



## 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  $\pm 110$  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

$\leq 1$  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  $-40^{\circ}\text{F}$  to  $140^{\circ}\text{F}$  ( $-40^{\circ}\text{C}$  to  $60^{\circ}\text{C}$ )  
Operating  $23^{\circ}\text{F}$  to  $122^{\circ}\text{F}$  ( $-5^{\circ}\text{C}$  to  $50^{\circ}\text{C}$ )

#### Cold junction effect

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

#### Resolution

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

#### Voltage range

$\pm 110.000$  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

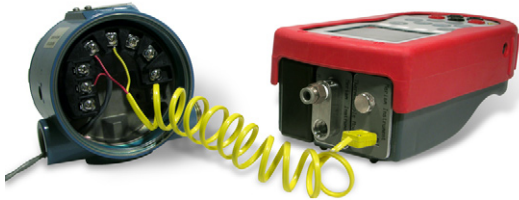


TIO0110

**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](http://www.meriam.com).



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