



INSTRUCTION MANUAL

MT1885

1500V DC MULTIMETER



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1. INTRODUCTION

This meter measures AC/DC Voltage, AC/DC Current, Resistance, Capacitance, Frequency (electrical & electronic), Duty Cycle, Diode Test, and Continuity plus Thermocouple Temperature. Proper use and care of this meter will provide many years of reliable service.

2. SAFETY SYMBOLS



This symbol adjacent to another symbol, terminal or operating device indicates that the operator must refer to an explanation in the Operating Instructions to avoid personal injury or damage to the meter.

WARNING

This symbol indicates a potentially hazardous situation, which if not avoided, could result in death or serious injury.

CAUTION

This symbol indicates a potentially hazardous situation, which if not avoided, may result in damage to the product.



This symbol advises the user that the terminal(s) so marked must not be connected to a circuit point at which the voltage with respect to earth ground exceeds (in this case) 1000 VAC or VDC.



This symbol adjacent to one or more terminals identifies them as being associated with ranges that may, in normal use, be subjected to particularly hazardous voltages. For maximum safety, the meter and its test leads should not be handled when these terminals are energized.



This symbol indicates that a device is protected throughout by double insulation or reinforced insulation.

PER IEC1010 OVERVOLTAGE INSTALLATION CATEGORY OVERVOLTAGE CATEGORY I

Equipment of OVERVOLTAGE CATEGORY I is equipment for connection to circuits in which measures are taken to limit the transient overvoltages to an appropriate low level.

Note – Examples include protected electronic circuits.

OVERVOLTAGE CATEGORY II

Equipment of OVERVOLTAGE CATEGORY II is energy-consuming equipment to be supplied from the fixed installation.

Note – Examples include household, office, and laboratory appliances.

OVERVOLTAGE CATEGORY III

Equipment of OVERVOLTAGE CATEGORY III is equipment in fixed installations.

Note – Examples include switches in the fixed installation and some equipment for industrial use with permanent connection to the fixed installation.

OVERVOLTAGE CATEGORY IV

Equipment of OVERVOLTAGE CATEGORY IV is for use at the origin of the installation.

Note – Examples include electricity meters and primary over-current protection equipment

3. SAFETY INSTRUCTIONS

This meter has been designed for safe use, but must be operated with caution. The rules listed below must be carefully followed for safe operation.

1. **NEVER** apply voltage or current to the meter that exceeds the specified maximum:

Input Protection Limits	
Function	Maximum Input
V DC or V AC	1500VDC/1000V AC RMS
mA AC/DC	800mA 1000V fast acting fuse
A AC/DC	10A 1000V fast acting fuse (10A for 30 seconds max every 15 minutes)
Frequency, Resistance, Capacitance, Duty Cycle, Diode Test, Continuity	250VDC/AC RMS
Temperature	250VDC/AC RMS

2. **USE EXTREME CAUTION** when working with high voltages.
3. **DO NOT** measure voltage if the voltage on the "COM" input jack exceeds 1000V above earth.
4. **NEVER** connect the meter leads across a voltage source while the function switch is in the current, resistance, or diode mode. Doing so can damage the meter.
5. **ALWAYS** discharge filter capacitors in power supplies and disconnect the power when making resistance or diode tests.
6. **ALWAYS** turn off the power and disconnect the test leads before opening the covers to replace the fuse or batteries.
7. **NEVER** operate the meter unless the back cover and the battery and fuse covers are in place and fastened securely.

If the equipment is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired.

4. CONTROLS AND JACKS

1 - 6,000 count LCD display

2 - Hz% button

3 - RANGE button


4 - MODE button

5 - Function switch

6 - mA, μ A and 10A input jacks

7 - COM input jack

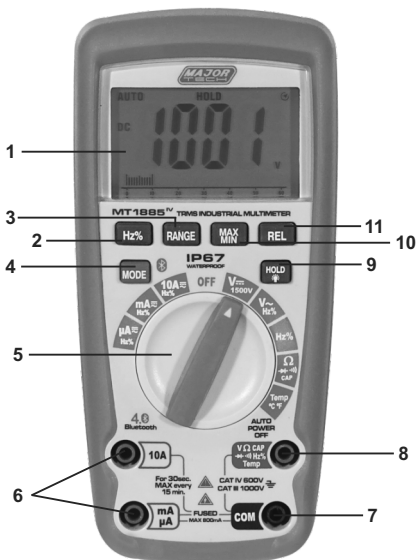
8 - Positive input jack

9 -  Backlight and Hold button

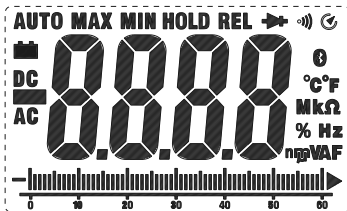
10 - MAX/MIN button

11 - REL button

Note: Tilt stand and battery compartment are on rear of unit.



5. SYMBOLS AND ANNUNCIATORS



	Continuity	REL	Relative
	Diode test	AC	Alternating current
	Battery status	DC	Direct current
n	nano (10^{-9}) (capacitance)	MIN	Minimum
μ	micro (10^{-6}) (amps, cap)	MAX	Maximum
m	milli (10^{-3}) (volts, amps)	AUTO	Auto Range Timing symbol Backlight Bargraph
A	Amps	V	Volts
k	kilo (10^3) (ohms)	AUTO	Auto ranging
F	Farads (capacitance)	HOLD	Display hold
M	mega (10^6) (ohms)	°F	Degrees Fahrenheit
Ω	Ohms	°C	Degrees Celsius
Hz	Hz Hertz (frequency)		

6. OPERATING INSTRUCTIONS



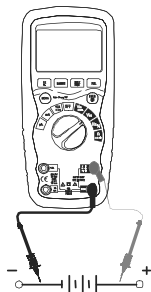
WARNING: Risk of electrocution. High-voltage circuits, both AC and DC, are very dangerous and should be measured with great care.

1. ALWAYS turn the function switch to the **OFF** position when the meter is not in use.
2. If "OL" appears in the display during a measurement when the value exceeds the range you have selected. Change to a higher range.

6.1. DC VOLTAGE MEASUREMENTS

CAUTION: Do not measure DC voltages if a motor on the circuit is being switched ON or OFF. Large voltage surges may occur that can damage the meter.

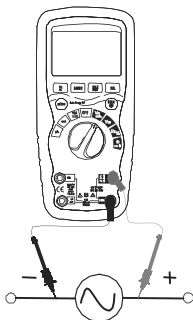
1. Set the function switch to the "**DC**" position.
2. Insert the black test lead banana plug into the negative **COM** jack. Insert the red test lead banana plug into the positive **V** jack.
3. Touch the black test probe tip to the negative side of the circuit. Touch the red test probe tip to the positive side of the circuit.
4. Read the voltage on the display.



6.2. AC VOLTAGE MEASUREMENTS

CAUTION: Do not measure AC voltages if a motor on the circuit is being switched ON or OFF. Large voltage surges may occur that can damage the meter.

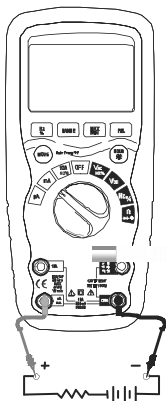
1. Set the function switch to the "**AC**" position.
2. Insert the black test lead banana plug into the negative **COM** jack. Insert red test lead banana plug into the positive **V** jack.
3. Touch the black test probe tip to the neutral side of the circuit. Touch the red test probe tip to the "hot" side of the circuit.
4. Read the voltage on the display.



6.3. AC/DC CURRENT MEASUREMENTS

CAUTION: Do not make 10A current measurements for longer than 30 seconds. Exceeding 30 seconds may cause damage to the meter and/or the test leads.

1. Insert the black test lead banana plug into the negative **COM** jack.
2. For current measurements up to 6000 μ A AC/DC, set the function switch to the **μ A** position and insert the red test lead banana plug into the **μ A/mA** jack, press mode button to select AC or DC.
3. For current measurements up to 600mA DC, set the function switch to the **mA** position and insert the red test lead banana plug into the **μ A/mA** jack, press mode button to select AC or DC.
4. For current measurements up to 10A DC, set the function switch to the **10A** position and insert the red test lead banana plug into the **10A** jack, press mode button to select AC or DC.
5. Remove power from the circuit under test, then open up the circuit at the point where you wish to measure current.
6. Touch the black test probe tip to the negative side of the circuit. Touch the red test probe tip to the positive side of the circuit.
7. Apply power to the circuit.
8. Read the current on the display.



6.4. RESISTANCE MEASUREMENTS

WARNING: To avoid electric shock, disconnect power to the unit under test and discharge all capacitors before taking any resistance measurements. Remove the batteries and unplug the line cords.

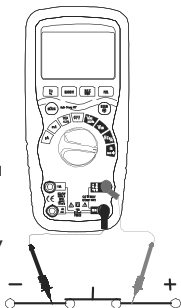
1. Set the function switch to the Ω CAP $\rightarrow \bullet \gg$ position.
2. Insert the black test lead banana plug into the negative **COM** jack. Insert the red test lead banana plug into the positive Ω jack.
3. Press the **MODE** button to indicate " Ω " on the display.
4. Touch the test probe tips across the circuit or part under test. It is best to disconnect one side of the part under test so the rest of the circuit will not interfere with the resistance reading.
5. Read the resistance on the display.



6.5. CONTINUITY CHECK

WARNING: To avoid electric shock, never measure continuity on circuits or wires that have voltage on them.

1. Set the function switch to the Ω CAP $\rightarrow \bullet \gg$ position.
2. Insert the black lead banana plug into the negative **COM** jack. Insert the red test lead banana plug into the positive Ω jack.
3. Press the **MODE** button to indicate " $\bullet \gg$ " and " Ω " on the display.
4. Touch the test probe tips to the circuit or wire you wish to check.
5. If the resistance is less than approximately 30Ω , the audible signal will sound. If the circuit is open, the display will indicate "OL".



6.6. DIODE TEST

1. Set the function switch to the **Ω CAP** position.
2. Insert the black test lead banana plug into the negative **COM** jack and the red test lead banana plug into the positive **V** jack.
3. Press the **MODE** button to indicate "**▶**" and "**V**" on the display.
4. Touch the test probes to the diode under test. Forward voltage will typically indicate 0.400 to 0.700V. Reverse voltage will indicate "**OL**". Shorted devices will indicate near 0V and an Open device will indicate "**OL**" in both polarities.



6.7. CAPACITANCE MEASUREMENTS

⚠ WARNING: To avoid electric shock, disconnect power to the unit under test and discharge all capacitors before taking any capacitance measurements. Remove the batteries and unplug the line cords.

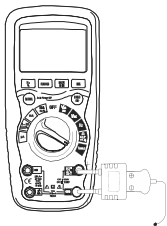
1. Set the rotary function switch to the **Ω CAP** **▶** **)))** position.
2. Insert the black test lead banana plug into the negative **COM** jack.
3. Insert the red test lead banana plug into the positive **V** jack.
4. Touch the test leads to the capacitor to be tested. Read the capacitance value on the display



6.8. TEMPERATURE MEASUREMENTS

1. Set the function switch to the "**Temp**" positive and press the **MODE** key to select the "**°C**" measuring or "**°F**" measuring.
2. Insert the Temperature Probe into the input jacks, making sure to observe the correct polarity.
3. Touch the Temperature Probe head to the part whose temperature you wish to measure. Keep the probe touching the part under test until the reading stabilizes (about 30 seconds).
4. Read the temperature on the display.

Note: The temperature probe is fitted with a type K mini connector. A mini connector to banana connector adaptor is supplied for connection to the input banana jacks.



6.9. FREQUENCY MEASUREMENT

1. Set the function switch to the Hz/Duty position.
2. Insert the black test lead banana plug into the negative (-) jack (COM) and the red test lead banana plug into the positive (+) jack (F).
3. Touch the test probe tips to the circuit under test.
4. Read the frequency on the display. The digital reading will indicate the proper decimal point, symbols (Hz, kHz, MHz) and value.

NOTE: Press the **Hz%** key to select the frequency or the duty cycle measuring.

6.10. NCV-CONTACT AC VOLTAGE TEST (NCV)

1. Set the function switch to the ON position.
2. Remove the meter and face the NCV detector to ACV source.
3. If source voltage above 110V, the red backlight will light.

6.11. MODE/BLUETOOTH BUTTON

1. To select DC/AC current or voltage or resistance/capacitance Diode/Continuity or °C /°F
2. Press the key then turn on the power, the Auto Power-off function will be cancelled, the sign "☑" disappears in the LCD; and enters into the sleep status (power-off), press the key then power on will have Auto Power-off function.
3. Press and hold **MODE** button to turn on the Bluetooth function. Hold until the Bluetooth symbol appears in the display.
4. Press and hold **MODE** button to turn off the Bluetooth function.

Note: Bluetooth Connect:

1. Download the **Major Tech METER-X** app on iOS & Android devices.
2. Turn on the Bluetooth function on the instrument using Menu Button.
3. On your mobile device, open the METER-X app and connect the meter to the app. You will be able to record live measurements and save them onto your app.
4. On the Meter-X app, to visit the help section via the settings menu for further assistance on using the app.



6.12. DATA HOLD BUTTON

The Data Hold function allows the meter to "freeze" a measurement for later reference.

1. Press the **DATA HOLD** button to "freeze" the reading on the indicator. The indicator "HOLD" will be appear in the display.
2. Press the **DATA HOLD** button to return to normal operation.
3. Press the **DATA HOLD** button to last 2 second, the blue back light function is enabled or disenabled.

6.13. RANGE BUTTON


When the meter is first turned on, it automatically goes into Auto Ranging. This automatically selects the best range for the measurements being made and is generally the best mode for most measurements. For measurement situations requiring that a range be manually selected, perform the following:

1. Press the **RANGE** button. The "AUTO" display indicator will turn off.
2. Press the **RANGE** button to step through the available ranges until you select the range you want.
3. Press and hold the **RANGE** button for 2 seconds to Exit the Manual Ranging mode and return to Auto Ranging.

6.14. MIN/MAX BUTTON

The meter displays the maximum or minimum value of input in the Max/Min mode. When **Max/Min** is pressed for the first time, the meter displays the maximum value. The meter displays the minimum value when it is pressed again. When **Max/Min** is pressed for the third time, the meter displays current value. The meter returns to normal operation when Max/Min is pressed and held for longer than one second. Press **HOLD** key in Max/Min mode makes the meter stop updating the maximum or the minimum value.

6.15. LOW BATTERY INDICATION

When the  icon appears alone in the display, the battery should be replaced.

7. MAINTENANCE

WARNING: To avoid electric shock, disconnect the test leads from any source of voltage before removing the back cover or the battery or fuse covers.

WARNING: To avoid electric shock, do not operate your meter until the battery and fuse covers are in place and fastened securely.

This Multimeter is designed to provide years of dependable service, if the following care instructions are performed:

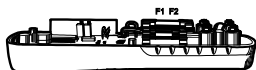
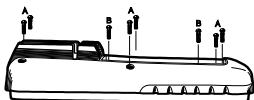
1. **KEEP THE METER DRY.** If it gets wet, wipe it off.
2. **USE AND STORE THE METER IN NORMAL TEMPERATURES.** Extreme temperatures can shorten the life of the electronic parts and distort or melt plastic parts.
3. **HANDLE THE METER GENTLY AND CAREFULLY.** Dropping it can damage the electronic parts or the case.
4. **KEEP THE METER CLEAN.** Wipe the case occasionally with a damp cloth. DO NOT use chemicals, cleaning solvents, or detergents.
5. **USE ONLY FRESH BATTERIES OF THE RECOMMENDED SIZE AND TYPE.** Remove old or weak batteries so they do not leak and damage the unit.
6. **IF THE METER IS TO BE STORED FOR A LONG PERIOD OF TIME,** the batteries should be removed to prevent damage to the unit.

7.1. BATTERY INSTALLATION

WARNING: To avoid electric shock, disconnect the test leads from any source of voltage before removing the battery cover.

1. Turn power off and disconnect the test leads from the meter.
2. Open the rear battery cover by removing two screws (B) using a Phillips head screwdriver.
3. Insert the battery into battery holder, observing the correct polarity.
4. Put the battery cover back in place. Secure with the screws.

WARNING: To avoid electric shock, do not operate the meter until the battery cover is in place and fastened securely.



NOTE: If your meter does not work properly, check the fuses and batteries to make sure that they are still in good condition and that they are properly inserted.

8. SPECIFICATIONS

8.1. DC VOLTAGE (AUTO-RANGING)

Range	Resolution	Accuracy
600.0mV	0.1mV	±0.9% of reading ± 9digits
6.000V	1mV	±0.5% of reading ± 5digits
60.00V	10mV	
600.0V	100mV	
1500V	1V	±0.6% of reading ± 6 digits

Input Impedance: approx. 10MΩ.

Maximum Input: 1500V DC or 1000V AC RMS.

8.2. AC VOLTAGE (AUTO-RANGING)

Range	Resolution	Accuracy
6.000V	1mV	±0.8% of reading ± 4digits
60.00V	10mV	
600.0V	100mV	
1000V	1V	±1.2% of reading ± 4 digits

All AC voltage ranges are specified from 5% of range to 100% of range

AC Voltage bandwidth: 50Hz to 1 KHz (Sine); 50/60Hz (All wave)

Input Impedance: 10MΩ.

AC Response: 50Hz to 1KHz

Maximum Input: 1000V DC or 1000V AC RMS.

8.3. DC CURRENT (AUTO-RANGING)

Range	Resolution	Accuracy
600.0uA	0.1uA	±1.0% of reading ± 3digits
6000uA	1uA	
60.00mA	10uA	
600.0mA	100uA	±1.0% of reading ± 3digits
10A	10mA	±1.0% of reading ± 3digits

Overload Protection: 800mA/1000V and 10A/1000V Fuse

Maximum Input: 6000uA DC on uA range

600mA DC on mA range

10A DC on 10A range.

10A: 30 sec max with reduced accuracy

8.4. AC CURRENT (AUTO-RANGING)

Range	Resolution	Accuracy
600.0uA	0.1uA	±1.5% of reading ± 3 digits
6000uA	1uA	
60.00mA	10uA	
600.0mA	100uA	
10A	10mA	±2.0% of reading ± 3 digits

All AC Current ranges are specified from 5% of range to 100% of range
AC Current bandwidth: 50Hz to 1kHz (Sine); 50/60Hz (AII wave).

Overload Protection: 800mA/1000V and 10A/1000V Fuse.

AC Response: 50 Hz to 1kHz

Maximum Input: 6000uA AC RMS on uA

600mA AC RMS on mA

10A AC RMS on 10A range

10A: 30 sec max with reduced accuracy.

8.5. RESISTANCE [Ω] (AUTO-RANGING)

Range	Resolution	Accuracy
600.0 Ω	0.1 Ω	±1.5% of reading ± 4 digits
6.000k Ω	1 Ω	±1.5% of reading ± 2 digits
60.00k Ω	10 Ω	
600.0k Ω	100 Ω	
6.000M Ω	1k Ω	±2.0% of reading ±8digits
60.00M Ω	10k Ω	

Input Protection: 250VDC/AC RMS.

8.6. CAPACITANCE (AUTO-RANGING)

Range	Resolution	Accuracy
99.9nF	0.01nF	±5.0% of reading ± 20 dgts
999.9nF	0.1nF	±4.0% of reading ± 5 dgts
9.999uF	0.001uF	
99.99uF	0.01uF	
999.9uF	0.1uF	
9.999mF	0.001mF	±10% of reading
99.99mF	0.01mF	

Input Protection: 250VDC/AC RMS.

8.7. FREQUENCY (ELECTRONIC) (AUTO-RANGING)

Range	Resolution	Accuracy
9.999Hz	0.001Hz	$\pm(1.2\% \text{ reading} \pm 4 \text{ digits})$
99.99Hz	0.01Hz	
999.9Hz	0.1Hz	
9.999KHz	1Hz	
99.99kHz	10Hz	
999.9kHz	100Hz	
9.999MHz	1kHz	

Sensitivity: 0.8V RMS min. at 20% to 80% duty cycle and <100kHz;
5VRMS min at 20% to 80% duty cycle and >100kHz.

Input Protection: 250VDC/AC RMS.

8.8. FREQUENCY (ELECTRICAL)

Range	Resolution	Accuracy
10.00~1KHz	0.01Hz	$\pm(1.5\% \text{ reading})$

Sensitivity: ACV Range ($\geq 6\%$ Range), 6000 μ A/600.0mA Range
($\geq 6\%$ Range), 600.0 μ A/60.00mA/10.00A ($\geq 60\%$ Range).

8.9. DUTY CYCLE

Range	Resolution	Accuracy
0.1%~99.9%	0.1%	$\pm 1.2\%$ of reading ± 2 dgts

Pulse width: >100 μ s, <100ms;

Frequency width: 5Hz – 150 kHz

Overload protection: 250V DC/AC RMS.

8.10. TEMPERATURE

Range	Resolution	Accuracy
-20.0°C to 599.9°C	0.1°C	$\pm 3.0\%$ of rdg $\pm 5^\circ\text{C}$
600°C to 1000°C	1°C	Meter only, probe accuracy not included
-4.0°F to 599.9 °F	0.1°F	$\pm 3.0\%$ of rdg $\pm 9^\circ\text{F}$
600°F to 1832°F	1°F	Meter only, probe accuracy not included

Sensor: Type K Thermocouple

Overload protection: 250VDC/AC RMS.

8.11. DIODE TEST

Range	Resolution	Accuracy
0.9mA typical	1mV	±10% of reading ± 5 digits

Open circuit voltage: MAX. 3.2V DC typical.

Overload protection: 250VDC/AC RMS.

8.12. AUDIBLE CONTINUITY

Function	Range
Enclosure	Double molded, waterproof
Shock (Drop Test)	6.5 feet (2 meters)
Diode Test	Test current of 0.9mA maximum, open circuit voltage 3.2V DC typical
Continuity Check	Audible signal will sound if the resistance is less than 50Ω (approx.), test current <0.9mA
Temperature Sensor	Requires type K thermocouple
Input Impedance	>10MΩ VDC & >10MΩVAC
AC Response	True RMS
AC True RMS:	The term stands for "Root-Mean-Square," which represents the method of calculation of the voltage or current value. Average responding multimeters are calibrated to read correctly only on sine waves and they will read inaccurately on non-sine wave or distorted signals. True RMS meters read accurately on either type of signal.
ACV Bandwidth	50Hz to 1KHz
Crest Factor	≤3 at full scale up to 500V, decreasing linearly to ≤ 1.5 at 1000V
Display	6000 count backlit liquid crystal with bargraph
Overrange indication	"OL" is displayed

Audible threshold: Less than 50Ω Test current MAX. 0.3mA


Overload protection: 250VDC/AC RMS.

Note: Accuracy specifications consist of two elements:

- (% reading)-This is the accuracy of the measurement circuit.
- (+ digits)-This is the accuracy of the analog to digital converter.

Note: Accuracy is stated at 18 to 28°C (65 to 83°F) and less than 75%RH.

8.14. NON-CONTACT VOLTAGE (NCV)

Function	Range
Auto Power Off	15 minutes (approximately) with disable feature
Polarity	Automatic (no indication for positive); Minus (-) sign for negative
Measurement Rate	3 times per second, nominal
Low Battery Indication	"  " is displayed if battery voltage drops below operating voltage
Battery	One 9 volt (NEDA 1604) battery
Fuses	mA, μ A ranges; 0.8A/1000V ceramic fast blow A range; 10A/1000V ceramic fast blow
Operating Temperature	5°C to 40°C (41°F to 104°F)
Storage Temperature	-20°C to 60°C (-4°F to 140°F)
Operating Humidity	Max 80% up to 31°C (87°F) decreasing linearly to 50% at 40°C (104°F)
Storage Humidity	<80%
Operating Altitude	2000 meters (7000ft.) maximum.
Weight	342g (includes holster).
Size	187 x 81 x 50mm (includes holster)
Safety	This meter is intended for origin of installation use and protected, against the users, by double insulation per EN61010-1 and IEC61010-1 2 nd Edition (2001) to Category IV 600V and Category I111000V; Pollution Degree 2. The meter also meets UL 61010-1, 2 nd Edition (2004), CAN/CSA C22.2 No. 61010-1 2 nd Edition (2004), and UL 610108-2-031, 1 ST Edition (2003)

The NCV function works on any rotary switch position.

1. Test the detector on a known live circuit before use.
2. Hold the top of the meter very close to the voltage source.
3. If voltage is present, the back light will flash a bright red.



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