Handheld Digital Multimeter

GDM-532

USER MANUAL

ISO-9001 CERTIFIED MANUFACTURER

GW INSTEK

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Table of Contents

SAFETY INSTRUCTIONS

This chapter contains important safety instructions that you must follow during operation and storage. Read the following before any operation to ensure your safety and to keep the instrument in the best possible condition.

Safety Standards

- The meter is designed according to BS EN 61010-1; BS EN 61010-2-030; BS EN 61010-2-033 and BS EN 61326-1; EN 61326-2-2.
- The meter conforms to CAT II 1000V/CAT III 600V, double insulation, overvoltage standard, and pollution degree 2.

Electrical Symbols

These safety symbols may appear in this manual or on the instrument.

	Caution		Alternating current
	Grounding		Direct Current
	Double insulated		Warning
	Conform to EU directive		

CAT III Measurement category III is applicable to test and measure circuits connected to the distribution part of the building's low-voltage MAINS installation.

CAT II Measurement category II is applicable to test and measure circuits connected directly to utilization points (socket outlets and similar points) of the low-voltage MAINS installation.

Safety Information

- Do not use the meter if the rear cover is not completely covered up, or it may pose a shock hazard.
- Check and make sure the insulation of the meter and test leads is in good condition without any damage before use. If the insulation of the meter casing is found to be significantly damaged, or if the meter is considered to be malfunctioning, please do not continue to use the meter.
- Keep fingers behind the finger guards of the test leads when using the meter.
- Do not apply more than 1000V between any terminal and earth ground to prevent electric shock and damage to the meter.
- Use caution when working with voltages above AC 30Vrms or DC 60V. Such voltages pose a shock hazard.
- The measured signal is not allowed to exceed the specified limit to prevent electric shock and damage to the meter.
- Place the function dial in the correct position before measurement.
- Never turn the function dial during measurement to avoid damage to the meter.
- Do not change the internal circuit of the meter to avoid damage to the meter or user.
- Damaged fuses must be replaced with fast-acting ones of same specifications.
- When "  " is displayed, please replace the batteries in time to ensure measurement accuracy.

- Do not use or store the meter in high temperature, high humidity, flammable, explosive, or strong magnetic field environments.
- Clean the meter casing with a damp cloth and mild detergent. Do not use abrasives or solvents.
- Use of test probe

  For CAT III /CAT IV test, please ensure probe cover is installed in place to avoid electric shock.

  For CAT II test, remove the probe cover to test recessed sockets such as wall socket, and do not lose the probe cover.

GETTING STARTED

This chapter describes the GDM-532 in a nutshell, including its main features and front/ rear panel introduction.

GDM-532 Overview

Overview

GDM-532 is a 9999-count true RMS digital multimeter with high resolution, auto range and new intelligent ADC chip. Designed according to CAT II 1000V/CAT III 600V, the meter comes with overvoltage and overcurrent alarms, and a false detection protector for 6kV electric shock and high voltages.

Features

- Unique appearance, ergonomic design, compact structure.
- 9999-count display, true RMS measurement, and fast ADC (3 times/s).
- Full-featured false detection protection for up to 1000V surge, and overvoltage/overcurrent alarm.
- Extended measuring range, especially for capacitance (compared with similar products), the ≤9.999mF response time within 6s.
- Optimized NCV function: EFHi mode to distinguish neutral and live wires, EFLo mode for low electric fields, and audio/visual alarm.
- Recoverable and anti-burning protector is built into the current input terminal.
- Measurement of flame sensor of heating device can be performed at μA position.
- Current (AC/DC) mode memory function.
- Low power consumption (general: 2mA; sleep state: <30μA) to effectively extend the battery life to 500 hours.

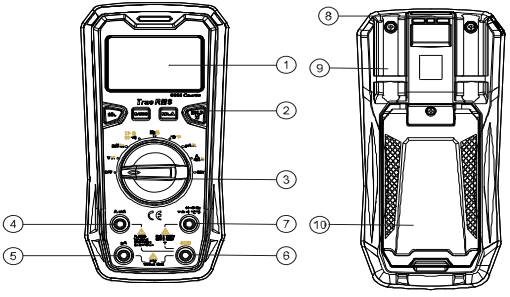
Accessories

Before using the GDM unit, check the package contents to make sure all the accessories are included. If any of the follows is missing or damaged, please contact your supplier immediately.

Standard Accessories	Description
	User manual*1 pc
	Test leads*1 pair
	Temperature probe*1 pc
	1.5V AAA Battery*3

If any of the above is missing or damaged, please contact your supplier immediately.

External Structure



Item Index	Description
1	LCD Display
2	Function buttons
3	Dial switch
4	mA /10A input terminal
5	μA input terminal
6	COM input terminal
7	Other terminals
8	Hook
9	Probe holder
10	Bracket

Function Buttons

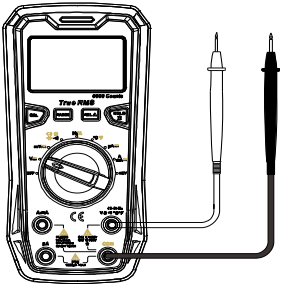
Button	Description
SEL Button:	Press this button to switch between DCV, continuity/resistance/diode/capacitance, frequency/duty cycle, °C/°F and AC/DC current. Each time you press it, the corresponding measuring range will be switched alternately.
RANGE Button:	When the dial switch is in position of V, mV, resistance, mA or A, short press this button to switch to manual range and long press to enter AUTO mode.
REL△ Button:	When the dial switch is in position of V, mV, resistance, capacitance, μA, mA or A, short press this button to enter relative value measurement mode.
HOLD/☼ Button:	Press this button to perform/cancel data hold; press this button for ≥ 2s to turn on/off the backlight.

OPERATION

Operating Instructions

AC/DC Voltage Measurement

Wire Connection Diagram



Steps of Measurement

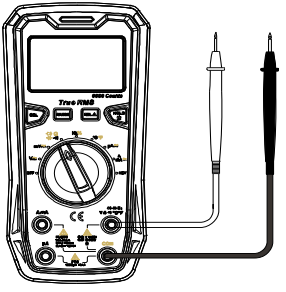
1. Turn the function dial to the AC/DC voltage position or the mV small voltage (<99.99mV) position.
2. Insert the red test lead into the "**VΩ**" terminal, black test lead into the "**COM**" terminal, and make the probes in contact with both ends of the measured voltage (parallel connection to the load).
3. Read the test result from LCD.


Warnings

- Do not input a voltage over 1000V, or it may damage the meter and hurt the user.
- If the range of the measured voltage is unknown, select the maximum range and then accordingly reduce (if the LCD displays "OL", it indicates that the voltage is over range).
- The input impedance of the meter is 10M Ω. This load effect may cause measurement errors in high-impedance circuits. If the impedance of the circuit is ≤10kΩ, the error can be ignored (≤0.1%).
- Be cautious to avoid electric shock when measuring high voltages.
- Before each use, verify meter operation by measuring a known voltage.

Continuity Test

Wire Connection Diagram



Steps of Measurement

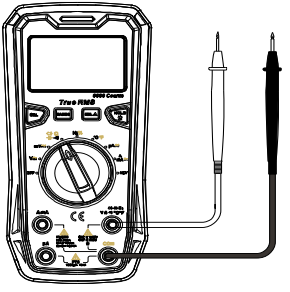
1. Turn the function dial to the continuity test position.
2. Insert the red test lead into the "**VΩ**" terminal, black test lead into the "**COM**" terminal, and make the probes in contact with the two test points.
3. When measured resistance>420Ω, the circuit is broken, LCD shows "OL" and the buzzer makes no sound. When measured resistance is at 30Ω～420Ω, the circuit conductance value is relatively large, the buzzer makes no sound along with a red LED indication. When measured resistance ≤30Ω, the circuit is in good conduction status and the buzzer beeps continuously along with a green LED indication.

Warnings

- Switch off the power supply of the circuit and discharge all capacitors before test.

Resistance Measurement

Wire Connection Diagram



Steps of Measurement

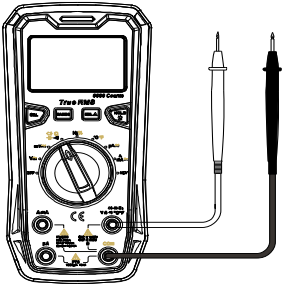
1. Turn the function dial to the resistance measurement position.
2. Insert the red test lead into the "**VΩ**" terminal, black test lead into the "**COM**" terminal, and make the probes in contact with both ends of the measured resistance (parallel connection to the resistance).
3. Read the test result from LCD.


Warnings

- Before measuring resistance, Switch off the power supply of the circuit and discharge all capacitors before measuring resistance.
- If the resistance is not less than 0.5Ω when the test leads are shorted, please check if the test leads are loose or abnormal.
- If the measured resistor is open or the resistance exceeds the maximum range, the LCD will display "OL".
- When measuring low resistance, the test leads will produce 0.1Ω~0.2Ω measurement error. To obtain the final accurate value, the resistance of shorted test leads should be subtracted from the measured resistance value.
- When measuring high resistance, it is normal to take a few seconds to stabilize the reading.
- Do not input voltages over 60 VDC or 30 VAC.

Diode Test

Wire Connection Diagram



Steps of Measurement

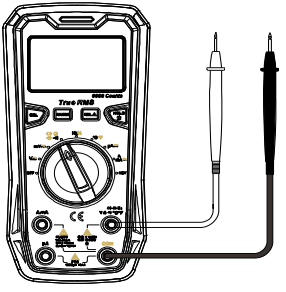
1. Turn the function dial to the diode test position.
2. Insert the red test lead into the "**VΩ⊣◀**" terminal, black test lead into the "**COM**" terminal, and make the probes in contact with the two endpoints of the PN junction.
3. If the diode is open or its polarity is reversed, the LCD will display "OL". For silicon PN junction, the normal value is generally about 500mV~800mV (0.5V~0.8 V).

Warnings

- Switch off the power supply of the circuit and discharge all capacitors before terminal, and make the probes in contact with the two endpoints of the capacitance. Testing the PN junction.
- The test voltage is about 4.0V/1.5mA.

Capacitance Measurement

Wire Connection Diagram



Steps of Measurement

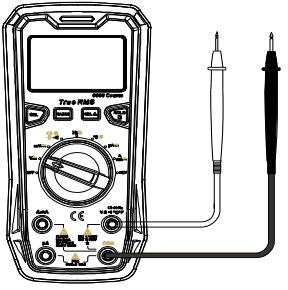
1. Turn the function dial to the capacitance measurement position.
2. Insert the red test lead into the "**VΩ**" terminal, black test lead into the "**COM**".
3. When there is no input, the meter displays a fixed value (intrinsic capacitance). For small capacitance measurement, this fixed value must be subtracted from the measured value to ensure measurement accuracy. So, please use the relative value measurement (REL) mode to automatically subtract the fixed value.


Warnings

- If the measured capacitor is shorted or the capacitance exceeds the maximum range, the LCD will display “OL”.
- When measuring high capacitance, it is normal to take a few seconds to stabilize the reading.
- Before measuring, discharge all capacitors (especially high-voltage capacitors) to avoid damage to the meter and user.

Frequency Measurement

Wire Connection Diagram



Steps of Measurement

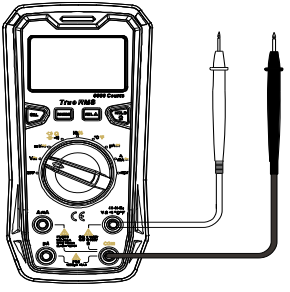
1. Turn the function dial to the "Hz/%" position.
2. Insert the red test lead into the "**VΩHz**" terminal, black test lead into the "**COM**" terminal, and connect the test leads to both ends of the signal source in parallel.
3. Read the test result from LCD.

Warnings

- The output signal of the measurement should be <30V, otherwise the measurement accuracy will be affected.

Duty Cycle Measurement

Wire Connection Diagram



Steps of Measurement

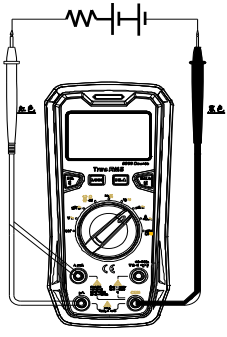
1. Turn the function dial to Hz/% position, short press SEL button to enter duty cycle measurement interface.
2. Insert the red test lead into the "**VΩHz**" terminal, black test lead into the "**COM**" terminal, and connect the test leads to both ends of the signal source in parallel (measuring range is ≤10Hz).
3. Read the test result from LCD.

Warnings

- The output signal of the measurement should be ＞1Vp-p, otherwise the measurement accuracy will be affected.

AC/DC Current Measurement

Wire Connection Diagram



Steps of Measurement

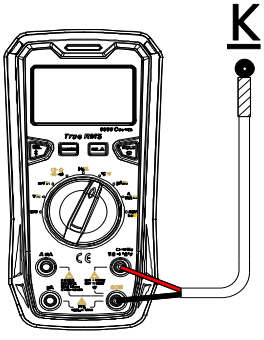
1. Turn the function dial to mA/A or μA measurement position.
2. Insert the red test lead into "**mA/A**" or "**μA**", and black test lead into "**COM**" terminal.
3. Press SEL button to switch between DC and AC.
4. Connect the test leads to the power supply or the circuit under test in series.
5. Read the test result from LCD.


Warnings

- Switch off the power supply of the circuit, make sure the input terminals and dial position are correct, and then connect the meter to the circuit in series.
- If the range of the measured current is unknown, select the maximum range and then accordingly reduce.
- If the "**mA/A**" terminal is overloaded, the built-in fuse will be blown and must be replaced.
- Do not connect the test leads to any circuit in parallel during current measurement to avoid damage to the meter and user.
- When the measured current is close to 10A, each measurement time should be <10s and the test interval should be >15 minutes.

Temperature Measurement

Wire Connection Diagram



Steps of Measurement

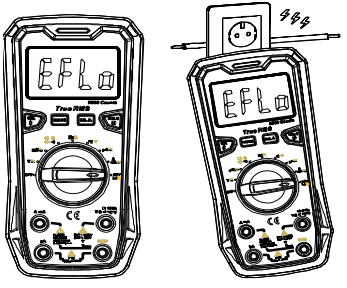
1. Turn the function dial to the temperature measurement position.
2. Insert the K-type thermocouple into the "**VΩ**" and "**COM**" terminals, and fix the temperature sensing end of the thermocouple on the object under test, read the temperature from LCD after the value stabilizes.

Warnings

- The LCD displays "**OL**" when the meter is turned on. Only K-type thermocouple is applicable, and the measured temperature should be less than 250°C/482°F (°F = °C × 1.8 + 32).

Non-Contact Voltage (NCV) Sensing

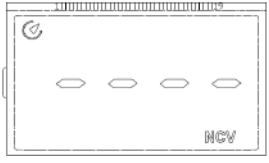
Wire Connection Diagram



Steps of Measurement

1. To sense whether there is AC voltage or electric field in the space, please turn the function dial to the "NCV" position. The meter defaults to "EFLo", short press SELECT to switch to EFHi.
2. In EFLo mode, bring the front end of the meter close to a socket or insulated wire (≥24V±6V). When an electric field is sensed, the buzzer will beep, the LED will flash and display the segment "-", as the intensity of the measured electric field increases, more segments (up to "----") will be displayed and the frequency for buzzer beeping will be higher.

3. In HFHi mode, bring the front end of the meter close to a socket or insulated wire (≥74V±12V). When an electric field is sensed, the buzzer will beep, the LED will flash and display the segment "-", as the intensity of the measured electric field increases, more segments (up to "----") will be displayed and the frequency for buzzer beeping will be higher.
4. The diagram of segment indicating the intensity of the electric field sensing is shown below.



Others

Additional operations

- The meter cannot enter the normal measurement status until its full display for about 2s after the starting up.
- During measurement, if there is no operation of the function dial for 15 minutes, the meter will automatically shut down to save power. Users can wake it up by pressing any button or turning the function dial, and the buzzer will beep once. To disable the auto-off function, turn the dial to OFF, press and hold SEL button for more than 2 seconds at the same time that the meter is turned on.
- The buzzer beeps once (about 0.25s) at any valid press of buttons or turning of the function dial.
- Buzzer alarm:

  The buzzer beeps continuously when the input voltage ≥990.0V or input current >9.900A, indicating that it is at the range limit.
- The buzzer makes five consecutive beeps about 1 minute before auto power off, and makes one long beep when the meter shuts down.
- Low battery detection:

  A. Battery voltage 3.7V~4.2V: "  " is displayed, the indicator lights up yellow for 2 seconds and then lights off, the meter still works.

  B. Battery voltage <(3.6V±0.3): After the meter is turned on, the indicator lights up red for 2 seconds and the meter shuts down.

SPECIFICATIONS

General Specifications

1 The maximum voltage between input terminal and earth ground is 1000Vrms.

2 10A terminal is equipped with 10A 1000V quick-acting fuse, Φ6.35×32mm.

3 9999-count display, show "OL" when overrange, update 3 times per second.

4 Range: Auto

5 Backlight: manually turn on and auto turn off after 30 seconds.

6 Polarity: Display symbol "—" for negative polarity input.

7 Data hold: "H" display on top right of LCD.

8 Low battery indication: "▭" display on bottom left of LCD.

9 Battery: AAA battery 1.5V×3

10 Working temperature: 0˚C～40˚C (32˚F～104˚F)

Storage temperature: -10˚C～50˚C (14˚F～122˚F)

Relative humidity: 0˚C～30˚C ≤75%, 30˚C～40˚C ≤50%

Working altitude: 0～2000m

Instruction for use: Indoor use

11 Dimension: 169*81*46mm

12 Weight: about 300g (including batteries)

13 EMC: For RF-field at 1V/m, overall accuracy = specified accuracy + 5% of the range. There is no specified indicator for RF-field at >1V/m.

Technical Specifications

Accuracy: ± (a% of reading + b digits), 1 year warranty

Ambient temperature: 23˚C ± 5˚C (73.4˚F ± 9˚F)

Ambient humidity: ≤75%

Note

- To ensure measurement accuracy, the operating temperature should be within 18°C~28°C and the fluctuation range should be within ±1°C.
- Temperature coefficient: 0.1 x (specified accuracy)/°C (<18°C or >28°C)

Technical Specifications Index

DC Voltage

Range	Resolution	Accuracy
9.999mV	0.001mV	±(0.7%+8) [10%~100% of the Range]
99.99mV	0.01mV	
999.9mV	0.1mV	±(0.5%+3)
9.999V	0.001V	
99.99V	0.01V	
999.9V	0.1V	

- Input impedance: About 10MΩ for DCV, about 3GΩ for DCmV. Unstable digits display when the circuit is open in mV range, the digits stabilize (≤ ±5 digits) after connecting to the load.
- Max input voltage: ±1000V, the alarm sounds at 990.0V, "OL" is displayed at >1000V.
- Overload protection: 1000Vrms (DC/AC)

AC Voltage

Range	Resolution	Accuracy
9.999mV	0.001mV	±(1%+3)
99.99mV	0.01mV	
999.9mV	0.1mV	±(0.8%+3)
9.999V	0.001V	
99.99V	0.01V	
999.9V	0.1V	

- Input impedance: About 10MΩ.
- Frequency response: 45Hz~400Hz.
- Display: True RMS
- Max input voltage: AC 1000V, the alarm sounds at 990.0V, "OL" is displayed at >1000V.
- Overload protection: 1000Vrms (DC/AC).

Resistance

Range	Resolution	Accuracy
999.9Ω	0.1Ω	±(0.8%+5)
9.999kΩ	0.001kΩ	±(0.8%+2)
99.99kΩ	0.01kΩ	
999.9kΩ	0.1kΩ	
9.999MΩ	0.001MΩ	±(1.5%+3)
99.99MΩ	0.01MΩ	±(2.0%+5)

- Measurement result = displayed value – resistance of shorted test leads.
- Overload protection: 1000V

Continuity and Diode

Range	Resolution	Remarks
	0.1Ω	Broken circuit: Resistance >30Ω, no beep. Well-connected circuit: Resistance ≤30Ω, consecutive beeps.
	0.001V	Open circuit voltage: About 3.3V (test current is about 1.5mA). For silicon PN junction, the normal value is about 0.5V~0.8V

- Overload protection: 1000Vrms (DC/AC)

Capacitance

Range	Resolution	Accuracy
9.999nF	0.001nF	±(4%+10)
99.99nF	0.01nF	±(4%+5)
999.9nF	0.1nF	
9.999μF	0.001μF	
99.99μF	0.01μF	
999.9μF	0.1μF	
9.999mF	0.001mF	±10%

- For capacitance ≤100nF, it is recommended to use REL mode to ensure measurement accuracy.
- Overload protection: 1000Vrms (DC/AC)

Temperature

Range			Resolution	Accuracy
℃	-40～1000℃	-40～0℃	1℃	±4℃
		＞0～100℃		±(1.0%+5)
		＞100～1000℃		±(2.0%+5)
℉	-40～1832℉	-40～32℉	1℉	±5℉
		＞32～212℉		±（1.5%+5)
		＞212～1832℉		±（2.5%+5)

- K-type thermocouple is only applicable to the measurement of temperature below 250℃/482℉.
- Overload protection: 1000Vrms (DC/AC)

DC Current

Range	Resolution	Accuracy
999.9µA	0.1µA	± (0.8%+3)
999.9mA	0.1mA	± (1.0%+3)
9.999A	0.001A	

- The alarm sounds at ≥9.900A. "OL" is displayed at >10.00A.
- Overload protection: 1000Vrms

AC Current

Range	Resolution	Accuracy
999.9µA	0.1µA	± (1.0%+3)
999.9mA	0.1mA	± (1.2%+3)
9.999A	0.001A	

- Frequency response: 40Hz~400Hz
- Display: True RMS
- Accuracy: 10~100% of the range, zeroing at short circuit.
- The alarm sounds at ≥9.900A, "OL" is displayed at >10.00A
- Overload protection: 1000Vrms

Frequency

Range	Resolution	Accuracy
99.99Hz～9.999MHz	0.01Hz～0.001MHz	±(0.1%+5)

⚠
- Input amplitude:
  ≤100kHz: 200mVrms ≤ input amplitude ≤ 30Vrms
  >100kHz~1MHz: 500mVrms ≤ input amplitude ≤ 30Vrms
  >1MHz: 900mVrms ≤ input amplitude ≤ 30Vrms
- Overload protection: 1000Vrms (DC/AC)

Duty cycle

Range	Resolution	Accuracy
0.1～99.9%	0.1%	±（3%+5)

⚠
- Input amplitude:
  Duty cycle is only applicable to the measurement of square wave at ≤10kHz.
  ≤1kHz: the duty cycle is 10.0%-95.0%
  >1kHz: the duty cycle is 30.0%-70.0%
- Overload protection: 1000Vrms (DC/AC)

MAINTENANCE

WARNING

- Switch off the power supply and remove the test leads before opening the rear cover.

General Maintenance

- Clean the meter casing with a damp cloth and mild detergent. Do not use abrasives or solvents.
- If there is any malfunction, stop using the meter and send it for maintenance.
- The maintenance and service must be implemented by qualified professionals or designated departments.

Battery/Fuse Replacements

Battery Replacement

Steps of Replacement

1. Turn the function dial to the "OFF" position, remove the test leads from the input terminals, and remove the protective cover.
2. Unscrew and remove the battery cover.
3. Replace with 3×1.5V AAA batteries, observing correct polarity.
4. Secure the battery cover and tighten the screw.

Fuse Replacement

Steps of Replacement

1. Turn the function dial to the "OFF" position, remove the test leads from the input terminals, and remove the protective cover.
2. Unscrew and remove the rear cover.
3. Replace the blown fuse (specifications: Fuse 10A/1000V Φ6.35×32mm ceramic tube).
4. Secure the rear cover and tighten the two screws.