

Millennium Series M2001 Bench Calibrator

Lab Standard

Multi-Function Calibrator



The **Martel M2001 Bench Calibrator** combines the power and features of the M2000 voltage/current calibrator, with the addition of thermocouple, RTD, and pressure calibration, for a single laboratory calibration instrument unmatched in versatility, performance, and value. As with every Martel calibrator, the M2001's world-class performance and features are accessed through a very simple-to-use, intuitive user interface. The Martel M2001 is truly a "process calibration laboratory in a box."

Features:

- ▲ Superior calibration accuracy to 0.0025% of reading
- ▲ Direct keyboard entry or cursor entry with decade control
- ▲ Automatic standby function protects device under test
- ▲ Source current, voltage, T/C, RTD (Ohms)
- ▲ Read T/C, RTD and pressure
- ▲ Source/read 11 thermocouple types
- ▲ Source/read nine standard RTD types
- ▲ Custom RTD/SPRT profile
- ▲ Nine setpoints for each output range and type
- ▲ Tellurium-Copper binding posts reduce thermal EMFs to $<1 \mu\text{V}$
- ▲ Local or RS232 remote control
- ▲ Optional IEEE-488 control available
- ▲ Compatible with Fluke Met/Cal[®] software
- ▲ Optional rack/panel mount kit available



MARTEL
ELECTRONICS

Simple, Intuitive Interface

The M2001 provides simple, front-panel entry of mode, range, and value, using either direct keyboard entry (1) or cursor entry (2).

Using cursor entry (2), the LEFT/RIGHT arrow keys are used to move the cursor under the digit in the display to be changed. The UP/DOWN arrow keys increment/decrement the value at the cursor position. Using direct keyboard entry (1), the exact value desired is entered using the numeric keys, such as 3--2-4-5 (3.245) and the ENTER key is pressed to set the output to that value. Whichever way you choose, setup is simple and fast. In the voltage output mode, the M2001 auto-ranges on the entered value for maximum accuracy at all times.

The Performance You Demand – In Any Mode

Voltage Mode

The M2001 calibrator has an automatic OPERATE/STANDBY function (3), which not only protects the device under test and the M2001 from overload conditions, but also provides UL/CSA-certified safe operation when ranging to output voltages over 30 V.

Changing output voltage values is fast and accurate. Either use keyboard entry to set the output value, or set the cursor and use the UP/DOWN keys to increment/decrement the output. As long as the output voltage stays below the 30 volt safe limit and there are no short-circuit conditions, the output is updated in realtime. If you go from an output value <30 V to a value >30 V, the unit automatically goes to STANDBY. Once you are above the 30 volt threshold, you can change the output in realtime once again (you've already been warned).

Current Mode

The automatic OPERATE/STANDBY function works in the current mode as well. Under open circuit conditions, the M2001 won't go into the OPERATE mode, since it cannot source any current.

Thermocouple Mode

The Martel M2001 can read and source any of 11 types of thermocouples. Its T/C voltage input and output is Cold Junction Compensated, using an ultra-stable PT-1000 sensor.

RTD Mode

The M2001 can read and source nine RTD types including YSI-400 and Ohms for non-standard curves. Probe coefficients (A, B, C, and R_0) can be entered directly, with storage for up to five custom curves and one SPRT curve.

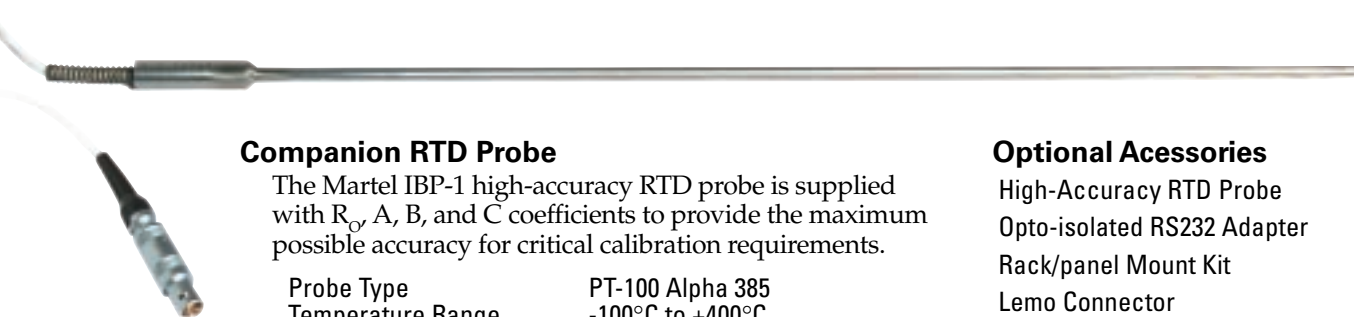
The performance of the M2001 in the RTD mode compares to dedicated RTD measurement instruments. Unlike low-cost, less accurate RTD instruments, the display in the M2001 is always active, reading to three decimal places, using polynomial averaging to extract a high accuracy signal. The result is a very quiet, high accuracy reading.

Pressure Mode

The M2001 operates with all Fluke 700 series pressure modules which cover pressure ranges from 0 to 1" H₂O to 10,000 psi. Pressure can be displayed in a wide range of engineering units with up to 0.025% Full Scale accuracy.

Total Setpoint Control

A 2ND FUNCTION key (4) provides easy access to the setpoint controls of the M2001. Up to nine setpoints can be defined for each output mode or each thermocouple and RTD type. Setpoints are recalled individually at the touch of three buttons, 2ND FUNCTION(4), SETPOINT (SPT) button and then the corresponding numeric keys 1-9. Any number of sequential setpoints can be stepped through automatically, with complete control of dwell time. Either way, for rapid setup of repeatable tests, no other instrument comes close to the Martel M2001.



Companion RTD Probe

The Martel IBP-1 high-accuracy RTD probe is supplied with R_0 , A, B, and C coefficients to provide the maximum possible accuracy for critical calibration requirements.

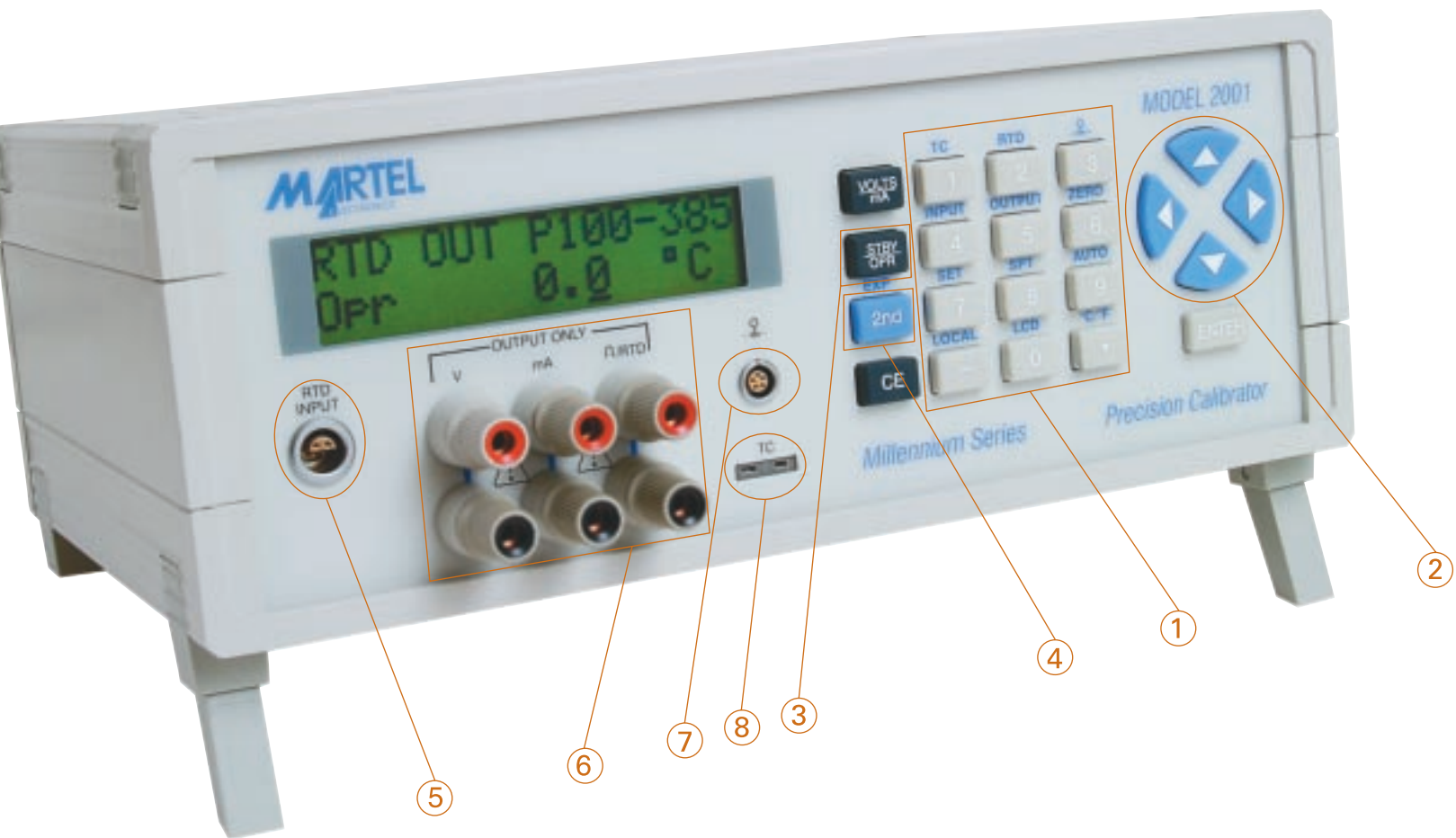
Probe Type	PT-100 Alpha 385
Temperature Range	-100°C to +400°C
Accuracy	±0.025°C
Stability	±0.025°C at 0° for 1 year ±0.05°C at 0°C for 5 years
Dimensions	0.25" OD, 14 inches
Cable	9.5' with mating connector

Optional Accessories

High-Accuracy RTD Probe	IBP-1
Opto-isolated RS232 Adapter	OI232
Rack/panel Mount Kit	M2000/1RMK
Lemo Connector	LCA-1
JKTE Thermocouple Kit	80029
RSNB Thermocouple Kit	80036
Universal RTD/Ohm Adapter	URA-1

M2001 and above options available in kit form.

Part Number



Remote Control

All of the M2001 operating functions can be accessed via RS232, using a standard PC running Fluke Met/Cal[®] software, HyperTerminal under Windows, Visual Basic, or any other software using an ASCII interface. An IEEE-488 bus interface is available as an option. Switching between LOCAL and REMOTE control is as simple as touching the 2ND FUNCTION (4) and LOCAL (-) buttons.

Rock-Solid Stability

The M2001 stability and accuracy is traceable to NIST standards. The accuracy of the M2001 is specified for both 90-day and one-year intervals. Manual zero calibrations can be made on all T/C and pressure functions to minimize offsets.

Flexible Output

Five-way copper alloy binding posts (6) provide a wide range of connection options. A multi-pin LEMO[®] connector (5) is used for the RTD input. (Mating connectors are available from Martel for connecting your own probes.) A standard Fluke[®] pressure module connector is provided (7), as is the CJC T/C input (8).

Voltage – Current – Thermocouple – RTD simple, intuitive interface. Unmatched performance. The Martel M2001 – process calibration laboratory in a box.

For information on a distributor near you, or other process calibrators from Martel, please visit our website at www.martelcorp.com.



URA-1 Universal RTD/Ohm Adapter

Martel... Your Source For Fluke Pressure Modules

Martel provides 29 Fluke Pressure Modules that are compatible with the Martel M2001 Bench Calibrator. Gage, differential, dual (compound), absolute, and vacuum modules are available to cover virtually any pressure application. Rugged cases protect the modules from harsh conditions.

Specifications

(1 year at 23°C ±5°C; % of reading, unless otherwise noted)

Output Voltage

Range	0 to 100.000 mV 0 to 1.00000 V 0 to 10.0000 V 0 to 100.000 V
Resolution	1 µV 10 µV 100 µV 1 mV
Accuracy (% of reading)	±0.003% (30ppm) ± 3 µV ±0.003% (30ppm) ± 20 µV ±0.003% (30ppm) ± 200 µV ±0.003% (30ppm) ± 2 mV
Maximum Burden (≤ 1 Ohm output impedance)	10 mA 10 mA 10 mA 1 mA

Output Current

Range	0 to 100.000 mA
Resolution	1 µA
Accuracy (% of reading)	±0.01% ± 2 Counts
Maximum Burden	10 V

Thermocouples

Output	J, K, T, E, R, S, N, B, L, U, C
Types	J, K, T, E, R, S, N, B, L, U, C
Range	mV
Resolution	0.1 °C/°F
Accuracy	0.14 °C; Type J, typical
Input	J, K, T, E, R, S, N, B, L, U, C
Types	J, K, T, E, R, S, N, B, L, U, C
Range	mV
Resolution	0.01 °C/°F
Accuracy	0.14 °C; Type J, typical

RTD

Output	PT385 (100, 200, 500, 1000), PT392, PT3916 (JIS), Ni120, Cu10, YSI400
Range	PT385 (100, 200, 500, 1000), PT392, PT3916 (JIS), Ni120, Cu10, YSI400, 25 Ohm SPRT
Resolution	0.1 °C/°F; PT385-100, typical
Accuracy	±0.1 °C; PT385-100, typical
Input (All Ω/RTD inputs are 4 wire)	PT385 (100, 200, 500, 1000), PT392, PT3916 (JIS), Ni120, Cu10, YSI400, 25 Ohm SPRT
Range	PT385 (100, 200, 500, 1000), PT392, PT3916 (JIS), Ni120, Cu10, YSI400, 25 Ohm SPRT
Resolution	0.001 °C/°F; PT385-100, typical
Accuracy	±0.020 °C; PT385-100, typical

Ohms

Output	5 to 4000.0 Ohms
Range	5 to 400.00Ω 5 to 4000.0Ω
Resolution	0.01 Ω 0.1Ω
Accuracy	±0.03Ω ±0.3Ω
Input	0 to 4000.00 Ohms
Range	0 to 400.00Ω 0 to 4000.0Ω
Resolution	0.001 Ω 0.01Ω
Accuracy	40 PPM ±0.002Ω 40 PPM ±0.02Ω

Pressure

Range	0 to 1 inch H ₂ O; to 10,000 psi
Compatibility	All Fluke 700 Series Pressure Modules

Stability

Warm-up Time	30 minutes to rated accuracy
Temp Co. (≤18°C/>28°C)	10% of accuracy spec/°C

Environmental

Operating Temperature	0°C to +50°C
Storage Temperature	-20°C to +70°C
Humidity	<80% to 30°C <70% to 40°C <40% to 50°C
Operating	<95%, non-condensing
Storage	<95%, non-condensing

Power Requirements

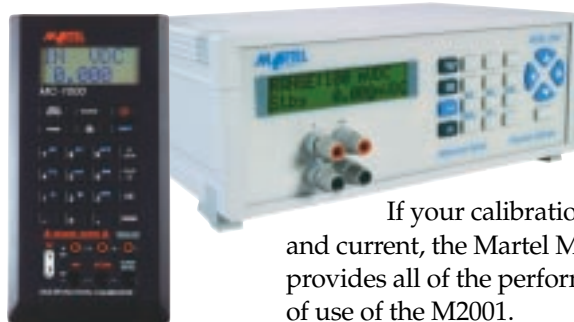
Voltage Range	90 to 240 VAC <15 VA
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Mechanical

Dimensions	11.5" x 4.7" x 8.75" (29.21 cm x 11.93 cm x 22.00cm)
Weight	Approximately 5 pounds (2.27 kg)
Display	16 x 2 large character alphanumeric, backlit LCD

Need M2001 capability for field applications?

If you need a reliable multi-function calibrator for field use, the Martel MC1000 Field Calibrator provides the calibration performance you expect from Martel in a compact, rugged, field-portable form.



Need similar performance for voltage and current only?

If your calibration needs are limited to voltage and current, the Martel M2000 Bench Calibrator provides all of the performance, functionality, and ease of use of the M2001.