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: 

  Courtesy of Steven Engineering, Inc.-230 Ryan Way, South San Francisco, CA 94080-6370-Main Office: (650) 588-9200-Outside Local Area: (800) 258-9200-www.stevenengineering.com
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.

**OVERVIEW**

**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

Ex d Models Include Rotatable Display!

2X, 4X and 8X models for Zone 1, Div 1 areas
Shown with TTC sensor

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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.
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
### Specifications

#### Power Input / Switch Output:

<table>
<thead>
<tr>
<th>Model</th>
<th>Input Type (Range)</th>
<th>Max Switch Ratings (SPST)</th>
<th>Temperature Derating</th>
<th>Min. Load Requirement</th>
<th>Off State Leakage</th>
</tr>
</thead>
<tbody>
<tr>
<td>2W2D00 2X2D00</td>
<td>2-Wire 24 VDC discrete input powered (12-30 VDC) @ 750 μA (max)</td>
<td>12-30 VDC @ 40 mA</td>
<td>NA</td>
<td>2.3 mA</td>
<td>0.75 mA maximum</td>
</tr>
<tr>
<td>2W4D00 2X4D00</td>
<td>2-Wire 48 VDC discrete input powered (30-50 VDC) @ 750 μA (max)</td>
<td>30-50 VDC @ 40 mA</td>
<td>NA</td>
<td>2.0 mA</td>
<td>0.8 mA maximum</td>
</tr>
<tr>
<td>2W3A00 2X3A00</td>
<td>2-Wire 120 V discrete input powered (90-130 VAC/VDC) @ 1 mA</td>
<td>90-130 VAC/VDC @ 0.1 A</td>
<td>NA</td>
<td>3.75 mA</td>
<td>1.0 mA maximum</td>
</tr>
<tr>
<td>2WLP41 2XLP41</td>
<td>2-Wire 24 VDC analog input loop powered (10-36 VDC) @ 4-20 mA</td>
<td>0-140 VAC/VDC @ 0.6 A</td>
<td>8% per 10°C above 21°C</td>
<td>0 mA</td>
<td>0.01 mA</td>
</tr>
<tr>
<td>2WLP43 2XLP43</td>
<td>2-Wire 24 VDC analog input loop powered (10-36 VDC) @ 4-20 mA</td>
<td>0-280 VAC/VDC @ 0.3 A</td>
<td>NA</td>
<td>1.8 A per 10°C above 38°C</td>
<td>150 mA</td>
</tr>
<tr>
<td>4W3A01 4X3A01</td>
<td>4-Wire 120 VAC external power supply (90-130 VAC) @ 15mA</td>
<td>24-280 VAC @ 10 A</td>
<td>10% per 10°C above 21°C</td>
<td>150 mA</td>
<td>0.1 mA</td>
</tr>
<tr>
<td>8W2D42 8X2D42</td>
<td>8-Wire 24 VDC external power supply (10-30 VDC) @ 30 mA</td>
<td>SW1: 75-250 VAC @ 1.5 A SW2: 75-250 VAC @ 1.5 A</td>
<td>10% per 10°C above 21°C</td>
<td>50mA</td>
<td>5 mA</td>
</tr>
<tr>
<td>8W2D44 8X2D44</td>
<td>8-Wire 24 VDC external power supply (10-30 VDC) @ 30 mA</td>
<td>SW1: 75-250 VAC @ 1.5 A SW2: 0-140 VAC/VDC @ 0.6 A</td>
<td>8% per 10°C above 21°C</td>
<td>0 mA</td>
<td>0.01 mA</td>
</tr>
<tr>
<td>8W2D45 8X2D45</td>
<td>8-Wire 24 VDC external power supply (10-30 VDC) @ 30 mA</td>
<td>SW1: 0-140 VAC/VDC @ 0.6 A SW2: 0-140 VAC/VDC @ 0.6 A</td>
<td>8% per 10°C above 21°C</td>
<td>0 mA</td>
<td>0.01 mA</td>
</tr>
</tbody>
</table>

#### Accuracy:

0.5% of full range span, at room temperature

#### Repeatability:

0.1% of full range span

#### Ambient Operating Temperature Range:

<table>
<thead>
<tr>
<th>Approved Ambient Operating Temperature Range</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>cULus (Division System)</strong></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Model</th>
<th>-40°F (-40°C)</th>
<th>185°F (85°C)</th>
<th>-40°F (-40°C)</th>
<th>140°F (60°C)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2W2D</td>
<td>-40°F (-40°C)</td>
<td>185°F (85°C)</td>
<td>-40°F (-40°C)</td>
<td>140°F (60°C)</td>
</tr>
<tr>
<td>2W4D</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
</tr>
<tr>
<td>2WLP</td>
<td>-40°F (-40°C)</td>
<td>176°F (80°C)</td>
<td>-40°F (-40°C)</td>
<td>140°F (60°C)</td>
</tr>
<tr>
<td>2W3A</td>
<td>-40°F (-40°C)</td>
<td>185°F (85°C)</td>
<td>-40°F (-40°C)</td>
<td>140°F (60°C)</td>
</tr>
<tr>
<td>4W3A</td>
<td>-40°F (-40°C)</td>
<td>158°F (70°C)</td>
<td>-40°F (-40°C)</td>
<td>140°F (60°C)</td>
</tr>
<tr>
<td>8W2D</td>
<td>-40°F (-40°C)</td>
<td>176°F (80°C)</td>
<td>-40°F (-40°C)</td>
<td>140°F (60°C)</td>
</tr>
<tr>
<td>2X2D</td>
<td>-40°F (-40°C)</td>
<td>185°F (85°C)</td>
<td>-40°F (-40°C)</td>
<td>185°F (85°C)</td>
</tr>
<tr>
<td>2XLp</td>
<td>-40°F (-40°C)</td>
<td>176°F (80°C)</td>
<td>-40°F (-40°C)</td>
<td>176°F (80°C)</td>
</tr>
<tr>
<td>2X3A</td>
<td>-40°F (-40°C)</td>
<td>185°F (85°C)</td>
<td>-40°F (-40°C)</td>
<td>185°F (85°C)</td>
</tr>
<tr>
<td>4X3A</td>
<td>-40°F (-40°C)</td>
<td>158°F (70°C)</td>
<td>-40°F (-40°C)</td>
<td>158°F (70°C)</td>
</tr>
<tr>
<td>8X2D</td>
<td>-40°F (-40°C)</td>
<td>176°F (80°C)</td>
<td>-40°F (-40°C)</td>
<td>176°F (80°C)</td>
</tr>
</tbody>
</table>

### Display Operating Temperature Range:

10°F (-12°C) to 158°F (70°C)
One Series - B -11

SPECIFICATIONS (continued)

Long-term stability: ±0.25% of range/year maximum
Temperature drift: 0.03% of full scale per °C
Switch response time: “Change-of-output” response ≤ 60 mS (16.7 Hz) (for detection of full step change and change of output state, delay feature off)
Display response time: 400 mS (2.5 Hz)
Transient filtering: Programmable time constants between 250 mS and 2 seconds in 2X increments
Diagnostics (IAW®): Open or shorted sensor; plugged port; power supply out of range; over and under-range conditions; microprocessor faults/failure; keypad short; switch fault
Output states: Field selectable for 2-state or 3-state operation. Pulse rates vary by model. Fast and slow rates are selectable. See installation manual for details.
Control modes: Field-configuration solid-state switch action with programmable manual reset

<table>
<thead>
<tr>
<th>Mode</th>
<th>Action</th>
<th>Fault</th>
</tr>
</thead>
<tbody>
<tr>
<td>2-state</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Normally closed</td>
<td>Open on rising media</td>
<td>Open</td>
</tr>
<tr>
<td>Normally open</td>
<td>Close on rising media</td>
<td>Open</td>
</tr>
<tr>
<td>Normally closed</td>
<td>Open on falling media</td>
<td>Open</td>
</tr>
<tr>
<td>Normally open</td>
<td>Close on falling media</td>
<td>Open</td>
</tr>
<tr>
<td>3-state</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Normally closed</td>
<td>Pulse on rising media</td>
<td>Open</td>
</tr>
<tr>
<td>Normally closed</td>
<td>Pulse on falling media</td>
<td>Open</td>
</tr>
</tbody>
</table>

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, 2XL, 8W2D, 8X2D models only)

<table>
<thead>
<tr>
<th>Electrical characteristics: (2-wire models only)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Model</td>
</tr>
<tr>
<td>-------</td>
</tr>
<tr>
<td>2W2D</td>
</tr>
<tr>
<td>2W4D</td>
</tr>
<tr>
<td>2W3A</td>
</tr>
</tbody>
</table>

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)

**Display:**
- Local 4 digit x 0.5" LCD
- IAW® (I Am Working) status
- Process variable
- Units of measure
- Switch status
- Latch status
- Set point value
- Deadband value
- Min/Max values
- Fault codes

**Set point & deadband:**
User-configured, 100% adjustable over entire sensor operating range

**Memory:**
Programming and data protected by non-volatile EEPROM

**Effective transmission distance:**
2,000 feet at rated voltage for 2W2D/2X2D and 2W3A/2X3A

**Sensors:**

- **Gauge Pressure** – 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.  
  Media temperature: -40 to 257°F (-40 to 125°C)

- **Differential Pressure** - 316L stainless steel, welded diaphragms, 1/4" NPT (male) process connections, piezo-resistive strain gauge silicon element, silicone oil fill.  
  Media temperature: -40 to 257°F (-40 to 125°C)

- **Temperature** – 316 stainless steel 0.25" OD sheath containing a 100 ohm 4-wire platinum RTD element available with epoxy fill (local low temp) or powder fill (remote high temp).  
  Media temperature: -300 to 1000°F (-184 to 538°C)

**Vacuum:**
All pressure sensors withstand deep vacuum with no calibration effects. Vacuum ranges are not currently available.

**EMI/RFI:**
Compliance to CE EMC requirements: EN 55011, EN 61326, EN 61000-6-2

**Emission:**
EN 55011 class A; Radiated emissions  
EN 61000-3-2 Harmonic Current Emissions

**Immunity:**
- EN 61000-3-3 Immunity to Voltage Fluctuations and Flicker  
- EN 61000-4-2 Immunity to Electrostatic Discharge  
- EN 61000-4-3 Immunity to Continuous Radiated Disturbances  
- EN 61000-4-4 Immunity to Electrical Fast Transients  
- EN 61000-4-5 Immunity to Surges  
- EN 61000-4-6 Immunity to Continuous Conducted Disturbances  
- EN 61000-4-8 Immunity to Power Frequency Magnetic Field  
- EN 61000-4-11 Immunity to Voltage Dips and Interruptions

**Weight:**
2W, 4W, 8W: 1.5 - 1.9 lbs (0.7 - 0.9 kg)  
2X, 4X, 8X: 4.5 - 6.0 lbs (2.0 - 2.7 kg)

**Shock:**
per MIL-STD-810G method 516.6 – when device is subjected to 15 g (10 mSec) and 40 g (6 mSec); 3 drops/axis  
Effects: less than +/- 0.40% of range

**Vibration:**
per IEC 61298-3 (field and pipeline applications with high vibration level, 10-1000 Hz range, 0.014" displacement peak amplitude, 5 g acceleration amplitude)  
Effects: less than +/- 0.40% of range

IAW® is a registered trademark of United Electric Controls Co. Specifications subject to change without notice
## How to Order

Build a part number by selecting the model, sensor and options from the tables below.

<table>
<thead>
<tr>
<th>Model</th>
<th>Description</th>
<th>Min. Load</th>
<th>Zone</th>
<th>Division</th>
</tr>
</thead>
<tbody>
<tr>
<td>2W2D00</td>
<td>2-wire discrete input powered, 12-30 VDC, 40 mA switch (24 VDC 2-Wire)</td>
<td>2.3 mA</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>2X2D00</td>
<td>2-wire discrete input powered, 30-50 VDC, 40 mA switch (48 VDC 2-Wire)</td>
<td>2.0 mA</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>2W4D00</td>
<td>2-wire discrete input powered, 12-30 VDC or VDC, 100 mA switch (115 VAC 2-Wire)</td>
<td>3.75 mA</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>2X3A00</td>
<td>2-wire loop-powered or 24V external powered, 4-20 mA output, 0-140 VAC/VDC, 0.3 A SSR switching</td>
<td>0 mA</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>4W3A01</td>
<td>Supply voltage – 90-130 VAC, 24-280 VAC, 10 A SSR switching</td>
<td>150 mA</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>8W2D42</td>
<td>Supply voltage – 10-30 VDC, SW1 &amp; SW2: 75-250 VAC, 1.5 A SSR, 4-20 mA output</td>
<td>SW1: 50 mA</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>8X2D42</td>
<td>Supply voltage – 10-30 VDC, SW1: 75-250 VAC, 1.5 A SSR, 4-20 mA output</td>
<td>SW1: 50 mA</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>8W2D44</td>
<td>Supply voltage – 10-30 VDC, SW1: 75-250 VAC, 1.5 A SSR, 4-20 mA output</td>
<td>SW1: 0 mA</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>8W2D45</td>
<td>Supply voltage – 10-30 VDC, SW1 &amp; SW2: 0-140 VAC/VDC, 0.6 A SSR, 4-20 mA output</td>
<td>SW1: 0 mA</td>
<td>✓</td>
<td>✓</td>
</tr>
</tbody>
</table>

### Sensor

<table>
<thead>
<tr>
<th>Pressure Operating Range(^1) + display resolution</th>
<th>Maximum Over Range(^2)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gauge pressure, piezo-resistive strain gage, silicone oil fill, 316L stainless wetted materials, 1/2&quot; NPT (female) process connection, displayed as shown.</td>
<td>For bar, kPa and kg/cm(^2), the option code must be specified (see pg. 10)</td>
</tr>
<tr>
<td>(0-5.00) psig</td>
<td>(690) mbar</td>
</tr>
<tr>
<td>(0-15.00) psig</td>
<td>(2068) mbar</td>
</tr>
<tr>
<td>(0-30.00) psig</td>
<td>(4137) mbar</td>
</tr>
<tr>
<td>(0-50.00) psig</td>
<td>(6895) mbar</td>
</tr>
<tr>
<td>(0-100.00) psig</td>
<td>(1379) bar</td>
</tr>
<tr>
<td>(0-2068) kPa</td>
<td>(4137) mbar</td>
</tr>
<tr>
<td>(0-2068) kPa</td>
<td>(6895) mbar</td>
</tr>
<tr>
<td>(0-2068) mPa</td>
<td>(1379) bar</td>
</tr>
<tr>
<td>(0-344.7) kPa</td>
<td>(6895) mbar</td>
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<tr>
<td>(0-344.7) kPa</td>
<td>(1379) bar</td>
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<td>(6895) mbar</td>
</tr>
<tr>
<td>(0-344.7) kPa</td>
<td>(1379) bar</td>
</tr>
</tbody>
</table>

* (P20 range available on 2X, 4X and 8X models only)
HOW TO ORDER  cont.

### ONE Series

**Sensor**  |  **Pressure Operating Range** + display resolution
--- | ---
Differential pressure, piezo-resitive strain gage, silicone oil fill, 316L stainless wetted materials, 1/4” NPT (male) process connections, displayed as shown.

<table>
<thead>
<tr>
<th>Sensor</th>
<th>Operating Range</th>
<th>Display Resolution</th>
</tr>
</thead>
<tbody>
<tr>
<td>K1</td>
<td>0-50.0 psid</td>
<td>3447 mbar</td>
</tr>
<tr>
<td>K2</td>
<td>0-100.0 psid</td>
<td>6895 mbar</td>
</tr>
<tr>
<td>K3</td>
<td>0-200.0 psid</td>
<td>13,8 bar</td>
</tr>
</tbody>
</table>

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 Maximum Over Range

<table>
<thead>
<tr>
<th>Sensor</th>
<th>Maximum Over Range</th>
<th>Maximum Working Pressure</th>
</tr>
</thead>
<tbody>
<tr>
<td>K1</td>
<td>100 psid</td>
<td>6895 mbar</td>
</tr>
<tr>
<td>K2</td>
<td>200 psid</td>
<td>13,8 bar</td>
</tr>
<tr>
<td>K3</td>
<td>400 psid</td>
<td>27,6 bar</td>
</tr>
</tbody>
</table>

### Sensor Temperature Range Description

| 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 (See page 11 fitting options) | Local (stem) mounted rigid to enclosure, 4” sheath length |
| TL2 | -40 to 1000°F/-40 to 538°C (See page 11 fitting options) | Local (stem) mounted rigid to enclosure, 6” sheath length |
| TL3 | -300 to 200°F/-184 to 93°C | Remote mounted, 6” sheath, 6’ fixed-length Teflon® extension (2.5” sheath and MI extension for explosion-proof and ATEX models) |
| TR1 | -40 to 900°F/-40 to 482°C (Example: TTC–NUN6–L 10.5) | 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) |
| TRC* | -40 to 100°F/-40 to 38°C | 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 | Remote mounted, 2.5” sheath, 6’ MI fixed extension length |
| THC* | -40 to 100°F/-40 to 38°C | Remote mounted, 2.5” sheath, 6’ MI fixed extension length |
| TC1 | -300 to 200°F/-184 to 93°C | Remote mounted, 2.5” sheath, 6’ MI fixed extension length |
| TCC* | -40 to 900°F/-40 to 482°C (Example: TTC–NUN6–L 10.5) | Remote mounted, 2.5” sheath, 6’ MI fixed extension length |
| TTC | -40 to 100°F/-40 to 38°C | Remote mounted, 2.5” sheath, 6’ MI fixed extension length |

**Thermowells and fittings are shown on page 11. To order spares and replacement temperature sensor assemblies, available only on explosion-proof models, 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)

<table>
<thead>
<tr>
<th>Set Point</th>
<th>Deadband</th>
<th>Switch Mode</th>
</tr>
</thead>
<tbody>
<tr>
<td>40.00</td>
<td>25.00</td>
<td>Open on rise</td>
</tr>
</tbody>
</table>

M202  Factory programmed set point, deadband and switch mode for two switches (all 6 settings are required at time of ordering - see example below)

<table>
<thead>
<tr>
<th>Switch</th>
<th>Set Point</th>
<th>Deadband</th>
<th>Switch Mode</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>040.3</td>
<td>001.5</td>
<td>Open on fall</td>
</tr>
<tr>
<td>2</td>
<td>050.0</td>
<td>005.0</td>
<td>Close on rise</td>
</tr>
</tbody>
</table>

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/cm2
M406  Compliance per Russian Gosgortechnadzor (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, 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)

1Note: 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.
# ONE Series

## Temperature Sensors and Fittings Compatibility Chart

**Models (Table 1)**

<table>
<thead>
<tr>
<th>Model (Table 1)</th>
<th>W073</th>
<th>W074</th>
<th>W080</th>
</tr>
</thead>
<tbody>
<tr>
<td>2W2D, 2W4D, 2WL, 8W2D</td>
<td>1/2” NPT compression fitting with ferrule to fit 0.25” sensor sheath</td>
<td>1/2” NPT union connection to fit 0.125” sensor extension cable</td>
<td>1/2” NPT union connection to fit 0.188” sensor extension cable</td>
</tr>
<tr>
<td>2W2D, 2WL, 8W2D (w/ ATEX option - M419)</td>
<td>TLx, TRx</td>
<td>TRx, THx, TCx</td>
<td>NA</td>
</tr>
<tr>
<td>2W3A, 4W3A</td>
<td>TLx</td>
<td>TRx, THx, TCx</td>
<td>TH1, TC1</td>
</tr>
<tr>
<td>2W3A (w/ ATEX option - M419)</td>
<td>TLx</td>
<td>TRx</td>
<td>TR1, TH1, TC1</td>
</tr>
<tr>
<td>2X2D, 2X4D, 2XL, 8X2D</td>
<td>TLx</td>
<td>TRx, THx, TCx</td>
<td>NA</td>
</tr>
<tr>
<td>2X3A, 4X3A</td>
<td>TLx</td>
<td>NA</td>
<td>TR1, TH1, TC1</td>
</tr>
</tbody>
</table>

*The sensor extension is mineral insulated (MI) when ATEX option M419 is specified.

### Fittings for Thermowells (Table 2)

<table>
<thead>
<tr>
<th>Thermowell</th>
<th>Length (L)</th>
<th>P (NPT)</th>
<th>Q</th>
<th>U</th>
<th>Local Temperature Sensors w/ 0.25” Sensor Sheath</th>
<th>Remote Temperature Sensors w/ Teflon® Cable</th>
<th>Remote Temperature Sensors w/ 0.125” Diameter MI Cable</th>
<th>Remote Temperature Sensors w/ 0.188” Diameter MI Cable</th>
</tr>
</thead>
<tbody>
<tr>
<td>L4-316</td>
<td>4</td>
<td>1/2</td>
<td>5/8</td>
<td>2.5</td>
<td>NA</td>
<td>W073</td>
<td>W073</td>
<td>W073</td>
</tr>
<tr>
<td>L4.5-316</td>
<td>4.5</td>
<td>1/2</td>
<td>5/8</td>
<td>3</td>
<td>NA</td>
<td>W073</td>
<td>W073</td>
<td>W073</td>
</tr>
<tr>
<td>L5.5-316</td>
<td>5.5</td>
<td>1/2</td>
<td>5/8</td>
<td>4</td>
<td>NA</td>
<td>W073</td>
<td>W073</td>
<td>W073</td>
</tr>
<tr>
<td>L6.0-316</td>
<td>6.0</td>
<td>1/2</td>
<td>5/8</td>
<td>4.5</td>
<td>NA</td>
<td>W073</td>
<td>W073</td>
<td>W073</td>
</tr>
<tr>
<td>L6.5-316</td>
<td>6.5</td>
<td>1/2</td>
<td>5/8</td>
<td>5</td>
<td>NA</td>
<td>W073</td>
<td>W073</td>
<td>W073</td>
</tr>
<tr>
<td>L7.0-316</td>
<td>7.0</td>
<td>1/2</td>
<td>5/8</td>
<td>7.5</td>
<td>NA</td>
<td>W073</td>
<td>W073</td>
<td>W073</td>
</tr>
<tr>
<td>L9.5-316</td>
<td>9.5</td>
<td>1/2</td>
<td>5/8</td>
<td>8</td>
<td>NA</td>
<td>W073</td>
<td>W073</td>
<td>W073</td>
</tr>
<tr>
<td>L12-316</td>
<td>12.0</td>
<td>1/2</td>
<td>5/8</td>
<td>10.5</td>
<td>NA</td>
<td>W073</td>
<td>W073</td>
<td>W073</td>
</tr>
<tr>
<td>L15-316</td>
<td>15.0</td>
<td>1/2</td>
<td>5/8</td>
<td>13.5</td>
<td>NA</td>
<td>W073</td>
<td>W073</td>
<td>W073</td>
</tr>
<tr>
<td>L18-316</td>
<td>18.0</td>
<td>1/2</td>
<td>5/8</td>
<td>16.5</td>
<td>NA</td>
<td>W073</td>
<td>W073</td>
<td>W073</td>
</tr>
<tr>
<td>L24-316</td>
<td>24.0</td>
<td>1/2</td>
<td>5/8</td>
<td>22.5</td>
<td>NA</td>
<td>W073</td>
<td>W073</td>
<td>W073</td>
</tr>
<tr>
<td>L4-316</td>
<td>4.0</td>
<td>3/4</td>
<td>3/4</td>
<td>2.5</td>
<td>NA</td>
<td>W073</td>
<td>W073</td>
<td>W073</td>
</tr>
<tr>
<td>L5-316</td>
<td>5.0</td>
<td>3/4</td>
<td>3/4</td>
<td>4.5</td>
<td>NA</td>
<td>W073</td>
<td>W073</td>
<td>W073</td>
</tr>
<tr>
<td>L7-316</td>
<td>7.0</td>
<td>3/4</td>
<td>3/4</td>
<td>7.5</td>
<td>NA</td>
<td>W073</td>
<td>W073</td>
<td>W073</td>
</tr>
<tr>
<td>L10-316</td>
<td>10.0</td>
<td>3/4</td>
<td>3/4</td>
<td>10.5</td>
<td>NA</td>
<td>W073</td>
<td>W073</td>
<td>W073</td>
</tr>
<tr>
<td>L15-316</td>
<td>15.0</td>
<td>3/4</td>
<td>3/4</td>
<td>13.5</td>
<td>NA</td>
<td>W073</td>
<td>W073</td>
<td>W073</td>
</tr>
<tr>
<td>L18-316</td>
<td>18.0</td>
<td>3/4</td>
<td>3/4</td>
<td>16.5</td>
<td>NA</td>
<td>W073</td>
<td>W073</td>
<td>W073</td>
</tr>
<tr>
<td>L24-316</td>
<td>24.0</td>
<td>3/4</td>
<td>3/4</td>
<td>22.5</td>
<td>NA</td>
<td>W073</td>
<td>W073</td>
<td>W073</td>
</tr>
</tbody>
</table>

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)

1/2 NPT (FEMALE) PRESSURE CONNECTION
3/4 NPT (FEMALE) ELECTRICAL CONNECTION
2 PLCS.

CLEARANCE FOR 1/4 DIA. BOLT, 2 PLCS.
DIMENSIONAL DRAWINGS (CONTINUED)

TEMPERATURE SENSORS

TL1-TL3 Sensors

TR1 and TRC Sensors (For 2W, 4W and 8W models only)

Consider Option M006, see pg. 10

TR1, TRC, TH1, THC, TC1, TCC Sensors (For explosion-proof DC models only)

TR1, TRC, TH1, THC, TC1, TCC Sensors (For explosion-proof AC models only)

TTC Sensors (For explosion-proof models only)

L=60” max., NUN=4” to 10” in 1” increments

GAUGE PRESSURE SENSORS

DIFFERENTIAL PRESSURE SENSORS

1/2”-14 NPT (FEMALE)

1/4”-18 NPT (MALE)

BOTH ENDS

Courtesy of Steven Engineering, Inc.-230 Ryan Way, South San Francisco, CA 94080-6370-Main Office: (650) 588-9200-Outside Local Area: (800) 258-9200-www.stevenengineering.com
## Approvals & Ratings

<table>
<thead>
<tr>
<th>Model</th>
<th>N. America</th>
<th>Europe</th>
<th>Australia</th>
<th>Russia</th>
</tr>
</thead>
</table>
| 2W2D  | Class I, Div 1, Groups A, B, C & D  
Class II, Div 1, Groups E, F & G  
Class III  
Class I, Zone 0, AEx ia IIC T5  
Class I, Zone 0, Ex ia IIC T5  
Per UE drawing # A-62174-20  
File#E226592 | Class I, Zone 2, AEx nc IIC T5  
Class I, Zone 2 Ex nc IIC T5 | N/A | 0ExiaIICT5  
TAMB = -40˚C to +85˚C  
Cert# ROSS US.GB05. Bo2993 |
| 2W2D  | Class I, Div 2 Groups A, B, C & D  
Class II, Div 2 Groups F & G  
Class III  
Class I, Zone 2, AEx nc IIC T5  
Class I, Zone 2 Ex nc IIC T5 | N/A | N/A | ExnLiICT5  
TAMB = -40˚C to +85˚C  
Cert# ROSS US.GB05. Bo2993 |
| 2W3A  | Class I, Div 2 Groups A, B, C & D  
Class II, Div 2 Groups F & G  
Class III  
Class I, Zone 2, AEx nc IIC T5  
Class I, Zone 2 Ex nc IIC T5 | N/A | N/A | ExnLiICT5  
TAMB = -40˚C to +85˚C  
Cert# ROSS US.GB05. Bo2993 |
| 2W4D  | N/A | N/A | N/A | N/A |
| 2WLP  | Class I, Div 2 Groups A, B, C & D  
Class II, Div 2 Groups F & G  
Class III  
Class I, Zone 2, AEx nc IIC T4  
Class I, Zone 2 Ex nc IIC T4 | N/A | ExnLiICT4  
TAMB = -40˚C to +80˚C  
Cert# ROSS US.GB05. Bo2993 |
| 4W3A  | Class I, Div 2 Groups A, B, C & D  
Class II, Div 2 Groups F & G  
Class III  
Class I, Zone 2, AEx nc IIC T4  
Class I, Zone 2 Ex nc IIC T4 | N/A | 2ExnCIICT4  
TAMB = -40˚C to +70˚C  
Cert# ROSS US.GB05. Bo2993 |
| 8W2D  | Class I, Div 2 Groups A, B, C & D  
Class II, Div 2 Groups F & G  
Class III  
Class I, Zone 2, AEx nc IIC T4  
Class I, Zone 2 Ex nc IIC T4 | N/A | ExnLiICT4  
TAMB = -40˚C to +80˚C  
Cert# ROSS US.GB05. Bo2993 |

**2W2D, 2X3A, 2X4D, 2XLP, 4X3A, 8X2D**
Explosion-Proof/Flameproof

**2X2D, 2X3A, 2X4D, 2XLP, 4X3A, 8X2D**
Explosion-Proof/Flameproof

Specifications subject to change without notice.
**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

**TX200 Series** – Pressure Transmitters
- 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

**117 Series** – Electro-Mechanical Pressure and Temperature Switch
- 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.

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 NEGLIGENCE ACT OR ACTS (OR NEGLIGENCE FAILURE TO ACT) COMMITTED BY SELLER, OR (IV) AN ACT FOR WHICH STRICT LIABILITY WILL BE IMPOSED TO SELLER, IS LIMITED TO THE “LIMITED WARRANTY” OF REPAIR AND/OR REPLACEMENT AS 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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