





## ELECTRONIC PRESSURE AND TEMPERATURE SWITCHES



### FEATURES

- Large digital gauge for status, process indication & diagnostic reporting
- 100% programmable set point & deadband for easy adjustment
- Solid-state design for high-vibration applications
- Explosion-proof, intrinsically safe and non-incendive models available for hazardous locations
- Suitable for SIL 1 & 2 safety systems
- Multiple approvals including:    



## OVERVIEW

United Electric Controls (UE) is renowned for high-quality workmanship and product design, and the *One Series* carries this nearly 80-year tradition well beyond electromechanical switches. *UE's One Series* line of digital electronic pressure and temperature switches sets new standards for quality, reliability and versatility. Designed to meet the needs of harsh and hazardous applications, the *One Series'* advanced self-diagnostics and digital electronics provide the most reliable switches for a variety of diverse industries.

The *One Series* from *UE* allows you to choose from explosion-proof, intrinsically safe and non-incendive models that monitor gauge pressure, differential pressure or temperature. With up to two fully adjustable set points and deadbands, available 4-20 mA analog output, and absolutely no moving parts, these versatile instruments can now be used in a wide variety of applications where switches weren't previously considered. Featuring a solid-state design, *UE's One Series* is your best choice for tough applications with high cycle rates, vibration and shock. For plant upgrades, there are a variety of power options ranging from 2-wire discrete and analog loop-powered models to externally powered models that can switch up to 280 VAC at 10 amperes to the load.

With an integral digital display and 4-20 mA output, the *One Series* from *UE* can effectively do the job of three – replacing a switch, a gauge and a transmitter. Powerful yet easy to install, the *One Series* from *UE* features tamper-resistance, intuitive programming, and set-up that is fast and easy.

## FEATURES

- Digital process display
- Programmable set point and deadband
- Self-diagnostic solid-state digital electronics
- Plug port detection
- Nuisance trip filtering
- Patented electronic IAW® self-diagnostics
- Min/Max process values memory
- 3-year warranty



*Ex d Models Include  
Rotatable Display!*

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

## INNOVATIVE DESIGN

The One Series' award-winning design provides numerous advances in alarm & shutdown switching technology.

## POWER

Extremely low power consumption allows the One Series 2-Wire electronic switch to operate with no additional wiring or batteries. Power is obtained from the control system's discrete or analog input, making it ideal for plant upgrades from mechanical switches while using the same wiring and control schemes. For direct switching applications, powered versions of the One Series can provide 2 independent solid-state relays or handle a load of up to 10 amperes. Loop-powered models feature field-scalable 4-20 mA analog output in addition to a solid-state relay switch – a switch + gauge + transmitter all in one.

## PROGRAMMABILITY

The set point and deadband settings allow for 100% adjustability, providing highly repeatable trip and reset points for your application. This feature allows the One Series to be used in pump and compressor applications where high cycle rate may shorten the life of mechanical controls. Nuisance trips, switch delay, plugged port detection and process extremes are all easily programmable, making these application challenges manageable by the instrument, with no special programming needed for the PLC.

## SELF-DIAGNOSTICS

Mechanical switches have no self-diagnostic capabilities – they are blind instruments. All One Series models include the patented IAW® (I Am Working) algorithm that can detect faults before they become process control problems. Detected faults are reported on the digital display while the switch will fail safe open and the 4-20 mA analog output goes beyond 4 and 20 to provide remote fault indication. The intelligent and configurable IAW® diagnostics allow the SIL-2-suitable One Series to provide a significantly higher risk reduction factor than some safety transmitters in SIS applications.



2W, 4W and 8W models  
for Zone 2, Div 2 areas  
*Shown with gauge sensor*

## APPLICATION VERSATILITY

For alarm and shutdown switching applications, there is no better choice than the *One Series* family of electronic switches from United Electric Controls. Measuring gauge pressure, differential pressure or temperature, the extremely rugged and reliable *One Series* takes all of the guess-work out of monitoring process variables to prevent injury, loss and downtime. With its large digital display, fully-adjustable deadband, and 100% solid-state design, the *One Series* is the obvious choice for plant upgrades and new construction projects. A built-in microprocessor includes digital repeatability and intelligent self-diagnostics, offering plant operators an extremely reliable and smart protection device.

Proven in use in literally thousands of diverse applications, UE has recently developed explosion-proof *One Series* models, extending this revolutionary switching technology to Zone 1 (Division 1) areas.

Here are just a few:

- Pumps and compressors – start/stop, optimizing, shutdown, staging
- Lubricating oil monitoring – sump temperature, bearing pressure, predictive maintenance
- Hydraulic oil pressure – high pressure monitoring, emergency shutdown, ram cycling
- Filter monitoring – automatic backwash, clog and change indication, proving flow
- Safety systems – safety integrity levels 1 & 2, alarm and shutdown, local switching, fast response time
- Plant upgrades – power and wastewater plant upgrades, drop-in replacement for mechanical switches



Gas Compressor Protection



Pump Emergency Shutdown



Lubrication Oil Monitoring

**SPECIFICATIONS**

**Power input/  
Switch output:**

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

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

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

**Ambient operating temperature range:**

	Approved Ambient Operating Temperature Range			
	cULus (Division System)		cULus & ATEX (Zone System)	
2W2D	-40°F (-40°C)	185°F (85°C)	-40°F (-40°C)	140°F (60°C)
2W4D	NA	NA	NA	NA
2WLP	-40°F (-40°C)	176°F (80°C)	-40°F (-40°C)	140°F (60°C)
2W3A	-40°F (-40°C)	185°F (85°C)	-40°F (-40°C)	140°F (60°C)
4W3A	-40°F (-40°C)	158°F (70°C)	-40°F (-40°C)	140°F (60°C)
8W2D	-40°F (-40°C)	176°F (80°C)	-40°F (-40°C)	140°F (60°C)
2X2D	-40°F (-40°C)	185°F (85°C)	-40°F (-40°C)	185°F (85°C)
2X4D	-40°F (-40°C)	185°F (85°C)	-40°F (-40°C)	185°F (85°C)
2XLP	-40°F (-40°C)	176°F (80°C)	-40°F (-40°C)	176°F (80°C)
2X3A	-40°F (-40°C)	185°F (85°C)	-40°F (-40°C)	185°F (85°C)
4X3A	-40°F (-40°C)	158°F (70°C)	-40°F (-40°C)	158°F (70°C)
8X2D	-40°F (-40°C)	176°F (80°C)	-40°F (-40°C)	176°F (80°C)

**Display operating temperature range:** 10°F (-12°C) 158°F (70°C)



## SPECIFICATIONS (CONTINUED)

- 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

Mode	Action	Fault
2-state		
Normally closed	Open on rising media	Open
Normally open	Close on rising media	Open
Normally closed	Open on falling media	Open
Normally open	Close on falling media	Open
3-state		
Normally closed	Pulse on rising media	Open
Normally closed	Pulse on falling media	Open

- Analog output:** 4-20 mA output, 700 ohms max. at 24 VDC, Field scalable, 2:1 turn down. Various faults are indicated at 0, 3.5, 22 and 24 mA. See installation manual for details. (2WLP, 2XLP, 8W2D, 8X2D models only)

**Electrical characteristics:**  
(2-wire models only)

Model		Switch State (Max.)	
		Voltage Open	Voltage Closed
2W2D	2X2D	12-30 VDC @ 750 µA	4.7 VDC @ 40 mA
2W4D	2X4D	30-50 VDC @ 1mA	5.0 VDC @ 40 mA
2W3A	2X3A	90-130 VAC/VDC @ 1 mA	13 VAC/VDC @ 100 mA

- Enclosure:** Type 4X/IP66 certified epoxy-coated aluminum construction
- Faceplate:** UV-resistant pressure sensitive keypad and display overlay
- Cover:** Epoxy-coated aluminum with tempered glass insert (explosion-proof models only)
- Conduit:** 1/2" NPT female stainless steel fitting; 3/4" NPT female aluminum casting (explosion-proof models only)

**SPECIFICATIONS (CONTINUED)**

<b>Display:</b>	<ul style="list-style-type: none"> <li>• Local 4 digit x 0.5" LCD</li> <li>• IAW® (I Am Working) status</li> <li>• Process variable</li> <li>• Units of measure</li> <li>• Switch status</li> </ul>	<ul style="list-style-type: none"> <li>• Latch status</li> <li>• Set point value</li> <li>• Deadband value</li> <li>• Min/Max values</li> <li>• Fault codes</li> </ul>
<b>Set point &amp; deadband:</b>	User-configured, 100% adjustable over entire sensor operating range	
<b>Memory:</b>	Programming and data protected by non-volatile EEPROM	
<b>Effective transmission distance</b>	2,000 feet at rated voltage for 2W2D/2X2D and 2W3A/2X3A	
<b>Sensors:</b>	<p><b>Gauge Pressure</b> – 316L stainless steel, welded diaphragm, 1/2" NPT (female) process connection, micro-machined piezo-resistive strain gauge silicon element, 0.25 ml silicone oil fill. Media temperature: -40 to 257°F (-40 to 125°C)</p> <p><b>Differential Pressure</b> - 316L stainless steel, welded diaphragms, 1/4" NPT (male) process connections, piezo-resistive strain gauge silicon element, silicone oil fill. Media temperature: -40 to 257°F (-40 to 125°C)</p> <p><b>Temperature</b> – 316 stainless steel 0.25" OD sheath containing a 100 ohm 4-wire platinum RTD element available with epoxy fill (local low temp) or powder fill (remote high temp). Media temperature: -300 to 1000°F (-184 to 538°C)</p>	
<b>Vacuum:</b>	All pressure sensors withstand deep vacuum with no calibration effects. Vacuum ranges are not currently available.	
<b>EMI/RFI:</b>	Compliance to CE EMC requirements: EN 55011, EN 61326, EN 61000-6-2	
<b>Emission:</b>	EN 55011 class A; Radiated emissions EN 61000-3-2 Harmonic Current Emissions	
<b>Immunity:</b>	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	
<b>Weight:</b>	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)	
<b>Shock:</b>	per MIL-STD-810G method 516.6 – when device is subjected to 15 g (10 mSec) and 40 g (6 mSec); 3 drops/axis Effects: less than +/- 0.40% of range	
<b>Vibration:</b>	per IEC 61298-3 (field and pipeline applications with high vibration level, 10-1000 Hz range, 0.014" displacement peak amplitude, 5 g acceleration amplitude) Effects: less than +/- 0.40% of range	

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