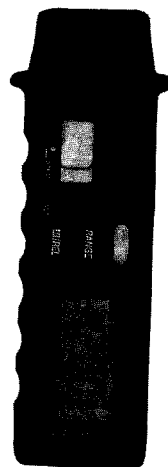


OPERATING INSTRUCTIONS
FOR
AMPROBE®
DIGITAL PEN MULTIMETER
MODEL PMM-2



CE

See "PRECAUTIONS FOR PERSONAL AND
INSTRUMENT PROTECTION" on Pg. 3

See "LIMITED WARRANTY" on Pg. 2



AMPROBE.
A United Dominion Company

LIMITED WARRANTY

Congratulations! You are now the owner of an AMPROBE Instrument. It has been crafted according to the highest standards of quality and workmanship. This instrument has been inspected for proper operation of all of its functions and tested by qualified factory technicians according to the long-established standards of AMPROBE.

Your AMPROBE Instrument has a limited warranty against defective materials and/or workmanship for one year from the date of purchase provided the seal is unbroken or, in the opinion of the factory, the instrument has not been opened, tampered with, or taken apart.

Should your instrument fail due to defective materials and/or workmanship during the one-year warranty period, return it along with a copy of your dated bill-of-sale which must identify the instrument by model number and manufacturer number.

IMPORTANT: For your protection, please use the instrument as soon as possible. If damaged, or should the need arise to return your instrument, place it in a shipping carton packed with sufficient packing material. It must be securely wrapped. Amprobe is not responsible for damage in transit. Be sure to include a packing slip (indicating model and manufacturer number) along with a brief description of the problem. Make certain your name and address appear on the box as well as the packing slip.

Ship prepaid via Air Parcel Post insured or U.P.S. (where available) to:

Service Division
AMPROBE INSTRUMENT
9101 Northwest 7th Ave
Miami, Florida 33150

Outside the U.S.A. the local Amprobe representative will assist you. Above limited warranty covers repair and replacement only and no other obligation is stated or implied.

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 600V 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 testers for actual testing, the unit should be checked on a low energy, high impedance source. **Do not use on power distribution lines or any other high energy sources.**
6. Do not attempt to measure a voltage unless you are already certain that the voltage is below 600VAC or 600 VDC.
7. 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.
8. 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. 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.

SAFETY/DEFINITION OF SYMBOLS

This instruction manual has warnings and safety precautions which must be followed in order to ensure safe operating conditions.

 Caution! Refer to Manual

 Double/Reinforced Insulation

 Caution, risk of electric shock

 Battery

 **CAUTION:** To avoid damage to the meter:

- 1) Disconnect the test leads from circuit under test before changing functions.
- 2) Never connect instrument to a voltage source with switch in the Ohms position.

INTRODUCTION

AMPROBE'S Model PMM-2 Digital Pen Multimeter is a versatile meter that allows you to do a multiple of tasks with a wide array of accessories.

Features include:

- 4200 count LCD display
- Auto-manual ranging
- 0.7% DCV accuracy
- 1.7% ACV accuracy
- 1.0% Ohms accuracy
- 600 Volt protection on all ranges
- Fast continuity beeper
- Data hold function
- Auto power off
- Fire retardant, high impact plastic case

UNPACKING AND INSPECTION OF CONTENTS

Upon removing your new instrument from its packing, you should have the following items:

1. Digital multimeter
2. Test lead (one black), PMTL-4
3. Red test probe set, one each of PMTL-1, PMTL-2
4. Alligator accessory, PMTL-3
5. Carrying case, SV-12
6. Instruction manual

FUNCTIONS

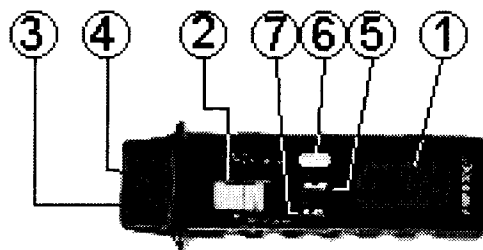


FIGURE 1

Refer to Figure 1 and to the following numbered steps to familiarize yourself with the meters front panel controls and connectors.

1. DIGITAL DISPLAY - The digital display has a 4200 count LCD readout with auto polarity, positive implied negative shown "-", decimal point, low battery annunciator , AC, DC range, H for data hold,  continuity, diode check, MΩ, KΩ, or Ω, Rel Δ and ADP functions.

2. FUNCTION SWITCH - Selects the desired function.

3. COM INPUT TERMINAL - Ground input connector.

4. V-Ω INPUT TERMINAL - Positive input connector for Volts, Ohms and Diode.

5. RANGE SWITCH PUSHBUTTON (Manual Range) - "Range" switch is pushed to select manual ranging and to change ranges. When "Range" switch is pushed once, "Range" annunciator on the LCD will appear. Push "Range" switch to select appropriate range to be used. Push "Range" switch and hold for 2 seconds to return to autoranging.

6. , , ADP, Ω, ,  SELECTION PUSHBUTTON - Push the yellow pushbutton alternately to measure AC voltage or DC voltage in the voltage mode or to measure ohms, continuity or diode in the Ω, ,  mode. When in the voltage function, pushing the yellow button for >2 seconds, the PMM-2 will enter

FUNCTIONS (CON'T)

the ADP mode. Push the yellow button alternately to select desired ADP functions of AC current, (clamp annunciator ON; Temperature in °C or °F, (Temp) annunciator ON; %RH, (RH) annunciator ON; μ A DC, (μ A) annunciator ON; Capacitance, (CX) annunciator ON; Carbon Monoxide concentration, (CO) annunciator ON; Anemometer, (ANEMO) annunciator ON & Light, (LIGHT) annunciator ON. Push yellow pushbutton for >2 seconds to return back to VAC & VDC functions.

7. **□ / Δ PUSHBUTTON** - This switch has two modes; one is data hold and the other is relative. This switch default works in the data hold mode. The PMM-2 will work in the relative mode if the **□ / Δ** switch is depressed for 2 seconds. Data hold mode - this mode is used to hold a measured value for any function; the HOLD annunciator is displayed. Conversions are made but the display is not updated. Relative mode - In the relative mode, the value shown on the LCD is always the difference between the stored reference value and the present reading. For example, if the reference value is 0.4 ohms and the present reading is 15.5 ohms, the display will indicate 15.1ohms.

SPECIFICATIONS

GENERAL SPECIFICATIONS

This instrument has been designed in accordance with UL3111-1 and IEC publications 1010 Pt 1, class II, Safety Requirements for Electrical Equipment for Measurement, Control and Laboratory use. This level of safety can only be guaranteed while the limits of 2.2 are observed.

DISPLAY : The liquid crystal display (LCD) has a maximum reading of 4200 counts.

POLARITY INDICATION : Automatic, positive implied, negative indicated.

OVER-RANGE: "OL" or "-OL"

LOW BATTERY INDICATION: "⎓" is displayed when the battery voltage drops below the operating voltage.

SAMPLING: 2 times per second.

AUTO POWER-OFF: Approximately 30 minutes.

ENVIRONMENTAL CONDITIONS

MAXIMUM ALTITUDE: 2000 meters

INSTALLATION CATEGORY: IEC 1010 600V Cat.II or 300V Cat. III

POLLUTION DEGREE: Level 2

OPERATING TEMPERATURE: 32°F to 122°F (0°C to 50°C), 0 to 80% R.H.

STORAGE TEMPERATURE: -4°F to 140°F (-20°C to 60°C), 0 to 80% R.H. when battery is removed from meter.

TEMPERATURE COEFFICIENT: 0.15 x (Spec. Acc'y/° C, < 18°C or >28°C.

POWER REQUIREMENTS: IEC LR03, AM4 OR AAA size 1.5V x 2.

BATTERY LIFE: 800 hours (Alkaline).

DIMENSIONS: (WxHxD) 1.6" (42mm) x 5.7" (145mm) x .9" (24mm).

WEIGHT: .26lbs. (120 grams), without probes.

ELECTRICAL SPECIFICATIONS

Accuracy is + or - (% reading + number of digits) at 23°C $\pm$ 5°C, less than 75% R.H.

1. **DC Voltage**
Range 4.2V to 600V

Range	Res.	Accuracy	Over Voltage Protection
4.2	1mV	$\pm 0.5\% + 2\text{Dgt.}$	600VDC or 600VRMS
42	10mV	$\pm 0.5\% + 2\text{Dgt.}$	
420	100mV	$\pm 0.5\% + 2\text{Dgt.}$	
600	1V	$\pm 0.5\% + 2\text{Dgt.}$	

Input Impedance: 10Meg Ohms

2. AC Voltage

Range 4.2V to 600V

Range	Res.	Accuracy	Over Voltage Protection
4.2*	1mV	$\pm 1.5\%Rdg + 5Dgt.$	600VDC or 600VRMS
42	10mV	$\pm 1.5\%Rdg + 5Dgt.$	
420	100mV	$\pm 1.5\%Rdg + 5Dgt.$	
600	1V	$\pm 1.5\%Rdg + 5Dgt.$	

* Frequency response: 40Hz. to 300Hz. for 4.2V range.
All other ranges: 40Hz to 500Hz.
Input impedance: 10 Meg ohms // less than 100pF.

3. Resistance

Range	Res.	Accuracy	Over Voltage Protection
420Ω	0.1Ω	$\pm (1.2\%Rdg + 8Dgt.)$	600VDC or 600VRMS
4.2KΩ	1Ω	$\pm (0.9\%Rdg + 4Dgt.)$	
42KΩ	10Ω	$\pm (0.9\%Rdg + 4Dgt.)$	
420KΩ	100Ω	$\pm (1.2\%Rdg + 4Dgt.)$	
4.2MΩ	1KΩ	$\pm (1.2\%Rdg + 4Dgt.)$	
42MΩ	10KΩ	$\pm (3\%Rdg + 7Dgt.)$	

Open circuit voltage: <1.3V

4. Diode Check and Continuity

Range	Res.	Accuracy	Max. Test Current	Max. Open Circuit Voltage
	1mV	$\pm (1.5\% Rdg + 5 Dgt.)^*$	1.5mA	3.3V

* For 0.4 to 0.8V

Overload protection: 600V AC/DC rms max.
Continuity: Built-in buzzer sounds when resistance is less than 50 ohms.

5. AUTOPOWER OFF

The meter will automatically shut itself off approximately 30 minutes after power on. The meter can be turned back on by pushing the "RANGE" pushbutton.

6. ADPFUNCTIONS

Function	Range	Resolution	Accuracy	Over voltage protection
Clamp (AC) Head	420.0A	0.1A	± (1.5%rdg + 5Dgt.) 40Hz to 300Hz	600VDC or 600VRMS
	600A	1A		
Temp. Head	420.0°C	0.1°C	± (0.5% + 2Dgt.)	
	420.0°F	0.1°F		
	4200°C	1°C		
	4200°F	1°F		
RH Head	100.0%	0.1%		
µA Head	420.0µA	0.1µA		
	4200µA	1µA		
Cap. Head	420.0µF	0.1µF		
	4200µF	1µF		
Anemo. Head	420.0m/s	0.1 m/s		
Co. Head	4200ppm	1 ppm		
Light Head	4.200KLux	1 Lux		
	42.00KLux	10Lux		

OPERATION

PREPARATION AND CAUTION BEFORE MEASUREMENT

1. Before measuring, allow the meter to get acclimated with the environment for at least 45-60 seconds after power-up.
2. When the function switch selector is changed during a measurement, be sure to do so only after removing the test leads from the unit under test!

VOLTAGE MEASUREMENTS

⚠ WARNING! TO AVOID AN ELECTRICAL SHOCK, HAZARD OR DAMAGE TO THE METER, DO NOT ATTEMPT TO MEASURE A VOLTAGE THAT MIGHT EXCEED 600VDC OR 600VAC. DO NOT APPLY MORE THAN 600VDC OR 600VAC RMS BETWEEN THE COMMON INPUT TERMINAL AND THE EARTH GROUND.

1. Connect the red test probe to the "V-Ω" input terminal and the black test lead to the "COM" terminal.
2. Set the function switch to " $\tilde{V}$ " position.
3. Push the yellow button to select the ACV or DCV function mode.
4. Connect the probes to the device to be measured.

An unstable display may occur especially in the 4.2V range even though you don't have the test leads in the input terminals. In this case, if an erroneous reading is suspected, insert the leads and short the voltage/ohm terminal and the common terminal leads; the meter should show a zero on the display. In ACV, an offset of .004 or less may be seen instead of 0. This offset is not cumulative when taking a measurement.

RESISTANCE MEASUREMENT

⚠ CAUTION: RESISTANCE TO BE MEASURED MUST BE DISCONNECTED FROM ALL POWER BEFORE APPLYING OHMMETER TEST LEADS. SEE PRECAUTIONS ON PAGE 3.

1. Connect the red test probe to the "V-Ω" terminal and the black test lead to the "COM" terminal.
2. Set the function switch to " Ω • $\rightarrow$ $\rightarrow$ " position and push the yellow button to select the resistance function.

3. For correct reading, ensure that the device being tested contains no voltage.
4. Connect the test leads across the resistor to be measured. In order to ensure the best accuracy in measurement of low resistance, short the test leads before measurement and record the test probe resistance. This needs to be subtracted from your actual measurement. You can also use the "Rel" feature.

CONTINUITY CHECK BY BUZZER

⚠ CAUTION: RESISTANCE TO BE MEASURED MUST BE DISCONNECTED FROM ALL POWER BEFORE APPLYING OHMMETER TEST LEADS. SEE PRECAUTIONS ON PAGE 3.

1. Connect the red test probe to the "V-Ω" terminal and the black lead to the "COM" terminal.
2. Set the function switch to " Ω • $\rightarrow$ $\rightarrow$ " position and push the yellow button to select the continuity function.
3. Connect the test probe and lead to the circuit to be measured. The buzzer will sound if the resistance of the circuit under test is lower than 20 ohms.

DIODE CHECK

⚠ CAUTION: DIODE TO BE CHECKED MUST BE DISCONNECTED FROM ALL POWER BEFORE APPLYING TEST LEADS. SEE PRECAUTIONS ON PAGE 3.

1. Connect the red test probe to the "V-Ω" terminal and the black lead to the "COM" terminal.
2. Set the function switch to " Ω • $\rightarrow$ $\rightarrow$ " position and push the yellow button to select the diode function.
3. When using the diode test range for checking silicon diodes, a reading of above 0.5 volts in the forward direction (other than an over-range indication) means that the diode is functional. An over-range indication means either (1) the diode is open or (2) the test leads are reversed. Reverse the test leads. If you still get an over-range indication, the diode is open. If the diode is defective, "000" (short circuit) or "OL" (indicating non-conductance is displayed). Check the manufacturers specifications for other types of diodes.

USING ACCESSORIES

AC CURRENT MEASUREMENT WITH CLAMP-ON TRANSDUCER MODEL PMM-C

AC current can be measured using a clamp-on current transducer available as an accessory: Model PMM-C for 0.4Amps through 300Amps AC.

1. On the PMM-2, move the slide switch to "V $\overline{V}$ " position.
2. Push the yellow button for >2 sec. The clamp annunciator will appear in the lower left corner of the LCD display.
3. Insert the PMM-C transducer into the input terminals firmly so the transducer trigger is to the left and the display is facing you.
4. Press the trigger to open the transformer jaws and clamp around one conductor only. Make sure the jaw is firmly closed around the conductor before observing the reading on the display.
5. Please follow the instruction manual that comes with the PMM-C.

NOTE: The offset on turn on can be 000.4 Amps or less when used with the PMM-C. This offset does not affect the readings above 0.4 Amps through 300 Amps AC.

The PMM-2 can also work with the following accessories, contact AMPROBE customer service at 516.593.5600 for data sheets on the following items:

- CT600 AC/DC (Current Transducer, 600ACA or DCA)
- A-47L (Energizer Line Splitter)
- PKT-2 (Dual K-Type Thermocouple Converter)*
- PCAP-2 (Capacitance Converter)*
- PRH-2 (Relative Humidity Converter)*
- PAMP-2 (MicroAmp Converter)*

*Note: The above converters read correctly when the "ADP" function of the PMM-2 is used.

REPLACEMENT PARTS

- SV-12 (Carrying Case)
- PMTL-1 (Short Red Test Probe)
- PMTL-2 (Long Red Test Probe)
- PMTL-3 (Black Alligator Clip)
- PMTL-4 (Standard Black Test Lead)
- 912 (AAA Battery - 1pc.) Note: an order of (2) is required for the PMM-2.

BATTERY REPLACEMENT

CAUTION: TO REDUCE THE RISK OF ELECTRIC SHOCK, DISCONNECT TEST LEADS BEFORE OPENING THE CASE.

1. Before replacing the battery, disconnect the test leads from any circuit under test and turn off the meter. Remove the test leads from the input terminals.
2. Position the meter face down on a soft surface. Remove the screw from the case bottom. Refer to Fig. 2.
3. Lift the end of the case bottom until it gently un-snaps from the case top near the input terminals.
4. Lift the battery holder from the unit and remove the (2) AAA batteries.
5. Re-insert the new batteries and place the battery holder onto the folded foil.
6. Replace the case bottom and install the screw.

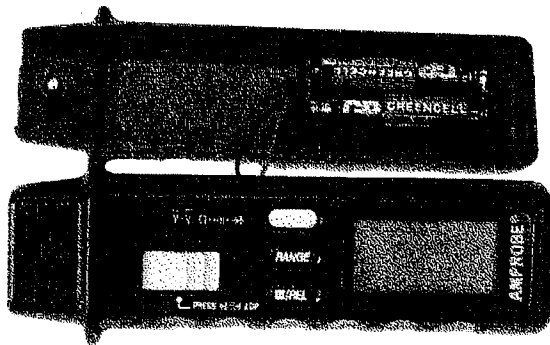


Figure 2

SERVICE

If the instrument fails to operate, check battery, leads, etc... and replace as necessary. If the instrument still does not operate, double check operating procedure as described in this manual. If the instrument still malfunctions, place it with the packing slip along with a brief description of the problem in sufficient cushioning material in a shipping carton.

Be sure to indicate the manufacturing number located on the back of the instrument. AMPROBE is not responsible for damage in transit. Make certain your name and address also appears on the box as well as the packing slip; ship prepaid via. U.P.S. (where available) or Air Parcel Post insured to:

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