INSTRUCTION MANUAL

MT25

600V AC/DC MULTIMETER

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1. Introduction

The MT25 Digital Multimeter is a compact handheld unit that provides fast and accurate measurements on an oversized, high contrast LCD display with a bargraph & backlight. The housing is double moulded plastic, for safety & durability. With multiple functions that include AC/DC voltage, AC/DC current, resistance, continuity, capacitance, frequency, duty cycle, temperature and diode test. The MT25 also offers the added convenience of a built-in LED flashlight and a tilt stand.

1.1. Warnings

- Read, understand and follow Safety Rules and Operating Instructions in this manual before using this meter.
- The meter's safety features may not protect the user if not used in accordance with the manufacturer's instructions.
- Ensure that the test leads are fully seated in the input jacks and keep fingers away from the metal probe tips when taking measurements.
- Before changing functions using the selector switch, always disconnect the test leads from the circuit under test.
- Use only Major Tech approved test leads with the proper safety category rating.
- Comply with all applicable safety codes. Use approved personal protective equipment when working near live electrical circuits - particularly with regard to arc-flash potential.
- Use caution on live circuits. Voltages above 30V AC, 42V AC peak, or 60V DC pose a shock hazard.
- Do not use if the meter or test leads appear damaged.
- Verify operation before using meter by measuring a known live voltage.
- Do not use the meter in wet or damp environments or during electrical storms.
- Do not use the meter near explosive vapors, dust or gasses.
- Do not use the meter if it operates incorrectly. The protection may be compromised.
- Do not operate meter while Low Battery warning is on. Replace batteries immediately.
- Do not apply voltage or current that exceeds the meter's maximum rated input limits.

1.2. Input Limits

Function	Maximum Input
Voltage AC or DC	600V AC RMS/600V DC
Current AC or DC	10A/600V AC RMS/600V DC (30 seconds max. every 15 minutes in the 10A range)
Resistance, Continuity, Diode Test, Capacitance, Frequency, Duty Cycle	250V AC RMS/250V DC
Temperature	250V AC/250V DC

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.

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.

Equipment is protected by double or reinforced insulation

MAX Indicates the terminal(s) so marked must not be connected to a circuit where the voltage with respect to earth ground exceeds the maximum safety rating of the meter.

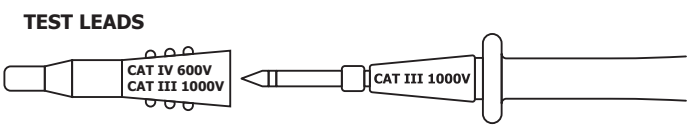
2.1. Safety Category Ratings

Category Rating	Brief Description	Typical Applications
CAT II	Single phase receptacles and connected loads	• Household appliances, power tools • Outlets more than 10m (30ft) from a CAT III source • Outlets more than 20m (60ft) from a CAT IV source
CAT III	Three phase circuits and single phase lighting circuits in commercial buildings	• Equipment in fixed installations such as 3-phase motors, switchgear and distribution panels • Lighting circuits in commercial buildings • Feeder lines in industrial plants • Any device or branch circuit that is close to a CAT III source

The measurement category (CAT) rating and voltage rating is determined by a combination of the meter, test probes and any accessories connected to the meter and test probes. The combination rating is the LOWEST of any individual component.

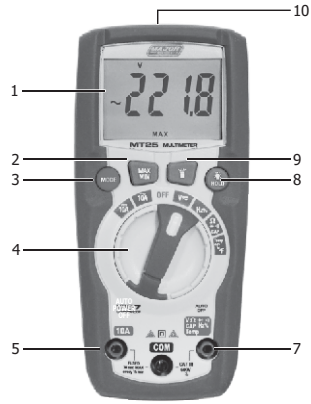
2.2. Warning

Operation is limited to CAT II applications when the insulated tips are removed from one or both test probes. Refer to Input Limits section in this manual for maximum voltage ratings.



3. Meter Description

1. LCD display
2. MAX/MIN button
3. MODE button
4. Rotary function switch
5. 10A input jack
6. COM input jack
7. V/Ω/°F °C input jack
8. HOLD Backlight button
9. Flashlight button
10. Flashlight



4. Symbols Used on LCD Display

V	Volts
A	Amperes
~	Alternating current
⎓	Direct current
−	Minus sign
Hz	Hertz (frequency)
%	Percent (duty cycle)
Ω	Ohms
)))	Continuity
⏩	Diode test
F	Farads (capacitance)
N	nano (10^{-9})

°F	Degress Farenheit
°C	Degrees Celcius
µ	micro (10^{-6})
m	milli (10^{-3})
k	kilo (10^{-3})
M	mega (10^{-6})
OL	Overload
◷	Auto Power Off
▭+ -	Low battery
AUTO	Autoranging
HOLD	Display hold
MAX/MIN	Maximum/Minimum

5. Operation

5.1. Auto Power Off

The meter automatically turns off after 15 minutes of inactivity. To reset the meter after it shuts off, turn rotary function switch to the off position and than set the switch to the desired function. To disable Auto Power Off, turn the rotary function switch to the off position. Press and hold the MODE button and set the rotary function switch to the desired function except **switch set to current**. Release the MODE button when the "⏲" symbol on the LCD display disappears. Auto Power Off is now disabled. Auto Power Off will be restored when the meter is turned off and back on again.

5.2. MODE Button

Used to select AC or DC voltage, Hz or % Duty Cycle, Ohms, Diode Test, Continuity or Capacitance, and °F and °C.

5.3. MAX MIN Button

1. Momentarily press the **MAX/MIN** button to activate the MAX/MIN mode. The "**MAX**" indicator will appear on the LCD display. The meter will display and hold the maximum reading and will update when a higher "**max**" occurs.
2. Momentarily press the **MAX/MIN** button to view the lowest reading. The "**MIN**" indicator meter will appear on the LCD display. The meter will display and hold the minimum reading and will update when a lower "**min**" occurs.
3. Press and hold the **MAX/MIN** button to end MAX/MIN and return to normal operation.

NOTE: The meter does not auto range when the MAX/MIN mode is active. The display will read "OL" if the range is exceeded. MAX/MIN does not work on Frequency, Duty Cycle, Diode Test, Continuity and Capacitance.

5.4. Flashlight Button

Press the 🔦 button to turn the flashlight on and off.

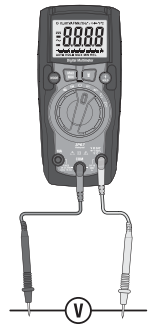
5.5. HOLD/Backlight Button

To freeze the reading on the display, momentarily press the HOLD 💡 button. "HOLD" will appear on the LCD display while the reading is being held. Momentarily press the HOLD 💡 button again to return to normal operation. The backlight illuminates the LCD display when the ambient light is too low to view the displayed readings. To turn on, press and hold the HOLD 💡 button until the backlight turns on. To turn off, press and hold the HOLD 💡 button again until the backlight turns off.

5.6. AC/DC Voltage Measurements

> ⚠ **WARNING:**
> Observe all safety precautions when working on live circuits.

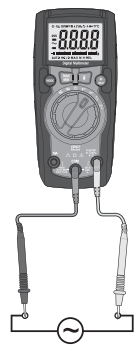
1. Set the rotatory function switch to the **V ⎓~** position.
2. Press the **MODE** button to select **AC** or **DC** voltage. The AC "**~**" or DC "⎓" symbol will appear on the LCD display.
3. Insert the black test lead into the **COM** input jack and the red test lead into the **V** input jack.
4. Touch the test lead probes to the circuit under test. If measuring DC voltage, touch the red test lead to the positive side of the circuit and the black test lead to the negative side of the circuit.



5.7. Frequency And % Duty Cycle Measurements

> ⚠ **WARNING:**
> Observe all safety precautions when working on live voltages. Do not measure frequency or duty cycle on circuits that exceed 600V.

1. Set the rotary function switch to the **HZ %** position.
2. Press the **MODE** button to select frequency or **%** duty cycle. The "**Hz**" or "**%**" symbol will appear on the LCD display.
3. Insert the black test lead into the **COM** input jack and the red test lead into the **V** input jack.
4. Touch the test lead probes to the circuit under test.
5. Read the frequency or % duty cycle on the LCD display.



5.8. AC Current Measurements

> ⚠ **WARNING:**
> Observe all safety precautions when working on live circuits. Do not measure current on circuits that exceed 250V. Measurements in the 10A range should be limited to 30 seconds maximum every 15 minutes. Max voltage 600V.

1. Set the rotary function switch to the **10A~** position.
2. Insert the black test lead into the **COM** input jack and the red test lead into the **10A** input jack.
3. Remove power from the circuit under test, then open up the circuit at the point where you wish to measure current.
4. Touch the test lead probes in series with the circuit being measured.
5. Apply power to the circuit.
6. Read the current on the LCD display.

5.9. DC Current Measurements

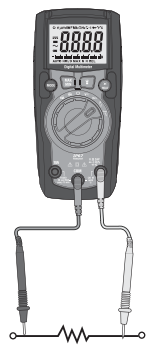
⚠ WARNING:
Observe all safety precautions when working on live circuits. Do not measure current on circuits that exceed 250V. Measurements in the 10A range should be limited to 30 seconds maximum every 15 minutes. max voltage 600V.

1. Set the rotary function switch to the **10A** ⎓ position.
2. Insert the black test lead into the **COM** input jack and the red test lead into the **10A** input jack.
3. Remove power from the circuit under test, then open up the circuit at the point where you wish to measure current.
4. Touch the test lead probes in series with the circuit being measured.
5. Apply power to the circuit.
6. Read the current on the LCD display.

5.10. Resistance Measurements

⚠ WARNING:
Never test resistance on a live circuit.

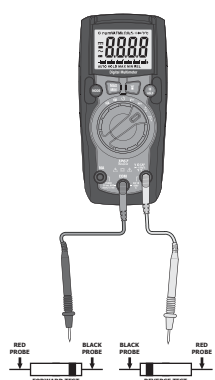
1. Set the rotary function switch to the **Ω** position.
2. Press the **MODE** button until the "**Ω**" symbol appears on the LCD display.
3. Insert the black test lead into the **COM** input jack and the red test lead into the **Ω** input jack.
4. Touch the test lead probes to the component under test. If the component is installed in a circuit, it is best to disconnect one side before testing to eliminate interference with other devices.
5. Read the resistance in on the LCD Display.



5.11. Diode Test

⚠ WARNING:
Never test diodes in a live circuit.

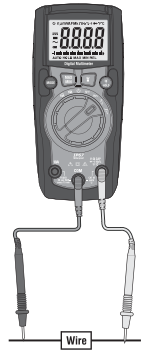
1. Set the rotary function switch to the **Ω** position.
2. Press the **MODE** button until the " " symbol appears on the LCD display.
3. Insert the black test lead into the **COM** input jack and the red test lead into the **Ω** input jack.
4. Touch the test lead probes to the diode under test.
5. Forward voltage will indicate 0.4 to 0.7 on the display. Reverse voltage will indicate "**OL**". Shorted devices will indicate near 0 and an open device will indicate "**OL**" in both polarities.



5.12. Continuity

⚠ **WARNING:**
Never test continuity on a live circuit.

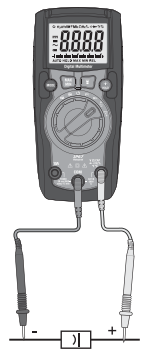
1. Set the rotary function switch to the **Ω** position.
2. Press the **MODE** button until the " " symbol appears on the LCD display.
3. Insert the black test lead into the **COM** input jack and the red test lead into the **Ω** input jack.
4. Touch the test lead probes to the device or wire under test.
5. A beeper will sound if the resistance is approximately 40Ω or less and the resistance value will be shown on the LCD display.



5.13. Capacitance Measurements

⚠ **WARNING:**
Safety discharge capacitors before taking capacitance measurements.

1. Set the rotary function switch to the **Ω** position.
2. Press the **MODE** button until the "**nF**" symbol appears on the LCD display.
3. Insert the black test lead into the **COM** input jack and the red test lead into the **Ω** input jack.
4. Touch the test lead probes to the capacitor under test.
5. Read the capacitance value on the LCD display. It may take up to a minute to get a stable reading on large capacitors.



5.14. Temperature Measurements

⚠ **WARNING:**
Do not touch temperature probe to live circuit.

1. Set the rotary function switch to the **°F °C** position.
2. Press the **MODE** button to select readings in **°F** or **°C**.
3. Connect the Temperature Probe to the Banana Plug Adapter. Note the **–** and **+** markings on the adapter. Connect the adapter to the meter, making sure the **–** side goes into the **COM** input jack and the **+** side goes into the **°F °C** input jack.
4. Touch the tip of the Temperature Probe to the object being measured. Keep the probe touching the object until the reading stabilizes (about 30 sec).
5. Read the temperature on the LCD display.

5.15. Battery Replacement

> ⚠ **WARNING:**
> To avoid electric shock, remove the test leads from the meter before removing the battery/fuse cover.

1. Lift up the tilt stand.
2. Loosen the two Phillips screws on the battery/fuse cover.
3. Remove the battery/fuse cover.
4. Replace the batteries with 3 x AAA 1.5V batteries.
5. Observe proper polarity as shown inside battery compartment.
6. Install the battery cover and tighten the screws

5.16. Fuse Replacement

> ⚠ **WARNING:**
> To avoid electric shock, remove the test leads from the meter before removing the battery/fuse cover.

1. Lift up the tilt stand.
2. Loosen the two Phillips screws on the battery/fuse cover.
3. Remove the battery/fuse cover.
4. Gently remove fuse and install new fuse into the holder.
5. Always use a UL recognized fuse of the proper size and value: 10A/600V (5 x 20mm) fast blow.
6. Install the battery cover and tighten the screws.

> ⚠ **WARNING:**
> To avoid electric shock, do not operate meter until the battery/fuse cover is securely fastened to the meter.

6. Maintenance

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. Temperature extremes 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. General Specifications

Insulation	Class 2, Double insulation
Enclosure	Double Molded, IP67 waterproof and dust-proof
Diode Test	Test current 0.3mA typical, open circuit voltage 2.8V DC typical
Continuity Test	Audible signal if the resistance is approx. 50Ω or less
Low Battery Indication	" + - " is displayed
Display	4000 count LCD display
Over Range Indication	"OL: is displayed
Polarity	Minus symbol "-" is displayed for negative polarity
Measurement Rate	2 readings per second, nominal
Auto Power Off	After approx. 15 minutes of inactivity
Input Impedance	7.8MΩ AC/DC voltage
AC Response	Average responding
AC Bandwidth	50 to 60Hz
Batteries	Three "AAA" 1.5V batteries
Fuse	10A/600V (5 x 20mm) fast blow
Operating Environment	0°C to 40°C (32°F to 104°F), <80% relative humidity
Storage Environment	-20°C to 60°C (-4°F to 140°F) <80% relative humidity
Operating Altitude	2000 meters
Dimensions / Weight	147 x 68 x 50mm / 318g
Safety	Complies with IEC 61010-1 v.3 for measurement Category lll 600V, Pollution Degree 2

8. Specifications

Accuracy is given at 18°C to 28°C (65°F to 83°F), less than 70% relative humidity

Function	Range	Resolution	Accuracy ±(% of reading+digits)
AC Voltage	4.000V	1mV	±(1.5% + 10 digits)
	40.00V	10mV	
	400.0V	0.1V	
	600V	1V	

Input Protection: 600V DC or 600V AC RMS
AC Response: 50 to 60Hz

Function	Range	Resolution	Accuracy ±(% of reading+digits)
DC Voltage	400.0mV	1mV	±(0.8% + 8 digits)
	4.000V	10mV	±(1.2% + 2 digits)
	40.00V	100mV	
	400.0V	0.1V	
	600V	1V	±(1.2% + 5 digits)

Input Protection: 600V DC or 600V AC RMS

Function	Range	Resolution	Accuracy ±(% of reading+digits)
AC Current	4.000A	1mA	±(3.0% + 5 digits)
	10.00A	10mA	

Overload Protection: 10A/600V Fuse
AC Response: 50 to 60Hz

Function	Range	Resolution	Accuracy ±(% of reading+digits)
DC Current	4.000A	1mA	±(3.0% + 5 digits)
	10.00A	10mA	

Overload Protection: 10A/600V Fuse

Function	Range	Resolution	Accuracy ±(% of reading+digits)
Frequency	9.999Hz	0.001Hz	±(1.5% + 5 digits)
	99.99Hz	0.01Hz	
	999.9Hz	0.1Hz	±(1.2% + 3 digits)
	9.999kHz	1Hz	
	99.99kHz	10Hz	
	999.9kHz	100Hz	
	9.999MHz	1kHz	±(1.5% + 4 digits)

Input Protection: 250V AC RMS or 250V DC
Sensitivity: >0.5V RMS <1MHz
>3V RMS >1MHz

Function	Range	Resolution	Accuracy ±(% of reading+digits)
Duty Cycle	0.1% to 99.9%	0.1%	±(1.2% + 2 digits)

Input Protection: 600V AC RMS or 600V DC
Pulse Width: 100µs - 100ms
Frequency Range: 5Hz to 150kHz
Sensitivity: >8V

Function	Range	Resolution	Accuracy ±(% of reading+digits)
Resistance	400.0Ω	0.1Ω	±(1.2% + 5 digits)
	4.000kΩ	1Ω	
	40.00kΩ	10Ω	
	400.0kΩ	100Ω	
	4.000MΩ	1kΩ	±(2.0% + 20 digits)
	40.00MΩ	10kΩ	±(5.0% + 20 digits)

Input Protection: 250V AC RMS or 250V DC

Function	Range	Resolution	Accuracy ±(% of reading+digits)
Capacitance	40.00nF	10pF	±(1.2% + 5 digits)
	400.0nF	100pF	
	4.000µF	0.001µF	
	40.00µF	0.01µF	
	400.0µF	0.1µF	±(2.0% + 20 digits)
	4000mF	1µF	±(5.0% + 20 digits)

Input Protection: 600V AC RMS or 600V DC
Pulse Width: 100µs - 100ms
Frequency Range: 5Hz to 150kHz
Sensitivity: >8V RMS

Function	Range	Resolution	Accuracy ±(% of reading+digits)
Temperature	-20 to 760°C	1°C	±(3% + 5°C)
	-4 to 1400°F	1°F	±(3% + 9°F)

Input Protection: 250V AC RMS or 250V DC

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