

**FLUKE®**

# **8508A**

Reference Multimeter

## Getting Started Manual

September 2004 Rev. 1, 8/08

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# Table of Contents

Title	Page
Introduction.....	1
Contacting Fluke.....	2
Unpacking and Inspection.....	2
Line Voltage and Line Fuse.....	2
Safety Considerations and Symbols.....	3
General Safety Summary.....	3
Symbols.....	5
Protection Class I.....	6
Protective Earth/Ground.....	6
Do Not Operate Without Covers.....	6
Safe Operating Conditions.....	6
The Power Cable and Power Supply Disconnection.....	7
Terminal Connections.....	7
Installation/Measurement Category I.....	7
Maintenance and Repair.....	8
Front and Rear Panel Features.....	8
Input Terminals.....	8
The Front Panel Displays.....	9
Front Panel Keys.....	9
Numeric Keyboard.....	10
Exiting a Menu.....	10
Major Function Keys.....	10
Direct Action Keys.....	11
Mode Keys.....	11
Rear Panel.....	11
Labels.....	12
Fuses.....	12
Voltage Selector.....	12
Power Input and Power Switch.....	12
Calibration Switch.....	12
Rear Panel Connectors and Pin Designations.....	12
Rear Inputs.....	12
External Trigger Input.....	13
IEEE 488 Input/Output.....	13

Power-On Configuration.....	13
Making Measurements.....	13
Using the Measurement Functions.....	14
AC Voltage.....	15
Resistance.....	15
High Voltage Ohms.....	15
True Ohms.....	16
Measuring Resistance.....	17
2-Wire Measurements.....	17
4-wire Measurements.....	17
DC Current.....	18
Measuring DC Current.....	18
AC Current.....	19
Measuring AC Current.....	19
Temperature.....	19
Multimeter Inputs.....	20
Monitoring Modes.....	21
Utility.....	22
Selftest.....	23
Math.....	23
Clear.....	24

# ***List of Figures***

<b>Figure</b>	<b>Title</b>	<b>Page</b>
1.	Rear Panel - Power Input Fuse and line Power Locations .....	3
2.	Front Panel Displays .....	8
3.	Front and Rear Input Terminals .....	8
4.	Sample of the Main Display .....	9
5.	8508A Rear Panel Detail.....	11
6.	Simple Lead Connections .....	14
7.	2-Wire Measurements .....	17
8.	4-Wire Measurements .....	17



# 8508A

## Reference Multimeter

### Introduction

The Fluke 8508A Reference Multimeter (hereafter "the Multimeter") is designed for the most demanding measurement applications and provides extremely high measurement precision in both stand-alone and systems applications.

This Getting Started Manual provides an overview of Chapters 1, 2, 3, and 5 from the Users Manual and includes enough information to begin operating you 8508A safely. For more detailed information, refer to the 8508A Users Manual on the 8508A CD-ROM. A description of the material contained in the Users Manual follows:

**Chapter 1** *Introduction and Safety Information* provides unpacking, storage and shipping instructions, line voltage and fuse selection, and safety information.

**Chapter 2** *Getting Acquainted with the Basics* provides an introduction to the front panel keys operation and rear panel connector details.

**Chapter 3** *Making Measurements* provides detailed access information to the full range of multimeter facilities, with suggestions for measurement techniques.

**Chapter 4** *Remote Operations Using the IEEE 488 Interface* provides detailed information for remote control access via the IEEE 488 interface.

**Chapter 5** *Specifications* provides specification details for the multimeter.

**Chapter 6** *Calibration and Verification* provides detailed information for access to calibration menus, suggested calibration methods and verification procedures for the multimeter.

### Warning

**To avoid electric shock, personal injury, or death, carefully read the information under *Safety Considerations* before attempting to install, use, or service the Multimeter.**

## Contacting Fluke

To contact Fluke for product information, operating assistance, service, or to get the location of the nearest Fluke distributor or Service Center, call:

1-888-99FLUKE (1-888-993-5853) in U.S.A.  
1-800-36-FLUKE (1-800-363-5853) in Canada  
+31-402-675-200 in Europe  
+81-3-3434-0181 Japan  
+65-738-5655 Singapore  
+1-425-446-5500 from other countries  
Visit Fluke's web site at: [www.fluke.com](http://www.fluke.com).

To register your product, visit [register.fluke.com](http://register.fluke.com)

## Unpacking and Inspection

Every care is taken in the choice of packing material to ensure that your equipment will reach you in perfect condition.

Carefully unpack the equipment and check for external damage. If the instrument is damaged notify the carrier and your sales representative immediately.

For orders of the model 8508A/01 check that the instrument has the six terminals on the rear panel for connection of signals.

In addition to the Multimeter the shipping container should include the following:

Item Description	Quantity
Power cable suitable for you location	1
CD-ROM containing detailed user information in a variety of languages	1
General Purpose CAT 11 Probe Kit and Wallet	1
Users Manual	1

## Line Voltage and Line Fuse

The instrument is packed ready for use with a line voltage determined at the time of ordering. The fuse that corresponds to the set line-voltage is installed in the Multimeter. See Figure 1.

For 200 V to 240 V supplies, 230 is shown in the voltage selector window on the rear panel, and the fuse is rated at 630 mA.

For 100 V to 120 V supplies, 115 is shown in the window and the fuse rating is 1.25 A.

Refer to the 8508A Users Manual for details about changing supply voltage and about changing or replacing line fuses.

### Caution

**To avoid fire hazard, use only the fuse arrangements that appear in the fuse specifications given in the Users Manual.**

**Additionally, the supply network must be fused at a maximum of 16 A, and if the power cable plug is internally fused, a 5 A fuse must be fitted in the power cable plug.**



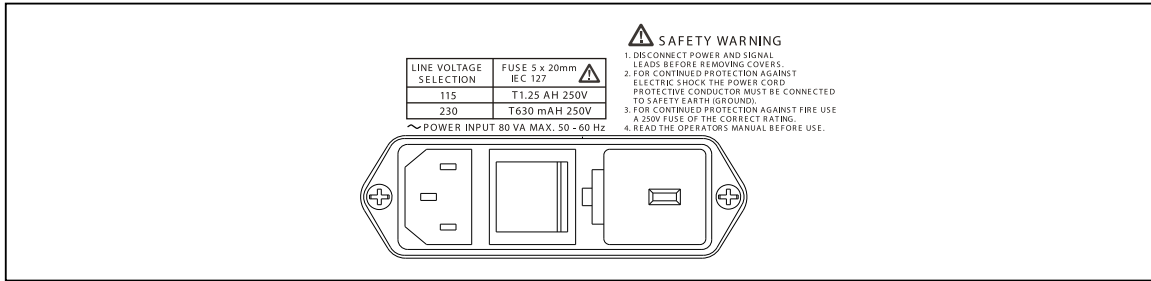


Figure 1. Rear Panel – Line Power Cable, On/Off Switch, and Line Power Fuse Locations

adj019f.eps

## Safety Considerations and Symbols

This section addresses safety considerations and describes symbols that appear on the Multimeter.

A **Warning** statement identifies conditions or practices that could result in injury or death.

A **Caution** statement identifies conditions or practices that could result in damage to the Multimeter or equipment to which it is connected.

### Warning

**This instrument can deliver a lethal electric shock.**

**To avoid electric shock, personal injury, or death, carefully read the information under *Safety Considerations* before attempting to install, use, or service the Multimeter.**

### General Safety Summary

This instrument has been designed and tested in accordance with the European standard publication EN61010-1: 2001 and U.S. / Canadian standard publications UL 61010-1A1 and CAN/CSA-C22.2 No.61010.1. The instrument has been supplied in a safe condition.

This manual contains information and warnings that must be observed to keep the instrument in a safe condition and ensure safe operation.

Using or servicing this Multimeter in conditions other than as specified in the Users Manual could compromise your safety.

To use the Multimeter correctly and safely, read and adhere to the precautions on the *Safety Page* and follow all the safety instructions or warnings given throughout this manual and the Users Manual that relate to specific measurement functions. In addition, follow all generally accepted safety practices and procedures required when working with and around electricity.








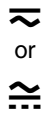





**⚠ ⚠ Safety Page**

**Warning:** To avoid possible electric shock, personal injury, or death, read the following before using the Multimeter:

- ⇒ Use the Multimeter only as specified in this manual, or the protection provided by the Multimeter might be impaired.
- ⇒ Do not use the Multimeter in wet environments.
- ⇒ The Multimeter can output lethal voltages. Use it only as described in this manual.
- ⇒ Inspect the Multimeter before using it. Do not use the Multimeter if it appears damaged. Pay particular attention to the insulation around the connectors.
- ⇒ Inspect the test leads before use. Do not use them if insulation is damaged or metal is exposed. Check the test leads for continuity. Replace damaged test leads before using the Multimeter.
- ⇒ Verify the Multimeter's operation by measuring a known voltage before and after using it. Do not use the Multimeter if it operates abnormally. Protection may be impaired. If in doubt, have the Multimeter serviced.
- ⇒ Whenever it is likely that safety protection has been impaired, make the Multimeter inoperative and secure it against any unintended operation.
- ⇒ Have the Multimeter serviced only by qualified service personnel.
- ⇒ Do not apply more than the rated voltage, as marked on the Multimeter, between the terminals or between any terminal and earth ground.
- ⇒ Always use the power cord and connector appropriate for the voltage and outlet of the country or location in which you are working.
- ⇒ Remove test leads from the Multimeter before opening the case.
- ⇒ Never remove the cover or open the case of an instrument without first removing the power source.
- ⇒ Never operate the Multimeter with the cover removed or the case open.
- ⇒ Use caution when working with voltages above 30 V ac rms, 42 V ac peak, or 42 V dc. These voltages pose a shock hazard.
- ⇒ Use only the replacement fuse(s) specified by the manual.
- ⇒ Use the proper terminals, function, and range for your measurements.
- ⇒ Do not operate the Multimeter around explosive gas, vapor, or dust.
- ⇒ When using probes, keep your fingers behind the finger guards.
- ⇒ When making electrical connections, connect the common test lead before connecting the live test lead; when disconnecting, disconnect the live test lead before disconnecting the common test lead.
- ⇒ Disconnect circuit power and discharge all high-voltage capacitors before testing resistance, continuity, diodes, or capacitance.
- ⇒ Before measuring current, check the Multimeter's fuses and turn OFF power to the circuit before connecting the Multimeter to the circuit.
- ⇒ When servicing the Multimeter, use only specified replacement parts.

**Symbols**

The following safety and electrical symbols may be used on the Multimeter, in this Getting Started Manual, or in the Users Manual.

	Risk of danger. Important information. See manual.		Power ON / OFF
	Hazardous voltage. Voltage > 30 V dc or ac peak might be present		Earth ground.
	AC (Alternating Current).	<b>CAT</b>	IEC 61010 Overvoltage (installation or measurement) Category .
	DC (Direct Current).		Fuse.
	AC or DC (Alternating or Direct Current)		Do not dispose of this product as unsorted municipal waste. Go to Fluke's website for recycling information.
	Digital signal.		Recycle.
	Potentially hazardous voltage.		Double insulated.

## **Protection Class I**

### **Protective Earth/Ground**

The Multimeter **must** be operated with a Protective Earth/Ground connected via the power cable's protective earth/ground conductor. The Protective Earth/Ground connects to the instrument before the line & neutral connections when the supply plug is inserted into the power socket on the back of the instrument.

#### **⚠ ⚠ Warning**

**To avoid possible electric shock, personal injury, or death:**

- **Ensure that no interruption of the protective ground conductor inside or outside the instrument has occurred. Any interruption of the protective ground is likely to make the instrument dangerous.**
- **Make signal connections to the instrument after making the protective ground connection.**
- **Remove signal connections before removing the protective ground connection, i.e. the power cable must be connected whenever signal leads are connected.**

### **Do Not Operate Without Covers**

#### **⚠ ⚠ Warning**

**To avoid possible electric shock, personal injury, or death, do not operate the instrument with its covers removed.**

**The covers protect users from live parts, and unless otherwise stated, must only be removed by qualified service personnel for maintenance and repair purposes.**

**Removing the covers may expose voltages in excess of 1.5 kV peak.**

### **Safe Operating Conditions**

#### **⚠ ⚠ Warning**

**To avoid electric shock or fire hazard, do not apply to or subject the Multimeter to any condition that is outside specified range. See Chapter 5 of the Users Manual for detailed instrument specifications and operating conditions.**

Only operate the Multimeter within the manufacturer's specified operating conditions. Examples of operating conditions that must be considered include:

- Ambient temperature
- Ambient humidity
- Power supply voltage & frequency
- Maximum terminal voltages or currents
- Altitude
- Ambient pollution level
- Exposure to shock and vibration

**⚠ Caution**

**To avoid possible damage to the Multimeter, consider direct sunlight, radiators and other heat sources when assessing ambient temperature.**

**Before connecting the Multimeter to the supply, make sure that the ac supply voltage connector on the rear panel is set to the correct voltage and that the correct fuses are installed. Refer to the Users Manual for fuse details.**

***The Power Cable and Power Supply Disconnection***

The intended power supply disconnect device is the ON/OFF switch that is located on the Multimeter's rear panel. See Figure 1.

The ON/OFF switch **must** be readily accessible while the instrument is operating. If this operating condition cannot be met, the power-cable plug or other power-disconnecting device **must** be readily accessible to the operator.

**⚠⚠ Warning**

**To avoid electric shock and fire hazard, make sure that the power cable is not damaged, and that it is adequately rated against power supply network fusing.**

**If the power cable plug is to be the accessible disconnect device, the power cable must not be longer than 3 meters.**

***Terminal Connections***

Make sure that the instrument is correctly grounded (earth ground) via the power cable before and while any other connection is made.

***Installation/Measurement Category I***

Measurement and/or guard terminals are designed for connection at Installation or Measurement Category I.

**⚠⚠ Warning**

**To avoid electric shock and fire hazard, do not connect the Multimeter terminals directly to the ac line power, to an ac line power current transformer, or to any other voltage or current source that may (even temporarily) exceed the instrument's peak ratings.**

**⚠⚠ Warning**

**To avoid injury or death, do not connect or disconnect signal leads while they are connected to a hazardous voltage or current source.**

**Make sure that signal leads are in a safe condition before you handle them.**

**This instrument can deliver a lethal electric shock. Never touch any lead or terminal unless you are absolutely certain that no dangerous voltage is present.**

## Maintenance and Repair

### ⚠ Warning

**For protection against injury and fire hazard, use only manufacturer supplied parts that are relevant to safety. Perform Safety tests after replacing any part that is relevant to safety.**

Observe all applicable local and/or national safety regulations and rules while performing any work.

First disconnect the instrument from all signal sources, then from the ac line supply before removing any cover.

Only the manufacturer's authorized service personnel should perform adjustment, parts replacement, maintenance, or repair on the Multimeter.

## Front and Rear Panel Features

This chapter contains descriptions the front and rear panel features of the 8508A Reference Multimeter (hereafter, referred to as the Multimeter). Figure 2 shows the Multimeter's front panel controls, indicators, and connectors.

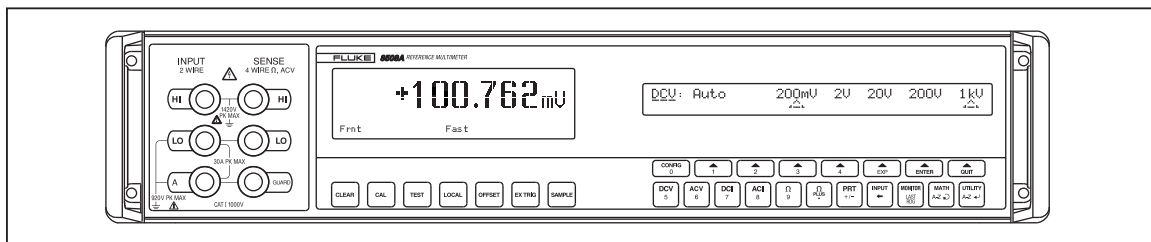


Figure 2. Front Panel Displays

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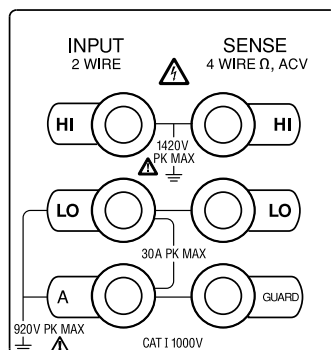
## Input Terminals

### ⚠⚠ Warning

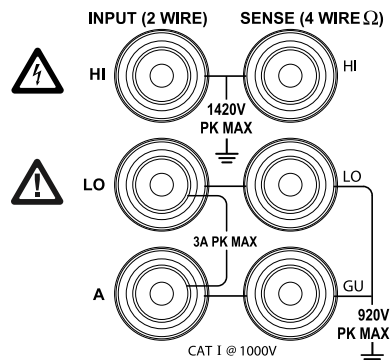
**to avoid electric shock, personal injury, or death, never touch any lead or terminal on the Multimeter unless you are absolutely certain that no dangerous voltage is present.**

The 8508A Multimeter has only front terminals. The 8508A/01 includes both front and rear panel input terminals (Figures 3). Select either front or rear, or Scan both using the Input menu or via IEEE-488 remote control.

For maximum input limits, see the *Specifications* section later in this manual.



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Figure 3. Front and Rear Input Terminals

Three pairs of 4 mm ‘banana’ terminals are fitted on the left of the front panel and, as an option, on the right of the rear panel . Their functions are as follows:

INPUT 2 wire		SENSE 4WIRE Ω, ACV	
<b>HI</b>	Voltage High Ohms High (2 – wire)	<b>HI</b>	Voltage High (4-wire <i>front only</i> ) Ohms High (4-wire)
<b>LO</b>	Voltage Low Current Low Ohms Low (2-wire)	<b>LO</b>	Voltage Low (4-wire <i>front only</i> )  Ohms Low (4wire)
<b>A</b>	Current High ( <i>only 2A max on rear</i> )	<b>GUARD</b>	

## The Front Panel Displays

The front panel (Figure 2) has two displays:

- The display on the left, the main display, is used to show all measurement readings, with status legends on the bottom line, and measurement qualifiers on the line above. Figure 4 shows details of the main display, including annunciators.
- The display on the right is used to display menus for the softkeys situated below. It is also used for error messages and status information when in remote.



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**Figure 4. Sample of the Main Display**

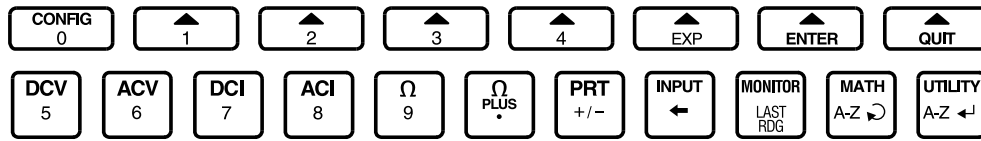
## Front Panel Keys

There are four types of keys on the front panel:

- The major measurement function keys: DCV 5 ACV 6 DCI 7 ACI 8 Ω 9 Ω PLUS PRT +/-
- The mode keys: CAL TEST ← MONITOR LAST RES. MATH A-Z UTILITY A-Z ← CLEAR
- Direct action keys that immediately initiate an action or set a state: LOCAL OFFSET EX TRIG SAMPLE
- The "soft-keys" point to a menu label on the display above, indicating the operation and setting of the Multimeter: ↑ 1 ↑ 2 ↑ 3 ↑ 4 ↑ EXP ↑ ENTER ↑ QUIT

System messages may appear to clarify settings or operations.

## Numeric Keyboard



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### Numeric Keyboard

The operation of the numeric keys is enabled for appropriate menus. The active keys are:

numerals 0 to 9.

decimal point

polarity

for exponent

for backspace

to enter the last reading taken

to confirm the numeric entry

to abort the numeric entry.

When the numeric keyboard is active other keys are locked out.

For some operations the two alpha selection keys are enabled along with the numeric keys.

selects the alpha characters (upper case only) and cycles A through Z.

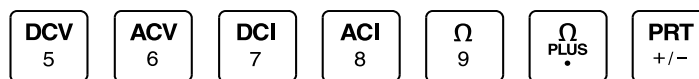
enters the selected character and moves the entry point one character to the right.

## Exiting a Menu

You can generally exit from any menu by pressing a measurement function key or a mode key.

For those menus where the numeric or alpha numeric keyboard is active, exit by pressing either Enter or Quit. For some menus, a special soft key permits exit by a single keystroke.

## Major Function Keys



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Each measurement function has a CONFIG (Configuration) menu, from which you can select function-dependent parameters such as resolution and filter settings.

Once set, the instrument remembers the function dependant parameters until you change it or turn the Multimeter off.







## Direct Action Keys










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### Direct Action Keys

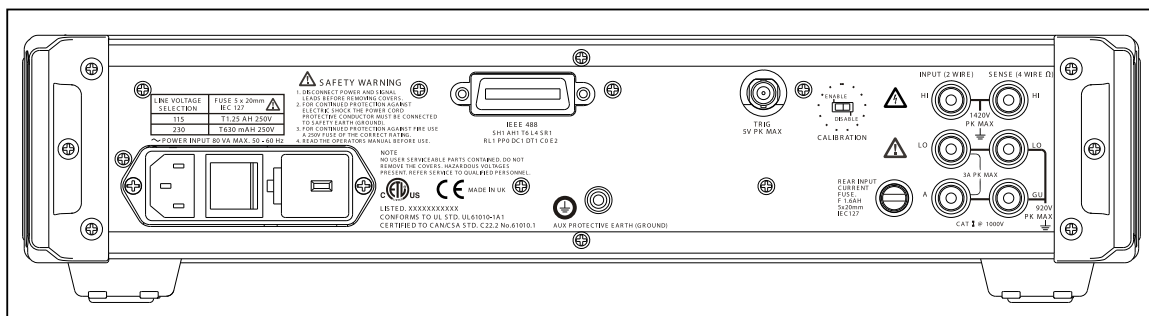
-  Press to disable internal triggers and enable all external trigger sources. The Ext annunciator on the main display is lit.
-  Press to trigger a single-shot measurement if the Multimeter is in Ext'trig mode. All measurements triggered using the Sample key are subject to the standard internal time delays before A-D conversion.
-  Press to return the Multimeter to the control of the front panel when operating on the IEEE-488 bus.
-  Press to store the displayed value in memory. This temporary value will be subsequently subtracted from the next measured value. The Offset annunciator on the main display is lit. To cancel this subtraction press the Offset key.

## Mode Keys

-  Press to access to the calibration mode.
-  Press to gain access to test operations.
-  Press to gain access to guarding, input zero operation, selection of alternate inputs, and scanning operations.
-  Provides additional monitoring operations on measurements e.g. frequency (in AC), and recorded measurements of maximum, minimum, and peak to peak
-  Provides additional mathematical operations on measurements
-  Press to gain access to bus address, display adjustments, line frequency selection, and information on cal due date, serial number and spot frequency.
-  Press to gain access to the menu for removing Input zero for the range selected or all the ranges in the selected function and for resetting the Multimeter to the power up state.

## Rear Panel

The rear panel of the Multimeter (Figure 5) and a description of it features follows:



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Figure 5. 8508A Rear Panel Detail

### **Labels**

Attached to the rear panel are the identification label for the instrument and a modification strike label.

### **Fuses**

**⚠ Power Fuse:** Located in the fuse drawer which is part of the integrated module for power input and voltage selection.

**⚠ Rear Input Current Fuse:** Protects the current measuring circuitry when using the rear terminals for signal input.

### **⚠⚠ Warning**

**To avoid damage to the Multimeter, or shock, injury, or death, use ONLY fuses with the amperage, interrupt, voltage, and speed ratings specified in the Users Manual.**

### **Voltage Selector**

The power line voltage selector block is located behind the fuse block drawer, and adapts the instrument to either 115V or 230V line inputs.

### **Power Input and Power Switch**

The power input socket and power ON/OFF switch are part of the integrated module for power input and voltage selection. Power on default configuration is listed later in this chapter.

### **Calibration Switch**

Access to calibration mode is enabled (or restricted) by the rear panel calibration switch. Setting the switch to ENABLE will allow access to the calibration mode via the front panel CAL key and the CALIBRATION menu, and will also enable the remote IEEE-488 interface calibration commands.

Always be set the calibration switch to DISABLE on completion of any calibration operation. Applying an integrity seal or calibration sticker to cover the rear panel Calibration switch is a convenient way to ensure the security of calibration and to prevent unauthorized access to the switch.

### **Rear Panel Connectors and Pin Designations**

### **⚠⚠ Warning**

**This instrument can deliver a lethal electric shock.**

**To avoid electric shock, personal injury, or death, never touch any lead or terminal unless you are absolutely certain that no dangerous voltage is present.**

### **Rear Inputs**

For details of rear input terminals see Figure 5.

### External Trigger Input

This co-axial BNC socket can be used to trigger a measurement when external triggers are enabled.

The single pin is pulled up internally to +5V, and requires a negative-going TTL edge to initiate the reading.

### IEEE 488 Input/Output

The IEEE 488 input/output is a 24-way Amphenol connector which is directly compatible with the IEEE 488 interface and the IEC 625 Bus.

Note that the Bus Address is set from the front panel. See Chapter 4 in the Users Manual for detailed information about the IEEE 488 connector and remote operations.

## Power-On Configuration

To turn the Multimeter on, use the Power Switch on the rear panel. The Multimeter powers on in the following configuration:

<b>Function</b>	DCV
<b>Range</b>	1 kV
<b>Resolution</b>	7-1/2 digits
<b>Input</b>	Front
<b>Filter</b>	Off
<b>Fast</b>	On
<b>External Guard</b>	Off
<b>Scan</b>	Off
<b>Monitor</b>	Off
<b>Math</b>	Off

## Making Measurements

### Warning

**This instrument can deliver a lethal electric shock.**

**To avoid electric shock, personal injury, or death, carefully read the information under *Safety Considerations* (earlier in this manual) before attempting to install, use, or service the Multimeter.**

**A   Warning statement identifies conditions or practices that could result in injury or death.**

**A  Caution statement identifies conditions or practices that could result in damage to the Multimeter or equipment to which it is connected.**

The following information is organized to provide an overview of the following Multimeter functions and modes.

### Functions

DC Voltage    AC Voltage    Resistance    DC Current    AC Current    Temperature

### Modes

Input Control    Monitoring    Math    Utility    Clear    Test

Before proceeding make sure that the Multimeter has been properly installed and prepared for operation as described earlier in this manual.

**⚠ ⚠ Warning**

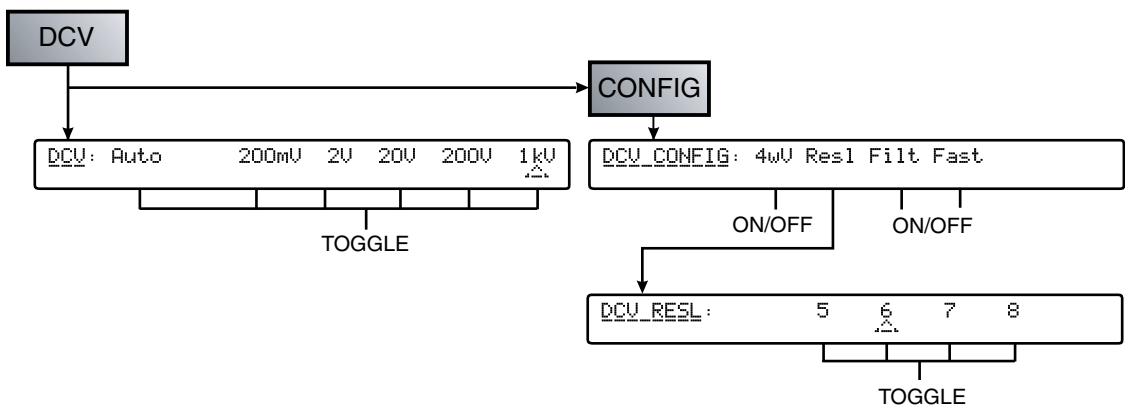
**Using this instrument can deliver a lethal electric shock. To avoid possible electric shock, personal injury, or death:**

- **Ensure that no interruption of the protective ground conductor inside or outside the instrument has occurred. Any interruption of the protective ground is likely to make the instrument dangerous.**
- **Never touch any lead or terminal unless you are absolutely certain that no dangerous voltage is present.**

**Using the Measurement Functions**

The following descriptions include an overview of the menus associated with the available measurement functions. These menus are adequate to explore the Multimeter’s various functions, ranges, and features. They are also useful as a quick reference to the available functions. To ensure proper use of these menus and measurement functions refer to the 8508A Users Manual for complete details.

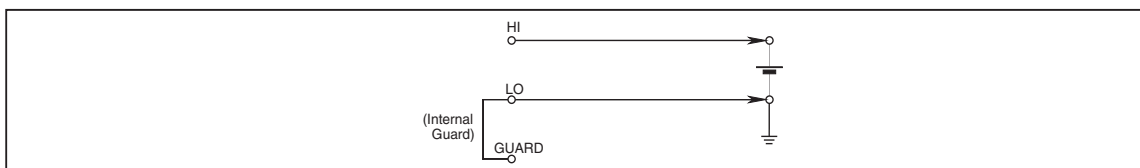
**DC Voltage**



adj054f.eps

**DC Voltage Menu Tree**

For the majority of applications the simple lead connection without external guard will be adequate. See Figure 6. The disadvantage of this simple arrangement is that the connecting leads can form a loop. If a stray alternating magnetic field (e.g., from the line transformer of a neighboring instrument) passes through the loop, it will behave as a single-turn secondary winding inducing unwanted AC voltages into the measuring circuit. Refer to the 8508A Users Manual for descriptions of more complex lead descriptions.

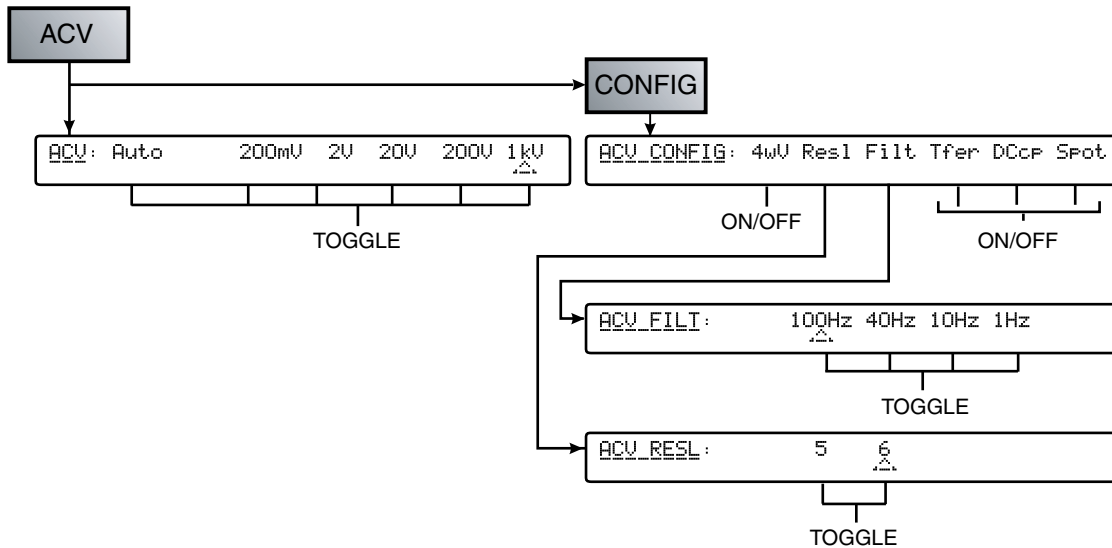


adj059f.eps

**Figure 6. Simple Lead Connections**

## AC Voltage

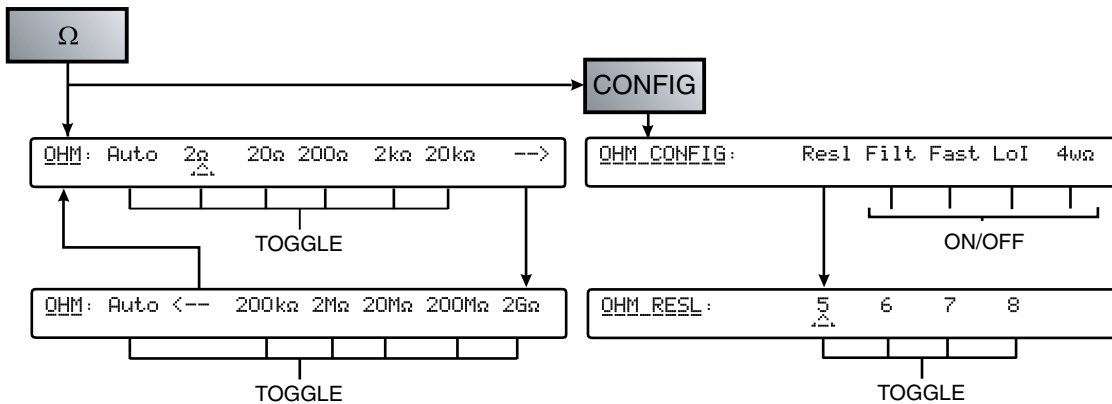
adj067f.eps



adj070f.eps

AC Voltage Menu Tree

## Resistance



adj076f.eps

Resistance Menu Tree

## High Voltage Ohms

The High Voltage Ohms function provides both 2-wire and 4-wire measurements of resistance, in decade ranges from 20MΩ to 20GΩ. The measurement is performed at High Voltage using a current source with high compliance. The resulting increase in current through the unknown resistor is valuable to the reduction of leakage and bias current uncertainties. The function may also be used alongside the normal Ohms function to determine the voltage coefficient in the unknown resistor.

The MAXIMUM voltage that could appear across the measured resistor is 240 V. No autoranging is provided in this function.

**⚠⚠ Warning**

**DANGER OF LETHAL ELECTRIC SHOCK**

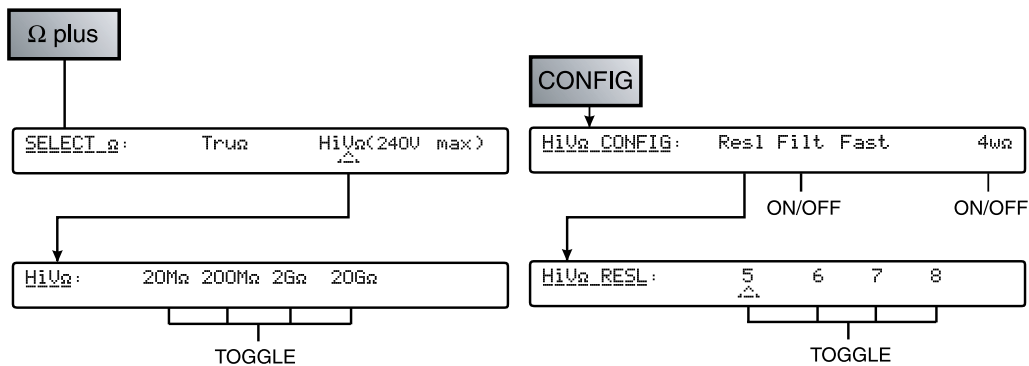
To avoid LETHAL electrical shock DO NOT CONNECT EXTERNAL CAPACITANCE greater than 50 nF to the Multimeter terminals.

The maximum voltage across the measured resistor or open Multimeter terminals while using the HiVΩ function is 240 V. The maximum current that the Multimeter will source while using HiVΩ is 10 μA (Lo to Hi), or 2.0 mA (Guard to Hi if Ext Guard is selected). These characteristics are not considered “Hazardous Live” within the Safety standards applied to this instrument. However, capacitors (>50 nF) external to the Multimeter could accumulate LETHAL charge while making a HiVΩ measurement. DO NOT TOUCH the Multimeter terminals or circuitry under test unless you are sure it is safe to do so.

**⚠⚠ Caution**

**HIGH VOLTAGE**

To avoid equipment damage when using the HiVΩ function make sure that circuits or components connected to the Multimeter can withstand at least 240 V dc.

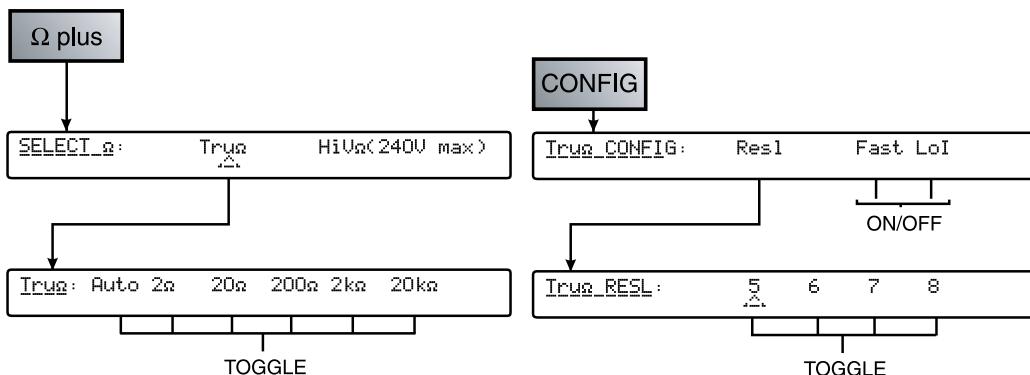


**HiVΩ Menu Tree**

adj085f.eps

**True Ohms**

The TruΩ mode takes two measurements per reading. The second measurement is made with the current reversed relative to the first measurement. The two measurements are combined to eliminate the effects of any external EMFs that may be present.



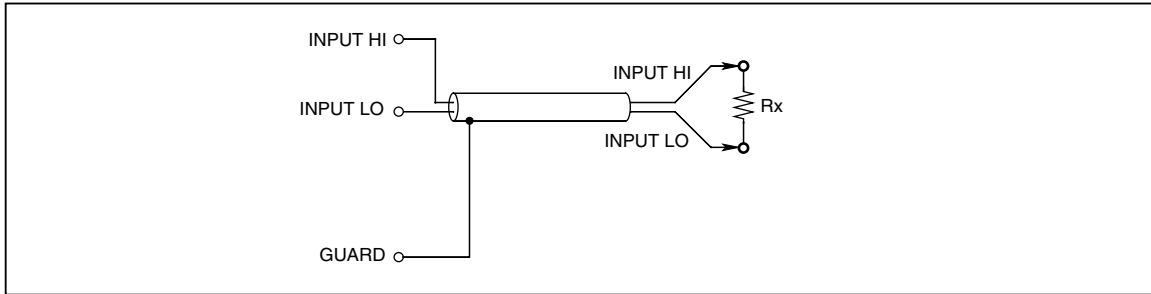
**TRUΩ Movement Between Menu**

adj086f.eps

## Measuring Resistance

### 2-Wire Measurements

For many applications the simple 2-wire arrangement will be adequate. See Figure 7. However, the value displayed will include the resistance of the connecting leads.

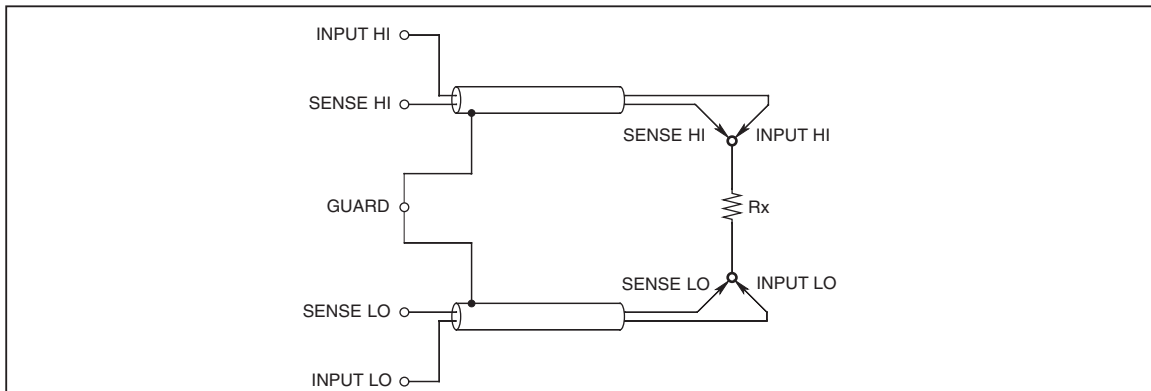


**Figure 7. 2-Wire Measurements**

adj091f.eps

### 4-wire Measurements

With a 4-wire connection the lead resistances have negligible effect and only the value of  $R_x$  is displayed. See figure 8.

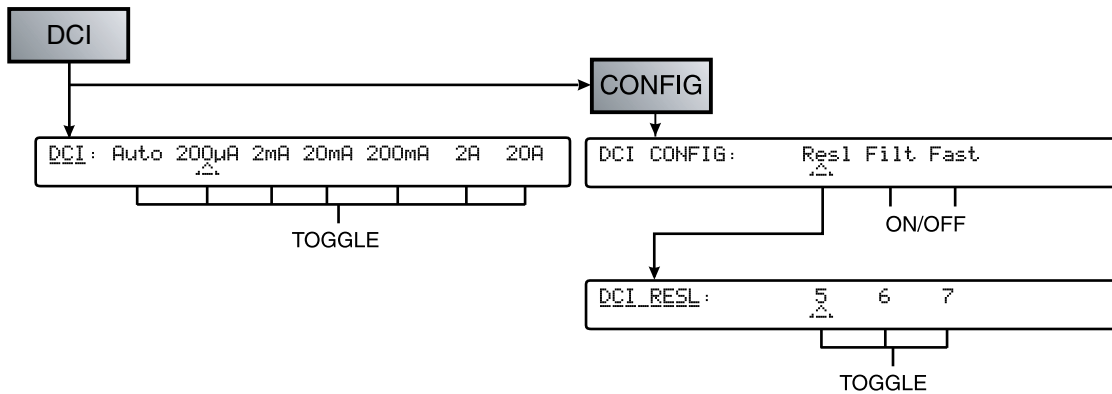


**Figure 8. 4-Wire Measurements**

adj092f.eps

## DC Current

adj098f.eps



adj100f.eps

### DCI Movement Between Menu

## Measuring DC Current

Similar connection considerations are required for DC current measurement as for DC voltage measurement. Refer to the 8508A Users Manual for a complete description of lead connections.

### **⚠ ⚠ Warning**

#### **HIGH CURRENT FLOW**

**To avoid fire hazard make sure that conductors of adequate guage are used when making current measurement. High Current can cause excessive heating of underated conductors and may cause a fire.**

#### *Note*

*The Current path between DMM terminals is not made when the Current functions are not in use or when Front or Rear terminals are deselected.*

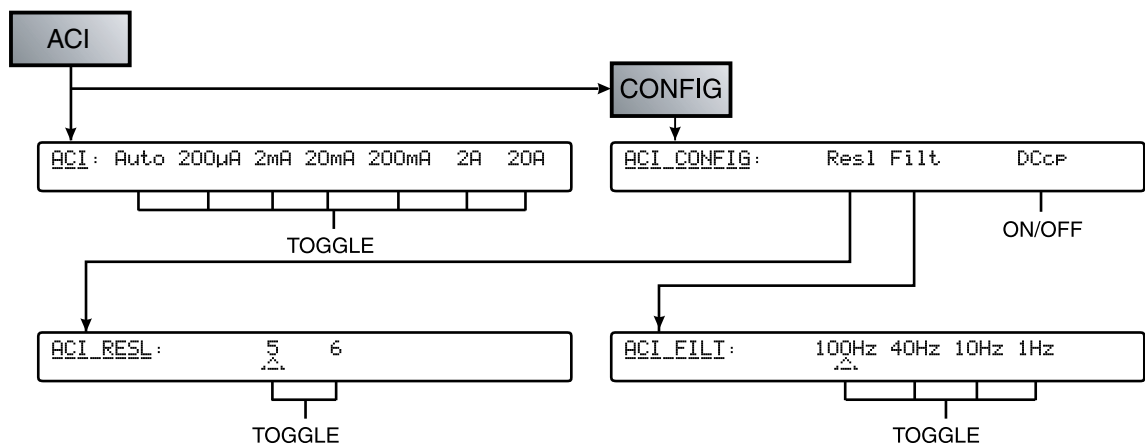
#### *Note*

*Maximum Input Current capability and protection The front input terminals may be used to measure currents up to 20 A. The front input A terminal protection is automatic and self-resetting, and does not interrupt current flow. Damage is likely to occur if more than 20 A is applied.*

*The Rear input terminals may be used to measure currents up to 2 A only. The rear input A terminal is protected by a fuse mounted on the rear panel.*



## AC Current



ACI Menu Tree

adj115f.eps

## Measuring AC Current

Insert the Multimeter in the current path via its **A** and **Lo** terminals. Similar connection considerations are required for AC current measurement as for AC voltage measurement.

### ⚠️ Warning

#### HIGH CURRENT FLOW

**To avoid fire hazard make sure that conductors of adequate guage are used when making current measurement. High Current can cause excessive heating of underated conductors and may cause a fire.**

#### Note

*The Current path between DMM terminals is not made when the Current functions are not in use or when Front or Rear terminals are deselected.*

#### Note

*Lead Impedance - When making AC current measurements pay particular attention to the lead impedance, especially lead capacitance at high frequencies on the lower current ranges. (See "Measuring AC Voltage" earlier in this chapter.)*

#### Note

*Maximum Input Current capability and protection - The front input terminals may be used to measure currents up to 20 A. The front input A terminal protection is automatic and self-resetting, and does not interrupt current flow. Damage is likely to occur if more than 20 A is applied.*

*The Rear input terminals may be used to measure currents up to 2 A only. The rear input A terminal is protected by a fuse mounted on the rear panel.*

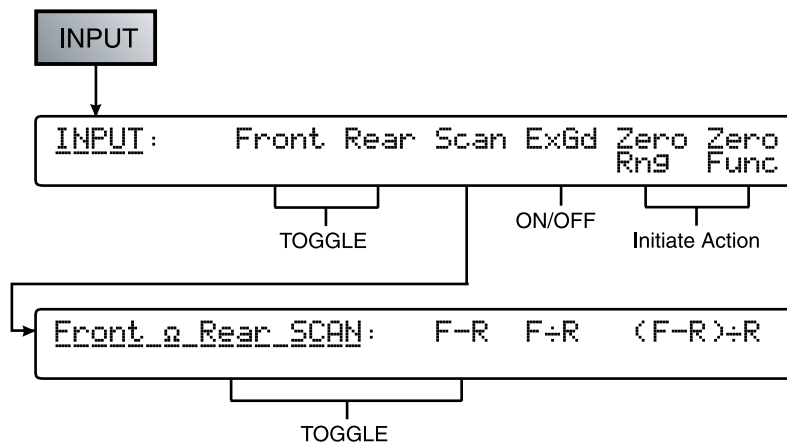
## Temperature

The Multimeter provides a temperature readout by measuring the resistance of the connected PRT or SPRT probe, and converting the resistance value to temperature. The multimeter autoranges between the 200Ω LoIΩ range and the 2kΩ Normal Ω range depending on the resistance value obtained at the temperature being measured.

Refer to the 8508A Users Manual for additional details.

## Multimeter Inputs

The Input key and its menu allow you to select either the Front or Rear panel terminals as the input to the Multimeter. The scan softkey gives access to dual-channel measurement and processing selection which produces a single result.



Input Menu Tree

adj128f.eps

In each of three Scan modes, measurements are taken alternately from the Front and Rear Terminals and are combined mathematically to produce a single result. Refer to the 8508A Users Manual for additional details and applications of the Scan mode.

*Note*

*Scan of the Current functions - Scan is not available in the ACI and DCI functions.*

*Note*

*Scan of the Ohms functions - In the Ohms and HiV Ohms functions the Scan Operation switches both current stimulus and potential difference measurement between the Front and Rear terminals. The Tru Ohms Ratio feature described below scans only the potential difference measurement between Front and Rear terminals, maintaining stimulus current through both Front and Rear terminals.*

**⚠⚠ Warning**

**DANGER OF LETHAL ELECTRIC SHOCK**

**To avoid LETHAL electrical shock DO NOT CONNECT EXTERNAL CAPACITANCE greater than 50 nF to the Multimeter terminals.**

**The maximum voltage across the measured resistor or open Multimeter terminals while using the HiVΩ function is 240 V. The maximum current that the Multimeter will source while using HiVΩ is 10 μA (Lo to Hi), or 2.0 mA (Guard to Hi if Ext Guard is selected). These characteristics are not considered “Hazardous Live” within the Safety standards applied to this instrument. However, capacitors (>50 nF) external to the Multimeter could accumulate LETHAL charge while making a HiVΩ measurement. DO NOT TOUCH the Multimeter terminals or circuitry under test unless you are sure it is safe to do so.**

**⚠⚠ Caution**

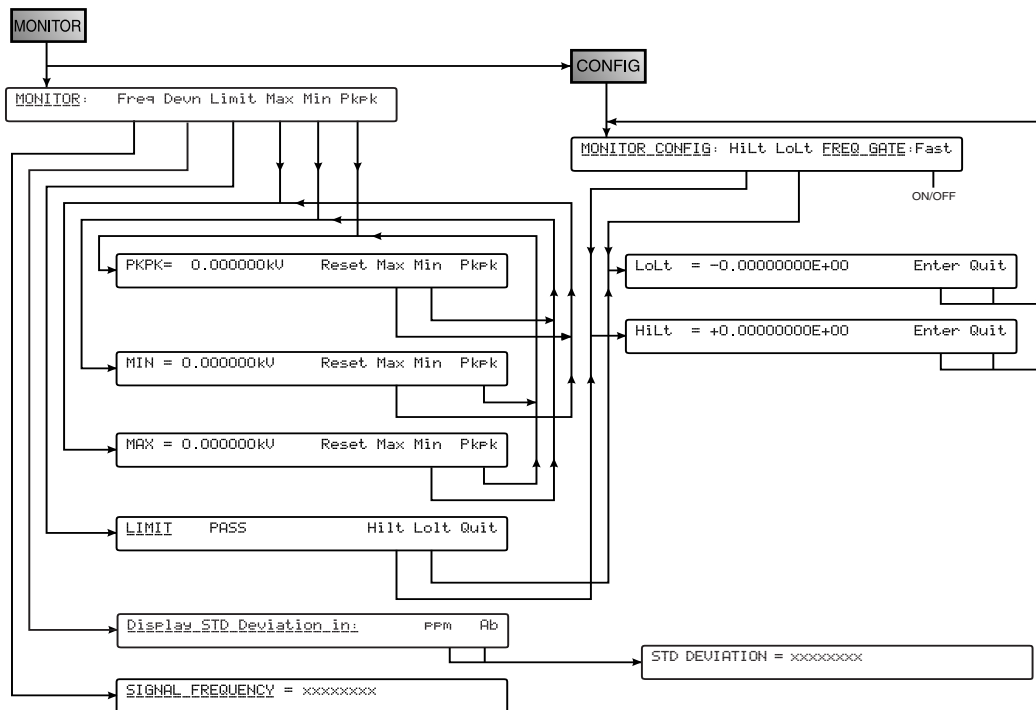
**HIGH VOLTAGE**

To avoid equipment damage when using the HiVΩ function make sure that circuits or components connected to the Multimeter can withstand at least 240 V dc.

*Note*

Scan of Temperature Measurement - Scan Mode is not available in the PRT Function. Temperature Measurements from two PRTs (each with its own linearization coefficients) connected to the Front and Rear Terminals may however be compared under remote control of the DMM.

**Monitoring Modes**



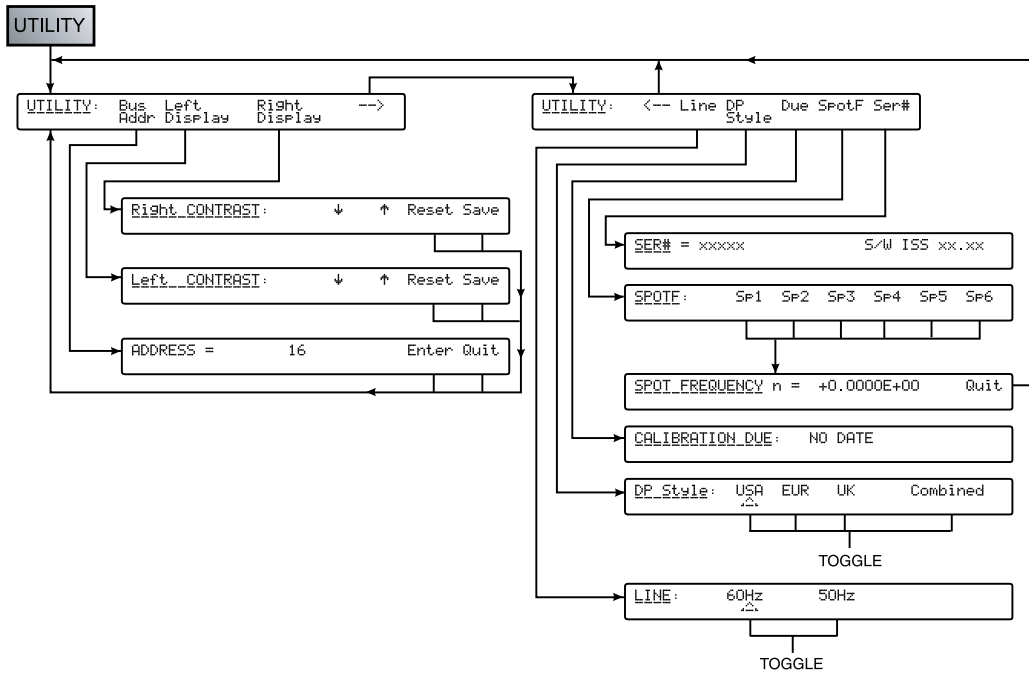
**Monitor Menu Tree**

adj114f.eps

*Note*

From any of these menus, pressing the Config hard key will enter the MONITOR CONFIG menu; pressing the Monitor key reverts to the MONITOR menu.

## Utility

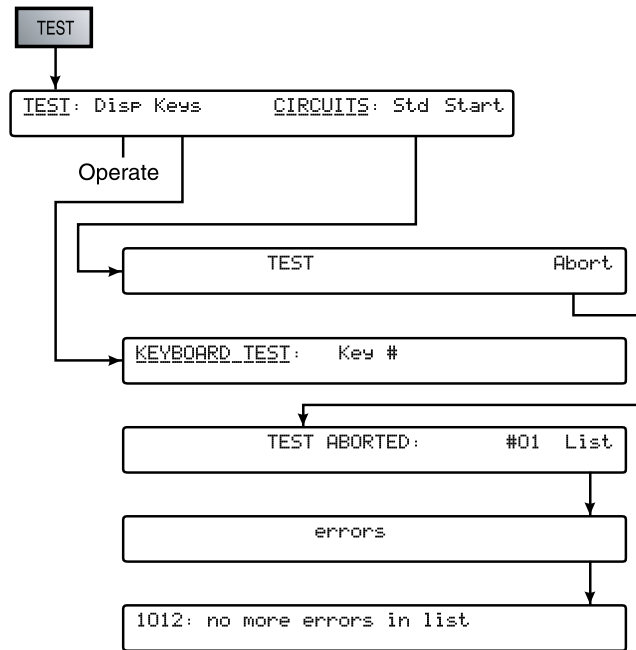


Utility Menu Tree

adj124.eps

## Selftest

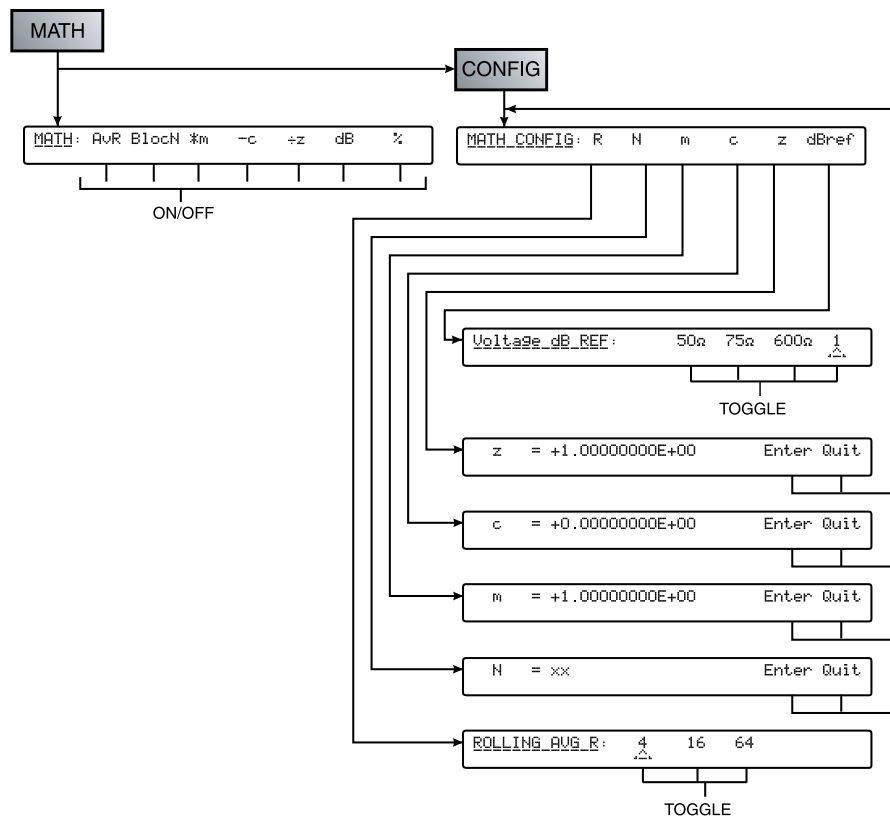
The Test mode provides a variety of selftest that may be run from the menu.



Test Menu Tree

adj125.eps

## Math



Math Menu Tree

adj127f.eps

The MATH CONFIG menu has six menu keys.

- R Provides selection of the number of readings used in rolling average.
- N Provides a numeric entry menu for the value of N. The most recent N value is shown and the keyboard is activated. Press Enter to store the new value or Quit to leave the old value intact and return to the MATH CONFIG menu.
- m Provides a numeric entry menu for the value of the multiplier constant, m.
- c Provides a numeric entry menu for the value of the subtractor constant, c.
- z Provides a numeric entry menu for the value of the divisor constant, z.
- dBref Provides selection of the decibel reference constant, dBREF Only voltage functions can utilize all the settings. Other functions will utilize a unity reference.

50Ω Selects a reference of 1 mW in 50 Ω.

75Ω Selects a reference of 1 mW in 75 Ω.

600Ω Selects a reference of 1 mW in 600 Ω

1 Selects a unity reference value.

## Clear

The 'input zero' corrections will remain active until power down, but the selections available in this menu allow the corrections to be cleared or restored to restored to their Power-up default.

CLEAR :	Rng	Func	Pwr up
	Zero	Zero	Dflt

CLEAR Menu

adj143f.eps