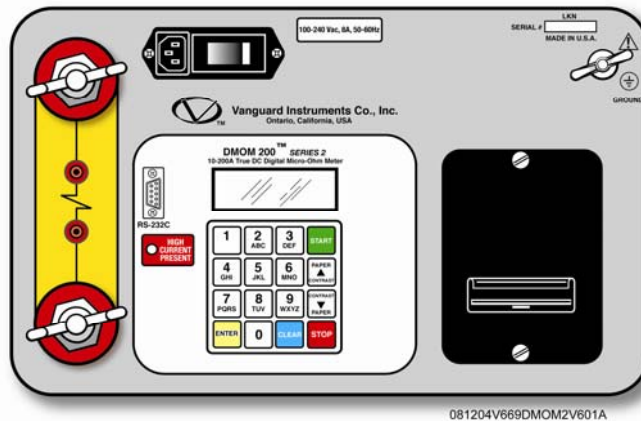
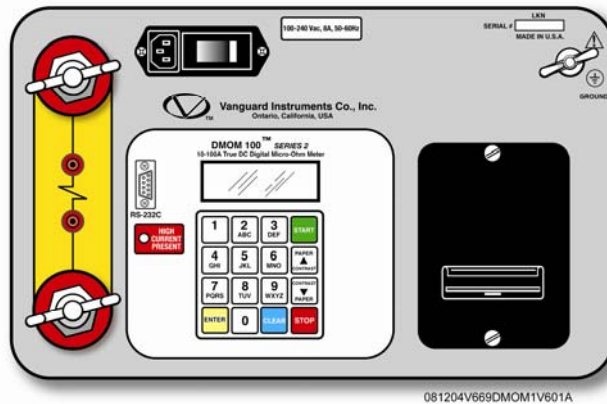

OPERATING INSTRUCTIONS
for the
DMOM-100 Series 2
DMOM-200 Series 2
10-100/200 Amperes True DC
Digital Micro-Ohm Meters



Vanguard Instruments Company
1520 S. Hellman Ave.
Ontario, California 91761

TEL: (909) 923-9390
FAX: (909) 923-9391

January 2009
Rev. 2

SAFETY SUMMARY

NOTICE

This manual applies to Models DMOM-100, and DMOM-200 Series 2. The operating procedures are virtually the same for all models. Any differences are clearly described in the step-by-step procedures.

FOLLOW EXACT OPERATING PROCEDURES

Any deviation from the procedures described in this operator's manual may create one or more safety hazards, damage the DMOM, or cause errors in the test results. Vanguard Instruments Co., Inc. assumes no liability for unsafe or improper use of the DMOM.

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

SAFETY WARNINGS AND CAUTIONS

This device shall be used only by **trained operators**.

All circuit breakers under test shall be **off line and fully isolated**.

DO NOT MODIFY TEST EQUIPMENT

Because of the risk of introducing unknown hazards, do not install substitute parts or perform any unauthorized modification to any Model DMOM Test unit. To ensure that all designed safety features are maintained, it is recommended that repairs be performed only by Vanguard Instruments Co. factory personnel or by an authorized repair service. Unauthorized modifications can cause serious safety hazards and will nullify the manufacturer's warranty.

Table of Contents

SAFETY SUMMARY	2
1.0 INTRODUCTION	6
1.1 Applicability	6
1.2 General Description	6
1.3 Functional Description.....	6
1.4 Furnished Test Accessories.....	6
1.5 Optional Accessories	7
2.0 DMOM SPECIFICATIONS.....	10
2.1 DMOM-100 Series 2 Specifications.....	10
2.2 DMOM-200 Series 2 Specifications.....	11
3.0 CONTROL AND DISPLAY	12
3.1 DMOM-100 Series 2 Front Panel.....	12
3.2 DMOM-200 Series 2 Front Panel.....	14
4.0 DMOM IMPORTANT FEATURES	16
4.1 Operating Voltages	16
4.2 DMOM Serial Interface	16
4.3 DMOM LCD Contrast Adjustment	16
4.4 DMOM Paper Advance or Retract	16
5.0 DMOM PRINTER PAPER	16
6.0 CABLE CONNECTION	17
7.0 OPERATING PROCEDURES	19
7.1 Step-by-Step Procedures.....	19
7.2 Precautions.....	19
7.3 Preparations.....	19
7.4 Operating Overview.....	19
7.5 Entering Alphanumeric Characters.....	20
7.6 Running a Normal Test Procedure.....	22
7.7 Running an Automatic Test Procedure.....	26
7.8 Entering Test Record ID.....	29
7.9 Reviewing a Record.....	31
7.10 Restoring a Record.....	33
7.11 Printing the Test Record Directory.....	35
7.12 Erasing Test Records	37
7.13 Computer Interface Mode.....	38
7.14 Calibration Check	39
APPENDIX A.....	41

Table of Figures

Figure 1.0	Combined Current and Sense Leads	7
Figure 2.0	DMOM-100/200 Sensing cable	7
Figure 3.0	Hand Spike Sense Leads	8
Figure 4.0	Current Cable	8
Figure 5.0	C-Clamp Cable.....	9
Figure 6.0	DMOM-100 Series 2 Control-Panel Controls and Display	12
Figure 7.0	DMOM-200 Series 2 Control-Panel Controls and Display	14
Figure 8.0	DMOM-100/200 Connection Diagram 1 (Separate Leads).....	17
Figure 9.0	DMOM-100/200 Connection Diagram 2 (Combined Leads).....	17
Figure 10.0	DMOM-100/200 Connection Diagram 3 (Separate Leads).....	18
Figure 11.0	DMOM-100/200 Connection Diagram 4 (Combined Leads).....	18
Figure 12.0	The START Menu	19
Figure 13.0	The SETUP Menu.....	20
Figure 14.0	Step-by Step Procedures for DMOM-100/200	21
Figure 15.0	Typical DMOM-100/200 Test Report	25
Figure 16.0	Typical Test Directory Printout	36
Figure 17.0	Calibration Connection (Separated Leads)	40
Figure 18.0	Calibration Connection (Combined Leads)	40

List of Tables

Table 1.0	DMOM-100 Series 2 Specifications	10
Table 2.0	DMOM-200 Series 2 Specifications	11
Table 3.0	Functional Description of DMOM-100 Series 2 Controls and Display	13
Table 4.0	Functional Description of DMOM-200 Series 2 Controls and Display	15
Table 5.0	Run Test Procedure (Measure an Unknown Resistance).....	22
Table 6.0	Run Automatic Test Procedure (Measure an Unknown Resistance).....	26
Table 7.0	Enter Record ID Procedure (Company, Site, and Equipment Identification).....	29
Table 8.0	Review Record Procedure.....	31
Table 9.0	Restore Record Procedures	33
Table 10.0	Print Test Record Directory Procedures	35
Table 11.0	Erase Test Record Procedure	37
Table 12.0	Computer Control Mode	38
Table 13.0	Calibration Check Procedure	39

1.0 INTRODUCTION

1.1 Applicability

This manual applies to the Model DMOM-100 S2™ and Model DMOM-200 S2™ (hereafter, DMOM), made by Vanguard Instruments Company, Inc.

1.2 General Description

The DMOM-100/200 Series 2 are the third generation micro-ohmmeters made by Vanguard Instruments Company. The DMOM-100/200 features microprocessor-controlled highly accurate measuring of very low resistances, ranging from 1 micro-ohm to 300 milli-ohms. The DMOM is field-portable, rugged, and easily operated by first-time users with a minimum of training. It features a 16-key push button pad for entering test parameters and control functions and a 4-line by 20-character LCD alphanumeric readout for displaying control-option menus, measured resistance values, and related identifying data. The DMOM has a built-in thermal printer, which prints test data on 2.5-inch-wide thermal sensitive paper. The operation requires little more than connecting test leads to an unknown resistance and selecting the desired functions and options. Operators select the test current (10 to 100 amperes for DMOM-100 or 10 to 200 amperes for DMOM-200) and test time (5 seconds to 2 minutes). 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.

1.3 Functional Description

The DMOM's operation is based on the electrical relationships described by Ohm's law: $R=V/I$, where I is a known current and V is the dc voltage measured across the unknown resistance (typically, a circuit breaker's contacts). Since the current (user selected) through the unknown resistance is known and the voltage across the unknown resistance is read by a precision voltmeter, the unknown resistance can be calculated using Ohm's law.

The DMOM's test voltage is supplied by a true 5Vdc power supply. The true DC test current is selectable from 10 to 100 amperes for the DMOM-100 and from 10 to 200 amperes for the DMOM-200. Test current is automatically ramped up and down slowly. This current ramp rate is programmable from 5 seconds to 30 seconds.

Voltmeter test leads run separately from the current-bearing test leads to the resistive load to eliminate any $I \cdot R$ voltage drop error in the current cables. These DMOM features make very precise micro-ohm measurements possible without having to calculate compensations for current-lead resistance errors.

1.4 Furnished Test Accessories

The DMOM is supplied with two 30-foot test cables with heavy-duty alligator clamps. Both the current (#1 AWG) and sense leads are combined into one cable (Figure 1.0). A ground cable and a power cord are also included with each DMOM.

Users can choose to have the current and sense leads separated as shown in Figure 2.0 and Figure 4.0. Optional hand spike sense leads are also available as shown in Figure 3.0.

1.5 Optional Accessories

1. Heavy-duty welding-type C-clamps (Figure 5.0) are available as optional accessories. These C-clamps allow test lead connections to a wide variety of bushing sizes, bus bars, and conductors that require low-resistance test-lead contacts.
2. Light weight (#4 AWG) cables are also available upon request.
3. Custom cable lengths are available upon request.

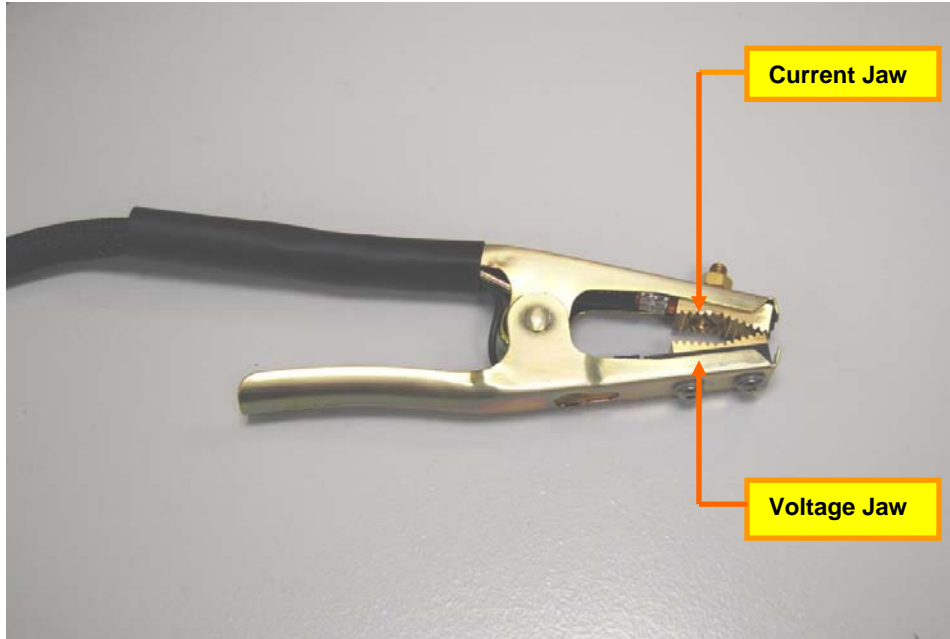


Figure 1.0 Combined Current and Sense Leads



Figure 2.0 DMOM-100/200 Sensing cable



Figure 3.0 Hand Spike Sense Leads



Figure 4.0 Current Cable



Figure 5.0 C-Clamp Cable

2.0 DMOM SPECIFICATIONS

2.1 DMOM-100 Series 2 Specifications

DMOM-100 specifications and leading particulars are listed in Table 1.0.

Table 1.0 DMOM-100 Series 2 Specifications

MODEL	DMOM-100 Series 2
TYPE	Special-Purpose Test Equipment, Portable, Low Resistance-Ohmmeter
CONFIGURATION	Third-generation (improved design, superseding original model)
SIZE (inches)	16.8” Wide by 12.6” High by 12” Deep (42.7 Cm x 32 Cm x 30.5 Cm)
WEIGHT	28 lbs. (12.70 Kg)
OPERATING VOLTAGE	100-240Vac, 8A, 50/60 Hz, with built in 10A circuit breaker
TEST CURRENT RANGE	10 Amperes to 100 Amperes, selectable in 1 ampere steps
RESISTANCE RANGE	1 micro-ohm to 300 milli-ohms
ACCURACY	± 1 % of Reading, ± 1 Count
MEMORY	63 records of 96 readings each
DISPLAY	Backlit LCD, 4-lines high by 20 characters wide
CONTROL	Keypad: 10 number keys and 6-function keys
PRINTER	Thermal printer, 2.5-inch wide thermal paper
POWER	8 amps, 100-240Vac, 50/60 Hz, with built in 10A circuit breaker
UNIT PROTECTION ...	Thermal-overload sensor and cutoff
INTERFACE	RS-232C Connector Port for PC Interface
ENVIRONMENT	Operating: 0°C to 55°C; Storage: -40°C to 65°C
FURNISHED ITEMS ...	One power cord, one ground cable, two 30-ft. test lead cables
EXPENDABLES	Paper, Thermal sensitive, 2.5-inch wide roll (VIC p/n TP3)
WARRANTY	One-Year Parts & Labor (Post-Warranty Service Contracts Available)

DMOM-100 S2 SPECIFICATIONS ARE SUBJECT TO UPGRADES AND MAY BE CHANGED WITHOUT PRIOR NOTICE.

2.2 DMOM-200 Series 2 Specifications

DMOM-200 specifications and leading particulars are listed in Table 2.0.

Table 2.0 DMOM-200 Series 2 Specifications

MODEL	DMOM-200 Series 2
TYPE	Special-Purpose Test Equipment, Portable, Low Resistance-Ohmmeter
CONFIGURATION	Third-generation (improved design, superseding original model)
SIZE (inches)	16.8 Wide by 12.6 High by 10.6 Deep (42.7 Cm x 32 Cm x 30.5 Cm)
WEIGHT	33 pounds (14.97 Kg)
OPERATING VOLTAGE	100-240Vac, 8A, 50/60 Hz, with 10A circuit breaker
TEST CURRENT RANGE	10 Amperes to 200 Amperes, selectable in 1 ampere steps
RESISTANCE RANGE	1 micro-ohm to 300 milli-ohms
ACCURACY	± 1 % of Reading, ± 1 Count
MEMORY	63 records of 96 readings each
DISPLAY	Backlit LCD, 4-lines high by 20 characters wide
CONTROL	Keypad: 10 number keys and 6-function keys
PRINTER	Thermal printer, 2.5-inch wide thermal paper
POWER	8 amps, 100-240Vac, 50/60 Hz, with built in 10A circuit breaker
UNIT PROTECTION ...	Thermal-overload sensor and cutoff
INTERFACE	RS-232C Connector Port for PC Interface
ENVIRONMENT	Operating: 0°C to 55°C; Storage: -40°C to 65°C
FURNISHED ITEMS ...	One power cord, one ground cable, two 30-ft. test lead cables
EXPENDABLES	Paper, Thermal sensitive, 2.5-inch wide roll (VIC p/n TP3)
WARRANTY	One-Year Parts & Labor (Post-Warranty Service Contracts Available)

DMOM-200 S2 SPECIFICATIONS ARE SUBJECT TO UPGRADES AND MAY BE CHANGED WITHOUT PRIOR NOTICE.

3.0 CONTROL AND DISPLAY

3.1 DMOM-100 Series 2 Front Panel

The DMOM-100 Series 2 controls and displays are shown in Figure 6.0, the control-panel illustration below. Pointing leader lines reference each item with an index number. Each index number is cross-referenced to a functional description in Table 3.0, which describes the function and purpose of each item on the control panel. Although the purpose of these controls and the display may seem obvious and intuitive, users should become familiar with them before attempting to use the DMOM-100 Series 2. First-time users should also review and become familiar with the Safety Summary on the front page.

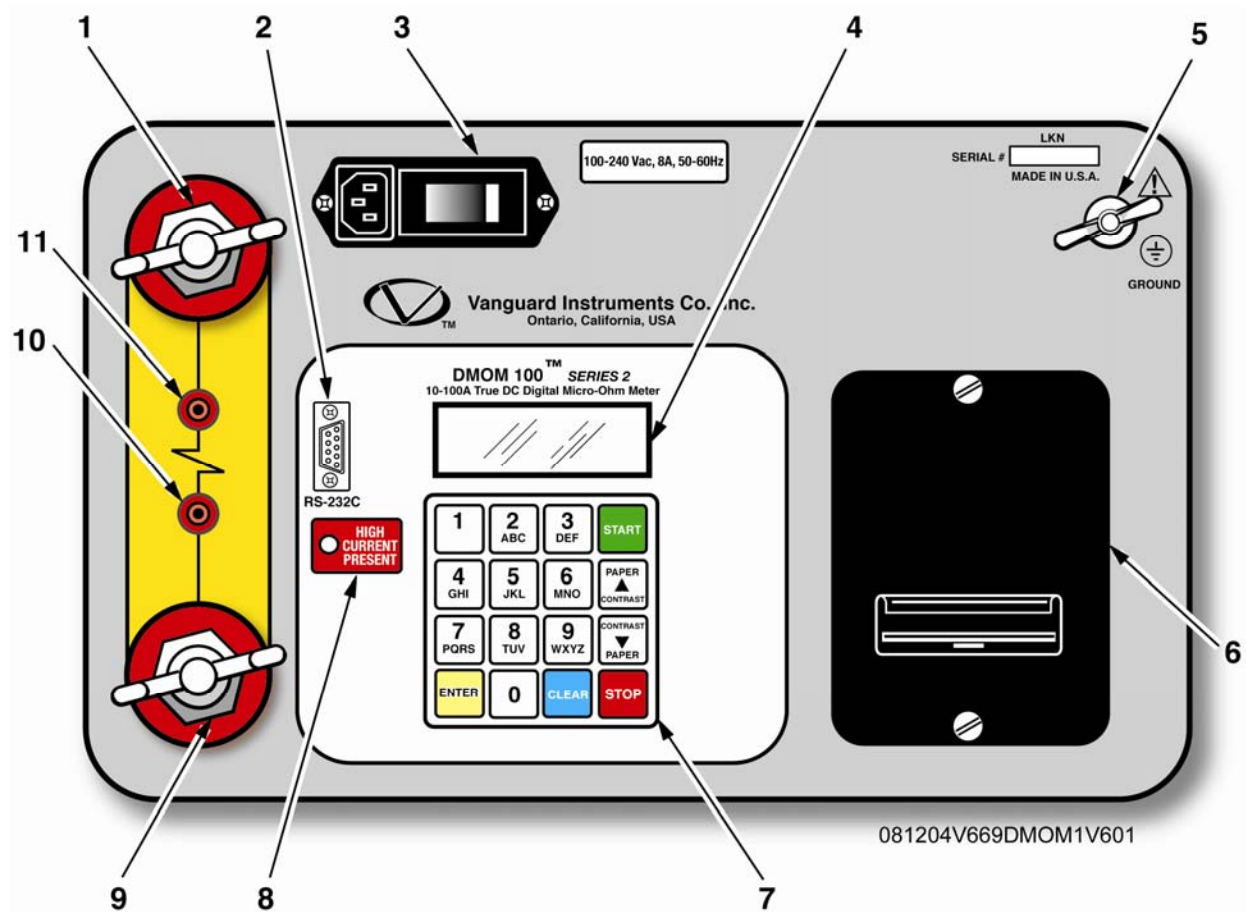


Figure 6.0 DMOM-100 Series 2 Control-Panel Controls and Display

Table 3.0 Functional Description of DMOM-100 Series 2 Controls and Display

Figure 1 Index #	Adjacent Panel Marking	Functional Description								
1 & 9	(Wing Nut)	Current lead connectors								
2	RS-232C	<p>RS-232C interface port; 9-pin connector; female DB type. The data rate is set to 19,200 baud, 1 start bit, 8 data bits, and no parity bit;</p> <table border="0" style="margin-left: auto; margin-right: auto;"> <tr> <td style="text-align: center;"><u>PIN</u></td> <td style="text-align: center;"><u>SIGNAL</u></td> </tr> <tr> <td style="text-align: center;">2</td> <td style="text-align: center;">Rx</td> </tr> <tr> <td style="text-align: center;">3</td> <td style="text-align: center;">Tx</td> </tr> <tr> <td style="text-align: center;">5</td> <td style="text-align: center;">Signal Gnd</td> </tr> </table> <p>This serial port is for factory calibration, firmware updates, and interfacing with the software program supplied with each unit.</p>	<u>PIN</u>	<u>SIGNAL</u>	2	Rx	3	Tx	5	Signal Gnd
<u>PIN</u>	<u>SIGNAL</u>									
2	Rx									
3	Tx									
5	Signal Gnd									
3	100-240 Vac, 8A, 50- 60 Hz	Input power connector with third-wire safety ground and built-in 10A circuit breaker.								
4	No marking	LCD; 4-line by 20-character; back-lighted; displays menus of selections, operator entries, and test-measurement results.								
5	GROUND (Wing Nut)	DMOM-100 Series 2 ground stud. Connect ground stud to substation ground using the provided cable.								
6	No marking	Built-in thermal printer, prints test result data on 2.5-inch-wide thermal paper.								
7	No marking	Operating key-pad controls, 10 alphanumeric keys and 6 function keys (i.e., START, STOP, CLEAR, ENTER, & CONTRAST/PAPER positioning ^ & v).								
8	HIGH CURRENT PRESENT	LED indicator, red; Lights when high-test-current is going through the test leads.								
10 & 11	(Resistor Symbol)	Voltage-sensing connector jacks (red).								

3.2 DMOM-200 Series 2 Front Panel

The DMOM-200 Series 2 controls and displays are shown in Figure 7.0, the control-panel illustration below. Pointing leader lines reference each item with an index number. Each index number is cross-referenced to a functional description in Table 4.0, which describes the function and purpose of each item on the control panel. Although the purpose of these controls and the display may seem obvious and intuitive, users should become familiar with them before attempting to use the DMOM-200 Series 2. First-time users should also review and become familiar with the Safety Summary on the front page.

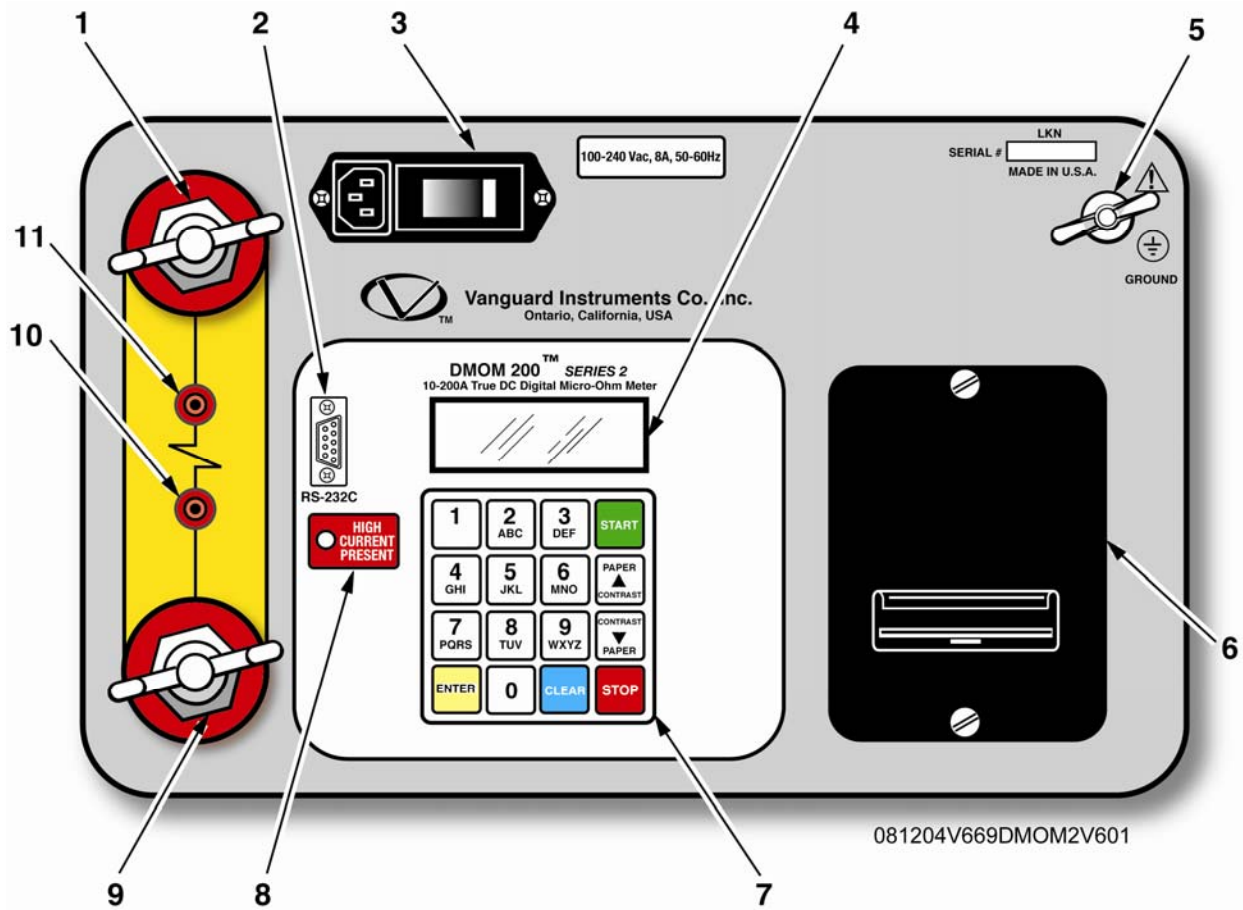


Figure 7.0 DMOM-200 Series 2 Control-Panel Controls and Display

Table 4.0 Functional Description of DMOM-200 Series 2 Controls and Display

Figure 1 Index #	Adjacent Panel Marking	Functional Description								
1 & 9	(Wing Nut)	Current lead connectors								
2	RS-232C	RS-232C interface port; 9-pin connector; female DB type. The data rate is set to 19,200 baud, 1 start bit, 8 data bits, and no parity bit; <div style="text-align: center;"> <table> <tr> <td><u>PIN</u></td> <td><u>SIGNAL</u></td> </tr> <tr> <td>2</td> <td>Rx</td> </tr> <tr> <td>3</td> <td>Tx</td> </tr> <tr> <td>5</td> <td>Signal Gnd</td> </tr> </table> </div> This serial port is for factory calibration, firmware updates, and interfacing with the software program supplied with each unit.	<u>PIN</u>	<u>SIGNAL</u>	2	Rx	3	Tx	5	Signal Gnd
<u>PIN</u>	<u>SIGNAL</u>									
2	Rx									
3	Tx									
5	Signal Gnd									
3	100-240 Vac, 8A, 50- 60 Hz	Input power connector with third-wire safety ground and built-in 10A circuit breaker.								
4	No marking	LCD; 4-line by 20-character; back-lighted; displays menus of selections, operator entries, and test-measurement results.								
5	GROUND (Wing Nut)	DMOM-200 Series 2 ground stud. Connect ground stud to substation ground using the provided cable.								
6	No marking	Built-in thermal printer, prints test result data on 2.5-inch-wide thermal paper.								
7	No marking	Operating key-pad controls, 10 alphanumeric keys and 6 function keys (i.e., START, STOP, CLEAR, ENTER, & CONTRAST/PAPER positioning ^ & v).								
8	HIGH CURRENT PRESENT	LED indicator, red; Lights when high-test-current is going through the test leads.								
10 & 11	(Resistor Symbol)	Voltage-sensing connector jacks (red).								

4.0 DMOM IMPORTANT FEATURES

4.1 Operating Voltages

The DMOM operates with voltages between 100-240Vac, 50/60Hz.

4.2 DMOM Serial Interface

A built-in RS-232C port permits the DMOM to be interfaced with an IBM-compatible personal computer. An IBM PC-compatible software package supplied with each DMOM allows the user to retrieve test records stored in the DMOM's memory. The software is compatible with Windows XP and Vista.

The RS-232C port is also used to calibrate the DMOM at the factory.

NOTE

The DMOM communicates with the PC via the RS-232C port only in computer interface mode.

4.3 DMOM LCD Contrast Adjustment

The purpose of this procedure is to adjust the darkness level of the alphanumeric characters shown in the LCD display, in order to produce the best readability for the ambient light in the testing area. To darken the LCD contrast, press and hold the Contrast/Paper ^ key for more than 1 second. To lighten the LCD contrast, press and hold the Contrast/Paper v key for more than 1 second. Release the key when the desired contrast level is obtained. The DMOM will save this LCD contrast setting level in memory.

4.4 DMOM Paper Advance or Retract

To advance the thermal paper, press and release the Contrast/Paper ^ key. The thermal paper will be advanced by 1/2 inch. To retract the thermal paper, press and release the Contrast/Paper v key. The thermal paper will be retracted by 1/2 inch.

5.0 DMOM PRINTER PAPER

The DMOM printer uses 2.5-inch wide thermal paper for printing test results. In order to maintain the highest quality printing and to avoid paper jams, we recommend using the paper supplied by our factory. Paper can be ordered from the following two sources.

Vanguard Instruments Co, Inc.
1520 S. Hellman Ave.
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

6.0 CABLE CONNECTION

The DMOM is supplied with two 30-foot test cables with heavy-duty alligator clamps. Both current (#1 AWG) and sense leads are combined into one cable (Figure 1.0). A typical cable connection for the DMOM to a device under test (using the combined test lead) is shown in Figure 9.0 and Figure 11.0. Figure 8.0 and Figure 10.0 illustrate the connection using separate current and sense leads.

To protect the DMOM against static discharge in the substation, always connect the unit's ground stud to the substation ground. It is also highly recommended that one side of the circuit breaker bushing be grounded during testing to eliminate any static discharge through the DMOM.

NOTE

The sense input is not polarity sensitive. The sense cables may be connected to either input without affecting the DMOM reading accuracy.

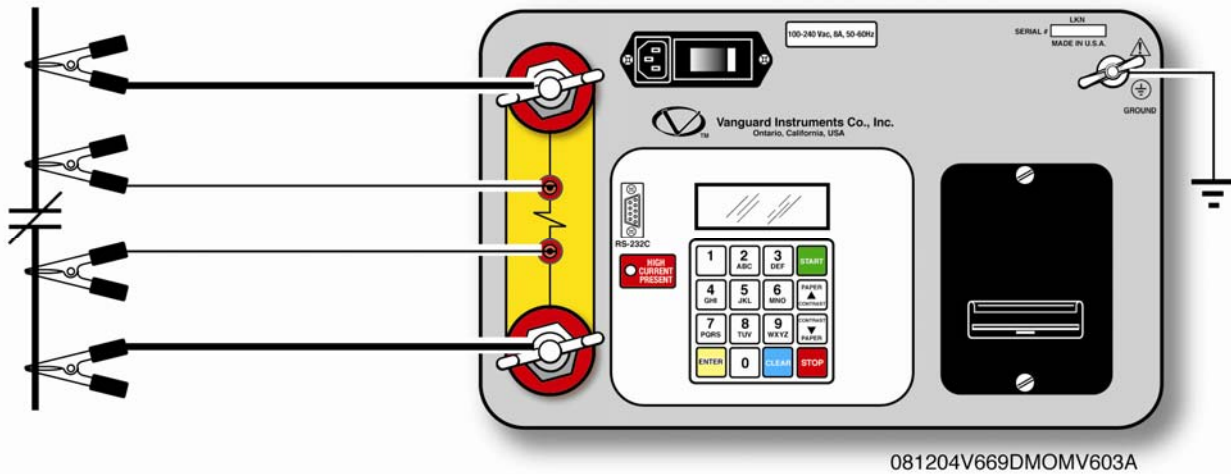


Figure 8.0 DMOM-100/200 Connection Diagram 1 (Separate Leads)

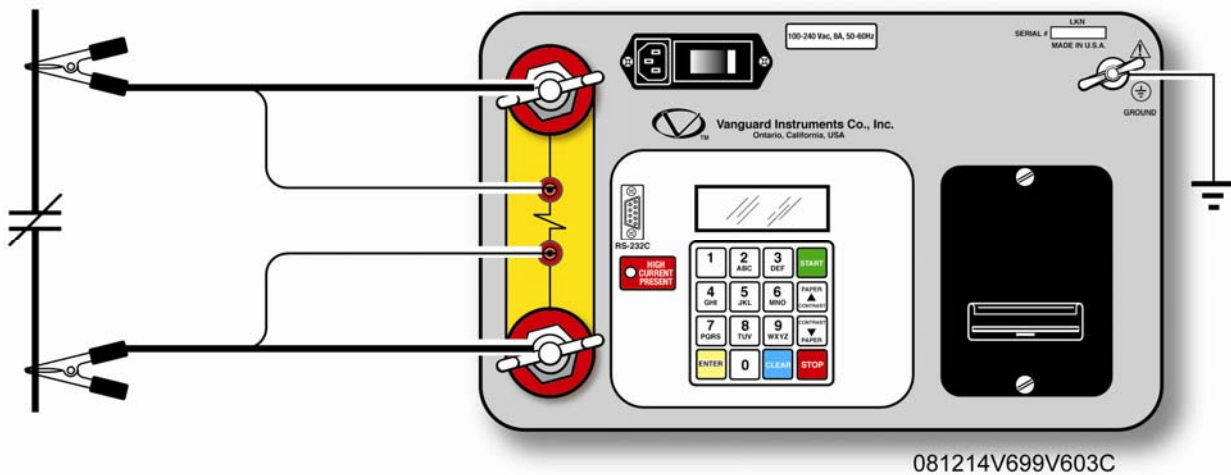


Figure 9.0 DMOM-100/200 Connection Diagram 2 (Combined Leads)

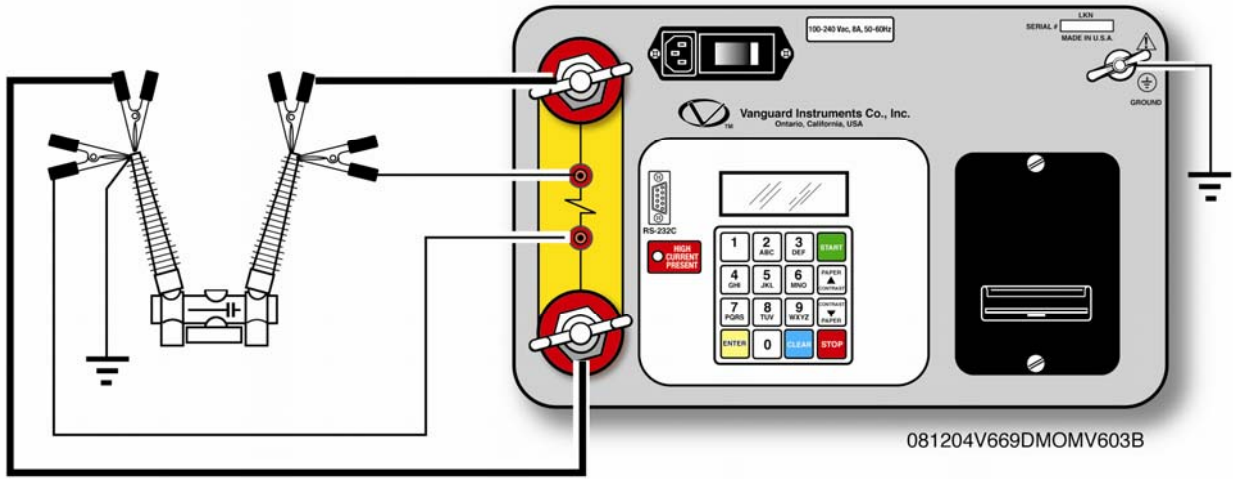


Figure 10.0 DMOM-100/200 Connection Diagram 3 (Separate Leads)

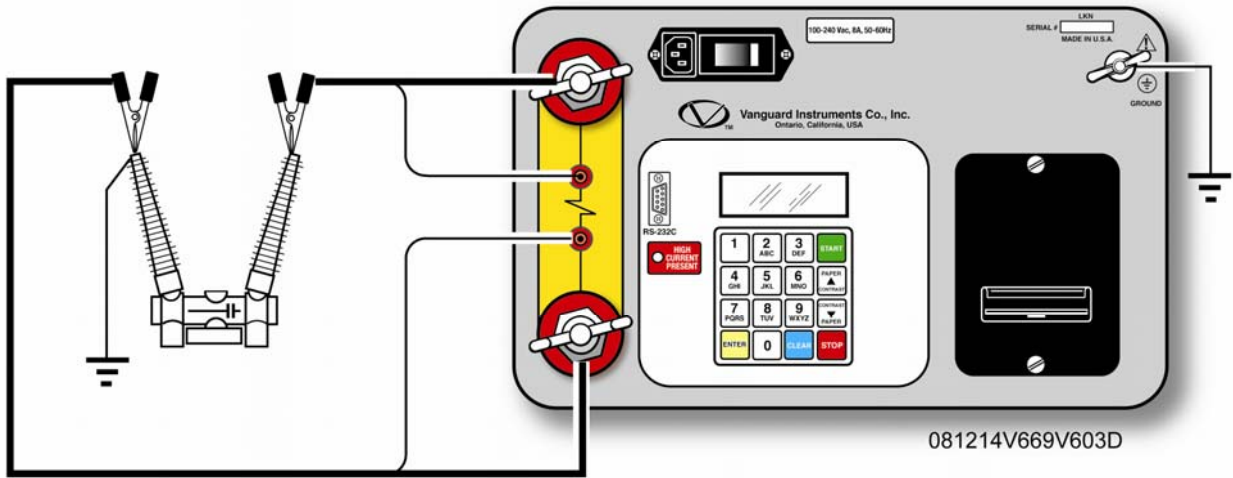


Figure 11.0 DMOM-100/200 Connection Diagram 4 (Combined Leads)

7.0 OPERATING PROCEDURES

7.1 Step-by-Step Procedures

Review Figure 14.0 before proceeding with the step-by-step procedures that follow.

7.2 Precautions

Do not measure the resistance of inductive devices. This can generate unsafe high-voltage spikes (created by a collapsing magnetic field) if the test current is interrupted by detaching a test lead during a test. Do not touch or disconnect any test lead that is connected to a device under test while testing is being conducted. ***Failure to heed this warning can cause injury to the user and/or damage to the DMOM.*** The DMOM measures low, non-inductive resistances (e.g., breaker contacts and bus-bar junctions). If the resistance of an inductive device needs to be measured, then the use of an instrument designed for that purpose is recommended (such as the WRM made by the Vanguard Instruments Company).

7.3 Preparations

- a. Ground the DMOM to the Substation ground.
- b. Plug the DMOM power cable into a power outlet.
- c. Connect the current-cable lugs and voltage-sensing cable plugs to the control-panel (Figure 6.0 and Figure 7.0).
- d. Attach the test-cable clamps to opposite terminals of the resistive load being tested (Figure 8.0 to Figure 11.0).
- e. If separate cables are used, attach the voltage-sensing clamps to the terminals of the resistive load. The sensing voltage clamps should be inside the current clamps.
- f. Turn on the DMOM's power, by pressing the rocker switch to ON.

7.4 Operating Overview

Procedures for operating the DMOM are presented in tabular format, with a different table for each of the operations available. All operations are described in step-by-step sequences. Each step is indexed by number and indicates an operator action, followed by a description or illustration of what should be observed on the DMOM display to confirm the action. All operations begin with the **START** menu (shown below):

1. RUN TEST	12/11/08
2. SETUP	12:25:00
3. CAL CHECK	

Figure 12.0 The START Menu

Item 1 (RUN TEST) is a menu of functions and options available for measuring an unknown resistance. Item 2 (SETUP) is for record manipulation in the DMOM. Item 2 (SETUP) expands into a menu of support functions. Item 3 (CAL CHECK) is a performance-verification operation for checking key circuit functions.



Figure 13.0 The SETUP Menu

The SETUP MENU lists the following 4 user options.

Item 1 (ENTER ID) is used to input identification information for each stored data record.

Item 2 (REVIEW RECORD) is used to review stored 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 under PC control or to set the time and date.

7.5 Entering Alphanumeric Characters

Entering alphanumeric characters is performed via the keypad (similar to a telephone keypad – see item 7 of Figure 6.0 and Figure 7.0). To input characters, press the key once to select the number marked on the key. Press the key a second time to select 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 \wedge key to advance to next character space; press the \vee key to move the cursor back one character space. The \wedge key may also be used to create a space between words. Press the **CLEAR** key to delete a selected character (the cursor must be under the character to be deleted).

Press the **ENTER** key to load all character selections into memory and move to the next input screen.

If no information is needed in a particular input screen, press the **ENTER** key and the display will advance to the next screen without any data entry.

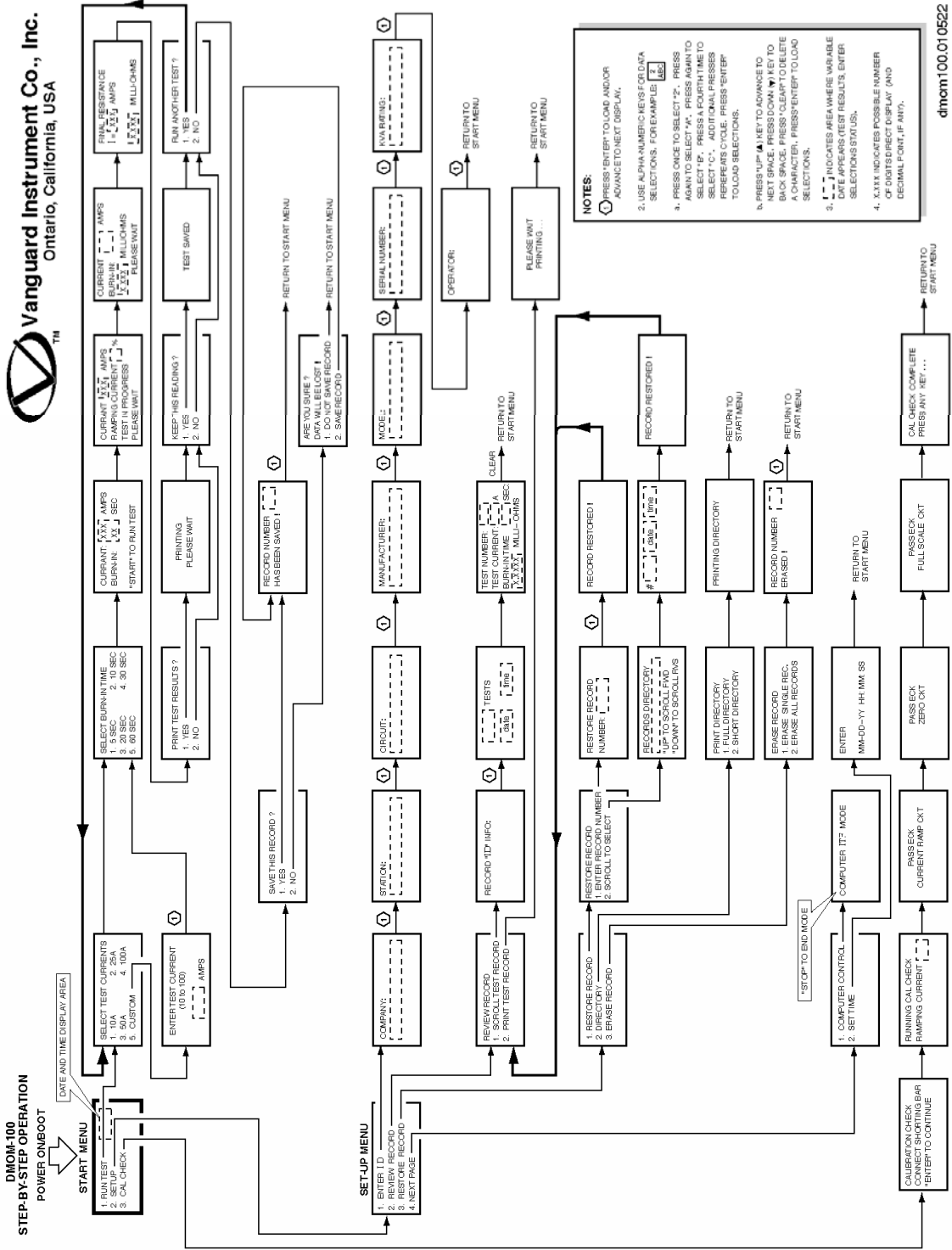


Figure 14.0 Step-by Step Procedures for DMOM-100/200

7.6 Running a Normal Test Procedure

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

NOTE

The red HIGH CURRENT PRESENT indicator will flash while the test current is applied to the resistance load.

Table 5.0 Run Test Procedure (Measure an Unknown Resistance)

STEP	ACTION	DMOM DISPLAY
5-1	Begin the Run Test procedure: From the START MENU , press key # 1 . A menu of test options will appear, as shown at right.	<div style="border: 1px solid black; padding: 5px;"> <p align="center">1.NORMAL TEST 2.AUTOMATIC TEST</p> </div>
5-2	Select the NORMAL TEST option by pressing key # 1 . The SELECT TEST CURRENT menu will appear. The DMOM-100 menu will contain 5 options. The DMOM-200 will contain 6 options. To select the test current, press the appropriate key for the desired test current. For this example, select key # 4 (100A) then go to step 5-4 . For a CUSTOM (user-defined) current, press key # 5 (key # 6 on DMOM-200), then go to step 5-3 .	<div style="border: 1px solid black; padding: 5px;"> <p align="center">SELECT TEST CURRENT: 1. 10A 2. 25A 3. 50A 4. 100A 5. CUSTOM</p> </div> <p align="center">Or</p> <div style="border: 1px solid black; padding: 5px;"> <p align="center">SELECT TEST CURRENT: 1. 10A 2. 25A 3. 50A 4. 100A 5. 200A 6. CUSTOM</p> </div>
5-3	The ENTER TEST CURRENT menu will appear. Using the keypad, enter the CUSTOM test current level (in 1 amp steps). After entering the value, press the ENTER key, then go to step 5-4 . For this example, use a 100A test current. <p align="center">NOTE <i>INVALID ENTRY will appear on the display if an invalid value is entered.</i></p>	<div style="border: 1px solid black; padding: 5px;"> <p align="center">ENTER TEST CURRENT (10 to 100) 100 AMPS</p> </div> <p align="center">or</p> <div style="border: 1px solid black; padding: 5px;"> <p align="center">ENTER TEST CURRENT (10 to 200) 100 AMPS</p> </div>
5-4	The SELECT BURN-IN TIME menu will appear. Press key 1 through 6 to select a value which corresponds to the desired burn-in time (see the display to the right). For this example, press key # 1 to select 5 SEC .	<div style="border: 1px solid black; padding: 5px;"> <p align="center">SELECT BURN-IN TIME: 1. 5 SEC 2. 10 SEC 3. 20 SEC 4. 30 SEC 5. 60 SEC 6. 2 MIN</p> </div>

Table 5.0 Run Test Procedure (Measure an Unknown Resistance Continued)

STEP	ACTION	DMOM DISPLAY
5-5	The SELECT RAMP TIME menu will appear. Push a key (1 through 4) to select a Ramp Time. For this example, push key # 1 to select 5 SEC (5 seconds).	<div style="border: 1px solid black; padding: 5px;"> <p>SELECT RAMP TIME: 1. 5 SEC 2. 10 SEC 3. 20 SEC 4. 30 SEC</p> </div>
5-6	The display will show the selected test current, burn-in time, and ramp time. <i>NOTE</i> <i>5-second burn-in and ramp times were selected in this example.</i>	<div style="border: 1px solid black; padding: 5px;"> <p>CURRENT: 100 AMPS BURN-IN: 5 SEC RAMP: 5 SEC "START" TO RUN TEST</p> </div>
5-7	Press the START key to run the resistance measurement test. A display of the ramping current and the percentage of ramp level will be displayed, along with the notices TEST IN PROGRESS and PLEASE WAIT .	<div style="border: 1px solid black; padding: 5px;"> <p>CURRENT: 100 AMPS RAMPING CURRENT 10% TEST IN PROGRESS PLEASE WAIT</p> </div>
5-8	Automatic. No operator action is required. Current, burn-in time, and resistance measurement changes will appear on the display during the burn-in.	<div style="border: 1px solid black; padding: 5px;"> <p>CURRENT: 100 AMPS BURNING-IN: 05 100.5 MICRO-OHMS PLEASE WAIT</p> </div>
5-9	Automatic. No operator action is required. At the end of the burn-in time, the current is ramped back down to zero. The ramp percentage will be displayed.	<div style="border: 1px solid black; padding: 5px;"> <p>FINAL RESISTANCE RAMPING CURRENT: xx% 100.5 MICRO-OHMS</p> </div>
5-10	Automatic. No operator action is required. At the end of the burn-in time, the final resistance measurement will be displayed. Press the ENTER key to go to next display.	<div style="border: 1px solid black; padding: 5px;"> <p>FINAL RESISTANCE I= 100 AMPS 100.5 MICRO-OHMS</p> </div>
5-11	The PRINT RESULTS option menu will be displayed.	<div style="border: 1px solid black; padding: 5px;"> <p>PRINT TEST RESULTS? 1. YES 2. NO</p> </div>
5-12	Press key # 1 to print. The PRINTING menu will be displayed during printing. A typical printout is shown in Figure 15.0. If no printout is needed, press key # 2 . Go to the next step.	<div style="border: 1px solid black; padding: 5px;"> <p>PRINTING REPORT PLEASE WAIT...</p> </div>
5-13	After the test report completes printing, or if key # 2 was pressed, the KEEP THIS READING menu will be displayed.	<div style="border: 1px solid black; padding: 5px;"> <p>KEEP THIS READING? 1. YES 2. NO</p> </div>

Table 5.0 Run Test Procedure (Measure an Unknown Resistance Continued)

STEP	ACTION	DMOM DISPLAY						
5-14	If the tested resistance measurement is to be stored in the test record buffer, press key # 1 (YES) . The TEST SAVED message will be displayed. Press the ENTER key to continue. If the test is not to be stored in memory, press key # 2 (NO) .	<div style="border: 1px solid black; padding: 10px; text-align: center;"> TEST SAVED </div>						
5-15	The RUN ANOTHER TEST menu will appear. If another test is not needed, press key # 2 (NO) . Go to step 5-17 . If another test needs to be run, press key # 1 (YES) . The SELECT TEST CURRENT menu will appear.	<div style="border: 1px solid black; padding: 10px;"> RUN ANOTHER TEST? 1. YES 2. NO </div>						
5-16	Repeat the sequence from step 5-2 to step 5-15 to run another test. <p style="text-align: center;"><i>NOTE</i></p> <i>The SELECT TEST CURRENT menu displayed to the right is from the DMOM-100. On the DMOM-200, option # 5 is 200A, and option # 6 is CUSTOM.</i>	<div style="border: 1px solid black; padding: 10px;"> SELECT TEST CURRENT: 1. 10A 2. 25A 3. 50A 4. 100A 5. CUSTOM </div>						
5-17	The SAVE THIS RECORD menu is displayed when another test was not selected in step 5-15 (by pressing key # 2). The test record contains all the readings taken during the test.	<div style="border: 1px solid black; padding: 10px;"> SAVE THIS RECORD? 1. YES 2. NO </div>						
5-18	To save this record, press key # 1 (YES) . If the test record is <i>not</i> to be saved, press key # 2 (NO) , then go to step 5-20 . <p style="text-align: center;"><i>NOTE</i></p> <i>A test record is saved in Flash EEPROM. A record number will be automatically assigned to the record by the DMOM. (The Test record was assigned #2 in this example).</i>	<div style="border: 1px solid black; padding: 10px; text-align: center;"> RECORD NUMBER xx HAS BEEN SAVED! </div>						
5-19	When the record has been saved (RECORD NUMBER “xx” is displayed), press the ENTER key to return to the START MENU .	<div style="border: 1px solid black; padding: 10px;"> <table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 50%;">1. RUN TEST</td> <td style="width: 50%;">12/11/08</td> </tr> <tr> <td>2. SETUP</td> <td>12:24:01</td> </tr> <tr> <td>3. CAL CHECK</td> <td></td> </tr> </table> </div>	1. RUN TEST	12/11/08	2. SETUP	12:24:01	3. CAL CHECK	
1. RUN TEST	12/11/08							
2. SETUP	12:24:01							
3. CAL CHECK								

Table 5.0 Run Test Procedure (Measure an Unknown Resistance Continued)

ITEM	ACTION	DMOM DISPLAY
5-20	Pressing key # 2 (NO) in response to the SAVE THIS TEST RECORD menu (see step 5-17) causes the ARE YOU SURE prompt (shown at right) to be displayed. To not save the record, press key # 1. To save the record, press key # 2.	<div style="border: 1px solid black; padding: 5px;"> <p>ARE YOU SURE? DATA WILL BE LOST!</p> <p>1. DO NOT SAVE RECORD 2. SAVE RECORD</p> </div>
5-21	If key # 1 is pressed in response to the ARE YOU SURE menu, the test record will be erased from the working buffer and the display will return to the START MENU . If key # 2 is pressed, the test record will be saved in Flash EEPROM. The test record number assigned to this record will also be displayed (see the illustration in step 5-18). Pressing the ENTER key to return to the START MENU .	<div style="border: 1px solid black; padding: 5px;"> <p>1. RUN TEST 12/11/08 2. SETUP 12:24:01 3. CAL CHECK</p> </div>

This ends the RUN NORMAL TEST procedure.

REC NUMBER 2	
TEST RESULTS	
DATE: 12/04/08 TIME: 11:46:13	
COMPANY:	VANGUARD
STATION:	SHOP
CIRCUIT:	SHOP 2
MFR:	GE
MODEL:	50
S/N:	9699752
KVA RATING:	45
OPERATOR:	JOHN DOE
TEST CURRENT: 10 AMPS BURN-IN TIME: 5 Seconds	
TEST RESULT: 100.3 MICRO-OHMS	
NOTES: _____	
TEST CURRENT: 10 AMPS BURN-IN TIME: 5 Seconds	
TEST RESULT: 101.2 MICRO-OHMS	
NOTES: _____	

VANGUARD INSTRUMENT CO., INC. REV 1.12 HPN (C) 2004-06
1520 S. MELLOWAY AVE
DENTON, CA 92761, USA
TEL: (909) 923-9390 FAX: (909) 923-9391
WWW.VANGUARD-INSTRUMENTS.COM
SERIAL NUMBER: 92160

Figure 15.0 Typical DMOM-100/200 Test Report

7.7 Running an Automatic Test Procedure

The Automatic Test Mode allows the user to initiate a test by applying the sense cable across the resistor load. This feature is handy when the user wants to take multiple resistance readings of the same load or of different loads in the same current path.

The burn-in time for Automatic Test is set for 5 seconds. The resistance reading is stored in the DMOM's working memory. The user can save up to 96 readings per test record. The DMOM Flash EEPROM can store 63 test records.

The following procedure describes the steps to measure an unknown resistance using Automatic Test Mode.

NOTE

- *Current cables should be connected across the resistive load to establish the current path. Removing and reconnecting one or both sense cables starts a new test.*
- *Hand spikes (see Figure 3.0) are designed specifically for this application.*

Table 6.0 Run Automatic Test Procedure (Measure an Unknown Resistance)

STEP	ACTION	DMOM DISPLAY
6-1	Press key # 1 (RUN TEST) on the START MENU . The TEST SELECTION menu will appear (shown at right).	<div style="border: 1px solid black; padding: 5px; text-align: center;"> 1.NORMAL TEST 2. AUTOMATIC TEST </div>
6-2	Press key # 2 to select the AUTOMATIC TEST option. The SELECT TEST CURRENT menu will appear. The DMOM-100 menu will contain 5 options. The DMOM-200 menu will contain 6 options. Press the corresponding key for the desired test current. For this example, select key # 4, (100A) then go to step 6-4 . For a CUSTOM test current, press key # 5 (key # 6 on DMOM-200), then go to step 6-3 . <p align="center"><i>Note</i></p> <p align="center"><i>The burn-in time is set for 5 seconds in the Automatic Test.</i></p>	<div style="border: 1px solid black; padding: 5px; text-align: center;"> SELECT TEST CURRENT: 1. 10A 2. 25A 3. 50A 4. 100A 5. CUSTOM </div> <p align="center">Or</p> <div style="border: 1px solid black; padding: 5px; text-align: center;"> SELECT TEST CURRENT: 1. 10A 2. 25A 3. 50A 4. 100A 5. 200A 6. CUSTOM </div>
6-3	Using the keypad, enter the CUSTOM test current level (in 1 amp steps). After entering the value, press the ENTER key, then go to step 6-4 . For this example, we used a 100A test current.	<div style="border: 1px solid black; padding: 5px; text-align: center;"> ENTER TEST CURRENT (10 to 100) 100 AMPS </div> <p align="center">or</p> <div style="border: 1px solid black; padding: 5px; text-align: center;"> ENTER TEST CURRENT (10 to 200) 100 AMPS </div>

Table 6.0 Run Test Procedure (Measure an Unknown Resistance Continued)

STEP	ACTION	DMOM DISPLAY
6-4	<p>The SELECT RAMP TIME menu will appear. Select a ramp time by pressing the corresponding key. For this example, press key # 1 to select a 5 SEC ramp time.</p>	<div style="border: 1px solid black; padding: 5px;"> <p>SELECT RAMP TIME: 1. 5 SEC 2. 10 SEC 3. 20 SEC 4. 30 SEC</p> </div>
6-5	<p>The AUTOMATIC TEST start menu will display the selected test current, burn-in time, and ramp time. Press the START key to run the resistance measurement test.</p>	<div style="border: 1px solid black; padding: 5px;"> <p>CURRENT: 100 AMPS BURN-IN: AUTO RAMP: 5 SEC “START” TO RUN TEST</p> </div>
6-6	<p>The AUTO TEST MODE screen will appear. No action is required. The ramping current percentage is displayed, along with the notice, TEST IN PROGRESS. When the test current has ramped up to the specified level (when current is at 100%), the test result display appears automatically.</p>	<div style="border: 1px solid black; padding: 5px;"> <p>AUTO TEST MODE RAMPING CURRENT 10% TEST IN PROGRESS PLEASE WAIT</p> </div>
6-7	<p>Automatic. No operator action is required. The burn-in time and the resistance measurement changes appear on the display during burn-in. At the end of the burn-in time, the current is ramped back down to zero.</p>	<div style="border: 1px solid black; padding: 5px;"> <p>AUTO TEST MODE BURNING IN: 05 500.5 MICRO-OHMS PLEASE WAIT</p> </div>
6-8	<p>Automatic. No operator action is required. At the end of the burn-in time, the FINAL RESISTANCE screen is displayed. To initiate another test, disconnect then reconnect one or both end of the cable clamps (Figure 1.0). Steps 6-5 to 6-7 will be repeated. For users with separate current and sense cables (Figure 2.0), disconnect then reconnect one or both sense cables, and steps 6-5 to 6-7 will be repeated. To end the AUTO TEST MODE, press the STOP key.</p> <p style="text-align: center;">Notes</p> <p><i>The user should allow two seconds between disconnect and reconnect to the test leads to initiate a new test.</i></p>	<div style="border: 1px solid black; padding: 5px;"> <p>FINAL RESISTANCE I= 100 AMPS 100.4 MICRO-OHMS AUTO TEST MODE</p> </div>
6-9	<p>When the STOP key is pressed, the AUTOMATIC TEST MODE will end, and the SAVE THIS RECORD menu will be displayed.</p>	<div style="border: 1px solid black; padding: 5px;"> <p>SAVE THIS RECORD? 1. YES 2. NO</p> </div>

Table 6.0 Run Test Procedure (Measure an Unknown Resistance Continued)

STEP	ACTION	DMOM DISPLAY						
<p>6-10</p>	<p>To save the record, press key # 1 (YES). If the test record is <i>not</i> to be saved, press key # 2 (NO) and go to step 6-12.</p> <p align="center">NOTE</p> <p><i>The DMOM can store 96 readings per test record.</i></p> <p><i>A test record is saved in Flash EEPROM. A record number will be automatically assigned to the record by the DMOM (The Test record was assigned # 2 in this example).</i></p>	<div style="border: 1px solid black; padding: 5px; text-align: center;"> <p>RECORD NUMBER 2 HAS BEEN SAVED!</p> </div>						
<p>6-11</p>	<p>After the record is saved (the record # assigned shows on the display), press the ENTER key to return to the START MENU (shown to the right).</p>	<div style="border: 1px solid black; padding: 5px;"> <table border="0" style="width: 100%;"> <tr> <td style="width: 60%;">1. RUN TEST</td> <td style="text-align: right;">12/11/08</td> </tr> <tr> <td>2. SETUP</td> <td style="text-align: right;">12:24:01</td> </tr> <tr> <td colspan="2">3. CAL CHECK</td> </tr> </table> </div>	1. RUN TEST	12/11/08	2. SETUP	12:24:01	3. CAL CHECK	
1. RUN TEST	12/11/08							
2. SETUP	12:24:01							
3. CAL CHECK								
<p>6-12</p>	<p>If key # 2 was pressed in step 6-10, the ARE YOU SURE menu will appear. Press key # 1 to not save the record. The START menu will appear (see illustration in step 6-11).</p> <p>Press key # 2 to save the record. A screen will appear noting that the record has been saved (see step 6-10). Press the ENTER key to return to the START menu.</p>	<div style="border: 1px solid black; padding: 5px;"> <p>ARE YOU SURE? DATA WILL BE LOST!</p> <ol style="list-style-type: none"> 1. DO NOT SAVE RECORD 2. SAVE RECORD </div>						

This ends the RUN AUTOMATIC TEST procedure.

7.8 Entering Test Record ID

This procedure allows the user to enter the equipment identification data to the test record.

Table 7.0 Enter Record ID Procedure (Company, Site, and Equipment Identification)

STEP	ACTION	DMOM DISPLAY
7-1	Press key # 2 on the START MENU to go to the SETUP MENU shown at right. <i>Note</i> Setup options 2 thru 4 go to the following procedural tables: 2. <i>REVIEW RECORD</i> procedures in Table 8.0 3. <i>RESTORE RECORD</i> Procedures in Table 9.0 4. <i>NEXT PAGE</i> procedures in Table 12.0.	<div style="border: 1px solid black; padding: 5px;"> 1. ENTER ID 2. REVIEW RECORD 3. RESTORE RECORD 4. NEXT PAGE </div>
7-2	On the SETUP MENU , press key # 1 (ENTER ID) to begin entering equipment ID data beginning with the COMPANY input screen. <i>Note:</i> See Section 7.5 for instructions on entering alphanumeric characters with the keypad.	<div style="border: 1px solid black; padding: 5px;"> COMPANY: </div>
7-3	Enter the utility COMPANY name using the alphanumeric keypad. Press the ENTER key to load the entered characters and advance to the STATION input screen.	<div style="border: 1px solid black; padding: 5px;"> STATION: </div>
7-4	Enter the utility STATION name using the alphanumeric keypad. Press the ENTER key to load the entered characters and advance to the CIRCUIT input screen.	<div style="border: 1px solid black; padding: 5px;"> CIRCUIT: </div>
7-5	Enter the test item's CIRCUIT name using the alphanumeric keypad. Press the ENTER key to load the entered characters and advance to the MANUFACTURER input screen.	<div style="border: 1px solid black; padding: 5px;"> MANUFACTURER: </div>
7-6	Enter the test item's MANUFACTURER name using the alphanumeric keypad. Press the ENTER key to load the entered characters and advance to the MODEL input screen.	<div style="border: 1px solid black; padding: 5px;"> MODEL: </div>

Table 7.0 Enter Record ID Procedure (continued)

STEP	ACTION	DMOM DISPLAY						
7-7	Enter the test item's MODEL using the alphanumeric keypad. Press the ENTER key to load the entered characters and advance to the SERIAL NUMBER input screen.	<div style="border: 1px solid black; padding: 5px; width: fit-content; margin: auto;"> SERIAL NUMBER: </div>						
7-8	Enter the test item's SERIAL NUMBER using the alphanumeric keypad. Press the ENTER key to load the entered characters and advance to the KVA RATING input screen.	<div style="border: 1px solid black; padding: 5px; width: fit-content; margin: auto;"> KVA RATING: </div>						
7-9	Enter the test item's KVA RATING using the alphanumeric keypad. Press the ENTER key to load the entered characters and advance to the OPERATOR input screen.	<div style="border: 1px solid black; padding: 5px; width: fit-content; margin: auto;"> OPERATOR: </div>						
7-10	Enter the test OPERATOR name, using the alphanumeric keypad. Press the ENTER key to load the entered characters and return to the START MENU display (shown at right).	<div style="border: 1px solid black; padding: 5px; width: fit-content; margin: auto;"> <table style="width: 100%; border-collapse: collapse;"> <tr> <td style="padding: 2px;">1. RUN TEST</td> <td style="padding: 2px; text-align: right;">12/11/08</td> </tr> <tr> <td style="padding: 2px;">2. SETUP</td> <td style="padding: 2px; text-align: right;">12:26:01</td> </tr> <tr> <td style="padding: 2px;">3. CAL CHECK</td> <td></td> </tr> </table> </div>	1. RUN TEST	12/11/08	2. SETUP	12:26:01	3. CAL CHECK	
1. RUN TEST	12/11/08							
2. SETUP	12:26:01							
3. CAL CHECK								

This completes the ENTER TEST RECORD ID procedure.

7.9 Reviewing a Record

This procedure describes the steps for reviewing a test record residing in the DMOM's working memory. The user can view the record on the LCD display or print the record on the thermal printer.

The view feature is useful when the user wants to review a test record stored in the DMOM's Flash EEPROM and there is no thermal paper for printing.

NOTE

To review a test record stored in Flash EEPROM, the user must first restore the test record from Flash EEPROM to working memory (see paragraph 7.10, Restore Record Procedure).

Table 8.0 Review Record Procedure

STEP	ACTION	DMOM DISPLAY
8-1	On the START MENU , press key # 2 (SETUP) to select the SETUP MENU (shown at right).	<div style="border: 1px solid black; padding: 5px;"> 1. ENTER ID 2. REVIEW RECORD 3. RESTORE RECORD 4. NEXT PAGE </div>
8-2	Press key# 2 (REVIEW RECORD) on the SETUP MENU . The REVIEW RECORD menu will be displayed.	<div style="border: 1px solid black; padding: 5px;"> REVIEW RECORD 1. SCROLL TEST RECORD 2. PRINT TEST RECORD </div>
8-3	If a record's test results are to be reviewed from a printout, press key # 2 to select the PRINT TEST RECORD option. The PLEASE WAIT PRINTING... screen will be displayed while printing is in progress. When printing is complete, the display will return to the START MENU . This ends the procedure for the PRINT TEST RECORD option.	<div style="border: 1px solid black; padding: 5px;"> PLEASE WAIT PRINTING . . . </div>
8-4	If records are to be viewed in sequence by scrolling the records on the LCD, press key # 1 to select the SCROLL TEST RECORDS option in the REVIEW RECORD menu. The RECORD ID INFO screen will appear. press one of the scroll keys (\wedge and \vee) to begin scrolling through the test records. The "number of tests" display will appear.	<div style="border: 1px solid black; padding: 5px;"> RECORD ID INFO: </div>

Table 8.0 Review Record Procedure (continued)

STEP	ACTION	DMOM DISPLAY
8-5	The “number of tests” display also shows the date and the time. Scroll through the test record (using the \wedge and \vee keys to scroll). When the test record of interest appears, press the ENTER key to select it.	<div style="border: 1px solid black; padding: 5px; text-align: center;"> <p>2 TESTS</p> <p>12/11/08 17:27:00</p> </div>
8-6	Pressing the ENTER key (from step 8-5) will list all test data, including test number, test current, burn-in time, and the measured resistance value. <i>NOTE</i> <i>The test record in this example contains 2 tests.</i>	<div style="border: 1px solid black; padding: 5px; text-align: center;"> <p>TEST NUMBER: 1</p> <p>TEST CURRENT: 100A</p> <p>BURN - IN TIME: 5 Sec</p> <p>500.3 MICRO-OHMS</p> </div>
8-7	Press the \wedge key to view to the next test. Press the \vee key to return to the previous test. Press the STOP key to return to the START MENU .	<div style="border: 1px solid black; padding: 5px; text-align: center;"> <p>TEST NUMBER: 2</p> <p>TEST CURRENT: 50A</p> <p>BURN - IN TIME: 5 Sec</p> <p>500.1 MICRO-OHMS</p> </div>

This completes the Review Record Procedure.

7.10 Restoring a Record

This procedure describes the steps to recall a test record stored in the DMOM's Flash memory.

Table 9.0 Restore Record Procedures

STEP	ACTION	DMOM DISPLAY
9-1	On the START MENU , press key # 2 (SETUP) to display the SETUP MENU .	<div style="border: 1px solid black; padding: 5px;"> 1. ENTER ID 2. REVIEW RECORD 3. RESTORE RECORD 4. NEXT PAGE </div>
9-2	On the SETUP MENU , press key # 3 (RESTORE RECORD) to display a menu of options (RESTORE RECORD , DIRECTORY , ERASE RECORD).	<div style="border: 1px solid black; padding: 5px;"> 1. RESTORE RECORD 2. DIRECTORY 3. ERASE RECORD </div>
9-3	Press key # 1 (RESTORE RECORD) to display a menu of restore records options. Option # 1 allows a user to restore a record when the record's number is known. Option # 2 allows the user to scroll through the stored records to select the correct one. To use Option # 2, go to step 9-7.	<div style="border: 1px solid black; padding: 5px;"> RESTORE RECORD 1. ENTER RECORD NUMBER 2. SCROLL TO SELECT </div>
9-4	OPTION 1: Press key # 1 (ENTER RECORD NUMBER) to display a prompt to enter the record number to restore.	<div style="border: 1px solid black; padding: 5px;"> RESTORE RECORD NUMBER: </div>
9-5	Enter the desired record number, then press the ENTER key to restore the record. The RECORD RESTORED screen will appear. Press the ENTER key to continue.	<div style="border: 1px solid black; padding: 5px;"> RECORD RESTORED! </div>
9-6	The REVIEW RECORD menu will appear. View or print the record by pressing the # 1 or # 2 key, or return to the START menu by pressing the STOP key.	<div style="border: 1px solid black; padding: 5px;"> REVIEW RECORD 1. SCROLL TEST RECORD 2. PRINT TEST RECORD </div>
9-7	OPTION 2: Press key # 2 (SCROLL TO SELECT) in the RESTORE RECORD menu (step 9-3) to display the RECORDS DIRECTORY .	<div style="border: 1px solid black; padding: 5px;"> RECORDS DIRECTORY "UP TO SCROLL FWD "DWN" TO SCROLL RVS </div>
9-8	In the RECORDS DIRECTORY , use the ^ and v keys to scroll through the directory listings of test records. When the desired test record is displayed, press the ENTER key to restore the test record.	<div style="border: 1px solid black; padding: 5px;"> #1 12/11/08 17:27:00 </div>

Table 9.0 Restore record Procedures (continued)

STEP	ACTION	DMOM DISPLAY
9-9	The RECORD RESTORED screen will be displayed. Press the ENTER key again to return to the REVIEW RECORD menu (resume the procedure at step 9-6) or press the STOP key to return to the START menu.	<div style="border: 2px solid black; padding: 10px; text-align: center;">RECORD RESTORED!</div>

This completes the Restore Record Procedure.

7.11 Printing the Test Record Directory

This procedure describes the steps to print the DMOM's Flash record directory.

Table 10.0 Print Test Record Directory Procedures

STEP	ACTION	DMOM DISPLAY
10-1	On the RESTORE RECORD display (step 9-2), press key # 2 (DIRECTORY) to go to the PRINT DIRECTORY menu.	<div style="border: 1px solid black; padding: 5px;"> <p align="center">PRINT DIRECTORY</p> <p>1. FULL DIRECTORY 2. SHORT DIRECTORY</p> </div>
10-2	<p>The PRINT DIRECTORY menu offers the choice to print either a FULL DIRECTORY or a SHORT DIRECTORY. Press Key # 1 (FULL DIRECTORY) or key # 2 (SHORT DIRECTORY).</p> <p>The PRINTING DIRECTORY notice will display as the selected directory prints. When printing is completed, the display will return to the START MENU. This ends the printing test record directory procedures.</p> <p align="center">NOTE</p> <p><i>The Short directory printout lists the last 10 test records stored in Flash EEPROM memory.</i></p>	<div style="border: 1px solid black; padding: 5px;"> <p align="center">PRINTING DIRECTORY</p> </div>

TEST DIRECTORY	
RECORD NUMBER: 4	DATE/TIME: 12/01/08 10:59:16
NUMBER OF TESTS: 1	STATION:
CIRCUIT:	MFR:
MODEL:	S/N:
RECORD NUMBER: 3	DATE/TIME: 12/01/08 10:49:59
NUMBER OF TESTS: 2	STATION:
CIRCUIT:	MFR:
MODEL:	S/N:
RECORD NUMBER: 2	DATE/TIME: 12/01/08 09:42:22
NUMBER OF TESTS: 1	STATION:
CIRCUIT:	MFR:
MODEL:	S/N:
RECORD NUMBER: 1	DATE/TIME: 12/01/08 09:14:42
NUMBER OF TESTS: 2	STATION:
CIRCUIT:	MFR:
MODEL:	S/N:

Figure 16.0 Typical Test Directory Printout

7.12 Erasing Test Records

This procedure describes the steps to delete a single test record or all the test records stored in the DMOM's Flash EEPROM.

Table 11.0 Erase Test Record Procedure

STEP	ACTION	DMOM DISPLAY
11-1	On the RESTORE RECORD display (step 9-2), press key # 3 (ERASE RECORD) to display the ERASE RECORD menu of options (shown at right).	<div style="border: 1px solid black; padding: 5px;"> <p align="center">ERASE RECORD 1.ERASE SINGLE RECORD 2. ERASE ALL RECORDS</p> </div>
11-2	On the ERASE RECORD menu display, press key # 1 to erase a single record. To erase all records, press key # 2, then continue with step 11-4.	<div style="border: 1px solid black; padding: 5px;"> <p align="center">ERASE RECORD NUMBER: XX</p> </div>
11-3	Enter record number to be deleted then press the ENTER key to confirm. A screen will appear noting that RECORD NUMBER: xx ERASED! (where xx = the record number). Press the ENTER key again to return to the main menu. <i align="center">NOTE Press the STOP key to abort.</i>	<div style="border: 1px solid black; padding: 5px;"> <p align="center">RECORD NUMBER: XX ERASED!</p> </div>
11-4	The ERASE ALL RECORDS menu will appear. Press the ENTER key to confirm that you want to erase all records. <i align="center">NOTE Press the STOP key to abort.</i>	<div style="border: 1px solid black; padding: 5px;"> <p align="center">ERASE ALL RECORDS! Are you SURE? "ENTER" TO CONTINUE</p> </div>
11-5	The ERASING RECORDS menu will appear during the erasure process.	<div style="border: 1px solid black; padding: 5px;"> <p align="center">ERASING RECORDS PLEASE WAIT</p> </div>
11-6	When the records have all been erased, the RECORDS ERASED screen will be displayed. Press the ENTER key to return to the main menu.	<div style="border: 1px solid black; padding: 5px;"> <p align="center">RECORDS ERASED!</p> </div>

7.13 Computer Interface Mode

A PC program is provided with each DMOM, which allows the user to download the test records stored in the DMOM's Flash EEPROM to a PC. The user is required to put the DMOM in Computer Interface Mode to allow the PC running the program to access the test records stored in the DMOM's Flash EEPROM.

Test records can be stored on any media the PC is capable of handling. This allows the user to store and archive test records for reviewing at any time. Test records can also be printed from the PC to any printer which it has access to.

Use the following steps to put the DMOM in Computer Control Mode.

Table 12.0 Computer Control Mode

STEP	ACTION	DMOM DISPLAY
12-1	On the START MENU , press key # 2 (SETUP) to display the SETUP MENU .	<div style="border: 1px solid black; padding: 5px;"> 1. ENTER ID 2. REVIEW RECORD 3. RESTORE RECORD 4. NEXT PAGE </div>
12-2	On SETUP MENU , press key # 4 (NEXT PAGE) . A menu will appear with option for computer control, setting the time, and calibrating the unit.	<div style="border: 1px solid black; padding: 5px;"> 1. COMPUTER CONTROL 2. SET TIME 3. CALIBRATE UNIT </div>
12-3	Press key # 1 to select COMPUTER CONTROL mode. <p align="center"><i>NOTE</i> <i>Press the STOP key to abort.</i></p>	<div style="border: 1px solid black; padding: 5px;"> COMPUTER ITF MODE </div>

7.14 Calibration Check

This procedure describes the steps to perform the calibration check on the DMOM. Before conducting the calibration check, connect the current probes and sense probes to a piece of copper or aluminum bar, as shown in Figure 17.0 and Figure 18.0.

Table 13.0 Calibration Check Procedure

STEP	ACTION	DMOM DISPLAY
13-1	The calibration check is a functional verification self-test of the DMOM. This procedure begins by pressing key # 3 on the START MENU , which displays a calibration check prompt to attach the test leads to a shorting bar (See Figure 17.0 and Figure 18.0).	<div style="border: 1px solid black; padding: 5px; text-align: center;"> CALIBRATION CHECK CONNECT SHORTING BAR "ENTER" TO CONTINUE </div>
13-2	When the test leads are attached to a shorting bar, press the ENTER key to start the self-test process. The self-test feature checks ramping current and displays a percent of ramp level as it ramps to full current. When the ramp reaches full current, the remaining self-check functions automatically sequence without operator control. If any circuit fails (does not pass), do not use the DMOM unit to measure any resistance until the problem has been corrected.	<div style="border: 1px solid black; padding: 5px; text-align: center;"> RUNNING CAL CHECK... RAMPING CURRENT: xx% </div>
13-3	Automatic. No operator action required.	<div style="border: 1px solid black; padding: 5px; text-align: center;"> RUNNING CAL CHECK... CURRENT RAMP CKT "PASS" </div>
13-4	Automatic. No operator action required.	<div style="border: 1px solid black; padding: 5px; text-align: center;"> RUNNING CAL CHECK... ZERO CKT CHECK "PASS" </div>
13-5	Automatic. No operator action required.	<div style="border: 1px solid black; padding: 5px; text-align: center;"> RUNNING CAL CHECK... FSCALE CKT CHECK "PASS" </div>
13-6	Automatic. No operator action required.	<div style="border: 1px solid black; padding: 5px; text-align: center;"> RUNNING CAL CHECK... MEAS CKT CHECK "PASS" </div>
13-7	Automatic. No operator action required.	<div style="border: 1px solid black; padding: 5px; text-align: center;"> RUNNING CAL CHECK... RAMPING CURRENT: xx% </div>

Table 13.0 Calibration Check Procedure (Continued)

STEP	ACTION	DMOM DISPLAY
13-8	Automatic. No operator action required.	CAL CHECK COMPLETE PRESS ANY KEY
13-9	Press any key to end the CALIBRATION CHECK .	The display will return to the START MENU .

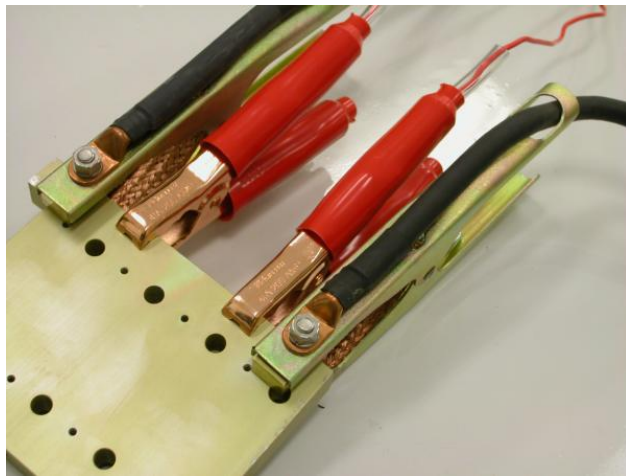


Figure 17.0 Calibration Connection (Separated Leads)



Figure 18.0 Calibration Connection (Combined Leads)

APPENDIX A
DMOM Troubleshooting Guide

Item	Symptom	Possible Problem	Solution
1	The reading is incorrect.	1. There is a poor connection at the test clips.	1. Check the connections to ensure that the teeth of the voltage-sensing and current clips are firmly in contact with the device under test. 2. Verify that the sense cables are connected on the inside of the current cables. See Figure 8.0 and Figure 10.0.
2	“Cable Error” Message.	1. There is no test current going through the device under test. 2. There is a sensing cables problem.	1. Check the current cable connections to the device under test. 2. Check the sensing cable connections. 3. Run a Calibration Test.



**Vanguard Instruments
Company, Inc.**

1520 S. Hellman Ave, Ontario, CA 91761, USA
Phone 909-923-9390 Fax 909-923-9391
Web site: <http://www.vanguard-instruments.com>



DMOM-100/200 S2 Jan 2009

Copyright © 2009 by Vanguard Instruments Company, Inc.