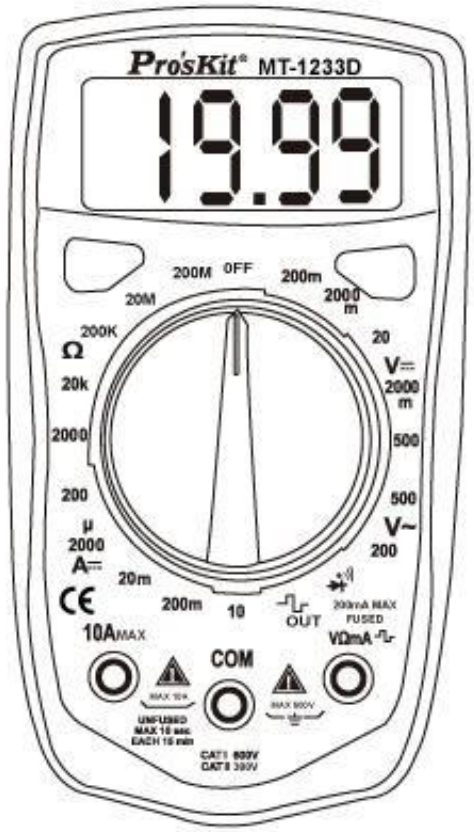
MT-1233C/MT-1233D

3-1/2 Digital Multimeter



User's Manual

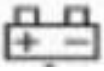
1st Edition, 2016

INTRODUCTION ⚠Warning To avoid electric shock or personal injury, read "Safety Information" and is Warning and Precautions" before using the Meter

Safety information

- This series meter Comply with IEC 1010-1 CAT I 600V / CAT II 300V overvoltage standards. See specifications
- Use the Meter only as specified in this manual, otherwise the protection provided by the Meter may be impaired.
- In this manual a Warming identifies conditions and actions that pose hazards to the user.
- A caution identifies conditions and actions that may damage the meter ort he equipment under test
- International symbols used on the Meter and in this manual are explained Table

Table 1. International Electrical Symbols

	AC (Alternating Current)
	DC (Direct Current)
	AC or DC
	Battery
	Safety information* Refer to the manual
	Earth ground
	Fuse
	Conforms to European Union directive
	Double insulated

 WARNING AND PRECAUTIONS

To avoid possible electric shock or personal injury, and to avoid possible damage to the meter or to the equipment under test, comply with the following practices:

- Do not use the meter if it is damaged. Before you use the meter, inspect the case. Pay particular attention to the insulation surrounding the connectors.
- Inspect the test leads for damaged insulation or exposed metal. Check the test leads for

continuity. Replace damaged test leads before you use the meter.

- Do not use the meter if it operates abnormally. Protection may be impaired. When in doubt, have the meter serviced.
- Do not operate the meter around explosive gas, vapor, or dust.
- Do not apply more than the rated voltage, as marked on the meter between terminals or between any terminal and earth ground.
- Before use, verify the meter's operation by measuring a known voltage.
- When measuring current, turn off circuit power before connecting the meter in the circuit.
- When servicing the meter, use only specified replacement parts. Do not use the Meter in a manner not specified by this manual or the safety features of the meter may be impaired.
- Use with caution when working above 30V ac rms, 42V ac peak, or 60V dc. Such voltages pose a shock hazard.
- When using the probes, keep your fingers behind the finger guards on the probes.
- Connect the common test lead before you connect the live test lead. When you disconnect test leads, disconnect the live test lead first.
- Remove the test leads from the meter before you open the battery door. Do not operate the meter with the battery door or portions of the cover removed or loosened.

- To avoid false readings, which could lead to possible
- Safety Compliance: IEC 61010-1, 2000 CAT I 600V overvoltage standards Do not measure voltages above 500V in Category installations

Overvoltage installations categories per IEC 61010-1, 2000: The meter is designed to protect against transients in these categories:

CAT I From high-voltage low-energy sources, e.g., electric circuits or a copy machine

CAT II From equipment supplied from the fixed installation, e.g., TVs, PCs, portable tools and household appliances

CAT III From equipment in fixed equipment installations, e.g. installation panels, feeders and short branch circuits, and lighting systems in large buildings.

General specifications

- ◆ Maximum Voltage between any Terminal and Earth Ground: 1000V
- ◆ Measurement rata: updates 2-3/sec.
- ◆ Over range indication: "1' figure only in the display
- ◆ Automatic negative polarity indication.
- ◆ The  is displayed when the battery voltage drops below the operating voltage
- ◆ operating temperature: 0℃～40℃, 0-75% RH.
- ◆ Storage temperature: -10℃～50℃, 0-75% RH.
- ◆ Power: Single standard 1.5V battery AAAx2

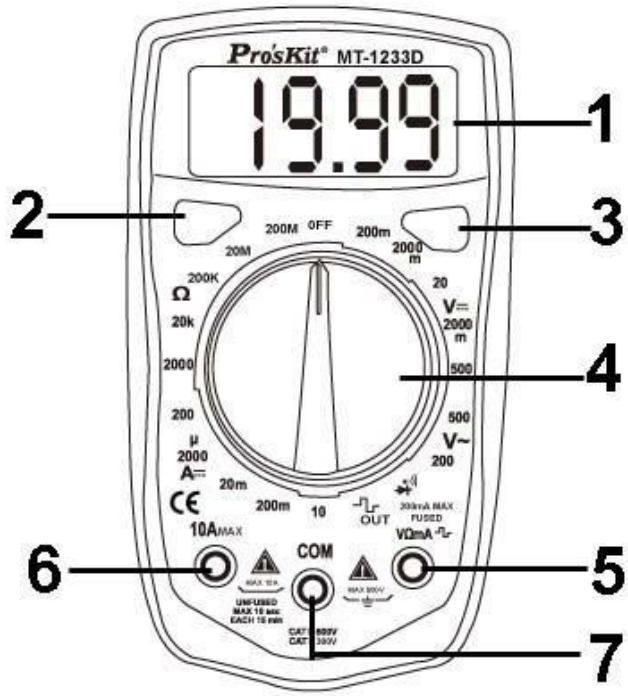
◆ Dimensions: 130L*72W*28H mm
◆ Weight approx: 130g (not including battery)

FRONT PANEL DESCRIPTION 1. LCD Display 2. DATA HOLD button 3. BACK LIGHT button 4. FUNCTION AND RANGE SWITCH

This switch is used to select the function and desired range as well as to turn on the instrument.

To extend the life of this battery, the switch should be in the "OFF" position when the instrument is not in use.

5. “VΩmA" JACK
6. "10A" JACK 7. "COM" JACK



SPECIFICATIONS

Accuracies are guaranteed for 1 year, 23℃±5 ℃, less than 80%RH

DC VOLTAGE

Range	Resolution	Accuracy
200mV	100uV	±0.8%+3d
2000mV	1mV	

20V	10mV	
200V	100mV	
500V	1V	±(1.0%+3d)

OVERLOAD PROTECTION: 220V rms AC for 200mV range and 500V DC or 500V rms for all ranges.

AC VOLTAGE

Range	Resolution	Accuracy
200V	100mV	±1.2%+5d
500V	1V	

RESPONSE: Average responding, calibrated in rms of a sine wave.

FREQUENCY RANGE: 40Hz ~ 400Hz

OVERLOAD PROTECTION: 500V DC or 500V rms for all ranges.

DC CURRENT

Range	Resolution	Accuracy
2000uA	1 uA	±(1.2%+5d)
20mA	10 uA	
200mA	100 uA	
10A	10mA	±(2.5%+5d)

OVERLOAD PROTECTION: 500mA 250V fuse (10A range unused).

MEASURING VOLTAGE DROP: 200mV

AUDIBLE CONTINUITY

RANGE	DESCRIPTION
	Built-in buzzer sounds if resistance is less then 30±20Ω

OVERLOAD PROTECTION: 5 second maximum 220V rms.

⚠ **WARNING**: DO NOT input any voltage at this range for safety!

SQUARE-WAVE OUTPUT (MT-1233D Only)

RANGE	DESCRIPTION
	The output of about 50Hz square wave test signal

⚠ **WARNING**: DO NOT input any voltage at this range for safety!

RESISTANCE

Range	Resolution	MT-1233C	MT-1233D
200Ω	0.1Ω	±(1.5%+5d)	
2000Ω	1Ω	±(1.0%+3d)	
20kΩ	10Ω		
200kΩ	100Ω		
20MΩ	10KΩ	±(1.0%+5d)	

200MΩ	100KΩ	-	±[1.0%(rdg -l0)+10d]

MAXIMUM OPEN CIRCUIT VOLTAGE: 2.3V. OVERLOAD PROTECTION: 5 seconds maximum 220Vrms.

⚠ **WARNING**: DO NOT input any voltage at resistance range for safety!

TEMPERATURE (MT-1233C only)

RANGE	RESOLUTION	ACCURACY
-40℃~150℃	1℃	±(1.0%+3d)
150℃~1000℃		±(1.5%+15d)
-40℉~302℉	1℉	±(1.0%+4d)
302℉~1832℉		±(1.5%+15d)

⚠ **WARNING**: DO NOT input any voltage at this range for safety!

OPERATING INSTRUCTIONS ⚠WARNING

✧ To avoid electrical shock hazard and/or damage of the Instrument, do not measure voltages that might exceed 600V above earth ground.

✧ Before the use of instrument, inspect test leads, connectors and probes for cracks, breaks, cracks in the insulation.

✧ Dangerous voltages may be present at the input terminals and may not be displayed.
✧ To avoid electrical shock or damage to the meter when measuring resistance or continuity in a circuit, make sure the power to the circuit is turned off and all capacitors are discharged.

DC & AC VOLTAGE MEASUREMENT

1. Connect red test lead to "VΩmA" jack, Black lead to "COM" jack.
2. Set RANGE switch to desired VOLTAGE position, if the voltage to be measured is not known before hand, set switch to the highest range and reduce it until satisfactory reading is obtained.
3. Connect test leads to device or circuit being measured.
4. Turn on power of the device or circuit being measured voltage value will appear on Digital Display along with the voltage polarity.

DC CURRENT MEASUREMENT

1. Red lead lo "VΩmA". Black lead to "COM”(for measurements between 200mA and 10A connect red lead to "10A” jack with fully depressed.)
2. RANGE switch to desired DCA position.
3. Open the circuit to be measured and connected test leads INSERIES with the load in with current is to measure.
4. Read current value on Digital Display.

5. Additionally,"10A"function is designed for intermittent use only. Maximum contact time of the test leads with the circuit is 15 seconds with a minimum intermission time of seconds between tests.

RESISTANCE MEASUREMENT

1. Red lead to "VΩmA". Black lead to "COM".
2. RANGE switch to desired OHM position.
3. If the resistance being measured is connected to a circuit, turn off power and discharge all capacitors before measurement.
4. Connect test leads LO circuit being measured.
5. Read resistance value on Digital Display.

DIODE MEASUREMENT

1. Red lead to "VΩmA", Black lead to "COM".
2. RANGE switch to "  " position.
3. Connect the red test lead to the anode! of the diode to be measured and black test lead to cathode.
4. The forward voltage drop in mV will be displayed. If the diode is reversed, figure "1" will be shown.

TEMPERATURE MEASUREMENT

(MT-1233C only)

1. Connect the K type thermoelectric couple to "VΩmA" and "COM" jacks.
2. RANGE switch to TEMP position.

3. The display will read Temperature value ℃

AUDIBLE CONTINUITY TEST

1. Red lead to "VΩmA", Black lead to "COM".
2. RANGE switch to “ ”position.
3. Connect test leads to two points of circuit to be tested. If the resistance is lower than 30Ω±20Ω, the buzzer will sound.

TEST SIGNAL USE (MT-1233D only)

1. RANGE switch to "”position.
2. A test signal (50Hz) appears between "VΩmA" and "COM” jack, the output voltage is approx 3V p-p with about 50KΩ impedance.

MAINTENANCE

Beyond replacing batteries and fuses, do not attempt to repair or service your Meter unless you are qualified to do so and have the relevant calibration, performance test and service instruments. The recommended calibration cycle is 12 months.

To clean the terminals

a) Push the Meter OFF and remove test leads.
b) Shake out any dirt that may be in the terminals.
c) Soak a new swab with isopropyl and work around the inside of each input terminal

d) Use a new swab to apply a light coat of fine machine oil to the inside of each terminal.

FUSES TEST ⚠Warning To avoid electric shock or injury, remove the test leads and any input signals before replacing the fuses

1. Turn the rotary switch to 200mA position.
2. Use a multimeter to measure resistance of "VΩmA" terminal or 10A terminal to COM terminal.

✧ A good mA terminal or 10A terminal fuse is indicated by a reading between 0Ω and 10Ω.

✧ If the display is overloaded, replace the fuse and test again.

If the display shows any other value, have the meter serviced. See "Service and Parts" later in this manual.

BATTERY AND FUSE REPLACEMENT

1) Battery and fuse replacement should only be done after the test leads have been disconnected and power is off.
2) Loosen screws with suitable screwdriver and remove case bottom.
3) The meter is powered by 1.5V battery (AAAx2). Snap the battery connector leads to the terminals of a new battery and reinsert the battery into the case top. Dress the battery leads so that they will

not be pinched between the case bottom and case top.

4) The meter is protected by fast action fuse 500mA/250V, dimensions is ¢ 5*20mm.
5) Replace the case bottom and reinstall the three screws, never operate the meter unless the case bottom is fully dosed.

ACCESSORIES

- User's manual
- Set of test leads(CAT I 600V  work)
- K type thermoelectric couple (MT-1233C only)

SERVICE AND PARTS

If the Meter fails, check the batteries and fuses first, and then review this manual to make sure that you are operating the Meter correctly

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