



# ETS Series (-1001) Digital Temperature Sensors



## Features

- **Outputs:**
  - **2 solid-state switch outputs provide a reliable alternative to mechanical temperature switches**
  - **One output can be configured as a scalable analog 4-20 mA signal, turning the unit into a combination temperature switch and transmitter**
- Ideal for industrial temperature measurement and indication in many applications
- RTD, measuring electronics, and process fitting combined in a single stainless steel probe
- Wide measuring range of -58 to 302°F
- Easily configured with pushbuttons or free ProSense XT-SOFT
- 30, 50, 100 or 150mm probe insertion lengths
- Integral 1/4" NPT or 1/2" NPT male process connection allows for direct installation without requiring extra fittings
- Built-in digital display provides indication of measured temperature and 2 yellow LEDs indicate output status
- The sensor housing can be rotated up to 310° and the digital display can be flipped 180° for installation flexibility
- Stainless steel housing provides a high IP65/IP66 ingress protection rating
- 4-pin M12 quick-disconnect electrical connection



For a variety of cable options see our website [www.AutomationDirect.com](http://www.AutomationDirect.com)



ETS Series (-1001) Digital Temperature Sensors				
Part Number	Description	Pcs/Pkg	Wt (lb)	Price
<b>ETS50N-30-1001</b>	ProSense digital temperature sensor, 1/2in male NPT process connection, 30mm insertion length, -58 to 302°F, output 1: switch PNP, N.O./N.C. selectable or 4-20 mA, output 2: switch PNP, N.O./N.C. selectable or 4-20 mA, 4-digit display.	1	0.9	\$177.00
<b>ETS50N-50-1001</b>	ProSense digital temperature sensor, 1/2in male NPT process connection, 50mm insertion length, -58 to 302°F, output 1: switch PNP, N.O./N.C. selectable or 4-20 mA, output 2: switch PNP, N.O./N.C. selectable or 4-20 mA, 4-digit display.	1	0.9	\$178.00
<b>ETS50N-100-1001*</b>	ProSense digital temperature sensor, 1/2in male NPT process connection, 100mm insertion length, -58 to 302°F, output 1: switch PNP, N.O./N.C. selectable or 4-20 mA, output 2: switch PNP, N.O./N.C. selectable or 4-20 mA, 4-digit display.	1	0.9	\$179.00
<b>ETS50N-150-1001*</b>	ProSense digital temperature sensor, 1/2in male NPT process connection, 150mm insertion length, -58 to 302°F, output 1: switch PNP, N.O./N.C. selectable or 4-20 mA, output 2: switch PNP, N.O./N.C. selectable or 4-20 mA, 4-digit display.	1	0.9	\$180.00
<b>ETS25N-30-1001</b>	ProSense digital temperature sensor, 1/4in male NPT process connection, 30mm insertion length, -58 to 302°F, output 1: switch PNP, N.O./N.C. selectable or 4-20 mA, output 2: switch PNP, N.O./N.C. selectable or 4-20 mA, 4-digit display.	1	0.8	\$175.00
<b>ETS25N-50-1001</b>	ProSense digital temperature sensor, 1/4in male NPT process connection, 50mm insertion length, -58 to 302°F, output 1: switch PNP, N.O./N.C. selectable or 4-20 mA, output 2: switch PNP, N.O./N.C. selectable or 4-20 mA, 4-digit display.	1	0.8	\$176.00

\* Thermowells available (see ETS Series Digital Temperature Sensor Accessories)



**NOTE: CHECK THE CHEMICAL COMPATIBILITY OF THE SENSOR'S WETTED PARTS WITH THE MEDIUM TO BE MEASURED**



# ETS Series (-1001) Digital Temperature Sensors

ProSense ETS (-1001) Series Specifications		
<b>Input</b>		
<b>Measuring Element</b>	Pt100 as per IEC 60751	
<b>Measuring Range</b>	-50 to 150°C (-58 to +302°F)	
<b>Min. Span</b>	20K/20°C (36°F)	
<b>Output</b>		
<b>Output Signal</b>	2 x PNP switch outputs or one PNP switch output and 1 x 4 to 20mA output (sourcing)	
<b>Range of Adjustment</b>	Switch output	Switch point (SP) and Switch-back point (RSP) in increments of 0.1°C (0.18°F) Min. distance between SP and RSP: 0.5°C (0.8°F)
	Analog output	Lower range value (LRV) and upper range value (URV) can be set anywhere within the sensor range (min. measuring range 20K (36°F)) LRV Factory Setting: 32°F (0°C) URV Factory Setting: 302°F (150°C)
	Damping	0 (no damping) or 9 to 40s in increments of 1 second
	Unit	°C, K, °F
<b>Analog Outputs</b>	Output on Fault	MIN = ≤ 3.6 mA MAX = ≥ 21.0 mA HOLD = last value
	Load	Max. (V <sub>power supply</sub> - 6.5 V) / 0.022A (current output) , 795Ω @ 24VDC
<b>Switch Outputs</b>	Switch status ON	I <sub>a</sub> ≤ 250mA
	Switch status OFF	I <sub>a</sub> ≤ 1mA
	Switching cycles	> 10,000,000
	Voltage drop PNP	≤ 2V
	Overload protection	Automatic testing of switching current; output is switched off in case of overcurrent, the switching current is tested again every 0.5 s; Max. capacitance load: 14μF for max. supply voltage (without resistive load); Periodic disconnection from a protective circuit in event of overcurrent (f = 2Hz) and indication of "Warning"
	Output on Fault	Switch opens
<b>Inductive Load</b>	Requires transient voltage suppression	
<b>Display</b>	Backlit LCD (7mm)	
<b>Power Supply</b>		
<b>Device Connection</b>	M12 connector	
<b>Supply Voltage</b>	12 to 30VDC (reverse polarity protection)	
<b>Current Consumption</b>	Without load < 60mA, with reverse polarity protection	
<b>Power Supply Failure</b>	Overvoltage	The device works continuously up to 34VDC without damage. No damage is caused to the device from a short-term overvoltage up to 1kV (as per EN 31000-4-5). The specific properties are no longer guaranteed if the supply voltage is exceeded
	Undervoltage	If the supply voltage drops below the minimum value, the device switches off (status as if note supply with power = switch open)
<b>Performance</b>		
<b>Reference conditions</b>	As per DIN IEC 60770 or DIN 61003 T = 25°C (77°F), relative humidity 45 to 75%, ambient air pressure 860 to 1060kPa (12.47 to 15.37 psi)	
	Supply voltage U	24VDC
<b>Max. Measured Error Switch Point and Display</b>	Electronics	± 0.2 K (0.36°F)
	Sensor	Total class A as per IEC 60751, -50 to +200°C (-58 to 392°F) Maximum measure error in °C = ± 0.15 + 0.002 ·  T  ( T  = Process temperature in °C without taking sign into account.)
	Total error	Electronics error + sensor error, e.g. for process temperature: -50 to +75°C (-58 to +167°F) ≤ 0.5 K (0.9°F) +75 to +200°C (+167 to 392°F) ≤ 0.75 K (1.35°F)
<b>Non-Repeatability Switch Point</b>	0.1 K (0.18°F) as per EN 61298-2 (without ambient temperature influence)	
<b>Long-Term Drift</b>	≤ 0.1 K (0.18°F) per year under reference operating conditions	



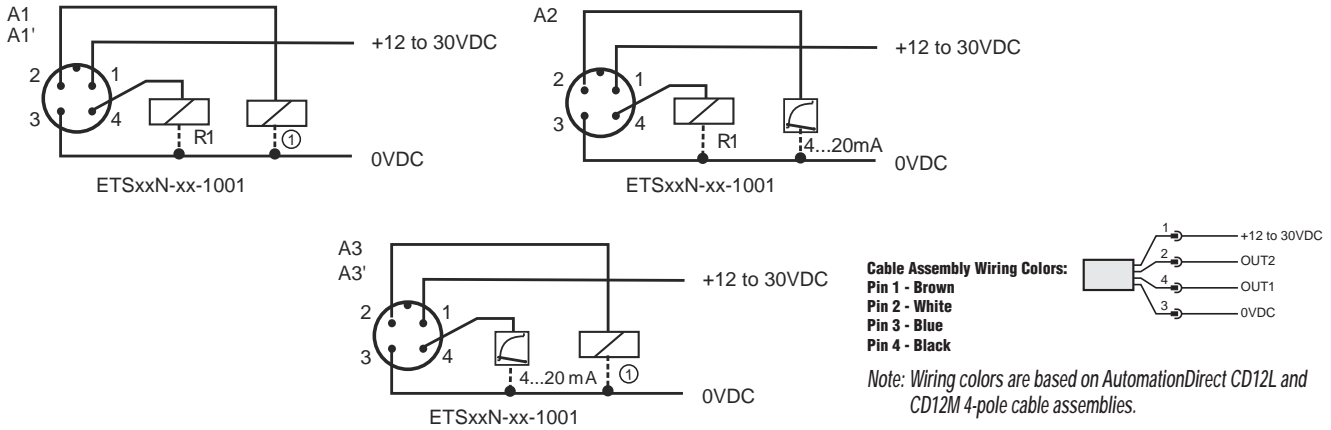
# ETS Series (-1001) Digital Temperature Sensors

ProSense ETS (-1001) Series Specifications		
<b>Performance Continued</b>		
<b>Sensor Response Time</b>	Measured as per IEC 60751, in water flowing at 0.4 m/s (1.3 ft/s) $t_{50} < 1.0 \text{ s}$ $t_{90} < 2.8 \text{ s}$	
<b>Influence of Ambient Temperature</b>	Switch output and display	0.00003/K
	Analog output	0.00005/K + influence of switch output and display
<b>Switch Output Response Time</b>	100ms	
<b>Analog Output</b>	Maximum measured error	Switch point error and display error + 0.1%
	Rise time $t_{90}$	$\leq 200\text{ms}$
	Settling time $t_{99}$	$\leq 500\text{ms}$
<b>Operating Conditions: Installation</b>		
<b>Installation Instructions</b>	Any orientation Housing can be rotated up to 310°	
<b>Orientation</b>	No restrictions	
<b>Operating Conditions: Environment</b>		
<b>Housing Material</b>	Stainless steel (316L); ethylene propylene diene monomer (EPDM)	
<b>Materials (wetted parts)</b>	Stainless steel (316L)	
<b>Ambient Temperature Range</b>	-40 to +85°C (-40 to +185°F)	
<b>Storage Temperature</b>	-40 to +85°C (-40 to +185°F)	
<b>Degree of Protection</b>	IP65	
<b>Shock Resistance</b>	50g as per DIN IEC 68-2-27 (11ms)	
<b>Vibration Resistance</b>	4g as per German Lloyd GL Guidelines	
<b>Electromagnetic Compatibility</b>	Interference emission as per IEC 61326 Series, class B electrical equipment Interference immunity as per IEC 61326 Series, appendix A (industrial use) and NAMUR Recommendation NE 21 EMC influence $\leq 0.5\%$	
<b>Process Temperature Limits</b>	-50 to +150°C (-58 to 302°F), Restrictions depending on process connection and ambient temperature	
	Max. ambient temperature	Max. process temperature
	Up to 25°C (77°F)	No restriction
	Up to 40°C (104°F)	135°C (275°F)
	Up to 60°C (140°F)	120°C (248°F)
Up to 85°C (185°F)	100°C (212°F)	
<b>Process Pressure</b>	100 bar (1450 psig) max.	
<b>Approvals</b>	CULus, File # E311366, CE	

\* To obtain the most current agency approval information, see the Agency Approval Checklist section on the specific part number's web page.

# prosense® ETS Series (-1001) Digital Temperature Sensors

## ETS Wiring Diagram

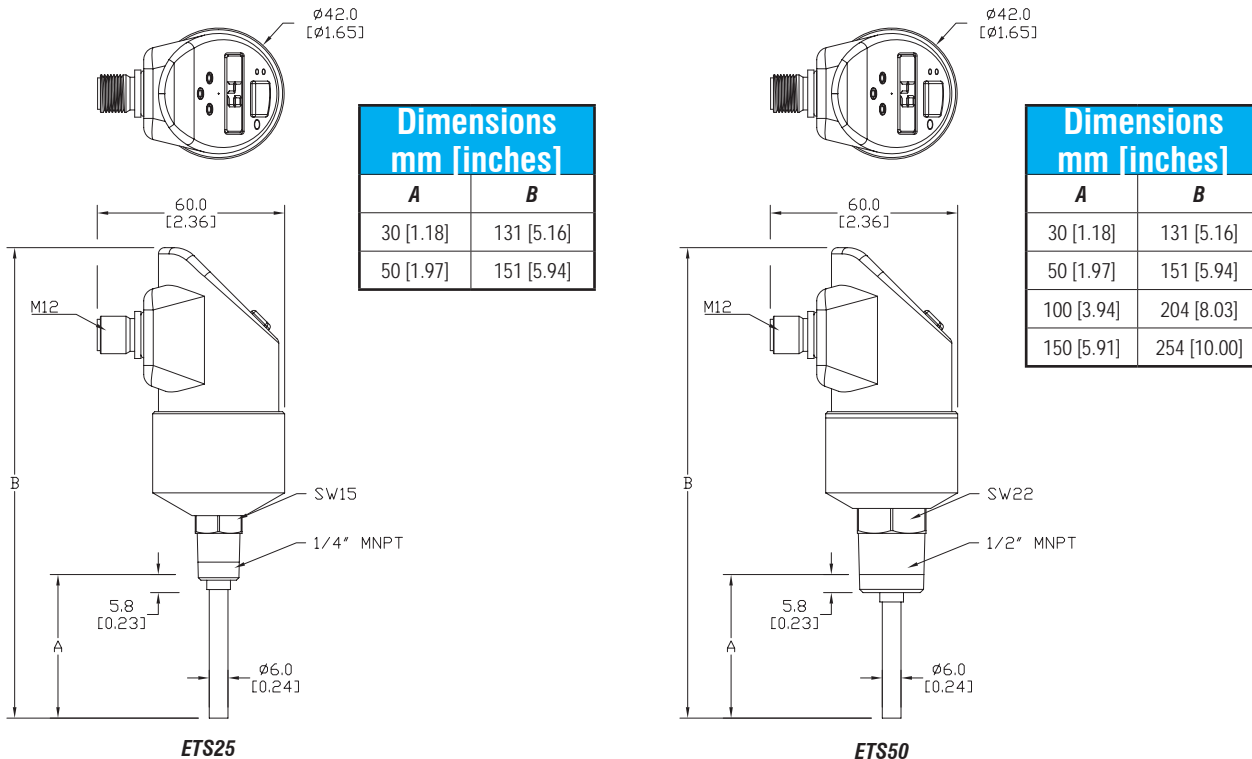


- A1: 2x PNP switch outputs R1 and ① (R2)
- A1': 2x PNP switch outputs R1 and ① (diagnosis/NC contact with "DESINA" setting)
- A2: 1x PNP switch output and 1x analog output (4 to 20 mA)
- A3: 1x analog output (4 to 20 mA) and 1x PNP switch output ① (R2)
- A3': 1x analog output (4 to 20 mA) and 1x PNP switch output ① (diagnosis / NC contact with "DESINA" setting)

For more information about DESINA, see [www.desina.de](http://www.desina.de)

## Dimensions

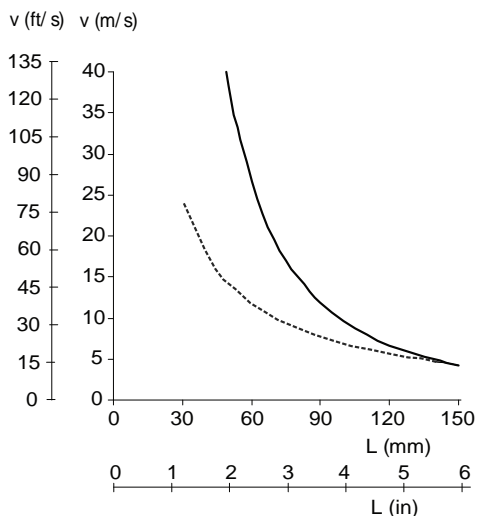
mm [inches]



See our website [www.AutomationDirect.com](http://www.AutomationDirect.com) for complete Engineering drawings.

# proSense® ETS Series (-1001) Digital Temperature Sensors

## Maximum Flow Velocity



L = insertion length, during flow  
 v = flow velocity  
 Medium: ----- air; - - - - - water



Scan the QR Code above or click to view the ETS Series product insert.

# pro<sup>sense</sup>® ETS Series Digital Temperature Sensor Accessories

## ETS Series Digital Temperature Sensor Accessories



TW06-01



TW06-02

Part No.	Description	Use with Transmitter Probe	Pcs/Pkg	Price
TW04-01	Standard duty threaded thermowell with 1/2 inch NPT male process threads, 304 stainless steel, 4-1/4 inch overall length with 0.260 inch bore diameter, 2-1/2 inch insertion length	ETS50N-100-XXXX	1	\$26.00
TW04-02	Standard duty threaded thermowell with 3/4 inch NPT male process threads, 304 stainless steel, 4-1/4 inch overall length with 0.260 inch bore diameter, 2-1/2 inch insertion length		1	\$26.00
TW04-03	Standard duty threaded thermowell with 1/2 inch NPT male process threads, 316 stainless steel, 4-1/4 inch overall length with 0.260 inch bore diameter, 2-1/2 inch insertion length		1	\$35.00
TW04-04	Standard duty threaded thermowell with 3/4 inch NPT male process threads, 316 stainless steel, 4-1/4 inch overall length with 0.260 inch bore diameter, 2-1/2 inch insertion length		1	\$35.00
TW06-01	Standard duty threaded thermowell with 1/2 inch NPT male process threads, 304 stainless steel, 6-1/4 inch overall length with 0.260 inch bore diameter, 4-1/2 inch insertion length	ETS50N-150-XXXX	1	\$36.00
TW06-02	Standard duty threaded thermowell with 3/4 inch NPT male process threads, 304 stainless steel, 6-1/4 inch overall length with 0.260 inch bore diameter, 4-1/2 inch insertion length		1	\$36.00
TW06-03	Standard duty threaded thermowell with 1/2 inch NPT male process threads, 316 stainless steel, 6-1/4 inch overall length with 0.260 inch bore diameter, 4-1/2 inch insertion length		1	\$45.50
TW06-04	Standard duty threaded thermowell with 3/4 inch NPT male process threads, 316 stainless steel, 6-1/4 inch overall length with 0.260 inch bore diameter, 4-1/2 inch insertion length		1	\$45.50



# ETS Series Digital Temperature Sensors

## Overview



AutomationDirect's ProSense ETS Series of Digital Temperature Sensors is ideal for industrial temperature measurement and indication in a wide variety of applications. The ETS series conveniently combines a precision RTD sensing element, measuring electronics, and process fitting all in a single stainless steel temperature transmitter probe. They have a wide measuring range of -58 to 302°F. Choose from four standard probe insertion lengths and two integral male NPT process threads that allow direct mounting to the process or thermowells, eliminating the need for separate probe mounting or adapter fittings. With no moving parts the two solid state switch outputs provide a reliable alternative to mechanical temperature switches. Available models allow an output to be configured as a scalable analog signal, turning the unit into a combination temperature switch and transmitter. The built-in digital display provides indication of the measured temperature. Two

yellow LEDs indicate output switch status. For optimum visibility the sensor housing can be rotated up to 310° after installation and the digital display can be electronically flipped 180° for inverted installations. Simple pushbutton setup allows the ETS to be easily and quickly configured prior to installation without the need for a separate temperature reference. Or, use our free ProSense XT-SOFT software to program the ETS parameters. Electrical connection is made with a 4-pin M12 quick-disconnect cable. The compact and robust design and construction of the ProSense ETS series withstands shock and vibration, and provides high accuracy and reliability required to excel in industrial temperature sensing applications.

ProSense ETS Digital Temperature Sensors Selection Guide					
Part Number	Price	Measuring Range*	Thread Size	Length	Outputs
ETS50N-30-1001	\$177.00	-58 to 302°F (-50 to 150°C)	1/2" MNPT	30mm	Output 1: switch PNP, N.O./N.C. selectable or 4-20 mA <sup>1</sup> Output 2: switch PNP, N.O./N.C. selectable or 4-20 mA <sup>1</sup>
ETS50N-50-1001	\$178.00			50mm	
ETS50N-100-1001**	\$179.00			100mm	
ETS50N-150-1001**	\$180.00			150mm	
ETS25N-30-1001	\$175.00		1/4" MNPT	30mm	
ETS25N-50-1001	\$176.00			50mm	
ETS50N-30-1003	\$125.00	-58 to 302°F (-50 to 150°C)	1/2" MNPT	30mm	Output 1: switch PNP, N.O./N.C. selectable Output 2: switch PNP, N.O./N.C. selectable
ETS50N-50-1003	\$126.00			50mm	
ETS50N-100-1003**	\$127.00			100mm	
ETS50N-150-1003**	\$128.00			150mm	
ETS25N-30-1003	\$125.00		1/4" MNPT	30mm	
ETS25N-50-1003	\$126.00			50mm	

\* Pushbuttons or free ProSense XT-SOFT software can be used to program custom measuring ranges and change other configuration parameters. An XT-USB programming cable may be required and purchased separately.

\*\* Thermowells available (see ETS Series Digital Temperature Sensor Accessories)

<sup>1</sup> Only one output can be configured as analog.



# pro<sup>sense</sup>® Temperature Transmitter Configuration Software

**Quick and easy configuration with Free XT-SOFT software – NO decade box, meters, or signal generators needed!**

## Overview

XT-SOFT PC software is a utility program that allows users to easily configure ProSense XTH-0-UNV, XTD-0-UNV and XTP series

temperature transmitters and ETS series digital temperature sensors. Download your free copy of XT-SOFT at [www.AutomationDirect.com](http://www.AutomationDirect.com) and connect your transmitter to the PC through an XT-USB configuration cable (purchased separately). An XT-M12 adapter is also required when connecting to an XTP series transmitter.

### System Requirements:

- Windows 10  
Windows 7 (32 and 64 bit)  
Windows Vista (64 bit)
- Windows XP  
1 USB 2.0 Port
- 128 MB hard disk space

## XTP Series Configuration Parameters:

- Measuring unit (°C/°F)
- Measuring range limits -50 to 150°C (-58 to 302)
- Fault condition reaction ( $\leq 3.6$  mA or  $\geq 21.0$  mA)
- Output (4-20 mA or 20-4 mA)
- Filter (0 to 8s)
- Offset (-9.9 to +9.9 K)
- Measurement point identification/TAG
- Output simulation drives output to a fixed value



**XTP Series**

## XTH & XTD Configuration Parameters:

- Sensor Type:
  - Thermocouple Types J, K, T, E, N, R, S, U, B, C, D, L
  - RTD Types Pt100, Pt500, Pt1000, Pt50, Ni100, Ni120, Ni500, Ni1000
- Linear Resistance 10 to 400 Ohms, 10 to 2000 Ohms
- Millivolts -10 to 100 mV
- Wiring connection 2, 3, or 4-wire (RTD or Linear Resistance only)
- Measuring range start and end points
- Selectable units of °F or °C
- Choose from internal or external cold junction compensation (TC only)
- Wire resistance compensation (2-wire RTD or Lin Resistance only)
- Output action of 4-20 mA or 20-4 mA
- Selectable up scale or down scale signal for sensor lead break or short circuit detection (NAMUR NE43 fault response)
- Adjustable digital filter time constant to compensate for undesirable input fluctuations
- Zero point correction offset factor in °F or °C



**XTH Series**



**XTD Series**

## ETS Series Configuration Parameters:

- Basic Settings:
  - Measuring unit (°C/°F/K)
  - Offset: Configure zero point:  $\pm 18^\circ\text{F}$  ( $\pm 10^\circ\text{C/K}$ )
  - Display - Measured value display  
Measured value display rotated 180°  
Set switch point display  
Set switch point display rotated 180°  
Display off  
Display off rotated 180°
- Damping: display value, output signal: 0 (no damping) to 40s (in increments of 1 second)
- DESINA - PIN assignment of the M12 connector is in accordance with the guidelines of DESINA
- Settings for Switch Output:
  - Switching characteristic - Window/NC contact  
Hysteresis/NC contact  
Window/NO contact  
Hysteresis/NO contact  
Analog output (if applicable)
  - Switch point value: -57.1 to 302°F (-49.5 to 150°C) in increments of 0.18°F (0.1°C)
  - Switch-back point value: -58 to 300°F (-50 to 149°C) in increments of 0.18°F (0.1°C)
  - Switch point delay: 0 to 99s in increments of 0.1s
  - Switch-back point delay: 0 to 99s in increments of 0.1s
- Settings for Analog Output (if applicable):
  - Value for 4mA: -58 to 266°F (-50 to 130°C) Lower range value in increments of 0.18°F (0.1°C)
  - Value for 20mA: -22 to 302°F (-30 to 150°C) Upper range value in increments of 0.18°F (0.1°C)
- Error current - Current value in event of error:
  - Minimum =  $\leq 3.6$  mA
  - Maximum =  $\geq 21.0$  mA
  - HOLD = last value
- Settings for Service Functions:
  - Locking code - Enter the locking code for enabling the device.
  - Change locking code - Freely selectable code 1 to 9999.  
0 = no locking
  - Simulation output 1 or 2 - OFF: No simulation  
OPEN: Switch output open  
CLOSE: Switch output closed  
Simulation values for analog output in mA (3.5 / 4.0 / 8.0 / 12.0 / 16.0 / 20.0 / 21.7)



**ETS Series**



# proSense® Temperature Transmitter Configuration Software



**XT-SOFT CD**



**XT-USB**



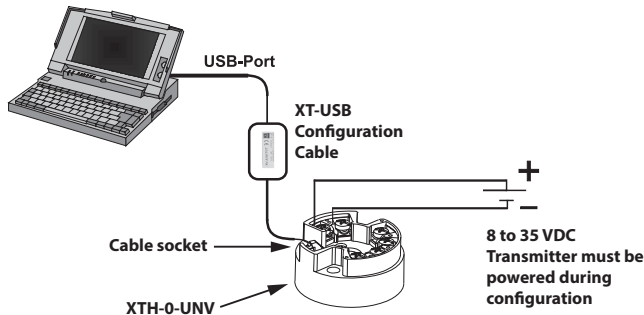
**XT-M12**

Part No.	Description	Pcs/Pkg	Wt(lb)	Price
<b>XT-SOFT</b>	ProSense configuration software, CD or free download. For use with ProSense temperature transmitter XTP series, digital temperature sensor ETS series and models XTH-0-UNV, XTD-0-UNV.	1	0.1	\$9.50
<b>XT-USB</b>	ProSense configuration cable, USB to keyed 4-pin male, 7.9 ft/2.4 m cable length. For use with XT-SOFT configuration software, ProSense temperature transmitter XTP series, digital temperature sensor ETS series and models XTH-0-UNV, XTD-0-UNV.	1	0.4	\$95.00
<b>XT-M12</b>	ProSense adapter, keyed 4-pin female to 4-pin M12. For use with ProSense temperature transmitter XTP series and XT-USB cable.	1	0.1	\$16.00

## Connection Examples

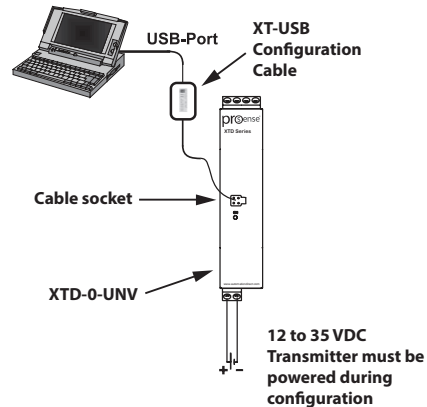
### XTH-0-UNV Connection

XT-SOFT PC configuration software

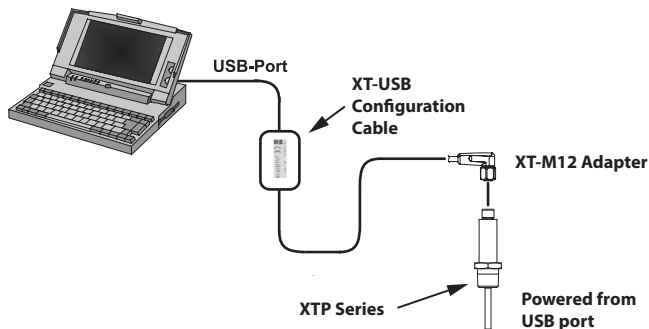


### XTD-0-UNV Connection

XT-SOFT PC configuration software

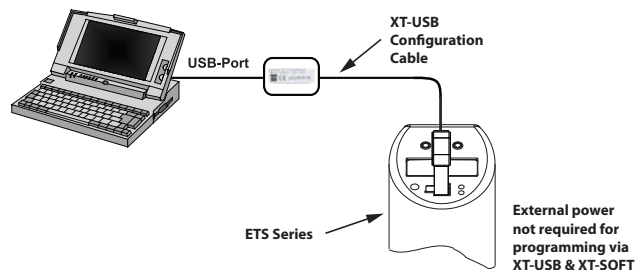


### XTP Series Connection



Note: XT-SOFT version 1.27.13.0 or later required for use with the XTP series transmitters

### ETS Series Connection



Note: XT-SOFT version 1.27.15.0 or later required for use with the ETS Series.



Scan the QR Code or click to view the help file for the XT-SOFT software.