



# 820/821 Series Digital Temperature Indicators User Manual

## 1. Description

The NOSHOK 820/821 Series Digital Temperature Indicators are a complete solution for most industrial temperature monitoring and temperature indicating applications. Made with high quality construction, these gauges features a bright and large 4-digit red LED display with an analog 4-20mA output. They are designed for optimum accuracy and performance. The 820/821 Series are an ideal replacement for bi-metal, liquid bulb and gas thermometers. They are also a suitable replacement for Mercury reduction programs.

The 820/821 Series can be factory calibrated to a customer specified temperature range. The 820/821 Series' built-in programmable transmitter can be re-scaled and re-calibrated using the optional interface module and software.

The 820/821 Series Digital Temperature Indicator arrives factory scaled and calibrated to the customer's specified temperature range. No costly field calibration is required. If the application changes, the 820/821 Series can be re-scaled at any range within the sensor limits while maintaining its accuracy.

The housing, probe and fitting material is all fabricated from stainless steel 316. The 820/821 Series Temperature Indicator is rated to NEMA 4X ( IP65 ). Multiple mounting configurations are available to meet customer requirements.

Standard extension cables offered are PVC or Silicon insulated wires. Some models are available with M12 Micro-Male Connector.

## 2. Function

The 820/821 Series line of temperature indicators uses a Pt100 Platinum RTD which is read by our embedded processor and displayed on an LED display.

### 3.1. Safety Instructions

Read the instruction manual completely before installing the 820/821 Series temperature indicator. All safety guidelines should be followed and the indicator should only be installed by qualified personnel following all local codes and regulations.




## 3.2. Proper Use


**3.2.1. Designated use:** These devices are intended for specific industrial or sanitary applications. Appropriate fittings, materials and form must be chosen depending on the use. Proper specification must be done to conform with temperature, pressure and flow velocity requirements.

**3.2.2. Installation:** these devices must be installed by qualified personnel taking all necessary precautions. The installation should adhere to all local regulations.

**3.2.3.** Ensure that the label on the 820/821 Series Digital Temperature Indicator is correct and is appropriate for the particular application

**3.2.4.** These devices are repairable. In the event of failure they should be returned to the factory for repair and recalibration. Please ensure the unit is clean and has no contaminants before returning.

 **3.2.5.** If the installation will occur in a hazardous location or near hazardous materials all necessary precautions should be taken.

 **3.2.6.** Mounting locations should be chosen to avoid high voltage electrical lines and for ease of installation and future maintenance.

## 4. Installation

### 4.1. Unpacking

If there is any visible damage to the unit check the packaging and notify the shipper immediately. Included in the package should be one temperature probe and one instruction manual.

**4.2. Storage:** note that the device should be stored at a temperature between  $-40\text{ }^{\circ}\text{C}$  to  $+85\text{ }^{\circ}\text{C}$  ( $-40\text{ }^{\circ}\text{F}$  to  $185\text{ }^{\circ}\text{F}$ ) in a location that is reasonably dry and clean.

### 4.3. Orientation:

There are no restrictions on the orientation of the probe installation location, but if there is a requirement for the pipe to be self draining the seating should be angled such that it will drain properly.

The probe should be centered in the process flow no matter what the orientation. Angled inserts should have the probe pointing into the direction of flow as shown.

Ensure that during installation all necessary precautions are taken. If this is a sanitary installation ensure that the probe has been properly cleaned in advance of installation and ensure that it is transported to the site of installation in a way that will maintain its sanitary condition.



If there are flammable or explosive fluids or gasses present at the site of installation ensure that proper grounding procedures are taken. Unwrapping a

probe from bubble wrap or other packaging can impart a static charge on the probe which may discharge upon insertion into the mounting location.

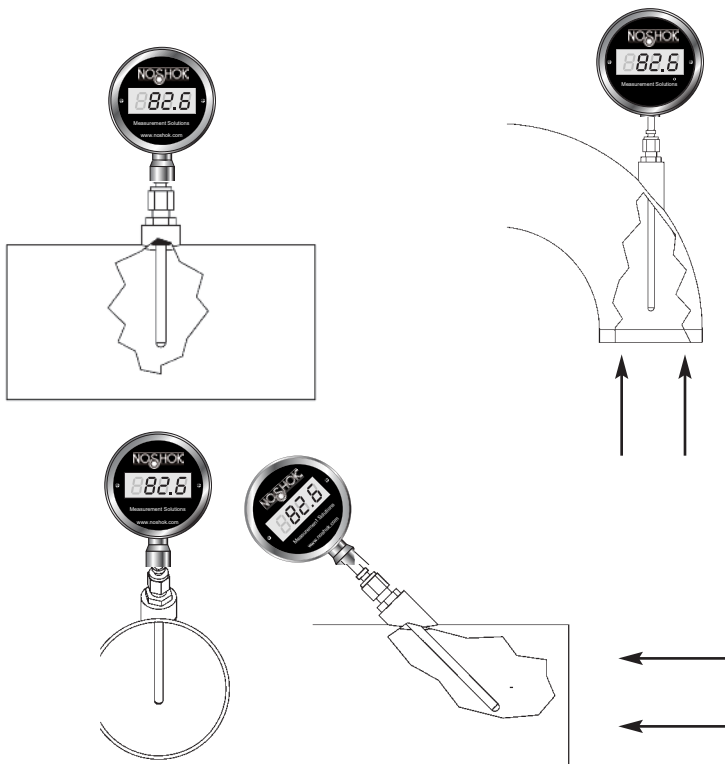
If the function demands it, seal the process connection with PTFE tape.

Note: NPT connections should be hand tightened and then turned only 1-1/2 turns further with an appropriate wrench. This value may change according to what type of sealant is used on the pipe threads. Do not use the display body to tighten the probe into the mounting location. Doing so may damage the probe. Use only the process connection or compression fitting for tightening.

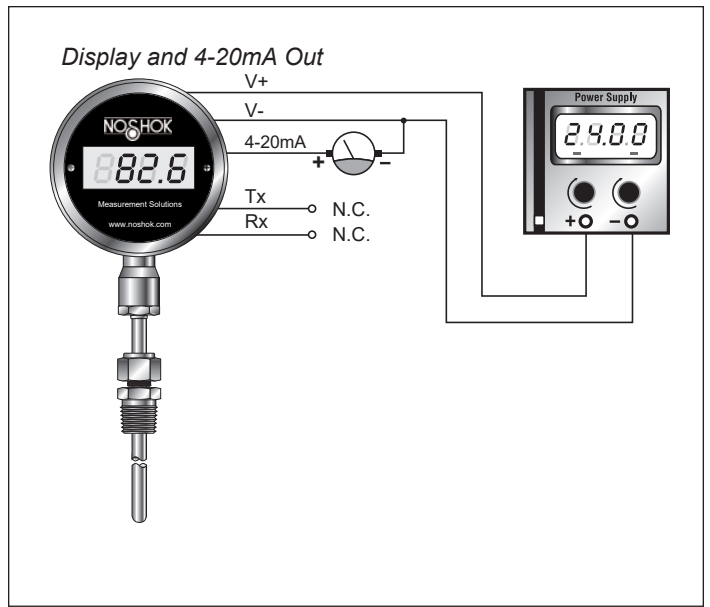
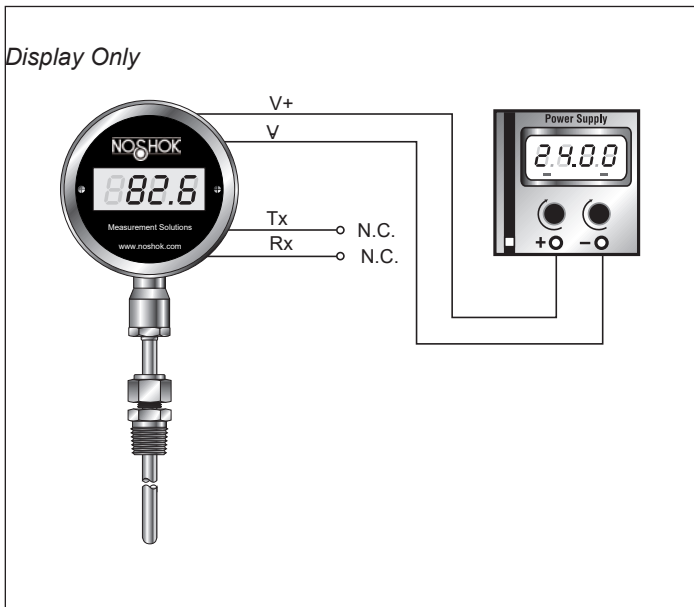
### 4.4. Trouble shooting

If the unit fails to function properly there are no user serviceable parts inside. If returning the unit to NOSHOK, please ensure that the unit is clean and free from any contaminants before shipping.

See next page for wiring diagrams.



SIGNAL	5-Pin Connector	8-Pin Connector	Lead Wires PVC (5)	Lead Wires PVC (8)	Lead Wires PTFE (5)
V+	Brown	Brown	Brown	Brown	Red
V-	Blue	Blue	Yellow or Blue	Blue	Black
4-20mA	Grey	Grey	Grey	Grey	Blue
Tx	White	White	White	White	White
Rx	Green	Green	Green	Green	Green
Relay - COM	-	Red	-	Red	-
Relay - NO	-	Yellow	-	Yellow	-
Relay - NC	-	Pink	-	Pink	-



**NOTE:**  
The communication wires (Tx & Rx) must be left not connected.

**NOTE:**  
The current indicator must be placed between the output (4-20 mA) and the negative side of the power supply.  
The communication wires (Tx and Rx) must be left not connected.

**M12 Micro-Male Connector  
5-pin configuration**

- 1 - Brown (V+)
- 2 - White (Tx)
- 3 - Blue (V-)
- 4 - Black (Rx)
- 5 - Grey (4-20 mA)

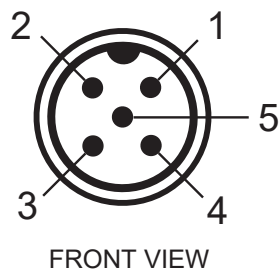


figure 1

**M12 Micro-Male Connector  
8-pin configuration**

- 1 - White (Tx)
- 2 - Brown (V+)
- 3 - Green (Rx)
- 4 - Yellow (Relay NO)
- 5 - Grey (4-20 mA)
- 6 - Pink (Relay NC)
- 7 - Blue (V-)
- 8 - Red (Relay COM)

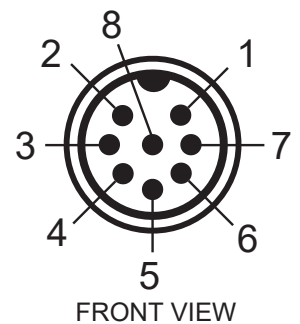


figure 2

### 5.1. Pressure Limits

The pressure limits for the probe is 500 psig, but the pressure limits for the process connection could be considerably less. Ensure the the appropriate process connection is used for the desired pressure limits.

### 5.2. Temperature Limits

The ambient temperature range for the exterior fitting enclosing the processor should not exceed -40 °C to 85 °C (-40 °F to 180 °F). The temperature limits for the probe should conform to the unit ordered.

Note that the temperature will affect the pressure and flow velocity limits of the probe.

### 5.3. Thermal Characteristics

For some RTD temperature sensors there is self heating from the measurement resistor. With NOSHOK 820/821 Series Digital Temperature Indicators the self heating is negligible. Any self heating error will be compensated for during calibration.

Calibration of all NOSHOK Digital Temperature Indicators takes place after the RTD and processor are installed in the thermowell and process connection. There should be no discrepancy in the measurement due to the thermal characteristics of the probe or process fitting.

### 5.4. Response Time

Warm up is approximately 30 seconds, then response time is typically 0.5 seconds. Note that the Digital Temperature Indicator can be ordered with an averaging function included in the factory calibration. This would change the response time and increase it up to as much as 30 seconds.

## 6. Calibration

Calibration is performed at the factory. For recalibration return the unit to the factory. Please ensure that the unit is clean and free of contaminants before shipping. On site calibration may only be conducted by a NOSHOK authorized distributor or by factory trained professionals.

## 7. Long-Term stability

The electronics and RTD should not deviate more than% 0.05 per year if sized and installed properly. Regularly scheduled calibration should be done to ensure that the unit is within accepted norms.

In the event of returning a unit to NOSHOK for calibration please ensure that there is no dangerous contaminants on the unit before shipping.



### CORPORATE HEADQUARTERS

1010 West Bagley Road · Berea, Ohio 44017  
440.243.0888 · Fax 440.243.3472  
E-mail : noshok@noshok.com  
Web : www.noshok.com

