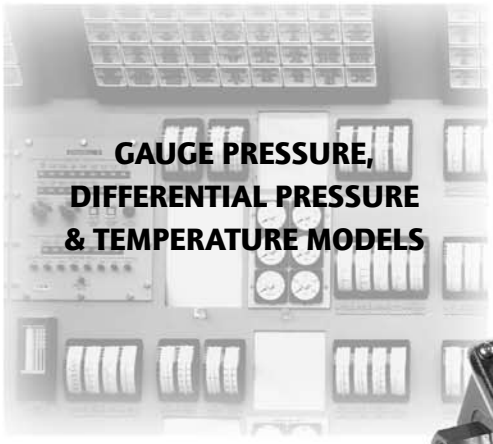
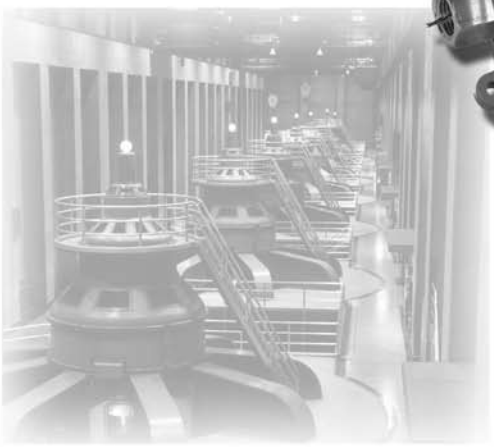
ELECTRONIC PRESSURE AND TEMPERATURE SWITCHES

The Preferred Choice for Plant Instrumentation Upgrades





FEATURES

- Large Process Display
- 100% Programmable Set Point and deadband
- All Solid-State – no moving parts
- Plugged Port detection
- Patented Electronic IAW® self-diagnostics
- 2-Wire and loop-powered models for PLC & DCS inputs
- High-power models for local switching applications
- c UL us and ATEX Certified for hazardous location service

ISO 9001 CERTIFIED COMPANY

OVERVIEW

MODELS 2W2D & 2W3A - PLC & DCS DISCRETE INPUT SWITCHING

The One Series 2-Wire derives its operating power from the discrete input to which it is connected. Unlike a transmitter, it will do this on a digital channel, not a more expensive analog channel. In most applications this will be the input of a Programmable Logic Controller (PLC), a Distributed Control System (DCS) or an interposing relay. Whether it's internal switch is open or closed, the One Series 2-Wire obtains a minute but sufficient amount of power to operate continuously - directly from the discrete input. No separate power wiring is required. The PLC/DCS input interprets the One Series 2-Wire connection as if it were mechanical contacts - JUST LIKE A SWITCH!

MODEL 2WLP - DIGITAL GAUGE, LOOP-POWERED TRANSMITTER AND SWITCH IN ONE

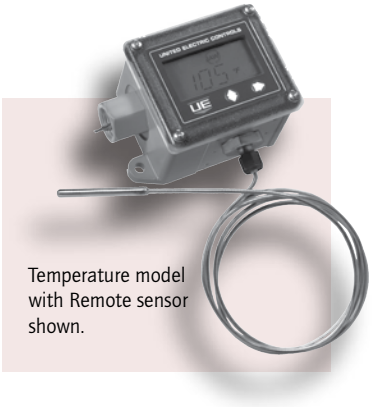
This model derives its power from a 4-20 mA loop, rather than from a discrete PLC input, and provides isolated analog and solid-state switch outputs. The 4-20 mA analog signal changes proportionately with the changes in the process while the switch can trigger an alarm or initiate a shutdown when a programmable threshold is reached. Because the switch is loop-powered, there are no extra wiring requirements; 2 wires go out to the load for local or remote switching while 2 wires send the 4-20 mA signal back to the PLC for process trending. This model potentially replaces a switch, gauge and transmitter with one instrument, using only one process tap!

MODEL 4W3A - HIGH-POWER LOCAL SWITCHING

Incorporating an integral solid-state relay (SSR), this model directly handles 10 amperes and up to 280 VAC, providing a local switching capability for controlling large loads directly. Switch decisions are made within 60 milliseconds, making this One Series ideal for pump and compressor protection applications. And the IAW® (I Am Working) watchdog self-diagnostics continuously monitor the health and status of the switch, providing piece of mind in critical applications. No PLC or DCS is required since 115 VAC power is provided separately.

MODEL 8W2D - TWO INDEPENDENT SOLID-STATE RELAYS + 4-20 mA

Each solid-state relay in this 24 VDC-powered model has an independent set point and deadband to provide precise control for two local or remote loads. The relays can handle up to 250 VAC at 1.5 A for local switching applications. Alternatively, a 0-140 VAC *and* VDC relay can be substituted for one or both relays for switching PLC or DCS inputs. A field-scalable 4-20 mA analog signal provides continuous process trending information. Now there is an excellent choice for replacing a switch, a gauge and a transmitter - all with one instrument and one process connection. Improve Reliability. Contain Costs.



Temperature model with Remote sensor shown.

- **Patented IAW® self diagnostics assures the One Series will switch when needed with local and remote indication**
- **No regular calibration required; extended service life**
- **Field adjustments for offset and span**
- **Digital accuracy and 0.1% repeatability over a wide temperature range**
- **3-year warranty**

KEY FEATURES

• **Keypad display** Large, easy-to-read display, showing the process condition and the status of the switch. Set point, deadband and minimum/maximum process values can be easily accessed from the keypad while in operation. Settings are protected from unauthorized access via specific keypad sequencing. All values are stored in non-volatile memory.

• **IAW® (I AM WORKING) self-diagnostics** All One Series models contain the patented IAW® self-diagnostics feature, giving the user peace-of-mind that the instrument is operating properly and will switch when required. Locally, animated IAW® arrows and display messages inform the operator of problems detected. Remotely, the switch and 4-20 mA outputs can be configured to alert the control room operator of the IAW® status.

• **2-Wire design** (2W2D & 2W3A models) The One Series 2-Wire innovative design allows the unit to power and switch using the same two wires. The electronic switch's low power requirements allow the One Series 2-Wire to operate using residual current from the PLC discrete input.

• **Easy upgrades** The One Series 2-Wire is a direct drop-in replacement for a switch that is attached to a PLC, using the same two wires. No other wiring is necessary, providing easy and cost-effective field instrument upgrades.

CERTIFIED FOR DIVISION 2 HAZARDOUS LOCATIONS

• **Certified to Enclosure Type 4X/IP66** Corrosion resistant enclosure is epoxy-coated aluminum with a gasketed, polycarbonate faceplate to withstand harsh and dirty environments, and plant wash-downs. All sensors and electrical conduits are stainless steel welded construction.

• **Agency Certifications: cULus, ATEX, and CE approvals** The One Series has been rigorously tested by independent agencies to ensure adherence to required industrial specifications, manufacturing practices and quality. Each One Series is backed by a limited 3-year warranty. United Electric Controls is an ISO 9001 certified manufacturing company.

• **Intrinsically safe** (with IS barrier, 2W2D model only) The One Series 2-Wire is approved for use in intrinsically-safe (Class I, Div. 1) applications. A galvanically-isolated barrier (option M036, part no. 62169-29) is custom-designed for use with the One Series. Without the safety barrier, all One Series models are approved for Division 2 Hazardous locations.

ADVANCED FEATURES

• **Recording of minimum and maximum process readings** The One Series can read and record the minimum and maximum process "extremes". The values remain in non-volatile memory until they are manually reset, using the keypad.

• **Offset and Span** adjustments for calibrating to user instrument and system requirements.

• **Plug Port detection** One Series IAW® includes an algorithm for detecting a plugged or isolated pressure sensor port, where the medium is viscous or contains particulate matter. When Plugged Port detection is enabled, the One Series display will alert the user locally and remotely, using its IAW® indications.

• **Latching or automatic reset** The switch output can be field-configured for either automatic reset or latching. The latching feature provides a "manual reset" requirement, making it necessary for the operator to intervene and determine why the alarm occurred.

• **Delay (nuisance trip) filtering** Certain pressure spikes and transients can cause nuisance trips and shut down a process unnecessarily. Delay filtering can be enabled to filter out the process variation. With this feature disabled, the One Series reacts within 60 mS to all process variations.

APPLICATIONS

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 provides digital repeatability and intelligent self-diagnostics, providing an extremely reliable and smart protection device that provides plant operators with the notion - this product will work when you need it to!

- **Pump and Compressor Applications**

With no moving parts and full adjustability, the highly-repeatable temperature compensated One Series makes an ideal pump staging switch. Adjust the set point to turn on the pump; adjust the deadband (switch hysterisis) to turn it off - providing accurate single loop control for the rotating equipment. The One Series reacts within 60 milliseconds to provide a rapid shutdown, preventing damage to expensive pumps and compressors.

- **Lube Oil Monitoring**

Fitted with an RTD temperature sensor, the One Series can measure the temperature of critical lubrication oil, providing emergency shutdowns or predictive maintenance data. The 4-20 mA output provides temperature trending data while the integral solid-state relay performs a local shutdown and/or alarm.

- **Hydraulic Oil Pressure**

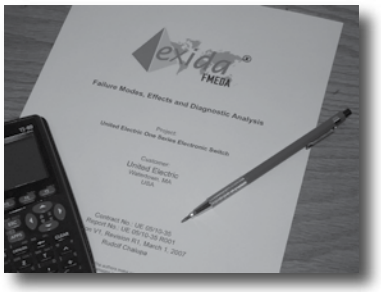
For harsh applications where varying temperature, erratic pressure and high-vibration are present, the One Series excels. Epoxy encapsulation and conformal coatings protect the solid-state electronics assemblies and allow the One Series to withstand the rigors of extreme oil pressures and high switching rates common with hydraulic power units. Atomized oil has no effect on the One Series operation or Type 4X enclosure.

- **Filter Monitoring**

Unique to the One Series electronic switches, differential pressure measurements can be made in hazardous locations with ranges as low as inches of water column and up to 200 PSID. By monitoring the flow through a filter, the One Series can predict and detect when a filter needs to be replaced or back-washed, automatically starting the sequence. All One Series sensors feature 316L stainless steel wetted parts for wide chemical compatibility. No elastomers; no ceramics.

- **Safety Instrumented Systems**

UE contracted with Exida LLC to provide a Failure Modes, Effects and Diagnostic Analysis (FMEDA) report for the One Series electronic switch product line. The data is intended to aid project engineers involved in designing Safety Instrumented Systems (SIS). The One Series is suitable for Safety Integrity Level (SIL) 1 applications and has a 50-year life expectancy. For additional information or a copy of the FMEDA report, please contact United Electric Controls.



- **Plant Upgrades**

With solid-state precision, self-diagnostics and minimal power requirements, the One Series is a cost-effective solution for increasing plant reliability for critical on/off alarm and shutdown protection. The One Series 2-Wire connects to a control system utilizing the existing wiring, making rewiring unnecessary. With a reaction time of 60 milliseconds or less and a sensible price, the One Series provides 5X faster response time at half the installed cost of a typical transmitter with a digital protocol!

The One Series Vs. Transmitters

	One Series	Process Transmitters
Solid State & Self-diagnositic:	Yes	Yes
Repeatability:	0.1%	0.1%
Response Time:	60 mS	300 mS
Local Readout, Programmability & Switching:	Yes	No
Max/Min Memory, Plug Port, Delay & Manual Reset:	Yes	No
Cost:	X	2.5X

- **Proven in Use**

Since 1998, the One Series has set the standard for electronic switch design. With an installed-base of literally tens of thousands of UE electronic switches in various and diverse applications worldwide, the One Series is field-proven in many process industries. Contact UE for additional information orfor help with your application.

- Oil refineries
- Food & beverage processing
- Pharmaceuticals
- Power plants
- Water treatment facilities
- Chemical processing
- Shipboard control systems
- Oil & gas pipelines
- Compressor stations

TECHNOLOGY

DIGITAL DESIGN

The One Series is a 100% solid-state microprocessor-based pressure or temperature instrument with an extremely low power design. A digital display gives real-time process and diagnostic information and simplifies programming. Because of it's unique interface and low power design, the One Series 2-Wire can be attached to a PLC, DCS, or common relay coils, using only 2 wires.

Differential Pressure model
(call for availability)

OPERATION

The One Series uses a stainless steel pressure transducer or temperature sensor to provide input to a micro-controller for making switch decisions. Programming and interrogating the One Series is done through two buttons on the faceplate. A sequence of key strokes for programming provides tamper resistance.

- The input is filtered, as programmed by the user.
- The value is compared to the programmed set point and deadband information.
- The output state is changed if required.
- The digital display is updated.
- The value is recorded, with a new maximum or minimum reading, for later interrogation by the user.
- The Plugged Port feature monitors the process to detect a clogged sensor.

IAW® (I AM WORKING) SELF-DIAGNOSTICS

The One Series contains UE's patented IAW® algorithm, providing both local and remote assurance of switch health, switch status, and fault conditions. The switch output can be configured to operate in either the IAW® (remote diagnostic mode) or simple on-off manner. When programmed for IAW® operation, the switch has three possible states. Various switch operating modes are shown in the table below.

Switch Mode	Display	Switch States	Switch Action
Open on Rise (Default)	OPEN RISE	2	Normally closes, opens as variable increases to set point, opens on fault
Close on Rise	CLOS RISE	2	Normally open, closes as variable increases to set point, opens on fault
Open on Fall	OPEN FALL	2	Normally closes, opens as variable decreases to set point, opens on fault
Close on Fall	CLOS FALL	2	Normally open, closes as variable increases to set point, opens on fault
Pulse on Rise (IAW®)*	PULS RISE	3	Normally closed, pulses as variable increases to set point, opens on fault
Pulse on Fall (IAW®)*	PULS FALL	3	Normally open, pulses as variable decreases to set point, opens on fault

** Not available on 8W2D models*

PLUGGED PORT DETECTION

The Plugged Port Detection feature, if enabled by the user, monitors the changes in the process variable over time. If there is sufficient fluctuation in the process variable, no problem is reported. If the process variable does not change (flattens) over the specified time period, a Plugged Port condition will be displayed. Both the amount of variation and the period of time to be monitored are user-programmable.

SPECIFICATIONS

Power input:	Model 2W2D - 12-30 VDC @ 750 µA derived from a PLC or DCS discrete input, or suitable load Model 2W3A - 90-130 VAC or VDC @ 1 mA derived from a PLC or DCS discrete input, or suitable load Model 2WLP - 10-36 VDC @ 4-20 mA loop-powered Model 4W3A - 90-130 VAC @ 15 mA external power supply Model 8W2D - 10-30 VDC @ 30 mA external power supply
Accuracy:	0.5% of full range span, under nominal conditions
Repeatability:	0.1% of full range span
Ambient operating temperature range:	Models 2W2D and 2W3A: -40 to 185°F (-40 to 85°C) Model 2WLP and 8W2D: -40 to 176°F (-40 to 80°C) Model 4W3A: -40 to 158°F (-40 to 70°C) Full display visibility, all models: 10 to 158°F (-12 to 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. However, unit must be configured as normally closed (Open rise, Open fall) in order that a diagnostic or other failure will produce an open output state 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 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 Table.
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

Pulse Rate Table

	2W2D 2WLP	2W3A 4W3A	8W2D
FAST	25 mS	200 mS	N/A
SLOW	100 mS	500 mS	N/A

Switch Output:

Model Number	SW1	SW2	Minimum Load Requirements
2W2D00	12-30 VDC @ 40 mA	N/A	2.30 mA
2W3A00	90-130 VAC/VDC @ 100 mA	N/A	3.75 mA
2WLP41	0-140 VAC/VDC @ 0.6 A [1]	N/A	0 mA
2WLP43	0-280 VAC/VDC @ 0.3A [1]	N/A	0 mA
4W3A01	24-280 VAC @ 10 A (max.*)[2]	N/A	150 mA
8W2D42	75-250 VAC @ 1.5 A [3]	75-250 VAC @ 1.5 A [3]	SW1 - 50 mA, SW2 - 50 mA
8W2D44	75-250 VAC @ 1.5 A [3]	0-140 VAC/VDC @ 0.6 A [1]	SW1 - 50 mA, SW2 - 0 mA
8W2D45	0-140 VAC/VDC @ 0.6 A [1]	0-140 VAC/VDC @ 0.6 A [1]	SW1 - 0 mA, SW2 - 0 mA

[1] Derate at 8% per 10˚C (18˚F) for temperatures above 21°C (70°F)

[2] Derate at 1.8 A per 10°C (18°F) for temperature above 38°C (100°F)

[3] Derate at 10% per 10°C (18°F) for temperatures above 21°C (70°F)

Electrical characteristics:
(Models 2W2D & 2W3A only)

Model 2W2D Switch open: 12-30 VDC @ 750 µA maximum;
switch closed: 4.7 VDC @ 40mA, max
Model 2W3A Switch open: 90-130 VAC or VDC @ 1 mA maximum;
switch closed: 13 VAC or VDC @ 100 mA, max

Enclosure:

Certified to Enclosure Type 4X/IP66, epoxy-coated aluminum

Faceplate:

UV-resistant polycarbonate with 2-button membrane switch and overlay

Wiring terminations:

Model 2W2D and 2W3A: terminal block with 3 screw connections (2 for switch, 1 for chassis ground)
Model 2WLP: terminal block 1 with 3 screw connections (2 for switch, 1 for chassis ground), terminal block 2 with 2 screw connections for 4-20 mA loop
Model 4W3A: terminal block with 4 screw connections (2 for ac switch, 2 for ac power)
Model 8W2D: three terminal blocks (1 for DC power, 1 for 4-20 mA output and 1 for both SSR switches)

Conduit:

1/2" NPT (female), Dual ports (2) for Model 2WLP and 8W2D 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 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

* Call for availability

2W & 8W APPROVALS & RATINGS

UNITED STATES AND CANADA

2W2D
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 0, AEx ia IIC T5
Class I, Zone 0, Ex ia IIC T5
Enclosure Type 4X
* Intrinsically safe when used with suitable barrier per drawing # A-62174-19. (I.S. Barrier available: Option M036)

2W2D & 2W3A,
Class I, Division 2, Groups A, B, C & D
Class II, Division 2, Groups F & G
Class III
Class I, Zone 2, AEx nC IIC T5
Class I, Zone 2, Ex nC IIC T5
Enclosure Type 4X

2WLP
Class I, Division 2, Groups A, B, C & D
Class II, Division 2, Groups F & G
Class III
Class I, Zone 2, AEx nC IIC T4
Class I, Zone 2, Ex nC IIC T4
Enclosure Type 4X

8W2D
Class I, Division 2, Groups A, B, C & D, T4A
Class II, Division 2, Groups F & G
Class III
Class I, Zone 2, AEx nC IIC T4A**
Class I, Zone 2, Ex nC IIC T4A**
Enclosure Type 4X

UL Listed, cUL Certified
2W2D, 2W3A , 2WLP & 8W2D
Pressure & Temperature: UL 50, 508, 913, 1604 & 2279; CSA No. E79-0, E79-11, E79-15, C22.2 No. 14, 157 & 213 - File # E226592

EUROPE

ATEX Directive (94/9/EC)
2W2D
II 1 G EEx ia IIC T5 **(OPTIONAL – code M419)**
II 1 D T+90°C
Tamb = -40°C to +85°C, IP 66
I.S. when installed per drawing # A-62174-20

2W2D, 2W3A & 8W2D**
II 3 G EEx nL IIC T5 **(OPTIONAL – code M419)**
II 3 D T+90°C
Tamb = -40°C to +85°C, IP 66

2WLP**
II 3 G EEx nL IIC T4 **(OPTIONAL – code M419)**
II 3 D T+130°C
Tamb = -40°C to +80°C, IP 66
UL International DEMKO A/S (N.B.# 0539)
Certificate # DEMKO 03 ATEX 0322281X (2W2D & 2WLP)
EN 50014, 50020, 50021, 50284, 50281-1-1 & 60529
Certificate # DEMKO 03 ATEX 135585X (2W3A)
EN 50021, 50281-1-1 & 60529

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

Electromagnetic Compatibility Directive (EMC) (89/336/EEC, 92/31/EEC & 93/68/EEC)
2W2D
UL International EMC Services
Certificate File # NC4525
EN 55011, 61000-4-2 thru 61000-4-6, 61000-4-8 & 61000-6-2

2W3A, 2WLP & 8W2D
Intertek ETL Entela
EN 55011, EN 61326

RUSSIA

2W2D, 2W3A, 2WLP & 8W2D
Gosgortechnadzor Permit **(OPTIONAL – code M406)**
2W2D - 0ExiaIICT5
2W3A - ExnLIICT5
2WLP & 8W2D - ExnLIICT4
2W2D & 2W3A - Tamb = -40°C to +85°C
2WLP & 8W2D - Tamb = -40°C to +80°C
NANIO CCVE Certification Center
Certificate # RRS 00-22739
GOST R 51330.0, 51330.1, 51330.10 & 51330.14

4W APPROVALS & RATINGS

UNITED STATES AND CANADA

Class I, Division 2, Groups A, B, C & D
Class II, Division 2, Groups F & G
Class III
Class I, Zone 2, AEx nC IIC T4A
Class I, Zone 2, Ex nC IIC T4A
Enclosure Type 4X

UL Listed, cUL Certified
Pressure & Temperature: UL 50, 913, 1604 & 2279; CSA No. E79-0, E79-11, E79-15, C22.2 No. 14, 157 & 213 - File # E226592

FMEDA - Failure modes, effects and diagnostic analysis report is available upon request, providing necessary data to perform SIL calculations. All models included.

HOW TO ORDER

ONE SERIES ELECTRONIC SWITCH User adjustable, digital indicating, 2-Wire and external power configurations. Build a part number by selecting appropriate code for each feature category. Example: **2W2D00P10-M276**

2W2D00	P	10	M276
Electronic Switch Model	Sensor Type	Range Configuration	Option Codes
12-30 VDC	*Pressure*	*0-5 psi*	*Units-mbar*

MODEL	DESCRIPTION
2W2D00	Discrete input powered, 12-30 VDC, 40 mA
2W3A00	Discrete input powered, 90-130 VAC or VDC, 100 mA
2WLP41	Loop-powered 4-20 mA output and 0-140 VAC or VDC, 0.6 A
2WLP43	Loop-powered 4-20 mA output and 0-280 VAC or VDC, 0.3 A
4W3A01	90-130 VAC Power Input, 24-280 VAC, 10 A
8W2D42	External powered by 10-30 VDC, two 75-250 VAC @ 1.5 A SSRs, 4-20 mA output
8W2D44	External powered by 10-30 VDC, one 75-250 VAC @ 1.5 A SSR, one 0-140 VAC/VDC @ 0.6 A SSR, 4-20 mA output
8W2D45	External powered by 10-30 VDC, two 0-140 VAC/VDC @ 0.6 A SSRs, 4-20 mA output

SENSOR TYPE

P	Gauge Pressure, 316L stainless steel welded diaphragm, 1/2" NPT (female)
K**	Differential Pressure, 316L stainless steel welded diaphragm, 1/4" NPT (male)
T	Temperature, 100 ohm RTD, 316 stainless steel sheath, 0.25" OD"

SENSOR RANGE AND CONFIGURATION

GAUGE PRESSURE	Ranges psig	Ranges (mbar)/bar	Maximum Over Range* psig	Maximum Over Range* (mbar)/bar
10	0-5	(0-344,7)	10	(689) (see Option M275 for "wc)
11	0-15	(0-1034)	30	(2068)
12	0-30	(0-2068)	60	(4137)
13	0-50	(0-3447)	100	(6895)
14	0-100	(0-6895)	200	13,8
15	0-300	0-20,68	600	41,4
16	0-500	0-34,47	1000	68,9
17	0-1000	0-68,95	2000	137,9
18	0-3000	0-206,8	6000	413,7
19	0-4500	0-310,3	9000	620,5

DIFFERENTIAL PRESSURE**	Ranges[1] psid	Ranges[1] (mbar)/bar	Over Range[2] psid	Over Range[2] bar	Working[3] psig	Working[3] bar
10	0-5	(0-344,7)	10	0,69	50	3,4 (see Option M275 for "wc)
11	0-50	0-3,4	100	6,9	500	34,5
12	0-100	0-6,9	200	13,8	1000	68,9
13	0-200	0-13,8	400	27,6	1000	68,9

RTD TEMPERATURE	Ranges	Description
L1	-50 to 450°F (-45 to 232°C)	Local mount sensor, 4" probe length
L2	-50 to 450°F (-45 to 232°C)	Local mount sensor, 6" probe length
L3	-50 to 450°F (-45 to 232°C)	Local mount sensor, 10" probe length
R1	-50 to 450°F (-45 to 232°C)	Remote mount sensor, 6" probe length, 6' Teflon extension wire
RC	-50 to 450°F (-45 to 232°C)	Remote mount sensor, 6" probe length, up to 30' Teflon extension wire
H1	-50 to 1000°F (-45 to 538°C)	Remote mount sensor, 2.5" probe length, 6' MI extension wire
HC	-50 to 1000°F (-45 to 538°C)	Remote mount sensor, 2.5" probe length, up to 30' MI extension wire (must specify length), 2W2D, 2WLP, and 8W2D models only
C1	-300 to 200°F (-184 to 93°C)	Remote mount sensor, 2.5" probe length, 6' MI extension wire,
CC	-300 to 200°F (-184 to 93°C)	Remote mount sensor, 2.5" probe length, up to 30' MI extension wire (must specify length), 2W2D, 2WLP, and 8W2D models only

*Exceeding this value may damage the sensor ** Call for availability

HOW TO ORDER CONTINUED

2W2D00	P	10	M276

OPTION CODES

HL1	Hazardous location certificate
M036	Transformer isolated IS barrier (Use 62169-29 if ordered separately)
M201	Factory set parameters (set point, deadband, switch operating mode) Must be specified when ordering per table on right:
M202	Factory set parameters for two switches
M270	Display units, degrees C for temperature
M275	Display units, inches of water column (P10 & K10 only)
M276	Display units, bar or mbar
M277	Display units, kPa or MPa
M278	Display units, kg/cm^2
M406	Compliance per Russian Gosgortechnadzor
M407	PED CE category IV compliance (must order Option M419) Available on 2W & 8W, models P11-P19 only
M419	ATEX approval (2W2D, 2W3A, 2WLP* and 8W2D* models only)
M444	Paper tag
M446	Stainless steel tag
M550	Oxygen cleaning service
M905	1/2" NPT female conduit added to right wall of enclosure for 2W2D, 2W3A & 4W3A models only
M906	1/2" NPT female conduit moved to bottom wall of enclosure for 2W2D, 2W3A & 4W3A models only
M907	1/2" NPT female conduit moved from right to top wall of enclosure for 2WLP & 8W2D models only
W073	1/2" NPT male compression fitting for use with all TL & TR sensors. See page 14.
W074	1/2" NPT male union connector for use with all TH & TC sensors for 2W2D, 2WLP & 8W2D models only
W080	1/2" NPT male union connector for use with TH1 & TC1 sensors for 2W3A & 4W3A models only

Option M201/M202 - Factory Set Parameters

One Series Model Number	SW	Switch Mode	Set Point	Deadband
	1			
	2‡			

‡ *8W2D models only*

Differential Pressure Sensors (definitions)

1. ***Ranges*** *are defined as the ranges of differential pressure between process inputs for which the sensors will operate within specified functional tolerances.*
2. ***Over Range*** *is defined as the maximum difference in pressure between the process inputs. Exceeding this pressure differential at any working pressure may permanently damage the sensor.*
3. ***Working Pressure*** *is defined as the maximum pressure at either process input. Exceeding this pressure at either process input individually or simultaneously may permanently damage the sensor.*

** Pending Approvals*

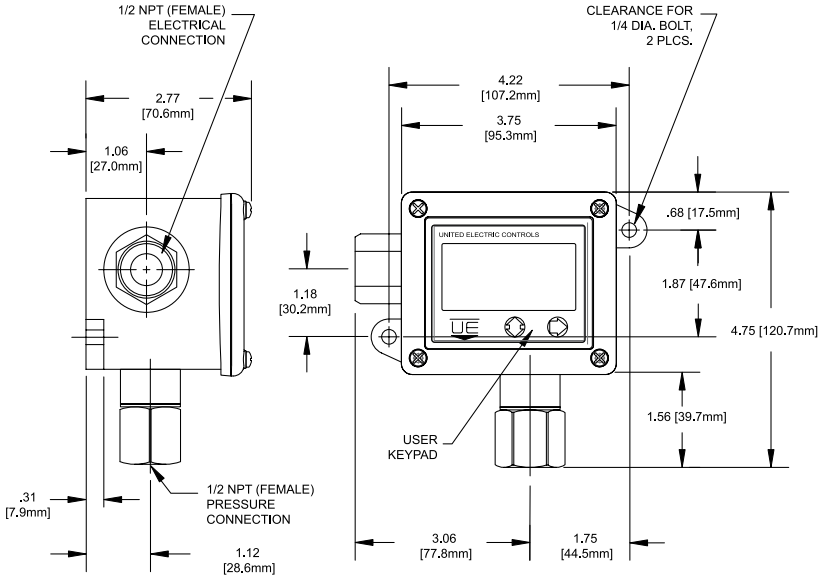
ONE SERIES - POWER AND SWITCH OPTIONS

Model	Power/Input Type	Input Voltage Range	SPST Switch Rating (maximum)	Minimum Load Requirement
2W2D00	2-Wire PLC, DCS, PC discrete input or interposing relay coil	12-30 VDC	30 VDC @ 40 mA	2.30 mA
2W3A00	2-Wire PLC, DCS, PC discrete input or interposing relay coil	90-130 VAC/VDC	130 VAC/VDC @ 100 mA	3.75 mA
2WLP41 (includes 4-20 mA output)	PLC, DCS, PC analog input (loop powered) or external power supply	10-36 VDC	140 VAC/VDC @ 0.6 A	0 mA
2WLP43 (includes 4-20 mA output)	PLC, DCS, PC analog input (loop powered) or external power supply	10-36 VDC	280 VAC/VDC @ 0.3 A	0 mA
4W3A01	External power supply	90-130 VAC	24-280 VAC @ 10 A	150 mA
8W2D42 (includes 4-20 mA output)	External power supply	10-30 VDC	SW1: 75-250 VAC @ 1.5 A SW2: 75-250 VAC @ 1.5 A	SW1: 50 mA SW2: 50 mA
8W2D44 (includes 4-20 mA output)	External power supply	10-30 VDC	SW1: 75-250 VAC @ 1.5 A SW2: 0-140 VAC/VDC @ 0.6 A	SW1: 50 mA SW2: 0 mA
8W2D45 (includes 4-20 mA output)	External power supply	10-30 VDC	SW1: 0-140 VAC/VDC @ 0.6 A SW2: 0-140 VAC/VDC @ 0.6 A	SW1: 0 mA SW2: 0 mA

DIMENSIONAL DRAWINGS

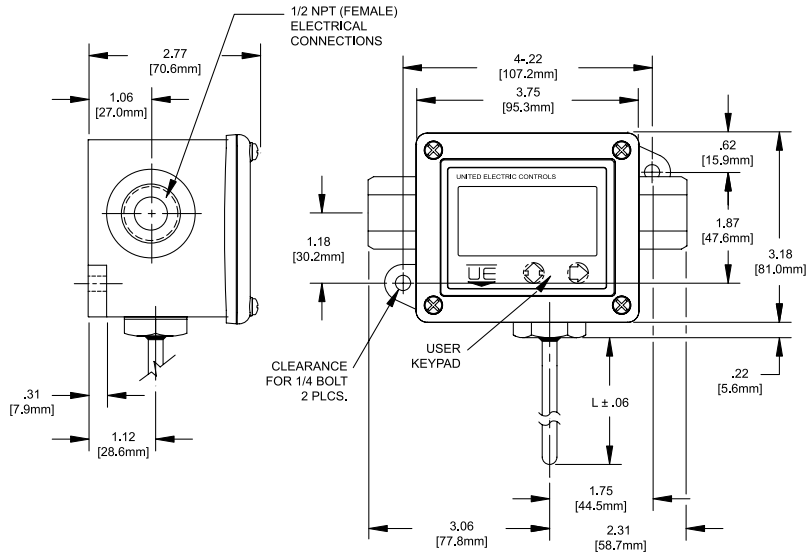
2W2D, 2W3A, 4W3A MODELS

(Single conduit shown with Gauge Pressure Sensor)



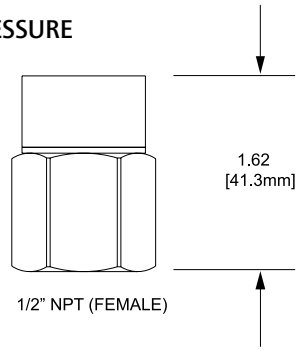
2WLP & 8W2D MODELS

(Dual conduit shown with Temperature Sensor)

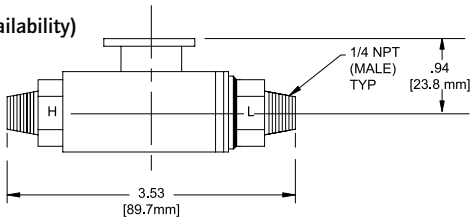


SENSOR DETAILS

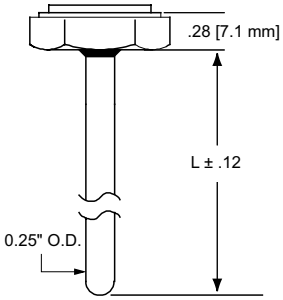
GAUGE PRESSURE



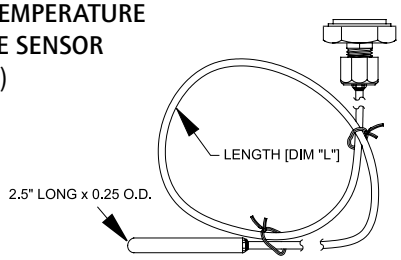
DIFFERENTIAL PRESSURE SENSOR
(Call for availability)



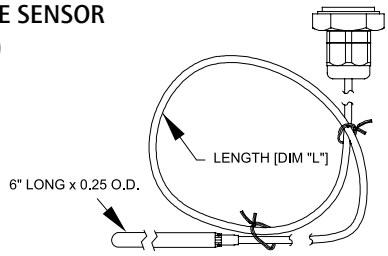
LOCAL TEMPERATURE SENSOR (L1, L3)



HIGH TEMPERATURE REMOTE SENSOR
(H1, HC)

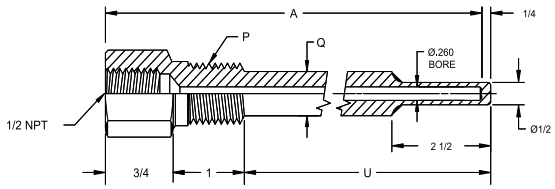


LOW TEMPERATURE REMOTE SENSOR
(R1, RC)

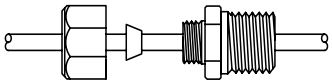


THERMOWELLS FOR TEMPERATURE SENSORS

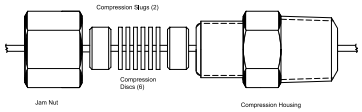
THERMOWELL



COMPRESSION FITTING
W073



UNION CONNECTION
W074 & W080



THERMOWELLS AND FITTINGS FOR ONE SERIES TEMPERATURE SENSORS

Thermowells (316L)					**1/2" NPT Compression Fitting**				**Union Connection**	
					W073				W074 & W080	
Thermowell	Length (A)				Local Sensor			Remote	Remote	
UE P/N	Inches	P (NPT)	Q	U	L1 (4")	L2 (6")	L3 (10")	R Sensor	R Sensor	H Sensor
1S260 L4-316	4	1/2	5/8	2.5	N/A	1	2	1	N/A	1
1S260 L5.5-316	5.5	1/2	5/8	4	N/A	N/A	2	N/A	N/A	1
1S260 L6-316	6	1/2	5/8	4.5	N/A	N/A	2	N/A	1	1
1S260 L6.5-316	6.5	1/2	5/8	5	N/A	N/A	1	N/A	1	1
1S260 L9-316	9	1/2	5/8	7.5	N/A	N/A	2	N/A	1	1
1S260 L9.5-316	9.5	1/2	5/8	8	N/A	N/A	N/A	N/A	1	1
1S260 L12-316	12	1/2	5/8	10.5	N/A	N/A	N/A	N/A	1	1
1S260 L15-316	15	1/2	5/8	13.5	N/A	N/A	N/A	N/A	1	1
1S260 L18-316	18	1/2	5/8	16.5	N/A	N/A	N/A	N/A	1	1
1S260 L24-316	24	1/2	5/8	22.5	N/A	N/A	N/A	N/A	1	1
2S260 L4-316	4	3/4	3/4	2.5	N/A	1	2	1	N/A	1
2S260 L6-316	6	3/4	3/4	4.5	N/A	N/A	1	N/A	1	1
2S260 L9-316	9	3/4	3/4	7.5	N/A	N/A	2	N/A	1	1
2S260 L12-316	12	3/4	3/4	10.5	N/A	N/A	N/A	N/A	1	1
2S260 L15-316	15	3/4	3/4	13.5	N/A	N/A	N/A	N/A	1	1
2S260 L18-316	18	3/4	3/4	16.5	N/A	N/A	N/A	N/A	1	1
2S260 L24-316	24	3/4	3/4	22.5	N/A	N/A	N/A	N/A	1	1

NOTE: 1 Recommended fitting in order to bottom out the temperature sensor in the thermowell.
2 Can be used, but temperature sensor will not bottom out in longer thermowells, and the enclosure will need more support in shorter thermowells.
N/A Will not work with these thermowells.

ONE SERIES DISPLAY RESOLUTION

DISPLAY RESOLUTION		**OPTIONS**					
Range Units	Dec. Places	Option -M276	Dec. Places	Option -M277	Dec. Places	Option -M278	Dec. Places
0-5 psi*	2	344,7 mbar	1	34.47 kPa	2	0.352 kg/cm	3
0-15 psi	2	1034 mbar	0	103.4 kPa	1	1.055 kg/cm	3
0-30 psi	2	2068 mbar	0	206.8 kPa	1	2.109 kg/cm	3
0-50 psi	1	3447 mbar	0	344.7 kPa	1	3.516 kg/cm	3
0-100 psi	1	6895 mbar	0	689.5 kPa	1	7.031 kg/cm	3
0-300 psi	1	20,68 bar	2	2068 kPa	0	21.09 kg/cm	2
0-500 psi	1	34,47 bar	2	3447 kPa	0	35.16 kg/cm	2
0-1000 psi	0	68,95 bar	2	6895 kPa	0	70.31 kg/cm	2
0-3000 psi	0	206,8 bar	1	20.68 MPa	2	210.9 kg/cm	1
0-4500 psi	0	310,3 bar	1	31.03 MPa	2	316.4 kg/cm	1

** Option M275 - Dec. Places 1, 138.4 "wc*

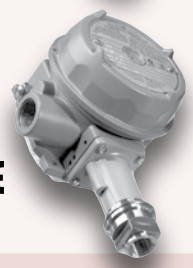
ALTERNATIVE PRODUCTS FROM UE

Spectra 12 Series

- Compact, cylindrical stainless steel design
- Hermetically sealed switch
- Explosion Proof
- Snap-acting belleville spring mechanism to enhance vibration resistance and set point stability
- Pressure ranges 1 to 6,000 psi;
  DP working pressure ranges 0 to 2500 psid;
  temperature ranges -130 to 650°F

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
- Internal or external set point adjustment



TX200 Series Pressure Transmitters

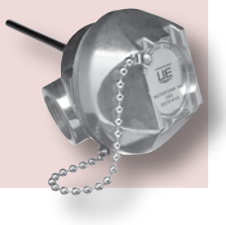
- Welded, hermetically sealed, 316 Stainless steel construction
- Ranges 0 to 100 psi up to 0 to 25,000 psi
- Choice of field adjustable or fixed range models
- 4-20 mA or 1-5 VDC output

117 Series

- 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 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 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.

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