



Thermocouple, mV Measure & Simulate Module For Use With MFT 4000 Series Calibrator

The TIO0110 is a thermocouple (T/C) measurement and simulation module for use with the Meriam MFT 4000 Series Multi-Function Tester. The module will accurately measure or source ± 110 milli-Volts (mV) for any of twelve (12) different T/C types according to NIST 175, ITS-90 (default) or ITS-68 standards. In the measure mode, the TIO0110 module converts mV dc to a temperature value in the user-selected temperature unit ($^{\circ}\text{F}$, $^{\circ}\text{C}$, $^{\circ}\text{R}$ or $^{\circ}\text{K}$) and per the selected standard. Milli-volts can also be displayed for direct reading or trouble shooting needs.

In the simulate mode, the TIO0110 module simulates an accurate mV signal to a receiving device. Users can enter the precise simulation temperature value, change the value with ramping controls on the MFT, or set-up and select from three Auto-step test procedures per T/C type. Test points are determined by the user and can be stepped through automatically or manually as desired. See T/C Table 1 on page 2 for available T/C types and measurement / simulation accuracy.

T/C calibration coefficients are factory loaded into module memory for instant access by the base MFT. Field recalibration of the module is provided by the MFT's "Rcal" feature.

Specifications

Input Impedance

> 10 megohms

Warm-up time

≤ 1 Minute to full rated accuracy

mV Accuracy

$\pm 0.025\%$ R + 0.005% FS

Temperature Effect

$\leq 2\mu\text{V}/^{\circ}\text{C}$

T/C Meas. Accuracy

$\pm 0.3^{\circ}\text{C}$ for E, J, K, N, & T types

T/C Meas. Accuracy

$\pm 1.0^{\circ}\text{C}$ for B, R & S types

T/C Meas. Accuracy

$\pm 0.5^{\circ}\text{C}$ for C, D, M & P types

Connector

- Measure: standard mini-T/C connector
- Source: standard mini-T/C connector

Temperature

Storage -40°F to 140°F (-40°C to 60°C)
Operating 23°F to 122°F (-5°C to 50°C)

Cold junction effect

$\pm 0.5^{\circ}\text{C}$ max

Resolution

$\pm 0.1^{\circ}$ or $\pm 1^{\circ}$ for T/Cs, ± 0.001 for mV

Voltage range

± 110.000 mV dc

Units

$^{\circ}\text{F}$, $^{\circ}\text{C}$, $^{\circ}\text{R}$, $^{\circ}\text{K}$, mV

Weight

3 ozs

Power

Supplied from MFT (simulate mode only)

Available certifications

- NIST traceable mV functions – standard
- CE Mark
- Intrinsically Safe – MET Laboratories per CSA C22.2 & UL 913 Class I Division I, Groups A, B, C & D



TIO0110

Table 1: TIO0110 Accuracy Table

T/C Type	Measurement Range	Measurement Accuracy	Simulation Accuracy
J	-210° C to 1200° C	±0.3° C	±0.5° C
K	-200° C to 1372° C	±0.5° C	±0.5° C
T	-200° C to 400° C	±0.3° C	±0.5° C
E	-200° C to 1000° C	±0.3° C	±0.5° C
N	-200° C to 1300° C	±0.3° C	±0.5° C
R	-50° C to 1768° C	±1.0° C	±1.0° C
S	0° C to 1768° C	±1.0° C	±1.0° C
B	250° C to 1820° C	±1.0° C	±1.0° C
C	0° C to 2315° C	±0.5° C	±0.5° C
D	0° C to 2315° C	±0.5° C	±0.5° C
M	0° C to 1410° C	±0.5° C	±0.5° C
P	0° C to 1395° C	±0.5° C	±0.5° C

**MFT display for T/C
Simulate mode**



MFT 4000 with TIO 0110 module
simulate T/C input to transmitter

TC Simulation	
Simulation Mode	
Start	
Units:	C
➔ Auto Step 1	
Auto Step 2	
Auto Step 3	
Up	Down Select Back

**MFT display for T/C
Setup mode**



MFT 4000 with TIO 0110 Module
T/C measure and simulate module

TC Setup	
Current Settings:	
➔ TC Type	J
Standard	ITS 90
Resolutoion	0.1 deg
Simulate Mode	
User Re-Calibrate	
Up	Down Select Back

Ordering Information

TIO0110-11-1 T/C Measure / Simulate Module

Accessories

A37062 TIO 0110 Starter Kit

To place an order, or request additional information, please contact us at 800-817-7849. For a full list of Meriam's Representatives worldwide, visit us at www.meriam.com.