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)

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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

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Table 2: RIO4000 Accuracy Table

		Operating Temperature 18 < T < 28° C*		
RTD Type	(α)	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: -10º C to +50º C
Accuracy statements are for ambient temperatures of 18º C to 28º C.
Apply the Temperature Coefficient for ambient temperatures below 18º C and above 28º C
*Temperature Coefficient = 0.02 ºC / ºC
** 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.

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