MOORE INDUSTRIES

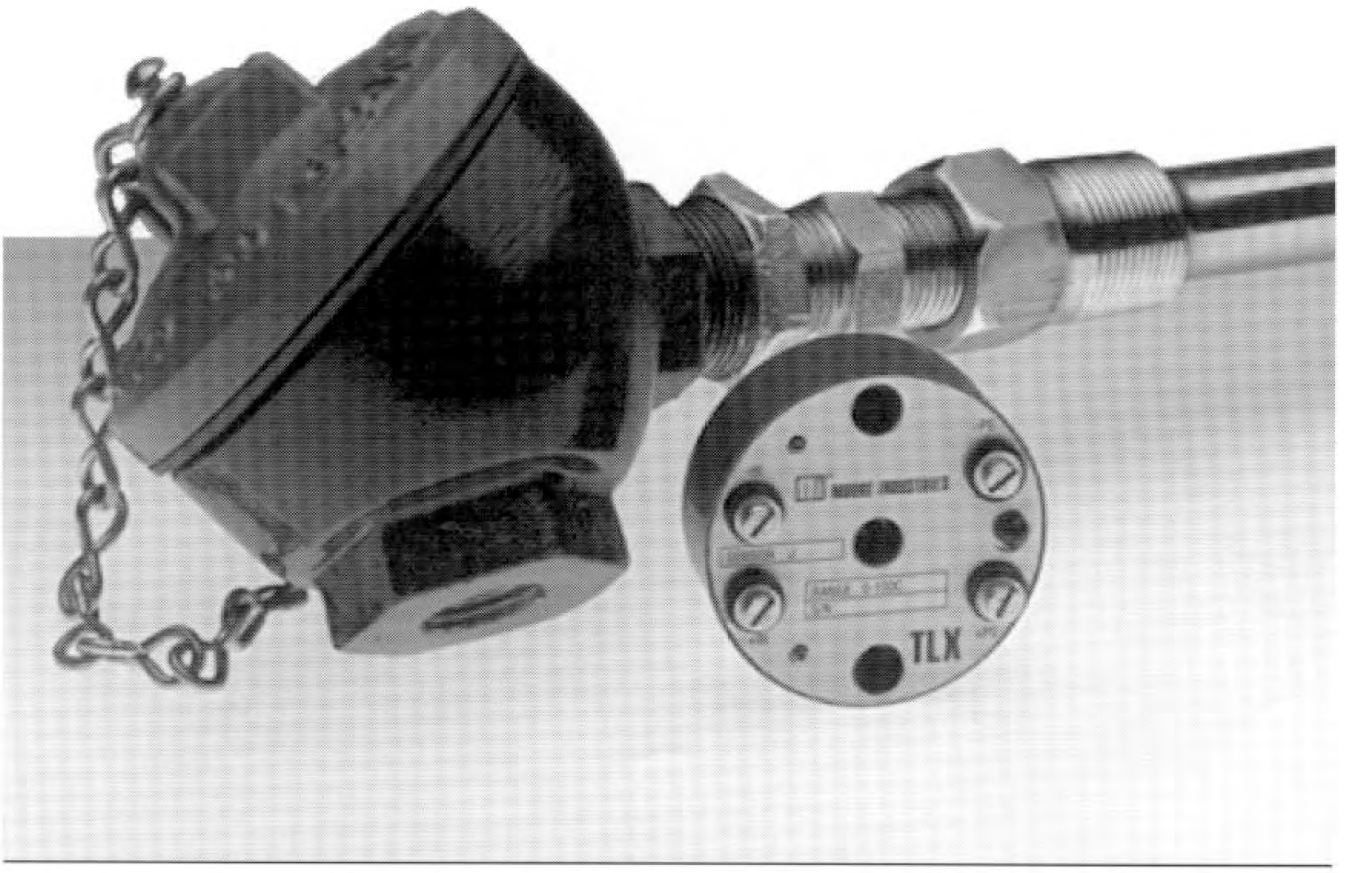
USERS' MANUAL

TNX/TLX

Low-Cost, ThermocoupleTransmitters

April 2016

227-705-00 C



TNX/TLX

Description

Two members of Moore Industries' family of temperature transmitters that feature low cost reliability are the TNX and TLX. These are 2-wire, head-mount thermocouple (T/C) transmitters that accept input from standard ISA T/C's and provide a proportional 4-20mA output. The TNX output is linear with respect to millivolts (non-linear with temperature), and the TLX provides precise linearization with respect to temperature.

When cost is the primary concern, these transmitters are ideal for connection to an indicator, recorder, or similar readout device.

Ordering

To order additional or replacement units, use the bold face data from the "Ordering Specifications" section of the table below. For additional assistance, refer to the model number example provided at the bottom of the table, or contact your Moore Industries' Sales Representative.

Specifications

Performance	**Accuracy:** ±0.1% of span for J- and K-type thermocouples; ±0.1% of span for R- and S-type thermocouples from 600-1600°C (includes the effects of linearity, hysterisis & repeatability); for other thermocouple types, consult the factory **Linearity (TLX only):** 0.1% of span for standard ranges **Ripple:** Less than 5mV peak-to-peak, typical **Power Supply and Load Effect:** Negligible within specified limits **Load Capability:** (Supply Voltage - 12V) ÷ 0.02A = ohms
Performance (continued)	**Burnout Protection:** Upscale to 28mA is standard (see -DD option) **Output Current Limiting:** 150% of span maximum
Ambient Temperature	**Range:** -20°C to +70°C (+4°F to +158°F) **Effect on Amplifier:** For inputs above 10mV: ±0.01% of span/°C change, typical; ±0.02% of span/°C change max. For inputs from 5-10mV: ±0.02% of span/°C change, typical; ±0.04% of span/°C max (with 5-10mV inputs, less than 5mV span drift not guaranteed)
Ambient Temperature	**Effect on Cold Junction Compensation:** 1°C max. error per 25°C ambient change over 15-70°C
Indicators	LED indicates adequate power supplied for operation
Adjustments	**Type:** External multiturn potentiometers **Zero and Span:** TNX, ±25% of span; TLX, ±5% of span
Weight	113 grams (4 ounces)

Ordering Specifications

Unit	Input	Output	Power	Options	Housing
TNX (output linear with input) **TLX** (output linear with temp.)	See Table 1 for typical Standard inputs **Custom Input Ranges:** To order a custom °C or °F range (within the limits of the available T/C types), specify the range next to the T/C type in the model number	**4-20MA** into 600 ohms with 24Vdc power supply	**12-42DC** **12-28DC*** *Order with Intrinsically Safe units	**-DD** Downscale drive **-ISE** BASEEFA approved Intrinsically Safe (12-28DC power required) **-N** BASEEFA approved Type N (N2HG or N2LS housing required) **-SAA** approved Intrinsically Safe (12-28DC power required)	**HPP** Hockey-puck housing **CCP** Clip for mounting HPP in CH7 enclosure **CPP** Clip for mounting HPP in 2HG and 2LS **CH4** HPP in cast iron connection head **CH5** HPP in cast aluminum connection head **CH6** HPP in plastic connection head **CH7** HP in explosion-proof connection head **2HG*** HPP in 2-hub, high glass window, explosion-proof enclosure **2LS*** HPP in 2-hub, solid cover explosion-proof enclosure *F prefix—add to order CENELEC flameproof approved (**F2LS**) N prefix—add to order U.K. Type N approved enclosure (**N2LS**) P suffix—enclosure comes equipped with a base plate and U-bolts for mounting on a 2-inch pipe (**2LSP**)

When ordering, specify: Unit / Input / Output / Power / Options [Housing]
Model number example: TLX / J0-100C / 4-20MA / 12-42DC / -DD [HPP]

TNX/TLX

Table 1. Examples of Standard Input Range Codes for J, K, T, E, R and S Thermocouple Types and Ranges

J0-100C (J, 0-100°C)	**K0-100C** (K, 0-100°C)	**T0-200C** (T, 0-200°C)	**E0-500C** (E, 0-500°C)	**R0-1600C** (R, 0-1600°C)	**S0-1500C** (S, 0-1500°C)
J0-200C (J, 0-200°C)	**K0-200C** (K, 0-200°C)	**T0-400F** (T, 0-400°F)	**E0-300F** (F, 0-300°F)		
J0-400C (J, 0-400°C)	**K0-300C** (K, 0-300°C)		**E0-400F** (E, 0-400°F)		
J0-500C (J, 0-500°C)	**K0-400C** (K, 0-400°C)		**E0-750F** (E, 0-750°F)		
J0-200F (J, 0-200°F)	**K0-600C** (K, 0-600°C)		**E0-1000F** (E, 0-1000°F)		
J0-300F (J, 0-300°F)	**K0-800C** (K, 0-800°C)		**E0-1800F** (E, 0-1800°F)		
J0-400F (J, 0-400°F)	**K0-1000C** (K, 0-1000°C)				
J0-500F (J, 0-500°F)	**K0-1200C** (K, 0-1200°C)				
J0-700F (J, 0-700°F)	**K0-400F** (K, 0-400°F)				
J0-1000F (J, 0-1000°F)	**K0-750F** (K, 0-750°F)				
	K0-1000F (K, 0-1000°F				
	K0-1500F (K, 0-1500°F)				
	K0-2000F (K, 0-2000°F)				

Other Standard and Special Ranges are available for all thermocouple types, consult the factory for details.

Calibration

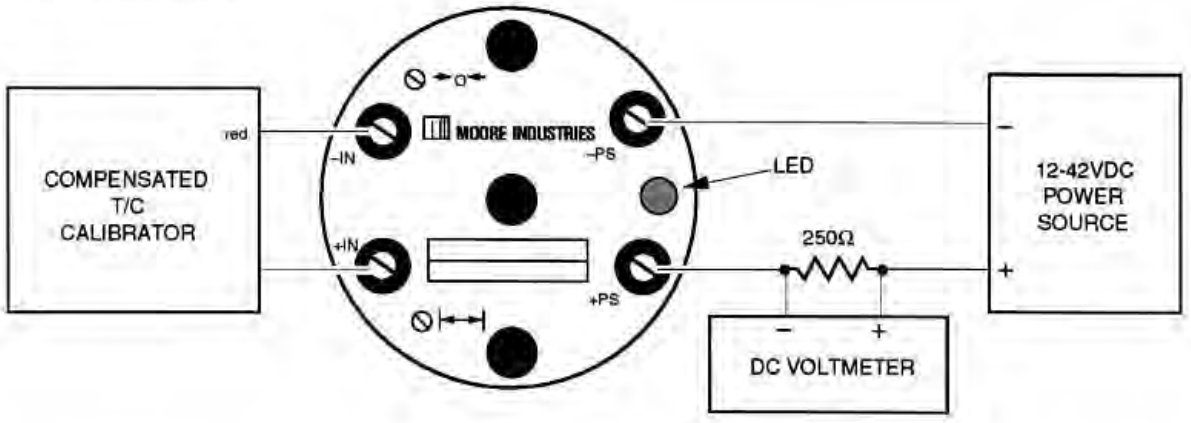
To calibrate the TNX and TLX zero and span, connect the unit to a compensated T/C calibrator, such as the Analogic model 6250 (or equivalent), and trim the output while monitoring the voltage drop across a precision resistor. Two potentiometers (pots), labeled " ►O◄ " for zero and " |◄►| " for span, are located on the unit front panel on both the TNX and TLX.

When calibrating the TNX or TLX, you will need:

- A compensated T/C calibrator, accurate to ±0.05% of rated TNX/TLX unit span, minimum
- A dc voltmeter calibrated to an accuracy of ±0.05% of unit span, minimum
- A precision, 250Ω resistor, accurate to ±0.1%, minimum
- A 12-42Vdc dc power supply
- T/C wire of the type and length to be used in the application.

Figure 1 shows the calibration hookup for both the TNX and TLX.

Figure 1. TNX/TLX Calibration Hookup



1. **With the unit connected as shown in the figure, apply the appropriate power, and allow 10 minutes for the setup to stabilize. Make sure to use the same type and length of T/C wire that is to be used in the application.**
2. **Set the T/C calibrator to the minimum rated temperature for the unit being calibrated.**
3. **Adjust the zero pot until the unit output is 1V, as measured across the load resistor.**
4. **Set the T/C calibrator to the maximum rated temperature for the unit being calibrated.**
5. **Adjust the span pot until the unit output is 5V, as measured across the load resistor.**
6. **Repeat steps 2 through 5 until the unit being calibrated produces stable output at both zero and full scale input.**

Installation

Figure 2 shows the TNX and TLX physical dimensions.

Intrinsic Safety. Installation of these units in intrinsically safe applications requires special consideration. Contact the factory if your unit is to be used in such applications.

Figure 3 shows the standard hookup for both the TNX and TLX.

Complete Temperature Assemblies. Moore Industries offers a complete line of temperature assemblies for use with these low cost transmitters, including sensors, thermowells, and fittings. Accessories can be ordered separately, or as ready-to-install assemblies. For information, refer to the Temperature Systems data sheet, or contact your Moore Industries Sales Representative.

Figure 2. *TNX/TLX Installation Dimensions*

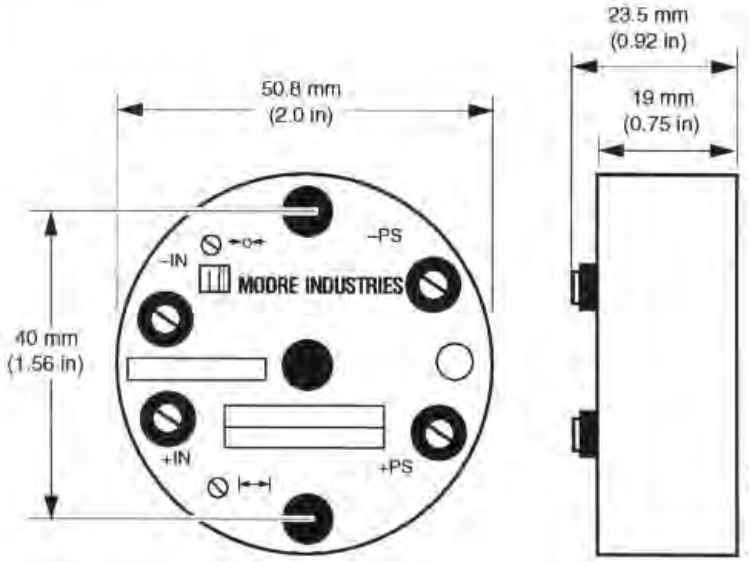
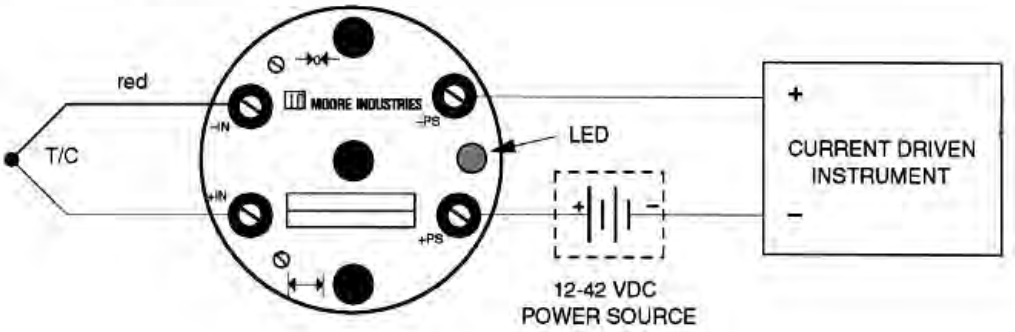


Figure 3. *TNX/TLX Installation Hookup*



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RETURN PROCEDURES

To return equipment to Moore Industries for repair, follow these four steps:

1. Call Moore Industries and request a Returned Material Authorization (RMA) number.

   Warranty Repair –
   If you are unsure if your unit is still under warranty, we can use the unit's serial number to verify the warranty status for you over the phone. Be sure to include the RMA number on all documentation.

   Non-Warranty Repair –
   If your unit is out of warranty, be prepared to give us a Purchase Order number when you call. In most cases, we will be able to quote you the repair costs at that time. The repair price you are quoted will be a "Not To Exceed" price, which means that the actual repair costs may be less than the quote. Be sure to include the RMA number on all documentation.

2. Provide us with the following documentation:
   a) A note listing the symptoms that indicate the unit needs repair
   b) Complete shipping information for return of the equipment after repair
   c) The name and phone number of the person to contact if questions arise at the factory

3. Use sufficient packing material and carefully pack the equipment in a sturdy shipping container.

4. Ship the equipment to the Moore Industries location nearest you.

The returned equipment will be inspected and tested at the factory. A Moore Industries representative will contact the person designated on your documentation if more information is needed. The repaired equipment, or its replacement, will be returned to you in accordance with the shipping instructions furnished in your documentation.

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