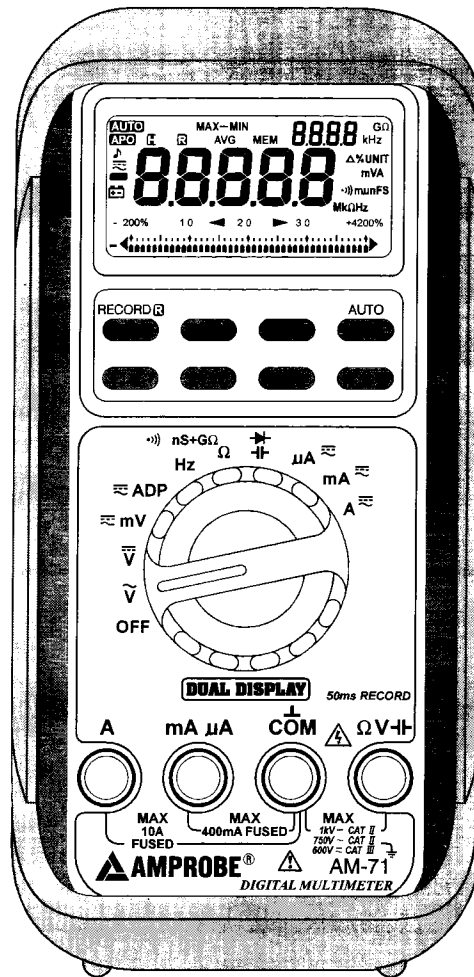




USER'S MANUAL

AM-71
*The Ultimate
Series™*

AMPROBE®

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PRECAUTIONS FOR PERSONAL AND INSTRUMENT PROTECTION

- 1) Read these instructions thoroughly and follow them carefully.
- 2) In many instances, you will be working with dangerous levels of voltage and/or current. Therefore, it is important that you avoid direct contact with any uninsulated, current-carrying surfaces. Appropriate insulating gloves, clothing and eye protection should be worn.
- 3) To avoid electrical shock to the user and/or damage to the instrument, do not apply more than 1000V between any terminal and ground.
- 4) Before applying test leads to circuit under test, make certain that leads are plugged into proper jacks and switches are set to proper range and function.
- 5) Before using any electrical instruments or tester for actual testing, the unit should be checked on a low energy high impedance source. **Do not use power distribution lines or any other high energy sources.**
- 6) When measuring current using the μA , mA or 10A input: Before connecting or disconnecting the meter to or from the circuit to be tested, turn off all power to the circuit.
- 7) Do not attempt to measure a voltage unless you are already certain that the voltage is below 750 VAC or 1000 VDC. Do not use the 400 mV range unless you are already certain that the voltage is below 500V (AC or DC).
- 8) If the instrument should indicate that voltage is not present in circuit, do not touch circuit until you have checked to see that all instrument switches are in proper position and instrument has been checked on a known live line.
- 9) Make certain no voltage is present in circuit before connecting ohmmeter to circuit.

IMPORTANT: Plug in only one accessory probe or set of test leads at any one time, except as directed.

IMPORTANT: Failure to follow these instructions and/or observe the above precautions may result in personal injury and/or damage to the instrument and/or accessories.

-1-

I) SAFETY

This instrument is designed and manufactured to meet double insulation requirements to International Safety Standard IEC1010-1 (1992).

This manual contains information and warnings that must be followed for operating the instrument safely and maintaining the instrument in a safe operating condition.

TERMS IN THIS MANUAL

WARNING identifies conditions and actions that could result in serious injury or even death to the user.

CAUTION identifies conditions and actions that could cause damage or malfunction in the instrument.

INTERNATIONAL ELECTRICAL SYMBOLS

 Attention ! Refer to the explanation in Manual

 Dangerous Voltage

 Ground

 Double Insulation

 Fuse

 AC—Alternating Current

 DC—Direct Current

 Either DC or AC

Safety: The instruments meet the requirements for double insulation to IEC1010-1(1992), EN 61010-1(1993) to:

terminal V/R: Installation category III, 600V ac phase to earth, and 750 Volts ac phase to phase.
Installation category II, 750 Volts ac.
Installation category II, 1000 Volts dc.

terminal mA/uA: Installation category III, 500 Volts ac.
Installation category II, 250 Volts dc.

terminal A: Installation category III, 600 Volts ac.
Installation category II, 250 Volts dc.

E.M.C. : The instruments meet EN 55011(3.1991) and EN 50082-1(1992)

WARNING

To avoid electrical shock hazard or damage to the meter, do not exceed the overload level shown in **TABLE 1**

FUNCTION	TERMINALS	OVERLOAD LEVEL
DC VOLTAGE	Ω V $\overline{\text{H}}$ & COM	1000 VDC or Vpeak
AC VOLTAGE		
mV MILLI-VOLT	Ω V $\overline{\text{H}}$ & COM	600 VDC or VAC rms
ADP ADAPTOR		
Hz FREQUENCY		
Ω RESISTANCE		
nS CONDUCTANCE		
$\bullet \cdot \cdot \cdot \cdot$ AUDIBLE CONTINUITY		
$\overline{\text{H}}$ CAPACITANCE		
$\overline{\text{H}}$ DIODE TEST		
A CURRENT	A & COM	10A/600V*
mA or uA CURRENT	mA uA & COM	630mA/500V

* 10A CONTINUOUS; 20A FOR 30 SECONDS MAXIMUM, 5 MINUTES COOL DOWN INTERVAL

TABLE 1

WARNING

To avoid electrical shock hazard, observe the proper safety precautions when working with voltages above 60 VDC or 25 VAC rms. These voltage levels pose a potential shock hazard to the user.

Inspect test leads, connectors, and probes for damaged insulation or exposed metal before using the instrument. If any defects are found, replace them immediately.

To avoid electrical shock hazard, do not touch test lead tips or the circuit being tested while power is applied to the circuit being measured.

Never attempt a voltage measurement with the test lead inserted into the μ A, mA, or A input jacks. You might be injured or damage the meter.

CAUTION

Disconnect the test leads from the test points before changing functions. Always set the instrument to the highest range and work downward for an unknown value. Always use the correct replacement fuses. Check the manual for proper part numbers.

II) INTRODUCTION

The Amprobe Ultimate Series Model AM-71 are hand held, battery operated professional quality digital multimeter for today's complex electrical & electronic system diagnostic and troubleshooting.

The measuring functions include DC Voltage, AC Voltage, Adaptor input, Frequency, Resistance, Conductance, Continuity Test, Capacitance, Diode Test, DC Current as well as AC Current.

Pushbutton functions include 4,000 Counts Fast Measuring mode, 40,000 Counts High Resolution Slow Measuring mode, Data Hold, Auto or Manual Ranging, Data Store & Recall, Relative Zero mode, Relative Percent Change mode, Relative Per Unit mode, 50ms Record MAX/MIN/MAX-MIN/AVG as well as Secondary Functions Selection.

Power on options include Line Filter Frequency 50/60Hz Selection for best noise rejection (normally only available in expensive bench top instruments), Auto Power off Disable as well as Beeper Disable.

This series is housed inside a gasket sealed heavy duty casing which keeps out grease, oil, dirt and moisture to maintain superb accuracy and reliability. Besides, the casing is made of high impact thick wall fire retarded material to maximize durability of the meter, and safety to the user. In addition, a sealed battery compartment design keeps battery leakage contaminants off the PC board, which largely reduces the potential risks of shortages and degrading of accuracy due to the contaminants. Besides, This environmental friendly series contains **NO** CFC Ozone Depleting Substances, and is **NOT** manufactured with such substances.

III) PRODUCT DESCRIPTION

(A) PANEL ILLUSTRATION, See FIG 1

1. **LCD display** 4-3/4 digit 40000 counts + 4 digit 9999 counts dual display LCD
2. **HOLD** Pushbutton to activate HOLD
3. **RANGE** Pushbutton to select Auto/Manual ranging
4. **Δ%U** Pushbutton to select Relative Zero, Relative Percentage Change, or Relative Per Unit mode
5. **RECALL** Pushbutton to Recall stored data
6. **Selector** Turn the Power On or Off and Select a function
7. **COM** Common (Ground reference) Input Jack for all functions
8. **ΩV⎓** Input Jack for all functions EXCEPT current functions, color coded
9. **A** Input Jack for 10A current function, color coded
10. **mA uA** Input Jack for 400mA or 4000uA current functions, color coded
11. **STORE** Pushbutton to store data displayed for later recall

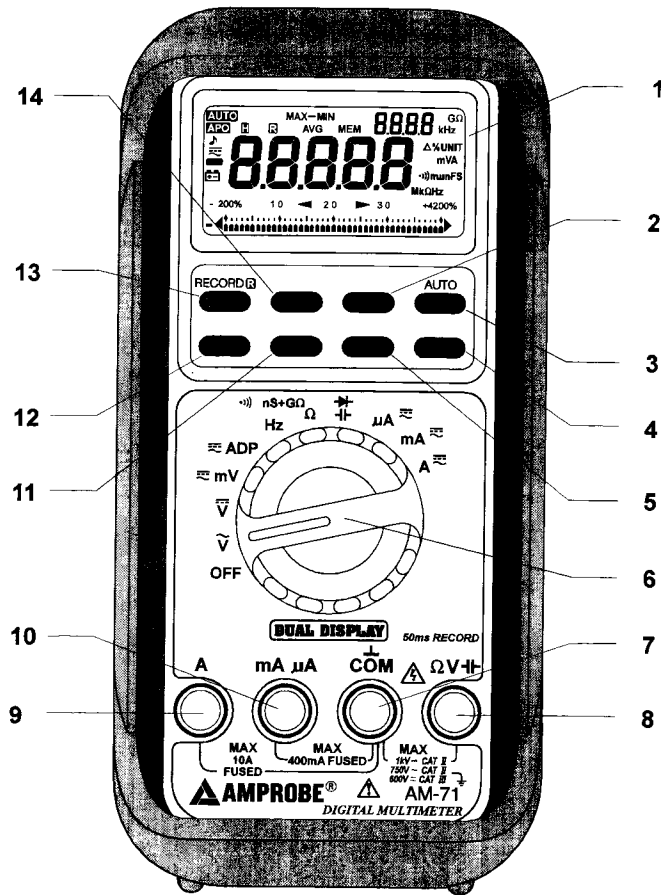


FIG 1. FRONT PANEL LAYOUT

12. **SELECT** Pushbutton to select secondary functions
13. **RECORDR**
40000 Pushbutton. Press momentarily to select 40,000 counts, or Press and Hold for 1 second to activate RECORD function
14. **4000** Pushbutton to select 4,000 counts fast mode

(B) LCD ILLUSTRATION, See FIG 2

15. **Δ.%UNIT** Δ annunciator indicates relative zero.
Δ % annunciators indicate relative percentage change.
Δ UNIT annunciators indicate relative per unit
16. **•)))** This annunciator indicates audible continuity function
17. **+4200%** Analog bar graph scale
18. **-|** Analog bar graph with overload flag and polarity
19. **DATA** Main digital readings of data being measured
20. **BATT** Low Battery alert, replace the battery as soon as possible to ensure accuracy
21. **-** This symbol indicates Negative Polarity

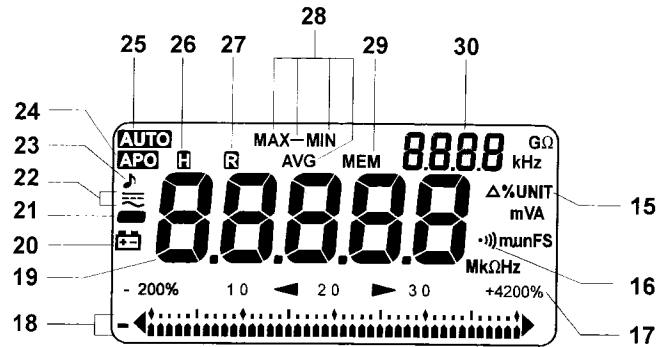


FIG 2. LCD DISPLAY (SHOWN ACTUAL SIZE)

22.   annunciator indicates direct current (DC) is selected.  annunciator indicates alternating current (AC) is selected
23.  This annunciator indicates beeper is on
24. **APO** This annunciator indicates Auto Power Off is enabled
25. **AUTO** This annunciator indicates Autoranging
26.  These annunciator indicates data HOLD function is activated
27.  This annunciator indicates the RECORD function is activated
28. **MAX-MIN**
AVG These annunciators indicate MAX (Maximum), MIN (Minimum), MAX-MIN (Maximum minus Minimum), or AVG (Average) reading is being displayed
29. **MEM** This annunciator blinks 2 times to confirm data storage when the STORE pushbutton is pressed, and turns on with the recalled data when the RECALL pushbutton is pressed
30. **DATA** Secondary display for Dual Display data

(C) ANALOG BAR GRAPH

The analog bar graph provides a visual indication of measurement like a traditional analog meter needle. The AM-71 analog bar graph updates 128 times per second in DCV and RESISTANCE functions showing excellent signal pattern in detecting faulty contacts, identifying potentiometer clicks, and indicating signal spikes during adjustments.

(D) NMRR (Normal Mode Rejection Ratio)

NMRR is the DMM's ability to reject unwanted AC noise effect which can cause inaccurate DC measurements. NMRR is typically specified in terms of dB (decibel). The AM-71 series has a NMRR specification of >60dB at 50 and 60Hz, which means the effect of AC noise is reduced more than 1000 times in DC measurements.

(E) CMRR (Common Mode Rejection Ratio)

Common mode voltage is voltage present on both the COM and VOLTAGE input terminals of a DMM, with respect to ground. CMRR is the DMM's ability to reject common mode voltage effect which can cause digit rattle or offset in voltage measurements.

The AM-71 series has a CMRR specifications of >60dB at DC to 60Hz in ACV function; and >120dB at DC, 50 and 60Hz in DCV function. If neither NMRR nor CMRR specification is specified, the DMM's performance will be uncertain.

IV) BASIC OPERATION

(A) DC VOLTAGE function

- 1) Set rotary switch to $\overline{V}$ position
- 2) Insert red (+) test lead into $\Omega V-H$ jack and black (—) test lead into **COM** input jack
- 3) Connect test leads to voltage source and observe the digital display, see **FIG 3**

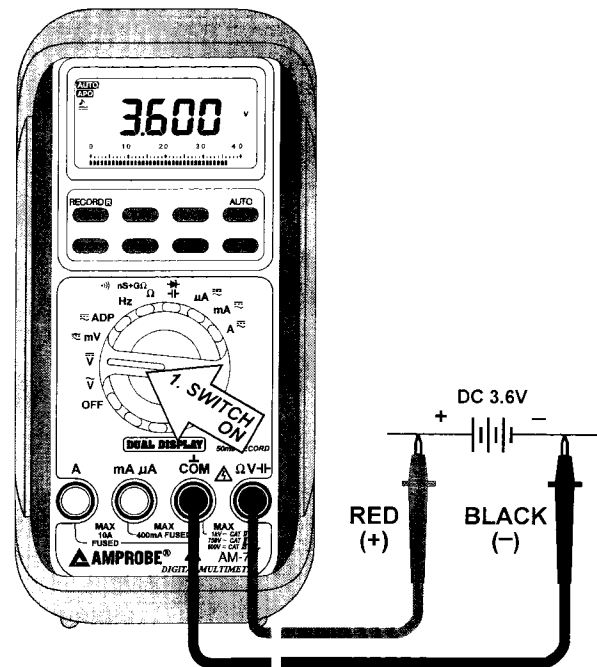


FIG 3. DC VOLTAGE FUNCTION

(B) AC, AC+Hz VOLTAGE functions

- 1) Set rotary switch to $\tilde{V}$ position
- 2) Insert red (+) test lead into $\Omega V \cdot H$ jack and black (—) test lead into **COM** input jack
- 3) Connect test leads to voltage source and observe the digital display, see **FIG 4**
- 4) Default at **AC**. Press **SELECT** button momentarily to select **ACV+Hz** in dual display if required

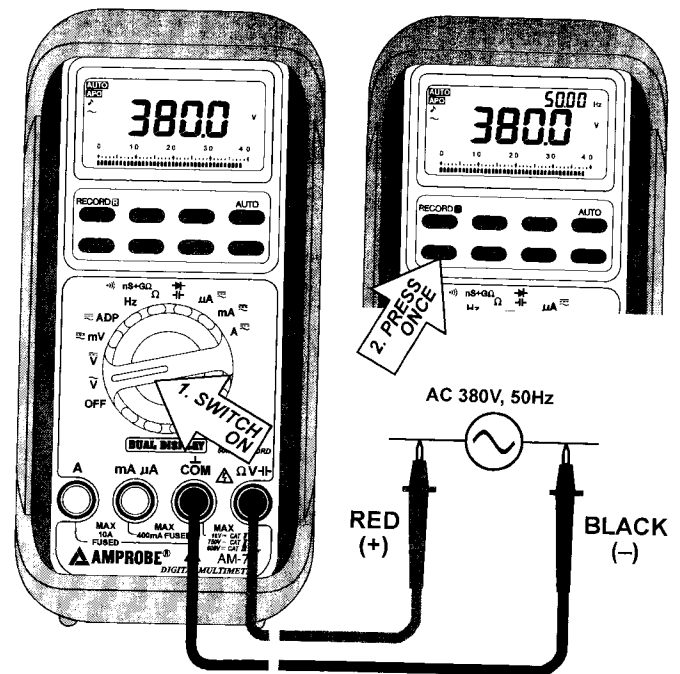


FIG 4. AC, AC+Hz VOLTAGE FUNCTIONS

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(C) DC, AC, AC+Hz mV functions

- 1) Set rotary switch to $\overline{\sim}$ mV position
- 2) Default at DC. Press **SELECT** button momentarily to select AC, and press again to select AC+Hz in dual display if required
- 3) Insert red (+) test lead into Ω V- $\overline{\sim}$ jack and black (-) test lead into **COM** input jack
- 4) Connect test leads to voltage source and observe the digital display, see **FIG 5**

-17-

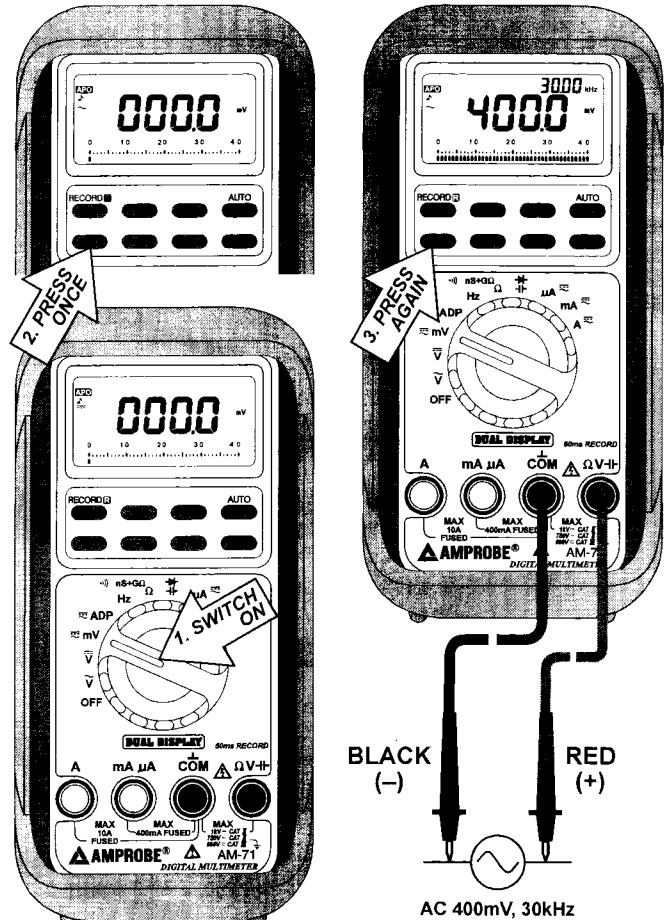


FIG 5. DC, AC, AC+Hz mV FUNCTIONS

(D) DC, AC, AC+Hz ADAPTOR functions

- 1) Set rotary switch to $\overline{\text{ADP}}$ position
- 2) Default at DC. Press **SELECT** button momentarily to select **AC**, and press again to select **AC+Hz** in dual display if required
- 3) Insert output plug of the adaptor with positive (+) into $\Omega V-H$ jack and the negative (-) into **COM** input jack, see **FIG 6**
- 4) The digital display defaults at 10 counts per mV, and can be extended to 100 counts per mV in 40,000 count mode
- 5) The extra high input impedance of 1000 M Ω makes the **ADP** function possible to cope with most voltage output adaptors available in stores. For current clamp adaptor with output 1mV per Ampere, 2000 counts on the digital display represents 200 Ampere. For temperature adaptor with output 1mV per degree, 2000 counts represents 200 degree

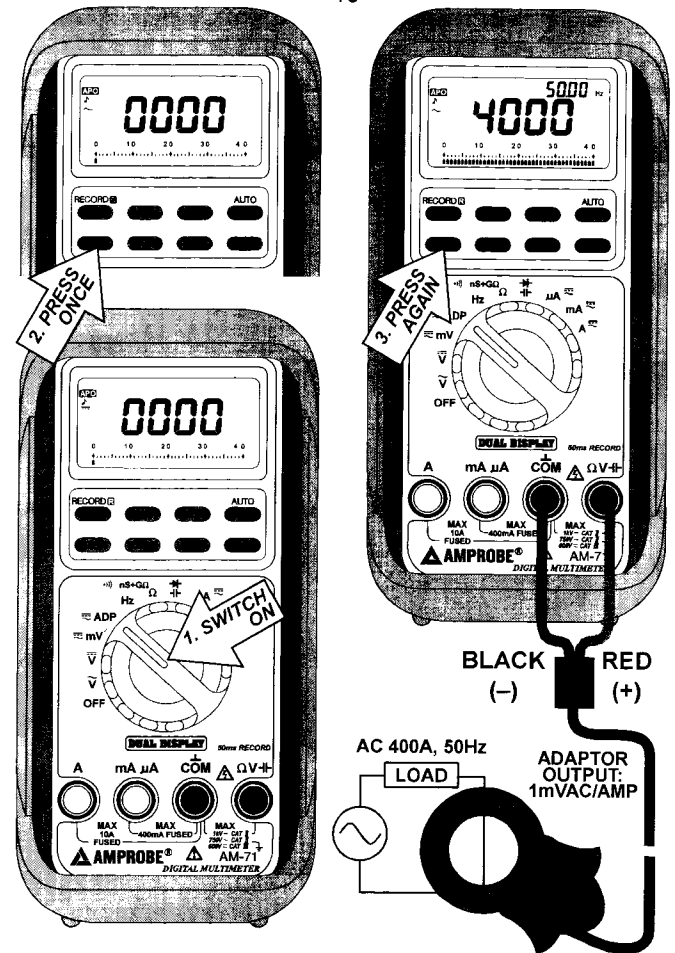


FIG 6. DC, AC, AC+Hz ADAPTOR FUNCTIONS

(E) Hz function

- 1) Set rotary switch to **Hz**
- 2) Insert red (+) test lead into **$\Omega V \cdot Hz$** jack and black (—) test lead into **COM** input jack
- 3) Connect test leads to signal source and observe the digital display, see **FIG 7**

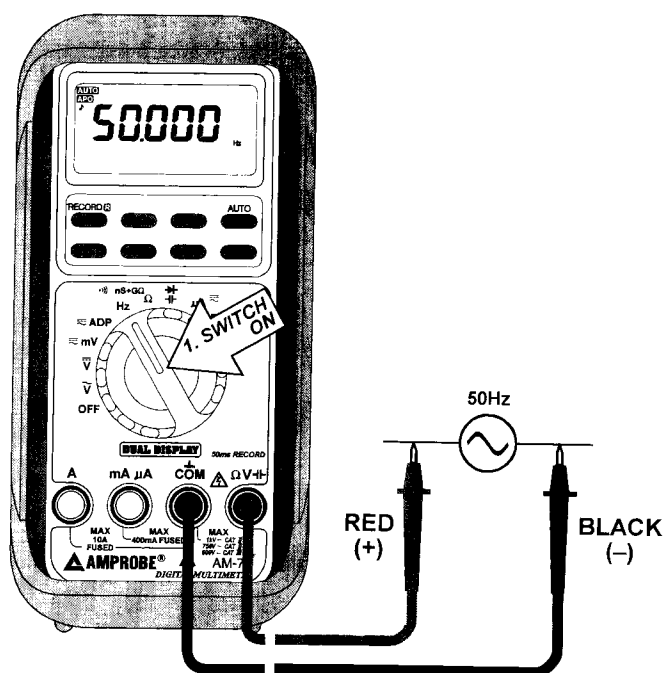


FIG 7. Hz FUNCTIONS

(F) Ω RESISTANCE, nS + G Ω CONDUCTANCE

- 1) Set rotary switch to Ω nS+G Ω Ω
- 2) Insert red (+) test lead into Ω V- Ω jack and black (-) test lead into COM input jack
- 3) Connect the test leads as shown in FIG 8 and observe the digital display
- 4) Default at Ω . Press SELECT button momentarily to select nS+G Ω in dual display for resistance measurements beyond 40M Ω

CAUTION

Using resistance measurement function in a live circuit will produce false results and may damage the instrument. In many cases the suspect component must be disconnected from the circuit to obtain an accurate reading

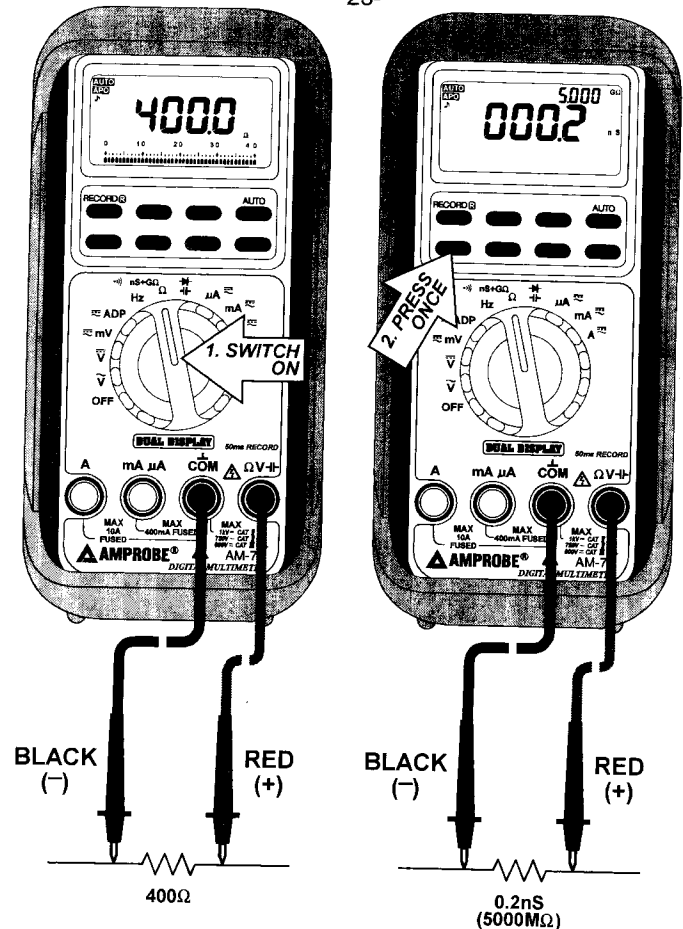


FIG 8. Ω , nS+G Ω FUNCTIONS

(G) AUDIBLE CONTINUITY function

- 1) Set rotary switch to  nS+GΩ Ω
- 2) Default at Ω . Press **SELECT** button momentarily two times to select  audible continuity function
- 3) Insert red (+) test lead into  jack and black (—) test lead into **COM** input jack
- 4) Connect the test leads to the end points of wire as shown in **FIG 9**
- 5) A continuous beep tone indicates a complete wire. This is useful for checking wiring connections and operation of switches

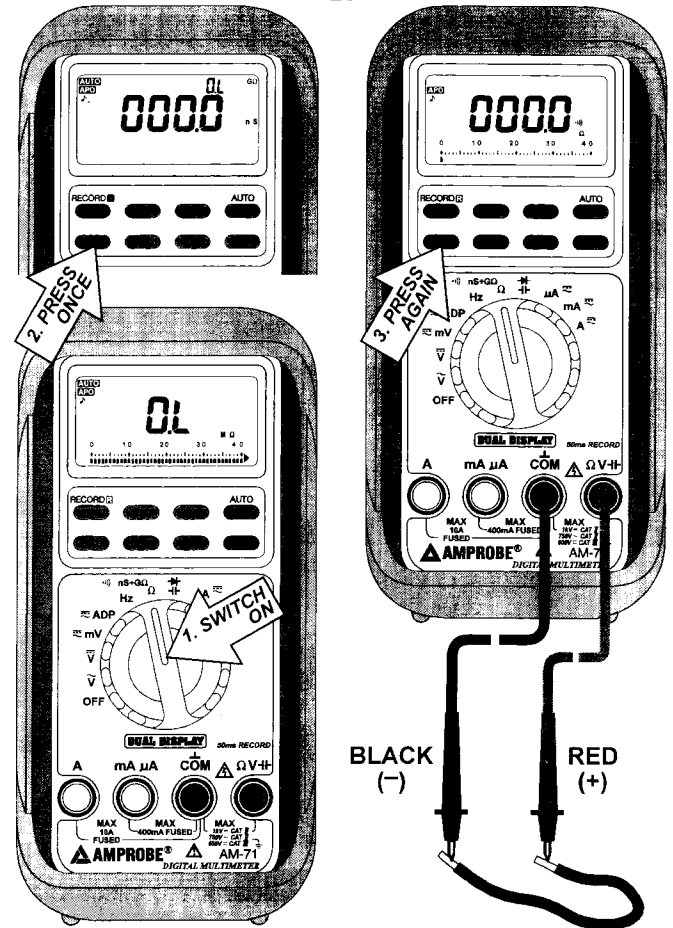


FIG 9.  AUDIBLE CONTINUITY FUNCTION

(H) $\text{--}\text{||}\text{--}$ CAPACITANCE function

- 1) Set rotary switch to $\text{--}\text{||}\text{--}$
- 2) Insert red (+) test lead into $\Omega\text{V}\text{--}\text{||}\text{--}$ jack and black (—) test lead into **COM** input jack
- 3) Connect the test leads as shown in **FIG 10** and observe the digital display

CAUTION

Discharge capacitors before making any measurement. Large value capacitors should be discharged through an appropriate resistance load

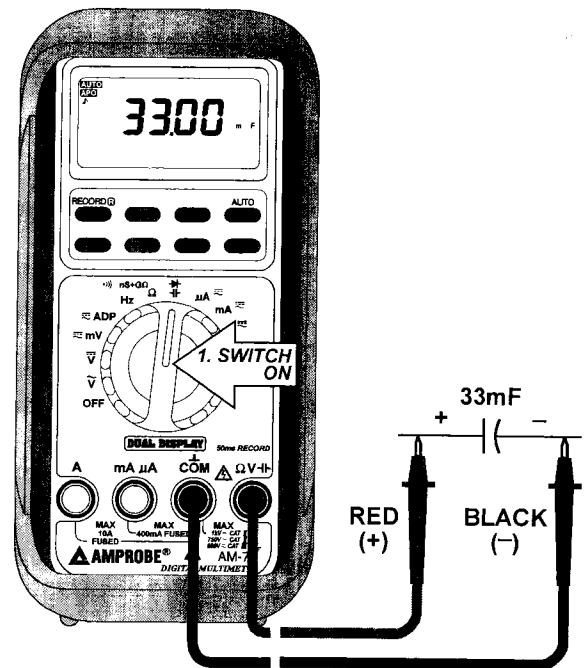


FIG 10. $\text{--}\text{||}\text{--}$ CAPACITANCE FUNCTION

(1) **✚ DIODE TEST function**

- 1) Set rotary switch to **✚✚✚**
- 2) Default at **✚✚** Capacitance. Press **SELECT** button momentarily to select **✚** diode test
- 3) Insert red (+) test lead into **ΩV✚** jack and black (--) test lead into **COM** input jack
- 4) Connect the test leads as shown in **FIG 11** and observe the digital display
- 5) Normal forward voltage drop (forward biased) for a good silicon diode is between 0.400V to 0.900V. A reading higher than that indicates a leaky diode (defective). A zero reading indicates a shorted diode (defective). An OL indicates an open diode (defective)
- 6) Reverse the test leads connections (reverse biased) across the diode
- 7) The digital display shows OL if the diode is good. Any other readings indicate the diode is resistive or shorted (defective)

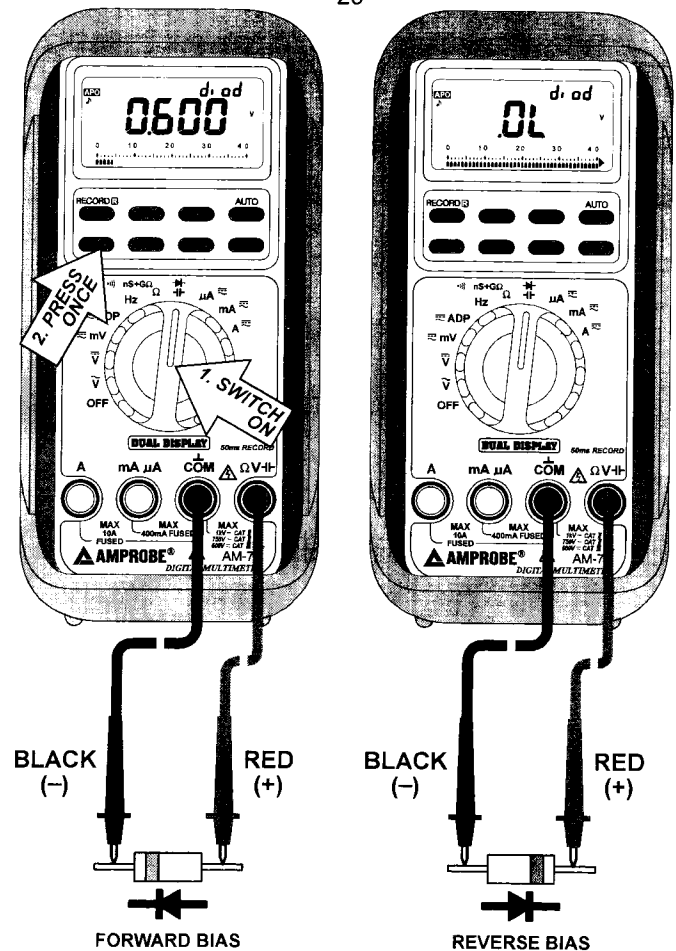


FIG 11. ✚ DIODE TEST FUNCTION

(J) DC, AC, AC + Hz of μA , mA or A functions

- 1) Set rotary switch to A, mA or μA
- 2) Insert red (+) test lead into mA μA or A jacks according to rotary switch selection and black (—) test lead into COM input jack
- 3) Default at DC. Press SELECT button momentarily to select AC, and press again to select AC+Hz in dual display if required
- 4) Connect the test leads as shown in FIG 12 and observe the digital display

WARNING

Do not measure any circuit that draws more than the current ratings of the protection fuses. If the fuse blows, replace it with the proper fuse. Failure to do this may result in injury or damage to the meter. Do not attempt a current measurement where the open circuit voltage is above 500V for mA μA jack, nor 600V for A jack. Suspected open circuit voltage must be checked with voltage functions

Voltage output current clamp adaptors are recommended to use with the meter adaptor or voltage functions for making high current measurements

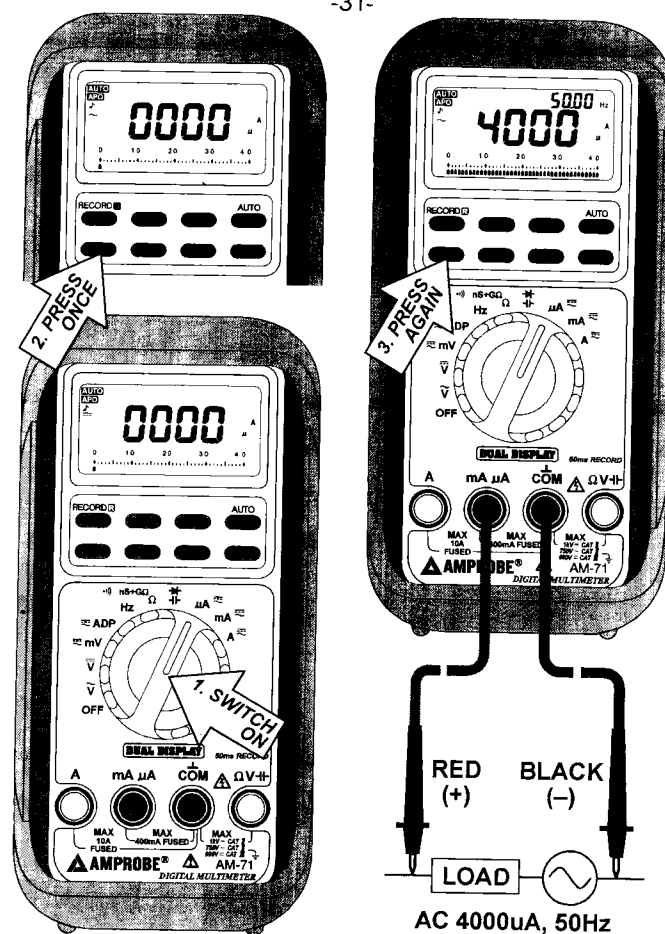


FIG 12. μA , mA, A FUNCTIONS

	DATA HOLD	RANGE LOCK	40,000 COUNTS	RELATIVE $\Delta\%.U$	RECORD *	DUAL DISPLAY	STORE RECALL
DC VOLTAGE	•	•	•	•	•		•
AC VOLTAGE	•	•	•	•	•	•	•
DC CURRENT	•	•	•	•	•		•
AC CURRENT	•	•	•	•	•	•	•
RESISTANCE	•	•	•	•	•		•
CONDUCTANCE	•		•			•	•
FREQUENCY	•						•
CAPACITANCE	•	•		•	•		•
ADAPTOR	•		•	•	•	•	•
CONTINUITY	•		•				•
DIODE	•						•

*Note: RECORD IS NOT available in Dual Display mode

TABLE 2. FEATURE AVAILABILITY SUMMARY

V) ADVANCED OPERATION

Note : See TABLE 2 for features availability

(A) 40,000 COUNTS HIGH RESOLUTION SLOW MODE

Press the **40000** button momentarily to enter the 4-3/4 digit high resolution slow mode with a maximum display at 40,000 counts. Press the **4000** button momentarily to return to 3-3/4 digit fast mode. See FIG 13. The 4-3/4 digit mode is available in all functions except Frequency, Capacitance and Diode Test

In 3-3/4 digit fast mode, the digital display updates 5 times per second nominal to give you the maximum measuring speed. In 4-3/4 digit slow mode, the digit display updates 1.25 times per second nominal to give you smooth readings as well as the full accuracy of the meter

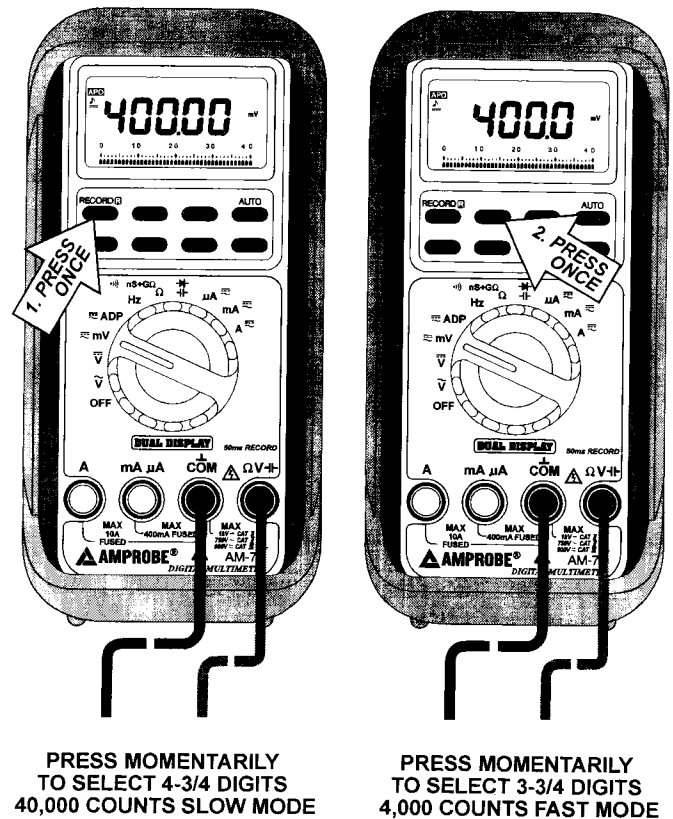


FIG 13. 40,000 COUNTS HIGH RESOLUTION SLOW MODE

(B) HOLD

Press the **HOLD** button momentarily to activate the hold function, the LCD annunciator **H** turns on. Press momentarily again to release. See **FIG 14**. The hold feature freezes the display for later view. When in RECORD mode, however, the hold function stops updating the measurements. Release the hold function to continue RECORD

(C) MANUAL OR AUTO RANGING

Press the **RANGE** button momentarily to select manual-ranging, and the meter will remain in the range it was in, the LCD annunciator **AUTO** turns off. Press the button momentarily again to step through the ranges. Press and hold the button for 1 second or more to resume auto-ranging. See **FIG 15**

Note: When the meter is in Record, Hold, Recall or Relative mode, changing the measuring range manually will cause the meter to exit those features

(D) DATA STORE & RECALL

Press the **STORE** button momentarily to store the displaying information. The LCD annunciator **MEM** blinks two times to confirm storage. Press the **RECALL** button momentarily to recall the stored data, the LCD annunciator **MEM** turns on. See **FIG 16**. Press any other buttons **EXCEPT** **RECALL** to resume measurements. This feature stores the whole display data in memory for later recall. The memory will remain even in auto-power-off mode, and can also be recalled while you are in another meter function. The memory will be erased if the rotary switch is switched to the OFF position

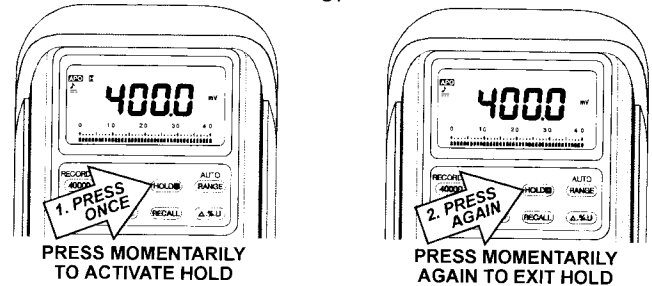


FIG 14. HOLD FUNCTION

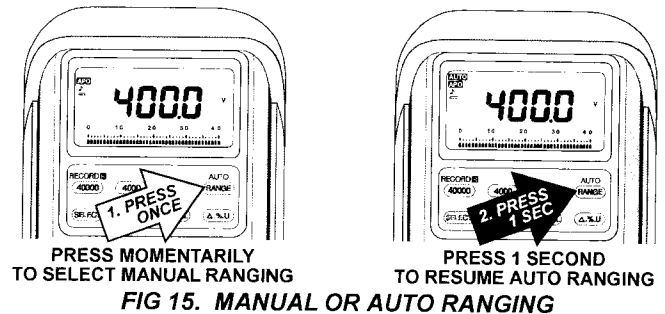


FIG 15. MANUAL OR AUTO RANGING

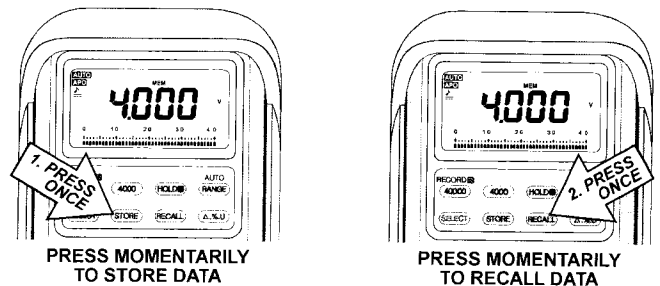


FIG 16. DATA STORE & RECALL

(E) **RELATIVE MODES Δ %.UNIT**

Press the Δ %.U button momentarily to enter the Relative Zero (Δ) mode, the LCD annunciator Δ turns on. Relative zero allows the user to offset the meter measurements with a relative reference value. Practically all displaying readings can be set as relative reference value including MAX, MIN, MAX-MIN, and AVG readings of RECORD function. See **FIG 17a**

Press the Δ %.U button momentarily again to enter the Relative Percentage Change (%) mode, the LCD annunciators Δ % turn on. In this mode, the readings show relative percentage changes, and the bar graph automatically indicates $\pm 200\%$, or $\pm 20\%$ full scale changes with respect to the relative reference value as center zero point. It simplifies zero, peaking, nulling measurements, and is excellent for fine adjustments. See **FIG 17b**

Press the Δ %.U button momentarily again to enter the Relative Per Unit (U) mode, the LCD annunciators Δ UNIT turn on. This is a unique feature to show the ratio of measuring values to the relative base value. The relative base value is considered to be one unit, and the consecutive measurements will be displayed in terms of units. Measuring the parallel capacitance of co-axial cable or parallel wire in conjunction with the relative per unit mode, for example, helps estimating the total cable length or locating cable breakage locations. See **FIG 17c**

Press and hold the Δ %.U button for 1 second or more to exit relative modes and resume normal measurements

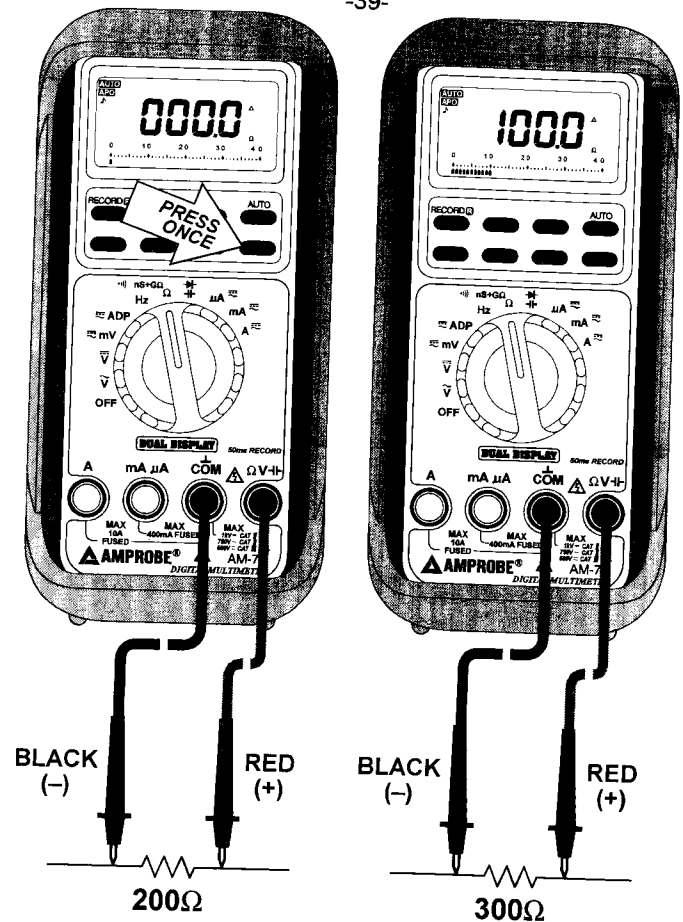


FIG 17a. RELATIVE ZERO (Δ)

-40-

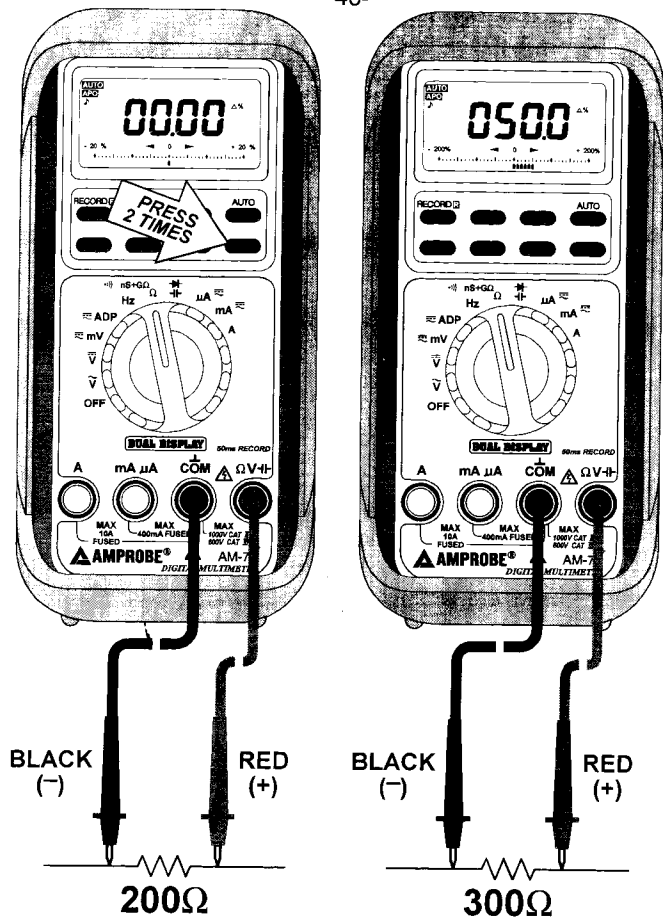
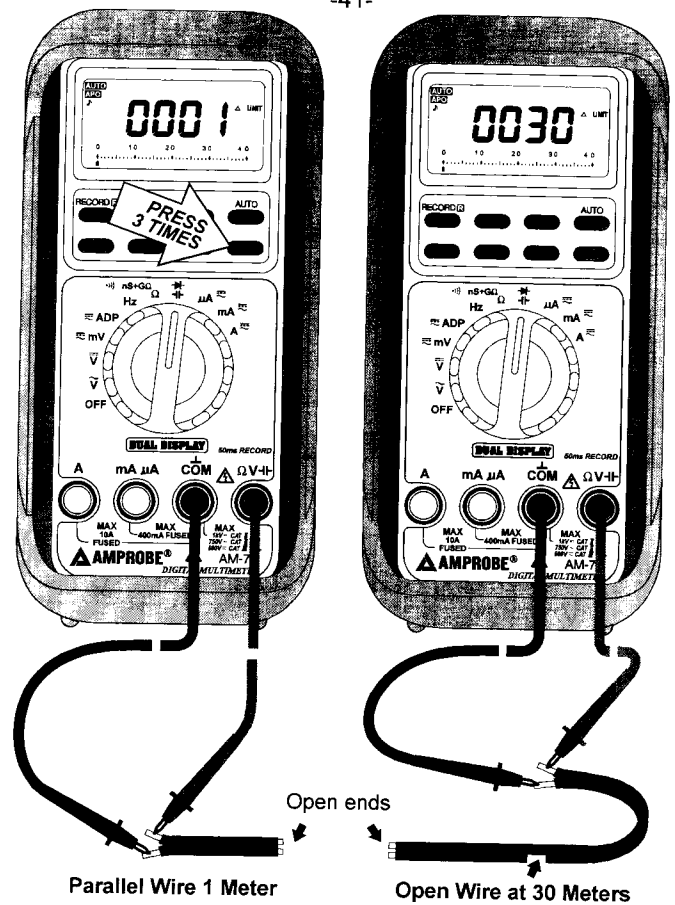


FIG 17b. RELATIVE PERCENTAGE CHANGE (%)

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NOTE: Test lead capacitance may affect the accuracy of this application. Lead length should be as short as possible

FIG 17c. RELATIVE PER UNIT (U)

(F) RECORD MODE

Perform measurements as described in BASIC OPERATION. Press and hold the  button for 1 second or more to activate RECORD mode, the LCD annunciators   turn on. The meter beeps when new maximum or minimum reading is updated. Press the button momentarily to read throughout the Maximum (MAX), Minimum (MIN), Maximum minus Minimum (MAX-MIN), and Average (AVG) readings. Press the button for 1 second or more to exit RECORD mode. See **FIG 18**

With the Auto-Ranging RECORD mode, you can easily track intermittent signals, capture turn-on/turn-off surges, and monitor line voltage changes over a much wider dynamic range with the best resolution. It largely surpasses single range recording which is easily overflowed, or with insufficient resolution. The AM-71 features a fast single range sampling speed of 50ms for MAX, MIN, MAX-MIN and AVG readings. The faster the sampling speed, the more accurate the measurement of surges, spikes and sags will be. The true average AVG feature calculates all readings taken over time continually

- Note: 1. Auto Power Off feature will be disable automatically in this mode
2. To retain the readings after measurements, use **HOLD ** function to stop updating the measurements before disconnecting the test leads. Use similar pushbutton procedures described above to read throughout the locked readings



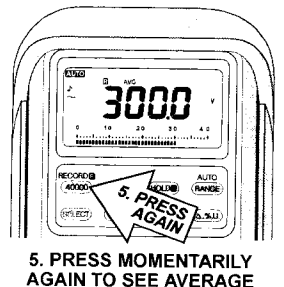
1. PRESS 1 SECOND TO ACTIVATE RECORD



4. PRESS MOMENTARILY AGAIN TO SEE MAX-MIN



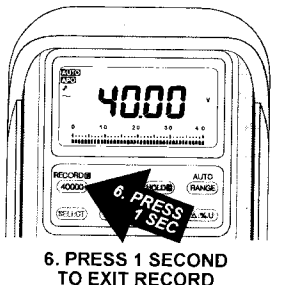
2. PRESS MOMENTARILY TO SEE MAXIMUM



5. PRESS MOMENTARILY AGAIN TO SEE AVERAGE



3. PRESS MOMENTARILY AGAIN TO SEE MINIMUM



6. PRESS 1 SECOND TO EXIT RECORD

FIG 18. RECORD MODE

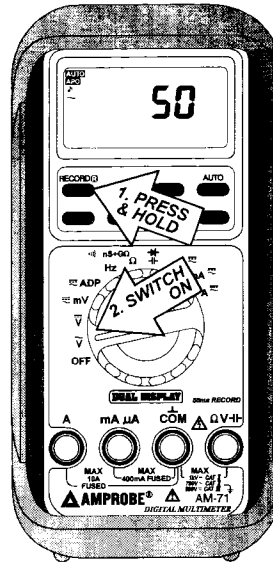
(G) LINE FILTER FREQUENCY 50 Hz OR 60 Hz SELECTION

The line filter frequency can be selected as a power-on option. Press the **RECORD** button while turning the meter on to display the set frequency. Press the **SELECT** button for 50 Hz or press the **STORE** button for 60 Hz selection. Then press the **RANGE** button to store the selected frequency. See **FIG 19**

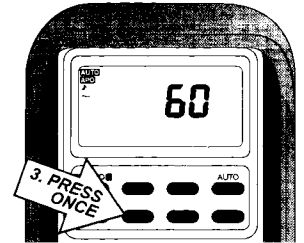
Selecting the appropriate line filter frequency to cope with your line frequency can maximize the meter's noise rejection ability. This is normally only available in expensive bench top multimeter

(H) SET BEEPER OFF

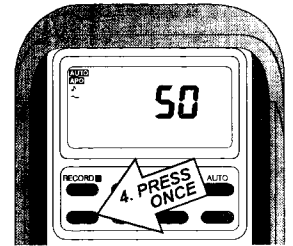
The beeper feature can be disabled manually as a power-on option by pressing the **SELECT** button while turning the meter on. The LCD annunciator  will be off during operation



1. PRESS THE BUTTON WHILE
2. TURNING ON THE METER



3. PRESS MOMENTARILY
TO SELECT 60Hz



4. PRESS MOMENTARILY
TO SELECT 50Hz



5. PRESS MOMENTARILY
TO ENTER (SET)

FIG 19. LINE FILTER FREQUENCY 50Hz OR 60Hz SELECT

(I) AUTO POWER OFF (APO)

The Auto Power Off (APO) mode turns the meter off automatically to extend battery life after 4.5 minutes of inactivities. The meter turns back on if the rotary switch is turned. Activities are specified as :

- 1) Rotary switch or push button operations
- 2) Significant measuring data readings

When the meter enters the RECORD mode, the Auto Power Off will be disabled automatically, and the LCD annunciator **APO** will be off

The Auto Power Off feature can be disabled manually as a power-on option by pressing the **4000** button while turning the meter on. The LCD annunciator **APO** will be off during operation

For maintenance purpose, the Auto Power Off timing can be shortened to 5 seconds by pressing the **RANGE** button while turning the meter on

- Note :
1. Stored data (MEM) remains after Auto Power Off, but will be erased if the rotary switch is switched to the OFF position
 2. Always turn the rotary switch to the OFF position when the meter is not in use. The meter will produce a beep sound to alert the user while turn off

(N) USING TILT STAND & BELT CLIP

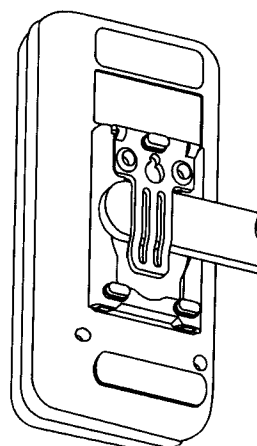
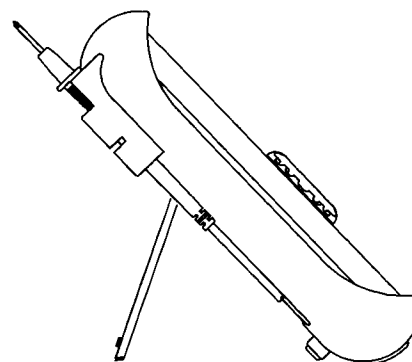


FIG 20. USING TILT STAND & BELT CLIP

(O) USING PROBE HOLDERS & WIRE CLIPPERS

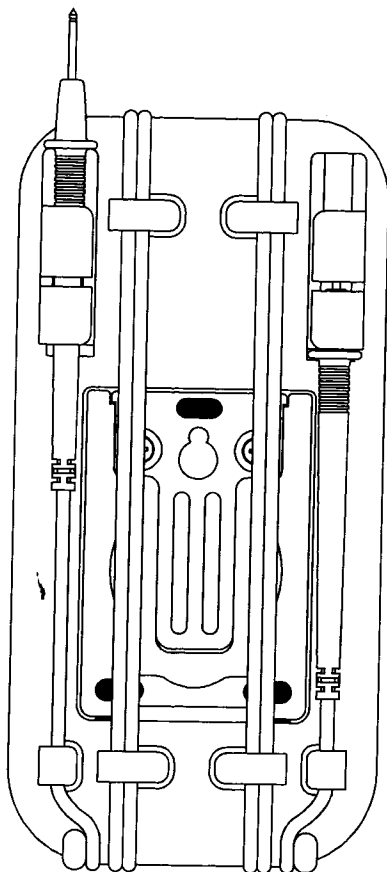


FIG 21. USING PROBE HOLDERS & WIRE CLIPPERS

(VI) SPECIFICATIONS

GENERAL SPECIFICATIONS

Display: 3-3/4 digits 4000 counts or 4-3/4 digits 40000 counts selectable (5 digits 99999 counts for Hz), and 4 digits 9999 counts dual display LCD

Polarity: Automatic

Update Rate:

3-3/4D Data: 5 per second nominal;

4-3/4D Data: 1.25 per second nominal;

43 Segments Bar graph: 128 per second max

Low Battery: The indicator appears when the battery voltage drops below approx. 7.2V

Operating Temperature: 0°C to 35°C, 0-80% R.H.; 35°C to 40°C, 0-70% R.H.

Storage Temperature: -20°C to 60°C, 80% R.H. (with battery removed)

Temperature Coefficient: Nominal 0.15 x (specified accuracy)/°C @ (0°C—18°C or 28°C—40°C)

Power Supply: Single Alkaline 9V battery NEDA1604A, JIS6AM6, IEC6LF22

APO Timing: Idle for 4.5 minutes

APO Consumption: 20 μ A typical

Sensing: Average responding

Power Consumption: 9 mA typical

Weight: 390 gm; 500 gm with holster

Dimension: L186mm X W87mm X H35.5mm; L198mm X W97mm X H55mm with holster

Safety: Designed to UL3111-1(6.1994), CSA C22.2 NO.1010-1-92, EN61010-1(1993), and IEC1010-1(1992) to :

terminal V/R: Installation category III, 600V ac phase to earth, and 750 Volts ac phase to phase.

Installation category II, 750 Volts ac.

Installation category II, 1000 Volts dc.

terminal mA/uA: Installation category III, 500 Volts ac.

Installation category II, 250 Volts dc.

terminal A: Installation category III, 600 Volts ac.

Installation category II, 250 Volts dc.

E.M.C.: The instruments meet EN 55011(3.1991) and EN 50082-1 (1992)

Accessories: Test leads (pair), holster, battery installed and user's manual

ELECTRICAL SPECIFICATIONS

ACCURACY IS $\pm$ (% READING DIGITS + NUMBER OF DIGITS) OR OTHERWISE SPECIFIED, AT 23°C $\pm$ 5°C & LESS THAN 75% R.H.

DC Voltage

RANGE	AM-71
	Accuracy
400.0mV, 4.000V, 40.00V, 400.0V	0.2%+1d
1000V	0.2%+2d

NMRR : >60dB @ 50/60Hz

CMRR : >120dB @ DC, 50/60Hz, Rs=1k Ω

Input Impedance : 10M Ω , 30pF nominal (100pF nominal for 400mV range)

Overload protection : 780 Vrms / 1000Vpeak (600VDC/VACrms for 400mV range)

AC Voltage

RANGE	AM-71
	Accuracy
50Hz — 60Hz	
400.0mV, 4.000V, 40.00V, 400.0V, 750V	0.7% + 3d
40Hz — 500Hz	
400.0mV, 4.000V, 40.00V, 400.0V, 750V	1.0% + 4d
500Hz — 1kHz	
400.0mV	1.3% + 4d
4.000V	2.5% + 4d
40.00V, 400.0V, 750V	1.3% + 4d
to 30kHz	
400.0mV	1.5dB typical
4.000V	Unspec'd
40.00V	3dB typical
400.0V	1.5dB typical
750V	1.5dB typical

CMRR : >60dB @ DC to 60Hz, Rs=1k Ω

Input Impedance : 10M Ω , 30pF nominal (100pF nominal for 400mV range)

Overload protection : 780 Vrms / 1000Vpeak (600VDC/VACrms for 400mV range)

AC Current

RANGE	AM-71	Burden Voltage
	Accuracy	
50Hz 60Hz		
4000 μ A	1.0%+4d	0.15mV/ μ A
400.0mA	1.0%+4d	3.3mV/mA
10.00A*	1.0%+4d	0.03V/A
40Hz 300Hz		
4000 μ A	1.2%+4d	0.15mV/ μ A
400.0mA	1.2%+4d	3.3mV/mA
10.00A*	1.2%+4d	0.03V/A
300Hz 1kHz		
4000 μ A	1.5%+4d	0.15mV/ μ A
400.0mA	1.5%+4d	3.3mV/mA
10.00A*	1.5%+4d	0.03V/A

mA μ A Overload Protection : 0.63A/500V Fuse, Interrupt Rating 200kA

A Overload Protection : 15A/600V Fuse, Interrupt Rating 100kA

*10A continuous; 20A for 30 seconds maximum, 5 minutes cool down interval

DC Current

RANGE	AM-71	Burden Voltage
	Accuracy	
4000 μ A	0.4% + 2d	0.15mV/ μ A
400.0mA	0.4% + 3d	3.3mV/mA
10.00A*	0.6% + 4d	0.03V/A

mA μ A Overload Protection : 0.63A/500V Fuse, Interrupt Rating 200kA

A Overload Protection : 15A/600V Fuse, Interrupt Rating 100kA

*10A continuous; 20A for 30 seconds maximum, 5 minutes cool down interval

Frequency

RANGE	AM-71
	Accuracy
99.999Hz, 999.99Hz, 9.9999kHz, 99.999kHz, 250.00kHz	0.05% + 4d

Sensitivity : 5Hz — 100kHz*, > 200 mVrms, < 20 Vrms;
100kHz — 250kHz, > 400 mVrms, < 20 Vrms;

*Pulse Width > 3 μ s in this frequency range

Update Rate : 1.9 per second nominal

Overload protection : 600VDC/VAC rms

Frequency & ACV or AC ADP in Dual Display

RANGE	AM-71
	Accuracy
99.99Hz, 999.9Hz, 9.999kHz, 20.00kHz	0.01% + 5d

Sensitivity* : 5Hz—100 Hz**, > 15% F.S. of AC range;
100Hz—1kHz, > 20% F.S. of AC range;
1kHz—10kHz, > 40% F.S. of AC range;
10kHz—20kHz, > 60% F.S. of AC range

*ACV 750V range : 5Hz—100Hz, > 420VAC;
100Hz—1kHz, > 550VAC

**Pulse Width > 3 μ s in this frequency range

Update Rate : 1.3 per second nominal

Capacitance

RANGE	AM-71
	Accuracy*
4.000nF**	4.0% + 10d
40.00nF	3.0% + 5d
400.0nF	0.8% + 5d
4.000 μ F	0.8% + 3d
40.00 μ F***	4.0% + 5d
400.0 μ F****	4.0% + 5d
4.000mF	3.5% + 5d

*Accuracies with film capacitor or better

**Specified from 10% to 100% of range

***Add 30 counts below 25% of range

****Add 50 counts below 25% of range

Overload protection : 600VDC/VAC rms

Ohms

RANGE	AM-71
	Accuracy
400.0 Ω , 4.000k Ω , 40.00k Ω , 400.0k Ω	0.3% + 2d
4.000M Ω	0.5% + 2d
40.00M Ω	2% + 5d
400.0nS	0.7% + 5d

Open Circuit Voltage : <1.3VDC (<3VDC for 400 Ω range)

Overload protection : 600VDC/VAC rms

Diode Tester

Range	Test Current (Typical)	Open Circuit Voltage
4.000V	0.8mA	< 3.5 VDC

Overload Protection : 600VDC/VAC rms

Audible Continuity Tester

Audible threshold : the beeper sounds if the measured resistance is lower than 10 Ω , and turns off when greater than 60 Ω . Response time < 150 μ s

Overload protection : 600VDC/VAC rms

DC Adaptor

10 counts per 1 mVDC

Accuracy : Same as DC 400.0mV range

Input Impedance : 1000M Ω , 70pF nominal

Overload protection : 600VDC/VAC rms

AC Adaptor

10 counts per 1 mVAC

Accuracy : Same as AC 400.0mV range

Input Impedance : 1000M Ω , 70pF nominal

Overload protection : 600VDC/VAC rms

RECORD mode

Nominal Response for DC : 50ms to 80%, 100ms to 99%

Nominal Response for AC : 50ms to 80%, 100ms to 95%

Accuracy : Specified accuracy ± 10 digits for changes > 200ms in duration (± 40 digits in AC); 1.5s autoranging buffer (except Cx)

VII) MAINTENANCE

WARNING

To avoid electrical shock, remove test leads and any input signals before opening the case. Do not operate with open case. Install only the same type of fuse or equivalent

Battery replacement procedure

When the battery symbol  on the display is on, replace the battery as soon as possible to ensure accuracy. The meter uses a single standard 9V alkaline battery (NEDA1604A, JIS6AM6, IEC6LF22)

- 1) Disconnect the meter from any circuit and remove the test leads from the input jacks
- 2) Turn the meter OFF
- 3) Loosen the four captive screws from the case bottom and turn the case over, see **FIG 22**
- 4) Lift the end of the case top nearest the input jacks until it unsnaps from the case bottom
- 5) Lift gently the battery from the battery compartment, and disconnect the battery from the battery connector
- 6) Snap the battery connector to the terminals of the replacement battery, and reinsert the battery into the battery compartment. Dress the battery leads so that they are properly seated in the compartment groove and will not be pinched between the case top and case bottom
- 7) Replace the case top, ensuring that all the gaskets are properly seated and the two snaps on the case top (near the LCD side) are engaged
- 8) Re-fasten the 4 captive screws

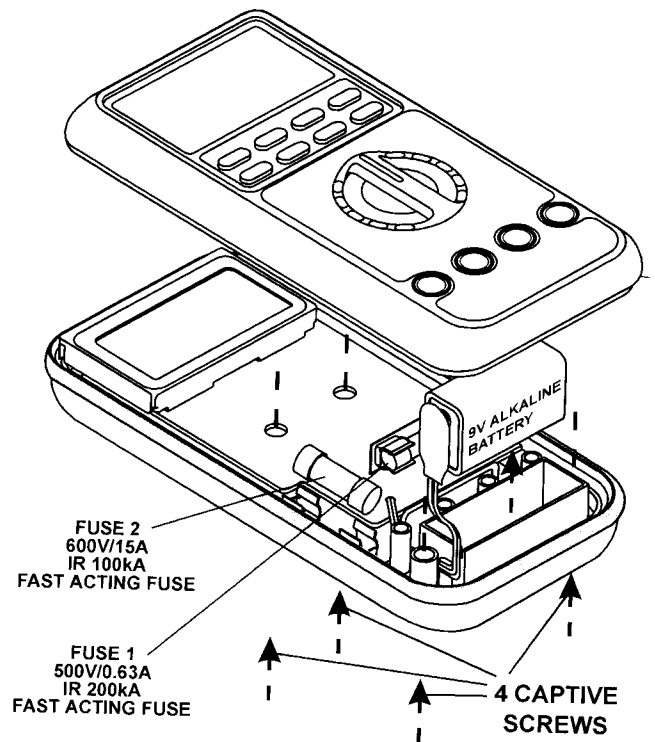


FIG 22. CHANGING BATTERY & FUSES

Fuse replacement procedure

The meter uses a 500V/0.63A IR 200kA fast acting fuse (FUSE 1) for mA uA input, and a 600V/15A IR 100kA fast acting fuse (FUSE 2) for A input

- 1) Perform steps 1) through 4) of the battery replacement procedure
- 2) Replace the blown fuses
- 3) Perform step 7) through 8) of the battery replacement procedure

Accessories and replacement parts

Amprobe P/N	Description	Quantity
H-70B	AM-71 Holster/Black	1
TSBC-71	AM-71 Case Gasket	1
	AM-71 Tilt Stand, Yellow	
	AM-71 Belt Clip	
	2 AM-71 upper case screws	
	2 AM-71 lower case screws	
MTL-90	AM-71, 90, 91 Test leads	1
FA-6x32/.63	AM-71, 90, 91 500V/.63A Fuse	1
KLK15	AM-71, 90, 91 600V/15A Fuse	1
	AM-71 User Manual	1
MN1604	9V Battery	1
TMA-1	Temp. Accessory	1
A400	400A AC Transducer	1
CT-600 AC/DC	AC/DC 600A Transducer	1
AW-80	kW/AMP, 1000A, 200kW Transducer	1
AW-81	kW/AMP, 1000A, 400kW Transducer	1
1R-100	INFRA-RED Scaw Probe	1
MTC-3	1 Red+1 Black Alligator Adaptors	1