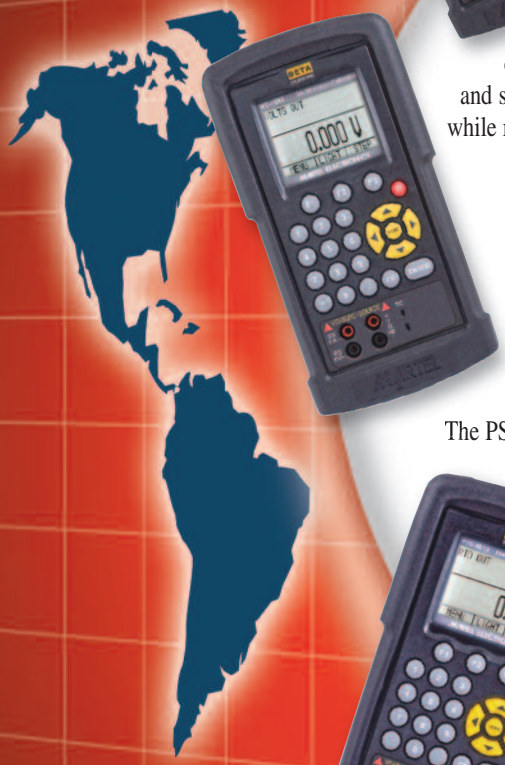
MARTEL ELECTRONICS

BETA CALIBRATORS

Calibration Technology Starts Here

Precision Calibrators



Martel "10" Series Calibrators

Work better and get better work with Martel TEN series multifunction calibrators. This family of 5 models scale up to do any size job you need when calibrating process instrumentation.

Start at the top with the DMC-1410 documenting multifunction calibrator. It's versatile, providing access to a complete range of calibration functions while performing automated on the fly calibration data collection and storage. A simple easy-to-use software package is included that allows the user to build a database of all assets that need calibration and download work orders to the calibrator.

Next in line is the MC-1210 multifunction calibrator. It's a rugged and reliable universal calibrator. Like all the others in this series, the MC-1210 is based on the proven reliable, accurate and stable MC-1200. It's dual display and isolated readback allows it to power a transmitter under test while reading its milliamp output. Truly an all-in-one calibrator. The MC1210 also has a wide range of switch test features for both pressure and temperature switches.

The MC-1010 provides a high level of functions and features at an easy to swallow price for the less demanding user who does not require the isolated read-back feature found on the DMC1410 or MC1210.

For those who need specialty temperature calibration with high accuracy, the PTC-8010 is the choice. Special display features show the cold junction temperature and milliVolt equivalents at a glance for thermocouples. Ohms equivalents are shown when using the RTD functions.

The PSC-4010 is a superior loop calibrator with both voltage, current and frequency functions. With the best display in the business it makes the essentials of instrument calibration easier than ever. And, a bonus feature not found in other loop calibrators is frequency in and out.

This innovative series features the introduction of a new, high contrast ClearBrite™ graphic display. The display features a vivid white backlight that makes the display easy to read in all light conditions.

All of these models feature Martel's easy to learn yet powerful 3 key menu structure. It's the same menu used in all of the company's BetaGauge pressure calibrators, too. Learn it once and you'll know how to use every significant calibrator Martel makes.

General Features

- New ClearBrite™ Graphic Display
- Auto Stepping/Auto Ramping
- 3 Key Martel Menu System
- Scroll/Step Output Control
- NIST Calibration Certificate
- Proven Rugged Reliable Design
- Fuseless Protection to 250 VAC

For more information:

Martel "10" Series Calibrators

10 Series Function Table

Function / Model	Documenting	Dual Display	Isolated Readback	Current In/Out	Voltage In/Out	Loop Power	Thermocouple In/Out	RTD/Ω In/Out	Frequency	Pressure†
DMC-1410	•	•	•	•	•	•	•	•	•	•
MC-1210		•	•	•	•	•	•	•	•	•
MC-1010				•	•	•	•	•	•	•
PTC-8010							•	•		
PSC-4010				•	•	•			•	

†with optional BPPA-100 pressure module adapter

10 Series Feature Table

Feature / Model	ClearBrite™ Graphic Display	Auto Stepping	Auto Ramping	RS-232 Serial Interface	NIST Calibration	Rubber Boot	Martel 3-Key User Interface	Scroll/Step Output	Numeric Input	AC Charger Adapter Option
DMC-1410	•	•	•	•	•	•	•	•	•	•
MC-1210	•	•	•	•	•	•	•	•	•	•
MC-1010	•	•	•	•	•	•	•	•	•	•
PTC-8010	•	•	•	•	•	•	•	•	•	•
PSC-4010	•	•	•	•	•	•	•	•	•	•

DMC 1410

MC 1210

MC 1010

PTC 8010

PSC 4010

Specifications (All specifications apply at 23°C ± 5°C. unless otherwise stated. Outside of this range add ± 0.005%of reading/°C. Specifications for battery operation only.)

General - (applies to DMC-1410, MC-1210, MC-1010, PTC-8010 and PSC-4010)	
Operating Temperature	-10°C to 50°
Storage Temperature	-20°C to 70°
Power	4 X AA batteries; Alkaline or optiona rechargeable
Low battery warning	Yes
Serial Communications	Yes, ASCII, RS-232, requires 1919069 cable or equivalent, USB adapter available
CE - EMC	EN50082-1: 1992 and EN55022: 1994 Class B
Safety	CSA C22.2 No. 1010.1: 1992

DC Voltage Measurement/Source - (applies to DMC-1410, MC-1210, MC-1010 and PSC-4010)

Measurement: Isolated (Upper Display)	
Range	0.000V- 30.000V
Accuracy (% of reading ± floor)	0.015% ± 2mV
Measurement: non-Isolated (Lower Display)	
Range	0.000V - 20.000V
Accuracy (% of reading ± floor)	0.015% ± 2mV
Source	
Range	0.000V - 20.000V
Accuracy (% of reading ± floor)	0.015% ± 2mV

Maximum current output in voltage ranges is 1mA with an output impedance of ≤ 1 .
† for DMC-1410, MC-1210 only.

DC Current Measurement/Source - (applies to DMC-1410, MC-1210, MC-1010 and PSC-4010)

Measurement: Isolated (Upper Display)	
Range	0.000mA - 24.000mA
Accuracy (% of reading ± floor)	0.015% ± 2mA
Measurement: non-Isolated (Lower Display)	
Range	0.000mA - 24.000mA
Accuracy (% of reading ± floor)	0.015% ± 2mA
Source	
Range	0.000mA - 24.000mA
Accuracy (% of reading ± floor)	0.015% ± 2mA

Maximum load on mA source is 1000Ω. Voltage input range on simulate mode 5V - 30V.
† for DMC-1410, MC-1210 only.

Frequency Measurement/Source - (applies to DMC-1410, MC-1210, MC-1010 and PSC-4010)

	Range	**Accuracy** (% of reading ± floor)
Measurement	2.0CPM - 600.0CPM	0.05% ± 0.1CPM
	1.0Hz - 1000.0Hz	0.05% ± 0.1Hz
	1.00KHz - 10.00KHz	0.05% ± 0.01KHz
Source	2.0CPM - 600.0CPM	0.05%
	1.0Hz - 1000.0Hz	0.05%
	1.00KHz - 10.00KHz	0.125%

Input voltage amplitude range on frequency is 1V to 20V zero based square wave only.
Output amplitude is adjustable from 1V to 20V, and is a square wave with 50% duty cycle.
For output frequency, a negative offset of approximately -0.1V is present to assure zero crossing.

Resistance Measurement - (applies to DMC-1410, MC-1210, MC-1010 and PTC-8010)

Ohms low	
Range	0.00Ω - 400.0Ω
Accuracy (% of reading ± floor)	0.025% ± 0.05Ω
Ohms high	
Range	401.0Ω - 4000.0Ω
Accuracy (% of reading ± floor)	0.025% ± 0.5Ω

Resistance Measurement - (applies to DMC-1410, MC-1210, MC-1010 and PTC-8010)

Ohms low		
Range	5.0Ω - 400.0Ω	5.0Ω - 400.0Ω
Excitation Current	0.1mA - 0.5mA	0.5mA - 3mA
Accuracy (% of reading ± floor)	0.025% ± 0.1Ω	0.025% ± 0.05Ω
Ohms high		
Range	400Ω - 1500Ω	1500Ω - 4000Ω
Excitation Current	0.05mA - 0.8mA	0.05mA - 0.4mA
Accuracy (% of reading ± floor)	0.025% ± 0.5Ω	0.025% ± 0.5Ω

Note: Units are compatible with smart transmitters and PLCs that use a strobing excitation current. Frequency response is ≤ 5ms.

Specifications (Continued)

RTD Measurement/Source - (applies to DMC-1410, MC-1210, MC-1010 and PTC-8010)

RTD Type	**Range** (˚C)	**Accuracy** (˚C)
Ni120 (672)	-80.0 - 260.0	0.2
Cu10	-100.0 - 260.0	1.4
Cu50	-180.0 - 200.0	0.4
Cu100	-180.0 - 200.0	0.3
YSI400	15.00 - 50.00	0.1
Pt100 (385)	-200.0 - 100.0	0.2
	100.0 - 300.0	0.3
	300.0 - 600.0	0.4
	600.0 - 800.0	0.5
Pt200 (385)	-200.0 - 100.0	0.8
	100.0 - 300.0	0.9
	300.0 - 630.0	1.0
Pt500 (385)	-200.0 - 100.0	0.4
	100.0 - 300.0	0.5
	300.0 - 630.0	0.6
Pt1000 (385)	-200.0 - 100.0	0.2
	100.0 - 300.0	0.3
	300.0 - 630.0	0.4
Pt10 (385)	-200.0 - 100.0	1.4
	100.0 - 300.0	1.6
	300.0 - 600.0	1.8
	600.0 - 800.0	2.0
Pt50 (385)	-200.0 - 100.0	0.4
	100.0 - 300.0	0.5
	300.0 - 600.0	0.6
	600.0 - 800.0	0.7
Pt100 (3926)	-200.0 - 100.0	0.2
	100.0 - 300.0	0.3
	300.0 - 630.0	0.4
Pt100 (3916)	-200.0 - 100.0	0.2
	100.0 - 300.0	0.3
	300.0 - 630.0	0.4

Thermocouple Measurement/Source (applies to DMC-1410, MC-1210, MC-1010 and PTC-8010)

TC Type	Range (°C)	Accuracy (˚C)
J	-210.0 - 0.0	0.4
	0.0 - 800.0	0.2
	800.0 - 1200.0	0.3
K	-200.0 - 0.0	0.6
	0.0 - 1000.0	0.3
	1000.0 - 1372.0	0.5
T	-250.0 - 0.0	0.6
	0.0 - 400.0	0.2
E	-250.0 - -100.0	0.6
	-100.0 - 1000.0	0.2
R	0.0 - 1767.0	1.2
S	0.0 - 1767.0	1.2
B	600.0 - 800.0	1.2
	800.0 - 1000.0	1.3
	1000.0 - 1820.0	1.5
C	0.0 - 1000.0	0.6
	1000.0 - 2316.0	2.3
XK	-200.0 - 800.0	0.2
BP	0.0 - 800.0	0.9
	800.0 - 2500.0	2.3
L	-200.0 - 0.0	0.25
	0.0 - 900.0	0.2
U	-200.0 - 0.0	0.5
	0.0 - 600.0	0.25
N	-200.0 - 0.0	0.8
	0.0 - 1300.0	0.4

*(In ˚C; add 0.2 for Cold Junction Compensation error)

MARTEL ELECTRONICS

AVAILABLE MODULES

PARAMETER/ RANGE	FULL SCALE ACCURACY	VACUUM ACCURACY	OVER PRESSURE
Isolated Gauge (PSIG):			
0 to 15 (0 to 1 Bar)	±0.025 %		300 %
0 to 30 (0 to 2 Bar)	±0.025 %		300 %
0 to 500 (0 to 35 Bar)	±0.025 %		200 %
0 to 1000 (0 to 70 Bar)	±0.025 %		200 %
0 to 1500 (0 to 100 Bar)	±0.035 %		200 %
0 to 3000 (0 to 200 Bar)	±0.05 %		200 %
0 to 5000 (0 to 340 Bar)	±0.05 %		200 %
0 to 10000 (0 to 700 Bar)	±0.01 %		120 %
Non Isolated Compound (PSIG):			
-0.4 to 0.4 (-20 to 20 mBar)	±0.1 %	±0.15 %	400 %
-1 to 1 (-70 to 70 mBar)	±0.05 %	±0.1 %	400 %
-5 to 5 (-350 to 350 mBar)	±0.075 %	±0.1 %	400 %
-7.2 to 7.2 (-500 to 500 mBar)	±0.07 %	±0.1 %	300 %
-10 to 10 (-700 to 700 mBar)	±0.03 %	±0.05 %	300 %
-15 to 15 (-1 to 1 Bar)	±0.04 %	±0.04 %	300 %
-15 to 30 (-1 to 2 Bar)	±0.025 %	±0.025 %	300 %
Isolated Compound (PSIG):			
-12 to 50 (-0.8 to 3.5 Bar)	±0.03 %	±0.03 %	200 %
-12 to 100 (-0.8 to 7 Bar)	±0.025 %	±0.025 %	200 %
-12 to 150 (-0.8 to 10 Bar)	±0.03 %	±0.03 %	200 %
-12 to 300 (-0.8 to 20 Bar)	±0.025 %	±0.025 %	150 %
Isolated Absolute (PSIA):			
0 to 15 (0 to 1 Bar)	±0.04 %		300 %
0 to 30 (0 to 2 Bar)	±0.025 %		300 %
0 to 50 (0 to 3.5 Bar)	±0.03 %		300 %
0 to 100 (0 to 7 Bar)	±0.025 %		300 %
0 to 300 (0 to 20 Bar)	±0.025 %		200 %
Differential (PSID):			
0 to 5 (0 to 350 mBar)	±0.075%		400 %
0 to 30 (0 to 2 Bar)	±0.025%		300 %
0 to 50 (0 to 3.5 Bar)	±0.03%		300 %

BetaGauge Pressure Modules

Martel Electronics offers 27 standard pressure modules, covering gauge, vacuum, absolute, compound, and differential measurements. Allmodules are directly compatible with the BetaGauge II. With the Model BPPA-100 Pressure Module Adapter, all modules (with the exception of the DC measurement model) are fully compatible with the Martel MC-1210 and MC-1010 Multi-Function Calibrators, the BetaGauge 330, 321A, 311A and 301 Pressure Calibrators, the DMC-1410 Documenting Multi-Function Calibrator, and the Martel Electronics M2001 and 3001 Laboratory/Bench Standards.

Pressure ranges may be displayed in any of 13 userselectable units. Water density correction factors of 4 °C, 20 °C, or 60 °F can be selected for either water column unit. The choice of pressure unit may be restricted by limitations on resolution of the instrument display of the particular calibrator the module is used with. For optimum mechanical strength, external pressure connection is made by a 1/8" FNPT 316SS connector welded to a stainless steel metal plate.

General Features

- 27 standard ranges
- Gauge, vacuum, absolute, compound, and differential measurements
- Accuracy specified over 15 °C to 35 °C range
- Isolated and non-isolated measurements, range dependant

Model BPPA-100 Pressure Module Adapter

BetaGauge Pressure Modules