

## PRESSURE, VACUUM, DIFFERENTIAL PRESSURE AND TEMPERATURE SWITCHES



### FEATURES

- Single Switch Output
- Epoxy Coated and Gasketed Cast Aluminum Enclosure Type 4X
- Tamper-Resistant Set Point "Lock"
- Heat Trace and Freeze Protection Thermostats
- Proof Pressures to 10,000 psi (689,5 bar)
- Adjustable Ranges:

#### Pressure:

30 "Hg Vac to 5000 psi  
(-1 to 344,7 bar)

#### "wc Ranges:

300 "wc Vacuum to 250 "wc Pressure  
(-746,7 to 622,3 mbar)

#### Differential Pressure:

0.2 "wcd to 500 psid  
(0,5 mbar to 34,5 bar)

#### Temperature:

-180 to 650°F  
(-117,8 to 343,3°C)



## OVERVIEW

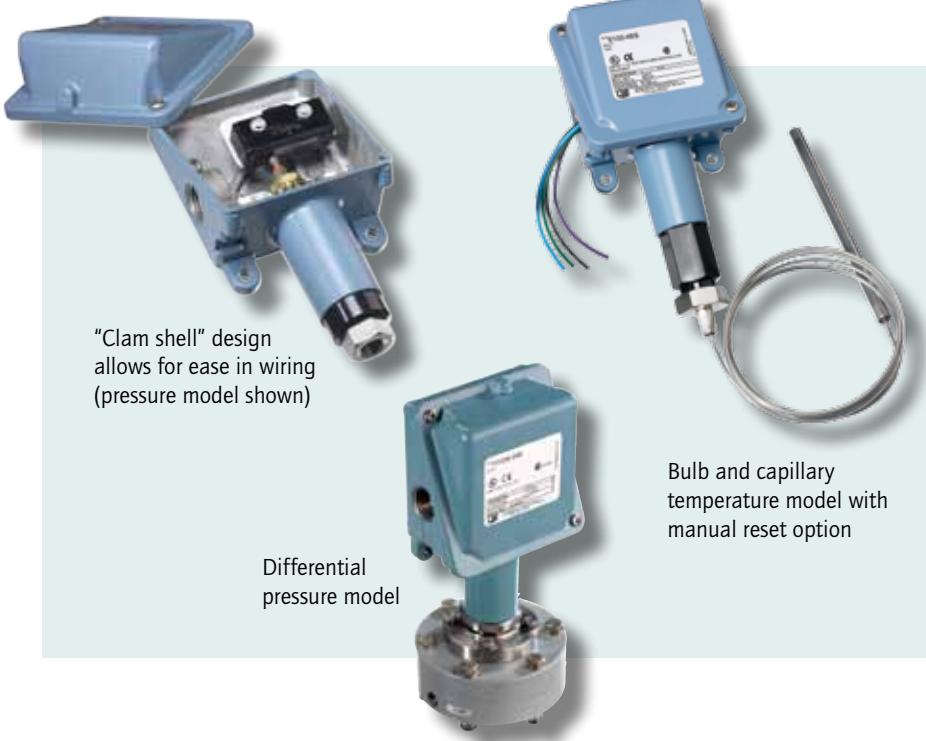
The 100 Series is a cost-effective pressure and temperature switch for process plants and OEM equipment. The rugged, one piece enclosure features a slanted cover for wiring accessibility.

A wide variety of microswitch and process-connection options make this versatile series ideal for applications requiring a rugged weather-proof mechanical switch.

Typical applications that utilize the 100 Series are heat tracing, freeze protection, processing equipment (pumps, compressors), inputs for annunciator panels, and fire suppression systems.

## FEATURES

- UL listed and cUL certified.
- CE compliant to low voltage directive and pressure equipment directive.
- Optional ATEX or GOST intrinsic safety compliance
- Single switch (SPDT or DPDT) output
- Welded stainless steel diaphragm models
- Ultra low pressure, "wc models
- Optional sensor material for corrosive media
- Polished stainless steel flush-mount connection
- Pump switch models with wide adjustable deadband



"Clam shell" design  
allows for ease in wiring  
(pressure model shown)

Differential  
pressure model

Bulb and capillary  
temperature model with  
manual reset option

## SPECIFICATIONS

|  |   |
|--|---|
| <b>STORAGE TEMPERATURE</b>               | -65 to 160°F (-54 to 71°C)  |
| <b>AMBIENT TEMPERATURE LIMITS</b>        | -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  |
| <b>SET POINT REPEATABILITY</b>           | Temperature models: ± 1% of adjustable range<br>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<br>Internal set point lock on all pressure models            |
| <b>SHOCK</b>                             | Set point repeats after 15 G, 10 millisecond duration   |
| <b>VIBRATION</b>                         | Set point repeats after 2.5 G, 5-500 Hz   |
| <b>ENCLOSURE</b>                         | Die cast aluminum, epoxy powder coated, gasketed, captive cover screws  |
| <b>ENCLOSURE CLASSIFICATION</b>          | Enclosure type 4X   |
| <b>SWITCH OUTPUT</b>                     | One SPDT snap action switch; switch may be wired "normally open" or "normally closed"   |
| <b>ELECTRICAL RATING</b>                 | 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. Consult factory for additional information. |
| <b>WEIGHT</b>                            | 2-7 lbs; Varies with model  |
| <b>ELECTRICAL CONNECTION</b>             | 1/2" NPT (female); Two 7/8" diameter knockouts  |
| <b>PRESSURE CONNECTION</b>               | 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)                    |
| <b>TEMPERATURE ASSEMBLY</b>              | Bulb and capillary: 6 feet 304 stainless steel except for E100-13545, 10 feet 304 stainless steel<br>Immersion stem: nickel-plated brass (standard) except for B100-13546 stainless steel; optional 316L stainless steel  |
| <b>FILL</b>                              | Models 1BS/BC are solvent filled, models 2-8 non-toxic oil filled   |
| <b>TEMPERATURE DEADBAND</b>              | Type <b>F</b> typically 1% and type <b>B, C, and E</b> typically 2% of range under laboratory conditions (70°F ambient circulating bath at rate of 1/2°F per minute change)   |
| <b>HEAT TRACING OR FREEZE PROTECTION</b> | Thermostats designed specifically for heat tracing and freeze protection ambient sensing applications are available with types B100 and E100  |

**APPROVALS**

UE declaration and third-party issued Agency certifications are available. Please consult your UE representative for additional information.

**UNITED STATES AND 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 0335063

EN 50014, 50020, 50284

**Low Voltage Directive (LVD) (73/23/EC & 93/68/EEC)**

UEC compliant to LVD

Products rated lower than 50 VAC and 75 VDC are outside of the scope of the LVD

**Pressure Equipment Directive (PED) (97/23/EC)**

Compliant to PED

Products rated lower than 7.5 psi are outside the scope of the PED

**RUSSIA**

Gosgortekhnadzor Permit **(OPTIONAL - code M406)**

OExiaIICT6

Tamb = -50°C to +60°C

NANIO CCVE Certification Center

Certificate # ROSS US.GB05.Bo2933

GOST R 51330.0, 51330.1, 51330.10 & 51330.14

## PRESSURE MODEL CHART

| Model  | Adjustable Set Point Range       |                                   | Deadband            |              | Over Range Pressure* |                      | Proof Pressure** |             |     |      |     |      |
|--|----------------------------------|-----------------------------------|---------------------|--------------|----------------------|----------------------|------------------|-------------|-----|------|-----|------|
| Type H100  | Low end of range on fall;<br>"wc | High end of range on rise<br>mbar | "wc                 | mbar         | psi                  | bar                  | psi              | bar         |     |      |     |      |
| <b>Buna N diaphragm and O-Ring with epoxy coated aluminum 1/2" NPT (female) pressure connection, large 0.72" orifice for clean-out purposes (other wetted materials available see page 11)</b> |                                  |                                   |                     |              |                      |                      |                  |             |     |      |     |      |
| 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 0,7   | 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 14,9  | 200                  | 13,8                 | 400              | 27,6        |     |      |     |      |
| <b>Welded 316L stainless steel diaphragm and 1/2" NPT (female) pressure connection, large 0.72" orifice for clean-out purposes</b>   |                                  |                                   |                     |              |                      |                      |                  |             |     |      |     |      |
| 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         |     |      |     |      |
| Model  | Adjustable Set Point Range       |                                   | Adjustable Deadband |              |                      | Over Range Pressure* | Proof Pressure** |             |     |      |     |      |
|  | "wc                              | mbar                              | "wc                 | mbar         | "wc                  | mbar                 | psi              | bar         |     |      |     |      |
| <b>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</b>     |                                  |                                   |                     |              |                      |                      |                  |             |     |      |     |      |
| 15737  | 50 Vac to 50                     | -124,5 to 124,5                   | 0,5 to 7            | 1,2 to 17,4  | 1 to 10              | 2,5 to 24,9          | 2 to 13          | 5,0 to 32,4 | 200 | 13,8 | 400 | 27,6 |
| <b>Deadband</b>  |                                  |                                   |                     |              |                      |                      |                  |             |     |      |     |      |
| psi  | bar (unless noted)               |                                   | psi                 | mbar         |                      | psi                  | bar              | psi         | bar |      |     |      |
| <b>Welded 316L stainless steel diaphragm and 1/2" NPT (female) pressure connection, large 0.72" orifice for clean-out purposes (NACE MR-0175 compliant)</b>                                    |                                  |                                   |                     |              |                      |                      |                  |             |     |      |     |      |
| 171  | 1 to 20                          | 68,9 mbar to 1,4                  | 0,1 to 1            | 6,9 to 68,9  | 500                  | 34,5                 | 1000             | 68,9        |     |      |     |      |
| 172  | 2 to 50                          | 0,1 to 3,4                        | 0,1 to 1,5          | 6,9 to 103,4 | 500                  | 34,5                 | 1000             | 68,9        |     |      |     |      |
| 173  | 4 to 100                         | 0,3 6,9                           | 0,1 to 2,5          | 6,9 to 172,4 | 500                  | 34,5                 | 1000             | 68,9        |     |      |     |      |
| 174  | 8 to 200                         | 0,6 to 13,8                       | 0,1 to 3,5          | 6,9 to 241,3 | 500                  | 34,5                 | 1000             | 68,9        |     |      |     |      |
| <b>2" sanitary welded 316L stainless steel diaphragm and pressure connection. Mates with Tri-Clamp® fitting systems (not UE supplied)</b>  |                                  |                                   |                     |              |                      |                      |                  |             |     |      |     |      |
| 560  | 0,5 to 15                        | 34,5 mbar to 1,0                  | 0,1 to 1            | 6,9 to 68,9  | 200                  | 13,8                 | 300              | 20,7        |     |      |     |      |
| 561  | 1 to 25                          | 68,9 mbar to 1,7                  | 0,1 to 1,5          | 6,9 to 103,4 | 200                  | 13,8                 | 300              | 20,7        |     |      |     |      |
| 562  | 2 to 50                          | 0,1 to 3,4                        | 0,1 to 2,5          | 6,9 to 172,4 | 200                  | 13,8                 | 300              | 20,7        |     |      |     |      |
| 563  | 4 to 100                         | 0,3 6,9                           | 0,1 to 4            | 6,9 to 275,8 | 200                  | 13,8                 | 300              | 20,7        |     |      |     |      |
| 564  | 8 to 200                         | 0,6 to 13,8                       | 0,1 to 5            | 6,9 to 344,7 | 200                  | 13,8                 | 300              | 20,7        |     |      |     |      |

Tri-Clamp® is a registered trademark of Alfa Laval.

**Application Note:** 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).

\* 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).

## 100 Series

## PRESSURE MODEL CHART

| Model  | Adjustable Set Point Range       |   | Deadband            |                    |          |            | Over Range Pressure* |            | Proof Pressure** |       |
|--|----------------------------------|---|---------------------|--------------------|----------|------------|----------------------|------------|------------------|-------|
| Type H100  | Low end of range on fall;<br>psi | High end of range on rise<br>bar (unless noted) | psi                 | bar (unless noted) | psi      | bar        | psi                  | bar        | psi              | bar   |
| 1.5" sanitary welded 316L stainless steel diaphragm and pressure connection. Mates with Tri-Clamp® fitting systems (not UE supplied)                             |                                  |   |                     |                    |          |            |                      |            |                  |       |
| 565  | 5 to 30                          | 0,3 to 2,1                                      | 1 to 5              | 68,9 mbar to 0,3   | 1000     | 68,9       | 1500                 | 103,4      |                  |       |
| 566  | 10 to 100                        | 0,7 to 6,9                                      | 1 to 12             | 68,9 mbar 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      |                  |       |
| Buna-N diaphragm and O-ring with nickel-plated brass 1/4" NPT (female) pressure connection; Option M540 Viton® diaphragm and O-ring available for models 701-705 |                                  |   |                     |                    |          |            |                      |            |                  |       |
| 701  | 1,5 to 30                        | 103,4 mbar to 2,1                               | 1 to 2              | 68,9 mbar to 0,1   | 500      | 34,5       | 600                  | 41,4       |                  |       |
| 702  | 3 to 100                         | 0,2 to 6,9                                      | 1 to 4              | 68,9 mbar to 0,3   | 500      | 34,5       | 600                  | 41,4       |                  |       |
| 703  | 9 to 300                         | 0,6 to 20,7                                     | 1 to 5              | 68,0 mbar to 0,3   | 500      | 34,5       | 600                  | 41,4       |                  |       |
| 704  | 15 to 500                        | 1,0 to 34,5                                     | 2 to 8              | 0,1 to 0,6         | 1500     | 103,4      | 2500                 | 172,4      |                  |       |
| 705  | 30 to 1000                       | 2,1 to 68,9                                     | 3 to 20             | 0,2 to 1,4         | 1500     | 103,4      | 2500                 | 172,4      |                  |       |
| 706  | 100 to 1700                      | 6,9 to 117,2                                    | 10 to 30            | 0,7 to 2,1         | 2000     | 103,4      | 2500                 | 172,4      |                  |       |
|  | psi                              | bar   | psi                 | bar                | psi      | bar        | psi                  | bar        | psi              | bar   |
| Viton® diaphragm and O-Ring with 316 stainless steel 1/4" NPT (female) pressure connection (includes adjustable deadband switch)                                 |                                  |   |                     |                    |          |            |                      |            |                  |       |
| 15623  | 20 to 200                        | 1,4 to 13,8                                     | 12 to 26            | 0,8 to 1,8         | 500      | 34,5       | 1000                 | 68,9       |                  |       |
| Model  | Adjustable Set Point Range       |   | Adjustable Deadband |                    |          |            | Over Range Pressure* |            | Proof Pressure** |       |
|  | psi                              | bar   | psi                 | bar                | psi      | bar        | psi                  | bar        | psi              | bar   |
| Buna N diaphragm and O-Ring nickel-plated brass 1/4" NPT (female) pressure connection; includes adjustable deadband microswitch                                  |                                  |   |                     |                    |          |            |                      |            |                  |       |
| 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  |
| 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  |
| 15733  | 9 to 300                         | 0,6 to 27,0                                     | 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  |
| 15734  | 15 to 500                        | 1,0 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 |
| 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 |
| 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 |
|  | psi                              | bar   | psi                 | bar                | psi      | bar        | psi                  | bar        | psi              | bar   |
| Welded 316 stainless steel diaphragm and 1/2" NPT (female) pressure connection, large 0.72" orifice for clean-out purposes (NACE MR-0175 compliant)              |                                  |   |                     |                    |          |            |                      |            |                  |       |
| 190  | 5 to 30                          | 0,3 to 2,1                                      | 1 to 3              | 0,1 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              | 0,1 to 0,6         | 15 max   | 1,0        | 1500                 | 103,4      | 2500             | 172,4 |
| 192  | 15 to 300                        | 1,0 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 |

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**Application Note:** 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).

| Model   | Adjustable Set Point Range       |                                  | Deadband                       |                              | Over Range Pressure* |       | Proof Pressure** |       |
|---|----------------------------------|----------------------------------|--------------------------------|------------------------------|----------------------|-------|------------------|-------|
| Type H100   | Low end of range on fall;<br>psi | High end of range on rise<br>bar | Lower 75%<br>range span<br>psi | Top 25%<br>range span<br>bar | psi                  | bar   | psi              | bar   |
| <b>Welded 316 stainless steel diaphragm and 1/2" NPT (female) pressure connection, 0.06" orifice to dampen pulsations</b>   |                                  |                                  |                                |                              |                      |       |                  |       |
| 490   | 5 to 30                          | 0,3 to 2,1                       | 1 to 3                         | 0,1 to 0,2                   | 6 max                | 0,4   | 1500             | 103,4 |
| 491   | 10 to 100                        | 0,7 to 6,9                       | 1 to 8                         | 0,1 to 0,6                   | 15 max               | 1,0   | 1500             | 103,4 |
| 492   | 15 to 300                        | 1,0 to 20,7                      | 3 to 18                        | 0,2 to 1,2                   | 25 max               | 1,7   | 1500             | 103,4 |
| 493   | 20 to 500                        | 1,4 to 34,5                      | 4 to 30                        | 0,3 to 2,1                   | 45 max               | 3,1   | 1500             | 103,4 |
| 494   | 80 to 1700                       | 5,5 to 117,2                     | 5 to 120                       | 0,3 to 8,3                   | 150 max              | 10,3  | 2000             | 137,9 |
|   | psi (unless noted)               | bar                              | psi (unless noted)             | bar (unless noted)           |                      | psi   | bar              | psi   |
| 316L stainless steel diaphragm (optional Hastelloy® C or Monel®); Viton® GLT O-Ring (optional Kalrez®, Silicone, Ethylene Propylene, or Aflas®); 316 stainless steel 1/2" NPT (female) pressure connection (optional Hastelloy® C or Monel®), large 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                          | 0,1 to 1,4                       | 0,3 to 2,5                     | 20,7 to 172,4 mbar           | 500                  | 34,5  | 1000             | 68,9  |
| 184   | 2 to 50                          | 0,1 to 3,4                       | 0,3 to 3                       | 20,7 to 206,8 mbar           | 500                  | 34,5  | 1000             | 68,9  |
| 185   | 4 to 100                         | 0,3 to 6,9                       | 0,5 to 6                       | 34,5 to 413,7 mbar           | 500                  | 34,5  | 1000             | 68,9  |
| 186   | 8 to 200                         | 0,6 to 13,8                      | 1 to 11                        | 0,1 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                      | 17,2 to 241,3                    | 50 to 300                      | 3,4 to 20,7                  | 4000                 | 275,8 | 7000             | 482,6 |
| 316L stainless steel diaphragm (optional Hastelloy® C or Monel®) Viton® GLT O-Ring (optional Kalrez®, Silicone, ethylene propylene or Aflas®), 316 stainless steel 1/2" NPT (female) pressure connection (optional Hastelloy® C or Monel®), 0.06" orifice to dampen pulsations. Models 488 and 489 316L stainless steel pressure connection (NACE MR-0175 compliant)                                    |                                  |                                  |                                |                              |                      |       |                  |       |
| 483   | 1 to 20                          | 0,1 to 1,4                       | 0,3 to 2,5                     | 20,7 to 172,4 mbar           | 500                  | 34,5  | 1000             | 68,9  |
| 484   | 2 to 50                          | 0,1 to 3,4                       | 0,3 to 3                       | 20,7 to 206,8 mbar           | 500                  | 34,5  | 1000             | 68,9  |
| 485   | 4 to 100                         | 0,3 to 6,9                       | 0,5 to 6                       | 34,5 to 413,7 mbar           | 500                  | 34,5  | 1000             | 68,9  |
| 486   | 8 to 200                         | 0,6 to 13,8                      | 1 to 11                        | 0,1 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 nickel-plated brass 1/4" NPT (female) pressure connection. Model 218 has 300 series stainless steel spring exposed to media  |                                  |                                  |                                |                              |                      |       |                  |       |
| 218   | 30 "Hg Vac to 0                  | -1 to 0                          | 1 to 2 "Hg                     | 33,9 to 67,7 mbar            | 3                    | 0,2   | 30               | 2,1   |
| 270   | 4 to 200                         | 0,3 to 13,8                      | 1 to 8                         | 0,1 to 0,6                   | 200                  | 13,8  | 250              | 17,2  |
| 274   | 6 to 300                         | 0,4 to 20,7                      | 1 to 10                        | 0,1 to 0,7                   | 300                  | 20,7  | 350              | 24,1  |
| <b>Welded 316L stainless steel bellows and 1/4" NPT (female) pressure connection</b>  |                                  |                                  |                                |                              |                      |       |                  |       |
| 358   | 15 to 200                        | 1,0 to 13,8                      | 1 to 3                         | 0,1 to 0,2                   | 200                  | 13,8  | 800              | 55,2  |
| 361   | 20 to 300                        | 1,4 to 20,7                      | 1 to 4                         | 0,1 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  |

Hastelloy® is a registered trademark of Haynes International, Inc. Monel® is a registered trademark of The Special Metals Corporation. Viton® and Kalrez® are registered trademarks of E.I. duPont de Nemours and Company. Aflas® is a registered trademark of Asahi Glass.

\* 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).

**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. Use of optional diaphragm materials for models 483-489 may increase deadband.



## 100 Series

## PRESSURE MODEL CHART

| Model  | Adjustable Set Point Range       |                                  | Deadband  |             | Over Range Pressure* |       | Proof Pressure** |       |
|--|----------------------------------|----------------------------------|-----------|-------------|----------------------|-------|------------------|-------|
| Type H100  | Low end of range on fall;<br>psi | High end of range on rise<br>bar | psi       | bar         | psi                  | bar   | psi              | bar   |
| 303 stainless steel piston, Buna N O-Ring with 303 stainless steel 1/4" NPT (female) pressure connection                                       |                                  |                                  |           |             |                      |       |                  |       |
| 610  | 75 to 1000                       | 5,2 to 68,9                      | 30 to 150 | 2,1 to 10,3 | 6000                 | 413,7 | 10,000           | 689,5 |
| 612  | 125 to 3000                      | 8,6 to 206,8                     | 40 to 250 | 2,8 to 17,2 | 6000                 | 413,7 | 10,000           | 689,5 |
| 616  | 700 to 5000                      | 48,3 to 344,7                    | 40 to 375 | 2,8 to 25,9 | 6000                 | 413,7 | 10,000           | 689,5 |
|  | psi                              | bar                              | psi       | bar         | psi                  | bar   | psi              | bar   |
| 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 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 |

## DIFFERENTIAL PRESSURE MODEL CHART

| Model   | Adjustable Set Point Range                          |  | Deadband              |                       | Working Pressure***   |            | Proof Pressure** |       |
|---|---|--|-----------------------|-----------------------|-----------------------|------------|------------------|-------|
| Type H100K  | Low end of range on fall;<br>psid<br>(unless noted) | High end of range on rise<br>bar<br>(unless noted) | psi<br>(unless noted) | bar<br>(unless noted) | psi<br>(unless noted) | bar        | psi              | bar   |
| Buna N diaphragms and sealing O-rings with 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 mbar       | 30 "Hg Vac to 200     | -1 to 13,8 | 400              | 27,6  |
| 541   | 1 to 20 "wcd  | 2,5 to 49,8 mbar                                   | 0,1 to 1,0 "wc        | 0,2 to 2,5 mbar       | 30 "Hg Vac to 200     | -1 to 13,8 | 400              | 27,6  |
| 542   | 5 to 50 "wcd  | 12,4 to 124,5 mbar                                 | 0,2 to 2,5 "wc        | 0,5 to 6,2 mbar       | 30 "Hg Vac to 200     | -1 to 13,8 | 400              | 27,6  |
| 543   | 10 to 200 "wcd                                      | 24,9 to 497,8 mbar                                 | 0,5 to 8 "wc          | 1,2 to 19,9 mbar      | 30 "Hg Vac to 200     | -1 to 13,8 | 400              | 27,6  |
| 544   | 2 to 20   | 0,1 to 1,4   | 0,1 to 1,3            | 6,9 to 89,6 mbar      | 30 "Hg Vac to 1200    | -1 to 82,7 | 2500             | 172,4 |
| 545   | 5 to 50   | 0,3 to 3,4   | 0,2 to 2,2            | 13,8 mbar to 0,1      | 30 "Hg Vac to 1200    | -1 to 82,7 | 2500             | 172,4 |
| 546   | 10 to 125   | 0,7 to 8,6   | 0,4 to 5,0            | 27,6 mbar to 0,3      | 30 "Hg Vac to 1200    | -1 to 82,7 | 2500             | 172,4 |
| 547   | 50 to 250   | 3,4 to 17,2  | 0,8 to 10             | 0,1 to 0,7            | 30 "Hg Vac to 1200    | -1 to 82,7 | 2500             | 172,4 |
| 548   | 100 to 500  | 6,9 to 34,5  | 2,0 to 15             | 0,1 to 1,0            | 30 "Hg Vac to 1200    | -1 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.

## TEMPERATURE MODEL CHART

| Model   | Adjustable Set Point Range |                | Max. Temp |       | Scale Division |    | Stem or Bulb Size†/Finish‡‡                                |
|---|----------------------------|----------------|-----------|-------|----------------|----|--|
|   | °F                         | °C             | °F        | °C    | °F             | °C |  |
| <b>Type B100</b> Internal adjustment via reference dial <b>Type C100</b> No reference dial; model 13546 not available |                            |                |           |       |                |    |  |
| 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†<br>(Freeze Protection)   | 15 to 140                  | -9.4 to 60     | 160       | 71.1  | 5†             | 2† | 9/16" x 2-11/16" long stainless steel                      |
| <b>Type E100</b> Stainless steel bulb and capillary; internal adjustment via reference dial                           |                            |                |           |       |                |    |  |
| 2BSA  | -120 to 100                | -84.4 to 37.8  | 150       | 65.6  | 10             | 5  | 3/8 x 2-7/16"  |
| 2BSB  | 30 to 250                  | -1.1 to 121.1  | 300       | 148.9 | 10             | 5  | 3/8 x 2-7/16"  |
| 3BS   | 100 to 400                 | 37.8 to 204.4  | 450       | 232.2 | 10             | 5  | 3/8 x 2-1/8"   |
| 4BS   | 25 to 100                  | -3.9 to 37.8   | 150       | 65.6  | 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<br>(Heat Tracing)   | 25 to 325                  | -3.9 to 162.8  | 360       | 182.2 | 10             | 5  | 1/8 x 11-5/8"  |
| Copper bulb and capillary   |                            |                |           |       |                |    |  |
| 2BCA  | -120 to 100                | -84.4 to 37.8  | 150       | 65.6  | 10             | 5  | 3/8 x 2-7/16"  |
| 2BCB  | 30 to 250                  | -1.1 to 121.1  | 300       | 148.9 | 10             | 5  | 3/8 x 2-7/16"  |
| 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 37.8   | 150       | 65.6  | 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       | 365.6 | 10             | 5  | 3/8 x 3-1/4"   |
| <b>Type F100</b> Stainless steel bulb and capillary; no reference dial  |                            |                |           |       |                |    |  |
| 1BS   | -180 to 120                | -117.8 to 48.9 | 170       | 76.7  | N/A            |    | 3/8 x 3-3/4"   |
| 2BS   | -125 to 350                | -87.2 to 176.7 | 400       | 204.4 | N/A            |    | 3/8 x 2-7/16"  |
| 3BS   | -125 to 500                | -87.2 to 260   | 550       | 287.8 | N/A            |    | 3/8 x 2-1/8"   |
| 4BS   | -40 to 120                 | -40 to 48.9    | 170       | 76.7  | N/A            |    | 3/8 x 6-3/4"   |
| 5BS   | -40 to 180                 | -40 to 82.2    | 230       | 110   | N/A            |    | 3/8 x 5"   |
| 6BS   | 0 to 250                   | -17.8 to 121.1 | 300       | 148.9 | N/A            |    | 3/8 x 4-1/2"   |
| 7BS   | 0 to 400                   | -17.8 to 204.4 | 450       | 232.2 | N/A            |    | 3/8 x 3"   |
| 8BS   | 50 to 650                  | 10 to 343.3    | 700       | 371.1 | N/A            |    | 3/8 x 3-1/4"   |
| Copper bulb and capillary   |                            |                |           |       |                |    |  |
| 1BC   | -180 to 120                | -117.8 to 48.9 | 170       | 76.7  | N/A            |    | 3/8 x 3-3/4"   |
| 2BC   | -125 to 350                | -87.2 to 176.7 | 400       | 204.4 | N/A            |    | 3/8 x 2-7/16"  |
| 3BC   | -125 to 500                | -87.2 to 260   | 550       | 287.8 | N/A            |    | 3/8 x 2-1/8"   |
| 4BC   | -40 to 120                 | -40 to 48.9    | 170       | 76.7  | N/A            |    | 3/8 x 6-3/4"   |
| 5BC   | -40 to 180                 | -40 to 82.2    | 230       | 110   | N/A            |    | 3/8 x 5"   |
| 6BC   | 0 to 250                   | -17.8 to 121.1 | 300       | 148.9 | N/A            |    | 3/8 x 4-1/2"   |
| 7BC   | 0 to 400                   | -17.8 to 204.4 | 450       | 232.2 | N/A            |    | 3/8 x 3"   |
| 8BC   | 50 to 650                  | 10 to 343.3    | 700       | 371.1 | N/A            |    | 3/8 x 3-1/4"   |

\*Type B100 only

†Optional immersion stem lengths and capillary lengths are available. Standard capillary length is 6 ft except models 13545 which is 10 ft.

‡‡Optional stainless steel immersion stem, and armored capillary covering available.



# 100 Series

100 Series

## HOW TO ORDER

### BUILDING A PART NUMBER

#### Select a **Type**

- Refer to the "Type" section below.
- Determine type number based on switch output, enclosure, adjustment and reference.
- Fill in the type portion of your part number with the corresponding number.

#### Select a **Model**

- Refer to the "Model Charts".
- Determine model based on adjustable range, deadband and proof pressure.
- Fill in the model portion of your part number with the corresponding number.

#### Select an **Option**

- Refer to the "Options" section.
- Determine option number based on switch output, optional materials or other product enhancements.
- Fill in the option portion of your part number with the corresponding number.
- Leave "option" portion blank if no options are needed.
- FOR MULTIPLE OPTIONS: Call United Electric Controls.

| <b>TYPE</b>                  | <b>DESCRIPTION</b>   |
|------------------------------|--|
| <b>PRESSURE</b>              | Type H100 - One SPDT output; epoxy coated enclosure; internal adjustment with "High-Low" reference scale   |
| <b>DIFFERENTIAL PRESSURE</b> | Type H100K- One SPDT output; epoxy coated enclosure; internal adjustment with "High-Low" reference scale   |
| <b>TEMPERATURE</b>           | Type B100 - Immersion stem; one SPDT output; internal adjustment with reference dial<br>Type C100 - Immersion stem; one SPDT output; internal adjustment with no reference<br>Type E100 - Bulb and capillary; one SPDT output; internal adjustment with reference dial<br>Type F100 - Bulb and capillary; one SPDT output; internal adjustment with no reference |

### 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, 10A 125/250 VAC resistive; deadband and minimum set point will increase. NOT AVAILABLE TEMPERATURE VERSIONS, TYPE H100K OR MODELS 171-194, 483-567, 680, 15623, AND 15731-15884  |
| 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 changes rise setting only. If adjustment on fall setting is required, use primary adjustment. NOT AVAILABLE TYPES B100, E100 OR MODELS 171-194, 483-494, 560-567, 610-616, 51623, 15731-15884 |
| 1530 | External manual reset, 15 A 125/250/480 VAC resistive; latches on rise, only. NOT 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 523, 533, 13545, 13546, 15623, 15731-15884  |
| 2000 | 20 A 125/250/480 VAC resistive. NOT AVAILABLE TYPE H100K OR MODELS 520-535, 13545, 13546, 15623, 15731-15884  |
| 3000 | 30 A 125/250/277 VAC resistive. NOT AVAILABLE TYPE H100K OR MODELS 171-194, 483-567, 680, 13545, 13546, 15623, 15731-15884  |

\* All switches have limited DC capabilities. Consult factory for details.

**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  |
| M277                   | Range indicated on nameplate in kPa or MPa, factory selected. NOT AVAILABLE ON TEMPERATURE VERSIONS  |
| M278                   | Range indicated on nameplate in Kg/cm <sup>2</sup> . NOT AVAILABLE ON TEMPERATURE VERSIONS   |
| 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   |
| M449                   | Mounting bracket kit. Required for models 520-535, 15737 when surface mounting. Use kit part number 6361-704 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. AVAILABLE ON MODELS 610-616 (O-ring only), 701-705 (Viton diaphragm & O-ring, stainless steel pressure connection), AND 540-548 (sealing diaphragms only, main diaphragm remains Kapton®, pressure connections remain aluminum) |
| M550                   | Oxygen service cleaning; internal construction may change. NOT AVAILABLE ON PRESSURE MODEL 706   |
| 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 (required for model 520-535, 15737, 540-548 when surface mounting)  |
| SD6286-51              | Watertight conduit fitting; connects 7/8" hole to 1/2" NPT (female) fitting  |
| <b>ALSO AVAILABLE:</b> | UE Final Inspection Reports, Certified Drawings, and other Certificates are available. Please consult your UE representative for additional information.   |

**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.<br>(Over range pressure is limited to 100 psi) |
| XC005 | 316L Stainless steel pressure connection, Viton® diaphragm, Viton® O-ring   |
| XC006 | 316L Stainless steel pressure connection, Kapton® 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                                  |
| XD003 | Monel diaphragm  |
| XP112 | Hastelloy C pressure connection                        |
| XP113 | Monel pressure connection                              |
| XR211 | Kalrez® O-ring   |
| XR212 | Silicone O-ring. NOT AVAILABLE MODELS 188-189, 488-489 |
| XR213 | Ethylene propylene O-ring                              |
| XR214 | Aflas® O-ring  |

**OPTIONAL FLUSH MOUNT FLANGES. AVAILABLE MODELS 560-567**

Other flanges (150# and 300#) available, please consult UE. Flanges conform to ANSI B16.5. Maximum pressure is limited by flange rating.

|      |   |                               |
|------|---|-------------------------------|
| F196 | Flush mounted flange, 150#, 1" lap joint, raised face | AVAILABLE MODELS 565-567 ONLY |
| F197 | Flush mounted flange, 150#, 2" lap joint, raised face | AVAILABLE MODELS 560-564 ONLY |
| F198 | Flush mounted flange, 300#, 1" lap joint, raised face | AVAILABLE MODELS 565-567 ONLY |
| F199 | Flush mounted flange, 300#, 2" lap joint, raised face | AVAILABLE MODELS 560-564 ONLY |

**Note:** No options are available on Heat Trace and Freeze Protection models 13546 and 13545 or pump switch model 15623 & 15884 except M201, M444 and M446.



# 100 Series

**100 Series**

## 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 ST/ST |

### 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.

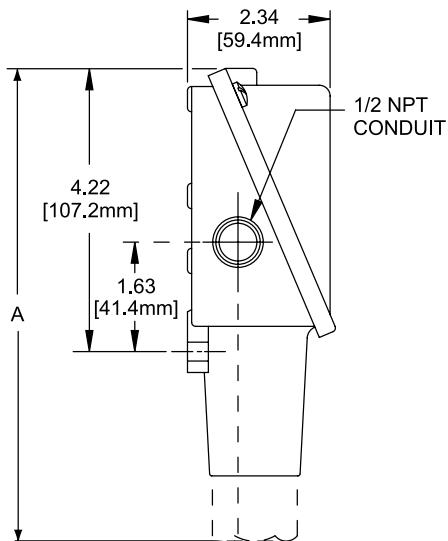
| Option | Description  |
|--------|--|
| W000   | Immersion stem only, brass   |
| W097   | Immersion stem and thermowell. Includes W000 stem and 1/2" NPT x 1-23/32" BT Brass thermowell      |
| W099   | Immersion stem and thermowell. Includes W000 stem and 1/2" NPT x 1-23/32" BT 316 ST/ST thermowell. |

### OPTIONAL LENGTHS:

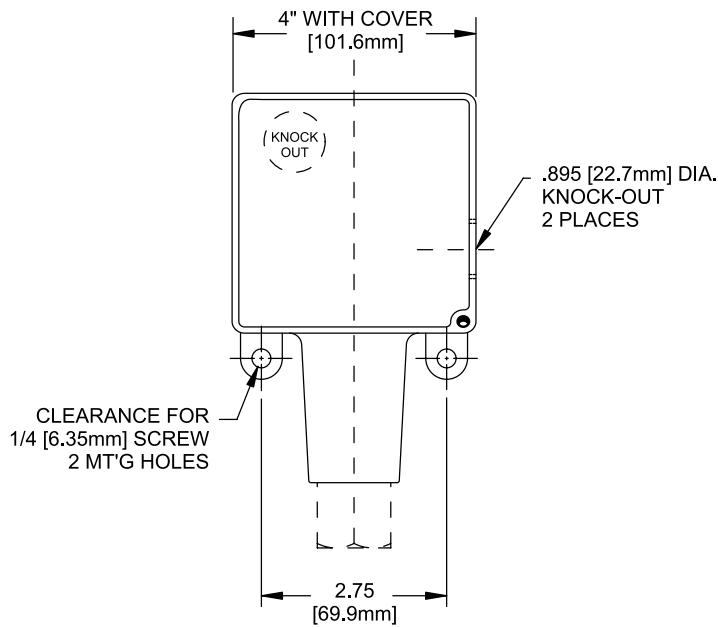
Optional immersion stem lengths to 15" available in Brass, with or without 316 ST/ST thermowell. Consult UE for additional information. Optional capillary length to \*50' available in Copper or 304 ST/ST. Armor or Teflon® capillary protection available to lengths less than or equal to capillary length. Consult UE for additional information.

\*Consult UE regarding repeatability and ambient effects on capillary lengths over 30'.

\*\* Dimensional drawings for union connectors and thermowells may be found at [www.ueonline.com](http://www.ueonline.com)

**DIMENSIONAL DRAWINGS**Dimensional drawings for all models may be found at [www.ueonline.com](http://www.ueonline.com)**Types B100, C100, E100, F100, H100, H100K**

| Models                       | Dimension A |       |                         |
|------------------------------|-------------|-------|-------------------------|
|                              | Inches      | mm    | NPT                     |
| <b>Pressure</b>              |             |       |                         |
| 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        | 177.8 | 1/4"                    |
| 358-376                      | 7.00        | 177.8 | 1/4"                    |
| 520-525, 15737               | 8.44        | 214.4 | 1/2"                    |
| 530-535                      | 8.00        | 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"                    |
| <b>Differential Pressure</b> |             |       |                         |
| 540-543                      | 8.47        | 215.1 | 1/8"                    |
| 544-548                      | 8.53        | 216.7 | 1/8"                    |
| <b>Temperature</b>           |             |       |                         |
| 120, 121, 13546              | 9.38        | 238.3 | Immersion stem          |
| 1BC-8BC, 1BS-8BS, 13545      | 8.69        | 220.7 | Bulb & capillary        |

*All dimensions stated in inches (millimeters)*

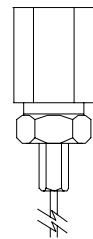
## 100 Series

## DIMENSIONAL DRAWINGS

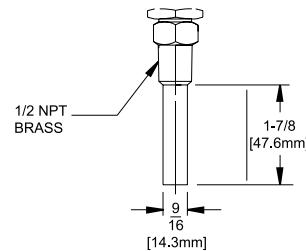
Dimensional drawings for all models may be found at [www.ueonline.com](http://www.ueonline.com)

## Temperature Sensors

Models 1BC-8BC, 1BS-8BS, 13545



Models 120,121

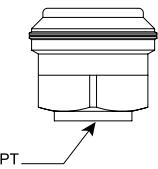
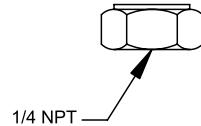


Model 13546

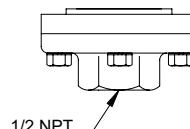


## Pressure Sensors

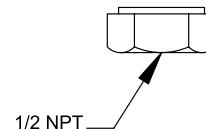
Models 171-174

Models 218-376, 610-706,  
15623,15731-15736

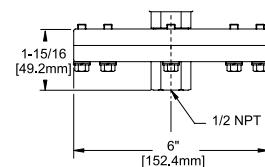
Models 183-186, 483-486



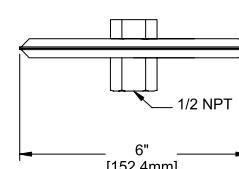
Models 188-194, 488-494



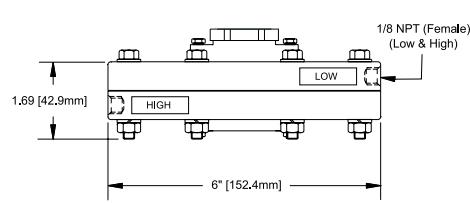
Models 520-525, 15737



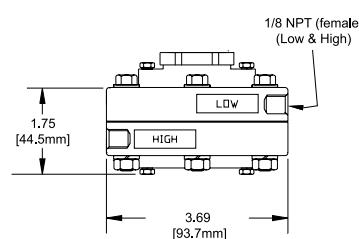
Models 530-535



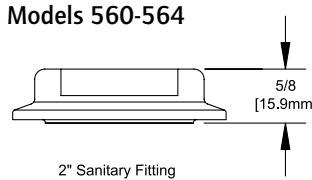
Models 540-543



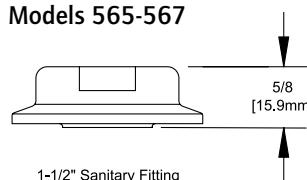
Models 544-548



Models 560-564



Models 565-567



All dimensions  
stated in inches  
(millimeters)

## ALTERNATIVE PRODUCTS FROM UE

**One Series**

- Electronic solid-state reliability
- Two-wire operation
- Digital display with keypad set-up
- 100% of range adjustable on-off deadband
- 4-20 mA output models
- Continuous diagnostic health check

**10 Series**

- Compact, cylindrical enclosure
- Pressure ranges from 4 to 7,500 psi, and proof pressure to 12,000 psi
- Choice of seven electrical terminations
- NPT or SAE threaded pressure connections

**117 Series**

- Single Switch for Corrosive and Hazardous Division 2 Locations
- Compact pressure, differential pressure and temperature models
- Hermetically-sealed SPDT and DPDT output
- Epoxy-coated weather-tight design houses stainless steel internal construction
- Convenient terminal block wiring

**400 Series**

- 1, 2, and 3 switch output may be separated up to 100% of range
- Wide selection of pressure, differential pressure, and temperature ranges
- Setting via reference dial or hex screw adjustment
- Weathertight 4X design ideal for ordinary location applications

**Temperature Sensors**

Rugged RTDs and thermocouples for process and energy applications, available with Nema 4X and explosion-proof heads to match heat-trace, turbine, combustion, and stack-emission applications



## RECOMMENDED PRACTICES AND WARNINGS

United Electric Controls Company recommends careful consideration of the following factors when specifying and installing UE pressure and temperature units. Before installing a unit, the Installation and Maintenance instructions provided with unit must be read and understood.

- To avoid damaging unit, proof pressure and maximum temperature limits stated in literature and on nameplates must never be exceeded, even by surges in the system. Operation of the unit up to maximum pressure or temperature is acceptable on a limited basis (e.g., start-up, testing) but continuous operation must be restricted to the designated over range pressure. Excessive cycling at maximum pressure or temperature limits could reduce sensor life.
- A back-up unit is necessary for applications where damage to a primary unit could endanger life, limb or property. A high or low limit switch is necessary for applications where a dangerous runaway condition could result.
- The adjustable range must be selected so that incorrect, inadvertent or malicious setting at any range point cannot result in an unsafe system condition.
- Install unit where shock, vibration and ambient temperature fluctuations will not damage unit or affect operation. When applicable, orient unit so that moisture does not enter the enclosure via the electrical connection. When appropriate, this entry point should be sealed to prevent moisture entry.
- Unit must not be altered or modified after shipment. Consult UE if modification is necessary.
- Monitor operation to observe warning signs of possible damage to unit, such as drift in set point or faulty display. Check unit immediately.
- Preventative maintenance and periodic testing is necessary for critical applications where damage could endanger property or personnel.
- Electrical ratings stated in literature and on nameplate must not be exceeded. Overload on a switch can cause damage, even on the first cycle. Wire unit according to local and national electrical codes, using wire size recommended in installation sheet.
- Do not mount unit in ambient temp. exceeding published limits.

## LIMITED WARRANTY

Seller warrants that the product hereby purchased is, upon delivery, free from defects in material and workmanship and that any such product which is found to be defective in such workmanship or material will be repaired or replaced by Seller (Ex-works, Factory, Watertown, Massachusetts, INCOTERMS); provided, however, that this warranty applies only to equipment found to be so defective within a period of 24 months from the date of manufacture by the Seller. Seller shall not be obligated under this warranty for alleged defects which examination discloses are due to tampering, misuse, neglect, improper storage, and in any case where products are disassembled by anyone other than authorized Seller's representatives. EXCEPT FOR THE LIMITED WARRANTY OF REPAIR AND REPLACEMENT STATED ABOVE, SELLER DISCLAIMS ALL WARRANTIES WHATSOEVER WITH RESPECT TO THE PRODUCT, INCLUDING ALL IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR ANY PARTICULAR PURPOSE.

## LIMITATION OF SELLER'S LIABILITY

SELLER'S LIABILITY TO BUYER FOR ANY LOSS OR CLAIM, INCLUDING LIABILITY INCURRED IN CONNECTION WITH (I) BREACH OF ANY WARRANTY WHATSOEVER, EXPRESSED OR IMPLIED, (II) A BREACH OF CONTRACT, (III) A NEGLIGENT ACT OR ACTS (OR NEGLIGENCE FAILURE TO ACT) COMMITTED BY SELLER, OR (IV) AN ACT FOR WHICH STRICT LIABILITY WILL BE INPUTTED TO SELLER, IS LIMITED TO THE "LIMITED WARRANTY" OF REPAIR AND/OR REPLACEMENT AS SO STATED IN OUR WARRANTY OF PRODUCT. IN NO EVENT SHALL THE SELLER BE LIABLE FOR ANY SPECIAL, INDIRECT, CONSEQUENTIAL OR OTHER DAMAGES OF A LIKE GENERAL NATURE, INCLUDING, WITHOUT LIMITATION, LOSS OF PROFITS OR PRODUCTION, OR LOSS OR EXPENSES OF ANY NATURE INCURRED BY THE BUYER OR ANY THIRD PARTY.

*UE specifications subject to change without notice.*

Be sure to visit [www.ueonline.com](http://www.ueonline.com) for the latest information.

## U.S. SALES OFFICES

United Electric Controls  
31 Old Stage Road  
Hampton Falls, NH 03844  
Phone: 617-899-1132  
email: [northeastsales@ueonline.com](mailto:northeastsales@ueonline.com)

United Electric Controls  
28 N. Wise Ave.  
Freeport, IL 61032  
Phone: 815-341-2588  
email: [midwestsales@ueonline.com](mailto:midwestsales@ueonline.com)

United Electric Controls  
1022 Vineyard Drive  
Conyers, GA 30013  
Phone: 770-335-9802  
email: [southeastsales@ueonline.com](mailto:southeastsales@ueonline.com)

United Electric Controls  
5829 Grazing Court  
Mason, OH 45040  
Phone: 513-535-5486  
email: [midatlanticsales@ueonline.com](mailto:midatlanticsales@ueonline.com)

United Electric Controls  
102 Salazar Court  
Clayton, CA 94517  
Phone: 925-408-5997  
email: [westcoastsales@ueonline.com](mailto:westcoastsales@ueonline.com)

United Electric Controls  
27 Summit Terrace  
Sparta, NJ 07871  
Phone: 973-271-2550  
email: [easternsales@ueonline.com](mailto:easternsales@ueonline.com)

United Electric Controls  
4306 Whickham Drive  
Fulshear, TX 77441  
Phone: 832-457-6138  
email: [southwestsales@ueonline.com](mailto:southwestsales@ueonline.com)

## CANADA

EASTERN  
68 Mosley Crescent  
Brampton, Ontario  
Canada L6Y 5C8  
Phone: 905-455-5131  
FAX: 905-455-5131

## INTERNATIONAL OFFICES

CHINA  
United Electric Controls, *Shanghai*  
Room 1011, 10th Flr,  
Huai Hai Zhonghua Building  
No. 885, Renmin Road, Luwan District  
Shanghai 200010, P.R. China  
Phone: +8621-6255 8059  
email: [chinasales@ueonline.com](mailto:chinasales@ueonline.com)

United Electric Controls, *Beijing*  
Room 1006, Jainhao International Bldg.  
Block D, No. 116  
Zizhuyuanlu, Haidian District  
Beijing, China 100089  
Phone & Fax: +86-10-5893-0551  
email: [beijingsales@ueonline.com](mailto:beijingsales@ueonline.com)

EASTERN EUROPE & SCANDINAVIA  
United Electric Controls  
05-806 Komorow  
Kujawska 5, Poland  
Phone: +48 22 499 4804  
email: [easterneuropesales@ueonline.com](mailto:easterneuropesales@ueonline.com)

GERMANY  
United Electric Controls  
An Der Zentlinde 21  
D-64711 Erbach, Germany  
Phone: 496-062-7400  
email: [europesales@ueonline.com](mailto:europesales@ueonline.com)

INDIA  
United Electric Controls  
House no. 7, Kamalkunj Society  
Nizampura,  
Baroda (Gujarat), India  
Phone: +91 (-265) -2788654  
email: [indiасales@ueonline.com](mailto:indiасales@ueonline.com)

ASIA-PACIFIC  
United Electric Controls, Far East  
No. 1-2-2, 2nd Floor  
Jalan 4/101C  
Cheras Business Centre  
Batu 5, Jalan Cheras  
56100 Kuala Lumpur, Malaysia  
Phone: 603-9133-4122  
email: [fareastsales@ueonline.com](mailto:fareastsales@ueonline.com)

MEXICO  
United Electric Controls  
Carretera Tampico Mante No 124  
Despacho 101, Col Mexico CP 89348  
Tampico, Tamaulipas Mexico  
Phone: 833-132-3726  
email: [latinamericasales@ueonline.com](mailto:latinamericasales@ueonline.com)

RUSSIA  
United Electric Controls, Moscow  
Kuusinen str., 19A, Office 310  
Moscow, 125252, Russia  
Phone: +7 (095) 792-88-06  
email: [russiansales@ueonline.com](mailto:russiansales@ueonline.com)



UNITED ELECTRIC  
CONTROLS

180 Dexter Avenue, P.O. Box 9143  
Watertown, MA 02471-9143 USA  
Telephone: 617 926-1000 Fax: 617 926-2568  
<http://www.ueonline.com>

CP04102500

## PRESSURE, VACUUM, DIFFERENTIAL PRESSURE AND TEMPERATURE SWITCHES



### FEATURES

- 1, 2 & 3 switch outputs
- Epoxy-coated enclosure designed to meet enclosure type 4X
- Wide variety of pressure sensors and materials
- Setting via reference dial or hex screw adjustment
- FM approved
- Adjustable Ranges:

"WC ranges: 300 "wc vacuum to 250 "wc pressure (-746,7 to 622,3 mbar)

Pressure: 30 "Hg Vac to 6000 psi (-1,0 to 413,7 bar)

Differential pressure: 1" wcd to 200 psid (2,5 mbar to 13,8 bar)

Temperature: -180 to 650 °F (-117,8 to 343,3 °C)

**ISO**  
**9001**  
CERTIFIED  
COMPANY

## OVERVIEW

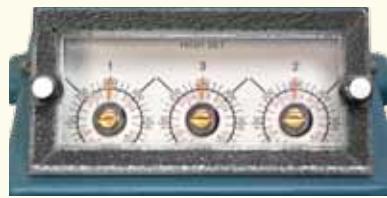
The 400 Series is a versatile family of pressure, differential pressure and temperature switches for applications that require single or multiple switching capabilities. Dual and triple switch versions provide multi-output for alarm and shutdown, pre-alarm and alarm, high/low limit or level staging functions.

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.

## FEATURES

- UL listed and cUL certified. FM approved.
- CE compliant to low voltage directive and pressure equipment directive.
- Optional ATEX or GOST intrinsic safety compliance.
- One, two or three switch outputs may be separated up to 100% of range.
- Wide variety of available options and pressure sensor modules.
- Most models available for immediate delivery.

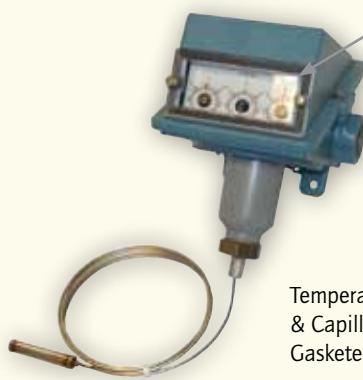


Reference scale, for types B, E & H  
with option M321

*Enlarged View*



Differential Pressure  
Model with M210  
Option - Dial Indication



Temperature Model with Remote Bulb  
& Capillary and M321 option -  
Gasketed Lexan Window



Dual Switch, Low Water  
Column Differential  
Pressure Model

## SPECIFICATIONS

|  |   |
|--|---|
| <b>STORAGE TEMPERATURE</b>                           | -65 to 160°F (-54 to 71°C)  |
| <b>AMBIENT TEMPERATURE LIMITS</b>                    | -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   |
| <b>SET POINT REPEATABILITY</b>                       | Temperature models: ± 2% of full scale range<br>Pressure: models 126-376, 520-535, 540-547, 570-572, S126B-S164B: ± 2% of full scale range; models 440-457, 550-559: ± 1% of full scale range; models 610-614: ± 3% of full scale range                               |
| <b>SHOCK</b>   | Set point repeats after 15 G, 10 millisecond duration   |
| <b>VIBRATION</b>                                     | Set point repeats after 2.5 G, 5-500 Hz   |
| <b>ENCLOSURE</b>                                     | Die cast aluminum, epoxy powder coated, gasketed, captive cover screws  |
| <b>ENCLOSURE CLASSIFICATION</b>                      | Designed to meet enclosure type 4X requirements   |
| <b>SWITCH OUTPUT</b>                                 | 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"  |
| <b>ELECTRICAL RATING</b>                             | 15 A 125/250/480 VAC resistive. Electrical switches have limited DC capabilities. Consult factory for additional information.   |
| <b>WEIGHT</b>  | Approx. 3 to 7.5 lbs.; varies with model  |
| <b>ELECTRICAL CONNECTION</b>                         | One 3/4" NPT and two 7/8" diameter knockouts  |
| <b>PRESSURE CONNECTION</b>                           | All models 1/4" NPT (female) except models S126B-S164B, 520-535: 1/2" NPT (female); models 540-547: 1/8" NPT (female)   |
| <b>TEMPERATURE ASSEMBLY</b>                          | 'E' types use the same assemblies as 'F' types, however, range spans are limited due to use of reference dials<br>Bulb and capillary: 6 feet 304 stainless steel<br>Immersion stem: models 120 &121: nickel-plated brass; optional 316L stainless steel available     |
| <b>FILL</b>  | Temperature Models: Model 1BS: solvent filled; models 2-8: non-toxic oil filled   |
| <b>TEMPERATURE DEADBAND</b>                          | 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)  |
| <b>DIFFERENTIAL PRESSURE INDICATOR (OPTION M210)</b> | 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 |



# 400 Series

## 400 Series

### APPROVALS



#### UNITED STATES AND CANADA

##### Type 400 & 402

##### UL Listed, cUL Certified

Pressure: UL 508; CSA C22.2 No. 14, file # E42272

Temperature: UL 873; CSA C22.2 No. 24, file # E10667



##### Type 403

##### UL 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 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 0335063

EN 50014, 50020 & 50284

##### Low Voltage Directive (LVD) (73/23/EC & 93/68/EEC)

Compliant to LVD

Products rated lower than 50 VAC and 75 VDC are outside of the scope of the LVD

##### Pressure Equipment Directive (PED) (97/23/EC)

Compliant to PED

Products rated below 7.5 PSI are outside of the scope of PED



#### RUSSIA

##### Gosgortekhnadzor Permit (OPTIONAL - code M406)

OExiaIICt6

Tamb = -50°C to +60°C

NANIO CCVE Certification Center

Certificate # ROSS US.GB05.Bo2933

GOST R 51330.0, 51330.1, 51330.10 & 51330.14

## 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

| Model  | Adjustable Set Point Range                             |                       | Deadband                                     |                       | Over Range Pressure*  |                       | Proof Pressure**      |                       |
|--|--|-----------------------|--|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
|  | Low end of range on fall;<br>High end of range on rise |                       | Deadband doubles for<br>2 and 3 switch types |                       | psi                   | bar                   | psi                   | bar                   |
|  | "wc  | mbar                  | "wc  | mbar                  |                       |                       |                       |                       |
| Buna-N diaphragm and O-Ring with epoxy coated aluminum 1/2" NPT (female) pressure connection, large 0.72" orifice for clean-out purposes. Other wetted materials available, see pg. 12 |  |                       |  |                       |                       |                       |                       |                       |
| 520†   | 300 Vac to 0   | -746,7 to 0           | 0,2 to 12                                    | 0,5 to 29,9           | 200                   | 13,8                  | 400                   | 27,6                  |
| 521†   | 10 Vac to 10   | -24,9 to 24,9         | 0,1 to 1                                     | 0,2 to 2,5            | 200                   | 13,8                  | 400                   | 27,6                  |
| 522†   | 50 Vac to 50   | -124,5 to 124,5       | 0,1 to 5                                     | 0,2 to 12,4           | 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 0,7            | 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 and 1/2" NPT (female) 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 1                                     | 0,2 to 2,5            | 50                    | 3,4                   | 100                   | 6,9                   |
| 532†   | 50 Vac 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                                    | 0,2 to 24,9           | 50                    | 3,4                   | 100                   | 6,9                   |
|  | psi<br>(unless noted)                                  | bar<br>(unless noted) | psi<br>(unless noted)                        | bar<br>(unless noted) | psi<br>(unless noted) | bar<br>(unless noted) | psi<br>(unless noted) | bar<br>(unless noted) |
| 316L stainless steel diaphragm and Viton® O-Ring with 316L stainless steel 1/4" NPT (female) pressure connection   |  |                       |  |                       |                       |                       |                       |                       |
| 570†   | 0 to 20  | 0 to 1,4              | 0,2 to 4                                     | 13,8 to 275,8 mbar    | 20                    | 1,4                   | 225                   | 15,5                  |
| 571†   | 0 to 50  | 0 to 3,4              | 0,7 to 6                                     | 48,3 to 413,7 mbar    | 50                    | 3,4                   | 225                   | 15,5                  |
| 572†   | 0 to 100   | 0 to 6,9              | 1 to 7                                       | 0,1 to 0,5            | 100                   | 6,9                   | 225                   | 15,5                  |
| Welded 316L stainless steel bellows and 1/2" NPT (female) pressure connection  |  |                       |  |                       |                       |                       |                       |                       |
| S126B  | 30 "Hg Vac to 0  | -1 to 0               | 0,2 to 0,9 "Hg                               | 6,8 to 30,5 mbar      | 3                     | 0,2                   | 5                     | 0,3                   |
| S134B  | 30 "Hg Vac to 20 psi                                   | -1 to 1,4             | 0,2 to 1,2 "Hg                               | 6,8 to 40,6 mbar      | 20                    | 1,4                   | 25                    | 1,7                   |
| S137B  | 0 to 80 "wc  | 0 to 199,1 mbar       | 2 to 6 "wc                                   | 5 to 14,9 mbar        | 199,1 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                   | 125                   | 8,6                   |
| S164B  | 0 to 200   | 0 to 13,8             | 0,3 to 2                                     | 20,7 to 137,9 mbar    | 200                   | 13,8                  | 200                   | 13,8                  |
| 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            | 200                   | 13,8                  | 250                   | 17,2                  |
| 361  | 0 to 300   | 0 to 20,7             | 2 to 9                                       | 0,1 to 0,6            | 300                   | 20,7                  | 350                   | 24,1                  |
| 376  | 0 to 500   | 0 to 34,5             | 3 to 12                                      | 0,2 to 0,8            | 500                   | 34,5                  | 575                   | 39,6                  |

\*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 subjected, which causes no permanent damage. The unit may require calibration (e.g. start-up, testing).

Viton® is a registered trademark of DuPont Performance Elastomers.

† Model not available on types J400 and J403; actual deadband shown, do not double – switch separation a maximum of 30 - 50% of range.

¹Switch separation of 30% maximum for dual and triple switch units.



# 400 Series

## 400 Series

### 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

| Model  | Adjustable Set Point Range                         |   | Deadband  |                    | Over Range Pressure*  |       | Proof Pressure** |       |
|--|--|---|---|--------------------|-----------------------|-------|------------------|-------|
|  | Low end of range on fall;<br>psi<br>(unless noted) | High end of range on rise;<br>bar<br>(unless noted) | Deadband doubles for<br>2 and 3 switch types<br>psi | bar                | psi<br>(unless noted) | bar   | psi              | bar   |
| 303 stainless steel piston with Buna-N O-Ring and 303 stainless steel 1/4" NPT (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        | 6,000                 | 413,7 | 10,000           | 689,5 |
| 612  | 200 to 3,000                                       | 13,8 to 206,8                                       | 40 to 250   | 2,8 to 17,2        | 6,000                 | 413,7 | 10,000           | 689,5 |
| 614  | 500 to 6,000                                       | 34,5 to 413,7                                       | 50 to 400   | 3,4 to 27,6        | 6,000                 | 413,7 | 10,000           | 689,5 |
| Brass bellows with nickel-plated brass 1/4" NPT (female) pressure connection; Models 126 and 134 have zinc-plated steel spring exposed to media  |  |   |   |                    |                       |       |                  |       |
| 126  | 30 "Hg Vac to 0                                    | -1 to 0   | 0.2" to 0.9 "Hg                                     | 6,8 to 30,5 mbar   | 3                     | 0,2   | 5                | 0,3   |
| 134  | 30 "Hg Vac to 20 psi                               | -1 to 1,4   | 0.2" to 1.2 "Hg                                     | 6,8 to 40,6 mbar   | 20                    | 1,4   | 25               | 1,7   |
| 137  | 0 to 80 "wc  | 0 to 199,1 mbar                                     | 2 to 6 "wc  | 5 to 14,9 mbar     | 3                     | 0,2   | 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               | 1,7   |
| 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  | 20,7 to 137,9 mbar | 200                   | 13,8  | 200              | 13,8  |
| Phosphor bronze bellows with nickel-plated brass 1/4" NPT (female) pressure connection   |  |   |   |                    |                       |       |                  |       |
| 270  | 0 to 200   | 0 to 13,8   | 1,5 to 8  | 0,1 to 0,6         | 200                   | 13,8  | 250              | 17,2  |
| 274  | 0 to 300   | 0 to 20,7   | 2 to 10   | 0,1 to 0,7         | 300                   | 20,7  | 350              | 24,1  |
| Buna-N diaphragm and O-Ring with aluminum 1/4" NPT (female) pressure connection 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 24,9 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 49,8 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 199,1 mbar                                     | 0,5 to 1,8 "wc                                      | 1,2 to 4,5 mbar    | 3                     | 0,2   | 225              | 15,5  |
| 448  | 80 "wc Vac to 0                                    | -199,1 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 49,8 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   | 0,1 to 0,4 "Hg                                      | 3,4 to 13,5 mbar   | 3                     | 0,2   | 225              | 15,5  |
| 451  | 0 to 80 "wc  | 0 to 199,1 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   | 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  | 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  | 0,05 to 0,3   | 3,4 to 20,7 mbar   | 30                    | 2,1   | 225              | 15,5  |
| Teflon® diaphragm and O-Ring with 316L stainless steel 1/4" NPT (female) pressure connection and cap   |  |   |   |                    |                       |       |                  |       |
| 550  | 30 "Hg Vac to 0                                    | -1 to 0   | 0,1 to 0,6 "Hg                                      | 3,4 to 20,3 mbar   | 3                     | 0,2   | 225              | 15,5  |
| 551  | 0 to 80 "wc  | 0 to 199,1 mbar                                     | 1,5 to 3,5 "wc                                      | 3,7 to 8,7 mbar    | 3                     | 0,2   | 225              | 15,5  |
| 552  | 30 "Hg Vac to 20 psi                               | -1 to 1,4   | 0,2 to 1 "Hg  | 6,8 to 33,9 mbar   | 20                    | 1,4   | 225              | 15,5  |
| 553  | 0 to 20  | 0 to 1,4  | 0,05 to 0,3   | 3,4 to 20,7 mbar   | 20                    | 1,4   | 225              | 15,5  |
| 554  | 0 to 30  | 0 to 2,1  | 0,1 to 0,4  | 6,9 to 27,6 mbar   | 30                    | 2,1   | 225              | 15,5  |
| 555  | 0 to 100   | 0 to 6,9  | 0,25 to 0,75  | 17,2 to 51,7 mbar  | 100                   | 6,9   | 225              | 15,5  |

Teflon® is a registered trademark of E.I. DuPont de Nemours and Company

†† Model not available on types J402 and J403

††† Model not available on type J403

## PRESSURE MODEL CHART

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

| Model  | Adjustable Set Point Range                         |  | Deadband              |                       | Proof Pressure** |      | Scale Division        |
|--|--|--|-----------------------|-----------------------|------------------|------|-----------------------|
|  | High end of range on rise<br>psi<br>(unless noted) | Low end of range on fall;<br>bar<br>(unless noted) | psi<br>(unless noted) | bar<br>(unless noted) | psi              | bar  | psi<br>(unless noted) |
| <b>Welded 316L stainless steel bellows and 1/2" NPT (female) pressure connection</b>   |  |  |                       |                       |                  |      |                       |
| S126B  | 30 "Hg Vac to 0                                    | -1 to 0  | 0.2 to 0.9 "Hg        | 6,8 to 30,5 mbar      | 5                | 0,3  | 2 "Hg                 |
| S134B  | 30 "Hg Vac to 20 psi                               | -1 to 1,4  | 0.2 to 1.2 "Hg        | 6,8 to 40,6 mbar      | 25               | 1,7  | 2 "Hg & 2 psi         |
| S137†  | 0 to 80 "wc  | 0 to 199,1 mbar                                    | 2 to 6 "wc            | 5 to 14,9 mbar        | 5                | 0,3  | 5 "wc                 |
| S144B  | 0 to 20  | 0 to 1,4   | 0.1 to 0.5            | 6,9 to 34,5 mbar      | 25               | 1,7  | 1                     |
| S146B  | 0 to 30  | 0 to 2,1   | 0.1 to 0.6            | 6,9 to 41,4 mbar      | 40               | 2,8  | 1                     |
| S156B  | 0 to 100   | 0 to 6,9   | 0.2 to 0.8            | 13,8 to 55,2 mbar     | 125              | 8,6  | 5                     |
| S164B  | 0 to 200   | 0 to 13,8  | 0.3 to 2              | 20,7 to 137,9 mbar    | 200              | 13,8 | 10                    |
| <b>Welded 316L stainless steel bellows and 1/4" NPT (female) pressure connection</b>   |  |  |                       |                       |                  |      |                       |
| 358  | 0 to 200   | 0 to 13,8  | 1.5 to 8              | 0,1 to 0,6            | 250              | 17,2 | 10                    |
| 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 | 20                    |
| <b>Brass bellows with nickel-plated brass 1/4" NPT (female) pressure connection; Models 126 and 134 have zinc-plated steel spring exposed to media</b> |  |  |                       |                       |                  |      |                       |
| 126  | 30 "Hg Vac to 0                                    | -1 to 0  | 0.2 to 0.9 "Hg        | 6,8 to 30,5 mbar      | 5                | 0,3  | 2 "Hg                 |
| 134  | 30 "Hg Vac to 20 psi                               | -1 to 1,4  | 0.2 to 1.2 "Hg        | 6,8 to 40,6 mbar      | 25               | 1,7  | 2 "Hg & 2 psi         |
| 137†   | 0 to 80 "wc  | 0 to 199,1 mbar                                    | 2 to 6 "wc            | 5 to 14,9 mbar        | 5                | 0,3  | 5 "wc                 |
| 144  | 0 to 20  | 0 to 1,4   | 0.1 to 0.5            | 6,9 to 34,5 mbar      | 25               | 1,7  | 1                     |
| 146  | 0 to 30  | 0 to 2,1   | 0.1 to 0.6            | 6,9 to 41,4 mbar      | 40               | 2,8  | 1                     |
| 156  | 0 to 100   | 0 to 6,9   | 0.2 to 0.8            | 13,8 to 55,2 mbar     | 125              | 8,6  | 5                     |
| 164  | 0 to 200   | 0 to 13,8  | 0.3 to 2              | 20,7 to 137,9 mbar    | 200              | 13,8 | 10                    |
| <b>Phosphor bronze bellows with nickel plated brass 1/4" NPT (female) pressure connection</b>  |  |  |                       |                       |                  |      |                       |
| 270††  | 0 to 200   | 0 to 13,8  | 1.5 to 8              | 0,1 to 0,6            | 250              | 17,2 | 10                    |
| 274††  | 0 to 300   | 0 to 20,7  | 2 to 10               | 0,1 to 0,7            | 350              | 24,1 | 10                    |
| <b>Buna-N diaphragm and O-Ring with aluminum 1/4" NPT (female) pressure connection and cap</b>   |  |  |                       |                       |                  |      |                       |
| 440†   | 0 to 2 "wc   | 0 to 5 mbar  | 0.07 to 0.25 "wc      | 0,2 to 0,6 mbar       | 225              | 15,5 | 0.1 "wc               |
| 441†   | 0 to 10 "wc  | 0 to 24,9 mbar                                     | 0.15 to 0.3 "wc       | 0,4 to 0,7 mbar       | 225              | 15,5 | 0.5 "wc               |
| 442†   | 0 to 20 "wc  | 0 to 49,8 mbar                                     | 0.2 to 0.5 "wc        | 0,5 to 1,2 mbar       | 225              | 15,5 | 1 "wc                 |
| 443†   | 0 to 80 "wc  | 0 to 199,1 mbar                                    | 0.5 to 1.8 "wc        | 1,2 to 4,5 mbar       | 225              | 15,5 | 5 "wc                 |
| 448†   | 80 "wc Vac to 0                                    | -199,1 to 0 mbar                                   | 1 to 3 "wc            | 2,5 to 7,5 mbar       | 225              | 15,5 | 5 "wc                 |
| 450††  | 30 "Hg Vac to 0                                    | -1 to 0  | 0.1 to .04 "Hg        | 3,4 to 13,5 mbar      | 225              | 15,5 | 2 "Hg                 |
| 452††  | 30 "Hg Vac to 20 psi                               | -1 to 1,4  | 0.1 to 1 "Hg          | 3,4 to 33,9 mbar      | 225              | 15,5 | 2 "Hg & 2 psi         |
| 453††  | 0 to 20  | 0 to 1,4   | 0.05 to 0.2           | 3,4 to 13,8 mbar      | 225              | 15,5 | 1                     |
| 454††  | 0 to 30  | 0 to 2,1   | 0.05 to 0.3           | 3,4 to 20,7 mbar      | 225              | 15,5 | 1                     |

\*\*Proof pressure: The maximum pressure to which a pressure sensor may be subjected, which causes no permanent damage. The unit may require calibration (e.g. start-up, testing).

† Model not available on types H402 and H403

†† Model not available on type H403



# 400 Series

## 400 Series

### PRESSURE MODEL CHART

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

| Model  | Adjustable Set Point Range                             |                       | Deadband                                     |                       | Proof Pressure**      |                       | Scale Division |     |
|--|--|-----------------------|--|-----------------------|-----------------------|-----------------------|----------------|-----|
|  | Low end of range on fall;<br>High end of range on rise |                       | Deadband doubles for<br>2 and 3 switch types |                       | psi<br>(unless noted) | bar<br>(unless noted) | psi            | bar |
|  | psi<br>(unless noted)                                  | bar<br>(unless noted) | psi<br>(unless noted)                        | bar<br>(unless noted) |                       |                       |                |     |
| Teflon® diaphragm and O-Ring with 316L stainless steel 1/4" NPT (female) pressure connection and cap |  |                       |  |                       |                       |                       |                |     |
| 550††  | 30 "Hg Vac to 0  | -1 to 0               | 0.1 to 0.6 "Hg                               | 3,4 to 20,3 mbar      | 225                   | 15,5                  | 2 "Hg          |     |
| 551†   | 0 to 80 "wc  | 0 to 199,1 mbar       | 1,5 to 3,5 "wc                               | 3,7 to 8,7 mbar       | 225                   | 15,5                  | 5 "wc          |     |
| 552††  | 30 "Hg Vac to 20 psi                                   | -1 to 1,4             | 0,2 to 1 "Hg                                 | 6,8 to 33,9 mbar      | 225                   | 15,5                  | 2 "Hg & 2 psi  |     |
| 553††  | 0 to 20  | 0 to 1,4              | 0,05 to 0,3                                  | 3,4 to 20,7 mbar      | 225                   | 15,5                  | 1              |     |
| 554††  | 0 to 30  | 0 to 2,1              | 0,1 to 0,4                                   | 6,9 to 27,6 mbar      | 225                   | 15,5                  | 1              |     |
| 555††  | 0 to 100   | 0 to 6,9              | 0,25 to 0,75                                 | 17,2 to 51,7 mbar     | 225                   | 15,5                  | 5              |     |

\*\*Proof pressure: The maximum pressure to which a pressure sensor may be subjected, which causes no permanent damage. The unit may require calibration (e.g. start-up, testing).

† 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

| Model  | Adjustable Set Point Range                             |                       | Deadband                                     |               | Working Pressure***    |                       | Proof Pressure** |      |
|--|--|-----------------------|--|---------------|------------------------|-----------------------|------------------|------|
|  | Low end of range on fall:<br>High end of range on rise |                       | Deadband doubles for<br>2 and 3 switch types |               | psid<br>(unless noted) | bar<br>(unless noted) | psi              | bar  |
|  | psid<br>(unless noted)                                 | bar<br>(unless noted) | psi  | mbar          |                        |                       |                  |      |
| Welded 316L stainless steel bellows and 1/2" NPT (female) pressure connections   |  |                       |  |               |                        |                       |                  |      |
| S147B  | 3 to 30  | 0,2 to 2,1            | 0,5 to 2                                     | 34,5 to 137,9 | 30 "Hg Vac to 100      | -1 to 6,9             | 300              | 20,7 |
| S157B  | 10 to 100  | 0,7 to 6,9            | 0,5 to 3                                     | 34,5 to 206,8 | 30 "Hg Vac to 180      | -1 to 12,4            | 300              | 20,7 |
| Brass bellows with nickel-plated brass 1/4" NPT (female) pressure connections    |  |                       |  |               |                        |                       |                  |      |
| 147  | 3 to 30  | 0,2 to 2,1            | 0,5 to 2                                     | 34,5 to 137,9 | 30 "Hg Vac to 100      | -1 to 6,9             | 180              | 12,4 |
| 157  | 10 to 100  | 0,7 to 6,9            | 0,5 to 3                                     | 34,5 to 206,8 | 30 "Hg Vac to 150      | -1 to 10,3            | 180              | 12,4 |
| Buna-N diaphragm and O-Ring with aluminum 1/4" NPT (female) pressure connections |  |                       |  |               |                        |                       |                  |      |
| 455  | 5 to 80 "wcd   | 12,4 to 199,1 mbar    | 1 to 4 "wc                                   | 2,5 to 10     | 30 "Hg Vac to 225      | -1 to 15,5            | 225              | 15,5 |
| 456  | 2 to 20  | 0,1 to 1,4            | 0,1 to 0,3                                   | 6,9 to 20,7   | 30 "Hg Vac to 225      | -1 to 15,5            | 225              | 15,5 |
| 457  | 3 to 30  | 0,2 to 2,1            | 0,1 to 0,4                                   | 6,9 to 27,6   | 30 "Hg Vac to 225      | -1 to 15,5            | 225              | 15,5 |

\*\*\*Working Pressure Range: The pressure range within which two opposing sensors can be safely operated and still maintain set point adjustability.

## DIFFERENTIAL PRESSURE MODEL CHART

Type J400K, single switch output with internal hex screw adjustment  
 Type J402K, dual switch output with internal hex screw adjustment

| Model | Adjustable Set Point Range |                           | Deadband               |                       | Working Pressure***   |                       | Proof Pressure** |     |
|-------|----------------------------|---------------------------|------------------------|-----------------------|-----------------------|-----------------------|------------------|-----|
|       | Low end of range on fall;  | High end of range on rise | psid<br>(unless noted) | bar<br>(unless noted) | psi<br>(unless noted) | bar<br>(unless noted) | psi              | bar |

Buna-N diaphragms and o-ring with epoxy coated aluminum 1/8" NPT (female) pressure connections (J402K only)

|      |                |                    |                |                  |                    |            |      |       |
|------|----------------|--------------------|----------------|------------------|--------------------|------------|------|-------|
| 540† | 1 to 7 "wcd    | 2,5 to 17,4 mbar   | 0,1 to 0,5 "wc | 0,2 to 1,2 mbar  | 30 "Hg Vac to 200  | -1 to 13,8 | 400  | 27,6  |
| 541† | 2 to 20 "wcd   | 5 to 49,8 mbar     | 0,5 to 2 "wc   | 1,2 to 5 mbar    | 30 "Hg Vac to 200  | -1 to 13,8 | 400  | 27,6  |
| 542† | 5 to 50 "wcd   | 12,4 to 124,5 mbar | 0,5 to 5 "wc   | 1,2 to 12,4 mbar | 30 "Hg Vac to 200  | -1 to 13,8 | 400  | 27,6  |
| 543† | 15 to 100 "wcd | 37,3 to 248,9 mbar | 0,5 to 7 "wc   | 1,2 to 17,4 mbar | 30 "Hg Vac to 200  | -1 to 13,8 | 400  | 27,6  |
| 544† | 2 to 20        | 0,1 to 1,4         | 1 to 2,5       | 0,1 to 0,2       | 30 "Hg Vac to 1200 | -1 to 82,7 | 2500 | 172,4 |
| 545† | 5 to 50        | 0,3 to 3,4         | 1 to 3         | 0,1 to 0,2       | 30 "Hg Vac to 1200 | -1 to 82,7 | 2500 | 172,4 |
| 546† | 10 to 100      | 0,7 to 6,9         | 1 to 5         | 0,1 to 0,3       | 30 "Hg Vac to 1200 | -1 to 82,7 | 2500 | 172,4 |
| 547† | 20 to 200      | 1,4 to 13,8        | 1 to 7         | 0,1 to 0,5       | 30 "Hg Vac to 1200 | -1 to 82,7 | 2500 | 172,4 |

Teflon® and Buna-N diaphragms, Buna-N O-Ring with aluminum 1/4" NPT (female) pressure connections

|     |           |            |          |                   |                   |            |     |      |
|-----|-----------|------------|----------|-------------------|-------------------|------------|-----|------|
| 559 | 10 to 100 | 0,7 to 6,9 | 0,2 to 1 | 13,8 to 68,9 mbar | 30 "Hg Vac to 225 | -1 to 15,5 | 225 | 15,5 |
|-----|-----------|------------|----------|-------------------|-------------------|------------|-----|------|

Type H400K, single switch output with internal adjustment via reference dial

Type H402K, dual switch output with internal adjustment via reference dial

Buna-N diaphragm and O-Ring with 1/4" NPT (female) aluminum pressure connections

|     |              |                    |            |                  |                   |            |     |      |
|-----|--------------|--------------------|------------|------------------|-------------------|------------|-----|------|
| 455 | 5 to 80 "wcd | 12,4 to 199,1 mbar | 1 to 4 "wc | 2,5 to 10 mbar   | 30 "Hg Vac to 225 | -1 to 15,5 | 225 | 15,5 |
| 456 | 2 to 20      | 0,1 to 1,4         | 0,1 to 0,3 | 6,9 to 20,7 mbar | 30 "Hg Vac to 225 | -1 to 15,5 | 225 | 15,5 |
| 457 | 3 to 30      | 0,2 to 2,1         | 0,1 to 0,4 | 6,9 to 27,6 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 | 0,7 to 6,9 | 0,2 to 1 | 13,8 to 68,9 mbar | 30 "Hg Vac to 225 | -1 to 15,5 | 225 | 15,5 |
|-----|-----------|------------|----------|-------------------|-------------------|------------|-----|------|

\*\*\*Working Pressure Range: The pressure range within which two opposing sensors can be safely operated and still maintain set point adjustability.

† Model not available on type J400K; actual deadband shown, do not double



# 400 Series

## 400 Series

### 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

| Model   | Adjustable Set Point Range |                | Max. Temp. |       | Scale Division†† |    | Stem or Bulb Size*/Finish**        |  |
|---|----------------------------|----------------|------------|-------|------------------|----|------------------------------------|--|
|   | °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" nickel-plated brass |  |
| 121   | 200 to 425                 | 93.3 to 218.3  | 475        | 246.1 | 5                | 5  | 9/16" x 1-7/8" 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        | 65.6  | 10               | 5  | 3/8 x 2-7/16"                      |  |
| 2BSB  | 30 to 250                  | -1.1 to 121.1  | 300        | 148.9 | 10               | 5  | 3/8 x 2-7/16"                      |  |
| 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        | 65.6  | 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          |                            |                |            |       |                  |    |                                    |  |
| 1BS†  | -180 to 120                | -117.8 to 48.9 | 170        | 76.7  | N/A              |    | 3/8 x 3-3/4"                       |  |
| 2BS   | -125 to 350                | -87.2 to 176.7 | 400        | 204.4 | N/A              |    | 3/8 x 2-7/16"                      |  |
| 3BS   | -125 to 500                | -87.2 to 260   | 550        | 287.8 | N/A              |    | 3/8 x 2-1/8"                       |  |
| 4BS   | -40 to 120                 | -40 to 48.9    | 170        | 76.7  | N/A              |    | 3/8 x 6-3/4"                       |  |
| 5BS   | -40 to 180                 | -40 to 82.2    | 230        | 110   | N/A              |    | 3/8 x 5"                           |  |
| 6BS   | 0 to 250                   | -17.8 to 121.1 | 300        | 148.9 | N/A              |    | 3/8 x 4-1/2"                       |  |
| 7BS   | 0 to 400                   | -17.8 to 204.4 | 450        | 232.2 | N/A              |    | 3/8 x 3"                           |  |
| 8BS   | 50 to 650                  | 10 to 343.3    | 700        | 371.1 | N/A              |    | 3/8 x 3-1/4"                       |  |

† Model not available on type F403

†† Only applies to types B400, B402, B403, E400, E402 and E403

\* Optional immersion stem lengths and capillary lengths are available

\*\* Optional stainless steel immersion stem and capillary covering available

\*\*\* Standard capillary lengths are 6ft

## HOW TO ORDER

### BUILDING A PART NUMBER

#### Select a **Type**

Refer to the "Type" section below.

Determine type number based on switch output, enclosure, adjustment and reference.

Fill in the type portion of your part number with the corresponding number.

#### Select a **Model**

Refer to the "Model Charts".

Determine model based on adjustable range, deadband and proof pressure.

Fill in the model portion of your part number with the corresponding number.

#### Select an **Option**

Refer to the "Options" section.

Determine option number based on switch output, optional materials or other product enhancements.

Fill in the option portion of your part number with the corresponding number.

Leave "option" portion blank if no options are needed.

*FOR MULTIPLE OPTIONS:* Call United Electric Controls.

#### TYPE

#### DESCRIPTION

#### PRESSURE

- Type J400 - One SPDT output; internal hex screw adjustment
- Type J402 - Two SPDT outputs; internal hex screw adjustment
- Type J403 - Three SPDT outputs; internal hex screw adjustment
- Type H400 - One SPDT output; internal adjustment with reference dial
- Type H402 - Two SPDT outputs; internal adjustment with reference dial
- Type H403 - Three SPDT outputs; internal adjustment with reference dial

#### DIFFERENTIAL PRESSURE

- Type J400K - One SPDT output; internal hex screw adjustment
- Type J402K - Two SPDT outputs; internal hex screw adjustment
- Type H400K - One SPDT output; internal adjustment with reference dial
- Type H402K - Two SPDT outputs; internal adjustment with reference dial

#### TEMPERATURE

- Type B400 - Immersion stem; one SPDT output; internal adjustment with reference dial
- Type B402 - Immersion stem; two SPDT outputs; internal adjustment with reference dial
- Type B403 - Immersion stem; three SPDT outputs; internal adjustment with reference dial
- Type C400 - Immersion stem; one SPDT output; internal hex screw adjustment
- Type C402 - Immersion stem; two SPDT outputs; internal hex screw adjustment
- Type C403 - Immersion stem; three SPDT outputs; internal hex screw adjustment
- Type E400 - Bulb and capillary; one SPDT output; internal adjustment with reference dial
- Type E402 - Bulb and capillary; two SPDT outputs; internal adjustment with reference dial
- Type E403 - Bulb and capillary; three SPDT outputs; internal adjustment with reference dial
- Type F400 - Bulb and capillary; one SPDT output; internal hex screw adjustment
- Type F402 - Bulb and capillary; two SPDT outputs; internal hex screw adjustment
- Type F403 - Bulb and capillary; three SPDT outputs; internal hex screw adjustment



# 400 Series

**400 Series**

## HOW TO ORDER OPTIONS

### SWITCH OPTIONS\*    **DESCRIPTION**

|      |  |
|------|--|
| 0140 | Gold contacts, 1 A 125 VAC resistive. NOT AVAILABLE MODELS 440-443   |
| 0500 | Close deadband, 5 A 125/250 VAC resistive. NOT AVAILABLE MODELS 440-443  |
| 1010 | DPDT switch, 10 A 125/250 VAC resistive; deadband and minimum set point will increase. 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 TYPES B, E AND MODELS 440-449, 520-535, 540-547, 570-572   |
| 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. 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 AVAILABLE MODELS 440-443, 520-535  |
| 1537 | Vapor-sealed 15 A 125/250 VAC resistive. NOT AVAILABLE MODELS 440-443, 520-535   |
| 1539 | Fungus resistant case, 15 A 125/250 VAC resistive. NOT AVAILABLE MODELS 440-443, 520-535   |
| 2000 | 20 A 125/250/480 VAC resistive. NOT AVAILABLE 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 J400K, H400K, J402K, H402K OR MODELS 440-443  |
| M201     | Factory set one switch; specify set point on increasing or decreasing pressure, differential pressure or temperature. NOT AVAILABLE DUAL OR TRIPLE SWITCH VERSIONS  |
| M202     | Factory set two switches; specify set points on increasing or decreasing pressure, differential pressure or temperature. NOT AVAILABLE 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 |
| M210     | Differential pressure indication. AVAILABLE J400K AND J402K, MODELS 147, S147B, 157 & S157B   |
| M277     | Range indicated on nameplate in kPa or MPa, factory selected. NOT AVAILABLE TEMPERATURE VERSIONS  |
| M278     | Range indicated on nameplate in Kg/cm <sup>2</sup> . NOT AVAILABLE 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  |
| M449     | Mounting bracket kit. Required for models 520-535 when surface mounting. Use kit part number 6361-704 for other models  |
| M504     | 316L Stainless steel immersion temperature stem. AVAILABLE TEMPERATURE MODELS 120, 121 ONLY   |
| M540     | Viton® wetted parts with standard connection material. Deadbands and low end of range may increase. AVAILABLE MODELS 448-454 and 540-547. MODELS 455-457 (Viton® sealing diaphragms and o-rings with Teflon® main diaphragm). MODELS 610-614 (o-ring only)                                  |
| M550     | Oxygen service cleaning; alcohol cleaning to remove residue from the process connection. NOT AVAILABLE ON MODELS 440-443  |
| M900     | Watertight conduit fitting; converts 7/8" hole to 1/2" NPT fitting. Required for product to meet NEMA 4X 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 Mounting Hardware (required for models 520-535, 540-547 when surface mounting)   |

### OPTIONAL MATERIAL FOR "WC SENSORS: (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   |
| XC006 | 316L stainless steel pressure connection, Kapton® diaphragm, Viton® O-Ring  |
| XC007 | 316L stainless steel pressure connection, Teflon® diaphragm, Viton® O-Ring  |

Lexan® is a registered trademark of Sabic Innovative Plastics.

\*All switches have limited DC capabilities. Consult factory for details.

## OPTIONS FOR TEMPERATURE MODELS

### UNION CONNECTORS\*\*

For all bulb & capillary switches, types E and 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 and F

| Brass                      | SD6225-75  | 1/2" NPT with 3/4" NPT adapter bushing, 4" BT |
|----------------------------|------------|---|
| 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 and 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 ST/ST |

### 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 and 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 st/st thermowell. |

### OPTIONAL LENGTHS:

Optional immersion stem lengths to 15" available in brass, with or without 316 st/st thermowell. Consult UE for additional information. Optional capillary length to \*50' available in copper or 304 st/st. Armor or Teflon® capillary protection available to lengths less than or equal to capillary length. Consult UE for additional information.

\* Consult UE regarding repeatability and ambient effects on capillary lengths over 30'.

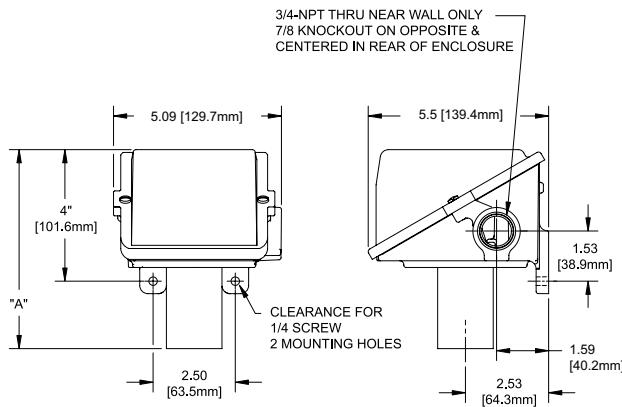
\*\* Dimensional drawings for union connectors and thermowells may be found at [www.ueonline.com](http://www.ueonline.com)

**DIMENSIONAL DRAWINGS**Dimensional drawings for all models may be found at [www.ueonline.com](http://www.ueonline.com)**Internal Hex Screw Set Point Adjustment**

Types J400, J402, J403, J400K, J402K, C400, C402, C403, F400, F402, F403

**Set Point Adjustment via Reference Dial**

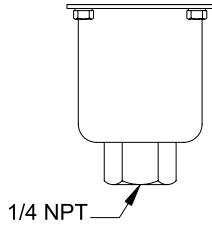
Types H400, H402, H403, H400K, H402K, B400, B402, B403, E400, E402, E403



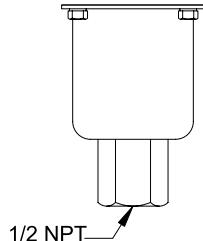
| Models                       | Dimension A |       |                  |
|------------------------------|-------------|-------|------------------|
|                              | Inches      | mm    | NPT              |
| <b>PRESSURE</b>              |             |       |                  |
| 126-164                      | 5.91        | 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              |
| <b>DIFFERENTIAL PRESSURE</b> |             |       |                  |
| 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              |
| <b>TEMPERATURE</b>           |             |       |                  |
| 120, 121                     | 7.38        | 187.3 | Immersion Stem   |
| 1BS-8BS                      | 6.72        | 170.7 | Bulb & Capillary |

**Pressure Sensors** All dimensions stated in inches (millimeters)

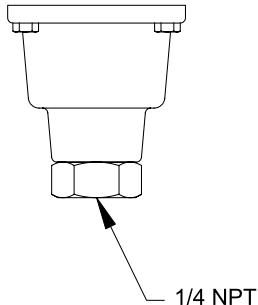
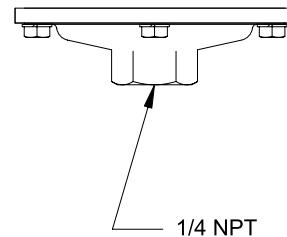
Models 126-164



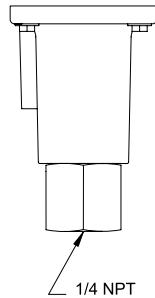
Models S126B-S164B



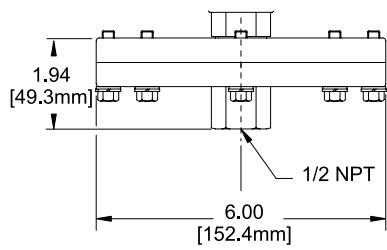
Models 270-376

Models 440-454,  
550-555, 570-572

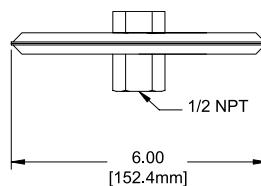
Models 610-614



Models 520-525



Models 530-535

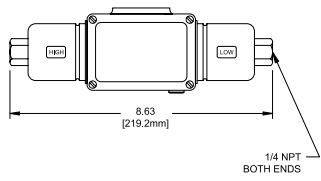


## DIMENSIONAL DRAWINGS

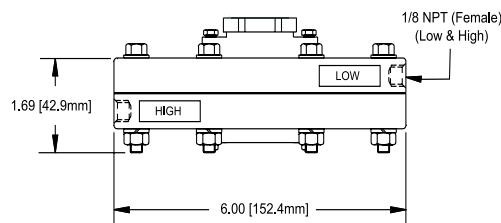
Dimensional drawings for all models may be found at [www.ueonline.com](http://www.ueonline.com)

### Differential Pressure Sensors

Models 147-157

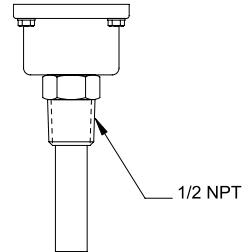


Models 540-543



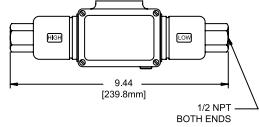
### Temperature Sensors

Models 120-121

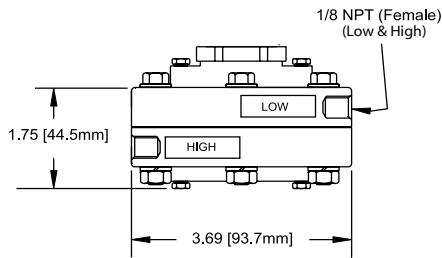


Local mount temperature version

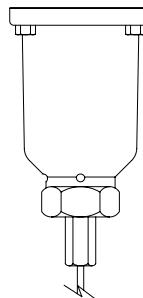
Models S147B-S157B



Models 544-547

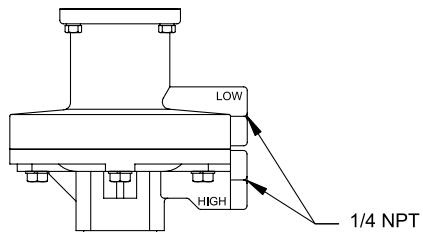


Models 1BS-8BS



Remote mount temperature version

Models 455-457, 559



## RECOMMENDED PRACTICES AND WARNINGS

United Electric Controls Company recommends careful consideration of the following factors when specifying and installing UE pressure and temperature units. Before installing a unit, the Installation and Maintenance instructions provided with unit must be read and understood.

- To avoid damaging unit, proof pressure and maximum temperature limits stated in literature and on nameplates must never be exceeded, even by surges in the system. Operation of the unit up to maximum pressure or temperature is acceptable on a limited basis (e.g., start-up, testing) but continuous operation must be restricted to the designated adjustable range. Excessive cycling at maximum pressure or temperature limits could reduce sensor life.
- A back-up unit is necessary for applications where damage to a primary unit could endanger life, limb or property. A high or low limit switch is necessary for applications where a dangerous runaway condition could result.
- The adjustable range must be selected so that incorrect, inadvertent or malicious setting at any range point cannot result in an unsafe system condition.
- Install unit where shock, vibration and ambient temperature fluctuations will not damage unit or affect operation. When applicable, orient unit so that moisture does not enter the enclosure via the electrical connection. When appropriate, this entry point should be sealed to prevent moisture entry.
- Unit must not be altered or modified after shipment. Consult UE if modification is necessary.
- Monitor operation to observe warning signs of possible damage to unit, such as drift in set point or faulty display. Check unit immediately.
- Preventative maintenance and periodic testing is necessary for critical applications where damage could endanger property or personnel.
- Electrical ratings stated in literature and on nameplate must not be exceeded. Overload on a switch can cause damage, even on the first cycle. Wire unit according to local and national electrical codes, using wire size recommended in installation sheet.
- Do not mount unit in ambient temp. exceeding published limits.

## LIMITED WARRANTY

Seller warrants that the product hereby purchased is, upon delivery, free from defects in material and workmanship and that any such product which is found to be defective in such workmanship or material will be repaired or replaced by Seller (Ex-works, Factory, Watertown, Massachusetts. INCOTERMS); provided, however, that this warranty applies only to equipment found to be so defective within a period of 24 months from the date of manufacture by the Seller. Seller shall not be obligated under this warranty for alleged defects which examination discloses are due to tampering, misuse, neglect, improper storage, and in any case where products are disassembled by anyone other than authorized Seller's representatives. EXCEPT FOR THE LIMITED WARRANTY OF REPAIR AND REPLACEMENT STATED ABOVE, SELLER DISCLAIMS ALL WARRANTIES WHATSOEVER WITH RESPECT TO THE PRODUCT, INCLUDING ALL IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR ANY PARTICULAR PURPOSE.

## LIMITATION OF SELLER'S LIABILITY

SELLER'S LIABILITY TO BUYER FOR ANY LOSS OR CLAIM, INCLUDING LIABILITY INCURRED IN CONNECTION WITH (I) BREACH OF ANY WARRANTY WHATSOEVER, EXPRESSED OR IMPLIED, (II) A BREACH OF CONTRACT, (III) A NEGLIGENT ACT OR ACTS (OR NEGLIGENT FAILURE TO ACT) COMMITTED BY SELLER, OR (IV) AN ACT FOR WHICH STRICT LIABILITY WILL BE INPUTTED TO SELLER, IS LIMITED TO THE "LIMITED WARRANTY" OF REPAIR AND/OR REPLACEMENT AS SO STATED IN OUR WARRANTY OF PRODUCT. IN NO EVENT SHALL THE SELLER BE LIABLE FOR ANY SPECIAL, INDIRECT, CONSEQUENTIAL OR OTHER DAMAGES OF A LIKE GENERAL NATURE, INCLUDING, WITHOUT LIMITATION, LOSS OF PROFITS OR PRODUCTION, OR LOSS OR EXPENSES OF ANY NATURE INCURRED BY THE BUYER OR ANY THIRD PARTY.

UE specifications subject to change without notice.

## U.S. SALES OFFICES

United Electric Controls  
31 Old Stage Road  
Hampton Falls, NH 03844  
Phone: 617-899-1132  
email: [northeastsales@ueonline.com](mailto:northeastsales@ueonline.com)

United Electric Controls  
28 N. Wise Ave.  
Freeport, IL 61032  
Phone: 815-341-2588  
email: [midwestsales@ueonline.com](mailto:midwestsales@ueonline.com)

United Electric Controls  
1022 Vineyard Drive  
Conyers, GA 30013  
Phone: 770-335-9802  
email: [southeastsales@ueonline.com](mailto:southeastsales@ueonline.com)

United Electric Controls  
5829 Grazing Court  
Mason, OH 45040  
Phone: 513-535-5486  
email: [midatlanticsales@ueonline.com](mailto:midatlanticsales@ueonline.com)

United Electric Controls  
102 Salazar Court  
Clayton, CA 94517  
Phone: 925-408-5997  
email: [westcoastsales@ueonline.com](mailto:westcoastsales@ueonline.com)

United Electric Controls  
27 Summit Terrace  
Sparta, NJ 07871  
Phone: 973-271-2550  
email: [easternsales@ueonline.com](mailto:easternsales@ueonline.com)

United Electric Controls  
4306 Whickham Drive  
Fulshear, TX 77441  
Phone: 832-457-6138  
email: [southwestsales@ueonline.com](mailto:southwestsales@ueonline.com)

## CANADA

EASTERN  
68 Mosley Crescent  
Brampton, Ontario  
Canada L6Y 5C8  
Phone: 905-455-5131  
FAX: 905-455-5131

WESTERN  
148 Silver Ridge Close N.W.  
Calgary, Alberta  
Canada T3B 3T4  
Phone: 403-247-3724  
FAX: 403-247-3724

## INTERNATIONAL OFFICES

CHINA  
United Electric Controls, *Shanghai Office*  
Room 1011, 10th Flr,  
Huai Hai Zhonghua Building  
No. 885, Renmin Road, Luwan District  
Shanghai 200010, P.R. China  
Phone: +8621-6255 8059  
email: [chinasales@ueonline.com](mailto:chinasales@ueonline.com)

United Electric Controls, *Beijing Office*  
Room 1006, Jainhao International Bldg.  
Block D, No. 116  
Zizhuyuanlu, Haidian District  
Beijing, China 100089  
Phone & Fax: +86-10-5893-0551  
email: [beijingsales@ueonline.com](mailto:beijingsales@ueonline.com)

## EASTERN EUROPE & SCANDINAVIA

United Electric Controls  
05-806 Komorow  
Kujawska 5, Poland  
Phone: +48 22 499 4804  
email: [easterneuropeales@ueonline.com](mailto:easterneuropeales@ueonline.com)

## GERMANY

United Electric Controls  
An Der Zentlinde 21  
D-64711 Erbach, Germany  
Phone: 496-062-7400  
email: [europeansales@ueonline.com](mailto:europeansales@ueonline.com)

## INDIA

United Electric Controls  
402, Aries Avenue-I, 58-United Colony  
Sama, Baroda - 390008, India  
Phone: +91-265-2788654  
email: [indisales@ueonline.com](mailto:indisales@ueonline.com)

## ASIA-PACIFIC

United Electric Controls, Far East  
No. 1-2-2, 2nd Floor  
Jalan 4/101C  
Cheras Business Centre  
Batu 5, Jalan Cheras  
56100 Kuala Lumpur, Malaysia  
Phone: 603-9133-4122  
email: [fareastsales@ueonline.com](mailto:fareastsales@ueonline.com)

## MEXICO

United Electric Controls  
Zacatecas #206 Suite 20  
Col Guadalupe CP 89120  
Tampico, Tamaulipas Mexico  
Phone: 52 (833) 2175201  
email: [latinamericasales@ueonline.com](mailto:latinamericasales@ueonline.com)

## RUSSIA

United Electric Controls, Moscow  
Elninskaya str., 15-140  
Moscow, 121552, Russia  
Phone: +7 (495) 792-88-06  
email: [russiansales@ueonline.com](mailto:russiansales@ueonline.com)



180 Dexter Avenue, P.O. Box 9143  
Watertown, MA 02471-9143 USA  
Telephone: 617 926-1000 Fax: 617 926-2568  
<http://www.ueonline.com>

CP02101000

## DIFFERENTIAL PRESSURE SWITCH



### FEATURES

- Sealed Metal Bellows Sensors
- Welded 316 Stainless Steel Sensors
- Gasketed Die-Cast Aluminum Enclosure with Epoxy Coating
- Single Switch Output
- Adjustable Ranges:  
30 "Hg Vac to 90 psid (-1 to 6 bar)

# J21K Series

## OVERVIEW

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**

|                                   |   |
|-----------------------------------|---|
| <b>STORAGE TEMPERATURE</b>        | -65 to 160°F (-54 to 71°C)  |
| <b>AMBIENT TEMPERATURE LIMITS</b> | -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     |
| <b>SET POINT REPEATABILITY</b>    | ±1% of full scale range   |
| <b>SHOCK</b>                      | Set point repeats after 15 G, 10 millisecond duration   |
| <b>VIBRATION</b>                  | Set point repeats after 2.5 G, 5-500 Hz   |
| <b>ENCLOSURE</b>                  | Die cast aluminum, epoxy powder coated, gasketed  |
| <b>ENCLOSURE CLASSIFICATION</b>   | Designed to meet enclosure type 4X requirements with M900 option (watertight conduit fitting)                                 |
| <b>SWITCH OUTPUT</b>              | One SPDT snap action switch; switch may be wired "normally open" or "normally closed"   |
| <b>ELECTRICAL RATING</b>          | 15 A 125/250/480 VAC resistive. Electrical switches have limited DC capabilities. Consult factory for additional information. |
| <b>WEIGHT</b>                     | Approximately 2 lbs. (0.90 kg.)   |
| <b>ELECTRICAL CONNECTION</b>      | 7/8" diameter conduit hole  |
| <b>PRESSURE CONNECTION</b>        | Models 127-150, 232-254, 357, 16020: 1/4" NPT (female); models S127B-S150B, 16021: 1/2" NPT (female)                          |

## APPROVALS

**UNITED STATES AND CANADA****UL listed, cUL certified**

UL 508; CSA C22.2, no. 14 File # E42272

**EUROPE****Low Voltage Directive (LVD) 73/23/EC & 93/68/EEC**

Compliant to LVD

Products rated lower than 50 VAC and 75 VDC are outside the scope of the LVD

**Pressure Equipment Directive (PED) 97/23/EC**

Compliant to PED

Products rated lower than 7.5 psi are outside the scope of the PED

**ATEX Directive (94/9/EC)****II 1G 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 0335063

EN 50014, 50020, 50284

**RUSSIA****Rostechnadzor Permit and GOST-R CoC (Optional - code M406)**

OExiaIICt6

Tamb = -50C to +60C

NANIO CCVE Certification Center

Certificate # ROSS US.GB05.Bo2933

GOST R 51330.0, 51330.1, 51330.10 &amp; 51330.14

## MODEL CHART

| Model  | Adjustable Set Point Range                          |                                  | Deadband              |                       | Differential Proof Pressure** |      | Working Pressure*     |            |
|--|---|----------------------------------|-----------------------|-----------------------|-------------------------------|------|-----------------------|------------|
|  | Low end of range on fall;<br>psid<br>(unless noted) | High end of range on rise<br>bar | psi<br>(unless noted) | bar<br>(unless noted) | psi                           | bar  | psi<br>(unless noted) | bar        |
| <b>Welded 316L stainless steel bellows with 1/2" NPT (female) pressure connections</b> |   |                                  |                       |                       |                               |      |                       |            |
| S127B  | 30 "Hg Vac to 0                                     | -1 to 0                          | 0.4 to 0.6 "Hg        | 13,5 to 20,3 mbar     | 15                            | 1.0  | 30 "Hg Vac to 0       | -1 to 0    |
| S140B  | 0 to 6  | 0 to 0,4                         | 0.1 to 0.4            | 6,9 to 27,6 mbar      | 6                             | 0,4  | 30 "Hg Vac to 30      | -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 Vac 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 Vac to 125     | -1 to 8,6  |
| <b>316L welded stainless steel bellows with 1/4" NPT (female) pressure connections</b> |   |                                  |                       |                       |                               |      |                       |            |
| 357  | 0 to 70   | 0 to 4,8                         | 2 to 4                | 0,1 to 0,3            | 70                            | 4,8  | 30 "Hg Vac to 350     | -1 to 24,1 |
| <b>Brass bellows with 1/4" NPT (female) pressure connections</b>                       |   |                                  |                       |                       |                               |      |                       |            |
| 127  | 30 "Hg Vac to 0                                     | -1 to 0                          | 0.4 to 0.6 "Hg        | 13,5 to 20,3 mbar     | 15                            | 1.0  | 30 "Hg Vac 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 Vac 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 Vac 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 Vac to 125     | -1 to 8,6  |
| <b>Phosphor bronze bellows with 1/4" NPT (female) pressure connections</b>             |   |                                  |                       |                       |                               |      |                       |            |
| 232  | 0 to 25   | 0 to 1,7                         | 0,6 to 1              | 41,4 to 68,9 mbar     | 25                            | 1,7  | 30 "Hg Vac 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 Vac 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)

**HOW TO ORDER****BUILDING A PART NUMBER****Select a Type**

Refer to the "Type" section below

Determine type number based on switch output, enclosure, adjustment and reference.

Fill in the type portion of your part number with the corresponding number.

**Select a Model**

Refer to the "Model Charts"

Determine model based on adjustable range, deadband and proof pressure.

Fill in the model portion of your part number with the corresponding number.

**Select an Option**

Refer to the "Options" section

Determine option number based on switch output, optional materials or other product enhancements.

Fill in the option portion of your part number with the corresponding number. Leave "option" portion blank if no options are needed.

**FOR MULTIPLE OPTIONS:** Call United Electric Controls.

**TYPE                    DESCRIPTION**

Differential Pressure      Type J21K - one SPDT output, internal adjustment with no reference dial.

**SWITCH OPTIONS\***

|      |  |
|------|--|
| 0140 | Gold contacts, 1 A 125 VAC resistive   |
| 0500 | Close deadband, 5 A 125/250 VAC resistive  |
| 1520 | Adjustable deadband, 15 A 125/250/277 VAC resistive; adjustment wheel changes rise setting only.<br>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   |

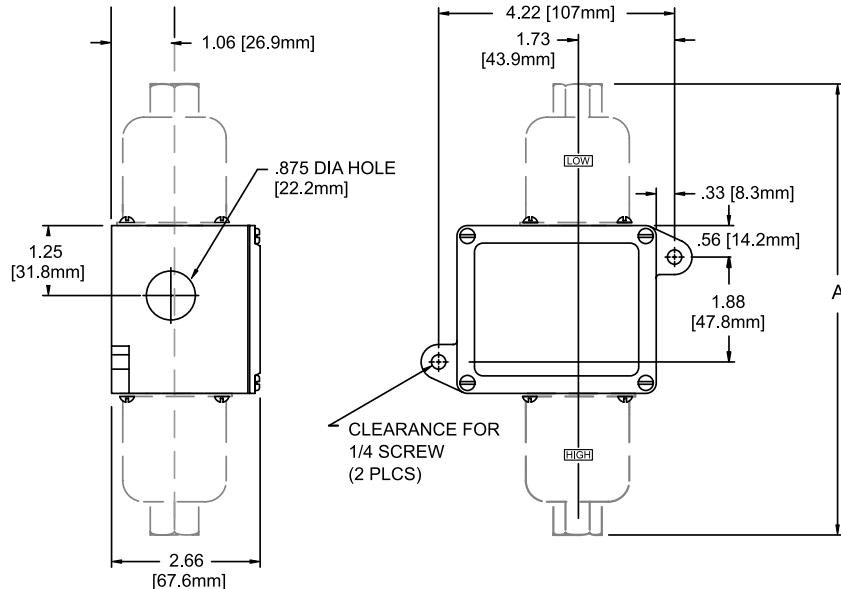
**OTHER OPTIONS**

|      |   |
|------|---|
| M201 | Factory set one switch; specify increasing or decreasing pressure and set point                                       |
| M277 | Range indicated on nameplate in kPa or MPa, factory selected  |
| M278 | Range indicated on nameplate in Kg/cm <sup>2</sup>  |
| M405 | European ATEX Intrinsic Safety compliance   |
| M406 | Intrinsic safety compliance per Russian Rostechnadzor (GOST-R)  |
| M444 | Paper ID tag  |
| M446 | Stainless steel ID tag & wire attachment  |
| M550 | Oxygen service cleaning; alcohol cleaning to remove residue from the process connection.<br>NOT AVAILABLE MODEL 254   |
| M900 | Watertight conduit fitting; converts 7/8" hole to 1/2" NPT fitting. Required for product to meet<br>Enclosure Type 4X |

\*All switches have limited DC capabilities. Consult factory for details.

**DIMENSIONAL DRAWINGS**

Dimensional drawings for all models may be found at [www.ueonline.com](http://www.ueonline.com)

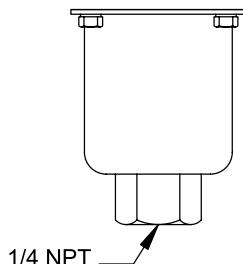
**Type J21K****INTERNAL SET POINT ADJUSTMENT**

| Dimension A |        |       |     |
|-------------|--------|-------|-----|
| Models      | Inches | mm    | NPT |
| 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 |

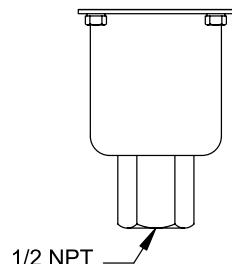
All dimensions stated in inches (millimeters)

**PRESSURE SENSORS**

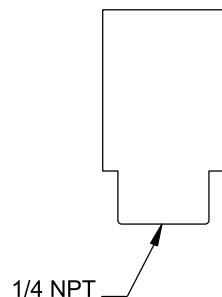
Model 127-16020



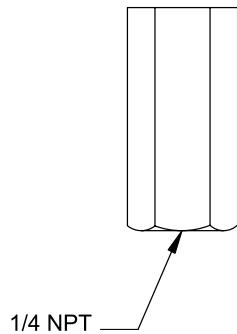
Model S127B-16021



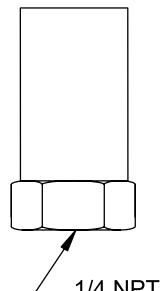
Model 232



Model 254



Model 357



## RECOMMENDED PRACTICES AND WARNINGS

United Electric Controls Company recommends careful consideration of the following factors when specifying and installing UE pressure and temperature units. Before installing a unit, the Installation and Maintenance instructions provided with unit must be read and understood.

- To avoid damaging unit, proof pressure and maximum temperature limits stated in literature and on nameplates must never be exceeded, even by surges in the system. Operation of the unit up to maximum pressure or temperature is acceptable on a limited basis (e.g., start-up, testing) but continuous operation must be restricted to the designated adjustable range. Excessive cycling at maximum pressure or temperature limits could reduce sensor life.
- A back-up unit is necessary for applications where damage to a primary unit could endanger life, limb or property. A high or low limit switch is necessary for applications where a dangerous runaway condition could result.
- The adjustable range must be selected so that incorrect, inadvertent or malicious setting at any range point cannot result in an unsafe system condition.
- Install unit where shock, vibration and ambient temperature fluctuations will not damage unit or affect operation. When applicable, orient unit so that moisture does not enter the enclosure via the electrical connection. When appropriate, this entry point should be sealed to prevent moisture entry.
- Unit must not be altered or modified after shipment. Consult UE if modification is necessary.
- Monitor operation to observe warning signs of possible damage to unit, such as drift in set point or faulty display. Check unit immediately.
- Preventative maintenance and periodic testing is necessary for critical applications where damage could endanger property or personnel.
- Electrical ratings stated in literature and on nameplate must not be exceeded. Overload on a switch can cause damage, even on the first cycle. Wire unit according to local and national electrical codes, using wire size recommended in installation sheet.
- Do not mount unit in ambient temp. exceeding published limits.

## LIMITED WARRANTY

Seller warrants that the product hereby purchased is, upon delivery, free from defects in material and workmanship and that any such product which is found to be defective in such workmanship or material will be repaired or replaced by Seller (Ex-works, Factory, Watertown, Massachusetts, INCOTERMS); provided, however, that this warranty applies only to equipment found to be so defective within a period of 24 months from the date of manufacture by the Seller. Seller shall not be obligated under this warranty for alleged defects which examination discloses are due to tampering, misuse, neglect, improper storage, and in any case where products are disassembled by anyone other than authorized Seller's representatives. EXCEPT FOR THE LIMITED WARRANTY OF REPAIR AND REPLACEMENT STATED ABOVE, SELLER DISCLAIMS ALL WARRANTIES WHATSOEVER WITH RESPECT TO THE PRODUCT, INCLUDING ALL IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR ANY PARTICULAR PURPOSE.

## LIMITATION OF SELLER'S LIABILITY

SELLER'S LIABILITY TO BUYER FOR ANY LOSS OR CLAIM, INCLUDING LIABILITY INCURRED IN CONNECTION WITH (I) BREACH OF ANY WARRANTY WHATSOEVER, EXPRESSED OR IMPLIED, (II) A BREACH OF CONTRACT, (III) A NEGLIGENT ACT OR ACTS (OR NEGLIGENT FAILURE TO ACT) COMMITTED BY SELLER, OR (IV) AN ACT FOR WHICH STRICT LIABILITY WILL BE INPUTTED TO SELLER, IS LIMITED TO THE "LIMITED WARRANTY" OF REPAIR AND/OR REPLACEMENT AS SO STATED IN OUR WARRANTY OF PRODUCT. IN NO EVENT SHALL THE SELLER BE LIABLE FOR ANY SPECIAL, INDIRECT, CONSEQUENTIAL OR OTHER DAMAGES OF A LIKE GENERAL NATURE, INCLUDING, WITHOUT LIMITATION, LOSS OF PROFITS OR PRODUCTION, OR LOSS OR EXPENSES OF ANY NATURE INCURRED BY THE BUYER OR ANY THIRD PARTY.

*UE specifications subject to change without notice.*

## U.S. SALES OFFICES

United Electric Controls  
31 Old Stage Road  
Hampton Falls, NH 03844  
Phone: 617-899-1132  
email: northeastsales@ueonline.com

United Electric Controls  
28 N. Wise Ave.  
Freeport, IL 61032  
Phone: 815-341-2588  
email: midwestsales@ueonline.com

United Electric Controls  
1022 Vineyard Drive  
Conyers, GA 30013  
Phone: 770-335-9802  
email: southeastsales@ueonline.com

United Electric Controls  
5829 Grazing Court  
Mason, OH 45040  
Phone: 513-535-5486  
email: midatlanticsales@ueonline.com

United Electric Controls  
102 Salazar Court  
Clayton, CA 94517  
Phone: 925-408-5997  
email: westcoastsales@ueonline.com

United Electric Controls  
27 Summit Terrace  
Sparta, NJ 07871  
Phone: 973-271-2550  
email: easternsales@ueonline.com

United Electric Controls  
4306 Whickham Drive  
Fulshear, TX 77441  
Phone: 832-457-6138  
email: southwestsales@ueonline.com

## CANADA

EASTERN  
68 Mosley Crescent  
Brampton, Ontario  
Canada L6Y 5C8  
Phone: 905-455-5131  
FAX: 905-455-5131

## INTERNATIONAL OFFICES

CHINA  
United Electric Controls, *Shanghai Office*  
Room 1011, 10th Flr,  
Huai Hai Zhonghua Building  
No. 885, Renmin Road, Luwan District  
Shanghai 200010, P.R. China  
Phone: +8621-6255 8059  
email: chinasales@ueonline.com

United Electric Controls, *Beijing Office*  
Room 1006, Jainhao International Bldg.  
Block D, No. 116  
Zizhuyuanlu, Haidian District  
Beijing, China 100089  
Phone: +86-10-5893-0518  
email: beijingsales@ueonline.com

EASTERN EUROPE & SCANDINAVIA  
United Electric Controls  
05-806 Komorow  
Kujawska 5, Poland  
Phone: +48 22 499 4804  
email: easterneuropeales@ueonline.com

GERMANY  
United Electric Controls  
An Der Zentlinde 21  
D-64711 Erbach, Germany  
Phone: 496-062-7400  
email: europeansales@ueonline.com

INDIA  
United Electric Controls  
#402, Aries Avenue – 1,  
United Colony, Sama, Baroda  
Gujarat, India 390 008  
Phone: +91 (-265) -2788654  
email: indiasales@ueonline.com

ASIA-PACIFIC  
United Electric Controls, Far East  
No. 1-2-2, 2nd Floor  
Jalan 4/101C  
Cheras Business Centre  
Batu 5, Jalan Cheras  
56100 Kuala Lumpur, Malaysia  
Phone: 603-9133-4122  
email: fareastsales@ueonline.com

MEXICO  
United Electric Controls  
Zacatecas # 206, Suite 20  
Col Guadalupe CP 89120  
Tampico, Tamaulipas Mexico  
Phone: 833-217-5201  
email: latinamericasales@ueonline.com

RUSSIA  
United Electric Controls, Moscow  
Elninskaya str., 15-140  
Moscow, 121552, Russia  
Phone: +7 (495) 792-88-06  
email: russiansales@ueonline.com

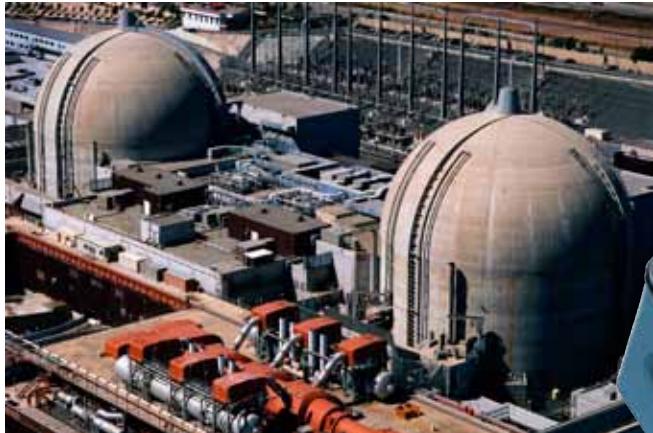


UNITED ELECTRIC  
CONTROLS

180 Dexter Avenue, P.O. Box 9143  
Watertown, MA 02471-9143 USA  
Telephone: 617 926-1000 Fax: 617 926-2568  
<http://www.ueonline.com>

CP01111500

## PRESSURE AND VACUUM SWITCHES



### FEATURES

- Gasketed, Die Cast Aluminum Enclosure with Epoxy Coating
- SPDT Switch Output
- Adjustable Deadband Option
- Sealed, Isolated Metal Bellows Sensors
- Adjustable Pressure Ranges:  
30 "Hg Vac to 6000 psi  
(-1 to 414 bar)



# J6 Series

## OVERVIEW

The UE J6 is a reliable, sensitive pressure switch, originally designed for instrument air applications in process plants. Its compact design and combination of set-point sensitivity and narrow or optional adjustable deadband, offers cost-saving solutions for a variety of applications.

The J6 is ideally suited for a wide range of industrial processes such as alarm/shutdown and low/high service pressures. OEMs also utilize the J6 in machinery and equipment for threshold protection.

## FEATURES

- UL listed and cUL certified
- Optional ATEX or GOST intrinsic safety compliance
- Designed to meet Enclosure Type 4X
- SPDT switch output
- Adjustable deadband option for precise on-off control
- Brass or welded stainless steel bellows sensors
- External manual reset option



**SPECIFICATIONS**

|                                   |   |
|-----------------------------------|---|
| <b>STORAGE TEMPERATURE</b>        | -65° to 160°F (-54 to 71°C)   |
| <b>AMBIENT TEMPERATURE LIMITS</b> | -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    |
| <b>SET POINT REPEATABILITY</b>    | Models S126B-S164B, 126-364, 680: ± 1% of adjustable range; models 610-614: ± 1.5% of adjustable range                        |
| <b>SHOCK</b>                      | Set point repeats after 15 G, 10 millisecond duration   |
| <b>VIBRATION</b>                  | Set point repeats after 2.5 G, 5-500 Hz   |
| <b>ENCLOSURE</b>                  | Die cast aluminum, epoxy powder coated, gasketed; captive cover screws  |
| <b>ENCLOSURE CLASSIFICATION</b>   | Designed to meet Enclosure Type 4X requirements   |
| <b>SWITCH OUTPUT</b>              | One SPDT; switch may be wired "normally open" or "normally closed"  |
| <b>ELECTRICAL RATING</b>          | 15 A 125/250/480 VAC resistive. Electrical switches have limited DC capabilities. Consult factory for additional information. |
| <b>WEIGHT</b>                     | Approx. 1 lb., 8 oz. (0.68 kg.)   |
| <b>ELECTRICAL CONNECTION</b>      | 1/2" NPT (female)   |
| <b>PRESSURE CONNECTION</b>        | All models 1/4" NPT (female) except models S126B-S164B: 1/2" NPT (female)   |

**APPROVALS****UNITED STATES AND CANADA**

UL Listed,  
UL 508, file #E42272  
cUL Certified  
CSA C22.2 No. 14, file #42272

**EUROPEAN UNION****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 0335063  
EN 50014, 50020 & 50284

**Low Voltage Directive (LVD) (73/23/EC & 93/68/EEC)**

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 Equipment Directive (PED) (97/23/EC)**

Compliant to PED  
Products rated below 7.5 psi are outside the scope of PED

**RUSSIA**

Gosgortekhnadzor Permit **(OPTIONAL - Code M406)**  
OExia IIC T6  
Tamb. = -50°C to +60°C  
NANIO CCVE Certification Center  
Certificate ROSS US.GB05.Bo2933  
GOST R 51330.0, 51330.1, 51330.10 & 51330.14

## PRESSURE MODEL CHART

| Model   | Adjustable Set Point Range                         |   | Deadband              |                       | Over Range Pressure*  |                       | Proof Pressure**      |                       |
|---|--|---|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
|   | Low end of range on fall;<br>psi<br>(unless noted) | High end of range on rise;<br>bar<br>(unless noted) | psi<br>(unless noted) | bar<br>(unless noted) | psi<br>(unless noted) | bar<br>(unless noted) | psi<br>(unless noted) | bar<br>(unless noted) |
| Welded 316L stainless steel bellows and 1/2" NPT (female) pressure connection   |  |   |                       |                       |                       |                       |                       |                       |
| S126B   | 30 "Hg Vac to 0 psi                                | -1 to 0   | 0.2 to 0.8 "Hg        | 6,8 to 27,1 mbar      | 3                     | 0,2                   | 5                     | 0,3                   |
| S134B   | 30 "Hg Vac to 20 psi                               | -1 to 1,4   | 0.2 to 0.8 "Hg        | 6,8 to 27,1 mbar      | 20                    | 1,4                   | 25                    | 1,7                   |
| S136B   | 0 to 50" wc  | 0 to 124,5 mbar                                     | 3 to 6 "wc            | 7,5 to 14,9 mbar      | 50 "wc                | 124,5 mbar            | 5                     | 0,3                   |
| S142B   | 0 to 18  | 0 to 1,2  | 4 to 7 "wc            | 10 to 17,4 mbar       | 18                    | 1,2                   | 25                    | 1,7                   |
| S148B   | 0 to 40  | 0 to 2,8  | 0.1 to 0.4            | 6,9 to 27,6 mbar      | 40                    | 2,8                   | 40                    | 2,8                   |
| S152B   | 0 to 50  | 0 to 3,4  | 0.1 to 0.5            | 6,9 to 34,5 mbar      | 50                    | 3,4                   | 75                    | 5,2                   |
| S156B   | 3 to 100   | 0,2 to 6,9  | 0.2 to 0.8            | 13,8 to 55,2 mbar     | 100                   | 6,9                   | 125                   | 8,6                   |
| S160B   | 50 to 180  | 3,4 to 12,4   | 0.3 to 1              | 20,7 to 68,9 mbar     | 180                   | 12,4                  | 180                   | 12,4                  |
| S164B   | 0 to 200   | 0 to 13,8   | 0.3 to 2              | 20,7 to 137,9 mbar    | 200                   | 13,8                  | 200                   | 13,8                  |
| Welded 316L stainless steel bellows and 1/4" NPT (female) pressure connection (Model 680 not recommended for rapid or high cycling pressure changes)  |  |   |                       |                       |                       |                       |                       |                       |
| 354   | 0 to 50  | 0 to 3,4  | 1.5 to 2.5            | 0,1 to 0,2            | 50                    | 3,4                   | 75                    | 5,2                   |
| 356   | 0 to 100   | 0 to 6,9  | 2 to 4                | 0,1 to 0,3            | 100                   | 6,9                   | 150                   | 10,3                  |
| 358   | 0 to 200   | 0 to 13,8   | 3 to 5                | 0,2 to 0,3            | 200                   | 13,8                  | 250                   | 17,2                  |
| 360   | 0 to 250   | 0 to 17,2   | 3 to 5                | 0,2 to 0,3            | 250                   | 17,2                  | 330                   | 22,8                  |
| 362   | 0 to 350   | 0 to 24,1   | 2 to 8                | 0,1 to 0,6            | 350                   | 24,1                  | 430                   | 29,6                  |
| 364   | 0 to 500   | 0 to 34,5   | 3 to 9                | 0,2 to 0,62           | 500                   | 34,5                  | 575                   | 39,6                  |
| 680   | 100 to 1700  | 6,9 to 117,2  | 9 to 23               | 0,6 to 1,6            | 1700                  | 117,2                 | 2500                  | 172,4                 |
| 303 stainless steel piston with Buna N O-ring and 303 stainless steel 1/4" NPT (female) pressure connection (not recommended for gas service since drying of the O-ring can allow bleeding of the medium into the atmosphere) |  |   |                       |                       |                       |                       |                       |                       |
| 610   | 75 to 1000   | 5,2 to 68,9   | 30 to 150             | 2,1 to 10,3           | 1000                  | 68,9                  | 10,000                | 689,5                 |
| 612   | 125 to 3000  | 8,6 to 206,8  | 40 to 250             | 2,8 to 17,2           | 3000                  | 206,8                 | 10,000                | 689,5                 |
| 614   | 500 to 6000  | 34,5 to 413,7                                       | 50 to 400             | 3,4 to 27,6           | 6000                  | 413,7                 | 10,000                | 689,5                 |

\* **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).

| Model  | Adjustable Set Point Range                         |  | Deadband              |                       | Over Range Pressure*  |                       | Proof Pressure**      |                       |
|--|--|--|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
|  | Low end of range on fall;<br>psi<br>(unless noted) | High end of range on rise<br>bar<br>(unless noted) | psi<br>(unless noted) | bar<br>(unless noted) | psi<br>(unless noted) | bar<br>(unless noted) | psi<br>(unless noted) | bar<br>(unless noted) |
| Brass bellows with nickel-plated brass 1/4" NPT (female) pressure connection†; Models 126 and 134 have zinc-plated steel spring exposed to media         |  |  |                       |                       |                       |                       |                       |                       |
| 126  | 30 "Hg Vac to 0 psi                                | -1 to 0  | 0.2 to 0.8 "Hg        | 6,8 to 27,1 mbar      | 3                     | 0,2                   | 5                     | 0,3                   |
| 134  | 30 "Hg Vac to 20 psi                               | -1 to 1,4  | 0.2 to 0.8 "Hg        | 6,8 to 27,1 mbar      | 20                    | 1,4                   | 25                    | 1,7                   |
| 136  | 0 to 50" wc  | 0 to 124,5 mbar                                    | 3 to 6 "wc            | 7,5 to 14,9 mbar      | 50 "wc                | 124,5 mbar            | 5                     | 0,3                   |
| 142  | 0 to 18  | 0 to 1,2   | 4 to 7 "wc            | 10 to 17,4 mbar       | 18                    | 1,2                   | 25                    | 1,7                   |
| 148  | 0 to 40  | 0 to 2,8   | 0.1 to 0.4            | 6,9 to 27,6 mbar      | 40                    | 2,8                   | 40                    | 2,8                   |
| 152  | 0 to 50  | 0 to 3,4   | 0.1 to 0.5            | 6,9 to 34,5 mbar      | 50                    | 3,4                   | 75                    | 5,2                   |
| 156  | 3 to 100   | 0,2 to 6,9   | 0.2 to 0.8            | 13,8 to 55,2 mbar     | 100                   | 6,9                   | 125                   | 8,6                   |
| 160  | 50 to 180  | 3,4 to 12,4  | 0.3 to 1              | 20,7 to 68,9 mbar     | 180                   | 12,4                  | 180                   | 12,4                  |
| Phosphor bronze bellows with nickel-plated brass 1/4" NPT (female) pressure connection; Model 218 has 300 series stainless steel spring exposed to media |  |  |                       |                       |                       |                       |                       |                       |
| 218  | 30 "Hg Vac to 0 psi                                | -1 to 0  | 1 to 2 "Hg            | 33,9 to 67,7 mbar     | 0                     | 0                     | 30                    | 2,1                   |
| 222  | 0 to 20  | 0 to 1,4   | 0,5 to 1              | 34,5 to 68,9 mbar     | 20                    | 1,4                   | 30                    | 2,1                   |
| 224  | 0 to 30  | 0 to 2,1   | 0,5 to 1              | 34,5 to 68,9 mbar     | 30                    | 2,1                   | 45                    | 3,1                   |
| 226  | 0 to 50  | 0 to 3,4   | 0,7 to 1,3            | 48,3 to 89,6 mbar     | 50                    | 3,4                   | 75                    | 5,2                   |
| 230  | 0 to 100   | 0 to 6,9   | 1 to 2                | 68,9 mbar to 0,1 bar  | 100                   | 6,9                   | 110                   | 7,6                   |
| 258  | 0 to 50  | 0 to 3,4   | 1,5 to 2,5            | 0,1 to 0,2            | 50                    | 3,4                   | 75                    | 5,2                   |
| 266  | 0 to 100   | 0 to 6,9   | 2 to 5                | 0,1 to 0,3            | 100                   | 6,9                   | 150                   | 10,3                  |
| 270  | 0 to 200   | 0 to 13,8  | 3 to 5                | 0,2 to 0,3            | 200                   | 13,8                  | 250                   | 17,2                  |
| 272  | 0 to 250   | 0 to 17,2  | 3 to 5                | 0,2 to 0,3            | 250                   | 17,2                  | 330                   | 22,8                  |
| 274  | 0 to 300   | 0 to 20,7  | 4 to 6                | 0,3 to 0,4            | 300                   | 20,7                  | 350                   | 24,1                  |

†Several of these models were previously offered with adjustable deadband as J6D. Specify option code 1520 if adjustable deadband is required.

# J6 Series

## HOW TO ORDER

### BUILDING A PART NUMBER

#### Select a **Type**

Refer to the "Type" section below.

Determine type number based on switch output, enclosure, adjustment and reference.

Fill in the type portion of your part number with the corresponding number.

#### Select a **Model**

Refer to the "Model Charts".

Determine model based on adjustable range, deadband and proof pressure.

Fill in the model portion of your part number with the corresponding number.

#### Select an **Option**

Refer to the "Options" section.

Determine option number based on switch output, optional materials or other product enhancements.

Fill in the option portion of your part number with the corresponding number.

Leave "option" portion blank if no options are needed. *FOR MULTIPLE OPTIONS:* Call United Electric Controls.

### TYPE

### DESCRIPTION

Pressure

**Type J6** - One SPDT output; epoxy coated enclosure; internal adjustment with no reference dial

### SWITCH OPTIONS\*

|      |   |
|------|---|
| 0140 | Gold contacts, 1 A 125 VAC resistive  |
| 0500 | Close deadband, 5 A 125/250 VAC resistive   |
| 1070 | 10 A 125 VDC resistive; deadband and minimum set point will increase  |
| 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. NOT AVAILABLE ON MODELS 258-274, 354-364, 610-614, 680. NOTE: Must select this option for models previously listed as J6D. |
| 1530 | External manual reset, 15 A 125/250/480 VAC resistive, latches on rising pressure only  |
| 2000 | 20 A 125/250 VAC resistive  |

### SENSOR AND OTHER OPTIONS

|      |  |
|------|--|
| M201 | Factory set one switch; specify increasing or decreasing pressure and set point  |
| M277 | Range indicated on nameplate in kPa or MPa factory selected  |
| M278 | Range indicated on nameplate in Kg/cm <sup>2</sup>   |
| M405 | Intrinsic safety compliance for European Union per ATEX standards, NOT AVAILABLE ON MODEL S164B  |
| M406 | Intrinsic safety compliance for Russia per Gosgortekhnadzor standards  |
| M444 | Paper ID tag   |
| M446 | Stainless steel ID tag & wire attachment   |
| M540 | Viton® construction (deadbands and low end of range may increase); wetted parts include Viton® O-ring and standard connection material. AVAILABLE ON MODELS 610-614 ONLY |
| M550 | Oxygen service cleaning; alcohol cleaning to remove residue from the process connection  |
| M913 | 1/4" NPT (female) 316L stainless steel pressure connection. AVAILABLE MODELS S126B-S164B   |
| M914 | 1/2" NPT (female) 316L stainless steel pressure connection. AVAILABLE MODELS 354-364   |

\* All switches have limited DC capabilities. Consult factory for details.

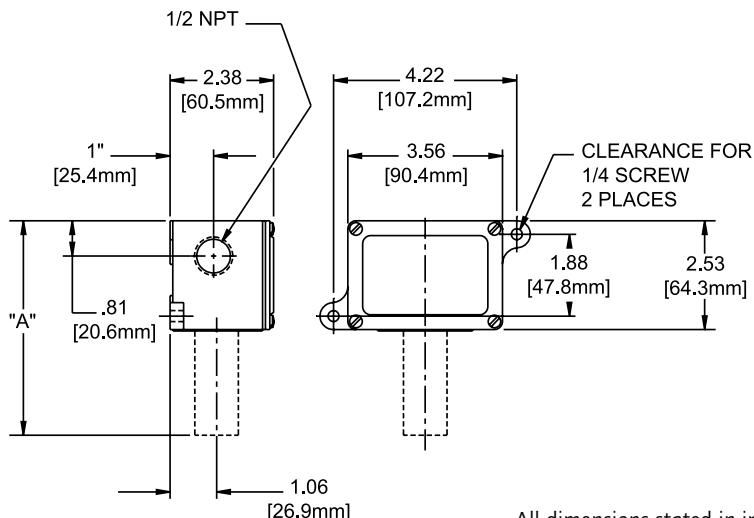
Viton® is a registered trademark of E.I. DuPont

**DIMENSIONAL DRAWINGS**

Dimensional drawings for all models may be found at [www.ueonline.com](http://www.ueonline.com)

**Internal Set Point Adjustment**

Types J6

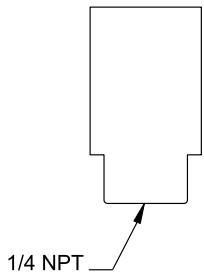


All dimensions stated in inches (millimeters)

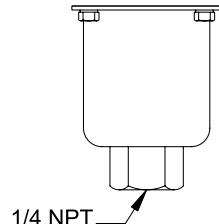
| Models      | Dimension A |       |     |
|-------------|-------------|-------|-----|
|             | Inches      | mm    | NPT |
| 126-160     | 5.06        | 128.5 | 1/4 |
| S126B-S164B | 5.47        | 138.9 | 1/2 |
| 218-230     | 4.31        | 109.5 | 1/4 |
| 258-274     | 4.75        | 120.7 | 1/4 |
| 354-364     | 4.78        | 121.4 | 1/4 |
| 610-614     | 5.72        | 145.3 | 1/4 |
| 680         | 4.97        | 126.2 | 1/4 |

**Pressure Sensors**

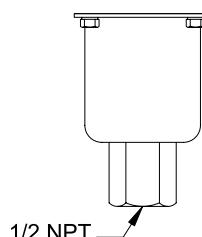
Models 218-230



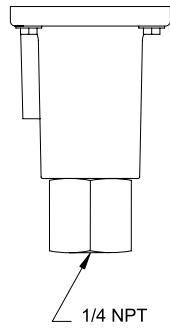
Models 126-160



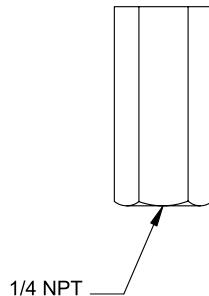
Models S126B-S164B



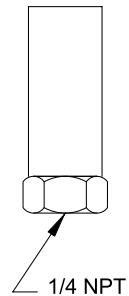
Models 610-614



Models 258-274



Models 354-364, 680



## RECOMMENDED PRACTICES AND WARNINGS

United Electric Controls Company recommends careful consideration of the following factors when specifying and installing UE pressure and temperature units. Before installing a unit, the Installation and Maintenance instructions provided with unit must be read and understood.

- To avoid damaging unit, proof pressure and maximum temperature limits stated in literature and on nameplates must never be exceeded, even by surges in the system. Operation of the unit up to maximum pressure or temperature is acceptable on a limited basis (e.g., start-up, testing) but continuous operation must be restricted to the designated adjustable range. Excessive cycling at maximum pressure or temperature limits could reduce sensor life.
- A back-up unit is necessary for applications where damage to a primary unit could endanger life, limb or property. A high or low limit switch is necessary for applications where a dangerous runaway condition could result.
- The adjustable range must be selected so that incorrect, inadvertent or malicious setting at any range point cannot result in an unsafe system condition.
- Install unit where shock, vibration and ambient temperature fluctuations will not damage unit or affect operation. When applicable, orient unit so that moisture does not enter the enclosure via the electrical connection. When appropriate, this entry point should be sealed to prevent moisture entry.
- Unit must not be altered or modified after shipment. Consult UE if modification is necessary.
- Monitor operation to observe warning signs of possible damage to unit, such as drift in set point or faulty display. Check unit immediately.
- Preventative maintenance and periodic testing is necessary for critical applications where damage could endanger property or personnel.
- Electrical ratings stated in literature and on nameplate must not be exceeded. Overload on a switch can cause damage, even on the first cycle. Wire unit according to local and national electrical codes, using wire size recommended in installation sheet.
- Do not mount unit in ambient temp. exceeding published limits.

## LIMITED WARRANTY

Seller warrants that the product hereby purchased is, upon delivery, free from defects in material and workmanship and that any such product which is found to be defective in such workmanship or material will be repaired or replaced by Seller (Ex-works, Factory, Watertown, Massachusetts. INCOTERMS); provided, however, that this warranty applies only to equipment found to be so defective within a period of 24 months from the date of manufacture by the Seller. Seller shall not be obligated under this warranty for alleged defects which examination discloses are due to tampering, misuse, neglect, improper storage, and in any case where products are disassembled by anyone other than authorized Seller's representatives. EXCEPT FOR THE LIMITED WARRANTY OF REPAIR AND REPLACEMENT STATED ABOVE, SELLER DISCLAIMS ALL WARRANTIES WHATSOEVER WITH RESPECT TO THE PRODUCT, INCLUDING ALL IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR ANY PARTICULAR PURPOSE.

## LIMITATION OF SELLER'S LIABILITY

SELLER'S LIABILITY TO BUYER FOR ANY LOSS OR CLAIM, INCLUDING LIABILITY INCURRED IN CONNECTION WITH (I) BREACH OF ANY WARRANTY WHATSOEVER, EXPRESSED OR IMPLIED, (II) A BREACH OF CONTRACT, (III) A NEGLIGENT ACT OR ACTS (OR NEGLIGENCE FAILURE TO ACT) COMMITTED BY SELLER, OR (IV) AN ACT FOR WHICH STRICT LIABILITY WILL BE INPUTTED TO SELLER, IS LIMITED TO THE "LIMITED WARRANTY" OF REPAIR AND/OR REPLACEMENT AS SO STATED IN OUR WARRANTY OF PRODUCT. IN NO EVENT SHALL THE SELLER BE LIABLE FOR ANY SPECIAL, INDIRECT, CONSEQUENTIAL OR OTHER DAMAGES OF A LIKE GENERAL NATURE, INCLUDING, WITHOUT LIMITATION, LOSS OF PROFITS OR PRODUCTION, OR LOSS OR EXPENSES OF ANY NATURE INCURRED BY THE BUYER OR ANY THIRD PARTY.

*UE specifications subject to change without notice.*

Be sure to visit [www.ueonline.com](http://www.ueonline.com) for the latest information.

## U.S. SALES OFFICES

United Electric Controls  
31 Old Stage Road  
Hampton Falls, NH 03844  
Phone: 617-899-1132  
email: [northeastsales@ueonline.com](mailto:northeastsales@ueonline.com)

United Electric Controls  
28 N. Wise Ave.  
Freeport, IL 61032  
Phone: 815-341-2588  
email: [midwestsales@ueonline.com](mailto:midwestsales@ueonline.com)

United Electric Controls  
1022 Vineyard Drive  
Conyers, GA 30013  
Phone: 770-335-9802  
email: [southeastsales@ueonline.com](mailto:southeastsales@ueonline.com)

United Electric Controls  
5829 Grazing Court  
Mason, OH 45040  
Phone: 513-535-5486  
email: [midatlanticsales@ueonline.com](mailto:midatlanticsales@ueonline.com)

United Electric Controls  
102 Salazar Court  
Clayton, CA 94517  
Phone: 925-408-5997  
email: [westcoastsales@ueonline.com](mailto:westcoastsales@ueonline.com)

United Electric Controls  
27 Summit Terrace  
Sparta, NJ 07871  
Phone: 973-271-2550  
email: [easternsales@ueonline.com](mailto:easternsales@ueonline.com)

United Electric Controls  
4306 Whickham Drive  
Fulshear, TX 77441  
Phone: 832-457-6138  
email: [southwestsales@ueonline.com](mailto:southwestsales@ueonline.com)

## CANADA

EASTERN  
68 Mosley Crescent  
Brampton, Ontario  
Canada L6Y 5C8  
Phone: 905-455-5131  
FAX: 905-455-5131

## INTERNATIONAL OFFICES

CHINA  
United Electric Controls, *Shanghai Office*  
Room 1011, 10th Flr,  
Huai Hai Zhonghua Building  
No. 885, Renmin Road, Luwan District  
Shanghai 200010, P.R. China  
Phone: +8621-6255 8059  
email: [chinasaless@ueonline.com](mailto:chinasaless@ueonline.com)

United Electric Controls, *Beijing Office*  
Room 1006, Jainhao International Bldg.  
Block D, No. 116  
Zizhuyuanlu, Haidian District  
Beijing, China 100089  
Phone & Fax: +86-10-5893-0551  
email: [beijingsales@ueonline.com](mailto:beijingsales@ueonline.com)

## EASTERN EUROPE & SCANDINAVIA

United Electric Controls  
05-806 Komorow  
Kujawska 5, Poland  
Phone: +48 22 499 4804  
email: [easterneuropeales@ueonline.com](mailto:easterneuropeales@ueonline.com)

## GERMANY

United Electric Controls  
An Der Zentlinde 21  
D-64711 Erbach, Germany  
Phone: 496-062-7400  
email: [europeansales@ueonline.com](mailto:europeansales@ueonline.com)

## INDIA

United Electric Controls  
402, Aries Avenue-I, 58-United Colony  
Sama, Baroda - 390008, India  
Phone: +91-265-2788654  
email: [indisales@ueonline.com](mailto:indisales@ueonline.com)

## ASIA-PACIFIC

United Electric Controls, Far East  
No. 1-2-2, 2nd Floor  
Jalan 4/101C  
Cheras Business Centre  
Batu 5, Jalan Cheras  
56100 Kuala Lumpur, Malaysia  
Phone: 603-9133-4122  
email: [fareastsales@ueonline.com](mailto:fareastsales@ueonline.com)

## MEXICO

United Electric Controls  
Zacatecas #206 Suite 20  
Col Guadalupe CP 89120  
Tampico, Tamaulipas Mexico  
Phone: 52 (833) 2175201  
email: [latinamericasales@ueonline.com](mailto:latinamericasales@ueonline.com)

## RUSSIA

United Electric Controls, Moscow  
Elninskaya str., 15-140  
Moscow, 121552, Russia  
Phone: +7 (495) 792-88-06  
email: [russiansales@ueonline.com](mailto:russiansales@ueonline.com)



180 Dexter Avenue, P.O. Box 9143  
Watertown, MA 02471-9143 USA  
Telephone: 617 926-1000 Fax: 617 926-2568  
<http://www.ueonline.com>

CP05102000

## INDICATING TEMPERATURE CONTROLS AND THERMOMETERS



### FEATURES

- Temperature Indication and Control
- Single or Dual SPDT Output
- Stainless Steel Bulb and Capillary
- $\pm 1\%$  Repeatability
- Enclosure Type 1, 4, and Explosion Proof Versions
- Temperature Ranges:  
-180 to 650°F  
(-117.8 to 343.3°C)

**ISO**  
**9001**  
CERTIFIED  
COMPANY

## OVERVIEW

For applications that require a visual display of process temperature and set point, the 800 Series offers a highly readable four inch setting/ indication scale. It is available in two versions: a Lexan® enclosure for enclosure type 1 or 4 applications (with option M300), and with Lexan® window and epoxy-coated aluminum enclosure for Div. 1 explosion proof applications. For temperature indication only, the T800 thermometer incorporates the same performance and construction features of the 800 Series.

800 Series models control and indicate the temperature of food service appliances, ovens, packaging machines, HVAC equipment, and various temperature applications within process plants.

## FEATURES

- Temperature indication and control switching
- Single or dual SPDT output
- Stainless steel bulb & capillary
- Simple to adjust via external knob
- Explosion proof models are UL listed, cUL certified, and ATEX compliant
- Optional Russian, Ukrainian, and Chinese, flameproof or intrinsic safety compliance
- Optional thermowells and union connectors available



Dual set point version

Explosion proof version

Lexan® is a registered trademark of General Electric Co.

## SPECIFICATIONS

|                                   |   |
|-----------------------------------|---|
| <b>STORAGE TEMPERATURE</b>        | -65 to 160°F (-54 to 71°C)  |
| <b>AMBIENT TEMPERATURE LIMITS</b> | -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   |
| <b>SET POINT REPEATABILITY</b>    | ± 1% of adjustable range  |
| <b>SHOCK</b>                      | Set point repeats after 15 G, 10 millisecond duration   |
| <b>VIBRATION</b>                  | Set point repeats after 2.5 G, 5-500 Hz   |
| <b>ENCLOSURE</b>                  | Types 800, 802: Lexan® black finish; clear Lexan® faceplate<br>Types T800, 820E, 822E: Die cast aluminum, epoxy coated enclosure, gasketed; Lexan® cover and faceplate  |
| <b>ENCLOSURE CLASSIFICATION</b>   | Types 800, 802, T800: Designed to meet enclosure type 1 requirements (enclosure type 4 by specifying option M300). Types 820E, 822E: Designed to meet enclosure type 4X; Class I Div. 1 products meet enclosure type 7; Class II, Div. 1 products meet enclosure type 9. Certified to IP66 requirements |
| <b>INDICATION ACCURACY</b>        | ± 1% of adjustable range  |
| <b>SWITCH OUTPUT</b>              | 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 set point. Switches may be wired "normally open" or "normally closed"  |
| <b>DUAL SWITCH ADJUSTMENT</b>     | Type 802: Dual switch controls have separate knob & temperature pointers for each switch set point (standard); turn inner green knob for setting #1 switch; outer black knob for switch #2.<br>Type 822E common adjustment single knob and pointer for set point  |
| <b>ELECTRICAL RATING</b>          | 15 A 125/250/480 VAC resistive. Electrical switches have limited DC capabilities. Consult factory for additional information.   |
| <b>WEIGHT</b>                     | Types 800, 802, T800: Approx. 3 lbs., 4 oz. (1.47 kg)<br>Types 820E, 822E: Approx. 7 lbs (3.18 kg)  |
| <b>ELECTRICAL CONNECTION</b>      | Types 800, 802: 7/8" diameter knockout on left hand side; 18 AWG color-coded leadwires, approx. 9 inches exposed with strain relief (option M100 adds terminal block wiring).<br>Types 820E, 822E: two 3/4" NPT E/C with terminal block   |
| <b>BULB AND CAPILLARY</b>         | 6 feet 304 stainless steel  |
| <b>TEMPERATURE FILL</b>           | Model 1BS: solvent filled; models 2-8: non-toxic oil filled   |
| <b>TEMPERATURE DEADBAND</b>       | Typically 1% of range under laboratory conditions (70°F ambient circulating bath at rate of 1/2°F per minute change)  |



## APPROVALS

**UNITED STATES AND CANADA****800 & 802 Models****UL Listed, CSA Certified**

UL 873, file # E10667; CSA C22.2 No. 24, file # LR7814

**820E & 822E Models**

Class I, Division 1 and 2, Groups B, C &amp; D

Class II, Division 1 and 2, Groups E, F &amp; G



Class III

Class I, Zone 1, Group IIB + H<sub>2</sub> T6

Enclosure Type 4X

**UL Listed, cUL Certified**

UL 50 &amp; 698; CSA No. 25 &amp; 30 - file # E43374

**EUROPE****820E & 822E Models****ATEX Directive (94/9/EC)**

II 2 G Ex d IIC T6

II 2 D Ex tD A21 IP66 T+85C

Tamb = -40°C to +75°C

UL International DEMKO A/S (N.B.# 0539)

Certificate # DEMKO 09 ATEX 0815573X

EN 60079-0, 60079-1, 61241-0 &amp; 61241-1

**Low Voltage Directive (LVD) (73/23/EC & 93/68/EEC)**

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**RUSSIA****820E & 822E Models**

Rostechnadzor Permit and GOST-R CoC

**(OPTIONAL - code M406)**

1ExdIICt6X

Tamb = -40°C to +71°C

NANIO CCVE Certification Center

Certificate # ROSS US.GB05.Bo2933

GOST R 51330.0, 51330.1, 51330.10 &amp; 51330-14

**UKRAINE****820E & 822E Models**Gosnadzorohrantruda Permit (**OPTIONAL - code M404**)

1ExdIICt6X

Tamb = -40°C to +71°C

Certificate # 1867.04.30 - 31.62.4

**CHINA****820E & 822E Models**CQST Certified (**OPTIONAL - code M408**)

Exd IIC T6

DIP A21 TA +85°C

Tamb = -40°C to +75°C

GB 3836.1, 3836.2 &amp; 12476.1

Certificate # CNEx09.2180X

## TEMPERATURE MODEL CHART

| Model | Adjustable Set Point Range |                | Max. Temp. |       | Scale Div. |    | Bulb Size     |
|-------|----------------------------|----------------|------------|-------|------------|----|---------------|
|       | °F                         | °C             | °F         | °C    | °F         | °C |               |
| 1BS*  | -180 to 120                | -117.8 to 48.9 | 170        | 76.7  | 5          | 5  | 3/8 x 3-3/4"  |
| 2BS   | -125 to 350                | -87.2 to 176.7 | 400        | 204.4 | 10         | 5  | 3/8 x 2-7/16" |
| 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        | 76.7  | 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        | 148.9 | 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 6 ft, optional capillary lengths and protection are available, consult UE.

\*NOT AVAILABLE TYPE T800

## HOW TO ORDER

### BUILDING A PART NUMBER

#### Select a **Type**

Refer to the "Type" section below.  
Determine type number based on switch output, enclosure, adjustment and reference.  
Fill in the type portion of your part number with the corresponding number.

#### Select a **Model**

Refer to the "Model Charts."  
Determine model based on adjustable range, deadband and proof pressure.  
Fill in the model portion of your part number with the corresponding number.

#### Select an **Option**

Refer to the "Options" section.  
Determine option number based on switch output, optional materials or other product enhancements.  
Fill in the option portion of your part number with the corresponding number.  
Leave "option" portion blank if no options are needed. FOR MULTIPLE OPTIONS: Call United Electric Controls.

#### **TYPE**

#### **TEMPERATURE**

- Type 800 - Bulb and capillary; one SPDT output; external indication
- Type 802 - Bulb and capillary; two SPDT outputs; external indication
- Type 820E - Bulb and capillary; one SPDT output; external indication, explosion proof
- Type 822E - Bulb and capillary; two SPDT outputs; external indication, explosion proof
- Type T800 - Thermometer only with external indication

#### **OPTIONS**

#### **SWITCH OPTIONS\***    **DESCRIPTION**

- |      |   |
|------|---|
| 0140 | Gold contacts, 1 A 125 VAC resistive. NOT AVAILABLE TYPE 800, 820E, T800  |
| 0500 | Close deadband, 5 A 125/250 VAC resistive. NOT AVAILABLE TYPE T800  |
| 1070 | 10 A 125 VDC or VAC resistive; deadband and minimum set point may increase. NOT AVAILABLE TYPES 802, 820E, T800 |
| 2000 | 20 A 125/250 VAC resistive. NOT AVAILABLE TYPE T800   |

#### **OTHER OPTIONS**

- |      |   |
|------|---|
| M007 | Drilled 7/8" electrical opening on right side. NOT AVAILABLE TYPES 820E, 822E and T800  |
| M100 | Terminal block wiring. NOT AVAILABLE TYPE 820E, 822E (standard) AND T800  |
| M201 | Factory set one switch; specify increasing or decreasing temperature and set point. NOT AVAILABLE TYPE 802, 822E, T800                                  |
| M202 | Factory set two switches; specify increasing or decreasing temperature and set point. NOT AVAILABLE TYPE 800, 820E, T800                                |
| M300 | Enclosure Type 4 construction; includes watertight conduit fitting and gasketing. NOT AVAILABLE TYPES 820E, 822E (which already meet enclosure type 4X) |
| M320 | Tamper resistant cover. NOT AVAILABLE TYPES T800  |
| M404 | Flameproof compliance for Ukraine per Gosnadzorohrantruda standards. NOT AVAILABLE TYPES 800, 802, T800   |
| M406 | Flameproof compliance for Russia per Rostechnadzor permit (RTN). NOT AVAILABLE TYPES 800, 802, T800   |
| M408 | Flameproof compliance for China per CQST standards. NOT AVAILABLE TYPES 800, 802, T800  |
| M444 | Paper ID tag  |
| M446 | Stainless steel ID tag & wire attachment  |
| M550 | Oxygen service cleaning; alcohol cleaning to remove residue from the process connection   |
| M900 | Watertight conduit fitting; converts 7/8" hole to 1/2" NPT fitting. NOT AVAILABLE TYPES 820E, 822E, T800  |

\* All switch options have limited DC capabilities. Consult factory for details.

**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*

| <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                             |

**OPTIONAL LENGTHS:**

Optional capillary length to 50' available in 304 st/st. Armor or Teflon® capillary protection available to lengths less than or equal to capillary length. Consult UE for additional information.

Consult UE regarding repeatability and ambient effects on capillary lengths over 30'

\*\*Dimensional drawings for union connectors and thermowells may be found at [www.ueonline.com](http://www.ueonline.com)

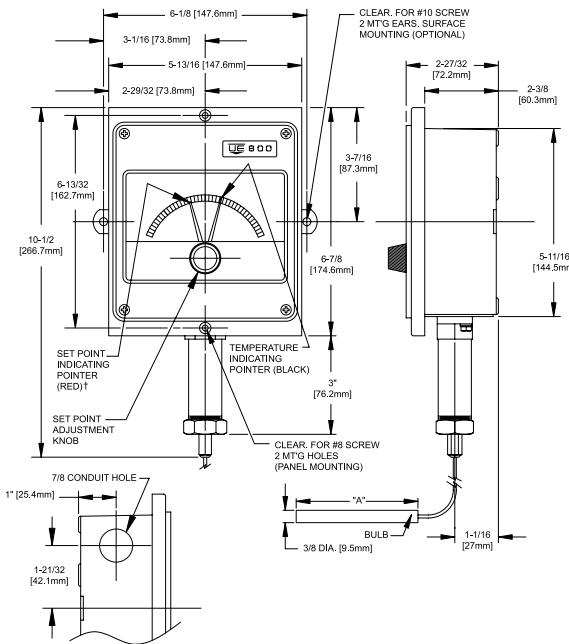
# DIMENSIONAL DRAWINGS

(Dimensional drawings for all models may be found at [www.ueonline.com](http://www.ueonline.com))

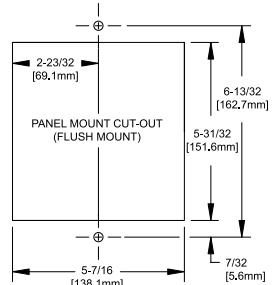
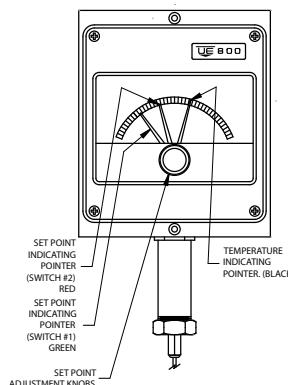
800 Series

## External Set Point Adjustment & Temperature Indication

## Types 800 & T800

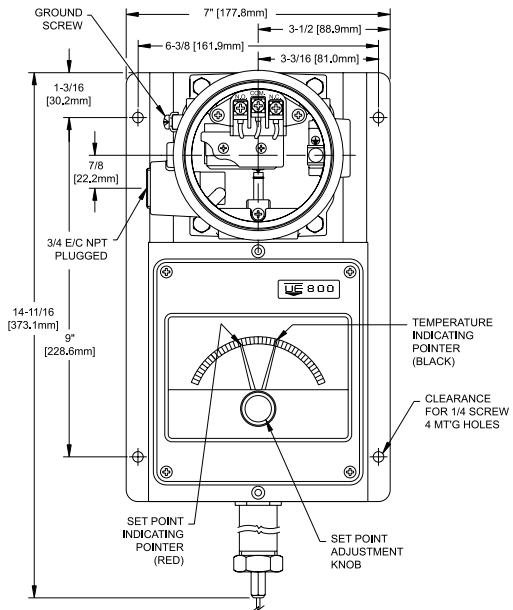


## Types 802

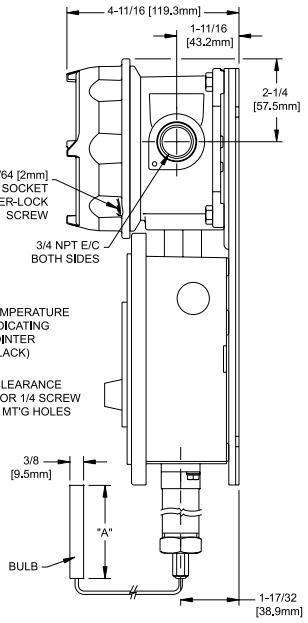
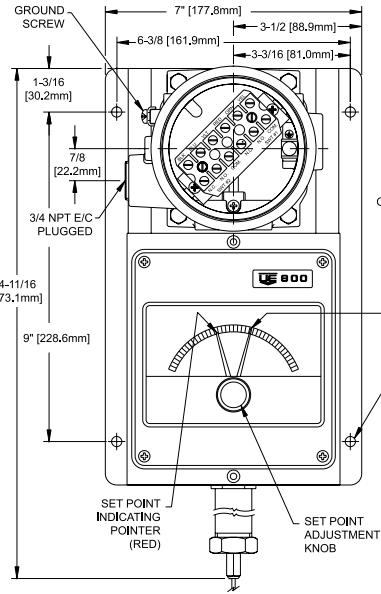


| Dimension A |        |       |
|-------------|--------|-------|
| Models      | Inches | mm    |
| 1BS         | 3-3/4  | 95.3  |
| 2BS         | 2-7/16 | 62.0  |
| 3BS         | 2-1/8  | 54.0  |
| 4BS         | 6-3/4  | 171.5 |
| 5BS         | 5      | 127.0 |
| 6BS         | 4-1/2  | 114.3 |
| 7BS         | 3      | 76.2  |
| 8BS         | 3-1/4  | 82.6  |

## Type 820 E



## Type 822 E



<sup>†</sup>Type T800 has no set point indicating pointer.

## RECOMMENDED PRACTICES AND WARNINGS

United Electric Controls Company recommends careful consideration of the following factors when specifying and installing UE pressure and temperature units. Before installing a unit, the Installation and Maintenance instructions provided with unit must be read and understood.

- To avoid damaging unit, proof pressure and maximum temperature limits stated in literature and on nameplates must never be exceeded, even by surges in the system. Operation of the unit up to maximum pressure or temperature is acceptable on a limited basis (e.g., start-up, testing) but continuous operation must be restricted to the designated adjustable range. Excessive cycling at maximum pressure or temperature limits could reduce sensor life.
- A back-up unit is necessary for applications where damage to a primary unit could endanger life, limb or property. A high or low limit switch is necessary for applications where a dangerous runaway condition could result.
- The adjustable range must be selected so that incorrect, inadvertent or malicious setting at any range point cannot result in an unsafe system condition.
- Install unit where shock, vibration and ambient temperature fluctuations will not damage unit or affect operation. When applicable, orient unit so that moisture does not enter the enclosure via the electrical connection. When appropriate, this entry point should be sealed to prevent moisture entry.
- Unit must not be altered or modified after shipment. Consult UE if modification is necessary.
- Monitor operation to observe warning signs of possible damage to unit, such as drift in set point or faulty display. Check unit immediately.
- Preventative maintenance and periodic testing is necessary for critical applications where damage could endanger property or personnel.
- Electrical ratings stated in literature and on nameplate must not be exceeded. Overload on a switch can cause damage, even on the first cycle. Wire unit according to local and national electrical codes, using wire size recommended in installation sheet.
- Do not mount unit in ambient temp. exceeding published limits.

## LIMITED WARRANTY

Seller warrants that the product hereby purchased is, upon delivery, free from defects in material and workmanship and that any such product which is found to be defective in such workmanship or material will be repaired or replaced by Seller (Ex-works, Factory, Watertown, Massachusetts. INCOTERMS); provided, however, that this warranty applies only to equipment found to be so defective within a period of 24 months from the date of manufacture by the Seller. Seller shall not be obligated under this warranty for alleged defects which examination discloses are due to tampering, misuse, neglect, improper storage, and in any case where products are disassembled by anyone other than authorized Seller's representatives. EXCEPT FOR THE LIMITED WARRANTY OF REPAIR AND REPLACEMENT STATED ABOVE, SELLER DISCLAIMS ALL WARRANTIES WHATSOEVER WITH RESPECT TO THE PRODUCT, INCLUDING ALL IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR ANY PARTICULAR PURPOSE.

## LIMITATION OF SELLER'S LIABILITY

SELLER'S LIABILITY TO BUYER FOR ANY LOSS OR CLAIM, INCLUDING LIABILITY INCURRED IN CONNECTION WITH (I) BREACH OF ANY WARRANTY WHATSOEVER, EXPRESSED OR IMPLIED, (II) A BREACH OF CONTRACT, (III) A NEGLIGENT ACT OR ACTS (OR NEGLIGENT FAILURE TO ACT) COMMITTED BY SELLER, OR (IV) AN ACT FOR WHICH STRICT LIABILITY WILL BE INPUTTED TO SELLER, IS LIMITED TO THE "LIMITED WARRANTY" OF REPAIR AND/OR REPLACEMENT AS SO STATED IN OUR WARRANTY OF PRODUCT. IN NO EVENT SHALL THE SELLER BE LIABLE FOR ANY SPECIAL, INDIRECT, CONSEQUENTIAL OR OTHER DAMAGES OF A LIKE GENERAL NATURE, INCLUDING, WITHOUT LIMITATION, LOSS OF PROFITS OR PRODUCTION, OR LOSS OR EXPENSES OF ANY NATURE INCURRED BY THE BUYER OR ANY THIRD PARTY.

*UE specifications subject to change without notice.*

## U.S. SALES OFFICES

United Electric Controls  
31 Old Stage Road  
Hampton Falls, NH 03844  
Phone: 617-899-1132  
email: northeastsales@ueonline.com

United Electric Controls  
28 N. Wise Ave.  
Freeport, IL 61032  
Phone: 815-341-2588  
email: midwestsales@ueonline.com

United Electric Controls  
1022 Vineyard Drive  
Conyers, GA 30013  
Phone: 770-335-9802  
email: southeastsales@ueonline.com

United Electric Controls  
5829 Grazing Court  
Mason, OH 45040  
Phone: 513-535-5486  
email: midatlanticsales@ueonline.com

United Electric Controls  
102 Salazar Court  
Clayton, CA 94517  
Phone: 925-408-5997  
email: westcoastsales@ueonline.com

United Electric Controls  
27 Summit Terrace  
Sparta, NJ 07871  
Phone: 973-271-2550  
email: easternsales@ueonline.com

United Electric Controls  
4306 Whickham Drive  
Fulshear, TX 77441  
Phone: 832-457-6138  
email: southwestsales@ueonline.com

## CANADA

EASTERN  
68 Mosley Crescent  
Brampton, Ontario  
Canada L6Y 5C8  
Phone: 905-455-5131  
FAX: 905-455-5131

## INTERNATIONAL OFFICES

CHINA  
United Electric Controls, *Shanghai Office*  
Room 1011, 10th Flr,  
Huai Hai Zhonghua Building  
No. 885, Renmin Road, Luwan District  
Shanghai 200010, P.R. China  
Phone: +8621-6255 8059  
email: chinasales@ueonline.com

United Electric Controls, *Beijing Office*  
Room 1006, Jainhao International Bldg.  
Block D, No. 116  
Zizhuyuanlu, Haidian District  
Beijing, China 100089  
Phone: +86-10-5893-0518  
email: beijingsales@ueonline.com

EASTERN EUROPE & SCANDINAVIA  
United Electric Controls  
05-806 Komorow  
Kujawska 5, Poland  
Phone: +48 22 499 4804  
email: easterneurope sales@ueonline.com

GERMANY  
United Electric Controls  
An Der Zentlinde 21  
D-64711 Erbach, Germany  
Phone: 496-062-7400  
email: europeansales@ueonline.com

INDIA  
United Electric Controls  
House no. 7, Kamalkunj Society  
Nizampura,  
Baroda (Gujarat), India  
Phone: +91 (-265) -2788654  
email: indiasales@ueonline.com

ASIA-PACIFIC  
United Electric Controls, Far East  
No. 1-2-2, 2nd Floor  
Jalan 4/101C  
Cheras Business Centre  
Batu 5, Jalan Cheras  
56100 Kuala Lumpur, Malaysia  
Phone: 603-9133-4122  
email: fareastsales@ueonline.com

MEXICO  
United Electric Controls  
Zacatecas # 206, Suite 20  
Col Guadalupe CP 89120  
Tampico, Tamaulipas Mexico  
Phone: 833-217-5201  
email: latinamericasales@ueonline.com

RUSSIA  
United Electric Controls, Moscow  
Elninskaya str, 15-140  
Moscow, 121552, Russia  
Phone: +7 (495) 792-88-06  
email: russiansales@ueonline.com



UNITED ELECTRIC  
CONTROLS

180 Dexter Avenue, P.O. Box 9143  
Watertown, MA 02471-9143 USA  
Telephone: 617 926-1000 Fax: 617 926-2568  
<http://www.ueonline.com>

CP04101500

Be sure to visit [www.ueonline.com](http://www.ueonline.com) for the latest information.

## PRESSURE, DIFFERENTIAL PRESSURE, AND TEMPERATURE SWITCHES



### FEATURES

- 316 Stainless Steel Construction
- Hermetically Sealed Micro-switch
- Convenient Field Adjustment
- Belleville Actuated
- UL, cUL approved and ATEX compliant
- Dual Seal Certified
- Adjustable Ranges:

Pressure: 1 to 12,500 psi  
(68,9 mbar to 861,9 bar)

Differential Pressure:  
0.7" wcd to 150 psid  
(1,7 mbar to 10,3 bar)

Temperature: -130°F to 650°F  
(-90°C to 340°C)

**ISO**  
**9001**  
CERTIFIED  
COMPANY

## OVERVIEW

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 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.



## FEATURES

- UL, cUL and ATEX approved for Div. 1 or Zone 1 hazardous locations, CE compliant
- Dual seal compliant to ANSI/ISA 12.27.01
- Pressure switch wetted parts are NACE MR-0175 compliant
- Snap-acting Belleville spring for long life, vibration resistance and stability
- Optional Hastelloy® and Monel® sensor material for corrosive media
- Optional medium-pressure and high-pressure autoclave pressure connections
- Mounting bracket available for retrofit applications
- 72" leadwires
- 3-year warranty

**APPLICATIONS**

Triple approval (UL, cUL and ATEX) 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." It can be used in a variety of applications where space is at a premium. All 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.

Offshore Platforms



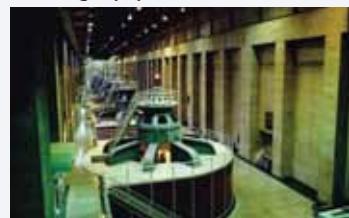
Chemical Plants &amp; Refineries



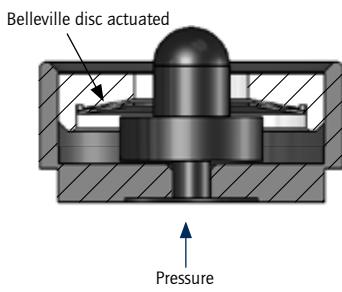
Instrument Panels



Rotating Equipment

**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.'
- **Small size:** Belleville springs are simple in appearance, but can deliver a heavy load with a relatively small deflection, contributing to a compact design.
- **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.

**SPECIFICATIONS****STORAGE TEMPERATURE** -58° to 203°F (-50 to 95°C)**OPERATING AMBIENT TEMPERATURE** -58 to 203°F (-50 to 95°C). Set point shifts less than 1% of range for a 50°F (28°C) ambient temperature change. Slight ambient effects for 25-50' extra capillary 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: 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: ±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 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**ELECTRICAL RATINGS**  
Code H: 5 A at 125/250 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.)

|                             |  |
|-----------------------------|--|
| <b>WEIGHT</b>               | Temperature models: approximately 1 lb 14 oz. (0,85 kg)<br>Pressure models: approximately 12 ounces (0,34 kg)<br>Differential models: approximately 3 lb (1,4 kg)  |
| <b>TEMPERATURE ASSEMBLY</b> | Non-toxic oil fill; 6 feet 304 stainless steel. Optional lengths available   |
| <b>TEMPERATURE DEADBAND</b> | Typically 2% of range under laboratory conditions<br>(70°F ambient circulating bath at a rate of 1/2°F per minute change)  |
| <b>PRESSURE CONNECTION</b>  | 1/2" NPT (female) or 1/4" NPT (female).<br>Differential pressure: 1/8" NPT (female)<br>Optional pressure connections available, see page 11.   |
| <b>MOUNTING</b>             | Pressure: May be pipe mounted or bracket mounted using kit 62169-13<br>Differential Pressure: Should be mounted using 2 mounting holes on sensor bracket<br>Temperature: Mounting kit 62169-13 should be specified for new installations |

## APPROVALS



### UNITED STATES AND 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 & 698; CSA C22.2 No. 14, 25 & 30 -  
File # E40857  
Dual seal certified to ISA 12.27.01 (meets CEC secondary  
seal requirements) standard on straight pressure models  
only  
Temperature: UL 873, 1203; CSA C22.2 No. 24, 25 & 30 -  
File # E43374



### Low Voltage Directive (LVD) 73/23/EC & 93/68/EEC

Compliant to LVD  
Products rated lower than 50 VAC and 75 VDC are outside the  
scope of the LVD  
The Low Voltage Directive does not apply to products for use in  
hazardous locations



### RUSSIA

Gosgortehnadzor Permit (**OPTIONAL - code M406**)  
0ExiaIICT6  
Tamb = -50°C to +60°C  
1ExdIICt6X  
Tamb = -56°C to +85°C  
NANIO CCVE Certification Center  
Certificate # ROSS US.GB05.Bo2933  
GOST R 51330.0, 51330.1, 51330.10 & 51330.14



### EUROPEAN UNION

#### ATEX Directive 94/9/EC



II 2 G Ex d IIC T6  
II 2 D Ex tD A21 IP66 T+85C  
Tamb = -50°C to +80°C  
UL International DEMKO A/S (N.B.# 0539)  
Certificate # DEMKO 08 ATEX 0717128X  
EN 60079-0, 60079-1, 61241-0 & 61241-1

#### 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 0335063  
EN 50014, 50020 & 50284

#### Pressure Equipment Directive (PED) 97/23/EC

Compliant to PED  
Products rated lower than 7.5 psi are outside the scope of the  
PED

## MODEL CHART

| Model | Adjustable Range<br>Lower end of range on fall;<br>High end of range on rise | Deadband |  | Over Range<br>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. (NACE MR-0175 compliant)

|   | 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. (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. (NACE MR-0175 compliant)

|   | 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 |

**\*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).

Kapton® is a registered trademark of E.I. DuPont de Nemours and Company.

Teflon® is a registered trademark of the DuPont Company.

Kalrez® and Viton® are registered trademarks of Dupont Performance Elastomers.

Hastelloy® is a registered trademark of Haynes International, Inc.

Monel® is a registered trademark of The Special Metals Corporation.

Aflas® is a registered trademark of Asahi Glass.

| Model  | Adjustable Range<br>Lower end of range on fall;<br>High end of range on rise | Deadband       |             | Over Range Pressure* | Proof Pressure** |       |       |  |  |  |  |  |
|--|--|----------------|-------------|----------------------|------------------|-------|-------|--|--|--|--|--|
| <b>Sensor Type 5</b> , 316L stainless steel 1/2" NPT (female) pressure connection and diaphragm (optional Hastelloy® C or Monel®), Viton® O-ring (optional Kalrez®, Ethylene Propylene, or Aflas®), 1/2" orifice for clean out purposes. (NACE MR-0175 compliant)  |  |                |             |                      |                  |       |       |  |  |  |  |  |
| <b>Sensor Type 6</b> , 316L stainless steel 1/4" NPT (female) pressure connection and diaphragm (optional Hastelloy® C or Monel®), Viton® O-ring (optional Kalrez®, Ethylene Propylene, or Aflas®), 1/8" orifice. (NACE MR-0175 compliant)   |  |                |             |                      |                  |       |       |  |  |  |  |  |
|  | psi  | bar            | psi         | bar                  | psi              | bar   | psi   |  |  |  |  |  |
| A  | 9 to 35  | 0,6 to 2,4     | 2 to 7      | 0,1 to 0,5           | 600              | 41,4  | 1000  |  |  |  |  |  |
| B  | 25 to 65   | 1,7 to 4,5     | 3 to 10     | 0,2 to 0,7           | 600              | 41,4  | 1000  |  |  |  |  |  |
| C  | 50 to 150  | 3,4 to 10,3    | 5 to 15     | 0,3 to 1,0           | 600              | 41,4  | 1000  |  |  |  |  |  |
| D  | 100 to 350   | 6,9 to 24,1    | 15 to 50    | 1,0 to 3,4           | 600              | 41,4  | 1000  |  |  |  |  |  |
| E  | 250 to 700   | 17,2 to 48,3   | 40 to 95    | 2,8 to 6,6           | 1500             | 103,4 | 3000  |  |  |  |  |  |
| F  | 400 to 1500  | 27,6 to 103,4  | 100 to 300  | 6,9 to 20,7          | 3000             | 206,8 | 4500  |  |  |  |  |  |
| G  | 1000 to 3200   | 68,9 to 220,6  | 100 to 500  | 6,9 to 34,5          | 6000             | 413,7 | 10000 |  |  |  |  |  |
| H  | 2000 to 6000   | 137,9 to 413,7 | 400 to 1000 | 27,6 to 68,9         | 8000             | 551,6 | 10000 |  |  |  |  |  |
| <b>Sensor Type 7</b> , 1/2" 316L stainless steel NPT (female) pressure connection and welded diaphragm. Large 23/32" orifice for clean out purposes. (NACE MR-0175 compliant)  |  |                |             |                      |                  |       |       |  |  |  |  |  |
|  | psi  | bar            | psi         | bar                  | psi              | bar   | psi   |  |  |  |  |  |
| A  | 3 to 15  | 0,2 to 1,0     | 1 to 4      | 0,1 to 0,3           | 300              | 20,7  | 500   |  |  |  |  |  |
| B  | 10 to 35   | 0,7 to 2,4     | 1 to 6      | 0,1 to 0,4           | 300              | 20,7  | 500   |  |  |  |  |  |
| C  | 25 to 85   | 1,7 to 5,9     | 3 to 11     | 0,2 to 0,8           | 300              | 20,7  | 500   |  |  |  |  |  |
| D  | 65 to 125  | 4,5 to 8,6     | 6 to 18     | 0,4 to 1,2           | 300              | 20,7  | 500   |  |  |  |  |  |
| <b>Sensor Type 8</b> , 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®, Silicone, Ethylene Propylene, or Aflas®), 1/8" orifice. Non-Belleville actuation. (NACE MR-0175 compliant) |  |                |             |                      |                  |       |       |  |  |  |  |  |
|  | psi  | bar            | psi         | bar (unless noted)   | psi              | bar   | psi   |  |  |  |  |  |
| A <sup>†</sup>   | 3 to 25  | 0,2 to 1,7     | 0,5 to 4    | 34,5 mbar to 0,3 bar | 600              | 41,4  | 1000  |  |  |  |  |  |
| B  | 15 to 75   | 1,0 to 5,2     | 1 to 7      | 0,1 to 0,5           | 600              | 41,4  | 1000  |  |  |  |  |  |
| C  | 25 to 150  | 1,7 to 10,3    | 1 to 12     | 0,1 to 0,8           | 600              | 41,4  | 1000  |  |  |  |  |  |
| D  | 50 to 450  | 3,4 to 31,0    | 3 to 28     | 0,2 to 1,9           | 2000             | 137,9 | 3000  |  |  |  |  |  |
| E  | 100 to 900   | 6,9 to 62,1    | 10 to 60    | 0,7 to 4,1           | 2000             | 137,9 | 3000  |  |  |  |  |  |
| F  | 500 to 2500  | 34,5 to 172,4  | 20 to 140   | 1,4 to 9,7           | 6000             | 413,7 | 7500  |  |  |  |  |  |
| G  | 700 to 4000  | 48,3 to 275,8  | 40 to 250   | 2,8 to 17,2          | 6000             | 413,7 | 7500  |  |  |  |  |  |

**Application Note:** The use of metallic diaphragms where higher pressure shock or heavy cycling is expected should be avoided. Sensor Type 7 or 9 should not be used where system or startup vacuum pressure might exceed 26" Hg Vac.

**\*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).

<sup>†</sup>Adjustable range is 4 to 25 psi (0,3 to 1,7 bar) for DPDT switch output

## MODEL CHART

| Model   | Adjustable Range<br>Lower end of range on fall;<br>High end of range on rise |                | Deadband    |                     | Over Range Pressure* |       | Proof Pressure** |        |
|---|--|----------------|-------------|---------------------|----------------------|-------|------------------|--------|
| <b>Sensor Type 9</b> , 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) |  |                |             |                     |                      |       |                  |        |
|   | psi  | bar            | psi         | mbar (unless noted) | 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 06 bar       | 300                  | 20,7  | 500              | 34,5   |
| <b>Sensor Type P</b> , 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)                  |  |                |             |                     |                      |       |                  |        |
|   | 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 1250 | 20,7 to 86,2        | 14000                | 965,3 | 16000            | 1103,2 |
| <b>Sensor Type P</b> , 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)                      |  |                |             |                     |                      |       |                  |        |
|   | psi  | bar            | psi         | bar                 | 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   | 3,4 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 1250 | 20,7 to 86,2        | 14000                | 965,3 | 16000            | 1103,2 |

\***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).

**Application Note:** The use of metallic diaphragms where higher pressure shock or heavy cycling is expected should be avoided. Sensor Type 7 to 9 should not be used where system or startup vacuum pressure might exceed 26" Hg Vac.

## DIFFERENTIAL PRESSURE MODEL CHART

| Model | Adjustable Range<br>Lower end of range on fall;<br>High end of range on rise | Deadband |  | Working Pressure Range*** |  | Proof Pressure** |  |  |
|-------|--|----------|--|---------------------------|--|------------------|--|--|
|-------|--|----------|--|---------------------------|--|------------------|--|--|

**Sensor Type K**, Buna N diaphragm and sealing diaphragms with epoxy coated aluminum 1/8" NPT (female) pressure connections. Non-Belleville actuation. 303/304 stainless steel mounting bracket attached.

**SPDT Switch (single pole double throw)‡**

|   | "wcd      | mbar          | "wc        | mbar                  | psi<br>(unless noted) | 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  |
|   | psid      | bar           | psi        | bar<br>(unless noted) | psi<br>(unless noted) | 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 and 1/8" NPT (female) pressure connections. Non-Belleville actuation. 303/304 stainless steel mounting bracket attached.

**DPDT Switch (double pole double throw)‡**

|   | "wcd      | mbar          | "wc        | mbar               | psi<br>(unless noted) | 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  |
|   | 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 |

## TEMPERATURE MODEL CHART (Standard capillary: 6ft, 304 st/st)

Installation may require optional mounting bracket kit (P/N 62169-13, see page 14)

| Model | Adjustable Range |               | Max. Temperature |       | Bulb Size         |
|-------|------------------|---------------|------------------|-------|-------------------|
|       | °F               | °C            | °F               | °C    |                   |
| R1    | -130 to 120      | -90 to 48,9   | 170              | 76,7  | 3/8 O.D. x 4-7/8" |
| R2    | 0 to 150         | -17,8 to 65,6 | 200              | 93,3  | 3/8 O.D. x 7-1/4" |
| R3    | 50 to 300        | 10 to 148,9   | 350              | 176,7 | 3/8 O.D. x 4-7/8" |
| R4    | 150 to 650       | 65,6 to 343,3 | 700              | 371,1 | 3/8 O.D. x 4"     |

**\*\*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.

‡See page 10 on building a part number for switch codes.

**HOW TO ORDER**

Select letter or number "codes" to construct part number

| <b>Part #</b>   | <b>12</b>   | <b>S</b>  | <b>H</b>          | <b>S</b>      | <b>N</b>           | <b>2</b>    | <b>A</b> | <b>M201</b> |
|---|---|---|-------------------|---------------|--------------------|-------------|----------|-------------|
|   | Series  | Housing Material  | Electrical Rating | Switch Output | Electrical Conduit | Sensor Type | Model    | Options     |
| (see next page)   |   |   |                   |               |                    |             |          |             |
| <b>ORDERING CODE</b>  |   |   |                   | <b>12</b>     | <b>S</b>           | <b>H</b>    | <b>S</b> | <b>N</b>    |
| <b>DESCRIPTION</b>  |   |   |                   |               |                    |             |          | <b>A</b>    |
| <b>SERIES 12 DESIGNATION</b>                                    | 12  |   |                   |               |                    |             |          | <b>M201</b> |
| 12  | Designation for Spectra 12 product line                 |   |                   |               |                    |             |          |             |
| <b>HOUSING MATERIAL</b>   | S   | 316 Stainless Steel   |                   |               |                    |             |          |             |
| <b>ELECTRICAL RATING*</b>                                       | L   | 1 amp   |                   |               |                    |             |          |             |
|   | H   | 5 amp   |                   |               |                    |             |          |             |
| <b>SWITCH OUTPUT</b>  | S   | SPDT  |                   |               |                    |             |          |             |
|   | D   | DPDT  |                   |               |                    |             |          |             |
| <b>ELECTRICAL CONDUIT</b>                                       | N   | 1/2" NPT male   |                   |               |                    |             |          |             |
|   | M   | M20 metric thread   |                   |               |                    |             |          |             |
| <b>SENSOR TYPE, PRESSURE CONNECTION OR BULB &amp; CAPILLARY</b> | 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   | 316 stainless steel piston, Buna N O-ring, 1/4" NPT (female) 316 stainless steel pressure connections (Belleville and non-Belleville actuated models) |                   |               |                    |             |          |             |
|   | K   | Kapton® diaphragm, Buna N sealing diaphragm, 1/8" NPT (female) pressure connections (non-Belleville actuation)  |                   |               |                    |             |          |             |
|   | R   | Remote bulb & capillary, temperature  |                   |               |                    |             |          |             |
| <b>MODELS, RANGE</b>  | A, B, C, D, E, See model chart for range specifications |   |                   |               |                    |             |          |             |
|   | F, G, H, 0, 1, 2,                                       |   |                   |               |                    |             |          |             |
|   | 3, 4, 5, 6, 7, 8, 9                                     |   |                   |               |                    |             |          |             |

\* All switches have limited DC capabilities. Consult factory for details.

12 S H S N 2 A M201

**OPTIONS**

- 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/cm<sup>2</sup> on nameplate. NOT AVAILABLE ON TEMPERATURE VERSIONS
- M405 European ATEX intrinsic safety compliance
- M406 Flameproof and intrinsic safety compliance per Russian Gostgortekhnadzor standards
- M421 Gostgortekhnadzor flameproof junction box, pre-wired (not UL approved or ATEX certified) (NOT AVAILABLE ON M20 METRIC THREAD ELECTRICAL CONDUIT VERSION)
- M423 ATEX flameproof compliant junction box, pre-wire (not UL approved) (NOT AVAILABLE ON M20 METRIC THREAD ELECTRICAL CONDUIT VERSION)
- 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, sensor material cannot be changed.  
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 (meets enclosure 4). NOT AVAILABLE ON M20 METRIC THREAD ELECTRICAL CONDUIT VERSION. NOT ATEX COMPLIANT.
- 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
- 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® construction (deadband and low end of range will increase slightly): SENSOR TYPE K wetted parts include Kapton diaphragm, Viton® O-ring and sealing diaphragm, aluminum pressure connection; SENSOR TYPE 8 wetted parts include stainless steel diaphragm and pressure connection with Viton O-ring; SENSOR TYPE P wetted parts include stainless steel piston and pressure connection with Viton O-ring.
- M541 Ethylene propylene (EPDM) O-ring for sensor types 5, 6, & P only
- M550 Oxygen service cleaning; internal construction and materials may change (includes Viton® diaphragm and/or O-ring when applicable). NOT AVAILABLE ON SENSOR TYPES 3, 4, AND 8
- M924 7/16-20 SAE (female) stainless steel pressure connection. AVAILABLE SENSOR TYPE 6 ONLY
- NC1 NACE certificate; NOT AVAILABLE FOR SENSOR TYPE K AND TEMPERATURE MODELS

**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)
- 6361-694 Junction box and terminal kit, not pre-wired (see option code M513 for description)

## OPTIONS FOR TEMPERATURE MODELS

## OPTIONAL SENSOR MATERIALS FOR CORROSIVE MEDIA AVAILABLE SENSOR TYPE 8

|       |   |
|-------|---|
| XD002 | Hastelloy® C diaphragm                    |
| XD003 | Monel® diaphragm                          |
| XP112 | 1/2" NPT Hastelloy® C pressure connection |
| XP113 | 1/2" NPT Monel® pressure connection       |
| XP114 | 1/4" NPT Hastelloy® pressure connection   |
| XP115 | 1/4" NPT Monel® pressure connection       |
| XR211 | Kalrez® O-ring                            |
| XR213 | Ethylene propylene O-ring                 |
| XR214 | Aflas® O-ring                             |
| XR216 | Viton O-ring                              |

## 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 &amp; capillary switches

316 Stainless Steel

|      |            |                   |
|------|------------|-------------------|
| 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 |

## OPTIONAL LENGTHS

Optional capillary length to  $\pm 50'$  available in 304 st/st. Armor or Teflon® capillary protection available to lengths less than or equal to capillary length. Consult UE for additional information.

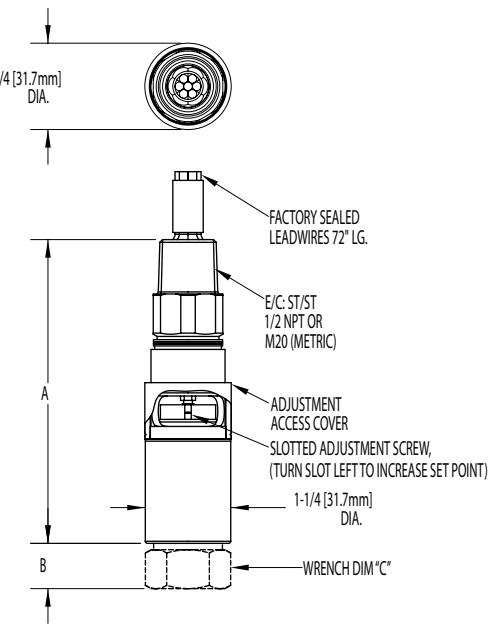
\*Consult UE regarding repeatability and ambient effects on capillary lengths over 30'.

\*Dimensional drawings for union connectors and thermowells may be found at [www.ueonline.com](http://www.ueonline.com)

## DIMENSIONAL DRAWINGS

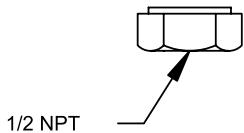
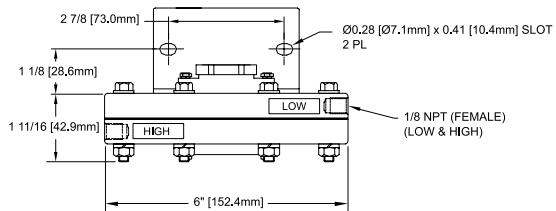
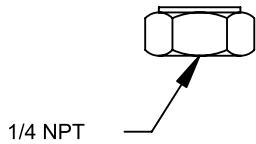
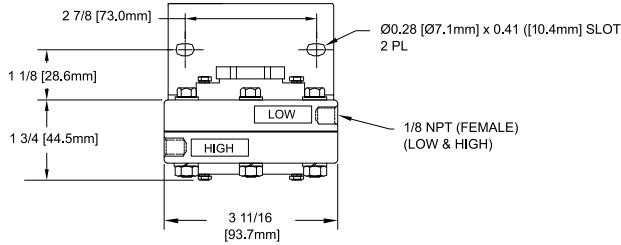
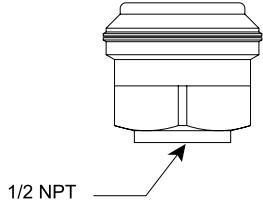
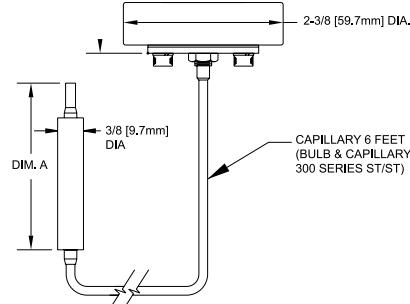
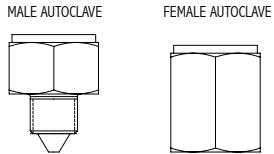
Dimensional drawings for all models may be found at [www.UEonline.com](http://www.UEonline.com)

| 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         | 1.6           | 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 |
| 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  |
| R1-R4  | 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   | HM6 Autoclave 3/8" (male)   | 4.4           | 111.1         | 1.5           | 37.6 | 1-1/16 | 27.0 |



**DIMENSIONAL DRAWINGS**

Dimensional drawings for all models may be found at [www.UEonline.com](http://www.UEonline.com)

**SENSOR DETAILS****Pressure****TYPES 2, 3, 5 SENSOR****Differential Pressure****TYPE K1-K3\*****TYPES 4, 6, 8 PO-P9****TYPES K4-K6\*****TYPES 7, 9 SENSOR****Temperature****TYPES R1-R4****TYPES P4 & P9 SENSOR ONLY**

*See Options for autoclave types*

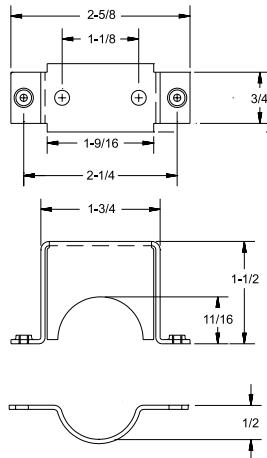
\*Shown with mounting bracket attached

| 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 |

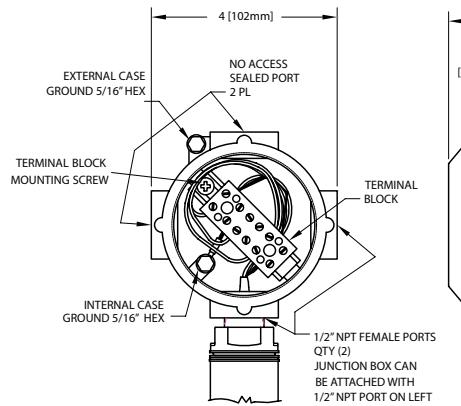
**DIMENSIONAL DRAWINGS**

Dimensional drawings for all models may be found at [www.UEonline.com](http://www.UEonline.com)

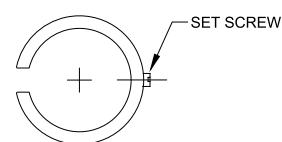
**OPTIONAL MOUNTING  
BRACKET KIT 62169-13**



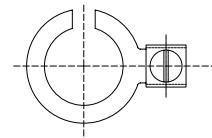
**OPTION M423 JUNCTION BOX**



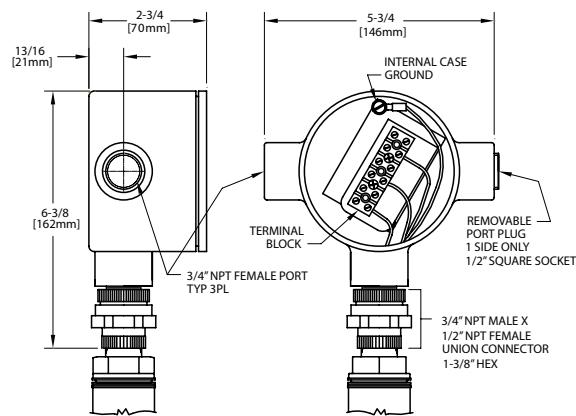
**OPTION M430 COVER LOCK**



**OPTION M460 EXTERNAL  
GROUNDING SCREW**

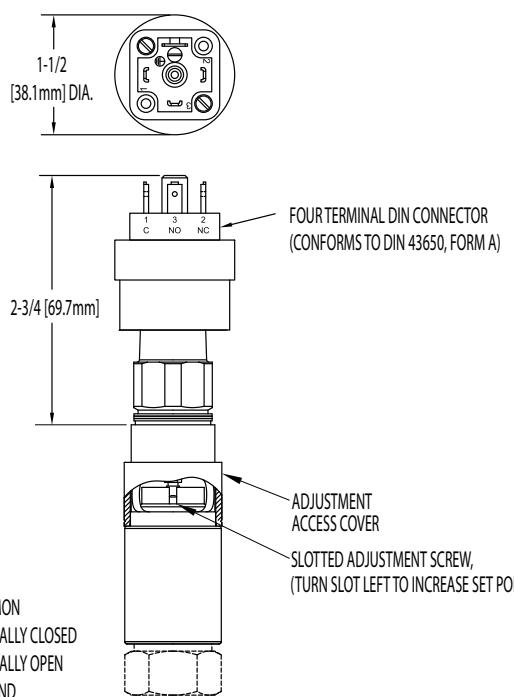


**OPTION M513 JUNCTION BOX**



Junction box meets enclosure type 4 requirements only. Not ATEX compliant (see option M423 for ATEX junction box)

**OPTION M515 DIN CONNECTOR.**



TERMINALS  
#1 COMMON  
#2 NORMALLY CLOSED  
#3 NORMALLY OPEN  
GROUND

Does not meet Div 1 or 2, or ATEX requirements.

## ALTERNATIVE PRODUCTS FROM UE

**TX200 Series Pressure Transmitters for Class I, Div. 1, Zone 1 Areas**

- Welded, hermetically sealed, 316 stainless steel enclosure type 4X/IP66
- Ranges 0 to 15 psi up to 0 to 25,000 psi
- Choice of field adjustable or fixed range models
- 4-20 mA, 1-5 or 0-10 VDC output

**120 Series**

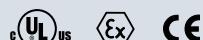
- Explosion-proof line of pressure, differential pressure, and temperature models with wide selection of ranges, sensors and pressure connections
- UL, cUL, ATEX certified for hazardous locations
- Single or dual switch outputs
- Welded stainless steel diaphragm pressure sensor
- Internal or external set point adjustment

**One Series for Division 1 (Zone 1)**

- Electronic pressure and temperature switches with no moving parts
- Fully adjustable deadband and smart self diagnostics
- 4-20 mA output and digital process display
- Explosion-proof enclosure for Division 1 (Zone 1) hazardous areas
- 2-wire, 4-wire and loop powered models available
- Digital display and tamper-proof keypad adjustment of setpoint and deadband

**117 Series**

- Single switch for corrosive and hazardous Division 2 locations
- Compact pressure, differential pressure and temperature models
- Hermetically-sealed SPDT or DPDT output
- Epoxy-coated, weather-tight design houses stainless steel internal construction
- Convenient terminal block wiring

**Temperature Sensors**

Rugged RTDs and thermocouples for process and energy applications, available with Nema 4X and explosion-proof heads to match heat-trace, turbine, combustion, and stack-emission applications



## RECOMMENDED PRACTICES AND WARNINGS

United Electric Controls Company recommends careful consideration of the following factors when specifying and installing UE pressure transmitters. Before installing a unit, the Installation and Maintenance instructions provided with unit must be read and understood.

- To avoid damaging unit, proof pressure and maximum temperature limits stated in literature and on nameplates must never be exceeded, even by surges in the system. Operation of the unit up to maximum pressure or temperature is acceptable on a limited basis (i.e., start-up, testing) but continuous operation must be restricted to the designated adjustable range. Excessive cycling at maximum pressure or temperature limits could reduce sensor life.
- A back-up unit is necessary for applications where damage to a primary unit could endanger life, limb or property. A high or low limit switch is necessary for applications where a dangerous runaway condition could result.
- Install unit where shock, vibration and ambient temperature fluctuations will not damage unit or affect operation. When applicable, orient unit so that moisture does not enter the enclosure via the electrical connection. When appropriate, this entry point should be sealed to prevent moisture entry.
- Unit must not be altered or modified after shipment. Consult UE if modification is necessary.
- Monitor operation to observe warning signs of possible damage to unit, such as drift. Check unit immediately.
- Preventative maintenance and periodic testing is necessary for critical applications where damage could endanger property or personnel.
- Supply voltage stated in literature and on nameplate must not be exceeded. Overload on a transmitter can cause damage, even on the first cycle. Wire unit according to local and national electrical codes, using wire size recommended in installation sheet.
- Do not mount unit in ambient temp. exceeding published limits.

## LIMITED WARRANTY

Seller warrants that the product hereby purchased is, upon delivery, free from defects in material and workmanship and that any such product which is found to be defective in such workmanship or material will be repaired or replaced by Seller (Ex-works, Factory, Watertown, Massachusetts. INCOTERMS); provided, however, that this warranty applies only to equipment found to be so defective within a period of 36 months from the date of manufacture by the Seller. Seller shall not be obligated under this warranty for alleged defects which examination discloses are due to tampering, misuse, neglect, improper storage, and in any case where products are disassembled by anyone other than authorized Seller's representatives. EXCEPT FOR THE LIMITED WARRANTY OF REPAIR AND REPLACEMENT STATED ABOVE, SELLER DISCLAIMS ALL WARRANTIES WHATSOEVER WITH RESPECT TO THE PRODUCT, INCLUDING ALL IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR ANY PARTICULAR PURPOSE.

## LIMITATION OF SELLER'S LIABILITY

SELLER'S LIABILITY TO BUYER FOR ANY LOSS OR CLAIM, INCLUDING LIABILITY INCURRED IN CONNECTION WITH (I) BREACH OF ANY WARRANTY WHATSOEVER, EXPRESSED OR IMPLIED, (II) A BREACH OF CONTRACT, (III) A NEGLIGENT ACT OR ACTS (OR NEGLIGENCE FAILURE TO ACT) COMMITTED BY SELLER, OR (IV) AN ACT FOR WHICH STRICT LIABILITY WILL BE INPUTTED TO SELLER, IS LIMITED TO THE "LIMITED WARRANTY" OF REPAIR AND/OR REPLACEMENT AS SO STATED IN OUR WARRANTY OF PRODUCT. IN NO EVENT SHALL THE SELLER BE LIABLE FOR ANY SPECIAL, INDIRECT, CONSEQUENTIAL OR OTHER DAMAGES OF A LIKE GENERAL NATURE, INCLUDING, WITHOUT LIMITATION, LOSS OF PROFITS OR PRODUCTION, OR LOSS OR EXPENSES OF ANY NATURE INCURRED BY THE BUYER OR ANY THIRD PARTY.

## U.S. SALES OFFICES

United Electric Controls  
31 Old Stage Road  
Hampton Falls, NH 03844  
Phone: 617-899-1132  
email: [northeastsales@ueonline.com](mailto:northeastsales@ueonline.com)

United Electric Controls  
28 N. Wise Ave.  
Freeport, IL 61032  
Phone: 815-341-2588  
email: [midwestsales@ueonline.com](mailto:midwestsales@ueonline.com)

United Electric Controls  
1022 Vineyard Drive  
Conyers, GA 30013  
Phone: 770-335-9802  
email: [southeastsales@ueonline.com](mailto:southeastsales@ueonline.com)

United Electric Controls  
5829 Grazing Court  
Mason, OH 45040  
Phone: 513-535-5486  
email: [midatlanticsales@ueonline.com](mailto:midatlanticsales@ueonline.com)

United Electric Controls  
102 Salazar Court  
Clayton, CA 94517  
Phone: 925-408-5997  
email: [westcoastsales@ueonline.com](mailto:westcoastsales@ueonline.com)

United Electric Controls  
27 Summit Terrace  
Sparta, NJ 07871  
Phone: 973-271-2550  
email: [easternsales@ueonline.com](mailto:easternsales@ueonline.com)

United Electric Controls  
4306 Whickham Drive  
Fulshear, TX 77441  
Phone: 832-457-6138  
email: [southwestsales@ueonline.com](mailto:southwestsales@ueonline.com)

## CANADA

EASTERN  
68 Mosley Crescent  
Brampton, Ontario  
Canada L6Y 5C8  
Phone: 905-455-5131  
FAX: 905-455-5131

## INTERNATIONAL OFFICES

CHINA  
United Electric Controls, *Shanghai*  
Room 1011, 10th Flr,  
Huai Hai Zhonghua Building  
No. 885, Renmin Road, Luwan District  
Shanghai 200010, P.R. China  
Phone: +8621-6255 8059  
email: [chinasales@ueonline.com](mailto:chinasales@ueonline.com)

United Electric Controls, *Beijing*  
Room 1006, Jainhao International Bldg.  
Block D, No. 116  
Zizhuyuanlu, Haidian District  
Beijing, China 100089  
Phone & Fax: +86-10-5893-0551  
email: [beijingsales@ueonline.com](mailto:beijingsales@ueonline.com)

EASTERN EUROPE & SCANDINAVIA  
United Electric Controls  
05-806 Komorow  
Kujawska 5, Poland  
Phone: +48 22 499 4804  
email: [easterneuropeales@ueonline.com](mailto:easterneuropeales@ueonline.com)

GERMANY  
United Electric Controls  
An Der Zentlinde 21  
D-64711 Erbach, Germany  
Phone: 496-062-7400  
email: [europeansales@ueonline.com](mailto:europeansales@ueonline.com)

INDIA  
United Electric Controls  
House no. 7, Kamalkunj Society  
Nizampura,  
Baroda (Gujarat), India  
Phone: +91 (-265) -2788654  
email: [indisales@ueonline.com](mailto:indisales@ueonline.com)

ASIA-PACIFIC  
United Electric Controls, Far East  
No. 1-2-2, 2nd Floor  
Jalan 4/101C  
Cheras Business Centre  
56100 Kuala Lumpur, Malaysia  
Phone: 603-9133-4122  
email: [asiapacific@ueonline.com](mailto:asiapacific@ueonline.com)

MEXICO  
United Electric Controls  
Zacatecas # 206, Suite 20  
Col Guadalupe CP 89120  
Tampico, Tamaulipas Mexico  
Phone: +52 833-217-5201  
email: [latinamericasales@ueonline.com](mailto:latinamericasales@ueonline.com)

RUSSIA  
United Electric Controls, Moscow  
Elninskaya str., 15-140  
Moscow, 121552 Russia  
Phone: +7 (495) 792-88-06  
email: [russiansales@ueonline.com](mailto:russiansales@ueonline.com)



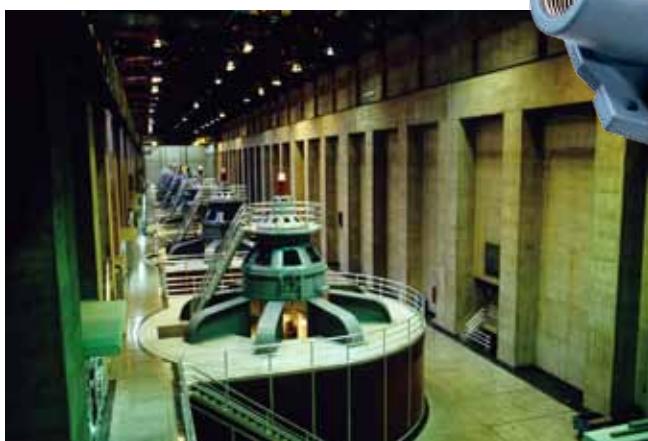
UNITED ELECTRIC  
CONTROLS

180 Dexter Avenue, P.O. Box 9143  
Watertown, MA 02471-9143 USA  
Telephone: 617 926-1000 Fax: 617 926-2568  
<http://www.ueonline.com>

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## EXPLOSION-PROOF PRESSURE, VACUUM, DIFFERENTIAL PRESSURE AND TEMPERATURE SWITCHES



### FEATURES

- Class I, Div. 1 & 2, (Zone 1)  
Class II, Div. 1 & 2  
Class III
- Worldwide approvals and certifications
- Choice of one or two SPDT,  
optional DPDT output
- Dual electrical conduit openings
- Terminal block wiring
- Welded diaphragm or bellows sensor
- Ultra-low pressure ranges



# 120 Series

## OVERVIEW

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 cULus and ATEX standards, UE's 120 Series is the choice where potentially explosive or highly corrosive atmospheres exist. Additionally, the 120 Series is suitable for use within safety instrumented systems (SIS) according to standard IEC 61511-1. Several 120 Series models have a SIL capability of SIL 2 based upon "proven in use" performance.

The 120 Series offers a variety of pressure, vacuum, differential pressure and temperature ranges, as well as port connections, wetted materials and sensor types. With a common flexible platform, 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 production and transmission, and pharmaceuticals.

## FEATURES

- Approvals include cULus and ATEX
- Optional approvals for Russia, Ukraine, China and Australia
- Internal adjustment screw or external adjustment via calibrated dial(s) with tamper resistant cover
- Integral cover lock
- SPDT, DPDT or dual SPDT output
- Wide variety of sensor materials
- Optional Hastelloy® and Monel® sensor material for corrosive media
- Wide adjustable deadband models
- Flush mount sensors
- Stainless steel flanges conforming to ANSI standards
- Heat tracing temperature models
- Most models available for immediate delivery!



## SPECIFICATIONS

|  |  |
|--|--|
| <b>STORAGE TEMPERATURE</b>                           | -65 to 160°F (-54 to 71°C)   |
| <b>AMBIENT TEMPERATURE LIMITS</b>                    | -58 to 160°F (-50 to 71°C); models 36-39, 520-525, 540-548, 701-705, 15834-15839; 0 to 160°F (-17 to 71°C); types 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                                     |
| <b>SET POINT REPEATABILITY</b>                       | Temperature models: Type B, C and F: ±1% of full scale range<br>Type E: ±2% of full scale range  |
| <b>SHOCK</b>   | Pressure models 126-164, S126B-S164B, 171-174, 270-274, 358-376, 520-535, 540-543, 560-564, 701-705, 15622, 15834-15839: ±1% of full scale range; models 450-559: ±1/2% of full scale range; models 36-39, 183-194, 483-494, 544-548, 565-567, 612-680, 15875: ±1-1/2% of full scale range                                     |
| <b>VIBRATION</b>                                     | Set point repeats after 15 G, 10 millisecond duration  |
| <b>ENCLOSURE</b>                                     | Die cast aluminum, epoxy powder coated; gasketed; coverlock; internal set point lock standard on types J, C, F; gasketed stainless steel tamper-resistant dial cover on types B, H, E; aluminum nameplate  |
| <b>ENCLOSURE CLASSIFICATION</b>                      | 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  |
| <b>SWITCH OUTPUT</b>                                 | 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". Two SPDT hermetic sealed switches available on H122P models                                       |
| <b>ELECTRICAL RATING</b>                             | 15A 125/250/480 VAC resistive (standard) except types J120-15622, 15834-15839, H121-15875: 20A 125/250/480 VAC resistive; H122P; 11A 125/250 VAC resistive; B121-13272, B122-13322, E121-13273, E122-13321; 22A 480VAC resistive. Electrical switches have limited DC capabilities. Consult factory for additional information |
| <b>REFERENCE SCALES</b>                              | Types B, E & H: external dial. Scale divisions vary with range (see model charts)  |
| <b>WEIGHT</b>  | 3-8 lbs. Varies with type and model  |
| <b>ELECTRICAL CONNECTION</b>                         | 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  |
| <b>PRESSURE CONNECTION</b>                           | Models S126B-S164B, 171-194, 483-494, 520-535: 1/2" NPT (female); models 560-564: 2" flush mount connection; models 565-567: 1-1/2" flush mount connection; models 540-548: 1/8" NPT (female); all others: 1/4" NPT (female)   |
| <b>TEMPERATURE ASSEMBLY</b>                          | 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. Fill: Model 1BS: solvent filled; models 2BS-8BS: non-toxic oil filled   |
| <b>TEMPERATURE DEADBAND</b>                          | Type F120, 820E, 822E: typically 1%; type 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)  |
| <b>PRESSURE DEADBAND</b>                             | See Individual model charts on pages 5-14  |
| <b>DIFFERENTIAL PRESSURE INDICATOR (OPTION M210)</b> | Differential pressure indication available types H121K and H122K with option M210 (check model availability under options); 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            |
| <b>TEMPERATURE INDICATION</b>                        | Temperature indication available types 820E and 822E. Indication accuracy is ±1% of adjustable range   |



## 120 Series

## AGENCY APPROVALS

**UNITED STATES AND 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 & 698; CSA C22.2  
 No. 25 & 30 - File # E40857  
 Temperature: UL 50 & 698; CSA C22.2  
 No. 25 & 30 - File # E43374

**UKRAINE**

Gosnadzorohrantruda Permit (**OPTIONAL - code M404**)  
 1ExdIICt6X  
 Tamb = -56°C to +85°C (types 120, 121 & 122)  
 Tamb = -40°C to +71°C (types 820 & 822)  
 Certificate # 1867.04.30 - 31.62.4

**CHINA**

CQST Certified (**OPTIONAL - code M408**)  
 Exd IIC T6  
 DIP A21 TA +85°C  
 Tamb. = -40°C to +75°C  
 GB 3836.1, 3836.2 & 12476.1  
 Pressure: Certificate # CNEx 09.2181X  
 Temperature: Certificate # CNEx 09.2180X

**GLOBAL CERTIFICATION\* (INCLUDES AUSTRALIA)**

IECEx Certified (**OPTIONAL - code M403**)  
 Ex d IIC T6  
 Ex tD A21 IP66 T+85°C  
 Tamb. = -40°C to 75°C  
 IEC 60079-0 & 60079-1, 61241-0 & 61241-1  
 Certificate # IECEx UL 03.0001X

\* See <http://www.iecex.com/countries.htm> for a list of participating members.

**EUROPE****ATEX Directive (94/9/EC)**

II 2 G Ex d IIC T6  
 II 2 D Ex tD A21 IP66 T+85°C

Tamb = -40°C to +75°C

UL International DEMKO A/S (N.B.# 0539)  
 Certificate # DEMKO 09 ATEX 0815573X  
 EN 60079-0, 60079-1, 61241-0 & 61241-1

II 1 G EEx ia IIC T6 (**OPTIONAL - code M405**)  
 (not available types 820E, 822E)

Tamb = -50°C to +60°C

UL International DEMKO A/S (N.B.# 0539)  
 Certificate # DEMKO 03 ATEX 0335063  
 EN 50014, 50020 & 50284

**Pressure Equipment Directive (PED) (97/23/EC)**

Compliant to PED

Products rated lower than 7.5 psi are outside the scope of the PED

**Low Voltage Directive (LVD) (73/23/EC & 93/68/EEC)**

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

**RUSSIA****Models 120, 121 and 122**

Gosgortekhnadzor Permit (**OPTIONAL - code M406**)

0ExialICT6

Tamb = -50°C to +60°C

NANIO CCVE Certification Center

Certificate # ROSS US.GB05.Bo2933

GOST R 51330.0, 51330.1, 51330.10 & 51330.14

**Models 120, 121, 122, 820 & 822**

1ExdIICt6X

Tamb = -56°C to +85°C (models 120, 121 & 122)

Tamb = -40°C to +71°C (models 820 & 822)

NANIO CCVE Certification Center

Certificate # ROSS US.GB05.Bo2933

GOST R 51330.0, 51330.1, 51330.10 & 51330.14

## PRESSURE MODEL CHART

## • Type J120, single switch with internal adjustment, dual conduits

| Model   | Adjustable Set Point Range       |                                   | Deadband   |                      | Over Range Pressure* |      | Proof Pressure** |       |
|---|----------------------------------|-----------------------------------|------------|----------------------|----------------------|------|------------------|-------|
|   | Low end of range on fall;<br>"wc | High end of range on rise<br>mbar | "wc        | mbar                 | 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 (other wetted materials available see pg. 16) |                                  |                                   |            |                      |                      |      |                  |       |
| 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                         | 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 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 14,9          | 200                  | 13,8 | 400              | 27,6  |
| Welded 316L stainless steel diaphragm and 1/2" NPT (female) 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                         | 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 (unless noted)                | psi        | mbar (unless noted)  | psi                  | bar  | psi              | bar   |
| 2" sanitary welded 316L stainless steel diaphragm and pressure connection. Mates with Tri-Clamp® fitting systems, (not UE supplied)   |                                  |                                   |            |                      |                      |      |                  |       |
| 560   | 0,5 to 15                        | 34,5 mbar to 1,0 bar              | 0,1 to 1   | 6,9 to 68,9          | 200                  | 13,8 | 300              | 20,7  |
| 561   | 1 to 25                          | 68,9 mbar to 1,7 bar              | 0,1 to 1,5 | 6,9 to 103,4         | 200                  | 13,8 | 300              | 20,7  |
| 562   | 2 to 50                          | 0,1 to 3,4                        | 0,1 to 2,5 | 6,9 to 172,4         | 200                  | 13,8 | 300              | 20,7  |
| 563   | 4 to 100                         | 0,3 to 6,9                        | 0,1 to 4   | 6,9 to 275,8         | 200                  | 13,8 | 300              | 20,7  |
| 564   | 8 to 200                         | 0,6 to 13,8                       | 0,1 to 5   | 6,9 to 344,7         | 200                  | 13,8 | 300              | 20,7  |
| 1.5" sanitary welded 316L stainless steel diaphragm and pressure connection. Mates with Tri-Clamp® fitting systems, (not UE supplied)   |                                  |                                   |            |                      |                      |      |                  |       |
| 565   | 5 to 30                          | 0,3 to 2,1                        | 1 to 5     | 68,9 mbar to 0,3 bar | 1000                 | 68,9 | 1500             | 103,4 |
| 566   | 10 to 100                        | 0,7 to 6,9                        | 1 to 12    | 68,9 mbar to 0,8 bar | 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 |
| Welded 316L stainless steel diaphragm and 1/2" NPT (female) pressure connection, large 0.72" orifice for clean-out purposes (NACE MR-0175 compliant)                                    |                                  |                                   |            |                      |                      |      |                  |       |
| 171   | 1 to 20                          | 68,9 mbar to 1,4 bar              | 0,1 to 1   | 6,9 to 68,9          | 500                  | 34,5 | 1000             | 68,9  |
| 172   | 2 to 50                          | 0,1 to 3,4                        | 0,1 to 1,5 | 6,9 to 103,4         | 500                  | 34,5 | 1000             | 68,9  |
| 173   | 4 to 100                         | 0,3 to 6,9                        | 0,1 to 2,5 | 6,9 to 172,4         | 500                  | 34,5 | 1000             | 68,9  |
| 174   | 8 to 200                         | 0,6 to 13,8                       | 0,1 to 3,5 | 6,9 to 241,3         | 500                  | 34,5 | 1000             | 68,9  |

**Application Note:** 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 might exceed 26 " Hg Vac

**\*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)

## 120 Series

## PRESSURE MODEL CHART

## • Type J120, single switch with internal adjustment, dual conduits (cont.)

| Model | Adjustable Set Point Range                         |   | Deadband              |                       | Over Range Pressure*  |                       | Proof Pressure** |     |
|-------|--|---|-----------------------|-----------------------|-----------------------|-----------------------|------------------|-----|
|       | Low end of range on fall;<br>psi<br>(unless noted) | High end of range on rise;<br>bar<br>(unless noted) | psi<br>(unless noted) | bar<br>(unless noted) | psi<br>(unless noted) | bar<br>(unless noted) | psi              | bar |

316L stainless steel diaphragm (optional Hastelloy® C or Monel®); Viton® GLT O-Ring (optional Kalrez®, Silicone, Ethylene Propylene or Aflas®); 316 stainless steel 1/2" NPT (female) pressure connection (optional Hastelloy® C or Monel®), 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     | 0,1 to 1,4    | 0,3 to 2,5 | 20,7 to 172,4 mbar | 500  | 34,5  | 1000 | 68,9  |
| 184 | 2 to 50     | 0,1 to 3,4    | 0,3 to 3   | 20,7 to 206,8 mbar | 500  | 34,5  | 1000 | 68,9  |
| 185 | 4 to 100    | 0,3 to 6,9    | 0,5 to 6   | 34,5 to 413,7 mbar | 500  | 34,5  | 1000 | 68,9  |
| 186 | 8 to 200    | 0,6 to 13,8   | 1 to 11    | 0,1 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 | 17,2 to 241,3 | 50 to 300  | 3,4 to 20,7        | 4000 | 275,8 | 7000 | 482,6 |

316L stainless steel diaphragm (optional Hastelloy® C or Monel®); Viton® GLT O-Ring (optional Kalrez®, Silicone, Ethylene Propylene or Aflas®); 316 stainless steel 1/2" NPT (female) pressure connection (optional Hastelloy® C or Monel®), 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     | 0,1 to 1,4    | 0,3 to 2,5 | 20,7 to 172,4 mbar | 500  | 34,5  | 1000 | 68,9  |
| 484 | 2 to 50     | 0,1 to 3,4    | 0,3 to 3   | 20,7 to 206,8 mbar | 500  | 34,5  | 1000 | 68,9  |
| 485 | 4 to 100    | 0,3 to 6,9    | 0,5 to 6   | 34,5 to 413,7 mbar | 500  | 34,5  | 1000 | 68,9  |
| 486 | 8 to 200    | 0,6 to 13,8   | 1 to 11    | 0,1 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 |

Welded 316L stainless steel bellows and 1/2" NPT (female) pressure connection

|       |                      |                      |                |                   |        |            |     |      |
|-------|----------------------|----------------------|----------------|-------------------|--------|------------|-----|------|
| S126B | 30 to 3 "Hg Vac      | -1 to -0,1           | 0,2 to 0,6 "Hg | 6,8 to 20,3 mbar  | 80 "wc | 199,1 mbar | 5   | 0,3  |
| S134B | 30 "Hg Vac to 20 psi | -1 to 1,4            | 0,2 to 0,6 "Hg | 6,8 to 20,3 mbar  | 20     | 1,4        | 25  | 1,7  |
| S137B | 15 to 80 "wc         | 37,3 to 199,1 mbar   | 2 to 6 "wc     | 5,0 to 14,9 mbar  | 80 "wc | 199,1 mbar | 5   | 0,3  |
| S144B | 0,5 to 20            | 34,5 mbar to 1,4 bar | 0,1 to 0,3     | 6,9 to 20,7 mbar  | 20     | 1,4        | 25  | 1,7  |
| S152B | 1 to 50              | 0,1 to 3,4           | 0,1 to 0,5     | 6,9 to 34,5 mbar  | 50     | 3,4        | 75  | 5,2  |
| S156B | 2 to 100             | 0,1 to 6,9           | 0,2 to 0,6     | 13,8 to 41,4 mbar | 100    | 6,9        | 125 | 8,6  |
| S164B | 4 to 200             | 0,3 to 13,8          | 0,2 to 1       | 13,8 to 68,9 mbar | 200    | 13,8       | 200 | 13,8 |

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Monel® is a registered trademark of the Special Metals Corporation

Tri-Clover and Tri-Clamp® is a registered trademark of Alfa Laval

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## PRESSURE MODEL CHART

## • Type J120, single switch with internal adjustment, dual conduits (cont.)

| Model | Adjustable Set Point Range                             |     | Deadband             |     |                    |     | Over Range Pressure* |     | Proof Pressure** |     |
|-------|--|-----|----------------------|-----|--------------------|-----|----------------------|-----|------------------|-----|
|       | Low end of range on fall;<br>High end of range on rise |     | Lower 75% range span |     | Top 25% range span |     |                      |     |                  |     |
|       | psi  | bar | psi                  | bar | psi                | bar | psi                  | bar | psi              | bar |

Welded 316 stainless steel diaphragm and 1/2" NPT (female) pressure connection, large 0.72" orifice for clean-out purposes (NACE MR-0175 compliant, except model 194)

|     |            |              |          |            |         |      |      |       |      |       |
|-----|------------|--------------|----------|------------|---------|------|------|-------|------|-------|
| 190 | 5 to 30    | 0,3 to 2,1   | 1 to 3   | 0,1 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   | 0,1 to 0,6 | 15 max  | 1,0  | 1500 | 103,4 | 2500 | 172,4 |
| 192 | 15 to 300  | 1,0 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 and 1/2" NPT (female) pressure connection, 0.06" orifice to dampen pulsations

|     |            |              |          |            |         |      |      |       |      |       |
|-----|------------|--------------|----------|------------|---------|------|------|-------|------|-------|
| 490 | 5 to 30    | 0,3 to 2,1   | 1 to 3   | 0,1 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   | 0,1 to 0,6 | 15 max  | 1,0  | 1500 | 103,4 | 2500 | 172,4 |
| 492 | 15 to 300  | 1,0 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** |     |
|-------|--|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|----------------------|-----|------------------|-----|
|       | Low end of range on fall;<br>High end of range on rise |                       |                       |                       |                       |                       |                      |     |                  |     |
|       | psi<br>(unless noted)                                  | bar<br>(unless noted) | psi<br>(unless noted) | bar<br>(unless noted) | psi<br>(unless noted) | bar<br>(unless noted) | psi                  | bar | psi              | bar |

Brass bellows with nickel-plated brass 1/4" NPT (female) pressure connection; models 126 & 134 have zinc-plated steel spring which is exposed to media

|     |                      |                      |                |                   |        |            |     |      |
|-----|----------------------|----------------------|----------------|-------------------|--------|------------|-----|------|
| 126 | 30 to 3 "Hg Vac      | -1 to -0,1           | 0,2 to 0,6 "Hg | 6,8 to 20,3 mbar  | 80 "wc | 199,1 mbar | 5   | 0,3  |
| 134 | 30 "Hg Vac to 20 psi | -1 to 1,4            | 0,2 to 0,6 "Hg | 6,8 to 20,3 mbar  | 20     | 1,4        | 25  | 1,7  |
| 137 | 15 to 80 "wc         | 37,3 to 199,1 mbar   | 2 to 6 "wc     | 5,0 to 14,9 mbar  | 80 "wc | 199,1 mbar | 5   | 0,3  |
| 144 | 0,5 to 20            | 34,5 mbar to 1,4 bar | 0,1 to 0,3     | 6,9 to 20,7 mbar  | 20     | 1,4        | 25  | 1,7  |
| 152 | 1 to 50              | 0,1 to 3,4           | 0,1 to 0,5     | 6,9 to 34,5 mbar  | 50     | 3,4        | 75  | 5,2  |
| 156 | 2 to 100             | 0,1 to 6,9           | 0,2 to 0,6     | 13,8 to 41,4 mbar | 100    | 6,9        | 125 | 8,6  |
| 164 | 4 to 200             | 0,3 to 13,8          | 0,2 to 1       | 13,8 to 68,9 mbar | 200    | 13,8       | 200 | 13,8 |

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 | 48,3 to 124,1 mbar | 100 | 6,9  | 800 | 55,2 |
| 358 | 15 to 200 | 1,0 to 13,8 | 1 to 3     | 0,1 to 0,2         | 200 | 13,8 | 800 | 55,2 |
| 361 | 20 to 300 | 1,4 to 20,7 | 1 to 4     | 0,1 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 |

Phosphor bronze bellows with nickel-plated brass 1/4" NPT (female) pressure connection

|     |          |             |        |            |     |      |     |      |
|-----|----------|-------------|--------|------------|-----|------|-----|------|
| 270 | 4 to 200 | 0,3 to 13,8 | 1 to 4 | 0,1 to 0,3 | 200 | 13,8 | 250 | 17,2 |
| 274 | 6 to 300 | 0,4 to 20,7 | 1 to 5 | 0,1 to 0,3 | 300 | 20,7 | 350 | 24,1 |

\*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).

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.

## 120 Series

## PRESSURE MODEL CHART

## • Type J120, single switch with internal adjustment, dual conduits (cont.)

| Model  | Adjustable Set Point Range                         |   | Deadband              |                       | Over Range Pressure*  |                       | Proof Pressure**      |                       |
|--|--|---|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
|  | Low end of range on fall;<br>psi<br>(unless noted) | High end of range on rise;<br>bar<br>(unless noted) | psi<br>(unless noted) | bar<br>(unless noted) | psi<br>(unless noted) | bar<br>(unless noted) | psi<br>(unless noted) | bar<br>(unless noted) |
| 303 stainless steel piston with Buna N O-Ring and 303 stainless steel 1/4" NPT (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 3000  | 8,6 to 206,8  | 40 to 250             | 2,8 to 17,2           | 6000                  | 413,7                 | 10000                 | 689,5                 |
| 616  | 700 to 5000  | 48,3 to 344,7                                       | 40 to 375             | 2,8 to 25,9           | 6000                  | 413,7                 | 10000                 | 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 nickel-plated brass 1/4" NPT (female) pressure connection; Optional Viton diaphragm and O-Ring available  |  |   |                       |                       |                       |                       |                       |                       |
| 701  | 1,5 to 30  | 103,4 mbar to 2,1 bar                               | 1 to 2                | 68,9 mbar to 0,1 bar  | 500                   | 34,5                  | 1000                  | 68,9                  |
| 702  | 3 to 100   | 0,2 to 6,9  | 1 to 4                | 68,9 to 0,3 bar       | 500                   | 34,5                  | 1000                  | 68,9                  |
| 703  | 9 to 300   | 0,6 to 20,7   | 1 to 5                | 68,9 to 0,3 bar       | 500                   | 34,5                  | 1000                  | 68,9                  |
| 704  | 15 to 500  | 1,0 to 34,5   | 2 to 8                | 0,1 to 0,6            | 1500                  | 103,4                 | 2500                  | 172,4                 |
| 705  | 30 to 1000   | 2,1 to 68,9   | 3 to 20               | 0,2 to 1,4            | 1500                  | 103,4                 | 2500                  | 172,4                 |
| Buna N diaphragm and O-Ring with 1/4" NPT (female) aluminum connection and cap   |  |   |                       |                       |                       |                       |                       |                       |
| 450  | 30 "Hg Vac to 3 "Hg Vac                            | -1 to -0,1  | 0,1 to 0,3 "Hg        | 3,4 to 10,2 mbar      | 80 "wc                | 199,1 mbar            | 225                   | 15,5                  |
| 451  | 2 to 80 "wc  | 5 to 199,1 mbar                                     | 0,8 to 2 "wc          | 2 to 5 mbar           | 80 "wc                | 199,1 mbar            | 225                   | 15,5                  |
| 452  | 30 "Hg Vac to 20 psi                               | -1,0 to 1,4   | 0,1 to 0,4 "Hg        | 3,4 to 13,5 mbar      | 20                    | 1,4                   | 225                   | 15,5                  |
| 453  | 0,5 to 20  | 34,5 mbar to 1,4 bar                                | 0,05 to 0,1           | 3,4 to 6,9 mbar       | 20                    | 1,4                   | 225                   | 15,5                  |
| 454  | 0,8 to 30  | 55,2 mbar to 2,1 bar                                | 0,05 to 0,2           | 3,4 to 13,8 mbar      | 30                    | 2,1                   | 225                   | 15,5                  |
| Teflon® diaphragm and O-Ring 316 stainless steel with 1/4" NPT (female) 316 stainless steel pressure connection and cap  |  |   |                       |                       |                       |                       |                       |                       |
| 550  | 30 "Hg Vac to 3 "Hg Vac                            | -1 to -0,1  | 0,1 to 0,4 "Hg        | 3,4 to 13,5 mbar      | 80 "wc                | 199,1 mbar            | 225                   | 15,5                  |
| 551  | 2 to 80 "wc  | 5 to 199,1 mbar                                     | 1 to 4 "wc            | 2,5 to 10 mbar        | 80 "wc                | 199,1 mbar            | 225                   | 15,5                  |
| 552  | 30 "Hg Vac to 20 psi                               | -1,0 to 1,4   | 0,2 to 0,5 "Hg        | 6,8 to 16,9 mbar      | 20                    | 1,4                   | 225                   | 15,5                  |
| 553  | 0,5 to 20  | 34,5 mbar to 1,4 bar                                | 0,1 to 0,2            | 6,9 to 13,8 mbar      | 20                    | 1,4                   | 225                   | 15,5                  |
| 554  | 0,8 to 30  | 55,2 mbar to 2,1 bar                                | 0,1 to 0,3            | 6,9 to 20,7 mbar      | 30                    | 2,1                   | 225                   | 15,5                  |
| 555  | 2 to 100   | 0,1 to 6,9  | 0,2 to 0,4            | 13,8 to 27,6 mbar     | 100                   | 6,9                   | 225                   | 15,5                  |

\*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 MODEL CHART

- Type J120, single switch with internal adjustment, dual conduits with adjustable deadband micro-switch

| Model  | Adjustable Set Point Range  |              | Adjustable Deadband   |            |                  |            | Over Range Pressure*  |            | Proof Pressure**      |       |      |       |
|--|---|--------------|-----------------------|------------|------------------|------------|-----------------------|------------|-----------------------|-------|------|-------|
|  | Low end of range on fall;<br>High end of range on rise<br>psi<br>(unless noted) |              | psi<br>(unless noted) |            | bar              |            | psi<br>(unless noted) |            | bar<br>(unless noted) |       |      |       |
| Viton® diaphragm and O-ring with 1/4" NPT (female) 303 stainless steel pressure connection |   |              |                       |            |                  |            |                       |            |                       |       |      |       |
| 15622  | 20 to 200   | 1,4 to 13,8  |                       | 12 to 26   | 0,8 to 1,8       |            |                       | 500        | 34,5                  | 1000  | 68,9 |       |
|  | psi   | bar          | Low end<br>psi        | bar        | Mid Range<br>psi | bar        | High End<br>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   | 0,2 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  | 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 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  | 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                  | 137,9 | 2500 | 172,4 |

- H121, single switch with external adjustment via reference dial, single conduit with adjustable deadband micro-switch

| Model   | Adjustable Set Point Range  |               | Adjustable Deadband |              |                  |              | Proof Pressure** |              | Dial Divisions |       |     |
|---|---|---------------|---------------------|--------------|------------------|--------------|------------------|--------------|----------------|-------|-----|
|   | Low end of range on fall;<br>High end of range on rise<br>psi<br>(unless noted) |               | Low end<br>psi      |              | Mid Range<br>psi |              | High End<br>psi  |              | psi            |       |     |
| 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 <sup>†</sup>  | 500 to 6000   | 34,5 to 413,7 | 150 to 400          | 10,3 to 27,6 | 250 to 500       | 17,2 to 34,5 | 450 to 750       | 31,0 to 51,7 | 10,000         | 689,5 | 100 |

\*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)

<sup>†</sup>Not available on type H122

## 120 Series

## PRESSURE MODEL CHART

- 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        |
|--|--|--|-----------------------|-----------------------|------------------|-------|-----------------------|
|  | Low end of range on fall;<br>psi<br>(unless noted) | High end of range on rise<br>bar<br>(unless noted) | psi<br>(unless noted) | bar<br>(unless noted) | psi              | bar   | psi<br>(unless noted) |
| Welded 316L stainless steel bellows and 1/2" NPT (female) pressure connection  |  |  |                       |                       |                  |       |                       |
| S126B  | 30 "Hg Vac to 0 psi                                | -1 to 0  | 0.2 to 0.9 "Hg        | 6,8 to 30,5 mbar      | 5                | 0,3   | 0.5 "Hg               |
| S134B  | 30 "Hg Vac to 20 psi                               | -1 to 1,4  | 0.2 to 1.2 "Hg        | 6,8 to 40,6 mbar      | 25               | 1,7   | 1 "Hg & 0.5 psi       |
| S137B†   | 2 to 80 "wc  | 5 to 199,1 mbar                                    | 2 to 10 "wc           | 5 to 24,9 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               | 2,8   | 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 137,9 mbar    | 200              | 13,8  | 5                     |
| Brass bellows with nickel-plated brass 1/4" NPT (female) pressure connection; models 126 & 134 have a zinc-plated steel spring which is exposed to media   |  |  |                       |                       |                  |       |                       |
| 126  | 30 "Hg Vac to 0 psi                                | -1 to 0  | 0.2 to 0.9 "Hg        | 6,8 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        | 6,8 to 40,6 mbar      | 25               | 1,7   | 1 "Hg & 0.5 psi       |
| 137†   | 2 to 80 "wc  | 5 to 199,1 mbar                                    | 2 to 10 "wc           | 5 to 24,9 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              | 20,7 to 137,9 mbar    | 200              | 13,8  | 5                     |
| 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 with Buna N O-Ring and 303 stainless steel 1/4" NPT (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 206,8                                      | 40 to 250             | 2,8 to 17,2           | 10,000           | 689,5 | 50                    |
| 614  | 500 to 6000  | 34,5 to 413,7                                      | 50 to 400             | 3,4 to 27,6           | 10,000           | 689,5 | 100                   |

\*\***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)

†Not available on type H122

## PRESSURE MODEL CHART

- 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        |
|--|--|----------------------------------|-----------------------|-----------------------|------------------|-------|-----------------------|
|  | Low end of range on fall;<br>psi<br>(unless noted) | High end of range on rise<br>bar | psi<br>(unless noted) | bar<br>(unless noted) | psi              | bar   | psi<br>(unless noted) |
| Phosphor bronze bellows with nickel-plated brass 1/4" NPT (female) 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 aluminum 1/4" NPT (female) pressure connection and cap  |  |                                  |                       |                       |                  |       |                       |
| 450  | 30 "Hg Vac to 0 psi                                | -1 to 0                          | 0.1 to 0.4 "Hg        | 3,4 to 13,5 mbar      | 225              | 15,5  | 0.5 "Hg               |
| 452  | 30 "Hg Vac to 20 psi                               | -1 to 1,4                        | 0.1 to 1 "Hg          | 3,4 to 33,9 mbar      | 225              | 15,5  | 1 "Hg & 0.5 psi       |
| 453  | 0 to 20  | 0 to 1,4                         | 0.05 to 0.2           | 3,4 to 13,8 mbar      | 225              | 15,5  | 0.5                   |
| 454  | 0 to 30  | 0 to 2,1                         | 0.05 to 0.3           | 3,4 to 20,7 mbar      | 225              | 15,5  | 0.5                   |
| Teflon® diaphragm and O-Ring with 316 stainless steel 1/4" NPT (female) pressure connection and cap  |  |                                  |                       |                       |                  |       |                       |
| 550  | 30 "Hg Vac to 0 psi                                | -1 to 0,                         | 0.1 to 0.6 "Hg        | 3,4 to 20,3 mbar      | 225              | 15,5  | 0.5 "Hg               |
| 552  | 30 "Hg Vac to 20 psi                               | -1 to 1,4                        | 0.2 to 1 "Hg          | 6,8 to 33,9 mbar      | 225              | 15,5  | 1 "Hg & 0.5 psi       |
| 553  | 0 to 20  | 0 to 1,4                         | 0.05 to 0.3           | 3,4 to 20,7 mbar      | 225              | 15,5  | 0.5                   |
| 554  | 0 to 30  | 0 to 2,1                         | 0.1 to 0.4            | 6,9 to 27,6 mbar      | 225              | 15,5  | 0.5                   |
| 555  | 0 to 100   | 0 to 6,9                         | 0.25 to 0.75          | 17,2 to 51,7 mbar     | 225              | 15,5  | 2                     |
| Buna N diaphragm and O-Ring with nickel-plated brass 1/4" NPT (female) pressure connection; Optional Viton diaphragm and O-Ring available (models 701-703) |  |                                  |                       |                       |                  |       |                       |
| 701†   | 3 to 30  | 0,2 to 2,1                       | 1 to 3                | 0,1 to 0,2            | 1000             | 68,9  | 0.5                   |
| 702  | 10 to 100  | 0,7 to 6,9                       | 1 to 5                | 0,1 to 0,3            | 1000             | 68,9  | 2                     |
| 703  | 30 to 300  | 2,1 to 20,7                      | 2 to 7                | 0,1 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. The unit may require calibration (e.g. start-up, testing)

†Not available on type H122



## 120 Series

## PRESSURE MODEL CHART

- Type H122P\*, two hermetically sealed single switches with external adjustment via reference dial, single conduit**

| Model  | Adjustable Set Point Range  | Deadband              |                       | Proof Pressure**       |        | Dial Divisions |                       |
|--|---|-----------------------|-----------------------|------------------------|--------|----------------|-----------------------|
|  | Low end of range on fall;<br>High end of range on rise<br>psi<br>(unless noted) | bar<br>(unless noted) | psi<br>(unless noted) | mbar<br>(unless noted) | psi    | bar            | psi<br>(unless noted) |
| Welded 316L stainless steel bellows and 1/2" NPT (female) pressure connection  |   |                       |                       |                        |        |                |                       |
| S126B  | 30 "Hg Vac to 0 psi   | -1 to 0               | 0.7 to 4 "Hg          | 23,7 to 135,4          | 5      | 0,3            | 0.5 "Hg               |
| S134B  | 30 "Hg Vac to 20 psi  | -1 to 1,4             | 1 to 6 "Hg            | 33,9 to 203,2          | 25     | 1,7            | 1 "Hg & 0.5 psi       |
| S144B  | 0 to 20   | 0 to 1,4              | 0.3 to 3              | 20,7 to 206,8          | 25     | 1,7            | 0.5                   |
| S146B  | 0 to 30   | 0 to 2,1              | 0.4 to 4              | 27,6 to 275,8          | 40     | 2,8            | 0.5                   |
| S156B  | 0 to 100  | 0 to 6,9              | 0.6 to 6              | 40,4 to 413,7          | 125    | 8,6            | 2                     |
| S164B  | 0 to 200  | 0 to 13,8             | 1.5 to 13             | 0,1 to 0,9 bar         | 200    | 13,8           | 5                     |
| Brass bellows with nickel-plated brass 1/4" NPT (female) pressure connection; models 126 & 134 have a zinc-plated steel spring which is exposed to media   |   |                       |                       |                        |        |                |                       |
| 126  | 30 "Hg Vac to 0 psi   | -1 to 0               | 0.7 to 4 "Hg          | 23,7 to 135,4          | 5      | 0,3            | 0.5 "Hg               |
| 134  | 30 "Hg Vac to 20 psi  | -1 to 1,4             | 1 to 6 "Hg            | 33,9 to 203,2          | 25     | 1,7            | 1 "Hg & 0.5 psi       |
| 144  | 0 to 20   | 0 to 1,4              | 0.3 to 3              | 20,7 to 206,8          | 25     | 1,7            | 0.5                   |
| 146  | 0 to 30   | 0 to 2,1              | 0.4 to 4              | 27,6 to 275,8          | 40     | 2,8            | 0.5                   |
| 156  | 0 to 100  | 0 to 6,9              | 0.6 to 6              | 40,4 to 413,7          | 125    | 8,6            | 2                     |
| 164  | 0 to 200  | 0 to 13,8             | 1.5 to 13             | 0,1 to 0,9 bar         | 200    | 13,8           | 5                     |
| Phosphor bronze bellows with nickel-plated brass 1/4" NPT (female) pressure connection   |   |                       |                       |                        |        |                |                       |
| 270  | 0 to 200  | 0 to 13,8             | 6 to 30               | 0,4 to 2,1 bar         | 250    | 17,2           | 5                     |
| 274  | 0 to 300  | 0 to 20,7             | 8 to 40               | 0,6 to 2,8 bar         | 350    | 24,1           | 10                    |
| 316L stainless steel bellows and 1/4" NPT (female) pressure connection   |   |                       |                       |                        |        |                |                       |
| 358  | 0 to 200  | 0 to 13,8             | 6 to 30               | 0,4 to 2,1 bar         | 250    | 17,2           | 5                     |
| 361  | 0 to 300  | 0 to 20,7             | 8 to 40               | 0,6 to 2,8 bar         | 350    | 24,1           | 10                    |
| 376  | 0 to 500  | 0 to 34,5             | 10 to 60              | 0,7 to 4,1 bar         | 575    | 39,6           | 10                    |
| Buna N diaphragm and O-Ring with aluminum 1/4" NPT (female) pressure connection and cap  |   |                       |                       |                        |        |                |                       |
| 450  | 30 "Hg Vac to 0 psi   | -1 to 0               | 0.4 to 3 "Hg          | 13,5 to 101,6          | 225    | 15,5           | 0.5 "Hg               |
| 452  | 30 "Hg Vac to 20 psi  | -1 to 1,4             | 0.8 to 6 "Hg          | 27,1 to 203,2          | 225    | 15,5           | 1 "Hg & 0.5 psi       |
| 453  | 0 to 20   | 0 to 1,4              | 0.2 to 2              | 13,8 to 137,9          | 225    | 15,5           | 0.5                   |
| 454  | 0 to 30   | 0 to 2,1              | 0.3 to 3              | 20,7 to 206,8          | 225    | 15,5           | 0.5                   |
| Teflon® diaphragm and O-Ring with stainless steel 1/4" NPT (female) 316 pressure connection and cap  |   |                       |                       |                        |        |                |                       |
| 550  | 30 "Hg Vac to 0 psi   | -1 to 0,              | 0.4 to 3 "Hg          | 13,5 to 101,6          | 225    | 15,5           | 0.5 "Hg               |
| 552  | 30 "Hg Vac to 20 psi  | -1 to 1,4             | 0.8 to 6 "Hg          | 27,1 to 203,2          | 225    | 15,5           | 1 "Hg & 0.5 psi       |
| 553  | 0 to 20   | 0 to 1,4              | 0.2 to 2              | 13,8 to 137,9          | 225    | 15,5           | 0.5                   |
| 554  | 0 to 30   | 0 to 2,1              | 0.3 to 3              | 20,7 to 206,8          | 225    | 15,5           | 0.5                   |
| 555  | 0 to 100  | 0 to 6,9              | 0.7 to 7              | 48,3 to 482,6          | 225    | 15,5           | 2                     |
| 303 stainless steel piston with Buna N O-Ring and 303 stainless steel 1/4" NPT (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 206,8         | 150 to 450            | 10,3 to 31 bar         | 10,000 | 689,5          | 50                    |
| 614  | 500 to 6000   | 34,5 to 413,7         | 200 to 500            | 13,8 to 34,5 bar       | 10,000 | 689,5          | 100                   |

\* Please note: Must specify option code 1180 with all models (i.e. H122P-270-1180)

## DIFFERENTIAL PRESSURE MODEL CHART

- Type J120K, single switch with internal adjustment, dual conduits

| Model   | Adjustable Set Point Range                             |                    | Deadband               |                       | Working Pressure***   |                       | Proof Pressure**      |                   |
|---|--|--------------------|------------------------|-----------------------|-----------------------|-----------------------|-----------------------|-------------------|
|   | Low end of range on fall;<br>High end of range on rise |                    | psid<br>(unless noted) | bar<br>(unless noted) | psi<br>(unless noted) | bar<br>(unless noted) | psi<br>(unless noted) | bar<br>psi<br>bar |
| Welded 316L stainless steel bellows and 1/2" NPT (female) pressure connections                    |  |                    |                        |                       |                       |                       |                       |                   |
| S147B   | 3 to 30  | 0,2 to 2,1         | 0,3 to 1,5             | 20,7 to 103,4 mbar    | 30 "Hg Vac to 100     | -1 to 6,9             | 300                   | 20,7              |
| S157B   | 10 to 100  | 0,7 to 6,9         | 0,5 to 2               | 34,5 to 137,9 mbar    | 30 "Hg Vac to 180     | -1 to 12,4            | 300                   | 20,7              |
| Welded brass bellows with nickel-plated brass 1/4" NPT (female) pressure connections              |  |                    |                        |                       |                       |                       |                       |                   |
| 147   | 3 to 30  | 0,2 to 2,1         | 0,3 to 1,5             | 20,7 to 103,4 mbar    | 30 "Hg Vac to 100     | -1 to 6,9             | 180                   | 12,4              |
| 157   | 10 to 100  | 0,7 to 6,9         | 0,5 to 2               | 34,5 to 137,9 mbar    | 30 "Hg Vac to 150     | -1 to 10,3            | 180                   | 12,4              |
| Welded 316L stainless steel bellows and 1/4" NPT (female) pressure connections                    |  |                    |                        |                       |                       |                       |                       |                   |
| 367   | 10 to 100  | 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 303 stainless steel 1/4" NPT (female) pressure connections       |  |                    |                        |                       |                       |                       |                       |                   |
| 36  | 3 to 30  | 0,2 to 2,1         | 1 to 5                 | 0,1 to 0,3            | 0 to 350              | 0 to 24,1             | 1000                  | 68,9              |
| 37  | 10 to 100  | 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  | 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  | 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 aluminum 1/4" NPT (female) pressure connections                  |  |                    |                        |                       |                       |                       |                       |                   |
| 455   | 5 to 80 "wcd   | 12,4 to 199,1 mbar | 1 to 4 "wc             | 2,5 to 10 mbar        | 30 "Hg Vac to 225     | -1 to 15,5            | 225                   | 15,5              |
| 456   | 2 to 20  | 0,1 to 1,4         | 0,1 to 0,3             | 6,9 to 20,7 mbar      | 30 "Hg Vac to 225     | -1 to 15,5            | 225                   | 15,5              |
| 457   | 3 to 30  | 0,2 to 2,1         | 0,1 to 0,4             | 6,9 to 27,6 mbar      | 30 "Hg Vac to 225     | -1 to 15,5            | 225                   | 15,5              |
| Teflon® and Buna N diaphragms, Buna N O-Ring with aluminum 1/4" NPT (female) pressure connections |  |                    |                        |                       |                       |                       |                       |                   |
| 559   | 10 to 100  | 0,7 to 6,9         | 0,2 to 1               | 13,8 to 68,9 mbar     | 30 "Hg Vac to 225     | -1 to 15,5            | 225                   | 15,5              |
| Buna N diaphragm and sealing diaphragms with 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 mbar       | 30 "Hg to 200         | -1 to 13,8            | 400                   | 27,6              |
| 541   | 1 to 20 "wcd   | 2,5 to 49,8 mbar   | 0,1 to 1,0 "wc         | 0,2 to 2,5 mbar       | 30 "Hg to 200         | -1 to 13,8            | 400                   | 27,6              |
| 542   | 5 to 50 "wcd   | 12,4 to 124,5 mbar | 0,2 to 2,5 "wc         | 0,5 to 6,2 mbar       | 30 "Hg to 200         | -1 to 13,8            | 400                   | 27,6              |
| 543   | 10 to 200 "wcd   | 24,9 to 497,8 mbar | 0,5 to 8 "wc           | 1,2 to 19,9 mbar      | 30 "Hg to 200         | -1 to 13,8            | 400                   | 27,6              |
| 544   | 2 to 20  | 0,1 to 1,4         | 0,1 to 1,3             | 6,9 to 89,6 mbar      | 30 "Hg to 1200        | -1 to 82,7            | 2500                  | 172,4             |
| 545   | 5 to 50  | 0,3 to 3,4         | 0,2 to 2,2             | 13,8 mbar to 0,1 bar  | 30 "Hg to 1200        | -1 to 82,7            | 2500                  | 172,4             |
| 546   | 10 to 125  | 0,7 to 8,6         | 0,4 to 5,0             | 27,6 mbar to 0,3 bar  | 30 "Hg to 1200        | -1 to 82,7            | 2500                  | 172,4             |
| 547   | 50 to 250  | 3,4 to 17,2        | 0,8 to 10              | 0,1 to 0,7            | 30 "Hg to 1200        | -1 to 82,7            | 2500                  | 172,4             |
| 548   | 100 to 500   | 6,9 to 34,5        | 2,0 to 15              | 0,1 to 1,0            | 30 "Hg to 1200        | -1 to 82,7            | 2500                  | 172,4             |

\*\***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.

## 120 Series

## DIFFERENTIAL PRESSURE MODEL CHART

- Type H121K, single switch with external adjustment dial via reference dial, single conduit**
- Type H122K, dual switch with external adjustment dial via reference dial, single conduit**

| Model   | Adjustable Set Point Range |                           | Deadband   |               | Working Pressure*** |            | Proof Pressure** |      | Dial Divisions |
|---|----------------------------|---------------------------|------------|---------------|---------------------|------------|------------------|------|----------------|
|   | Low end of range on fall;  | High end of range on rise | psid       | bar           | psi                 | mbar       | psi              | bar  | psi            |
| Welded 316L stainless steel bellows and 1/2" NPT (female) pressure connections                    |                            |                           |            |               |                     |            |                  |      |                |
| S147B   | 3 to 30                    | 0,2 to 2,1                | 0.3 to 2   | 20,7 to 137,9 | 30 "Hg Vac to 100   | -1 to 6,9  | 300              | 20,7 | 0,5            |
| S157B   | 10 to 100                  | 0,7 to 6,9                | 0,5 to 3   | 34,5 to 206,8 | 30 "Hg Vac to 180   | -1 to 12,4 | 300              | 20,7 | 2              |
| Brass bellows with nickel-plated brass 1/4" NPT (female) pressure connections                     |                            |                           |            |               |                     |            |                  |      |                |
| 147   | 3 to 30                    | 0,2 to 2,1                | 0,3 to 2   | 20,7 to 137,9 | 30 "Hg Vac to 100   | -1 to 6,9  | 180              | 12,4 | 0,5            |
| 157   | 10 to 100                  | 0,7 to 6,9                | 0,5 to 3   | 34,5 to 206,8 | 30 "Hg Vac to 150   | -1 to 10,3 | 180              | 12,4 | 2              |
| Buna N diaphragm, O-Ring with aluminum 1/4" NPT (female) pressure connections                     |                            |                           |            |               |                     |            |                  |      |                |
| 456   | 2 to 20                    | 0,1 to 1,4                | 0,1 to 0,3 | 6,9 to 20,7   | 30 "Hg Vac to 225   | -1 to 15,5 | 225              | 15,5 | 0,5            |
| 457   | 3 to 30                    | 0,2 to 2,1                | 0,1 to 0,4 | 6,9 to 27,6   | 30 "Hg Vac to 225   | -1 to 15,5 | 225              | 15,5 | 0,5            |
| Teflon® and Buna N diaphragms, Buna N O-Ring with aluminum 1/4" NPT (female) pressure connections |                            |                           |            |               |                     |            |                  |      |                |
| 559   | 10 to 100                  | 0,7 to 6,9                | 0,2 to 1   | 13,8 to 68,9  | 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. 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.



Differential Pressure Indicating Option M210

## 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 Range |                | Max. Temp. |       | Scale Div. |     | Stem or Bulb Size*/Finish**                               |
|---|----------------------------|----------------|------------|-------|------------|-----|---|
|   | °F                         | °C             | °F         | °C    | °F         | °C  |   |
|   |                            |                |            |       |            |     | OD x Length   |
| Type B121, single switch, immersion stem, external adjustment via reference dial. Type B122, dual switch, immersion stem, external adjustment via reference dial. Type 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 thread, 1/2" NPT nickel-plated brass |
| 121   | 200 to 425                 | 93.3 to 218.3  | 475        | 246.1 | 5†         | 5†  | 9/16" x 1-7/8" below thread, 1/2" NPT nickel-plated brass |
| 13272 (B121)<br>13322 (B122)<br>(Heat Tracing)  | 15 to 140                  | -9.4 to 60     | 160        | 71.1  | 2†         | 2†  | 9/16" x 2-11/16" long stainless steel                     |
| Type E121, single switch, bulb and capillary, external adjustment via reference dial. Type E122, dual switch, bulb and capillary, external adjustment via reference dial  |                            |                |            |       |            |     |   |
| 2BSA  | -120 to 100                | -84.4 to 37.8  | 150        | 65.6  | 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        | 65.6  | 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"  |
| 13273 (E121)<br>13321 (E122)<br>(Heat Tracing)  | 25 to 325                  | -3.9 to 162.8  | 360        | 182.2 | 5          | 5   | 1/4" x 10-1/4"  |
| Type F120, single switch, bulb and capillary, internal adjustment   |                            |                |            |       |            |     |   |
| 1BS   | -180 to 120                | -117.8 to 48.9 | 170        | 76.7  | N/A        | N/A | 3/8 x 3-3/4"  |
| 2BS   | -125 to 350                | -87.2 to 176.7 | 400        | 204.4 | N/A        | N/A | 3/8 x 2-5/8"  |
| 3BS   | -125 to 500                | -87.2 to 260   | 550        | 287.8 | N/A        | N/A | 3/8 x 2-1/8"  |
| 4BS   | -40 to 120                 | -40 to 48.9    | 170        | 76.7  | N/A        | N/A | 3/8 x 6-3/4"  |
| 5BS   | -40 to 180                 | -40 to 82.2    | 230        | 110   | N/A        | N/A | 3/8 x 5"  |
| 6BS   | 0 to 250                   | -17.8 to 121.1 | 300        | 148.9 | N/A        | N/A | 3/8 x 4-1/2"  |
| 7BS   | 0 to 400                   | -17.8 to 204.4 | 450        | 232.2 | N/A        | N/A | 3/8 x 3"  |
| 8BS   | 50 to 650                  | 10 to 343.3    | 700        | 371.1 | N/A        | N/A | 3/8 x 3-1/4"  |

† Types B121, B122 only.

\*Optional immersion stem lengths and capillary lengths are available – consult UE. Standard capillary length is 6 FT except HTFP models which are 10 FT.

\*\*Optional stainless steel immersion stem, and stainless steel armored or Teflon covered capillary available – consult UE.

## 120 Series

## INDICATING TEMPERATURE CONTROL MODEL CHART

- 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 Range |                | Max. Temp. |       | Scale Div. |    | Bulb Size    |
|-------|----------------------------|----------------|------------|-------|------------|----|--------------|
|       | °F                         | °C             | °F         | °C    | °F         | °C | OD x Length  |
| 1BS   | -180 to 120                | -117.8 to 48.9 | 170        | 76.7  | 5          | 5  | 3/8 x 3-3/4" |
| 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        | 76.7  | 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        | 148.9 | 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 – consult UE.



## HOW TO ORDER

### BUILDING A PART NUMBER

#### Select a **Type**

Refer to the "Type" section below.  
Determine type number based on switch output, enclosure, adjustment and reference. Fill in the type portion of your part number with the corresponding number.

#### Select a **Model**

Refer to the "Model Charts"  
Determine model based on adjustable range, deadband and proof pressure.  
Fill in the model portion of your part number with the corresponding number.

#### Select an **Option**

Refer to the "Options" section  
Determine option number based on switch output, optional materials or other product enhancements.  
Fill in the option portion of your part number with the corresponding number.  
Leave "option" portion blank if no options are needed. FOR MULTIPLE OPTIONS: Call United Electric Controls.

| <b>TYPE</b>           | <b>DESCRIPTION</b>  |
|-----------------------|---|
| Pressure              | Type J120 - One SPDT; epoxy coated enclosure; <b>internal adjustment with no reference scale, dual conduits</b><br>Type H121 - One SPDT; epoxy coated enclosure; <b>external adjustment with reference dial, single conduit</b><br>Type H122 - Two SPDT; epoxy coated enclosure; <b>external adjustment with reference dial, single conduit</b><br>Type H122P - Two SPDT; <b>hermetically sealed switches</b> ; epoxy coated enclosure; <b>external adjustment with reference dial, single conduit</b>  |
| Differential Pressure | Type J120K - One SPDT; epoxy coated enclosure; <b>internal adjustment with no reference scale, dual conduits</b><br>Type H121K - One SPDT; epoxy coated enclosure; <b>external adjustment with reference dial, single conduit</b><br>Type H122K - Two SPDT; epoxy coated enclosure; <b>external adjustment with reference dial, single conduit</b>  |
| Temperature           | Type B121 - Immersion stem; <b>one SPDT</b> ; epoxy coated enclosure; <b>external adjustment with reference dial, single conduit</b><br>Type B122 - Immersion stem; <b>two SPDT</b> ; epoxy coated enclosure; <b>external adjustment with reference dial, single conduit</b><br>Type C120 - Immersion stem; <b>one SPDT</b> ; epoxy coated enclosure; <b>internal adjustment with no reference scale, dual conduits</b><br>Type E121 - Bulb and capillary; <b>one SPDT</b> ; epoxy coated enclosure; <b>external adjustment with reference dial, single conduit</b><br>Type E122 - Bulb and capillary; <b>two SPDT</b> ; epoxy coated enclosure; <b>external adjustment with reference dial, single conduit</b><br>Type F120 - Bulb and capillary; <b>one SPDT</b> ; epoxy coated enclosure; <b>internal adjustment with no reference dial, dual conduits</b><br>Type 820E - Bulb and capillary; <b>one SPDT</b> ; <b>external adjustment and temperature indication, dual conduits</b><br>Type 822E - Bulb and capillary; <b>two SPDT</b> ; <b>external adjustment and temperature indication, dual conduits</b> |

### SWITCH OPTIONS\*\*

|      |   |
|------|---|
| 0140 | Gold contacts, 1 amp 125 VAC resistive, NOT AVAILABLE TYPE H122P, 820E, & 822E  |
| 0500 | Close deadband, 5 amp 125/250 VAC resistive. NOT AVAILABLE TYPE H122P AND MODELS 520-535  |
| 1010 | DPDT switch, 10 amp 125/250 VAC resistive; deadband and minimum set point will increase. NOT AVAILABLE TEMPERATURE VERSIONS; TYPES H122, H122P H122K; OR J120K MODELS 36-39, 367, AND 540-548; OR J120 MODELS 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 TYPES 820E, 822E, H122P, H122K, B122, AND J120K MODELS 36-39; J120 MODELS 171-194, 483-494, 520-535, 560-567   |
| 1180 | Hermetically sealed, SPDT, 11 amp 125/250 VAC resistive, must be specified with type H122P. NOT AVAILABLE TYPES 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 TYPES 820E, 822E, B122, E122, H122, H121K, H122K, H122P or models 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 TYPES 820E, 822E, B122, E122, H122, H121K, H122K, H122P or models 523, 533 |

\*\* All switches have limited DC capabilities. Consult factory for details.

**SWITCH OPTIONS\*\* (CONT.)**

|       |  |
|-------|--|
| 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 TYPES 820E, 822E, B121, B122, E121, E122, H121, H122, H121K, H122K, H122P or models 171-194, 483-494, 520-535, 560-567, 612-616 |
| 1530  | External manual reset, 15 amp 125/250/480 VAC resistive; latches on rise only. NOT AVAILABLE TYPES 820E, 822E, B122, E122, H122, H121K, H122P  |
| 1535  | High ambient, 15 amp 125/250 VAC resistive; temperatures up to 250°F (120°C). NOT AVAILABLE TYPES 820E, 822E, H122P models 520-535   |
| 1537  | Vapor sealed switch, 15 amp 125/250 VAC resistive. NOT AVAILABLE TYPES 820E, 822E, H122P or models 520-535   |
| 1539  | Fungus resistant case, 15 amp 125/250 VAC resistive. NOT AVAILABLE TYPES 820E, 822E, H122P or models 520-535   |
| 2000  | 20 amp 125/250 VAC resistive. NOT AVAILABLE MODELS H122P, 520-535, 540-548   |
| 3000  | 30 amp 125/250/277 VAC resistive. NOT AVAILABLE TYPES 820E, 822E, B121, B122, E122, H121, H122, H121K, H122K, H122P, J120K or models 171-194, 483-494, 520-535, 540-548, 560-567   |

**SENSOR OPTIONS**

|          |   |
|----------|---|
| M504     | 316L stainless steel stem. AVAILABLE TEMPERATURE MODELS 120 AND 121 ONLY  |
| M540     | Viton® wetted parts with standard pressure connection. Deadbands and low end of range may increase. AVAILABLE MODELS 36-39, 450-454, 540-548. Models 455-457 (Viton® sealing diaphragms and O-rings with Teflon® main diaphragm). Models 612-616 (O-Ring only). AVAILABLE TYPE J120 MODELS 701-705 and TYPES H121 and H122 MODELS 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   |
| 6361-762 | 1/2" NPT MALE to G1/2 male stainless steel pressure fitting adaptor kit   |
| 6361-761 | 1/4" NPT male to G1/2 male stainless steel pressure fitting adaptor kit   |

**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<br>(Over range pressure is limited to 100 psi) |
| XC005 | 316L Stainless steel pressure connection, Viton® diaphragm, Viton® O-Ring  |
| XC006 | 316L Stainless steel pressure connection, Kapton® diaphragm, Viton® O-Ring   |
| XC007 | 316L Stainless steel pressure connection, Teflon® diaphragm, Viton® O-Ring   |

**OPTIONAL SENSOR MATERIAL FOR CORROSIVE MEDIA. AVAILABLE MODELS 183-189, 483-489**

|       |  |
|-------|--|
| XD002 | Hasleloy® C diaphragm (NACE MR-0175 compliant)           |
| XD003 | Monel® diaphragm (NACE MR-0175 compliant)                |
| XP112 | Hasleloy® C pressure connection (NACE MR-0175 compliant) |
| XP113 | Monel® pressure connection (NACE MR-0175 compliant)      |

\*Please note: In order to accommodate free movement of adjustable wheel, left hand electrical conduit is permanently sealed.

\*\* All switches have limited DC capabilities. Consult factory for details.

**OPTIONAL SENSOR MATERIAL FOR CORROSIVE MEDIA (CONT.)**

|       |  |
|-------|--|
| XR211 | Kalrez® O-Ring   |
| XR212 | Silicone O-Ring. NOT AVAILABLE MODELS 188-189, 488-489 |
| 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, MODELS 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/cm <sup>2</sup> . NOT AVAILABLE ON TEMPERATURE VERSIONS   |
| M320     | Tamper resistant cover for indication portion of control, internal adjustment. AVAILABLE TYPES 820E AND 822E ONLY                      |
| M403     | Flameproof compliance for Australia per IECEx standards NOT AVAILABLE ON 820E AND 822E   |
| M404     | Flameproof compliance for Ukraine per Gosnadzorohrantruda standards  |
| 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 Gosgortekhnadzor standards. Intrinsic safety NOT AVAILABLE TYPES 820E & 822E |
| M408     | Flameproof compliance for China per CQST standards   |
| M440     | Cover chain  |
| M444     | Paper ID tag   |
| M446     | Stainless steel ID tag & wire attachment   |
| M450     | Breather drain. NOT AVAILABLE WITH OPTIONS 1530, M210 OR WITH ATEX CERTIFICATION   |
| M550     | Oxygen service cleaning; alcohol cleaning to remove residue from the process connection. NOT AVAILABLE ON H122, MODELS 704 AND 705     |
| 6361-704 | Surface and pipe mounting hardware. (required for models 520-535, 540-548 when surface mounting)                                       |

**ALSO AVAILABLE:** 150# and 300# flanges (consult factory for part numbers)

**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              |
|----------------------------|--------------------|--------------------------|
| <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 Models 13273 and 13321*

| <u>Brass</u>               |            |                                 |
|----------------------------|------------|---------------------------------|
| 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                       | 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 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 ST/ST |

**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 ST/ST thermowell |

**OPTIONAL LENGTHS**

Optional immersion stem lengths to 15" available in brass, with or without 316 ST/ST thermowell. Consult UE for additional information.

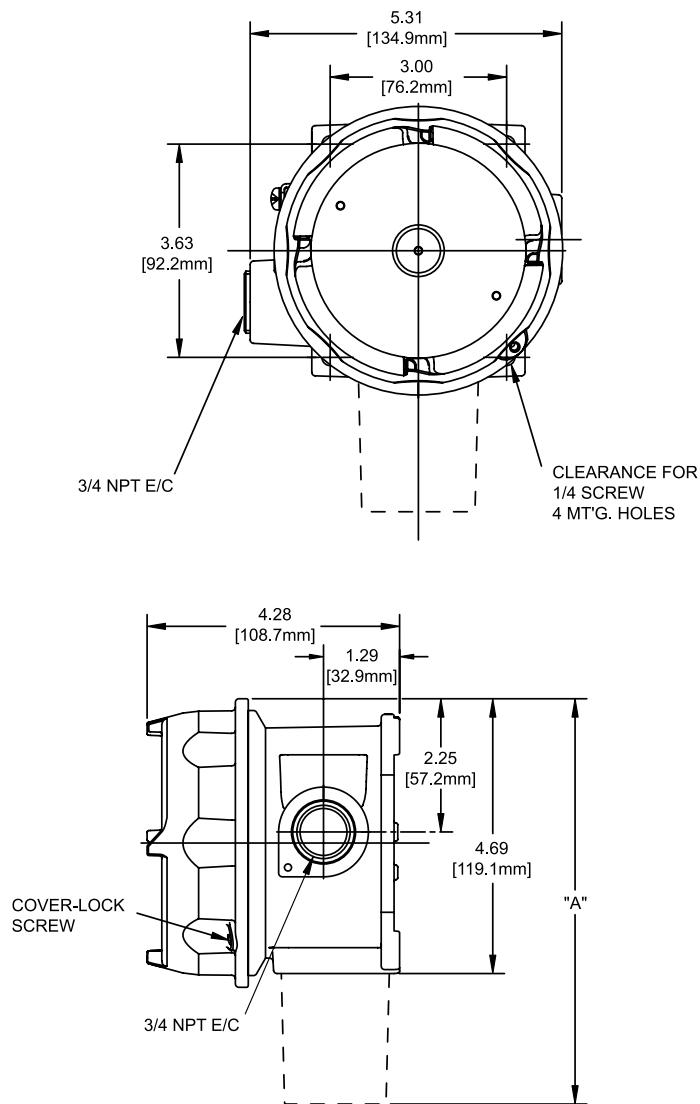
Optional capillary length to \*50' available in copper or 304 ST/ST. Armor or Teflon® capillary protection available to lengths less than or equal to capillary length. Consult UE for additional information.

\*Consult UE regarding repeatability and ambient effects on capillary lengths over 30'.

## DIMENSIONAL DRAWINGS

(Dimensional drawings for all models may be found at [www.ueonline.com](http://www.ueonline.com))**Internal Set Point Adjustment, dual conduits**

Types J120, J120K, C120, F120



| Models                       | Dimension A |       |                  |
|------------------------------|-------------|-------|------------------|
|                              | Inches      | mm    | NPT              |
| <b>Pressure</b>              |             |       |                  |
| 126-164                      | 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              |
| 560-564                      | 7.53        | 191.3 | 2" Sanitary      |
| 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              |
| <b>Differential Pressure</b> |             |       |                  |
| 36-39, 147-157, 367          | 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                      | 9.34        | 237.2 | 1/8              |
| 544-548                      | 9.41        | 239.0 | 1/8              |
| <b>Temperature</b>           |             |       |                  |
| 120-121                      | 9.13        | 231.9 | Immersion Stem   |
| 185-885                      | 8.47        | 215.1 | Bulb & capillary |

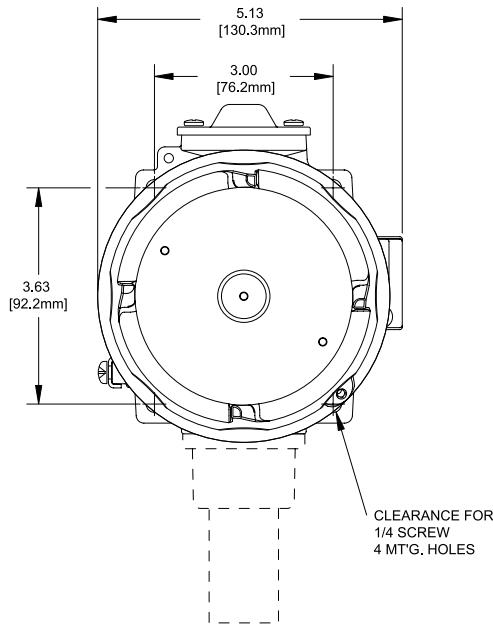
All dimensions stated in inches (millimeters)

## 120 Series

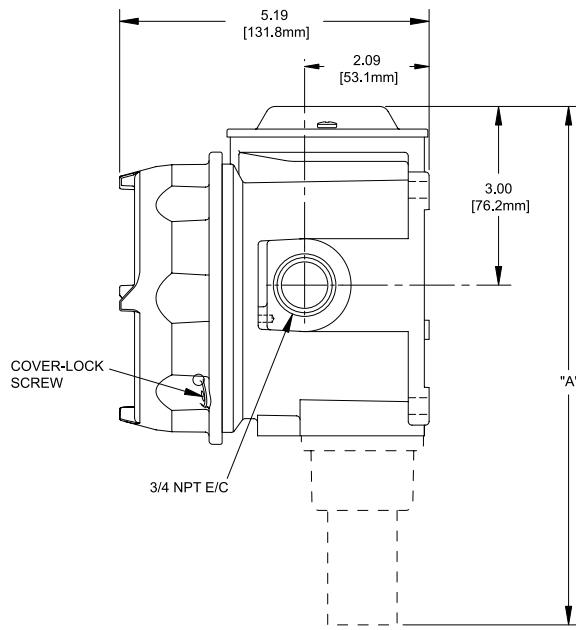
## DIMENSIONAL DRAWINGS

(Dimensional drawings for all models may be found at [www.ueonline.com](http://www.ueonline.com))**External Set Point Adjustment, single conduit**

Types B121, B122, E121,  
E122, H121, H122,  
H122P, H121K, H122K



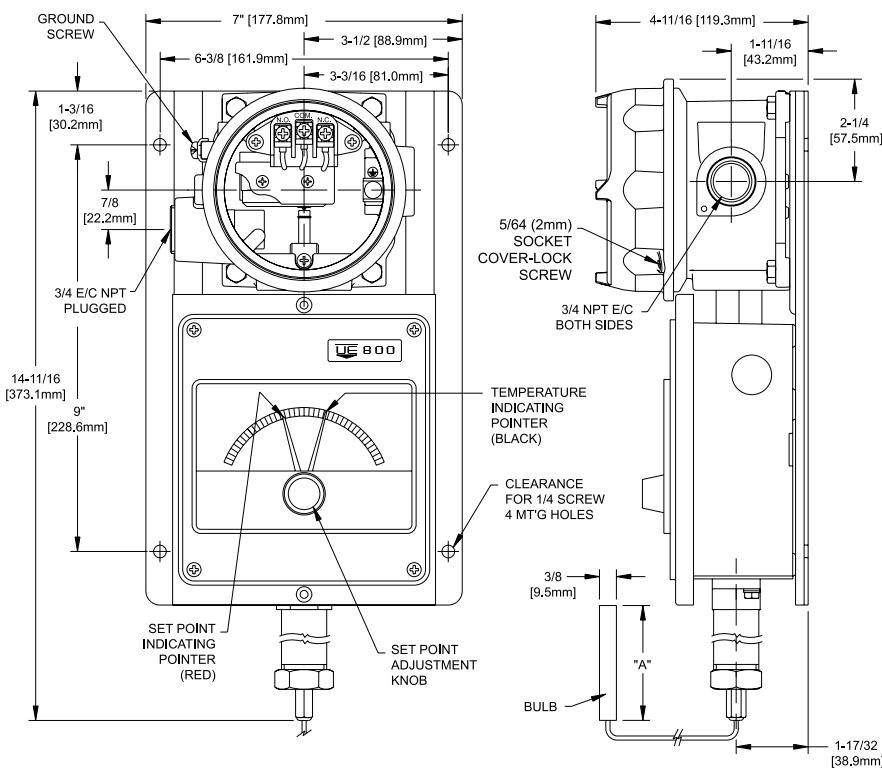
| Models                       | Dimension A |       |                                    |
|------------------------------|-------------|-------|------------------------------------|
|                              | Inches      | mm    | NPT                                |
| <b>Pressure</b>              |             |       |                                    |
| 126-164                      | 8.09        | 205.5 | 1/4                                |
| S126B-S164B                  | 8.50        | 215.9 | 1/2                                |
| 270-274                      | 7.88        | 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                                |
| <b>Differential Pressure</b> |             |       |                                    |
| 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                                |
| <b>Temperature</b>           |             |       |                                    |
| 120,121                      | 10.00       | 254.0 | Immersion Stem                     |
| 285-88S                      | 9.31        | 236.5 | Bulb & capillary                   |
| 13272, 13322                 | 10.00       | 254.0 | Immersion Stem<br>(Heat tracing)   |
| 13273, 13321                 | 9.31        | 236.5 | Bulb & capillary<br>(Heat tracing) |



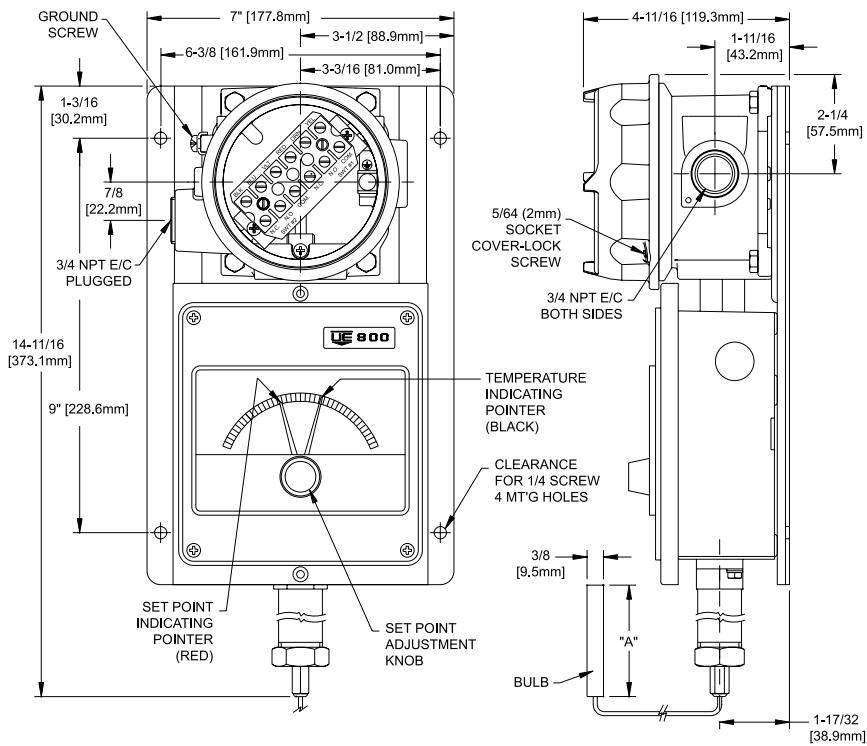
## DIMENSIONAL DRAWINGS

(Dimensional drawings for all models may be found at [www.ueonline.com](http://www.ueonline.com))

## External Set Point Adjustment &amp; Temperature Indication

Type 820E  
single switch

| Dimension A |        |       |
|-------------|--------|-------|
| Models      | Inches | mm    |
| 1BS         | 3-3/4  | 95,3  |
| 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  |

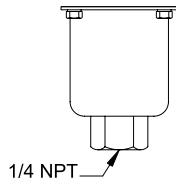
Type 822E  
dual switch

## DIMENSIONAL DRAWINGS

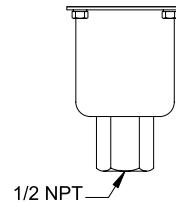
## SENSORS

**Pressure Sensors**

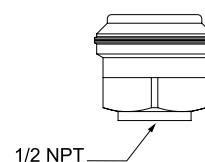
(see drawings and charts on page 21 &amp; 22 for complete dimensions)



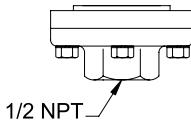
Models 126-164



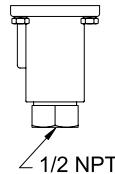
Models S126B-S164B



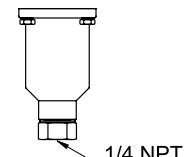
Models 171-174



Models 183-186, 483-486



Models 188-194, 488-494



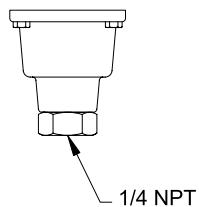
J120 Models 270-376, 680

## DIMENSIONAL DRAWINGS

## SENSORS

**Pressure Sensors**

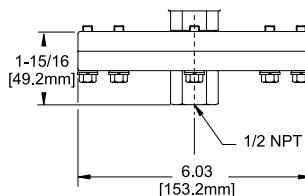
(see drawings and charts on page 21 &amp; 22 for complete dimensions)



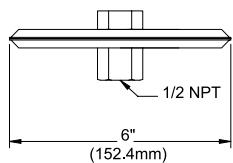
H121/H122 Models 270-376



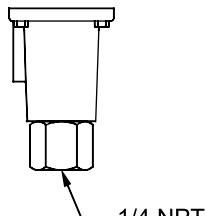
Models 450-454, 550-555



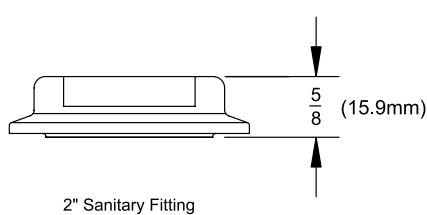
Models 520-525



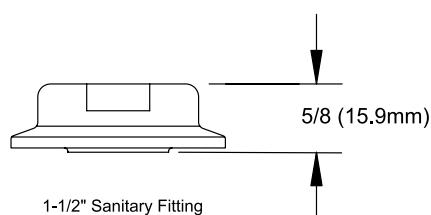
Models 530-535



Models 612-616, 701-705, 15622



Models 560-564



Models 565-567

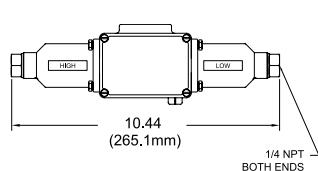
## 120 Series

## DIMENSIONAL DRAWINGS

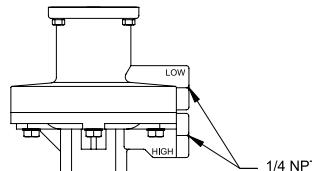
## SENSORS

**Differential Pressure Sensors**

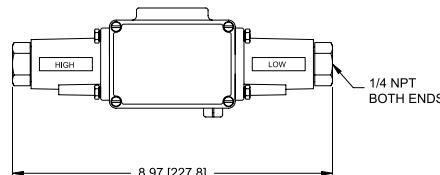
(see drawings and charts on page 21 &amp; 22 for complete dimensions)



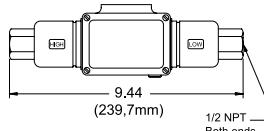
J120K Models 367



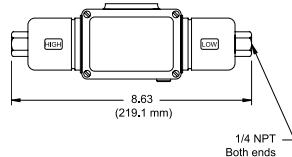
Models 455-457, 559



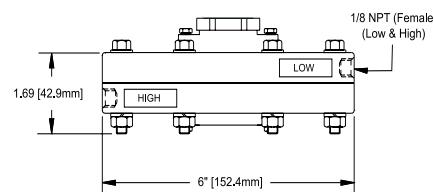
J120K Models 36-39



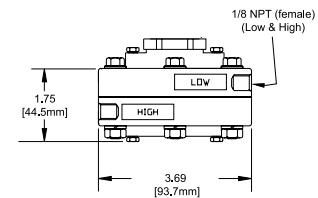
Models S147B-S157B



Models 147-157



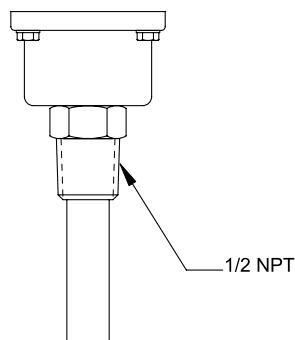
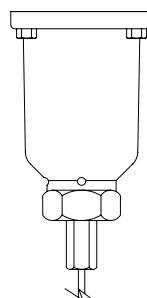
Models 540-543



Models 544-548

**Temperature Sensors**

(See drawings and charts on pages 21-23 for complete dimensions, as well as Temperature Model Chart on pages 15-16 for immersion stem and bulb dimensions. The standard capillary length is 6 feet except for models 13273 &amp; 13321 which is 10 feet)

Models  
120-121, 13272, 13322Models  
1BS-8BS, 13273, 13321

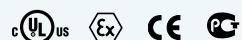
## ALTERNATIVE PRODUCTS FROM UE

**Stainless Steel 12 Series**

- Compact, cylindrical 316 stainless steel design
- Hermetically sealed micro-switch
- Explosion Proof
- Snap-acting belleville spring mechanism for maximum vibration resistance and set point stability
- Pressure ranges 1 to 12,500 psi; DP working pressure ranges 0 to 2500 psid; temperature ranges -130 to 650°F
- Dual seal compliance to ANSI/ISA 12.27.01

**One Series for Division 1 (Zone 1)**

- Electronic pressure and temperature switches with no moving parts
- Fully adjustable deadband and smart self diagnostics
- 4-20 mA output and digital process display
- Explosion-proof enclosure for Division 1 (Zone 1) hazardous areas
- 2-wire, 4-wire and loop powered models available

**TX200 Series Pressure Transmitters**

- Welded, hermetically sealed, 316 Stainless steel construction
- Ranges 0 to 15 psi up to 0 to 40,000 psi
- Choice of field adjustable or fixed range models
- 4-20 mA transmitter output or 1-5 VDC or 0-10 VDC transducer output
- Variety of pressure connections including NPT, SAE, Autoclave

**One Series for Division 2 (Zone 2)**

- Electronic solid-state reliability
- Two-wire operation
- Digital display with keypad set-up
- 100% of range adjustable on-off deadband
- 4-20 mA output models
- Continuous diagnostic health check

**Temperature Sensors**

Rugged RTD's and Thermocouples for process and energy applications, available with Nema 4X and explosion-proof heads to match heat-trace, turbine, combustion, and stack-emission applications



## RECOMMENDED PRACTICES AND WARNINGS

United Electric Controls Company recommends careful consideration of the following factors when specifying and installing UE pressure and temperature units. Before installing a unit, the Installation and Maintenance instructions provided with unit must be read and understood.

- To avoid damaging unit, proof pressure and maximum temperature limits stated in literature and on nameplates must never be exceeded, even by surges in the system. Operation of the unit up to maximum pressure or temperature is acceptable on a limited basis (e.g., start-up, testing) but continuous operation must be restricted to the designated adjustable range. Excessive cycling at maximum pressure or temperature limits could reduce sensor life.
- A back-up unit is necessary for applications where damage to a primary unit could endanger life, limb or property. A high or low limit switch is necessary for applications where a dangerous runaway condition could result.
- The adjustable range must be selected so that incorrect, inadvertent or malicious setting at any range point cannot result in an unsafe system condition.
- Install unit where shock, vibration and ambient temperature fluctuations will not damage unit or affect operation. When applicable, orient unit so that moisture does not enter the enclosure via the electrical connection. When appropriate, this entry point should be sealed to prevent moisture entry.
- Unit must not be altered or modified after shipment. Consult UE if modification is necessary.
- Monitor operation to observe warning signs of possible damage to unit, such as drift in set point or faulty display. Check unit immediately.
- Preventative maintenance and periodic testing is necessary for critical applications where damage could endanger property or personnel.
- Electrical ratings stated in literature and on nameplate must not be exceeded. Overload on a switch can cause damage, even on the first cycle. Wire unit according to local and national electrical codes, using wire size recommended in installation sheet.
- Do not mount unit in ambient temp. exceeding published limits.

## LIMITED WARRANTY

Seller warrants that the product hereby purchased is, upon delivery, free from defects in material and workmanship and that any such product which is found to be defective in such workmanship or material will be repaired or replaced by Seller (Ex-works, Factory, Watertown, Massachusetts. INCOTERMS); provided, however, that this warranty applies only to equipment found to be so defective within a period of 24 months from the date of manufacture by the Seller. Seller shall not be obligated under this warranty for alleged defects which examination discloses are due to tampering, misuse, neglect, improper storage, and in any case where products are disassembled by anyone other than authorized Seller's representatives. EXCEPT FOR THE LIMITED WARRANTY OF REPAIR AND REPLACEMENT STATED ABOVE, SELLER DISCLAIMS ALL WARRANTIES WHATSOEVER WITH RESPECT TO THE PRODUCT, INCLUDING ALL IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR ANY PARTICULAR PURPOSE.

## LIMITATION OF SELLER'S LIABILITY

SELLER'S LIABILITY TO BUYER FOR ANY LOSS OR CLAIM, INCLUDING LIABILITY INCURRED IN CONNECTION WITH (I) BREACH OF ANY WARRANTY WHATSOEVER, EXPRESSED OR IMPLIED, (II) A BREACH OF CONTRACT, (III) A NEGLIGENT ACT OR ACTS (OR NEGLIGENT FAILURE TO ACT) COMMITTED BY SELLER, OR (IV) AN ACT FOR WHICH STRICT LIABILITY WILL BE IMPUTED TO SELLER, IS LIMITED TO THE "LIMITED WARRANTY" OF REPAIR AND/OR REPLACEMENT AS SO STATED IN OUR WARRANTY OF PRODUCT. IN NO EVENT SHALL THE SELLER BE LIABLE FOR ANY SPECIAL, INDIRECT, CONSEQUENTIAL OR OTHER DAMAGES OF A LIKE GENERAL NATURE, INCLUDING, WITHOUT LIMITATION, LOSS OF PROFITS OR PRODUCTION, OR LOSS OR EXPENSES OF ANY NATURE INCURRED BY THE BUYER OR ANY THIRD PARTY.

*UE specifications subject to change without notice.*

Be sure to visit [www.ueonline.com](http://www.ueonline.com) for the latest information.

## U.S. SALES OFFICES

United Electric Controls  
31 Old Stage Road  
Hampton Falls, NH 03844  
Phone: 617-899-1132  
email: [northeastsales@ueonline.com](mailto:northeastsales@ueonline.com)

United Electric Controls  
28 N. Wise Ave.  
Freeport, IL 61032  
Phone: 815-341-2588  
email: [midwestsales@ueonline.com](mailto:midwestsales@ueonline.com)

United Electric Controls  
1022 Vineyard Drive  
Conyers, GA 30013  
Phone: 770-335-9802  
email: [southeastsales@ueonline.com](mailto:southeastsales@ueonline.com)

United Electric Controls  
5829 Grazing Court  
Mason, OH 45040  
Phone: 513-535-5486  
email: [midatlanticsales@ueonline.com](mailto:midatlanticsales@ueonline.com)

United Electric Controls  
102 Salazar Court  
Clayton, CA 94517  
Phone: 925-408-5997  
email: [westcoastsales@ueonline.com](mailto:westcoastsales@ueonline.com)

United Electric Controls  
27 Summit Terrace  
Sparta, NJ 07871  
Phone: 973-271-2550  
email: [easternsales@ueonline.com](mailto:easternsales@ueonline.com)

United Electric Controls  
4306 Whickham Drive  
Fulshear, TX 77441  
Phone: 832-457-6138  
email: [southwestsales@ueonline.com](mailto:southwestsales@ueonline.com)

## CANADA

EASTERN  
68 Mosley Crescent  
Brampton, Ontario  
Canada L6Y 5C8  
Phone: 905-455-5131  
FAX: 905-455-5131

WESTERN  
148 Silver Ridge Close N.W.  
Calgary, Alberta  
Canada T3B 3T4  
Phone: 403-247-3724  
FAX: 403-247-3724



UNITED ELECTRIC  
CONTROLS

180 Dexter Avenue, P.O. Box 9143  
Watertown, MA 02471-9143 USA  
Telephone: 617 926-1000 Fax: 617 926-2568  
<http://www.ueonline.com>

## INTERNATIONAL OFFICES

CHINA  
United Electric Controls, *Shanghai Office*  
Room 1011, 10th Flr,  
Huai Hai Zhonghua Building  
No. 885, Renmin Road, Luwan District  
Shanghai 200010, P.R. China  
Phone: +8621-6255 8059  
email: [chinasaless@ueonline.com](mailto:chinasaless@ueonline.com)

United Electric Controls, *Beijing Office*  
Room 1006, Jainhao International Bldg.  
Block D, No. 116  
Zizhuyuanlu, Haidian District  
Beijing, China 100089  
Phone: +86-10-5893-0518  
email: [beijingsales@ueonline.com](mailto:beijingsales@ueonline.com)

EASTERN EUROPE & SCANDINAVIA  
United Electric Controls  
05-806 Komorow  
Kujawska 5, Poland  
Phone: +48 22 499 4804  
email: [easterneuropepesales@ueonline.com](mailto:easterneuropepesales@ueonline.com)

GERMANY  
United Electric Controls  
An Der Zentlinde 21  
D-64711 Erbach, Germany  
Phone: 496-062-7400  
email: [europesales@ueonline.com](mailto:europesales@ueonline.com)

INDIA  
United Electric Controls  
House no. 7, Kamalkunj Society  
Nizampura,  
Baroda (Gujarat), India  
Phone: +91 (-265) -2788654  
email: [indisales@ueonline.com](mailto:indisales@ueonline.com)

ASIA-PACIFIC  
United Electric Controls, Far East  
No. 1-2-2, 2nd Floor  
Jalan 4/101C  
Cheras Business Centre  
Batu 5, Jalan Cheras  
56100 Kuala Lumpur, Malaysia  
Phone: 603-9133-4122  
email: [fareastsales@ueonline.com](mailto:fareastsales@ueonline.com)

MEXICO  
United Electric Controls  
Zacatecas # 206, Suite 20  
Col Guadalupe CP 89120  
Tampico, Tamaulipas Mexico  
Phone: 833-217-5201  
email: [latinamericasales@ueonline.com](mailto:latinamericasales@ueonline.com)

RUSSIA  
United Electric Controls, Moscow  
Elninskaya str., 15-140  
Moscow, 121552, Russia  
Phone: +7 (495) 792-88-06  
email: [russiansales@ueonline.com](mailto:russiansales@ueonline.com)

CP12093500

## PRESSURE, VACUUM, DIFFERENTIAL PRESSURE, TEMPERATURE



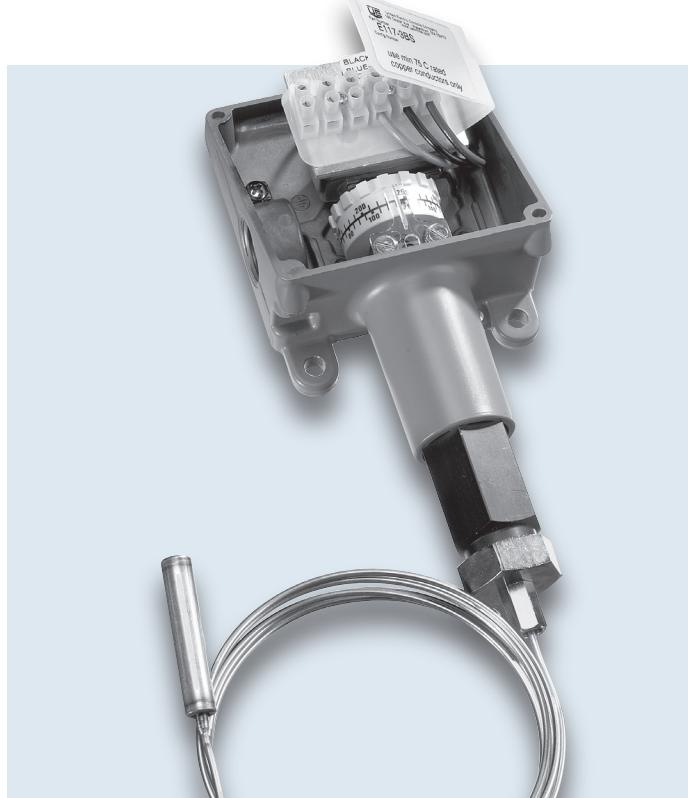
### FEATURES

- Epoxy Coated Type 4X Enclosure and Stainless Steel Component Parts
- Hermetically Sealed Snap Switch, SPDT or DPDT Output
- Terminal Block Wiring
- Tamper-Resistant Set Point "Lock"
- Adjustable Ranges:  
 "wc ranges: 300 "wc vacuum to 250  
 "wc pressure (-747 to 622 mbar)  
 Pressure: 30 "Hg Vac to 3500 psi  
 (-1 to 241 bar)  
 Differential Pressure: 0.8 "wcd to  
 500 psid (2 mbar to 34.5 bar)  
 Temperature: -120 to 640°F  
 (-85 to 338°C)

# 117 Series

## OVERVIEW

Approved for Division 2 hazardous locations and corrosive atmospheres, the 117 Series can be used to measure vacuum, pressure, differential pressure or temperature in a variety of applications. Its compact, epoxy-coated enclosure and hermetically sealed snap switch provide superior corrosion resistance within the harshest environments. Popular sensors in a variety of materials are available, ranging from all welded stainless steel to elastomer diaphragms. Rugged, reliable and cost effective, the 117 Series is an ideal choice for the most demanding applications; typically wastewater treatment, pulp and paper mills, food and beverage plants, steel and aluminum mills, petrochemical, and pharmaceutical plants.



## FEATURES

- Approved for Division 2 hazardous locations
- Optional ATEX or GOST intrinsic safety compliance for Zone 0
- Hermetically sealed snap switch, SPDT or DPDT output
- Welded stainless steel diaphragms
- Optional sensor material for corrosive media
- Ultra-low pressure ranges
- Polished stainless steel flush mount sensors

## SPECIFICATIONS

|                                       |   |
|---------------------------------------|---|
| <b>STORAGE<br/>TEMPERATURE</b>        | -65° to 160°F (-54 to 71°C)   |
| <b>AMBIENT<br/>TEMPERATURE LIMITS</b> | -40° to 160°F (-40° to 71°C); except models 520-525, 540-548, 700-706: 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  |
| <b>SET POINT<br/>REPEATABILITY</b>    | Temperature models: ± 1% of adjustable range<br>Pressure models 171-174, 218, 358-376, 520-535, 540-543, 560-564 and 700-706: ± 1% of adjustable range; models 183-194, 544-548, 483-494, 565-567: ± 1.5% of adjustable range<br>Internal set point lock on all pressure models |
| <b>SHOCK</b>                          | Set point repeats after 15 G, 10 millisecond duration   |
| <b>VIBRATION</b>                      | Set point repeats after 2.5 G, 5-500 Hz   |
| <b>ENCLOSURE</b>                      | Die cast aluminum, epoxy powder coated, gasketed; captive cover screws; stainless steel nameplate   |
| <b>ENCLOSURE<br/>CLASSIFICATION</b>   | Enclosure Type 4X   |
| <b>SWITCH OUTPUT</b>                  | One SPDT hermetically sealed snap action switch; switch may be wired "normally open" or "normally closed"; DPDT (option 1190/1195)  |
| <b>ELECTRICAL RATING</b>              | 11 A 125/250 VAC resistive; 5 A @ 28 VDC; 1 A @ 48 VDC; 1/2 A @ 125 VDC; switch contacts gold flashed   |
| <b>WEIGHT</b>                         | 1.5-6.5 lbs. Varies with model  |
| <b>ELECTRICAL<br/>CONNECTION</b>      | 1/2" NPT (female); two 7/8" diameter knockouts  |
| <b>PRESSURE CONNECTION</b>            | Models 218, 358-376, 700-706: 1/4" NPT (female); models 171-194, 483-494, 520-535: 1/2" NPT (female); models 560-564: 2" sanitary connection; models 565-567: 1.5" sanitary connection, models 540-548: 1/8" NPT (female)   |
| <b>TEMPERATURE<br/>ASSEMBLY</b>       | Bulb and capillary: 6 feet; 304 stainless steel<br>Immersion stem: nickel-plated brass (standard length only); optional 316L stainless steel  |
| <b>FILL</b>                           | Non-toxic oil filled  |
| <b>TEMPERATURE<br/>DEADBAND</b>       | Typically 4% of range under laboratory conditions (70°F ambient circulating bath at rate of 1/2°F per minute change)  |
| <b>REFERENCE SCALE</b>                | Pressure: "Low-Medium-High" increment<br>Temperature: Calibrated dial scale   |

## APPROVALS

**UNITED STATES AND CANADA****UL Listed, cUL Certified**

Class I, Division 2, Groups A, B, C &amp; D

Class II, Division 2, Groups F &amp; G

Class III

Enclosure Type 4X

Pressure: UL 508 &amp; 1604; CSA C22.2 No. 14

&amp; 213 - File # E40857

Temperature: UL 508 &amp; 1604; CSA C22.2 No. 24

&amp; 213 - File # E43374

**EUROPEAN UNION****ATEX Directive 94/9/EC****II 1 G EEx ia IIC T6 (OPTIONAL - code M405)**

Tamb = -50C to +60C

UL International DEMKO A/S (N.B.# 0539)

Certificate # DEMKO 03 ATEX 0335063

EN 50014, 50020 &amp; 50284

**Pressure Equipment Directive (PED) 97/23/EC**

Gage pressure models only

Category IV, Module H1, **(OPTIONAL - code M407)**

TÜV Industrie Service, TÜV SÜD AG (N.B.# 0036)

Certificate # USA 02/04/38/001 thru USA

02/07/38/033

**Low Voltage Directive (LVD) 73/23/EC & 93/68/EEC**

Compliant to LVD

Products rated lower than 50 VAC and 75 VDC are outside the scope of the LVD

The Low Voltage Directive does not apply to products for use in hazardous locations

**RUSSIA**Gosgortekhnadzor Permit **(OPTIONAL - code M406)**

0ExialICT6

Tamb = -50C to +60C

NANIO CCVE Certification Center

Certificate # RRS 00-22739

GOST R 51330.0, 51330.1, 51330.10 &amp; 51330.14

## PRESSURE MODEL CHART

| Model   | Adjustable Set Point Range |                 | Deadband   |              | *Over Range Pressure |      | **Proof Pressure |      |
|---|----------------------------|-----------------|------------|--------------|----------------------|------|------------------|------|
| Type H117   | "wc                        | mbar            | "wc        | mbar         | 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<br>(Other wetted materials available - see page 9) |                            |                 |            |              |                      |      |                  |      |
| 520   | 300 Vac to 0               | -746,7 to 0     | 0,8 to 32  | 2,0 to 79,6  | 200                  | 13,8 | 400              | 27,6 |
| 521   | 10 Vac to 10               | -24,9 to 24,9   | 0,4 to 2,4 | 1,0 to 6,0   | 200                  | 13,8 | 400              | 27,6 |
| 522   | 50 Vac to 50               | -124,5 to 124,5 | 0,4 to 12  | 1,0 to 29,9  | 200                  | 13,8 | 400              | 27,6 |
| 523   | 0,5 to 5                   | 1,2 to 12,4     | 0,4 to 1,2 | 1,0 to 3,0   | 200                  | 13,8 | 400              | 27,6 |
| 524   | 2,5 to 50                  | 6,2 to 124,5    | 0,4 to 3,2 | 1,0 to 8,0   | 200                  | 13,8 | 400              | 27,6 |
| 525   | 10 to 250                  | 24,9 to 622,3   | 0,4 to 24  | 1,0 to 59,7  | 200                  | 13,8 | 400              | 27,6 |
| Welded 316L stainless steel diaphragm and 1/2" NPT (female) pressure connection, large 0.72" orifice for clean-out purposes   |                            |                 |            |              |                      |      |                  |      |
| 530   | 300 Vac to 0               | -746,7 to 0     | 0,8 to 60  | 2,0 to 149,3 | 50                   | 3,4  | 100              | 6,9  |
| 531   | 10 Vac to 10               | -24,9 to 24,9   | 0,4 to 2,4 | 1,0 to 6,0   | 50                   | 3,4  | 100              | 6,9  |
| 532   | 50 Vac to 50               | -124,5 to 124,5 | 0,4 to 12  | 1,0 to 29,9  | 50                   | 3,4  | 100              | 6,9  |
| 533   | 0,5 to 5                   | 1,2 to 12,4     | 0,4 to 1,2 | 1,0 to 3,0   | 50                   | 3,4  | 100              | 6,9  |
| 534   | 2,5 to 50                  | 6,2 to 124,5    | 0,4 to 3,2 | 1,0 to 8,0   | 50                   | 3,4  | 100              | 6,9  |
| 535   | 10 to 250                  | 24,9 to 622,3   | 0,4 to 40  | 1,0 to 99,6  | 50                   | 3,4  | 100              | 6,9  |

\*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).

| Model   | Adjustable Set Point Range |                      | Deadband    |                    | *Over Range Pressure |       | **Proof Pressure |       |
|---|----------------------------|----------------------|-------------|--------------------|----------------------|-------|------------------|-------|
| Type H117   | psi                        | bar (unless noted)   | psi         | bar (unless noted) | psi                  | bar   | psi              | bar   |
| 2" sanitary welded 316L stainless steel diaphragm and pressure connection. Mates with Tri-Clamp® fitting systems (not UE supplied)  |                            |                      |             |                    |                      |       |                  |       |
| 560   | 1 to 15                    | 68,9 mbar to 1 bar   | 0,3 to 3    | 20,7 mbar to 0,2   | 200                  | 13,8  | 300              | 20,7  |
| 561   | 1 to 25                    | 68,9 mbar to 1 bar   | 0,3 to 4,5  | 20,7 mbar to 0,3   | 200                  | 13,8  | 300              | 20,7  |
| 562   | 2 to 50                    | 0,1 to 3,4           | 0,3 to 7,5  | 20,7 mbar to 0,5   | 200                  | 13,8  | 300              | 20,7  |
| 563   | 4 to 100                   | 0,3 to 6,9           | 0,3 to 12   | 20,7 mbar to 0,8   | 200                  | 13,8  | 300              | 20,7  |
| 564   | 8 to 200                   | 0,6 to 13,8          | 0,3 to 15   | 20,7 mbar to 1     | 200                  | 13,8  | 300              | 20,7  |
| 1.5" sanitary welded 316L stainless steel diaphragm and pressure connection. Mates with Tri-Clamp® fitting systems (not UE supplied)  |                            |                      |             |                    |                      |       |                  |       |
| 565   | 5 to 30                    | 0,3 to 2,1           | 3 to 15     | 0,2 to 1,0         | 1000                 | 68,9  | 1500             | 103,4 |
| 566   | 10 to 100                  | 0,7 to 6,9           | 3 to 36     | 0,2 to 2,5         | 1000                 | 68,9  | 1500             | 103,4 |
| 567   | 15 to 300                  | 1,0 to 20,7          | 9 to 66     | 0,6 to 4,6         | 1000                 | 68,9  | 1500             | 103,4 |
| Welded 316L stainless steel diaphragm and 1/2" NPT (female) pressure connection, large 0.72" orifice for clean-out purposes; NACE MR-0175 compliant   |                            |                      |             |                    |                      |       |                  |       |
| 171   | 1 to 20                    | 68,9 mbar to 1,4 bar | 0,1 to 3    | 6,9 mbar to 0,2    | 500                  | 34,5  | 1000             | 68,9  |
| 172   | 2 to 50                    | 0,1 to 3,4           | 0,1 to 5    | 6,9 mbar to 0,3    | 500                  | 34,5  | 1000             | 68,9  |
| 173   | 4 to 100                   | 0,3 to 6,9           | 0,1 to 10   | 6,9 mbar to 0,7    | 500                  | 34,5  | 1000             | 68,9  |
| 174   | 8 to 200                   | 0,6 to 13,8          | 0,1 to 15   | 6,9 mbar to 1,0    | 500                  | 34,5  | 1000             | 68,9  |
| 316L stainless steel diaphragm (optional Hastelloy® C or Monel®); Viton® GLT O-ring (optional Kalrez®, Silicone, Ethylene Propylene, or Aflas®); 316 stainless steel 1/2" NPT (female) pressure connection (optional Hastelloy® C, or Monel®), large 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                    | 0,1 to 1,4           | 0,3 to 5    | 20,7 mbar to 0,3   | 500                  | 34,5  | 1000             | 68,9  |
| 184   | 2 to 50                    | 0,1 to 3,4           | 0,3 to 10   | 20,7 mbar to 0,4   | 500                  | 34,5  | 1000             | 68,9  |
| 185   | 4 to 100                   | 0,3 to 6,9           | 0,5 to 16   | 34,5 mbar to 0,7   | 500                  | 34,5  | 1000             | 68,9  |
| 186   | 8 to 200                   | 0,6 to 13,8          | 0,5 to 21,5 | 34,5 mbar to 1,2   | 500                  | 34,5  | 1000             | 68,9  |
| 188   | 50 to 1000                 | 3,4 to 68,9          | 30 to 300   | 2,1 to 20,7        | 2000                 | 137,9 | 7000             | 482,6 |
| 189   | 250 to 3500                | 17,2 to 241,3        | 50 to 500   | 3,4 to 34,5        | 4000                 | 275,8 | 7000             | 482,6 |
| 316L stainless steel diaphragm (optional Hastelloy® C, or Monel®; Viton® GLT O-ring (optional Kalrez®, Silicone, Ethylene Propylene or Aflas®); 316 stainless steel 1/2" NPT (female) pressure connection (optional Hastelloy® C, or Monel®), 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                    | 0,1 to 1,4           | 0,3 to 5    | 20,7 mbar to 0,3   | 500                  | 34,5  | 1000             | 68,9  |
| 484   | 2 to 50                    | 0,1 to 3,4           | 0,3 to 10   | 20,7 mbar to 0,4   | 500                  | 34,5  | 1000             | 68,9  |
| 485   | 4 to 100                   | 0,3 to 6,9           | 0,5 to 16   | 34,5 mbar to 0,7   | 500                  | 34,5  | 1000             | 68,9  |
| 486   | 8 to 200                   | 0,6 to 13,8          | 0,5 to 21,5 | 34,5 mbar to 1,2   | 500                  | 34,5  | 1000             | 68,9  |
| 488   | 50 to 1000                 | 3,4 to 68,9          | 30 to 300   | 2,1 to 20,7        | 2000                 | 137,9 | 7000             | 482,6 |
| 489   | 250 to 3500                | 17,2 to 241,3        | 50 to 500   | 3,4 to 34,5        | 4000                 | 275,8 | 7000             | 482,6 |

**Application Note:** 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.

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**Tri-Clamp®** is a registered trademark of Alfa Laval.

## 117 Series

## PRESSURE MODEL CHART

| Model   | Adjustable Set Point Range |              | Deadband           |                    |            | *Over Range Pressure | **Proof Pressure |      |
|---|----------------------------|--------------|--------------------|--------------------|------------|----------------------|------------------|------|
| Type H117   | psi (unless noted)         | bar          | psi (unless noted) | bar (unless noted) | psi        | bar                  | psi              | bar  |
| Phosphor bronze bellows with nickel-plated brass 1/4" NPT (female) pressure connection; 303 stainless steel spring exposed to media                                   |                            |              |                    |                    |            |                      |                  |      |
| 218   | 30 "Hg Vac to 0            | -1 to 0      | 2 to 5 "Hg         | 0,07 to 0,17       | 3          | 0,2                  | 30               | 2,1  |
| Welded 316L stainless steel bellows and 1/4" NPT (female) pressure connection   |                            |              |                    |                    |            |                      |                  |      |
| 358   | 15 to 200                  | 1,0 to 13,8  | 6 to 20            | 0,4 to 1,4         | 200        | 13,8                 | 800              | 55,2 |
| 361   | 20 to 300                  | 1,4 to 20,7  | 8 to 22            | 0,6 to 1,5         | 300        | 20,7                 | 800              | 55,2 |
| 376   | 25 to 500                  | 1,7 to 34,5  | 10 to 28           | 0,7 to 1,9         | 500        | 34,5                 | 800              | 55,2 |
| Lower 75% range span      Top 25% range span      Lower 75% range span<br>psi (unless noted)      psi      bar  |                            |              |                    |                    |            |                      |                  |      |
| Welded 316 stainless steel diaphragm and 1/2" NPT (female) pressure connection, large 0.72" orifice for clean-out purposes; NACE MR-0175 compliant (except model 194) |                            |              |                    |                    |            |                      |                  |      |
| 190   | 5 to 30                    | 0,3 to 2,1   | 3 to 8             | 10 max             | 0,2 to 0,6 | 1500                 | 103,4            | 2500 |
| 191   | 10 to 100                  | 0,7 to 6,9   | 3 to 30            | 45 max             | 0,2 to 2,1 | 1500                 | 103,4            | 2500 |
| 192   | 15 to 300                  | 1,0 to 20,7  | 10 to 40           | 60 max             | 0,7 to 2,8 | 1500                 | 103,4            | 2500 |
| 193   | 20 to 500                  | 1,4 to 34,5  | 15 to 45           | 75 max             | 1,0 to 3,1 | 1500                 | 103,4            | 2500 |
| 194   | 80 to 1700                 | 5,5 to 117,2 | 5 to 120           | 200 max            | 0,3 to 8,3 | 2000                 | 137,9            | 2500 |
| Welded 316 stainless steel diaphragm and 1/2" NPT (female) pressure connection, 0.06" orifice to dampen pulsations; NACE MR-0175 compliant (except model 494)         |                            |              |                    |                    |            |                      |                  |      |
| 490   | 5 to 30                    | 0,3 to 2,1   | 3 to 8             | 10 max             | 0,2 to 0,6 | 1500                 | 103,4            | 2500 |
| 491   | 10 to 100                  | 0,7 to 6,9   | 3 to 30            | 45 max             | 0,2 to 2,1 | 1500                 | 103,4            | 2500 |
| 492   | 15 to 300                  | 1,0 to 20,7  | 10 to 40           | 60 max             | 0,7 to 2,8 | 1500                 | 103,4            | 2500 |
| 493   | 20 to 500                  | 1,4 to 34,5  | 15 to 45           | 75 max             | 1,0 to 3,1 | 1500                 | 103,4            | 2500 |
| 494   | 80 to 1700                 | 5,5 to 117,2 | 5 to 120           | 200 max            | 0,3 to 8,3 | 2000                 | 137,9            | 2500 |

**Deadband Notes:** 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 welded stainless steel diaphragm sensor and hermetically sealed 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).

| Model   | Adjustable Set Point Range<br>Low end of range on fall;<br>High end of range on rise |                    | Deadband           |                    | *Over Range Pressure   |                  | **Proof Pressure   |       |
|---|--|--------------------|--------------------|--------------------|------------------------|------------------|--|-------|
| Type H117   | psi  | bar                | psi                | bar                | psi                    | bar              | psi  | bar   |
| Buna N diaphragm and O-ring with 303 stainless steel 1/4" NPT (female) pressure connection; option M540 Viton® diaphragm and O-ring available |  |                    |                    |                    |                        |                  |  |       |
| 700   | 3 to 20  | 0,2 to 1,4         | 1,0 to 4           | 0,1 to 0,3         | 500                    | 34,5             | 1000   | 68,9  |
| 702   | 3 to 100   | 0,2 to 6,9         | 2 to 12            | 0,1 to 0,8         | 500                    | 34,5             | 1000   | 68,9  |
| 704   | 15 to 500  | 1,0 to 34,5        | 15 to 30           | 1,0 to 2,1         | 1500                   | 103,4            | 2500   | 172,4 |
| 706   | 100 to 1700  | 6,9 to 117,2       | 20 to 110          | 1,4 to 7,6         | 2000                   | 137,9            | 2500   | 172,4 |
| <b>DIFFERENTIAL PRESSURE MODEL CHART</b>  |  |                    |                    |                    |                        |                  |  |       |
| Model   | Adjustable Set Point Range<br>Low end of range on fall;<br>High end of range on rise |                    | Deadband           |                    | ***Working<br>Pressure |                  | **Proof<br>Pressure  |       |
| Type H117K  | psi (unless noted)   | bar (unless noted) | psi (unless noted) | bar (unless noted) | psi (unless noted)     | bar              | psi  | bar   |
| Kapton® diaphragm, Buna N sealing diaphragms and epoxy coated aluminum 1/8" NPT (female) pressure connections                                 |  |                    |                    |                    |                        |                  |  |       |
| 540   | 0.8 to 7 "wcd  | 2,0 to 17,4 mbar   | 0.1 to 1.3 "wc     | 0,2 to 3,2 mbar    | 30 "Hg to 200          | -1 to 13,8       | 400  | 27,6  |
| 541   | 2 to 20 "wcd   | 5,0 to 49,8 mbar   | 0.2 to 1.6 "wc     | 0,5 to 4,0 mbar    | 30 "Hg to 200          | -1 to 13,8       | 400  | 27,6  |
| 542   | 5 to 50 "wcd   | 12,4 to 124,5 mbar | 0,4 to 4,0 "wc     | 1,0 to 10,0 mbar   | 30 "Hg to 200          | -1 to 13,8       | 400  | 27,6  |
| 543   | 10 to 200 "wcd   | 24,9 to 497,8 mbar | 0,8 to 12 "wc      | 2,0 to 29,9 mbar   | 30 "Hg to 200          | -1 to 13,8       | 400  | 27,6  |
| 544   | 2 to 20  | 0,1 to 1,4         | 0,2 to 2           | 13,8 mbar to 0,1   | 30 "Hg to 1200         | -1 to 82,7       | 2500   | 172,4 |
| 545   | 5 to 50  | 0,3 to 3,4         | 0,4 to 3,2         | 27,6 mbar to 0,2   | 30 "Hg to 1200         | -1 to 82,7       | 2500   | 172,4 |
| 546   | 10 to 125  | 0,7 to 8,6         | 0,7 to 7           | 48,3 mbar to 0,5   | 30 "Hg to 1200         | -1 to 82,7       | 2500   | 172,4 |
| 547   | 50 to 250  | 3,4 to 17,2        | 1 to 15            | 0,1 to 1,0         | 30 "Hg to 1200         | -1 to 82,7       | 2500   | 172,4 |
| 548   | 100 to 500   | 6,9 to 34,5        | 2 to 20            | 0,1 to 1,4         | 30 "Hg to 1200         | -1 to 82,7       | 2500   | 172,4 |
| <b>TEMPERATURE MODEL CHART</b>  |  |                    |                    |                    |                        |                  |  |       |
| Model   | Adjustable Set Point Range   |                    | Max. Temp          | Scale<br>Division  | †Stem/Bulb<br>Size     |                  |  |       |
| Type B117   | °F   | °C                 | °F                 | °C                 | °F                     | °C               | OD x Length  |       |
| 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) |       |
| <b>Type E117</b>  |  |                    |                    |                    |                        | Bulb OD x length |  |       |
| 2BSA  | -120 to 100  | -84.4 to 37.8      | 150                | 65.6               | 10                     | 5                | 3/8 x 2-7/16"  |       |
| 5BS   | -20 to 80  | -28.9 to 26.7      | 130                | 54.4               | 5                      | 2                | 3/8 x 5"   |       |
| 4BS   | 25 to 100  | -3.9 to 37.8       | 150                | 65.6               | 2                      | 1                | 3/8 x 6-3/4"   |       |
| 2BSB  | 30 to 250  | -1.1 to 121.1      | 300                | 148.9              | 10                     | 5                | 3/8 x 2-7/16"  |       |
| 3BS   | 100 to 400   | 37.8 to 204.4      | 450                | 232.2              | 10                     | 5                | 3/8 x 2-1/8"   |       |
| 8BS   | 350 to 640   | 176.7 to 337.8     | 690                | 365.6              | 10                     | 5                | 3/8 x 3-1/4"   |       |

Kapton® is a registered trademark of E.I. DuPont.

†Optional immersion stem lengths and capillary lengths are available.

# 117 Series

## HOW TO ORDER

### BUILDING A PART NUMBER

#### Select a **Type**

Refer to the "Type" section below.

Determine type number based on switch output, enclosure, adjustment and reference.

Fill in the type portion of your part number with the corresponding number.

#### Select a **Model**

Refer to the "Model Charts".

Determine model based on adjustable range, deadband and proof pressure.

Fill in the model portion of your part number with the corresponding number.

#### Select an **Option**

Refer to the "Options" section.

Determine option number based on switch output, optional materials or other product enhancements.

Fill in the option portion of your part number with the corresponding number.

Leave "option" portion blank if no options are needed. *FOR MULTIPLE OPTIONS:* Call United Electric Controls.

| <b>TYPE</b>           | <b>DESCRIPTION</b>  |
|-----------------------|---|
| Pressure              | Type H117 - One SPDT output; epoxy coated enclosure; internal adjustment with "High-Low" reference scale  |
| Differential Pressure | Type H117K - One SPDT output; epoxy coated enclosure; internal adjustment with "High-Low" reference scale   |
| Temperature           | Type B117 - Immersion stem; One SPDT output; epoxy coated enclosure; internal adjustment with calibrated dial scale,<br>Type E117 - Bulb and capillary; One SPDT output; epoxy coated enclosure; internal adjustment with calibrated dial scale |

#### **SWITCH OPTIONS\***

|      |  |
|------|--|
| 1190 | Hermetically sealed, DPDT, 11 A 125/250 VAC, products set on rising pressure or temperature only. 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 523, 533 |
| 1195 | Hermetically sealed, DPDT, 11 A 125/250 VAC; products set on falling pressure or temperature only. 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 523, 533 |

#### **SENSOR AND OTHER OPTIONS**

|           |  |
|-----------|--|
| M201      | Factory set one switch, specify increasing or decreasing pressure or temperature and setpoint  |
| M277      | Range indicated on nameplate in kPa/MPa, factory selected. NOT AVAILABLE TEMPERATURE VERSIONS  |
| M278      | Range indicated on nameplate in Kg/cm <sup>2</sup> . NOT AVAILABLE TEMPERATURE VERSIONS  |
| M405      | Intrinsic safety compliance for European Union per ATEX standards  |
| M406      | Intrinsic safety compliance for Russia per Gosgortekhnadzor standards  |
| M407      | CE compliance to Pressure Equipment Directive (category IV). AVAILABLE ON MODELS 171-174, 183-189, 192-194, and 700-706 only. Optional sensor material for corrosive media are excluded.   |
| M444      | Paper ID tag   |
| M446      | Stainless steel ID tag & wire attachment   |
| M449      | Mounting bracket kit. Required for models 520-535 when surface mounting. Use kit part number 6361-704 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. AVAILABLE ON MODELS 700-704 (Viton diaphragm and o-ring, stainless steel pressure connection), AND 540-548 (sealing diaphragms only, main diaphragm remains Kapton®, pressure connections remain aluminum) |
| M550      | Oxygen service cleaning; internal construction may change. NOT AVAILABLE PRESSURE MODEL 706 OR TEMPERATURE TYPE E117   |
| SD6286-51 | Watertight conduit fitting; converts 7/8" hole to 1/2" NPT (female) fitting  |
| 6361-704  | Surface and Pipe Mounting Hardware (required for model 520-535, 540-548 when surface mounting)   |

\*Refer to Electrical Ratings under Specifications on page 3 for DC ratings.

**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.<br>(Over range pressure is limited to 100 psi) |
| XC005 | 316L Stainless steel pressure connection, Viton® diaphragm, Viton® O-ring   |
| XC006 | 316L Stainless steel pressure connection, Kapton® 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; NOT NACE COMPLIANT             |
| XD003 | Monel® diaphragm; NOT NACE COMPLIANT                   |
| XP112 | Hastelloy® C pressure connection; NOT NACE COMPLIANT   |
| XP113 | Monel® pressure connection; NOT NACE COMPLIANT         |
| XR211 | Kalrez® O-ring   |
| XR212 | Silicone O-ring. NOT AVAILABLE MODELS 188-189, 488-489 |
| XR213 | Ethylene Propylene O-ring                              |
| XR214 | Aflas® O-ring  |

**OPTIONAL FLUSH MOUNT FLANGES. AVAILABLE MODELS 560-567**

Other flanges (150# and 300#) available, please consult UE. Flanges conform to ANSI B16.5. Maximum pressure is limited by flange rating.

|      |  |
|------|--|
| F196 | Flush mounted flange, 150#, 1" lap joint, raised face. AVAILABLE MODELS 565-567 ONLY |
| F197 | Flush mounted flange, 150#, 2" lap joint, raised face. AVAILABLE MODELS 560-564 ONLY |
| F198 | Flush mounted flange, 300#, 1" lap joint, raised face. AVAILABLE MODELS 565-567 ONLY |
| F199 | Flush mounted flange, 300#, 2" lap joint, raised face. AVAILABLE MODELS 560-564 ONLY |

**OPTIONS FOR TEMPERATURE MODELS****UNION CONNECTORS** (Dimensional drawings may be found at [www.ueonline.com](http://www.ueonline.com))

| 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** (Dimensional drawings may be found at [www.ueonline.com](http://www.ueonline.com))

For all bulb & capillary switches

|                            |            |   |
|----------------------------|------------|---|
| <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

|      |            |                                   |
|------|------------|-----------------------------------|
| W139 | SD6225-139 | 3/4" NPT X 1-23/32" BT, BRASS     |
| W140 | SD6225-140 | 3/4" NPT X 1-23/32" BT, 316 ST/ST |

# 117 Series

## OPTIONS FOR TEMPERATURE MODELS

### 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 st/st thermowell |

#### OPTIONAL LENGTHS:

Optional immersion stem lengths to 15" available in brass, with or without 316 st/st thermowell. Consult UE for additional information.

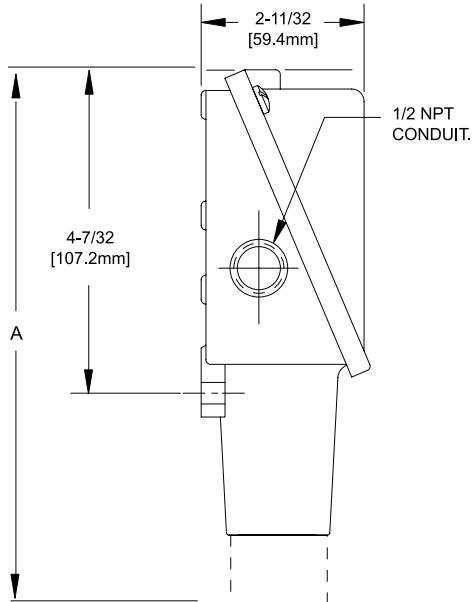
Optional capillary length to \*50' available in copper or 304 st/st. Armor or Teflon® capillary protection available to lengths less than or equal to capillary length. Consult UE for additional information.

\* Consult UE regarding repeatability and ambient effects on capillary lengths over 30'.

## DIMENSIONAL DRAWINGS

Dimensional drawings for all models may be found at [www.ueonline.com](http://www.ueonline.com)

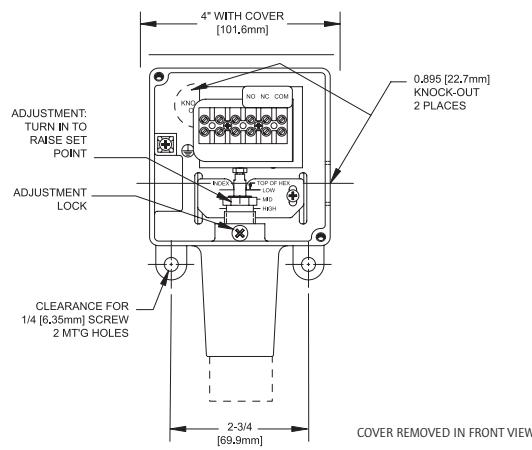
Types H117, H117K, B117, E117



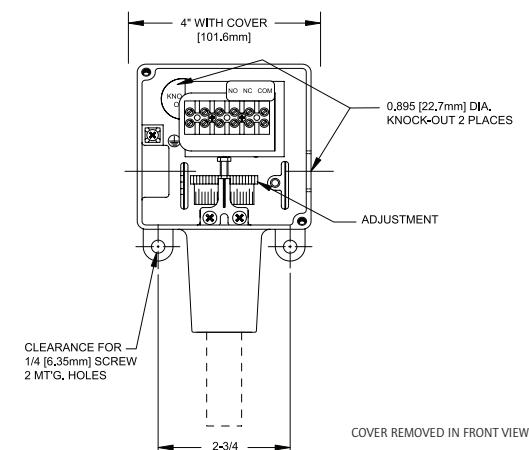
| Models                       | Dimension A |       |                         |
|------------------------------|-------------|-------|-------------------------|
|                              | Inches      | mm    | NPT                     |
| <b>Pressure</b>              |             |       |                         |
| 171-174                      | 7.63        | 193.8 | 1/2                     |
| 183-186, 483-486             | 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                     |
| 358-376                      | 7.00        | 177.8 | 1/4                     |
| 520-525                      | 8.44        | 214.4 | 1/2                     |
| 530-535                      | 8.00        | 203.2 | 1/2                     |
| 560-564                      | 6.63        | 168.4 | 2" Sanitary Fitting     |
| 565-567                      | 6.63        | 168.4 | 1-1/2" Sanitary Fitting |
| 700-706                      | 6.63        | 168.4 | 1/4                     |
| <b>Differential Pressure</b> |             |       |                         |
| 540-543                      | 8.47        | 215.1 | 1/8                     |
| 544-548                      | 8.53        | 216.7 | 1/8                     |
| <b>Temperature</b>           |             |       |                         |
| 120,121                      | 9.38        | 238.3 | Immersion Stem          |
| 2BSA-8BS                     | 8.69        | 220.7 | Bulb & Capillary        |

All dimensions stated in inches (millimeters)

Types H117, H117K

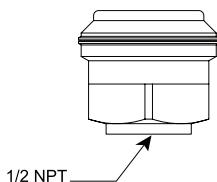


Types B117, E117

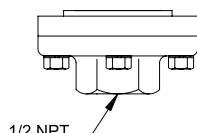


## PRESSURE SENSORS

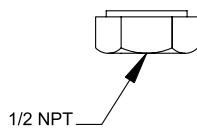
Models 171-174



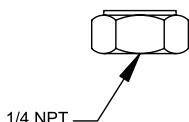
Models 183-186, 483-486



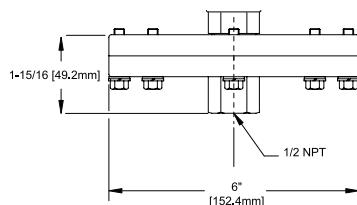
Models 188-194, 488-494



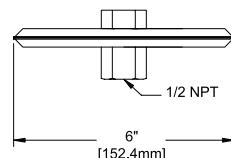
Models 218-376, 700-706



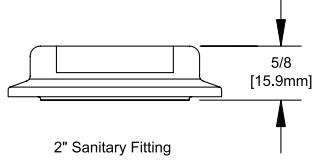
Models 520-525



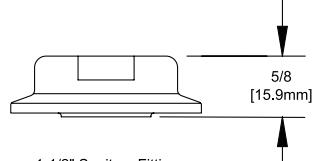
Models 530-535



Models 560-564

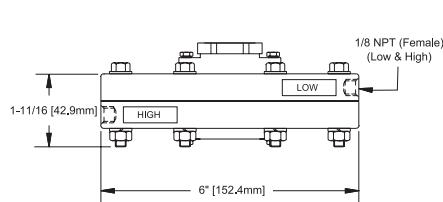


Models 565-567

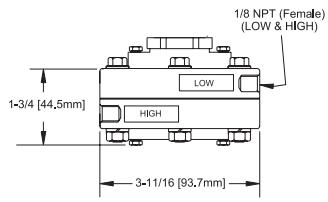


## DIFFERENTIAL PRESSURE SENSORS

Models 540-543

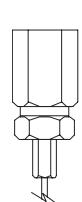


Models 544-548

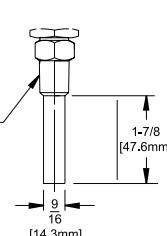


## TEMPERATURE SENSORS

Model 2BSA-8BS



Model 120-121



## **RECOMMENDED PRACTICES AND WARNINGS**

United Electric Controls Company recommends careful consideration of the following factors when specifying and installing UE pressure and temperature units. Before installing a unit, the Installation and Maintenance instructions provided with unit must be read and understood.

- To avoid damaging unit, proof pressure and maximum temperature limits stated in literature and on nameplates must never be exceeded, even by surges in the system. Operation of the unit up to maximum pressure or temperature is acceptable on a limited basis (e.g., start-up, testing) but continuous operation must be restricted to the designated adjustable range. Excessive cycling at maximum pressure or temperature limits could reduce sensor life.
- A back-up unit is necessary for applications where damage to a primary unit could endanger life, limb or property. A high or low limit switch is necessary for applications where a dangerous runaway condition could result.
- The adjustable range must be selected so that incorrect, inadvertent or malicious setting at any range point cannot result in an unsafe system condition.
- Install unit where shock, vibration and ambient temperature fluctuations will not damage unit or affect operation. When applicable, orient unit so that moisture does not enter the enclosure via the electrical connection. When appropriate, this entry point should be sealed to prevent moisture entry.
- Unit must not be altered or modified after shipment. Consult UE if modification is necessary.
- Monitor operation to observe warning signs of possible damage to unit, such as drift in set point or faulty display. Check unit immediately.
- Preventative maintenance and periodic testing is necessary for critical applications where damage could endanger property or personnel.
- Electrical ratings stated in literature and on nameplate must not be exceeded. Overload on a switch can cause damage, even on the first cycle. Wire unit according to local and national electrical codes, using wire size recommended in installation sheet.
- Do not mount unit in ambient temp. exceeding published limits.

## **LIMITED WARRANTY**

Seller warrants that the product hereby purchased is, upon delivery, free from defects in material and workmanship and that any such product which is found to be defective in such workmanship or material will be repaired or replaced by Seller (Ex-works, Factory, Watertown, Massachusetts. INCOTERMS); provided, however, that this warranty applies only to equipment found to be so defective within a period of 36 months from the date of manufacture by the Seller. Seller shall not be obligated under this warranty for alleged defects which examination discloses are due to tampering, misuse, neglect, improper storage, and in any case where products are disassembled by anyone other than authorized Seller's representatives. EXCEPT FOR THE LIMITED WARRANTY OF REPAIR AND REPLACEMENT STATED ABOVE, SELLER DISCLAIMS ALL WARRANTIES WHATSOEVER WITH RESPECT TO THE PRODUCT, INCLUDING ALL IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR ANY PARTICULAR PURPOSE.

## **LIMITATION OF SELLER'S LIABILITY**

SELLER'S LIABILITY TO BUYER FOR ANY LOSS OR CLAIM, INCLUDING LIABILITY INCURRED IN CONNECTION WITH (I) BREACH OF ANY WARRANTY WHATSOEVER, EXPRESSED OR IMPLIED, (II) A BREACH OF CONTRACT, (III) A NEGLIGENT ACT OR ACTS (OR NEGLIGENT FAILURE TO ACT) COMMITTED BY SELLER, OR (IV) AN ACT FOR WHICH STRICT LIABILITY WILL BE INPUTTED TO SELLER, IS LIMITED TO THE "LIMITED WARRANTY" OF REPAIR AND/OR REPLACEMENT AS SO STATED IN OUR WARRANTY OF PRODUCT. IN NO EVENT SHALL THE SELLER BE LIABLE FOR ANY SPECIAL, INDIRECT, CONSEQUENTIAL OR OTHER DAMAGES OF A LIKE GENERAL NATURE, INCLUDING, WITHOUT LIMITATION, LOSS OF PROFITS OR PRODUCTION, OR LOSS OR EXPENSES OF ANY NATURE INCURRED BY THE BUYER OR ANY THIRD PARTY.

*UE specifications subject to change without notice.*

## **U.S. SALES OFFICES**

United Electric Controls  
31 Old Stage Road  
Hampton Falls, NH 03844  
Phone: 617-899-1132  
email: northeastsales@ueonline.com

United Electric Controls  
28 N. Wise Ave.  
Freeport, IL 61032  
Phone: 815-341-2588  
email: midwestsales@ueonline.com

United Electric Controls  
1022 Vineyard Drive  
Conyers, GA 30013  
Phone: 770-335-9802  
email: southeastsales@ueonline.com

United Electric Controls  
5829 Grazing Court  
Mason, OH 45040  
Phone: 513-535-5486  
email: midatlanticsales@ueonline.com

United Electric Controls  
102 Salazar Court  
Clayton, CA 94517  
Phone: 925-408-5997  
email: westcoastsales@ueonline.com

United Electric Controls  
27 Summit Terrace  
Sparta, NJ 07871  
Phone: 973-271-2550  
email: easternsales@ueonline.com

United Electric Controls  
4306 Whickham Drive  
Fulshear, TX 77441  
Phone: 832-457-6138  
email: southwestsales@ueonline.com

United Electric Controls  
5201 Arbor Court  
Odessa, TX 79762  
Phone: 432-770-4164  
email: westtexassales@ueonline.com

## **CANADA**

EASTERN  
68 Mosley Crescent  
Brampton, Ontario  
Canada L6Y 5C8  
Phone: 905-455-5131  
FAX: 905-455-5131

WESTERN  
148 Silver Ridge Close N.W.  
Calgary, Alberta  
Canada T3B 3T4  
Phone: 403-247-3724  
FAX: 403-247-3724



**UNITED ELECTRIC  
CONTROLS**

180 Dexter Avenue, P.O. Box 9143  
Watertown, MA 02471-9143 USA  
Telephone: 617 926-1000 Fax: 617 926-2568  
<http://www.ueonline.com>

## **INTERNATIONAL OFFICES**

### **CHINA**

United Electric Controls, *Shanghai Office*  
Room 1011, 10th Flr,  
Huai Hai Zhonghua Building  
No. 885, Renmin Road, Luwan District  
Shanghai 200010, P.R. China  
Phone: +8621-6255 8059  
email: chinasales@ueonline.com

United Electric Controls, *Beijing Office*  
Room 1006, Jainhao International Bldg.  
Block D, No. 116  
Zizhuyuanlu, Haidian District  
Beijing, China 100089  
Phone & Fax: +86-10-5893-0551  
email: beijingsales@ueonline.com

### **EASTERN EUROPE & SCANDINAVIA**

United Electric Controls  
05-806 Komorow  
Kujawska 5, Poland  
Phone: +48 22 499 4804  
email: easterneuropeales@ueonline.com

### **GERMANY**

United Electric Controls  
An Der Zentlinde 21  
D-64711 Erbach, Germany  
Phone: 496-062-7400  
email: europeansales@ueonline.com

### **INDIA**

United Electric Controls  
402, Aries Avenue-I, 58-United Colony  
Sama, Baroda - 390008, India  
Phone: +91-265-2788654  
email: indiasales@ueonline.com

### **ASIA-PACIFIC**

United Electric Controls, Far East  
No. 1-2-2, 2nd Floor  
Jalan 4/101C  
Cheras Business Centre  
Batu 5, Jalan Cheras  
56100 Kuala Lumpur, Malaysia  
Phone: 603-9133-4122  
email: fareastsales@ueonline.com

### **MEXICO**

United Electric Controls  
Zacatecas #206 Suite 20  
Col Guadalupe CP 89120  
Tampico, Tamaulipas Mexico  
Phone: 52 (833) 2175201  
email: latinamericasales@ueonline.com

### **RUSSIA**

United Electric Controls, Moscow  
Elninskaya str., 15-140  
Moscow, 121552, Russia  
Phone: +7 (495) 792-88-06  
email: russiansales@ueonline.com

## PRESSURE SWITCH



### FEATURES

- Tamper-Resistant Field Adjustment
- Adjustable Ranges from 4 to 7500 PSI (0,3 to 517,1 Bar)
- Choice of 7 Electrical Terminations
- 1-1/4" Diameter
- Height as Small as 3"

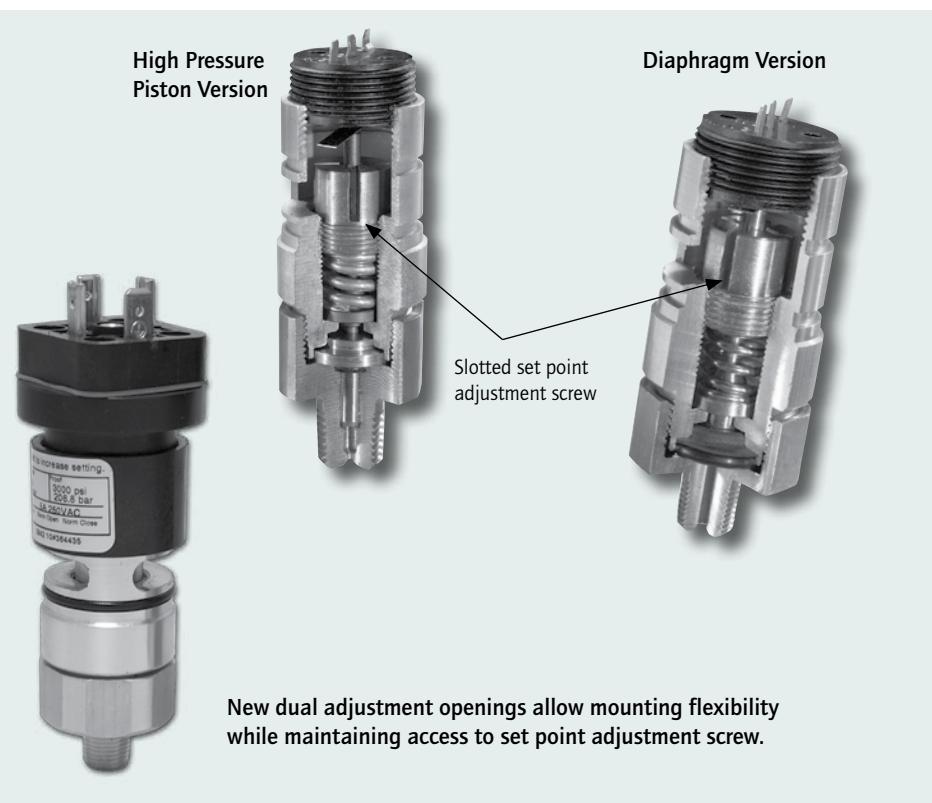
## OVERVIEW

Available with seven electrical termination varieties, a choice of sensors, and several pressure connections, the 10 Series is designed to meet most requirements for a variety of OEM and industrial applications. Just 1-1/4 inches in diameter and as small as 3 inches high, this compact, cylindrical switch mounts wherever space is at a premium. A reliable and cost-effective switch, the 10 Series is ideal for applications with high settings and surges. Among the tough applications in which the product has proven itself are: mobile hydraulic units, compactors, balers and lube oil systems.

In addition to standard capabilities, modified designs or options are available to help you meet specific application requirements. Design flexibility allows for customized pressure connections, electrical terminations and pressure ranges. Consult UE for all product capabilities, order restrictions and special conditions.

## FEATURES

- cULus recognized, CE compliant to low voltage directive and pressure equipment directive
- Optional ATEX intrinsic safety compliance
- NPT or SAE threaded pressure connections
- Choice of 7 electrical terminations
- Optional leadwire/cable lengths
- Rugged and vibration resistant
- Proof pressures up to 12,000 psi (827 bar)



**SPECIFICATIONS**

|                                   |   |
|-----------------------------------|---|
| <b>STORAGE TEMPERATURE</b>        | -40 to 180°F (-40 to 82°C)  |
| <b>AMBIENT TEMPERATURE LIMITS</b> | 0 to 160°F (-18 to 71°C) with Buna-N construction; 0 to 180°F (-18 to 82°C) with Viton® construction; set point shifts less than 1% of range for a 50°F (28°C) ambient temperature change. Unit will operate down to -40°F (-40°C) but with reduced repeatability                           |
| <b>MAX. MEDIA TEMPERATURE</b>     | 200°F (93°C) with Buna-N sensor; 250°F (121°C) with Viton® sensor   |
| <b>SHOCK</b>                      | Set point repeats after 50 G, 10 millisecond duration   |
| <b>VIBRATION</b>                  | Set point repeats after 10 G, 5-500 CPS   |
| <b>ENCLOSURE CLASSIFICATION</b>   | Types C, D, E, F & G: Designed to meet enclosure type 4 requirements Types A & B: Not applicable  |
| <b>SET POINT REPEATABILITY</b>    | Models 10-12: ± 1% of full scale range; Models 13-16: ± 1.5% of full scale range  |
| <b>SWITCH OUTPUT</b>              | One SPDT  |
| <b>ELECTRICAL RATING</b>          | Rated to 5 A resistive and 5 A inductive (75% power factor), at 125 VAC & 250 VAC, 1/4 HP; 5 A resistive and 3 A inductive at 30 VDC; 0.5 A resistive and 0.25 A inductive at 125 VDC; gold flashing over silver contact for loads down to 5 mA at 6 VDC, 2 mA at 12 VDC and 1 mA at 24 VDC |
| <b>ENCLOSURE</b>                  | Aluminum  |
| <b>WEIGHT</b>                     | Type A: 5 oz.; Type B: 6 oz.; Type C: 6.5 oz.; Type D: 6 oz.; Type E: 12 oz.; Type F: 6.5 oz.; Type G: 12 oz.   |
| <b>ELECTRICAL CONNECTION</b>      | 7 electrical terminations; Refer to "How to Order"  |
| <b>PRESSURE CONNECTION</b>        | Models 10-12: 1/8" NPT (male); Models 13-16: 1/4" NPT (male); optional SAE threads and other connections (see options list)   |
| <b>MOUNTING</b>                   | Via pressure connection. Surface mounting bracket kit available for field installation. (see Options list)  |

## 10 Series

## APPROVALS



## UNITED STATES AND CANADA

UL Recognized, cUL Recognized  
Pressure: UL 508; CSA C22.2 No. 14, file # E42272



## EUROPE

## ATEX Directive (94/9/EC)

II 1 G Ex ia IIC T6 (OPTIONAL - code M405)



Tamb = -50°C to +60°C

UL International DEMKO A/S (N.B.# 0539)

Certificate # DEMKO 03 ATEX 0335063

EN 50014, 50020 & 50284

## Low Voltage Directive (LVD) (73/23/EC &amp; 93/68/EEC)

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 Equipment Directive (PED) (97/23/EC)

Compliant to PED

Products rated lower than 7.5 psi are outside the scope of the PED



## RUSSIA

## Gosgortekhnadzor Permit (OPTIONAL - code M406)

0ExiaIICT6

Tamb = -50°C to +60°C

NANIO CCVE Certification Center

Certificate # ROSS US.GB05.Bo2933

GOST 51330.0, 51330.1, 51330.10 & 51330.14

## MODEL CHART

| Range Code  | Adjustable Set Point Range      |                                  | Deadband   |                       | Over Range Pressure* |       | Proof Pressure** |       |
|---|---------------------------------|----------------------------------|------------|-----------------------|----------------------|-------|------------------|-------|
|   | Low end of range on fall<br>psi | High end of range on rise<br>bar | psi        | bar<br>(unless noted) | psi                  | bar   | psi              | bar   |
| Buna-N diaphragm and O-ring with 1/8" NPT (male) brass pressure connection              |                                 |                                  |            |                       |                      |       |                  |       |
| 10  | 4 to 50                         | 0,3 to 3,4                       | 1 to 6     | 68,9 mbar to 0,4 bar  | 1000                 | 68,9  | 3000             | 206,8 |
| 11  | 10 to 150                       | 0,7 to 10,3                      | 2 to 10    | 0,1 to 0,7            | 1500                 | 103,4 | 3000             | 206,8 |
| 12  | 30 to 600                       | 2,1 to 41,4                      | 8 to 60    | 0,6 to 4,1            | 2500                 | 172,4 | 3000             | 206,8 |
| Stainless steel piston and Buna-N O-ring with 1/4" NPT (male) brass pressure connection |                                 |                                  |            |                       |                      |       |                  |       |
| 13  | 100 to 1500                     | 6,9 to 103,4                     | 20 to 220  | 1,4 to 15,2           | 8000                 | 551,6 | 10,000           | 689,5 |
| 14  | 180 to 3000                     | 12,4 to 206,8                    | 50 to 400  | 3,4 to 27,6           | 8000                 | 551,6 | 10,000           | 689,5 |
| 15  | 400 to 4700                     | 27,6 to 324,1                    | 100 to 600 | 6,9 to 41,4           | 8000                 | 551,6 | 10,000           | 689,5 |
| 16  | 4000 to 7500                    | 275,8 to 517,1                   | 400 to 950 | 27,6 to 65,5          | 10,000               | 689,5 | 12,000           | 827,4 |

\* 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).

**HOW TO ORDER**

Build a part number by selecting appropriate code for each feature category. Example: 10-B11\*M201

|                             | <b>10</b><br>Series<br>Designation   | <b>B</b><br>Electrical<br>Termination<br>Type   | <b>11</b><br>Range | <b>M201</b><br>Misc. Options |
|-----------------------------|--|---|--------------------|------------------------------|
| <b>ORDERING CODE</b>        | <b>DESCRIPTION</b>   |   |                    |                              |
| SERIES DESIGNATION          | 10   | Designation for 10 Series product line  | <b>10</b>          | <b>B</b>                     |
| ELECTRICAL TERMINATION TYPE | A<br>B<br>C<br>D<br>E<br>F<br>G  | 0.11" push-on terminals. Mating terminals supplied<br>0.25" push-on terminals<br>NEMA 4; 1/2" NPT (male) conduit connection; 20" leads<br>NEMA 4; 20" leads<br>NEMA 4; 1/2" NPT (female) conduit connection; 5' cable<br>NEMA 4; 4 terminal DIN connector. Mating part not supplied<br>NEMA 4; 5' cable   |                    | <b>11</b>                    |
| RANGE                       | 10, 11, 12, 13<br>14, 15, 16   | See model chart on page 4   |                    | <b>M201</b>                  |
| MISCELLANEOUS OPTIONS       | M201<br>M277<br>M278<br>M405<br>M406<br>M430<br>M444<br>M446<br>M449<br>M511<br>M512<br>M540<br>M541<br>M550<br>M925<br>M929<br>62169-26<br>L040<br>L060<br>L080<br>L100<br>L120 | Factory set one switch; specify increasing or decreasing pressure and set point<br>Range indicated on nameplate in kPa or MPa, factory selected<br>Range indicated on nameplate in kg/cm <sup>2</sup><br>Intrinsic safety compliance for European Union per ATEX standards<br>Intrinsic safety compliance for Russia per Gosgortekhnadzor standards<br>Cover lock<br>Paper ID Tag<br>Stainless steel ID tag & wire attachment<br>Surface mounting bracket kit<br>1/4" NPT (male) 316 stainless steel pressure connection<br>1/4" NPT (male) brass pressure connection. NOT AVAILABLE ON MODELS 13, 14, 15, OR 16<br>Viton® construction. Deadbands and low end of range may increase (consult factory). Wetted parts include Viton® diaphragm and/or O-ring plus standard pressure connection material<br>Ethylene propylene (EPDM) construction. Deadbands may increase (consult factory). Wetted parts include EPDM diaphragm and/or O-ring plus standard pressure connection material<br>Oxygen service cleaning (alcohol cleaning to remove residue from the process connection); Buna-N diaphragm and/or O-ring changes to Viton®<br>7/16-20 UNF-2A, SAE male brass pressure connection<br>G1/2 straight pipe thread pressure connection<br>Surface mounting bracket kit<br>4' leadwire/cable. NOT AVAILABLE ON TYPES A, B, E, F, G<br>6' leadwire/cable. NOT AVAILABLE ON TYPES A, B, F<br>8' leadwire/cable. NOT AVAILABLE ON TYPES A, B, F<br>10' leadwire/cable. NOT AVAILABLE ON TYPES A, B, F<br>12' leadwire/cable. NOT AVAILABLE ON TYPES A,B, F |                    |                              |

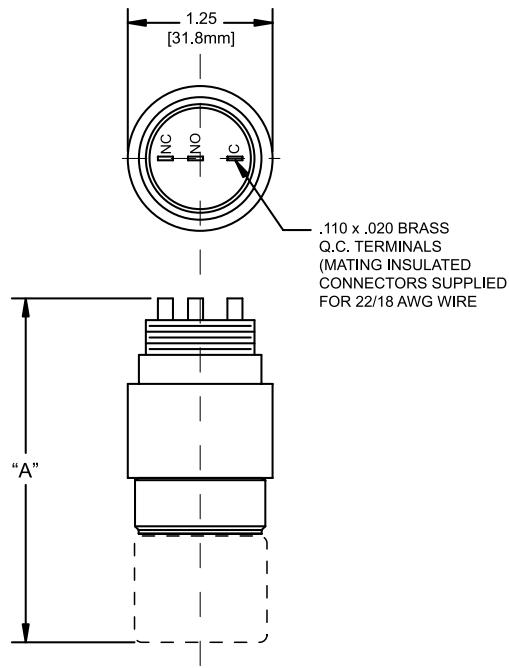
Viton® is a registered trademark of E.I. Dupont Company

## 10 Series

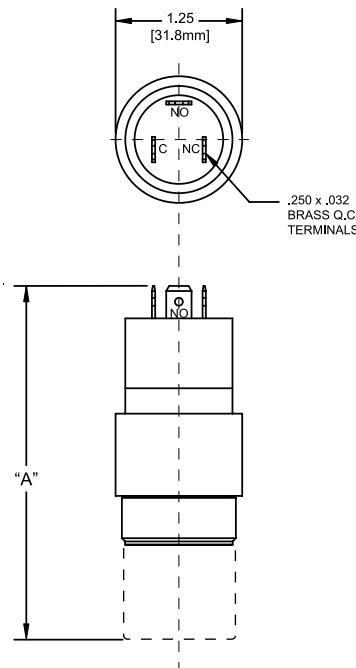
## DIMENSIONAL DRAWINGS

Dimensional drawings for all models may be found at [www.ueonline.com](http://www.ueonline.com)

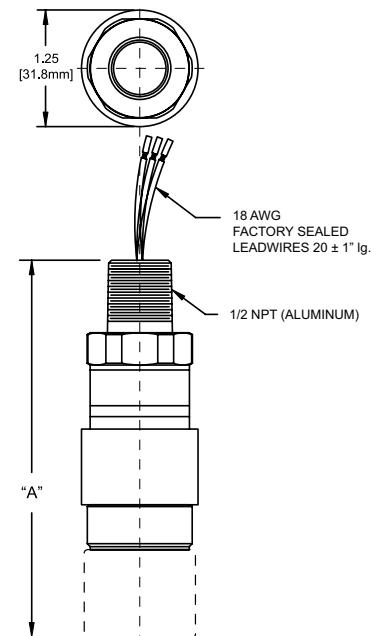
Type 10-A



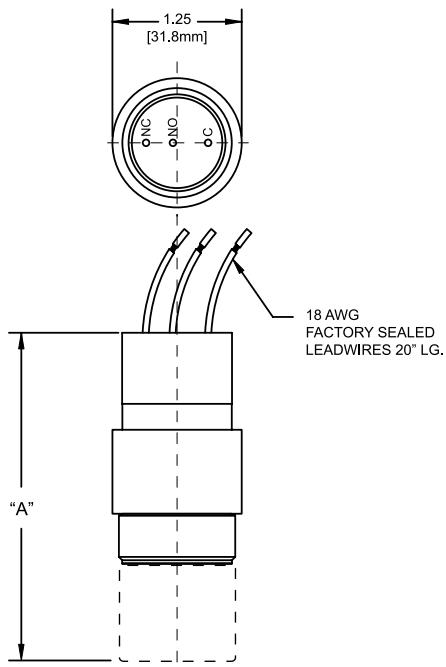
Type 10-B



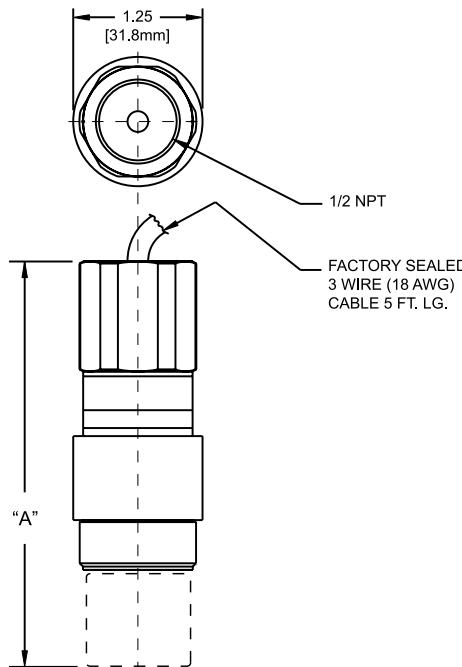
Type 10-C



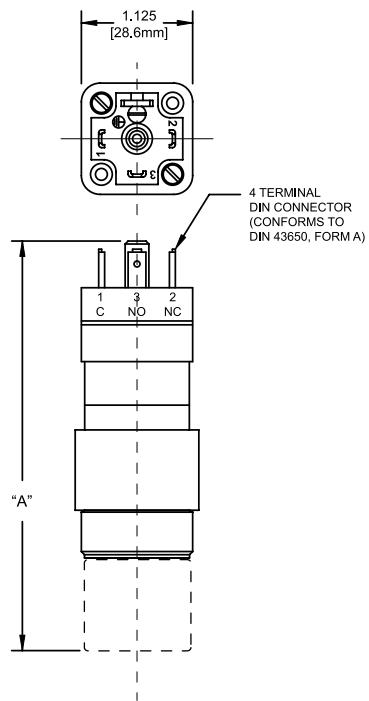
Type 10-D



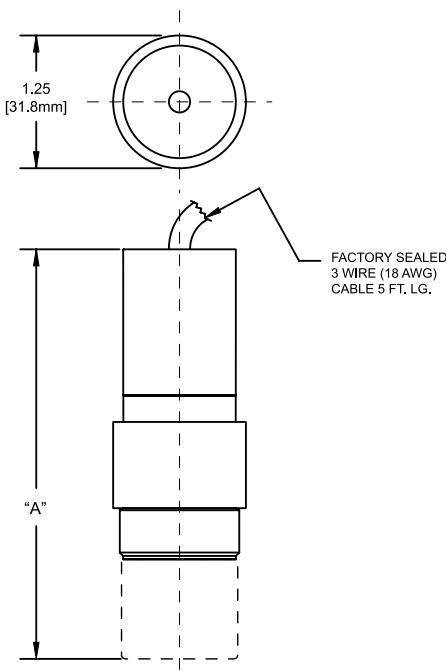
Type 10-E



Type 10-F



Type 10-G

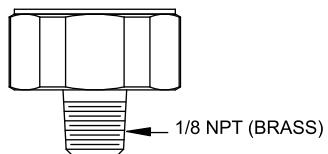


| "A" Dimension Chart |        |       |      |
|---------------------|--------|-------|------|
| Models              | Inches | mm    | NPT  |
| A10-12              | 3.00   | 76.2  | 1/8" |
| A13-16              | 3.31   | 84.1  | 1/4" |
| B10-12              | 3.50   | 88.9  | 1/8" |
| B13-16              | 3.81   | 96.8  | 1/4" |
| C10-12              | 4.06   | 103.2 | 1/8" |
| C13-16              | 4.38   | 111.1 | 1/4" |
| D10-12              | 3.19   | 81.0  | 1/8" |
| D13-16              | 3.50   | 88.9  | 1/4" |
| E10-12              | 3.94   | 100.0 | 1/8" |
| E13-16              | 4.25   | 108.0 | 1/4" |
| F10-12              | 4.13   | 104.8 | 1/8" |
| F13-16              | 4.44   | 112.7 | 1/4" |
| G10-12              | 3.88   | 98.4  | 1/8" |
| G13-16              | 4.19   | 106.4 | 1/4" |

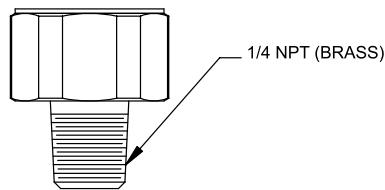
NOTE: For full size drawings, please visit our web site @[www.ueonline.com](http://www.ueonline.com)

## PRESSURE CONNECTION DETAILS

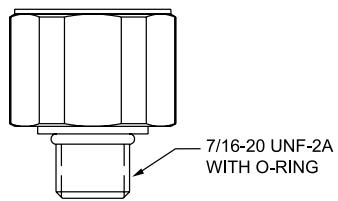
Model 10-12



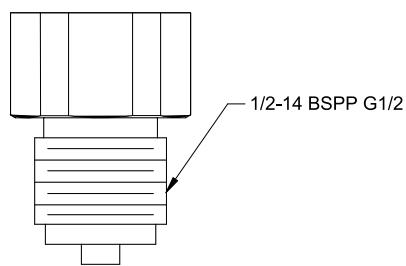
Model 13-16



Option M925



Option M929



## RECOMMENDED PRACTICES AND WARNINGS

United Electric Controls Company recommends careful consideration of the following factors when specifying and installing UE pressure and temperature units. Before installing a unit, the Installation and Maintenance instructions provided with unit must be read and understood.

- To avoid damaging unit, proof pressure and maximum temperature limits stated in literature and on nameplates must never be exceeded, even by surges in the system. Operation of the unit up to maximum pressure or temperature is acceptable on a limited basis (e.g., start-up, testing) but continuous operation must be restricted to the designated adjustable range. Excessive cycling at maximum pressure or temperature limits could reduce sensor life.
- A back-up unit is necessary for applications where damage to a primary unit could endanger life, limb or property. A high or low limit switch is necessary for applications where a dangerous runaway condition could result.
- The adjustable range must be selected so that incorrect, inadvertent or malicious setting at any range point cannot result in an unsafe system condition.
- Install unit where shock, vibration and ambient temperature fluctuations will not damage unit or affect operation. When applicable, orient unit so that moisture does not enter the enclosure via the electrical connection. When appropriate, this entry point should be sealed to prevent moisture entry.
- Unit must not be altered or modified after shipment. Consult UE if modification is necessary.
- Monitor operation to observe warning signs of possible damage to unit, such as drift in set point or faulty display. Check unit immediately.
- Preventative maintenance and periodic testing is necessary for critical applications where damage could endanger property or personnel.
- Electrical ratings stated in literature and on nameplate must not be exceeded. Overload on a switch can cause damage, even on the first cycle. Wire unit according to local and national electrical codes, using wire size recommended in installation sheet.
- Do not mount unit in ambient temp. exceeding published limits.

## LIMITED WARRANTY

Seller warrants that the product hereby purchased is, upon delivery, free from defects in material and workmanship and that any such product which is found to be defective in such workmanship or material will be repaired or replaced by Seller (Ex-works, Factory, Watertown, Massachusetts, INCOTERMS); provided, however, that this warranty applies only to equipment found to be so defective within a period of 24 months from the date of manufacture by the Seller. Seller shall not be obligated under this warranty for alleged defects which examination discloses are due to tampering, misuse, neglect, improper storage, and in any case where products are disassembled by anyone other than authorized Seller's representatives. EXCEPT FOR THE LIMITED WARRANTY OF REPAIR AND REPLACEMENT STATED ABOVE, SELLER DISCLAIMS ALL WARRANTIES WHATSOEVER WITH RESPECT TO THE PRODUCT, INCLUDING ALL IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR ANY PARTICULAR PURPOSE.

## LIMITATION OF SELLER'S LIABILITY

Seller's liability to Buyer for any loss or claim, including liability incurred in connection with (i) breach of any warranty whatsoever, expressed or implied, (ii) a breach of contract, (iii) a negligent act or acts (or negligent failure to act) committed by Seller, or (iv) an act for which strict liability will be imputed to seller, is limited to the "limited warranty" of repair and/or replacement as so stated in our warranty of product. In no event shall the Seller be liable for any special, indirect, consequential or other damages of a like general nature, including, without limitation, loss of profits or production, or loss or expenses of any nature incurred by the buyer or any third party.

*UE specifications subject to change without notice.*

Be sure to visit [www.ueonline.com](http://www.ueonline.com) for the latest information.

## U.S. SALES OFFICES

United Electric Controls  
31 Old Stage Road  
Hampton Falls, NH 03844  
Phone: 617-899-1132  
email: [northeastsales@ueonline.com](mailto:northeastsales@ueonline.com)

United Electric Controls  
28 N. Wise Ave.  
Freeport, IL 61032  
Phone: 815-341-2588  
email: [midwestsales@ueonline.com](mailto:midwestsales@ueonline.com)

United Electric Controls  
1022 Vineyard Drive  
Conyers, GA 30013  
Phone: 770-335-9802  
email: [southeastsales@ueonline.com](mailto:southeastsales@ueonline.com)

United Electric Controls  
5829 Grazing Court  
Mason, OH 45040  
Phone: 513-535-5486  
email: [midatlanticsales@ueonline.com](mailto:midatlanticsales@ueonline.com)

United Electric Controls  
102 Salazar Court  
Clayton, CA 94517  
Phone: 925-408-5997  
email: [westcoastsales@ueonline.com](mailto:westcoastsales@ueonline.com)

United Electric Controls  
27 Summit Terrace  
Sparta, NJ 07871  
Phone: 973-271-2550  
email: [easternsales@ueonline.com](mailto:easternsales@ueonline.com)

United Electric Controls  
4306 Whickham Drive  
Fulshear, TX 77441  
Phone: 832-457-6138  
email: [southwestsales@ueonline.com](mailto:southwestsales@ueonline.com)

## CANADA

EASTERN  
68 Mosley Crescent  
Brampton, Ontario  
Canada L6Y 5C8  
Phone: 905-455-5131  
FAX: 905-455-5131

WESTERN  
148 Silver Ridge Close N.W.  
Calgary, Alberta  
Canada T3B 3T4  
Phone: 403-247-3724  
FAX: 403-247-3724

## INTERNATIONAL OFFICES

CHINA  
United Electric Controls, *Shanghai Office*  
Room 1011, 10th Flr,  
Huai Hai Zhonghua Building  
No. 885, Renmin Road, Luwan District  
Shanghai 200010, P.R. China  
Phone: +8621-6255 8059  
email: [chinasaless@ueonline.com](mailto:chinasaless@ueonline.com)

United Electric Controls, *Beijing Office*  
Room 1006, Jainhao International Bldg.  
Block D, No. 116  
Zizhuyuanlu, Haidian District  
Beijing, China 100089  
Phone: +86-10-5893-0518  
email: [beijingsales@ueonline.com](mailto:beijingsales@ueonline.com)

EASTERN EUROPE & SCANDINAVIA  
United Electric Controls  
05-806 Komorow  
Kujawska 5, Poland  
Phone: +48 22 499 4804  
email: [easterneuropepesales@ueonline.com](mailto:easterneuropepesales@ueonline.com)

GERMANY  
United Electric Controls  
An Der Zentlinde 21  
D-64711 Erbach, Germany  
Phone: 496-062-7400  
email: [europesales@ueonline.com](mailto:europesales@ueonline.com)

INDIA  
United Electric Controls  
House no. 7, Kamalkunj Society  
Nizampura,  
Baroda (Gujarat), India  
Phone: +91 (-265) -2788654  
email: [indisales@ueonline.com](mailto:indisales@ueonline.com)

ASIA-PACIFIC  
United Electric Controls, Far East  
No. 1-2-2, 2nd Floor  
Jalan 4/101C  
Cheras Business Centre  
Batu 5, Jalan Cheras  
56100 Kuala Lumpur, Malaysia  
Phone: 603-9133-4122  
email: [fareastsales@ueonline.com](mailto:fareastsales@ueonline.com)

MEXICO  
United Electric Controls  
Zacatecas # 206, Suite 20  
Col Guadalupe CP 89120  
Tampico, Tamaulipas Mexico  
Phone: 833-217-5201  
email: [latinamericasales@ueonline.com](mailto:latinamericasales@ueonline.com)

RUSSIA  
United Electric Controls, Moscow  
Elninskaya str., 15-140  
Moscow, 121552, Russia  
Phone: +7 (495) 792-88-06  
email: [russiansales@ueonline.com](mailto:russiansales@ueonline.com)

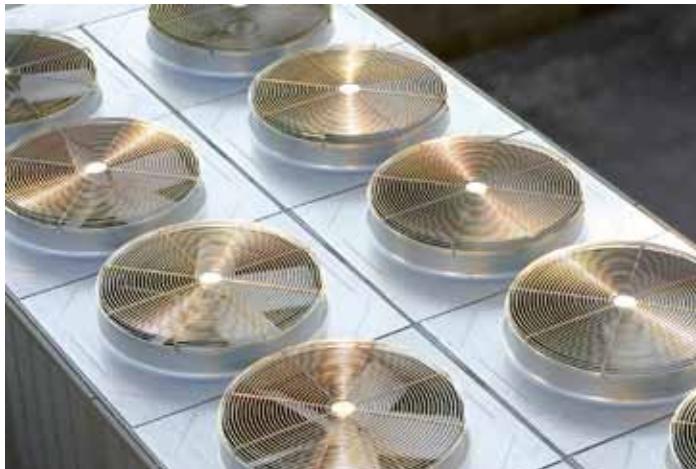


UNITED ELECTRIC  
CONTROLS

180 Dexter Avenue, P.O. Box 9143  
Watertown, MA 02471-9143 USA  
Telephone: 617 926-1000 Fax: 617 926-2568  
<http://www.ueonline.com>

CP01103500

## PRESSURE, VACUUM & DIFFERENTIAL PRESSURE



### FEATURES

- Brass & Polysulfone (FDA compliant) Pressure Connections
- Compact Size
- Complies with Enclosure Type 4 with watertight conduit fitting
- Terminal block wiring
- Optional red status light
- Adjustable Ranges:

Pressure: 30" Hg Vac to 90 psi  
(-1 to 6,2 bar)

Differential Pressure: 1 to 45 psid  
(68,9 mbar to 3,1 bar)

## OVERVIEW

The cost-effective 24 Series Delta-Pro™ pressure, vacuum, and differential pressure switches offer a unique blend of compact size, excellent performance, and environmental protection. Available with brass or polysulfone pressure connections the Delta-Pro is ideal for applications involving hot or cool air, water, gas or oil. The precision snap-acting switch and sensitive diaphragms combine to provide a narrow deadband and repeatability of approximately  $\pm 1\%$  of full scale range. A convenient, externally accessible adjustment screw is multi-turn to provide easy set point adjustability. The force-balanced design gives the Delta-Pro excellent vibration resistance.

## FEATURES

- UL listed and cUL certified. CE compliant to low voltage directive and pressure equipment directive
- Vacuum, Pressure or Differential pressure measurement
- 5 A @ 125/250 VAC SPDT snap-acting switch
- External stainless steel multi-turn adjusting screw
- OEM capabilities include external adjustment knob with or without reference scale



Delta-Pro with Brass Pressure Connections

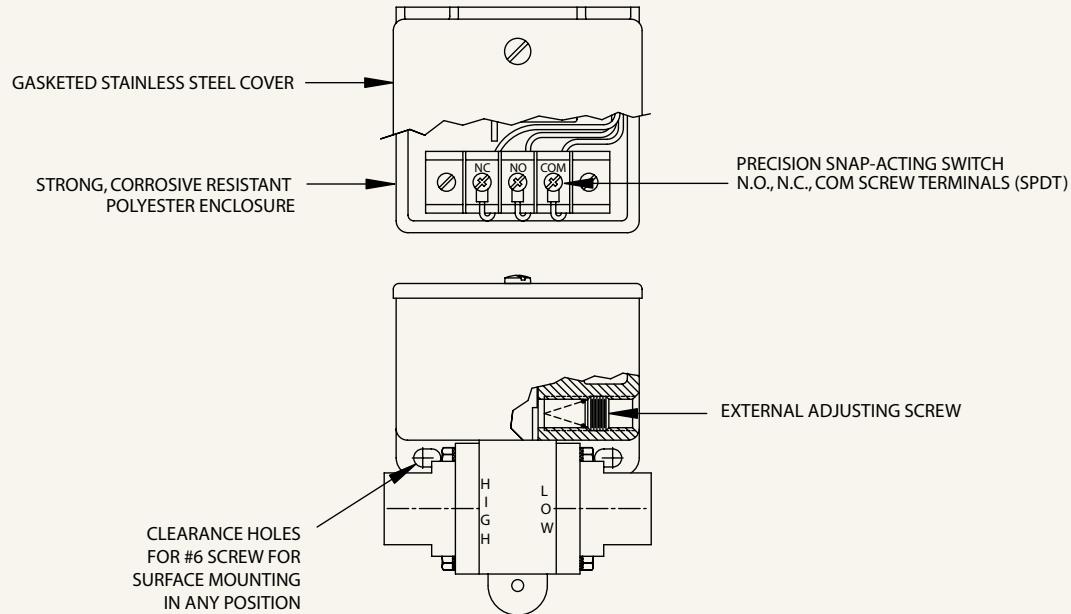


Delta-Pro with Polysulfone Pressure Connections



**APPLICATIONS**

Typical applications include filter monitoring and proof-of-flow. The 24 Series is used within the water & wastewater, bioprocessing, food & beverage, HVAC and gas processing industries.

**TECHNOLOGY**

The 24 Series (Delta Pro™) was designed to be a compact, cost-effective differential pressure switch for applications such as proof-of-flow, filter monitoring, etc. It depends upon 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.

## 24 Series

**SPECIFICATIONS**

|                                    |  |
|------------------------------------|--|
| <b>STORAGE TEMPERATURE</b>         | -20° to 180°F (-29° to 82°C)   |
| <b>AMBIENT TEMPERATURE</b>         | 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  |
| <b>MAX MEDIA TEMPERATURE</b>       | 200°F (93°C) at 100 psi working pressure   |
| <b>SHOCK</b>                       | Set point repeats after 15G, 10 millisecond duration   |
| <b>VIBRATION</b>                   | Set point repeats after 2.5G, 5-500 Hz   |
| <b>ENCLOSURE CLASSIFICATION</b>    | Complies with enclosure type 4 requirements with optional water tight conduit connector. Reinforced polyester body, stainless steel cover with gasket.   |
| <b>SET POINT REPEATABILITY</b>     | Typically ± 1% of full scale range.  |
| <b>SWITCH OUTPUT</b>               | One SPDT precision snap-acting micro-switch with mechanical contact life of 10 million cycles. Actual life depends on electrical load and cycle frequency  |
| <b>ELECTRICAL RATING</b>           | 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 |
| <b>WEIGHT</b>                      | 6.5 oz.  |
| <b>ELECTRICAL CONNECTION</b>       | 7/8" hole for optional 1/2" NPT conduit connector. Terminal block with screw terminals. Max wire size 16 AWG   |
| <b>PRESSURE CONNECTION</b>         | Models 013-014, 019-022: 1/4" NPT (female) brass; models 011-012, 015-018: 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.   |
| <b>MOUNTING &amp; INSTALLATION</b> | Surface mount with two screws through clearance holes, or mount by pressure connections  |

Udel® is a registered trademark of Solvay Advanced Polymers

\* The U.S. Food &amp; 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.

**APPROVALS****UNITED STATES AND CANADA****UL Listed, cUL Certified**

Pressure: UL 508; CSA C22.2 No. 14, File #E42272

**EUROPEAN UNION****Low Voltage Directive (LVD) 73/23/EC & 93/68/EEC**

Compliant to LVD

Products rated lower than 50 VAC and 75 VDC are outside the scope of the LVD  
The Low Voltage Directive does not apply to products for use in hazardous locations**Pressure Equipment Directive (PED) 97/23/EC****Pressure models only**

Compliant to PED

Products rated below 7.5 psi are outside the scope of the PED

## DIFFERENTIAL PRESSURE MODEL CHART

| Model  | Adjustable Range                                      |                  | Typical Deadband   |      | ***Max. Working Pressure |           | **Proof Pressure |      |
|--|---|------------------|--------------------|------|--------------------------|-----------|------------------|------|
|  | Low end of range of fall<br>High end of range on rise | psid             | bar (unless noted) | psid | mbar                     | psi       | bar              | psi  |
| Polyurethane (polyether) diaphragm and polysulfone® 1/4" NPS (female) (mechanical) pressure connection |   |                  |                    |      |                          |           |                  |      |
| 011  | 1 to 10   | 68,9 mbar to 0,7 | 0,75               | 51,7 | 0 to 150                 | 0 to 10,3 | 150              | 10,3 |
| 012  | 4 to 45   | 0,3 to 3,1       | 1                  | 68,9 | 0 to 150                 | 0 to 10,3 | 150              | 10,3 |
| Polyurethane (polyether) diaphragm and brass 1/4" NPT (female) pressure connection                     |   |                  |                    |      |                          |           |                  |      |
| 013  | 1 to 10   | 68,9 mbar to 0,7 | 0,75               | 51,7 | 0 to 150                 | 0 to 10   | 150              | 10,3 |
| 014  | 4 to 45   | 0,3 to 3,1       | 1                  | 68,9 | 0 to 150                 | 0 to 10   | 150              | 10,3 |

## VACUUM AND PRESSURE MODEL CHART

| Model   | Adjustable Range      |                       | Typical Deadband      |                        | *Over Range Pressure |      | **Proof Pressure |      |
|---|-----------------------|-----------------------|-----------------------|------------------------|----------------------|------|------------------|------|
|   | psi<br>(unless noted) | bar<br>(unless noted) | psi<br>(unless noted) | mbar<br>(unless noted) | psi                  | bar  | psi              | bar  |
| Polyurethane (polyether) diaphragm and polysulfone®, 1/4" NPS (female) (mechanical) pressure connection |                       |                       |                       |                        |                      |      |                  |      |
| 015   | 30" to 2" Hg VAC      | -1 bar to -68,9 mbar  | 2,5" Hg               | 84,7                   | 150                  | 10,3 | 150              | 10,3 |
| 016   | 1 to 10               | 68,9 mbar to 0,7      | 0,75                  | 51,7                   | 150                  | 10,3 | 150              | 10,3 |
| 017   | 4 to 45               | 0,3 to 3,1            | 1                     | 68,9                   | 150                  | 10,3 | 150              | 10,3 |
| 018   | 10 to 90              | 0,7 to 6,2            | 3                     | 0,2 bar                | 150                  | 10,3 | 150              | 10,3 |
| Polyurethane (polyether) diaphragm and brass 1/4" NPT (female) pressure connection                      |                       |                       |                       |                        |                      |      |                  |      |
| 019   | 30" to 2" Hg VAC      | -1 bar to -68,9 mbar  | 2,5" Hg               | 84,7                   | 150                  | 10,3 | 150              | 10,3 |
| 020   | 1 to 10               | 68,9 mbar to 0,7      | 0,75                  | 51,7                   | 150                  | 10,3 | 150              | 10,3 |
| 021   | 4 to 45               | 0,3 to 3,1            | 1                     | 68,9                   | 150                  | 10,3 | 150              | 10,3 |
| 022   | 10 to 90              | 0,7 to 6,2            | 3                     | 0,2 bar                | 150                  | 10,3 | 150              | 10,3 |

\*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: The pressure range within which two opposing sensors can be safely operated and still maintain set point adjustability.



# 24 Series

## 24 Series

### HOW TO ORDER

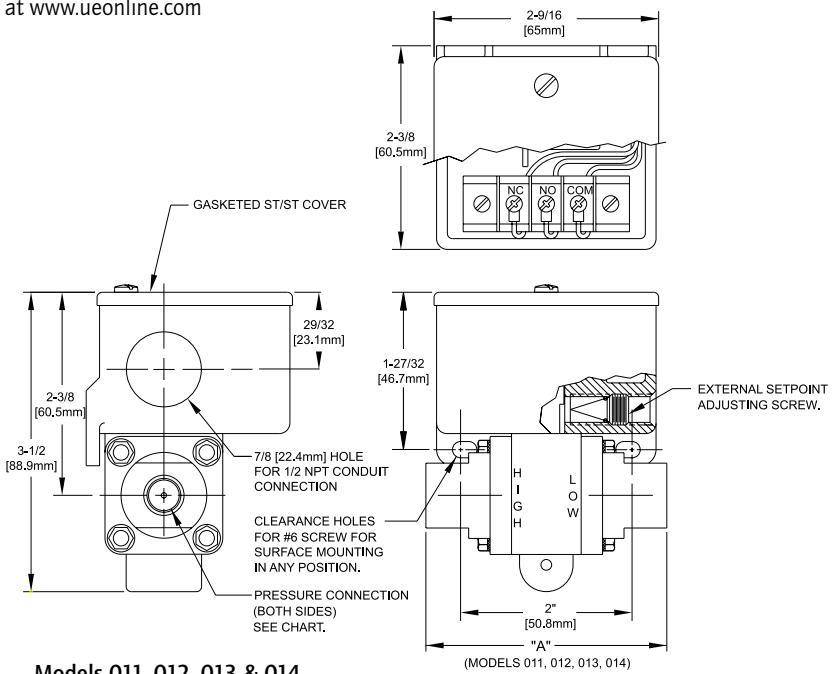
Build a part number by selecting a model and options. Choose the Sensor Type and the Range from the Model Chart. If options are required, add the code from the option list below. Example: 24-013 \* M900.

| <b>COMPONENTS</b>                     | <b>CODE</b>  | <b>DESCRIPTION</b>  | <b>24</b><br>Select a Type | <b>013</b><br>Select a Model | <b>M900</b><br>Select an Option |
|---------------------------------------|--|---|----------------------------|------------------------------|---------------------------------|
| <b>SERIES DESIGNATION</b>             | 24   | Designation for 24 Series product line  | 24                         | 013                          | M900                            |
| <b>DIFFERENTIAL PRESSURE MODELS *</b> | 011, 012<br>013, 014   | Polyurethane (polyether) diaphragm and 1/4" NPS (female) (mechanical) polysulfone pressure connection<br>Polyurethane (polyether) diaphragm and 1/4" NPT (female) brass pressure connection   |                            |                              |                                 |
|                                       |  | (See Model Chart for Differential Pressure Ranges)  |                            |                              |                                 |
| <b>VACUUM AND PRESSURE MODELS *</b>   | 015, 016,<br>017, 018<br>019, 020,<br>021, 022               | Polyurethane (polyether) diaphragm and 1/4" NPS (female) (mechanical) polysulfone pressure connection<br>Polyurethane (polyether) diaphragm and 1/4" NPT (female) brass pressure connection   |                            |                              |                                 |
|                                       |  | (See Model Chart for Pressure Ranges)   |                            |                              |                                 |
| <b>OPTIONS</b>                        | M020<br>M201<br>M260<br>M262<br>M277<br>M278<br>M540<br>M900 | Red status light, 115 VAC only. Specify whether light turns on or off with increasing or decreasing pressure<br>Factory set one switch; specify set point on increasing or decreasing pressure<br>Self-contained battery-operated audible alarm<br>Buna-N diaphragm<br>Range indicated on nameplate in kPa or MPa, factory selected<br>Range indicated on nameplate in Kg/cm <sup>2</sup><br>Viton® construction (deadband and low end of range may increase slightly. Consult factory.)<br>Wetted parts include Viton® diaphragm plus standard connection material.<br>Water tight conduit fitting; converts 7/8" hole to 1/2" NPT fitting; must specify for Enclosure Type 4 compliance |                            |                              |                                 |

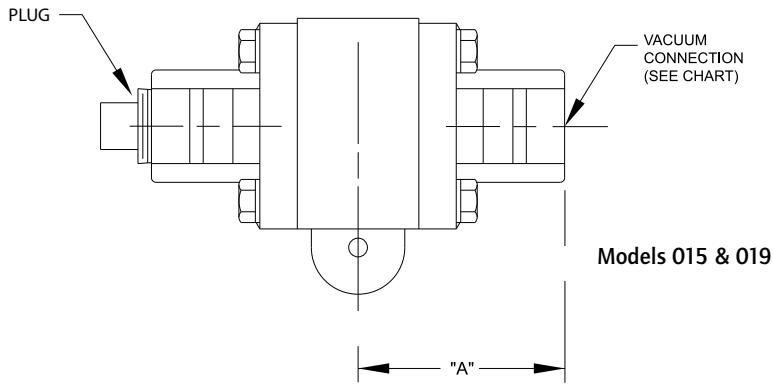
Viton® is a registered trademark of E.I. duPont de Nemours and Company.

## DIMENSIONAL DRAWINGS

Dimensional drawings for all models may be found at [www.ueonline.com](http://www.ueonline.com)  
All dimensions stated in inches (millimeters)

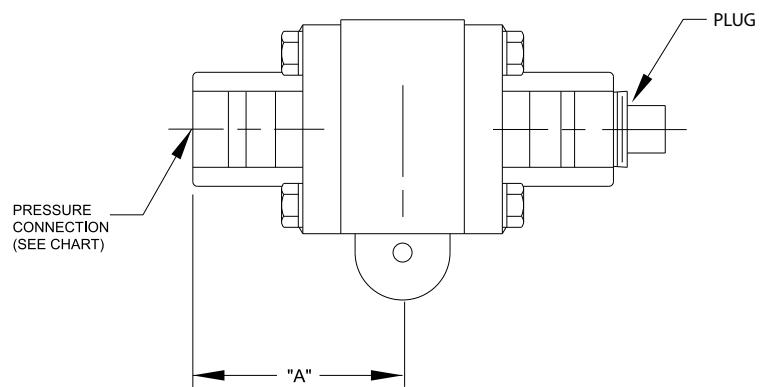


Models 011, 012, 013 &amp; 014



Models 015 &amp; 019

Models 016, 017, 018, 020, 021 &amp; 022



| Model              | DIMENSION A     | Pressure Connection      |
|--------------------|-----------------|--------------------------|
| 011, 012           | 2.75" (69.9 mm) | 1/4" NPS (F) Polysulfone |
| 013, 014           | 3.13" (79.5 mm) | 1/4" NPT (F) Brass       |
| 015, 016, 017, 018 | 1.44" (36.6 mm) | 1/4" NPS (F) Polysulfone |
| 019, 020, 021, 022 | 1.56" (39.6 mm) | 1/4" NPT (F) Brass       |

## RECOMMENDED PRACTICES AND WARNINGS

United Electric Controls Company recommends careful consideration of the following factors when specifying and installing UE pressure and temperature units. Before installing a unit, the Installation and Maintenance instructions provided with unit must be read and understood.

- To avoid damaging unit, proof pressure and maximum temperature limits stated in literature and on nameplates must never be exceeded, even by surges in the system. Operation of the unit up to maximum pressure or temperature is acceptable on a limited basis (e.g., start-up, testing) but continuous operation must be restricted to the designated adjustable range. Excessive cycling at maximum pressure or temperature limits could reduce sensor life.
- A back-up unit is necessary for applications where damage to a primary unit could endanger life, limb or property. A high or low limit switch is necessary for applications where a dangerous runaway condition could result.
- The adjustable range must be selected so that incorrect, inadvertent or malicious setting at any range point cannot result in an unsafe system condition.
- Install unit where shock, vibration and ambient temperature fluctuations will not damage unit or affect operation. When applicable, orient unit so that moisture does not enter the enclosure via the electrical connection. When appropriate, this entry point should be sealed to prevent moisture entry.
- Unit must not be altered or modified after shipment. Consult UE if modification is necessary.
- Monitor operation to observe warning signs of possible damage to unit, such as drift in set point or faulty display. Check unit immediately.
- Preventative maintenance and periodic testing is necessary for critical applications where damage could endanger property or personnel.
- Electrical ratings stated in literature and on nameplate must not be exceeded. Overload on a switch can cause damage, even on the first cycle. Wire unit according to local and national electrical codes, using wire size recommended in installation sheet.
- Do not mount unit in ambient temp. exceeding published limits.

## LIMITED WARRANTY

Seller warrants that the product hereby purchased is, upon delivery, free from defects in material and workmanship and that any such product which is found to be defective in such workmanship or material will be repaired or replaced by Seller (Ex-works, Factory, Watertown, Massachusetts. INCOTERMS); provided, however, that this warranty applies only to equipment found to be so defective within a period of 24 months from the date of manufacture by the Seller. Seller shall not be obligated under this warranty for alleged defects which examination discloses are due to tampering, misuse, neglect, improper storage, and in any case where products are disassembled by anyone other than authorized Seller's representatives. EXCEPT FOR THE LIMITED WARRANTY OF REPAIR AND REPLACEMENT STATED ABOVE, SELLER DISCLAIMS ALL WARRANTIES WHATSOEVER WITH RESPECT TO THE PRODUCT, INCLUDING ALL IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR ANY PARTICULAR PURPOSE.

## LIMITATION OF SELLER'S LIABILITY

SELLER'S LIABILITY TO BUYER FOR ANY LOSS OR CLAIM, INCLUDING LIABILITY INCURRED IN CONNECTION WITH (I) BREACH OF ANY WARRANTY WHATSOEVER, EXPRESSED OR IMPLIED, (II) A BREACH OF CONTRACT, (III) A NEGLIGENT ACT OR ACTS (OR NEGLIGENT FAILURE TO ACT) COMMITTED BY SELLER, OR (IV) AN ACT FOR WHICH STRICT LIABILITY WILL BE INPUTTED TO SELLER, IS LIMITED TO THE "LIMITED WARRANTY" OF REPAIR AND/OR REPLACEMENT AS SO STATED IN OUR WARRANTY OF PRODUCT. IN NO EVENT SHALL THE SELLER BE LIABLE FOR ANY SPECIAL, INDIRECT, CONSEQUENTIAL OR OTHER DAMAGES OF A LIKE GENERAL NATURE, INCLUDING, WITHOUT LIMITATION, LOSS OF PROFITS OR PRODUCTION, OR LOSS OR EXPENSES OF ANY NATURE INCURRED BY THE BUYER OR ANY THIRD PARTY.

*UE specifications subject to change without notice.*

Be sure to visit [www.ueonline.com](http://www.ueonline.com) for the latest information.

## U.S. SALES OFFICES

United Electric Controls  
31 Old Stage Road  
Hampton Falls, NH 03844  
Phone: 617-899-1132  
email: [northeastsales@ueonline.com](mailto:northeastsales@ueonline.com)

United Electric Controls  
28 N. Wise Ave.  
Freeport, IL 61032  
Phone: 815-341-2588  
email: [midwestsales@ueonline.com](mailto:midwestsales@ueonline.com)

United Electric Controls  
1022 Vineyard Drive  
Conyers, GA 30013  
Phone: 770-335-9802  
email: [southeastsales@ueonline.com](mailto:southeastsales@ueonline.com)

United Electric Controls  
5829 Grazing Court  
Mason, OH 45040  
Phone: 513-535-5486  
email: [midatlanticsales@ueonline.com](mailto:midatlanticsales@ueonline.com)

United Electric Controls  
102 Salazar Court  
Clayton, CA 94517  
Phone: 925-408-5997  
email: [westcoastsales@ueonline.com](mailto:westcoastsales@ueonline.com)

United Electric Controls  
27 Summit Terrace  
Sparta, NJ 07871  
Phone: 973-271-2550  
email: [easternsales@ueonline.com](mailto:easternsales@ueonline.com)

United Electric Controls  
4306 Whickham Drive  
Fulshear, TX 77441  
Phone: 832-457-6138  
email: [southwestsales@ueonline.com](mailto:southwestsales@ueonline.com)

## CANADA

EASTERN  
68 Mosley Crescent  
Brampton, Ontario  
Canada L6Y 5C8  
Phone: 905-455-5131  
FAX: 905-455-5131

## INTERNATIONAL OFFICES

CHINA  
United Electric Controls, *Shanghai Office*  
Room 1011, 10th Flr,  
Huai Hai Zhonghua Building  
No. 885, Renmin Road, Luwan District  
Shanghai 200010, P.R. China  
Phone: +8621-6255 8059  
email: [chinasaless@ueonline.com](mailto:chinasaless@ueonline.com)

United Electric Controls, *Beijing Office*  
Room 1006, Jainhao International Bldg.  
Block D, No. 116  
Zizhuyuanlu, Haidian District  
Beijing, China 100089  
Phone: +86-10-5893-0518  
email: [beijingsales@ueonline.com](mailto:beijingsales@ueonline.com)

EASTERN EUROPE & SCANDINAVIA  
United Electric Controls  
05-806 Komorow  
Kujawska 5, Poland  
Phone: +48 22 499 4804  
email: [easterneuropeales@ueonline.com](mailto:easterneuropeales@ueonline.com)

GERMANY  
United Electric Controls  
An Der Zentlinde 21  
D-64711 Erbach, Germany  
Phone: 496-062-7400  
email: [europesales@ueonline.com](mailto:europesales@ueonline.com)

INDIA  
United Electric Controls  
#402, Aries Avenue – I, United Colony,  
Sama, Baroda,  
Gujarat, India 390 008  
Phone: +91 (-265) -2788654  
email: [indiasales@ueonline.com](mailto:indiasales@ueonline.com)

ASIA-PACIFIC  
United Electric Controls, Far East  
No. 1-2-2, 2nd Floor  
Jalan 4/101C  
Cheras Business Centre  
Batu 5, Jalan Cheras  
56100 Kuala Lumpur, Malaysia  
Phone: 603-9133-4122  
email: [fareastsales@ueonline.com](mailto:fareastsales@ueonline.com)

MEXICO  
United Electric Controls  
Zacatecas # 206, Suite 20  
Col Guadalupe CP 89120  
Tampico, Tamaulipas Mexico  
Phone: 833-217-5201  
email: [latinamericasales@ueonline.com](mailto:latinamericasales@ueonline.com)

RUSSIA  
United Electric Controls, Moscow  
Elninskaya str., 15-140  
Moscow, 121552, Russia  
Phone: +7 (495) 792-88-06  
email: [russiansales@ueonline.com](mailto:russiansales@ueonline.com)



UNITED ELECTRIC  
CONTROLS

180 Dexter Avenue, P.O. Box 9143  
Watertown, MA 02471-9143 USA  
Telephone: 617 926-1000 Fax: 617 926-2568  
<http://www.ueonline.com>

CP01111500

## PRESSURE SWITCH



## FEATURES

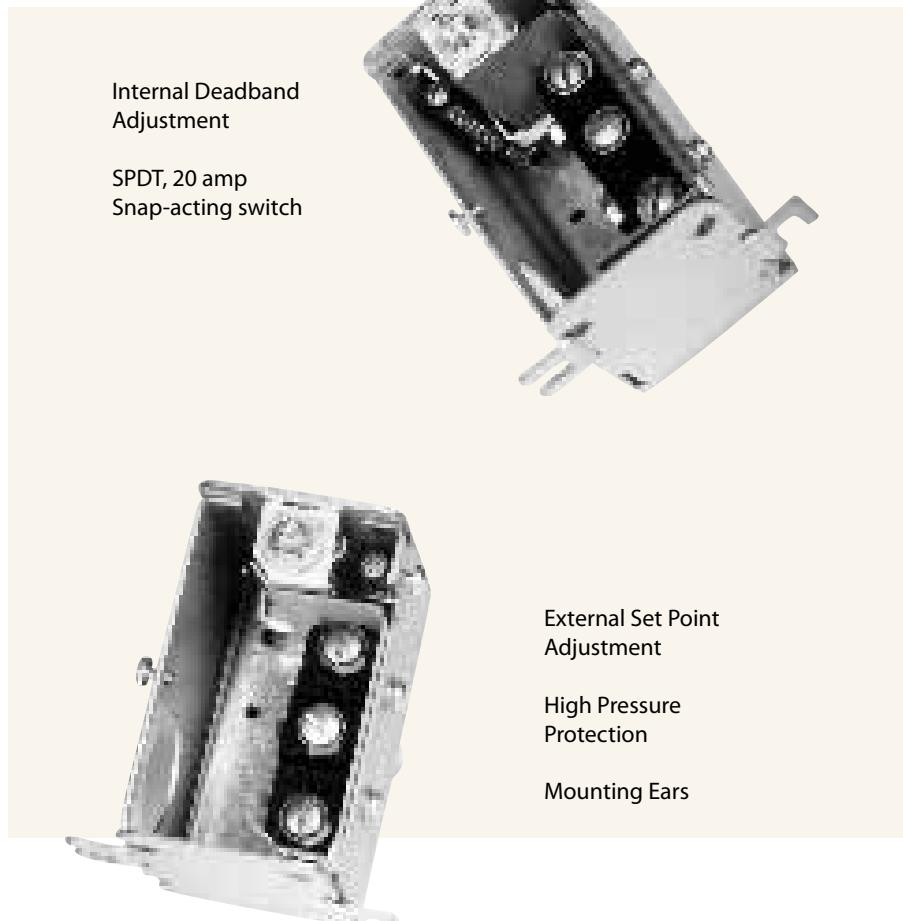
- External Setpoint Adjustment
- Internally Adjustable Deadband
- Compact Construction
- All Metal Enclosure

## 25 Series

## overview

The 25 Series is a low cost pressure switch featuring an externally adjustable set point and an internally adjustable deadband. It offers a self contained solution for direct control of AC loads up to 20 amps with adjustable pressure ranges up to 475 psi.

The adjustable set point and deadband feature is a real benefit for applications where a full function logic controller would not be necessary. Technicians can make on-the-fly corrections during development testing, start-up or maintenance. The compact design and low cost also make the 25 Series well suited for installation on OEM equipment or in panels.



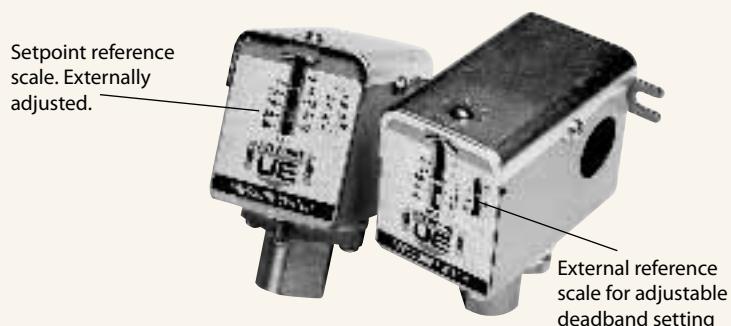
## features

- External Adjustment
- Adjustable Deadband
- Compact Construction
- All Metal Enclosure

The 25 Series features proven diaphragm sensing technology, a 20 amp snap-acting switch, and adjustable ranges up to 475 psi, highlighting its versatility. The 25 Series is cULus listed and is available with a Buna-N, Viton® or EPDM diaphragm pressure sensor. The switch comes with a standard brass pressure connection; however, other materials are available for volume applications. All models achieve a rated proof pressure of 600 psi and are contained in a NEMA housing. The robust design provides repeatability of  $\pm 1\%$ , even when subjected to shock and vibration.

## Applications

The 25 Series Adjustable Pressure Switch offers an easy-to-install solution for direct control of HVAC fans and blowers, as well as control of pumps, compressors and valves. The switch is ideal for alarm and shutdown applications where the user must protect people, equipment or the environment.



## technology

The 25 Series relies on simple, but dependable technology to achieve its purpose: a cost-effective, ideal product for direct pump monitoring/control and similar applications. The 25 uses a diaphragm to sense changes in pressure, which are transmitted through a lever to the 20A snap-action switch. Changes to set point are accomplished easily while the unit is under pressure through the external adjusting screw. This adjustment "pre-loads" the lever, which results in excellent vibration-resistance. On many models, the deadband (the difference between actuation and de-actuation) is also field-adjustable, giving the user flexibility in configuring the product to the application.



# 25 Series

25 Series

## specifications

STORAGE TEMPERATURE-65 to 160°F (-54 to 71°C)

OPERATING AMBIENT

TEMPERATURE

0 to 160°F (17 to 71°C) Set point shifts less than 1% of range  
for a 50°F (28°C) ambient temperature change

MAXIMUM

MEDIA TEMPERATURE

Buna-N sensor: 200°F (93°C)

Viton® sensor: 250°F (121°C)

EPDM sensor: 250°F (121°C)

ENCLOSURE

Zinc plated steel with bright chromate finish

ENCLOSURE

CLASSIFICATION

Complies with enclosure type 1

SHOCK

Set point repeats after 15 G, 10 millisecond duration

VIBRATION

Set point repeats after 2.5 G, 5 to 500 Hz

SET POINT

REPEATABILITY

Typically ±1% of span

SWITCH OUTPUT

One SPDT, snap-acting switch

ELECTRICAL RATINGS

20 A @ 480 VAC resistive

1 HP @125 VAC Resistive, adjustable deadband versions (choice F)

2 HP @250 VAC Resistive, adjustable deadband versions (choice F)

ELECTRICAL CONNECTION

7/8" hole for optional NPT conduit connector

WEIGHT

16 oz.

PRESSURE CONNECTION 1/4" NPT female Brass, or 1/8" NPT female Brass

MOUNTING

Surface mount with two screws through clearance holes,  
or mount by pressure connection

Viton is a registered trademark of E.I. DuPont Company.

## approvals



UL 873 listed, files # E10667, # E57086  
CSA C22.2 No. 24-1993, Files # E10667, # 57086



CE Compliance with LVD (Low Voltage Directive)

## model chart

### Adjustable Deadband Version - Deadband Choice A

| Model | Adjustable Range*        |     |                           |      | Adjustable Deadband Range |     |     |      | Max. Working Pressure |      | Proof Pressure |      |
|-------|--------------------------|-----|---------------------------|------|---------------------------|-----|-----|------|-----------------------|------|----------------|------|
|       | Low end of range on fall |     | High end of range on rise |      | psi                       |     | bar |      | psi                   |      | bar            |      |
| A     | 3                        | 0,2 | 30                        | 2,1  | 5                         | 0,3 | 11  | 0,8  | 30                    | 2,1  | 600            | 41,4 |
| B     | 20                       | 1,4 | 200                       | 13,8 | 20                        | 1,4 | 70  | 4,83 | 200                   | 13,8 | 600            | 41,4 |
| C     | 25                       | 1,7 | 475                       | 32,8 | 35                        | 2,4 | 140 | 9,7  | 475                   | 32,8 | 600            | 41,4 |

### Fixed Deadband Version - Deadband Choice F

| Model | Adjustable Range*        |     |                           |      | Fixed Deadband Tolerance |     |     |     | Max. Working Pressure |      | Proof Pressure |      |     |  |     |  |
|-------|--------------------------|-----|---------------------------|------|--------------------------|-----|-----|-----|-----------------------|------|----------------|------|-----|--|-----|--|
|       | Low end of range on fall |     | High end of range on rise |      | psi                      |     | bar |     | psi                   |      | bar            |      | psi |  | bar |  |
| A     | 3                        | 0,2 | 30                        | 2,1  | 2                        | 0,1 | 5   | 0,3 | 30                    | 2,1  | 600            | 41,4 |     |  |     |  |
| B     | 20                       | 1,4 | 200                       | 13,8 | 4                        | 0,3 | 10  | 0,7 | 200                   | 13,8 | 600            | 41,4 |     |  |     |  |
| C     | 25                       | 1,7 | 475                       | 32,8 | 10                       | 0,7 | 25  | 1,7 | 475                   | 32,8 | 600            | 41,4 |     |  |     |  |

\* Value indicated on dial is the set point on falling pressure.

Deadband represents the reset point above this setting. Dial setting plus deadband must not exceed adjustable range.



# 25 Series

25 Series

## how to order

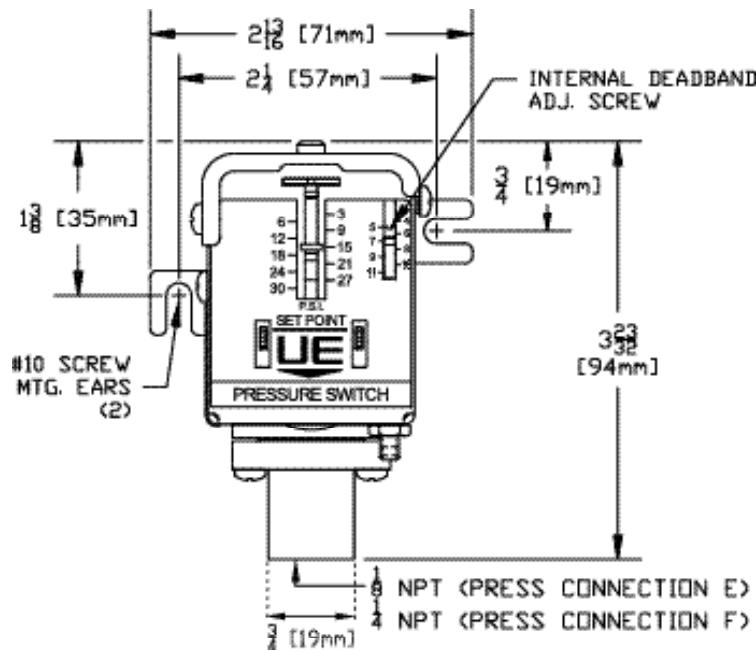
Select a single letter or number "Code" to make up a part number.

| 25                                    | A                       | 1                  | F                   | 2               | A        | M201                  |
|---------------------------------------|-------------------------|--------------------|---------------------|-----------------|----------|-----------------------|
| Series Designation                    | Model/Range             | Number of Switches | Pressure Connection | Sensor Material | Deadband | Miscellaneous Options |
| (Example of "Code") 25 A 1 F 2 A M201 |                         |                    |                     |                 |          |                       |
| COMPONENTS                            |                         |                    |                     |                 |          |                       |
| CODE                                  | DESIGNATION             |                    |                     |                 |          |                       |
| SERIES DESIGNATION                    | 25                      |                    |                     |                 |          |                       |
| MODEL/RANGE                           |                         |                    |                     |                 |          |                       |
| A                                     |                         |                    |                     |                 |          |                       |
| B                                     |                         |                    |                     |                 |          |                       |
| C                                     |                         |                    |                     |                 |          |                       |
| NUMBER OF SWITCHES                    |                         |                    |                     |                 |          |                       |
| 1                                     |                         |                    |                     |                 |          |                       |
| PRESSURE CONNECTION                   |                         |                    |                     |                 |          |                       |
| E                                     |                         |                    |                     |                 |          |                       |
| F                                     |                         |                    |                     |                 |          |                       |
| SENSOR MATERIAL                       |                         |                    |                     |                 |          |                       |
| 2                                     |                         |                    |                     |                 |          |                       |
| 3                                     |                         |                    |                     |                 |          |                       |
| 4                                     |                         |                    |                     |                 |          |                       |
| DEADBAND                              |                         |                    |                     |                 |          |                       |
| F                                     |                         |                    |                     |                 |          |                       |
| A                                     |                         |                    |                     |                 |          |                       |
| MISCELLANEOUS OPTIONS                 |                         |                    |                     |                 |          |                       |
| M201                                  |                         |                    |                     |                 |          |                       |
| M230*                                 |                         |                    |                     |                 |          |                       |
| M444                                  |                         |                    |                     |                 |          |                       |
| M446                                  |                         |                    |                     |                 |          |                       |
|                                       | Factory set point       |                    |                     |                 |          |                       |
|                                       | Set adjustable deadband |                    |                     |                 |          |                       |
|                                       | Paper tag               |                    |                     |                 |          |                       |
|                                       | Stainless steel tag     |                    |                     |                 |          |                       |

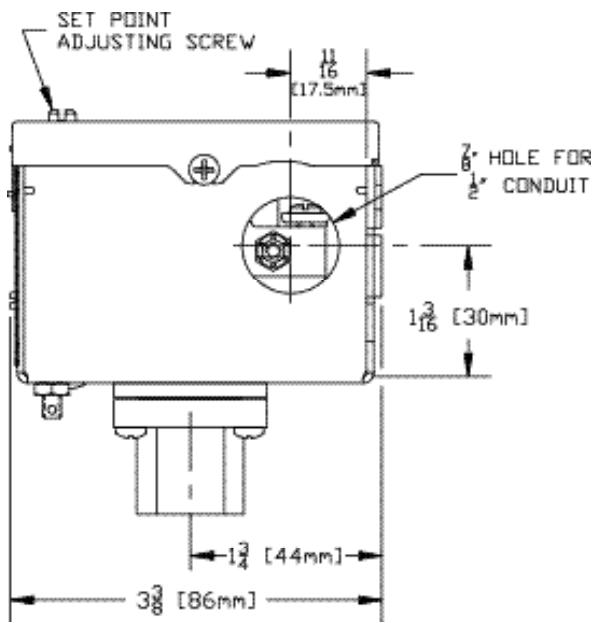
\* Do not specify M201 when specifying M230

## dimensional drawings

Front View



Side View



## RECOMMENDED PRACTICES AND WARNINGS

United Electric Controls Company recommends careful consideration of the following factors when specifying and installing UE pressure and temperature units. Before installing a unit, the Installation and Maintenance instructions provided with unit must be read and understood.

- To avoid damaging unit, proof pressure and maximum temperature limits stated in literature and on nameplates must never be exceeded, even by surges in the system. Operation of the unit up to maximum temperature is acceptable on a limited basis (i.e., start-up, testing) but continuous operation must be restricted to the designated adjustable range. Excessive cycling at maximum temperature limits could reduce sensor life.
- A back-up unit is necessary for applications where damage to a primary unit could endanger life, limb or property. A high or low limit switch is necessary for applications where a dangerous runaway condition could result.
- The adjustable range must be selected so that incorrect, inadvertent or malicious setting at any range point cannot result in an unsafe system condition.
- Install unit where shock, vibration and ambient temperature fluctuations will not damage unit or affect operation. Orient unit so that moisture does not enter the enclosure via the electrical connection. When appropriate, this entry point should be sealed to prevent moisture entry.
- Unit must not be altered or modified after shipment. Consult UE if modification is necessary.
- Monitor operation to observe warning signs of possible damage to unit, such as drift in set point or faulty display. Check unit immediately.
- Preventative maintenance and periodic testing is necessary for critical applications where damage could endanger property or personnel.
- For all applications, a factory set unit should be tested before use.
- Electrical ratings stated in literature and on nameplate must not be exceeded. Overload on a switch can cause damage, even on the first cycle. Wire unit according to local and national electrical codes, using wire size recommended in installation sheet.
- Use only factory authorized replacement parts and procedures.
- Do not mount unit in ambient temp. exceeding published limits.

## LIMITED WARRANTY OF REPAIR AND REPLACEMENT

Seller warrants that the product hereby purchased is, upon delivery, free from defects in material and workmanship and that any such product which is found to be defective in such workmanship or material will be repaired or replaced by Seller (F.O.B. UE Watertown); provided, however, that this warranty applies only to equipment found to be so defective within a period of 18 months from the date of manufacture by the Seller (36 months for the Spectra 12 and One Series products). Seller shall not be obligated under this warranty for alleged defects which examination discloses are due to tampering, misuse, neglect, improper storage, and in any case where products are disassembled by anyone other than authorized Seller's representatives.

EXCEPT FOR THE LIMITED WARRANTY OF REPAIR AND REPLACEMENT STATED ABOVE, SELLER DISCLAIMS ALL WARRANTIES WHATSOEVER WITH RESPECT TO THE PRODUCT, INCLUDING ALL IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR ANY PARTICULAR PURPOSE.

## LIABILITY LIMITATION

SELLER'S LIABILITY TO BUYER FOR ANY LOSS OR CLAIM, INCLUDING LIABILITY INCURRED IN CONNECTION WITH (I) BREACH OF ANY WARRANTY WHATSOEVER EXPRESSED OR IMPLIED, (II) A BREACH OF CONTRACT, (III) A NEGLIGENT ACT OR ACTS (OR NEGLIGENT FAILURE TO ACT) COMMITTED BY SELLER, OR (IV) AN ACT FOR WHICH STRICT LIABILITY WILL BE IMPUTED TO SELLER, IS LIMITED TO THE LIMITED WARRANTY OF REPAIR AND REPLACEMENT STATED HEREIN. IN NO EVENT SHALL THE SELLER BE LIABLE FOR ANY SPECIAL, INDIRECT, CONSEQUENTIAL OR OTHER DAMAGES OF A LIKE GENERAL NATURE, INCLUDING, WITHOUT LIMITATION, LOSS OF PROFITS OR PRODUCTION, OR LOSS OR EXPENSES OF ANY NATURE INCURRED BY THE BUYER OR ANY THIRD PARTY.

UE specifications subject to change without notice.

## U.S. SALES OFFICES

United Electric Controls  
32 Highland Rd.  
South Hampton, NH 03827  
Phone: 603-394-0078  
FAX: 603-394-0175

United Electric Controls  
28 N. Wise Ave.  
Freeport, IL 61032  
Phone: 815-235-3501  
FAX: 815-235-3847

United Electric Controls  
1022 Vineyard Drive  
Conyers, GA 30013  
Phone: 770-483-8400  
FAX: 770-929-8716

United Electric Controls  
5829 Grazing Court  
Mason, OH 45040  
Phone: 513-398-3175  
FAX: 513-398-3076

United Electric Controls  
19335 Hadley  
Stilwell, KS 66085  
Phone: 913-685-2775  
FAX: 913-685-2774

United Electric Controls  
1753 Beach Street  
San Francisco, CA 94123  
Phone: 415-563-5811  
FAX: 415-563-5909

## INTERNATIONAL OFFICES

AUSTRALIA  
United Electric Controls  
(Australia) PTY Ltd  
Unit 2, 615 Warrigal Road  
Locked Bag 600  
Ashburton, Victoria  
3147, Australia  
Phone: 613-9567-0750  
FAX: 613-9567-0755

BELGIUM  
United Electric Controls-Europe  
G. Van Gervenstraat 19A  
B-9120 Beveren-Waas, Belgium  
Phone: 32-37554-383  
FAX: 32-37552-747

CANADA  
United Electric Controls  
(Canada) Ltd  
5320 Bradco Boulevard  
Mississauga, Ontario  
L4W 1G7 Canada  
Phone: 905-625-5082  
FAX: 905-625-5709

GERMANY  
United Electric Controls  
An Der Zentlinde 21  
D-64711 Erbach, Germany  
Phone: 496-062-7400  
FAX: 496-062-7501

INDIA  
United Electric Controls  
Amar Hill, Saki Vihar Road  
Powai, Mumbai 400 072  
Phone: 91-22-857-6921  
FAX: 91-22-857-1707

MALAYSIA  
United Electric Controls, Far East  
No. 1-2-2, 2nd Floor  
Jalan 4/10/1C  
Cheras Business Centre  
Batu 5, Jalan Cheras  
56100 Kuala Lumpur, Malaysia  
Phone: 603-9133-4122  
FAX: 603-9133-4155

MEXICO  
United Electric Controls  
Chihuahua 129-1 NTE  
Unidad Nacional 89410  
Madero, TAM  
Mexico  
Phone: 52-833-210-0646  
FAX: 52-833-210-5761



UNITED ELECTRIC  
CONTROLS

180 Dexter Avenue, P.O. Box 9143  
Watertown, MA 02471-9143 USA  
Telephone: 617 926-1000 Fax: 617 926-2568  
<http://www.ueonline.com>

EMCO50001201

## PRESSURE, VACUUM AND TEMPERATURE



### FEATURES

- Compact Size
- Wide Selection of Adjustable Ranges:  
Pressure: 30" Hg Vac to 6000 psi (-1 to 413.7 bar)  
Temperature: -130 to 650°F (-90 to 343.3°C)
- Choice of One or Two Switch Outputs
- Adjustable or Narrow Deadband Options
- Reference Dial or Hex Screw Set Point Adjustment

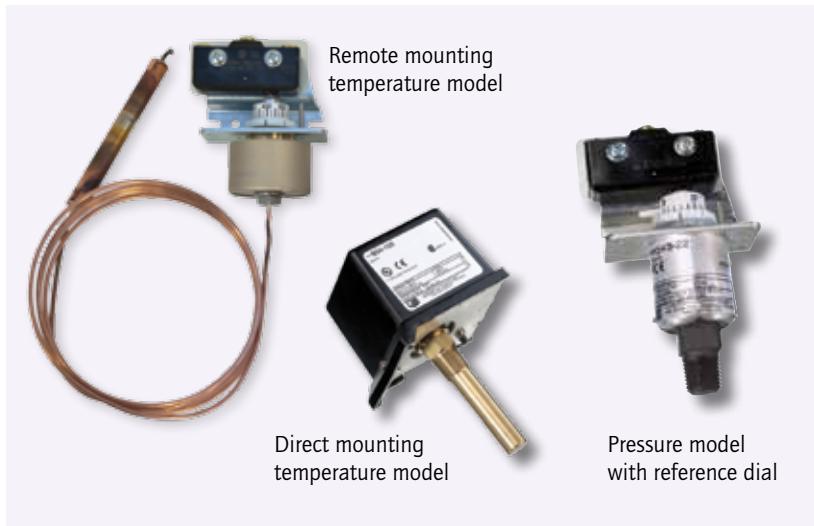
**OVERVIEW**

The 54 Series offers the OEM a combination of reliable performance and low cost. Available in pressure and temperature versions, with single or dual SPDT outputs and enclosed or open frame (skeleton) construction, the 54 Series family provides design versatility.

The 54 has been field-proven in a wide variety of OEM applications, including medical, laboratory, fire protection and heating equipment.

**FEATURES**

- Compact size
- Choice of one or two switch outputs
- Reference dial or hex screw-type setting
- Optional 1/2" NPT (male) by 1/8" NPT (female) polysulfone® pressure connection
- Optional external manual reset
- NEMA 1 or open frame (skeleton) versions for OEM applications
- Brass bellows models



Polysulfone® is a registered trademark of Amoco

## SPECIFICATIONS

|                                   |   |
|-----------------------------------|---|
| <b>STORAGE TEMPERATURE</b>        | -65 to 160°F (-54 to 71°C)  |
| <b>AMBIENT TEMPERATURE LIMITS</b> |   |
| Pressure Models                   | Models 126-164, 610-614: -40 to 160°F (-40 to 71°C);<br>Models 22-28: 0 to 160°F (-18 to 71°C)  |
| Temperature Models                | -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.                            |
| <b>SHOCK</b>                      | Set point repeats after 15 G, 10 millisecond duration   |
| <b>VIBRATION</b>                  | Set point repeats after 2.5 G, 5-500 CPS  |
| <b>ENCLOSURE CLASSIFICATION</b>   | Types C54, C54A, B54, F54, E54, J54, J54A, H54: complies with NEMA 1 requirements.<br>Types C54S, B54S, F54S, E54S, J54S, J54AS, H54S: not applicable |
| <b>SET POINT REPEATABILITY</b>    |   |
| Pressure Models                   | Models 22-28, 126-164: ± 1% of full scale range;<br>Models 610-614: ± 1.5% of full scale range  |
| Temperature Models                | ± 1% of full scale range  |
| <b>SWITCH OUTPUT</b>              | One or two SPDT snap action switch(es); dual switch may be separated up to 100% of range; switches may be wired "normally open" or "normally closed"  |
| <b>ELECTRICAL RATING</b>          | 15A 125/250/480 VAC resistive. Electrical switches have limited DC capabilities. Consult UE for additional information.                               |
| <b>ENCLOSURE MATERIAL</b>         | Lexan® black finish for Types J54, J54A, H54, B54, C54, C54A, E54, F54 only   |
| <b>WEIGHT</b>                     | Approximately 12 oz.  |
| <b>ELECTRICAL CONNECTION</b>      | Types J54 & H54, C54, C54A, B54, E54, F54: 7/8" diameter hole; Type J54A: 1-1/16" diameter hole   |
| <b>PRESSURE CONNECTION</b>        | Models 22-28: 1/4" NPT (male); 126-164, 610-614: 1/4" NPT (female)  |
| <b>TEMPERATURE ASSEMBLY</b>       | Bulb and Capillary: 6 feet copper or 304 stainless steel capillary<br>Immersion Stem: Brass   |
| <b>TEMPERATURE FILL</b>           | Non-toxic oil   |
| <b>TEMPERATURE DEADBAND</b>       | Typically 1% of range under laboratory conditions (70°F circulating bath at rate of 1/2°F per minute change)  |

## APPROVALS

### UNITED STATES AND CANADA



**Type J54, J54A, H54**

**UL Listed, cUL Certified**

Pressure: UL 508, CSA C22.2 No. 14, file # E42272



**Type J54S, J54AS, H54S**

**UL Recognized, cUL Recognized**

Pressure: UL 508, CSA C22.2 No. 14, file #E42272



**Type B54, C54, E54, F54**

**UL listed, CSA Certified**

Temperature: UL 873, file # E10667;  
CSA C22.2 No. 0 & 24, file # LR7814



**Type B54S, C54S, E54S, F54S**

**UL Recognized, CSA Certified**

Temperature: UL 873, file # E10667;  
CSA C22.2 No. 0 & 24, file # LR7814

### EUROPE



**Low Voltage Directive (LVD) (73/23/ED & 93/68/EEC)**

UEC compliant to LVD

Products rated lower than 50 VAC and 75 VDC are outside of the scope of the LVD

**Pressure Equipment Directive (PED) (97/23/EC)**

Compliant to PED

Products rated lower than 7.5 psi are outside the scope of the PED

Lexan® is a registered trademark of General Electric Company

## PRESSURE MODEL CHART

| Model   | Adjustable Set Point Range                             | Deadband           |                    | Over Range Pressure* |                        | Proof Pressure**       |                 |                 |
|---|--|--------------------|--------------------|----------------------|------------------------|------------------------|-----------------|-----------------|
|   | Low end of range on fall;<br>High end of range on rise | psi (unless noted) | bar (unless noted) | psi (unless noted)   | bar (unless noted)     | psi                    | bar             |                 |
| <b>J54, J54A, J54S, J54AS, H54, H54S</b>  |  |                    |                    |                      |                        |                        |                 |                 |
| Buna N diaphragm and O-Ring with 1/4" NPT (male) aluminum pressure connection; limited to process temperature below 200°F   |  |                    |                    |                      |                        |                        |                 |                 |
| 22  | 30" Hg Vac to 0  | -1 to 0            | 1 to 3,5" Hg Vac   | 33,9 to 118,5 mbar   | 0                      | 0                      | 50              | 3,4             |
| 24  | 3 to 30  | 0,2 to 2,1         | 0,4 to 1,3         | 27,6 to 89,6 mbar    | 50                     | 3,4                    | 200             | 13,8            |
| 25  | 10 to 100  | 0,7 to 6,9         | 1 to 2,5           | 68,9 to 172,4 mbar   | 100<br>above set point | 6,9<br>above set point | above set point | above set point |
| 27  | 30 to 300  | 2,1 to 20,7        | 1,3 to 4           | 89,6 to 275,8 mbar   | Max 600                | Max 41,4               |                 |                 |
| 28  | 50 to 500  | 3,4 to 34,5        | 1,5 to 5           | 103,4 to 344,7 mbar  |                        |                        |                 |                 |
| Brass bellows with nickel-plated brass 1/4" NPT (female) pressure connection; Model 126 has a zinc-plated steel spring exposed to media   |  |                    |                    |                      |                        |                        |                 |                 |
| 126   | 30" Hg Vac to 0  | -1 to 0            | 0,2 to 0,9" Hg     | 6,8 to 30,5 mbar     | 3                      | 0,2                    | 5               | 0,3             |
| 137   | 0 to 80 "wc  | 0 to 199,1 mbar    | 1 to 8 "wc         | 2,5 to 19,9 mbar     | 3                      | 0,2                    | 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              | 1,7             |
| 146   | 0 to 30  | 0 to 2,1           | 0,1 to 0,6         | 6,9 to 41,4 mbar     | 30                     | 2,1                    | 40              | 2,8             |
| 152†  | 0 to 50  | 0 to 3,4           | 0,1 to 0,7         | 6,9 to 48,3 mbar     | 50                     | 3,4                    | 75              | 5,2             |
| 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           | 20,7 to 137,9 mbar   | 200                    | 13,8                   | 200             | 13,8            |
| <b>J54, J54S</b>  |  |                    |                    |                      |                        |                        |                 |                 |
| 303 stainless steel piston and Buna N O-Ring with 1/4" NPT (female) pressure connection (not recommended for gas service since drying of the O-Ring can allow bleeding of the medium into the atmosphere) |  |                    |                    |                      |                        |                        |                 |                 |
| 610   | 75 to 1000   | 5,2 to 68,9        | 30 to 150          | 2,1 to 10,3          | 6000                   | 413,7                  | 10,000          | 689,5           |
| 612   | 125 to 3000  | 8,6 to 206,8       | 40 to 250          | 2,8 to 17,2          | 6000                   | 413,7                  | 10,000          | 689,5           |
| 614   | 700 to 6000  | 48,3 to 413,7      | 50 to 400          | 3,4 to 27,6          | 6000                   | 413,7                  | 10,000          | 689,5           |

\*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).

† Model not available for types H54, H54S

## TEMPERATURE MODEL CHART

| Model  | Adjustable Set Point Range |                | Max. Temperature |       | Scale*** Division |    | Stem Size<br>NPT x BT (inches) |
|--|----------------------------|----------------|------------------|-------|-------------------|----|--------------------------------|
|  | °F                         | °C             | °F               | °C    | °F                | °C |                                |
| <b>B54, B54S, C54, C54S, C54A, C54AS,</b> Brass immersion stem |                            |                |                  |       |                   |    |                                |
| 103  | 0 to 225                   | -17.8 to 107.2 | 250              | 121.1 | 10                | 5  | 3/8 x 2-1/8                    |
| 109  | 200 to 425                 | 93.3 to 218.3  | 425              | 218.3 | 10                | 5  | 3/8 x 2-1/8                    |
| OD x Length  |                            |                |                  |       |                   |    |                                |
| <b>E54, F54,</b> Copper bulb and capillary                     |                            |                |                  |       |                   |    |                                |
| D20BC  | -130 to 120                | -90 to 48.9    | 170              | 76.7  | 10                | 5  | 3/8 x 4-1/2                    |
| D21BC  | 0 to 150                   | -17.8 to 65.6  | 200              | 93.3  | 5                 | 5  | 3/8 x 6-7/8                    |
| D22BC  | 50 to 300                  | 10 to 148.9    | 350              | 176.7 | 10                | 5  | 3/8 x 4-1/2                    |
| D23BC  | 150 to 650                 | 65.6 to 343.3  | 700              | 371.1 | 25                | 10 | 3/8 x 3-5/8                    |
| <b>E54, F54,</b> Stainless steel bulb and capillary            |                            |                |                  |       |                   |    |                                |
| D20BS†   | -130 to 120                | -90 to 48.9    | 170              | 76.7  | 10                | 5  | 3/8 x 4-1/2                    |
| D21BS  | 0 to 150                   | -17.8 to 65.6  | 200              | 93.3  | 5                 | 5  | 3/8 x 6-7/8                    |
| D22BS  | 50 to 300                  | 10 to 148.9    | 350              | 176.7 | 10                | 5  | 3/8 x 4-1/2                    |
| D23BS  | 150 to 650                 | 65.6 to 343.3  | 700              | 371.1 | 25                | 10 | 3/8 x 3-5/8                    |
| <b>E54S, F54S,</b> Copper bulb and capillary                   |                            |                |                  |       |                   |    |                                |
| D21BC  | 0 to 150                   | -17.8 to 65.6  | 200              | 93.3  | 5                 | 5  | 3/8 x 6-7/8                    |
| D22BC  | 50 to 300                  | 10 to 148.9    | 350              | 176.7 | 10                | 5  | 3/8 x 4-1/2                    |
| D23BC  | 150 to 650                 | 65.6 to 343.3  | 700              | 371.1 | 25                | 10 | 3/8 x 3-5/8                    |
| <b>E54S, F54S,</b> Stainless steel bulb and capillary          |                            |                |                  |       |                   |    |                                |
| D21BS  | 0 to 150                   | -17.8 to 65.6  | 200              | 93.3  | 5                 | 5  | 3/8 x 6-7/8                    |
| D22BS  | 50 to 300                  | 10 to 148.9    | 350              | 176.7 | 10                | 5  | 3/8 x 4-1/2                    |
| D23BS  | 150 to 650                 | 65.6 to 343.3  | 700              | 371.1 | 25                | 10 | 3/8 x 3-5/8                    |

† Not available Type F54

\*\*\* Applies to Types B54, B54S, E54, E54S only

**HOW TO ORDER****BUILDING A PART NUMBER****Select a Type**

Refer to the "Type" section below.

Determine type number based on switch output, enclosure, adjustment and reference.

Fill in the type portion of your part number with the corresponding number.

**Select a Model**

Refer to the "Model Charts."

Determine model based on adjustable range, deadband and proof pressure.

Fill in the model portion of your part number with the corresponding number.

**Select an Option**

Refer to the "Options" section.

Determine option number based on switch output, optional materials or other product enhancements.

Fill in the option portion of your part number with the corresponding number.

Leave "option" portion blank if no options are needed. FOR MULTIPLE OPTIONS: Call United Electric Controls.

**TYPE****DESCRIPTION - PRESSURE MODELS**

J54:

NEMA 1 enclosure; One SPDT output; internal hex adjustment with no reference dial

J54A:

NEMA 1 enclosure; Two SPDT outputs; internal hex adjustment with no reference dial

J54S:

Skeleton construction; One SPDT output; hex adjustment with no reference dial

J54AS:

Skeleton construction; Two SPDT outputs; hex adjustment with no reference dial

H54:

NEMA 1 enclosure; One SPDT output; internal adjustment with reference dial

H54S:

Skeleton construction; One SPDT output; adjustment with reference dial

**TEMPERATURE MODELS**

C54:

NEMA 1 enclosure; Immersion stem; one SPDT output; internal hex adjustment with no reference dial

C54A:

NEMA 1 enclosure; Immersion stem; two SPDT outputs; internal hex adjustment with no reference dial

C54S:

Skeleton construction; Immersion stem; one SPDT output; hex adjustment with no reference dial

C54AS:

Skeleton construction; Immersion stem; Two SPDT outputs; hex adjustment with no reference dial

B54:

NEMA 1 enclosure; Immersion stem; one SPDT output; internal adjustment with reference dial

B54S:

Skeleton construction; Immersion stem; one SPDT output; adjustment with reference dial

F54:

NEMA 1 enclosure; Bulb and capillary; one SPDT output; internal hex adjustment with no reference dial

F54S:

Skeleton construction; Bulb and capillary; one SPDT output; hex adjustment with no reference dial

E54:

NEMA 1 enclosure; Bulb and capillary; one SPDT output; internal adjustment with reference dial

E54S:

Skeleton construction; Bulb and capillary; one SPDT output; adjustment with reference dial

**SWITCH OPTIONS\*****CODE****DESCRIPTION**

0500

Close deadband, 5A 125/250 VAC resistive NOT AVAILABLE ON B54, B54S, C54, C54S, C54A, C54AS, E54S, F54, F54S

1520

Adjustable deadband, 15A 125/250/277 VAC resistive. Adjustable wheel changes rise setting only. If adjustment of fall setting is required, use primary adjustment. NOT AVAILABLE ON TYPES J54A, J54AS, H54, H54S, PRESSURE MODELS 610-614 &amp; TEMPERATURE VERSIONS

1530

External manual reset, 15A 125/250/480 VAC resistive; reset on increasing pressure or temperature only. NOT AVAILABLE ON TYPES J54A, J54S, J54AS, H54S,B54S, C54A, C54AS, C54S, E54S, F54S OR MODELS 610-614

2000

20A 125/250 VAC resistive

\* All switches have limited DC capabilities. Consult factory for details.

**GENERAL OPTIONS**

| <b>CODE</b> | <b>DESCRIPTION</b>  |
|-------------|---|
| M201        | Factory set one switch; specify increasing or decreasing pressure or temperature and set point. NOT AVAILABLE ON TYPES J54A, J54AS, C54A, C54AS   |
| M202        | Factory set two switches; specify increasing or decreasing pressure or temperature and set point. NOT AVAILABLE ON TYPES J54, J54S, H54, H54S, B54, B54S, C54, C54S, E54, E54S, F54, F54S   |
| M270        | Calibrated dial in Celsius. NOT AVAILABLE ON PRESSURE VERSIONS AND TYPES B54, B54S, C54, C54S, C54A, C54AS, F54, F54S   |
| M277        | Range indicated on nameplate in kPa or MPa. NOT AVAILABLE ON TEMPERATURE VERSIONS   |
| M278        | Range indicated on nameplate in kg/cm <sup>2</sup> . NOT AVAILABLE ON TEMPERATURE VERSIONS.   |
| M444        | Paper ID tag  |
| M446        | Stainless steel ID tag & wire attachment  |
| M540        | Viton® construction (deadband and low end range may increase slightly. Consult factory); Wetted parts include Viton® diaphragm and O-Ring plus standard connection material. NOT AVAILABLE MODELS 126-164 OR TEMPERATURE VERSIONS |

**PRESSURE CONNECTION OPTIONS**

|      |   |
|------|---|
| M501 | Polysulfone® pressure connection 1/2" NPT (male) x 1/8" NPT (female). NOT AVAILABLE MODELS 126-164, 610-614 OR TEMPERATURE VERSIONS |
|------|---|

**OPTIONS FOR TEMPERATURE MODELS****UNION CONNECTORS***For all bulb & capillary switches*

| 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*

|      | <u>Brass</u>                           |  |
|------|--|--|
| W075 | SD6225-75                              | 3/4" bushing adapter, 4" BT                |
| W191 | SD6225-191                             | 1/2" NPT, 4" BT                            |
| W118 | SD6225-118                             | 3/4" bushing adapter, 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                          |
|      | <i>For all Immersion stem switches</i> |  |
| W141 | SD6225-141                             | 1/2" NPT x 1 9/16" BT, brass               |
| W146 | SD6225-146                             | 1/2" NPT x 1 9/16" BT, 316 stainless steel |

**OPTIONAL LENGTHS:**

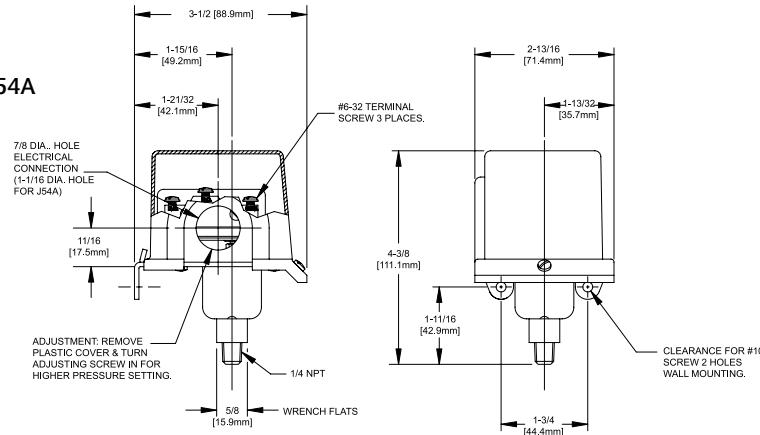
Optional immersion stem lengths to 15" available in brass, with or without 316 st/st thermowell. Consult UE for additional information. Optional capillary length to \*50' available in copper or 304 st/st. Armor or Teflon® capillary protection available to lengths less than or equal to capillary length. Consult UE for additional information.

\*Consult UE regarding repeatability and ambient effects on capillary lengths over 30'.

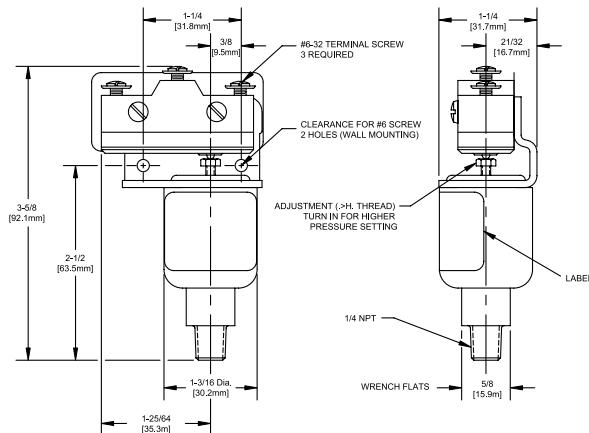
Viton® is a registered trademark of Dupont Dow Elastomers

## DIMENSIONAL DRAWINGS

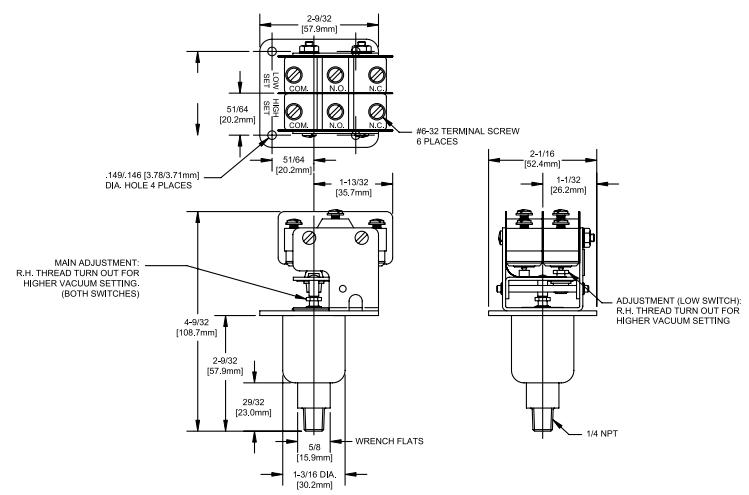
## Pressure Models

Type H54, J54 and J54A  
Models 22 - 28

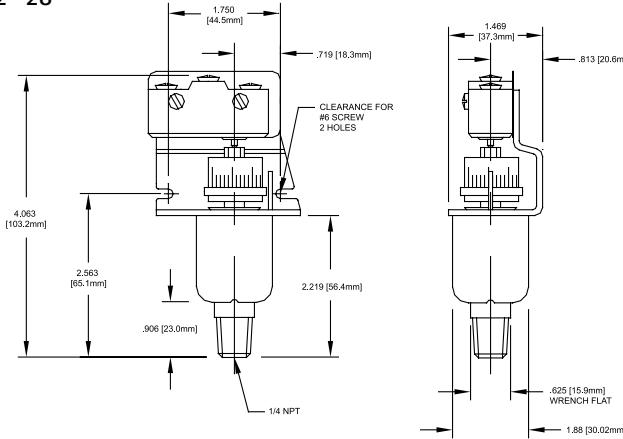
Type J54S, Models 22 - 28



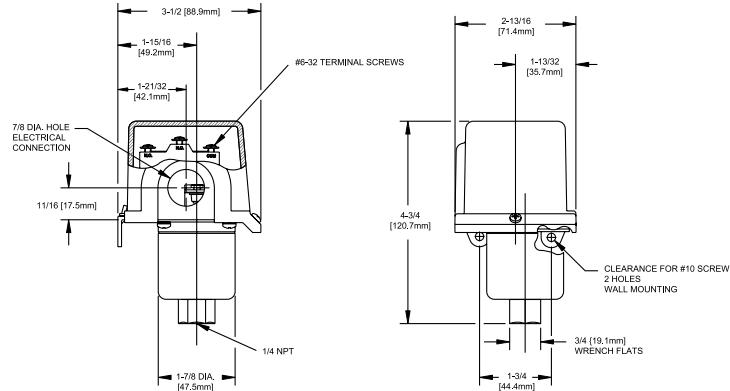
Type J54AS, Models 22 - 28



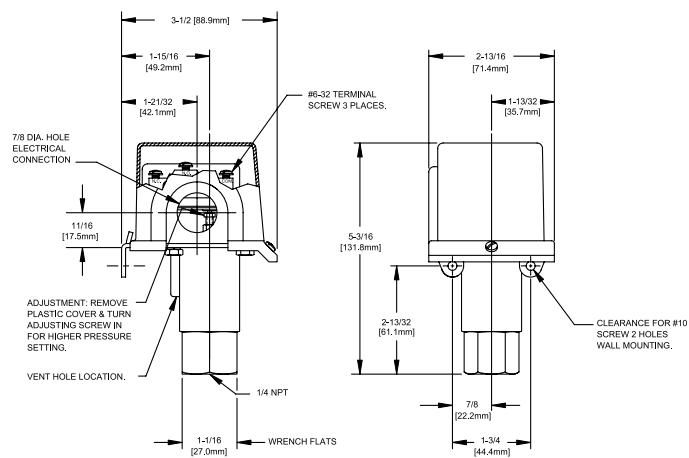
Type H54S, Models 22 - 28



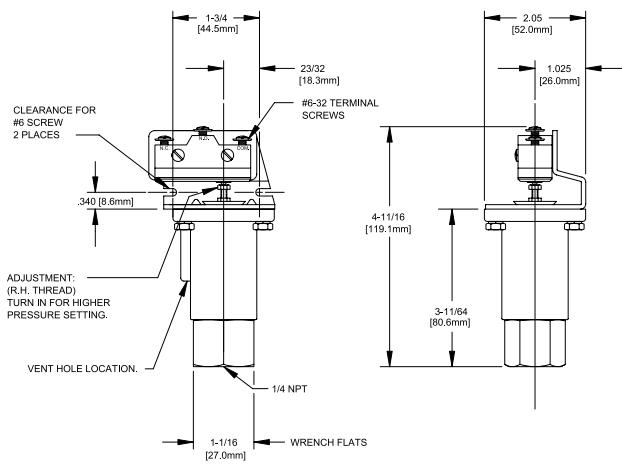
**Type H54, J54, and J54A  
Models 126-164**



**Type J54  
Models 610 - 614**



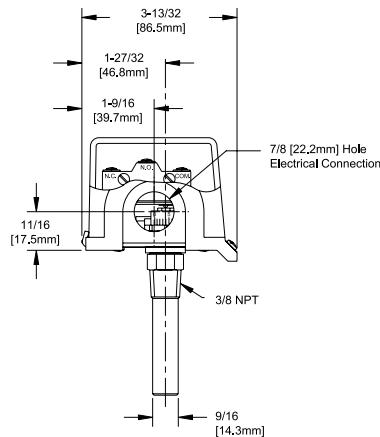
**Type J54S  
Models 610 - 614**



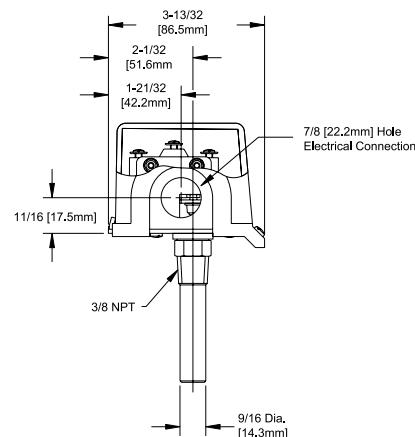
## DIMENSIONAL DRAWINGS

## Temperature Models

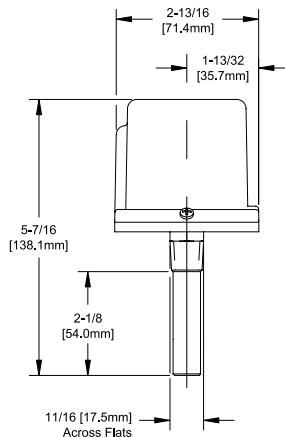
Types B54, C54



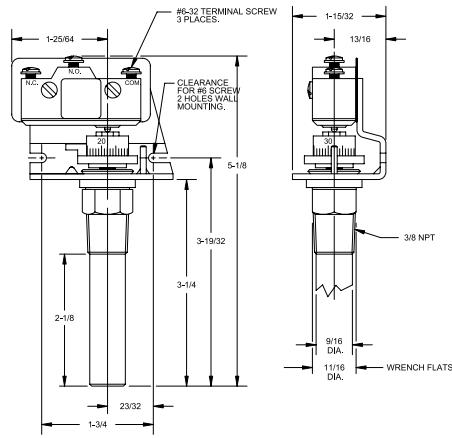
Type C54A



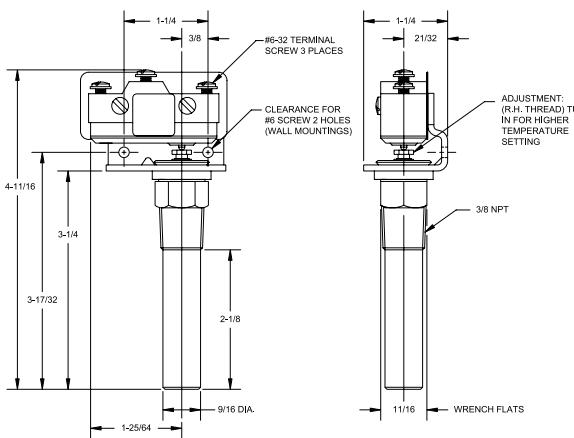
Types B54, C54, C54A



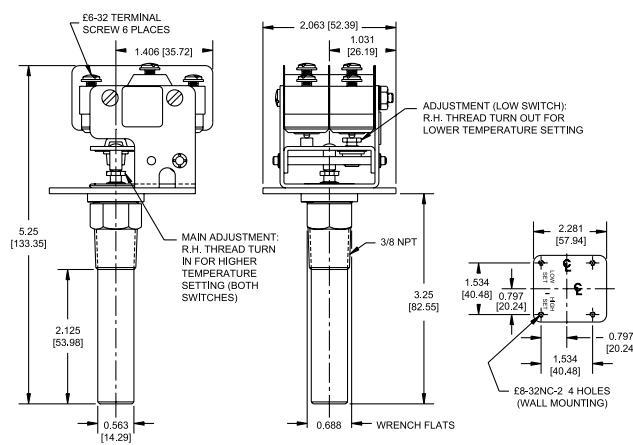
Type B54S



Type C54S

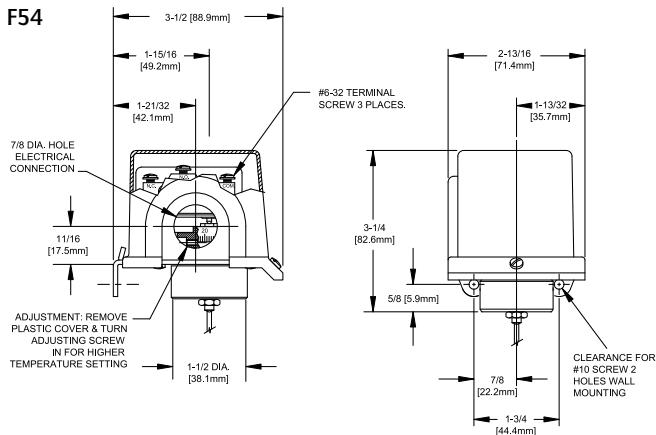


Type C54AS

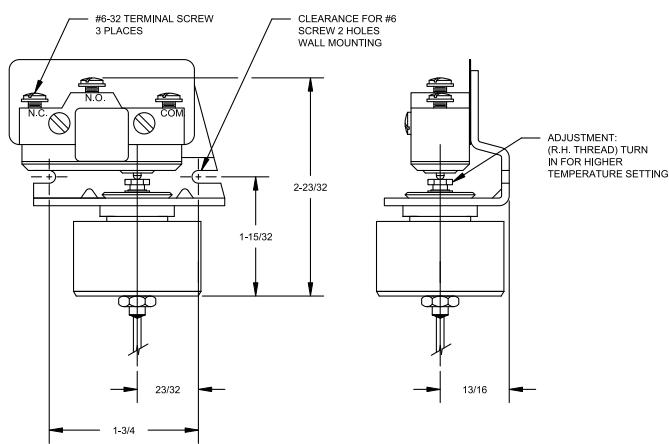


All dimensions stated in inches (millimeters)

## Types E54 and F54

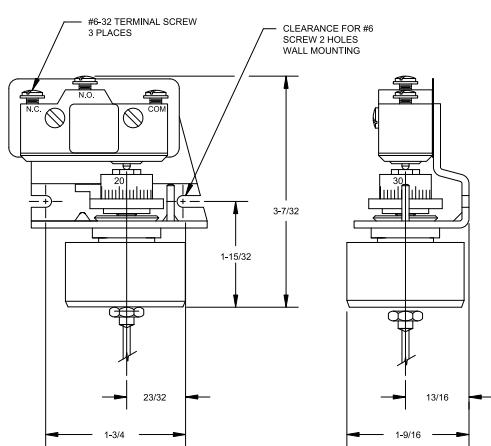


## Type F54S



| Bulb Size                  |        |       |
|----------------------------|--------|-------|
| Models                     | Inches | mm    |
| E54 & F54                  |        |       |
| D20BC, D20BS, D22BC, D22BS | 4.50   | 114.3 |
| D21BC, D21BS               | 6.86   | 174.6 |
| D23BC, D23BS               | 3.63   | 92.1  |
| E54S & F54S                |        |       |
| D21BC, D21BS               | 6.86   | 174.6 |
| D22BC, D22BS               | 4.50   | 114.3 |
| D23BC, D23BS               | 3.63   | 92.1  |

## Type E54S



## RECOMMENDED PRACTICES AND WARNINGS

United Electric Controls Company recommends careful consideration of the following factors when specifying and installing UE pressure and temperature units. Before installing a unit, the Installation and Maintenance instructions provided with unit must be read and understood.

- To avoid damaging unit, proof pressure and maximum temperature limits stated in literature and on nameplates must never be exceeded, even by surges in the system. Operation of the unit up to maximum pressure or temperature is acceptable on a limited basis (e.g., start-up, testing) but continuous operation must be restricted to the designated adjustable range. Excessive cycling at maximum pressure or temperature limits could reduce sensor life.
- A back-up unit is necessary for applications where damage to a primary unit could endanger life, limb or property. A high or low limit switch is necessary for applications where a dangerous runaway condition could result.
- The adjustable range must be selected so that incorrect, inadvertent or malicious setting at any range point cannot result in an unsafe system condition.
- Install unit where shock, vibration and ambient temperature fluctuations will not damage unit or affect operation. When applicable, orient unit so that moisture does not enter the enclosure via the electrical connection. When appropriate, this entry point should be sealed to prevent moisture entry.
- Unit must not be altered or modified after shipment. Consult UE if modification is necessary.
- Monitor operation to observe warning signs of possible damage to unit, such as drift in set point or faulty display. Check unit immediately.
- Preventative maintenance and periodic testing is necessary for critical applications where damage could endanger property or personnel.
- Electrical ratings stated in literature and on nameplate must not be exceeded. Overload on a switch can cause damage, even on the first cycle. Wire unit according to local and national electrical codes, using wire size recommended in installation sheet.
- Do not mount unit in ambient temp. exceeding published limits.

## LIMITED WARRANTY

Seller warrants that the product hereby purchased is, upon delivery, free from defects in material and workmanship and that any such product which is found to be defective in such workmanship or material will be repaired or replaced by Seller (Ex-works, Factory, Watertown, Massachusetts, INCOTERMS); provided, however, that this warranty applies only to equipment found to be so defective within a period of 24 months from the date of manufacture by the Seller. Seller shall not be obligated under this warranty for alleged defects which examination discloses are due to tampering, misuse, neglect, improper storage, and in any case where products are disassembled by anyone other than authorized Seller's representatives. EXCEPT FOR THE LIMITED WARRANTY OF REPAIR AND REPLACEMENT STATED ABOVE, SELLER DISCLAIMS ALL WARRANTIES WHATSOEVER WITH RESPECT TO THE PRODUCT, INCLUDING ALL IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR ANY PARTICULAR PURPOSE.

## LIMITATION OF SELLER'S LIABILITY

Seller's liability to Buyer for any loss or claim, including liability incurred in connection with (i) breach of any warranty whatsoever, expressed or implied, (ii) a breach of contract, (iii) a negligent act or acts (or negligent failure to act) committed by Seller, or (iv) an act for which strict liability will be imputed to seller, is limited to the "limited warranty" of repair and/or replacement as so stated in our warranty of product. In no event shall the Seller be liable for any special, indirect, consequential or other damages of a like general nature, including, without limitation, loss of profits or production, or loss or expenses of any nature incurred by the buyer or any third party.

*UE specifications subject to change without notice.*

Be sure to visit [www.ueonline.com](http://www.ueonline.com) for the latest information.

## U.S. SALES OFFICES

United Electric Controls  
31 Old Stage Road  
Hampton Falls, NH 03844  
Phone: 617-899-1132  
email: [northeastsales@ueonline.com](mailto:northeastsales@ueonline.com)

United Electric Controls  
28 N. Wise Ave.  
Freeport, IL 61032  
Phone: 815-341-2588  
email: [midwestsales@ueonline.com](mailto:midwestsales@ueonline.com)

United Electric Controls  
1022 Vineyard Drive  
Conyers, GA 30013  
Phone: 770-335-9802  
email: [southeastsales@ueonline.com](mailto:southeastsales@ueonline.com)

United Electric Controls  
5829 Grazing Court  
Mason, OH 45040  
Phone: 513-535-5486  
email: [midatlanticsales@ueonline.com](mailto:midatlanticsales@ueonline.com)

United Electric Controls  
102 Salazar Court  
Clayton, CA 94517  
Phone: 925-408-5997  
email: [westcoastsales@ueonline.com](mailto:westcoastsales@ueonline.com)

United Electric Controls  
27 Summit Terrace  
Sparta, NJ 07871  
Phone: 973-271-2550  
email: [eastersales@ueonline.com](mailto:eastersales@ueonline.com)

United Electric Controls  
4306 Whickham Drive  
Fulshear, TX 77441  
Phone: 832-457-6138  
email: [southwestsales@ueonline.com](mailto:southwestsales@ueonline.com)

## CANADA

EASTERN  
68 Mosley Crescent  
Brampton, Ontario  
Canada L6Y 5C8  
Phone: 905-455-5131  
FAX: 905-455-5131

WESTERN  
148 Silver Ridge Close N.W.  
Calgary, Alberta  
Canada T3B 3T4  
Phone: 403-247-3724  
FAX: 403-247-3724

## INTERNATIONAL OFFICES

CHINA  
United Electric Controls, *Shanghai Office*  
Room 1011, 10th Flr,  
Huai Hai Zhonghua Building  
No. 885, Renmin Road, Luwan District  
Shanghai 200010, P.R. China  
Phone: +8621-6255 8059  
email: [chinasaless@ueonline.com](mailto:chinasaless@ueonline.com)

United Electric Controls, *Beijing Office*  
Room 1006, Jainhao International Bldg.  
Block D, No. 116  
Zizhuyuanlu, Haidian District  
Beijing, China 100089  
Phone: +86-10-5893-0518  
email: [beijingsales@ueonline.com](mailto:beijingsales@ueonline.com)

EASTERN EUROPE & SCANDINAVIA  
United Electric Controls  
05-806 Komorow  
Kujawska 5, Poland  
Phone: +48 22 499 4804  
email: [easterneuropeales@ueonline.com](mailto:easterneuropeales@ueonline.com)

GERMANY  
United Electric Controls  
An Der Zentlinde 21  
D-64711 Erbach, Germany  
Phone: 496-062-7400  
email: [europesales@ueonline.com](mailto:europesales@ueonline.com)

INDIA  
United Electric Controls  
House no. 7, Kamalkunj Society  
Nizampura,  
Baroda (Gujarat), India  
Phone: +91 (-265) -2788654  
email: [indisales@ueonline.com](mailto:indisales@ueonline.com)

ASIA-PACIFIC  
United Electric Controls, Far East  
No. 1-2-2, 2nd Floor  
Jalan 4/101C  
Cheras Business Centre  
Batu 5, Jalan Cheras  
56100 Kuala Lumpur, Malaysia  
Phone: 603-9133-4122  
email: [fareastsales@ueonline.com](mailto:fareastsales@ueonline.com)

MEXICO  
United Electric Controls  
Zacatecas # 206, Suite 20  
Col Guadalupe CP 89120  
Tampico, Tamaulipas Mexico  
Phone: 833-217-5201  
email: [latinamericasales@ueonline.com](mailto:latinamericasales@ueonline.com)

RUSSIA  
United Electric Controls, Moscow  
Elninskaya str., 15-140  
Moscow, 121552, Russia  
Phone: +7 (495) 792-88-06  
email: [russiansales@ueonline.com](mailto:russiansales@ueonline.com)



UNITED ELECTRIC  
CONTROLS

180 Dexter Avenue, P.O. Box 9143  
Watertown, MA 02471-9143 USA  
Telephone: 617 926-1000 Fax: 617 926-2568  
<http://www.ueonline.com>

CP01101500

## REMOTE MOUNTING TEMPERATURE SWITCH AND CONTROL



### FEATURES

- Single or Dual 15 A Switch Output
- Panel or Surface Mount
- External adjustment via reference dial
- Heat Tracing Models
- Adjustable Ranges Within -130 to 650°F (-90 to 343.3°C)

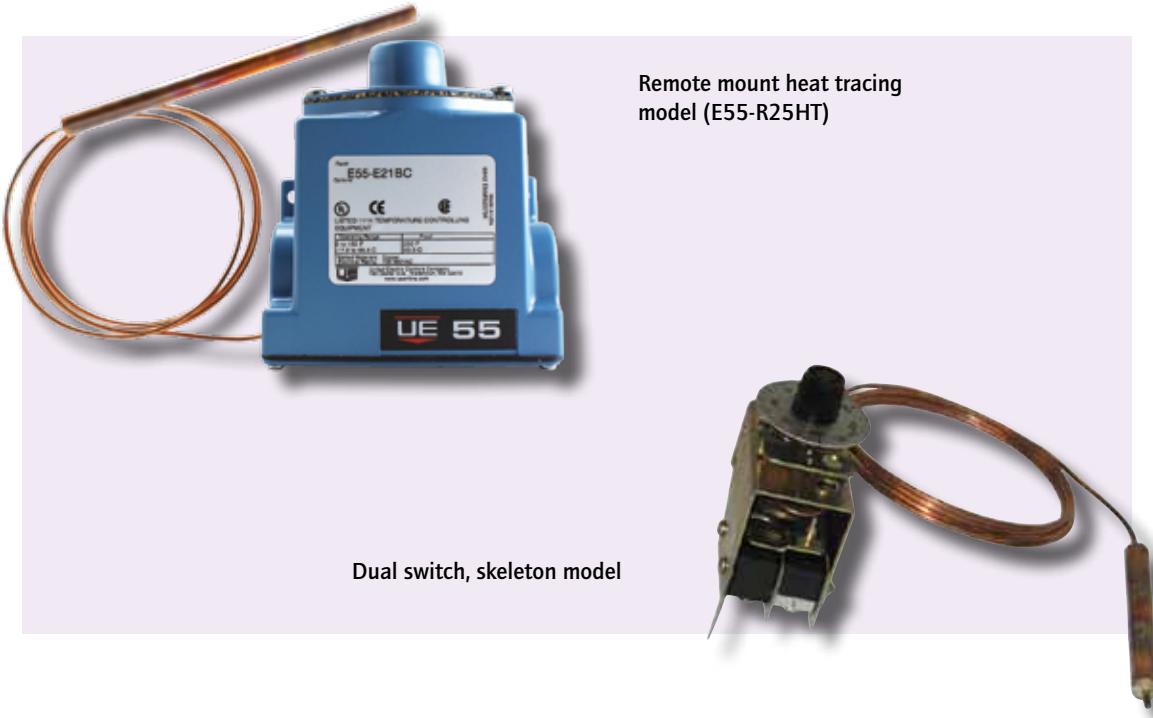


## OVERVIEW

The E55 Series provides rugged, dependable temperature control for many applications. Available in single or dual output versions, with either an epoxy coated enclosure (designed to meet NEMA Type 4X) or skeleton construction, the E55 combines flexibility with compact size. It has been used in diverse applications such as food service appliances, oven control, and heat tracing.

## FEATURES

- Single or dual 15 A switch output
- Skeleton or Enclosure construction
  - designed to meet NEMA Type 4X
- Optional external manual reset
- Compact size
- Copper or stainless steel bulb & capillary



Remote mount heat tracing  
model (E55-R25HT)

Dual switch, skeleton model

## SPECIFICATIONS

|                                   |   |
|-----------------------------------|---|
| <b>STORAGE TEMPERATURE</b>        | -65 to 160°F (-54 to 71°C)  |
| <b>AMBIENT TEMPERATURE LIMITS</b> | -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   |
| <b>SET POINT REPEATABILITY</b>    | ± 1% of adjustable range  |
| <b>SHOCK</b>                      | Set point repeats after 15 G, 10 millisecond duration   |
| <b>VIBRATION</b>                  | Set point repeats after 2.5 G, 5-500 Hz   |
| <b>ENCLOSURE CLASSIFICATION</b>   | Type E55 & E55A: Designed to meet enclosure type 4X requirements<br>Types E55S & E55AS: Skeleton, open frame construction, not applicable   |
| <b>ENCLOSURE</b>                  | Die cast aluminum, epoxy powder coated with stainless steel, gasketed adjustment cover (E55 and E55A)   |
| <b>SWITCH OUTPUT</b>              | One or two SPDT; dual switch may be separated up to 100% of range; switches may be wired "normally open" or "normally closed"   |
| <b>ELECTRICAL RATING</b>          | 15 A 125/250/480 VAC resistive; 22 A 480 VAC for E55-R25HT and E55-L24HT heat trace models. Electrical switches have limited DC capabilities. Consult factory for additional information                          |
| <b>ELECTRICAL CONNECTION</b>      | 1/2" NPT (female) (E55 and E55A)  |
| <b>WEIGHT</b>                     | Types E55S, E55AS (skeleton): approximately 12 oz.; Types E55, E55A: approximately 1 lb.  |
| <b>BULB AND CAPILLARY</b>         | Models E20BC - E23BC: 6 feet copper;<br>Models E20BS - E23BS: 6 feet stainless steel<br>Model R25HT-101: 10 feet stainless steel<br>Model L24HT: stainless steel, Local sensor, no capillary, for ambient sensing |
| <b>TEMPERATURE FILL</b>           | Non-toxic oil   |
| <b>TEMPERATURE DEADBAND</b>       | Typically 1% of range under laboratory conditions (70°F circulating bath at rate of 1/2°F per minute change)  |

## APPROVALS

### UNITED STATES AND CANADA



#### **E55(A) Models**

#### **UL Listed, CSA Certified**

UL 873, file # E10667; C22.2 no. 24, file # LR7814



#### **E55(A)S Models**

#### **UL Recognized, CSA Certified**

UL 873, file # E10667; C22.2 no. 24, file # LR7814

### EUROPE



#### **Low Voltage Directive (LVD) (73/23/EC & 93/68/EEC)**

#### **UEC compliant to LVD**

Products rated lower than 50 VAC and 75 VDC are outside of the scope of the LVD

## MODEL CHART

| Model                                    | Adjustable Set Point Range |               | Max. Temp. |       | Dial Div. |    | Bulb Size            |
|--|----------------------------|---------------|------------|-------|-----------|----|----------------------|
| Copper bulb<br>& capillary               | °F                         | °C            | °F         | °C    | °F        | °C | OD x Length (inches) |
| E20BC                                    | -130 to 120                | -90 to 48.9   | 170        | 76.7  | 10        | 5  | 3/8 x 4-3/8          |
| E21BC                                    | 0 to 150                   | -17.8 to 65.6 | 200        | 93.3  | 5         | 5  | 3/8 x 6-7/8          |
| E22BC                                    | 50 to 300                  | 10 to 148.9   | 350        | 176.7 | 10        | 5  | 3/8 x 4-3/8          |
| E23BC                                    | 150 to 650                 | 65.6 to 343.3 | 700        | 371.1 | 25        | 10 | 3/8 x 3-5/8          |
| <hr/> Stainless steel bulb and capillary |                            |               |            |       |           |    |                      |
| E20BS <sup>#</sup>                       | -130 to 120                | -90 to 48.9   | 170        | 76.7  | 10        | 5  | 3/8 x 4-3/8          |
| E21BS                                    | 0 to 150                   | -17.8 to 65.6 | 200        | 93.3  | 5         | 5  | 3/8 x 6-7/8          |
| E22BS                                    | 50 to 300                  | 10 to 148.9   | 350        | 176.7 | 10        | 5  | 3/8 x 4-3/8          |
| E23BS                                    | 150 to 650                 | 65.6 to 343.3 | 700        | 371.1 | 25        | 10 | 3/8 x 3-5/8          |
| R25HT <sup>#‡</sup>                      | 25 to 325                  | -3.9 to 162.8 | 600        | 315.6 | 10        | -  | 1/4 x 7-3/16         |
| L24HT <sup>#‡</sup>                      | 15 to 140                  | -9.4 to 60    | 190        | 87.8  | 5         | -  | 3/8 x 7              |

<sup>#</sup> Not available with Type E55AS<sup>#‡</sup> Not available with Types E55A, E55S, E55AS

## HOW TO ORDER

### BUILDING A PART NUMBER

#### Select a Type

Refer to the "Type" section below.  
Determine type number based on switch output, enclosure, adjustment and reference.  
Fill in the type portion of your part number with the corresponding number.

#### Select a Model

Refer to the "Model Charts".  
Determine model based on adjustable range, and capillary material.  
Fill in the model portion of your part number with the corresponding number.

#### Select an Option

Refer to the "Options" section.  
Determine option number based on switch output, optional materials or other product enhancements.  
Fill in the option portion of your part number with the corresponding number.  
Leave "option" portion blank if no options are needed. *FOR MULTIPLE OPTIONS:* Call United Electric Controls.

#### TYPE

|       |   |
|-------|---|
| E55   | Bulb & capillary; one SPDT output; Epoxy coated enclosure; external adjustment with reference dial, tamper-resistant cover  |
| E55A  | Bulb & capillary; two SPDT outputs; Epoxy coated enclosure; external adjustment with reference dial, tamper-resistant cover |
| E55S  | Bulb & capillary; one SPDT output; skeleton construction; external adjustment with reference dial                           |
| E55AS | Bulb & capillary; two SPDT outputs; skeleton construction; external adjustment with reference dial                          |

#### SWITCH OPTIONS\*

|      |  |
|------|--|
| 0500 | Close deadband, 5 A 125/250 VAC resistive. NOT AVAILABLE ON MODELS R25HT, L24HT  |
| 1530 | External manual reset, 15 A 125/250/480 VAC resistive; reset on increasing temperature.<br>NOT AVAILABLE ON TYPES E55S, E55AS, & MODELS R25HT, L24HT |
| 2000 | 20 A 125/250 VAC resistive. NOT AVAILABLE ON MODELS R25HT, L24HT   |

#### GENERAL

|      |  |
|------|--|
| M020 | Pilot light. AVAILABLE HEAT TRACE MODELS R25HT, L24HT ONLY   |
| M201 | Factory set one switch; specify increasing or decreasing temperature and set point. NOT AVAILABLE ON TYPES E55A, E55AS |
| M202 | Factory set two switches; specify increasing or decreasing temperature and set point. NOT AVAILABLE ON TYPES E55, E55S |
| M270 | Calibrated dial in Celsius. NOT AVAILABLE ON HEAT TRACE MODELS R25HT, L24HT  |
| M444 | Paper ID tag. NOT AVAILABLE ON HEAT TRACE MODELS R25HT, L24HT  |
| M446 | Stainless steel ID tag & wire attachment   |

#### UNION CONNECTORS\*\*

(Not available on model L24HT or R25HT)

| 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, all 1/2" NPT Internal (Not available on models R25HT, L24HT)

|                            |            |   |
|----------------------------|------------|---|
| <u>Brass</u>               |            |   |
| W075                       | SD6225-75  | 1/2" NPT with 3/4" NPT bushing adapter, 4" BT |
| W191                       | SD6225-191 | 1/2" NPT, 4" BT                               |
| W118                       | SD6225-118 | 1/2" NPT with 3/4" NPT bushing adapter, 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                             |

#### OPTIONAL LENGTHS:

Optional capillary length to 50' available in copper or 304 st/st. Armor or Teflon® capillary protection available to lengths less than or equal to capillary length. Consult UE for additional information.

Consult UE regarding repeatability and ambient effects on capillary lengths over 30'.

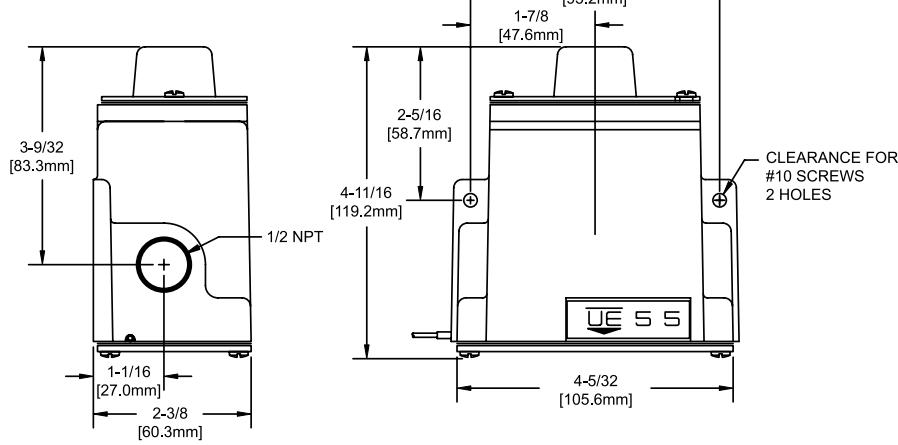
\* All switch options have limited DC capabilities. Consult factory for details.

\*\* Dimensional drawings for union connector and thermowells may be found at [www.ueonline.com](http://www.ueonline.com)

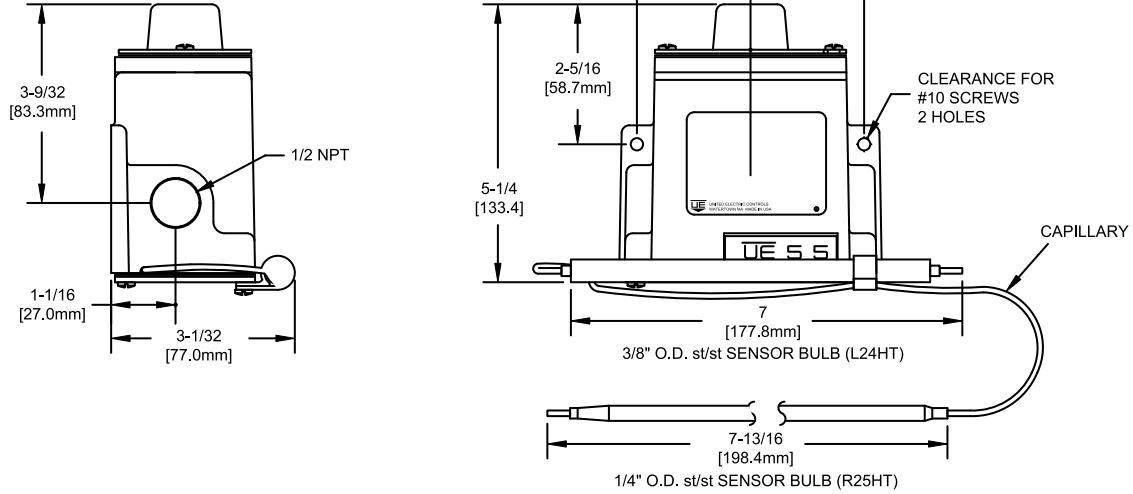
## DIMENSIONAL DRAWINGS

(Dimensional drawings for all models may be found at [www.ueonline.com](http://www.ueonline.com))

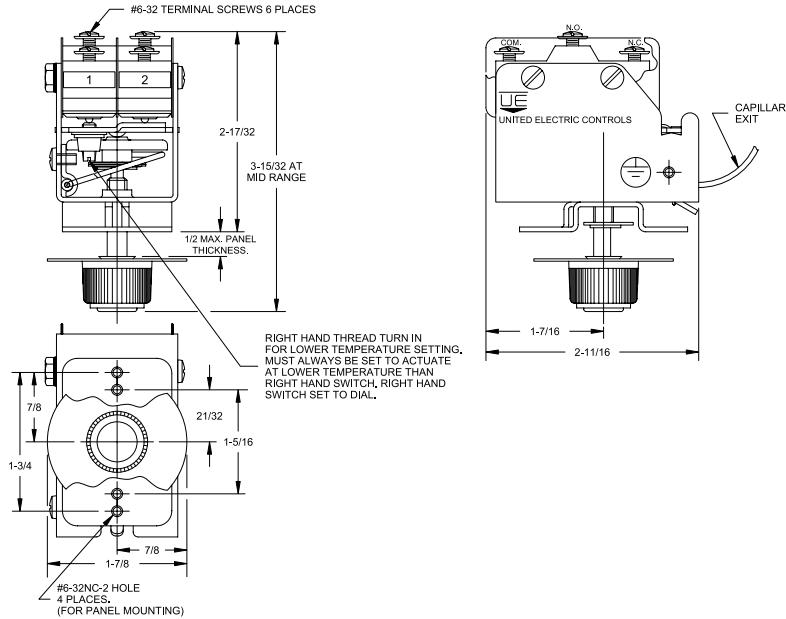
Types E55 / E55A



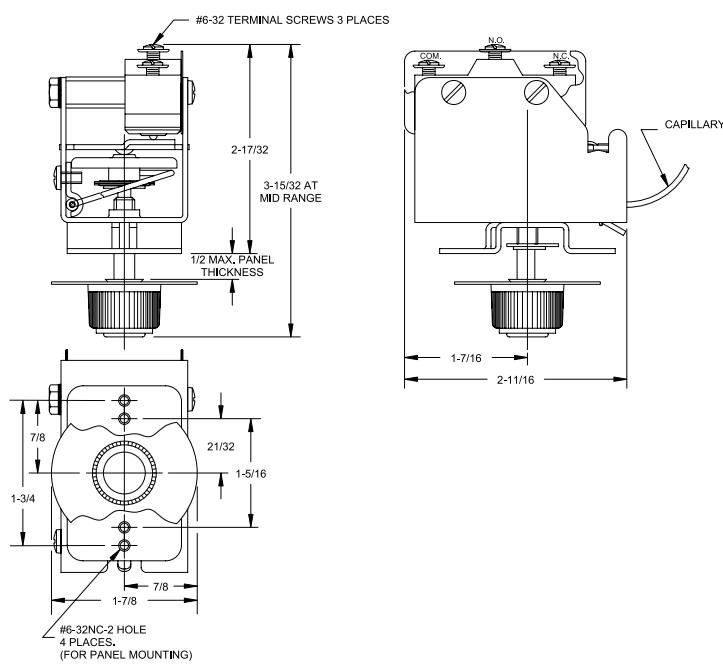
Type E55 Heat Tracing Models



Type E55AS



Type E55



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- Unit must not be altered or modified after shipment. Consult UE if modification is necessary.
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- Do not mount unit in ambient temp. exceeding published limits.

## LIMITED WARRANTY

Seller warrants that the product hereby purchased is, upon delivery, free from defects in material and workmanship and that any such product which is found to be defective in such workmanship or material will be repaired or replaced by Seller (Ex-works, Factory, Watertown, Massachusetts, INCOTERMS); provided, however, that this warranty applies only to equipment found to be so defective within a period of 24 months from the date of manufacture by the Seller. Seller shall not be obligated under this warranty for alleged defects which examination discloses are due to tampering, misuse, neglect, improper storage, and in any case where products are disassembled by anyone other than authorized Seller's representatives. EXCEPT FOR THE LIMITED WARRANTY OF REPAIR AND REPLACEMENT STATED ABOVE, SELLER DISCLAIMS ALL WARRANTIES WHATSOEVER WITH RESPECT TO THE PRODUCT, INCLUDING ALL IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR ANY PARTICULAR PURPOSE.

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## U.S. SALES OFFICES

United Electric Controls  
31 Old Stage Road  
Hampton Falls, NH 03844  
Phone: 617-899-1132  
email: [northeastsales@ueonline.com](mailto:northeastsales@ueonline.com)

United Electric Controls  
28 N. Wise Ave.  
Freeport, IL 61032  
Phone: 815-341-2588  
email: [midwestsales@ueonline.com](mailto:midwestsales@ueonline.com)

United Electric Controls  
1022 Vineyard Drive  
Conyers, GA 30013  
Phone: 770-335-9802  
email: [southeastsales@ueonline.com](mailto:southeastsales@ueonline.com)

United Electric Controls  
5829 Grazing Court  
Mason, OH 45040  
Phone: 513-535-5486  
email: [midatlanticsales@ueonline.com](mailto:midatlanticsales@ueonline.com)

United Electric Controls  
102 Salazar Court  
Clayton, CA 94517  
Phone: 925-408-5997  
email: [westcoastsales@ueonline.com](mailto:westcoastsales@ueonline.com)

United Electric Controls  
27 Summit Terrace  
Sparta, NJ 07871  
Phone: 973-271-2550  
email: [easternsales@ueonline.com](mailto:easternsales@ueonline.com)

United Electric Controls  
4306 Whickham Drive  
Fulshear, TX 77441  
Phone: 832-457-6138  
email: [southwestsales@ueonline.com](mailto:southwestsales@ueonline.com)

## CANADA

EASTERN  
68 Mosley Crescent  
Brampton, Ontario  
Canada L6Y 5C8  
Phone: 905-455-5131  
FAX: 905-455-5131

## INTERNATIONAL OFFICES

CHINA  
United Electric Controls, *Shanghai Office*  
Room 1011, 10th Flr,  
Huai Hai Zhonghua Building  
No. 885, Renmin Road, Luwan District  
Shanghai 200010, P.R. China  
Phone: +8621-6255 8059  
email: [chinasales@ueonline.com](mailto:chinasales@ueonline.com)

United Electric Controls, *Beijing Office*  
Room 1006, Jainhao International Bldg.  
Block D, No. 116  
Zizhuyuanlu, Haidian District  
Beijing, China 100089  
Phone: +86-10-5893-0518  
email: [beijingsales@ueonline.com](mailto:beijingsales@ueonline.com)

EASTERN EUROPE & SCANDINAVIA  
United Electric Controls  
05-806 Komorow  
Kujawska 5, Poland  
Phone: +48 22 499 4804  
email: [easterneuropesales@ueonline.com](mailto:easterneuropesales@ueonline.com)

GERMANY  
United Electric Controls  
An Der Zentlinde 21  
D-64711 Erbach, Germany  
Phone: 496-062-7400  
email: [europansales@ueonline.com](mailto:europansales@ueonline.com)

INDIA  
United Electric Controls  
House no. 7, Kamalkunj Society  
Nizampura,  
Baroda (Gujarat), India  
Phone: +91 (-265) -2788654  
email: [indisales@ueonline.com](mailto:indisales@ueonline.com)

ASIA-PACIFIC  
United Electric Controls, Far East  
No. 1-2-2, 2nd Floor  
Jalan 4/101C  
Cheras Business Centre  
Batu 5, Jalan Cheras  
56100 Kuala Lumpur, Malaysia  
Phone: 603-9133-4122  
email: [fareastsales@ueonline.com](mailto:fareastsales@ueonline.com)

MEXICO  
United Electric Controls  
Zacatecas # 206, Suite 20  
Col Guadalupe CP 89120  
Tampico, Tamaulipas Mexico  
Phone: 833-217-5201  
email: [latinamericasales@ueonline.com](mailto:latinamericasales@ueonline.com)

RUSSIA  
United Electric Controls, Moscow  
Elninskaya str., 15-140  
Moscow, 121552, Russia  
Phone: +7 (495) 792-88-06  
email: [russiansales@ueonline.com](mailto:russiansales@ueonline.com)



UNITED ELECTRIC  
CONTROLS

180 Dexter Avenue, P.O. Box 9143  
Watertown, MA 02471-9143 USA  
Telephone: 617 926-1000 Fax: 617 926-2568  
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CP04101000

## SKELETON PRESSURE AND VACUUM SWITCHES



### FEATURES

- Sealed Metal Bellows Sensor
- Brass or Phosphor Bronze Wetted Material
- Small Size
- 15 A SPDT Switch Output
- Easy to Wire Screw Terminals
- Adjustable Ranges from 30" Hg Vac to 300 psi (-1 to 20,7 bar)

J 4 0 - B - 0 4

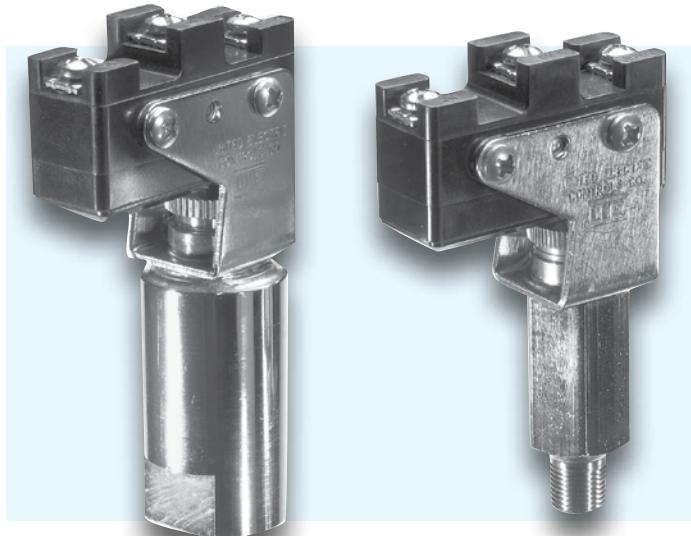
## J40 Series

### OVERVIEW

The J40 can be utilized in OEM applications where compact size and performance are required. The sealed bellows sensor provides a "leak-free" sensor for applications where elastomers are unacceptable. Proven reliability involving sterilizers, plasma-cutting, anesthesia equipment, and even protective switching devices for power equipment, have made the J40 a versatile OEM pressure switch.

### FEATURES

- Sealed metal bellows sensor
- Brass or phosphor bronze wetted material
- Compact size
- Easy external adjustment
- Optional adjustable deadband switch
- UL recognized for the US and Canada; CE compliant to LVD & PED



Optional Hex bellows housing

## SPECIFICATIONS

|                                       |  |
|---------------------------------------|--|
| <b>STORAGE<br/>TEMPERATURE</b>        | -65 to 160°F (-54 to 71°C)   |
| <b>AMBIENT<br/>TEMPERATURE LIMITS</b> | -40 to 160°F (-40 to 71°C)   |
| <b>SHOCK</b>                          | Set point repeats after 15 G, 10 millisecond duration  |
| <b>VIBRATION</b>                      | Set point repeats after 2.5 G, 5-500 CPS   |
| <b>ENCLOSURE<br/>CLASSIFICATION</b>   | Not applicable   |
| <b>SET POINT<br/>REPEATABILITY</b>    | ± 1% of full scale range   |
| <b>SWITCH OUTPUT</b>                  | One SPDT; switch may be wired "normally open" or "normally closed"   |
| <b>ELECTRICAL RATING</b>              | 15 A 125/250 VAC resistive. Electrical switches have limited DC capabilities. Consult UE for additional information. |
| <b>ENCLOSURE</b>                      | Skeleton construction  |
| <b>WEIGHT</b>                         | Approx. 4 oz.  |
| <b>ELECTRICAL<br/>CONNECTION</b>      | Direct to switch terminals   |
| <b>PRESSURE<br/>CONNECTION</b>        | Models 218-230: 1/4" NPT (female);<br>Models 256-274: 1/8" NPT (male)  |
| <b>MOUNTING</b>                       | Via NPT pressure connection  |

## APPROVALS



**UNITED STATES AND CANADA**  
**UL Recognized, cUL Recognized**  
 UL 508; CSA C22.2 No. 14, file #E42272



**EUROPE**  
**Low Voltage Directive (LVD) (73/23/ED & 93/68/EEC**  
 UEC Compliant to LVD  
 Products rated lower than 50 VAC and 75 VDC are outside of the scope of the LVD

**Pressure Equipment Directive (PED) (97/23/EC)**  
 Compliant to PED  
 Products rated below 7.5 psi are outside of the scope of the PED

## MODEL CHART

| Model  | Adjustable Set Point Range |           | Deadband           |                    | *Proof Pressure |      |
|--|----------------------------|-----------|--------------------|--------------------|-----------------|------|
|  | psi (unless noted)         | bar       | psi (unless noted) | bar (unless noted) | psi             | bar  |
| Phosphor bronze bellows with brass 1/8" NPT (male) pressure connection   |                            |           |                    |                    |                 |      |
| 256  | 0 to 30                    | 0 to 2,1  | 1.5 to 2.5         | 0,1 to 0,2         | 45              | 3,1  |
| 260  | 0 to 60                    | 0 to 4,1  | 1.5 to 4           | 0,1 to 0,3         | 90              | 6,2  |
| 262  | 0 to 90                    | 0 to 6,2  | 1.5 to 4           | 0,1 to 0,3         | 135             | 9,3  |
| 266  | 0 to 100                   | 0 to 6,9  | 2 to 4             | 0,1 to 0,3         | 150             | 10,3 |
| 271  | 0 to 240                   | 0 to 16,5 | 2 to 6             | 0,1 to 0,4         | 330             | 22,8 |
| 274  | 0 to 300                   | 0 to 20,7 | 4 to 6             | 0,3 to 0,4         | 350             | 24,1 |
| Phosphor bronze bellows with brass 1/4" NPT (female) pressure connection |                            |           |                    |                    |                 |      |
| 218  | 30" Hg Vac to 0            | -1 to 0   | 1 to 2.5" Hg Vac   | 33,9 to 84,7 mbar  | 5               | 0,3  |
| 222  | 0 to 20                    | 0 to 1,4  | 0,2 to 1,3         | 13,8 to 89,6 mbar  | 30              | 2,1  |
| 224  | 0 to 30                    | 0 to 2,1  | 0,2 to 1,3         | 13,8 to 89,6 mbar  | 45              | 3,1  |
| 226  | 0 to 50                    | 0 to 3,4  | 0,2 to 1,3         | 13,8 to 89,6 mbar  | 75              | 5,2  |
| 230  | 0 to 100                   | 0 to 6,9  | 1 to 2,3           | 0,1 to 0,2         | 110             | 7,6  |

\* 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).

## HOW TO ORDER

### BUILDING A PART NUMBER

#### Select a **Type**

Refer to the "Type" section below.  
 Determine type number based on switch output, enclosure, adjustment and reference.  
 Fill in the type portion of your part number with the corresponding number.

#### Select a **Model**

Refer to the "Model Charts"  
 Determine model based on adjustable range, deadband and proof pressure.  
 Fill in the model portion of your part number with the corresponding number.

#### Select an **Option**

Refer to the "Options" section  
 Determine option number based on switch output, optional materials or other product enhancements.  
 Fill in the option portion of your part number with the corresponding number. Leave "option" portion blank if no options are needed.  
**FOR MULTIPLE OPTIONS:** Call United Electric Controls.

#### **TYPE**

#### **DESCRIPTION**

J40 One SPDT output; skeleton open frame construction; external adjustment with no reference dial

#### **SWITCH OPTIONS\***

|      |   |
|------|---|
| 0140 | Gold contacts, 1 A 125 VAC resistive  |
| 0500 | Close deadband, 5 A 125/250 VAC resistive   |
| 1070 | 10 A 125 VDC or VAC resistive; deadband and minimum set point will increase; consult factory for information  |
| 1520 | Adjustable deadband, 15 A 125/250/277 VAC resistive. Adjustable wheel changes rise setting only.<br>If adjustment of fall setting is required, use primary adjustment |
| 1535 | High ambient, 15 A 125/250 VAC resistive; temperatures up to 250°F (121°C)  |

#### **GENERAL**

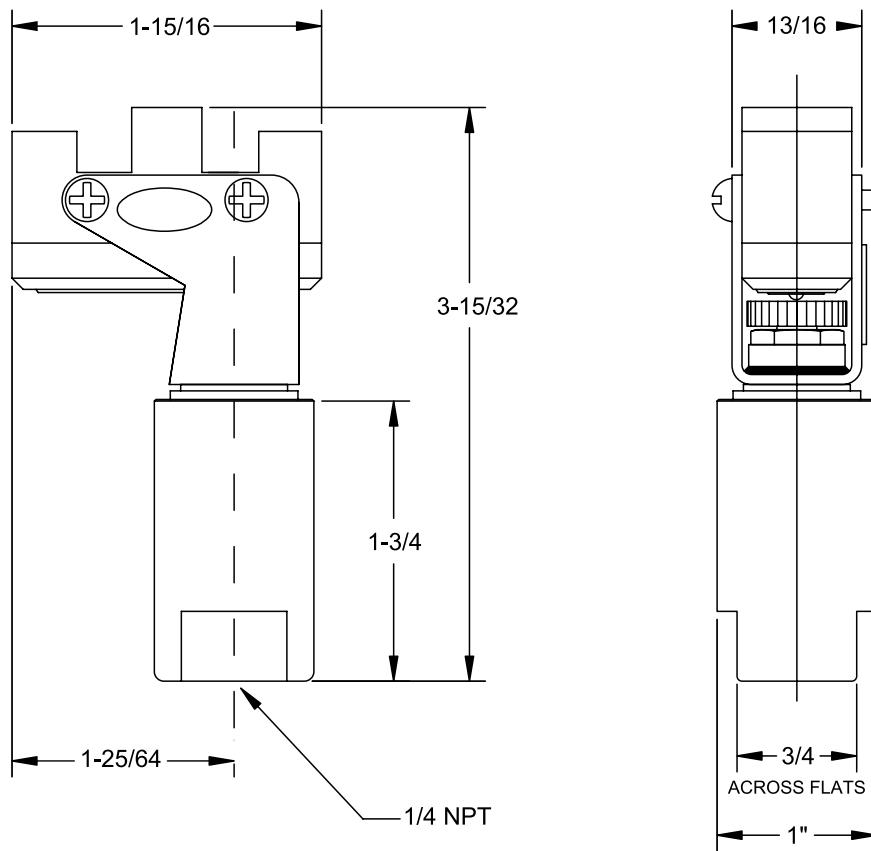
|      |  |
|------|--|
| M201 | Factory set one switch; specify set point on increasing or decreasing pressure           |
| M444 | Paper ID tag   |
| M446 | Stainless steel ID tag and wire attachment   |
| M514 | Hex bellows housing. NOT AVAILABLE ON MODELS 218-230                                     |
| M550 | Oxygen service cleaning; alcohol cleaning to remove residue from the process connection. |

\* All switches have limited DC capabilities. Consult factory for details.

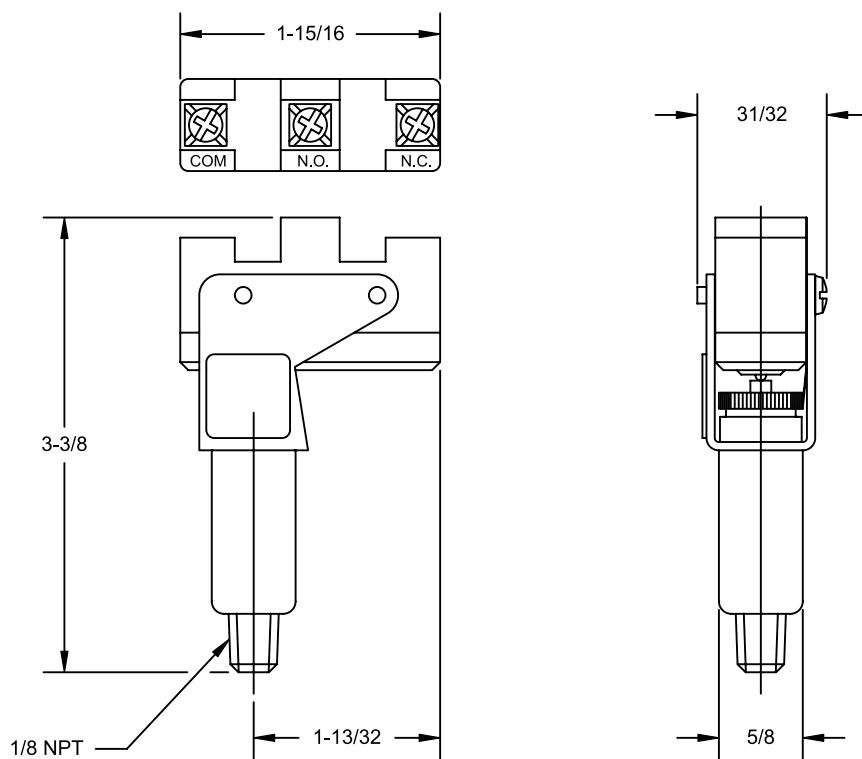
**DIMENSIONAL DRAWINGS**

Dimensional drawings for all models may be found at [www.ueonline.com](http://www.ueonline.com)

Type J40, Models 218-230



Type J40, Models 256-274



## RECOMMENDED PRACTICES AND WARNINGS

United Electric Controls Company recommends careful consideration of the following factors when specifying and installing UE pressure and temperature units. Before installing a unit, the Installation and Maintenance instructions provided with unit must be read and understood.

- To avoid damaging unit, proof pressure and maximum temperature limits stated in literature and on nameplates must never be exceeded, even by surges in the system. Operation of the unit up to maximum pressure or temperature is acceptable on a limited basis (e.g., start-up, testing) but continuous operation must be restricted to the designated adjustable range. Excessive cycling at maximum pressure or temperature limits could reduce sensor life.
- A back-up unit is necessary for applications where damage to a primary unit could endanger life, limb or property. A high or low limit switch is necessary for applications where a dangerous runaway condition could result.
- The adjustable range must be selected so that incorrect, inadvertent or malicious setting at any range point cannot result in an unsafe system condition.
- Install unit where shock, vibration and ambient temperature fluctuations will not damage unit or affect operation. When applicable, orient unit so that moisture does not enter the enclosure via the electrical connection. When appropriate, this entry point should be sealed to prevent moisture entry.
- Unit must not be altered or modified after shipment. Consult UE if modification is necessary.
- Monitor operation to observe warning signs of possible damage to unit, such as drift in set point or faulty display. Check unit immediately.
- Preventative maintenance and periodic testing is necessary for critical applications where damage could endanger property or personnel.
- Electrical ratings stated in literature and on nameplate must not be exceeded. Overload on a switch can cause damage, even on the first cycle. Wire unit according to local and national electrical codes, using wire size recommended in installation sheet.
- Do not mount unit in ambient temp. exceeding published limits.

## LIMITED WARRANTY

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## U.S. SALES OFFICES

United Electric Controls  
31 Old Stage Road  
Hampton Falls, NH 03844  
Phone: 617-899-1132  
email: [northeastsales@ueonline.com](mailto:northeastsales@ueonline.com)

United Electric Controls  
28 N. Wise Ave.  
Freeport, IL 61032  
Phone: 815-341-2588  
email: [midwestsales@ueonline.com](mailto:midwestsales@ueonline.com)

United Electric Controls  
1022 Vineyard Drive  
Conyers, GA 30013  
Phone: 770-335-9802  
email: [southeastsales@ueonline.com](mailto:southeastsales@ueonline.com)

United Electric Controls  
5829 Grazing Court  
Mason, OH 45040  
Phone: 513-535-5486  
email: [midatlanticsales@ueonline.com](mailto:midatlanticsales@ueonline.com)

United Electric Controls  
102 Salazar Court  
Clayton, CA 94517  
Phone: 925-408-5997  
email: [westcoastsales@ueonline.com](mailto:westcoastsales@ueonline.com)

United Electric Controls  
27 Summit Terrace  
Sparta, NJ 07871  
Phone: 973-271-2550  
email: [easternsales@ueonline.com](mailto:easternsales@ueonline.com)

United Electric Controls  
4306 Whickham Drive  
Fulshear, TX 77441  
Phone: 832-457-6138  
email: [southwestsales@ueonline.com](mailto:southwestsales@ueonline.com)

## CANADA

EASTERN  
68 Mosley Crescent  
Brampton, Ontario  
Canada L6Y 5C8  
Phone: 905-455-5131  
FAX: 905-455-5131

WESTERN  
148 Silver Ridge Close N.W.  
Calgary, Alberta  
Canada T3B 3T4  
Phone: 403-247-3724  
FAX: 403-247-3724



UNITED ELECTRIC  
CONTROLS

180 Dexter Avenue, P.O. Box 9143  
Watertown, MA 02471-9143 USA  
Telephone: 617 926-1000 Fax: 617 926-2568  
<http://www.ueonline.com>

## INTERNATIONAL OFFICES

### CHINA

United Electric Controls, *Shanghai Office*  
Room 1011, 10th Flr,  
Huai Hai Zhonghua Building  
No. 885, Renmin Road, Luwan District  
Shanghai 200010, P.R. China  
Phone: +8621-6255 8059  
email: [chinasaless@ueonline.com](mailto:chinasaless@ueonline.com)

United Electric Controls, *Beijing Office*  
Room 1006, Jainhao International Bldg.  
Block D, No. 116  
Zizhuyuanlu, Haidian District  
Beijing, China 100089  
Phone: +86-10-5893-0518  
email: [beijingsales@ueonline.com](mailto:beijingsales@ueonline.com)

### EASTERN EUROPE & SCANDINAVIA

United Electric Controls  
05-806 Komorow  
Kujawska 5, Poland  
Phone: +48 22 499 4804  
email: [easterneuropeales@ueonline.com](mailto:easterneuropeales@ueonline.com)

### GERMANY

United Electric Controls  
An Der Zentlinde 21  
D-64711 Erbach, Germany  
Phone: 496-062-7400  
email: [europeansales@ueonline.com](mailto:europeansales@ueonline.com)

### INDIA

United Electric Controls  
House no. 7, Kamalkunj Society  
Nizampura,  
Baroda (Gujarat), India  
Phone: +91 (-265) -2788654  
email: [indisales@ueonline.com](mailto:indisales@ueonline.com)

### ASIA-PACIFIC

United Electric Controls, Far East  
No. 1-2-2, 2nd Floor  
Jalan 4/101C  
Cheras Business Centre  
Batu 5, Jalan Cheras  
56100 Kuala Lumpur, Malaysia  
Phone: 603-9133-4122  
email: [fareastsales@ueonline.com](mailto:fareastsales@ueonline.com)

### MEXICO

United Electric Controls  
Zacatecas # 206, Suite 20  
Col Guadalupe CP 89120  
Tampico, Tamaulipas Mexico  
Phone: 833-217-5201  
email: [latinamericasales@ueonline.com](mailto:latinamericasales@ueonline.com)

### RUSSIA

United Electric Controls, Moscow  
Elninskaya str, 15-140  
Moscow, 121552, Russia  
Phone: +7 (495) 792-88-06  
email: [russiansales@ueonline.com](mailto:russiansales@ueonline.com)



APPLIED SENSOR TECHNOLOGIES  
A Division of UNITED ELECTRIC CONTROLS



## PRODUCTS:

- Thermocouples
- RTDs
- Thermowell & Protection Tubes
- Sensor Box™
- Transmitters
- Accessories

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| <b>Bar stock thermowells</b>  |  |         |
| H, S  | <a href="#">NPT process connections</a>                                      | 3-1     |
| HL, SL  | <a href="#">NPT process connections, with lag</a>                            | 3-2     |
| LS  | <a href="#">NPT process connections, limited space</a>                       | 3-3     |
| F, FH   | <a href="#">Flange connection, welded or ring-type joint</a>                 | 3-4     |
| SW  | <a href="#">Socket-weld connection</a>                                       | 3-5     |
| SWL   | <a href="#">Socket-weld connection, with lag</a>                             | 3-6     |
| WIH   | <a href="#">Weld-in connection</a>   | 3-7     |
| WIHL  | <a href="#">Weld-in connection, with lag</a>                                 | 3-8     |
| VS  | <a href="#">Van Stone flange connection</a>                                  | 3-9     |
| <b>Protection tubes</b>   |  |         |
| CT1   | <a href="#">Plain ceramic (alumina or mullite) tube</a>                      | 3-10    |
| CT2, CT3  | <a href="#">Ceramic (alumina or mullite) tube with hex fitting or nipple</a> | 3-11    |
| MT1, MT2  | <a href="#">Closed tube, with or without bushing</a>                         | 3-12    |
| MT4   | <a href="#">Closed tube, with welded or ring-type flange</a>                 | 3-13    |
| <b>Special secondary (outer) protection tubes</b>   |  |         |
| PT2   | <a href="#">Outer protection tube, with bushing</a>                          | 3-14    |
| PT3   | <a href="#">Outer protection tube, with slip flange</a>                      | 3-15    |
| <b>Sensor Box™ Index</b>  |  |         |
| Style(s)  | Description  | Page#   |
| EK-1000   | <a href="#">Sensor Box and accessory components</a>                          | 4-1a/b  |
| <b>Transmitters Index</b>   |  |         |
| Style(s)  | Description  | Page#   |
| <b>For terminal head mounting</b>   |  |         |
| UNI5-S  | <a href="#">Isolated 4-20 mA output</a>                                      | 5-1     |
| UNI5-H  | <a href="#">Isolated HART® protocol output</a>                               | 5-2     |
| TC2/RTD2  | <a href="#">Non-isolated 4-20 mA output</a>                                  | 5-3     |
| <b>Accessories Index</b>  |  |         |
| Description   |  | Page#   |
| <a href="#">NEMA 4 &amp; 4X terminal heads and blocks</a>   |  | 6-1     |
| <a href="#">FM/CSA/ATEX approved explosion-proof terminal heads and blocks</a>                                      |  | 6-2     |
| <a href="#">Connection Components (plugs/jacks, compression fittings, spring-loaded fittings, bayonet adaptors)</a> |  | 6-3     |
| <a href="#">Thermocouple and extension wire</a>   |  | 6-4     |

## **CONNECTION HEAD WITH WELDED NPT PROCESS CONNECTION**

### **How to build a part number:**

To order an Applied Sensor Technologies temperature sensor, select the requirements for the categories listed below and fill in the corresponding boxes with your selection. Don't see exactly what you need? Give us a call!

| SENSOR TYPE | ASSEMBLY STYLE | SHEATH DIAMETER | SHEATH MATERIAL | CALIBRATION | HOT JUNCTION | SHEATH LENGTH | OPTIONS |
|-------------|----------------|-----------------|-----------------|-------------|--------------|---------------|---------|
|             |                |                 |                 |             |              |               |         |

#### **SENSOR TYPE**

**MI** – Mineral insulated thermocouple

#### **ASSEMBLY STYLE**

##### **15 – Sheath with cast aluminum head and 1/2" NPT welded stainless steel process connection;**

**process connection;** head conforms to NEMA 4 requirements; 3/4" NPT conduit connection; ceramic terminal block; gasketed screw cover with stainless steel chain  
(Note: for spring-loaded assembly, see Style 75 and add optional head)

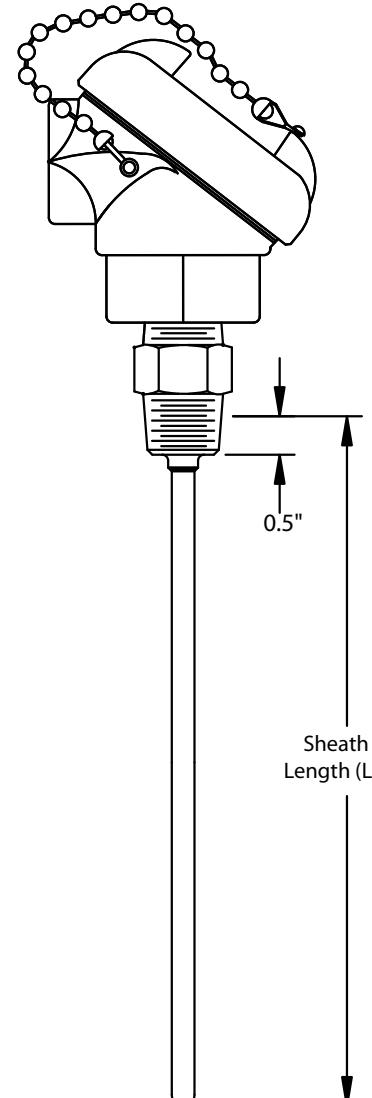
#### **SHEATH DIAMETER** (in inches)

**4** – 1/8 (0.125)

**6** – 3/16 (0.188)

**7** – 1/4 (0.250)

**9** – 3/8 (0.375)



#### **SHEATH MATERIAL**

**2** – 310 stainless steel (available on diameters 6 & 7, with K or KK calibration)

**3** – 316 stainless steel

**5** – Inconel® 600

#### **CALIBRATION** – Standard limits

**J** – Single J      **JJ** – Dual J

**K** – Single K      **KK** – Dual K

**T** – Single T      **TT** – Dual T

**E** – Single E      **EE** – Dual E

*Special limits are available – consult AST*

#### **HOT JUNCTION**

**G** – Grounded junction

**U** – Ungrounded junction

**E** – Exposed junction

#### **SHEATH LENGTH** (Note: lengths over L84 will be shipped coiled unless otherwise specified at time of order)

**L#** – (e.g., L6 = 6" sheath, L12.5 = 12.5" length)

#### **OPTIONS** – see page 1-1b

## STYLE 15

### **AVAILABLE OPTIONS and MODIFICATIONS**

| <b>ASSEMBLY OPTIONS</b>  |   |
|--|---|
| Option Code  | Description   |
| TAG1   | Stainless steel tag and wire  |
| PC25   | 1/4" NPT process connection   |
| PC75   | 3/4" NPT process connection   |
| CAL1   | NIST traceable calibration [specify point(s)]   |
| CRT1   | Certificate of conformance  |
| WC20   | Wiring cable gland for 0.187 - 0.312 diameter cables, for terminal heads with 1/2" NPT conduit connections                                      |
| WC21   | Wiring cable gland for 0.125 - 0.187 diameter cables, for terminal heads with 1/2" NPT conduit connections                                      |
| <b>TRANSMITTERS</b> – For complete specs, see Transmitters section |   |
| TR11   | 4-20 mA, 2-wire transmitter, single input, isolated output; specify range, units of measure (e.g., 0-200°C) and optional terminal head with *.  |
| TR12   | 4-20 mA, 2-wire transmitter, single input, non-isolated output; specify range and units of measure (e.g., 0-200°C) and terminal head with *.    |
| TR13   | HART®/ 4-20 mA, 2-wire transmitter, single input, isolated output; specify range and units of measure (e.g., 0-200°C) and terminal head with *. |

| <b>NEMA 4 OR 4X TERMINAL HEAD OPTIONS</b>              |                                 |                    |                    |
|--|---------------------------------|--------------------|--------------------|
| Head without ground screw                              | Head with internal ground screw | Process Connection | Conduit Connection |
| Cast aluminum, screw cover with chain, NEMA 4          |                                 |                    |                    |
| HD10*  | HD11*                           | 1/2"               | 1/2"               |
| Std.*  | HD13*                           | 1/2"               | 3/4"               |
| Epoxy-coated aluminum, screw cover with chain, NEMA 4X |                                 |                    |                    |
| HD50*  | HD51*                           | 1/2"               | 1/2"               |
| HD52*  | HD53*                           | 1/2"               | 3/4"               |
| Cast iron, screw cover with chain, NEMA 4              |                                 |                    |                    |
| HD20*  | HD21*                           | 1/2"               | 1/2"               |
| HD22*  | HD23*                           | 1/2"               | 3/4"               |
| 316 stainless steel, screw cover with chain, NEMA 4X   |                                 |                    |                    |
| HD40*  | HD41*                           | 1/2"               | 3/4"               |
| White polypropylene, screw cover with chain, NEMA 4    |                                 |                    |                    |
| HD30   | N/A                             | 1/2"               | 3/4"               |
| Black polypropylene, screw cover with chain, NEMA 4    |                                 |                    |                    |
| HD31   | N/A                             | 1/2"               | 3/4"               |
| Nylon, screw cover                                     |                                 |                    |                    |
| HD32   | N/A                             | 1/2"               | 1/2"               |

\*can be used with transmitters

#### Notes:

1. See Accessories for additional information.
2. For former Style 60, use option HD20.
3. For former Style 29, use option HD32.

## **CONNECTION HEAD WITH SPRING-LOADED ASSEMBLY AND MOUNTING HARDWARE**

### **How to build a part number:**

To order an Applied Sensor Technologies temperature sensor, select the requirements for the categories listed below and fill in the corresponding boxes with your selection. Don't see exactly what you need? Give us a call!

| SENSOR TYPE | ASSEMBLY STYLE | CONNECTION | CONNECTION LENGTH | SHEATH DIAMETER | SHEATH MATERIAL | CALIBRATION | HOT JUNCTION | SHEATH LENGTH | OPTIONS |
|-------------|----------------|------------|-------------------|-----------------|-----------------|-------------|--------------|---------------|---------|
|             |                |            |                   |                 |                 |             |              |               |         |

#### **SENSOR TYPE**

**MI** – Mineral insulated thermocouple

#### **ASSEMBLY STYLE**

**45** – Sheath with **cast aluminum head**; spring-loaded in head; head conforms to NEMA

4 requirements; 3/4" NPT conduit connection; ceramic terminal block; 1/2" NPT

carbon steel process connection; gasketed screw cover with stainless steel chain;

maximum head temperature 100°C

#### **CONNECTION**

**H** – Head only, no mounting hardware; 1/2" NPT (female) instrument connection

**N** – 1/2" NPT carbon steel nipple

**NU** – 1/2" NPT carbon steel nipple and union

**NUN** – 1/2" NPT carbon steel nipple, union and nipple

Add suffix "**1S**" for 304 stainless steel

Add suffix "**2S**" for 316 stainless steel

See chart below for restrictions

#### **CONNECTION LENGTH**

**###** (e.g., 006 = 6 inch)

(See chart below for standard available lengths)

#### **SHEATH DIAMETER** (in inches)

**4** – 1/8 (0.125)

**6** – 3/16 (0.188)

**7** – 1/4 (0.250)

**9** – 3/8 (0.375)

#### **SHEATH MATERIAL**

**3** – 316 stainless steel

#### **CALIBRATION** – Standard limits

**J** – Single J      **JJ** – Dual J

**K** – Single K      **KK** – Dual K

**T** – Single T      **TT** – Dual T

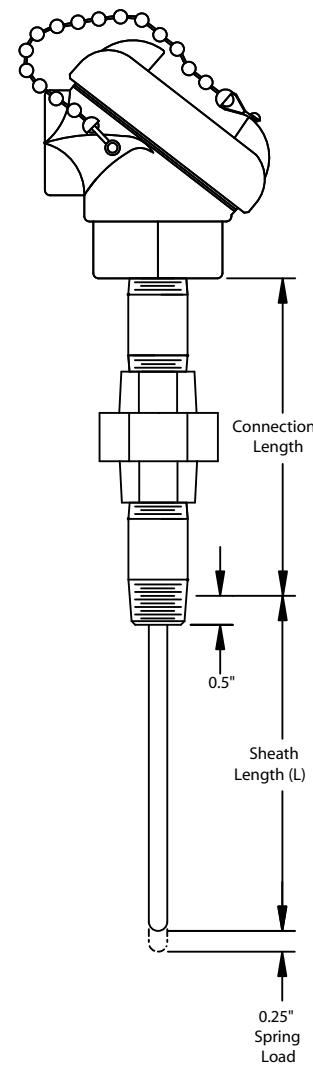
**E** – Single E      **EE** – Dual E

*Special limits are available – consult AST*

| STANDARD AVAILABLE CONNECTION LENGTHS |      |        |
|---------------------------------------|------|--------|
| N                                     | NU   | NUN    |
| N/A                                   | 2.00 | 2.50   |
| 0.50                                  | 2.50 | 3.00 * |
| 1.00                                  | 3.00 | 4.00 * |
| 1.50                                  | 3.50 | 5.00   |
| 2.00                                  | 4.00 | 6.00 * |
| 3.00                                  | 5.00 | 8.00   |
| 5.00                                  | 7.00 | 12.00  |
| 6.00                                  | 8.00 | 14.00  |

\* NUN 2S OPTION AVAILABLE IN THESE LENGTHS ONLY.

DIMENSIONS ARE GIVEN IN INCHES



#### **HOT JUNCTION**

**G** – Grounded junction

**U** – Ungrounded junction

**SHEATH LENGTH** (Note: lengths over L84 will be shipped coiled unless otherwise specified at time of order)

**L#** – (e.g., L6 = 6 inch sheath, L12.5 = 12.5 inch length)

**OPTIONS** – see page 1-2b

## STYLE 45

### AVAILABLE OPTIONS and MODIFICATIONS

| <b>ASSEMBLY OPTIONS</b>    |  |
|----------------------------|--|
| Option Code                | Description  |
| TAG1                       | Stainless steel tag and wire   |
| CAL1                       | NIST traceable calibration [specify point(s)]  |
| CRT1                       | Certificate of conformance   |
| WC20                       | Wiring cable gland for 0.187 - 0.312 diameter cables, for terminal heads with 1/2" NPT conduit connections |
| WC21                       | Wiring cable gland for 0.125 - 0.187 diameter cables, for terminal heads with 1/2" NPT conduit connections |
| Transmitters: see Style 48 |  |

| <b>NEMA 4 OR 4X TERMINAL HEAD OPTIONS</b>              |                                 |                    |                    |
|--|---------------------------------|--------------------|--------------------|
| Head without ground screw                              | Head with internal ground screw | Process Connection | Conduit Connection |
| Cast aluminum, screw cover with chain, NEMA 4          |                                 |                    |                    |
| HD10   | HD11                            | 1/2"               | 1/2"               |
| Std.   | HD13                            | 1/2"               | 3/4"               |
| Epoxy-coated aluminum, screw cover with chain, NEMA 4X |                                 |                    |                    |
| HD50   | HD51                            | 1/2"               | 1/2"               |
| HD52   | HD53                            | 1/2"               | 3/4"               |
| Cast iron, screw cover with chain, NEMA 4              |                                 |                    |                    |
| HD20   | HD21                            | 1/2"               | 1/2"               |
| HD22   | HD23                            | 1/2"               | 3/4"               |
| 316 stainless steel, screw cover with chain, NEMA 4X   |                                 |                    |                    |
| HD40   | HD41                            | 1/2"               | 3/4"               |

Notes:

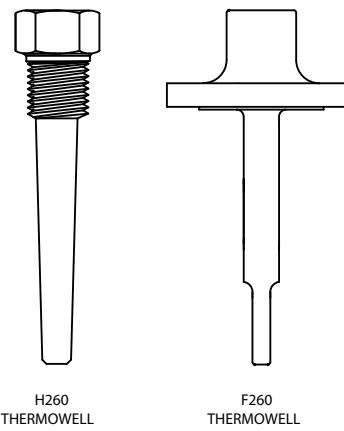
1. See Accessories for additional information
2. For former Style 46, use option HD20

### **EXTENSION WIRE**

A selection of extension-grade thermocouple wire is available to connect the sensor to its input device. Consult Accessories section.

### **THERMOWELLS & PROTECTION TUBES**

For a complete offering of metal, ceramic and composite material thermowells and protection tubes, please see the Thermowell and Protection Tube sections.



## **EXPLOSION-PROOF CONNECTION HEAD WITH WELDED NPT PROCESS CONNECTION**

### **How to build a part number:**

To order an Applied Sensor Technologies temperature sensor, select the requirements for the categories listed below and fill in the corresponding boxes with your selection. Don't see exactly what you need? Give us a call!

| SENSOR TYPE | ASSEMBLY STYLE | SHEATH DIAMETER | SHEATH MATERIAL | CALIBRATION | HOT JUNCTION | SHEATH LENGTH | OPTIONS |
|-------------|----------------|-----------------|-----------------|-------------|--------------|---------------|---------|
|             |                |                 |                 |             |              |               |         |

#### **SENSOR TYPE**

**MI** – Mineral insulated thermocouple

#### **ASSEMBLY STYLE**

**78** – Sheath with cast aluminum head and 1/2" NPT welded stainless steel process connection; head CSA/FM approved for Class I, Division 1, Groups B, C, D; Class II, Groups E, F, G; screw cover with chain and gasketed o-ring, meets NEMA 4; ceramic terminal block; 1/2" NPT conduit connection (Note: for spring-loaded fitting, see Style 75 and add optional head).

#### **SHEATH DIAMETER** (in inches)

**4** – 1/8 (0.125)

**6** – 3/16 (0.188)

**7** – 1/4 (0.250)

**9** – 3/8 (0.375)

#### **SHEATH MATERIAL**

**2** - 310 stainless steel (available on diameters 6 & 7, with K or KK calibration)

**3** - 316 stainless steel

**5** - Inconel® 600

#### **CALIBRATION** – Standard limits

**J** – Single J      **JJ** – Dual J

**K** – Single K      **KK** – Dual K

**T** – Single T      **TT** – Dual T

**E** – Single E      **EE** – Dual E

Special limits are available – consult AST

#### **HOT JUNCTION**

**G** – Grounded junction

**U** – Ungrounded junction

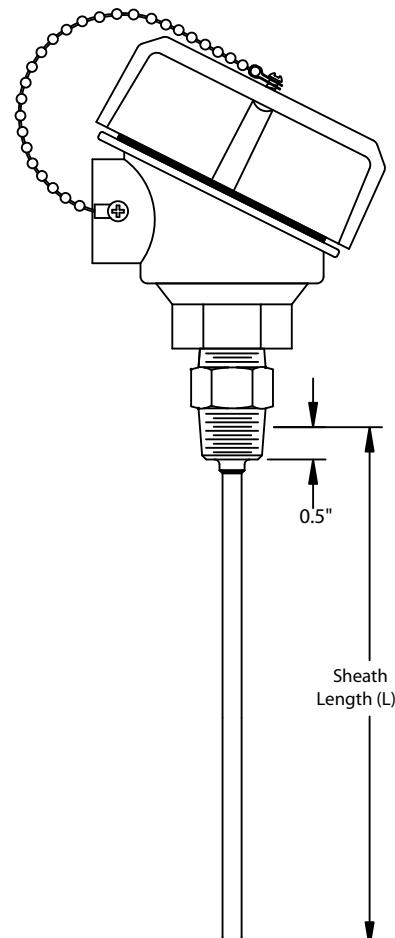
**E** – Exposed junction

(Note: lengths over L84 will be shipped coiled unless otherwise specified at time of order)

#### **SHEATH LENGTH**

**L#** – (e.g., L6 = 6 inch sheath, L12.5 = 12.5 inch length)

**OPTIONS** – see page 1-3b



## STYLE 78

### **AVAILABLE OPTIONS and MODIFICATIONS**

| <b>ASSEMBLY OPTIONS</b>  |   |
|--|---|
| Option Code  | Description   |
| TAG1   | Stainless steel tag and wire  |
| PC25   | 1/4" NPT process connection   |
| PC75   | 3/4" NPT process connection   |
| CAL1   | Calibration, NIST traceable calibration [specify point(s)]  |
| CRT1   | Certificate of conformance  |
| <b>TRANSMITTERS</b> – For complete specs, see Transmitters section |   |
| TR11   | 4-20 mA, 2-wire transmitter, single input, isolated output; specify range and units of measure (e.g., 0-200°C)                                  |
| TR12   | 4-20 mA, 2-wire transmitter, single input, non-isolated output; specify range and units of measure (e.g., 0-200°C) and terminal head with *.    |
| TR13   | HART®/ 4-20 mA, 2-wire transmitter, single input, isolated output; specify range and units of measure (e.g., 0-200°C) and terminal head with *. |

| <b>EXPLOSION-PROOF TERMINAL HEAD OPTIONS</b>   |                    |                    |
|--|--------------------|--------------------|
| Option Code  | Process Connection | Conduit Connection |
| Cast aluminum; screw cover with chain; o-ring gasket (Gasket rated to 100°C exposure); ceramic terminal block; FM/CSA approved for Class I Div. 1, Groups B, C and D; Class II Groups E, F and G; internal ground screw. |                    |                    |
| HD71   | 1/2"               | 3/4"               |
| Stainless steel (same specs as HD71)   |                    |                    |
| HD74   | 1/2"               | 1/2"               |
| HD75   | 1/2"               | 3/4"               |
| Epoxy-coated (same specs as HD71)  |                    |                    |
| HD80   | 1/2"               | 1/2"               |
| HD81   | 1/2"               | 3/4"               |

Note: See Accessories section for additional specs.

## **EXPLOSION-PROOF CONNECTION HEAD WITH SPRING-LOADED ASSEMBLY AND MOUNTING HARDWARE**

### **How to build a part number:**

To order an Applied Sensor Technologies temperature sensor, select the requirements for the categories listed below and fill in the corresponding boxes with your selection. Don't see exactly what you need? Give us a call!

| SENSOR TYPE | ASSEMBLY STYLE | CONNECTION | CONNECTION LENGTH | SHEATH DIAMETER | SHEATH MATERIAL | CALIBRATION | HOT JUNCTION | SHEATH LENGTH | OPTIONS |
|-------------|----------------|------------|-------------------|-----------------|-----------------|-------------|--------------|---------------|---------|
|             |                |            |                   |                 |                 |             |              |               |         |

#### **SENSOR TYPE**

**MI** – Mineral insulated thermocouple

#### **ASSEMBLY STYLE**

**77 – Sheath with cast aluminum head;** spring-loaded in head; CSA/FM approved head for Class I, Division 1, Groups B, C, D; Class II, Groups E, F, G; screw cover with chain and gasketed o-ring; designed for NEMA 4; ceramic terminal block; 1/2" NPT conduit and process connections.

#### **CONNECTION**

**H** – Head only, no mounting hardware; 1/2" NPT (female) instrument connection

**N** – 1/2" NPT carbon steel nipple

**NU** – 1/2" NPT carbon steel nipple and plated steel explosion-proof union

**NUN** – 1/2" NPT carbon steel nipples and plated steel explosion-proof union

Add suffix "**1S**" for 304 stainless steel nipples

#### **CONNECTION LENGTH**

**###** (e.g., 006 = 6 inch)

(See chart below for standard available lengths)

#### **SHEATH DIAMETER**

**4** – 1/8 (0.125)

**6** – 3/16 (0.188)

**7** – 1/4 (0.250)

**9** – 3/8 (0.375)

#### **SHEATH MATERIAL**

**3** – 316 stainless steel

#### **CALIBRATION** - Standard limits

**J** – Single J      **JJ** – Dual J

**K** – Single K      **KK** – Dual K

**T** – Single T      **TT** – Dual T

**E** – Single E      **EE** – Dual E

*Special limits are available – consult AST*

#### **HOT JUNCTION**

**G** – Grounded junction

**U** – Ungrounded junction

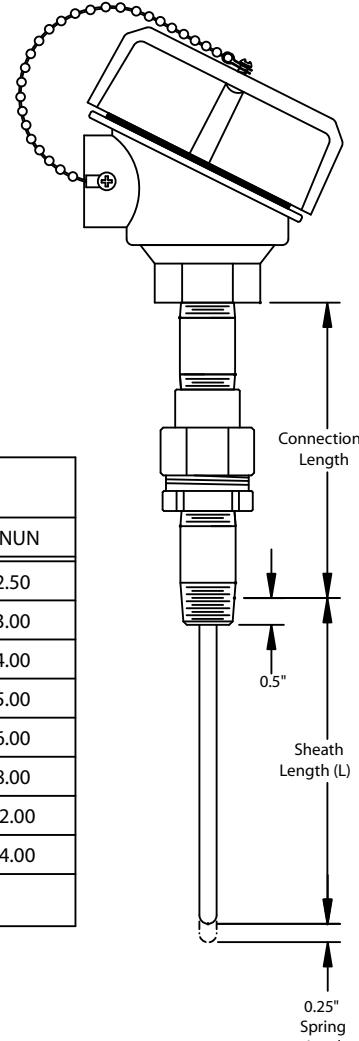
**SHEATH LENGTH:** (Note: lengths over L84 will be shipped coiled unless otherwise specified at time of order)

**L#** - (e.g., L6 = 6 inch sheath, L12.5 = 12.5 inch length)

**OPTIONS** – see page 1-4b

| STANDARD AVAILABLE CONNECTION LENGTHS |      |       |
|---------------------------------------|------|-------|
| N                                     | NU   | NUN   |
| N/A                                   | 2.00 | 2.50  |
| 0.50                                  | 2.50 | 3.00  |
| 1.00                                  | 3.00 | 4.00  |
| 1.50                                  | 3.50 | 5.00  |
| 2.00                                  | 4.00 | 6.00  |
| 3.00                                  | 5.00 | 8.00  |
| 5.00                                  | 7.00 | 12.00 |
| 6.00                                  | 8.00 | 14.00 |

DIMENSIONS ARE GIVEN IN INCHES



## STYLE 77

### **AVAILABLE OPTIONS and MODIFICATIONS**

| <b>ASSEMBLY OPTIONS</b>                 |   |
|---|---|
| Option Codes                            | Description                                   |
| TAG1                                    | Stainless steel tag and wire                  |
| CAL1                                    | NIST traceable calibration [specify point(s)] |
| CRT1                                    | Certificate of conformance                    |
| <b>TRANSMITTERS</b>                     |   |
| See Style 48 for available transmitters |   |

| <b>EXPLOSION-PROOF TERMINAL HEAD OPTIONS</b>  |                    |                    |
|---|--------------------|--------------------|
| Option Code   | Process Connection | Conduit Connection |
| Cast aluminum; screw cover with chain; o-ring gasket; ceramic terminal block; FM/CSA approved for Class I Div. 1, Groups B, C and D; Class II Groups E, F and G (Gasket rated to 100°C exposure); internal ground screw |                    |                    |
| HD71  | 1/2"               | 3/4"               |
| Same as above, except epoxy-coated  |                    |                    |
| HD80  | 1/2"               | 1/2"               |
| HD81  | 1/2"               | 3/4"               |

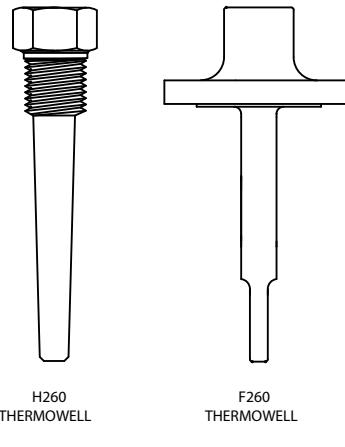
Note: See Accessories section for outline drawings and additional specs.

### **THERMOWELLS & PROTECTION TUBES**

For a compete offering of metal, ceramic and composite material thermowells and protection tubes, please see the Thermowell and Protection Tube sections.

### **EXTENSION WIRE**

A selection of extension-grade thermocouple wire is available to connect the sensor to its input device. Consult Accessories section.



H260  
THERMOWELL

F260  
THERMOWELL

## **DOUBLE-SIDED, SPRING-LOADED PROCESS MOUNTING WITH TERMINAL HEAD OPTIONS**

### **How to build a part number:**

To order an Applied Sensor Technologies temperature sensor, select the requirements for the categories listed below and fill in the corresponding boxes with your selection. Don't see exactly what you need? Give us a call!

| SENSOR TYPE | ASSEMBLY STYLE | SHEATH DIAMETER | SHEATH MATERIAL | CALIBRATION | HOT JUNCTION | SHEATH LENGTH | LEADWIRE LENGTH | OPTION |
|-------------|----------------|-----------------|-----------------|-------------|--------------|---------------|-----------------|--------|
|             |                |                 |                 |             |              |               |                 |        |

#### **SENSOR TYPE**

**MI** – Mineral insulated thermocouple

#### **ASSEMBLY STYLE**

**75** – Sheath with double-sided, spring-loaded fitting; Teflon® insulated conductors; 1/2" NPT stainless steel connection. (Note: a variety of terminal heads may be added to this style – see page 1-5b)

#### **SHEATH DIAMETER** (in inches)

- 4** – 1/8 (0.125)
- 6** – 3/16 (0.188)
- 7** – 1/4 (0.250)
- 9** – 3/8 (0.375)

#### **SHEATH MATERIAL**

- 3** – 316 stainless steel
- 5** – Inconel® 600

#### **CALIBRATION** Standard limits

- |                     |                    |
|---------------------|--------------------|
| <b>J</b> – Single J | <b>JJ</b> – Dual J |
| <b>K</b> – Single K | <b>KK</b> – Dual K |
| <b>T</b> – Single T | <b>TT</b> – Dual T |
| <b>E</b> – Single E | <b>EE</b> – Dual E |

Special limits are available – consult AST

#### **HOT JUNCTION**

- G** – Grounded junction
- U** – Ungrounded junction

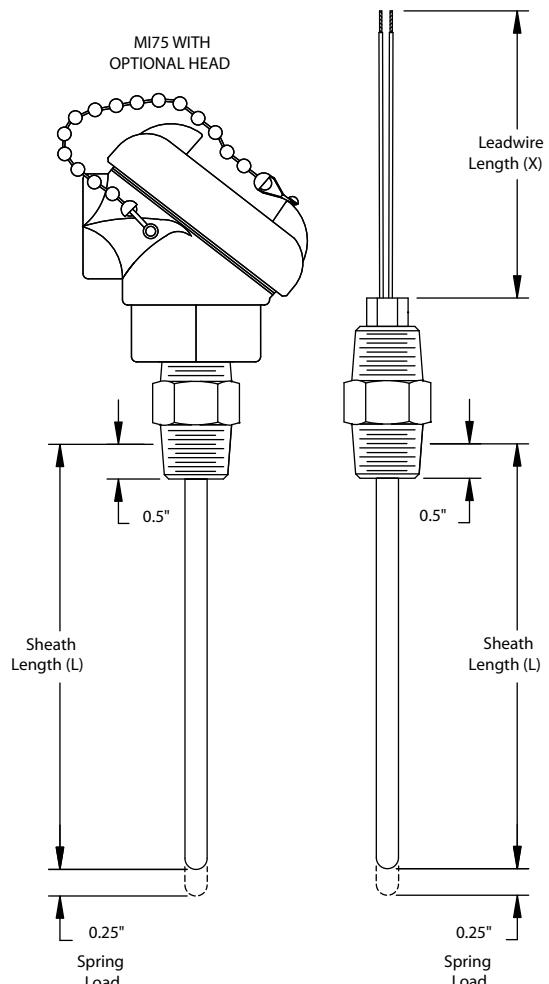
**SHEATH LENGTH** (Note: lengths over L84 will be shipped coiled unless otherwise specified at time of order)

**L#** – (e.g., L6 = 6 inch sheath, L12.5 = 12-1/2" length)

#### **LEADWIRE LENGTH**

**X#** - (e.g., X3 = 3 inch length; X3 is standard if specifying a terminal head)

#### **OPTIONS** – see page 1-5b



## STYLE 75

### AVAILABLE OPTIONS and MODIFICATIONS

| <b>ASSEMBLY OPTIONS</b> |  |
|-------------------------|--|
| Option Code             | Description  |
| TAG1                    | Stainless steel tag and wire   |
| CAL1                    | NIST traceable calibration [specify point(s)]  |
| CRT1                    | Certificate of conformance   |
| WC20                    | Wiring cable gland for 0.187 - 0.312 diameter cables, for terminal heads with 1/2" NPT conduit connections |
| WC21                    | Wiring cable gland for 0.125 - 0.187 diameter cables, for terminal heads with 1/2" NPT conduit connections |

| <b>WIRING CONNECTION OPTIONS</b> |   |
|----------------------------------|---|
| Option Code                      | Description                                     |
| WC76                             | #6 spade terminals, plated copper               |
| WC70                             | #10 spade terminals, plated copper              |
| WC84                             | 1/4" push-on insulated terminals, plated copper |
| WC90                             | #10 ring terminals                              |
| WC98                             | #8 ring terminals                               |

| <b>TRANSMITTERS</b> |   |
|---------------------|---|
| TR11                | 4-20 mA, 2-wire; single input; isolated output; specify range, units of measure (e.g., 0-200°C) and terminal head with *. See Accessories section for additional information. |
| TR12                | 4-20 mA, 2-wire transmitter, single input, non-isolated output; specify range and units of measure (e.g., 0-200°C) and terminal head with *.                                  |
| TR13                | HART®/ 4-20 mA, 2-wire transmitter, single input, isolated output; specify range and units of measure (e.g., 0-200°C) and terminal head with *.                               |

#### **THERMOWELLS & PROTECTION TUBES**

For a complete offering of metal, ceramic and composite material thermowells and protection tubes, please see the Thermowell and Protection Tube sections.

| <b>NEMA 4 OR 4X TERMINAL HEAD OPTIONS</b>              |                                 |                    |
|--|---------------------------------|--------------------|
| Head without ground screw                              | Head with internal ground screw | Process Connection |
| Cast aluminum, screw cover with chain, NEMA 4          |                                 |                    |
| HD10*  | HD11*                           | 1/2"               |
| HD12*  | HD13*                           | 1/2" 3/4"          |
| Epoxy-coated aluminum, screw cover with chain, NEMA 4X |                                 |                    |
| HD50*  | HD51*                           | 1/2"               |
| HD52*  | HD53*                           | 1/2" 3/4"          |
| Cast iron, screw cover with chain, NEMA 4              |                                 |                    |
| HD20*  | HD21*                           | 1/2"               |
| HD22*  | HD23*                           | 1/2" 3/4"          |
| 316 stainless steel, screw cover with chain, NEMA 4X   |                                 |                    |
| HD40*  | HD41*                           | 1/2" 3/4"          |
| White polypropylene, screw cover with chain, NEMA 4    |                                 |                    |
| HD30   | N/A                             | 1/2" 3/4"          |
| Black polypropylene, screw cover with chain, NEMA 4    |                                 |                    |
| HD31   | N/A                             | 1/2" 3/4"          |
| Nylon, screw cover                                     |                                 |                    |
| HD32   | N/A                             | 1/2" 1/2"          |

| <b>EXPLOSION-PROOF TERMINAL HEAD OPTIONS</b>   |                    |                    |
|--|--------------------|--------------------|
| Option Code  | Process Connection | Conduit Connection |
| Cast aluminum, screw cover with chain; o-ring gasket rated to 100°C; ceramic terminal block; FM/CSA approved for Class I Div. 1, Groups B, C, D; Class II, Groups E, F, G; internal ground screw |                    |                    |
| HD70*  | 1/2"               | 1/2"               |
| HD71*  | 1/2"               | 3/4"               |
| Stainless steel (same spec as HD70/71)   |                    |                    |
| HD74*  | 1/2"               | 1/2"               |
| HD75*  | 1/2"               | 3/4"               |
| Epoxy-coated (same spec as HD70/71)  |                    |                    |
| HD80*  | 1/2"               | 1/2"               |
| HD81*  | 1/2"               | 3/4"               |
| Cast aluminum; ATEX approved for EEx d IIC; screw cover with chain; silicone rubber o-ring gasket; ceramic terminal block; rated for NEMA 4X, IP66 to IP68; internal and external ground screws  |                    |                    |
| HD72*  | 1/2"               | 1/2"               |
| HD73*  | 1/2"               | 3/4"               |
| Cast aluminum (Formerly Style 60); screw cover; plastic terminal block; UL/CSA approved for Class I Div. 1, Groups C and D; Class II Groups E, F and G.  |                    |                    |
| HD60   | 1/2"               | 1/2"               |
| HD61   | 1/2"               | 3/4"               |

\*can be used with transmitters

Note: Many non-standard options, including additional sheath diameters and materials, may also be available - consult AST for specific requirements. HART® is a registered trademark of the HART Communication Foundation.

## **SPRING-LOADED PROCESS MOUNTING HARDWARE WITH OPTIONAL TERMINAL HEAD**

### **How to build a part number:**

To order an Applied Sensor Technologies temperature sensor, select the requirements for the categories listed below and fill in the corresponding boxes with your selection.

| SENSOR TYPE | ASSEMBLY STYLE | CONNECTION TYPE AND MATERIAL | CONN. LENGTH | SHEATH DIAMETER | SHEATH MATERIAL | CALIBRATION | HOT JUNCTION | SHEATH LENGTH | LEADWIRE LENGTH | OPTIONS |
|-------------|----------------|------------------------------|--------------|-----------------|-----------------|-------------|--------------|---------------|-----------------|---------|
|             |                |                              |              |                 |                 |             |              |               |                 |         |

#### **SENSOR TYPE**

**MI** – Mineral insulated thermocouple

#### **ASSEMBLY STYLE**

**48** – Sheath with spring-loaded hex connector and connection hardware; head as option

#### **CONNECTION TYPE AND MATERIAL**

| Code         | Union Type        | Union Material      | Lower Nipple Material |
|--------------|-------------------|---------------------|-----------------------|
| <b>NU</b>    | Ordinary location | Carbon steel        | None                  |
| <b>NUS</b>   | Ordinary location | Stainless steel     | None                  |
| <b>NUX</b>   | Explosion-proof   | Electroplated steel | None                  |
| <b>NUN</b>   | Ordinary location | Carbon steel        | Carbon steel          |
| <b>NUNS</b>  | Ordinary location | Stainless steel     | Stainless steel       |
| <b>NUNX</b>  | Explosion-proof   | Electroplated steel | Carbon steel          |
| <b>NUNXS</b> | Explosion-proof   | Electroplated steel | Stainless steel       |

#### **CONNECTION LENGTH** (For NU, NUX, NUS, use 002.5)

### (e.g., 006 = 6 inch)

(See chart for available standard lengths)

#### **SHEATH DIAMETER** (in inches)

**4** – 1/8" (0.125)

**6** – 3/16" (0.188)

**7** – 1/4" (0.250)

**9** – 3/8" (0.375)

#### **SHEATH MATERIAL**

**3** – 316 stainless steel

**5** – Inconel® 600

#### **CALIBRATION** – Standard limits

**J** – Single J      **JJ** – Dual J

**K** – Single K      **KK** – Dual K

**T** – Single T      **TT** – Dual T

**E** – Single E      **EE** – Dual E

*Special limits are available – consult AST*

#### **HOT JUNCTION**

**G** – Grounded junction

**U** – Ungrounded junction

#### **SHEATH LENGTH** (Note: lengths over L84 will be shipped coiled unless otherwise specified at time of order)

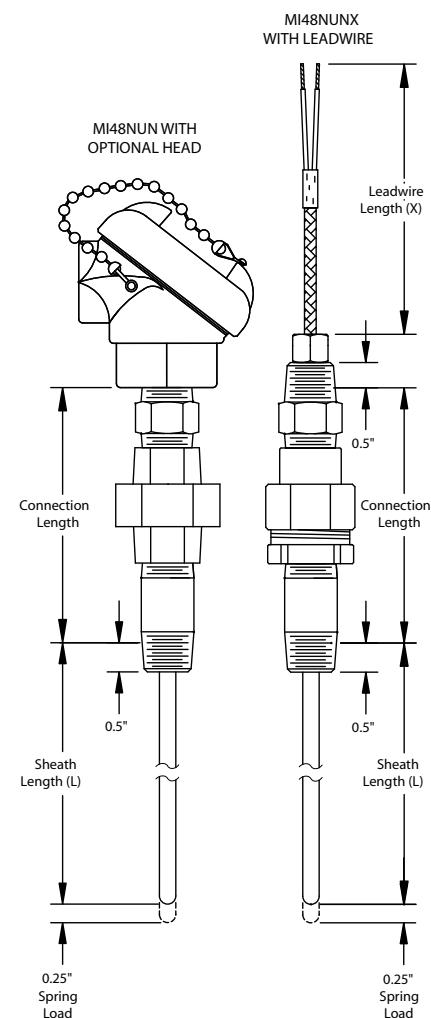
**L#** – (e.g., L6 = 6 inch sheath, L12.5 = 12.5 inch length)

#### **LEADWIRE LENGTH**

**X#** – (e.g., X3 = 3 inch length; X3 is standard if specifying optional head)

#### **OPTIONS** – see page 1-6b

| STANDARD AVAILABLE CONNECTION LENGTHS FOR NUN CONNECTIONS |  |
|---|--|
| 3.00  |  |
| 3.50  |  |
| 4.00  |  |
| 4.50  |  |
| 5.00  |  |
| 6.00  |  |
| 8.00  |  |
| DIMENSIONS ARE GIVEN IN INCHES                            |  |



## STYLE 48

### AVAILABLE OPTIONS and MODIFICATIONS

| <b>ASSEMBLY OPTIONS</b> |  |
|-------------------------|--|
| Option Code             | Description  |
| TAG1                    | Stainless steel tag and wire   |
| CAL1                    | NIST traceable calibration [specify point(s)]  |
| CRT1                    | Certificate of conformance   |
| WC20                    | Wiring cable gland for 0.187 - 0.312 diameter cables, for terminal heads with 1/2" NPT conduit connections |
| WC21                    | Wiring cable gland for 0.125 - 0.187 diameter cables, for terminal heads with 1/2" NPT conduit connections |

| <b>WIRING CONNECTION OPTIONS</b> |   |
|----------------------------------|---|
| Option Code                      | Description                                     |
| WC76                             | #6 spade terminals, plated copper               |
| WC70                             | #10 spade terminals, plated copper              |
| WC84                             | 1/4" push-on insulated terminals, plated copper |
| WC90                             | #10 ring terminals                              |
| WC98                             | #8 ring terminals                               |

| <b>TRANSMITTERS</b> - for complete specs, see Transmitters section |   |
|--|---|
| TR11   | 4-20 mA, 2-wire; single input; isolated output; specify range, units of measure (e.g., 0-200°C) and terminal head with *. See Accessories section for additional information. |
| TR12   | 4-20 mA, 2-wire transmitter, single input, non-isolated output; specify range and units of measure (e.g., 0-200°C) and terminal head with *.                                  |
| TR13   | HART®/ 4-20 mA, 2-wire transmitter, single input, isolated output; specify range and units of measure (e.g., 0-200°C) and terminal head with *.                               |

### **THERMOWELLS & PROTECTION TUBES**

For a complete offering of metal, ceramic and composite material thermowells and protection tubes, please see the Thermowell and Protection Tube sections.

| <b>NEMA 4 OR 4X TERMINAL HEAD OPTIONS</b>  |                                 |                    |                    |
|--|---------------------------------|--------------------|--------------------|
| Head without ground screw  | Head with internal ground screw | Process Connection | Conduit Connection |
| Cast aluminum, screw cover with chain, NEMA 4  |                                 |                    |                    |
| HD10*  | HD11*                           | 1/2"               | 1/2"               |
| HD12*  | HD13*                           | 1/2"               | 3/4"               |
| Epoxy-coated aluminum, screw cover with chain, NEMA 4X   |                                 |                    |                    |
| HD50*  | HD51*                           | 1/2"               | 1/2"               |
| HD52*  | HD53*                           | 1/2"               | 3/4"               |
| Cast iron, screw cover with chain, NEMA 4  |                                 |                    |                    |
| HD20*  | HD21*                           | 1/2"               | 1/2"               |
| HD22*  | HD23*                           | 1/2"               | 3/4"               |
| 316 stainless steel, screw cover with chain, NEMA 4X   |                                 |                    |                    |
| HD40*  | HD41*                           | 1/2"               | 3/4"               |
| White polypropylene, screw cover with chain, NEMA 4  |                                 |                    |                    |
| HD30   | N/A                             | 1/2"               | 3/4"               |
| Black polypropylene, screw cover with chain, NEMA 4  |                                 |                    |                    |
| HD31   | N/A                             | 1/2"               | 3/4"               |
| Nylon, screw cover   |                                 |                    |                    |
| HD32   | N/A                             | 1/2"               | 1/2"               |
| <b>EXPLOSION-PROOF TERMINAL HEAD OPTIONS</b>   |                                 |                    |                    |
| Option Code  | Process Connection              | Conduit Connection |                    |
| Cast aluminum, screw cover with chain; o-ring gasket rated to 100°C; ceramic terminal block; FM/CSA approved for Class I Div. 1, Groups B, C, D; Class II, Groups E, F, G; internal ground screw |                                 |                    |                    |
| HD70*  | 1/2"                            | 1/2"               |                    |
| HD71*  | 1/2"                            | 3/4"               |                    |
| Stainless steel (same specs as HD70/71)  |                                 |                    |                    |
| HD74*  | 1/2"                            | 1/2"               |                    |
| HD75*  | 1/2"                            | 3/4"               |                    |
| Epoxy-coated (same specs as HD70/71)   |                                 |                    |                    |
| HD80*  | 1/2"                            | 1/2"               |                    |
| HD81*  | 1/2"                            | 3/4"               |                    |
| Cast aluminum; ATEX approved for EEx d IIC; screw cover with chain; silicone rubber o-ring gasket; ceramic terminal block; rated for NEMA 4X, IP66 to IP68; internal and external ground screws  |                                 |                    |                    |
| HD72*  | 1/2"                            | 1/2"               |                    |
| HD73*  | 1/2"                            | 3/4"               |                    |
| Cast aluminum (Formerly Style 60); screw cover; plastic terminal block; UL/CSA approved for Class I Div. 1, Groups C and D; Class II Groups E, F and G.  |                                 |                    |                    |
| HD60   | 1/2"                            | 1/2"               |                    |
| HD61   | 1/2"                            | 3/4"               |                    |

\*can be used with transmitters

Note: Many non-standard options, including additional sheath diameters and materials, may also be available – consult AST for specific requirements. HART® is a registered trademark of the HART Communication Foundation.



## **CONNECTION HEAD WITH WELDED HEX FITTING**

### **How to build a part number:**

To order an Applied Sensor Technologies temperature sensor, select the requirements for the categories listed below and fill in the corresponding boxes with your selection. Don't see exactly what you need? Give us a call!

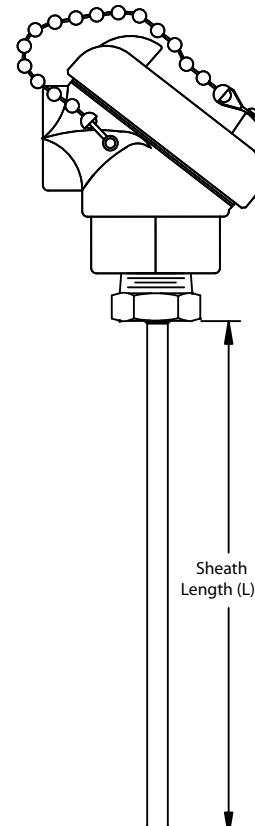
| SENSOR TYPE | ASSEMBLY STYLE | SHEATH DIAMETER | SHEATH MATERIAL | CALIBRATION | HOT JUNCTION | SHEATH LENGTH | OPTIONS |
|-------------|----------------|-----------------|-----------------|-------------|--------------|---------------|---------|
|             |                |                 |                 |             |              |               |         |

#### **SENSOR TYPE**

**MI** – Mineral insulated thermocouple

#### **ASSEMBLY STYLE**

**21** – Sheath with cast aluminum head and welded stainless steel connection; for use as ambient sensor or with compression fitting for process mounting; head conforms to NEMA 4 requirements; 3/4" conduit connection; ceramic terminal block; gasketed screw cover with stainless steel chain. See page 1-7b for other head options.



#### **SHEATH DIAMETER** (in inches)

- 4** – 1/8 (0.125)
- 6** – 3/16 (0.188)
- 7** – 1/4 (0.250)
- 9** – 3/8 (0.375)

#### **SHEATH MATERIAL**

- 3** – 316 stainless steel
- 5** – Inconel® 600

#### **CALIBRATION** – Standard Limits

- |                     |                    |
|---------------------|--------------------|
| <b>J</b> – Single J | <b>JJ</b> – Dual J |
| <b>K</b> – Single K | <b>KK</b> – Dual K |
| <b>T</b> – Single T | <b>TT</b> – Dual T |
| <b>E</b> – Single E | <b>EE</b> – Dual E |

Special limits are available – consult AST

#### **HOT JUNCTION**

- G** – Grounded junction
- U** – Ungrounded junction
- E** – Exposed junction

#### **SHEATH LENGTH** (Note: lengths over L84 will be shipped coiled unless otherwise specified at time of order)

**L#** – (e.g., L6 = 6" sheath, L12.5 = 12.5" length)

#### **OPTIONS** – see page 1-7b

Style 21

## STYLE 21

| ASSEMBLY OPTIONS  |   |                 |                 |
|---|---|-----------------|-----------------|
| Option Code   | Description   |                 |                 |
| TAG1  | Stainless steel tag and wire  |                 |                 |
| B90-  | 90° bend in sheath [specify length from tip in inches e.g., B90-6)  |                 |                 |
| B45-  | 45° bend in sheath (specify length from tip in inches e.g., B45-6)  |                 |                 |
| CAL1  | NIST traceable calibration [specify point(s)]   |                 |                 |
| CRT1  | Certificate of conformance  |                 |                 |
| WC20  | Wiring cable gland for 0.187 - 0.312 diameter cables, for terminal heads with 1/2" NPT conduit connections  |                 |                 |
| WC21  | Wiring cable gland for 0.125 - 0.187 diameter cables, for terminal heads with 1/2" NPT conduit connections  |                 |                 |
| COMPRESSION FITTINGS (for diameters 4, 6, 7)                |   |                 |                 |
| Option Code   | NPT   | Material        | Ferrule         |
| CF10  | 1/8"  | Stainless steel | Stainless steel |
| CF11  | 1/8"  | Stainless steel | Teflon®         |
| CF12  | 1/8"  | Brass           | Brass           |
| CF20  | 1/4"  | Stainless steel | Stainless steel |
| CF21  | 1/4"  | Stainless steel | Teflon®         |
| CF22  | 1/4"  | Brass           | Brass           |
| CF30  | 1/2"  | Stainless steel | Stainless steel |
| CF31  | 1/2"  | Stainless steel | Teflon®         |
| CF32  | 1/2"  | Brass           | Brass           |
| TRANSMITTERS - for complete specs, see Transmitters section |   |                 |                 |
| TR11  | 4-20 mA, 2-wire, single input, isolated output; specify range, units of measure (e.g., 0-200°C) and optional head with *. See Accessories section for additional information. |                 |                 |
| TR12  | 4-20 mA, 2-wire transmitter, single input, non-isolated output; specify range and units of measure (e.g., 0-200°C) and terminal head with *.                                  |                 |                 |
| TR13  | HART®/ 4-20 mA, 2-wire transmitter, single input, isolated output; specify range and units of measure (e.g., 0-200°C) and terminal head with *.                               |                 |                 |
| WELD PADS   |   |                 |                 |
| Option Code   | Radius To Fit Pipe  |                 |                 |
| WP00  | Horizontal pad/flat   |                 |                 |
| WP10  | 1" nominal pipe size  |                 |                 |
| WP15  | 1.5" nominal pipe size  |                 |                 |
| WP20  | 2" nominal pipe size  |                 |                 |
| WP25  | 2.5" nominal pipe size  |                 |                 |
| WP30  | 3" nominal pipe size  |                 |                 |
| WP35  | 3.5" nominal pipe size  |                 |                 |
| WP40  | 4" nominal pipe size  |                 |                 |

**Note:** Many non-standard options, including additional sheath diameters and materials, may also be available – consult AST for specific requirements. HART® is a registered trademark of the HART Communication Foundation.

## AVAILABLE OPTIONS and MODIFICATIONS

| NEMA 4 OR 4X TERMINAL HEAD OPTIONS   |                                 |                    |                    |
|--|---------------------------------|--------------------|--------------------|
| Head without ground screw  | Head with internal ground screw | Process Connection | Conduit Connection |
| Cast aluminum, screw cover with chain  |                                 |                    |                    |
| HD10*  | HD11*                           | 1/2"               | 1/2"               |
| Std.*  | HD13*                           | 1/2"               | 3/4"               |
| Epoxy-coated, cast aluminum, NEMA 4X   |                                 |                    |                    |
| HD50*  | HD51*                           | 1/2"               | 1/2"               |
| HD52*  | HD53*                           | 1/2"               | 3/4"               |
| Cast iron, screw cover with chain  |                                 |                    |                    |
| HD20*  | HD21*                           | 1/2"               | 1/2"               |
| HD22*  | HD23*                           | 1/2"               | 3/4"               |
| 316 stainless steel, screw cover; NEMA 4X  |                                 |                    |                    |
| HD40*  | HD41*                           | 1/2"               | 3/4"               |
| Polypropylene, white, screw cover  |                                 |                    |                    |
| HD30   | N/A                             | 1/2"               | 3/4"               |
| Polypropylene, black screw cover   |                                 |                    |                    |
| HD31   | N/A                             | 1/2"               | 3/4"               |
| Nylon, screw cover   |                                 |                    |                    |
| HD32   | N/A                             | 1/2"               | 1/2"               |
| EXPLOSION-PROOF TERMINAL HEAD OPTIONS  |                                 |                    |                    |
| Option Code  | Process Connection              |                    | Conduit Connection |
| Cast aluminum, screw cover with chain; o-ring gasket rated to 100°C; ceramic terminal block; FM/CSA approved for Class I Div. 1, Groups B, C, D; Class II, Groups E, F, G; internal ground screw |                                 |                    |                    |
| HD70*  | 1/2"                            |                    | 1/2"               |
| HD71*  | 1/2"                            |                    | 3/4"               |
| Stainless steel (same specs as HD70/71)  |                                 |                    |                    |
| HD74*  | 1/2"                            |                    | 1/2"               |
| HD75*  | 1/2"                            |                    | 3/4"               |
| Epoxy-coated (same specs as HD70/71)   |                                 |                    |                    |
| HD80*  | 1/2"                            |                    | 1/2"               |
| HD81*  | 1/2"                            |                    | 3/4"               |
| Cast aluminum; ATEX approved for EEx d IIC; screw cover with chain; silicone rubber o-ring gasket; ceramic terminal block; rated for NEMA 4X, IP66 to IP68; internal and external ground screws  |                                 |                    |                    |
| HD72*  | 1/2"                            |                    | 1/2"               |
| HD73*  | 1/2"                            |                    | 3/4"               |
| Cast aluminum (Formerly Style 60); screw cover; plastic terminal block; UL/CSA approved for Class I Div. 1, Groups C and D; Class II Groups E, F and G.  |                                 |                    |                    |
| HD60   | 1/2"                            |                    | 1/2"               |
| HD61   | 1/2"                            |                    | 3/4"               |
| *can be used with transmitters   |                                 |                    |                    |

## **NOBLE METAL THERMOCOUPLE WITH TERMINAL HEAD AND PROTECTION TUBE**

### **How to build a part number:**

To order an Applied Sensor Technologies temperature sensor, select the requirements for the categories listed below and fill in the corresponding boxes with your selection. Don't see exactly what you need? Give us a call!

| SENSOR TYPE | STYLE | PROTECTION TUBE CONFIGURATION | CALIBRATION | WIRE GAUGE | BEAD MATERIAL | PRIMARY TUBE LENGTH | OPTIONS |
|-------------|-------|-------------------------------|-------------|------------|---------------|---------------------|---------|
|             |       |                               |             |            |               |                     |         |

#### **SENSOR TYPE**

**BTC** – Beaded construction

#### **STYLE**

**81N** – Noble metal element with primary protection tube only; threaded connection between head and tube; NEMA 4 aluminum terminal head and ceramic terminal block; 3/4" NPT conduit connection; gasketed screw cover with stainless steel chain

#### **PROTECTION TUBE CONFIGURATION**

(e.g., **00A6** = 3/8" O.D. tube with 6" nipple and 1/2" NPT connection.  
See page 1-8b for available combinations of OD and thread size)

##### Protection tube diameter

- 0** – 3/8" O.D.
- 1** – 1/2" O.D.
- 2** – 11/16" O.D.
- 3** – 3/4" O.D.

##### Process thread size and material

- |                     |                            |
|---------------------|----------------------------|
| <i>Carbon Steel</i> | <i>316 stainless steel</i> |
| <b>0</b> – 1/2" NPT | <b>3</b> – 1/2" NPT        |
| <b>1</b> – 3/4" NPT | <b>4</b> – 3/4" NPT        |
| <b>2</b> – 1" NPT   | <b>5</b> – 1" NPT          |

##### Protection tube material

- A** – Alumina (98.8% aluminum oxide)
- M** – Mullite (not recommended over 1200°C)

##### Connection Length ("CL")

- 1** – hex fitting only
- # – length of nipple

#### **CALIBRATION**

##### **Single junction**

- R** – Platinum and Platinum/13% Rhodium
- S** – Platinum and Platinum/10% Rhodium
- B** – Platinum/6% Rhodium and Platinum/30% Rhodium

##### **Dual junctions**

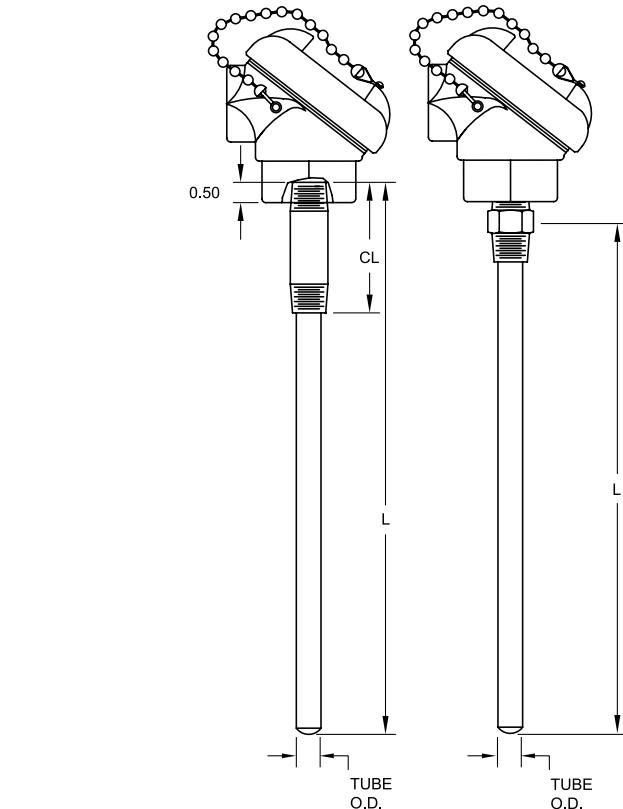
- RR**
- SS**
- BB**

#### **WIRE GAUGE**

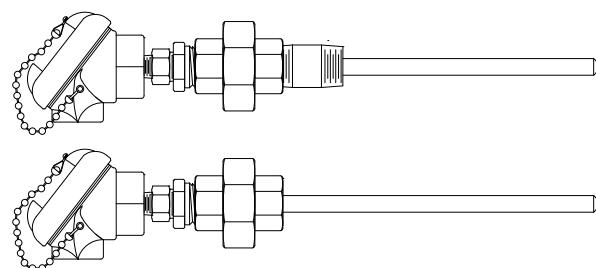
- 24** – 24 AWG

#### **BEAD MATERIAL**

- A** – Alumina beads (0.125" OD for single junction, 0.188" for dual)



**Note:** union fitting or union with nipple can be added to this style (consult AST for part numbers and availabilities)



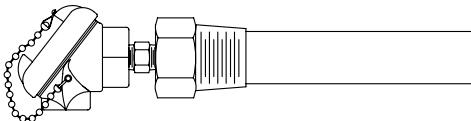
## STYLE 81N

### TERMINAL HEAD OPTIONS

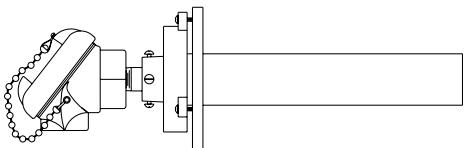
| ASSEMBLY OPTIONS |  |
|------------------|--|
| Option Code      | Description  |
| TAG1             | Stainless steel tag and wire   |
| CAL1             | NIST traceable calibration [specify point(s)]  |
| CRT1             | Certificate of conformance   |
| WC20             | Wiring cable gland for 0.187 - 0.312 diameter cables, for terminal heads with 1/2" NPT conduit connections |
| WC21             | Wiring cable gland for 0.125 - 0.187 diameter cables, for terminal heads with 1/2" NPT conduit connections |

For additional Noble Metal Thermocouple styles, see:

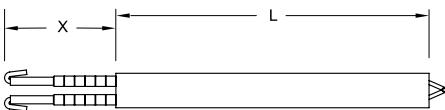
**Style 81B** – Secondary tube with mounting bushing



**Style 81F** – Secondary tube with slip flange mounting



**Style 51** – Replacement Sensor



Notes:

- Not all materials and process thread sizes are compatible with all tubing O.D.'s. Use the chart below as a guide for the possible combinations.

| NEMA 4 OR 4X TERMINAL HEAD OPTIONS                          |   |                    |                    |
|---|---|--------------------|--------------------|
| Head without ground screw                                   | Head with internal ground screw   | Process Connection | Conduit Connection |
| Cast aluminum, screw cover with chain, NEMA 4               |   |                    |                    |
| HD10*   | HD11*   | 1/2"               | 1/2"               |
| Std.*   | HD13*   | 1/2"               | 3/4"               |
| Epoxy-coated aluminum, screw cover with chain, NEMA 4X      |   |                    |                    |
| HD50*   | HD51*   | 1/2"               | 1/2"               |
| HD52*   | HD53*   | 1/2"               | 3/4"               |
| Cast iron, screw cover with chain, NEMA 4                   |   |                    |                    |
| HD20*   | HD21*   | 1/2"               | 1/2"               |
| HD22*   | HD23*   | 1/2"               | 3/4"               |
| 316 stainless steel, screw cover with chain, NEMA 4X        |   |                    |                    |
| HD40*   | HD41*   | 1/2"               | 3/4"               |
| White polypropylene, screw cover with chain, NEMA 4         |   |                    |                    |
| HD30  | N/A   | 1/2"               | 3/4"               |
| Black polypropylene, screw cover with chain, NEMA 4         |   |                    |                    |
| HD31  | N/A   | 1/2"               | 3/4"               |
| Nylon, screw cover  |   |                    |                    |
| HD32  | N/A   | 1/2"               | 1/2"               |
| *can be used with transmitters                              |   |                    |                    |
| TRANSMITTERS – For complete specs, see Transmitters section |   |                    |                    |
| TR11  | 4-20 mA, 2-wire transmitter, single input, isolated output; specify range, units of measure (e.g., 0-200°C) and optional terminal head with *.  |                    |                    |
| TR12  | 4-20 mA, 2-wire transmitter, single input, non-isolated output; specify range and units of measure (e.g., 0-200°C) and terminal head with *.    |                    |                    |
| TR13  | HART®/ 4-20 mA, 2-wire transmitter, single input, isolated output; specify range and units of measure (e.g., 0-200°C) and terminal head with *. |                    |                    |

### PROCESS THREAD (NPT)

| TUBE O.D.  | Carbon steel |          |          | 316 Stainless |          |          |
|------------|--------------|----------|----------|---------------|----------|----------|
|            | CODE         | 0 (1/2") | 1 (3/4") | 2 (1")        | 3 (1/2") | 4 (3/4") |
| 0 (3/8")   | Yes          |          |          |               | Yes      |          |
| 1 (1/2")   | Yes          | Yes      |          |               | Yes      |          |
| 2 (11/16") |              | Yes      |          |               |          | Yes      |
| 3 (3/4")   |              | Yes      | Yes      | Yes           |          | Yes      |

- Applied Sensor Technologies recommends alumina protection tubes when using platinum thermocouples. Mullite, although less expensive when compared to alumina, can contaminate the platinum, causing drift.
- In many cases platinum thermocouples can be recycled, thereby reducing the long-term overall cost. Please contact Applied Sensor Technologies for further information.
- Applied Sensor Technologies offers many other temperatures sensor designs and technologies, including base metal thermocouples, RTDs, thermistors and Integrated Circuit chips, along with a full line of accessory items such as thermowell, transmitters, etc. Please visit our website or contact us for further information.

## **NOBLE METAL THERMOCOUPLE WITH SECONDARY PROTECTION TUBE & BUSHING**

### **How to build a part number:**

To order an Applied Sensor Technologies temperature sensor, select the requirements for the categories listed below and fill in the corresponding boxes with your selection. Don't see exactly what you need? Give us a call!

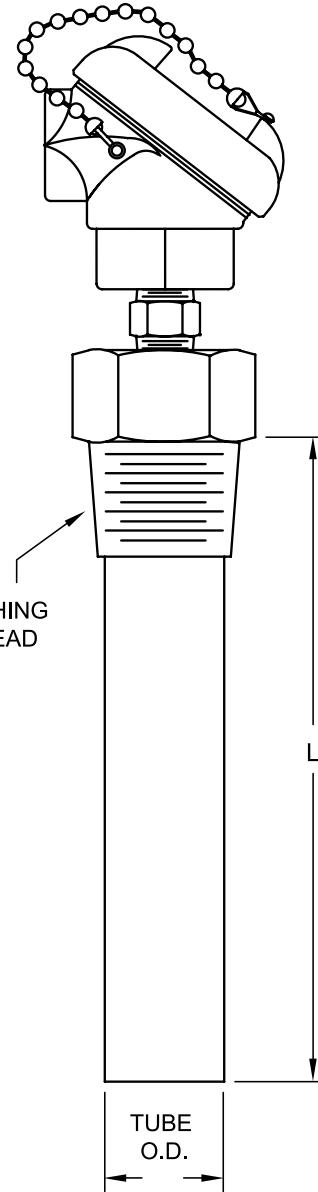
| SENSOR TYPE | STYLE | SECONDARY TUBE CONFIGURATION | CALIBRATION | WIRE GAUGE | BEAD MATERIAL | SECONDARY TUBE LENGTH | OPTIONS |
|-------------|-------|------------------------------|-------------|------------|---------------|-----------------------|---------|
|             |       |                              |             |            |               |                       |         |

#### **SENSOR TYPE**

**BTC** – Beaded construction

#### **STYLE**

**81B** – Noble metal element with inner and outer protection tubes; threaded bushing process attachment; NEMA 4 aluminum terminal head and ceramic terminal block; 3/4" NPT conduit connection; gasketed screw cover with stainless steel chain



#### **SECONDARY TUBE CONFIGURATION**

(e.g., **9C5A** = 1.75" O.D. silicon carbide protection tube with 2" NPT carbon steel bushing. See page 1-9b for available combinations of materials and sizes)

##### Outer protection tube diameter

- |                         |                        |
|-------------------------|------------------------|
| <b>3</b> – 3/4" O.D.    | <b>7</b> – 1-1/4" O.D. |
| <b>4</b> – 7/8" O.D.    | <b>8</b> – 1-1/2" O.D. |
| <b>5</b> – 1" O.D.      | <b>9</b> – 1-3/4" O.D. |
| <b>6</b> – 1-1/10" O.D. |                        |

##### Outer protection tube material

- |   |                      |
|---|----------------------|
| <b>C</b> – Silicon Carbide, oxide bonded* | <b>H</b> – Hexalloy® |
| <b>S</b> – Sialon®                        | <b>L</b> – LT1       |

\* Other grades of silicon carbide available upon request. Consult AST.

##### Bushing thread and material

- |                       |                            |
|-----------------------|----------------------------|
| <b>Carbon Steel</b>   | <b>316 Stainless steel</b> |
| <b>2</b> – 1" NPT     | <b>6</b> – 1" NPT          |
| <b>3</b> – 1-1/4" NPT | <b>7</b> – 1-1/4" NPT      |
| <b>4</b> – 1-1/2" NPT | <b>8</b> – 1-1/2" NPT      |
| <b>5</b> – 2" NPT     | <b>9</b> – 2" NPT          |

##### Inner protection tube material

- |  |                       |
|--|-----------------------|
| <b>A</b> – Alumina (98.8% aluminum oxide)        | <b>H</b> – Hastelloy® |
| <b>M</b> – Mullite (not recommended over 1200°C) |                       |

#### **CALIBRATION**

##### **Single junction**

- |   |           |
|---|-----------|
| <b>R</b> – Platinum and Platinum/13% Rhodium            | <b>RR</b> |
| <b>S</b> – Platinum and Platinum/10% Rhodium            | <b>SS</b> |
| <b>B</b> – Platinum/6% Rhodium and Platinum/30% Rhodium | <b>BB</b> |

##### **Dual junctions**

- |           |
|-----------|
| <b>RR</b> |
| <b>SS</b> |
| <b>BB</b> |

#### **WIRE GAUGE**

**24** – 24 AWG

#### **BEAD MATERIAL**

**A** – Alumina beads (0.125" OD for single junction, 0.188" for dual)

#### **SECONDARY TUBE LENGTH**

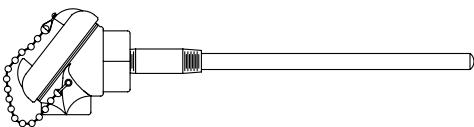
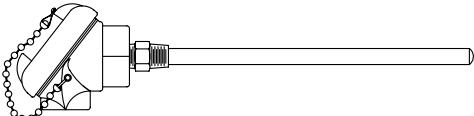
**L#** – (e.g., L12 = 12" outer protection tube length)

**OPTIONS** – see page 1-9b

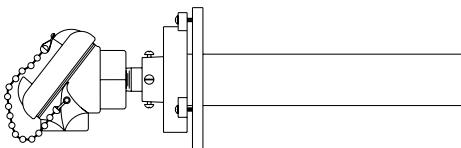
| ASSEMBLY OPTIONS |  |
|------------------|--|
| Option Code      | Description  |
| TAG1             | Stainless steel tag and wire   |
| CAL1             | NIST traceable calibration [specify point(s)]  |
| CRT1             | Certificate of conformance   |
| WC20             | Wiring cable gland for 0.187 - 0.312 diameter cables, for terminal heads with 1/2" NPT conduit connections |
| WC21             | Wiring cable gland for 0.125 - 0.187 diameter cables, for terminal heads with 1/2" NPT conduit connections |

For additional Noble Metal Thermocouple styles, see:

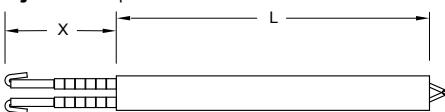
**Style 81N** – Single, primary protection tube only



**Style 81F** – Secondary tube with slip flange mounting



**Style 51** – Replacement Sensor



#### Notes:

- Not all materials and process thread sizes are compatible with all tubing O.D.'s. Use the chart below as a guide for the possible combinations. For each combination of thread and O.D., available materials are noted - Silicon Carbide (C), Sialon® (S), Hexalloy® (H) and LT1 (L).

## STYLE 81B

### TERMINAL HEAD OPTIONS

| NEMA 4 OR 4X TERMINAL HEAD OPTIONS                     |                                 |                    |                    |
|--|---------------------------------|--------------------|--------------------|
| Head without ground screw                              | Head with internal ground screw | Process Connection | Conduit Connection |
| Cast aluminum, screw cover with chain, NEMA 4          |                                 |                    |                    |
| HD10*  | HD11*                           | 1/2"               | 1/2"               |
| Std.*  | HD13*                           | 1/2"               | 3/4"               |
| Epoxy-coated aluminum, screw cover with chain, NEMA 4X |                                 |                    |                    |
| HD50*  | HD51*                           | 1/2"               | 1/2"               |
| HD52*  | HD53*                           | 1/2"               | 3/4"               |
| Cast iron, screw cover with chain, NEMA 4              |                                 |                    |                    |
| HD20*  | HD21*                           | 1/2"               | 1/2"               |
| HD22*  | HD23*                           | 1/2"               | 3/4"               |
| 316 stainless steel, screw cover with chain, NEMA 4X   |                                 |                    |                    |
| HD40*  | HD41*                           | 1/2"               | 3/4"               |
| White polypropylene, screw cover with chain, NEMA 4    |                                 |                    |                    |
| HD30   | N/A                             | 1/2"               | 3/4"               |
| Black polypropylene, screw cover with chain, NEMA 4    |                                 |                    |                    |
| HD31   | N/A                             | 1/2"               | 3/4"               |
| Nylon, screw cover                                     |                                 |                    |                    |
| HD32   | N/A                             | 1/2"               | 1/2"               |

\*can be used with transmitters

**TRANSMITTERS** – For complete specs, see Transmitters section

|      |   |
|------|---|
| TR11 | 4-20 mA, 2-wire transmitter, single input, isolated output; specify range, units of measure (e.g., 0-200°C) and optional terminal head with *.  |
| TR12 | 4-20 mA, 2-wire transmitter, single input, non-isolated output; specify range and units of measure (e.g., 0-200°C) and terminal head with *.    |
| TR13 | HART®/ 4-20 mA, 2-wire transmitter, single input, isolated output; specify range and units of measure (e.g., 0-200°C) and terminal head with *. |

### PROCESS THREAD (NPT)

| OUTER TUBE O.D. | CARBON STEEL |        |            |            | 316 STAINLESS |        |            |            |
|-----------------|--------------|--------|------------|------------|---------------|--------|------------|------------|
|                 | CODE         | 2 (1") | 3 (1-1/4") | 4 (1-1/2") | 5 (2")        | 6 (1") | 7 (1-1/4") | 8 (1-1/2") |
| 3 (3/4")        | H            | H      | H          | H          | H             | H      | H          | H          |
| 4 (7/8")        | L,S          | L,S    | L,S        | L,S        | L,S           | L,S    | L,S        | L,S        |
| 5 (1")          |              | H      | H          | H          |               | H      | H          | H          |
| 6 (1-1/10")     |              | S      | S          | S          |               | S      | S          | S          |
| 7 (1-1/4")      |              |        | H          | H          |               |        | H          | H          |
| 8 (1-1/2")      |              |        | H          | H          |               |        | H          | H          |
| 9 (1-3/4")      |              |        |            | C          |               |        |            | C          |

- Applied Sensor Technologies recommends alumina protection tubes when using platinum thermocouples. Mullite, although less expensive when compared to alumina, can contaminate the platinum, causing drift.
- In many cases platinum thermocouples can be recycled, thereby reducing the long-term overall cost. Please contact Applied Sensor Technologies for further information.
- Applied Sensor Technologies offers many other temperatures sensor designs and technologies, including base metal thermocouples, RTDs, thermistors and Integrated Circuit chips, along with a full line of accessory items such as thermowells, transmitters, etc. Please visit our website or contact us for further information.

Note: Many non-standard options, including additional sheath diameters and materials, may also be available – consult AST for specific requirements. HART® is a registered trademark of the HART Communication Foundation.

**UE** APPLIED SENSOR TECHNOLOGIES  
A Division of UNITED ELECTRIC CONTROLS

## **NOBLE METAL THERMOCOUPLE WITH SECONDARY PROTECTION TUBE & MOUNTING FLANGE**

### **How to build a part number:**

To order an Applied Sensor Technologies temperature sensor, select the requirements for the categories listed below and fill in the corresponding boxes with your selection. Don't see exactly what you need? Give us a call!

| SENSOR TYPE | STYLE | PROTECTION TUBE CONFIGURATION | CALIBRATION | WIRE GAUGE | BEAD MATERIAL | OUTER PROTECTION TUBE LENGTH | OPTIONS |
|-------------|-------|-------------------------------|-------------|------------|---------------|------------------------------|---------|
|             |       |                               |             |            |               |                              |         |

#### **SENSOR TYPE**

**BTC** – Beaded construction

#### **STYLE**

**81F** – Noble metal element with primary and secondary protection tubes;

mounting flange process attachment; NEMA 4 aluminum terminal head and ceramic terminal block; 3/4" NPT conduit connection; gasketed screw cover with stainless steel chain

#### **PROTECTION TUBE CONFIGURATION**

(e.g., **9C5A** = 1.75" O.D. silicon carbide protection tube with 4-7/8" mounting flange and alumina inner protection tube)

Outer protection tube diameter

**9** - 1-3/4" O.D.

Outer protection tube material

**C** - Silicon carbide, oxide bonded\*

\* Other grades of silicon carbide available upon request. Consult AST.

Flange size

**5** - 4-7/8" O.D.

Inner protection tube material

**A** - Alumina (98.8% aluminum oxide)

**M** - Mullite (not recommended over 1200°C)

#### **CALIBRATION**

**Single junction**

**R** – Platinum and Platinum/13% Rhodium

**S** – Platinum and Platinum/10% Rhodium

**B** – Platinum/6% Rhodium and Platinum/30% Rhodium

#### **Dual junctions**

**RR**

**SS**

**BB**

#### **WIRE GAUGE**

**24** – 24 AWG

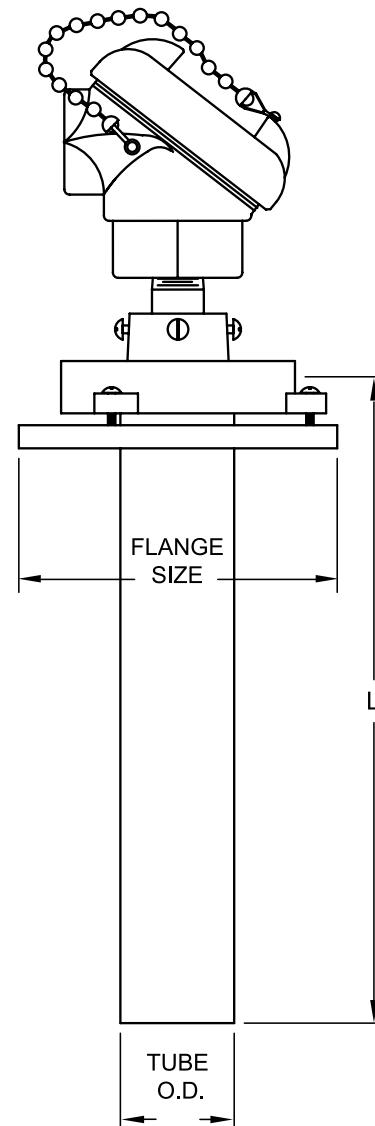
#### **BEAD MATERIAL**

**A** – Alumina beads (0.125" OD for single junction, 0.188" for dual)

#### **OUTER PROTECTION TUBE LENGTH**

**L#** – (e.g., L12 = 12" outer protection tube length)

**OPTIONS** – see page 1-10b



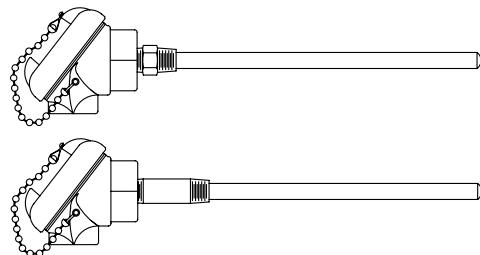
## STYLE 81F

### TERMINAL HEAD OPTIONS

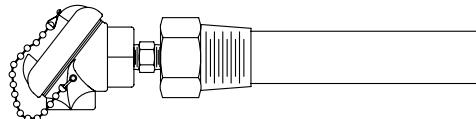
| ASSEMBLY OPTIONS |  |
|------------------|--|
| Option Code      | Description  |
| TAG1             | Stainless steel tag and wire   |
| CAL1             | NIST traceable calibration [specify point(s)]  |
| CRT1             | Certificate of conformance   |
| WC20             | Wiring cable gland for 0.187 - 0.312 diameter cables, for terminal heads with 1/2" NPT conduit connections |
| WC21             | Wiring cable gland for 0.125 - 0.187 diameter cables, for terminal heads with 1/2" NPT conduit connections |

For additional Noble Metal Thermocouple styles, see:

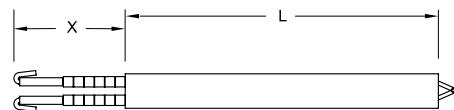
**Style 81N** – Single, primary protection tube only



**Style 81B** – Secondary tube with mounting bushing



**Style 51** – Replacement Sensor



| NEMA 4 OR 4X TERMINAL HEAD OPTIONS                          |   |                    |                    |
|---|---|--------------------|--------------------|
| Head without ground screw                                   | Head with internal ground screw   | Process Connection | Conduit Connection |
| Cast aluminum, screw cover with chain, NEMA 4               |   |                    |                    |
| HD10*   | HD11*   | 1/2"               | 1/2"               |
| Std.*   | HD13*   | 1/2"               | 3/4"               |
| Epoxy-coated aluminum, screw cover with chain, NEMA 4X      |   |                    |                    |
| HD50*   | HD51*   | 1/2"               | 1/2"               |
| HD52*   | HD53*   | 1/2"               | 3/4"               |
| Cast iron, screw cover with chain, NEMA 4                   |   |                    |                    |
| HD20*   | HD21*   | 1/2"               | 1/2"               |
| HD22*   | HD23*   | 1/2"               | 3/4"               |
| 316 stainless steel, screw cover with chain, NEMA 4X        |   |                    |                    |
| HD40*   | HD41*   | 1/2"               | 3/4"               |
| White polypropylene, screw cover with chain, NEMA 4         |   |                    |                    |
| HD30  | N/A   | 1/2"               | 3/4"               |
| Black polypropylene, screw cover with chain, NEMA 4         |   |                    |                    |
| HD31  | N/A   | 1/2"               | 3/4"               |
| Nylon, screw cover  |   |                    |                    |
| HD32  | N/A   | 1/2"               | 1/2"               |
| *can be used with transmitters                              |   |                    |                    |
| TRANSMITTERS – For complete specs, see Transmitters section |   |                    |                    |
| TR11  | 4-20 mA, 2-wire transmitter, single input, isolated output; specify range, units of measure (e.g., 0-200°C) and optional terminal head with *.  |                    |                    |
| TR12  | 4-20 mA, 2-wire transmitter, single input, non-isolated output; specify range and units of measure (e.g., 0-200°C) and terminal head with *.    |                    |                    |
| TR13  | HART®/ 4-20 mA, 2-wire transmitter, single input, isolated output; specify range and units of measure (e.g., 0-200°C) and terminal head with *. |                    |                    |

Notes:

- Applied Sensor Technologies recommends alumina protection tubes when using platinum thermocouples. Mullite, although less expensive when compared to alumina, can contaminate the platinum, causing drift.
- In many cases platinum thermocouples can be recycled, thereby reducing the long-term overall cost. Please contact Applied Sensor Technologies for further information.
- Applied Sensor Technologies offers many other temperatures sensor designs and technologies, including base metal thermocouples, RTDs, thermistors and Integrated Circuit chips, along with a full line of accessory items such as thermowell, transmitters, etc. Please visit our website or contact us for further information.

## **SHEATH WITH LEADWIRE**

### **How to build a part number:**

To order an Applied Sensor Technologies temperature sensor, select the requirements for the categories listed below and fill in the corresponding boxes with your selection. Don't see exactly what you need? Give us a call!

| SENSOR TYPE | ASSEMBLY STYLE | SHEATH DIAMETER | SHEATH MATERIAL | CALIBRATION | HOT JUNCTION | SHEATH LENGTH | LEADWIRE LENGTH | OPTIONS |
|-------------|----------------|-----------------|-----------------|-------------|--------------|---------------|-----------------|---------|
|             |                |                 |                 |             |              |               |                 |         |

#### **SENSOR TYPE\***

**GP** – General purpose thermocouple  
**MI** – Mineral insulated thermocouple

#### **ASSEMBLY STYLE**

**02** – Sheath with leadwire; fiberglass insulated conductors; fiberglass jacket  
**04** – Sheath with leadwire; fiberglass insulated conductors; fiberglass jacket; stainless steel overbraid overall  
**28** – Sheath with Teflon® insulated conductors; Teflon® jacketed cable

#### **SHEATH DIAMETER** (in inches)

**4** – 1/8 (0.125)  
**6** – 3/16 (0.188)  
**7** – 1/4 (0.250)  
**9** – 3/8 (0.375)

#### **SHEATH MATERIAL**

**3** – 316 stainless steel  
**5** – Inconel® 600 (MI only)

#### **CALIBRATION** - Standard limits

|                     |                    |
|---------------------|--------------------|
| <b>J</b> – Single J | <b>JJ</b> – Dual J |
| <b>K</b> – Single K | <b>KK</b> – Dual K |
| <b>T</b> – Single T | <b>TT</b> – Dual T |
| <b>E</b> – Single E | <b>EE</b> – Dual E |

*Special limits are available – consult AST*

*Dual junction not available with all GP Thermocouples in sheath diameter 4 and GPO4 diameter 6*

#### **HOT JUNCTION**

**G** – Grounded junction  
**U** – Ungrounded junction  
**E** – Exposed junction

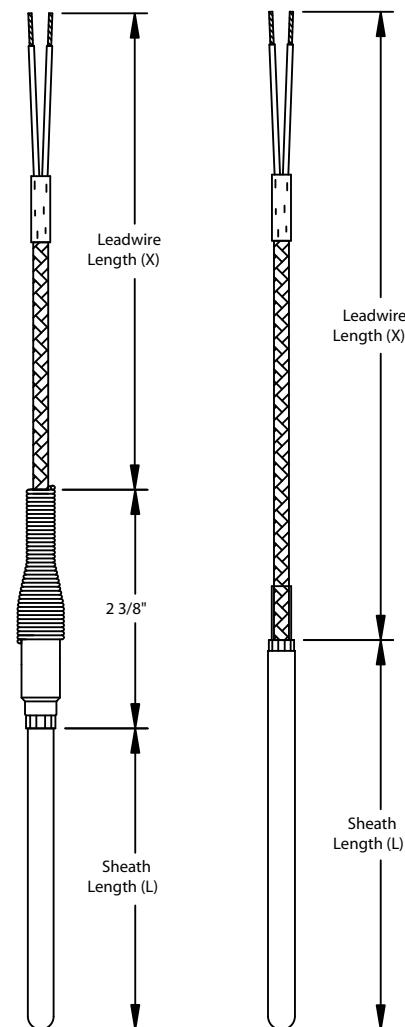
**SHEATH LENGTH** (Note: maximum L=96" for GP; for MI, lengths over L84 will be shipped coiled unless otherwise specified)

**L#** – (e.g., L6 = 6 inch sheath, L12.5 = 12.5 inch length)

#### **LEADWIRE LENGTH**

**X#** – (e.g., X72 = 72 inch length)

#### **OPTIONS** – see page 1-11b



\*Note: GP thermocouples, manufactured using hollow tubing and wire, tend to be lower cost than MI, but cannot be bent in the field and are standardly designed for sensing temperatures below 500°F. MI thermocouples are more rugged than GP due to compacted magnesium-oxide powder insulation, can be bent in the field, and are appropriate for the temperature range of the sensor and sheath.

## STYLES 02, 04, 28

### **AVAILABLE OPTIONS and MODIFICATIONS**

| <b>ASSEMBLY OPTIONS</b> |   |
|-------------------------|---|
| Option Code             | Description   |
| TAG1                    | Stainless steel tag and wire  |
| B90-                    | 90° bend in sheath (specify length from tip in inches e.g., B90-6)                            |
| B45-                    | 45° bend in sheath (specify length from tip in inches e.g., B45-6)                            |
| CAL1                    | NIST traceable calibration [specify point(s)]   |
| CRT1                    | Certificate of conformance  |
| HT10                    | High temperature (900°F) transition. (Standard transition on Styles 02 and 04 is 500°F/260°C) |

| <b>WIRING CONNECTION OPTIONS</b>                    |   |                 |                 |
|---|---|-----------------|-----------------|
| WC76  | #6 spade terminals, plated copper               |                 |                 |
| WC70  | #10 spade terminals, plated copper              |                 |                 |
| WC84  | 1/4" push-on insulated terminals, plated copper |                 |                 |
| WC90  | #10 ring terminals                              |                 |                 |
| WC98  | #8 ring terminals                               |                 |                 |
| For plugs and jacks, see Styles 05, 07, 69.         |   |                 |                 |
| <b>COMPRESSION FITTINGS</b> (for diameters 4, 6, 7) |   |                 |                 |
| Option Code   | NPT   | Material        | Ferrule         |
| CF10  | 1/8"  | Stainless steel | Stainless steel |
| CF11  | 1/8"  | Stainless steel | Teflon®         |
| CF12  | 1/8"  | Brass           | Brass           |
| CF20  | 1/4"  | Stainless steel | Stainless steel |
| CF21  | 1/4"  | Stainless steel | Teflon®         |
| CF22  | 1/4"  | Brass           | Brass           |
| CF30  | 1/2"  | Stainless steel | Stainless steel |
| CF31  | 1/2"  | Stainless steel | Teflon®         |
| CF32  | 1/2"  | Brass           | Brass           |
| <b>WELD PADS</b>                                    |   |                 |                 |
| WP00  | Horizontal pad/flat                             |                 |                 |
| WP10  | 1" nominal pipe size                            |                 |                 |
| WP15  | 1.5" nominal pipe size                          |                 |                 |
| WP20  | 2" nominal pipe size                            |                 |                 |
| WP25  | 2.5" nominal pipe size                          |                 |                 |
| WP30  | 3" nominal pipe size                            |                 |                 |
| WP35  | 3.5" nominal pipe size                          |                 |                 |
| WP40  | 4" nominal pipe size                            |                 |                 |

### **EXTENSION WIRE**

A selection of extension-grade thermocouple wire is available to connect the sensor to its input device. Consult Accessories section.

## **SHEATH WITH LEADWIRE AND ARMOR**

### **How to build a part number:**

To order an Applied Sensor Technologies temperature sensor, select the requirements for the categories listed below and fill in the corresponding boxes with your selection. Don't see exactly what you need? Give us a call!

| SENSOR TYPE | ASSEMBLY STYLE | SHEATH DIAMETER | SHEATH MATERIAL | CALIBRATION | HOT JUNCTION | SHEATH LENGTH | ARMOR CABLE LENGTH | OPTIONS |
|-------------|----------------|-----------------|-----------------|-------------|--------------|---------------|--------------------|---------|
|             |                |                 |                 |             |              |               |                    |         |

#### **SENSOR TYPE\***

**GP** – General purpose thermocouple  
**MI** – Mineral insulated thermocouple

#### **ASSEMBLY STYLE**

##### **O3 – Sheath with leadwire and flexible stainless steel armor cable;**

fiberglass-insulated conductors; fiberglass jacket.

**O3P – PVC-coated armor**, Teflon®-insulated conductors

**O3T – Teflon® coated armor**, Teflon®-insulated conductors

#### **SHEATH DIAMETER** (in inches)

**4** – 1/8 (0.125)

**6** – 3/16 (0.188)

**7** – 1/4 (0.250)

**9** – 3/8 (0.375)

#### **SHEATH MATERIAL**

**3** – 316 stainless steel

**5** – Inconel® 600 (MI only)

#### **CALIBRATION** Standard limits

**J** – Single J      **JJ** – Dual J

**K** – Single K      **KK** – Dual K

**T** – Single T      **TT** – Dual T

**E** – Single E      **EE** – Dual E

Special limits are available – consult AST

Dual junction not available with GP thermocouples in sheath diameter 4

#### **HOT JUNCTION**

**G** – Grounded junction

**U** – Ungrounded junction

**E** – Exposed junction

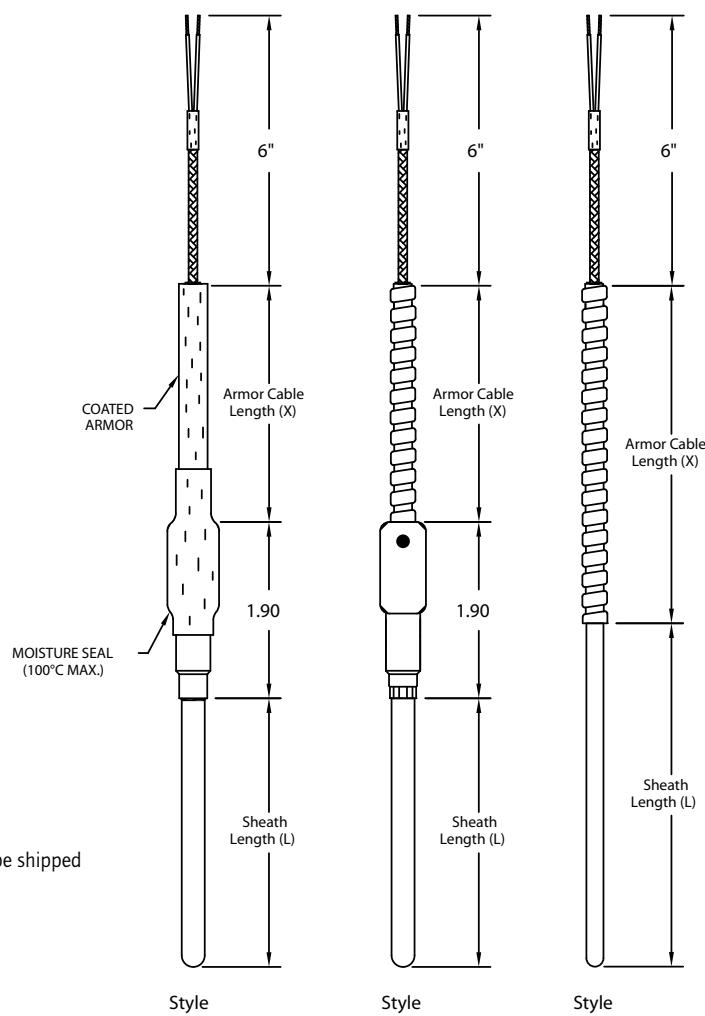
**SHEATH LENGTH** (Note: maximum L=96" for GP; for MI, lengths over L84 will be shipped coiled unless otherwise specified)

**L#** – (e.g., L6 = 6 inch sheath, L12.5 = 12.5 inch length)

#### **ARMOR CABLE LENGTH**

**X#** - (e.g., X72 = 72 inch length)

#### **OPTIONS** – see page 1-12b



\*Note: GP thermocouples, manufactured using hollow tubing and wire, tend to be lower cost than MI, but cannot be bent in the field and are standardly designed for sensing temperatures below 500°F. MI thermocouples are more rugged than GP due to compacted magnesium-oxide powder insulation, can be bent in the field, and are appropriate for the temperature range of the sensor and sheath.

## STYLE 03

### AVAILABLE OPTIONS and MODIFICATIONS

| <b>ASSEMBLY OPTIONS</b>  |  |                 |                 |
|--|--|-----------------|-----------------|
| Option Code  | Description  |                 |                 |
| TAG1   | Stainless steel tag and wire   |                 |                 |
| B90-   | 90° bend in sheath (specify length from tip in inches e.g., B90-6)           |                 |                 |
| B45-   | 45° bend in sheath (specify length from tip in inches e.g., B45-6)           |                 |                 |
| CAL1   | NIST traceable calibration [specify point(s)]                                |                 |                 |
| CRT1   | Certificate of conformance   |                 |                 |
| HT10   | High temperature (900°F) transition. (Standard transition rated 500°F/260°C) |                 |                 |
| <b>COMPRESSION FITTINGS</b>  |  |                 |                 |
| Option Code  | NPT  | Material        | Ferrule         |
| CF10   | 1/8"   | Stainless steel | Stainless steel |
| CF11   | 1/8"   | Stainless steel | Teflon®         |
| CF12   | 1/8"   | Brass           | Brass           |
| CF20   | 1/4"   | Stainless steel | Stainless steel |
| CF21   | 1/4"   | Stainless steel | Teflon®         |
| CF22   | 1/4"   | Brass           | Brass           |
| CF30   | 1/2"   | Stainless steel | Stainless steel |
| CF31   | 1/2"   | Stainless steel | Teflon®         |
| CF32   | 1/2"   | Brass           | Brass           |
| <b>LEADWIRE AND ARMOR OPTIONS</b>                                      |  |                 |                 |
| BA50   | Bayonet cap on armor, no spring ( <b>formerly Style 25</b> )                 |                 |                 |
| Note: For assembly with sheath, armor and terminal head, see Style 66. |  |                 |                 |

| <b>WIRING CONNECTION OPTIONS</b>  |   |
|---|---|
| WC76  | #6 spade terminals, plated copper               |
| WC70  | #10 spade terminals, plated copper              |
| WC84  | 1/4" push-on insulated terminals, plated copper |
| WC90  | #10 ring terminals                              |
| WC98  | #8 ring terminals                               |
| <b>PLUGS AND JACKS</b> (Note: plug is designed to be attached to sensor assemblies. Jack options – for customer wiring – should only be specified if plug option is also included. Cable clamp is included for both plug and jack options.) |   |
| PJ10  | Standard plug, rated to 177°C (350°F)           |
| PJ20  | Standard jack, rated to 177°C (350°F)           |
| PJ30  | Miniature plug, rated to 177°C (350°F)          |
| PJ40  | Miniature jack, rated to 177°C (350°F)          |
| PJ50  | High temp. plug, rated to 260°C (500°F)         |
| PJ60  | High temp. jack, rated to 260°C (500°F)         |
| <b>BX CONNECTORS</b>  |   |
| WC40  | 1/2"  |
| WC50  | 3/4"  |
| <b>WELD PADS</b>  |   |
| WP00  | Horizontal pad/flat                             |
| WP10  | 1" nominal pipe size                            |
| WP15  | 1.5" nominal pipe size                          |
| WP20  | 2" nominal pipe size                            |
| WP25  | 2.5" nominal pipe size                          |
| WP30  | 3" nominal pipe size                            |
| WP35  | 3.5" nominal pipe size                          |

#### **EXTENSION WIRE**

A selection of extension-grade thermocouple wire is available to connect the sensor to its input device. Consult Accessories section.

## **SHEATH WITH LEADWIRE AND PLUG**

### **How to build a part number:**

To order an Applied Sensor Technologies temperature sensor, select the requirements for the categories listed below and fill in the corresponding boxes with your selection. Don't see exactly what you need? Give us a call!

| SENSOR TYPE | ASSEMBLY STYLE | SHEATH DIAMETER | SHEATH MATERIAL | CALIBRATION | HOT JUNCTION | SHEATH LENGTH | LEADWIRE LENGTH | OPTIONS |
|-------------|----------------|-----------------|-----------------|-------------|--------------|---------------|-----------------|---------|
|             |                |                 |                 |             |              |               |                 |         |

#### **SENSOR TYPE\***

**GP** – General purpose thermocouple  
**MI** – Mineral insulated thermocouple

#### **ASSEMBLY STYLE**

**05** – Sheath with leadwire; standard male plug; fiberglass insulated conductors; fiberglass jacket

**07** – Sheath with leadwire; stainless steel overbraid; standard male plug; fiberglass insulated conductors; fiberglass jacket

**69** – Sheath with leadwire; miniature plug; fiberglass insulated conductors; fiberglass jacket

#### **SHEATH DIAMETER** (in inches)

**4** – 1/8 (0.125)

**6** – 3/16 (0.188)

**7** – 1/4 (0.250)

**9** – 3/8 (0.375)

#### **SHEATH MATERIAL**

**3** – 316 stainless steel

**5** – Inconel® 600 (MI only)

#### **CALIBRATION** – Standard limits

**J** – Single J      **JJ** – Dual J

**K** – Single K      **KK** – Dual K

**T** – Single T      **TT** – Dual T

**E** – Single E      **EE** – Dual E

Special limits are available – consult AST

Dual junctions not available with all GP Thermocouples in sheath diameter 4 and GP07 diameter 6

#### **HOT JUNCTION**

**G** – Grounded junction

**U** – Ungrounded junction

**E** – Exposed junction

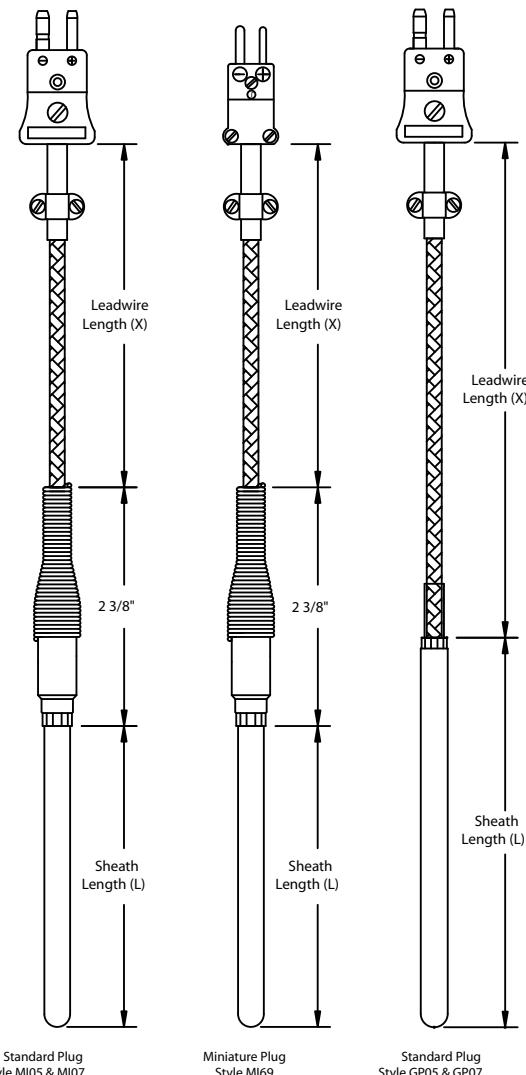
**SHEATH LENGTH** (Note: maximum L=96" for GP; for MI, lengths over L84 will be shipped coiled unless otherwise specified)

**L#** – (e.g., L6 = 6 inch sheath, L12.5 = 12.5 inch length)

#### **LEADWIRE LENGTH**

**X#** – (e.g., X72 = 72 inch length)

#### **OPTIONS** – see page 1-13b



\*Note: GP thermocouples, manufactured using hollow tubing and wire, tend to be lower cost than MI, but cannot be bent in the field and are standardly designed for sensing temperatures below 500°F. MI thermocouples are more rugged than GP due to compacted magnesium-oxide powder insulation, can be bent in the field, and are appropriate for the temperature range of the sensor and sheath.

## STYLES 05, 07, 69

### AVAILABLE OPTIONS and MODIFICATIONS

| ASSEMBLY OPTIONS  |  |
|---|--|
| Option Code   | Description  |
| TAG1  | Stainless steel tag and wire   |
| B90-  | 90° bend in sheath (specify length from tip in inches e.g., B90-6)           |
| B45-  | 45° bend in sheath (specify length from tip in inches e.g., B45-6)           |
| CAL1  | NIST traceable calibration [specify point(s)]                                |
| CRT1  | Certificate of conformance   |
| HT10  | High temperature (900°F) transition. (Standard transition rated 500°F/260°C) |
| <b>PLUG AND JACK OPTIONS</b> (Note: plug is designed to be attached to sensor assemblies. Jack options – for customer wiring – should only be specified if plug option is also included. Cable clamp is included for both plug and jack options.) |  |
| PJ20  | Standard jack, rated to 177°C (350°F)  |
| PJ40  | Miniature jack, rated to 177°C (350°F)                                       |
| PJ50  | High temp. standard plug, rated to 260°C (500°F)                             |
| PJ60  | High temp. standard jack, rated to 260°C (500°F)                             |

#### **EXTENSION WIRE**

A selection of extension-grade thermocouple wire is available to connect the sensor to its input device. Consult Accessories section.

| COMPRESSION FITTINGS (for diameters 4, 6, 7) |                        |                 |                 |
|--|------------------------|-----------------|-----------------|
| Option Code                                  | NPT                    | Material        | Ferrule         |
| CF10   | 1/8"                   | Stainless steel | Stainless steel |
| CF11   | 1/8"                   | Stainless steel | Teflon®         |
| CF12   | 1/8"                   | Brass           | Brass           |
| CF20   | 1/4"                   | Stainless steel | Stainless steel |
| CF21   | 1/4"                   | Stainless steel | Teflon®         |
| CF22   | 1/4"                   | Brass           | Brass           |
| CF30   | 1/2"                   | Stainless steel | Stainless steel |
| CF31   | 1/2"                   | Stainless steel | Teflon®         |
| CF32   | 1/2"                   | Brass           | Brass           |
| WELD PADS                                    |                        |                 |                 |
| WP00   | Horizontal pad/flat    |                 |                 |
| WP10   | 1" nominal pipe size   |                 |                 |
| WP15   | 1.5" nominal pipe size |                 |                 |
| WP20   | 2" nominal pipe size   |                 |                 |
| WP25   | 2.5" nominal pipe size |                 |                 |
| WP30   | 3" nominal pipe size   |                 |                 |
| WP35   | 3.5" nominal pipe size |                 |                 |
| WP40   | 4" nominal pipe size   |                 |                 |

## **SHEATH WITH MALE PLUG**

### **How to build a part number:**

To order an Applied Sensor Technologies temperature sensor, select the requirements for the categories listed below and fill in the corresponding boxes with your selection. Don't see exactly what you need? Give us a call!

| SENSOR TYPE | ASSEMBLY STYLE | SHEATH DIAMETER | SHEATH MATERIAL | CALIBRATION | HOT JUNCTION | SHEATH LENGTH | OPTIONS |
|-------------|----------------|-----------------|-----------------|-------------|--------------|---------------|---------|
|             |                |                 |                 |             |              |               |         |

#### **SENSOR TYPE\***

**GP** – General purpose thermocouple

**MI** – Mineral insulated thermocouple

#### **ASSEMBLY STYLE**

**14** – Sheath with standard male plug; maximum termination temperature 177°C (350°F)

**74** – Sheath with miniature male plug; maximum sheath diameter 3/16" OD; maximum termination temperature 177°C (350°F)

#### **SHEATH DIAMETER** (in inches)

**3** – 1/16 (0.063) (Style MI 74 only)

**4** – 1/8 (0.125)

**6** – 3/16 (0.188)

**7** – 1/4 (0.250) (Style 14 only)

#### **SHEATH MATERIAL**

**3** – 316 stainless steel

**5** – Inconel® 600 (MI only)

#### **CALIBRATION** – Standard limits

**J** – Single J

**K** – Single K

**T** – Single T

**E** – Single E

Special limits are available – consult AST

#### **HOT JUNCTION**

**G** – Grounded junction

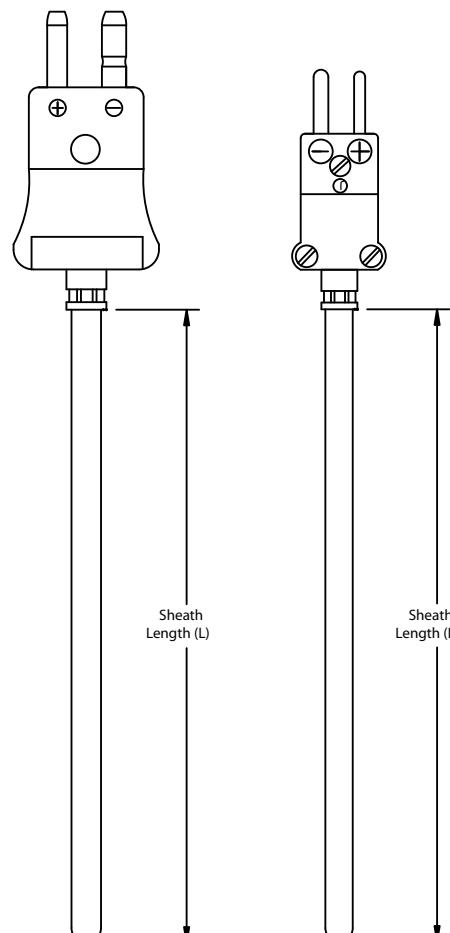
**U** – Ungrounded junction

**E** – Exposed junction

**SHEATH LENGTH** (Note: maximum L=96" for GP; for MI, lengths over L84 will be shipped coiled unless otherwise specified)

**L#** – (e.g., L6 = 6" sheath, L12.5 = 12.5" length)

**OPTIONS** – see page 1-14b



\*Note: GP thermocouples, manufactured using hollow tubing and wire, tend to be lower cost than MI, but cannot be bent in the field and are standardly designed for sensing temperatures below 500°F. MI thermocouples are more rugged than GP due to compacted magnesium-oxide powder insulation, can be bent in the field, and are appropriate for the temperature range of the sensor and sheath.

Style 14

Style 74

## STYLES 14 & 74

### AVAILABLE OPTIONS and MODIFICATIONS

| <b>ASSEMBLY OPTIONS</b> |  |
|-------------------------|--|
| Option Code             | Description  |
| TAG1                    | Stainless steel tag and wire                           |
| CAL1                    | NIST traceable calibration [specify point(s)]          |
| CRT1                    | Certificate of conformance                             |
| <b>PLUGS AND JACKS</b>  |  |
| PJ20                    | Standard jack, rated to 177°C (350°F) (Style 14 only)  |
| PJ40                    | Miniature jack, rated to 177°C (350°F) (Style 74 only) |

#### **EXTENSION WIRE**

A selection of extension-grade thermocouple wire is available to connect the sensor to its input device. Consult Accessories section.

| <b>COMPRESSION FITTINGS</b> (for diameters 4, 6, 7) |      |                 |                 |
|---|------|-----------------|-----------------|
| Option Code   | NPT  | Material        | Ferrule         |
| CF10  | 1/8" | Stainless steel | Stainless steel |
| CF11  | 1/8" | Stainless steel | Teflon®         |
| CF12  | 1/8" | Brass           | Brass           |
| CF20  | 1/4" | Stainless steel | Stainless steel |
| CF21  | 1/4" | Stainless steel | Teflon®         |
| CF22  | 1/4" | Brass           | Brass           |
| CF30  | 1/2" | Stainless steel | Stainless steel |
| CF31  | 1/2" | Stainless steel | Teflon®         |
| CF32  | 1/2" | Brass           | Brass           |

## **CUTABLE SHEATH WITH LEADWIRE**

### **How to build a part number:**

To order an Applied Sensor Technologies temperature sensor, select the requirements for the categories listed below and fill in the corresponding boxes with your selection. Don't see exactly what you need? Give us a call!

| SENSOR TYPE | ASSEMBLY STYLE | SHEATH DIAMETER | SHEATH MATERIAL | CALIBRATION | HOT JUNCTION | SHEATH LENGTH | LEADWIRE LENGTH | OPTIONS |
|-------------|----------------|-----------------|-----------------|-------------|--------------|---------------|-----------------|---------|
|             |                |                 |                 |             |              |               |                 |         |

#### **SENSOR TYPE**

**GP** – General purpose thermocouple

#### **ASSEMBLY STYLE**

**38** – **Field cutable sheath length with leadwire**; fiberglass insulated conductors; fiberglass jacket; stainless steel overbraid; (cannot be shortened to less than 4")

#### **SHEATH DIAMETER** (in inches)

**6** – 3/16 (0.188)

**7** – 1/4 (0.250)

#### **SHEATH MATERIAL**

**3** – 316 stainless steel

#### **CALIBRATION** - Standard limits

**J** – Single J      **JJ** – Dual J

**K** – Single K      **KK** – Dual K

**T** – Single T      **TT** – Dual T

**E** – Single E      **EE** – Dual E

*Special limits are available- consult AST*

#### **HOT JUNCTION**

**G** – Grounded junction

**U** – Ungrounded junction

#### **SHEATH LENGTH** (Maximum L=96")

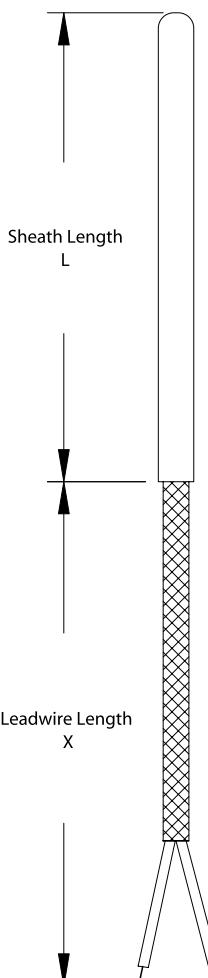
**L#** – (e.g., L24 = 24 inch sheath)

#### **LEADWIRE LENGTH**

**X#** – (e.g., X72 = 72 inch length)

#### **OPTION**

**TAG1** – stainless steel tag and wire





#### **EXTENSION WIRE**

A selection of extension-grade thermocouple wire is available to connect the sensor to its input device. Consult Accessories section.

**Many additional components are available in our Sensor Box program, including spring-loaded fittings and plugs and jacks.**

**The Sensor Box allows you to build sensor assemblies on-site, saving time and expense. See the Sensor Box literature for further details.**

## **SPRING LOADED BAYONET FITTING WITH ARMOR**

### **How to build a part number:**

To order an Applied Sensor Technologies temperature sensor, select the requirements for the categories listed below and fill in the corresponding boxes with your selection. Don't see exactly what you need? Give us a call!

| SENSOR TYPE | ASSEMBLY STYLE | SHEATH DIAMETER | SHEATH MATERIAL | CALIBRATION | HOT JUNCTION | SHEATH LENGTH | ARMOR CABLE LENGTH | OPTIONS |
|-------------|----------------|-----------------|-----------------|-------------|--------------|---------------|--------------------|---------|
|             |                |                 |                 |             |              |               |                    |         |

#### **SENSOR TYPE\***

**GP** – General purpose thermocouple  
**MI** – Mineral insulated thermocouple

#### **ASSEMBLY STYLE**

**71** – Sheath with stainless steel armor; fiberglass insulated conductors; fiberglass jacket; spring-loaded bayonet cap; (use with Bayonet Adapter- see options on page 1-16b)

#### **SHEATH DIAMETER** (in inches)

**6** – 3/16 (0.188)

#### **SHEATH MATERIAL**

**3** – 316 stainless steel

#### **CALIBRATION** - Standard limits

|                     |                    |
|---------------------|--------------------|
| <b>J</b> – Single J | <b>JJ</b> – Dual J |
| <b>K</b> – Single K | <b>KK</b> – Dual K |
| <b>T</b> – Single T | <b>TT</b> – Dual T |
| <b>E</b> – Single E | <b>EE</b> – Dual E |

#### **HOT JUNCTION**

**G** – Grounded junction  
**U** – Ungrounded junction

**SHEATH LENGTH** (Note: maximum L=96" for GP; for MI, lengths over L84 will be shipped coiled unless otherwise specified)

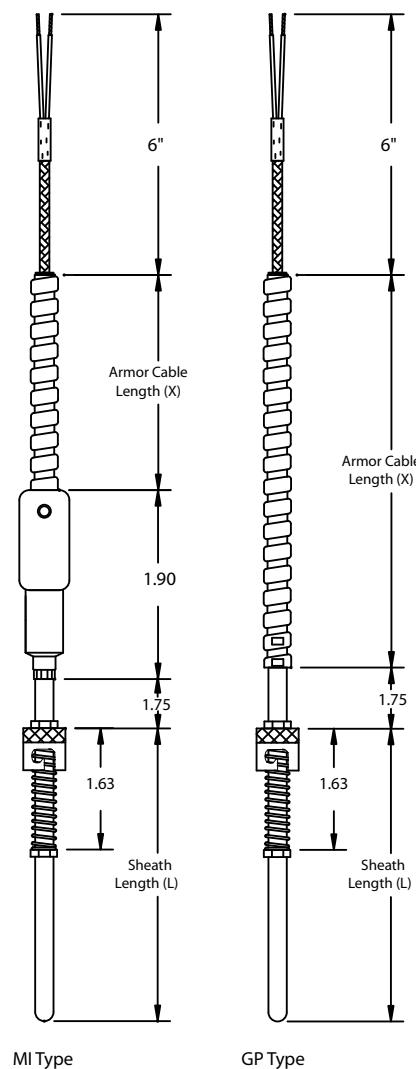
**L#** – (e.g., L6 = 6 inch sheath, L12.5 = 12.5 inch length)

#### **ARMOR CABLE LENGTH**

**X#** – (e.g., X72 = 72 inch length)

#### **OPTIONS** – see page 1-16b

\*Note: GP thermocouples, manufactured using hollow tubing and wire, tend to be lower cost than MI, but cannot be bent in the field and are standardly designed for sensing temperatures below 500°F. MI thermocouples are more rugged than GP due to compacted magnesium-oxide powder insulation, can be bent in the field, and are appropriate for the temperature range of the sensor and sheath.



## STYLE 71

### AVAILABLE OPTIONS and MODIFICATIONS

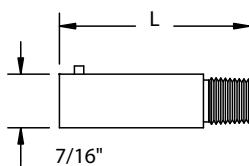
| ASSEMBLY OPTIONS                |  |                    |
|---------------------------------|--|--------------------|
| Option Code                     | Description  |                    |
| TAG1                            | Stainless steel tag and wire   |                    |
| BD90                            | 90° bend in sheath, 3/4" from back end of cap<br><b>Formerly Style 35</b>    |                    |
| BD45                            | 45°bend in sheath, 3/4" from back end of cap<br><b>Formerly Style 70</b>     |                    |
| CAL1                            | NIST traceable calibration [specify point(s)]                                |                    |
| CRT1                            | Certificate of conformance   |                    |
| HT10                            | High temperature (900°F) transition. (Standard transition rated 500°F/260°C) |                    |
| BAYONET ADAPTERS (PLATED STEEL) |  |                    |
| Option Code                     | Thread Size  | Length (L)         |
| BA20                            | 1/8" - 27 NPT  | 7/8"               |
| BA22                            | 1/8" - 27 NPT  | 1-1/2"             |
| BA24                            | 1/8" - 27 NPT  | 2-1/2"             |
| PIPE CLAMP AND BAYONET ADAPTERS |  |                    |
| Option Code                     | Band Diameter  | Adapter Length (l) |
| BA30                            | 11/16" to 1-1/4"   | 2"                 |
| BA31                            | 1-1/16" to 2"  | 2"                 |
| BA32                            | 2-1/16" to 3"  | 2"                 |
| BA33                            | 3-5/16" to 4-1/4"  | 2"                 |
| BA34                            | 4-1/8" to 5"   | 2"                 |

| WIRING CONNECTION OPTIONS  |  |
|--|--|
| Option Code  | Description                                      |
| WC76   | #6 spade terminals, plated copper                |
| WC70   | #10 spade terminals, plated copper               |
| WC84   | 1/4" push-on insulated terminals, plated copper  |
| WC90   | #10 ring terminals                               |
| WC98   | #8 ring terminals                                |
| PLUGS AND JACKS (Note: plug is designed to be attached to sensor assemblies. Jack options – for customer wiring – should only be specified if plug option is also included. Cable clamp is included for both plug and jack options.) |  |
| PJ10   | Standard plug, rated to 177°C (350°F)            |
| PJ20   | Standard jack, rated to 177°C (350°F)            |
| PJ30   | Miniature plug, rated to 177°C (350°F)           |
| PJ40   | Miniature jack, rated to 177°C (350°F)           |
| PJ50   | High temp. standard plug, rated to 260°C (500°F) |
| PJ60   | High temp. standard jack, rated to 260°C (500°F) |
| BX CONNECTORS  |  |
| WC40   | 1/2"   |
| WC50   | 3/4"   |

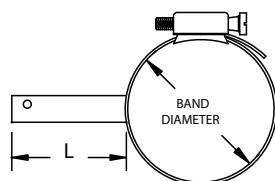
#### EXTENSION WIRE

A selection of extension-grade thermocouple wire is available to connect the sensor to its input device. Consult Accessories section.

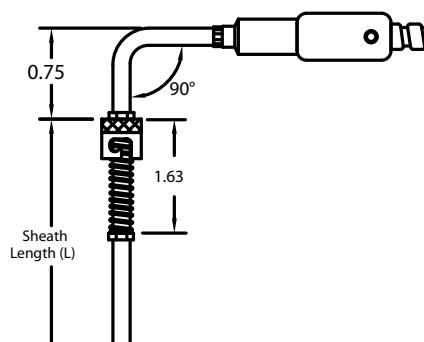
BAYONET ADAPTER  
(PLATED STEEL)



PIPE CLAMP WITH  
BAYONET ADAPTER



BD90 OPTION VIEW  
ON MI71 STYLE



## **SHEATH WITH WELDED PROCESS MOUNTING**

### **How to build a part number:**

To order an Applied Sensor Technologies temperature sensor, select the requirements for the categories listed below and fill in the corresponding boxes with your selection. Don't see exactly what you need? Give us a call!

| SENSOR TYPE | ASSEMBLY STYLE | SHEATH DIAMETER | SHEATH MATERIAL | CALIBRATION | HOT JUNCTION | SHEATH LENGTH | LEADWIRE LENGTH | OPTIONS |
|-------------|----------------|-----------------|-----------------|-------------|--------------|---------------|-----------------|---------|
|             |                |                 |                 |             |              |               |                 |         |

#### **SENSOR TYPE**

**MI** – Mineral insulated thermocouple

#### **ASSEMBLY STYLE**

**23P** – Sheath with single-sided process mounting; fiberglass insulated conductors; fiberglass jacket; 1/2" NPT stainless steel connection with leadwire

**23I** – Sheath with single-sided instrument mounting; fiberglass insulated conductors; fiberglass jacket; 1/2" NPT stainless steel connection with leadwire

**24** – Sheath with double-sided hex fitting; fiberglass insulated conductors and jacket; 1/2" NPT stainless steel connection with leadwire

#### **SHEATH DIAMETER** (in inches)

**4** – 1/8 (0.125)

**6** – 3/16 (0.188)

**7** – 1/4 (0.250)

**9** – 3/8 (0.375)

#### **SHEATH MATERIAL**

**3** – 316 stainless steel

**5** – Inconel® 600

#### **CALIBRATION** – Standard limits

**J** – Single J      **JJ** – Dual J

**K** – Single K      **KK** – Dual K

**T** – Single T      **TT** – Dual T

**E** – Single E      **EE** – Dual E

Special limits are available – consult AST

#### **HOT JUNCTION**

**G** – Grounded junction

**U** – Ungrounded junction

**E** – Exposed junction

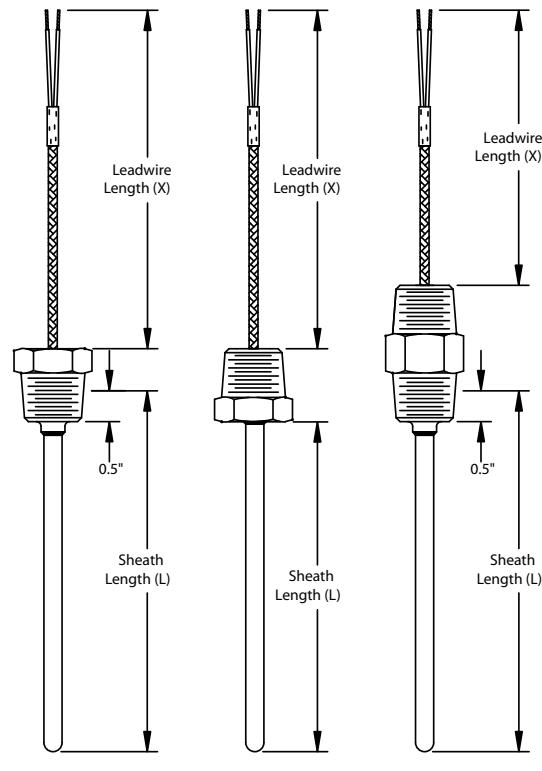
**SHEATH LENGTH** (Note: lengths over L84 will be shipped coiled unless otherwise specified at time of order)

**L#** – (e.g., L6 = 6 inch sheath, L12.5 = 12.5 inch length)

#### **LEADWIRE LENGTH**

**X#** – (e.g., X72 = 72 inch length)

**OPTIONS** – see page 1-17b



## STYLE 23I, 23P, 24

### AVAILABLE OPTIONS and MODIFICATIONS

| <b>ASSEMBLY OPTIONS</b> |  |
|-------------------------|--|
| Option Code             | Description  |
| TAG1                    | Stainless steel tag and wire   |
| B90-                    | 90° bend in sheath [specify length from tip in inches e.g., B90-6)           |
| B45-                    | 45° bend in sheath (specify length from tip in inches e.g., B45-6)           |
| CAL1                    | NIST traceable calibration [specify point(s)]                                |
| CRT1                    | Certificate of conformance   |
| HT10                    | High temperature (900°F) transition. (Standard transition rated 500°F/260°C) |

| <b>WIRING CONNECTION OPTIONS</b>  |  |
|---|--|
| Option Code   | Description                                      |
| WC76  | #6 spade terminals, plated copper                |
| WC70  | #10 spade terminals, plated copper               |
| WC84  | 1/4" push-on insulated terminals, plated copper  |
| WC90  | #10 ring terminals                               |
| WC98  | #8 ring terminals                                |
| <b>PLUGS AND JACKS</b> (Note: plug is designed to be attached to sensor assemblies. Jack options – for customer wiring – should only be specified if plug option is also included. Cable clamp is included for both plug and jack options.) |  |
| PJ10  | Standard plug, rated to 177°C (350°F)            |
| PJ20  | Standard jack, rated to 177°C (350°F)            |
| PJ30  | Miniature plug, rated to 177°C (350°F)           |
| PJ40  | Miniature jack, rated to 177°C (350°F)           |
| PJ50  | High temp. standard plug, rated to 260°C (500°F) |
| PJ60  | High temp. standard jack, rated to 260°C (500°F) |
| <b>WELD PADS (Style 23I only)</b>   |  |
| WP00  | Horizontal pad/flat                              |
| WP10  | 1" nominal pipe size                             |
| WP15  | 1.5" nominal pipe size                           |
| WP20  | 2" nominal pipe size                             |
| WP25  | 2.5" nominal pipe size                           |
| WP30  | 3" nominal pipe size                             |
| WP35  | 3.5" nominal pipe size                           |
| WP40  | 4" nominal pipe size                             |

## **WASHER WITH LEADWIRE AND ARMOR**

### **How to build a part number:**

To order an Applied Sensor Technologies temperature sensor, select the requirements for the categories listed below and fill in the corresponding boxes with your selection. Don't see exactly what you need? Give us a call!

| SENSOR TYPE | ASSEMBLY STYLE | WASHER SIZE | MATERIAL | CALIBRATION | HOT JUNCTION | SHEATH LENGTH | ARMOR CABLE LENGTH | OPTIONS |
|-------------|----------------|-------------|----------|-------------|--------------|---------------|--------------------|---------|
|             |                |             |          |             |              |               |                    |         |

#### **SENSOR TYPE\***

**GP** – General purpose thermocouple

**MI** – Mineral insulated thermocouple

#### **ASSEMBLY STYLE**

**32 – Washer with leadwire; fiberglass insulated conductors;** fiberglass jacket; armor cable; stainless steel washer thickness 1/4" (0.250); sheath diameter 0.188" only

#### **WASHER SIZE (in inches)**

| FOR BOLT SIZE           | ID    | OD    |
|-------------------------|-------|-------|
| <b>6</b> – 3/16 (0.188) | 0.193 | 0.375 |
| <b>7</b> – 1/4 (0.250)  | 0.255 | 0.500 |
| <b>9</b> – 3/8 (0.375)  | 0.380 | 0.750 |
| <b>10</b> – 1/2 (0.500) | 0.510 | 1.000 |

#### **WASHER AND SHEATH MATERIAL**

**3** – 316 stainless steel

#### **CALIBRATION** Standard limits

**J** – Single J      **JJ** – Dual J

**K** – Single K      **KK** – Dual K

**T** – Single T      **TT** – Dual T

**E** – Single E      **EE** – Dual E

*Special limits are available – consult AST*

#### **HOT JUNCTION**

**G** – Grounded junction

**U** – Ungrounded junction

**SHEATH LENGTH** (Note: maximum L=96" for GP; for MI, lengths over L84 will be shipped coiled unless otherwise specified)

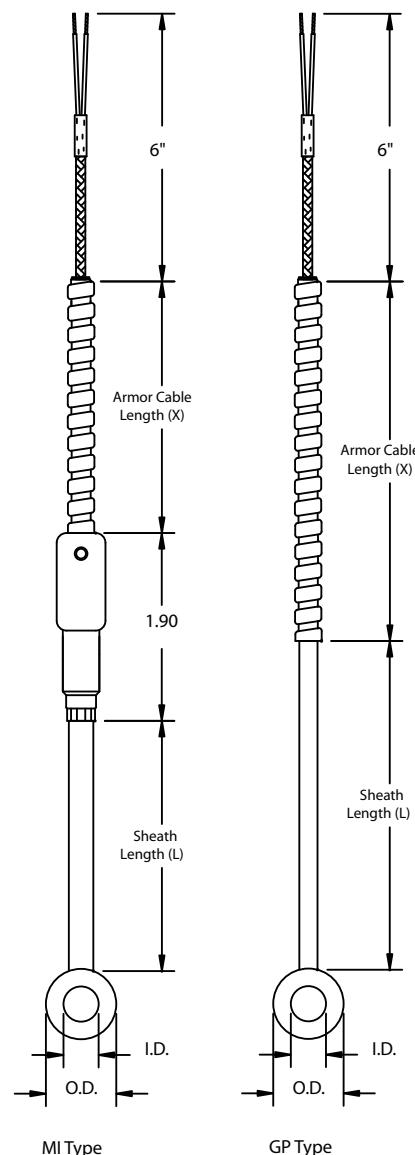
**L#** – (e.g., L6 = 6 inch sheath, L12.5 = 12.5 inch length)

#### **ARMOR CABLE LENGTH**

**X#** – (e.g., X72 = 72 inch length)

#### **OPTIONS** – see page 1-18b

\*Note: GP thermocouples, manufactured using hollow tubing and wire, tend to be lower cost than MI, but cannot be bent in the field and are standardly designed for sensing temperatures below 500°F. MI thermocouples are more rugged than GP due to compacted magnesium-oxide powder insulation, can be bent in the field, and are appropriate for the temperature range of the sensor and sheath.



## STYLE 32

### **AVAILABLE OPTIONS and MODIFICATIONS**

| <b>ASSEMBLY OPTIONS</b> |  |
|-------------------------|--|
| Option Code             | Description  |
| TAG1                    | Stainless steel tag and wire   |
| B90-                    | 90° bend in sheath [specify length from tip in inches e.g., B90-6)           |
| B45-                    | 45° bend in sheath (specify length from tip in inches e.g., B45-6)           |
| CAL1                    | NIST traceable calibration [specify point(s)]                                |
| CRT1                    | Certificate of conformance   |
| HT10                    | High temperature (900°F) transition. (Standard transition rated 500°F/260°C) |

| <b>WIRING CONNECTION OPTIONS</b>  |   |
|---|---|
| Option Code   | Description                                     |
| WC76  | #6 spade terminals, plated copper               |
| WC70  | #10 spade terminals, plated copper              |
| WC84  | 1/4" push-on insulated terminals, plated copper |
| WC90  | #10 ring terminals                              |
| WC98  | #8 ring terminals                               |
| <b>PLUGS AND JACKS</b> (Note: plug is designed to be attached to sensor assemblies. Jack options – for customer wiring – should only be specified if plug option is also included. Cable clamp is included for both plug and jack options.) |   |
| PJ10  | Standard plug, rated to 177°C (350°F)           |
| PJ20  | Standard jack, rated to 177°C (350°F)           |
| PJ30  | Miniature plug, rated to 177°C (350°F)          |
| PJ40  | Miniature jack, rated to 177°C (350°F)          |
| PJ50  | High temp. plug, rated to 260°C (500°F)         |
| PJ60  | High temp. jack, rated to 260°C (500°F)         |
| <b>BX CONNECTORS</b>  |   |
| WC40  | 1/2"  |
| WC50  | 3/4"  |

### **EXTENSION WIRE**

A selection of extension-grade thermocouple wire is available to connect the sensor to its input device. Consult Accessories section.

## **MOUNTING LUG WITH LEADWIRE**

### **How to build a part number:**

To order an Applied Sensor Technologies temperature sensor, select the requirements for the categories listed below and fill in the corresponding boxes with your selection. Don't see exactly what you need? Give us a call!

| SENSOR TYPE | ASSEMBLY STYLE | LUG HOLE SIZE | CALIBRATION | HOT JUNCTION | SHEATH LENGTH | LEADWIRE LENGTH | OPTIONS |
|-------------|----------------|---------------|-------------|--------------|---------------|-----------------|---------|
|             |                |               |             |              |               |                 |         |

#### **SENSOR TYPE**

**GP** – General purpose thermocouple

#### **ASSEMBLY STYLE**

**41F** – Stainless steel mounting lug with fiberglass leadwire; diameter 0.312" only; 500°F max.

**41T** – Stainless steel mounting lug with Teflon® leadwire; diameter 0.312" only; 400°F max.

#### **LUG HOLE SIZE** - diameter of hole (in inches)

**6** – 3/16 (0.188)

**7** – 1/4 (0.250)

**9** – 3/8 (0.375)

#### **CALIBRATION** - Standard limits

**J** – Single J      **JJ** – Dual J

**K** – Single K      **KK** – Dual K

**T** – Single T      **TT** – Dual T

**E** – Single E      **EE** – Dual E

#### **HOT JUNCTION**

**G** – Grounded junction

**U** – Ungrounded junction

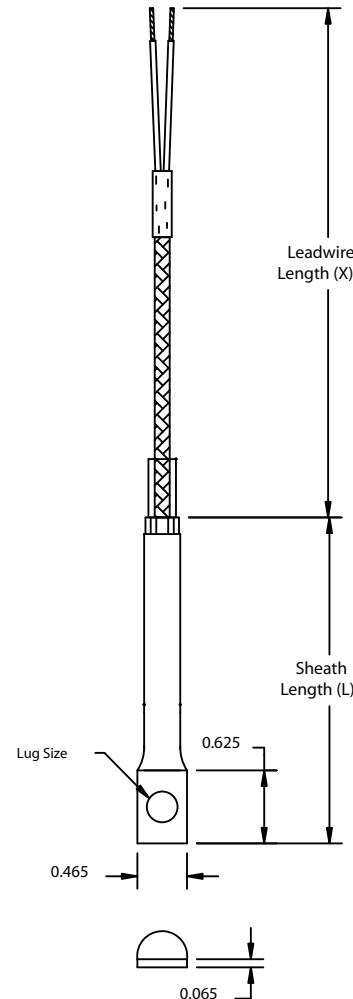
#### **SHEATH LENGTH** (Minimum L=1.75"; maximum L=96")

**L#** - (e.g., L6 = 6 inch sheath)

#### **LEADWIRE LENGTH**

**X#** - (e.g., X72 = 72 inch length)

#### **OPTIONS** – see page 1-19b



## STYLES 41F & 41T

### AVAILABLE OPTIONS and MODIFICATIONS

| ASSEMBLY OPTIONS |   |
|------------------|---|
| Option Code      | Description                                   |
| TAG1             | Stainless steel tag and wire                  |
| CAL1             | NIST traceable calibration [specify point(s)] |
| CRT1             | Certificate of conformance                    |

| WIRING CONNECTION OPTIONS |   |
|---------------------------|---|
| Option Code               | Description                                     |
| WC76                      | #6 spade terminals, plated copper               |
| WC70                      | #10 spade terminals, plated copper              |
| WC84                      | 1/4" push-on insulated terminals, plated copper |
| WC90                      | #10 ring terminals                              |
| WC98                      | #8 ring terminals                               |

**PLUGS AND JACKS** (Note: plug is designed to be attached to sensor assemblies. Jack options – for customer wiring – should only be specified if plug option is also included. Cable clamp is included for both plug and jack options.)

|      |  |
|------|--|
| PJ10 | Standard plug, rated to 177°C (350°F)            |
| PJ20 | Standard jack, rated to 177°C (350°F)            |
| PJ30 | Miniature plug, rated to 177°C (350°F)           |
| PJ40 | Miniature jack, rated to 177°C (350°F)           |
| PJ50 | High temp. standard plug, rated to 260°C (500°F) |
| PJ60 | High temp. standard jack, rated to 260°C (500°F) |

### EXTENSION WIRE

A selection of extension-grade thermocouple wire is available to connect the sensor to its input device. Consult Accessories section.

## **ATEX-APPROVED, CONNECTION HEAD WITH WELDED NPT PROCESS CONNECTION**

### **How to build a part number:**

To order an Applied Sensor Technologies temperature sensor, select the requirements for the categories listed below and fill in the corresponding boxes with your selection. Don't see exactly what you need? Give us a call!

| SENSOR TYPE | ASSEMBLY STYLE | SHEATH DIAMETER | SHEATH MATERIAL | CALIBRATION | HOT JUNCTION | SHEATH LENGTH | OPTIONS |
|-------------|----------------|-----------------|-----------------|-------------|--------------|---------------|---------|
|             |                |                 |                 |             |              |               |         |

#### **SENSOR TYPE**

**MI** – Mineral insulated thermocouple

#### **ASSEMBLY STYLE**

##### **22 – Sheath with cast aluminum head and 1/2" NPT welded stainless steel process connection;**

**connection;** head ATEX approved for EEx d IIC; IP66 to 68; screw cover with chain and gasketed o-ring, meets NEMA 4X; ceramic terminal block; 3/4" NPT conduit connection; internal and external ground screws (Note: for spring-loaded fitting, see Style 75 and add optional head).

#### **SHEATH DIAMETER** (in inches)

**4** – 1/8 (0.125)

**6** – 3/16 (0.188)

**7** – 1/4 (0.250)

**9** – 3/8 (0.375)

#### **SHEATH MATERIAL**

**3** – 316 stainless steel

**5** – Inconel® 600

#### **CALIBRATION** – Standard limits

**J** – Single J      **JJ** – Dual J

**K** – Single K      **KK** – Dual K

**T** – Single T      **TT** – Dual T

**E** – Single E      **EE** – Dual E

*Special limits are available – consult AST*

#### **HOT JUNCTION**

**G** – Grounded junction

**U** – Ungrounded junction

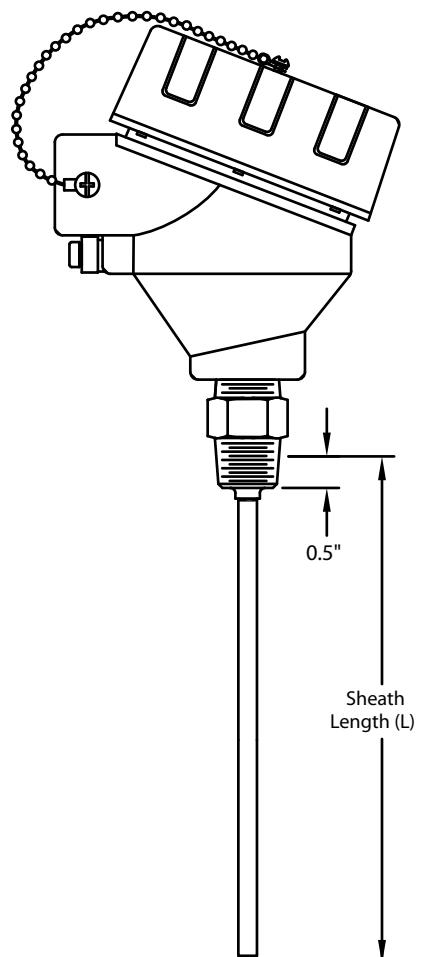
**E** – Exposed junction

(Note: lengths over L84 will be shipped coiled unless otherwise specified at time of order)

#### **SHEATH LENGTH**

**L#** – (e.g., L6 = 6 inch sheath, L12.5 = 12.5 inch length)

#### **OPTIONS** – see page 1-20b



**AVAILABLE OPTIONS and MODIFICATIONS**

| <b>TERMINAL HEAD OPTION</b>  |   |                    |
|--|---|--------------------|
| Same specification as standard head                                |   |                    |
| Option Code  | Process Connection  | Conduit Connection |
| HD72   | 1/2"  | 1/2"               |
| <b>ASSEMBLY OPTIONS</b>  |   |                    |
| Option Code  | Description   |                    |
| TAG1   | Stainless steel tag and wire  |                    |
| PC25   | 1/4" NPT process connection   |                    |
| PC75   | 3/4" NPT process connection   |                    |
| CAL1   | Calibration, NIST traceable calibration [specify point(s)]  |                    |
| CRT1   | Certificate of conformance  |                    |
| <b>TRANSMITTERS</b> – For complete specs, see Transmitters section |   |                    |
| TR11   | 4-20 mA, 2-wire transmitter, single input, isolated output; specify range and units of measure (e.g., 0-200°C)                                  |                    |
| TR12   | 4-20 mA, 2-wire transmitter, single input, non-isolated output; specify range and units of measure (e.g., 0-200°C) and terminal head with *.    |                    |
| TR13   | HART®/ 4-20 mA, 2-wire transmitter, single input, isolated output; specify range and units of measure (e.g., 0-200°C) and terminal head with *. |                    |

## **NOBLE METAL THERMOCOUPLE WITH SECONDARY PROTECTION TUBE & MOUNTING COLLAR**

### **How to build a part number:**

To order an Applied Sensor Technologies temperature sensor, select the requirements for the categories listed below and fill in the corresponding boxes with your selection. Don't see exactly what you need? Give us a call!

| SENSOR TYPE | STYLE | PROTECTION TUBE CONFIGURATION | CALIBRATION | WIRE GAUGE | BEAD MATERIAL | OUTER PROTECTION TUBE LENGTH | OPTIONS |
|-------------|-------|-------------------------------|-------------|------------|---------------|------------------------------|---------|
|             |       |                               |             |            |               |                              |         |

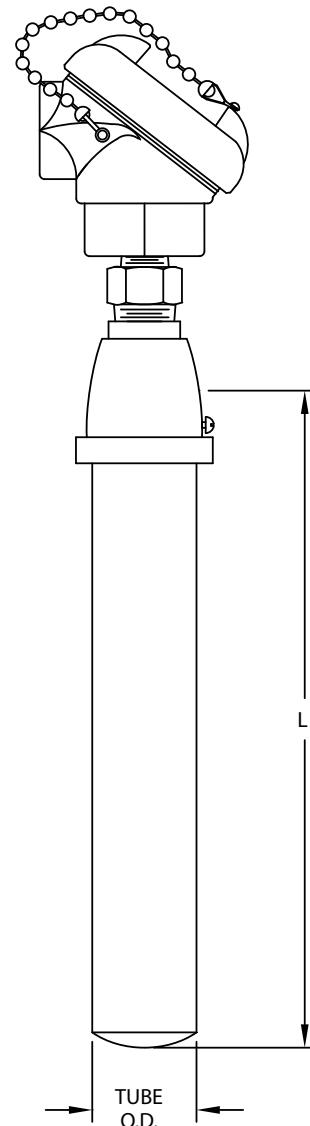
#### **SENSOR TYPE**

**BTC** – Beaded construction

#### **STYLE**

##### **81C – Noble metal element with primary and secondary protection tubes;**

mounting collar process attachment; NEMA 4 aluminum terminal head and ceramic terminal block; 3/4" NPT conduit connection; gasketed screw cover with stainless steel chain



#### **PROTECTION TUBE CONFIGURATION**

(e.g., **9CA** = 1.75" O.D. silicon carbide protection tube with collar and alumina inner protection tube)

##### Outer protection tube diameter

**9** - 1-3/4" O.D.

##### Outer protection tube material

**C** - Silicon carbide, oxide bonded\*

\* Other grades of silicon carbide available upon request. Consult AST.

##### Inner protection tube material

**A** - Alumina (98.8% aluminum oxide)

**M** - Mullite (not recommended over 1200°C)

#### **Dual junctions**

**RR**

**SS**

**BB**

#### **CALIBRATION**

##### **Single junction**

**R** – Platinum and Platinum/13% Rhodium

**S** – Platinum and Platinum/10% Rhodium

**B** – Platinum/6% Rhodium and Platinum/30% Rhodium

#### **WIRE GAUGE**

**24** – 24 AWG

#### **BEAD MATERIAL**

**A** – Alumina beads (0.125" OD for single junction, 0.188" for dual)

#### **OUTER PROTECTION TUBE LENGTH**

**L#** – (e.g., L12 = 12" outer protection tube length)

**OPTIONS** – see page 1-21b

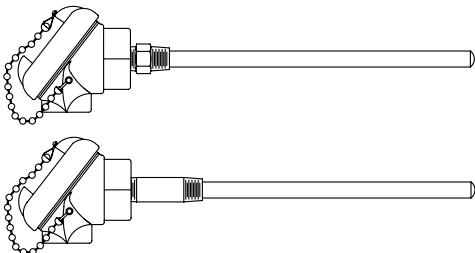
## STYLE 81C

### TERMINAL HEAD OPTIONS

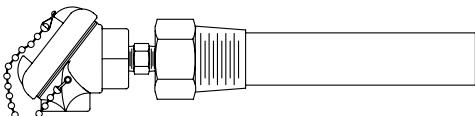
| ASSEMBLY OPTIONS |  |
|------------------|--|
| Option Code      | Description  |
| TAG1             | Stainless steel tag and wire   |
| CAL1             | NIST traceable calibration [specify point(s)]  |
| CRT1             | Certificate of conformance   |
| WC20             | Wiring cable gland for 0.187 - 0.312 diameter cables, for terminal heads with 1/2" NPT conduit connections |
| WC21             | Wiring cable gland for 0.125 - 0.187 diameter cables, for terminal heads with 1/2" NPT conduit connections |
| HW10             | Split flange for mounting  |

For additional Noble Metal Thermocouple styles, see:

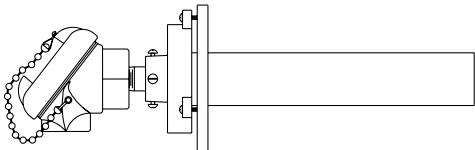
**Style 81N** – Single, primary protection tube only



**Style 81B** – Secondary tube with mounting bushing



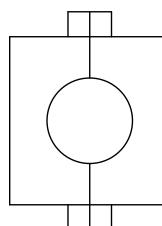
**Style 81F** – Secondary tube with mounting flange



**Style 51** – Replacement Sensor



| NEMA 4 OR 4X TERMINAL HEAD OPTIONS                          |  |                    |                    |
|---|--|--------------------|--------------------|
| Head without ground screw                                   | Head with internal ground screw  | Process Connection | Conduit Connection |
| Cast aluminum, screw cover with chain, NEMA 4               |  |                    |                    |
| HD10*   | HD11*  | 1/2"               | 1/2"               |
| Std.*   | HD13*  | 1/2"               | 3/4"               |
| Epoxy-coated aluminum, screw cover with chain, NEMA 4X      |  |                    |                    |
| HD50*   | HD51*  | 1/2"               | 1/2"               |
| HD52*   | HD53*  | 1/2"               | 3/4"               |
| Cast iron, screw cover with chain, NEMA 4                   |  |                    |                    |
| HD20*   | HD21*  | 1/2"               | 1/2"               |
| HD22*   | HD23*  | 1/2"               | 3/4"               |
| 316 stainless steel, screw cover with chain, NEMA 4X        |  |                    |                    |
| HD40*   | HD41*  | 1/2"               | 3/4"               |
| White polypropylene, screw cover with chain, NEMA 4         |  |                    |                    |
| HD30  | N/A  | 1/2"               | 3/4"               |
| Black polypropylene, screw cover with chain, NEMA 4         |  |                    |                    |
| HD31  | N/A  | 1/2"               | 3/4"               |
| Nylon, screw cover  |  |                    |                    |
| HD32  | N/A  | 1/2"               | 1/2"               |
| *can be used with transmitters                              |  |                    |                    |
| TRANSMITTERS – For complete specs, see Transmitters section |  |                    |                    |
| TR11  | 4-20 mA, 2-wire transmitter, single input, isolated output; specify range, units of measure (e.g., 0-200°C) and optional terminal head with *.   |                    |                    |
| TR12  | 4-20 mA, 2-wire transmitter, single input, non-isolated output; specify range and units of measure (e.g., 0-200°C) and terminal head with *.     |                    |                    |
| TR13  | HART® / 4-20 mA, 2-wire transmitter, single input, isolated output; specify range and units of measure (e.g., 0-200°C) and terminal head with *. |                    |                    |



Split flange option HW10

**Notes:**

- Applied Sensor Technologies recommends alumina protection tubes when using platinum thermocouples. Mullite, although less expensive when compared to alumina, can contaminate the platinum, causing drift.
- In many cases platinum thermocouples can be recycled, thereby reducing the long-term overall cost. Please contact Applied Sensor Technologies for further information.
- Applied Sensor Technologies offers many other temperatures sensor designs and technologies, including base metal thermocouples, RTDs, thermistors and Integrated Circuit chips, along with a full line of accessory items such as thermowell, transmitters, etc. Please visit our website or contact us for further information.

## **BEADED REPLACEMENT ELEMENT FOR BASE-METAL THERMOCOUPLES**

### **How to build a part number:**

To order an Applied Sensor Technologies temperature sensor, select the requirements for the categories listed below and fill in the corresponding boxes with your selection. Don't see exactly what you need? Give us a call!

| SENSOR TYPE | ASSEMBLY STYLE | WIRE GAUGE | BEAD SHAPE | CALIBRATION | HOT JUNCTION | INSULATOR MATERIAL | BEAD LENGTH | LEADWIRE LENGTH |
|-------------|----------------|------------|------------|-------------|--------------|--------------------|-------------|-----------------|
|             |                |            |            |             |              |                    |             |                 |

#### **SENSOR TYPE**

**BTC** – Beaded thermocouple

#### **ASSEMBLY STYLE**

**50** – Replacement element for beaded base-metal thermocouple styles (such as Style 80)

#### **WIRE GAUGE**

**08** – 0.128" diameter (K and KK calibrations only)

**14** – 0.064" diameter

#### **BEAD SHAPE**

**R** – Round

#### **CALIBRATION**

|                     |                    |
|---------------------|--------------------|
| <b>J</b> – Single J | <b>JJ</b> – Dual J |
| <b>K</b> – Single K | <b>KK</b> – Dual K |

#### **HOT JUNCTION**

**U** – Ungrounded junction

**E** – Exposed junction

**TE** – Twisted, exposed junction

#### **INSULATOR MATERIAL**

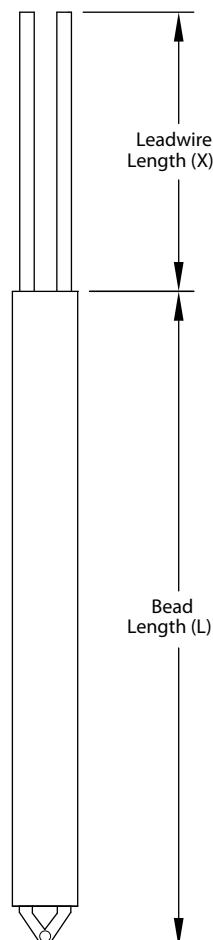
**M** – Mullite

#### **BEAD LENGTH** (length of insulator + junction)

**L#** – (e.g., L12=12" insulator, including junction end)

#### **LEADWIRE EXTENSION LENGTH** (length of wires at cold end)

**X#** – (e.g., X3=3" leadwire extension)

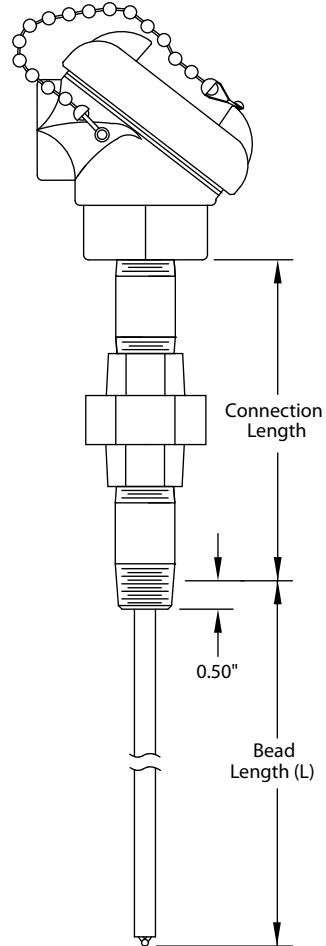


## STYLE 50



Applied Sensor Technologies offers a wide variety of constructions using the Style 50 element. Many are based on the common Style 80 shown at the right. Many others are available to meet your requirements.

Give us a call!



## **BEADED REPLACEMENT ELEMENT FOR NOBLE-METAL THERMOCOUPLES**

### **How to build a part number:**

To order an Applied Sensor Technologies temperature sensor, select the requirements for the categories listed below and fill in the corresponding boxes with your selection. Don't see exactly what you need? Give us a call!

| SENSOR TYPE | ASSEMBLY STYLE | WIRE GAUGE | BEAD SHAPE | CALIBRATION | HOT JUNCTION | INSULATOR MATERIAL | BEAD LENGTH | LEADWIRE LENGTH |
|-------------|----------------|------------|------------|-------------|--------------|--------------------|-------------|-----------------|
|             |                |            |            |             |              |                    |             |                 |

#### **SENSOR TYPE**

**BTC** – Beaded thermocouple

#### **ASSEMBLY STYLE**

**51** – Replacement element for beaded noble-metal thermocouple styles (such as Style 81)

#### **WIRE GAUGE**

**24** – 0.020" diameter

#### **BEAD SHAPE**

**R** – Round

#### **CALIBRATION**

|                     |                    |
|---------------------|--------------------|
| <b>R</b> – Single R | <b>RR</b> – Dual R |
| <b>S</b> – Single S | <b>SS</b> – Dual S |
| <b>B</b> – Single B | <b>BB</b> – Dual B |

#### **HOT JUNCTION**

**E** – Exposed junction

#### **INSULATOR MATERIAL**

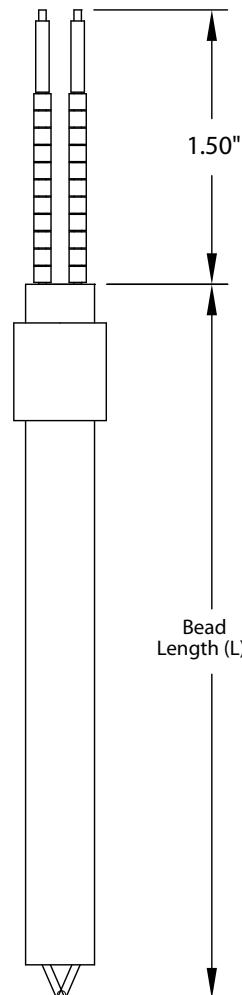
**A** – Alumina

#### **BEAD LENGTH** (length of insulator + junction)

**L#** – (e.g., L12=12" insulator, including junction end)

#### **LEADWIRE EXTENSION LENGTH** (length of wires at cold end)

**X#** – (e.g., X3=3" leadwire extension)

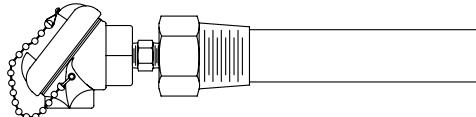


## STYLE 51

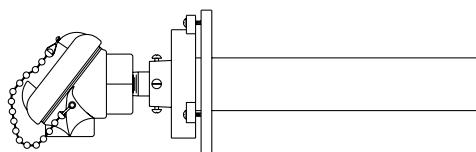


For additional Noble Metal Thermocouple styles, see:

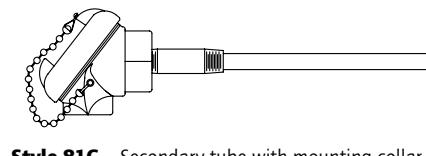
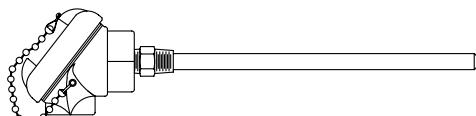
**Style 81B** – Secondary tube with mounting bushing



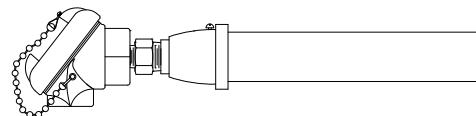
**Style 81F** – Secondary tube with mounting flange



**Style 81N** – Single, primary protection tube only



**Style 81C** – Secondary tube with mounting collar



Applied Sensor Technologies offers a wide variety of constructions using the Style 51 element. Some of the more common Styles are listed at the right. Many others are available to meet your requirements.

Give us a call!

## **CONNECTION HEAD WITH BEADED THERMOCOUPLE AND MOUNTING HARDWARE**

### **How to build a part number:**

To order an Applied Sensor Technologies temperature sensor, select the requirements for the categories listed below and fill in the corresponding boxes with your selection. Don't see exactly what you need? Give us a call!

| SENSOR TYPE | ASSEMBLY STYLE | CONNECTION | CONNECTION LENGTH | WIRE GAUGE | BEAD SHAPE | CALIBRATION | HOT JUNCTION | INSULATOR MATERIAL | BEAD LENGTH | OPTIONS |
|-------------|----------------|------------|-------------------|------------|------------|-------------|--------------|--------------------|-------------|---------|
|             |                |            |                   |            |            |             |              |                    |             |         |

#### **SENSOR TYPE**

**BTC** – Beaded thermocouple

#### **ASSEMBLY STYLE**

**80** – Sheath with cast aluminum head and beaded base-metal thermocouple; head conforms to NEMA 4 requirements; 3/4" NPT conduit connection; ceramic terminal block; 1/2" NPT carbon steel process connection; gasketed screw cover with stainless steel chain; maximum head temperature 100°C

#### **CONNECTION**

**H** – Head only, no mounting hardware; 1/2" NPT (female) instrument connection

**N** – 1/2" NPT carbon steel nipple

**NU** – 1/2" NPT carbon steel nipple and union

**NUN** – 1/2" NPT carbon steel nipple, union and nipple

Add suffix "**1S**" for 304 stainless steel

Add suffix "**2S**" for 316 stainless steel

See chart below for restrictions

#### **CONNECTION LENGTH**

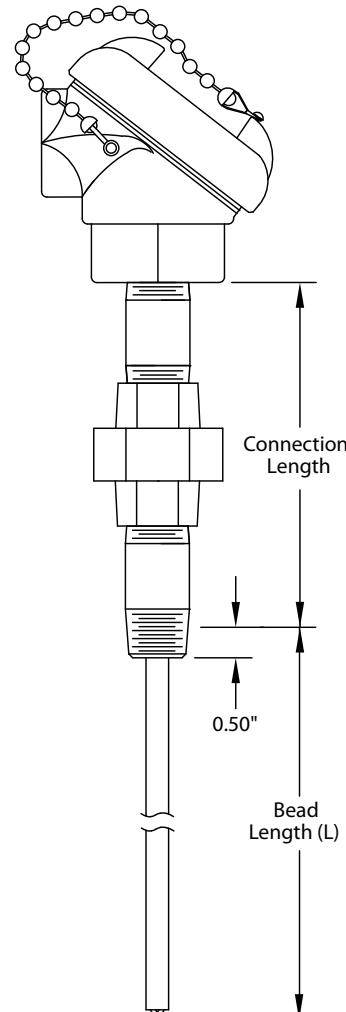
**###** (e.g., 006 = 6 inch)

(See chart below for standard available lengths)

| STANDARD AVAILABLE CONNECTION LENGTHS |      |        |
|---------------------------------------|------|--------|
| N                                     | NU   | NUN    |
| N/A                                   | 2.00 | 2.50   |
| 0.50                                  | 2.50 | 3.00 * |
| 1.00                                  | 3.00 | 4.00 * |
| 1.50                                  | 3.50 | 5.00   |
| 2.00                                  | 4.00 | 6.00 * |
| 3.00                                  | 5.00 | 8.00   |
| 5.00                                  | 7.00 | 12.00  |
| 6.00                                  | 8.00 | 14.00  |

\* NUN 2S OPTION AVAILABLE IN THESE LENGTHS ONLY.

DIMENSIONS ARE GIVEN IN INCHES



#### **WIRE GAUGE**

**14** – 0.064" diameter

**08** – 0.128" diameter (*K & KK calibrations only*)

#### **BEAD SHAPE**

**R** – Round

#### **CALIBRATION** – Standard limits

**J** – Single J

**JJ** – Dual J

**K** – Single K

**KK** – Dual K

#### **HOT JUNCTION**

**E** – Exposed junction

**TE** – Twisted exposed

#### **INSULATOR MATERIAL**

**M** – Mullite

#### **BEAD LENGTH**

**L#** – (e.g., L6 = 6 inch sheath, L12.5 = 12.5 inch length)

**OPTIONS** – see page 1-24b

## STYLE 80

### AVAILABLE OPTIONS and MODIFICATIONS

| ASSEMBLY OPTIONS |  |
|------------------|--|
| Option Code      | Description  |
| TAG1             | Stainless steel tag and wire   |
| CAL1             | NIST traceable calibration [specify point(s)]  |
| CRT1             | Certificate of conformance   |
| WC20             | Wiring cable gland for 0.187 - 0.312 diameter cables, for terminal heads with 1/2" NPT conduit connections |
| WC21             | Wiring cable gland for 0.125 - 0.187 diameter cables, for terminal heads with 1/2" NPT conduit connections |

| NEMA 4 OR 4X TERMINAL HEAD OPTIONS                     |                                 |                    |                    |
|--|---------------------------------|--------------------|--------------------|
| Head without ground screw                              | Head with internal ground screw | Process Connection | Conduit Connection |
| Cast aluminum, screw cover with chain, NEMA 4          |                                 |                    |                    |
| HD10   | HD11                            | 1/2"               | 1/2"               |
| Std.   | HD13                            | 1/2"               | 3/4"               |
| Epoxy-coated aluminum, screw cover with chain, NEMA 4X |                                 |                    |                    |
| HD50   | HD51                            | 1/2"               | 1/2"               |
| HD52   | HD53                            | 1/2"               | 3/4"               |
| Cast iron, screw cover with chain, NEMA 4              |                                 |                    |                    |
| HD20   | HD21                            | 1/2"               | 1/2"               |
| HD22   | HD23                            | 1/2"               | 3/4"               |
| 316 stainless steel, screw cover with chain, NEMA 4X   |                                 |                    |                    |
| HD40   | HD41                            | 1/2"               | 3/4"               |

Notes:

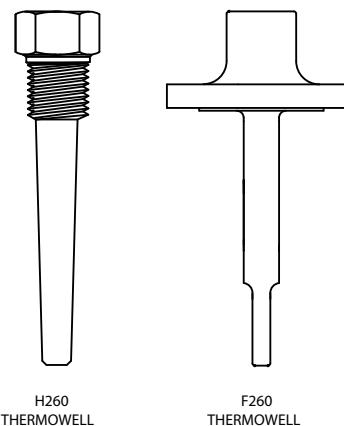
- See Accessories for additional information

### **EXTENSION WIRE**

A selection of extension-grade thermocouple wire is available to connect the sensor to its input device. Consult Accessories section.

### **THERMOWELLS & PROTECTION TUBES**

For a complete offering of metal, ceramic and composite material thermowells and protection tubes, please see the Thermowell and Protection Tube sections.



### **REPLACEMENT ELEMENT** – see Style 50

**Style 50** – Beaded replacement for base-metal thermocouple



## **NEMA 4 CONNECTION HEAD WITH WELDED PROCESS CONNECTION**

### **How to build a part number:**

To order an Applied Sensor Technologies temperature sensor, select the requirements for the categories listed below and fill in the corresponding boxes with your selection. Don't see exactly what you need? Give us a call!

| SENSOR TYPE | ASSEMBLY STYLE | SHEATH DIAMETER | SHEATH MATERIAL | TEMPERATURE RANGE | SHEATH LENGTH | OPTIONS |
|-------------|----------------|-----------------|-----------------|-------------------|---------------|---------|
|             |                |                 |                 |                   |               |         |

#### **SENSOR TYPE** (See page 2-1b for optional elements)

**RTP1** – Platinum; DIN 0.00385; 100 ohm +/- 0.12% @ 0°C; 3-wire construction (**For dual element, add prefix "D", e.g., DRTP1**)

#### **ASSEMBLY STYLE**

**15** – Sheath with cast aluminum head and 1/2" NPT welded stainless steel process connection; head conforms to NEMA 4 requirements; 3/4" NPT conduit connection; ceramic terminal block; gasketed screw cover with stainless steel chain

#### **SHEATH DIAMETER** (in inches) (see below for restrictions)

- 4** – 1/8 (0.125)
- 6** – 3/16 (0.188)
- 7** – 1/4 (0.250)
- 9** – 3/8 (0.375)

#### **SHEATH MATERIAL**

- 3** – 316 stainless steel

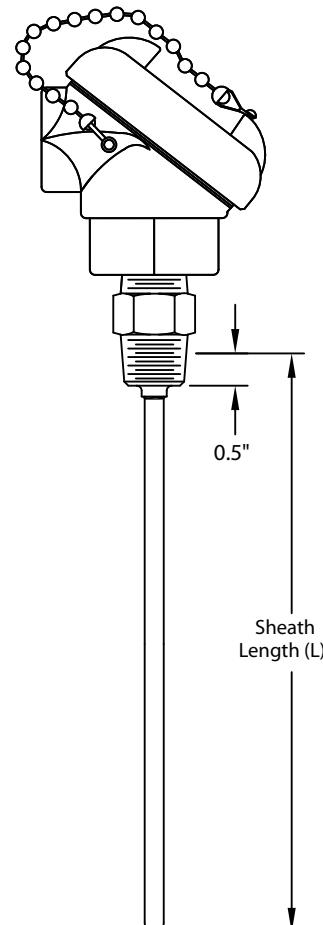
#### **TEMPERATURE RANGE** - Minimum and maximum operating temperatures

- 1** – -45 to 260°C (-50 to 500°F)
- 2** – -45 to 482°C (-50 to 900°F)
- 3** – -45 to 788°C (-50 to 1450°F)
- 4** – -200 to 260°C (-328 to 500°F)

#### **SHEATH LENGTH** (for lengths greater than L=36", consult AST)

- L#** – (e.g., L6 = 6 inch sheath)

#### **OPTIONS** – see page 2-1b



| Smallest Diameter Sheath Available By Sensor Type and Temperature Range |        |         |          |        |        |         |          |
|---|--------|---------|----------|--------|--------|---------|----------|
| SINGLE  |        |         |          |        |        |         |          |
| Temp Range  | RTP 1  | RTP 1A  | RTP 1AA  | RTP 6  | RTP 7  | RTP 7A  | RTP 7AA  |
| 1   | 1/8    | 1/8     | 1/8      | 1/8    | 3/16   | 3/16    | 3/16     |
| 2   | 3/16   | 3/16    | 3/16     | 3/16   | 3/16   | 3/16    | 3/16     |
| 3   | 3/16   |         |          | 3/16   | 3/16   |         |          |
| 4   | 1/8    |         |          | 1/8    | 3/16   |         |          |
| DUAL  |        |         |          |        |        |         |          |
| Temp Range  | DRTP 1 | DRTP 1A | DRTP 1AA | DRTP 6 | DRTP 7 | DRTP 7A | DRTP 7AA |
| 1   | 3/16   | 3/16    | 3/16     | 3/16   |        |         |          |
| 2   | 1/4    | 1/4     | 1/4      | 3/16   |        |         |          |
| 3   | 1/4    |         |          | 1/4    |        |         |          |
| 4   | 3/16   |         |          | 3/16   |        |         |          |

## STYLE 15

### AVAILABLE OPTIONS and MODIFICATIONS

| <b>OPTIONAL ELEMENTS</b>  |   |               |
|---|---|---------------|
| RTDs are standardly platinum, 100-ohm, DIN-curve elements with a 0.00385 alpha.   |   |               |
| Option Code   | Accuracy (at 0°C)   | Construction  |
| RTP1 (std.)   | ±0.12%  | 3-wire        |
| RTP1A   | <b>±0.06%</b>   | 3-wire        |
| RTP1AA  | <b>±0.01%</b>   | 3-wire        |
| RTP6  | ±0.12%  | <b>2-wire</b> |
| RTP7  | ±0.12%  | <b>4-wire</b> |
| RTP7A   | <b>±0.06%</b>   | <b>4-wire</b> |
| RTP7AA  | <b>±0.01%</b>   | <b>4-wire</b> |
| Notes:  |   |               |
| 1. For dual element, add prefix "D" (e.g., DRTP6)<br>2. Additional materials, curves and resistance values are available - see Capabilities brochure. |   |               |
| <b>ASSEMBLY OPTIONS</b>   |   |               |
| Option Code   | Description   |               |
| TAG1  | Stainless steel tag and wire  |               |
| CAL1  | NIST traceable calibration [specify point(s)]   |               |
| CRT1  | Certificate of conformance  |               |
| WC20  | Wiring cable gland for 0.187 - 0.312 diameter cables, for terminal heads with 1/2" NPT conduit connections                                      |               |
| WC21  | Wiring cable gland for 0.125 - 0.187 diameter cables, for terminal heads with 1/2" NPT conduit connections                                      |               |
| <b>TRANSMITTERS</b> – For complete specs, see Transmitters section  |   |               |
| TR11  | 4-20 mA, 2-wire transmitter, single input, isolated output; specify range, units of measure (e.g., 0-200°C) and optional terminal head with *.  |               |
| TR12  | 4-20 mA, 2-wire transmitter, single input, non-isolated output; specify range and units of measure (e.g., 0-200°C) and terminal head with *.    |               |
| TR13  | HART®/ 4-20 mA, 2-wire transmitter, single input, isolated output; specify range and units of measure (e.g., 0-200°C) and terminal head with *. |               |

| <b>NEMA 4 OR 4X TERMINAL HEAD OPTIONS</b>              |                                 |                    |                    |
|--|---------------------------------|--------------------|--------------------|
| Head without ground screw                              | Head with internal ground screw | Process Connection | Conduit Connection |
| Cast aluminum, screw cover with chain, NEMA 4          |                                 |                    |                    |
| HD10*  | HD11*                           | 1/2"               | 1/2"               |
| Std.*  | HD13*                           | 1/2"               | 3/4"               |
| Epoxy-coated aluminum, screw cover with chain, NEMA 4X |                                 |                    |                    |
| HD50*  | HD51*                           | 1/2"               | 1/2"               |
| HD52*  | HD53*                           | 1/2"               | 3/4"               |
| Cast iron, screw cover with chain, NEMA 4              |                                 |                    |                    |
| HD20*  | HD21*                           | 1/2"               | 1/2"               |
| HD22*  | HD23*                           | 1/2"               | 3/4"               |
| 316 stainless steel, screw cover with chain, NEMA 4X   |                                 |                    |                    |
| HD40*  | HD41*                           | 1/2"               | 3/4"               |
| White polypropylene, screw cover with chain, NEMA 4    |                                 |                    |                    |
| HD30   | N/A                             | 1/2"               | 3/4"               |
| Black polypropylene, screw cover with chain, NEMA 4    |                                 |                    |                    |
| HD31   | N/A                             | 1/2"               | 3/4"               |
| Nylon, screw cover                                     |                                 |                    |                    |
| HD32   | N/A                             | 1/2"               | 1/2"               |

\*can be used with transmitters

Notes:

1. See Accessories for additional information
2. For former Style 16, use option HD20
3. For former Style 29, use option HD32

## **NEMA 4 CONNECTION HEAD WITH SPRING-LOADED ASSEMBLY AND MOUNTING HARDWARE**

### **How to build a part number:**

To order an Applied Sensor Technologies temperature sensor, select the requirements for the categories listed below and fill in the corresponding boxes with your selection. Don't see exactly what you need? Give us a call!

| SENSOR TYPE | ASSEMBLY STYLE | CONNECTION | CONNECTION LENGTH | SHEATH DIAMETER | SHEATH MATERIAL | TEMPERATURE RANGE | SHEATH LENGTH | OPTIONS |
|-------------|----------------|------------|-------------------|-----------------|-----------------|-------------------|---------------|---------|
|             |                |            |                   |                 |                 |                   |               |         |

#### **SENSOR TYPE** (See page 2-2b for optional elements)

**RTP1** – Platinum; DIN 0.00385; 100 ohm +/- 0.12% @ 0°C; 3-wire construction  
(For dual element, add prefix "D"- e.g., **DRTP1**)

#### **ASSEMBLY STYLE**

**45** – Sheath with cast aluminum head; spring-loaded in head; conforms to NEMA 4 requirements; 3/4" NPT conduit connection; ceramic terminal block; 1/2" NPT process connection; gasketed screw cover with stainless steel chain

#### **CONNECTION**

**H** – Head only; 1/2" NPT (female) instrument connection

**N** – 1/2" NPT carbon steel nipple only

**NU** – 1/2" NPT carbon steel nipple and union

**NUN** – 1/2" NPT carbon steel nipple, union and nipple

Add suffix "**1S**" for 304 stainless steel

Add suffix "**2S**" for 316 stainless steel

See chart below for restrictions

#### **CONNECTION LENGTH**

**###** – (e.g., 006 = 6 inch)

See chart below for standard available lengths

#### **SHEATH DIAMETER** (in inches) (see below for restrictions)

**4** – 1/8 (0.125)

**6** – 3/16 (0.188)

**7** – 1/4 (0.250)

**9** – 3/8 (0.375)

#### **SHEATH MATERIAL**

**3** – 316 stainless steel

#### **TEMPERATURE RANGE** - Minimum and maximum operating temperatures

**1** – -45 to 260°C (-50 to 500°F)

**2** – -45 to 482°C (-50 to 900°F)

**3** – -45 to 788°C (-50 to 1450°F)

**4** – -200 to 260°C (-328 to 500°F)

#### **SHEATH LENGTH** (for lengths greater than L=36", consult AST)

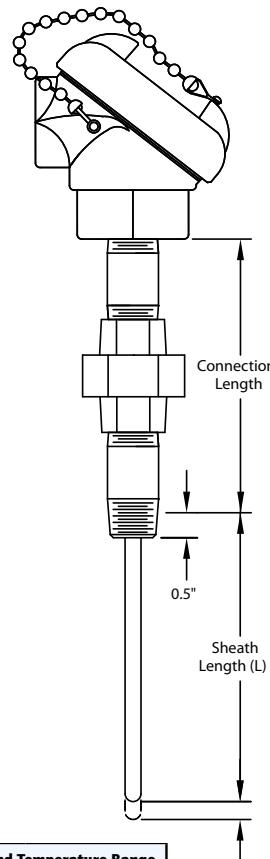
**L#** – (e.g., L6 = 6 inch sheath)

#### **OPTIONS** – see page 2-2b

| STANDARD AVAILABLE CONNECTION LENGTHS |      |        |
|---------------------------------------|------|--------|
| N                                     | NU   | NUN    |
| N/A                                   | 2.00 | 2.50   |
| 0.50                                  | 2.50 | 3.00 * |
| 1.00                                  | 3.00 | 4.00 * |
| 1.50                                  | 3.50 | 5.00   |
| 2.00                                  | 4.00 | 6.00 * |
| 3.00                                  | 5.00 | 8.00   |
| 5.00                                  | 7.00 | 12.00  |
| 6.00                                  | 8.00 | 14.00  |

\* NUN 25 OPTION AVAILABLE IN THESE LENGTHS ONLY.

DIMENSIONS ARE GIVEN IN INCHES



#### **Smallest Diameter Sheath Available By Sensor Type and Temperature Range**

##### **SINGLE**

| Temp Range | RTP 1 | RTP 1A | RTP 1AA | RTP 6 | RTP 7 | RTP 7A | RTP 7AA |
|------------|-------|--------|---------|-------|-------|--------|---------|
| 1          | 1/8   | 1/8    | 1/8     | 1/8   | 3/16  | 3/16   | 3/16    |
| 2          | 3/16  | 3/16   | 3/16    | 3/16  | 3/16  | 3/16   | 3/16    |
| 3          | 3/16  |        |         | 3/16  | 3/16  |        |         |
| 4          | 1/8   |        |         | 1/8   | 3/16  |        |         |

##### **DUAL**

| Temp Range | DRTP 1 | DRTP 1A | DRTP 1AA | DRTP 6 | DRTP 7 | DRTP 7A | DRTP 7AA |
|------------|--------|---------|----------|--------|--------|---------|----------|
| 1          | 3/16   | 3/16    | 3/16     | 3/16   |        |         |          |
| 2          | 1/4    | 1/4     | 1/4      | 3/16   |        |         |          |
| 3          | 1/4    |         |          | 1/4    |        |         |          |
| 4          | 3/16   |         |          | 3/16   |        |         |          |

## STYLE 45

### **AVAILABLE OPTIONS and MODIFICATIONS**

| <b>OPTIONAL ELEMENTS</b>   |  |               |
|--|--|---------------|
| RTDs are standardly platinum, 100-ohm, DIN-curve elements with a 0.00385 alpha.                  |  |               |
| Option Code  | Accuracy (at 0°C)  | Construction  |
| RTP1 (std.)  | ±0.12%   | 3-wire        |
| RTP1A  | <b>±0.06%</b>  | 3-wire        |
| RTP1AA   | <b>±0.01%</b>  | 3-wire        |
| RTP6   | ±0.12%   | <b>2-wire</b> |
| RTP7   | ±0.12%   | <b>4-wire</b> |
| RTP7A  | <b>±0.06%</b>  | <b>4-wire</b> |
| RTP7AA   | <b>±0.01%</b>  | <b>4-wire</b> |
| Notes:   |  |               |
| 1. For dual element, add prefix "D" (e.g., DRTP6)  |  |               |
| 2. Additional materials, curves and resistance values are available - see Capabilities brochure. |  |               |
| <b>ASSEMBLY OPTIONS</b>  |  |               |
| Option Code  | Description  |               |
| TAG1   | Stainless steel tag and wire   |               |
| CAL1   | NIST traceable calibration [specify point(s)]  |               |
| CRT1   | Certificate of conformance   |               |
| WC20   | Wiring cable gland for 0.187 - 0.312 diameter cables, for terminal heads with 1/2" NPT conduit connections |               |
| WC21   | Wiring cable gland for 0.125 - 0.187 diameter cables, for terminal heads with 1/2" NPT conduit connections |               |
| Transmitters: see Style 48   |  |               |

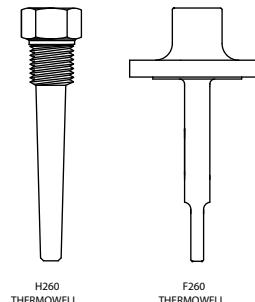
| <b>NEMA 4 OR 4X TERMINAL HEAD OPTIONS</b>              |                                 |                    |                    |
|--|---------------------------------|--------------------|--------------------|
| Head without ground screw                              | Head with internal ground screw | Process Connection | Conduit Connection |
| Cast aluminum, screw cover with chain, NEMA 4          |                                 |                    |                    |
| HD10   | HD11                            | 1/2"               | 1/2"               |
| Std.   | HD13                            | 1/2"               | 3/4"               |
| Epoxy-coated aluminum, screw cover with chain, NEMA 4X |                                 |                    |                    |
| HD50   | HD51                            | 1/2"               | 1/2"               |
| HD52   | HD53                            | 1/2"               | 3/4"               |
| Cast iron, screw cover with chain, NEMA 4              |                                 |                    |                    |
| HD20   | HD21                            | 1/2"               | 1/2"               |
| HD22   | HD23                            | 1/2"               | 3/4"               |
| 316 stainless steel, screw cover with chain, NEMA 4X   |                                 |                    |                    |
| HD40   | HD41                            | 1/2"               | 3/4"               |

Note:

1. For former Style 46, use option HD20

### **THERMOWELLS & PROTECTION TUBES**

For a complete offering of metal, ceramic and composite material thermowells and protection tubes, please see the Thermowell and Protection Tube sections.



**Note: Many non-standard options, including additional sheath diameters and materials, may also be available - consult AST for specific requirements.**

## **EXPLOSION-PROOF CONNECTION HEAD WITH WELDED PROCESS CONNECTION**

### **How to build a part number:**

To order an Applied Sensor Technologies temperature sensor, select the requirements for the categories listed below and fill in the corresponding boxes with your selection. Don't see exactly what you need? Give us a call!

| SENSOR TYPE | ASSEMBLY STYLE | SHEATH DIAMETER | SHEATH MATERIAL | TEMPERATURE RANGE | SHEATH LENGTH | OPTIONS |
|-------------|----------------|-----------------|-----------------|-------------------|---------------|---------|
|             |                |                 |                 |                   |               |         |

**SENSOR TYPE** (See page 2-3b for optional elements)

**RTP1** – Platinum; DIN 0.00385; 100 ohm +/- 0.12% @ 0°C; 3-wire construction

(For dual element, add prefix "D" - e.g., **DRTP1**)

### **ASSEMBLY STYLE**

**78** – Sheath with **cast aluminum head** and 1/2" NPT welded stainless steel process connection; head CSA/FM approved for Class I, Division I, Groups B, C, D; Class II, Groups E, F, G; screw cover with chain and gasketed o-ring; meets NEMA 4; ceramic terminal block; 1/2" NPT conduit connection

### **SHEATH DIAMETER** (in inches) (see below for restrictions)

**4** – 1/8 (0.125)

**6** – 3/16 (0.188)

**7** – 1/4 (0.250)

**9** – 3/8 (0.375)

### **SHEATH MATERIAL**

**3** – 316 stainless steel

### **TEMPERATURE RANGE** - Minimum and maximum operating temperatures

**1** – -45 to 260°C (-50 to 500°F)

**2** – -45 to 482°C (-50 to 900°F)

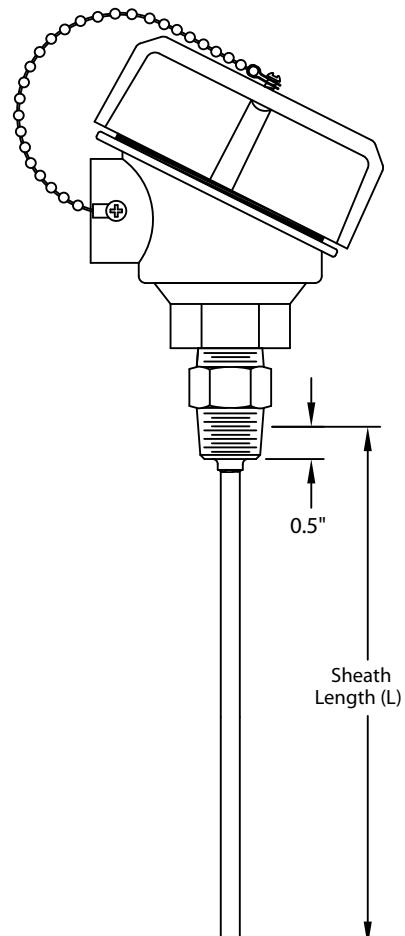
**3** – -45 to 788°C (-50 to 1450°F)

**4** – -200 to 260°C (-328 to 500°F)

### **SHEATH LENGTH** (for lengths greater than L=36", consult AST)

**L#** – (e.g., L6 = 6 inch sheath)

### **OPTIONS** – see page 2-3b



| Smallest Diameter Sheath Available By Sensor Type and Temperature Range |        |         |          |        |        |         |          |
|---|--------|---------|----------|--------|--------|---------|----------|
| SINGLE  |        |         |          |        |        |         |          |
| Temp Range  | RTP 1  | RTP 1A  | RTP 1AA  | RTP 6  | RTP 7  | RTP 7A  | RTP 7AA  |
| 1   | 1/8    | 1/8     | 1/8      | 1/8    | 3/16   | 3/16    | 3/16     |
| 2   | 3/16   | 3/16    | 3/16     | 3/16   | 3/16   | 3/16    | 3/16     |
| 3   | 3/16   |         |          | 3/16   | 3/16   |         |          |
| 4   | 1/8    |         |          | 1/8    | 3/16   |         |          |
| DUAL  |        |         |          |        |        |         |          |
| Temp Range  | DRTP 1 | DRTP 1A | DRTP 1AA | DRTP 6 | DRTP 7 | DRTP 7A | DRTP 7AA |
| 1   | 3/16   | 3/16    | 3/16     | 3/16   |        |         |          |
| 2   | 1/4    | 1/4     | 1/4      | 3/16   |        |         |          |
| 3   | 1/4    |         |          | 1/4    |        |         |          |
| 4   | 3/16   |         |          | 3/16   |        |         |          |

## STYLE 78

### AVAILABLE OPTIONS and MODIFICATIONS

| OPTIONAL ELEMENTS   |   |               |
|---|---|---------------|
| RTDs are standardly platinum, 100-ohm, DIN-curve elements with a 0.00385 alpha.   |   |               |
| Option Code   | Accuracy (at 0°C)   | Construction  |
| RTP1 (std.)   | ±0.12%  | 3-wire        |
| RTP1A   | <b>±0.06%</b>   | 3-wire        |
| RTP1AA  | <b>±0.01%</b>   | 3-wire        |
| RTP6  | ±0.12%  | <b>2-wire</b> |
| RTP7  | ±0.12%  | <b>4-wire</b> |
| RTP7A   | <b>±0.06%</b>   | <b>4-wire</b> |
| RTP7AA  | <b>±0.01%</b>   | <b>4-wire</b> |
| Notes:  |   |               |
| 1. For dual element, add prefix "D" (e.g., DRTP6)<br>2. Additional materials, curves and resistance values are available - see Capabilities brochure. |   |               |
| ASSEMBLY OPTIONS  |   |               |
| Option Code   | Description   |               |
| TAG1  | Stainless steel tag and wire  |               |
| PC25  | 1/4" NPT process connection   |               |
| PC75  | 3/4" NPT process connection   |               |
| CAL1  | Calibration, NIST traceable calibration [specify point(s)]  |               |
| CRT1  | Certificate of conformance  |               |
| TRANSMITTERS – For complete specs, see Transmitters section   |   |               |
| TR11  | 4-20 mA, 2-wire transmitter, single input, isolated output; specify range and units of measure (e.g., 0-200°C)                                  |               |
| TR12  | 4-20 mA, 2-wire transmitter, single input, non-isolated output; specify range and units of measure (e.g., 0-200°C) and terminal head with *.    |               |
| TR13  | HART®/ 4-20 mA, 2-wire transmitter, single input, isolated output; specify range and units of measure (e.g., 0-200°C) and terminal head with *. |               |

| EXPLOSION-PROOF TERMINAL HEAD OPTIONS  |                    |                    |
|--|--------------------|--------------------|
| Option Code  | Process Connection | Conduit Connection |
| Cast aluminum; screw cover with chain; o-ring gasket (Gasket rated to 100°C exposure); ceramic terminal block; FM/CSA approved for Class I Div. 1, Groups B, C and D; Class II Groups E, F and G; internal ground screw. |                    |                    |
| HD71   | 1/2"               | 3/4"               |
| Stainless steel (same specs as HD71)   |                    |                    |
| HD74   | 1/2"               | 1/2"               |
| HD75   | 1/2"               | 3/4"               |
| Epoxy-coated (same specs as HD71)  |                    |                    |
| HD80   | 1/2"               | 1/2"               |
| HD81   | 1/2"               | 3/4"               |

Note: See Accessories section for additional specs.

## **EXPLOSION-PROOF CONNECTION HEAD WITH SPRING-LOADED ASSEMBLY AND MOUNTING HARDWARE**

### **How to build a part number:**

To order an Applied Sensor Technologies temperature sensor, select the requirements for the categories listed below and fill in the corresponding boxes with your selection. Don't see exactly what you need? Give us a call!

| SENSOR TYPE | ASSEMBLY STYLE | CONNECTION | CONNECTION LENGTH | SHEATH DIAMETER | SHEATH MATERIAL | TEMPERATURE RANGE | SHEATH LENGTH | OPTIONS |
|-------------|----------------|------------|-------------------|-----------------|-----------------|-------------------|---------------|---------|
|             |                |            |                   |                 |                 |                   |               |         |

#### **SENSOR TYPE** (See page 2-4b for optional elements)

**RTP1** – Platinum; DIN 0.00385; 100 ohm +/- 0.12% @ 0°C; 3-wire construction  
(For dual element, add prefix "D"- e.g., DRTP1)

#### **ASSEMBLY STYLE**

**77** – Sheath with cast aluminum head; spring-loaded in head; head CSA/FM approved for Class I, Division I, Groups B, C, D; Class II, Groups E, F, G, including union; screw cover with chain and gasketed o-ring. Ceramic terminal block; 1/2" NPT conduit and process connections

#### **CONNECTION**

**H** – Head only; 1/2" NPT (female) instrument connection

**N** – 1/2" NPT carbon steel nipple only

**NU** – 1/2" NPT carbon steel nipple and plated steel union

**NUN** – 1/2" NPT carbon steel nipples and plated steel union

Add suffix "1S" for 304 stainless steel nipples

#### **CONNECTION LENGTH**

### – (e.g., 006=6 inch)

See chart below for standard available lengths.

#### **SHEATH DIAMETER** (in inches) (see below for restrictions)

**4** – 1/8 (0.125)

**6** – 3/16 (0.188)

**7** – 1/4 (0.250)

**9** – 3/8 (0.375)

#### **SHEATH MATERIAL**

**3** – 316 stainless steel

#### **TEMPERATURE RANGE** - Minimum and maximum operating temperatures

**1** – -45 to 260°C (-50 to 500°F)

**2** – -45 to 482°C (-50 to 900°F)

**3** – -45 to 788°C (-50 to 1450°F)

**4** – -200 to 260°C (-328 to 500°F)

#### **SHEATH LENGTH** (for lengths greater than L=36", consult AST)

**L#** – (e.g., L6 = 6 inch sheath)

#### **OPTIONS** – see page 2-4b

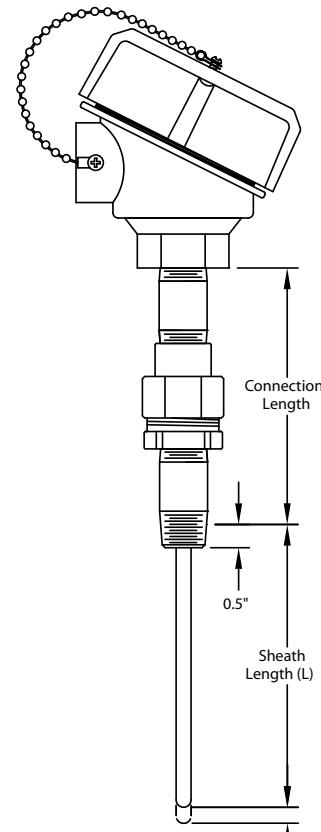
| STANDARD AVAILABLE CONNECTION LENGTHS |      |       |
|---------------------------------------|------|-------|
| N                                     | NU   | NUN   |
| N/A                                   | 2.00 | 2.50  |
| 0.50                                  | 2.50 | 3.00  |
| 1.00                                  | 3.00 | 4.00  |
| 1.50                                  | 3.50 | 5.00  |
| 2.00                                  | 4.00 | 6.00  |
| 3.00                                  | 5.00 | 8.00  |
| 5.00                                  | 7.00 | 12.00 |
| 6.00                                  | 8.00 | 14.00 |

DIMENSIONS ARE GIVEN IN INCHES

#### **Smallest Diameter Sheath Available By Sensor Type and Temperature Range**

| SINGLE     |       |        |         |       |       |        |         |
|------------|-------|--------|---------|-------|-------|--------|---------|
| Temp Range | RTP 1 | RTP 1A | RTP 1AA | RTP 6 | RTP 7 | RTP 7A | RTP 7AA |
| 1          | 1/8   | 1/8    | 1/8     | 1/8   | 3/16  | 3/16   | 3/16    |
| 2          | 3/16  | 3/16   | 3/16    | 3/16  | 3/16  | 3/16   | 3/16    |
| 3          | 3/16  |        |         | 3/16  | 3/16  |        |         |
| 4          | 1/8   |        |         | 1/8   | 3/16  |        |         |

| Temp Range | DRTP 1 | DRTP 1A | DRTP 1AA | DRTP 6 | DRTP 7 | DRTP 7A | DRTP 7AA |
|------------|--------|---------|----------|--------|--------|---------|----------|
| 1          | 3/16   | 3/16    | 3/16     | 3/16   |        |         |          |
| 2          | 1/4    | 1/4     | 1/4      | 3/16   |        |         |          |
| 3          | 1/4    |         |          | 1/4    |        |         |          |
| 4          | 3/16   |         |          | 3/16   |        |         |          |



## STYLE 77

### **AVAILABLE OPTIONS and MODIFICATIONS**

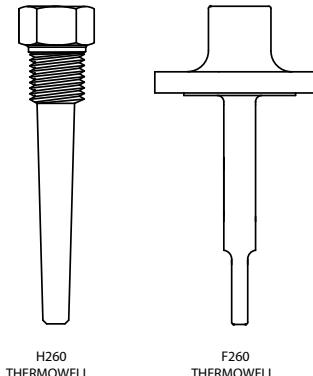
| <b>OPTIONAL ELEMENTS</b>  |   |               |  |  |
|---|---|---------------|--|--|
| RTDs are standardly platinum, 100-ohm, DIN-curve elements with a 0.00385 alpha.   |   |               |  |  |
| Option Code   | Accuracy (at 0°C)                             | Construction  |  |  |
| RTP1 (std.)   | ±0.12%  | 3-wire        |  |  |
| RTP1A   | <b>±0.06%</b>                                 | 3-wire        |  |  |
| RTP1AA  | <b>±0.01%</b>                                 | 3-wire        |  |  |
| RTP6  | ±0.12%  | <b>2-wire</b> |  |  |
| RTP7  | ±0.12%  | <b>4-wire</b> |  |  |
| RTP7A   | <b>±0.06%</b>                                 | <b>4-wire</b> |  |  |
| RTP7AA  | <b>±0.01%</b>                                 | <b>4-wire</b> |  |  |
| Notes:  |   |               |  |  |
| 1. For dual element, add prefix "D" (e.g., DRTP6)<br>2. Additional materials, curves and resistance values are available - see Capabilities brochure. |   |               |  |  |
| <b>ASSEMBLY OPTIONS</b>   |   |               |  |  |
| Option Codes  | Description                                   |               |  |  |
| TAG1  | Stainless steel tag and wire                  |               |  |  |
| CAL1  | NIST traceable calibration [specify point(s)] |               |  |  |
| CRT1  | Certificate of conformance                    |               |  |  |
| <b>TRANSMITTERS</b>   |   |               |  |  |
| See Style 48 for available transmitters   |   |               |  |  |

| <b>EXPLOSION-PROOF TERMINAL HEAD OPTIONS</b>  |                    |                    |
|---|--------------------|--------------------|
| Option Code   | Process Connection | Conduit Connection |
| Cast aluminum; screw cover with chain; o-ring gasket; ceramic terminal block; FM/CSA approved for Class I Div. 1, Groups B, C and D; Class II Groups E, F and G (Gasket rated to 100°C exposure); internal ground screw |                    |                    |
| HD71  | 1/2"               | 3/4"               |
| Same as above, except epoxy-coated  |                    |                    |
| HD80  | 1/2"               | 1/2"               |
| HD81  | 1/2"               | 3/4"               |

Note: See Accessories section for outline drawings and additional specs.

### **THERMOWELLS & PROTECTION TUBES**

For a compete offering of metal, ceramic and composite material thermowells and protection tubes, please see the Thermowell and Protection Tube sections.



## **CONNECTION HEAD WITH WELDED HEX FITTING**

### **How to build a part number:**

To order an Applied Sensor Technologies temperature sensor, select the requirements for the categories listed below and fill in the corresponding boxes with your selection. Don't see exactly what you need? Give us a call!

| SENSOR TYPE | ASSEMBLY STYLE | SHEATH DIAMETER | SHEATH MATERIAL | TEMPERATURE RANGE | SHEATH LENGTH | OPTIONS |
|-------------|----------------|-----------------|-----------------|-------------------|---------------|---------|
|             |                |                 |                 |                   |               |         |

**SENSOR TYPE** (See page 2-5b for optional elements)

**RTP1** – Platinum; DIN 0.00385; 100 ohm +/- 0.12% @ 0°C; 3-wire construction

(For dual element, add prefix "D"- e.g., **DRTP1**)

### **ASSEMBLY STYLE**

**21** – Sheath with head; for use as ambient sensor or with compression fitting for process mounting. See page 2-5b for head options.

### **SHEATH DIAMETER** (in inches) (see below for restrictions)

**4** – 1/8 (0.125)

**6** – 3/16 (0.188)

**7** – 1/4 (0.250)

**9** – 3/8 (0.375)

### **SHEATH MATERIAL**

**3** – 316 stainless steel

### **TEMPERATURE RANGE** - Minimum and maximum operating temperatures

**1** – -45 to 260°C (-50 to 500°F)

**2** – -45 to 482°C (-50 to 900°F)

**3** – -45 to 788°C (-50 to 1450°F)

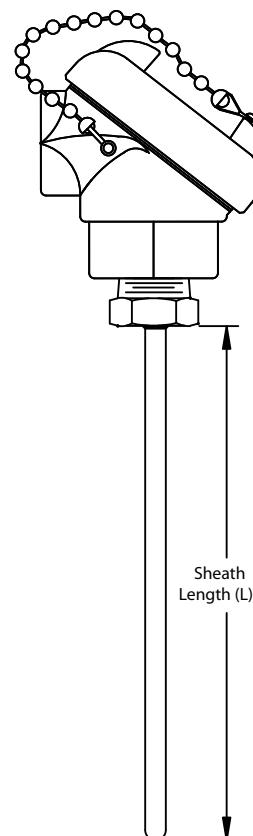
**4** – -200 to 260°C (-328 to 500°F)

### **SHEATH LENGTH** (for lengths greater than L=36", consult AST)

**L#** – (e.g., L6 = 6" sheath)

### **OPTIONS** – see page 2-5b

| Smallest Diameter Sheath Available By Sensor Type and Temperature Range |        |         |          |        |        |         |          |
|---|--------|---------|----------|--------|--------|---------|----------|
| SINGLE  |        |         |          |        |        |         |          |
| Temp Range  | RTP 1  | RTP 1A  | RTP 1AA  | RTP 6  | RTP 7  | RTP 7A  | RTP 7AA  |
| 1   | 1/8    | 1/8     | 1/8      | 1/8    | 3/16   | 3/16    | 3/16     |
| 2   | 3/16   | 3/16    | 3/16     | 3/16   | 3/16   | 3/16    | 3/16     |
| 3   | 3/16   |         |          | 3/16   | 3/16   |         |          |
| 4   | 1/8    |         |          | 1/8    | 3/16   |         |          |
| DUAL  |        |         |          |        |        |         |          |
| Temp Range  | DRTP 1 | DRTP 1A | DRTP 1AA | DRTP 6 | DRTP 7 | DRTP 7A | DRTP 7AA |
| 1   | 3/16   | 3/16    | 3/16     | 3/16   |        |         |          |
| 2   | 1/4    | 1/4     | 1/4      | 3/16   |        |         |          |
| 3   | 1/4    |         |          | 1/4    |        |         |          |
| 4   | 3/16   |         |          | 3/16   |        |         |          |



Style 21

#### OPTIONAL ELEMENTS

RTDs are standardly platinum, 100-ohm, DIN-curve elements with a 0.00385 alpha.

| Option Code | Accuracy (at 0°C) | Construction  |
|-------------|-------------------|---------------|
| RTP1 (std.) | ±0.12%            | 3-wire        |
| RTP1A       | <b>±0.06%</b>     | 3-wire        |
| RTP1AA      | <b>±0.01%</b>     | 3-wire        |
| RTP6        | ±0.12%            | <b>2-wire</b> |
| RTP7        | ±0.12%            | <b>4-wire</b> |
| RTP7A       | <b>±0.06%</b>     | <b>4-wire</b> |
| RTP7AA      | <b>±0.01%</b>     | <b>4-wire</b> |

Notes:

- For dual element, add prefix "D" (e.g., DRTP6)
- Additional materials, curves and resistance values are available - see Capabilities brochure.

#### ASSEMBLY OPTIONS

| Option Code | Description  |
|-------------|--|
| TAG1        | Stainless steel tag and wire   |
| B90-        | 90° bend in sheath [specify length from tip in inches e.g., B90-6]   |
| B45-        | 45° bend in sheath (specify length from tip in inches e.g., B45-6)   |
| CAL1        | NIST traceable calibration [specify point(s)]  |
| CRT1        | Certificate of conformance   |
| WC20        | Wiring cable gland for 0.187 - 0.312 diameter cables, for terminal heads with 1/2" NPT conduit connections |
| WC21        | Wiring cable gland for 0.125 - 0.187 diameter cables, for terminal heads with 1/2" NPT conduit connections |

**TRANSMITTERS** - for complete specs, see Transmitters section

|      |   |
|------|---|
| TR11 | 4-20 mA, 2-wire, single input, isolated output; specify range, units of measure (e.g., 0-200°C) and optional head with *.                       |
| TR12 | 4-20 mA, 2-wire transmitter, single input, non-isolated output; specify range and units of measure (e.g., 0-200°C) and terminal head with *.    |
| TR13 | HART®/ 4-20 mA, 2-wire transmitter, single input, isolated output; specify range and units of measure (e.g., 0-200°C) and terminal head with *. |

**COMPRESSION FITTINGS** (for diameters 4, 6, 7)

| Option Code | NPT  | Material        | Ferrule         |
|-------------|------|-----------------|-----------------|
| CF10        | 1/8" | Stainless steel | Stainless steel |
| CF11        | 1/8" | Stainless steel | Teflon®         |
| CF12        | 1/8" | Brass           | Brass           |
| CF20        | 1/4" | Stainless steel | Stainless steel |
| CF21        | 1/4" | Stainless steel | Teflon®         |
| CF22        | 1/4" | Brass           | Brass           |
| CF30        | 1/2" | Stainless steel | Stainless steel |
| CF31        | 1/2" | Stainless steel | Teflon®         |
| CF32        | 1/2" | Brass           | Brass           |

## STYLE 21

#### AVAILABLE OPTIONS and MODIFICATIONS

##### NEMA 4 OR 4X TERMINAL HEAD OPTIONS

| Head without ground screw                              | Head with internal ground screw | Process Connection | Conduit Connection |
|--|---------------------------------|--------------------|--------------------|
| Cast aluminum, screw cover with chain, NEMA 4          |                                 |                    |                    |
| HD10*  | HD11*                           | 1/2"               | 1/2"               |
| Std.*  | HD13*                           | 1/2"               | 3/4"               |
| Epoxy-coated aluminum, screw cover with chain, NEMA 4X |                                 |                    |                    |
| HD50*  | HD51*                           | 1/2"               | 1/2"               |
| HD52*  | HD53*                           | 1/2"               | 3/4"               |
| Cast iron, screw cover with chain, NEMA 4              |                                 |                    |                    |
| HD20*  | HD21*                           | 1/2"               | 1/2"               |
| HD22*  | HD23*                           | 1/2"               | 3/4"               |
| 316 stainless steel, screw cover with chain, NEMA 4X   |                                 |                    |                    |
| HD40*  | HD41*                           | 1/2"               | 3/4"               |
| White polypropylene, screw cover with chain, NEMA 4    |                                 |                    |                    |
| HD30   | N/A                             | 1/2"               | 3/4"               |
| Black polypropylene, screw cover with chain, NEMA 4    |                                 |                    |                    |
| HD31   | N/A                             | 1/2"               | 3/4"               |
| Nylon, screw cover                                     |                                 |                    |                    |
| HD32   | N/A                             | 1/2"               | 1/2"               |

##### EXPLOSION-PROOF TERMINAL HEAD OPTIONS

| Option Code  | Process Connection | Conduit Connection |
|--|--------------------|--------------------|
| Cast aluminum, screw cover with chain; o-ring gasket rated to 100°C; ceramic terminal block; FM/CSA approved for Class I Div. 1, Groups B, C, D; Class II, Groups E, F, G; internal ground screw |                    |                    |
| HD70*  | 1/2"               | 1/2"               |
| HD71*  | 1/2"               | 3/4"               |
| Stainless steel (same specs as HD70/71)  |                    |                    |
| HD74*  | 1/2"               | 1/2"               |
| HD75*  | 1/2"               | 3/4"               |
| Epoxy-coated (same specs as HD70/71)   |                    |                    |
| HD80*  | 1/2"               | 1/2"               |
| HD81*  | 1/2"               | 3/4"               |
| Cast aluminum; ATEX approved for EEx d IIC; screw cover with chain; silicone rubber o-ring gasket; ceramic terminal block; rated for NEMA 4X, IP66 to IP68; internal and external ground screws  |                    |                    |
| HD72*  | 1/2"               | 1/2"               |
| HD73*  | 1/2"               | 3/4"               |
| Cast aluminum (formerly Style 60); screw cover; plastic terminal block; UL/CSA approved for Class I Div. 1, Groups C and D; Class II Groups E, F and G.  |                    |                    |
| HD60   | 1/2"               | 1/2"               |
| HD61   | 1/2"               | 3/4"               |

\*can be used with transmitters

Note: Many non-standard options, including additional sheath diameters and materials, may also be available – consult AST for specific requirements. HART® is a registered trademark of the HART Communication Foundation.

**UE** APPLIED SENSOR TECHNOLOGIES  
A Division of UNITED ELECTRIC CONTROLS

## **DOUBLE-SIDED, SPRING-LOADED PROCESS MOUNTING WITH TERMINAL HEAD OPTIONS**

### **How to build a part number:**

To order an Applied Sensor Technologies temperature sensor, select the requirements for the categories listed below and fill in the corresponding boxes with your selection. Don't see exactly what you need? Give us a call!

| SENSOR TYPE | ASSEMBLY STYLE | SHEATH DIAMETER | SHEATH MATERIAL | TEMPERATURE RANGE | SHEATH LENGTH | LEADWIRE LENGTH | OPTIONS |
|-------------|----------------|-----------------|-----------------|-------------------|---------------|-----------------|---------|
|             |                |                 |                 |                   |               |                 |         |

#### **SENSOR TYPE** (See page 2-6b for optional elements)

**RTP1** – Platinum; DIN 0.00385; 100 ohm +/- 0.12% @ 0°C; 3-wire construction

(For dual element, add prefix "D"- e.g., **DRTP1**)

#### **ASSEMBLY STYLE**

**75** – Sheath with double-sided, spring-loaded fitting; Teflon® insulated conductors; 1/2" NPT stainless steel connection. (Note: a variety of terminal heads may be added to this style – see page 2-6b)

#### **SHEATH DIAMETER** (in inches) (see below for restrictions)

**4** – 1/8 (0.125)

**6** – 3/16 (0.188)

**7** – 1/4 (0.250)

**9** – 3/8 (0.375)

#### **SHEATH MATERIAL**

**3** – 316 stainless steel

#### **TEMPERATURE RANGE** - Minimum and maximum operating temperatures

**1** – -45 to 260°C (-50 to 500°F)

**2** – -45 to 482°C (-50 to 900°F)

**3** – -45 to 788°C (-50 to 1450°F)

**4** – -200 to 260°C (-328 to 500°F)

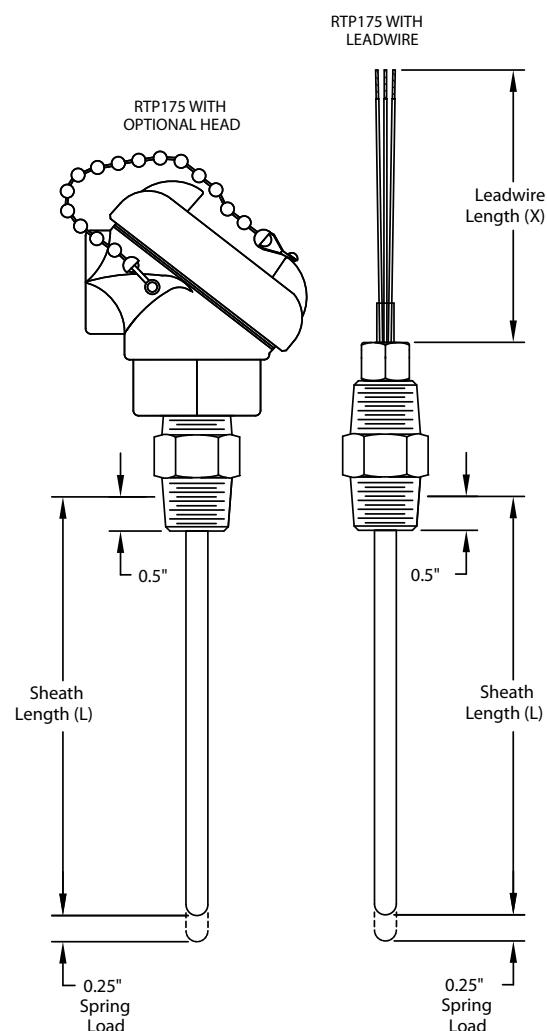
#### **SHEATH LENGTH** (for lengths greater than L=36", consult AST)

**L#** – (e.g., L6 = 6 inch sheath)

#### **LEADWIRE LENGTH**

**X#** – (e.g., X3=3 inch length; X3 is standard if specifying a terminal head)

#### **OPTIONS** – see page 2-6b



| Smallest Diameter Sheath Available By Sensor Type and Temperature Range |        |         |          |        |        |         |          |
|---|--------|---------|----------|--------|--------|---------|----------|
| SINGLE  |        |         |          |        |        |         |          |
| Temp Range  | RTP 1  | RTP 1A  | RTP 1AA  | RTP 6  | RTP 7  | RTP 7A  | RTP 7AA  |
| 1   | 1/8    | 1/8     | 1/8      | 1/8    | 3/16   | 3/16    | 3/16     |
| 2   | 3/16   | 3/16    | 3/16     | 3/16   | 3/16   | 3/16    | 3/16     |
| 3   | 3/16   |         |          | 3/16   | 3/16   |         |          |
| 4   | 1/8    |         |          | 1/8    | 3/16   |         |          |
| DUAL  |        |         |          |        |        |         |          |
| Temp Range  | DRTP 1 | DRTP 1A | DRTP 1AA | DRTP 6 | DRTP 7 | DRTP 7A | DRTP 7AA |
| 1   | 3/16   | 3/16    | 3/16     | 3/16   |        |         |          |
| 2   | 1/4    | 1/4     | 1/4      | 3/16   |        |         |          |
| 3   | 1/4    |         |          | 1/4    |        |         |          |
| 4   | 3/16   |         |          | 3/16   |        |         |          |

| OPTIONAL ELEMENTS   |   |               |
|---|---|---------------|
| RTDs are standardly platinum, 100-ohm, DIN-curve elements with a 0.00385 alpha.   |   |               |
| Option Code   | Accuracy (at 0°C)   | Construction  |
| RTP1 (std.)   | ±0.12%  | 3-wire        |
| RTP1A   | <b>±0.06%</b>   | 3-wire        |
| RTP1AA  | <b>±0.01%</b>   | 3-wire        |
| RTP6  | ±0.12%  | <b>2-wire</b> |
| RTP7  | ±0.12%  | <b>4-wire</b> |
| RTP7A   | <b>±0.06%</b>   | <b>4-wire</b> |
| RTP7AA  | <b>±0.01%</b>   | <b>4-wire</b> |
| Notes:<br>1. For dual element, add prefix "D" (e.g., DRTP6)<br>2. Additional materials, curves and resistance values are available - see Capabilities brochure. |   |               |
| ASSEMBLY OPTIONS  |   |               |
| Option Code   | Description   |               |
| TAG1  | Stainless steel tag and wire  |               |
| CAL1  | NIST traceable calibration [specify point(s)]   |               |
| CRT1  | Certificate of conformance  |               |
| WC20  | Wiring cable gland for 0.187 - 0.312 diameter cables, for terminal heads with 1/2" NPT conduit connections  |               |
| WC21  | Wiring cable gland for 0.125 - 0.187 diameter cables, for terminal heads with 1/2" NPT conduit connections  |               |
| WIRING CONNECTION OPTIONS   |   |               |
| Option Code   | Description   |               |
| WC76  | #6 spade terminals, plated copper   |               |
| WC70  | #10 spade terminals, plated copper  |               |
| WC84  | 1/4" push-on insulated terminals, plated copper   |               |
| WC90  | #10 ring terminals  |               |
| WC98  | #8 ring terminals   |               |
| TRANSMITTERS  |   |               |
| TR11  | 4-20 mA, 2-wire; single input; isolated output; specify range, units of measure (e.g., 0-200°C) and terminal head with *. See Accessories section for additional information. |               |
| TR12  | 4-20 mA, 2-wire transmitter, single input, non-isolated output; specify range and units of measure (e.g., 0-200°C) and terminal head with *.                                  |               |
| TR13  | HART® / 4-20 mA, 2-wire transmitter, single input, isolated output; specify range and units of measure (e.g., 0-200°C) and terminal head with *.                              |               |

#### THERMOWELLS & PROTECTION TUBES

For a complete offering of metal, ceramic and composite material thermowells and protection tubes, please see the Thermowell and Protection Tube sections.

## STYLE 75

#### AVAILABLE OPTIONS and MODIFICATIONS

| NEMA 4 OR 4X TERMINAL HEAD OPTIONS   |                                 |                    |                    |
|--|---------------------------------|--------------------|--------------------|
| Head without ground screw  | Head with internal ground screw | Process Connection | Conduit Connection |
| Cast aluminum, screw cover with chain, NEMA 4  |                                 |                    |                    |
| HD10*  | HD11*                           | 1/2"               | 1/2"               |
| HD12*  | HD13*                           | 1/2"               | 3/4"               |
| Epoxy-coated aluminum, screw cover with chain, NEMA 4X   |                                 |                    |                    |
| HD50*  | HD51*                           | 1/2"               | 1/2"               |
| HD52*  | HD53*                           | 1/2"               | 3/4"               |
| Cast iron, screw cover with chain, NEMA 4  |                                 |                    |                    |
| HD20*  | HD21*                           | 1/2"               | 1/2"               |
| HD22*  | HD23*                           | 1/2"               | 3/4"               |
| 316 stainless steel, screw cover with chain, NEMA 4X   |                                 |                    |                    |
| HD40*  | HD41*                           | 1/2"               | 3/4"               |
| White polypropylene, screw cover with chain, NEMA 4  |                                 |                    |                    |
| HD30   | N/A                             | 1/2"               | 3/4"               |
| Black polypropylene, screw cover with chain, NEMA 4  |                                 |                    |                    |
| HD31   | N/A                             | 1/2"               | 3/4"               |
| Nylon, screw cover   |                                 |                    |                    |
| HD32   | N/A                             | 1/2"               | 1/2"               |
| EXPLOSION-PROOF TERMINAL HEAD OPTIONS  |                                 |                    |                    |
| Option Code  | Process Connection              | Conduit Connection |                    |
| Cast aluminum, screw cover with chain; o-ring gasket rated to 100°C; ceramic terminal block; FM/CSA approved for Class I Div. 1, Groups B, C, D; Class II, Groups E, F, G; internal ground screw |                                 |                    |                    |
| HD70*  | 1/2"                            | 1/2"               |                    |
| HD71*  | 1/2"                            | 3/4"               |                    |
| Stainless steel (same spec as HD70/HD71)   |                                 |                    |                    |
| HD74*  | 1/2"                            | 1/2"               |                    |
| HD75*  | 1/2"                            | 3/4"               |                    |
| Epoxy-coated (same spec as HD70/HD71)  |                                 |                    |                    |
| HD80*  | 1/2"                            | 1/2"               |                    |
| HD81*  | 1/2"                            | 3/4"               |                    |
| Cast aluminum; ATEX approved for EEx d IIC; screw cover with chain; silicone rubber o-ring gasket; ceramic terminal block; rated for NEMA 4X, IP66 to IP68; internal and external ground screws  |                                 |                    |                    |
| HD72*  | 1/2"                            | 1/2"               |                    |
| HD73*  | 1/2"                            | 3/4"               |                    |
| Cast aluminum (formerly Style 60); screw cover; plastic terminal block; UL/CSA approved for Class I Div. 1, Groups C and D; Class II Groups E, F and G.  |                                 |                    |                    |
| HD60   | 1/2"                            | 1/2"               |                    |
| HD61   | 1/2"                            | 3/4"               |                    |

\*can be used with transmitters

Note: Many non-standard options, including additional sheath diameters and materials, may also be available - consult AST for specific requirements. HART® is a registered trademark of the HART Communication Foundation.



## **SPRING-LOADED PROCESS MOUNTING HARDWARE WITH OPTIONAL TERMINAL HEAD**

### **How to build a part number:**

To order an Applied Sensor Technologies temperature sensor, select the requirements for the categories listed below and fill in the corresponding boxes with your selection.

| SENSOR TYPE | ASSEMBLY STYLE | CONNECTION TYPE AND MATERIAL | CONNECTION LENGTH | SHEATH DIAMETER | SHEATH MATERIAL | TEMPERATURE RANGE | SHEATH LENGTH | LEADWIRE LENGTH | OPTIONS |
|-------------|----------------|------------------------------|-------------------|-----------------|-----------------|-------------------|---------------|-----------------|---------|
|             |                |                              |                   |                 |                 |                   |               |                 |         |

**SENSOR TYPE** (See page 2-7b for optional elements)

**RTP1** – Platinum; DIN 0.00385; 100 ohm +/- 0.12% @ 0°C; 3-wire construction

(For dual element, add prefix "D"- e.g., **DRTP1**)

### **ASSEMBLY STYLE**

**48** – Sheath with spring-loaded hex connector and connection hardware; head as option

### **CONNECTION TYPE AND MATERIAL**

|              |                   |                     |                       |
|--------------|-------------------|---------------------|-----------------------|
| Code         | Union Type        | Union Material      | Lower Nipple Material |
| <b>NU</b>    | Ordinary location | Carbon steel        | None                  |
| <b>NUS</b>   | Ordinary location | Stainless steel     | None                  |
| <b>NUX</b>   | Explosion-proof   | Electroplated steel | None                  |
| <b>NUN</b>   | Ordinary location | Carbon steel        | Carbon steel          |
| <b>NUNS</b>  | Ordinary location | Stainless steel     | Stainless steel       |
| <b>NUNX</b>  | Explosion-proof   | Electroplated steel | Carbon steel          |
| <b>NUNXS</b> | Explosion-proof   | Electroplated steel | Stainless steel       |

### **CONNECTION LENGTH** (For NU, NUX, NUS, use 002.5)

### (e.g., 006 = 6 inch)

(See chart below for available standard lengths)

### **SHEATH DIAMETER** (in inches) (see below for restrictions)

**4** – 1/8" (0.125)

**6** – 3/16" (0.188)

**7** – 1/4" (0.250)

**9** – 3/8" (0.375)

### **SHEATH MATERIAL**

**3** – 316 stainless steel

### **TEMPERATURE RANGE** - Minimum and maximum operating temperatures

**1** – -45 to 260°C (-50 to 500°F)

**2** – -45 to 482°C (-50 to 900°F)

**3** – -45 to 788°C (-50 to 1450°F)

**4** – -200 to 260°C (-328 to 500°F)

### **SHEATH LENGTH** (for lengths greater than L=36", consult AST)

**L#** – (e.g., L6 = 6 inch sheath)

### **LEADWIRE LENGTH**

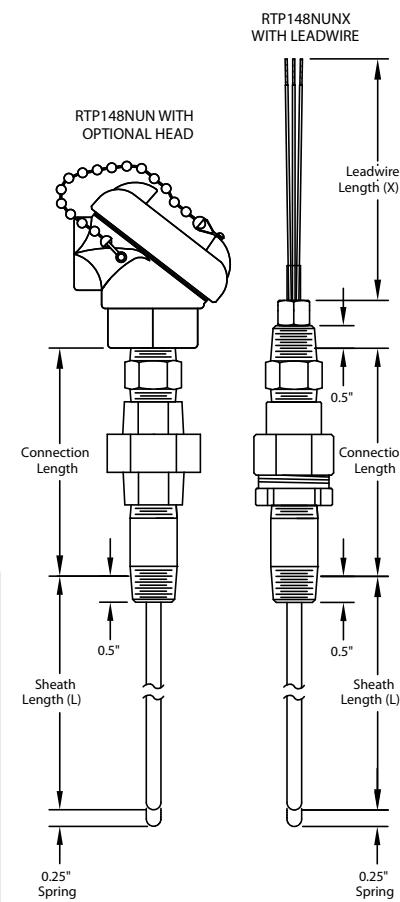
**X#** – (e.g., X3 = 3 inch length; X3 is standard if specifying optional head)

### **OPTIONS** – see page 2-7b

| STANDARD AVAILABLE CONNECTION LENGTHS FOR NUN CONNECTIONS |  |
|---|--|
| 3.00  |  |
| 3.50  |  |
| 4.00  |  |
| 4.50  |  |
| 5.00  |  |
| 6.00  |  |
| 8.00  |  |
| DIMENSIONS ARE GIVEN IN INCHES                            |  |

**Smallest Diameter Sheath Available By Sensor Type and Temperature Range**

| SINGLE     |        |         |          |        |        |         |          |
|------------|--------|---------|----------|--------|--------|---------|----------|
| Temp Range | RTP 1  | RTP 1A  | RTP 1AA  | RTP 6  | RTP 7  | RTP 7A  | RTP 7AA  |
| 1          | 1/8    | 1/8     | 1/8      | 1/8    | 3/16   | 3/16    | 3/16     |
| 2          | 3/16   | 3/16    | 3/16     | 3/16   | 3/16   | 3/16    | 3/16     |
| 3          | 3/16   |         |          | 3/16   | 3/16   |         |          |
| 4          | 1/8    |         |          | 1/8    | 3/16   |         |          |
| DUAL       |        |         |          |        |        |         |          |
| Temp Range | DRTP 1 | DRTP 1A | DRTP 1AA | DRTP 6 | DRTP 7 | DRTP 7A | DRTP 7AA |
| 1          | 3/16   | 3/16    | 3/16     | 3/16   |        |         |          |
| 2          | 1/4    | 1/4     | 1/4      | 3/16   |        |         |          |
| 3          | 1/4    |         |          | 1/4    |        |         |          |
| 4          | 3/16   |         |          | 3/16   |        |         |          |



**OPTIONAL ELEMENTS**

RTDs are standardly platinum, 100-ohm, DIN-curve elements with a 0.00385 alpha.

| Option Code | Accuracy (at 0°C) | Construction  |
|-------------|-------------------|---------------|
| RTP1 (std.) | ±0.12%            | 3-wire        |
| RTP1A       | <b>±0.06%</b>     | 3-wire        |
| RTP1AA      | <b>±0.01%</b>     | 3-wire        |
| RTP6        | ±0.12%            | <b>2-wire</b> |
| RTP7        | ±0.12%            | <b>4-wire</b> |
| RTP7A       | <b>±0.06%</b>     | <b>4-wire</b> |
| RTP7AA      | <b>±0.01%</b>     | <b>4-wire</b> |

## Notes:

- For dual element, add prefix "D" (e.g., DRTP6)
- Additional materials, curves and resistance values are available - see Capabilities brochure.

**ASSEMBLY OPTIONS**

| Option Code | Description  |
|-------------|--|
| TAG1        | Stainless steel tag and wire   |
| CAL1        | NIST traceable calibration [specify point(s)]  |
| CRT1        | Certificate of conformance   |
| WC20        | Wiring cable gland for 0.187 - 0.312 diameter cables, for terminal heads with 1/2" NPT conduit connections |
| WC21        | Wiring cable gland for 0.125 - 0.187 diameter cables, for terminal heads with 1/2" NPT conduit connections |

**WIRING CONNECTION OPTIONS**

| Option Code | Description                                     |
|-------------|---|
| WC76        | #6 spade terminals, plated copper               |
| WC70        | #10 spade terminals, plated copper              |
| WC84        | 1/4" push-on insulated terminals, plated copper |
| WC90        | #10 ring terminals                              |
| WC98        | #8 ring terminals                               |

**TRANSMITTERS** - for complete specs, see Transmitters section

|      |   |
|------|---|
| TR11 | 4-20 mA, 2-wire; single input; isolated output; specify range, units of measure (e.g., 0-200°C) and terminal head with *. See Accessories section for additional information. |
| TR12 | 4-20 mA, 2-wire transmitter, single input, non-isolated output; specify range and units of measure (e.g., 0-200°C) and terminal head with *.                                  |
| TR13 | HART®/ 4-20 mA, 2-wire transmitter, single input, isolated output; specify range and units of measure (e.g., 0-200°C) and terminal head with *.                               |

**THERMOWELLS & PROTECTION TUBES**

For a complete offering of metal, ceramic and composite material thermowells and protection tubes, please see the Thermowell and Protection Tube sections.

**STYLE 48****AVAILABLE OPTIONS and MODIFICATIONS****NEMA 4 OR 4X TERMINAL HEAD OPTIONS**

| Head without ground screw                              | Head with internal ground screw | Process Connection | Conduit Connection |
|--|---------------------------------|--------------------|--------------------|
| Cast aluminum, screw cover with chain, NEMA 4          |                                 |                    |                    |
| HD10*  | HD11*                           | 1/2"               | 1/2"               |
| HD12*  | HD13*                           | 1/2"               | 3/4"               |
| Epoxy-coated aluminum, screw cover with chain, NEMA 4X |                                 |                    |                    |
| HD50*  | HD51*                           | 1/2"               | 1/2"               |
| HD52*  | HD53*                           | 1/2"               | 3/4"               |
| Cast iron, screw cover with chain, NEMA 4              |                                 |                    |                    |
| HD20*  | HD21*                           | 1/2"               | 1/2"               |
| HD22*  | HD23*                           | 1/2"               | 3/4"               |
| 316 stainless steel, screw cover with chain, NEMA 4X   |                                 |                    |                    |
| HD40*  | HD41*                           | 1/2"               | 3/4"               |
| White polypropylene, screw cover with chain, NEMA 4    |                                 |                    |                    |
| HD30   | N/A                             | 1/2"               | 3/4"               |
| Black polypropylene, screw cover with chain, NEMA 4    |                                 |                    |                    |
| HD31   | N/A                             | 1/2"               | 3/4"               |
| Nylon, screw cover                                     |                                 |                    |                    |
| HD32   | N/A                             | 1/2"               | 1/2"               |

**EXPLOSION-PROOF TERMINAL HEAD OPTIONS**

| Option Code  | Process Connection | Conduit Connection |
|--|--------------------|--------------------|
| Cast aluminum, screw cover with chain; o-ring gasket rated to 100°C; ceramic terminal block; FM/CSA approved for Class I Div. 1, Groups B, C, D; Class II, Groups E, F, G; internal ground screw |                    |                    |
| HD70*  | 1/2"               | 1/2"               |
| HD71*  | 1/2"               | 3/4"               |
| Stainless steel (same specs as HD70/HD71)  |                    |                    |
| HD74*  | 1/2"               | 1/2"               |
| HD75*  | 1/2"               | 3/4"               |
| Epoxy-coated (same specs as HD70/HD71)   |                    |                    |
| HD80*  | 1/2"               | 1/2"               |
| HD81*  | 1/2"               | 3/4"               |
| Cast aluminum; ATEX approved for EEx d IIC; screw cover with chain; silicone rubber o-ring gasket; ceramic terminal block; rated for NEMA 4X, IP66 to IP68; internal and external ground screws  |                    |                    |
| HD72*  | 1/2"               | 1/2"               |
| HD73*  | 1/2"               | 3/4"               |
| Cast aluminum (Formerly Style 60); screw cover; plastic terminal block; UL/CSA approved for Class I Div. 1, Groups C and D; Class II Groups E, F and G.  |                    |                    |
| HD60   | 1/2"               | 1/2"               |
| HD61   | 1/2"               | 3/4"               |

\*can be used with transmitters

Note: See Accessories section for outline drawings and additional specs.

**Note: Many non-standard options, including additional sheath diameters and materials, may also be available – consult AST for specific requirements. HART® is a registered trademark of the HART Communication Foundation.**



## **SANITARY PROCESS CONNECTION WITH TERMINAL HEAD**

### **How to build a part number:**

To order an Applied Sensor Technologies temperature sensor, select the requirements for the categories listed below and fill in the corresponding boxes with your selection. Don't see exactly what you need? Give us a call!

| SENSOR TYPE | ASSEMBLY STYLE | CAP SIZE | CAP STYLE | SHEATH DIAMETER | SHEATH MATERIAL | TEMPERATURE RANGE | SHEATH LENGTH | OPTIONS |
|-------------|----------------|----------|-----------|-----------------|-----------------|-------------------|---------------|---------|
|             |                |          |           |                 |                 |                   |               |         |

**SENSOR TYPE** (See page 2-8b for optional elements)

**RTP1** – Platinum; DIN 0.00385; 100 ohm +/- 0.12% @ 0°C; 3-wire construction

(For dual element, add prefix "D"- e.g., **DRTP1**)

### **ASSEMBLY STYLE**

**33** – Sheath with sanitary process connection and white polypropylene

**head**; 3/4" NPT conduit connection; ceramic terminal block; maximum termination temperature 104°C (220°F)

### **CAP SIZE**

|                  |                 |
|------------------|-----------------|
| <b>A</b> – 0.50* | <b>E</b> – 2.00 |
| <b>B</b> – 0.75* | <b>F</b> – 2.50 |
| <b>C</b> – 1.00  | <b>G</b> – 3.00 |
| <b>D</b> – 1.50  | <b>H</b> – 4.00 |

\*Available in cap style C only

### **CAP STYLE**

|                                 |
|---------------------------------|
| <b>A</b> – 16 A Tri Clamp® cap  |
| <b>C</b> – 16AMP Tri Clamp® cap |

### **SHEATH DIAMETER**

|                         |
|-------------------------|
| <b>6</b> – 3/16 (0.188) |
| <b>7</b> – 1/4 (0.250)  |

### **SHEATH MATERIAL**

**3** – 316 stainless steel

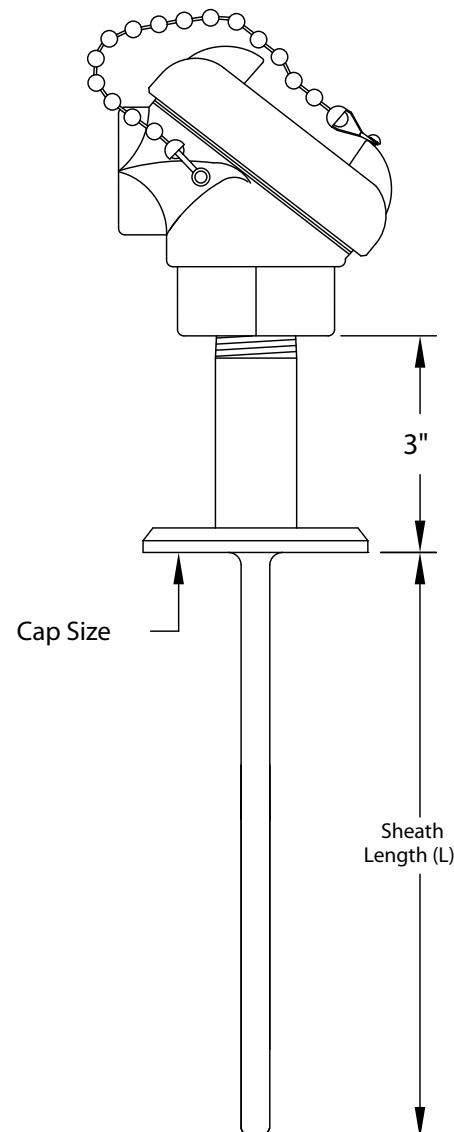
### **TEMPERATURE RANGE** - Minimum and maximum operating temperatures

**1** – -45 to 200°C (-50 to 400°F)

### **SHEATH LENGTH** (for lengths greater than L=36", consult AST)

**L#** – (e.g., L6 = 6 inch sheath)

### **OPTIONS** – see page 2-8b



Tri Clamp® is a registered trademark of Alfa-Laval, Inc.

## STYLE 33

### AVAILABLE OPTIONS and MODIFICATIONS

| OPTIONAL ELEMENTS   |   |              |
|---|---|--------------|
| RTDs are standardly platinum, 100-ohm, DIN-curve elements with a 0.00385 alpha.   |   |              |
| Option Code   | Accuracy (at 0°C)   | Construction |
| RTP1 (std.)   | ±0.12%  | 3-wire       |
| RTP1A   | <b>±0.06%</b>   | 3-wire       |
| RTP1AA  | <b>±0.01%</b>   | 3-wire       |
| Notes:  |   |              |
| 1. For dual element, add prefix "D" (e.g., DRTP1)<br>2. Additional materials, curves and resistance values are available - see Capabilities brochure. |   |              |
| ASSEMBLY OPTIONS  |   |              |
| Option Code   | Description   |              |
| TAG1  | Stainless steel tag and wire  |              |
| CAL1  | NIST traceable calibration [specify point(s)]   |              |
| CRT1  | Certificate of conformance  |              |
| WC20  | Wiring cable gland for 0.187 - 0.312 diameter cables, for terminal heads with 1/2" NPT conduit connections                                      |              |
| WC21  | Wiring cable gland for 0.125 - 0.187 diameter cables, for terminal heads with 1/2" NPT conduit connections                                      |              |
| TRANSMITTERS  |   |              |
| TR11  | 4-20 mA, 2-wire transmitter, single input, isolated output; specify range, units of measure (e.g., 0-200°C) and head with *.                    |              |
| TR12  | 4-20 mA, 2-wire transmitter, single input, non-isolated output; specify range and units of measure (e.g., 0-200°C) and terminal head with *.    |              |
| TR13  | HART®/ 4-20 mA, 2-wire transmitter, single input, isolated output; specify range and units of measure (e.g., 0-200°C) and terminal head with *. |              |

| NEMA 4 OR 4X TERMINAL HEAD OPTIONS                                |                                 |                    |                    |
|---|---------------------------------|--------------------|--------------------|
| Head without ground screw   | Head with internal ground screw | Process Connection | Conduit Connection |
| Cast aluminum, screw cover with chain, NEMA 4 (Formerly Style 67) |                                 |                    |                    |
| HD10*   | HD11*                           | 1/2"               | 1/2"               |
| HD12*   | HD13*                           | 1/2"               | 3/4"               |
| Epoxy-coated aluminum, screw cover with chain, NEMA 4X            |                                 |                    |                    |
| HD50*   | HD51*                           | 1/2"               | 1/2"               |
| HD52*   | HD53*                           | 1/2"               | 3/4"               |
| 316 stainless steel, screw cover with chain, NEMA 4X              |                                 |                    |                    |
| HD40*   | HD41*                           | 1/2"               | 3/4"               |
| Black polypropylene, screw cover with chain, NEMA 4               |                                 |                    |                    |
| HD31  | N/A                             | 1/2"               | 3/4"               |

\*can be used with TR11 transmitter

## **SANITARY CONNECTION WITH LEADWIRE**

### **How to build a part number:**

To order an Applied Sensor Technologies temperature sensor, select the requirements for the categories listed below and fill in the corresponding boxes with your selection. Don't see exactly what you need? Give us a call!

| SENSOR TYPE | ASSEMBLY STYLE | CAP SIZE | CAP STYLE | SHEATH DIAMETER | SHEATH MATERIAL | TEMPERATURE RANGE | SHEATH LENGTH | LEADWIRE LENGTH | OPTIONS |
|-------------|----------------|----------|-----------|-----------------|-----------------|-------------------|---------------|-----------------|---------|
|             |                |          |           |                 |                 |                   |               |                 |         |

**SENSOR TYPE** (See page 2-9b for optional elements)

**RTP1** – Platinum; DIN 0.00385; 100 ohm +/- 0.12% @ 0°C; 3-wire construction

### **ASSEMBLY STYLE**

**58 – Sheath with leadwire; sanitary process connection;** Teflon® insulated conductors; Teflon® jacketed cable

### **CAP SIZE** (in inches)

- |                  |                 |
|------------------|-----------------|
| <b>A</b> – 0.50* | <b>E</b> – 2.00 |
| <b>B</b> – 0.75* | <b>F</b> – 2.50 |
| <b>C</b> – 1.00  | <b>G</b> – 3.00 |
| <b>D</b> – 1.50  | <b>H</b> – 4.00 |

\*Available in Cap Style C only.

### **CAP STYLE**

- A** – 16 A Tri Clamp® cap  
**C** – 16AMP Tri Clamp® cap

### **SHEATH DIAMETER** (in inches)

- 6** – 3/16 (0.188)  
**7** – 1/4 (0.250)

### **SHEATH MATERIAL**

- 3** – 316 stainless steel

### **TEMPERATURE RANGE** - Minimum and maximum operating temperatures

- 1** – -45 to 200°C (-50 to 400°F)

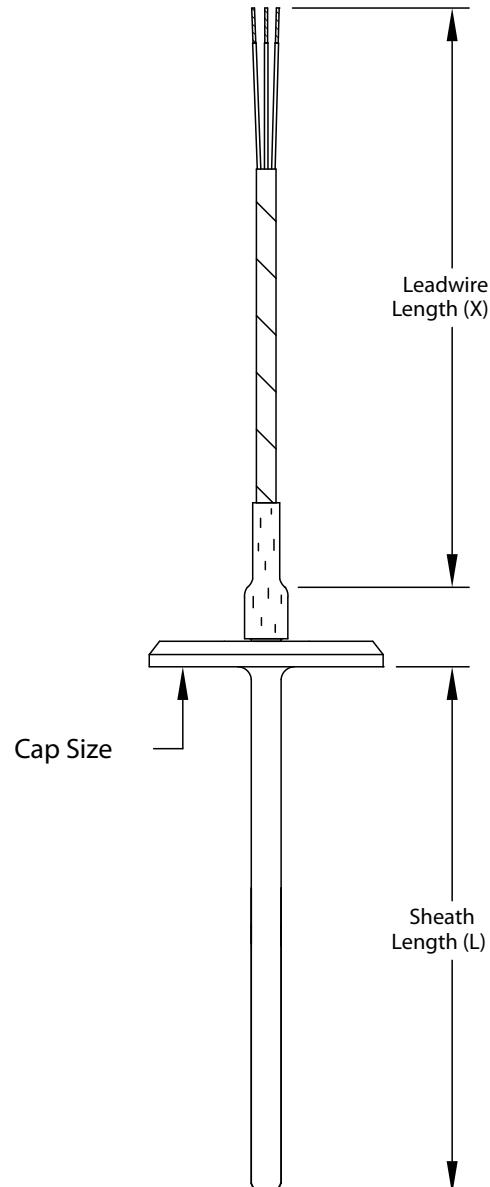
### **LEADWIRE LENGTH** (for lengths greater than L=36", consult AST)

- L#** – (e.g., L6 = 6 inch sheath)

### **LEADWIRE LENGTH**

- X#** – (e.g., X72 = 72 inch length)

### **OPTIONS** – see page 2-9b



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Tri Clamp® is a registered trademark of Alfa-Laval, Inc.

## STYLE 58

### AVAILABLE OPTIONS and MODIFICATIONS

| OPTIONAL ELEMENTS   |                   |              |
|---|-------------------|--------------|
| RTDs are standardly platinum, 100-ohm, DIN-curve elements with a 0.00385 alpha. |                   |              |
| Option Code   | Accuracy (at 0°C) | Construction |
| RTP1 (std.)   | ±0.12%            | 3-wire       |
| RTP1A   | <b>±0.06%</b>     | 3-wire       |
| RTP1AA  | <b>±0.01%</b>     | 3-wire       |

Note: additional materials, curves and resistance values are available - see Capabilities brochure.

| ASSEMBLY OPTIONS |   |
|------------------|---|
| Option Code      | Description                                 |
| TAG1             | Stainless steel tag and wire                |
| CAL1             | NIST traceable calibration [specify points] |
| CRT1             | Certificate of conformance                  |

| WIRING CONNECTION OPTIONS |   |
|---------------------------|---|
| Option Code               | Description                                     |
| WC76                      | #6 spade terminals, plated copper               |
| WC70                      | #10 spade terminals, plated copper              |
| WC84                      | 1/4" push-on insulated terminals, plated copper |
| WC90                      | #10 ring terminal                               |
| WC98                      | #8 ring terminal                                |

## **SHEATH WITH LEADWIRE**

### **How to build a part number:**

To order an Applied Sensor Technologies temperature sensor, select the requirements for the categories listed below and fill in the corresponding boxes with your selection. Don't see exactly what you need? Give us a call!

| SENSOR TYPE | ASSEMBLY STYLE | SHEATH DIAMETER | SHEATH MATERIAL | TEMPERATURE RANGE | SHEATH LENGTH | LEADWIRE LENGTH | OPTIONS |
|-------------|----------------|-----------------|-----------------|-------------------|---------------|-----------------|---------|
|             |                |                 |                 |                   |               |                 |         |

**SENSOR TYPE** (See page 2-10b for optional elements)

**RTP1** – Platinum; DIN 0.00385; 100 ohm +/- 0.12% @ 0°C; 3-wire construction

(For dual element, add prefix "D"- e.g., **DRTP1**)

### **ASSEMBLY STYLE**

**20 – Sheath with leadwire;** Teflon® insulated conductors; no jacket

**28 – Sheath with Teflon® jacketed cable;** Teflon® insulated conductors

### **SHEATH DIAMETER** (in inches) (see below for restrictions)

**4** – 1/8 (0.125)

**6** – 3/16 (0.188)

**7** – 1/4 (0.250)

**9** – 3/8 (0.375)

### **SHEATH MATERIAL**

**3** – 316 stainless steel

### **TEMPERATURE RANGE** - Minimum and maximum operating temperatures

**1** – -45 to 260°C (-50 to 500°F)

**2** – -45 to 482°C (-50 to 900°F)

**3** – -45 to 788°C (-50 to 1450°F)

**4** – -200 to 260°C (-328 to 500°F)

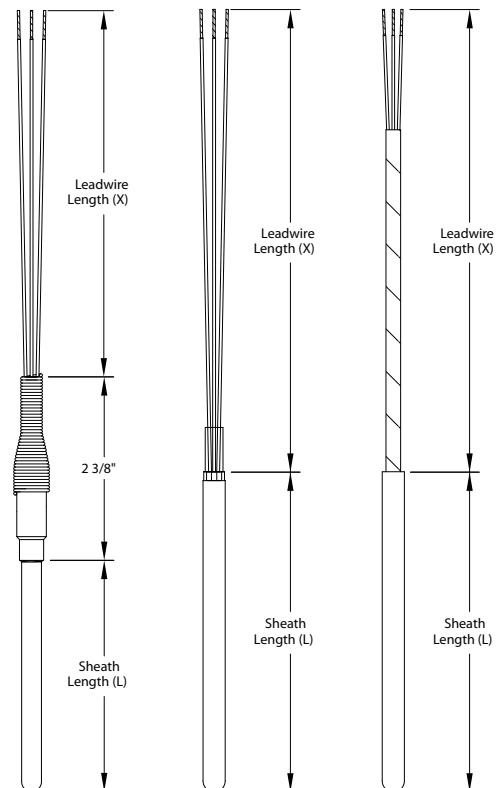
### **SHEATH LENGTH** (for lengths greater than L=36", consult AST)

**L#** – (e.g., L6 = 6 inch sheath, L12.5 = 12.5 inch length)

### **LEADWIRE LENGTH**

**X#** – (e.g., X72 = 72 inch length)

### **OPTIONS** – see page 2-10b



Temperature Range 3 view  
for Style 20 & 28

Temperature Range 2 & 4  
view for Style 28

| Smallest Diameter Sheath Available By Sensor Type and Temperature Range |        |        |      |        |        |        |      |
|---|--------|--------|------|--------|--------|--------|------|
| Style 20, SINGLE  |        |        |      |        |        |        |      |
| Temp Range  | RTP 1  | RTP 1A |      | RTP 6  | RTP 7  | RTP 7A |      |
| 1   | 1/8    | 1/8    | 1/8  | 1/8    | 3/16   | 3/16   | 3/16 |
| 2   | 3/16   | 3/16   | 3/16 | 3/16   | 3/16   | 3/16   | 3/16 |
| 3   | 3/16   |        |      | 3/16   | 3/16   |        |      |
| 4   | 1/8    |        |      | 1/8    | 3/16   |        |      |
| Style 20, DUAL  |        |        |      |        |        |        |      |
| Temp Range  | DRTP 1 |        |      | DRTP 6 | DRTP 7 |        |      |
| 1   | 3/16   | 3/16   | 3/16 | 3/16   | 1/4    | 1/4    | 1/4  |
| 2   | 1/4    | 1/4    | 1/4  | 3/16   | 3/8    | 3/8    | 3/8  |
| 3   | 1/4    |        |      | 1/4    | 1/4    |        |      |
| 4   | 3/16   |        |      | 3/16   | 1/4    |        |      |

| Smallest Diameter Sheath Available By Sensor Type and Temperature Range |       |        |         |       |       |        |         |
|---|-------|--------|---------|-------|-------|--------|---------|
| Style 28, SINGLE ONLY   |       |        |         |       |       |        |         |
| Temp Range  | RTP 1 | RTP 1A | RTP 1AA | RTP 6 | RTP 7 | RTP 7A | RTP 7AA |
| 1   | 1/8   | 1/8    | 1/8     |       |       |        |         |
| 2   | 3/16  | 3/16   | 3/16    |       |       |        |         |
| 3   | 3/16  |        |         |       |       |        |         |
| 4   | 1/8   |        |         |       |       |        |         |

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## STYLES 20 & 28

### AVAILABLE OPTIONS and MODIFICATIONS

| OPTIONAL ELEMENTS   |  |               |
|---|--|---------------|
| RTDs are standardly platinum, 100-ohm, DIN-curve elements with a 0.00385 alpha.   |  |               |
| Option Code   | Accuracy (at 0°C)  | Construction  |
| RTP1 (std.)   | ±0.12%   | 3-wire        |
| RTP1A   | <b>±0.06%</b>  | 3-wire        |
| RTP1AA  | <b>±0.01%</b>  | 3-wire        |
| RTP6  | ±0.12%   | <b>2-wire</b> |
| RTP7  | ±0.12%   | <b>4-wire</b> |
| RTP7A   | <b>±0.06%</b>  | <b>4-wire</b> |
| RTP7AA  | <b>±0.01%</b>  | <b>4-wire</b> |
| Notes:  |  |               |
| 1. For dual element, add prefix "D" (e.g., DRTP6)<br>2. Additional materials, curves and resistance values are available - see Capabilities brochure.   |  |               |
| ASSEMBLY OPTIONS  |  |               |
| Option Code   | Description  |               |
| TAG1  | Stainless steel tag and wire   |               |
| CAL1  | NIST traceable calibration [specify point(s)]  |               |
| CRT1  | Certificate of conformance   |               |
| B45-  | 45° bend in sheath (specify length from tip in inches e.g., B45-6 [minimum length = 3"]) |               |
| B90-  | 90° bend in sheath (specify length from tip in inches e.g., B90-6 [minimum length = 3"]) |               |
| WIRING CONNECTION OPTIONS   |  |               |
| Option Code   | Description  |               |
| WC76  | #6 spade terminals, plated copper  |               |
| WC70  | #10 spade terminals, plated copper   |               |
| WC84  | 1/4" push-on insulated terminals, plated copper  |               |
| WC90  | #10 ring terminals   |               |
| WC98  | #8 ring terminals  |               |
| PLUGS AND JACKS (For 2 and 3 wire constructions only. Note: plug is designed to be attached to sensor assemblies. Jack options – for customer wiring – should only be specified if plug option is also included. Cable clamp is included for both plug and jack options.) |  |               |
| PJ10  | Standard plug, rated to 177°C (350°F)  |               |
| PJ20  | Standard jack, rated to 177°C (350°F)  |               |
| <b>For flexible stainless steel armor, see Style 03</b>   |  |               |

| COMPRESSION FITTINGS (for diameters 4, 6, 7) |      |                 |                 |
|--|------|-----------------|-----------------|
| Option Code                                  | NPT  | Material        | Ferrule         |
| CF10   | 1/8" | Stainless steel | Stainless steel |
| CF11   | 1/8" | Stainless steel | Teflon®         |
| CF12   | 1/8" | Brass           | Brass           |
| CF20   | 1/4" | Stainless steel | Stainless steel |
| CF21   | 1/4" | Stainless steel | Teflon®         |
| CF22   | 1/4" | Brass           | Brass           |
| CF30   | 1/2" | Stainless steel | Stainless steel |
| CF31   | 1/2" | Stainless steel | Teflon®         |
| CF32   | 1/2" | Brass           | Brass           |

## **SHEATH WITH LEADWIRE AND ARMOR CABLE**

### **How to build a part number:**

To order an Applied Sensor Technologies temperature sensor, select the requirements for the categories listed below and fill in the corresponding boxes with your selection. Don't see exactly what you need? Give us a call!

| SENSOR TYPE | ASSEMBLY STYLE | SHEATH DIAMETER | SHEATH MATERIAL | TEMPERATURE RANGE | SHEATH LENGTH | LEADWIRE LENGTH | OPTIONS |
|-------------|----------------|-----------------|-----------------|-------------------|---------------|-----------------|---------|
|             |                |                 |                 |                   |               |                 |         |

#### **SENSOR TYPE** (See page 2-11b for optional elements)

**RTP1** – Platinum; DIN 0.00385; 100 ohm +/- 0.12% @ 0°C; 3-wire construction

(For dual element, add prefix "D"- e.g., **DRTP1**)

#### **ASSEMBLY STYLE**

**03** – Sheath with leadwire and flexible stainless steel armor cable; Teflon® insulated conductors

**03P** – PVC coated armor

**03T** – Teflon® coated armor

#### **SHEATH DIAMETER** (in inches) (see below for restrictions)

**4** – 1/8 (0.125)

**6** – 3/16 (0.188)

**7** – 1/4 (0.250)

**9** – 3/8 (0.375)

#### **SHEATH MATERIAL**

**3** – 316 stainless steel

#### **TEMPERATURE RANGE** - Minimum and maximum operating temperatures

**1** – -45 to 260°C (-50 to 500°F)

**2** – -45 to 482°C (-50 to 900°F)

**3** – -45 to 788°C (-50 to 1450°F)

**4** – -200 to 260°C (-328 to 500°F)

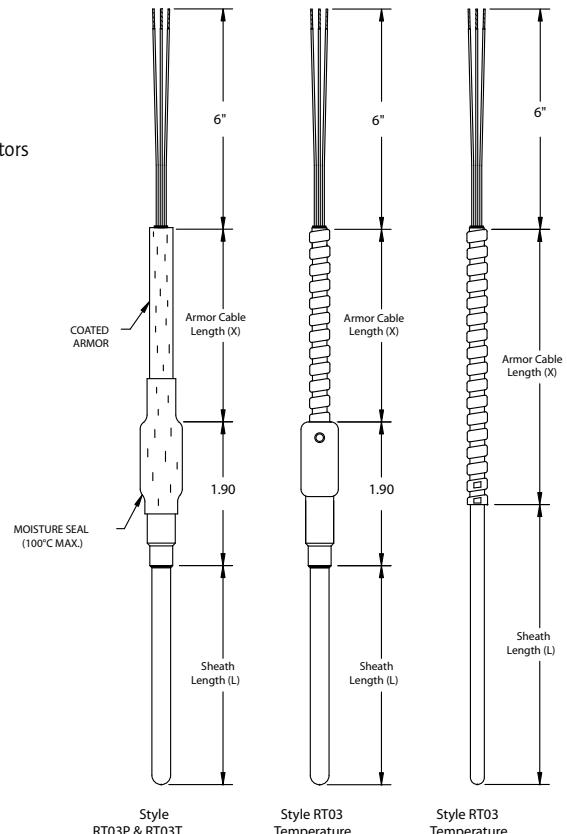
#### **SHEATH LENGTH** (for lengths greater than L=36", consult AST)

**L#** – (e.g., L6 = 6 inch sheath)

#### **ARMOR CABLE LENGTH**

**X#** – (e.g., X72 = 72 inch length)

#### **OPTIONS** – see page 2-11b



Style RT03P & RT03T

Style RT03  
Temperature Range: 2,3,4

Style RT03  
Temperature Range: 1

| Smallest Diameter Sheath Available By Sensor Type and Temperature Range |        |         |          |        |        |         |          |
|---|--------|---------|----------|--------|--------|---------|----------|
| SINGLE  |        |         |          |        |        |         |          |
| Temp Range  | RTP 1  | RTP 1A  | RTP 1AA  | RTP 6  | RTP 7  | RTP 7A  | RTP 7AA  |
| 1   | 1/8    | 1/8     | 1/8      | 1/8    | 3/16   | 3/16    | 3/16     |
| 2   | 3/16   | 3/16    | 3/16     | 3/16   | 3/16   | 3/16    | 3/16     |
| 3   | 3/16   |         |          | 3/16   | 3/16   |         |          |
| 4   | 1/8    |         |          | 1/8    | 3/16   |         |          |
| DUAL  |        |         |          |        |        |         |          |
| Temp Range  | DRTP 1 | DRTP 1A | DRTP 1AA | DRTP 6 | DRTP 7 | DRTP 7A | DRTP 7AA |
| 1   | 3/16   | 3/16    | 3/16     | 3/16   | 1/4    | 1/4     | 1/4      |
| 2   | 1/4    | 1/4     | 1/4      | 3/16   | 3/8    | 3/8     | 3/8      |
| 3   | 1/4    |         |          | 1/4    | 1/4    |         |          |
| 4   | 3/16   |         |          | 3/16   | 1/4    |         |          |

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## STYLE 03

### **AVAILABLE OPTIONS AND MODIFICATIONS**

| <b>OPTIONAL ELEMENTS</b>  |   |               |
|---|---|---------------|
| RTDs are standardly platinum, 100-ohm, DIN-curve elements with a 0.00385 alpha.   |   |               |
| Option Code   | Accuracy (at 0°C)   | Construction  |
| RTP1 (std.)   | ±0.12%  | 3-wire        |
| RTP1A   | <b>±0.06%</b>   | 3-wire        |
| RTP1AA  | <b>±0.01%</b>   | 3-wire        |
| RTP6  | ±0.12%  | <b>2-wire</b> |
| RTP7  | ±0.12%  | <b>4-wire</b> |
| RTP7A   | <b>±0.06%</b>   | <b>4-wire</b> |
| RTP7AA  | <b>±0.01%</b>   | <b>4-wire</b> |
| Notes:  |   |               |
| 1. For dual element, add prefix "D" (e.g., DRTP6)<br>2. Additional materials, curves and resistance values are available - see Capabilities brochure.   |   |               |
| <b>ASSEMBLY OPTIONS</b>   |   |               |
| Option Code   | Description   |               |
| TAG1  | Stainless steel tag and wire  |               |
| CAL1  | NIST traceable calibration [specify point(s)]                                 |               |
| CRT1  | Certificate of conformance  |               |
| B45-  | 45° bend in sheath (specify length from tip in inches e.g., B45-6)            |               |
| B90-  | 90° bend in sheath (specify length from tip in inches e.g., B90-6)            |               |
| <b>ARMOR OPTIONS</b>  |   |               |
| BA50  | Bayonet cap on armor (Style 03, temperature range 1 only) – formerly Style 25 |               |
| <b>PLUGS AND JACKS</b> (2 and 3-wire construction only. Note: plug is designed to be attached to sensor assemblies. Jack options – for customer wiring – should only be specified if plug option is also included. Cable clamp is included for both plug and jack options.) |   |               |
| PJ10  | Standard plug, rated to 177°C (350°F)   |               |
| PJ20  | Standard jack, rated to 177°C (350°F)   |               |
| <b>WELD PADS</b>  |   |               |
| WP00  | Horizontal pad/flat   |               |
| WP10  | 1" nominal pipe size  |               |
| WP15  | 1.5" nominal pipe size  |               |
| WP20  | 2" nominal pipe size  |               |
| WP25  | 2.5" nominal pipe size  |               |
| WP30  | 3" nominal pipe size  |               |
| WP35  | 3.5" nominal pipe size  |               |
| WP40  | 4" nominal pipe size  |               |

| <b>COMPRESSION FITTINGS</b>  |   |                 |                 |
|--|---|-----------------|-----------------|
| Option Code  | NPT   | Material        | Ferrule         |
| CF10   | 1/8"  | Stainless steel | Stainless steel |
| CF11   | 1/8"  | Stainless steel | Teflon®         |
| CF12   | 1/8"  | Brass           | Brass           |
| CF20   | 1/4"  | Stainless steel | Stainless steel |
| CF21   | 1/4"  | Stainless steel | Teflon®         |
| CF22   | 1/4"  | Brass           | Brass           |
| CF30   | 1/2"  | Stainless steel | Stainless steel |
| CF31   | 1/2"  | Stainless steel | Teflon®         |
| CF32   | 1/2"  | Brass           | Brass           |
| <b>WIRING CONNECTION OPTIONS</b>                                       |   |                 |                 |
| Option Code  | Description                                     |                 |                 |
| WC76   | #6 spade terminals                              |                 |                 |
| WC70   | #10 spade terminals, plated copper              |                 |                 |
| WC84   | 1/4" push-on insulated terminals, plated copper |                 |                 |
| WC90   | #10 ring terminals                              |                 |                 |
| WC98   | #8 ring terminals                               |                 |                 |
| <b>BX CONNECTORS</b>   |   |                 |                 |
| WC40   | 1/2"  |                 |                 |
| WC50   | 3/4"  |                 |                 |
| Note: for assembly with sheath, armor and terminal head, see Style 66. |   |                 |                 |

## **SHEATH WITH MALE PLUG**

### **How to build a part number:**

To order an Applied Sensor Technologies temperature sensor, select the requirements for the categories listed below and fill in the corresponding boxes with your selection. Don't see exactly what you need? Give us a call!

| SENSOR TYPE | ASSEMBLY STYLE | SHEATH DIAMETER | SHEATH MATERIAL | TEMPERATURE RANGE | SHEATH LENGTH | OPTIONS |
|-------------|----------------|-----------------|-----------------|-------------------|---------------|---------|
|             |                |                 |                 |                   |               |         |

**SENSOR TYPE** (See page 2-12b for optional elements)

**RTP1** – Platinum; DIN 0.00385; 100 ohm +/- 0.12% @ 0°C; 3-wire construction

### **ASSEMBLY STYLE**

**14 – Sheath with standard male plug;** hollow pins; maximum termination temperature 177°C (350°F)

### **SHEATH DIAMETER** (in inches)

**6** – 3/16 (0.188)

**7** – 1/4 (0.250)

### **SHEATH MATERIAL**

**3** – 316 stainless steel

### **TEMPERATURE RANGE** - Minimum and maximum operating temperatures

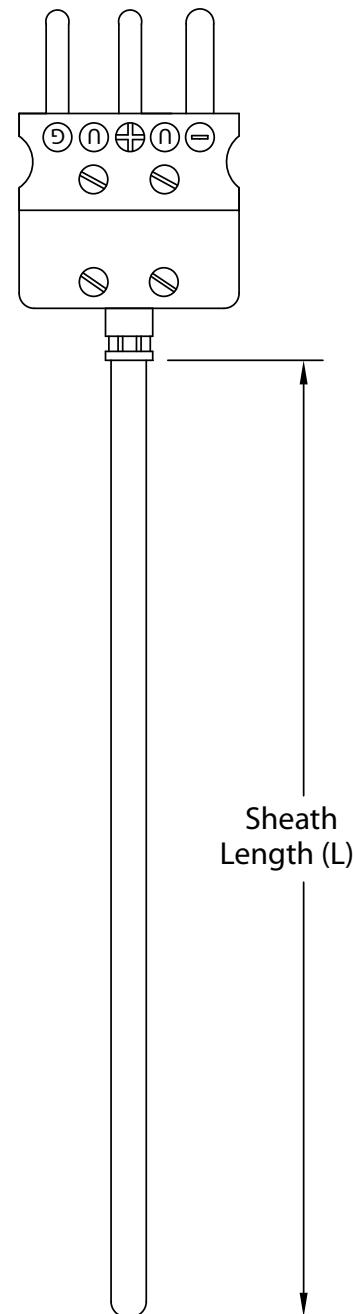
**1** – -45 to 260°C (-50 to 500°F)

**2** – -45 to 482°C (-50 to 900°F)

### **SHEATH LENGTH** (for lengths greater than L=36", consult AST)

**L#** – (e.g., L6 = 6 inch sheath)

### **OPTIONS** – see page 2-12b



## STYLE 14

### AVAILABLE OPTIONS and MODIFICATIONS

| <b>OPTIONAL ELEMENTS</b>  |   |              |
|---|---|--------------|
| RTDs are standardly platinum, 100-ohm, DIN-curve elements with a 0.00385 alpha.                     |   |              |
| Option Code   | Accuracy (at 0°C)                             | Construction |
| RTP1 (std.)   | ±0.12%  | 3-wire       |
| RTP1A   | <b>±0.06%</b>                                 | 3-wire       |
| RTP1AA  | <b>±0.01%</b>                                 | 3-wire       |
| Note: additional materials, curves and resistance values are available - see Capabilities brochure. |   |              |
| <b>ASSEMBLY OPTIONS</b>   |   |              |
| Option Code   | Description                                   |              |
| TAG1  | Stainless steel tag and wire                  |              |
| CAL1  | NIST traceable calibration [specify point(s)] |              |
| CRT1  | Certificate of conformance                    |              |
| PJ20  | Standard jack included                        |              |

| <b>COMPRESSION FITTINGS</b> |      |                 |                 |
|-----------------------------|------|-----------------|-----------------|
| Option Code                 | NPT  | Material        | Ferrule         |
| CF10                        | 1/8" | Stainless steel | Stainless steel |
| CF11                        | 1/8" | Stainless steel | Teflon®         |
| CF12                        | 1/8" | Brass           | Brass           |
| CF20                        | 1/4" | Stainless steel | Stainless steel |
| CF21                        | 1/4" | Stainless steel | Teflon®         |
| CF22                        | 1/4" | Brass           | Brass           |
| CF30                        | 1/2" | Stainless steel | Stainless steel |
| CF31                        | 1/2" | Stainless steel | Teflon®         |
| CF32                        | 1/2" | Brass           | Brass           |

## **CUTABLE SHEATH WITH LEADWIRE**

### **How to build a part number:**

To order an Applied Sensor Technologies temperature sensor, select the requirements for the categories listed below and fill in the corresponding boxes with your selection. Don't see exactly what you need? Give us a call!

| SENSOR TYPE | ASSEMBLY STYLE | SHEATH DIAMETER | SHEATH MATERIAL | TEMPERATURE RANGE | SHEATH LENGTH | LEADWIRE LENGTH |
|-------------|----------------|-----------------|-----------------|-------------------|---------------|-----------------|
|             |                |                 |                 |                   |               |                 |

#### **SENSOR TYPE**

**RTP1** – Platinum; DIN 0.00385; 100 ohm +/- 0.12% @ 0°C; 3-wire construction

#### **ASSEMBLY STYLE**

**38** – **Field cutable sheath length with leadwire;** Teflon® insulated conductors for temperature range 1; Fiberglass insulated conductors for temperature range 2; cannot be cut to less than 4"

#### **SHEATH DIAMETER**

**6** – 3/16 (0.188)

**7** – 1/4 (0.250)

#### **SHEATH MATERIAL**

**3** – stainless steel

#### **TEMPERATURE RANGE** - Minimum and maximum operating temperatures

**1** – -45 to 260°C (-50 to 500°F)

**2** – -45 to 482°C (-50 to 900°F)

#### **SHEATH LENGTH** (for lengths greater than L=36", consult AST)

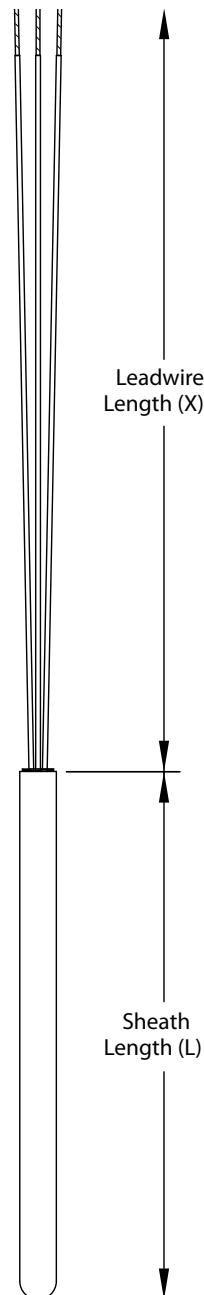
**L#** – (e.g., L6 = 6 inch sheath)

#### **LEADWIRE LENGTH**

**X#** – (e.g., X72 = 72 inch length)

#### **OPTION**

**TAG1** – stainless steel tag and wire



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Style 38



**Many additional components are available in our Sensor Box program, including spring-loaded fittings and plugs and jacks.**

**The Sensor Box allows you to build sensor assemblies on-site, saving time and expense. See the Sensor Box literature for further details.**

## **WELD PAD WITH LEADWIRE**

### **How to build a part number:**

To order an Applied Sensor Technologies temperature sensor, select the requirements for the categories listed below and fill in the corresponding boxes with your selection. Don't see exactly what you need? Give us a call!

| SENSOR TYPE | ASSEMBLY STYLE | SHEATH DIAMETER | SHEATH MATERIAL | TEMPERATURE RANGE | SHEATH LENGTH | LEADWIRE LENGTH | OPTIONS |
|-------------|----------------|-----------------|-----------------|-------------------|---------------|-----------------|---------|
|             |                |                 |                 |                   |               |                 |         |

#### **SENSOR TYPE** (See page 2-14b for optional elements)

**RTP1** – Platinum; DIN 0.00385; 100 ohm +/- 0.12% @ 0°C; 3-wire construction

#### **ASSEMBLY STYLE**

**39** – Sheath with flat weld pad and leadwire; Teflon® insulated conductors; Teflon® jacket; pad same material as sheath, 1" X 1" pad size; 1/8" pad thickness; radiused pad available as an option.

#### **SHEATH DIAMETER**

**6** – 3/16 (0.188)

**7** – 1/4 (0.250)

#### **SHEATH MATERIAL**

**3** – stainless steel

#### **TEMPERATURE RANGE** - Minimum and maximum operating temperatures

**1** – -45 to 260°C (-50 to 500°F)

**2** – -45 to 482°C (-50 to 900°F)

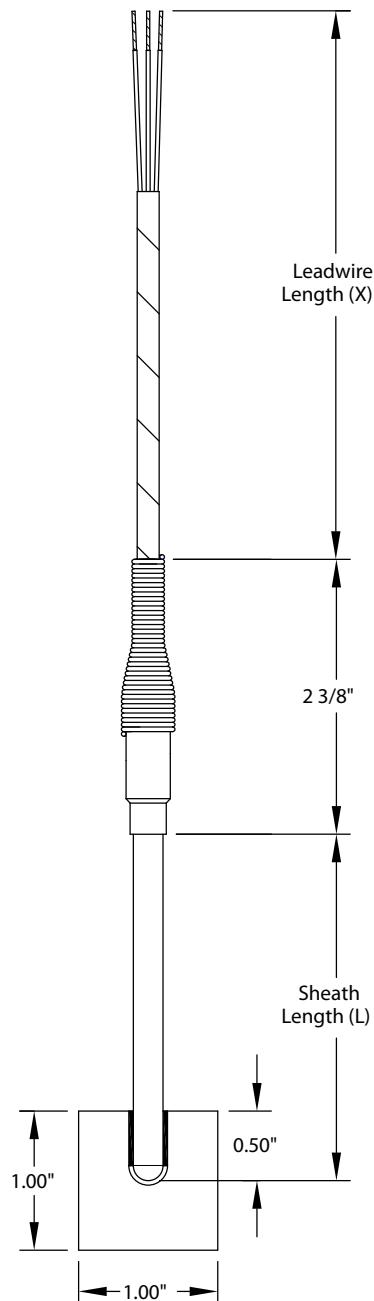
#### **SHEATH LENGTH** (for lengths greater than L=36", consult AST)

**L#** – (e.g., L6 = 6 inch sheath)

#### **LEADWIRE LENGTH**

**X#** – (e.g., X72 = 72 inch length)

#### **OPTIONS** – see page 2-14b



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## STYLE 39

### **AVAILABLE OPTIONS and MODIFICATIONS**

| <b>OPTIONAL ELEMENTS</b>  |  |              |
|---|--|--------------|
| RTDs are standardly platinum, 100-ohm, DIN-curve elements with a 0.00385 alpha.   |  |              |
| Option Code   | Accuracy (at 0°C)  | Construction |
| RTP1 (std.)   | ±0.12%   | 3-wire       |
| RTP1A   | <b>±0.06%</b>  | 3-wire       |
| RTP1AA  | <b>±0.01%</b>  | 3-wire       |
| Note: additional materials, curves and resistance values are available - see Capabilities brochure.   |  |              |
| <b>ASSEMBLY OPTIONS</b>   |  |              |
| Option Code   | Description  |              |
| TAG1  | Stainless steel tag and wire                                       |              |
| CAL1  | NIST traceable calibration [specify point(s)]                      |              |
| CRT1  | Certificate of conformance   |              |
| B45-  | 45° bend in sheath (specify length from tip in inches e.g., B45-6) |              |
| B90-  | 90° bend in sheath (specify length from tip in inches e.g., B90-6) |              |
| <b>WIRING CONNECTION OPTIONS</b>  |  |              |
| Option Code   | Description  |              |
| WC76  | #6 spade terminals, plated copper                                  |              |
| WC70  | #10 spade terminals, plated copper                                 |              |
| WC84  | 1/4" push-on insulated terminals, plated copper                    |              |
| WC90  | #10 ring terminals   |              |
| WC98  | #8 ring terminals  |              |
| <b>PLUGS AND JACKS</b> (Note: plug is designed to be attached to sensor assemblies. Jack options – for customer wiring – should only be specified if plug option is also included. Cable clamp is included for both plug and jack options.) |  |              |
| PJ10  | Standard plug, rated to 177°C (350°F)                              |              |
| PJ20  | Standard jack, rated to 177°C (350°F)                              |              |

| <b>WELD PADS</b>  |                        |
|---|------------------------|
| Pads are normally supplied flat. For matching a pipe radius, use the codes below: |                        |
| WP10  | 1" nominal pipe size   |
| WP15  | 1.5" nominal pipe size |
| WP20  | 2" nominal pipe size   |
| WP25  | 2.5" nominal pipe size |
| WP30  | 3" nominal pipe size   |
| WP35  | 3.5" nominal pipe size |
| WP40  | 4" nominal pipe size   |

## **SHEATH WITH WELDED PROCESS MOUNTING**

### **How to build a part number:**

To order an Applied Sensor Technologies temperature sensor, select the requirements for the categories listed below and fill in the corresponding boxes with your selection. Don't see exactly what you need? Give us a call!

| SENSOR TYPE | ASSEMBLY STYLE | SHEATH DIAMETER | SHEATH MATERIAL | TEMPERATURE RANGE | SHEATH LENGTH | LEADWIRE LENGTH | OPTIONS |
|-------------|----------------|-----------------|-----------------|-------------------|---------------|-----------------|---------|
|             |                |                 |                 |                   |               |                 |         |

#### **SENSOR TYPE** (See page 2-15b for optional elements)

**RTP1** – Platinum; DIN 0.00385; 100 ohm +/- 0.12% @ 0°C; 3-wire construction

(For dual element, add prefix "D"- e.g., **DRTP1**)

#### **ASSEMBLY STYLE**

**23I** – Sheath with single sided instrument mounting; Teflon® insulated conductors; 1/2" NPT stainless steel connection with leadwire

**23P** – Sheath with single sided process mounting; Teflon® insulated conductors; 1/2" NPT stainless steel connection with leadwire

**24** – Sheath with double-sided mounting; Teflon® insulated conductors; 1/2" NPT stainless steel connection

#### **SHEATH DIAMETER** (in inches) (see below for restrictions)

**4** – 1/8 (0.125)

**6** – 3/16 (0.188)

**7** – 1/4 (0.250)

**9** – 3/8 (0.375)

#### **SHEATH MATERIAL**

**3** – 316 stainless steel

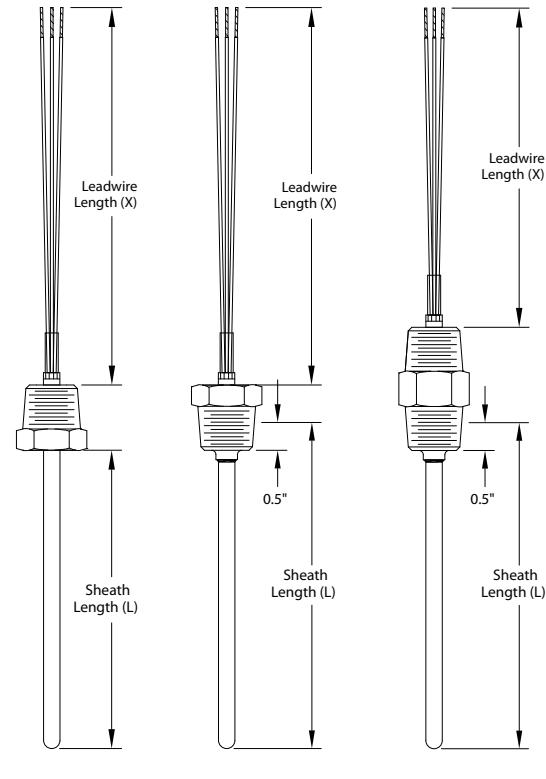
#### **TEMPERATURE RANGE** - Minimum and maximum operating temperatures

**1** – -45 to 260°C (-50 to 500°F)

**2** – -45 to 482°C (-50 to 900°F)

**3** – -45 to 788°C (-50 to 1450°F)

**4** – -200 to 260°C (-328 to 500°F)



#### **SHEATH LENGTH** (for lengths greater than L=36", consult AST)

**L#** – (e.g., L6 = 6 inch sheath)

#### **LEADWIRE LENGTH**

**X#** – (e.g., X72 = 72 inch length)

#### **OPTIONS** – see page 2-15b

| Smallest Diameter Sheath Available By Sensor Type and Temperature Range |        |         |          |        |        |         |          |
|---|--------|---------|----------|--------|--------|---------|----------|
| SINGLE  |        |         |          |        |        |         |          |
| Temp Range  | RTP 1  | RTP 1A  | RTP 1AA  | RTP 6  | RTP 7  | RTP 7A  | RTP 7AA  |
| 1   | 1/8    | 1/8     | 1/8      | 1/8    | 3/16   | 3/16    | 3/16     |
| 2   | 3/16   | 3/16    | 3/16     | 3/16   | 3/16   | 3/16    | 3/16     |
| 3   | 3/16   |         |          | 3/16   | 3/16   |         |          |
| 4   | 1/8    |         |          | 1/8    | 3/16   |         |          |
| DUAL  |        |         |          |        |        |         |          |
| Temp Range  | DRTP 1 | DRTP 1A | DRTP 1AA | DRTP 6 | DRTP 7 | DRTP 7A | DRTP 7AA |
| 1   | 3/16   | 3/16    | 3/16     | 3/16   | 1/4    | 1/4     | 1/4      |
| 2   | 1/4    | 1/4     | 1/4      | 3/16   | 3/8    | 3/8     | 3/8      |
| 3   | 1/4    |         |          | 1/4    | 1/4    |         |          |
| 4   | 3/16   |         |          | 3/16   | 1/4    |         |          |

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## STYLES 23I, 23P & 24

### AVAILABLE OPTIONS and MODIFICATIONS

| OPTIONAL ELEMENTS   |  |               |  |  |
|---|--|---------------|--|--|
| RTDs are standardly platinum, 100-ohm, DIN-curve elements with a 0.00385 alpha.   |  |               |  |  |
| Option Code   | Accuracy (at 0°C)  | Construction  |  |  |
| RTP1 (std.)   | ±0.12%   | 3-wire        |  |  |
| RTP1A   | <b>±0.06%</b>  | 3-wire        |  |  |
| RTP1AA  | <b>±0.01%</b>  | 3-wire        |  |  |
| RTP6  | ±0.12%   | <b>2-wire</b> |  |  |
| RTP7  | ±0.12%   | <b>4-wire</b> |  |  |
| RTP7A   | <b>±0.06%</b>  | <b>4-wire</b> |  |  |
| RTP7AA  | <b>±0.01%</b>  | <b>4-wire</b> |  |  |
| Notes:  |  |               |  |  |
| 1. For dual element, add prefix "D" (e.g., DRTP6)<br>2. Additional materials, curves and resistance values are available - see Capabilities brochure.   |  |               |  |  |
| ASSEMBLY OPTIONS  |  |               |  |  |
| Option Code   | Description  |               |  |  |
| TAG1  | Stainless steel tag and wire                                       |               |  |  |
| CAL1  | NIST traceable calibration [specify point(s)]                      |               |  |  |
| CRT1  | Certificate of conformance   |               |  |  |
| B45-  | 45° bend in sheath (specify length from tip in inches e.g., B45-6) |               |  |  |
| B90-  | 90° bend in sheath (specify length from tip in inches e.g., B90-6) |               |  |  |
| <b>For spring-loaded design, see Style 75</b>   |  |               |  |  |
| <b>For terminal heads, see Styles 15 and 21</b>   |  |               |  |  |
| WIRING CONNECTION OPTIONS   |  |               |  |  |
| Option Code   | Description  |               |  |  |
| WC76  | #6 spade terminals, plated copper                                  |               |  |  |
| WC70  | #10 spade terminals, plated copper                                 |               |  |  |
| WC84  | 1/4" push-on insulated terminals, plated copper                    |               |  |  |
| WC90  | #10 ring terminals   |               |  |  |
| WC98  | #8 ring terminals  |               |  |  |
| <b>PLUGS AND JACKS</b> (Available on 23P only, 2 and 3 wire constructions only.<br>Note: plug is designed to be attached to sensor assemblies. Jack options – for customer wiring – should only be specified if plug option is also included.<br>Cable clamp is included for both plug and jack options.) |  |               |  |  |
| PJ10  | Standard plug, rated to 177°C (350°F)                              |               |  |  |
| PJ20  | Standard jack, rated to 177°C (350°F)                              |               |  |  |

| WELD PADS (Style 23I only) |                        |
|----------------------------|------------------------|
| WP00                       | Horizontal pad/flat    |
| WP10                       | 1" nominal pipe size   |
| WP15                       | 1.5" nominal pipe size |
| WP20                       | 2" nominal pipe size   |
| WP25                       | 2.5" nominal pipe size |
| WP30                       | 3" nominal pipe size   |
| WP35                       | 3.5" nominal pipe size |
| WP40                       | 4" nominal pipe size   |

## **WASHER STYLE WITH LEADWIRE**

### **How to build a part number:**

To order an Applied Sensor Technologies temperature sensor, select the requirements for the categories listed below and fill in the corresponding boxes with your selection. Don't see exactly what you need? Give us a call!

| SENSOR TYPE | ASSEMBLY STYLE | WASHER SIZE | WASHER MATERIAL | TEMPERATURE RANGE | SHEATH LENGTH | LEADWIRE LENGTH | OPTIONS |
|-------------|----------------|-------------|-----------------|-------------------|---------------|-----------------|---------|
|             |                |             |                 |                   |               |                 |         |

**SENSOR TYPE** (See page 2-16b for optional elements)

**RTP1** – Platinum; DIN 0.00385; 100 ohm +/- 0.12% @ 0°C; 3-wire construction

(For dual element, add prefix "D"- e.g., **DRTP1**) (see page 2-16b for restrictions)

### **ASSEMBLY STYLE**

**32 – Washer with leadwire:** Teflon® insulated conductors; armor cable; washer thickness 3/16" (0.188"); Sheath diameter 0.188" only

### **WASHER SIZE** (in inches)

|                         | Washer |       |
|-------------------------|--------|-------|
|                         | ID     | OD    |
| <b>6</b> – 3/16 (0.188) | 0.193  | 0.375 |
| <b>7</b> – 1/4 (0.250)  | 0.255  | 0.500 |
| <b>9</b> – 3/8 (0.375)  | 0.380  | 0.750 |
| <b>10</b> – 1/2 (0.500) | 0.510  | 1.000 |

### **WASHER MATERIAL**

**3** – stainless steel

### **TEMPERATURE RANGE** - Minimum and maximum operating temperatures

**1** – -45 to 260°C (-50 to 500°F)

**2** – -45 to 482°C (-50 to 900°F)

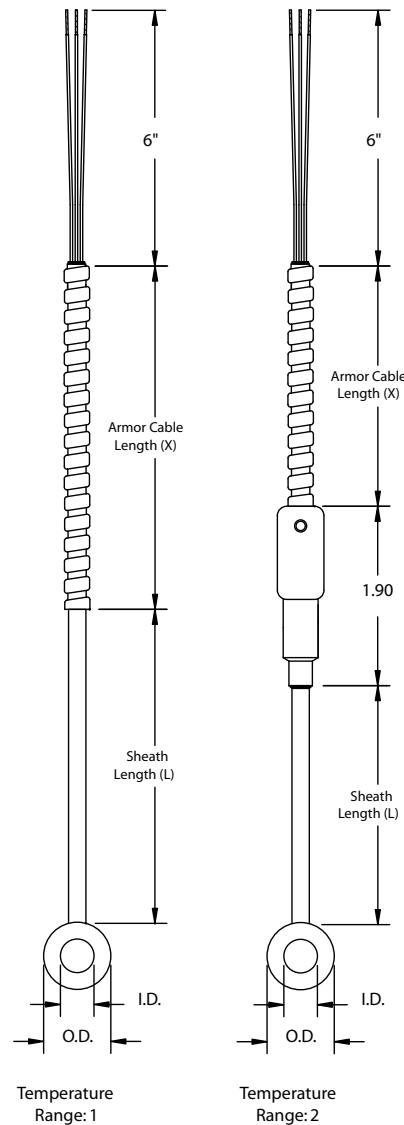
### **SHEATH LENGTH** (for lengths greater than L=36", consult AST)

**L#** – (e.g., L6 = 6 inch sheath)

### **LEADWIRE LENGTH**

**X#** – (e.g., X6 = 6 inch length)

### **OPTIONS** – see page 2-16b



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**AVAILABLE OPTIONS and MODIFICATIONS**

| <b>OPTIONAL ELEMENTS</b>  |  |               |
|---|--|---------------|
| RTDs are standardly platinum, 100-ohm, DIN-curve elements with a 0.00385 alpha.   |  |               |
| Option Code   | Accuracy (at 0°C)  | Construction  |
| RTP1 (std.)   | ±0.12%   | 3-wire        |
| RTP1A   | <b>±0.06%</b>  | 3-wire        |
| RTP1AA  | <b>±0.01%</b>  | 3-wire        |
| RTP6  | ±0.12%   | <b>2-wire</b> |
| RTP7  | ±0.12%   | <b>4-wire</b> |
| RTP7A   | <b>±0.06%</b>  | <b>4-wire</b> |
| RTP7AA  | <b>±0.01%</b>  | <b>4-wire</b> |
| Notes:  |  |               |
| 1. For dual element, add prefix "D" (e.g., DRTP6). Dual available on 2 and 3-wire constructions only.   |  |               |
| 2. Additional materials, curves and resistance values are available - see Capabilities brochure.  |  |               |
| <b>ASSEMBLY OPTIONS</b>   |  |               |
| Option Code   | Description  |               |
| TAG1  | Stainless steel tag and wire                                       |               |
| CAL1  | NIST traceable calibration [specify point(s)]                      |               |
| CRT1  | Certificate of conformance   |               |
| B45-  | 45° bend in sheath (specify length from tip in inches e.g., B45-6) |               |
| B90-  | 90° bend in sheath (specify length from tip in inches e.g., B90-6) |               |
| <b>WIRING CONNECTION OPTIONS</b>  |  |               |
| Option Code   | Description  |               |
| WC76  | #6 spade terminals, plated copper                                  |               |
| WC70  | #10 spade terminals, plated copper                                 |               |
| WC84  | 1/4" push-on insulated terminals, plated copper                    |               |
| WC90  | #10 ring terminals   |               |
| WC98  | #8 ring terminals  |               |
| <b>PLUGS AND JACKS</b> (Note: plug is designed to be attached to sensor assemblies. Jack options – for customer wiring – should only be specified if plug option is also included. Cable clamp is included for both plug and jack options.) |  |               |
| PJ10  | Standard plug, rated to 177°C (350°F)                              |               |
| PJ20  | Standard jack, rated to 177°C (350°F)                              |               |
| <b>BX CONNECTORS</b>  |  |               |
| WC40  | 1/2"   |               |
| WC50  | 3/4"   |               |

## **MOUNTING LUG WITH LEADWIRE**

### **How to build a part number:**

To order an Applied Sensor Technologies temperature sensor, select the requirements for the categories listed below and fill in the corresponding boxes with your selection. Don't see exactly what you need? Give us a call!

| SENSOR TYPE | ASSEMBLY STYLE | LUG HOLE SIZE | TEMPERATURE RANGE | SHEATH LENGTH | LEADWIRE LENGTH | OPTIONS |
|-------------|----------------|---------------|-------------------|---------------|-----------------|---------|
|             |                |               |                   |               |                 |         |

**SENSOR TYPE** (See page 2-17b for optional elements)

**RTP1** – Platinum; DIN 0.00385; 100 ohm +/- 0.12% @ 0°C; 3-wire construction

(For dual element, add prefix "D"- e.g., **DRTP1**)

### **ASSEMBLY STYLE**

**41** – Stainless steel mounting lug with Teflon® leadwire; diameter 0.312" only

### **LUG HOLE SIZE** (in inches)

**6** – 3/16 (0.188)

**7** – 1/4 (0.250)

**9** – 3/8 (0.375)

### **TEMPERATURE RANGE** - Minimum and maximum operating temperatures

**1** – -45 to 260°C (-50 to 500°F)

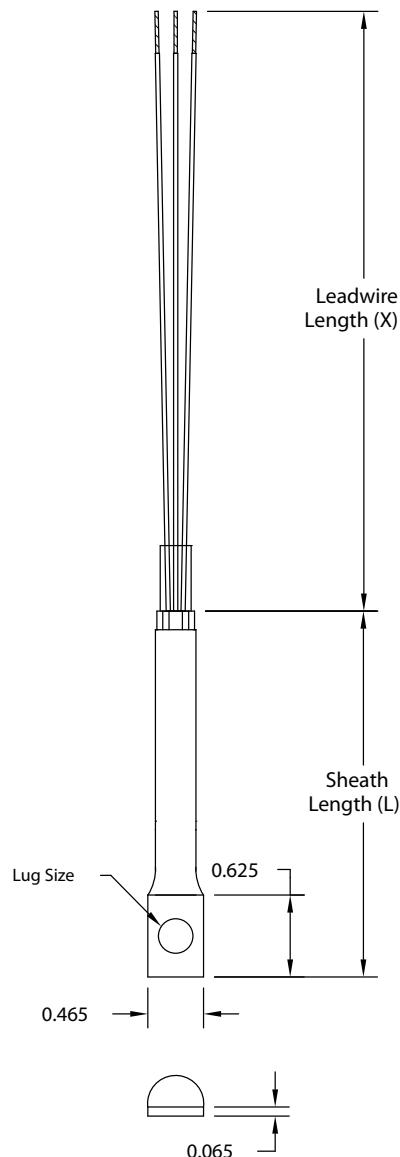
### **SHEATH LENGTH** (Minimum L=1.75"; for lengths greater than L=36", consult AST)

**L#** – (e.g., L6 = 6 inch sheath)

### **LEADWIRE LENGTH**

**X#** – (e.g., X72 = 72 inch length)

### **OPTIONS** – see page 2-17b



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**AVAILABLE OPTIONS and MODIFICATIONS**

| <b>OPTIONAL ELEMENTS</b>  |   |               |
|---|---|---------------|
| RTDs are standardly platinum, 100-ohm, DIN-curve elements with a 0.00385 alpha.   |   |               |
| Option Code   | Accuracy (at 0°C)                               | Construction  |
| RTP1 (std.)   | ±0.12%  | 3-wire        |
| RTP6  | ±0.12%  | <b>2-wire</b> |
| RTP7  | ±0.12%  | <b>4-wire</b> |
| Notes:  |   |               |
| 1. For dual element, add prefix "D" (e.g., DRTP6)<br>2. Additional materials, curves and resistance values are available - see Capabilities brochure.   |   |               |
| <b>ASSEMBLY OPTIONS</b>   |   |               |
| Option Code   | Description                                     |               |
| TAG1  | Stainless steel tag and wire                    |               |
| CAL1  | NIST traceable calibration [specify point(s)]   |               |
| CRT1  | Certificate of conformance                      |               |
| <b>WIRING CONNECTION OPTIONS</b>  |   |               |
| Option Code   | Description                                     |               |
| WC76  | #6 spade terminals, plated copper               |               |
| WC70  | #10 spade terminals, plated copper              |               |
| WC84  | 1/4" push-on insulated terminals, plated copper |               |
| WC90  | #10 ring terminals                              |               |
| WC98  | #8 ring terminals                               |               |
| <b>PLUGS AND JACKS</b> (Note: plug is designed to be attached to sensor assemblies. Jack options – for customer wiring – should only be specified if plug option is also included. Cable clamp is included for both plug and jack options.) |   |               |
| PJ10  | Standard plug, rated to 177°C (350°F)           |               |
| PJ20  | Standard jack, rated to 177°C (350°F)           |               |

## **SHEATH WITH LEADWIRE AND PROTECTIVE TEFILON® SLEEVE**

### **How to build a part number:**

To order an Applied Sensor Technologies temperature sensor, select the requirements for the categories listed below and fill in the corresponding boxes with your selection. Don't see exactly what you need? Give us a call!

| SENSOR TYPE | ASSEMBLY STYLE | SHEATH DIAMETER | SHEATH MATERIAL | TEMPERATURE RANGE | SHEATH LENGTH | TEFLON® SLEEVE | LEADWIRE LENGTH | OPTIONS |
|-------------|----------------|-----------------|-----------------|-------------------|---------------|----------------|-----------------|---------|
|             |                |                 |                 |                   |               |                |                 |         |

**SENSOR TYPE** (See page 2-18b for optional elements)

**RTP1** – Platinum; DIN 0.00385; 100 ohm  $\pm 0.12\%$  @ 0°C; 3-wire construction

(For dual element, add prefix "D"- e.g., **DRTP1**)

### **ASSEMBLY STYLE**

**42** – Sheath with protective Teflon® sleeve; Teflon® insulated leadwire extension beyond Teflon® sleeve

**SHEATH DIAMETER** (in inches) (see below for restrictions)

**6** – 3/16 (0.188) Finished OD = 0.240

**7** – 1/4 (0.250) Finished OD = 0.300

### **SHEATH MATERIAL**

**3** – 316 stainless steel

**TEMPERATURE RANGE** - Minimum and maximum operating temperatures

**1** – -45 to 260°C (-50 to 500°F)

**Sheath Length (L)** (for lengths greater than L=36", consult AST)

**L#** – (e.g., L6 = 6 inch sheath)

### **TEFLON® SLEEVE**

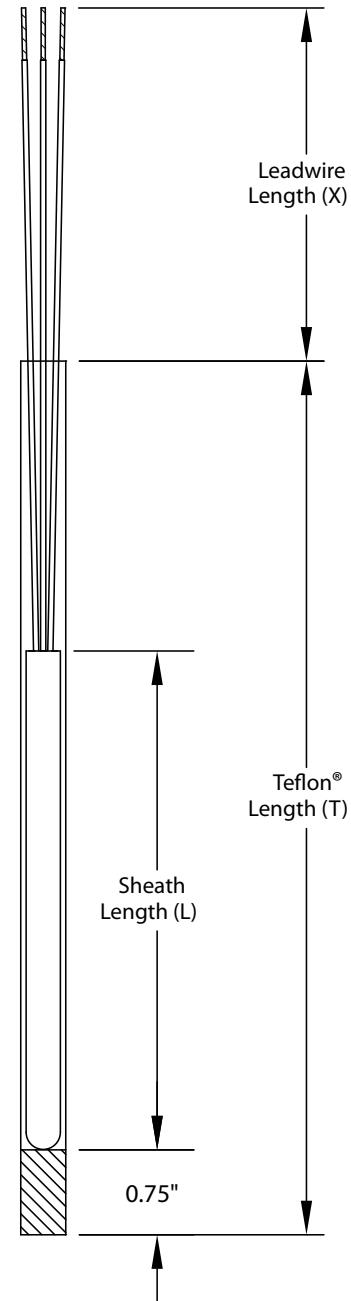
**T#** – (e.g., T12 = 12" of Teflon®)

### **LEADWIRE LENGTH**

**X#** – (e.g., X12.5 = 12.5 inch length beyond Teflon® sleeve)

**OPTIONS** – see page 2-18b

| Smallest Diameter Sheath Available By Sensor Type and Temperature Range |        |         |          |        |        |         |          |
|---|--------|---------|----------|--------|--------|---------|----------|
| SINGLE  |        |         |          |        |        |         |          |
| Temp Range  | RTP 1  | RTP 1A  | RTP 1AA  | RTP 6  | RTP 7  | RTP 7A  | RTP 7AA  |
| 1   | 3/16   | 3/16    | 3/16     | 3/16   | 3/16   | 3/16    | 3/16     |
| DUAL  |        |         |          |        |        |         |          |
| Temp Range  | DRTP 1 | DRTP 1A | DRTP 1AA | DRTP 6 | DRTP 7 | DRTP 7A | DRTP 7AA |
| 1   | 3/16   | 3/16    | 3/16     | 3/16   | 1/4    | 1/4     | 1/4      |



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**AVAILABLE OPTIONS and MODIFICATIONS**

| <b>OPTIONAL ELEMENTS</b>  |  |               |
|---|--|---------------|
| RTDs are standardly platinum, 100-ohm, DIN-curve elements with a 0.00385 alpha.   |  |               |
| Option Code   | Accuracy (at 0°C)  | Construction  |
| RTP1 (std.)   | ±0.12%   | 3-wire        |
| RTP1A   | <b>±0.06%</b>  | 3-wire        |
| RTP1AA  | <b>±0.01%</b>  | 3-wire        |
| RTP6  | ±0.12%   | <b>2-wire</b> |
| RTP7  | ±0.12%   | <b>4-wire</b> |
| RTP7A   | <b>±0.06%</b>  | <b>4-wire</b> |
| RTP7AA  | <b>±0.01%</b>  | <b>4-wire</b> |
| Notes:  |  |               |
| 1. For dual element, add prefix "D" (e.g., DRTP6)<br>2. Additional materials, curves and resistance values are available - see Capabilities brochure.   |  |               |
| <b>ASSEMBLY OPTIONS</b>   |  |               |
| Option Code   | Description  |               |
| TAG1  | Stainless steel tag and wire                                       |               |
| CAL1  | NIST traceable calibration [specify point(s)]                      |               |
| CRT1  | Certificate of conformance   |               |
| B45-  | 45° bend in sheath (specify length from tip in inches e.g., B45-6) |               |
| B90-  | 90° bend in sheath (specify length from tip in inches e.g., B90-6) |               |
| <b>WIRING CONNECTION OPTIONS</b>  |  |               |
| Option Code   | Description  |               |
| WC76  | #6 spade terminals, plated copper                                  |               |
| WC70  | #10 spade terminals, plated copper                                 |               |
| WC84  | 1/4" push-on insulated terminals, plated copper                    |               |
| WC90  | #10 ring terminals   |               |
| WC98  | #8 ring terminals  |               |
| <b>PLUGS AND JACKS</b> (Note: plug is designed to be attached to sensor assemblies. Jack options – for customer wiring – should only be specified if plug option is also included. Cable clamp is included for both plug and jack options.) |  |               |
| PJ10  | Standard plug, rated to 177°C (350°F)                              |               |
| PJ20  | Standard jack, rated to 177°C (350°F)                              |               |

## **ATEX APPROVED CONNECTION HEAD WITH WELDED PROCESS CONNECTION**

### **How to build a part number:**

To order an Applied Sensor Technologies temperature sensor, select the requirements for the categories listed below and fill in the corresponding boxes with your selection. Don't see exactly what you need? Give us a call!

| SENSOR TYPE | ASSEMBLY STYLE | SHEATH DIAMETER | SHEATH MATERIAL | TEMPERATURE RANGE | SHEATH LENGTH | OPTIONS |
|-------------|----------------|-----------------|-----------------|-------------------|---------------|---------|
|             |                |                 |                 |                   |               |         |

#### **SENSOR TYPE** (See page 2-3b for optional elements)

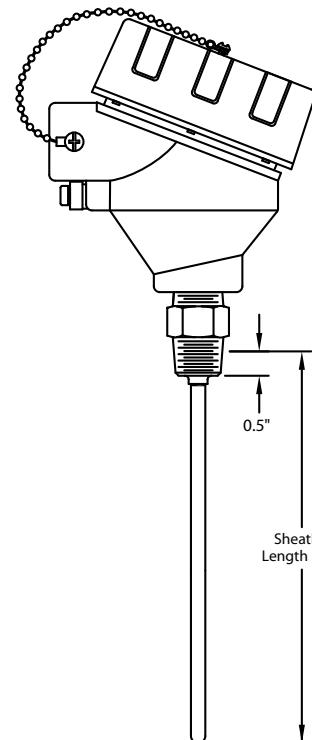
**RTP1** – Platinum; DIN 0.00385; 100 ohm +/- 0.12% @ 0°C; 3-wire construction

(For dual element, add prefix "D" - e.g., DRTP1)

#### **ASSEMBLY STYLE**

**22** – Sheath with cast aluminum head and 1/2" NPT welded stainless

**steel process connection**; head ATEX approved for EEx d IIC; IP66 to 68; screw cover with chain and gasketed o-ring; meets NEMA 4X; ceramic terminal block; 3/4" NPT conduit connection; internal and external ground screws (Note: For spring-loaded fitting, see Style 75 and add optional head).



#### **SHEATH DIAMETER** (in inches) (see below for restrictions)

**4** – 1/8 (0.125)

**6** – 3/16 (0.188)

**7** – 1/4 (0.250)

**9** – 3/8 (0.375)

#### **SHEATH MATERIAL**

**3** – 316 stainless steel

#### **TEMPERATURE RANGE** - Minimum and maximum operating temperatures

**1** – -45 to 260°C (-50 to 500°F)

**2** – -45 to 482°C (-50 to 900°F)

**3** – -45 to 788°C (-50 to 1450°F)

**4** – -200 to 260°C (-328 to 500°F)

#### **SHEATH LENGTH** (for lengths greater than L=36", consult AST)

**L#** – (e.g., L6 = 6 inch sheath)

#### **OPTIONS** – see page 2-19b

| Smallest Diameter Sheath Available By Sensor Type and Temperature Range |        |         |          |        |        |         |          |
|---|--------|---------|----------|--------|--------|---------|----------|
| SINGLE  |        |         |          |        |        |         |          |
| Temp Range  | RTP 1  | RTP 1A  | RTP 1AA  | RTP 6  | RTP 7  | RTP 7A  | RTP 7AA  |
| 1   | 1/8    | 1/8     | 1/8      | 1/8    | 3/16   | 3/16    | 3/16     |
| 2   | 3/16   | 3/16    | 3/16     | 3/16   | 3/16   | 3/16    | 3/16     |
| 3   | 3/16   |         |          | 3/16   | 3/16   |         |          |
| 4   | 1/8    |         |          | 1/8    | 3/16   |         |          |
| DUAL  |        |         |          |        |        |         |          |
| Temp Range  | DRTP 1 | DRTP 1A | DRTP 1AA | DRTP 6 | DRTP 7 | DRTP 7A | DRTP 7AA |
| 1   | 3/16   | 3/16    | 3/16     | 3/16   |        |         |          |
| 2   | 1/4    | 1/4     | 1/4      | 3/16   |        |         |          |
| 3   | 1/4    |         |          | 1/4    |        |         |          |
| 4   | 3/16   |         |          | 3/16   |        |         |          |

## STYLE 22

### **AVAILABLE OPTIONS and MODIFICATIONS**

| <b>OPTIONAL ELEMENTS</b>  |   |               |
|---|---|---------------|
| RTDs are standardly platinum, 100-ohm, DIN-curve elements with a 0.00385 alpha.   |   |               |
| Option Code   | Accuracy (at 0°C)   | Construction  |
| RTP1 (std.)   | ±0.12%  | 3-wire        |
| RTP1A   | <b>±0.06%</b>   | 3-wire        |
| RTP1AA  | <b>±0.01%</b>   | 3-wire        |
| RTP6  | ±0.12%  | <b>2-wire</b> |
| RTP7  | ±0.12%  | <b>4-wire</b> |
| RTP7A   | <b>±0.06%</b>   | <b>4-wire</b> |
| RTP7AA  | <b>±0.01%</b>   | <b>4-wire</b> |
| Notes:  |   |               |
| 1. For dual element, add prefix "D" (e.g., DRTP6)<br>2. Additional materials, curves and resistance values are available - see Capabilities brochure. |   |               |
| <b>ASSEMBLY OPTIONS</b>   |   |               |
| Option Code   | Description   |               |
| TAG1  | Stainless steel tag and wire  |               |
| PC25  | 1/4" NPT process connection   |               |
| PC75  | 3/4" NPT process connection   |               |
| CAL1  | Calibration, NIST traceable calibration [specify point(s)]  |               |
| CRT1  | Certificate of conformance  |               |
| <b>TRANSMITTERS – For complete specs, see Transmitters section</b>  |   |               |
| TR11  | 4-20 mA, 2-wire transmitter, single input, isolated output; specify range and units of measure (e.g., 0-200°C)                                  |               |
| TR12  | 4-20 mA, 2-wire transmitter, single input, non-isolated output; specify range and units of measure (e.g., 0-200°C) and terminal head with *.    |               |
| TR13  | HART®/ 4-20 mA, 2-wire transmitter, single input, isolated output; specify range and units of measure (e.g., 0-200°C) and terminal head with *. |               |

| <b>EXPLOSION-PROOF TERMINAL HEAD OPTIONS</b> |                    |                    |
|--|--------------------|--------------------|
| Option Code                                  | Process Connection | Conduit Connection |
| Same specifications as standard              |                    |                    |
| HD72   | 1/2"               | 1/2"               |

## **BAR STOCK, NPT CONNECTION, NO LAG**

### **How to build a part number:**

To order an Applied Sensor Technologies thermowell, select the requirements for the categories listed below and fill in the corresponding boxes with your selection. Don't see exactly what you need? Give us a call!

| PROCESS CONNECTION | STYLE | BORE | WELL LENGTH | WELL MATERIAL | OPTIONS |
|--------------------|-------|------|-------------|---------------|---------|
|                    |       |      |             |               |         |

#### **PROCESS CONNECTION (P)**

- 1** - 1/2" NPT
- 2** - 3/4" NPT
- 3** - 1" NPT
- 5** - 1-1/2" NPT

#### **STYLE**

- S** - Stepped stem (0.260" bore only; for straight stem, see Options)
- H** - Tapered stem

#### **BORE**

- 260** - 0.260" bore
- 385** - 0.385" bore

#### **WELL LENGTH (in inches)\***

**L#** - Specify length of thermowell (e.g., L4=4")

Standard lengths:

- |                             |                             |
|-----------------------------|-----------------------------|
| <b>L4</b> - L=4"; U=2.5"    | <b>L6</b> - L=6"; U=4.5"    |
| <b>L9</b> - L=9"; U=7.5"    | <b>L12</b> - L=12"; U=10.5" |
| <b>L15</b> - L=15"; U=13.5" | <b>L18</b> - L=18"; U=16.5" |
| <b>L24</b> - L=24"; U=22.5" |                             |

Specify other (L = U + 1.5")

#### **WELL MATERIAL**

- |                                  |  |
|----------------------------------|--|
| --- 304 stainless steel          | <b>316L</b> - 316L stainless steel     |
| <b>310</b> - 310 stainless steel | <b>400</b> - Monel 400®                |
| <b>316</b> - 316 stainless steel | <b>CS</b> - Carbon steel               |
| <b>INC</b> - Inconel 600®        | <b>F11</b> - F11 carbon steel (forged) |
| <b>321</b> - 321 stainless steel | <b>F22</b> - F22 carbon steel (forged) |
| <b>ALUM</b> - Aluminum           | <b>F91</b> - F91 carbon steel (forged) |
| <b>HAST</b> - Hastelloy C®       | <b>A20</b> - Alloy 20                  |
| <b>TTNM</b> - Titanium           | <b>BRASS</b> - Brass                   |

#### **OPTIONS**

**TW01** - Stainless steel cap and chain assembly

**TW02** - Brass cap and chain assembly

**TAG2** - Stamped tag #

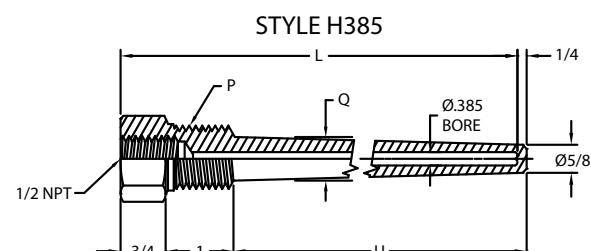
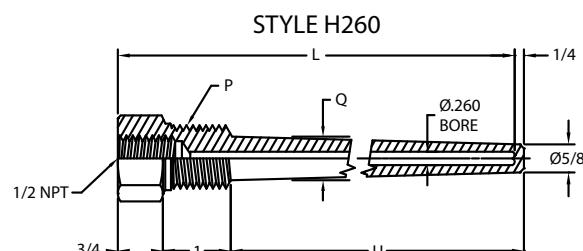
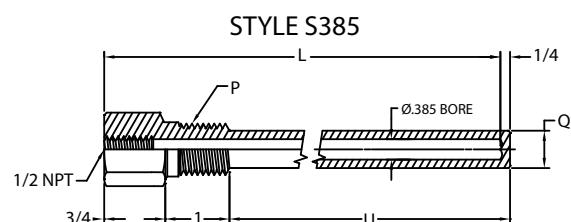
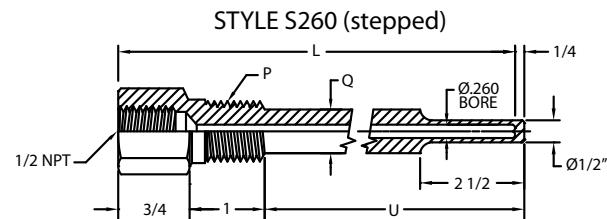
**STRT** - Straight stem

**MTR1** - Material Test Report

**WFC1** - Wake Frequency Calculation

Root Diameter (Q)

| Process Connection = | 1/2" NPT | 3/4" NPT | 1" NPT | 1-1/2" NPT |
|----------------------|----------|----------|--------|------------|
| S260 and S385        | .63"     | .75"     | .88"   | .88"       |
| H260 and H385        | .63"     | .88"     | 1.06"  | 1.63"      |



(\* ) Thermowells with an overall length of 42" or less are machined from SOLID BAR STOCK. Thermowells with an overall length greater than 42" are constructed using a welded design and are available in straight, stepped or tapered design. However, for tapered only the last 16" are tapered.

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## BAR STOCK, NPT CONNECTION WITH LAG

### How to build a part number:

To order an Applied Sensor Technologies thermowell, select the requirements for the categories listed below and fill in the corresponding boxes with your selection. Don't see exactly what you need? Give us a call!

| PROCESS CONNECTION | STYLE | BORE | WELL LENGTH | LAG EXTENSION | WELL MATERIAL | OPTIONS |
|--------------------|-------|------|-------------|---------------|---------------|---------|
|                    |       |      |             |               |               |         |

#### PROCESS CONNECTION (P)

**1** - 1/2" NPT

**2** - 3/4" NPT

**3** - 1" NPT

**5** - 1-1/2" NPT

#### STYLE

**SL** - NPT connection, stepped stem with lag extension (for straight stem, see Options)

**HL** - NPT connection, tapered stem, with lag extension

#### BORE

**260** - 0.260" bore

**385** - 0.385" bore

#### WELL LENGTH (in inches)\*

**L#** - Specify length of thermowell (e.g., L9=9")

Standard lengths:

| Length (L) = | U =       |           |
|--------------|-----------|-----------|
|              | If T = 2" | If T = 3" |
| <b>L6</b>    | 6"        | 2.5"      |
| <b>L9</b>    | 9"        | 5.5"      |
| <b>L12</b>   | 12"       | 8.5"      |
| <b>L15</b>   | 15"       | 11.5"     |
| <b>L18</b>   | 18"       | 14.5"     |
| <b>L24</b>   | 24"       | 20.5"     |

Specify other (L = U+T+1.5")

#### LAG EXTENSION (in inches)

**T#** - Specify length of lagging (e.g., T2 = 2" lag)

**T2** - 2"    **T3** - 3"

Specify other

#### WELL MATERIAL

--- 304 stainless steel

**310** - 310 stainless steel

**316** - 316 stainless steel

**INC** - Inconel 600®

**321** - 321 stainless steel

**ALUM** - Aluminum

**HAST** - Hastelloy C®

**TTNM** - Titanium

**316L** - 316L stainless steel

**400** - Monel 400®

**CS** - Carbon steel

**F11** - F11 carbon steel (forged)

**F22** - F22 carbon steel (forged)

**F91** - F91 carbon steel (forged)

**A20** - Alloy 20

**BRASS** - Brass

#### OPTIONS

**TW01** - Stainless steel cap and chain assembly

**TW02** - Brass cap and chain assembly

**TAG2** - Stamped tag #

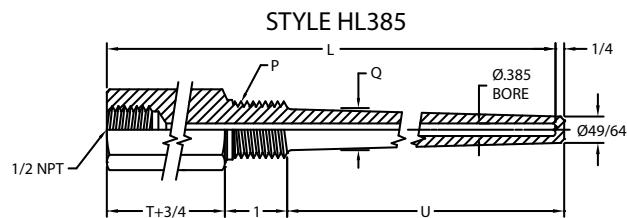
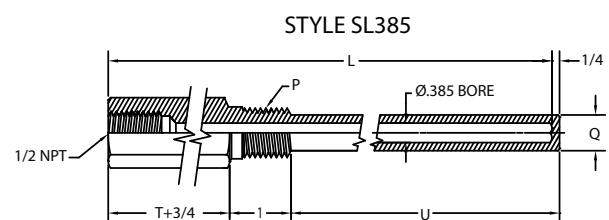
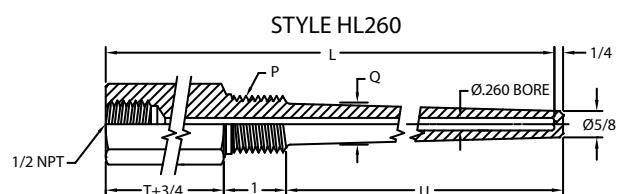
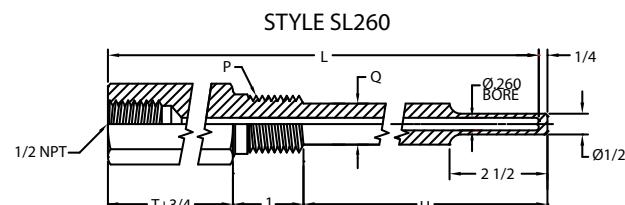
**STRT** - Straight stem

**MTR1** - Material Test Report

**WFC1** - Wake Frequency Calculation

Root Diameter (Q)

| Process Connection = | 1/2" NPT | 3/4" NPT | 1" NPT | 1-1/2" NPT |
|----------------------|----------|----------|--------|------------|
| SL260 and SL385      | .63"     | .75"     | .88"   | .88"       |
| HL260 and HL385      | .68"     | .88"     | 1.06"  | 1.63"      |



(\*) Thermowells with an overall length of 42" or less are machined from SOLID BAR STOCK. Thermowells with an overall length greater than 42" are constructed using a welded design and are available in straight, stepped or tapered design. However, for tapered only the last 16" are tapered.

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## **BAR STOCK, NPT CONNECTION, LIMITED SPACE**

### **How to build a part number:**

To order an Applied Sensor Technologies thermowell, select the requirements for the categories listed below and fill in the corresponding boxes with your selection. Don't see exactly what you need? Give us a call!

| PROCESS CONNECTION | STYLE | BORE | WELL MATERIAL | OPTIONS |
|--------------------|-------|------|---------------|---------|
|                    |       |      |               |         |

#### **PROCESS CONNECTION (P)**

- 1** – 1/2" NPT
- 2** – 3/4" NPT
- 3** – 1" NPT

#### **STYLE**

**LS** – Limited space, straight stem

#### **BORE**

- 260** – 0.260" bore
- 385** – 0.385" bore

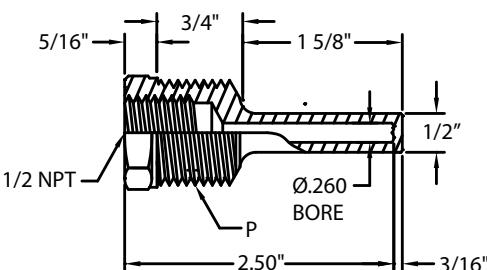
#### **WELL MATERIAL**

- 304 stainless steel
- 316L** – 316L stainless steel
- 310** – 310 stainless steel
- 316** – 316 stainless steel
- INC** – Inconel 600®
- 321** – 321 stainless steel
- ALUM** – Aluminum
- HAST** – Hastelloy C®
- TTNM** – Titanium
- 400** – Monel 400®
- CS** – Carbon steel
- F11** – F11 carbon steel (forged)
- F22** – F22 carbon steel (forged)
- F91** – F91 carbon steel (forged)
- A20** – Alloy 20
- BRASS** – Brass

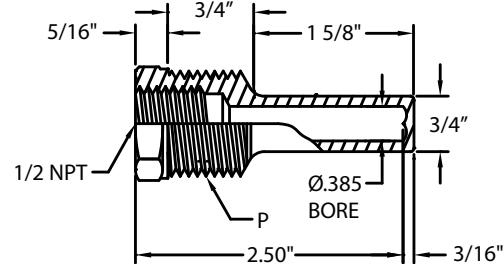
#### **OPTIONS**

- TW01** – Stainless steel cap and chain assembly
- TW02** – Brass cap and chain assembly
- TAG2** – Stamped tag #
- MTR1** – Material Test Report

**STYLE LS260**



**STYLE LS385**



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## **BAR STOCK, FLANGE CONNECTION**

### **How to build a part number:**

To order an Applied Sensor Technologies thermowell, select the requirements for the categories listed below and fill in the corresponding boxes with your selection. Don't see exactly what you need? Give us a call!

| STYLE | BORE | INSERTION LENGTH | WELL & FLANGE MATERIAL | FLANGE SIZE | FLANGE RATING | FLANGE TYPE | OPTIONS |
|-------|------|------------------|------------------------|-------------|---------------|-------------|---------|
|       |      |                  |                        |             |               |             |         |

#### **STYLE**

**F** – Flanged connection, stepped stem (for straight stem, see Options)  
**FH** – Flanged connection, tapered stem

#### **BORE**

**260** – 0.260" bore  
**385** – 0.385" bore

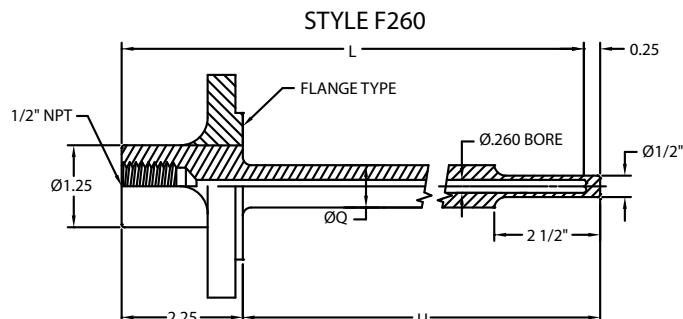
#### **INSERTION LENGTH** (in inches)\*

**U#** – Specify length below the flange (e.g., U4 = 4")

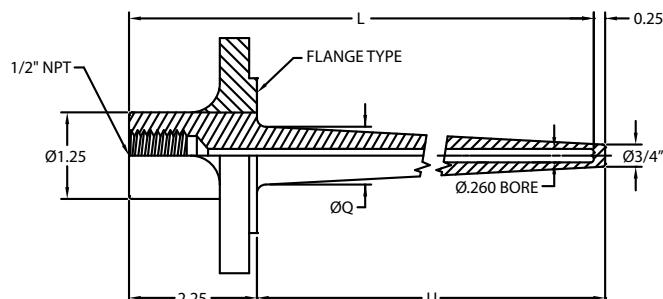
Standard lengths:

**U4** – U=4"; L=6"      **U7** – U=7"; L=9"  
**U10** – U=10"; L=12"    **U13** – U=13"; L=15"  
**U16** – U=16"; L=18"    **U22** – U=22"; L=24"

Specify other (L = U + 2")



**STYLE FH260**



#### **WELL AND FLANGE MATERIAL**

|                                  |  |
|----------------------------------|--|
| --- – 304 stainless steel        | <b>316L</b> – 316L stainless steel     |
| <b>310</b> – 310 stainless steel | <b>400</b> – Monel 400®                |
| <b>316</b> – 316 stainless steel | <b>CS</b> – Carbon steel               |
| <b>INC</b> – Inconel 600®        | <b>F11</b> – F11 carbon steel (forged) |
| <b>321</b> – 321 stainless steel | <b>F22</b> – F22 carbon steel (forged) |
| <b>ALUM</b> – Aluminum           | <b>F91</b> – F91 carbon steel (forged) |
| <b>HAST</b> – Hastelloy C®       | <b>A20</b> – Alloy 20                  |
| <b>TTNM</b> – Titanium           | <b>BRASS</b> – Brass                   |

|             | Root Diameter (Q)   |
|-------------|---|
| F260        | 0.75"   |
| F385        | 0.75"   |
| FH260 & 385 | 1" flange = .88"<br>1.5" flange = 1.06"<br>All others = 1.25" |

#### **FLANGE SIZE**

|                      |                          |
|----------------------|--------------------------|
| <b>1</b> – 1" flange | <b>1.5</b> – 1.5" flange |
| <b>2</b> – 2" flange | <b>3</b> – 3" flange     |
| <b>4</b> – 4" flange |                          |

#### **FLANGE RATING**

|                          |                                    |
|--------------------------|------------------------------------|
| <b>150</b> – 150# rating | <b>300</b> – 300# rating           |
| <b>600</b> – 600# rating | <b>900/1500</b> – 900/1500# rating |

#### **FLANGE TYPE**

**RF** – Welded, raised face (standard)  
**FF** – Welded, flat face  
**RTJ** – Ring type joint

#### **OPTIONS**

**TW01** – Stainless steel cap and chain assembly  
**TW02** – Brass cap and chain assembly  
**TAG2** – Stamped tag #  
**STRT** – Straight stem  
**MTR1** – Material Test Report  
**WFC1** – Wake Frequency Calculation  
**TFLN** – Teflon sleeve or coating

(\*) Thermowells with an overall length of 42" or less are machined from SOLID BAR STOCK. Thermowells with an overall length greater than 42" are constructed using a welded design and are available in straight, stepped or tapered design. However, for tapered only the last 16" are tapered.

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## **BAR STOCK, SOCKET-WELD CONNECTION, NO LAG**

### **How to build a part number:**

To order an Applied Sensor Technologies thermowell, select the requirements for the categories listed below and fill in the corresponding boxes with your selection. Don't see exactly what you need? Give us a call!

| PROCESS CONNECTION | STYLE | BORE | WELL LENGTH | WELL MATERIAL | OPTIONS |
|--------------------|-------|------|-------------|---------------|---------|
|                    |       |      |             |               |         |

#### **PROCESS CONNECTION (P)**

**2** – 3/4" pipe (OD = 1.05")

**3** – 1" pipe (OD = 1.315")

**5** – 1-1/2" pipe (OD = 1.90")

#### **STYLE**

**SW** – Socket-weld connection, stepped stem, no lag (for straight stem, see Options)

**SWH** – Socket-weld connection, tapered stem, no lag

#### **BORE**

**260** – 0.260" bore

**385** – 0.385" bore

#### **WELL LENGTH (in inches)\***

**L#** – Specify length of thermowell (e.g., L4 = 4")

Standard lengths:

**L4** – L=4"; U=2.5"

**L9** – L=9"; U=7.5"

**L15** – L=15"; U=13.5"

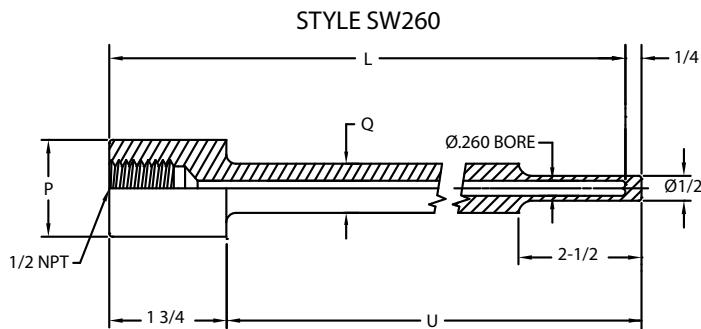
**L24** – L=24"; U=22.5"

**L6** – L=6"; U=4.5"

**L12** – L=12"; U=10.5"

**L18** – L=18"; U=16.5"

Specify other (L = U+1.5")



#### **WELL MATERIAL**

--- 304 stainless steel

**316L** – 316L stainless steel

**310** – 310 stainless steel

**400** – Monel 400®

**316** – 316 stainless steel

**CS** – Carbon steel

**INC** – Inconel 600®

**F11** – F11 carbon steel (forged)

**321** – 321 stainless steel

**F22** – F22 carbon steel (forged)

**ALUM** – Aluminum

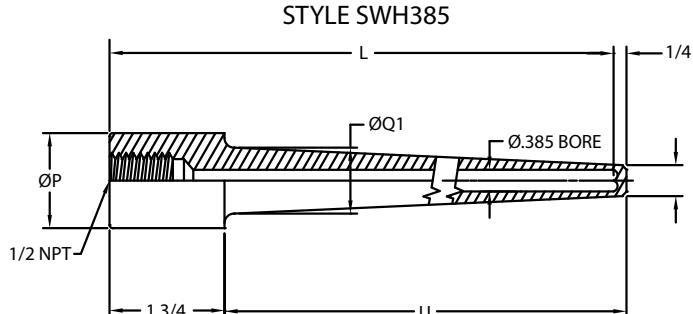
**F91** – F91 carbon steel (forged)

**HAST** – Hastelloy C®

**A20** – Alloy 20

**TTNM** – Titanium

**BRASS** – Brass



#### **OPTIONS**

**TW01** – Stainless steel cap and chain assembly

**TW02** – Brass cap and chain assembly

**TAG2** – Stamped tag #

**STRT** – Straight stem

**MTR1** – Material Test Report

**WFC1** – Wake Frequency Calculations

Root Diameter (Q)

| Process Connection = | 3/4" pipe | 1" pipe | 1.5" pipe |
|----------------------|-----------|---------|-----------|
| SW260 & 385          | .75"      | .88"    | 1.13"     |
| SWH260 & 385         | .75"      | 1.00"   | 1.25"     |
| SWH Tip Diameter     | .63"      | .75"    | .75"      |

(\* ) Thermowells with an overall length of 42" or less are machined from SOLID BAR STOCK. Thermowells with an overall length greater than 42" are constructed using a welded design and are available in straight, stepped or tapered design. However, for tapered only the last 16" are tapered.

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## **BAR STOCK, SOCKET-WELD CONNECTION WITH LAG**

### **How to build a part number:**

To order an Applied Sensor Technologies thermowell, select the requirements for the categories listed below and fill in the corresponding boxes with your selection. Don't see exactly what you need? Give us a call!

| PROCESS CONNECTION | STYLE | BORE | WELL LENGTH | LAG EXTENSION | WELL MATERIAL | OPTIONS |
|--------------------|-------|------|-------------|---------------|---------------|---------|
|                    |       |      |             |               |               |         |

#### **PROCESS CONNECTION (P)**

**2** – 3/4" pipe (OD = 1.05")

**3** – 1" pipe (OD = 1.315")

**5** – 1-1/2" pipe (OD = 1.90")

#### **STYLE**

**SWL** – Socket-weld connection, stepped stem, no lag (for straight stem, see Options)

**SWLH** – Socket-weld connection, tapered stem, no lag

#### **BORE**

**260** – 0.260" bore

**385** – 0.385" bore

#### **WELL LENGTH (in inches)\***

**L#** – Specify length of thermowell (e.g., L9 = 9")

Standard lengths:

| U =          |           |           |
|--------------|-----------|-----------|
| Length (L) = | If T = 2" | If T = 3" |
| <b>L6</b>    | 6"        | 2.5"      |
| <b>L9</b>    | 9"        | 5.5"      |
| <b>L12</b>   | 12"       | 8.5"      |
| <b>L15</b>   | 15"       | 11.5"     |
| <b>L18</b>   | 18"       | 14.5"     |
| <b>L24</b>   | 24"       | 20.5"     |

Specify other (L = U+T+1.5")

#### **LAG EXTENSION (in inches)**

**T#** – Specify length of lagging (e.g., T2=2" lag)

**T2** – 2"    **T3** – 3"    Specify other

#### **WELL MATERIAL**

--- 304 stainless steel

**316L** – 316L stainless steel

**310** – 310 stainless steel

**400** – Monel 400®

**316** – 316 stainless steel

**CS** – Carbon steel

**INC** – Inconel 600®

**F11** – F11 carbon steel (forged)

**321** – 321 stainless steel

**F22** – F22 carbon steel (forged)

**ALUM** – Aluminum

**F91** – F91 carbon steel (forged)

**HAST** – Hastelloy C®

**A20** – Alloy 20

**TTNM** – Titanium

**BRASS** – Brass

#### **OPTIONS**

**TW01** – Stainless steel cap and chain assembly

**TW02** – Brass cap and chain assembly

**MTR1** – Material Test Report

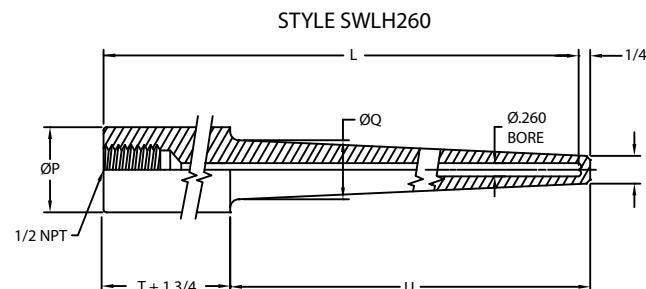
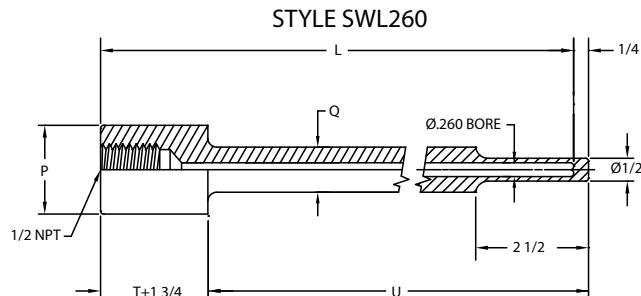
**TAG2** – Stamped tag #

**WFC1** – Wake Frequency Calculations

**STRT** – Straight stem

Root Diameter (Q)

| Process Connection =     | 3/4" pipe | 1" pipe | 1.5" pipe |
|--------------------------|-----------|---------|-----------|
| <b>SWL260 &amp; 385</b>  | .75"      | .88"    | 1.25"     |
| <b>SWLH260 &amp; 385</b> | .75"      | 1.00"   | 1.25"     |
| <b>SWLH Tip Diameter</b> | .63"      | .75"    | .75"      |



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## **BAR STOCK, WELD-IN CONNECTION, NO LAG**

### **How to build a part number:**

To order an Applied Sensor Technologies thermowell, select the requirements for the categories listed below and fill in the corresponding boxes with your selection. Don't see exactly what you need? Give us a call!

| PROCESS CONNECTION | STYLE | BORE | WELL LENGTH | WELL MATERIAL | OPTIONS |
|--------------------|-------|------|-------------|---------------|---------|
|                    |       |      |             |               |         |

#### **PROCESS CONNECTION (P)**

- 2** – 3/4" pipe (OD = 1.05")
- 3** – 1" pipe (OD = 1.315")
- 5** – 1-1/2" pipe (OD = 1.90")

#### **STYLE**

**WIH** – Weld-in, tapered stem, no lag

#### **BORE**

- 260** – 0.260" bore
- 385** – 0.385" bore

#### **WELL LENGTH (in inches)\***

**L#** – Specify length of thermowell (e.g., L4 = 4")

Standard lengths:

- |                             |                             |
|-----------------------------|-----------------------------|
| <b>L4</b> – L=4"; U=2.5"    | <b>L6</b> – L=6"; U=4.5"    |
| <b>L9</b> – L=9"; U=7.5"    | <b>L12</b> – L=12"; U=10.5" |
| <b>L15</b> – L=15"; U=13.5" | <b>L18</b> – L=18"; U=16.5" |
| <b>L24</b> – L=24"; U=22.5" |                             |

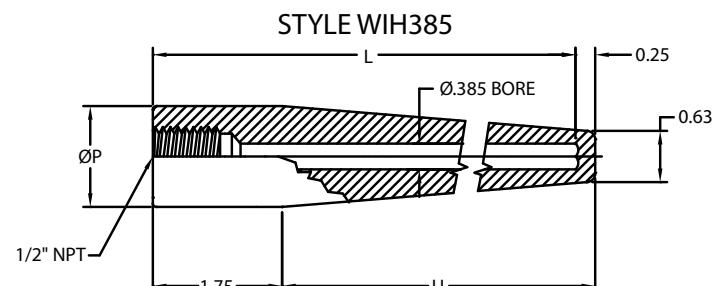
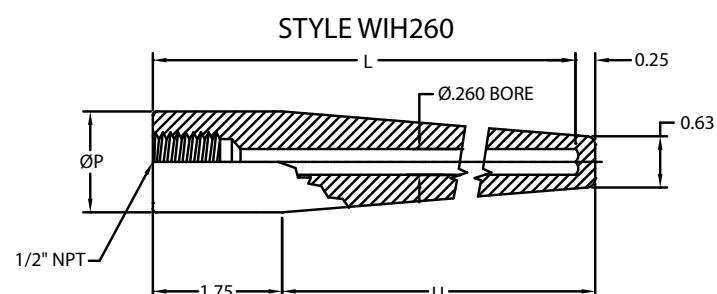
Specify other (L = U+1.5")

#### **WELL MATERIAL**

- |                                  |  |
|----------------------------------|--|
| --- – 304 stainless steel        | <b>316L</b> – 316L stainless steel     |
| <b>310</b> – 310 stainless steel | <b>400</b> – Monel 400®                |
| <b>316</b> – 316 stainless steel | <b>CS</b> – Carbon steel               |
| <b>INC</b> – Inconel 600®        | <b>F11</b> – F11 carbon steel (forged) |
| <b>321</b> – 321 stainless steel | <b>F22</b> – F22 carbon steel (forged) |
| <b>ALUM</b> – Aluminum           | <b>F91</b> – F91 carbon steel (forged) |
| <b>HAST</b> – Hastelloy C®       | <b>A20</b> – Alloy 20                  |
| <b>TTNM</b> – Titanium           | <b>BRASS</b> – Brass                   |

#### **OPTIONS**

- TW01** – Stainless steel cap and chain assembly
- TWO2** – Brass cap and chain assembly
- TAG2** – Stamped tag #
- MTR1** – Material Test Report
- WFC1** – Wake Frequency Calculations



(\*) Thermowells with an overall length of 42" or less are machined from SOLID BAR STOCK. Thermowells with an overall length greater than 42" are constructed using a welded design and are available in straight, stepped or tapered design. However, for tapered only the last 16" are tapered.

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## **BAR STOCK, WELD-IN CONNECTION WITH LAG**

### **How to build a part number:**

To order an Applied Sensor Technologies thermowell, select the requirements for the categories listed below and fill in the corresponding boxes with your selection. Don't see exactly what you need? Give us a call!

| PROCESS CONNECTION | STYLE | BORE | WELL LENGTH | LAG EXTENSION | WELL MATERIAL | OPTIONS |
|--------------------|-------|------|-------------|---------------|---------------|---------|
|                    |       |      |             |               |               |         |

#### **PROCESS CONNECTION (P)**

**2** – 3/4" pipe (OD = 1.05")

**3** – 1" pipe (OD = 1.315")

**5** – 1-1/2" pipe (OD = 1.90")

#### **STYLE**

**WIHL** – Weld-in, tapered stem with lag extension

#### **BORE**

**260** – 0.260" bore

**385** – 0.385" bore

#### **WELL LENGTH (in inches)\***

**L#** – Specify length of thermowell (e.g., L9 = 9")

Standard lengths:

| U =          |           |           |
|--------------|-----------|-----------|
| Length (L) = | If T = 2" | If T = 3" |
| <b>L6</b>    | 6"        | 2.5"      |
| <b>L9</b>    | 9"        | 5.5"      |
| <b>L12</b>   | 12"       | 8.5"      |
| <b>L15</b>   | 15"       | 11.5"     |
| <b>L18</b>   | 18"       | 14.5"     |
| <b>L24</b>   | 24"       | 20.5"     |

Specify other (L = U+T+1.5")

#### **LAG EXTENSION (in inches)**

**T#** – Specify length of lagging (e.g., T2=2" lag)

**T2** – 2"    **T3** – 3"    **Specify other**

#### **WELL MATERIAL**

--- 304 stainless steel

**316L** – 316L stainless steel

**310** – 310 stainless steel

**400** – Monel 400®

**316** – 316 stainless steel

**CS** – Carbon steel

**INC** – Inconel 600®

**F11** – F11 carbon steel (forged)

**321** – 321 stainless steel

**F22** – F22 carbon steel (forged)

**ALUM** – Aluminum

**F91** – F91 carbon steel (forged)

**HAST** – Hastelloy C®

**A20** – Alloy 20

**TTNM** – Titanium

**BRASS** – Brass

#### **OPTIONS**

**TW01** – Stainless steel cap and chain assembly

(\*) Thermowells with an overall length of 42" or less are machined from SOLID BAR STOCK. Thermowells with an overall length greater than 42" are constructed using a welded design and are available in straight, stepped or tapered design. However, for tapered only the last 16" are tapered.

**TWO2** – Brass cap and chain assembly

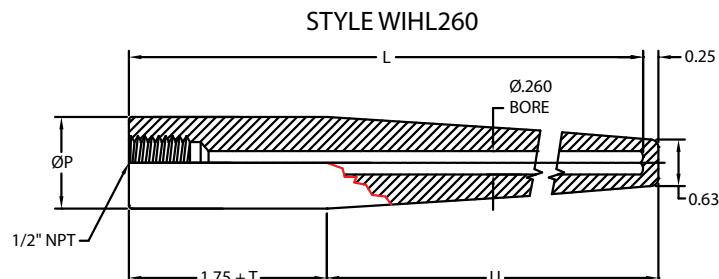
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**TAG2** – Stamped tag #

Hastelloy® is a registered trademark of Haynes Int'l.

**MTR1** – Material Test Report

**WFC1** – Wake Frequency Calculations



## **BAR STOCK, VAN STONE FLANGE CONNECTION**

### **How to build a part number:**

To order an Applied Sensor Technologies thermowell, select the requirements for the categories listed below and fill in the corresponding boxes with your selection. Don't see exactly what you need? Give us a call!

| PROCESS CONNECTION | STYLE | BORE | INSERTION LENGTH | WELL MATERIAL | FLANGE MATERIAL | FLANGE RATING | OPTIONS |
|--------------------|-------|------|------------------|---------------|-----------------|---------------|---------|
|                    |       |      |                  |               |                 |               |         |

#### **PROCESS CONNECTION (P)**

**3** – 1" pipe (OD = 1.315", R = 2")

**5** – 1-1/2" pipe (OD = 1.90", R = 2-7/8")

#### **STYLE**

**VS** – Van Stone Flange, straight stem with step

#### **BORE**

**260** – 0.260" bore (Q = 3/4")

**385** – 0.385" bore (Q = 7/8")

#### **INSERTION LENGTH (in inches)\***

**U#** – Specify length below the flange (e.g., U4 = 4")

Standard lengths:

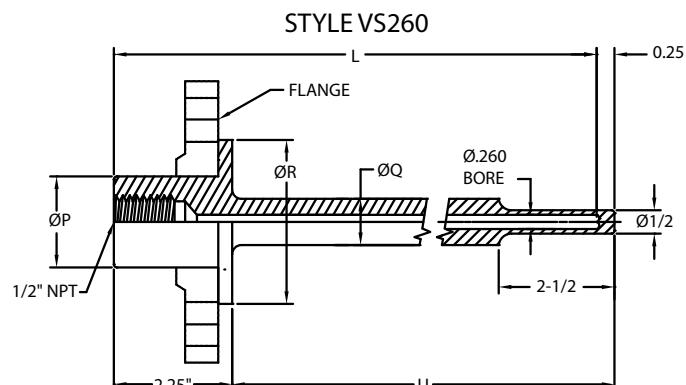
**U2** – U=2"; L=4"      **U4** – U=4"; L=6"

**U7** – U=7"; L=9"      **U10** – U=10"; L=12"

**U13** – U=13"; L=14"    **U16** – U=16"; L=18"

**U22** – U=22"; L=24"

Specify other (U = L-2")



#### **WELL MATERIAL**

**304** – 304 stainless steel

**316L** – 316L stainless steel

**310** – 310 stainless steel

**400** – Monel 400®

**316** – 316 stainless steel

**CS** – Carbon steel

**INC** – Inconel 600®

**F11** – F11 carbon steel (forged)

**321** – 321 stainless steel

**F22** – F22 carbon steel (forged)

**ALUM** – Aluminum

**F91** – F91 carbon steel (forged)

**HAST** – Hastelloy C®

**A20** – Alloy 20

**TTNM** – Titanium

**BRASS** – Brass

#### **FLANGE MATERIAL**

**304** – 304 stainless steel

**316** – 316 stainless steel

#### **FLANGE RATING**

**150** – 150# rating

**300** – 300# rating

**600** – 600# rating

**900/1500** – 900/1500# rating

#### **OPTIONS**

**TW01** – Stainless steel cap and chain assembly

**TW02** – Brass cap and chain assembly

**TAG2** – Stamped tag #

**MTR1** – Material Test Report

**WFC1** – Wake Frequency Calculations

**TFLN** – Teflon coating

(\*) Thermowells with an overall length of 42" or less are machined from SOLID BAR STOCK. Thermowells with an overall length greater than 42" are constructed using a welded design and are available in straight, stepped or tapered design. However, for tapered only the last 16" are tapered.

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## **CERAMIC TUBE, NO MOUNTING FITTING**

### **How to build a part number:**

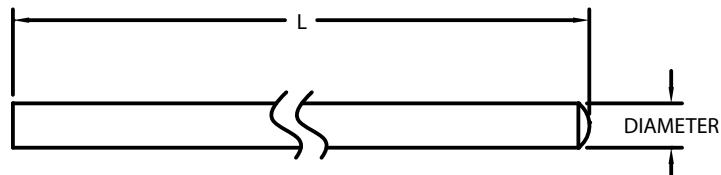
To order an Applied Sensor Technologies protection tube, select the requirements for the categories listed below and fill in the corresponding boxes with your selection. Don't see exactly what you need? Give us a call!

| STYLE | TUBE DIAMETER | TUBE MATERIAL | LENGTH |
|-------|---------------|---------------|--------|
|       |               |               |        |

#### **STYLE**

**CT1** – Ceramic protection tube, no mounting fitting

**CT1**



#### **TUBE DIAMETER**

##### **O.D.**

- 0** – 0.375"
- 1** – 0.5"
- 2** – 0.688"
- 3** – 0.75"
- 4** – 0.875"
- 5** – 1"
- 6** – 1.1"
- 7** – 1.25"
- 8** – 1.5"
- 9** – 1.75"

#### **TUBE MATERIAL**

**A** – Alumina

**M** – Mullite – not recommended for noble metal thermocouples

**H** – Hexalloy

**L** – LT-1

**S** – Sialon

**C** – Silicon carbide, oxide bonded

#### **LENGTH (in inches)**

**L#** – Specify length (e.g., L6 = 6" overall length)

## **CERAMIC TUBE, WITH MOUNTING FITTING OR NIPPLE**

### **How to build a part number:**

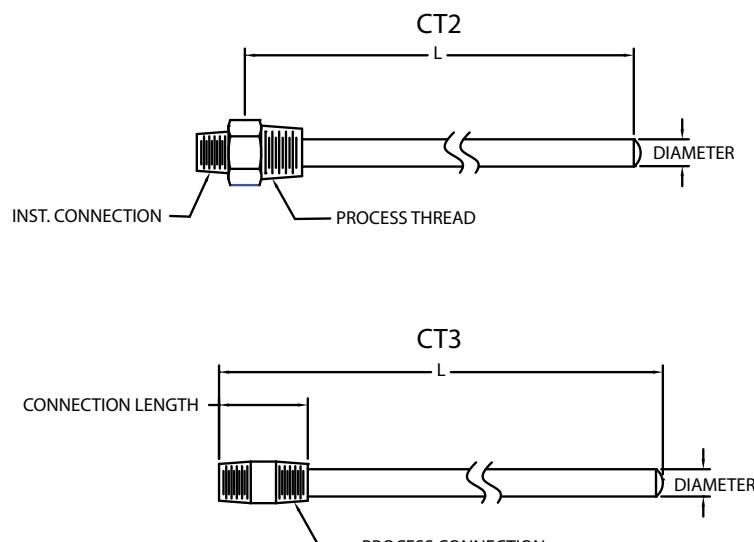
To order an Applied Sensor Technologies protection tube, select the requirements for the categories listed below and fill in the corresponding boxes with your selection. Don't see exactly what you need? Give us a call!

| STYLE | TUBE DIAMETER | TUBE MATERIAL | INSTRUMENT CONNECTION | PROCESS CONNECTION | CONNECTION MATERIAL | CONNECTION LENGTH | LENGTH |
|-------|---------------|---------------|-----------------------|--------------------|---------------------|-------------------|--------|
|       |               |               |                       |                    |                     |                   |        |

#### **STYLE**

**CT2** – Ceramic protection tube with threaded hex fitting

**CT3** – Ceramic protection tube with pipe nipple



#### **TUBE DIAMETER**

##### **O.D.**

- 0** – 0.375"
- 1** – 0.5"
- 2** – 0.688"
- 3** – 0.75"
- 4** – 0.875"
- 5** – 1"
- 7** – 1.25"

#### **TUBE MATERIAL**

**A** – Alumina

**M** – Mullite – not recommended for noble metal thermocouples

**H** – Hexalloy

**L** – LT-1

#### **INSTRUMENT CONNECTION\***

- 0** – 1/2" NPT
- 1** – 3/4" NPT
- 2** – 1" NPT
- 3** – 1-1/4" NPT

#### **PROCESS CONNECTION\***

- 0** – 1/2" NPT
- 1** – 3/4" NPT
- 2** – 1" NPT
- 3** – 1-1/4" NPT

#### **CONNECTION MATERIAL**

**Y** – 304 stainless steel

**W** – 316 stainless steel

**G** – Carbon steel

#### **CONNECTION LENGTH**

**1** – CT2 only (hex fitting length)

**#** – CT3 only (length of nipple in inches; e.g., 6 = 6" nipple)

#### **LENGTH (in inches)**

**L#** – Specify length (For CT2, U is approximately L – 1"; for CT3, U is approximately L – the nipple length)

\*Note: For CT3, Instrument and Process Connection sizes must be the same.

## **METAL TUBE, PLAIN OR WITH MOUNTING BUSHING**

### **How to build a part number:**

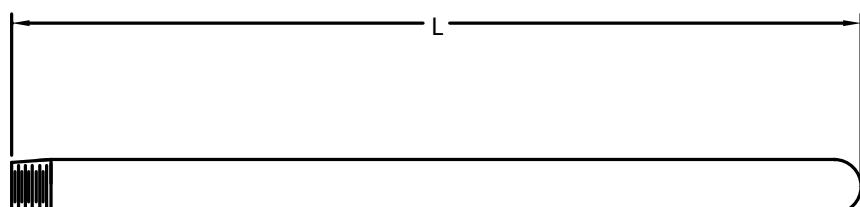
To order an Applied Sensor Technologies protection tube, select the requirements for the categories listed below and fill in the corresponding boxes with your selection. Don't see exactly what you need? Give us a call!

| STYLE | PIPE SIZE/<br>INSTRUMENT<br>CONNECTION | PIPE<br>SCHEDULE | PIPE & BUSHING<br>MATERIAL | BUSHING SIZE | OVERALL LENGTH | INSERTION LENGTH |
|-------|--|------------------|----------------------------|--------------|----------------|------------------|
|       |  |                  |                            |              |                |                  |

#### **STYLE**

**MT1** – Metal protection tube, threaded, no bushing  
**MT2** – Metal protection tube, threaded, with bushing

#### **STYLE MT1**



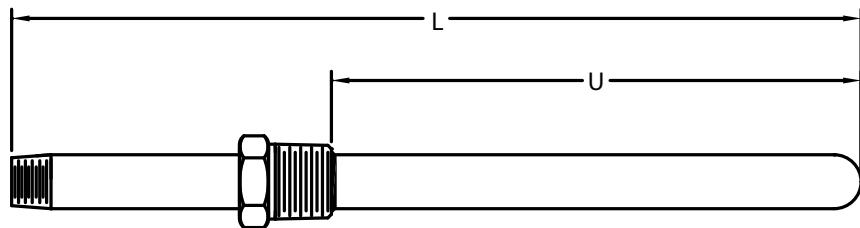
#### **PIPE SIZE/INSTRUMENT CONNECTION**

| Pipe Size                   | Connection |
|-----------------------------|------------|
| 1 – 1/2" pipe (0.840" dia.) | 1/2" NPT   |
| 2 – 3/4" pipe (1.050" dia.) | 3/4" NPT   |
| 3 – 1" pipe (1.315" dia.)   | 1" NPT     |

#### **PIPE SCHEDULE**

**40** – Schedule 40  
**80** – Schedule 80  
**160** – Schedule 160

#### **STYLE MT2**



#### **PIPE AND BUSHING MATERIAL**

**304** – 304 stainless steel  
**310** – 310 stainless steel  
**316** – 316 stainless steel  
**316L** – 316L stainless steel  
**321** – 321 stainless steel  
**A20** – Alloy 20  
**INC** – Inconel 600®  
**400** – Monel 400®

#### **BUSHING SIZE**

**1** – 1/2" NPT  
**2** – 3/4" NPT  
**3** – 1" NPT  
**4** – 1-1/4" NPT  
**5** – 1-1/2" NPT  
**7** – 2" NPT

#### **OVERALL LENGTH (in inches)**

**L#** – Specify overall length of tube (e.g., L24 = 24" long tube)

#### **INSERTION LENGTH (MT2 only, in inches)**

**U#** – Specify length below bushing connection (e.g., U6 = 6" below thread)

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## **METAL TUBE WITH MOUNTING FLANGE**

### **How to build a part number:**

To order an Applied Sensor Technologies protection tube, select the requirements for the categories listed below and fill in the corresponding boxes with your selection. Don't see exactly what you need? Give us a call!

| STYLE | PIPE SIZE/<br>INSTRUMENT<br>CONNECTION | PIPE<br>SCHEDULE | PIPE &<br>FLANGE<br>MATERIAL | FLANGE SIZE | FLANGE<br>RATING | FLANGE TYPE | OVERALL<br>LENGTH | INSERTION<br>LENGTH |
|-------|--|------------------|------------------------------|-------------|------------------|-------------|-------------------|---------------------|
|       |  |                  |                              |             |                  |             |                   |                     |

#### **STYLE**

**MT4** – Metal protection tube, threaded, with flange

#### **PIPE SIZE/INSTRUMENT CONNECTION**

##### **Pipe Size Connection**

- |                                    |          |
|------------------------------------|----------|
| <b>1</b> – 1/2" pipe (0.840" dia.) | 1/2" NPT |
| <b>2</b> – 3/4" pipe (1.050" dia.) | 3/4" NPT |
| <b>3</b> – 1" pipe (1.315" dia.)   | 1" NPT   |

#### **PIPE SCHEDULE**

- 40** – Schedule 40  
**80** – Schedule 80  
**160** – Schedule 160

#### **PIPE AND FLANGE MATERIAL**

- 304** – 304 stainless steel  
**310** – 310 stainless steel  
**316** – 316 stainless steel  
**316L** – 316L stainless steel  
**321** – 321 stainless steel  
**A20** – Alloy 20  
**INC** – Inconel 600®  
**400** – Monel 400®

#### **FLANGE SIZE**

- 1** – 1" flange  
**1.5** – 1.5" flange  
**2** – 2" flange  
**3** – 3" flange  
**4** – 4" flange

#### **FLANGE RATING**

- 150** – 150# flange rating  
**300** – 300# flange rating  
**600** – 600# flange rating  
**900/1500** – 900/1500# flange rating

#### **FLANGE TYPE**

- RF** – Raised face  
**FF** – Flat face  
**RTJ** – Ring type joint

#### **OVERALL LENGTH (in inches)**

**L#** – Specify overall length of tube (e.g., L24 = 24" long tube)

#### **INSERTION LENGTH (in inches)**

**U#** – Specify length below flange (e.g., U6 = 6" below flange)

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## **SPECIAL SECONDARY (OUTER) TUBE WITH MOUNTING BUSHING**

### **How to build a part number:**

To order an Applied Sensor Technologies protection tube, select the requirements for the categories listed below and fill in the corresponding boxes with your selection. Don't see exactly what you need? Give us a call!

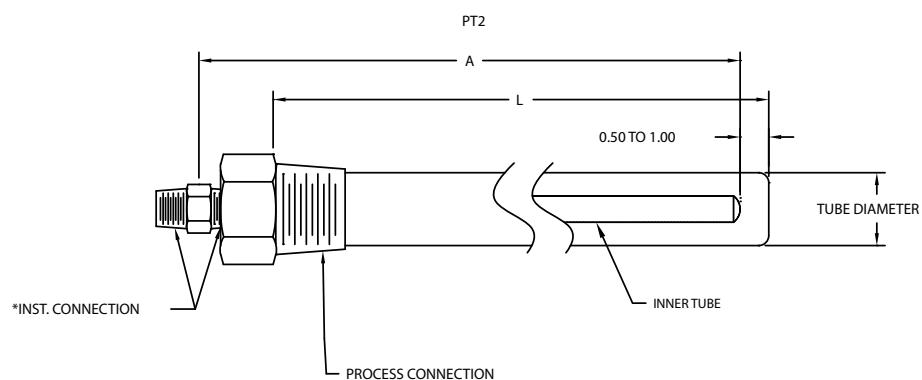
| STYLE | TUBE DIAMETER | TUBE MATERIAL | INSTRUMENT CONNECTION | PROCESS CONNECTION | BUSHING MATERIAL | OVERALL LENGTH |
|-------|---------------|---------------|-----------------------|--------------------|------------------|----------------|
|       |               |               |                       |                    |                  |                |

#### **STYLE**

**PT2** – Outer protection tube, with bushing, to be used with inner ceramic protection tube (Style CT2 or CT3)

#### **TUBE DIAMETER**

- 3** – 3/4" O.D.
- 4** – 7/8" O.D.
- 5** – 1" O.D.
- 6** – 1-1/10" O.D.
- 7** – 1-1/4" O.D.
- 8** – 1-1/2" O.D.
- 9** – 1-3/4" O.D.



#### **TUBE MATERIAL**

- C** – Silicon carbide, oxide bonded
- S** – Sialon
- H** – Hexalloy
- L** – LT1 metal ceramic

#### **INSTRUMENT CONNECTION**

- 0** – 1/2" NPT
- 1** – 3/4" NPT

#### **PROCESS CONNECTION**

- 2** – 1" NPT
- 3** – 1-1/4" NPT
- 4** – 1-1/2 NPT
- 5** – 2" NPT

#### **BUSHING MATERIAL**

- G** – Carbon steel
- W** – 316 stainless steel

#### **OVERALL LENGTH** (in inches)

**L#** – Specify length of tube including threads  
(e.g., L24=24" long tube)

Use CT2/CT3 spec sheet to specify inner protection tube, using appropriate O.D. from chart below:

| OUTER TUBE O.D. | INNER TUBE O.D. |
|-----------------|-----------------|
| 3/4"            | .375"           |
| 7/8"            | .375"           |
| 1"              | .375"           |
| 1.10"           | .375"           |
| 1-1/4"          | .688"           |
| 1-1/2"          | .688"           |
| 1-3/4"          | .75"            |

Note: to match inner tube length to outer, inner length (A) = outer tube length (L) + 0.75"

#### Notes:

- Not all materials and process thread sizes are compatible with all tubing O.D.'s. Use the chart below as a guide for the possible combinations. For each combination of thread and O.D., available materials are noted – Silicon Carbide (C), Sialon® (S), Hexalloy® (H) and LT1 (L).
- Applied Sensor Technologies recommends alumina protection tubes when using platinum thermocouples. Mullite, although less expensive when compared to alumina, can contaminate the platinum, causing drift.

| OUTER TUBE O.D.    | PROCESS THREAD (NPT) |               |                   |                   |
|--------------------|----------------------|---------------|-------------------|-------------------|
|                    | <b>CODE</b>          | <b>2 (1")</b> | <b>3 (1-1/4")</b> | <b>4 (1-1/2")</b> |
| <b>3 (3/4")</b>    | H                    | H             | H                 | H                 |
| <b>4 (7/8")</b>    | L,S                  | L,S           | L,S               | L,S               |
| <b>5 (1")</b>      |                      | H             | H                 | H                 |
| <b>6 (1-1/10")</b> |                      | S             | S                 | S                 |
| <b>7 (1-1/4")</b>  |                      |               | H                 | H                 |
| <b>8 (1-1/2")</b>  |                      |               | H                 | H                 |
| <b>9 (1-3/4")</b>  |                      |               |                   | C                 |

## **SPECIAL SECONDARY (OUTER) TUBE WITH MOUNTING FLANGE**

### **How to build a part number:**

To order an Applied Sensor Technologies protection tube, select the requirements for the categories listed below and fill in the corresponding boxes with your selection. Don't see exactly what you need? Give us a call!

| STYLE | TUBE DIAMETER | TUBE MATERIAL | SLIP FLANGE SIZE | OVERALL LENGTH |
|-------|---------------|---------------|------------------|----------------|
|       |               |               |                  |                |

#### **STYLE**

**PT3** – Outer protection tube, with 4-7/8" mounting flange for mounting, to be used with inner ceramic protection tube (Style CT2 or CT3)

#### **TUBE DIAMETER**

**9** – 1-3/4" O.D.

#### **TUBE MATERIAL**

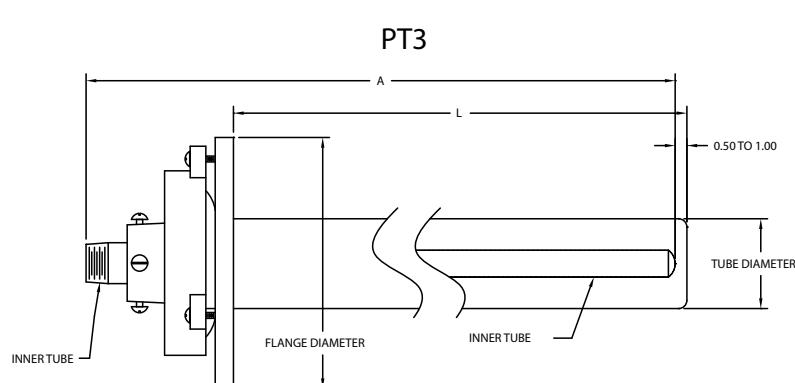
**C** – Silicon carbide, oxide bonded

#### **SLIP FLANGE SIZE**

**5** – 4-7/8"

#### **OVERALL LENGTH** (in inches)

**L#** – Specify length of tube below flange  
(e.g., L24=24" long tube)



Notes – when inner protection tube is required:

1. Use CT2/CT3 spec sheet to specify inner tube.
2. Style should be CT3 with a 3/4" diameter to match up with 1-3/4" outer tube.
3. Minimum nipple length should be 4" in order to extend past the collar.
4. Length of inner tube (A) should be equal to outer tube length (L) + 2.5".
5. Applied Sensor Technologies recommends alumina inner protection tubes when using platinum thermocouples. Mullite, although less expensive when compared to alumina, can contaminate the platinum, causing drift.



## TEMPERATURE SENSOR ASSEMBLY SYSTEM FOR THE MAINTENANCE PROFESSIONAL

### How to build a part number:

The basic Sensor Box™, part number EK1000, comes complete with the common parts listed below, along with your choice of any 6 of the sensor pods listed on this page, e.g., "EK1000 with (3) RT1260, (1) MI1113JU and (2) MI1113KU."

### EK1000 Common Parts:

| Part Number | Description  | Quantity    |
|-------------|--|-------------|
| HS2524      | Housing, 0.250" O.D. x 24" long, 316 stainless steel   | 6           |
| PH02        | Aluminum terminal head for NEMA 4, 1/2" NPT process connection and 3/4" conduit connection with 4-post ceramic terminal block. | 3           |
| AC1087      | Spring-loading kit for PH02 head   | 6           |
| NC1002      | Nipple, 1/2" NPT x 2" long, carbon steel   | 6           |
| UC1011      | Union, 1/2" NPT, carbon steel  | 3           |
| TS1092      | Wire guide grommet for housing   | 1 bag of 10 |
| Tools:      | Crimper, tube cutter, screwdriver, tape measure, wire stripper   | 1 each      |

### Standard Sensor Pods\* (pick 6, any combination)

| Part Number | Description  |
|-------------|--|
| RT1260      | 100-ohm platinum RTD, 3-wire, Teflon® insulation   |
| RT1254      | 100-ohm platinum RTD, 3-wire, fiberglass insulation  |
| MI1113_U    | Ungrounded thermocouple, fiberglass leads, specify calibration (J, K, E, T) – e.g., MI1113JU |
| MI1113_G    | Grounded thermocouple, fiberglass leads, specify calibration (J, K, E, T) – e.g., MI1113JG   |
| MI1113TF_U  | Ungrounded thermocouple, Teflon® leads, specify calibration (J, K, E, T) – e.g., MI1113TFJU  |
| MI1113TF_G  | Grounded thermocouple, Teflon® leads, specify calibration (J, K, E, T) – e.g., MI1113TFJG    |

### Options:

Many parts can be added to the basic EK1000 to address specific needs. See page 4-1b for a listing of additional parts.



\*Notes:

1. Standard pods are 4" long and have 48" leads; designed to fit into 0.250" housings.
2. Pods with fiberglass leads are rated to 900°F; those with Teflon® leads are rated to 400°F.

| <b>RTD Sensor Pods (100-ohm, Class B, 0.00385 alpha with 48" leads)</b>    |  |
|--|--|
| Part Number  | Description  |
| <i>Pods for 0.250" O.D. Housings</i>                                       |  |
| RT1254   | 3-wire, fiberglass insulation (std)  |
| RT1260   | 3-wire, Teflon® insulation (std)   |
| RT1257   | 4-wire, Teflon® insulation   |
| RT1276   | 4-wire, fiberglass insulation  |
| <i>Pods for 0.188" O.D. Housings</i>                                       |  |
| RT1184   | 3-wire, fiberglass insulation  |
| RT1256   | 3-wire, Teflon® insulation   |
| <b>Thermocouple Sensor Pods* (standard limits of error with 48" leads)</b> |  |
| <i>Pods for 0.250" O.D. Housings</i>                                       |  |
| MI1113_U   | Ungrounded junction, fiberglass insulation (specify J, K, E or T calibration; e.g., MI1113KU)        |
| MI1113_G   | Grounded junction, fiberglass insulation (specify J, K, E or T calibration; e.g., MI1113KG)          |
| MI1113TF_U   | Ungrounded junction, Teflon® insulation (specify J, K, E or T calibration; e.g., MI1113TFJU)         |
| MI1113TF_G   | Grounded junction, Teflon® insulation (specify J, K, E or T calibration; e.g., MI1113TFJG)           |
| <i>Pods for 0.188" O.D. Housings</i>                                       |  |
| MI1115_U   | Ungrounded junction, fiberglass insulation (specify J, K, E or T calibration; e.g., MI1115KU)        |
| MI1115_G   | Grounded junction, fiberglass insulation (specify J, K, E or T calibration; e.g., MI1115KG)          |
| MI1115TF_U   | Ungrounded junction, Teflon® insulation (specify J, K, E or T calibration; e.g., MI1115TFJU)         |
| MI1115TF_G   | Grounded junction, Teflon® insulation, 48" long (specify J, K, E or T calibration; e.g., MI1115TFJG) |
| *For dual element, specify as JJ, KK, EE or TT                             |  |
| <b>Housings (stainless steel, one closed end)</b>                          |  |
| HS2512   | 0.250" O.D. x 12" long   |
| HS2524   | 0.250" O.D. x 24" long (std. with kit)   |
| HS2536   | 0.250" O.D. x 36" long   |
| HS2548   | 0.250" O.D. x 48" long   |
| HS1812   | 0.188" O.D. x 12" long   |
| HS1824   | 0.188" O.D. x 24" long   |
| HS1836   | 0.188" O.D. x 36" long   |
| HS1848   | 0.188" O.D. x 48" long   |
| <b>Compression Fittings</b>  |  |
| <i>For 0.250" housings</i>   |  |
| PF65   | 1/4" NPT, 316 stainless steel body and ferrule   |
| PF66   | 1/4" NPT, 316 stainless steel body; Teflon® ferrule  |
| PF73   | 1/2" NPT, 316 stainless steel body and ferrule   |
| PF74   | 1/2" NPT, 316 stainless steel body; Teflon® ferrule  |
| <i>For 0.188" housings</i>   |  |
| PF55   | 1/4" NPT, 316 stainless steel body and ferrule   |
| PF56   | 1/4" NPT, 316 stainless steel body; Teflon® ferrule  |
| PF59   | 1/2" NPT, 316 stainless steel body and ferrule   |
| PF60   | 1/2" NPT, 316 stainless steel body; Teflon® ferrule  |
| <b>Unions (1/2" NPT)</b>   |  |
| UC1011   | Carbon steel, ordinary location  |
| US1011   | Stainless steel, ordinary location   |
| HF1091   | Plated steel, explosion-proof  |

**UE** APPLIED SENSOR TECHNOLOGIES  
A Division of UNITED ELECTRIC CONTROLS

## THE SENSOR BOX™ EK1000

### AVAILABLE ACCESSORIES

| <b>Terminal Heads with 4-Post Terminal Block Included (1/2" NPT process conn.)</b> |  |  |
|--|--|--|
| Part Number  | Conduit Connection                                     | Description                                  |
| PH01   | 1/2"   | Aluminum, ordinary locations                 |
| PH02   | 3/4"   | Aluminum, ordinary locations (Std. with kit) |
| PH04   | 1/2"   | Cast iron, ordinary locations                |
| PH05   | 3/4"   | Cast iron, ordinary locations                |
| PH23   | 3/4"   | Black polypropylene, ordinary locations      |
| PH24   | 3/4"   | White polypropylene, ordinary locations      |
| PH47   | 3/4"   | 316 stainless steel, ordinary locations      |
| PH50   | 1/2"   | Aluminum, explosion-proof, 3-post block      |
| PH51   | 3/4"   | Aluminum, explosion-proof, 3-post block      |
| <b>Terminal Blocks</b>   |  |  |
| Part Number  | Description  |  |
| PH44   | 4-post, ceramic  |  |
| PH48   | 3-post, ceramic, for PH50 and PH51 heads               |  |
| <b>Carbon Steel Nipples (1/2" NPT)</b>   |  |  |
| NC1001   | 1" long  |  |
| NC1002   | 2" long  |  |
| NC1003   | 3" long  |  |
| NC1004   | 4" long  |  |
| NC1006   | 6" long  |  |
| <b>Stainless Steel Nipples (1/2" NPT)</b>  |  |  |
| NS1001   | 1" long  |  |
| NS1002   | 2" long  |  |
| NS1003   | 3" long  |  |
| NS1004   | 4" long  |  |
| NS1006   | 6" long  |  |
| <b>Spring-Loaded Kits</b>  |  |  |
| AC1088   | For 0.188" housings                                    |  |
| AC1087   | For 0.250" housings                                    |  |
| <b>Spring-Loaded Hex Fittings</b>  |  |  |
| PF14   | Stainless steel, for 0.250" housings                   |  |
| PF13   | Stainless steel, for 0.188" housings                   |  |
| <b>Plugs and Jacks</b>   |  |  |
| PT05-  | Thermocouple plug (specify J, K, E or T); e.g., PT05-J |  |
| PT05-3   | 3-pin RTD plug   |  |
| PT06-  | Thermocouple jack (specify J, K, E or T); e.g., PT06-K |  |
| PT06-3   | 3-pin RTD jack   |  |
| PA10   | Wire clamp   |  |
| B1250  | Brass crimp insert, for 0.250" housings                |  |
| B1188  | Brass crimp insert, for 0.188" housings                |  |
| <b>Strain Reliefs (Bag of 10)</b>  |  |  |
| TS1092   | Nylon grommet for 0.250" housings                      |  |
| TS1094   | Teflon® strain relief for 0.188" housings              |  |
| <b>Armor Cable Kit</b>   |  |  |
| TS1093   | 3' stainless armor and adaptor for 0.250" housings     |  |

Note: Pods with fiberglass insulation are rated to 900°F; those with Teflon® leads are rated to 400°F.

**Note: Many non-standard options, including additional sheath diameters and materials, may also be available – consult AST for specific requirements.**

## 4-20 MA OUTPUT, ISOLATED

### How to build a part number:

To order an Applied Sensor Technologies transmitter, select the requirements for the categories listed below and fill in the corresponding boxes with your selection. Don't see exactly what you need? Give us a call!

| TRANSMITTER TYPE | INPUT | RANGE | UNITS OF MEASURE | OPTION |
|------------------|-------|-------|------------------|--------|
|                  |       |       |                  |        |

#### TRANSMITTER TYPE\*

**UNI5-S** – Isolated transmitter with single 4-20mA output for terminal head mounting

#### INPUT

**J** – J type thermocouple  
**K** – K type thermocouple  
**E** – E type thermocouple  
**T** – T type thermocouple  
**Pt100** – 100-ohm platinum RTD  
**Pt250** – 250-ohm platinum RTD  
**Pt500** – 500-ohm platinum RTD  
**Pt1000** – 1000-ohm platinum RTD

**R** – R type thermocouple  
**S** – S type thermocouple  
**B** – B type thermocouple  
**Ni100** – 100-ohm nickel RTD  
**Ni500** – 500-ohm nickel RTD  
**Ni1000** – 1000-ohm nickel RTD  
**Cu10** – 10-ohm copper RTD  
**Cu100** – 100-ohm copper RTD

#### RANGE (specify minimum and maximum values, e.g., 0-100)\*

# – **Minimum Range Value** (temperature value that equals 4 mA)

# – **Maximum Range Value** (temperature value that equals 20 mA)

#### UNITS OF MEASURE

Specify °F or °C

#### OPTION

**DS01** – Downscale open circuit protection

\*See chart below for available sensor ranges and minimum spans

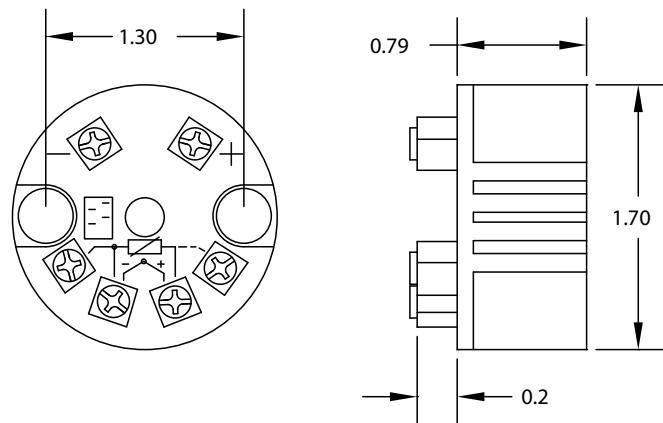
#### **Specifications**

|                         |  |
|-------------------------|--|
| Isolation (I/O):        | 500 VDC  |
| Supply Voltage:         | 10-40 VDC, polarity protected                                      |
| Sensor Lead Resistance: | RTD: 500 ohms max.<br>T/C: 10,000 ohms max.<br>Effect: 0.001°C/ohm |
| Maximum Load:           | $R_{max} = (V_{supply} - 10V) / 20 \text{ mA}$                     |
| Stability:              | Zero drift: 0.02°C/°C<br>Span drift: 0.01°C/°C                     |
| Ambient Temperature:    | -40 to + 85°C  |
| Housing:                | Epoxy-coated zinc alloy  |
| Start-up Time:          | 20 seconds   |
| Warm-up Time:           | 5 minutes  |
| Open Circuit Detection: | Upscale standard   |

#### **\*Available sensor ranges and limitations**

| Sensor Type                               | Min. Temp. | Max. Temp. | Min. Span |
|---|------------|------------|-----------|
| <b>J T/C</b>                              | -200°C     | 1200°C     | 50°C      |
| <b>K T/C</b>                              | -270°C     | 1370°C     | 50°C      |
| <b>E T/C</b>                              | -270°C     | 1000°C     | 50°C      |
| <b>T T/C</b>                              | -270°C     | 400°C      | 50°C      |
| <b>R or S T/C</b>                         | -60°C      | 1760°C     | 250°C     |
| <b>B T/C</b>                              | 0°C        | 1820°C     | 600°C     |
| <b>Pt100, Pt250, Pt500 and Pt1000 RTD</b> | -200°C     | 850°C      | 25°C      |
| <b>Ni100, Ni500 and Ni1000 RTD</b>        | -60°C      | 250°C      | 25°C      |
| <b>Cu10 and Cu100 RTD</b>                 | -200°C     | 250°C      | 25°C      |

**Note:** when used as an option in combination with a temperature sensor assembly, use option code **TR11** at end of assembly part #.



## 4-20 MA/HART® OUTPUT, ISOLATED

### How to build a part number:

To order an Applied Sensor Technologies transmitter, select the requirements for the categories listed below and fill in the corresponding boxes with your selection. Don't see exactly what you need? Give us a call!

| TRANSMITTER TYPE | INPUT | RANGE | UNITS OF MEASURE | OPTION |
|------------------|-------|-------|------------------|--------|
|                  |       |       |                  |        |

#### TRANSMITTER TYPE

**UNI5-H** – Isolated transmitter with single 4-20mA/HART® output for terminal head mounting

#### INPUT

**J** – J type thermocouple  
**K** – K type thermocouple  
**E** – E type thermocouple  
**T** – T type thermocouple  
**Pt100** – 100-ohm platinum RTD  
**Pt250** – 250-ohm platinum RTD  
**Pt500** – 500-ohm platinum RTD  
**Pt1000** – 1000-ohm platinum RTD

**R** – R type thermocouple  
**S** – S type thermocouple  
**B** – B type thermocouple  
**Ni100** – 100-ohm nickel RTD  
**Ni500** – 500-ohm nickel RTD  
**Ni1000** – 1000-ohm nickel RTD  
**Cu10** – 10-ohm copper RTD  
**Cu100** – 100-ohm copper RTD

#### RANGE (specify minimum and maximum values, e.g., 0-100)\*

# – **Minimum Range Value** (temperature value that equals 4 mA)  
# – **Maximum Range Value** (temperature value that equals 20 mA)

#### UNITS OF MEASURE

Specify °F or °C

#### OPTION

**DS01** – Downscale open circuit protection

\*See chart below for available sensor ranges and minimum spans

#### **Specifications**

|                         |   |
|-------------------------|---|
| Input:                  | Thermocouple or 3-wire/4-wire RTD           |
| Isolation (I/O):        | 500 VDC                                     |
| Supply Voltage:         | 10-40 VDC, polarity protected               |
| Output:                 | 4-20mA or 20-4 mA                           |
| Digital Output:         | HART® protocol                              |
| Sensor Lead Resistance: | RTD: 500 ohms max.<br>T/C: 10,000 ohms max. |
| Maximum Load:           | $R_{max} = (V_{supply} - 10)/20 \text{ mA}$ |
| Stability:              | 0.005% / °C (zero & span drift)             |
| Ambient Temperature:    | -40 to + 85°C                               |
| Housing:                | Epoxy-coated zinc alloy                     |
| Open Circuit Detection: | Upscale standard                            |

#### **\*Available sensor ranges and limitations**

| Sensor Type                               | Min. Temp. | Max. Temp. | Min. Span |
|---|------------|------------|-----------|
| <b>J T/C</b>                              | -200°C     | 1200°C     | 50°C      |
| <b>K T/C</b>                              | -270°C     | 1370°C     | 50°C      |
| <b>E T/C</b>                              | -270°C     | 1000°C     | 50°C      |
| <b>T T/C</b>                              | -270°C     | 400°C      | 50°C      |
| <b>R or S T/C</b>                         | -60°C      | 1760°C     | 250°C     |
| <b>B T/C</b>                              | 0°C        | 1820°C     | 600°C     |
| <b>Pt100, Pt250, Pt500 and Pt1000 RTD</b> | -200°C     | 850°C      | 25°C      |
| <b>Ni100, Ni500 and Ni1000 RTD</b>        | -60°C      | 250°C      | 25°C      |
| <b>Cu10 and Cu100 RTD</b>                 | -200°C     | 250°C      | 25°C      |

**Note:** when used as an option in combination with a temperature sensor assembly, use option code **TR13** at end of assembly part #.

## **4-20 MA OUTPUT, NON-ISOLATED**

### **How to build a part number:**

To order an Applied Sensor Technologies transmitter, select the requirements for the categories listed below and fill in the corresponding boxes with your selection. Don't see exactly what you need? Give us a call!

| TRANSMITTER TYPE | INPUT | RANGE | UNITS OF MEASURE |
|------------------|-------|-------|------------------|
|                  |       |       |                  |

#### **TRANSMITTER TYPE**

**TC2** – Non-isolated transmitter with thermocouple input and single 4-20 mA output for terminal head mounting  
**RTD2** – Non-isolated transmitter with RTD input and single 4-20 mA output for terminal head mounting

#### **INPUT**

|                                |   |
|--------------------------------|---|
| <b>J</b> – J type thermocouple | <b>R</b> – R type thermocouple                  |
| <b>K</b> – K type thermocouple | <b>S</b> – S type thermocouple                  |
| <b>E</b> – E type thermocouple | <b>B</b> – B type thermocouple                  |
| <b>T</b> – T type thermocouple | <b>Pt100</b> – 100-ohm platinum RTD (RTD2 only) |

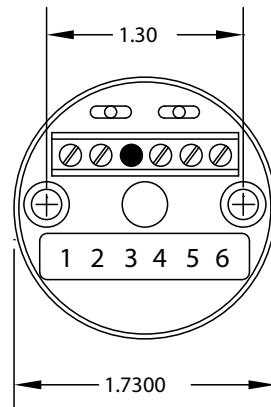
#### **RANGE** (specify minimum and maximum values, e.g., 0-100)\*

# – **Minimum Range Value** (temperature value that equals 4 mA)  
# – **Maximum Range Value** (temperature value that equals 20 mA)

#### **UNITS OF MEASURE**

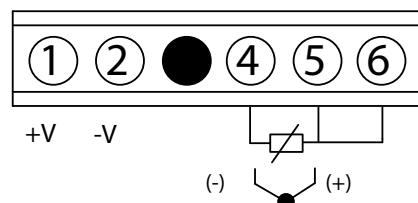
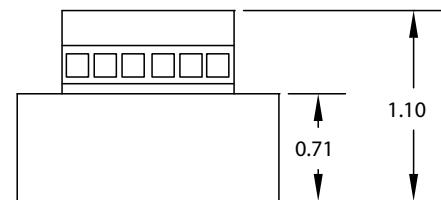
Specify **°F** or **°C**

#### **RTD2 AND TC2**



#### **Specifications**

Supply Voltage: 8-38 VDC, polarity protected  
Maximum Load:  $R_{max} = (V_{supply} - 8V)/20 \text{ mA}$   
Stability (both zero and span drift): RTD: 0.03% of span/ $^{\circ}\text{C}$  (100 $^{\circ}\text{C}$  span)  
T/C: 0.04% of span/ $^{\circ}\text{C}$  (25 mV span)  
Linearity: RTD: better than +/- 0.05% of span  
T/C: better than +/- 0.03% of span  
Ambient Temperature: -20 to + 70 $^{\circ}\text{C}$   
Humidity: 0-95% RH, non-condensing  
\*Input span: RTD: 20 $^{\circ}\text{C}$  min., 500 $^{\circ}\text{C}$  max.  
T/C: 10 mV min.



**Note:** when used as an option in combination with a temperature sensor assembly, use option code **TR12** at end of assembly part #.

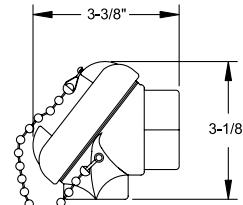


## NEMA 4 & 4X REPLACEMENT HEADS AND TERMINAL BLOCKS

### **CAST ALUMINUM – gasketed screw cover**

NEMA 4 with gasketed screw cover and stainless steel chain;  
4-post ceramic terminal block included. For epoxy-coated, NEMA  
4X, add suffix-E to part#. (e.g., PH01E)

| Ordering Code | Process Conn. | Conduit Conn. |
|---------------|---------------|---------------|
| PH01          | 1/2"          | 1/2"          |
| PH02          | 1/2"          | 3/4"          |
| PH03          | 3/4"          | 3/4"          |

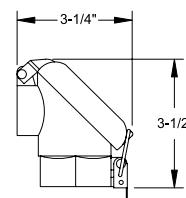


PH01 - PH06

### **CAST IRON – NEMA 4, gasketed screw cover**

NEMA 4 with gasketed screw cover and stainless steel chain;  
4-post ceramic terminal block included. For epoxy-coated, NEMA  
4X, add suffix-E to part #. (e.g., PH04E)

| Ordering Code | Process Conn. | Conduit Conn. |
|---------------|---------------|---------------|
| PH04          | 1/2"          | 1/2"          |
| PH05          | 1/2"          | 3/4"          |
| PH06          | 3/4"          | 3/4"          |

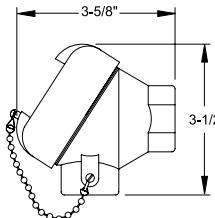


PH45

### **CAST ALUMINUM – flip-top cover**

NEMA 4 with flip-top cover and latching closure, 4-post ceramic  
terminal block included.

| Ordering Code | Process Conn. | Conduit Conn. |
|---------------|---------------|---------------|
| PH45          | 1/2"          | 3/4"          |



PH47

### **316 STAINLESS STEEL – NEMA 4X, gasketed screw cover**

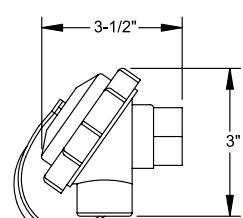
NEMA 4X with gasketed screw cover and stainless steel chain;  
4-post ceramic terminal block included.

| Ordering Code | Process Conn. | Conduit Conn. |
|---------------|---------------|---------------|
| PH47          | 1/2"          | 3/4"          |

### **BLACK POLYPROPYLENE – NEMA 4, gasketed screw cover**

NEMA 4 with gasketed screw cover, 4-post ceramic terminal block  
included.

| Ordering Code | Process Conn. | Conduit Conn. |
|---------------|---------------|---------------|
| PH23          | 1/2"          | 3/4"          |

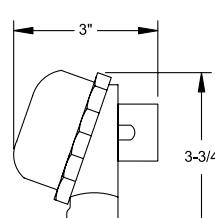


PH23 - PH24

### **WHITE POLYPROPYLENE – NEMA 4, gasketed screw cover**

NEMA 4 with gasketed screw cover and stainless steel chain;  
4-post ceramic terminal block included.

| Ordering Code | Process Conn. | Conduit Conn. |
|---------------|---------------|---------------|
| PH24          | 1/2"          | 3/4"          |

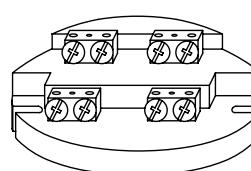


PH26

### **NYLON – NEMA 4, gasketed screw cover**

Gasketed screw cover, 4-post ceramic terminal block included.

| Ordering Code | Process Conn. | Conduit Conn. |
|---------------|---------------|---------------|
| PH26          | 1/2"          | 1/2"          |



PH41

### **CERAMIC TERMINAL BLOCK REPLACEMENTS**

For NEMA 4 heads, brass terminals

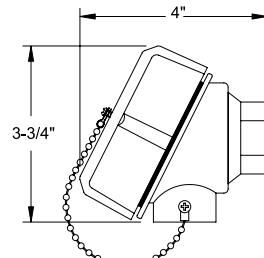
| Ordering Code | No. of Terminals | Max. Wire Size |
|---------------|------------------|----------------|
| PH39          | 2                | 8 AWG.         |
| PH40          | 3                | 8 AWG.         |
| PH41          | 4                | 8 AWG.         |
| PH42          | 6                | 14 AWG.        |

## **EXPLOSION-PROOF REPLACEMENT HEADS AND TERMINAL BLOCKS**

### **CAST ALUMINUM – FM/CSA approved**

FM/CSA approved for Class I, Div. 1, Groups B, C, D; Class II, Groups E, F, G; gasketed screw cover and stainless steel chain; 6-post ceramic terminal block included. For epoxy-coated, add suffix-E to part #. (e.g., PH50E)

| Ordering Code | Process Conn. | Conduit Conn. |
|---------------|---------------|---------------|
| PH50          | 1/2"          | 1/2"          |
| PH51          | 1/2"          | 3/4"          |
| PH52          | 3/4"          | 3/4"          |
| PH56          | 1/2"          | 1/2"          |
| PH57          | 1/2"          | 3/4"          |

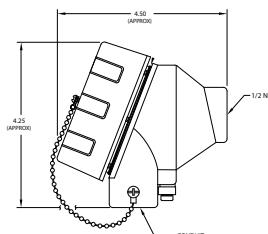


PH50-52,  
PH56-57

### **CAST ALUMINUM – ATEX approved**

ATEX approved for EEx d IIC, gasketed screw cover and stainless steel chain; 3-post ceramic terminal block included.

| Ordering Code | Process Conn. | Conduit Conn. |
|---------------|---------------|---------------|
| PH53          | 1/2"          | 3/4"          |

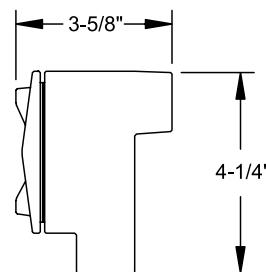


PH53

### **CAST ALUMINUM – UL/CSA approved**

UL/CSA approved for Class I, Div. 1, Groups C, D; Class II, Groups E, F, G; screw cover; 4-post plastic terminal strip included. For epoxy-coated, add suffix-E to part #. (e.g., PH17E)

| Ordering Code | Process Conn. | Conduit Conn. |
|---------------|---------------|---------------|
| PH17          | 1/2"          | 1/2"          |
| PH18          | 1/2"          | 3/4"          |
| PH19          | 3/4"          | 3/4"          |

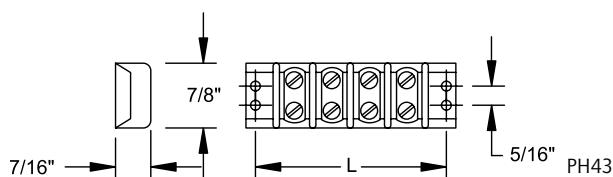


PH17-19

### **PLASTIC TERMINAL STRIP REPLACEMENTS**

For explosion-proof heads (PH17-PH22), brass terminals

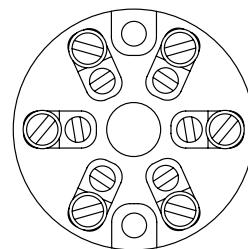
| Ordering Code | No. of Terminals | Length of Strip |
|---------------|------------------|-----------------|
| PH43-4        | 4                | 2.16"           |
| PH43-6        | 6                | 2.91"           |



### **CERAMIC TERMINAL BLOCK REPLACEMENTS**

For explosion-proof heads (PH50-PH52), brass terminals

| Ordering Code | No. of Terminals | Max. Wire Size |
|---------------|------------------|----------------|
| PH48          | 3                | 8 AWG.         |
| PH49          | 6                | 14 AWG.        |



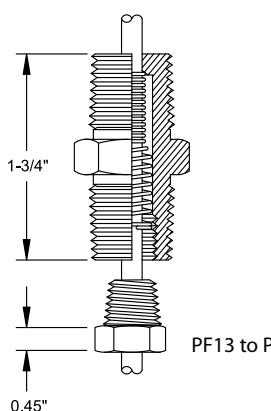
PH49

## PARTS TO CONNECT TO WIRING OR THE PROCESS

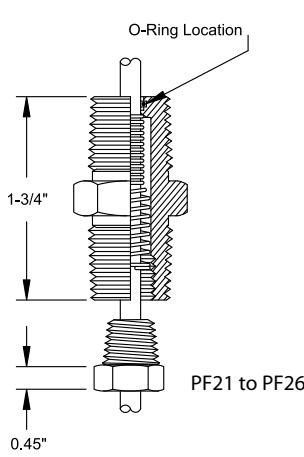
| COMPRESSION FITTINGS      |      |          |          |
|---------------------------|------|----------|----------|
| For 1/8" diameter sheath  |      |          |          |
| Part Number               | NPT  | Body/Nut | Ferrule  |
| <b>PF38</b>               | 1/8" | 304 stst | 304 stst |
| <b>PF39</b>               | 1/8" | 304 stst | Teflon®  |
| <b>PF40</b>               | 1/4" | 304 stst | 304 stst |
| <b>PF41</b>               | 1/4" | 304 stst | Teflon®  |
| For 3/16" diameter sheath |      |          |          |
| <b>PF52</b>               | 1/8" | 304 stst | 304 stst |
| <b>PF53</b>               | 1/8" | 304 stst | Teflon®  |
| <b>PF54</b>               | 1/8" | Brass    | Brass    |
| <b>PF55</b>               | 1/4" | 304 stst | 304 stst |
| <b>PF56</b>               | 1/4" | 304 stst | Teflon®  |
| <b>PF59</b>               | 1/2" | 304 stst | 304 stst |
| <b>PF60</b>               | 1/2" | 304 stst | Teflon®  |
| For 1/4" diameter sheath  |      |          |          |
| <b>PF63</b>               | 1/8" | 304 stst | 304 stst |
| <b>PF65</b>               | 1/4" | 304 stst | 304 stst |
| <b>PF66</b>               | 1/4" | 304 stst | Teflon®  |
| <b>PF67</b>               | 1/4" | Teflon®  | Teflon®  |
| <b>PF68</b>               | 1/4" | Brass    | Brass    |
| <b>PF73</b>               | 1/2" | 304 stst | 304 stst |
| <b>PF74</b>               | 1/2" | 304 stst | Teflon®  |
| <b>PF75</b>               | 1/2" | Brass    | Brass    |



PF38 to PF75



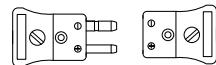
PF13 to PF18



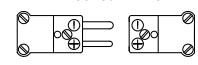
PF21 to PF26

| PLUGS AND JACKS  |   |
|--|---|
| (Note: specify J, K, E or T calibration. e.g., PT05-J) |   |
| <b>PT05</b>  | Standard plug, rated to 177°C (350°F)                       |
| <b>PT06</b>  | Standard jack, rated to 177°C (350°F)                       |
| <b>PT07</b>  | High Temp. plug, rated to 260° (500°F)                      |
| <b>PT08</b>  | High Temp. jack, rated to 260° (500°F)                      |
| <b>PT09</b>  | Miniature plug, rated to 177°C (350°F)                      |
| <b>PT10</b>  | Miniature jack, rated to 177°C (350°F)                      |
| <b>PA9</b>   | Rubber boot for use with PT05/PT06                          |
| <b>PA10</b>  | Cable clamp for PT05 to PT08                                |
| <b>PA11</b>  | Neoprene bushing for use with PA10 to prevent wire abrasion |

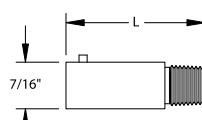
PT05 to PT08



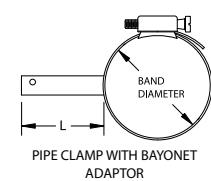
PT09 to PT10



PA20 to PA24



PA30 to PA37



| BAYONET ADAPTERS (PLATED STEEL) |               |            |
|---------------------------------|---------------|------------|
| Part Number                     | Thread Size   | Length (L) |
| <b>PA20</b>                     | 1/8" - 27 NPT | 7/8"       |
| <b>PA21</b>                     | 1/8" - 27 NPT | 1"         |
| <b>PA22</b>                     | 1/8" - 27 NPT | 1-1/2"     |
| <b>PA23</b>                     | 1/8" - 27 NPT | 2"         |
| <b>PA24</b>                     | 1/8" - 27 NPT | 2-1/2"     |

| PIPE CLAMP AND BAYONET ADAPTERS |                  |                    |
|---------------------------------|------------------|--------------------|
| Part Number                     | Band Diameter    | Adapter Length (L) |
| <b>PA30</b>                     | 1-1/4" to 2-1/4" | 1"                 |
| <b>PA31</b>                     | 1-1/4" to 2-1/4" | 2"                 |
| <b>PA32</b>                     | 2-1/4" to 3-1/4" | 1"                 |
| <b>PA33</b>                     | 2-1/4" to 3-1/4" | 2"                 |
| <b>PA34</b>                     | 3-1/4" to 4-1/4" | 1"                 |
| <b>PA35</b>                     | 3-1/4" to 4-1/4" | 2"                 |
| <b>PA36</b>                     | 4-1/4" to 5"     | 1"                 |
| <b>PA37</b>                     | 4-1/4" to 5"     | 2"                 |

| SPRING-LOADED FITTINGS                                |               |               |                 |
|---|---------------|---------------|-----------------|
| Standard, Non-sealed                                  |               |               |                 |
| Part Number   | Process Conn. | Conduit Conn. | Sensor Diameter |
| <b>PF13</b>   | 1/2" NPT      | 1/2" NPT      | 3/16"           |
| <b>PF14</b>   | 1/2" NPT      | 1/2" NPT      | 1/4"            |
| <b>PF17</b>   | 3/4" NPT      | 3/4" NPT      | 3/16"           |
| <b>PF18</b>   | 3/4" NPT      | 3/4" NPT      | 1/4"            |
| O-Ring Sealed*  |               |               |                 |
| <b>PF21</b>   | 1/2" NPT      | 1/2" NPT      | 3/16"           |
| <b>PF22</b>   | 1/2" NPT      | 1/2" NPT      | 1/4"            |
| <b>PF25</b>   | 3/4" NPT      | 3/4" NPT      | 3/16"           |
| <b>PF26</b>   | 3/4" NPT      | 3/4" NPT      | 1/4"            |
| Notes:  |               |               |                 |
| 1. Maximum pressure rating 15 psi                     |               |               |                 |
| 2. Buna N O-ring rated for -23 to 93°C (-10 to 200°F) |               |               |                 |

## **THERMOCOUPLE AND EXTENSION-GRADE WIRE**

### **THERMOCOUPLE GRADE WIRE**

Used to either fabricate thermocouples by creating a junction in one end of the wire pair, or as extension wire between the thermocouple and the measuring device. The conditions of measurement determine the type of thermocouple wire and insulation that should be used. Temperature range, wire gauge, environment, protection, insulation requirements, response and service life should all be considered.

### **THERMOCOUPLE EXTENSION WIRE**

Has approximately the same thermoelectric characteristics as thermocouple grade wire, but its purpose is only to carry the signal, not to measure temperature. Thermocouple extension wire is usually lower in cost.

| <b>Insulation Characteristics</b>                       |                           |                            |                            |
|---|---------------------------|----------------------------|----------------------------|
| <b>Description (individual conductors/overall)</b>      | <b>Temperature Limits</b> | <b>Moisture Resistance</b> | <b>Abrasion Resistance</b> |
| Teflon®/Teflon® FEP                                     | 204°C (400°F)             | Excellent                  | Excellent                  |
| Teflon®/ Teflon® TFE or PFA Tape                        | 260°C (500°F)             | Excellent                  | Excellent                  |
| Fiberglass/Fiberglass                                   | 482°C (900°F)             | Fair                       | Fair                       |
| Fiberglass (Filaflex®)/Fiberglass (Filaflex®) High Temp | 760°C (1400°F)            | Fair                       | Fair                       |

| <b>Calibration</b>   | <b>Part Number</b>             |                             |                                  |
|--|--------------------------------|-----------------------------|----------------------------------|
|  | <b>TC Grade, Stranded Wire</b> | <b>TC Grade, Solid Wire</b> | <b>Extension Grade, Stranded</b> |
| <b>Teflon® / Teflon® FEP insulated, 20 Gauge</b>   |                                |                             |                                  |
| Type J   | 20JST58                        | 20JS58                      | 20JXST58                         |
| Type K   | 20KST58                        | 20KS58                      | 20KXST58                         |
| Type T   | 20TST58                        | 20TS58                      | 20TXST58                         |
| Type E   | 20EST58                        | 20ES58                      | 20EXST58                         |
| <b>Teflon® / Teflon® TFE Tape insulated, 20 Gauge</b>  |                                |                             |                                  |
| Type J   | 20JST60                        | 20JS60                      | 20JXST60                         |
| Type K   | 20KST60                        | 20KS60                      | 20KXST60                         |
| Type T   | 20TST60                        | 20TS60                      | 20TXST60                         |
| Type E   | 20EST60                        | 20ES60                      | 20EXST60                         |
| <b>Fiberglass/Fiberglass insulated, 20 Gauge</b>   |                                |                             |                                  |
| Type J   | 20JST57                        | 20JS57                      | 20JXST57                         |
| Type K   | 20KST57                        | 20KS57                      | 20KXST57                         |
| Type T   | 20TST57                        | 20TS57                      | 20TXST57                         |
| Type E   | 20EST57                        | 20ES57                      | 20EXST57                         |
| <b>Fiberglass (Filaflex®)/Fiberglass (Filaflex®) insulated, 20 Gauge</b>                             |                                |                             |                                  |
| Type J   | 20JST70                        | 20JS70                      | 20JXST70                         |
| Type K   | 20KST70                        | 20KS70                      | 20KXST70                         |
| Type T   | 20TST70                        | 20TS70                      | 20TXST70                         |
| Type E   | 20EST70                        | 20ES70                      | 20EXST70                         |
| <b>Fiberglass (Filaflex®)/ Fiberglass (Filaflex®) insulated, stainless steel overbraid, 20 Gauge</b> |                                |                             |                                  |
| Type J   | 20JST71                        | 20JS71                      | 20JXST71                         |
| Type K   | 20KST71                        | 20KS71                      | 20KXST71                         |
| Type T   | 20TST71                        | 20TS71                      | 20TXST71                         |
| Type E   | 20EST71                        | 20ES71                      | 20EXST71                         |

**Teflon®** is a registered trademark of E.I. DuPont

**Filaflex®** is a registered trademark of PMC Corporation

## ELECTRONIC PRESSURE AND TEMPERATURE SWITCHES



### FEATURES

- Large digital gauge for status, process indication & diagnostic reporting
- 100% programmable set point & deadband for easy adjustment
- Solid-state design for high-vibration applications
- Explosion-proof, intrinsically safe and non-incendive models available for hazardous locations
- Suitable for SIL 1 & 2 safety systems
- Multiple approvals including:

**OVERVIEW**

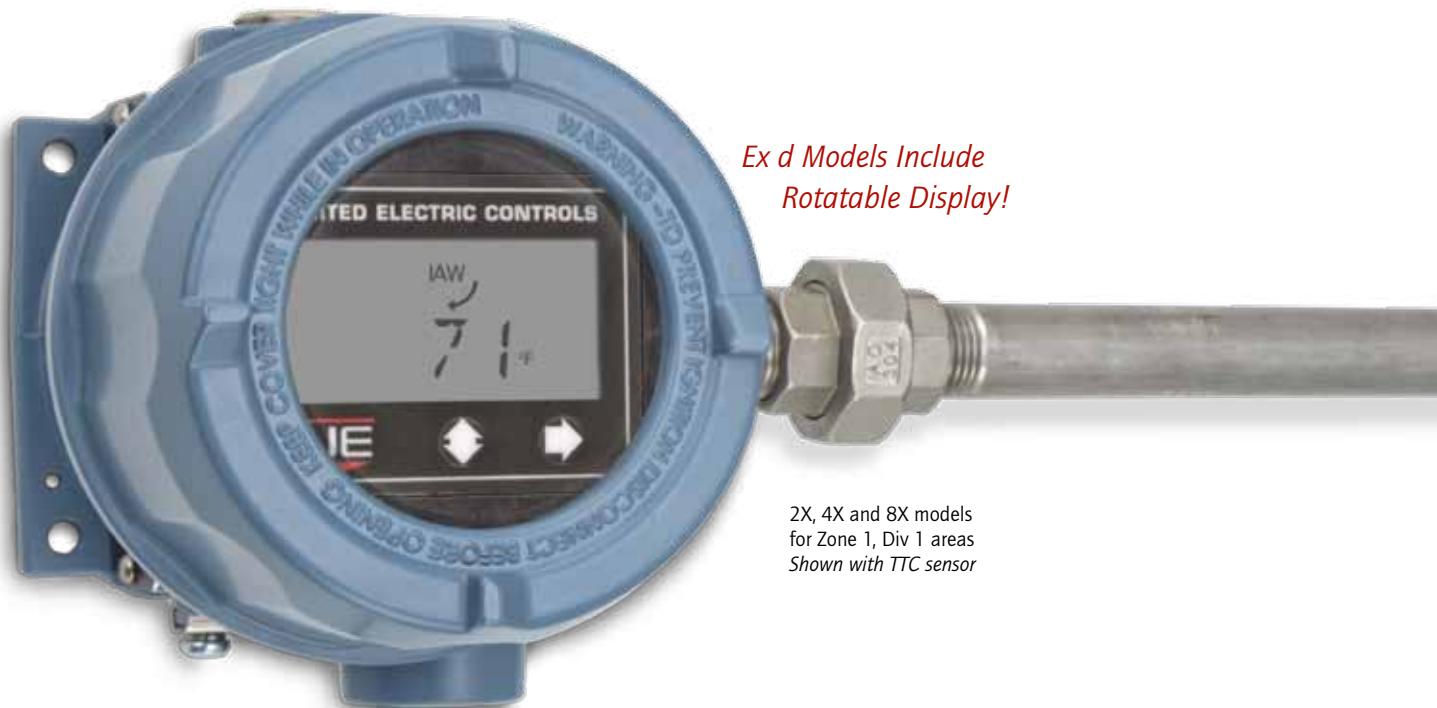
United Electric Controls (UE) is renowned for high-quality workmanship and product design, and the *One Series* carries this nearly 80-year tradition well beyond electromechanical switches. UE's *One Series* line of digital electronic pressure and temperature switches sets new standards for quality, reliability and versatility. Designed to meet the needs of harsh and hazardous applications, the *One Series'* advanced self-diagnostics and digital electronics provide the most reliable switches for a variety of diverse industries.

The *One Series from UE* allows you to choose from explosion-proof, intrinsically safe and non-incendive models that monitor gauge pressure, differential pressure or temperature. With up to two fully adjustable set points and deadbands, available 4-20 mA analog output, and absolutely no moving parts, these versatile instruments can now be used in a wide variety of applications where 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, vibration and shock. For plant upgrades, there are a variety of power options ranging from 2-wire discrete and analog loop-powered models to externally powered models that can switch up to 280 VAC at 10 amperes 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 – 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**

- Digital process display
- Programmable set point and deadband
- Self-diagnostic solid-state digital electronics
- Plug port detection
- Nuisance trip filtering
- Patented electronic IAW® self-diagnostics
- Min/Max process values memory
- 3-year warranty



**INNOVATIVE DESIGN**

The One Series' award-winning design provides numerous advances in alarm & shutdown switching technology.

**POWER**

Extremely low power consumption allows the One Series 2-Wire electronic switch to operate with no additional wiring or batteries. Power is obtained from the control system's discrete or analog input, making it ideal for plant upgrades from mechanical switches while using the same wiring and control schemes. For direct switching applications, powered versions of the One Series can provide 2 independent solid-state relays or handle a load of up to 10 amperes. Loop-powered models feature field-scalable 4-20 mA analog output in addition to a solid-state relay switch – a switch + gauge + transmitter all in one.

**PROGRAMMABILITY**

The set point and deadband settings allow for 100% adjustability, providing highly repeatable trip and reset points for your application. This feature allows the One Series to be used in pump and compressor applications where high cycle rate may shorten the life of mechanical controls. Nuisance trips, switch delay, plugged port detection and process extremes are all easily programmable, making these application challenges manageable by the instrument, with no special programming needed for the PLC.

**SELF-DIAGNOSTICS**

Mechanical switches have no self-diagnostic capabilities – they are blind instruments. All One Series models include the patented IAW® (I Am Working) algorithm that can detect faults before they become process control problems. Detected faults are reported on the digital display while the switch will fail safe open and the 4-20 mA analog output goes beyond 4 and 20 to provide remote fault indication. The intelligent and configurable IAW® diagnostics allow the SIL-2-suitable One Series to provide a significantly higher risk reduction factor than some safety transmitters in SIS applications.



2W, 4W and 8W models  
for Zone 2, Div 2 areas  
*Shown with gauge sensor*

**APPLICATION VERSATILITY**

For alarm and shutdown switching applications, there is no better choice than the *One Series* family of electronic switches from United Electric Controls. Measuring gauge 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 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 self-diagnostics, offering plant operators an extremely reliable and smart protection device.

Proven in use in literally thousands of diverse applications, UE has recently developed explosion-proof *One Series* models, extending this revolutionary switching technology to Zone 1 (Division 1) areas.

Here are just a few:

- Pumps and compressors – start/stop, optimizing, shutdown, staging
- Lubricating oil monitoring – 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
- Safety systems – safety integrity levels 1 & 2, alarm and shutdown, local switching, fast response time
- Plant upgrades – power and wastewater plant upgrades, drop-in replacement for mechanical switches



Gas Compressor Protection



Pump Emergency Shutdown



Lubrication Oil Monitoring

## SPECIFICATIONS

**Power input/  
Switch output:**

| Model            | Input Type (Range)  | Max Switch Ratings (SPST)                                | Temperature Derating      | Min. Load Requirement | Off State Leakage |
|------------------|---|--|---------------------------|-----------------------|-------------------|
| 2W2D00<br>2X2D00 | 2-Wire 24 VDC discrete input powered (12-30 VDC) @ 750 µA (max) | 12-30 VDC @ 40 mA  | NA                        | 2.3 mA                | 0.75 mA maximum   |
| 2W4D00<br>2X4D00 | 2-Wire 48 VDC discrete input powered (30-50 VDC) @ 750 µA (max) | 30-50 VDC @ 40 mA  |                           | 2.0 mA                | 0.8 mA maximum    |
| 2W3A00<br>2X3A00 | 2-Wire 120 V discrete input powered (90-130 VAC/VDC) @ 1 mA     | 90-130 VAC/VDC @ 0.1 A                                   |                           | 3.75 mA               | 1.0 mA maximum    |
| 2WLP41<br>2XLP41 | 2-Wire 24 VDC analog input loop powered (10-36 VDC) @ 4-20 mA   | 0-140 VAC/VDC @ 0.6 A                                    | 8% per 10°C above 21°C    | 0 mA                  | 0.01 mA           |
| 2WLP43<br>2XLP43 | 2-Wire 24 VDC analog input loop powered (10-36 VDC) @ 4-20 mA   | 0-280 VAC/VDC @ 0.3 A                                    |                           |                       |                   |
| 4W3A01<br>4X3A01 | 4-Wire 120 VAC external power supply (90-130 VAC) @ 15mA        | 24-280 VAC @ 10 A  | 1.8 A per 10°C above 38°C | 150 mA                | 0.1 mA            |
| 8W2D42<br>8X2D42 | 8-Wire 24 VDC external power supply (10-30 VDC) @ 30 mA         | SW1: 75-250 VAC @ 1.5 A<br>SW2: 75-250 VAC @ 1.5 A       | 10% per 10°C above 21°C   | 50mA                  | 5 mA              |
| 8W2D44<br>8X2D44 | 8-wire 24 VDC external power supply (10-30 VDC) @ 30 mA         | SW1: 75-250 VAC @ 1.5 A<br>SW2: 0-140 VAC/VDC @ 0.6 A    |                           |                       |                   |
| 8W2D45<br>8X2D45 | 8-wire 24 VDC external power supply (10-30 VDC) @ 30 mA         | SW1: 0-140 VAC/VDC @ 0.6 A<br>SW2: 0-140 VAC/VDC @ 0.6 A | 8% per 10°C above 21°C    | 0 mA                  | 0.01 mA           |

**Accuracy:**

0.5% of full range span, at room temperature

**Repeatability:**

0.1% of full range span

**Ambient operating temperature range:**

|      | Approved Ambient Operating Temperature Range |                            |               |              |
|------|--|----------------------------|---------------|--------------|
|      | cULus (Division System)                      | cULus & ATEX (Zone System) |               |              |
| 2W2D | -40°F (-40°C)                                | 185°F (85°C)               | -40°F (-40°C) | 140°F (60°C) |
| 2W4D | NA   | NA                         | NA            | NA           |
| 2WLP | -40°F (-40°C)                                | 176°F (80°C)               | -40°F (-40°C) | 140°F (60°C) |
| 2W3A | -40°F (-40°C)                                | 185°F (85°C)               | -40°F (-40°C) | 140°F (60°C) |
| 4W3A | -40°F (-40°C)                                | 158°F (70°C)               | -40°F (-40°C) | 140°F (60°C) |
| 8W2D | -40°F (-40°C)                                | 176°F (80°C)               | -40°F (-40°C) | 140°F (60°C) |
| 2X2D | -40°F (-40°C)                                | 185°F (85°C)               | -40°F (-40°C) | 185°F (85°C) |
| 2X4D | -40°F (-40°C)                                | 185°F (85°C)               | -40°F (-40°C) | 185°F (85°C) |
| 2XLP | -40°F (-40°C)                                | 176°F (80°C)               | -40°F (-40°C) | 176°F (80°C) |
| 2X3A | -40°F (-40°C)                                | 185°F (85°C)               | -40°F (-40°C) | 185°F (85°C) |
| 4X3A | -40°F (-40°C)                                | 158°F (70°C)               | -40°F (-40°C) | 158°F (70°C) |
| 8X2D | -40°F (-40°C)                                | 176°F (80°C)               | -40°F (-40°C) | 176°F (80°C) |

**Display operating temperature range:**

10°F (-12°C) 158°F (70°C)

**SPECIFICATIONS (CONTINUED)**

|                               |   |
|-------------------------------|---|
| <b>Long-term stability:</b>   | ±0.25% of range/year maximum  |
| <b>Temperature drift:</b>     | 0.03% of full scale per °C  |
| <b>Switch response time:</b>  | "Change-of-output" response ≤ 60 mS (16.7 Hz) (for detection of full step change and change of output state, delay feature off)                             |
| <b>Display response time:</b> | 400 mS (2.5 Hz)   |
| <b>Transient filtering:</b>   | Programmable time constants between 250 mS and 2 seconds in 2X increments   |
| <b>Diagnostics (IAW®):</b>    | Open or shorted sensor; plugged port; power supply out of range; over and under-range conditions; microprocessor faults/failure; keypad short; switch fault |
| <b>Output states:</b>         | Field selectable for 2-state or 3-state operation.<br>Pulse rates vary by model. Fast and slow rates are selectable. See installation manual for details.   |
| <b>Control modes:</b>         | Field-configuration solid-state switch action with programmable manual reset  |

| Mode            | Action                 | Fault |
|-----------------|------------------------|-------|
| 2-state         |                        |       |
| Normally closed | Open on rising media   | Open  |
| Normally open   | Close on rising media  | Open  |
| Normally closed | Open on falling media  | Open  |
| Normally open   | Close on falling media | Open  |
| 3-state         |                        |       |
| Normally closed | Pulse on rising media  | Open  |
| Normally closed | Pulse on falling media | Open  |

**Analog output:**

4-20 mA output, 700 ohms max. at 24 VDC, Field scalable, 2:1 turn down. Various faults are indicated at 0, 3.5, 22 and 24 mA. See installation manual for details.  
(2WLP, 2XLP, 8W2D, 8X2D models only)

**Electrical characteristics:**  
(2-wire models only)

|       |      | Switch State (Max.)   |                     |
|-------|------|-----------------------|---------------------|
| Model |      | Voltage Open          | Voltage Closed      |
| 2W2D  | 2X2D | 12-30 VDC @ 750 µA    | 4.7 VDC @ 40 mA     |
| 2W4D  | 2X4D | 30-50 VDC @ 1mA       | 5.0 VDC @ 40 mA     |
| 2W3A  | 2X3A | 90-130 VAC/VDC @ 1 mA | 13 VAC/VDC @ 100 mA |

**Enclosure:**

Type 4X/IP66 certified epoxy-coated aluminum construction

**Faceplate:**

UV-resistant pressure sensitive keypad and display overlay

**Cover:**

Epoxy-coated aluminum with tempered glass insert (explosion-proof models only)

**Conduit:**

1/2" NPT female stainless steel fitting; 3/4" NPT female aluminum casting (explosion-proof models only)

**SPECIFICATIONS (CONTINUED)**

|   |   |
|---|---|
| <b>Display:</b>                         | <ul style="list-style-type: none"> <li>• Local 4 digit x 0.5" LCD</li> <li>• IAW® (I Am Working) status</li> <li>• Process variable</li> <li>• Units of measure</li> <li>• Switch status</li> <li>• Latch status</li> <li>• Set point value</li> <li>• Deadband value</li> <li>• Min/Max values</li> <li>• Fault codes</li> </ul>   |
| <b>Set point &amp; deadband:</b>        | User-configured, 100% adjustable over entire sensor operating range   |
| <b>Memory:</b>                          | Programming and data protected by non-volatile EEPROM   |
| <b>Effective transmission distance:</b> | 2,000 feet at rated voltage for 2W2D/2X2D and 2W3A/2X3A   |
| <b>Sensors:</b>                         | <p><b>Gauge Pressure</b> – 316L stainless steel, welded diaphragm, 1/2" NPT (female) process connection, micro-machined piezo-resistive strain gauge silicon element, 0.25 ml silicone oil fill.<br/> Media temperature: -40 to 257°F (-40 to 125°C)</p> <p><b>Differential Pressure</b> - 316L stainless steel, welded diaphragms, 1/4" NPT (male) process connections, piezo-resistive strain gauge silicon element, silicone oil fill.<br/> Media temperature: -40 to 257°F (-40 to 125°C)</p> <p><b>Temperature</b> – 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).<br/> Media temperature: -300 to 1000°F (-184 to 538°C)</p> |
| <b>Vacuum:</b>                          | All pressure sensors withstand deep vacuum with no calibration effects. Vacuum ranges are not currently available.  |
| <b>EMI/RFI:</b>                         | Compliance to CE EMC requirements: EN 55011, EN 61326, EN 61000-6-2   |
| <b>Emission:</b>                        | EN 55011 class A; Radiated emissions<br>EN 61000-3-2 Harmonic Current Emissions   |
| <b>Immunity:</b>                        | EN 61000-3-3 Immunity to Voltage Fluctuations and Flicker<br>EN 61000-4-2 Immunity to Electrostatic Discharge<br>EN 61000-4-3 Immunity to Continuous Radiated Disturbances<br>EN 61000-4-4 Immunity to Electrical Fast Transients<br>EN 61000-4-5 Immunity to Surges<br>EN 61000-4-6 Immunity to Continuous Conducted Disturbances<br>EN 61000-4-8 Immunity to Power Frequency Magnetic Field<br>EN 61000-4-11 Immunity to Voltage Dips and Interruptions   |
| <b>Weight:</b>                          | 2W, 4W, 8W: 1.5 - 1.9 lbs (0.7 - 0.9 kg)<br>2X, 4X, 8X: 4.5 - 6.0 lbs (2.0 - 2.7 kg)  |
| <b>Shock:</b>                           | per MIL-STD-810G method 516.6 – when device is subjected to 15 g (10 mSec) and 40 g (6 mSec); 3 drops/axis<br>Effects: less than +/- 0.40% of range   |
| <b>Vibration:</b>                       | 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)<br>Effects: less than +/- 0.40% of range  |

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**HOW TO ORDER**

Build a part number by selecting the model, sensor and options from the tables below.

| Model  | Description   | Min. Load                | Zone |   | Division |   |
|--------|---|--------------------------|------|---|----------|---|
|        |   |                          | 0    | 1 | 2        | 1 |
| 2W2D00 | 2-wire discrete input powered,<br>12-30 VDC, 40 mA switch (24 VDC 2-Wire)                             | 2.3 mA                   | ✓    | ✓ | ✓        | ✓ |
| 2X2D00 |   |                          |      | ✓ | ✓        | ✓ |
| 2W4D00 | 2-wire discrete input powered,<br>30-50 VDC, 40 mA switch (48 VDC 2-Wire)                             | 2.0 mA                   |      |   |          |   |
| 2X4D00 |   |                          |      | ✓ | ✓        | ✓ |
| 2W3A00 | 2-wire discrete input powered,<br>90-130 VAC or VDC, 100 mA switch (115 VAC 2-Wire)                   | 3.75 mA                  |      |   | ✓        | ✓ |
| 2X3A00 |   |                          |      | ✓ | ✓        | ✓ |
| 2WLP41 | 2-wire loop-powered or 24V external powered, 4-20 mA output, 0-140 VAC/VDC, 0.6 A SSR switching       | 0 mA                     |      |   | ✓        | ✓ |
| 2XLP41 |   |                          |      | ✓ | ✓        | ✓ |
| 2WLP43 | 2-wire loop-powered or 24V external powered, 4-20 mA output, 0-280 VAC/VDC, 0.3 A SSR switching       | 0 mA                     |      |   | ✓        | ✓ |
| 2XLP43 |   |                          |      | ✓ | ✓        | ✓ |
| 4W3A01 | Supply voltage – 90-130 VAC,<br>24-280 VAC, 10 A SSR switching  | 150 mA                   |      |   | ✓        | ✓ |
| 4X3A01 |   |                          |      | ✓ | ✓        | ✓ |
| 8W2D42 | Supply voltage – 10-30 VDC,<br>SW1 & SW2: 75-250 VAC, 1.5 A SSR, 4-20 mA output                       | SW1: 50 mA<br>SW2: 50 mA |      |   | ✓        | ✓ |
| 8X2D42 |   |                          |      | ✓ | ✓        | ✓ |
| 8W2D44 | Supply voltage – 10-30 VDC, SW1: 75-250 VAC, 1.5 A SSR, SW2: 0-140 VAC/VDC, 0.6 A SSR, 4-20 mA output | SW1: 50 mA<br>SW2: 0 mA  |      |   | ✓        | ✓ |
| 8X2D44 |   |                          |      | ✓ | ✓        | ✓ |
| 8W2D45 | Supply voltage – 10-30 VDC,<br>SW1 & SW2: 0-140 VAC/VDC, 0.6 A SSR, 4-20 mA output                    | SW1: 0 mA<br>SW2: 0 mA   |      |   | ✓        | ✓ |
| 8X2D45 |   |                          |      | ✓ | ✓        | ✓ |

| Sensor   | Pressure Operating Range <sup>1</sup> + display resolution |            |           |                          |           | Maximum Over Range <sup>2</sup> |           |
|--|--|------------|-----------|--------------------------|-----------|---------------------------------|-----------|
| Gauge pressure, piezo-resistive strain gage, silicone oil fill, 316L stainless wetted materials, 1/2" NPT (female) process connection, displayed as shown. |  |            |           |                          |           |                                 |           |
| P10  | 0-5.00 psig  | 344,7 mbar | 34.47 kPa | 0.352 kg/cm <sup>2</sup> | 138.5 "wc | 10 psig                         | 690 mbar  |
| P11  | 0-15.00 psig   | 1034 mbar  | 103.4 kPa | 1.055 kg/cm <sup>2</sup> | 415.5 "wc | 30 psig                         | 2068 mbar |
| P12  | 0-30.00 psig   | 2068 mbar  | 206.8 kPa | 2.109 kg/cm <sup>2</sup> | 831.1 "wc | 60 psig                         | 4137 mbar |
| P13  | 0-50.00 psig   | 3447 mbar  | 344.7 kPa | 3.516 kg/cm <sup>2</sup> | 1385 "wc  | 100 psig                        | 6895 mbar |
| P14  | 0-100.0 psig   | 6895 mbar  | 689.5 kPa | 7.031 kg/cm <sup>2</sup> | 2770 "wc  | 200 psig                        | 13,8 bar  |
| P15  | 0-300.0 psig   | 20,68 bar  | 2068 kPa  | 21.09 kg/cm <sup>2</sup> | NA        | 600 psig                        | 41,4 bar  |
| P16  | 0-500.0 psig   | 34,47 bar  | 3447 kPa  | 35.16 kg/cm <sup>2</sup> | NA        | 1000 psig                       | 68,9 bar  |
| P17  | 0-1000.0 psig  | 68,95 bar  | 6895 kPa  | 70.31 kg/cm <sup>2</sup> | NA        | 2000 psig                       | 137,9 bar |
| P18  | 0-3000.0 psig  | 206,8 bar  | 20,68 mPa | 210.9 kg/cm <sup>2</sup> | NA        | 6000 psig                       | 413,7 bar |
| P19  | 0-4500 psig  | 310,3 bar  | 31.03 mPa | 316.4 kg/cm <sup>2</sup> | NA        | 9000 psig                       | 620,5 bar |
| P20*   | 0-6000 psig  | 413,7 bar  | 41.40 mPa | 421.9 kg/cm <sup>2</sup> | NA        | 12000 psig                      | 827,4 bar |

\* (P20 range available on 2X, 4X and 8X models only)

For bar, kPa and kg/cm<sup>2</sup>, the option code must be specified (see pg. 10)

## HOW TO ORDER CONT.

| Sensor   | Pressure Operating Range <sup>1</sup> + display resolution |           |           |                          |          |
|--|--|-----------|-----------|--------------------------|----------|
| Differential pressure, piezo-resistive strain gage, silicone oil fill, 316L stainless wetted materials, 1/4" NPT (male) process connections, displayed as shown. |  |           |           |                          |          |
| K11  | 0-50.0 psid  | 3447 mbar | 344.7 kPa | 3.516 kg/cm <sup>2</sup> | 1385 "wc |
| K12  | 0-100.0 psid   | 6895 mbar | 689.5 kPa | 7.031 kg/cm <sup>2</sup> | 2770 "wc |
| K13  | 0-200.0 psid   | 13,8 bar  | 1379 kPa  | 14.10 kg/cm <sup>2</sup> | NA       |

| Sensor | Maximum Over Range <sup>2</sup> |           | Maximum Working Pressure <sup>3</sup> |           |
|--------|---------------------------------|-----------|---------------------------------------|-----------|
| K11    | 100 psid                        | 6895 mbar | 500 psig                              | 34,47 bar |
| K12    | 200 psid                        | 13,8 bar  | 1500 psig                             | 103,4 bar |
| K13    | 400 psid                        | 27,6 bar  | 1500 psig                             | 103,4 bar |

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.

| Sensor  | Temperature Range   | Description (see page 13 for sensor drawings)  |
|---|---|--|
| Temperature – 4-wire RTD, 100 Ω platinum, DIN 0.00385, 0.25" OD sensor sheath, 316 stainless steel construction   |   |  |
| TL1   | -40 to 450°F/-40 to 232°C<br>(See page 11 fitting options)  | 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   |
| TR1   |   | Remote mounted, 6" sheath, 6' fixed-length Teflon® extension (2.5" sheath and MI extension for explosion-proof and ATEX models)  |
| TRC*  |   | Remote mounted, 6" sheath, 1' to 30' in 1' increments variable Teflon® extension length MUST BE SPECIFIED. Consider Option M006. (2.5" sheath and MI extension for explosion-proof and ATEX models)  |
| TH1   | -40 to 1000°F/-40 to 538°C<br>(See page 11 fitting options) | Remote mounted, 2.5" sheath, 6' MI fixed extension length  |
| THC*  |   | Remote mounted, 2.5" sheath, 2W2D, 2X2D, 2W4D, 2WLP, 2XLP, 8W2D and 8X2D models only, 1' to 30' MI extension length MUST BE SPECIFIED. USE OPTION W074 ONLY.   |
| TC1   | -300 to 200°F/-184 to 93°C<br>(See page 11 fitting options) | Remote mounted, 2.5" sheath, 6' MI fixed extension length  |
| TCC*  |   | Remote mounted, 2.5" sheath, 2W2D, 2X2D, 2W4D, 2WLP, 2XLP, 8W2D & 8X2D models only, 1' to 30' MI extension length MUST BE SPECIFIED. USE OPTION W074 ONLY.   |
| TTC   | -40 to 900°F/-40 to 482°C<br>(Example: TTC-NUN6-L 10.5)     | Local (stem) spring-loaded mount, NUN connection lengths: 4" – 10" in 1" increments, variable sheath (L) length up to 60", BOTH MUST BE SPECIFIED, available on 2X, 4X and 8X models only. Refer to drawing on page 13. Thermowell required, see page 11.  |
| TU1   | -300 to 200°F/-184 to 93°C                                  | User-supplied sensor for explosion-proof models only must be a 3-wire or 4-wire RTD, 100 Ω platinum, DIN 0.00385 (response curve for RTD). Choose range expected for the application. See below to order replacement sensors. No sensor is included with TU1 - TU3 ranges. For 2X3A and 4X3A models with remote sensors, extension length must be limited to 6'. |
| TU2   | -40 to 450°F/-40 to 232°C                                   |  |
| TU3   | -40 to 1000°F/-40 to 538°C                                  |  |
| Thermowells and fittings are shown on page 11. To order spares and <b>replacement temperature sensor assemblies, available only on explosion-proof models</b> , provide the "TA#" number from the product nameplate. Example: TA#: 62128723 |   |  |

\*Custom extension lengths are not available with 2W3A, 2X3A, 4W3A or 4X3A models.

**OPTION CODES****QC1** Calibration certificate of conformance**HL1** Hazardous location certificate**M006** Add armor to temperature sensor Teflon® extension (2W, 4W, 8W, TR1 and TRC models only)**M201** Factory programmed set point, deadband and switch mode (all 3 settings are required at time of ordering - see example below)

| <b>Set Point<sup>1</sup></b> | <b>Deadband<sup>1</sup></b> | <b>Switch Mode</b> |
|------------------------------|-----------------------------|--------------------|
| 40.00                        | 25.00                       | Open on rise       |

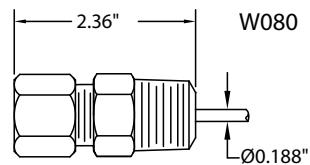
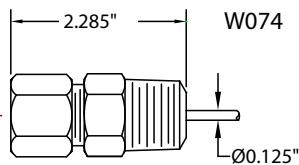
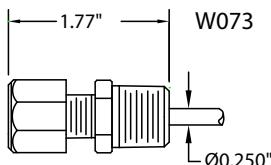
**M202** Factory programmed set point, deadband and switch mode for two switches (all 6 settings are required at time of ordering - see example below)

| <b>Switch</b> | <b>Set Point<sup>1</sup></b> | <b>Deadband<sup>1</sup></b> | <b>Switch Mode</b> |
|---------------|------------------------------|-----------------------------|--------------------|
| 1             | 040.3                        | 001.5                       | Open on fall       |
| 2             | 050.0                        | 005.0                       | Close on rise      |

**M270** Display units, degrees C for temperature models**M275** Display units, inches of water column (P10, P11 and K11 sensor ranges only)**M276** Display units, bar or mbar**M277** Display units, kPa or MPa**M278** Display units, kg/cm<sup>2</sup>**M406** Compliance per Russian Gosgortekhnadzor (N/A on 2W4D)**M419** ATEX approval (2W2D, 2W3A, 2WLP and 8W2D models only. N/A on 2W4D and 4W3A. Standard on explosion-proof models. 2.5" sheath and MI extension for TR1 and TRC with this option. See page 9).**M444** Paper tag**M446** Stainless steel tag**M449** Mounting adapter plate kit 62169-40 (use to match JIC form bolt pattern on 2W, 4W and 8W models only)**M550** Oxygen cleaning service**M905** 1/2" NPT female conduit added to right wall of enclosure for 2W2D, 2W3A, 2W4D and 4W3A models only**M906** 1/2" NPT female conduit moved to bottom wall of enclosure for 2W2D, 2W3A, 2W4D and 4W3A models only, approvals N/A, see option M449, not available with differential pressure (K) sensors**M907** 1/2" NPT female conduit moved from right to top wall of enclosure for 2WLP and 8W2D models only, approvals N/A, see option M449**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 for 2W2D, 2X2D, 2W4D, 2WLP, 2XLP, 8W2D and 8X2D models**W080** 1/2" NPT male union connector for use with TR1, TH1 and TC1 sensors for 2W3A, 2X3A, 4W3A and 4X3A models**W930** 1/2" NPT male to G1/2 male adapter for use with gauge pressure sensors P10-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)

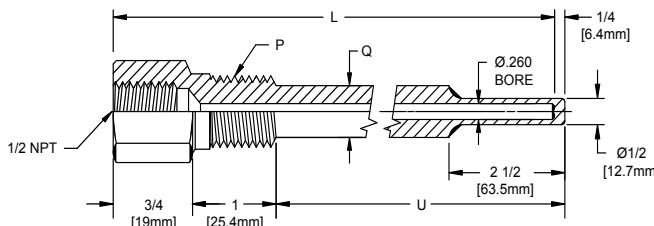
**<sup>1</sup>Note: Four numbers must be entered for each set point and deadband. Please refer to the display resolution chart on pages 8 & 9 for the correct number of decimal places allowed for the sensor range and units of measure selected.**

## TEMPERATURE SENSORS AND FITTINGS COMPATIBILITY CHART



| Model (Table 1)  | W073     | W074   | W080   |
|--|----------|--|--|
| 1/2" NPT compression fitting with ferrule to fit 0.25" sensor sheath | TLx, TRx | 1/2" NPT union connection to fit 0.125" sensor extension cable | 1/2" NPT union connection to fit 0.188" sensor extension cable |
| 2W2D, 2W4D, 2WLP, 8W2D   | TLx, TRx | TRx, THx, TCx  | NA   |
| 2W2D, 2WLP, 8W2D (w/ ATEX option - M419)                             | TLx      | TRx, THx, TCx  | NA   |
| 2W3A, 4W3A   | TLx, TRx | TRx  | TH1, TC1   |
| 2W3A (w/ ATEX option - M419)   | TLx      | NA   | TR1, TH1, TC1  |
| 2X2D, 2X4D, 2XLP, 8X2D   | TLx      | TRx, THx, TCx  | NA   |
| 2X3A, 4X3A   | TLx      | NA   | TR1, TH1, TC1  |

\*The sensor extension is mineral insulated (MI) when ATEX option M419 is specified.



## Fittings for Thermowells (Table 2)

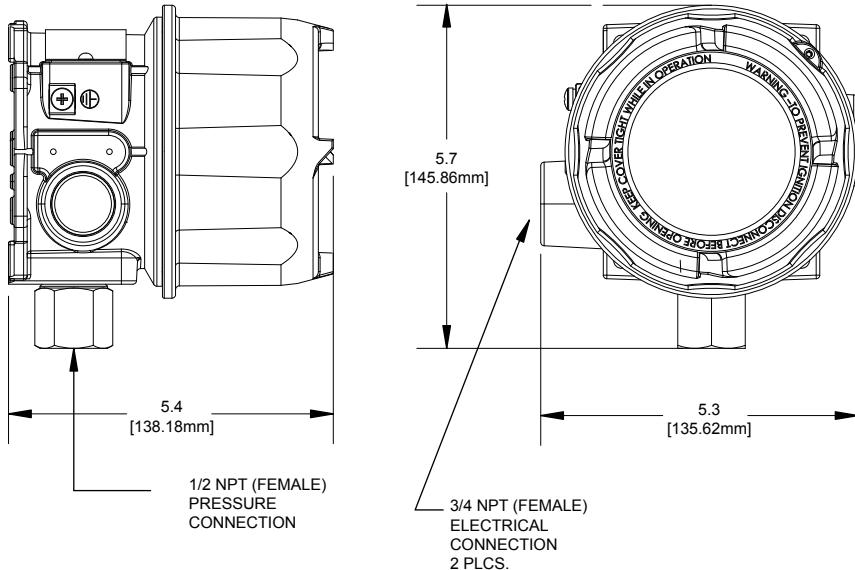
| Thermowell<br>UE Part # | Length (L)<br>Inches | P (NPT) | Q   | U    | Local Temperature Sensors w/<br>0.25" Sensor Sheath <sup>1</sup> |          |           | Remote<br>Temperature<br>Sensors w/<br>Teflon® Cable | Remote<br>Temperature<br>Sensors w/<br>0.125" Diameter<br>MI Cable <sup>1</sup> | Remote<br>Temperature<br>Sensors w/<br>0.188" Diameter<br>MI Cable <sup>1</sup> |
|-------------------------|----------------------|---------|-----|------|--|----------|-----------|--|---|---|
|                         |                      |         |     |      | TL1 (4")   | TL2 (6") | TL3 (10") |  |   |   |
| 1S260 L4-316            | 4                    | 1/2     | 5/8 | 2.5  | NA   | W073     | W073      | W073   | W074  | W080  |
| 1S260 L4.5-316          | 4.5                  | 1/2     | 5/8 | 3    | NA   | W073     | W073      | W073   | W074  | W080  |
| 1S260 L5.5-316          | 5.5                  | 1/2     | 5/8 | 4    | NA   | W073     | W073      | W073   | W074  | W080  |
| 1S260 L6-316            | 6                    | 1/2     | 5/8 | 4.5  | NA   | W073     | W073      | W073   | W074  | W080  |
| 1S260 L6.5-316          | 6.5                  | 1/2     | 5/8 | 5    | NA   | W073     | W073      | W073   | W074  | W080  |
| 1S260 L9-316            | 9                    | 1/2     | 5/8 | 7.5  | NA   | NA       | NA        | W074   | W074  | W080  |
| 1S260 L9.5-316          | 9.5                  | 1/2     | 5/8 | 8    | NA   | NA       | NA        | W074   | W074  | W080  |
| 1S260 L12-316           | 12                   | 1/2     | 5/8 | 10.5 | NA   | NA       | NA        | W074   | W074  | W080  |
| 1S260 L15-316           | 15                   | 1/2     | 5/8 | 13.5 | NA   | NA       | NA        | W074   | W074  | W080  |
| 1S260 L18-316           | 18                   | 1/2     | 5/8 | 16.5 | NA   | NA       | NA        | W074   | W074  | W080  |
| 1S260 L24-316           | 24                   | 1/2     | 5/8 | 22.5 | NA   | NA       | NA        | W074   | W074  | W080  |
| 2S260 L4-316            | 4                    | 3/4     | 3/4 | 2.5  | NA   | W073     | W073      | W073   | W074  | W080  |
| 2S260 L6-316            | 6                    | 3/4     | 3/4 | 4.5  | NA   | NA       | W073      | W073   | W074  | W080  |
| 2S260 L9-316            | 9                    | 3/4     | 3/4 | 7.5  | NA   | NA       | NA        | W074   | W074  | W080  |
| 2S260 L12-316           | 12                   | 3/4     | 3/4 | 10.5 | NA   | NA       | NA        | W074   | W074  | W080  |
| 2S260 L15-316           | 15                   | 3/4     | 3/4 | 13.5 | NA   | NA       | NA        | W074   | W074  | W080  |
| 2S260 L18-316           | 18                   | 3/4     | 3/4 | 16.5 | NA   | NA       | NA        | W074   | W074  | W080  |
| 2S260 L24-316           | 24                   | 3/4     | 3/4 | 22.5 | NA   | NA       | NA        | W074   | W074  | W080  |

Note: Reference (Table 1) to determine sensor sheath diameter or the diameter of the MI cable by model

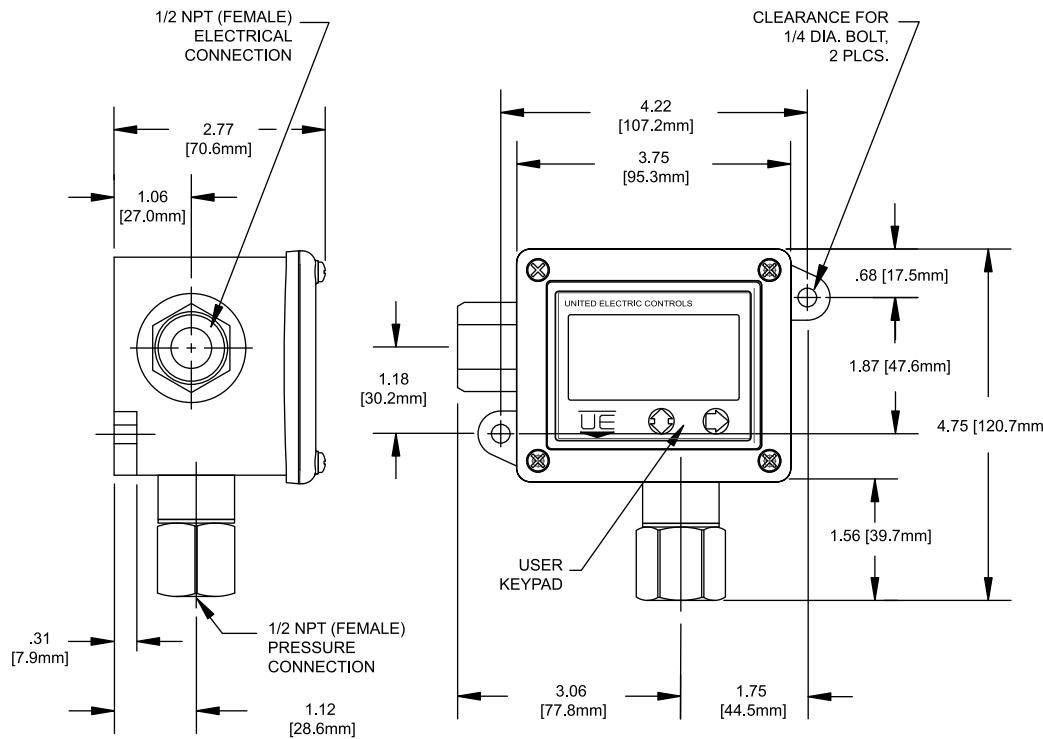
## DIMENSIONAL DRAWINGS

## ENCLOSURE AND SENSOR DETAILS

**2X, 4X and 8X models**  
(Shown with gauge pressure sensor)

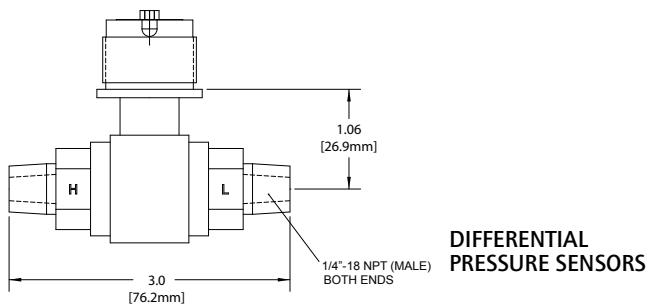
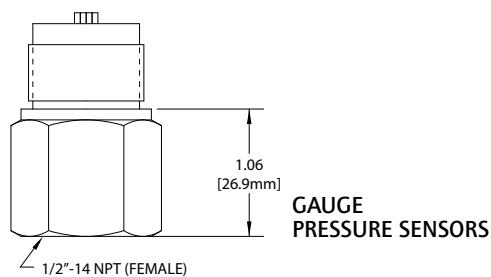
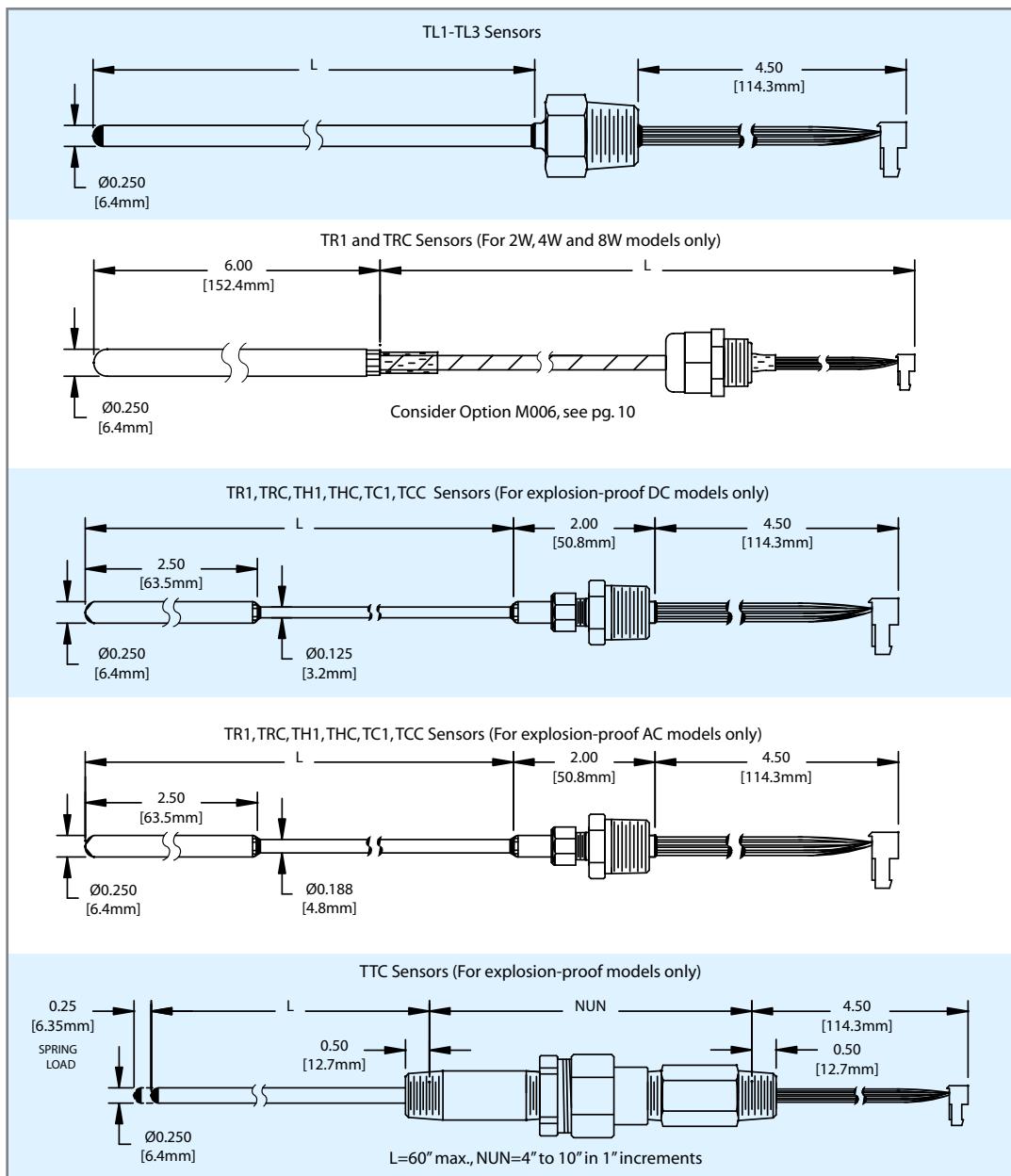


**2W, 4W and 8W models**  
(Single conduit shown with gauge pressure sensor)



## DIMENSIONAL DRAWINGS (CONTINUED)

## TEMPERATURE SENSORS



## APPROVALS &amp; RATINGS

| <b>Model</b>  | <b>N. America</b>   | <b>Europe</b>   | <b>Australia</b>                                      | <b>Russia</b>  |
|---|---|---|---|--|
|   | UL Listed, cUL Certified<br>UL50, 508, 913, 1604 & 60079-15;<br>CSA No. E79-0, E79-11, E60079-15,<br>C22.2<br>No. 14, 157 & 213<br>File#E226592                                       | (select option M419)<br>(ATEX Directive 94/9/EC)<br>EN 60079-0, 60079-15, 50281-1-<br>1, 50020<br><br>EMC Directive: refer to page 7            | IECEx Scheme  | (select option M406)<br>Gosgortekhnadzor<br>GOST R 51330.0, 5.1330.1,<br>51330.10, and 51330.14  |
| 2W2D<br>Intrinsically safe<br>when used with<br>a safety barrier<br>(option M036) | Class I, Div 1, Groups A, B, C & D<br>Class II, Div 1, Groups E, F & G<br>Class III<br>Class I, Zone 0, AEx ia IIC T5<br>Class I, Zone 0, Ex ia IIC T5<br>Per UE drawing # A-62174-19 | II 1 G EEx ia IIC T5<br>II 1 D T+90°C, IP66<br>T <sub>AMB</sub> = -40°C to +60°C<br>Per UE drawing # A-62174-20<br>Cert# DEMKO 03 ATEX 0322281X | N/A   | ExiaIICT5<br>T <sub>AMB</sub> = -40°C to +85°C<br>Cert# ROSS US.GB05. Bo2993   |
| 2W2D<br>Non-incendive   | Class I, Div 2 Groups A, B, C & D<br>Class II, Div 2 Groups F & G<br>Class III<br>Class I, Zone 2, AEx nC IIC T5<br>Class I, Zone 2 Ex nC IIC T5                                      | II 3 G EEx nL IIC T5<br>II 3 D T+90°C, IP66<br>T <sub>AMB</sub> = -40°C to +60°C<br>Cert# DEMKO 03 ATEX 0322281X                                | N/A   | ExnLIICT5<br>T <sub>AMB</sub> = -40°C to +85°C<br>Cert# ROSS US.GB05. Bo2993   |
| 2W3A<br>Non-incendive   | Class I, Div 2 Groups A, B, C & D<br>Class II, Div 2 Groups F & G<br>Class III<br>Class I, Zone 2, AEx nC IIC T5<br>Class I, Zone 2 Ex nC IIC T5                                      | II 3 G Ex nL IIC T5<br>II 3 D T+90°C, IP66<br>T <sub>AMB</sub> = -40°C to +60°C<br>Cert# DEMKO 08 ATEX 0726838X                                 | N/A   | ExnLIICT5<br>T <sub>AMB</sub> = -40°C to +85°C<br>Cert# ROSS US.GB05. Bo2993   |
| 2W4D  | N/A   | N/A   | N/A   | N/A  |
| 2WLP<br>Non-incendive   | Class I, Div 2 Groups A, B, C & D<br>Class II, Div 2 Groups F & G<br>Class III<br>Class I, Zone 2, AEx nC IIC T4<br>Class I, Zone 2 Ex nC IIC T4                                      | II 3 G Ex nL IIC T4<br>II 3 D T+110°C, IP66<br>T <sub>AMB</sub> = -40°C to +60°C<br>Cert# DEMKO 08 ATEX 0726838X                                | N/A   | ExnLIICT4<br>T <sub>AMB</sub> = -40°C to +80°C<br>Cert# ROSS US.GB05. Bo2993   |
| 4W3A<br>Non-incendive   | Class I, Div 2 Groups A, B, C & D<br>Class II, Div 2 Groups F & G<br>Class III<br>Class I, Zone 2, AEx nC IIC T4<br>Class I, Zone 2 Ex nC IIC T4                                      | N/A   | N/A   | 2ExnCIICT4<br>T <sub>AMB</sub> = -40°C to +70°C<br>Cert# ROSS US.GB05. Bo2993  |
| 8W2D<br>Non-incendive   | Class I, Div 2 Groups A, B, C & D<br>Class II, Div 2 Groups F & G<br>Class III<br>Class I, Zone 2, AEx nC IIC T4<br>Class I, Zone 2 Ex nC IIC T4                                      | II 3 G Ex nL IIC T4<br>II 3 D T+110°C, IP66<br>T <sub>AMB</sub> = -40°C TO +60°C<br>Cert# DEMKO 08 ATEX 0726838X                                | N/A   | ExnLIICT4<br>T <sub>AMB</sub> = -40°C to +80°C<br>Cert# ROSS US.GB05. Bo2993   |
| <b>Model</b>  | <b>N. America</b>   | <b>Europe</b>   | <b>Australia</b>                                      | <b>Russia</b>  |
|   | UL Listed, cUL Certified<br>UL 50, 50E, 1203, UL/CSA 61010-1,<br>60079-0, 60079-1, CSA C22.2 No.<br>25,30<br>File#E226592   | (ATEX Directive 94/9/EC)<br>EN 60079-0, 60079-1,<br>61241-0, 61241-1  | IECEx Scheme<br>IEC 60079-0,<br>60079-1               | (select option M406)<br>Gosgortekhnadzor   |
| 2X2D, 2X3A,<br>2X4D<br>2XLP, 4X3A,<br>8X2D<br>Explosion-Proof/<br>Flameproof      | Class I, Div 1, Groups A, B, C & D<br>Class II, Div 1, Groups E, F & G<br>Class III<br>Class I, Zone 1, AEx nC IIC T3/T5**<br>Class I, Zone 1 Ex nC IIC T5                            | II 2 G Ex d IIC T3/T5**<br>II 2 D Ex tD A21 IP66 T+90°C<br>Cert# DEMKO 09 ATEX 0813748X   | Ex d IIC T3/<br>T5**<br>Cert# IECEx<br>UL<br>08.0017X | 1ExdIIC T3/T5**<br>2X2D, 2X3A and 2X4D:<br>-40°C ≤ T <sub>AMB</sub> ≤ +85°C<br>2XLP + 8X2D:<br>-40°C ≤ T <sub>AMB</sub> ≤ +80°C<br>4X3A:<br>-40°C ≤ T <sub>AMB</sub> ≤ +70°C |

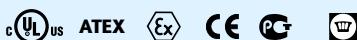
\*\*T3 for pressure sensor ranges P10-P16 only. T5 for all other models.

Specifications subject to change without notice.

## ADDITIONAL PRODUCTS FROM UE

**Spectra 12 Series** – Electro-Mechanical Pressure and Temperature Switch

- Dual seal compliant to ANSI/ISA 12.27.01
- Compact, cylindrical 316 stainless steel enclosure
- Hermetically-sealed SPDT or DPDT switch output
- Explosion-proof
- Snap-acting belleville spring mechanism to enhance vibration resistance and set point stability
- Pressure ranges to 12,500 psi; DP working pressure ranges to 2500 psid; temperature ranges to 650°F

**120 Series** – Electro-Mechanical Pressure and Temperature Switch

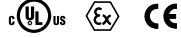
- Explosion-proof line of pressure, differential pressure, and temperature models with wide selection of ranges, sensors and pressure connections
- UL, cUL, ATEX certified for hazardous locations
- Single or dual switch outputs
- Welded stainless steel diaphragm pressure sensor
- Internal or external set point adjustment

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- Welded, hermetically-sealed, 316 stainless steel construction
- Ranges 0 to 15 psi up to 0 to 25,000 psi
- Choice of field adjustable or fixed range models
- 4-20 mA, 1-5 VDC, or 0-10 VDC output

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- Single switch for corrosive and hazardous division 2 locations
- Compact pressure, differential pressure and temperature models
- Hermetically-sealed SPDT and DPDT switch output
- Epoxy-coated, weather-tight design houses stainless steel internal construction
- Convenient terminal block wiring

**Temperature Sensors**

Rugged RTDs and thermocouples for process and energy applications, available with Nema 4X and explosion-proof heads to match heat-trace, turbine, combustion, and stack-emission applications



## RECOMMENDED PRACTICES AND WARNINGS

United Electric Controls Company recommends careful consideration of the following factors when specifying and installing UE pressure and temperature units. Before installing a unit, the Installation and Maintenance instructions provided with unit must be read and understood.

- To avoid damaging unit, proof pressure and maximum temperature limits stated in literature and on nameplates must never be exceeded, even by surges in the system. Operation of the unit up to maximum pressure or temperature is acceptable on a limited basis (e.g., start-up, testing) but continuous operation must be restricted to the designated adjustable range. Excessive cycling at maximum pressure or temperature limits could reduce sensor life.
- A back-up unit is necessary for applications where damage to a primary unit could endanger life, limb or property. A high or low limit switch is necessary for applications where a dangerous runaway condition could result.
- The adjustable range must be selected so that incorrect, inadvertent or malicious setting at any range point cannot result in an unsafe system condition.
- Install unit where shock, vibration and ambient temperature fluctuations will not damage unit or affect operation. When applicable, orient unit so that moisture does not enter the enclosure via the electrical connection. When appropriate, this entry point should be sealed to prevent moisture entry.
- Unit must not be altered or modified after shipment. Consult UE if modification is necessary.
- Monitor operation to observe warning signs of possible damage to unit, such as drift in set point or faulty display. Check unit immediately.
- Preventative maintenance and periodic testing is necessary for critical applications where damage could endanger property or personnel.
- Electrical ratings stated in literature and on nameplate must not be exceeded. Overload on a switch can cause damage, even on the first cycle. Wire unit according to local and national electrical codes, using wire size recommended in installation sheet.
- Do not mount unit in ambient temp. exceeding published limits.

## LIMITED WARRANTY

Seller warrants that the product hereby purchased is, upon delivery, free from defects in material and workmanship and that any such product which is found to be defective in such workmanship or material will be repaired or replaced by Seller (Ex-works, Factory, Watertown, Massachusetts. INCOTERMS); provided, however, that this warranty applies only to equipment found to be so defective within a period of 36 months from the date of manufacture by the Seller. Seller shall not be obligated under this warranty for alleged defects which examination discloses are due to tampering, misuse, neglect, improper storage, and in any case where products are disassembled by anyone other than authorized Seller's representatives. EXCEPT FOR THE LIMITED WARRANTY OF REPAIR AND REPLACEMENT STATED ABOVE, SELLER DISCLAIMS ALL WARRANTIES WHATSOEVER WITH RESPECT TO THE PRODUCT, INCLUDING ALL IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR ANY PARTICULAR PURPOSE.

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SELLER'S LIABILITY TO BUYER FOR ANY LOSS OR CLAIM, INCLUDING LIABILITY INCURRED IN CONNECTION WITH (I) BREACH OF ANY WARRANTY WHATSOEVER, EXPRESSED OR IMPLIED, (II) A BREACH OF CONTRACT, (III) A NEGLIGENT ACT OR ACTS (OR NEGLIGENT FAILURE TO ACT) COMMITTED BY SELLER, OR (IV) AN ACT FOR WHICH STRICT LIABILITY WILL BE INPUTTED TO SELLER, IS LIMITED TO THE "LIMITED WARRANTY" OF REPAIR AND/OR REPLACEMENT AS SO STATED IN OUR WARRANTY OF PRODUCT. IN NO EVENT SHALL THE SELLER BE LIABLE FOR ANY SPECIAL, INDIRECT, CONSEQUENTIAL OR OTHER DAMAGES OF A LIKE GENERAL NATURE, INCLUDING, WITHOUT LIMITATION, LOSS OF PROFITS OR PRODUCTION, OR LOSS OR EXPENSES OF ANY NATURE INCURRED BY THE BUYER OR ANY THIRD PARTY.

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## U.S. SALES OFFICES

United Electric Controls  
31 Old Stage Road  
Hampton Falls, NH 03844  
Phone: 617-899-1132  
email: northeastsales@ueonline.com

United Electric Controls  
28 N. Wise Ave.  
Freeport, IL 61032  
Phone: 815-341-2588  
email: midwestsales@ueonline.com

United Electric Controls  
1022 Vineyard Drive  
Conyers, GA 30013  
Phone: 770-335-9802  
email: southeastsales@ueonline.com

United Electric Controls  
5829 Grazing Court  
Mason, OH 45040  
Phone: 513-535-5486  
email: midatlanticsales@ueonline.com

United Electric Controls  
102 Salazar Court  
Clayton, CA 94517  
Phone: 925-408-5997  
email: westcoastsales@ueonline.com

United Electric Controls  
27 Summit Terrace  
Sparta, NJ 07871  
Phone: 973-271-2550  
email: easternsales@ueonline.com

United Electric Controls  
4306 Whickham Drive  
Fulshear, TX 77441  
Phone: 832-457-6138  
email: southwestsales@ueonline.com

## CANADA

EASTERN  
68 Mosley Crescent  
Brampton, Ontario  
Canada L6Y 5C8  
Phone: 905-455-5131  
FAX: 905-455-5131

 UNITED ELECTRIC  
CONTROLS

180 Dexter Avenue, P.O. Box 9143  
Watertown, MA 02471-9143 USA  
Telephone: 617 926-1000 Fax: 617 926-2568  
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## INTERNATIONAL OFFICES

CHINA  
United Electric Controls, *Shanghai Office*  
Room 1011, 10th Flr,  
Huai Hai Zhonghua Building  
No. 885, Renmin Road, Luwan District  
Shanghai 200010, P.R. China  
Phone: +8621-6255 8059  
email: chinasales@ueonline.com

United Electric Controls, *Beijing Office*  
Room 1006, Jainhao International Bldg.  
Block D, No. 116  
Zizhuyuanlu, Haidian District  
Beijing, China 100089  
Phone & Fax: +86-10-5893-0551  
email: beijingsales@ueonline.com

EASTERN EUROPE & SCANDINAVIA  
United Electric Controls  
05-806 Komorow  
Kujawska 5, Poland  
Phone: +48 22 499 4804  
email: easterneuropepesales@ueonline.com

GERMANY  
United Electric Controls  
An Der Zentlinde 21  
D-64711 Erbach, Germany  
Phone: 496-062-7400  
email: europeansales@ueonline.com

INDIA  
United Electric Controls  
House no. 7, Kamalkunj Society  
Nizampura,  
Baroda (Gujarat), India  
Phone: +91 (-265) -2788654  
email: indiasales@ueonline.com

ASIA-PACIFIC  
United Electric Controls, Far East  
No. 1-2-2, 2nd Floor  
Jalan 4/101C  
Cheras Business Centre  
56100 Kuala Lumpur, Malaysia  
Phone: 603-9133-4122  
email: asiapacific@ueonline.com

MEXICO  
United Electric Controls  
Zacatecas # 206, Suite 20  
Col Guadalupe CP 89120  
Tampico, Tamaulipas Mexico  
Phone: +52 833-217-5201  
email: latinamericasales@ueonline.com

RUSSIA  
United Electric Controls, Moscow  
Elninskaya str., 15-140  
Moscow, 121552 Russia  
Phone: +7 (495) 792-88-06  
email: russiansales@ueonline.com

## EXPLOSION - PROOF PRESSURE TRANSMITTER

TX200  
SERIES™

### FEATURES

- Fixed range or field-adjustable
- 4-20 mA, 1-5 or 0-10 VDC output
- 0.25% accuracy
- Compact, 316 stainless steel, hermetically sealed enclosure
- cULus & ATEX certified for Class I, Div. 1, Zone 1
- Pressure ranges:  
0 to 15 psi to 0 to 25,000 psi  
(0 to 1 bar to 0 to 1723,7 bar)

**ISO**  
**9001**  
CERTIFIED  
COMPANY

## OVERVIEW

United Electric's TX200™ is a compact, rugged pressure transmitter designed for process control industries worldwide, and ideally suited for petrochemical and upstream oil and gas applications. All welded, 316 stainless steel hermetic construction provides airtight and watertight protection within the harshest environments. A bonded foil strain gauge sensor or piezo-resistive strain gauge sensor provide reliability and durability.

## FEATURES

- Enclosure type 4X/IP66
- Welded stainless steel wetted material
- Submersible to 100 feet
- Wide variety of pressure connections
- Non-interactive zero and span adjustment
- 5:1 pressure range turndown
- Adjustable version may be calibrated in-place
- Certificate of calibration accompanies every unit



**Model TX200A** is field adjustable for zero and span using external stainless steel control buttons. Each control button is 316 stainless steel, and magnetically coupled through the hermetically sealed enclosure. For ease of calibration, the transmitter does not require a calibrated pressure source and can be calibrated in-place. Model TX200A span control allows a 5:1 pressure range turndown.

**Protective Shield.** Affixed to the TX200 is a 316 stainless steel, rotatable protective cover, which helps protect product markings and adjustment buttons (TX200A) from the elements and tampering.

**Model TX200B** is a fixed range transmitter for applications where the process is consistent and field adjustability is not required or desired. The TX200B provides a cost-effective alternative to conventional process transmitters.

## APPLICATIONS

cULus and ATEX approvals assure most worldwide hazardous location requirements are met. TX200 pressure transmitters are used to monitor pressure in a variety of upstream, midstream, and downstream applications.



Instrument Panels



- Offshore rigs and pumping platforms
- RTU's & SCADA systems
- Sub-sea valve monitoring
- Flow line manifold monitoring
- Oil/gas separator systems



- Gas flow monitoring
- Pipeline compressor stations for maintaining flow and pressure levels along gas pipelines
- Pipeline monitoring of both surface and subterranean pipeline's physical and mechanical integrity
- Pump monitoring



- Onshore drilling rigs
- Wellhead monitoring
- Monitoring tubing & casing pressures
- CO<sub>2</sub> injection skids
- Blowout preventor (BOP) accumulator
- Emergency shutdown and safety monitoring

## TECHNOLOGY

Pressure transmitters convert applied pressure to an electronic signal through various technologies. The TX200 pressure transmitter utilizes two of these - a piezo-resistive pressure sensor for low-pressure applications and a bonded foil strain gage pressure sensor for high-pressure applications, both using ASIC technology to provide optimum sensor signal conditioning and temperature compensation of the sensor output.

## SPECIFICATIONS

### PERFORMANCE

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|  |   |
|--|---|
| <b>Full Scale Pressure Range (FSPR):</b>     | 0 to 15 (0 to 1,0 bar) through 0 to 25,000 psi (0 to 1723,7 bar)  |
| <b>Non-linearity (L):</b>                    | 0 to 15 (0 to 1,0 bar) typical 0.3%, 0 to 30 psi through 0 to 250 psi (0 to 17,2 bar)<br>typical @ 0.2% FSO 0 to 500 (0 to 34,5 bar) through 0 to 25,000 psi (0 to 1723,7 bar) typical @ 0.1% FSO |
| <b>Hysteresis (H) and Repeatability (R):</b> | ±0.1% FSO   |
| <b>Accuracy (L, H, R):</b>                   | 0.25% (0.5% for 15 psi range)   |
| <b>Full Scale Output (FSO):</b>              | 16 mA (4 - 20 mA), 4 VDC (1-5 VDC), 10 VDC (0-10 VDC)   |
| <b>Resolution:</b>                           | Infinite  |
| <b>Zero Balance:</b>                         | ± 0.5% (FSO)  |
| <b>Response Time:</b>                        | 10 mSec (typical 90% final value)   |
| <b>Temperature Effect on Zero:</b>           | ±0.5% per 100°F (55°C)  |
| <b>Temperature Effect on Span:</b>           | ±0.5% per 100°F (55°C)  |
| <b>Compensated Temperature Range:</b>        | 0°F to + 176°F (-18°C to 80°C)  |
| <b>Media Temperature:</b>                    | -40°F to 257°F (-40°C to 125°C)   |
| <b>Operating Temperature:</b>                | -40°F to 185°F (-40°C to 85°C) per UL, cUL<br>-40°F to 176°F (-40°C to 80°C) per ATEX   |
| <b>Storage Temperature Range:</b>            | -67°F to + 221°F (-55°C to 105°C)   |

### ELECTRICAL

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|                               |  |
|-------------------------------|--|
| <b>Supply Voltage:</b>        | 10 to 36 VDC for 4-20 mA output<br>10 to 30 VDC for 1-5 VDC output<br>14 to 30 VDC for 0-10 VDC output   |
| <b>Output Signal:</b>         | 4-20 mA or 1-5 VDC or 0-10 VDC<br><i>Range adjustment/calibration for TX200A only</i><br>Span adjustment: rangeable down 5:1 FSPR<br>Range calibration signal: nominal 20% of FSPR, externally switched<br>Calibration signal accuracy: ±1.0% FSO (a certificate of calibration with the exact signal to pressure correlation is provided with each unit). |
| <b>Load Impedance:</b>        | 4-20 mA output: 1300 ohms max. at 36 VDC or 700 ohms max. at 24 VDC<br>1-5 VDC or 0-10 VDC output: 2000 ohms min.  |
| <b>Circuit Protection:</b>    | The TX200 input is protected against transient surges using both varistor and TVS transient voltage suppressor technology, and is reverse polarity protected.  |
| <b>Electrical Connection:</b> | 1/2" NPT (male), 72" 18 AWG, color coded leadwires   |
| <b>Wiring:</b>                | Red: +VDC<br>Black: -VDC<br>Green: Earth Ground<br>Blue: 1-5 V or 0-10 V output (only)   |

**MECHANICAL**

|                                  |   |
|----------------------------------|---|
| <b>Wetted Materials:</b>         | 316, 15-5 stainless steel; Hastelloy C and Monel available, please consult UE   |
| <b>Pressure Connections:</b>     | 1/4" NPT, 1/2" NPT, 7/16-20 SAE, G-1/4, G-1/2, and medium pressure and high pressure autoclave (see pressure connection chart page 10), 316 stainless steel   |
| <b>Sensors</b>                   | Model 03-08, 15929: 316 stainless steel welded diaphragm, micro-machined piezo-resistive strain gauge silicon element, 0.25 ml silicon oil fill<br><br>Model 09-20: 15-5 stainless steel welded diaphragm, bonded foil strain gauge element |
| <b>Proof Pressure:</b>           | ≤10,000 psi (689,5 bar) 3 times FSPR; ≥15,000 psi (1034,2 bar) 2 times FSPR   |
| <b>Burst Pressure:</b>           | 15 to 2000 psi (6,9 to 137,9 bar) 10 times FSPR; 2500 to 6000 psi (172,4 to 413,7 bar) 8 times FSPR or 30,000 psi, whichever is less; 7500 to 25,000 psi (517,1 to 1723,7 bar) 4 times FSPR or 90,000, whichever is less                    |
| <b>Shock:</b>                    | 200 G's, one millisecond duration   |
| <b>Vibration:</b>                | Tested to MIL-STD-810F, modified to 2000 Hz at 15 G's peak  |
| <b>Enclosure:</b>                | 316 stainless steel   |
| <b>Enclosure Classification:</b> | Welded, hermetically sealed, enclosure type 4X. Certified to IP66 requirements  |
| <b>Weight:</b>                   | TX200A: approx. 1.5 lbs (.68 kg), TX200B: approx. 1.3 lbs (.59 kg)  |

## APPROVALS



### UNITED STATES AND CANADA

**Class I**, Division 1 & 2, Groups A, B, C & D

**Class II**, Division 1 & 2, Groups E, F & G

**Class III**

**Class I**, Zone 1, Group IIC

Enclosure Type 4X

**UL** Listed, **cUL** Certified

UL 698, 1203, 61010-1;

CSA No. 25, 30, 61010-1 - File # E226592



### EUROPEAN UNION

#### ATEX Directive 94/9/ EC

II 2 G Ex d IIC T5

II 2 D Ex tD A21 IP66 T+90C

Tamb = -40C to +80C

EN 60079-0, 60079-1, 61241-0, 61241-1

UL International DEMKO A/S (N.B.# 0539)

Certificate # DEMKO 08 ATEX 0810742X



#### Pressure Equipment Directive (PED)

#### (97/23/EC)

Sound Engineering Practice (SEP)

#### Electromagnetic Compatibility Directive

#### (EMC)

#### (89/336/EEC, 92/31/EEC & 93/68/EEC)

UL International EMC Services

Certificate File # NC4525

EN 55011, 61000-6-4, 61000-6-2, 61326

## PRESSURE MODEL CHART

| Model   | Pressure Range |             | Proof Pressure* |        | Burst Pressure** |        |
|---|----------------|-------------|-----------------|--------|------------------|--------|
|   | psi            | bar         | psi             | bar    | psi              | bar    |
| Welded 316 stainless steel diaphragm and pressure connection (see page 9 for available connections)                       |                |             |                 |        |                  |        |
| 03  | 0 to 15        | 0 to 1      | 45              | 3,1    | 150              | 10,3   |
| 04  | 0 to 30        | 0 to 2,1    | 90              | 6,2    | 300              | 20,7   |
| 05  | 0 to 50        | 0 to 3,4    | 150             | 10,3   | 500              | 34,5   |
| 06  | 0 to 100       | 0 to 6,9    | 300             | 20,7   | 1000             | 68,9   |
| 07  | 0 to 250       | 0 to 17,2   | 750             | 51,7   | 2500             | 172,4  |
| 08  | 0 to 500       | 0 to 34,5   | 1500            | 103,4  | 5000             | 344,7  |
| Welded 15-5 stainless steel diaphragm with 316 stainless steel pressure connection (see page 9 for available connections) |                |             |                 |        |                  |        |
| 09  | 0 to 1000      | 0 to 68,9   | 3000            | 206,8  | 10,000           | 689,5  |
| 17  | 0 to 1500      | 0 to 103,4  | 4500            | 310,3  | 15,000           | 1034,2 |
| 18  | 0 to 2000      | 0 to 137,9  | 6000            | 413,7  | 20,000           | 1379,0 |
| 10  | 0 to 2500      | 0 to 172,4  | 7500            | 517,1  | 20,000           | 1379,0 |
| 19  | 0 to 3000      | 0 to 206,8  | 9000            | 620,5  | 25,000           | 1723,7 |
| 11  | 0 to 5000      | 0 to 344,7  | 15,000          | 1034,2 | 25,000           | 1723,7 |
| 20  | 0 to 6000      | 0 to 413,7  | 18,000          | 1241,1 | 30,000           | 2068,4 |
| 12  | 0 to 7500      | 0 to 517,1  | 22,500          | 1551,3 | 30,000           | 2068,4 |
| 13  | 0 to 10,000    | 0 to 689,5  | 30,000          | 2068,4 | 40,000           | 2757,9 |
| 14  | 0 to 15,000    | 0 to 1034,2 | 30,000          | 2068,4 | 60,000           | 4136,9 |
| 15  | 0 to 20,000    | 0 to 1379,0 | 40,000          | 2757,9 | 80,000           | 5515,8 |
| 16  | 0 to 25,000    | 0 to 1723,7 | 50,000          | 3447,4 | 90,000           | 6205,3 |
| 316 stainless steel 1/4" NPT (female) pressure connection and welded diaphragm with 4-20 mA output (fixed range only)     |                |             |                 |        |                  |        |
| 15929   | 0 to 300       | 0 to 20,7   | 750             | 51,7   | 2500             | 172,4  |

\* **Proof Pressure:** The maximum pressure to which a pressure sensor may be occasionally subjected (e.g., start-up, testing), which causes no permanent damage. The unit may require re-calibration if subjected to pressure above proof.

\*\* **Burst Pressure:** Pressure which may cause failure of the pressure element, resulting in permanent damage.

## HOW TO ORDER

Select letter or number codes to construct part number.

| PART #                        | TX200                        | A | 9 | S | 1 | T | M446 |
|-------------------------------|------------------------------|---|---|---|---|---|------|
| CODE                          | DESCRIPTION                  |   |   |   |   |   |      |
| <b>ENCLOSURE DESIGNATION</b>  |                              |   |   |   |   |   |      |
| A                             | Field-adjustable transmitter |   |   |   |   |   |      |
| B                             | Fixed range transmitter      |   |   |   |   |   |      |
| 15929 <sup>†</sup>            | Fixed range transmitter      |   |   |   |   |   |      |
| <b>MODELS, PRESSURE RANGE</b> |                              |   |   |   |   |   |      |
| 03                            | 0 to 15                      |   |   |   |   |   |      |
| 04                            | 0 to 30                      |   |   |   |   |   |      |
| 05                            | 0 to 50                      |   |   |   |   |   |      |
| 06                            | 0 to 100                     |   |   |   |   |   |      |
| 07                            | 0 to 250                     |   |   |   |   |   |      |
| 08                            | 0 to 500                     |   |   |   |   |   |      |
| 09                            | 0 to 1000                    |   |   |   |   |   |      |
| 17                            | 0 to 1500                    |   |   |   |   |   |      |
| 18                            | 0 to 2000                    |   |   |   |   |   |      |
| 10                            | 0 to 2500                    |   |   |   |   |   |      |
| 19                            | 0 to 3000                    |   |   |   |   |   |      |
| 11                            | 0 to 5000                    |   |   |   |   |   |      |
| 20                            | 0 to 6000                    |   |   |   |   |   |      |
| 12                            | 0 to 7500                    |   |   |   |   |   |      |
| 13                            | 0 to 10,000                  |   |   |   |   |   |      |
| 14                            | 0 to 15,000                  |   |   |   |   |   |      |
| 15                            | 0 to 20,000                  |   |   |   |   |   |      |
| 16                            | 0 to 25,000                  |   |   |   |   |   |      |
| <b>PRESSURE REFERENCE</b>     |                              |   |   |   |   |   |      |
| S                             | psi (sealed gage)            |   |   |   |   |   |      |

Continued  
on page 9

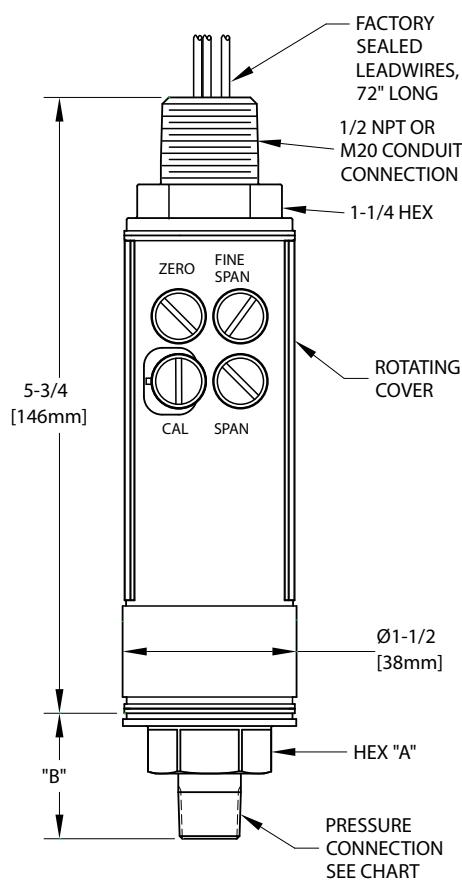
<sup>†</sup> Model incorporates enclosure, pressure range & connection, and output (see pressure model chart on page 7)

## HOW TO ORDER (CONTINUED)

| PART #                     | TX200   | A         | 9                | S                     | 1                      | T                | M446    |
|----------------------------|---|-----------|------------------|-----------------------|------------------------|------------------|---------|
|                            | Type  | Enclosure | Models,<br>Range | Pressure<br>Reference | Pressure<br>Connection | Output<br>Signal | Options |
| <b>PRESSURE CONNECTION</b> |   |           |                  |                       |                        |                  |         |
| 1                          | 1/4" NPT (female); NOT AVAILABLE MODELS 15-16   |           |                  |                       |                        |                  |         |
| 2                          | 1/2" NPT (female); NOT AVAILABLE MODELS 14-16   |           |                  |                       |                        |                  |         |
| 3                          | 1/2" NPT (male); NOT AVAILABLE MODELS 14-16   |           |                  |                       |                        |                  |         |
| 4                          | HF4 high pressure autoclave 1/4" (female); NOT AVAILABLE MODELS 03-05   |           |                  |                       |                        |                  |         |
| 5                          | HF6 high pressure autoclave 3/8" (female); NOT AVAILABLE MODELS 03-05   |           |                  |                       |                        |                  |         |
| 6                          | LF4 medium pressure autoclave 1/4" (female); NOT AVAILABLE MODELS 03-05   |           |                  |                       |                        |                  |         |
| 7                          | LF6 medium pressure autoclave 3/8" (female); NOT AVAILABLE MODELS 03-05   |           |                  |                       |                        |                  |         |
| 8                          | 1/4" NPT (male); NOT AVAILABLE MODELS 15-16   |           |                  |                       |                        |                  |         |
| 9                          | 7/16-20 SAE (female); NOT AVAILABLE MODELS 14-16  |           |                  |                       |                        |                  |         |
| A                          | G-1/4 (female); NOT AVAILABLE MODELS 14-16  |           |                  |                       |                        |                  |         |
| B                          | G-1/2 (female); NOT AVAILABLE MODELS 14-16  |           |                  |                       |                        |                  |         |
| C                          | 7/16-20 SAE (male); NOT AVAILABLE MODELS 14-16  |           |                  |                       |                        |                  |         |
| D                          | HM4 high pressure autoclave 1/4" (male) ; NOT AVAILABLE MODELS 03-05  |           |                  |                       |                        |                  |         |
| E                          | HM6 high pressure autoclave 3/8" (male) ; NOT AVAILABLE MODELS 03-05  |           |                  |                       |                        |                  |         |
| F                          | LM4 medium pressure autoclave 1/4" (male); NOT AVAILABLE MODELS 03-05   |           |                  |                       |                        |                  |         |
| G                          | LM6 medium pressure autoclave 3/8" (male); NOT AVAILABLE MODELS 03-05   |           |                  |                       |                        |                  |         |
| H                          | G-1/4 (male); NOT AVAILABLE MODELS 14-16  |           |                  |                       |                        |                  |         |
| J                          | G-1/2 (male); NOT AVAILABLE MODELS 14-16  |           |                  |                       |                        |                  |         |
| <b>OUTPUT</b>              |   |           |                  |                       |                        |                  |         |
| T                          | 4-20 mA   |           |                  |                       |                        |                  |         |
| D                          | 1-5 VDC   |           |                  |                       |                        |                  |         |
| P                          | 0-10 VDC; NOT AVAILABLE MODELS 03-06  |           |                  |                       |                        |                  |         |
| <b>OPTIONS</b>             |   |           |                  |                       |                        |                  |         |
| M276                       | Pressure range markings in bar  |           |                  |                       |                        |                  |         |
| M277                       | Pressure range markings in kPa  |           |                  |                       |                        |                  |         |
| M278                       | Pressure range markings in Kg/cm <sup>2</sup>   |           |                  |                       |                        |                  |         |
| M423                       | ATEX flameproof compliant metallic junction box, pre-wired (not UL approved). NOT AVAILABLE ON M20 METRIC THREAD ELECTRICAL CONDUIT VERSION |           |                  |                       |                        |                  |         |
| M441                       | M20 metric thread (male) electrical connection  |           |                  |                       |                        |                  |         |
| M444                       | Paper ID tag  |           |                  |                       |                        |                  |         |
| M446                       | Stainless steel ID tag and wire   |           |                  |                       |                        |                  |         |
| M460                       | External ground screw; required by ATEX for non-metallic conduit systems  |           |                  |                       |                        |                  |         |
| M513                       | UL approved junction box, pre-wired, meets enclosure type 4. NOT ATEX COMPLIANT   |           |                  |                       |                        |                  |         |
| M550                       | Oxygen service cleaning; alcohol cleaning to remove residue from the process connection   |           |                  |                       |                        |                  |         |

## DIMENSIONAL DRAWING

Dimensional drawings for all models may be found at [www.ueonline.com](http://www.ueonline.com)



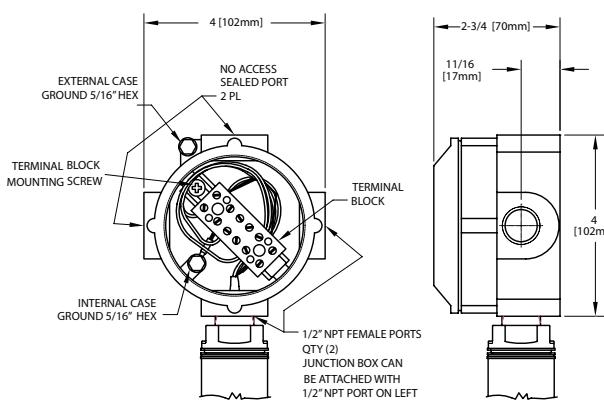
Pressure Connection Chart

| Code | Description            | Hex "A" in | Length "B" in [mm] |
|------|------------------------|------------|--------------------|
| 1    | 1/4" NPT (female)      | 15/16      | 0.54 [13.7]        |
| 2    | 1/2" NPT (female)      | 1-3/8      | 1.01 [25.7]        |
| 3    | 1/2" NPT (male)        | 15/16      | 1.26 [32.0]        |
| 4    | HF4 autoclave (female) | 15/16      | 0.54 [13.7]        |
| 5    | FH6 autoclave (female) | 1-3/8      | 0.90 [22.9]        |
| 6    | LF4 autoclave (female) | 15/16      | 0.54 [13.7]        |
| 7    | LF6 autoclave (female) | 15/16      | 0.65 [16.5]        |
| 8    | 1/4" NPT (male)        | 15/16      | 0.97 [24.6]        |
| 9    | 7/16-20 SAE (female)   | 15/16      | 0.54 [13.7]        |
| A    | G-1/4 (female)         | 15/16      | 0.54 [13.7]        |
| B    | G-1/2 (female)         | 1-3/8      | 1.01 [25.7]        |
| C    | 7/16-20 SAE (male)     | 15/16      | 0.77 [19.6]        |
| D    | HM4 autoclave (male)   | 15/16      | 1.10 [27.9]        |
| E    | HM6 autoclave (male)   | 15/16      | 1.29 [32.8]        |
| F    | LM4 autoclave (male)   | 15/16      | 1.18 [30.0]        |
| G    | LM6 autoclave (male)   | 15/16      | 1.32 [33.5]        |
| H    | G-1/4 (male)           | 15/16      | 1.03 [26.2]        |
| J    | G-1/2 (male)           | 1-3/8      | 1.78 [45.2]        |

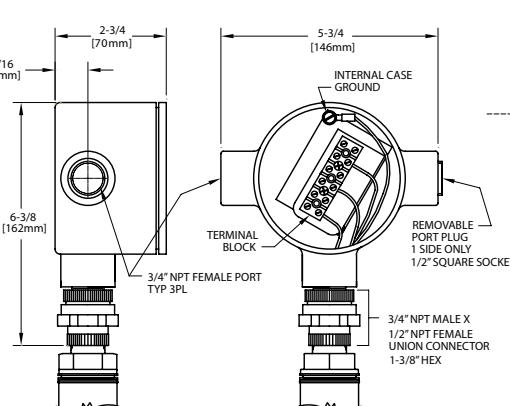
Wire Color Coding

|              | 4-20 mA output | 1-5 or 0-10 VDC output |
|--------------|----------------|------------------------|
| <b>RED</b>   | + VDC          | + VDC                  |
| <b>BLACK</b> | - VDC          | - VDC                  |
| <b>GREEN</b> | Earth Ground   | Earth Ground           |
| <b>BLUE</b>  | N/A            | Voltage Output         |

OPTION M423 ATEX JUNCTION BOX



OPTION M513 UL JUNCTION BOX



OPTION M460 EXTERNAL GROUNDING SCREW



## ALTERNATIVE PRODUCTS FROM UE

### **Stainless Steel 12 Series**

- Compact, cylindrical 316 stainless steel design
- Hermetically sealed micro-switch
- Explosion Proof
- Snap-acting belleville spring mechanism for maximum vibration resistance and set point stability
- Pressure ranges 1 to 12,500 psi; DP working pressure ranges 0 to 2500 psid; temperature ranges -130 to 650°F
- Dual seal compliance to ANSI/ISA 12.27.01



### **120 Series**

- Explosion-proof line of pressure, differential pressure, and temperature models with wide selection of ranges, sensors and pressure connections
- UL, cUL, ATEX certified for hazardous locations
- Single or dual switch outputs
- Welded stainless steel diaphragm pressure sensor
- Internal or external set point adjustment



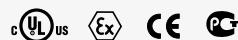
### **One Series for Division 1 (Zone 1)**

- Electronic pressure and temperature switches with no moving parts
- Fully adjustable deadband and smart self diagnostics
- 4-20 mA output and digital process display
- Explosion-proof enclosure for Division 1 (Zone 1) hazardous areas
- 2-wire, 4-wire and loop powered models available
- Digital display and tamper-proof keypad adjustment of setpoint and deadband



### **One Series for Division 2 (Zone 2)**

- Electronic solid-state reliability
- Two-wire operation
- Digital display with keypad set-up
- 100% of range adjustable on-off deadband
- 4-20 mA output models
- Continuous diagnostic health check



### **Temperature Sensors**

Rugged RTDs and thermocouples for process and energy applications, available with Nema 4X and explosion-proof heads to match heat-trace, turbine, combustion, and stack-emission applications



## RECOMMENDED PRACTICES AND WARNINGS

United Electric Controls Company recommends careful consideration of the following factors when specifying and installing UE pressure transmitters. Before installing a unit, the Installation and Maintenance instructions provided with unit must be read and understood.

- To avoid damaging unit, proof pressure and maximum temperature limits stated in literature and on nameplates must never be exceeded, even by surges in the system. Operation of the unit up to maximum pressure or temperature is acceptable on a limited basis (i.e., start-up, testing) but continuous operation must be restricted to the designated adjustable range. Excessive cycling at maximum pressure or temperature limits could reduce sensor life.
- A back-up unit is necessary for applications where damage to a primary unit could endanger life, limb or property. A high or low limit switch is necessary for applications where a dangerous runaway condition could result.
- Install unit where shock, vibration and ambient temperature fluctuations will not damage unit or affect operation. When applicable, orient unit so that moisture does not enter the enclosure via the electrical connection. When appropriate, this entry point should be sealed to prevent moisture entry.
- Unit must not be altered or modified after shipment. Consult UE if modification is necessary.
- Monitor operation to observe warning signs of possible damage to unit, such as drift. Check unit immediately.
- Preventative maintenance and periodic testing is necessary for critical applications where damage could endanger property or personnel.
- Supply voltage stated in literature and on nameplate must not be exceeded. Overload on a transmitter can cause damage, even on the first cycle. Wire unit according to local and national electrical codes, using wire size recommended in installation sheet.
- Do not mount unit in ambient temp. exceeding published limits.

## LIMITED WARRANTY

Seller warrants that the product hereby purchased is, upon delivery, free from defects in material and workmanship and that any such product which is found to be defective in such workmanship or material will be repaired or replaced by Seller (Ex-works, Factory, Watertown, Massachusetts. INCOTERMS); provided, however, that this warranty applies only to equipment found to be so defective within a period of 36 months from the date of manufacture by the Seller. Seller shall not be obligated under this warranty for alleged defects which examination discloses are due to tampering, misuse, neglect, improper storage, and in any case where products are disassembled by anyone other than authorized Seller's representatives. EXCEPT FOR THE LIMITED WARRANTY OF REPAIR AND REPLACEMENT STATED ABOVE, SELLER DISCLAIMS ALL WARRANTIES WHATSOEVER WITH RESPECT TO THE PRODUCT, INCLUDING ALL IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR ANY PARTICULAR PURPOSE.

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31 Old Stage Road  
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United Electric Controls  
28 N. Wise Ave.  
Freeport, IL 61032  
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email: [midwestsales@ueonline.com](mailto:midwestsales@ueonline.com)

United Electric Controls  
1022 Vineyard Drive  
Conyers, GA 30013  
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email: [southeastsales@ueonline.com](mailto:southeastsales@ueonline.com)

United Electric Controls  
5829 Grazing Court  
Mason, OH 45040  
Phone: 513-535-5486  
email: [midatlanticsales@ueonline.com](mailto:midatlanticsales@ueonline.com)

United Electric Controls  
102 Salazar Court  
Clayton, CA 94517  
Phone: 925-408-5997  
email: [westcoastsales@ueonline.com](mailto:westcoastsales@ueonline.com)

United Electric Controls  
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Sparta, NJ 07871  
Phone: 973-271-2550  
email: [eastersales@ueonline.com](mailto:eastersales@ueonline.com)

United Electric Controls  
4306 Whickham Drive  
Fulshear, TX 77441  
Phone: 832-457-6138  
email: [southwestsales@ueonline.com](mailto:southwestsales@ueonline.com)

## CANADA

EASTERN  
68 Mosley Crescent  
Brampton, Ontario  
Canada L6Y 5C8  
Phone: 905-455-5131  
FAX: 905-455-5131

## INTERNATIONAL OFFICES

CHINA  
United Electric Controls, *Shanghai*  
Room 1011, 10th Flr,  
Huai Hai Zhonghua Building  
No. 885, Renmin Road, Luwan District  
Shanghai 200010, P.R. China  
Phone: +8621-6255 8059  
email: [chinasaless@ueonline.com](mailto:chinasaless@ueonline.com)

United Electric Controls, *Beijing*  
Room 1006, Jainhao International Bldg.  
Block D, No. 116  
Zizhuyuanlu, Haidian District  
Beijing, China 100089  
Phone & Fax: +86-10-5893-0551  
email: [beijingsales@ueonline.com](mailto:beijingsales@ueonline.com)

EASTERN EUROPE & SCANDINAVIA  
United Electric Controls  
05-806 Komorow  
Kujawska 5, Poland  
Phone: +48 22 499 4804  
email: [easterneuropeales@ueonline.com](mailto:easterneuropeales@ueonline.com)

GERMANY  
United Electric Controls  
An Der Zentlinde 21  
D-64711 Erbach, Germany  
Phone: 496-062-7400  
email: [europesales@ueonline.com](mailto:europesales@ueonline.com)

INDIA  
United Electric Controls  
House no. 7, Kamalkunj Society  
Nizampura,  
Baroda (Gujarat), India  
Phone: +91 (-265) -2788654  
email: [indisales@ueonline.com](mailto:indisales@ueonline.com)

ASIA-PACIFIC  
United Electric Controls, Far East  
No. 1-2-2, 2nd Floor  
Jalan 4/101C  
Cheras Business Centre  
56100 Kuala Lumpur, Malaysia  
Phone: 603-9133-4122  
email: [asiapacific@ueonline.com](mailto:asiapacific@ueonline.com)

MEXICO  
United Electric Controls  
Zacatecas # 206, Suite 20  
Col Guadalupe CP 89120  
Tampico, Tamaulipas Mexico  
Phone: +52 833-217-5201  
email: [latinamericasales@ueonline.com](mailto:latinamericasales@ueonline.com)

RUSSIA  
United Electric Controls, Moscow  
Elninskaya str., 15-140  
Moscow, 121552 Russia  
Phone: +7 (495) 792-88-06  
email: [russiansales@ueonline.com](mailto:russiansales@ueonline.com)



UNITED ELECTRIC  
CONTROLS

180 Dexter Avenue, P.O. Box 9143  
Watertown, MA 02471-9143 USA  
Telephone: 617 926-1000 Fax: 617 926-2568  
<http://www.ueonline.com>

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