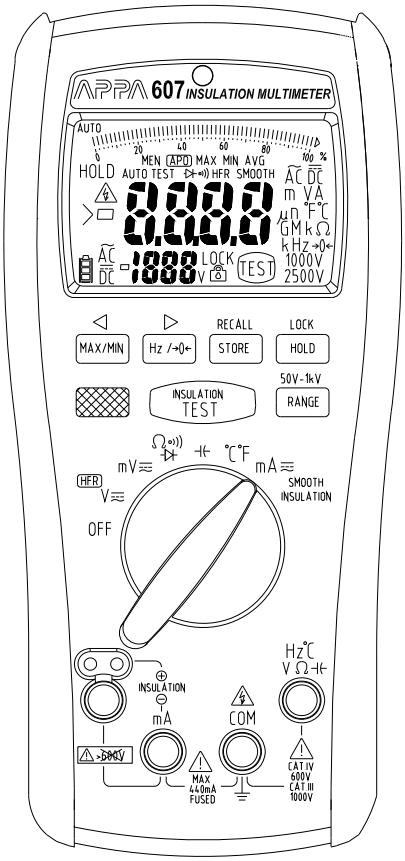
User Manual

APPA 607



CE

APPA

Advanced Instrument Technology Made Easy

⚠ Read First

⚠ Safety Information

Understand and follow operating instructions carefully.
Use the meter only as specified in this manual; otherwise, the protection provided by the meter may be impaired.

⚠ WARNING

Identifies hazardous conditions and actions that could cause **BODILY HARM** or **DEATH**

⚠ CAUTION

Identifies conditions and actions that could **DAMAGE** the meter or equipment under test

⚠ WARNING

- When using test leads or probes, keep your fingers behind the finger guards.
- Remove test lead from Meter before opening the battery door or Meter case.
- Use the Meter only as specified in this manual or the protection by the Meter might be impaired.
- Always use proper terminals, switch position, and range for measurements.
- Verify the Meter's operation by measuring a known voltage. If in doubt, have the Meter serviced.
- Do not apply more than the rated voltage, as marked on Meter, between terminals or between any terminal and earth ground.
- Only replace the blown fuse with the proper rating as specified in this manual.
- Use caution with voltages above 30 Vac rms, 42 Vac peak, or 60 Vdc. These voltages pose a shock hazard.
- To avoid false readings that can lead to electric shock and injury, replace battery as soon as low battery indicator.
- Disconnect circuit power and discharge all high-voltage capacitors before testing resistance, continuity, diodes, or capacitance.
- Do not use Meter around explosive gas or vapor.
- To reduce the risk of fire or electric shock do not expose this product to rain or moisture.

⚠ CAUTION

- Disconnect the test leads from the test points before changing the position of the function rotary switch.
- Never connect a source of voltage with the function rotary switch in Ω,⊣⊢,°C ,mA, INSULATION position.
- Do not expose Meter to extremes in temperature or high humidity.
- Never set the meter in Ω,⊣⊢,°C ,mA, INSULATION function to measure the voltage of a power supply circuit in equipment that could result in damage the meter and the equipment under test.

Symbols as marked on the Meter and Instruction manual

⚠	Risk of electric shock
⚠	See instruction manual
⎓	DC measurement
⧈	Equipment protected by double or reinforced insulation
⎓	Battery
⏛	Fuse
⏚	Earth
~	AC measurement
CE	Conforms to EU directives
	Do not discard this product or throw away.

Unsafe Voltage

To alert you to the presence of a potentially hazardous voltage, when the Tester detects a voltage ≧30 V or a voltage overload (OL) in V, mV, insulation function. The "⚠" symbol is displayed and High voltage indicator is turned on.

Maintenance

Do not attempt to repair this Meter. It contains no userserviceable parts. Repair or servicing should only be performed by qualified personnel.

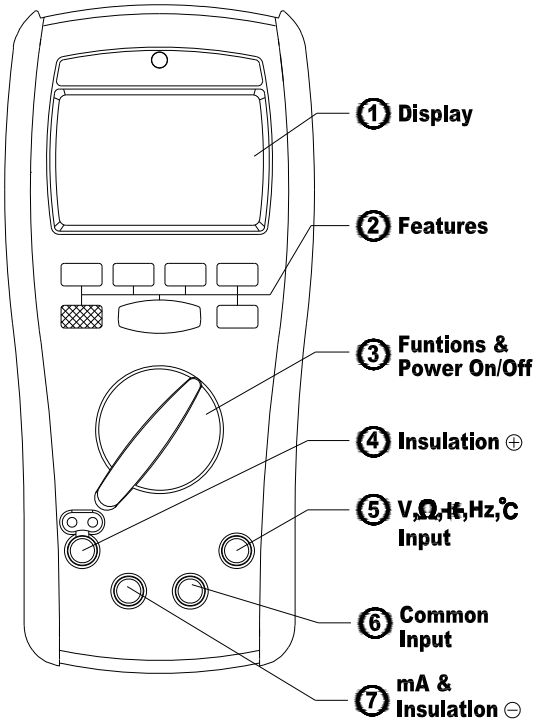
Cleaning

Periodically wipe the case with a dry cloth and detergent.
Do not use abrasives or solvents.

The Meter Description

Front Panel Illustration

1. LCD display : 10000 counts .
2. Push-buttons for features.
3. Rotary switch for turn the Power On / Off and select the function.
4. Input Terminal for Insulation function.
5. Input Terminal for V,Ω, ⊣⊢ , Hz, °C functions.
6. Common (Ground reference) Input Terminal for all functions expect Insulation function.
7. Input Terminal for mA or Common Input Terminal for Insulation function.

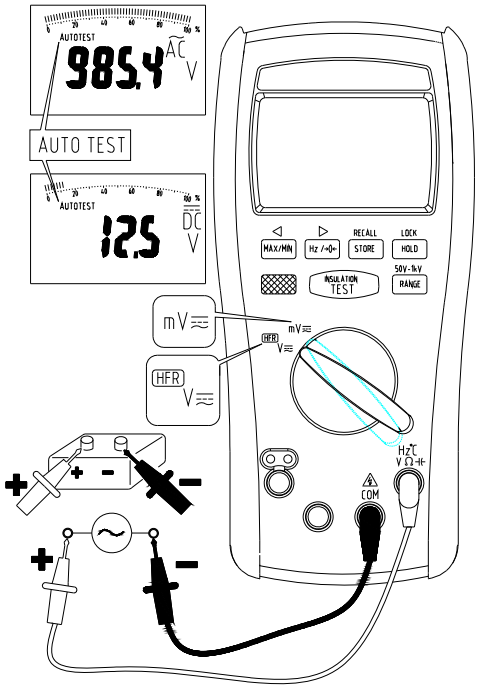


Making Basic Measurements

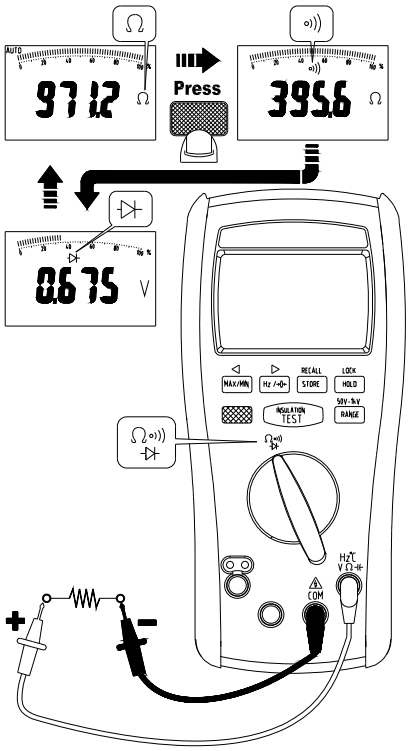
Preparation and Caution Before Measurement
⚠ : **Observe the rules** of ⚠ Warnings and ⚠ Cautions

When connecting the test leads to the **DUT** (Device Under Test) **connect the common (mA) test lead before connecting the live lead ; when removing the test leads removing the test live lead before removing the common test lead.**
The figures on the following pages show how to make basic measurements.

Measuring AC / DC Voltage

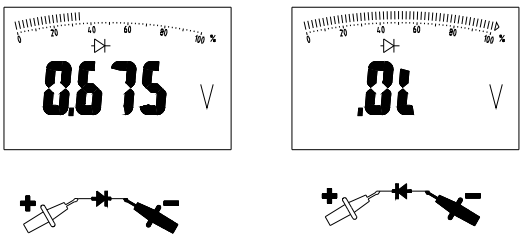


Measuring Resistance / Continuity / Diode

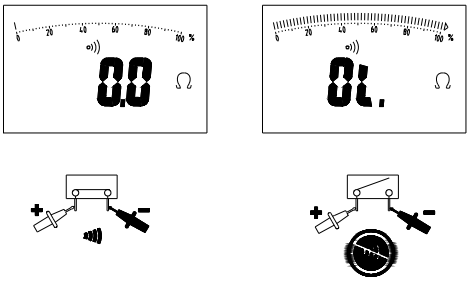


Press the Blue button to select the measuring function.

Testing Diode

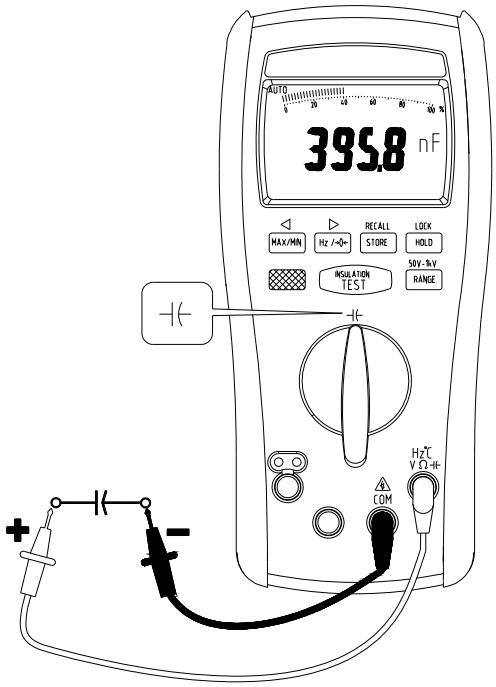


Testing Continuity

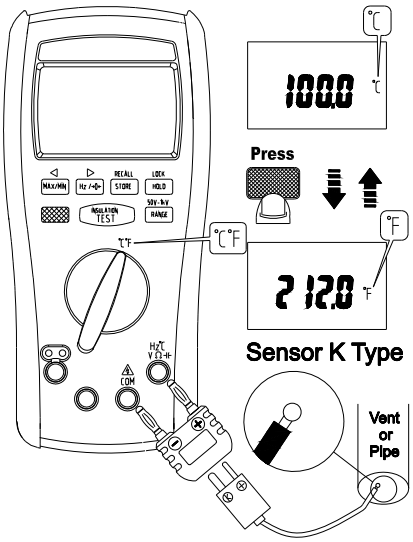


The buzzer allows you to quick continuity tests without having to watch the display. The buzzer sounds when a short (< 30Ω) is defected.

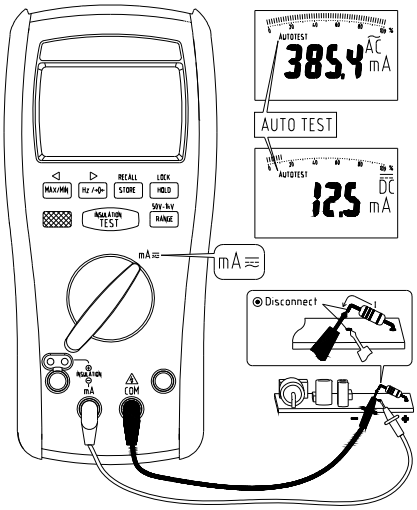
Measuring Capacitance



Measuring Temperature °C / °F

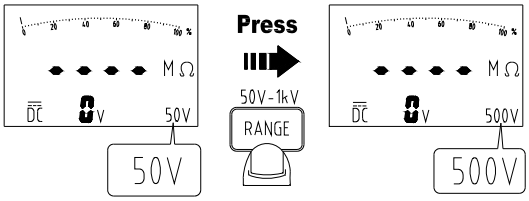


Measuring AC / DC Current



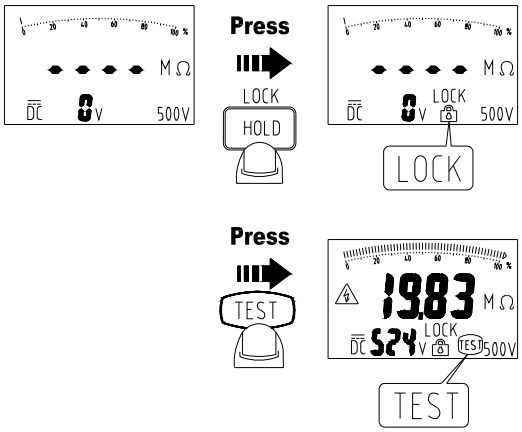
Measuring Insulation Resistance

Select test voltage



Press the Range button to select the test voltage
(50V / 100V / 250V / 500V / 1000V)

Lock test voltage

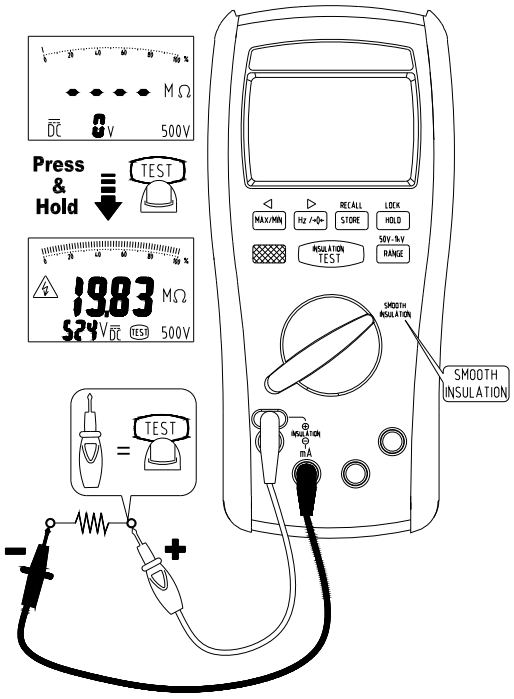


Press the Hold button to lock the test voltage. Press the button again to cancel the lock mode.

Make the reading stably

Press the Blue button to make the reading stably, the “Smooth” appears on the display. Press the Blue button again to cancel this mode.

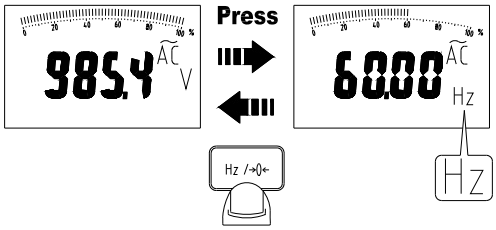
Measuring Insulation Resistance



Insulation tests should only be performed on dead circuits. Check the fuse before testing. To measure insulation resistance, follow the steps below.

1. Insert test probes in the "⊕ " and "⊖ " input terminals.
2. Turn the rotary switch to Insulation position.
3. Press the Range button to select the test voltage.
4. Connect the probes to the circuit.
5. Push and hold the Test button to start the test.
   The "Test" and "⚠" appear on the display. The secondary display shows the test voltage applied to the circuit under test. The primary display shows the resistance.
6. Keep the probes on the test points and release the Test button. The resistance reading appears on the primary display until a new test is started or a different function or range is selected or > 30 V is detected.

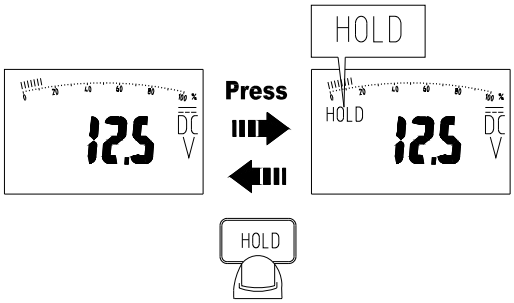
Measuring Frequency for ACV, ACmV and ACmA



The meter measures the frequency of a voltage or current signal by counting the number of times the signal crosses a threshold level each second. To measure frequency, follow the steps below.

1. Turn the rotary switch to V, mV or mA position.
2. Press the Hz button to measure the frequency.
3. Press the Hz button or change the rotary switch position to exit this function.

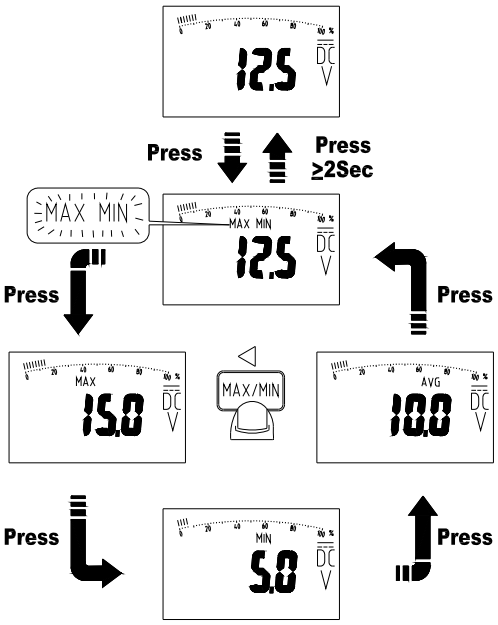
Display Hold



In the Hold mode, the meter holds the reading. To use the Hold mode, follow the steps below.

1. Press the Hold button to activate Hold mode. The “ Hold ” appears on the display.
2. Press the Hold button, Blue button, Range button or change the rotary switch position to exit this function.

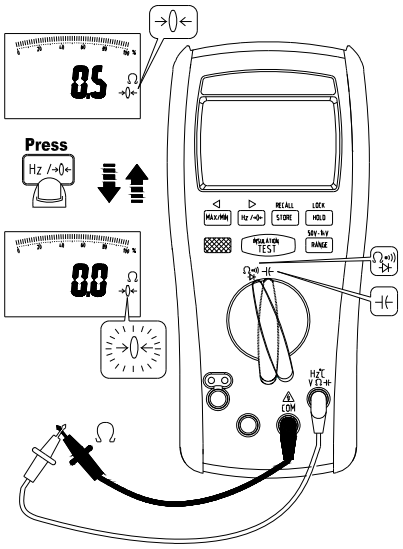
Display MAX / MIN / AVG



The “MIN/MAX/AVG“ mode records minimum and maximum input values. When the inputs go below the recorded minimum value or above the recorded maximum value, the meter beeps and records the new value. MIN/MAX/AVG mode can also calculate an average of maximum and minimum. To use the MIN/MAX/AVG mode, follow the steps below.

1. Press the “MIN/MAX“ button to activate MIN/MAX/AVG mode. The “MIN MAX” blinks on the display.
2. Press the “MIN/MAX“ button to step through the present readings, maximum, minimum and average (AVG).
3. Press the “MIN/MAX“ button for 2 seconds, Blue button, Range button or change the rotary switch position to exit

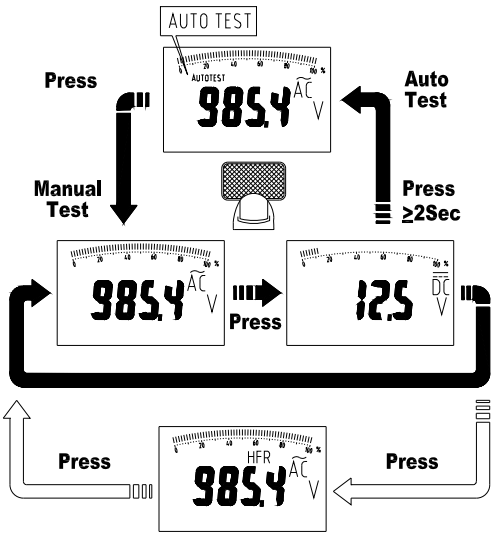
Relative mode for Ω / ⊣⊢



In the Relative mode, the meter records the present reading as reference and the later reading will subtract it. To use the Relative mode, follow the steps below.

1. Turn the rotary switch to **Ω** or ⊣⊢ position.
2. Press the Hz button to activate Relative mode. The "→ 0 ← " blinks on the display.
3. Press the Hz button, Blue button, Range button or change the rotary switch position to exit this function.

Auto Test and Manual Test



The meter has both “AutoTest “ mode and Manual Test mode.

- In the Auto Test mode, the meter compares the reading of AC and DC, and the bigger reading appears on the display. The meter beeps when the AC/DC mode has change.
- In the Manual Test mode, you override “AutoTest “ and select the AC/DC mode yourself.

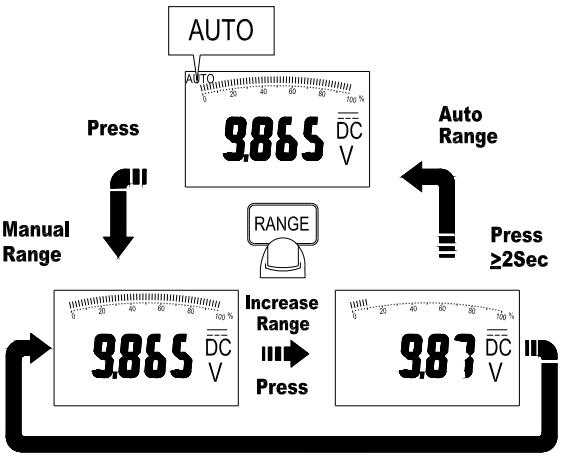
When you turn the rotary switch to V, mV or mA position, it defaults to Auto Test mode and the “AutoTest ” appears on the display.

1. To enter the Manual Test mode, press the Blue button.
2. In the Manual Test mode, press the Blue button to change the AC/DC mode.
3. Press the Blue button for 2 seconds to activate Auto Test mode.

High Frequency Reject mode

When the rotary switch in V position, the HFR mode can be used. To use HFR mode, press the Blue button in the Manual Test mode.

Auto Range and Manual Range



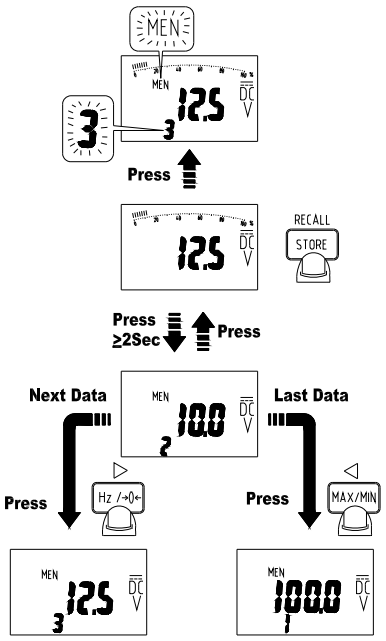
The meter has both Auto Range mode and Manual Range mode.

- In the Auto Range mode, the meter selects the range with the best resolution.
- In the Manual Range mode, you select the range yourself.

When you turn the meter on, it defaults to Auto Range mode and the “Range” appears on the display.

1. To enter the Manual Range mode, press the Range button. The “Range” disappears on the display.
2. In the Manual Range mode, press the Range button to increment the range. After the highest range, the meter returns to the lowest range.
3. Press the Range button for 2 seconds to activate Auto Range mode.

Store and Recall



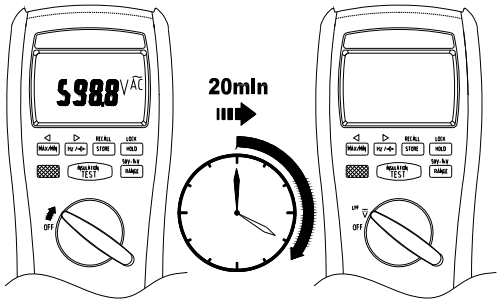
You can store the reading on the display, and recall the reading on the display after.

- To store the reading press the Store button.
  The data amount and “MEM” blink on the secondary display.
- Each function has a separate memory space. Each memory space has the maximum 100 amounts.

To recall the reading on the display, press the Store button for 2 seconds to activate Recall mode. The data amount shows on the secondary display. In the Recall mode, you can make the following operation.

- Press the ← button or → button to select the data amount.
- Press the ← button or → button for 2 seconds to search data quickly.
- Press the Blue button to clear all stored data in this function.
- Press the Store button for 2 seconds or change the rotary switch position to exit this function.

Auto Power Off



Wake-up the meter by switching rotor or pressing any button.

Auto Backlight

The backlight is automatically turned on at dark environment.

BUZZER

The meter beeps once for every valid key-press, and beeps twice for every invalid key-press.

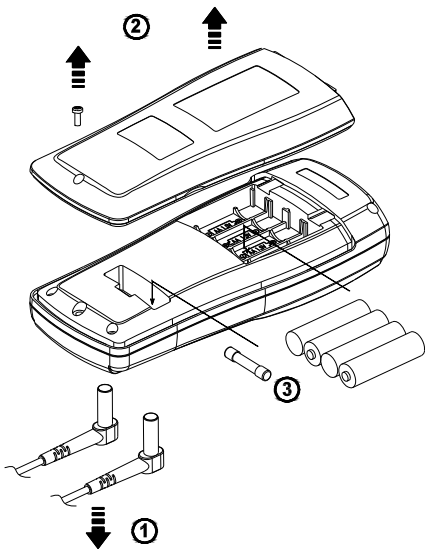
Power On Options

Press button while turning the meter on from OFF position.

Blue button : Disable APO
MAX/MIN button : Disable auto backlight
Store button : Clear all stored data
Test button : Display LCD test frame
Range button : Default °C / °F reading

Battery and Fuse Replacement

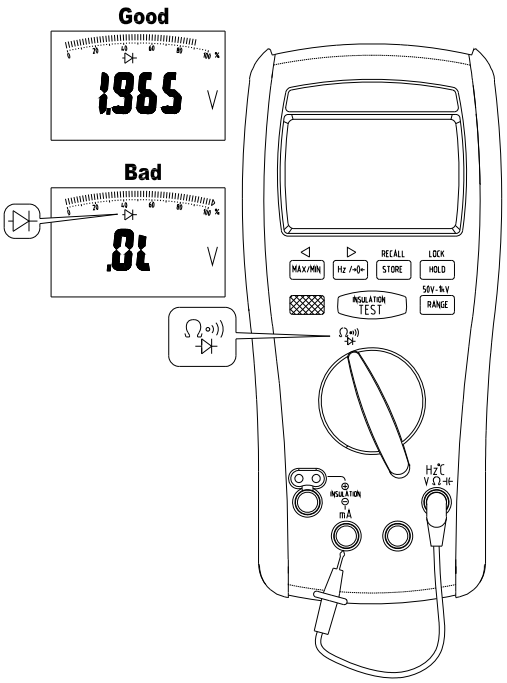
Refer to the following figure to replace fuse and the batteries :



⚠ Caution

- Use only a fuse with the amperage, interrupt, voltage, and speed rating specified.
- Fuse rating : 440mA,1000V fast blow fuse.
- Replace the batteries as soon as the low batteries indicator "▯" appears, to avoid false reading.
- 1.5V x 4 alkaline batteries.

Testing the fuse



Test the fuse as described below.

1. Insert a test probe in the V, Ω, , Hz, °C input terminal.
2. Turn the rotary switch to Ω position, and press the Blue button to diode function.
3. Insert the probe in the mA input terminal. If the display reading is 0L, the fuse is bad and should be replaced.

Specifications

General Specifications

Maximum voltage applied to any terminal :
1000 V ac rms or dc.
Display : 10000 counts.
Polarity Indication :
Automatic, positive implied, negative indicated.
Overrange Indication : OL
Batteries Life : ALKALINE 80 hours.
Insulation test : Tester can perform at least 600 insulation tests with new alkaline batteries at room temperature. These are standard tests of 1 MΩ at 1000 V with a duty cycle of 5 seconds on and 25 seconds off.
Low Batteries Indication : "" is displayed when the batteries voltage drops below operating voltage.
Low battery voltage : Approx. 4.8V
Auto Power Off : Approx 20 minutes.
Operating Ambient : Non-condensing ≦10°C,
11°C ~ 30°C (≦80% RH),
30°C ~ 40°C (≦75% RH),
40°C ~ 50°C (≦45%RH)
Storage Temperature :
-20°C to 60°C , 0 to 80% R.H. (batteries not fitted)
Temperature Coefficient :
Add 0.15 x (Spec.Accy) / °C, < 18°C or > 28°C .
Measure : Samples 3 times per second normal.
Altitude : 6561.7 ft (2000m)
Safety : Complies with EN61010-1, UL61010-1,IEC 61010-1,
CAT.IV. 600V, CAT.Ⅲ. 1000V

CAT	Application field
Ⅰ	The circuits not connected to mains.
Ⅱ	The circuits directly connected to Low-voltage installation.
Ⅲ	The building installation.
Ⅳ	The source of the Low-voltage installation.

Compliance to EN 61557 : IEC61557-1, IEC61557-2, IEC61557-4, IEC61557-10
Weight : (630g) including battery.
Dimensions (W x H x D) :
95mm x 207mm x 52mm with holster.
Accessories : Battery (installed), Test leads and user manual.
Power Requirements : 1.5V x 4 IEC LR6 or AA size.
Pollution degree : 2

EMC : EN 61326-1
Shock vibration : Sinusoidal vibration per MIL-T- 28800E (5 ~ 55 Hz, 3g maximum).
Drop Protection : 4 feet drop to hardwood on concrete floor.
Indoor Use.

Electrical Specifications

Accuracy is ±(% reading + number of digits) at 23°C ± 5°C < 80%RH.

AC Voltage Measurement

Function	Range	Accuracy	
		50Hz to 60Hz	60Hz to 5kHz
ACmV	100.00mV	±(0.9%+3d)	±(0.9%+3d)
	1000.0mV	±(0.9%+3d)	±(0.9%+3d)
ACV	10.000V	±(0.9%+3d)	±(1.9%+3d)
	100.00V	±(0.9%+3d)	±(1.9%+3d)
	1000.0V	±(0.9%+3d)	±(1.9%+3d) [1]
HFR ACV	10.000V	±(0.9%+3d)	±(2.9%+3d) [2]
	100.00V	±(0.9%+3d)	±(2.9%+3d) [2]
	1000.0V	±(0.9%+3d)	±(2.9%+3d) [2]
[1] 60Hz to 1kHz [2] 60Hz to 500Hz			

DC voltage Measurement

Function	Range	Accuracy
DCmV	100.00mV	±(0.08%+3d)
	1000.0mV	±(0.08%+2d)
DCV	10.000V	±(0.08%+2d)
	100.00V	±(0.08%+2d)
	1000.0V	±(0.08%+2d)

Over voltage protection : 1000V AC rms or DC.
The cut-off frequency of the high frequency reject : 1 kHz.
Input Impedance : 10MΩ // less than 100pF.

CMRR / NMRR : (Common Mode Rejection Ratio)
(Normal Mode Rejection Ratio)
V_{AC} : CMRR > 60dB at DC, 50Hz / 60Hz
V_{DC} : CMRR > 100dB at DC, 50Hz / 60Hz
NMRR > 50dB at DC, 50Hz / 60Hz
AC Conversion Type :
AC conversions are ac-coupled, true rms responding, calibrated to the sine wave input.
For non-sine wave add the following Crest Factor corrtions :
For Crest Factor of 1.4 to 2.0, add 1.0% to accuracy.
For Crest Factor of 2.0 to 2.5, add 2.5% to accuracy.
For Crest Factor of 2.5 to 3.0, add 4.0% to accuracy.
CF 3 @ 330V, 2 @ 500V

AC/DC Current Measurement

Function	Range	Accuracy
DCmA	100.00mA	±(0.2%+2d)
	400.0mA	±(0.2%+2d)
ACmA	100.00mA	±(1.5%+2d) [1]
	400.0mA	±(1.5%+2d) [1]
[1] 50Hz to 5kHz		

Overload Protection :
mA Input : Max 440mA
AC Conversion Type : Conversion type and additional specification are same as DC/AC voltage.
Maximun Input Current Restriction Time : 10 minutes

Frequency Measurement for ACV/ACmV/ACmA

Function	Range	Accuracy
Frequency	100.00Hz	±(0.1%+5d)
	1000.0Hz	±(0.1%+5d)
	10.000kHz	±(0.1%+5d)
	100.00kHz	±(0.1%+5d)

Frequency Counter Sensitivity

Function	Input Range (AC)	V_{AC} Sensitivity (RMS Sine Wave)	
		10Hz to 10kHz	10kHz to 100kHz
ACmV	100.00mV	15.00mV	15.00mV
	1000.0mV	150.0mV	150.0mV
ACV	10.000V	1.500V	1.500V
	100.00V	3V	-
	1000.0V	30V	-
ACmA	100.00mA	15.00mA	-
	400.0mA	30mA	-

Minimun Pulse Width : >10us
Overload Protection : 1000V AC rms or DC

Resistance Measurement

Function	Range	Accuracy
Resistance	1000.0Ω	±(0.5%+2d)
	10.000KΩ	±(0.5%+2d)
	100.00KΩ	±(0.5%+2d)
	1000.0KΩ	±(0.5%+2d)
	10.000MΩ	±(0.5%+2d)
	40.00MΩ	±(0.5%+2d)

Open Circuit Voltage : Approximate -0.25V
Short Circuit Current : Approximate –0.25mA
Overload Protection : 1000V AC rms or DC

Continuity and Diode Measurement

Function	Range	Accuracy
Continuity	400.0Ω	±(0.5%+2d)
Diode	2.000V	±(0.5%+2d)

Continuity : Built-in buzzer sounds when measured resistance is less than 30Ω and sounds off when measured resistance is more than 100Ω, between 30Ω to 100Ω the buzzer maybe sound or off either.
Continuity MAX Test Current : -0.25mA
Continuity MAX Open Circuit Voltage : -1.2V
Diode MAX Test Current : 0.6mA
Diode MAX Open Circuit Voltage : 2.5V
Overload Protection : 1000V AC rms or DC

Capacitance Measurement

Function	Range	Measuring Time	Accuracy
Capacitance	10.000nF	0.7sec	±(1.2%+80d)
	100.00nF	0.7sec	±(1.2%+20d)
	1000.0nF	0.7sec	±(1.2%+2d)
	10.000uF	0.7sec	±(1.2%+2d)
	100.00uF	0.7sec	±(1.2%+2d)
	1000.0uF	3.75sec	±(1.2%+2d)
	10.000mF	7.5sec	±(1.2%+20d)
	40.00mF	7.5sec	±(1.2%+80d)

Overload Protection : 1000V AC rms or DC

Temperature Measurement

Function	Range	Accuracy
Temperature	-200.0 ~ 0.0 °C	±(1%+2°C)
	0.0 ~ 1200 °C	±(1%+1°C)
	-328.0 ~ 32.0 °F	±(1%+36°F)
	32.0 ~ 2192 °F	±(1%+18°F)

Overload Protection : 1000V AC rms or DC

Insulation Resistance Measurement

Test Voltage	Range	Accuracy
50V	2.000MΩ	±(1.5%+5d)
	20.00MΩ	±(1.5%+5d)
	55.0MΩ	±(1.5%+5d)
100V	2.000MΩ	±(1.5%+5d)
	20.00MΩ	±(1.5%+5d)
	110.0MΩ	±(1.5%+5d)
250V	2.000MΩ	±(1.5%+5d)
	20.00MΩ	±(1.5%+5d)
	200.0MΩ	±(1.5%+5d)
	275MΩ	±(1.5%+5d)
500V	2.000MΩ	±(1.5%+5d)
	20.00MΩ	±(1.5%+5d)
	200.0MΩ	±(1.5%+5d)
	550MΩ	±(1.5%+5d)
1000V	2.000MΩ	±(1.5%+5d)
	20.00MΩ	±(1.5%+5d)
	200.0MΩ	±(1.5%+5d)
	2000MΩ	±(1.5%+5d)
	22.0GΩ	±(10%+3d)

Test Voltage vs. Maximum Resistance Range :
50V/55.0MΩ, 100V/110.0MΩ, 250V/275MΩ, 500V/550MΩ, 1000V/22.0GΩ.
Test Voltage vs. Minimum Resistance Range (with Test Current = 1mA) :
50V/50KΩ, 100V/100KΩ, 250V/250KΩ, 500V/500KΩ, 1000V/1MΩ.
Test Voltage Accuracy : +20%, -0%
Short Circuit Test Current : 1mA
Auto Discharge Function :
Discharge time < 1 sec for C ≦ 1μF
Maximum Capacitive Load : Operable with up to 1μF load
Live Circuit Detection : if ≧ 30V AC/DC at inputs, test inhibited
Overload Protection : 600V AC rms or DC

Limited Warranty

This meter is warranted to the original purchaser against defects in material and workmanship for 2 years from the date of purchase. During this warranty period, Manufacturer will, at its option, replace or repair the defective unit, subject to verification of the defect or malfunction.

This warranty does not cover Carlos fuses, disposable batteries, or damage from abuse, neglect, accident, unauthorized repair, alteration, contamination, or abnormal conditions of operation or handling.

Any implied warranties arising out of the sale of this product, including but not limited to implied warranties of merchantability and fitness for a particular purpose, are limited to the above. The manufacturer shall not be liable for loss of use of the instrument or other incidental or consequential damages, expenses, or economic loss, or for any claim or claims for such damage, expense or economic loss. Some states or countries laws vary, so the above limitations or exclusions may not apply to you.

APPA TECHNOLOGY CORP.
9F.119-1 Pao-Zong Rd., Shin-Tien,
Taipai, 23145, Taiwan, R.O.C.
Tel : 886-2-29178820
Fax : 886-2-29170848
E-MAIL : info @appatech.com
http ://www.appatech.com