



RTD Measurement & Simulation Module For Use with MFT 4000 Series Calibrator

The RIO4000 is the RTD measure and simulate module for the Meriam MFT 4000 Series Multi-Function Tester. The module accurately measures or simulates the resistance of 22 different RTD sensor types with nominal resistance to 4000 ohms. 2-, 3-, and 4-wire RTD Measurement for various RTD types; platinum, copper, nickel or iron. Various alpha coefficients are supported per Table 1. The module can simulate temperature to all conventional or smart temperature transmitters and signal conditioners.

The MFT converts measured resistance to a corresponding temperature value and displays the value in the user-selected temperature engineering units (°F, °C, °R or °K). Ohms can also be displayed for direct reading or troubleshooting. Pt 100 RTDs probes are available from Meriam for use with the module. The Meriam RTD probes are 4-wire, DIN Class A probes, which come complete with handle, 5' coiled cable, and connector. Accessory connectors are available to connect to any RTD or temperature transmitter for measurement or simulation applications. The RTD Simulation mode can be setup by entering a specific temperature or a range of temperatures that can be set up for stepping and ramping functions.

Specifications

0-400 Ω Measurement Accuracy

±0.01% of R + 0.075 Ω

0-400 Ω Simulation Accuracy

See Table 2

400-4000 Ω Measurement Accuracy

±0.01% of R + 0.237Ω

400-4000 Ω Simulation Accuracy

See Table 2

Resistance Range

0 – 4000 ohms

Input impedance

> 10 megohms

Mating Connector

Switchcraft #TA6FL Pulsed excitation current support

Units

°F, °C, °R, °K, ohms

Temperature

Effect: ≤ 0.001 ohm/ oC

Storage: -40° F to 140° F (-40° C to 60° C)

Operating: 14° F to 122° F (-10° C to 50° C)


Resolution

± 0.1° or ± 1° for RTDs

Weight

3 ozs.

Certifications Available

CE Mark (standard) 

NIST traceability certificate (standard)

Intrinsically Safe, MET Laboratories per 

CSA C22.2 & UL Class I Division I (standard)

RIO4000

Accessories

| | |
|-------------------|---|
| P/N A900028-90200 | Connector solders to a customer's RTD wiring to facilitate connection to the RIO4000 module |
| P/N A900028-90201 | Pt 100 RTD, DIN Class "A", 0.00385 alpha, 4 leads, 1/4" O.D., 304SS probe, 10" probe length, 3.5" handle and 5 ft coiled cable with connector for RPT1000 module. |
| P/N A900028-90500 | Measure Cable to connect the RIO4000 module to RTD wires or transmitter terminals. Used for Measure Mode only. (Do not use for Simulation Mode) (Rs= 0.0 Ohms) |
| P/N A900028-90502 | 2-Wire simulation cable. (Rs = 7.5 Ohms) |

Table 1: Supported RTD Materials / Nominal Resistance

| Material | R0 | ALPHA | Rs(ID) | Temp Range (deg C) |
|----------|---------|---------|--------|--------------------|
| Platinum | 25.5 | 0.00392 | 17.8 | -200 to +630° C |
| Platinum | 98.129 | 0.00392 | 21.5 | -200 to +600° C |
| Platinum | 100 | 0.00385 | 100 | -200 to +850° C |
| Platinum | 100 | 0.00392 | 46.4 | -200 to +630° C |
| Platinum | 100 | 0.00391 | 56.2 | -200 to +630° C |
| Platinum | 100 | 0.00393 | 68.1 | -200 to +850° C |
| Platinum | 100 | 0.00389 | 82.5 | -200 to +630° C |
| Platinum | 200 | 0.00385 | 178 | -200 to +630° C |
| Platinum | 200 | 0.00392 | 215 | -200 to +630° C |
| Platinum | 470 | 0.00392 | 261 | -200 to +630° C |
| Platinum | 500 | 0.00392 | 316 | -200 to +630° C |
| Platinum | 500 | 0.00391 | 383 | -200 to +630° C |
| Platinum | 500 | 0.00385 | 464 | -200 to +630° C |
| Platinum | 1000 | 0.00385 | 1000 | -200 to +630° C |
| Platinum | 1000 | 0.00375 | 1210 | -50 to +500° C |
| Copper | 9.035 | 0.00427 | 12.1 | -100 to +260° C |
| Copper | 100 | 0.00427 | 121 | -100 to +260° C |
| Nickel | 100 | 0.00618 | 31.6 | -60 to +160° C |
| Nickel | 120 | 0.00672 | 147 | -80 to +260° C |
| Iron | 604 | 0.00518 | 562 | -100 to +200° C |
| Iron | 908.4 | 0.00527 | 681 | -100 to +200° C |
| Iron | 1816.81 | 0.00527 | 1470 | -100 to +200° C |

The table above lists the RTDs supported by the RIO4000 module and MFT 4000 Series. Materials, types and alpha coefficients are based on popular RTDs used in the field.

Meriam offers Pt 100 accessory probes that are automatically recognized by the RIO4000 module. No set up is necessary on the MFT. Users can configure their own reference RTDs similarly by using the accessory connector and Rs resistor (Probe ID resistor listed in the table above) to connect their RTD. This technique allows the module to automatically recognize the connected RTD and load its characteristics. If no Rs resistor is used, a copper wire must be installed in its place. This causes an RTD selection menu to automatically appear on the MFT display, enabling the user to configure the MFT for use with any supported RTD type.

Ordering Information

RIO4000-11-1 RTD Measure/Simulate Module
A37063 RTD 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.

Table 2: RIO4000 Accuracy Table

| RTD Type | (α) | Operating Temperature 18 < T < 28° C* | | |
|----------|----------|---------------------------------------|------------------------|---------------------|
| | | T Range (°C) | Measure (2, 3, 4 wire) | Simulate (2 wire**) |
| Pt 100 | 385 | -200 to 0 | 0.3 | 0.3 |
| | | 0 to 400 | 0.4 | 0.4 |
| | | 400 to 850 | 0.5 | 0.6 |
| Pt 100 | 389, 391 | -200 to 0 | 0.3 | 0.4 |
| | | 0 to 360 | 0.4 | 0.6 |
| Pt 100 | 392 | -200 to 0 | 0.4 | 0.4 |
| | | 0 to 360 | 0.5 | 0.6 |
| Pt 100 | 393 | -200 to 0 | 0.5 | 0.4 |
| | | 0 to 400 | 0.4 | 0.5 |
| | | 400 to 850 | .6 | 0.6 |
| Pt 200 | 385, 392 | -200 to 0 | 0.2 | 0.4 |
| | | 0 to 400 | 0.6 | 0.5 |
| | | 400 to 630 | 0.8 | 0.6 |
| Pt 500 | 385, 392 | -200 to 0 | 0.2 | 0.4 |
| | | 0 to 400 | 0.3 | 0.5 |
| | | 400 to 630 | 0.4 | 0.6 |
| Pt 500 | 391 | -200 to 0 | 0.2 | 0.4 |
| | | 0 to 400 | 0.4 | 0.5 |
| | | 400 to 630 | 0.5 | 0.6 |
| Pt 1000 | 385 | -200 to 0 | 0.2 | 0.4 |
| | | 0 to 400 | 0.3 | 0.5 |
| | | 400 to 630 | 0.4 | 0.6 |
| Pt 1000 | 375 | -50 to 0 | 0.3 | 0.4 |
| | | 0 to 500 | 0.3 | 0.5 |
| Cu 10 | 4274 | -100 to 0 | 2 | 2 |
| | | 0 to 260 | 2 | 2 |
| Cu 100 | 4274 | -100 to 0 | 1 | 1 |
| | | 0 to 260 | 1 | 1 |
| Ni 100 | 618 | -60 to 160 | 0.2 | 0.4 |
| Ni 120 | 672 | -80 to 260 | 0.2 | 0.4 |
| Fe 604 | 518 | -100 to 200 | 0.3 | 0.5 |
| Fe 908 | 527 | -100 to 200 | 0.3 | 0.5 |
| Fe 1816 | 527 | -100 to 200 | 0.2 | 0.5 |

Ambient temperature limits: -10° C to +50° C

Accuracy statements are for ambient temperatures of 18° C to 28° C. Apply the Temperature Coefficient for ambient temperatures below 18° C and above 28° C

*Temperature Coefficient = 0.02 °C / °C

** For 2-Wire Simulation, Manufacturer's 2 Wire Simulation Cable is Required.

Note: Simulation Accuracies hold true on Pulsed Type Transmitters when they are placed in "Active Calibration" mode, or a similar continuous mode. Consult factory for more detail.