

# Potentiometer Input to DC Transmitter

TX-4003



**Input:** 100 Ω to 900 Ω Potentiometer  
**Output:** 0-20 mA

- Factory Set Custom I/O Range
- Easy-to-Install Plug-In Design
- Hot Swappable
- Full 2000 V Input/Output/Power Isolation
- Input and Output LoopTracker® LEDs
- Output Test Button

## Application

- Turbex, Howden Siemens Equipment

### Potentiometer Input Range

3 wire connection  
 1 VDC excitation provided to potentiometer

Minimum: 100 Ω  
 Maximum: 900 Ω

### Input Impedance

100Ω to 1 MΩ minimum

### Common Mode Rejection

100 dB minimum

### LoopTracker

Variable brightness LEDs indicate I/O level and status

### DC Output Range

Current: 0-20 mA, sinking

### Calibration

Multi-turn zero and span potentiometers for output  
 ±15% of span adjustment range typical

### Output Test

Sets output to test level when pressed  
 Test level factory set to approx. 50% of span

### Output Ripple and Noise

Less than 10 mVRMS

### Linearity

Better than ±0.1% of span

### Ambient Temperature Range and Stability

-10°C to +60°C operating ambient

Better than ±0.02% of span per °C stability, calculated, not tested. To avoid permanent damage, do not operate outside of specified ambient temperature range.

### Response Time

70 milliseconds typical

### Isolation

2000 VRMS minimum

Full isolation: power to input, power to output, input to output

### Installation Environment

IP 40, requires installation in panel or enclosure

Use with API 008 or API 008 FS 8-pin socket

UL 508C pollution degree 2 environments or better

This is a replacement for an existing custom isolator. Make sure model numbers are the same. Do not modify wiring.

DO NOT substitute an API 4003 series or another manufacturer's 4003 module.

### Power

9-30 VDC, 2.5 W typical

API maintains a constant effort to upgrade and improve its products. Specifications are subject to change without notice. See [api-usa.com](http://api-usa.com) for latest product information. Consult factory for your specific requirements.

**WARNING:** This product can expose you to chemicals including lead, which is known to the State of California to cause cancer or birth defects or other reproductive harm. For more information go to [www.P65Warnings.ca.gov](http://www.P65Warnings.ca.gov)

### Precautions

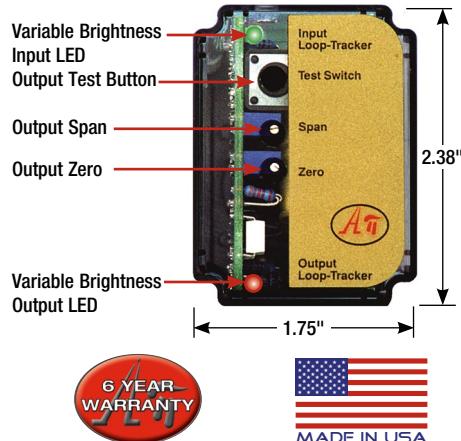
**WARNING!** All work must be performed by a qualified electrician or instrumentation engineer.

**WARNING!** Avoid shock hazards! Turn all power off before removing or installing module.

### Précautions

**ATTENTION!** Tous les travaux doivent être effectués par un électricien qualifié ou un ingénieur en instrumentation.

**ATTENTION!** Évitez les risques d'électrocution! Coupez l'alimentation avant de retirer ou d'installer le module.



Model	Input	Output	Power
TX-4003	100 to 900 Ohm potentiometer	0-20 mA	9-30 VDC

### Description

The TX-4003 accepts a resistance input from a potentiometer and provides an optically isolated DC current output that is linearly related to the potentiometer position.

The full 3-way (input, output, power) isolation makes this module useful for ground loop elimination, common mode signal rejection, and noise pickup reduction.

### LoopTracker

API exclusive features include LoopTracker LEDs (green for input, red for output) that vary in intensity with changes in the process input and output signals.

### Output Test

An output test button provides a fixed output (independent of the input) when held depressed. The output test greatly aids in saving time during initial startup and/or troubleshooting. The test output level is factory set at 50% of output span.

### Mounting

The TX-4003 plugs into a standard 8-pin octal socket.

### Calibration TX-4003

The TX-4003 comes from the factory calibrated for the application. Field calibration is typically not required, however, Zero and Span potentiometers are available to fine-tune the module output to compensate for applications where, for mechanical reasons, the potentiometer cannot be set exactly to 100 Ω and/or 900 Ω.

1. Apply power to the module and allow a minimum 20 minute warm up time.

2. Using an accurate resistance calibration device, provide an input to the module equal to the minimum input required for calibration (5% of the input range).

Due to the fact that the unit is ranged for an output of 0-20 mA use 5% of the input (140 Ω) for the minimum input as there is no way to distinguish between 0 mA and an open circuit on the output signal.

Potentiometer Input – The connections are made to the 8-pin socket. You may wish to check the potentiometer with an ohmmeter before connecting since device wiring may vary.

3. Connect an accurate measurement device to the output.

Adjust the Zero potentiometer for 5% of the minimum output desired. The Zero control should only be adjusted when the input signal is at its minimum.

Example: The unit is ranged for 100-900 Ω input and 0-20 mA output so 5% of the input signal will be 140 Ω and 5% of the output signal will be 1 mA.

4. Set the input at maximum, and then adjust the Span pot for the exact maximum output desired.

The Span control should only be adjusted when the input signal is at its maximum. This will produce the corresponding maximum output signal.

5. Repeat adjustments for maximum accuracy.

### Test Button and Output Test

The Test Switch pushbutton, when depressed, will provide the output side of the loop with a known good signal that can be used as a diagnostic aid during initial start-up or during troubleshooting.

It can be adjusted from 0 to 100% of the calibrated output range. When released, the output will return to normal.

Turn the Test Range potentiometer while pressing the Test Switch until the desired output test level is reached.

### Operation

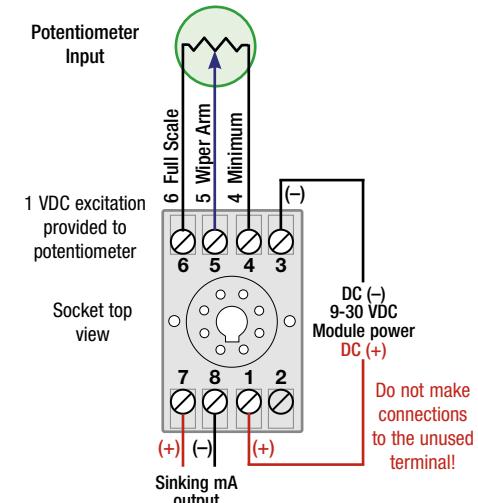
The input circuitry provides a constant 1 volt excitation source to the potentiometer. It is stabilized against potentiometer value variations over the entire operating range.

The potentiometer signal first passes through an optical isolator, then is passed to the output stage where it is scaled to the desired output range.

**GREEN Input LED** – Provides a visual indication that a signal is being sensed by the input circuitry of the module. It also indicates the input signal strength by changing in intensity as the process changes from minimum to maximum. If the LED fails to illuminate, or fails to change in intensity as the process changes, this may indicate a problem with module power or signal input wiring.

**RED Output LED** – Provides a visual indication that the output signal is functioning. It becomes brighter as the input and the corresponding output change from minimum to maximum.

The RED LED will only light if the output loop current path is complete. Failure to illuminate or a failure to change in intensity as the process changes may indicate a problem with the module power or signal output wiring.



The device connected to the output provides loop power