



DIGITAL MULTIMETER

AMM-1009

User's Manual



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SAFETY WARNINGS

The following safety information must be observed to insure maximum personal safety during the operation at this meter:

- Do not use the meter if the meter or test leads look damaged, or if you suspect that the meter is not operating properly.
- Use caution when working above 60V dc or 30V ac rms. Such voltages pose a shock hazard.
- When using the probes, keep your fingers behind the finger guards on the probes.
- Measuring voltage which exceeds the limits of the multimeter may damage the meter and expose the operator to a shock hazard. Always recognize the meter voltage limits as stated on the front of the meter.
- If the equipment is used in a manner not specified by the manufacturer, the protection provided the equipment may be impaired.

Symbols used on this instrument are:



notes.

Caution: refer to accompanying

This symbol indicates that the operator must refer to an explanation in the Operating Instructions to avoid personal injury or damage to the meter.



Caution: risk of electric shock

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

This CAUTION symbol indicates a potentially hazardous situation, which if not avoided, may result 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.



Equipment protected throughout by Double Insulation (Class II)



Equipment complies with current EU directives.

SYMBOLS AND ANNUNCIATORS

BAT Low Battery

HOLD Data Hold

SPECIFICATIONS

Display: 3 3/4 digit liquid crystal display LCD with a maximum reading of 3999.

Polarity: Automatic, positive implied, negative polarity indication.

Overrange: (OL) or (-OL) is displayed

Zero: Automatic

Low battery indication: A battery “BAT” symbol is displayed when the battery voltage drops below the operating level.

Measurement rate: 2.5 times per second nominal.

Operating environment: 0°C to 40°C at < 70 %RH

Storage Temperature: -20°C to 60°C, 0 to 80%RH
with battery removed from meter.

Accuracy: Stated accuracy at 23°C±5°C, < 75%RH.

Power: single standard 9V battery.

Battery life: 150 hours typical.

Dimensions: 182 (H) x 82 (W) x55 (D) mm

Weight: 375g.

Accessories: test leads, 9V battery, gift box with carrying case.

DC Voltage

Range	Resolution	Accuracy
400.0mV	0.1mV	$\pm 0.5\%$ of rdg ± 1 digits
4.000V	1mV	
40.00V	10mV	
400.0V	100mV	
1000V	1V	$\pm 0.5\%$ of rdg ± 1 digits

Input Impedance: 10M Ω .

Overload protection: 500V dc or ac rms on 400mV range, 1000V dc or 750V ac on all other ranges.

AC Voltage(50Hz-500Hz)

Range	Resolution	Accuracy
400.0mV	0.1mV	$\pm 1.0\%$ of rdg ± 4 digits
4.000V	1mV	

40.00V	10mV	
400.0V	100mV	
750V	1V	$\pm 1.5\%$ of rdg ± 4 digits

Input Impedance: 10M Ω .

Overload protection: 500V dc or ac rms on 400mV range, 1000V dc or 750V ac on all other ranges.

DC Current

Range	Resolution	Accuracy
40.00mA	10uA	$\pm 1.0\%$ of rdg ± 1 digits
400.0mA	100uA	
20A	10mA	$\pm 3.0\%$ of rdg ± 1 digits

Input Protection: 0.5A / 250V fast blow fuse 10A / 30sec. input “unfuse”

AC Current(50Hz-500Hz)

Range	Resolution	Accuracy
40.00mA	10uA	$\pm 1.5\%$ of rdg ± 4 digits
400.0mA	100uA	
20A	10mA	$\pm 3.5\%$ of rdg ± 4 digits

Input Protection: 0.5A / 250V fast blow fuse 10A / 30sec. input “unfuse”

Resistance [Ω]

Range	Resolution	Accuracy
400.0 Ω	0.1 Ω	$\pm 0.8\%$ of rdg ± 4 digits
4.000k Ω	1 Ω	$\pm 0.8\%$ of rdg ± 2 digits
40.00k Ω	10 Ω	
400.0k Ω	100 Ω	
4.000M Ω	1k Ω	
40.00M Ω	10k Ω	$\pm 3.0\%$ of rdg ± 4 digits
400.00M Ω	100k Ω	$\pm [(10\% \text{ of rdg} - 20\text{dgt}) + 10\text{dgt}]$

Open circuit voltage:

0.6V dc (3.0V dc on 400 Ω and 400M Ω ranges)

Overload protection: 500V dc or ac rms.

Continuity

Audible indication: < 100 Ω

Overload protection: 500V dc or ac rms.

Diode Test

Test current: 1.0mA \pm 0.6mA

Open circuit voltage: 3.0V dc typical.

Overload protection: 500V dc or ac rms.

Capacitance Cx

Range	Resolution	Accuracy
4.000nF	1pF	$\pm 5.0\%$ of rdg ± 10 dgts
40.00nF	10pF	$\pm 5.0\%$ of rdg ± 10 dgts
400.0nF	0.1nF	$\pm 5\%$ of rdg ± 10 dgts
4.000uF	1nF	
40.00uF	10nF	

Test Frequency: about 400Hz

Frequency (Auto-ranging)

Ranges: 4kHz, 40kHz, 400kHz, 4000kHz

Accuracy: $\pm (0.1\% \text{rdg} + 1 \text{dgt})$

Sensitivity: 200mV (10Hz-4kHz);
2V (4kHz ~4MHz)

Effect reading: 10-3999

Logic Test

Threshold: Logic Hi($2.8 \pm 0.5\text{V}$)

Logic Lo($0.8 \pm 0.5\text{V}$)

Indication: 40 msec beeper at logic low

Frequency response: 20MHz

Detectable pulse width: 25nS

Pulse limits: $> 30\%$ & $< 70\%$ duty

Overload protection: 500V dc or ac rms.

OPERATION

Before taking any measurements, read the safety information section. Always examine the instrument for damage, contamination(excessive dirt, grease, etc) and defects. Examine the test leads for cracked or frayed insulation. If any abnormal conditions exist do not attempt to make any measurement.

VOLTAGE MEASUREMENT

- 1.Connect the black test lead to COM jack and the red test lead to $V\Omega$ jack.
2. Set the function/Range switch to the desired voltage type (AC or DC) and range. If magnitude of voltage is not known, set switch to the highest range and reduce until a satisfactory reading is obtained.
- 3.Connect the test leads to the device or circuit being measured.
- 4.For dc, a(-) sign is displayed for negative polarity; positive polarity is implied.

CURRENT MEASUREMENT

1. Set the Function/Range switch to the desired current type (AC or DC) and range.

2. For current measurements less than 400mA , connect the red test leads to the mA jack and the black test lead to COM jack.
3. For current measurements over 400mA or greater, connect the red test leads to the 10A jack and the black test lead to the COM jack.
4. Remove power from the circuit under test and open the normal circuit path where the measurement is to be taken. Connect the meter in series with the circuit.
5. Use caution when measuring 10 amps on 10A range for 30s, please waiting for 10 minutes for next measurement of 10 amps for safety reason.

RESISTANCE and CONTINUITY MEASUREMENT

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/Range switch to the desired resistance range or continuity position.
2. Remove power from the equipment under test.


3. Connect the black test lead to COM jack and the red test lead to $V\Omega$ jack.
4. Touch the probes to the test points. In ohms, the value indicated in the display is the measured value of resistance. In continuity test, the beeper sounds continuously, if the resistance is less than 100Ω .
5. When using $400M\Omega$ Range; The $400M\Omega$ Range has a fixed 20 ± 2 -count offset in the reading. When the test leads are shorted together in this range, the meter will display 02.0. The residual reading must be subtracted from the reading obtained in step 4 when this range is used. For example, when measuring $100M\Omega$ on the $400m\Omega$ range, the display will read 102.0, from which the 20 residual is subtracted to obtain the actual resistance of $100.0M\Omega$.

WARNING

The accuracy of the functions might be slightly affected, when exposed to a radiated electromagnetic field environment, eg, radio, telephone or similar.

DIODE TEST

WARNING: To avoid electric shock, do not test any diode that has voltage on it.

1. Connect the black test lead to COM jack and the red test lead to $V\Omega$ jack.
2. Set the function switch to the  position.
3. Turn off power to the circuit under test.
4. Touch probes to the diode. A forward-voltage drop is about 0.6V (typical for a silicon diode).
5. Reverse the probes. If the diode is good, "OL" is displayed. If the diode is shorted, ".000" or another number is displayed.
6. If the diode is open, "OL" is displayed in both directions.
7. If the junction is measured in a circuit and a low reading is obtained with both lead connections, the junction may be shunted by a resistance of less than $1K\Omega$. In this case the diode must be disconnected from the circuit for accurate testing.

FREQUENCY MEASUREMENT

WARNING: To avoid electric shock, discharge the capacitor under test before measuring.

1. Set the Function/Range switch to the “Hz” position.
2. Connect the red test lead to the n ***V Ω jack.*** and the black test lead to the COM jack.
3. Connect the test leads to the point of measurement and read the frequency from the display.

CAPACITANCE MEASUREMENT

1. Set the function/range switch to the desired F range.
2. Never apply an external voltage to the Cx sockets. Damage to the meter may result.
3. Read the capacitance directly from the display.

LOGIC MEASUREMENT

1. Set the function/range switch to the logic position.

2. Connect the red test lead to the ***V Ω jack*** and the black test lead to the COM jack.
3. Connect the red test lead to the test point and the black lead to the common buss of the logic circuit.
4. A “▲” on the display indicates TTL logic high and a “▼” indicates a TTL logic low. Both indicators are on when the point of measurement is toggling high and low.

MAINTENANCE

WARNING: Remove test leads before changing battery or fuse or performing any servicing.

BATTERY and FUSE replacement

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

1. When the batteries become exhausted or drop below the operating voltage, the battery warning symbol will appear in the LCD display. The battery should be replaced.
2. Follow instructions for installing battery. See the Battery Installation section of this manual.
3. Dispose of the old battery properly.

WARNING: To avoid electric shock, do not operate your meter with the battery cover removed.

BATTERY INSTALLATION

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

Do not operate the instrument with the battery cover removed

1. Disconnect the test leads from the meter.
2. Open the battery cover by loosening the screw 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 two screws.

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

REPLACING THE FUSES

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

1. Disconnect the test leads from the meter and any item under test.
2. Open the fuse door by loosening the screw on the door using a Phillips head screwdriver.
3. Remove the old fuse from its holder by gently pulling it out.
4. Install the new fuse into the holder.
5. Always use a fuse of the proper size and value (0.5A/250V fast blow for the 400mA range).
6. Put the fuse door back in place. Insert the screw and tighten it securely.

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