

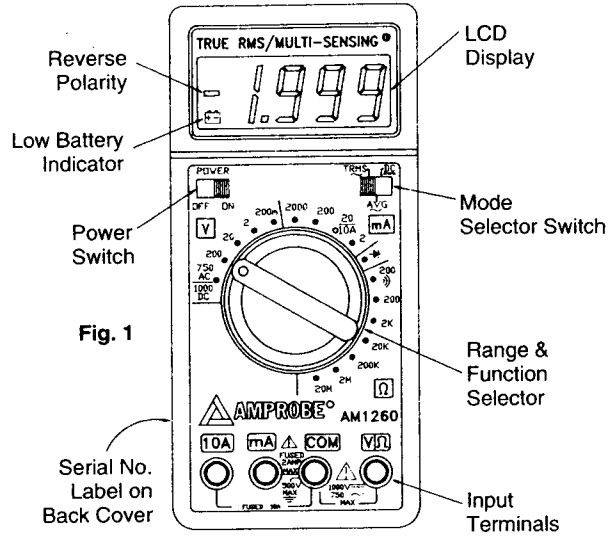
OPERATING INSTRUCTIONS

for

AMPROBE®

Digital Multimeter

Model AM-1250 and AM-1260



See "Precautions for Personal and Instrument Protection" on Page 4

See "Limited Warranty" on Page 2

 **AMPROBE INSTRUMENT®**
DIVISION OF CORE INDUSTRIES INC., LYNBROOK, NEW YORK 11563

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. It has been tested by qualified factory technicians according to the long-established standards of AMPROBE INSTRUMENT.

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 serial 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 cushioning material. It must be securely wrapped. Amprobe is not responsible for damage in transit. Be sure to include a packing slip (indicating model and serial number) along with a brief description of the problem. Make certain your name and address appears on the box as well as packing slip.

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

Service Division
AMPROBE INSTRUMENT
630 Merrick Road (use for U.P.S.)
P.O. Box 329 (use for Parcel Post)
Lynbrook, NY 11563-0329

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.

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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 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 200 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.

SAFETY

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

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 the rotary switch in the Ohms position.
- 3) Always use the correct replacement fuse. Check manual (page 19) for proper fuse rating.

INTRODUCTION

Amprobe's Model AM-1250 and AM-1260 Digital Multimeters are true-RMS instruments designed for use in the field, laboratory, and home. Most other multimeters are average-sensing, which can result in serious errors when measuring distorted waveforms. Only a true-RMS meter, such as the AM-1250 or AM-1260, can accurately measure nonsinusoidal voltages and currents. (See "The Importance of True RMS" on page 17.)

The AM-1250 has two measurement modes: TRMS (AC true-RMS) and DC. The AM-1260 is Multi-Sensing™, with three measurement modes: TRMS (AC true-RMS), AVG (AC average-sensing), and DC.

The AM-1250 and AM-1260 can measure Volts, Amps, and Ohms. They also have a continuity buzzer (on one of the 200Ω ranges) and a diode-test function.

NOTE: Multi-Sensing™ is a patented feature of Amprobe Instrument.

SPECIFICATIONS

Measurement modes (voltage and current):

AM-1250 measures DC and true-RMS AC only.
AM-1260 has three measurement modes: DC, TRMS (AC true-RMS), and AVG (AC average-sensing, scaled to RMS).

Voltage Ranges:

0-1.999/19.99/199.9/750 VAC (true-RMS or average-sensing)

Maximum Peak input Voltage: 1100V

0-1.999/19.99/199.9/1000 VDC

0-199.9 mV AC/DC

15kV DC range capability available through the use of optional high voltage probe model HV-2 and resistor model HVR-4 or HVR-41 (not supplied with probe).

Resistance Ranges:

0-199.9 ohms

0-199.9 ohms with continuity buzzer

0-1.999/19.99/199.9 K Ω

0-1.999/19.99 M Ω

Special diode test range: 2mA @ 1.999VDC

Current Ranges:

0-1.999/19.99/199.9/1999 mA AC/DC

0-10 amps AC/DC

The following additional ranges are available through use of optional current transducer accessory models A663-4B, A664-4B, and CT-600.

0-300 amps AC, 45-400 Hz (A663-4B)

0-1000 amps AC, 45-400 Hz (A664-4B)

0-100/600 amps AC/DC, 40-400 Hz sine waves (CT-600)

Power (kW) Ranges: (Also high current AC):

The following two power ranges are available through use of optional accessory transducer models AW80 and AW81.

0-20/200 kW, 50-60 Hz (AW80)

0-40/400 kW, 50-60 Hz (AW81)

Both the AW80 and AW81 also measure current 0-150/1000 amps AC (50-60 Hz).

Leakage:

0-1.999 mA AC (120 or 240 VAC appliances). This feature is available through the use of optional AC leakage detector accessory Model ACL-1260.

Accuracy:

DC (volts, millivolts, and milliamps ranges): $\pm 0.8\%$ of reading ± 1 LSD

AC TRMS (volts, millivolts, and milliamps ranges) sine waves: $\pm 1.5\%$ of reading ± 1 LSD sine waves 40Hz to 5kHz.

AC TRMS volts or millivolts, distorted waves: $\pm 1.5\%$ of reading ± 3 LSD, valid for waveforms with crest factor ≤ 3 , 40Hz to 2kHz, with harmonics up to 20kHz.

AC TRMS milliamps, distorted waves: $\pm 1.5\%$ of reading ± 3 LSD, valid for waveforms with crest factor ≤ 3 , 40Hz to 2kHz, with harmonics up to 10kHz.

AC AVG (volts, millivolts, and milliamps ranges; AM-1260 only):

$\pm 1.5\%$ of reading ± 1 LSD sine waves 40Hz to 2kHz.

$\pm 1.5\%$ of reading ± 4 LSD sine waves 2kHz to 5kHz.

10 amps AC/DC: As per the above specs for the DC, AC TRMS, and AC Avg modes, plus additional error of $\pm 1\%$ of reading ± 2 LSD. AC sine wave readings (TRMS and AVG) valid for 40Hz to 3kHz. Distorted waveform RMS readings valid for waveforms with crest factor ≤ 3 , 40Hz to 1kHz, with harmonics up to 5kHz.

All AC specs are valid only from 5% to 100% of range.

All ohms ranges: $\pm 1\%$ of reading ± 2 LSD.

Temperature coefficient of ohms ranges: $\pm 0.01\%$ of reading/ $^{\circ}\text{C}$ max.

Temperature coefficient of volts and amps ranges: $\pm 0.05\%$ of reading/ $^{\circ}\text{C}$ max.

Accuracy with accessories:

Clamp-on AC current transducers A663-4B and A664-4B:

same as 200mV or 2V range spec plus additional error of $\pm 1\%$ of reading, valid only for 45-400Hz with harmonics up to 2kHz.

Clamp-on AC/DC current transducer CT-600:

same as 200mV or 2V range spec plus additional error of $\pm 2\%$ of reading $\pm 0.5\text{A}$ from 0-100 Amps, or $\pm 2\%$ of reading $\pm 2\text{A}$ from 100-600 Amps. Valid only for DC and 40-400Hz sine waves.

15 kV DC high voltage probe: same as 20V or 200V range spec plus additional error of $\pm 2\%$ of reading.

KW/amp transducers AW80 and AW81:

KW: $\pm 2.8\%$ of reading, 50-60 Hz.

amps AC: same as 200mV or 2V range spec plus additional error of $\pm 1/2\%$ of reading, 50-60Hz sine waves only.

Over-range indication: "1" at left side of display.

Input Impedance: 10M Ω .

Response time: Not more than 2.5 seconds.

Sampling rate: Approximately 2.5 times/second.

Power supply: One 9V alkaline battery, Model MN-1604.

Battery life: More than 200 hours.

Low-battery indication: " " in bottom left corner of display.

Case Voltage Breakdown: 3000VAC.

Operating Temperature/Relative Humidity:
+32°F to 120°F (0°C to +50°C): 80% RH.

Storage Temperature/Relative Humidity:
+14°F to 131°F (-10°C to +55°C): 80% RH.

Size: 6.3"H x 3"W x 1.28"D.
(16cm H x 7.62cm W x 3.25cm D).

Weight: 9.0 oz. (255 gm) without test leads.

Circuit protection:

The milliamp ranges are fuse protected up to 600 volts AC/DC with a 2 amp fuse, Cat. No. 6.3x25-2-12. The 10A range is protected up to 600 volts AC/DC with a 10 amp fuse, Cat. No. 6.3x25-10-12. Do not use substitute fuses.

All voltage ranges, except the 200mV range, are overload protected for up to 800 VAC and 1100 VDC.

The 200mV range and all resistance ranges are protected against momentary misapplication of up to a maximum of 500V AC/DC for no longer than 10 seconds.

IMPORTANT: Use of instrument and/or accessories on circuits with higher voltages and/or currents than the indicated overload limits may result in personal injury and/or damage to the instrument and/or accessories.


MAKING MEASUREMENTS

General

The ON/OFF switch is located at the top left corner of the front panel.

Use the rotary switch to select function (volts, millivolts, milliamps, amps, ohms, or diode check) and range.


Select AC or DC using the mode switch (TRMS/DC switch on the AM-1250, or TRMS/AVG/DC on the AM-1260) at the top right corner of the front panel. The AM-1250 takes true-RMS measurements of AC voltages and currents. The AM-1260 can take either true-RMS or average-sensing measurements.

Low Battery Indication: When the battery symbol " " appears in the lower left-hand corner of the display, replace battery. See section on "Fuse and Battery Replacement" at the end of this manual.

Over-range Indication: When an input is greater than the range selected, a "1" will appear in the display and the remaining digits will be blanked. This is an over-range indication.

AC Voltage Measurement

(See precautions on Page 4)

 **Warning! Do not exceed input of 500 VAC on the 200mV range. Do not exceed 750 VAC on any other voltage range.**

1. Move mode switch (TRMS/DC on the AM-1250, or TRMS/AVG/DC on the AM-1260) to either TRMS (for true-RMS measurements) or AVG (for average-sensing measurements, scaled to RMS).
2. Move rotary switch to desired AC voltage range.
3. Push black test lead into "COM" jack.
4. Push red test lead into "V/ Ω " jack.
5. Place one test probe on each side of the AC voltage.
6. If meter reading falls within the limits of a lower range, move rotary switch to the lower range. This would ensure better resolution.

DC Voltage Measurement

(See precautions on Page 4)



Warning! Do not exceed input of 500 VDC on the 200mV range. Do not exceed 1000 VDC on any other voltage range.

1. Move mode switch (TRMS/DC on the AM-1250, or TRMS/AVG/DC on the AM-1260) to DC.
2. Move rotary switch to desired DC voltage range.
3. Push black test lead into "COM" jack.
4. Push red test lead into "V/Ω" jack.
5. Place one test probe on each side of the DC voltage. If the negative and positive sides of the circuit to be tested are known, connect the black test probe to the negative side of the circuit and connect the red test probe to the positive side. If the black probe is connected to the positive side, a "-" sign will appear in the left of the display.
6. If the meter reading falls within the limits of a lower range, move rotary switch to the lower range. This would ensure better resolution. For high voltages 1-15 kVDC, see instructions for "High Voltage Probe 15kV (DC only)" on page 00.

AC/DC Current Measurements

(See precautions on Page 4)

WARNING

Do not apply voltage between "10A", "mA" and "COM" terminals.

(See page 12 for instructions on measuring higher AC currents using accessory clamp-on transducer A663-4B or A664-4B. See page 14 for instructions on measuring higher DC currents using accessory clamp-on transducer CT-600.)

A milliampere is one thousandth (1/1000) of an ampere and may be written as 1 mA or 0.001 amp. A microampere (μ A) is one millionth (1/1,000,000) of an ampere.


1. Move mode switch to desired setting.
2. Using the rotary switch, select appropriate range. When current is unknown, use the highest current range.
3. Plug black test lead into the "COM" jack.
4. Plug red test lead into the "mA" jack for measurements up to 1999mA. For measurements above 1990mA and up to 10 amps, plug red test lead into "10A" jack.


5. Using red and black test leads, connect the meter in series with circuit under test.
6. If meter reading falls within limits of a lower range, move rotary switch to the lower range. (When moving from the 10A range to a lower range, disconnect leads from circuit under test and move red test lead to "mA" jack.)

Resistance Measurements

(See precautions on Page 4)

1. Move rotary switch to desired ohms range.
2. Plug the black test lead into the "COM" jack.
3. Plug the red test lead into the "V/Ω" jack.
4. When the test lead tips are shorted together, the display should indicate zero resistance on all ohmmeter ranges. (Leads may have up to 0.3 ohm.)
5. Connect test leads across the resistance to be measured.
- Caution:** Resistance to be measured must be disconnected from all power before applying ohmmeter test leads.
6. If meter reading falls within the limits of a lower range, move rotary switch to the lower range.

Continuity: When using 200Ω range with , continuity buzzer will sound for resistances of zero to a maximum of approximately 70Ω. Ohmic values will be displayed for the entire range.

Diode test: When using the diode test range () for checking silicon diodes, a reading 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) that the diode is "open" or (2) that the test leads are connected in reverse. Reverse test lead connections. If you still get an over-range indication, the diode is "open". For other types of diodes, the forward reading may be different. Check manufacturer's specifications.

USING ACCESSORIES

High Voltage Probe 15kV (DC only)

(See precautions on Page 4)



Warning! Do not exceed 15,000 volts AC or DC.

Note: With the AM-1250 or AM-1260, the High Voltage Probe Model HV-2 can be used for **DC only**. It cannot be used on TRMS or AVG. (The probe can be used for AC with other Amprobe multimeters such as the AM-14, AM-12, or AM-4B.)

1. To use the accessory High Voltage Probe Model HV-2 with the AM-1250 or AM-1260, unscrew handle from main probe and insert resistor Model HVR-4 (not supplied with probe) with the spring on the resistor toward the handle. (Note: If your AM-1260 was obtained as part of the TAM-1260 Testmaster Kit, then the resistor is already installed in the probe. Otherwise, probe HV-2 and resistor HVR-4 must both be ordered separately.)
2. Screw handle back onto probe.
3. Move mode switch to DC setting.
4. Move rotary switch to 200 Volts.
5. Plug instrument's black voltage test lead into "COM" jack on AM-1250 or AM-1260 and fasten the other end of this lead to "ground" of the circuit being tested.
6. Plug HV-2 probe (with resistor installed) into V/ Ω jack.
7. With your hand behind the protective discs on the handle of the probe, touch the probe tip to the circuit under test.
8. Take reading and multiply by 100.

CAUTION: DO NOT EXCEED 15,000 volts AC or DC.

NOTE: Tip of HV-2 probe is replaceable.

High AC Current Measurement with Clamp-On Transducer A663-4B or A664-4B

(See precautions on Page 4)

AC Current can be measured using a clamp-on current transducer available separately as an accessory: Model A663-4B for 0-300 amps, Model A664-4B for 0-1000 amps.

1. Move mode switch to TRMS or AVG.
2. Move rotary switch to desired range.
 - a) For currents below 200 amperes, select the 200mV position.

- b) For currents above 200 amperes, or for unknown currents, select the 2V range.
3. Plug the leads of the A663-4B/A664-4B transducer into the "COM" jack and the "V/ Ω " jack.
4. Clamp current transducer around a single conductor.
5. To interpret display:
 - a) Disregard the decimal point when using the "2V" range, e.g. a reading of .251 is 251 amps; a reading of .832 is 832 amps.
 - b) Read display directly (do *not* disregard decimal point) when using the "200 mV" range, e.g. a reading of 123.4 is 123.4 amps.
 - c) If instrument is set on "2V" range and the reading is less than .200, switch to the "200mV" range.

A663-4B/A664-4B with additional current-measuring accessories: The Energizer Line Splitter (Model A47-L) and the AmpTran Transformer (Models CT50-1 and CT50-2) may be used with the A663-4B/A664-4B Transducers to further expand the current measuring capability of the AM-1250/1260. Readings should be interpreted as in Table 1. The CT50-1 and CT50-2 should be used with 50Hz and 60Hz currents only.

Table 1. Interpreting readings using the A663-4B or A664-4B with Line Splitter (A47-L) or AmpTran® (CT50-1 or -2):

Accessory	AM-1250/1260 Range	To Get Actual Current (In Amps)
CT50-1 or -2	200mV	Multiply meter reading by 50.
A-47L, "1x" loop	200mV	Read display directly.
A-47L, "10x" loop	200mV	Divide meter reading by 10.

The AmpTran CT50-1 has a maximum rating of 6,000 amperes intermittent duty and 5,000 amperes continuous duty. The AmpTran CT50-2 has a maximum rating of 3,600 amperes intermittent duty and 3,000 amperes continuous duty. Hence the AM-1250/1260 should be set to the "200mV" range when using the AmpTran Transformers with the A663-4B/A664-4B current transducers, since 5000 amps = 50 x 100 amps; and, on the A663-4B/A664-4B, 100 amps corresponds to 100 mV. If the AM-1250/1260 display reads greater than "100.0" with the CT50-1, or greater than "60.0" with the CT50-2, then the current exceeds the rating of the AmpTran Transformer.

The Energizer A-47L has a maximum rating of 20 amperes intermittent duty and 15 amperes continuous duty.

High DC (or AC) Current Measurement with Clamp-On Transducer CT-600

(See precautions on Page 4)

DC Current can be measured using the Model CT-600 clamp-on current transducer available separately as an accessory. The CT-600 can also measure AC current; but if the user requires accurate true-RMS measurement of *nonsinusoidal* AC waveforms, it is better to use the A663-4B or A664-4B for AC measurement.

1. Move mode switch to desired setting.
2. Move rotary switch to "2V" range.
3. Plug the leads of the CT-600 current transducer into the "COM" jack and the "V/Ω" jack.
4. Select appropriate range (100A or 600A) on CT-600. If it is not known whether current will be higher or lower than 100A, select the 600A range.
5. If measuring DC, zero-adjust the CT-600 before clamping around conductor.
6. Clamp CT-600 around a single conductor and interpret AM-1250/1260 display as in Table 2.

Table 2. Interpreting readings using the CT-600

CT-600 Range	AM-1250/1260 Range	To Get Actual Current (in Amps)
600A	2V	Disregard decimal point (e.g. a reading of ".532" is 532 amps) Valid only for readings less than ".600"
	200mV	Read display directly (e.g. a reading of "183.5" is 183.5 amps)
100A	2V	Multiply reading by 100 (e.g. a reading of ".251" is 25.1 amps) Valid only for readings less than "1.000"
	200mV	Divide reading by 10 (e.g. a reading of "154.0" is 15.4 amps)

7. To select optimum range:
 - a) Start with the AM-1250/1260 set on "2V" range.
 - b) If CT-600 is set on 600A range and the reading is less than ".100", switch to the 100V range.
 - c) If CT-600 is set on 100A range and the reading is greater than 1.000, switch to the 600A range. (There will not be an over-range indication.)

d) If CT-600 is set on 600A range and the reading is less than ".200" but greater than ".100", move the AM-1250/1260 rotary switch to "200mV" range.

e) If CT-600 is set on 100A range and the reading is less than ".200", move the AM-1250/1260 rotary switch to "200mV" range.

CT-600 with additional current-measuring accessories:

The Energizer Line Splitter (Model A47-L) and the AmpTran® Transformer (Models CT50-1 and CT50-2) may be used with the CT-600 Transducer to further expand the current measuring capability of the AM-1250/1260. Display should be interpreted as in Table 3. The AmpTran® Transformers should be used to measure AC currents only; they cannot measure DC.

Table 3. Interpreting readings using the CT-600 with Line Splitter (A-47L) or AmpTran® (CT50-1 or -2):

Accessory	CT-600 Range	AM-1250/1260 Range	To Get Actual Current (in Amps)
CT50-1 or CT50-2 (AC only)	100A	2V	Disregard decimal point in meter reading and multiply reading by 5.*
		200mV	Multiply reading by 5.
A-47L, "1x" loop	100A	2V	Multiply reading by 100.
		200mV	Divide reading by 10.
A-47L, "10x" loop	100A	2V	Multiply reading by 10.
	600A	200mV	Divide reading by 100.

***Example:** For a reading of .600, drop the decimal point and multiply by 5. Current is $600 \times 5 = 3,000$ amps.

Note that the AmpTran® CT50-1 and CT50-2 have maximum continuous current ratings of 5,000 amps and 3,000 amps, respectively. Hence the CT-600 should be set to the "100A" range when using the AmpTran® Transformers, since $5000 \text{ amps} = 50 \times 100 \text{ amps}$. If the AM-1250/1260 display reads greater than "1.000" (2V range) with the CT50-1, or greater than ".600" (2V range) with the CT50-2, then the current exceeds the rating of the AmpTran® Transformer.

AC Leakage

(See precautions on Page 4)

AC Leakage can be measured using the Model ACL-1260 Leakage Detector available separately as an accessory. (For 120/230 VAC Appliances.)

1. Move mode switch to TRMS or AVG.
2. Move rotary switch to 2mA position.
3. Plug the black connector lead of the ACL-1260 into the AM-1250/1260's "COM" jack.
4. Plug the red connector lead of the ACL-1260 into the AM-1250/1260's "mA" jack.
5. Fasten the alligator clip test lead of the ACL-1260 to an earth ground or ground contact of a three-prong socket.

IMPORTANT: If the appliance to be checked has a three-prong plug with a ground, the ground connection inside the appliance must be disconnected. Disconnect appliance from power before doing this.

6. If the appliance has been disconnected from the power supply, re-connect it.
7. Using one test probe of the ACL-1260, touch various parts (bare metal) inside and outside of the appliance. If the appliance has a multiple-cycle switch and/or a multiple level power switch, test the appliance with the switch(es) in each position.
8. Refer to Table 4 for levels of leakage which are considered acceptable according to ANSI.

Table 4. Maximum Leakage Current*

Type of Appliance	Maximum Leakage Current (Milliamperes)
Two-wire cord-connected appliance	0.50
Three-wire (including grounding conductor) cord-connected portable appliance	0.50
Three-wire (including grounding conductor) cord-connected stationary or fixed appliance	0.75

*Reference ANSI publication C'101.1-'973.

NOTE: Additional leakage-current requirements may be found in individual product specifications.

Power (kW) or Amps with AW-80/81

(See precautions on Page 4)

Power (kW) or single phase AC current can be measured using the Model AW-80 or AW-81 watt/amp transducer available separately as an accessory.

Model AW-80 has kW ranges 0-19.99/199.9 kW with voltage inputs up to 240 VAC (+ 10% max) and current inputs of 0-150/1000 amps AC. Model AW-81 has kW ranges 0-40.0/400 kW with voltage inputs of 208 to 550VAC (+ 10% max) and current inputs of 0-150/1000 amps AC.

Both units may also be used to measure current 0-1000 amps AC (50-60 Hz).

For complete instructions, see separate AW-80/81 Operating Instruction Booklet, Part No. 981759

Temperature Measurement with TMA-1

(See precautions on Page 4)

Temperature can be measured using the Multi-Temp Temperature Accessory TMA-1 and associated temperature probes. Temperature can be read in either Fahrenheit or Celsius, depending on the probe. (See Amprobe catalog for more information about the TMA-1 and temperature probes TPIF, TPIC, TPSF, TPSC, TPAF, TPAC.)

1. Move mode switch to DC.
2. Move rotary switch to 200mV position.
3. Plug the TMA-1 into the AM-1250/1260's "V/ Ω " and "COM" input jacks.
4. Use the temperature probe as explained in the TMA-1 "Helpful Hints" sheet. Wait for the reading to stabilize.
5. If the display over-ranges (i.e. the reading is 200 or higher), move rotary switch to 2V position. Wait for reading to stabilize.
6. If the AM-1250/1260 is in the 200mV range, the temperature can be read directly. If the AM-1250/1260 is in the 2V range, multiply the reading by 1000 (i.e. ignore the decimal point).

THE IMPORTANCE OF TRUE RMS

Most multimeters are average-sensing, not true- RMS. That is, they measure the "RMS" (root-mean-square) of an AC voltage or current **not** by measuring the RMS itself, but by measuring the average of a full-wave rectification of the

input and multiplying the signal by an appropriate scale factor so that for a sine wave, the average-sensed value equals the RMS. This method gives an accurate reading of the RMS value for sine waves, but not for other waveforms. Some nonsinusoidal waveforms can produce severe measurement errors. For example, for an SCR waveform with a conduction angle of 90°, an average-responding instrument will read 29% low. Other types of distorted waveforms can produce even worse errors.

Nonsinusoidal *currents* are quite common on power lines, though power-line *voltages* are usually very nearly sinusoidal.

For accurate measurement of the RMS of a distorted wave, a true-RMS meter is needed. The AM-1250 and AM-1260 are true-RMS meters.

The AM-1260 has both a true-RMS mode and an average-sensing mode. Only the true-RMS mode should be relied on to give accurate RMS readings. The average-sensing mode is useful for detecting the presence of distortion. If the average sensing reading differs significantly from the true-RMS reading, the waveform is distorted. For sine waves up to 2kHz, the average-sensing reading will be within a few counts of the true-RMS reading.

There are some applications, such as motors, where it is desirable to know the rectified-average value of the current as well as the RMS value. To determine the rectified-average value of an AC current, take an average-sensing reading (which is scaled to RMS, not average) and divide it by 1.11.

Total true-RMS of a DC current with ripple


To determine the total true-RMS of a DC current with AC ripple, it is necessary to take both a DC measurement and a true-RMS AC measurement. The total RMS is then calculated as follows:

$$\text{RMS of (DC + AC)} = \sqrt{(\text{DC})^2 + (\text{RMS AC})^2}$$

FUSE AND BATTERY REPLACEMENT

The fuse that protects the mA ranges of the instrument is a 2 Amp, 600V AC/DC fuse, Cat. No. 6.3x25-2-12.

The fuse that protects the 10A range is a 10 Amp, 600V AC/DC fuse, Cat. No. 6.3x25-10-12.

Warning!
 **Always use the correct replacement fuse, as indicated above. Do not use a substitute fuse.**

1. Before replacing fuse or battery, disconnect the test leads from any circuit under test and turn off the meter.
2. Remove a single screw on bottom of back cover. Lift off back cover.
3. Replace fuse or battery as needed. When the back of the instrument is viewed with the cover off, the fuse that protects the mA ranges is located on the right side, near the 10A input jack. The fuse that protects the 10A range is located on the right side, further away from the input jacks. See figure 2.
4. Replace cover and tighten screw.

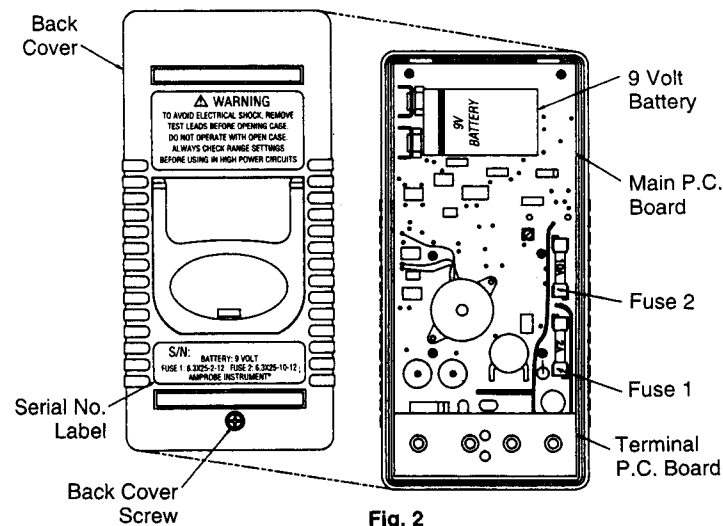


Fig. 2

REPLACEMENT PARTS

Item	Description	Catalog/Part No.
BT	Battery	MN1604
F1	Fuse - 600V - 2 Amps	6.3x25-2-12
F2	Fuse - 600V - 10 Amps	6.3x25-10-12
MTL-1200	Test Lead Set	MTL-1200
	Operating Instructions	966750

SERVICE

If the instrument fails to operate, check battery, fuse(s), leads, etc. and replace as necessary. If the instrument still does not operate, double check operating procedure as described in the instruction manual. If the instrument still malfunctions, place it with packing slip along with a brief description of the problem in sufficient cushioning material in a shipping carton. Be sure to indicate the serial 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 packing slip; ship prepaid via U.P.S. (where available) or Air Parcel Post insured to:

Service Division
AMPROBE INSTRUMENT
~~630 Merrick Road (use for U.P.S.)~~
~~P.O. Box 329 (use for Parcel Post)~~
~~Lynbrook, NY 11563-0329~~

Outside the USA, the local Amprobe representative will assist you.

*3270 Executive Way
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