Part No. 923751
12/95

OPERATING INSTRUCTIONS FOR AMPROBE®

DigiMatic™

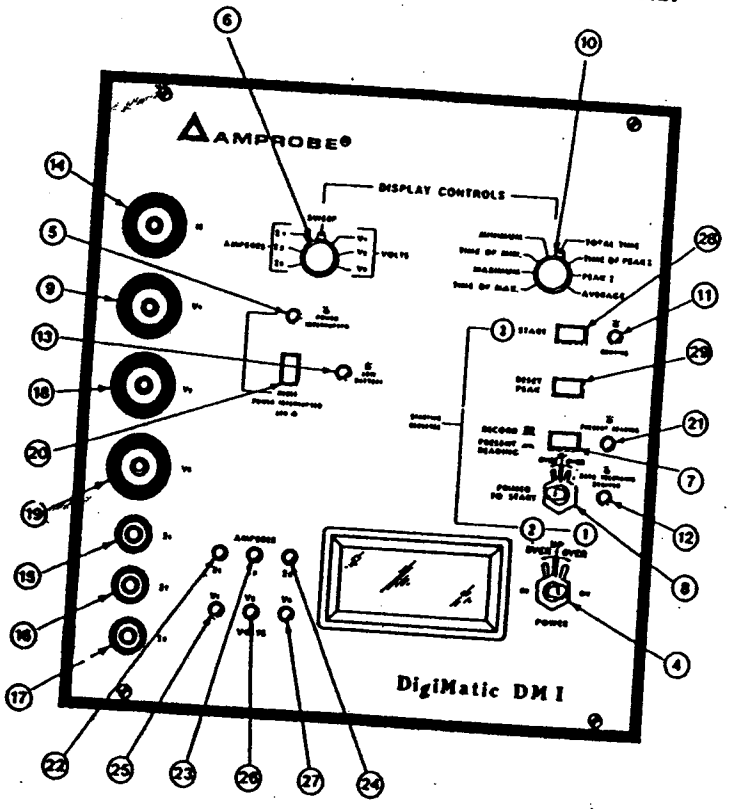
MODEL DM-I

• See precautions for personal and instrument protection on page 3

• See limited warranty on page 2

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

NUMBERS SHOWN ON PANEL ILLUSTRATION CORRESPOND WITH REFERENCES WITHIN THE OPERATING INSTRUMENTS.



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 and clothing should be worn.
3. Before connecting or disconnecting the instrument to or from the circuit to be tested, turn off all power to the circuit.
4. Before installing or removing batteries and/or fuse, disconnect all inputs to instrument and remove power cord from the outlet.
5. 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.

SPECIFICATIONS

RANGES: 0-750 VAC, auto-ranging
0-1000 Amps AC, auto-ranging

RESOLUTION: 0-100.0 0.1
100-1000.0 1.0

ACCURACY: volts ± 1.0% ± 2 digits
amps ± 1.5% ± 2 digits
peak ± 2.0% ± 5 digits

FREQUENCY RANGE: From 40 Hz to 400 Hz.

OPERATING TEMPERATURE: 0° - 50°C
32° - 122°F
80% non-condensing humidity

STORAGE TEMPERATURE: -10 to + 60°C
14 to 140°F
90% non-condensing humidity

SENSING: True RMS except for surge, which is peak

CASE BREAKDOWN: 2500 Volts

OVERVOLTAGE PROTECTION: Up to 1000 volts

PEAK RESPONSE: 80ms

OPERATING INSTRUCTIONS FOR DigiMatic™ MODEL DM-I

I. For battery and fuse insertion or replacement, check that no voltages are connected to instrument. Remove screws and lift where noted on the side panel.

II. HOW TO POWER UP AND TEST INSTRUMENT
Before plugging power cord into an outlet, lift battery compartment cover to verify that line voltage switch is in proper position.

Place variable select control ⑥ to 'Sweep'. 'Record/Present Reading' switch ⑦ should be up (record mode), 'Primed To Start' switch ⑧ should be in position ①, 'Power' switch ④ should be in 'Off' position.

Plug in power cord, set 'Power' switch ④ to 'On' position (pull toggle switch up and over to change position). Note that display reads 888.8 and the 'Running' LED ⑪ and 'Power Interrupted' LED ⑤ illuminate for approximately 3–4 seconds, after which everything blanks except for

display decimal point and LED ⑫. If these events do not occur, check the fuse.

Since battery back-up is required, replace the batteries if the 'Low Battery' LED ⑬ is illuminated. Use four (4) type C batteries. Fresh carbon cell batteries will last 96 hours; fresh alkaline batteries will last 144 hours if a power interrupt occurs.

Put variable select control ⑥ in 'V-1'; function select control ⑩ at 'Minimum'; display should read 999.9. Put function select control ⑩ at 'Maximum'; display should read 000.0.

III. Connect voltage leads and current transducers. For proper hookup see (flip up) diagram page 11. Connect green voltage lead 'N' (neutral) ⑭ as follows:

CIRCUIT TYPE	LEAD N
3 phase, 4 wire	Neutral
3 phase, 3 wire	Optional
Single phase, 2 wire	Neutral
Single phase, 3 wire	Neutral

Color on body of transducer should be in keeping with the proper color voltage connection.

To Test All Connections, Proceed as Follows:

A) Depress 'Record/Present Reading' switch ⑦. Note that the corresponding LED ㉑ illuminates.

B) Set the variable select switch ⑥ to 'I-1' and check the reading which should be actual value. Note the corresponding LED ㉒ illuminates. Check 'I-2' ⑯ and 'I-3' ⑰ in the same manner only if on polyphase circuitry.

C) Set variable select control ⑨ to 'V-1' and check the reading which should be actual value. Note corresponding LED ㉕ illuminates. Check 'V-2' and 'V-3' in the same manner on polyphase circuitry.

D) Set variable select control ⑨ to 'Sweep' position. At this setting, display will blank except for decimal point. Depress 'Record/Present Reading' switch ⑦ again (to record position). Note 'Present Reading' LED ㉑ extinguishes. At this setting display will be be blank except for decimal point and LEDs 'I-1' ㉒, 'I-2' ㉓, 'I-3' ㉔ and 'V-1' ㉕, 'V-2' ㉖, 'V-3' ㉗ will be extinguished.

IV. TO START RECORDING, PROCEED AS FOLLOWS:

Note: To obtain accurate data in average and minimum mode, it is necessary that the user have all intended inputs connected to DigiMatic prior to depressing the start button.

A) Set the 'Primed To Start' switch ⑧ (pull toggle up and over to change position) to position ① if not presently at ①. Note that the data recording stopped LED ⑫ is on.

B) Set the 'Primed To Start' switch ⑧ to position ②. The stopped LED ⑫ should still be on.

C) Verify that 'Record/Present Reading' switch ⑦ is in record position.

D) Depress the 'Start' pushbutton ㉘. Note the 'Running' LED ⑪, 'Stopped' LED ⑫ and 'Power Interrupted' LED ⑤ all illuminate for 2–3 seconds, and that the display reads 888.8 for about 3–4 seconds, after which the 'Stop' ⑫ and 'Power Interrupt' LED ⑤ extinguish. The display now indicates input values.

E) Depress 'Reset Peak' switch ㉙ to insure that potentially erroneous data is cleared.

F) Refer to your own timepiece, Note the time of day for future reference. Time is measured in hours and tenths of hours, e.g., 24.7 means 24 and 7/10 hours since the start of recording. This data will be displayed when the function select switch ⑩ is placed in the total time position.

G) Set the variable select control ⑨ to the 'Sweep' position. Check that all voltages and currents are correctly connected. Each voltage or current will display for one second. The particular voltage or current being displayed will be indicated by the red and amber LEDs (I-1 ㉒, I-2 ㉓, I-3 ㉔, V-1 ㉕, V-2 ㉖, V-3 ㉗). This sequence will be shown as above.

In the 'Sweep' mode the function select control ⑩ has no effect. Use the 'Sweep' mode to monitor the present value of all voltages and currents while recording.

V. PRESENT VALUE AND RECORD MODES

After the above sequence, the unit will be in the 'Record' mode. To suspend the 'Record' mode and monitor a particular voltage or current, depress the 'Record/Present Reading' pushbutton ⑦. This control will latch. The amber 'Present Reading' LED ㉑ will illuminate, recording will be suspended, and the display will read out the present value of the voltage or current selected by the variable select control ⑨. Unused input will be at or close to zero readings. The function select control ⑩ will have no effect. (Note: 'Sweep' and 'Present Reading' cannot be selected simultaneously, or display will blank.) The display will continuously read the present value of the

variable selected until the 'Record/Present Reading' switch (7) is depressed again and then released.

The DigiMatic model DM-I will then resume record operations. During the record mode any combination of variables (I-1 (15), I-2 (16), I-3 (17), V-1 (9), V-2 (18), V-3 (19)) and functions (maximum, time of maximum, minimum, time of minimum, total accumulated time, peak surge, time of peak surge, average value) can be selected by the function select control (10) and read while recording continues. The only combinations which should not be selected are either of the peak functions and any voltage variable. If such a combination is selected, the maximum value of the voltage selected will flash at a rate of once per second. This reading is maximum voltage but not peak.

VI. CURRENT PEAK READINGS

The largest peak current can be read at any time in the 'Record' mode. To reset the value so new peaks can be read, depress and release the 'Reset Peak' control (29). Note that new higher peaks will be recorded without operating the 'Reset Peak' control.

VII. STOPPED MODE

The DigiMatic DM-I will terminate the record mode when either the 'Primed To Start' switch (8) is placed in 'Data Recording Stopped' position, or when the total time reaches 999.9 hours (about 41 days, 16 hours). In the stopped mode, DigiMatic DM-I terminates recording new data but retains previously accumulated data which can be selected via the function select control (10) and variable select control (6). The present value mode can still be accessed by depressing the 'Record/Present Reading' switch

(7). If a combination of peak function and voltage variable is selected, the maximum value of the voltage will be flashed at a rate of twice per second. Note that inadvertently depressing the 'Start' pushbutton (28) will have no effect until the 'Stop' toggle (8) (pull toggle up and over to change position) is returned to the 'Primed To Start' position. However, if data recording is stopped due to reaching 999.9 hours of recording time, it will be necessary to move 'Primed To Start' switch (8) to position #1 and back to position #2 to start a new recording cycle. This is to insure that inadvertently pushing the 'Start' switch (28) will not clear previously recorded data.

VIII. MORE ABOUT SWEEP

When in the 'Record' mode (7) and the variable select control (6) is in the 'Sweep' position, the operator can monitor the present readings of three voltages and three currents while simultaneously recording maximum, minimum, and peak I of these quantities. Only present readings will be displayed when in the sweep mode. Compare this to reading three voltmeters, three clamp-on ammeters, and three more clamp-on ammeters if peak is required. Even with all this instrumentation, the maximum value and minimum value would probably be missed. Note: 'Sweep' and 'Present Reading' cannot be selected simultaneously, or display will blank.

IX. MORE ABOUT PRESENT VALUE

In the 'Present Reading' mode (7), the operator can continuously monitor one of six variables at the turn of a switch. (6) Peaks, as well as maximum and minimum, however, are not recorded.

X. MORE ABOUT RECORD MODE

When in the record mode, DigiMatic measures and records data on six different inputs. Each input is sampled for approximately one second, resulting in a complete cycle time of about six seconds.

Each sample taken on an input is compared to the present maximum and minimum for that input. If the sample value is greater than the present maximum, the sample value replaces the present maximum. If the sample value is less than or equal to the existing minimum, the sample value replaces the existing minimum. Time of max. and time of min. indicates the time of the last corresponding replacement. The sample value is then used to calculate a new average. The average value for an input is equal to the average of all samples taken on that input during the recording period.

The true RMS circuit used to obtain the above mentioned sample value is not fast enough to measure surge currents (motor starting current, etc.). Therefore, the DM-I comes equipped with three peak capturing circuits which continuously monitor inputs I1, I2, and I3. These peak circuits respond to surges lasting at least 80ms.

When the DigiMatic detects a new peak current which is greater than the present peak current, the new peak value replaces the present peak value. This data will be displayed when the function select switch ⑩ is placed in the peak I position. Time of peak I indicates the time of the last replacement.

XI. POWER FAILURE INDICATION

With batteries installed, DigiMatic model DM-I will recognize a power failure. Previously recorded data will be retained. Good carbon cell batteries will retain data for 96 hours. Fresh alkaline batteries will retain data for 144 hours. When power returns, DigiMatic model DM-I will continue where it left off and illuminate the 'Power Interrupted' LED ⑤. To determine the duration of the power failure (to the nearest tenth of an hour) add the total time to the starting time. The difference between that time and the current time is the duration of the power failure. To recognize future power failures, reset the indication by means of the 'Reset' pushbutton ⑳.

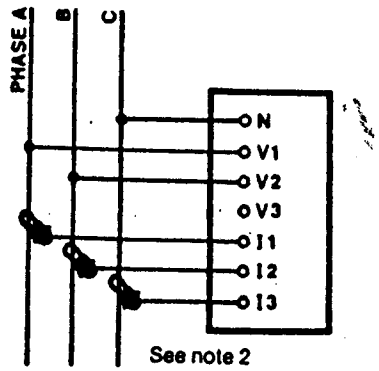
If batteries are not installed or if they are low, data will be lost in the event of power failure and no indication will be shown. When power resumes, DigiMatic model DM-I will reset.

XII. POWER DOWN PREPARATION

On power down, always set the 'power' switch ④ to off before removing the power cord from the outlet. Failure to follow this procedure will result in battery drainage. Remember, setting the power switch to the off position erases previously recorded data.

FLIP THIS PANEL
for
Circuit Connection Information

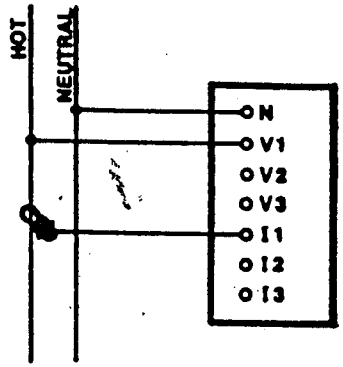
3 PHASE - 3 WIRE



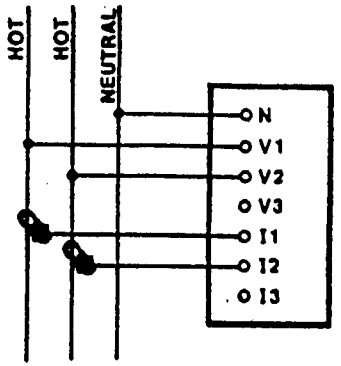
Note 1 - this configuration requires a balanced system. *All Voltage* readings must be multiplied by 1.73.

Note 2 - this configuration allows the direct measurement (without a multiplier) of two of the three phase to phase voltages. The voltages are measured with respect to the phase connected to the neutral lead. For example, if the instrument is connected as shown, V1 is the voltage across phases A and C, V2 is the voltage across phases B and C. To measure the voltage across phases A and B, connect the V1 lead to phase A and the neutral lead to phase B. Instrument accuracy is independent of system balance.

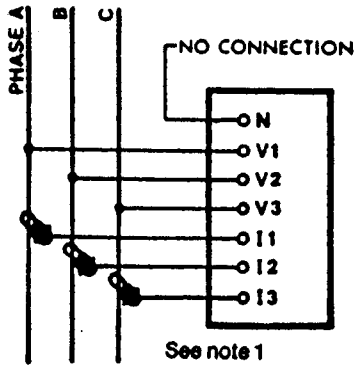
SINGLE PHASE - 2 WIRE



SINGLE PHASE - 3 WIRE



3 PHASE - 3 WIRE



3 PHASE - 4 WIRE