valve at inlet, valve seat silver (1/4" connections only)
2 = valve at inlet, valve seat PCTFE (1/4" connections only)
3 = valve at outlet, valve seat silver (1/4" connections only)
4 = valve at outlet, valve seat PCTFE (1/4" connections only)

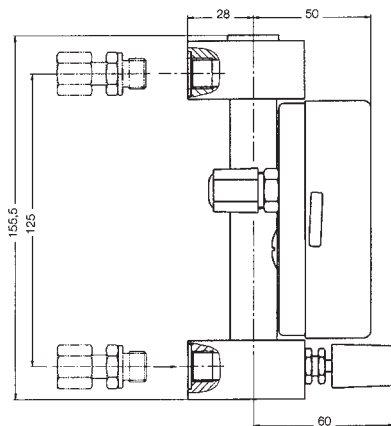
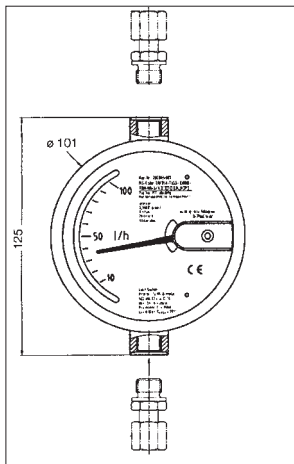
Version:

1 = local indication only
2 = local indication, 1 min. contact
3 = local indication, 1 max. contact
4 = local indication, 1 min. and 1 max. contact
5 = local indication, analog output
4...20 mA

Options:

0 = without
1 = special calibration or other feature(s) needed, provide written details

DIMENSIONS (MM)



PKP

DS25 Flowmeter, Alarm & Analog Output (With Totalizer)

F.S. Ranges 0.01-570 gpm Liquid, 0.44-1100 scfm Gas

DESCRIPTION

Model DS25 flowmeters work according to the proven variable area principle. A float is guided in a conical measuring tube and is nearly independent of the viscosity of the medium. The flowing medium moves the float in the flow direction. An externally mounted pointer indicator is magnetically coupled to the float and thus, following the float position, indicates the flow rate on a scale.

This indicator assembly is equipped with a scale calibrated to the operating conditions in the system and additionally may contain alarm contacts and analog output including totalizer.

The variable area flowmeter model DS25 is used for measuring and monitoring the flow of all kinds of liquids or gases. By using only stainless steel AISI 316 Ti for the wetted parts, the meter is especially suited for aggressive media or for use in food and drink applications (with Tri-Clamp or other hygienic process connections)

SPECIFICATIONS

TECHNICAL SPECIFICATIONS (MEASURING TUBE)

Measurable Media: liquids and gases

Ranges: see Tables 2 and 3

Turndown Ratio: 10:1

Accuracy:

DS25.1: 1.6% f.s.

DS25.2: 2.5% f.s.

Process Connections: see Table 1

Max. Pressure: see Table 1

Media Temperature:

DS25.1: -180°C ... +400°C

DS25.2: -80°C ... +130°C

(the actual operating temperature also depends on the max. permissible temperatures for the indicator and the options utilized in the unit)

Materials:

DS25.1: all wetted parts stainless steel AISI 316 Ti

DS25.2: all wetted parts stainless steel AISI 316 Ti with PTFE coating

Mounting: Vertical

Flow Direction: from bottom to top

Mounting Length: see Table 1

Straight Pipe Run Recommended:

1/2" to 2 1/2": none

3" through 4": min 5 x diameter upstream

Electrical Protection: IP65



DS25 Flow Meter

FEATURES

- For Liquids & Gases
- Pressure to 320 bar (40 & 100 bar standard)
- Temperature to 400°C
- AISI 316 Ti Stainless Steel Construction
- Individually Calibrated
- Alarm & Analog Outputs Available

INDICATOR

The indicator part of the DS25 consists of an aluminum or polyamide housing with a pointer assembly magnetically coupled to the float.

The scale may be calibrated in flow units or in percent. Additionally, transmitters including totalizer and alarm contacts may be mounted in the indicator housing.

Ambient Temperature:

PA housing: -25°C ... +100°C

AL housing: -25°C ... +130°C

(for higher or lower operating temperatures use option "temperature isolation (DS25.A)")

ALARM CONTACTS

Model: inductive proximity switch, SJ3.5-N per DIN 19234 (NAMUR); or SPDT Relay

Rated Voltage: 8 VDC

Output Signal: ≤ 1 mA = in alarm state; ≥ 3 mA = not in alarm state

ALARM CONTACTS CONT'D

Ambient Temperature: -25°C ... +100°C (for higher or lower operating temperatures use option "temperature isolation (DS25.A)")

Explosion Protection: ATEX100 EEx ia IIC T6

Recommended Accessories: KF Transformer isolated barrier with relay output (Converts NAMUR output to SPDT relay)

TRANSMITTER

Output Signal: 4 ... 20 mA

Indication: LCD display, 8 digits (programmable for indication of flow rate or as non-resettable totalizer)

Supply Voltage: see ordering information

Max. Load: 4-wire: >= 500 Ohm

2-wire: (Supply Voltage-13.5 V)
20 mA

Operating Temperature: 0 ... 100°C (for higher or lower operating temperatures use option "temperature isolation (DS25.A)")

Electrical Connection: Cable Gland or PG11

INTRINSICALLY SAFE TRANSMITTER

Technical specifications same as standard unit, except:

Output Signal: 4 ... 20 mA, 2-wire

Operating Temperature: -25°C ... +70°C (for higher or lower operating temperatures use option "temperature isolation (DS25.A)")

Explosion Protection: ATX100 EEx ia IIC T6

Recommended Accessories: intrinsically safe power supply (see "Options")

PNEUMATIC TRANSMITTER

on request

OPTIONS

Temperature isolation (DS25.A):

For media temperatures outside the limits given in the technical specifications for the indicator assembly the measuring tube and the indicator assembly may be temperature isolated by mounting the indicator at a distance of 60 mm from the measuring tube. This ensures that the unit may be operated at media temperatures as high as stated in the specifications for the measuring tube.

Damping (DS25.D):

Float damping is recommended for gas or steam applications to prevent erratic up and down movement of the float.

Oxygen Applications: For use with oxygen the meters may be supplied oil and grease-free.

Certificates: On request

Tags: Stainless steel tags with customer specified text are optionally available

TRANSFORMER ISOLATED BARRIER W/RELAY OUTPUTS

Per DIN 19234 (NAMUR)

| Model | Power | No. channels | Contact Rating |
|----------------|---------------|--------------|------------------------|
| KFA5-SR2-EX2.W | 103.5-126 VAC | 2 | AC:253V/2A, DC: 40V/2A |
| KFD5-SR2-EX2.W | 20-30 VDC | 2 | AC:253V/2A, DC: 40V/2A |

POWER SUPPLY FOR INTRINSICALLY SAFE TRANSMITTER

Output Signal: 0 / 4...20 mA, galvanically separated
Supply Voltage:

SE11.2: 24 VAC / DC

Max. Load: 750 Ohm

Control Circuit: intrinsically safe [EEx ia] IIC

STEAM JACKETS

Steam jackets are used to keep the media in the measuring tube at a required temperature. Consult us for available configurations.

Table 1-Connection Chart

| Nominal Bore mm (inches) | Description Pressure Rating | Tube number | Connection Code | Length L(mm) |
|---------------------------|-----------------------------------|-------------|-----------------|--------------|
| 15 (1/2") | Flanges ANSI 1/2", 150 lbs. | 1 | 102 | 250 |
| | Flanges ANSI 1/2", 300 lbs. | 1 | 103 | 250 |
| | 1/2" NPT female, 580 PSI | 1 | 105 | 295 |
| | Flanges ANSI 1/2", 150 lbs. | 2 | 207 | 250 |
| | Flanges ANSI 1/2", 300 lbs. | 2 | 208 | 250 |
| | 1/2" NPT female, 580 PSI | 2 | 210 | 295 |
| 20 (3/4") | Flanges ANSI 3/4", 150 lbs. | 1 | 112 | 250 |
| | Flanges ANSI 3/4", 300 lbs. | 1 | 113 | 250 |
| | 3/4" NPT female, 580 PSI | 1 | 115 | 295 |
| | Flanges ANSI 3/4", 150 lbs. | 2 | 217 | 250 |
| | Flanges ANSI 3/4", 300 lbs. | 2 | 218 | 250 |
| | 3/4" NPT female, 580 PSI | 2 | 220 | 295 |
| 25 (1") | Flanges ANSI 1", 150 lbs. | 1 | 122 | 250 |
| | Flanges ANSI 1", 300 lbs. | 1 | 123 | 250 |
| | Tri-Clamp DN25 / 1", 150 PSI | 1 | 127 | 250 |
| | Flanges ANSI 1", 150 lbs. | 2 | 229 | 250 |
| | Flanges ANSI 1", 300 lbs. | 2 | 230 | 250 |
| | Tri-Clamp DN25 / 1", 150 PSI | 2 | 234 | 250 |
| | Flanges ANSI 1", 150 lbs. | 3 | 336 | 250 |
| | Flanges ANSI 1", 300 lbs. | 3 | 337 | 250 |
| 1" NPT female, 580 PSI | 3 | 339 | 310 | |
| 32 (1 1/4") | Tri-Clamp DN32, 150 PSI | 1 | 141 | 250 |
| | Flanges ANSI 1 1/4", 150 lbs. | 2 | 243 | 250 |
| | Flanges ANSI 1 1/4", 300 lbs. | 2 | 244 | 250 |
| | Tri-Clamp DN32, 150 PSI | 2 | 245 | 250 |
| | Flanges ANSI 1 1/4", 150 lbs. | 3 | 347 | 250 |
| | Flanges ANSI 1 1/4", 300 lbs. | 3 | 348 | 250 |
| | 1 1/4" NPT female, 580 PSI | 3 | 350 | 310 |
| 40 (1 1/2") | Tri-Clamp DN40 / 1 1/2", 150 PSI* | 1 | 151 | 250 |
| | Tri-Clamp DN40 / 1 1/2", 150 PSI* | 2 | 252 | 250 |
| | Flanges ANSI 1 1/2", 150 lbs. | 3 | 354 | 250 |
| | Flanges ANSI 1 1/2", 300 lbs. | 3 | 355 | 250 |
| | Flanges ANSI 2", 150 lbs. | 3 | 357 | 250 |
| 50 (2") | Flanges ANSI 2", 300 lbs. | 3 | 358 | 250 |
| | Tri-Clamp DN50 / 2", 150 PSI* | 3 | 360 | 250 |
| | Flanges ANSI 2", 150 lbs. | 4 | 462 | 250 |
| | Flanges ANSI 2", 300 lbs. | 4 | 463 | 250 |
| | 2" NPT female, 580 PSI | 4 | 465 | 325 |
| | 2" NPT female, 580 PSI | 4 | 468 | 325 |
| | Tri-Clamp DN80 / 3", 150 PSI* | 4 | 470 | 300 |
| | Flanges ANSI 3", 150 lbs. | 5 | 572 | 250 |
| Flanges ANSI 3", 300 lbs. | 5 | 573 | 260 | |
| 100 (4") | Tri-Clamp DN100 / 4", 150 PSI | 5 | 575 | 250 |
| | Flanges ANSI 4", 150 lbs. | 6 | 678 | 250 |
| | Flanges ANSI 4", 300 lbs. | 6 | 679 | 250 |
| 125 (5") | Flanges ANSI 5", 150 lbs. | 6 | 682 | 250 |
| | Flanges ANSI 5", 300 lbs. | 6 | 683 | 250 |
| 150 (6") | Flanges ANSI 6", 150 lbs. | 6 | 686 | 250 |
| | Flanges ANSI 6", 300 lbs. | 6 | 687 | 250 |

*not available with "steam jacket" option

Table 2
Range Codes, Model DS25.1
Stainless Steel Version

| Water @20°C | | | Max Viscosity (Centipoise) Without Recalibration |
|-------------|------------|-------------|---|
| Tube No. | Range Code | Range (g/m) | Pressure Drop(PSI) |
| 1 | 101 | 0.001-0.01 | 0.58 |
| | 102 | 0.017-0.176 | 0.58 |
| | 103 | 0.027-0.277 | 0.58 |
| | 104 | 0.044-0.44 | 0.58 |
| | 105 | 0.044-0.44 | 0.087 |
| 2 | 206 | 0.044-0.44 | 0.087 |
| | 207 | 0.07-0.7 | 0.218 |
| | 208 | 0.07-0.7 | 0.087 |
| | 209 | 0.1-1.1 | 0.58 |
| | 210 | 0.1-1.1 | 0.087 |
| | 211 | 0.17-1.76 | 0.58 |
| | 212 | 0.17-1.76 | 0.087 |
| | 213 | 0.27-2.77 | 0.58 |
| | 214 | 0.27-2.77 | 0.218 |
| | 215 | 0.44-4.4 | 0.58 |
| | 216 | 0.44-4.4 | 0.21 |
| | 217 | 0.7-7.0 | 0.58 |
| | 218 | 1-10.0 | 0.653 |
| 3 | 319 | 0.44-4.4 | 0.102 |
| | 320 | 0.7-7.0 | 0.102 |
| | 321 | 1.1-11.0 | 0.595 |
| | 322 | 1.1-11.0 | 0.232 |
| | 323 | 1.7-17.0 | 0.595 |
| | 324 | 2.6-26.0 | 0.604 |
| 4 | 425 | 1.1-11.0 | 0.116 |
| | 426 | 1.7-17.0 | 0.116 |
| | 427 | 2.2-27.0 | 0.682 |
| | 428 | 2.7-27.0 | 0.116 |
| | 429 | 4.4-44.0 | 0.682 |
| | 430 | 4.4-44.0 | 0.276 |
| | 431 | 7.0-70.0 | 0.682 |
| | 432 | 10-100 | 0.914 |
| 5 | 533 | 11-110 | 0.87 |
| | 534 | 17-170 | 0.87 |
| | 535 | 26-260 | 0.87 |
| 6 | 638 | 44-440 | 1.02 |

Air/Gases @20°C, 1.013 bar abs.

| Tube No. | Range Code | Range (SCFM) | Pressure Drop(PSI) |
|----------|------------|--------------|--------------------|
| 1 | 101 | 0.044-0.44 | 0.653 |
| | 102 | 0.07-0.7 | 0.653 |
| | 103 | 0.1-1.0 | 0.653 |
| | 104 | 0.17-1.77 | 0.653 |
| 2 | 206 | 0.32-3.2 | 0.29 |
| | 207 | 0.23-2.3 | 0.16 |
| | 208 | 0.38-3.8 | 0.16 |
| | 209 | 0.44-4.4 | 0.653 |
| | 210 | 0.59-5.9 | 0.16 |
| | 211 | 0.76-7.6 | 0.653 |
| | 212 | 0.94-9.4 | 0.16 |
| | 213 | 1.2-12 | 0.653 |
| | 214 | 1.5-15 | 0.16 |
| | 215 | 1.8-18 | 0.653 |
| | 216 | 2-20 | 0.29 |
| 3 | 319 | 2.3-23 | 0.174 |
| | 320 | 2.9-29 | 0.319 |
| | 321 | 4.1-41 | 0.194 |
| | 322 | 5.3-53 | 0.319 |
| | 323 | 7.7-77 | 0.682 |
| 4 | 425 | 5.9-59 | 0.203 |
| | 426 | 7.7-77 | 0.363 |
| | 427 | 9.4-94 | 0.203 |
| | 428 | 12-118 | 0.363 |
| | 429 | 12-118 | 0.783 |
| | 430 | 17-170 | 0.203 |
| | 431 | 21-210 | 0.363 |
| | 432 | 29-290 | 0.783 |
| 5 | 533 | 29-290 | 0.435 |
| | 534 | 44-440 | 0.943 |
| | 535 | 50-500 | 0.435 |
| | 536 | 70-700 | 0.943 |
| | 537 | 110-1100 | 0.943 |

Table 3
Range Codes Model
DS25.2 PTFE Coated

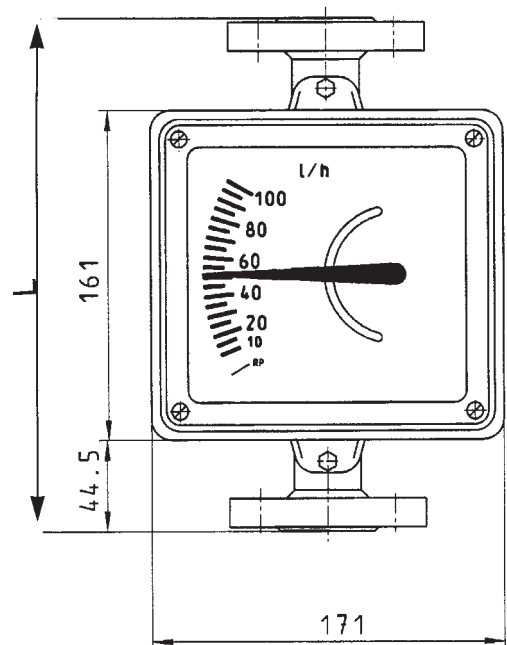
Water @20°C

| Tube No. | Range Code | Range (g/m) | Pressure Drop(PSI) |
|----------|------------|-------------|--------------------|
| 2 | 250 | 0.044-0.44 | 0.232 |
| | 251 | 0.07-0.7 | 0.232 |
| | 252 | 0.1-1.1 | 0.232 |
| | 253 | 0.17-1.76 | 0.232 |
| | 254 | 0.27-2.77 | 0.232 |
| | 255 | 0.44-4.4 | 0.261 |
| 3 | 356 | 0.7-7.0 | 0.290 |
| | 357 | 1.1-11.0 | 0.290 |
| | 358 | 1.7-17.0 | 0.319 |
| 4 | 459 | 1.7-17.0 | 0.290 |
| | 460 | 2.2-27.0 | 0.290 |
| | 461 | 4.4-44.0 | 0.290 |
| | 462 | 7.0-70.0 | 0.319 |
| 5 | 563 | 7.0-70.0 | 0.363 |
| | 564 | 11-110 | 0.363 |
| | 565 | 17-170 | 0.363 |
| 6 | 666 | 28-280 | 0.435 |

Air/Gases @20°C, 1.013 bar abs.

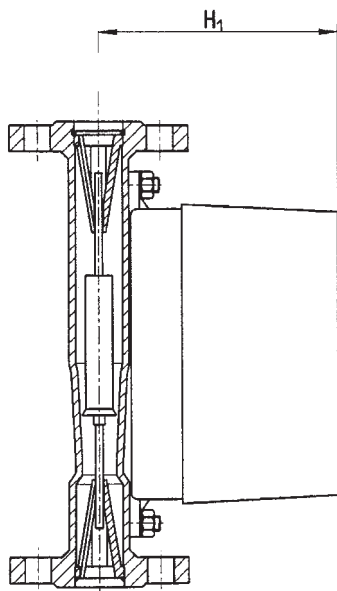
| Tube No. | Range Code | Range (SCFM) | Pressure Drop(PSI) |
|----------|------------|--------------|--------------------|
| 2 | 250 | 0.2-2.0 | 0.29 |
| | 251 | 0.3-3.0 | 0.29 |
| | 252 | 0.5-5.0 | 0.29 |
| | 253 | 0.76-7.6 | 0.29 |
| | 254 | 1.2-12 | 0.29 |
| | 255 | 2-20 | 0.319 |
| 3 | 356 | 2.9-29 | 0.363 |
| | 357 | 5-50 | 0.363 |
| 4 | 459 | 8-80 | 0.363 |
| | 460 | 12-120 | 0.363 |
| | 461 | 21-210 | 0.363 |
| 5 | 563 | 29-290 | 0.174 |
| | 564 | 52-520 | 0.319 |

DIMENSIONS (MM)

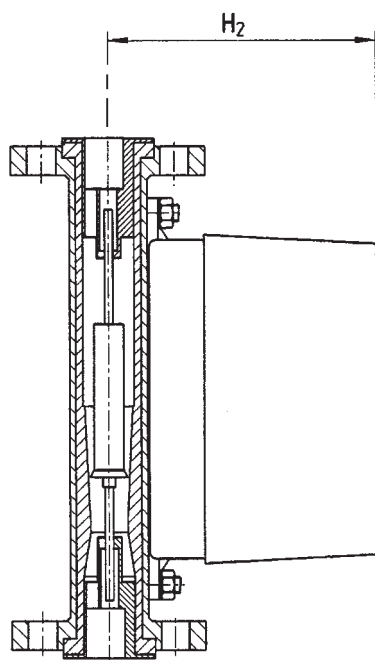


L Dimension- See Conection Chart, Table 1

DIMENSIONS (MM), CONT'D



Stainless Steel Measuring Tube



PTFE Measuring Tube

| Meas. Tube | H1(mm) | H2(mm) | Wt(kg) |
|------------|--------|--------|--------|
| 1 | 122 | 122 | 5 |
| 2 | 123 | 127 | 5 |
| 3 | 131 | 136 | 6.5 |
| 4 | 147 | 152 | 11 |
| 5 | 161 | 168 | 16 |
| 6 | 170 | 176 | 20 |

ORDERING INFORMATION

| | | | | | | | | | |
|---|-------|----|------|----|------|----|----|------|-----|
| Order no.: | DS25. | 1. | 105. | 1. | 104. | 1. | 0. | 000. | CG. |
| Variable area flowmeter | | | | | | | | | |
| Material version: | | | | | | | | | |
| 1 = stainless steel | | | | | | | | | |
| 2 = wetted parts PTFE coated | | | | | | | | | |
| Process connection: | | | | | | | | | |
| 101...678 = according to Table 1 | | | | | | | | | |
| 999 = special connection | | | | | | | | | |
| Medium: | | | | | | | | | |
| 1 = water / liquids | | | | | | | | | |
| 2 = air / gases | | | | | | | | | |
| Measuring range: | | | | | | | | | |
| 101...666 = according to range code tables 2 &3 | | | | | | | | | |
| 999 = special range | | | | | | | | | |
| Indicator housing: | | | | | | | | | |
| 1= Polyamide | | | | | | | | | |
| 2= Aluminum | | | | | | | | | |
| Alarm contacts: | | | | | | | | | |
| 0= without | | | | | | | | | |
| 1= 1 min contact | | | | | | | | | |
| 2= 1 max. contact | | | | | | | | | |
| 3= 1 min & 1 max. contact | | | | | | | | | |
| 4= 2 min. contacts | | | | | | | | | |
| 5= 2 max. contacts | | | | | | | | | |
| 1S= 1 min contact, SPDT, with SE01.3 | | | | | | | | | |
| 2S= 1 max. contact, SPDT, with SE01.3 | | | | | | | | | |
| 3S= 1 min & 1 max. contact, 2 x SPDT, with SE01.4 | | | | | | | | | |
| 4S= 2 min. contacts, 2 x SPDT, with SE01.4 | | | | | | | | | |
| 5S= 2 max. contacts, 2 x SPDT, with SE01.4 | | | | | | | | | |
| Analog output and supply voltage: | | | | | | | | | |
| 1st digit: | | | | | | | | | |
| 0= without | | | | | | | | | |
| 1=transmitter | | | | | | | | | |
| 2= transmitter, intrinsically safe | | | | | | | | | |
| 3= pneumatic transmitter | | | | | | | | | |
| 2nd and 3rd digit: | | | | | | | | | |
| 00= without | | | | | | | | | |
| 02= 110 VAC, 4-20 mA, 4-wire | | | | | | | | | |
| 03= 230 VAC, 4-20 mA, 4-wire | | | | | | | | | |
| 06= 24 VAC, 4-20 mA, 4-wire | | | | | | | | | |
| 08= 24 VDC, 4-20 mA, 2-wire | | | | | | | | | |
| 13= 3-15 psi | | | | | | | | | |
| Electrical Connection: | | | | | | | | | |
| CG=Cable Gland | | | | | | | | | |
| PG11=PG11 | | | | | | | | | |
| Options: | | | | | | | | | |
| please indicate in writing | | | | | | | | | |

Further Ordering Information

Important: for complete identification of the meter the following information must be specified:

- 1) Order no. according to table above
- 2) Identify desired units of flow
- 3) Identify medium
- 4) Temperature (operational, max.)
- 5) Pressure (operational, max.)
- 6) Viscosity (for liquids only)
- 7) Specific gravity of medium
- 8) For gases only: reference conditions
- 9) Any additional application specific information

CLARK

CLXC-C1 Series Single Jet Totalizing Water Meter

1/2" & 3/4" Sizes, With or Without Reed Switch Output

DESCRIPTION

Model series CLXC-C1 meters are single-jet dry type totalizing water meters. They are an ideal choice for a range of water use monitoring applications as well as many OEM and industrial applications where keeping track of consumed water volume is important for meeting regulatory and environmental requirements.

A pulse output of one pulse per gallon, 10 gallons or 10 liters is available.

CLXC-C1 meters are accurate and reliable. They are produced in an ISO9001 certified production facility and conform to International Standard ISO4064.

SPECIFICATIONS

GENERAL

Measuring Principle: Single Jet

Meter Type: Dry, magnetic coupling between rotor and register movement

Meter Sizes: 1/2", 3/4"

Max Media Temperature:

Cold Water Meter: 122°F (50°C)

Hot Water Meter: 194°F (90°C)

Max Operating Pressure: 150 PSI

Proof Pressure: 300 PSI

Materials:

Main Casing: Brass (CuZn40Pb2)

Register Box Rings: Brass (CuZn40Pb2)

Transparent Cover: Polycarbonate

Measuring Rotor: Polycarbonate

Rotor Spindles: 304 Austenitic Stainless Steel

Upper Plate: Polycarbonate

Bottom Plate: Polycarbonate

Register Gear Trains: POM

Worm Gear: POM

Registration Accuracy, with water <80°F (27°C):

Normal Test Flow Range (Table 1): ±2%

Pressure Drop: 15 PSI Max, see pressure drop curves

Installation: Horizontal orientation recommended

Casing Spud Connections: External straight threads

according to ANSI/ASME B1.20.1. See Dimensions, Connections and Weights (Table 2) for details.

Standard Accessories: Each meter is supplied with meter coupling (tailpiece) sets; includes

2 couplings and 2 gaskets

OPTIONAL PULSE/REED SWITCH OUTPUT:

The pulse emitter consists of a plastic housing with a reed switch that is closed when a magnet mounted on one of the meters register gears comes into its activation proximity.



Table 1- Operating Characteristics

| Model | Size | Max. Flow GPM (m ³ /hr) | Nom. Flow GPM (m ³ /hr) | Min. Flow GPM (m ³ /hr) | Normal Test Flow Limits GPM (m ³ /hr) | Min. Reading Gallons (m ³ /hr) | Max. Reading Gallons (m ³ /hr) | Pulse Output Options |
|-------------|------|------------------------------------|------------------------------------|------------------------------------|--|---|---|----------------------|
| CLXC-C1-15D | 1/2" | 13.20 (3.0) | 7.50 (1.7) | 0.13 (.03) | 1-13.2 (0.23-3.0) | 0.01 (0.0001) | 9999999 (999999) | 1P/1 or 10 P/10 Li |
| CLXC-C1-20D | 3/4" | 22 (5.0) | 11.00 (2.5) | 0.22 (0.05) | 1-22 (0.23-5.0) | 0.01 (0.0001) | 9999999 (999999) | 1P/1 or 10 P/10 Li |

A 1.5 meter (59") length of 2-conductor wire 3.5 mm inch diameter is standard. One conductor has red insulation and one has black.

Max Voltage: 24V AC/DC

Max Current: 0.01 A

Output Bounce Time: 0.01 second

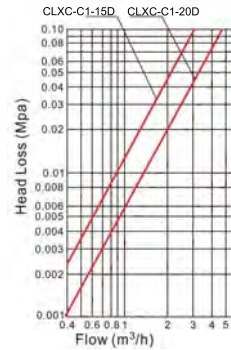
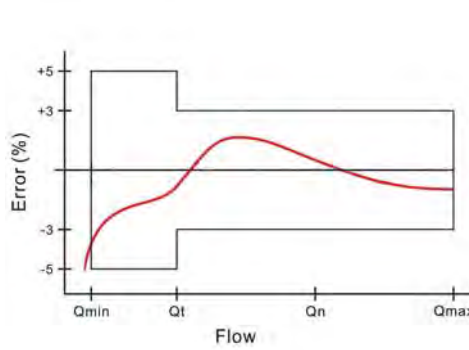
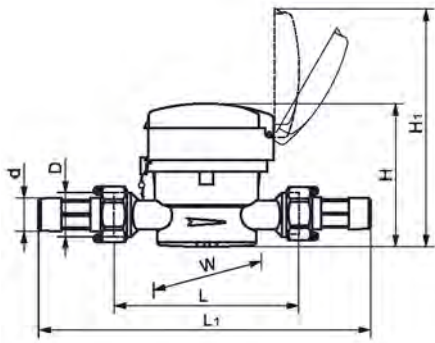


Reed Switch



CLXD-C1 with Reed Switch Output

DIMENSIONS, CONNECTIONS, ACCURACY, PRESSURE DROP



| Table 2- Dimensions, Connections & Weights | | | | | | | | | | |
|--|------|-------------------------|----------------------------------|------------------------|-------------------------|-----------------------------|-------------------------|------------------------------|------------------------------------|----------------------------------|
| Model | Size | L Length Inches (mm) | L1 Overall Length Inches (mm) | W Width Inches (mm) | H Height Inches (mm) | H1 Working Height Inches | D Body Threads (NPS) | d Connector Threads (NPT) | Weight W/O Couplings lb (kg) | Weight W/Couplings lb (kg) |
| CLXC-C1-15D | 1/2" | 4.33 (110) | 8.03 (204) | 3.15 (80) | 2.83 (72) | 5.63 (143) | 3/4" | 1/2" NPT | 1.32 (0.6) | 1.72 (0.78) |
| CLXC-C1-20D | 3/4" | 5.12 (130) | 9.21 (234) | 3.15 (80) | 2.83 (72) | 5.63 (143) | 1" | 3/4" NPT | 1.54 (0.70) | 2.16 (0.98) |

Meter Dial Layout



Cubic Meters with Reed Switch Output



Gallons

ORDERING INFORMATION

CLXC-C1-A-B-C-D-E

EXAMPLE: CLXC-20D-S

| A Meter Size | B Hot or Cold water Meter | C Pulse Output | D Units |
|--|------------------------------|---|-------------------------------|
| 15D= 1/2" 20D= 3/4" | C= Cold H=Hot | = None S= 1Pulse per Gal S10= 1Pulse per 10 Gal S10L= 1 Pulse per 10 Liters (.01 m³) | = Gallons CM= Cubic meters |
| Note: Each unit is shipped with a set of two couplings and gaskets | | | |

TWO PIECE METER COUPLINGS (TAILPIECES)

| Coupling Part Number | Description | Material | Length of Coupling | Used With Meter Model | Qty needed per mete |
|----------------------|--|-----------|--------------------|-----------------------|---------------------|
| C15T-C1 | 3/4" NPS female nut to 1/2" NPT male union; includes 2 couplings and 2 gaskets | CuZn40Pb2 | 2-3/8" | CLXC-15D | 1 |
| C20T-C1 | 1" NPS female nut to 3/4" NPT male union includes 2 couplings and 2 gaskets | CuZn40Pb2 | 2-1/2" | CLXC-20D | 1 |

CLARK

CLXC-P Series Single Jet Totalizing Water Meter

5/8 x 3/4 Size, With or Without Reed Switch Output

DESCRIPTION

Model series CLXC-P meters are single-jet dry type totalizing water meters. They are an ideal choice for a range of sub-metering applications for apartment and commercial buildings as well as marinas, RV and camping parks etc.

An optional pulse/reed switch output is available.

CLXC-P meters are accurate and reliable. They are produced in an ISO9001 certified production facility and are constructed in conformance with AWWA standard C712-10.



CLXC-P is certified by Water Quality Association to meet ANSI/NSF 61 for materials safety and ANSI/NSF 372 for lead free compliance.



SPECIFICATIONS

GENERAL

Measuring Principle: Single Jet

Meter Type: Dry, magnetic coupling between rotor and register movement

Meter Size: 5/8 x 3/4

Max Media Temperature:

Cold Water Meter: 122°F (50°C)

Hot Water Meter: *149°F (65°C)

*WQA tested & certified 140°F (60°C)

Max Operating Pressure: 150 PSI

Materials:

Meter Body, Inlet filter, coupling: GV-5 FWA is a 50% glass fibre reinforced engineering thermoplastic material

Other Materials: See Table 2

Registration Accuracy, with water <80°F (27°C):

Normal Test Flow Range (Table 1): ±1.5% (The meter will register 98.5% to 101.5% of the water that passes through it)

At Minimum Flow (Table 1): -5%,+1.0% (The meter will register 95% to 101.0% of the water that passes through it)

Pressure Drop: 15 PSI Max, see pressure drop curves

Installation: Horizontal orientation recommended

Casing Spud Connections: External straight threads according to ANSI/ASME B1.20.1. See Dimensions, Connections and Weights (Table 2) for details.

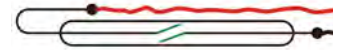
Standard Accessories: Each meter is supplied with meter coupling (tailpiece) sets; includes 2 couplings and 2 gaskets

| Model | Max. Flow GPM | Nom. Flow GPM | Min. Flow GPM | Normal Test Flow Limits GPM | Min. Major Dial Division Reading | Max. Reading | Pulse Output Option |
|------------|---------------|---------------|---------------|-----------------------------|--------------------------------------|---|---|
| CLXC-P-20D | 22 GPM | 11.00 | 0.22 | 1-22 | 0.01G 0.1L .0001m ³ | 9999999 G 99999999 L 99999 m ³ | 1P/1G 1P/ 10G 1P/10 L 1P/100L 1P/.01 m ³ 1P/.1 m ³ |

OPTIONAL PULSE/REED SWITCH OUTPUT:

The pulse emitter consists of a plastic housing with a reed switch that is closed when a magnet mounted on one of the meters register gears or dial indicator comes into its activation proximity.

A 1.5 meter (59") length of 2-conductor wire 3.5 mm inch diameter is standard.



One conductor has red insulation and Reed Switch one has black.

Max Voltage: 24V AC/DC

Max Current: 0.01 A

Output Bounce Time: 0.01 second

**OPTIONAL
PULSE/REED SWITCH
OUTPUT CONT'D**

Reed Switch Location is under the meter lens on the main register in proximity to the least significant tumbler digit for the following:
 1P/10 Gal
 1P/100 Liters
 1P/0.1 m³



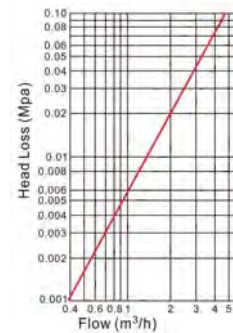
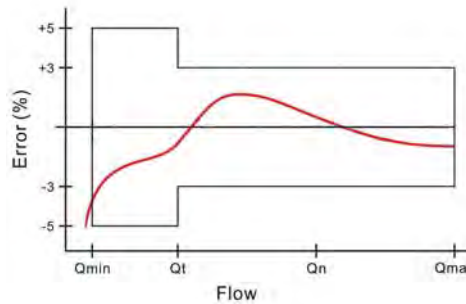
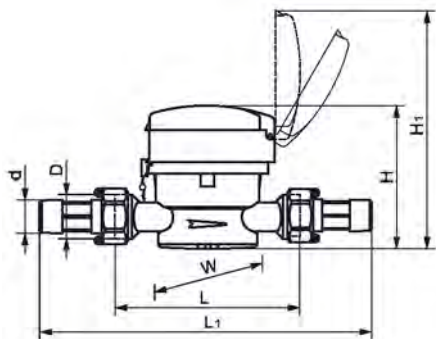
Reed Switch Location is on the meter lens on the higher value rotary dial:
 1P/1 Gal
 1P/10 Liters
 1P/0.01 m³



| Table 2 Meter Parts | | | | |
|---------------------|-------------------|---|--|-------------------|
| No. | Description | Material Cold Water Meter | Material Hot Water Meter | Wetted Non-Wetted |
| Lid Assembly | | | | |
| 1.1 | Lid | ABS | PP | Non-Wetted |
| 1.2 | Pin | Copper | | |
| 1.3 | Cap | ABS | PP | |
| 2 | Register | ABS, Rubber Gasket, POM, Stainless Steel, LDPE, Agate, Magnet | PC, Rubber Gasket, POM, Stainless Steel, Agate, Magnet | Wetted |
| 3 | Magnet Protection | Industrial Pure Iron | | |
| 4 | Magnet Protection | | | |
| 5 | Inner Screw Ring | PPO | | |
| 6 | Gasket | POM | | |
| 7 | O=Ring | EPDM | | |
| 8 | Pressure Plate | PA | | |
| Impeller Assembly | | | | |
| | Pivot | Stainless Steel | | Wetted |
| | Magnet | Ferrite | | |
| | Impeller | PP | | |
| | Lining | CFPA | | |
| Body Parts | | | | |
| 10.1 | Pivot | POM, Stainless Steel | | Wetted |
| 10.2 | Body | PA | | |
| 10.3 | Inlet Filter | PA | | |
| C20T-P Connector | | | | |
| 11.1 | Nut | PA | | Non-Wetted |
| 11.2 | Coupling | PA | | Wetted |
| 11.3 | Gasket | EPDM | | |

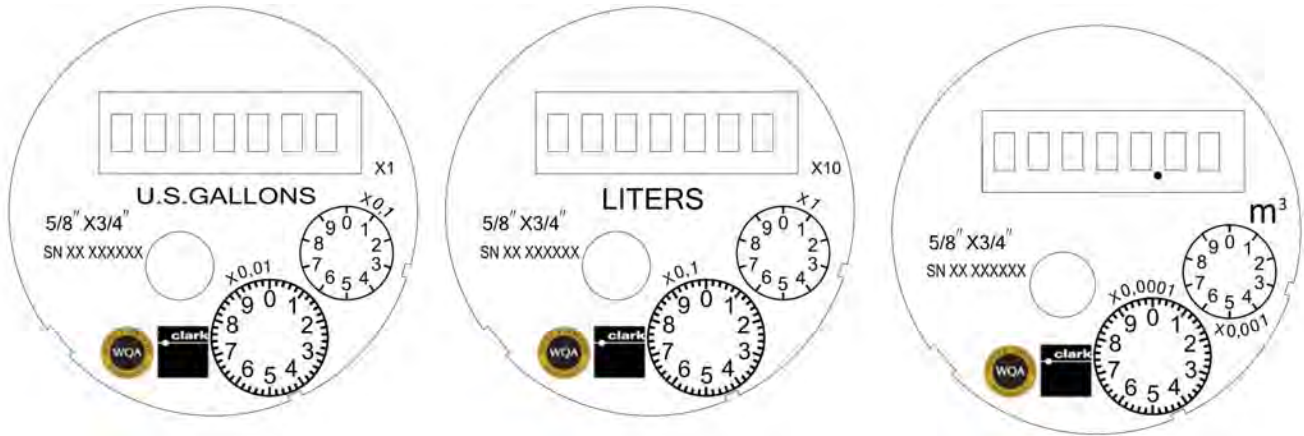


DIMENSIONS, CONNECTIONS, ACCURACY, PRESSURE DROP



| Table 2- Dimensions, Connections & Weights | | | | | | | | | |
|--|----------------------|-------------------------------|---------------------|----------------------|--------------------------|----------------------|---------------------------|------------------------------|----------------------------|
| Model | L Length Inches (mm) | L1 Overall Length Inches (mm) | W Width Inches (mm) | H Height Inches (mm) | H1 Working Height Inches | D Body Threads (NPS) | d Connector Threads (NPT) | Weight W/O Couplings lb (kg) | Weight W/Couplings lb (kg) |
| CLXC-P-20D | 5.12 (130) | 9.21 (234) | 3.15 (80) | 2.83 (72) | 5.63 (143) | 1" | 3/4" NPT | .75 (0.34) | .95 (0.43) |

Meter Dial Layout



ORDERING INFORMATION

CLXC-P-A-B-C-D-E

EXAMPLE: CLXC-P-20D-S

| A Meter Size | B Hot or Cold water Meter | C Pulse Output | D Units |
|---|------------------------------|---|---|
| 20D= 5/8 x 3/4" | C= Cold H=Hot | -- None S= 1Pulse per 1 Gal S10= 1Pulse per 10 Gal S10L= 1 Pulse per 10 Liters (.01 m ³) Output S100L= 1 Pulse per 100 Liters (0.1m ³) | -- Gallons L= Liters CM= Cubic meters |
| <p>Bold order combinations are typically in stock Minimum order quantities may apply for non-stock items Note: Each unit is shipped with a set of two couplings and gaskets</p> | | | |

TWO PIECE METER COUPLINGS (TAILPIECES)

| Coupling Part Number | Description | Material | Length of Coupling | Used With Meter Model | Qty needed per meter |
|----------------------|---|-----------------------------|--------------------|-----------------------|----------------------|
| C20T-P | 1" NPS female nut to 3/4" NPT male union includes 2 couplings and 2 gaskets | Coupling-PA Gasket- EPDM | 2-1/2" | CLXC-P-20D | 1 |



C20-P

CLARK

MJ-SDC Multi-Jet Totalizing Water Meter

5/8" x 3/4", With or Without Pulse/Reed Switch Output

DESCRIPTION

Model MJ-SDC 5/8 x 3/4" meters are multi-jet, dry type totalizing water meters. They are an ideal choice for a range of municipal, private and industrial water metering applications.

A pulse/reed switch output of one pulse per 0.1, 1.0, 10 or 100 gallons is available.

MJ-SDC meters are accurate and reliable. They are produced in an ISO9001 certified production facility and are constructed in conformance with AWWA C708 standards. The product complies with NSF/ANSI 61 Annex G, NSF/ANSI 372 and conforms with lead free plumbing as defined by California, Vermont, Maryland and Louisiana state laws and the U.S Safe Drinking Water Act due to take effect January 2014.



SPECIFICATIONS

GENERAL

- Measuring Principle: Multi-Jet
- Meter Type: Dry, magnetic coupling between rotor and register movement
- Meter Sizes: 5/8 x 3/4"
- Max Operating Temperature: 122°F (50°C)
- Max Operating Pressure: 150 PSI
- Proof Pressure: 300 PSI
- Materials:
 - Main Casing: ECO Brass (C87850)
 - Couplings/Tailpieces: C89833
 - Other Materials: See Table 2
- Registration Accuracy, with water <80°F (27°C):
- Normal Test Flow Range (Table 1): The meter will register 98.5% to 101.5% of the water that passes through it.
- At Minimum Test Flow (Table 1): The meter will register 97% to 103% of the water that passes through it.
- Pressure Drop: <15 PSI, see curve (fig. 1)
- Installation: Horizontal orientation recommended

- Inlet Strainer: Internal and can be cleaned without breaking security seal
- Casing Spud Connections: External straight threads according to ANSI/ASME B1.20.1. See Dimensions, Connections and Weights (Table 2) for details.
- Accessories: Meter coupling (tailpiece) sets that include 2 couplings and 2 gaskets, are optionally available.

OPTIONAL PULSE/REED SWITCH OUTPUT:

The pulse emitter consists of a plastic housing with a reed switch that is closed when a magnet mounted on one of the meters register totalizers comes into its activation proximity. A 1.5 meter (59") length of 2-conductor wire 3.5 mm inch diameter is standard. One conductor has red insulation and one has black.

- Max Voltage: 24V AC/DC
- Max Current: 0.01 A
- Gallons per pulse: 0.1, 1 (standard), 10, 100
- Output Bounce Time: 0.01 second

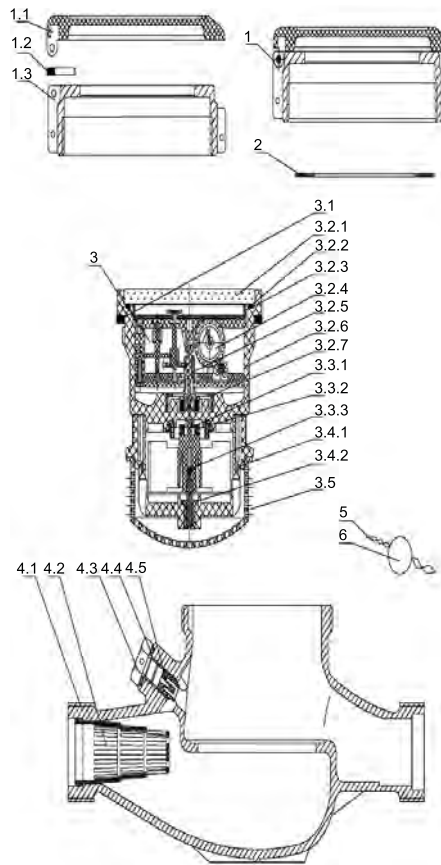
| Model | Size | Safe Max. Flow GPM | Recommended Maximum Continuous Flow Rate GPM | Min. Test Flow GPM | Normal Test Flow Limits GPM | Min. Reading Gallons | Max. Reading Gallons | Gallons/Pulse Output Option |
|--------|------------|--------------------|--|--------------------|-----------------------------|----------------------|----------------------|-------------------------------|
| MJ-SDC | 5/8 x 3/4" | 20 | 10 | 0.25 | 1-20 | 0.005 | 9,999,999.99 | 0.1, *1, 10, 100 *Standard |



MJ-SDC with Reed Switch Output

| Table 2 Meter Parts | | |
|---------------------|-----------------------------|-----------------------------------|
| 1 | Lid-Pin-Cap | |
| 1.1 | Lid | ABS |
| 1.2 | Pin | Brass |
| 1.3 | Head Ring | Brass |
| 2 | Sliding Gasket | HDPE |
| 3 | Register Assembly | |
| 3.1 | Register Chamber Gasket | EPDM |
| 3.2 | Register | PET, PC, SS, Rubber, Glass, ABS |
| 3.2.1 | Glass | Glass |
| 3.2.2 | Gasket | ABS |
| 3.2.3 | O-ring | Rubber |
| 3.2.4 | Indicator | PC, SS, Rubber, Glass, ABS |
| 3.2.5 | Central Gear | POM, Magnet |
| 3.2.6 | Register Chamber | PA757, POM, SiO ₂ |
| 3.2.7 | Upper Protect Ring | Iron |
| 3.3 | Impeller Assembly | |
| 3.3.1 | Impeller | POM |
| 3.3.2 | Magnet | Ferrite |
| 3.3.3 | Bearing | SiO ₂ |
| 3.4 | Measuring Chamber Assembly | |
| 3.4.1 | Measuring Chamber | ABS |
| 3.4.2(A) | Measuring Chamber Shaft | SS, POM |
| 3.4.2(B) | Measuring Chamber Shaft Tip | Carbon Fiber Reinforced Polyamide |
| 3.5 | Inside Strainer | PP |
| 4 | Body Parts | |
| 4.1 | Body | C87850 |
| 4.2 | Inlet Strainer | PP |
| 4.3 | Calibration Bolt | PA |
| 4.4 | Calibration Gasket | EPDM |
| 4.5 | Calibration Screw | POM |
| 5 | Copper Wire | Copper |
| 6 | Seal | Lead, Plastic |

fig. 3 Meter Parts



OPERATION:

Water flows through the meter's strainer (inlet and internal) and into the measuring chamber where it drives the impeller. A driving magnet transmits the movement of the impeller to a driven magnet located within the sealed register. The magnet is connected to a gear train which translates the impeller rotations into volume totalizers displayed on the register dial face.

fig. 1- Pressure Drop

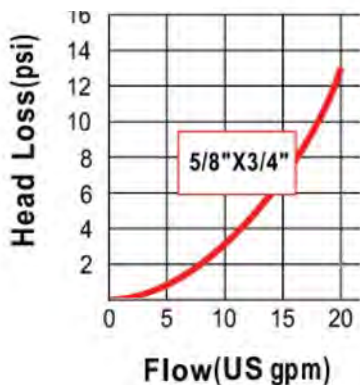
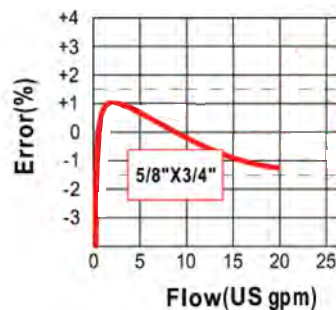
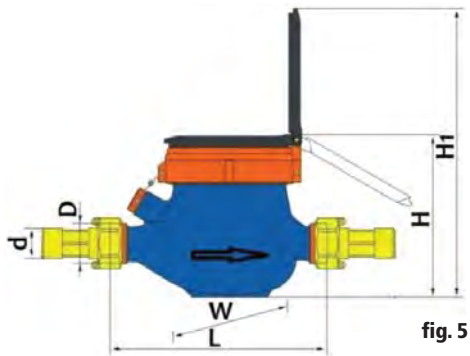


fig. 2- Accuracy



DIMENSIONS, CONNECTIONS & WEIGHT



| Model | Size | L Length Inches (mm) | W Width Inches (mm) | H Height Inches (mm) | H ₁ Height Inches (mm) | D Spud Threads (NPS) | d NPT | Weight |
|--------|------------|----------------------|---------------------|----------------------|-----------------------------------|----------------------|-------|--------|
| MJ-SDC | 5/8 x 3/4" | 7.5 (190) | 3.7 (94) | 4.23(107.5) | 7.52 (191) | 1" | 3/4" | 3 lbs |

ORDERING INFORMATION

BUILD PART NUMBER FROM BELOW CHART: A-B-C

EXAMPLE: MJ-SDC-5/8X3/4-X0.1

| A Model | B Meter Type | C *Pulse Output |
|----------------|---|---|
| MJ-SDC-5/8x3/4 | No entry = Cold Water Meter **H-NLB= Hot Water Meter | -- None x0.01= Pulse every .1 gal x0.1= Pulse every 1 gal x1= Pulse every 10 gal x10= Pulse every 100 gal |

* Units are standardly available without pulse output and with a pulse output of 1 gallon per pulse. Consult factory for other pulse output values, minimum order quantities may apply.
** Hot water meters have not as yet been third party tested for NSF/ANSI 61 and NSF/ANSI 372 compliance

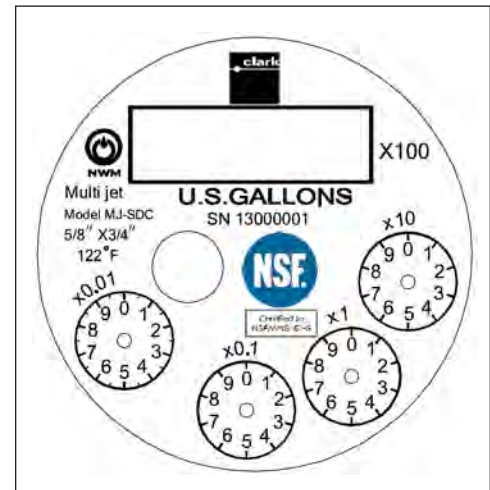


fig. 4- Cold Water Meter Dial Layout

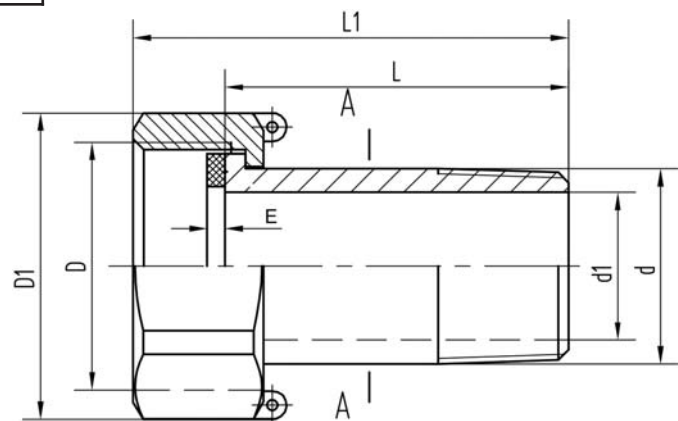
METER COUPLINGS (TAILPIECES)

| 3/4" Meter Size | Description | Dimension (mm) |
|-----------------|------------------|----------------|
| d1 | Hole Diameter | 20 |
| L | Coupling Length | 50 |
| L1 | Length | 62 |
| d | Coupling Thread | 3/4-14 NPT |
| D | Nut Thread | 1-11.5 NPSM |
| D1 | Dimension | 41 |
| E | Gasket Thickness | 3 |



ECO-Connection tailpiece assemblies are certified by NSF to meet ANSI/NSF 61 for materials safety and ANSI/NSF 372 for lead free compliance

| Model | Description | Weight |
|--------------------|---|--------|
| ECO-Connection 3/4 | includes 2 couplings, 2 nuts and 2 EPDM gaskets | 0.6 lb |



CLARK

MJP-SDC Plastic Totalizing Cold Water Meter

5/8" x 3/4", 1" & 1-1/2" Multi-Jet Type, Pulse/Reed Switch Output

DESCRIPTION

Model MJP-SDC meters are multi-jet, dry type, cold water totalizing water meters. They are an ideal choice for a range of water treatment and water monitoring applications.

A pulse/reed switch output of one pulse per 0.1, 1.0, 10 or 100 gallons is available.

MJP-SDC meters are accurate and reliable. They are produced in an ISO9001 certified production facility. The cold water meters are certified by NSF to meet ANSI/NSF 61 for materials safety and ANSI/NSF 372 for lead free compliance and conform with lead free plumbing as defined by California, Vermont, Maryland and Louisiana state laws and the U.S Safe Drinking Water Act.



SPECIFICATIONS

GENERAL

Measuring Principle: Multi-Jet

Meter Type: Dry, magnetic coupling between rotor and register movement

Meter Sizes: 5/8" x 3/4", 1", 1-1/2"

Max Operating Temperature: 86°F (30°C)

Max Operating Pressure: 150 PSI

Materials:

Main Casing: GV-5 FWA Black 9225

Couplings/Tailpieces: GV-5 FWA Black 9225

Registration Accuracy, with water <80°F (27°C):

Normal Test Flow Range (Table 1): The meter will register 98.5% to 101.5% of the water that passes through it.

At Minimum Test Flow (Table 1): The meter will register 97% to 103% of the water that passes through it.

Pressure Drop: <15 PSI , see curve (fig. 1)

Installation: Horizontal orientation recommended
Inlet Strainer: Internal and can be cleaned without breaking security seal

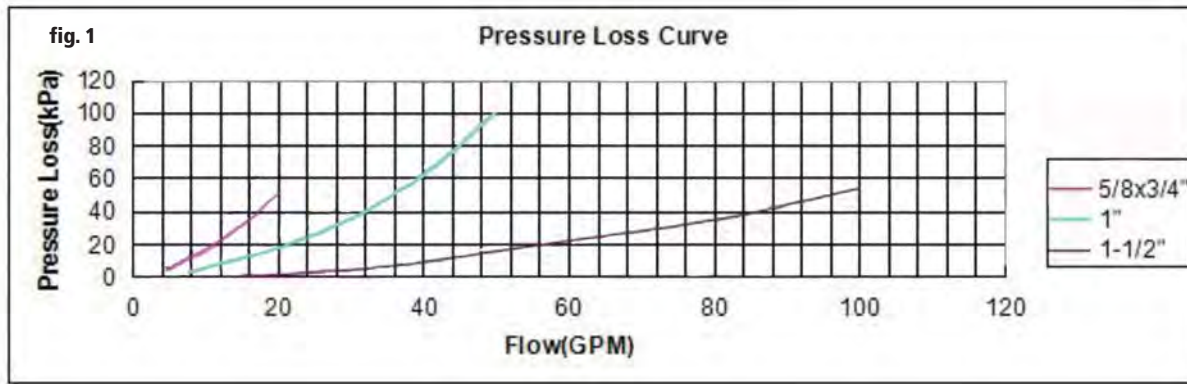
Casing Spud Connections: External straight threads according to ANSI/ASME B1.20.1. See Dimensions, Connections and Weights (Table 2) for details.

Accessories: Meter coupling (tailpiece) sets that include 2 couplings and 2 gaskets, are supplied with each meter

Table 1- Operating Characteristics

| Model | Size | Safe Max. Flow GPM | Recommended Maximum Continuous Flow Rate GPM | Min. Test Flow GPM | Normal Test Flow Limits GPM | Min. Reading Gallons | Max. Reading Gallons | Gallons/Pulse Output Option |
|---------|-------------|--------------------|--|--------------------|-----------------------------|----------------------|----------------------|-----------------------------|
| MJP-SDC | 5/8" x 3/4" | 20 | 10 | 0.25 | 1-20 | 0.005 | 9999999.99 | 0.1, 1, 10, 100 |
| MJP-SDC | 1" | 50 | 25 | 0.75 | 3-50 | 0.005 | 9999999.99 | 0.1, 1, 10, 100 |
| MJP-SDC | 1-1/2" | 100 | 50 | 1.5 | 5-100 | 0.05 | 9999999.9 | 1, 10, 100 |

PRESSURE LOSS CURVE



OPTIONAL PULSE/REED SWITCH OUTPUT:

The pulse emitter consists of a plastic housing with a reed switch that is closed when a magnet mounted on one of the meters register totalizers comes into its activation proximity. A 1.5 meter (59") length of 2-conductor wire 3.5 mm inch diameter is standard. One conductor has red insulation and one has black.

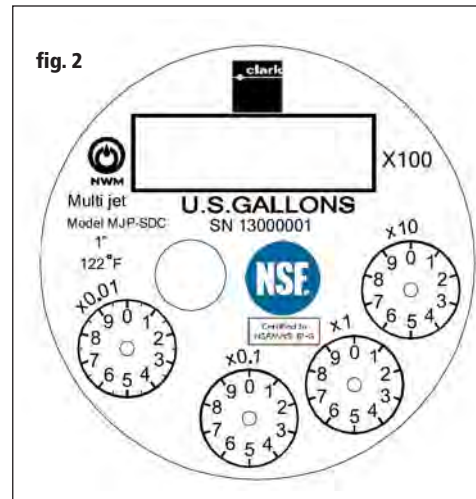
Optionally a dual reed switch output with 3-conductor cable is available. The two reed switches are symmetrically placed and both are magnetically activated in one register/dial turn. So, two switch activations represents one pulse. As, in normal operation, it is not possible for both reed switches to be activated at the same time, a security feature of a microprocessor based system is to periodically sample both switches, and, if both are closed (high level signal), this would indicate external magnetic disturbance.

- Max Voltage: 24V AC/DC
- Max Current: 0.01 A
- Gallons per pulse: 0.1, 1, 10 (standard), 100
- Capacitance: 0.2 pF
- Output Bounce Time: 0.01 second

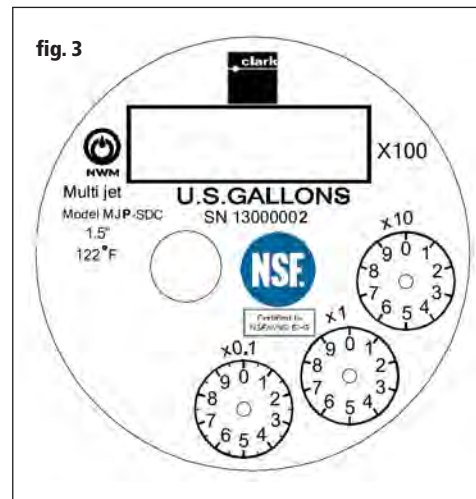


MJ-SDC with Reed Switch Output

DIALS



3/4" & 1" Size Meters: 5 Registers, 4 Dials



1-1/2" Size Meters: 6 Registers, 3 Dials

DIMENSIONS, CONNECTIONS & WEIGHT

fig. 4

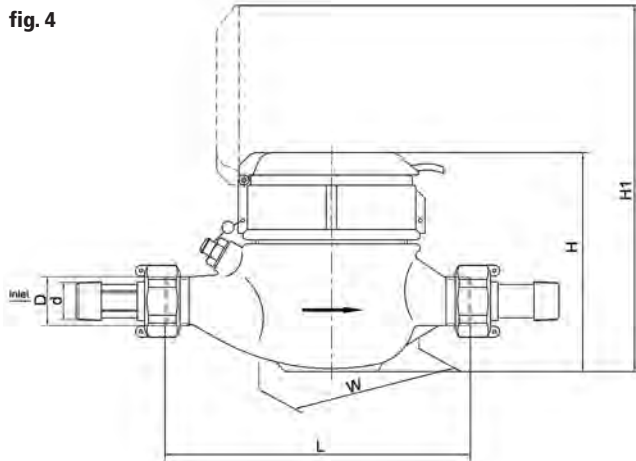
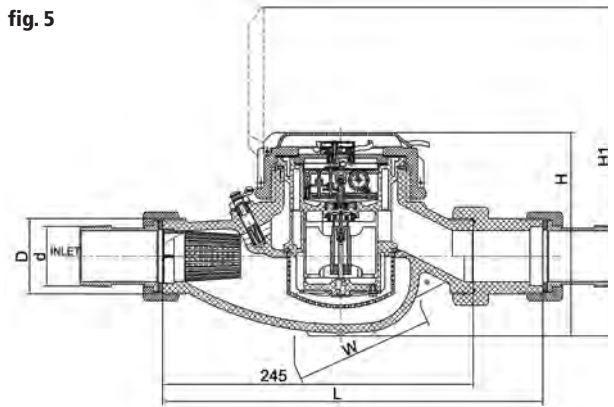
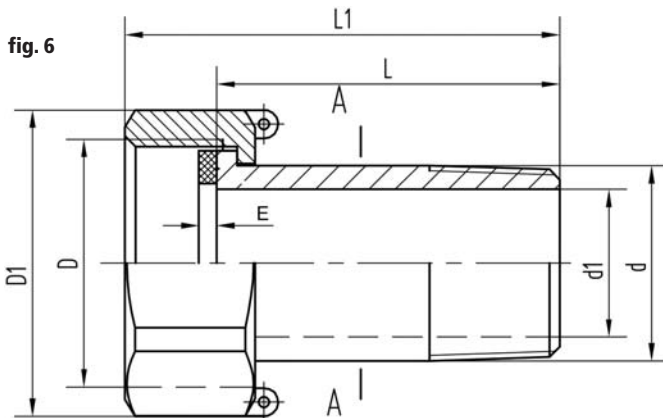


fig. 5



| Model | fig. | Size | L Length Inches (mm) | W Width Inches (mm) | H Height Inches (mm) | H ₁ Height Inches (mm) | D Spud Threads (BSPP) | d NPT | Weight lbs (kgs) |
|------------------|------|-------------|----------------------|---------------------|----------------------|-----------------------------------|-----------------------|--------|------------------|
| MJP-SDC- 5/8x3/4 | 4 | 5/8" x 3/4" | 7-1/2 (190) | 3.98 (101) | 4.72 (120) | 7.87 (200) | 1" | 3/4" | 1.58 (0.717) |
| MJP-SDC-1 | 4 | 1" | 10-1/4 (260) | 4.09 (104) | 5.12 (130) | 8.27 (210) | 1-1/4" | 1" | 1.85 (0.84) |
| MJP-SDC-1.5 | 5 | 1.5" | 11-7/8 (300) | 5.31 (135) | 6.38 (162) | 10.30 (261) | 2" | 1-1/2" | 3.17 (1.44) |

fig. 6



Meter Coupling/Tailpiece Set
(2 x Coupling, Nut & Gasket)

| Dimensions | Description | 5/8 x3/4" Meter | 1" Meter | 1 1/2" Meter |
|------------|------------------|-----------------|-------------|----------------|
| d1 | Hole Diameter | 20 mm | 25 mm | 40 mm |
| L | Coupling Length | 50 mm | 58 mm | 62 mm |
| L1 | Length | 62 mm | 73 mm | 77 mm |
| d | Coupling Thread | 3/4-14 NPT | 1-11.5 NPT | 1 1/2-11.5 NPT |
| D | Nut Thread | 1" BSPP | 1 1/4" BSPP | 2" BSPP |
| D1 | Dimension | 43 mm | 51 | 70 |
| E | Gasket Thickness | 3 mm | | 3.5 |

ORDERING INFORMATION

BUILD PART NUMBER FROM BELOW CHART: A-BC
EXAMPLE: MJP-SDC-1X1

| A *Model | B Output | C **Pulse Frequency |
|---|---|---|
| MJP-SDC-5/8x3/4 MJP-SDC-1 MJP-SDC-1.5 | -= None X= Single Pulse Output D= Dual Pulse Output | 0.01= Pulse every .1 gal (3/4" & 1" only) 0.1= Pulse every 1 gal 1= Pulse every 10 gal (standard) 10= Pulse every 100 gal |
| * Models include a set of pipe couplings ** Units are standardly available with a single pulse output a every 10 gallons. Consult factory for other pulse output values, minimum order quantities may apply. | | |

CLARK

MJ-SDC Multi-Jet Totalizing Water Meter

1", 1-1/2" & 2" With or Without Pulse/Reed Switch Output

DESCRIPTION

Model MJ-SDC meters are multi-jet, dry type totalizing water meters. They are an ideal choice for a range of municipal, private and industrial water metering applications.

A pulse/reed switch output of one pulse per 0.1, 1.0, 10 or 100 gallons is available.

MJ-SDC meters are accurate and reliable. They are produced in an ISO9001 certified production facility and are constructed in conformance with AWWA C708 standards. The cold water meters are certified by NSF to meet ANSI/NSF 61 for materials safety and ANSI/NSF 372 for lead free compliance and conform with lead free plumbing as defined by California, Vermont, Maryland and Louisiana state laws and the U.S Safe Drinking Water Act.

SPECIFICATIONS

GENERAL

- Measuring Principle: Multi-Jet
- Meter Type: Dry, magnetic coupling between rotor and register movement
- Meter Sizes: 1", 1-1/2", 2"
- Max Operating Temperature: Cold Water
Meter :122°F (50°C); Hot Water Meter 194°F (90°C)
- Max Operating Pressure: 150 PSI
- Proof Pressure: 300 PSI
- Materials:
 - Main Casing: ECO Brass (C87850)
 - Couplings/Tailpieces: ECO Brass (C87850)
 - Other Materials: See Table 2
- Registration Accuracy, with water <80°F (27°C):
 - Normal Test Flow Range (Table 1): The meter will register 98.5% to 101.5% of the water that passes through it.
 - At Minimum Test Flow (Table 1): The meter will register 97% to 103% of the water that passes through it.
- Pressure Drop: <15 PSI , see curve (fig. 1)
- Installation: Horizontal orientation recommended



- Inlet Strainer: Internal and can be cleaned without breaking security seal
- Casing Spud Connections: External straight threads according to ANSI/ASME B1.20.1. See Dimensions, Connections and Weights (Table 2) for details.
- Accessories: Meter coupling (tailpiece) sets that include 2 couplings and 2 gaskets, are optionally available.

OPTIONAL PULSE/REED SWITCH OUTPUT:

- The pulse emitter consists of a plastic housing with a reed switch that is closed when a magnet mounted on one of the meters register totalizers comes into its activation proximity. A 1.5 meter (59") length of 2-conductor wire 3.5 mm inch diameter is standard. One conductor has red insulation and one has black. Optionally a dual reed switch output with 3-conductor cable is available (consult Factory).
- Max Voltage: 24V AC/DC
- Max Current: 0.01 A
- Gallons per pulse: 0.1, 1, 10 (standard), 100
- Capacitance: 0.2 pF
- Output Bounce Time: 0.01 second

| Table 1- Operating Characteristics | | | | | | | | |
|------------------------------------|--------|--------------------|--|--------------------|-----------------------------|----------------------|----------------------|-----------------------------|
| Model | Size | Safe Max. Flow GPM | Recommended Maximum Continuous Flow Rate GPM | Min. Test Flow GPM | Normal Test Flow Limits GPM | Min. Reading Gallons | Max. Reading Gallons | Gallons/Pulse Output Option |
| MJ-SDC | 1" | 50 | 25 | .75 | 3-50 | 0.005 | 9,999,999.99 | 0.1, 1, 10, 100 |
| MJ-SDC | 1-1/2" | 100 | 50 | 1.5 | 5-100 | 0.05 | 99,999,999.9 | 1, 10, 100 |
| MJ-SDC | 2" | 160 | 80 | 2.0 | 8-160 | 0.05 | 99,999,999.9 | 1, 10, 100 |



MJ-SDC with Reed Switch Output

| Table 2 Meter Parts | | |
|---------------------|-------------------------|---------------------------------|
| 1 | Lid-Pin-Cap | |
| 1.1 | Lid | ABS |
| 1.2 | Pin | Brass |
| 1.3 | Head Ring | Brass |
| 2 | Sliding Gasket | |
| | Sliding Gasket | HDPE |
| 3 | Register Assembly | |
| 3.1 | Register Chamber Gasket | EPDM |
| 3.2 | Register | PET, PC, SS, Rubber, Glass, ABS |
| 3.2.1 | Glass | Glass |
| 3.2.2 | Gasket | ABS |
| 3.2.3 | O-ring | Rubber |
| 3.2.4 | Indicator | PC, SS, Rubber, Glass, ABS |
| 3.2.5 | Central Gear | POM, Magnet |
| 3.2.6 | Register Chamber | PA757, POM, SiO ₂ |
| 3.2.7 | Upper Protect Ring | Iron |

| Meter Parts | | |
|-------------|-----------------------------|-----------------------------------|
| 3.3 | Impeller Assembly | |
| 3.3.1 | Impeller | POM |
| 3.3.2 | Magnet | Ferrite |
| 3.3.3 | Bearing | SiO ₂ |
| 3.4 | Measuring Chamber Assembly | |
| 3.4.1 | Measuring Chamber | ABS |
| 3.4.2(A) | Measuring Chamber Shaft | SS, POM |
| 3.4.2(B) | Measuring Chamber Shaft Tip | Carbon Fiber Reinforced Polyamide |
| 3.4.3 | Nut | Stainless Steel |
| 3.4.4 | Screw | Stainless Steel |
| 3.4.5 | Calibration Plate | ABS |
| 3.5 | Inside Strainer | PP |
| 4 | Body Parts | |
| 4.1 | Body | C87850 |
| 4.2 | Inlet Strainer | PP |
| 4.3 | Calibration Bolt | PA |
| 4.4 | Calibration Gasket | EPDM |
| 4.5 | Calibration Screw | POM |
| 5 | Copper Wire | Copper |
| 6 | Seal | Lead, Plastic |

fig. 3 Meter Parts

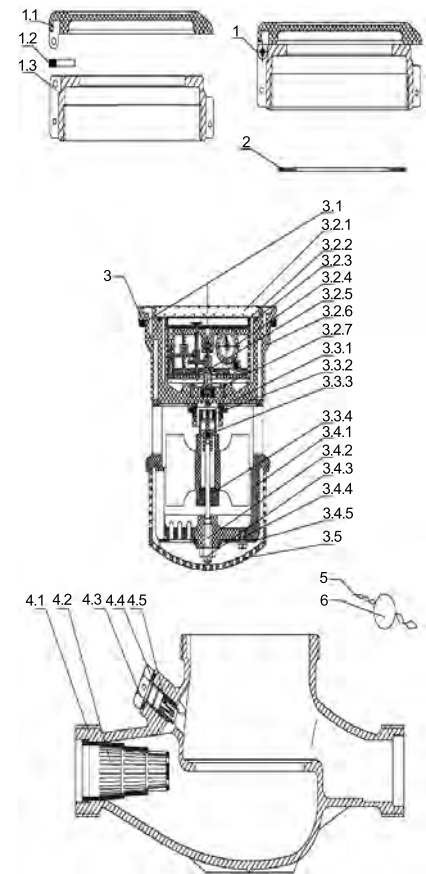


fig. 1- Pressure Drop

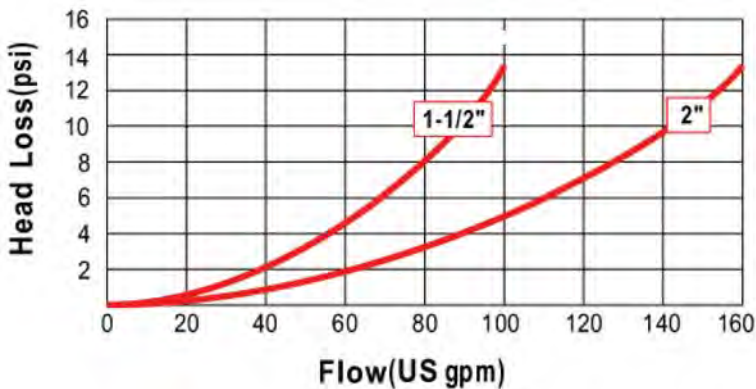
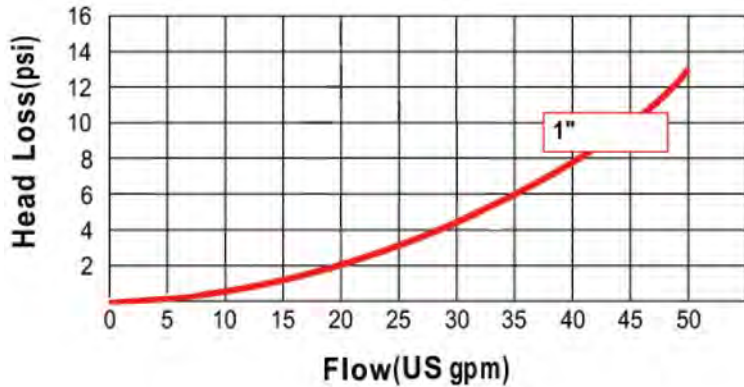
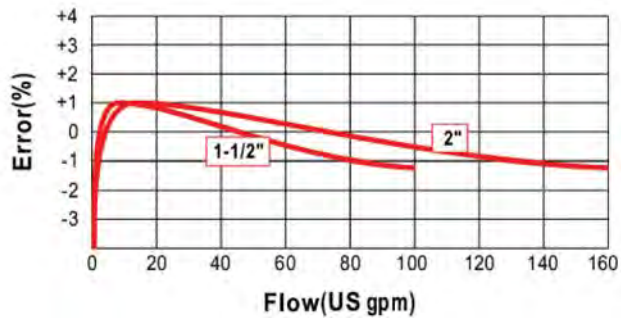
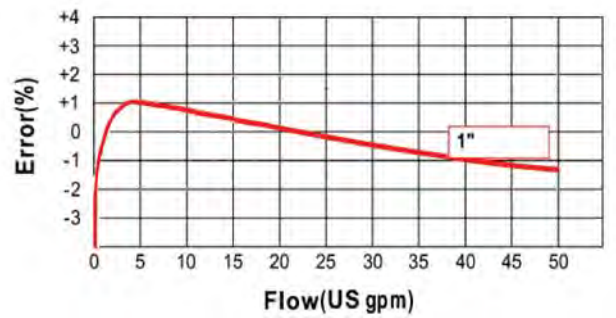


fig. 2- Accuracy



DIMENSIONS, CONNECTIONS & WEIGHT

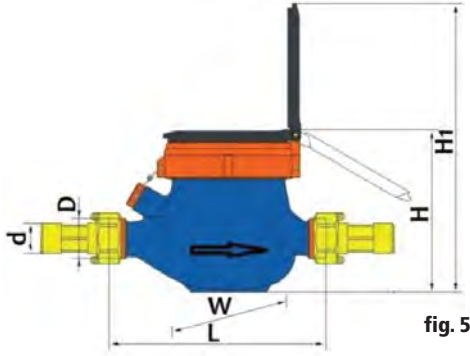


fig. 5



Table 3 Dimensions, Connections & Weight

| Model | Size | L Length Inches (mm) | W Width Inches (mm) | H Height Inches (mm) | H ₁ Height Inches (mm) | D Spud Threads (NPS) | d NPT | Weight lbs (kgs) |
|------------|------|-------------------------------|------------------------------|-------------------------------|--|-------------------------------|----------|---------------------|
| MJ-SDC-1 | 1" | 10-1/4 (260) | 3.86 (98) | 4.63 (117.5) | 8.13 (206.5) | 1-1/4" | 1" | 5.29 (2.4) |
| MJ-SDC-1.5 | 1.5" | 11-7/8 (300) | 4.80 (122) | 5.57 (141.5) | 10.10 (256.5) | 2" | 1-1/2" | 11.20 (5.1) |
| MJ-SDC-2 | 2.0" | 11-7/8 (300) | 4.80 (122) | 5.57 (141.5) | 10.10 (256.5) | 2-1/2" | 2" | 13.7 (6.2) |

ORDERING INFORMATION

BUILD PART NUMBER FROM BELOW CHART: A-B-C
EXAMPLE: MJ-SDC-1X1

| A Model | B Meter Type | C *Pulse Output |
|------------------------------------|---|---|
| MJ-SDC-1 MJ-SDC-1.5 MJ-SDC-2 | No entry = Cold Water Meter **H-NLB= Hot Water Meter | -= None x0.01= Pulse every .1 gal (MJ-SDC-1 Only) x0.1= Pulse every 1 gal x1= Pulse every 10 gal (standard) x10= Pulse every 100 gal |

* Units are standardly available without pulse output and with a pulse output of one pulse every 10 gallons. Consult factory for other pulse output values, minimum order quantities may apply.
 ** Hot water meters have not as yet been third party tested for NSF/ANSI 61 and NSF/ANSI 372 compliance

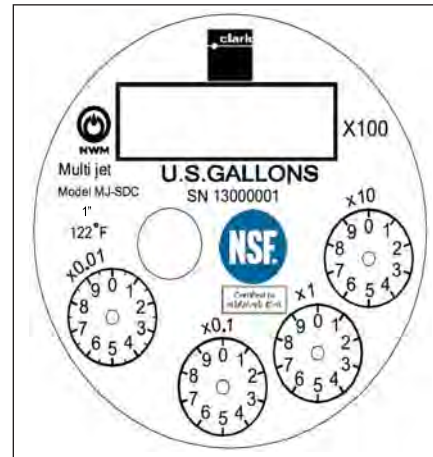
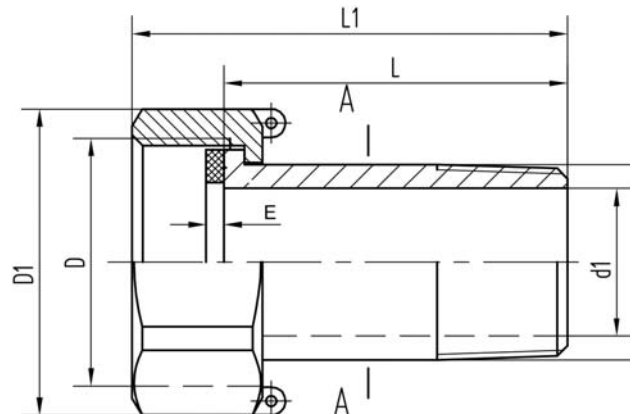


ECO-Connection tailpiece assemblies are certified by NSF to meet ANSI/NSF 61 for materials safety and ANSI/NSF 372 for lead free compliance

| Model | Description | Weight |
|----------------------------|---|---------|
| ECO-Connection 1" | Contractor Coupling Pack includes 2 ea. tailpiece and nut assemblies and 2 ea. EPDM gaskets | 1.04 lb |
| ECO-Connection 1.5" | Contractor Coupling Pack includes 2 ea. tailpiece and nut assemblies and 2 ea. EPDM gaskets | 2.32 lb |
| ECO-Connection 2" | Contractor Coupling Pack includes 2 ea. tailpiece and nut assemblies and 2 ea. EPDM gaskets | 4.4 lb |

METER COUPLINGS (TAILPIECES)

| Dimension | Description | Dimension (mm) 1" Meter | Dimension (mm) 1 1/2" Meter | Dimension (mm) 2" Meter |
|-----------|------------------|----------------------------|--------------------------------|----------------------------|
| d1 | Hole Diameter | 25 | 40 | 50 |
| L | Coupling Length | 58 | 62 | 70 |
| L1 | Length | 73.5 | 78 | 92 |
| d | Coupling Thread | 1-11.5 NPT | 1 1/2-11.5 NPT | 2-11.5 NPT |
| D | Nut Thread | 1 1/4-11.5 NPSM | 2-11.5 NPSM | 2 1/2-8 NPSM |
| D1 | Dimension | 51.8 | 70 | 89 |
| E | Gasket Thickness | 3 | 3.5 | 4 |



1" Size Meters: 5 Registers, 4 Dials



1-1/2" & 2" Size Meters: 6 Registers, 3 Dials

RCM

7000/8000 Series Liquid/Gas/Steam Flow Meter

Differential Pressure Type, 1/4" to 8" Pipe, Alarm, Freq. & Analog Outputs

DESCRIPTION

Use the 7000/8000 series flow meters for measuring the flow rate of liquids, gases, compressed air or steam in closed pipes. Flow switch and flow transmitters options for process monitoring and control are standardly available. The meters feature a large easy to read analog dial with 270 degree pointer movement or a digital display where both rate and total measurements displayed.

The 7000/8000 series measures flow based on a pressure differential created across a built-in calibrated nozzle. The meter is self-contained and complete. It does not require external power connections, separate orifices, or blocking, purging or equalizing valves.



7000/8000 series are suitable for measuring water, oil and most other low viscosity liquids which do not deposit and which are compatible with the materials of construction. The flow meters are also suitable for measuring compressed air, oxygen, carbon dioxide and many other non-toxic compressed gases (Specify Option I). Saturated steam can also be measured up to 120 psig (Option K).

Models can be fitted with a transmitter with current or frequency outputs for remote indication or totalization, or with reed switch contacts for signaling high or low flows.

Typical applications include: lube oil monitoring, blending processes, cooling water, reverse osmosis systems and compressed air measurement.

SPECIFICATIONS

GENERAL

Accuracy: $\pm 3\%$ F.S.

Repeatability: $\pm 1\%$ F.S.

Pipe Sizes: 1/4" to 8"

Mechanical Dial: 270°, see Dial & Scales Table

Optional Digital Flow Display/Totalizer: Loop powered 4-20 mA, two-wire, 4 1/2 digit flow display, 8 digits for totalization, includes square root extraction.

Flow Range Turn Down Ratio: 6 to 1

Flow Ranges: See flow tables (Full scale ranges from 4 GPH to 3000 GPM liquid, 40 SCFH to 20,000 SCFM gas)

Pressure, max: 180 psig (12.6 kg/cm²); 400 psig optional

Pressure, min: 10 psig (0.67 kg/cm²)

Temperature, max: 212°F (100°C); 350°F (177°C) optional

Temperature, min: -30°F (-34°C); -80°F (-62°C) optional

Viscosity, max: 5 centipoise (to 500 cps optionally available)

Housing: Super ABS, UV stabilized; Epoxy coated aluminum optional

Flowmeter Body: Bronze; Monel or 316 SS optional

Bellows: Bronze; Monel or 316 SS optional

Seals: Buna-N; Viton, EPR, Teflon optional

Crystal: Polycarbonate

Gear Movement: Bronze; 316 SS optional

Pressure Drop: Bronze, max 5 psig; SS & Monel, max 7 psig

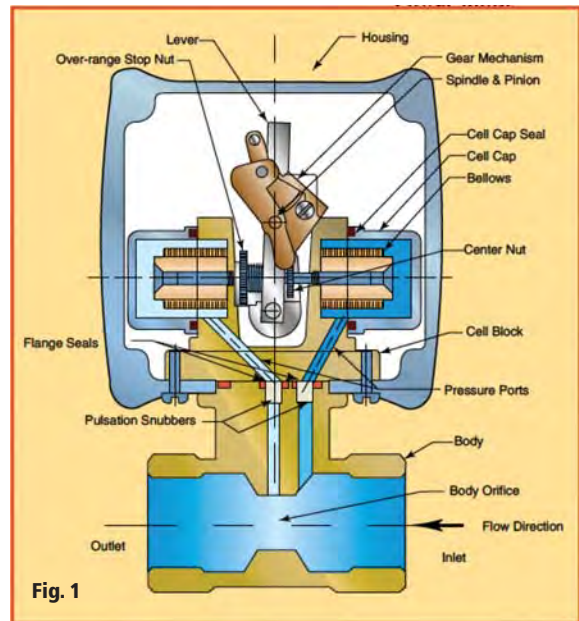


Fig. 1

7000 Series Cutaway View

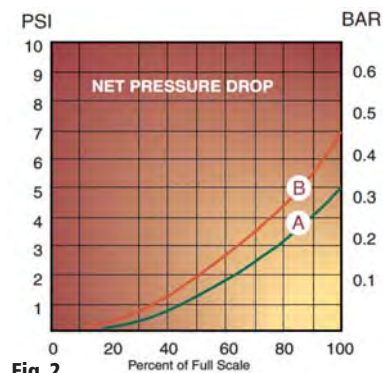


Fig. 2

Pressure Drop Characteristics

Bronz Meters- Curve A
Monel & SS Meters- Curve B
Option H (400 psig)- Curve B

FLOW TABLES

| Size | | Liquid | | Gas | | Steam |
|--------|----|--------|------|------|--------------------|-------|
| Inches | mm | GPM | LPM | SCFM | Nm ³ /h | #/h |
| 1/4 | 08 | 2 | 8 | 10 | 15 | 40 |
| 1/4 | 08 | 3 | 15 | 20 | 30 | 60 |
| 1/4 | 08 | 4 | 25 | 30 | 50 | 80 |
| 1/2 | 15 | 2 | 8 | 10 | 15 | 40 |
| 1/2 | 15 | 3 | 10 | 20 | 30 | 60 |
| 1/2 | 15 | 4 | 15 | 30 | 50 | 80 |
| 1/2 | 15 | 6 | 25 | 40 | 80 | 120 |
| 1/2 | 15 | 10 | 40 | 60 | 100 | 200 |
| 3/4 | 20 | 6 | 25 | 60 | 100 | 120 |
| 3/4 | 20 | 10 | 40 | 100 | 150 | 200 |
| 3/4 | 20 | 15 | 60 | 150 | 200 | 300 |
| 3/4 | 20 | 20 | 80 | 200 | 300 | 400 |
| 1 | 25 | 15 | 60 | 150 | 250 | 300 |
| 1 | 25 | 20 | 80 | 200 | 400 | 400 |
| 1 | 25 | 30 | 120 | 300 | 500 | 600 |
| 1 | 25 | 40 | 150 | 400 | 600 | 800 |
| 1-1/2 | 40 | 30 | 120 | 300 | 500 | 600 |
| 1-1/2 | 40 | 40 | 150 | 400 | 600 | 800 |
| 1-1/2 | 40 | 60 | 240 | 600 | 1000 | 1000 |
| 1-1/2 | 40 | 100 | 400 | 800 | 1200 | 2000 |
| 2 | 50 | 40 | 150 | 400 | 600 | 800 |
| 2 | 50 | 60 | 240 | 600 | 1000 | 1000 |
| 2 | 50 | 100 | 400 | 800 | 1200 | 2000 |
| 2 | 50 | 150 | 600 | 1000 | 1500 | 3000 |
| 2 | 50 | 200 | 800 | 1200 | 2000 | 4000 |
| 3 | 80 | 200 | 800 | 1000 | 1500 | 4000 |
| 3 | 80 | 300 | 1000 | 2000 | 3000 | 6000 |
| 3 | 80 | 400 | 1500 | 3000 | 5000 | 8000 |
| 3 | 80 | 500 | 2000 | 4000 | 6000 | 10000 |

| Size | | Liquid | | | Gas | |
|--------|----|--------|-----|------|------|--------------------|
| Inches | mm | GPH | LPM | cc/m | SCFH | Nm ³ /h |
| 1/2 | 15 | 4 | 15 | 200 | 40 | 1 |
| 1/2 | 15 | 6 | 20 | 300 | 60 | 2 |
| 1/2 | 15 | 10 | 40 | 400 | 100 | 3 |
| 1/2 | 15 | 15 | 60 | 600 | 150 | 4 |
| 1/2 | 15 | 20 | 80 | 1000 | 200 | 6 |
| 1/2 | 15 | 30 | 120 | 2000 | 300 | 8 |
| 1/2 | 15 | 40 | 150 | 3000 | 400 | 10 |
| 1/2 | 15 | 60 | 240 | 4000 | - | - |
| 1/2 | 15 | 100 | 400 | 6000 | - | - |

| Size | | Liquid | | Gas | | Steam |
|--------|-----|--------|-------|-------|--------------------|-------|
| Inches | mm | GPM | LPM | SCFM | Nm ³ /h | #/h |
| 2-1/2 | 65 | 80 | 240 | 600 | 1000 | 1000 |
| 2-1/2 | 65 | 100 | 400 | 800 | 1200 | 2000 |
| 2-1/2 | 65 | 150 | 600 | 1000 | 1500 | 3000 |
| 2-1/2 | 65 | 200 | 800 | 1200 | 2000 | 4000 |
| 4 | 100 | 300 | 1000 | 1500 | 50 | 6000 |
| 4 | 100 | 400 | 1500 | 3000 | 100 | 8000 |
| 4 | 100 | 600 | 2400 | 5000 | 150 | 10000 |
| 4 | 100 | 800 | 3000 | 6000 | 200 | 15000 |
| 5 | 125 | 300 | 1000 | 1500 | 50 | 6000 |
| 5 | 125 | 400 | 1500 | 3000 | 100 | 8000 |
| 5 | 125 | 600 | 2400 | 5000 | 150 | 10000 |
| 5 | 125 | 800 | 3000 | 6000 | 200 | 15000 |
| 6 | 150 | 600 | 2400 | 3000 | 100 | 10000 |
| 6 | 150 | 800 | 3000 | 5000 | 150 | 15000 |
| 6 | 150 | 1000 | 4000 | 8000 | 250 | 20000 |
| 6 | 150 | 2000 | 8000 | 15000 | 400 | 40000 |
| 8 | 200 | 600 | 2400 | 5000 | 150 | 10000 |
| 8 | 200 | 1000 | 4000 | 8000 | 250 | 20000 |
| 8 | 200 | 2000 | 8000 | 15000 | 400 | 40000 |
| 8 | 200 | 3000 | 12000 | 20000 | 600 | 60000 |



7000 Series



8000 Series



7000 Series (VUL Orientation)

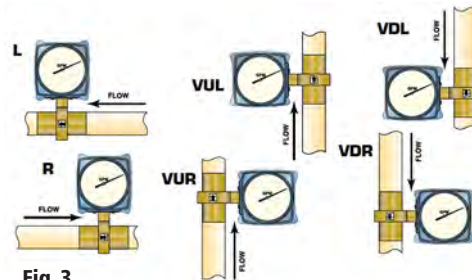


Fig. 3 Meter Housing & Indicator Orientation Choices & Designations

| Range | | Smallest Increment | Range | | Smallest Increment |
|-------|------|--------------------|-------|-----|--------------------|
| Max | Min | | Max | Min | |
| 1 | 0.15 | 0.01 | 100 | 15 | 1 |
| 2 | 0.30 | 0.05 | 120 | 15 | 1 |
| 3 | 0.40 | 0.05 | 150 | 20 | 2 |
| 4 | 0.50 | 0.10 | 200 | 30 | 2 |
| 6 | 0.50 | 0.10 | 240 | 30 | 2 |
| 8 | 1.0 | 0.10 | 250 | 30 | 5 |
| 10 | 1.5 | 0.10 | 300 | 40 | 5 |
| 15 | 2.0 | 0.20 | 400 | 50 | 10 |
| 20 | 3.0 | 0.50 | 600 | 50 | 10 |
| 25 | 3.0 | 0.50 | 800 | 100 | 10 |
| 30 | 4.0 | 0.50 | 1000 | 150 | 10 |
| 40 | 5.0 | 1.0 | 1500 | 200 | 20 |
| 50 | 6.0 | 1.0 | 2000 | 300 | 20 |
| 60 | 5.0 | 1.0 | 3000 | 400 | 50 |
| 80 | 10.0 | 1.0 | 4000 | 500 | 100 |

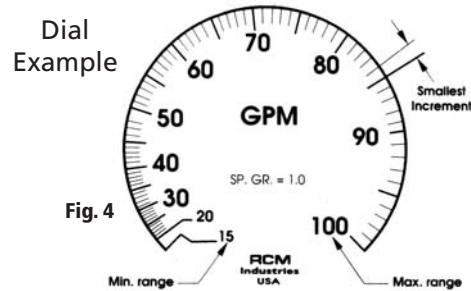


Fig. 4

OPTIONS

| Table 5 Options | |
|-----------------|--|
| Option | Description |
| A | Viton seals |
| B | EPR seals |
| B2 | Teflon seals |
| C | Calibrate for Specific Gravity |
| D | Gasketed case (NEMA-4X, IP-66) |
| DR-1 | Remote Digital Display, Rate/Total/Accum. Total |
| E | Non-standard flow rate |
| ES | Low flow rate (below 2GPM) |
| F | Aluminum housing with plastic dial crystal |
| F2 | Aluminum housing with glass dial crystal |
| G | Custom scale/dial |
| H | High pressure service (400 psig/Inconel bellows) |
| I | Compressed gas service |
| J | Peak flow indicator (second pointer w/reset) |
| K | Saturated steam service |
| N | Ammonia service |

| Table 5 Options Continued | |
|---------------------------|---|
| Option | Description |
| P | Panel mount (1/4 & 1/2") |
| R2 | Remote readout, Bronze |
| R3 | Remote readout, 316 SS |
| T | Expanded Temperature Range |
| V | High Viscosity (5-500 cps- specify) |
| W | 4-20 mA (linear) |
| W2 | 4-20 mA w/local mechanical indicator, (requires external square root extractor) |
| W3 | 4-20 mA (same as W2 but no indicator) |
| X | Hi/Lo alarm relays |
| Y | Frequency Output |
| -EM | European Labeling |
| -IS | Intrinsic Safety for W2 & W3 (consult factory for details) |
| -1S2 | 1 single throw double pole reed switch |
| -2S2 | 2 single throw double pole reed switches |

OUTPUT OPTIONS (W, X,Y, Z, W2, W3, Y, IS, 1S2, 2S2)

Table 6

| Transmitter 4-20 mA Output | 4-Wire (Order Options W,X,Y,Z) | 2-Wire (Order Options W2 & W3) |
|--|--|--|
| Accuracy Horizontal Flow | ±3% F.S. above 30% F.S. | |
| Accuracy Vertical Flow | ±5% F.S. above 30% F.S. | ±3% F.S. above 30% F.S. |
| Ambient Temp Limit | 120o F (50° C) | |
| Current Output | 4-20 mA into 800 ohms max. | 4-20 mA into 650 ohms max. (350 ohms with option R) |
| Hi/Lo Alarm (Option X) Contact Rating | 3.0 A @24V, 1A@117V, 0.5A@ 230V | N/A |
| Frequency Output (Option Y) | 1000 Hz F.S. 5 V peak, 270 µs on time | N/A |
| Electrical Rating | General Purpose | Option IS: Intrinsic safety for Class I Div I Groups A,B,C,D; Class II Div I Groups E,F,G; EEx ia IIC T3 25mA, 24 Vdc per meter. |
| Power Input | 100mA, 24 VDC | 25mA, 24 VDC |
| Reed Switches (Options 1S2 & 2S2) | | |
| Setability | ±5% F.S. | |
| Repeatability | ±1% F.S. | |
| Hysteresis | 7-13% F.S. | |
| Contact Rating | 10 watts | |
| Voltage | 175 VDC Max., 125 VAC Max. | |
| Current | 350 mA Max.Switching | |



**OPTION W3 2 WIRE FLOW TRANSMITTER
NO DISPLAY**

OPTION DESCRIPTIONS

Table 7

| Option | Description |
|--------|--|
| A & B | O-Ring Seals: Viton* (option A), EPR (option B) or Teflon* (PTFE) (option B2) O-rings may be supplied in lieu of the standard Buna-N O-ring. |
| C | Calibration for Specific Gravity: All flow meters are normally calibrated for water with a specific gravity of 1.0 (density of 62.4 lbs./ft.3). This option provides a custom sized orifice to accommodate the actual specific gravity of the measured liquid. |
| D | Gasketed Meter Housing: If the meter is to be exposed to the weather, marine service, splashing liquids, corrosive vapors, or extreme humidity or dusty conditions, then a gasketed meter housing is recommended. Gaskets are installed at the body flange, back cover plate and under the dial crystal to make the housing leaktight. |
| DR-1 | Remote digital display (rate & total):DR-1 displays instantaneous flow rate, total and accumulated total. A scaled pulse output is according to accumulated total is standard. |
| E | Non-Standard Flow Rates: Various fullscale flow rates are available for each pipe size as indicated in the charts of "Standard Flow Rates and Body Sizes". Special orifices can be furnished for smaller flows. Consult factory if this option is desired. |
| ES | Low Flow Rates: A low flow meter is available with 1/2" female NPT connections for measuring the flow of liquids as low as 1 GPH and gases as low as 10 SCFH. |

OPTION DESCRIPTIONS CONTINUED

| Option | Description |
|---------|---|
| G | Custom Scales & Dials: Non-standard flow rates and custom dial patterns require preparation of special artwork. A one-time charge is made for each custom dial pattern or non-standard scale. |
| H | 400 PSIG Service: Meters equipped with bellows made of Inconel 718 TM are available with service ratings to 400 psig and may be used where service conditions permit use of stainless steel. A slight increase in pressure drop across the meter results when these bellows are used. (See Pressure Drop Characteristic table) |
| I | Compressed Gas Service: Meters intended for compressed gas service require individual sizing of meter orifices to suit the desired flow rate, gas composition, line pressure and temperature. Dials are marked with type of gas, specific gravity, line pressure and temperature. |
| J | Peak Flow Indicator: A second pointer is provided with a reset knob to provide an indication of the maximum flow rate achieved since reset. |
| K | Saturated Steam Service: The steam service option includes EPR seals, SS bellows and an inverted aluminum housing. Steam pressures are limited to 120# saturated unless remote mounted (Option R2 & R3) |
| N | Ammonia Service: This option includes brass free construction throughout, EPR seals, a stainless gear movement and gasketed case, Price includes calibration for specific gravity, pressure and temperature. This option is available for stainless steel models only. |
| P | Panel Mount: The meter may be mounted behind a panel for pipe sizes 1 1/2" and smaller |
| R2 & R3 | Remote Readout: Adapters and 3-way equalizing valve provide extended temperature ranges or remote mount for more convenient viewing, |
| T | Extended Temperature Range: Materials suitable for a range of 80°F to 350°F are provided, Higher temperatures available in combination with option R2 and R3. Consult factory. |
| V | Calibration for High Viscosity Liquids: Liquids having a high viscosity cause flow meters to read high; however, this effect is slight for liquids having viscosities less than 5 centipoises. Heavy lubricating and fuel oils with viscosities up to 500 cps require special sizing of the flow meter orifice. |
| W | Current Output: The flow meters are available with 4-20 mA output for interfacing with remote indicators, controllers, computers and alarms. Option W uses a solid state sensor (Hall Effect) to detect the position of the pointer lever mechanism. Low flow cutoff drives the output to 4 mA when flow drops below approximately 30% of full scale. Output is linear with flow rate. |
| W2 & W3 | Current Output: Options W2 and W3 use a solid state strain-gauge to sense the differential pressure directly. Option W2 includes a mechanical flow indicator. Option W3 does not. Conditions which could cause the mechanical movement zero to shift will not affect the output from this transmitter. This transmitter provides improved rangeability at low flow rate and accordingly, does not include a low flow cutoff. Output is proportional to flow rate squared (r ²). Square root extraction is required in the receiving device. |
| X | Limit Switches: A pair of limit switches can be ordered to provide high and low limit signals. Relay contacts (N.O.) provide simple connection to electrical interlock circuits or alarm indicators. Potentiometers are provided for adjusting set points. Red and green LEDs indicate relay operation. |
| Y | Frequency Output: A 0- 1000 Hz frequency output is available to drive batch controllers or scaled electronic counters. The frequency output becomes 0 |
| Z | Combination: This option combines option W, X and Y in the same unit. |

TO ORDER:

A-BC-D-E-FGHI

Example: 3/4"-71-B-20-AD1S2 (3/4" NPT Series 7000 meter of bronze construction, flow direction from left to right, flow range of 20 GPM full scale, equipped with optional seals of Viton, optional gasketed case and one single-pole double throw reed switch).

Table 8

| A Size | B Flow Meter Series | C Body Material | D Flow Direction | E *Full Scale Flow Range (GPM) | F, G, H, I Options |
|---|---|---|---|-----------------------------------|-----------------------|
| Select from tables 1, 2 & 3 | 7= 7000 Series (NPT Thread) 8= 8000 Series (Wafer Mount) | 1= Bronze 2= Monel 3= 316 Stainless Steel | See Fig. 3 L= Right to left R= Left to right VUL=Vertical up, meter left VUR=Vertical up, meter right VDL=Vertical down, meter left VDR= Vertical down, meter right | Select from Tables 1, 2 & 3 | Select from table 5 |
| *Call us for gas and steam service as operating conditions must be known for proper calibration & marking of the product. For low flow rates (Table 2) specify F.S. flow rate in GPH followed by Option ES. For example 1/2"-71-B-4-ES | | | | | |

ACCESSORIES

Table 9

| Accessory P/N | Description |
|---------------|--|
| SK-1 | Compressed Air Survey Kit |
| DR-1 | Remote Digital Readout (requires transmitter) |
| PS-24 | Power Supply, 115 Vac in 24 Vdc out, 100 mA |
| KT-1 | Brass fittings for connecting remote readout option R2. Includes 2 -1/4" shutoff valves and selection of compression fittings. |
| KT-3 | Stainless Steel fittings for connecting remote readout option R3. Includes 2 -1/4" shutoff valves and selection of compression fittings. |
| SS | Stainless steel tag, permanently affixed |
| CT | Cardboard Tag |



SK-1 Compressed Air Survey Kit

Includes:

- Series 7000 Flow meter w/3 1/2" dial
- Light weight aluminum body
- Selection of 5 range orifices
- 4" pressure gage for field recalibration
- Quick change aluminum pipe adaptors
- Orifice change tool
- Rugged carry case & manual and pressure & temperature correction factors

Accuracy: ±3% F.S.
Pipe Size: 1, 2 or 3"
Dial Indication: 100%
Flow Ranges: 5 customer selected (max 400, 2000, 4000 SCFM for 1", 2", 3" respectively)
Calibrated Pressure/Temperature: 100 psig/80°F
Pressure Gage Accuracy: ±1% F.S



DR-1 Remote Digital Display

DR-1 displays instantaneous flow rate, total and accumulated total. A scaled pulse output is according to accumulated total is standard. DR-1 is a very compact design, loop powered display with optional backlighting green/amber.

The DR-1 digital display can be connected as a remote display to our 4-wire transmitter output option W (4-20mA linear output signal), 2-wire loop powered transmitter option W2 or W3 (4-20mA loop powered signal) where output is proportional to flow rate squared. A 4-20 mA loop powered flowmeter (RW3) that integrates the DR-1 display is available, contact us for details. Refer to the Installation & Programming Manual for details.

Numeric password protection prevents unauthorized access to menu. The easy to read menu prompts make the digital display so easy to program. An isolated scaled pulse output is available for

hook up to a remote totalizer or batch controller. Requires 24Vdc power supply not included (option PS-24).

GENERAL

Power Input:

- 100mA, 24Vdc power supply (optional accessory)
- Input loop powered from sensor signal 4-20mA

Display:

- High intensity reflective numeric and alpha numeric LCD, UV resistant
- 7 and 11 digits, various symbols & measuring units
- LCD Update: 8 times per sec. to 30 sec.
- Data Protection: EEPROM back up of totals every minute

Pass Code Protection

Optional:

- Backlighting Green / Amber (Requires 24Vdc Power Supply)

Environmental:

- Standard Unit: -40°F (-40°C) to +178°F (80°C)
- Intrinsically Safe: -40°F (-40°C) to +158°F (70°C)

Signal Inputs:

- Full Scale Range: 4 to 20 mA DC
- Voltage Drop: 2.6Vdc @ 20mA
- Update Time: 4 times / sec.
- Span: 0.001 / 999,999 with variable decimal position

Signal Output:

- Pulse output transmitting accumulated total
- One passive transistor output (NPN)
- Max. 500 Hz pulse length user definable between 1 msec up to 10 sec.

Listing:

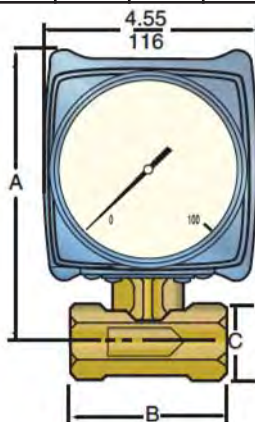
- Electromagnetic Compatibility: EN 61326 (1997), EN61010 - 1 (1993)

Accuracy:

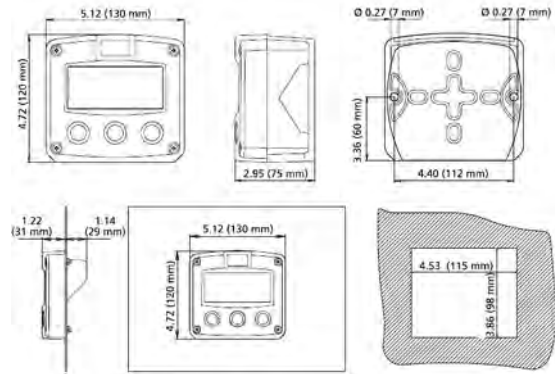
- Resolution 16 bit error < 0.01mA / ±0.05% F.S.
- Low level cut-off programmable

DIMENSIONS INCHES(MM)

| Table 10 Dimensions 7000 Series | | | | | | | | | |
|---------------------------------|------|-----|------|-----|------|-----|---------|--------|----------|
| Size | A | | B | | C | | D | | E |
| | in. | mm | in. | mm | in. | mm | in. Hex | mm Hex | |
| 1/4" | 5.95 | 151 | 3.06 | 78 | 1.50 | 38 | 1.25 | 32 | 4 (2.3) |
| 1/2" | 5.95 | 151 | 3.06 | 78 | 1.50 | 38 | 1.25 | 32 | 4 (2.3) |
| 3/4" | 5.95 | 151 | 3.06 | 78 | 1.50 | 38 | 1.25 | 32 | 4 (2.3) |
| 1" | 6.07 | 154 | 3.06 | 78 | 1.75 | 44 | 1.50 | 38 | 5 (2.7) |
| 1-1/2" | 6.39 | 162 | 3.06 | 78 | 2.60 | 64 | 2.12 | 54 | 5 (2.7) |
| 2" | 6.80 | 172 | 3.19 | 81 | 3.19 | 81 | 2.75 | 70 | 7 (3.2) |
| 3" | 7.48 | 190 | 4.19 | 106 | 4.62 | 117 | 4.00 | 102 | 12 (5.5) |

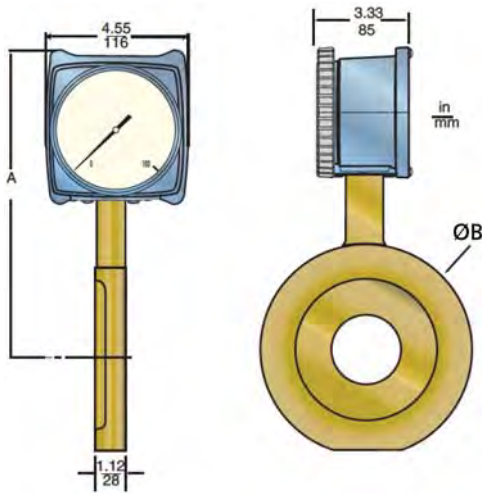


DR-1 Housing



DR-1 Panel Mount

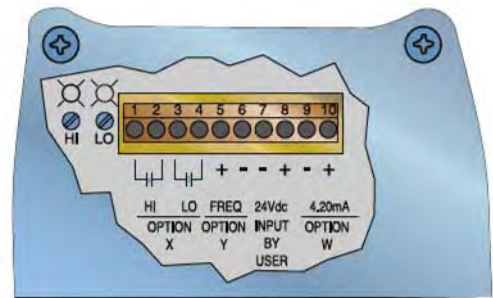
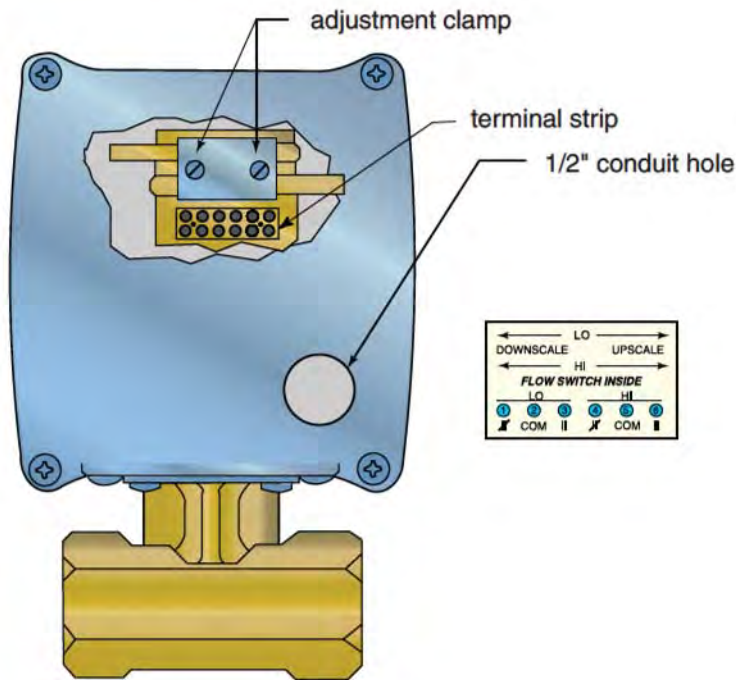




| Size | *A | | B | | Weight |
|--------|-------|-----|-------|-----|-----------|
| | in. | mm | in. | mm | lbs (kg) |
| 1/2" | 6.62 | 168 | 1.69 | 43 | 4 (1.8) |
| 3/4" | 7.06 | 179 | 2.00 | 51 | 5 (2.3) |
| 1" | 7.25 | 184 | 2.38 | 60 | 5 (2.3) |
| 1-1/2" | 7.81 | 198 | 3.12 | 79 | 7 (3.2) |
| 2" | 8.00 | 203 | 3.75 | 95 | 8 (3.6) |
| 2-1/2" | 8.54 | 217 | 4.25 | 108 | 9 (4.1) |
| 3" | 8.87 | 225 | 5.00 | 127 | 11 (5.0) |
| 4" | 9.95 | 252 | 6.13 | 156 | 15 (6.8) |
| 5" | 10.36 | 263 | 7.38 | 187 | 20 (9.1) |
| 6" | 11.05 | 280 | 8.38 | 213 | 24 (10) |
| 8" | 12.20 | 311 | 10.38 | 264 | 33 (15.0) |

*Subtract 2.00 inches (51 mm) for option W3

CONNECTION DETAIL

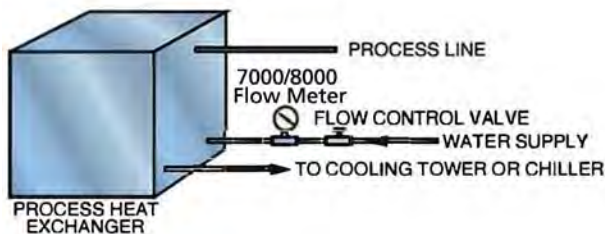


Options W, X, Y, Z

Reed Switch Options 1S2 & 2S2

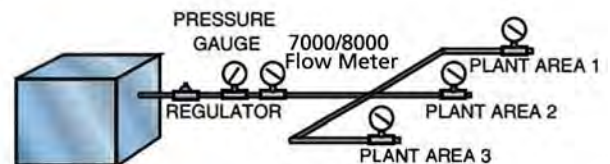
Refer to installation and operating manuals for detailed wiring and installation instructions.

TYPICAL APPLICATIONS



Process Control

Use 7000/8000 flow meter to measure the optimum flow rate for cooling water under various load conditions. The Flo-Gage can then be used to quickly set the most economical flow rate.



Compressed Air Monitoring For Energy Conservation

Mount a 7000/8000 flow meter downstream of a pressure regulator to monitor compressor operation and air utilization. Flow meters can be used at the compressor as well as at key distribution points. Reduction in wasted air can pay back installation cost in as little as a few weeks.

CLARK SOLUTIONS

Series 1000 & 2000 FLO-GARD™ Inline Flow Switches

Differential Pressure Orifice Type, Liquids & Gases

DESCRIPTION

FLO-GARD™ flow switches provide economical solutions for equipment protection and automation.

All FLO-GARD™ flow switches provide high reliability design with no paddles or small flow paths to plug or stick. Switches are suitable for measuring oil and water containing contaminants. Switches may also be selected for gases.

A wide range of sizes and materials provides optimal selection. Choose one or two field adjustable switch set points from 0.5 gallons per hour (1/2") to 3000 GPM (8"). All switches are independently adjustable from 15% to 100% of range.

A maintenance-free design, FLO-GARD™ flow switches operate on the differential pressure principle (bellows sensors) and have no bearing or sliding surfaces to corrode and stick. Normal maintenance is NOT required.

The switches have a low installation cost. FLO-GARD™ flow switches include a terminal strip and splash-proof junction box for making field connections, eliminating the cost of providing a field junction box.

SPECIFICATIONS

Pressure: max. 400 psig (28.1 kg/cm²)
 Temperature: max. 212°F (100°C); optional 350°F (177°C)
 Temperature: min. -30°F (-34°C); optional -80°F (-62°C)

Protect from freezing liquids

Pressure drop: 5 psig at max flow
 1.2 psig at 50% of max flow

Mounting: NPT threaded (series 1000) or Wafer style (series 2000) for mounting between any 150 or 300 class flanges or international equivalent

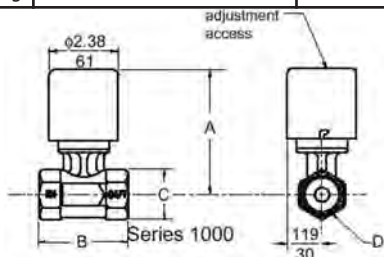
REED SWITCHES

Setability: ±5% F.S.
 Repeatability: ±1% F.S.
 Hysteresis: 7 to 13% F.S.

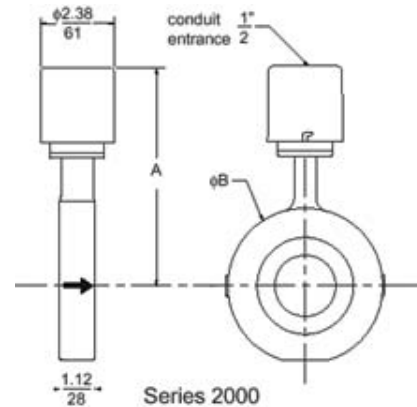


- Housing: Aluminum
Polyester coated
- Pressure Cell: Aluminum, hard anodized
- Body: Bronze
316 SS
- Bellows: Bronze
316 SS
Inconel (high pressure)

| | Non-Hazardous | Hazardous (Specify Option IS) CSA / NRTLc: AEx ia IIC: Class I, Division I, Groups A, B, C & D; Class II, Division I, Groups E, F & G |
|----------------|----------------------------|--|
| Voltage | 175 Vdc max., 125 Vac max. | 28V max. |
| Current | 350 mA max. switching | 110 mA max. |
| Contact Rating | 10 Watts | 1.2 Watts |



| Pipe Size | | Dimensions Series 1000 | | | | | | | |
|-----------|------|------------------------|-----|------|-----|------|-----|------|-----|
| | | A | | B | | C | | D | |
| in | mm | in | mm | in | mm | in | mm | in | mm |
| 0.25 | 0.08 | 3.46 | 88 | 3.06 | 78 | 1.06 | 27 | 1.06 | 27 |
| 0.5 | 15 | 3.46 | 88 | 3.06 | 78 | 1.06 | 27 | 1.06 | 27 |
| 0.75 | 20 | 4.18 | 106 | 3.06 | 78 | 1.50 | 38 | 1.25 | 32 |
| 1.0 | 25 | 4.30 | 109 | 3.06 | 78 | 1.75 | 44 | 1.50 | 38 |
| 1.5 | 40 | 4.68 | 119 | 3.06 | 78 | 2.50 | 64 | 2.12 | 54 |
| 2.0 | 50 | 5.05 | 128 | 3.19 | 81 | 3.19 | 81 | 2.75 | 70 |
| 3.0 | 80 | 5.74 | 146 | 4.19 | 106 | 4.62 | 117 | 4.00 | 102 |



| Pipe Size | | Dimensions | | | | | |
|-----------|-----|------------|-----|-------|-----|----|----|
| | | A | | B | | | |
| in | mm | in | mm | in | mm | in | mm |
| 0.5 | 15 | 4.85 | 123 | 1.69 | 43 | | |
| .075 | 20 | 5.29 | 134 | 2.00 | 51 | | |
| 1.0 | 25 | 5.48 | 139 | 2.38 | 60 | | |
| 1.5 | 40 | 6.04 | 153 | 3.12 | 79 | | |
| 2.0 | 50 | 6.23 | 158 | 3.75 | 95 | | |
| 2.5 | 65 | 6.73 | 171 | 4.25 | 108 | | |
| 3.0 | 80 | 7.10 | 180 | 5.0 | 127 | | |
| 4.0 | 100 | 8.17 | 207 | 6.13 | 156 | | |
| 5.0 | 125 | 8.57 | 217 | 7.38 | 187 | | |
| 6.0 | 150 | 9.29 | 235 | 8.38 | 213 | | |
| 8.0 | 200 | 10.54 | 267 | 10.38 | 264 | | |

FLOW SELECTION CHARTS

| Pipe Size- Inches, mm | | | | | | Maximum Flow Range | | | |
|-----------------------|-----|-----|----|-------|----|--------------------|-----|------|--------------------|
| 1/4 | 1/2 | 3/4 | 1 | 1 1/2 | 2 | liquid | | gas | |
| 08 | 15 | 20 | 25 | 40 | 50 | GPM | l/m | SCFM | NM ³ /h |
| ● | ● | | | | | 2 | 8 | 10 | 15 |
| ● | ● | | | | | 3 | 10 | 20 | 30 |
| ● | ● | | | | | 4 | 15 | 30 | 50 |
| | ● | ● | | | | 6 | 25 | 40 | 80 |
| | ● | ● | | | | 10 | 40 | 60 | 100 |
| | | ● | ● | | | 15 | 60 | 100 | 250 |
| | | ● | ● | | | 20 | 80 | 200 | 400 |
| | | | ● | ● | | 30 | 120 | 300 | 500 |
| | | | ● | ● | ● | 40 | 150 | 400 | 600 |
| | | | | ● | ● | 60 | 240 | 600 | 1000 |
| | | | | ● | ● | 100 | 400 | 800 | 1200 |
| | | | | | ● | 150 | 600 | 1000 | 1500 |
| | | | | | ● | 200 | 800 | 1200 | 2000 |

| Pipe Size- Inches, mm | | | | | | Maximum Flow Range | | | |
|-----------------------|----|-----|-----|-----|-----|--------------------|-------|-------|--------------------|
| 2 1/2 | 3 | 4 | 5 | 6 | 8 | liquid | | gas | |
| 65 | 80 | 100 | 125 | 150 | 200 | GPM | l/m | SCFM | NM ³ /h |
| ● | | | | | | 60 | 240 | 600 | 1000 |
| ● | | | | | | 100 | 400 | 800 | 1200 |
| ● | | | | | | 150 | 600 | 1000 | 1500 |
| ● | ● | | | | | 200 | 800 | 1200 | 2000 |
| | ● | ● | ● | | | 300 | 1000 | 1500 | 50 |
| | ● | ● | ● | | | 400 | 1500 | 3000 | 100 |
| | ● | | | | | 500 | 2000 | 4000 | 100 |
| | | ● | ● | ● | ● | 600 | 2400 | 5000 | 150 |
| | | ● | ● | ● | | 800 | 3000 | 6000 | 200 |
| | | | | ● | ● | 1000 | 4000 | 8000 | 250 |
| | | | | ● | ● | 2000 | 8000 | 15000 | 400 |
| | | | | | ● | 3000 | 12000 | 20000 | 600 |

Female threaded connections available 1/4 to 2" and 3" (.08 mm to 50 mm & 80 mm)

Flanged (wafer) connections available 1/2" to 8" (15 mm to 200 mm)

Metric threads are not available in stainless steel

ORDERING INFORMATION

ORDER EXAMPLE-

2-1NPT-1-20GPM-BN-1S2

WATER, MAX TEMP 125°F, MAX PRESSURE 150 PSIG

- 1) Specify Pipe Size- See above Tables
- 2) Specify Connection-
 - 1NPT= Series 1000, NPT connection
 - 1M= Series 1000, FBSP Parallel Threads
 - 2= Series 2000, Flange connection
- 3) Specify Body & Bellows Material-
 - 1= Bronze
 - 3= Stainless Steel
- 4) Specify Maximum Flow Range from tables and Flow Units (GPM, l/m, SCFM etc.)
- 5) Specify Options- See Seals & Options
- 6) Specify Switch Quantity-
 - 1S2= one SPDT switch
 - 2S2= two SPDT switches
- 7) Please advise us of the media, max pressure and max temperature that the switch will see.

Example: A meter with a max flow range of 100 has a useful range from 15 to 100.

| Useful Range All Units of Measurement | |
|---------------------------------------|------|
| Min. | Max. |
| 0.2 | 1 |
| 0.3 | 2 |
| 0.4 | 3 |
| 0.5 | 4 |
| 0.5 | 6 |
| 1.0 | 8 |
| 1.5 | 10 |
| 2 | 15 |
| 3 | 20 |
| 3 | 25 |
| 4 | 30 |
| 6 | 50 |
| 5 | 60 |
| 10 | 80 |
| 15 | 100 |
| 15 | 120 |
| 20 | 150 |
| 30 | 200 |
| 30 | 240 |
| 30 | 250 |
| 40 | 300 |
| 50 | 400 |
| 50 | 600 |
| 100 | 800 |
| 150 | 1000 |
| 200 | 1500 |
| 300 | 2000 |
| 400 | 3000 |

Optional Low Flow Rates (Option ES)

| Size | | Maximum Flow Range | | | |
|------|----|--------------------|-----|------|------|
| | | liquid | | gas | |
| in | mm | GPH | l/h | cc/m | SCFH |
| 1/2 | 15 | 4 | 15 | 200 | 40 |
| 1/2 | 15 | 6 | 20 | 300 | 60 |
| 1/2 | 15 | 10 | 40 | 400 | 100 |
| 1/2 | 15 | 15 | 60 | 600 | 150 |
| 1/2 | 15 | 20 | 80 | 1000 | 200 |
| 1/2 | 15 | 30 | 120 | 2000 | 300 |
| 1/2 | 15 | 40 | 150 | 3000 | 400 |
| 1/2 | 15 | 60 | 240 | 4000 | |
| 1/2 | 15 | 100 | 400 | 6000 | |

Seals & Options

- A Viton™ Seals
- BN Buna (Standard) Seals**
- B EPR Seals
- B2 TFE Seals
- ES Low Flow Rate (below 2 GPM)
- I Compressed Gas Service (specify gas, temp. & pressure)
- IS Hazardous Reed Switch Rating
- T Expanded Temp. Range (-80 to 350°F), includes option A; consult factory for higher temperatures

EQUFLOW

PFA(0045, 0085, 00125) Turbine Flow Sensor

PFA wetted parts, F.S. ranges of 2, 20, & 40 lpm, Frequency Output

DESCRIPTION

The PFA flow sensor has low flow sensing capabilities in a wide range of applications, and is suitable for clear, opaque, neutral, corrosive and aggressive liquids including fuel.

An ultra light-weight turbine follows the fluctuation of flow very accurately and generates a high resolution IR reflected digital output signal.

Aggressive media can be measured as the only wetted materials are PFA and a ruby bearing.

K-factors (pulses per liter) are factory determined and provided for each flow tube. Customer specified K-factors can be accommodated and are programmed at the factory.

External optional electronic packages include model PD6300 Flow rate indicator and totalizer and PD6310 batch controllers. Rich in features, these products provide complete solutions for monitoring and batching applications.



Features

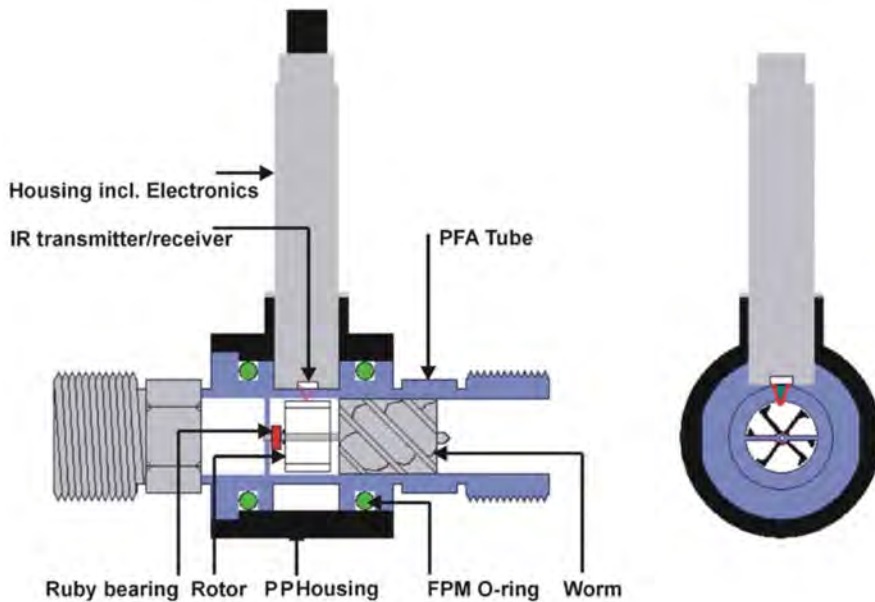
- Turbine flowsensor with high resolution output
- Flow measuring by revolutionary IR turbine reflection
- PFA for high chemical and corrosion resistance
- High accuracy and repeatability
- Suitable for opaque liquids
- PFA meets all the requirements of the US Pharmacopeia Class VI
- Programmable K-factor (at factory)
- All wetted parts are made of PFA with ruby bearing

SPECIFICATIONS

GENERAL

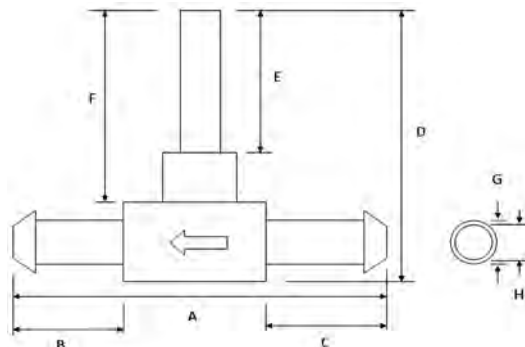
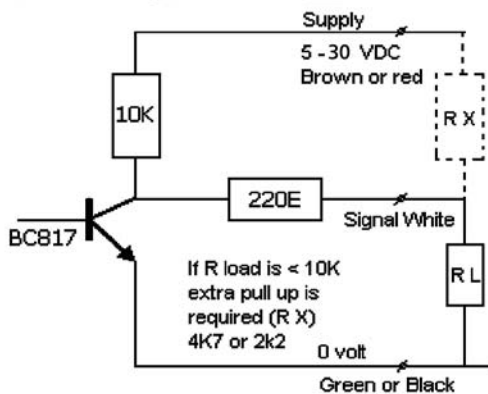
Patent No. US5388466

| Model | PFA0045 | PFA0085 | PFA0125 |
|---|-------------------|-------------------|-------------------|
| Inner diameter in mm | 4.5 | 8.5 | 12.5 |
| Flow range | 0.1 - 2 L/min | 0.5 - 20 L/min | 1.5 - 40 L/min |
| Accuracy | 1% of reading | 1% of reading | 1% of reading |
| Repeatability | < 0.15 % | < 0.15 % | < 0.15 % |
| Wetted parts | PFA / Ruby | PFA / Ruby | PFA / Ruby |
| Body | PP | PP | PP |
| Tube connection thread/hose barb | 1/8 " NPT / 7 mm | 1/4 " NPT/ 12 mm | 1/2 " NPT/BSP |
| Tube length in mm | 52 | 60 | 72 |
| Liquid temperature in °C | -20 to +80 | -20 to +80 | -20 to +80 |
| Max. pressure at 20° C in bar (psi) | 20 (284) | 15 (213) | 10 (142) |
| Viscosity in cSt. | 0.8 - 10 | 0.8 - 10 | 0.8 - 10 |
| K factor (water) in pulse/Liter (nominal) | 110,000 | 6,100 | 2,000 |
| Power supply | 5 - 30 Vdc | 5 - 30 Vdc | 5 - 30 Vdc |
| Output signal | 5 - 30 V sq. wave | 5 - 30 V sq. wave | 5 - 30 V sq. wave |
| Power consumption | 34 mA at 5 V | 34 mA at 5 V | 34 mA at 5 V |
| Electrical lead | PVC 1 meter | PVC 1 meter | PVC 1 meter |
| Recommended Line filter | 100 µm | 100 µm | 150 µm |



Working Principal:
 A static worm forces the passing fluid to spin. The spinning fluid drives a rotor with reflectors into a frictionless rotation. A high resolution infrared sensor determines the rate of flow by counting the passing reflections. The set up even allows the flow of opaque liquids to be determined accurately. The ultra low mass of the rotor guarantees a quick response to changes in the rate of flow

Wiring:
Power Supply 5-30 Vdc)
Output All Sensors: NPN square wave



| Dim. (MM) | 0045- Barb | 0045- NPT | 0085- Barb | 0085- NPT | 0125- NPT |
|-----------|------------|-----------|------------|-----------|-----------|
| A | 50.8 | 51.5 | 60.3 | 60.3 | 71.5 |
| B | 14.7 | 15.8 | 19.2 | 19.2 | 22.3 |
| C | 16.6 | 15.8 | 19.2 | 19.2 | 26.3 |
| D | 60.6 | 60.6 | 66.8 | 66.8 | 71.2 |
| E | 36.7 | 36.7 | 36.7 | 36.7 | 36.7 |
| F | 46.5 | 45.5 | 44.4 | 44.4 | 45.6 |
| G | 7.8 | 9.8 | 13.2 | 13.2 | 14.0 |
| H | 4.6 | 4.7 | 9.0 | 9.0 | 20.3 |

ORDERING INFORMATION

ABCDEFGH

PFA0045TNP01XA

| A Model | B Tube Dia./Range | C Wetted Material | D Connection | E Cable Type | F Cable Length | G Housing | H Power |
|---------|---|-------------------|--|--------------|--|------------------|-------------|
| PFA | 0045= 4.5 mm/0.1-2 l/min 0085= 8.5 mm/1.0-20 l/min 0125= 12.5 mm/2.0-38 l/min | T=PFA & Ruby | H= Hose Barb N= NPT B= BSP(12.5 mm only) | P= PVC | 01= 1 meter (Standard) 02= 2 meters | X= Fixed Housing | A= 5-30 VDC |

Ask About Our Other Eqflow Products.....

- Disposable Flow Sensor
- Stainless Flow Sensor
- Electronic packages for use with Flow Meters
 - PD6300 Flow rate indicator and totalizer
 - PD6310 batch controllers



EQUFLOW

PFAD Disposable PFA Turbine Flow Sensor

PFA wetted parts, F.S. ranges of 2 & 20 lpm, Frequency Output

DESCRIPTION

The PFAD flow sensor has been developed to perform a fast exchange of the flowtube to accommodate hygienic applications in the pharmaceutical industry and other applications where a field replaceable sensor is desirable. It is suitable for clear, opaque, neutral, corrosive and aggressive liquids.

A field replaceable ultra light-weight turbine assembly follows the fluctuation of flow very accurately and generates a high resolution IR reflected digital output signal. Two housing styles, "clip" and "click" types are offered.

Aggressive media can be accommodated as the only wetted materials are PFA and a ruby bearing.

K-factors (pulses per liter) are factory determined and provided for each flow tube. Customer specified K-factors can be accommodated and are programmed at the factory.

External optional electronic packages include model PD6300 flow rate indicator and totalizer and PD6310 batch controllers. Rich in features, these products provide complete solutions for monitoring and batching applications.

Features

- Turbine flowsensor with high resolution output
- Flow measuring by revolutionary IR turbine reflection.
- PFA for high chemical and corrosion resistance
- High accuracy and repeatability
- Suitable for opaque liquids
- PFA meets all the requirements of the US Pharmacopeia Class VI
- Programmable K-factor (at factory)
- All wetted parts are made of PFA with ruby bearing

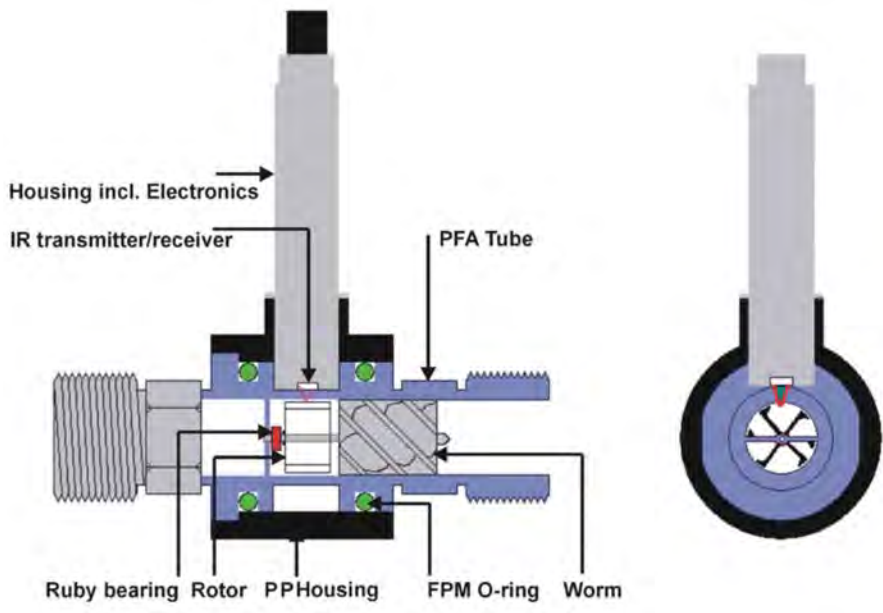


SPECIFICATIONS

Patent No. US5388466

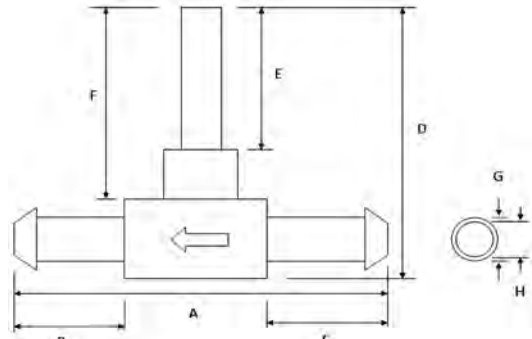
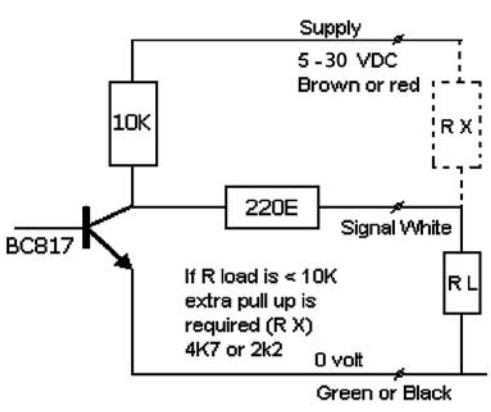
GENERAL

| Model | PFAD0045 | PFAD0085 |
|---|-------------------|-------------------|
| Inner diameter in mm | 4.5 | 8.5 |
| Flow range | 0.1 - 2 L/min | 0.5 - 20 L/min |
| Accuracy | 1% of reading | 1% of reading |
| Repeatability | < 0.15 % | < 0.15 % |
| Wetted parts | PFA / Ruby | PFA / Ruby |
| Tube connection thread/hosebarb | 1/8 " NPT / 7 mm | 1/4 " NPT/ 12 mm |
| Tube length in mm | 52 | 60 |
| Liquid temperature in °C | -20 to +80 | -20 to +80 |
| Max. pressure at 20° C in bar (psi) | 20 (284) | 15 (213) |
| Viscosity in cSt. | 0.8 - 10 | 0.8 - 10 |
| K factor (water) in pulse/Liter (nominal) | 110,000 | 6,100 |
| Power supply | 5 - 30 Vdc | 5 - 30 Vdc |
| Output signal | 5 - 30 V sq. wave | 5 - 30 V sq. wave |
| Power consumption | 34 mA at 5 V | 34 mA at 5 V |
| Electrical lead | PVC 1 meter | PVC 1 meter |
| Recommended Line filter | 100 µm | 100 µm |



Working Principal:
 A static worm forces the passing fluid to spin. The spinning fluid drives a rotor with reflectors into a frictionless rotation. A high resolution infrared sensor determines the rate of flow by counting the passing reflections. The set up even allows the flow of opaque liquids to be determined accurately. The ultra low mass of the rotor guarantees a quick response to changes in the rate of flow

Wiring:
Power Supply 5-30 Vdc
Output All Sensors: NPN square wave



| Dim. (MM) | 0045- Barb | 0085- Barb |
|-----------|------------|------------|
| A | 52 | 62 |
| B | 15 | 20 |
| C | 17 | 20 |
| D | 60 | 67 |
| E | 36 | 36 |
| F | 46 | 46 |
| G | 7.0 | 12 |
| H | 4.5 | 9.0 |

ORDERING INFORMATION
ABCDEFGH
PFAD0045TNP01DA

| A Model | B Tube Dia./Range | C Wetted Material | D Connection | E Cable Type | F Cable Length | G Version | H Power |
|--|---|-------------------|------------------------|--|--|-------------------------------------|-------------|
| PFAD | 0045= 4.5 mm/0.1-2 l/min 0085= 8.5 mm/1.0-20 l/min | T=PFA & Ruby | H= Hose Barb N= NPT | P= PVC | 01= 1 meter (Standard) 02= 2 meters | D= Click Housing C= Clip Housing | A= 5-30 VDC |
| Replacement Flow Tubes (DX-Click, CX-Clip Housing) PFAD0045TH000(D,C)X- Replacement flow tube, 4.5 mm tube, 7 mm hose barb PFAD0045TN000(D,C)X- Replacement flow tube, 4.5 mm tube, 1/8" NPT PFAD0085TH000(D,C)- Replacement flow tube, 8.5 mm tube, 12 mm hose barb PFAD0085TNH000(D,C)X- Replacement flow tube, 8.5 mm tube, 1/4" NPT | | | | Replacement Electronics 0045.P.X.P01.DA- Click Housing Replacement Electronics, 4.5 mm tube 0085.P.X.P01.DA- Click Housing Replacement Electronics, 8.5 mm tube 000.P.X.P01.CA-Clip Housing Replacement Electronics, | | | |

Ask About Our Other Equflow Products.....

- Standard Flow Sensor
- Stainless Flow Sensor
- Electronic packages for use with Flow Meters
 - PD6300 Flow rate indicator and totalizer
 - PD6310 batch controllers



EQUFLOW

PVDF Disposable Turbine Flow Sensor

PVDF wetted parts, F.S. ranges of 2 & 20 lpm, Frequency Output

DESCRIPTION

The PVDF Turbine Flow Sensor has been developed to perform a fast interchange of the flowtube to accommodate hygienic applications in the medical, pharmaceutical, and bio-technological industries. It has low flow capabilities and high resolution square wave output. The flow tube can be sterilized to 140°C (284°F) and is gamma radiation resistant up to 50 kGy. These features make this model ideal for monitoring and controlling fluid flows in hygienic applications.

A field replaceable ultra light-weight turbine assembly follows the fluctuation of flow very accurately and generates a high resolution IR (Infrared) reflected digital output signal.

External optional electronic packages include model PD6300 flow rate indicator and totalizer and PD6310 batch controllers. Rich in features, these products provide complete solutions for monitoring and batching applications.

Features

- Turbine flowsensor with high resolution output
- Flow measuring by revolutionary IR turbine reflection.
- PVDF for high chemical and corrosion resistance
- High accuracy and repeatability
- Suitable for opaque liquids
- Meets all the requirements of the US Pharmacopeia Class VI
- BSE/TSE certificate available
- All wetted parts are made of PVDF with ruby bearing
- Programmable K-factor (at factory)
- PVDF flow tube gamma radiation resistant up to 50kGy



Available in two different configurations as shown above, the PVDF sensor may be ordered with a tube holder or may be clip mounted.

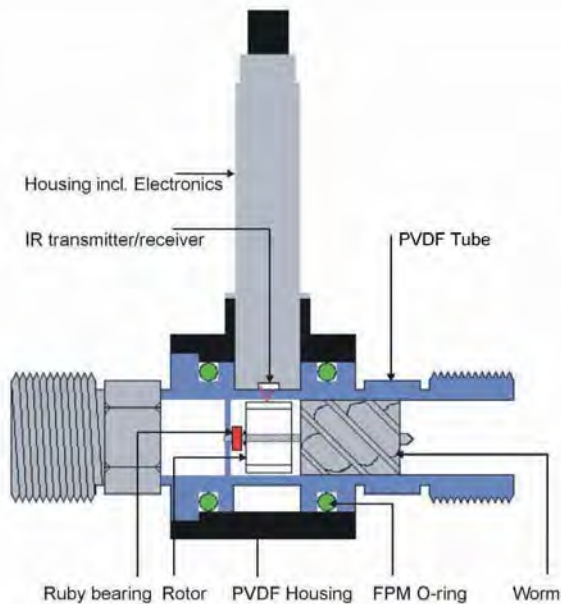
SPECIFICATIONS

GENERAL

Patent No. US5388466

| Model | PVDF0045 | PVDF0085 |
|--|-------------------|------------------|
| Inner diameter in mm | 4.7 | 9.3 |
| Flow range (L/min) | 0.06 - 2.0 | 0.3 - 20.0 |
| Hose barb tube connection | 7 mm | 12 mm |
| Tube length in mm | 53 | 62 |
| Max. pressure at 20°C in bar (psi) | 25 Bar (363 psi) | 20 Bar (290 psi) |
| *K factor (water) in pulse/Liter (nominal) | 100,000 | 4,500 |
| Wetted parts | PVDF / Ruby | |
| Accuracy | 1% of reading | |
| Repeatability | < 0.15 % | |
| Liquid temperature in °C | -20 to +80 | |
| Viscosity in cSt. | 0.8 - 10 | |
| Power supply | 5 - 30 Vdc | |
| Output signal | 5 - 30 V sq. wave | |
| Power consumption | 34 mA at 5 V | |
| Electrical lead | PVC, 1 meter | |
| Recommended Line filter | 100 µm | |
| Flow tube sterilizable | up to 140°C | |
| Gamma radiation resistant | 50 kGy | |

*K-factors (pulses per liter) are factory determined and provided for each flow tube. Customer specified K-factors can be accommodated and are programmed at the factory.



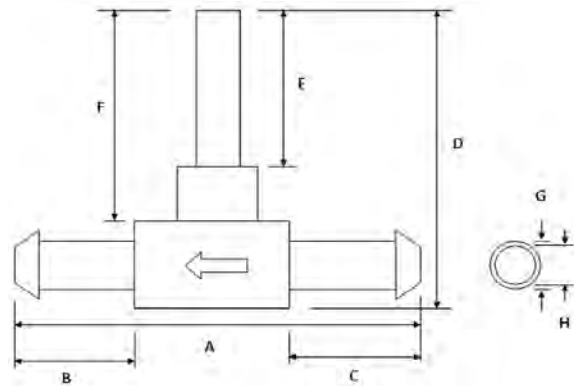
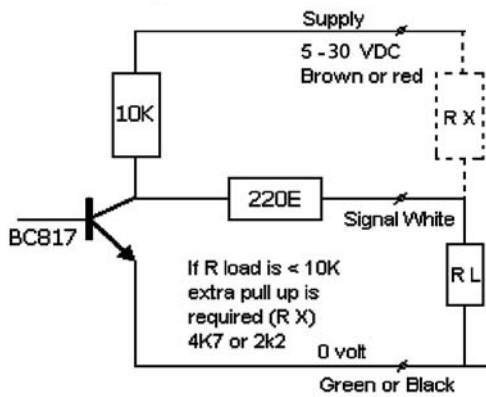
Working Principal:
 A static worm forces the passing fluid to spin. The spinning fluid drives a rotor with reflectors into a frictionless rotation. A high resolution infrared sensor determines the rate of flow by counting the passing reflections. The set up even allows the flow of opaque liquids to be determined accurately. The ultra low mass of the rotor guarantees a quick response to changes in the rate of flow.

WIRING

Wiring:

Power Supply 5-30 Vdc

Output All Sensors: NPN square wave



| Dim. (MM) | PVDF0045 | PVDF0085 |
|-----------|----------|----------|
| A | 52 | 62 |
| B | 15 | 20 |
| C | 17 | 20 |
| D | 60 | 67 |
| E | 36 | 36 |
| F | 46 | 46 |
| G | 7.0 | 12 |
| H | 4.5 | 9.0 |

ORDERING INFORMATION

ABCDEFGH

PVDF0045PHP01CA

| A Model | B Tube Diameter / Range | C Wetted Material | D Connection | E Cable Type | F Cable Length | G Version | H Power |
|---------|--|-------------------|--------------|--------------|--|-------------------------------------|-------------|
| PVDF | 0045= 4.5 mm/0.03-2 l/min 0085= 8.5 mm/0.3-20 l/min | P=PVDF | H= Hose Barb | P= PVC | 01= 1 meter (Standard) 02= 2 meters | T= Click Housing C= Clip Housing | A= 5-30 VDC |

Replacement Parts

Clip Mounted:

PVDF0045PH000CX PVDF tube only for model 0045

PVDF0085PH000CX PVDF tube only for model 0085

0000.P.X.P.01.CA Electronics

Tube Holder:

0045.C.X.P.01.TA Tubeholder for PVDF 4.5, w/5-30vdc electronics

0085.C.X.P.01.TA Tubeholder for PVDF 8.5, w/5-30vdc electronics

0045.P.H.0.00.TX PVDF disposable tube 4.5 for tube holder

0085.P.H.0.00.TX PVDF disposable tube 8.5 for tube holder

EQUFLOW

0045 & 0085 Disposable Flowmeter Tube Holder System

F.S. ranges of 2 & 20 lpm, Frequency Output, For Use With Equflow Flow Tubes

DESCRIPTION

These flowmeters house Equflow disposable PFA and PVDF turbine flowtubes. They have low flow capabilities useful in a wide range of flow processes.

The idea is to perform fast exchange of the flowtube in single-use applications. Clinical, analytical, bio-tech and pharmaceutical chemistry equipment applications, where frequent tube changes are necessary to avoid contamination of the process, are the typical use.

Despite the term "disposable", these devices are also suitable for long-term measurement.



Features

- Performs a fast exchange of the flow tubes.
- High resolution square wave output
- Flow measuring with revolutionary Infra-Red turbine rotor reflection
- PVDF and PFA wetted parts for high chemical resistance
- Also suitable for opaque liquids
- Meet all requirements of US Pharmacopeia Class VI
- BSE/TSE certificate available
- PVDF flowcells Gamma stable up to 50 kGy
- Tube can be sterilized up to 140 °C

SPECIFICATIONS

GENERAL

| Model | 0045 | 0085 |
|---|-------------------|-------------------|
| Inner diameter in mm | 4.5 | 8.5 |
| Flow range | 0.1 - 2 L/min | 0.5 - 20 L/min |
| Accuracy | 1% of reading | 1% of reading |
| Repeatability | < 0.15 % | < 0.15 % |
| Wetted parts | PFA / Ruby | PFA / Ruby |
| Body | PP | PP |
| Tube connection thread/hosebarb | 1/8 " NPT / 7 mm | 1/4 " NPT/ 12 mm |
| Tube length in mm | 52 | 60 |
| Liquid temperature in °C | -20 to +80 | -20 to +80 |
| -Max. pressure at 20° C in bar (psi) | 20 (284) | 15 (213) |
| Viscosity in cSt. | 0.8 - 10 | 0.8 - 10 |
| K factor (water) in pulse/Liter (nominal) | 110,000 | 6,100 |
| Power supply | 5 - 30 Vdc | 5 - 30 Vdc |
| Output signal | 5 - 30 V sq. wave | 5 - 30 V sq. wave |
| Power consumption | 34 mA at 5 V | 34 mA at 5 V |
| Electrical lead | PVC 1 meter | PVC 1 meter |
| Recommended Line filter | 100 µm | 100 µm |

ORDERING INFORMATION

Patent US5388466

| *Model | Description |
|------------------|---|
| 0045.C.X.P.01.TA | Tubeholder for PVDF and PFA 4.5 turbine tube; excluding flow tube |
| 0085.C.X.P.01.TA | Tubeholder for PVDF and PFA 8.5 turbine tube; excluding flow tube |

* See bulletins PFAD & PVDF or call us for available flow tubes

EQUFLOW

SS(0045, 0085, 00125) Stainless Steel Turbine Flow Sensor

SS wetted parts, F.S. ranges of 2, 20, & 40 lpm, Frequency Output

DESCRIPTION

Model SS flow sensor has low flow sensing capabilities in a wide range of applications, and is suitable for clear, opaque, neutral, corrosive and aggressive liquids. It has a rugged stainless steel housing and is available with threaded or Tri-Clamp end connections.

An ultra light-weight turbine follows the fluctuation of flow very accurately and generates a high resolution IR reflected digital output signal.

K-factors (pulses per liter) are factory determined and provided for each flow tube. Customer specified K-factors can be accommodated and are programmed at the factory.

External optional electronic packages include model PD6300 Flow rate indicator and totalizer and PD6310 batch controllers. Rich in features, these products provide complete solutions for monitoring and batching applications.



Features

- Turbine flowsensor with high resolution output
- Flow measuring by revolutionary IR turbine reflection
- 316 Stainless Steel & PFA parts for high chemical and corrosion resistance
- High accuracy and repeatability
- Suitable for opaque liquids
- Programmable K-factor (at factory)

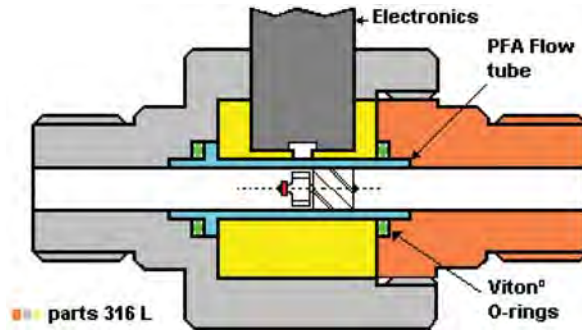
SPECIFICATIONS

Patent No. US5388466

GENERAL

| Model | SS0045 | SS0085 | SS0125 |
|--|-------------------|-------------------|-------------------|
| Inner diameter in mm | 4.5 | 8.5 | 12.5 |
| Flow range | 0.1 - 2 L/min | 0.5 - 20 L/min | 1.5 - 40 L/min |
| Accuracy | 1% of reading | 1% of reading | 1% of reading |
| Repeatability | < 0.15 % | < 0.15 % | < 0.15 % |
| Wetted parts | 316 SS/PFA /Ruby | 316 SS/PFA /Ruby | 316 SS/PFA /Ruby |
| O-ring Seals | Viton or EPDM | Viton or EPDM | Viton or EPDM |
| Tube connection thread | 1/4 " NPT/BSP | 3/8 "NPT/BSP | 1/2 " NPT/BSP |
| Tri-Clamp Connection Option | 3/4" | 3/4" | 1" |
| Liquid temperature in °C | -20 to +80 | -20 to +80 | -20 to +80 |
| Max. pressure at 20° C in bar (psi) | 100 (1,450) | 100 (1,450) | 100 (1,450) |
| Viscosity in cSt. | 0.8 - 10 | 0.8 - 10 | 0.8 - 10 |
| *K factor (water) in pulse/Litre (nominal) | 110,000 | 5,500 | 2,000 |
| Power supply | 5 - 30 Vdc | 5 - 30 Vdc | 5 - 30 Vdc |
| Output signal | 5 - 30 V sq. wave | 5 - 30 V sq. wave | 5 - 30 V sq. wave |
| Power consumption | 35 mA at 5 V | 35 mA at 5 V | 35 mA at 5 V |
| Electrical lead | PVC 1 meter | PVC 1 meter | PVC 1 meter |
| Dimensions incl. housing (mm) | L-72.6, ø 40 | L-72.3, ø 40 | L-73.6, ø 40 |
| Recommended Line filter | 100 µm | 100 µm | 150 µm |

*K-factors (pulses per liter) are factory determined and provided for each flow tube. Customer specified K-factors can be accommodated and are programmed at the factory.



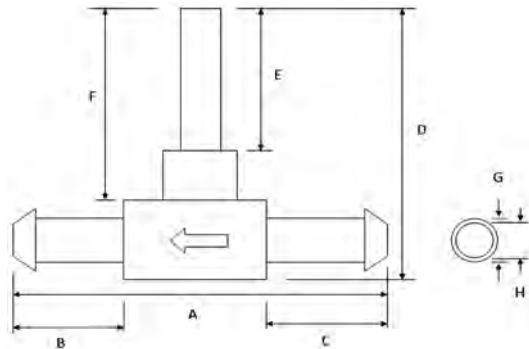
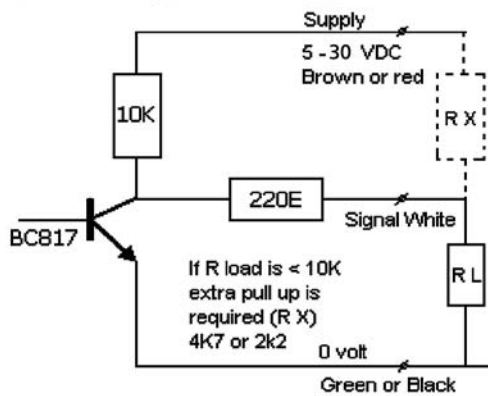
Working Principal:

A static worm forces the passing fluid to spin. The spinning fluid drives a rotor with reflectors into a frictionless rotation. A high resolution infrared sensor determines the rate of flow by counting the passing reflections. The set up even allows the flow of opaque liquids to be determined accurately. The ultra low mass of the rotor guarantees a quick response to changes in the rate of flow

Wiring:

Power Supply 5-30 Vdc or 5 Vdc (low voltage option)

Output All Sensors: NPN square wave



| Dim. (MM) | 0045- NPT | 0045-BSP | 0085- NPT | 0085- BSP | 0125- NPT | 0125- BSP |
|-----------|-----------|----------|-----------|-----------|-----------|-----------|
| A | 72.5 | 67 | 72.3 | 67.2 | 73.8 | 71.2 |
| B | 14.7 | 14.4 | 14.8 | 12.35 | 15.5 | 14.2 |
| C | 14.7 | 14.4 | 14.8 | 12.35 | 15.5 | 14.2 |
| D | 68.5 | 68.5 | 71.2 | 71.2 | 76 | 76 |
| E | 28.5 | 28.5 | 30.3 | 30.3 | 30 | 30 |
| F | 12 | 12 | 12 | 12 | 12 | 12 |
| G | 13.8 | 13.8 | 17.2 | 17.2 | 21.7 | 21.7 |
| H | 4.5 | 4.5 | 8.85 | 8.85 | 14 | 14 |
| I | 40 | 40 | 40 | 40 | 45 | 45 |

ORDERING INFORMATION

ABCDEFGHIJ
SS0045SNP01XA

| A Model | B Tube Dia./Range | C Wetted Material | D Connection | E Cable Type | F Cable Length | G Version | H Power |
|---------|---|--------------------|----------------------------------|--------------|--|------------------|-------------|
| SS | 0045= 4.5 mm/0.1-2 l/min 0085= 8.5 mm/1.0-20 l/min 0125= 12.5 mm/2.0-38 l/min | S=316 SS/PFA /Ruby | N= NPT B= BSP T= Tri-Clamp | P= PVC | 01= 1 meter (Standard) 02= 2 meters | X= Fixed housing | A= 5-30 VDC |

Ask About Our Other Equiflow Products.....

- Standard Flow Sensor
- Disposable Flow Sensor
- Electronic packages for use with Flow Meters
 - PD6300 Flow rate indicator and totalizer
 - PD6310 batch controllers



CLARK

Series CFS Turbine Flow Sensors

1/4", 3/8", 1/2" Pipe Size, 0.8-25 LPM, Reed Switch Output

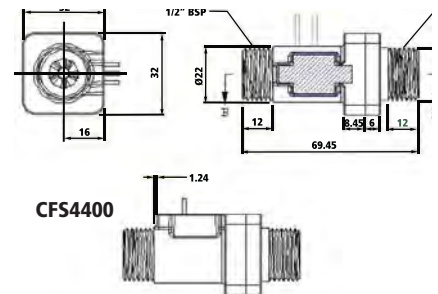
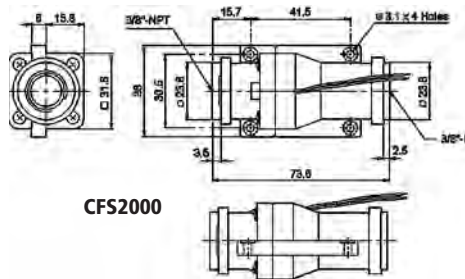
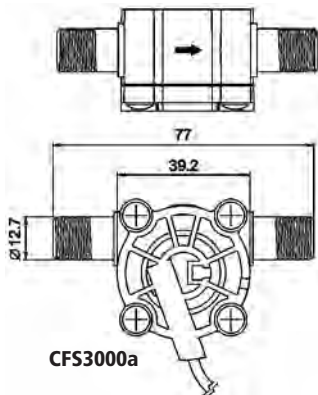
DESCRIPTION

Series CFS Turbine flow sensors are designed for water and compatible clean fluid flow measurement. They are a very economical choice for application where the accuracy, materials of construction and 500,000 liter approximate life rating of the sensors are acceptable.

A magnet imbedded in the turbine (CFS2000 & 3000A) or a PA plastic encased magnet turbine (FS4400) closes a hermetically isolated reed switch when in proximity. Sensor calibration factors are provided to convert pulses to flow rate.

Common applications include water treatment systems, filter monitoring, water dispensing, cooling loops and many other.

| |  |  |  |
|-----------------------------|---|--|---|
| Specification | CFS3000A | CFS2000 | CFS4400 |
| Connection | 1/4" Male NPT | 3/8" Female NPT | 1/2" BSP |
| Flow Range | 0.8 to 8.0 LPM | 1.0 to 14.1 LPM (Verticle Mount) 1.5 to 14.1 LPM (Horizontal Mount) | 1.5 to 20 LPM |
| Temperature Operating Range | 0-40°C | 0-40°C | 0-80°C |
| Max. Pressure | 6 Bar | 6 Bar | 10 Bar |
| Accuracy | ±5% Measured Value | ±10% Measured Value | ±10% Measured Value |
| Wetted Materials | | | |
| Sensor Body | Acetal Copolymer, TICONA M90 | Acetal Copolymer, TICONA M90 | PPS, 40% Glass |
| Turbine | Acetal Copolymer, TICONA M90 | Acetal Copolymer, TICONA M90 | PA Coated Magnet |
| Turbine Shaft | 304 SS | 304 SS | Ceramic |
| O-Ring | EPDM | EPDM | EPDM |
| Reed Contact Rating | 10 VDC, 10 mA Max. | | |
| Approx. Sensor Life | Approx. 500,000 Liters | | |
| Mounting Orientation | Horizontal, Max 30° from Horizontal) | Horizontal or Vertical (Up or Down Flow) | Horizontal to Vertical |
| Mounting | 4 ea self tap holes for M3 x 10 mm | 4 ea 3.1 mm Dia through holes | Stem Mount Via Pipe Fitting |
| Weight | 50 Grams | | |
| Liters per Pulse | 0.8 to 1.0 LPM: 0.0039 LPP | 0.0033 LPP (Verticle Mount) | At 1.5 LPM: 0.007 Horz., 0.0036 Vert. |
| | 1.0 to 2.5 LPM: 0.0040 LPP | 0.004 LPP (Horizontal Mount) | At 6.0 LPM: 0.0038 Horz., 0.0038 Vert. |
| | 2.5 to 8.0 LPM: 0.0041 LPP | | At 15 LPM: 0.004 Horz., 0.0042 Vert. |
| | | | At 20 LPM: 0.004 Horz., 0.0043 Vert. |



ORDERING INFORMATION

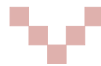
| Model | Description |
|----------|------------------------------|
| CFS3000A | Flow Sensor, 1/4" Male NPT |
| CFS2000 | Flow Sensor, 3/8" Female NPT |
| CFS4400 | Flow Sensor, 1/2" Male BSP |



G SERIES PRECISION METERS

The High Precision Meter line is the most accurate of the GPI Turbine Meters and includes a traditional design. These meters come in a variety of sizes and fitting options including BSP, ISO, NPT and ANSI Flange fittings. The GSCPS in this section carries the 3A Sanitary Rating.



1) Select Your Turbine**Threaded Models****Sanitary Clamp Models****Flange Models****2) Select Your Sensor****Local Pickup Wire Lead****3) Select Your Electronic Choice**

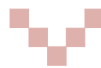
For further details and selections see the Electronics Section.

Remote Models

| | |
|-------|--------|
| GA500 | R700-R |
| GG500 | R800-R |
| GX500 | SC500 |

Local Models

| | |
|-------|--------|
| GA510 | R700-L |
| GG510 | R800-L |
| GX510 | SC510 |

**4) Do You Want It Assembled?**

GPI will assemble the components you choose into a single unit, configured to your request.

Contact the factory for details on Custom System Assembly.

G SERIES METER NUMBER REFERENCE

G SERIES

USE THIS AS A GUIDE – SIZES VARY BY FITTING TYPE.
(Does not apply to model GSCPS - 3A Meters)

Product Identifier

G = G Series Precision Turbine Meter

Fitting Type

- N** = NPT (Male)
- I** = ISO Taper (Male)
- B** = BSP (Male)
- F** = Flanged
- SC** = Sanitary Clamp

Meter Dimensions listed on page 93.

Shaft / Sleeve Bearing / Thrust Bearing

- T-** = Tungsten Carbide / Tungsten Carbide
- P-** = Stainless Steel / PTFE / Stainless Steel

Turbine Size & Flowrate

- 050S** = 1/2 in. (0.6 - 6 GPM) Low Flow - Turbine Body Only♦
- 051S** = 1/2 in. (0.8 - 6 GPM) Standard - Uses Low Drag Standard Sensor 1
- 051H** = 1/2 in. (0.8 - 6 GPM) High Temp - Turbine Body Only♦
- 075S** = 3/4 in. (1.6 - 16 GPM) Standard - Uses Standard Sensor 2
- 075H** = 3/4 in. (1.6 - 16 GPM) High Temp - Turbine Body Only♦
- 075E** = 3/4 in. (2.32 - 23 GPM) Ext-Range - Uses Standard Sensor 2
- 75EH** = 3/4 in. (2.32 - 23 GPM) Ext-Range High Temp - Turbine Body Only♦
- 100S** = 1 in. (6.7 - 67 GPM) Standard - Uses Standard Sensor 2
- 100H** = 1 in. (6.7 - 67 GPM) High Temp - Turbine Body Only♦
- 150S** = 1-1/2 in. (17.7 - 177 GPM) Standard - Uses Standard Sensor 2
- 150H** = 1-1/2 in. (17.7 - 177 GPM) High Temp - Turbine Body Only♦
- 200S** = 2 in. (33 - 330 GPM) Standard - Uses Standard Sensor 2
- 200H** = 2 in. (33 - 330 GPM) High Temp - Turbine Body Only♦
- 300S** = 3 in. (60-600 GPM) Standard - Uses Standard Sensor 2

Sensor Choice

- 1** = Low Drag Standard Sensor with 12 inch Lead Wires
- 2** = Standard Sensor with 12 inch Lead Wires
- X** = No Sensor - Turbine Body Only

Electronic Choice (Local)*

Turbine Mounted

- 5** = GG510 - Standard Display
- 6** = GX510 - 4-20 mA Transmitter with Display
- 7** = GA510 - 4-20 mA Transmitter
- 8** = SC510 - Scaled Pulse Output
- X** = No Electronics - Turbine Body Only

G + **I** + **T-** + **-075S** + **2** + **-6**

← (Sample Model Number)

* Electronic Choice not available on all models.

GBT, GIT & GNT PRECISION METERS

Model GNT NPT Fitting



GNT shown here
with Local Display



For complete part number,
see "Number Reference" chart on page 81.

ACCURACY: ± 0.5%

Select Your Meter Size:

| | | |
|----------|------------|--------|
| 1/2 inch | 1 inch | 2 inch |
| 3/4 inch | 1-1/2 inch | 3 inch |



For Your Special Application Needs:

Model GNT HT

For High Temperatures

(This model is not available in 3 inch)



Sensor Options:

- Low Drag Pickup (1/2 in. turbines)
- Standard Pickup (3/4 to 3 in. turbines)

Electronics Options:

- GG510 (Display with Pulse Output)
- GX510 (Display with 4-20 mA Output)
- GA510 (4-20 mA Output)
- SC510 (Scaled Pulse Output)

SPECIFICATIONS

| | | | |
|-------------------------------------|---|---------------------------------|--|
| Design Type: | Turbine | | |
| Housing Material: | 316 Stainless Steel | | |
| Meter Sizes Available: | | | |
| For GNT: NPT Taper (Male) | 1/2" 3/4" 1" 1-1/2" 2" 3" | | |
| For GBT: BSPP * (Male) | 1/2" 3/4" 1" 1-1/2" 2" 3" | | |
| For GIT: ISO Taper (Male) | 1/2" 3/4" 1" 1-1/2" 2" 3" | | |
| For High Temperature*: | 1/2" 3/4" 1" 1-1/2" 2" — | | |
| Flow Range: | 1/2" (051) | 0.8 - 6.0 GPM (3.0 - 22 LPM) | |
| | 3/4" (075) | 1.6 - 16 GPM (6.0 - 60 LPM) | |
| | 3/4" (075E) | 2.3 - 23 GPM (8.7 - 87 LPM) | |
| | 1" (100) | 6.7 - 67 GPM (25.2 - 252 LPM) | |
| | 1-1/2" (150) | 17.7 - 177 GPM (67.0 - 670 LPM) | |
| | 2" (200) | 33 - 330 GPM (125.0 - 1250 LPM) | |
| | 3" (300) | 60 - 600 GPM (227.1 - 2271 LPM) | |
| Accuracy (Linearity): | ± 0.5% | | |
| Repeatability: | ± 0.1% | | |
| Pressure Rating: | 1/2" to 2" = 5,000 PSI / 340 BAR 3" = 2,500 PSI / 170 BAR | | |
| Operating Temperature Range: | -450° F to +800° F (-268° C to +426° C) | | |
| Typical K-Factor: | 1/2" (051) | 10,000 | |
| | 3/4" (075) | 3,750 | |
| | 3/4" (075E) | 2,608 | |
| | 1" (100) | 896 | |
| | 1-1/2" (150) | 340 | |
| | 2" (200) | 181 | |
| | 3" (300) | 50 | |
| Wetted Materials: | | | |
| Housing: | 316 Stainless Steel | | |
| Sleeve Bearings: | Tungsten Carbide | | |
| Thrust Bearing: | Tungsten Carbide | | |
| Shaft: | Tungsten Carbide | | |
| Rotor: | CD4MCu Stainless Steel | | |
| Rotor Supports: | 316 Stainless Steel | | |
| Recommended Strainer Size: | | | |
| | 1/2" | 40 mesh | |
| | 3/4" | 40 mesh | |
| | 1" | 40 mesh | |
| | 1-1/2" | 18 mesh | |
| | 2" | 14 mesh | |
| | 3" | 14 mesh | |
| Frequency Output: | 1/2" (051) | 125 - 1000 Hz | |
| | 3/4" (075) | 100 - 1000 Hz | |
| | 3/4" (075E) | 100 - 1000 Hz | |
| | 1" (100) | 100 - 1000 Hz | |
| | 1-1/2" (150) | 100 - 1000 Hz | |
| | 2" (200) | 100 - 1000 Hz | |
| | 3" (300) | 50 - 500 Hz | |
| Calibration Report | Comes standard with G Series meters. N.I.S.T. - Certification available. | | |

APPROVALS



- * Requires High Temp Pickup.
- * ISO 228-1 designation is G.

GBP, GIP & GNP PRECISION METERS

G SERIES

SPECIFICATIONS

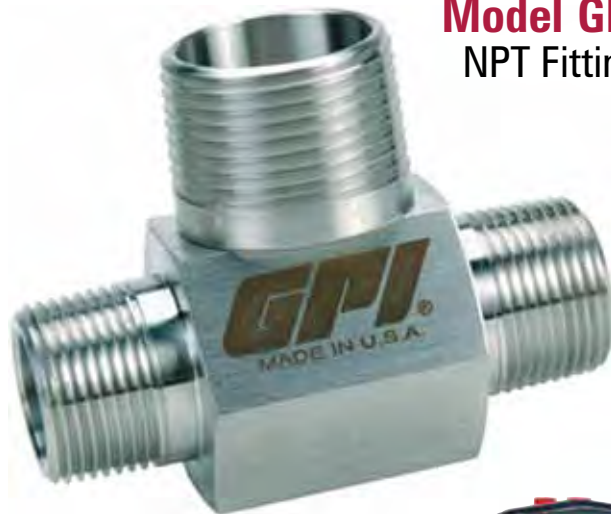
| | | | | | |
|-------------------------------------|---|---------------------------------|----|--------|----|
| Design Type: | Turbine | | | | |
| Housing Material: | 316 Stainless Steel | | | | |
| Meter Sizes Available: | | | | | |
| For GNP: NPT (Male) | 1/2" | 3/4" | 1" | 1-1/2" | 2" |
| For GBP: BSPP* (Male) | 1/2" | 3/4" | 1" | 1-1/2" | 2" |
| For GIP: ISO Taper (Male) | 1/2" | 3/4" | 1" | 1-1/2" | 2" |
| Flow Range: | 1/2" (050)* | 0.6 - 6.0 GPM (2.2 - 22 LPM) | | | |
| | 1/2" (051) | 0.8 - 6.0 GPM (3.0 - 22 LPM) | | | |
| | 3/4" (075) | 1.6 - 16 GPM (6.0 - 60 LPM) | | | |
| | 3/4" (075E) | 2.3 - 23 GPM (8.7 - 87 LPM) | | | |
| | 1" (100) | 6.7 - 67 GPM (25.2 - 252 LPM) | | | |
| | 1-1/2" (150) | 17.7 - 177 GPM (67.0 - 670 LPM) | | | |
| | 2" (200) | 33 - 330 GPM (125.0 - 1250 LPM) | | | |
| Accuracy (Linearity): | ± 0.5% | | | | |
| Repeatability: | ± 0.1% | | | | |
| Pressure Rating: | 1/2" to 2" = 5,000 PSI / 340 BAR | | | | |
| Operating Temperature Range: | -450° F to +800° F (-268° C to +426° C) | | | | |
| Typical K-Factor: | 1/2" (050)* | 10,000 | | | |
| | 1/2" (051) | 10,000 | | | |
| | 3/4" (075) | 3,750 | | | |
| | 3/4" (075E) | 2,608 | | | |
| | 1" (100) | 896 | | | |
| | 1-1/2" (150) | 340 | | | |
| | 2" (200) | 181 | | | |
| Wetted Materials: | | | | | |
| Housing: | 316 Stainless Steel | | | | |
| Sleeve Bearings: | PTFE | | | | |
| Thrust Bearing: | 440C Stainless Steel | | | | |
| Shaft: | 316 Stainless Steel | | | | |
| Rotor: | CD4MCu Stainless Steel | | | | |
| Rotor Supports: | 316 Stainless Steel | | | | |
| Recommended Strainer Size: | | | | | |
| | 1/2" | 40 mesh | | | |
| | 3/4" | 40 mesh | | | |
| | 1" | 40 mesh | | | |
| | 1-1/2" | 18 mesh | | | |
| | 2" | 14 mesh | | | |
| Frequency Output: | 1/2" (051)* | 125 - 1000 Hz | | | |
| | 3/4" (075) | 100 - 1000 Hz | | | |
| | 3/4" (075E) | 100 - 1000 Hz | | | |
| | 1" (100) | 100 - 1000 Hz | | | |
| | 1-1/2" (150) | 100 - 1000 Hz | | | |
| | 2" (200) | 100 - 1000 Hz | | | |
| Calibration Report | Comes standard with G Series meters. N.I.S.T. – Certification available. | | | | |

APPROVALS



* 1/2 in. (050) requires RF Pickup.
* ISO 228-1 designation is G.

Model GNP NPT Fitting



GNP shown here
with Local Display

For complete part number,
see "Number Reference" chart on page 81.

ACCURACY: ± 0.5%

Select Your Meter Size:

1/2 inch 1 inch 2 inch
3/4 inch 1-1/2 inch



Sensor Options:

- Low Drag Pickup (1/2 in. turbines)
- Standard Pickup (3/4 to 3 in. turbines)

Electronics Options:

- GG510 (Display with Pulse Output)
- GX510 (Display with 4-20 mA Output)
- GA510 (4-20 mA Output)
- SC510 (Scaled Pulse Output)

ANSI FLANGE PRECISION METERS

Model GFT 150# RF ANSI Flange Fitting



GFT shown here
with GX510



For complete part number,
see "Number Reference" chart on page 81.

ACCURACY: ± 0.5%

Select Your Meter Size:

| | | |
|----------|------------|--------|
| 3/4 inch | 1-1/2 inch | 3 inch |
| 1 inch | 2 inch | |



For Your Special Application Needs:

Model GFP

For Chemicals

(These models not available in 3 inch)

Model GFT HT

For High Temperatures



Sensor:

- Standard Pickup (3/4 to 3 inch turbines)

Electronics Options:

- GG510 (Display with Pulse Output)
- GX510 (Display with 4-20 mA Output)
- GA510 (4-20 mA Output)
- SC510 (Scaled Pulse Output)

SPECIFICATIONS

| | | | | | |
|-------------------------------------|---|---------------------------------|--------|----|----|
| Design Type: | Turbine | | | | |
| Housing Material: | 316 Stainless Steel | | | | |
| Meter Sizes Available: | | | | | |
| For GFT: | 3/4" | 1" | 1-1/2" | 2" | 3" |
| For GFP: | 3/4" | 1" | 1-1/2" | 2" | — |
| For High Temperature: | 3/4" | 1" | 1-1/2" | 2" | — |
| Flow Range: | 3/4" (075) | 1.6 - 16 GPM (6.0 - 60 LPM) | | | |
| | 3/4" (075E) | 2.3 - 23 GPM (8.7 - 87 LPM) | | | |
| | 1" (100) | 6.7 - 67 GPM (25.2 - 252 LPM) | | | |
| | 1-1/2" (150) | 17.7 - 177 GPM (67.0 - 670 LPM) | | | |
| | 2" (200) | 33 - 330 GPM (125.0 - 1250 LPM) | | | |
| | 3" (300) | 60 - 600 GPM (227.1 - 2271 LPM) | | | |
| Accuracy (Linearity): | ± 0.5% | | | | |
| Repeatability: | ± 0.1% | | | | |
| Pressure Rating: | Flange Rule | | | | |
| Operating Temperature Range: | | | | | |
| For Tungsten Carbide: | -450° F to +800° F (-268° C to +426° C) | | | | |
| For SS/PTFE: | -100° F to +185° F (-74° C to +85° C) | | | | |
| Typical K-Factor: | 3/4" (075) | 3,750 | | | |
| | 3/4" (075E) | 2,608 | | | |
| | 1" (100) | 896 | | | |
| | 1-1/2" (150) | 340 | | | |
| | 2" (200) | 181 | | | |
| | 3" (300) | 50 | | | |
| Wetted Materials (GFT): | | | | | |
| Housing: | 316 Stainless Steel | | | | |
| Sleeve Bearings: | Tungsten Carbide | | | | |
| Thrust Bearing: | Tungsten Carbide | | | | |
| Shaft: | Tungsten Carbide | | | | |
| Rotor: | CD4MCu Stainless Steel | | | | |
| Rotor Supports: | 316 Stainless Steel | | | | |
| Wetted Materials (GFP): | | | | | |
| Housing: | 316 Stainless Steel | | | | |
| Sleeve Bearings: | PTFE | | | | |
| Thrust Bearing: | 440C Stainless Steel | | | | |
| Shaft: | 316 Stainless Steel | | | | |
| Rotor: | CD4MCu Stainless Steel | | | | |
| Rotor Supports: | 316 Stainless Steel | | | | |
| Recommended Strainer Size: | | | | | |
| | 3/4" | 40 mesh | | | |
| | 1" | 40 mesh | | | |
| | 1-1/2" | 18 mesh | | | |
| | 2" | 14 mesh | | | |
| | 3" | 14 mesh | | | |
| Frequency Output: | 3/4" (075) | 100 - 1000 Hz | | | |
| | 3/4" (075E) | 100 - 1000 Hz | | | |
| | 1" (100) | 100 - 1000 Hz | | | |
| | 1-1/2" (150) | 100 - 1000 Hz | | | |
| | 2" (200) | 100 - 1000 Hz | | | |
| | 3" (300) | 50 - 500 Hz | | | |
| Calibration Report | Comes standard with G Series meters. N.I.S.T. - Certification available. | | | | |

APPROVALS



* Requires High Temp Pickup.

SPECIFICATIONS

| | | |
|-------------------------------------|---|------------------------------------|
| Design Type: | Turbine | |
| Housing Material: | 316 Stainless Steel | |
| Meter Sizes Available (ID): | 1" 1-1/2" 2" | |
| Meter ID: | 1" | 1-1/2" Fitting |
| | 1-1/2" | 1-1/2" Fitting |
| | 2" | 2" Fitting |
| Flow Range: | 1" (100) | 6.7 - 67 GPM (25.2 - 252 LPM) |
| | 1-1/2" (150) | 17.7 - 177 GPM (67.0 - 670 LPM) |
| | 2" (200) | 33 - 330 GPM (125.0 - 1250 LPM) |
| Accuracy (Linearity): | ± 0.5% | |
| Repeatability: | ± 0.1% | |
| Pressure Rating: | Limited by fitting size, clamp size & temp. | |
| Operating Temperature Range: | | |
| For GSCPS: | -100° F to +225° F (-74° C to +107° C) | |
| SIP (up to 1 hour): | +285° F (+140° C) | |
| Typical K-Factor: | 1" (100) | 896 |
| | 1-1/2" (150) | 340 |
| | 2" (200) | 181 |
| Wetted Materials (SIP): | | |
| Housing: | 316 Stainless Steel | |
| Sleeve Bearings: | PEEK | |
| Thrust Bearing: | PEEK | |
| Shaft: | 316 Stainless Steel | |
| Rotor: | CD4MCu Stainless Steel | |
| Rotor Supports: | 316 Stainless Steel | |
| Recommended Strainer Size: | | |
| | 1" | 40 mesh |
| | 1-1/2" | 18 mesh |
| | 2" | 14 mesh |
| Frequency Output: | 1" (100) | 100 - 1000 Hz |
| | 1-1/2" (150) | 100 - 1000 Hz |
| | 2" (200) | 100 - 1000 Hz |
| Calibration Report | Comes standard with G Series meters. N.I.S.T. – Certification available. | |

APPROVALS

GSCPS & "L" Option Meters carry a



Sanitary Rating.

Flowmeters for milk and milk products, Number 28-04.



This meter meets the strict 3-A Sanitary Standards using the new "Third Party Verification" (TPV) program. Our methods of design, construction and traceability of components have been reviewed and approved.

The internals of this meter are machined or polished to meet 3-A self-draining and cleaning requirements (Ra 32). The GSCPS Meter meets Clean in Place (CIP), Steam in Place (SIP) and Clean Out of Place (COP) requirements.

Model GSCPS Standard Sanitary Clamp



Model GSCPS Low Profile Sanitary Clamp



For complete part number, see "Number Reference" chart on page 81.

ACCURACY: ± 0.5%

**GSCPS Stainless Steel
Precision Turbine Meter**



Select Your Meter Size:

- 1 inch Meter with 1-1/2 inch Fitting
- 1-1/2 inch Meter with 1-1/2 inch Fitting
- 2 inch Meter with 2 inch Fitting

Use this meter in pre-process applications where high accuracy is required without 3-A Approval.

Model GSCP Tri-Clover® Clamp



*GSCP shown here
with Local Display*



*For complete part number,
see "Number Reference" chart on page 81*

ACCURACY: ± 0.5%

Select Your Meter Size:

- 1/2 inch Meter with 3/4 or 1 inch Fitting
- 3/4 inch Meter with 1-1/2 inch Fitting
- 1 inch Meter with 1-1/2 inch Fitting
- 1-1/2 inch Meter with 1-1/2 inch Fitting
- 2 inch Meter with 2 inch Fitting



Sensor Options:

- Low Drag Pickup (1/2 in. turbines)
- Standard Pickup (3/4 to 2 in. turbines)

Electronics Options:

- GG510 (Display with Pulse Output)
- GX510 (Display with 4-20 mA Output)
- GA510 (4-20 mA Output)
- SC510 (Scaled Pulse Output)

SPECIFICATIONS

| | | | | | |
|-------------------------------------|---|----------------|--------------------|--------|----|
| Design Type: | Turbine | | | | |
| Housing Material: | 316 Stainless Steel | | | | |
| Meter Sizes Available (ID): | 1/2" | 3/4" | 1" | 1-1/2" | 2" |
| Meter ID: | 1/2" | 3/4" Fitting | | | |
| | 1/2" | 1" Fitting | | | |
| | 3/4" | 1-1/2" Fitting | | | |
| | 1" | 1-1/2" Fitting | | | |
| | 1-1/2" | 1-1/2" Fitting | | | |
| | 2" | 2" Fitting | | | |
| Flow Range: | 1/2" (050) [†] | 0.6 - 6 GPM | (2.2 - 22 LPM) | | |
| | 1/2" (051) | 0.8 - 6 GPM | (3.0 - 22 LPM) | | |
| | 3/4" (075) | 1.6 - 16 GPM | (6.0 - 60 LPM) | | |
| | 3/4" (075E) | 2.3 - 23 GPM | (8.7 - 87 LPM) | | |
| | 1" (100) | 6.7 - 67 GPM | (25.2 - 252 LPM) | | |
| | 1-1/2" (150) | 17.7 - 177 GPM | (67.0 - 670 LPM) | | |
| | 2" (200) | 33 - 330 GPM | (125.0 - 1250 LPM) | | |
| Accuracy (Linearity): | ± 0.5% | | | | |
| Repeatability: | ± 0.1% | | | | |
| Pressure Rating: | Limited by fitting size, clamp size & temp. | | | | |
| Operating Temperature Range: | -100° F to +185° F (-74° C to +85° C) | | | | |
| Typical K-Factor: | 1/2" (050) [†] | 10,000 | | | |
| | 1/2" (051) | 10,000 | | | |
| | 3/4" (075) | 3,750 | | | |
| | 3/4" (075E) | 2,608 | | | |
| | 1" (100) | 896 | | | |
| | 1-1/2" (150) | 340 | | | |
| | 2" (200) | 181 | | | |
| Wetted Materials: | | | | | |
| Housing: | 316 Stainless Steel | | | | |
| Sleeve Bearings: | PTFE | | | | |
| Thrust Bearing: | 440C Stainless Steel | | | | |
| Shaft: | 316 Stainless Steel | | | | |
| Rotor: | CD4MCu Stainless Steel | | | | |
| Rotor Supports: | 316 Stainless Steel | | | | |
| Recommended Strainer Size: | | | | | |
| | 1/2" | 40 mesh | | | |
| | 3/4" | 40 mesh | | | |
| | 1" | 40 mesh | | | |
| | 1-1/2" | 18 mesh | | | |
| | 2" | 14 mesh | | | |
| Frequency Output: | 1/2" (050) | 100 - 1000 Hz | | | |
| | 1/2" (051) | 125 - 1000 Hz | | | |
| | 3/4" (075) | 100 - 1000 Hz | | | |
| | 3/4" (075E) | 100 - 1000 Hz | | | |
| | 1" (100) | 100 - 1000 Hz | | | |
| | 1-1/2" (150) | 100 - 1000 Hz | | | |
| | 2" (200) | 100 - 1000 Hz | | | |
| Calibration Report | Comes standard with G Series meters. N.I.S.T. – Certification available. | | | | |

[†] GSCP-050 requires RF Pickup.

Magnetic Pickups



When choosing a magnetic pickup, the turbine meter and electronics are generally already known. Electronics can be either Local or Remote. Remote electronics include GPI Remote Displays or output to customer supplied equipment. Follow these 3 steps when choosing a magnetic pickup then see the Specification Table for further details.



1
Select your size:
1/2 inch or
3/4 to 3 inch



2
Choose: Local or Remote/Output
Local uses a wire lead pickup.
Remote/Output requires a connector.



3
What's your signal type:
Sine Wave or Square Wave
Sine Wave - has no sensor power, can be used with battery powered displays.
Square Wave - sensor power is required.

1/2 INCH METER SIZES

Magnetic Pickups work with...

| Description | Part Number | Sensor Power | Temperature Range | Cable Type | Connector Required | Cable Length | Thread Size | Local | Remote | Battery Pwr Display |
|---|-------------|--------------|---------------------------------------|------------|--------------------|--------------|-------------|-------|--------|---------------------|
| Wire Lead Low Drag | 81006001 | None | -100° F - +250° F (-73° C - +121° C) | None | None | 12 in. | 5/8" - 18 | X | | Yes |
| Low Drag | 81006000 | None | -100° F - +250° F (-73° C - +121° C) | S | 80001200 | N/A | 5/8" - 18 | | X | Yes |
| High Temp., Low Drag (10 ft. cable) | 81007001 | None | -450° F - +800° F (-268° C - +426° C) | None | None | 10 ft. | 5/8" - 18 | | X | Yes |
| * RF (required for GNP-050, GTP-050 & GSCP-050) | 81005002 | 7-30 VDC | -40° F - +248° F (-29° C - +120° C) | D | 80001202 | N/A | 5/8" - 18 | | X | No |

3/4 TO 3 INCH METER SIZES

| | | | | | | | | | | |
|----------------------------|----------|----------|---------------------------------------|------|----------|--------|-----------|---|---|-----|
| Wire Lead Standard | 81003000 | None | -100° F - +250° F (-73° C - +121° C) | None | None | 12 in. | 5/8" - 18 | X | | Yes |
| Standard | 81001000 | None | -100° F - +250° F (-73° C - +121° C) | S | 80001200 | N/A | 5/8" - 18 | | X | Yes |
| Herm / High Temperature | 81002000 | None | -450° F - +258° F (-268° C - +125° C) | S | 80001200 | N/A | 5/8" - 18 | | X | Yes |
| High Temperature, Standard | 81007000 | None | -450° F - +800° F (-268° C - +426° C) | None | None | 3 ft. | 5/8" - 18 | | X | Yes |
| * Digital (Di-Mag) | 81004000 | 5-32 VDC | -40° F - +248° F (-29° C - +120° C) | D | 80001202 | N/A | 5/8" - 18 | | X | No |

* Externally powered pickups for pulse output only.

Pickup Enclosures



Pickup Enclosures are optional on G Series Meters. Choose from four pickup enclosures. Models N4A and N4S are weather-proof enclosures. For explosion-proof enclosures, choose N7A for the enclosure without terminal strip or the N7AT with terminal strip.

ENCLOSURES – PART NUMBERS

| Description | Part Number |
|--|-------------|
| N4AWP - Weatherproof magnetic pickup steel enclosure | 80001101 |
| N4SWP - Weatherproof magnetic pickup 316 S.S. enclosure | 80001105 |
| N7AXP - Explosion-proof pickup enclosure (NEMA 7D) | 80001100 |
| N7ATXP - Explosion-proof pickup enclosure w/terminal strip (NEMA 7D) | 80001102 |
| Optional Spacer | 42825524 |

Connectors



Connectors are included with cable assemblies from GPI. If you need replacement connectors, choose from the following:

| CONNECTORS – PART NUMBERS | |
|---|-------------|
| Description | Part Number |
| Standard mating connector (2 pin) used on Type S and T cable assemblies | 80001200 |
| Water resistant connector (2 pin) used on Type H cable assembly | 80001201 |
| Di-Mag connector (3 pin) used on Type D cable assembly | 80001202 |

Cable Assemblies



GPI Cable Assemblies include the connector.

| CABLE ASSEMBLY – PART NUMBERS | | | |
|---------------------------------------|----------|---|----------|
| Type “S” Standard Cable (2 Conductor) | | Type “H” Water Resistant (2 Conductor) | |
| Cable Length | Part No. | Cable Length | Part No. |
| 8 inch | 83001001 | 8 inch | 83003001 |
| 5 feet | 83001005 | 5 feet | 83003005 |
| 10 feet | 83001010 | 10 feet | 83003010 |
| 15 feet | 83001015 | 15 feet | 83003015 |
| 20 feet | 83001020 | 20 feet | 83003020 |
| 25 feet | 83001025 | 25 feet | 83003025 |
| 30 feet | 83001030 | 30 feet | 83003030 |
| 40 feet | 83001040 | 40 feet | 83003040 |
| 50 feet | 83001050 | 50 feet | 83003050 |
| 75 feet | 83001075 | 75 feet | 83003075 |
| 100 feet | 83001100 | | |
| 125 feet | 83001125 | | |
| Type “D” Di-Mag or RF (3 Conductor) | | Type “T” High Temperature (2 Conductor) | |
| Cable Length | Part No. | Cable Length | Part No. |
| 8 inch | 83002001 | 8 inch | 83004001 |
| 5 feet | 83002005 | 5 feet | 83004005 |
| 10 feet | 83002010 | 10 feet | 83004010 |
| 15 feet | 83002015 | 15 feet | 83004015 |
| 20 feet | 83002020 | 20 feet | 83004020 |
| 25 feet | 83002025 | 25 feet | 83004025 |
| 30 feet | 83002030 | 30 feet | 83004030 |
| 40 feet | 83002040 | 40 feet | 83004040 |
| 50 feet | 83002050 | 50 feet | 83004050 |
| 75 feet | 83002075 | 75 feet | 83004075 |



G SERIES PRECISION METERS

The High Precision Meter line is the most accurate of the GPI Turbine Meters and includes a traditional design. These meters come in a variety of sizes and fitting options including BSP, ISO, NPT and ANSI Flange fittings. The GSCPS in this section carries the 3A Sanitary Rating.



1) Select Your Turbine**Threaded Models****Sanitary Clamp Models****Flange Models****2) Select Your Sensor****Local Pickup Wire Lead****3) Select Your Electronic Choice**

For further details and selections see the Electronics Section.

Remote Models

| | |
|-------|--------|
| GA500 | R700-R |
| GG500 | R800-R |
| GX500 | SC500 |

Local Models

| | |
|-------|--------|
| GA510 | R700-L |
| GG510 | R800-L |
| GX510 | SC510 |

**4) Do You Want It Assembled?**

GPI will assemble the components you choose into a single unit, configured to your request.

Contact the factory for details on Custom System Assembly.

G SERIES METER NUMBER REFERENCE

G SERIES

USE THIS AS A GUIDE – SIZES VARY BY FITTING TYPE.
(Does not apply to model GSCPS - 3A Meters)

Product Identifier

G = G Series Precision Turbine Meter

Fitting Type

- N** = NPT (Male)
- I** = ISO Taper (Male)
- B** = BSP (Male)
- F** = Flanged
- SC** = Sanitary Clamp

Meter Dimensions listed on page 93.

Shaft / Sleeve Bearing / Thrust Bearing

- T-** = Tungsten Carbide / Tungsten Carbide
- P-** = Stainless Steel / PTFE / Stainless Steel

Turbine Size & Flowrate

- 050S** = 1/2 in. (0.6 - 6 GPM) Low Flow - Turbine Body Only♦
- 051S** = 1/2 in. (0.8 - 6 GPM) Standard - Uses Low Drag Standard Sensor 1
- 051H** = 1/2 in. (0.8 - 6 GPM) High Temp - Turbine Body Only♦
- 075S** = 3/4 in. (1.6 - 16 GPM) Standard - Uses Standard Sensor 2
- 075H** = 3/4 in. (1.6 - 16 GPM) High Temp - Turbine Body Only♦
- 075E** = 3/4 in. (2.32 - 23 GPM) Ext-Range - Uses Standard Sensor 2
- 75EH** = 3/4 in. (2.32 - 23 GPM) Ext-Range High Temp - Turbine Body Only♦
- 100S** = 1 in. (6.7 - 67 GPM) Standard - Uses Standard Sensor 2
- 100H** = 1 in. (6.7 - 67 GPM) High Temp - Turbine Body Only♦
- 150S** = 1-1/2 in. (17.7 - 177 GPM) Standard - Uses Standard Sensor 2
- 150H** = 1-1/2 in. (17.7 - 177 GPM) High Temp - Turbine Body Only♦
- 200S** = 2 in. (33 - 330 GPM) Standard - Uses Standard Sensor 2
- 200H** = 2 in. (33 - 330 GPM) High Temp - Turbine Body Only♦
- 300S** = 3 in. (60-600 GPM) Standard - Uses Standard Sensor 2

Sensor Choice

- 1** = Low Drag Standard Sensor with 12 inch Lead Wires
- 2** = Standard Sensor with 12 inch Lead Wires
- X** = No Sensor - Turbine Body Only

Electronic Choice (Local)*

Turbine Mounted

- 5** = GG510 - Standard Display
- 6** = GX510 - 4-20 mA Transmitter with Display
- 7** = GA510 - 4-20 mA Transmitter
- 8** = SC510 - Scaled Pulse Output
- X** = No Electronics - Turbine Body Only



* Electronic Choice not available on all models.

GBT, GIT & GNT PRECISION METERS

Model GNT NPT Fitting



GNT shown here
with Local Display



For complete part number,
see "Number Reference" chart on page 81.

ACCURACY: ± 0.5%

Select Your Meter Size:

| | | |
|----------|------------|--------|
| 1/2 inch | 1 inch | 2 inch |
| 3/4 inch | 1-1/2 inch | 3 inch |



For Your Special Application Needs:

Model GNT HT

For High Temperatures

(This model is not available in 3 inch)



Sensor Options:

- Low Drag Pickup (1/2 in. turbines)
- Standard Pickup (3/4 to 3 in. turbines)

Electronics Options:

- GG510 (Display with Pulse Output)
- GX510 (Display with 4-20 mA Output)
- GA510 (4-20 mA Output)
- SC510 (Scaled Pulse Output)

SPECIFICATIONS

| | | | |
|-------------------------------------|---|---------------------------------|--|
| Design Type: | Turbine | | |
| Housing Material: | 316 Stainless Steel | | |
| Meter Sizes Available: | | | |
| For GNT: NPT Taper (Male) | 1/2" 3/4" 1" 1-1/2" 2" 3" | | |
| For GBT: BSPP * (Male) | 1/2" 3/4" 1" 1-1/2" 2" 3" | | |
| For GIT: ISO Taper (Male) | 1/2" 3/4" 1" 1-1/2" 2" 3" | | |
| For High Temperature*: | 1/2" 3/4" 1" 1-1/2" 2" — | | |
| Flow Range: | 1/2" (051) | 0.8 - 6.0 GPM (3.0 - 22 LPM) | |
| | 3/4" (075) | 1.6 - 16 GPM (6.0 - 60 LPM) | |
| | 3/4" (075E) | 2.3 - 23 GPM (8.7 - 87 LPM) | |
| | 1" (100) | 6.7 - 67 GPM (25.2 - 252 LPM) | |
| | 1-1/2" (150) | 17.7 - 177 GPM (67.0 - 670 LPM) | |
| | 2" (200) | 33 - 330 GPM (125.0 - 1250 LPM) | |
| | 3" (300) | 60 - 600 GPM (227.1 - 2271 LPM) | |
| Accuracy (Linearity): | ± 0.5% | | |
| Repeatability: | ± 0.1% | | |
| Pressure Rating: | 1/2" to 2" = 5,000 PSI / 340 BAR 3" = 2,500 PSI / 170 BAR | | |
| Operating Temperature Range: | -450° F to +800° F (-268° C to +426° C) | | |
| Typical K-Factor: | 1/2" (051) | 10,000 | |
| | 3/4" (075) | 3,750 | |
| | 3/4" (075E) | 2,608 | |
| | 1" (100) | 896 | |
| | 1-1/2" (150) | 340 | |
| | 2" (200) | 181 | |
| | 3" (300) | 50 | |
| Wetted Materials: | | | |
| Housing: | 316 Stainless Steel | | |
| Sleeve Bearings: | Tungsten Carbide | | |
| Thrust Bearing: | Tungsten Carbide | | |
| Shaft: | Tungsten Carbide | | |
| Rotor: | CD4MCu Stainless Steel | | |
| Rotor Supports: | 316 Stainless Steel | | |
| Recommended Strainer Size: | | | |
| | 1/2" | 40 mesh | |
| | 3/4" | 40 mesh | |
| | 1" | 40 mesh | |
| | 1-1/2" | 18 mesh | |
| | 2" | 14 mesh | |
| | 3" | 14 mesh | |
| Frequency Output: | 1/2" (051) | 125 - 1000 Hz | |
| | 3/4" (075) | 100 - 1000 Hz | |
| | 3/4" (075E) | 100 - 1000 Hz | |
| | 1" (100) | 100 - 1000 Hz | |
| | 1-1/2" (150) | 100 - 1000 Hz | |
| | 2" (200) | 100 - 1000 Hz | |
| | 3" (300) | 50 - 500 Hz | |
| Calibration Report | Comes standard with G Series meters. N.I.S.T. - Certification available. | | |

APPROVALS



- * Requires High Temp Pickup.
- * ISO 228-1 designation is G.

SPECIFICATIONS

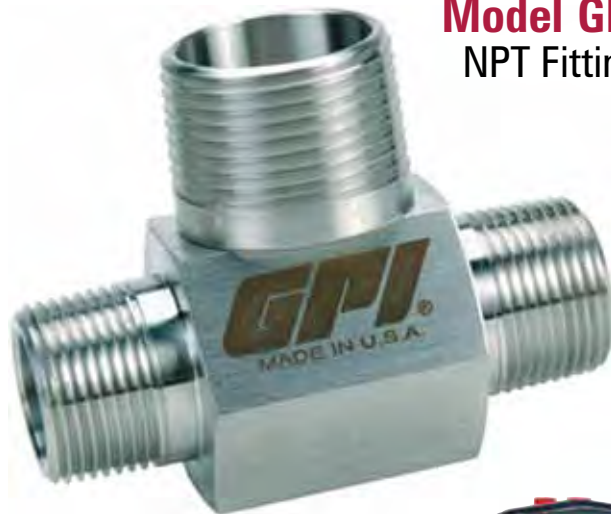
| | | | | | |
|-------------------------------------|---|---------------------------------|----|--------|----|
| Design Type: | Turbine | | | | |
| Housing Material: | 316 Stainless Steel | | | | |
| Meter Sizes Available: | | | | | |
| For GNP: NPT (Male) | 1/2" | 3/4" | 1" | 1-1/2" | 2" |
| For GBP: BSPP* (Male) | 1/2" | 3/4" | 1" | 1-1/2" | 2" |
| For GIP: ISO Taper (Male) | 1/2" | 3/4" | 1" | 1-1/2" | 2" |
| Flow Range: | 1/2" (050)* | 0.6 - 6.0 GPM (2.2 - 22 LPM) | | | |
| | 1/2" (051) | 0.8 - 6.0 GPM (3.0 - 22 LPM) | | | |
| | 3/4" (075) | 1.6 - 16 GPM (6.0 - 60 LPM) | | | |
| | 3/4" (075E) | 2.3 - 23 GPM (8.7 - 87 LPM) | | | |
| | 1" (100) | 6.7 - 67 GPM (25.2 - 252 LPM) | | | |
| | 1-1/2" (150) | 17.7 - 177 GPM (67.0 - 670 LPM) | | | |
| | 2" (200) | 33 - 330 GPM (125.0 - 1250 LPM) | | | |
| Accuracy (Linearity): | ± 0.5% | | | | |
| Repeatability: | ± 0.1% | | | | |
| Pressure Rating: | 1/2" to 2" = 5,000 PSI / 340 BAR | | | | |
| Operating Temperature Range: | -450° F to +800° F (-268° C to +426° C) | | | | |
| Typical K-Factor: | 1/2" (050)* | 10,000 | | | |
| | 1/2" (051) | 10,000 | | | |
| | 3/4" (075) | 3,750 | | | |
| | 3/4" (075E) | 2,608 | | | |
| | 1" (100) | 896 | | | |
| | 1-1/2" (150) | 340 | | | |
| | 2" (200) | 181 | | | |
| Wetted Materials: | | | | | |
| Housing: | 316 Stainless Steel | | | | |
| Sleeve Bearings: | PTFE | | | | |
| Thrust Bearing: | 440C Stainless Steel | | | | |
| Shaft: | 316 Stainless Steel | | | | |
| Rotor: | CD4MCu Stainless Steel | | | | |
| Rotor Supports: | 316 Stainless Steel | | | | |
| Recommended Strainer Size: | | | | | |
| | 1/2" | 40 mesh | | | |
| | 3/4" | 40 mesh | | | |
| | 1" | 40 mesh | | | |
| | 1-1/2" | 18 mesh | | | |
| | 2" | 14 mesh | | | |
| Frequency Output: | 1/2" (051)* | 125 - 1000 Hz | | | |
| | 3/4" (075) | 100 - 1000 Hz | | | |
| | 3/4" (075E) | 100 - 1000 Hz | | | |
| | 1" (100) | 100 - 1000 Hz | | | |
| | 1-1/2" (150) | 100 - 1000 Hz | | | |
| | 2" (200) | 100 - 1000 Hz | | | |
| Calibration Report | Comes standard with G Series meters. N.I.S.T. – Certification available. | | | | |

APPROVALS



* 1/2 in. (050) requires RF Pickup.
* ISO 228-1 designation is G.

Model GNP NPT Fitting



GNP shown here
with Local Display

For complete part number,
see "Number Reference" chart on page 81.

ACCURACY: ± 0.5%

Select Your Meter Size:

| | | |
|----------|------------|--------|
| 1/2 inch | 1 inch | 2 inch |
| 3/4 inch | 1-1/2 inch | |



Sensor Options:

- Low Drag Pickup (1/2 in. turbines)
- Standard Pickup (3/4 to 3 in. turbines)

Electronics Options:

- GG510 (Display with Pulse Output)
- GX510 (Display with 4-20 mA Output)
- GA510 (4-20 mA Output)
- SC510 (Scaled Pulse Output)

CLARK

WP Series Turbine Water Meter

2" to 8" Pipe Size, With or Without Reed Switch

DESCRIPTION

The WP meters are Woltmann type totalizing water meters comprised of a rotor with helical blades inserted axially in the flow stream.

The units feature a magnetic drive for low transmission resistance and a dry dial register insures clear reading. They operate at low pressure loss and offer excellent accuracy in 2" to 8" pipes.

The meter body is made of cast or ductile iron and is epoxy coated. The meter register assembly can be removed for repair or replacement without disrupting the process flow.

SPECIFICATIONS

GENERAL

Measuring Principle: Turbine/Woltman helical bladed rotor

Meter Type: Dry, magnetic coupling between rotor and register movement

Meter Sizes: 2", 3", 4", 6", 8"

Meter Ratings:

Cold Water Meter: Calibrated for water temperatures to 104°F (40°C)

Hot Water Meter: Calibrated for water temperatures to 194°F (90°C)

Max Media Operatng Temperature & Pressure:

| Temperature (F°) | Pressure (PSIG) |
|------------------|-----------------|
| -20 to 150 | 200 |
| 200 | 190 |

Materials Of Construction: See table 4

Accuracy: Cold water meter: $\pm 2\%$ at nominal/intermediate (Q_n) and maximum (Q_{max}) flow, $\pm 5\%$ at minimum flow rate (Q_{min}) to transition flow rate Q_t . See fig 1.

Hot water meter: $\pm 3\%$ at nominal/intermediate (Q_n) and maximum (Q_{max}) flow, $\pm 5\%$ at minimum flow rate (Q_{min}) to transition flow rate (Q_t). See fig 1.

Pressure Drop: See Pressure drop curves fig. 2

Connections: ASME Class 125 Flanges per B16.1

Dimensions and Weights: See table 2 for details

Installation: Clean pipe line before installing meter.

- 1) Horizontal position with register facing upward is recommended however any position is acceptable.
- 2) Meter must be installed with direction of flow as indicated by arrow cast into the meter body.
- 3) Install valve before inlet of meter. A valve at outlet is also recommended.
- 4) Install meter in a location with at least 10 diameters of straight pipe at the inlet and 5 diameters at the outlet to assure proper flow profile to meter.
- 5) Do not use a meter rated for cold water as a hot water meter.



WP- 2" Size



WP- 3" & 4" Sizes



WP-6" & 8" Sizes

OPTIONAL PULSE/REED SWITCH OUTPUT:

The pulse emitter consists of a plastic housing with a reed switch that is closed when a magnet mounted on one of the meters register gears comes into its activation proximity.

A 1.5 meter (59") length of 2-conductor wire 3.5 mm diameter is standard. One conductor has red insulation and one has black.

Max Voltage: 24V AC/DC

Max Current: 0.01 A

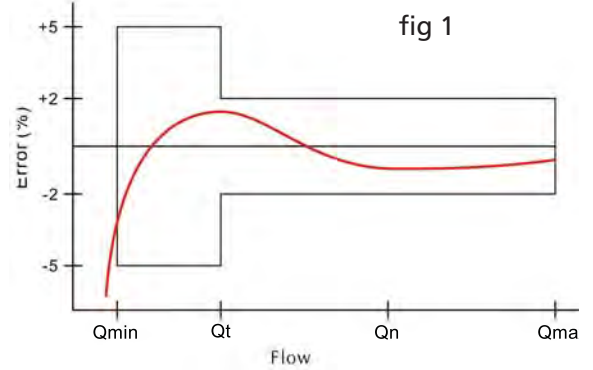


Reed Switch

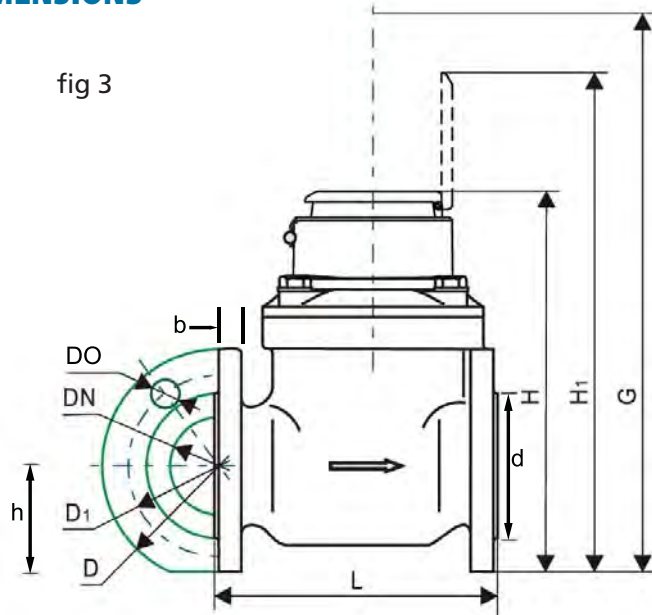


| Table 1- Operating Characteristics | | | | | | | | |
|------------------------------------|------|-----------------------------------|---------------------------------|-----------------------------------|--|----------------------|----------------------|---------------------|
| Model | Size | Max. Flow GPM (Q _{max}) | Nom. Flow GPM (Q _n) | Min. Flow GPM (Q _{min}) | Transition Flow rate (Q _t) | Min. Reading Gallons | Max. Reading Gallons | Pulse Output Option |
| WP-SDC(1A7)-2 | 2" | 160 | 25 | 4 | 13 | 0.1 | 999999999 | 1 P/100 Gal |
| WP-SDC(1A7)-3 | 3" | 350 | 50 | 8 | 35 | 0.1 | 999999999 | 1 P/100 Gal |
| WP-SDC(1A7)-4 | 4" | 530 | 90 | 15 | 53 | 0.1 | 999999999 | 1 P/100 Gal |
| WP-SDC(1A7)-6 | 6" | 1230 | 200 | 30 | 132 | 1.0 | 999999999 | 1 P/1000 Gal |
| WP-SDC(1A7)-8 | 8" | 2200 | 350 | 50 | 220 | 1.0 | 999999999 | 1 P/1000 Gal |

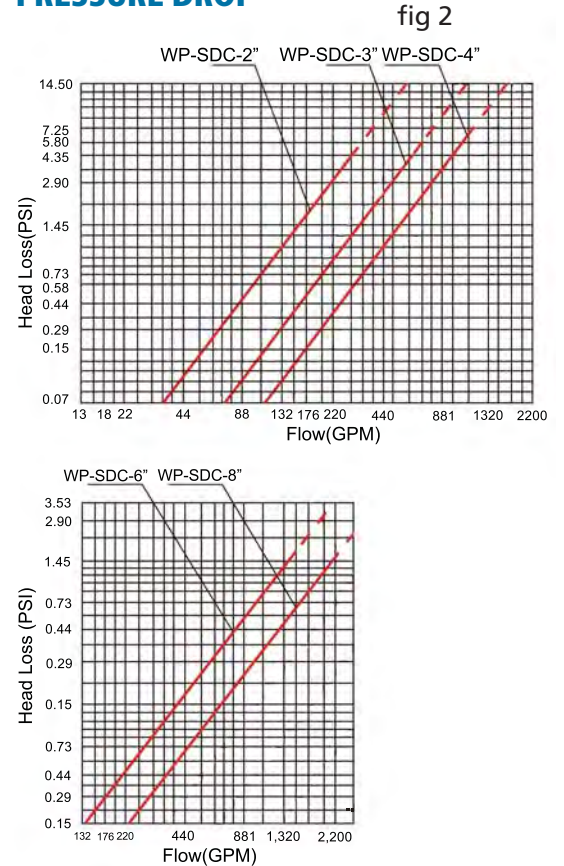
TYPICAL ACCURACY CURVE



DIMENSIONS



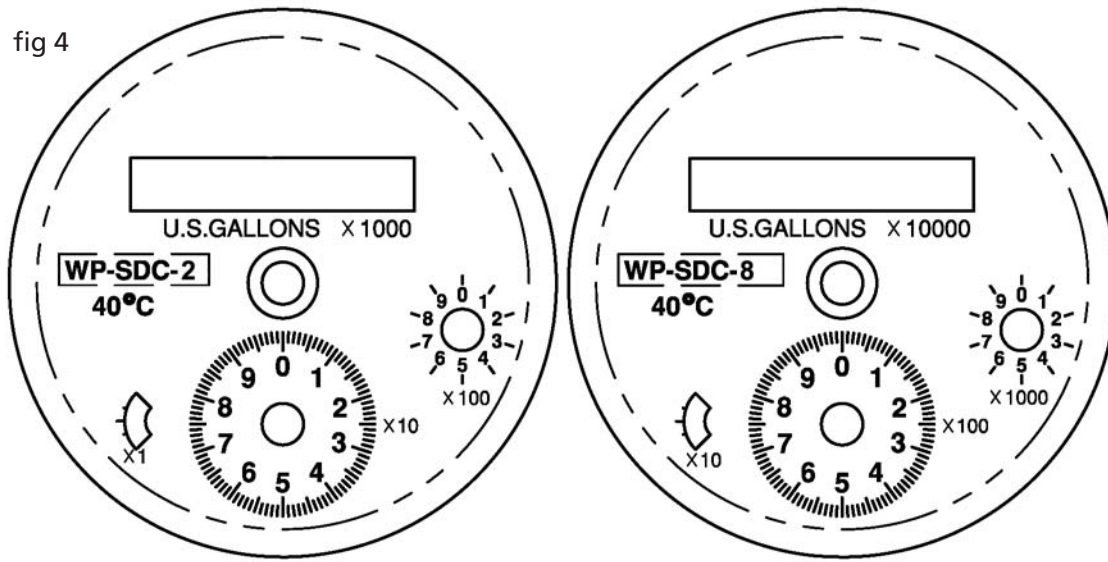
PRESSURE DROP



| Table 2- Dimensions | | | | | | | | | | | | |
|---------------------|------|---------------|----------------------------|---------------|---------------|---------------|----------------|---------------|----------------|----------------------------|---------------|----------------|
| Model | Size | D Inches (mm) | D ₁ Inches (mm) | d Inches (mm) | b Inches (mm) | h Inches (mm) | DO Inches (mm) | L Inches (mm) | H Inches (mm) | H ₁ Inches (mm) | G Inches (mm) | No. Bolt Holes |
| WP-SDC(1A7)-2 | 2" | 6.50 (165) | 4.75 (120.62) | 3.62 (92) | 0.63 (16) | 2.76 (70) | 0.748 (19) | 7.87 (200) | 10.10 (256) | 12.90 (328) | 15.70 (400) | 4 |
| WP-SDC(1A7)-3 | 3" | 7.50 (190.5) | 6.00 (152.40) | 5.00 (127) | 0.748 (19) | 3.58 (91) | 0.748 (19) | 8.86 (225) | 10.90 (276) | 13.70 (348) | 15.70 (400) | 4 |
| WP-SDC(1A7)-4 | 4" | 9.00 (228.6) | 7.50 (190.50) | 6.18 (157) | 0.945 (24) | 4.29 (109) | 0.748 (19) | 9.84 (250) | 11.30 (286) | 14.10 (358) | 15.70 (400) | 8 |
| WP-SDC(1A7)-6 | 6" | 11.00 (279.4) | 9.50 (241.30) | 8.50 (216) | 0.965 (24.5) | 5.31 (135) | 0.878 (22.30) | 11.80 (300) | 13.60 (345.50) | 16.40 (417.50) | 19.70 (500) | 8 |
| WP-SDC(1A7)-8 | 8" | 13.50 (343) | 11.80 (298.50) | 10.60 (270) | 1.12 (28.5) | 6.50 (165) | 0.878 (22.30) | 13.80 (350) | 14.70 (372.50) | 17.50 (444.50) | 19.70 (500) | 8 |

METER DIALS

fig 4



ORDERING INFORMATION

Table 3

| Model | Description |
|-------------------------------------|----------------------------|
| Cold Water Meter, No Pulse Output | |
| WP-SDC(1A7)-2 | 2" Meter |
| WP-SDC(1A7)-3 | 3" Meter |
| WP-SDC(1A7)-4 | 4" Meter |
| WP-SDC(1A7)-6 | 6" Meter |
| WP-SDC(1A7)-8 | 8" Meter |
| Cold Water Meter, With Pulse Output | |
| WP-SDC(4A7)-2 | 2" Meter, 1 Pulse/100 gal |
| WP-SDC(4A7)-3 | 3" Meter, 1 Pulse/100 gal |
| WP-SDC(4A7)-4 | 4" Meter, 1 Pulse/100 gal |
| WP-SDC(4A7)-6 | 6" Meter, 1 Pulse/1000 gal |
| WP-SDC(4A7)-8 | 8" Meter, 1 Pulse/1000 gal |

| Model | Description |
|-------------------------------------|---------------------------|
| Hot Water Meter, No Pulse Output | |
| WP-SDH(1A7)-2 | 2" Meter |
| WP-SDH(1A7)-3 | 3" Meter |
| WP-SDH(1A7)-4 | 4" Meter |
| WP-SDH(1A7)-6 | 6" Meter |
| WP-SDH(1A7)-8 | 8" Meter |
| Cold Water Meter, With Pulse Output | |
| WP-SDH(4A7)-2 | 2" Meter, 1 Pulse/100 gal |
| WP-SDH(4A7)-3 | 3" Meter, 1 Pulse/100 gal |
| WP-SDH(4A7)-4 | 4" Meter, 1 Pulse/100 ga |
| WP-SDH(4A7)-6 | 6" Meter, 1 Pulse/1000 ga |
| WP-SDH(4A7)-8 | 8" Meter, 1 Pulse/1000 ga |



Table 4

| Part Description & Materials | | |
|------------------------------|-----|------------------------------------|
| No. | Qty | WP-2", 3", 4" |
| 1 | 1 | Hinge Pin Brass |
| 2 | 1 | Lid ABS |
| 3 | 2 | Plug ABS |
| 4 | 1 | Upper Retaining Ring- ABS |
| 5 | 1 | Register Assembly |
| 6 | 1 | Bracket ABS |
| 7 | 3 | Screw 1Cr18Nig |
| 8 | 4 | Screw 1Cr18Nig |
| 9 | 1 | Immovable Plate ABS |
| 10 | 1 | Register House ABS |
| 11 | 3 | Screw 1Cr18Nig |
| 12 | 1 | Screw w/hole 1Cr18Nig |
| 13 | 4 | Gasket 1Cr18Nig |
| 14 | 1 | Measuring Unit Fe,CU,ABS,PA,PPO |
| 15 | 1 | O-ring NBR |
| 16 | 1 | Iron with Epoxy Coating |
| 17 | 2 | Copper Wire Brass |
| 18 | 2 | Seal Lead |
| 19 | 1 | Seal Pin 1Cr18Nig |
| 20 | 2 | Rvet Brass |
| 21 | 1 | Label Brass, Stainless Steel |
| 22 | 2 | Flange Gasket NBR |

| Part Description & Materials | | |
|------------------------------|-----|------------------------------------|
| No. | Qty | WP-6", 8" |
| 1 | 1 | Hinge Pin Brass |
| 2 | 1 | Lid ABS |
| 3 | 2 | Plug ABS |
| 4 | 1 | Upper Retaining Ring- ABS |
| 5 | 1 | Register Assembly |
| 6 | 1 | Bracket ABS |
| 7 | 3 | Screw 1Cr18Nig |
| 8 | 4 | Screw 1Cr18Nig |
| 9 | 1 | Immovable Plate ABS |
| 10 | 1 | Register House ABS |
| 11 | 7 | Screw 1Cr18Nig |
| 12 | 1 | Screw w/hole 1Cr18Nig |
| 13 | 8 | Gasket 1Cr18Nig |
| 14 | 2 | Screw 20# |
| 15 | 1 | Measuring Unit Fe,CU,ABS,PA,PPO |
| 16 | 1 | Gasket NBR |
| 17 | 1 | Iron with Epoxy Coating |
| 18 | 2 | Copper Wire Brass |
| 19 | 2 | Seal Lead |
| 20 | 1 | Seal Pin 1Cr18Nig |
| 21 | 2 | Rvet Brass |
| 22 | 1 | Label Brass, Stainless Steel |
| 23 | 2 | Flange Gasket NBR |

CLARK

FSI-T00-000 Impeller Type Flow Sensor

1", 1 1/2" & 2" Pipe Size, Pulse Output

DESCRIPTION

FSI-T00 flow sensors are designed specifically for flow monitoring and control applications in fluidic systems where the materials of construction and performance specifications are suitable.

The sensor features a square wave digital signal proportional to flow. The characteristics of the output signal duplicate existing impeller flow sensor signals making the FSI series sensor compatible with all manufacturer's control products.

The pulse signal will travel up to 2,000 feet without amplification.

The key elements of this new technology are a proprietary mounting tee, ultra-lightweight impeller and improved processor based electronics giving the FSI series sensor improved performance.



SPECIFICATIONS

Pipe Sizes

1", 1 1/2", 2"

Wetted Materials

Impeller: HDPE (High Density Polyethylene)

Shaft: Tungsten Carbide

O-ring: BUNA N

Tee, Sensor Housing, Retaining Nut: Type 1 PVC

Pressure Rating

Sensor designed to Schedule 40 specifications

Samples tested to working pressure of 240 PSI

Temperature Range

32°F to 140° F (0° to 60° C)

Output Signal

Frequency Range: 0.3 Hz to 200 Hz

Output Pulse: 5 msec +/-25%

Transducer Excitation

Quiescent current 600 uA@8 VDC to 35 VDC max.

Quiescent voltage (VHigh)= Supply Voltage - (600uA X Supply Impedance)

On State (VLow)= Max. 1.2 VDC@50mA current limit, (10 Ohm + 0.7VDC)

Velocity Range (See Table 2)

0.25 to 15 FPS

Electrical Cable

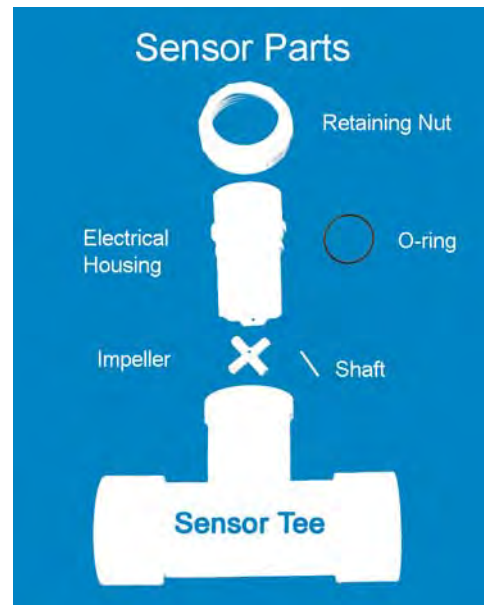
2 single conductor solid copper U.L. listed #18 AWG leads with direct burial insulation

Lead length: 48 inches

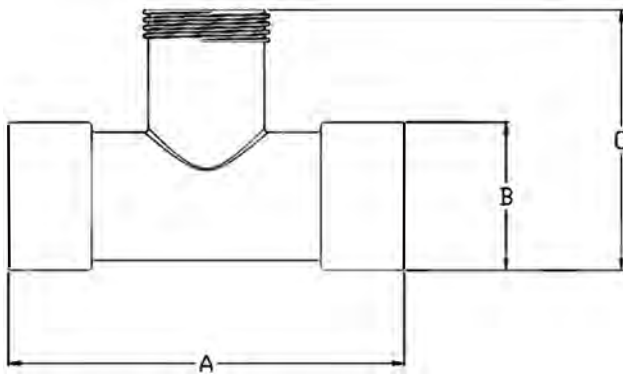
Wiring may be extended up to 2,000 feet with direct burial, twisted pair shielded cable

FEATURES

- **Molded Mounting Tee:** Improved control of dimensions for more consistent measurement and improved performance at low flow.
- **Threaded Retaining Nut Instead of Retaining Pin:** Easier to service in a valve box, more moisture resistance for electronics resulting in longer life.
- **Unique 4 Bladed Lightweight Impeller:** Measures lower flow rates. Detects flow as low as 20% of published minimum rate of other impeller sensors
- **Smart Electronics Detection System:** Sensor electronics contain a micro-processor for better signal filtering and conditioning. Detection circuit also contains superior over-voltage and over-current protection.



DIMENSIONS



| Model | Pipe Size | A Length Inches (mm) | B Width Inches (mm) | C Height Inches (mm) | *K Factor (To read flow rate in GPM) | *Offset |
|-------------|-----------|----------------------|---------------------|----------------------|--------------------------------------|---------|
| FSI-T10-001 | 1" | 5.625 (143) | 1.710 (43) | 3.487 (88) | 0.322 | 0.20 |
| FSI-T15-001 | 1 1/2" | 6.188 (157) | 2.310 (58) | 5.097 (130) | 0.650 | 0.750 |
| FSI-T20-001 | 2" | 7.00 (178) | 2.875 (73) | 4.573 (116) | 1.192 | 0.938 |

*Frequency = (GPM/K) - Offset or GPM = Frequency x K + Offset

FLOW SENSOR OPERATING RANGE

FST flow sensors use a rotating impeller to sense the water moving through the closed pipe. The speed of the impeller rotation is proportional to the velocity of the liquid. As the impeller turns, it produces digital pulses. The relationship between velocity and volumetric flow rate is dependent on the size of the pipe and may be calculated using the formula $Q_{gpm} = V_{fps} \times D^2 \times 2.45$ where Q is the flow rate in gpm, V is velocity in fps and D is the inside diameter of the pipe in inches. The pipe must be full for the rotational speed of the impeller to accurately reflect flow.

FSI Series flow sensors measure flow over a range from 0.25 fps to 15 fps. Size the flow sensor for the flow rates that need to be measured, not the pipe size. The most common mistake in selecting a flow sensor is to oversize the unit and not be able to measure low flow. The flow sensor will operate at significantly higher velocities than commonly used for sizing pipe. Note: a 2" flow sensor has an operating range high enough for use with 3 or 4 inch diameter pipelines running at lower velocities. If the system flow rate falls below the minimum shown in these tables, use a smaller diameter flow sensor installed in a "meter run"- a section of pipe containing 10 diameters of straight pipe ahead of the sensor and 5 diameters of straight pipe after the sensor.

| Model | Flow | | | |
|-----------------|-------------------|-----------------------|-------------------|------|
| | FSI-T10-001 1" | FSI-T15-001 1 1/2" | FSI-T20-001 2" | |
| Feet Per Second | GPM | GPM | GPM | |
| Minimum Flow | 0.25 | 0.86 | 1.8 | 2.8 |
| | 1 | 3.5 | 7.24 | 11.3 |
| | 2 | 7 | 14.5 | 23 |
| | 3 | 10.4 | 22 | 34 |
| | 5 | 17 | 36 | 57 |
| | 7 | 24 | 51 | 79 |
| | 10 | 35 | 72 | 113 |
| | 12 | 42 | 87 | 136 |
| Maximum Flow | 15 | 52 | 108 | 170 |

ELECTRICAL

- Two conductors are required to connect the flow sensor to the monitor or control device.
- The RED lead from the sensor is the + (Positive) lead and the BLACK lead from the sensor is the - (Negative) lead. Observe polarity when extending these conductors and connect them to the + and - leads or terminals of the FLOW SENSOR INPUT of the monitor or controller. Do not connect flow sensor to Power or Valve circuits!
- Use a shielded Direct Burial cable with at least one twisted pair of conductors. Multiple pair cable may be used. Use #20 AWG or larger stranded copper wire conductors to extend the distance up to 2,000 feet.
- Waterproof the splices. The preferred method is the two part epoxy kit, Scotchlok 3570 as manufactured by 3M. Follow all manufacturer's instructions.
- Make sure that the flow sensor housing is installed in the tee or the retaining nut is on the wire leads before making the splices.
- Provide a service loop in the cable to allow the flow sensor housing to be removed from the tee and brought above grade for servicing.
- Avoid making splices in the direct burial cable.

ORDERING INFORMATION

| Model | Size |
|-------------|--------|
| FSI-T10-001 | 1" |
| FSI-T15-001 | 1 1/2" |
| FSI-T20-001 | 2" |

CLARK

FSI-500-000 Saddle Mount Impeller Type Flow Sensor

3" & 4" Pipe Size, Pulse Output

DESCRIPTION

FSI-500 flow sensors are designed specifically for flow monitoring and control applications in fluidic systems where the materials of construction and performance specifications are suitable.

The flow sensors are designed specifically for irrigation measurement and control applications. The standard two-wire flow sensor output is a digital square wave proportional to flow. The characteristics of the output signal duplicate existing impeller flow sensor signals making the FSI series sensor compatible with all manufacturer's control products.

The pulse signal will travel up to 2,000 feet without amplification.

The sensor insert mounts in a housing that controls the depth and alignment of the impeller, unlike other insert type sensors that may be mis-aligned or set to the wrong depth. The housing is permanently attached to the PVC saddle therefore no additional mounting hardware is required. They are rated to operate at pressures up to 150 psi.

FEATURES

- **Lower flow measurement** than competitive devices from unique mechanical design
- **Moisture resistant construction** for underground installations
- **Simple installation** – drill the pipe and mount the saddle- no need to measure, align or set depth
- **Easy to service** — single large retaining nut holds the sensor insert in the housing.



SPECIFICATIONS

Pipe Sizes

3", 4"

Wetted Materials

Impeller: HDPE (High Density Polyethylene)

Shaft: Tungsten Carbide

O-ring: BUNA N

Tee, Sensor Housing, Retaining Nut: Type 1 PVC

Working Pressure

150 PSI@90°F

Temperature Range

32°F to 140° F (0° to 60° C)

Output Signal

Frequency Range: 0.3 Hz to 200 Hz

Output Pulse: 5 msec +/-25%

Transducer Excitation

Quiescent current 600 uA@8 VDC to 35 VDC max.

Quiescent voltage (VHigh)= Supply Voltage - (600uA X Supply Impedance)

On State (VLow)= Max. 1.2 VDC@50mA current limit, (10 Ohm + 0.7VDC)

Accuracy:

±2% F.S.

Velocity Range (See Table 2)

0.25 to 12 FPS

3" Saddle: 6-300 GPM

4" Saddle: 10-480 GPM

Electrical Cable

2 single conductor solid copper U.L. listed #18 AWG leads with direct burial insulation

Lead length: 48 inches

Wiring may be extended up to 2,000 feet with direct burial, twisted pair shielded cable

DIMENSIONS

| Table 1- Dimensions, K Factors | | | | | | |
|--------------------------------|-----------|--------------------|-------------------|---------------------|---------------------------------------|----------|
| Model | Pipe Size | Length Inches (mm) | Width Inches (mm) | H*eight Inches (mm) | **K Factor (To read flow rate in GPM) | **Offset |
| FSI-S30-001 | 3" | 5.0 (127) | 5.5 (140) | 6.5 (165) | 2.75 | 1.58 |
| FSI-S40-001 | 4" | 5.0 (127) | 5.5 (140) | 7.5 (190) | 4.53 | 1.11 |

*Minimum Clearance Above sensor Required for Removal: 3.75 inches (96 mm)
 **Frequency = (GPM/K) - Offset or GPM = Frequency x K + Offset

FLOW SENSOR OPERATING RANGE

FSI-S30/40 flow sensors use a rotating impeller to sense the water moving through the closed pipe. The speed of the impeller rotation is proportional to the velocity of the liquid. As the impeller turns, it produces digital pulses. The relationship between velocity and volumetric flow rate is dependent on the size of the pipe and may be calculated using the formula $Q_{gpm} = V_{fps} \times D^2 \times 2.45$ where Q is the flow rate in gpm, V is velocity in fps and D is the inside diameter of the pipe in inches. The pipe must be full for the rotational speed of the impeller to accurately reflect flow.

| Table 2- Flow | | | |
|---------------|-----------------|-------------------|------------------|
| Model | | FSI-S30-001 3" | FSI-40-001 4" |
| | Feet Per Second | GPM | GPM |
| Minimum Flow | 0.25 | 6 | 10 |
| | 1 | 25 | 40 |
| | 2 | 50 | 80 |
| | 3 | 75 | 120 |
| | 5 | 125 | 200 |
| | 7 | 175 | 280 |
| | 10 | 250 | 400 |
| | 12 | 300 | 480 |

ELECTRICAL

- Two conductors are required to connect the flow sensor to the monitor or control device.
- The RED lead from the sensor is the + (Positive) lead and the BLACK lead from the sensor is the - (Negative) lead. Observe polarity when extending these conductors and connect them to the + and - leads or terminals of the FLOW SENSOR INPUT of the monitor or controller. Do not connect flow sensor to Power or Valve circuits!
- Use a shielded Direct Burial cable with at least one twisted pair of conductors. Multiple pair cable may be used. Use #20 AWG or larger stranded copper wire conductors to extend the distance up to 2,000 feet.
- Waterproof the splices. The preferred method is the two part epoxy kit, Scotchlok 3570 as manufactured by 3M. Follow all manufacturer's instructions.
- Make sure that the flow sensor housing is installed in the tee or the retaining nut is on the wire leads before making the splices.
- Provide a service loop in the cable to allow the flow sensor housing to be removed from the tee and brought above grade for servicing.
- Avoid making splices in the direct burial cable.

ORDERING INFORMATION

| Model | Size |
|-------------|------|
| FSI-S30-001 | 3" |
| FSI-S40-001 | 4" |

Truflo

LS Series Insertion Flow Meter

1/2" to 24", Frequency Pulse Output

DESCRIPTION

Series LS flow meters are insertion paddle type and feature all plastic wetted components suitable for a wide range of media compatibility.

Series LS measures flows in pipes from 1/2" to 24". They are very accurate (0.75% F.S) and have a frequency pulse output.

A full range of TEE fittings, saddles and adaptors assure easy and trouble free mounting.

SPECIFICATIONS

GENERAL

Pipe Sizes: 1/2" to 24"

Flow Velocity range: 0.33 to 26 ft/s (0.1 to 8 m/s)

Supply Voltage: 24 VDC

Measuring Accuracy: $\pm 0.75\%$ Full Scale

Repeatability: $\pm 0.5\%$ Full Scale

Output Frequency: 60.5Hz per m/s nominal velocity (18.45Hz ft/s)

Pulse Output Type: Transistor NPN Open-Collector (Max. DC60V/100mA)

Electrical Connection: DIN Mini-Connector 43650-A (IP65), Electrical cable (IP68)

Cable Type: 3 conductor + Shield.26A WG.PVC

Reverse Voltage: Protection Included As Standard

Enclosure Rating: NEMA 4X (IP65) or NEMA 6 (IP68) RATINGS

Sensor Body Material: PVDF, PP

Rotor Material: PFA

Shaft and Bearing Material: Zirconium Cermaic (ZrO2)

O-rings Material: FKM (Viton) or EPDM

Measuring Viscosity Range: 0.5 to 20 Centi Stokes (cst)

Maximum Particle Size: <10% (Particles in flow stream) or <0.5 mm cross section or length

Max Operating Pressure/Temperature:

PVDF Body: 200 psi @ -30 C to 80°C; 36 psi @ 90°C

PPBody: 180 psi @ -20 C to 27°C; 25 psi @ 80°C

Storage Temp:

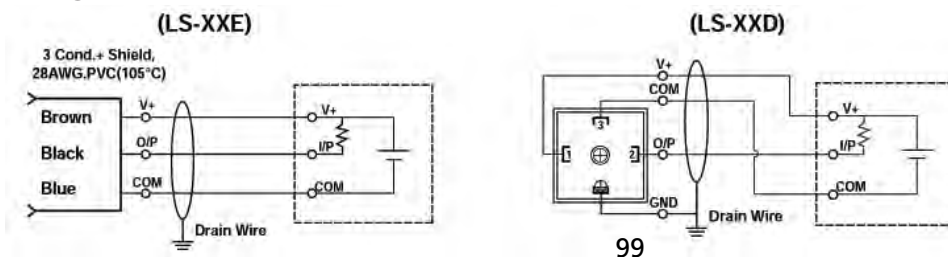
PVDF Body: -30 to 100°C

PP Body: -30 to 90°C

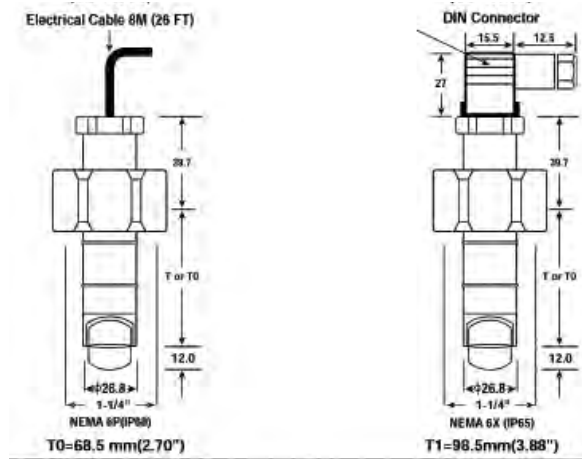
Certification: EN 55022:1998



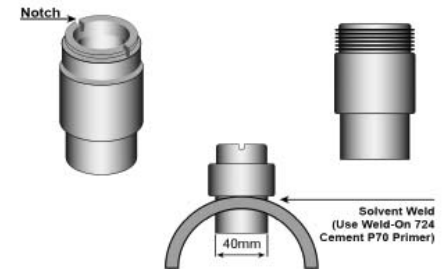
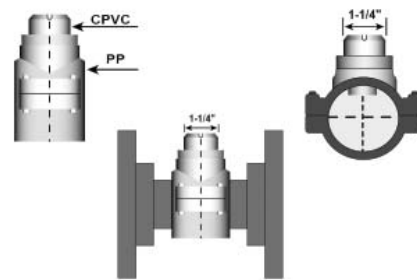
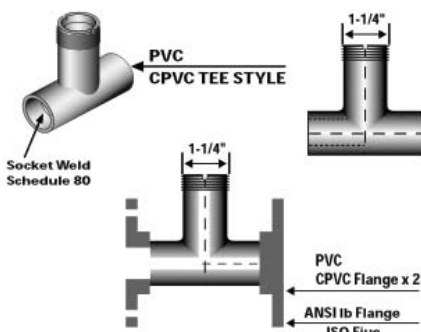
WIRING



DIMENSIONS (MM)



FITTINGS- SCHEDULE 80 PVC/CPVC



| Model | Size | Sensor Length | Description |
|-------|--------|---------------|-------------------------|
| PT010 | 1" | T | PVC Tee fitting Socket |
| PT015 | 1-1/2" | | |
| CT015 | 1-1/2" | T | CPVC Tee fitting Socket |
| CT020 | 2" | | |
| PT020 | 2" | T | PVC Tee fitting Socket |
| PT080 | 3" | | |
| CT030 | 3" | T | CPVC Tee fitting Socket |
| CT040 | 4" | T | |

| Model | Size | Sensor Length | Description |
|-------|--------|---------------|--------------------------------|
| SA20 | 2" | T | CPVC + PP Clamp Saddles |
| SA025 | 2-1/2" | | |
| SA030 | 3" | T | PP Clamp Saddle + PVC adaptors |
| SA040 | 4" | | |
| SA060 | 6" | T1 | |
| SA080 | 8" | | |
| SA100 | 10" | | |
| SA120 | 12" | | |
| SA140 | 14" | | |

| Model | Size | Sensor Length |
|---------|---------|---------------|
| PLGS-GT | 0.5"-4" | T |
| PLGS-T1 | 6"-24" | T1 |

ORDERING INFORMATION

- 1) ORDER FITTINGS (SEE FITTINGS)
- 2) ORDER FLOW METER (SEE BELOW TABLE)

MODEL CONFIGURATION: LS-ABCD

EXAMPLE: LS-5TDF

| A | B | C | D |
|-----------------------------|-------------------------|---|-------------------|
| Sensor Body | Sensor Length | Electrical Connection/Protection Class | O-rings |
| 3= PP 5= Natural PVDF | T= 1/2"-4" T1=6"-24" | D= DIN mini-connection 43650-A/IP652 E= Electrical cable 8M/IP68 (26 FT) S= Electrical cable (customer) -IP68 | F= FKM E= EPDM |



DUALPULSE – insertion flowmeters

DP490 & DP525 are cost effective stainless steel flowmeters for measuring the flow of water, fuels & other low viscosity liquids in pipes sizes 1.5”~100” (40~2500mm). Insertion flowmeters are installed with the metering head 1/8th into the pipe resulting in very little pressure drop. They do not require external power when used with the Flomec rate totalizers, however some options such as high temperature & non-magnetic models require external power.

Applications include HVAC, hot & chilled water, fire systems, water distribution (management & treatment), boiler feed water & hydrant flow testing.

FEATURES:

- IP68 (NEMA6) submersible 316SS construction.
- Low cost of ownership, wide flow range.
- Rugged & compact design.
- Intrinsically safe hazardous area versions.
- Integral or remote pre-amplifiers & flow instruments
- DP525 version suitable for “hot tap” installation.
- Quadrature pulse output option & Bi-Directional Flow Measurement
- Integral 4-20mA output option

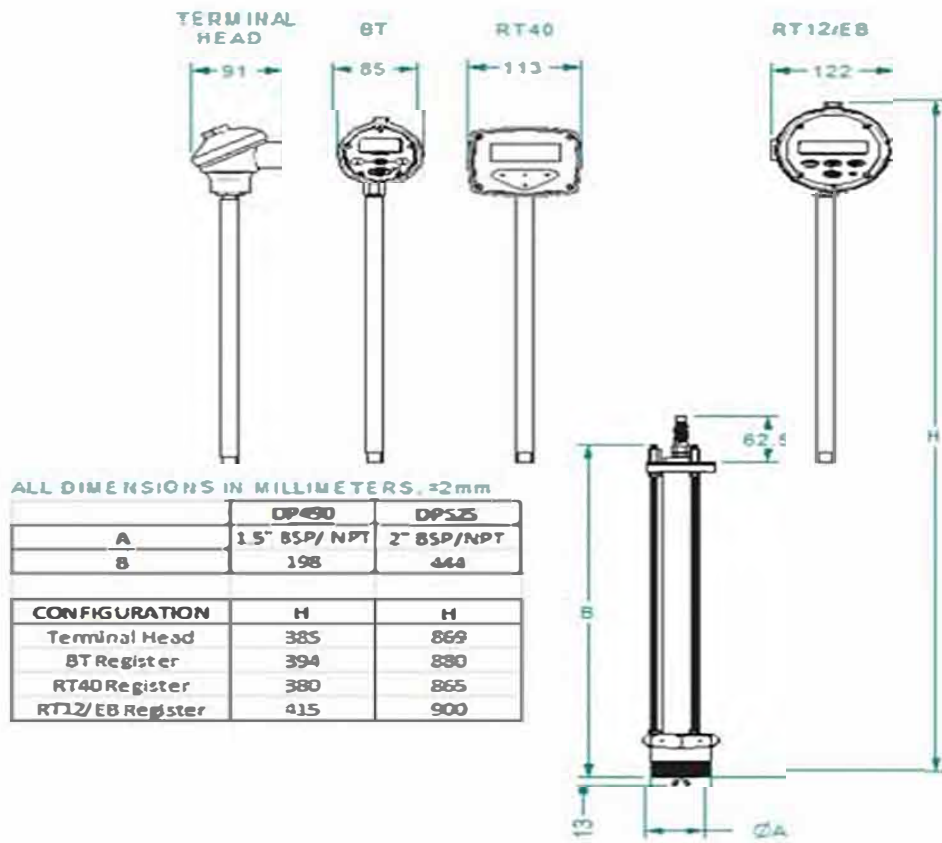


General Specifications

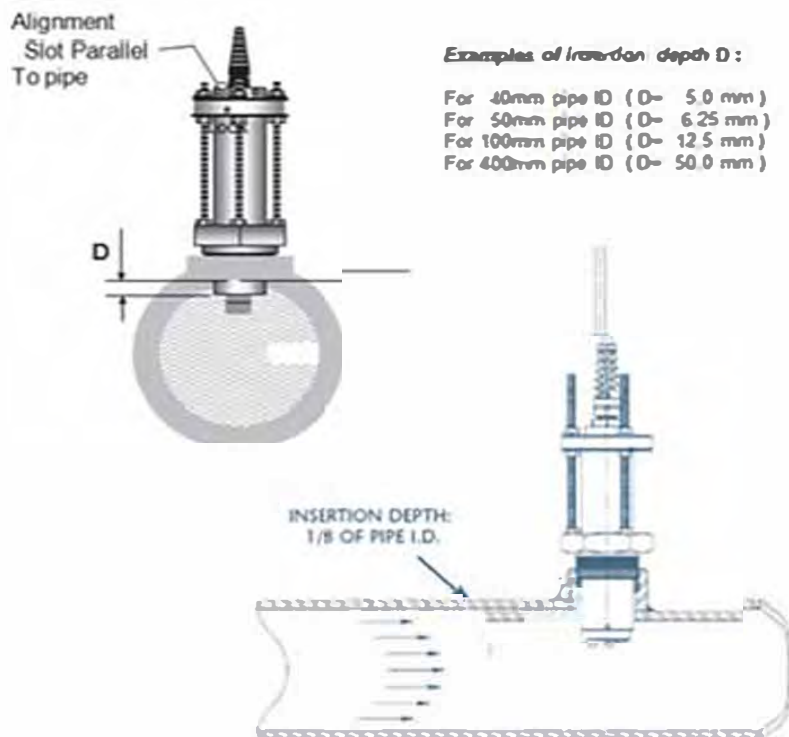
| Model Prefix | DP490 | DP525 |
|----------------------|--|---|
| Suit pipe sizes | 40~900mm (1.5" ~ 35") | 50~2500mm (2"~100") |
| Pipe connection | 1.5" or 2" BSPT or NPT mate | 2" BSPT or NPT male |
| Flow range | 0.25 ~ 6300 litres/sec (4 ~ 99600 USGM) | 0.4 ~ 49000 litres/sec (6 ~ 780000 USGM) |
| Flow velocity range | 0.3 ~ 10 metres/sec (1 ~ 33 feet/sec) | |
| Linearity | typically ± 1.5% with well-established flow profile | |
| Temperature range | -40°C ~ +150°C (-40°F ~ +300°F) | |
| Maximum pressure | 80 bar (1160 psig) | |
| Materials | 316ss body & rotor shaft, PVDF rotor (PEEK rotor optional) | |
| Pulse Outputs | | |
| Reed switch | 30Vdc x 200mA (max.), Nom. 0 ~ 80hz* | |
| Hall effect | 3 wire NPN, 5 ~ 24 Vdc, 20mA (max.) Nom. 0 ~ 240hz | |
| Voltage Pulse | Self-Generated voltage. Nom. 0 ~ 240hz | |
| Non-magnetic sensor | 3 wire NPN, 5~24Vdc max, 20mA max. Nom. 0 ~ 240hz | |
| Optional outputs | 4~20mA, scaled pulse, quadrature pulse, flow alarms or two stage batch control | |
| Protection class | IP68 (NEMA6), integral ancillaries can be supplied I.S. (intrinsically safe) | |
| Overall dimensions | Refer over page | |

* Reed Switch resolution is 1/3rd that of the NPN Hall Effect or Voltage pulse outputs.

Over all Dimensions:



Standard Installation:



Model Coding – Dual Pulse Insertion Flowmeters:



| | |
|-------|---|
| DP490 | 1.5 to 36" pipes (40 - 900mm) |
| DP525 | 2 to 90" pipes (50 - 2500 mm) suitable for "hot-tap" installations (valve not included) |

Body material

| | |
|---|---------------------|
| S | 316 Stainless Steel |
|---|---------------------|

Rotor & bearing materials

| | |
|---|--|
| 1 | PEEK high temperature rotor with stainless steel rotor shaft; -150°C (300°F) |
| 2 | PVDF rotor with 316 stainless steel rotor shaft (standard); 100°C (212°F) |

O-ring materials

| | |
|---|--|
| 1 | Viton (standard); -15°C (5°F) minimum |
| 2 | EPR (Ethylene Propylene Rubber); -40→125°C (-40→260°F) |
| 3 | Teflon encapsulated viton or application specific; -15°C (5°F) minimum |
| 4 | Buna-N (Nitrile); -40→100°C (-40→212°F) |

Temperature limits

| | |
|---|---|
| 5 | 100°C (212°F) standard; (80°C (185°F) maximum for non magnetic output type 6) and FI 4-20mA |
| 2 | 125°C (260°F) - available with electrical connectors 5 & 6 & PEEK rotor only |
| 3 | 150°C (300°F) - NPN output only (available with electrical connections 5 & PEEK rotor only) |

Process connection

| | | |
|---|----------------------------------|------------|
| 1 | BSPT male thread - 1½" (DP490) | 2" (DP525) |
| 2 | NPT male thread - 1½" (DP490) | 2" (DP525) |
| 3 | 2" BSPT male thread on the DP490 | |
| 4 | 2" NPT male thread on the DP490 | |

Pick-up type

| | |
|---|---|
| 1 | NPN open collector & voltage pulse (standard) |
| 2 | NPN open collector(s) only (for temp code 3 or QP option) |
| 3 | Fused switch only (may be used with an I.S. barrier or installed in hazardous areas) |
| 4 | Non magnetic rotor with NPN output (for liquids with ferrous impurities, needs power) |
| 6 | NPN open collector & Reed Switch |

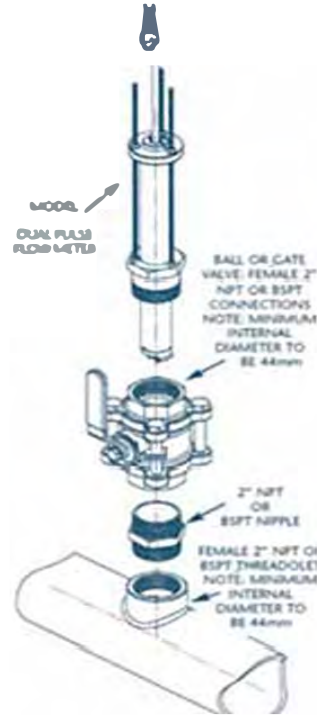
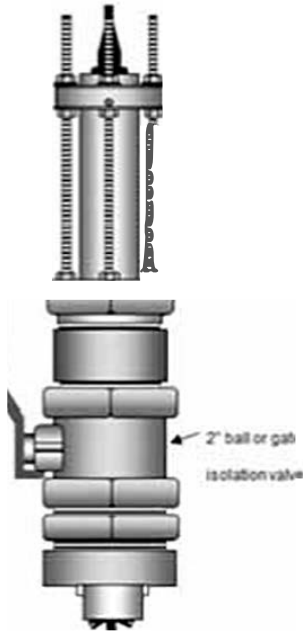
Cable connection

| | |
|---|--|
| 1 | 3 metres cable [10ft] (standard) |
| 2 | 10 metres cable [33ft] |
| 3 | 20 metres cable [66ft] |
| 4 | 50 metres cable [164ft] (for longer lengths refer to factory) |
| 5 | Terminal box on stem kit (add this for integral output option FI, 4-20mA output) |
| 6 | Stem kit (price excluded with integral options B2, B3, R2, R3 & E0) |

Integral options

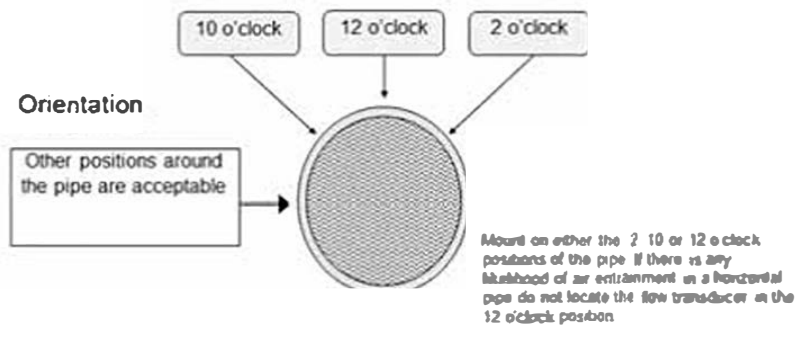
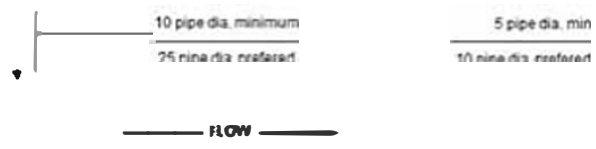
| | | |
|------------------------------|----|--|
| | QP | Quadrature pulse output (requires PQ2 for bi-directional flow capability) |
| with scalable pulse output | B2 | BT11 dual totaliser (with scalable pulse output) |
| ECEX & ATEX approved | B3 | I.S. intrinsically safe BT11 including output |
| scaled pulse, alarm & 4-20mA | R0 | RT12 rate totaliser with all outputs (Alloy housing) |
| scaled pulse, alarm & 4-20mA | R2 | RT12 rate totaliser w/ all outputs |
| ECEX & ATEX approved | R3 | I.S. intrinsically safe RT12 with all outputs |
| scaled pulse - backlighting | R4 | * RT40 large LCD flow rate totaliser |
| | FI | Loop powered 4-20mA analog output (also add option 5 terminal box on stem kit) |
| | E0 | Escalatch dc powered two stage batch controller |
| | SB | Specific build requirement |

Hot Tap Installation



Major obstructions such as pumps, valves, reducers or strainers to be kept well outside the straight run pipe sections

Installation Straight Piping Requirements



Truflo

LSS Series Insertion Flow Meter

1/2" to 24", Display, Total, Freq., Analog & Alarm Outputs, Modbus RTU

DESCRIPTION

Series LSS flow meters are insertion paddle type and feature all plastic wetted components suitable for a wide range of media compatibility.

A large LED Display provides local readout of flow rate and flow total. Units of measure and alarm setpoint are readily selected via push buttons on the instrument face.

A variety of outputs including frequency, 4-20 mA and alarm are available.

Modbus 485 communications option provides an interface with a building automation or monitoring system.

SPECIFICATIONS

GENERAL

Pipe Sizes: 1/2" to 24"

Flow Velocity range: 0.33 to 26 ft/s (0.1 to 8 m/s)

Supply Voltage: DC 14 to 28V

Measuring Accuracy: $\pm 0.75\%$ Full Scale

Repeatability: $\pm 0.5\%$ Full Scale

Engineering Units: LPM, M³/h

Input Sampling (Output Responses): 6 Cycles/Sec.

Readout Range:

0-99999 (Flow Rate)

0-999999999 (Totalizer)

Relay Output: Dual Adjustable Set Points, programmable hysteresis & time delay

Relay Contact Output: 30VDC, 3 Amp, resistive

Analog Output: 4-20mA

Protection Class: IP66 NEMA 4X

RS-485 Baud Rate: 19200/9600/4800/2400

RS-485 Protocol: Modbus RTU Mode

Output Frequency: 60.5Hz per m/s nominal velocity (18.45Hz ft/s)
(Max. 10Hz (totalizer last digit))

Pulse Output Type: Transistor NPN Open-Collector (Max. DC60V/100mA)

LED Display: Bright Red or Green LED (0.4" High)

Parameter Setting: Push Button

Memory Mode: Non-Volatile E2 PROM Memory

Sensor Body Material: Natural PVDF

Rotor Material: PFA Teflon

Shaft and Bearing Material: Zirconium Cermaic (ZrO₂)

O-rings Material: FKM (Viton)

Display Housing Materials: Polyimide 66 + PBT + 15% Glass Filled (UL94V-0)

Measuring Viscosity Range: 0.5 to 20 Centi Stokes (cst)

Maximum Particle Size: <10% (Particles in flow stream) or <0.5 mm² size

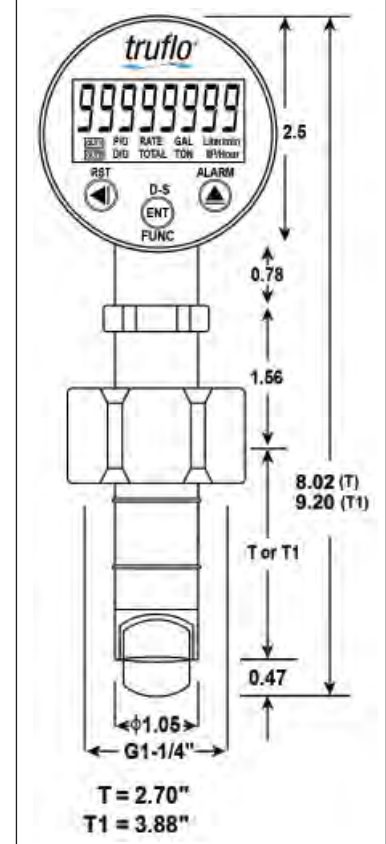
Max Operating Pressure/Temperature: 200 psi @ -30 C (-22 F) to 30°C (86F);
36 psi @ 90°C (194F)

Storage Temp: -30 to 80°C (-22 to 176F), 20 to 90RH Non-Condensed

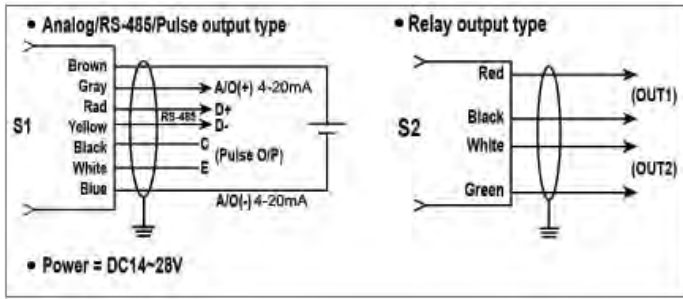
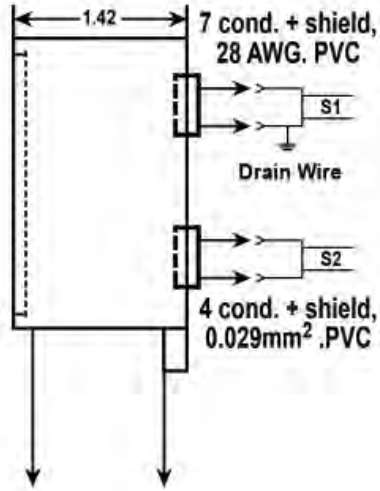
Certification: EN 55022:1998/A1:2000 Class A



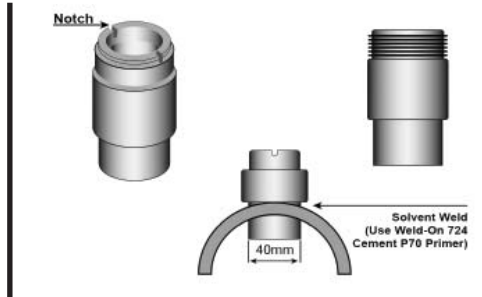
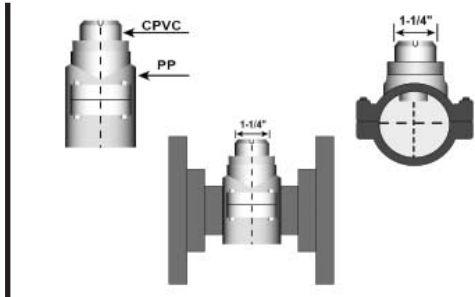
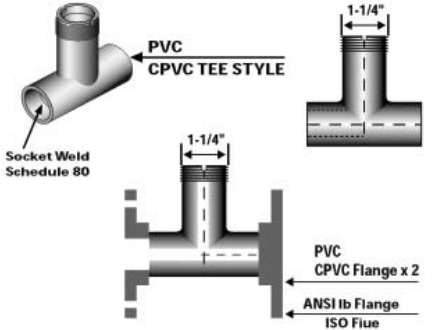
DIMENSIONS (INCHES)



WIRING



FITTINGS- SCHEDULE 80 PVC/CPVC



| Model | Size | Sensor Length | Description |
|-------|--------|---------------|-------------------------|
| PT010 | 1" | T | PVC Tee fitting Socket |
| PT015 | 1-1/2" | | |
| CT015 | 1-1/2" | T | CPVC Tee fitting Socket |
| CT020 | 2" | | |
| PT020 | 2" | T | PVC Tee fitting Socket |
| PT080 | 3" | | |
| CT030 | 3" | T | CPVC Tee fitting Socket |
| CT040 | 4" | | |

| Model | Size | Sensor Length | Description |
|-------|--------|---------------|--------------------------------|
| SA20 | 2" | T | CPVC + PP Clamp Saddles |
| SA025 | 2-1/2" | | |
| SA030 | 3" | T | PP Clamp Saddle + PVC adaptors |
| SA040 | 4" | | |
| SA060 | 6" | T1 | |
| SA080 | 8" | | |
| SA100 | 10" | | |
| SA120 | 12" | | |
| SA140 | 14" | | |

| Model | Size | Sensor Length |
|---------|---------|---------------|
| PLGS-GT | 0.5"-4" | T |
| PLGS-T1 | 6"-24" | T1 |

ORDERING INFORMATION

- 1) ORDER FITTINGS (SEE FITTINGS)
- 2) ORDER FLOW METER (SEE BELOW TABLE)

MODEL CONFIGURATION: LSS-AB-CDEFGH
EXAMPLE: LSS-50-23NPF8

| A | B | C | D | E | F | G | H |
|-----------------------------|------------------------------|--------------|--------------------------|---------------------|-----------------|-------------------|------------------------|
| Sensor Body | Sensor Length | Alarm Output | Analog Output | RS-485 Output | Pulse Output | O-rings | Cable Length |
| 5= Natural PVDF 3= PP | 0= 2.7" (T) 1= 3.88" (T1) | 2= 2 Relays | 2= 1-5 VDC 3= 4-20 mA | N= None Y= RS485 | P= Pulse Output | F= FKM E= EPDM | 8= 8M Std C= Custom |

OUTPUT FLOW CONVERSION

K factors to convert pulse output to liters or gallons are located in the instruction manual.

$$Q_v = f/k$$

Q_v = Volume Flow Rate, liters per second

f = Output Frequency (Hz)

k = k factor (pulses/liter- divide by 3.785 for pulses/gal)

Truflo

TK Series Multi-Function Paddle Wheel Flow Meter

1/2" to 4", Display Rate & Total, Pulse, Analog & Alarm Outputs

DESCRIPTION

Series TK flow meters are paddle type and feature a choice of wetted plastic materials suitable for a wide range of media compatibility.

A large LED Display provides local readout of flow rate and flow total. Units of measure and alarm setpoint are readily selected via push buttons on the instrument face.

A variety of outputs for flow and total including frequency/pulse, analog (4-20 mA & 0-5V) and alarm are available.

Modbus 485 communications option provides an interface with a building automation or monitoring system.

SPECIFICATIONS

GENERAL

- Pipe Sizes: 1/2" to 4"
- Flow Velocity range: 0.3m/s (0.98 ft/s) to 10 m/s (32.8 ft/s)
- Operating Voltage: DC 10 to 30V
- Measuring Accuracy: > ± 1.0% of F.S. @ 20°C (68°F)
- Repeatability: ±0.5% Full Scale
- Turndown: 33:1
- Response Time: Real Time
- Parameter Setting: Push Button
- Memory Mode: Non-Volatile E2 PROM Memory
- Sensor Body Material: PVDF, PP or 316SS
- Pipe Connections: NPT, BSP, ANSI Flanges, Socket
- Electrical Connection: M12/3m Cable
- Rotor Material: Tefzel
- Shaft and Bearing Material: Zirconium Cermamic (ZrO2)
- Seals: EPDM/ FKM (Viton)
- Display Housing Materials: Polymide 66 + PBT + 15% Glass Filled (UL94V-0)
- Measuring Viscosity Range: 0.5 to 20 Centi Stokes (cst)
- Maximum Particle Size: <10% (Particles in flow stream) or <0.5 mm² size
- Operating Pressure/Temperature: 150 psi
- Operating Temperature: PVC, 60°C; PP, 80°C; 316 SS, 120°C
- Electronics Operating Temp: -25 to 50°C
- Output Frequency: 60.5Hz m/s Nominal (18.45Hz ft/s nominal) (Max. 10Hz (totalizer last digit))
- Pulse Output Type: Transistor NPN Open-Collector (Max. DC60V/100mA)
- Display:
 - Flow Units of measure: GPM, LPM, KL/MIN
 - LED Display: Bright Red (Totalizer) or Green LED (Flow Indication)
 - Readout: 99999.9 (Flow Rate, one decimal place)
 - 999999 (Totalizer)



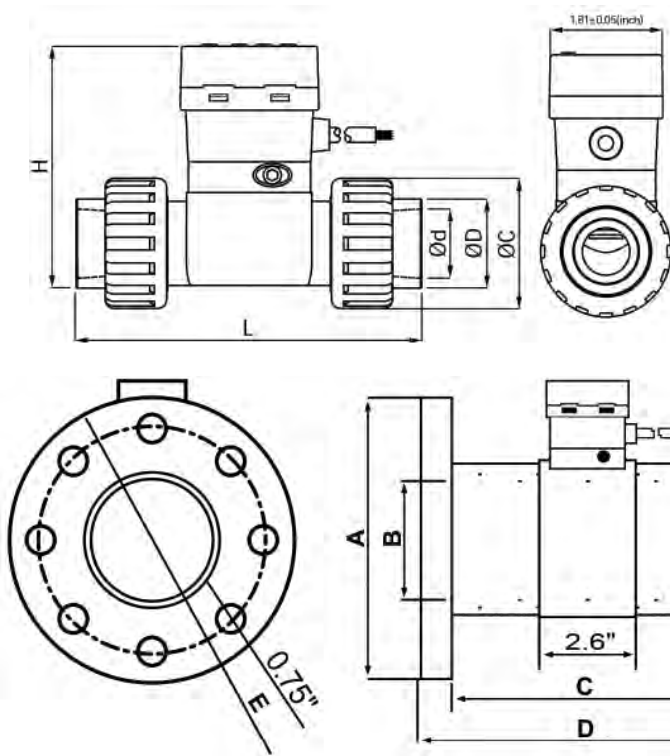
| Pipe Size | Sched 80 ID (inches) | Flow Rate (LPM/GPM) | | * K Factors | |
|-----------|----------------------|-----------------------|----------------------|-------------|------|
| | | Min. Velocity 0.3 m/s | Max. Velocity 10 m/s | GPM | LPM |
| 1/2" | 0.55 | 3.5/1.0 | 120/32 | 32.6 | 124 |
| 3/4" | 0.74 | 5.0/1.5 | 170/45 | 18.9 | 72 |
| 1" | 0.96 | 9.0/2.5 | 300/79 | 14.2 | 54 |
| 1-1/2" | 1.50 | 25.0/6.5 | 850/225 | 5.0 | 19 |
| 2" | 1.90 | 60.0/16 | 1850/357 | 2.7 | 10.3 |
| 3" | 2.90 | 90.0/24 | 2800/739 | 1.2 | 4.7 |
| 4" | 3.80 | 125.0/33 | 4350/1149 | 0.6 | 2.1 |

* K-Factor Pre Programmed by Factory - No flow meter Programming of a K-Factor is required. Required when programming remote display or controller.

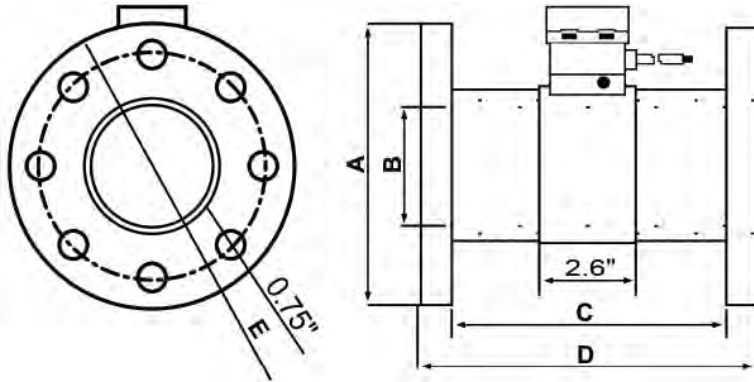
Outputs:

- Relay Output: Adjustable 0.1 to 999 GPM
- Relay Contact Output: 5 VDC, 1 Amp
- Analog Output: 4-20mA, 120 Ohms max.
- Flow Rate Pulse: NPN open-collector transistor. 1 pulse per gallon std output, K-factor programmed at factory or pulse output of Paddle (5KHz max.).
- Totalizer Pulse: NPN open-collector transistor, 1 pulse per gallon. Can be manually, time or auto reset.
- Communication:
 - RS-485 Baud Rate: 9600/19200/38400
 - RS-485 Protocol: Modbus RTU or ASCII
- Protection Class: IP66 NEMA 4X
- Certification: CSA CE Rohs

DIMENSIONS (INCHES)

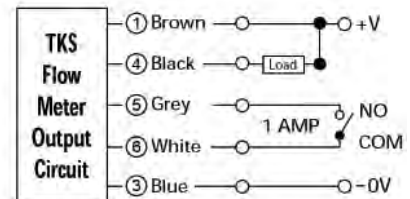
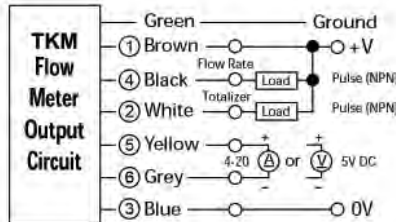
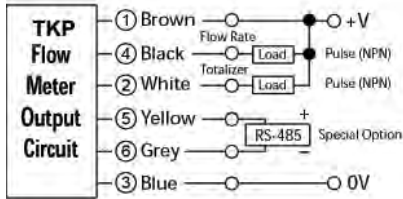


| Pipe Size | *H | *L | *Ød | *ØD |
|-----------|------|------|------|------|
| 1/2" | 4.09 | 5.48 | 0.84 | 1.07 |
| 3/4" | 4.17 | 6.12 | 1.05 | 1.36 |
| 1" | 4.30 | 6.76 | 1.32 | 1.68 |
| 1-1/2" | 5.02 | 7.66 | 1.91 | 2.33 |
| 2" | 5.56 | 8.39 | 2.38 | 2.86 |



| Size | A | B | C | D | E |
|---------|------|-------|------|-------|-------|
| 3" ANSI | 7.5" | 3.15" | 7.3" | 8.94" | 5.98" |
| 4" ANSI | 9" | 3.94" | 8.0" | 9.4" | 7.5" |

WIRING



| Series TKP-Totalizer/Rate/Pulse Out | | | |
|--|----------------------------|--------|----------------------------|
| Brown | 10-30 VDC (+) | Yellow | (+) RS485 |
| Blue | 0 V (-) | Grey | (-) RS485 |
| White | Totalizer Pulse Output NPN | Black | Flow Rate Pulse Output NPN |
| Yellow & Grey with RS485 (Only) Black Wire can be Changed for Flow Total Limit Output or Unit Volume Pulse Output | | | |

| Series TKM- Totalizer/Rate/Analog & Pulse Out | | | |
|--|----------------------------|--------|---|
| Brown | 10-30 VDC (+) | Yellow | 4-20 mA or 0-5V |
| Blue | 0 V (-) | Grey | 4-20 mA or 0-5V DC (4-20mA Default, -0-5VDC Option-Special Order) |
| White | Totalizer Pulse Output NPN | Black | Flow Rate Pulse Output NPN |
| Yellow & Grey with RS485 (Only) Black Wire can be Changed for Flow Total Limit Output or Unit Volume Pulse Output | | | |

| Series TKS- Flow Rate/Alarm/Pulse Out | | | |
|--|----------------------------|-------|----------|
| Brown | 10-30 VDC (+) | White | Com |
| Blue | 0 V (-) | Grey | NO, 1Amp |
| Black | Flow Rate Pulse Output NPN | | |
| Yellow & Grey with RS485 (Only) Black Wire can be Changed for Flow Total Limit Output or Unit Volume Pulse Output | | | |

ORDERING INFORMATION

MODEL CONFIGURATION: ABC-DEF
EXAMPLE: TKM20NPT-A-PVCSTD

| A | B | C | D | E | F |
|---|--|---|---|---|--|
| Model Series | Pipe Size | Pipe Fitting | Communication or Transmitter | Body Material | Electrical Connection |
| TKP = Paddle Wheel Flow Meter & Flow Totalizer+ (Flow Rate Pulse + Flow Totalizer Pulse) TKM = Paddle Wheel Flow Meter with Transmitter + (Flow Rate Pulse + Totalizer Pulse) TKS = Paddle Wheel Flow Meter with Relay Output + (Flow Rate Pulse) | 15 = (1/2") 20 = (3/4") 25 = (1") 40 = (1 1/2") 50 = (2") 80 = (3") 100 = (4") | S= Socket NPT= Male NPT, plastic models; female NPT stainless models BSP= BSP Male FL= Flange (3&4" models) | Non = Without Communication RS = TKP Series with RS-485 MODBUS Selectable A = TKM Series with Transmitter (4- 20mA) + Pulse V= TKM Series with Transmitter (0- 5V) + Pulse | PVC = PVC PP = Polypropylene ST = 316 SST | STD = Wire Lead (3m) - Other Lengths Available |

CLARK

WMX101 Flanged Magnetic Flow Transmitter

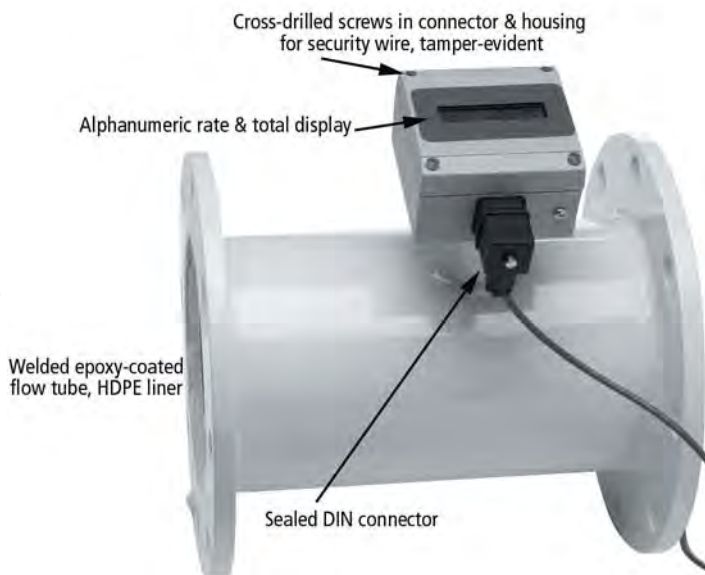
4" to 10" Pipe, F.S. flow ranges 500 to 1800 GPM

DESCRIPTION

The WMX101 is a flanged electromagnetic flow meter for use in utility or industrial water and wastewater applications. An ingenious economical design makes it an ideal meter for applications where propeller meters have been the norm, but with no moving parts to wear the magnetic flow meter minimizes maintenance costs and dramatically decreases total cost of ownership.

For simplicity, no field programming is required. Large, domed measurement and grounding electrodes discourage fouling. Rate and total indication are standard. There is a solid-state pulse output for connection to standard telemetry systems or to an external 4-20 mA converter.

Power required for the meter is within easy range of a solar panel, which can be ordered as an accessory or obtained locally. A shielded power/pulse output cable with DIN connection is included with the meter. Optional features include immersible electronics for occasional vault flooding. The AO55 pulse to analog converter can be added where a 4-20 mA signal is required.



FEATURES

- Economical as mechanical meter
- No moving parts
- Solar-compatible power level
- Telemetry-ready
- Internal grounding electrodes

SPECIFICATIONS

Pipe Sizes: 4", 6", 8", 10"

Flanges: AWWA 150 lb. drilling

Pressure: 150 psi working pressure

Temperature: 10°F to 130°F

Environmental: NEMA 4X standard, short term immersible option available

Accuracy (% of reading): ±1%, 10 to 100%; ±2%, 10% to cutoff

Materials:

Body: Welded steel, epoxy powder coated

Liner: HDPE

Electronics Housing: Diecast Aluminum

Electrodes: T316 stainless steel

Display:

| 6 Digit Rate of Flow Display Units | 8 Digit Totalizer Display Units |
|------------------------------------|---------------------------------|
| Gallons/Minute | Gallons |
| Million Gallons/Minute | Gallons X 1000 |
| Liters/Second | Cubic Meter |
| Cubic Feet Per minute | Cubic Feet |

Power: 12-24 VDC, 30 mA max.

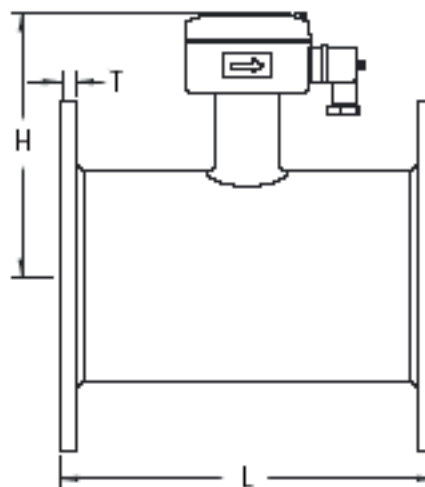
Output Signal: Current-sinking pulse, opto-isolated, 24 VDC, 10 mA max

Empty Pipe Detection: Hardware/software, conductivity-based

Flow Range:

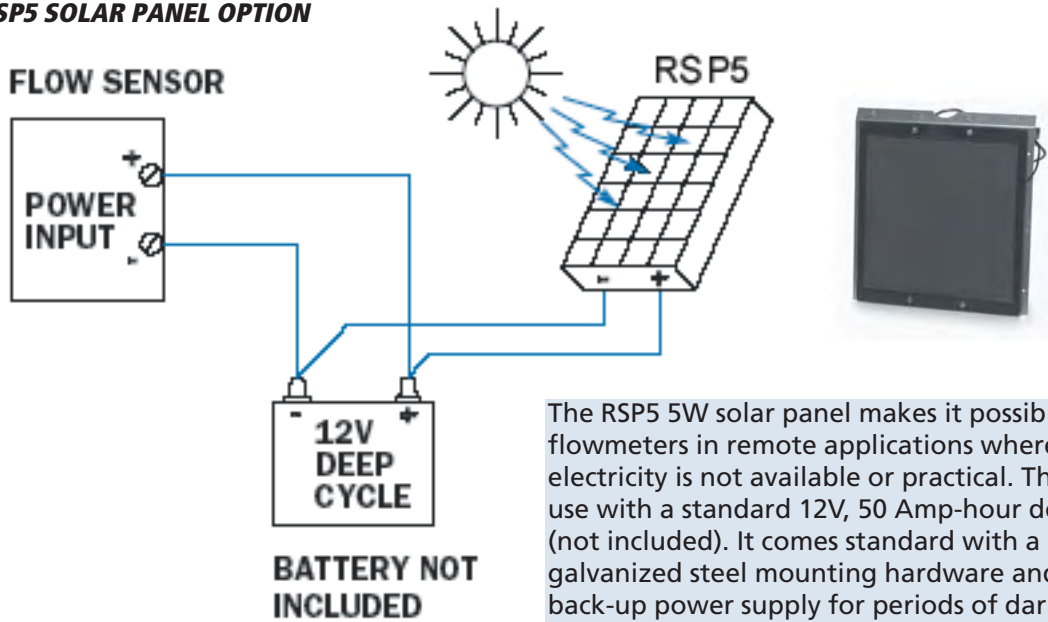
| Flow Range (GPM) | Pipe Size | | | |
|------------------|-----------|------|------|------|
| | 4" | 6" | 8" | 10" |
| Min. | 12 | 32 | 60 | 100 |
| Max. | 500 | 1200 | 1500 | 1800 |

DIMENSIONS (MM)



| Meter Size WMX101 | L | H | T | Weight (Kg) |
|-------------------|-----|-----|-------|-------------|
| -400 | 250 | 188 | 15.88 | 10.5 |
| -600 | 300 | 216 | 17.48 | 14.5 |
| -800 | 350 | 241 | 17.48 | 21.5 |
| -1000 | 450 | 264 | 17.48 | 32 |

RSP5 SOLAR PANEL OPTION



The RSP5 5W solar panel makes it possible to use WMX101 flowmeters in remote applications where a reliable source of electricity is not available or practical. The RSP5 is intended for use with a standard 12V, 50 Amp-hour deep cycle battery (not included). It comes standard with a charge controller and galvanized steel mounting hardware and provides a 90-day back-up power supply for periods of darkness.

Typical current at design operating point: 330 mA
 Typical voltage at design operating point: 15 V
 Weight: 3.63 Kg (8 lb)
 Overall height: 371 mm (14.625")
 Overall Width: 346 mm (13.625")

ORDERING INFORMATION

A-B-C-D-E

EXAMPLE: WMX101-8-00-GPM-GA

| A Model | B Size | C Options | D Rate of Flow Units | E Totalizing Units |
|------------|--|--|---|--|
| WMX101 | 400= 4" 600= 6" 800= 8" 1000= 10" | 00= None 45= Immersible 39= Grooved Ends 38= Bi-Directional | GPM= Gallons/Minute MGD= Million Gallons.Day LPS= Liters/Second CFM= Cubic Feet/Minute | GA= Gallons GT= Gallons X 1000 CF= Cubic Feet CM= Cubic Meter |

Accessories

- A055W**= Blind 4-20 mA converter, wall mount
- PC42**= Dual power supply, 110-115 VAC, 24 VDC
- PC3**= Power converter, plug-in, 110-115 VAC, 24 VDC
- RSP5W**= Solar panel kit, 5 Watt
- 31051**= Extra cable, specify length
- 31090**= Grounding ring 4"
- 31091**= Grounding ring 6"
- 31092**= Grounding ring 8"
- 31093**= Grounding ring 10"

PKP

DM01D Compact Magnetic Inductive Flow Transmitter

F.S. Liquid Flow Ranges from 100 ml/min to 200 l/min

DESCRIPTION

The compact magnetic inductive flowmeter model DM01D works without moving parts. It is designed especially for low flow rates and tight mounting conditions. Full scale ranges from 100 ml/min to 200 l/min are available.

The magnetic inductive flow meter works according to Faraday's law of induction. The liquid to be measured, (which must be electrically conductive), flows perpendicular to a magnetic field. This induces a voltage in the liquid. This voltage is picked up by means of two electrodes located in the measuring tube. The voltage is fed to a signal conditioning circuit that converts it to a square wave frequency output.

DM01D has no moving parts, therefore no maintenance and no wear and tear. There are no parts obstructing the flow in the measuring pipe and under normal operating conditions, no influence on the output of temperature, viscosity, concentration or pressure changes. A high turndown ratio (up to 50:1) expands the device application. Particles in the medium and viscous or polluted media may be measured without problems.

SPECIFICATIONS

Wetted Parts: measuring tube and electrodes, st. steel;
process connections, Delrin or PVDF

Max. Pressure: 6 bar

Medium Temperature: -10 to +40 °C

Max. Inaccuracy: +/- 1.5% of actual value

Min. Conductivity: 20 µS/cm

Supply Voltage: 24 VDC +/- 10%

Max Current Consumption: 50 mA

Output Signal: flow proportional frequency, square wave

Electrical Protection: IP 65

ORDERING INFORMATION

DM01DABC

EXAMPLE: DM01D0DM

| A Range(l.min) | B Connection Material | C Connection |
|---|--------------------------|--|
| 01 = 0.1...5 02 = 1...20 03 = 2...50 04 = 5...100 05 = 10...200 | D= Delrin P= PVDF | *N = Female to Male NPT PP Adapter Supplied M = Metric per Table 1 * Ranges 01 & 02, 1/2" NPT; Range 03, 3/4" NPT; Ranges 04 & 05, 1" NPT |



DM01D

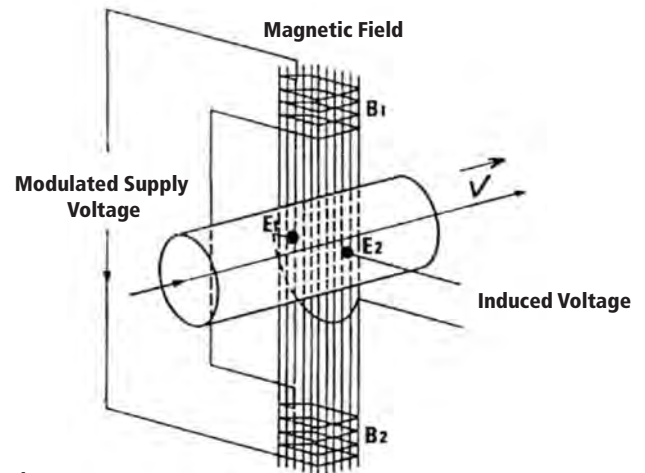


Table 1

| measuring range. (l/min) | width x height (mm) | dia. of measuring tube (mm) | process conn. | K-factor (pulses per liter) |
|--------------------------|---------------------|-----------------------------|---------------|-----------------------------|
| 0.1...5 | 84.5 x 123 | 8 | *G 1/2 AG | 1000 |
| 0.2...20 | 84.5 x 123 | 8 | *G 1/2 AG | 800 |
| 0.5...50 | 90 x 123 | 14 | *G 3/4 AG | 400 |
| 1...100 | 90 x 123 | 18 | *G 1 AG | 200 |
| 2...200 | 90 x 123 | 18 | *G 1 AG | 100 |

*Note- PP female to male NPT adapters are available (1/2", 3/4" & 1")

PKP

DV01 Gear-Wheel Flowmeter

For Viscous Liquids, 20-4000 cSt, to 65 l/min, Frequency Output

DESCRIPTION

Model DV01 flow meter consists of a pair of steel gear wheels in an aluminum housing that are rotated by flowing liquid. A magnetic proximity sensor and signal conditioning circuit are isolated from the measuring chamber and sense the rotation of the gear wheels. The signal is converted to a pulse train output.

Models DV01-1 and DV01-3 gears have sleeve bearings and model DV01-2 uses ball bearings. They have low pressure drop and are quiet in operation.

The units are particularly well suited to dosing applications as well monitoring lubrication systems.

SPECIFICATIONS

Max. Pressure: DV01-1, 100 bar; DV01-(2,3), 160 bar

Pressure Drop: varies with viscosity and flow rate (consult factory)

Temperature Range: -10...+80°C (optional to 150°C)

Accuracy Of Measured Value: DV01-1, ±3%;

DV01-2, ±0.3%; DV01-3, ± 2.5%

Supply Voltage: 19...28 Vdc

Output Signal: square wave pulses,
min V= 0.8(supply voltage), 50% duty cycle (± 15%)

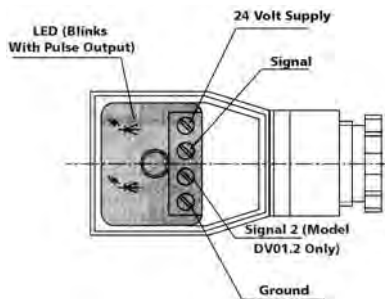
Enclosure Rating: IP 65

Weight: DV01-1, 0.5 kg; DV01-2, 0.7 kg; DV01-3, 1.9 kg

| Model | Range l/min | Viscosity cSt | Connection | Meas. Volume ml/pulse | Resolution pulses/l |
|--------|-------------|---------------|------------|-----------------------|---------------------|
| DV01-1 | 0.25...10 | 20...4000 | 3/8 G* | 0.2 | 5,000 |
| DV01-2 | 0.16...16 | 20...3000 | 3/8 G* | 0.25 | 4,082 |
| DV01-3 | 1...65 | 20...4000 | 3/4 G* | 2 | 500 |

*Adaptor available for NPT

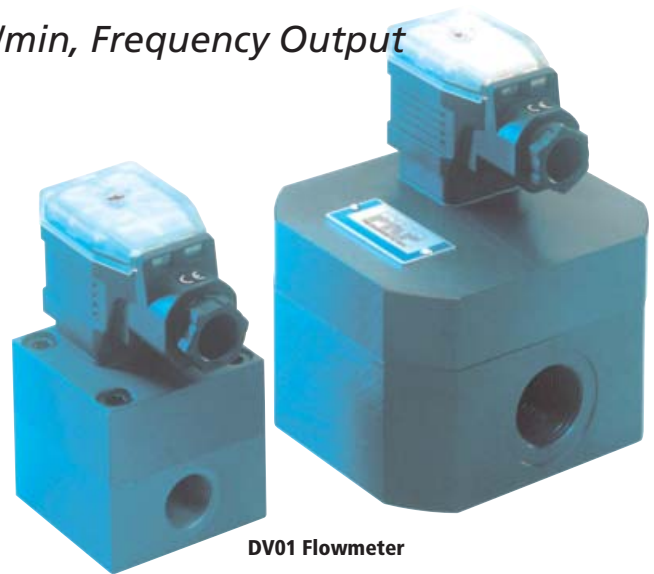
WIRING



ORDERING INFORMATION

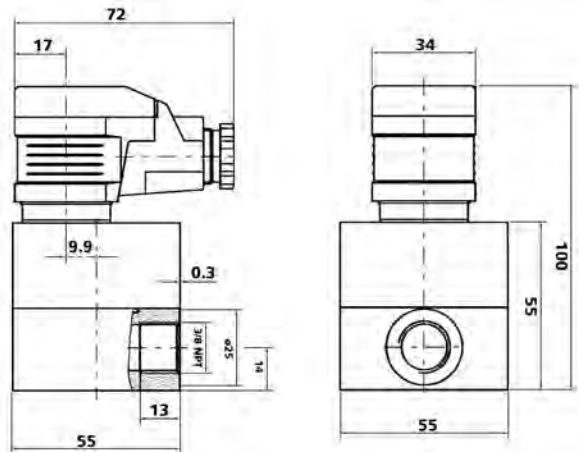
| Model | Range |
|--------|------------------|
| DV01-1 | 0.25 to 10 l/min |
| DV01-2 | 0.16 to 16 l/min |
| DV01-3 | 1.0 to 65 l/min |

Add Suffix "H" for High Temperature Option

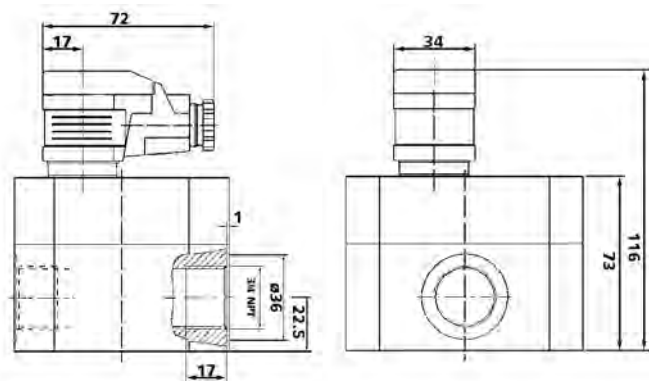


DV01 Flowmeter

DIMENSIONS (MM)



DV01; DV02 same as DV01 except housing is 55 x 65 mm x 108 mm height



DV01-3
Width x Depth : 90 x 100 mm



Series OM Oval Gear Flowmeters



SIZE

| | | | | |
|--------------|-------------------------|-----------|---------------|---------------|
| OM004 | = 1/8 in. | (4mm) | 0.13-9.5 GPH | 0.5-36 L/hr |
| OM006 | = 1/4 in. | (6mm) | 0.5-27 GPH | 2-100 L/hr |
| OM008 | = 3/8 in. | (8mm) | 4-145 GPH | 15-550 L/hr |
| OM008 | = 1/4 in. high pressure | (6 mm) | 4-145 GPH | 15-550 L/hr |
| OM015 | = 1/2 in. | (15mm) | 0.26-10.6 GPM | 1-40 L/min |
| OM025 | = 1 in. | (25mm) | 2.6-40 GPM | 10-150 L/min |
| OM040 | = 1-1/2 in. | (40mm) | 4-66 GPM | 15-250 L/min |
| OM050 | = 2 in. | (50mm) | 8-120 GPM | 30-450 L/min |
| OM080 | = 3 in. | (80mm) | 10-200 GPM | 35-750 L/min |
| OM080 | = 3 in. extended flow | (80mm) | 13-260 GPM | 50-1000 L/min |
| OM100 | = 4 in. | (100mm) | 20-400 GPM | 75-1500 L/min |

BODY MATERIAL

- A** = Aluminum
- E** = Extended flow aluminum version
- P** = PPS (73 PSI / 5 Bar)
- M** = Intermediate pressure aluminum meter (2000 PSI [138 Bar] max.)
- S** = 316L Stainless Steel
- N** = Intermediate press. 316L SS meters (OM004N-025N = 1450 PSI [100 bar] , OM040N-050N = 725 PSI [50 bar])
- H** = High Pressure 316SS (OM004H-040H = 5580 PSI [400 bar] max. OM050H = 4200 PSI [300 bar])

ROTOR MATERIAL

- 0** = PPS - PTFE filled (Polyphenylene Sulfide)
- 1** = Keishi cutting of PPS rotors (for high viscosity liquids)
- 5** = Stainless steel (standard on OM004 & OM006, optional on other sizes)
- 7** = Keishi cutting of stainless steel rotors (for high viscosity liquids)

BEARING TYPE

- 0** = No Bearing - PPS rotor option only
- 1** = Carbon Ceramic (standard with stainless steel rotors)

O-RING MATERIAL

- 1** = FKM (Viton™) (standard for Alum.) -5° F minimum (-15° C)
- 2** = EPR (Ethylene Propylene Rubber) - for ketones only
- 3** = PTFE encapsulated FKM (Viton™) - (standard for SS)
- 4** = Buna-N (Nitrile), -40° F minimum (-40° C)

MAXIMUM TEMPERATURE LIMIT

- 2** = 250° F (120° C) max.
(reduced to 80° C when fitted with integral instruments)
- 3** = 300° F (150° C) max.
(Hall Effect output only, not available with HP meters)
- 5** = 250° F (120° C) max. (includes integral cooling fin)
- 8** = 176° F (80° C) max.
(applies to Mech. Reg., OM025P & OM008 with PPS rotors)

Continued on next page.

OM SERIES OVAL GEAR METERS **METER NUMBER REFERENCE****PROCESS CONNECTIONS**

- 1** = BSPP (G) female threaded
- 2** = NPT female threaded
- 3** = Sanitary Fittings (Sanitary Fittings are 1/2" larger than the meter size)
- 4** = ANSI-150 RF flanged
- 5** = ANSI-300 RF flanged
- 6** = PN16 DIN flanged

CABLE ENTRIES

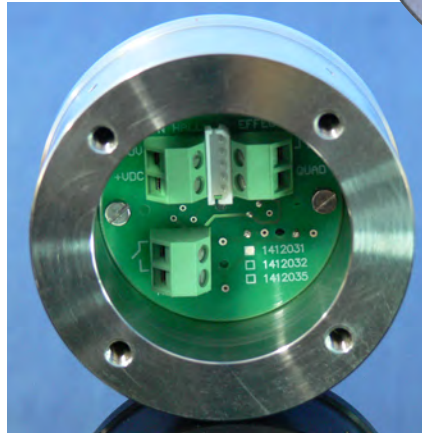
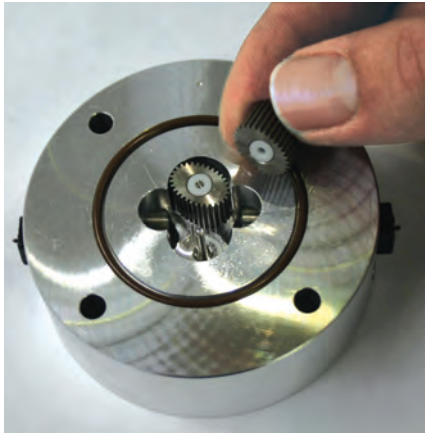
- 0** = 3-6mm cable gland or no cable entry [Exclusive to B2 & B3 options (OM004 to OM008 meter only)]
- 1** = M20 x 1.5 mm
- 2** = 1/2" NPT (OM004-OM008) 1/2" NPT Adaptor used for other sizes

INTEGRAL OPTIONS

- = Combination Reed Switch and Hall Effect Sensor
- G5** = [GG 500] Rate / Total Display with pulse out and optional Ex. Power
[Local Display w/ Pulse (60°C)]
- G6** = [GX 500] Rate / Total Display w/ 4-20mA out [Local Display w/ 4-20mA (60°C)]
- G7** = [GA 500] Loop powered 4-20mA analog output [Local 4-20mA (60°C)]
- RS** = Reed Switch only - to suit Intrinsically safe installations
- E1** = Explosionproof Exd IIB T4/T6 (aluminum & stainless meters) [IECEX & ATEX mines approved]
- E2** = Explosionproof Exd I/IIB T4/T6 (stainless meters only) [IECEX & ATEX mines approved]
- QP** = Quadrature pulse (2 NPN phased outputs) [not available with high press models]
- Q1** = Explosionproof Exd (with quadrature pulse, but not available with high pressure meter)
[IECEX & ATEX approved]
- HR** = High resolution Hall effect output (Hall Effect only) [OM004:11200ppL, OM006:4200ppL]
- H1** = Explosionproof - Exd with HR Hi-res. Hall option [IECEX & ATEX approved]
- PF** = Pulsating flow option (Hall effect output only) [for injected combustion engines]
- P1** = Explosionproof - Exd with PF pulsating flow option [IECEX & ATEX approved]
- B2** = BT11 totaliser with pulse output [with scaleable pulse output]
- B3** = Intrinsically safe BT11 with pulse output [IECEX & ATEX approved]
- R0** = RT12 rate totaliser with all outputs (Alloy housing) [scaled pulse, alarms, 4-20mA]
- R2** = RT12 rate totaliser with all outputs (GRN housing) [scaled pulse, alarms, 4-20mA]
- R3** = Intrinsically safe RT12 with all outputs (GRN housing) [IECEX & ATEX approved]
- R4** = RT40 rate totaliser with backlit large digit LCD [scaleable pulse output, backlight]
- E0** = EB10 batch controller [2 stage DC batcher & totaliser]
- M3** = 4-digit Mechanical Totalizer - litres [Resolution depends on size]
- M4** = 4-digit Mechanical Totalizer - gallon [Resolution depends on size]
- FI** = Loop powered 4-20mA analog output 176° F (- 80° C) max.
[Consult Factory for Availability with High Pressure Meters]

OM Small Capacity Flowmeters

1/8", 1/4", 3/8" Pipe Size



OM small capacity Flowmeters

Volumetric flow measurement of clean liquids or low flows used in automotive, aviation, mining, power, chemical, pharmaceutical, food, paint, petroleum industries and environmental applications. For metering additives for fuel, consumer products, water treatment and flotation cells, corrosion inhibitors, catalysts, emulsifiers, oils, grease, fragrances, adhesives, solvents, ink and insecticides. .

Features / Benefits

- High accuracy and repeatability, direct reading
- No requirement for flow conditioning (straight pipe runs)
- Stainless Steel rotors (Optional PPS Rotor for OM008 meter)
- Measures high and low viscosity liquids
- Quadrature pulse output option and bi-directional flow
- Integral 4-20mA output option
- Optional Exd I/IIB approval (ATEX, IECEx)
- PF option available for metering pulsating flows

Meter Selection

- **Aluminium** meters for petroleum products (oils and grease, fuels and fuel oils)
- **Stainless steel** meters for the chemical, cosmetic, food and pharmaceutical industries (water based liquids)
- **Blind pulse** meters available with reed switch and Hall Effect outputs. Optional Quadrature pulse and Integral 4-20mA outputs available

Integral Instruments

Options include integral LCD totalisers, flow rate totalisers and batch controllers (4-20mA, scaled pulse, alarms and batch control)

- BT LCD 5-digit reset, 8-digit cumulative totaliser
- RT12 LCD 6-digit reset, cumulative totaliser and flow rate, analog and pulse outputs
- RT40 LCD 6-digit reset, cumulative totaliser and flow rate. Backlit Display
- EB LCD 6-digit 2 stage batcher and cumulative totaliser

(Available for remote mounting and with I.S. approvals)

General Specification

Flow Rates: 0.16 - 145 US gal/hr. (0.5 - 550 litres / hr.)*

Sizes: 1/8" - 3/8" NB (4 - 8mm)

Materials: Aluminium, 316 Stainless steel

NMI Approved Meters

National Measurement Institute (NMI) Weights and Measures Approval – Australia

Meters 1" and above available with optional NMI pattern approval and quadrature pulse output

* See also **Medium and Large Capacity** data sheets for other size meters.

Specifications

| Model Prefix: | OM004 (1/8") | OM006 (1/4") | OM008 (3/8") |
|-------------------------------|--|--------------|--------------|
| Nominal size (inches): | 1/8" (4mm) | 1/4" (6mm) | 3/8" (8mm) |
| *Flow range - (GPH): | (0.13-9.5) | (0.5-27) | (4-145) |
| - (LPH): | (0.5 - 36) | (2 - 100) | (15 - 550) |
| **Accuracy @ 3cp: | ± 1% of reading (accuracy is ± 0.2% of reading with optional RT12 with non-linearity correction) | | |
| Repeatability: | Typically ± 0.03% of reading | | |
| Temperature range: | -4° F - +250° F (-20° C - +120° C), refer factory for lower temperature | | |
| Maximum pressure: | PSI (Threaded meters)bar | | |
| Aluminium meters: | 220 (15) | | |
| 316 stainless steel: | 495 (34) | | |
| Intermediate press. SS meter: | 1450 (100) | 1450 (100) | 1450 (100) |
| High pressure models: | 5800 (400) | 5800 (400) | 5800 (400) |

Electrical - for pulse meters (see below for optional outputs)

| Output pulse resolution: | Pulses / gallon (Pulses / litre) - nominal | | |
|----------------------------------|--|--------------|------------|
| Reed switch: | 10600 (2800) | 3975 (1050) | 1345 (355) |
| Hall effect: | 10600 (2800) | 3975 (1050) | 2690 (710) |
| QP-Quadrature Hall option: | 10600 (2800) | 3975 (1050) | 2690 (710) |
| PF-Pulsating Flow (Hall Effect): | 10600 (2800) | 3975 (1050) | 675 (178) |
| HR-High resolution Hall effect: | 42400 (11200) | 15900 (4200) | N/A |
| Reed switch output: | 30Vdc x 200mA max. [maximum thermal shock 18° F (10° C) / minute] | | |
| Hall effect output (NPN): | 3 wire open collector, 5-24Vdc max., 20mA max. | | |
| Optional outputs: | 4-20mA, scaled pulse, quadrature pulse, flow alarms or two stage batch control | | |

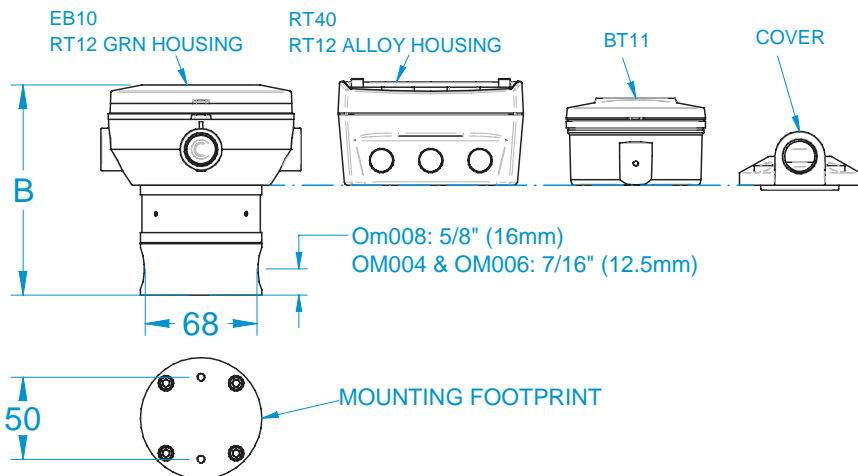
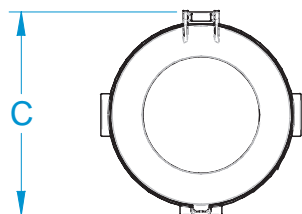
Physical

| | |
|-------------------------|--|
| Protection class: | IP66/67 (NEMA4X), optional Exd I / IIB T4/T6, integral ancillaries can be supplied I.S. (intrinsically safe) |
| Overall dimensions: | Refer Below |
| Recommended filtration: | 200 mesh (75 microns) |

- * Maximum flow is to be reduced as viscosity increases, see flow de-rating guide. Max. recommended pressure drop is 100Kpa. (14.5 psi)
 ** OP and PF Options are not available with High Pressure Meters

All dimensions are inches ± .079 (millimeters ±2mm)

| OPTION | B | | | C |
|---------------------------|-----------|-----------|-----------|-----------|
| | OM004 | OM006 | OM008 | |
| EB10 / RT12 GRN HOUSING | 4.8 / 122 | 4.8 / 122 | 5.0 / 129 | 4.9 / 124 |
| RT40 / RT12 ALLOY HOUSING | 4.9 / 125 | 4.9 / 125 | 5.2 / 132 | 3.8 / 96 |
| BT | 4.4 / 113 | 4.4 / 113 | 4.7 / 120 | 3.7 / 94 |
| COVER | 3.6 / 92 | 3.6 / 92 | 3.9 / 99 | 2.8 / 72 |



OM Medium Capacity Flowmeters 1/2", 1", 1-1/2", 2" Pipe Size



OM medium capacity flowmeters

Volumetric flow measurement of clean liquids used in automotive, aviation, mining, power, chemical, pharmaceutical, food, paint, petroleum industries. For distribution of fuels, fuel oils, lubricants, alcohols, solvents, blending of bio and ethanol fuels, metering of chemicals, grease, adhesives, ink, insecticides and pumps or gravity fed non-conductive liquids.

Features / Benefits

- High accuracy and repeatability, direct reading
- No requirement for flow conditioning (straight pipe runs)
- Various rotor material options
- Measures high and low viscosity liquids
- Quadrature pulse output option and bi-directional flow
- Integral 4-20mA output option
- Optional Exd I/IIB approval (ATEX, IECEx)

Meter Selection

- **Aluminium** meters for petroleum products (oils and grease, fuels and fuel oils)
- **Stainless steel** meters for the chemical, cosmetic, food and pharmaceutical industries (water based liquids)
- **Blind pulse** meters available with reed switch and Hall Effect outputs. Optional Quadrature pulse and Integral 4-20mA outputs are available

Integral Instruments

Options include integral LCD totalisers, flow rate totalisers and batch controllers (4-20mA, scaled pulse, alarms and batch control)

- BT LCD 5-digit reset, 8-digit cumulative totaliser
- RT12 LCD 6-digit reset, cumulative totaliser and flow rate, analog and pulse outputs
- RT40 LCD 6-digit reset, cumulative totaliser and flow rate. Backlit Display
- EB LCD 6-digit 2 stage batcher and cumulative totalizer
- M/V* = Mechanical registers (see model numbering)

(Available for remote mounting and with I.S. approvals)

General Specification

Flowrates: 0.26 - 150 US gal/min. (1 - 580 litres/min.)*

Sizes: 1/2" - 2" NB (15-50 mm)

Materials: Aluminium, 316 Stainless steel or Ryton (PPS)

NMI Approved Meters

National Measurement Institute (NMI) Weights and Measures Approval – Australia

Meters 1" and above available with optional NMI pattern approval and quadrature pulse output

* See also [Small and Large Capacity](#) data sheets for other size meters.

Specifications

| Model Prefix: | OM015 (1/2") | OM025 (1") | OM040 (1.5") | OM050 (2") | OM050 (2")E |
|--------------------------------|--|------------|--------------|------------|-------------|
| Nominal size (inches): | 1/2" (15mm) | 1" (25mm) | 1.5" (40mm) | 2" (50mm) | 2" (50mm) |
| *Flow range - (GPM): | 0.26 - 10.6 | 2.6 - 40 | 2.6 - 66 | 8 - 120 | 9-150 |
| - (LPM): | 1 - 40 | 10 - 150 | 15 - 250 | 30 - 450 | 35-580 |
| **Accuracy @ 3cp: | ± 0.5% of reading (accuracy is ± 0.2% of reading with optional RT12 with non-linearity correction) | | | | |
| Repeatability: | Typically ± 0.03% of reading | | | | |
| Temperature range: | -4°F - +250°F (-20°C - +120°C), refer factory for lower temperature | | | | |
| Maximum pressure: | PSI (Threaded meters) bar | | | | |
| Aluminium meters: | 990 (68) | 990 (68) | 435 (30) | 285 (20) | 285 (20) |
| Intermediate press. AL | - | 2000 (138) | - | - | - |
| 316 stainless steel: | 990 (68) | 990 (68) | 435 (30) | 550 (38) | - |
| Intermediate press. SS meter: | 1450 (100) | 1450 (100) | 725 (50) | 725 (50) | - |
| *** High pressure models: | 5800 (400) | 5800 (400) | 5800 (400) | 4350 (300) | - |
| Max. pressure Mechanical Meter | PSI (Threaded meters) bar | | | | |
| Aluminium meters | 580 (40) | 580 (40) | 435 (30) | 285 (20) | 285 (20) |
| 316 stainless steel | 580 (40) | 580 (40) | 435 (30) | 285 (20) | - |

Electrical - for pulse meters (see below for optional outputs)

| Output pulse resolution: | Pulses / gallon (Pulses / litre) - nominal | | | | |
|----------------------------|--|-----------|----------|----------|-----------|
| Reed switch: | 318 (84) | 102 (27) | 53 (14) | 25 (6.5) | 18 (4.8) |
| Hall effect: | 636 (168) | 405 (107) | 212 (56) | 99 (26) | 73 (19.2) |
| QP-Quadrature Hall option: | 636 (168) | 204 (54) | 106 (28) | 49 (13) | 36 (9.6) |
| Reed switch output: | 30Vdc x 200mA max. [maximum thermal shock 50° F (10° C) / minute] | | | | |
| Hall effect output (NPN): | 3 wire open collector, 5-24Vdc max., 20mA max. | | | | |
| Optional outputs: | 4-20mA, scaled pulse, quadrature pulse, flow alarms or two stage batch control | | | | |

Physical

| | |
|-------------------------|--|
| Protection class: | IP66/67 (NEMA4X), optional Exd I / IIB T4/T6, integral ancillaries can be supplied I.S. (intrinsically safe) |
| Overall dimensions: | Refer Below |
| Recommended filtration: | 100 mesh (150 microns) |

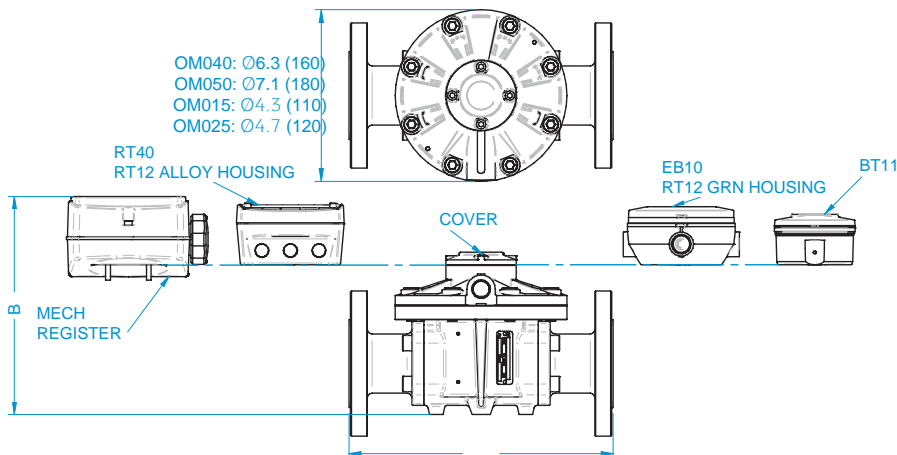
* Maximum flow is to be reduced as viscosity increases, see flow de-rating guide. Max. recommended pressure drop is 100Kpa. (15 psi)

** Accuracy ± 1% of reading with M - Series mechanical registers and accuracy ± 0.5% of reading with V-series mechanical register.

*** QP and PF Options are not available with High Pressure Meters.

All dimensions are inches ± .079 (millimeters ±2mm)

| MODULAR FITTING | A | | | | | | CONFIGURATION | B | | | | | | | |
|----------------------------------|--------------|--------------|--------------|--------------|---------------|---------------|-------------------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|---------------|
| | OM015 | OM025A | OM025S | OM040 | OM050 | OM050E | | OM015S | OM025A | OM025S | OM040A | OM040S | OM050 | OM050E | |
| A.N.S.I. 150 DIN16 JIS 10K | 7.4 (189) | 7.8 (198) | 9.3 (237) | 9.9 (252) | 10.9 (277) | 10.9 (277) | EB10/RT12 GRN Housing | 6.0 (154) | 5.8 (148) | 6.6 (168) | 6.5 (165) | 7.9 (203) | 7.6 (194) | 8.6 (218) | 10.5 (268) |
| | | | | | | | BT11 Register | 5.7 (145) | 5.5 (139) | 6.3 (160) | 6.2 (157) | 7.8 (198) | 7.3 (186) | 8.3 (210) | 10.2 (260) |
| | | | | | | | RT40/RT12 Alloy Housing | 6.2 (157) | 5.9 (151) | 6.7 (171) | 6.6 (168) | 8.1 (206) | 7.8 (197) | 8.7 (221) | 10.7 (271) |
| B.S.P N.P.T. | 4.3 (110) | 5.4 (137) | 6.9 (176) | 7.4 (188) | 8.3 (212) | 8.3 (212) | Cover | 4.2 (106) | 3.9 (100) | 4.7 (120) | 4.6 (117) | 6.1 (155) | 5.7 (146) | 6.7 (170) | 8.6 (220) |
| | | | | | | | Mech. Register | 7.0 (178) | 6.9 (176) | 7.4 (188) | 8.4 (214) | 8.9 (227) | 8.7 (222) | 9.3 (237) | 11.3 (286) |



OM Large Capacity Flowmeters 3" & 4" Pipe Size



OM large capacity lowmeters

Volumetric flow measurement of clean liquids used in receipt verification, loading, un-loading and distribution management at petroleum plants, mine sites, marine and aviation facilities. For pumped or gravity fed distribution of fuels, oils, solvents, alcohols.

Features / Benefits

- High accuracy and repeatability, direct reading
- No requirement for flow conditioning (straight pipe runs)
- Various rotor material options
- Measures high and low viscosity liquids
- Quadrature pulse output option and bi-directional flow
- Integral 4-20mA output option
- Optional Exd I/IB approval (ATEX, IECEx)

Meter Selection

- **Aluminium** meters for petroleum products (oils and grease, fuels and fuel oils)
- **Stainless steel** meters for the chemical, cosmetic, food and pharmaceutical industries (water based liquids)
- **Blind pulse** meters available with reed switch and Hall Effect outputs. Optional Quadrature pulse and Integral 4-20mA outputs are available

Integral Instruments

Options include integral LCD totalisers, flow rate totalisers and batch controllers (4-20mA, scaled pulse, alarms and batch control)

- BT LCD 5-digit reset, 8-digit cumulative totaliser
- RT12 LCD 6-digit reset, cumulative totaliser and flow rate, analog and pulse outputs
- RT40 LCD 6-digit reset, cumulative totaliser and flow rate. Backlit Display
- EB LCD 6-digit 2 stage batcher and cumulative totalizer
- M/V* = Mechanical registers (see model numbering)

(Available for remote mounting and with I.S. approvals)

General Specification

Flowrates: 10 - 660 US gal/min. (35 - 2500 litres/min.)*

Sizes: 3" - 4" NB (80-100 mm)

Materials: Aluminium, 316 Stainless steel

NMI Approved Meters

National Measurement Institute (NMI) Weights and Measures Approval – Australia

Meters 1" and above available with optional NMI pattern approval and quadrature pulse output

* See also **Small and Medium Capacity** data sheets for other size meters.

Specifications

| Model Prefix: | OM080 | OM080E | OM100 | OM100E |
|------------------------|--|-------------|------------|--------------|
| Nominal size (inches): | 3" (80mm) | 3" (80mm) E | 4" (100mm) | 4" (100mm) E |
| *Flow range - (GPM): | 10 - 200 | 13 - 260 | 20 - 400 | 40 - 660 |
| - (LPM): | 35 - 750 | 50 - 1000 | 75 - 1500 | 150 - 2500 |
| **Accuracy @ 3cp: | ± 0.5% of reading (accuracy is ± 0.2% of reading with optional RT12 with non-linearity correction) | | | |
| Repeatability: | Typically ± 0.03% of reading | | | |
| Temperature range: | -4° F - +250° F (-20° C - +120° C), refer factory for lower temperature | | | |
| Maximum pressure: | PSI (Threaded meters) bar | | | |
| Aluminium meters | 175 (12) | 175 (12) | 145 (10) | 145 (10) |
| 316 stainless steel | 175 (12) | - | - | - |

Electrical - for pulse meters (see below for optional outputs)

| | | | | |
|---------------------------|--|-------------|------------|-------------|
| Output pulse resolution: | Pulses / gallon (Pulses / litre) - nominal | | | |
| Reed switch: | 10 (2.65) | 5.68 (1.55) | 4.15 (1.1) | 2.1 (0.56) |
| Hall effect: | 40.5 (10.65) | 22.7 (6.0) | 8.3 (4.4) | 8.5 (2.24) |
| Quadrature Hall option: | 20 (5.33) | 11.36 (3.0) | 8.3 (2.2) | 4.24 (1.12) |
| Reed switch output: | 30Vdc x 200mA max. [maximum thermal shock 50° F (10° C) / minute] | | | |
| Hall effect output (NPN): | 3 wire open collector, 5-24Vdc max., 20mA max. | | | |
| Optional outputs: | 4-20mA, scaled pulse, quadrature pulse, flow alarms or two stage batch control | | | |

Physical

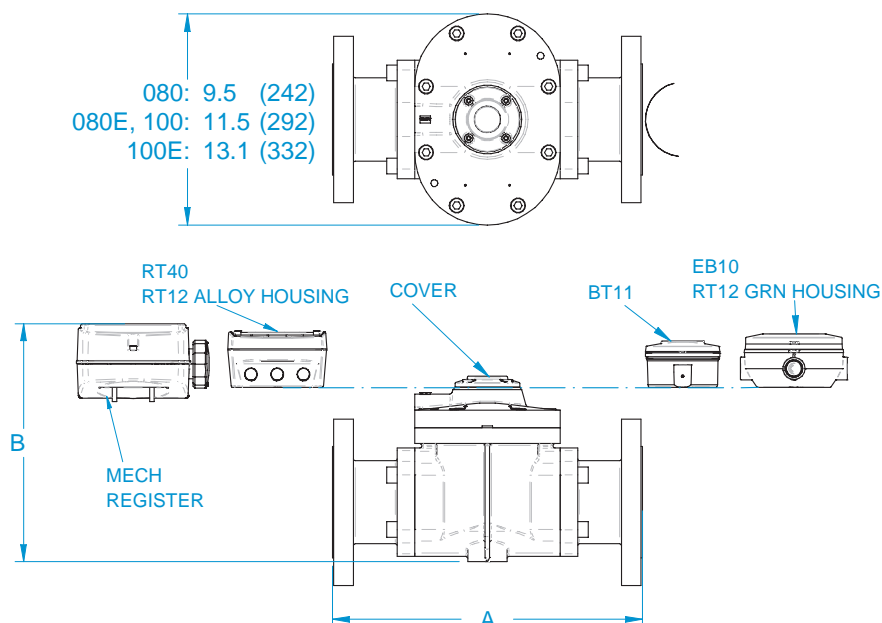
| | |
|-------------------------|--|
| Protection class: | IP66/67 (NEMA4X), optional Exd I / IIB T4/T6, integral ancillaries can be supplied I.S. (intrinsically safe) |
| Overall dimensions: | Refer Below |
| Recommended filtration: | 40 mesh (350 microns) |

* Maximum flow is to be reduced as viscosity increases, see flow de-rating guide. Max. recommended pressure drop is 100Kpa. (15 psi)

** Accuracy ± 1% of reading with M - Series mechanical registers and accuracy ± 0.5% of reading with V-series mechanical register.

All dimensions are inches ± .079 (millimeters ±2mm)

| MODULAR FITTING | A | | | | CONFIGURATION | B | | | | |
|----------------------------------|---------------|---------------|---------------|---------------|------------------------------------|------------|------------|------------|------------|------------|
| | OM080 | OM080E | OM100 | OM100E | | OM080A | OM080S | OM080E | OM100 | OM100E |
| A.N.S.I. 150 DIN16 JIS 10K | 13.9 / 354 | 15.0 / 382 | 15.3 / 388 | 16.3 / 414 | EBREGISTER / RT12 GRN HOUSING | 10.2 / 260 | 10.1 / 257 | 10.9 / 277 | 12.7 / 322 | 15.7 / 399 |
| | | | | | BT REGISTER | 9.9 / 252 | 10.2 / 259 | 10.6 / 269 | 12.3 / 314 | 15.4 / 391 |
| | | | | | RT40 REGISTER / RT12 ALLOY HOUSING | 10.3 / 264 | 10.2 / 260 | 11.0 / 281 | 12.8 / 326 | 15.8 / 403 |
| B.S.P. N.P.T. | 10.5 / 266 | 11.6 / 294 | 11.6 / 294 | 12.6 / 320 | COVER | 8.4 / 213 | 8.1 / 206 | 9.0 / 229 | 10.7 / 274 | 13.9 / 352 |
| | | | | | MECH. REGISTER | 10.6 / 270 | N/A | 11.3 / 288 | 13.1 / 333 | 16.4 / 416 |



Display With Pulse Output

GG500
Remote Mount



GG510
Local Mount

The GG500 is a remote mount Pulse-Out Transmitter with battery powered display. Choose the GG510 when a local mount is needed.

GG500/GG510 – SPECIFICATIONS

| | |
|--------------------------------|---|
| Accuracy: | ± 0.1% of reading |
| Output Options: | |
| Primary Output: | Open Collector (NPN) |
| Pulse-Out: | |
| Max. "OFF" Voltage: | 60 V |
| Max. "ON" Current: | 200 mA |
| Max. "ON" Voltage Drop: | < 0.5 V @ 200 mA |
| Electrical: | |
| Strain Relief: | Hubble PG7 |
| Strain Relief Thread: | Female 1/2-20 UNF-2B |
| Cable: | <i>Remote:</i> Belden 9363 (500 Series only) <i>Local:</i> No cable provided |
| Cable Length: | 20 ft. (6 m) provided (500 Series only) |
| Power Supply: | 9-volt battery or externally powered |
| Voltage Supply (Min.): | 7 VDC |
| Voltage Supply (Max.): | 30 VDC |
| Input Options: | Hall Effect, Reed Switch, Open Collector or Low Level Sine Wave |
| Remote Mounting: | Pipe or wall |
| Operating Temperature: | +14° F to +140° F (-10° C to +60° C) |
| Frequency Input: | |
| Low Level Coil (LLC): | 0 - 1000 Hz |
| High Level Low Freq.: | 0 - 150 Hz |
| High Level High Freq.: | 0 - 1000 Hz |
| Enclosure Rating: | NEMA 4X / IP55 |
| Shipping Weight: | <i>Remote:</i> 2.0 lbs. (.90 kg) <i>Local:</i> 1.0 lbs. (.45 kg) |
| Calibratable: | K-factor Entry |

ACCURACY: ±0.1% READING

Features and Benefits:

- ✓ Provides communication with process control equipment.
- ✓ Works with G Series, G2 Turbine Meters and GM Oval Gear Meters.
- ✓ 2 Totals (Batch = Resettable, Cumulative = Non-Resettable); Rate of Flow. Factory calibrated in gallons and litres. Field calibratable. Allows user calibration. Includes non-volatile totals.
- ✓ Industry Standard Output: Unscaled Pulse.
- ✓ Easily mounted on pipe or wall.

GX500/GX510 – SPECIFICATIONS

| | |
|---------------------------------|---|
| Accuracy: | ± 0.1% of reading |
| Output Options: | |
| Primary Output: | Loop (4-20 mA or 0-20 mA) |
| Minimum: | 1.5 mA |
| Maximum: | 25 mA |
| Auxiliary Outputs 0-5 V: | Single Ended |
| Minimum: | 0.1 V |
| Maximum: | 4.9 V |
| Pulse-Out: | |
| Max. "OFF" Voltage: | 60 V |
| Max. "ON" Current: | 200 mA |
| Max. "ON" Voltage Drop: | < 0.5 V @ 200 mA |
| Electrical: | |
| Strain Relief: | Hubble PG7 |
| Strain Relief Thread: | Female 1/2-20 UNF-2B |
| Cable: | <i>Remote:</i> Belden 9363 (500 Series only) <i>Local:</i> No cable provided |
| Cable Length: | 20 ft. (6 m) provided (500 Series only) |
| Power Supply: | 2-wire, loop powered |
| Voltage Supply (Min.): | 8.5 VDC |
| Voltage Supply (Max.): | 35 VDC |
| Input Options: | Hall Effect, Reed Switch, Open Collector or Low Level Sine Wave |
| Remote Mounting: | Pipe or wall |
| Operating Temperature: | +32° F to +140° F (0° C to +60° C) |
| Frequency Input: | |
| Low Level Coil (LLC): | 0.25 - 1000 Hz |
| High Level Low Freq.: | 0.25 - 150 Hz |
| High Level High Freq.: | 0.25 - 1000 Hz |
| Optically Isolated HLLF: | w/2500 V optical isolation |
| Optically Isolated HLHF: | w/2500 V optical isolation |
| Enclosure Rating: | NEMA 4X / IP55 |
| Shipping Weight: | <i>Remote:</i> 2.0 lbs. (.90 kg) <i>Local:</i> 1.1 lbs. (.5 kg) |
| Calibratable: | K-factor Entry |

Display With 4-20 mA Output



GX500
Remote Mount



GX510
Local Mount

The GX500 is a remote mount 4-20 mA Output Transmitter with display. Choose the GX510 when a local mount is needed.

ACCURACY: ±0.1% READING

Features and Benefits:

- ✓ Provides communication with process control equipment.
- ✓ Works with G Series, G2 Turbine Meters and GM Oval Gear Meters.
- ✓ 2 Totals (Batch = Resettable, Cumulative = Non-Resettable); Rate of Flow. Factory calibrated in gallons and litres. Field calibratable. Allows user calibration. Includes non-volatile totals.
- ✓ Now available with Lockout feature.
- ✓ Microprocessor-based electronics have extremely low power requirements.
- ✓ Easy to set 4-20 mA endpoints under actual flow conditions.
- ✓ A signal conditioner with industry standard current loop output.
- ✓ Easily mounted on pipe or wall.

4-20 mA Output

GA500
Remote MountGA510
Local Mount

The GA500 is a remote mount 4-20 mA Output Transmitter without display. Choose the GA510 when a local mount is needed.

GA500/GA510 – SPECIFICATIONS

| | |
|--------------------------|---|
| Accuracy: | ± 0.1% of reading |
| Output Options: | |
| Primary Output: | Loop (4-20 mA or 0-20 mA) |
| Minimum: | 1.5 mA |
| Maximum: | 25 mA |
| Auxiliary Outputs 0-5 V: | Single Ended |
| Minimum: | 0.1 V |
| Maximum: | 4.9 V |
| Pulse-Out: | |
| Max. "OFF" Voltage: | 60 V |
| Max. "ON" Current: | 200 mA |
| Max. "ON" Voltage Drop: | < 0.5 V @ 200 mA |
| Electrical: | |
| Strain Relief: | Hubble PG7 |
| Strain Relief Thread: | Female 1/2-20 UNF-2B |
| Cable: | <i>Remote:</i> Belden 9363 (500 Series only) <i>Local:</i> No cable provided |
| Cable Length: | 20 ft. (6 m) provided (500 Series only) |
| Power Supply: | 2-wire, loop powered |
| Voltage Supply (Min.): | 8.5 VDC |
| Voltage Supply (Max.): | 35 VDC |
| Input Options: | Hall Effect, Reed Switch, Open Collector or Low Level Sine Wave |
| Mounting: | Pipe or wall |
| Operating Temperature: | +32° F to +140° F (0° C to +60° C) |
| Frequency Input: | |
| Low Level Coil (LLC): | 0.25 - 1000 Hz |
| High Level Low Freq.: | 0.25 - 150 Hz |
| High Level High Freq.: | 0.25 - 1000 Hz |
| Optically Isolated HLLF: | w/2500 V optical isolation |
| Optically Isolated HLHF: | w/2500 V optical isolation |
| Enclosure Rating: | NEMA 4X / IP55 |
| Shipping Weight: | <i>Remote:</i> 2.0 lbs. (.90 kg) <i>Local:</i> 1.1 lbs. (.5 kg) |

ACCURACY: ±0.1% READING

Features and Benefits:

- ✓ Provides communication with process control equipment.
- ✓ Works with G Series, G2 Turbine Meters and GM Oval Gear Meters.
- ✓ Now available with Lockout feature.
- ✓ Microprocessor-based electronics have extremely low power requirements.
- ✓ Easy to set 4-20 mA endpoints under actual flow conditions.
- ✓ A signal conditioner with industry standard current loop output.
- ✓ Easily mounted on pipe or wall.

Features

- ▶ Self powered, 8 digit LCD cumulative totalizer and large 5 digit resettable totalizer
- ▶ Robust field or meter mountable housing with protection cover
- ▶ Simple programming
- ▶ PIN protected programming
- ▶ Accepts universal pulse inputs
- ▶ IP66/67 Weatherproof (NEMA 4X)
- ▶ Intrinsically safe version
- ▶ Long battery life
- ▶ Reverse polarity protection
- ▶ Display backlighting option

Outputs

- Pre-amplified pulse
- Scaleable pulse

Also available

- Flow rate totalisers
- Ecobatch batch controllers



Overview

The BT programmable self powered totaliser is specifically designed for computing & displaying totals from flowmeters or machinery with frequency, sine wave or pulse outputs.

The instrument simultaneously displays resettable (batch) total & a cumulative total in engineering units as programmed by the user.

Ultra low power consumption is a result of innovative design which provides as much as 10 years of service from the replaceable 3.6V lithium battery. The BT may also be externally powered by 8~24Vdc.

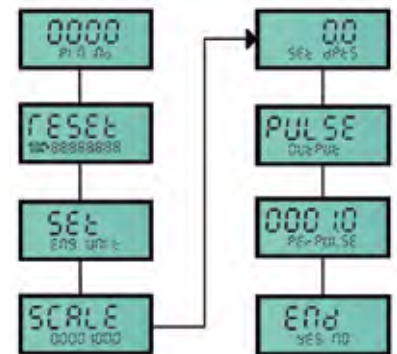
Pulse Outputs

The pulse output can be set as either a scaled or un-scaled pulse & is NPN/ PNP selectable.

The un-scaled pulse serves as a frequency amplifier for turbine or paddle wheel style flowmeters.

Programming

Simple PIN protected flow chart programming with English prompts guide you through the programming routine, greatly reducing the need to refer to the instruction manual.



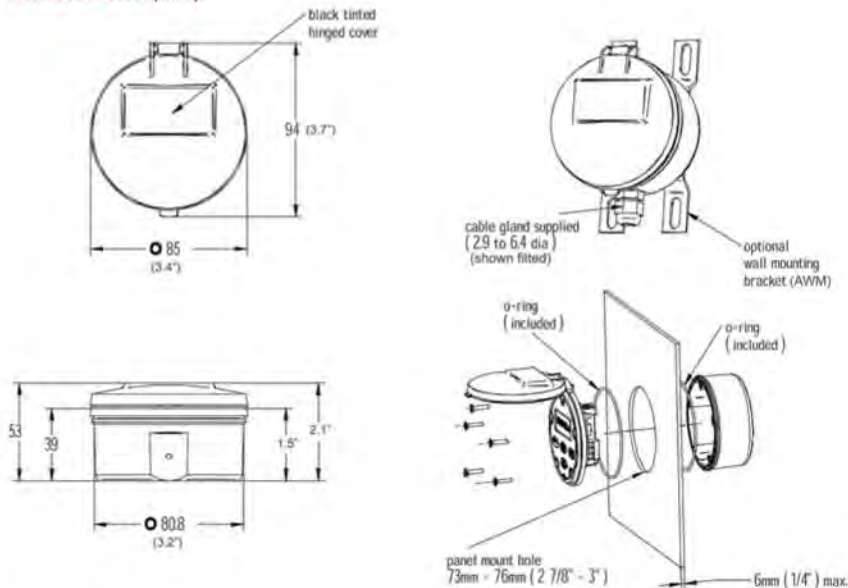
Programming Sequence

Specifications

| | |
|---------------------------------|---|
| Liquid crystal display (LCD) | alpha numeric LCD characters |
| Resettable total | 5 digit x 7.5mm high, programmable to 3 decimal places |
| Accumulated total | 8 digit x 3.6mm high, programmable to 3 decimal places |
| Engineering units displayed | litres, MLitres, gallons, Mgallons m3, lbs, kgs or no engineering units displayed |
| Input types (pulse & frequency) | reed switch, open collector, coil (15mV P-P min.), voltage, current, namur & other proximities |
| Max. input frequencies | coil 5Khz, hall 2.5Khz, namur 250hz |
| Input scaling range | 0.001~9,999,999.999 with 3 floating decimal points |
| Pulse outputs | NPN/PNP selectable, non-scaleable (5Khz max.) or scaleable (8hz max.). The scaleable pulse output has a pulse width of 60msec |
| Operating temperature | -20~+80°C (-4~176°F), refer factory for higher / lower temp. |
| Power source | 1 x 3.6V lithium battery, can last to 10 yrs. |
| External powering | 8~24Vdc (drives output & backlighting) |
| Intrinsic safe option | Exia IIB T4 |
| Enclosure | IP66/67 (NEMA 4X) glass reinforced nylon, 175g (0.4lb) |
| Electrical | supplied with gland to suit 3-6mm (0.1-0.2") Ø cable |
| Mounting | meter mount, wall, surface, pipe & panel |

IN THE INTEREST OF CONTINUED PRODUCT DEVELOPMENT THE DESIGN & SPECIFICATIONS MAY ALTER WITHOUT NOTICE

Dimensions (mm)



Ordering codes

| | |
|---------------------|---|
| FMBT110D0 | cumulative & batch (reset) totalizer with pulse output |
| <i>Housing type</i> | |
| FM | universal mount (field, surface, pipe, wall or panel mount) |
| MM | integral meter mount |
| <i>Options</i> | |
| I | intrinsically safe to Exia IIB T4 |
| B | backlighting of LCD display (requires external dc power) |

Optional adaptors

| | | | |
|-----|-------------------------------------|-----|--------------------------------|
| AWM | stainless steel wall mount kit | ATM | fixed stem for Turbine meters |
| APM | stainless steel 2" pipe mount kit | AUS | swivel stem for Turbine meters |
| ACF | cooling fin for hi temp. flowmeters | ACG | additional cable gland |



wall - surface mount



panel mounted



meter mount



meter mount



batch controller

flow rate totaliser

other instruments

FRT12 Flow Rate & Totalizer Display

LCD display FRT12 is a fully programmable self-powered flow rate totalizer specifically designed for computing & displaying flow rates & totals from flow meters with pulse, sine wave or frequency outputs.

The instrument displays resettable (batch) total, cumulative total and instantaneous flow rate in engineering units as programmed by the user.

Outputs (Under external power)

An unscaled pulse output serves as an input signal amplifier ideally suited for coil type inputs from turbine or paddle wheel meters. The output can be transmitted over long distance & is NPN/PNP selectable (current sinking or current sourcing).

Features /Benefits

- Self or external powered, 8 digit LCD total & 8 digit cumulative totalizer, 5 digit rate display
- Robust IP66/67~NEMA 4X universal mount or DIN Panel mount version
- Aluminium/GRN field & panel mountable housing
- Scaled pulse, 4-20mA (Loop Powered) Output, Dual flow inputs (A+B, A-B, A+B), multi point linearization of flow input or frequency inputs
- High & low flow alarms & Low Frequency cutoff
- PIN protected programming
- Simple flow chart touch key programming
- Reverse polarity protection
- Non volatile memory, Long battery life
- Relay board with SPDT outputs (Optional)
- Flowmeter & pipe mount kits available
- Optional Intrinsically safe version to Exia IIB T4 version (IECEX & ATEX approved)

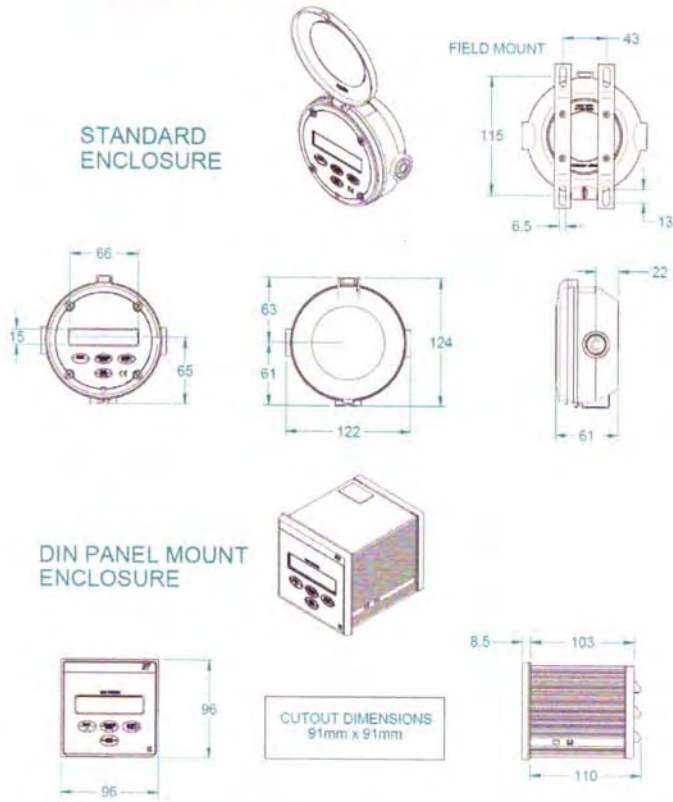


Specifications

| Model prefix : | FRT12 |
|-----------------------|--|
| Displays | 8 digit numeric display with LCD character 8 digit reset & cumulative totalizer 5 digit rate display |
| Memory | All programmed & accumulative data is stored permanently in non-volatile memory |
| Temperature range | -20°C ~ +80°C max (-4°F ~ 176°F max) |
| Signal Input | Pulse/frequency Input with reed switch Hall Effect, Voltage, Current & Coil, dual inputs (A+B,A-B,A+B) |
| Pulse Output | NPN transistor, Scalable (20hz, 100mA max.) |
| Rate Outputs | 4~20mA into 750 ohms @24Vdc, NPN/PNP solid state & relay options |
| Linearisation | 10-point correction |
| Intrinsic safe option | Exia IIB T4 |
| Battery power | Life expectancy 5 years* (Unit draws about 70mA under battery) |
| External Power | Regulated 8~24Vdc x 50mA min (Reverse polarity protected) |
| Configuring | PIN Protected data entry IP66/67 (NEMA4X) |
| Protection class | 3 x M20 or 1/2" NPT female conduit entries for GRN Hosuing 3 x M16 female conduit entries for Aluminium housing |
| K-factor range | Scale factor i.g. pulses/litre, gallon etc. programmable range 0.001 ~ 99,999.999 |
| Engineering Units | Selectable Ltr, gal, m ³ ,kgs, lbs (total)/sec, /min, /hr or day (rate) |

* Battery life reduces when rate is more often displayed & there is no external power connected.

Over all Dimensions:



Model Code:

| | |
|--|---|
| FRT12 | Flow rate totalizer with 4~20mA, scalable pulse & alarm outputs, dual flow inputs |
| Electrical access | |
| 1 | M120 x 1.5mm (M16 x 1.5 for Aluminium housing) female threaded conduit entry ports |
| 2 | 1/2" NPT female threaded conduit entry ports (Not available on aluminium housing) |
| Flow Input type | |
| D | Digital (pulse or frequency) |
| Power supply | |
| 0 | Self powered (battery) or regulated 8~24 Vdc |
| Housing type | |
| FM | Universal mount (field or panel) - GRN Housing |
| MM | Integral meter mount- GRN Housing* |
| FA | Universal mount (field or panel) - Aluminium Alloy Housing* |
| MA | Integral meter mount- Aluminium Alloy Housing* |
| * Only order MA when retro fitting instrument to OM series pulse meter | |
| Electrical options | |
| R | Control output relay board interface with two SPDT relays |
| I | I.S intrinsically safe to Exia IIB T4 - IECEx & ATEX approved |
| Mechanical options | |
| P | Facia protector - for Aluminium housing only (3mm clear polycarbonate protection plate) |

Model No. Example

FRT12 1 D 0 FM - I

Other Instruments also available:

- Battery totalizers (FBT11)
- Automatic batch controllers (FEB10)
- Flow rate totalizer with backlit large digit LCD, alarm & scalable outputs (FRT40)



FRT40 Rate And Totalizer Display

LCD display RT40 battery powered flow rate totaliser is specifically designed for computing & displaying flow rates & totals from flow meters with pulse, sine wave or frequency outputs.

The instrument displays resettable (batch) total, cumulative total and instantaneous flow rate in engineering units as programmed by the user.

Robust field & panel enclosure

Designed for the more rugged applications in mines sites & mobile installations, the RT40 LCD display has a backlight panel & large digits for distance viewing at night.

Features /Benefits

- Battery or external powered, 6 digit large LCD total & 8 digit cumulative totaliser, 5 digit rate display
- Robust IP66/67~NEMA 4X Aluminium field & panel mountable housing
- LCD Backlighting standard
- Scalable universal pulse or frequency inputs
- Scaled pulse output
- PIN protected programming
- Simple flow chart touch key programming
- Reverse polarity protection
- Long battery life
- Heavy duty facia protector shield
- Relay board with SPDT outputs
- Flowmeter & pipe mount kits

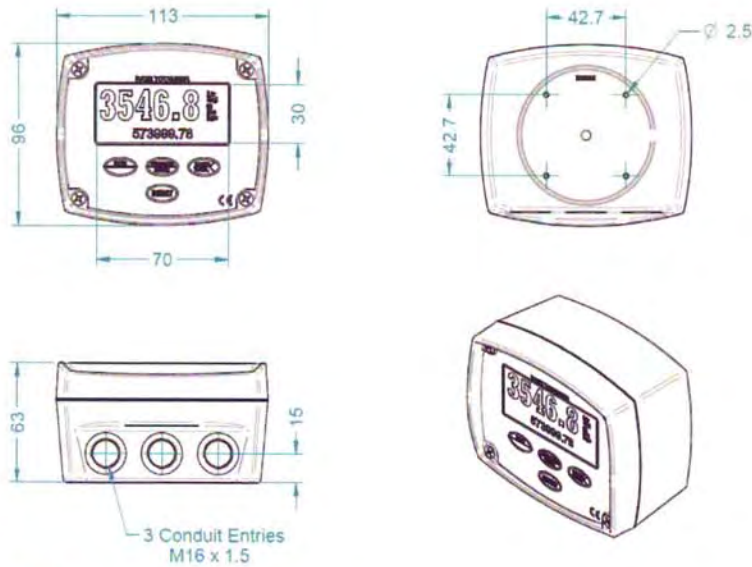


Specifications

| Model prefix : | FRT40 |
|-------------------|--|
| Displays | Large backlit 6 digit numeric display with LCD character 8 digit reset cumulative totaliser 5 digit rate display |
| Memory | All programmed & accumulative data is stored permanently in non-volatile memory |
| Temperature range | -20°C ~ +80°C max. (-4°F ~ 176°F max.) |
| Signal Input | Pulse/frequency Input with reed switch Hall Effect, Voltage, Current & Coil |
| Pulse Output | NPN transistor, Scalable (20hz, 100mA max.) |
| Battery power | Life expectancy 5 years* (Unit draws about 70µA under battery) |
| External Power | Regulated 8~24Vdc x 50mA min (Reverse polarity protected) |
| Configuring | PIN Protected data entry |
| Protection class | IP66/67 (NEMA4X) 3 x M16 x 1.5 female conduit entries |
| K-factor range | Scale factor i.g. pulses/litre, gallon etc. programmable range 0.001 ~ 99,999.999 |
| Engineering Units | Selectable Ltr, gal, m ³ ,kgs, lbs (total)/sec, /min, /hr or day (rate) |

* Battery life reduces when rate is more often displayed & there is no external power connected.

Over all Dimensions:



Model Code:

FRT40 Flow rate totalizer with backlit large digit LCD, Scalable pulse output

Electrical access

1 M16 x 1.5mm female threaded conduit entry ports

Flow Input type

D Digital (pulse or frequency)

Power supply

0 Self powered (battery) or regulated 8-24 Vdc

Housing type

FA Universal mount (field or panel) - Aluminium Alloy Housing

MA Integral meter mount- Aluminium Alloy Housing*

* Only order MA when retro fitting instrument to OM series pulse meter

Mechanical options

P Facia protector - 3mm clear polycarbonate protection plate

Model No. Example

FRT40 **1** **D** **0** **FA** **P**

Other Instruments also available:

- Battery totalizers (FBT11)
- Automatic batch controllers (FEB10)
- Rate totalizer with 4~20mA, alarm & scalable outputs, dual flow inputs & linearization (FRT12)



EB Series Batch Controllers

Features

- ▶ Large 8 digit batch & cumulative total LCD
- ▶ Robust IP66/67 universal mount or DIN panel mount version
- ▶ Simple programming
- ▶ PIN protected programming
- ▶ Scaleable flow inputs
- ▶ Two stage control
- ▶ Automatic overrun compensation
- ▶ Missing pulse (*no flow*) alarm
- ▶ Maximum batch size limiting
- ▶ Non volatile memory
- ▶ Multiple batcher interlock function
- ▶ Remote Run, Stop, batch set, etc

Also available

- Batching systems
- Self powered totalisers
- Flow rate totalisers



Overview

The EB *Ecobatch* is a fully programmable high speed batch controller specifically designed to operate with common pulse producing flowmeters such as positive displacement, turbine, mass, vortex or magnetic style.

The instrument displays batch value, batch progress & cumulative total in engineering units as programmed by the user, it also logs the total number of batches performed and total volume dispensed.

Ecobatch scrolls messages to prompt the user at each stage of operation. Batch limiting and no-flow detection are "*safeguards*" against erroneously high batch entries, loss of the flow input signal or control valve or pump failure.

Control outputs

Two independent outputs can be programmed to provide stepped control at the start and/or end of each batch. DC powered models have two solid state control outputs, DIN models can be AC or DC powered and have two single pole double throw (SPDT) control 5A relays.

An Automatic Overrun Compensation feature corrects for any batch errors attributed to slow closing valves or flow rate variations.

Network interlocks

As many as 9 *Ecobatch* controllers may be networked together, typical applications are where one liquid is being dispensed to a number of outlets or a number of different liquids are being batched via one common flowmeter. *Ecobatch* will also take an "inhibit start" signal from other control or plant equipment.

Programming

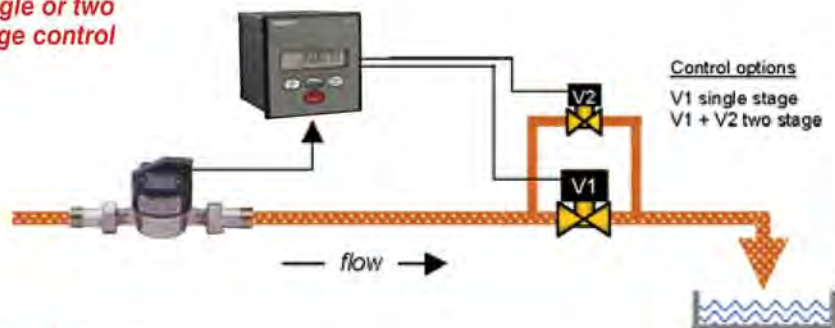
Simple PIN protected flow chart programming with English prompts guide you through the programming routine, greatly reducing the need to refer to the instruction manual.

Specifications

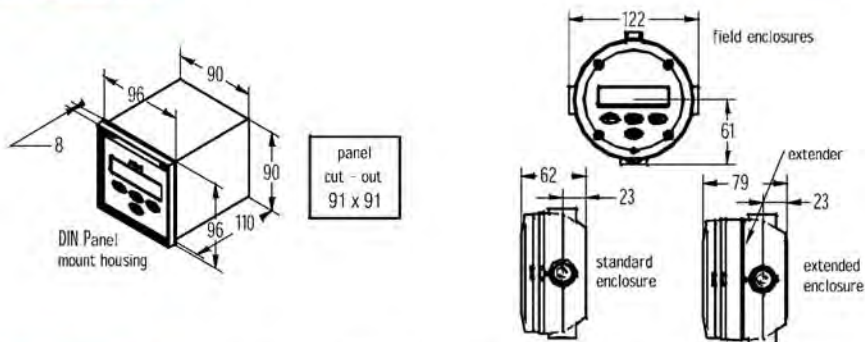
| | |
|---|---|
| Liquid crystal display (LCD) | 9mm high alpha numeric characters + subscripts |
| Batch & accumulated totals | 8 digit, programmable to 3 decimal places |
| Engineering units displayed | litres, gallons, m3, lbs, kgs or nil eng. units displayed |
| Input types (pulse & frequency) | reed switch, open collector, coil (15mV P-P min.), current, voltage, namur & other proximities. Max. frequency 10Khz |
| Input scaling range | 0.001~9,999,999.999 with 3 floating decimal points |
| Control outputs (field mount) | Two 1A NPN open collectors, 24Vdc max. |
| (panel mount) | Two SPDT 5A relays (with DIN versions) |
| Alarm output (no flow alarm) | 1A open collector (NPN/PNP selectable), 24Vdc max. |
| Operating temperature | -10~+80°C (14~176°F), refer factory for higher / lower temp. |
| Power requirements | 12~24Vdc, 50mA, 95~260Vac (DIN version) |
| Status interlocks | Batch status output, batch inhibit input, network looping |
| Enclosures (two styles) | IP66/67 (NEMA 4X) GRN field mount or DIN panel mount |
| Mounting | meter mount, wall, surface, pipe or panel mount |
| Batching systems example (see front page photo) | Ecobatch with flowmeter & control valve eg: UM020 system 1~70 L/min, 10 bar, 90°C (0.3-18 Usgpm, 145psi, 195°F) |

IN THE INTEREST OF CONTINUED PRODUCT DEVELOPMENT THE DESIGN & SPECIFICATIONS MAY ALTER WITHOUT NOTICE

Single or two stage control



Dimensions (mm)



Ordering codes (# = electrical entries: 1 = M20, 2 = 1/2" NPT, 0 = DIN housing with terminals)

| | | | |
|-----------------------------------|--|---|-------------|
| FMEB10# | Single & two stage high speed batch controller (cumulative & batch totals) | | |
| Input type | | | |
| D | digital (pulse or frequency) | | |
| Power supply (*PM version only) | | | |
| 0 | 12~24Vdc, 50mA | 1 | *95~135Vac |
| | | 2 | *190~260Vac |
| Housing type | | | |
| FM | universal mount (field, surface, pipe, wall, stem or panel mount) | | |
| MM | integral meter mount | | |
| PM | DIN panel mount 91 x 91mm (3.6 x 3.6") cut out | | |
| FE | DIN mount field enclosure IP66 (NEMA 4x) | | |

Refer factory for mounting accessories.



wall - surface mount



DIN mount field enclosure



meter mount



meter mount



flow rate totaliser

battery totaliser

other instruments

Y STRAINERS FOR OVAL GEAR METERS

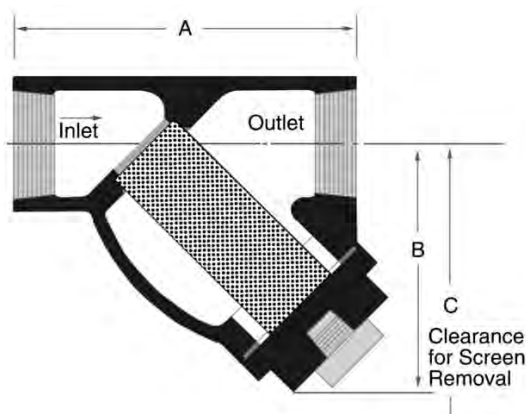
REFERENCE

Y STRAINER – SPECIFICATIONS

| | | |
|-------------------------------|--------------------|----------|
| Blow-off Fitting: | 1/4 inch: | 1/4" NPT |
| | 1/2 inch: | 1/4" NPT |
| | 3/4 inch: | 1/4" NPT |
| | 1 inch: | 1/2" NPT |
| | 1-1/4 inch: | 1/2" NPT |
| | 1-1/2 inch: | 1/2" NPT |
| | 2 inch: | 1/2" NPT |
| Screen Standard: | 1/4 inch: | 200 mesh |
| | 1/2 inch: | 60 mesh |
| | 3/4 inch: | 60 mesh |
| | 1 inch: | 60 mesh |
| | 1-1/4 inch: | 60 mesh |
| | 1-1/2 inch: | 60 mesh |
| | 2 inch: | 60 mesh |
| Screen Opening (inch): | 1/4 inch: | 0.011" |
| | 1/2 inch: | 0.032" |
| | 3/4 inch: | 0.032" |
| | 1 inch: | 0.032" |
| | 1-1/4 inch: | 0.032" |
| | 1-1/2 inch: | 0.032" |
| | 2 inch: | 0.032" |
| Shipping Weight: | 1/4 inch: | 4 lbs. |
| | 1/2 inch: | 4 lbs. |
| | 3/4 inch: | 5 lbs. |
| | 1 inch: | 6 lbs. |
| | 1-1/4 inch: | 8 lbs. |
| | 1-1/2 inch: | 10 lbs. |
| | 2 inch: | 18 lbs. |

PART NUMBERS & DIMENSIONS

| Part Number | Size | A | B | C |
|-------------|-------------|--------|---------|--------|
| 125700-01 | 1/4 inch: | 3-1/4" | 2-3/16" | 3" |
| 125700-02 | 1/2 inch: | 3-1/4" | 2-3/16" | 3" |
| 125700-03 | 3/4 inch: | 3-5/8" | 2-3/4" | 3-1/4" |
| 125700-04 | 1 inch: | 4-1/4" | 3-3/16" | 4-1/8" |
| 125700-05 | 1-1/4 inch: | 5-1/4" | 3-7/8" | 5" |
| 125700-06 | 1-1/2 inch: | 6-1/4" | 4-3/4" | 5-7/8" |
| 125700-07 | 2 inch: | 7-5/8" | 6" | 8-1/8" |



Oval Gear Meters work best with clean fluid, free of debris. GPI carries Y Strainers to fit most models of Oval Gear Meters. These strainers range from 1/4 in. to 2 in. models. All sizes come complete with blow-off and plug.

Select Your Strainer Size:

1/4 inch 1/2 inch 3/4 inch 1 inch
1-1/4 inch 1-1/2 inch 2 inch



Features and Benefits:

- ✓ Machined, tapered seat ensures a perfect fit for the removable, 316 Stainless Steel screen.
- ✓ 316 Stainless Steel body and all screens are 316 Stainless Steel.
- ✓ All sizes come complete with blow-off and plug. These can be replaced with ball valve for on-line blow-down of particulate.
- ✓ Rated for up to 1480 PSI at 100° F for water, oil or gas.
- ✓ Female NPT threads.

CLARK

200 Series Vortex Flow Transmitter

Frequency Output, 1/4" to 1.0" Pipe Sizes, Rugged Molded PPA Construction

DESCRIPTION

The series 200 vortex flow transmitters are designed with equipment manufacturers in mind and are an excellent economical choice for system flow monitoring and control.

The transmitters work on the principle of Kármán's vortex trail, named after Theodore von Kármán's mathematical description of the phenomenon. Vortex shedding flowmeters present the flow in a pipe with an obstruction/bluff in the flowmeter body. As velocity increases, alternating vortices are formed on each side of the bluff body and travel downstream.

The 200 series utilize piezoelectric sensors embedded in a ETFE vane located downstream of the bluff to detect the generated vortices. The frequency measured represents the flow velocity. A flow factor is provided to convert frequency to volume flow rate for each model size.

The minimum measured flow rate is dependent on the viscosity of the fluid.

Versions with a 1000 Ohm RTD temperature sensor built-in to the bluff are available.

SPECIFICATIONS

Medium: Suitable for water & water glycol based heat exchange systems with the usual additives and other fluids compatible with the materials of construction (consult factory). For media with viscosity greater than 2 millipascal seconds (2 centipoise), higher flow rates are required to form vortices raising the minimum measurable flow rate value.

Flow ranges: From 0.24 to 39.6 GPM (0.9 ... 150 litres per minute). See Table 2.

Temperature measurement: Optional PT1000 RTD imbedded in flow sensor bluff
Measure range -40°F to +302°F (-40 to > +150 °C)
1000.00 Ohm @ 32°F (0 °C)
1573.25 Ohm @ 302°F (150 °C)

Temperature: Ambient: 5° to 185°F (-15 to + 85 °C)
In storage: -22° to 185°F (-30 to + 85 °C)

Max. pressures and medium temperature:

Table 1

| psi | bar | °F | °C | Duration |
|-----|-----|-----|-----|-----------|
| 174 | 12 | 104 | 40 | Lifetime |
| 87 | 6 | 212 | 100 | Lifetime |
| 58 | 4 | 257 | 125 | 600 hours |
| 58 | 4 | 284 | 140 | 2 hours |

Max. test pressure: 261 psi/18 bar at 104°F/40 °C

Loss of pressure / cavitation: A minimum inlet pressure of 10.2 psi (0.7 bars) is required to avoid cavitation issues at maximum flow.

Wetted materials:

Sensor vane: ETFE

Sealing material: EPDM

Flow sensor and bluff:

ASTM- PPA, Polyphthalamide

ISO-PA6T/6i, Grivory 40%GF

Power supply: 5 VDC (4.75 to 5.25)



Features

- Low cost product with high levels of accuracy
- Temperature insensitive measuring principle
- Excellent media resistance (measuring element not in contact with the media)
- Minimal pressure loss
- Measuring element not sensitive to debris
- Direct temperature measurement in the medium

Output: Square pulse frequency 0 / 5 VDC (The signal frequency depends on the nominal diameter, see order)

Signal amplitude at $U_{IN}=5.0$ V:

Load > 10 kOhm against IN < 0.1 ... 5.0 V

Current consumption: < 4 mA

Response time: A high accuracy of flow rate is detected within 100 ms.

Electrical connection: 3-pole connector (without temperature output), RAST 2.5 (AMP DUO PLUG 2.5™ is recommended mating connector.) M12x1, 5-pole circular receptacle provided for temperature output option. See accessories for cable assembly offerings

Polarity reversal protection: Mechanically protected

Protection class: IP20, IP65 (M12x1 only)

Mounting position: In principle universal. We recommend that, when the sensor is mounted in horizontal pipe runs that the electrical connection/sensor assembly be mounted off vertical (3 o'clock or 9 o'clock best).

Piping connection fittings: See tables 5, 6 & 7 for standard selection of types & sizes. Special fittings can be produced by Clark or the customer.

Accuracy:

Accuracy specifications are valid for media with a viscosity < 2 centipoise (2 millipascal seconds):
For water in temperature range 41 to 212°F (5 to 100°C) or for water with maximum 20% glycol at ≥ 77°F (> 25°C)

Up to 50% fs: ≤ 1% fs

From 50% fs: ≤ 2% of measured value

Temperature measurement accuracy:

PT 1000 for DIN EN 60751 Class B
 ± 0.8°F @ 68° (± 0.45 °C @ 20 °C)
 ± 1.4°F @ 190°F (± 0.75 °C @ 90 °C)

Packaging:

Packaged singly (standard) or in multiple blister packs
 Blister packs:
 DN 8, 10 and 15 Blister packs each containing 30 pcs
 DN 20 and 25 Blister packs each containing 20 pcs

Table 2- Models

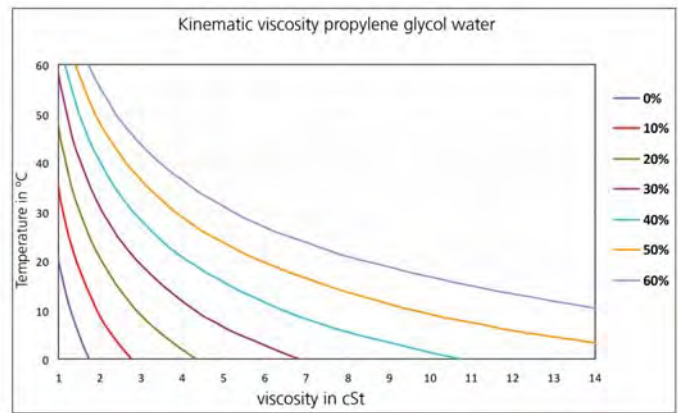
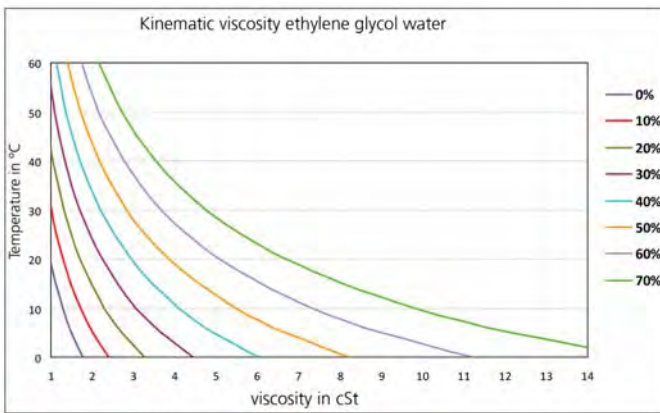
| Size | Pipe Size | Full Scale Range (Gal/min) | Full Scale Range (l/min) | Approximate Frequency Range (Hz) | Calibration Factor/Formula Q= volume flow in LPM f=Hz | Approx. Weight |
|------|-----------|----------------------------|--------------------------|----------------------------------|---|------------------|
| DN8 | 1/4" | 0.238 to 3.96 | 0.9 to 15.0 | 31 to 399 | Q= 0.0383*f-0.3 | 0.1 lbs (47g) |
| DN10 | 3/8" | 0.476 to 8.45 | 1.8 to 32.0 | 24 to 383 | Q= 0.0841*f-0.2 | 0.13 lbs (57 g) |
| DN15 | 1/2" | 0.925 to 13.20 | 3.5 to 50.0 | 20 to 270 | Q= 0.1861*f-0.2 | 0.15 lbs (68 g) |
| DN20 | 3/4" | 1.32 to 22.50 | 5.0 to 85.0 | 14 to 227 | Q= 0.3751*f-0.3 | 0.20 lbs (92 g) |
| DN25 | 1" | 2.38 to 39.6 | 9.0 to 150.0 | 12 to 204 | Q= 0.7370*f-0.2 | 0.22 lbs (100 g) |

Characteristic line Formulas:

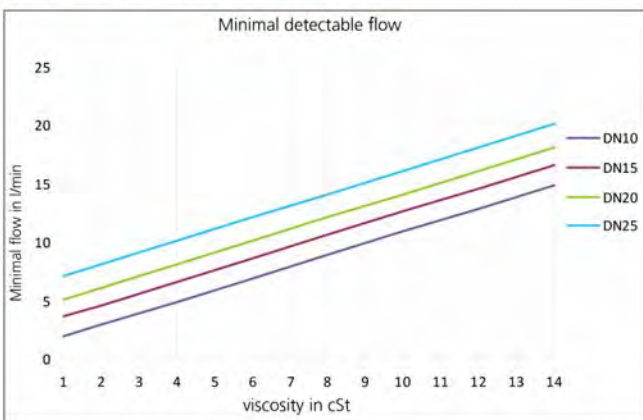
Frequency Output- $Q_v = K_f * f + Q_0$
 Quantity per Pulse (liters/pulse)- Quantity/Pulse= $Q_v * K_f / 60 * (Q_v - Q_0)$
 Current Output- $Q_v = K_1 * (I_{out} - 4 \text{ mA})$
 Voltage Output- $Q_v = K_u * U_{out}$

| | | |
|-----------|------------------------------|--------------|
| Q_v | Volume Flow Rate | [l/min] |
| Q_0 | Axis Intercept | [l/min] |
| K_f | Coefficient Frequency Output | [(l/min)/f] |
| K_u | Coefficient Voltage Output | [(l/min)/V] |
| K_1 | Coefficient Current Output | [(l/min)/f] |
| f | Frequency | [Hz] |
| U_{out} | Voltage | [V] |
| I_{out} | Current | [mA] |
| Qty/Pulse | Quantity per Pulse | liters/pulse |

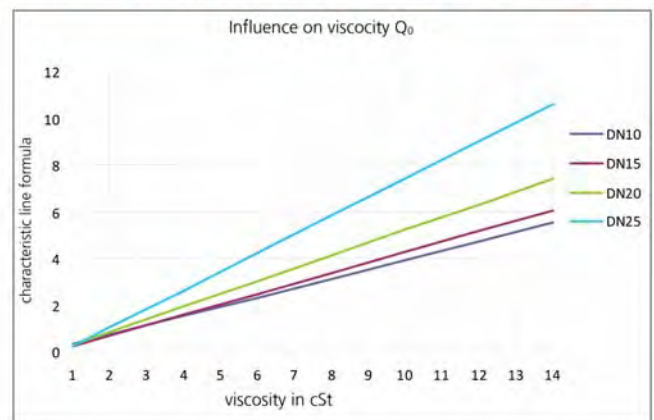
Influence of Glycol: Following definitions correct the influence of media with higher viscosity than water (media viscosity (v) > 1.8 cSt. Corrections result in measuring accuracy of 3% FS in range of 1.8-4 cSt & 4% FS in the range of 4-14 cSt.



Definition of respond threshold Q_{min}



Definition of characteristic line formula $Q = k * f - Q_0$



Response threshold Q_{min} (minimum flow in l/min)

DN 10: $Q_{min} = v + 0.8$
 DN 15: $Q_{min} = v + 2.5$
 DN 20: $Q_{min} = v + 4$
 DN 25: $Q_{min} = v + 6$

(Multiply liters x 0.264 to convert to gallons)

Formula characteristic line for $Q > Q_{min}$ in l/min

Frequency output:
 DN10: $Q = 0.0832 * f - 0.40v + 0.20$
 DN15: $Q = 0.1843 * f - 0.45v + 0.25$
 DN20: $Q = 0.3754 * f - 0.55v + 0.25$
 DN25: $Q = 0.7467 * f - 0.80v + 0.60$
 Voltage output 0 ...10V
 DN10: $Q = 3.2 * U_{out} - 0.40v + 0.40$
 DN15: $Q = 5.0 * U_{out} - 0.45v + 0.45$
 DN20: $Q = 8.5 * U_{out} - 0.55v + 0.55$
 DN25: $Q = 15.0 * U_{out} - 0.80v + 0.80$

Current output 4 ... 20 mA (I in mA)
 DN10: $Q = 2.000 * (I - 4 \text{ mA}) - 0.40v + 0.40$
 DN15: $Q = 3.125 * (I - 4 \text{ mA}) - 0.45v + 0.45$
 DN20: $Q = 5.313 * (I - 4 \text{ mA}) - 0.55v + 0.55$
 DN25: $Q = 9.375 * (I - 4 \text{ mA}) - 0.80v + 0.80$

DIMENSIONS DN 8, 10, 15, 20

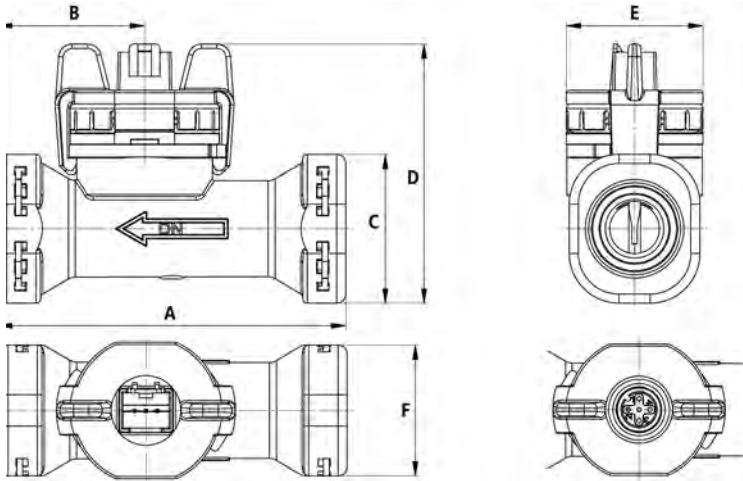


Table 3

Dimensions do not include fittings- see following tables for standard fitting offerings

| Size | A inches(mm) | B inches(mm) | C inches(mm) | D inches(mm) | E inches(mm) | f inches(mm) |
|------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|
| DN8 | 2.83 (72) | 1.16 (29.5) | 1.30 (32.9) | 2.32 (59) | 1.19 (30.2) | 1.14 (28.9) |
| DN10 | 3.03 (77) | 1.28 (32.5) | 1.30 (32.9) | 2.26 (57.3) | 1.19 (30.2) | 1.14(28.9) |
| DN15 | 3.23 (82) | 1.28 (32.5) | 1.54 (39) | 2.46 (62.4) | 1.19 (30.2) | 1.30 (33) |
| DN20 | 4.13 (105) | 1.55 (39.3) | 1.19 (43) | 2.61 (66.3) | 1.19 (30.2) | 1.47 (37.4) |

DIMENSIONS DN 25

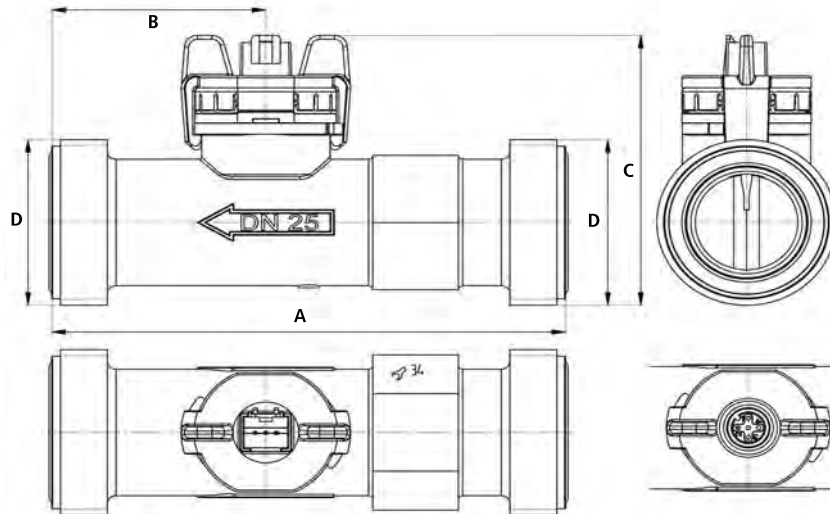


Table 4

| Size | A inches(mm) | B inches(mm) | C inches(mm) | D BSPP Male Pipe Thread |
|------|-----------------|-----------------|-----------------|----------------------------|
| DN25 | 120 (4.72) | 1.97 (50) | 2.69 (68.3) | G1 1/4 |

PIPING CONNECTIONS

The 200 series offers great flexibility with respect to piping connections. Inserting and removing fittings for pipe sizes to 3/4" is easy. A clip secures the end fitting to the flow sensor and an o-ring provides the seal. OEM clients may wish to produce fittings according to their own design needs.

The 1" size model (DN25) has metric G1 1/4 male threads molded integral to the sensor body and is supplied with two EPDM sealing o-rings. 1" NPT 303 SS and polypropylene adaptors are available (see Table 7).

THREADED ADAPTERS

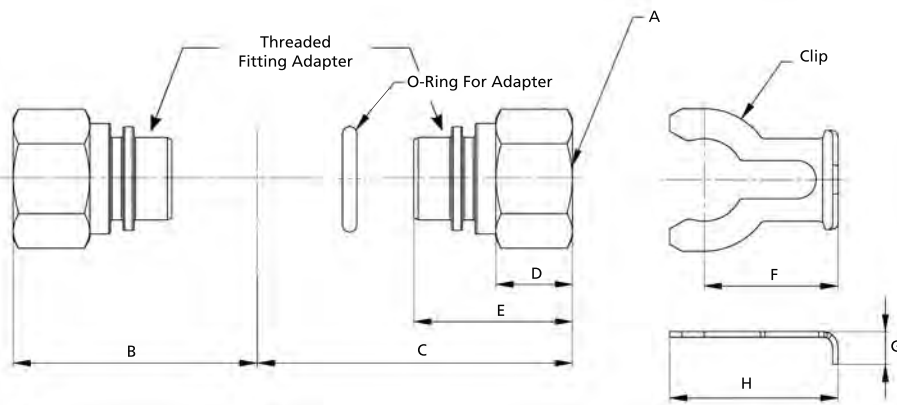


Table 5: Stainless Threaded Adapters (1/4"-3/4" NPT) & Clip Table

| Size | Clip Part Number | O-Ring Part Number (Material) | Threaded Adapter Part Number | *Material | A | B inches (mm) | C inches (mm) | **D inches (mm) | E inches (mm) | F inches (mm) | g inches (mm) | H inches (mm) |
|------|------------------|-------------------------------|------------------------------|-----------|----------|---------------|---------------|-----------------|---------------|---------------|---------------|---------------|
| DN8 | C810 | R810E (EPDM) | ADS1/4 | 303 SS | 1/4" NPT | 1.76 (44.65) | 2.27 (57.65) | 0.551 (14) | 1.14(29) | 0.965 (24.5) | 0.236 (6) | 1.21 (30.8) |
| DN10 | C810 | R810E (EPDM) | ADS3/8 | 303 SS | 3/8" NPT | 1.87 (47.55) | 2.35 (59.65) | 0.551 (14) | 1.142 (29) | 0.965 (24.5) | 0.236 (6) | 1.21 (30.8) |
| DN15 | C15 | R15E (EPDM) | ADS1/2 | 303 SS | 1/2" NPT | 1.97 (50.05) | 2.64 (67.05) | 0.646 (16.4) | 1.260 (32) | 1.1 (28) | 0.191 (4.85) | 1.36 (34.5) |
| DN20 | C20 | R20E (EPDM) | ADS3/4 | 303 SS | 3/4" NPT | 2.32 (58.85) | 3.36 (85.25) | 0.731(18.6) | 1.499 (37.8) | 1.1 (28) | 0.315 (8) | 1.36 (34.5) |

*Contact us for other materials or details on how to make your own fittings

**The overall length of the flow sensor is increased by approximately twice this value

Table 6: Brass Solder Adapters

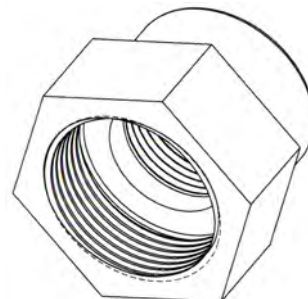
| Size | Clip Part Number | O-Ring Part Number (Material) | Adapter Part Number | Material | Standard Tubing Size (For Use With Type K & Type L Copper Tubing) |
|------|------------------|-------------------------------|---------------------|-----------|---|
| DN8 | C810 | R810E (EPDM) | SADB1/4 | 360 Brass | 1/4" |
| DN10 | C810 | R810E (EPDM) | SADB3/8 | 360 Brass | 3/8" |
| DN15 | C15 | R15E (EPDM) | SADB1/2 | 360 Brass | 1/2" |
| DN20 | C20 | R20E (EPDM) | SADB3/4 | 360Brass | 3/4" |



Table 7: DN25 BSP to NPT Adapters

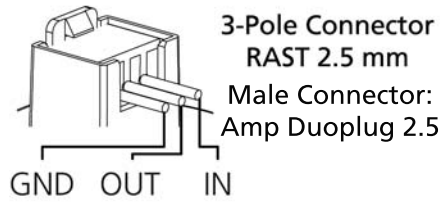
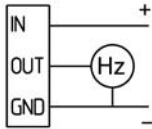
| *Size | Description | Material |
|----------|---------------------------------|---------------------|
| ADSG1NPT | Adapter G1-1/4 to 1" NPT Female | 303 Stainless Steel |
| ADPG1NPT | Adapter G1-1/4 to 1" NPT Female | Polypropylene |

* Two R25E EPDM sealing o-rings are supplied with model DN25

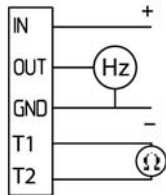


WIRING

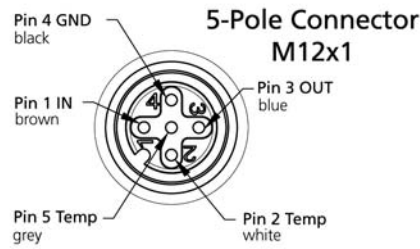
Without RTD Temp Sensor



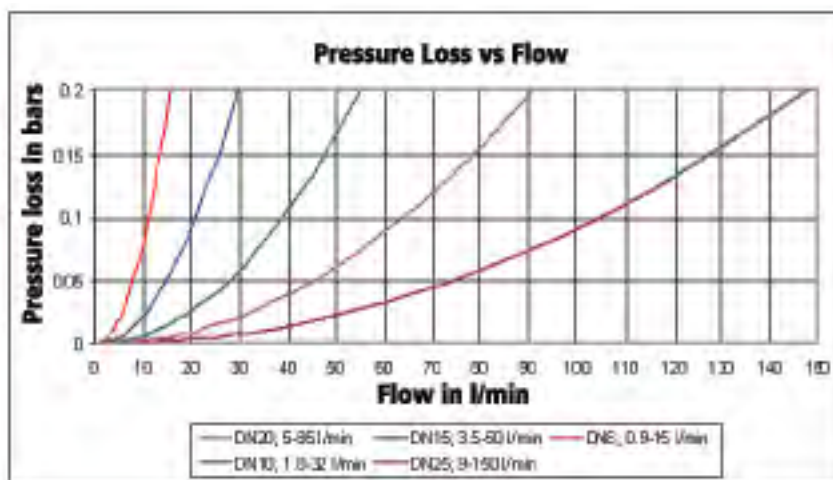
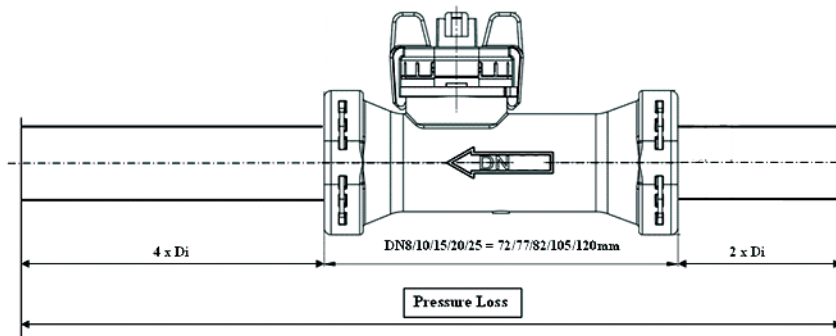
Install a 10K Pull-up Resistor
Between "in" & "OUT"



With RTD Temp Sensor



PRESSURE LOSS



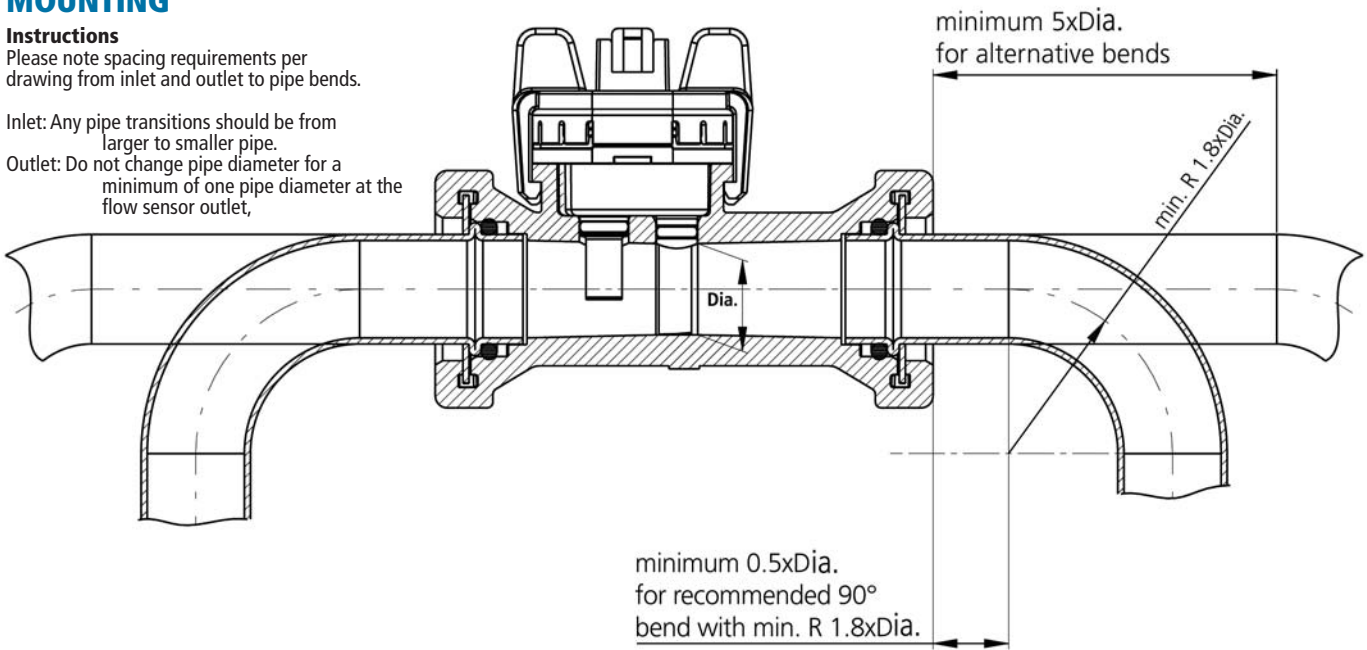
MOUNTING

Instructions

Please note spacing requirements per drawing from inlet and outlet to pipe bends.

Inlet: Any pipe transitions should be from larger to smaller pipe.

Outlet: Do not change pipe diameter for a minimum of one pipe diameter at the flow sensor outlet,



ORDERING INFORMATION

1) Order flow sensor model from table 7 -ABCDEF

Example: 20091000

2) Order End Connection adapters, O-rings and adapter clips

| A Model | B Version | C Size | E Electrical Connection | F Seal Material |
|---------|---|--|--|---|
| 200 | 9=Flow 8=Flow & Temperature (1000 Ohm RTD) | 08=DN8 10=DN10 15=DN15 20=DN20 25=DN25 | 00=3-Pole RAST 2.5 14= 3-Pole M12X1 circular connector 15= 5-Pole M12X1 circular connector | DN8 to DN20- Order Separately from Table 9 1=EPDM (Included with DN25) |

| Size | Connection Adapter (Two Required) | O-rings (Two Required) | Adapter Clips (Two Required) |
|------|-----------------------------------|---|--------------------------------|
| DN8 | Select from Table 6 or Table 7 | Select from Table 6 or Table 7 | Select from Table 6 or Table 7 |
| DN10 | | | |
| DN15 | | | |
| DN20 | | | |
| DN25 | Select from Table 8 | Two R25E o-rings supplied standard with flow sensor, adapter clips not used on this model | |

| Part Number | Description |
|---------------|---|
| Electrical | |
| 111668 | Amp Duoplug 2.5, 3-pole plug with 11.80" (30 cm) cable (Old Part Number ECAD2.530) |
| 101817 | Amp Duoplug 2.5, 3-pole plug with 43.3" (110 cm) cable (Old Part Number ECAD2.5110) |
| 114605 | M12x1 straight circular connector, 3-pole plug with 78.7" (200 cm) cable |
| 114564 | M12x1 straight circular connector, 5-pole plug with 78.7" (200 cm) cable (Old Part Number ECM125) |
| Fitting Clips | |
| C810 | For DN8 and DN10 |
| C15 | For DN15 |
| C20 | For DN20 |
| O-Rings | |
| R810E | EPDM, AS568-113 |
| R15E | EPDM, AS568-909 |
| R20E | EPDM, AS568-118 |
| R25E | EPDM, 31 mm dia. x 3 mm wall |

| Part Number | Description |
|---------------------------------------|---|
| Connection Adapter Fittings- Threaded | |
| ADS1/4 | Model DN8 Stainless Steel Adapter, 1/4" NPT Female |
| ADS3/8 | Model DN10 Stainless Steel Adapter, 3/8" NPT Female |
| ADS1/2 | Model DN15 Stainless Steel Adapter, 1/2" NPT Female |
| ADS3/4 | Model DN20 Stainless Steel Adapter, 3/4" NPT Female |
| ADSG1NPT | Stainless Steel Adapter G1-1/4 to 1" NPT Female |
| ADPG1NPT | Polypropylene Adapter G1-1/4 to 1" NPT Female |
| Connection Adapter Fittings- Soldered | |
| SADB1/4 | Model DN8 to 1/4" copper tubing |
| SADB3/8 | Model DN10 to 3/8" copper tubing |
| SADB1/2 | Model DN15 to 1/2" copper tubing |
| SADB3/4 | Model DN20 to 3/4" copper tubing |
| O-Rings | |
| R810E | EPDM, AS568-113 |
| R15E | EPDM, AS568-909 |
| R20E | EPDM, AS568-118 |
| R25E | EPDM, 31 mm dia. x 3 mm wall |

CLARK

210 Series Vortex Flow Transmitter

Frequency & Analog Output, 1/4" to 1.0" Pipe Sizes, Rugged PPA Construction

DESCRIPTION

In comparison to the OEM flow sensor type 200, the type 210 is available with an increased range of power supply and output signals all with and without temperature measurement.

With no moving parts the flow sensor is not sensitive to debris, has marginal pressure loss and high accuracy.

Versions with a 1000 Ohm RTD temperature sensor built-in to the bluff are available.

SPECIFICATIONS

Medium: Suitable for water & water glycol based heat exchange systems with the usual additives and other fluids compatible with the materials of construction (consult factory). For media with viscosity greater than 2 millipascal seconds (2 centipoise), higher flow rates are required to form vortices raising the minimum measurable flow rate value.

Flow ranges: From 0.24 to 39.6 GPM (0.9 ... 150 litres per minute). See Table 3.

Temperature measurement: Optional PT1000 RTD imbedded in flow sensor bluff
 Measure range -40°F to +302°F (-40 to > +150 °C)
 1000.00 Ohm @ 32°F (0 °C)
 1573.25 Ohm @ 302°F (150 °C)

Temperature: Ambient: 5° to 185°F (-15 to + 85 °C)
 In storage: -22° to 185°F (-30 to + 85 °C)

Max. pressures and medium temperature:

Table 1

| psi | bar | °F | °C | Duration |
|-----|-----|-----|-----|-----------|
| 174 | 12 | 104 | 40 | Lifetime |
| 87 | 6 | 212 | 100 | Lifetime |
| 58 | 4 | 257 | 125 | 600 hours |
| 58 | 4 | 284 | 140 | 2 hours |

Max. test pressure: 261 psi/18 bar at 104°F/40 °C

Loss of pressure / cavitation: A minimum inlet pressure of 10.2 psi (0.7 bars) is required to avoid cavitation issues at maximum flow.

Wetted materials:

Sensor vane: ETFE

Sealing material: EPDM

Flow sensor and bluff:

ASTM- PPA, Polyphthalamide

ISO-PA6T/6I, Grivory 40%GF

Power/Output Options:

Table 2

| | Square Pulse Frequency Output | Voltage Output | Current Output |
|--------------------------|--------------------------------|----------------|-------------------------------|
| Power (U _{in}) | 4.75-33 VDC | 11.5-33 VDC | 8-33 VDC |
| Signal | <0.5...>U _{in} -0.5 V | 0-10 V | 4-20 mA |
| Load Against GND | <1 mA/<100 nF | <6 mA/<100 nF | <(U _{in} -8 V)/20 mA |
| Current Consumption | <2 mA | <5 mA | - |



Features

- Low cost product with high levels of accuracy
- Temperature insensitive measuring principle
- Excellent media resistance (measuring element not in contact with the media)
- Minimal pressure loss
- Measuring element not sensitive to debris
- Direct temperature measurement in the medium

Response time: A high accuracy of flow rate is detected within 100 ms.

Electrical connection: 3-pole connector (without temperature output), RAST 2.5 (AMP DUO PLUG 2.5™ is recommended mating connector.) M12x1, 5-pole circular receptacle provided for temperature output option. See accessories for cable assembly offerings

Polarity reversal protection: Short circuit, reverse voltage and external voltage protected within the admissible supply voltage.

Protection class: IP20, IP65 (M12x1 only)

Mounting position: In principle universal. We recommend that, when the sensor is mounted in horizontal pipe runs that the electrical connection/sensor assembly be mounted off vertical (3 o'clock or 9 o'clock best).

Piping connection fittings: See tables 6, 7 & 8 for standard selection of types & sizes. Special fittings can be produced by Clark or the customer.

Accuracy:

Accuracy specifications are valid for media with a viscosity <2 centipoise (2 millipascal seconds):

For water in temperature range 41 to 212°F (5 to 100°C) or for water with maximum 20% glycol at ≥77°F (≥25°C)

Up to 50% fs: ≤ 1% fs

From 50% fs: ≤ 2% of measured value

Temperature measurement accuracy:

PT 1000 for DIN EN 60751 Class B
 ± 0.8°F @ 68° (± 0.45 °C @ 20 °C)
 ± 1.4°F @ 190°F (± 0.75 °C @ 90 °C)

Packaging:

Packaged singly (standard) or in multiple blister packs
 Blister packs:
 DN 8, 10 and 15 Blister packs each containing 30 pcs
 DN 20 and 25 Blister packs each containing 20 pcs

Table 3- Model Size Selection

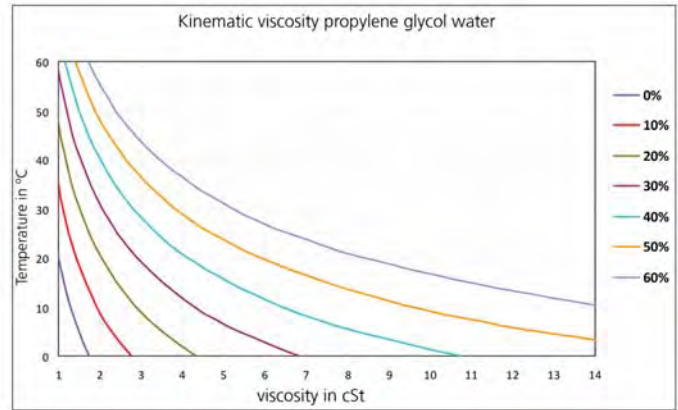
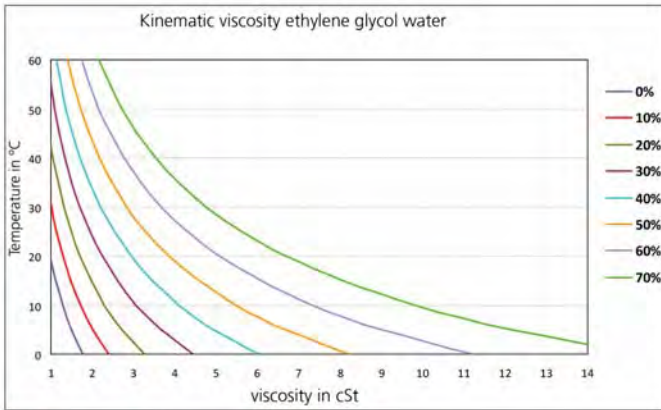
| Size | Pipe Size | Full Scale Range (Gal/min) | Full Scale Range (l/min) | Approximate Frequency Range (Hz) | Calibration Factor/Formula Q= volume flow in LPM f=Hz | Approx, Weight (Without End Fittings) |
|------|-----------|----------------------------|--------------------------|----------------------------------|---|---------------------------------------|
| DN8 | 1/4" | 0.238 to 3.96 | 0.9 to 15.0 | 31 to 399 | Q= 0.0383*f-0.3 | 0.1 lbs (47g) |
| DN10 | 3/8" | 0.476 to 8.45 | 1.8 to 32.0 | 24 to 383 | Q= 0.0841*f-0.2 | 0.13 lbs (57 g) |
| DN15 | 1/2" | 0.925 to 13.20 | 3.5 to 50.0 | 20 to 270 | Q= 0.1861*f-0.2 | 0.15 lbs (68 g) |
| DN20 | 3/4" | 1.32 to 22.50 | 5.0 to 85.0 | 14 to 227 | Q= 0.3751*f-0.3 | 0.20 lbs (92 g) |
| DN25 | 1" | 2.38 to 39.6 | 9.0 to 150.0 | 12 to 204 | Q= 0.7370*f-0.2 | 0.22 lbs (100 g) |

Characteristic line Formulas:

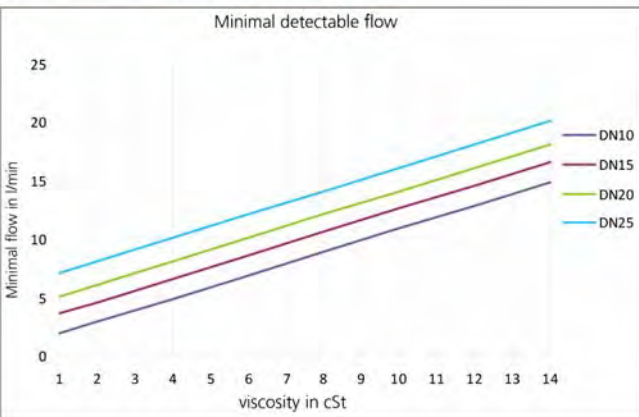
Frequency Output- $Q_v = K_f * f + Q_0$
 Quantity per Pulse (liters/pulse)- Quantity/Pulse= $Q_v * K_f / 60 * (Q_v - Q_0)$
 Current Output- $Q_v = K_i * (I_{out} - 4 \text{ mA})$
 Voltage Output- $Q_v = K_u * U_{out}$

| | | |
|-----------|------------------------------|--------------|
| Q_v | Volume Flow Rate | [l/min] |
| Q_0 | Axis Intercept | [l/min] |
| K_f | Coefficient Frequency Output | [(l/min)/f] |
| K_u | Coefficient Voltage Output | [(l/min)/V] |
| K_i | Coefficient Current Output | [(l/min)/f] |
| f | Frequency | [Hz] |
| U_{out} | Voltage | [V] |
| I_{out} | Current | [mA] |
| Qty/Pulse | Quantity per Pulse | liters/pulse |

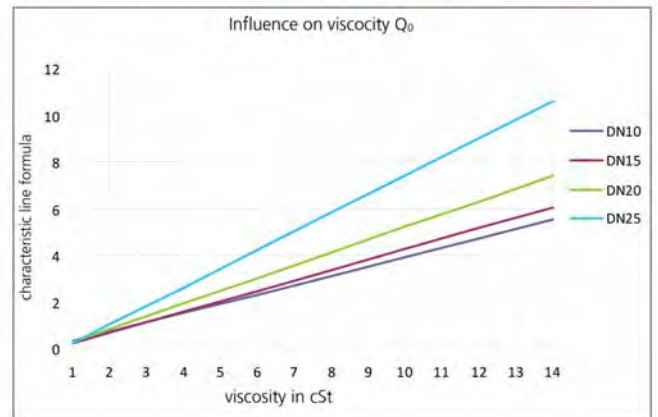
Influence of Glycol: Following definitions correct the influence of media with higher viscosity than water (media viscosity (v) > 1.8 cSt. Corrections result in measuring accuracy of 3% FS in range of 1.8-4 cSt & 4% FS in the range of 4-14 cSt.



Definition of respond threshold Q_{min}



Definition of characteristic line formula $Q = k * f - Q_0$



Response threshold Q_{min} (minimum flow in l/min)

DN 10: $Q_{min} = v + 0.8$
 DN 15: $Q_{min} = v + 2.5$
 DN 20: $Q_{min} = v + 4$
 DN 25: $Q_{min} = v + 6$

(Multiply liters x 0.264 to convert to gallons)

Formula characteristic line for $Q > Q_{min}$ in l/min

Frequency output:
 DN10: $Q = 0.0832 * f - 0.40v + 0.20$
 DN15: $Q = 0.1843 * f - 0.45v + 0.25$
 DN20: $Q = 0.3754 * f - 0.55v + 0.25$
 DN25: $Q = 0.7467 * f - 0.80v + 0.60$
 Voltage output 0 ... 10 V
 DN10: $Q = 3.2 * U_{out} - 0.40v + 0.40$
 DN15: $Q = 5.0 * U_{out} - 0.45v + 0.45$
 DN20: $Q = 8.5 * U_{out} - 0.55v + 0.55$
 DN25: $Q = 15.0 * U_{out} - 0.80v + 0.80$

Current output 4 ... 20 mA (I in mA)
 DN10: $Q = 2.000 * (I - 4 \text{ mA}) - 0.40v + 0.40$
 DN15: $Q = 3.125 * (I - 4 \text{ mA}) - 0.45v + 0.45$
 DN20: $Q = 5.313 * (I - 4 \text{ mA}) - 0.55v + 0.55$
 DN25: $Q = 9.375 * (I - 4 \text{ mA}) - 0.80v + 0.80$

DIMENSIONS DN 8, 10, 15, 20

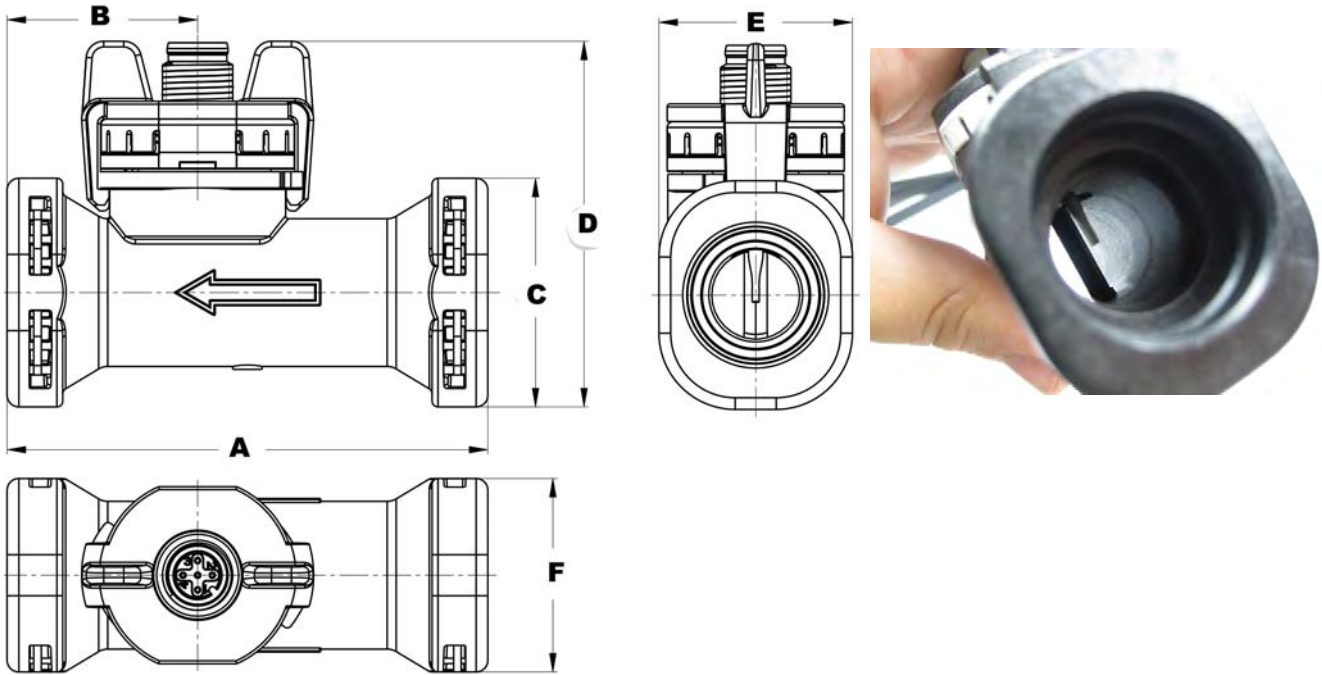


Table 4

Dimensions do not include fittings- see following tables for standard fitting offerings

| Size | A inches(mm) | B inches(mm) | C inches(mm) | D inches(mm) | E inches(mm) | f inches(mm) |
|------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|
| DN8 | 2.83 (72) | 1.16 (29.5) | 1.30 (32.9) | 2.32 (59) | 1.19 (30.2) | 1.14 (28.9) |
| DN10 | 3.03 (77) | 1.28 (32.5) | 1.30 (32.9) | 2.26 (57.3) | 1.19 (30.2) | 1.14(28.9) |
| DN15 | 3.23 (82) | 1.28 (32.5) | 1.54 (39) | 2.46 (62.4) | 1.19 (30.2) | 1.30 (33) |
| DN20 | 4.13 (105) | 1.55 (39.3) | 1.19 (43) | 2.61 (66.3) | 1.19 (30.2) | 1.47 (37.4) |

DIMENSIONS DN 25

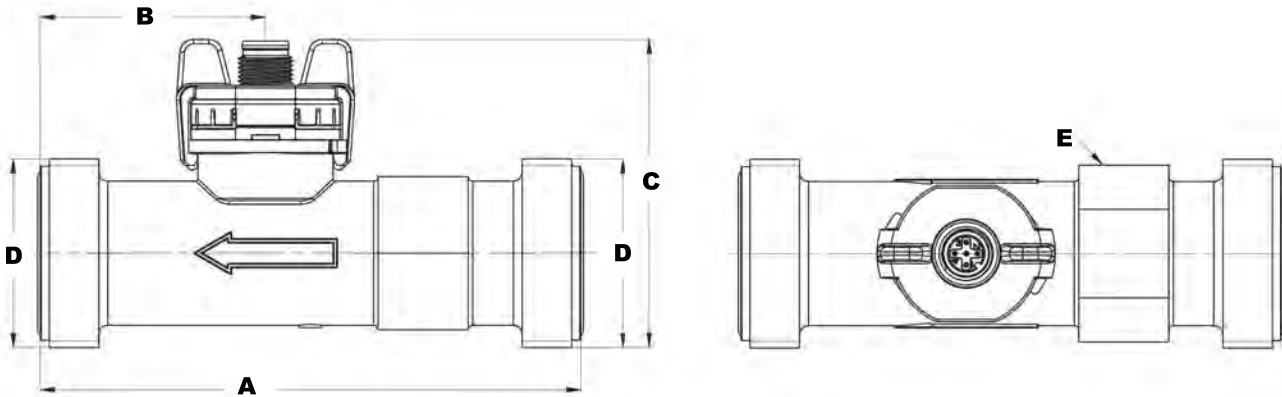


Table 5

| Size | A inches(mm) | B inches(mm) | C inches(mm) | D *BSPP Male Pipe Thread | E Wrench Flat | F inches(mm) |
|--|-----------------|-----------------|-----------------|-----------------------------|------------------|-----------------|
| DN25 | 120 (4.72) | 1.97 (50) | 2.69 (68.3) | G1 1/4 | 34 mm | 1.02 (26) |
| Minimum Locking Torque- 2.5 Nm Maximum Locking Torque- 15 Nm | | | | | | |

PIPING CONNECTIONS

The 210 series offers great flexibility with respect to piping connections. Inserting and removing fittings for pipe sizes to 3/4" is easy. A clip secures the end fitting to the flow sensor and an o-ring provides the seal. OEM clients may wish to produce fittings according to their own design needs.

The 1" size (DN25) has metric G1 1/4 male threads molded integral to the sensor body and is supplied with two EPDM sealing o-rings. 1" NPT 303 SS and polypropylene adaptors are available (see Table 7).

THREADED ADAPTERS

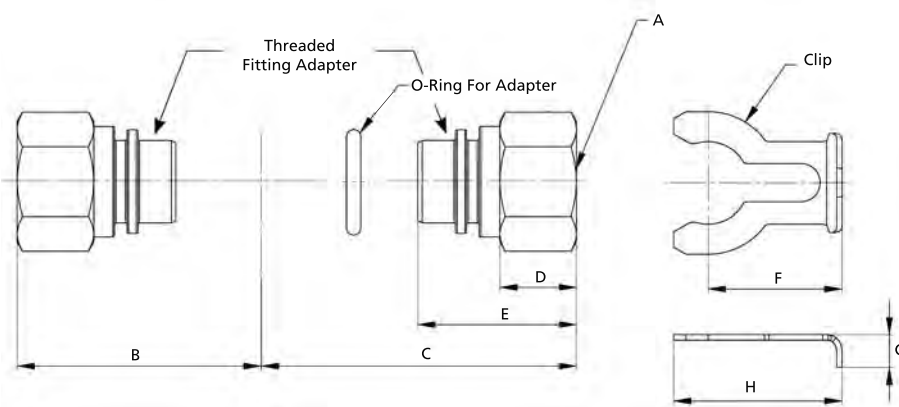


Table 6: Stainless Threaded Adapters (1/4"-3/4" NPT) & Clip Table

| Size | Clip Part Number | O-Ring Part Number (Material) | Threaded Adapter Part Number | *Material | A | B inches (mm) | C inches (mm) | **D inches (mm) | E inches (mm) | F inches (mm) | g inches (mm) | H inches (mm) |
|------|------------------|-------------------------------|------------------------------|-----------|----------|---------------|---------------|-----------------|---------------|---------------|---------------|---------------|
| DN8 | C810 | R810E (EPDM) | ADS1/4 | 303 SS | 1/4" NPT | 1.76 (44.65) | 2.27 (57.65) | 0.551 (14) | 1.14(29) | 0.965 (24.5) | 0.236 (6) | 1.21 (30.8) |
| DN10 | C810 | R810E (EPDM) | ADS3/8 | 303 SS | 3/8" NPT | 1.87 (47.55) | 2.35 (59.65) | 0.551 (14) | 1.142 (29) | 0.965 (24.5) | 0.236 (6) | 1.21 (30.8) |
| DN15 | C15 | R15E (EPDM) | ADS1/2 | 303 SS | 1/2" NPT | 1.97 (50.05) | 2.64 (67.05) | 0.646 (16.4) | 1.260 (32) | 1.1 (28) | 0.191 (4.85) | 1.36 (34.5) |
| DN20 | C20 | R20E (EPDM) | ADS3/4 | 303 SS | 3/4" NPT | 2.32 (58.85) | 3.36 (85.25) | 0.731(18.6) | 1.499 (37.8) | 1.1 (28) | 0.315 (8) | 1.36 (34.5) |

*Contact us for other materials or details on how to make your own fittings

**The overall length of the flow sensor is increased by approximately twice this value

Table 7: Brass Solder Adapters

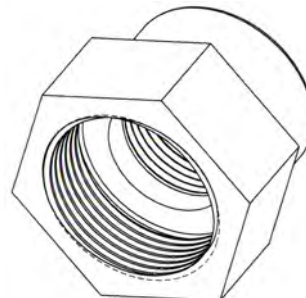
| Size | Clip Part Number | O-Ring Part Number (Material) | Adapter Part Number | Material | Standard Tubing Size (For Use With Type K & Type L Copper Tubing) |
|------|------------------|-------------------------------|---------------------|-----------|---|
| DN8 | C810 | R810E (EPDM) | SADB1/4 | 360 Brass | 1/4" |
| DN10 | C810 | R810E (EPDM) | SADB3/8 | 360 Brass | 3/8" |
| DN15 | C15 | R15E (EPDM) | SADB1/2 | 360 Brass | 1/2" |
| DN20 | C20 | R20E (EPDM) | SADB3/4 | 360Brass | 3/4" |



Table 8: DN25 BSP to NPT Adapters

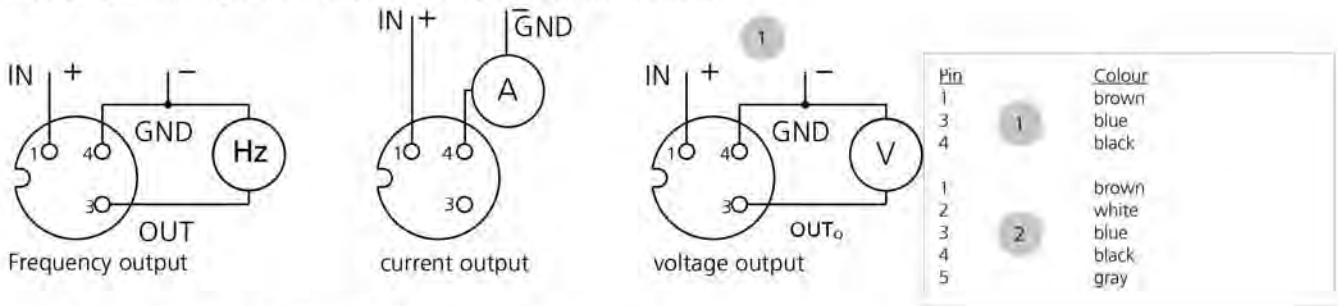
| *Model | Description | Material |
|----------|---------------------------------|---------------------|
| ADSG1NPT | Adapter G1-1/4 to 1" NPT Female | 303 Stainless Steel |
| ADPG1NPT | Adapter G1-1/4 to 1" NPT Female | Polypropylene |

* Two R25E EPDM sealing o-rings are supplied with model DN25

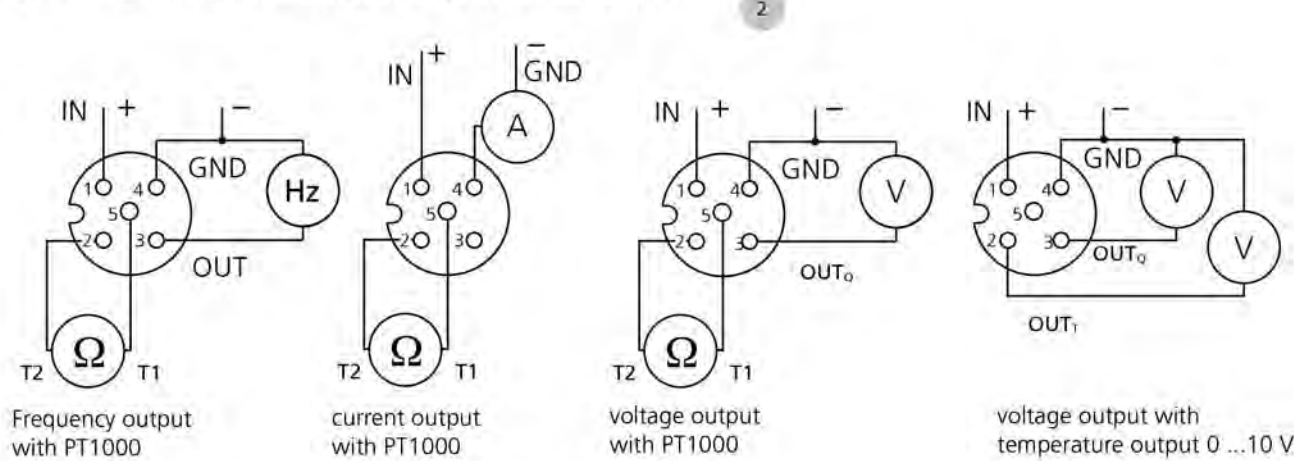


WIRING

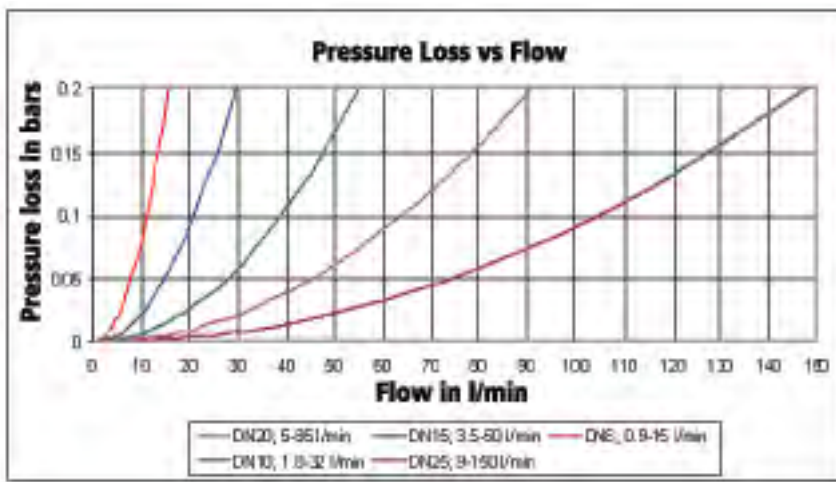
3-pole circular connection M12x1 without temperature measurement



5-pole circular connection M12x1 with temperature measurement



PRESSURE LOSS



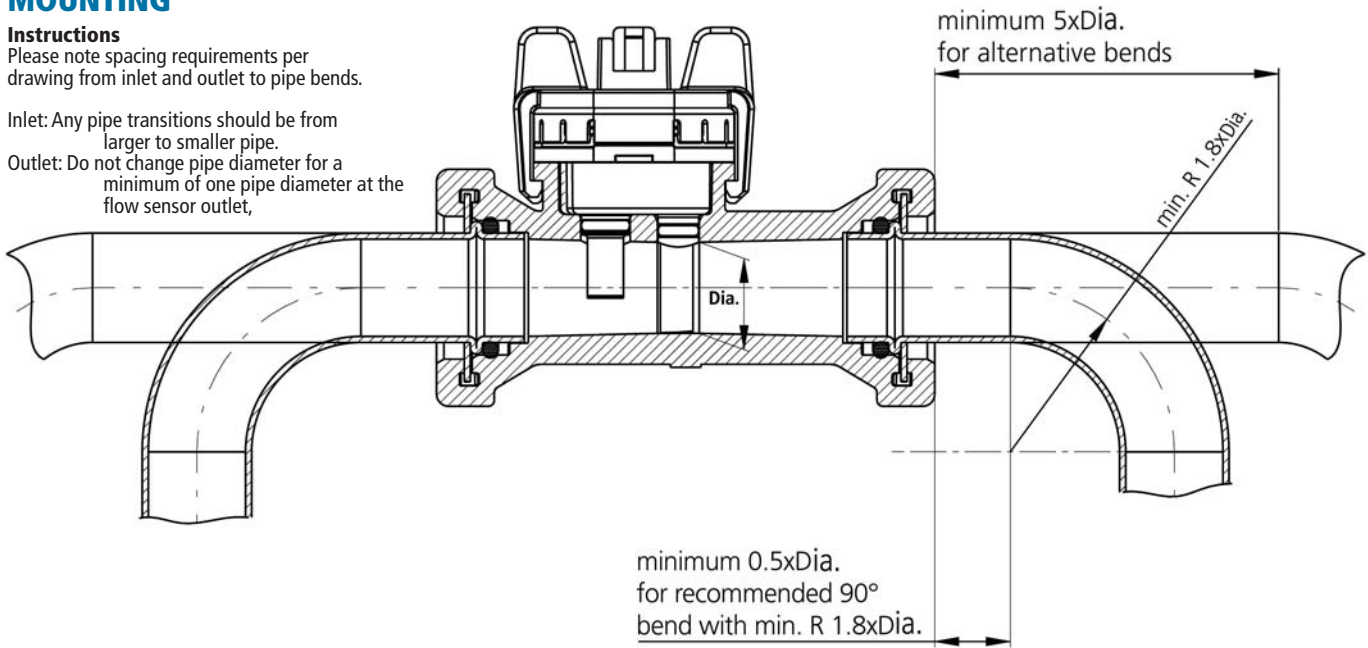
MOUNTING

Instructions

Please note spacing requirements per drawing from inlet and outlet to pipe bends.

Inlet: Any pipe transitions should be from larger to smaller pipe.

Outlet: Do not change pipe diameter for a minimum of one pipe diameter at the flow sensor outlet,



ORDERING INFORMATION

1) Order flow sensor model from table 7 -ABCDEF

Example: 21091044

2) Order End Connection adapters, O-rings and adapter clips

| A Model | B Version | C Size | D Output | E Electrical Connection | F Seal Material |
|---------|--|---|---------------------------------------|--|---|
| 210 | 9=Flow 8=Flow & Temperature (1000 Ohm RTD) | 08=DN8 10=DN10 15=DN15 20=DN20 | 2=Frequency 3= 0-10V 4= 4-20 mA | 4= 2 or 3 Pole M12X1 5= 4 or 5 Pole M12X1 | DN8 to DN20- Order Separately from Table 10 |
| | | 25=DN25 | | | 1=EPDM (Included with DN25) |

| Size | Connection Adapter (Two Required) | O-rings (Two Required) | Adapter Clips (Two Required) |
|------|-----------------------------------|---|--------------------------------|
| DN8 | Select from Table 6 or Table 7 | Select from Table 6 or Table 7 | Select from Table 6 or Table 7 |
| DN10 | | | |
| DN15 | | | |
| DN20 | | | |
| DN25 | Select from Table 8 | Two R25E o-rings supplied standard with flow sensor, adapter clips not used on this model | |

| Part Number | Description |
|--------------------------|--|
| Electrical | |
| 114604 | M12x1 straight circular connector, 3 pole plug with 78.7" (200 cm) cable |
| 114564 (Replaces ECM125) | M12x1 straight circular connector, 5 pole plug with 78.7" (200 cm) cable |
| Fitting Clips | |
| C810 | For DN8 and DN10 |
| C15 | For DN15 |
| C20 | For DN20 |
| O-Rings | |
| R810E | EPDM, AS568-113 |
| R15E | EPDM, AS568-909 |
| R20E | EPDM, AS568-118 |
| R25E | EPDM, 31 mm dia. x 3 mm wall |

| Part Number | Description |
|---------------------------------------|---|
| Connection Adapter Fittings- Threaded | |
| ADS1/4 | Model DN8 Stainless Steel Adapter, 1/4" NPT Female |
| ADS3/8 | Model DN10 Stainless Steel Adapter, 3/8" NPT Female |
| ADS1/2 | Model DN15 Stainless Steel Adapter, 1/2" NPT Female |
| ADS3/4 | Model DN20 Stainless Steel Adapter, 3/4" NPT Female |
| ADSG1NPT | Stainless Steel Adapter G1-1/4 to 1" NPT Female |
| ADPG1NPT | Polypropylene Adapter G1-1/4 to 1" NPT Female |
| Connection Adapter Fittings- Soldered | |
| SADB1/4 | Model DN8 to 1/4" copper tubing |
| SADB3/8 | Model DN10 to 3/8" copper tubing |
| SADB1/2 | Model DN15 to 1/2" copper tubing |
| SADB3/4 | Model DN20 to 3/4" copper tubing |

HUBA

212 Series Vortex Flow/Temp. Transmitter With Display

4-20 mA Output, 1/4" to 1.0" Pipe Sizes, Rugged PPA Construction

DESCRIPTION

Flow transmitter type 212 is based on the Vortex trail principle and incorporates a piezoelectric sensor element. The unit has a digital display indicating flow rate and the media temperature (when ordered with the optional temperature sensor).

With no moving parts, the flow sensor is not sensitive to debris, has marginal pressure loss and high accuracy.

Versions with a 1000 Ohm RTD temperature sensor built-in to the bluff are available.

SPECIFICATIONS

Medium: Suitable for water & water glycol based heat exchange systems with the usual additives and other fluids compatible with the materials of construction (consult factory). For media with viscosity greater than 2 millipascal seconds (2 centipoise), higher flow rates are required to form vortices raising the minimum measurable flow rate value.

Flow ranges: From 0.24 to 39.6 GPM (0.9 ... 150 litres per minute). See Table 3.

Temperature measurement: Optional sensor imbedded in flow sensor bluff

Measuring range: -4°F to +185°F (-20 to +85 °C)

Output: 4 to 14.5 mA

Accuracy: ±1°C

Temperature: Ambient: 4° to 122°F (-20 to +50 °C)

Media: < +185°F (+85 °C)

In storage: -22° to 176°F (-30 to +80 °C)

Max. pressures and medium temperature:

Table 1

| psi | bar | °F | °C | Duration |
|-----|-----|-----|-----|-----------|
| 174 | 12 | 104 | 40 | Lifetime |
| 87 | 6 | 212 | 100 | Lifetime |
| 58 | 4 | 257 | 125 | 600 hours |
| 58 | 4 | 284 | 140 | 2 hours |

Max. test pressure: 261 psi/18 bar at 104°F/40 °C

Loss of pressure / cavitation: A minimum inlet pressure of 10.2 psi (0.7 bars) is required to avoid cavitation issues at maximum flow.

Wetted materials:

Sensor vane: ETFE

Sealing material: EPDM

Flow sensor and bluff:

ASTM- PPA, Polyphthalamide

ISO-PA6T/6I, Grivity 40%GF

Power/Output Options:

Table 2

| | Flow Output | Temperature Output |
|---------------------|--------------------------------------|--|
| Power (U_{in}) | 10-30 VDC | 10-30 VDC |
| Signal | 4-20 mA | 4-14.5 mA |
| Load Against GND | $<(U_{in}-10\text{ V})/20\text{ mA}$ | $<(U_{in}-10\text{ V})/14.5\text{ mA}$ |
| Current Consumption | <50 mA | |



Features

- Low cost product with high levels of accuracy
- Temperature insensitive measuring principle
- Excellent media resistance (measuring element not in contact with the media)
- Minimal pressure loss
- Measuring element not sensitive to debris
- Direct temperature measurement in the medium

Response time:

Signal delay: < 2s

Response time: <500 ms

Display update rate: <500 ms

Electrical connection: 5-pole M12x1, circular receptacle

Polarity reversal protection: Short circuit, reverse voltage and external voltage protected within the admissible supply voltage.

Protection class: IP65 (M12x1)

Mounting position: In principle universal. We recommend that, when the sensor is mounted in horizontal pipe runs that the electrical connection/sensor assembly be mounted off vertical (3 o'clock or 9 o'clock best).

Piping connection fittings: See tables. Body style G has integral molded BSPP external threads supplied with EPDM seals. Body style N has field insertable fittings that are offered in a range of NPT threads and tube fittings. Special fittings can be produced by Clark or the customer.

Accuracy:

Accuracy specifications are valid for media with a viscosity <2 centipoise (2 millipascal seconds).

For water in temperature range 41 to 212°F (5 to 100°C) or for water with maximum 20% glycol at ≥77°F (≥25°C)

Up to 50% fs: ≤ 1% fs

From 50% fs: ≤ 2% of measured value

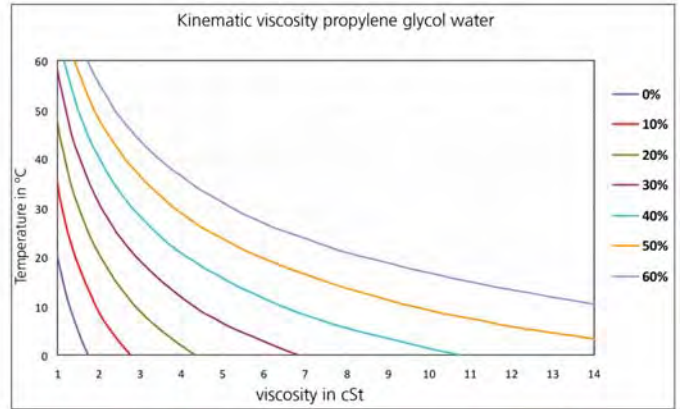
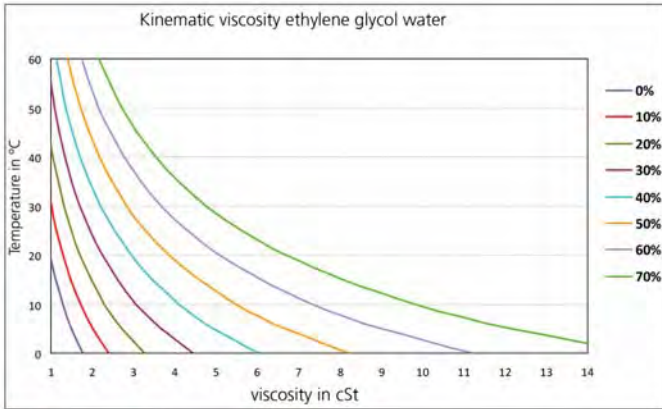
Packaging:

Packaged singly (standard) or in multiple packs

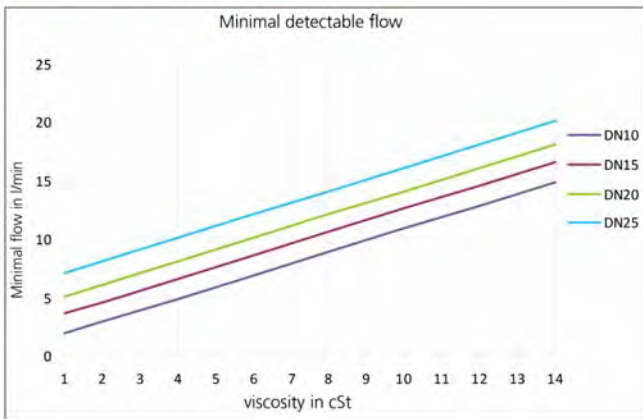
Table 3- Model Size Selection

| Size | Pipe Size | Full Scale Range (Gal/min) | Full Scale Range (l/min) | K ₁ (l/min/mA) | Approx. Weight |
|------|-----------|----------------------------|--------------------------|---------------------------|-------------------|
| DN8 | 1/4" | 0.238 to 3.96 | 0.9 to 15.0 | 0.938 | 0.2 lbs (90g) |
| DN10 | 3/8" | 0.265 to 10.6 | 1.8 to 32.0 | 2.000 | 0.23 lbs (105 g) |
| DN10 | 3/8" | 0.528 to 10.6 | 2.0 to 40.0 | 2.500 | 0.23 lbs (105 g) |
| DN15 | 1/2" | 0.925 to 13.20 | 3.5 to 50.0 | 3.125 | 0.25 lbs (115 g) |
| DN20 | 3/4" | 1.32 to 22.50 | 5.0 to 85.0 | 5.313 | 0.30 lbs (135 g) |
| DN25 | 1" | 2.38 to 39.6 | 9.0 to 150.0 | 9.375 | 2.54 lbs (1150 g) |

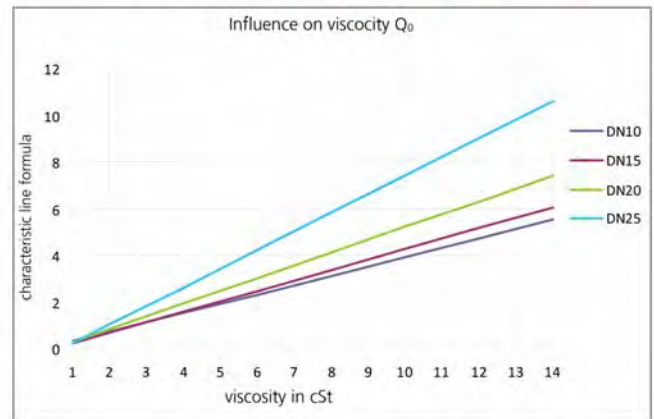
Influence of Glycol: Following definitions correct the influence of media with higher viscosity than water (media viscosity (v) > 1.8 cSt. Corrections result in measuring accuracy of 3% FS in range of 1.8-4 cSt & 4% FS in the range of 4-14 cSt.



Definition of respond threshold Q_{min}



Definition of characteristic line formula Q = k * f - Q₀

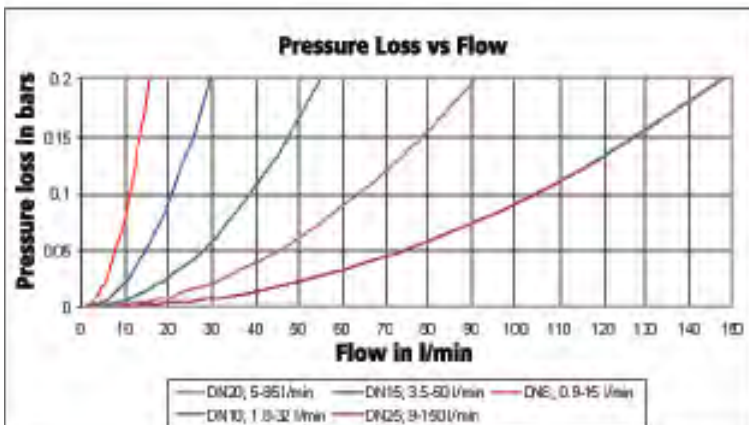


Response threshold Q_{min} (minimum flow in l/min)

- DN 10: Q_{min} = v + 0.8
 - DN 15: Q_{min} = v + 2.5
 - DN 20: Q_{min} = v + 4
 - DN 25: Q_{min} = v + 6
- (Multiply liters x 0.264 to convert to gallons)

Formula characteristic line for Q > Q_{min} in l/min

- Current output 4 ... 20 mA (l in mA)
- DN10: Q = K₁ * (I - 4 mA) - 0.40v + 0.40
- DN15: Q = K₁ * (I - 4 mA) - 0.45v + 0.45
- DN20: Q = K₁ * (I - 4 mA) - 0.55v + 0.55
- DN25: Q = K₁ * (I - 4 mA) - 0.80v + 0.80



DIMENSIONS (MM)

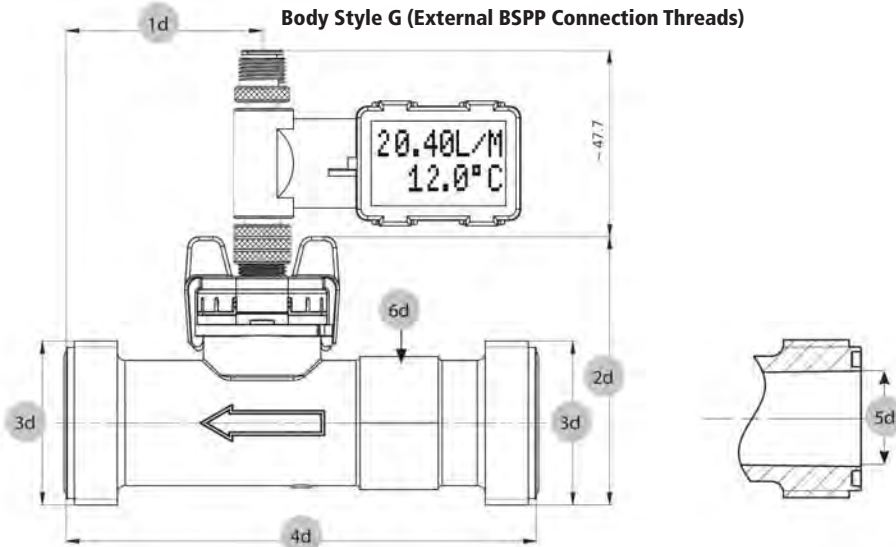


Table 4

| Size | 1d (mm) | 2d (mm) | 3d BSPP Male Pipe Thread | 4d (mm) | 5d (mm) | 6d Wrench Flat (mm) | Min./Max Locking Torque (Nm) |
|------|---------|---------|--------------------------|---------|---------|---------------------|------------------------------|
| DN8 | 48.2 | 55.7 | G3/4 | 86 | 11.5 | 12 | 1/12 |
| DN10 | 39.5 | 54.1 | G3/4 | 90 | 11.5 | 19 | 1/12 |
| DN15 | 41.6 | 59.5 | G1 | 97 | 16 | 22 | 2/12 |
| DN20 | 42.6 | 65.8 | G1-1/4 | 117 | 20 | 27 | 2.5/15 |
| DN25 | 56.0 | 71.3 | G1-1/4 | 132 | 26 | 34 | 2.5/15 |

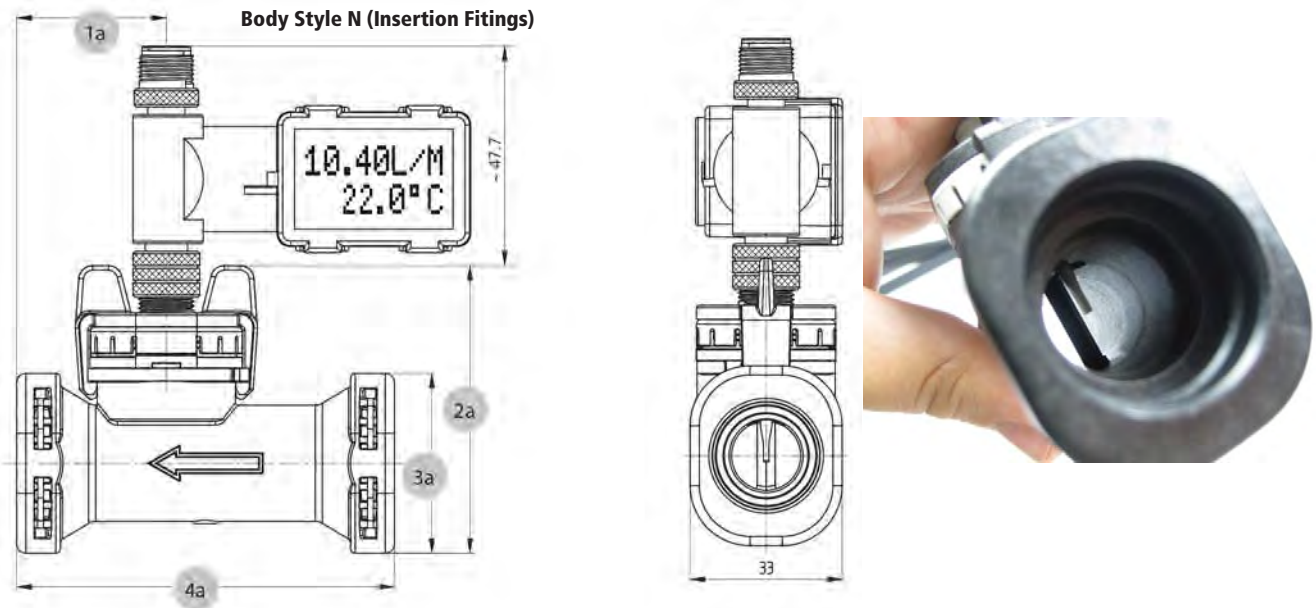


Table 5

| Size | 1a (mm) | 2a (mm) | 3a (mm) | 4a (mm) | 5a (mm) |
|------|------------------------------|---------|---------|---------|---------|
| DN8 | 29.5 | 59.0 | 32.9 | 72 | 28.9 |
| DN10 | 32.5 | 57.3 | 32.9 | 77 | 28.9 |
| DN15 | 32.5 | 62.4 | 39.0 | 82 | 33.0 |
| DN20 | 39.3 | 66.3 | 43.0 | 105 | 37.4 |
| DN25 | Not available (G style only) | | | | |

N STYLE BODY PIPING CONNECTIONS & DN25 NPT ADAPTERS

The 212 series offers simple to install piping connections. Inserting and removing fittings for pipe sizes to 3/4" is easy. A clip secures the end fitting to the flow sensor and an o-ring provides the seal. OEM clients may wish to produce fittings according to their own design needs.

The 1" size (DN25) has metric G1 1/4 male threads molded integral to the sensor body and is supplied with two EPDM sealing o-rings. 1" NPT 303 SS and polypropylene adaptors are available (see Table 7).

THREADED ADAPTERS

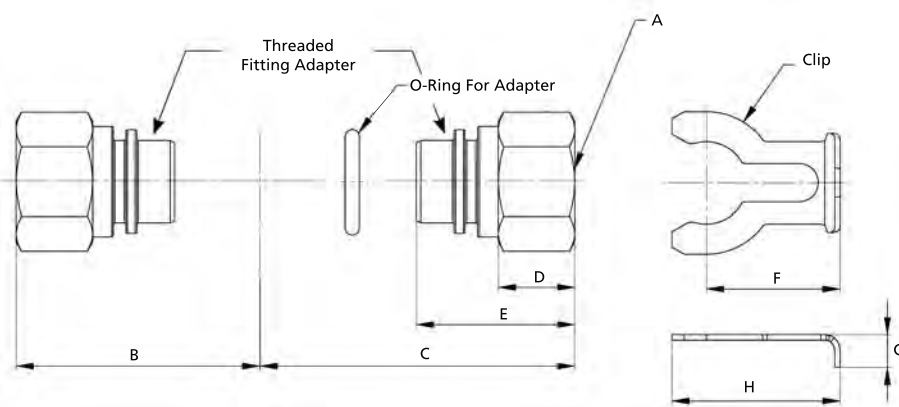


Table 6: Stainless Threaded Adapters (1/4"-3/4" NPT) & Clip Table

| Size | Clip Part Number | O-Ring Part Number (Material) | Threaded Adapter Part Number | *Material | A | B inches (mm) | C inches (mm) | **D inches (mm) | E inches (mm) | F inches (mm) | g inches (mm) | H inches (mm) |
|------|------------------|-------------------------------|------------------------------|-----------|----------|---------------|---------------|-----------------|---------------|---------------|---------------|---------------|
| DN8 | C810 | R810E (EPDM) | ADS1/4 | 303 SS | 1/4" NPT | 1.76 (44.65) | 2.27 (57.65) | 0.551 (14) | 1.14(29) | 0.965 (24.5) | 0.236 (6) | 1.21 (30.8) |
| DN10 | C810 | R810E (EPDM) | ADS3/8 | 303 SS | 3/8" NPT | 1.87 (47.55) | 2.35 (59.65) | 0.551 (14) | 1.142 (29) | 0.965 (24.5) | 0.236 (6) | 1.21 (30.8) |
| DN15 | C15 | R15E (EPDM) | ADS1/2 | 303 SS | 1/2" NPT | 1.97 (50.05) | 2.64 (67.05) | 0.646 (16.4) | 1.260 (32) | 1.1 (28) | 0.191 (4.85) | 1.36 (34.5) |
| DN20 | C20 | R20E (EPDM) | ADS3/4 | 303 SS | 3/4" NPT | 2.32 (58.85) | 3.36 (85.25) | 0.731(18.6) | 1.499 (37.8) | 1.1 (28) | 0.315 (8) | 1.36 (34.5) |

*Contact us for other materials or details on how to make your own fittings

**The overall length of the flow sensor is increased by approximately twice this value

Table 7: Brass Solder Adapters

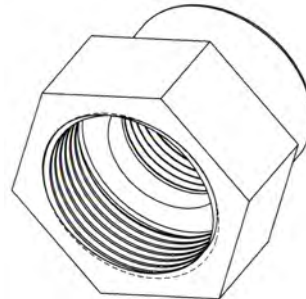
| Size | Clip Part Number | O-Ring Part Number (Material) | Adapter Part Number | Material | Standard Tubing Size (For Use With Type K & Type L Copper Tubing) |
|------|------------------|-------------------------------|---------------------|-----------|---|
| DN8 | C810 | R810E (EPDM) | SADB1/4 | 360 Brass | 1/4" |
| DN10 | C810 | R810E (EPDM) | SADB3/8 | 360 Brass | 3/8" |
| DN15 | C15 | R15E (EPDM) | SADB1/2 | 360 Brass | 1/2" |
| DN20 | C20 | R20E (EPDM) | SADB3/4 | 360Brass | 3/4" |



Table 8: DN25 BSP to NPT Adapters

| *Model | Description | Material |
|----------|---------------------------------|---------------------|
| ADSG1NPT | Adapter G1-1/4 to 1" NPT Female | 303 Stainless Steel |
| ADPG1NPT | Adapter G1-1/4 to 1" NPT Female | Polypropylene |

* Two R25E EPDM sealing o-rings are supplied with model DN25



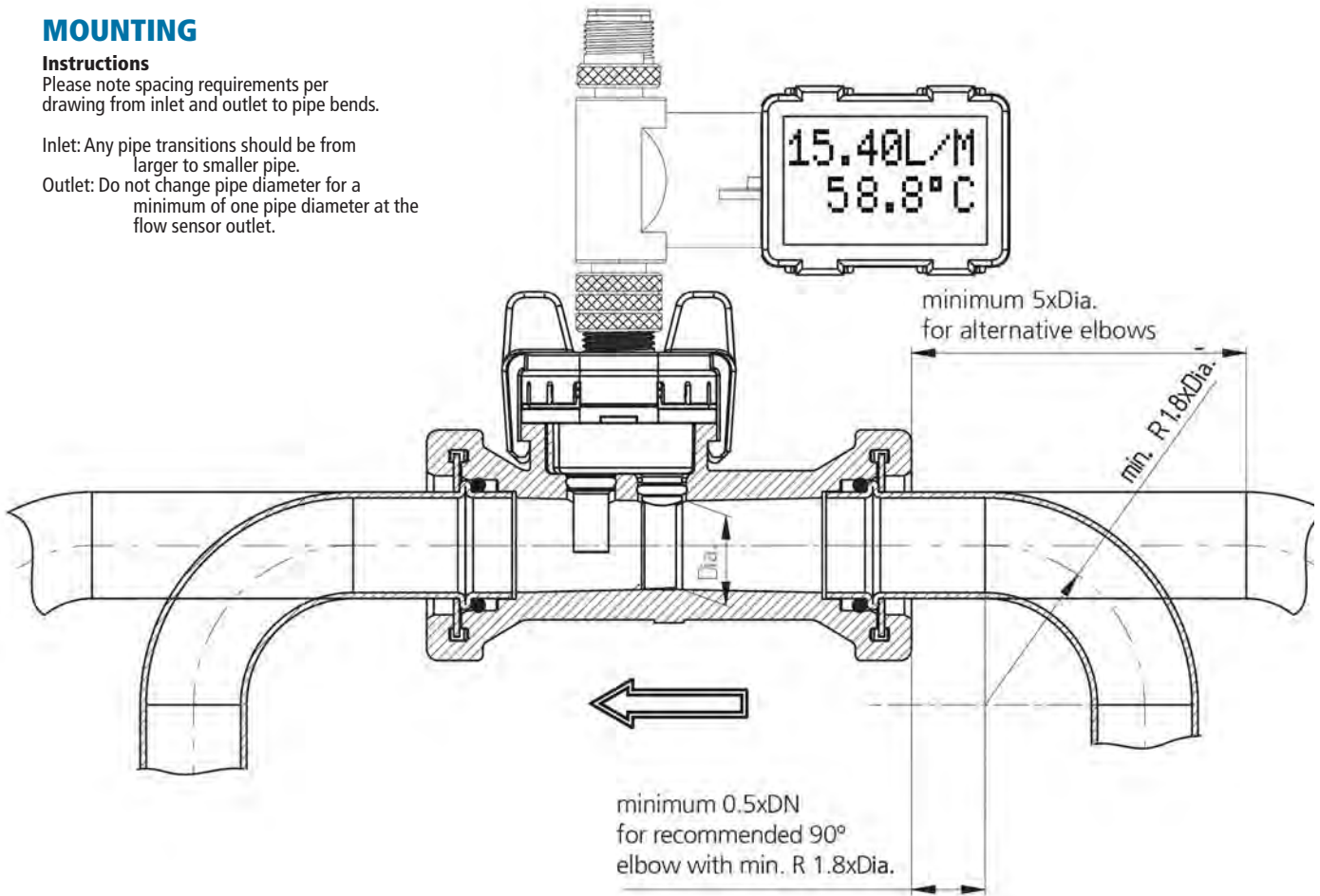
MOUNTING

Instructions

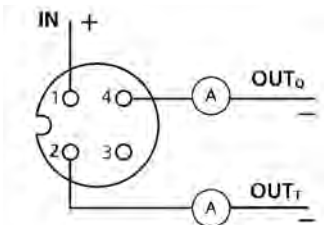
Please note spacing requirements per drawing from inlet and outlet to pipe bends.

Inlet: Any pipe transitions should be from larger to smaller pipe.

Outlet: Do not change pipe diameter for a minimum of one pipe diameter at the flow sensor outlet.



WIRING



Pin 3 & Pin 5- not connected (Pin 5 not shown)

Connect pin 1 and pin 4 to ensure the power supply of the internal electronics.

ORDERING INFORMATION

1) Order flow sensor model from table 9 -A.B.C.D.E.F.G.H.I
Example: 212.9.15.4.2.0.M.1.K

2) Order End Connection adapters, O-rings and adapter clips separately for N Connections. See table10.

| A Model | B Version | C Size | D Output | E Display | F Temp. Units | G Flow Units | H Seals | I Connections |
|---------|--------------------------------|---|--|--|--------------------------------------|--------------------|-----------------|---|
| 212 | 9=Flow 8=Flow & Temperature | 08=DN8 10=DN10 (1.8 to 32 l/min) 11=DN10 (2.0 to 40 l/min) 15=DN15 20=DN20 25=DN25 | 4= 4-20 mA (Flow) 5= 4-20 mA (Flow & Temperature) | Flow Only 2= 1 Line Flow & Temperature 0= 2 lines 1= 1 line alternating (2s) | 0= None (Flow Only) C= °C F=°F | M= l/min S= l/s | 1=EPDM 2=FPM | K= Outside Metric Threads (G) N= Adapter Fittings (Table 10) |

| Size | Connection Adapter (Two Required) | O-rings (Two Required) | Adapter Clips (Two Required) |
|------|--------------------------------------|---|---------------------------------|
| DN8 | Select from Table 6 or Table 7 | Select from Table 6 or Table 7 | Select from Table 6 or Table 7 |
| DN10 | | | |
| DN15 | | | |
| DN20 | | | |
| DN25 | Select from Table 8 | Two R25E o-rings supplied standard with flow sensor, adapter clips not used on this model | |

| Part Number | Description |
|---------------|--|
| Electrical | |
| 115024 | Straight-wire box for connector M12x1, 5 pole plug with 78.7" (200 cm) cable |
| 114564 | Straight-wire box for connector M12x1, screw terminal, 5 pole |
| Fitting Clips | |
| C810 | For DN8 and DN10 |
| C15 | For DN15 |
| C20 | For DN20 |
| O-Rings | |
| R810E | EPDM, AS568-113 |
| R15E | EPDM, AS568-909 |
| R20E | EPDM, AS568-118 |
| R25E | EPDM, 31 mm dia. x 3 mm wall |

| Part Number | Description |
|---------------------------------------|---|
| Connection Adapter Fittings- Threaded | |
| ADS1/4 | Model DN8 Stainless Steel Adapter, 1/4" NPT Female |
| ADS3/8 | Model DN10 Stainless Steel Adapter, 3/8" NPT Female |
| ADS1/2 | Model DN15 Stainless Steel Adapter, 1/2" NPT Female |
| ADS3/4 | Model DN20 Stainless Steel Adapter, 3/4" NPT Female |
| ADSG1NPT | Stainless Steel Adapter G1-1/4 to 1" NPT Female |
| ADPG1NPT | Polypropylene Adapter G1-1/4 to 1" NPT Female |
| Connection Adapter Fittings- Soldered | |
| SADB1/4 | Model DN8 to 1/4" copper tubing |
| SADB3/8 | Model DN10 to 3/8" copper tubing |
| SADB1/2 | Model DN15 to 1/2" copper tubing |
| SADB3/4 | Model DN20 to 3/4" copper tubing |

HUBA

236 Series Vortex Flow Transmitter

Freq. & Analog Outputs, 1/4" to 1.25" Pipe Sizes, Rugged Brass Construction

DESCRIPTION

Type 236 flow transmitter is similar to other Huba series 200 product except it incorporates a brass housing. Type 236 is available with a range of power supply and analog and frequency output signals.

With no moving parts the flow sensor is not sensitive to debris, has marginal pressure loss and high accuracy.

Versions with a 1000 Ohm RTD temperature sensor built-in to the bluff are available.

SPECIFICATIONS

Medium: Suitable for water & water glycol based heat exchange systems with the usual additives and other fluids compatible with the materials of construction (consult factory). For media with viscosity greater than 2 millipascal seconds (2 centipoise), higher flow rates are required to form vortices raising the minimum measurable flow rate value.

Flow ranges: From 0.48 to 63.4 GPM (1.8 ... 240 litres per minute). See Table 3.

Temperature measurement:

Optional PT1000 RTD imbedded in flow sensor bluff
 Measure range: -40°F to +257°F (- 40 to > +125 °C)
 Accuracy: Class B DIN EN 60751, @ T= 0 ,
 $\pm 0.3 \text{ }^\circ\text{C} \pm 0.005 * \Delta T$

0-10 V analog output option:

Range: -25 to +125°C
 Accuracy: $\pm 0.5^\circ\text{C} \pm 0.005 * \Delta T$
 Calculate Temperature: $T(^\circ\text{C}) = 150^\circ\text{C}/10V * U_{\text{out}} - 25^\circ\text{C}$

Temperature Influences:

Self-heating at temperature sensor: 1 K/mW
 Conduction resistance to connector: 0.8 Ohm

Operating Temperature:

Media: less than or equal to 257°F (+125°C)
 Ambient: 5° to 185°F (-15 to + 85 °C),
 In storage: -22° to 185°F (-30 to + 85 °C)

Max. pressures and medium temperature:

Table 1

| psi | bar | °F | °C | Duration |
|-----|-----|-----|-----|-----------|
| 174 | 12 | 104 | 40 | Lifetime |
| 87 | 6 | 212 | 100 | Lifetime |
| 58 | 4 | 257 | 125 | 600 hours |
| 58 | 4 | 284 | 140 | 2 hours |

Loss of pressure / cavitation: A minimum inlet pressure of 10.2 psi (0.7 bars) is required to avoid cavitation issues at maximum flow.

Wetted materials:

Sensor vane: ETFE
 Sealing material: EPDM or FPM
 Flow sensor and bluff:
 Brass (CuZn40Pb2)
 ISO-PA6T/6I, Grivory 40%GF

Response time Frequency Output: Signal delay <100 ms, response time <5 ms

Response time Analog Output: Signal delay <2 s, response time <500 ms



Features

- Low cost product with high levels of accuracy
- Temperature insensitive measuring principle
- Excellent media resistance (measuring element not in contact with the media)
- Minimal pressure loss
- Measuring element not sensitive to debris
- Direct temperature measurement in the medium

Power/Output Options:

Table 2

| | Square Pulse Frequency Output | Voltage Output | Current Output |
|--|-------------------------------|----------------|-------------------------|
| Power (U_{in}) | 4.75-33 VDC | 11.5-33 VDC | 8-33 VDC |
| Signal | <0.5...> U_{in} -0.5 V | 0-10 V | 4-20 mA |
| Load Against GND | <1 mA/<100 nF | <6 mA/<100 nF | <(U_{in} -8 V)/20 mA |
| Current Consumption load free I_{in} | <2 mA | <5 mA | - |

Electrical connection/Protection Class:

M12x1/IP 65

Polarity reversal protection: Short circuit, reverse voltage and external voltage protected within the admissible supply voltage.

Mounting position: In principle universal. We recommend that, when the sensor is mounted in horizontal pipe runs that the electrical connection/sensor assembly be mounted off vertical (3 o'clock or 9 o'clock best).

Piping connection fittings: See table 4

Accuracy:

Accuracy specifications are valid for media with a viscosity <2 centipoise (2 millipascal seconds):

For water in temperature range 41 to 212°F (5 to 100°C) or for water with maximum 20% glycol at ≥77°F (≥25°C)

Up to 50% fs: ≤ 1% fs

From 50% fs: ≤ 2% of measured value

Table 3- Model Size Selection

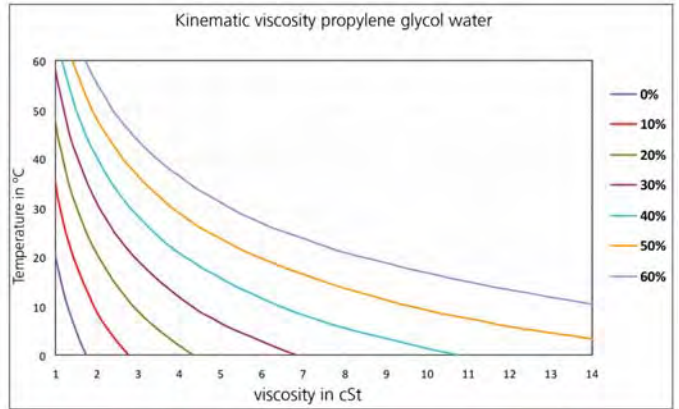
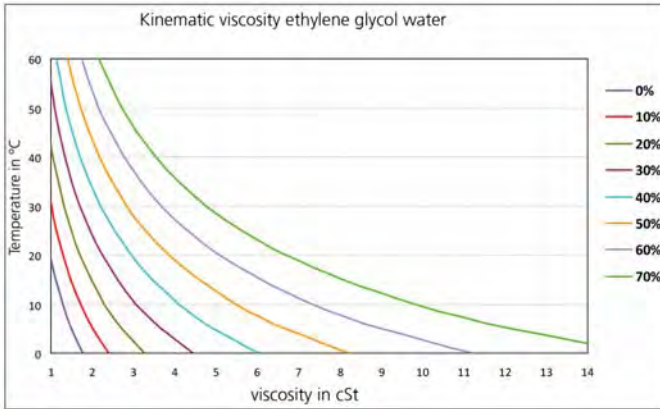
| Size | Pipe Size | Full Scale Range (Gal/min) | Full Scale Range (l/min) | Volume per Pulse (at 50% F.S.) | Frequency Range (Hz) | Q _o | K _f | K _v | K _i | Pressure Drop (pa) Where Q is flow (l/min) |
|------|-----------|----------------------------|--------------------------|--------------------------------|----------------------|----------------|----------------|----------------|----------------|--|
| DN10 | 3/8" | 0.238 to 3.96 | 1.8 to 32.0 | 1.386 ml/min | 24 to 380 | -0.2 | 0.0487 | 3.2 | 2.000 | 22.5*Q ² |
| DN10 | 3/8" | 0.528 to 10.6 | 2.0 to 40 | 1.386 ml/min | 26 to 479 | -0.2 | 0.0840 | 4.0 | 2.500 | 22.5*Q ² |
| DN15 | 1/2" | 0.925 to 13.20 | 3.5 to 50.0 | 2.993 ml/min | 20 to 277 | -0.2 | 0.1810 | 5.0 | 3.125 | 6.70*Q ² |
| DN20 | 3/4" | 1.32 to 22.50 | 5.0 to 85.0 | 6.140 ml/min | 14 to 230 | -0.3 | 0.3710 | 8.5 | 5.313 | 2.50*Q ² |
| DN25 | 1" | 2.38 to 39.6 | 9.0 to 150.0 | 12.134 ml/min | 13 to 206 | -0.2 | 0.7300 | 15 | 9.375 | 0.92*Q ² |
| DN32 | 1-1/4" | 3.7 to 63.4 | 14 to 240 | 27.513 ml/min | 9 to 145 | -1.47 | 1.6710 | 24 | 15.000 | 0.25*Q ² |

Characteristic line Formulas:

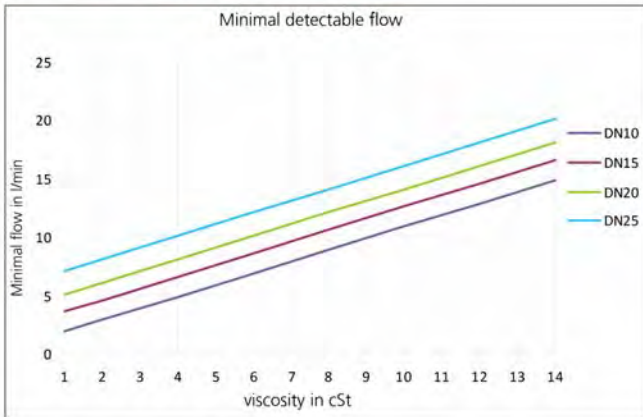
- Frequency Output- $Q_v = K_f * f + Q_o$
- Quantity per Pulse (liters/pulse)- $\text{Quantity/Pulse} = Q_v * K_f / 60 * (Q_v - Q_o)$
- Current Output- $Q_v = K_i * (I_{out} - 4 \text{ mA})$
- Voltage Output- $Q_v = K_u * U_{out}$

| | | |
|------------------|------------------------------|--------------|
| Q _v | Volume Flow Rate | [l/min] |
| Q _o | Axis Intercept | [l/min] |
| K _f | Coefficient Frequency Output | [(l/min)/f] |
| K _v | Coefficient Voltage Output | [(l/min)/V] |
| K _i | Coefficient Current Output | [(l/min)/f] |
| f | Frequency | [Hz] |
| U _{out} | Voltage | [V] |
| I _{out} | Current | [mA] |
| Qty/Pulse | Quantity per Pulse | liters/pulse |

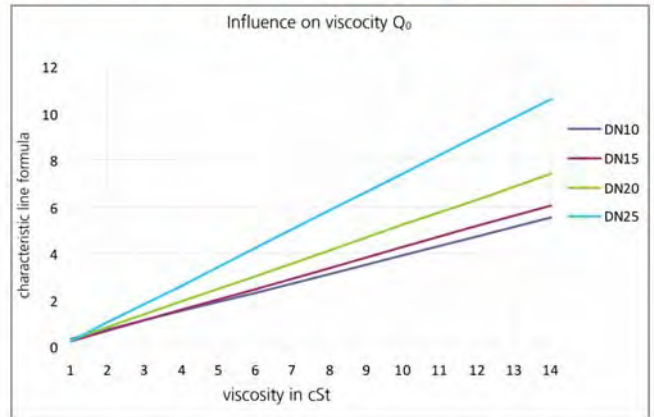
Influence of Glycol: Following definitions correct the influence of media with higher viscosity than water (media viscosity (v) > 1.8 cSt. Corrections result in measuring accuracy of 3% FS in range of 1.8-4 cSt & 4% FS in the range of 4-14 cSt.



Definition of respond threshold Q_{min}



Definition of characteristic line formula Q = k * f - Q_o



Response threshold Q_{min} (minimum flow in l/min)

- DN 10: Q_{min} = v + 0.8
- DN 15: Q_{min} = v + 2.5
- DN 20: Q_{min} = v + 4
- DN 25: Q_{min} = v + 6

(Multiply liters x 0.264 to convert to gallons)

Frequency output:

- DN10: Q = K_f * f - 0.40v + 0.20
- DN15: Q = K_f * f - 0.45v + 0.25
- DN20: Q = K_f * f - 0.55v + 0.25
- DN25: Q = K_f * f - 0.80v + 0.60
- DN32: Q = K_f * f - 0.85v + 0.60

- Voltage output 0...10 V
- DN10: Q = K_v * U_{out} - 0.40v + 0.40
- DN15: Q = K_v * U_{out} - 0.45v + 0.45
- DN20: Q = K_v * U_{out} - 0.55v + 0.55
- DN25: Q = K_v * U_{out} - 0.80v + 0.80
- DN32: Q = K_v * U_{out} - 0.85v + 0.85

Current output 4 ... 20 mA (I in mA)

- DN10: Q = K_i * (I - 4 mA) - 0.40v + 0.40
- DN15: Q = K_i * (I - 4 mA) - 0.45v + 0.45
- DN20: Q = K_i * (I - 4 mA) - 0.55v + 0.55
- DN25: Q = K_i * (I - 4 mA) - 0.80v + 0.80
- DN32: Q = K_i * (I - 4 mA) - 0.80v + 0.80

DIMENSIONS DN 8, 10, 15, 20

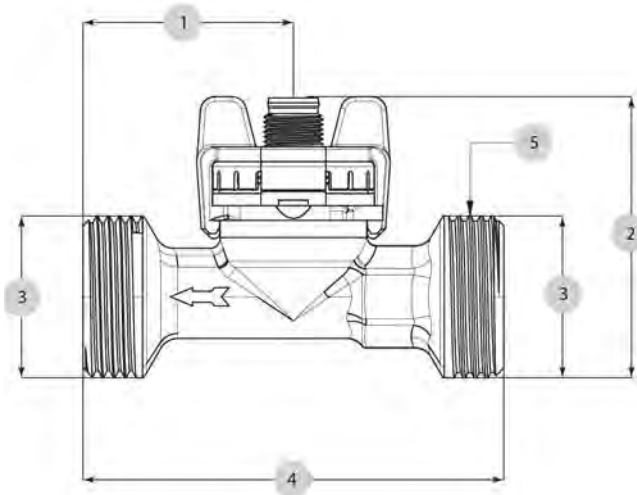


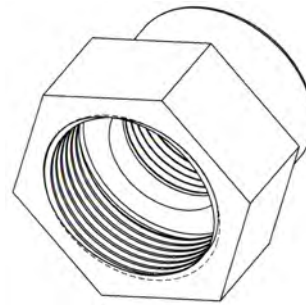
Table 4

| Size/Thread Type | 1 (mm) | 2 (mm) | 3 Thread | 4 (mm) | 5 (mm) |
|------------------|--------|--------|----------|--------|--------|
| DN10/K | 43 | 51.1 | G 1/2 | 86 | 19 |
| DN10/M | 43 | 54.1 | G 3/4 | 86 | 19 |
| DN10/G | 43 | 57.3 | G 1 | 86 | 19 |
| DN15/K | 41 | 55.9 | G 3/4 | 87 | 22 |
| DN15/G | 41 | 59.3 | G 1 | 87 | 22 |
| GN20/K | 40.6 | 61.6 | G 1 | 105 | 27 |
| DN20/G | 40.6 | 65.6 | G 1-1/4 | 105 | 27 |
| DN25/K | 50 | 68.1 | G 1-1/4 | 120 | 34 |
| DN25/G | 50 | 71.1 | G 1-1/2 | 120 | 34 |
| DN32K | 50 | 74.9 | G 1-1/2 | 134 | 41 |

Table 5: BSP to NPT Adapters

| *Model | Description | Material |
|----------|---------------------------------|---------------------|
| ADSG1NPT | Adapter G1-1/4 to 1" NPT Female | 303 Stainless Steel |
| ADPG1NPT | Adapter G1-1/4 to 1" NPT Female | Polypropylene |

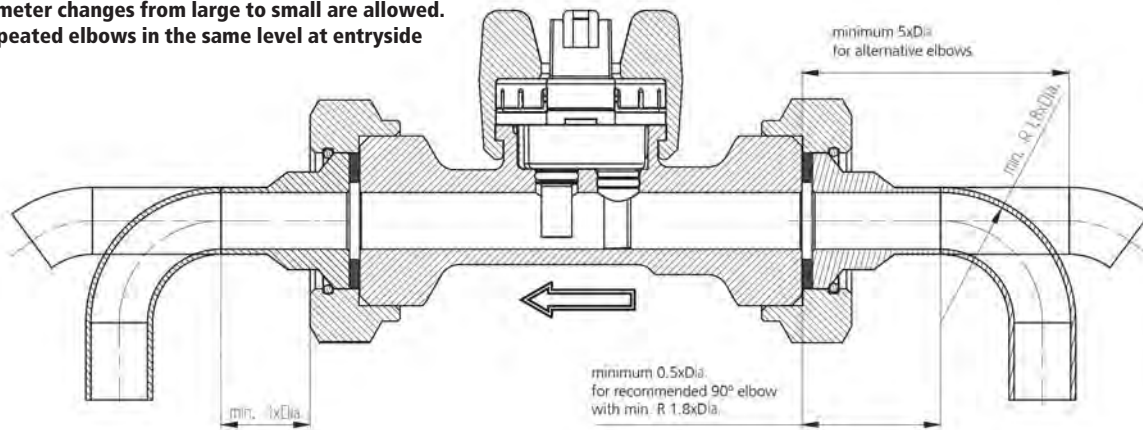
* Two R25E EPDM sealing o-rings are supplied with model DN25



MOUNTING

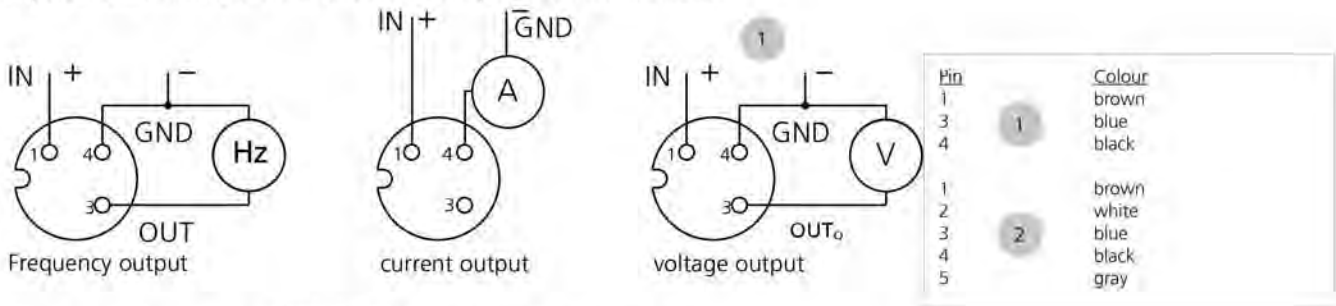
Consider the following to ensure the correct function of the sensor.

- Only diameter changes from large to small are allowed.
- Avoid repeated elbows in the same level at entryside

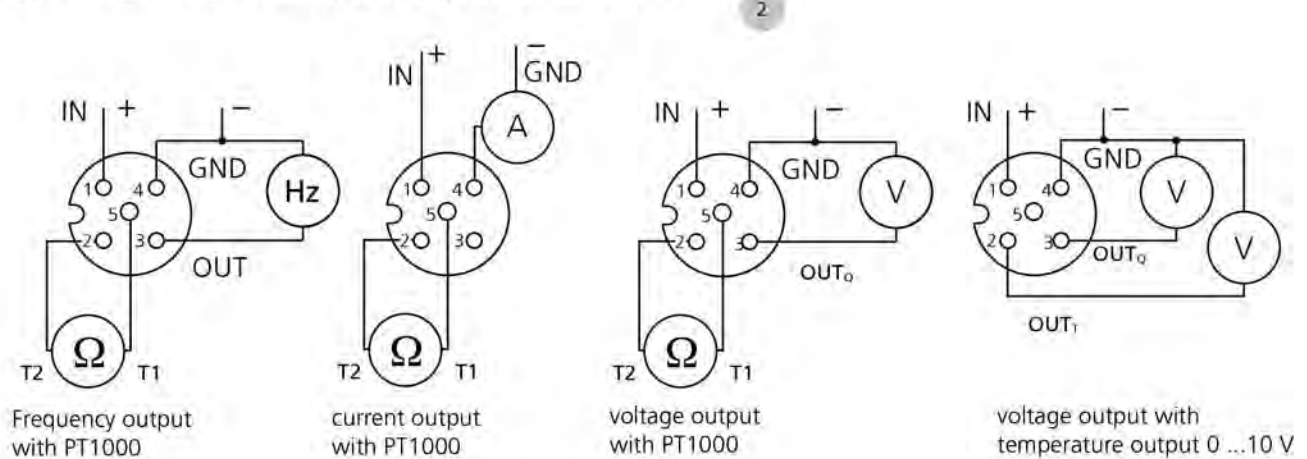


WIRING

3-pole circular connection M12x1 without temperature measurement



5-pole circular connection M12x1 with temperature measurement



ORDERING INFORMATION

1) Order flow sensor model from table 7 -ABCDEF

Example: 21091044

2) Order End Connection adapters, O-rings and adapter clips

| Flow Sensor Order Table | | | | | | |
|-------------------------|---|--|---------------------------------------|--|-----------------|--|
| A Model | B Version | C Size | D Output | E Electrical Connection | F Seal Material | G Pipe Connections |
| 236 | 9=Flow 8=Flow & Temperature (1000 Ohm RTD) 6=Flow & Temperature (0-10VDC) | 10=DN10, 32 l/min F.S. 11=DN10, 40 l/min F.S. 15=DN15, 50 l/min F.S. 20=DN20, 85 l/min F.S. 25=DN25, 150 l/min F.S. 32=DN32, 240 l/min F.S. | 2=Frequency 3= 0-10V 4= 4-20 mA | 4= 2 or 3 Pole M12X1 5= 4 or 5 Pole M12X1 | 1=EPDM 2=FPM | Brass with outside thread- see table 4 K=K M=M G=G |

| Component Parts | |
|-----------------|--|
| Part Number | Description |
| Electrical | |
| 114605 | Straight-wire box for connector M12x1, 3 pole plug with 78.7" (200 cm) cable |
| 114604 | Corner-wire box for connector M12x1, 3 pole plug with 78.7" (200 cm) cable |
| 114564 | Straight-wire box for connector M12x1, 5 pole plug with 78.7" (200 cm) cable |
| 114563 | Corner-wire box for connector M12x1, 5 pole plug with 78.7" (200 cm) cable |
| 114563 | Straight-wire box for connector M12x1, screw terminal |
| ADSG1NPT | Stainless Steel Adapter G1-1/4 to 1" NPT Female |
| ADPG1NPT | Polypropylene Adapter G1-1/4 to 1" NPT Female |

CLARK SOLUTIONS

RVL Vortex Flowmeters

Technical Bulletin: Application, Design, Installation

INTRODUCTION

Selection of the best flow meter for your specific application is a critical step, one that will affect the quality of your process for years. Choosing the wrong meter can lead to inaccurate readings, high maintenance costs, and expensive downtime.

The following section is designed to explain the technology of vortex flow meters and the specifications of the Clark Solutions vortex product line. Our goal is to ensure that the vortex meter you select meets the requirements of your specific application.

HOW VORTEX FLOW METERS WORK

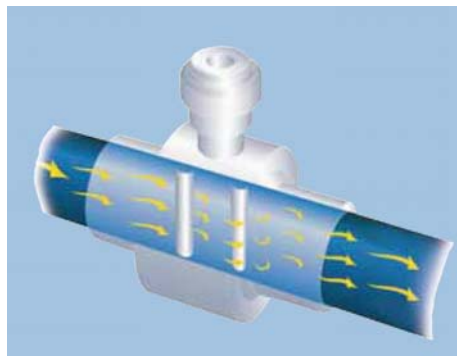
The operation of the RVL vortex flow meter is based on the vortex shedding principle. As fluid moves around a body, vortices (eddies) are formed and move downstream. They form alternately, from one side to the other, causing pressure fluctuations. These are sensed by a piezoelectric crystal in the sensor tube, and are converted to a 4-20 mA or pulse signal. The frequency of the vortices is directly proportional to the flow. This results in extremely accurate and repeatable measurements with no troublesome moving parts.

MATERIAL SELECTION

When choosing the best pipe material for your process, it is necessary to review the fluid to be transported, its concentration, the minimum and maximum operating temperatures, and the pressures to be accommodated. Choosing a flow meter is a similar process, but it is necessary to review a few additional considerations, such as fluid viscosity, suspended particles, density of the fluid and, most importantly, expected flow range. One advantage of utilizing a Universal vortex flow meter is that there are no gaskets or elastomers in the meter. Therefore, you only need to be concerned with the thermoplastic material used for the body construction. In a thermoplastic piping system, the material chosen for the flow meter should match that of the pipe if at all possible. If you are planning to install a meter in a metal pipe system, you must consider three operating conditions: temperature, media, and pressure. Chemical resistance data is available on request from Clark.

FLOW RATE AND RANGE REQUIREMENTS

When choosing a flow meter, it is necessary to verify with the supplier that the unit selected is suited for your specific flow range needs. Most manufacturers state flow range capabilities by publishing maximum allowed flow rates. Then they provide a turndown ratio to determine minimum flow rate. To use the turndown ratio, simply divide the maximum rate by the ratio to determine the minimum rate.



RVL vortex flow meters offered by Clark have a 12:1 turndown ratio (exceptions: RVL025 1/4" unit and RVL050L 1/2" unit; 8:1).

LINE FLUIDS

Many factors may affect the capability of a meter to accurately measure the flow of specific fluids. Different solutions have varying effects on meters. For instance, heavy particle suspension will wear down internal parts on some meters or cause sensing inaccuracies for non-obtrusive metering systems. For vortex flow meters, high viscosities tend to dampen the formation of vortices and reduce the effective range. Particles and internal bubbles do not usually affect vortex meters. PVDF models work very well in slurry services. However, slurries containing grit will wear down the bluff body, although it can withstand a 5% reduction before accuracy is affected. Also, long fibers will catch and build up on the bluff, decreasing accuracy. Standard factory calibration is for 32 SSU (1 CST) viscosity liquid. Viscosity above 1 CST will raise the minimum readable flow rate, reducing rangeability. The effect is linear to viscosity. No adjustments are required for specific gravities up to 2.0. Liquids with high specific gravities will adversely affect the permissible amount and duration of overrange flow. The following chart indicates the reduction of range based on viscosity.

| Viscosity | Min. | Max. | Flow Range |
|-----------|------|------|------------|
| 1 CST | 1 | 12 | 12:1 |
| 2 CST | 2 | 12 | 6:1 |
| 3 CST | 3 | 12 | 4:1 |
| 4 CST | 4 | 12 | 3:1 |
| 5 CST | 5 | 12 | 2.4:1 |
| 6 CST | 6 | 12 | 2:1 |

ACCURACY AND REPEATABILITY

Depending on your application, accuracy and repeatability may be critical. Accuracy is measured as a percentage by which the meter reading could vary from the actual flow. Repeatability is the percentage by which the meter may vary for a specific flow rate from reading to reading. In other words, if you are operating at a flow rate of 50 gpm and the rate increases to 75 gpm and then returns to 50 gpm, repeatability indicates the percentage within which you will now read the 50 gpm flow rate versus the original reading. Accuracy is normally published by the manufacturer in two formats: accuracy of full scale, or accuracy of rate. Accuracy of full scale is a percentage of the maximum flow rate, no matter what the actual flow. Accuracy of rate is a percent of the actual flow rate of the fluid the meter is currently reading.

THE IMPORTANCE OF CALIBRATION

When choosing a meter for an application where accuracy and repeatability are critical, it is necessary to use a meter that is wet calibrated by the manufacturer, and supplied with documentation of that calibration. A meter that is not individually calibrated cannot be relied on as truly accurate to its specification.

Production tolerance differences can and will affect a meter's accuracy. For this reason, meters must be wet calibrated to ensure specified accuracy and functionality for the user.

LINE CONNECTIONS

The next step is planning the installation of the unit into your pipe line. You may prefer to mount the unit permanently by welding it into the line, or you might provide access for meter removal from the line by using a flanged or threaded model. Certain line connections may require the use of a gasket. It is important to choose a gasket material that will not contaminate your media, and to be sure it is chemically resistant to the fluid being transported.

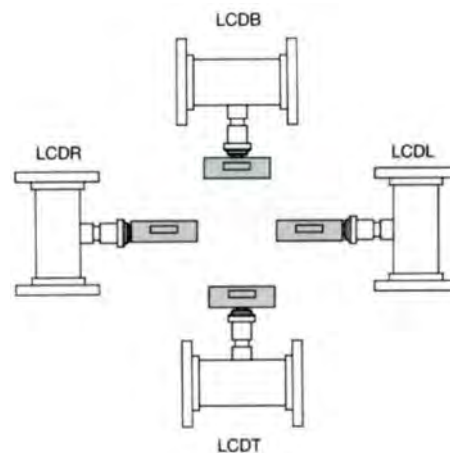
RVL vortex flow meters are available with a wide selection of line connection options. These options include butt, wafer, male thread socket, and threaded flare.

MAXIMUM FLOW RATES

Maximum flow rates are indicated on the RVL specification pages in this catalog. You can safely and accurately measure up to 125% of the maximum flow rates listed, although units with the HT (High Temperature) option cannot be overranged. The signal for 125% overranging would be 24 mA. You must make sure you have sufficient voltage to overrange a meter.

OUTPUT AND DISPLAYS

Universal vortex flow meters come with a variety of output options. The standard output is an analog signal ranging from 4 to 20 mA or 0-5 VDC. Pulse outputs are also available. For remote Indication Clark supplies a range of monitors and controllers. All RVL vortex flow meters are designed to be standalone units if required. Each unit can have its own individual local LCD flow rate display. The readout can be mounted in a variety of positions for convenient readability. For specifications, dimensions, and placement of the LCD, consult the factory. The figure below shows available mounting positions.



PIPING REQUIREMENTS

Turbulence in the pipe line can affect the accuracy of most flow meters. Sources of turbulence are pumps, valves, or changes-in-direction in the line. To avoid these potential problems, it is standard practice to place the meter a certain distance from the turbulence source. Most manufacturers provide the user with minimum distances for their particular products. These distances are indicated in Pipe Diameters (PD). For example, 5 PD means place the flow meter five times its inside diameter away from the source of turbulence. It is also common to provide a minimum distance downstream between a meter and a valve or a change-in-direction.

For optimum accuracy, we recommend at least 20 PD upstream and 5 PD downstream for Universal vortex flow meters. If an upstream elbow is closely coupled to another elbow, 27 PD may be required upstream and 10 PD may be required downstream between the meter and a valve. When the diameter of the meter is smaller than the pipe line, you need at least 15 PD of pipe with the same diameter as the meter upstream, and 5 PD downstream. Overall, 25 PD of straight run prior to the meter is required. If there is a plane change in the installation, this requirement increases to 30 PD upstream. The downstream requirement is now 2 PD of pipe with the same diameter as the meter, and a minimum of 5 PD overall of straight run. The usual 10 PD downstream between the meter and a valve is still required. If the required piping parameters are not met, there will be a corresponding reduction in accuracy.

WIRING

Connect a twisted wire pair (not provided) to the terminals of the transmitter marked + and -. If the twisted wire pair is shielded, do not connect the shield to the transmitter. The shield should be grounded at the receiver only (see Figure 4). The transmitter is reverse-polarity protected. The twisted wire pair should be connected to the receiving equipment. Twisted wire pair lengths of up to 1,000 feet are generally acceptable, and lengths up to 10,000 feet are often usable if the twisted wire pair is kept dry and distant from electrical noise sources. The receiving equipment must accept industry standard "true two wire" or "loop power" 4-20 mA process transmitter inputs. This means that the receiving equipment, such as a recorder or controller, must supply power for the transmitter along the twisted wire pair. If the receiving equipment does not provide power, a separate power supply, typically 24 Vdc at 30 mA, must be used, as shown in Figure below. There are many brands of receivers which provide 24 Vdc for this purpose.

Several receivers may be connected in a series as shown in Figure below, but only one should provide power, and all should have isolated inputs. If the receiver requires 1-5 Vdc, connect a 250 Ohm, 0.1%, 1/2-watt precision resistor across its input. The voltage provided by the receiver must be within the limits shown in the Required DC Voltage Chart below. To use this figure, first add the resistance of all the receivers, indicators, etc., and the wire in the loop. If the wire resistance is unknown, use a value of 50 Ohm for a twisted wire of 1,000 feet or less with a gauge of #22 AWG or heavier. If a 1-5

Vdc receiver is used with a 250 Ohm resistor, its resistance is 250 Ohm. Only one point on the 4-20 mA loop should be grounded. Some receiving equipment inputs are grounded by their manufacturers. This is sufficient. Always follow the receiver manufacturer's recommendations for "loop powered" or "true two wire" process transmitters. Always follow local electrical codes.

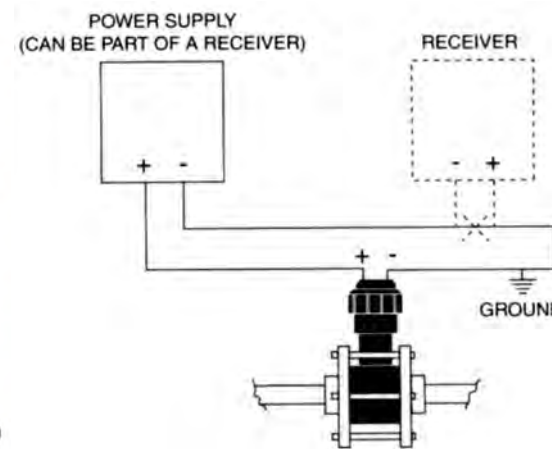
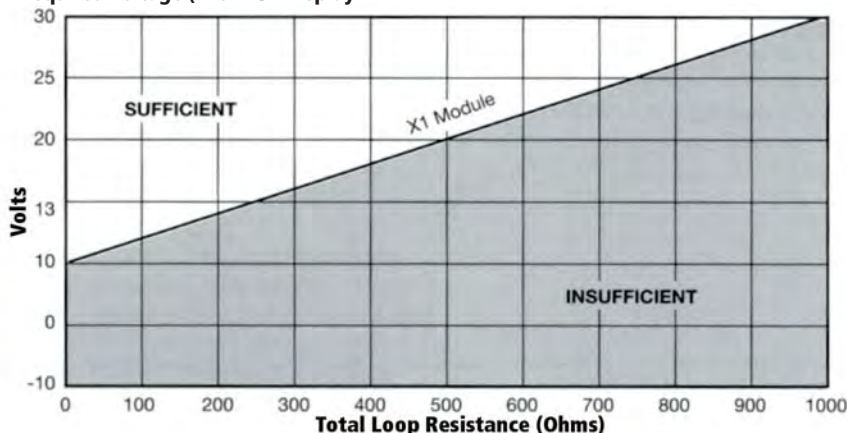
Service: General purpose.

Electrical classification: General purpose, non-hazardous, or NEMA 4X

QUICK SPECIFICATION

All flow meters 1/4" through 9" shall be of the vortex shedding style with no moving parts. Meters shall be constructed of PVC, CPVC, PP, or PVDF. Meters shall have a 12 to 1 turndown ratio with an accuracy of $\pm 1\%$ of full scale, $\pm 1\%$ of rate when used with the Vorsite 2000 flow indicator/controller, and be $\pm 1/4\%$ repeatable of point. All meters shall be wet calibrated at the factory and supplied with calibration records. Line connections for pipe systems shall be thread, metric butt, wafer or flange. Flare and sanitary connections shall be used for tubing systems. Output is either to be linear 4-20 mA or digital pulse to communicate with the Vorsite 2000 Flow Indicator/Controller.

Required Voltage (with LCD Display)



CLARK SOLUTIONS

Series RVL Vortex Flowmeter

1/4" to 3" Pipe Size, PVC, CPVC, or PVDF Construction

DESCRIPTION

The operation of the RVL vortex flow meter is based on the vortex shedding principle. As fluid moves around a body, vortices (eddies) are formed and move downstream. They form alternately, from one side to the other, causing pressure fluctuations. These are sensed by a piezoelectric crystal in the sensor tube, and are converted to a 4-20 mA, 0-5 VDC or pulse signal.

The frequency of the vortices is directly proportional to the flow. This results in extremely accurate and repeatable measurements with no troublesome moving parts.

Unlike stainless steel or paddle wheel designs, the vortex sensor is perfect for aggressive or easily contaminated flow media.

Applications include flow monitoring and control of corrosive chemicals and slurries in chemical processing, water/wastewater, and DI water.

SPECIFICATIONS

IN-LINE FLOWMETERS

Media: Liquids

Connection: Butt or NPT Male thread

Turndown Ratio: 12:1 (except 1/4": 8:1)

Accuracy: $\pm 1\%$ of full scale, 4-20 mA or 0-5 VDC;

$\pm 2\%$ of full scale, frequency pulse

Repeatability: $\pm 0.25\%$ actual flow

Output Signal: 4-20 mA, 0-5 Vdc or

frequency pulse (source-sink driver;

1A source / 1.5A sink; typical output

resistance 10 Ohms) Power Supply: 13 to 30 Vdc

Weatherproof: NEMA-4X (IP 66)

Maximum Overrange: 125% for 1/2 hour,

No overrange for Hi-Temp units

Response Time: 2 seconds minimum, step change in flow

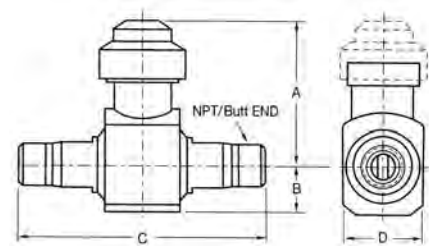
CSA: CSA File: 215035

CSA Standard C22.2 No. O-M and No. 142-M

ORDERING INFORMATION

ORDER NUMBER RVLA-BCDEF

EXAMPLE: RVL050-N4XN1



Dimensions (Inches)

| Size | PVC/CPVC | | | | PVDF (Butt) | | | |
|--------|----------|------|------|------|-------------|------|------|------|
| | A | B | C | D | A | B | C | D |
| 1/4" | 3.81 | 1.75 | 5.25 | 2.50 | 5.90 | 0.63 | 4.87 | 1.31 |
| 1/2" | 3.81 | 1.75 | 7.13 | 2.50 | 5.75 | 0.78 | 4.87 | 1.31 |
| 3/4" | 3.81 | 1.75 | 7.63 | 2.50 | 5.75 | 0.94 | 4.87 | 1.44 |
| 1" | 3.92 | 1.75 | 8.03 | 2.50 | 5.88 | 1.19 | 5.09 | 2.00 |
| 1 1/2" | 3.90 | 2.00 | 8.37 | 2.50 | 6.21 | 1.50 | 6.24 | 2.50 |
| 2" | 4.31 | 2.00 | 8.37 | 2.50 | 6.60 | 1.88 | 6.77 | 3.00 |

Max. & Min Flow

| Size | Weight | Min. Flow | Max Flow |
|--------|---------|-----------|----------|
| 1/4" | 1.5 lbs | 0.6 GPM | 5 GPM |
| 1/2" | 1.6 lbs | 1.3 GPM | 15 GPM |
| 3/4" | 1.7 lbs | 2.1 GPM | 25 GPM |
| 1" | 1.8 lbs | 4.2 GPM | 50 GPM |
| 1 1/2" | 2.7 lbs | 8.3 GPM | 100 GPM |
| 2" | 3.1 lbs | 16.7 GPM | 200 GPM |

Max. Fluid Operating Temperature

| Temp. | PVC | CPVC | PVDF |
|-------|----------|----------|----------|
| 203°F | NR | 24 PSIG | 40 PSIG |
| 150°F | NR | 63 PSIG | 130 PSIG |
| 100°F | 93 PSIG | 120 PSIG | 150 PSIG |
| 70°F | 150 PSIG | 150 PSIG | 150 PSIG |

| A Size/Range | | B Body Style & End Connections | C Body Material | D Output | E Options ¹ | F Display |
|-----------------|----------------------|--|------------------------------|---|--|---|
| Size/Range | Line Size | | | | | |
| Symbol | GPM LPM Inches MM | | | | | |
| 025 | 5 19 1/4 6.35 | B= Butt End Connection (available with PVDF material only) N= NPT (Male) Thread | 1= PVC 2= CPVC 4= PVDF | X= 4-20 mA (standard) P= Frequency Pulse V= 0-5 Vdc | N= None C= Class 1000 Cleaning H= High Temperature rated: 203 °F (95 °C) ² S= Stainless Steel Tag 3= 3-Pin Connector | N= None 1= Top mount LCD 2= Bottom mount LCD 3= Right mount LCD 4= Left mount LCD |
| 050 | 15 57 1/2 20 | | | | | |
| 075 | 25 95 3/4 25 | | | | | |
| 100 | 50 189 1 32 | | | | | |
| 150 | 100 379 1 1/2 50 | | | | | |
| 200 | 200 757 2 63 | | | | | |

¹Multiple options may be selected

²High Temperature option ONLY available with CPVC and PVDF body materials

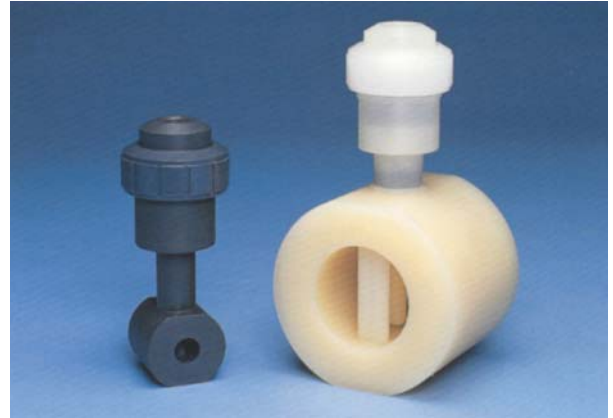
CLARK SOLUTIONS

Series RVL Vortex Flowmeter

SPECIFICATIONS

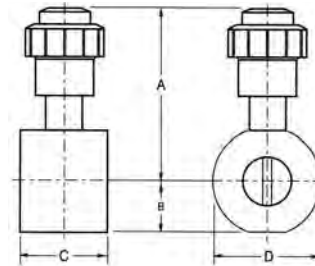
WAFER MOUNTING

Medium: Liquids
 Connection: Wafer
 Turndown Ratio: 12:1 (except 1/4": 8:1)
 Accuracy: $\pm 1\%$ of full scale, 4-20 mA or 0-5 VDC;
 $\pm 2\%$ of full scale, frequency pulse
 Repeatability: $\pm 0.25\%$ actual flow
 Output Signal: 4-20 mA, 0-5 Vdc or frequency pulse
 (source-sink driver; 1A source / 1.5A sink; typical output resistance 10 Ohms)
 Power Supply: 13 to 30 Vdc
 Weatherproof: NEMA-4X (IP 66)
 Maximum Overrange: 125% for 1/2 hour,
 No overrange for Hi-Temp units
 Response Time: 2 seconds minimum, step change in flow
 CSA: CSA File: 215035
 CSA Standard C22.2 No. O-M and No. 142-M



Max. & Min Flow Rates

| Size | Weight | Min. Flow | Max Flow |
|--------|---------|-----------|----------|
| 1/2" | 0.8 | 1.3 GPM | 15 GPM |
| 3/4" | 0.9 lbs | 2.1 GPM | 25 GPM |
| 1" | 1.1 lbs | 4.2 GPM | 50 GPM |
| 1 1/2" | 1.7 lbs | 8.3 GPM | 100 GPM |
| 2" | 2.6 lbs | 16.7 GPM | 200 GPM |
| 3" | 4.8 lbs | 25.0 GPM | 300 GPM |



Max. Fluid Operating Temp./Press.

| Temp | PVC (PSIG) | PP (PSIG) | CPVC (PSIG) | PVDF (PSIG) |
|-------|------------|-----------|-------------|-------------|
| 203°F | NR | NR | CF | CF |
| 150°F | NR | 90 | 100 | 130 |
| 100°F | 400 | 130 | 130 | 150 |
| 70°F | 150 | 150 | 150 | 150 |

Dimensions (Inches)

| Size | PVDF- ANSI 150 Standard | | | |
|--------|-------------------------|------|------|------|
| | A | B | C | D |
| 1/2" | 5.85 | 0.78 | 2.03 | 1.75 |
| 3/4" | 5.90 | 0.94 | 2.03 | 2.13 |
| 1" | 5.69 | 1.19 | 2.25 | 2.47 |
| 1 1/2" | 6.00 | 1.50 | 2.63 | 3.25 |
| 2" | 6.37 | 1.88 | 3.22 | 4.00 |
| 3" | 6.88 | 2.50 | 4.25 | 5.24 |

ORDERING INFORMATION

ORDER NUMBER RVL A-BCDEF

EXAMPLE: RVL050-W4XN1

| A Size/Range | | B Body Style & End Connections | C Body Material | D Output | E Options ¹ | F Display |
|-------------------|------------------|---|--|---|--|---|
| Size/Range | Line Size | | | | | |
| Symbol | GPM LPM | | | | | |
| 050 | 15 57 | W= Wafer (mounts between flanges) | 1= PVC 2= CPVC 3= Polypropylene 4= PVDF | X= 4-20 mA (standard) P= Frequency Pulse V= 0-5 Vdc | N= None C= Class 1000 Cleaning H= High Temperature rated: 203 °F (95 °C) ² S= Stainless Steel Tag 3= 3-Pin Connector | N= None 1= Top mount LCD 2= Bottom mount LCD 3= Right mount LCD 4= Left mount LCD |
| 075 | 25 95 | | | | | |
| 100 | 50 189 | | | | | |
| 150 | 100 379 | | | | | |
| 200 | 200 757 | | | | | |
| 300 | 300 1136 | | | | | |
| | | | | | | |

¹Multiple options may be selected

²High Temperature option ONLY available with CPVC and PVDF body materials

CLARK SOLUTIONS

Series RVL Vortex Flowmeter

SPECIFICATIONS

IN-LINE FLARE END

Medium: Liquids

Connection: Tube (flare-end), Requires two flare tubing nuts (not included)

Turndown Ratio:

1/2" size = 8:1

3/4" size = 12:1

1" size = 12:1

Accuracy: $\pm 1\%$ of full scale, 4-20 mA or 0-5 Vdc;

$\pm 2\%$ of full scale, frequency pulse

Repeatability: $\pm 0.25\%$ actual flow

Output Signal: 4-20 mA, 0-5 Vdc or frequency pulse
(source-sink driver; 1A source / 1.5A sink; typical output resistance 10 Ohms)

Power Supply: 13 to 30 Vdc

Weatherproof: NEMA-4X (IP 66)

Maximum Overrange: 125% for 1/2 hour,

No overrange for Hi-Temp units

Response Time: 2 seconds minimum, step change in flow

CSA: CSA File: 215035

CSA Standard C22.2 No. O-M and No. 142-M

Max. & Min Flow Rates

| Size | Weight | Min. Flow | Max Flow |
|------|---------|-----------|----------|
| 1/2" | 1.5 LBS | 0.6 GPM | 5 GPM |
| 3/4" | 1.6 LBS | 1.3 GPM | 15 GPM |
| 1" | 1.7 LBS | 2.1 GPM | 25 GPM |

Max. Fluid Operating Temp./Press.

| Temp | PVDF (PSIG) |
|-------|-------------|
| 203°F | 20 |
| 150°F | 37 |
| 100°F | 67 |
| 70°F | 150 |

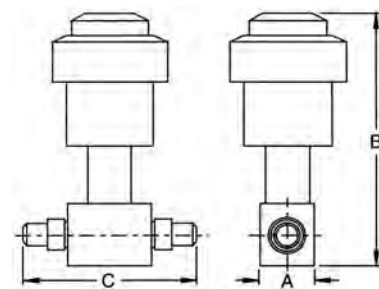
ORDERING INFORMATION

ORDER NUMBER RVL A-BCDE

EXAMPLE: RVL050L-4XN1

| A Size/Range | | B Body Material | C Output | D Options ¹ | E Display |
|-----------------|-------------------|-----------------------|---|---|---|
| Size/Range | Line Size | 4= PVDF | X= 4-20 mA (standard) P= Frequency Pulse V= 0-5 Vdc | N= None C= Class 1000 Cleaning S= Stainless Steel Tag 3= 3-Pin Connector | N= None 1= Top mount LCD 2= Bottom mount LCD 3= Right mount LCD 4= Left mount LCD |
| Symbol | GPM LPM Inches MM | | | | |
| 050L | 15 57 1/2 20 | | | | |
| 075L | 25 95 3/4 25 | | | | |
| 100L | 50 189 1 32 | | | | |

¹Multiple options may be selected

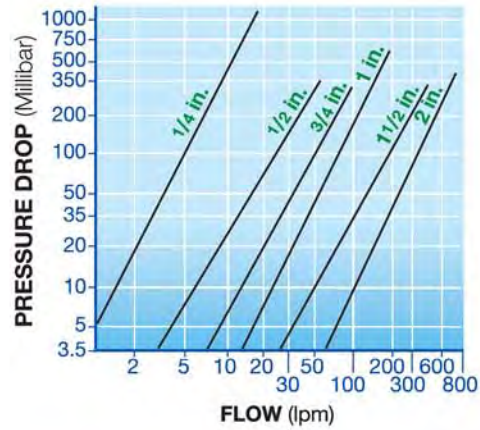
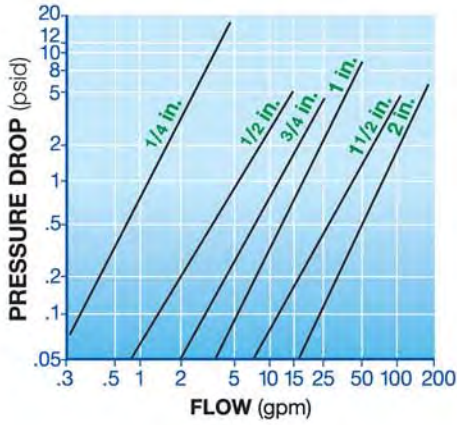


Dimensions (Inches)

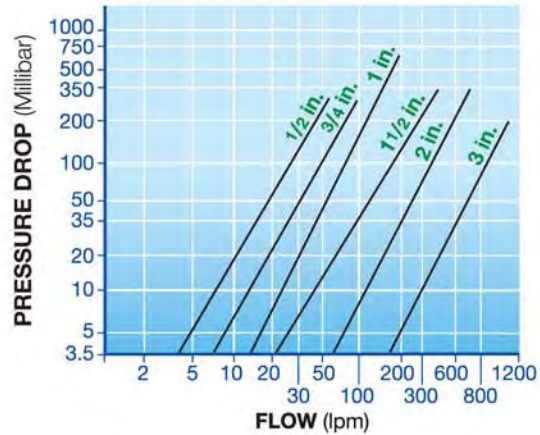
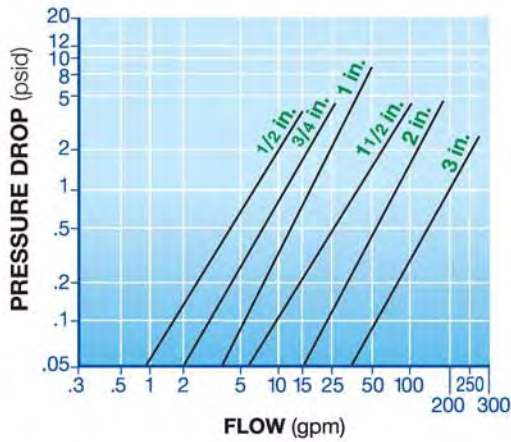
| Size | A | B | C |
|------|------|------|------|
| 1/2" | 1.31 | 6.25 | 4.87 |
| 3/4" | 1.31 | 6.25 | 4.66 |
| 1" | 1.44 | 6.59 | 5.42 |

RVL Series Pressure Drop vs Flow Rate

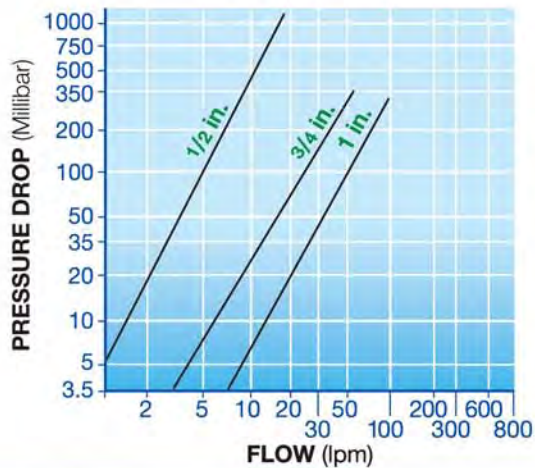
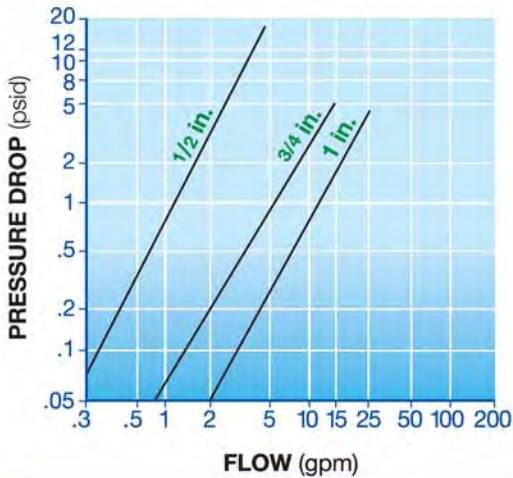
In-Line Flow Meters for Liquids



Wafer Flow Meters for Liquids



In-Line Flare End Flow Meters for Liquids



CLARK Series 2100 Polysulfone Flow Switches

1/8" and 1/4" Pipe Size

DESCRIPTION

Series 2100 flow switches are manufactured to exacting standards and provide accurate flow detection for most applications. Product inspection involves calibrated tools and gages traceable to National Bureau of Standards.

The switches function as a magnet embedded in a spring loaded polysulfone piston is displaced at the proper calibrated flow of liquid to actuate the hermetically sealed reed switch.

The flow switches are broadly used as OEM components and in machine tools, HVAC equipment and any process where the materials of construction and function are suitable.

SPECIFICATIONS

End Connections: 9/16"-18 UNF- 2A Typ.; adapters offered- 1/8" & 1/4" NPT & 1/2" ID Tubing Barb

Housing Material: Polysulfone

Piston Material: Polysulfone

Spring: 316 SS

O-Ring: Viton "A"

Wire: 18 AWG Polymeric 24" Long

Reed Switch: 15 VA SPST (N.O., N.C.), SPDT

Operating Temperature: -20 to 225°F

Operating Pressure: 250 PSI

Set Point Accuracy: 15% Max

Set Point Difference: 20% Max

Repeatability: 1% Max. Deviation

Specialty Options: 1 cc/min set point low flow model

Notes:

-Standard flow calibration is in water@70°F. Calibrated on increasing flow with lead wires up.

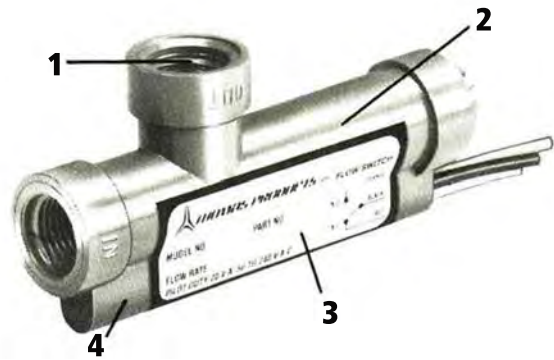
-Set point accuracy will change slightly in other than calibrated position.

-Polysulfone is a FDA approved material

ORDERING INFORMATION

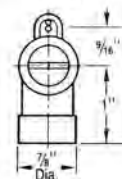
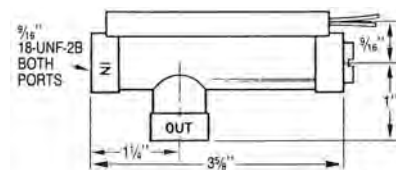
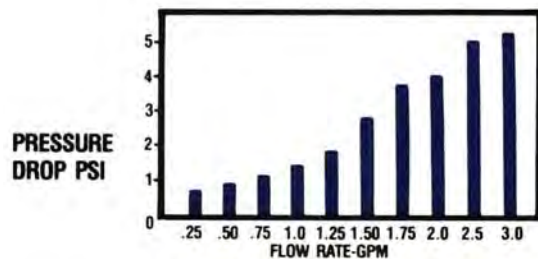
| Model | Flow Setting | Switch Type |
|------------|--------------|-------------|
| 2100-12686 | 0.1 GPM | N.O. |
| 2100-12687 | 0.25 GPM | N.O. |
| 2100-12688 | 0.5 GPM | N.O. |
| 2100-12589 | 0.75 GPM | N.O. |
| 2100-12690 | 1 GPM | N.O. |
| 2100-12691 | 1.5 GPM | N.O. |
| 2100-12695 | 0.1 GPM | N.C. |
| 2100-12696 | 0.25 GPM | N.C. |
| 2100-12697 | 0.5 GPM | N.C. |
| 2100-12698 | 0.75 GPM | N.C. |
| 2100-12699 | 1 GPM | N.C. |
| 2100-12700 | 1.5 GPM | N.C. |
| 2100-12704 | 0.1 GPM | SPDT |
| 2100-12705 | 0.25 GPM | SPDT |
| 2100-12706 | 0.5 GPM | SPDT |

| Accessories | |
|-------------|--|
| Model | Description |
| 2100-12720 | Adapter w/o-ring 9/16"-18 UNF to 1/8" NPT Female |
| 2100-12721 | Adapter w/o-ring 9/16"-18 UNF to 1/4" NPT Female |
| 2100-12722 | Adapter w/o-ring 9/16"-18 UNF to 1/2" Hose Barb |



1. Full size out port minimizes turbulence
2. Unique reverse taper design helps pass particulates.
3. One-piece housing yields burst strength of 1500 PSI @70°F
4. Large full size reed switch silicone potted for shock and vibration deadening

TYPICAL PRESSURE DROP VS FLOW



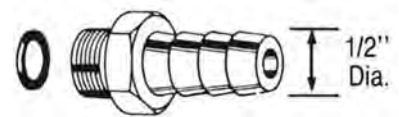
9/16"-18 UNF - 2A TYP.



2100-12720- 1/8" NPT Adapter



2100-12721- 1/4" NPT Adapter



2100-12722- 1/2"

CLARK

Series 1100 Bronze & Stainless Steel Flow Switches

3/4" to 3" Pipe Size

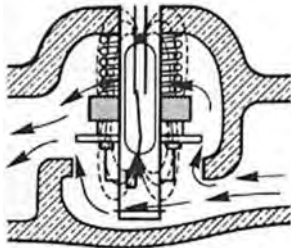
DESCRIPTION

Series 1100 flow switches are manufactured to exacting standards and provide accurate flow detection for most applications. Product inspection involves calibrated tools and gages traceable to National Bureau of Standards.

The flow switches are broadly used in machine tools, HVAC equipment and any process where the materials of construction and function are suitable.

Models are offered in bronze and 316 stainless steel housings with NPT threading. Optionally BSPT, SAE, Silver Braze & Socket connections are available.

FLOW SWITCH OPERATION



A magnet equipped shuttle is displaced at the proper calibrated flow of liquid to actuate the hermetically sealed reed switch. At flow rates under the set point, clearance is provided for the liquid to continue to flow.

When flow rates exceed the

set point the shuttle or piston is displaced even further to reveal a smooth, clear opening for a low pressure drop.

SPECIFICATIONS

Pipe Sizes: 3/4", 2", 1 1/4", 1 1/2", 2", 2 1/2", 3"

End Connections: NPT Standard; BSPT, SAE, Silver Braze, Socket & other available

Housing Material: Bronze or 316 SS, see models table

Shuttle: Teflon®

Spring: 316 SS

Magnet: Ceramic Ring Magnet

O-Ring: Viton "A"

Wire: 18 AWG Polymeric 24" Long

Reed Switch: 20 VA SPDT

Operating Temperature: -20 to 300°F

Operating Pressure: 400 PSI

Proof Pressure: 800 PSI

Burst Strength: 1200 PSI

Set Point Accuracy: ±10% Max

Set Point Difference: ±10%

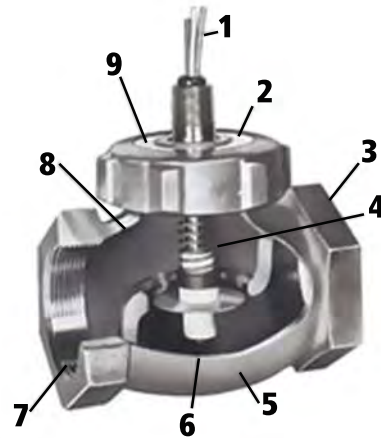
Repeatability: 1% Max. Deviation

Notes:

-Standard flow calibration is in water@70°F. Calibrated on increasing flow.

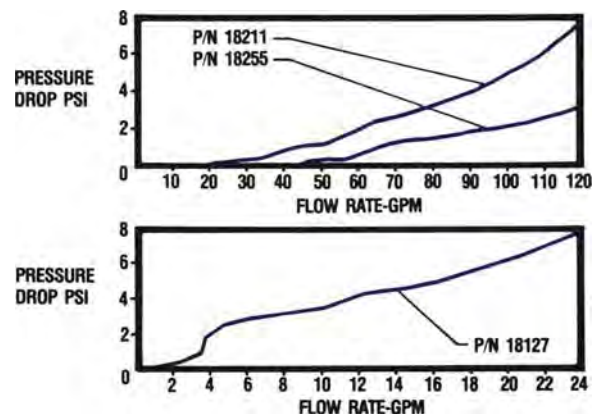
-Strain Reliefs are standard

-Call with special requirements including materials, electrical ratings, high temperature, port connections, special cable requirements etc.



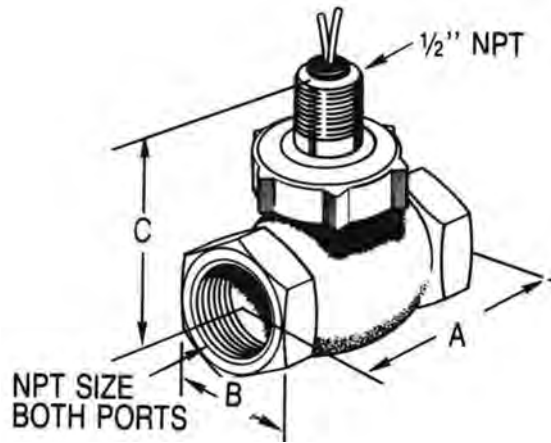
1. Switch capsule.
2. Salt spray and accelerated life tested. Naval Sea Systems Command.
3. 25% heavier wall thickness, published burst strength is derated.
4. Welding: Certified welders under requalification system, performed in low hydrogen environment; process schedules revision controlled. Inspection 100% bubble tight, hydrostatic, fluorescent penetrate.
5. True globe shaped housing yields lower pressure drop and minimizes turbulence
6. High pressure SST welded end plugs.
7. Machining in-house, special modifications available (i.e., NPT, BSPT, SAE, Silver Braze, Socket, etc.). Inspection using calibrated tools and gages traceable to National Bureau of Standards under recalibration systems.
8. Shock and vibration approved. Listed QPL 16032 shipboard alarm systems.
9. Serialization, documentation retained on purchased materials, processes, inspection, etc. Operational Q.C. systems and manual, MIL I 45208 MIL STD 45662. Raw materials inventoried in a controlled and segregated department under stock rotation program. Call-outs presented are typical to their respective models.

TYPICAL PRESSURE DROP VS FLOW



DIMENSIONS

| Dimensions | | | |
|------------|-----------------|--------------|-----------------|
| Size NPT | Length A Inches | Hex B Inches | H Height Inches |
| 3/4" | 2-7/8 | 1-3/8 | 2-3/4 |
| 1" | 3-1/4 | 1-25/32 | 3 |
| 1 1/4" | 4 | 3-3/16 | 3-3/16 |
| 1 1/2" | 4-1/2 | 2-1/2 | 3-1/2 |
| 2" | 5-3/8 | 3-3/32 | 4 |
| 2-1/2" | 6-5/16 | 3-5/8 | 4-1/2 |
| 3" | 7-3/8 | 4-3/8 | 5-5/32 |



ORDERING INFORMATION

| Model | Size NPT | Housing Material | Flow Setting GPM |
|------------|----------|------------------|------------------|
| 1100-18100 | 3/4" | Bronze | 0.5 |
| 1100-18101 | 3/4" | Bronze | 1.0 |
| 1100-18102 | 3/4" | Bronze | 2.0 |
| 1100-18103 | 3/4" | Bronze | 3.0 |
| 1100-18104 | 3/4" | Bronze | 4.0 |
| 1100-18105 | 3/4" | Bronze | 5.0 |
| 1100-18106 | 3/4" | Bronze | 6.0 |
| 1100-18107 | 3/4" | Bronze | 8.0 |
| 1100-18127 | 1" | Bronze | 0.5 |
| 1100-18128 | 1" | Bronze | 1.0 |
| 1100-18129 | 1" | Bronze | 2.0 |
| 1100-18130 | 1" | Bronze | 3.0 |
| 1100-18131 | 1" | Bronze | 4.0 |
| 1100-18132 | 1" | Bronze | 5.0 |
| 1100-18133 | 1" | Bronze | 6.0 |
| 1100-18134 | 1" | Bronze | 8.0 |
| 1100-18140 | 1" | 316 SS | 0.5 |
| 1100-18141 | 1" | 316 SS | 1.0 |
| 1100-18142 | 1" | 316 SS | 2.0 |
| 1100-18143 | 1" | 316 SS | 3.0 |
| 1100-18144 | 1" | 316 SS | 4.0 |
| 1100-18145 | 1" | 316 SS | 5.0 |
| 1100-18146 | 1" | 316 SS | 6.0 |
| 1100-18147 | 1" | 316 SS | 8.0 |
| 1100-18153 | 1-1/4" | Bronze | 1.0 |
| 1100-18154 | 1-1/4" | Bronze | 2.0 |
| 1100-18155 | 1-1/4" | Bronze | 4.0 |
| 1100-18156 | 1-1/4" | Bronze | 6.0 |
| 1100-18157 | 1-1/4" | Bronze | 8.0 |
| 1100-18158 | 1-1/4" | Bronze | 10 |
| 1100-18159 | 1-1/4" | Bronze | 12 |
| 1100-18160 | 1-1/4" | Bronze | 16 |
| 1100-18161 | 1-1/4" | Bronze | 20 |
| 1100-18183 | 1-1/2" | Bronze | 1.5 |
| 1100-18184 | 1-1/2" | Bronze | 3 |
| 1100-18185 | 1-1/2" | Bronze | 5 |
| 1100-18186 | 1-1/2" | Bronze | 7.5 |
| 1100-18187 | 1-1/2" | Bronze | 10 |
| 1100-18188 | 1-1/2" | Bronze | 15 |

| Model | Size NPT | Housing Material | Flow Setting GPM |
|------------|----------|------------------|------------------|
| 1100-18189 | 1-1/2" | Bronze | 20 |
| 1100-18190 | 1-1/2" | Bronze | 30 |
| 1100-18197 | 1-1/2" | 316 SS | 1.5 |
| 1100-18198 | 1-1/2" | 316 SS | 3 |
| 1100-18199 | 1-1/2" | 316 SS | 5 |
| 1100-18200 | 1-1/2" | 316 SS | 7.5 |
| 1100-18201 | 1-1/2" | 316 SS | 10 |
| 1100-18202 | 1-1/2" | 316 SS | 15 |
| 1100-18203 | 1-1/2" | 316 SS | 20 |
| 1100-18204 | 1-1/2" | 316 SS | 30 |
| 1100-18211 | 2" | Bronze | 2 |
| 1100-18212 | 2" | Bronze | 4 |
| 1100-18213 | 2" | Bronze | 5 |
| 1100-18214 | 2" | Bronze | 10 |
| 1100-18215 | 2" | Bronze | 15 |
| 1100-18216 | 2" | Bronze | 26 |
| 1100-18217 | 2" | Bronze | 35 |
| 1100-18218 | 2" | Bronze | 50 |
| 1100-18239 | 2 1/2" | Bronze | 5 |
| 1100-18240 | 2 1/2" | Bronze | 10 |
| 1100-18241 | 2 1/2" | Bronze | 15 |
| 1100-18242 | 2 1/2" | Bronze | 20 |
| 1100-18243 | 2 1/2" | Bronze | 25 |
| 1100-18244 | 2 1/2" | Bronze | 30 |
| 1100-18245 | 2 1/2" | Bronze | 40 |
| 1100-18246 | 2 1/2" | Bronze | 50 |
| 1100-18247 | 2 1/2" | Bronze | 60 |
| 1100-18248 | 2 1/2" | Bronze | 75 |
| 1100-18255 | 3" | Bronze | 5 |
| 1100-18256 | 3" | Bronze | 15 |
| 1100-18257 | 3" | Bronze | 20 |
| 1100-18258 | 3" | Bronze | 25 |
| 1100-18259 | 3" | Bronze | 30 |
| 1100-18260 | 3" | Bronze | 40 |
| 1100-18261 | 3" | Bronze | 50 |
| 1100-18262 | 3" | Bronze | 60 |
| 1100-18263 | 3" | Bronze | 75 |
| 1100-18264 | 3" | Bronze | 100 |

CLARK Series 1800 PVC Flow Switches

1" Pipe Size

DESCRIPTION

Series 1800 flow switches are manufactured to exacting standards and provide accurate flow detection for most applications. Product inspection involves calibrated tools and gages traceable to National Bureau of Standards.

Switch function involves magnet equipped PVC shuttle that is displaced at the proper calibrated flow of liquid to actuate the hermetically sealed reed switch.

The flow switches are broadly used as OEM components, in water & waste facilities, irrigation, HVAC equipment and any process where the materials of construction and function are suitable.



Model 1800 With & Without 1/2" NPT Conduit Connection

1. Solid one-piece removable bonnet provides safe use to 150 PSI
2. Switch design utilizes a stainless return spring to mount in any attitude
3. **Anti-meniscous** projections on shuttle prevents from drying in place after long machine shutdowns

SPECIFICATIONS

Wetted Materials

End Connections: 1" Slip

Housing Material: PVC

Piston Material: PVC; CPVC available, consult us

Magnet: Ceramic Ring Magnet

Spring: 316 SS

O-Ring: Viton "A"

Wiring: 18 AWG Polymeric 24" Long; with or without 1/2" NPT conduit connection spud (see model table)

Reed Switch: 20 VA SPST, **N.O.**; SPDT available option

Max Flow: 7 GPM

Operating Temperature: -20 to 140°F

Operating Pressure: 150 PSI

Set Point Accuracy: ±20% Max

Set Point Difference: ±20% Max

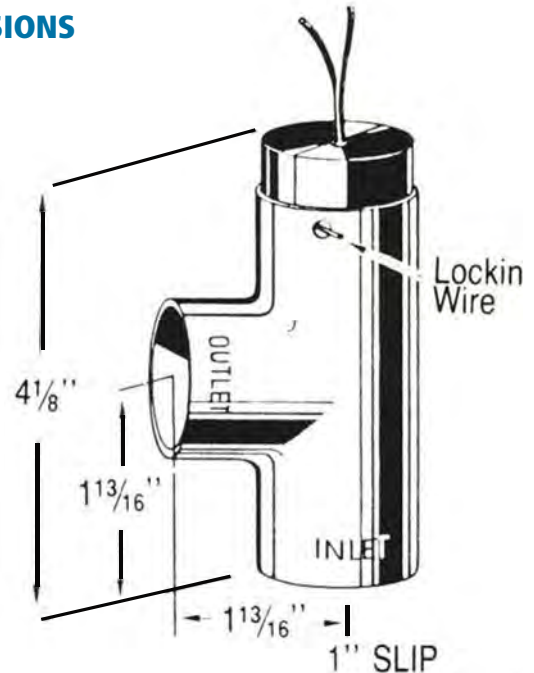
Notes:

-Standard flow calibration is in water@70°F. Calibrated on increasing flow with lead wires up.

-Flow setpoints available to 6 GPM, consult us

-Use only plastic junction box & flexible conduit if using the 1/2" NPT conduit spud.

DIMENSIONS



ORDERING INFORMATION

| Model | Flow Setting | 1/2" NPT Conduit Spud |
|------------|--------------|-----------------------|
| 1800-42549 | 0.5 GPM | No |
| 1800-42545 | 1.0 GPM | No |
| 1800-42570 | 0.5 GPM | Yes |
| 1800-42571 | 1.0 GPM | Yes |

| PVC Adapter Fittings | |
|----------------------|----------------------|
| Model | Description |
| 1800-42751 | 1" Slip to 3/4" Slip |
| 1800-42752 | 1" Slip to 1/2" Slip |
| 1800-42753 | 1" Slip to 3/4" NPT |
| 1800-42754 | 1" Slip to 1/2" NPT |

CLARK Series 2600 PVC Flow Switches

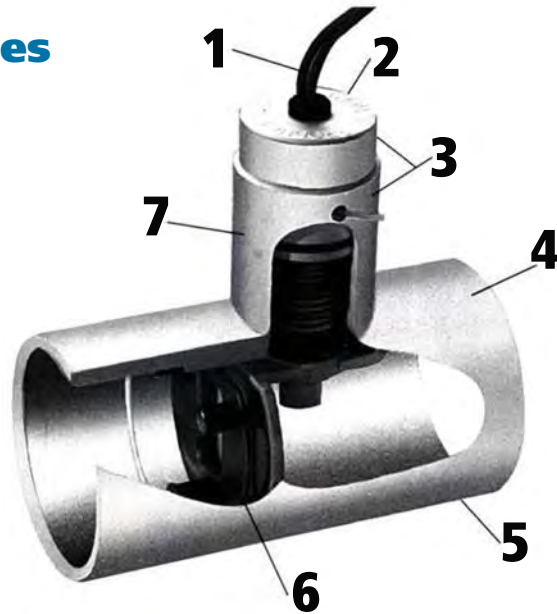
2" Pipe Size

DESCRIPTION

Series 2600 flow switches are manufactured to exacting standards and provide accurate flow detection for most applications. Product inspection involves calibrated tools and gages traceable to National Bureau of Standards.

Switch function involves magnet equipped PVC shuttle that is displaced at the proper calibrated flow of liquid to actuate the hermetically sealed reed switch.

The flow switches are broadly used as OEM components, in water & waste facilities, irrigation, HVAC equipment and any process where the materials of construction and function are suitable.



SPECIFICATIONS

Wetted Materials

End Connections: 2" Slip

Housing Material: PVC

Piston Material: PVC

Magnet: Ceramic Ring Magnet

Clapper: 316 SS

Spring: 316 SS

O-Ring: Viton "A"

Wiring: 18 AWG Polymer 24" Long; with or without 1/2" NPT conduit connection spud (see model table)

Reed Switch: 20 VA SPST, N.O.; SPST, N.O. & SPDT are available options, call us

Operating Temp., No 1/2" NPT Conduit Spud: -20 to 140°F

Operating Temp., With 1/2" NPT Conduit Spud: -20 to 122°F (due to different bonnet assembly)

Operating Pressure: 150 PSI

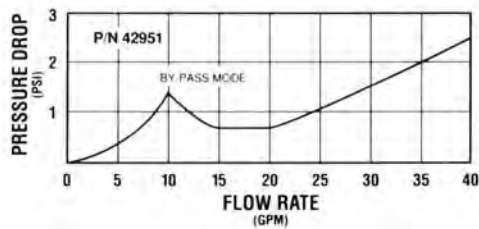
Set Point Accuracy: ±20% Max

Set Point Difference: ±20% Max

1. UL recognized
2. Serialization, documentation, retained on purchased materials, processes, inspection etc.
3. Removable bonnet assembly, replacement parts available.
4. Only virgin materials used and no color concentrate added during molding
5. Periodic destructive testing verifies burst strength ratings
6. Patented stainless steel clapper opens as flow increases. It enables low setpoint values and lowers pressure drop.
7. Accelerated life tested in a variety of fluids



TYPICAL PRESSURE DROP VS FLOW



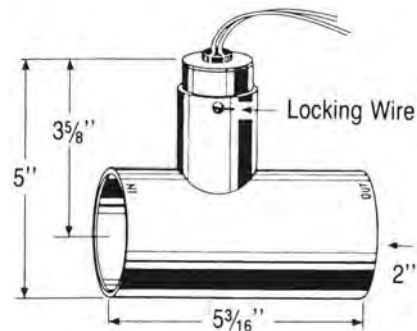
ORDERING INFORMATION

| Model | Flow Setting | 1/2" NPT Conduit Spud | PVC Adapter Fittings | |
|------------|--------------|-----------------------|----------------------|------------------------|
| | | | Model | Description |
| 2600-42951 | 0.5 GPM | No | 2600-42954 | 2" Slip to 1 1/2" Slip |
| 2600-42952 | 1.0 GPM | No | 2600-42955 | 2" Slip to 1 1/4" Slip |
| 2600-42953 | 2.0 GPM | No | 2600-42956 | 2" Slip to 1" Slip |
| 2600-42969 | 0.5 GPM | Yes | 2600-42957 | 2" Slip to 3/4" Slip |
| 2600-42970 | 1.0 GPM | Yes | 2600-42958 | 2" Slip to 1/2" Slip |
| 2600-42971 | 2.0 GPM | Yes | 2600-42959 | 2" Slip to 1 1/2" NPT |
| | | | 2600-42960 | 2" Slip to 1 1/4" NPT |
| | | | 2600-42961 | 2" Slip to 1" NPT |
| | | | 2600-42962 | 2" Slip to 3/4" NPT |
| | | | 2600-42963 | 2" Slip to 1/2" NPT |

Notes:

- Standard flow calibration is in water@70°F. Calibrated on increasing flow with lead wires up.
- Use only plastic junction box & flexible conduit if using the 1/2" NPT conduit spud.

DIMENSIONS



CLARK DS 1000 & DS 1000X

Loop-Powered Rate Meter, Analog Input

DESCRIPTION

With backlit 5 digit LED display, the panel mount meters DS1000 and DS1000X use a 4-20 mA analog input signal. Both the DS1000 for safe areas, and DS1000X for hazardous areas, feature custom engineering units and bargraph, as well as programmable exponent. The bright orange backlight, Nema 4X front panel, and shallow depth case with mounting brackets simplify installation in almost any environment. Simple programming via 4 front panel buttons is stored in non-volatile memory, and secured by means of a password. For hazardous locations, model DS1000X has FM approval and CSA certification.



FEATURES

- 4-20 mA Input
- 5 Digit LCD, 0.6" (15.2 mm) High
- FM Type 4X, IP65 Front
- Shallow Depth Case 3.2" Behind Panel
- 2 V Drop (5.7 V with Backlight)
- Loop-Powered Backlight Standard
- Custom Engineering Units & Bargraph
- Linear, Square Root, or Programmable Exponent
- Maximum & Minimum Display
- Operating Temperature -30 to 65 °C (-22 to 149 °F)
- Model DS1000X- Intrinsically Safe & Non-Incendive
- HART Protocol Transparent

SPECIFICATIONS

GENERAL

Display: 5 digit LCD (-99999 to 99999), 0.60" (15.2 mm) high, 7-segment, automatic lead zero blanking.

Engineering Units: 0.25" (6.4 mm) high, 14-segment

Bargraph: 20-segment, 0-100% indication

Trend Arrows: Up and down trend indication

Backlight: Bright orange LED (intensity varies with signal)

Front Panel: FM Type 4X, IP65; panel gasket provided

Display Update Rate: 2.5/second

Overrange: Display flashes 99999

Underrange: Display flashes -99999

Programming Method: Four front panel buttons

Noise Filter: Programmable from 1 to 199

Recalibration: Recommended at least every 12 months

Max/Min Display: Max/min readings reached by the process are stored until reset by the user or until power to the meter is turned off.

Password: Programmable password restricts modification of settings.

Non-Volatile Memory: All programmed settings are stored in non-volatile memory for a minimum of ten years if power is lost.

Voltage Drop: 2.0 V max w/o backlight, 5.7 V max with backlight

Equivalent Resistance: 100 ohms @ 20 mA without backlight, 285 ohms @ 20 mA with backlight

Normal Mode Rejection: 64 dB at 50/60 Hz

Operating Temperature Range: -30 to 65 °C (-22 to 149 °F)

Storage Temperature Range: -40 to 85 °C (-40 to 185 °F)

Relative Humidity: 0-90% non-condensing

Connections: Screw terminals accept 12 to 22 AWG wire

Enclosure: 1/8 DIN, high impact plastic, UL 94V-0, color: gray

Mounting: 1/8 DIN panel cutout required. Two panel mounting bracket assemblies provided.

Tightening Torque: 4.5 lb-in (0.5 Nm) Screw terminal connectors

Overall Dimensions: 4.68" x 2.45" x 3.79" (119 x 62 x 96 mm)

Weight: 5.7 oz (162 g)

INPUT

Input Range: 4-20 mA

Accuracy: $\pm 0.03\%$ of span ± 1 count, square root and programmable exponent: 10-100% FS.

Calibration: Scale without signal or calibrate with signal source

Calibration Range: User programmable over entire range of meter

Minimum Span: 0.40 mA between inputs 1 and 2

Input Overload: Over current protection to 2 A maximum

Decimal Point: Up to 4 places

Function: Linear, square root or programmable exponent

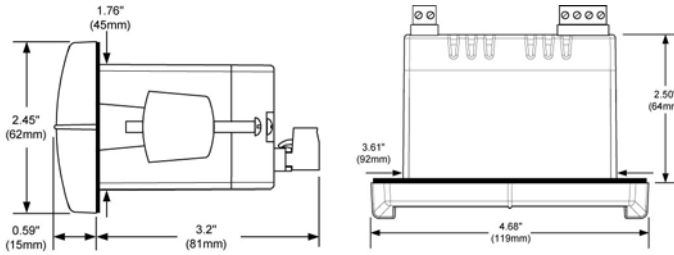
Low-Flow Cutoff: -99999 to 99999 (-99999 disables cutoff function)

Temperature Drift: 50 PPM/°C from -40 to 65 °C (-40 to 149 °F) ambient

INSTALLATION

Installation, wiring, and setup may be completed without having to remove the meter from its case.

Mounting Dimensions - Inches (mm)

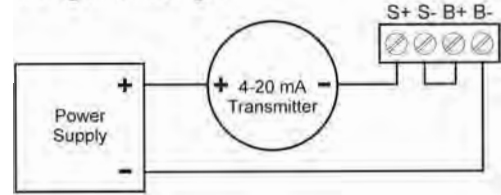


Notes:

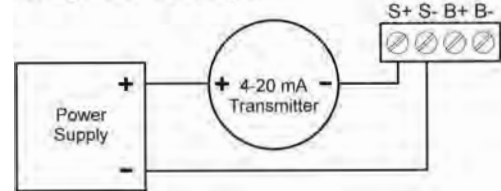
1. Panel cutout required: 3.622" x 1.772" (92 x 45)
2. Panel thickness: 0.040" - 0.250" (1.0 - 6.4)
3. Mounting brackets lock in place for easy mounting

4-20 mA Input Connection

Wiring with Backlight



Wiring without Backlight



ENCLOSURES



DS1000 shown in NEMA 4X enclosure
Order Option - ENC

Additional enclosure options include steel, stainless steel, plastic, and explosion-proof. Enclosures for multiple meters are also available. Consult factory for details.

MODEL DS1000X - APPROVALS FOR HAZARDOUS LOCATIONS

FM Approved & CSA Certified as intrinsically safe with entity for use in Class I, Div 1 Groups ABCD; Class II, Div 1, Groups EFG; Class III, Div 1; Class I, Zone 0, Group IIC; T-code = T4.
Non-incendive: Suitable for use in Class 1, Div 2, Groups ABCD; Class II, Div 2, Groups FG; Class III, Div 2.
Entity Parameters: $U_i=30$ V; $I_i=175$ mA; $C_i=0$; $L_i=0$; $P_i=1.0$ W

ORDERING INFORMATION

EXAMPLE: DS1000-ENC

| Model | Description | Option |
|---------|--|---------------------------------|
| DS1000 | Rate Meter for Safe Area | |
| DS1000X | Rate Meter for hazardous area - FM & CSA | ENC = plastic NEMA 4X enclosure |

CLARK DS 2000 & DS 2000X

Loop-Powered Rate/Totalizer, Analog Input

DESCRIPTION

With backlit 5 digit LED display, the DS2000 and DS2000X totalizer/ratemeters use a 4-20 mA analog input signal. Both the DS2000 for safe areas, and DS2000X for hazardous areas, feature bargraph, open collector output, programmable exponent, and custom engineering units. The bright orange backlight, Nema 4X front panel, and shallow depth case with mounting brackets simplify installation in almost any environment. Simple programming via 4 front panel buttons is stored in non-volatile memory, and secured by means of a password. The DS2000X with FM approval and CSA certification is suitable for hazardous locations.



FEATURES

- 4-20 mA Input
- Programmable Alternating Rate/Total Display
- FM Type 4X, IP65 Front
- Overflow Feature Displays Total up to 8 Digits
- 5 Digit LCD, 0.6" (15.2 mm) High
- Custom Engineering Units & Bargraph
- Linear, Square Root, or Programmable Exponent
- Maximum & Minimum Display
- Operating Temperature -20 to 65 °C (-4 to 149 °F)
- Intrinsically Safe & Non-Incendive - DS2000X
- Open Collector Alarm or Pulse Output

SPECIFICATIONS

GENERAL

Display: 5 digit LCD (-99999 to 99999), 0.60" (15.2 mm) high, 7-segment, automatic lead zero blanking.

Engineering Units: 0.25" (6.4 mm) high, 14-segment

Bargraph: 20-segment, 0-100% indication

Trend Arrows: Up and down trend indication

Backlight: Bright orange LED (intensity varies with signal)

Front Panel: FM Type 4X, IP65; panel gasket provided

Display Update Rate: 2.5/second

Overrange: Display flashes 99999

Underrange: Display flashes -99999

Programming Method: Four front panel buttons

Noise Filter: Programmable from 1 to 199

Recalibration: Recommended at least every 12 months

Max/Min Display: Max/min readings reached by the process are stored until reset by the user or until power to the meter is turned off.

Password: Programmable password restricts modification of settings.

Non-Volatile Memory: All programmed settings are stored in non-volatile memory for a minimum of ten years if power is lost.

Voltage Drop: 2.0 V max w/o backlight, 5.7 V max with backlight

Equivalent Resistance: 100 ohms @ 20 mA without backlight, 285 ohms @ 20 mA with backlight

Normal Mode Rejection: 64 dB at 50/60 Hz

Operating Temperature Range: -20 to 65 °C (-4 to 149 °F)

Allowable Temperature Range: -40 to 65 °C (-40 to 149 °F)
n.b. Below 20 °C the LCD becomes less readable.

Storage Temperature Range: -40 to 85 °C (-40 TO 185 °F)

Relative Humidity: 0-90% non-condensing

Connections: Screw terminals accept 12 to 22 AWG wire

Enclosure: 1/8 DIN, high impact plastic, UL 94V-0, color: gray

Mounting: 1/8 DIN panel cutout required. Two panel mounting bracket assemblies provided.

Tightening Torque: 4.5 lb-in (0.5 Nm) Screw terminal connectors

Overall Dimensions: 4.68" x 2.45" x 3.79" (119 x 62 x 96 mm)

Weight: 5.7 oz (162 g)

INPUT

Input Range: 4-20 mA

Accuracy: $\pm 0.03\%$ of span ± 1 count, square root and programmable exponent: 10-100% FS.

Calibration: Scale without signal or calibrate with signal source

Calibration Range: User programmable over entire range of meter

Minimum Span: 0.40 mA between inputs 1 and 2

Input Overload: Over current protection to 2 A maximum

Decimal Point: Up to 4 places

Function: Linear, square root or programmable exponent

Low-Flow Cutoff: -99999 to 99999 (-99999 disables cutoff function)

Temperature Drift: 50 PPM/°C from -40 to 65 °C (-40 to 149 °F) ambient

TOTALIZER FEATURES

Total Display: 0 to 9,9999 main total display plus 0 to 999 total overflow for combined 8 digit total of 99,999,999.

Alternating Display: May be programmed to alternate between rate and total every 10 seconds.

Time Base: Seconds, minutes, hours, or days

Totalizer Conversion Factor: 0.0001 to 99999

Totalizer: Calculates total based on rate, time base, and field programmable multiplier; stored in non-volatile memory upon power loss.

Totalizer Rollover: Total rolls over when total exceeds 99,999,999.

Totalizer Reset: Manual reset or automatic with time delay, or disabled for non-resettable total applications.

OPEN COLLECTOR OUTPUT

Rating: Isolated open collector, 30 VDC @ 175 mA maximum

Alarm Output: Assign to rate or total, high or low rate alarm.

Deadband: 0-100% FS, user selectable

Acknowledge: ACK button resets output and screen indication.

Automatic Reset: Alarm resets automatically when signal reaches reset point.

Pulse Output: K-Factor programmable from 0.0001 to 99999.

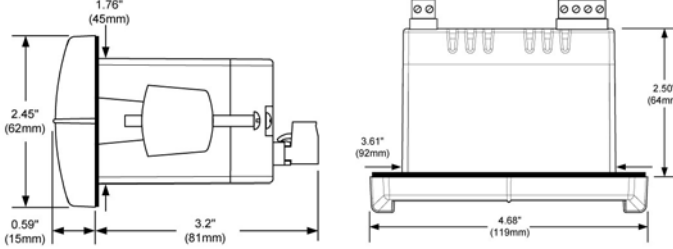
Programmable frequency: 2,4,6,8,16,32,64,128 Hz.

Pulse width: minimum 3.9ms @ 128 Hz; maximum 250 ms @ 2 Hz.

INSTALLATION

Installation, wiring, and setup may be completed without having to remove the meter from its case.

Mounting Dimensions - Inches (mm)

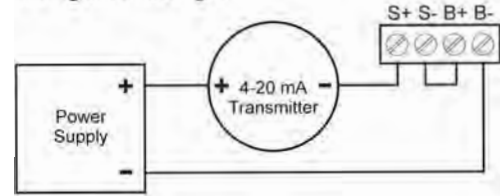


Notes:

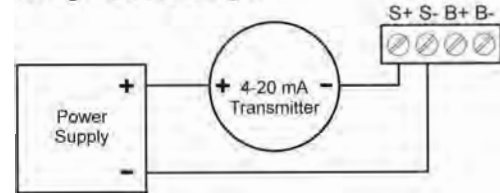
1. Panel cutout required: 3.622" x 1.772" (92 x 45)
2. Panel thickness: 0.040" - 0.250" (1.0 - 6.4)
3. Mounting brackets lock in place for easy mounting

4-20 mA Input Connection

Wiring with Backlight



Wiring without Backlight



ENCLOSURES



DS2000 shown in NEMA 4X enclosure
Order Option - ENC

Additional enclosure options include steel, stainless steel, plastic, and explosion proof. Enclosures for multiple meters are also available. Consult factory for details.

DS2000X APPROVALS FOR HAZARDOUS LOCATIONS

FM Approved & CSA Certified as intrinsically safe with entity for use in Class I, Div 1 Groups ABCD; Class II, Div 1, Groups EFG; Class III, Div 1; Class I, Zone 0, Group IIC; T-code = T4.
Non-incendive: Suitable for use in Class 1, Div 2, Groups ABCD; Class II, Div 2, Groups FG; Class III, Div 2.
Entity Parameters: $U_i=30$ V; $I_i=175$ mA; $C_i=0$; $L_i=0$; $P_i=1.0$ W

ORDERING INFORMATION

EXAMPLE: DS2000-ENC

| Model | Description | Option |
|---------|--|---------------------------------|
| DS2000 | Rate/Totalizer for Safe Area | ENC = plastic NEMA 4X enclosure |
| DS2000X | Rate/Totalizer for hazardous area - FM & CSA | |

CLARK DS 3000A & DS 3000P

Dual-line Rate/Totalizer, Analog or Pulse Input

DESCRIPTION

Simultaneous display of rate and total makes the 2-line DS3000 Rate/Totalizer an ideal choice for flow applications. The DS3000A may be configured for a variety of analog input signals, while the DS3000P will take pulse input signals. Via the UV resistant, Nema 4X front panel, the main and secondary displays may be programmed to display totals, engineering units, custom legends, min/max values or relay setpoints.



FEATURES

- Nema 4X, IP65 Front Panel
- User Configurable, Sunlight Readable Display
- Input Power: 85-365 VAC or 12/24 VDC
- Large, Dual-Line, 6-Digit Display for Simultaneous Rate & Total
- 9-Digit Totalizer; Total Stored in Non-volatile Memory
- 2 or 4 Relays + Isolated 4-20 mA Output Options
- Programmable Displays & Function Keys
- Rates in Units per Second, Minute, Hour, or Day
- Total, Grand Total or Non-Resettable Grand Total
- Password Protection for Total Reset

SPECIFICATIONS

GENERAL

Display: Main display: 0.60" (15 mm) high, second display: 0.46" (12mm) high. Displays are 6 digits (-99999 to 999999), red LEDs, leading zeros suppressed.

Display Intensity: Eight user selectable intensity levels

Overrange: Display flashes 999999 **Underrange:** -99999

Front Panel: NEMA 4X, IP65

Programming Methods: Four front panel buttons, digital inputs, PC and multi-point linearization utility, or cloning using Copy function.

Recalibration: All ranges are calibrated at the factory. Recalibration is recommended at least every 12 months.

Max/Min Display: Max/Min values are stored until reset or power is turned off.

Decimal Point: Up to five decimal places: d.ddddd, d.dddd, d.ddd, d.dd, d.d, dddddd

Password: Multiple programmable passwords protect settings and totals.

Non-Volatile Memory: All programmed settings are stored in nonvolatile memory for a minimum of ten years if power is lost.

Power Options: 85-265 VAC 50/60 Hz, 90-265 VDC 20 W max, or jumper selectable 12/24 VDC $\pm 10\%$, 15 W max.

Fuse: Required external fuse: UL Recognized, 5 A max, slow blow; up to 6 meters may share one 5 A fuse.

Isolated Transmitter Power Supply: Terminals P+ & P-: 24 VDC $\pm 10\%$ @ 200 mA max (standard), (12/24 VDC powered models rated @ 100 mA max). 5 or 10 VDC @ 50 mA max, selectable with internal jumper J4.

Isolation: 4 kV input/output-to-power line. 500 V input-to-output or output-to-P+ supply.

Temperature: Operating: -40 to 65°C. Storage temperature range: -40 to 85°C. Relative humidity: 0 to 90% non-condensing.

Connections: Removable screw terminal blocks accept 12 to 22 AWG wire, RJ45 for external relays, digital I/O, and serial communication adapters.

Enclosure: 1/8 DIN, high impact plastic, UL 94V-0, color: black

Mounting: 1/8 DIN panel cutout required: 3.622" x 1.772" (92 mm x 45 mm). Two panel mounting bracket assemblies are provided.

Overall Dimensions: 4.68" x 2.45" x 5.64" (119 mm x 62 mm x 143 mm) (W x H x D); Weight: 9.5 oz (269 g)

ANALOG INPUT (MODEL DS3000A)

Field selectable: 0-20, 4-20 mA, ± 10 VDC (0-5, 1-5, 0-10 V)

Accuracy: $\pm 0.03\%$ of calibrated span ± 1 count, square root & programmable exponent accuracy range: 10-100% of calibrated span

Display Update Rate: 5/second (200 ms)

Temperature Drift: 0.005% of calibrated span/ $^{\circ}$ C max from 0 to 65 $^{\circ}$ C ambient, 0.01% of calibrated span/ $^{\circ}$ C max from -40 to 0 $^{\circ}$ C ambient

Math Function: Linear, square root, programmable exponent, or round horizontal tank volume calculation.

Multi-Point Linearization: 2 to 32 points

Programmable Exponent: 1.0001 to 2.9999

Low-Flow Cutoff: 0-999999 (0 disables cutoff function)

Calibration Range: Input : 4-20 mA, ± 10 V. Minimum span: 0.15 mA or 0.10 V

Input Overload: Current input protected by resettable fuse, 30 VDC max.

Noise Filter: Programmable from 2 to 199 (0 will disable filter)

Filter Bypass: Programmable from 0.1 to 99.9% of calibrated span

Normal Mode Rejection: Greater than 60 dB at 50/60 Hz

PULSE INPUT (MODEL DS3000P)

Field selectable: Pulse or square wave 0-5 V, 0-12 V, or 0-24 V @ 30 kHz; TTL; open collector 4.7 kohm pull-up to 5 V @ 30 kHz; NPN or PNP transistor, switch contact 4.7 kohm pull-up to 5 V @ 40 Hz.

Low Voltage Mag Pickup (Isolated): 40mVp-p to 8Vp-p

Minimum Input Frequency: 0.001 Hz -> Minimum frequency is dependent on high gate setting

Maximum Input Frequency: 30,000 Hz (10,000 for Low Voltage Mag Pickup)

Input Impedance: Pulse input: Greater than 300 kohm @ 1 kHz. Open collector/switch input: 4.7 kohm pull-up to 5 V.

Accuracy: $\pm 0.03\%$ of calibrated span ± 1 count

Display Update Rate: Total: 10/sec, Rate: 10/sec to 1/100 sec

Temperature Drift: Rate display is not affected by changes in temperature.

Multi-Point Linearization: 2 to 32 points

Low-Flow Cutoff: 0-999999 (0 disables cutoff function)

Calibration: May be calibrated using K-factor, scale using internal calibration, or by applying an external calibration signal.

K-Factor: Field programmable K-factor converts input pulses to rate in engineering units. 0.00001 to 999,999 pulses/unit.

Time Base: Second, minute, hour, or day

Gate: Low gate: 0.1-99.9 seconds; High gate: 2.0-999.9 seconds

SPECIFICATIONS (continued)

RATE/TOTALIZER

Display Assignment: Each display may be assigned to rate, total, grand total, alternate R & T, units, or set point.

Alternating Display: Either display may be programmed to alternate between rate and total or rate and grand total every 10 seconds.

Total Conversion Factor: 0.00001 to 59,999

Totalizer Rollover: Totalizer rolls over when display exceeds 999,999,999. Relay status reflects the display value.

Totalizer Presets: Up to eight, user selectable under Setup menu. Any set point can be assigned to total and may be programmed anywhere in the range of the meter for total alarm indication.

Programmable Total Reset Delay: 0.1 to 999.9 seconds; applied to the first relay assigned to total or grand total. If the meter is programmed to reset total to zero automatically when the preset is reached, then a delay will occur before the total is reset.

Total Reset: Via front panel button, external contact closure on digital inputs, automatically via user selectable preset value and time delay, or via serial communications.

Non-Resettable Total: The grand total can be programmed as a nonresetttable total by entering the password "050873". Caution: Once the Grand Total has been programmed as "non-resetttable" the feature cannot be disabled.

RELAYS

Rating: 2 or 4 SPDT (Form C) internal and/or 4 SPST (Form A) external; rated 3 A @ 30 VDC and 125/250 VAC resistive load; 1/14 HP @ 125/250 VAC for inductive loads

Noise Suppression: Noise suppression is recommended for each relay contact switching inductive loads.

Deadband: 0-100% of span, user programmable

Relay Assignment: Relays may be assigned to rate, total, or grand total.

High or Low Alarm: User may program any alarm for high or low trip point.

Relay Operation: automatic (non-latching), latching (requires manual acknowledge), sampling (based on time), off (disable unused relays), and manual control mode.

Relay Reset: User selectable via front panel buttons, digital inputs, or PC

Time Delay: 0 to 999.9 seconds, on & off relay time delays.

Fail-Safe Operation: Programmable and independent for each relay.

Note: Relay coil is energized in non-alarm condition. In case of power failure, relay will go to alarm state.

4-20 mA TRANSMITTER OUTPUT

Output Source: Rate, total, grand total, max, min, set points 1-8, or manual control

Scaling Range: 1.000 to 23.000 mA for any display range

Calibration: Factory calibrated: 4.000 to 20.000 = 4-20 mA output

Analog Output Programming: 23.000 mA maximum for all parameters: Overrange, underrange, max, min, and break

Accuracy: +/- 0.1% FS +/- 0.004 mA

External Loop Power Supply: 35 VDC maximum

Output Loop Resistance: (Power/Minimum Resistance/Maximum Resistance)
24 VDC / 10 ohm / 700 ohm; 35 VDC external/ 100 ohm / 1200 ohm

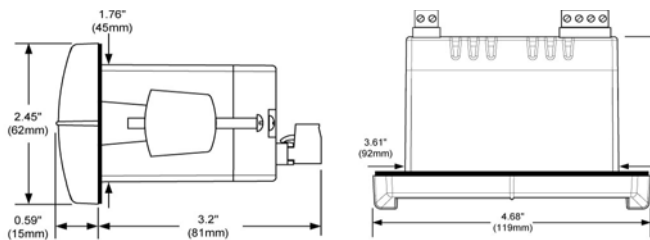
OTHER OPTIONS AVAILABLE (Consult factory for details)

Serial Communication

Digital I/O Expansion Module

4-Relay Expansion Module

MOUNTING DIMENSIONS



Notes:

1. Panel cutout required: 3.622" x 1.772" (92 x 45)
2. Panel thickness: 0.040" - 0.250" (1.0 - 6.4)
3. Mounting brackets lock in place for easy mounting

DS3000P shown in NEMA 4X enclosure Order Option - ENC

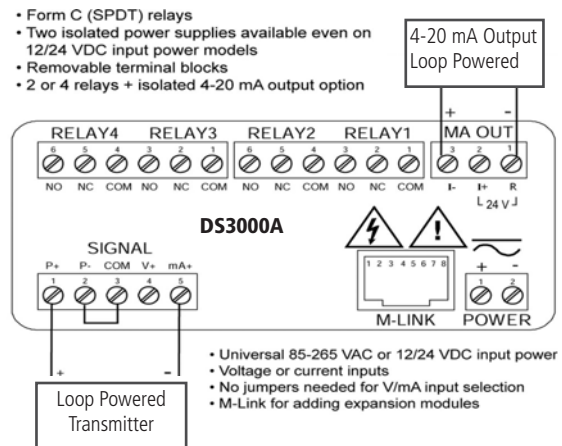
Additional enclosure options include plastic, stainless steel, and painted steel. Enclosures for multiple meters are also available. Consult factory for details.



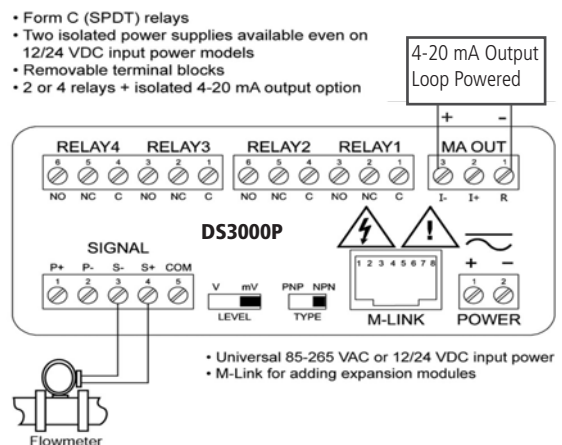
ORDERING INFORMATION

EXAMPLE: DS3000P-ENC

| Model | Description | Option |
|--------|---|---------------------------------|
| DS3000 | A = Rate / Totalizer for Analog Input P = Rate / Totalizer for Pulse / Frequency Input | ENC = plastic NEMA 4X enclosure |



CONNECTIONS



CLARK DS 5000

Universal Process Controller - Up to 8 Inputs / Outputs

DESCRIPTION

Suitable for most batching or dosing applications, the DS5000 is a versatile, high quality and reliable microcomputer-based controller. The instrument's user configurable screw-terminal channels enable any mix of up to eight inputs and/or outputs regardless of the signal type.



FEATURES

- Dosing and Proportional Mixing
- Mix Up To Four Independent I/O Channels or Eight I/O Ports
- Input Measurements - Digital, Current, Volts
- Output Controls - Relay, Current, Volts
- Menu Driven Graphic Controls
- Measurement Accuracy to 0.01%
- On-Board Datalogging
- Real-Time Clock-Calendar
- Information Reports and Alarms
- Serial Communication
- User Programmable Units, Rate-Time Base, Scaling
- Keypad Security

SPECIFICATIONS

GENERAL

Control Functions: Monitor, Batch, Blend, PID, Manual

Measure Type Rate: Total, Scalar

Process Input: Digital, Current, Volt

Process Rate: 0.00±9,999,999.99 unit/time-base

Totalize Range: 0-99,999,999.99 units

Process Output: Current, Volt, Relay

Programmable Values:

Port Select: Off, Input, Output

Rate Time: Base scalar (none), sec, min, hrs, day

Rate Set-Point: 0.00±9,999,999.99 units

Batch Set-Point: 0.00±9,999,999.99 units

Blend Set-Point: 0.00±9999999.999%

Rate-Value Filter: 1.0-20 sec 10%-90%

PID Response: 1.0-20 sec

Input Signal Interpolate: Lo-Hi Value=0-10.000/20.000,

Lo-Hi units=0.00±9,999,999.99

Output Interpolate: Lo-Hi Value=0-10.000/20.000,

Lo-Hi units=0.00±9,999,999.99

Pulse Signal Interpolate: 0.00±9,999,999.999 pulse/qty ratio

Measure Units: 5 Chars (a-z, 0-9, A-Z, other)

Quantity 1, 2 Alarm: 0.00-99,999,999.99 units

Rate Hi-Lo Alarm: 0.00±9,999,999.99 units

Service Time Alarm: 0-65,535 hrs

Global Functions:

WAN Addresses: Dual 16 characters

Answer Rings: 0-255 (WAN option only)

Network Address: 0-65,535

Serial Port Functions: Sio-Wan-Lan, Report-Log-Alarms

Date-Time Clock: dd-mm-yy, hrs-min-sec

Report/Log Frequency: 0-999 sec-min-hrs-day-month

Serial Ports

Sio: EIA-TIA232D fdx D9S

Wan: USOC RJ-11 tip-ring FCC Subpart H fdx WAN option

Lan: EIA-TIA485 multidrop master-slave option <or> 10-100 Ethernet option

Self Diagnostics

Memory validities, installation, communication local-remote

Input Interface

Channels Isolation: >85 dbv (nom)

Interface: 1x3 plug signal gnd excitation <or> DA15S option

Excitation: Vr (4.096V±0.01%) +5v Vpwr @ ~25mA max

Digital Pulse: 0-24 V threshold 2.4V (typ) Zi~10K pulled to +5V

>20KHz ±0.001% hall, open collector 5V cmos switch contacts

Analog Voltage: 0-10.000V ±0.10% Zi~10.0K DA15S sense compensated

Analog Current: 0-20.000 mA ±0.10% Zi=100 ohm

Analog Resistance: 0-0.2M ohms

Output Interface

Interface: 1x3 plug signal gnd aux-signal <or> DA15S option

Analog Voltage: 0-10.000V ±0.10% Zo<0.25 ohm DA15S option sense compensated

Analog Current: 0-20.000mA ±0.10% Zo~2M sourcing

Relay Rating: Form C 28 VDC-vac 1.0A Isolated 1KV

Aux Signal: -4.0V to +8V @ +/- 4.0mA

Power Control: 2.0 Amps Max.

Value Memory

Nvram 8Kx8 non-volatile parallel

Eerom 512x8 non-volatile 100 yr retention, Eerom 256Kx8 non-volatile

serial log option

Static ram 1Kx8 parallel, Static ram 32x8 serial battery backed

Power Required

Volts-Power: 12-24 VDC 2.0w (without options)

Jack Unipolar: 2.1<or>2.5mm 2A<or>5A center pos UL/CSA

Plug Bipolar: DE9P 5A rated UL/CSA

Battery: Lithium 3.0V 12mm 35 mA-hr 9 yr operate date-time clock option

Operating Environment

Operation: 0-55°C 0-95% RH non-condensing

Ship-Storage: -20° to +85°C 0-95% RH non-condensing

Warm Up: 3 sec typical to rated accuracy

Enclosure: ABS plastic NEMA 4X front panel

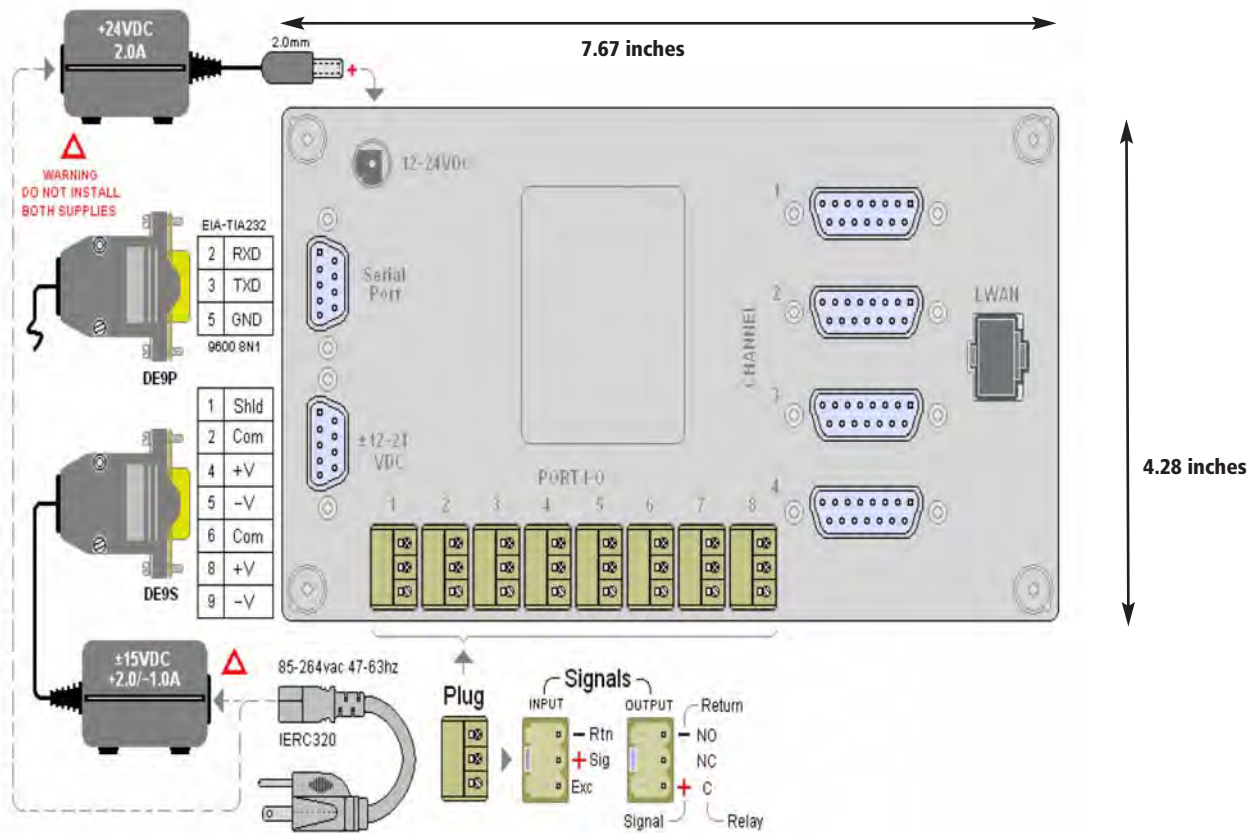
Mounting Frame, panel, desk-top

Panel Cut-Out Rectangular 7.67x4.28, R 0.125 4x (195x109, R 3.0 4x)

Weight: 595gm (without options)

Compliances: CE Mark RoHS FCC15-A FCC68 5TUUSA-23969-DT-E

ELECTRICAL DIAGRAM



ORDERING INFORMATION

EXAMPLE: DS5000-C532A2BC

| Model | # Inputs | # Outputs | Communications | Power | Options | Mounting |
|--------|----------|-----------|---|--|--|---|
| DS5000 | * C[1-9] | * 3[0-7] | A - Serial communication C - WAN modem | 0 - No power 2 - 12V to 115 VAC 3 - 24 V to 115 VAC 4 - 95 to 264 VAC | B - Keypad security C - Realtime clock calendar L - Onboard datalogger | A - Frame C - Panel D - Table top |

* Total number of Inputs plus Outputs must be less than or equal to 8.

CLARK

CS-800 Multi-Purpose Test Instrument

Air Velocity/Wind Speed, Humidity, Temperature, Light Intensity

DESCRIPTION

The CS-800 is a marvelous and economical service tool for use in the factory and in commercial and industrial buildings as well as laboratories for quick checking of ventilating fume hood and grill velocities, humidity, temperature and lighting levels. It is also useful on the farm for checking ventilation and lighting in enclosed livestock facilities as well as compost and critical equipment temperatures. Quick reference to outdoor wind speed is also of interest to farmers, firefighters, environmentalists, weather studies, and sportsmen.

Measuring units and functions are easily selected using the six button touch pad. Reading hold function and Max-Min data record function are standard features.

SPECIFICATIONS

GENERAL

- Display: 8 mm LCD
- Measurement: Air Velocity, Humidity, Temperature, Light
- Operating Humidity: Max. 80% R.H.
- Operating Temperature: 0 to 50°C (32-122°F)
- Over Range Display: " - - - - "
- Power Supply: 9 VDC Heavy Duty Battery (not included)
- Current Consumption: Approx. 6.2 mA
- Weight: 160g(with battery)
- Dimension: 156H x 60W x 33L mm (6.14" x 2.36" x 1.29")
- Options: Carrying case, type K thermocouple probes

AIR VELOCITY(ROTATING VANE ANEMOMETER)

| Unit | Range | Resolution | Accuracy |
|--------|-------------|------------|-------------------|
| ft/min | 80 to 5910 | 1 ft/min | |
| m/s | 0.4 to 30.0 | 0.1 m/s | ±3% F.S. < 20 m/s |
| km/h | 1.4 to 108 | 0.1 km/h | ±4%F.S. > 20 m/s |
| knots | 0.8 to 58.3 | 0.1 knots | |

HUMIDITY(THIN FILM CAPACITANCE SENSOR)

| Unit | Range | Resolution | Accuracy |
|------|-------|------------|--|
| % RH | 10-95 | 0.1% RH | ±4% reading. < 70% RH ±4% reading. > 70% RH +1.2% |

LIGHT(PHOTO DIODE AND COLOR CORRECTION SENSOR)

| Unit | Range | Resolution | Accuracy |
|-------|-------------|------------|------------------------|
| Lux | 0 to 20,000 | 1 Lux | ±5% reading. ±8 digits |
| Ft-cd | 0 to 2000 | 1 Ft-cd | |

TEMPERATURE (BUILT-IN THERMISTOR)

Displays along with Air Velocity or Humidity function

| Unit | Range | Resolution | Accuracy |
|------|-----------|------------|----------|
| °F | 32 to 122 | 0.1°F | ±2.5°F |
| °C | 0 to 50 | 0.1°C | ±1.2°C |



External type K probes are supplied with mini thermocouple plug

| Unit | Range | Resolution | Accuracy |
|------|--------------|------------|------------------|
| °F | -148 to 2372 | 0.1°F | ±1% reading +2°F |
| °C | -100 to 1300 | 0.1°C | ±1% reading +1°C |

TP-01



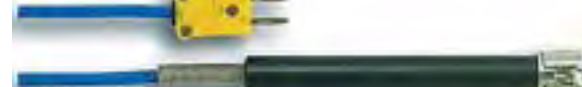
TP-02A



TP-03



TP-04



ORDERING INFORMATION

| Model | Description |
|--------|---|
| CS-800 | Multi-purpose test Instrument |
| CA52A | Carrying case with sash for model CS-800 |
| TP-01 | Naked bead probe, -40 to 250°C(-40 to 482°F) |
| TP-02A | General purpose, -50 to 900°C(-50 to 1600°F) 10 cm x 3.2 mm diameter |
| TP-03 | Immersion Probe, -50 to 1200°C(-50 to 2200°F) 10 cm x 8 mm diameter |
| TP-04 | Surface probe, -50 to 400°C(-50 to 752°F) 12 mm L, 15 mm diameter sensing head |

CLARK CS-810 Anemometer

Air Velocity & Wind Speed

DESCRIPTION

The CS-810 is an economical service tool for use in the factory and in commercial and industrial buildings as well as laboratories for quick checking of ventilating fume hood and grill velocities. It is also useful on the farm for checking ventilation in enclosed livestock facilities.

Quick reference of outdoor wind speed is also of interest to farmers, firefighters, environmentalists, weather studies, and sportsmen.

Measuring units and functions are easily selected using the four button touch pad. Reading hold function and Max-Min data record function are standard features.

SPECIFICATIONS

GENERAL

Measurement: Air Velocity & Wind Speed

Display: 8 mm LCD

Display Update Time: 1 second

Operating Humidity: Max. 80% R.H.

Operating Temperature: 0 to 50°C (32-122°F)

Over Range Display: "----"

Power Supply: 9 VDC Heavy Duty Battery (not included)

Current Consumption: Approx. 6.2 mA

Auto Power Off: Unit switches off after ten minutes of no buttons being pushed

Hold Function: The current value displayed is frozen upon pressing the "HOLD" button. Pressing the button again returns the unit to normal operation.

Data Record Function: Maximum and minimum reading values can be recorded and updated

Weight: 160g(with battery)

Dimension: 156H x 60W x 33L mm (6.14" x 2.36" x 1.29")

Options: Carrying case

Measuring Units:

| Unit | Range | Resolution | Accuracy |
|--------|-------------|------------|-------------------|
| ft/min | 80 to 5910 | 1 ft/min | |
| m/s | 0.4 to 30.0 | 0.1 m/s | ±3% F.S. < 20 m/s |
| km/h | 1.4 to 108 | 0.1 km/h | ±4%F.S. > 20 m/s |
| knots | 0.8 to 58.3 | 0.1 knots | |



FEATURES

- LOW FRICTION VANE WHEEL DESIGN IS ACCURATE
- WRISTLET PROVIDES PROTECTION FOR ONE HAND OPERATION
- MICROPROCESSOR ASSURES EXCELLENT PERFORMANCE
- LIGHTWEIGHT & COMPACT SIZE
- MEMORIZE MAX. & MIN. VALUES WITH RECALL

ORDERING INFORMATION

- CS-810 Anemometer
- CA-52A Carrying case with sash

HUBA

Type 525 Pressure Transmitter

F.S Pressure Ranges from 1 to 10 PSI, Voltage/Current/Ratiometric Outputs

DESCRIPTION

Huba Type 525 pressure transmitters have a compact design along with a high measurement accuracy.

The transmitters utilize proven Huba ceramic technology in use on Huba pressure measurement products for over 20 years.

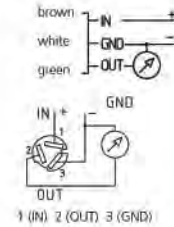
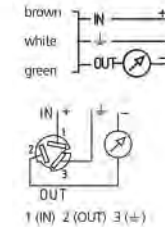
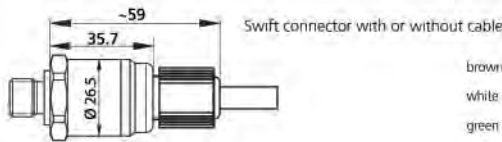
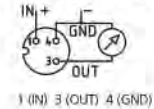
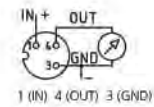
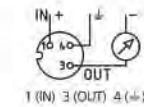
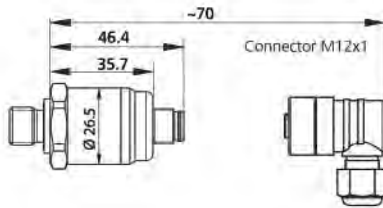
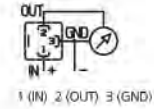
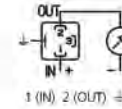
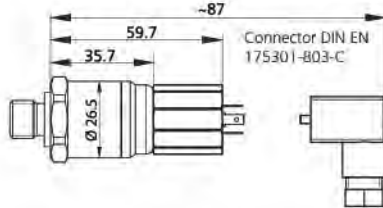
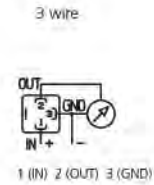
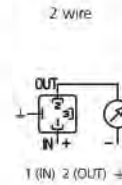
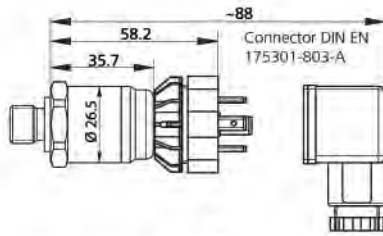
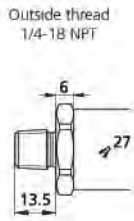
Wetted materials include 316 SS connections, ceramic sensor and a selection of seal materials including FPM, EPDM and NBR.



| SPECIFICATIONS | | |
|---|---|--|
| Full Scale Pressure Ranges | 1 PSI, 2 PSI, 3 PSI, 5 PSI, 10 PSI | |
| Medium | Compatible liquids & gases | |
| Temperature Operating Range | | |
| Medium | FPM | -15...+85°C |
| | EPDM | -25...+85°C |
| | NBR | -20...+85°C |
| Ambient | -25...+85°C | |
| Storage | -40...+85°C | |
| Max Over/Rupture Pressure | 29 PSI (2 bar) | |
| Max. Negative Pressure | -29" Hg (-1 bar) | |
| Wetted Materials | Pressure Connections | AISI 316L |
| | Measuring Element | Al ₂ O ₃ (99.6%) |
| | Sealing Material | FPM, EPDM, NBR |
| Electrical | | |
| Electrical Plug Material | Polyarylamide 50% glass filled, UL 94 V-0 | |
| Signal Output Options | | |
| 2-wire, 4-20 mA output | Power Supply 10-30 VDC; Current Consumption- <23 mA | |
| | Load (Ohms)= Supply Voltage-10V÷0.02 A | |
| 3-wire, 0-5V output | Power Supply 7-33 VDC; Current Consumption- <5 mA | |
| | Load - >10k Ohm/<100 nF | |
| 3-wire, 0-10V output | Power Supply 12-33 VDC; Current Consumption- <5 mA | |
| | Load - >10k Ohm/<100 nF | |
| 3-wire, ratiometric 10...90% supply voltage | Power Supply 5 VDC ±10% Current Consumption- <5 mA | |
| Dynamic Response | | |
| Start-up Time | <200 ms | |
| Response Time | <150 ms | |
| Load Cycle | <100Hz | |

| Specifications Continued | |
|--|---|
| Electrical Connection - IP65 Protection | |
| Connector DIN EN 175301-803-A | |
| Connector DIN EN 175301-803-C (Industrial standard 9.4 mm) | |
| Connector M 12X1 | |
| Swift connector with or without cable (PVC weather proof) | |
| Pressure Connection | 1/4-18 NPT Male (Metric options on request) |
| Accuracy: ±0.00435 PSI+0.4% F.S. (includes zero point, full scale, linearity, hysteresis, repeatability and thermal characteristic (-25 ... 85 °C | |
| Long Term Stability Per IEC EN 60770-1: ±0.2% F.S. | |
| Standard Mounting Position: Vertical, pressure connection down | |
| Effect of alternate mounting position on accuracy: | |
| Horizontal Mounting | ±0.00145 PSI (0.1 mbar) |
| Verticle Mount Connection Up | ±0.0029 PSI (0.2mbar) |
| Weight | 120 g |
| Testing: | |
| Electromagnetic Compatibility | CE conformity per EN 61326-2-3 |
| Shock Per IEC 68-2-6 | 50 g, 6 ms half sine wave, all 6 directions, free fall from 1 m on concrete (6x) |
| Vibration IEC 68-2-6 | 20 g, 15 ... 2000 Hz, 15 ... 25 Hz with amplitude μ 15 mm, 1 Octave/min. all 3 directions, 50 constant load |
| UL | applied acc. cULus 61010-1 |
| Protection against explosion (4 ... 20 mA) | applied acc. ATEX - Ex II ½ G Ex ia IIC T4 Ga/Gb |
| | applied acc. IECEx - Ex II ½ D Ex ia IIIC T120AC Da/Db |

DIMENSIONS (MM), ELECTRICAL CONNECTIONS, WIRING



ORDERING INFORMATION

BUILD PART NUMBER FROM TABLE BELOW- A.B.C.D.E.F

EXAMPLE: 525.984.20.3.2.311

| *A MODEL | B PRESSURE RANGE | C SEAL | D OUTPUT | *E ELECTRICAL CONNECTION | F PRESSURE CONNECTION |
|-------------|---|--|--|--|--------------------------|
| 525 | 981= 0-1 PSI 982= 0-2 PSI 984= 0-3 PSI 986= 0-5 PSI 988= 0-10 PSI | 00= FPM (Fluoro Elastomer) 10= EPDM (Ethylene Propylene) 20= NBR (Butadiene Acrylonitrile) | 1= 0-5 VDC 2= 0-10VDC 3= 4-20 mA 7= Ratiometric | 1= DIN EN 175301-803-A 2= DIN EN 175301-803-C 0= Swift Connector, no cable L= Swift Connector, 1.5 m cable N= Swift Connector, 2.0 m cable Q= Swift Connector, 3.0 m cable R= Swift Connector, 5.0 m cable | 311= 1/4-18 NPT Male |

* Special ranges are available on request
** DIN connectors are supplied without female connector
Other connectors such as M12 provided on request

NOSHOK Series 100 Pressure Transmitter

Two-wire, 4-20mA, Vacuum To 15,000 PSIG & PSIA

DESCRIPTION

The 100 series current output pressure transmitters were designed to provide a previously unequalled level of performance, utilizing Piezo Resistive or Thin film sensor technology dependent on pressure range. 100 Series Transducers are highly accurate, shock resistant and extremely stable over a long period of time. EMC, electro-magnetic compatibility, to IEC 1000 has been engineered in as a standard feature along with reverse polarity, overvoltage, and short circuit protection.

Advanced manufacturing techniques combined with technologically advanced standard features allow NOSHOK to offer a level of performance previously found only on transducers costing hundreds of dollars more.

A final electrical output and calibration inspection is performed on all NOSHOK Transducers and Transmitters after final assembly and prior to shipment to insure 100% "out of the box" reliability.



SPECIFICATIONS

OUTPUT SIGNAL: 4-20 mA, 2 wire

PRESSURE RANGES: Vacuum and compound through 0 - 15000 PSI; gauge and absolute

PROOF PRESSURE: 0-5, 0-10, 0-7500 through 0-15000 PSI: 1.5 times range; 0-15 PSI through 0-6000 PSI: 5 times range

BURST PRESSURE: 0-5, 0-10, 0-7500 through 0-15000 PSI: 2 times range; 0-15 PSI through 0-6000 PSI: 5 times range

ACCURACY: (BSFL or RSS) (includes repeatability, hysteresis and linearity) 0.5% full scale standard 0.25% full scale optional

WETTED MATERIALS: 316 stainless steel for vacuum through 300 psi; 17-4PH stainless steel sensing diaphragm and 316 stainless steel process connection for higher ranges

HOUSING MATERIAL: 316 Stainless Steel

REPEATABILITY: 0.05% full scale

HYSTERESIS: 0.1% full scale

STABILITY: 0.2% full scale per year

INPUT EXCITATION: 12-30 VDC unregulated

TEMPERATURE RANGES COMPENSATED: 32 to 175 °F (0 to 80 °C)

EFFECT: 0.02%/°F

STORAGE: -40 to 212 °F (-40 to 100 °C)

MEDIUM: -22 to 212 °F (-30 to 100 °C)

AMBIENT: -40 to 185 °F (-40 to 85 °C)

RESPONSE TIME: Less than 1 ms (between 10-90% full scale)

PRESSURE CYCLE LIMIT: 150Hz

OPERATING LIFE: 100 million cycles

ADJUSTMENT: 10% full scale of zero and span

ENVIRONMENTAL PROTECTION: NEMA 4x, DIN IP65 (IEC 529)

ELECTROMAGNETIC CAPABILITY: per IEC 1000 4-2 - ESD Level 2

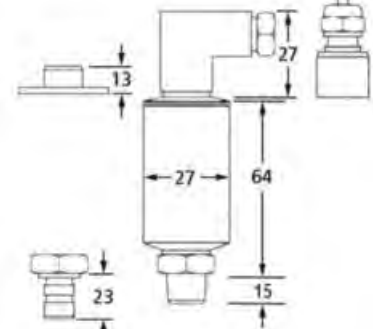
4-3 - Fields (RFI) Level 2, 4-4 - Burst Level 3, 4-5 - Surge Level 2

ELECTRICAL PROTECTION: Reverse polarity, overvoltage and short circuit protection

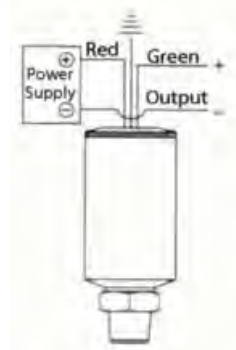
SHOCK: Less than 0.05% full scale effect or 1000g's @ 20 ms on any axis

VIBRATION Less than 0.05% full scale effect for 30g's @ 5-2000 Hz on any axis

DIMENSIONS(MM)



WIRING



TO ORDER: 100-A-B-1-C-D

Example: 100-10-1-1-3-7

A=Range

| | | | | | | | | | | | |
|-------------|---------------|-------------|----------------|-----------|------------|------------|-------------|-------------|--------------|-----------|-------------|
| 0-30" HgVAC | 30V | 30/200PSIG | 30/20 | 0-60PSIG | 60 | 0-600PSIG | 600 | 0-5000PSIG | 5000 | 0-15PSIA | 15A |
| 30"/15PSIG | 30/15 | 30"/300PSIG | 30/3000 | 0-100PSIG | 100 | 0-750PSIG | 750 | 0-6000PSIG | 6000 | 0-30PSIA | 30A |
| 30"/30PSIG | 30/30 | 0-5PSIG | 5 | 0-150PSIG | 150 | 0-1000PSIG | 1000 | 0-7500PSIG | 7500 | 0-60PSIA | 60A |
| 30"/60PSIG | 30/60 | 0-10PSIG | 10 | 0-200PSIG | 200 | 0-1500PSIG | 1500 | 0-10000PSIG | 10000 | 0-100PSIA | 100A |
| 30"/100PSIG | 30/100 | 0-15PSIG | 15 | 0-300PSIG | 300 | 0-2000PSIG | 2000 | 0-15000PSIG | 15000 | 0-150PSIA | 150A |
| 30"/150PSIG | 30/150 | 0-30PSIG | 30 | 0-500PSIG | 500 | 0-3000PSIG | 3000 | | | 0-200PSIA | 200A |
| | | | | | | | | | | 0-300PSIA | 300A |

B=Accuracy

1 ±0.5% **2** ±0.25%

C=Process Connection

2 1/4" NPT Male **3** 7/16"-20 UNF
OTHER CONNECTIONS ON REQUEST

D=Electrical Connection

- 1** 36" Cable (connected to option 7)
- 2** 4 Pin Bendix
- 3** 6 Pin Bendix
- 6** 1/2" NPT Conduit (w/36" cable)
- 7** Mini-Hirschmann (w/mating connector)

NOSHOK

Series 615 Pressure Transmitter

High Accuracy, Vacuum To 120,000 PSIG & 300 PSIA

DESCRIPTION

NOSHOK Series 615 Pressure Transducers are designed for heavy duty applications requiring high accuracy and durability. Utilizing diffused semiconductor or sputtered Thin Film technology, these transducers are stable, accurate, shock resistant, and extremely durable.

The durability is coupled with the mechanical integrity of the case, process connection, and wetted parts constructed of corrosion resistant stainless steel.

Available in a wide variety of electrical and process configurations, the Series 615 Pressure Transducers are the choice for heavy duty applications.

A final electrical output and calibration inspection is performed on all NOSHOK transducers prior to shipment to ensure 100% "out of the box" reliability.



SPECIFICATIONS

Output signals:

4mA to 20mA, 2-wire; 1 Vdc to 5Vdc, 1 Vdc to 6Vdc, 1 Vdc to 11 Vdc, 3-wire; 0Vdc to 5Vdc and 0 Vdc to 10 Vdc, 3-wire; 0 Vdc to 5 Vdc and 0 Vdc to 10 Vdc, 4-wire

Pressure ranges: Standard gauge ranges from vacuum to 120,000 psig; Standard absolute ranges from 15 psia to 300 psia

Proof pressure: 3 times Full Scale for ranges 0 psi to 2psi through 0 psi to 200 psi

1.75 times Full Scale for ranges 0 psi to 300 psi through 0 psi to 10,000 psi

1.5 times Full Scale for 0 psi to 15,000 psi range

1.2 times Full Scale for ranges 0 psi to 20,000 psi through 0 psi to 120,000 psi

Burst pressure: 3.8 times Full Scale for ranges 0 psi to 2 psi through 0 psi to 200 psi

4 times Full Scale for ranges 0 psi to 300 psi through 0 psi to 10,000 psi

3 times Full Scale for 0 psi to 15,000 psi range

1.5 times Full Scale for ranges 0 psi to 20,000 psi through 0 psi to 120,000 psi

Accuracy: $\pm 0.25\%$ Full Scale (best fit straight line); Includes the combined effects of linearity, hysteresis and repeatability; $\pm 0.125\%$ Full Scale (optional)

Repeatability: $\leq \pm 0.05\%$ Full Scale

Hysteresis: $\leq \pm 0.1\%$ Full Scale

Stability: $\leq \pm 0.2\%$ Full Scale for 1 year, nonaccumulating

Power supply: 10Vdc to 30 Vdc for current output, unregulated; 14 Vdc to 30 Vdc for voltage output, unregulated

Load limitations: $\leq (V_{Power} - 10) / 0.020$ Amp for 4mA to 20mA

$\geq 10,000$ Ohms for 0 Vdc to 10Vdc, 3-wire

$\geq 5,000$ Ohms for 0 Vdc to 5Vdc, 3-wire

Wetted materials : 316 stainless steel for vacuum through 300psi; 17-4PH stainless steel sensing diaphragm and 316 stainless steel process connection for higher ranges

FEATURES

- Advanced diffused semi-conductor and sputtered thin film sensor for maximum stability
- High accuracy and long term stability
- Ranges from vacuum to 120,000 psi
- Corrosion resistant stainless steel construction
- Span and zero adjustments

Hydraulic & Pneumatic Systems

Industrial Machinery

Pumps & Compressors

HVAC

Water Management

Laboratory & Test

Medical Equipment

Railroad Equipment

Marine

Power Generation

Housing materials: 316 stainless steel

Temperature ranges: Compensated 32 °F to 175 °F / 0 °C to 80 °C

Effect: $\pm 0.01\%$ / °F for zero and span

Storage: -40 °F to 212 °F / -40 °C to 100 °C

Media: -20 °F to 212 °F / -30 °C to 100 °C

Ambient: -15 °F to 175 °F / -10 °C to 80 °C

Response time: Less than 1ms

(between 10% and 90% Full Scale)

Durability: >100,000,000 Full Scale cycles

Adjustment: $\pm 10\%$ Full Scale for zero and span

Environmental protection: NEMA4X, IP65 (IEC529)

Electromagnetic rating: CE compliant to EMC norm EN61326:1997/A1:1998 RFI, EMI and ESD protection

Electrical protection: Reverse polarity over voltage and short circuit protection

Shock: Less than $\pm 0.05\%$ Full Scale effect or 1000 g's @ 20 ms on any axis

Vibration: Less than $\pm 0.01\%$ Full Scale effect for 15 g's @ 0 Hz to 2000 Hz on any axis

Weight: Approximately 7.2oz.

DIMENSIONS INCHES (MM)



WIRING

| 2-Wire Wiring | | | | |
|---------------|------------|-------|-----|--------|
| | Hirschmann | Cable | M12 | Bendix |
| + Supply | 1 | Red | 1 | A |
| + Output | 2 | Black | 3 | B |

| 3-Wire Wiring | | | | |
|---------------|------------|-------|-----|--------|
| | Hirschmann | Cable | M12 | Bendix |
| + Supply | 1 | Red | 1 | A |
| Common | 2 | Black | 3 | B |
| + Output | 3 | White | 4 | C |

TO ORDER: 615-A-B-C-D-E

Example: 615-2-1-1-2-8

| A= Range | | | | | | | | | | | |
|------------|------------------------|------------|---------------|------------|----------------|------------|------------------|------------|-------------------|------------|---------------|
| Range Code | Range | Range Code | Range | Range Code | Range | Range Code | Range | Range Code | Range | Range Code | Range |
| 30V | -30 in. Hg to 0 PSIG | 2 | 0 to 2 PSIG | 150 | 0 to 150 PSIG | 3000 | 0 to 3,000 PSIG | 30000 | 0 to 30,000 PSIG | 15A | 0 to 15 PSIA |
| 30/15 | -30 in. Hg to 15 PSIG | 3 | 0 to 3 PSIG | 200 | 0 to 200 PSIG | 4000 | 0 to 4,000 PSIG | 40000 | 0 to 40,000 PSIG | 30A | 0 to 30 PSIA |
| 30/30 | -30 in. Hg to 30 PSIG | 5 | 0 to 5 PSIG | 300 | 0 to 300 PSIG | 5000 | 0 to 5,000 PSIG | 50000 | 0 to 50,000 PSIG | 60A | 0 to 60 PSIA |
| 30/60 | -30 in. Hg to 60 PSIG | 10 | 0 to 10 PSIG | 500 | 0 to 500 PSIG | 6000 | 0 to 6,000 PSIG | 60000 | 0 to 60,000 PSIG | 100A | 0 to 100 PSIA |
| 30/100 | -30 in. Hg to 100 PSIG | 15 | 0 to 15 PSIG | 600 | 0 to 600 PSIG | 7500 | 0 to 7,500 PSIG | 75000 | 0 to 75,000 PSIG | 150A | 0 to 150 PSIA |
| 30/150 | -30 in. Hg to 150 PSIG | 30 | 0 to 30 PSIG | 750 | 0 to 750 PSIG | 10000 | 0 to 10,000 PSIG | 85000 | 0 to 85,000 PSIG | 200A | 0 to 200 PSIA |
| 30/200 | -30 in. Hg to 200 PSIG | 60 | 0 to 60 PSIG | 1000 | 0 to 1000 PSIG | 15000 | 0 to 15,000 PSIG | 100000 | 0 to 10,000 PSI | 300A | 0 to 300 PSIA |
| 30/300 | -30 in. Hg to 300 PSIG | 100 | 0 to 100 PSIG | 2000 | 0 to 2000 PSIG | 20000 | 0 to 20,000 PSIG | 120000 | 0 to 120,000 PSIG | | |

B= Accuracy

1 ±0.5% 2 ±0.25%

C= Output Signals

1 4mA to 20mA, 2-wire 4 1 to 6 Vdc, 3-wire*
 2 0 to 5Vdc, 3-wire 5 0 to 10 Vdc, 3-wire
 3 1 to 5Vdc, 3-wire 6 1 to 11 Vdc, 3-wire*
 *Ranges up to 0 psig to 60000 psig

D= Process Connection

2 1/4" NPT Male 8 1/2" NPT Male
 6 9/16"-18 aminco (Std on 30000 to 120000 psig)

E= Electrical Connection

1 36" cable (connected to option 8) 8 Hirschmann (DIN EN175301-803 Form A) 25 M12x14-pin
 3 6-pin Bendix 14 Hirschmann type with 1/2" NPT female conduit 36 Integral 36" Cable
 6 1/2" NPT conduit w/36" cable

NOSHOK

Series 625 Intrinsically Safe Pressure Transmitter

Hazardous Environment Approved, Vacuum To 120,000 PSIG & 300 PSIA

DESCRIPTION

The NOSHOK Series 625 and 626 pressure transmitters combine the reliability and long life of diffused semiconductor and sputtered thin film strain gage sensors with safe electronics for outstanding performance and value. These transmitters were designed for applications that require pressure measurement in hazardous environments. All wetted parts are made of welded stainless steel with no internal O-rings, gaskets or seals.

These transmitters are available with a wide variety of pressure connections, ranges and electrical connections to suit most applications. All units undergo extensive testing during the manufacturing process to ensure that the highest performance is achieved in the demanding environments found in today's applications. The transmitters are available with standard threaded connections and are Factory Mutual and Canadian Standards Association approved. All models incorporate significant levels of RFI, EMI and ESD protection.



SPECIFICATIONS

Output signals:

4mA to 20mA, 2-wire

Pressure ranges: Standard gauge ranges from vacuum to 600,000 psig

Proof pressure: 3 times Full Scale for ranges 0 psi to 5 psi through 0 psi to 200 psi

2 times Full Scale for ranges 0 psi to 300 psi through 0 psi to 10,000 psi

1.5 times Full Scale for 0 psi to 15,000 psi range

1.2 times Full Scale for ranges 0 psi to 25,000 psi and 0 psi to 60,000 psi

Burst pressure: 3.8 times Full Scale for ranges 0 psi to 5 psi through 0 psi to 200 psi

2 times Full Scale for ranges 0 psi to 300 psi through 0 psi to 10,000 psi

2 times Full Scale for 0 psi to 15,000 psi range

2 times Full Scale for ranges 0 psi to 25,000 psi through 0 psi to 60,000 psi

Accuracy: $\pm 0.25\%$ Full Scale (best fit straight line); Includes the combined effects of linearity, hysteresis and repeatability; $\pm 0.125\%$ Full Scale (optional)

Repeatability: $\leq \pm 0.05\%$ Full Scale

Hysteresis: $\leq \pm 0.1\%$ Full Scale

Stability: $\leq \pm 0.2\%$ Full Scale for 1 year, nonaccumulating

Power supply: 10Vdc to 30 Vdc unregulated ;Minimum voltage across transmitter connections is 10 Vdc

Load limitations: $\leq (V_{Power} - 10) / 0.020$ Amp

Wetted materials : 316 stainless steel for ranges up through 0 psi to 300 psi, 316 stainless steel with 17-4PH stainless steel diaphragm for ranges 0 psi to 300 psi and higher:

Housing materials: 316 stainless steel

Response time: Less than 1ms

(between 10% and 90% Full Scale)

Durability: >100,000,000 Full Scale cycles

Adjustment: $\pm 10\%$ Full Scale for zero and span

Environmental Rating: IP65 to IP67 depending upon electrical connection

Electromagnetic rating: Meets EMC norm

EN61326: 1997/A1 1998 RFI, EMI and ESD protected

FEATURES

- Advanced diffused semi-conductor and sputtered thin film sensor for maximum stability
- High accuracy and long term stability
- Ranges from vacuum to 120,000 psi
- Corrosion resistant stainless steel construction
- Span and zero adjustments

Hydraulic & Pneumatic Systems

Industrial Machinery

Pumps & Compressors

HVAC

Water Management

Laboratory & Test

Oil Field

Railroad Equipment

Marine

Power Generation

Temperature ranges: Compensated 32 °F to 175 °F/0 °C to 80 °C

Zero Effect: $\pm 0.011\%$ /°F

Span Effect: $\pm 0.011\%$ /°F

Storage: -40 °F to 212 °F/-40 °C to 100 °C

Media: -25 °F to 212 °F/-32 °C to 100 °C; -58 °F to 220 °F optional

Ambient: -22 °F to 212 °F/-30 °C to 100 °C; -58 °F to 220 °F optional

Electrical protection: Reverse polarity over voltage and short circuit protection

Shock: 1000 g's according to IEC770 for mechanical shock

Vibration: 20 g's according to IEC770 under resonance conditions

Hazardous approvals: Factory Mutual and Canadian Standards Association approved as indicated ANSI/ISA-12.27.01-2003, Approved single seal

Intrinsically Safe, entity approval for Class I, II and III, Division 1, Groups A, B, C, D, E, F and G; and Class I, Zone 0 Aex ia IIC Dust Ignition-proof for Class II and III, Division 1, Groups E, F and G Non-incendive for Class I, Division 2, Groups A, B, C and D FMRC 3600, 3610, 3611, 3810 (including supplement #1), ISA-S12.0.01, IEC60529 (including amendment #1)

Weight: Approximately 7.2oz.

DIMENSIONS INCHES (MM)



WIRING

| 2-Wire Wiring | | | | |
|---------------|------------|-------|-----|--------|
| | Hirschmann | Cable | M12 | Bendix |
| + Supply | 1 | Red | 1 | A |
| + Output | 2 | Black | 3 | B |

TO ORDER: 625-A-B-C-D-E

Example: 625-200-1-1-2-8

| A= Range | | | | | | | | | |
|------------|-----------------------------|------------|---------------|------------|-----------------|------------|------------------|------------|---------------|
| Range Code | Range | Range Code | Range | Range Code | Range | Range Code | Range | Range Code | Range |
| 50IN | 0 to 50 inH ₂ O | 2 | 0 to 2 PSIG | 200 | 0 to 200 PSIG | 5000 | 0 to 5,000 PSIG | 15A | 0 to 15 PSIA |
| 100IN | 0 to 100 inH ₂ O | 3 | 0 to 3 PSIG | 300 | 0 to 300 PSIG | 8000 | 0 to 8,000 PSIG | 30A | 0 to 30 PSIA |
| 30V | -30 in. Hg to 0 PSIG | 5 | 0 to 5 PSIG | 500 | 0 to 500 PSIG | 10000 | 0 to 10,000 PSIG | 60A | 0 to 60 PSIA |
| 30/30 | -30 in. Hg to 30 PSIG | 15 | 0 to 15 PSIG | 750 | 0 to 750 PSIG | 15000 | 0 to 15,000 PSIG | 100A | 0 to 100 PSIA |
| 30/60 | -30 in. Hg to 60 PSIG | 30 | 0 to 30 PSIG | 1000 | 0 to 1000 PSIG | 25000 | 0 to 25,000 PSIG | 150A | 0 to 150 PSIA |
| 30/100 | -30 in. Hg to 100 PSIG | 50 | 0 to 50 PSIG | 1500 | 0 to 1500 PSIG | 40000 | 0 to 40,000 PSIG | 200A | 0 to 200 PSIA |
| 30/150 | -30 in. Hg to 150 PSIG | 100 | 0 to 100 PSIG | 2000 | 0 to 2000 PSIG | 60000 | 0 to 60,000 PSIG | 300A | 0 to 300 PSIA |
| 30/200 | -30 in. Hg to 200 PSIG | 150 | 0 to 150 PSIG | 3000 | 0 to 3,000 PSIG | | | | |

B= Accuracy

1 ±0.5% 2 ±0.25%

C= Output Signals

1 4mA to 20mA, 2-wire

D= Process Connection

2 1/4" NPT Male
3 7/16 -20 UNF SAE #4 male
8 1/2" NPT Male

E= Electrical Connection

1 36" cable (connected to option 8) 25 M12x14-pin
3 6-pin bendix- IP65 36 Integral 36" Cable
8 Hirschmann (DIN EN175301-803 FormA)
14 Hirschmann type with 1/2" NPT female conduit

CLARK

Series 110 Sanitary Pressure Transmitter

Two & Three-wire, 4-20mA or Voltage output, Vacuum to 400 PSIG

DESCRIPTION

The Series 110 Sanitary Pressure Transmitter is designed for heavy duty sanitary applications where high accuracy and durability are required. Using diffused semiconductor sensor technology these transducers are stable, accurate, shock resistant and extremely durable.

The housing is constructed of 316SS and welded to the process connection for greater strength and integrity. The available 1 1/2 inch or 2 inch Tri-Clamp® connection, with its integral cooling extension, is 316L stainless steel and wetted parts are electro-polished to Ra25 microinch or better.

Series 110 Sanitary Transmitters meet 3A requirements for the food & beverage, dairy, pharmaceutical and biotechnology industries in addition to ASME BPE-2002 and are CE compliant.

A final electrical output and calibration inspection is performed on all transmitters prior to shipment to ensure 100% "out-of-the-box" reliability.

SPECIFICATIONS

Output Signals: 4-20 mA 2-wire; 0V-5 Vdc, 3-wire; 1-5 Vdc, 3-wire; 1-6 Vdc, 3-wire; 0-10 Vdc, 3-wire; 1-11 Vdc, 3-wire
 Pressure Ranges: Standard gauge ranges from vacuum to 400 PSIG
 Proof Pressure: 3 times Full Scale for ranges 0-2 PSIG through 0-200 PSIG; 1.75 times Full Scale for ranges 0-300 PSIG through 0-400 PSIG
 Burst Pressure: 3.8 times Full Scale for ranges 0 -2 PSIG through 0-200 PSIG; 4 times Full Scale for ranges 0-300 PSIG through 0-400 PSIG
 Accuracy: ±0.25% Full Scale (B.F.S.L), ±0.125% Full Scale (optional)
 Repeatability: ±0.05% Full Scale
 Hysteresis: ±0.1% Full Scale
 Stability: ±0.2% Full Scale for 1 year, non-accumulating

Power Supply: 10-30Vdc for current output 14-30Vdc for voltage output
 Case Materials: 316 stainless steel
 Temperature Ranges: Compensated 32°F to 175°F (0°C to 80°C)
 Effect: ±0.01%/°F for zero and span
 Ambient: -40°F to 176°F (-40°C to 80°C)
 Adjustment: ±10% Full Scale for zero and span
 Environment Protection: NEMA 4X, IP65 (IEC 529)
 Electromagnetic Rating: CE compliant to EMC norm EN61326: 1997/A1: 1998 RFI, EMI, ESD protection
 Electrical Protection: Reverse polarity, overvoltage and short circuit protection
 Process Connection: 1 1/2 inch or 2 inch Tri-Clamp®
 Seal Housing Material: 316L stainless steel
 Diaphragm Material: 316L stainless steel electropolished to Ra25 or better
 Fill Fluid: White Oil (FFL 77), USP grade
 Media Temperature: -40°F to 300°F (-40°C to 150°C)

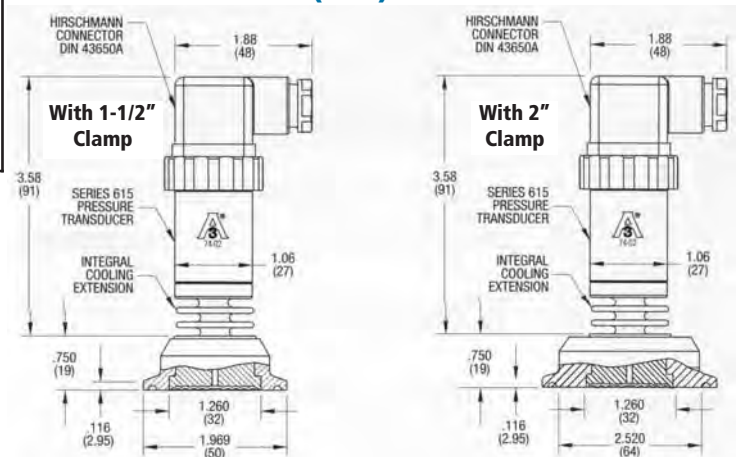


ORDERING INFORMATION

SELECT FROM EACH COLUMN OF ABOVE CHART
 EXAMPLE: 110-12-4-615-1-34-1-1

| A Model | B Clamp Size | C Seal Fill Fluid | D Inventory ID Number | E Accuracy | F Pressure Range | G Output Signal | H Electrical Connection |
|---------|--------------------|----------------------|-----------------------|---------------------------------|---|-----------------|---|
| 110 | 12=1-1/2" 16=2" | 4=FFL77 White Oil | 615 | 1=±0.25% F.S. 2=±0.125% F.S. | 01=30" HG to 0 psig 04=30" Hg to 15 psig 31=0-100" w.c. 34=0-5 psig 37=0-10 psig 40=0-15 psig 43=0-30 psig 46=0-60 psig 49=0-100 psig 52=0-150 psig 58=0-200 psig 61=0-300 PSIG 64=0-400 PSIG | 1= 4-20mA | 1=36" cable attached to Hirschmann 8=Hirschmann (DIN 43650A) 14=1/2" ISO 4400 conduit 23=cable gland with internal junction box 29=1/2" NPT female conduit w/internal junction box 36=integral 36" cable |

DIMENSIONS INCHES(MM)



HUBA

506 Series 303 Stainless Steel Pressure Transmitter

Refrigeration Transmitter for OEM Applications, Ranges to 870 psi (60 bar)

DESCRIPTION

The pressure transmitter type 506 with proven ceramic technology, features calibrated and amplified sensor signals which are available as standard voltage or current outputs.

The transmitters have a high resistance to extreme temperatures and exhibit no mechanical ageing or creeping. They are manufactured in a fully automated assembly line to give an ideal cost-to-performance ratio.

The 506 series are specially developed for original equipment manufacturer applications involving industrial refrigeration technology. Minimum order quantities apply and test samples are available for qualified OEM customers.



SPECIFICATIONS

Pressure Ranges: Relative pressure/Gauge (measurement of pressure relative to ambient pressure) Full scale ranges determined by customer to 870 psi (60 bar)
Lowest f.s. pressure range is 102 psi (7 bar)

Max. Overload:

F.S. ranges to 580 psi (40 bar): 2x measuring range
F.S. ranges 580 to 870 psi (40-60 bar): 1160 psi (80 bar)

Rupture Pressure:

F.S. ranges to 580 psi (40 bar): 3x measuring range
F.S. ranges 580 to 870 psi (40-60 bar): 1310 psi (90 bar)

Accuracy:

Total of linearity, hysteresis and repeatability
< +/- 0.5 % fs (> 10 – 60 bar)
< +/- 1.0 % fs (7 – 10 bar)

Adjustment accuracy zero point and full scale (repeatable)

0 – 5 V ± 50 mV
1 – 6 V ± 50 mV
0 – 10 V ± 100 mV
10 – 90% ± 1%

Materials in Contact with the Fluid Medium:

Ceramic/303 Stainless steel
Sealing material: Neoprene
Housing Cover: Nylon (Pa 6)

Temperature Influences:

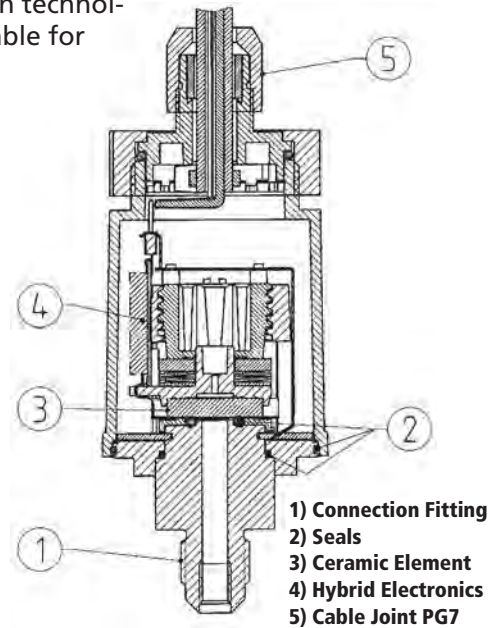
Medium and ambient temperature range:
- 40°C ... + 80°C

Zero 10 ... 60 bar < +/- 0.04% fs/°C
Span 10 ... 60 bar < +/- 0.015% fs/°C
Zero & Span 7 ... 10 bar < +/- 0.02% fs/°C

Load Cycle: < 50 Hz

Dynamic Response: Suitable for static and dynamic measurements.

Response time: < 5 ms



- 1) Connection Fitting
- 2) Seals
- 3) Ceramic Element
- 4) Hybrid Electronics
- 5) Cable Joint PG7

Signal and Power Supply:

| | | |
|-----------|-------------|--------------|
| 0 – 5 V | 11 – 33 VDC | 3-wire cable |
| 1 – 6 V | 11 – 33 VDC | 3-wire cable |
| 0 – 10 V | 18 – 33 VDC | 3-wire cable |
| 4 – 20 mA | 11 – 33 VDC | 2-wire cable |

Short circuit-proof and protected against polarity reversal (to max. +/- supply voltage).

Load & Current Consumption:

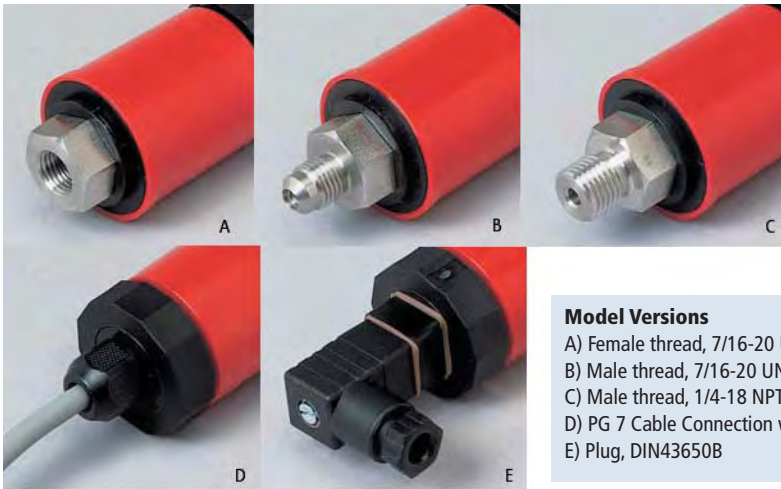
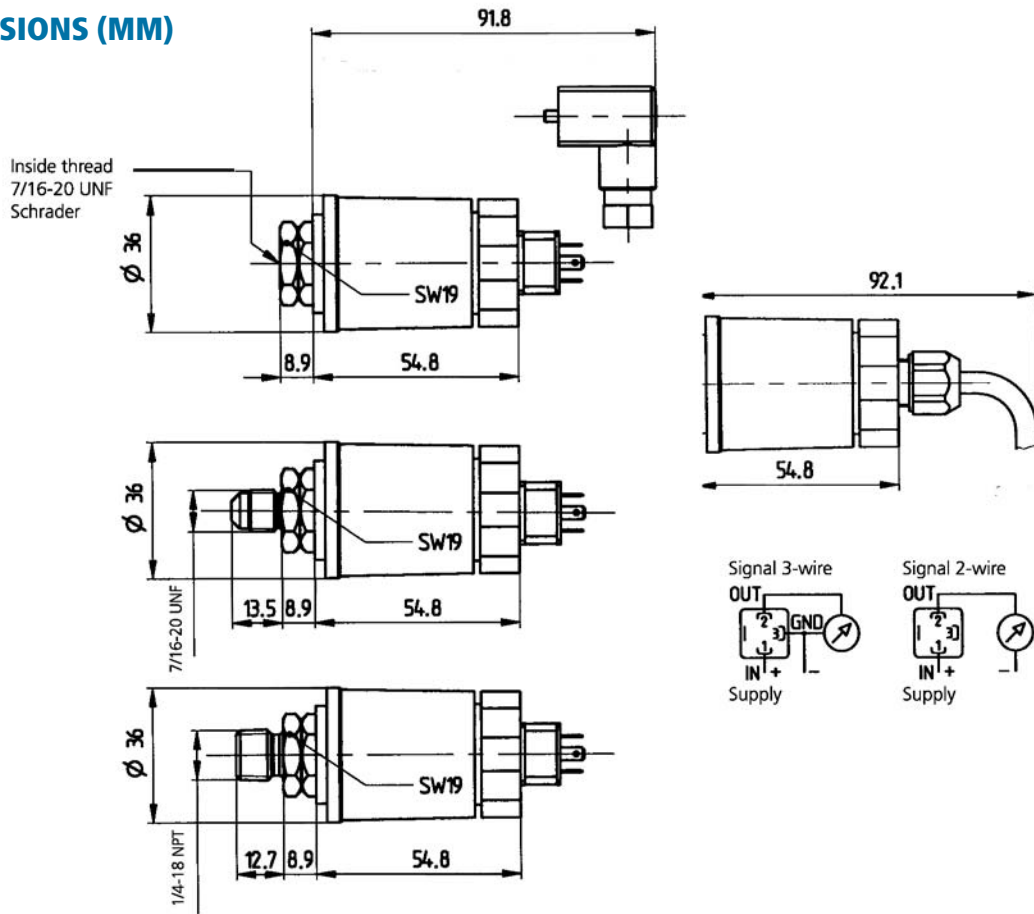
| Output | Load | Current |
|-----------|-------------------------------|---------|
| 0 – 5 V | > 10 kOhm/<100 nF | 2 mA |
| 1 – 6 V | > 10 kOhm/<100 nF | 2 mA |
| 0 – 10 V | > 10 kOhm/<100 nF | 3 mA |
| 4 – 20 mA | < supply voltage - 11 V [Ohm] | 20 mA |

0.02 A

Electrical connections / Protection class:

| | |
|-----------------|-------|
| Cable 1.5 m | IP 65 |
| Plug, DIN43650B | IP 65 |

DIMENSIONS (MM)



Model Versions

- A) Female thread, 7/16-20 UNF Schrader
- B) Male thread, 7/16-20 UNF Schrader
- C) Male thread, 1/4-18 NPT
- D) PG 7 Cable Connection with 1.5 meter cable
- E) Plug, DIN43650B

ORDERING INFORMATION

A-B-C-D-E-F-G-H

EXAMPLE: 506.9XX-A-0-3-0-3-1-0..300 PSI

| A Model | B Seal Material | C Calibration | D Output | E Electrical Connections | F Pressure Connections | G Housing Material | H Pressure Range |
|---------|-----------------|-----------------------|---|---------------------------------------|---|--|--|
| 506.9XX | A= Neoprene | 0= Factory Calibrated | 1= 0-5 V 6= 1-6 V 2= 0-10 V 3= 4-20 mA | 0= Cable, 1.5 m 2= Plug, DIN43650B | 0= 7/16-20 UNF female Schrader 2= 7/16-20 UNF male Schrader 3= 1/4 NPT male | 1= 303 SS 2= 303 ss with orifice/snubber on pressure port | Customer Specified Contact us F.S. ranges from 102 psi to 870 psi Example: 0..300 psi= 0 to 300 psi |

Note: Bulk packaging available

HUBA

511 Series Pressure Transmitter

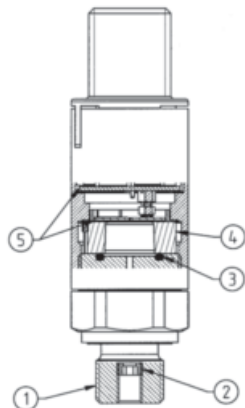
Liquids And Gases, FS Ranges 30" Hg Vacuum to 7500 PSI

DESCRIPTION

These compact pressure transmitters meet the highest specification for mechanical stress, EMC compatibility, and operational reliability.

Model 511 is particularly suitable for demanding industrial applications. The sensor utilizes a ceramic technology developed by Huba Control of Switzerland. Millions sold over the past 10 years demonstrate the reliability of the ceramic sensor design that utilizes integrated (to the sensor) electronics.

The integrated sensor/electronic design has a high degree of accuracy over wide temperature range.



- 1) Connection Fitting
- 2) Rupture Protection
- 3) Seal
- 4) Ceramic Cell
- 5) Electrical Connection



- **HIGH RESISTANCE TO EXTREME TEMPERATURE**
- **COMPACT, RUGGED CONSTRUCTION**
- **PATENTED RUPTURE SEALING DEVICE IN CONNECTOR PREVENTS MEDIA LEAKAGE IN EVENT OF SENSOR FAILURE**
- **ATTRACTIVE PRICE TO PERFORMANCE RATIO**

SPECIFICATIONS

Pressure Measurement: Absolute pressure & gage pressure (differential measurement of pressure relative to ambient pressure).

F.S. Pressure Ranges: -1 to 600 bar (-14.5 to 8700 PSI)

Maximum/Rupture Pressure:

3.0x Full scale at -1 ... 4 bar

2.5x Full scale at 6 ... 400 bar

2.0x Full scale at 600 bar

Higher rupture pressure on request

A patented media stop system prevents media egress when exceeding rupture pressure range (40 bar nominal value)

Accuracy:

Total of linearity, hysteresis and repeatability:

< +/- 0.3% fs

Adjustment accuracy zero point and full scale:

< +/- 0.3% fs

Casing: Stainless steel 1.4305 (AISI 303)

Materials In Contact With The Medium:

Ceramic Al_2O_3

Stainless steel 1.4305 (AISI 303)

Rupture Seal: PPS

Seal Material: FPM, NBR, others on request

Media Temperature With Sealing Materials:

FPM - 15 ... + 125 °C

NBR - 25 ... + 85 °C

FPM SPEC. - 40 ... + 150 °C

Ambient Temperature: Max. 85 °C

(Versions up to 150 °C on request)

Temperature Influences:

Zero < +/- 0.015% fs/°C

Span < +/- 0.015% fs/°C

Temperature range - 40 ... + 125 °C

Dynamic Response: Suitable for static and dynamic measurements. Response time < 2 ms, typ. 1 ms

Pressure Connections: See order code selection table

Weight: Version inside thread 85 grams

Version outside thread 95 grams

Installation Orientation: Unrestricted

Signal/Power Supply: See order code selection table

Protection: Short circuit-proof and protected against polarity reversal. Each connection is protected against other with max. +/- supply voltage.

Electric strength 500 VDC, on request 1000 VDC

Load:

Voltage outputs: > 10 kOhm / < 100 nF

Current Output: Max 1250 Ohms

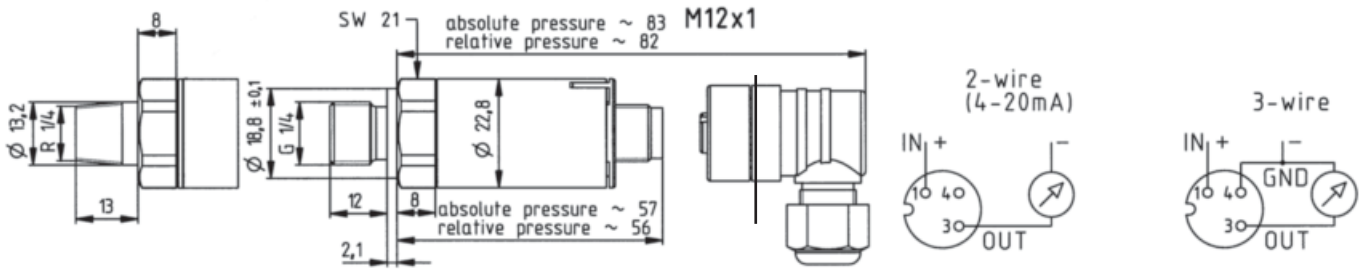
Current Consumption With Max. Signal Output:

Voltage outputs: < 4 mA

4 - 20 mA: < 20 mA

Electrical connections : M12 x 1 or cable, 1.5 meters other connectors available on request

DIMENSIONS (MM) & ELECTRICAL



TESTING

Shock according to IEC 68-2-27: 75 G, 11 ms half sine wave, all 3 directions. Free fall from 1 m on concrete (6x).

Constant shock according to IEC 68-2-29: 40 G for 6 ms, 1000x all 3 directions.

Vibration according to IEC 68-2-6: 20 G, 9 ... 200 Hz, 2 ... 9 Hz with amplit +/- 15 mm, 1 Octave / min. all 3 directions, 50 constant load.

Electromagnetic compatibility: CE conformity (EMC) by application of harmonized standards: Interference stability EN 50082-2, IEC 61000-6-2 and EN 61326-1, interference emit EN 50081-1, EN 55022, CISPR 22, EN 61326-1

| Interference stability | Test standard | Effects |
|---|--|------------|
| Electrostatic discharge (ESD) | EN 61000-4-2 15 kV air discharge, 8 kV contact discharge | No effect |
| High-frequency electromagnetic radiation (HF) | EN 61000-4-3 200 V/m, 80 ... 1000 Mz | No effect |
| Conducted HF interference | EN 61000-4-6 30 V, 0.15 ... 80 MHz | No effect |
| Fast transients (burst) | EN 61000-4-4 4 kV | No effect |
| Surge | EN 61000-4-5 Line-Line, Line-Case 500 V, 12 Ohm, 9 µF 1 kV, 42 Ohm, 0.5 µF | No failure |
| Magnetic fields | EN 61000-4-8 30 A/m, 50 Hz | No effect |
| Insulation voltage | 500 VDC (optional 1000 VDC) 350 VAC (optional 700 VAC) | No effect |

| Interference emit | Test standard | Effects |
|------------------------|----------------------------|-------------|
| Conducted interference | EN 55022 0.15... 30 MHz | No emission |
| Radiation from housing | 30...1000 MHz, 10 meters | No emission |

ORDERING INFORMATION

MODEL NUMBER = 511.ABCDEFG

Example: 511.9A1003031

| A=Type | *B=Range | C=Seals | D=Output | E=Elect. Connections | F=Press. Connections | G=Connection Orifice |
|----------------------------|---|---------------|-------------------|--------------------------------------|--------------------------------|---------------------------------------|
| 9=Gage pressure | A1= 0 to 30" Hg Vacuum | 00=FPM | 3=4-20 mA | 0=1.5 Meter Cable | 3= 1/4-18 NPT | 1=Without (ranges to 300 PSI) |
| 8=Absolute pressure | B1= 0 to 15 PSI | 20=NBR | (2-wire, 8-33VDC) | 1=M12 x 1 (without female connector) | A= 1/8-27 NPT (ranges<500 PSI) | 2=With (ranges 500 PSI and gre |
| | B4= 0 to 30 PSI | 60=FPM SPEC | 1= 0-5 V | Consult us with special requirements | 1=G1/4 female | |
| | B5= 0 to 60 PSI | | 2= 0-10 V | | 5= M12 x 1.5 male | |
| | B7= 0 to 100 PSI | | (3-wire, 8-33VDC) | | 6= M14 x 1.5 male | |
| | C1= 0 to 200 PSI | | | | | |
| | C2= 0 to 300 PSI | | | | | |
| | C3= 0 to 500 PSI | | | | | |
| | D0= 0 to 750 PSI | | | | | |
| | D1= 0-1000 PSI | | | | | |
| | D2= 0 to 2000 PSI | | | | | |
| | D3= 0 to 3000 PSI | | | | | |
| | E46= 0 to 5000 PSI (FPM SPEC seal only) | | | | | |
| | E56= 0-7500 PSI (FPM SPEC seal only) | | | | | |

Accessories & Options:

106975= Female connector for M12 x 1

Packaging

Single= Single Package for each transmitter

Multiple= Packaged in 25 piece lots

**BOLD ITEMS ARE TYPICALLY IN STOCK
(2-3 week delivery for non-stock items)**

Ranges in other units of pressure such as bar are available. Special ranges available on request.

HUBA

401 Series Low Differential Pressure Transmitter

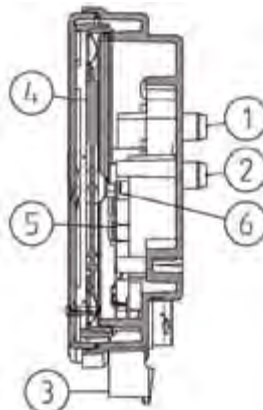
OEM Use, F.S. ranges 3 mbar (1.2" w.c.), 5 mbar (2.01" w.c.), 8 mbar (3.21" w.c.)

DESCRIPTION

The type 401 series pressure transmitters, with its unique proven ceramic fulcrum lever technology, has adjusted, temperature compensated sensor signals, available as a voltage output.

The (VDC) voltage output is an amplified, linear signal suitable for direct processing in electronic control systems.

They are for use with air and non-corrosive gases



- 1) Pressure connection P1 (higher pressure)
- 2) Pressure connection P2 (lower pressure)
- 3) Electrical connection
- 4) Diaphragm
- 5) Ceramic fulcrum lever with amplified electronics
- 6) Over pressure stop

SPECIFICATIONS

Medium: Air, neutral gases
Pressure range: 0-3 / 0-5 / 0-8 mbar (1.2/2.01/3.21" w.c.)
Tolerable overload on one side: 25 mbar (10" w.c.), 100 mbar (1.4 PSI) short period at room temperature
Rupture pressure: 200 mbar (2.9 PSI)
Leak rate: < 5 cm³/h (air), at measuring range
Materials in contact with medium
Cover: Polycarbonate (PC)
Diaphragm: Model 401- LSR (Liquid Silicon Rubber)
Model 403- NBR
Sensor: Ceramic Al₂O₃ / glass
Temperature
Medium and ambient 0 °C to +70 °C (0 to 158°F)
Storage -40 °C to +70 °C (-40 to 158°F)
Power supply / Output
Power supply: 10.4 to 18 VDC
Power supply possible up to 28 VDC (with higher power up drift, see diagram)
Output: 0.5 to 4.5 VDC
Load: > 15 kOhm (against GND)
Current consumption: At nominal voltage without load < 8 mA
Dynamic response: Suitable for static and dynamic measurements
Response time: < 10 ms
Load cycle: < 10 Hz
Electrical connection: 3-pole plug connector RAST 2.5
Suggested Connector: AMP DUOPLUG 2.5™
Enclosure Rating: IP 00

Polarity reversal protection: Mechanically protected

FEATURES

- Optimal feedback for VAV systems
- Diaphragm geometry inherently stable due to homogeneous manufacture with a 2-component injection moulding process (plastic-silicon)
- Tight dimensioning for high sensitivity and long-time stability
- Excellent repeatability even in the lower pressure range

Accuracy

Max. Tolerance zero point: ± 0.5% fs
Max. Tolerance full scale: -1.5 / +0.5% fs
Resolution: 0.1% fs
Max. Total of linearity, hysteresis and repeatability: ± 0.3 % fs
Long term stability acc. to DIN EN 60770: ± 1.0% fs

Typ. Temp. Coeff. zero point: ± 0.2% fs/10°C
Max. Temp. Coeff. zero point: ± 0.3% fs/10°C
Typ. Temp. Coeff. sensitivity: ± 0.1% fs/10°C

Pressure connections: Hose connector ø6.2 mm

Installation Orientation:

Diaphragm horizontal: Pressure connections downward

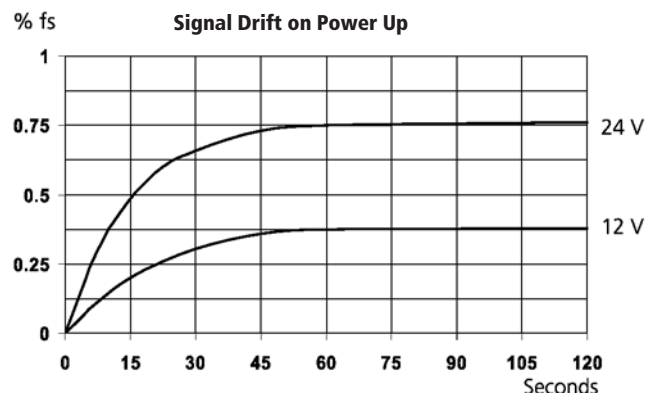
Diaphragm vertical: Pressure connections lateral, signal approx. 13 Pa below actual pressure

Mounting: Mounting bracket type A / type B

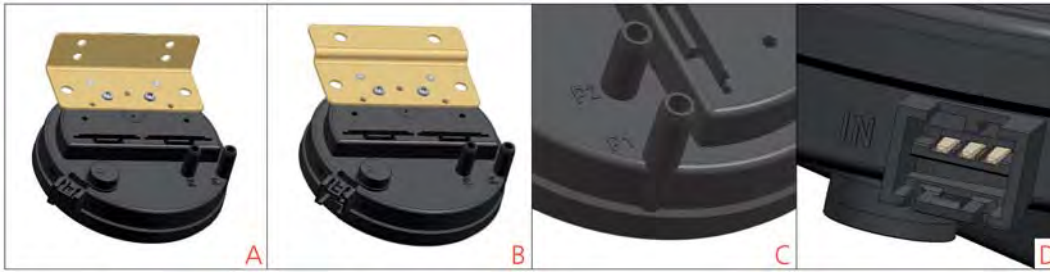
Tests / Admissions: DVGW according to DIN EN 1854 CE-0085BM0306

Weight: approx. 45 g

Packaging: Cardboard boxes with blister-pack inserts

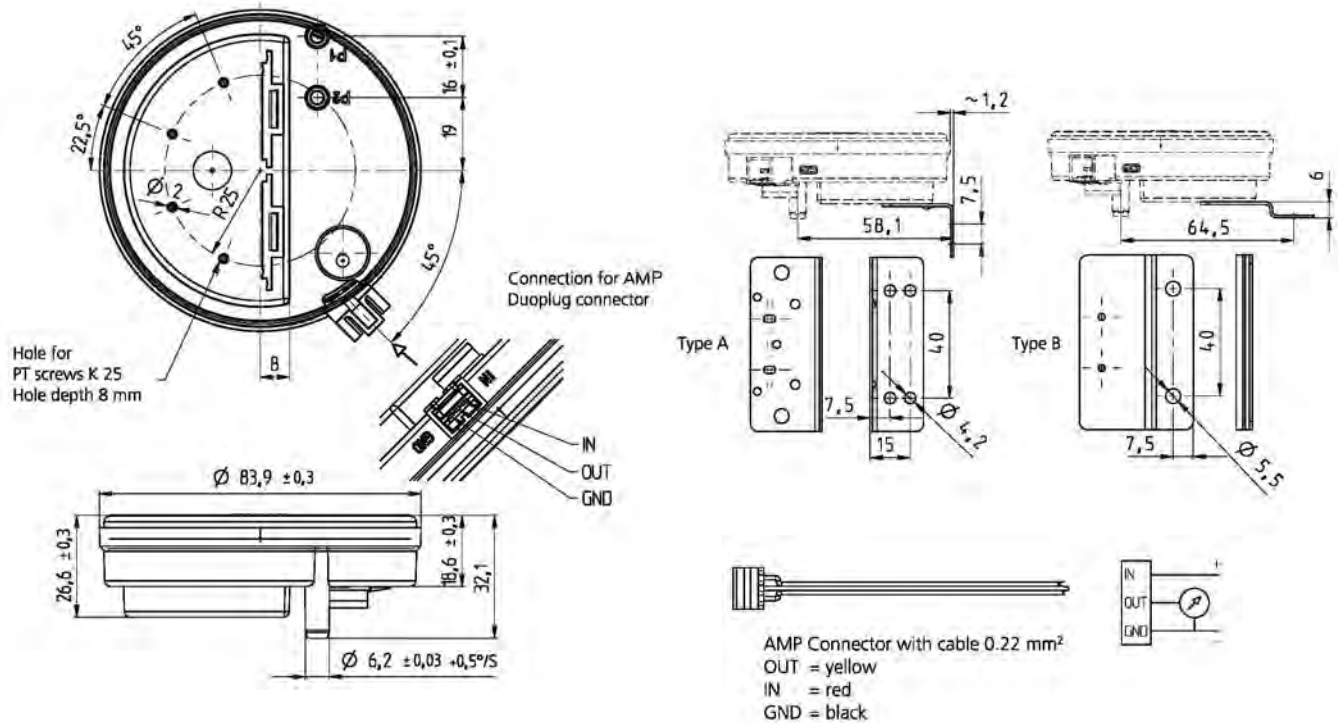


MOUNTING



A – Mounting bracket type A
 B – Mounting bracket type B
 C – Pressure connection Ø 6.2 mm
 D – Electrical connection RAST 2.5

DIMENSIONS (MM) & ELECTRICAL



ORDERING INFORMATION

Note: This transmitter product is intended for OEM clients. bulk packaging is in box lots of 120 pieces per box. Minimum order is for 3 boxes(360 units). Contact us for evaluation samples.

| Model | Description |
|--|---|
| 401-93000 | Transmitter, Silicon Diaphragm, 0-3 mbar(1.2" w.c.) |
| 401-95000 | Transmitter, Silicon Diaphragm, 0-5 mbar(2.01" w.c.) |
| 401-98000 | Transmitter, Silicon Diaphragm, 0-8 mbar(3.21" w.c.) |
| 403-93000 | Transmitter, NBR Diaphragm, 0-3 mbar(1.2" w.c.) |
| 403-95000 | Transmitter, NBR Diaphragm, 0-5 mbar(2.01" w.c.) |
| 403-98000 | Transmitter, NBR Diaphragm, 0-8 mbar(3.21" w.c.) |
| 103460 | Bracket type A |
| 100098 | Bracket type B |
| 102976 | Special screws for fastening transmitter to bracket (2 screws per transmitter required) |
| 100251 | Orifice for dampening pulsed pressure |
| 111668 | *AMP DUOPLUG 2.5™ Connector with 30 cm cable |
| 101817 | *AMP DUOPLUG 2.5™ Connector with 110 cm cable |
| 112282 | *AMP DUOPLUG 2.5™ Connector with 150 cm cable |
| *AMP Connector Part Number is 3-829868-3 | |

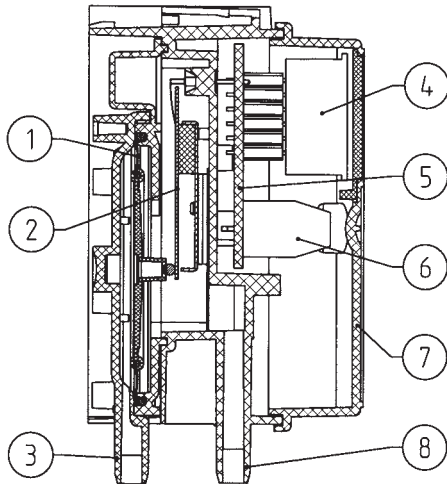
HUBA

694 Series Differential Pressure Transmitter

2-Wire, 4-20 mA output, F.S. Ranges $\pm 0.2''$ w.c. to $4.0''$ w.c.

DESCRIPTION

Type 694 series differential pressure transmitters incorporate a proven diaphragm driven ceramic fulcrum lever technology. They deliver calibrated, temperature-compensated sensor signals, available as standard 4-20 mA current output. They are ideal for registering low static pressures and air flow in air conditioning systems and for the measurement of pressure relationships in environmental, laboratory and clean-room applications.



- 1) Diaphragm
- 2) Ceramic sensor element
- 3) P1 higher pressure/lower vacuum
- 4) Optional Display
- 5) Amplifier electronics
- 6) Connection terminals
- 7) Cover
- 8) P2 lower pressure/higher vacuum



Ceramic sensor element with piezoresistors in a Wheatstone Bridge configuration and built in signal conditioning offers outstanding performance and long term stability.



SPECIFICATIONS

Pressure ranges: See order code selection table.

Max Pressure: See order code selection table.

Burst pressure: 500 mbar (7.25 PSI)

Accuracy Calculation: Terminal point method

Accuracy Including Linearity, Hysteresis &

Repeatability:

F.S. Ranges ± 0.2 and $0.4''$ w.c. - $\leq \pm 2\%$ f.s.

F.S. Ranges above $0.4''$ w.c. - $\leq \pm 1\%$ f.s.

Case Construction: Polycarbonate Lexan 141R, Fire classification to UL94

Cover: ABS Plastic

Diaphragm: Two-component silicone LSR

Operating Temperature: 0°C to $+70^\circ\text{C}$

Storage Temperature -10 to $+70^\circ\text{C}$

Effect of Temperature on Zero: $< \pm 0.04\%$ fs/ $^\circ\text{C}$ *

Effect of Temperature on Span: $< \pm 0.02\%$ fs/ $^\circ\text{C}$ *

*For Ranges to $0.4''$ w.c, multiply values x 2.5

Response time < 10 ms

Resolution: Ranges to $0.4''$ w.c. $< 0.2\%$ fs

Ranges above $0.4''$ w.c.: $< 0.1\%$ fs

Pressure connections: $3/16''$ I.D. Tubing

Weight: 90 grams

Installation Orientation: Vertical (factory calibrated)

Power Supply: 12-33 Vdc

Short circuit proof and protected against polarity reversal

Load Impedance: 1100 Ohms Max

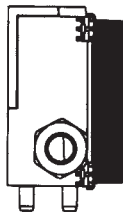
Electromagnetic compatibility: CE conformity to EC directive 89/336 EEC (EMC) by application of harmonized standards IEC 61000-6-3 and EN 61000-6-2.

Electrical Connection: Screw terminals for wire and stranded conductors up to 16 gage .

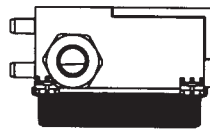
Cable gland with built-in strain relief Pg 11 Thread ($1/2''$ NPT adaptor for conduit connection optional)

Enclosure Rating: IP 54 (NEMA 3, 3S & 13)

Factory Calibrated for Vertical installation with pressure ports down



Horizontal installation with cover down, reading approx. $0.04''$ w.c. higher



Horizontal installation with cover up, reading approx. $0.04''$ w.c. lower



DIMENSIONS (MM) & ELECTRICAL

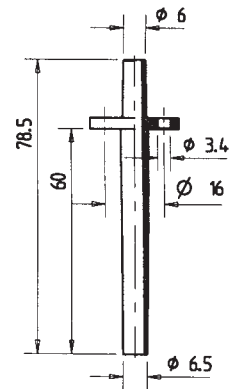
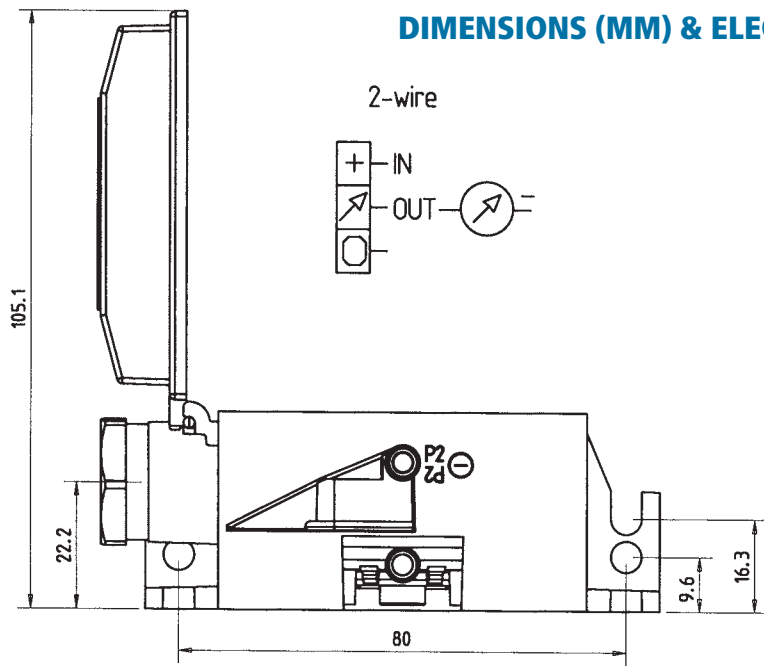
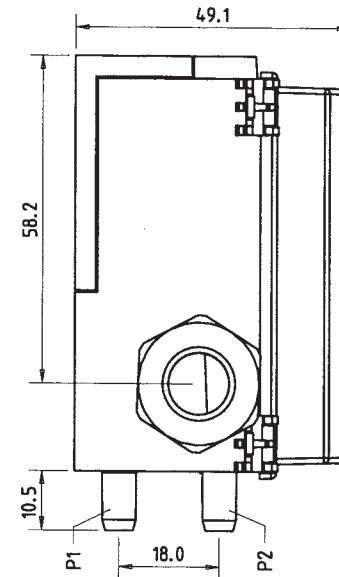
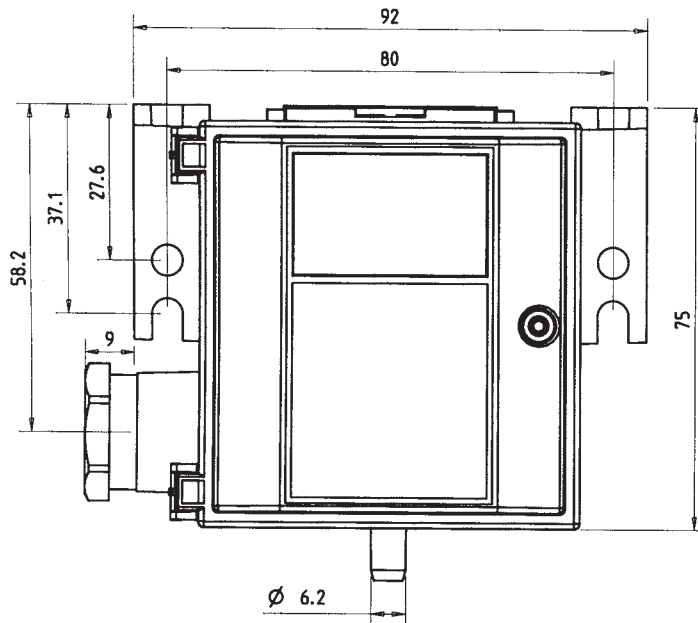


Fig. 1
Plastic Duct Mount
Static Probe



ORDERING INFORMATION

| Model | Range | Max Pressure |
|---------------|--------------------|------------------|
| 694.931115010 | ±0.2 inches w.c. | 20.0 inches w.c. |
| 694.911115010 | 0-0.4 inches w.c. | 20 inches w.c. |
| 694.912115010 | 0-1.20 inches w.c. | 20 inches w.c. |
| 694.913115010 | 0-2.0 inches w.c. | 40 inches w.c. |
| 694.914115010 | 0-4.0 inches w.c. | 40 inches w.c. |

Accessories & Options:

Higher Ranges: Consult Factory

Integral Digital Display: Consult Factory

Voltage Output: Consult Factory

Square Root Extraction: Consult Factory

104262: Plastic Static Pressure Probe (See Figure 1 Above)

100064: Connection set including two static probes,

A0012: 1/2" NPT Adapter to replace strain relief connector with conduit

Bold Order Items Typically Ship From Stock

HUBA

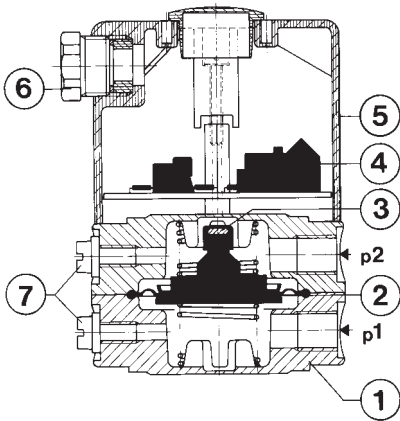
652 Series Differential Pressure Transmitter

Liquids And Gases, F.S. Ranges 20 inches w.c to 15 PSID

DESCRIPTION

The differential pressure transmitter series 652 are especially suited for the continuous level or flow monitoring of neutral and slightly aggressive liquids and gases in heating, ventilation and process applications.

The pressure or differential pressure to be monitored acts on a diaphragm, which in turn acts against a spring. A permanent magnet fastened on the diaphragm moves in the direction of a hall sensor mounted outside the pressure case. This sensor emits an electrical signal which is proportional to the magnetic field. The signal is linearized, compensated and amplified.



- 1) Pressure case
- 2) Diaphragm
- 3) Permanent magnet
- 4) Printed Circuit board
- 5) Cover
- 6) PG9 Strain Relief
- 7) Vent
- P1 Higher Pressure, Lower Vacuum
- P2 Lower pressure, Higher Vacuum



- **HIGH OVERPRESSURE SAFETY PROTECTION**
- **RUGGED MECHANICS WITH HIGH OPERATING RELIABILITY**
- **COMPATIBLE WITH SLIGHTLY AGGRESSIVE LIQUIDS AND GASES**
- **ATTRACTIVE PRICE TO PERFORMANCE RATIO**

SPECIFICATIONS

Pressure Ranges: See ordering information
Max Pressure:

- 145 PSI range 20.0" w.c.
- 290 PSI range 7 PSID and higher

Rupture pressure: 435 PSI

Linearity: < +/- 1.5 % fs

Hysteresis: < +/- 1.5 % fs

Zero point offset < +/- 1.0 % fs

Pressure case: Anodized black aluminium, brass or nickel-plated brass

Cover: plastic

Diaphragm: NBR-based, EPDM, Viton

Materials Coming Into Contact With Media:

- 430F SS
- 304 SS
- 301 SS
- AISI A2 Alloy screws
- Polyacetate-C / Polyamide

Operating Temperature: NBR-based, 32-176°F(0-80°C);
FPM, 14-176°F(-10-80°C); EPDM, 14-176°F(-10-80°C)

Operating Temperature PC Board: -13-140°F(-25-60°C)

Temperature Drift: 0.08% fs / degree from Calibration Temperature (20°C)

Response Time: < 10 ms

Pressure connections: 1/8 NPT female thread

Weight Aluminium Pressure Case :13 oz

Weight Brass/Nickel-Plated Brass Case: 1.9 lbs

Installation: The transmitter is calibrated in the factory with the diaphragm positioned vertically. In the case of liquid media, vent screw should be oriented up and the pressure connections down.

Outputs: 0 - 10 V, 3-wire cable ; 4-20 mA 3-wire cable

Installation Warmup Time: 15 minutes

Power supply: 20 - 30 VDC

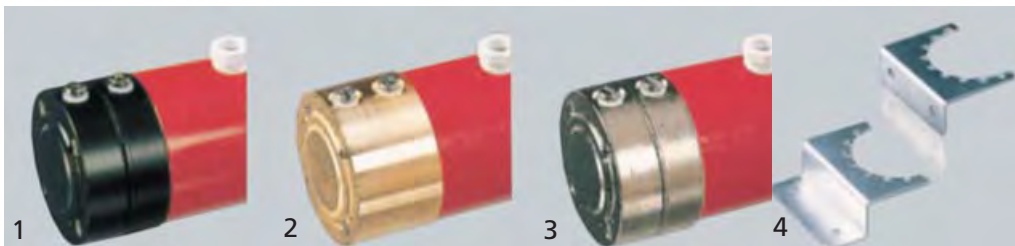
Current load: ≤ 300 Ohm

Voltage load: ≤ 10 KOhm

Current Consumption:

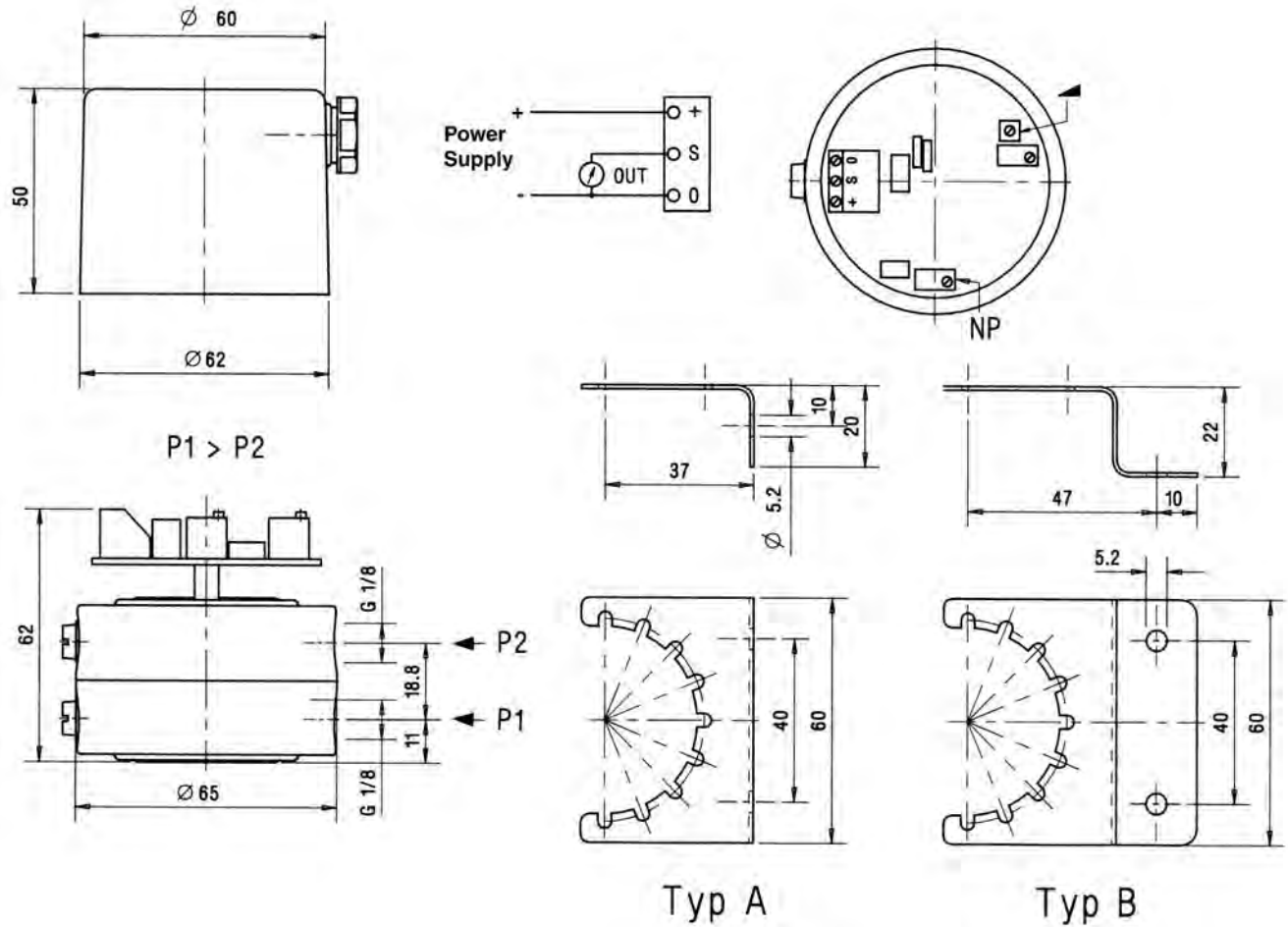
0 - 10 V- 35 mA

4 - 20 mA- max. 55 mA



- Case material
- 1) Anodized Aluminum
 - 2) Brass
 - 3) Nickel Plated Brass
 - 4) Mounting brackets

DIMENSIONS (MM) & ELECTRICAL



ORDERING INFORMATION

MODEL NUMBER = 652.9ABCDEFGHIJ

| A=Range | B=Output | C=Linearity | D=Power | E=Elect. Connections | F=Press. Connections | G=Case | H=Diaphragm |
|--------------|----------|-------------------|------------|----------------------|----------------------|---|--------------------------------|
| 1=0-20" w.c. | 4=4-20mA | 1= $\pm 1.5\%$ fs | 0=20-30VDC | 0=Screw Terminals | N=1/8 FNPT | 2=Nickel Plated Brass 0=Anodized Aluminum 1=Brass | 0=NBR-Based 1=FPM 2=EPDM |

Accessories & Options:

A01: Type A mounting bracket
 A02: Type B mounting bracket
 Higher accuracies on request
 Special Ranges Available On Request

HUBA

692 Series Differential Pressure Transmitter

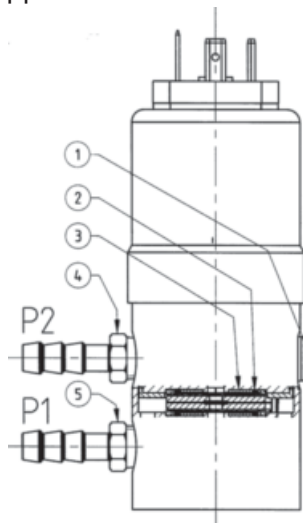
Liquids And Gases, FS Ranges 20 PSID to 150 PSID

DESCRIPTION

The differential pressure transmitter series 692 incorporates proven, unique ceramic sensor technology. The units feature calibrated and amplified sensor signals that are available as standard voltage or current outputs.

The housing is stainless steel or PVDF and a variety of seal elastomers are offered to accommodate different liquid and gas media.

Series 692 transmitters are ideal for monitoring pumps and pressure drops in HVAC chilled water and process systems as well as various other tank level monitoring and control applications.



- 1) Set Screw
- 2) Seals
- 3) Ceramic Element
- 4) P2 Pressure Port, Lower pressure, Higher Vacuum
- 5) P1 Pressure Port, Higher Pressure, Lower Vacuum



SPECIFICATIONS

Max Common Mode Pressure:

362 PSI to pressure range 60 PSID
725 PSI on pressure range 100 & 150 PSID

*Max Differential Pressure One Port To The Other:

Range 0-25 PSID- 43 PSI
Range 0-35 PSID- & 0-60 PSID- 174 PSI
Range 0-100 PSID & 0-150 PSID- 290 PSI
on P1, 174 PSI on P2

Rupture pressure: 1.5 x common mode pressure

Accuracy

Total of linearity, hysteresis and repeatability:

< +/- 0.5 % fs at common mode 2x pressure range
< +/- 0.8 % fs at common mode 3x pressure range
< +/- 1.3 % fs at common mode 5x pressure range

Zero point residual current (0 - 20 mA):

100 μ A at 2x nominal pressure
150 μ A at 3x nominal pressure
250 μ A at 5x nominal pressure

Materials of housing in Contact With Media:

Ceramic/303 Stainless Steel
Sealing material: FPM, contact us for EPDM or NBR

Medium And Ambient Temperature: 4 to 176°F (-15 °C to +80 °C)

* Use an equalizing manifold for installations where the process common mode pressure is greater than the stated max port to port differential pressure.

• **HIGH RESISTANCE TO EXTREME TEMPERATURE**

• **NO MECHANICAL AGING OR CREEPAGE**

• **COMPATIBLE WITH SLIGHTLY AGGRESSIVE LIQUIDS AND GASES**

• **ATTRACTIVE PRICE TO PERFORMANCE RATIO**

Effect of Temperature (% fs/°C): <0.1%, add following values for higher operating pressures,
< +/- 0.015 at 2x nominal pressure
< +/- 0.022 at 3x nominal pressure
< +/- 0.037 at 5x nominal pressure

Suitable for static and dynamic measurements

Response Time: < 5 ms

Pressure Connections: 1/8 FNPT (standard or 1/8" Barb (optional, contact us)

Weight: approx. 15 oz(430 grams)

Signal: 2-wire, 4 - 20 mA,

Power supply: 11 - 33 VDC

Short circuit proof and protected against polarity reversal.

Electromagnetic Compatibility: CE conformity to EC directive 89/336, EEC (EMC) according to harmonized standards EN 50081-1, EN 50081-2 and EN 50082-2.

Load Impedance: 1100 Ohms Max.

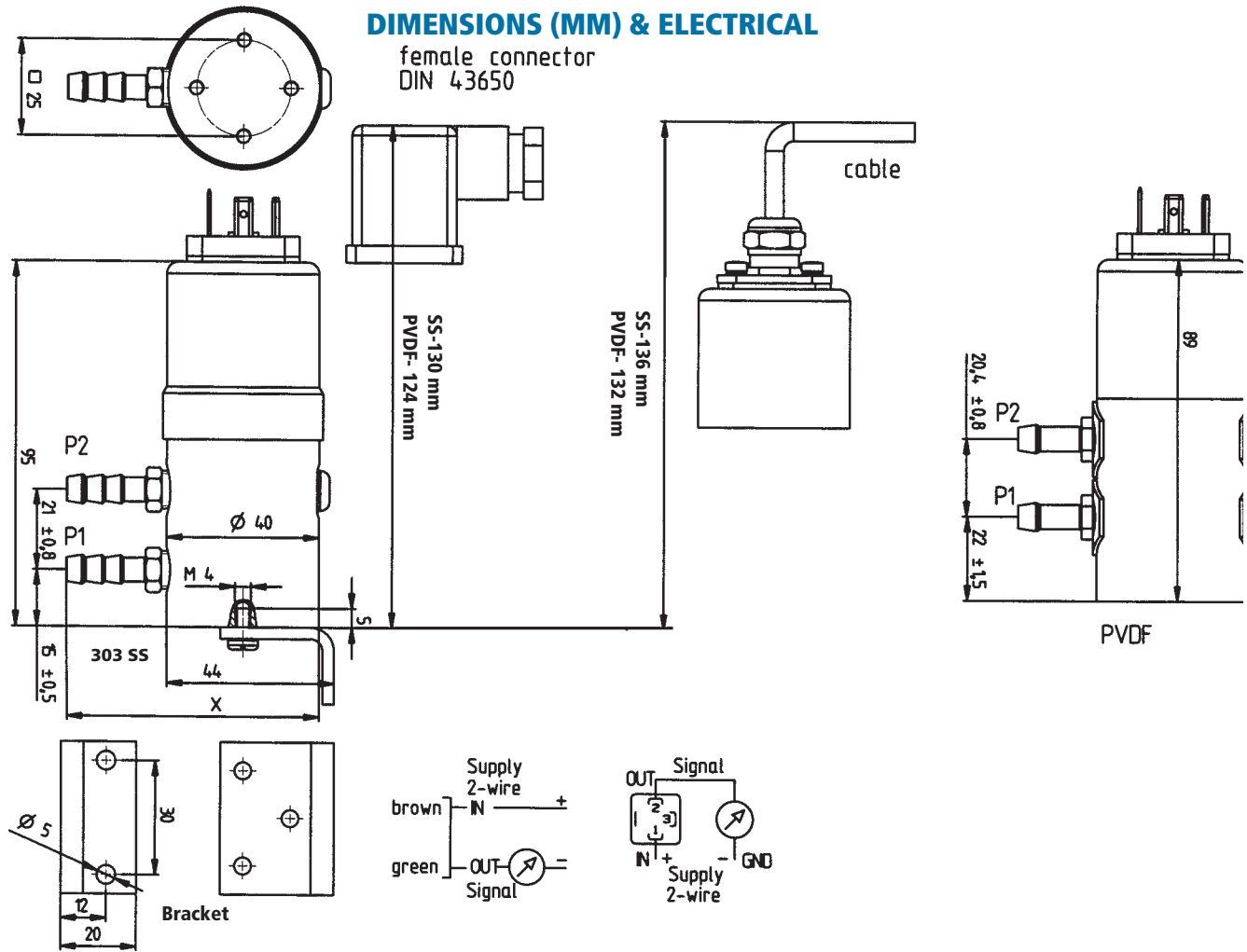
Current Consumption at Maximum Signal Output:
4 - 20 mA < 25 mA

Electrical Connections:

Connector: DIN 43650-A, NEMA 4 (IP 65)
or, optionally (contact us):

Cable: 4.5 ft, NEMA 4 (IP 65), with cable gland

DIMENSIONS (MM) & ELECTRICAL



ORDERING INFORMATION

MODEL NUMBER = 692-33-004-A

Example: 692-33-004-18

A=Range

- 25=0-25 PSID.
- 25=0-35 PSID
- 60=0-60 PSID
- 100=0-100 PSID
- 200=0-200 PSID

Accessories & Options:

PVDF Housing(Ranges to 100PSI Max): Consult factory
Voltage Signal Outputs: Consult Factory
Special Ranges & Higher Ranges Available On Request

101999= Mounting Bracket

103510= Female Connector, DIN43650-A with seal,
NEMA 4 (IP65) when secured by screw

HUBA

699 Series Differential Pressure Indicator & Transmitter

Field Selectable Voltage and Current Outputs, F.S. Ranges From 0.1 to 20" W.C.

DESCRIPTION

Series 699 measures low differential pressures typically found in air conditioning applications such as air flow measurement, fan static pressures and specialty room pressure measurements in clean rooms and other low pressure space monitoring applications.

The 699 series incorporates time proven ceramic fulcrum lever technology. They deliver adjusted and temperature-compensated sensor signals, available as standard voltage or current outputs.

The 699 is available in three configurations offering different levels of function and cost.

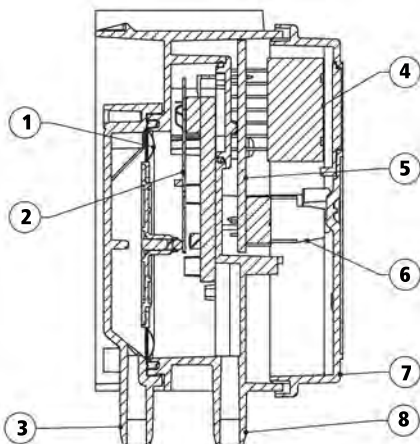
Configuration 1 is a transmitter with field selectable ranges and factory preset output signal and zero offset configurations.

Configuration 2 incorporates a 10 position DIP switch allowing field selection of range, output signal & response time. A potentiometer allows further adjustment of span within the selected range.

Configuration 3 incorporates an LED display and full field function programming via programming button including setting of range and fine tuning of span, output signal, zero offset, units of measurement, response time, square root extraction and display light settings.



Ceramic sensor element with piezoresistors in a Wheatstone Bridge configuration and built in signal conditioning offers outstanding performance and long term stability.



| Cross-section Drawing Legend | |
|------------------------------|--|
| 1 | Diaphragm |
| 2 | Sensor element |
| 3 | P1 (Higher Pressure) Pressure connection |
| 4 | LCD-Display (option) |
| 5 | Amplification Circuit |
| 6 | Connection terminals |
| 7 | Cover |
| 8 | P2 (Lower Pressure) Pressure connection |

SPECIFICATIONS

Medium: Air and neutral gases

Pressure ranges: F.S. from ± 0.1 to 20" w.c.

See order table for field selectable ranges offered for each model

Units of pressure measurement: Inches w.c., mm w.c.

Tolerable overload on one side of diaphragm:

Pressure: 40" w.c. at P1, 1.6" w.c. at P2

Vacuum: 40" w.c. at P2, 1.6" w.c. at P1

Rupture pressure:

2 x overload at ambient temperature

1.5 x overload at 70 °C

Zero Adjustment: Zero point resettable by reset button

Materials in contact with medium:

Housing: Polycarbonate PC

Diaphragm: Silicone

Sensor: Al₂O₃ (96%) / glass

Temperature:

Medium and ambient: 32 to 158°F (0 to +70 °C)

Storage: 14 to 158°F (10 to +70 °C)

No condensation

Output/Power Supply:

Three-Wire

0 to 10 V, 13.5 to 33 VDC / 24 VAC $\pm 15\%$

0 to 20 mA, 13.5 to 33 VDC / 24 VAC $\pm 15\%$

4 to 20 mA, 13.5 to 33 VDC / 24 VAC $\pm 15\%$

Two-Wire

4 to 20 mA, 8.0 to 33 VDC

SPECIFICATIONS

Output/Power Supply (Cont'd):
 Additional adjustable by software (with LCD-
 Display, configuration 3 only): 0-5.0V, 6.5 to
 33 VDC / 24 VAC ±15%

Load:
 3-wire:
 0-10 V > 10 kOhm
 0-20 mA < 500 Ohm
 4-20 mA < 500 Ohm
 2-wire:
 4-20 mA < $\frac{\text{supply voltage} - 8 \text{ V}}{0.02 \text{ A}}$ Ohms

Current Consumption:
 3-wire:
 0-10 V < 10 mA
 0-20 mA < 30 mA
 4-20 mA < 30 mA
 2-wire:
 4-20 mA 20 mA

Backlight LCD-Display: 30 mA

Dynamic response:
 Response time: < 20 ms
 Load cycle: < 10 Hz

Response time Filter: Filter response time switchable
 for configuration 2: off or 1 second;
 Filter response time programmable for
 configuration 3: 0.2 / 1 / 5 / 20 seconds

Electrical connection: Screw terminals for wire and
 stranded conductors up to 16 AWG, PG11 cable
 gland with built-in strain relief
 Polarity reversal protection: Short circuit proof and
 protected against polarity reversal. Each
 connection is protected against crossover up to
 max. supply voltage.

Protection standard:
 Without cover: IP 00
 With cover: IP 54 or IP 65

Pressure connections:
 Hose barb: .244" (6.2 mm)

Installation: Recommended and factory adjustment
 vertical, with pressure connections downward
 Mounting: Mounting bracket (integrated in case)
 Display, configuration 3: LCD display, double spaced
 per 8 digit alphanumeric (3-wire with backlight)

Tests: CE conform

Weight:
 With Display: approx. 100 g
 Without Display: 90 g

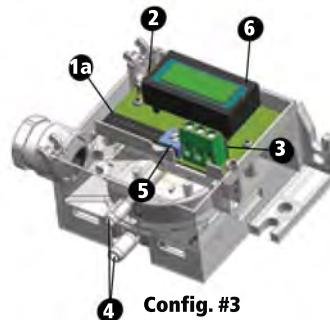
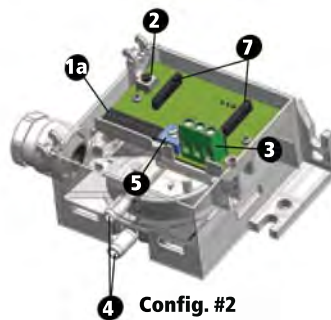
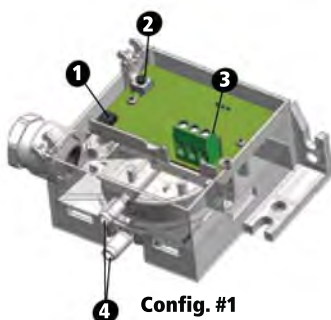
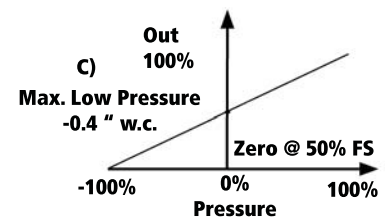
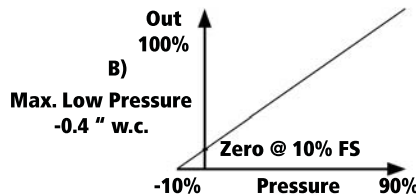
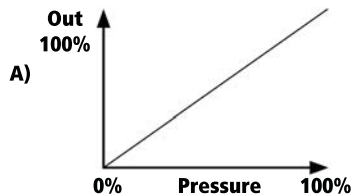
Packaging: Individually boxed

Options: Modbus RTU RS485, duct probes, DIN
 mounting adaptor

| Accuracy | | | | | |
|---|--------------|--------------|--------------|--------------|---------------|
| | 0.2" w.c. | 0.4" w.c. | 1.2" w.c. | 2.0" w.c. | 4 to 20" w.c. |
| Tolerance zero point (max.). | ±1.0% fs | ±1.0% fs | ±0.7% fs | ±0.7% fs | ±0.7% fs |
| Tolerance full scale | ±1.0% fs | ±1.0% fs | ±0.7% fs | ±0.7% fs | ±0.7% fs |
| Resolution | ±0.2% fs | ±0.2% fs | ±0.1% fs | ±0.1% fs | ±0.1% fs |
| Total of linearity, hysteresis and repeatability (max.) | ±1.0% fs | ±1.0% fs | ±1.0% fs | ±1.0% fs | ±0.6% fs |
| Long term stability acc. to DIN IEC 60770 | ±1.0% fs | ±1.0% fs | ±1.0% fs | ±1.0% fs | ±1.0% fs |
| Temp. Coeff. zero point (typ.) | ±0.2% fs/10K | ±0.2% fs/10K | ±0.2% fs/10K | ±0.1% fs/10K | ±0.1% fs/10K |
| TC Temp. Coeff. zero point (max.) | ±1.0% fs/10K | ±1.0% fs/10K | ±0.5% fs/10K | ±0.4% fs/10K | ±0.4% fs/10K |
| Temp. Coeff. sensitivity (typ.) | ±0.3% fs/10K | ±0.3% fs/10K | ±0.2% fs/10K | ±0.1% fs/10K | ±0.1% fs/10K |
| Temp. Coeff. sensitivity (max.) | ±0.6% fs/10K | ±0.6% fs/10K | ±0.5% fs/10K | ±0.5% fs/10K | ±0.2% fs/10K |

Test conditions: 25 °C, 45%RH, Power Supply 24 VDC; Temperature Coefficient Zero Point 32 to 158°F (0 ... 70 °C)

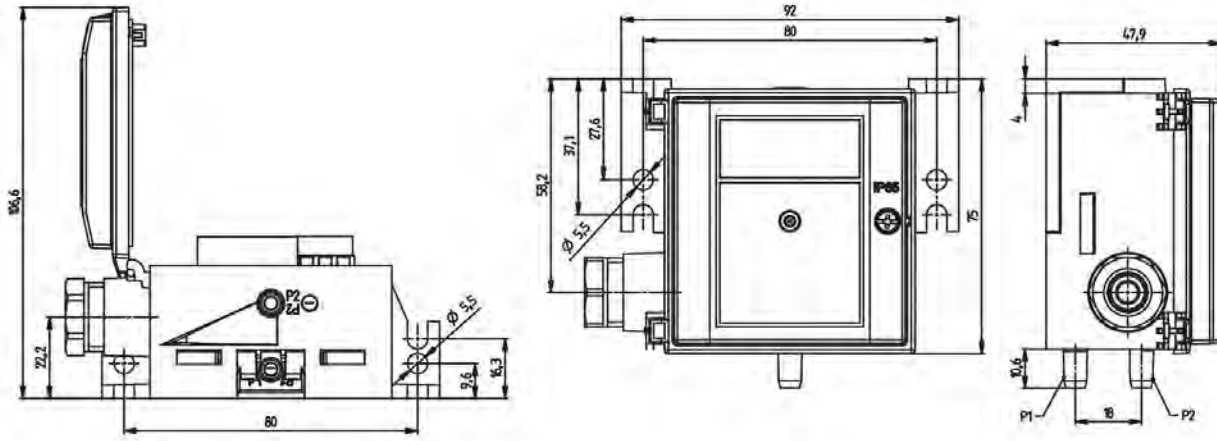
PRESSURE RANGE ZERO OFFSETS Factory preset for configurations 1 & 2; Field programmable for configuration 3



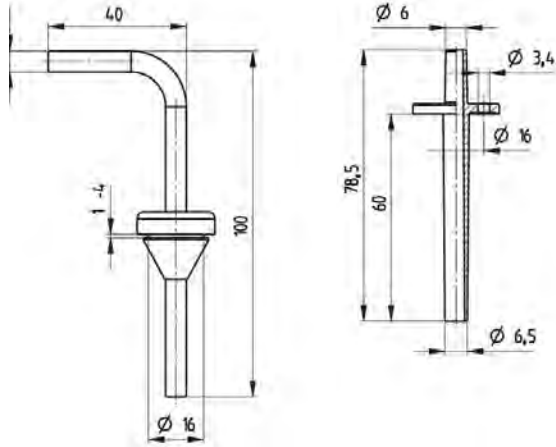
| Legend | |
|--------|------------------------------------|
| 1 | Dual DIP Switch |
| 1a | 10 Position DIP Switch |
| 2 | Zero Point Reset |
| 3 | Terminal Connection |
| 4 | P1 & P2 Pressure Ports |
| 5 | Signal Amplification Potentiometer |
| 6 | LCD |
| 7 | LCD Receptacle |

| Configuration Major Differences | | | |
|---------------------------------------|-----------|----------------|----------------------|
| Parameter | Config. 1 | Config. 2 | Config. 3 |
| LCD Display | No | No | Yes |
| Field Select Output Signals | No | Yes | Yes |
| Field Select Response Time | No | Std. or 1 sec. | 0.2, 1, 5 or 20 sec. |
| Display Program Menu & Program Button | No | No | Yes |

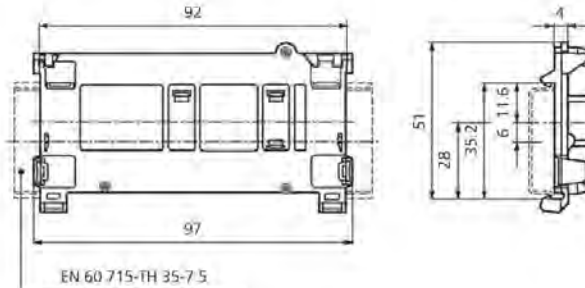
Dimensions mm



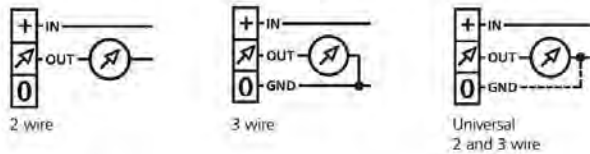
Duct Probes



Optional DIN Rail Mounting Plate



Wiring



ORDERING INFORMATION ABCDEFGHI (699.911321113)

| A Model | B Pressure Range Zero Offset | C F.S. Pressure Range Field Selectable as Designated | D Units of Measure | *E Output Signal/ Adjustment | F Output & Power Supply | **G Display |
|---------|---|--|---------------------------------|--|---|---|
| 699.9 | 1= 0-100% 2= -10% to 0 to 100% 3=-100% to 0 to+100% | 0= 0.1/0.2 inches w.c. 1= 0.1/0.2/0.3 inches w.c 2=0.3/0.6/1 inches w.c 3=0.5/1/2 inches w.c 4= 1/2/3 inches w.c 5=2/3/5 inches w.c 6=3/5/10 inches w.c 7= 5/10/20 inches w.c | 6= inches of water 3= mm w.c | 1= Linear w/o filter 2=Linear w/ filter (Config 2&3) 4= Square root extracted w/o filter 3= Square root extracted w/filter (Config 2&3) | 1= 0-10 V, three-wire 2= 0-20 mA- three-wire 4= 4-20 mA, three-wire 5= 4-20 mA, 2-wire | 0= None 1= In Eng. Units Ordered 2= In % F.S. |

*For Configuration 2 Select Output Signal 2 or 3 ** For Configuration 3 Select Display 1 or 2

| H Connection | I Environmental |
|--|--------------------|
| 1= 6.2 mm Tube Connection 2= 6.2 mm Tube Connection, Orifice in P1 3= 6.2 mm Tube Connection, Orifice in P2 4= 6.2 mm Tube Connection, Orifice in P1 & P2 | 0= IP54 3= IP65 |

| Option P/N | Description |
|------------|--|
| 117305 | MODBUS module |
| 104312 | Quantity 2 90° Duct probe with 2m (6.5') connecting tubing |
| 100064 | Quantity 2 Static pressure duct probe with 2m (6.5') connecting tubing |
| 112854 | DIN rail mounting adaptor |

HUBA

513 Series Pressure Sensor

OEM Ceramic Pressure Sensor, F.S. Ranges from -1 to 160 bar (-14.5 to 2320 psi)

DESCRIPTION

This pressure-measuring cell is based on time proven ceramic technology.

Due to the very robust design of the ceramic cell there are no significant changes in the sensor characteristics when packaged by the customer.

This technology with an amplified ratiometric output signal, supports direct assembly without the need for the user to adjust for temperature or pressure.

- **NEGLIGIBLE TEMPERATURE INFLUENCE ON ACCURACY**
- **NO CUSTOMER SPECIFIC ADJUSTMENT OF ZERO POINT AND TEMPERATURE COMPENSATION NECESSARY**
- **INTEGRATED AMPLIFIER ELECTRONICS**
- **EASY MOUNTING**

SPECIFICATIONS

Medium: Liquids and neutral gases

Pressure ranges:

Absolute: 0 to 1 to 25 bar (0 to 14.5 to 363 psia)

0.8 to 1.4 bar (bar. sensor. 23.6 to 41.3 " Hg)

Relative/Gauge: -1 to 0 - 160 bar (-14.5 to 0 to 2,320 psig)

Overload / Rupture pressure:

3.0 x Measuring range at -1 to 4 bar (-14.5 to 58 psi)

2.5 x Measuring range at 6 to 60 bar (87 to 870 psi)

2.0 x Measuring range at 100 to 160 bar (1,450 to 2,320 psi)

Higher overload, higher rupture pressure on request

Material in contact with the medium:

Measuring cell: Ceramic Al₂O₃ (96%)

Sealing material: FPM, NBR, FPM spec.

Temperature Medium and ambient with sealing:

FPM -15 to +125 °C (5 to +257 °F)

NBR -25 to +85 °C (-13 to +185 °F)

FPM spec. -30 to +150 °C (-22 to +302 °F)

Storage -40 to +130 °C (-40 to +266 °F)

Storage In packaging -40 to +65 °C (-40 to +149 °F)

Accuracy:

Resolution: 0.1% fs

Long-term stability acc. DIN IEC 60770: ±0.5% fs

Total of linearity, hysteresis and repeatability:

max. ±0.3% fs

Barometrical sensor max. ±0.5% fs

Versions with full scale adjustment:

Tolerance zero point: max. ±0.5% fs

Tolerance full scale: max. ±0.5% fs

Versions without full scale adjustment:

Zero point: 0.5 V ±0.02 V

Full scale: 3.0 V ±1.2 V

Power supply / Output:

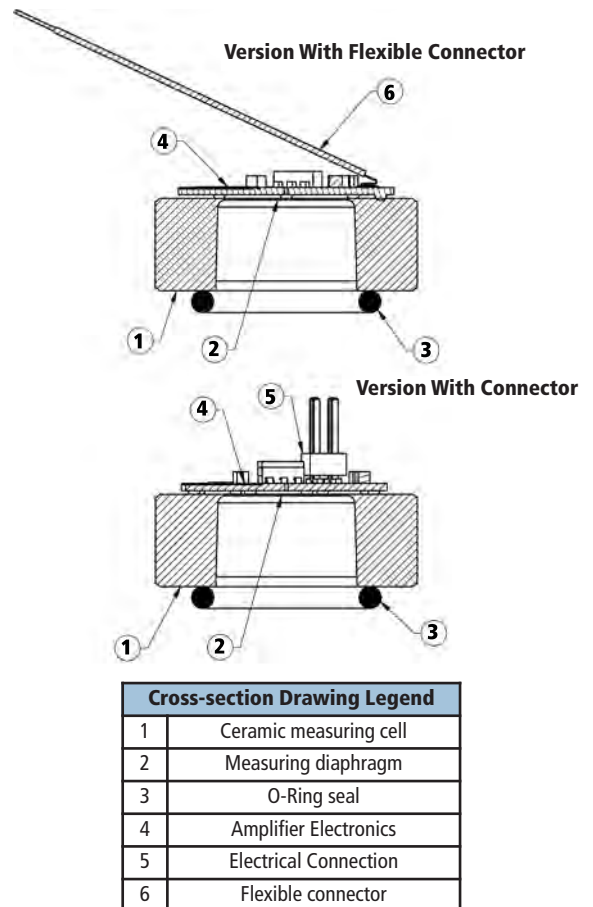
Power supply: 5 VDC (4.75 to 5.25 V)

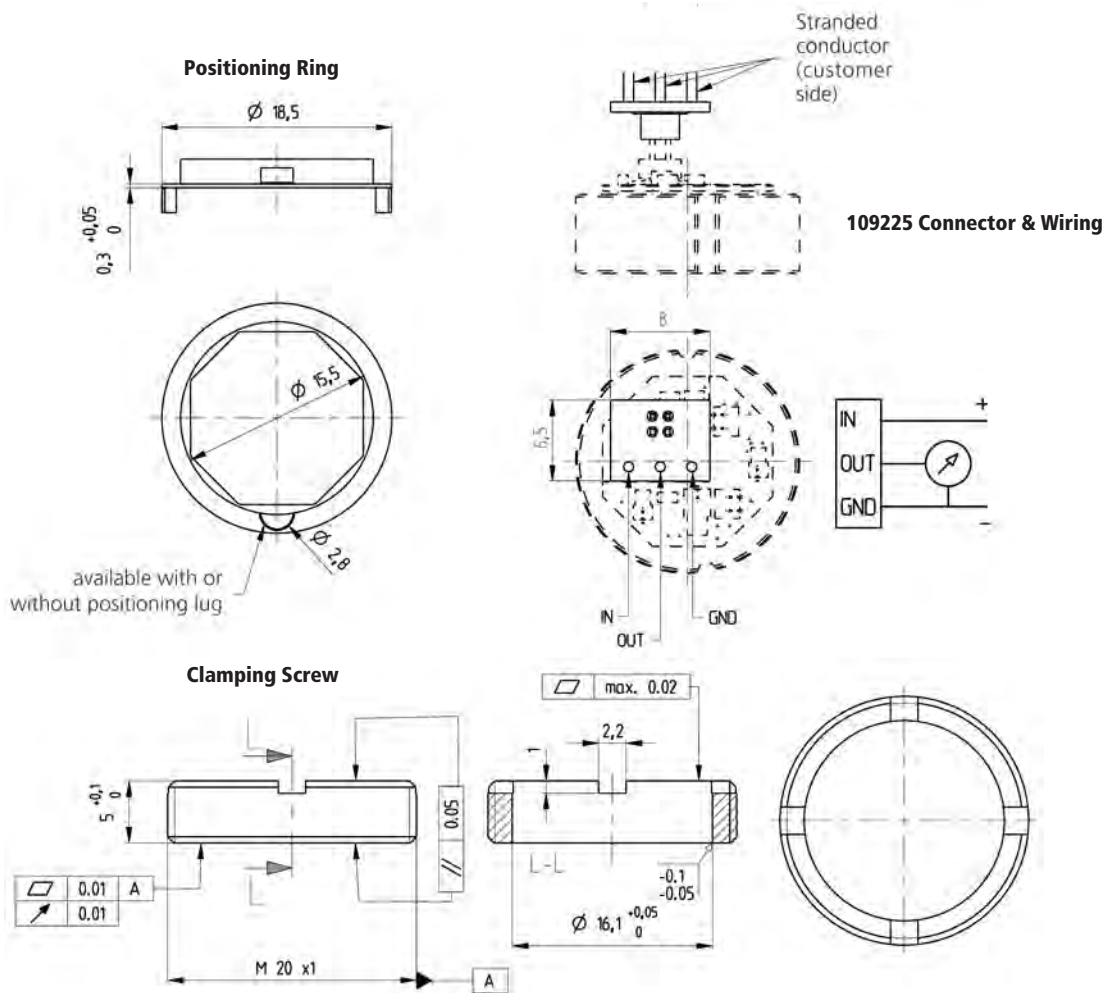
Output with full scale adjustment:

ratiom. 0.5 to 4.5 V, 10 to 90% of power supply

Output without full scale adjustment:

0.5 to 3 ±1.2 V

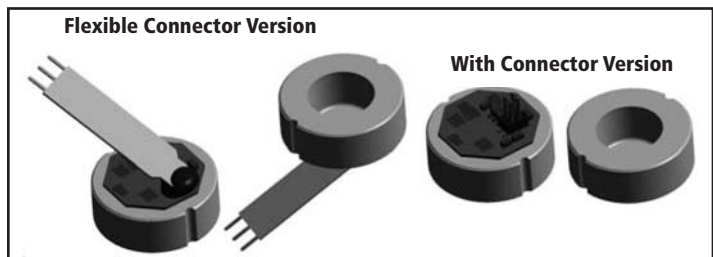




ORDERING INFORMATION A-B-C-D-E (513-9-17-0-0H)

| A Model | B Pressure | C Pressure Range | D Calibration | E Output & Power Supply |
|------------|--------------------------------------|--|---|---|
| 513 | 9= Relative/ Gauge 8= Absolute | 00= -1 to 0 bar (Relative/Gauge Only) 10= 0.8 to 1.4 bar (Barometric Sensor-Absolute Only) 11= 0 to 1 bar 12= 0 to 1.6 bar 14= 0 to 2.5 bar 15= 0 to 4 bar 17= 0 to 6 bar 30= 0 to 10 bar 31= 0 to 16 bar 32= 0 to 25 bar (Relative/Gauge Only) 33= 0 to 40 bar (Relative/Gauge Only) 40= 0 to 60 bar (Relative/Gauge Only) 41= 0 to 100 bar (Relative/Gauge Only) | 0= Factory Adjusted Zero Point & Full Scale 1= Factory Adjusted Zero Point Only (Relative Models Only) | 04= 0.5 ... 4.5 V ratiom. with connector without humidity protection; 5 VDC (4.75 ... 5.25) 0F= 0.5 ... 4.5 V ratiom. with connector with humidity protection 5 VDC (4.75 ... 5.25) 0H= 0.5 ... 4.5 V ratiom. with flexible connector without humidity protection 5 VDC (4.75 ... 5.25) 0J= 0.5 ... 4.5 V ratiom. with flexible connector with humidity protection 5 VDC (4.75 ... 5.25) |

| Accessory Part Numbers |
|--|
| 105598= O-ring FPM, -15 to +125 °C, -1 to 60 bar |
| 105145= O-ring NBR, -25 to +85 °C, -1 to 60 bar |
| 109338= O-ring FPM spec., -30 to +150 °C, -1 to 60 bar |
| 105285= O-ring FPM, -15 to +125 °C, 100 to 160 bar |
| 104952= O-ring NBR, -25 to +85 °C, 100 to 160 bar |
| 109339= O-ring FPM spec., -30 to +150 °C, 100 to 160 bar |
| 107397= Positioning ring (PPS) with cam |
| 107926= Positioning ring (PPS) without cam |
| 109225= Female Connector with three solder pads |
| 112151= Clamp screw M20x1 |
| 112187= Insertion tool for clamp screw |



HUBA

516 Series Pressure Sensor

OEM Ceramic Pressure Sensor, F.S. Ranges from -1 to 16 bar (-14.5 to 232 psi)

DESCRIPTION

This pressure transmitter is based on ceramic technology, developed by Huba Control and used for the last 10 years, in millions of applications.

Used in combination with a unique integrated electronic design, this gives the type 516 series a high degree of accuracy for all temperature ranges.

This technology with an amplified ratiometric output signal, supports direct assembly without the need for the user to adjust for temperature or pressure.

- **NEGLIGIBLE TEMPERATURE INFLUENCE ON ACCURACY**
- **NO CUSTOMER SPECIFIC ADJUSTMENT OF ZERO POINT AND TEMPERATURE COMPENSATION NECESSARY**
- **INTEGRATED AMPLIFIER ELECTRONICS**
- **EASY PC BOARD MOUNTING**



SPECIFICATIONS

Medium: Liquids and neutral gases

Pressure ranges:

Absolute: 0 to 1 to 16 bar (0 to 14.5 to 232 psia)
0.8 to 1.4 bar (bar. sensor. 23.6 to 41.3 " Hg)

Relative/Gauge: -1 to 0 to 16 bar (-14.5 to 0 to 232 psig)

Overload / Rupture pressure:
3.0 x Measuring range at -1 to 4 bar (-14.5 to 58 psi)
2.5 x Measuring range at 6 to 16 bar (87 to 232 psi)

Material in contact with the medium:

Measuring connection: PA
Measuring cell: Ceramic Al₂O₃ (96%)
Sealing material: NBR, FPM spec.

Temperature Medium and ambient with sealing:

NBR -25 to +80 °C (-13 to +176 °F)
FPM spec. -30 to +80 °C (-22 to +176 °F)
Storage -40 to +80 °C (-40 to +176 °F)
Storage In packaging -40 to +65 °C (-40 to +149 °F)

Accuracy:

Resolution: 0.1% fs
Long-term stability acc. DIN IEC 60770: ±0.5% fs
Total of linearity, hysteresis and repeatability:
max. ±0.5% fs

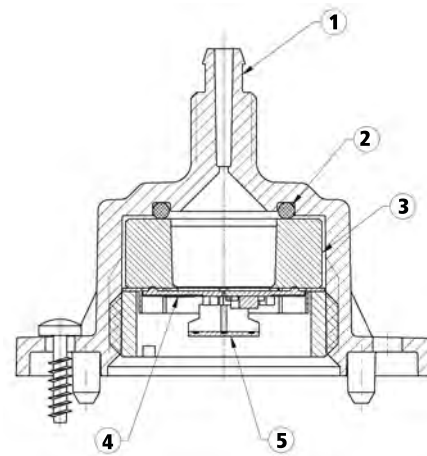
Barometrical sensor: max. ±0.8% fs
Temp.Coeff. Zero point: Max. ±0.3% fs/10K
Temp.Coeff. Sensitivity: Max. ±0.2% fs/10K
Test Conditions: 25 °C, 45% RH, Power Supply
5 VDC; Temp. Coeff. -15 to 80 °C

Power supply / Output:

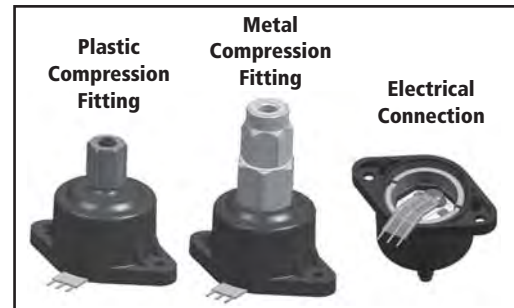
Power supply: 5 VDC (4.75 to 5.25 V)
Output with full scale adjustment:
ratiometric 0.5 to 4.5 V
10 to 90% of power supply
Output without full scale adjustment:
0.5 to 3 ±1.2 V

Load: > 10 kOhm / < 100 nF

Current consumption: At nominal pressure
without load: < 4 mA



| Cross-section Drawing Legend | |
|------------------------------|-----------------------|
| 1 | Pressure Connections |
| 2 | O-Ring Seal |
| 3 | Ceramic Measuring Cel |
| 4 | Amplifier Electronics |
| 5 | Electrical Connection |



SPECIFICATIONS

Dynamic response: Suitable for static and dynamic measurements

Response time: < 2 ms, 1 ms Typ.

Load cycle: < 100 Hz

Electrical connection:

Flexible connector Contact Spacing: 2.54 mm (100 mil)

Tests: Vibration acc. DIN IEC 600-68-2-620 g, 2 ... 2000 Hz with amplitude ± 15 mm, 10 Octave/min. all 3 directions, 3 constant load

Protection standard: IP 00

Pressure connection: Plastic quick fitting or Metal quick fitting

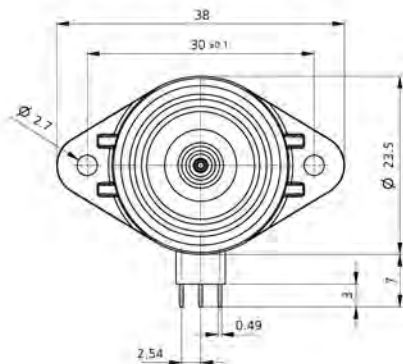
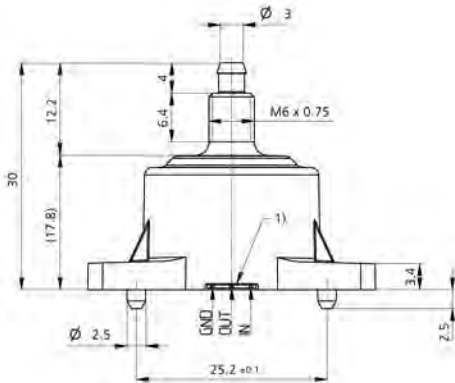
ESD-handling: Necessary

Weight: With plastic quick fitting approx. 15 g; With metal quick fitting approx. 25 g

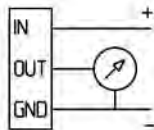
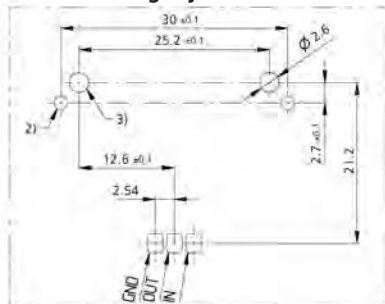
Packaging:

Multiple packaging: 4 blisters in covering box (140 pcs)

DIMENSIONS MM

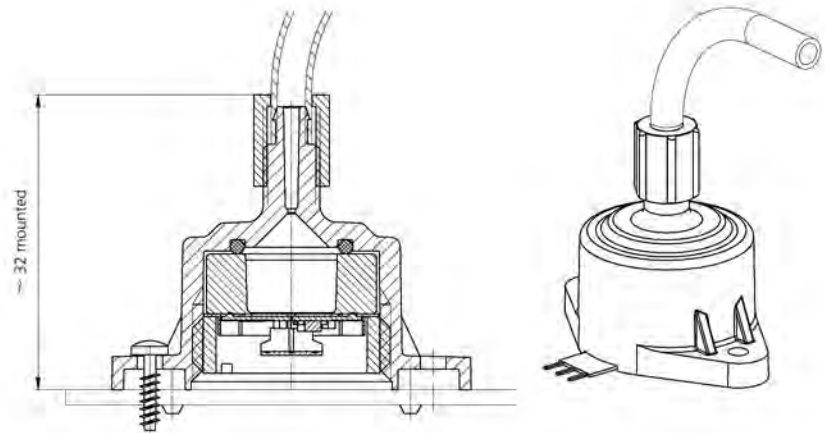


PCB Drilling Layout

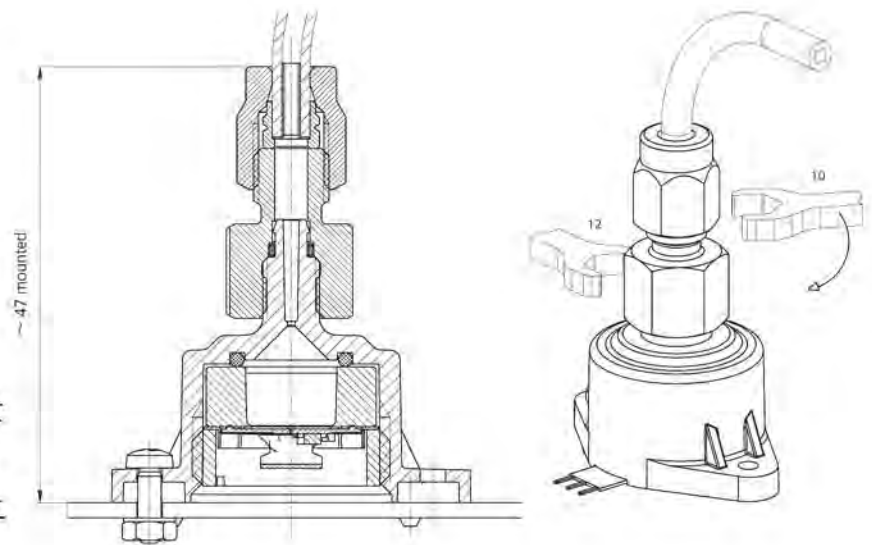


- 1) Keep the space at the flex cable open for relative/gauge pressure for the pressure compensation. Do not seal or cover it.
 - 2) Securing holes :
 - for self tapping screw (K22) [1.75 mm
 - for metric screw (M2.5) [2.7 mm
- We recommend metric screws with nut instead of self tapping screws for higher pressure or eventual mechanical loads.

Pressure connection: Plastic compression fitting for higher pressure / higher temperature



Pressure connection: Metal compression fitting for higher pressure / higher temperature



Installation of metal compression fitting:

- 1) It is essential to connect the tube to the sensor before mounting on the pcb.
- 2) Assemble finger tight, final adjustment 1.5 turn with spanner 10.

| ORDERING INFORMATION | | | | |
|-----------------------------|--------------------------------------|--|--|---|
| A | B | C | D | E |
| Model | Pressure | PressureRange | O-Ring/Connection Type | Calibration |
| 516 | 9= Relative/ Gauge 8= Absolute | 00= -1 to 0 bar (RelativeOnly) 10= 0.8 to 1.4 bar (Barometric Sensor-Absolute Only) 11= 0 to 1 bar 12= 0 to 1.6 bar 14= 0 to 2.5 bar 15= 0 to 4 bar 17= 0 to 6 bar 30= 0 to 10 bar 31= 0 to 16 bar | 2= NBR/Plastic Compression Fitting 6= FPM Spec./Plastic Compression Fitting 3= NBR/Metal Compression Fitting (brass) 7= FPM Spec./Metal Compression Fitting (brass) | 0= Factory Adjusted Zero Point & Full Scale 1= Factory Adjusted Zero Point Only (Relative Models Only) |

| Accessory Part Numbers | |
|-------------------------------|---|
| 108436 | Self tapping filister head screw WN 1412, KA22x8 |
| 111423 | Mounting set for 35 pieces (screws, serrated lock washers, nuts) M 2.5 x 10 |
| 104551 | Calibration certificate |

NOSHOK

Series 400/500 Stainless Steel Pressure Gages

1 1/2", 2 1/2", 4" & 6" Dry & Liquid filled, F.S. Ranges Vacuum to 30,000 PSI

DESCRIPTION

Noshok 400 (dry) and 500 (liquid filled) series all stainless steel gages are the ultimate in corrosion resistant, heavy duty, vacuum and pressure gauges. They are used in corrosive service world-wide where ruggedness and reliability are critical. Typical applications include chemical and petroleum refineries, pharmaceutical, off-shore drilling and production, papermills, fertilizer, etc.

MODELS

Table 1

| Model | Dial Size | Connection | Dry/Glycerine Filled |
|--------|-----------|----------------------|----------------------|
| 15.400 | 1 1/2" | 1/8" NPT Bottom | D |
| 15.410 | 1 1/2" | 1/8" NPT Center Back | D |
| 25.400 | 2 1/2" | 1/4" NPT Bottom | D |
| 25.410 | 2 1/2" | 1/4" NPT Center Back | D |
| 25.500 | 2 1/2" | 1/4" NPT Bottom | G |
| 25.510 | 2 1/2" | 1/4" NPT Center Back | G |
| 40.400 | 4" | 1/2" NPT Bottom | D |
| 40.410 | 4" | 1/2" NPT Lower Back | D |
| 40.500 | 4" | 1/2" NPT Bottom | G |
| 40.510 | 4" | 1/2" NPT Lower Back | G |
| 60.400 | 6" | 1/2" NPT Bottom | D |
| 60.410 | 6" | 1/2" NPT Lower back | D |
| 60.500 | 6" | 1/2" NPT Bottom | G |
| 60.510 | 6" | 1/2" NPT Lower back | G |

SPECIFICATIONS

SIZES: 1 1/2, 2 1/2, 4 and 6 inch sizes

CONNECTION: 1/8" NPT on 1 1/2" sizes, 1/4" NPT on 2 1/2" sizes, 1/2" NPT on 4" and 6" sizes. Available in bottom and back configurations.

CASE: 304 Stainless Steel

LENS: Instrument glass on 1 1/2" and 4" sizes, Trogamide on 2 1/2" size, Safety glass on 6" size.

BOURDON TUBE: 316 Stainless Steel "C" tube to 600 PSI, coiled safety tube above 600 PSI

MOVEMENT: Stainless Steel

ACCURACY: 2.5% Full Scale on 1 1/2" size; 1.5% Full Scale on 2 1/2" size; 1% Full Scale on 4" and 6" sizes.

AVAILABLE RANGES: Vacuum and Compound through 30,000 PSI. Dependent on model and size.

SAFETY: Models 40.400, 40.410, 40.500, 40.510, safety relief disk on back and top of case; model 60.400, 60.410 safety relief disk on rear of case.

OPTIONS AND ACCESSORIES: Panel mounting options, orifices, adjustable pointers, max indicating pointers, rubber case protectors, special dials, metric dials, special connections and more.

WORKING PRESSURE DYNAMIC: 60% of dial range

STATIC: 90% of dial range

TEMPERATURE: 400 SERIES: 40 Degrees F to 260 Degrees F (-40 Degrees C to 127 Degrees C) 500 SERIES: 0 Degrees to 160 Degrees F (-18 Degrees to 71 Degrees C)



60.400 & 60.410 Dry Pressure Gage



60.400 & 60.410 Liquid Filled Pressure Gage

OPTIONS

Flanges for Panel Mounting: Polished stainless steel front flanges (**SS FF**) are available for flush panel mounting on models 25.510, 25.510 40.400, 40.410, 60.400, 60.410, 40.500, 40.510, 60.500, 60.510.

Panel Mount Clips(**PMC**): Available for flush mounting models 25.410 & 25.510. The PMC is easily field installed on the gage diameter into pre-formed grooves in the case. The narrow gage bezel or an optional polished flange ring (**FR**) which is 20 % larger in size than the gage bezel is on the front of the panel.

Maximum Indicating pointers(**MIP**): Useful to identify system spikes. MIP's add 1% error to the gage (2% for ranges under 60 PSI) due to the added load on the bourdon tube. Available on most models except 1 1/2".

Solid Front Safety Gages: Available option for all 2 1/2", 4" & 6" sizes.

Ammonia Gages: Ammonia Refrigeration Gages with dials reading in both pressure and temperature are available in 2 1/2" and 4" sizes.

Metric Dials: Dual scale metric dials in PSI/BAR, PSI/kPa & PSI/kg/cm² are available for most models.

Special Connections: Consult factory for metric threads, female threads, straight threads (flare or swivel type), high pressure connections and special o-ring type connections.

Orifices: Threaded 316SS orifices (.032" I.D.) are available on all 400 and 500 series gages. They restrict the flow of rapidly increasing and decreasing pressures, thereby lessening the immediate effect of pulsations and pressure spikes.

DIMENSIONS (MM)

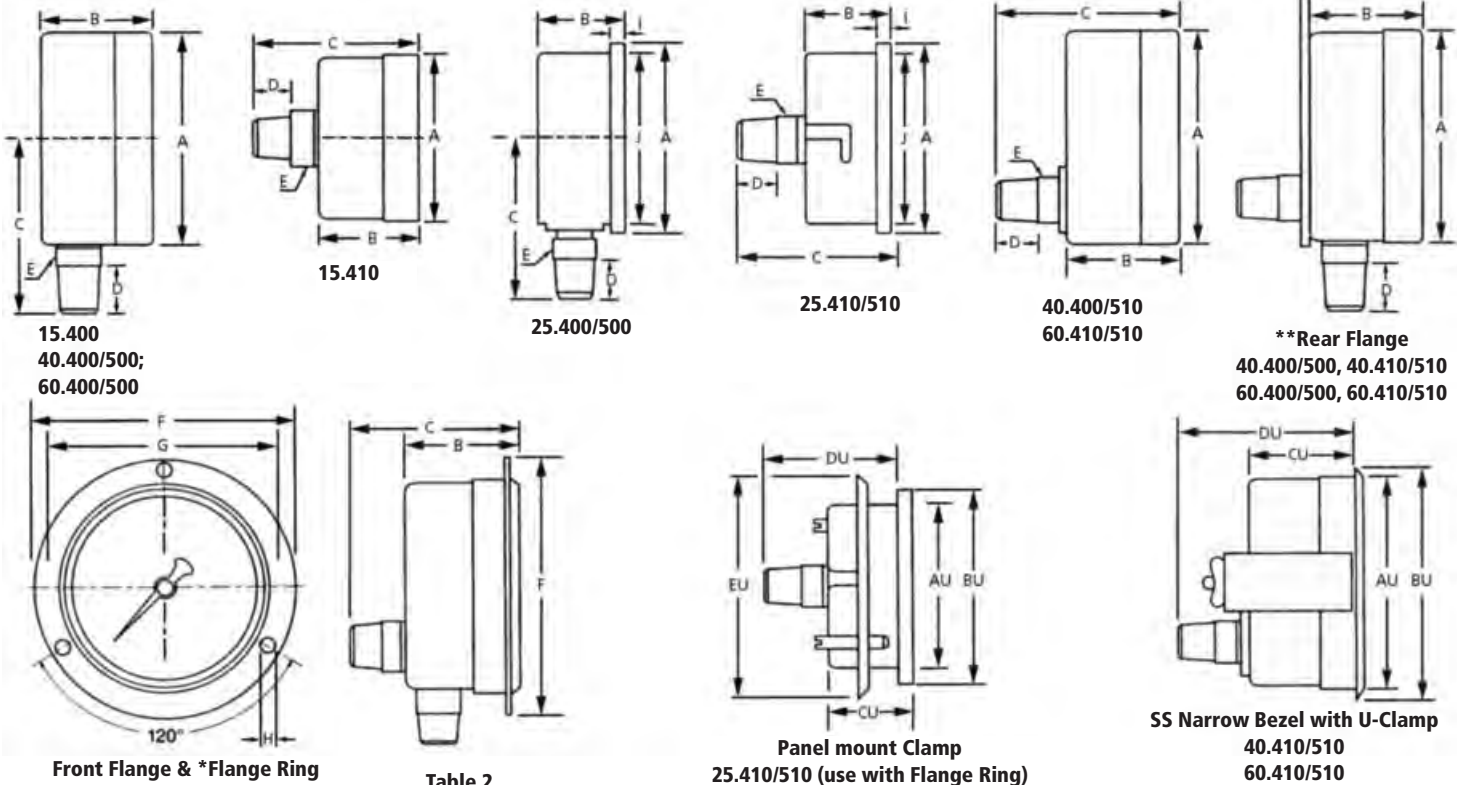


Table 2

| Model | A | B | C | D | E | F | G | H | I | J |
|--------|-----|----|-----|----|----|-----|-----|-----|---|----|
| 15.400 | 40 | 26 | 38 | 12 | 14 | - | - | - | - | - |
| 15.410 | 40 | 26 | 41 | 10 | 14 | - | - | - | - | - |
| 25.400 | 69 | 32 | 57 | 14 | 14 | - | - | - | 5 | 62 |
| 25.500 | 69 | 32 | 57 | 14 | 14 | - | - | - | 5 | 62 |
| 25.410 | 69 | 32 | 57 | 14 | 14 | 85 | - | - | 5 | 62 |
| 25.510 | 69 | 32 | 57 | 14 | 14 | 85 | - | - | 5 | 62 |
| 40.400 | 101 | 51 | 87 | 20 | 22 | 132 | 116 | 4.8 | - | - |
| 40.500 | 101 | 51 | 87 | 20 | 22 | 132 | 116 | 4.8 | - | - |
| 40.410 | 101 | 51 | 85 | 20 | 22 | 132 | 116 | 4.8 | - | - |
| 40.510 | 101 | 51 | 85 | 20 | 22 | 132 | 116 | 4.8 | - | - |
| 60.400 | 160 | 60 | 118 | 20 | 22 | 196 | 178 | 5.8 | - | - |
| 60.500 | 160 | 60 | 118 | 20 | 22 | 196 | 178 | 5.8 | - | - |
| 60.410 | 160 | 61 | 93 | 20 | 22 | 196 | 178 | 5.8 | - | - |
| 60.510 | 160 | 61 | 93 | 20 | 22 | 196 | 178 | 5.8 | - | - |

Table 3

| GAGES WITH PANEL MOUNT CLAMP OR NARROW BEZEL WITH U-CLAMP | | | | | |
|---|-----|-----|------|------|----|
| Model | AU | BU | CU | DU | EU |
| 25.410 | 62 | 69 | 27 | 52 | 75 |
| 25.510 | 62 | 69 | 27 | 52 | 75 |
| 40.410 | 101 | 105 | 47 | 81.5 | - |
| 40.510 | 101 | 105 | 47 | 81.5 | - |
| 60.410 | 160 | 174 | 55.5 | 87.5 | - |
| 60.510 | 160 | 174 | 55.5 | 87.5 | - |

*The Flange Ring (FR) is only for use with models 25.410/510 and must be used in conjunction with the panel Mount Clamp (PMC). It does not have mounting holes.

** Dimensions of Rear Flange are the same as the Front Flange

ORDERING INFORMATION

ORDER NUMBER A-B-C

- 1) A= Specify Model (Table 1)
- 2) B= Specify Range (Table 4)
- 3) C= Specify Options (See Bolded items under "Options")

EXAMPLE:

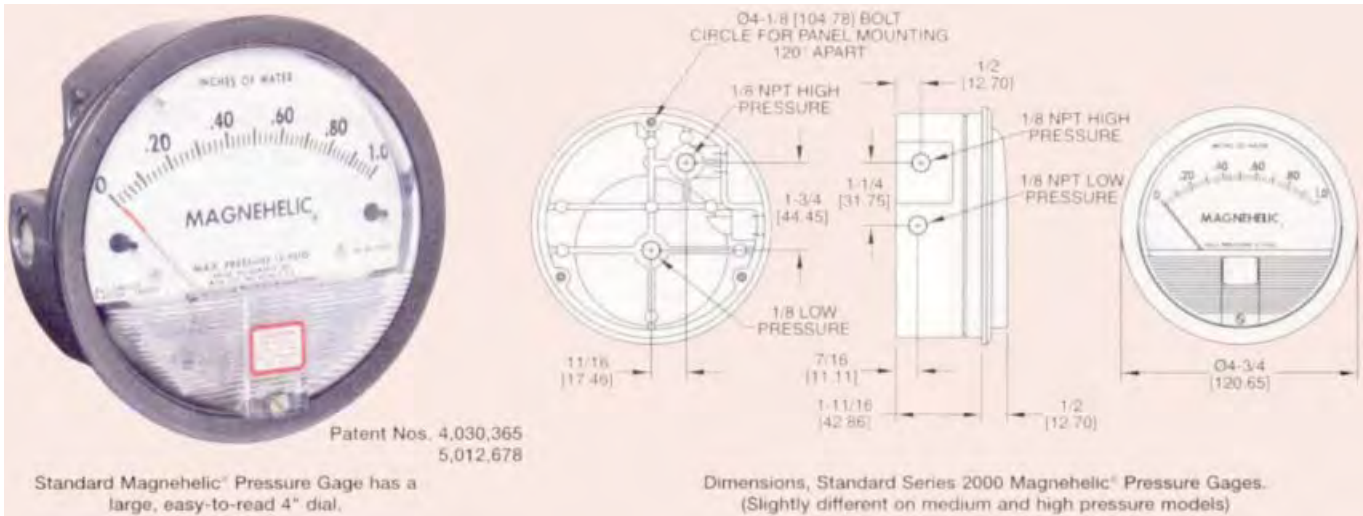
60.500-160PSI

| Table 4 | MODEL | | | | | | | |
|---------------|------------|------------|--------------------------|------------|--------------------------|------------|--------------------------|------------|
| | 15.400/410 | | 25.400/410 25.500/510 | | 40.400/410 40.500/510 | | 60.400/410 60.500/510 | |
| RANGE | Fig. Int. | Grad. Int. | Fig. Int. | Grad. Int. | Fig. Int. | Grad. Int. | Fig. Int. | Grad. Int. |
| 30" Hg Vac | - | - | 5" Hg | 0.5 PSI | 5" Hg | 0.2 PSI | 5" Hg | 0.5" Hg |
| 30"VAC/15 PSI | - | - | 10"/5 PSI | 1"/0.5 PSI | 10"/5 PSI | 1"/0.5 PSI | 10"/5 PSI | 1"/0.5 PSI |
| 30"VAC/30PSI | - | - | 10"/10 PSI | 1"/0.5 PSI | 10"/10 PSI | 1"/0.5 PSI | 10"/10 PSI | 1"/0.5 PSI |
| 30"VAC/60PSI | - | - | 10"/10 PSI | 1"/1 PSI | 10"/10 PSI | 1"/1 PSI | 10"/10 PSI | 1"/1 PSI |
| 30"VAC/100PSI | - | - | 30"/10 PSI | 2"/1 PSI | 30"/10 PSI | 2"/1 PSI | 30"/10 PSI | 2"/2 PSI |
| 30"VAC/160PSI | - | - | 30"/20 PSI | 5"/2 PSI | 30"/20 PSI | 5"/2 PSI | 30"/20 PSI | 5"/2 PSI |
| 30"VAC/200PSI | - | - | 30"/20 PSI | 5"/2 PSI | 30"/20 PSI | 5"/2 PSI | 30"/20 PSI | 5"/5 PSI |
| 30"VAC/300PSI | - | - | 30"/50 PSI | 10"/5 PSI | 30"/50 PSI | 10"/5 PSI | 30"/50 PSI | 10"/5 PSI |
| 0-15 PSI | - | - | 1 PSI | 0.1 PSI | 1 PSI | 0.1 PSI | 1 PSI | 0.1 PSI |
| 0-30 PSI | 5 | 1 | 5 PSI | 0.2 PSI | 5 PSI | 0.2 PSI | 5 PSI | 0.2 PSI |
| 0-60 PSI | 5 | 0.5 | 5 PSI | 0.5 PSI | 10 PSI | 0.5 PSI | 10 PSI | 0.5 PSI |
| 0-100 PSI | 10 | 1 | 10 PSI | 1 PSI | 10 PSI | 1 PSI | 10 PSI | 1 PSI |
| 0-160 PSI | 20 | 1 | 20 PSI | 1 PSI | 20 PSI | 2 PSI | 20 PSI | 2 PSI |
| 0-300 PSI | 50 | 2 | 50 PSI | 2 PSI | 50 PSI | 2 PSI | 50 PSI | 2 PSI |
| 0-600 PSI | 50 | 5 | 50 PSI | 5 PSI | 100 PSI | 5 PSI | 100 PSI | 5 PSI |
| 0-1,000 PSI | - | - | 100 PSI | 10 PSI | 100 PSI | 10 PSI | 100 PSI | 10 PSI |
| 0-2,000 PSI | - | - | 200 PSI | 20 PSI | 200 PSI | 20 PSI | 200 PSI | 20 PSI |
| 0-3,000 PSI | - | - | 500 PSI | 20 PSI | 500 PSI | 20 PSI | 500 PSI | 20 PSI |
| 0-5,000 PSI | - | - | 500 PSI | 50 PSI | 500 PSI | 50 PSI | 500 PSI | 50 PSI |
| 0-10,000 PSI | - | - | 1000 PSI | 100 PSI | 1000 PSI | 100 PSI | 1000 PSI | 100 PSI |
| 0-15,000 PSI | - | - | 3000 PSI | 100 PSI | 3000 PSI | 100 PSI | 3000 PSI | 100 PSI |
| 0-20,000 PSI | - | - | - | - | 2000 PSI | 200 PSI | 2000 PSI | 200 PSI |
| 0-30,000 PSI | - | - | - | - | 5000 PSI | 200 PSI | 5000 PSI | 200 PSI |

CLARK SOLUTIONS

Series 2000 Magnehelic® Differential Pressure Gage

Indicate Positive, Negative, or Differential Pressure



DESCRIPTION

Select the Magnehelic® gage for high accuracy - guaranteed within 2% of full scale and for the wide choice of ranges available to suit your needs precisely. Using the simple, frictionless Magnehelic® movement, it quickly indicates low air or non-corrosive gas pressures - either positive, negative (vacuum) or differential. The design resists shock, vibration and over-pressures. No manometer fluid to evaporate, freeze or cause toxic or leveling problems. It's inexpensive, too. Widely used to measure fan and blower pressures, filter resistance, air velocity, furnace draft, pressure drop across orifice plates, liquid levels with bubbler systems and pressures in fluid amplifier or fluidic systems. It also checks gas-air ratio controls and automatic valves, and monitors blood and respiratory pressures in medical care equipment.

SPECIFICATIONS

Ambient temperature range: 20° to 140°F* (-7° to 60°C).
 Rated total pressure: -20" Hg. to 15 psig† (-68 kPa to 103 kPa).
 Overpressure: Relief plug opens at approximately 25 psig (172 kPa).
 Connections: 1/8" NPT(F) high and low pressure taps, duplicated - one pair side and one pair back.
 Housing: Die cast aluminum. Case and aluminum parts iridite-dipped to withstand 168 hour salt spray test. Exterior finish is dark gray.
 Accuracy: Plus or minus 2% of full scale (3% on -0 and 4% on -00 ranges), throughout range at 70°F (21°C).
 Standard accessories: Two 1/8 " NPT plugs for duplicate pressure taps, two 1/8 " pipe thread to rubber tubing adapters and three flush mounting adapters with screws. (Mounting ring and snap ring retainer substituted for 3 adapters in MP & HP gage accessories.)

Weight: 1 lb. 2 oz. (460 g)

Mounting: A single case size is used for most ranges of Magnehelic® gages. They can be flush or surface mounted with standard hardware supplied. With the optional A-610 Pipe Mounting Kit they may be conveniently installed on horizontal or vertical 1 1/4 " -2" pipe.

*Low temperature models available as special option.

†For applications with high cycle rate within gage total pressure rating, next higher rating is recommended. See Medium and High pressure options.

Although calibrated for vertical position, many ranges above 1" may be used at any angle by simply re-zeroing. However, for maximum accuracy, they must be calibrated in the same position in which they are used. These characteristics make Magnehelic® gages ideal for both stationary and portable applications. A 4 9/16 " hole is required for flush panel mounting. Complete mounting and connection fittings plus instructions are furnished with each instrument. Flush ...Surface...or Pipe Mounted.

ORDER INFORMATION

| Model Number | Range Inches Of Water | Model Number | Range Zero Center Inches Of Water |
|--------------|-----------------------|---------------------|-----------------------------------|
| 2000-0† | 0-.25 | 2300-† | .25-0-.25 |
| 2000-0† | 0-.50 | 2301 | 5-0-.5 |
| 2001 | 0-1.0 | 2302 | 1-0-1 |
| 2002 | 0-2.0 | 2304 | 2-0-2 |
| 2003 | 0-3.0 | 2310 | 5-0-5 |
| 2004 | 0-4.0 | 2320 | 10-0-10 |
| 2005 | 0-5.0 | 2330 | 15-0-15 |
| 2006 | 0-6.0 | | |
| 2008 | 0-8.0 | Model Number | Range PSI |
| 2010 | 0-10 | 2201 | 0-1 |
| 2015 | 0-15 | 2202 | 0-2 |
| 2020 | 0-20 | 2203 | 0-3 |
| 2025 | 0-25 | 2204 | 0-4 |
| 2030 | 0-30 | 2205 | 0-5 |
| 2040 | 0-40 | 2210* | 0-10 |
| 2050 | 0-50 | 2215* | 0-15 |
| 2060 | 0-60 | 2220* | 0-20 |
| 2080 | 0-80 | 2230** | 0-30 |
| 2100 | 0-100 | | |
| 2150 | 0-150 | | |

†calibrated for vertical scale position
 *rated to 35 PSIG internal pressure
 **rated to 80 PSIG internal pressure

Accessories

A-310A, 3-Way Vent Valve
 A-321, Safety Relief Valve
 A-432, Portable Kit
 A-605, Air Filter Kit
 A-610, Pipe Mount Kit

Options - To order, add suffix: I.E. 2001-ASF
 ASF (Adjustable Signal Flag)
 HP (High Pressure Option)- 80 PSI
 LT (Low Temperatures to -20°F)
 MP (Med. Pressure Option)-35 PSI
 SP (Setpoint Indicator)

HIGH AND MEDIUM PRESSURE MODELS: Installation is similar to standard gages except that a 4 13/16 " hole is needed for flush mounting. The medium pressure construction is rated for internal pressures up to 35 psig and the high pressure up to 80 psig. Available in all ranges. Weight 1 lb., 10 oz (Installation of the A-321 safety relief valve on standard Magnehelic® gages often provides adequate protection against infrequent overpressure.

HUBA

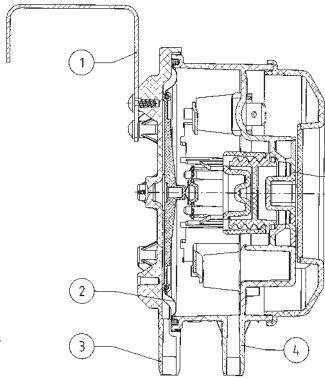
604 Series Differential Pressure Switch

Switch Points From 0.05" w.c. to 20" w.c.

DESCRIPTION

The 604 differential pressure switch is typically used for system interlock and alarm in ventilation ducts for monitoring of filter and fan pressures. They are also used to protect heating coils from overheating and for monitoring liquid level, laboratory and clean room pressures, fume hood and paint spray booth pressures and other commercial and industrial differential pressure relationships.

They are for use with air and non-corrosive gases



- 1) Mounting Bracket
- 2) Diaphragm
- 3) P1 Connection of Higher Pressure or Lower Vacuum
- 4) P2 Connection of Lower Pressure or Higher Vacuum
- 5) Scale (Switch Point Setting)



SPECIFICATIONS

Pressure Ranges: See order code selection table.
 Overpressure: 20.0 inches w.c. at medium and ambient temperature -22 to 185°F (-30 to +85 °C)
 Overpressure: 30 inches w.c. at medium and ambient temperature -22 to 167°F (-30 to +75 °C)
 Storage Temperature: -40 to 185°F (-40 to +85 °C)
 Dead Band: Factory set
 Lowest Actuation Pressure: 0.08 inches w.c.
 Repeatability:
 In the range 0.1 to 1.2 inches w.c. < +/- 0.01 inches w.c.
 In the ranges 0.4 to 4.0 inches w.c. < +/- 0.02 inches w.c.

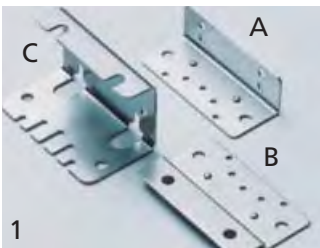
Case construction, Main case: fiberglass-reinforced plastic
 Cover: plastic
 Weight: 120 grams without bracket, 144 grams with bracket type C
 Installation Orientation: Standard diaphragm vertical (factory calibration) When the switch is rotated to horizontal the switching points will change by 0.044 inches w.c. (higher when cover is up, lower when cover is down)

- **AUTOMATED CALIBRATION PROCESS FOR HIGH ACCURACY**
- **INTEGRATED CABLE STRAIN RELIEF**
- **TRAPEZOIDAL BEAD DIAPHRAGM DESIGN INSURES LONG TERM SET POINT STABILITY**
- **MULTI PLATED BRASS, SILVER PALADIUM, GOLD CONTACTS SUITABLE FOR LOGIC LEVEL SWITCHING TO 2A**

Pressure Connections: Tubing Connector for 3/16 ID Tub
 Diaphragm: Silicone LSR, Tempered 392°F (200 °C), free of gas emissions
 Electrical Connections: Screw terminals
 Cable Gland: Pg 11 with cable strain relief
 Switch Type: SPDT
 Option : N/O contact
 Contact: Multi-layer contact (suitable for DDC)
 5 A 250 VAC, resistive
 2 A 30 VDC, resistive
 Approval Marking: UL, MFHX2.MH49692

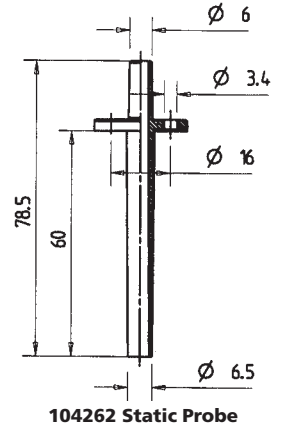
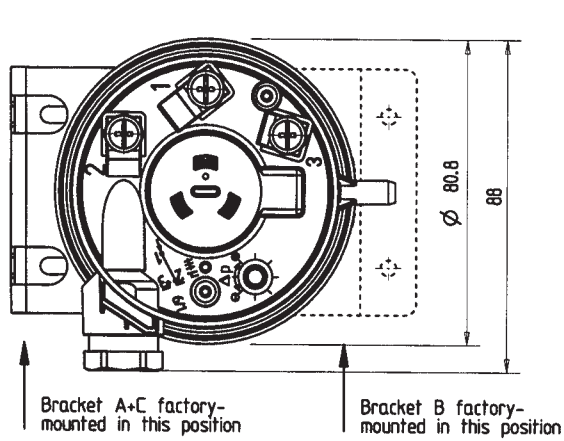
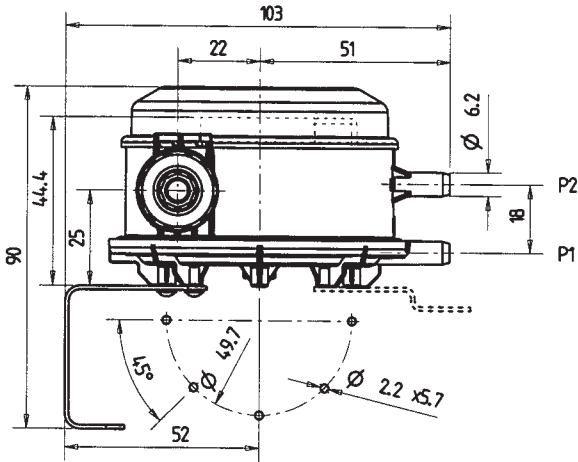


EU conformity:
 Low voltage directive 73/23/EWG
 Gas appliance directive 90/396/EWG
 CE 0085 A P0918
 Protection Class: IP 00 without cover, IP 54 with cover
 Service Life: Mechanical, > 10⁶ switching cycles



- 1) Mounting Bracket Types A, B, C
- 2) Mounting Clip
- 3) Plastic Duct Mount Static Tips

DIMENSIONS (MM) & ELECTRICAL

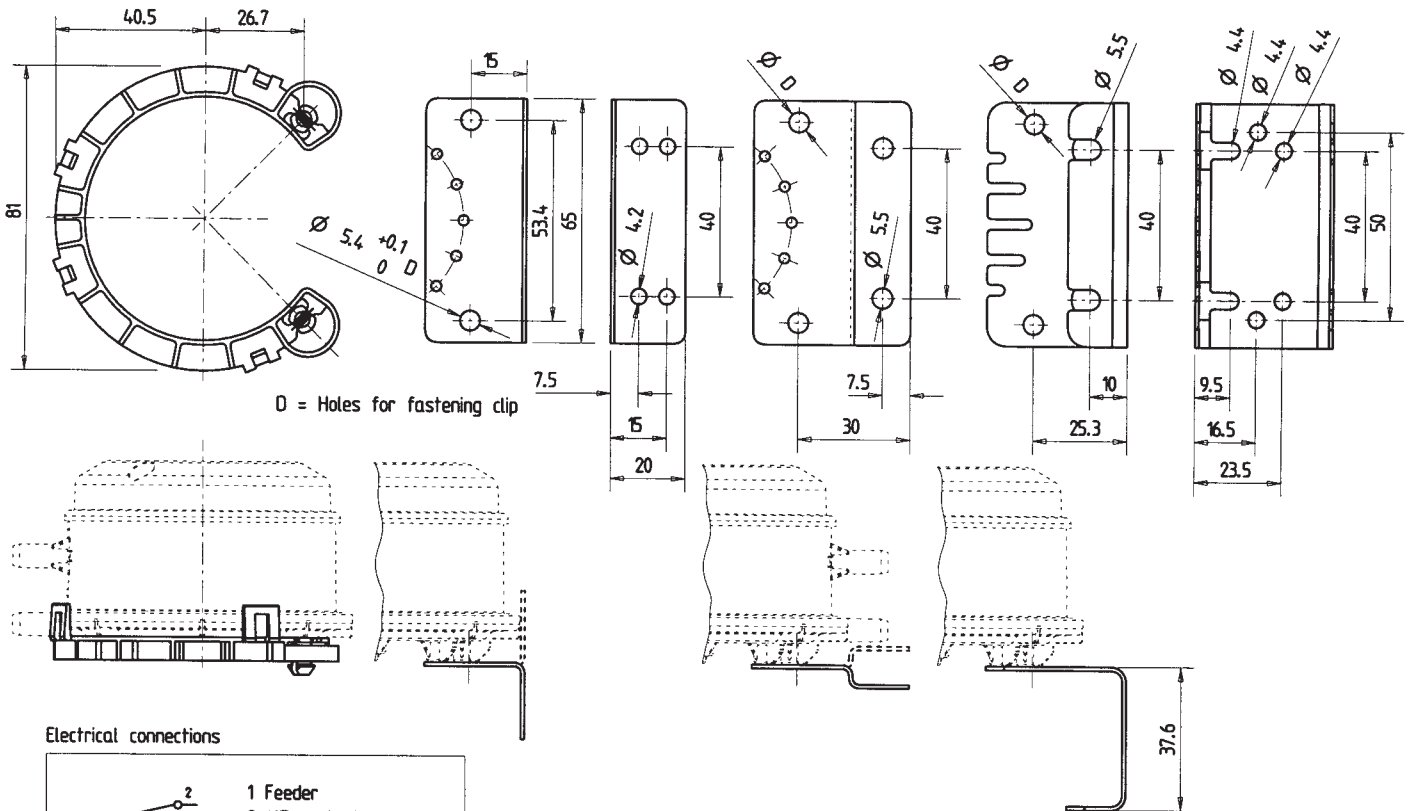


Mounting the switch with fastening clip

Bracket type A

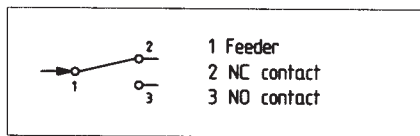
Bracket type B

Bracket type C



D = Holes for fastening clip

Electrical connections



ORDERING INFORMATION

| Model | Range |
|-------------|----------------------|
| 604.S020030 | 0.08-1.2 inches w.c. |
| 604.S220030 | 0.4-4.0 inches w.c. |
| 604.S420030 | 2.0-8.0 inches w.c. |
| 604.S520030 | 4-20 inches w.c. |

Switch Kits including Type C Mounting Bracket & Model 100064 Conn. Set

| | |
|-------------|----------------------|
| 604.S020032 | 0.08-1.2 inches w.c. |
| 604.S220032 | 0.4-4.0 inches w.c. |
| 604.S420032 | 2.0-8.0 inches w.c. |
| 604.S520032 | 4-20 inches w.c. |

Accessories & Options:

- Special Dead band Setting: Consult factory
- 104262: Plastic Static Pressure Probe (See Figure 1 Above)
- 100064: Connection set including two static probes, 6ft of tubing
- 100295: Type A mounting bracket
- 100098: Type B mounting bracket
- 100106: Type C mounting bracket
- 102976: Bracket mounting screw (use three per bracket)
- 100294: Fastening clip

HUBA

605 Series Differential Pressure Switch

Switch Points From 0.05" w.c. to 1.6" w.c.

DESCRIPTION

The 605 differential pressure switch is designed for OEM differential pressure alarm or interlock applications.

Typical applications are in appliances and HVAC systems for fan, room pressure, draft, and level monitoring.

They are for use with air and non-corrosive gases.

Minimum order quantities apply to this product.

SPECIFICATIONS

Pressure Switch Point: Factory Set, 0.05-1.6" w.c. (12.45-400 Pa)

Dead Band: Factory set, see tables D & E

Max. Overpressure: 20" w.c. (5000 Pa)

Media & Ambient Temperature: -22 to 176°F (-30 to 80°C)

Storage Temperature: -22 to 185°F (-30 to +85 °C)

Lowest Actuation Pressure: 0.05" w.c. (12.45 Pa)

Switch Point Tolerance: See table A

Switch Point Repeatability: ±.004" w.c. (1.0 Pa)

Case construction:

Main case: fiberglass-reinforced plastic

Cover: plastic

Weight: 60 grams without bracket

Installation Orientation: Vertical or horizontal (with electrical connections facing downward). Must be specified.

Pressure Connections: Tubing Connector for 3/16 ID Tubes

Diaphragm: Silicone LSR

Electrical Connections: AMP connectors, 6.3 or 4.8 mm per DIN 46244

Switch Type: SPDT

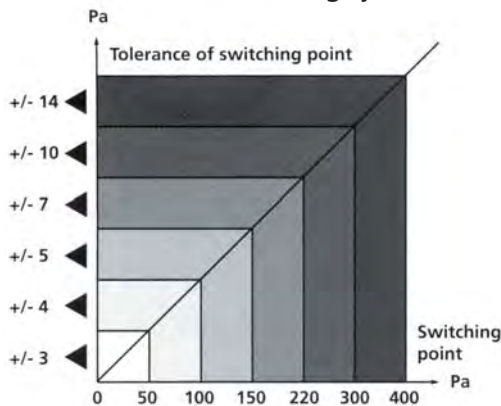
Contact Rating: See Tables D & E

Approval: UL, MFHX2.MH49692

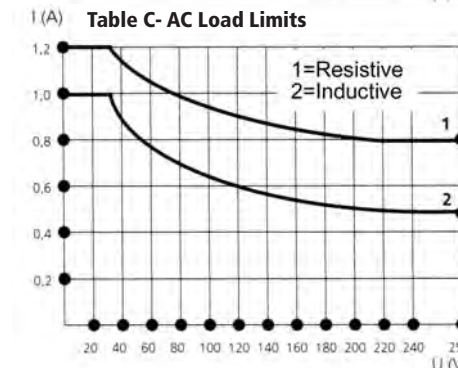
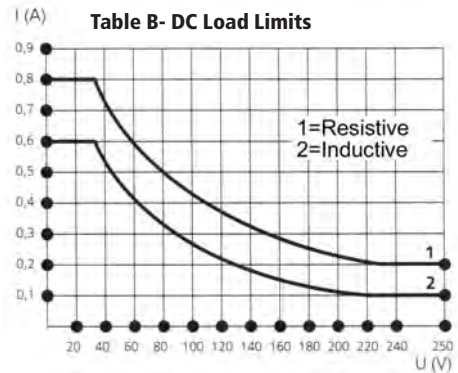


Protection Class: IP 00 without cover, IP 30 with contact safety guard, IP 54 with cover, with PG9/11, IP 65 with cover, with PG9/11 and seal.

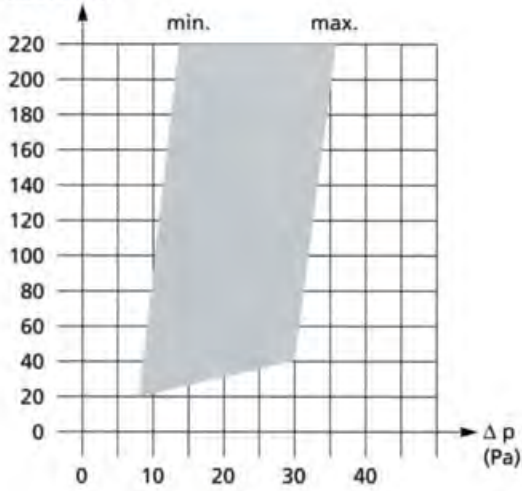
Service Life: > 10⁶ switching cycles



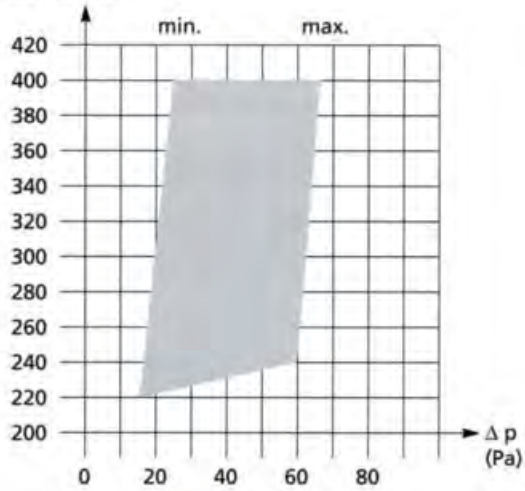
- **AUTOMATED CALIBRATION PROCESS FOR HIGH ACCURACY**
- **INTEGRATED CABLE STRAIN RELIEF**
- **TRAPEZOIDAL BEAD DIAPHRAGM DESIGN INSURES LONG TIME SET POINT STABILITY**
- **SELF-CLEANING CONTACT DESIGN HAS LONG LIFE**



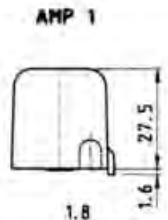
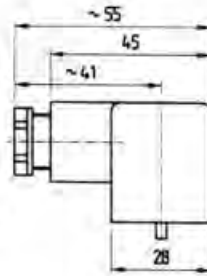
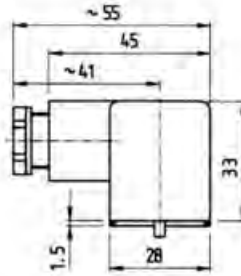
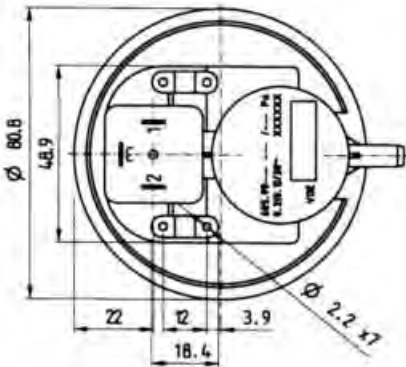
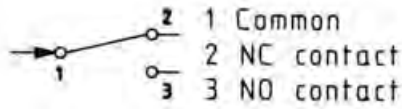
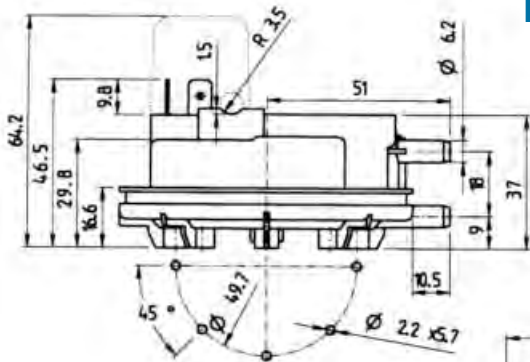
Switching point above (Pa) **Table D-Adjustable Dead Band**



Switching point above (Pa) **Table E-Adjustable Dead Band**



DIMENSIONS (MM) & ELECTRICAL



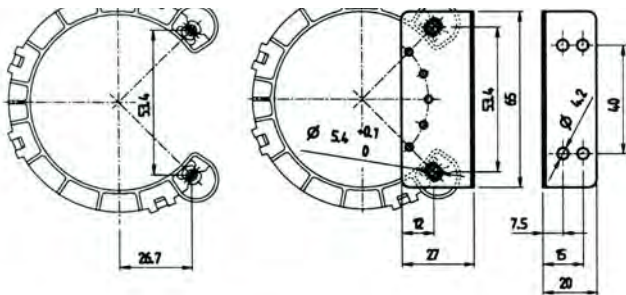
Fastening Clip

Cover with seal and PT screw
Order no. 100306

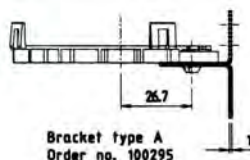
Cover without seal with PT screw
Order no. 100307

Contact safety guard with PT screw

Cable exit AMP2
Order no. 100300



Fastening clip
Order no. 100294 s=0.8-1.1
Order no. 100293 s=1.8-2.1



Bracket type A
Order no. 100295

ORDERING INFORMATION

Model Number:

Consult Factory but in General

- 1) Specify Model 605.S
- 2) Specify Switch Point
- 3) Specify Dead Band
- 4) Specify Mounting Position
- 5) Specify Electrical Connection

Accessories & Options:

- Switch points above 1.6" w.c.- Consult Factory
- 100294: Fastening clip
 - 100293: Fastening Clip
 - 100295: Type A mounting bracket

Typically an OEM product, please call us to discuss your application.

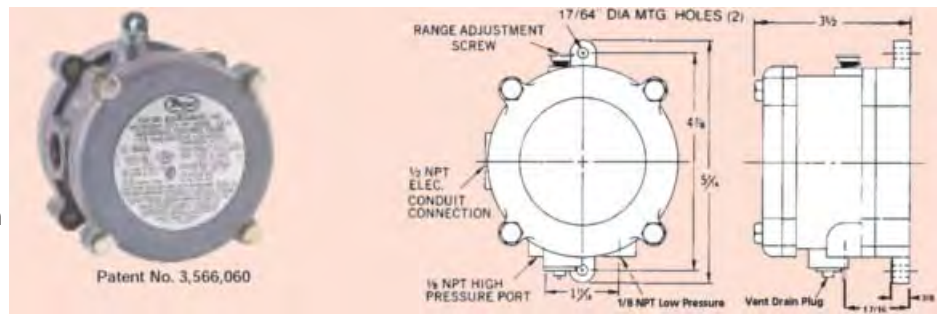
CLARK SOLUTIONS

1950 Series Explosion-Proof Differential Pressure Switches

Set points from 0.07" to 85" W.C. Repetitive accuracy within 2%.

DESCRIPTION

Model 1950 Explosion-Proof Differential Pressure Switch combines the best features of the popular series 1900 with an integral explosion-proof and weather-proof housing, making it an exceptional value for either application. It is C.E., U.L. and C.S.A. Listed, F.M. approved for use in Class I Groups C and D, Class II Groups E, F, and G and Class III hazardous atmospheres (NEMA 7 & 9). Weather-proof features include a drain plug and O-ring seal in cover. Electrical connections are easily made by removing front cover. For convenience the set point adjustment screw is located on the outside of the housing. Twelve models offer set points from 0.03 to 209 (0.8 to 508 mm) w.c. and from 0.5 to 50 psi (3.4 to 345 kPa). The unit is very light and compact, about half the weight and bulk of other explosion-proof or weather-proof switches with separate enclosures.



ORDER INFORMATION

| Model | Operating Range, in w.c. | Approximate Dead Band | |
|------------|--------------------------|-----------------------|---------|
| | | Min Set | Max Set |
| 1950-02-2S | .03 to .10 | .025 | .05 |
| 1950-00-2F | .07 to .15 | .04 | .05 |
| 1950-0-2F | .15 to .50 | .10 | .15 |
| 1950-1-2F | .4 to 1.6 | .15 | .20 |
| 1950-5-2F | 1.4 to 5.5 | .30 | .40 |
| 1950-10-2F | 3 to 11 | .40 | .50 |
| 1950-20-2F | 4 to 20 | .40 | .60 |

| Model | Operating Range, PSID | Approximate Dead Band | |
|-------------|-----------------------|-----------------------|---------|
| | | Min Set | Max Set |
| 1950P-2-2F | 0.5 to 2 | .3 | .3 |
| 1950P-8-2F | 1.5 to 8 | 1.0 | 1.0 |
| 1950P-15-2F | 3 to 15 | .9 | .9 |
| 1950P-25-2F | 4 to 25 | .7 | .7 |
| 1950P-50-2F | 15 to 50 | 1.0 | 1.5 |

CAUTION: For use only with air or compatible gases. Applications with hazardous atmospheres and a single positive pressure may require special venting.

Patent No. 3,566,060

Natural Gas Compatibility- Model 1950G is supplied with a Buna-N diaphragm for natural gas service. Ranges available are from 0.10 to 20 inches w.c. Consult us for specification details.

SPECIFICATIONS

Temperature Limits: -40°F to 140°F (-40°C to 60°C). 0°F to 140°F (-18°C to 60°C) for 1950P-8, 15, 25, and 50. -30°F to 130°F (-34°C to 54°C) for 1950-02

Maximum Surge Pressure: 1950-10 psi (0.7 bar), 1950P - 50 psi (3.4 bar)
1950P-50 only - 90 psi (6.2 bar)

Rated Pressure: 1950 - 45" (0.1 bar) w.c., 1950P - 35 psi (2.4 bar), 1950P-50 only - 70 psi (4.8 bar)

Pressure Connection: 1/8" NPT(F).

Electrical Rating: 15 amps, 125, 250, 480 volts, 60 Hz. AC. Resistive, 1/8 H.P. @125 volts, 1/4 H.P. @ 250 volts, 60 Hz. A.C.

Wiring Connections: 3 screw type; common, norm. open and normally closed.

Conduit Connection: 1/2" NPT(F).

Set Point Adjustment: Screw type on top of housing. Field adjustable.

Housing: Anodized cast aluminum.

Diaphragm: Molded fluorosilicone rubber. '-02 model, silicone on nylon.

Calibration Spring: Stainless steel.

Installation: Mount with diaphragm in vertical position.

Weight: 3 1/4 lbs. (1.5 kg), '- 02 model, 4 lbs., 7 oz. (2 kg)

UNITED ELECTRIC

Model 24, Differential Pressure Switch

Brass or Polysulfone®, Adjustable Ranges 1 to 45 PSID

DESCRIPTION

The 24 Series differential pressure and vacuum switches offer a unique blend of compact size, excellent performance, environmental protection and attractive price. Available with brass or polysulfone® pressure connections, the Model 24 will stand up in your most corrosive applications. The precision snap-acting switch and sensitive diaphragms combine to provide a narrow deadband and repeatability of approximately ±1% of range span. The convenient, externally accessible adjustment screw is multi-turn to provide easy set point adjustability. The force-balanced design gives the Model 24 excellent vibration resistance.



The Model 24 was designed to be a compact, cost-effective differential pressure switch for applications such as proof-of-flow, filter monitoring, etc. It depends on two opposing diaphragms to sense pressure on the "High" and "Low" pressure outputs of a system. The resulting pressure differential is transmitted through a linkage to a snap-action electrical switch, providing an output when a pre-set difference is exceeded. This set point can be easily modified while under pressure via an external adjusting screw. This adjustment "pre-loads" the actuation mechanism, which results in excellent vibration-resistance. Straight pressure and vacuum versions, with a single diaphragm, are also available.


SPECIFICATIONS

GENERAL

Storage Temperature: -20 ° to 180 °F (-29 ° to 82°C)
 Ambient Temperature: 30 ° to 160°F (-1 ° to 71 °C). Set point typically shifts less than ±0.6% of range for a 50°F (28°C) ambient temperature change; consult factory for special ratings
 Max Media Temperature: 200°F (93°C) at 100 psi working pressure
 Shock: Set point repeats after 15G, 10 millisecond duration.
 Vibration: Set point repeats after 2.5 G, 5-500 Hz.
 Enclosure Classification: Complies with enclosure type 4 requirements with optional water tight conduit connector. Reinforced polyester body, stainless steel cover with gasket.
 Set Point Repeatability: Typically ± 1% of full scale range
 Switch Output: SPDT precision snap-acting design with mechanical contact life of 10 million cycles. Actual life depends on electrical load and cycle frequency

Electrical Rating: Rated to 5 A resistive and 5 A inductive (75%PF) at 125 VAC and 250 VAC, 1/4 HP; 5 A resistive and 3 A inductive at 30 VDC and 0.5 A resistive and 0.25 inductive at 125 VDC. Gold flash over silver contacts for minimum loads of 5 mA at 6 VDC, 2 mA at 12 VDC and 1 mA at 24 VDC Weight: 6.5 oz.
 Electrical Connection: 7/8" hole for optional 1/2" NPT conduit connector. Terminal block with screw terminals. Max wire size 16 AWG
 Pressure Connection: Models 013-014: 1/4" NPT (female) brass; models 011-012, : 1/4" NPS (female) FDA compliant* Udel® polysulfone, non-tapered to minimize connection stress with 1/4" NPT (male) fittings - max torque is 2-ft.lbs.
 Mounting & Installation: Surface mount with two screws through clearance holes, or mount by pressure connections

 **U.S. & Canada**
 UL Listed, cUL Certified
 Pressure: UL 508; CSA C22.2 No.14, File #E42272

 **Europe**
 Low Voltage Directive (LVD) 2006/95/ECUEC
 Compliant to LVD- The Low Voltage Directive does not apply to products for use in hazardous locations

Udel® is a registered trademark of Solvay Advanced Polymers* The U.S. Food & Drug Administration (FDA) has approved polysulfone resins as compliant with the specifications of the FDA 21CFR177.1655 for repeated use and selected single use in contact with food under conditions of use as specified in the citation.

Table 1

| Model | Adjustable Range | | Typical Deadband | | *Max Working Pressure | | **Proof Pressure | |
|--|------------------|----------------|------------------|------|-----------------------|-----|------------------|-----|
| | psid | bar | psid | bar | psi | bar | psi | bar |
| Polyurethane (polyether) diaphragm, ethylene propylene O-Ring, 1/4" NPS (female) (mechanical) polysulfone® pressure connection | | | | | | | | |
| 011 | 1 to 10 | 70 mbar to 0.7 | 0.75 | 0.05 | 150 | 10 | 150 | 10 |
| 012 | 4 to 45 | 0.3 to 3.0 | 1.0 | 0.07 | 150 | 10 | 150 | 10 |
| Polyurethane (polyether) diaphragm, ethylene propylene O-Ring, 1/4" NPT (female) brass pressure connection | | | | | | | | |
| 013 | 1 to 10 | 70 mbar to 0.7 | 0.75 | 0.05 | 150 | 10 | 150 | 10 |
| 014 | 4 to 45 | 0.3 to 3.0 | 1.0 | 0.07 | 150 | 10 | 150 | 10 |

* Working Pressure: The pressure range within which two opposing sensors can be safely operated and still maintain set point adjustability provided the difference in pressure between them does not exceed the designated adjustable range.

** Proof Pressure: The maximum pressure to which a pressure sensor may be occasionally subjected, which causes no permanent damage. The unit may require calibration (e.g. start-up testing)

DIMENSIONS INCHES (MM)

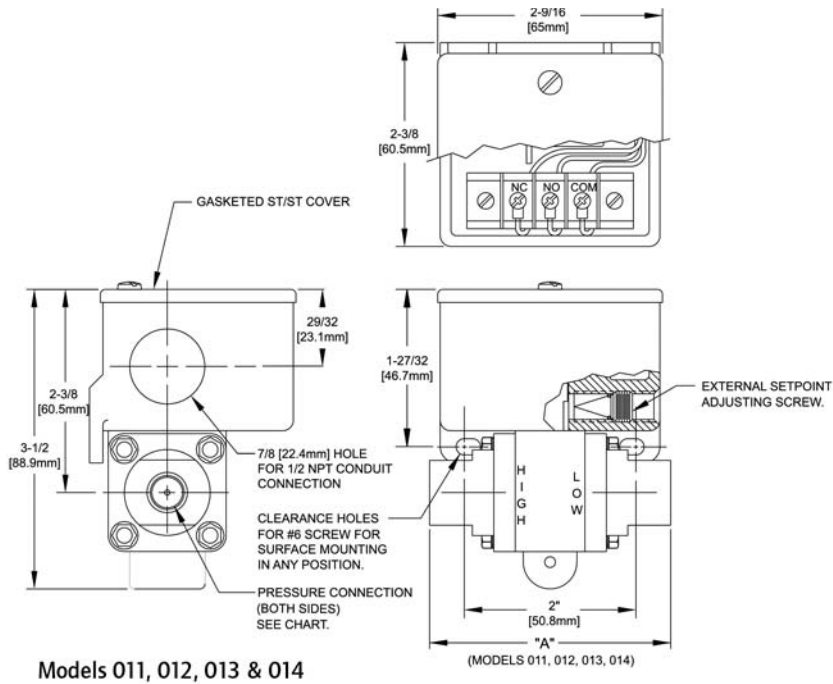


Table 2

| Model | Dimension A inches (mm) | Pressure Connection |
|----------|-------------------------|--------------------------|
| 011, 012 | 2.75 (69.9) | 1/4" NPS (F) Polysulfone |
| 013, 014 | 3.13 (79.5) | 1/4" NPT (F) Brass |

ORDERING INFORMATION

SPECIFY ABC (FROM TABLE BELOW)

EXAMPLE: 24012

| A Type | B Model (See Table 1) | C Options |
|---------------|---|--|
| 24= 24 Series | 011=011 012=012 013=013 014= 014 | -= None M020= Red status light, 115VAC only. Specify whether light turns on or off with increasing or decreasing pressure M201= Factory set switch; specify increasing or decreasing and set point M262= Buna-N diaphragm M540= Viton® construction (deadbands & low end of range may increase slightly). Wetted parts include Viton® diaphragm and/or O-Ring plus standard connection material. M900= M900= Water tight conduit fitting; converts 7/8" hole to 1/2" NPT fitting; must specify for compliance to NEMA 4 |

Viton® is a registered trademark of E.I. duPont de Nemours and Company.

UNITED ELECTRIC

Model J21K, Differential Pressure Switch

316L SS, Brass or Phosphor Bronze Bellows, Adjustable Ranges 30" Hg to 90 PSID

DESCRIPTION

The J21K differential pressure switch monitors the difference between two system pressures or vacuums and senses excessive flow deviation, or verifies that a filter is clogged.

The J21K's rugged design, with epoxy coated enclosure and sealed metal bellows, lends itself to exacting applications. Widely used in refrigeration (chiller) and compressor applications, the J21K can be used for filter status monitoring and proof of flow.

Features:

- Designed to meet Enclosure Type 4X (with watertight conduit fitting)
- UL listed and cUL certified
- Optional ATEX and Rostechnadzor (GOST-R) intrinsic safety compliance
- Optional adjustable deadband
- Single switch output
- Opposing bellows design



SPECIFICATIONS

GENERAL

Storage Temperature: -65 ° to 160 °F (-54 ° to 71 °C)

Ambient Temperature: -40 ° to 160 °F (-40 ° to 71 °C). Set point typically shifts less than 1% of range for a 50 °F (28 °C) ambient temperature change

Set Point Repeatability: Typically ± 1% of full scale range

Shock: Set point repeats after 15G, 10 millisecond duration.

Vibration: Set point repeats after 2.5 G, 5-500 Hz.

Enclosure: Die cast aluminum, epoxy powder coated, gasketed

Enclosure Classification: Designed to meet enclosure type 4X requirements with M900 option (watertight conduit fitting)

Switch Output: One SPDT snap action switch; switch may be wired "normally open" or "normally closed"

Electrical Rating: 15 A 125/250/480 VAC resistive. Electrical switches have limited DC capabilities. Consult factory for additional information.

Weight: Approximately 2 lbs (0.90 kg)

Electrical Connection: 7/8" diameter conduit hole

Pressure Connection: Models 127-150, 232-254, 357, 16020: 1/4" NPT (female); models S127B-S150B, 16021: 1/2" NPT (female)



U.S. & Canada

UL Listed, cUL Certified

Pressure: UL 508; CSA C22.2 No.14, File #E42272



Europe

Low Voltage Directive (LVD) 73/23/EC & 93/68/EEC Compliant to LVD

Pressure Equipment Directive (PED) 97/23/EC

Compliant to PED



ATEX Directive (94/9/EC) II 1G Ex ia IIC T6 Ga

(Optional - code M405)

-50°C ≤ Tamb ≤ +60°C

UL International DEMKO A/S (N.B.#0539)

Certificate # DEMKO II ATEX 1105261X

EN 60079-0, 60079-11, 60079-26

Table 1

| Model | Adjustable Set Point Range Low end of range on fall; High end of range on rise | | Deadband | | **Differential Proof Pressure | | *Working Pressure | |
|---|--|-------------|------------------------|-----------------------|-------------------------------|------|-----------------------|------------|
| | psid (unless noted) | bar | psid (unless noted) | bar (unless noted) | psi | bar | psi (unless noted) | bar |
| Welded 316L stainless steel bellows with 1/2" NPT (female) pressure connections | | | | | | | | |
| S127B | 30" Hg to 0 | -1 to 0 | 0.4 to 0.6" Hg | 13.5 to 20.3 mbar | 15 | 1.0 | 30" Hg to 0 | -1 to 0 |
| S140B | 0 to 6 | 0 to 0.4 | 0.1 to 0.4 | 6.0 to 27.6 mbar | 6 | 0.4 | 30" Hg to 3.0 | -1 to 2.1 |
| S150B | 0 to 40 | 0 to 2.8 | 0.3 to 0.7 | 20.7 to 48.3 mbar | 300 | 20.7 | 30" Hg to 300 | -1 to 20.7 |
| 16021 | 1 to 15 | 0.07 to 1.0 | 0.1 to 0.6 | 6.9 to 41.4 mbar | 125 | 8.6 | 30" Hg to 125 | -1 to 8.6 |
| 316L welded stainless steel bellows with 1/4" NPT (female) pressure connections | | | | | | | | |
| 357 | 0 to 70 | 0 to 4.8 | 2 to 4 | 0.1 to 0.3 | 70 | 4.8 | 30" Hg to 350 | -1 to 24.1 |
| Brass bellows with 1/4" NPT (female) pressure connections | | | | | | | | |
| 127 | 30" Hg to 0 | -1 to 0 | 0.4 to 0.6" HG | 13.5 to 20.3 mbar | 15 | 1.0 | 30" Hg to 0 | -1 to 0 |
| 140 | 0 to 6 | 0 to 0.4 | 0.1 to 0.4 | 6.9 to 27.6 mbar | 6 | 0.4 | 30" Hg to 30 | -1 to 2.1 |
| 150 | 0 to 40 | 0 to 2.8 | 0.3 to 0.7 | 20.7 to 48.3 mbar | 40 | 2.8 | 30" Hg to 180 | -1 to 12.4 |
| 16020 | 1 to 15 | 0.07 to 1.0 | 0.1 to 0.6 | 6.9 to 41.4 mbar | 125 | 8.6 | 30" Hg to 125 | -1 to 8.6 |
| Phosphor bronze bellows with 1/4" NPT (female) pressure connections | | | | | | | | |
| 232 | 0 to 25 | 0 to 1.7 | 0.6 to 1 | 41.4 to 68.9 mbar | 25 | 1.7 | 30" Hg to 110 | -1 to 7.6 |
| 254 | 0 to 90 | 0 to 6.2 | 2 to 4 | 0.1 to 0.3 | 90 | 6.2 | 30" Hg to 200 | -1 to 13.8 |

*Working Pressure Range: The pressure range within which two opposing sensors can be safely operated and still maintain set point adjustability.

** Differential Proof Range: The maximum differential pressure to which a pressure sensor may be occasionally subjected, which causes no permanent damage. The unit may require calibration (e.g. start up, testing)

DIMENSIONS INCHES (MM)

Type J21K

INTERNAL SET POINT ADJUSTMENT

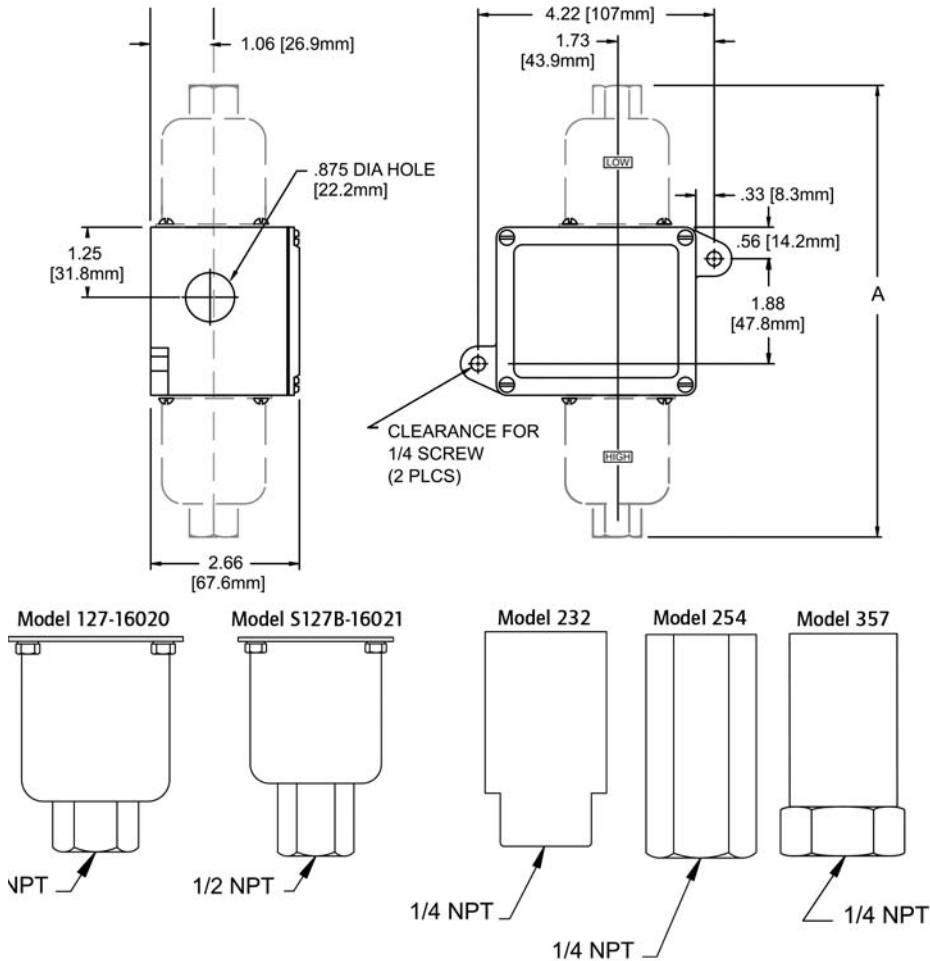


Table 2

| Model | Dimension A | | Conn. NPT |
|-------------|-------------|-------|-----------|
| | inches | mm | |
| 127-16020 | 8.06 | 204.7 | 1/4 |
| S127B-16021 | 8.86 | 225.0 | 1/2 |
| 232 | 6.53 | 165.9 | 1/4 |
| 254 | 6.50 | 165.1 | 1/4 |
| 357 | 6.88 | 174.8 | 1/4 |

ORDERING INFORMATION

- 1) SPECIFY MODEL TYPE
 - 2) SELECT MODEL (FROM TABLE 3)
 - 3) SELECT SWITCH OR OTHER OPTIONS IF REQUIRED
- EXAMPLE: J21K-M201(10 PSI RISING)**

Type

J21K- one SPDT output, internal adjustment with no reference dial.

Switch Options

- 0140- Gold contacts, 1A 125 VAC resistive.
- 0500- Close deadband, 5A 125/250 VAC resistive.
- 1520- Adjustable deadband, 15 A 125/250/277 VAC resistive; adjustment wheel changes rise setting only. If adjustment on fall setting is required use primary adjustment
- 1535- High ambient, 15 A 125/250 VAC resistive; temperatures up to 250°F (121°C)
- 1537- Vapor sealed switch, 15A 125/250 VAC resistive

Other Options

- M201- Factory set one switch; specify increasing or decreasing pressure and setpoint
- M276- Range indicated on nameplate in bars/mbars. NOT AVAILABLE ON TEMPERATURE VERSIONS
- M277- Range indicated on nameplate in kPa or MPa, factory selected
- M278- Range indicated on nameplate in Kg/cm2
- M405- Intrinsic safety compliance for European Union per ATEX standards
- M444- Paper ID tag
- M446- Stainless steel ID tag & wire attachment
- M550- Oxygen service cleaning, alcohol cleaning to remove residue from the process connection; not available model 254
- M900- Watertight conduit fitting; converts 7/8" hole to 1/2" NPT fitting. Required for product to meet Enclosure Type 4X

UNITED ELECTRIC

120 Series, Pressure, Vacuum, Diff. Pressure & Temp. Switches

Explosion Proof, Adjustable Ranges 30" Vac to 6000 PSI, -180 to 650°F

DESCRIPTION

As safety requirements become more stringent, the determining factor in specifying an industrial pressure, differential pressure and/or temperature switch rests upon that switch protecting equipment, processes and personnel. Meeting hazardous location requirements through adherence to UL, CSA, and ATEX standards, the 120 Series is the choice where potentially explosive or highly corrosive atmospheres exist.

The 120 Series offers a variety of pressure, differential pressure, vacuum and temperature ranges, as well as port connections, wetted materials and sensor types. With common, flexible "platforms", models can quickly be adapted at the factory for special requirements, such as ranges, process connections and electrical ratings. Typical industries using 120 Series switches include chemical, petrochemical, refinery, oil and gas pipelines & production and pharmaceuticals.



SPECIFICATIONS

GENERAL

Storage Temperature: -65° to 160°F (-54 to 71°C)

Ambient Temperature: -58 to 160°F (-50 to 71°C); ranges 36-39, 520-525, 540-548, 701-705: 0 to 160°F (-17 to 71°C); Models 820E, 822E: -40 to 160°F (-40 to 71°C) set point typically shifts less than 1% of range for a 50°F (28°C) ambient temperature change; less than 2% for types E121 & E122

Set Point Repeatability: Temperature models: Type B, C and F: ±1% of full scale range Type E: ±2% of full scale range

Pressure models: 126-164, S126B-S164B, 171-174, 270-274, 358-376, 520-535, 540-543, 560-564, 701-705: ±1% of adjustable range; models 450-559: ±1/2% of adjustable range; models 36-39, 183-194, 483-494, 544-548, 565-567, 612-680: ±1 1/2% of adjustable range

Shock: Set point repeats after 15 G, 10 millisecond duration

Vibration: Set point repeats after 2.5 G, 5-500 Hz

Enclosure: Die cast aluminum (max. 0.4% copper), epoxy powder coated; gasketed; coverlock; internal set point lock standard on types J, C, F; gasketed aluminum tamper-resistant dial cover on types B, H, E; aluminum name plate

Enclosure Class: Certified to enclosure type 4X. Class I, Division 1 product meets enclosure type 7; Class II, Division 1 product meets enclosure type 9. Certified to IP66 requirements

Switch Output: One or two SPDT; dual switch may be separated up to 100% of range; except type 822E where switch #2 can be set up to 25% of range span below switch #1 setpoint; switches may be wired "normally open" or "normally closed".

Electrical Rating: 15A 125/250/480 VAC resistive (standard), 2A @ 30 VDC, 1A @ 48 VDC, 0.5A @ 125 VDC; except types J120-15622, 15834-15839, H121-15875: 20A 125/250/480 VAC resistive, 6A @ 30 VDC, 0.5A @ 125 VDC, 0.25A @ 250 VDC; except types B121-13272, B122-13322, E121-13273, E122-13321: 22A 480 VAC resistive, 2A @ 30 VDC, 1A @ 48 VDC, 0.4A @ 125 VDC.

NOTE: DC Ratings are based on experience - Consult factory for further information. VDC ratings are not listed on nameplates

Weight: 3-7.5 lbs; Varies with type & model

Reference Scales: Types B, E & H: external dial. Scale divisions vary with range.

Electrical Connection: Type H, B, E; one 3/4" NPT E/C; type J, C, F, 820E, 822E; two 3/4" NPT E/C; terminal block standard

Pressure Connection: Models S126B-S164B, 171-194, 483-494, 520-535: 1/2" NPT (female); models 565-567: 1-1/2" flush mount connection; models 540-548: 1/8" NPT (female); all others: 1/4" NPT (female)

Temperature Assembly: Bulb and capillary: 6 feet 304 stainless steel (standard) except for E121-13273 and E122-13321: 10 feet; Immersion stem: nickel-plated brass (standard) except for B121-13272 and B122-13322: stainless steel.

FEATURES

- Approvals include cULus, ATEX & SAA; compliance with CE and NACE standards
- Internal adjustment or external adjustment via calibrated dials with tamper resistant cover
- Single or Dual Output
- Optional Hastelloy®, Monel® and Tantalum sensor material for corrosive media
- Indicating Differential Pressure Module

Temperature Deadband: Models F120, 820E, 822E: typically 1%; B-, C-, and E- 121 and 122: typically 2% of range under laboratory conditions (70°F [21°C] ambient circulating bath at rate of 1/2°F per minute change)

Pressure Deadband: See model charts

Differential Pressure Indication: Differential pressure indication available models H121 and H122K with option M210; accuracy approximately 1% mid 50% of range, 3% at ends; window is plexiglass and gasketed; indicator may be field adjusted for approximately ±1% accuracy at any set point within range

Temperature Indication: Temperature indication available models 820E and 822E. Indication accuracy is ±1% of adjustable range

Approvals:

United States & Canada
Class I, Division 1 and 2, Groups B, C & D
Class II, Division 1 and 2, Groups E, F & G
Class III
Class I, Zone 1, Group IIB + H2 T6
Enclosure Type 4X
UL Listed, cUL Certified
Pressure: UL 50 & 1203; CSA C22.2No. 25 & 30 - File # E40857
Temperature: UL 50 & 1203; CSA C22.2 No. 25 & 30 - File # E43374

Europe
ATEX Directive (94/9/EC)
II 2 G Ex d IIC T6 Gb
II 2 D Ex tb IIIC T85°C Db IP66
Tamb = -40°C to +75°C
UL International DEMKO A/S (N.B.# 0539)
Certificate # DEMKO 09 ATEX 0815573X Rev. 2
EN 60079-0, 60079-1, 60079-31
II 1 G Ex ia IIC T6 Ga (OPTIONAL – code M405)
(not available types 820E, 822E)
Tamb = -50°C to +60°C
UL International DEMKO A/S (N.B.# 0539)
Certificate # DEMKO 11 ATEX 1105261 Rev. 0
EN 60079-0, 60079-11, 60079-26

Pressure Equipment Directive (PED) (97/23/EC) : Compliant to PED. Product rated lower than 7.5 psi are outside the scope of the PED.

Low Voltage Directive (LVD) (2006/95/EC): UEC compliant to LVD. Products rated lower than 50 VAC and 75 VDC are outside of the scope of the LVD. The Low Voltage Directive does not apply to products for use in hazardous locations.

Pressure Type J120, Single Switch With Internal Adjustment, Dual Conduits

| Model | Adjustable Set Point Range | | Deadband | | *Over Range Pressure | | **Proof Pressure | | | |
|--|----------------------------|-----------------|-----------------|--------------|----------------------|-------|----------------------|-------|------------------|-------|
| | inches w.c. | mbar | inches w.c. | mbar | psi | bar | psi | bar | | |
| Buna N diaphragm and O-Ring with epoxy coated aluminum, 1/2" NPT (female) press. conn., 0.72" orifice for clean-out purposes (other wetted materials available) | | | | | | | | | | |
| 520 | 300 Vac to 0 | -746.7 to 0 | 0.2 to 8 | 0.5 to 19.9 | 100 | 6.9 | 100 | 6.9 | | |
| 521 | 10 Vac to 10 | -24.9 to 24.9 | 0.1 to 0.6 | 0.2 to 1.5 | 100 | 6.9 | 100 | 6.9 | | |
| 522 | 50 Vac to 50 | -124.5 to 124.5 | 0.1 to 3 | 0.2 to 7.5 | 100 | 6.9 | 100 | 6.9 | | |
| 523 | 0.5 to 5.0 | 1.2 to 12.4 | 0.1 to 0.3 | 0.2 to 0.70 | 100 | 6.9 | 100 | 6.9 | | |
| 524 | 2.5 to 50 | 6.2 to 124.5 | 0.1 to 0.8 | 0.2 to 2.0 | 100 | 6.9 | 100 | 6.9 | | |
| 525 | 10 to 250 | 24.9 to 622.3 | 0.1 to 6 | 0.2 to 14.9 | 100 | 6.9 | 100 | 6.9 | | |
| Welded 316L stainless steel diaphragm with 1/2" NPT (female) 316L pressure connection | | | | | | | | | | |
| 530 | 300 Vac to 0 | -746.7 to 0 | 0.2 to 15 | 0.5 to 37.3 | 50 | 3.4 | 100 | 6.9 | | |
| 531 | 10 Vac to 10 | -24.9 to 24.9 | 0.1 to 0.6 | 0.2 to 1.5 | 50 | 3.4 | 100 | 6.9 | | |
| 532 | 50 Vac to 50 | -124.5 to 124.5 | 0.1 to 3 | 0.2 to 7.5 | 50 | 3.4 | 100 | 6.9 | | |
| 533 | 0.5 to 5.0 | 1.2 to 12.4 | 0.1 to 0.3 | 0.2 to 0.70 | 50 | 3.4 | 100 | 6.9 | | |
| 534 | 2.5 to 50 | 6.2 to 124.5 | 0.1 to 0.8 | 0.2 to 2.0 | 50 | 3.4 | 100 | 6.9 | | |
| 535 | 10 to 250 | 24.9 to 622.3 | 0.1 to 10 | 0.2 to 24.9 | 50 | 3.4 | 100 | 6.9 | | |
| | psi | bar | psi | bar | psi | bar | psi | bar | | |
| Welded stainless steel diaphragm with 1/2" NPT (female) pressure connection, large 0.72" orifice for clean-out purposes (NACE MR-0175 compliant) | | | | | | | | | | |
| 171 | 1 to 20 | 0.07 to 1.4 | 0.1 to 1.0 | 0.01 to 0.1 | 500 | 34.5 | 1000 | 68.9 | | |
| 172 | 2 to 50 | 0.14 to 3.4 | 0.1 to 1.5 | 0.01 to 0.1 | 500 | 34.5 | 1000 | 68.9 | | |
| 173 | 4 to 100 | 0.3 to 6.9 | 0.1 to 2.5 | 0.01 to 0.2 | 500 | 34.5 | 1000 | 68.9 | | |
| 174 | 8 to 200 | 0.6 to 13.8 | 0.1 to 3.5 | 0.01 to 0.2 | 500 | 34.5 | 1000 | 68.9 | | |
| 2" sanitary welded 316L stainless steel diaphragm and pressure connection. Mates with Tri-Clamp® fitting systems | | | | | | | | | | |
| 560 | 0.5 to 15 | 0.03 to 1.0 | 0.1 to 1 | 0.01 to 0.1 | 200 | 13.8 | 300 | 20.7 | | |
| 561 | 1 to 25 | 0.07 to 1.7 | 0.1 to 1.5 | 0.01 to 0.1 | 200 | 13.8 | 300 | 20.7 | | |
| 562 | 2 to 50 | 0.14 to 3.4 | 0.1 to 2.5 | 0.01 to 0.2 | 200 | 13.8 | 300 | 20.7 | | |
| 563 | 4 to 100 | 0.03 to 6.9 | 0.1 to 4 | 0.01 to 0.3 | 200 | 13.8 | 300 | 20.7 | | |
| 564 | 8 to 200 | 0.6 to 13.8 | 0.1 to 5 | 0.01 to 0.3 | 200 | 13.8 | 300 | 20.7 | | |
| 1.5" sanitary welded 316L stainless steel diaphragm and pressure connection. Mates with Tri-Clamp fitting systems | | | | | | | | | | |
| 565 | 5 to 30 | 0.3 to 2.1 | 1 to 5 | 0.1 to 0.3 | 1000 | 68.9 | 1500 | 103.4 | | |
| 566 | 10 to 100 | 0.7 to 6.9 | 1 to 12 | 0.1 to 0.8 | 1000 | 68.9 | 1500 | 103.4 | | |
| 567 | 15 to 300 | 1.0 to 20.7 | 3 to 22 | 0.2 to 1.5 | 1000 | 68.9 | 1500 | 103.4 | | |
| 316L stainless steel diaphragm (optional Hastelloy® C 276 or Monel® 400); Viton® GLT O-Ring (optional Kalrez®, Ethylene Propylene or Aflas®); 316 stainless steel 1/2" NPT (female) pressure connection (optional Hastelloy® C 276 or Monel® 400), 0.72" orifice for clean-out purposes. Models 188 and 189 have a 316L stainless steel 1/2" NPT (female) pressure connection (NACE MR-0175 compliant) | | | | | | | | | | |
| 183 | 1 to 20 | 0.07 to 1.4 | 0.3 to 2.5 | 0.021 to 0.2 | 500 | 34.5 | 1000 | 68.9 | | |
| 184 | 2 to 50 | 0.14 to 3.4 | 0.3 to 3 | 0.021 to 0.2 | 500 | 34.5 | 1000 | 68.9 | | |
| 185 | 4 to 100 | 0.3 to 6.9 | 0.5 to 6 | 0.03 to 0.4 | 500 | 34.5 | 1000 | 68.9 | | |
| 186 | 8 to 200 | 0.6 to 13.8 | 1 to 11 | 0.07 to 0.8 | 500 | 34.5 | 1000 | 68.9 | | |
| 188 | 50 to 1000 | 3.4 to 68.9 | 25 to 125 | 1.7 to 8.6 | 2000 | 137.9 | 7000 | 482.6 | | |
| 189 | 250 to 3500 | 17.3 to 241.3 | 50 to 300 | 3.4 to 20.7 | 4000 | 275.8 | 7000 | 482.6 | | |
| 316L stainless steel diaphragm (optional Hastelloy® C 276 or Monel® 400); Viton® GLT O-Ring (optional Kalrez®, Ethylene Propylene or Aflas®); 316 stainless steel 1/2" NPT (female) pressure connection (optional Hastelloy® C 276 or Monel® 400), 0.06" orifice to dampen pulsations. Models 488 and 489 have a 316L stainless steel 1/2" NPT (female) pressure connection (NACE MR-0175 compliant) | | | | | | | | | | |
| 483 | 1 to 20 | 0.07 to 1.4 | 0.3 to 2.5 | 0.021 to 0.2 | 500 | 34.5 | 1000 | 68.9 | | |
| 484 | 2 to 50 | 0.14 to 3.4 | 0.3 to 3 | 0.021 to 0.2 | 500 | 34.5 | 1000 | 68.9 | | |
| 485 | 4 to 100 | 0.3 to 6.9 | 0.5 to 6 | 0.03 to 0.4 | 500 | 34.5 | 1000 | 68.9 | | |
| 486 | 8 to 200 | 0.6 to 13.8 | 1 to 11 | 0.07 to 0.8 | 500 | 34.5 | 1000 | 68.9 | | |
| 488 | 50 to 1000 | 3.4 to 68.9 | 25 to 125 | 1.7 to 8.6 | 2000 | 137.9 | 7000 | 482.6 | | |
| 489 | 250 to 3500 | 17.3 to 241.3 | 50 to 300 | 3.4 to 20.7 | 4000 | 275.8 | 7000 | 482.6 | | |
| Welded 316L stainless steel bellows with 1/2" NPT (female) pressure connection | | | | | | | | | | |
| S126B | 30" to 3" Hg Vac | -1 to 0 | 0.2 to 0.6" Hg | 0.01 to 0.02 | 80" wc | 0.2 | 5 | 0.3 | | |
| S134B | 30" Hg Vac to 20 | -1 to 1.4 | 0.2 to 0.6" Hg | 0.01 to 0.02 | 20 | 1.4 | 25 | 1.7 | | |
| S137B | 15 to 80" wc | 0.04 to 0.2 | 2 to 6" wc | 0.01 to 0.02 | 80" wc | 0.2 | 5 | 0.3 | | |
| S144B | 0.5 to 20 | 0.04 to 1.4 | 0.1 to 0.3 | 0.01 to 0.02 | 20 | 1.4 | 25 | 1.7 | | |
| S152B | 1 to 50 | 0.07 to 3.4 | 0.1 to 0.5 | 0.01 to 0.03 | 50 | 3.4 | 75 | 5.2 | | |
| S156B | 2 to 100 | 0.14 to 6.9 | 0.2 to 0.6 | 0.01 to 0.04 | 100 | 6.9 | 125 | 8.6 | | |
| S164B | 4 to 200 | 0.28 to 13.8 | 0.2 to 1 | 0.01 to 0.01 | 200 | 13.8 | 200 | 13.8 | | |
| Model | Adjustable Set Point Range | | Deadband | | | | *Over Range Pressure | | **Proof Pressure | |
| | psi | bar | Lower 75% range | | Top 25% Range | | psi | bar | psi | bar |
| Welded stainless steel diaphragm with 1/2" NPT (female) pressure conn., large 0.072" orifice for clean-out purposes (NACE MR-0175 compliant, except model 194) | | | | | | | | | | |
| 190 | 5 to 30 | 0.3 to 2.1 | 1 to 3 | 0.07 to 0.2 | 6 max | 0.4 | 1500 | 103.4 | 2500 | 172.4 |
| 191 | 10 to 100 | 0.7 to 6.9 | 1 to 8 | 0.07 to 0.6 | 15 max | 1.0 | 1500 | 103.4 | 2500 | 172.4 |
| 192 | 15 to 300 | 1 to 20.7 | 3 to 18 | 0.2 to 1.2 | 25 max | 1.7 | 1500 | 103.4 | 2500 | 172.4 |
| 193 | 20 to 500 | 1.4 to 34.5 | 4 to 30 | 0.3 to 2.1 | 45 max | 3.1 | 1500 | 103.4 | 2500 | 172.4 |
| 194 | 80 to 1700 | 5.5 to 117.2 | 5 to 120 | 0.3 to 8.3 | 150 max | 10.3 | 2000 | 138.9 | 2500 | 172.4 |
| Welded 316 stainless steel diaphragm with 1/2" NPT (female) pressure connection, 0.06" orifice to dampen pulsations (NACE MR-0175 compliant, except model 194) | | | | | | | | | | |
| 490 | 5 to 30 | 0.3 to 2.1 | 1 to 3 | 0.07 to 0.2 | 6 max | 0.4 | 1500 | 103.4 | 2500 | 172.4 |
| 491 | 10 to 100 | 0.7 to 6.9 | 1 to 8 | 0.07 to 0.6 | 15 max | 1.0 | 1500 | 103.4 | 2500 | 172.4 |
| 492 | 15 to 300 | 1 to 20.7 | 3 to 18 | 0.2 to 1.2 | 25 max | 1.7 | 1500 | 103.4 | 2500 | 172.4 |
| 493 | 20 to 500 | 1.4 to 34.5 | 4 to 30 | 0.3 to 2.1 | 45 max | 3.1 | 1500 | 103.4 | 2500 | 172.4 |
| 494 | 80 to 1700 | 5.5 to 117.2 | 5 to 120 | 0.3 to 8.3 | 150 max | 10.3 | 2000 | 138.9 | 2500 | 172.4 |

*Over Range Pressure: The maximum pressure that may be applied continuously without causing damage and maintaining set point repeatability
 ** Proof Pressure: The maximum pressure to which a pressure sensor may be occasionally subjected, which causes no permanent damage. Unit may require calibration.

Pressure Type J120, Single Switch With Internal Adjustment, Dual Conduits (cont'd)

| Model | Adjustable Set Point Range High end of range on rise, low end on fall | | Deadband | | *Over Range Pressure | | **Proof Pressure | |
|---|--|---------------|--------------------|----------------|----------------------|------------|------------------|-------|
| | psi (unless noted) | bar | psi (unless noted) | bar | psi | bar | psi | bar |
| Brass bellows with 1/4" NPT (female) nickel-plated brass pressure connection; Models 126 & 134 have zinc-plated steel spring exposed to media | | | | | | | | |
| 126 | 30 to 3" Hg Vac | -1 to 0.1 | 0.2" to 0.6" Hg | 0.01 to 0.02 | 80"wc | 0.2 | 5 | 0.3 |
| 134 | 30" Hg Vac to 20 psi | -1 to 1.4 | 0.2" to 6" Hg | 0.01 to 0.02 | 20 | 1.4 | 25 | 1.7 |
| 137 | 15 to 80"wc | 0.04 to 0.19 | 2 to 6"wc | 0.01 to 0.02 | 80"wc | 0.2 | 5 | 0.3 |
| 144 | 0.5 to 20 | 0.04 to 1.4 | 0.1 to 0.3 | 0.01 to 0.02 | 20 | 1.4 | 25 | 1.7 |
| 152 | 1 to 50 | 0.07 to 3.4 | 0.1 to 0.5 | 0.01 to 0.03 | 50 | 3.4 | 75 | 5.2 |
| 156 | 2 to 100 | 0.14 to 6.9 | 0.2 to 0.6 | 0.01 to 0.04 | 100 | 6.9 | 125 | 8.6 |
| 164 | 4 to 200 | 0.3 to 13.8 | 0.2 to 1 | 0.01 to 0.01 | 200 | 13.8 | 200 | 13.8 |
| Phosphor bronze bellows with 1/4" NPT (female) nickel-plated brass pressure connection | | | | | | | | |
| 270 | 4 to 200 | 0.3 to 13.8 | 1 to 4 | 0.07 to 0.3 | 200 | 13.8 | 250 | 17.2 |
| 274 | 6 to 300 | 0.4 to 20.7 | 1 to 5 | 0.07 to 0.3 | 300 | 20.7 | 350 | 24.1 |
| Welded 316L stainless steel bellows and 1/4" NPT (female) pressure connection | | | | | | | | |
| 356 | 15 to 100 | 1.0 to 6.9 | 0.7 to 1.8 | 0.05 to 0.1 | 100 | 6.9 | 800 | 55.2 |
| 358 | 15 to 200 | 1.0 to 13.8 | 1 to 3 | 0.07 to 0.2 | 200 | 13.8 | 800 | 55.2 |
| 361 | 20 to 300 | 1.4 to 20.7 | 1 to 4 | 0.07 to 0.3 | 300 | 20.7 | 800 | 55.2 |
| 376 | 25 to 500 | 1.7 to 34.5 | 1.5 to 5 | 0.1 to 0.3 | 500 | 34.5 | 800 | 55.2 |
| 303 stainless steel piston and Buna-N O-Ring with 1/4" (female) pressure connection (not recommended for gas service since drying of the O-Ring seal can allow bleeding of medium into the atmosphere) | | | | | | | | |
| 612 | 125 to 3,000 | 8.6 to 206.8 | 40 to 250 | 2.8 to 17.2 | 6,000 | 413.7 | 10,000 | 689.5 |
| 616 | 700 to 5000 | 48.3 to 344.7 | 40 to 375 | 2.8 to 25.9 | 6,000 | 413.7 | 10,000 | 689.5 |
| 316 stainless steel bellows and 1/4" NPT (female) pressure connection (not recommended for rapid or high cycling pressure changes) | | | | | | | | |
| 680 | 100 to 1700 | 6.9 to 117.2 | 9 to 40 | 0.6 to 2.8 | 1700 | 117.2 | 2500 | 172.4 |
| Buna-N diaphragm and O-Ring with 1/4" NPT (female) nickel-plated brass pressure connection; Optional Viton® diaphragm & O-Ring available for code 704-705 | | | | | | | | |
| 701 | 1.5 to 30 | 0.1 to 2.1 | 1 to 2 | 0.07 to 0.14 | 500 | 34.5 | 1000 | 68.9 |
| 702 | 3 to 100 | 0.2 to 6.9 | 1 to 4 | 0.07 to 0.3 | 500 | 34.5 | 1000 | 68.9 |
| 703 | 9 to 300 | 0.6 to 20.7 | 1 to 5 | 0.07 to 0.3 | 500 | 34.5 | 1000 | 68.9 |
| 704 | 15 to 500 | 1.0 to 34.5 | 2 to 8 | 0.14 to 0.6 | 1500 | 103.4 | 2500 | 172.4 |
| 705 | 30 to 1000 | 2.1 to 68.9 | 3 to 20 | 0.21 to 1.4 | 1500 | 103.4 | 2500 | 172.4 |
| Buna-N diaphragm and O-Ring with 1/4" NPT (female) stainless steel pressure connection and cap | | | | | | | | |
| 450 | 30" to 3" Hg Vac | -1.0 to -0.1 | 0.1 to 0.3" Hg | 0.003 to 0.1 | 80"wc | 0.2 | 225 | 15.5 |
| 452 | 30" Hg Vac to 20 psi | -1 to 1.4 | 0.1 to 0.4" Hg | 0.003 to 0.01 | 20 | 1.4 | 225 | 15.5 |
| Buna-N diaphragm and O-Ring with 1/4" NPT (female) aluminum pressure connection and cap | | | | | | | | |
| 451 | 2 to 80 | 5 to 199.1 | 0.8 to 2" wc | 2 to 5 mbar | 80"wc | 199.1 mbar | 225 | 15.5 |
| 453 | 0.5 to 20 | 0.03 to 1.4 | 0.05 to 0.1 | 0.003 to 0.01 | 20 | 1.4 | 225 | 15.5 |
| 454 | 0.8 to 30 | 0.06 to 2.1 | 0.05 to 0.2 | 0.003 to 0.014 | 30 | 2.1 | 225 | 15.5 |
| Teflon® diaphragm and O-Ring with 1/4" NPT (female) 316L stainless steel pressure connection and cap | | | | | | | | |
| 550 | 30" to 3" Hg Vac | -1 to 0.1 | 0.1 to 0.4" Hg | 0.003 to 0.01 | 80"wc | 0.2 | 225 | 15.5 |
| 551 | 2 to 80"wc | 0.005 to 0.2 | 1 to 4"wc | 0.003 to 0.01 | 80"wc | 0.2 | 225 | 15.5 |
| 552 | 30" Hg Vac to 20 psi | -1 to 1.4 | 0.2 to 0.5" Hg | 0.007 to 0.02 | 20 | 1.4 | 225 | 15.5 |
| 553 | 0.5 to 20 | 0.03 to 1.4 | 0.1 to 0.2 | 0.007 to 0.014 | 20 | 1.4 | 225 | 15.5 |
| 554 | 0.8 to 30 | 0.06 to 2.1 | 0.1 to 0.3 | 0.007 to 0.02 | 30 | 2.1 | 225 | 15.5 |
| 555 | 2 to 100 | 0.14 to 6.9 | 0.2 to 0.4 | 0.014 to 0.03 | 100 | 6.9 | 225 | 15.5 |

Pressure Type J120, Single Switch With Internal Adjustment, Dual Conduits With Adjustable Deadband Micro-switch

| Model | Adjustable Set Point Range High end of range on rise, low end on fall | | Adjustable Deadband | | *Over Range Pressure | | **Proof Pressure | |
|--|--|-------------|---------------------|------------|----------------------|------|------------------|------|
| | psi | bar | psi | bar | psi | bar | psi | bar |
| Viton® diaphragm and O-ring with 1/4" NPT (female) 316 stainless steel pressure connection | | | | | | | | |
| 15622 | 20 to 200 | 1.4 to 13.8 | 12 to 16 | 0.8 to 1.8 | 500 | 34.5 | 1000 | 68.9 |

| Model | Adjustable Set Point Range High end of range on rise, low end on fall | | Adjustable Deadband | | | | | | *Over Range Pressure | | **Proof Pressure | |
|--|--|--------------|---------------------|------------|-----------|------------|-----------|------------|----------------------|-------|------------------|-------|
| | | | Low End | | Mid Range | | High End | | | | | |
| | psi | bar | psi | bar | psi | bar | psi | bar | psi | bar | psi | bar |
| Buna N diaphragm and O-Ring with nickel-plated brass 1/4" NPT (female) pressure connection | | | | | | | | | | | | |
| 15834 | 3 to 30 | 0.1 to 2.1 | 1.5 to 4 | 0.1 to 0.3 | 2 to 4.5 | 0.1 to 0.3 | 2.5 to 5 | 0.2 to 0.3 | 500 | 34.5 | 1000 | 68.9 |
| 15835 | 5 to 100 | 0.3 to 6.9 | 3 to 6 | 0.2 to 0.4 | 4 to 7.5 | 0.3 to 0.5 | 5 to 9 | 0.3 to 0.6 | 500 | 34.5 | 1000 | 68.9 |
| 15836 | 9 to 300 | 0.6 to 20.7 | 4 to 11 | 0.3 to 0.8 | 5 to 13 | 0.3 to 0.9 | 5 to 16 | 0.3 to 1.1 | 500 | 34.5 | 1000 | 68.9 |
| 15837 | 15 to 500 | 1 to 34.5 | 8 to 25 | 0.6 to 1.7 | 9 to 28 | 0.6 to 1.9 | 10 to 31 | 0.7 to 2.1 | 1500 | 103.4 | 2500 | 172.4 |
| 15838 | 30 to 1000 | 2.1 to 68.9 | 9 to 30 | 0.6 to 2.1 | 10 to 35 | 0.7 to 2.4 | 30 to 90 | 2.1 to 6.2 | 1500 | 103.4 | 2500 | 172.4 |
| 15839 | 100 to 1700 | 6.9 to 117.2 | 25 to 60 | 1.7 to 4.1 | 40 to 80 | 2.8 to 5.5 | 50 to 100 | 3.4 to 6.9 | 2000 | 137.5 | 2500 | 172.4 |

*Over Range Pressure: The maximum pressure that may be applied continuously without causing damage and maintaining set point repeatability
 ** Proof Pressure: The maximum pressure to which a pressure sensor may be occasionally subjected, which causes no permanent damage. Unit may require calibration.

Type H121, Single Switch With External Adjustment Via Reference Dial, Single conduit with Adjustable Deadband Micro-switch

| Model | Adjustable Set Point Range High end of range on rise, low end on fall | | Adjustable Deadband | | | | | | *Proof Pressure | |
|---|--|---------------|---------------------|--------------|------------|--------------|------------|------------|-----------------|-------|
| | | | Low End | | Mid Range | | High End | | | |
| | psi | bar | psi | bar | psi | bar | psi | bar | psi | bar |
| 303 stainless steel piston with Buna N O-Ring and 303 stainless steel 1/4" NPT (female) pressure connection, includes adjustable deadband micro-switch (not recommended for gas service since drying of the O-Ring seal can allow bleeding of medium into the atmosphere) | | | | | | | | | | |
| 15875 | 500-6000 | 34.5 to 413.7 | 150 to 400 | 10.3 to 27.6 | 250 to 500 | 17.2 to 34.5 | 450 to 700 | 31 to 51.7 | 10,000 | 689.5 |

**Type H121, Single Switch With External Adjustment Via Reference Dial, Single Conduit
Type H122, Dual Switch With External Adjustment Via Reference Dial, Single Conduit**

| Model | Adjustable Set Point Range | | Deadband | | *Proof Pressure | | Dial Divisions |
|---|----------------------------|---------------|-----------------|-------------------|-----------------|-------|-----------------|
| | psi | bar | psi | bar | psi | bar | psi |
| Welded 316L stainless steel bellows with 1/2" NPT (female) pressure connection | | | | | | | |
| S126B | 30" Hg Vac to 0 | -1 to 0 | 0.2 to 0.9" Hg | 7 to 30.5 mbar | 5 | 0.3 | 0.5" Hg |
| S134B | 30" Hg Vac to 20 | -1 to 1.4 | 0.2 to 1.2" Hg | 7 to 40.6 mbar | 25 | 1.7 | 1" Hg & 0.5 psi |
| S137B(Type H122 N/A) | 2 to 80"wc | 0.005 to 0.2 | 2 to 10"wc | 5 to 20 mbar | 5 | 0.3 | 2"wc |
| S144B | 0 to 20 | 0 to 1.4 | 0.1 to 0.5 | 7 to 34.5 mbar | 25 | 1.7 | 0.5 |
| S146B | 0 to 30 | 0 to 2.1 | 0.1 to 0.6 | 6.9 to 41.4 mbar | 40 | 2.78 | 0.5 |
| S156B | 0 to 100 | 0 to 6.9 | 0.2 to 0.8 | 13.8 to 55.2 mbar | 125 | 8.6 | 2 |
| S164B | 0 to 200 | 0 to 13.8 | 0.3 to 2 | 20.7 to 138 mbar | 200 | 13.8 | 5 |
| Brass bellows with 1/4" NPT (female) nickel-plated brass pressure connection; Models 126 & 134 have zinc-plated steel spring exposed to media | | | | | | | |
| 126 | 30" Hg Vac to 0 | -1 to 0 | 0.2" to 0.9" Hg | 7 to 30.5 mbar | 5 | 0.3 | 0.5" Hg |
| 134 | 30" Hg Vac to 20 psi | -1 to 1.4 | 0.2" to 1.2" Hg | 7 to 40.6 mbar | 25 | 1.7 | 1" Hg & 0.5 psi |
| 137 (Type H122 N/A) | 2 to 80"wc | 0.005 to 0.2 | 2 to 10"wc | 5 to 20 mbar | 5 | 0.3 | 2"wc |
| 144 | 0 to 20 | 0 to 1.4 | 0.1 to 0.5 | 6.9 to 34.5 mbar | 25 | 1.7 | 0.5 |
| 146 | 0 to 30 | 0 to 2.1 | 0.1 to 0.6 | 6.9 to 41.4 mbar | 40 | 2.8 | 0.5 |
| 156 | 0 to 100 | 0 to 6.9 | 0.2 to 0.8 | 13.8 to 55.2 mbar | 125 | 8.6 | 2 |
| 164 | 0 to 200 | 0 to 13.8 | 0.3 to 2.0 | 20.7 to 138 mbar | 200 | 13.8 | 5 |
| Welded 316L stainless steel bellows and 1/4" NPT (female) pressure connection | | | | | | | |
| 358 | 0 to 200 | 0 to 13.8 | 1.5 to 8 | 0.1 to 0.6 | 250 | 17.2 | 5 |
| 361 | 0 to 300 | 0 to 20.7 | 2 to 9 | 0.1 to 0.6 | 350 | 24.1 | 10 |
| 376 | 0 to 500 | 0 to 34.5 | 3 to 12 | 0.2 to 0.8 | 575 | 39.6 | 10 |
| 303 stainless steel piston and Buna-N O-Ring with 1/4" (female) pressure connection (not recommended for gas service since drying of the O-Ring seal can allow bleeding of medium into the atmosphere) | | | | | | | |
| 612 | 200 to 3000 | 13.8 to 207 | 40 to 250 | 2.8 to 17.2 | 10000 | 689.5 | 50 |
| 614 | 500 to 6000 | 34.5 to 413.7 | 50 to 400 | 3.4 to 27.6 | 10000 | 689.5 | 100 |

| Model | Adjustable Set Point Range | | Deadband | | *Proof Pressure | | Dial Divisions |
|---|----------------------------|----------------|----------------|---------------|-----------------|-------|----------------|
| | psi | bar | psi | bar | psi | bar | psi |
| Phosphor bronze bellows with 1/4" NPT (female) nickel-plated brass pressure connection | | | | | | | |
| 270 | 0 to 200 | 0 to 13.8 | 1.5 to 8 | 0.1 to 0.6 | 250 | 17.2 | 5 |
| 274 | 0 to 300 | 0 to 20.7 | 2 to 10 | 0.1 to 0.7 | 350 | 24.1 | 10 |
| Buna N diaphragm and O-Ring with 1/4" NPT (female) stainless steel connection and cap | | | | | | | |
| 450 | 30" Hg Vac to 0 | -1 to 0 mbar | 0.1 to 0.4"wc | 0.003 to 0.01 | 225 | 15.5 | 0.5" Hg |
| 452 | 30" Hg Vac to 20 psi | -1 to 1.4 mbar | 0.1 to 1" Hg | 0.003 to 0.03 | 225 | 15.5 | 1" & 0.5 psi |
| Buna-N diaphragm and O-Ring with 1/4" NPT (female) aluminum pressure connection and cap | | | | | | | |
| 453 | 0 to 20 | 0 to 1.4 mbar | 0.05 to 0.2 | 0 to 0.01 | 225 | 15.5 | 0.5 |
| 454 | 0 to 30 | 0 to 2.1 mbar | 0.05 to 0.3 | 0 to 0.02 | 225 | 15.5 | 0.5 |
| Teflon® diaphragm and O-Ring with 1/4" NPT (female) 316L stainless steel pressure connection and cap | | | | | | | |
| 550 | 30" Hg Vac to 0 | -1 to 0 | 0.1 to 0.6" Hg | 0.003 to 0.02 | 225 | 15.5 | 0.5" Hg |
| 552 | 30" Hg Vac to 20 psi | -1 to 1.4 | 0.2 to 1" Hg | 0.007 to 0.03 | 225 | 15.5 | 1" & 0.5 psi |
| 553 | 0 to 20 | 0 to 1.4 | 0.05 to 0.3 | 0 to 0.02 | 225 | 15.5 | 0.5 |
| 554 | 0 to 30 | 0 to 2.1 | 0.1 to 0.4 | 0.01 to 0.03 | 225 | 15.5 | 0.5 |
| 555 | 0 to 100 | 0 to 6.9 | 0.25 to 0.75 | 0.02 to 0.05 | 225 | 15.5 | 2 |
| Buna-N diaphragm and O-Ring with 1/4" NPT (female) nickel-plated brass pressure connection; Optional Viton® diaphragm & O-Ring available for code 701 & 703 | | | | | | | |
| 701 (Type H122 N/A) | 3 to 30 | 0.2 to 2.1 | 1 to 3 | 0.07 to 0.2 | 1000 | 68.9 | 0.5 |
| 702 | 10 to 100 | 0.7 to 6.9 | 1 to 5 | 0.07 to 0.3 | 1000 | 68.9 | 2 |
| 703 | 30 to 300 | 2.1 to 20.7 | 2 to 7 | 0.14 to 0.5 | 1000 | 68.9 | 10 |
| 704 | 50 to 500 | 3.4 to 34.5 | 3 to 12 | 0.2 to 0.8 | 2500 | 172.4 | 10 |
| 705 | 200 to 1000 | 13.8 to 68.9 | 5 to 25 | 0.3 to 1.7 | 2500 | 172.4 | 25 |

* **Proof Pressure:** The maximum pressure to which a pressure sensor may be occasionally subjected, which causes no permanent damage. Unit may require calibration.

Differential Pressure Type J120k Single Switch With Internal Adjustment, Dual Conduit

| Model | Adjustable Set Point Range High end of range on rise, low end on fall | | Deadband | | ***Working Pressure Range | | **Proof Pressure | |
|--|--|--------------------|-----------------|------------------|---------------------------|------------|------------------|-------|
| | "wcd/psid | mbar/bar | "wc/psi | mbar/bar | psi | bar | psi | bar |
| Welded 316L bellows with 1/2" NPT (female) pressure connections | | | | | | | | |
| S147B | 3 to 30 psid | 0.2 TO 2.1 bar | 0.3 TO 1.5 psi | 0.02 to 0.1bar | 30" Hg Vac to 100 | -1 to 6.9 | 300 | 20.7 |
| S157B | 10 to 100 psid | 0.7 TO 6.9 bar | 0.5 TO 2 psi | 0.03 to 0.14 bar | 30" Hg Vac to 180 | -1 to 12.4 | 300 | 20.7 |
| Welded Brass bellows with 1/4" NPT (female) nickel-plated brass pressure connections | | | | | | | | |
| 147 | 3 to 30 psid | 0.2 to 2.1 bar | 0.3 to 1.5 psi | 0.02 to 0.1bar | 30" Hg Vac to 100 | -1 to 6.9 | 180 | 12.4 |
| 157 | 10 to 100 psid | 0.7 to 6.9 bar | 0.5 to 2 psi | 0.03 to 0.14 bar | 30" Hg Vac to 150 | -1 to 10.3 | 180 | 12.4 |
| 316L stainless steel bellows and 1/4" NPT (female) pressure connections | | | | | | | | |
| 367 | 10 to 100 psid | 0.7 to 6.9 | 4 to 10 | 0.3 to 0.7 | 0 to 350 | 0 to 24.1 | 500 | 34.5 |
| Buna-N diaphragm and O-Ring with stainless steel 1/4" NPT (female) pressure connections | | | | | | | | |
| 36 | 3 to 30 psid | 0.2 to 2.1 | 1 to 5 | 0.07 to 0.3 | 0 to 350 | 0 to 24.1 | 1000 | 68.9 |
| 37 | 10 to 100 psid | 0.7 to 6.9 | 2 to 8 | 0.1 to 0.6 | 0 to 500 | 0 to 34.5 | 1000 | 68.9 |
| 38 | 30 to 300 psid | 2.1 to 20.7 | 2 to 15 | 0.1 to 1.0 | 0 to 1000 | 0 to 68.9 | 2500 | 172.4 |
| 39 | 50 to 500 psid | 3.4 to 34.5 | 3 to 20 | 0.2 to 1.4 | 0 to 1000 | 0 to 68.9 | 2500 | 172.4 |
| Buna-N diaphragm and O-Ring with 1/4" NPT (female) aluminum pressure connections | | | | | | | | |
| 455 | 5 to 80" wcd | 12.4 to 200 mbar | 1 to 4" wcd | 2 to 10 mbar | 30" Hg Vac to 225 | -1 to 15.5 | 225 | 15.5 |
| 456 | 2 to 20 psid | 0.1 to 1.4 bar | 0.1 to 0.3 psi | 6.9 to 20.7 mbar | 30" Hg Vac to 225 | -1 to 15.5 | 225 | 15.5 |
| 457 | 3 to 30 psid | 0.2 to 2.1 bar | 0.1 to 0.4 psi | 6.9 to 27.6 mbar | 30" Hg Vac to 225 | -1 to 15.5 | 225 | 15.5 |
| Buna-N diaphragm, Buna-N sealing diaphragms and epoxy coated aluminum 1/8" NPT (female) pressure connections | | | | | | | | |
| 540 | 0.2 to 7" wcd | 0.5 to 17.4 mbar | 0.05 to 0.4" wc | 0.1 to 0.1 mbar | 30" Hg to 200 | -1 to 13.8 | 400 | 27.6 |
| 541 | 1 to 20" wcd | 2.5 to 49.7 mbar | 0.1 to 0.7" wc | 0.2 to 1.7 mbar | 30" Hg to 200 | -1 to 13.8 | 400 | 27.6 |
| 542 | 5 to 50" wcd | 12.4 to 124.4 mbar | 0.2 to 2.0" wc | 0.5 to 5.0 mbar | 30" Hg to 200 | -1 to 13.8 | 400 | 27.6 |
| 543 | 10 to 200" wcd | 24.9 to 497 mbar | 0.5 to 6.0" wc | 1.2 to 14.9 mbar | 30" Hg to 200 | -1 to 13.8 | 400 | 27.6 |
| 544 | 2 to 20 psid | 0.1 to 1.4 bar | 0.1 to 0.8 psi | 6.9 to 55.2 mbar | 30" Hg to 1200 | -1 to 82.7 | 2500 | 172.4 |
| 545 | 5 to 50 psid | 0.3 to 3.4 bar | 0.2 to 1.6 psi | 0 to 0.1 bar | 30" Hg to 1200 | -1 to 82.7 | 2500 | 172.4 |
| 546 | 0 to 125 psid | 0.7 to 8.6 bar | 0.4 to 3.5 psi | 0 to 0.2 bar | 30" Hg to 1200 | -1 to 82.7 | 2500 | 172.4 |
| 547 | 50 to 250 psid | 3.4 to 17.2 bar | 1.5 to 7.2 psi | 0.1 to 0.5 bar | 30" Hg to 1200 | -1 to 82.7 | 2500 | 172.4 |
| 548 | 100 to 500 psid | 6.9 to 34.5 bar | 2.0 to 12.0 psi | 0.1 to 0.8 bar | 30" Hg to 1200 | -1 to 82.7 | 2500 | 172.4 |
| Teflon® and Buna-N diaphragms, Buna-N O-Ring with 1/4" (female) aluminum pressure connections | | | | | | | | |
| 559 | 10 to 100 psid | 0.7 to 6.9 bar | 0.2 to 1 psi | 14 to 69 mbar | 30" Hg Vac to 225 | -1 to 15.5 | 225 | 15.5 |

**Differential Pressure Type H121K single switch with external adjustment via reference dial
Differential Pressure Type H122K dual switch with external adjustment via reference dial**

| Range/Material Code | Adjustable Set Point Range High end of range on rise, low end on fall | | Deadband | | ***Working Pressure Range | | **Proof Pressure | | Dial Divisions |
|---|--|----------------|----------------|----------------|---------------------------|------------|------------------|------|----------------|
| | "wcd/psid | mbar/bar | "wc/psi | mbar/bar | psi | bar | psi | bar | psi |
| Welded 316L bellows with 1/2" NPT (female) pressure connections | | | | | | | | | |
| S147B | 3 TO 30 psid | 0.2 TO 2.1 bar | 0.3 TO 2 psi | 20 to 140 mbar | 30" Hg Vac to 100 | -1 to 6.9 | 300 | 20.7 | 0.5 |
| S157B | 10 TO 100 psid | 0.7 TO 6.9 bar | 0.5 TO 3 psi | 30 to 200 mbar | 30" Hg Vac to 180 | -1 to 12.4 | 300 | 20.7 | 2 |
| Brass bellows with 1/4" NPT (female) nickel-plated brass pressure connections | | | | | | | | | |
| 147 | 3 to 30 psid | 0.2 to 2.1 bar | 0.3 TO 2 psi | 20 to 140 mbar | 30" Hg Vac to 100 | -1 to 6.9 | 180 | 12.4 | 0.5 |
| 157 | 10 to 100 psid | 0.7 to 6.9 bar | 0.5 TO 3 psi | 30 to 200 mbar | 30" Hg Vac to 150 | -1 to 10.3 | 180 | 12.4 | 2 |
| Buna-N diaphragm and O-Ring with 1/4" NPT (female) aluminum pressure connections | | | | | | | | | |
| 456 | 2 to 20 psid | 0.1 to 1.4 bar | 0.1 to 0.3 psi | 0.01 to 0.02 | 30" Hg Vac to 225 | -1 to 15.5 | 225 | 15.5 | 0.5 |
| 457 | 3 to 30 psid | 0.2 to 2.1 bar | 0.1 to 0.4 psi | 0.01 to 0.03 | 30" Hg Vac to 225 | -1 to 15.5 | 225 | 15.5 | 0.5 |
| Teflon® and Buna-N diaphragms, Buna-N O-Ring with 1/4" (female) aluminum pressure connections | | | | | | | | | |
| 559 | 10 to 100 psid | 0.7 to 6.9 bar | 0.2 to 1 psi | 0.01 to 0.07 | 30" Hg Vac to 225 | -1 to 15.5 | 225 | 15.5 | 2 |

**** Proof Pressure:** The maximum pressure to which a pressure sensor may be occasionally subjected, which causes no permanent damage. Unit may require calibration.
*****Working Pressure Range:** The pressure range within which two opposing sensors can be safely operated and still maintain set point adjustability.

TEMPERATURE MODEL CHART

Type B121, single switch, immersion stem, external adjustment via reference dial, single conduit

Type B122, dual switch, immersion stem, external adjustment via reference dial, single conduit

Type C120, single switch, immersion stem, internal adjustment, dual conduits

Type E121, single switch, bulb and capillary, external adjustment via reference dial, single conduit

Type E122, dual switch, bulb and capillary, external adjustment via reference dial, single conduit

Type F120, single switch, bulb and capillary, internal adjustment, dual conduits

| Model | Adjustable Set Point | | Max. Temp | | Scale Division | | Stem/Bulb Size OD x Length |
|--|----------------------|----------------|-----------|-------|----------------|----|--|
| | °F | °C | °F | °C | °F | °C | |
| Model B121, single switch, immersion stem, external adjustment via reference dial. Model B122, dual switch, immersion stem, external adjustment via reference dial. Model C120, single switch, immersion stem, internal adjustment | | | | | | | |
| 120 | 0 to 225 | -17.8 to 107.2 | 275 | 135 | 5* | 5* | 9/16" x 1-7/8" below 1/2" NPT thread (nickel-plated brass) |
| 121 | 200 to 425 | 93.3 to 218.3 | 475 | 246.1 | 5* | 5* | 9/16" x 1-7/8" below 1/2" NPT thread (nickel-plated brass) |
| 13272 (B121) 13322 (B122) (Heat Tracing Freeze Protection) | 15 to 140 | -9.4 to 60 | 160 | 71.1 | 2* | 2* | 9/16" x 2-11/16" stainless steel |
| Model E121, single switch, bulb and capillary, external adjustment via reference dial. Model E122, dual switch, bulb and capillary, external adjustment via reference dial | | | | | | | |
| 2BSA | -120 to 100 | -84.4 to 37.8 | 150 | 65.5 | 5 | 5 | 3/8 x 2-5/8" |
| 2BSB | 30 to 250 | 1.1 to 121.1 | 300 | 148.9 | 5 | 5 | 3/8 x 2-5/8" |
| 3BS | 100 to 400 | 37.8 to 204.4 | 450 | 232.2 | 5 | 5 | 3/8 x 2-1/8" |
| 4BS | 25 to 100 | -3.9 to 37.8 | 150 | 65.5 | 2 | 1 | 3/8 x 6-3/4" |
| 5BS | -20 to 80 | -28.9 to 26.7 | 130 | 54.4 | 2 | 2 | 3/8 x 5" |
| 8BS | 350 to 640 | 176.7 to 337.8 | 690 | 365.6 | 5 | 5 | 3/8 x 3-1/4" |
| 13272 (E121) 13321 (E122) | 25 to 325 | -3.9 to 162.8 | 360 | 182.2 | 5 | 5 | 1/4" x 9-1/2" |
| Model F120, single switch, bulb and capillary***, internal adjustment | | | | | | | |
| Stainless steel bulb & capillary | | | | | | | |
| 1BS | -180 to 120 | -117.8 to 48.9 | 170 | 76.6 | - | - | 3/8 x 3-3/4" |
| 2BS | -125 to 350 | -87.2 to 176.7 | 400 | 204.4 | - | - | 3/8 x 2-5/8" |
| 3BS | -125 to 500 | -87.2 to 260 | 550 | 287.8 | - | - | 3/8 x 2-1/8" |
| 4BS | -40 to 120 | -40 to 48.9 | 170 | 76.6 | - | - | 3/8 x 6-3/4" |
| 5BS | -40 to 180 | -40 to 82.2 | 230 | 110 | - | - | 3/8 x 5" |
| 6BS | 0 to 250 | -17.8 to 121.1 | 300 | 148.8 | - | - | 3/8 x 4-1/2" |
| 7BS | 0 to 400 | -17.8 to 204.4 | 450 | 232.2 | - | - | 3/8 x 3" |
| 8BS | 50 to 650 | 10 to 343.3 | 700 | 371.1 | - | - | 3/8 x 3-1/4" |

EXPLOSION-PROOF INDICATING TEMPERATURE CONTROLS

Type 820E, single switch, external adjustment and temperature indication, dual conduits

Type 822E, dual switch, external adjustment and temperature indication, dual conduits

| Model | Adjustable Set Point | | Max. Temp | | Scale Division | | Stem/Bulb Size OD x Length |
|-------|----------------------|----------------|-----------|-------|----------------|----|-------------------------------|
| | °F | °C | °F | °C | °F | °C | |
| 2BS | -125 to 350 | -87.2 to 176.7 | 400 | 204.4 | 10 | 5 | 3/8 x 2-5/8" |
| 3BS | -125 to 500 | -87.2 to 260 | 550 | 287.8 | 10 | 5 | 3/8 x 2-1/8" |
| 4BS | -40 to 120 | -40 to 48.9 | 170 | 76.6 | 5 | 2 | 3/8 x 6-3/4" |
| 5BS | -40 to 180 | -40 to 82.2 | 230 | 110 | 5 | 2 | 3/8 x 5" |
| 6BS | 0 to 250 | -17.8 to 121.1 | 300 | 148.8 | 5 | 2 | 3/8 x 4-1/2" |
| 7BS | 0 to 400 | -17.8 to 204.4 | 450 | 232.2 | 10 | 5 | 3/8 x 3" |
| 8BS | 50 to 650 | 10 to 343.3 | 700 | 371.1 | 10 | 10 | 3/8 x 3-1/4" |



Standard capillary length is 6ft. optional lengths and capillary protection available

ORDERING INFORMATION

SPECIFY TYPE, MODEL (FROM CHARTS) THEN OPTIONS IF REQUIRED

EXAMPLE: J120-274-0140-M201(100 PSI RISING)

Type- Pressure

- Type J120 - One SPDT; epoxy coated enclosure; internal adjustment with no reference scale, dual conduits
Type H121 - One SPDT; epoxy coated enclosure; external adjustment with reference dial, single conduit
Type H122 - Two SPDT; epoxy coated enclosure; external adjustment with reference dial, single conduit

Type- Differential Pressure

- Type J120K - One SPDT; epoxy coated enclosure; internal adjustment with no reference scale, dual conduits
Type H121K - One SPDT; epoxy coated enclosure; external adjustment with reference dial, single conduit
Type H122K - Two SPDT; epoxy coated enclosure; external adjustment with reference dial, single conduit

Type- Temperature

- Type B121 - Immersion stem; one SPDT; epoxy coated enclosure; external adjustment with reference dial, single conduit
Type B122 - Immersion stem; two SPDT; epoxy coated enclosure; external adjustment with reference dial, single conduit
Type C120 - Immersion stem; one SPDT; epoxy coated enclosure; internal adjustment with no reference scale, dual conduits
Type E121 - Bulb and capillary; one SPDT; epoxy coated enclosure; external adjustment with reference dial, single conduit
Type E122 - Bulb and capillary; two SPDT; epoxy coated enclosure; external adjustment with reference dial, single conduit
Type F120 - Bulb and capillary; one SPDT; epoxy coated enclosure; internal adjustment with no reference dial, dual conduits
Type 820E - Bulb and capillary; one SPDT; external adjustment and temperature indication, dual conduits
Type 822E - Bulb and capillary; two SPDT; external adjustment and temperature indication, dual conduits

Switch Options^{1,2,3}

- 0140 Gold contacts, 1 amp 125 VAC resistive, NOT AVAILABLE MODELS H122P, 820E, & 822E
0500 Close deadband, 5 amp 125/250 VAC resistive. NOT AVAILABLE MODEL H122P Ranges 520-535
1010 DPDT switch, 10 amp 125/250 VAC resistive. NOT AVAILABLE TEMPERATURE VERSIONS; MODELS H122, H122P, H122K; OR J120K RANGES 36-39, 367, AND 540-548; OR J120 RANGES 171-194, 483-494, 520-535, 560-567, 680
1070 10 amp 125 VDC or VAC resistive; deadband and minimum set point will increase. NOT AVAILABLE MODELS 820E, 822E, H122P, H122K, B122, AND J120K RANGES 36-39; J120 RANGES 171-194, 483-494, 520-535
1180 Hermetically sealed SPDT, 11 amp 125/250 VAC resistive, must be specified with model H122P. NOT AVAILABLE MODELS B122, E122, H122, H121K and H122K, 820 AND 822E; deadband and minimum set point will increase.
1190 Hermetically sealed DPDT, 11 amp 125/250 VAC; products set on rising pressure or temperature due to inherent separation of circuits on falling pressure or temperature; specify option 1195 if setting on fall is required; deadband and minimum set point will increase. Not available models 820E, 822E, B121, B122, E121, E122, H121, H122, H121K, H122K, H122P or ranges 523, 533
1195 Hermetically sealed DPDT, 11 amp 125/250 VAC; products set on falling pressure or temperature due to inherent separation of circuits on rising pressure or temperature; specify option 1190 if setting on rise is required; deadband and minimum set point will increase. Not available models 820E, 822E, B121, B122, E121, E122, H121, H122, H121K, H122K, H122P or ranges 523, 533
1519* Adjustable deadband, 15 amp 125/250/480 VAC resistive; adjustable wheel changes rise setting only; if adjustment of fall setting is required use primary adjustment; deadband and minimum set point will increase. Not available models 820E, 822E, B121, B122, E121, E122, H121, H122, H121K, H122K, H122P or ranges 171-194, 483-494, 520-535, 612-616
1535 High ambient, 15 amp 125/250 VAC resistive; temperatures up to 250°F (120°C). Not available models 820E, 822E, H122P ranges 520-535
1537 Vapor sealed switch, 15 amp 125/250 VAC resistive. Not available models 820E, 822E, H122P or ranges 520-535
1539 Fungus resistant case, 15 amp 125/250 VAC resistive. Not available models 820E, 822E, H122P or ranges 520-535
2000 20 amp 125/250 VAC resistive. Not available ranges 520-535, 540-548
3000 30 amp 125/250/300 VAC resistive. Not available models 820E, 822E, B121, B122, H121, H122, H121K, H122K, H122P for ranges 36-39, 171-193, 483-493, 520-535, 540-548, 560-567

¹ All switches have limited DC capabilities. VDC ratings are not listed on nameplates. Consult factory for details.

² Deadbands change when switch options are added. Consult factory for details.

³ Not available for models 15622, 15834-15839, 15875, 13272, 13273, 13321 and 13322.

*Please note: In order to accommodate free movement of adjustable wheel, left hand electrical conduit is permanently sealed.

Sensor Options

- M504 316L stainless steel stem. Available temperature models 120 and 121 only
M540 Viton® construction; (deadbands and low end of range may increase slightly) wetted parts include Viton® diaphragm and O-Ring. Available ranges 36-39, 450-457, 540-548 (Kapton® diaphragm, Viton® O-ring and sealing diaphragms), 612-616 (O-ring only) with standard pressure connection. Available MODEL J120 RANGES 701-705 and MODEL H121 and H122 RANGES 701-703 with stainless steel pressure connection.
M913 1/4" NPT (female) stainless steel pressure connection. AVAILABLE ON MODELS S126B - S146B, S152B, S156B, S164B, 188 AND 189 ONLY
M914 1/2" NPT (female) stainless steel pressure connection. AVAILABLE ON MODELS 356, 358, 361, 376, 612 AND 616 ONLY
6361-761 1/4" NPT male to G1/2 male stainless steel pressure fitting adaptor kit
6361-762 1/2" NPT male to G1/2 male stainless steel pressure fitting adaptor kit

Optional Sensor For "WC Ranges. Available for range codes 52-525

- XC001 Aluminum pressure connection, Viton® diaphragm, Viton® O-Ring
XC002 Aluminum pressure connection, Kapton® diaphragm, Buna-N O-Ring
XC003 Aluminum pressure connection, Kapton® diaphragm, Viton® O-Ring
XC004 316L Stainless steel pressure connection, 316L Stainless steel diaphragm, Viton® O-Ring (Over range pressure is limited to 100 psi)
XC005 316L Stainless steel pressure connection, Viton® diaphragm, Viton® O-Ring
XC007 316L Stainless steel pressure connection, Teflon® diaphragm, Viton® O-Ring

Optional Sensor Material For Corrosive Media, Available Range Codes 183-189, 483-489

| | |
|-------|----------------------------------|
| XD002 | Hastelloy® C diaphragm |
| XD003 | Monel® diaphragm |
| XP112 | Hastelloy® C pressure connection |
| XP113 | Monel® pressure connection |
| XR211 | Kalrez® O-Ring |
| XR213 | Ethylene propylene O-Ring |
| XR214 | Aflas® O-Ring |

Other Options

| | |
|----------|--|
| M201 | Factory set one switch |
| M202 | Factory set two switches. Not available single switch versions |
| M210 | Differential pressure indication. Available on H121K, H122K, RANGES 147, 157, S147B, S157B only |
| M277 | Range indicated on nameplate in kPa or MPa. Not available on temperature versions |
| M278 | Range indicated on nameplate in Kg/cm2. Not available on temperature versions |
| M320 | Tamper resistant cover for indication portion of control , internal adjustment, available models 820E & 822E only |
| M391 | Flame proof, intrinsic safety for INMETRO compliance. |
| M395 | Flame proof compliance Ex d per Korea Occupational Safety and Health Agency (KOSHA) |
| M404 | Flameproof compliance for Ukraine per Gosnadzorohrantruda permits. |
| M405 | Intrinsic safety compliance for European Union per ATEX standards. NOT AVAILABLE TYPES 820E AND 822E |
| M406 | Flameproof and intrinsic safety compliance for Russia per EAC permit. Intrinsic safety NOT AVAILABLE TYPES 820E & 822E |
| M440 | Cover chain |
| M444 | Paper ID tag |
| M446 | Stainless steel ID tag & wire attachment |
| M449 | Surface mounting hardware kit that is required for models 520-535 & 540-548 when surface mounting. Use option code only at time of ordering product, otherwise use surface and pipe mounting kit part number 6361-704 as a separate order or for other models. |
| M450 | Breather drain. Not available with options 1530, M210, M415 or with ATEX certification |
| M550 | Oxygen service cleaning; internal construction may change |
| 6361-704 | Surface and pipe mounting hardware. (required for ranges 520-535, 540-548 when surface mounting) |

NOTE: Options available on models 13272, 13273, 13321, 13322, 15622, 15834-15839 and 15875 are M201, M202, M444, M446 and various certification related documentation only.

OPTIONS FOR TEMPERATURE MODELS**UNION CONNECTORS**

| Option | Replacement Number | Description |
|---------------------|--------------------|--------------------------|
| Brass | | |
| W027 | SD6213-27 | 1/2" NPT w/ 3/4" bushing |
| W045 | SD6213-45 | 3/4" NPT |
| W051 | SD6213-51 | 1/2" NPT |
| 304 Stainless Steel | | |
| W028 | SD6213-28 | 1/2" NPT w/ 3/4" bushing |
| W046 | SD6213-46 | 3/4" NPT |
| W050 | SD6213-50 | 1/2" NPT |

THERMOWELLS

For all bulb & capillary switches, except Models 13273 and 13321

| | | |
|---------------------|------------|---------------------------------|
| Brass | | |
| W075 | SD6225-75 | 3/4" NPT bushing adapter, 4" BT |
| W191 | SD6225-191 | 1/2" NPT, 4" BT |
| W118 | SD6225-118 | 3/4" NPT bushing adapter, 7" BT |
| W192 S | D6225-192 | 1/2" NPT, 7" BT |
| 316 Stainless Steel | | |
| W076 S | D6225-76 | 3/4" NPT, 4.5" BT |
| W193 | SD6225-193 | 1/2" NPT, 4.5" BT |
| W119 | SD6225-119 | 3/4" NPT, 7.5" BT |
| W177 | SD6225-177 | 1/2" NPT, 7.5" BT |

For all immersion stem switches except Models 13272 and 13322

| | | |
|------|------------|--------------------------------|
| W139 | SD6225-139 | 3/4" NPT X 1 23/32" BT, BRASS |
| W140 | SD6225-140 | 3/4" NPT X 1 23/32" BT, 316 SS |

W000 IMMERSION STEM AND THERMOWELLS

Note: Option W000 is a special Immersion Stem construction that has no external thread. This option fits inside a special thermowell and is secured with a set-screw.

Option Description

W000 Immersion stem only, BRASS

W097 Immersion stem and thermowell. Includes W000 stem and 1/2" NPT x 1 23/32" BT BRASS thermowell

W099 Immersion stem and thermowell. Includes W000 stem and 1/2" NPT x 1 23/32" BT 316 SS thermowell

OPTIONAL LENGTHS

Optional immersion stem lengths to 15" available in brass, with or without 316 SS thermowell. Consult Clark for additional information.

Optional capillary length to *50' available in copper or 304 SS. Armor or Teflon® capillary protection may be available to lengths less than or equal to capillary length. Consult Clark for additional information.

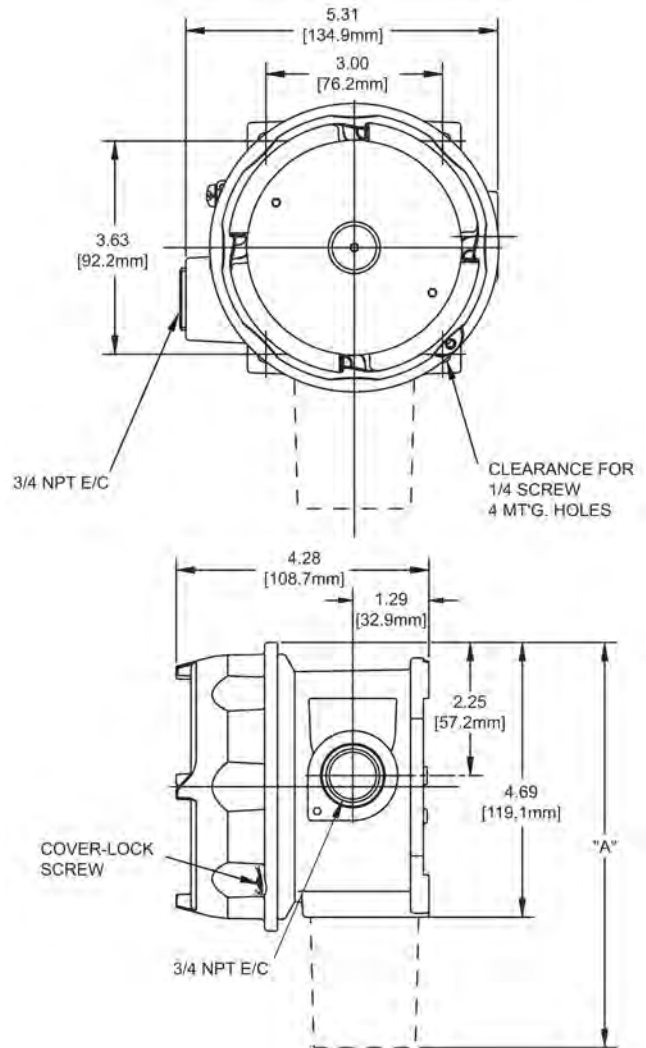
*Consult Clark regarding repeatability and ambient effects on capillary lengths over 30'.

DIMENSIONS

Internal set point adjustment, dual contacts

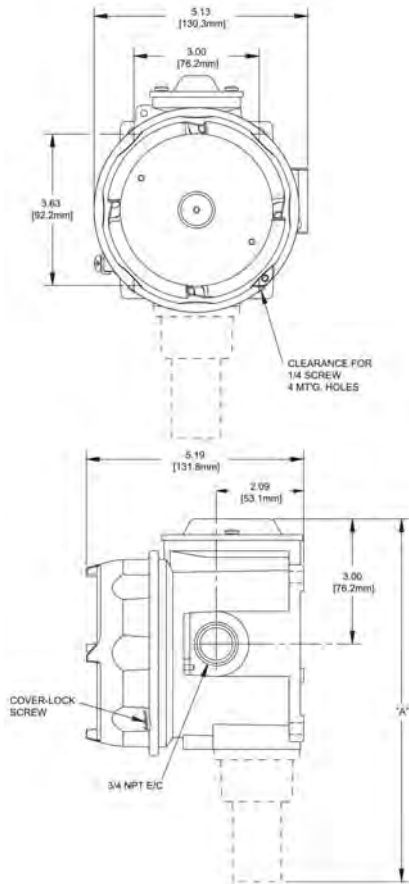
Types J120, J120K, C120, F120

| Dimension A | | | |
|-----------------------|--------|-------|------------------|
| Model | Inches | mm | NPT |
| Pressure | | | |
| 126-124 | 7.25 | 184.2 | 1/4 |
| S126B-S164B | 7.63 | 193.8 | 1/2 |
| 171-174 | 8.72 | 221.5 | 1/2 |
| 183-186, 483-486 | 8.41 | 213.6 | 1/2 |
| 188-189, 488-489 | 7.47 | 189.7 | 1/2 |
| 190-194, 490-494 | 7.44 | 189.0 | 1/2 |
| 270-274 | 8.13 | 206.5 | 1/4 |
| 356-361, 376 | 8.09 | 205.5 | 1/4 |
| 450, 452 | 8.81 | 223.8 | 1/4 |
| 451, 453, 454 | 8.06 | 204.7 | 1/4 |
| 520-525 | 9.25 | 235.0 | 1/2 |
| 530-535 | 8.84 | 224.5 | 1/2 |
| 550, 552 | 8.81 | 223.8 | 1/4 |
| 551, 553-555 | 8.34 | 211.8 | 1/4 |
| 565-567 | 7.53 | 191.3 | 1-1/2" Sanitary |
| 612, 616 | 7.88 | 200.2 | 1/4 |
| 680 | 8.13 | 206.5 | 1/4 |
| 701-705, 15622 | 7.44 | 189.0 | 1/4 |
| Differential Pressure | | | |
| 36-39, 147-157, | 7.59 | 192.8 | 1/4 |
| S147B-S157B | 7.59 | 192.8 | 1/2 |
| 455-457, 559 | 8.44 | 214.4 | 1/4 |
| 540-543 | 9.44 | 237.2 | 1/8 |
| 544-548 | 9.34 | 239.0 | 1/8 |
| Temperature | | | |
| 120, 121 | 9.13 | 231.9 | Immersion Stem |
| 2BS-8BS | 8.47 | 215.1 | Bulb & Capillary |



External Set Point Adjustment, single conduit

Types B121, B122, E121, E122, H121, H122, H121K, H122K

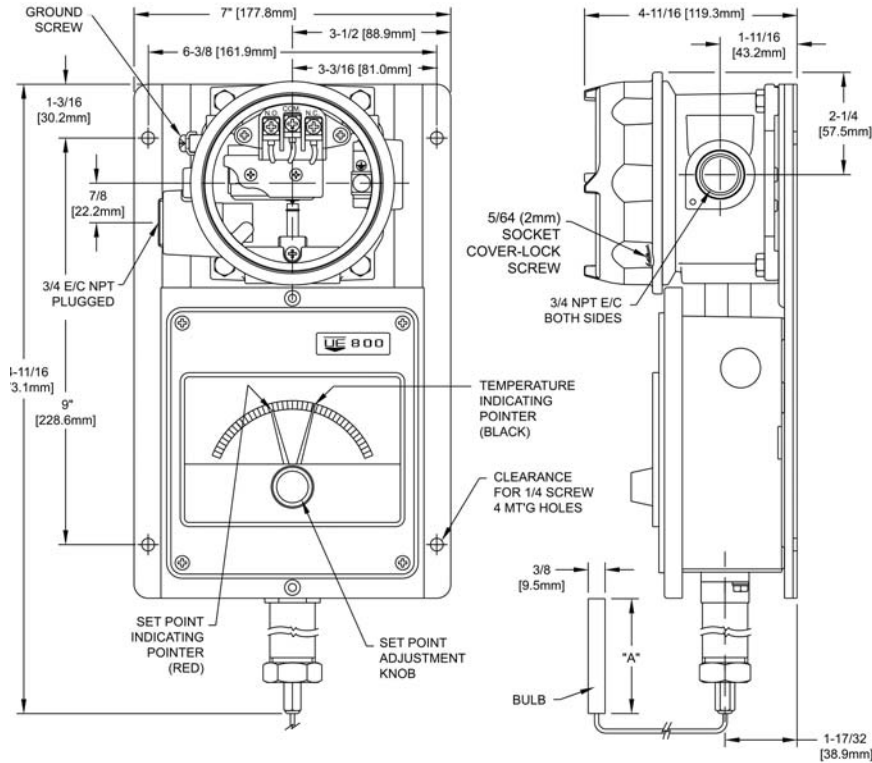


| Dimension A | | | |
|-----------------------|--------|-------|---------------------------------|
| Model | Inches | mm | NPT |
| 126-124 | 8.09 | 205.5 | 1/4 |
| S126B-S164B | 8.50 | 215.9 | 1/2 |
| 270-274 | 7.68 | 200.2 | 1/4 |
| 358-376 | 7.81 | 198.4 | 1/4 |
| 450, 452 | 9.69 | 246.1 | 1/4 |
| 453, 454 | 8.94 | 227.1 | 1/4 |
| 550, 552 | 9.75 | 247.7 | 1/4 |
| 553-555 | 9.31 | 236.5 | 1/4 |
| 612, 614 | 8.75 | 222.3 | 1/4 |
| 701-705 | 8.31 | 211.1 | 1/4 |
| Differential Pressure | | | |
| 147-157 | 8.44 | 214.4 | 1/4 |
| S147B-S157B | 8.44 | 214.4 | 1/2 |
| 456-457, 559 | 9.31 | 236.5 | 1/4 |
| Temperature | | | |
| 120, 121 | 10.00 | 254.0 | Immersion Stem |
| 2BS-8BS | 9.31 | 236.5 | Bulb & Capillary |
| 13272, 13322 | 10 | 254.0 | Immersion Stem (Heat Tracing) |
| 13273, 13321 | 9.31 | 236.5 | Bulb & Capillary (Heat Tracing) |

DIMENSIONS INCHES (MM)

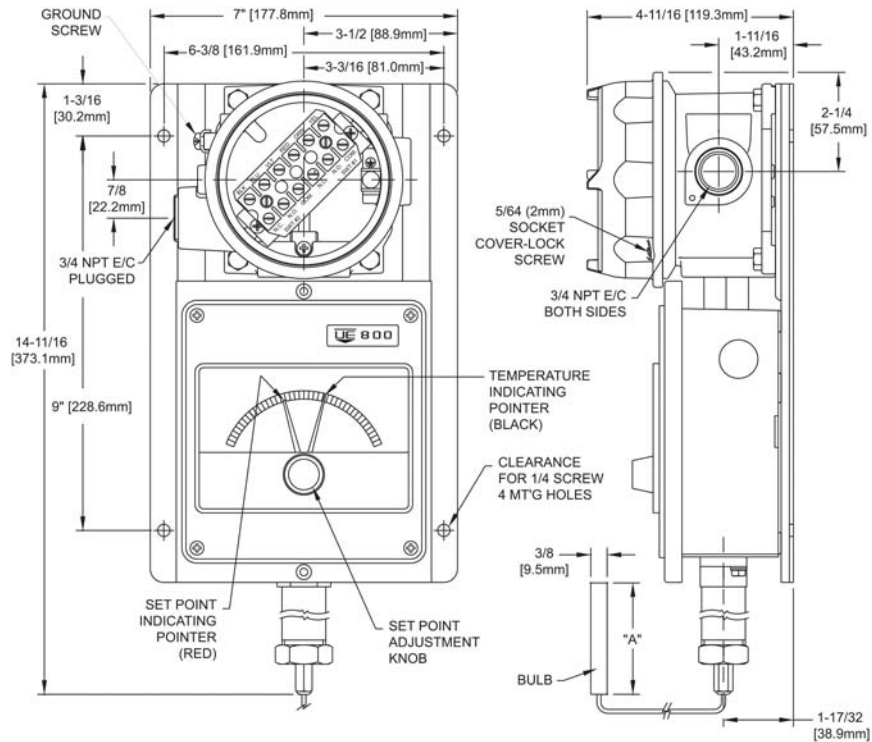
Type 820E, single switch, external adjustment and temperature indication
 Type 822E, dual switch, external adjustment and temperature indication

Typel 820E



| Dimension A | | |
|-------------|--------|-------|
| Model | Inches | mm |
| 2BS | 2-5/8 | 66.7 |
| 3BS | 2-1/8 | 54.0 |
| 4BS | 6-3/4 | 171.5 |
| 5BS | 5 | 127.0 |
| 6BS | 4-1/2 | 114.3 |
| 7BS | 3 | 76.2 |
| 8BS | 3-1/4 | 82.6 |

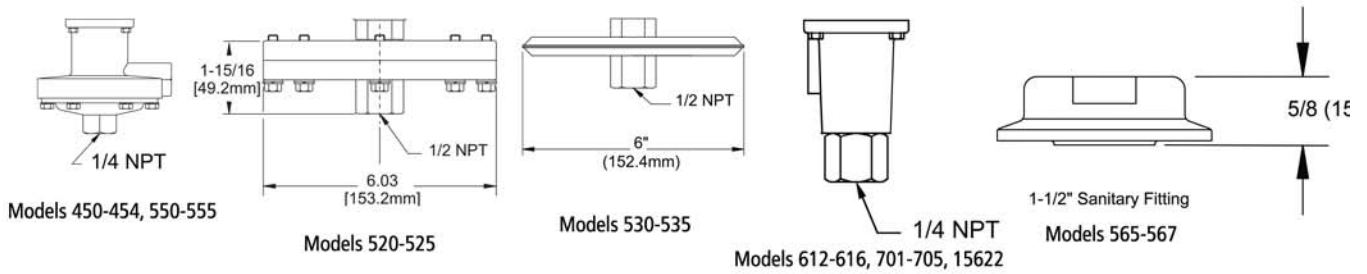
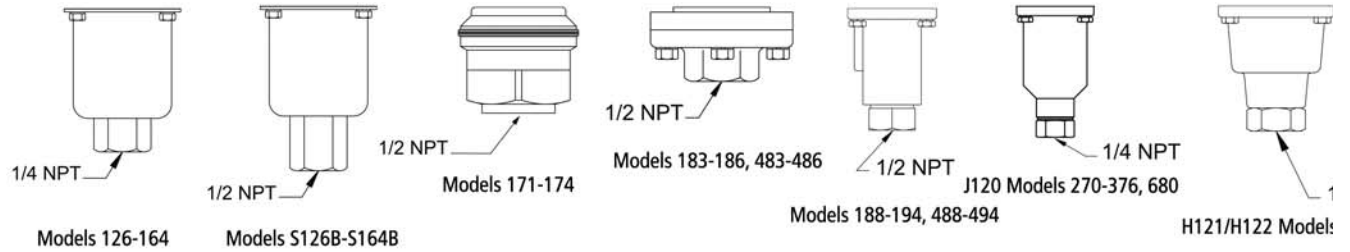
Type 822E



DIMENSIONS INCHES (MM)

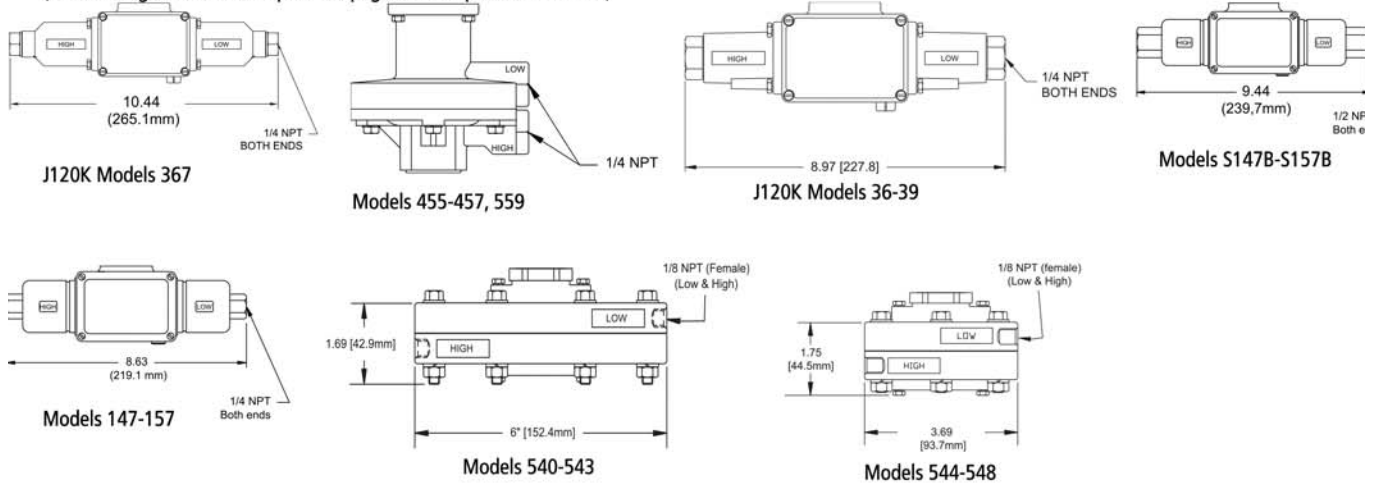
Pressure Sensors

(See drawings and charts on previous pages for complete dimensions.)



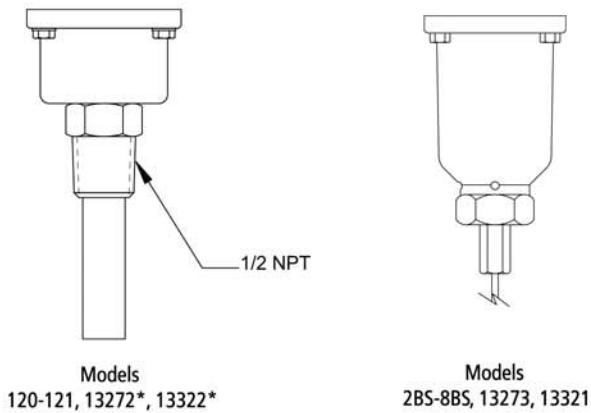
Differential Pressure Sensors

(See drawings and charts on previous pages for complete dimensions.)



Temperature Sensors

(See drawings and charts on previous pages for complete dimensions, as well as Temperature Model Chart for immersion stem and bulb dimensions. The standard capillary length is 6 feet except for models 13273 & 13321 which is 10 feet)



*Please Note: These models do not include the 1/2 NPT

UNITED ELECTRIC

One Series Pressure & Temperature Transmitter/Switches

F.S. Ranges to 6,000 PSI, -50 to 1,000°F, Intrinsically Safe

DESCRIPTION

The One Series from UE provides explosion (flame)-proof, intrinsically safe and non-incendive models that monitor gage pressure, differential pressure or temperature. With a 4-20 mA analog output and up to two independently programmable switches and no moving parts, these versatile instruments can be used in a wide variety of control applications where mechanical switches weren't previously considered.

Featuring a solid-state design, UE's One Series is your best choice for tough applications with high cycle rates, severe shock and high vibration. For plant upgrades, there are a variety of power options ranging from 2-wire analog loop-powered, 2-wire discrete input powered and externally powered models that can switch up to 280 volts to the load.

With an integral digital display and 4-20 mA output, the One Series from UE can effectively do the job of three by replacing a switch, a gauge and a transmitter. Powerful yet easy to install, the One Series from UE features tamper-resistance, intuitive programming, and set-up that is fast and easy.

FEATURES

- Programmable set point and deadband provides the most versatile, accurate and repeatable alarm and shutdown switching using the integral keypad or a HART® communicator
- Configurable IAW™ self-diagnostics provide piece of mind that the instrument is functioning properly by communicating with the control system using a dedicated discrete output
- Plugged Port Detection allows a means to detect a clogged sensor, avoiding potentially dangerous process conditions
- Max/Min memory – samples and stores the highest and lowest extreme process variables for process diagnostics and learning
- Nuisance trip filtering eliminates unwanted nuisance trips and unnecessary alarms
- Programmable trip delay – hold off the trip decision for tenths of seconds up to several minutes
- Trip counter – records trips for up to two relays for process diagnostics and learning
- 3-year warranty

ADVANCED FEATURES:

Transmitter-only and hybrid Transmitter-Switch One Series models now feature HART® 7 compatibility. Any function that can be controlled with the keypad can also be controlled with a HART® communicator. This feature makes it unnecessary to remove the enclosure cover to make programming changes or access the MAX/MIN values, especially important in explosive environments. All programming functions can be performed remotely.

The set point and deadband settings allow for 100% adjustability, providing highly repeatable trip and reset points for many different applications. This feature allows the One Series to be used for pump and compressor cycling applications where high cycle rates may shorten the life of mechanical controls. Temperature monitoring models can provide highly repeatable thermostatic control of heaters and chillers. New software features in the One Series allow trip points to be filtered, delayed and counted. Plugged Port Detection can utilize MAX/MIN process extremes data to provide a powerful yet simple tool for detecting clogged impulse lines, rendering these application challenges manageable by the instrument, with no special programming needed at the PLC.

Mechanical switches have no self-diagnostic capabilities – they are blind instruments. All One Series models include UE's exclusive IAW™ (I Am Working) self-diagnostic system that detects faults before they become process monitoring problems.



ADVANCED FEATURES(CONT'D):

Detected faults are reported on the digital display while the set point switch will fail safe (change to the tripped state) and the 4-20 mA analog output will go to ≤ 3.6 mA to provide remote fault indication per the NAMUR standard. A separate IAW™ discrete output remains normally closed and will fail-safe-open if a fault is detected or if power is lost. By monitoring this output, the intelligent and configurable IAW™ diagnostics provide immediate remote indication that the One Series remains reliable and available to react to and report process conditions worthy of an alarm and/or shutdown.

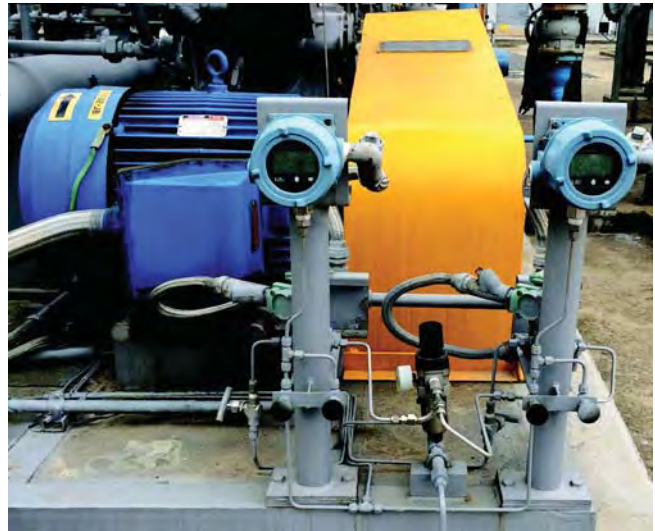
For alarm and shutdown monitoring applications, there is no better choice than the One Series family of hybrid transmitter-switches. Measuring gage pressure, differential pressure or temperature, the extremely rugged and reliable One Series takes all of the guess-work out of monitoring process variables to prevent injury, loss and downtime.

With its large backlit* digital display, fully adjustable deadband and 100% solid-state design, the One Series is the obvious choice for plant upgrades and new construction projects. A built-in microprocessor includes digital repeatability and intelligent IAW™ self-diagnostics, offering plant operators an extremely reliable and smart process and capital equipment protection device.

Proven in use in literally thousands of diverse applications, One Series is designed for harsh and hazardous location process monitoring with certificates available for intrinsically safe and explosion proof areas including cULus, ATEX and IECEx among others. See the Approvals and Ratings page for complete area classification details and temperature ratings.

APPLICATIONS

- Pumps and compressors – start/stop, optimizing, shutdown, staging, fast PD pump switching
- Lubricating oil monitoring – seal oil pressure, sump temperature, bearing pressure, predictive maintenance
- Hydraulic oil pressure – high pressure monitoring, emergency shutdown, ram cycling
- Filter monitoring – automatic backwash, clog and change indication, proving flow
- Plant upgrades – power and wastewater plant upgrades, drop-in replacement for mechanical switches



Pump Emergency Shutdown

SPECIFICATIONS

| Power Input/Switch Capacity | | | | | |
|-----------------------------|--|--|--|------------------------|-------------------|
| Model | Maximum Power Ratings/Output Signal | Set Point Switch Ratings (SPST) | IAW™ Switch Ratings (SPST) | Min. Load Requirements | Off State Leakage |
| 1XSWLL | 2-wire 7.8 – 50VDC discrete input powered @ 0.75 mA | 7.8 – 50 VDC @ 0.1 A MOSFET derate @ 1 mA per °C > 25°C | 7.8 – 50 VDC @ 0.1 A MOSFET derate @ 1 mA per °C > 25°C | 2.0 mA | 0.8 mA |
| 1XTXSW | 2-wire 20 – 40 VDC @ 21 mA / Loop powered 4-20 mA analog output with HART® version 7 | SW1 & SW2: 0 – 280 VAC & VDC @ 0.3 A derate 8% per 10°C > 21°C | 0 – 30 VDC @ 0.020 A MOSFET | 0 mA | 0.01 mA |
| 1XTX00 | 2-wire 20 – 40 VDC @ 21 mA / Loop powered 4-20 mA analog output with HART® version 7 | N/A | N/A | N/A | N/A |

Accuracy: 0.5% of full range span, at room temperature

Repeatability: 0.1% of full range span

Long Term Stability: $\pm 0.25\%$ of range/year maximum

Temperature Drift: 0.03% of full scale per °C (0.12% for the K10 range)

Switch Response Time: ≤ 100 ms for detection of full step change and change of output state with Trip Delay and Filter turned off

Display Response Time: 400 ms (updated 2.5 times per second)

SPECIFICATIONS (CONT'D)

| Approved Ambient Operating Temperature Range | | |
|---|-------------------------------|-------------------------------|
| Model | cULus (Division System) | cULus & ATEX (Zone System) |
| 1XSWLL | -40°F (-40°C) TO 185°F (85°C) | -40°F (-40°C) TO 185°F (85°C) |
| 1XTXSW | | |
| 1XTX00 | | |
| Display visibility temperature range: 10°F (-12°C) to 158°F (70°C) all models | | |

Filter (transient filtering to prevent nuisance trips): Programmable time constants for 0.25, 0.5, 1, and 2 seconds, default OFF.

Trip Delay (switch decision delay): 0 to 999.9 seconds in 1/10th second increments

Set 4 MA (scale the 4 mA output): Programmable from -3 to 25% of the sensor's range, values are in the units of measure selected and are range dependent.

Set 20 MA (scale the 20 mA output): Programmable from 50 to 110% of the sensor's range, values are in the units of measure selected and are range dependent.

IAW™ (I Am Working) Diagnostics: Upon detecting a fault, the local display will show a fault code, the set point switch will change to the as-programmed tripped state, the normally-closed IAW™ Output switch will fail-safe-open and the NAMUR NE 43 standard 4-20 mA output will indicate ≤ 3.6 mA. See installation manual for a complete listing of detectable faults and codes.

| Switch Control modes (1XTXSW and 1XSW models only) | | |
|--|--|------------------------|
| Mode | Set Point Switch Action | IAW™ Output (on fault) |
| Open Rise | Normally closed, opens at set point on rising media and fault | Opens |
| Open Fall | Normally closed, opens at set point on falling media and fault | Opens |
| Open Rise | Normally open, closes at set point on rising media and fault | Opens |
| Open Fall | Normally open, closes at set point on falling media and fault | Opens |
| Open Out of Window | Normally closed, opens above set point high and below set point low and fault, closes below deadband high and above deadband low | Opens |
| Close Out of Window | Normally open, closes above set point high and below set point low and fault, opens below deadband high and above deadband low | Opens |

Analog output (1XTX models only): 4-20 mA NAMUR NE 43 compliant and HART® version 7 compatible current output, 360 ohms max. at 24 VDC, field scalable 2:1 turn down. Faults are indicated at ≤ 3.6 mA. See installation manual for details.

Enclosure and cover: Type 4X/IP66 certified epoxy-coated aluminum alloy 360 with tempered glass window. See Dimensional Drawings for more detail.

Conduit: 3/4" NPT female aluminum casting; 2 openings

Display: 4 digit x 0.5" (12.7 mm) backlit* LCD provides the following information

| | |
|----------------------------|-------------------------------|
| Process variable | MAX/MIN process values |
| IAW™ (I Am Working) status | Units of measure |
| Switch status | Latch status |
| Set point values | Deadband values |
| Trip counts | Fault codes |
| Offset indication | * backlit on 1XTX models only |

SPECIFICATIONS (CONT'D)

Set point & deadband: Programmable over the sensor's entire range

Memory: Programming and data protected by non-volatile FRAM

Effective Transmission Distance: 2,000 feet (610 meters) at rated voltage for 1XSW models

Sensors:

Gage Pressure – 316L stainless steel wetted parts, welded diaphragm, 1/2" NPT (female) process connection, micro-machined piezo-resistive strain gage silicon element, 0.25 ml silicone oil fill, maximum diaphragm displacement: 0.00053 inches.

Maximum media temperature: -40 to 257°F (-40 to 125°C)

Vacuum: All gage pressure sensors withstand deep vacuum with no calibration effects. For compound vacuum ranges, see Gage Pressure Sensor table below.

Differential Pressure - 316L stainless steel, welded diaphragms, 1/4" NPT (male) process connections, piezoresistive strain gage silicon element, silicone oil fill.

Maximum media temperature: -40 to 257°F (-40 to 125°C)

Temperature – 316 stainless steel 0.25" OD sheath containing a 100 ohm 4-wire platinum RTD element available with epoxy fill (local low temp) or powder fill (remote high temp).

Media temperature limits:

-328 to 1000°F, intermittent to 1100°F (-200 to 538°C, int. to 593°C) for TH and TT ranges

-40 to 500°F (-40 to 260°C) for TR and TL ranges

EMI/RFI: Compliance to CE EMC requirements: EN 61000-6-2, EN 61000-6-4

Emission: EN 61000-6-4 Class A

Immunity:

EN 61000-4-2 Immunity to Electrostatic Discharge

EN 61000-4-3 Immunity to Continuous Radiated Disturbances

EN 61000-4-4 Immunity to Electrical Fast Transients

EN 61000-4-5 Immunity to Surges

EN 61000-4-6 Immunity to Continuous Conducted Disturbances

EN 61000-4-11 Immunity to Voltage Dips and Interruptions

Weight: 4.5 - 6.0 lbs (2.0 - 2.7 kg) depending on sensor. Add 1.9 lbs. (0.9 kg) for option M041

Shock: Per MIL-STD-810G method 516.6 – when device is subjected to 15 g (10 mSec) and 40 g (6 mSec); 3 drops/axis

Vibration: per IEC 61298-3 (field and pipeline applications with high vibration level, 10-1000 Hz range, 0.014" displacement peak amplitude, 5 g acceleration amplitude)

Effects: less than +/- 0.40% of range

ORDERING INFORMATION

BUILD A PART NUMBER BY SELECTING THE MODEL, SENSOR AND OPTIONS FROM THE TABLES BELOW.

EXAMPLE: 1XTXSWP15-M041

| Model | Description | Zone | | | Division | |
|---|--|--|---|---|----------|---|
| | | 0 | 1 | 2 | 1 | 2 |
| 1XSWLL (Replaces 2W2D,2X2D, 2W4D,2X4D) | <ul style="list-style-type: none"> 2-wire, discrete input powered switch for 24 and 48 VDC logic solver inputs Programmable set point switch rated at 7.8 - 50.0 VDC @ 0.1 A max. IAW™ health status fail-safe-open switch rated at 7.8 - 50.0 VDC @ 0.1 A wired separately to the logic solver@ 0.1 A max. | 0 | • | • | 0 | • |
| 1XTXSW (Replaces 2WLP, 2XLP, 8W2D,8X2D) | <ul style="list-style-type: none"> Loop-powered 24 VDC HART® enabled transmitter Two programmable set point fail-safe solid state relays rated at 0 - 280 VAC/VDC @ 0.3 A IAW™ health status fail-safe-open switch rated at 0 - 30.0 VDC @ 0.020 A | | • | • | • | • |
| 1XTX00 (Transmitter Only) | <ul style="list-style-type: none"> Loop-powered 24 VDC HART® enabled transmitter | | • | • | • | • |
| | | 0 - a safety barrier is required for intrinsically safe areas, Zone 0 and Div. 1 Ex ia | | | | |

| Gage Pressure Sensor: Gage pressure, piezo-resistive strain gage, silicone oil fill, 316L stainless wetted materials, 1/2" NPT (female) process connection | | | | | | |
|--|--|-----------|------------|-----------|--------------------------|-------------------------------------|
| Sensor P/N | Pressure Operating Range ¹ & Display Resolution | | | | | Max. Over Range ² (PSIG) |
| P06 | -14.7 TO 30 psig | 931.1" wc | 2068 mbar | 206.8 kPa | 2.109 kg/cm ² | 60 |
| P08 | -14.7 to 100 psig | 2770" wc | 6895 mbar | 689.5 kPa | 7.031 kg/cm ² | 200 |
| P10 | 0-5.00 psig | 138.5" wc | 344.7 mbar | 34.47 kPa | 0.352 kg/cm ² | 10 |
| P11 | 0-15.00 psig | 415.5" wc | 1034 mbar | 103.4 kPa | 1.055 kg/cm ² | 30 |
| P12 | 0-30.00 psig | 831.1" wc | 2068 mbar | 206.8 kPa | 2.109 kg/cm ² | 60 |
| P13 | 0-50.00 psig | 1385" wc | 3447 mbar | 344.7 kPa | 3.516 kg/cm ² | 100 |
| P14 | 0-100.0 psig | 2770" wc | 6895 mbar | 689.5 kPa | 7.031 kg/cm ² | 200 |
| P15 | 0-300.0 psig | N/A | 20.68 bar | 2068 kPa | 21.09 kg/cm ² | 600 |
| P16 | 0-500.0 psig | N/A | 34.47 bar | 3447 kPa | 35.16 kg/cm ² | 1000 |
| P17 | 0-1000 psig | N/A | 68.95 bar | 6895 kPa | 70.31 kg/cm ² | 2000 |
| P18 | 0-3000 psig | N/A | 206.8 bar | 20.68 MPa | 210.9 kg/cm ² | 6000 |
| P19 | 0-4500 psig | N/A | 310.3 bar | 31.03 MPa | 316.4 kg/cm ² | 9000 |
| P20 | 0-6000 psig | N/A | 413.7 bar | 41.37MPa | 421.9 kg/cm ² | 12000 |

| Differential Pressure Sensor: Differential pressure, piezo-resistive strain gage, silicone oil fill, 316L stainless wetted materials, 1/4" NPT (male) process connection | | | | | | | |
|---|--|-----------|------------|-----------|--------------------------|-------------------------------------|---|
| Sensor P/N | Pressure Operating Range ¹ & Display Resolution | | | | | Max. Over Range ² (PSID) | Max. Working Pressure ³ (PSIG) |
| K10 | 0-5.000 psid | 138.5" wc | 344.7 mbar | 34.47 KPa | 0.352 kg/cm ² | 10 | 50 |
| K11 | 0-50.00 psid | 1385" wc | 3447 mbar | 344.7 KPa | 3.516 kg/cm ² | 100 | 500 |
| K13 | 0-100.0 psid | 2770" wc | 6895 mbar | 689.5 KPa | 7.031 kg/cm ² | 200 | 1500 |
| K14 | 0-200.0 psid | NA | 13.79 bar | 1379 KPa | 14.10 kg/cm ² | 400 | 1500 |

¹ - The pressure range that the sensor will perform within specified tolerances.

² - The maximum pressure that can be applied without affecting sensor performance.

³ - The maximum pressure that can be applied to both ports simultaneously without affecting sensor performance. Pressure on the "H" sensor port must be ≥ pressure on the "L" sensor port.

| Temperature Sensor: 4-wire RTD, 100 Ω platinum, DIN 0.00385, 0.25" OD sensor sheath, 316 stainless steel construction | | |
|--|----------------------------|--|
| Sensor P/N | Temperature Range | Description (See drawings) |
| TL1 | -40 to 450°F/-40 to 232°C | Local (stem) mounted rigid to enclosure, 4" sheath length |
| TL2 | | Local (stem) mounted rigid to enclosure, 6" sheath length |
| TL3 | | Local (stem) mounted rigid to enclosure, 10" sheath length |
| TR | -40 to 1000°F/-40 to 538°C | Remote mounted, 2.5" sheath, 6' MI fixed extension length |
| TRC | | Remote mounted, 2.5" sheath, 1' to 30' MI extension length MUST BE SPECIFIED. USE OPTION W074 ONLY |
| TH1 | | Remote mounted, 2.5" sheath, 6' MI fixed extension length |
| THC | | Remote mounted, 2.5" sheath, 1' to 30' MI extension length MUST BE SPECIFIED. USE OPTION W074 ONLY. |
| TC1* | | Remote mounted, 2.5" sheath, 6' MI fixed extension length |
| TCC* | -300 to 200°F/-184 to 93°C | Remote mounted, 2.5" sheath, 1' to 30' MI extension length MUST BE SPECIFIED. USE OPTION W074 ONLY |
| TLC | | Local (stem) spring-loaded mount, NUN connection lengths: 4" – 10" in 1" increments, variable sheath (L) length up to 60", BOTH MUST BE SPECIFIED. Refer to drawing on page 13. Thermowell required, see page 11. (Example: TTC-NUN6-L 10.5) |

Thermowells and fittings are shown on page 11. To order spares and replacement temperature sensor assemblies, provide the "TA#:" number from the product nameplate. Example: TA#: 62128723

*Calibration certification is not available on the TC1 and TCC

OPTION CODES

M041: Dual Seal- Provides secondary process seal for all pressure models

M201: Factory programmable set point, deadband and switch mode for one switch (Model 1XTXSW Only)
(see M202 for information required)

M202: Factory programmable set point, deadband and switch mode for two relays (Model 1XTXSW Only)

| All 6 settings are required when ordering - see example below | | | |
|---|------------------------|-----------------------|---------------|
| Relay | Set Point ¹ | Deadband ¹ | Relay Mode |
| SW1 | 040.3 | 001.5 | OPEN ON FALL |
| SW2 | 050.0 | 005.0 | CLOSE ON RISE |

| For WINDOW modes, all 10 settings are required when ordering - see example below | | | | | |
|--|-----------------------------|----------------------------|----------------------------|---------------------------|--------------|
| Relay | Set Point High ¹ | Deadband High ¹ | Set Point Low ¹ | Deadband Low ¹ | Relay Mode |
| SW1 | 60.00 | 12.00 | 18.50 | 10.25 | OPEN WINDOW |
| SW2 | 30.50 | 06.25 | 09.00 | 04.75 | CLOSE WINDOW |

¹Note: Four digits must be entered for each set point and deadband. Please refer to above sensor tables for the display resolution for the correct number of decimal places allowed for the sensor range and units of measure selected.

M270: Display units, degrees C for temperature models

M275: Display units, inches of water column

M276: Display units, bar or mbar

M277: Display units, kPa or MPa

M278: Display units, kg/cm²

M395: Flameproof compliance Ex d per Korea Occupational Safety and Health Agency (KOSHA)*

M406: Compliance per Russian Gosgortekhnadzor*

M444: Paper tag

M446: Stainless steel tag

M449: Mounting bracket for pipe or wall. Use part number 6361-704 if ordered separately. See page 12 for additional information.

M550: Oxygen service: Cleaned in accordance with ASTM G93

W073: 1/2" NPT male compression fitting for use with all TL and TR sensors, see page 8 for additional information

W074: 1/2" NPT male union connector for use with all TR, TH and TC sensors

W081: Thermowell adapter - Adapts 3/8" Thermowell to 1/4" sensor sheath

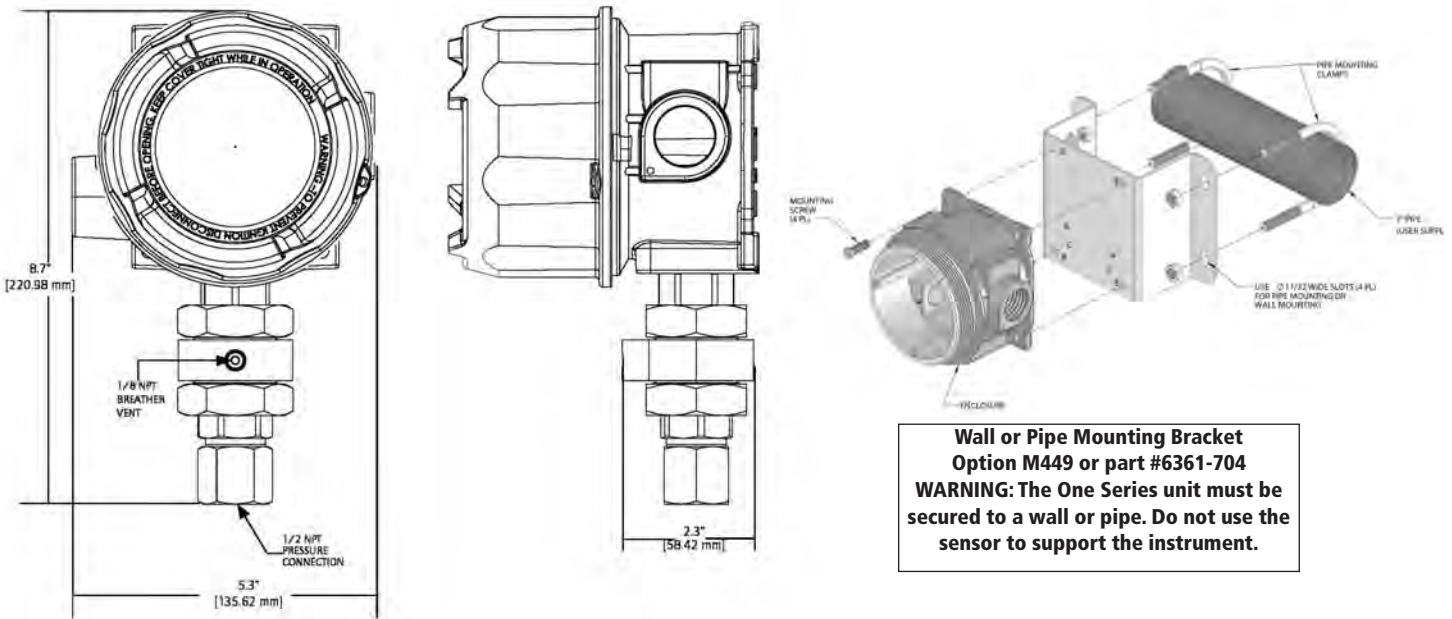
W930: 1/2" NPT male to G1/2 male adapter for use with gage pressure sensors P06-P20. Use part number 6361-762 if ordered separately.

W932: 1/4" NPT female to G1/2 male adapter for use with differential pressure sensors K10-K13. Use part number 6361-763 if ordered separately (2 required)

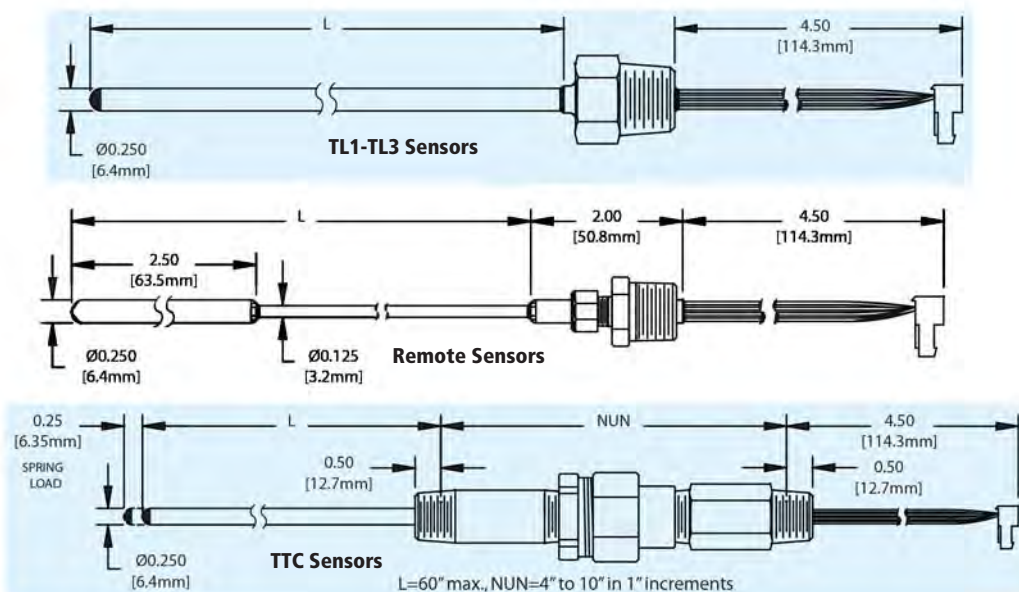
6361-752: Replacement cover assembly

DIMENSIONS INCHES (MM)

Enclosure shown with Dual Seal option M041 and gage pressure sensor

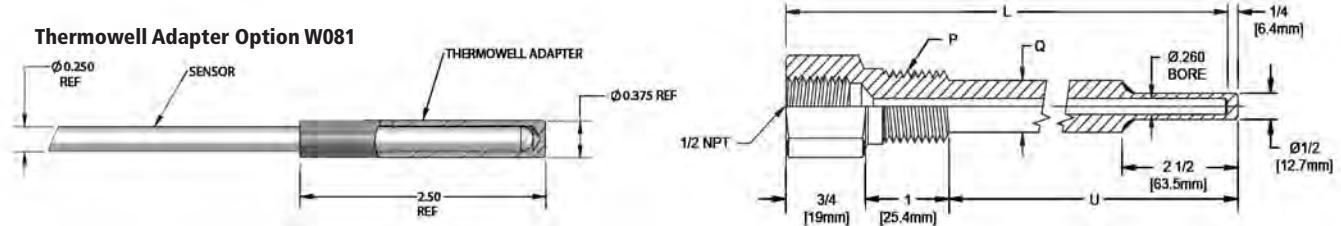


Temperature Sensors



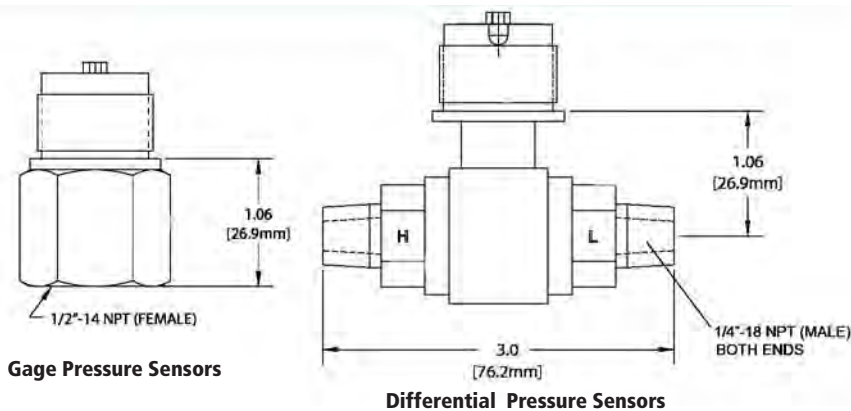


| Model | W073 1/2" NPT compression fitting with ferrule to fit 0.25" sensor sheath | W074 1/2" NPT union connection to fit 0.125" sensor extension cable |
|------------|--|--|
| 1XSW, 1XTX | TLx | TRx, THx, TCx |



| Fittings for Thermowells | | | | | Local Temperature Sensors w/0.25" Sensor Sheath | | | Remote Temperature Sensors w/Teflon® Cable | Remote Temperature Sensors w/0.125" Diameter MI Cable |
|--------------------------|---------------------|---------|-----|------|---|----------|-----------|--|---|
| Thermowell P/N | Length (L) (Inches) | P (NPT) | O | U | TL1 (4") | TL2 (6") | TL3 (10") | TR | TR, TH, TC |
| 1S260 L2.5-316 | 2.5 | 1/2 | 5/8 | 1 | W073 | W073 | W073 | W073 | W074 |
| 1S260 L4-316 | 4 | 1/2 | 5/8 | 2.5 | NA | W073 | W073 | W073 | W074 |
| 1S260 L4.5-316 | 4.5 | 1/2 | 5/8 | 3 | NA | W073 | W073 | W073 | W074 |
| 1S260 L5.5-316 | 5.5 | 1/2 | 5/8 | 4 | NA | NA | W073 | W074 | W074 |
| 1S260 L6-316 | 6 | 1/2 | 5/8 | 4.5 | NA | NA | W073 | W074 | W074 |
| 1S260 L6.5-316 | 6.5 | 1/2 | 5/8 | 5 | NA | NA | W073 | W074 | W074 |
| 1S260 L9-316 | 9 | 1/2 | 5/8 | 7.5 | NA | NA | NA | W074 | W074 |
| 1S260 L9.5-316 | 9.5 | 1/2 | 5/8 | 8 | NA | NA | NA | W074 | W074 |
| 1S260 L12-316 | 12 | 1/2 | 5/8 | 10.5 | NA | NA | NA | W074 | W074 |
| 1S260 L15-316 | 15 | 1/2 | 5/8 | 13.5 | NA | NA | NA | W074 | W074 |
| 1S260 L18-316 | 18 | 1/2 | 5/8 | 16.5 | NA | NA | NA | W074 | W074 |
| 1S260 L24-316 | 24 | 1/2 | 5/8 | 22.5 | NA | NA | NA | W074 | W074 |
| 25260 L2.5-316 | 2.5 | 3/4 | 3/4 | 1 | W073 | W073 | W073 | W073 | W074 |
| 25260 L4-316 | 4 | 3/4 | 3/4 | 2.5 | NA | W073 | W073 | W073 | W074 |
| 25260 L6-316 | 6 | 3/4 | 3/4 | 4.5 | NA | NA | W073 | W074 | W074 |
| 25260 L9-316 | 9 | 3/4 | 3/4 | 7.5 | NA | NA | NA | W074 | W074 |
| 25260 L12-316 | 12 | 3/4 | 3/4 | 10.5 | NA | NA | NA | W074 | W074 |
| 25260 L15-316 | 15 | 3/4 | 3/4 | 13.5 | NA | NA | NA | W074 | W074 |
| 25260 L18-316 | 18 | 3/4 | 3/4 | 16.5 | NA | NA | NA | W074 | W074 |
| 25260 L24-316 | 24 | 3/4 | 3/4 | 22.5 | NA | NA | NA | W074 | W074 |

Pressure Sensors



APPROVALS & RATINGS

| Model | N. America | Europe | International |
|------------------|--|---|--|
| 1XSWLL | cULus Listed UL: 50, 50E, 913, 1203 and 61010-1. ANSI/ISA 12.12.01, ISA 12.27.01. CSA C22.2: 25, 30, 157, 213, 94.01, 94.2 and 61010-1. CSA C22.2 / UL : 60079, -0, -1, -11, -15, -31. | EN 60079-0, EN 60079-1, EN 60079-11, EN 60079-15, EN 60079-31 | IEC 60079-0, IEC 60079-1, IEC 60079-11, IEC 60079-15, IEC 60079-31 |
| 1XSWLL | Class 1 , Division 1 GROUPS A, B, C & D; CLASS II, DIVISION 1, GROUPS E, F, G; CLASS III (Note: No gas group A with option M041) CLASS I, ZONE 1, AEx d IIC **T3/T5; Ex d IIC **T3/T5; CLASS I, ZONE 0, AEx ia IIC T4; Ex ia IIC T4; CLASS I, DIVISION 2, GROUPS A, B, C & D; CLASS II, DIVISION 2, GROUPS E, F, G; CLASS III (No gas group A with option M041) CLASS I, ZONE 2, GROUPS AEx nA IIC T4; Ex nA IIC T4; -40°C ≤ Tamb ≤ 85°C (-40°F ≤ Tamb ≤ 185°F) ENCLOSURE TYPE 4X, IP66 UL File: E226592 | II 2 G Ex db IIC **T3/T5 Gb; II 2 D Ex tb IIIC T+90°C Db; IP66 II 1 G Ex ia IIC T4 Ga; II 1 D Ex ia IIIC T+135°C Da; -40°C ≤ Tamb ≤ 85°C (-40°F ≤ Tamb ≤ 185°F) DEMKO 09 ATEX 0813748X II 3 G Ex nA IIC T4 Gc; DEMKO 15 ATEX 1483 -40°C ≤ Tamb ≤ 85°C (-40°F ≤ Tamb ≤ 185°F) | Ex db IIC **T3/T5 Gb; Ex tb IIIC T+90°C Db; IP66 Ex ia IIC T4 Ga; Ex tb IIIC T+135°C Da; IECEx UL 08.0017X -40°C ≤ Tamb ≤ 85°C (-40°F ≤ Tamb ≤ 185°F) |
| 1XTXSW 1XTX00 | cULus Listed UL: 50, 50E, 913, 1203 and 61010-1. ANSI/ISA 12.12.01, ISA 12.27.01. CSA C22.2: 25, 30, 213, 94.01, 94.2 and 61010-1. CSA C22.2 / UL : 60079, -0, -1, -15, -31. | EN 60079-0, EN 60079-1, EN 60079-15, EN 60079-31 | IEC 60079-0, IEC 60079-1, IEC 60079-15, IEC 60079-31 |
| TXTXSW TXX00 | Class 1 , Division 1, GROUPS A, B, C & D; CLASS II, DIVISION 1, GROUPS E, F, G; CLASS III (Note: No gas group A with option M041) CLASS I, ZONE 1, AEx d IIC **T3/T5; Ex d IIC **T3/T5; CLASS I, DIVISION 2, GROUPS A, B, C & D; CLASS II, DIVISION 2, GROUPS E, F, G; CLASS III (No gas group A with option M041) CLASS I, ZONE 2, GROUPS AEx nA IIC T4; Ex nA IIC T4; | II 2 G Ex db IIC **T3/T5 Gb; II 2 D Ex tb IIIC T+90°C Db; IP66 -40°C ≤ Tamb ≤ 85°C (-40°F ≤ Tamb ≤ 185°F) DEMKO 09 ATEX 0813748X II 3 G Ex nA IIC T4 Gc; DEMKO 15 ATEX 1483 -40°C ≤ Tamb ≤ 85°C (-40°F ≤ Tamb ≤ 185°F) | Ex db IIC **T3/T5 Gb; Ex tb IIIC T+135°C Db; IECEx UL 08.0017X -40°C ≤ Tamb ≤ 85°C (-40°F ≤ Tamb ≤ 185°F) |

**T3 for pressure sensor ranges P06, P08, and P10-P16 only. T5 for all other models.

Specifications subject to change without notice.

UNITED ELECTRIC

100 Series, Pressure, Vacuum, Diff. Pressure & Temp. Switches

Adjustable Ranges 30" Vac to 5000 PSI, -180 to 650°F

DESCRIPTION

The 100 Series is a cost-effective pressure and temperature control for process plants and OEM equipment. The rugged, one piece enclosure features a slanted cover for wiring accessibility. A wide variety of electrical and process-connection options make this series ideal for many applications, where weather-proof, ruggedness and versatility are required.

Various applications utilize the 100 Series: heat tracing, freeze protection, processing equipment (pumps, compressors), inputs for annunciator panels and fire suppression systems.



SPECIFICATIONS

GENERAL

Storage Temperature: -65° to 160°F (-54 to 71°C)

Ambient Temperature: -40 to 160°F (-40 to 71°C); models 520-525, 540-548, 700-706, 15731-15736: 0 to 160°F (-18 to 71°C); Set point typically shifts less than 1% of range for a 50°F (28°C) ambient temperature change

Set Point Repeatability: Temperature models: Temperature models: ± 1% of adjustable range Pressure models 15623, 15731-15737, 171-174, 218, 270-376, 520-535, 540-543, 700-706, 560-564: ± 1% of adjustable range; models 190-194, 183-189, 483-494, 544-548, 565-567, 610-680, 15884: ±1.5% of adjustable range Internal set point lock on all pressure models

Shock: Set point repeats after 15 G, 10 millisecond duration

Vibration: Set point repeats after 2.5 G, 5-500 Hz

Enclosure: Die cast aluminum, epoxy powder coated, gasketed, captive cover screws

Enclosure Class: Enclosure type 4X

Switch Output: One SPDT snap action switch

Electrical Rating: 15A 125/250/480 VAC resistive except for H100-15623, 15731-15737, 15884, 20A 125/250/480 VAC resistive, B100-13546 and E100-13545, 22A/480 VAC. Electrical switches have limited DC capabilities at 24-30 VDC, 2A resistive and 1A inductive. 125 VDC, 0.5A resistive, 0.03A inductive.

Electrical Connection: 1/2" NPT (female); Two 7/8" diameter knockouts

Pressure Connection: Models 15623, 218, 270-376, 610-680, 701-706, 15731-15884: 1/4" NPT (female); Models 171-194, 483-494, 520-535, 15737: 1/2" NPT (female); Models 540-548: 1/8" NPT (female); Models 560-564: 2" Sanitary Fitting; Models 565-567: 1.5" Sanitary Fitting (Sanitary fittings mate with Tri-Clamp® fitting systems)

Weight: 2-7 lbs; Varies with model

Temperature Assembly:

Bulb and capillary: 6 feet 304 stainless steel except for E100-13545, 10 feet 304 stainless steel

Immersion stem: nickel-plated brass (standard) except for B100-13546 stainless steel; optional 316L stainless steel

Fill: Models 1BS/BC are solvent filled, models 2-8 non-toxic oil filled

Temperature Deadband: Type F typically 1% and type B, C, and E typically 2% of range under laboratory conditions (70°F ambient circulating bath at rate of 1/2°F per minute change)

Heat Tracing or Freeze Protection: Thermostats designed specifically for heat tracing and freeze protection ambient sensing applications are available with types B100 and E100

Approvals:

United States & Canada

UL Listed, cUL Certified

Temperature: UL 873; CSA C22.2 no. 24, File # E10667

Pressure: UL 508; CSA C22.2 no. 14, File # E42272;

Enclosure Type 4X

Europe

ATEX Directive (94/9/EC) II 1 G EEx ia IIC T6, (OPTIONAL - code M405) Tamb. = -50°C to +60°C; UL International DEMKO A/S (N.B.#0539), Certificate #DEMKO 03 ATEX 0335063EN 50014, 50020, 50284

Low Voltage Directive (LVD) (73/23/EC & 93/68/EEC)

Pressure Equipment Directive (PED) (97/23/EC)

Pressure Type H100 Chart

| Model | Adjustable Set Point Range | | Deadband | | *Over Range Pressure | | **Proof Pressure | |
|---|----------------------------|-----------------|------------|--------------|----------------------|------|------------------|------|
| | " w.c. | mbar | " w.c. | mbar | psi | bar | psi | bar |
| Buna-N diaphragm & O-Ring with 1/2" NPT (female) aluminum press. conn. (other wetted materials available, see Order Info), large 0.72" orifice for clean-out purposes | | | | | | | | |
| 520 | 300 Vac to 0 | -746.7 to 0 | 0.2 to 8 | 0.5 to 19.9 | 200 | 13.8 | 400 | 27.6 |
| 521 | 10 Vac to 10 | -24.9 to 24.9 | 0.1 to 0.6 | 0.2 to 1.5 | 200 | 13.8 | 400 | 27.6 |
| 522 | 50 Vac to 50 | -124.5 to 124.5 | 0.1 to 3 | 0.2 to 7.5 | 200 | 13.8 | 400 | 27.6 |
| 523 | 0.5 to 5.0 | 1.2 to 12.4 | 0.1 to 0.3 | 0.2 to 0.75 | 200 | 13.8 | 400 | 27.6 |
| 524 | 2.5 to 50 | 6.2 to 124.5 | 0.1 to 0.8 | 0.2 to 2.0 | 200 | 13.8 | 400 | 27.6 |
| 525 | 10 to 250 | 24.9 to 622.3 | 0.1 to 6 | 0.2 to 24.9 | 200 | 13.8 | 400 | 27.6 |
| Welded 316L stainless steel diaphragm with 1/2" NPT (female) 316L pressure connection, large 0.72" orifice for clean-out purposes | | | | | | | | |
| 530 | 300 Vac to 0 | -746.7 to 0 | 0.2 to 15 | 0.5 to 37.3 | 50 | 3.4 | 100 | 6.9 |
| 531 | 10 Vac to 10 | -24.9 to 24.9 | 0.1 to 0.6 | 0.2 to 1.5 | 50 | 3.4 | 100 | 6.9 |
| 532 | 50 Vac to 50 | -124.5 to 124.5 | 0.1 to 3 | 0.2 to 7.5 | 50 | 3.4 | 100 | 6.9 |
| 533 | 0.5 to 5.0 | 1.2 to 12.4 | 0.1 to 0.3 | 0.2 to 0.7 | 50 | 3.4 | 100 | 6.9 |
| 534 | 2.5 to 50 | 6.2 to 124.5 | 0.1 to 0.8 | 0.2 to 2.0 | 50 | 3.4 | 100 | 6.9 |
| 535 | 10 to 250 | 24.9 to 622.3 | 0.1 to 10 | 0.2 to 24.9 | 50 | 3.4 | 100 | 6.9 |
| | psi | bar | psi | bar | psi | bar | psi | bar |
| Welded stainless steel diaphragm with 1/2" NPT (female) pressure connection, large 0.72" orifice for clean-out purposes (NACE MR-0175 compliant) | | | | | | | | |
| 171 | 1 to 20 | 0.07 to 1.4 | 0.1 to 1.0 | 0.01 to 0.07 | 500 | 34.5 | 1000 | 68.9 |
| 172 | 2 to 50 | 0.14 to 3.4 | 0.1 to 1.5 | 0.01 to 0.10 | 500 | 34.5 | 1000 | 68.9 |
| 173 | 4 to 100 | 0.3 to 6.9 | 0.1 to 2.5 | 0.01 to 0.17 | 500 | 34.5 | 1000 | 68.9 |
| 174 | 8 to 200 | 0.6 to 13.7 | 0.1 to 3.5 | 0.01 to 0.24 | 500 | 34.5 | 1000 | 68.9 |
| 2" sanitary welded 316L stainless steel diaphragm and pressure connection. Mates with Tri-Clamp® fitting systems | | | | | | | | |
| 560 | 0.5 to 15 | 0.03 to 1.03 | 0.1 to 1 | 0.01 to 0.07 | 200 | 13.8 | 300 | 20.7 |
| 561 | 1 to 25 | 0.07 to 1.72 | 0.1 to 1.5 | 0.01 to 0.10 | 200 | 13.8 | 300 | 20.7 |
| 562 | 2 to 50 | 0.14 to 3.45 | 0.1 to 2.5 | 0.01 to 0.17 | 200 | 13.8 | 300 | 20.7 |
| 563 | 4 to 100 | 0.03 to 6.9 | 0.1 to 4 | 0.01 to 0.2 | 200 | 13.8 | 300 | 20.7 |
| 564 | 8 to 200 | 10.6 to 13.8 | 0.1 to 5 | 0.01 to 0.3 | 200 | 13.8 | 300 | 20.7 |

Pressure Type H100

| Model | Adjustable Set Point Range | | Deadband | | *Over Range Pressure | | **Proof Pressure | |
|---|----------------------------|---------------|------------|---------------|----------------------|-------|------------------|-------|
| | psi | bar | psi | bar | psi | bar | psi | bar |
| 1.5" sanitary welded 316L stainless steel diaphragm and pressure connection. Mates with Tri-Clamp® fitting systems | | | | | | | | |
| 565 | 5 to 30 | 0.3 to 2.1 | 1 to 5 | 0.07 to 0.3 | 1000 | 68.9 | 1500 | 103.4 |
| 566 | 10 to 100 | 0.7 to 6.9 | 1 to 12 | 0.07 to 0.8 | 1000 | 68.9 | 1500 | 103.4 |
| 567 | 15 to 300 | 1.0 to 20.7 | 3 to 22 | 0.21 to 1.5 | 1000 | 68.9 | 1500 | 103.4 |
| Buna-N diaphragm and O-Ring with 1/4" NPT (female) nickel-plated brass pressure connection; Option M540 Viton® diaphragm & O-Ring available for code 704-705 | | | | | | | | |
| 701 | 1.5 to 30 | 0.1 to 2 | 1 to 2 | 0.07 to 0.14 | 500 | 34.5 | 600 | 41.4 |
| 702 | 3 to 100 | 0.2 to 6.9 | 1 to 4 | 0.07 to 0.28 | 500 | 34.5 | 600 | 41.4 |
| 703 | 9 to 300 | 0.7 to 20.7 | 1 to 5 | 0.07 to 0.34 | 500 | 34.5 | 600 | 41.4 |
| 704 | 15 to 500 | 1.0 to 34.5 | 2 to 8 | 0.14 to 0.55 | 1500 | 103.4 | 2500 | 172.4 |
| 705 | 30 to 1000 | 2.1 to 69 | 3 to 20 | 0.21 to 1.38 | 1500 | 103.4 | 2500 | 172.4 |
| 706 | 100 to 1700 | 6.9 to 117 | 10 to 30 | 0.07 to 2.07 | 2000 | 137.9 | 2500 | 172.4 |
| Viton® diaphragm and O-Ring with 316 stainless steel 1/4" NPT (female) pressure connection (includes adjustable deadband switch) | | | | | | | | |
| 15623 | 20-200 | 1.4 to 13.8 | 12 to 16 | 0.8 to 1.8 | 500 | 34.5 | 1000 | 68.9 |
| 316L stainless steel diaphragm (optional Hastelloy® C, Monel® or Tantalum); Viton® GLT O-Ring (optional Kalrez®, Silicone, Ethylene Propylene, or Aflas®); 316 stainless steel 1/2" NPT (female) pressure connection (optional Hastelloy® B or C, or Monel®), large 0.72" orifice for clean-out purposes. Models 188 & 189 have a 316L stainless steel 1/2" NPT (female) pressure connection (NACE MR-0175 compliant) | | | | | | | | |
| 183 | 1 to 20 | 0.07 to 1.4 | 0.3 to 2.5 | 0.021 to 0.17 | 500 | 34.5 | 1000 | 68.9 |
| 184 | 2 to 50 | 0.14 to 3.4 | 0.3 to 3 | 0.021 to 0.2 | 500 | 34.5 | 1000 | 68.9 |
| 185 | 4 to 100 | 0.3 to 6.9 | 0.5 to 6 | 0.03 to 0.4 | 500 | 34.5 | 1000 | 68.9 |
| 186 | 8 to 200 | 0.6 to 13.8 | 1 to 11 | 0.07 to 0.8 | 500 | 34.5 | 1000 | 68.9 |
| 188 | 50 to 1000 | 3.45 to 68.9 | 25 to 125 | 1.7 to 8.6 | 2000 | 137.9 | 7000 | 482.6 |
| 189 | 250 to 3500 | 17.3 to 241.3 | 50 to 300 | 3.4 to 20.7 | 4000 | 275.8 | 7000 | 482.6 |

| Model | Adjustable Set Point Range | | Deadband | | | | *Over Range Pressure | | **Proof Pressure | |
|--|----------------------------|--------------|-----------------|-------------|---------------|------|----------------------|-------|------------------|-------|
| | | | Lower 75% range | | Top 25% Range | | | | | |
| | psi | bar | psi | bar | psi | bar | psi | bar | psi | bar |
| Welded stainless steel diaphragm with 1/2" NPT (female) pressure connections, large 0.072" orifice for clean-out purposes (NACE MR-0175 compliant) | | | | | | | | | | |
| 190 | 5 to 30 | 0.3 to 2.1 | 1 to 3 | 0.07 to 0.2 | 6 max | 0.4 | 1500 | 103.4 | 2500 | 172.4 |
| 191 | 10 to 100 | 0.7 to 6.9 | 1 to 8 | 0.07 to 0.6 | 15 max | 1.0 | 1500 | 103.4 | 2500 | 172.4 |
| 192 | 15 to 300 | 1 to 20.7 | 3 to 18 | 0.2 to 1.2 | 25 max | 1.7 | 1500 | 103.4 | 2500 | 172.4 |
| 193 | 20 to 500 | 1.4 to 34.5 | 4 to 30 | 0.3 to 2.1 | 45 max | 3.1 | 1500 | 103.4 | 2500 | 172.4 |
| 194 | 80 to 1700 | 5.5 to 117.2 | 5 to 120 | 0.3 to 8.3 | 150 max | 10.3 | 2000 | 137.9 | 2500 | 172.4 |
| Welded 316 stainless steel diaphragm with 1/2" NPT (female) pressure connection, 0.06" orifice to dampen pulsations | | | | | | | | | | |
| 490 | 5 to 30 | 0.3 to 2.1 | 1 to 3 | 0.07 to 0.2 | 6 max | 0.4 | 1500 | 103.4 | 2500 | 172.4 |
| 491 | 10 to 100 | 0.7 to 6.9 | 1 to 8 | 0.07 to 0.6 | 15 max | 1.0 | 1500 | 103.4 | 2500 | 172.4 |
| 492 | 15 to 300 | 1 to 20.7 | 3 to 18 | 0.2 to 1.2 | 25 max | 1.7 | 1500 | 103.4 | 2500 | 172.4 |
| 493 | 20 to 500 | 1.4 to 34.5 | 4 to 30 | 0.3 to 2.1 | 45 max | 3.1 | 1500 | 103.4 | 2500 | 172.4 |
| 494 | 80 to 1700 | 5.5 to 117.2 | 5 to 120 | 0.3 to 8.3 | 150 max | 10.3 | 2000 | 137.9 | 2500 | 172.4 |

| Model | Adjustable Set Point Range | | Deadband | | *Over Range Pressure | | **Proof Pressure | |
|---|----------------------------|---------------|------------|--------------|----------------------|-------|------------------|-------|
| | psi | bar | psi | bar | psi | bar | psi | bar |
| 316L stainless steel diaphragm (optional Hastelloy® C, Monel® or Tantalum) Viton® GLT O-Ring (optional Kalrez®, Silicone, ethylene propylene or Aflas®), 316 stainless steel 1/2" NPT (female) pressure conn. (optional Hastelloy® B, or C, or Monel®), 0.06" orifice. Models 488 & 489, 316L pressure connection. (NACE MR-0175 compliant) | | | | | | | | |
| 483 | 1 to 20 | 0.07 to 1.4 | 0.3 to 2.5 | 0.02 to 0.17 | 500 | 34.5 | 1000 | 68.9 |
| 484 | 2 to 50 | 0.14 to 3.4 | 0.3 to 3 | 0.02 to 0.2 | 500 | 34.5 | 1000 | 68.9 |
| 485 | 4 to 100 | 0.3 to 6.9 | 0.5 to 6 | 0.03 to 0.4 | 500 | 34.5 | 1000 | 68.9 |
| 486 | 8 to 200 | 0.6 to 13.8 | 1 to 11 | 0.07 to 0.8 | 500 | 34.5 | 1000 | 68.9 |
| 488 | 50 to 1000 | 3.4 to 68.9 | 25 to 125 | 1.7 to 8.6 | 2000 | 137.9 | 7000 | 482.6 |
| 489 | 250 to 3500 | 17.2 to 241.3 | 50 to 300 | 3.4 to 20.7 | 4000 | 275.8 | 7000 | 482.6 |
| Phosphor bronze bellows with 1/4" NPT (female) nickel-plated brass pressure connection. Model 218 has 300 series stainless steel spring in media | | | | | | | | |
| 218 | 30" Hg Vac to 0 | -1 to 0 | 1 to 2" Hg | 0.03 to 0.07 | 3 | 0.2 | 30 | 2.1 |
| 270 | 4 to 200 | 0.3 to 13.8 | 1 to 8 | 0.07 to 0.6 | 200 | 13.8 | 250 | 17.2 |
| 274 | 6 to 600 | 0.4 to 20.7 | 1 to 10 | 0.07 to 0.7 | 300 | 20.7 | 350 | 24.1 |
| Welded 316L stainless steel bellows with 1/4" NPT (female) pressure connections | | | | | | | | |
| 358 | 15 to 200 | 1 to 13.8 | 1 to 3 | 0.07 to 0.2 | 200 | 13.8 | 800 | 55.2 |
| 361 | 20 to 300 | 1.38 to 20.7 | 1 to 4 | 0.07 to 0.3 | 300 | 20.7 | 800 | 55.2 |
| 376 | 25 to 500 | 1.8 to 34.5 | 1.5 to 5 | 0.10 to 0.3 | 500 | 34.5 | 800 | 55.2 |
| 303 stainless steel piston, Buna-N O-Ring with 1/4" NPT (female) 303 stainless steel pressure connection(not recommended for gas service since drying of O-Ring seal can allow bleeding of medium into the atmosphere) | | | | | | | | |
| 610 | 75 to 1000 | 5.2 to 68.9 | 30 to 150 | 2.07 to 10.3 | 6000 | 413.7 | 10,000 | 689.5 |
| 612 | 125 to 3000 | 8.6 to 206 | 40 to 250 | 2.76 to 17.2 | 6000 | 413.7 | 10,000 | 689.5 |
| 616 | 700 to 5000 | 48.5 to 344 | 40 to 375 | 2.76 to 25.9 | 6000 | 413.7 | 10,000 | 689.5 |
| 303 stainless steel piston, Buna N O-Ring with 303 stainless steel 1/4" NPT (female) pressure connection (includes adjustable deadband switch) | | | | | | | | |
| 15884 | 700 to 5000 | 48.3 to 344.7 | 80 to 500 | 5.5 to 34.5 | 6000 | 413.7 | 10,000 | 689.5 |
| 316 stainless steel bellows with 1/4" NPT (female) pressure connection (not recommended for gas applications or for rapid or high cycling pressure changes) | | | | | | | | |
| 680 | 100 to 1700 | 6.9 to 117.2 | 9 to 40 | 0.6 to 2.8 | 1700 | 117.2 | 2500 | 172.4 |

* **Over Range Pressure:** The maximum pressure that may be applied continuously without causing damage and maintaining set point repeatability.

** **Proof Pressure:** The maximum pressure to which a pressure sensor may be occasionally subjected, which causes no permanent damage. The unit may require calibration (e.g., start-up, testing).

Pressure Type H100: Field Adjustable Deadband

| Model | Adjustable Set Point Range High end of range on rise, low end on fall | | Adjustable Deadband | | | | | | *Over Range Pressure | | **Proof Pressure | |
|---|---|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|----------------------|-------|------------------|-------|
| | | | Low End | | Mid Range | | High End | | | | | |
| | psi (unless noted) | bar (unless noted) | psi (unless noted) | bar (unless noted) | psi (unless noted) | bar (unless noted) | psi (unless noted) | bar (unless noted) | psi | bar | psi | bar |
| Buna N diaphragm and O-Ring with epoxy coated aluminum, 1/2" NPT (female) pressure connection, large 0.72" orifice for clean-out purposes; includes adjustable deadband microswitch | | | | | | | | | | | | |
| 15737 | 50 vac to 50" wc | -124.5 to 124.5 mbar | 0.5 to 7" wc | 1.2 to 17.4 mbar | 1 to 10" wc | 2.5 to 24.9 mbar | 2 to 13" wc | 5.0 to 32.4 mbar | 200 | 13.8 | 400 | 27.6 |
| 15731 | 3 to 30 | 0.2 to 2.1 | 1.5 to 4 | 0.1 to 0.3 | 2 to 4.5 | 0.1 to 0.3 | 2.5 to 5 | 0.2 to 0.3 | 500 | 34.5 | 600 | 41.4 |
| 15732 | 5 to 100 | 0.3 to 6.9 | 3 to 6 | 0.2 to 0.4 | 4 to 7.5 | 0.3 to 0.5 | 5 to 9 | 0.3 to 0.6 | 500 | 34.5 | 600 | 41.4 |
| 15733 | 9 to 300 | 0.6 to 27 | 4 to 11 | 0.3 to 0.8 | 5 to 13 | 0.3 to 0.9 | 5 to 16 | 0.3 to 1.1 | 500 | 34.5 | 600 | 41.4 |
| 15734 | 15 to 500 | 1 to 34.5 | 8 to 25 | 0.6 to 1.7 | 9 to 28 | 0.6 to 1.9 | 10 to 31 | 0.7 to 2.1 | 1500 | 103.4 | 2500 | 172.4 |
| 15735 | 30 to 1000 | 2.1 to 68.9 | 9 to 30 | 0.6 to 2.1 | 10 to 35 | 0.7 to 2.4 | 30 to 90 | 2.1 to 6.2 | 1500 | 103.4 | 2500 | 172.4 |
| 15736 | 100 to 1700 | 6.9 to 117.2 | 25 to 60 | 1.7 to 4.1 | 40 to 80 | 2.8 to 5.5 | 50 to 100 | 3.4 to 6.9 | 2000 | 137.9 | 2500 | 172.4 |

Differential Pressure Type H100K

| Model | Adjustable Set Point Range | | Deadband | | ***Working Pressure Range | | **Proof Pressure | |
|---|----------------------------|--------------------|-----------------|-----------------|---------------------------|------------|------------------|-------|
| | "wcd/psid | mbar/bar | psi | mbar/bar | psi | bar | psi | bar |
| Kapton® diaphragm, Buna-N sealing diaphragms and epoxy coated aluminum 1/8" NPT (female) pressure connections | | | | | | | | |
| 540 | 0.2 to 7" wcd | 0.5 to 17.4 mbar | 0.05 to 0.6" wc | 0.1 to 1.5 bar | 30" Hg Vac to 200 | -1 to 13.8 | 400 | 27.6 |
| 541 | 1 to 20" wcd | 2.5 to 49.7 mbar | 0.1 to 1.0" wc | 0.2 to 2.5 bar | 30" Hg Vac to 200 | -1 to 13.8 | 400 | 27.6 |
| 542 | 5 to 50" wcd | 12.4 to 124.4 mbar | 0.2 to 2.5" wc | 0.5 to 6.2 bar | 30" Hg Vac to 200 | -1 to 13.8 | 400 | 27.6 |
| 543 | 10 to 200" wcd | 24.9 to 497.0 mbar | 0.5 to 8" wc | 1.2 to 19.9 bar | 30" Hg Vac to 200 | -1 to 13.8 | 400 | 27.6 |
| 544 | 2 to 20 psid | 0.1 to 1.4 bar | 0.1 to 1.3 psi | 6.9 to 89.6 bar | 30" Hg Vac to 1200 | -1 to 82.7 | 2500 | 172.4 |
| 545 | 5 to 50 psid | 0.3 to 3.4 bar | 0.2 to 2.2 psi | 0 to 0.15 bar | 30" Hg Vac to 1200 | -1 to 82.7 | 2500 | 172.4 |
| 546 | 10 to 125 psid | 0.7 to 8.6 bar | 0.4 to 5.0 psi | 0 to 0.34 bar | 30" Hg Vac to 1200 | -1 to 82.7 | 2500 | 172.4 |
| 547 | 50 to 250 psid | 3.4 to 17.2 bar | 0.8 to 10 psi | 0.1 to 0.69 bar | 30" Hg Vac to 1200 | -1 to 82.7 | 2500 | 172.4 |
| 548 | 100 to 500 psid | 6.9 to 34.5 bar | 2.0 to 15 psi | 0.1 to 1.03 bar | 30" Hg Vac to 1200 | -1 to 82.7 | 2500 | 172.4 |

Application Notes: The use of metallic diaphragms where higher pressure shock or heavy cycling is expected should be avoided. Models 171-174 should not be used where system or start-up vacuum pressure might exceed 26" Hg Vac (-0.9 bar). Use of optional diaphragm materials for models 483-489 may increase deadband.
Deadband Note: Models 190-194, 490-494 are expressed as the lower 75% and top 25% of the range span because of the operating characteristics of the diaphragm sensor and switch.

- *Over Range Pressure:** The maximum pressure that may be applied continuously without causing damage and maintaining set point repeatability.
- **Proof Pressure:** The maximum pressure to which a pressure sensor may be occasionally subjected, which causes no permanent damage. The unit may require calibration (e.g., start-up, testing).
- ***Working Pressure Range:** The pressure range within which two opposing sensors can be safely operated and still maintain set point adjustability provided the difference in pressure between them does not exceed the designated adjustable range.

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Temperature Type B100: Internal Adjustment via Reference Dial

Temperature Type C100: No Reference Dial, Model 13546 not Available

| Model | Adjustable Set Point Range | | Max. Temp | | Scale Division | | Stem/Bulb Size* OD x Length |
|---------|----------------------------|----------------|-----------|-------|----------------|-----|--|
| | °F | °C | °F | °C | °F | °C | |
| 120 | 0 to 225 | -17.8 to 107.2 | 275 | 135 | 10** | 5** | 9/16" x 1-7/8" below 1/2" NPT thread (nickel-plated brass) |
| 121 | 200 to 425 | 93.3 to 218.3 | 475 | 246.1 | 10** | 5** | 9/16" x 1-7/8" below 1/2" NPT thread (nickel-plated brass) |
| 13546** | 15 to 140 | -9.4 to 60 | 60 | 71.1 | 5** | 2** | 9/16" x 2-11/16" long stainless steel (Freeze Protection) |

Temperature Type E100 Internal Adjustment via Reference Dial

| Stainless steel bulb & capillary | | | | | | | |
|----------------------------------|-------------|----------------|-----|-------|----|---|------------------------------|
| 2BSA | -120 to 100 | -84.4 to 37.8 | 150 | 65.5 | 10 | 5 | 3/8 x 2-5/8" |
| 2BSB | 30 to 250 | -1.1 to 121.1 | 300 | 148.9 | 10 | 5 | 3/8 x 2-5/8" |
| 3BS | 100 to 400 | 37.8 to 201.1 | 450 | 232.2 | 10 | 5 | 3/8 x 2-1/8" |
| 4BS | 25 to 100 | -3.9 to 37.8 | 150 | 65.5 | 2 | 1 | 3/8 x 6-3/4" |
| 5BS | -20 to 80 | -28.9 to 26.7 | 130 | 54.4 | 5 | 2 | 3/8 x 5" |
| 8BS | 350 to 640 | 176.7 to 337.8 | 690 | 365.6 | 10 | 5 | 3/8 x 3-1/4" |
| 13545 | 25 to 325 | -3.9 to 162.8 | 360 | 182.2 | 10 | 5 | 1/8 x 11-5/8" (Heat Tracing) |
| Copper bulb & capillary | | | | | | | |
| 2BCA | -120 to 100 | 84.4 TO 37.8 | 150 | 65.5 | 10 | 5 | 3/8 X 2-5/8" |
| 2BCB | 30 to 250 | -1.1 TO 121.1 | 300 | 18.9 | 10 | 5 | 3/8 X 2-5/8" |
| 3BC | 100 to 400 | 37.8 TO 204.4 | 450 | 232.2 | 10 | 5 | 3/8 X 2-1/8" |
| 4BC | 25 to 100 | -3.9 TO 37.7 | 150 | 65.5 | 2 | 1 | 3/8 X 6-3/4" |
| 5BC | -20 to 80 | -28.9 TO 26.7 | 130 | 54.4 | 5 | 2 | 3/8 X 5" |
| 8BC | 350 to 640 | 176.7 TO 337.8 | 690 | 365.5 | 10 | 5 | 3-3/8" 3-1/4" |

Temperature Type F100 No Reference Dial

| Stainless steel bulb & capillary | | | | | | | |
|----------------------------------|-------------|----------------|-----|-------|---|---|--------------|
| 1BS | -180 to 120 | -117.8 to 48.9 | 170 | 76.6 | - | - | 3/8 x 3-3/4" |
| 2BS | -125 to 350 | -87.2 to 176.7 | 400 | 204.4 | - | - | 3/8 x 2-5/8" |
| 3BS | -125 to 500 | -87.2 to 260 | 550 | 287.8 | - | - | 3/8 x 2-1/8" |
| 4BS | -40 to 120 | -40 to 48.9 | 170 | 76.6 | - | - | 3/8 x 6-3/4" |
| 5BS | -40 to 180 | -40 to 82.2 | 230 | 110 | - | - | 3/8 x 5" |
| 6BS | 0 to 250 | -17.8 to 121.1 | 300 | 148.8 | - | - | 3/8 x 4-1/2" |
| 7BS | 0 to 400 | -17.8 to 204.4 | 450 | 232.2 | - | - | 3/8 x 3" |
| 8BS | 50 to 650 | 10 to 343.3 | 700 | 371.1 | - | - | 3/8 x 3-1/4" |
| Copper bulb & capillary | | | | | | | |
| 1BC | -180 to 120 | -117.8 to 48.9 | 170 | 76.6 | - | - | 3/8 x 3-3/4" |
| 2BC | -125 to 350 | -87.2 to 176.7 | 400 | 204.4 | - | - | 3/8 x 2-5/8" |
| 3BC | -125 to 500 | -87.2 to 260 | 550 | 287.8 | - | - | 3/8 x 2-1/8" |
| 4BC | -40 to 120 | -40 to 48.9 | 170 | 76.6 | - | - | 3/8 x 6-3/4" |
| 5BC | -40 to 180 | -40 to 82.2 | 230 | 110 | - | - | 3/8 x 5" |
| 6BC | 0 to 250 | -17.8 to 121.1 | 300 | 148.8 | - | - | 3/8 x 4-1/2" |
| 7BC | 0 to 400 | -17.8 to 204.4 | 450 | 232.2 | - | - | 3/8 x 3" |
| 8BC | 50 to 650 | 10 to 343.3 | 700 | 371.1 | - | - | 3/8 x 3-1/4" |

*Optional stainless steel immersion stem, and armored capillary covering available.

**Type B100 only

ORDERING INFORMATION

SPECIFY MODEL TYPE, MODEL (FROM CHARTS) THEN OPTIONS IF REQUIRED

EXAMPLE: H100-483-0140-M201(10 PSI RISING)

Type

- H100 -One SPDT output; epoxy coated enclosure; internal adjustment with "High-Low" reference scale
 - H100K-One SPDT output; epoxy coated enclosure; internal adjustment with "High-Low" reference scale
 - B100 -Immersion stem; one SPDT output; internal adjustment with reference dial
 - C100 -Immersion stem; one SPDT output; internal adjustment with no reference scale
 - E100 -Bulb and capillary; one SPDT output; internal adjustment with reference dial
 - F100 -Bulb and capillary; one SPDT output; internal adjustment with no reference scale
- Switch Options**
- 0140- Gold contacts, 1A 125 VAC resistive. NOT AVAILABLE MODELS 13545, 13546, 15623, 15731-15884
 - 0500- Close deadband, 5A 125/250 VAC resistive. NOT AVAILABLE MODELS 520-535, 13545, 13546, 15623, 15731-15884
 - 1010- DPDT switch, 10 A 125/250 VAC resistive; deadband and minimum set point will increase. NOT AVAILABLE TEMPERATURE VERSIONS, TYPE H100K OR RANGES 171-194, 483-567 AND RANGE 680
 - 1070- 10 A 125 VDC resistive; deadband and minimum set point will increase. NOT AVAILABLE MODELS 171- 194, 483-535, 560-567, 13545, 13546, 15623, 15731-15884

- 1519- Adjustable deadband, 15 A 125/250/480 VAC resistive; adjustment wheel char rise setting only. If adjustment on fall setting is required, use primary adjustm NOT AVAILABLE TYPES B100, E100 OR MODELS 171-194, 483-494, 560-567, 616, 51623, 15731-15884
- 1530- External manual reset, 15 A 125/250/480 VAC resistive; latches on rise, only. N AVAILABLE MODELS 13545, 13546, 15623, 15731-15884
- 1535- High ambient, 15 A 125/250 VAC resistive; temperatures up to 250°F (121.1°C NOT AVAILABLE MODELS 520-535, 13545, 13546, 15623, 15731-15884
- 1537- Vapor sealed switch, 15 A 125/250 VAC resistive. NOT AVAILABLE MODELS 52 533, 13545, 13546, 15623, 15731-15884
- 2000- 20 A 125/250/480 VAC resistive. NOT AVAILABLE TYPE H100K OR MODELS 52 535, 13545, 13546, 15623, 15731-15884
- 3000- 30 A 125/250/277 VAC resistive. NOT AVAILABLE TYPE H100K OR MODELS 17 194, 483-567, 680, 13545, 13546, 15623, 15731-15884

Other Options

- M020- Red status light, 115 VAC only. NOT AVAILABLE MODELS 13545, 13546, 15623, 15731-15884
- M201- Factory set one switch; specify increasing or decreasing pressure or temperature and setpoint
- M276- Range indicated on nameplate in bars/mbars. NOT AVAILABLE ON TEMPERATURE VERSIONS
- M278- Range indicated on nameplate in Kg/cm2. NOT AVAILABLE ON TEMPERATURE VERSIONS
- M405- Intrinsic safety compliance for European Union per ATEX standards
- M444- Paper ID tag
- M446- Stainless steel ID tag & wire attachment
- M449- Surface mounting hardware kit that is required for models 520-535, 15737, & 540-548 when surface mounting. Use option code only at time of ordering product, otherwise use surface and pipe mounting kit part number 6361-704 as a separate order or for other models.
- M504- 316L stainless steel immersion stem. AVAILABLE TEMPERATURE MODELS 120, 121 ONLY
- M540- Viton® construction (deadband and low end range may increase slightly); wetted parts include Viton® diaphragm and O-ring plus stainless steel pressure connection. ON RANGES 610-616 (O-RING ONLY), 701-705, Kapton® diaphragm, Viton® O-Ring and sealing diaphragms and aluminum pressure connections ON RANGES 540-548
- M550- Oxygen service cleaning; internal construction may change
- M914- 1/2" NPT (female) stainless steel pressure connection. Available models 358-376, 610-616
- M921- Brass pressure connection. Available models 610-616
- 6361-704- Surface and pipe mounting hardware kit for all models. Required for surface mounting models 520-535, 15737 & 540-548 if not previously ordered with option M449.
- SD6286-51- Watertight conduit fitting; connects 7/8" hole to 1/2" NPT (female) fitting

Optional Sensor Material for "WC Ranges. Available Models 520-525

- XC001- Aluminum pressure connection, Viton® diaphragm, Viton® O-ring
- XC002- Aluminum pressure connection, Kapton® diaphragm, Buna-N O-ring
- XC003- Aluminum pressure connection, Kapton® diaphragm, Viton® O-ring
- XC004- 316L Stainless steel pressure connection, 316L stainless steel diaphragm, Viton® O-ring. (Over range pressure is limited to 100 psi)
- XC005- 316L Stainless steel pressure connection, Viton® diaphragm, Viton® O-ring
- XC007- 316L Stainless steel pressure connection, Teflon® diaphragm, Viton® O-ring

OPTIONAL SENSOR MATERIALS FOR CORROSIVE MEDIA AVAILABLE MODELS 183-189,483-489

- XD002- Hastelloy C diaphragm (NACE MR-0175 compliant)
- XD003- Monel diaphragm (NACE MR-0175 compliant)
- XP112- Hastelloy C pressure connection (NACE MR-0175 compliant)
- XP113- Monel pressure connection
- XR211- Kalrez® O-ring (NACE MR-0175 compliant)
- XR213- Ethylene propylene O-ring
- XR214- Aflas® O-ring

OPTIONAL FLUSH MOUNT FLANGES AVAILABLE Models 560-567

- F196- Flush mounted flange, 150#, 1" lap joint, raised face
AVAILABLE RANGES 565-567 ONLY
- F197- Flush mounted flange, 150#, 2" lap joint, raised face
AVAILABLE RANGES 560-564 ONLY
- F198- Flush mounted flange, 300#, 1" lap joint, raised face
AVAILABLE RANGES 565-567 ONLY
- F199- Flush mounted flange, 300#, 2" lap joint, raised face
AVAILABLE RANGES 560-564 ONLY

OPTIONS FOR TEMPERATURE MODELS**UNION CONNECTORS**

| Option | Replacement Number | Description |
|----------------------------|--------------------|-------------------------|
| <u>Brass</u> | | |
| W027 | SD6213-27 | 1/2" NPT w/3/4" bushing |
| W045 | SD6213-45 | 3/4" NPT |
| W051 | SD6213-51 | 1/2" NPT |
| <u>304 Stainless Steel</u> | | |
| W028 | SD6213-28 | 1/2" NPT w/3/4" bushing |
| W046 | SD6213-46 | 3/4" NPT |
| W050 | SD6213-50 | 1/2" NPT |

THERMOWELLS

For all bulb & capillary switches, except Model 13545

| | | |
|----------------------------|------------|---|
| <u>Brass</u> | | |
| W075 | SD6225-75 | 1/2" NPT with 3/4" NPT adapter bushing, 4" BT |
| W191 | SD6225-191 | 1/2" NPT, 4" BT |
| W118 | SD6225-118 | 1/2" NPT with 3/4" NPT adapter bushing, 7" BT |
| W192 | SD6225-192 | 1/2" NPT, 7" BT |
| <u>316 Stainless Steel</u> | | |
| W076 | SD6225-76 | 3/4" NPT, 4.5" BT |
| W193 | SD6225-193 | 1/2" NPT, 4.5" BT |
| W119 | SD6225-119 | 3/4" NPT, 7.5" BT |
| W177 | SD6225-177 | 1/2" NPT, 7.5" BT |

For all immersion stem switches; except Model 13546

| | | |
|------|------------|--------------------------------|
| W139 | SD6225-139 | 3/4" NPT X 1 23/32" BT, BRASS |
| W140 | SD6225-140 | 3/4" NPT X 1 23/32" BT, 316 SS |

W000 IMMERSION STEM AND THERMOWELLS

Note: Option W000 is a special Immersion Stem construction that has no external thread. This option fits inside a special thermowell and is secured with a set-screw.

| Option | Description |
|--------|---|
| W000 | Immersion stem only, Brass |
| W097 | Immersion stem and thermowell. Includes W000 stem and 1/2" NPT x 1 23/32" BT Brass thermowell |
| W099 | Immersion stem and thermowell. Includes W000 stem and 1/2" NPT x 1 23/32" BT 316 SS thermowell. |

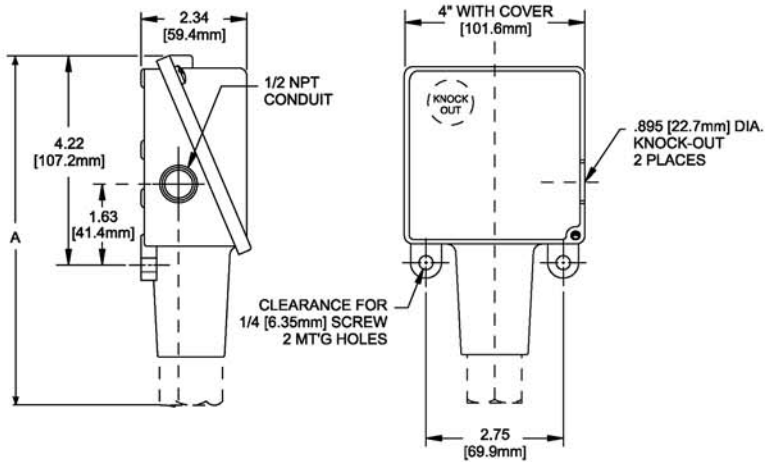
OPTIONAL LENGTHS:

Optional immersion stem lengths to 15" may be available in brass, with or without 316 SS thermowell. Consult Clark for additional information.
Optional capillary length to *50' available in copper or 304 SS Armor or Teflon® capillary protection available to lengths less than or equal to capillary length. Consult Clark for additional information.

*Consult Clark regarding repeatability and ambient effects on capillary lengths over 30'.

DIMENSIONS INCHES (MM)

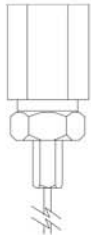
TYPES B100, C100, E100, F100, H100, H100K



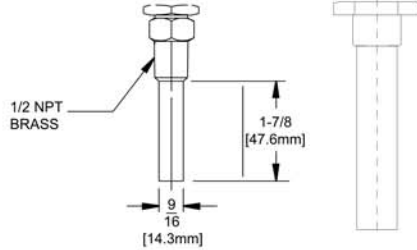
| Dimension A | | | |
|-----------------------------|--------|--------|-------------------------|
| Range Code | Inches | mm | NPT |
| 171-174 | 7.63 | 193.8 | 1/2 |
| 183-186, 484-486 | 7.56 | 192.0 | 1/2 |
| 188, 189, 488-489 | 6.63 | 168.4 | 1/2 |
| 190-194, 490-494 | 6.63 | 168.4 | 1/2 |
| 218 | 6.56 | 166.6 | 1/4 |
| 270-274 | 7.00 | 177.38 | 1/4 |
| 358-376 | 7.00 | 177.8 | 1/4 |
| 520-525, 15737 | 6.44 | 214.4 | 1/2 |
| 530-535 | 6.00 | 203.2 | 1/2 |
| 560-564 | 6.63 | 168.4 | 2" Sanitary Fitting |
| 565-567 | 6.63 | 168.4 | 1-1/2" Sanitary Fitting |
| 610-616, 680, 15884 | 7.00 | 177.8 | 1/4 |
| 701-706, 15623, 15731-15736 | 6.63 | 168.4 | 1/4 |
| Differential Pressure | | | |
| 540-543 | 8.47 | 215.1 | 1/8 |
| 544-548 | 8.53 | 216.7 | 1/8 |
| Temperature | | | |
| 120, 121, 13546 | 9.38 | 238.3 | Imersion Stem |
| 1BC-8BC, 1BS-8BS, 13545 | 8.69 | 220.7 | Bulb & Capillary |

Temperature Sensors

Models 1BC-8BC, 1BS-8BS, 13545

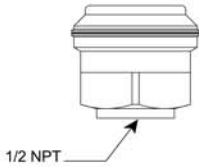


Models 120,121 Model 13546

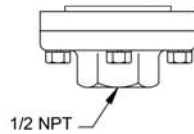


Pressure Sensors

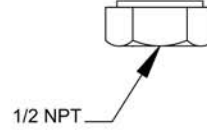
Models 171-174



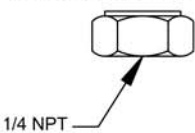
Models 183-186, 483-486



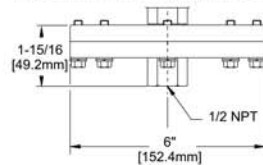
Models 188-194, 488-494



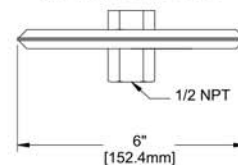
Models 218-376, 610-706, 15623, 15731-15736



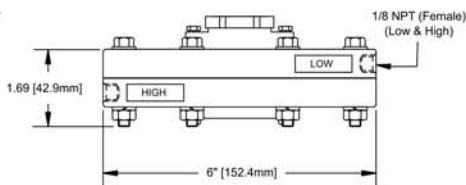
Models 520-525, 15737



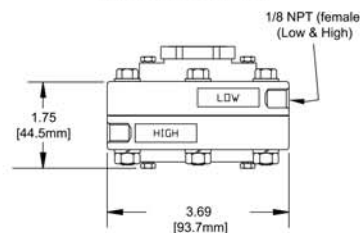
Models 530-535



Models 540-543



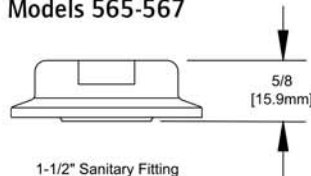
Models 544-548



Models 560-564



Models 565-567



UNITED ELECTRIC

12 Series: Pressure, Diff. Pressure & Temp. Switches

Explosion Proof, Adjustable Ranges 30" Vac to 12,500 PSI, -130 to 650°F

DESCRIPTION

12 Series hazardous location switches are ideal for operation in tough applications where space is at a premium. A snap-action Belleville spring assembly is used in most models to provide vibration resistance and prolonged switch life. The 316 stainless steel enclosure and hermetically sealed switch provide rugged protection from the environment. Approved for use in hazardous locations worldwide, the 12 Series is installed within applications ranging from offshore oil rigs to rotating equipment, and more.

Quadruple approvals (UL, cUL, ATEX and IECEx) mean the 12 Series meets the demanding requirements of critical applications within hazardous locations. Additionally, the 12 Series complies with ANSI/ISA 12.27.01, "secondary seal requirements for process sealing between electrical systems and flammable or combustible process fluids," and NEC 501.17, "process sealing." It can be used in a variety of applications where space is at a premium. Metal wetted parts comply with NACE MR-0175 and the 316 stainless steel, type 4X enclosure rating assure long-term performance in the harshest environments.

SPECIFICATIONS

GENERAL

STORAGE TEMPERATURE: -58° to 176°F (-50 to 80°C)

OPERATING AMBIENT TEMPERATURE: -58 to 176°F (-50 to 80°C). Set point shifts less than 1% of range for a 50°F (28°C) ambient temperature change. Slight ambient effects for 25-50' extracapillary length on temperature switch models, consult factory.

MEDIA TEMPERATURE: Pressure models: Sensor types 2, 7, 9: -50 to 400°F (-45 to 204°C)

Sensor types 3, 4, 8: -20 to 200°F (-28 to 93°C)

Sensor types 5, 6: 0 to 320°F (-18 to 160°C)

Sensor type P, W: 0 to 200°F (-18 to 93°C), 20 to 250°F (-7 to 121°C) for optional Viton sensor.

Differential pressure models: Sensor type K: 0 to 180°F (-18 to 82°C), 20 to 250°F (-7 to 121°C) for optional Viton sensor

Temperature models: See model chart.

SET POINT REPEATABILITY:

Temperature models: ±1% of adjustable range

Pressure models: Sensor types 2, P: ±1.5% of adjustable range

Sensor types 3-9, W: ±1% of adjustable range

Differential pressure models: K1 to K3: ±1%, K4 to K6: ±1.5% of adjustable range

SHOCK: Differential pressure and temperature models: set point repeats after 15 G's, 10 millisecond duration

Pressure models: Set point repeats after 75 G's, 10 milliseconds

VIBRATION: Differential pressure and temperature models: Set point repeats after 2.5 G's, 10-2000 Hz.

Pressure models: Set point repeats after 15 G's, 10-2000 Hz

ENCLOSURE: 316 series stainless steel

ENCLOSURE CLASSIFICATION: Certified to Enclosure Type 4X

Class I, Division 1 product meets enclosure Type 7;

Class II, Division I product meets enclosure type 9.

Certified to IP66 requirements

SWITCH OUTPUT: Code S: One SPDT, hermetically sealed.

Code D: Two SPDT for DPDT action, hermetically sealed. Available for pressure models only.

ELECTRICAL RATINGS: Code H: 5 A at 115/250 VAC, 5 A resistive and 3 A inductive at 28 VDC Silver contacts

Code L: 1 A at 125 VAC, 1 A resistive and 0.5 A inductive at 28 VDC, Bifurcated gold contacts

ELECTRICAL CONNECTION: Code N: 1/2" NPT (male) with 72" leadwires

Code M: M20 metric threads, 72" leads

Option M515, 4 terminal DIN connector (DIN 43650 Form A) available SPDT only (does not meet Div. 1 or 2, or ATEX requirements.)



WEIGHT: Temperature models: approximately 1 lb 14 oz. (0,85 kg)

Pressure models: approximately 12 ounces (0,34 kg)

Vacuum, "WC models: Approximately 1 lb 12 oz (0,79 kg)

Differential models: K1-K3: approximately 6 lb (2,72 kg)

4-K6: approximately 4 lb (1,81 kg)

K1-K3 w/ option M480: approximately 10 lb (4,55 kg)

K4-K6 w/ option M480: approximately 5.5 lb (2,5 kg)

TEMPERATURE ASSEMBLY: Bulb and capillary: Non-toxic oil fill; 6 feet 304 stainless steel. Optional lengths available Immersion Stem: 316 stainless steel

TEMPERATURE DEADBAND: Typically 2% of range under laboratory conditions (70°F ambient circulating bath at a rate of 1/2°F per minute change)

PRESSURE CONNECTION: 1/2" NPT (female) or 1/4" NPT (female). Differential pressure: 1/8" NPT (female) Optional pressure connection materials available-

MOUNTING: Pressure: May be pipe mounted or bracket mounted using kit 62169-13

Differential Pressure: Should be mounted using 2 mounting holes on attached mounting bracket

Temperature: Mounting kit 62169-13 should be specified for new installations

APPROVALS

United States & Canada

UL Listed, cUL Certified

Class I, Division 1 and 2, Groups A, B, C & D

Class II, Division 1 and 2, Groups E, F & G

Class III

Class I, Zone 1, Group IIC

Enclosure Type 4X

Pressure: UL 508 & 1203; CSA C22.2 No. 14, 25 & 30

File # E40857

Dual seal certified to ANSI/ISA 12.27.01 (meets CEC & NEC secondary seal requirements) standard on straight pressure models only

Temperature: UL 873, 1203; CSA C22.2 No. 24, 25 & 30 -File # E43374

European Union

ATEX Directive (94/9/EC)

II 2 G EEx d IIC T6

II 2 D T+85°C

Tamb = -50°C to +80°C

IP 66

UL International DEMKO A/S (N.B.# 0539)

Certificate # DEMKO 03 ATEX 0252466X

EN 60079-0, 60079-1, 60079-31

II 1 G Ex ia IIC T6 Ga (OPTIONAL - code M405)

Tamb = -50°C to +60°C

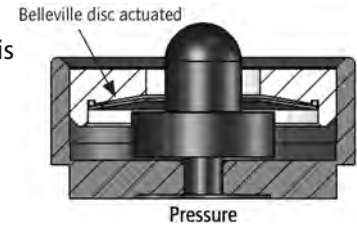
UL International DEMKO A/S (N.B.# 0539)

Certificate # DEMKO 11 ATEX 1105261X

EN 60079-0, 60079-11, 60079-26

TECHNOLOGY

At the heart of the 12 Series is a Belleville spring assembly. The spring is a small conical washer that transfers motion to a hermetically sealed 1 or 5 amp microswitch. Its 'snap-action' provides fast, positive contact transfer. The Belleville spring 'snaps over' when pressure is applied and 'snaps back' upon pressure release.



ADVANTAGES:

- Set point stability: The switch performs under challenging environmental conditions such as vibration and temperature changes. In addition, minimal movement of components reduces sensor fatigue thereby increasing life and accuracy.
- Resistance to vibration: Preloading of the electrical switch helps reduce contact chatter.
- Maximum life: The Belleville spring enhances cycle life with a short stroke movement to minimize fatigue.
- Deadbands: The Belleville is a negative-rate snap acting device, so on-off deadband values are wider at the low end of the range. To minimize deadbands, select a model with a set point at the higher end of the range whenever possible.

12 SERIES MODEL CHART

| Sensor Type/Range Code | Adjustable Range Lower end of range on fall; Higher end on rise | | Deadband | | Over Range Pressure* | | Proof Pressure** | |
|--|---|----------------|-------------|--------------|----------------------|------------|------------------|------------|
| Sensor Type 2 , 316 stainless steel 1/2" NPT (female) pressure connection and welded diaphragm, 23/32" orifice for clean out purposes. High proof pressure. Not recommended for high cycling applications. Belleville actuation. (NACE MR-0175 compliant) | | | | | | | | |
| Range Code | psi | bar | psi | bar | psi | bar | psi | bar |
| A | 10 to 25 | 0.7 to 1.7 | 2 to 7 | 0.1 to 0.5 | 1000 | 68.9 | 2500 | 172.4 |
| B | 15 to 45 | 1.0 to 3.1 | 3 to 10 | 0.2 to 0.7 | 1000 | 68.9 | 2500 | 172.4 |
| C | 25 to 85 | 1.7 to 5.9 | 5 to 20 | 0.3 to 1.4 | 1000 | 68.9 | 2500 | 172.4 |
| D | 50 to 130 | 3.4 to 9.0 | 7 to 25 | 0.5 to 1.7 | 1500 | 103.4 | 2500 | 172.4 |
| E | 100 to 210 | 6.9 to 14.5 | 8 to 30 | 0.6 to 2.1 | 1500 | 103.4 | 2500 | 172.4 |
| F | 160 to 400 | 11.0 to 27.6 | 10 to 50 | 0.7 to 3.4 | 1500 | 103.4 | 2500 | 172.4 |
| G | 275 to 850 | 19.0 to 58.6 | 40 to 125 | 2.8 to 8.6 | 1500 | 103.4 | 2500 | 172.4 |
| Sensor Type 3 , 316L stainless steel 1/2" NPT (female) pressure connection, Teflon® coated Polyimide (Kapton®) diaphragm, Buna N O-ring, 1/2" orifice for clean out purposes. Belleville actuation. (NACE MR-0175 compliant) | | | | | | | | |
| Sensor Type 4 , 316L stainless steel 1/4" NPT (female) pressure connection, Teflon® coated Polyimide (Kapton®) diaphragm, Buna N O-ring, 1/8" orifice. Belleville actuation. (NACE MR-0175 compliant) | | | | | | | | |
| Range Code | psi | bar | psi | bar | psi | bar | psi | bar |
| A | 8 to 30 | 0.6 to 2.1 | 2 to 6 | 0.1 to 0.4 | 600 | 41.4 | 1000 | 68.9 |
| B | 15 to 55 | 1.0 to 3.8 | 3 to 8 | 0.2 to 0.6 | 600 | 41.4 | 1000 | 68.9 |
| C | 30 to 170 | 2.1 to 11.7 | 5 to 15 | 0.3 to 1.0 | 600 | 41.4 | 1000 | 68.9 |
| D | 100 to 370 | 6.9 to 25.5 | 15 to 50 | 1.0 to 3.4 | 600 | 41.4 | 1000 | 68.9 |
| E | 200 to 700 | 13.8 to 48.3 | 40 to 90 | 2.8 to 6.2 | 1500 | 103.4 | 3000 | 206.8 |
| F | 400 to 1500 | 27.6 to 103.4 | 100 to 250 | 6.9 to 17.2 | 3000 | 206.8 | 4500 | 310.3 |
| G | 1000 to 3200 | 68.9 to 220.6 | 100 to 500 | 6.9 to 34.5 | 6000 | 413.7 | 10000 | 689.5 |
| H | 2000 to 6000 | 137.9 to 413.7 | 400 to 800 | 27.6 to 55.2 | 8000 | 551.6 | 10000 | 689.5 |
| Sensor Type 5 , 316L stainless steel 1/2" NPT (female) pressure connection and diaphragm, Viton® O-ring, 1/2" orifice for clean out purposes. Belleville actuation. (NACE MR-0175 compliant) | | | | | | | | |
| Sensor Type 6 , 316L stainless steel 1/4" NPT (female) pressure connection and diaphragm, Viton® O-ring, 1/8" orifice. Belleville actuation. (NACE MR-0175 compliant) | | | | | | | | |
| Range Code | psi | bar | psi | bar | psi | bar | psi | bar |
| A | 9 to 35 | 0.6 to 2.4 | 2 to 7 | 0.1 to 0.5 | 600 | 41.4 | 1000 | 68.9 |
| B | 25 to 65 | 1.7 to 4.5 | 3 to 10 | 0.2 to 0.7 | 600 | 41.4 | 1000 | 68.9 |
| C | 50 to 150 | 3.4 to 10.3 | 5 to 15 | 0.3 to 1.0 | 600 | 41.4 | 1000 | 68.9 |
| D | 100 to 350 | 6.9 to 24.1 | 15 to 50 | 1.0 to 3.4 | 600 | 41.4 | 1000 | 68.9 |
| E | 250 to 700 | 17.2 to 48.3 | 40 to 95 | 2.8 to 6.6 | 1500 | 103.4 | 3000 | 206.8 |
| F | 400 to 1500 | 27.6 to 103.4 | 100 to 300 | 6.9 to 20.7 | 3000 | 206.8 | 4500 | 310.3 |
| G | 1000 to 3200 | 68.9 to 220.6 | 100 to 500 | 6.9 to 34.5 | 6000 | 413.7 | 10000 | 689.5 |
| H | 2000 to 6000 | 137.9 to 413.7 | 400 to 1000 | 27.6 to 68.9 | 8000 | 551.6 | 10000 | 689.5 |
| Sensor Type 7 , 1/2" 316L stainless steel NPT (female) pressure connection and welded diaphragm. Large 23/32" orifice for clean out purposes. Belleville actuation. (NACE MR-0175 compliant) | | | | | | | | |
| Range Code | psi | bar | psi | bar | psi | bar | psi | bar |
| A | 3 to 15 | 0.2 to 1.0 | 1 to 4 | 0.1 to 0.3 | 300 | 20.7 | 500 | 34.5 |
| B | 10 to 35 | 0.7 to 2.4 | 1 to 6 | 0.1 to 0.4 | 300 | 20.7 | 500 | 34.5 |
| C | 25 to 85 | 1.7 to 5.9 | 3 to 11 | 0.2 to 0.8 | 300 | 20.7 | 500 | 34.5 |
| D | 65 to 125 | 4.5 to 8.6 | 6 to 18 | 0.4 to 1.2 | 300 | 20.7 | 500 | 34.5 |

| Sensor Type/Range Code | Adjustable Range Lower end of range on fall; Higher end of rise | | Deadband | | Over Range Pressure* | | Proof Pressure** | |
|--|---|---------------|-----------|----------------------|----------------------|-------|------------------|-------|
| Sensor Type 8 , 316L stainless steel 1/4" NPT (female) pressure connection, Teflon® coated Polyimide (Kapton®) diaphragm (optional Hastelloy® C or Monel®), Buna N O-ring (optional Kalrez®, Viton®, Ethylene Propylene, or Aflas®), 1/8" orifice. Non-Belleville actuation. (NACE MR-0175 compliant) | | | | | | | | |
| Range Code | psi | bar | psi | bar (unless noted) | psi | bar | psi | bar |
| A | 3 to 25 | 0.2 to 1.7 | 0.5 to 4 | 34.5 mbar to 0.3 bar | 600 | 41.4 | 1000 | 68.9 |
| B | 15 to 75 | 1.0 to 5.2 | 1 to 7 | 0.1 to 0.5 | 600 | 41.4 | 1000 | 68.9 |
| C | 25 to 150 | 1.7 to 10.3 | 1 to 12 | 0.1 to 0.8 | 600 | 41.4 | 1000 | 68.9 |
| D | 50 to 450 | 3.4 to 31.0 | 3 to 28 | 0.2 to 1.9 | 2000 | 137.9 | 3000 | 206.8 |
| E | 100 to 900 | 6.9 to 62.1 | 10 to 60 | 0.7 to 4.1 | 2000 | 137.9 | 3000 | 206.8 |
| F | 500 to 2500 | 34.5 to 172.4 | 20 to 140 | 1.4 to 9.7 | 6000 | 413.7 | 7500 | 517.1 |
| G | 700 to 4000 | 48.3 to 275.8 | 40 to 250 | 2.8 to 17.2 | 6000 | 413.7 | 7500 | 517.1 |

| Sensor Type 9 , 316L stainless steel 1/2" NPT (female) pressure connection and welded diaphragm. Large 23/32" orifice for clean-out purposes. Non-Belleville actuation. (NACE MR-0175 compliant) | | | | | | | | |
|---|----------|------------|----------|----------------|-----|------|-----|------|
| Range Code | psi | bar | psi | mbar | psi | bar | psi | bar |
| A | 1 to 15 | 0.1 to 1.0 | 0.5 to 2 | 34.5 to 137.9 | 300 | 20.7 | 500 | 34.5 |
| B | 3 to 50 | 0.2 to 3.4 | 0.5 to 4 | 34.5 to 275.8 | 300 | 20.7 | 500 | 34.5 |
| C | 5 to 100 | 0.3 to 6.9 | 1.0 to 8 | 0.1 to 0.6 bar | 300 | 20.7 | 500 | 34.5 |

| Sensor Type P , 316 stainless steel piston and Buna N O-Ring with 316 stainless steel 1/4" NPT (female) pressure connection. Non-Belleville actuation. (NACE MR-0175 compliant) | | | | | | | | |
|--|----------------|----------------|-------------|--------------|-------|-------|-------|--------|
| Range Code | psi | bar | psi | bar | psi | bar | psi | bar |
| 0 | 50 to 500 | 3.4 to 34.5 | 15 to 65 | 1.0 to 4.5 | 6000 | 413.7 | 10000 | 689.5 |
| 1 | 300 to 1200 | 20.7 to 82.7 | 30 to 200 | 2.1 to 13.8 | 6000 | 413.7 | 10000 | 689.5 |
| 2 | 600 to 2600 | 41.4 to 179.3 | 50 to 350 | 3.4 to 24.1 | 6000 | 413.7 | 10000 | 689.5 |
| 3 | 1200 to 5500 | 82.7 to 379.2 | 100 to 800 | 6.9 to 55.2 | 7500 | 517.1 | 10000 | 689.5 |
| 4 | 4000 to 12,500 | 275.8 to 861.9 | 300 to 1450 | 20.7 to 99.9 | 14000 | 965.3 | 16000 | 1103.2 |

| Sensor Type P , 316 stainless steel piston and Buna N O-Ring with 316 stainless steel 1/4" NPT (female) pressure connection. Belleville actuation. (NACE MR-0175 compliant) | | | | | | | | |
|--|--------------------------|---------------------|--------------------------|--------------|-------|-------|-------|--------|
| Range Code | inches wc (unless noted) | mbar (unless noted) | inches wc (unless noted) | mbar | psi | bar | psi | bar |
| 6 | 300 to 1200 | 20.7 to 82.7 | 30 to 200 | 2.1 to 13.8 | 6000 | 413.7 | 10000 | 689.5 |
| 7 | 600 to 2600 | 41.4 to 179.3 | 50 to 350 | 2.4 to 24.1 | 6000 | 413.7 | 10000 | 689.5 |
| 8 | 1200 to 5500 | 82.7 to 379.2 | 100 to 800 | 6.9 to 55.2 | 7500 | 517.1 | 10000 | 689.5 |
| 9 | 4000 to 12,500 | 275.8 to 861.9 | 300 to 1450 | 20.7 to 99.9 | 14000 | 965.3 | 16000 | 1103.2 |

| Sensor Type W , 316L stainless steel 1/2" NPT (female) pressure connection and Buna N diaphragm. Non-Belleville actuation. | | | | | | | | |
|---|---------------------|---------------|--------------|-------------|-----|-----|-----|-----|
| Range Code | psi | bar | psi | bar | psi | bar | psi | bar |
| 1 | 30" Hg Vac to 0 psi | -1 to 0 bar | 0.2 to 2" Hg | 6.8 to 67.7 | 75 | 5.2 | 100 | 6.9 |
| 2 | -20 to 20 | -49.9 to 49.8 | 0.5 to 3.5 | 1.2 to 8.7 | 75 | 5.2 | 100 | 6.9 |
| 3 | 2 to 50 | 5.0 to 125.5 | 0.5 to 5 | 1.2 to 12.4 | 75 | 5.2 | 100 | 6.9 |
| 4 | 10 to 200 | 24.9 to 497.8 | 1 to 10 | 2.5 to 24.9 | 75 | 5.2 | 100 | 6.9 |

DIFFERENTIAL PRESSURE MODEL CHART

| Sensor Type/Range Code | Adjustable Range Lower end of range on fall; Higher end on rise | | Deadband | | Working Pressure Range*** | | Proof Pressure** | |
|---|---|---------------|------------|--------------------|---------------------------|--------------|------------------|-------|
| Sensor Type K , Buna N diaphragm and sealing diaphragms with epoxy coated aluminum housing and 1/8" NPT (female) pressure connections. Non-Belleville actuation. 303/304 stainless steel mounting bracket attached. SPDT Switch (single pole double throw) | | | | | | | | |
| Range Code | wcd | mbar | wcd | mbar | psi | bar | psi | bar |
| 1 | 0.7 to 10 | 1.7 to 24.9 | 0.2 to 1 | 0.5 to 2.5 | 30 Hg Vac to 200 | -1.0 to 13.8 | 400 | 27.6 |
| 2 | 3 to 20 | 7.5 to 49.8 | 0.3 to 1.5 | 0.7 to 3.7 | 30 Hg Vac to 200 | -1.0 to 13.8 | 400 | 27.6 |
| 3 | 10 to 150 | 24.9 to 373.4 | 0.3 to 5 | 0.7 to 12.4 | 30 Hg Vac to 200 | -1.0 to 13.8 | 400 | 27.6 |
| Range Code | psid | bar | psi | bar | psi | bar | psi | bar |
| 4 | 2 to 20 | 0.1 to 1.4 | 0.3 to 1.5 | 20.7 to 103.4 mbar | 30 Hg Vac to 1200 | -1.0 to 82.7 | 2500 | 172.4 |
| 5 | 5 to 80 | 0.3 to 5.5 | 1 to 8 | 0.1 to 0.6 | 30 Hg Vac to 1200 | -1.0 to 82.7 | 2500 | 172.4 |
| 6 | 10 to 150 | 0.7 to 10.3 | 1 to 10 | 0.1 to 0.7 | 30 Hg Vac to 1200 | -1.0 to 82.7 | 2500 | 172.4 |

| Sensor Type K , Buna N diaphragm and sealing diaphragms with epoxy coated aluminum housing and 1/8" NPT (female) pressure connections. Non-Belleville actuation. | | | | | | | | |
|---|-----------|---------------|------------|--------------------|-------------------|--------------|------|-------|
| Range Code | wcd | mbar | wc | mbar | psi | bar | psi | bar |
| 1 | 0.7 to 10 | 1.7 to 24.9 | 0.2 to 1.5 | 0.5 to 3.7 | 30 Hg Vac to 200 | -1.0 to 13.8 | 400 | 27.6 |
| 2 | 3 to 20 | 7.5 to 49.8 | 0.3 to 2 | 0.7 to 5.0 | 30 Hg Vac to 200 | -1.0 to 13.8 | 400 | 27.6 |
| 3 | 10 to 150 | 24.9 to 373.4 | 0.3 to 8 | 0.7 to 19.9 | 30 Hg Vac to 200 | -1.0 to 13.8 | 400 | 27.6 |
| Range Code | psid | bar | psi | bar | psi | bar | psi | bar |
| 4 | 2 to 20 | 0.1 to 1.4 | 0.3 to 3 | 20.7 to 206.8 mbar | 30 Hg Vac to 1200 | -1.0 to 82.7 | 2500 | 172.4 |
| 5 | 5 to 80 | 0.3 to 5.5 | 1 to 10 | 0.1 to 0.7 | 30 Hg Vac to 1200 | -1.0 to 82.7 | 2500 | 172.4 |
| 6 | 10 to 150 | 0.7 to 10.3 | 1 to 15 | 0.1 to 1.0 | 30 Hg Vac to 1200 | -1.0 to 82.7 | 2500 | 172.4 |

***Over Range Pressure:** The maximum pressure that may be applied continuously without causing damage and maintaining set point repeatability.
****Proof Pressure:** The maximum pressure to which a pressure sensor may be occasionally subjected, which causes no permanent damage. The unit may require calibration (e.g., start-up, testing).
*****Working Pressure Range:** The pressure range within which two opposing sensors can be safely operated and still maintain set point adjustability provided the difference in pressure between them does not exceed the designated adjustable range.

TEMPERATURE MODEL CHART

Installation may require optional mounting bracket kit (P/N 62169-13)

| Range Code | Adjustable Range | | Max Temperature | | Stem or Bulb Size |
|---|------------------|----------------|-----------------|-------|-------------------------------|
| | °F | °C | °F | °C | |
| Sensor Type L , 316 Stainless steel immersion stem 1/2" NPT (male) | | | | | |
| 1 | 0 to 225 | -17.8 to 107.2 | 275 | 135 | 9/16" x 1-25/32" below thread |
| 2 | 200 to 425 | 93.3 to 218.3 | 475 | 246.1 | 9/16" x 1-25/32" below thread |
| Sensor Type R , 304 Stainless steel bulb and capillary | | | | | |
| 1 | -130 to 120 | -90 to 48.9 | 170 | 76.7 | 3/8 O.D. x 4-7 / 8" |
| 2 | 0 to 150 | -17.8 to 65.6 | 200 | 93.3 | 3/8 O.D. x 7-1 / 4" |
| 3 | 50 to 300 | 10 to 148.9 | 350 | 176.7 | 3/8 O.D. x 4-7/8" |
| 4 | 150 to 650 | 65.6 to 343.3 | 700 | 371.1 | 3/8 O.D. x 4" |

ORDERING INFORMATION

BUILD PART NUMBER PER BELOW TABLE

Model Number Reference

| | | | | | | | |
|----|---|---|---|---|---|---|------|
| 12 | S | L | S | N | 2 | A | M201 |
|----|---|---|---|---|---|---|------|

| | |
|------|---|
| 12 | 12 Designates the 12 Series |
| S | S Stainless Steel HOUSING MATERIAL |
| L | L 1 amp H 5 amp All switches have limited DC capabilities. Consult factory for details. ELECTRICAL RATING |
| S | S SPDT D DPDT Available for pressure models only. TYPE OF SWITCHES |
| N | N 1/2" NPT male M M20 metric thread ELECTRICAL CONDUIT |
| 2 | 2 Welded 316 stainless steel diaphragm, 1/2" NPT (female) pressure connection 3 Teflon® coated Polyimide (Kapton®) diaphragm, Buna N O-ring, 1/2" NPT (female) pressure connection 4 Teflon® coated Polyimide (Kapton®) diaphragm, Buna N O-ring, 1/4" NPT (female) pressure connection 5 316L stainless steel diaphragm, Viton® O-ring, 1/2" NPT (female) pressure connection 6 316L stainless steel diaphragm, Viton® O-ring, 1/4" NPT (female) pressure connection 7 Welded 316L stainless steel diaphragm, 1/2" NPT (female) pressure connection 8 Kapton® diaphragm, Buna N O-ring, 1/4" NPT (female) pressure connection, non-Belleville actuation 9 316L stainless steel welded diaphragm, 1/2" NPT (female) pressure connection, non-Belleville actuation P 303 stainless steel piston, Buna N O-ring, 1/4" NPT (female) pressure connections, non-Belleville actuation W 316 Stainless steel 1/2" NPT (female) pressure connection and Buna N diaphragm (Non-Belleville actuation) K Kapton® diaphragm, Buna N sealing diaphragm, 1/8" NPT (female) pressure connections* L Local mount, immersion stem, temperature (Non-Belleville actuated) R Remote bulb & capillary, temperature SENSOR TYPE (See Tables) |
| A | A, B, C, D, E, F, G, H, O, 1, 2, 3, 4, 5, 6, 7, 8, 9 RANGE (See tables) |
| M201 | M201 Factory set switch, specify increasing or decreasing pressure M277 Range in kPa or mPa on nameplate, factory selected. NOT AVAILABLE ON TEMPERATURE VERSIONS M278 Range in kg/cm2 on nameplate. NOT AVAILABLE ON TEMPERATURE VERSIONS M404 Flameproof compliance for Ukraine per Gosnadzorohrantruda standards M405 European ATEX intrinsic safety compliance M406 Flameproof and intrinsic safety compliance per Russian Gosgortekhnadzor standards M407 CE compliance to Pressure Equipment Directive (category IV). NOT AVAILABLE ON TEMPERATURE VERSIONS M421 EAC flameproof junction box, pre-wired (not UL approved) To be ordered with M406 option. (NOT AVAILABLE ON M20 METRIC THREAD ELECTRICAL CONDUIT VERSION). THREADS TO STANDARD CONDUIT 1/2" NPT (M) M423 ATEX flameproof compliant junction box, pre-wire (not UL approved) (NOT AVAILABLE ON M20 METRIC THREAD ELECTRICAL CONDUIT VERSION). THREADS TO STANDARD CONDUIT 1/2" NPT (M) M430 Cover lock M444 Paper ID tag M446 Stainless steel ID tag and wire attachment M460 External ground screw; required for non-metallic conduit systems (ATEX installations only) M480 316 Stainless steel construction, pressure connections only; Viton® sensor material. AVAILABLE SENSOR TYPE K ONLY. M511 1/4" NPT (male) pressure connection for sensor types 3, 4, 5, 6 and 8 only M513 UL/CSA approved, explosion proof junction box, pre-wired (not approved for ATEX or as enclosure type 4X). NOT AVAILABLE ON METRIC THREAD ELECTRICAL CONDUIT VERSION OPTIONS |

| OPTIONS CONTINUED | | |
|---|---|--|
| M201 | M515 DIN Connector-4 terminal; conforms to DIN 43650 Form A, (not approved for Class I Div. 1 & 2 or ATEX flame proof requirements). NOT AVAILABLE ON DPDT OR METRIC THREAD ELECTRICAL CONDUIT VERSIONS | |
| | M516 316 Stainless steel 1/4" NPT (female) pressure connection and piston. AVAILABLE SENSOR TYPE P ONLY | |
| | M521 LF4 Medium pressure autoclave 1/4" (female); AVAILABLE SENSOR TYPES P4 & P9 ONLY | |
| | M522 LM4 Medium pressure autoclave 1/4" (male); AVAILABLE SENSOR TYPES P4 & P9 ONLY | |
| | M523 LF6 Medium pressure autoclave 3/8" (female); AVAILABLE SENSOR TYPES P4 & P9 ONLY | |
| | M524 LM6 Medium pressure autoclave 3/8" (male); AVAILABLE SENSOR TYPES P4 & P9 ONLY | |
| | M525 HF4 High pressure autoclave 1/4" (female); AVAILABLE SENSOR TYPES P4 & P9 ONLY | |
| | M526 HM4 High pressure autoclave 1/4" (male); AVAILABLE SENSOR TYPES P4 & P9 ONLY | |
| | M527 HF6 High pressure autoclave 3/8" (female); AVAILABLE SENSOR TYPES P4 & P9 ONLY | |
| | M528 HM6 High pressure autoclave 3/8" (male); AVAILABLE SENSOR TYPES P4 & P9 ONLY | |
| | M540 Viton® wetted parts with standard pressure connection. Deadband and low end of range may increase. Available sensor types 8 (O-ring), P (O-ring) & K (diaphragm, O-ring and sealing diaphragms) only. | |
| | M550 Oxygen service cleaned in accordance with ASTM G93, Verification type 1, tests 1 through 3. NOT AVAILABLE ON SENSOR TYPES 3 AND 4 | |
| | M924 7/16-20 SAE (female) stainless steel pressure connection. AVAILABLE SENSOR TYPE 6 ONLY | |
| | ACCESSORIES | |
| | 62169-13 Mounting bracket kit (available with pressure and temperature models only) | |
| 62169-31 ATEX flameproof compliant junction box and terminal kit, not pre-wired (see option code M423 for description) | | |
| 6361-694 Junction box and terminal kit, not pre-wired (see option code M513 for description) | | |
| OPTIONAL SENSOR MATERIALS FOR CORROSIVE MEDIA- AVAILABLE SENSOR TYPE 8 ONLY | | |
| XD002 Hastelloy C diaphragm (NACE MR-0175 compliant) | | |
| XD003 Monel diaphragm (NACE MR-0175 compliant) | | |
| XP112 Hastelloy C pressure connection (NACE MR-0175 compliant) | | |
| XP113 Monel pressure connection | | |
| XP114 1/4" NPT Hastelloy® pressure connection | | |
| XP115 1/4" NPT Monel® pressure connection | | |
| XR211 Kalrez® O-ring(NACE MR-0175 compliant) | | |
| XR213 Ethylene propylene O-ring | | |
| XR214 Aflas® O-ring | | |
| XR216 Viton O-ring | | |

OPTIONS FOR TEMPERATURE MODELS

UNION CONNECTORS

| Option | Replacement Number | Description |
|--------|----------------------------|-------------------------|
| | <u>304 Stainless Steel</u> | |
| W028 | SD6213-28 | 1/2" NPT w/3/4" bushing |
| W046 | SD6213-46 | 3/4" NPT |
| W050 | SD6213-50 | 1/2" NPT |

THERMOWELLS

For all bulb & capillary switches

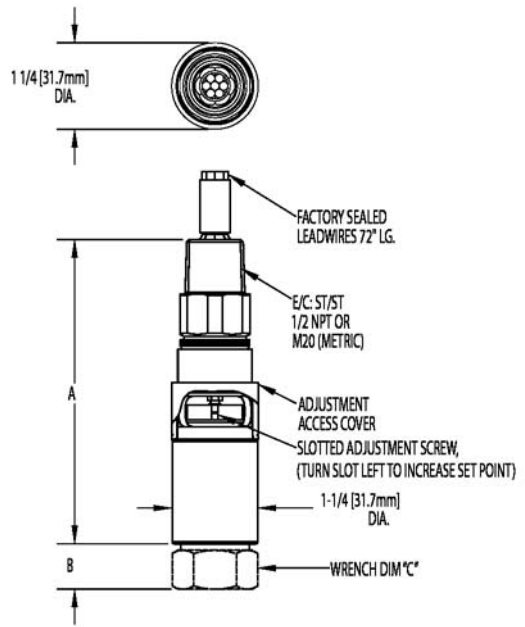
| <u>316 Stainless Steel</u> | | |
|---------------------------------|------------|--------------------------------|
| W076 | SD6225-76 | 3/4" NPT, 4.5" BT |
| W193 | SD6225-193 | 1/2" NPT, 4.5" BT |
| W119 | SD6225-119 | 3/4" NPT, 7.5" BT |
| W177 | SD6225-177 | 1/2" NPT, 7.5" BT |
| For all immersion stem switches | | |
| W140 | SD6225-140 | 3/4" NPT X 1 23/32" BT, 316 SS |

OPTIONAL LENGTHS:

Optional capillary length to 50' may be available in 304 st/st. Consult Clark for availability, and regarding repeatability and ambient effects on capillary lengths over 30'. 304 stainless steel armor capillary protection is available to lengths less than or equal to capillary length.

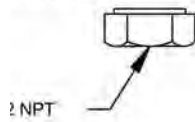
DIMENSIONS INCHES (MM)

| PRESSURE & TEMPERATURE SWITCH / CONNECTION CHART | | | | | | | |
|--|-----------------------------|-------------|-------|-------------|------|-------------|------|
| Type | Description | Dimension A | | Dimension B | | Dimension C | |
| | | inches | mm | inches | mm | inches | mm |
| 2 | 1/2" NPT (female) | 4.4 | 111.1 | 0.7 | 16.5 | 1-1/16 | 27.0 |
| 3.5 | 1/2" NPT (female) | 4.4 | 111.1 | 0.6 | 15.2 | 1-1/16 | 27.0 |
| 4,6,8 | 1/4" NPT (female) | 4.4 | 111.1 | 0.6 | 15.2 | 1-1/16 | 27.0 |
| 7,9 | 1/2" NPT (female) | 4.0 | 100.3 | 4.6 | 40.6 | 1-1/8 | 28.6 |
| P1-P9 | 1/4" NPT (female) | 4.4 | 111.1 | 1.0 | 25.4 | 1-1/16 | 27.0 |
| W1-W2 | 1/2" NPT (female) | 4.0 | 100.3 | 2.2 | 55.9 | 1-1/16 | 27.0 |
| W2-W3 | 1/2" NPT (female) | 4.0 | 100.3 | 1.7 | 42.9 | 1-1/16 | 27.0 |
| K1-K3 | 1/8" NPT (female) | 4.4 | 111.1 | 1.7 | 42.9 | N/A | N/A |
| K4-K6 | 1/8" NPT (female) | 4.4 | 111.1 | 1.8 | 44.5 | N/A | N/A |
| L1-L2 | Local Temperature | 4.4 | 111.1 | 2.9 | 73.7 | 1-1/16 | 27.0 |
| R1-R4 | Remote Temperature | 4.4 | 111.1 | 0.6 | 15.2 | N/A | N/A |
| M521 | LF4 Autoclave 1/4" (female) | 4.4 | 111.1 | 1.2 | 29.7 | 1-1/16 | 27.0 |
| M522 | LM4 Autoclave 1/4" (male) | 4.4 | 111.1 | 1.4 | 34.8 | 1-1/16 | 27.0 |
| M523 | LF6 Autoclave 3/8" (female) | 4.4 | 111.1 | 1.4 | 36.1 | 1-1/16 | 27.0 |
| M524 | LM6 Autoclave 3/8" (male) | 4.4 | 111.1 | 1.5 | 38.4 | 1-1/16 | 27.0 |
| M525 | HF4 Autoclave 1/4" (female) | 4.4 | 111.1 | 1.2 | 29.7 | 1-1/16 | 27.0 |
| M526 | HM4 Autoclave 1/4" (male) | 4.4 | 111.1 | 1.3 | 32.8 | 1-1/16 | 27.0 |
| M527 | HF6 Autoclave 3/8" (female) | 4.4 | 111.1 | 1.4 | 36.1 | 1-1/16 | 27.0 |
| M528 | HF6 Autoclave 3/8" (male) | 4.4 | 111.1 | 1.5 | 37.6 | 1-1/16 | 27.0 |

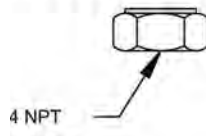


Pressure

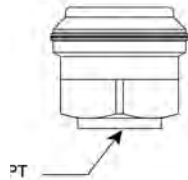
Types 2, 3, 5



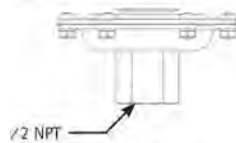
Types 4, 6, 8 P0-P9



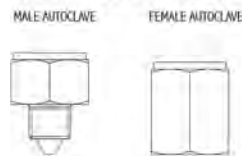
Types 7, 9



Type W

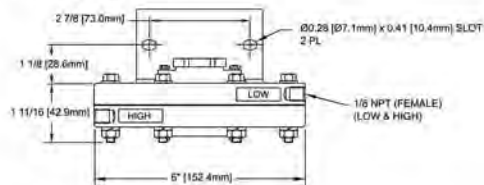


Autoclave Option (P4 & P9 SENSOR ONLY)

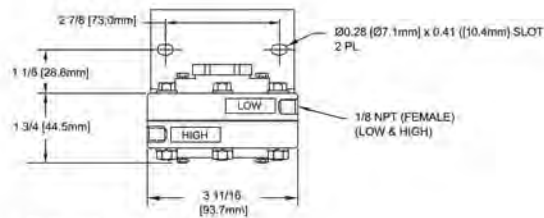


Differential Pressure (Shown with mounting bracket attached)

TYPE K1-K3

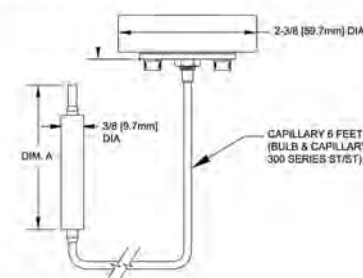


TYPES K4-K6

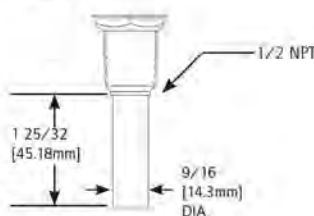


Temperature

TYPE R



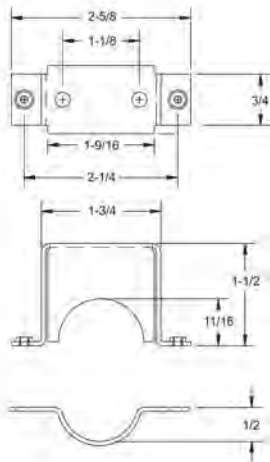
TYPE L



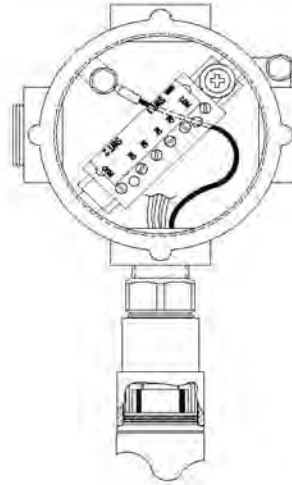
| BULB DIMENSIONS | | |
|-----------------|--------|-------|
| Dimension A | | |
| Types | Inches | mm |
| R1 | 4-7/8" | 123.8 |
| R2 | 7-1/4" | 184.2 |
| R3 | 4-7/8" | 123.8 |
| R4 | 4" | 101.6 |

DIMENSIONS INCHES (MM)

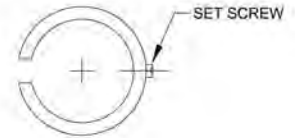
OPTIONAL MOUNTING BRACKET KIT 62169-13



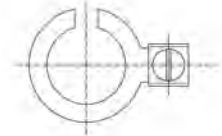
OPTION M421 & M423 JUNCTION BOX



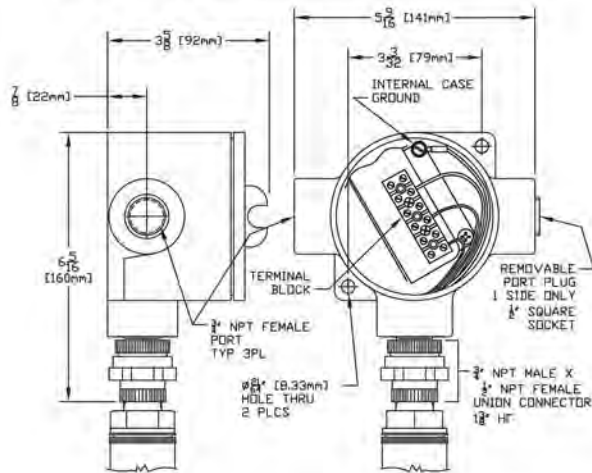
OPTION M430 COVER LOCK



OPTION M460 EXTERNAL GROUNDING SCREW

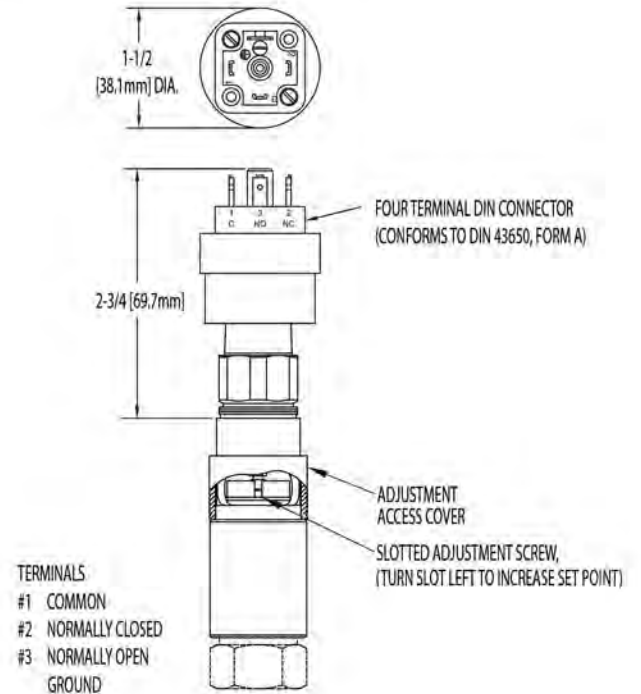


OPTION M513 JUNCTION BOX



Junction box meets enclosure type 4 requirements only. Not ATEX compliant (see option M423 for ATEX junction box)

OPTION M515 DIN CONNECTOR.



Does not meet Div 1 or 2, or ATEX requirements.

UNITED ELECTRIC

400 Series, Pressure, Vacuum, Diff. Pressure & Temp. Switches

1,2 & 3 Switch output, Adjustable Ranges 30" Vac to 6000 PSI, -180 to 650°F

DESCRIPTION

The 400 Series is a versatile family of vacuum, pressure, differential pressure and temperature switches for applications that require single or multiple switching capabilities. Dual and triple switch versions provide multi-output for alarm and shutdown, pre-alarm and alarm, high/low limit or level staging functions.

A wide variety of microswitch and process connection options, along with a weather-tight enclosure, make the 400 Series an ideal choice for most ordinary location applications. Its worldwide use is assured with approvals and certifications to agency standards.

Widely used throughout the process industries, the 400 Series provides threshold protection and control for many critical functions. Typical installations are found in industrial gas production, energy generation including pumps, turbines and compressors, pulp and paper, and water and wastewater treatment.



SPECIFICATIONS

GENERAL

Storage Temperature: -65° to 160°F (-54 to 71°C)
 Ambient Temperature: -40° to 160°F (-40 to 71°C); Set point typically shifts less than 1% of range for a 50°F (28°C) ambient temperature change
 Set Point Repeatability: Temperature models: ± 2% of adjustable range
 Pressure: models 126-376, 520-535, 540-547, 570-572: ± 2 % of full scale range; models 440-457, 550-559: ± 1% of full scale range; models 610-614: ± 3% of full scale range
 Shock: Set point repeats after 15 G, 10 millisecond duration
 Vibration: Set point repeats after 2.5 G, 5-500 Hz
 Enclosure: Die cast aluminum, epoxy powder coated, gasketed, captive cover screws
 Enclosure Class: Designed to meet enclosure type 4X requirements
 Switch Output: One, two or three SPDT switches, may be separated up to 100% of range except models 521-524, 531-534: 50%; models 520, 525, 530, 535, 570-572: 30%; switches may be wired "normally open" or "normally closed"
 Electrical Rating: 15 A 125/250/480 VAC resistive. Electrical switches have limited DC capabilities.
 Weight: 3-7.5 lbs, varies with model
 Electrical Connection: One 3/4" NPT and two 7/8" diameter knockouts
 Pressure Connection: All models 1/4" NPT (female) except models S126B-S164B, 520-535: 1/2" NPT (female); models 540-547: 1/8" NPT (female)
 Temperature Assembly: 'E' types use the same assemblies as 'F' types; however, range spans are limited due to use of reference dials
 Bulb and capillary: 6 feet 304 stainless steel
 Immersion stem: models 120 & 121: nickel-plated brass; optional 316L stainless steel available
 Fill: Models 1BS are solvent filled, models 2-8 are non-toxic oil filled

Temperature Deadband: Type F typically 1% and type E, B & C typically 2% of range under laboratory conditions (70°F ambient circulating bath at rate of 1/2°F per minute change)
 Differential Pressure Indicator (option M210): Differential pressure indication available J400K, J402K models 147-S157B; accuracy approximately 1-1/2% mid 50% of range, 3% at ends; window is plexiglass and gasketed; indicator may be field adjusted for approximately ±1% accuracy at any set point within range

Approvals:

U.S. & Canada
 Type 400 & 402UL Listed, cUL Certified
 Pressure: UL 508; CSA C22.2 No. 14, file # E42272
 Temperature: UL 873; CSA C22.2 No. 24, file # E10667
 Type 403UL Recognized, cUL Recognized
 Pressure: UL 508; CSA C22.2 No. 14, file # E42272
 Temperature: UL 873; CSA C22.2 No. 24, file # E10667
 All Types FM Approved
 Pressure: Class 3510
 Temperature: Class 3545

Europe
 ATEX Directive (94/9/EC)
 II 1 G Ex ia IIC T6 Ga (OPTIONAL – code M405)
 Tamb = -50°C to +60°C
 UL International DEMKO A/S (N.B.# 0539)
 Certificate # DEMKO 11 ATEX 1105621X Rev. 0
 EN 60079-0, 60079-11 & 60079-26

Low Voltage Directive (LVD) (2006/95/EC): Compliant to LVD
 Pressure Equipment Directive (PED) (97/23/EC): Compliant to PED

Pressure Model Chart

Type J400, single switch output with internal hex screw adjustment Type J402, dual switch output with internal hex screw adjustment
 Type J403, triple switch output with internal hex screw adjustment

| Range/Material Code | Adjustable Set Point Range | | Deadband | | *Over Range Pressure | | **Proof Pressure | |
|--|--|-----------------|-----------------------------|-------------|----------------------|------|------------------|------|
| | High end of range on rise, low end on fall | | (x2 for 2 & 3 switch types) | | psi | bar | psi | bar |
| | "wc | mbar | "wc | mbar | | | | |
| Buna-N diaphragm and O-Ring with 1/2" NPT (female) epoxy coated aluminum pressure connection | | | | | | | | |
| 520† | -300 to 0 | -746.7 to 0 | 0.2 to 12 | 0.5 to 29.9 | 200 | 13.8 | 400 | 27.6 |
| 521† | -10 to 10 | -24.9 to 24.9 | 0.1 to 1 | 0.2 to 2.5 | 200 | 13.8 | 400 | 27.6 |
| 522† | -50 to 50 | -124.5 to 124.5 | 0.1 to 5 | 0.2 to 12.4 | 200 | 13.8 | 400 | 27.6 |
| 533† | 0.5 to 5.0 | 1.2 to 12.4 | 0.1 to 0.3 | 0.2 to 0.7 | 200 | 13.8 | 400 | 27.6 |
| 524† | 2.5 to 50 | 6.2 to 124.5 | 0.1 to 2 | 0.2 to 5.0 | 200 | 13.8 | 400 | 27.6 |
| 525† | 10 to 250 | 24.9 to 622.3 | 0.1 to 10 | 0.2 to 24.9 | 200 | 13.8 | 400 | 27.6 |
| Welded 316L stainless steel diaphragm with 1/2" NPT (female) 316L pressure connection | | | | | | | | |
| 530† | -300 to 0 | -746.7 to 0 | 0.2 to 15.0 | 0.5 to 37.3 | 50 | 3.4 | 100 | 6.9 |
| 531† | -10 to 10 | -24.9 to 24.9 | 0.1 to 1 | 0.2 to 2.5 | 50 | 3.4 | 100 | 6.9 |
| 532† | -50 to 50 | -124.5 to 124.5 | 0.1 to 6 | 0.2 to 14.9 | 50 | 3.4 | 100 | 6.9 |
| 533† | 0.5 to 5.0 | 1.2 to 12.4 | 0.1 to 0.3 | 0.2 to 0.7 | 50 | 3.4 | 100 | 6.9 |
| 534† | 2.5 to 50 | 6.2 to 124.5 | 0.1 to 2.5 | 0.2 to 6.2 | 50 | 3.4 | 100 | 6.9 |
| 535† | 10 to 250 | 24.9 to 622.3 | 0.1 to 10.0 | 0.2 to 24.9 | 50 | 3.4 | 100 | 6.9 |

† Model not available on types J400 and J403; actual deadband shown, do not double – switch separation a maximum of 30 - 50% of range.

Pressure Model Charts

Type J400, single switch output with internal hex screw adjustment

Type J402, dual switch output with internal hex screw adjustment

Type J403, triple switch output with internal hex screw adjustment

| Range/Material Code | Adjustable Set Point Range High end of range on rise, low end on fall | | Deadband (doubles for 2 & 3 switch types) | | *Over Range Pressure | | **Proof Pressure | |
|---|--|-----------------------|--|-----------------------|-----------------------|-----------------------|------------------|------|
| | PSI (unless noted) | bar (unless noted) | psi (unless noted) | bar (unless noted) | psi (unless noted) | bar (unless noted) | psi | bar |
| 316L stainless steel diaphragm, Viton® O-Ring with 1/4" (female) 316L stainless steel pressure connection | | | | | | | | |
| 570 [†] | 0 to 20 | 0 to 1.4 | 0.2 to 4 | 14 to 275 mbar | 20 | 1.4 | 225 | 15.5 |
| 571 [†] | 0 to 50 | 0 to 3.4 | 0.7 to 6 | 48 to 410 mbar | 50 | 3.4 | 225 | 15.5 |
| 572 [†] | 0 to 100 | 0 to 6.9 | 1 to 7 | 69 to 480 mbar | 100 | 6.9 | 225 | 15.5 |
| Welded 316L stainless steel diaphragm with 1/2" NPT (female) pressure connection | | | | | | | | |
| S126B | 30" Hg Vac to 0 | -1 to 0 | 0.2 to 0.9" Hg | 7 to 30.5 mbar | 0 | 0 | 30" Hg Vac | -1 |
| S134B | 30" Hg Vac to 20 psi | -1 to 1.4 | 0.2 to 1.2" Hg | 7 to 40.6 mbar | 20 | 1.4 | 25 | 1.7 |
| S137B | 0 to 80"wc | 0 to 200 mbar | 2 to 6" wc | 5 to 15 mbar | 80"wc | 200 mbar | 5 | 0.3 |
| S144B | 0 to 20 | 0 to 1.4 | 0.1 to 0.5 | 6.9 to 34.5 mbar | 20 | 1.4 | 25 | 1.7 |
| S146B | 0 to 30 | 0 to 2.1 | 0.1 to 0.6 | 6.9 to 41.4 mbar | 30 | 2.1 | 40 | 2.8 |
| S156B | 0 to 100 | 0 to 6.9 | 0.2 to 0.8 | 13.8 to 55.2 mbar | 100 | 6.9 | 200 | 13.8 |
| S164B | 0 to 200 | 0 to 13.8 | 0.3 to 2 | 20.7 to 138 mbar | 200 | 13.8 | 200 | 13.8 |
| Welded 316L stainless steel diaphragm with 1/4" NPT (female) pressure connection | | | | | | | | |
| 358 | 0 to 200 | 0 to 13.8 | 1.5 to 8 | 0.1 to 19.9 | 200 | 13.7 | 250 | 17.2 |
| 361 | 0 to 300 | 0 to 20.7 | 2 to 9 | 0.1 to 22.4 | 300 | 20.7 | 350 | 24.1 |
| 376 | 0 to 500 | 0 to 34.5 | 3 to 12 | 0.2 to 29.9 | 500 | 34.5 | 575 | 39.6 |
| 303 stainless steel piston and Buna-N O-Ring with 1/4" (female) pressure connection (not recommended for gas service since drying of the O-Ring seal can allow bleeding of medium into the atmosphere) | | | | | | | | |
| 610 | 100 to 1,000 | 6.9 to 68.9 | 30 to 150 | 2.1 to 10.3 | 1,000 | 68.9 | 10,000 | 690 |
| 612 | 200 to 3,000 | 13.8 to 207 | 40 to 250 | 2.8 to 17.2 | 3,000 | 207 | 10,000 | 690 |
| 614 | 500 to 6,000 | 34.5 to 414 | 50 to 400 | 3.4 to 27.6 | 6,000 | 414 | 10,000 | 690 |
| Brass bellows with 1/4" NPT (female) nickel-plated brass pressure connection; Models 126 & 134 have zinc-plated steel spring exposed to media | | | | | | | | |
| 126 | 30" Hg Vac to 0 | -1 to 0 | 0.2" to 0.9" Hg | 7 to 30.5 mbar | 0 | 0 | 30" Hg Vac | -1 |
| 134 | 30" Hg Vac to 20 psi | -1 to 1.4 | 0.2" to 1.2" Hg | 7 to 40.6 mbar | 20 | 1.4 | 25 | 1.7 |
| 137 | 0 to 80"wc | 0 to 200 mbar | 2 to 6" wc | 5 to 15 mbar | 80"wc | 200 mbar | 5 | 0.3 |
| 144 | 0 to 20 | 0 to 1.4 | 0.1 to 0.5 | 6.9 to 34.5 mbar | 20 | 1.4 | 25 | 1.8 |
| 146 | 0 to 30 | 0 to 2.1 | 0.1 to 0.6 | 6.9 to 41.4 mbar | 30 | 2 | 40 | 2.8 |
| 156 | 0 to 100 | 0 to 6.9 | 0.2 to 0.8 | 13.8 to 55.2 mbar | 100 | 6.9 | 125 | 8.6 |
| 164 | 0 to 200 | 0 to 13.8 | 0.3 to 2.0 | 20.7 to 138 mbar | 200 | 13.8 | 200 | 13.8 |
| Phosphor bronze bellows with 1/4" NPT (female) nickel-plated brass pressure connection | | | | | | | | |
| 270 | 0 to 200 | 0 to 13.8 | 1.5 to 8 | 0.1 to 19.9 | 200 | 13.8 | 250 | 17.2 |
| 274 | 0 to 300 | 0 to 20.7 | 2 to 10 | 0.1 to 24.9 | 300 | 20.7 | 350 | 24.1 |
| Buna-N diaphragm and O-Ring with 1/4" NPT (female) aluminum pressure connection and cap; Models 448, 450 & 452 have stainless steel pressure conn. and cap | | | | | | | | |
| 440 ^{††} | 0 to 2" wc | 0 to 5 mbar | 0.07 to 0.25" wc | 0.2 to 0.6 mbar | 3 | 0.2 | 225 | 15.5 |
| 441 ^{†††} | 0 to 10" wc | 0 to 25 mbar | 0.15 to 0.3" wc | 0.4 to 0.7 mbar | 3 | 0.2 | 225 | 15.5 |
| 442 | 0 to 20" wc | 0 to 50 mbar | 0.2 to 0.5" wc | 0.5 to 1.2 mbar | 3 | 0.2 | 225 | 15.5 |
| 443 | 0 to 80" wc | 0 to 200 mbar | 0.5 to 1.8" wc | 1.2 to 4.5 mbar | 3 | 0.2 | 225 | 15.5 |
| 448 | 80 to 0" wc Vac | -200 to 0 mbar | 1 to 3" wc | 2.5 to 7.5 mbar | 3 | 0.2 | 225 | 15.5 |
| 449 ^{†††} | 0 to 20" wc | 0 to 50 mbar | 1 to 2" wc | 2.5 to 5.0 mbar | 3 | 0.2 | 225 | 15.5 |
| 450 | 30" Hg Vac to 0 | -1 to 0 mbar | 0.1 to 0.4" wc | 3.4 to 13.5 mbar | 3 | 0.2 | 225 | 15.5 |
| 451 | 0 to 80" wc | 0 to 200 mbar | 1 to 3" wc | 2.5 to 7.5 mbar | 3 | 0.2 | 225 | 15.5 |
| 452 | 30" Hg Vac to 20 psi | -1 to 1.4 mbar | 0.2 to 1" Hg | 6.8 to 33.9 mbar | 20 | 1.4 | 225 | 15.5 |
| 453 | 0 to 20 | 0 to 1.4 mbar | 0.05 to 0.2 | 3.4 to 13.8 mbar | 20 | 1.4 | 225 | 15.5 |
| 454 | 0 to 30 | 0 to 2.1 mbar | 0.05 to 0.3 | 3.4 to 20.7 mbar | 30 | 2.1 | 225 | 15.5 |
| Teflon® diaphragm and O-Ring with 1/4" NPT (female) 316L stainless steel pressure connection and cap | | | | | | | | |
| 550 | 30" Hg Vac to 0 | -1 to 0 | 0.1 to 0.6" Hg | 3.4 to 20.3 | 0 | 0 | 225 | 15.5 |
| 551 | 0 to 80" wc | 0 to 200 mbar | 1.5 to 3.5" wc | 3.7 to 8.7 | 80"wc | 200 mbar | 225 | 15.5 |
| 552 | 30" Hg Vac to 20 psi | -1 to 1.4 | 0.2 to 1" Hg | 6.8 to 33.9 | 20 | 1.4 | 225 | 15.5 |
| 553 | 0 to 20 | 0 to 1.4 | 0/05 to 0.3 | 3.4 to 20.7 | 20 | 1.4 | 225 | 15.5 |
| 554 | 0 to 30 | 0 to 2.1 | 0.1 to 0.4 | 6.9 to 27.6 | 30 | 2.1 | 225 | 15.5 |
| 555 | 0 to 100 | 0 to 6.9 | 0.25 to 0.75 | 17.2 to 51.7 | 100 | 6.9 | 225 | 15.5 |

[†]Switch separation of 30% maximum for dual and triple switch units. ^{††} Model not available on types J402 and J403 ^{†††}Model not available on type J403

Type H400, single switch output with internal adjustment via reference dial

Type H402, dual switch output with internal adjustment via reference dial

Type H403, triple switch output with internal adjustment via reference dial

| Range/Material Code | Adjustable Set Point Range High end of range on rise, low end on fall | | Deadband (x2 for 2 & 3 switch types) | | **Proof Pressure | | Scale Division |
|--|--|-----------------------|---|-----------------------|------------------|------|-----------------------|
| | psi (unless noted) | bar (unless noted) | psi (unless noted) | bar (unless noted) | psi | bar | psi (unless noted) |
| Welded 316L stainless steel bellows with 1/2" NPT (female) pressure connection | | | | | | | |
| S126B | 30" Hg Vac to 0 | -1 to 0 | 0.2 to 0.9" Hg | 7 to 30.5 mbar | 30" Hg Vac | -1 | 0.5" Hg |
| S134B | 30" Hg Vac to 20 | -1 to 1.4 | 0.2 to 1.2" Hg | 7 to 40.6 mbar | 25 | 1.7 | 1" Hg & 0.5 psi |
| S137B [†] | 0 to 80" wc | 0 to 200 mbar | 2 to 6" wc | 5 to 15 mbar | 5 | 0.3 | 2" wc |
| S144B | 0 to 20 | 0 to 1.4 | 0.1 to 0.5 | 6.9 to 34.5 mbar | 25 | 1.7 | 0.5 |
| S146B | 0 to 30 | 0 to 2.1 | 0.1 to 0.6 | 6.9 to 41.4 mbar | 40 | 2.78 | 0.5 |
| S156B | 0 to 100 | 0 to 6.9 | 0.2 to 0.8 | 13.8 to 55.2 mbar | 200 | 13.8 | 2 |
| S164B | 0 to 200 | 0 to 13.8 | 0.3 to 2 | 20.7 to 138 mbar | 200 | 13.8 | 5 |

[†]Model not available on types H402 and H403

Type H400, single switch output with internal adjustment via reference dial

Type H402, dual switch output with internal adjustment via reference dial

Type H403, triple switch output with internal adjustment via reference dial

| Range/Material Code | Adjustable Set Point Range High end of range on rise, low end on fall | | Deadband (x2 for 2 & 3 switch types) | | **Proof Pressure | | Scale Division |
|--|--|-----------------------|---|-----------------------|------------------|------|-----------------------|
| | psi (unless noted) | bar (unless noted) | psi (unless noted) | bar (unless noted) | psi | bar | psi (unless noted) |
| Welded 316L stainless steel bellows with 1/4" NPT (female) pressure connection | | | | | | | |
| 358 | 0 to 200 | 0 to 13.8 | 1.5 to 8 | 0.1 to 19.9 | 250 | 17.2 | 5 |
| 361 | 0 to 300 | 0 to 20.7 | 2 to 9 | 0.1 to 22.4 | 350 | 24.1 | 10 |
| 376 | 0 to 500 | 0 to 34.5 | 3 to 12 | 0.2 to 29.9 | 575 | 39.6 | 10 |
| Brass bellows with 1/4" NPT (female) nickel plated brass pressure connection; Models 126& 134 have zinc-plated steel spring in media | | | | | | | |
| 126 | 30" Hg to 0 psi | -1 to 0 | 0.2 to 0.9" Hg | 7 to 35 mbar | 30" Hg Vac | -1 | 0.5" Hg |
| 134 | 30" Hg to 20 psi | -1 to 1.4 | 0.2 to 1.2" Hg | 7 to 40.6 mbar | 25 | 1.7 | 1" Hg & 0.5 psi |
| 137† | 0 to 80"wc | 0 to 200 mbar | 2 to 6"wc | 5 to 15 mbar | 5 | 0.3 | 2"wc |
| 144 | 0 to 20 | 0 to 1.4 | 0.1 to 0.5 | 6.9 to 34.5 mbar | 25 | 1.8 | 0.5 |
| 146 | 0 to 30 | 0 to 2.1 | 0.1 to 0.6 | 6.9 to 41.4 mbar | 40 | 2.8 | 0.5 |
| 156 | 0 to 100 | 0 to 6.9 | 0.2 to 0.8 | 13.8 to 55.2 mbar | 125 | 8.6 | 2 |
| 164 | 0 to 200 | 0 to 13.8 | 0.3 to 2 | 20.7 to 138 mbar | 200 | 13.8 | 5 |
| Phospher Bronze bellows with 1/4" NPT (female) nickel plated brass pressure connection | | | | | | | |
| 270†† | 0 to 200 | 0 to 13.8 | 1.5 to 8 | 0.1 to 19.9 | 250 | 17.2 | 5 |
| 274†† | 0 to 300 | 0 to 20.7 | 2 to 10 | 0.1 to 24.9 | 350 | 24.1 | 10 |
| Buna-N diaphragm and O-Ring with 1/4" NPT (female) aluminum pressure connection and cap | | | | | | | |
| 440† | 0 to 2"wc | 0 to 5 mbar | 0.07 to 0.25"wc | 0.2 to 0.6 | 225 | 15.5 | 0.1"wc |
| 441† | 0 to 10"wc | 0 to 25 mbar | 0.15 to 0.3"wc | 0.4 to 0.7 | 225 | 15.5 | 0.5"wc |
| 442† | 0 to 20"wc | 0 to 50 mbar | 0.2 to 0.5"wc | 0.5 to 0.12 | 225 | 15.5 | 1"wc |
| 443† | 0 to 80"wc | 0 to 200 mbar | 0.5 to 1.8"wc | 1.2 to 4.5 | 225 | 15.5 | 5"wc |
| 448 | 80"wc Vac to 0 | -200 to 0 mbar | 1 to 3"wc | 2.5 to 7.5 | 225 | 15.5 | 5"wc |
| 450 | 30" Hg Vac to 0 | -1 to 0 | 0.1 to 0.4" Hg | 3.4 to 13.5 | 225 | 15.5 | 0.5" Hg |
| 452 | 30" Hg Vac to 20 | -1 to 1.4 | 0.2 to 1" Hg | 6.8 to 33.9 | 225 | 15.5 | 0.5" Hg & 0.5 psi |
| 453 | 0 to 20 | 0 to 1.4 | 0.05 to 0.2 | 3.4 to 13.8 | 225 | 15.5 | 0.5 |
| 454 | 0 to 30 | 0 to 2.1 | 0.05 to 0.3 | 3.4 to 20.7 | 225 | 15.5 | 0.5 |
| Teflon® diaphragm, O-Ring with 1/4" NPT (female) 316L stainless steel pressure connection and cap | | | | | | | |
| 550†† | 30" Hg Vac to 0 | -1 to 0 | 0.1 to 0.6" Hg | 3.4 to 20.3 | 225 | 15.5 | 2" Hg |
| 552†† | 30" Hg Vac to 20 | -1 to 1.4 | 0.2 to 1" Hg | 6.8 to 33.9 | 225 | 15.5 | 2" Hg & 0.5 psi |
| 553†† | 0 to 20 | 0 to 1.4 | 0.05 to 0.3 | 3.4 to 20.7 | 225 | 15.5 | 1 |
| 554†† | 0 to 30 | 0 to 2.1 | 0.1 to 0.4 | 6.9 to 27.6 | 225 | 15.5 | 1 |
| 555†† | 0 to 100 | 0 to 6.9 | 0.25 to 0.75 | 17.2 to 51.7 | 225 | 15.5 | 5 |

† Model not available on types H402 and H403 †† Model not available on type H403

Differential Pressure Model Chart

Type J400K, single switch output with internal hex screw adjustment

Type J402K, dual switch output with internal hex screw adjustment

| Range/Material Code | Adjustable Set Point Range High end of range on rise, low end on fall | | Deadband (x2 for 2 & 3 switch types) | | ***Working Pressure | | **Proof Pressure | |
|---|--|--------------------|---|------------------|---------------------|------------|------------------|-------|
| | "wcd/psid | mbar/bar | "wc/psi | mbar/bar | psi | bar | psi | bar |
| Welded 316L bellows with 1/2" NPT (female) pressure connections | | | | | | | | |
| S147B | 3 TO 30 psid | 0.2 TO 2.1 bar | 0.5 TO 2 psi | 34.5 to 138 mbar | 30" Hg Vac to 225 | -1 to 6.9 | 300 | 20.7 |
| S157B | 10 TO 100 psid | 0.7 TO 6.9 bar | 0.5 TO 3 psi | 34.5 to 207 mbar | 30" Hg Vac to 180 | -1 to 12.4 | 300 | 20.7 |
| Brass bellows with 1/4" NPT (female) nickel-plated brass pressure connections | | | | | | | | |
| 147 | 3 to 30 psid | 0.2 to 2.1 bar | 0.5 to 2 psi | 34.5 to 138 mbar | 30" Hg Vac to 100 | -1 to 6.9 | 180 | 12.4 |
| 157 | 10 to 100 psid | 0.7 to 6.9 bar | 0.5 to 3 psi | 34.5 to 207 mbar | 30" Hg Vac to 150 | -1 to 10.3 | 180 | 12.4 |
| Buna-N diaphragm and O-Ring with 1/4" NPT (female) aluminum pressure connections | | | | | | | | |
| 455 | 5 to 80 "wcd | 12 to 100 mbar | 1 to 4" wcd | 2.5 to 10 mbar | 30" Hg Vac to 225 | -1 to 15.5 | 225 | 15.5 |
| 456 | 2 to 20 psid | 0.1 to 1.4 bar | 0.1 to 0.3 psi | 6.9 to 20.7 mbar | 30" Hg Vac to 225 | -1 to 15.5 | 225 | 15.5 |
| 457 | 3 to 30 psid | 0.2 to 2.1 bar | 0.1 to 0.4 psi | 6.9 to 27.6 mbar | 30" Hg Vac to 225 | -1 to 15.5 | 225 | 15.5 |
| Kapton® diaphragm, Buna-N sealing diaphragms and epoxy coated aluminum 1/8" NPT (female) pressure connections | | | | | | | | |
| 540† | 1 to 7" wcd | 2.5 to 17.4 mbar | 0.1 to 0.5"wc | 0.2 to 1.2 mbar | 200 | 13.8 | 400 | 27.6 |
| 541† | 2 to 20" wcd | 5 to 49.8 mbar | 0.5 to 5.0"wc | 1.2 to 5 mbar | 200 | 13.8 | 400 | 27.6 |
| 542† | 5 to 50" wcd | 12.4 to 124.4 mbar | 0.5 to 2.5"wc | 1.2 to 12.4 bar | 200 | 13.8 | 400 | 27.6 |
| 543† | 15 to 100" wcd | 37.3 to 249 mbar | 0.5 to 7"wc | 1.2 to 17.4 mbar | 200 | 13.8 | 400 | 27.6 |
| 544† | 2 to 20 psid | 0.1 to 1.4 bar | 1 to 2.5 psi | 0.1 to 0.2 bar | 1200 | 82.7 | 2500 | 172.4 |
| 545† | 5 to 50 psid | 0.3 to 3.4 bar | 1 to 3 psi | 0.1 to 0.2 bar | 1200 | 82.7 | 2500 | 172.4 |
| 546† | 10 to 100 psid | 0.7 to 6.9 bar | 1 to 5.0 psi | 0.1 to 0.3 bar | 1200 | 82.7 | 2500 | 172.4 |
| 547† | 20 to 200 psid | 1.4 to 13.8 bar | 1 to 7 psi | 0.1 to 0.5 bar | 1200 | 82.7 | 2500 | 172.4 |
| Teflon® and Buna-N diaphragms, Buna-N O-Ring with 1/4" (female) aluminum pressure connections | | | | | | | | |
| 559 | 10 to 100 psid | 0.7 to 6.9 bar | 0.2 to 1 psi | 14 to 69 mbar | 30" Hg Vac to 225 | -1 to 15.5 | 225 | 15.5 |

†Model not available on type J400K; actual deadband shown, do not double

*Over Range Pressure: The maximum pressure that may be applied continuously without causing damage and maintaining setpoint repeatability.

**Proof Pressure: The maximum pressure to which a pressure sensor may be occasionally subjected, which causes no permanent damage. The unit may require calibration (e.g., start-up, testing).

***Working Pressure Range: The pressure range within which two opposing sensors can be safely operated and still maintain set point adjustability provided the difference in pressure between them does not exceed the designated adjustable range.

Differential Pressure Model Chart

Type H400K, single switch output with internal adjustment via reference dial

Type H402K, dual switch output with internal adjustment via reference dial

| Range/Material Code | Adjustable Set Point Range High end of range on rise, low end on fall | | Deadband (x2 for 2 & 3 switch types) | | ***Working Pressure | | **Proof Pressure | |
|---|--|----------------|---|--------------|---------------------|------------|------------------|------|
| | "wcd/psid | mbar/bar | "wc/psi | mbar/bar | psi | bar | psi | bar |
| Buna-N diaphragm and O-Ring with 1/4" NPT (female) aluminum pressure connections | | | | | | | | |
| 455 | 5 to 80" wcd | 12 to 200 mbar | 1 to 4" wc | 2 to 10 mbar | 30" Hg Vac to 225 | -1 to 15.5 | 225 | 15.5 |
| 456 | 2 to 20 psid | 0.1 to 1.4 bar | 0.1 to 0.3 psi | 7 to 21 mbar | 30" Hg Vac to 225 | -1 to 15.5 | 225 | 15.5 |
| 457 | 3 to 30 psid | 0.2 to 2.1 bar | 0.1 to 0.4 psi | 7 to 28 mbar | 30" Hg Vac to 225 | -1 to 15.5 | 225 | 15.5 |
| Teflon® and Buna-N diaphragms, Buna-N O-Ring with 1/4" NPT (female) aluminum pressure connections | | | | | | | | |
| 559 | 10 to 100 psid | 0.7 to 6.9 bar | 0.2 to 1 bar | 14 to 69 bar | 30" Hg Vac to 225 | -1 to 15.5 | 225 | 15.5 |

*Over Range Pressure: The maximum pressure that may be applied continuously without causing damage and maintaining setpoint repeatability.

**Proof Pressure: The maximum pressure to which a pressure sensor may be occasionally subjected, which causes no permanent damage. The unit may require calibration (e.g., start-up, testing).

***Working Pressure Range: The pressure range within which two opposing sensors can be safely operated and still maintain set point adjustability provided the difference in pressure between them does not exceed the designated adjustable range.

Temperature Model Chart

Type B400, single switch output, immersion stem, internal adjustment via reference dial

Type B402, dual switch output, immersion stem, internal adjustment via reference dial

Type B403, triple switch output, immersion stem, internal adjustment via reference dial

Type C400, single switch output, immersion stem, internal hex screw adjustment

Type C402, dual switch output, immersion stem, internal hex screw adjustment

Type C403, triple switch output, immersion stem, internal hex screw adjustment

Type E400, single switch output, bulb & capillary†, internal adjustment via reference dial

Type E402, dual switch output, bulb & capillary†, internal adjustment via reference dial

Type E403, triple switch output, bulb & capillary†, internal adjustment via reference dial

Type F400, single switch output, bulb & capillary†, internal hex screw adjustment

Type F402, dual switch output, bulb & capillary†, internal hex screw adjustment

Type F403, triple switch output, bulb & capillary†, internal hex screw adjustment

| Range/Material Code | Adjustable Set Point Range | | Max. Temp | | Scale Division | | Stem or Bulb Size††/Finish††† OD x Length |
|---|----------------------------|----------------|-----------|-------|----------------|----|--|
| | °F | °C | °F | °C | °F | °C | |
| Type B400, B402, B403, single, dual, or triple switch output, immersion stem, internal adjustment via reference dial. | | | | | | | |
| Type C400, C402, C403, single, dual, or triple switch output, immersion stem, internal hex screw adjustment | | | | | | | |
| 120 | 0 to 225 | -17.8 to 107.2 | 275 | 135 | 5 | 5 | 9/16" x 1-7/8" below 1/2" NPT thread (nickel-plated brass) |
| 121 | 200 to 425 | 93.3 to 218.3 | 475 | 246.1 | 5 | 5 | 9/16" x 1-7/8" below 1/2" NPT thread (nickel-plated brass) |
| Type E400, E402, E403, single, dual, or triple switch output, bulb & capillary†, internal adjustment via reference dial | | | | | | | |
| 2BSA | -120 to 100 | -84.4 to 37.8 | 150 | 65.5 | 10 | 5 | 3/8 x 2-5/8" |
| 2BSB | 30 to 250 | 1.1 to 121.1 | 300 | 148.9 | 10 | 5 | 3/8 x 2-5/8" |
| 3BS | 100 to 400 | 37.8 to 204.4 | 450 | 232.2 | 10 | 10 | 3/8 x 2-1/8" |
| 4BS | 25 to 100 | -3.9 to 37.8 | 150 | 65.5 | 5 | 2 | 3/8 x 6-3/4" |
| 5BS | -20 to 80 | -28.9 to 26.7 | 130 | 54.4 | 5 | 2 | 3/8 x 5" |
| 8BS | 350 to 640 | 176.7 to 337.8 | 690 | 365.6 | 10 | 10 | 3/8 x 3-1/4" |
| Type F400, F402, F403, single, dual, or triple switch output, bulb & capillary†, internal hex screw adjustment | | | | | | | |
| Stainless steel bulb & capillary | | | | | | | |
| 1BS†††† | -180 to 120 | -115 to 48.9 | 170 | 76.6 | - | - | 3/8 x 3-3/4" |
| 2BS | -125 to 350 | -87.2 to 176.7 | 400 | 204.4 | - | - | 3/8 x 2-5/8" |
| 3BS | -125 to 500 | -87.2 to 260 | 550 | 287.7 | - | - | 3/8 x 2-1/8" |
| 4BS | -40 to 120 | -40 to 48.9 | 170 | 76.6 | - | - | 3/8 x 6-3/4" |
| 5BS | -40 to 180 | -40 to 82.2 | 230 | 110 | - | - | 3/8 x 5" |
| 6BS | 0 to 250 | -17.8 to 121.1 | 300 | 148.8 | - | - | 3/8 x 4-1/2" |
| 7BS | 0 to 400 | -17.8 to 204.4 | 450 | 232.2 | - | - | 3/8 x 3" |
| 8BS | 50 to 650 | 10 to 343.3 | 700 | 371.1 | - | - | 3/8 x 3-1/4" |

† Standard capillary lengths are 6ft †† Optional stainless steel immersion stem and capillary covering available

††† Optional immersion stem lengths and capillary lengths are available †††† Model not available on type F403

ORDERING INFORMATION

SPECIFY TYPE, MODEL/RANGE CODE (FROM CHARTS) THEN OPTIONS IF REQUIRED

EXAMPLE: J400-570-0140-M201(10 PSI RISING)

Type- Pressure

- J400- One SPDT output; internal hex screw adjustment
- J402-Two SPDT outputs; internal hex screw adjustment
- J403-Three SPDT outputs; internal hex screw adjustment
- H400- One SPDT output; internal adjustment with reference dial
- H402- Two SPDT outputs; internal adjustment with reference dial
- H403- Three SPDT outputs; internal adjustment with reference dial

Type- Differential Pressure

- J400K- One SPDT output; internal hex screw adjustment
- J402K-Two SPDT outputs; internal hex screw adjustment
- H400K- One SPDT output; internal adjustment with reference dial
- H402K- Two SPDT outputs; internal adjustment with reference dial

Type- Temperature

- B400- Immersion stem; one SPDT output; internal adjustment with reference dial
- B402- Immersion stem; two SPDT outputs; internal adjustment with reference dial
- B403- Immersion stem; three SPDT outputs; internal adjustment with reference dial
- C400- Immersion stem; one SPDT output; internal hex screw adjustment
- C402- Immersion stem; two SPDT outputs; internal hex screw adjustment
- C403- Immersion stem; three SPDT outputs; internal hex screw adjustment
- E400- Bulb and capillary; one SPDT output; internal adjustment with reference dial
- E402- Bulb and capillary; two SPDT outputs; internal adjustment with reference dial
- E403- Bulb and capillary; three SPDT outputs; internal adjustment with reference dial
- F400- Bulb and capillary; one SPDT output; internal hex screw adjustment
- F402- Bulb and capillary; two SPDT outputs; internal hex screw adjustment
- F403- Bulb and capillary; three SPDT outputs; internal hex screw adjustment

Switch Options

- 0140- Gold contacts, 1A 125 VAC resistive, not available models 440-443
 0500- Close deadband, 5A 125/250 VAC resistive, not available models 440-443, 520-535 & 540-547
 1010- DPDT switch, 10 A 125/250 VAC resistive not available temperature versions type J403, type H403 AND models 440-449, 520-535, 540-547, 570-572
 1070- 10 A 125 VDC resistive; deadband and minimum set point will increase. Not available on types B & E and models 448-449, 520-535, 540-547, 570-572
 1520- Adjustable deadband, 15 A 125/250/480 VAC resistive. Adjustment wheel changes rise setting only if adjustment on fall setting is required, use primary adjustment (see product Installation & Maintenance instructions for additional information). Note: Not available on middle switch for TYPE J403, C403 And F403. Not available types B, E, H, or models 440-443, 520-535, 540-547, 570-572, 610-614
 1530- External manual reset, 15 A 125/250/480 VAC resistive; latches on rise only. Not available triple switch versions or models 440-443, 520-535, 570-572
 1535- High ambient, 15 A 125/250/480 VAC resistive; temperatures up to 250°F/145°C. Not Aailable 440-443, 520-535
 1537- Vapor sealed switch, 15 A 125/250 VAC resistive. Not available on models 440-443, 520-535
 1539- Fungus resistant case, 15 A 125/250 VAC resistive. Not available on models 440-443, 520-535
 2000- 20 A 125/250/300 VAC resistive. Not available on models 440-443, 520-535, 540-547, 570-572

Other Options

- M020- Red status light, 115 VAC only. Specify whether light goes on or off with increasing or decreasing pressure or temperature. Not available models J400K, H400K, J402K, H402K OR MODELS 440-443, 449
 M201- Factory set one switch; specify increasing or decreasing pressure or temperature and setpoint. Not available on double or triple switch versions
 M202- Factory set two switches; specify set points on increasing or decreasing pressure, differential pressure or temperature Not Availabe single or triple switch versions.
 M203 Factory set three switches; note: the third or middle switch must always be set to highest pressure or temperature when switches are set apart; specify set points on increasing or decreasing pressure, differential pressure or Temperature. Not available single or dual switch versions.

M278- Range indicated on nameplate in Kg/cm². Not available on temperature versions.

- M321- Gasketed Lexan® window. NOT AVAILABLE ON J, C, F TYPES
 M405- Intrinsic safety compliance for European Union per ATEX standards
 M406- Intrinsic safety compliance for Russia per Gosgortekhnadzor standards
 M444- Paper ID tag
 M446- Stainless steel ID tag & wire attachment
 M504- 316L stainless steel immersion stem. Available on models 120,121 only.
 M540- Viton® construction (deadband and low end range may increase slightly); wetted parts include Viton® with standard connection material. Available models 448-454 and 540-547. Types J400K & J402K MODELS 455-457 include Viton® sealing diaphragms and O-rings with Teflon® main diaphragm. Types H400K & H402K modelsS 456-457 include Viton® sealing diaphragms and O-rings with Teflon® main diaphragm. Models 610-614 (Viton® O-ring only).
 M550- Oxygen service cleaning; internal construction may change. Not available on models 440-443 or H400K and H402K-455
 M900- Watertight conduit fitting; converts 7/8" hole to 1/2" NPT fitting. Required for product to meet NEMA 4X or if using knockout holes for wiring.
 M913- 1/4" NPT (female) stainless steel pressure connection. Available models S126B-S146B, S156B, S164B only.
 M914- 1/2" NPT (female) stainless steel pressure connection. Available models 358-376
 M921- 1/4" NPT (female) brass pressure connection. Available models 610-614, Type J402 only
 6361-704- Surface and pipe mount hardware kit for all models. Recommended for surface mounting needs 520-535 & 540- 547, if not previously ordered with option M449.
 SD6286-51- Watertight conduit fitting; connects 7/8" hole to 1/2" NPT (female) fitting, if not previously ordered with option M900

Optional Sensor Material for "WC Ranges. Available Models 520-525

- XC001- Aluminum pressure connection, Viton® diaphragm, Viton® O-ring
 XC002- Aluminum pressure connection, Kapton® diaphragm, Buna-N O-ring
 XC003- Aluminum pressure connection, Kapton® diaphragm, Viton® O-ring
 XC004- 316L Stainless steel pressure connection, 316L stainless steel diaphragm, Viton® O-ring. (Over range pressure is limited to 100 psi)
 XC005- 316L Stainless steel pressure connection, Viton® diaphragm, Viton® O-ring
 XC007- 316L Stainless steel pressure connection, Teflon® diaphragm, Viton® O-ring

OPTIONS FOR TEMPERATURE MODELS

UNION CONNECTORS for all bulb & capillary switches types E & F

| Option | Replacement Number | Description |
|---|--------------------|---|
| <u>Brass</u> | | |
| W027 | SD6213-27 | 1/2" NPT w/3/4" bushing |
| W045 | SD6213-45 | 3/4" NPT |
| W051 | SD6213-51 | 1/2" NPT |
| <u>304 Stainless Steel</u> | | |
| W028 | SD6213-28 | 1/2" NPT w/3/4" bushing |
| W046 | SD6213-46 | 3/4" NPT |
| W050 | SD6213-50 | 1/2" NPT |
| THERMOWELLS for all bulb & capillary switches types E & F | | |
| <u>Brass</u> | | |
| W075 | SD6225-75 | 1/2" NPT with 3/4" NPT adapter bushing, 4" BT |
| W191 | SD6225-191 | 1/2" NPT, 4" BT |
| W118 | SD6225-118 | 1/2" NPT with 3/4" NPT adapter bushing, 7" BT |
| W192 | SD6225-192 | 1/2" NPT, 7" BT |
| <u>316 Stainless Steel</u> | | |
| W076 | SD6225-76 | 3/4" NPT, 4.5" BT |
| W193 | SD6225-193 | 1/2" NPT, 4.5" BT |
| W119 | SD6225-119 | 3/4" NPT, 7.5" BT |
| W177 | SD6225-177 | 1/2" NPT, 7.5" BT |
| For all immersion stem switches types B & C | | |
| W139 | SD6225-139 | 3/4" NPT X 1 23/32" BT, BRASS |
| W140 | SD6225-140 | 3/4" NPT X 1 23/32" BT, 316 SS |

W000 IMMERSION STEM AND THERMOWELLS

Note: Option W000 is a special Immersion Stem construction that has no external thread. This option fits inside a special thermowell and is secured with a set-screw. Available on types B & C only.

| Option | Description |
|--------|---|
| W000 | Immersion stem only, Brass |
| W097 | Immersion stem and thermowell. Includes W000 stem and 1/2" NPT x 1 23/32" BT Brass thermowell |
| W099 | Immersion stem and thermowell. Includes W000 stem and 1/2" NPT x 1 23/32" BT 316 SS thermowell. |

OPTIONAL LENGTHS:

Optional immersion stem lengths to 15" may be available in brass, with or without 316 SS thermowell. Consult Clark for additional information.
 Optional capillary length to *50' available in copper or 304 SS Armor or Teflon® capillary protection available to lengths less than or equal to capillary length. Consult Clark for additional information.

*Consult Clark regarding repeatability and ambient effects on capillary lengths over 30'.

DIMENSIONS (INCHES)

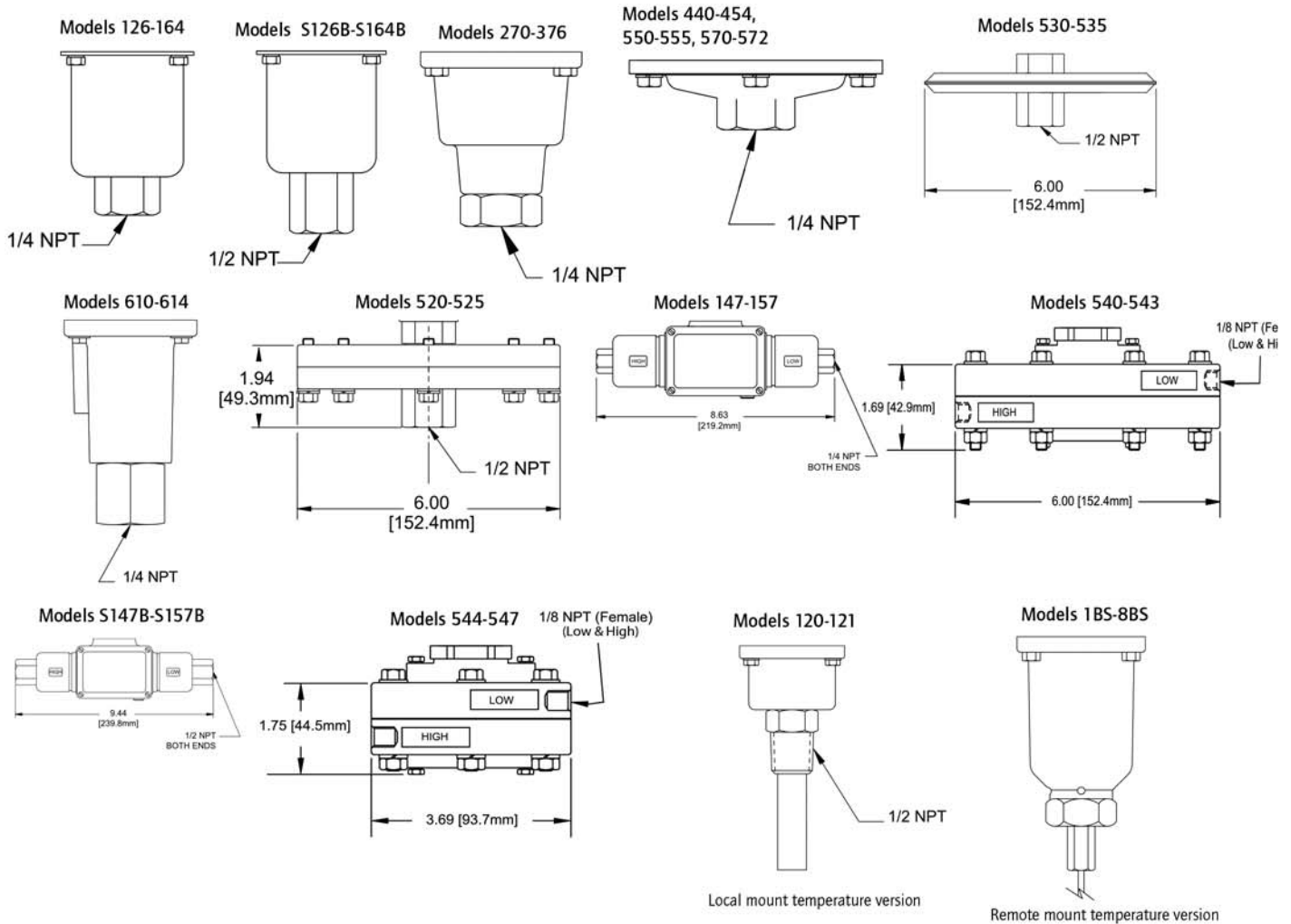
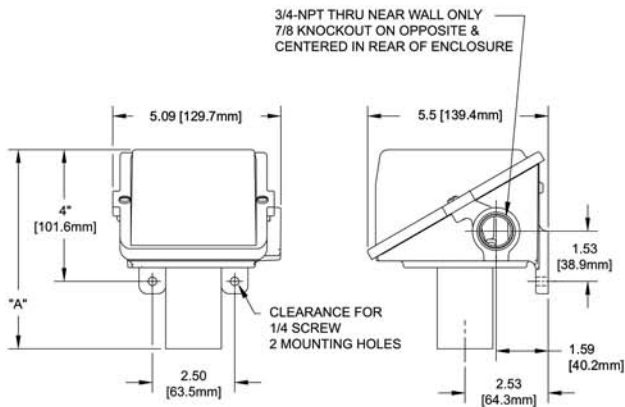
Internal Hex Screw Set Point Adjustment Types

J400, J402, J403, J400K, J402K, C400, C402, C403,
F400, F402, F403

Set Point Adjustment via Reference Dial Types

H400, H402, H403, H400K, H402K, B400, B402, B403,
E400, E402, E403

| Dimension A | | | |
|-------------------------------|--------|-------|------------------|
| Range Code | Inches | mm | NPT |
| Pressure | | | |
| 126-124 | 5.81 | 150.0 | 1/4 |
| S126B-S164B | 6.31 | 160.3 | 1/2 |
| 270-376 | 5.50 | 139.7 | 1/4 |
| 440-443, 449 451, 453, 454 | 4.28 | 108.7 | 1/4 |
| 448, 450, 452 | 5.03 | 127.8 | 1/4 |
| 520-525 | 8.25 | 209.6 | 1/2 |
| 530-535 | 8.13 | 206.5 | 1/2 |
| 551, 553-555 | 4.56 | 115.8 | 1/4 |
| 550, 552 | 5.03 | 127.8 | 1/4 |
| 570-572 | 4.56 | 115.8 | 1/4 |
| 610-614 | 6.31 | 160.3 | 1/4 |
| Differential Pressure | | | |
| 147-157 | 6.13 | 155.7 | 1/4 |
| S147B-S157B | 6.13 | 155.7 | 1/2 |
| 455-559 | 7.00 | 177.8 | 1/4 |
| 540-543 | 7.97 | 202.4 | 1/8 |
| 544-547 | 8.03 | 204.0 | 1/8 |
| Temperature | | | |
| 120, 121 | 7.38 | 187.3 | Immersion Stem |
| 1BS-8BS | 6.72 | 170.7 | Bulb & Capillary |



CLARK SOLUTIONS

SM Pressure Switch

Set Point Range, 2-120 PSI, Factory Preset

DESCRIPTION

Model SM is a simple, reliable low cost pressure switch that uses a spring loaded diaphragm as the sensing element. A Buna-N diaphragm is standard, however, a selection of other diaphragm materials are optionally available.

In operation, the diaphragm actuates a snap action electrical switch that insures a positive, instantaneous electrical contact under all operating conditions.

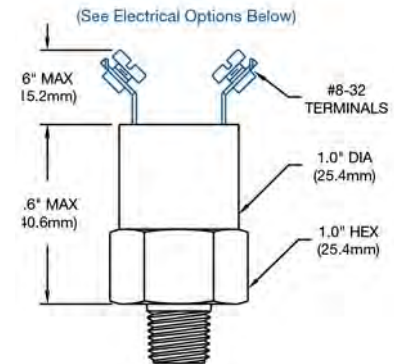


SPECIFICATIONS



- Set Point Range- 2-120 PSI (0.14-8.3 bar)
- Set Point Tolerance- ± 1 PSI or 5% (0.07 bar)
- Max Operating pressure- 250 PSI (17 bar)
- Proof Pressure- 750 PSI (51 bar)
- Switch Deadband (differential)- 8-16%
- Current Rating- 5 A @ 250 VAC, 5A @30 VDC Resistive
- Media Connection- Brass (Standard); Optional: Aluminum, Nickel Plating, Delrin, Zinc Plated Steel, 303 SS, 316 SS
- Circuit Form- SPST-NO, SPST-NC, SPDT
- Electrical Connections- See order table
- Diaphragm- Buna-N (other materials available, consult us)
- Cycle Life- 1 Million Cycles
- Housing: NEMA 4, 13

DIMENSIONS



ORDERING INFORMATION

ORDER NUMBER (SEE TABLE)

A-BCD-EF-GH

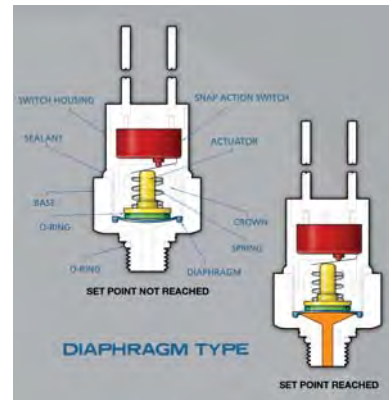
EXAMPLE- SM-B1C-50R-4WL

| A Model | B Connection Material | C Media Connection | D Circuit Form | E Fixed Set Point | F Set Point Direction | G Wire Length (Where Applicable) | H *Electrical Options |
|---------|---|---|----------------------------------|----------------------|-------------------------|--|---|
| SM | A= Aluminum B= Brass (Standard) N= Nickel Plating P= Delrin S= Zinc Plated Steel T= 303 Stainless Steel U= 316 Stainless Steel | 1= 1/4" NPT Male 2= 1/8" NPT Male 6= 7/16" SAE O-Ring (-4) 14= 1/2" NPT Male 1/8" NPT Female 17 1/4" BSPP Male (G1/4) 28 1/8" BSPP Male (G1/8) 41 7/16" - 20 Internal 45° Flare - SAE J 513 77 M16 x 1.5 SAE J2244-3 | A SPST-NO B SPST-NC C SPDT | Specify 2-120 PSI | R= Rising F= Falling | -= No Wire 1= 3" Wire Length 2= 6" Wire Length 3= 12" Wire Length 4= 18" Wire Length 5= 24" Wire Length 6= 36" Wire Length 7= 48" Wire Length 8= 60" Wire Length 9= Special Wire Length | - = Screw Terminals (Standard) WL= Wire Leads QC= 1/4" Spade Connection WP= Weather Pack HR= DIN43650A Connector MP= Metri-Pack AT= 10 A @ 125/250 VAC 5 A @ 30 VDC GG= Internal Ground AU= Gold Plate/Alloy for low currents *See next page for more choices |

The snap-action design will maintain its state with contacts either open or closed, until a precise set point is reached when it will snap over center to a new state. It will remain in that state until a distinct change towards its original setting is sensed, at which time it will snap back to its original state.

The design's snap-action feature prevents contact intermittency near its switch point, which is common in creeper designs. As system pressures fluctuate, our switches inherent differential prevents searching. Only the highest quality snap-action switches are used. The switches are UL, CSA, and military approved.

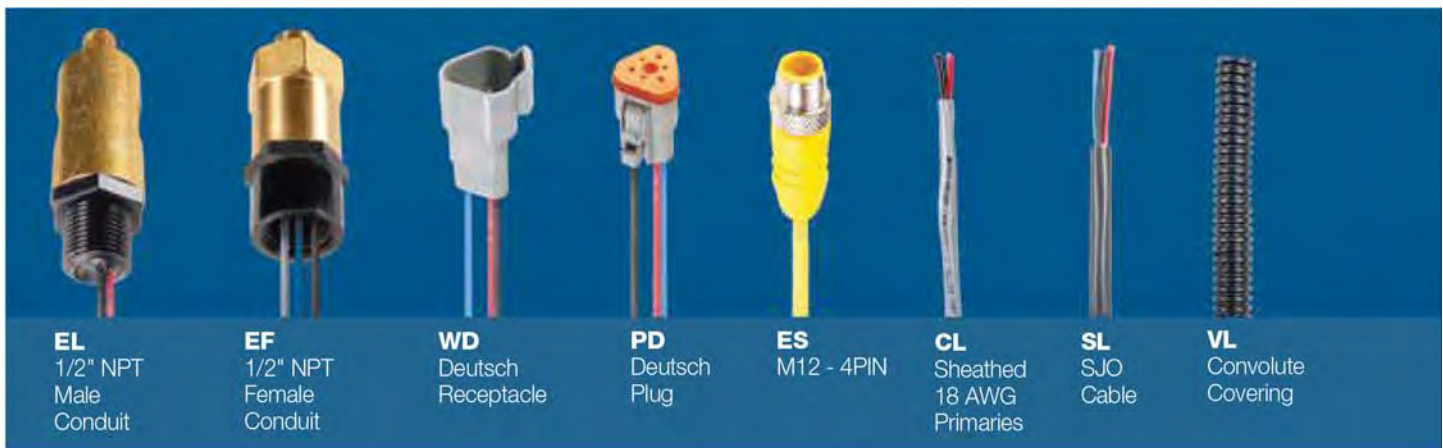
The elastomer diaphragm, which moves a precise .040 of an inch, ensures accurate, instantaneous contact under all operating conditions. While nitrile is preferred for general use, other materials are available.



A COMPREHENSIVE SELECTION OF ELECTRICAL CONNECTIONS

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We offer a growing selection of connections, and if you want something else, just ask us for it.



| | | | | |
|---------------------------------------|--------------------------|-----------------------------|-------------------------------|-----------------------------|
| Color Code: | Black – Common | Red – Normally Open | Blue – Normally Closed | |
| Pin Assignments: | A – Normally Open | B – Common | C – Normally Closed | |
| DIN Connector Pin Assignments: | #1 – Common | #2 – Normally Closed | #3 – Normally Open | #4 – Not Used |
| M12 Connector Pin Assignments: | #1 – Common | #2 – Not Used | #3 – Normally Open | #4 – Normally Closed |

CLARK SOLUTIONS

MM Pressure Switch

Set Point Range, 2-120 PSI, Factory Preset

DESCRIPTION

Model MM is a simple, reliable low cost pressure switch that uses a spring loaded diaphragm as the sensing element. A Buna-N diaphragm is standard, however, a selection of other diaphragm materials are optionally available.

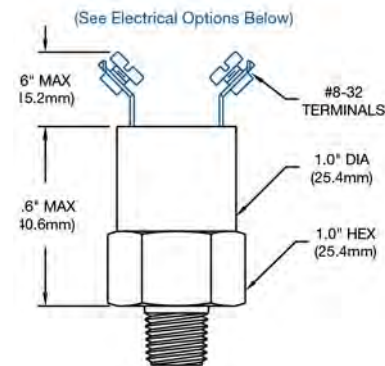
In operation, the diaphragm actuates a snap action electrical switch that insures a positive, instantaneous electrical contact under all operating conditions.



SPECIFICATIONS

- Set Point Range- 2-120 PSI (0.14-8.3 bar)
- Set Point Tolerance- ± 1 PSI or 5% (0.07 bar)
- Max Operating pressure- 600 PSI (41 bar)
- Proof Pressure- 1800 PSI (124 bar)
- Switch Deadband (differential)- 8-16%
- Current Rating- 5 A @ 250 VAC, 5A @30 VDC Resistive
- Media Connection- Brass (Standard); Optional: Aluminum, Nickel Plating, Delrin, Zinc Plated Steel, 303 SS, 316 SS
- Circuit Form- SPST-NO, SPST-NC, SPDT
- Electrical Connections- See order table
- Diaphragm- Buna-N (other materials available, consult us)
- Cycle Life- 1 Million Cycles
- Housing: NEMA 4, 13

DIMENSIONS



ORDERING INFORMATION

ORDER NUMBER (SEE TABLE)
A-BCD-EF-GH

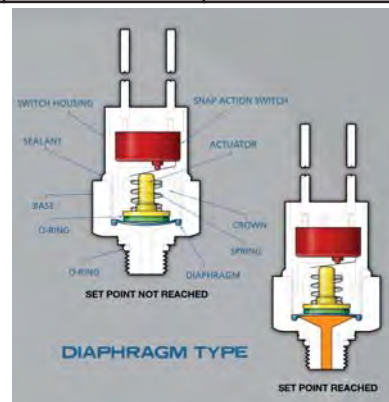
EXAMPLE-MM-B1C-150R-4WL

| A Model | B Connection Material | C Media Connection | D Circuit Form | E Fixed Set Point | F Set Point Direction | G Wire Length (Where Applicable) | H *Electrical Options |
|---------|---|---|----------------------------------|----------------------|-------------------------|--|---|
| MM | A= Aluminum B= Brass (Standard) N= Nickel Plating P= Delrin S= Zinc Plated Steel T= 303 Stainless Steel U= 316 Stainless Steel | 1= 1/4" NPT Male 2= 1/8" NPT Male 6= 7/16" SAE O-Ring (-4) 14= 1/2" NPT Male 1/8" NPT Female 17= 1/4" BSPP Male (G1/4) 28= 1/8" BSPP Male (G1/8) 41= 7/16"-20 Internal 45° | A SPST-NO B SPST-NC C SPDT | Specify 2-120 PSI | R= Rising F= Falling | -= No Wire 1= 3" Wire Length 2= 6" Wire Length 3= 12" Wire Length 4= 18" Wire Length 5= 24" Wire Length 6= 36" Wire Length 7= 48" Wire Length 8= 60" Wire Length 9= Special Wire Length | - = Screw Terminals (Standard) WL= Wire Leads WP= Weather Pack HR= DIN43650A Connector MP= Metri-Pack AT= 10 A @ 125/250 VAC 5 A @ 30 VDC AU= Gold Plate/Alloy for low currents *See next page for more choices |

The snap-action design will maintain its state with contacts either open or closed, until a precise set point is reached when it will snap over center to a new state. It will remain in that state until a distinct change towards its original setting is sensed, at which time it will snap back to its original state.

The design's snap-action feature prevents contact intermittency near its switch point, which is common in creeper designs. As system pressures fluctuate, our switches inherent differential prevents searching. Only the highest quality snap-action switches are used. The switches are UL, CSA, and military approved.

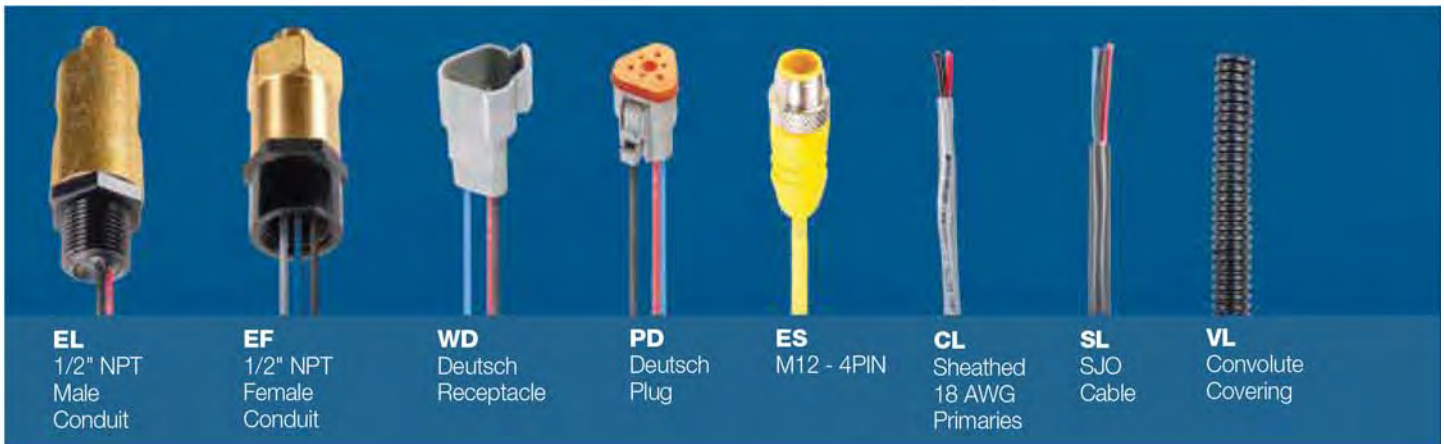
The elastomer diaphragm, which moves a precise .040 of an inch, ensures accurate, instantaneous contact under all operating conditions. While nitrile is preferred for general use, other materials are available.



A COMPREHENSIVE SELECTION OF ELECTRICAL CONNECTIONS

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We offer a growing selection of connections, and if you want something else, just ask us for it.



| | | | | |
|---------------------------------------|--------------------------|-----------------------------|-------------------------------|-----------------------------|
| Color Code: | Black - Common | Red - Normally Open | Blue - Normally Closed | |
| Pin Assignments: | A - Normally Open | B - Common | C - Normally Closed | |
| DIN Connector Pin Assignments: | #1 - Common | #2 - Normally Closed | #3 - Normally Open | #4 - Not Used |
| M12 Connector Pin Assignments: | #1 - Common | #2 - Not Used | #3 - Normally Open | #4 - Normally Closed |

CLARK SOLUTIONS

LM Pressure Switch

Set Point Range, 10-300 PSI, Factory Preset

DESCRIPTION

Model LM is a simple, reliable low cost pressure switch that uses a spring loaded diaphragm as the sensing element. A Buna-N diaphragm is standard, however, a selection of other diaphragm materials are optionally available.

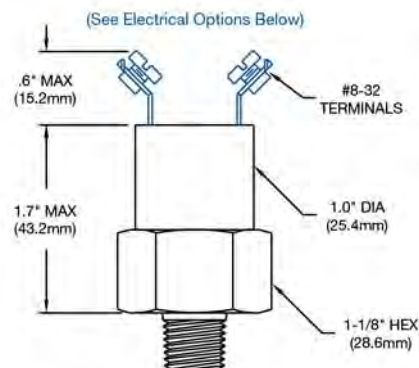
In operation, the diaphragm actuates a snap action electrical switch that insures a positive, instantaneous electrical contact under all operating conditions.

SPECIFICATIONS

- Set Point Range- 10-300 PSI (0.69-20 bar)
- Set Point Tolerance- ± 1 PSI or 5% (0.07 bar)
- Max Operating pressure- 2000 PSI (137bar)
- Proof Pressure- 6000 PSI (413 bar)
- Switch Deadband (differential)- 12-24%
- Current Rating- 5 A @ 250 VAC, 5 A@30 VDC (Resistive)
- Media Connection- Brass (Standard); Optional: Aluminum, Nickel Plating, Delrin, Zinc Plated Steel, 303 SS, 316 SS
- Circuit Form- SPST-NO, SPST-NC, SPDT
- Electrical Connections- See order table
- Diaphragm- Buna-N (other materials available, consult us)
- Cycle Life- 1 Million Cycles
- Housing: NEMA 4, 13



DIMENSIONS



ORDERING INFORMATION

ORDER NUMBER (SEE TABLE)
A-BCD-EF-GH

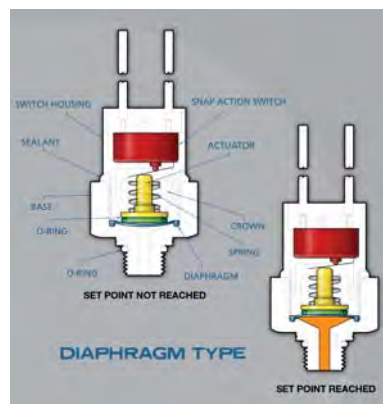
EXAMPLE- LM-B1C-150R-4WL

| A Model | B Connection Material | C Media Connection | D Circuit Form | E Fixed Set Point | F Set Point Direction | G Wire Length (Where Applicable) | H *Electrical Options |
|---------|---|---|----------------------------------|-----------------------|-------------------------|--|---|
| LM | A= Aluminum B= Brass (Standard) N= Nickel Plating P= Delrin S= Zinc Plated Steel T= 303 Stainless Steel U= 316 Stainless Steel | 1= 1/4" NPT Male 2= 1/8" NPT Male 6= 7/16" SAE O-Ring (-4) 12= M10 x 1 SAE J2244-3 49= M14 x 1.5 J2244/3 68= 9/16" 18 SAE O-Ring Face Seal (Female) | A SPST-NO B SPST-NC C SPDT | Specify 10-300 PSI | R= Rising F= Falling | -- No Wire 1= 3" Wire Length 2= 6" Wire Length 3= 12" Wire Length 4= 18" Wire Length 5= 24" Wire Length 6= 36" Wire Length 7= 48" Wire Length 8= 60" Wire Length 9= Special Wire Length | - = Screw Terminals (Standard) WL= Wire Leads WP= Weather Pack HR= DIN43650A Connector MP= Metri-Pack AT= 10 A @ 125/250 VAC 5 A @ 30 VDC AU= Gold Plate/Alloy for low currents *See next page for more choices |

The snap-action design will maintain its state with contacts either open or closed, until a precise set point is reached when it will snap over center to a new state. It will remain in that state until a distinct change towards its original setting is sensed, at which time it will snap back to its original state.

The design's snap-action feature prevents contact intermittency near its switch point, which is common in creeper designs. As system pressures fluctuate, our switches inherent differential prevents searching. Only the highest quality snap-action switches are used. The switches are UL, CSA, and military approved.

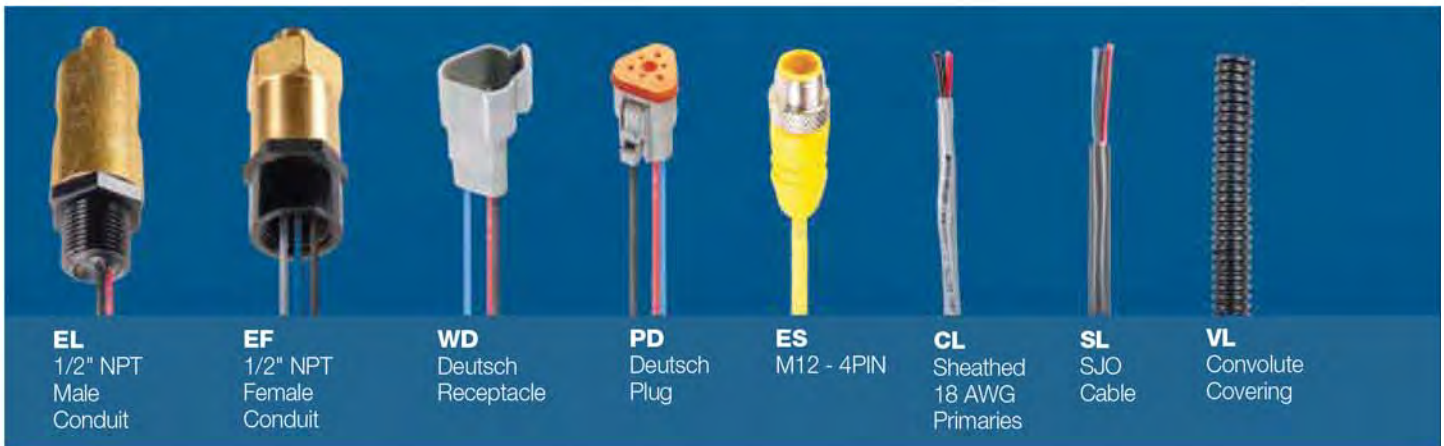
The elastomer diaphragm, which moves a precise .040 of an inch, ensures accurate, instantaneous contact under all operating conditions. While nitrile is preferred for general use, other materials are available.



A COMPREHENSIVE SELECTION OF ELECTRICAL CONNECTIONS

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| | | | | |
|---------------------------------------|--------------------------|-----------------------------|-------------------------------|-----------------------------|
| Color Code: | Black – Common | Red – Normally Open | Blue – Normally Closed | |
| Pin Assignments: | A – Normally Open | B – Common | C – Normally Closed | |
| DIN Connector Pin Assignments: | #1 – Common | #2 – Normally Closed | #3 – Normally Open | #4 – Not Used |
| M12 Connector Pin Assignments: | #1 – Common | #2 – Not Used | #3 – Normally Open | #4 – Normally Closed |

CLARK SOLUTIONS

SQ Pressure Switch

FS Adjustable Set Point Ranges, 10-120 PSI

DESCRIPTION

Model SQ is a simple, reliable low cost pressure switch that uses a spring loaded diaphragm as the sensing element. Brass connections and Buna-N diaphragm are standard. The switch point is field adjustable against a visible reference scale.

In operation, the diaphragm actuates a snap action electrical switch that insures a positive, instantaneous electrical contact under all operating conditions.



SPECIFICATIONS

- Set Point Range- 2-120 PSI (0.14-8.3 bar)
- Set Point Tolerance- ± 1 PSI or 5% (0.07 bar)
- Max Operating Pressure- 250 PSI (17 bar)
- Proof Pressure- 750 PSI (51 bar)
- Switch Deadband (Differential)- 10-20%
- Current Rating- 10 A @ 125/250 VAC; 5A @30 VDC
- Media Connection- 1/8" NPT Male Brass
- Circuit Form- SPDT
- Electrical Connections- 1/4" Spade
- Diaphragm- Buna-N
- Cycle Life- 1 Million Cycles

ORDERING INFORMATION

| Model | Adjustment Range |
|-------|------------------|
| SQ-1 | 2-10 PSI |
| SQ-2 | 6-30 PSI |
| SQ-3 | 20-120 PSI |

The snap-action design will maintain its state with contacts either open or closed, until a precise set point is reached when it will snap over center to a new state. It will remain in that state until a distinct change towards its original setting is sensed, at which time it will snap back to its original state.

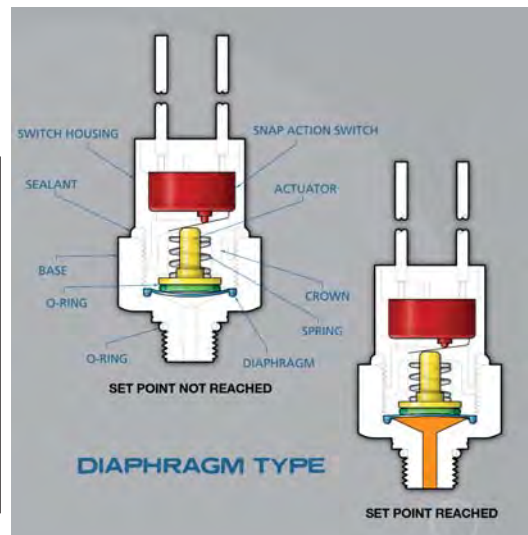
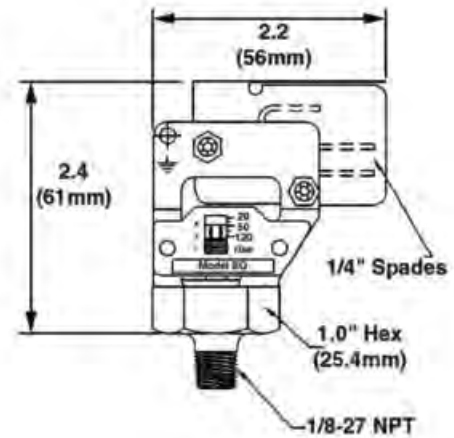
The design's snap-action feature prevents contact intermittency near its switch point, which is common in creper designs. As system pressures fluctuate, our switches inherent differential prevents searching. Only the highest quality snap-action switches are used. The switches are UL, CSA, and military approved.

The elastomer diaphragm, which moves a precise .040 of an inch, ensures accurate, instantaneous contact under all operating conditions. While nitrile is preferred for general use, we can also provide ethylene



SQ

DIMENSIONS (MM)



CLARK SOLUTIONS

CJ Pressure Switch

Adjustable Set Point Range, 3-1500 PSI

DESCRIPTION

Model CJ is a simple, reliable low cost pressure switch that uses a spring loaded diaphragm as the sensing element. A Buna-N diaphragm is standard.

In operation, the diaphragm actuates a snap action electrical switch that insures a positive, instantaneous electrical contact under all operating conditions.

SPECIFICATIONS

- Set Point Range: 3 – 120 PSI (.21 – 8.3 Bar)
- Set Point Tolerance: ±1 PSI or 5% (.07 Bar)
- Maximum Operating Pressure: 250 PSI (17 Bar)
- Proof Pressure: 750 PSI (51 Bar)
- Differential: 10 – 20%
- Current Rating: 3 A @ 125 VAC
2 A @ 30 VDC (Resistive)

Media Connection: Brass (Standard); Optional: Aluminum, Nickel Plating, Delrin, Zinc Plated Steel, 303 SS, 316 SS

Circuit Form: SPST-NO or SPST-NC

Electrical Connection: See Order Chart Below for Options

Diaphragm Material: Buna N

Cycle Life: 1 Million Cycles

Housing: NEMA 4, 13

ORDERING INFORMATION

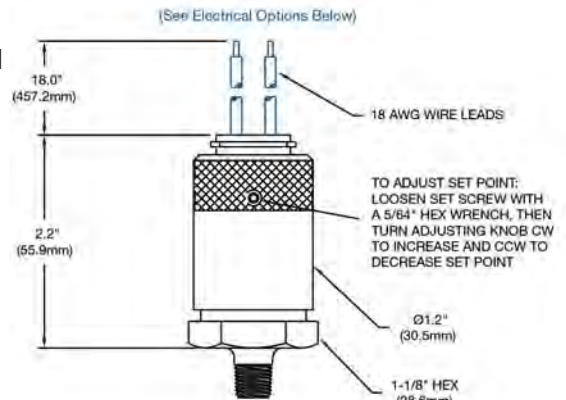
ORDER NUMBER (SEE TABLE)

A-BCD-EFGHI

EXAMPLE-CJ-B1C-4150J-4WL



DIMENSIONS INCHES (MM)

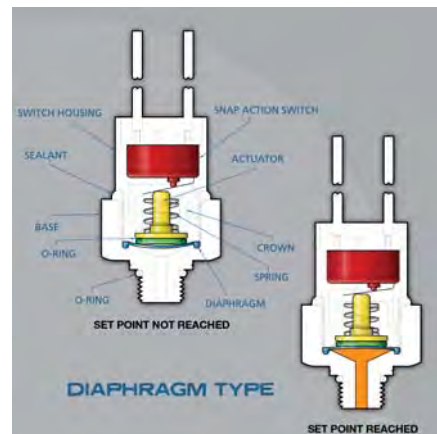


| A Model | B Connection Material | C Media Connection | D Circuit Form | E Range | F Fixed Set Point | G Set Point Direction | H Wire Length (Where Applicable) | I *Electrical Options |
|---------|---|--|----------------------------------|--|---------------------------------------|---|--|--|
| CJ | A= Aluminum B= Brass (Standard) N= Nickel Plating P= Delrin S= Zinc Plated Steel T= 303 Stainless Steel U= 316 Stainless Steel | 1= 1/4" NPT Male 2= 1/8" NPT Male 6= 7/16" SAE O-Ring (-4) 14= 1/2" NPT Male 1/8" NPT Female 17= 1/4" BSPP Male (G1/4) 28= 1/8" BSPP Male (G1/8) | A SPST-NO B SPST-NC C SPDT | 1= 3 - 10 PSI 2= 6 - 30 PSI 3= 20 - 120 PSI 4*= 100 - 400 PSI 5*= 500 - 1500 PSI *Not yet UL recognized | Specify 3--120 PSI 121-1500 PSI | J= Rising Adjustable G= Falling Adjustable | -= No Wire 1= 3" Wire Length 2= 6" Wire Length 3= 12" Wire Length 4= 18" Wire Length 5= 24" Wire Length 6= 36" Wire Length 7= 48" Wire Length 8= 60" Wire Length 9= Special Wire Length | - = Screw Terminals (Stan WL= Wire Leads WP= Weather Pack HR= DIN43650A Connect MP= Metri-Pack AT= 10 A @ 125/250 VA 5 A @ 30 VDC AU= Gold Plate/Alloy for low currents *See next page for more ch |

The snap-action design will maintain its state with contacts either open or closed, until a precise set point is reached when it will snap over center to a new state. It will remain in that state until a distinct change towards its original setting is sensed, at which time it will snap back to its original state.

The design's snap-action feature prevents contact intermittency near its switch point, which is common in creeper designs. As system pressures fluctuate, our switches inherent differential prevents searching. Only the highest quality snap-action switches are used. The switches are UL, CSA, and military approved.

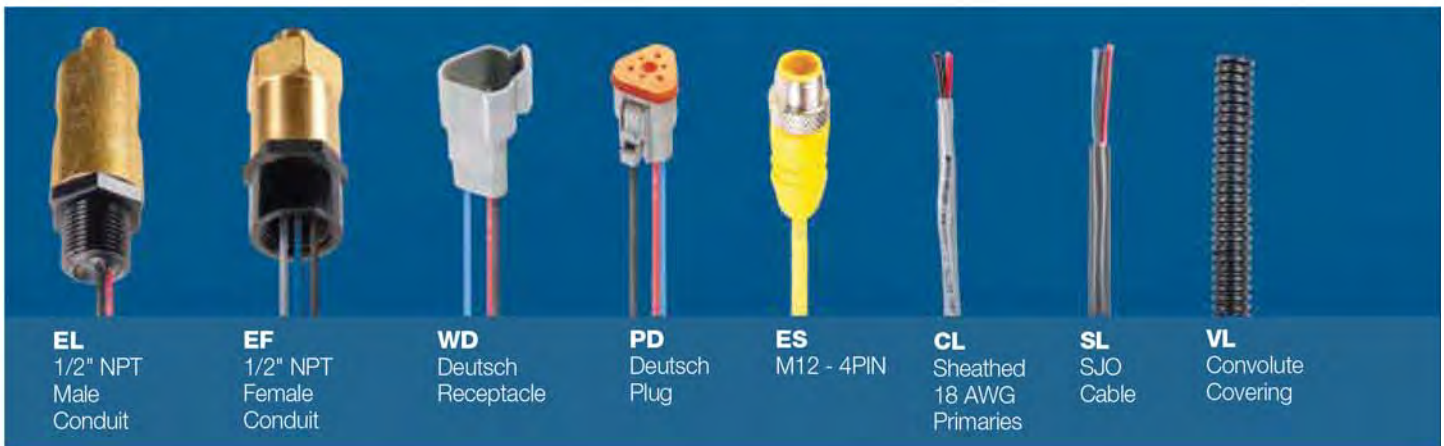
The elastomer diaphragm, which moves a precise .040 of an inch, ensures accurate, instantaneous contact under all operating conditions. While nitrile is preferred for general use, other materials are available.



A COMPREHENSIVE SELECTION OF ELECTRICAL CONNECTIONS

We see designs used in all types of applications imaginable, so we want to make sure you have a wide choice of electrical connections.

We offer a growing selection of connections, and if you want something else, just ask us for it.



| | | | | |
|---------------------------------------|--------------------------|-----------------------------|-------------------------------|-----------------------------|
| Color Code: | Black – Common | Red – Normally Open | Blue – Normally Closed | |
| Pin Assignments: | A – Normally Open | B – Common | C – Normally Closed | |
| DIN Connector Pin Assignments: | #1 – Common | #2 – Normally Closed | #3 – Normally Open | #4 – Not Used |
| M12 Connector Pin Assignments: | #1 – Common | #2 – Not Used | #3 – Normally Open | #4 – Normally Closed |

CLARK SOLUTIONS

XM Pressure Switch

Adjustable Set Point Range, 4-4000 PSI

DESCRIPTION

Model XM is a simple, reliable low cost pressure switch that uses a spring loaded diaphragm as the sensing element. A Buna-N diaphragm is standard. XM is a popular choice for mobile hydraulic applications.

In operation, the diaphragm actuates a snap action electrical switch that insures a positive, instantaneous electrical contact under all operating conditions.

SPECIFICATIONS



- Set Point Range: 4 – 4000 PSI (4.3 – 275 Bar)
- Set Point Tolerance: ±5 PSI or 5% (.34 Bar)
- Maximum Operating Pressure: 5000 PSI (344 Bar)
- Proof Pressure: 15000 PSI (1034 Bar)
- Differential: 8 – 16%
- Current Rating: 3 A @ 125 VAC
2 A @ 30 VDC (Resistive)

- Media Connection: Zinc Plated Steel (Standard); Optional: Aluminum, Nickel Plating, Brass, 303 SS, 316 SS
- Circuit Form: SPST-NO or SPST-NC or SPDT
- Electrical Connection: See Order Chart Below for Options
- Diaphragm Material: Buna N
- Cycle Life: 1 Million Cycles
- Housing: NEMA 4, 13

ORDERING INFORMATION

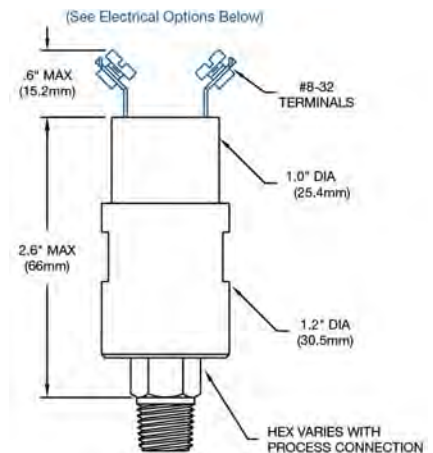
ORDER NUMBER (SEE TABLE)
A-BCD-EFGH

EXAMPLE-XM-S1C-4150J-4WL

| A Model | B Connection Material | C Media Connection | D Circuit Form | E Fixed Set Point | F Set Point Direction | G Wire Length (Where Applicable) | H *Electrical Options |
|---------|--|--|-------------------------------------|-------------------------|-------------------------|--|--|
| XM | A= Aluminum B= Brass N= Nickel Plating P= Delrin S= Zinc Plated Steel(Standard) T= 303 Stainless Steel U= 316 Stainless Steel | 1= 1/4" NPT Male 2= 1/8" NPT Male 4= 7/16" SAE 37° Flare (-4) 6= 7/16" SAE O-Ring (-4) 11= 9/16" SAE O-Ring (-6) 17= 1/4" BSPP Male (G1/4) 47= 1/4" - 19BSPP Female (G1/4) | A= SPST-NO B= SPST-NC C= SPDT | Specify 40--4000 PSI | R= Rising F= Falling | -= No Wire 1= 3" Wire Length 2= 6" Wire Length 3= 12" Wire Length 4= 18" Wire Length 5= 24" Wire Length 6= 36" Wire Length 7= 48" Wire Length 8= 60" Wire Length 9= Special Wire Length | -= Screw Terminals (Standard) WL= Wire Leads WP= Weather Pack HR= DIN43650A Connector MP= Metri-Pack AT= 10 A @ 125/250 VAC 5 A @ 30 VDC AU= Gold Plate/Alloy for low currents *See next page for more choices |



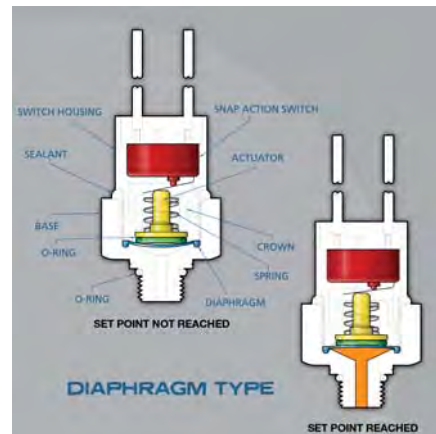
DIMENSIONS INCHES (MM)



The snap-action design will maintain its state with contacts either open or closed, until a precise set point is reached when it will snap over center to a new state. It will remain in that state until a distinct change towards its original setting is sensed, at which time it will snap back to its original state.

The design's snap-action feature prevents contact intermittency near its switch point, which is common in creeper designs. As system pressures fluctuate, our switches inherent differential prevents searching. Only the highest quality snap-action switches are used. The switches are UL, CSA, and military approved.

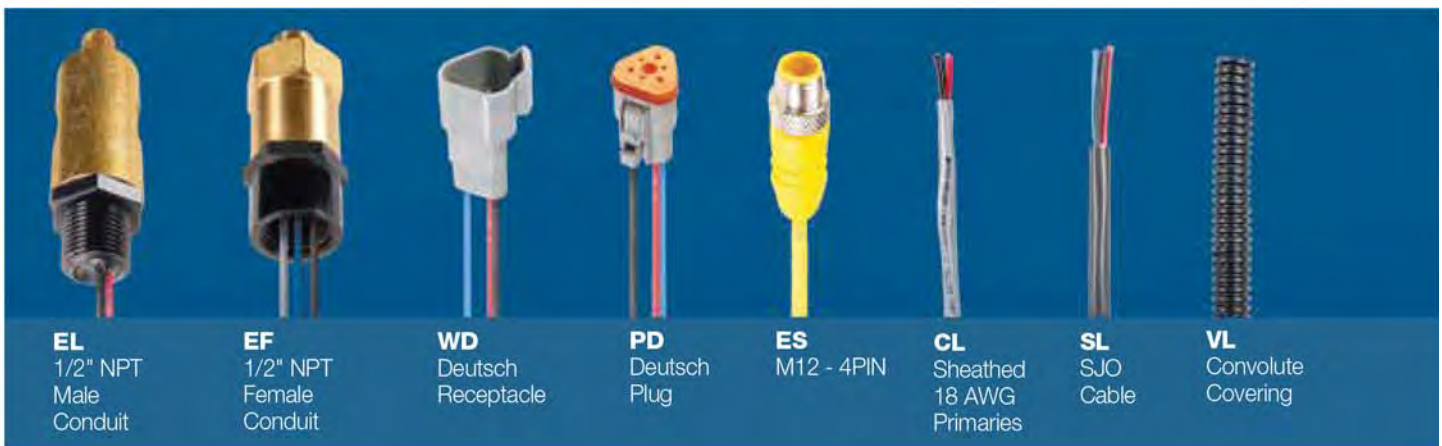
The elastomer diaphragm, which moves a precise .040 of an inch, ensures accurate, instantaneous contact under all operating conditions. While nitrile is preferred for general use, other materials are available.



A COMPREHENSIVE SELECTION OF ELECTRICAL CONNECTIONS

We see designs used in all types of applications imaginable, so we want to make sure you have a wide choice of electrical connections.

We offer a growing selection of connections, and if you want something else, just ask us for it.



Color Code: **Black** – Common **Red** – Normally Open **Blue** – Normally Closed

Pin Assignments: **A** – Normally Open **B** – Common **C** – Normally Closed

DIN Connector Pin Assignments: #1 – Common #2 – Normally Closed #3 – Normally Open #4 – Not Used

M12 Connector Pin Assignments: #1 – Common #2 – Not Used #3 – Normally Open #4 – Normally Closed

CLARK SOLUTIONS

CD Pressure Switch

Adjustable Set Point Range, 10-7500 PSI

DESCRIPTION

Model CD is a simple, reliable low cost pressure switch. A long life elastomer diaphragm is standard for set points to 200 PSI and a proven sealed piston sensor is used for higher ranges.

In operation, the diaphragm/piston actuates a snap action electrical switch that insures a positive, instantaneous electrical contact under all operating conditions.



SPECIFICATIONS

Set Point Range: 10 – 7500 PSI (.69 – 517 Bar)

Set Point Tolerance: ±5 PSI or 5% (.34 Bar)

| Range | Max. Operating Pressure | Proof Pressure |
|--------------------------|-------------------------|----------------------|
| to 200 PSI (Ranges 1-3) | 1000 PSI (69 bar) | 3000 PSI (206 bar) |
| to 4500 PSI (Ranges 4-7) | 5000 PSI (344 bar) | 15000 PSI (1034 bar) |
| to 7500 (Range 8) | 7500 PSI (517 bar) | 22500 PSI (1551 bar) |

Differential: 10 – 20%

Current Rating: 5 A @ 250 VAC

5 A @ 30 VDC (Resistive)

Media Connection: See Order Chart Below for Options

Circuit Form: SPST-NO or SPST-NC

Electrical Connection: See Order Chart Below for Options

Diaphragm Material: Buna (Ranges 1 – 3)

Piston: Hardened Steel (Ranges 4 – 7)

Cycle Life: 1 Million Cycles

Housing: NEMA 4, 13

ORDERING INFORMATION

ORDER NUMBER (SEE TABLE)

ABCD-EFGH

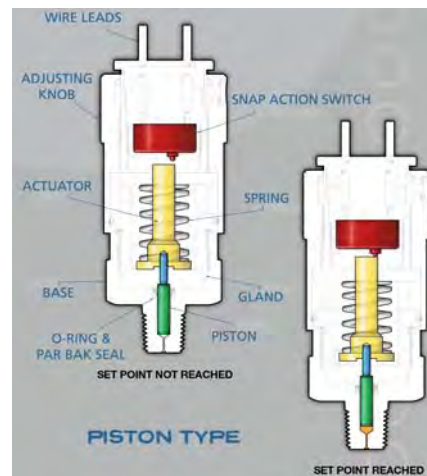
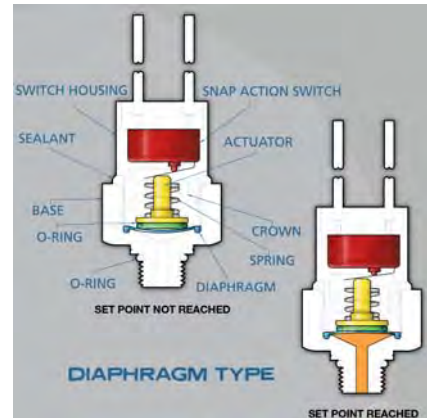
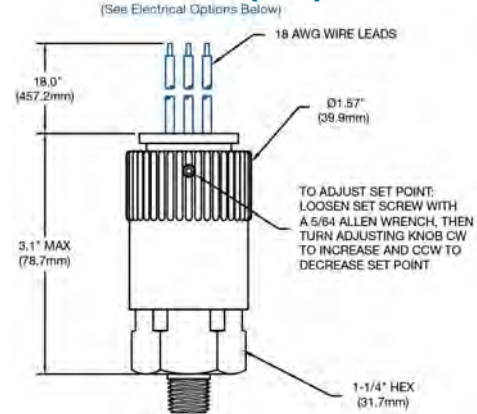
EXAMPLE- CDB1C-61000JWL

| A Model | B Connection Material | C Media Connection | D Circuit Form | E Range |
|---------|---|--|-------------------------------------|---|
| CD | B= Brass (Standard) N= Nickel Plating T= 303 Stainless Steel U= 316 Stainless Steel | Piston Sensor 1= 1/4"-18 NPT Male 3= 3/4"-16 SAE Male 11= 9/16"-18 SAE Male Diaphragm Sensor 1= 1/4"-18 NPT Male 9= 3/8"-18 NPT Male | A= SPST-NO B= SPST-NC C= SPDT | Diaphragm Sensor 1= 10-40 PSI 2= 25-100 PSI 3= 50-200 PSI Piston Sensor 4= 100-400 PSI 5= 250-1000 PSI 6= 500-2000 PSI 7= 1200-4500 |

| F Desired Set Point | G Set Point Direction | H *Electrical Connections |
|---------------------|---|--|
| 10 – 7500 PSI | J= Rising Adjustable G= Falling Adjustable | WL= Wire Leads 18" EL= Male Conduit 1/2-14 EF= Female Conduit 1/2-14 HR= DIN43650A Connector HH= DIN43650A Plug Only WP= Weather Pack MP= Metri-Pack AT= 10 A @ 125/250 VAC, 5 A @ 30 VDC AU= Gold Contacts, 50 mA @ 30 VDC *See next page for more choices |



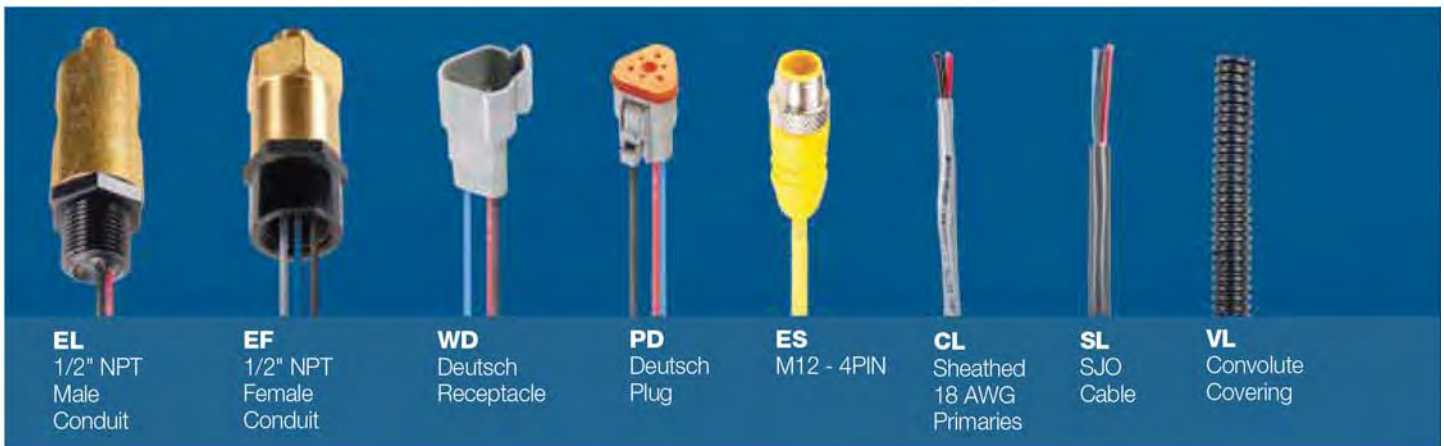
DIMENSIONS INCHES (MM)



A COMPREHENSIVE SELECTION OF ELECTRICAL CONNECTIONS

We see designs used in all types of applications imaginable, so we want to make sure you have a wide choice of electrical connections.

We offer a growing selection of connections, and if you want something else, just ask us for it.



| | | | | |
|---------------------------------------|--------------------------|-----------------------------|-------------------------------|-----------------------------|
| Color Code: | Black – Common | Red – Normally Open | Blue – Normally Closed | |
| Pin Assignments: | A – Normally Open | B – Common | C – Normally Closed | |
| DIN Connector Pin Assignments: | #1 – Common | #2 – Normally Closed | #3 – Normally Open | #4 – Not Used |
| M12 Connector Pin Assignments: | #1 – Common | #2 – Not Used | #3 – Normally Open | #4 – Normally Closed |

CLARK SOLUTIONS

CF Pressure Switch

Fixed Set Point Range, 10-4500 PSI

DESCRIPTION

Model CF is a simple, reliable low cost pressure switch. A long life elastomer diaphragm is standard for set points to 300 PSI and a proven sealed piston sensor is used for higher ranges.

In operation, the diaphragm/piston actuates a snap action electrical switch that insures a positive, instantaneous electrical contact under all operating conditions.



SPECIFICATIONS

Set Point Range: 10 – 4500 PSI (.69 – 310 Bar)

Set Point Tolerance: ±5 PSI or 5% (.34 Bar)

| Range | Max. Operating Pressure | Proof Pressure |
|------------------------------|-------------------------|----------------------|
| to 300 PSI (Diaphragm Model) | 1000 PSI (69 bar) | 3000 PSI (206 bar) |
| to 4500 PSI (Piston Model) | 5000 PSI (344 bar) | 15000 PSI (1034 bar) |

Differential: 10 – 20%

Current Rating: 5 A @ 250 VAC

5 A @ 30 VDC (Resistive)

Media Connection: See Order Chart Below for Options

Circuit Form: SPST-NO, SPST-NC or SPDT

Electrical Connection: See Order Chart Below for Options

Diaphragm Material: Buna (Set Points to 300 PSI)

Piston: Hardened Steel (Set Points to 4500 PSI)

Cycle Life: 1 Million Cycles

Housing: NEMA 4, 13

ORDERING INFORMATION

ORDER NUMBER (SEE TABLE)

ABCD-EFGH

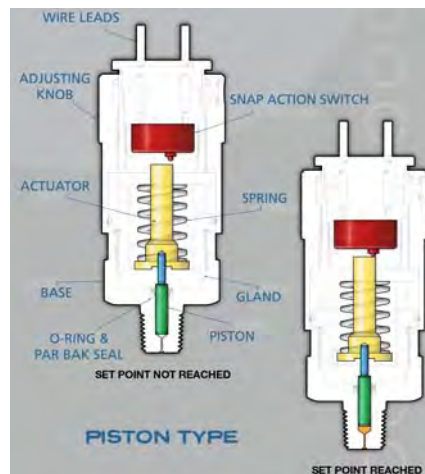
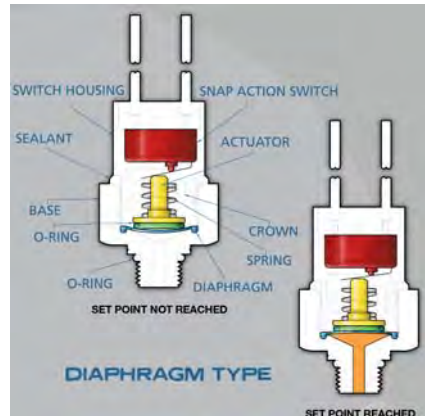
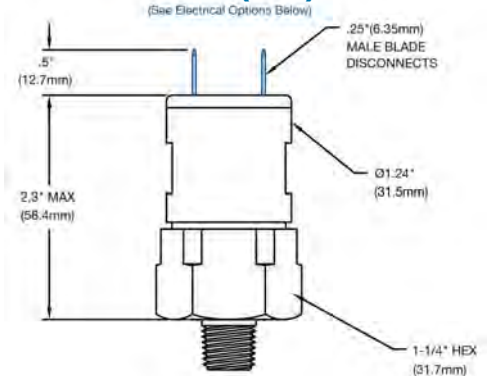
EXAMPLE- CFB1C-4200RWL

| A Model | B Connection Material | C Media Connection | D Circuit Form |
|---------|---|--|-------------------------------------|
| CF | B= Brass (Standard) N= Nickel Plating T= 303 Stainless Steel U= 316 Stainless Steel | Piston Sensor 1= 1/4"-18 NPT Male 3= 3/4"-16 SAE Male 11= 9/16"-18 SAE Male Diaphragm Sensor 1= 1/4"-18 NPT Male 9= 3/8"-18 NPT Male | A= SPST-NO B= SPST-NC C= SPDT |

| E Desired Set Point | F Set Point Direction | G *Electrical Connections |
|---------------------|---|--|
| 10-4500 PSI | R= Rising Adjustable F= Falling Adjustable | WL= Wire Leads 18" EL= Male Conduit 1/2-14 EF= Female Conduit 1/2-14 HR= DIN43650A Connector HH= DIN43650A Plug Only WP= Weather Pack MP= Metri-Pack AT= 10 A @ 125/250 VAC, 5 A @ 30 VDC AU= Gold Contacts, 50 mA @ 30 VDC *See next page for more choices |



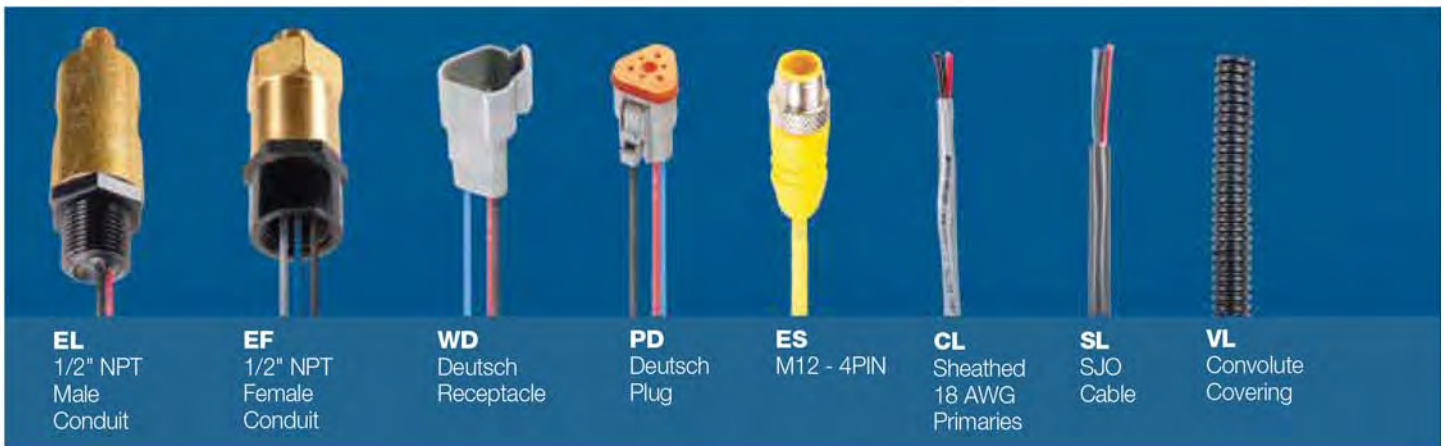
DIMENSIONS INCHES (MM)



A COMPREHENSIVE SELECTION OF ELECTRICAL CONNECTIONS

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Color Code: **Black** – Common **Red** – Normally Open **Blue** – Normally Closed
 Pin Assignments: **A** – Normally Open **B** – Common **C** – Normally Closed
 DIN Connector Pin Assignments: #1 – Common #2 – Normally Closed #3 – Normally Open #4 – Not Used
 M12 Connector Pin Assignments: #1 – Common #2 – Not Used #3 – Normally Open #4 – Normally Closed

CLARK SOLUTIONS WX Pressure Switch

Adjustable Set Point Range, 50-5000 PSI

DESCRIPTION

Model WX is a simple, reliable low cost pressure switch that uses a spring loaded diaphragm as the sensing element. A Buna-N diaphragm is standard. WX is a popular choice for demanding hydraulic applications.

In operation, the diaphragm actuates a snap action electrical switch that insures a positive, instantaneous electrical contact under all operating conditions.



SPECIFICATIONS



- Set Point Range: 50 – 5000 PSI (1.38 – 344 Bar)
- Set Point Tolerance: ± 5 PSI or 5% (.34 Bar)
- Maximum Operating Pressure: 5000 PSI (344 Bar)
- Proof Pressure: 15000 PSI (1034 Bar)
- Differential: 3 – 10%
- Current Rating: 3 A @ 125 VAC
2 A @ 30 VDC (Resistive)

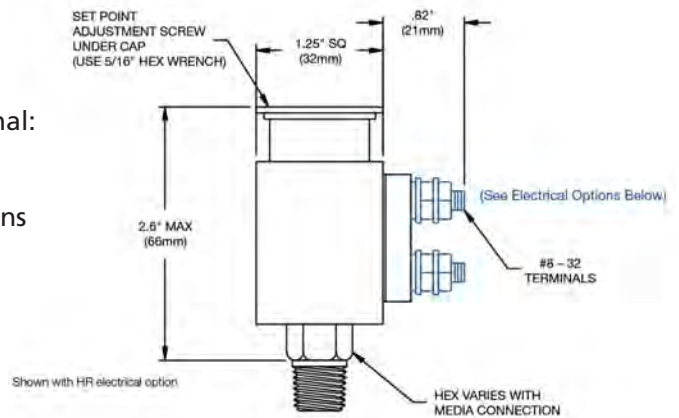
- Media Connection: Zinc Plated Steel (Standard); Optional: Aluminum, Nickel Plating, Brass, 303 SS, 316 SS
- Circuit Form: SPST-NO or SPST-NC or SPDT
- Electrical Connection: See Order Chart Below for Options
- Diaphragm Material: Buna N
- Cycle Life: 1 Million Cycles
- Housing: NEMA 4, 13

ORDERING INFORMATION

ORDER NUMBER (SEE TABLE)
A-BCD-EFGH

EXAMPLE-WX-S1C-4J4WL

DIMENSIONS INCHES (MM)

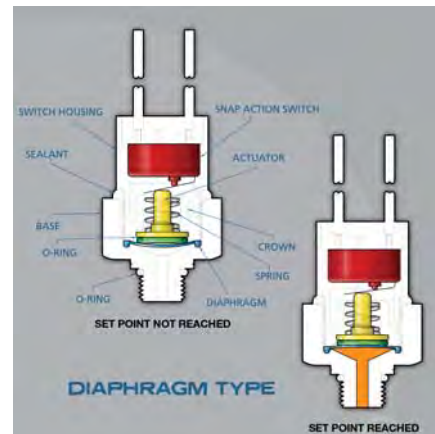


| A Model | B Connection Material | C Media Connection | D Circuit Form | E Adjustment Range | F Set Point Direction | G Wire Length (Where Applicable) | H *Electrical Options |
|---------|--|--|----------------------------------|--|---|--|--|
| WX | A= Aluminum B= Brass N= Nickel Plating P= Delrin S= Zinc Plated Steel(Standard) T= 303 Stainless Steel U= 316 Stainless Steel | 1= 1/4" NPT Male 2= 1/8" NPT Male 4= 7/16" SAE 37° Flare (-4) 6= 7/16" SAE O-Ring (-4) 11= 9/16" SAE O-Ring (-6) 17= 1/4" BSPP Male (G1/4) 39= 1/4" - 18 NPTF SAE J516 (-4) 67= 9/16" - 18 SAE O-Ring Face Seal | A SPST-NO B SPST-NC C SPDT | 1= 50-150 PSI 2= 140-400 PSI 3= 300-800 PSI 4= 700-2500 PSI 5= 2000-5000 PSI | J= Rising Adjustable G= Falling Adjustable | -= No Wire 1= 3" Wire Length 2= 6" Wire Length 3= 12" Wire Length 4= 18" Wire Length 5= 24" Wire Length 6= 36" Wire Length 7= 48" Wire Length 8= 60" Wire Length 9= Special Wire Length | - = Screw Terminals (Standard) WL= Wire Leads WP= Weather Pack HR= DIN43650A Connector MP= Metri-Pack AT= 10 A @ 125/250 VAC 5 A @ 30 VDC AU= Gold Plate/Alloy for low currents *See next page for more choices |

The snap-action design will maintain its state with contacts either open or closed, until a precise set point is reached when it will snap over center to a new state. It will remain in that state until a distinct change towards its original setting is sensed, at which time it will snap back to its original state.

The design's snap-action feature prevents contact intermittency near its switch point, which is common in creeper designs. As system pressures fluctuate, our switches inherent differential prevents searching. Only the highest quality snap-action switches are used. The switches are UL, CSA, and military approved.

The elastomer diaphragm, which moves a precise .040 of an inch, ensures accurate, instantaneous contact under all operating conditions. While nitrile is preferred for general use, other materials are available.



A COMPREHENSIVE SELECTION OF ELECTRICAL CONNECTIONS

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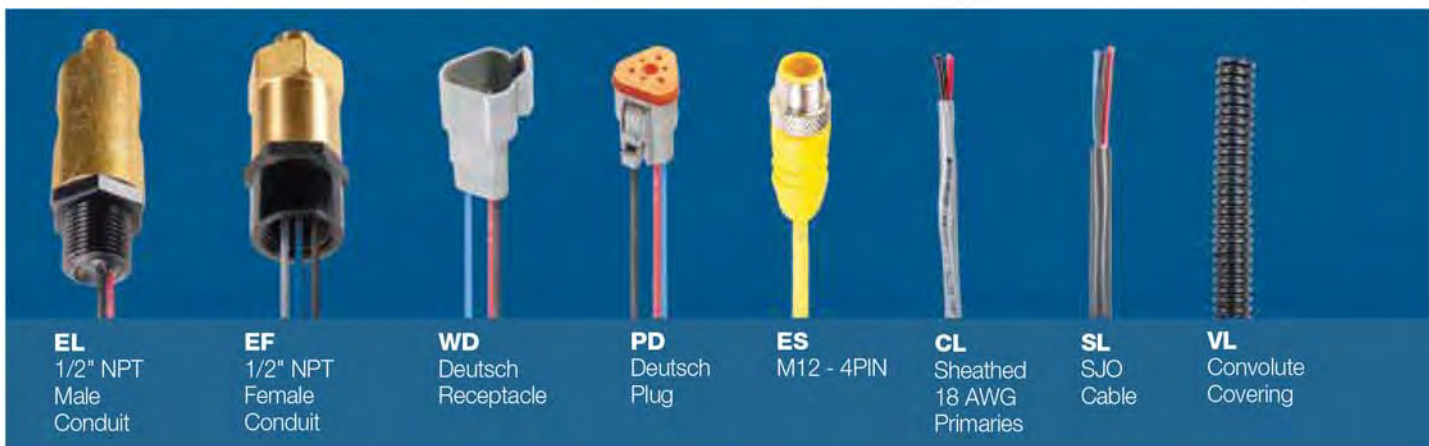
We offer a growing selection of connections, and if you want something else, just ask us for it.



HF DIN43650A 1/2" Conduit (Plug & Receptacle)
HH DIN43650A (Plug Only)
HR DIN43650A Strain Relief (Plug & Receptacle)
HP 9.4mm DIN (Plug Only)
HM 9.4mm DIN (Plug & Receptacle)
MP Metri-Pack Female 280 Series Sealed
NP Metri-Pack Male 280 Series Sealed



CP Metri-Pack Female 150 Series Sealed
DP Metri-Pack Male 150 Series Sealed
PP Boot (Military Connector)
QC 1/4" Male Spade Quick Connect
WL Wire Leads
WP Weather Pack (Female)
TP Weather Pack (Male)



EL 1/2" NPT Male Conduit
EF 1/2" NPT Female Conduit
WD Deutsch Receptacle
PD Deutsch Plug
ES M12 - 4PIN
CL Sheathed 18 AWG Primaries
SL SJO Cable
VL Convolute Covering

Color Code: Black – Common Red – Normally Open Blue – Normally Closed
Pin Assignments: A – Normally Open B – Common C – Normally Closed
DIN Connector Pin Assignments: #1 – Common #2 – Normally Closed #3 – Normally Open #4 – Not Used
M12 Connector Pin Assignments: #1 – Common #2 – Not Used #3 – Normally Open #4 – Normally Closed

CLARK SOLUTIONS

VP Vacuum Switch

Set Point Range, 1-29" Hg, Field Adjustable

DESCRIPTION

Model VP is a simple, reliable low cost Vacuum switch that uses a spring loaded long-life elastomeric diaphragm as the sensing element. Model VP can be provided with a factory calibrated set-point or can be field adjustable.

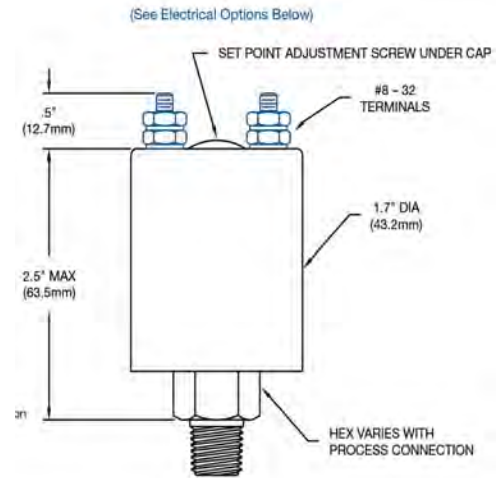
In operation, the diaphragm actuates a snap action electrical switch that insures a positive, instantaneous electrical contact under all operating conditions.



SPECIFICATIONS

- Set Point Range- 1-29" Hg (25-736 mm Hg)
- Set Point Tolerance- ± 2 " Hg (50 mm Hg)
- Max Operating pressure- 250 PSi (17 bar)
- Switch Deadband (differential)- 20-40%
- Current Rating- 5 A @250 VAC, 5A @30 VDC (Resistive)
- Media Connection- Zinc Plated Steel
- Circuit Form- SPST-NO, SPST-NC, SPDT
- Electrical Connections- See Order Table Below
- Diaphragm- Buna-N (consult us for other materials)
- Cycle Life- 1 Million Cycles
- Housing- NEMA 4, 13

DIMENSIONS (MM)



ORDERING INFORMATION

ORDER NUMBER (SEE TABLE)

A-BCD-EFG

EXAMPLES- VP-S1C2R5WL

VP-S1C2JWL

| A Model | B Connection Material | C Media Connection | D Circuit Form | E Adjustment Range | F Factory Set Point or Field Adjustable | G *Electrical Options |
|---------|-----------------------|--|----------------------------------|--|--|---|
| VP | S= Zinc Plated Steel | 1= 1/4" NPT Male 11= 9/16" SAE O-Ring (-6) 13= 1/2" SAE O-Ring (-5) 17= 1/4" BSPP Male (G1/4) | A SPST-NO B SPST-NC C SPDT | 1= 1"-5" Hg 2= 4"-15" Hg 3= 10"-29" Hg | Rxx=Rising, factory preset, specify switch point Fxx=Falling, factory preset, specify switch point J=Rising Adjustable G=Falling Adjustable | - = Screw Terminals (Standard) WL= Wire Leads 18" WP= Weather Pack HR= DIN43650A Connector MP= Metri-Pack AT= 10 A @ 125/250 VAC 5 A @ 30 VDC AU= Gold Plate/Alloy for low currents *See next page for more choices |

More about changing switch state.....

The snap-action design will maintain its state with contacts either open or closed, until a precise set point is reached when it will snap over center to a new state. It will remain in that state until a distinct change towards its original setting is sensed, at which time it will snap back to its original state.

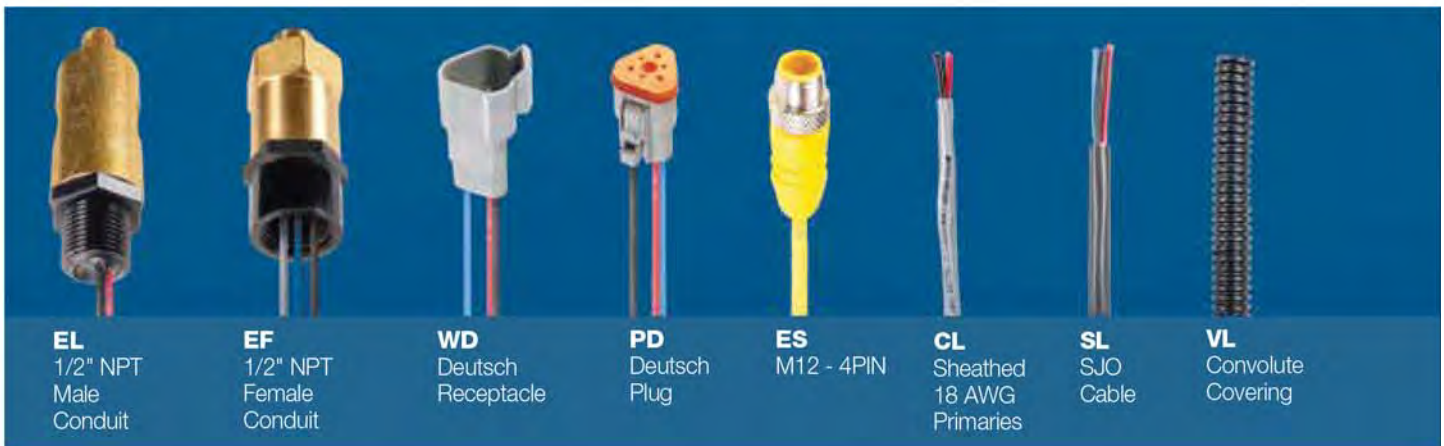
The design's snap-action feature prevents contact intermittency near its switch point, which is common in creeper designs. As system pressures fluctuate, our switches inherent differential prevents searching. Only the highest quality snap-action switches are used. The switches are UL, CSA, and military approved.

The elastomer diaphragm, which moves a precise .040 of an inch, ensures accurate, instantaneous contact under all operating conditions. While nitrile is preferred for general use, other materials are available.

A COMPREHENSIVE SELECTION OF ELECTRICAL CONNECTIONS

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We offer a growing selection of connections, and if you want something else, just ask us for it.



| | | | | |
|---------------------------------------|--------------------------|-----------------------------|-------------------------------|-----------------------------|
| Color Code: | Black – Common | Red – Normally Open | Blue – Normally Closed | |
| Pin Assignments: | A – Normally Open | B – Common | C – Normally Closed | |
| DIN Connector Pin Assignments: | #1 – Common | #2 – Normally Closed | #3 – Normally Open | #4 – Not Used |
| M12 Connector Pin Assignments: | #1 – Common | #2 – Not Used | #3 – Normally Open | #4 – Normally Closed |

CLARK SOLUTIONS

VM Vacuum Switch

Set Point Range, 4-29" Hg, Factory Preset

DESCRIPTION

Model VM is a simple, reliable low cost Vacuum switch that uses a spring loaded long-life elastomeric diaphragm as the sensing element. Model VM can be provided with a factory calibrated set-point or can be field adjustable.

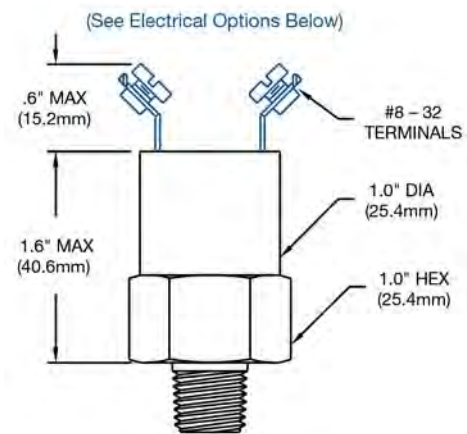
In operation, the diaphragm actuates a snap action electrical switch that insures a positive, instantaneous electrical contact under all operating conditions.



SPECIFICATIONS

- Set Point Range- 4-30" Hg (102-762 mm Hg)
- Set Point Tolerance- ± 1 " Hg or 5% (25 mm Hg)
- Max Operating pressure- 250 PSI (17 bar)
- Switch Deadband (differential)- 20-40%
- Current Rating-
- Media Connection- Standard: Brass (Optional: Aluminum, Nickel Plating, Delrin, 303 SS, 316 SS)
- Circuit Form- SPST-NO, SPST-NC, SPDT
- Electrical Connections- See Order Table Below
- Diaphragm- Buna-N
- Cycle Life- 1 Million Cycles
- Housing: NEMA 4, 13

DIMENSIONS (MM)



ORDERING INFORMATION

ORDER NUMBER (SEE TABLE)
A-BCD-EFG

EXAMPLE- LM-B1C-150R-4WL

| A Model | B Connection Material | C Media Connection | D Circuit Form | E Fixed Set Point | F Set Point Direction | G *Electrical Options |
|---------|---|--|----------------------------------|----------------------|-------------------------|---|
| VM | A= Aluminum B= Brass (Standard) N= Nickel Plating P= Delrin S= Zinc Plated Steel T= 303 Stainless Steel U= 316 Stainless Steel | 1= 1/4" NPT Male 2= 1/8" NPT Male 11= 9/16" SAE O-Ring (-6) 17= 1/4" BSPP Male (G1/4) | A SPST-NO B SPST-NC C SPDT | Specify 4"-29" Hg | R= Rising F= Falling | - = Screw Terminals (Standard) WL= Wire Leads WP= Weather Pack HR= DIN43650A Connector MP= Metri-Pack AT= 10 A @ 125/250 VAC 5 A @ 30 VDC AU= Gold Plate/Alloy for low currents *See next page for more choices |

More about changing switch state....

The snap-action design will maintain its state with contacts either open or closed, until a precise set point is reached when it will snap over center to a new state. It will remain in that state until a distinct change towards its original setting is sensed, at which time it will snap back to its original state.

The design's snap-action feature prevents contact intermittency near its switch point, which is common in creeper designs. As system pressures fluctuate, our switches inherent differential prevents searching. Only the highest quality snap-action switches are used. The switches are UL, CSA, and military approved.

The elastomer diaphragm, which moves a precise .040 of an inch, ensures accurate, instantaneous contact under all operating conditions. While nitrile is preferred for general use, other materials are available.

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HF

DIN43650A
1/2" Conduit
(Plug & Receptacle)

HH

DIN43650A
(Plug Only)

HR

DIN43650A
Strain Relief
(Plug & Receptacle)

HP

9.4mm DIN
(Plug Only)

HM

9.4mm DIN
(Plug & Receptacle)

MP

Metri-Pack
Female 280
Series Sealed

NP

Metri-Pack
Male 280
Series Sealed



CP

Metri-Pack
Female 150
Series Sealed

DP

Metri-Pack
Male 150
Series Sealed

PP

Boot
(Military
Connector)

QC

1/4" Male
Spade Quick
Connect

WL

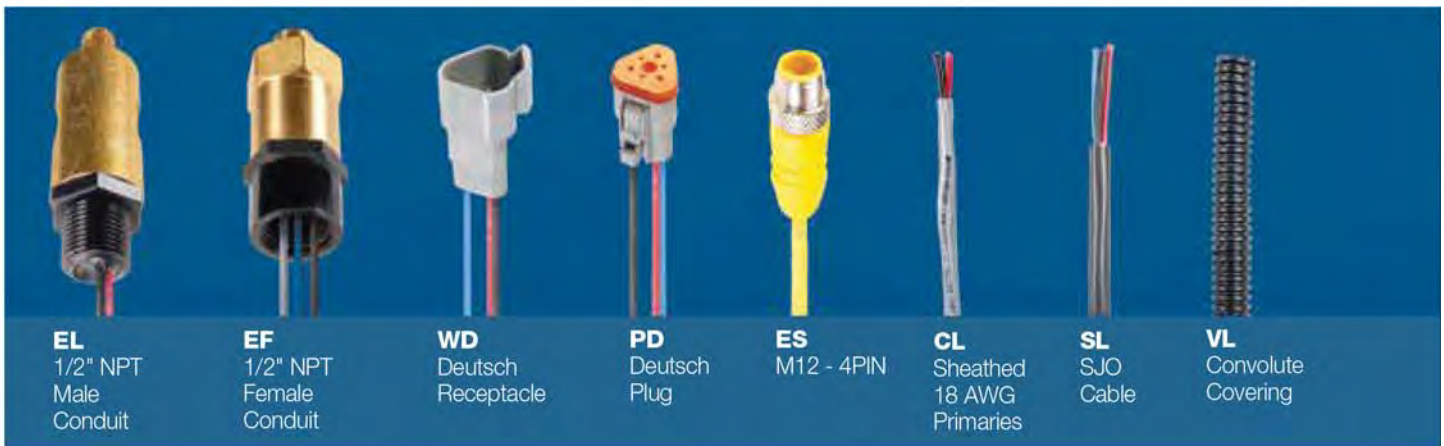
Wire Leads

WP

Weather Pack
(Female)

TP

Weather Pack
(Male)



EL

1/2" NPT
Male
Conduit

EF

1/2" NPT
Female
Conduit

WD

Deutsch
Receptacle

PD

Deutsch
Plug

ES

M12 - 4PIN

CL

Sheathed
18 AWG
Primaries

SL

SJO
Cable

VL

Convolute
Covering

Color Code: **Black** – Common **Red** – Normally Open **Blue** – Normally Closed
Pin Assignments: **A** – Normally Open **B** – Common **C** – Normally Closed
DIN Connector Pin Assignments: **#1** – Common **#2** – Normally Closed **#3** – Normally Open **#4** – Not Used
M12 Connector Pin Assignments: **#1** – Common **#2** – Not Used **#3** – Normally Open **#4** – Normally Closed

CLARK SOLUTIONS NV Vacuum Switch

Set Point Range, 3-29" Hg, Field Adjustable

DESCRIPTION

Model NV is a simple, reliable low cost Vacuum switch that uses a spring loaded long-life elastomeric diaphragm as the sensing element. Model NV can be provided with a factory calibrated setpoint or can be field adjustable.

In operation, the diaphragm actuates a snap action electrical switch that insures a positive, instantaneous electrical contact under all operating conditions.



SPECIFICATIONS

- Set Point Range- 3-29" Hg (76-736 mm Hg)
- Set Point Tolerance- ± 2 " Hg (50 mm Hg)
- Max Operating pressure- 250 Psi (17 bar)
- Switch Deadband (differential)- 20-40%
- Current Rating- 5 A @250 VAC, 5A @30 VDC (Resistive)
- Media Connection- Brass Standard, Optional: Aluminum, Nickel Plating, Delrin, 303 SS, 316 SS
- Circuit Form- SPST-NO, SPST-NC, SPDT
- Electrical Connections- See Order Table Below
- Diaphragm- Buna-N (consult us for other materials)
- Cycle Life- 1 Million Cycles
- Housing- NEMA 4, 13

ORDERING INFORMATION

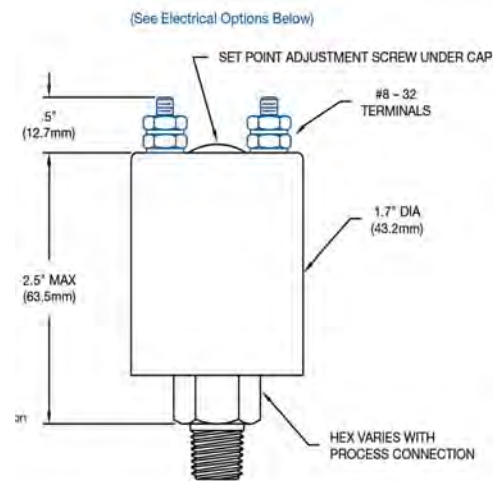
ORDER NUMBER (SEE TABLE)

A-BCD-EFG

EXAMPLES- NV-B1C-1R6WP

NV-B1C-1JWP

DIMENSIONS (MM)



| A Model | B Connection Material | C Media Connection | D Circuit Form | E Adjustment Range | F Factory Set Point or Field Adjustable | G *Electrical Options |
|---------|---|--|----------------------------------|------------------------------|--|---|
| NV | A= Aluminum B= Brass (Standard) N= Nickel Plating P= Delrin T= 303 Stainless Steel U= 316 Stainless Steel | 1= 1/4" NPT Male 3= 3/4" UNF SAE O-Ring (-5) 17= 1/4" BSPP Male (G1/4) | A SPST-NO B SPST-NC C SPDT | 1= 3"-12" Hg 2= 8"-29" Hg | Rxx=Rising, factory preset, specify switch point Fxx=Falling, factory preset, specify switch point J=Rising Adjustable G=Falling Adjustable | - = Screw Terminals (Standard) WL= Wire Leads 18" WP= Weather Pack HR= DIN43650A Connector MP= Metri-Pack AT= 10 A @ 125/250 VAC 5 A @ 30 VDC AU= Gold Plate/Alloy for low currents *See next page for more choices |

More about changing switch state.....

The snap-action design will maintain its state with contacts either open or closed, until a precise set point is reached when it will snap over center to a new state. It will remain in that state until a distinct change towards its original setting is sensed, at which time it will snap back to its original state.

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HF
DIN43650A
1/2" Conduit
(Plug & Receptacle)

HH
DIN43650A
(Plug Only)

HR
DIN43650A
Strain Relief
(Plug & Receptacle)

HP
9.4mm DIN
(Plug Only)

HM
9.4mm DIN
(Plug & Receptacle)

MP
Metri-Pack
Female 280
Series Sealed

NP
Metri-Pack
Male 280
Series Sealed



CP
Metri-Pack
Female 150
Series Sealed

DP
Metri-Pack
Male 150
Series Sealed

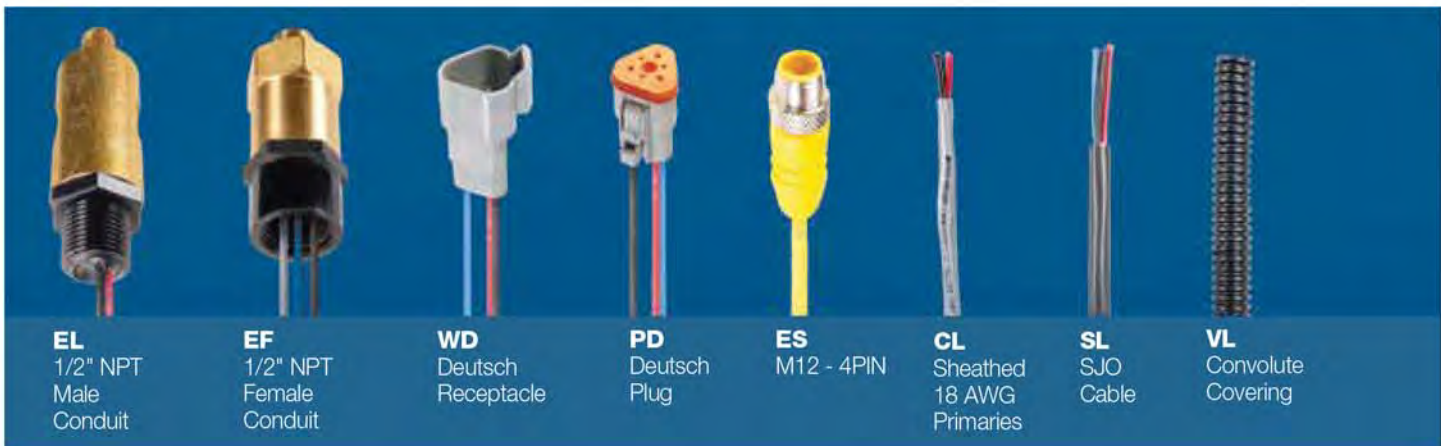
PP
Boot
(Military
Connector)

QC
1/4" Male
Spade Quick
Connect

WL
Wire Leads

WP
Weather Pack
(Female)

TP
Weather Pack
(Male)



EL
1/2" NPT
Male
Conduit

EF
1/2" NPT
Female
Conduit

WD
Deutsch
Receptacle

PD
Deutsch
Plug

ES
M12 - 4PIN

CL
Sheathed
18 AWG
Primaries

SL
SJO
Cable

VL
Convolute
Covering

Color Code: **Black** – Common **Red** – Normally Open **Blue** – Normally Closed
Pin Assignments: **A** – Normally Open **B** – Common **C** – Normally Closed
DIN Connector Pin Assignments: **#1** – Common **#2** – Normally Closed **#3** – Normally Open **#4** – Not Used
M12 Connector Pin Assignments: **#1** – Common **#2** – Not Used **#3** – Normally Open **#4** – Normally Closed

AMR

THERM 2420-1L Portable Temperature Instrument

For Thermocouple Types K, N, L, J, U, T, S

DESCRIPTION

Model MA2420 is a handy temperature measurement instrument with built in display. It features 7 selectable measuring ranges for thermocouple types K, N, L, J, U, T & S.

The unit is easy to operate by means of 7 keys. It incorporates a generously dimensioned 2-row 7/16 segment display including units.

The unit of measure is °F or °C. Measuring functions include measured value with cold junction compensation, thermal voltage mV, zero setting, saving of maximum and minimum values, and hold function.

Test functions include segment monitoring, range monitoring, sensor breakage indication, battery voltage check and display.

SPECIFICATIONS

Measuring input: For thermocouple via miniature flat connector

A/D converter: delta-sigma, 15-bit resolution Measuring ranges:

| | |
|-------------------|----------------|
| NiCr-Ni(K) | -200...+1370°C |
| NiCroSil-Nisil(N) | -200...+1300°C |
| Fe-CuNi(L) | -200...+900°C |
| Fe-CuNi(J) | -200...+950°C |
| CCu-CuNi(U) | -200...+600°C |
| CCu-CuNi(T) | -200...+400°C |
| PtRh10-Pt(S) | 0 ...1760 °C |

Resolution: 0.1 °C

Linearization Accuracy: for thermocouples, types K, N, L, J, U, T: ±0.05 °C ±0.05% of measured value; type S: ±0.3 °C

Measuring Rate: 2.5 mops (measuring operations per second)

System Accuracy: ±0.1% of measured value ±3 digits

Nominal Temperature: 22°C ±2 °C

Temperature Drift: 0.01% / °C

Cold junction compensation: effective in range -30 to +80 °C (accuracy ± 0.2 °C ± 0.01 °C / °C)

LC display:

| | |
|----------------------------|---------------------|
| 7 segments: Measured value | 5 char., 15 mm |
| Function | 4½ characters, 9 mm |
| 16 segments: Units | 2 characters, 9 mm |
| | 7 symbols |

Keypad: 7 silicone keys

Power Supply: 3 AA alkaline batteries

Current Consumption: approx. 10mA

Housing: LxWxH 127 x 83 x 42 mm ABS (maximum 70 °C)

Operating Temperature: -10 ... +60 °C

Atmospheric Humidity: (ambient)10 ... 90 % r.H. (non-condensing)

ORDERING INFORMATION

Model

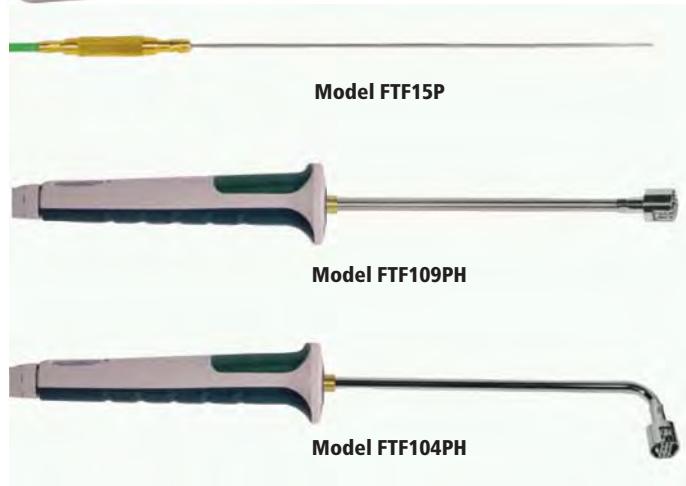
MT24201L Temperature measuring instrument including 3 AA Batteries, Instructions & test certificate

Accessories

FTF15P Temperature sensor for liquids and gases

FTF109PH Temperature sensor for surfaces

FTF104PH Temperature sensor for surfaces, angled head



| | Probe Model | | |
|---------------|------------------------|--|------------------|
| | FTF15P | FTF109PH | FTF104PH |
| Meas. Element | NiCr-Ni (Type K) | NiCr-Ni (Type K) | NiCr-Ni (Type K) |
| Probe Length | 200 mm | 180 mm | 180 mm |
| Meas. Head | 1.5 mm | 15 mm Dia. | 15 mm Dia. |
| Meas. Range | -200 to 1100 oC | -50 to 500 oC | -50 to 500 oC |
| Response Time | 1.5 s | 1 s | 1 s |
| Cable Length | 1.4 m PVC | 1.5 m PVC | 1.5 m PVC |
| Connector | Mini Flat | Mini Flat | Mini Flat |
| Notes | Sheathed line, Inconel | Tip is thermal ribbon, not elect. isolated | |

CLARK SOLUTIONS TT Bi-Metal Temperature Switch

Set Point Range, 40-300°F, Factory Preset

DESCRIPTION

Model TT is a simple, compact, reliable low cost immersion temperature switch that uses a bi-metal sensing element.

In operation, the bi-metal element has direct action contacts with minimum hysteresis. Contacts are gold diffused, fine silver.

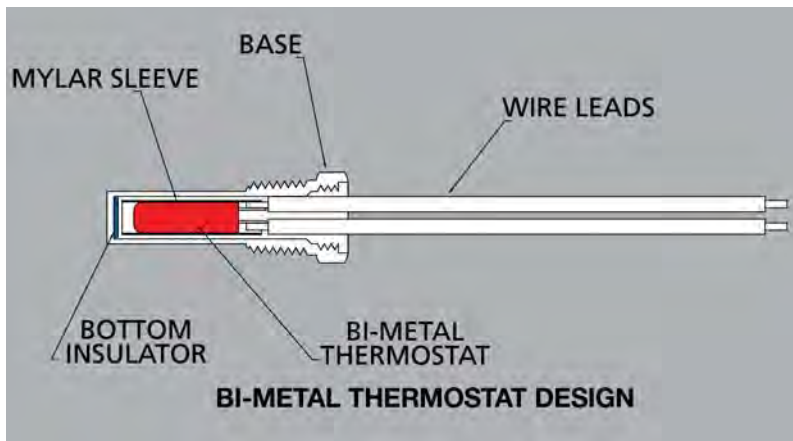
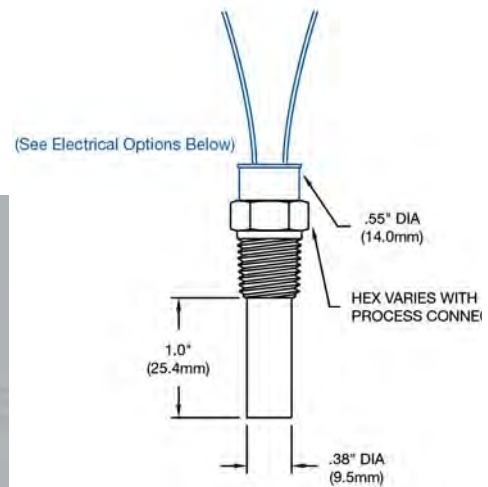
SPECIFICATIONS



- Set Point Range- 40-300°F (4-149°C)
- Set Point Tolerance- $\pm 5^\circ\text{F}$ (2.8°C)
- Maximum Temperature- 325°F (163°C)
- Max External Pressure- 5000 PSI
- Current Rating- 3 A @240 VAC, 2 A @24 VDC (Resistive)
- Probe Length- 1/2", 3/4", 1", 1-1/2", 2"
- Media Connection- Standard: Brass (Optional: 303 SS, 316 SS)
- Circuit Form- SPST-NO, SPST-NC
- Electrical Connections- See Order Chart Below for Options
- Housing- NEMA 4, 13



DIMENSIONS



ORDERING INFORMATION

ORDER NUMBER (SEE TABLE)
A-BCDE-EFG

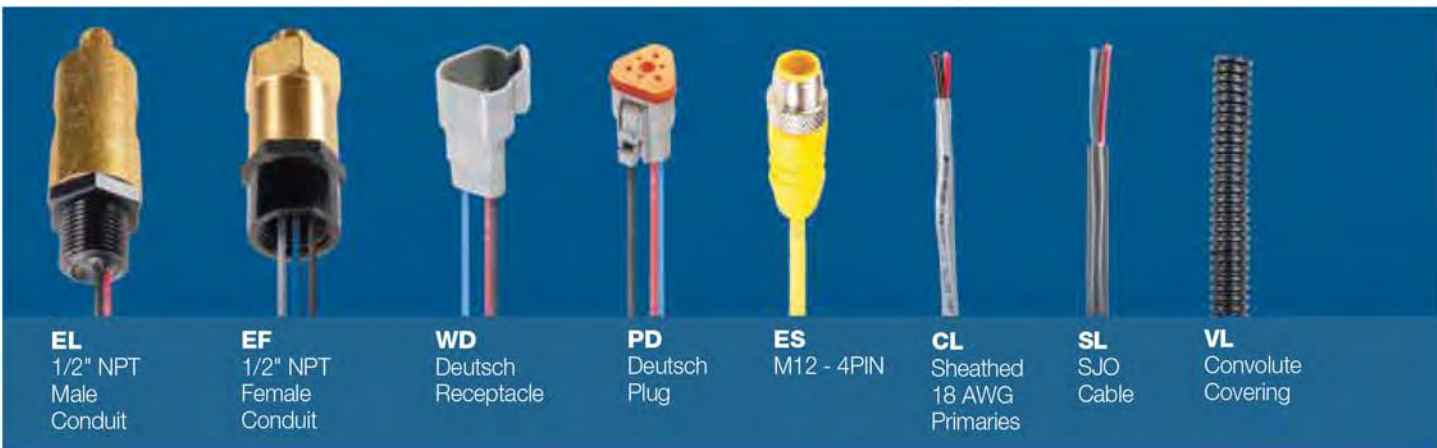
EXAMPLES- TT-B1B-150RWL

| A Model | B Probe Length | C Connection Material | D Media Connection | E Circuit Form | F Fixed Set Point | G Set Point Direction | H *Electrical Options |
|---------|---|--|--|------------------------|---|-----------------------|---|
| TT | D= 1/2" E= 3/4" F= 1" H= 1-1/2" J= 2" | B= Brass (Standard) T= 303 Stainless Steel U= 316 Stainless Steel | 1= 1/2" NPT Male 2= 3/8" NPT Male 3= 1/4" NPT Male 5= 3/4" SAE O-Ring (-8) 6= M16 x 1.5 13= 1/4" NPT (316SS) 35= M12 x 1.5 46= M14 x 1.25 | A SPST-NO B SPST-NC | Specify Between 40°F to 300°F | R=Rising F=Falling | - = Screw Terminals (Standard) WL= Wire Leads 18" QC= 1/4" Spade Connection WP= Weather Pack HR= DIN43650A Connector MP= Metri-Pack GG= Internal Ground *See next page for more choices |

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Color Code: **Black** – Common **Red** – Normally Open **Blue** – Normally Closed
 Pin Assignments: **A** – Normally Open **B** – Common **C** – Normally Closed
 DIN Connector Pin Assignments: #1 – Common #2 – Normally Closed #3 – Normally Open #4 – Not Used
 M12 Connector Pin Assignments: #1 – Common #2 – Not Used #3 – Normally Open #4 – Normally Closed

CLARK SOLUTIONS HT Bellows Type Temperature Switch

Set Point Range, 40-300°F, Factory Preset

DESCRIPTION

Model TM is a simple, compact, reliable and economical temperature switch that uses a bellows sensing element. It is similar to model TM but can switch higher loads.

The unit is shock and vibration resistant and available in a wide range of configurations. It is shipped with the switch point factory preset.

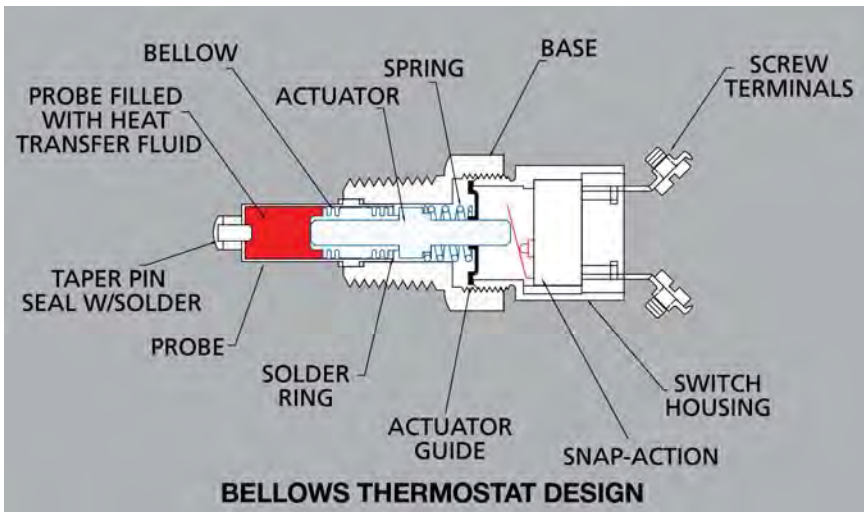
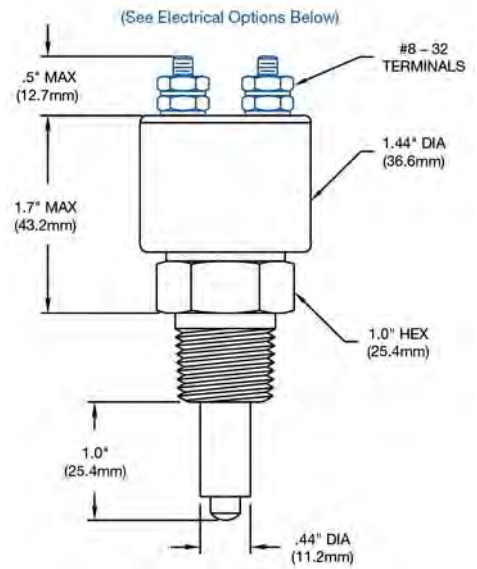
SPECIFICATIONS



- Set Point Range- 40°-300°F (4°-49°C)
- Set Point Tolerance- ±5°F (2.8°C)
- Maximum Operating Temperature- 100°F above set point (325°F max)
- Differential- 8-16°F
- Current Rating- 10 A @ 125/250 VAC 5 A @ 30 VDC
- Media Connection Standard- Brass (Optional: 303 SS, 316 SS)
- Circuit Form SPST-NO, SPST-NC or SPDT
- Electrical Connection See Order Chart Below for Options
- Maximum External Pressure 500 PSI
- Housing- NEMA 4, 13



DIMENSIONS



ORDERING INFORMATION

ORDER NUMBER (SEE TABLE)
A-BCD-EFG

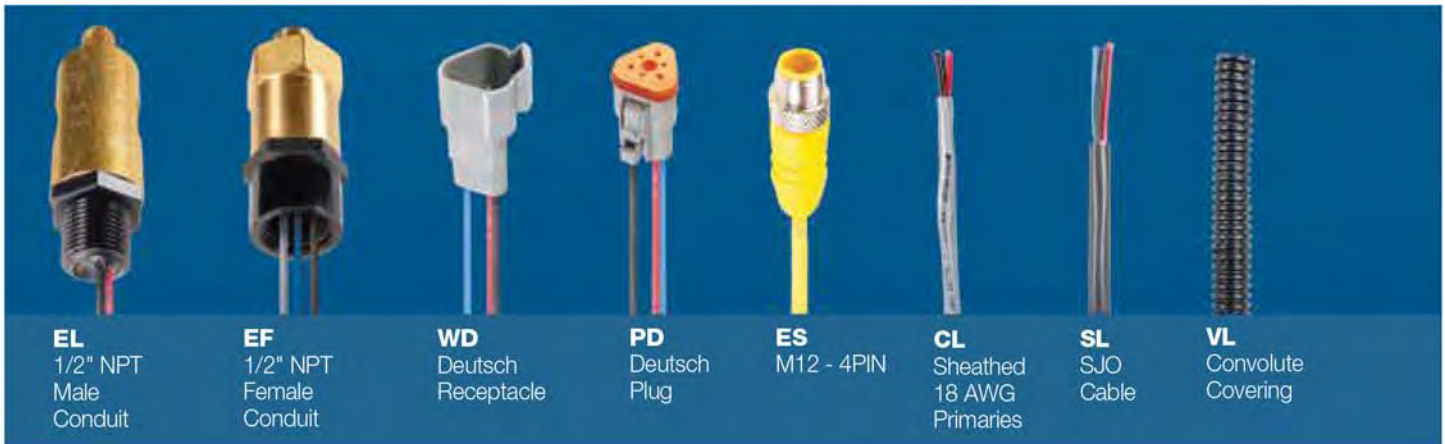
EXAMPLES- HT-B1A200RWL

| A Model | B Connection Material | C Media Connection | D Circuit Form | E Fixed Set Point | F Set Point Direction | G *Electrical Options |
|---------|--|---|-------------------------------------|---|------------------------|--|
| HT | B= Brass (Standard) T= 303 Stainless Steel U= 316 Stainless Steel | 1= 1/2" NPT Male 2= 3/8" NPT Male 6= M16 x 1.5 7= 1/2" BSPP Male (G1/2) 16= 3/8" — 19 BSPT/JIS 27= M22 x 1.5 SAE J2244 45= 1/2" BSPP 303 SS | A= SPST-NO B= SPST-NC C= SPDT | Specify Between 40°F to 300°F | R=Rising F= Falling | - = Screw Terminals (Standard) WL= Wire Leads 18" QC= 1/4" Spade Connection WP= Weather Pack HR= DIN43650A Connector MP= Metri-Pack AT= 10 A @ 125/250 VAC, 5 A @ 30 VDC GG= Internal Ground AU Gold Plate/Alloy for low currents *See next page for more choices |

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| | | | | |
|---------------------------------------|--------------------------|-----------------------------|-------------------------------|-----------------------------|
| Color Code: | Black – Common | Red – Normally Open | Blue – Normally Closed | |
| Pin Assignments: | A – Normally Open | B – Common | C – Normally Closed | |
| DIN Connector Pin Assignments: | #1 – Common | #2 – Normally Closed | #3 – Normally Open | #4 – Not Used |
| M12 Connector Pin Assignments: | #1 – Common | #2 – Not Used | #3 – Normally Open | #4 – Normally Closed |

CLARK SOLUTIONS TM Bellows Type Temperature Switch

Set Point Range, 40-300°F, Factory Preset

DESCRIPTION

Model TM is a simple, compact, reliable and economical temperature switch that uses a bellows sensing element.

The unit is shock and vibration resistant and available in a wide range of configurations. It is shipped with the switch point factory preset.

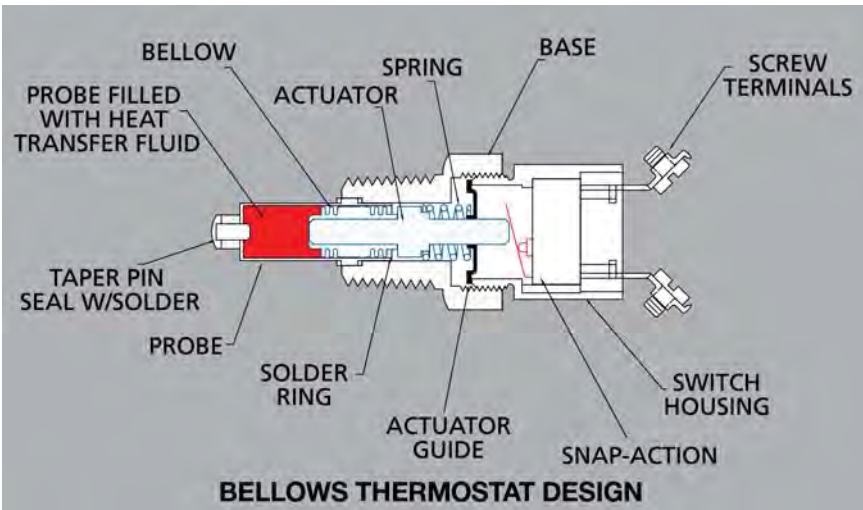
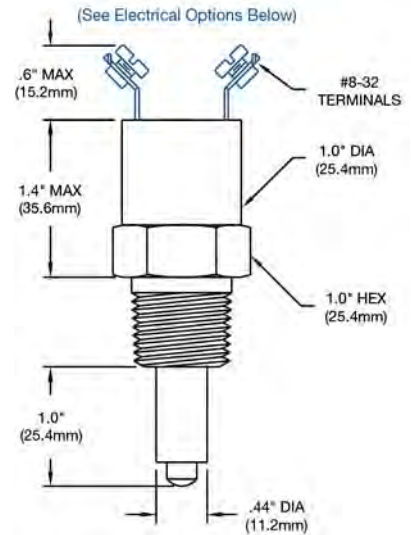
SPECIFICATIONS



- Set Point Range- 40°-300°F (4°-49°C)
- Set Point Tolerance- ±5°F (2.8°C)
- Maximum Operating Temperature- 100°F above set point (325°F max)
- Differential- 8-16°F
- Current Rating- 5 A @ 250 VAC, 5 A @ 30 VDC (Resistive)
- Media Connection Standard- Brass (Optional: 303 SS, 316 SS)
- Circuit Form SPST-NO, SPST-NC or SPDT
- Electrical Connection See Order Chart Below for Options
- Maximum External Pressure 500 PSI
- Housing- NEMA 4, 13



DIMENSIONS



ORDERING INFORMATION

ORDER NUMBER (SEE TABLE)

A-BCD-EFG

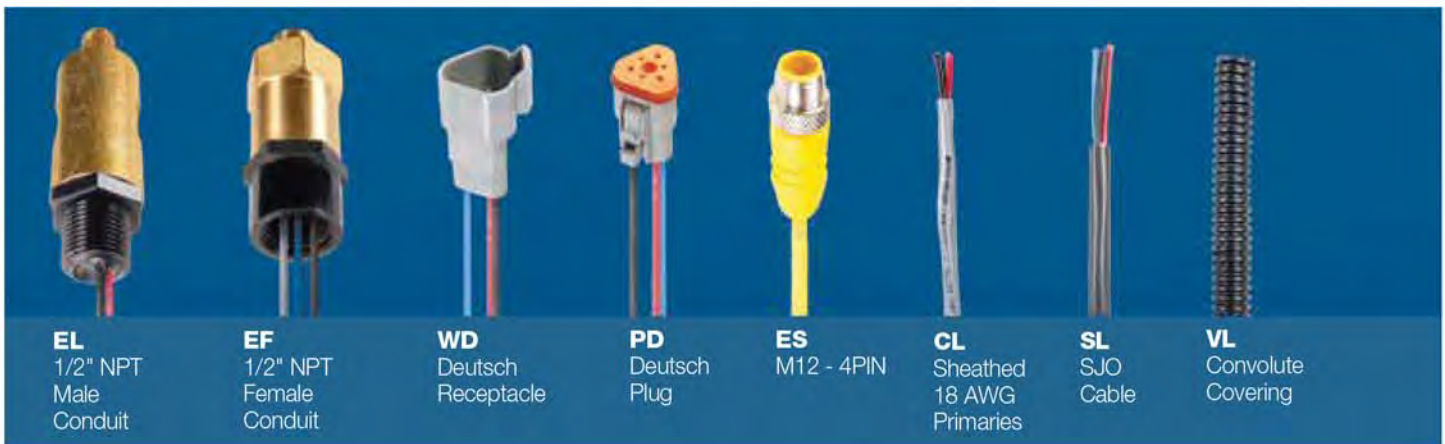
EXAMPLES- TD-B1A200RWL

| A Model | B Connection Material | C Media Connection | D Circuit Form | E Fixed Set Point | F Set Point Direction | G *Electrical Options |
|---------|--|---|-------------------------------------|---|------------------------|--|
| TD | B= Brass (Standard) T= 303 Stainless Steel U= 316 Stainless Steel | 1= 1/2" NPT Male 2= 3/8" NPT Male 6= M16 x 1.5 7= 1/2" BSPP Male (G1/2) 16= 3/8" — 19 BSPT/JIS 27= M22 x 1.5 SAE J2244 45= 1/2" BSPP 303 SS | A= SPST-NO B= SPST-NC C= SPDT | Specify Between 40°F to 300°F | R=Rising F= Falling | - = Screw Terminals (Standard) WL= Wire Leads 18" QC= 1/4" Spade Connection WP= Weather Pack HR= DIN43650A Connector MP= Metri-Pack AT= 10 A @ 125/250 VAC, 5 A @ 30 VDC GG= Internal Ground AU Gold Plate/Alloy for low currents *See next page for more choices |

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| | | | | |
|---------------------------------------|--------------------------|-----------------------------|-------------------------------|-----------------------------|
| Color Code: | Black – Common | Red – Normally Open | Blue – Normally Closed | |
| Pin Assignments: | A – Normally Open | B – Common | C – Normally Closed | |
| DIN Connector Pin Assignments: | #1 – Common | #2 – Normally Closed | #3 – Normally Open | #4 – Not Used |
| M12 Connector Pin Assignments: | #1 – Common | #2 – Not Used | #3 – Normally Open | #4 – Normally Closed |

CLARK SOLUTIONS

TD Snap-Disc Thermostat Temperature Switch

Set Point Range, 150-300°F, Factory Preset

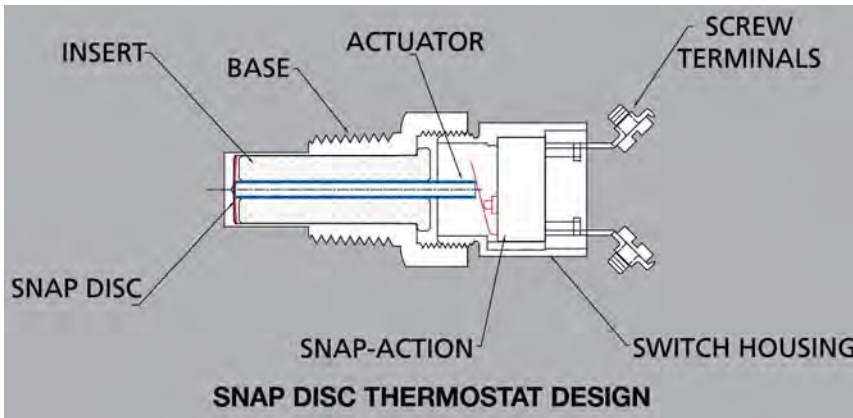
DESCRIPTION

Model TD is a simple, compact, reliable and economical temperature switch that uses a snap-disc sensing element.

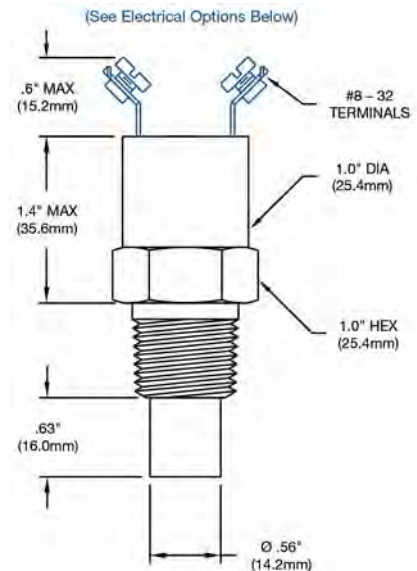
The unit is shock and vibration resistant and available in a wide range of configurations. It is shipped with the switch point factory preset.

SPECIFICATIONS

- Set Point Range-150°-300°F (65°-149°C)
- Set Point Tolerance- ±5°F (2.8°C)
- Maximum Operating Temperature- 325°F (163°C)
- Differential- 8-16°F
- Current Rating- 5 A @ 250 VAC, 5 A @ 30 VDC (Resistive)
- Media Connection Standard- Brass (Optional: 303 SS, 316 SS)
- Circuit Form- SPST-NO, SPST-NC or SPDT
- Electrical Connection- See Order Chart Below for Options
- Maximum External Pressure- 2500 PSI
- Housing- NEMA 4, 13



DIMENSIONS



ORDERING INFORMATION

ORDER NUMBER (SEE TABLE)

A-BCD-EFG

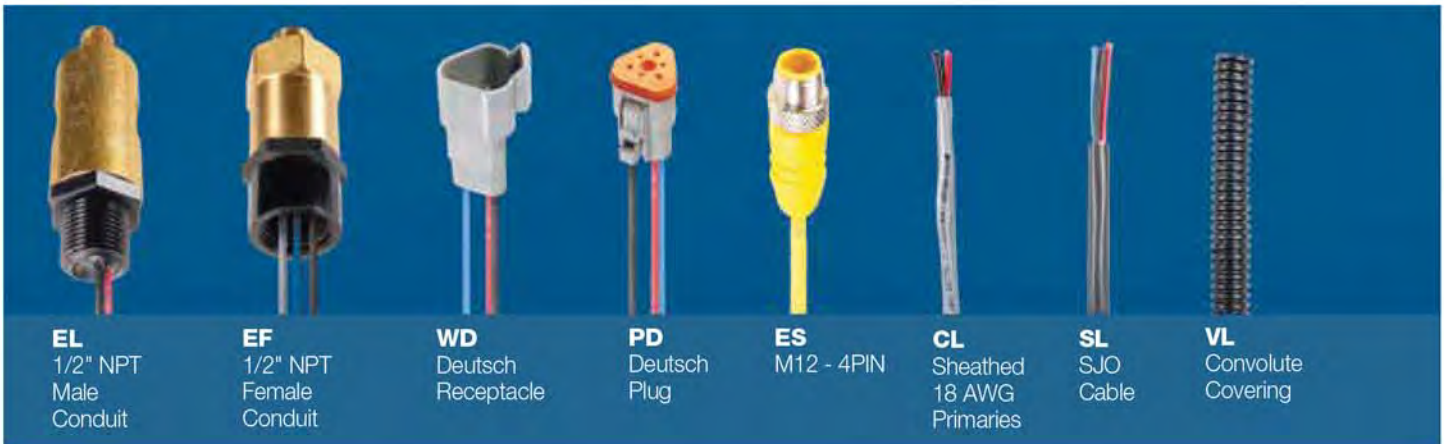
EXAMPLES- TD-B1A200RWL

| A Model | B Connection Material | C Media Connection | D Circuit Form | E Fixed Set Point | F Set Point Direction | G *Electrical Options |
|---------|--|--|-------------------------------------|--|-----------------------|--|
| TD | B= Brass (Standard) T= 303 Stainless Steel U= 316 Stainless Steel | 1= 1/2" NPT Male 2= 3/8" NPT Male 5= 3/4" SAE O-Ring (-8) 17= M18 x 1.5 SAE J2244 23= 1/2" BSPT (R1/2) 38= 9/16" SAE-6 J514 | A= SPST-NO B= SPST-NC C= SPDT | Specify Between 150°F to 300°F | R=Rising | - = Screw Terminals (Standard) WL= Wire Leads 18" QC= 1/4" Spade Connection WP= Weather Pack HR= DIN43650A Connector MP= Metri-Pack GG= Internal Ground *See next page for more choices |

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| | | | | |
|---------------------------------------|--------------------------|-----------------------------|-------------------------------|-----------------------------|
| Color Code: | Black – Common | Red – Normally Open | Blue – Normally Closed | |
| Pin Assignments: | A – Normally Open | B – Common | C – Normally Closed | |
| DIN Connector Pin Assignments: | #1 – Common | #2 – Normally Closed | #3 – Normally Open | #4 – Not Used |
| M12 Connector Pin Assignments: | #1 – Common | #2 – Not Used | #3 – Normally Open | #4 – Normally Closed |

CLARK

Series L007 Horizontal Mount Level Switches

Compact, Low Cost

DESCRIPTION

The L007 series horizontal mount level switches have a no-leak construction and are ideal for small tanks.

The units side-wall mount internally or externally and offer a broad range of media compatibility due to the selection of construction materials.

Model L007 operates on falling or rising level. Normally open or normally closed switch operation is easily defined by the mounting position of the switch. When normally open the float lowers with the fluid level and, conversely, when the float is mounted to rise with the fluid level, it is in a normally closed configuration.

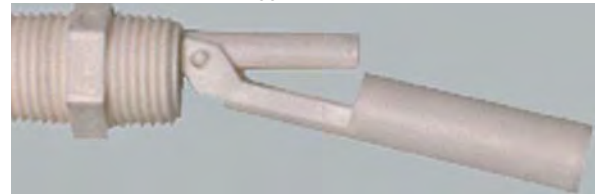
High temperature applications can be accommodated using stainless steel construction.



L007- Stainless Steel

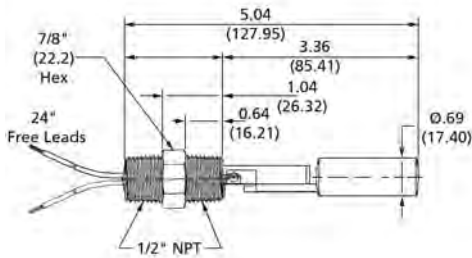


L007- PVDF

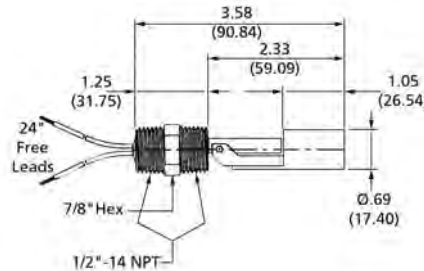


L007-Polypropylene

DIMENSIONS INCHES (MM)



L007- Stainless Steel



L007-Plastic, 1/2" NPT

Contact Rating: 240V AC/DC Max, 0.5 A, resistive; 1 A available as option

ORDERING INFORMATION

SELECT MODEL NUMBER

| Model | Mounting | Wetted Materials | SG | Temperature | Pressure |
|----------------|----------|------------------|------|--------------|----------|
| L007-0404-0403 | 1/2" NPT | PVDF | 0.85 | -13 TO 240°F | 100 PSIG |
| L007-0402-0203 | 1/2" NPT | PP | 0.85 | -13 TO 120°F | 100 PSIG |
| L007-0405-0503 | 1/2" NPT | PVC | 0.85 | -13 TO 140°F | 50 PSIG |
| L007-0408-0803 | 1/2" NPT | SS | 0.85 | -13 TO 300°F | 300 PSIG |

CLARK Series L070 Horizontal Mount Level Switches

Compact, Stainless Steel Construction

DESCRIPTION

The L070 level switch is mounted in the horizontal orientation to monitor high and low liquid levels. The L070 provides a switch closure to activate alarms, send signals to an I/O card or PLC, and many other level monitoring and control functions.

The L070 level switch operates by the rising and falling liquid moving a magnet into close proximity of a hermetically sealed reed switch. The magnet is encapsulated in a float device. The float mechanism has an operating specific gravity of 0.40 but can be modified to monitor the interface levels between two fluids of different specific gravities with a minimum 0.10 specific gravity differential.

The switch can be installed in either Normally-Open or Normally-Closed orientation.



L070

FEATURES

- ALL STAINLESS STEEL
- OPERATES ON FALLING OR RISING LEVEL
- RELIABLE REED SWITCH ACTION
- UL & FM APPROVED
- NEMA 4 CONSTRUCTION WITH J-BOX

SPECIFICATIONS

Process Connection: 1 1/2" NPT (other connections available)

Electrical Connection: 1/2" NPT

Electrical Rating: 100 VA SPST (240 V AC/DC maximum voltage), resistance load (optional 20 VA SPDT 240V AC/DC maximum switching)

Temperature Rating: -40°F to 300°F

Min. Media Sp.Gr.: 0.40

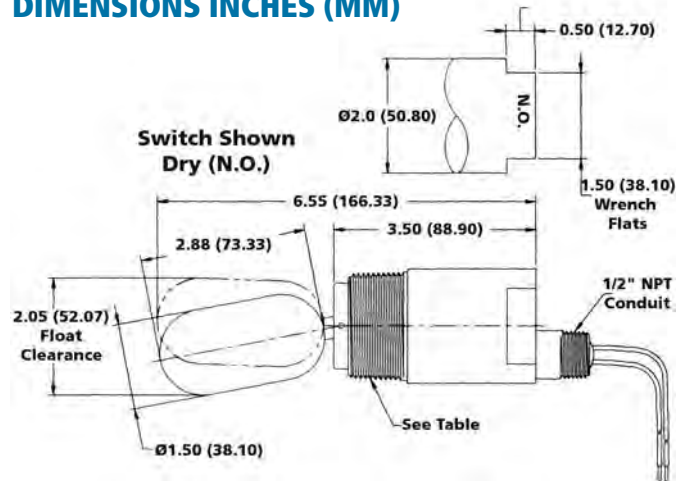
Wetted Materials: 316 SS Housing, float assembly and pivot spacers; 18-8 SS float pivot pin

Max. Pressure: 1500 PSIG

Approvals: UL & CUL

FM-EP (CL I,II, III, Div 1, Groups C, D, E, F, & G)

DIMENSIONS INCHES (MM)



ORDERING INFORMATION

SELECT MODEL NUMBER

| Mounting | Wetted Materials | SG | Temperature | Pressure | Model Number |
|---------------|------------------|------|---------------|-----------|----------------|
| 1 1/2" NPT | SS | 0.40 | -40° to 300°F | 1500 PSIG | L070-0808-0803 |
| 2" NPT | SS | 0.40 | -40° to 300°F | 1500 PSIG | L070-0908-0803 |
| 2" 150#FL | SS | 0.40 | -40° to 300°F | 230 PSIG | L070-7308-0803 |
| 2 1/2" 150#FL | SS | 0.40 | -40° to 300°F | 230 PSIG | L070-7408-0803 |
| 3" 150#fl | SS | 0.40 | -40° to 300°F | 230 PSIG | L070-7508-0803 |
| 4" #150FL | SS | 0.40 | -40° to 300°F | 230 PSIG | L070-7608-0803 |
| 2" 300#FL | SS | 0.40 | -40° to 300°F | 600 PSIG | L070-8408-0803 |
| 2 1/2" 300#FL | SS | 0.40 | -40° to 300°F | 600 PSIG | L070-8508-0803 |
| 3" 300#FL | SS | 0.40 | -40° to 300°F | 600 PSIG | L070-8608-0803 |
| 4" 300#FL | SS | 0.40 | -40° to 300°F | 600 PSIG | L070-8708-0803 |

CLARK

Series L312 & L500 Custom Level Switches

Compact, 1-6 Reed Switch Outputs

DESCRIPTION

The L312 series level switches are individually designed from over 360 component parts to create a custom switch available in lengths from one foot (304mm) to four feet (1.2m). Switch point tolerance is +/- 1/8" (3mm).

The L500 series level switches are individually designed from over 1,400 component parts to create a custom switch available in lengths from one foot (304mm) to 11 feet (3.3m). Switch point tolerance is +/- 1/8" (3mm).

To specify, review the choices in mounting types, stem material, float size and material, switching points, and electrical specifications. Fax or call us to review.



L500



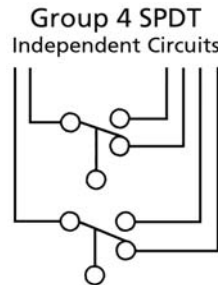
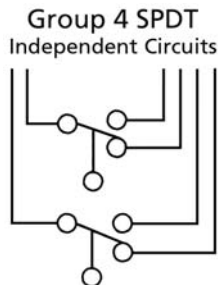
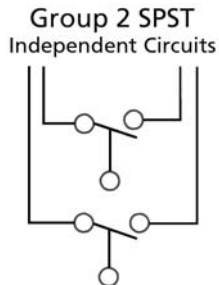
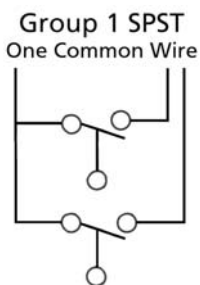
L312

| Table 1, Mounting Types Model L312 | | Model L500 | |
|---------------------------------------|-------------|------------|---------------------|
| Code | Mounting | Code | Mounting |
| 00 | No Mounting | 04 | 1/2" NPT |
| 01 | 1/8" NPT | 07 | 1/4" NPT |
| 02 | 1/4" NPT | 09 | 2" NPT |
| 03 | 3/8" NPT | 75 | 3" 150# ANSI Flange |
| 05 | 3/4" NPT | | |
| 06 | 1" NPT | | |
| 07 | 1 1/4" NPT | | |

| Table 2, Stem Materials Model L312 | | Model L500 | |
|---------------------------------------|-------------------|------------|----------|
| Code | Material | Code | Material |
| BR | Brass | BR | Brass |
| PV | PVC | SS | 316SS |
| SS | 316SS | | |
| TF | Teflon (max. 24") | | |
| PS | Polysulfone | | |

| Table 3, Float Materials and Dimensions Model L312 | | | Model L500 | | |
|---|----------|------------|------------|----------|--------------|
| Code | Material | Dimensions | Code | Material | Dimensions |
| 1010BN | Buna N | 1"x1" | 1217BN | Buna N | 1.25"x1.875" |
| 1010PV | PVC | 1"x1" | 1817BN | Buna N | 1.875"x1.75" |
| 1010STD | 316SS | 1"x1" | 2000 | 316SS | 2" Sphere |
| 1410 | 316SS | 1.5"x1" | 1513 | 316SS | 1.5"x1.3" |
| 1000LW | 316SS | 1" Sphere | | | |
| 0815LSG | 316SS | 0.9"x1.5" | | | |

| Table 4, Reed Switch Electrical Specifications Model L312 | | Model L500 | |
|--|--|------------|--|
| Code | Description | Code | Description |
| G1 | SPST switches, share a common wire, max 5 switch points | G1 | SPST switches, circuits share a common wire, max 6 switch points |
| G2 | SPST switches, independent circuits, max 3 switch points | G2 | SPST switches, independent circuits, max 6 switch points |
| | | G3 | SPDT switches, circuits share a common wire, max 6 switch points |
| | | G4 | SPDT switches, independent circuits, max 6 switch points |



Only two actuation points are shown

Each reed switch requires one float except in certain special applications (consult factory). For special applications, a single float can be used to activate two switch points, though these points must have a minimum separation of 1/4" (6 mm). The maximum number of actuation levels depends on the wiring type selected.

Ratings:

L312: 20 VA@120VAC SPST

50VA@240 VAC SPST

L500: 20,50 or 100 VA@120 VAC SPDT

50VA @240 VAC SPST

Connection: 24" Free Leads #22 AWG

Mounting Attitude: Vertical ±30°

| Table 5, Operating Specifications for Material Combinations Model L312 | | | | | Model L500 | | | | |
|---|-----------------------------|---------------|----------|------|------------|----------------|---------------|----------|------|
| Float Code | Mounting Code | Temperature | Pressure | *SG | Float Code | Mounting Code | Temperature | Pressure | *SG |
| 1010BN | 00, 01, 02, 03, 06, 07 | -40 to +180°F | 150 PSIG | 0.80 | 1217BN | 04, 07, 09, 75 | -40 to +180°F | 150 PSIG | 0.65 |
| 1010PV | 00, 01, 02, 03, 06, 07 | -40 to +140°F | 50 PSIG | 0.95 | 1817BN | 04, 09, 75 | -40 to +180°F | 150 PSIG | 0.65 |
| 1010STD | 00, 01, 02, 03, 06, 07 | -40 to +300°F | 600 PSIG | 0.95 | 2000 | 04, 09, 75 | -40 to +300°F | 750 PSIG | 0.75 |
| 1410 | 00, 01, 02, 03 | -40 to +300°F | 100 PSIG | 0.70 | 1513 | 04, 09, 75 | -40 to +300°F | 120 PSIG | 0.85 |
| 1000LW | 00, 01, 02, 03, 06, 07 | -40 to +300°F | 275 PSIG | 0.80 | | | | | |
| 0815LSG | 00, 01, 002, 03, 05, 06, 07 | -40 to +300°F | 200 PSIG | 0.85 | | | | | |

*SG refers to recommended minimum liquid specific gravity

ACTUATION LEVEL DIMENSIONS

- A= Minimum distance from actuation point to bottom of mounting.
 B= Minimum distance between actuation levels.
 C= Minimum distance from end of unit to lowest actuation point.
 D= Minimum distance between actuation point when a single float is used to actuate two switches.

Notes:

- 1) A, B, and C dimensions are based on a specific gravity of 1.0.
- 2) One float for two actuation levels can be used only with a 20VA switch.
- 3) Actuation levels are calibrated on descending fluid level, with water as the fluid, unless otherwise specified.
- 4) Standard tolerance on actuation levels is $\pm 1/8"$ (3mm).

| Dimensions | | Model L312 | | | | Model L500 | | | | |
|------------|--|------------|----------|---------|------|------------|--------|----|----|------|
| Float Code | | A | B | C | D | Float Code | A | B | C | D |
| 1010BN | | 1" | 1 3/4" | 1" | 1/8" | 1217BN | 1 1/2" | 3" | 2" | 1/4" |
| 1010PV | | 1" | 1 3/4" | 1" | 1/8" | 1817BN | 1 1/2" | 3" | 2" | 1/4" |
| 1010STD | | 1" | 1 3/4" | 1" | 1/8" | 2000 | 1 1/2" | 3" | 2" | 1/4" |
| 1410 | | 1" | 1 3/4" | 1" | 1/8" | 1513 | 1 1/2" | 3" | 2" | 1/4" |
| 1000LW | | 1" | 1 13/16" | 1" | 1/8" | | | | | |
| 0815LSG | | 1" | 2 7/16" | 1 7/16" | 1/8" | | | | | |

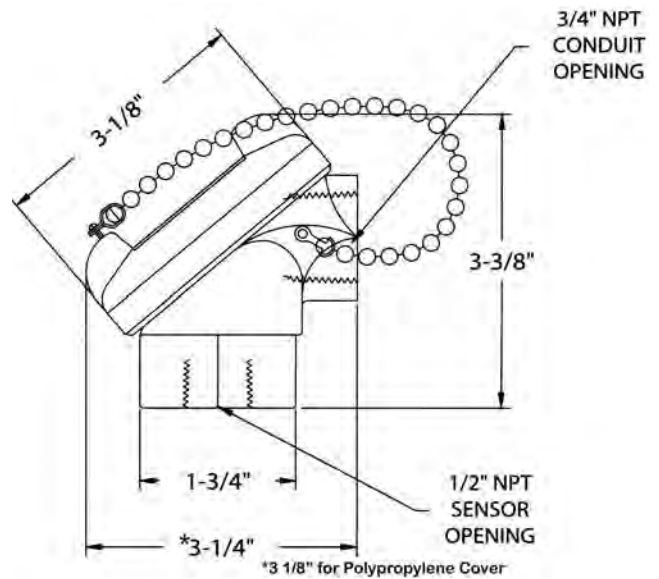
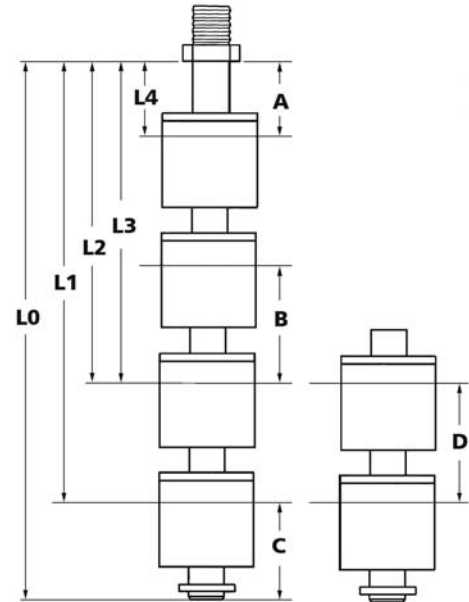
ORDERING INFORMATION

- 1) Select Model Series: L312 or L500
- 2) Select Mounting Type: Table 1
- 2) Select Stem Material: Table 2
- 4) Select Float Material: Table 3
- 5) Select Wiring Type: Table 4
- 6) Select Switch Rating:

| | |
|-------------|-------------|
| L312 | L500 |
| 3 VA SPDT | 30 VA SPDT |
| 20 VA SPST | 50 VA SPST |
| 50 VA SPST | 100 VA SPST |
- 7) Select Lead Wire Length: 12", 24" or other (specify)
- 8) Advise Switch Actuation Levels:

| Level | Distance to Actuation level (Inches)* | SPST Switch Operation** (Check Type) | |
|--------|---------------------------------------|--------------------------------------|------|
| | | N.O. | N.C. |
| L6 | | | |
| L5 | | | |
| L4 | | | |
| L3 | | | |
| L2 | | | |
| ***L1 | | | |
| ****L0 | | | |

- * Measured from the bottom of the mounting plug or flange
 ** Switch position is "normal" with unit dry (empty tank)
 *** L1 is the distance to the lowest actuation level with mounting "up" and is the distance to the highest actuation level with mounting "down"
 **** L0= length overall, measured from the bottom of the mounting plug or flange to the end of the unit



White Polypropylene & Die Cast Aluminum Junction Boxes

- 9) Specify if junction box option required:
 - WP= White Polypropylene rated NEMA 4X (excellent resistance to acids, alkalines and many process chemicals. Temperature rating is 198°F).
 - AL= Die cast Aluminum rated NEMA 4, 7, & 9

CLARK

Series U00X Ultrasonic Level Switch

316 Stainless Steel Construction, Actuation Lengths 1 to 100 Inches

DESCRIPTION

The U00X Series Solid-State Level Switches are reliable, low-cost liquid level controls for use in installations where mechanical float-type switches are impractical. U00X models are compatible with many liquids, regardless of the fluid's density or conductivity. The units require no calibration, withstand pressures up to 2,000 PSIG and their compact, 7/8" diameter probes install in any orientation. U00X models are constructed from durable and easy-to-clean 316 stainless steel with probe lengths available up to 100". Optional materials include CPVC, PVDF and Hastelloy C.

An ultrasonic transmitter and receiver detect the presence of fluid between two piezoelectric crystals sealed within the sensing gap. As the gap fills with liquid, an ultrasonic wave signal passes between the crystals and either results in an output shift from 8 mA to 16 mA (U002), or activates a relay (U003 & U004).



FEATURES

-NO MOVING PARTS: PULSED 2 MHZ ULTRASONIC SIGNAL

-HORIZONTAL OR VERTICAL MOUNTING

-NO CALIBRATION REQUIRED

SPECIFICATIONS

MEASUREMENT PRINCIPLE: Ultrasonic Sound Waves Converted to Output Signal

MEASURED VARIABLE: Wet or Dry Gap Actuation

INDICATION LENGTH: 2 1/8" to 100" (5.39 cm to 254 cm)

POWER: U002: 12 to 35 VDC

U003: 12 to 35 VDC

U004: 12 to 16 VDC

SIGNAL: U002 Current Shift: Dry Gap: 8 mA (± 1 mA)

Wet Gap: 16 mA (± 1 mA)

U003 Relay Output: SPDT: 1 Amp at 30 VDC; 0.5 Amp at 150/125 VAC/DC

U004 Relay Output: SPDT: 1 Amp at 30 VDC; 0.5 Amp at 150/125 VAC/DC

"Fail-Safe" Operation on Power Loss to Normal Dry Wired Position of SPDT Switch

CABLING: 12" (305 mm) Flying Leads of 18 AWG Wire

OPERATING TEMPERATURE: -40° to +185° F (-40° to +85° C)

AMBIENT TEMPERATURE: -40° to +185° F (-40° to +85° C)

PRESSURE: 316 Stainless Steel: 2,000 PSIG (138 bar)

INGRESS PROTECTION: NEMA 4X

ENCLOSURE (OPTIONAL): Die-Cast Aluminum

MOUNT, EXT. TUBE & SENSOR TIP: 316 Stainless Steel Standard, Other Materials Available

EXPLOSION -PROOF MODELS: Call for available models U002E, U003E & U004E,

FM Approved Class1, Div1, Groups C & D; Class II/III Groups E, F & G

ORDERING INFORMATION

MODEL NUMBER : A-B-CDE

ORDER EXAMPLE: U003-55-316SS-3/4

APPLICATIONS

Water & Wastewater

Light Slurries

Food/Dairy

Oils

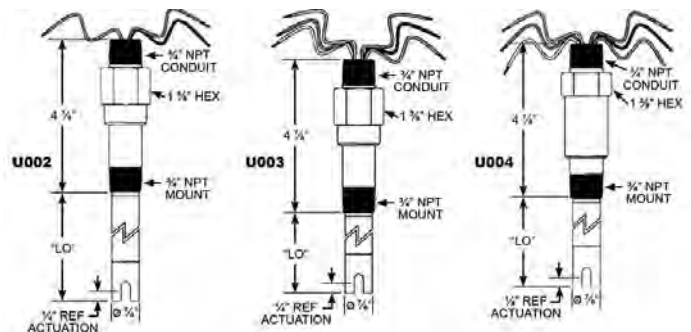
Pump Control & Protection

Fill-Line Monitoring

Level Monitoring

Leak Detection

DIMENSIONS INCHES (MM)



| A Model | B Insertion Length ("LO") Inches | C Stem & Probe Material | D Junction Box | E Process Connection |
|----------------------|---|-------------------------------|---|--|
| U002 U003 U004 | Specify Between 2 1/8" to 100" | 316SS= 316 Stainless Steel | - = None (Standard) JB= Die-Cast Aluminum Enclosure | 3/4= 3/4" NPT (Standard) Call for other: Up to 4" NPT Up to 4" Sanitary Flange Up to 4" 150 and 300 ANSI Flanges |

CLARK

EchoPod® Ultrasonic Level Switch/Transmitter/Controller

Loop Powered 4-20 mA Output, Range To 49.2" (1.25 m)

DESCRIPTION

EchoPod is an innovative level sensor that replaces floats, conductance and pressure sensors that fail due to dirty, sticking and scaling media in small tanks 49.2" (1.25m) or less. EchoPod, a general purpose sensor, combines non-contact switch, controller and transmitter capabilities in one package. Combining 4 relays, 4-20mA output and pump/valve control in one small sensor allows EchoPod to be a solution. Maintenance free, EchoPod reduces tank system hardware through simplicity and consolidation. Additionally, EchoPod is well suited for corrosive and dirty applications with its non-metallic housing and transducer. EchoPod provides a total solution for fluid handling and automation.

The rugged PVDF enclosure is well suited for a wide range of corrosive, waste or slurry type media, and can be broadly selected for atmospheric day tank, process vessel or dispenser, pump lift station and waste sump applications. Level indication can be monitored via a local display or controlled through a PLC.

SPECIFICATIONS

GENERAL

- Range:** 49.2" (1.25 m)
- Accuracy:** 0.125" (3mm)
- Resolution:** 0.019" (0.5 mm)
- Beam Width:** 2" (5 cm)
- Dead Band:** 2" (5 cm)
- Supply Voltage:** 24VDC (loop)
- Loop Resistance:** 400 Ohm Max.
- Consumption:** 35 mA Maximum
- Signal Output:** 4-20 mA (When loop powered)
- Contact Type:** (4) SPST, 1A relays
- Loop Fail Safety:** 4 mA, 20 mA, 21 mA, 22 mA or hold last

Relay Fail Safety:

- Power Loss: Hold Last
- Power On: Open, close or hold last

Hysteresis:

Selectable
Configuration: WebCal® Windows® software interface

Temperature Compensation: Automatic over range

Operating Temperature: 20 to 140°F (-7 to 60°C)

Operating Pressure: Atmospheric

Enclosure: NEMA 4X, encapsulated, corrosive resistant & submersible

Enclosure Material: PC/ABS FR

Strain Relief: Santoprene

Transducer Material: PVDF

Cable Length: 48" (1.2 m)

Cable Jacket Material: Polyurethane

Process Mount: 1" NPT or 1" G

ORDERING INFORMATION

| Model | Description |
|-----------|---|
| DL14-NPT | EchoPod, 1" NPT Process Connection |
| DL14-G | EchoPod, 1" G (Metric) Process Connection |
| L199-1001 | USB Interface Tool to Program EchoPod (One unit can be used to program multiple EchoPods) |

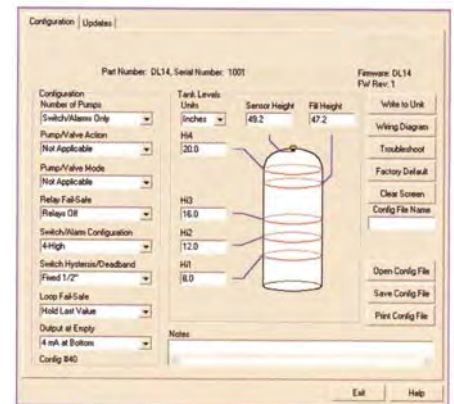
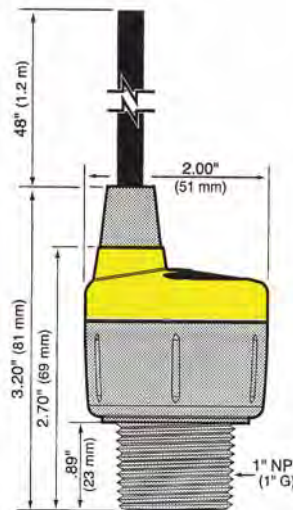
For a demonstration and download of WebCal™ goe to <http://www.flowline.com/webcal>



FEATURES

- ~ Provides switch, controller and transmitter capabilities
- ~ Replacement of multi-point float, conductivity and pressure level switches
- ~ WebCal™, an innovative PC user interface that provides fast and accurate configuration
- ~ Compact sensor with 2" dead band and beam width optimized for small tank applications 49.2" (1.25m) or less

DIMENSIONS



Simple software configuration through WebCal™, using USB connectivity enables flexible system integration or retrofit for suitable applications. WebCal's user interface makes configuration quick and simple for even novice computer users. By entering your application requirements through pre-programmed menus, WebCal will accurately configure EchoPod to your application requirements every time. Additionally, WebCal provides a printed wiring schematic management system that saves your configuration for back-up, technical assistance or additional applications.

PKP

FS00Z Float Switch

Float Level Switch With Micro Switch, For Polluted And Other Media

DESCRIPTION

The FS00Z level switch consists of a polypropylene housing with an integrated watertight and position dependent electromechanical microswitch. The unit works according to the lift principle. The hollow float is raised (lowered) by the rising (falling) liquid until it reaches an angle of 45° from horizontal when switching takes place. The mercury free float switch can be mounted to the tank/container via a through hole such as a 1/2" cable gland from the tank top.

The switch point is defined by manipulating placement of a supplied ballast weight on the connecting cable or by inserting cable through a tube of desired length.

The FS00Z level switch is suitable for level monitoring of compatible liquids and, due to the high contact rating of 10 (8) Amps, 250V, for direct pump control. It is well applied for potable water applications as well as heavily polluted media.

SPECIFICATIONS

Contact Rating: SPST- N/O, 10A resistive (8A inductive),250V;
 SPST- N/C 10A resistive (8A inductive), 250 V;
 SPDT, 6A (4 A inductive), 250 VAC

Cable Material: Neoprene (black), Polyurethane (yellow), LAPP-Therm (olive) and special cable on request

Cable Connection to Float: Polyamide cap nut

Cable Length: 5, 10 or 20 meters (special lengths available)

Connection: 3-wire (comm., signal, ground) for SPST, N/O and N/C versions, four wire for SPDT version

Configuration: N/O closes on rise in fluid level (opens on fall);
 N/C opens on rise in level (closes on fall); SPDT for N/O or N/C operation

Electrical Protection: IP68

Max Pressure: 2 bar (29 PSI)

Max Media Temperature: 60°C or, with LAPP-Therm cable, 95°C

Storage Temperature: 95°C max.

Float Material: Polypropylene, mirror welded

Float Dimensions: 40 mm x 95 mm x 68 mm

Ballast Material: cast iron, plastic coated (Levasit)

Ballast Dimensions: 30 x 30 x 190 mm

Weight: Float, 110g; Ballast, 700g

Media Density: Minimum 0.55 g/cm³

Switching Angle: ±45° from horizontal

Rated Life: Minimum 50,000 switch cycles

ORDERING INFORMATION

ABCDE

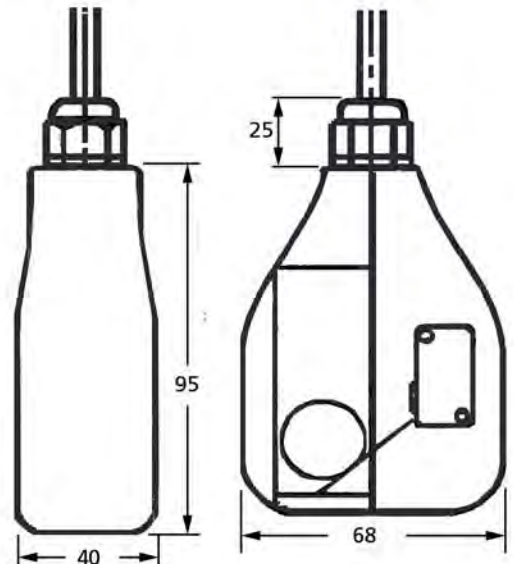
EXAMPLE FS00ZWN51

| A Model | B Contact Function | C Cable Material | D Cable Length | E Ballast Weight |
|---------|-----------------------------|--|--|-----------------------|
| FS00Z | W= SPDT S= N/O O= N/C | L=LAPP-Therm N= Neoprene P= Polyurethane | 5= 5m 10= 10m 20= 20m 99= Other | 0= Without 1= With |



- Low Cost
- Vertical or Horizontal Mounting
- Simple Installation
- General Use, Oils, Chemicals, Gasoline, Grease

DIMENSIONS (MM)



HUBA

Type 712 Level Measuring Pressure Transmitter

Gage/Absolute Ranges to 3 bar, Voltage/Current/Ratiometric Outputs

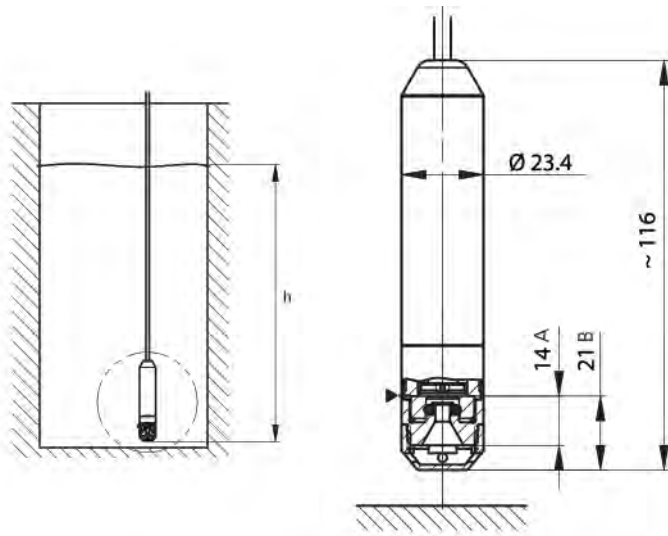
DESCRIPTION

The 712 level transmitter consists of a ceramic measuring cell (gage and absolute pressure) with signal conditioning electronics. The sensor, the electronics and the connection cable are hermetically encapsulated in a stainless steel case. The measuring diaphragm is protected from outside influences by a protection cover. A venting pipe is included in the connection cable for the gage pressure version. Versions with integrated temperature measurement are available.

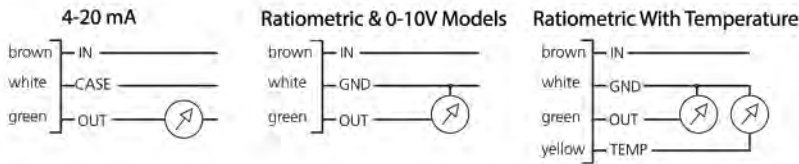
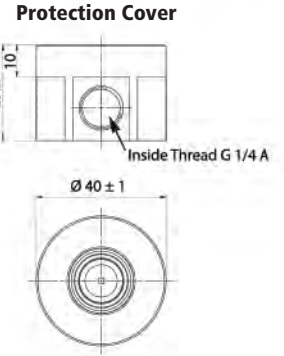


| SPECIFICATIONS | | Specifications Continued | | | | | | | | | | | | | |
|---|--|---|-------------------------------|---|--|---|----------------|-----------------|-----------------|----------------|-----------------|------------------|----------------|------------------|------------------|
| Full Scale Pressure Ranges | Gage Pressure: zero to 0.3, 1.0, 1.6 or 2.5 bar Absolute Pressure: 0.8 to 1.4, 2.0 or 3.0 bar | Electrical Connection | | | | | | | | | | | | | |
| Medium | Compatible liquids | Cable PE-HD | length 2, 5, 10, 15, 20, 30 m | | | | | | | | | | | | |
| Temperature Operatng Range | | Accuracy | | | | | | | | | | | | | |
| Medium & Ambient | -20...+80°C | Standard Accuracy: ± 0.8% F.S. (Max. deviation at 25 °C including zero point, full scale, linearity, hysteresis and repeatability) | | | | | | | | | | | | | |
| Storage | -40...+80°C | Long Term Stability Per IEC EN 60770-1: ±0.2% F.S. | | | | | | | | | | | | | |
| Max Over/Rupture Pressure | 3 times F.S.; max. 3 bar for range 0-0.3 bar | Thermal Characteristics: ±0.2% F.S./100°C at -20 ... +80 °C; 0.3 bar range with output 4 ... 20 mA = ±0.5% fs/100°C | | | | | | | | | | | | | |
| Wetted Materials | Pressure Connections | AISI 316L | | | | | | | | | | | | | |
| | Sensor | Ceramic Al ₂ O ₃ | | | | | | | | | | | | | |
| | Cable | PE-HD | | | | | | | | | | | | | |
| | Protection Cover | PPE | | | | | | | | | | | | | |
| | Sealing Material | FPM, EPDM (for water) | | | | | | | | | | | | | |
| Electrical | | Explosion Proof Models | | | | | | | | | | | | | |
| Signal Output Options | | ATEX rated designs for use with a barrier are available for current output and ratiometric output models | | | | | | | | | | | | | |
| 2-wire, 4-20 mA output | Power Supply 10-30 VDC; Current Consumption- <20 mA | Weight (Without Cable) | | | | | | | | | | | | | |
| | Load (Ohms)= Supply Voltage-7V±0.02 A | 200 g | | | | | | | | | | | | | |
| 3-wire, 0-10V output | Power Supply 12-30 VDC; Current Consumption- <5 mA | Testing: | | | | | | | | | | | | | |
| | Load - >10k Ohm/<100 nF | Explosion Protection | | | | | | | | | | | | | |
| 3-wire, ratiometric 10...90% supply voltage | Power Supply 5 VDC ±10% | IECEX SEV 12.006: Ex ia IIC T4 Ga | | | | | | | | | | | | | |
| | Current Consumption- <3 mA | SEV 12 ATEX 0138: II 1 G Ex ia IIC T4 Ga | | | | | | | | | | | | | |
| | Load - >5k Ohm/<100 nF | Electromagnetic Compatibility | | | | | | | | | | | | | |
| 4-wire with temperature measurement, ratiometric 10...90% supply voltage | Power Supply 5 VDC ±10% | CE conformity per EN 61326-2-3 | | | | | | | | | | | | | |
| | Current Consumption- <3 mA | Drinking Water Approval | | | | | | | | | | | | | |
| | Load - >5k Ohm/<100 nF | ACS | | | | | | | | | | | | | |
| Temperature Output | >1MΩ | Drinking Water Verificaton Certificate For Plastic Parts | | | | | | | | | | | | | |
| Dynamic Response Time | <2 ms | KTW W270 WRAS | | | | | | | | | | | | | |
| Protection Standard | IP68 | Max Level Measurement Possible For Absolute Pressure Ranges (Effect of Atmospheric Pressure) <table border="1"> <thead> <tr> <th>Pressure Range</th> <th>P_{Baro}= 1060 mbar (At Sea Level)</th> <th>P_{Baro}= 740 mbar (At 2000 Meters Above Sea Level)</th> </tr> </thead> <tbody> <tr> <td>0.8 to 1.4 bar</td> <td>3.5 meters w.c.</td> <td>6.7 meters w.c.</td> </tr> <tr> <td>0.8 to 2.0 bar</td> <td>9.6 meters w.c.</td> <td>12.8 meters w.c.</td> </tr> <tr> <td>0.8 to 3.0 bar</td> <td>20.0 meters w.c.</td> <td>23.0 meters w.c.</td> </tr> </tbody> </table> | | Pressure Range | P _{Baro} = 1060 mbar (At Sea Level) | P _{Baro} = 740 mbar (At 2000 Meters Above Sea Level) | 0.8 to 1.4 bar | 3.5 meters w.c. | 6.7 meters w.c. | 0.8 to 2.0 bar | 9.6 meters w.c. | 12.8 meters w.c. | 0.8 to 3.0 bar | 20.0 meters w.c. | 23.0 meters w.c. |
| Pressure Range | P _{Baro} = 1060 mbar (At Sea Level) | | | P _{Baro} = 740 mbar (At 2000 Meters Above Sea Level) | | | | | | | | | | | |
| 0.8 to 1.4 bar | 3.5 meters w.c. | | | 6.7 meters w.c. | | | | | | | | | | | |
| 0.8 to 2.0 bar | 9.6 meters w.c. | | | 12.8 meters w.c. | | | | | | | | | | | |
| 0.8 to 3.0 bar | 20.0 meters w.c. | 23.0 meters w.c. | | | | | | | | | | | | | |
| Run Time (Time starts at the moment of application of minimal supply voltage) | <10 ms | | | | | | | | | | | | | | |
| | 296 | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | |

DIMENSIONS (MM), ELECTRICAL CONNECTIONS, WIRING



- h - Fluid level
- - Measurement reference height
- A - Distance from protection cover to the position of measuring diaphragm
- B - distance from beginning of thread to the position of measuring diaphragm (versions without protection cover)



See installation manual for explosion proof model wiring

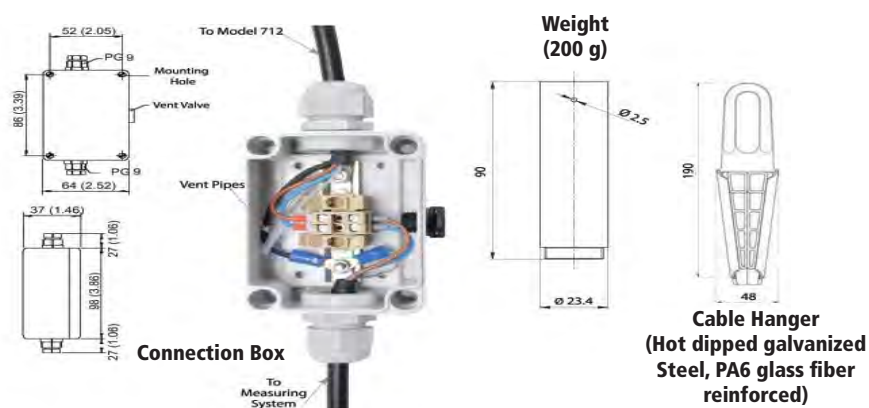
ORDERING INFORMATION

BUILD PART NUMBER FROM TABLE BELOW- A.B.C.D.E.F.G.H

EXAMPLE: 712.9.14.1.0.2.4.0

| A MODEL | B PRESSURE MODE | C PRESSURE RANGE | D SEALING MATERIAL | E OUTPUT | F ELECTRICAL CONNECTION | G PROTECTION COVER | H EXPLOSION PROTECTION |
|---|--|--|---|--|--|--------------------------|------------------------------|
| 712 | 8= Absolute 9= Gage *C= Absolute, high accuracy *D= Gage, high accuracy | Gage Pressure 13= 0 to 0.3 bar 11= 0 to 1.0 bar 12= 0 to 1.6 bar 14= 0 to 2.5 bar Absolute Pressure 13= 0.8 to 1.4 bar 12=.8 to 2.0 bar 14= 0.8 to 3 bar | 0= FPM (Fluoro-elastomer) 1= EPDM (Ethylene propylene) | 0= 4-20 mA 1= Ratiometric 2= Ratiometric, includes temperature sensor 3= 0-10 VDC | 0= 2 m cable 1= 5 m cable 2= 10 m cable 3= 15 m cable 4= 20 m cable 5= 20 m cable | 0= Without 4= With | 0= Without 1= With |
| *Available only for ratiometric models with ranges 1 bar or greater | | | | | | | |

| ACCESSORIES | |
|-------------|------------------------------|
| P/N | DESCRIPTION |
| 118026 | Cable Hanger |
| 118027 | Connection Box |
| 118028 | Test Adapter |
| 118067 | Protection Cover (pkg of 10) |
| 118093 | Additional Weight |



LEVEL CALCULATIONS

General level with relative pressure sensor:

$$h = \frac{\Delta p}{\rho \cdot g}$$

General level with absolute pressure sensor:

$$h = \frac{P_{TS} - P_{Baro}}{\rho \cdot g}$$

which
$$P_{TS} = \frac{U_{TS} - U_{TS_NP}}{U_{TS_EW} - U_{TS_NP}} \cdot (P_{TS_EW} - P_{TS_NP}) + P_{TS_NP}$$

and
$$P_{Baro} = \frac{U_{Baro} - U_{Baro_NP}}{U_{Baro_EW} - U_{Baro_NP}} \cdot (P_{Baro_EW} - P_{Baro_NP}) + P_{Baro_NP}$$
 Using a second level sensor as barometric air pressure sensor

For level sensor with current output use nominal signal values for I_{TS} ... instead of variables U_{TS} ... (resp. I_{Baro} ... instead of U_{Baro} ...)

Simplification of formula for level sensor with ratiometric output:

$$P_{TS} = \frac{U_{TS} - 0.1 \cdot U_{IN}}{0.8 \cdot U_{IN}} \cdot (P_{TS_EW} - P_{TS_NP}) + P_{TS_NP}$$

$$P_{Baro} = \frac{U_{Baro} - 0.1 \cdot U_{IN}}{0.8 \cdot U_{IN}} \cdot (P_{Baro_EW} - P_{Baro_NP}) + P_{Baro_NP}$$
 Using a second level sensor as barometric air pressure sensor

Legend:

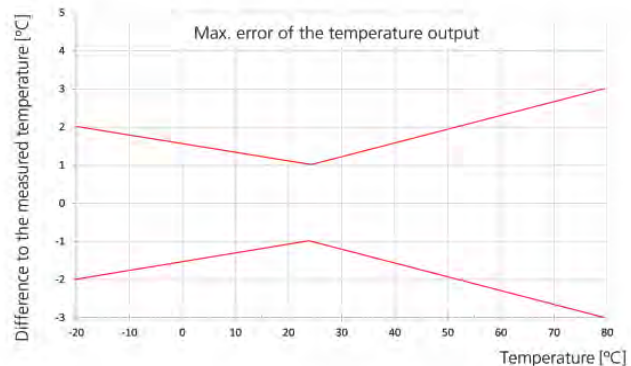
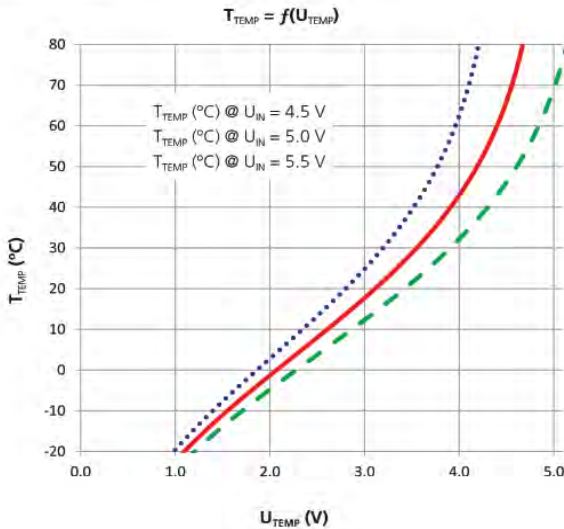
| | | | |
|----------------|---|----------------|--|
| h | level [m] | ρ | density of media [kg/m ³] |
| Δp | measured relative pressure [Pa] | g | acceleration of fall 9.80665 [m/s ²] |
| P_{TS} | measured pressure of level sensor [Pa] | U_{TS} | signal on level sensor output [V or mA] |
| P_{Baro} | measured pressure of barometer [Pa] | U_{Baro} | Signal on barometer output [V or mA] |
| P_{TS_NP} | minimal nominal pressure of level sensor [Pa] | U_{TS_NP} | minimal nominal signal of level sensor [V or mA] |
| P_{TS_EW} | maximum nominal pressure of level sensor [Pa] | U_{TS_EW} | maximum nominal signal of level sensor [V or mA] |
| P_{Baro_NP} | minimal nominal pressure of barometer [Pa] | U_{Baro_NP} | minimal nominal signal of barometer [V or mA] |
| P_{Baro_EW} | maximum nominal pressure of barometer [Pa] | U_{Baro_EW} | maximum nominal signal of barometer [V or mA] |

TEMPERATURE SENSOR CHARACTERISTICS

$$T_{TEMP} = T_0 + 1 \left/ \left(a + b \cdot \ln \left(R \cdot \left[\frac{U_{IN}}{U_{TEMP}} - 1 \right] \right) + c \cdot \ln \left(R \cdot \left[\frac{U_{IN}}{U_{TEMP}} - 1 \right] \right)^3 \right) \right. T_{TEMP}$$

T_0 Temperature NTC [°C] T_0 -273.15 [°C] U_{TEMP} Voltage NTC [V]
 R 20'000 [Ω]
 U_{IN} 4.5 ... 5.5 [V]

a = 0.001204001
 b = 0.000208775
 c = 0.000000294



CLARK SOLUTIONS

612 Submersible Pressure Transmitter

Two-wire, 4-20mA, Vacuum To 15,000 PSIG & PSIA

DESCRIPTION

Series 612 submersible pressure transmitters were designed to provide a previously unequalled level of performance. Utilizing Piezoresistive Sensor Technology, Series 612 Transducers are accurate, shock resistant and extremely stable over long periods of time. Reverse polarity protection, short circuit protection and lightning protection have been engineered in as standard features.

Advanced manufacturing techniques combined with technologically advanced standard features allow the 612 to offer a level of performance previously found on transducers costing hundreds of dollars more.

A final electrical output and calibration inspection is performed on all Transducers and Transmitters after final assembly to insure 100% "out of the box" reliability.



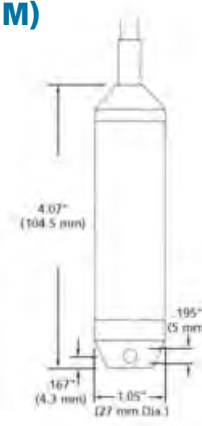
Model 612

SPECIFICATIONS

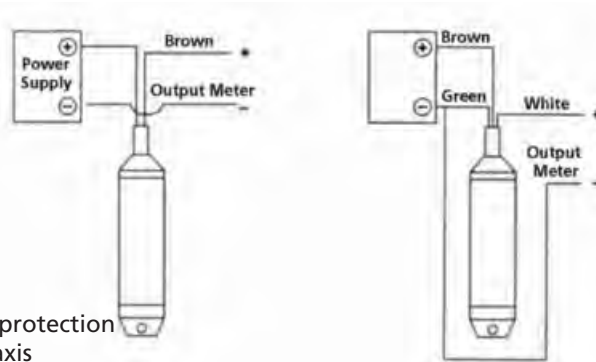
- Output Signal: 4-20 mA, 2 wire; 0-5V and 0-10V, 3 wire
- Pressure Ranges: 0-300 PSI
- Wetted Materials: 316 SS
- Proof Pressure: 2 times range
- Burst pressure: 4 times range
- Accuracy: (BSFL or RSS) (includes repeatability, hysteresis and linearity):
 $\pm 0.25\%$ full scale standard, 0.12% full scale optional
- Repeatability: 0.05% full scale
- Hysteresis: 0.05% full scale
- Input Excitation: 2 wire, 12-30 Vdc unregulated; 3 wire, 14-30Vdc;
 Field Service Unit, 6 Vdc
- Temperature Ranges:
 Compensated: 32 to 122 °F (0 to 50°C)
 Effect: 0.2%/50°F
 Storage: -22 to 175°F (-30 to 80°C)
 Medium: -14 to 175°F (-30 to 80°C)
- Response Time: Less than 1 ms (between 10-90% full scale)
- Operating life: 100 million cycles
- Adjustment: 5% full scale of zero and span
- Environmental Protection: NEMA 6, IP68
- Electromagnetic Capability: per IEC 801 (EN50081, EN50082):
 Part 2 - ESD Level 2
 Part 3 - Fields (RFI) Level 2
 Part 4 - Burst Level 3
 Part 5- Surge Level 2

Electrical Protection: Reverse polarity, overvoltage and short circuit protection
 Shock: Less than $\pm 0.05\%$ full scale effect or 100g's @ 20 ms on any axis
 Vibration: Less than 0.01% full scale effect for 20g's @ 0-2000 Hz on any axis

DIMENSIONS(MM)



WIRING



ORDERING INFORMATION

ABCDE (ORDER CABLE SEPARATELY)

EXAMPLE 6121511N

| A Model | B Range (PSIG) | C Accuracy | D Output Signal | E End Fitting |
|---------|----------------|------------|------------------------|--------------------------------|
| 612 | 2=0-2.0 | 3=0-3.0 | 1=4-20 mA | N=Nose cone |
| | 5=0-5.0 | 10=0-10 | 2=0-5VDC, 3-wire | NW=Nose cone with added weight |
| | 15=0-15 | 30=0-30 | 5=0-10 VDC, 3-wire | |
| | 60=0-60 | 100=0-100 | 12=0.5-2.5 VDC, 3-wire | |
| | 150=0-150 | 200=0-200 | | |

Cable (includes integral vent tube for sensor reference to atmosphere)

| Model | Cable Length |
|--------------|--------------|
| 612Cable-5 | 5ft |
| 612Cable-15 | 15ft |
| 612Cable-25 | 25ft |
| 612Cable-50 | 50ft |
| 612Cable-100 | 100ft |
| 612Cable-150 | 150ft |

CLARK SOLUTIONS

PXR Series Temperature & Process Controllers

Fuji Electric PID Controllers with Fuzzy Control of Self-Tuning

The new PXR series controllers are the newest additions to Fuji Electric's trusted line of temperature and process controllers. They are now packed with features and options and come in several sizes – 1/32 DIN, 1/16DIN, 1/8 DIN and 1/4 DIN.

These controllers have all the standard features that you expect from Fuji Electric's superior controllers, and more. In addition to auto-tuning and fuzzy control, they now come with self-tuning — an innovation in the control field. It automatically retunes the controller under certain conditions, without the need to revert to auto-tuning. The standard 8-segment ramp/soak feature has been expanded to include two patterns that can be linked to create a 16-step profile. The PXR accepts temperature and process inputs and offers a choice of three kinds of outputs to meet a wide variety of needs in the process industries.



Low-cost options include dual outputs, programmable alarms, remote setpoint, RS485 communications, analog retransmission, digital input, timer function, heater burnout alarm and 24V AC/DC supply voltage. One of the most impressive features is the large LED display. The faceplate, designed for NEMA 4X (IP66 equivalent), is watertight and corrosion-resistant. The easy-to-use 3-button keypad allows for programming similar to the popular PXW controller. The screw-terminal on the back further reduces the cost by eliminating the need for sockets. The PXR3 can be DIN-rail mounted with the optional adapter. Remote monitoring of up to 31 controllers at a time is possible with the RS485 option that uses the industry-standard Modbus™ protocol. The communications option comes with our free Windows®-based software, PXR-LITETM. The software allows you to program the controller from the PC and view real-time data and trend graph while logging the data into a text file. A powerful tool for the OEM customer is the Program Loader option with Windows®-based software. Programs for different applications can be saved to and from the controller.

SPECIFICATIONS

Power supply voltage: 100 (-15%) to 240V (+10%) AC, 50/60Hz; 24V (±10%) AC/DC
Power consumption: PXR3: 6VA (100 VAC), 8VA (220V, 24V). PXR4: 8VA (100V),
10VA (220V), 12VA (24V). PXR5, 9: 10VA(100V), 12VA (220V, 24V)
Reference junction compensation: accuracy ±1°C at 23°C

Input

Input signal Thermocouple: J, K, R, B, S, T, E, N, PL2. RTD: Pt100. Voltage, current.
For 1 to 5V/4 to 20 mA DC, 0 to 5V/0 to 20 mA DC, use 250 ohm shunt resistor included

Input filter: 0 to 900.0 sec set in 0.5 sec steps

Burnout: For thermocouple or RTD input, control output direction (upper or lower) is selectable

Control Function

Control action On/Off; PID control (with auto-tuning, self-tuning); Fuzzy Control (with auto-tuning)

Proportional band (P): 0 to 999.9% of measuring range set in 0.1% steps

Integral time: (I) 0 to 3200 sec set in 1 sec steps

Differential time: (D) 0 to 999.9 sec set in 1 sec steps

Proportional cycle: 1 to 150 sec set in 1 sec steps

Hysteresis width: 0 to 50% of measuring range; For on/off action only

Input sampling cycle: 0.5 sec

Control Output 1 (select one)

Relay contact: PXR4, 5, 9: SPDT, 220 V AC/30 V DC, 3A (resistive load). PXR3: SPST contact, 220 V AC/30 V DC, 3A (resistive load)

SSR: PXR4, 5, 9: ON—17 to 25 V DC; OFF—0.5 V DC or less. PXR3: 12 to 16 V DC. Max. current: 20mA or less

4 to 20 mA DC: PXR4, 5, 9: Allowable load resistance 600 ohms or less. PXR3: 100 to 500 ohms

Control Output 2 (Heating/Cooling Control) (select one)

Relay contact: SPST, 220 V AC/30 V DC, 3A (resistive load)

SSR: PXR4, 5, 9: ON—17 to 25 V DC; OFF—0.5 V DC or less. PXR3: 12 to 16 V DC. Max. current: 20mA or less

4 to 20 mA DC: PXR4, 5, 9: Allowable load resistance 600 ohms or less. PXR3: 100 to 500 ohms

Operation and Display Section

Parameter setting method: Digital setting by 3 keys; Key lock function provided

Display unit: Process value/set value displayed individually 4 digits, 7-segment LED

Status display LED: Control output, process alarm output, heater burnout alarm output

Indication accuracy (at 23°C): Thermocouple: ± (0.5% of measuring range) ± 1 digit ± 1°C. For thermocouple R at 0 to 500°C: ± (1% of measuring range) ± 1 digit ± 1°C. For thermocouple B at 0 to 400°C: ± (5% of measuring range) ± 1 digit ± 1°C. RTD, voltage/current: ±(0.5% of measuring range) ± 1 digit

FEATURES

- Advanced control functions PID Plus Self Tuning; PID Plus Fuzzy Control; Autotuning
- NEMA 4X faceplate with large LED display 4-digit, red and green display; Waterproof faceplate conforms to NEMA-4X/IP66
- Multiple inputs Choose between thermocouple/RTD and 4-20mA/0-5V inputs
- Single or dual control outputs Relay, SSR driver or 4-20mA
- Ramp/soak function Up to 16 ramp/soak segments or two 8-segment patterns, a standard feature
- Programmable alarms option 2 programmable SPST relays with On/Off delay function
- Remote setpoint option Change setpoint with a 1-5V signal
- Analog retransmission option 4-20mA retransmission of PV, SV, MV, DV
- Digital input option Change between 2 setpoints; Change between ramp/soak and standby; Start/reset the ramp/soak; Start/stop the auto tuning; Cancel the alarm latch; Start the incorporated timer
- Timer function On-delay or off-delay timer activated with digital input; Up to 2 timer outputs can be obtained
- Heater burnout alarm option If heater burns out, alarm goes off
- Communications option RS485 (Modbus™ protocol) interface permits remote monitoring of up to 31 units from a PC. Comes with free Windows®-based software, PXR-LITETM
- Warranty Manufactured in a ISO 9001 facility and backed by a 3-year warranty

SPECIFICATIONS CONT'D

Alarm (option)

Alarm type: Absolute alarm, deviation alarm, zone alarm with upper and lower limits for each; hold function available; alarm latch function provided

Alarm ON-delay: Delay setting 0 to 9999 sec set in 1 sec steps

Process alarm output: Relay contact: SPST, 220 V AC/30 V DC, 1A (resistive load); Max. 2 points (PXR3), max. 3 points (PXR4,5, 9)

Heater burnout option: (not available on PXR3) Alarm setting range: 1 to 50A Available only when control output is relay or SSR drive.

Heater burnout alarm: output Relay contact: SPST, 220 V AC/30 V DC, 1A (resistive load); 1 output point

Current detector: CTL-6-S for 1 to 30 A; CTL-12 for 20 to 50 A

Digital Input (option)

Points: 1 or 2; contact closure. 5 V DC, approx. 2mA

Function (select one): Set value (SV, SV1 to 3) changeover, start/stop control action, start/reset ramp/soak action, start/stop auto-tuning, cancel alarm latch, start incorporated timer

Retransmission Output (option)

Output signal: 4-20 mA DC

Load resistance: 500 ohms or less

Output accuracy: $\pm 0.3\%$ FS

Output selection: PV, SV, MV, DV (SV-SV9)

Timer Function (option)

Start: By digital input option

Setting: 0 to 9999 sec set in 1 sec steps

Action: Event ON-delay or OFF-delay

Signal output: Alarm output relays used; 2 points are available

Communication Function (option)

Physical specifications: EIA RS485

Communication protocol: Modbus (RTU). Free Windows®-based software, PXR-LITETM

Communication method: 2-wire method; half-duplex, bit serial, start-stop sync type

Data type: 8 bits; Parity: odd/even/none

Communication rate: 9600 bps

Connection aspect: Multi-drop up to 31 controllers

Communication distance: Total extension 500m or less

RS232C/RS485 signal converter: RSFC24 (recommended, see ordering information)

Remote Setpoint Option

Input signal: 1 to 5 V DC, 1 point

Accuracy: $\pm 0.5\%$ ± 1 digit

Input sampling cycle: 0.5 sec

Display of remote mode: LED on front panel

Input impedance: 1M ohms or more

Other Functions

Parameter mask function: Parameter display can be disabled from keypad

Ramp/soak function: 8 ramps and 8 soaks; 1 or 2 program patterns; digital input allows start/reset of the action

Operating and Storage Conditions

Ambient operating temperature: 14 to 122°F (-10 to 50°C)

Ambient operating humidity: Less than 90% RH (no condensation)

Storage temperature: -4 to 140°F (-20 to 60°C)

Structure

Mounting method: Panel flush mounting. PXR3 can be DIN-rail mounted using the optional adapter

External terminal: Screw terminal

Dimensions: PXR3: 1 x 2 x 4 in. (24 x 48 x 98mm). PXR4: 1.89 x 1.89 x 3.37 in. (48 x 48 x 79.8 mm). PXR5: 2.07 x 3.96 x 3.77 in. (52.5 x 100.5 x 95.8 mm). PXR9: 3.96 x 3.96 x 3.77 in. (100.5 x 100.5 x 95.8 mm)

Protective structure: Front panel NEMA4X (IEC standard IP66 equivalent) (when mounted on panel with supplied gasket). Rear case: IEC IP20

Outer color: Black (front panel, case)

Agency approvals: UL, c-UL recognized (UL873), CSA (C22.2 No.24-93), CE certified (LVD:EN61010-1, EMC:1326-1)

Optional Items

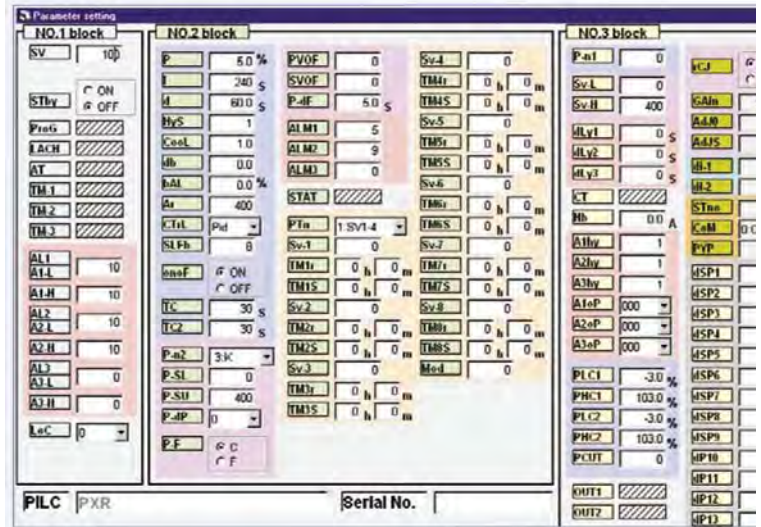
Current transformer: For 1 to 30 A: CTL-6-S. For 20 to 50 A: CTL-12

Signal converter for communication function: RSFC24

DIN Rail adapter: For PXR3 only

Terminal cover: For PXR4 only

Program Loader Interface

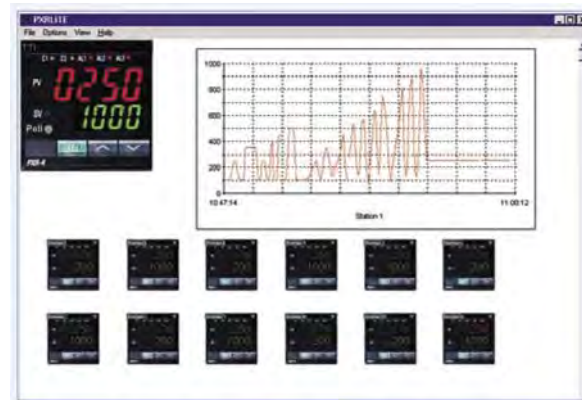


FEATURES

The Program Loader for Fuji Electric's PX and PXR series controllers is a powerful tool for the OEM customer. Using the PXR4 Loader Assembly, the controller can be configured from a PC running on Windows environment.

- Retrieve or store controller data
- Selectively mask or unmask parameters for viewing on the controller
- Clone settings to other controllers from saved files
- Print data report

PXR LITE Communication Software



FEATURES

PXR-LITETM is free Windows®-based software that is supplied with the communications option on a PXR controller. It is the latest in control and monitoring of Fuji Electric's PXR series controllers. It provides continuous remote monitoring of single or multiple controllers using a single half-duplex RS485 line.

- Monitor and control up to 31 controllers from a PC via RS485!
- RS232 signal converter
- Real-time charting and data-logging
- Remote setpoint adjustment
- Set control modes, alarms and other control parameters
- Remote auto-tuning and ramp-soak programming
- Live display of process and set point values, alarm annunciator
- View single-station or multi-station data
- Comprehensive help file included
- Runs on Windows environment version 3.1 or later

ORDERING INFORMATION

PXR3

EXAMPLE PXR3BEY14VOA1

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| P | X | R | A | B | C | D | 1 | E | F | G | A | 1 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|

Box A: Front Panel Size

3 = 1/32 DIN (24x48mm)

Box B: Input Signal

T = Thermocouple (°C)

R = Thermocouple (°F)

N = RTD, Pt100 ohm, 3-wire type (°C)

S = RTD, Pt100 ohm, 3-wire type (°F)

B = 4-20mA DC, 1-5V DC

A = 0-20mA DC, 0-5V DC

Box C: Control Output 1

A = Relay contact output

C = SSR or SSC drive output

E = 4-20mA DC output

Box D: Control Output 2

Y = None

A = Relay contact output

C = SSR or SSC drive output

E = 4-20mA DC output

Box E: Alarm Options

4 = None

5 = High/low alarm 1 point

G = High/low alarm 2 points¹

Box F: Power Supply

V = Standard (100-240 VAC, 50/60Hz)

B = 24V AC/DC (50/60Hz)

Box G: Additional Functions

0 = None

M = RS485 communication (Modbus)

Q = Retransmission + DI 1 point

R = Retransmission (4-20mA DC)

T = Digital Input (DI) x 2

V = RS485 communications (Modbus)+ DI



PXR4 Terminal Cover (option)

PXR3 DIN Rail Adapter

Note: RS485 option comes with Free software, PXR-LITE. RS485 requires signal converter to connect to PC, P/N RSFC24 recommended.

¹High/low alarm 2 points not available when control output 2 is selected.

ORDERING INFORMATION

PXR4, PXR5, PXR9

EXAMPLE PXR4BEY14VOA1

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| P | X | R | A | B | C | D | 1 | E | F | G | A | 1 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|

Box A: Front Panel Size

4 = 1/16 DIN (48x48mm)

5 = 1/8 DIN (48x96mm)

9 = 1/4 DIN (96x96mm)

Box B: Input Signal

T = Thermocouple (°C)

R = Thermocouple (°F)

N = RTD, Pt100 ohm, 3-wire type (°C)

S = RTD, Pt100 ohm, 3-wire type (°F)

B = 4-20mA DC, 1-5V DC

A = 0-20mA DC, 0-5V DC

Box C: Control Output 1

A = Relay contact output

C = SSR or SSC drive output

E = 4-20mA DC output

Box D: Control Output 2

Y = None

A = Relay contact output

C = SSR or SSC drive output

E = 4-20mA DC output

R = Retransmission (4-20mA DC)

Box E: Alarm Options

4 = None N/C

6 = Heater break alarm^{1,2}

G = High/low alarm 2 points

H = High/low alarm 2 points + heater break alarm^{1,2}

M = Alarm 3 points

D = Remote setpoint³

P = Remote setpoint + alarm 2 points³

Box F: Power Supply

V = Standard (100-240 VAC, 50/60Hz)

B = 24V AC/DC (50/60Hz)

Box G: Additional Functions

0 = None N/C

M = RS485 communication (Modbus)

S = Digital Input (DI) x 1

T = Digital Input (DI) x 2¹

V = RS485 communications (Modbus) + DI^{1,3}

Note: RS485 option comes with Free software, PXR-LITE. RS485 requires signal converter to connect to PC, P/N RSFC24 recommended.

¹Heater break option not available with 4-20mA output, or with 2 digital inputs, or with RS485 +1 digital input.

²Must order current transformer CTL-6-S or CTL-12 with heater break option.

³ Remote setpoint option not available with RS485 +1 digital input.

Accessories

CTL-6-S- Current transformer for 1-30A

CTL-12- Current transformer for 20-50A

RSFC24- RS485 to RS232 signal converter

PXR4- Loader Assembly Program loader for PXR4 (can be used for PX series also)

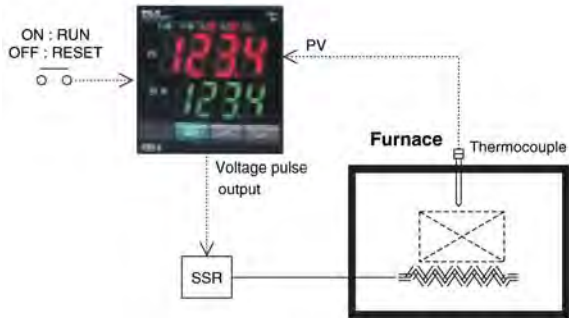
PXR3- Rail Adapter Mounting adapter for DIN rail installation

PXR4- Terminal Cover Terminal block protective cover

TYPICAL APPLICATIONS

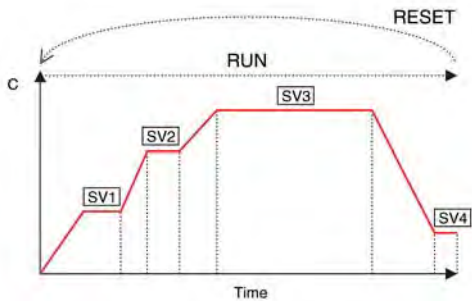
Furnace Heat Pattern Control Ramp/Soak Function

Digital Input
Ramp/Soak Control

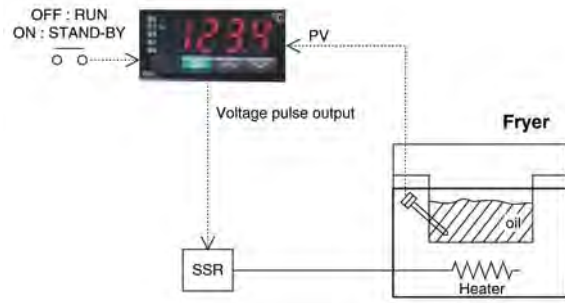


Ramp/Soak Function

- Control Temp. according to "Heat pattern with ramp"
- Keep temp. stable for a certain period with "Heat pattern" and then cool down/
- "Heat pattern" can be Started(Run)/Reset by an external digital input.

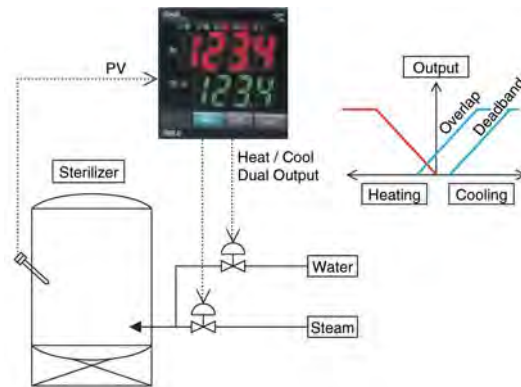


Fryer Control To Keep Oil Temp. Stable



Control Run/Stand-by selectable through external input

Cooling-Heating Control



Cooling output and heating output can be overlapped or a "Dead Band" set between them

Sale Terms and Conditions

- 1. Prices and Specifications** are subject to change without notice.
- 2. Shipping dates** are approximate. They are dependent upon credit approval and subject to delays beyond our control.
- 3. Terms:** Net 30 days to companies with established credit rating. In the event Buyer fails to fulfill previous terms of payment, or in case Seller shall have any doubt at any time as to Buyer's financial responsibility, Seller may decline to make further deliveries except upon receipt of cash in advance or other special arrangements.
- 4. Liability Point and Title:** All material is sold F.O.B. Factory (Domestic)/FCA Free Carrier (International). Title to all material sold shall pass to buyer upon delivery by Seller to carrier at shipping point.
- 5. State and Local Taxes:** Any taxes which the Seller may be required to pay or collect upon or with respect to the sale, purchase, delivery, use or consumption of any of the material covered hereby shall be for the account of the Buyer and shall be added to the purchase price.
- 6. Special tooling,** dies, silk screens and molds acquired specially to produce goods for Buyer remain the property of Clark or Clark's suppliers and may not be removed unless by mutual agreement
- 7. Export Orders:** Terms, discounts and conditions of sale for purchase orders originating or for shipment to final destinations outside the U.S.A. will be furnished upon request.
- 8. Limited Warranty:** The Seller warrants all instruments and equipment to be free from defects in workmanship or material under normal use and service in accordance with the manufacturers' warranty statement. Liability under this warranty is limited to repair or replacement F.O.B. Factory (Domestic)/FCA Free Carrier (International) of any parts which prove to be defective within that time or credit of the purchase price at the Seller's option provided the instruments have been returned, transportation prepaid, within the specified time frame from date of purchase. All technical advice, recommendations and services are based on technical data and information which the Seller believes to be reliable and are intended for use by persons having skill and knowledge of the business, at their own discretion. In no case is Seller liable beyond replacement of equipment F.O.B. Factory (Domestic)/FCA Free Carrier (International) or the full purchase price. This warranty does not apply if the maximum ratings label is removed or if the instrument or equipment is abused, altered, used at ratings above the maximum specified, or otherwise misused in any way.
THIS EXPRESS LIMITED WARRANTY IS IN LIEU OF AND EXCLUDES ALL OTHER REPRESENTATIONS MADE BY ADVERTISEMENTS OR BY AGENTS AND ALL OTHER WARRANTIES, BOTH EXPRESS AND IMPLIED. THERE ARE NO IMPLIED WARRANTIES OF MERCHANTABILITY OR OF FITNESS FOR A PARTICULAR PURPOSE FOR GOODS COVERED HEREUNDER.
- 9. Buyer's Remedies:** THE BUYER'S EXCLUSIVE AND SOLE REMEDY ON ACCOUNT OF OR IN RESPECT TO THE FURNISHING OF NON-CONFORMING OR DEFECTIVE MATERIAL SHALL BE TO SECURE REPLACEMENT THEREOF AS AFORESAID. THE SELLER SHALL NOT IN ANY EVENT BE LIABLE FOR THE COST OF ANY LABOR EXPENDED ON ANY SUCH MATERIAL OR FOR ANY SPECIAL, DIRECT, INDIRECT, CONSEQUENTIAL OR INCIDENTAL DAMAGES TO ANYONE BY REASON OF THE FACT THAT IT SHALL HAVE BEEN NON-CONFORMING OR DEFECTIVE.
- 10. Acceptance:** All orders shall be subject to the terms and conditions contained or referred to in the Seller's quotation, acknowledgement, and to those listed here and to no others whatsoever. No waiver, alteration or modification of these terms and conditions shall be binding unless in writing and signed by an executive officer of the Seller. Prices are exclusive of any taxes. Cancelled orders may be subject to cancellation charges.