



## Excela™ Electronic Pressure and Temperature Switches



UNITED ELECTRIC  
CONTROLS

Discrete Input Powered

## Installation and Maintenance Instructions

Please read all instructional literature carefully and thoroughly before starting. Refer to the final page for the listing of Recommended Practices, Liabilities and Warranties.

### GENERAL (MOUNTING and WIRING)



MISUSE OF THIS PRODUCT MAY CAUSE PERSONAL INJURY. THESE INSTRUCTIONS MUST BE THOROUGHLY READ AND UNDERSTOOD BEFORE UNIT IS INSTALLED. SEE PRODUCT NAMEPLATE INFORMATION FOR SPECIFIC AGENCY CERTIFICATIONS APPLICABLE TO YOUR PRODUCT.



CONTINUOUS OPERATION SHOULD NOT EXCEED THE DESIGNATED OVER RANGE PRESSURE OR WORKING PRESSURE RANGE STATED WITHIN THE LITERATURE AND ON DEVICE NAMEPLATE.

### INSTALLATION

#### Tools Required

1-1/16" wrench for sensor hex fitting  
screwdriver for mounting bolts  
2 mounting bolts (1/4" Max.)

### MOUNTING



FOR PRESSURE AND LOCAL TEMPERATURE MODELS, ALWAYS HOLD A WRENCH ON THE SENSOR HEX WHEN MOUNTING UNIT. DO NOT TIGHTEN BY TURNING ENCLOSURE. THIS WILL DAMAGE THE CONNECTION BETWEEN THE SENSOR AND HOUSING.



INSTALL UNITS WHERE SHOCK, VIBRATION AND TEMPERATURE FLUCTUATIONS ARE MINIMAL. ORIENT UNIT MAKING SURE THAT THE ELECTRICAL CONDUIT CONNECTION IS NOT FACING UP, TO PREVENT MOISTURE FROM ENTERING ENCLOSURE. DO NOT MOUNT UNIT IN AMBIENT TEMPERATURES EXCEEDING PUBLISHED LIMITS.



FOR DIFFERENTIAL PRESSURE MODELS (ESPECIALLY LOW RANGE UNITS), MOUNT THE SENSOR LEVEL TO MINIMIZE ANY PRESSURE READING OFFSETS. THE OFFSET COMMAND MAY BE USED TO ZERO THE DISPLAY (SEE PAGE 5 FOR ADDITIONAL INFORMATION).

Excela is rated for both indoor and outdoor operation, IP66 and Nema 4X, with a temperature rating of -40°C to 71°C

- Surface mount the unit using the two (2) 1/4" clearance holes in the mounting ears
- Pressure and Differential Pressure units can be mounted directly to process connections if they are able to support the product.
- To pipe mount: Thread the pressure connection onto the pressure port. Use a wrench on the hex pressure connection to tighten. Test for leaks. On Differential Pressure models, the Low (L) side pressure must NOT exceed the high (H) side pressure.
- Allow space in front of the unit to access the programming function of the product.

#### Over Range Pressure:

The maximum pressure to which a pressure sensor may be continuously subjected to without causing damage and maintaining setpoint repeatability.

#### Max Working Pressure:

The maximum that can be applied to both process ports simultaneously without affecting sensor performance. The low (L) side pressure must NOT exceed the high (H) side pressure. Damage to the sensor may result.



**WARNING: NEVER INSERT ANY OBJECT INTO THE PRESSURE SENSOR OPENING. DAMAGE TO THE SENSOR WILL RESULT, AFFECTING ACCURACY.**

## Local and Remote Temperature Models

**For Immersion Sensing:** Use of a thermowell is highly recommended to aid in maintenance. Insert the sensor housing (0.25" diameter) into the well ensuring that the housing bottoms out and will be completely immersed in the media (2.5" min.) Secure the sensor using an appropriately sized compression fitting or union connector. Refer to options W073, W074 and W080 in the Excelsa technical brochure.

**For Surface Sensing:** Secure the sensor housing to the pipe or vessel using an adhesive or strapping method suitable for the application.

### WIRING



[Wiring and Setup Video](#)

**Tools Required**  
Phillips-head screwdriver  
Wire strippers



ALL MODELS ACCEPT 8-50 VDC DISCRETE POWER SOURCE DIRECTLY FROM DIGITAL INPUTS of PLCs, DCSs AND OTHER LOW-POWER DC LOADS. THE SWITCHED OUTPUT MAXIMUM LOAD RATING IS 0.1A. OVERLOADING THE SWITCH MAY CAUSE FAILURE.



THE DEVICES SHALL BE PROPERLY GROUNDED IN THE END USE APPLICATION.



THE INPUT POWER SHALL BE NEC/CEC CLASS 2, UL/CSA/IEC 60950 LPS OR UL/CSA/IEC 61010 LIMITED ENERGY



LEADWIRES MUST BE RATED 105°C MINIMUM. FOR AMBIENT TEMPERATURES BELOW -10°C, USE SUITABLE FIELD WIRING.

Excelsa is powered through the residual current of the PLC

Note: For bench testing using a 24 VDC power supply, use the test resistor supplied (1.8K  $\Omega$ ) with the unit.

- Loosen the four (4) Phillips-head screws holding the faceplate to the enclosure. Gently remove the faceplate module. Disconnect the 8 wire connector from the faceplate to allow easy wiring.
- Pass the wires through the conduit connector and connect to the terminal block. You can wire the unit as a Normally Open or a Normally Closed switch.

### Terminal Block Wiring

- Excelsa's terminal block is marked Common (COM), Normally Closed (NC) and Normally Open (NO)
- If replacing a mechanical switch, match the wiring to make it simple.
- The unit is not polarity sensitive and mimics a mechanical SPDT switch operation
- Terminal block accepts 12-24 AWG wiring.
- Reconnect the 8 wire connector to the faceplate which is keyed and can only be connected one way.
- Place the faceplate back on the enclosure and re-attach using the (4) Phillips screws (4 in-lbs or 0.45 N-m). DO NOT OVERTIGHTEN.



### Wiring configurations

The signal output of the Excelsa mimics that of a single pole double throw (SPDT) mechanical switch. When connecting the Excelsa to a programmable logic controller (PLC), this is the signal the PLC sees coming from the Excelsa:

When wiring Normally Open (NO) and Common (COM)

- PLC sees open circuit below setpoint
- PLC sees closed circuit above setpoint

When wiring Normally Close (NC) and Common (COM)

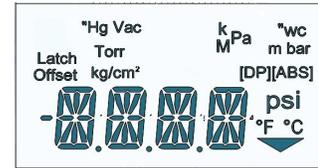
- PLC sees closed circuit below setpoint
- PLC sees open circuit above setpoint

## DISPLAY

The Excelsa features a large, easy-to-read display, showing the process condition and the status of the switch. (See programming section for a complete description.) Setpoint and minimum/maximum process values can be easily accessed from the front of the unit while in operation. Programming and interrogating the Excelsa is done through two buttons on the faceplate.

The Excelsa features a large, easy to read LCD display. It is used for three main purposes:

- Process value indication
- Programming of key features
- Switch status/troubleshooting.



In the process display mode:

- Pushing the left ⇐ button once, the display will scroll the min/max process values and the number of switch trips. The display will revert back to the Process Display mode after scrolling.

**Note: While scrolling you can clear the values by pushing the right → arrow.**

- Pushing the right → button once, the display will scroll setpoint, Rise and Fall. The display will revert back to the Process Display mode after scrolling.

## ALARM CONDITION

When the process goes beyond the Rise setpoint, the Green LED will change to Red.

The Red LED will continue to flash until the process has returned to a value below the Fall setting, at which point the Green LED will flash again. If latch mode is activated, the Red LED will continue to flash even if the value drops below the Fall setting. Refer to Latch function on page 5 to clear a latched output.

Note: The LED color should be set to Green for 'FALL' alarm points. Refer to LED flip function on page 4.

## PROGRAMMING

See flowchart on page 8

**NOTE:** The  arrow moves down the menu and the  arrow moves to the right for the next selection

### Basic Programming Menu



[Basic Programming Video](#)

#### Unit of measure and set-points

To use the product as a basic switch, Excelsa programming is simple:

- Enter the basic programming mode by pressing the  $\updownarrow$  and  $\rightarrow$  buttons simultaneously.
- The display will scroll "SET UNITS".and allow you to select the unit of measure. After the selection pressing the  $\updownarrow$  arrow displays SW.

**Note: Whenever the unit of measure is changed, Min/Max memory is reset but trip count will not be reset.**

**Note: Trip count is reset when power to the unit is disconnected (e.g., power cycle).**

- The SW screen allows you to set rise and fall settings by changing each digit on the display.
- Set-points can be separated from 1% to 99% of range.
- If the unit has negative range capability then a – or + option will be offered. Otherwise it is always positive.
- Returning to the SW screen allows you to either save your settings and resume operation or move into the advanced menu settings.
- See programming flowchart on page 8 for saving settings.



[Advanced Programming Video](#)

### Advanced Programming Menu

**NOTE:** No initial configuration of these features is required. The default for these advanced commands is zero or off.

Press the  $\updownarrow$  and  $\rightarrow$  buttons simultaneously; press the  $\updownarrow$  to get to the SW .At this point press  $\updownarrow$  and  $\rightarrow$  buttons simultaneously to get into the advanced menu, which starts with the LED FLIP display.

#### Advanced Menu List

- LED FLIP – Changes LED color from Red to Green when switch trips
- PASSWRD – Add your own 4-digit password for security
- OFST – Allows low range value offset by +/- 10%
- SPAN – Change the high end by +/- 10%
- LCH1 – Latch switch output on rise – needs to be reset manually
- PLUG PORT – Monitors pressure fluctuations in process - 1 min; 1 hr; 24 hr.
- FILTER – Smoothens transient pressure spikes - Programmable from 1/4 to 2 seconds
- TRIP DELAY – Like a switch timer – delay trip up to 999.9 seconds

#### **LED FLIP: LED LIGHT COLOR REVERSAL:**

This function allows you to reverse the LED color logic to match your process (i.e., rise or fall application).

**Set to RED:** This is for applications on the rise. The GREEN LED will flash in normal operating condition. Above the rise setpoint the LED will flash RED and it will revert to GREEN once it is below the fall setpoint.

**Set to GREEN:** This is for applications on the fall. The GREEN LED will flash in normal operating condition. Below the fall setpoint, the LED will flash RED and it will revert to GREEN once it is above the rise setpoint.

#### **PASSWORD:**

The Excelsa allows you to enable password protection to make any adjustments to the unit's operation. Once activated and saved through the advanced programming menu, it becomes the key to all subsequent changes to the unit's operational settings. Make sure you remember the password, since it will be required for all future changes.

**NOTE:** Password 0000 is not an acceptable password.

You can also deactivate it from the advance-programming menu if you decide it is no longer needed.

If you lose your password and need to access the programming menu, contact UE (insidesales@ueonline.com; +1 617-923-6977) and we can give you a one-time password to enter the programming mode.

**OFFSET:**

Offset adjustment changes the zero point without changing the slope of the calibration line. The Excelsa is factory calibrated to 0.5% of sensor range at room temperature. In some applications, it may be necessary to re-calibrate the unit in the field. Offset allows the user to enter a positive ("POS") or negative ("NEG") offset to the display readings. An offset of up to +/- 10% of the range is allowed.

**NOTE:** Any numerical value entered other than 0.00 will cause the display to indicate "Offset" just above the process reading in the process display.



USE OF THIS OPTION MAY CREATE A CONDITION WHERE THE DISPLAY MAY INDICATE "0.00" WHEN SIGNIFICANT PRESSURE OR TEMPERATURE(10% OF RANGE) EXISTS IN THE SYSTEM. INDEPENDENT VERIFICATION OF THE PROCESS VARIABLE SHOULD BE DONE PRIOR TO MAINTENANCE ON THE SYSTEM IF "OFFSET" APPEARS ON THE PROCESS DISPLAY.

**SPAN:**

SPAN adjustment adjusts the high end of the range by ± 10% by changing the slope of the line while holding the zero point fixed.

To calculate the SPAN value, apply a reference source below full scale to the Excelsa sensor. Record the value that shows on the Excelsa display and the reference source value. Divide the reference source value by the display value and then multiply the result by the sensor's upper range value.

FORMULA: SPAN = reference source / display value x upper range value

- Pressure example: For a sensor range of 0 - 100 psi, choose a reference source (90) below the upper range limit (100) to prevent an over range condition. Divide the reference source value from the resulting display value (88). Multiply the result by the upper range limit. Span = 90 / 88 x 100 = 102 (rounded)
- Temperature example: For a sensor range of -40 to 450°F, choose a reference source (400) below the upper range limit (450) to prevent an over range condition. Divide the reference source value from the resulting display value (404). Multiply the result by the upper range limit. Span = 400 / 404 x 450 = 446 (rounded)

**LATCH MODE:**

(Similar to Manual Reset on mechanical switch)

The switch output can be configured to latch when the setpoint is reached on rising set-point only.

- Set Latching Mode: In the Programming Mode, set "LCH1" to "ON". When the set-point is crossed on increasing process parameter, the switch will latch, and will remain in the latched state until it is manually reset by the user.
- To clear a Latched Output: First hit both buttons simultaneously, then "MAN RSET" will appear on the screen. To clear and exit, press both buttons ↕→

**PLUGGED PORT:**

The Excelsa has the ability to monitor the sensor for changes over time, and can indicate that the process port has become blocked, or plugged. The time and the pressure fluctuation is adjustable to match the application.

There are four possible settings for the detection time: OFF • 1 Min. • 1 Hr. • 24 Hrs.

When the feature is enabled, the user must then enter the plugged port range. The number is limited to +/- 10% of the full-scale sensor range.

If the pressure does not vary more than the threshold value during the selected time, the unit goes into alarm mode.

**Filter:**

In some applications, it is desirable to "dampen" the switch response and prevent intermittent false trips due to pressure spikes or other transient/isolated events. The Filter feature provides a software digital filter with a programmable time constant for suppressing certain transient short-duration events.

Selection for pressure models: OFF • 1/4 Sec. • 1/2 Sec. • 1 Sec. • 2 Sec.

Selection for temperature models: • 1/2 Sec. • 1 Sec. • 2 Sec.

**DELAY:**

The Trip Delay provides a configurable delay for switch trips with a range of up to 999.9 seconds.

To program the delay turn the feature on and then set the number of seconds for the delay.

If latch mode is activated, the Red LED will continue to flash even if the value drops below the Fall setting. Refer to Latch function on page 5 to clear a latched output.

**NOTE:** Enabling the trip delay function would delay notification of a tripped process event. Select an appropriate time delay that will still accommodate for sufficient response time to a tripped event.

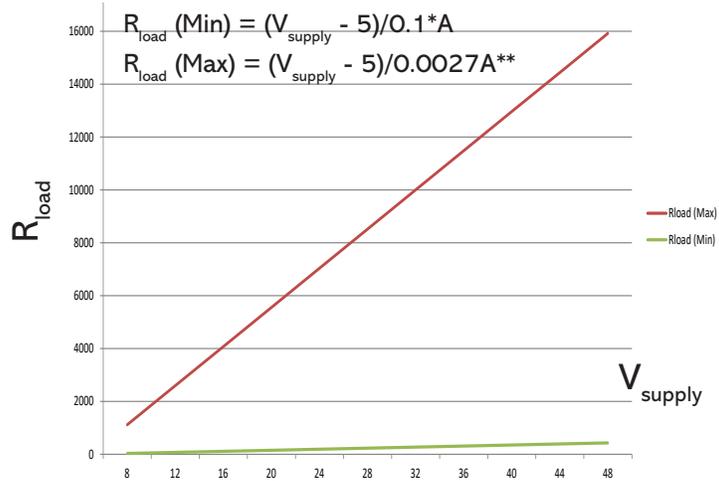
## ACCEPTABLE SUPPLY VOLTAGES AND LOADS FOR EXCELA

The charts below provide a range of acceptable power supply voltages (in Volts) and series loads (in Ohms).

**NOTE:** If you need assistance with determining the compatibility of the Excela electronic switch with your PLC, DCS, or relay, we can help. Please have the manufacturer’s model number of the PLC, DCS or the relay ready when you call. Please call (617) 923-6977 (Technical Sales) for assistance.

### Excela Allowable Voltage / Load Characteristics

V <sub>supply</sub>	R <sub>load</sub> (Max)	R <sub>Load</sub> (Min)
8	1111	30
12	2593	70
16	4074	110
20	5556	150
24	7037	190
28	8519	230
32	10000	270
36	11481	310
40	12963	350
44	14444	390
48	15926	430



\*De-rate 0.001A per C above 25°C

\*\* At -40°F/°C start up current could be up to 3 mA

## TROUBLESHOOTING

Excela is an electronic switch and cannot be properly tested with an ohmmeter. Instead, measure the voltage drop across the switch connected to the terminal block. A properly functioning Excela electronic switch will exhibit the following voltage levels:

Model	Voltage when switch is open	Voltage when switch is closed
1GSWLL	8-50 VDC	5 VDC

## DISPLAY MODULE CALIBRATION

The Serial # on the module and the enclosure must match for proper operation. Swapping modules among similar ranges would result in the product calibration being outside the stated tolerances.

## EXCELA ERROR MESSAGES

The Excela diagnostics are capable of detecting many possible error conditions. Some error conditions will clear automatically when the parameter returns to normal; others require the device to be powered down and restarted; and some may require repair or replacement. A list of error conditions are listed below.

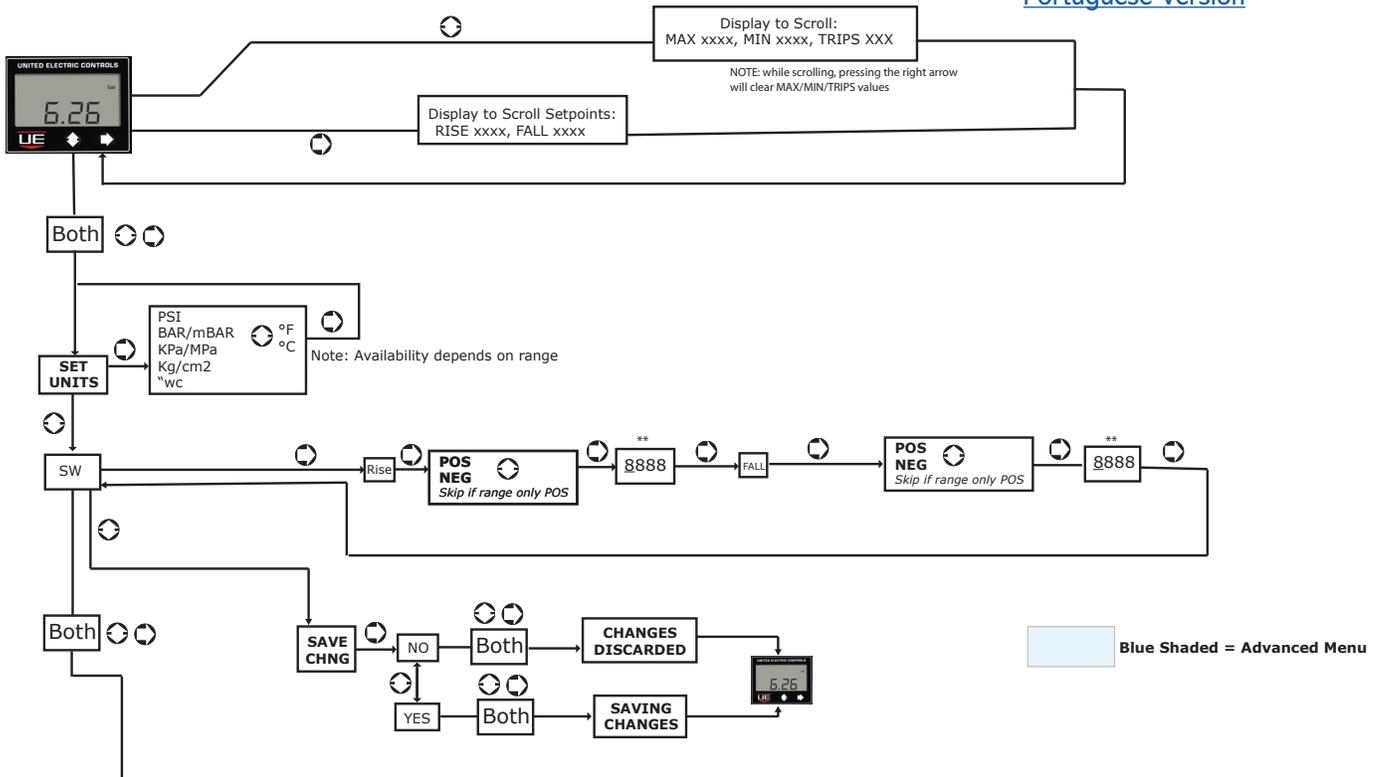
Possible Corrective Actions				
Error Condition and Code Message	Probable Causes	Try This First	Other Options	Switch Output
Codes E44, E45, E49, E50	CRC error on Serial memory used to store calibration / configuration data.	Cycle Power. In most cases, it should clear the error and operate normally.	If error does not clear, unit has to be returned for factory repair.	Switch output indicates alarm conditions based on the wiring set-up of the unit and matches the Red LED output.
KEY STUCK	Keypad button shorted.	Cycle Power. In most cases, it should clear the error and operate normally.	If error does not clear, unit has to be returned for factory repair.	
"EXTREME OVER-RANGE E88"	TEMPERATURE device process input above 110% of range.	Cycle Power. In most cases, it should clear the error and operate normally.	If error continues, check for sensor damage due to over range exposure.	
"EXTREME OVER-RANGE E88"	PRESSURE device process input above 150% of range.	Cycle Power. In most cases, it should clear the error and operate normally.	If error continues, check for sensor damage due to over range exposure.	
Overrange	Process input is above 103% of range.	PRESSURE and TEMPERATURE above range value.	Automatic Reset when process variable returns to normal.	
Underrange	Process input is below -1.25% of range	PRESSURE and TEMPERATURE below range value.	Automatic Reset when process variable returns to normal.	
PLUG	Process is not varying outside of Plug Port Window setting.	Is pressure / temperature dynamic? Is sensor clogged? Is plug port setup OK?	Turn feature off.	
"Reference Fault E09, E13, E14"	Hardware internal voltages are out of range.	Reference Fault can be caused by the presence of electrical noise. Eliminate electrical noise sources.	If error does not clear, unit has to be returned for factory repair.	
Watchdog Fault	The processor is being reset automatically on an internal fault. Could be caused by transients on the power supply or unit connected to a load resistance that is too high.	Review load resistance. Cycle power. In most cases, it should clear the error and operate normally.	If error continues, try a different power supply or unit has to be returned to factory for repair.	
All errors that start with up to three alphanumeric digits	Causes are various	Cycle Power. In most cases, it should clear the error and operate normally.	If error does not clear, unit has to be returned for factory repair.	

Note: If the error remains after power cycling, please contact UE Inside Sales at [insidesales@ueonline.com](mailto:insidesales@ueonline.com) or call +1 (617) 923-6977

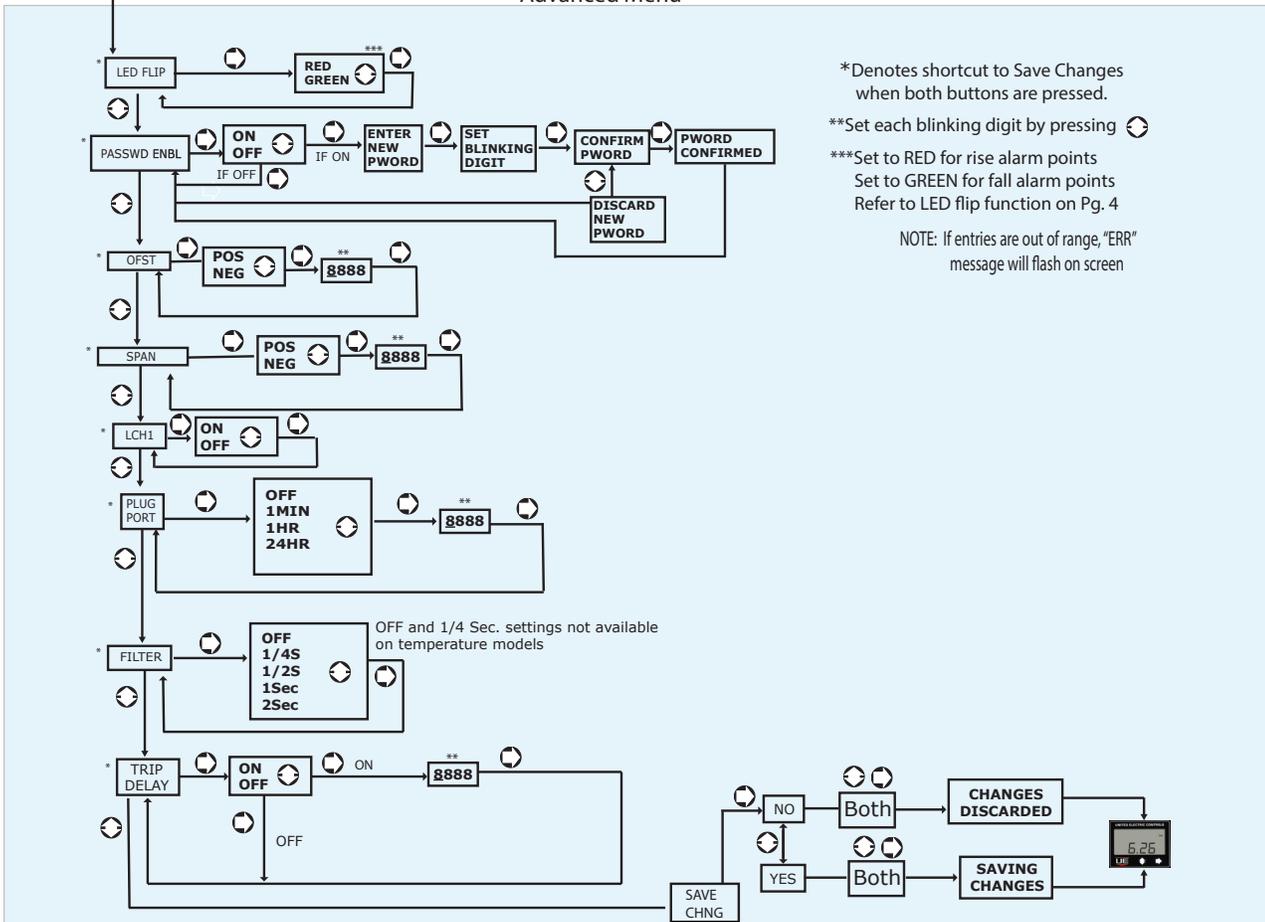
# Excela™ Electronic Switch Programming Flowchart

## Excela Electronic Switch Programming Flowchart

[Installation Manual Hyperlinks](#)  
[English Version](#)  
[Spanish Version](#)  
[Portuguese Version](#)

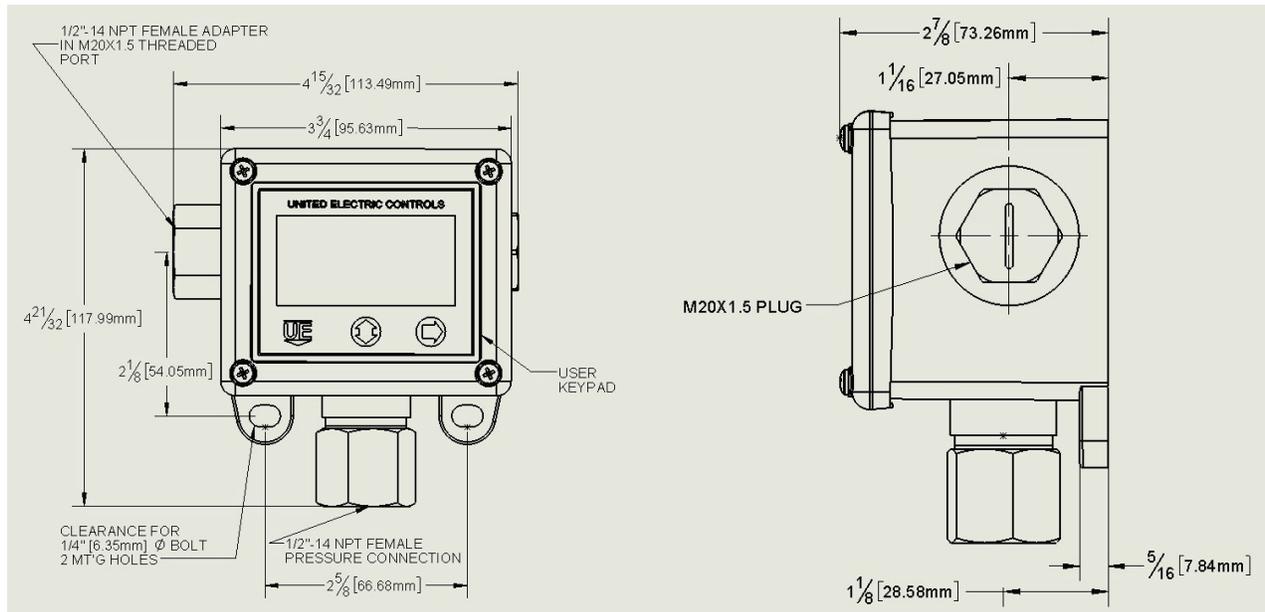


### Advanced Menu

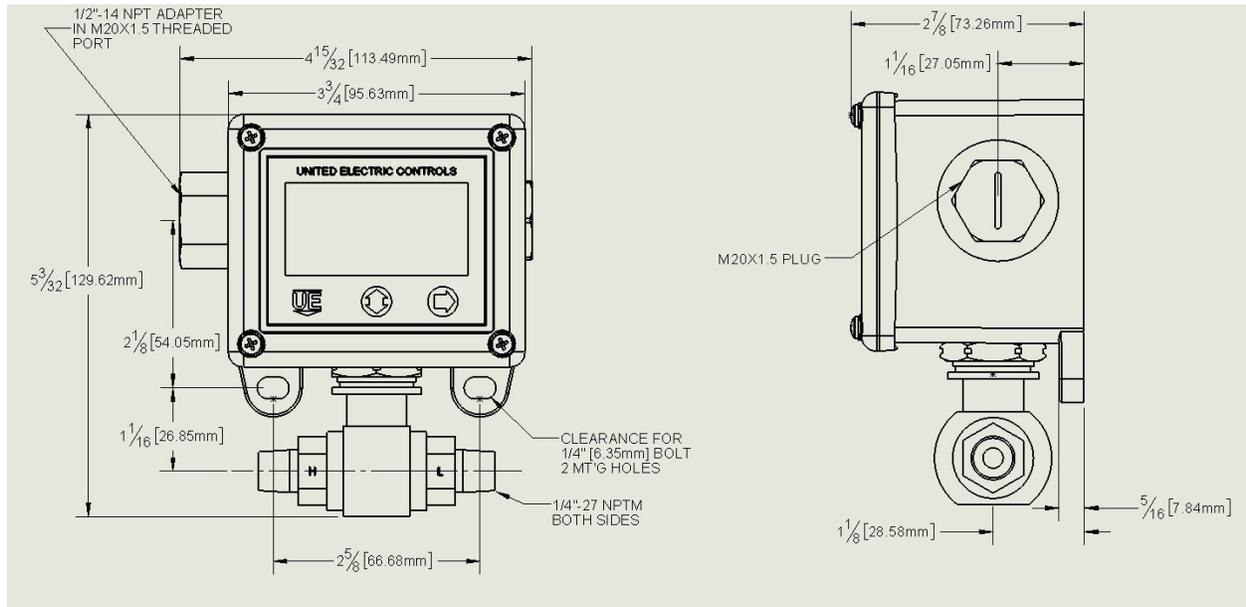


# DIMENSIONAL DRAWINGS

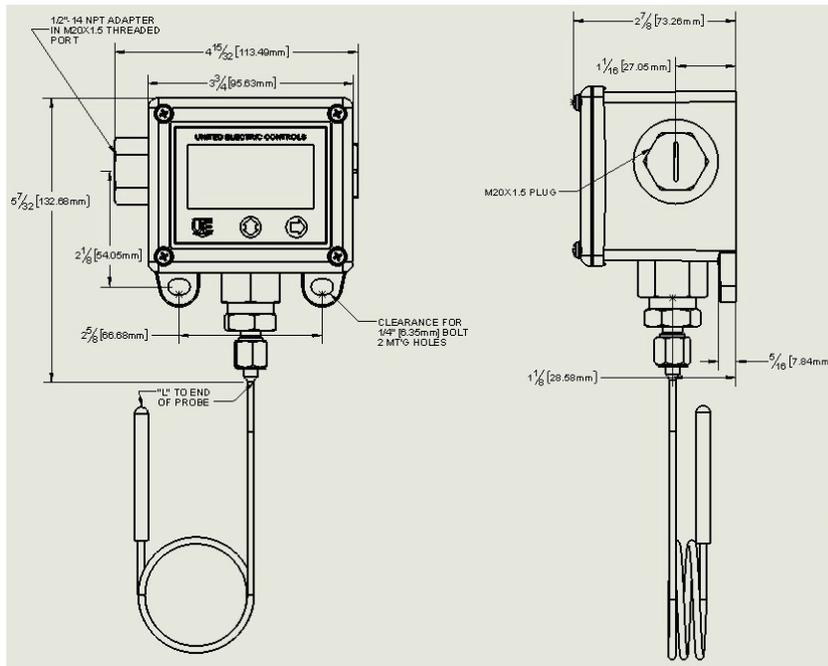
## Model 1GSWLL Gauge Pressure Sensor



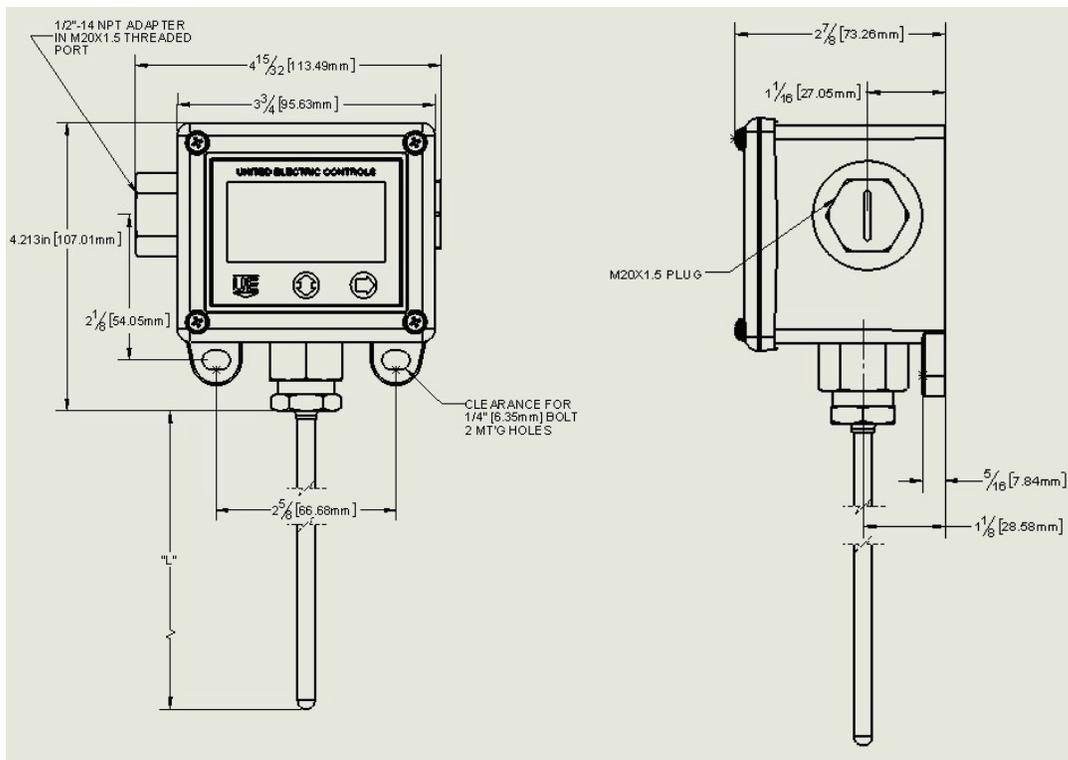
## Model 1GSWLL Differential Pressure Sensor



## Model 1GSWLL Temperature Model R Sensor



## Model 1GSWLL Temperature Model L Sensor



## Recommended Maintenance Procedures

Excela is an electronic switch with a digital display. It has internal diagnostics that continuously check its electronics to make sure it is operational and alarms if it detects an error.

UEC recommends the following annual checks on the Excela product line to keep the unit in optimal operating form for the intended function.

1. Check unit for any visible damage, corrosion, leakage or contamination. Clean and repair as needed.
2. For electrical testing, bypass the PLC connection to avoid false trips. For test, use a 24 VDC power source and a 1.8K ohm resistor on the COM terminal.
3. Press the up/down arrow button to view the maximum and minimum process parameters that have been recorded by the unit. To clear values, press the right arrow button and continue to record new min/max values.
4. Press the right key to display the switch setpoints. Verify that the setpoints are correct.
5. To confirm process display on Excela, connect calibration gauge to the Excela and verify that both displays match, within tolerance. If minor adjustment is needed, up to +/- 10 % of range, use the offset and span features within Excela's advanced programming menu to adjust.
6. If the display shows error messages, check the Installation & Maintenance sheet for potential causes and corrective actions.

To help with the maintenance, QR codes to the various videos and documents are listed below.



[Wiring and Setup Video](#)



[Basic Programming Video](#)



[Advanced Programming Video](#)

The Excela is a robust and reliable instrument that requires minimum yearly maintenance. If you have any questions related to this maintenance guide, please contact United Electric Controls at insidesales@ueonline.com or call inside sales at Tel: +1 617-923-6977 for additional information.

## Warnings: French Translations

Page	Warning Text	Texte d'avertissement
1	Misuse of this product may cause personal injury. These instructions must be thoroughly read and understood before unit is installed. See the product nameplate information for specific agency certifications applicable to your product.	Une mauvaise utilisation de ce produit peut entraîner des blessures. Ces instructions doivent être soigneusement lues et comprises avant l'appareil est installé. Voir l'information sur la plaque signalétique du produit pour les certifications d'agence spécifiques applicables.
1	Continuous operation should not exceed the designated over range pressure or working pressure range stated within the literature and on device nameplate.	Le fonctionnement continu ne doit pas dépasser la pression de dépassement ou la plage de pression de fonctionnement indiquée dans la documentation et sur la plaque signalétique de l'appareil.
1	For pressure and local temperature models, always hold a wrench on the sensor housing hex when mounting the device. Do not tighten by turning the enclosure, as this will damage the connection between the sensor and housing.	Pour tous les modèles de température et pression locaux, toujours tenir une clé sur l'hexagone du capteur pendant le montage de l'unité. Ne pas serrer en tournant l'enceinte, cela pourrait endommager la connexion entre le capteur et l'enceinte.
1	Install units where shock, vibration and temperature fluctuations are minimal. Orient unit making sure that the electrical conduit connection is not facing up to prevent moisture from entering enclosure. Do not mount unit in ambient temperatures exceeding the published limits.	Installez des unités là où les chocs, les vibrations et les fluctuations de température sont minimales. Orientez l'unité en vous assurant que la connexion du conduit électrique n'est pas orientée vers le haut pour empêcher l'humidité de pénétrer dans le boîtier. N'installez pas l'unité à des températures ambiantes dépassant les limites publiées.
1	For differential pressure models (especially low range units), mount the sensor level to minimize any pressure reading offsets. The offset command may be used to zero the display (see page xx for additional information).	Pour les modèles de pression différentielle (de pressions faibles), montez le niveau du capteur afin de minimiser tout décalage de lecture de pression. La commande décalée peut être utilisée pour mettre l'affichage à zéro (voir la page xx pour plus d'informations).
1	Never insert any object into the pressure sensor opening. Damage to the sensor will result, affecting accuracy.	Ne jamais insérer un objet dans l'orifice du capteur de pression. Les dommages à la membrane de capteur se traduira, à affecter la précision.
2	All models accept 8---50 VDC discrete power source directly from digital inputs of PLC's, DCS and other low power DC loads. The switched output maximum load rating is 0.1A. Overloading the switch may cause failure.	Tous les modèles acceptent une source d'alimentation discrète 8 --- 50 VDC directement à partir des entrées numériques des API, DCS et autres charges CC de faible puissance. La capacité de charge maximale de la sortie commutée est de 0,1 A. Une surcharge du commutateur peut provoquer une panne.
2	The device shall be properly grounded in the end use application.	L'appareil doit être correctement mis à la terre dans l'application d'utilisation finale.
2	The input power shall be NEC/CEC Class 2, UL/CSA/IEC 60950 LPS or UL/CSA/IEC 61010 limited energy.	La puissance d'entrée doit être NEC / CEC Classe 2, UL / CSA / CEI 60950 LPS ou UL / CSA / CEI 61010 à énergie limitée.
2	Field wiring must be rated 105°C minimum. For ambient temperatures below -10°C, use suitable field wiring.	Câblage sur le terrain doit être évalué à 105°C minimum. Pour une température ambiante inférieure à -10°C, utiliser le câblage approprié.
5	Use of this option may create a condition where the display may indicate "0.00" when significant pressure or temperature (up to 10% of maximum range) exists in the system. Independent verification of the process variable should be done prior to maintenance on the system when "offset" appears on the display.	L'utilisation de cette option peut créer une condition dans laquelle l'écran peut indiquer «0,00» lorsqu'une pression ou une température significative (jusqu'à 10% de la plage maximale) existe dans le système. Une vérification indépendante de la variable de processus doit être effectuée avant la maintenance du système lorsque «offset» apparaît à l'écran.

## 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 setpoint or faulty display. Check unit immediately.
- Preventative maintenance and periodic testing is necessary for critical applications where damage could endanger property or personnel.
- Electrical ratings stated in literature and on nameplate must not be exceeded. Overload on a switch can cause damage, even on the first cycle. Wire unit according to local and national electrical codes, using wire size recommended in installation sheet.
- Do not mount unit in ambient temp. exceeding published limits.

## LIMITED WARRANTY

Seller warrants that the product hereby purchased is, upon delivery, free from defects in material and workmanship and that any such product which is found to be defective in such workmanship or material will be repaired or replaced by Seller (Ex-works, Factory, Watertown, Massachusetts, INCOTERMS); provided, however, that this warranty applies only to equipment found to be so defective within a period of 24 months from the date of manufacture by the Seller (36 months for the Excelsa, Spectra 12 and One Series products; 18 months for Temperature Sensors). 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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CONTROLS

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