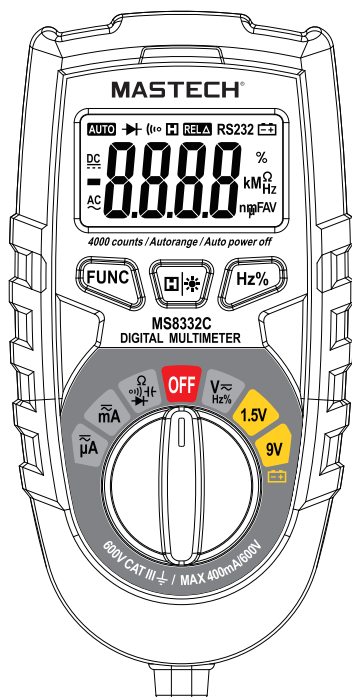


MASTECH®

M58332C

Digital Multimeter User Manual



CONTENTS

1. Introduction.....	1
2. Safety Information.....	2
3. Product Overview.....	3
3.1 Product External View	3
3.2 Function Keys.....	4
3.3 Symbols.....	4
4. Technical Index	5
4.1 General Characteristics.....	5
4.2 Electrical Technical Index.....	5
5. Measuring Operations	9
5.1 AC Voltage and DC Voltage Measurement	9
5.2 Resistance Measurement.....	10

CONTENTS

5.3 Diode Measurement	11
5.4 Continuity Measurement	11
5.5 Capacitance Measurement.....	12
5.6 Frequency Measurement	13
5.7 Duty Cycle Measurement	13
5.8 Current Measurement	13
6. Maintenance	15
6.1 Battery Replacement	15
6.2 Fuse Replacement.....	15
6.3 Cleaning.....	15

1. Introduction

The digital multimeter is designed and manufactured according to safety requirements of EN 61010-1, EN 61010-2-030, EN 61010-2-033, EN 61010-031 on electronic measuring instrument and hand held digital multipurpose meter.

And conforms to UL STD.61010-1,61010-2-030, 61010-2-033, Certified to CSA STD.C22.2 NO.61010-1, 61010-2-030, IEC STD61010-2-033.

The product meets with the requirements of 600V CAT III and pollution degree 2.

The meter can be used for measuring DC voltage, AC voltage, resistance, diode, buzzer, Continuity test, DC current and AC current etc. The unique non-contact AC voltage detection function can promptly remind you to pay attention to safety operation, the full scale AC220V protection design makes you more safe and relieved.

This series of meters can be widely used for schools, labs, research institutes, enterprises and factories etc. various electronic industries Please read this operating instruction carefully and pay attention to related safe working standards before using this meter, Protection provided by the instrument will be impaired if used in a manner not specified by the manufacturer.

2. Safety Information

Warning

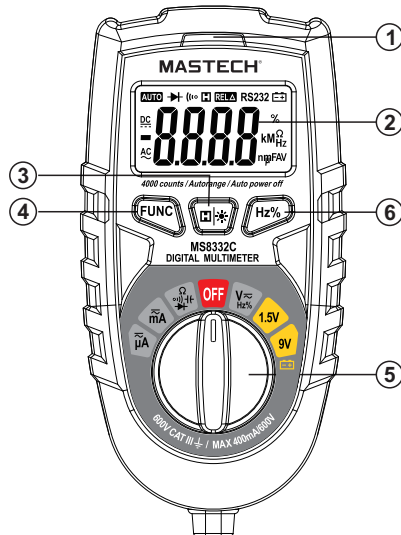
The special attention should be paid when using the meter because the improper usage may cause electric shock and damage the meter. The safety measures in common safety regulations and operating instruction should be complied with when using. In order to make fully use of its functions and ensure safe operations please comply with the usage in this section carefully.

In order to avoid personal injury and meter damage caused by electric shock, the following safety tips should be paid attention to:

- Don't measure any voltage out of stipulated measuring range of the meter.
- Don't apply high voltage (above 100V) at input end when measuring resistance and diode.
- Don't use the meter if the test line is damaged or exposed metal part.
- Avoid using under direct sunlight or high temperature.
- Pay attention to the possibility of electric shock when measuring voltage in excess of 36V AC or 48C DC.
- Before measuring current, firstly turn off the power of measured equipment and measured circuit, Electrify to measure after connecting test leads.
- Pay attention to battery polarity when changing battery.
- Measure known voltage with the meter to verify that the meter is working properly. If the meter is working abnormally, stop using it immediately. A protective device may be damaged. If there is any doubt, please have the meter inspected by a qualified technician.

3. Product Overview

3.1 Product External View



1. Non-contact AC Voltage Indicator Light
2. LCD Display
3. HOLD/backlight Key
4. Function Selection Key
5. Select Switch
6. Hz% Switching Key

3.2 Function Keys

	Function Switching Key, The voltage current range is used for switching AC/DC mode, the resistance range is used for switching $\Omega \rightarrow \rightarrow \rightarrow$ CAP mode.
	Switching key between frequency and duty cycle, it is used for switching Hz and % at voltage range and current range.
	HOLD/backlight Key, press this key to hold the data. Press this key 2 second to open the backlight.

3.3 Symbols

	AC (Alternating Current)
	DC (Direct Current)
	Double Insulation
	Caution, risk of danger (see manual)
	Fuse
	Accord with the related EU laws and regulations
	Ground
	Conforms to UL STD. 61010-1, 61010-2-030 and 61010-031; Certified to CSA STD C22.2 NO. 61010-1, 61010-2-030 and 61010-031
CAT III	(MEASUREMENT CATEGORY III) is applicable to test and measuring circuits connected to the distribution part of the building's low-voltage MAINS installation.

4 Technical Index

4.1 General Characteristics

- Automatic measuring range is DMM, full range is 3999 counting.
- Display: 3 3/4 digits LCD display.
- Overload protection: full range protection.
- Data hold function.
- Relative value measurement.
- Low voltage display.
- Over range display ("OL")
- Automatic power off.
- Working temperature and humidity: 0~40°C(32~104°F); relative humidity <80%RH
- Storage temperature and humidity: -10~50°C(14~122°F); relative humidity <70%RH
- Altitude < 2000m
- Power Supply: AAA 2*1.5V Battery
- Safety Class: EN61010-1, CAT III 600V
- Dimension (LxWxH): 110X58X33mm,
- Weight: about 150g

4.2 Electrical Technical Index

(Ambient Temperature: 23±5°C Relative Humidity: <75%)

4.2.1 DC Voltage

Measuring Range	Resolution	Accuracy
400mV	0.1mV	±(0.5% rdg + 3dgt)
4V	1mV	
40V	10mV	
400V	100mV	
600V	1V	±(0.8% rdg +5dgt)

Input Impedance:10MΩ

Max. Input Voltage:600V DC

4.2.2 AC Voltage

Measuring Range	Resolution	Accuracy
4V	1mV	±(0.8% rdg + 3dgt)
40V	10mV	
400V	100mV	
600V	1V	±(1.0% rdg +5dgt)

Input Impedance: 10MΩ

Max. Input Voltage: 600V AC

Frequency Range: 40~400Hz

Response: average value response (r.m.s. of sine wave)



4.2.3 Resistance

Measuring Range	Resolution	Accuracy
400Ω	0.1Ω	±(1.0% rdg + 3dgt)
4kΩ	1Ω	
40kΩ	10Ω	
400kΩ	100Ω	
4MΩ	1KΩ	±(1.2% rdg +15dgt)
40MΩ	10KΩ	

Open Circuit Voltage: about 0.25V.

Overload Protection: 250V DC or AC (r.m.s.)

4.2.4 Diode, Continuity

Measuring Range	Function
	Display forward voltage drop of diode
	The buzzer makes a sound when the resistance is less than $50\pm 20\Omega$

Open Circuit Voltage: diode is about 1.5V, buzzer is about 0.5V.
Overload Protection: 250V DC or AC (r.m.s.)

4.2.5 DC Current

Measuring Range	Resolution	Accuracy
400uA	0.1uA	$\pm(1.8\% \text{ rdg} + 5\text{dgt})$
4000uA	1uA	
40mA	10uA	
400mA	100uA	

Max.Current:400mA

Overload Protection: mA measuring range: FF 400mA/600V fuse

4.2.6 AC Current

Measuring Range	Resolution	Accuracy
400uA	0.1uA	$\pm(2.0\% \text{ rdg} + 8\text{dgt})$
4000uA	1uA	
40mA	10uA	
400mA	100uA	

Max.Current: 400mA

Overload Protection: mA measuring range:

FF 400mA H 600V, 10KA fuse

Frequency Range: 40~400Hz

Response: Average value (r.m.s. of sine wave)

4.2.7 Capacitance

Measuring Range	Resolution	Accuracy
40nF	0.01nF	$\pm(5.0\% \text{ rdg} + 30\text{dgt})$
400nF	0.1nF	$\pm(3.0\% \text{ rdg} + 15\text{dgt})$
4uF	1nF	$\pm(5.0\% \text{ rdg} + 25\text{dgt})$
40uF	10nF	
100uF	100nF	

Overload Protection: 250V DC or AC (r.m.s.)

4.2.8 Frequency

Measuring Range	Accuracy
1Hz-5MHz	$\pm(1.5\% \text{ rdg} + 15\text{dgt})$

4.2.9 Duty Cycle

Measuring Range	Accuracy
0.5-99.9%	$\pm(2.0\% \text{ rdg} + 5\text{dgt})$

4.2.10 Bat test

Measuring Range	Accuracy
1.5V	$\pm(2.0\% \text{ rdg} + 20\text{dgt})$
9V	

5. Measuring Operations

5.1 AC Voltage and DC Voltage Measurement

Warning


1. To avoid electrical shock or meter damage, any voltage in excess of 600V DC or r.m.s AC are not allowed to measure.
2. To avoid electrical shock or meter damage, any voltage in excess of 600V DC or r.m.s. AC between meter and earth aren't allowed to apply.
3. Don't measure AC/DC voltages if a motor on the circuit is being switched ON or OFF. Large voltage surges may occur that can damage meter.

The voltage ranges of the meter are:

DC Voltage: 400.0mV, 4.000V, 40.00V, 400.0V, 600V;

AC Voltage: 4.000V, 40.00V, 400.0V, 400.0V.600V

The method of measuring voltage is:

1. Turn rotary switch to **V \approx Hz%** position.
2. Press  key and select AC or DC measuring Apply the two ends of test leads to measure the voltage value of circuit under test. (Paralleled with circuit under test).
3. Read measured voltage value with LCD . When measuring DC voltage ,the display shall display the voltage polarity connected with red test leads at the same time.

Notice:

At DC 400mV and AC 4V ranges and under non-input, the meter shall have several readings because of outside interference, but its normal usage and measuring accuracy will not be affected.

5.2 Resistance Measurement


Warning

In order to avoid the meter or measured equipment from being damaged, cut off all power supply of measured circuits and discharge all high voltage capacitors before measuring capacitance.

The resistance ranges of the meter are:

400.0 Ω , 4.000k Ω , 40.00 k Ω , 400.0 k Ω , 4.000M Ω , 40.00 M Ω .

The method of measuring resistance is:

1. Turn rotary switch to **\rightarrow CAP \rightarrow Ω** position.
2. Press  key and select Ω measuring range.
3. Apply the two ends of test leads to measure the resistance value of circuit under test.
4. Read measured resistance value with LCD.

Notice:




1. Theno-line measured resistance value shall be different from rated resistance value, because other elements on circuit are connected with measured resistance, which is equivalent to parallel connection of two or multi resistances.
2. When measuring low resistance, for the measurement accuracy, please firstly make two test leads short circuit , here read out the displayed resistance value, minus this displayed value from the correct counting of measured resistance.
3. When measuring at high resistance range, the reading can be confirmed after several seconds.
4. Under open circuit , if the meter displays "OL", it will show that the measured value exceeds range.

5.3 Diode Measurement

Warning

To avoid the meter or measured equipment from being damaged, cut off all power supply of measured circuits and discharge all high voltage capacitors before measuring diode.

The method of measuring diode is:

1. Turn rotary switch to  position.
2. Press  key and select  measuring range.
3. Separately connect black and red test leads to negative pole and positive pole of measured diode.
4. The meter shall display forward bias value of measured diode. If the poles of the test leads are connected inversely, the meter will display "OL".

Notice:


For on-line measuring diode, display forward voltage drop at forward measurement; the reverse measurement depends on the values of other elements connected in parallel at both ends of diode.

5.4 Continuity Measurement

Warning

To avoid the meter or measured equipment from being damaged, cut off all power supply of measured circuits and discharge all high voltage capacitors before continuity measurement.

The method of continuity measurement is:

1. Turn rotary switch to  position.
2. Press  key and select  measuring range.

3. Separately connect two ends of test leads to the two ends of measured part and circuit.
4. The meter shall display the approximate resistance value between measured points. Here if the resistance value between measured points is less than $50 \pm 20\Omega$, the buzzer will make a sound.

5.5 Capacitance Measurement




Warning

To avoid the meter or measured equipment from being damaged, cut off all power supply of measured circuits and discharge all high voltage capacitors before on/off measurement.

The capacitance ranges of the meter are:

40.00nF, 400.0nF, 4.000uF, 40.00uF, 100.0uF.

The method of measuring capacitance is:

1. Turn rotary switch to  position.
2. Press  key and select  measuring range.
3. Apply the two ends of test leads to measure the two pins of the capacitance under test and read measured value from LCD.

Notice:

1. The meter shall take some time to stabilize the reading when high capacitance.
2. The small capacitance with less than 10nF shall minus the distribution capacitance of the meter and lead (namely displayed base number) when measuring.

5.6 Frequency Measurement

The method of measuring frequency is:

1. Turn rotary switch **V \approx Hz%** to position.
2. Press **Hz%** key and select **Hz** range.
3. Apply the two ends of test leads to measure the frequency value of the circuit under test.
4. Read frequency value from LCD.

5.7 Duty Cycle Measurement

The method of measuring duty cycle is:

1. Turn rotary switch to **V \approx Hz%** position.
2. Press **Hz%** key and select **%** range.
3. Apply the two ends of test leads to measure the duty cycle value of the circuit under test.
4. Read frequency value from LCD.

5.8 Current Measurement

Warning

To avoid the meter or measured equipment from being damaged, firstly check the fuse of the meter before measuring current. When measuring , please use correct input socket, function shift and measuring range.

Don't try to measure current when the open circuit voltage exceeds 250V.

The DC current range: 400uA, 4.000mA, 40.00mA, 400.0mA. The AC current range: 400uA, 4.000mA, 40.00mA, 400.0mA

The method of measuring resistance is:

1. Cut off the power of measured circuit. Discharge all high voltage capacitance on measured circuit.

2. Turn rotary switch to mA or uA position. When the measured current is less than 400uA, select uA position. When the measured current is 4mA~400mA, select mA position.
3. Disconnect the circuit under test. Connect black test lead to the end of disconnected circuit under test (with lower voltage), connect red test lead to the other end of disconnected circuit under test (with higher voltage).
4. Switch on the power of the circuit, and then read out displayed reading. If the display only displays "OL", it will show that the input exceeds selected range, and the rotary switch shall be placed at higher range.
5. Cut off the power of measured circuit. Discharge all capacitances, take off the test leads and recover the circuit

Notice:

1. The measuring current of the meter shall be connected in series, not connected in parallel to avoid from damaging the meter or endangering personal safety.
2. When measuring DC current, if the test leads are reversely connected to the circuit , the display will change into negative, but not affect measuring accuracy.

6. Maintenance

- Before removing the rear cover, disconnect the probe from the circuit to be measured.
- To protect the internal circuit, replace the fuse with one of the same specification: FF 400mA H 600V, 10KA
- Don't use the instrument until the rear cover is placed back and the screws are tightened.
- Clean the housing of instrument only with a wet rag dripped with little detergent but never chemical solution.
- In case of any abnormality, stop using it and sent it for maintenance.



Warning

To avoid electrical shock, remove test leads before replacing battery or fuse and cleaning.

6.1 Replacing The Batteries




WARNING

To avoid electric shock, make sure that the test leads have been clearly move away from the circuit under measurement before opening the battery cover of the meter.



WARNING

Do not mix old and new batteries. Do not mix alkaline, standard (carbon-zinc), or rechargeable (ni-cad, ni-mh, etc) batteries.

- 6.1.1 If the sign “” appears, it means that the batteries should be replaced.
- 6.1.2 Loosen the fixing screw of the battery cover and remove it.
- 6.1.3 Replace the exhausted batteries with new ones.

- 6.1.4 Put the battery cover back and fix it again to its origin form.

Note:

Do not reverse the polarity of the batteries.

6.2 Fuse Replacement

The step of replacing fuse is:

1. Switch off the power.
2. Open lower cover with screwdriver to take out the broken fuse.
3. Load the fuse with same Electrical specifications (FF400mA H 600V, 10KA) ,recover battery cover and make the screw fixed.

6.3 Cleaning

When the meter surface is required to clean, please use soft cloth, don't use organic solvent with corrosive and solvent action to the case.

