OPERATING PROCEDURES!
for the
MODEL DMOM™ -100
10-100 Amperes True DC
Digital Micro-Ohm Meter
Part Number VIC-9000-100

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JULY 2001
REV. 0

SAFETY SUMMARY
The following safety precautions must be observed during all phases of test set-up, test hookups, testing, and test-lead disconnects.

Do Not Service or Test Alone
Do not perform test procedures or service unless another person is also present who is capable of rendering aid and resuscitation.

Avoid Contact with High Voltage
Because electrical utility station environments contain high voltages and currents, there is always the possibility of personal contact with an unexpected lethal voltage generated by magnetic induction and/or electrostatic leakage from nearby live circuitry. When test units are connected to deenergized (“dead”) power lines, regardless of how short they are, always discharge the lines before attaching any test lead. Because of the possibly deadly consequences of physical contact with such high-voltage lines, engineers and technicians must always treat electrical equipment and hookups as though a lethal condition will eventually occur. Therefore, no matter how unlikely it may seem, never assume anything about the safety of any test setup.

Ensure the safety of personnel by checking first-hand to eliminate all possible hazards!

Do Not Test Inductive Winding Resistance
Because the DMOM-100™ produces test currents up to 100 amperes, it is able to build up large magnetic fields in iron-core transformers. The interruption of such test currents can produce a high voltage spike that can cause severe injury, death, and/or equipment damage. Therefore, do not attempt to measure the resistance of iron-core transformer windings (use equipment designed specifically for that purpose).

Do Not Modify Test Equipment
Because of the added risk of introducing additional or unknown hazards, do not install substitute parts or perform any unauthorized modification to the DMOM-100™. To ensure that designed safety features are maintained, it is recommended that all DMOM-100™ repairs be done at Vanguard Instruments Company or by an authorized repair-service. Unauthorized DMOM-100™ modifications can create unknown safety hazards and will void the warranty.

Follow Exact Operating Procedures
Any deviation from the operating procedures described in this manual may create one or more safety hazards, damage the DMOM-100™ or cause test errors; Vanguard Instruments Co. assumes no liability for unsafe or improper use of the DMOM-100™.
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1.0 INTRODUCTION

1.1 Applicability
This manual applies to the Model DMOM-100™, part number VIC-9000-100, which is made by Vanguard Instruments Company.

1.2 Supersedure Notice
This manual is the basic issue for the Model DMOM-100™ and does not supersede any published document.

1.3 General Description
The DMOM-100™ is a Digital Micro-Ohm Meter for precisely measuring non-inductive resistances from 1 micro-ohm to 300 milli-ohms. Applications include resistance measurement of circuit-breaker contacts, bushing joints, or any other low resistance. It is field-portable, rugged, and easily operated by first-time users having little training (its microprocessor-driven, which automates many functions). It has a 16-key pushbutton pad for entering test parameters and control functions, and a 4-line by 20-character LCD readout for displaying control-option menus, measured resistance values, and related identifying data. The DMOM-100™ has a built-in thermal printer, which prints test data on 2.5-inch-wide thermally sensitive paper. Operation requires little more than connecting the test leads to an unknown resistance and selecting the test parameters; it requires no calculation of lead-loss, handwritten notes, or the memorizing of detailed routines. Operators select the test current (10 to 100 amperes) and test time (5 to 60 seconds). Measured resistance data is displayed and can be printed on the thermal printer. The measured resistance data can also be stored (up to 63 records of 96 readings each) in FLASH EEPROM memory; Operators can recall the stored resistance-measurements and related data at a later time for review and printing.

1.4 Functional Description
DMOM-100™ operation is based on the electrical relationships described by Ohm’s law: \( R = \frac{V}{I} \), where \( I \) is a known test current and \( V \) is the voltage across the unknown resistance (e.g., breaker contacts). Since the test current through the unknown resistance is known and voltage across it is read by the microprocessor, the resistance is calculated using Ohm’s law.

The DMOM-100™ test voltage is supplied by a filtered direct-current power supply. A precisely regulated constant-current source controls the current ramps up/down time and the test current. The dc test current (10 to 100 amps) slowly ramps up/down, which virtually eliminates magnetically induced transients; thus, the risk of inductively tripping a circuit-breaker’s bus differential relay is virtually non-existent.

DMOM-100™ voltmeter test leads are run separately from the current-bearing test leads to the resistive load; thus, voltages are measured at the terminals of the resistance being measured, eliminating error from the \( I \times R \) voltage drop in the test current cables. The DMOM-100™ makes precise micro-ohm measurements possible without calculating compensation for test-current-lead resistance errors.

1.5 Furnished Test Accessories
The DMOM-100™ is supplied with a power cord, a roll of 2.5-inch-wide printer paper, and one 35-foot test cable set with quick-disconnect plugs to the unit and heavy-duty alligator clamps to the load. Heavy-duty welding-type C-clamps (see Appendix B) are also available as optional accessories (C-clamps allow test-lead connection to a wide variety of bushing sizes, bus bars, and many other junctions that require low-contact resistance).
## DMOM-100™ SPECIFICATIONS

### Table 1.0  DMOM-100™ Specifications and Leading Particulars

<table>
<thead>
<tr>
<th>Feature</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>MODEL</strong></td>
<td>DMOM-100™ (part number VIC-9000-100)</td>
</tr>
<tr>
<td><strong>TYPE</strong></td>
<td>Special-purpose test equipment, portable; 100-ampere, Digital Micro-Ohm Meter</td>
</tr>
<tr>
<td><strong>POWER</strong></td>
<td>85 to 132 V ac or 200-240 V ac (selectable), 50/60 Hz</td>
</tr>
<tr>
<td><strong>SIZE (inches)</strong></td>
<td>16.8 wide by 12.6 high by 10.6 deep</td>
</tr>
<tr>
<td><strong>WEIGHT</strong></td>
<td>Less than 21 lbs</td>
</tr>
<tr>
<td><strong>TEST CURRENT</strong></td>
<td>10 to 100 amperes</td>
</tr>
<tr>
<td><strong>RESISTANCE READING RANGE</strong></td>
<td>1 micro-ohm to 300 milliohms</td>
</tr>
<tr>
<td><strong>ACCURACY</strong></td>
<td>±1% reading, ± 1 count</td>
</tr>
<tr>
<td><strong>DISPLAY</strong></td>
<td>LCD, 4-line by 20-character, back lighted</td>
</tr>
<tr>
<td><strong>CONTROLS</strong></td>
<td>Keypad: 10 number keys and 6 function keys</td>
</tr>
<tr>
<td><strong>COMPUTER INTERFACE</strong></td>
<td>RS-232C</td>
</tr>
<tr>
<td><strong>PRINTER</strong></td>
<td>Thermal printer (prints on 2.5-inch-wide thermal paper)</td>
</tr>
<tr>
<td><strong>ENVIRONMENT</strong></td>
<td>Operating: 0°C to 55°C; Storage: -40°C to 65°C</td>
</tr>
<tr>
<td><strong>FURNISHED</strong></td>
<td>One power cord, one 35-foot test cable set, One cable bag</td>
</tr>
<tr>
<td><strong>EXPENDABLES</strong></td>
<td>Paper, thermally sensitive, 2.5-inch wide roll (VIC part # TP-3)</td>
</tr>
<tr>
<td><strong>WARRANTY</strong></td>
<td>One-year warranty on parts and labor; post warranty service contracts available</td>
</tr>
</tbody>
</table>

**NOTE:**

*The above specifications are valid at nominal operating voltage and at a temperature of 25°C (77°F)*

*DMOM-100™ specifications may be upgraded and changed without prior notice.*
3.0 CONTROLS AND INDICATORS
(See Figure 1.0 and refer to Table 2.0).

The DMOM-100™ controls and indicators are shown in a panel illustration (see Figure 1.0). Pointing leader lines reference each item in the figure with an index number. Each index number is cross-referenced to a functional description in Table 2.0, which describes the purpose of each item on the control panel. Although the purpose of these controls and the display may seem obvious, users should become familiar with them before attempting to use the DMOM-100™. However, accidental misuse of the controls will usually cause no serious loss of data or equipment damage. First-time users should review and become familiar with the Safety Summary located in the front section of this manual.

Figure 1.0 DMOM-100™ Control Panel (Controls and Indicators)
<table>
<thead>
<tr>
<th>Fig. 1 Index</th>
<th>PANEL MARKING</th>
<th>FUNCTIONAL DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>ON/OFF</td>
<td>Input power connector with third-wire safety ground and 10A built-in circuit breaker.</td>
</tr>
<tr>
<td>2</td>
<td>RS-232C</td>
<td>Connector, 9-pin; Serial interface-port connector (female DB type) to allow the DMOM-100™ to be controlled by an IBM-compatible PC.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>PIN SIGNAL</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2 Tx</td>
</tr>
<tr>
<td></td>
<td></td>
<td>3 Rx</td>
</tr>
<tr>
<td></td>
<td></td>
<td>5 Signal Gnd</td>
</tr>
<tr>
<td>3</td>
<td>(no marking)</td>
<td>Display, back-lighted liquid crystal (LCD); 4-line by 20-character; sunlight readable; displays test menus (operator options), status, and test results (See Figure 2 for operating displays of control steps in logical flow sequence).</td>
</tr>
<tr>
<td>4</td>
<td>(no marking)</td>
<td>Built-in thermal printer; prints test result data on 2.5-inch-wide thermal paper.</td>
</tr>
<tr>
<td>5</td>
<td>(no overall marking; keys are individually marked—see Figure 1)</td>
<td>Operating key-pad controls; 10 alpha-numeric keys and 6 function keys (i.e., START, STOP, CLEAR, ENTER, &amp; CONTRAST/PAPER positioning ∧ &amp; ∨).</td>
</tr>
<tr>
<td>6</td>
<td>HIGH CURRENT PRESENT</td>
<td>Warning indicator; red LED; Lights when high current is running through the test leads.</td>
</tr>
<tr>
<td>7</td>
<td>(no marking)</td>
<td>Voltage-sensing test-lead plug-in sockets (2), red; reads voltage at test load.</td>
</tr>
<tr>
<td>8</td>
<td>(no marking)</td>
<td>Test-current lead plug-in sockets (2), red; conducts up to 100 amperes through unknown resistances.</td>
</tr>
</tbody>
</table>
### 4.0 PRETEST SETUP

#### 4.1 Operating Voltages

The DMOM-100™ operating voltages are selectable between 90-130Vac, 50/60Hz or 210-240, 50/60Hz. Voltage selection is set by the placement of jumpers on the power terminal block as listed in Table 3.0 below and Figures 2.0 and 3.0.

<table>
<thead>
<tr>
<th>VOLTAGE SELECTION</th>
<th>TERMINAL BLOCK JUMPERS</th>
</tr>
</thead>
<tbody>
<tr>
<td>90-130Vac</td>
<td>Brown to blue &amp; yellow to green</td>
</tr>
<tr>
<td>210-240Vac</td>
<td>Blue to yellow</td>
</tr>
</tbody>
</table>

Figure 2.0  90 to 130Vac Jumper Setting

Figure 3.0  210 to 240Vac Jumper Setting
4.2 DMOM-100™ Printer Paper
The DMOM-100™ printer uses 2.5-inch wide thermal paper for printing test results. We recommend that to maintain the highest quality printing and to avoid paper jamming, use paper supplied by our factory. Paper can be ordered from two sources, as follows:

Vanguard Instruments Co, Inc.
1710 Grevillea Court
Ontario, CA 91761
Tel: 909-923-9390
Fax: 909-923-9391
Part Number: TP-3 Paper

OR
BG Instrument Co.
Route 1, Box 258
Mead, WA 99201
Tel: 509-893-9881
Fax: 509-893-9803
Part Number: TP-3 paper

4.3 DMOM-100™ Cable Connections
The DMOM-100™ is supplied with a 35-foot test cable set. Each cable consists of a current-carrying cable and a voltage-sensing cable. The current-carrying cable is terminated with a 100-ampere male plug. The sensing cable is terminated with a 25-ampere female plug. Insert the current-cable plugs and voltage-sensing plugs into their respective control-panel jacks (see Figure 4.0 below). Ensure that voltage plugs (smaller) are inserted into jacks adjacent to their companion current jacks (larger).

Figure 4.0 DMOM-100™ Cable Connection
5.0 OPERATING PROCEDURES
(Refer to Tables 4.0 through 12.0)

5.1 Operating Overview
(See Figure 5.0, for step-by-step flow.)
Procedures for operating the DMOM-100™
are presented in tabular format, with a
different table for each of the main menus
(START and SETUP) procedures. Each
procedural step is indexed by number and
indicates an operator action, followed by a
description of the result or what should be
observed to confirm the action (setting the
stage for the next step). All operations are
described in step-by-step sequences and
begin with the start menu (shown below):

START MENU

1. RUN TEST 06/11/01
2. SETUP 12:23:01
3. CAL CHECK

Item 1 on this menu (RUN TEST) is the
procedure for measuring an unknown
resistance. Item 2 (SETUP) is for record
identification in the DMOM-100™. Item 2
(SETUP) expands into a menu of support
functions. Item 3 (CAL CHECK) is a
performance-verification procedure for
checking key circuit functions (refer to table
11). All operator procedures begin with the
START MENU and may continue on the
SETUP MENU, with each step-by-step
procedure presented in tabular form.

SETUP MENU

1. ENTER ID
2. REVIEW RECORD
3. RESTORE RECORD
4. NEXT PAGE

The SETUP MENU lists 4 user options:
Item 1 (ENTER ID) is used to specify
identification record data (please observe
instructions in note 2 on Figure 5.0, Step-by-
Step Procedures for DMOM-100™

Operations). Item 2 (REVIEW RECORD)
is used to review store records. Item 3
(RESTORE RECORD) is used to erase or
restore test records or to print a directory of
test records in stored memory. Item 4
(NEXT PAGE) is used to put the DMOM-
100™ under PC control or to set the time
and date clock.

5.2 Preparation
Plug unit power plug into power service
outlet. Set unit main power switch to ON
position. Plug test-lead cable plugs into red
jacks on control panel (ensure current and
voltage-sensing cables are plugged into
companion jacks). Connect current and
voltage-sensing test lead clamps to opposite
terminals of resistance to be measured.

5.3 Keying-in Data Characters
Unless otherwise prompted by the display,
keyed-in data is loaded by pressing the
ENTER key (which also changes the display
to go to the next screen). When using the
alpha/numeric keys (like telephone dial-in
pushbuttons; see item 5 of Figure 1.0) to
specify data characters: Press the key once
to set the number marked on the key. Press
the key a second time to set the first letter
marked on the key. Press the key a third
time to select the second letter marked on
the key. Press the key a fourth time to select
the third letter marked on the key.
Additional key presses will repeat the
selection cycle (e.g., 2, A, B, C, 2 . . . ).
When the character of choice is selected,
press the \ key to advance to next character
space; press the \ key to back-space. Press
CLEAR to delete a selected character
(cursor must be on character to be deleted).
Again, press the “ENTER” key to load all
character selections.
Figure 5.0 Step-by-Step Procedures for DMOM-100™ Operations

DMOM-100™ Step-by-Step Operation

1. **Input**:
   - RUN TEST
   - CAL CHECK

2. **Setup Menu**
   - SELECT TEST CURRENT
     - 1. 0-30 A
     - 2. 0-60 A
     - 3. 0-100 A
     - 4. 0-200 A

3. **Current Test**
   - PRINT TEST RESULTS:
     - 1. YES
     - 2. NO

4. **Continue**
   - DATA WERE SAVED?
     - 1. YES
     - 2. NO

5. **Menu Options**
   - SETUP MENU
   - START MENU

6. **Notes**
   - Use **SORT** and **DELETE** keys for data management.
   - Press **SEL** to select options.
   - Press **CALL** to access additional functions.

7. **DMOM-100™ Operations**
   - **START MENU**
     - POWER ON/BOOT
   - **CAL CHECK**
   - **INPUT**
   - **SELECT TEST CURRENT** (0-30 A, 0-60 A, 0-100 A, 0-200 A)
   - **PRINT TEST RESULTS**
     - 1. YES
     - 2. NO
   - **DATA WERE SAVED?**
     - 1. YES
     - 2. NO

8. **Setup Menu**
   - ENTER ID:
     - 1. RECORD
     - 2. PRINT RECORD
     - 3. NEXT PAGE

9. **Menu Options**
   - SETUP MENU
   - START MENU

10. **Notes**
    - Use **SORT** and **DELETE** keys for data management.
    - Press **SEL** to select options.
    - Press **CALL** to access additional functions.

11. **DMOM-100™ Operations**
    - **START MENU**
      - POWER ON/BOOT
    - **CAL CHECK**
    - **INPUT**
    - **SELECT TEST CURRENT** (0-30 A, 0-60 A, 0-100 A, 0-200 A)
    - **PRINT TEST RESULTS**
      - 1. YES
      - 2. NO
    - **DATA WERE SAVED?**
      - 1. YES
      - 2. NO
    - **SETUP MENU**
      - ENTER ID:
        - 1. RECORD
        - 2. PRINT RECORD
        - 3. NEXT PAGE
    - **Menu Options**
      - SETUP MENU
      - START MENU

12. **DMOM-100™ Operations**
    - **START MENU**
      - POWER ON/BOOT
    - **CAL CHECK**
    - **INPUT**
    - **SELECT TEST CURRENT** (0-30 A, 0-60 A, 0-100 A, 0-200 A)
    - **PRINT TEST RESULTS**
      - 1. YES
      - 2. NO
    - **DATA WERE SAVED?**
      - 1. YES
      - 2. NO
    - **SETUP MENU**
      - ENTER ID:
        - 1. RECORD
        - 2. PRINT RECORD
        - 3. NEXT PAGE
    - **Menu Options**
      - SETUP MENU
      - START MENU

13. **Notes**
    - Use **SORT** and **DELETE** keys for data management.
    - Press **SEL** to select options.
    - Press **CALL** to access additional functions.

14. **DMOM-100™ Operations**
    - **START MENU**
      - POWER ON/BOOT
    - **CAL CHECK**
    - **INPUT**
    - **SELECT TEST CURRENT** (0-30 A, 0-60 A, 0-100 A, 0-200 A)
    - **PRINT TEST RESULTS**
      - 1. YES
      - 2. NO
    - **DATA WERE SAVED?**
      - 1. YES
      - 2. NO
    - **SETUP MENU**
      - ENTER ID:
        - 1. RECORD
        - 2. PRINT RECORD
        - 3. NEXT PAGE
    - **Menu Options**
      - SETUP MENU
      - START MENU

15. **Notes**
    - Use **SORT** and **DELETE** keys for data management.
    - Press **SEL** to select options.
    - Press **CALL** to access additional functions.
### 5.4 Run Test Procedure

The following procedure describes the steps to measure an unknown resistance.

**NOTE**
The red HIGH CURRENT PRESENT indicator will begin flashing when the test current are applied to resistance load.

#### Table 4.0 Run Test Procedure (Measure an Unknown Resistance)

<table>
<thead>
<tr>
<th>STEP</th>
<th>ACTION</th>
<th>DMOM-100™ DISPLAY</th>
</tr>
</thead>
<tbody>
<tr>
<td>4-1</td>
<td>Begin RUN TEST procedure: Press key no. 1 on START MENU. “SELECT TEST CURRENT” menu appears.</td>
<td>SELECT TEST CURRENT: 1. 10A 2. 25A 3. 50A 4. 100A 5. CUSTOM</td>
</tr>
<tr>
<td>4-2</td>
<td>Select test current: Press key for desired test current. If a test current is other than listed in items 1 thru 4, then press key # 5 for user-defined (CUSTOM) test current and go to step 4-2a. If menu items 1 thru 4 were pressed, then SELECT BURN-IN TIME menu appears. Go to step 4-3. <strong>NOTE</strong> Select 5-second burn-in time in this example.</td>
<td>SELECT BURN-IN TIME: 1. 5 SEC 2. 10 SEC 3. 20 SEC 4. 30 SEC 5. 60 SEC</td>
</tr>
<tr>
<td>4-2a</td>
<td>Custom select burn-in current level entry by pressing numeric keys, then press ENTER and go to step 4-3. <strong>NOTE</strong> For this example, we used 100A test current.</td>
<td>ENTER TEST CURRENT (10 to 100) 100 AMPS</td>
</tr>
<tr>
<td>4-3</td>
<td>Select burn-in time by pressing the key (1 - 6) that corresponds to desired burn-in time (see display on step 4-2). Display of selected test current and burn-in time appears.</td>
<td>CURRENT: 100 AMPS BURN-IN: 5 SEC “START” TO RUN TEST</td>
</tr>
<tr>
<td>4-4</td>
<td>Press START key to run resistance measurement test. Display of ramping current and percent of ramp level displays with the notice TEST IN PROGRESS. When test current has ramped up to the specified level (current is at 100%), the test result display appears automatically.</td>
<td>CURRENT: 100 AMPS RAMPING CURRENT 10% TEST IN PROGRESS PLEASE WAIT</td>
</tr>
<tr>
<td>4-5</td>
<td>Automatic; no operator action required. Current, burn-in time, and resistance measurement changes on the display during burn-in. At the end of burn-in time, final resistance measurement displays.</td>
<td>CURRENT: 100 AMPS BURN-IN: 5 SEC 500.5 MICRO-OHMS PLEASE WAIT</td>
</tr>
</tbody>
</table>
Table 4.0  Run Test Procedure (Measure an Unknown Resistance)  
(Continued)

<table>
<thead>
<tr>
<th>STEP</th>
<th>ACTION</th>
<th>DMOM-100™ DISPLAY</th>
</tr>
</thead>
</table>
| 4-6  | Automatic; no operator action required. At the end of burn-in time final resistance displays. Press the “ENTER” key to go to next display. | **FINAL RESISTANCE**  
I= 100 AMPS  
500.5 MICRO-OHMS |
| 4-7  | Automatic: Print test result option display. | **PRINT RESULTS?**  
1. YES  
2. NO |
| 4-8  | Printing option: When the “PRINT TEST RESULTS?” displays, press #1 key to print.  
   Typical print out is shown in Figure 6.0. If no printout is needed, then go to next step. | **PRINTING PLEASE WAIT** |
| 4-9  | Automatic; No operator action is required.  
   When test report completes printing, KEEP THIS READING?” displays. | **KEEP THIS READING?**  
1. YES  
2. NO |
| 4-10 | “KEEP THIS READING?” If the tested resistance measurement is to be stored in test record buffer, press # 1 key (YES). If no record of the test is to be stored in memory, then press # 2 key (NO). | **TEST SAVED** |
| 4-11 | Automatic; No operator action is required.  
   “RUN ANOTHER TEST?” displays. | **RUN ANOTHER TEST?**  
1. YES  
2. NO |
| 4-12 | If another test needs to be run, then press #1 key (YES).  
   Beginning test options (SELECT TEST CURRENT:) menu displays (return to step # 4-1). If another test is not needed, then press #2 key (NO) and go to step 4-14. | **SELECT TEST CURRENT:**  
1. 10A  
2. 25A  
3. 50A  
4. 100A  
5. CUSTOM |
| 4-13 | Return to step #1 to setup for another test (repeat sequence from step 4-1 to step 4-11. | Step 4-1 thru 4-11 displays repeat. |
Table 4.0  Run Test Procedure (Measure an Unknown Resistance)
(Continued)

<table>
<thead>
<tr>
<th>STEP</th>
<th>ACTION</th>
<th>DMOM-100™ DISPLAY</th>
</tr>
</thead>
</table>
| 4-14 | “SAVE THIS RECORD?” displays when another test was not selected in step 4-12. Test record contains all the reading taken in this test. | SAVE THIS TEST RECORD?  
1. YES  
2. NO |
| 4-15 | To save this record, press key #1 (YES). If test record is not to be saved, press key #2 (NO) and go to step 4-17.  
NOTE  
A test record is saved in Flash EEPROM. A record number will be automatically assigned to the record by the DMOM-100™. (The Test record was assigned #2 in this example). | RECORD NUMBER 2 HAS BEEN SAVED! |
| 4-16 | When record is saved (record # shows on display), press ENTER to return to START MENU, which presents options for all step-by-step operating procedures. |  
1. RUN TEST 06/11/01  
2. SETUP 12:24:01  
3. CAL CHECK |
| 4-17 | Pressing key #2 (NO) on SAVE THIS TEST RECORD (see step 4-14) causes the ARE YOU SURE? Prompt (shown at right). | ARE YOU SURE?  
DATA WILL BE LOST!  
1. DO NOT SAVE RECORD  
2. SAVE RECORD |
| 4-18 | In response to ARE YOU SURE? If key #1 is pressed, test record will be erased from working buffer and display returns to “START MENU”. If key #2 is pressed, the test record will be saved in Flash EEPROM. Test record number assigned to this record will also be displayed. Exit the RECORD SAVED display by pressing ENTER, which returns display to the START MENU. |  
1. RUN TEST  
2. SETUP  
3. CAL CHECK |

This ends the RUN TEST procedure.
Figure 6.0  Typical DMOM-100™ Tabulated Report Printout
5.5 Enter ID Procedure
This procedure allows the user to enter the equipment identification to the test record.

<table>
<thead>
<tr>
<th>STEP</th>
<th>ACTION</th>
<th>DMOM-100™ DISPLAY</th>
</tr>
</thead>
<tbody>
<tr>
<td>5-1</td>
<td>Press key #2 (SETUP MENU) on START MENU to go to Setup menu (shown at right).</td>
<td>1. ENTER ID  2. REVIEW RECORD  3. RESTORE RECORD  4. NEXT PAGE</td>
</tr>
<tr>
<td>5-2</td>
<td>On SETUP MENU, press #1 key (ENTER ID) to begin identification entry (begins with “COMPANY” display). Note: Other setup options go to the following procedural tables: 1. Review Record procedure in Table 6.0 2. Restore Record Procedure in Table 7.0 3. NEXT PAGE procedures.</td>
<td>COMPANY:</td>
</tr>
<tr>
<td>5-3</td>
<td>Enter utility COMPANY name using alpha/numeric keypad. When the COMPANY name is keyed in, press ENTER to load keyed data and go to STATION identification display.</td>
<td>STATION:</td>
</tr>
<tr>
<td>5-4</td>
<td>Enter utility STATION name using alpha/numeric keypad. When STATION name is keyed in, press ENTER to load keyed data and go to CIRCUIT identification display.</td>
<td>CIRCUIT:</td>
</tr>
<tr>
<td>5-5</td>
<td>Enter utility CIRCUIT name using alpha/numeric keypad. When CIRCUIT name is keyed in, press ENTER to load keyed data and go to MANUFACTURER identification display.</td>
<td>MANUFACTURER:</td>
</tr>
<tr>
<td>5-6</td>
<td>Enter tested item’s MANUFACTURER name using alpha/numeric keys. When the manufacturer’s name is keyed in, press ENTER to load keyed data and go to MODEL identification display.</td>
<td>MODEL:</td>
</tr>
</tbody>
</table>
Table 5.0  Run Setup Procedure (test-record, site, and equipment identification)  
(continued)

<table>
<thead>
<tr>
<th>STEP</th>
<th>ACTION</th>
<th>DMOM-100™ DISPLAY</th>
</tr>
</thead>
<tbody>
<tr>
<td>5-7</td>
<td>Enter test item’s MODEL using alpha/numeric keypad. When item’s MODEL is keyed in, press ENTER to load keyed data and go to SERIAL NUMBER identification display.</td>
<td></td>
</tr>
<tr>
<td>5-8</td>
<td>Enter test item’s SERIAL NUMBER using alpha/numeric key pad. When serial number is keyed in, press ENTER to load keyed-in data and go to KVA RATING display.</td>
<td></td>
</tr>
<tr>
<td>5-9</td>
<td>Enter test items KVA RATING using alpha/numeric keypad. When KVA RATING is keyed in, press ENTER to load keyed-in data and go to OPERATOR identification display.</td>
<td></td>
</tr>
<tr>
<td>5-10</td>
<td>Enter test OPERATOR name, using alpha/numeric keypad. When OPERATOR name is keyed in, press ENTER to load keyed-in data and return to START MENU display.</td>
<td></td>
</tr>
</tbody>
</table>

This completes the ENTER ID procedure.
5.6 Review Record Procedure
This procedure describes steps to review a test record residing in DMOM-100™ working memory. The user can view the record on the LCD display or from a thermal printout.

NOTE
To review a test record stored in Flash EEPROM, the user must first restore test record from Flash EEPROM to working memory (see paragraph 5.7)

<table>
<thead>
<tr>
<th>STEP</th>
<th>ACTION</th>
<th>DMOM-100™ DISPLAY</th>
</tr>
</thead>
<tbody>
<tr>
<td>6-1</td>
<td>On START MENU, press key #2 (SETUP) to select SETUP MENU (shown at right).</td>
<td>1. ENTER ID 2. REVIEW RECORD 3. RESTORE RECORD 4. NEXT PAGE</td>
</tr>
<tr>
<td>6-2</td>
<td>Press key#2 (REVIEW RECORD) on SETUP MENU, which displays the REVIEW RECORD menu options.</td>
<td>REVIEW RECORD 1. SCROLL TEST RECORD 2. PRINT TEST RECORD</td>
</tr>
<tr>
<td>6-3</td>
<td>If test-result records are to be printed out on paper, press #2 key (PRINT TEST RECORD) on the REVIEW RECORD display. Test records print out as the printing notice displays. When printout of test records is complete, display returns to START MENU, which ends the procedure for this branch of the SETUP procedure.</td>
<td>PLEASE WAIT PRINTING . . .</td>
</tr>
<tr>
<td>6-4</td>
<td>If records are to be viewed in sequence (scrolled), press key #1 (SCROLL TEST RECORDS) on the REVIEW RECORD display. Scroll through test records (use ∧ and ∨ keys to scroll). When record of interest appears, stop scrolling and press ENTER.</td>
<td>RECORD ID INFO: 1710 VIC ABC</td>
</tr>
<tr>
<td>6-5</td>
<td>When the scrolled data record of interest displays, press ENTER key. Selected test record ID displays the selected test record number. When it is confirmed that the correct test record ID has been selected, press ENTER to display the number of tests in the record, the time and date of the selected test.</td>
<td>2 TESTS 06/11/01 17:27:00</td>
</tr>
</tbody>
</table>
### Table 6.0  Review Record Procedure (continued)

<table>
<thead>
<tr>
<th>STEP</th>
<th>ACTION</th>
<th>DMOM-100™ DISPLAY</th>
</tr>
</thead>
<tbody>
<tr>
<td>6-6</td>
<td>When the record number, with the time and date of the test, displays and is noted, press the ENTER key: Display lists full data of the test, including test number, test current, burn-in time, and the measured resistance value. <strong>NOTE</strong> The test record in this example contains 2 tests.</td>
<td><img src="image" alt="Test Record Example" /></td>
</tr>
<tr>
<td>6-7</td>
<td>Press ( \wedge ) key to advance to next test. Press ( \vee ) key to return to previous test.</td>
<td><img src="image" alt="Test Record Example" /></td>
</tr>
<tr>
<td>6-8</td>
<td>Press STOP to return to START MENU. This completes the review record procedure.</td>
<td>Display returns to START MENU.</td>
</tr>
</tbody>
</table>
5.7 Restore Record Procedure

This procedure describes the steps to recall a test record stored in the DMOM-100™ Flash memory.

<table>
<thead>
<tr>
<th>STEP</th>
<th>ACTION</th>
<th>DMOM-100™ DISPLAY</th>
</tr>
</thead>
</table>
| 7-1  | On START MENU, press #2 key (SETUP) to display the SETUP MENU. | 1. ENTER ID  
2. REVIEW RECORD  
3. RESTORE RECORD  
4. NEXT PAGE |
| 7-2  | On SETUP MENU, press #3 key (RESTORE RECORD) to display menu of options (Restore Record, Directory, Erase Record). | 1. RESTORE RECORD  
2. DIRECTORY  
3. ERASE RECORD |
| 7-3  | Press #1 key (RESTORE RECORD) to display menu of restore records options. | RESTORE RECORD  
1. ENTER RECORD NUMBER  
2. SCROLL TO SELECT |
| 7-4  | Press key #1 (ENTER RECORD NUMBER) to display prompt to enter record number to restore. Press key #2 (SCROLL TO SELECT) and go to step 7-6 for Records Directory display. | RESTORE RECORD NUMBER: |
| 7-5  | When record number has been keyed in, press ENTER to restore the selected record. When the display confirms that the record is restored (brief display time) display returns to REVIEW RECORD options menu (resume procedure at step 7-9 in Table 7.0). | RECORD RESTORED! |
| 7-6  | In the RESTORE RECORD menu, press key #2 to display a scrolled Records Directory. | RECORDS DIRECTORY  
“UP TO SCROLL FWD  
“DWN” TO SCROLL RVS |
| 7-7  | In the Records Directory, use ^ and v keys to scroll through the directory listings of test records. When the test record of interest displays, press the ENTER key to display the record number and the time and date of the selected test. | #1 06/11/01 17:27:00  
1710  
VIC |
### Table 7.0 Restore Record Procedures (Continued)

<table>
<thead>
<tr>
<th>STEP</th>
<th>ACTION</th>
<th>DMOM-100 DISPLAY</th>
</tr>
</thead>
<tbody>
<tr>
<td>7-8</td>
<td>Press ENTER key again to restore selected test record. A Record Restored confirmation displays, after which the display returns to REVIEW RECORD (resumes by returning to step 7-9).</td>
<td>RECORD RESTORED!</td>
</tr>
<tr>
<td>7-9</td>
<td>Test ENTER key again to display REVIEW RECORD option.</td>
<td>REVIEW RECORD</td>
</tr>
<tr>
<td>7-10</td>
<td>Press key #1 to display data on LCD (see step 6-5). Press key #2 to print test record.</td>
<td>1. SCROLL TEST RECORD 2. PRINT TEST RECORD</td>
</tr>
</tbody>
</table>

This completes the Restore Record Procedure.
5.8 Print Test Record Directory Procedure

This procedure describes the steps to print the test record directory that is stored in the DMOM-100™ Flash EEPROM.

Table 8.0 Print Test Record Directory

<table>
<thead>
<tr>
<th>STEP</th>
<th>ACTION</th>
<th>DMOM-100™ DISPLAY</th>
</tr>
</thead>
<tbody>
<tr>
<td>8-1</td>
<td>On the RESTORE RECORD display (step 7-2), press key #2 (DIRECTORY) to go to a print menu of print options.</td>
<td>PRINT DIRECTORY</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1. FULL DIRECTORY</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2. SHORT DIRECTORY</td>
</tr>
<tr>
<td>8-2</td>
<td>PRINT DIRECTORY choice is to print either a FULL DIRECTORY or a SHORT DIRECTORY. Regardless of which choice is selected, the PRINTING DIRECTORY notice displays as the selected directory prints out a paper copy. When printout is completed, display returns to the START MENU. This ends the directory procedures.</td>
<td>PRINTING DIRECTORY</td>
</tr>
<tr>
<td>NOTE</td>
<td>The Short directory printout lists the last 10 test records stored in Flash EEPROM memory.</td>
<td></td>
</tr>
</tbody>
</table>

Figure 7.0 Typical Directory Printout

```
TEST DIRECTORY

RECORD NUMBER: 2
DATE/TIME: 06/07/01 09:57:45
NUMBER OF TESTS: 4
STATION: SHOP
CIRCUIT: 1710 GREVILLEA CT
MFR: VICTOR
MODEL: ABC
S/N: 123456

RECORD NUMBER: 1
DATE/TIME: 06/07/01 09:55:19
NUMBER OF TESTS: 2
STATION: SHOP
CIRCUIT: 1710 GREVILLEA CT
MFR: VICTOR
MODEL: ABC
S/N: 123456
```
### 5.9 Test Record Procedure

This procedure describes the steps to delete a test record or all test records stored in the DMOM-100™ Flash EEPROM.

#### Table 9.0 Erase Test Record Procedure

<table>
<thead>
<tr>
<th>STEP</th>
<th>ACTION</th>
<th>DMOM-100™ DISPLAY</th>
</tr>
</thead>
<tbody>
<tr>
<td>9-1</td>
<td>On the RESTORE RECORD display (step 7-2), press key #3 (ERASE RECORD) to display an ERASE RECORD menu of options (shown at right).</td>
<td>ERASE RECORD 1. ERASE SINGLE RECORD 2. ERASE ALL RECORDS</td>
</tr>
<tr>
<td>9-2</td>
<td>On the ERASE RECORD menu display, press key #1 to erase a single record.</td>
<td>ERASE RECORD NUMBER: XX</td>
</tr>
<tr>
<td>9-3</td>
<td>When this selection is made, the user shall enter record number then press ENTER key to confirm. Press ENTER key again to return to main menu. <strong>NOTE</strong> Press STOP key to abort.</td>
<td>RECORD NUMBER: XX ERASED!</td>
</tr>
<tr>
<td>9-4</td>
<td>Press key #2 to erase all records. Press ENTER key to confirm. <strong>NOTE</strong> Press STOP key to abort.</td>
<td>ERASE ALL RECORDS! Are you SURE? “ENTER” TO CONTINUE</td>
</tr>
<tr>
<td>9-5</td>
<td>Press ENTER key to confirm.</td>
<td>ERASING RECORDS PLEASE WAIT</td>
</tr>
<tr>
<td>9-6</td>
<td>Press ENTER key to return to main menu.</td>
<td>RECORDS ERASED!</td>
</tr>
</tbody>
</table>
5.10 Computer Interface Procedure
This procedure describes the steps to put the DMOM-100™ in computer interface.

<table>
<thead>
<tr>
<th>STEP</th>
<th>ACTION</th>
<th>DMOM-100™ DISPLAY</th>
</tr>
</thead>
<tbody>
<tr>
<td>10-1</td>
<td>Press key #4 (NEXT PAGE) on the SETUP MENU to display the COMPUTER CONTROL interface (ITF) and SET TIME options menu.</td>
<td>1. COMPUTER CONTROL 2. SET TIME</td>
</tr>
<tr>
<td>10-2</td>
<td>Press key #1 (COMPUTER CONTROL) to place the DMOM-100™ under an external PC’s control. PC software permits DMOM100™ test record to be transferred to the PC. To end the PC control, press the STOP key, which will restore control to the keypad and return to the START MENU display.</td>
<td>COMPUTER ITF MODE</td>
</tr>
</tbody>
</table>

5.11 Set Clock Procedures
This procedure describes the steps to set the DMOM-100™ real time clock.

<table>
<thead>
<tr>
<th>STEP</th>
<th>ACTION</th>
<th>DMOM-100™ DISPLAY</th>
</tr>
</thead>
<tbody>
<tr>
<td>11-1</td>
<td>When key #4 (NEXT PAGE) is pressed on the SETUP MENU, the COMPUTER CONTROL interface (ITF) and SET TIME options menu displays.</td>
<td>1. COMPUTER CONTROL 2. SET TIME</td>
</tr>
<tr>
<td>11-2</td>
<td>On the first NEXT PAGE menu, press key #2 (SET TIME) to go to steps for setting the time and date clock.</td>
<td>ENTER MM-DD-YY HH-MM-SS</td>
</tr>
<tr>
<td>11-3</td>
<td>Enter month, day, year, hour, minute, and second for real-time clock. Display will now return to the START MENU.</td>
<td></td>
</tr>
</tbody>
</table>

This completes the Set Clock procedure.
Operating Procedures

5.12 Calibration Check
This procedure describes the steps to perform the calibration check on the DMOM-100™.

Table 12.0 Calibration Check Procedure

<table>
<thead>
<tr>
<th>STEP</th>
<th>ACTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>12-1</td>
<td>The calibration check is a functional verification self-test of the DMOM-100™. This procedure begins by pressing key #3 on the START MENU, which displays a calibration check prompt to attach test lead clips to a shorting bar (See Figure 8.0).</td>
</tr>
<tr>
<td>12-2</td>
<td>When test lead clips are attached to a shorting bar, press ENTER key to proceed with self-testing process. The self-test feature checks ramping current and displays current at each point in a continuous ramp. When the ramp flattens, the remaining self-check automatically sequences without operator control. If any circuit fails (does not pass), then do not measure any resistance until the problem is corrected.</td>
</tr>
<tr>
<td>12-3</td>
<td>Automatic; no operator action required.</td>
</tr>
<tr>
<td>12-4</td>
<td>Automatic; no operator action required.</td>
</tr>
<tr>
<td>12-5</td>
<td>Automatic; no operator action required.</td>
</tr>
<tr>
<td>12-6</td>
<td>Automatic; no operator action required.</td>
</tr>
<tr>
<td>12-7</td>
<td>Automatic; no operator action required.</td>
</tr>
</tbody>
</table>
Table 12.0 Calibration Check Procedure (Continued)

<table>
<thead>
<tr>
<th>STEP</th>
<th>ACTION</th>
<th>OBSERVE RESULT</th>
</tr>
</thead>
<tbody>
<tr>
<td>12-8</td>
<td>Automatic; no operator action required.</td>
<td>CAL CHECK COMPLETE PRESS ANY KEY</td>
</tr>
<tr>
<td>12-9</td>
<td>Press any key to end CAL CHECK.</td>
<td>Display returns to START MENU.</td>
</tr>
</tbody>
</table>

Figure 8.0  Bus Bar Connection
APPENDIX A

DMOM-100™ Troubleshooting Guide

<table>
<thead>
<tr>
<th>Item</th>
<th>Symptom</th>
<th>Possible Problem</th>
<th>Solution</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Reading is incorrect.</td>
<td>1. Poor connection at the Clips. 2. Broken sensing lead.</td>
<td>1. Check connection to make sure sensing and current teeth are touching the device under test (DUT). 2. Inspect sensing cables.</td>
</tr>
<tr>
<td>2</td>
<td>No Test Current. (Current % read zero) and resistance reading = 0</td>
<td>1. No test current going through DUT. 2. Drive circuit not working.</td>
<td>1. Check Connection to DUT. 2. Run Calibration Test.</td>
</tr>
<tr>
<td>3</td>
<td>Have test current but resistance reading = 0.</td>
<td>1. Broken sense leads. 2. Reverse sense leads.</td>
<td>1. Inspect sense leads.</td>
</tr>
</tbody>
</table>

NOTE: DUT = Device Under Test
APPENDIX B

DMOM-100™ Cable Accessories

Plastic Quick-Disconnect Clip, C-Clamp, Current Connector, and Sensing-Wire Connector