

OPERATING INSTRUCTIONS

AMPROBE®

Digital Clamp-On Volt/Amp/Ohmmeter

ACD-9A

SEE PRECAUTIONS FOR PERSONAL
AND INSTRUMENT SAFETY INSIDE

SPECIFICATIONS

Functions	Ranges	Models
ACV	0-199.9 and 0-999	ACD-7A/8A/9A
DCV	0-199.9 and 0-999	ACD-7A/8A/9A
AC Amps	0-199.9 and 0-300	ACD-7A/8A
AC Amps	0-199.9 and 0-999	ACD-9A
Ohms	0-199.9 and 0-1999	ACD-7A/8A/9A

Instrument Accuracy:

Amps: $\pm 2\% \pm 2 \text{ LSD}^*$
Ohms & AC Volts: $\pm 2\% \pm 1 \text{ LSD}$
DC Volts: $\pm 0.75\% \pm 1 \text{ LSD}$
Peak(ACD-8A/9A only): $\pm 2\% \pm 1 \text{ LSD}$
Resolution: "0.1" on low range and "1" on high range
Frequency: 40-400 Hz
Sensing: Average
Power: 1 No. MN1604 9V alkaline battery (not supplied)
*Least Significant Digit



Battery Life: 200 hours minimum
Display: 3½ digits LCD, .4" high with maximum reading of 1999
Fuse: 1 No.8AG-360x023 1 Amp Fast Blow (supplied)
Ohmmeter Test Voltage: 2.0V Max., Open Circuit
Zeroing: Automatic except in Ohms mode
Sampling Rate: Minimum of 2 times per second
Response Time: 2.5 seconds maximum
Peak Response Time (ACD-8A&9A only): 0.08 seconds
Peak Decay (ACD-8A&9A only): Not more than 1LSD each 15 seconds
Input Impedance: 10 Megohms
Case Voltage Breakdown Test: 3000VAC
Storage Temperature/Humidity: 20°F to 140°F; -6°C to 60°C; 80% RH
Operating Temperature/Humidity: 32°F to 120°F; 0°C to 49°C; 80% RH
Circuit Protection: All voltage and current ranges are protected for 50% overload for a maximum of one minute. Fuse protected to 600 Volts on the Ohms range.

LIMITED WARRANTY

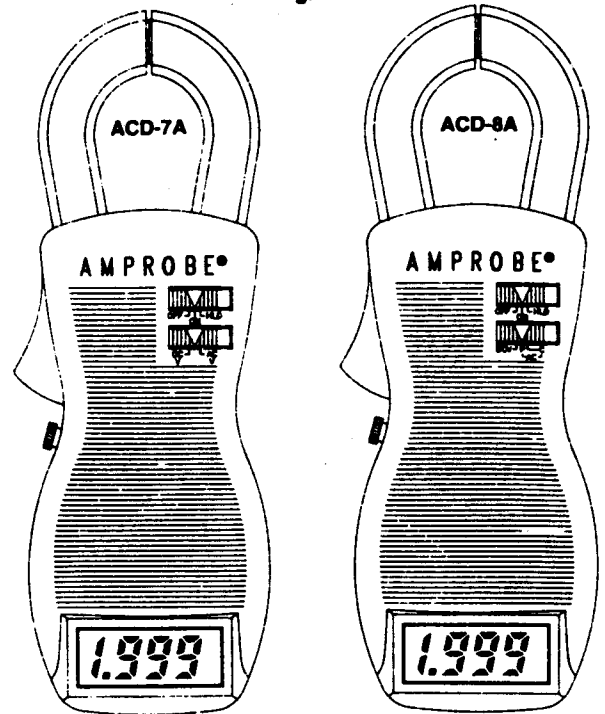
Congratulations! You are now the owner of an AMPROBE® Instrument. It has been union crafted according to quality standards and contains quality components and workmanship. This instrument has been inspected for proper operation of all its functions. It has been tested by qualified factory technicians 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 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 instrument by model number and serial number (located on back of instrument).

For your protection, please use the instrument as soon as possible. If damaged, or should the need arise to return your instrument, it must be securely wrapped (to prevent damage in transit) and sent prepaid via Air Parcel Post insured or UPS where available to Service Division, AMPROBE INSTRUMENT, 630 Merrick Rd., (use for U.P.S.), P.O. Box 329 (use for P.P.), Lynbrook, New York 11563 U.S.A. Outside of U.S.A. your AMPROBE representative will assist you.

Above limited warranty covers repair and replacement of instrument only and no other obligation is stated or implied.

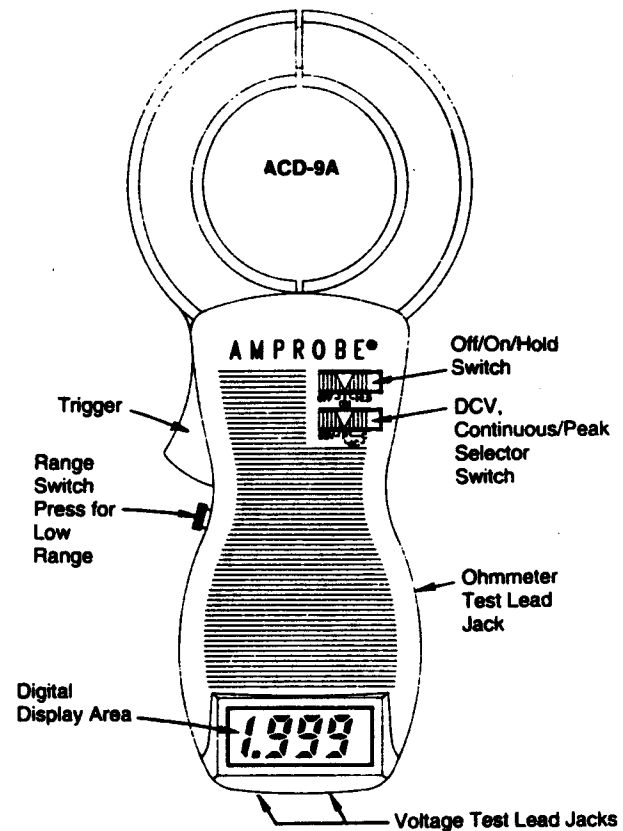
Fig. 1



PRECAUTIONS FOR PERSONAL AND INSTRUMENT PROTECTION

IMPORTANT:

- 1) Before using any electrical instrument or tester for actual testing, the unit should be checked on a known live line to make certain it is operating properly.
- 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 and clothing should be worn.
- 3) The jaws of clamp-on instruments should not, under any circumstances, be used as a device to hold the instrument when taking other than a current reading. When using a clamp-on as a voltmeter or ohmmeter never clamp the jaws around or onto a conductor, box or anything else—conducting or non-conducting—except a test lead. (See fig. 8).
- 4) Before applying test leads to circuit under test, make certain that test leads are plugged into proper instrument jacks.
- 5) Make certain no voltage is present in circuit, before connecting ohmmeter to circuit.
- 6) Should the instrument accidentally be used to try to measure a voltage or current beyond the range of the instrument, immediately remove the instrument from the circuit. See Over-Range Indication.
- 7) When not in use, keep instrument in its carrying case.
- 8) When instrument will not be used for a period of time, remove the battery from instrument.



DESCRIPTION

Models ACD-7A, 8A & 9A will directly measure AC current, AC voltage, DC voltage and resistance. They will provide a digital readout of the RMS value of the Variable being measured. All models are average sensing RMS calibrated in the continuous mode.

Models ACD-8A & 9A are peak sensing, RMS calibrated in the peak mode. High and low ranges can be changed by momentarily pressing the red button on left side. See fig. 2A. The range can also be locked in by pressing and turning the red button counterclockwise. See fig. 2B.

Helpful Hints for Getting Top Performance From Your Digital Clamp-On

- Make certain both switches are moved completely into the desired position.
- When measuring resistance, make certain the voltage test lead that is being used is inserted into the jack marked "COM" on the back of the instrument.
- When measuring current of widely varying values, start with the conductor in which you expect to find the lowest current, then the next highest, etc. To reduce the possibility of retained magnetism in the jaw, open and close the jaws a few times between measurement. The operating temperature range of the instrument is +32°F to +120°F. If the instrument has been in a location where the temperature was lower than 32°F or higher than 120°F, allow the instrument to adjust to within the operating temperature range.

ACCURACY

Accuracy of $\pm 2\%$ of reading ± 2 least significant digits (LSD) based on a sinusoidal waveform is for amps only. See specifications for other variables.

Example 1: Instrument is reading 850 amperes. $\pm 2\%$ equals ± 17 amps or 833 to 867. Taking ± 2 LSD into consideration, actual current value is between 831 (833-2) and 869 (867 + 2).

Example 2: Instrument is reading 20.0 amperes. $\pm 2\%$ equals ± 0.4 or 19.6 to 20.4. Taking ± 2 LSD into consideration, actual current value is between 19.4 (19.6 - 0.2) and 20.6 (20.4 + 0.2).

RANGE SWITCH

All models have Press-to-Change Range switch on the left side. By momentarily pressing the red button, the instrument switches from high to low range. See fig. 2A. By pressing and turning counterclockwise, the low range can be locked in. See fig. 2B.

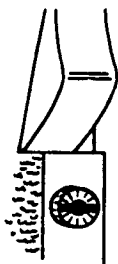


Fig. 2A
Range Switch
Depress for
Low Range.



Fig. 2B
Low Range
Locked "ON"
Position.

OFF-ON-HLD SWITCH

To take a reading, first turn instrument on by moving switch from "OFF" to "ON". See fig. 3. If it is desirable to retain a reading for any length of time, simply move this switch to the next position which is "HLD" (HOLD). See fig. 3. To take the next reading, move this switch back to "ON" position. Data is not updated in HLD mode.

Fig. 3



CONTINUOUS OR PEAK OPERATION

Models ACD-8A & 9A can be used to continuously monitor a fluctuating variable (current, voltage, resistance) or to measure the peak/surge value of a variable such as a motor starting current. The surge must last for at least 0.08 seconds. Motor starting current normally lasts for approximately 0.17 seconds. For continuous operation, move the DCV/P/C switch to the "C" position. For peak measurements, move the DCV/P/C switch to the "P" position. See fig. 4.

Fig. 4



INSTALLING BATTERY AND FUSE

The ACD-7A, 8A & 9A uses one MN1604 9V Alkaline Battery

To install:

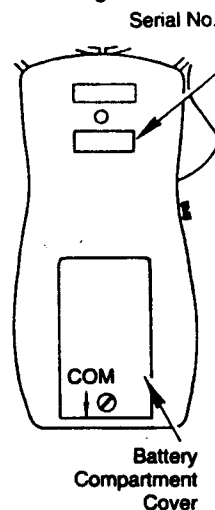
- 1) Loosen screw located toward the bottom on the back of the instrument. See fig. 5.
- 2) Lift battery compartment cover.
- 3) Firmly snap connector onto battery terminals.
- 4) Replace cover and tighten screw.

The instrument uses one Number 8AG-360X023, 1 Amp Fast Blow Fuse which installs in the probe handle of the OHB-4HE Ohmmeter Battery Attachment.

To install:

- 1) Unscrew the top (probe tip) section from the bottom section of the probe handle.
- 2) Insert fuse into top section.
- 3) Screw two sections together.

Fig. 5



LOW BATTERY INDICATION

Replace the battery when the low battery indication appears in the left side of the display. See fig. 6.

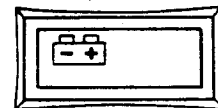


Fig. 6
Low Battery

OVER-RANGE INDICATION

If you attempt to measure a voltage, current or resistance greater than the instrument's range capability, the instrument will signal over-range as shown in fig. 7A and B. Instrument is over-range protected for 50% overload. Remove from circuit immediately.



Fig. 7A
Low Range



Fig. 7B
High Range

HOW TO MEASURE AC CURRENT

See Precautions for Personal and Instrument Safety

- 1) Disconnect voltage test leads and ohmmeter test lead from instrument.
- 2) Turn instrument on by moving OFF/ON/HLD switch to "ON" position.
- 3) For ACD-7A, move "DCV/ACV" switch to ACV position. For ACD-8A/9A, move "DCV/P/C" switch to either "P" or "C". See Continuous or Peak Operation for more details.
- 4) Encircle single conductor with jaws.
- 5) Release finger pressure on trigger and allow jaws to close fully around the conductor.

HOW TO MEASURE AC VOLTAGE

See Precautions for Personal and Instrument Safety

Fig. 8
Replaceable Probe Tip
Cat. No. VPT



NOTE: Because the ACD-7A/8A/9A is a high impedance voltmeter (10 Megohms) and RF signals exist almost everywhere, it is possible to get a voltage reading even when the instrument is not connected to a circuit. However, this will not affect your actual voltage measurements.

- 1) Disconnect ohmmeter test lead from instrument and/or remove transformer jaws from around any conductors.
- 2) Turn instrument on by moving OFF/ON/HLD switch to "ON" position.
- 3) For ACD-7A, move "DCV/ACV" switch to ACV. For ACD-8A/9A, move "DCV/P/C" switch to either "P" or "C". See Continuous or Peak Operation for more details.
- 4) Be sure voltage leads are connected properly by pushing against receptacle spring and twist clockwise to lock. Black lead should be inserted in common position as indicated in fig. 5.
- 5) Position handle of test lead between jaws of instrument as shown in fig. 8.
- 6) With instrument in one hand and the other voltage test lead in the other, apply test leads to test points of circuit.

HOW TO MEASURE DC VOLTAGE

See Precautions for Personal and Instrument Safety

- 1) Disconnect ohmmeter test lead from instrument and/or remove transformer jaws from around any conductors.
- 2) Turn instrument on by moving OFF/ON/HLD switch to "ON" position.
- 3) Move "DCV/ACV" (ACD-7A) or "DCV/P/C" (ACD-8A/9A) switch to the DCV position.
- 4) Be sure voltage leads are connected properly by pushing against receptacle spring and twist clockwise to lock. Black lead should be inserted in common position as indicated in fig. 5.
- 5) Position handle of test lead between jaws of instrument as shown in fig. 8.
- 6) With instrument in one hand and the other voltage test lead in the other, apply test leads to test points of circuit.
- 7) If negative and positive sides of the circuit to be tested are known, connect black test lead to the negative side and red test lead to the positive side. If polarity of circuit is not known and a negative sign appears on the display when leads are connected, then reverse leads for proper polarity indications.

HOW TO MEASURE RESISTANCE

See Precautions for Personal and Instrument Safety

(Ohmmeter Test Voltage is 2.0V on low range, 2.9V on high range).

Caution: Make certain no voltage is present in circuit before connecting ohmmeter to circuit. If ohmmeter is applied to a live line, the ohmmeter fuse may blow and/or instrument may be damaged, depending on voltage level. Also make certain any capacitors in circuit are discharged.

- 1) Turn instrument on by moving OFF/ON/HLD switch to "ON" position.
- 2) Insert one insulated voltage test lead connector into right hand voltage receptacle (viewing instrument from front) on the bottom of the instrument. Looking at the back of the instrument, this voltage receptacle is marked "COM". See fig. 5.
- 3) Clamp voltage test lead probe between jaws. See fig. 8.
- 4) Plug ohmmeter lead into jack on the right hand side of the instrument. See fig. 1.
- 5) For ACD-7A move "DCV/ACV" switch to any position. For ACD-8A/9A, "DCV/P/C" switch must be in either the "DCV" or "C" position.
- 6) Short ohmmeter test probe tip to voltage test lead probe tip.
 - a) If fuse in ohmmeter adaptor is good, reading should be below one ohm.
 - b) If fuse is blown, the instrument will indicate over-range. See fig. 7A or B.
- 7) With instrument in one hand and ohmmeter test probe in the other hand, apply probe tips to circuit or device. **NOTE:** When measuring low resistances, subtract the resistance value obtained from 6 (a) above from the reading obtained in the actual test. Instrument measures its own lead resistance. Also make certain good electrical contact is made with test points. Because of the sensitivity of the instrument, even slight corrosion on probe tip or test points may cause erroneous readings. To clean probe tips, use fine steel wool.