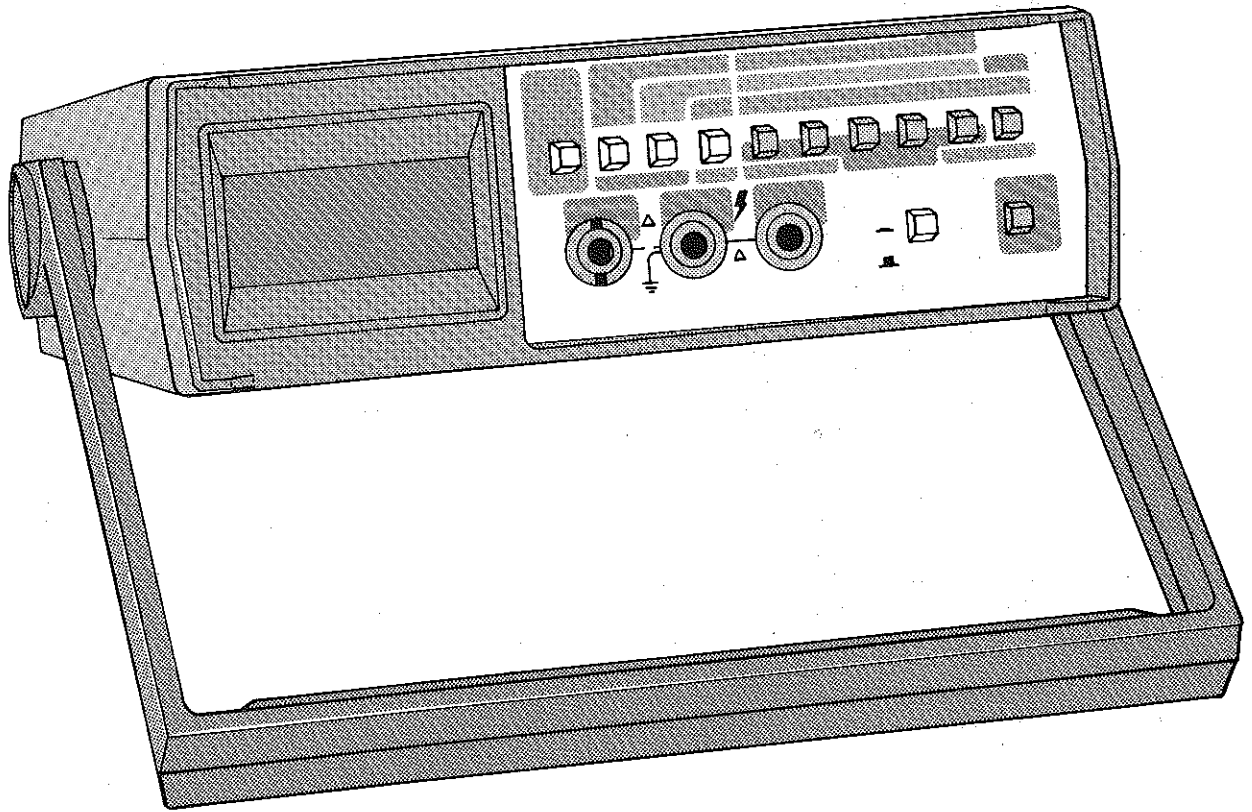


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8050A



8050A Digital Multimeter

Section 1

Introduction & Specifications

1-1. INTRODUCTION

1-2. Your John Fluke Model 8050A is a portable, bench-type digital multimeter with a 4½ digit liquid crystal display (LCD). Your 8050A can make dB voltage measurements (ac and dc) and conductance measurements ($1/\Omega$) in addition to the usual DMM measurements -- ac/dc volts, ac/dc current, and resistance. Some of the advantages of owning an 8050A are:

TRUE RMS MEASUREMENT OF AC SIGNALS: True RMS measurement is the only accurate way to directly measure ac signals that are not noise-free pure sine waves. Your 8050A can measure frequencies up to 50 kHz.

SEVEN MEASUREMENT FUNCTIONS:

AC and DC VOLTS: Standard linear voltage measurements from 10 μ V to 1000V dc and 10 mV to 750V ac true rms.

dB VOLTAGE (dB, dBm, dBW; and dBV): Allows voltage measurements in decibels referenced to any user selected reference level or any 1-of-16 selectable reference impedances.

AC and DC CURRENT: Standard current measurements up to 2A.

RESISTANCE: Standard resistance measurements up to 20 M Ω .

CONDUCTANCE ($1/\Omega$): Allows fast, noise-free resistance measurements of up to 100,000 M Ω .

EACH MEASUREMENT RANGE HAS:

300 Autopolarity operation.

Overrange indication.

Effective protection from overloads and transients.

Dual slope integration measurement technique to insure fast, accurate, noise-free measurements.

RELATIVE: Allows you to store any input signal as an offset or relative reference value. Subsequent measurements are displayed as the difference between the input level and the reference level. Relative reference works for all measurement functions.

DIODE TEST: Ranges of the resistance function will turn on PN junctions allowing testing of diodes and transistors. These ranges are marked with a diode symbol on the front panel of your 8050A. The preferred 2 k Ω range is marked with the largest diode symbol.

IN CIRCUIT RESISTANCE CHECKS: Are possible with all resistance ranges that are not marked with a diode symbol on the 8050A front panel.

IMPROVED TEST LEADS: Finger guards on the probes and shrouded contacts on the input terminals decrease the possibility of accidental contact with circuit voltages.

LONG-TERM CALIBRATION STABILITY: 1-year.

ACCESSORIES: A line of accessories that extend the range and scope of your instrument. These accessories are listed in Table 1-1 and are described in detail in Section 6.

Table 1-1. 8050A Options and Accessories

MODEL	DESCRIPTION
ACCESSORIES	
C80	Carrying Case
C86	Carrying Case
M00-200-611	Offset Rack Mounting Kit
M00-200-612	Center Rack Mounting Kit
M00-200-613	Side-By-Side Rack Mounting Kit
Y8008	Touch and Hold Probe
80T-150	Temperature Probe
80I-600	Current Transformer
80K-40	High Voltage Probe
81RF	High Frequency Probe
80J-10	Current Shunt
OPTION	
-01	Rechargeable Battery Option

1-3. UNPACKING YOUR INSTRUMENT

1-4. The shipping container should contain this manual, your multimeter, two test leads (one red and one black), and any accessories you have ordered. Check the shipment for damage. If anything is wrong with your shipment, contact the John Fluke Service Center nearest you. Section 7 contains a list of these service centers. If reshipment is required, please use the original shipping container. If the original container is not available, a new container may be obtained from the John Fluke Mfg. Co., Inc. Please state that your DMM is a Model 8050A when ordering a new shipping container.

1-5. Turn your 8050A upside down. The decal on the bottom of your instrument is marked with the line voltage and frequency required for proper operation. Refer to Section 4 if a change in the input power configuration is desired.

1-6. GETTING ACQUAINTED

1-7. Let's take a brief look at your DMM before we discuss exactly how to operate it. Your meter is lightweight with a low profile that hugs the work bench. The light-grey case is made of rugged, high-impact plastic. The handle can be rotated to eight positions.

1-2

NOTE

One position allows it to be used as a carrying handle. Other positions allow the handle to be used as a bail to tilt the front panel for convenient bench-top operation.

1-8. The LCD is on the left side of the front panel. The right side of your 8050A contains two rows of switches and input connectors. The power cord receptacle is located on the rear panel of your DMM.

1-9. USING YOUR METER

1-10. The following paragraphs describe each of the controls on your 8050A and how these controls can be used for each instrument function. Exercises are included to help familiarize you with your 8050A and to verify that your instrument is functional.

1-11. The LCD

1-12. The LCD (Figure 1-1) is a low-power, high-contrast display. The 4½ digits -- easily read from across the room -- can register from 0000 to 19999. For ease of discussion, the 19999 will be rounded to 20000 in the remainder of this text. For example, we will refer to the 2V range, not the 1.9999V range. In all linear functions, the decimal point position is determined by the range selected. The REL (Relative) annunciator will appear in the lower right corner of the LCD when the RELATIVE switch is at the ON position. The dB annunciator will appear in the upper right corner of the LCD if the dB measurement function is selected. The HV (High Voltage) annunciator will appear in the center of the right side of the LCD any time an input signal greater than 40V dc/ac rms is measured. If you own an 8050A with the -01 Battery Option, the BT indicator will appear in the upper left corner of the LCD to indicate that battery voltage is low and you need to recharge the batteries (see Section 6). Polarity of the input signal or direction of dB or relative measurements is indicated by a + or - sign at the center of the left side of the LCD. The + sign is disabled in the AC V, AC mA, kΩ, and S measurement functions. The - sign may appear in any measurement function, but is normally not meaningful when making AC V, AC mA, kΩ, and S measurements. If you are reading resistance and the minus sign remains on, there may still be energy in the circuit being measured. The circuitry may still have power applied, a capacitor may still be charged, etc. You will only get this indication of an energized circuit if the power in the circuit is negative with respect to the COMMON input terminal. If the power in the circuit is positive with respect to the COMMON input terminal, an erroneous resistance will be displayed. If there is any doubt about whether there is energy remaining in the circuit you are reading, read the resistance, then reverse the test lead positions. If the minus sign is displayed in either case, the

remaining energy must be removed from the circuit before correct resistance readings can be made.

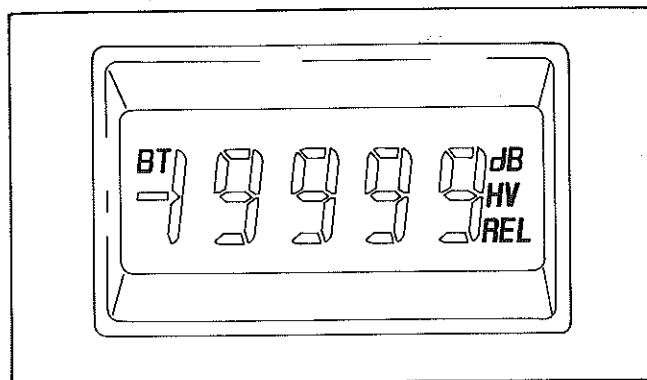


Figure 1-1. LCD

1-13. There are three LCD indications that require interpretation. If you apply an input signal that exceeds the limits of the range selected, the LCD will have a 1 in the extreme left digit location and a blank in the other four digit locations (other display indicators such as a decimal point may also be present). All decimal point positions appear in the display to indicate certain illegal combinations of front panel switch settings. For example, if you select the DC V function and the 20M/REF Z range switch, all four decimal points will appear on the display. Finally, when selecting lower ranges while the RELATIVE switch is at the ON position, the right-hand digit(s) will be blanked to indicate that the resolution of measurements for that range is decreased by the resolution of the stored relative reference level -- more about this indication is contained in the description of the RELATIVE switch in this section.

1-14. POWER Switch

1-15. The green POWER switch is located in the lower right corner of the 8050A front panel. This is a push-push switch so don't try to pull the POWER switch to the out (OFF) position. Push the POWER switch on your 8050A to the in (ON) position.

1-16. RELATIVE Switch

1-17. The RELATIVE switch -- located immediately to the left of the POWER switch (Figure 1-2) -- allows direct measurements to be made in relation to a reference level. When the RELATIVE switch is in the ON position, the displayed value is the input signal measurement with the reference level algebraically subtracted.

1-18. To store a reference level, connect the test leads to the reference level source and set the RELATIVE switch to the ON position. The REL annunciator will appear and the display will read +0000. You can now make measurements and the displayed value will be relative to

the stored reference level. Remember that if either the algebraic sum or the input signal exceed the limits of the range selected, the LCD will display an overrange condition. The stored reference level only works in the measurement function for which it was established. For example, suppose that we have stored a reference level of +1V dc with the DC V function selected, if we select the $k\Omega$ function, normal resistance measurements can be made. If we select the DC V function again, the stored reference level of +1V ac will be subtracted from the input signal and the result will be displayed.

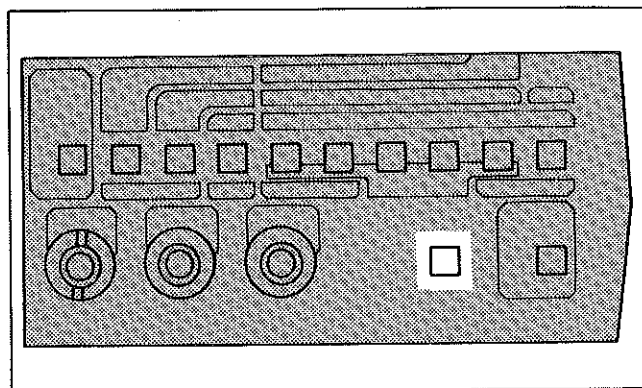


Figure 1-2. RELATIVE Switch

1-19. If any linear function is selected, optimum resolution will be obtained only on the range where the relative reference level was originally established. If a higher range of measurement is selected, the stored reference will be rounded to the resolution of the range selected. For example, in the linear volts function with the 2V range selected, a relative reference level of 1.2345V is established. If the 20V range is selected, the usable reference level will be altered to 1.235V. If the 200V range is selected, the stored reference level will be altered to 1.23V. If, however, you select a lower range than the range at which the relative reference level was established, the resolution of the display will be the same as the resolution of the stored reference level. For example, in the linear volts function, with the 20V range selected, a relative reference level of 1.234V is established. If the 2V range is selected and a 1V signal is measured, the display value will be -.234XV with the extreme right digit blanked.

1-20. AC/DC Select Switch

1-21. The switch used to select either ac or dc measurements is located at the left end of the upper row of pushbuttons. The AC/DC switch works for both the current and the voltage measurement functions. This switch is a push-push type switch. Do not try to pull the AC/DC switch to the out (DC) position.

1-22. Voltage Measurements

1-23. Your 8050A can make either linear voltage or dB voltage measurements. For both types of voltage measurements, plug the black test lead into the COMMON terminal and the red test lead into the V/k Ω /S terminal.

1-24. Linear Voltage Measurements

1-25. The controls and terminals used for making linear voltage measurements are highlighted in Figure 1-3. Starting at the top left is the AC/DC switch. Next is the V pushbutton. This pushbutton is interlocked with the other two white function selection switches -- mA and V/k Ω /S. That is, if the V function switch is at the in position (V selected), and any other function select switch is pushed, the V pushbutton will be released to the out position. Push the V switch to the in position. Push the V switch to the in position.

1-26. The light green area around the V switch is extended up and to the right to enclose the five range values of the voltage function. Push the range switch immediately below the range value desired to select a range of voltage measurement. The range select switches are interlocked in the same manner as the function switches.

1-27. Perform the following procedure:

1. If the test leads are not connected, plug them into your DMM: red test lead to the V/k Ω /S terminal and black to the COMMON terminal.
2. Select the 2V range.
3. Push the AC/DC switch to the DC position.
4. With the POWER switch set to the OFF position, connect your DMM to a line power outlet rated at the operating voltage and frequency of your instrument.
5. Push the POWER switch to the ON position. The LCD should count down rapidly to a reading of .0000.
6. Touch the sampling end of the red test lead to the mA terminal. (A firm contact must be made or the display may be in error.) The LCD should display approximately -1.3 to -1.6V. This is the signal voltage for the optional Touch and Hold Probe (see Section 6). It is not a precise voltage and will vary from instrument to instrument. This voltage is not present when the ac or the dc current function, or the dB function is selected.

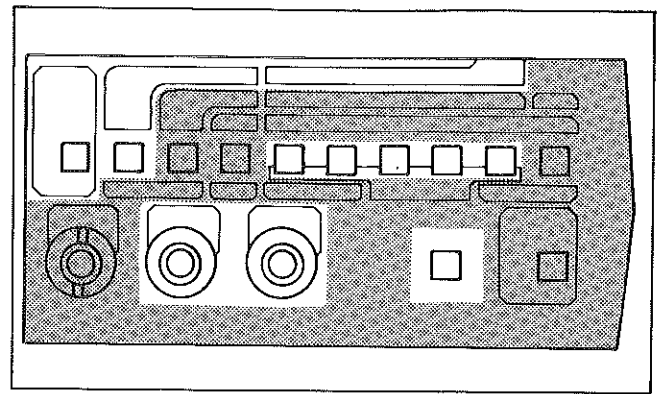


Figure 1-3. Linear Voltage Measurements

7. Push the AC/DC switch to the AC position. The LCD should count down to a reading that is typically -.0020 to .0020 -- the dc signal has been eliminated.
8. Remove the red test lead from the mA terminal.
9. Select the 750V ac range.

WARNING

LOCAL LINE VOLTAGE IS MEASURED IN THE FOLLOWING STEP. BE CAREFUL NOT TO TOUCH THE PROBE TIPS WITH YOUR FINGERS OR TO ALLOW THE PROBE TIPS TO TOUCH EACH OTHER.

10. Insert the sampling ends of the test leads into the slots of a power outlet. The LCD should display the true local line voltage.
11. Push the AC/DC switch to the DC position. The LCD should display near zero volts but there may be some residual dc voltage on the power line due to non-linear loads such as SCR light dimmers.
12. Remove the test leads from the line power outlet.

1-28. dB Voltage Measurements

1-29. The controls and terminals used for making dB voltage measurements are highlighted in Figure 1-4. Starting at the top left is the AC/DC switch. Use the AC position to measure noise or ac signals (dBm, for example). Both the V and mA function select switches must be pushed at the same time to select the dB measurement function. The five range switches for the dB function are partially enclosed by a dark blue area. The 200 mV range switch will autorange from below -60.0 dBm (REF Z = 600 Ω) to +8.24 dBm. This is the only autoranging capability of your 8050A.

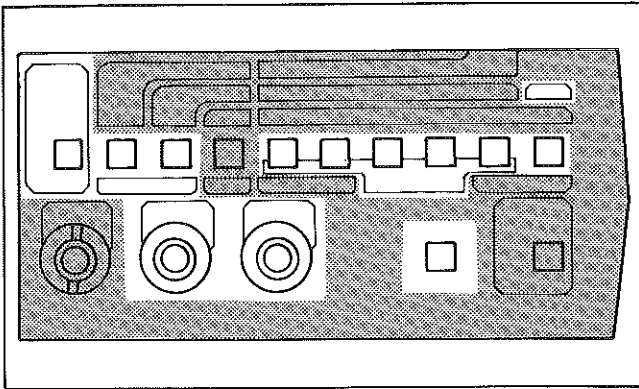


Figure 1-4. dB Voltage Measurements

1-30. When the instrument is first turned on with dB selected the standard 8050A will display, 600, the REFERENCE IMPEDANCE. To select one of the 16 stored reference impedances, push the REF Z switch to the in position. For the first three seconds, the LCD will display the standard reference impedance of 600Ω. Then the 16 stored reference impedances will appear sequentially on the display (see Table 1-2) at a rate of about one per second. When the reference impedance you want to use appears, select any one of the dB ranges. The sequence will stop and the microcomputer will store the displayed impedance as the reference. Normal dB measurement resumes. The 8050A will continue to use the reference impedance that you have just selected until you select another reference impedance or turn the instrument off.

1-31. Current Measurements

1-32. All of the controls and terminals used to make current measurements are highlighted in Figure 1-5. The AC/DC and mA function switches determine the measurement function. The colored area around the mA switch extends up and to the right to enclose the five range values for the mA measurement function. Push the range switch immediately below the range value desired to select a range of current measurement.

1-33. As the colored areas around the terminals indicate, the red test lead should be plugged into the mA terminal and the black test lead should be plugged into the COMMON terminal. The mA terminal is also the fuse holder for an in-line mA circuit protection fuse. To gain access to the fuse, insert your fingernail or a coin in the slot on the mA terminal, push inwards, and rotate the terminal counterclockwise. The terminal will pop out after about 1/4 turn. The terminal and the fuse may now be pulled out of the DMM. To replace the fuse, insert the fuse and terminal, press on the terminal and rotate the terminal clockwise about 1/4 turn.

1-34. Resistance Measurements

1-35. The controls and terminals used to make resistance measurements are highlighted in Figure 1-6.

The measurement function is selected by pushing the kΩ switch to the in position. The colored area enclosing the kΩ function switch extends up and to the right enclosing the six range values for the resistance function. To select a particular resistance range, depress the range switch immediately below the desired range value. Connect the test leads; red to the V/kΩ/S terminal and black to the COMMON terminal.

Table 1-2. Display Sequence of Reference Impedances

SEQUENCE NUMBER	REFERENCE IMPEDANCE 1 mW = 0 dB	DISPLAY	REMARKS
0	600	600	
1	800	800	
2	900	900	
3	1000	1000	
4	1200	1200	
5	8000	8000	dB V
6	50	50	
7	75	75	dB V into 8Ω
8	93	93	
9	110	110	
10	125	125	
11	135	135	
12	150	150	
13	250	250	
14	300	300	
15	500	500	
0, etc.			

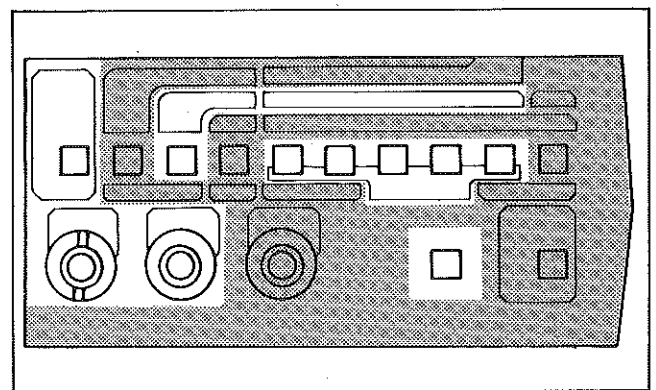


Figure 1-5. Current Measurements

1-36. Use the following procedure to familiarize yourself with the resistance function and to see how the range switches affect decimal point position on the LCD.

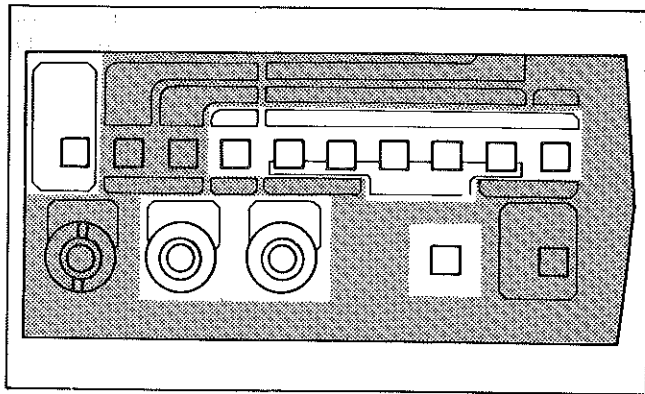


Figure 1-6. Resistance Measurements

1. With the test leads held apart, select the 2000 k Ω range. The LCD should display an overrange indication -- a 1 in the extreme left hand position and the rest of the digits blank.
2. Make a firm connection between the sampling ends of the test leads. The LCD should count down to 0000.
3. Maintain a firm contact between the ends of the test leads and sequentially select the ranges starting with the 200 Ω switch. The decimal point for each should be as follows:

200 Ω
 2 k Ω
 20 k Ω
 00.00*
 .0000
 0.000
 200 k Ω
 2000 k Ω
 20 M Ω
 00.00
 000.0
 0.000

* Displayed value will show lead resistance which can be removed by using the RELATIVE switch.

1-37. Conductance Measurements

1-38. The controls and terminals used to make conductance measurements are highlighted in Figure 1-7.

1-6

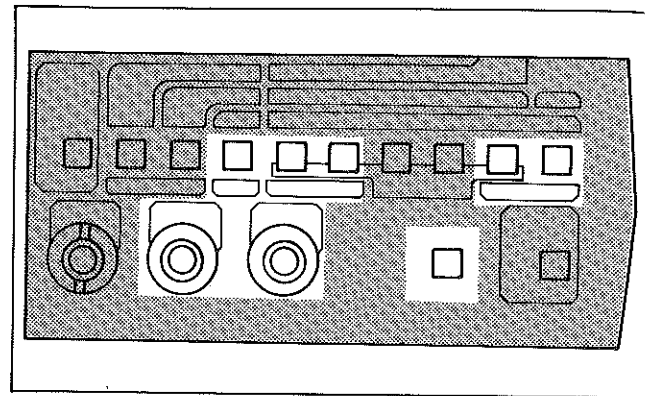


Figure 1-7. Conductance Measurements

With exception of range selection, the controls and connections are exactly the same as the resistance function. There are two ranges of conductance measurement: 2 mS and 200 nS. Each range is selected by simultaneously pushing the two indicated range switches to the in position.

1-39. Use the following procedure to exercise the conductance function:

1. Select the conductance function 200 nS range.
2. Hold the sampling ends of the test leads apart. After settling the LCD should display 00.00 to 00.20 (the residual reading results from input test lead, pcb, and component leakage, and can be removed by using the RELATIVE switch).
3. Make a firm contact between the sampling ends of the test leads. The LCD should display an overrange condition.

1-40. ACCESSORIES

1-41. The options and accessories that can be used to extend the range and scope of your 8050A are listed in Table 1-1. Each option and accessory is described in Section 6 of this manual.

1-42. SPECIFICATIONS

1-43. Table 1-3 lists the specifications of your 8050A. Table 1-4 lists the specifications for each 8050A option.

Table 1-3. 8050A Specifications

ELECTRICAL: The electrical specifications given assume an operating temperature of 18°C to 28°C relative humidity up to 90%, and a 1-year calibration cycle.

FUNCTIONS: DC volts, AC volts (linear and dB), DC current, AC current, resistance, diode test, conductance, relative.

DC VOLTS*:

RANGE	RESOLUTION	ACCURACY for 1-Year
±200 mV	10 μ V	±(0.03% of reading + 2 digits).
±2V	1 mV	
±20V	10 mV	
±200V	100 mV	
±1000V	1V	

INPUT IMPEDANCE: 10 M Ω <100 pF, all ranges

NORMAL MODE REJECTION RATIO: >60 dB at 60 Hz (at 50 Hz on 50 Hz Option)

COMMON MODE REJECTION RATIO: >90 dB at dc, 50 Hz and 60 Hz*
(1 k Ω unbalanced) * >120 dB available on request

COMMON MODE VOLTAGE (MAXIMUM): 500V dc or peak ac

RESPONSE TIME TO RATED ACCURACY: 1 second maximum

MAXIMUM INPUT: 1000V dc or peak ac continuous (less than 10 seconds duration on both the 200 mV and 2V ranges).

*DC Volts can also be used in the dB mode with .01 dB resolution between 5% of range and full range.

AC VOLTS (TRUE RMS RESPONDING, AC COUPLED):

LINEAR RANGES:

INPUT VOLTAGE	SELECTED RANGE	RESOLUTION	ACCURACY for 1-Year				
			45 Hz	1 kHz	10 kHz	20 kHz	50 kHz
10 mV to 200 mV	200 mV	10 μ V	±.5% + 10 digits	1 kHz	±1% + 10 digits	±5% + 30 digits	Not Specified
0.1V to 2V	2V	100 μ V					
1V to 20V	20V	1 mV					
10V to 200V	200V	10 mV					
100V to 750V	750V	100 mV					

Table 1-3. 8050A Specifications (cont)

dB RANGES:

INPUT VOLTAGE	SELECTED RANGE	dBm (600Ω REF)	RESOLUTION dBm	ACCURACY for 1-Year				
				45 Hz	1 kHz	10 kHz	20 kHz	50 kHz
0.77 mV to 1 mV	200 mV	-60 to -58	0.1	±0.5 dBm				
1 mV to 2 mV	200 mV	-58 to -52	0.01					
2 mV to 2V	200 mV	-52 to +8	0.01	±0.15 dBm				
0.1V to 2V	2V	-18 to +8	0.01			±0.25 dBm	±0.75 dBm	
1V to 20V	20V	+2 to +28	0.01					
10V to 200V	200V	+22 to +48	0.01					
100V to 750V	750V	+42 to +60	0.01					Not Specified

VOLT - Hz PRODUCT: 10^7 max (200V max @ 50 kHz)

EXTENDED dB RESPONSE: Typically -72 dB (600Ω Ref) ±1 to 10 kHz

EXTENDED FREQUENCY RESPONSE: Typically ±3 dB at 200 kHz

COMMON MODE NOISE REJECTION RATIO (1 kΩ unbalance): >60 dB at 50 Hz and 60 Hz

CREST FACTOR RANGE: Waveforms with Peak/RMS ratio of 1:1 to 3:1

INPUT IMPEDANCE: 10 MΩ in parallel with <100 pF

MAXIMUM INPUT VOLTAGE: 750V rms or 1000V peak continuous (less than 10 seconds duration on both the 200 mV and 2V ranges), not to exceed the volt-hertz product of 10^7 .

RESPONSE TIME: 2 seconds maximum within a range

***DECIBEL RANGE REFERENCE IMPEDANCES:** Fifteen user selectable impedance reference levels are provided to reference a 0 dBm, 1 mW levels (50Ω, 75Ω, 93Ω, 110Ω, 125Ω, 135Ω, 150Ω, 250Ω, 300Ω, 500Ω, 600Ω, 800Ω, 900Ω, 1000Ω, 1200Ω), and a 8Ω impedance reference level is provided to reference a 0 dBW level.

DC CURRENT:

RANGE	RESOLUTION	ACCURACY for 1-Year	BURDEN VOLTAGE
200 μA	0.01 μA	±(0.3% of reading + 2 digits)	0.3V max
2 mA	0.1 μA		
20 mA	1 μA		
200 mA	10 μA		
2000 mA	100 μA		0.9V max

OVERLOAD PROTECTION: 2A/250V fuse in series with 3A/600V fuse (for high energy sources).

Table 1-3. 8050A Specifications (cont)

AC CURRENT (TRUE RMS RESPONDING, AC COUPLED):

RANGE	RESOLUTION	ACCURACY: from 5% of range to full-scale, 1-Year			BURDEN VOLTAGE
		45 Hz to 2 kHz	2 kHz to 10 kHz	10 kHz to 20 kHz	
200 μ A	0.01 μ A	$\pm(1\%$ of reading + 10 digits)		$\pm(2\%$ of reading + 10 digits)	0.3V rms max
2 mA	0.1 μ A				
20 mA	1 μ A				
200 mA	10 μ A				
2000 mA	100 μ A	$\pm(1\%$ of reading + 10 digits)	Not Specified		0.9V rms max

OVERLOAD PROTECTION: 2A/250V fuse in series with 3A/600V fuse (for high energy sources).

CREST FACTOR RANGE: 1:1 to 3:1 ratio

RESISTANCE:

RANGE	RESOLUTION	ACCURACY for 1-Year	FULL SCALE VOLTAGE ACROSS UNKNOWN RESISTANCE
200 Ω	0.01 Ω	$\pm(0.1\%$ reading + 2 digits + .02 Ω)	.19V
2 k Ω	0.1 Ω		1.2V
20 k Ω	1 Ω	$\pm(.05\%$ of reading + 2 digits)	.2V
200 k Ω	10 Ω		2V
2000 k Ω	100 Ω	$\pm(0.25\%$ reading + 3 digits)	.2V
20 M Ω	1 k Ω		2V

OVERLOAD PROTECTION: 500V dc/ac rms on all ranges

OPEN CIRCUIT VOLTAGE: Less than 3.5V on all ranges

RESPONSE TIME (TO RATED ACCURACY): 10 seconds maximum on 20 M Ω range
2 seconds maximum on all other ranges

DIODE TEST: These three ranges have enough voltage to turn on silicon junctions to check for proper forward-to-back resistance. The 2 k Ω range is preferred and is marked with a larger diode symbol on the front panel of the instrument. The three non-diode test ranges will not turn on silicon junctions so in-circuit resistance measurements can be made with these three ranges.

**CONDUCTANCE:**

RANGE	RESOLUTION	ACCURACY for 1-Year
2 mS	.1 μ S (10 M Ω)	$\pm(0.1\%$ of reading + 5 digits)
200 nS	.1 nS (100,000 M Ω)	$\pm(0.5\%$ of reading + 20 digits)

MAXIMUM OPEN CIRCUIT VOLTAGE: <3.5V

OVERLOAD PROTECTION: 500V dc/ac rms on all ranges

CONDUCTANCE UNITS: We use the international unit of conductance, the siemen = S = 1/ Ω . Another unit of conductance is the mho.

Table 1-3. 8050A Specifications (cont)

RELATIVE:

RELATIVE REFERENCE: An input applied when the relative button is depressed to the on position is held as "0" reference point. Subsequent readings indicate deviation (\pm) from this point. (Note: REL annunciator indicates when this mode is enabled.)

RELATIVE ACCURACY: Error will not exceed the sum of the errors of the two measurements.

ENVIRONMENTAL:

TEMPERATURE COEFFICIENT: <0.1 times the applicable accuracy specification per $^{\circ}\text{C}$ for 0°C to 18°C and 28°C to 50°C (32°F to 64.4°F and 50.4°F to 122°F).

OPERATING TEMPERATURE: 0°C to 50°C (32°F to 122°F).

STORAGE TEMPERATURE: (without batteries): -40°C to $+70^{\circ}\text{C}$ (-40°F to $+158^{\circ}\text{F}$).
(with batteries): -40°C to $+50^{\circ}\text{C}$ (-40°F to $+122^{\circ}\text{F}$).

RELATIVE HUMIDITY: Up to 90%, 0°C to 35°C (32 - 95°F), up to 70%, 35°C to 50°C (95 - 122°F), except on 2000 $\text{k}\Omega$, 20 $\text{M}\Omega$, and 200 nS ranges where it is up to 80%, 0°C to 35°C (32 - 95°F).

GENERAL:

MAXIMUM COMMON MODE VOLTAGE: 500V dc, or peak ac (low terminal potential with respect to power line ground)

SIZE: 22 cm X 6 cm X 25 cm (8- $\frac{1}{2}$ " X 2- $\frac{1}{2}$ " X 10") See Figure 1-8.

WEIGHT: 1.08 kg (2 lbs., 6 oz.)

POWER REQUIREMENTS (LINE ONLY MODELS):

LINE VOLTAGE: 90 to 110V ac 47 to 440 Hz Factory configured for customer specified
200 to 264V ac, 47 to 440 Hz voltage.

POWER CONSUMPTION: 4W max.

STANDARDS: IEC 348 Protection Class 1

Table 1-4. 8050A Options Specifications

-01 BATTERY OPTION:**BATTERIES:** TYPE: NiCAD

OPERATING TIME: 10 hours, typical

RECHARGE TIME: (with POWER switch in OFF position): 14 hours for full charge

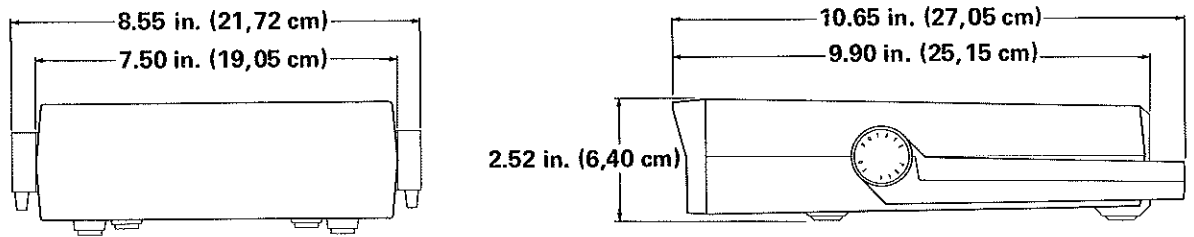
POWER CONSUMPTION: 6W max.**LINE POWER:** 90-270V, 47-440 Hz, field changeable**STANDARDS:** IEC 348: Protection Class 1 when operated from supply mains
Protection Class 2 when operated from internal batteries

Figure 1-8. 8050A Dimensions