
# ONE SERIES

## Electronic Pressure & Temperature Switches

DURABLE, RELIABLE AND VERSATILE: UNITED ELECTRIC CONTROLS' ONE SERIES ELECTRONIC PRESSURE & TEMPERATURE SWITCHES – THE BEST CHOICE FOR BOTH NEW CONSTRUCTION AND PLANT INSTRUMENTATION UPGRADES.

### PRODUCT BENEFITS AT A GLANCE:

- LARGE DIGITAL DISPLAY FOR STATUS & PROCESS INDICATION
- 100% PROGRAMMABLE SET POINT & DEADBAND FOR EASY ADJUSTABILITY
- SOLID-STATE DESIGN FOR HIGH-VIBRATION APPLICATIONS
- LOCAL & REMOTE DIAGNOSTICS REPORTING FOR MAXIMUM RELIABILITY
- EXPLOSION-PROOF, INTRINSICALLY SAFE AND NON-INCENDIVE MODELS AVAILABLE FOR HAZARDOUS LOCATIONS
- MULTIPLE APPROVALS INCLUDING:


UNITED ELECTRIC CONTROLS

ISO 9001 CERTIFIED COMPANY

## 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.

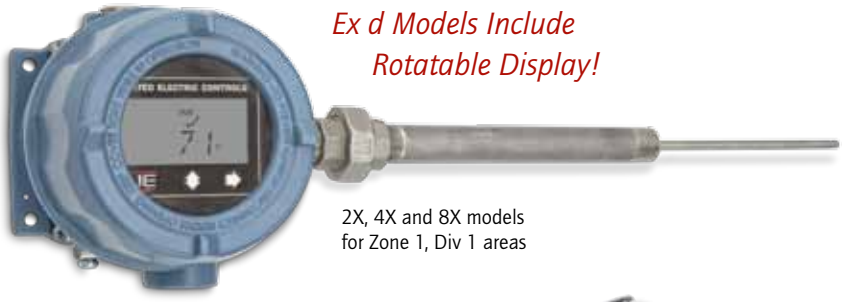
The *One Series from UE* allows you to choose from explosion-proof, intrinsically safe and non-incendive models that monitor gauge pressure, differential pressure or temperature. With up to two fully adjustable set points and deadbands, available 4-20 mA analog output, and absolutely no moving parts, 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 deliver 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.

## MAKE THE SMART CHOICE. THE ONE SERIES FROM UE IS:

- A reliable, cost-effective solution for upgrading plant instrumentation.
- Ideal for applications that demand a switch that never needs calibration, has programmable adjustability and 0.1% repeatablity.
- Easily integrated into a safety instrumented system (SIS) that requires a smart self-diagnostic switch (FMEDA and SIL verification reports available upon request).

## KEY FEATURES THAT SET UE'S ONE SERIES APART:



*Ex d Models Include Rotatable Display!*

2X, 4X and 8X models for Zone 1, Div 1 areas

2W, 4W and 8W models for Zone 2, Div 2 areas

- 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 TECHNOLOGY

The *One Series'* patented digital design requires extremely low-power, allowing it to operate from residual current derived from a typical programmable logic controller (PLC) or distributed computer system (DCS) discrete input. A micro-processor provides 0.5% accuracy and 0.1% repeatability while monitoring all switch functions, ensuring reliability. Electronic components are surface mounted and then encapsulated, providing resistance to weather, shock and vibration. Software algorithms include a full-time watch dog, monitoring all vital system functions. Should a fault be detected, the *One Series from UE* will report on the display and use the discrete and analog signals for remote indication, providing the peace of mind that this switch will work when needed.

## 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

**The most popular *One Series* application is for pump control.**

**The *One Series* and other switches monitoring lube oil on a gear box.**

**The explosion-proof *One Series* protecting a natural gas compressor.**

## SPECIFICATIONS

**Power input/Switch ouput:**

| Model | Input Type (Range) | Switch Ratings (SPST) | Temperature Derating | Min. Load Requirement |
|---|---|---|---|---|
| 2W2D00<br>2X2D00 | 2-Wire 24 VDC discrete input powered (12-30 VDC) @ 750 µA (max) | 12-30 VDC @ 40 mA | | 2.3 mA |
| 2W4D00<br>2X4D00 | 2-Wire 48 VDC discrete input powered (30-50 VDC) @ 750 µA (max) | 30-50 VDC @ 40 mA | | 2.0 mA |
| 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 |
| 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 |
| 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 |
| 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 |
| 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 |

**Accuracy:** 0.5% of full range span, at room temperature

**Repeatability:** 0.1% of full range span

**Ambient operating temperature range:**

| | Approved 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) | |

**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)

**Response time filtering** (Delay): Software-configurable 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.
For 2-state operation: (Default Setting)
Output will remain in one state (open or close) during normal ("inside threshold") operation; change to the opposite state for "at and outside threshold" conditions.
Note: unit must be configured as normally closed (Open rise, Open fall) to distinguish between a diagnostic or other failure and a process upset.

**Output states (cont.):**

For 3-state operation:
Output will remain in closed state during normal ("inside threshold") operation; change to open state to indicate a fault/failure; and rapidly change between closed and open (pulse) state during "at and outside threshold" conditions.
Pulse rates vary by model. Fast and slow rates are selectable. See installation manual for details.

**Control modes:**

Field configurable for change of state above or below set point value. Software configurable for automatic or manual reset.

**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 | | V. Open | V. 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)

**Display:**

- Local 4 digit x 0.5" LCD
- I Am Working (IAW®) status arrows
- 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 and 2W3A

**Sensors:**

**Gauge Pressure** – 316 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** - 316 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)

**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

**Shock:**

Consult factory

## 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 | 2 |
| 2W2D00 | 2-wire discrete input powered, 12-30 VDC, 40 mA switch (24 VDC 2-Wire) | 2.3 mA | ✓ | ✓ | ✓ | ✓ | ✓ |
| 2X2D00 | | | | ✓ | ✓ | ✓ | ✓ |
| 2W4D00 | 2-wire discrete input powered, 30-50 VDC, 40 mA switch (48 VDC 2-Wire) | 2.0 mA | | | | | |
| 2X4D00 | | | | ✓ | ✓ | ✓ | ✓ |
| 2W3A00 | 2-wire discrete input powered, 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 | 0 mA | | | ✓ | | ✓ |
| 2XLP41 | | | | ✓ | ✓ | ✓ | ✓ |
| 2WLP43 | 2-wire loop-powered or 24V external powered, 4-20 mA output, 0-280 VAC/VDC, 0.3 A SSR | 0 mA | | | ✓ | | ✓ |
| 2XLP43 | | | | ✓ | ✓ | ✓ | ✓ |
| 4W3A01 | External powered by 90-130 VAC, 24-280 VAC, 10 A SSR | 150 mA | | | ✓ | | ✓ |
| 4X3A01 | | | | ✓ | ✓ | ✓ | ✓ |
| 8W2D42 | External powered by 10-30 VDC, SW1 & SW2: 75-250 VAC, 1.5 A SSR, 4-20 mA ouput | SW1: 50 mA SW2: 50 mA | | | ✓ | | ✓ |
| 8X2D42 | | | | ✓ | ✓ | ✓ | ✓ |
| 8W2D44 | External powered by 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 SW2: 0 mA | | | ✓ | | ✓ |
| 8X2D44 | | | | ✓ | ✓ | ✓ | ✓ |
| 8W2D45 | External powered by 10-30 VDC, SW1 & SW2: 0-140 VAC/VDC, 0.6 A SSR, 4-20 mA output | SW1: 0 mA SW2: 0 mA | | | ✓ | | ✓ |
| 8X2D45 | | | | ✓ | ✓ | ✓ | ✓ |

| Sensor | Pressure Operating Range[1] + display resolution | | | | Maximum Over Range[2] | |
|---|---|---|---|---|---|---|
| Gauge pressure, piezo-resistive strain gage, silicon 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$^2$ | 10 psig | 690 mbar |
| P11 | 0-15.00 psig | 1034 mbar | 103.4 kPa | 1.055 kg/cm$^2$ | 30 psig | 2068 mbar |
| P12 | 0-30.00 psig | 2068 mbar | 206.8 kPa | 2.109 kg/cm$^2$ | 60 psig | 4137 mbar |
| P13 | 0-50.00 psig | 3447 mbar | 344.7 kPa | 3.516 kg/cm$^2$ | 100 psig | 6895 mbar |
| P14 | 0-100.0 psig | 6895 mbar | 689.5 kPa | 7.031 kg/cm$^2$ | 200 psig | 13,8 bar |
| P15 | 0-300.0 psig | 20,68 bar | 2068 kPa | 21.09 kg/cm$^2$ | 600 psig | 41,4 bar |
| P16 | 0-500.0 psig | 34,47 bar | 3447 kPa | 35.16 kg/cm$^2$ | 1000 psig | 68,9 bar |
| P17 | 0-1000 psig | 68,95 bar | 6895 kPa | 70.31 kg/cm$^2$ | 2000 psig | 137,9 bar |
| P18 | 0-3000 psig | 206,8 bar | 20.68 mPa | 210.9 kg/cm$^2$ | 6000 psig | 413,7 bar |
| P19 | 0-4500 psig | 310,3 bar | 31.03 mPa | 316.4 kg/cm$^2$ | 9000 psig | 620,5 bar |
| P20* | 0-6000 psig | 413,7 bar | 41.40 mPa | 421.9 kg/cm$^2$ | 12000 psig | 827,4 bar |

For bar, kPa and kg/cm$^2$, the option code must be specified (see pg. 7)

*** (P20 range available on 2X, 4X and 8X models only)**

| Sensor | Pressure Operating Range[1] + display resolution | | | | Maximum Over Range[2] | | Maximum Working Pressure[3] | |
|---|---|---|---|---|---|---|---|---|
| Differential pressure, piezo-resitive 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$^2$ | 100 psid | 6895 mbar | 500 psig | 34,47 bar |
| K12 | 0-100.0 psid | 6895 mbar | 689.5 kPa | 7.031 kg/cm$^2$ | 200 psid | 13,8 bar | 1500 psig | 103,4 bar |
| K13 | 0-200.0 psid | 13,8 bar | 1379 kPa | 14.10 kg/cm$^2$ | 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.

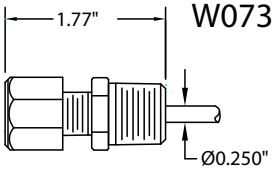
## HOW TO ORDER CONT.

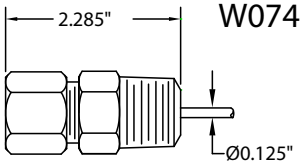
| Sensor | Temperature Range | Description |
|---|---|---|
| Temperature – 4-wire RTD, 100 Ω platinum, DIN 0.00385, 0.25" OD sensor sheath, 316 stainless steel construction | | |
| TL1 | -40 to 450°F/-40 to 232°C (Consider option W073) (See page 8 for more information) | Local (stem) mounted rigid to 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 2X, 4X and 8X 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 2X, 4X and 8X models) |
| TH1 | -40 to 1000°F/-40 to 538°C (Consider options W074 and W080) | 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 (Consider options W074 and W080) | 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 (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 9. Thermowell required, see page 8. |
| TU1 | -300 to 200°F/-184 to 93°C | User-supplied sensor for explosion-proof models only must be 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. |
| 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 8. 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 | | |

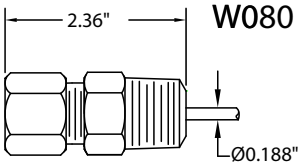
### OPTION CODES

**HL1** Hazardous location certificate
**M006** Add armor to temperature sensor Teflon® extension (2W, 4W, 8W, TR1 and TRC models only)
**M036** Transformer isolated IS barrier for model 2W2D only (use 62169-29 if ordered separately)
**M201** Factory set parameters (set point, deadband, switch mode **required when ordering**)
**M202** Factory set parameters for 2 switches (use with 8W2D and 8X2D only: **2 of each parameter required**)
**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 (pending for explosion-proof models, call for availability)
**M419** ATEX approval (2W2D, 2W3A, 2WLP and 8W2D models only. N/A on 2W4D/4W3A. Standard on explosion-proof models.)
**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 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 K11-K13. Use part number 6361-763 if ordered separately (2 required)

# TEMPERATURE SENSORS AND FITTINGS COMPATIBILITY CHART

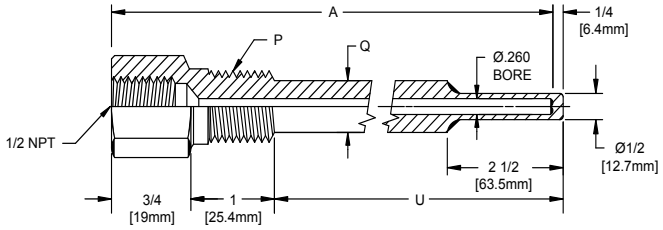



| **Model (Table 1)** | **W073**<br>1/2" NPT compression fitting with ferrule to fit 0.25" sensor sheath | **W074**<br>1/2" NPT union connection to fit 0.125" sensor extension cable | **W080**<br>1/2" NPT union connection to fit 0.188" sensor extension cable |
|---|---|---|---|
| 2W2D, 2W4D, 2WLP, 8W2D | TLx, TRx | TRx, THx, TCx | |
| 2W2D, 2WLP, 8W2D (w/ ATEX option - M419) | TLx | TRx, THx, TCx | |
| 2W3A, 4W3A | TLx, TRx | | TH1, TC1 |
| 2W3A (w/ ATEX option - M419) | TLx | | TR1, TH1, TC1 |
| 2X2D, 2X4D, 2XLP, 8X2D | TLx | TRx, THx, TCx | |
| 2X3A, 4X3A | TLx | | TR1, TH1, TC1 |

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



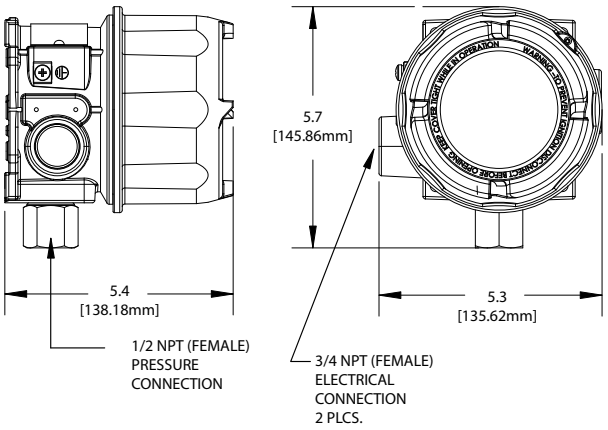

**Fittings for Thermowells (Table 2)**

| Thermowell UE Part # | Length (A) Inches | P (NPT) | Q | U | Local Temperature Sensors w/ 0.25" Sensor Sheath[1] TL1 (4") | TL2 (6") | TL3 (10") | Remote Temperature Sensors w/ Teflon® Cable TR | Remote Temperature Sensors w/ 0.125" Diameter MI Cable[1] TR, TH & TC | Remote Temperature Sensors w/ 0.188" Diameter MI Cable[1] TR, TH & TC |
|---|---|---|---|---|---|---|---|---|---|---|
| 1S260 L4-316 | 4 | 1/2 | 5/8 | 2.5 | - | W073 | W073 | W073 | W074 | W080 |
| 1S260 L5.5-316 | 5.5 | 1/2 | 5/8 | 4 | - | - | W073 | W073 | W074 | W080 |
| 1S260 L6-316 | 6 | 1/2 | 5/8 | 4.5 | - | - | W073 | W073 | W074 | W080 |
| 1S260 L6.5-316 | 6.5 | 1/2 | 5/8 | 5 | - | - | W073 | W073 | W074 | W080 |
| 1S260 L9-316 | 9 | 1/2 | 5/8 | 7.5 | - | - | - | W074 | W074 | W080 |
| 1S260 L9.5-316 | 9.5 | 1/2 | 5/8 | 8 | - | - | - | W074 | W074 | W080 |
| 1S260 L12-316 | 12 | 1/2 | 5/8 | 10.5 | - | - | - | W074 | W074 | W080 |
| 1S260 L15-316 | 15 | 1/2 | 5/8 | 13.5 | - | - | - | W074 | W074 | W080 |
| 1S260 L18-316 | 18 | 1/2 | 5/8 | 16.5 | - | - | - | W074 | W074 | W080 |
| 1S260 L24-316 | 24 | 1/2 | 5/8 | 22.5 | - | - | - | W074 | W074 | W080 |
| | | | | | | | | | | |
| 2S260 L4-316 | 4 | 3/4 | 3/4 | 2.5 | - | W073 | W073 | W073 | W074 | W080 |
| 2S260 L6-316 | 6 | 3/4 | 3/4 | 4.5 | - | - | W073 | W073 | W074 | W080 |
| 2S260 L9-316 | 9 | 3/4 | 3/4 | 7.5 | - | - | - | W074 | W074 | W080 |
| 2S260 L12-316 | 12 | 3/4 | 3/4 | 10.5 | - | - | - | W074 | W074 | W080 |
| 2S260 L15-316 | 15 | 3/4 | 3/4 | 13.5 | - | - | - | W074 | W074 | W080 |
| 2S260 L18-316 | 18 | 3/4 | 3/4 | 16.5 | - | - | - | W074 | W074 | W080 |
| 2S260 L24-316 | 24 | 3/4 | 3/4 | 22.5 | - | - | - | W074 | W074 | W080 |

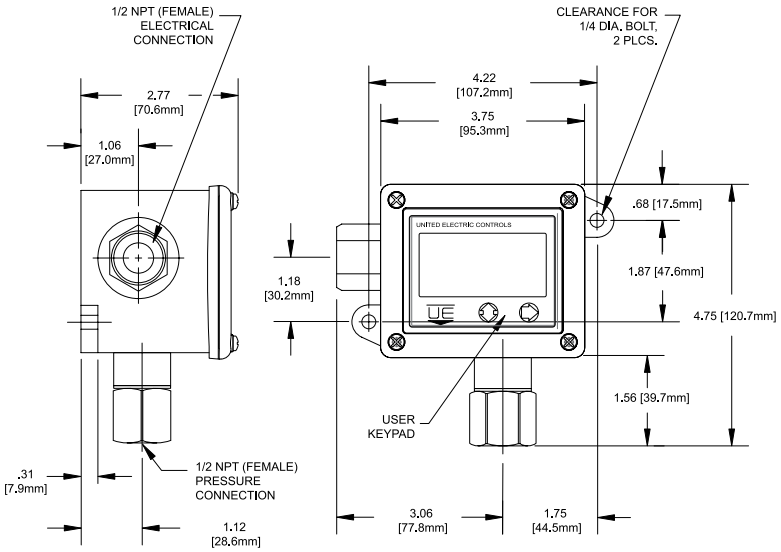
Note:
1. Reference (Table 1) to determine sensor sheath diameter or the diameter of the MI cable by model

## ENCLOSURE AND SENSOR DETAILS

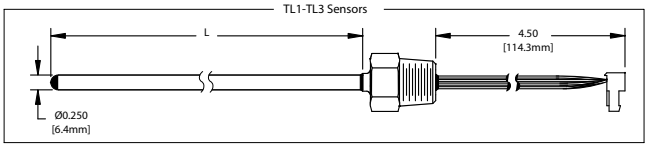
2X, 4X and 8X Models
(Shown with gauge pressure sensor)

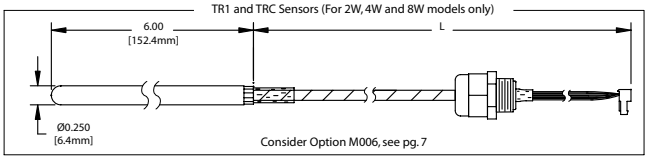


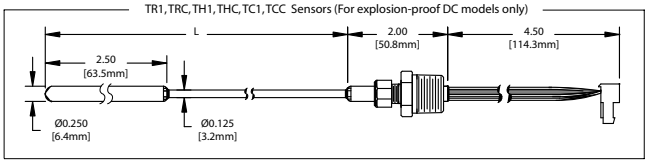

2W, 4W and 8W Models
(Single conduit shown with gauge pressure sensor)

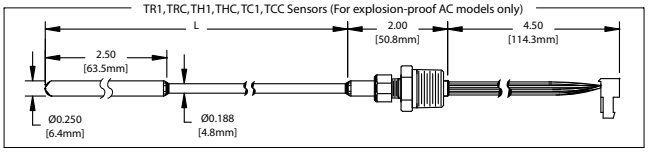


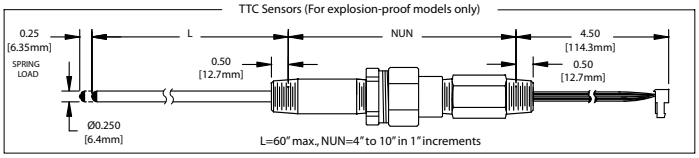

### TEMPERATURE SENSORS



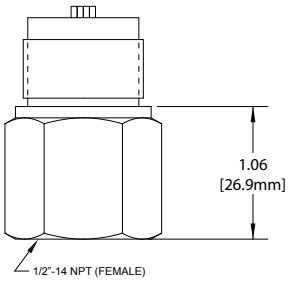



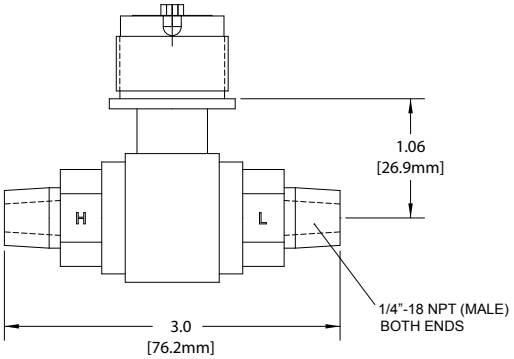




### GAUGE PRESSURE SENSORS




### DIFFERENTIAL PRESSURE SENSORS



# Approvals & Ratings

| **Model** | **N. America**<br>UL Listed, cUL Certified<br>UL50, 508, 913, 1604 & 60079-15;<br>CSA No. E79-0, E79-11, E60079-15, C22.2 No. 14, 157 & 213<br>File#E226592 | **Europe**<br>(select option M419)<br>(ATEX Directive 94/9/EC)<br>EN 60079-0, 60079-15, 50281-1-1, 50020 | **Australia**<br>IECEx Scheme | **Russia**<br>(select option M406)<br>Gosgortechnadzor |
|---|---|---|---|---|
| 2W2D<br>Intrinsically safe when used with a safety barrier (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>$T_{AMB}$ = -40˚C to +60˚C<br>Per UE drawing # A-62174-20<br>Cert# DEMKO 03 ATEX 0322281X | N/A | 0ExiaIICT5<br>$T_{AMB}$ = -40˚C to +85˚C<br>Cert# RRS 00-22739 |
| 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>$T_{AMB}$ = -40˚C to +60˚C<br>Cert# DEMKO 03 ATEX 0322281X | N/A | ExnLIICT5<br>$T_{AMB}$ = -40˚C to +85˚C<br>Cert# RRS 00-22739 |
| 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>$T_{AMB}$ = -40˚C to +60˚C<br>Cert# DEMKO 08 ATEX 0726838X | N/A | ExnLIICT5<br>$T_{AMB}$ = -40˚C to +85˚C<br>Cert# RRS 00-22739 |
| **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>$T_{AMB}$ = -40˚C to +60˚C<br>Cert# DEMKO 08 ATEX 0726838X | N/A | ExnLIICT4<br>$T_{AMB}$ = -40˚C to +80˚C<br>Cert# RRS 00-22739 |
| 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 | N/A |
| 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>$T_{AMB}$ = -40˚C TO +60˚C<br>Cert# DEMKO 08 ATEX 0726838X | N/A | ExnLIICT4<br>$T_{AMB}$ = -40˚C to +80˚C<br>Cert# RRS 00-22739 |
| **Model** | **N. America**<br>UL Listed, cUL Certified<br>UL 50, 50E, 1203, UL/CSA 61010-1, 60079-0, 60079-1, CSA C22.2 No. 25,30<br>File#E226592 | **Europe**<br>(ATEX Directive 94/9/EC)<br>EN 60079-0, 60079-1, 61241-0, 61241-1 | **Australia**<br>IECEx Scheme<br>IEC 60079-0, 60079-1 | **Russia**<br>(select option M406)<br>Gosgortechnadzor |
| 2X2D, 2X3A, 2X4D<br>2XLP, 4X3A, 8X2D<br>Explosion-Proof/ 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/T5**<br>Cert# IECEx UL 08.0017X | N/A* |

* Approval pending
**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 Approved
- Compact, cylindrical 316 stainless steel enclosure
- Hermetically-sealed switch
- Explosion-proof
- Snap-acting belleville spring mechanism to enhance 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

**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
- 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 or 1-5 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 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 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

## 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: easterneuropesales@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,
Baraoda (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

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



CP06095000