

ECG[®]

Test Equipment

COMPLETE LINE



NTE[®]
ELECTRONICS, INC.

Analog Multimeter

AM-10

- **Pocket Size - Very Economical**
- **6 Functions, 10 Ranges**

- $\pm 4\%$ Basic DC Accuracy
- 2" Mirrored Scale
- $2k\Omega/V$ AC & DC Input Sensitivity
- Fuse and Diode Protection
- DC Current
- Resistance
- Decibels
- Battery Test
- 90-Day Limited Warranty

Test Leads (ML-10) and Operating Instructions Included



SPECIFICATIONS:

General

Front/Side Controls: Range selector switch, "0" Ω adjustment

Movement: 90° arc, 200 μ A full scale

Scales (5): One scale for OHMS, 2 scales for AC/DC, one scale for dB and Battery test

Scale Length: 2"

Operating Position: Horizontal or vertical

Power: 1.5V AA battery (not included)

Movement and Indicator Protection:

Diode and Fuse (0.5A, 250V)

Dimensions, Weight: 2.4" wide x 3.5" long x 1.1" thick (60mm x 89mm x 29mm), net weight 4oz. (113g)

DC Voltage

Ranges: 0-15, 150, 500V

Input Impedance: 2k Ω per Volt

Rated Accuracy: $\pm 4\%$ of full scale

DC Current

Ranges: 0-150mA

Rated Accuracy: $\pm 4\%$ of full scale

AC Voltage

Ranges: 0-15, 150, 500V

Input Impedance: 2k Ω per Volt

Rated Accuracy: $\pm 5\%$ of full scale

Resistance

Ranges:

R x 1K 0 - 1M Ω (full scale)

Decibels

Ranges:

-20dB to +26dB on 15V AC range

0dB to +46dB on 150V AC range

10dB to +56dB on 500V AC range

Battery Test

Ranges: 1.5V AA

Analog Multimeter

AM-22

- **General Purpose VOM**
- **7 Functions, 20 Ranges**

- $\pm 4\%$ DC Accuracy FS
- 4" Mirrored Scale
- 20K Ω /VDC, 8K Ω /VAC Input Sensitivity
- Fuse and Diode Protection
- 10 Amp DC Range
- 1000 Volts AC/DC
- Continuity Buzzer
- Battery Test
- Tilt Stand
- Anti-Skid Pads
- 90-Day Limited Warranty

Test Leads (ML-375), Spare Fuse and Operating Instructions Included
 OPTIONAL ACCESSORY - Carrying Case (MC-300) - See Page 24

SPECIFICATIONS:

General

Front Panel Controls: Range selector switch with power "OFF" position, 0 Ω adjust and mechanical zero adjuster

Movement: 90° arc, 40 μ A full scale

Scales (6): One scale for OHMS, 3 scales for AC/DC, one scale for dB and one scale for battery test

Scale Length: 4"

Operating Position: Horizontal or vertical; rubber pads to prevent slipping on moderate horizontal or vertical slopes

Power: 1.5V AA (2) batteries (not included)

Movement and Indicator Protection: Diode and Fuse (0.5A/250V)

Dimensions, Weight: 3.8" wide x 5.875" long x 1.5" thick (97 mm x 149 mm x 38 mm), net weight 8.2oz. (231g)



DC Voltage

Ranges: 0-2.5, 10, 50, 250, 1000V

Input Impedance: 20K Ω per Volt

Rated Accuracy: $\pm 4\%$ of full scale

DC Current

Ranges: 0-5m, 50m, 500m, 10A

Rated Accuracy: $\pm 4\%$ of full scale

AC Voltage

Ranges: 0-10, 50, 250, 1000V

Input Impedance: 8K Ω per Volt

Rated Accuracy: $\pm 5\%$ of full scale

Resistance

Ranges:

R x 1 0 - 10K Ω

R x 10 0 - 100K Ω

R x 1K 0 - 10M Ω

Rated Accuracy: $\pm 4\%$ of arc

Decibels

Ranges:

-8dB to +22dB on 10V AC range

+6dB to +36dB on 50V AC range

+20dB to +50dB on 250V AC range

+32dB to +62dB on 1000V AC range

Continuity Test

Buzzer Response: <100 Ω

Response Time: Instant

Battery Test

Ranges: 1.5V, 9V

Analog Multimeter

AM-30

- **Our Top Of The Line Analog Meter**
- **Full Function** • **Temperature Measurement**

- 3% DC Accuracy FS
- 5" Mirrored Scale
- 30k Ω /V DC, 10k Ω /V AC Input Sensitivity
- Fuse and Diode Protection
- 10 Amp DC Range
- 1000 Volts AC/DC
- Transistor Test
- Battery Test
- Continuity Buzzer
- Tilt Stand/Carrying Handle
- 90-Day Limited Warranty

Test Leads (ML-43), Temperature Probe (TC-30),
Fuse and Operating Instructions Included

OPTIONAL ACCESSORY - Carrying Case (MC-30) - See Page 24

SPECIFICATIONS:

General

Front Panel Controls: Range selector switch with "OFF" position, 0 Ω adjust/temperature calibration, 0 Ω calibration switch

Movement: 90° arc, 25 μ A movement

Scales (8): One scale for OHMS, three scales for AC/DC, one scale for dB, two scales for temperature, one scale for battery test

Scale Length: 5"

Operating Position: Horizontal or vertical; rubber pads to prevent slipping on moderate horizontal slopes

Power: 9V (NEDA 1604) and 1.5V AA (2) batteries (not included)

Movement and Indicator Protection: Fuse (0.5A, 250V)

Operating Temperature: 18°C to 25°C for rated accuracy

Dimensions, Weight: 4.8" wide x 6.9" long x 1.9" thick (127mm x 175mm x 48mm), net weight 14oz. (422g)



DC Voltage

Ranges: 0-0.6, 3, 12, 60, 300, 1000V

Input Impedance: 30k Ω per Volt

Rated Accuracy: \pm 3% of full scale

DC Current

Ranges: 120 μ , 13m, 30m, 300m, 10A

Rated Accuracy: \pm 3% of full scale

AC Voltage

Ranges: 0-12, 30, 120, 300, 1000V

Input Impedance: 10k Ω per Volt

Rated Accuracy: \pm 4% of full scale

Resistance

Ranges:

R x 1 0-5k Ω

R x 100 0-500k Ω

R x 1k 0-5M Ω

R x 10k 0-50M Ω

Rated Accuracy: 3° arc

Decibels

Ranges:

-10dB to +24dB on 12V AC range

-2dB to +32dB

8dB to +44dB

20dB to +52dB

30dB to +62dB

0dB referenced to 1 milliwatt at 600 Ω

Temperature

Ranges: -50°C to +260°C (-60°F to +400°F)

Battery Test

Ranges: 1.5V AA, 9V

Analog Multimeter

FET-43

- **Very High Input Impedance**
- **Excellent Trouble Shooting Tool**
- **5 Functions, 43 Ranges**
- 4.5" Meter Scale
- $\pm 2.5\%$ DC accuracy FS
- 10M Ω DC, 1M Ω AC Input Resistance
- FET Input
- Jeweled Meter Movement
- Overload Protection †
- Polarity Reversing Switch *
- Zero Center Scale Adjustment
- Low Battery Indicator
- Metal Tilt Stand
- 1-Year Limited Warranty

Battery, Test Leads (ML-43) and Operating Instructions Included

SPECIFICATIONS:

General

Front Panel Controls: Range selector switch, power on-off switch, with operational LED, polarity reverse switch, "0" Ω ADJ, Center "0" ADJ

Movement: Jeweled pivots, 90° arc, 44 μ A full scale

Scales (9): Ω DC V•A, AC RMS, AC peak to peak (2), \pm DC V•A (center null), AC 12 A, DC 0.1 μ A, dB

Scale Length: 4.5"

***Polarity Reverse Switch:** DC and Ω ranges (Reverses meter movement only. Does not reverse test lead polarity.)

Operating Position: Horizontal or vertical, rubber pads to prevent slipping on moderate slopes

Power: 1.5V AA (2) and 9V (NEDA 1604) batteries

Movement and Indicator Protection: Double FET protection and fuse (2A/250V)

Operating Temperature: 25°C (75°F) rated accuracy, less than 4% additional error over the range of -4°C (25°F) to 50°C (130°F)

Dimensions, Weight: 5" wide x 6.75" long x 2" thick (125mm x 170mm x 50mm), net weight 17oz. (480g)



DC Voltage

Ranges: 0-0.3, 1.2, 3.0, 120, 300, 1200V, 0- \pm 1.5, 0.6, 6, 15, 60, 150, 600V at Center 0

Input Impedance: Approx. 10M Ω , 3M Ω on 300 mV range

Rated Accuracy: $\pm 2.5\%$ DC and $\pm 3.5\%$ AC of full scale on all ranges

DC Current

Ranges: 0-0.1 μ A, 0.3, 3, 30, 300mA, 12A

Potential Drop: 300mV

Rated Accuracy: Within $\pm 2.5\%$ full scale on all ranges

AC Voltage

Ranges: RMS 0-3, 12, 30, 120, 300, 1200V, peak to peak, 0-8.4, 33, 84, 330, 840, 3300RMS, 1200V (peak to peak 3300V) on separate jack

Input Impedance: Approx. 1M Ω , 800pF; 2.5M Ω on 3V range

Rated Accuracy:

50Hz - 5MHz $\pm 3\%$
30Hz - 10MHz ± 1 dB sine wave
30Hz - 1MHz ± 1 dB rectangular wave at 3V range only

30Hz - 3MHz $\pm 5\%$ sine wave
30Hz - 120MHz $\pm 5\%$ rectangular on all other ranges except 3V

dB: -10dB - +63dB on AC ranges

AC Current

Ranges: 0-12A, within $\pm 3.5\%$ full scale. DC, AC, 12 Amp range on separate jack

Resistance

Ranges:

R x 1 0 - 1K Ω (Center 10)
R x 10 0 - 10K Ω (Center 100 Ω)
R x 100 0 - 100K Ω (Center 1K Ω)
R x 1K 0 - 1M Ω (Center 10K Ω)
R x 10K 0 - 10M Ω (Center 100K Ω)
R x 1M 0 - 1000M Ω (Center 10M Ω)

Accuracy: $\pm 2.5^\circ$ of arc

† Does not apply to 12 Amp range. Damage to meter or injury to operator can occur if voltage or excessive current is applied to 12 Amp. input.

Pocket Digital Multimeter

DM-15

Use For: • Home • Office • Factory
• Car • Boat • School

- Autoranging
- Auto Power OFF
- Bar Graph
- 3 1/2 Digit LCD, 0.35" H
- 3200 Count
- 10MΩ Input Z
- Data Hold
- Range Hold
- Diode Test
- Audible Continuity Test
- 32MΩ FS
- Overload Protection
- 1-Year Limited Warranty

Batteries, Test Leads, Carrying Case and Operating Instructions Included

SPECIFICATIONS:

General

Display: 3.5 Digit LCD, 0.35" high, with polarity indicator
Overrange Indication: "OL" is displayed
Auto Power Off: Approx. 10 min. after mode or function change
Measurement Rate: 2 times per second
Operating Environment: 0°C to 40°C, <70% relative humidity

Storage Environment:
 -20°C to 60°C,
 <80% relative humidity

Power: 1.5V button-type batteries (2) IEC LR-44, NEDA 1166A

Low Battery Indicator: "B" is displayed.

Dimensions, Weight: 2.2" wide x 4.4" long x .41" thick (56mm x 111.5mm x 10.5mm), net weight 3oz. (86g)



DC Voltage

Range	Resolution	Accuracy
320mV	100μV	±2% of rdg ±2D
3.2V	1mV	±1% of rdg ±2D
32V	10mV	±2% of rdg ±2D
320V	100mV	±2% of rdg ±2D
450V	1V	±2% of rdg ±2D

Input Impedance: mV = >1000MΩ;
 3.2V = 11MΩ. 10MΩ all other ranges
 Maximum Input: 450V DC

AC Voltage

Range	Resolution	Accuracy
3.2V	1mV	±3% of rdg ±5D
32V	10mV	±3% of rdg ±5D
320V	100mV	±3% of rdg ±5D

Input Impedance: 3.2V = 11MΩ, 10MΩ all other ranges

Maximum Input: 320V AC rms
 Frequency Range: 50/60Hz

Resistance

Range	Resolution	Accuracy
320Ω	100mΩ	±2% of rdg ±4D
3.2KΩ	1Ω	±2% of rdg ±2D
32KΩ	10Ω	±2% of rdg ±2D
320KΩ	100Ω	±2% of rdg ±2D
3.2MΩ	1KΩ	±5% of rdg ±5D
32MΩ	10KΩ	±10% of rdg ±2D

Input Protection: 450V DC or 320 AC rms

Continuity Test (Audible)

Resistance Range: 320Ω

Beeper Response: <20Ω

Diode Test

Voltage: 3.2V @ 0.6mA

Digital Multimeter

DM-21

• Low Cost General Purpose

- Transistor h_{FE}
- Diode Test
- LED Test
- Square Wave Generator
- 7 Functions, 11 Ranges
- 0.8% Basic DC Accuracy
- 3 1/2 Digit LCD, 0.55" H
- Low Power Ω
- Overload Protection
- RF Shielded
- Polarity Indicator
- Low Battery Indicator
- Tilt Stand
- 1-Year Limited Warranty

Battery, Test Leads (ML-375) and Operating Instructions Included
 OPTIONAL ACCESSORY - Carrying Case (MC-50) - See Page 24



SPECIFICATIONS:

General

Display: 3 1/2 Digit LCD, 0.55" high, with polarity

Overrange Indication: "1" or "-1" is displayed.

Measurement Rate: 2.5 times per second

Operating Environment: 0°C to 50°C, <70% relative humidity

Storage Environment: -20°C to 60°C, <80% relative humidity with battery removed

Power: 9V carbon zinc battery (NEDA 1604)

Battery Life: 150 hours typical with carbon zinc cells

Low Battery Indicator: Symbol is displayed

Dimensions, Weight: 2.8" wide x 6" long x 1.5" thick (70mm x 151mm x 38mm), net weight 7oz. (200g)

DC Voltage

Range	Resolution	Accuracy
2V	1mV	$\pm 0.8\%$ of rdg $\pm 1D$
20V	10mV	$\pm 0.8\%$ of rdg $\pm 1D$
200V	100mV	$\pm 0.8\%$ of rdg $\pm 1D$
600V	1V	$\pm 0.8\%$ of rdg $\pm 1D$

Input Impedance: 1M Ω on all ranges.

Maximum Input: 600V DC or 500AC rms.

AC Voltage

Range	Resolution	Accuracy
200V	100mV	$\pm 1.5\%$ of rdg $\pm 4D$
500V	1V	$\pm 1.5\%$ of rdg $\pm 4D$

Input Impedance: 450K Ω on all ranges.

Maximum Input: 600V DC or 500AC rms.

Frequency Range: 50Hz - 500Hz.

Resistance

Range	Resolution	Accuracy
200 Ω	0.1 Ω	$\pm 1.5\%$ of rdg $\pm 3D$
2K Ω	1 Ω	$\pm 1.5\%$ of rdg $\pm 3D$
20K Ω	10 Ω	$\pm 1.5\%$ of rdg $\pm 3D$
200K Ω	100 Ω	$\pm 1.5\%$ of rdg $\pm 3D$
2M Ω	1K Ω	$\pm 1.5\%$ of rdg $\pm 3D$

Overload Protection: 500V DC or 350AC rms

Transistor h_{FE} Test (PNP, NPN)

Test Condition: 10 μ A Base Current @ <3.5V

h_{FE} Range: 0 - 1000

Diode Test

Voltage: <3.5V @ 1mA ± 0.6 mA

LED Test

Voltage: <3.5V @ 10mA ± 0.6 mA

Generator

Waveform: Square

Frequency: 50Hz approx

Output: ± 3 to -0.5V DC, 50% Duty Cycle

Impedance: 120K Ω

Digital Multimeter

DM-38A

- **Multifunction DMM** • **Heavy Duty**
- **3 3/4 Digit, 0.5" H** • **Peak Data Hold**
- Frequency Counter
- Capacitance Test
- Logic Detector
- 20A AC/DC
- 0.5% Basic DC Accuracy
- 40MΩ Full Scale
- Transistor h_{FE} Test
- Diode Test
- Audible Continuity Test
- 20MΩ Input Z
- Overload Protection
- RF Shielded
- Lo Power Ohms
- Tilt Stand
- Polarity Indicator
- Overrange Indicator
- Low Battery Indicator
- 1-Year Limited Warranty

Battery, Test Leads and Operating Instructions Included

OPTIONAL ACCESSORY - Carrying Case (MC-300) - See Page 24



SPECIFICATIONS:

General

Display: 3 3/4 Digit LCD, 0.5" high, with polarity indicator (4,000 count)

Overrange Indication: "OL" is displayed

Measurement Rate: 3 times per second

Operating Environment: 0°C to 50°C, <70% relative humidity

Storage Environment: -20°C to 60°C, <80% relative humidity with battery removed

Power: 9V carbon zinc battery (NEDA 1604)

Battery Life: 150 hours typical with carbon zinc cells

Low Battery Indicator: Display indicates "B"

Dimensions, Weight: 3.3" wide x 6.3" long x 1" thick (84mm x 160mm x 25mm), net weight 9oz. (250g)

Peak Data Hold: When the Peak Hold function is engaged, the maximum reading is shown on the display until a higher reading is recorded or power to the meter is removed

DC Voltage

Range	Resolution	Accuracy
400mV	100μV	±0.5% of rdg ±1D
4V	1mV	±0.5% of rdg ±1D
40V	10mV	±0.5% of rdg ±1D
400V	100mV	±0.5% of rdg ±1D
1000V	1V	±0.5% of rdg ±1D

Input Impedance: 20MΩ on all ranges

Overload Protection: 500V DC/350V AC for 15 sec. on 400mV range; 1,100V DC/800V AC on all other ranges

DC Current

Range	Resolution	Accuracy
40mA	10μA	±1% of rdg ±1D
400mA	100μA	±1% of rdg ±1D
20A	10mA	±2% of rdg ±3D

Overload Protection: mA input 0.8A/250V fuse; 20A input (unfused), up to 20A for 15 seconds

AC Voltage

Range	Resolution	Accuracy
400mV	100μV	±1% of rdg ±4D
4V	1mV	±1% of rdg ±4D
40V	10mV	±1% of rdg ±4D
400V	100mV	±1% of rdg ±4D
750V	1V	±1.5% of rdg ±4D

Input Impedance: 20MΩ on all ranges

Overload Protection: 500V DC/350V AC for 15 sec. on 400mV range; 1,100V DC/800V AC on all other ranges

Frequency Range: 50 - 500Hz

AC Current

Range	Resolution	Accuracy
40mA	10μA	±1.2% of rdg ±4D
400mA	100μA	±1.2% of rdg ±4D
20A	10mA	±2% of rdg ±4D

Overload Protection: mA input, 0.8A/250V fuse; 20A input (unfused), up to 20A for 15 seconds

Resistance

Range	Resolution	Accuracy
400Ω	0.1Ω	±1% of rdg ±3D
4KΩ	1Ω	±0.8% of rdg ±1D
40KΩ	10Ω	±0.8% of rdg ±1D
400KΩ	100Ω	±0.8% of rdg ±1D
4MΩ	1KΩ	±0.8% of rdg ±1D
40MΩ	10KΩ	±3% of rdg ±3D
400MΩ	1MΩ	±5% of rdg -10D, +4D

Overload Protection: 500V DC/AC, 10 seconds

Capacitance

Range	Resolution	Accuracy
4nF	1pF	±3% of rdg ±10D
40nF	10pF	±3% of rdg ±10D
400nF	100pF	±3% of rdg ±10D
4μF	1nF	±3% of rdg ±10D
40μF	10nF	±3% of rdg ±10D

Test Frequency: 400Hz

Test Voltage: 50mV

Frequency Measurement

Range: 4K to 4MHz (Aurorange)

Accuracy: ± 1% rdg ± 2D

Input Sensitivity: 50mV rms

Overload Protection: 500V DC/AC

Logic Measurement

Logic Type: TTL

Input Impedance: 120KΩ ±10K

Logic Thresholds

Logic 1: 2.4V, ±0.2V

Logic 0: 0.7V, ±0.2V

Frequency Response: 20MHz

Detestable Pulse Width: 25ns, min.

Overload Protection: 50V DC/AC

Continuity Test

Resistance Range: 400Ω

Beeper Response: <50Ω

Response Time: <100mSec

Transistor h_{FE} Test (PNP, NPN)

Test Condition: 10μA Base Current @ 2.8V

h_{FE} Range: 0 - 1000

Diode Test

Voltage: 3.2V @ 1.6mA Max

Digital Multimeter

DM-50

- **Low Cost-Multipurpose**
- **9 Functions, 20 Ranges**

- Frequency Counter
- Transistor h_{FE}
- Battery Tester
- Diode Test
- 20M Ω FS
- 10A DC
- 0.5% Basic DC Accuracy
- 3 1/2 Digit LCD, 0.55" H
- Audible Continuity Test
- 10M Ω Input Z
- Low Power Ω
- Overload Protection
- RF Shielded
- Tilt Stand
- 1-Year Limited Warranty

Battery, Test Leads (ML-375), Spare Fuse and Operating Instructions Included
 OPTIONAL ACCESSORY - Carrying Case (MC-50) - See Page 24

SPECIFICATIONS:

General

Display: 3 1/2 Digit LCD, 0.55" high, with polarity

Overrange Indication: "OL" is displayed

Measurement Rate: 2.5 times per second

Operating Environment: 0°C to 50°C, <70% relative humidity

Storage Environment: -20°C to 60°C, <80% relative humidity with battery removed

Power: 9V carbon zinc battery (NEDA 1604)

Battery Life: 150 hours typical with carbon zinc cells

Low Battery Indicator: Symbol is displayed.

Dimensions, Weight: 2.8" wide x 6" long x 1.5" thick (70mm x 151mm x 38mm), net weight 7oz. (200g)



DC Voltage

Range	Resolution	Accuracy
200mV	100 μ V	$\pm 0.5\%$ of rdg $\pm 1D$
2V	1mV	$\pm 0.5\%$ of rdg $\pm 1D$
20V	10mV	$\pm 0.5\%$ of rdg $\pm 1D$
200V	100mV	$\pm 0.5\%$ of rdg $\pm 1D$
600V	1V	$\pm 0.5\%$ of rdg $\pm 1D$

Input Impedance: 10M Ω on all ranges
 Maximum Input: 600V DC or AC rms

DC Current

Range	Resolution	Accuracy
2mA	1 μ A	$\pm 1\%$ of rdg $\pm 1D$
20mA	10 μ A	$\pm 1\%$ of rdg $\pm 1D$
200mA	100mA	$\pm 1\%$ of rdg $\pm 1D$
10A	10mA	$\pm 3\%$ of rdg $\pm 1D$

Overload Protection: mA input, 0.5A/250V fuse;
 10A input 10/600V fuse

AC Voltage

Range	Resolution	Accuracy
200V	100mV	$\pm 1.5\%$ of rdg $\pm 4D$
600V	1V	$\pm 1.5\%$ of rdg $\pm 4D$

Input Impedance: 4.5M Ω on all ranges
 Maximum Input: 600V DC or AC rms
 Frequency Range: 50Hz - 500Hz

Battery Tester

1.5V (Load Current Approximately 150mA)
 9V (Load Current Approximately 6mA)

Resistance

Range	Resolution	Accuracy
200 Ω	0.1 Ω	$\pm 0.8\%$ of rdg $\pm 3D$
2K Ω	1 Ω	$\pm 0.8\%$ of rdg $\pm 1D$
20K Ω	10 Ω	$\pm 0.8\%$ of rdg $\pm 1D$
200K Ω	100 Ω	$\pm 0.8\%$ of rdg $\pm 1D$
2000K Ω	1K Ω	$\pm 0.8\%$ of rdg $\pm 1D$
20M Ω	10K Ω	$\pm 3\%$ of rdg $\pm 3D$

Overload Protection: 500V DC or 350AC rms

Frequency Measurement

Range: 2kHz - 15MHz (Autorange)
 Accuracy: $\pm 0.1\%$ rdg $\pm 1D$
 Input Sensitivity: Trig Lo: 1 Vrms; Trig Hi: 2 Vrms
 Overload Protection: 500V DC or 500AC rms

Continuity Test (Audible)

Resistance Range: 2K Ω
 Beeper Response: <30 Ω

Transistor h_{FE} Test (PNP, NPN)

Test Condition: 10 μ A Base Current @ 3.5V
 h_{FE} Range: 0 - 1000

Diode Test

Voltage: 2V @ 1.6mA Max

Digital Multimeter

DM-59

- Perfect For Workshop and School
- 10 Functions, 30 Ranges

- Frequency Counter
- h_{FE}
- Capacitance
- Diode Test
- 20M Ω FS
- 10A AC/DC
- 0.5% Basic DC Accuracy
- 3 1/2 Digit LCD, 0.55" H
- Audible Continuity Test
- 10M Ω Input Z
- Overload Protection
- RF Shielded
- Tilt Stand
- 1-Year Limited Warranty

Battery, Test Leads (ML-375), Spare Fuse and Operating Instructions Included
 OPTIONAL ACCESSORY - Carrying Case (MC-50) - See Page 24



SPECIFICATIONS:

General

Display: 3 1/2 Digit LCD, 0.55" high, with polarity

Overrange Indication: "OL" is displayed

Measurement Rate: 2.5 times per second

Operating Environment: 0°C to 50°C, <70% relative humidity

Storage Environment: -20°C to 60°C, <80% relative humidity with battery removed

Power: 9V carbon zinc battery (NEDA 1604)

Battery Life: 150 hours typical with carbon zinc cells

Low Battery Indicator: Symbol is displayed

Dimensions, Weight: 2.8" wide x 6" long x 1.5" thick (70mm x 151mm x 38mm)
 net weight 7oz. (200g)

DC Voltage

Range	Resolution	Accuracy
200mV	100 μ V	$\pm 0.5\%$ of rdg $\pm 1D$
2V	1mV	$\pm 0.5\%$ of rdg $\pm 1D$
20V	10mV	$\pm 0.5\%$ of rdg $\pm 1D$
200V	100mV	$\pm 0.5\%$ of rdg $\pm 1D$
600V	1V	$\pm 0.5\%$ of rdg $\pm 1D$

Input Impedance: 10M Ω on all ranges

Maximum Input: 600V DC or AC rms

DC Current

Range	Resolution	Accuracy
2mA	1 μ A	$\pm 1.0\%$ of rdg $\pm 1D$
20mA	10 μ A	$\pm 1.0\%$ of rdg $\pm 1D$
200mA	100mA	$\pm 1.0\%$ of rdg $\pm 1D$
10A	10mA	$\pm 3.0\%$ of rdg $\pm 1D$

Overload Protection: mA input, 0.5A/250V fuse;

10A input 10A/600V fuse

AC Voltage

Range	Resolution	Accuracy
200mV	100 μ V	$\pm 1.0\%$ of rdg $\pm 4D$
2V	1mV	$\pm 1.0\%$ of rdg $\pm 4D$
20V	10mV	$\pm 1.0\%$ of rdg $\pm 4D$
200V	100mV	$\pm 1.0\%$ of rdg $\pm 4D$
600V	1V	$\pm 1.9\%$ of rdg $\pm 4D$

Input Impedance: 10M Ω on all ranges

Maximum Input: 600V DC or AC rms

Frequency Range: 50Hz - 500Hz

AC Current

Range	Resolution	Accuracy
2mA	1 μ A	$\pm 2.0\%$ of rdg $\pm 4D$
20mA	10 μ A	$\pm 2.0\%$ of rdg $\pm 4D$
200mA	100mA	$\pm 2.0\%$ of rdg $\pm 4D$
10A	10mA	$\pm 3.5\%$ of rdg $\pm 4D$

Overload Protection: mA input, 0.5A/250V fuse;

10A input 10A/250V fuse

Resistance

Range	Resolution	Accuracy
200 Ω	0.1 Ω	$\pm 0.8\%$ of rdg $\pm 3D$
2K Ω	1 Ω	$\pm 0.8\%$ of rdg $\pm 1D$
20K Ω	10 Ω	$\pm 0.8\%$ of rdg $\pm 1D$
200K Ω	100 Ω	$\pm 0.8\%$ of rdg $\pm 1D$
2000K Ω	1K Ω	$\pm 0.8\%$ of rdg $\pm 1D$
20M Ω	10K Ω	$\pm 3\%$ of rdg $\pm 3D$

Overload Protection: 500V DC or AC rms

Capacitance

Range	Resolution	Accuracy
2000pF	1pF	$\pm 2.0\%$ of rdg $\pm 10D$
20nF	10pF	$\pm 2.0\%$ of rdg $\pm 10D$
200nF	100pF	$\pm 2.0\%$ of rdg $\pm 10D$
2 μ F	1nF	$\pm 2.0\%$ of rdg $\pm 10D$
20 μ F	10nF	$\pm 2.0\%$ of rdg $\pm 10D$

Test Frequency: 2.5Hz

Test Voltage: 3V

Frequency Measurement

Range: 2kHz - 15MHz (Autorange)

Accuracy: $\pm 0.1\%$ rdg $\pm 1D$

Input Sensitivity: Trig Lo: 1 Vrms; Trig Hi: 2 Vrms

Overload Protection: 500V DC or AC rms

Continuity Test (Audible)

Resistance Range: 200 Ω

Beeper Response: <40 Ω

Transistor h_{FE} Test (PNP, NPN)

Test Condition: 10 μ A Base Current @ <3.5V

h_{FE} Range: 0 - 1000

Diode Test

Voltage: 2V @ 1.6mA Max

Digital Multimeter

DM-75

- **Low Cost**
- **Full Function General Purpose**
- **Rotary Range Switch**
- Diode Test
- 0.7% Basic DC Accuracy
- 3 1/2 Digit LCD, 0.5" H
- 10A DC
- 10M Ω Input Impedance, DC
- Overload Protection
- Pocket Size
- 90-Day Limited Warranty

Battery, Test Leads and Operating Instructions Included

OPTIONAL ACCESSORY - Carrying Case (MC-50) - See Page 24

SPECIFICATIONS:

General

Display: 3 1/2 Digit LCD, 0.5" high, with polarity indicator

Overrange Indication: 3 least significant digits blanked

Operating Environment: 0°C to 50°C, <80% relative humidity

Storage Environment: -15°C to 50°C

Power: 9V alkaline or carbon zinc battery

Battery Life: 100 hours typical with carbon zinc cells, 200 hours typical with alkaline cells

Dimensions, Weight: 2.8" wide x 5" long x 1" thick (71mm x 127mm x 25.4mm), net weight 6.1oz. (173g)



DC Voltage

Range	Resolution	Accuracy
200mV	0.1mV	±0.7% of rdg ±4D
2000mV	1mV	±0.7% of rdg ±2D
20V	10mV	±0.7% of rdg ±2D
200V	100mV	±0.7% of rdg ±2D
1000V	1V	±0.7% of rdg ±2D

Input Impedance: 10M Ω on all ranges

DC Current

Range	Resolution	Accuracy
200 μ A	0.1 μ A	± 1% of rdg ± 2D
2000 μ A	1 μ A	± 1% of rdg ± 2D
20mA	10 μ A	± 1% of rdg ± 2D
200mA	100 μ A	± 1.2% of rdg ± 2D
2000mA	1mA	± 1.5% of rdg ± 2D
10A	10mA	± 1.5% of rdg ± 2D

Overload Protection: mA input, 2A/250V fuse; 10A input (unfused) up to 10A for 15 seconds

AC Voltage

Range	Resolution	Accuracy
200V	100mV	±1.2% of rdg ±10D
750V	1V	±1.2% of rdg ±10D

Overload Protection: 750V rms

Frequency Range: 45Hz - 450Hz

Resistance

Range	Resolution	Accuracy
200 Ω	0.1 Ω	±0.7% of rdg ±2D
2000 Ω	1 Ω	±0.7% of rdg ±2D
20K Ω	10 Ω	±0.7% of rdg ±2D
200K Ω	100 Ω	±0.7% of rdg ±2D
2000K Ω	1K Ω	±1% of rdg ±2D

Diode Test

Voltage: 2.8V @ 1mA

Digital Multimeter

DM-78A

• Heavy Duty, Ideal For Plant/ Industrial Maintenance

- Water Resistant (O-Ring Seals)
- Withstands 5' Drop
- Protective Holster (MH-350)
- Large Display Window
- 3200 Count LCD, .55" H
- 65 Segment Analog Bar Graph
- 0.5% Basic DC Accuracy
- Auto Power Off
- 10M Ω Input Z
- "No Hand" Data Hold
- Input Warning Beeper*
- 20A AC/DC Fused
- Diode Test
- Instant Continuity Beeper
- Overload Protection
- 1-Year Limited Warranty

Batteries, Test Leads (ML-375), and Operating Instructions Included

OPTIONAL ACCESSORY - Carrying Case (MC-300) - See Page 24



SPECIFICATIONS:

General

Display: 3200 count LCD, 65 segment bar graph, 0.55" high, with polarity

Auto Power Off: Approx. 10 min. after mode or function change

Overrange Indication: "OL" is displayed

Operating Environment: 0°C to 50°C, <80% relative humidity

Storage Environment: -20°C to 60°C, <80% relative humidity with battery removed

Temperature Coefficient: (0°C to 18°C and 28°C to 50°C), less than 0.15 x applicable accuracy specification per second

Measurement Rate: Digital 2 times per second, analog 12 times per second

Power: 1.5V AAA (2) alkaline or carbon zinc batteries

Battery Life: 1000 hours with alkaline cells

Low Battery Indicator: Symbol is displayed

Fuse: 1A 240/250V Fast

Dimensions, Weight: 3.3" wide x 6.9" long x 1.2" thick (84mm x 175mm x 31mm), net weight 12oz. (340g)

DC Voltage

Range	Resolution	Accuracy
300mV	0.1mV	$\pm 0.5\%$ of rdg $\pm 2D$
3V	1mV	$\pm 0.5\%$ of rdg $\pm 2D$
30V	10 mV	$\pm 0.5\%$ of rdg $\pm 2D$
300V	100mV	$\pm 0.5\%$ of rdg $\pm 2D$
1000V	1V	$\pm 0.5\%$ of rdg $\pm 2D$

Input Impedance: 10M Ω

Overload Protection: 1100Vpk (15 sec.)

DC Current

Range	Resolution	Accuracy
300 μ A	0.1 μ A	$\pm 1\%$ of rdg $\pm 2D$
3mA	1 μ A	$\pm 1.2\%$ of rdg $\pm 2D$
30mA	10 μ A	$\pm 1\%$ of rdg $\pm 2D$
300mA	100 μ A	$\pm 1.2\%$ of rdg $\pm 2D$
20A	10mA	$\pm 2\%$ of rdg $\pm 3D$

Overload Protection: μ A, mA = 1A 240/250V, 20A = 13A 240/250V (readings over 10A max., 30 sec.)

Voltage Drop: 200mV on 300 μ A, 30mA ranges; 2V all others

AC Voltage

Range	Resolution	Accuracy
3V	1mV	$\pm 1.3\%$ of rdg $\pm 5D$
30V	10mV	$\pm 1.3\%$ of rdg $\pm 5D$
300V	100mV	$\pm 1.3\%$ of rdg $\pm 5D$
750V	1V	$\pm 1.3\%$ of rdg $\pm 5D$

Frequency Range: 3V on 40Hz - 300Hz; 40Hz - 500Hz all others

Input Impedance: 10M Ω on all ranges

Overload Protection: 770V AC RMS or 1100Vpk (15 sec.)

AC Current

Range	Resolution	Accuracy
300 μ A	0.1 μ A	$\pm 1.5\%$ of rdg $\pm 3D$
3mA	1 μ A	$\pm 1.5\%$ of rdg $\pm 3D$
30mA	10 μ A	$\pm 1.5\%$ of rdg $\pm 3D$
300mA	100 μ A	$\pm 2\%$ of rdg $\pm 3D$
20A	10mA	$\pm 2.5\%$ of rdg $\pm 5D$

Frequency Range: 40Hz - 500Hz

Overload Protection: μ A, mA = 1A 240/250V, 20A = 13A 240/250V (readings over 10A max., 30 sec.)

Voltage Drop: 200mV on 300 μ A, 30mA ranges; 2V all others

Resistance

Range	Resolution	Accuracy
300 Ω	0.1 Ω	$\pm 1\%$ of rdg $\pm 4D$
3K Ω	1 Ω	$\pm 0.75\%$ of rdg $\pm 2D$
30K Ω	10 Ω	$\pm 0.75\%$ of rdg $\pm 2D$
300K Ω	100 Ω	$\pm 0.75\%$ of rdg $\pm 2D$
3M Ω	1K Ω	$\pm 1.5\%$ of rdg $\pm 3D$
30M Ω	10K Ω	$\pm 2.5\%$ of rdg $\pm 5D$

Lo-Power Ω open circuit 1.3V

Overload Protection: 600VDC or 600V AC RMS (10 sec.)

Diode Test

Voltage: 3.3V @ 1.5mA max

Continuity Test

Beeper Response: <50 Ω

Response Time: Instant

Delay Hold: Allows "No-Hand" data hold operation

* **Input Warning Beeper:** Eliminates incorrect test lead placement and selector switch settings

Digital Multimeter

DM-80

- Heavy Duty, Ideal For Plant/Industrial Maintenance
- Autoranging • 11 Functions, 39 Ranges

- 0.3% Basic DC Accuracy
- 42 Segment Bar Graph
- 4000 Count LCD
- Min./Max.
- Data Hold
- Memory
- Capacitance
- Frequency
- Temperature
- Diode Test
- Audible Continuity Test
- Overload Protection
- 1-Year Limited Warranty

Battery, Test Leads (ML-375), Thermocouple (TC-50P), Protective Holster and Operating Instructions Included

OPTIONAL ACCESSORY - Carrying Case (MC-80) - See Page 24



SPECIFICATIONS:

General

Display: 3 3/4 Digit LCD with polarity indicator, 42 segment bar graph, .5" high

Auto Power Off: 30 minutes

Overrange Indication: Most significant digit blinks

Operating Environment: 0°C to 40°C, <80% relative humidity

Storage Environment: -20°C to 60°C, <70% relative humidity

Measurement Rate: Digital 2 times per second, bargraph 20 times per second, capacitance 1 time per second

Power: 9V alkaline or carbon zinc battery (NEDA 1604)

Battery Life: 500 hours typical with alkaline cells

Fuse: 2A/250V

Dimensions, Weight: 3.25" wide x 7" long x 1.25" thick (82.6mm x 177.8mm x 31.8mm), net weight 11.5oz. (326g)

DC Voltage

Range	Resolution	Accuracy
400mV	0.1mV	±0.3% of rdg ±1D
4V	1mV	±0.3% of rdg ±1D
40V	10mV	±0.3% of rdg ±1D
400V	100mV	±0.3% of rdg ±1D
1000V	1V	±0.3% of rdg ±3D

Overload Protection: 1000V pk (10 sec.)

DC Current

Range	Resolution	Accuracy
4mA	0.001mA	±1.5% of rdg ±2D
40mA	0.01mA	±1.5% of rdg ±2D
400mA	0.1mA	±1.5% of rdg ±2D
4000mA	1mA	±1.5% of rdg ±2D
10A	0.01A	±2% of rdg ±2D

Overload Protection: mA = 2A/250V, 10A = Unfused

AC Voltage

Range	Resolution	Accuracy
4V	1mV	±1.2% of rdg ±5D
40V	10mV	±1.2% of rdg ±5D
400V	100mV	±1.2% of rdg ±5D
750V	1V	±1.2% of rdg ±5D

Input Impedance: 10MΩ on all ranges

Overload Protection: 1000V pk (10 sec.)

AC Current

Range	Resolution	Accuracy
4mA	0.001mA	±2% of rdg ±5D
40mA	0.01mA	±2% of rdg ±5D
400mA	0.1mA	±2% of rdg ±5D
2000mA	1mA	±2% of rdg ±5D
10A	0.01A	±2% of rdg ±5D

Frequency Range: 50Hz - 500Hz

Overload Protection: mA = 2A/250V,

10A = Unfused

Resistance

Range	Resolution	Accuracy
400Ω	0.1Ω	±1% of rdg ±2D
4KΩ	1Ω	±0.7% of rdg ±2D
40KΩ	10Ω	±0.7% of rdg ±2D
400KΩ	100Ω	±0.7% of rdg ±2D
4MΩ	1KΩ	±0.7% of rdg ±2D
40MΩ	10KΩ	±2% of rdg ±5D

Overload Protection: 250V DC or peak AC, 10 sec.

Capacitance

Range	Resolution	Accuracy
4nF	0.001nF	±5% of rdg ±2D
40nF	0.01nF	±5% of rdg ±2D
400nF	0.1nF	±5% of rdg ±2D
4μF	1nF	±5% of rdg ±2D
40μF	10nF	±5% of rdg ±2D

Frequency Measurement

Range	Resolution	Accuracy
100Hz	0.001Hz	±1% of rdg ±10D
1000Hz	0.1Hz	±1% of rdg ±10D
10kHz	1Hz	±1% of rdg ±10D
100kHz	10Hz	±1% of rdg ±10D
1000kHz	100Hz	Not Specified

Temperature Measurement

Range: 0°F to 2000°F

Resolution: 1°F

Accuracy: 0°F to 225°F (±5° ±2D)

225°F to 2000°F (±3% of rdg)

Diode Test: 3.2V

Continuity Test (Audible)

Beeper Response: <40Ω

Response Time: Instantly

Digital Multimeter

DM-500

- **Our Top Of The Line DMM**
- **High Accuracy & Resolution - Affordable Price**
- **Perfect For Lab Use or Plant Maintenance**

- Auto Ranging/True RMS
- Dual Display
- Analog Bar Graph
- 3 3/4 Digit LCD, 1.8" H
- 10 Location Memory
- Time Mode
- MIN, MAX, AVG and REL
- Capacitance/Inductance
- Temperature (C & F)
- Logic Detector
- Continuity/Diode Test
- Fused 20A Input
- Data Hold
- 2-Year Limited Warranty

Battery, Test Leads (ML-375), Thermocouple (TC-50P), Adapter (MA-500), Carrying Case, Spare Fuse and Operating Instructions Included

OPTIONAL ACCESSORIES - Safety Holster with Probe Holders (MH-500), Soft Carrying Case (MC-500) - See Page 24



SPECIFICATIONS:

General

Display: 3 3/4 Digit LCD, 1.8" high, 21 segment bar graph

Overrange Indication: "OL" is displayed.

Operating Environment: 0°C to 50°C, <80% relative humidity

Storage Environment: -40°C to 70°C, <95% relative humidity with battery removed

Auto Power OFF: After 30 min. ±1 min. with no key operation except for Hz, C or L

Power: 9V alkaline or carbon zinc battery

Battery Life: 60 hours typical with carbon zinc cells, 120 hours typical with alkaline cells

Low Battery Indication: Below 6.9V ±0.5V

Dimensions, Weight: 3.46" wide x 7.83" long x 1.45" thick (88mm x 199mm x 37mm), Net weight 14.5oz. (410g)

DC Voltage

Range	Resolution	Accuracy
400mV	0.1mV	±0.3% of rdg ±2D
4V	0.001V	±0.5% of rdg ±2D
40V	0.01V	±0.5% of rdg ±2D
400V	0.1V	±0.5% of rdg ±2D
1000V	1V	±0.5% of rdg ±2D

Overload Protection: 250V rms, PTC on 400mV range, 1000V rms on all other ranges

Input Impedance: 71GΩ on 400mV range, 10MΩ on all other ranges

DC Current

Range	Resolution	Accuracy
400µA	0.1µA	± 1% of rdg ± 2D
400mA	0.1mA	± 1% of rdg ± 2D
20A	0.1A	± 1% of rdg ± 2D

Overload Protection: 250V rms, PTC on 400µA range, 0.5A/250V fuse on 400µA range, 20A/250V fuse on 20A range

AC Voltage

Range	Resolution	Accuracy
400mV	0.1mV	±1% of rdg ±3D
4V	0.001V	±1.5% of rdg ±5D
40V	0.01V	±1.5% of rdg ±5D
400V	0.1V	±1.5% of rdg ±5D
750V	1V	±1.5% of rdg ±5D

Input Impedance: >1GΩ on 400mV range, 10MΩ on all other ranges

Overload Protection: 250V rms, PTC on the 400mV range, 100V rms on all other ranges

Frequency Range: 50Hz to 1kHz on 400mV range, 50Hz to 100Hz on the 4V range, 50Hz to 500Hz on all other ranges

AC Current

Range	Resolution
400µA	0.1µA
400mA	0.1mA
20A	0.01A

Accuracy: ±1.5% of rdg ±3D @ 50Hz to 100Hz, ±3% of rdg ±5D @ 100Hz to 1kHz

Overload Protection: Use DC current values

Resistance

Range	Resolution	Accuracy
400Ω	0.1Ω	±0.5% of rdg ±2D
4KΩ	0.001KΩ	±0.5% of rdg ±2D
40KΩ	0.01KΩ	±0.5% of rdg ±2D
400KΩ	0.1KΩ	±0.5% of rdg ±2D
4MΩ	0.001MΩ	±1% of rdg ±2D
40MΩ	0.01MΩ	±1% of rdg ±2D

Overload Protection: 250V rms, PTC

Frequency Measurement

Range	Resolution	Accuracy
10kHz	1Hz	±0.01% of rdg ±1D
100kHz	10Hz	±0.01% of rdg ±1D
1MHz	100Hz	±0.01% of rdg ±1D
10MHz	1kHz	±0.01% of rdg ±1D

Continued on next page.

DM-500 *continued*

SPECIFICATIONS:

Decibel

Range	dBm Range	Frequency	Accuracy
4V	-25.74 to 14.25	30 to 200Hz	±0.5dB
40V	-5.74 to 8.24	20 to 1kHz	±0.5dB
40V	-5.74 to 8.24	1k to 2kHz	±1dB
40V	-5.74 to 8.24	2k to 5kHz	±2dB
40V	8.24 to 34.25	30 to 5kHz	±0.5dB
40V	8.24 to 34.25	5k to 10kHz	±1dB
40V	8.24 to 34.25	10k to 20kHz	±2dB
400V	31.76 to 54.25	30 to 20kHz	±0.5dB
750V	51.76 to 59.71	30 to 20kHz	±0.5dB

Input Impedance: 10MΩ

Resolution: 0.01dBm

Logic Measurement

Logic Type: TTL

Range: Lo = <0.8V, Hi = >2V, Mid = 0.8V to 2V

Capacitance

Range: 0 - 100μF

Resolution: 0.01μF

Accuracy: ±3% of rdg ±5D

Diode

Open Circuit Voltage: 3.3V max.

Test Current: 1mA

Inductance

Range: 0 to 100H

Resolution: 0.01H

Accuracy: ±3% of rdg ±5D up to 20H

±5% of rdg ±5D up to 50H

±10% of rdg ±5D up to 100H

Signal Out

Frequency: 2048Hz, 4096Hz,
8192Hz Square Wave

Output Level: 4V p-p min.

Accuracy: ±0.01%

Output Impedance: 1.5kΩ

Time

Range: 1 sec. to 10 hours (presettable)

Resolution: 1 sec

Accuracy: ±0.2% of rdg ±1D

Temperature

Range: -17°C to 1200°C (0°F to 2000°F)

Resolution 1°C (1°F)

Accuracy:

±3% of rdg ±5D from -20°C to 10°C
(0°F to 50°F)

±3 of rdg ±3D from 10°C to 350°C
(50°F to 662°F)

±5% of rdg ±3D from 350°C to 1200°C (662°F
to 2000°F)

Continuity

Beeper Response: <100Ω

AC Clamp-On Current Adapter

CM-100

- **Ideal For Plant/Industrial Maintenance**
- **Adds AC Clamp-On Current Measurement Capability To Standard DMMs***

- 0-1000 Amps AC
- $\pm 2.5\%$ Basic Accuracy
0-800 A; 3.5% 800-1000A
- 1mV/1A Resolution
- 0-1V RMS AC Output
with $\geq 1\text{m}\Omega$ Meters
- 2.1" Jaw Opening
- Works with Most DMMs
(Full Scale $\leq 1\text{-}2\text{V AC}$)
- Small Size
- Light Weight
- Durable, High Impact
Plastic Case
- 90-Day Limited Warranty

Test Leads, Wrist Strap and Operating Instructions Included

SPECIFICATIONS:

General

Input: 0-1000A AC max.

Output: 0-1V AC RMS with $\geq 1\text{M}\Omega$ meters

Resolution: 1mV/1A

Accuracy (50 Hz - 60 Hz):

0-800A $\pm 2.5\%$ of rdg $\pm 4D$
800-1000A $\pm 3.0\%$ of rdg $\pm 4D$

Operating Temperature: 0°C to +50°C

Storage Temperature: -20°C to +60°C

Dimensions, Weight: 3.4" wide x
7.25" long x 1" thick (86mm x 184mm x
25mm), net weight 7oz. (198g)

Output Jacks: Standard banana type

The ECG model CM-100 Adapter Jaw enables clamp-on AC current measurements of up to 1000 amperes to be made with a conventional digital multimeter.

* The CM-100 works with most popular brands and models of DMMs. It requires a meter with an AC voltage range $\leq 1\text{-}2\text{V AC}$ full scale and an input impedance of $1.0\text{m}\Omega$ or greater.



Digital Capacitance Meter

CX-920A

- A "Must" For Trouble Shooting and Circuit Design
- Measures To 20mF (20,000µF)
- Portable, Battery Operated

- 0.1pF to 20mF (20,000µF), 9 Ranges
- 0.5% Basic Accuracy
- 3 1/2 Digit LCD, 0.55" H
- Zero Adjustment
- Input Protected
- Low Battery Indicator
- Overrange Indicator
- Rotary Range Switch
- Rugged Construction
- Tilt Stand
- 1-Year Limited Warranty

Battery, Test Leads (ML-920A), Spare Fuse and Operating Instructions Included



SPECIFICATIONS:

General

Display: 3 1/2 Digit LCD, 0.55" high

Overrange Indication: A "1" is displayed with the 3 least significant digits blanked

Operating Environment: 0°C to 50°C, <70% relative humidity

Storage Environment: -20°C to 60°C, <80% relative humidity with battery removed

Temperature Coefficient: 0.1 x specified accuracy per °C, which is only applicable for the temperature range of <18°C or >28°C

Power: 9V alkaline or carbon zinc battery (NEDA 1604)

Battery Life: 150 hours typical with carbon zinc cells

Low Battery Indicator: Symbol is displayed

Dimensions, Weight: 2.8" wide x 6" long x 1.5" thick (70mm x 151mm x 38mm), net weight 7oz. (200g)

Capacitance

Range	Resolution	Accuracy
200pF	0.1pF	±0.5% of rdg ±1D ±0.5pF
2000pF	1pF	±0.5% of rdg ±1D
20nF (.02µF)	10pF	±0.5% of rdg ±1D
200nF (.2µF)	100pF	±0.5% of rdg ±1D
2µF	1nF	±0.5% of rdg ±1D
20µF	10nF	±0.5% of rdg ±1D
200µF	0.1µF	±0.5% of rdg ±1D
2000µF	1µF	±2% of rdg ±1D
20mF (20,000µF)	10µF	±4% of rdg ±1D

Accuracy is based on an operating temperature of 23°C (73°F) at relative humidity up to 75%

Test Voltage

3.5V peak max., "+" input terminal voltage is always higher than "-" input terminal

Overload Protection

100mA/250V, fast blow fuse

Zero Capacitance Adjustment Range

Approx. ±20pF

Battery Tester

BAT-15

Ideal For: • Home • Office • Workshop

- **Very Economical**
- **15 Measuring Ranges**
- **Pocket Size**
- Moving Coil -90° Arc, 200µA FS Movement
- Easy To Read Scales
- Self Storing Test Leads
- High Impact ABS Plastic Case

Battery, Test Leads and Operating Instructions Included



SPECIFICATIONS:

General

Front Panel Controls: Function selector switch, mechanical zero adjuster

Movement: Moving coil -90° arc, 200µA full scale

Scales (3): Silver, mercury, all other batteries

Operating Position: Horizontal or vertical

Dimensions, Weight: 4.12" long x 2.5" wide x 1.2" thick (105mm x 64mm x 32mm), net weight 4.1oz. (116g)

Battery	Total Load Ohm	Working Fine Current (mA)	Max. Replace Volts	Max. Good Volts
1.5V Button	750	2	1.05	1.65
All Chemistries* 1.5V "AAA"	75	20	1.05	1.65
All Chemistries* 1.5V "AA"	37.5	40	1.05	1.65
All Chemistries* 1.5V "C"	10	150	1.05	1.65
All Chemistries* 1.5V "D"	5	300	1.05	1.65
3V Lithium	3,000	1	2.1	3.3
22.5V	2,250	10	15.7	24.7
12V	60	200	8.4	13.2
9V	500	18	6.3	9.9
6V Lantern	15	400	4.2	6.6
5.6-6.0V	1,200	5	3.8	6.0
4.0-4.5V	900	5	2.86	4.5
2.7-3.0V	600	5	1.91	3.0
1.6-1.7V	1,500	1	1.08	1.7
1.35-1.4V	292	5	1.05	1.65

1. Working Fine Currents (mA) are based on nominal battery voltage

2. Max. Replace Volts are 70% of nominal battery voltage

3. Max. Good Volts are 110% of nominal battery voltage

*NOTICE

1.5V AAA, AA all chemistries: General purpose (carbon zinc)

1.5V C, all chemistries: Heavy-duty (zinc chloride)

1.5V D, all chemistries: Alkaline (alkaline manganese)

Digital Infrared Thermometer

DIT-205

- **Pen-style IR thermometer fits easily in a pocket or purse for quick and easy surface temperature measurements**
- **Temperature Range: -27° to 428°F (-33° to 220°C)**
- **Accuracy: ±2% of reading or ±2°C**
- 0.1° resolution for accurate readings
- Selectable temperature units F/C
- 1:1 Optics (distance-to-spot size ratio)
- Emissivity preset to 0.95
- LCD display
- Non-contact
- Does not use a laser beam
- Metal alloy case
- Lithium batteries (2 LR44 included typically provide for 180 hours of continuous operation)
- Low battery indication
- Automatic power OFF after 15 seconds
- RoHS Compliant
- 1 Year Warranty
- Durable pocket clip



SPECIFICATIONS:

General

Measurement Range: -27° to 428°F
(-33° to 220°C)

Ambient Operating Range: 32° to 122°F
(0° to 50°C)

Storage Temperature Range: -4° to 149°F
(-20° to 65°C)

Accuracy: ±2% of reading or ±2°C

Resolution at -9.9°~199.9°C: 0.1° F or °C

Response Time (90%): 1 second

D:S: 1:1

Emissivity: Fixed 0.95

Update Frequency: 1.4Hz

Dimensions: 3.25 x 0.5 inches

Wave Length Response: 5-14um

Weight (with battery): 2 oz

Batteries: 2 LR44 (included)

Battery Life: 180hr (typical)

Where can I use an infrared thermometer?

Kitchen:

- Temperatures of all cooking surfaces
- Microwaved foods
- Dishes in microwave heat differently
- Baby formula bottles
- Baby foods
- Teflon fry pans actually become toxic at high temperatures
- Appliance performance: freezer and oven temperature
- Dishwasher water temperatures
- Hot oil temperatures in deep fryers
- Cookie sheet temperature
- Crock pot accuracy
- Melting chocolate
- Candle making
- Home beer brewing
- Fondues: cheese, oil, chocolate
- Serving temperatures of beer and wine
- Pizza ovens

Safety:

- Child car seats
- Bath water: especially children and infants
- Check playground equipment: slides and swings
- Beach sand
- Benches and chair temperatures

Health:

- Foot temperatures for diabetics
- Muscle tears and sprains
- Arthritic areas
- Horses: bad shoe, muscle tear, scar tissue
- Livestock breeding area temperatures
- Food serving quality at buffets
- Damp spots where mold and mildew grow

Around the home:

- Doors and windows for drafts
- Air conditioner air temperature
- Furnace registers
- Flue temperature in heating systems
- Ballasts in florescent lighting
- Dimmer switches for overheating
- Lightbulb before unscrewing
- Wood stoves flue temperature and ducts
- Fireplace logs (gas burn)
- Fuses and breakers for possible shorts
- Room temperatures (scan walls for heat layers)
- Reptile cages and environment
- Aquarium water temperatures
- Air conditioning: supply and return registers
- Surface temperature before painting

Outdoor uses:

- Verify BBQ surface temperatures
- Water temperatures in pools, spas and hot tubs
- Lawns for heat stress and areas sprinkler missed
- Outdoor fire pits and tool temperatures
- Small stoke engines: mowers, snow blowers
- Driveway temperature before recoating surfaces

Automotive, Hobby, Racing:

- Engine check - spark plugs - manifold
- Air conditioning and heating
- Radiator blockages
- Brake temperatures overheating
- Catalytic converters blockage
- Tire temperatures - under/over inflated
- Track temperatures match correct tires
- Engine temperatures in remote control vehicles

Handheld Digital Thermometer

DT-205

- **Perfect For - HVAC/Industrial Maintenance - Techs - Hobbyist**
- **Pocket Size - Light Weight** • **Built-In Retractable 3.5" Probe**
- **°C or °F Switchable**

- $\pm 1^{\circ}\text{C}$, $\pm 2^{\circ}\text{F}$ Accuracy
- Up to 0.1° Resolution
- 3.5 Digit LCD, 0.55" H
- Rugged Construction
- Low Battery Indicator
- Overrange Indicator
- 90 Day Limited Warranty



Battery, Carrying Case and Operating Instructions Included

DESCRIPTION:

The DT-205 is a pocket-sized Digital Thermometer with a built-in thermocouple probe that retracts into the case. It possesses features of more costly instruments such as switchable Fahrenheit and Celsius scales, up to 0.1° resolution and a large easy-to-read 3 1/2 digit display.

Measurement range is -50°C to 150°C and -58°F to 302°F . Ruggedly constructed and fast acting, the DT-205 is ideally suited for set up, adjustment and monitoring heating and cooling systems plus checking for heat loss.

SPECIFICATIONS:

General

Display: 3 1/2 Digit LCD, 0.5" high.

Overrange Indication: A "1" or "-1" is displayed with the 3 least significant digits blanked

Measurement Rate: 3 times per second

Operating Environment: 0°C to 35°C , <90% relative humidity, 35°C to 50°C <70% relative humidity

Storage Environment: -40°C to 60°C , with battery removed

Power: 9V alkaline or carbon zinc battery (NEDA 1604)

Battery Life: 300 hours typical with carbon zinc cells

Low Battery Indicator: Display indicates "Bat"

Dimensions, Weight: 1.8" wide x 5.6" long x 1.1" thick (46mm x 142mm x 28mm) Net weight 5.6oz. (142g) with battery

Celsius

Range	Resolution	Accuracy
-50°C to 150°C	0.1°C	$\pm 3^{\circ}$ @ -50° to 0° $\pm 1^{\circ}$ @ 0° to 100° $\pm 3^{\circ}$ @ 100° to 150°

Temperature Coefficient: <0.1 x the applicable accuracy specification per $^{\circ}\text{C}$, from 0°C to 18°C and 28°C to 50°C

Fahrenheit

Range	Resolution	Accuracy
-58°F to 302°F	1°F	$\pm 6^{\circ}$ @ -58° to 32° $\pm 2^{\circ}$ @ 32° to 212° $\pm 6^{\circ}$ @ 212° to 302°

Temperature Coefficient: <0.1 x the applicable accuracy specification per $^{\circ}\text{F}$, from 32°F to 64.4°F to 122°F

PR21 Logic Probe

- **Perfect Trouble Shooting Tool**
- **20MHz Pulse Detector**
- **Switch Selectable**
 - Pulse Detection or Memory
 - TTL/CMOS
- **Audible Logic State Tones**
- **Input Impedance 1M Ω**
- **Detects 30ns Pulses**
- **Operates to 20MHz**
- **Color Coded LEDs**
- **Circuit Powered**
- **90-Day Limited Warranty**



DESCRIPTION:

The PR21 is a versatile instrument for troubleshooting and analyzing logic circuits. Features include visual indication of pulse level and pulse presence, pulse memory, plus an audible, two-tone, logic state indicator. The probe responds to pulses as narrow as 30ns and pulse trains up to 20MHz, and is compatible with TTL, DTL, RTL, HTL, CMOS and MOS. It is also compact and light weight. Three color-coded LEDs indicate pulse presence and high/low logic states. Visual indication is complemented by audible tones of two distinctly different frequencies to distinguish the logic states easily. The PR21 Logic Probe is a valuable servicing aid, especially when used in conjunction with the PR31 Logic Pulsar.

SPECIFICATIONS:

Input Signal Frequency: 20MHz Max
Minimum Detectable Pulse Width: 30ns
Input Impedance: 1M Ω
Operating Supply Range (Vcc): 4V DC Min., 18V DC Max.
TTL Logic "1" (Hi LED) >2.3 \pm 0.2V DC
Logic "0" (Lo LED) <0.8 \pm 0.2V DC
CMOS Logic "1" (Hi LED) >70% Vcc \pm 10%
Logic "0" (Lo LED) <30% Vcc \pm 10%

Maximum Allowable Supply Voltage (Vcc): \pm 20V DC
Power Supply Protection: \pm 20V DC Max. (15 sec.)
Signal Input Protection: \pm 220V AC/DC Max. (15 sec.)
Pulse Indicator Flash Time: 500ms
Operating Environment: 0°C to 50°C, <80% relative humidity
Storage Environment: -20°C to 65°C, <75% relative humidity
Dimensions, Weight: 8.2" long x 0.7" dia. (21cm x 1.8cm)
net weight 1.6 oz. (45g)

PR31 Logic Probe

- **Trouble Shooting/Design Tool**
- **Pulse Generator**

- Use with Companion Logic Probe PR21 or Scope
- Compatible with Most Logic Families
- Signal Injector (Square Wave)
- Switchable 0.5/400Hz Pulse Rate
- Sources/Sinks 100mA Pulses
- External Sync Input
- Circuit Powered
- 90-Day Limited Warranty



DESCRIPTION:

The PR31 Pulse Generator is used to inject a signal into a logic circuit without having to remove the IC or open the circuit. Using the companion PR21 Logic Probe you can detect component failures or wiring errors. The average power of the injected signal is limited by supply voltage (Vcc) of the circuit under test, and with its short duration pulses, will not damage circuit components.

The PR31 Logic Pulsar produces a 10 μ s signal at a 100 mA load and can be switched to either 0.5Hz or 400Hz. It is also capable of generating a square wave equal to approximately 90% of the supply voltage (Vcc) at the square wave output terminal so that an oscilloscope can be used to observe and trace signals. The PR31 Logic Pulsar also has an external sync input, which enables the user to synchronize the pulse output with an external signal, such as a computer clock circuit.

SPECIFICATIONS:

Input Signal Frequency: 20MHz Max

Minimum Detectable Pulse Width: 30ns

Input Impedance: 1M Ω

Operating Supply Range (Vcc): 4V DC Min., 18V DC Max.

TTL Logic "1" (Hi LED) >2.3 \pm 0.2V DC

Logic "0" (Lo LED) <0.8 \pm 0.2V DC

CMOS Logic "1" (Hi LED) >70% Vcc \pm 10%

Logic "0" (Lo LED) <30% Vcc \pm 10%

Maximum Allowable Supply Voltage (Vcc): \pm 20V DC

Power Supply Protection: \pm 20V DC Max. (15 sec.)

Signal Input Protection: \pm 220V AC/DC Max. (15 sec.)

Pulse Indicator Flash Time: 500ms

Operating Environment: 0°C to 50°C, <80% relative humidity

Storage Environment: -20°C to 65°C, <75% relative humidity

Dimensions, Weight: 8.2" long x 0.7" dia. (21cm x 1.8cm)
net weight 1.6 oz. (45g)

Output Pulse Rate: 0.5/400Hz

Output Pulse Width: 10-15 μ s

Output Pulse Amplitude: Approx. 90% Vcc

Output Current: 100mA Sink/Source

Square Wave Output Current: 5mA Sink/Source

Sync Input Impedance: 1M Ω

Power Supply Range (Vcc): 5-15V DC

Overload Protection:

Power Supply 20V DC Max. (30 sec.)

Sync Input 120V DC Max. (30 sec.)

Test Point 35V DC Max. (30 sec.)

Operating Environment: 0°C to 50°C, <80% relative humidity

Storage Environment: -20°C to 65°C, <75% relative humidity

Dimensions, Weight: 8.2" long x 0.7" dia. (21cm x 1.8cm)
net weight 1.4oz. (40g)

Oscilloscope Probes

PR60, PR100, PR200B

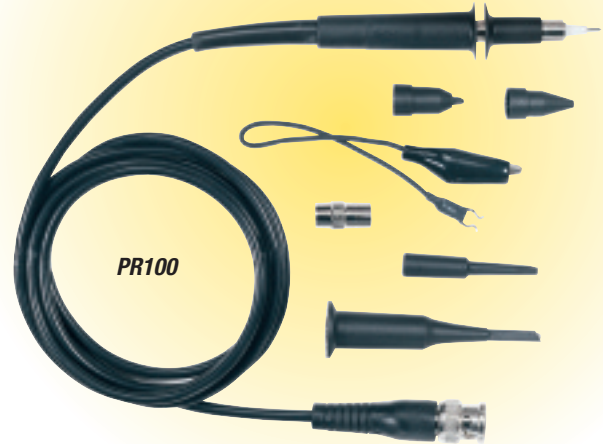
- High Quality At Economical Prices
- Compatible with Popular Scopes
- Switchable X1, X10 and Ground Reference

- Stable Calibration
- Ground Clip Rotates 360°
- Pin-Point Probe Tip
- 90-Day Limited Warranty



PR60

- 60 MHz Bandwidth



PR100

- 100 MHz Bandwidth

PR200B

- 200 MHz Bandwidth

SPECIFICATIONS:

Switch Function

X1:

Attenuation: 1:1
Bandwidth: DC to 20MHz
Input Capacitance: 72pf
Input Resistance: 237Ω

X10:

Attenuation: 10:1
Bandwidth: DC to 60MHz
Internal Resistance: 9MΩ
Compensation Range: 15 to 40pF
Input Capacitance: 14pF
Input Resistance:

10MΩ, with Oscilloscope of
1MΩ Input Resistance

Working Voltage: 600V AC p-p or 300V DC + AC p-p

Operating Temperature: -15°C to +70°C

Coaxial Cable Length: 53.6" (1363mm)

Accessories Supplied

Ground Lead and Clip
Retractable Hook

Replacement Accessories

PR200BGL - Ground Lead and Clip

PR60SH - Retractable Hook

SPECIFICATIONS:

Switch Function

X1:

Attenuation: 1:1
Bandwidth: DC to 10MHz
Rise Time: 35ns
Input Capacitance: 75pf + Oscilloscope
Input Capacitance

X10:

Attenuation: 10:1
Bandwidth: DC to 100MHz
Rise Time: 3.5ns
Compensation Range: 15 to 50pF
Input Resistance:

10MΩ, with Oscilloscope of
1.0MΩ Input Resistance

Input Capacitance: 11pF

Reference Position: Tip Grounded via 9MΩ,
Oscilloscope Input Grounded

Working Voltage: 600V (DC + peak AC)

Operating Temperature: 0°C to +70°C

Coaxial Cable Length: 57" (1478mm)

Accessories Supplied

Ground Lead and Clip Retractable Hook
IC Tip Insulating Tip
BNC Adapter Trimmer Tool

Replacement Accessories

PR200BGL - Ground Lead and Clip

PR200BSH - Retractable Hook

PR200BKT Accessory Kit: Ground Lead and
Clip; IC Tip; BNC Adapter; Retractable Hook;
Insulating Tip; Trimmer Tool

SPECIFICATIONS:

Switch Function

X1:

Attenuation: 1:1
Bandwidth: DC to 5MHz
Rise Time: 75ns
Input Capacitance: 60pf + Oscilloscope
Input Capacitance

X10:

Attenuation: 10:1 (±3%)
Bandwidth: DC to 200MHz
Rise Time: 1.8ns
Compensation Range: 10 to 60pF
Input Resistance:

10MΩ, with Oscilloscope of
1.0MΩ Input Resistance

Input Capacitance: 14pF

Reference Position: Tip Grounded via 9MΩ,
Oscilloscope Input Grounded

Working Voltage: 600V (DC + peak AC)

Operating Temperature: 0°C to +70°C

Coaxial Cable Length: 47.2" (1200mm)

Accessories Supplied

Ground Lead and Clip Retractable Hook
IC Tip Insulating Tip
BNC Adapter Trimmer Tool
Replacement Tip

Replacement Accessories

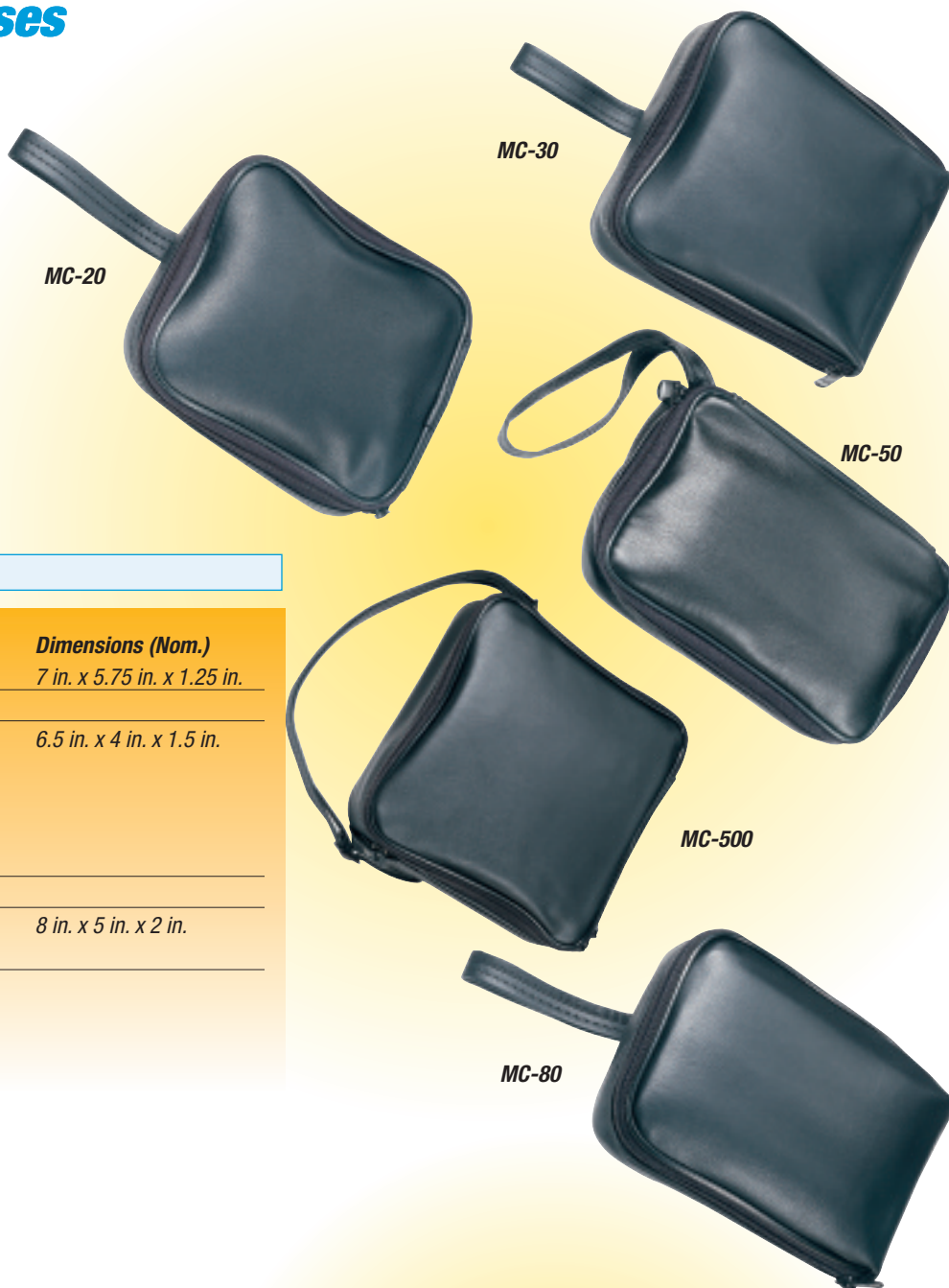
PR200BGL - Ground Lead and Clip

PR200BSH - Retractable Hook

PR200BKT Accessory Kit: Ground Lead and
Clip; IC Tip; BNC Adapter; Retractable Hook;
Insulating Tip; Trimmer Tool; Replacement Tip

Soft Carrying Cases

- Cloth Reinforced Vinyl
- Double Machine Stitched
- Cushion Lining
- Dependable Fasteners
- Carrying Handles



DESCRIPTION:

Meter Model No.	Part No.	Dimensions (Nom.)
AM-20	MC-20	7 in. x 5.75 in. x 1.25 in.
AM-30	MC-30	
CX-920A	MC-50	6.5 in. x 4 in. x 1.5 in.
DM-21		
DM-50		
DM-59		
DM-75		
DM-80	MC-80	
DM-37	MC-300	8 in. x 5 in. x 2 in.
DM-78A		
DM-500	MC-500	

Protective Holster and Tilt Stand

- Fitted
- Resilient Molded Plastic
- Belt Clip

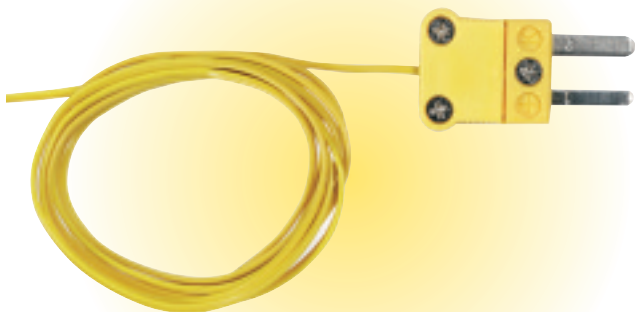
DESCRIPTION:

Meter Model No.	Part No.
DM-500	MH-500



Accessories

Replacement Thermocouples (K-Type)



DESCRIPTION:

Meter Model No.

DM-80
DM-500

TC-50P (With Connector)
TC-50P (With Connector)

Replacement Oscilloscope Probe Accessories

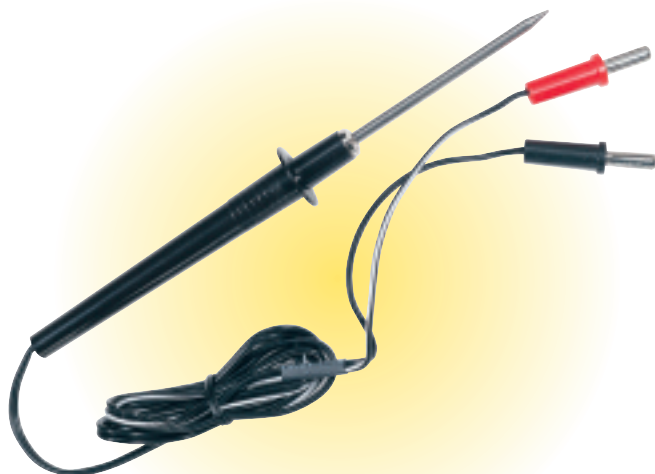


DESCRIPTION:

Probe Model No.
PR200B

Part No.
PR200BSH (Retractable Hook)

Temperature Probe

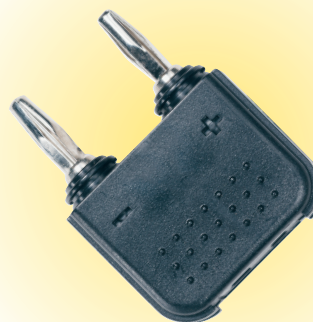


DESCRIPTION:

Meter Model No.
AM-30

TC-30

K-Type Temperature Probe Adapter



DESCRIPTION:

Meter Model No.
DM-500

Part No.
MA-500

Distributed by:

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