MINCO
TT274
2-wire Temperature Transmitter

Installation and Operating Instructions
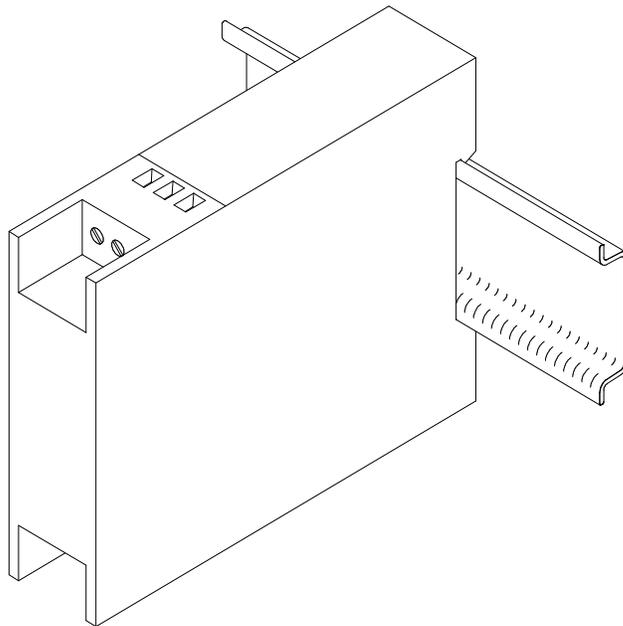
MINCO PRODUCTS, INC.

Description

Model TT274 is a 2-wire temperature transmitter for T/C's (thermocouple thermometers). The Temptran^{TM} converts the T/C's signal into a 4 to 20 mA current. The current changes according to the range marked on the Temptran: 4 mA at the lowest temperature of the range, rising to 20 mA at the top of the range. The leads that supply power also carry the current signal.

Installation

Locate the Temptran near the T/C, in an area where the ambient temperature stays between -40 and 85 °C (-40 and 185 °F). If calibration is necessary, set dip-switches before attaching to DIN rail.

Connect the Temptran as shown below, observing the ± polarity of the current loop and T/C connections. Maximum DC supply voltage = 45 VDC. The T/C connections for the Temptran in the wiring diagram below must be connected as shown or the transmitter will not function properly.

Wiring Diagram
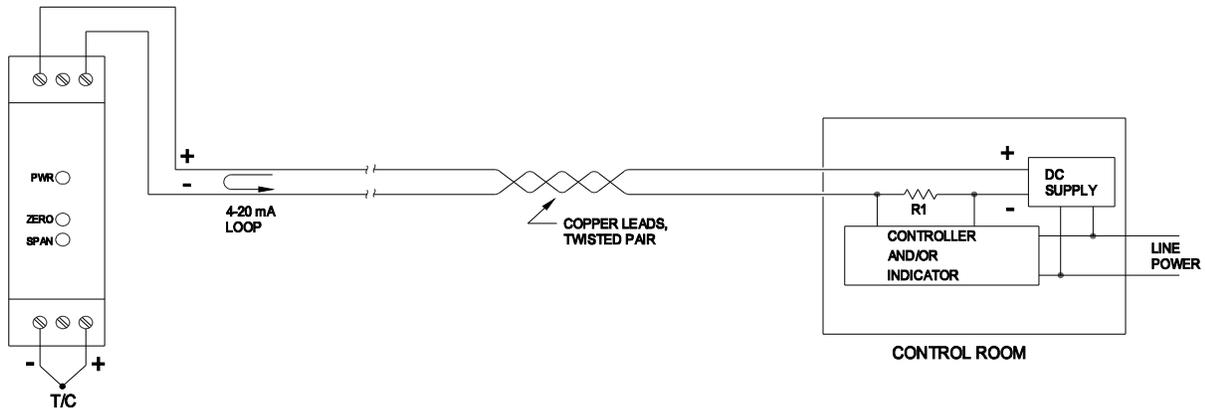
Calibration

1. Determine thermocouple type, either K or J. Select desired Zero (4 mA) temperature and Span (20 mA- 4 mA) range from the tables below. The Zero temperature must be within -50 to 150 °C, and the Span range (20 mA temp. - 4 mA temp.) must be within 150 to 1200 °C for a type K thermocouple and 125 to 850 °C for a type J thermocouple. For example, for a -25 to 200 °C temperature range and type K thermocouple, the Zero temperature is -25 °C and the Span range is (200-(-25)) = 225 °C. According to the tables, switch positions 1 and 5 would be ON.

Zero (4 mA) coarse adjust		
	Thermocouple Type	
Switch Position	**K**	**J**
1 ON	X	
1 OFF		X
2, 3, 4 OFF	-50 to 0 °C (-58 to 32 °F)	
2 ON 3, 4 OFF	0 to 50 °C (32 to 122 °F)	
3 ON 2, 4 OFF	50 to 100 °C (122 to 212 °F)	
4 ON 2, 3 OFF	100 to 150 °C (212 to 302 °F)	

Span (20 mA - 4 mA) coarse adjust		
	Thermocouple Type	
Switch Position	**K**	**J**
5 ON 6-9 OFF	150 to 225 °C (302 to 437 °F)	125 to 170 °C (257 to 338 °F)
6 ON 5, 7-9 OFF	225 to 325 °C (437 to 617 °F)	170 to 250 °C (338 to 482 °F)
7 ON 5,6,8,9 OFF	325 to 475 °C (617 to 887 °F)	250 to 360 °C (482 to 680 °F)
8 ON 5-7, 9 OFF	475 to 675 °C (887 to 1247 °F)	360 to 515 °C (680 to 959 °F)
9 ON 5-8 OFF	675 to 925 °C (1247 to 1697 °F)	515 to 690 °C (959 to 1274 °F)
5-9 OFF	925 to 1200 °C (1697 to 2192 °F)	690 to 850 °C (1274 to 1562 °F)

2. Set dip-switches per values selected from tables.

3. Connect a power supply of 24 VDC, and a digital milliammeter (5-1/2 digit preferred) as shown in figure 1, or use a loop calibrator instead of the DC supply and milliammeter.

4. Connect a thermocouple simulator with cold junction compensation to the input of the transmitter.

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                                            ┌──────────────┐
                                            │              │
  ┌──────────────┐                          │          ──  │  24 VDC
  │ ⊘ ⊘ ⊘        │            +             │          ──  │  POWER SUPPLY
  │              │            ─    ┌──→     ( mA )    ──    │
  │ PWR ○        │         4-20 mA      INDICATOR          │
  │ ZERO ○       │          LOOP
  │ SPAN ○       │
  │              │
  │ ⊘ ⊘ ⊘        │
  └──────────────┘
       ─      +
    T/C SIMULATOR
```
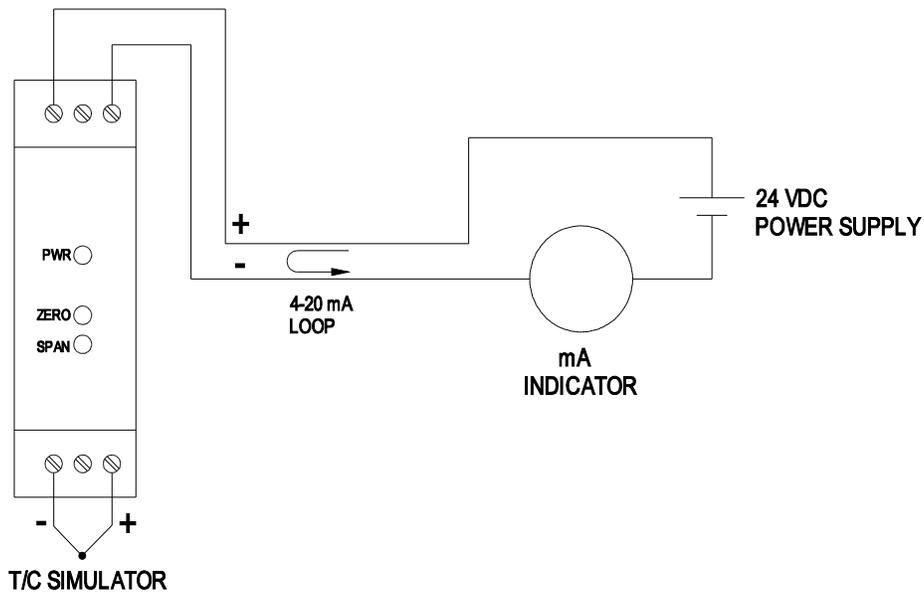
5. Set thermocouple simulator to simulate the 4 mA temperature. For the given example, the simulator should be set to -25 °C.

6. Adjust ZERO potentiometer on the transmitter until the meter reads 4 mA.

7. Set thermocouple simulator to simulate the 20 mA temperature. For the given example, the simulator should be set to 200 °C.

8. Adjust SPAN potentiometer on the transmitter until the meter reads 20 mA.

9. Repeat steps 5-8 until no further adjustment is necessary.

Warranty
Items returned within one year from the date of sale, transportation prepaid, which Minco Products, Inc. (The "Seller") reasonably determines to be faulty by reason of defective materials or faulty workmanship will be replaced or repaired at the Seller's discretion, free of charge.

This remedy is to be the sole and exclusive remedy available to the buyer in the event of a breach by the Seller. Items that show evidence of mishandling or misapplication may be returned by the Seller at the customer's expense.

Furthermore, the Seller is not to be held responsible for consequential damages caused by its product except as required under Minnesota Statutes, Section 336.1-719 (3).

This warranty is expressly in lieu of any other expressed warranty or implied warranty of merchantability or fitness for a particular purpose, and of any other obligations or liability on the part of the Seller or its employees or agents.

Specifications

Input: Type J or K thermocouples.
Output: 4 to 20 mA DC over specified range.
Accuracy: +/- 0.2% of span.
Linearity: Voltage linear.
Adjustments: Zero: -50 °C to 150 °C
　　　　　　　　　Span: 50 °C to 600 °C
Ambient Temperature:
　Operating: -40 to 85 °C (-40 to 185 °F).
　Storage: -55 to 100 °C (-67 to 212 °F).
Ambient Temperature Effects:
　+/- 0.02% of span/°F (+/- 0.036% of span/°C).
Cold Junction Compensation Drift:
　+/- 0.03 °C/°C for -25 to 70 °C ambients
　+/- 0.06 °C/°C for -40 to -25 and 70 to 85 °C ambients

Warmup Drift: +/- 0.1% of span max., assuming Vsupply = 24 VDC and Rloop = 250 ohms. Stable within 15 minutes.
Input/Output Isolation (Optional): 600 VRMS, 1 minute
Supply Voltage:
　Non-Isolated: 10 to 45 volts DC with no load.
　Isolated: 13 to 45 volts DC with no load.
　Reverse polarity protected.
Voltage effect: +/- 0.001% of span per volt.
Maximum Load Resistance: The maximum allowable resistance of the signal-carrying loop is given by this formula:
　Non-Isolated: Rloop max = (Vsupply-10)/.02 amps
　Isolated:　　 Rloop max = (Vsupply-13)/.02 amps
Maximum Output Current: 28 mA.
Connections: Terminal block accepts wires from AWG 22 to AWG 14.
Weight: 4.2 oz. (119 grams).

Model Number Coding:

TT274　K　1　I　(-25/+200)　C . . .　Sample part number

- **Temperature Scale:** F = Fahrenheit, C = Celsius
- **Temperature Range:** (4 mA temperature / 20 mA temperature)
- **Input/Output:** N= Non-Isolated; I= Isolated to 600 VRMS, 1 minute
- **Output:** 4-20 mA DC.
- **T/C Element Code:** J = type J thermocouple, K = type K thermocouple.
- **Model Number:** TT274, DIN Rail Mount T/C Temptran
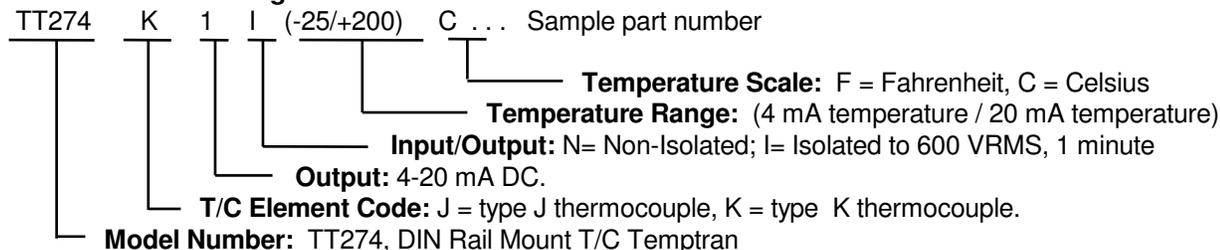
Dimensions: All dimensions are in inches (millimeters)
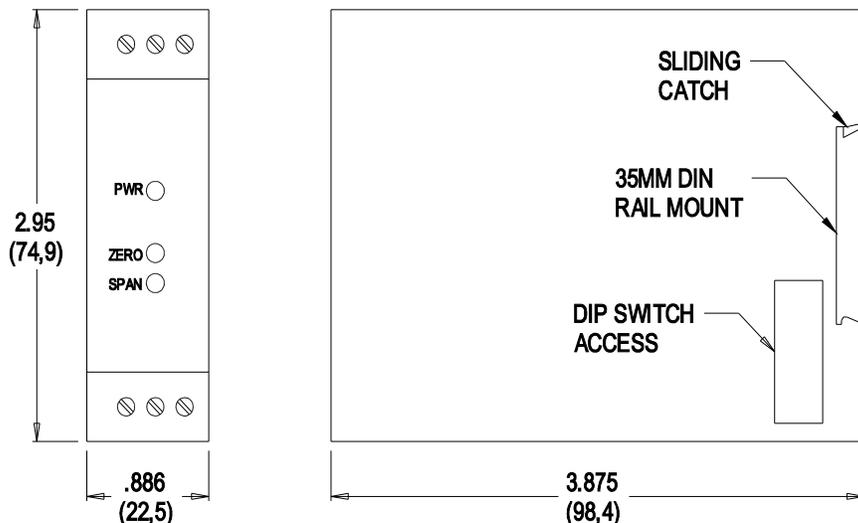
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