

DL1883 MULTIMETER



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USER'S MANUAL

CONTENTS

TITLE	PAGE
INTRODUCTION	1
MULTIMETER SAFETY	2
GETTING STARTED QUICKLY	3
HOW TO USE THE METER	4
Input Terminals	4
Function Selector Rotary Switch	4
Pushbuttons	6
Holster and Stand	7
APPLICATIONS	8
Measuring Voltage (AC/DC)	8
Measuring Current	8
Continuity Testing	9
Measuring Resistance	9

CONTENTS, continued

TITLE	PAGE
Diode Testing	10
MAINTENANCE	
General Maintenance	11
Calibration	11
Battery Replacement	12
Fuse Replacement	12
Service	13
REPLACEMENT PARTS	13
SPECIFICATIONS	15

INTRODUCTION

INTRODUCTION

This meter has been designed and tested according to IEC Publication 348, Safety Requirements for Electronic Measuring Apparatus. This manual contains information and warnings which must be followed to ensure safe operation and retain the meter in safe condition.

NOTE

The meter also provides a HOLD mode that allows you to keep your eyes fixed on the probes when taking measurements in difficult or hazardous circumstances, then read the display when it is convenient and safe.

After unpacking the meter, if you notice that the meter is damaged or something is missing, contact the place of purchase immediately. Save the shipping container and packing material in case you have to reship the meter.

WARNING

READ "MULTIMETER SAFETY" BEFORE USING THE METER.

Your DI-LOG Digital Multimeter (also referred to as "the meter") is a handheld instrument that is designed for use in the field, laboratory, and at home. The meter is powered by a 9V battery and has a rugged case sealed against dirt, dust, and moisture. A snap-on holster with stand protects the meter from rough handling.

MULTIMETER SAFETY

MULTIMETER SAFETY

Before using the meter, read the following safety information carefully. In this manual the word "WARNING" is used for conditions and actions that pose hazards(s) to the user; the word "CAUTION" is used for conditions and actions that may damage your meter. The symbols shown in Figure 1 are used internationally to denote the electrical functions and conditions indicated.

- Avoid working alone.
- Inspect the test leads for damaged insulation or exposed metal. Check test lead continuity. Damaged leads should be replaced.
- Be sure the meter is in good operating condition. During a continuity test, a meter reading that goes from overload (OL) to 0 generally means the meter is working properly.
- Select the proper function and range for your measurement.

WARNING

TO AVOID ELECTRICAL SHOCK, USE CAUTION WHEN WORKING ABOVE 60V DC OR 25V AC RMS. SUCH VOLTAGES POSE A SHOCK HAZARD.

- Disconnect the live test lead before disconnecting the common test lead.









	DANGEROUS VOLTAGE		GROUND
	AC-ALTERNATING CURRENT		SEE EXPLANATION IN MANUAL
	DC-DIRECT CURRENT		DOUBLE INSULATION (Protection Class II)
	EITHER DC OR AC		FUSE

Figure 1. International Electrical Symbols

- Follow all safety procedures for equipment being tested. Disconnect the input power and discharge all high-voltage capacitors through a protective impedance before testing in the Ω and \rightarrow functions.
- When making a current measurement, turn the power off before connecting the meter to the circuit.

GETTING STARTED QUICKLY

- Check meter fuses before measuring current transformer secondary or motor winding current. (See "Fuse Test" in the "MAINTENANCE" section.) An open fuse may allow high voltage build-up, which is potentially hazardous.

GETTING STARTED QUICKLY

Examine the meter carefully, familiarizing yourself with the layout of the input terminals, rotary switch, pushbuttons and display. Notice the **WARNING** information engraved into the rear panel.

If you have used a multimeter before, simply examining your meter will probably give you a good idea how to use it. The following procedure is an overview of how to take basic measurements.

WARNING

TO AVOID ELECTRICAL SHOCK OR DAMAGE TO THE METER, DO NOT APPLY MORE THAN 1000V BETWEEN ANY TERMINAL AND EARTH GROUND.

1. Insert the test leads in the appropriate input terminals (See Table 1).

2. To turn the meter on and select a function, press the ON/OFF button and then turn the rotary switch to the appropriate switch position.

3. To take a measurement, use the test lead probes to make the proper contacts. Remember, insert the meter in the circuit in parallel for voltage and in series for current measurements. Read the measurement on the display.

4. To select the HOLD operation, press the HOLD button above the rotary switch and press again to exit. The annunciator **HOLD** is displayed when the HOLD mode has been selected.

Although this procedure will allow you to get started quickly, we suggest that you take the time to read the remainder of this manual so that you can learn to take full advantage of your meter's capabilities.

HOW TO USE THE METER

Input Terminals and Function Selector Rotary Switch

HOW TO USE THE METER

This section describes your meter and how to use it. **FOR EASE OF REFERENCE, EACH DESCRIPTION IS NUMBERED AND KEYED TO THE ILLUSTRATION INSIDE THE FRONT COVER.**

Input Terminals

Items 1-4 describe the input terminals. (See Table 1 for overload limits.)

① A Amperes Input Terminal

For current measurements (ac or dc) up to 10A continuous (20A for 30 seconds) when function selector switch is in the mA/A position.

② mA μ A Milliamp/Microamp Input Terminal

For current measurements up to 200mA (ac or dc) when the function selector switch is in the mA/A or μ A position.

③ COM Common Terminal

Return terminal for all measurements.

④ V Ω Volt, Ohms, Continuity, Diode Test Input Terminal

Function Selector Rotary Switch

⑤ Item 5 describes functions that are selected by setting the rotary switch.

V Volts ac \tilde{A} Amperes ac

\bar{V} Volts dc \bar{A} Amperes dc

Ω Resistance

Continuity Test: When testing continuity, the beeper sounds if the resistance falls below the typical value indicated in Table 2.

HOW TO USE THE METER
Input Terminals

Table 1. Input Terminals and Limits

FUNCTION	INPUT TERMINALS Red Lead Black Lead	MIN DISPLAY READING	MAX DISPLAY READING	MAXIMUM INPUT
V	VΩ COM	0.1 mV	1000V	1000V
V	VΩ COM	0.001V	1000V	1000V
mV	VΩ COM	0.1 mV	200.0 mV	1000V
Ω	VΩ COM	0.1Ω	20.00 MΩ	600V
mA	VΩ COM	0.001V	2.000V	600V
A	A mA/μA COM	0.01 mA	20.00 A*	10A/600V*
μA	mA/μA COM	0.1 μA	2000 mA	2000 mA/600V
	μA COM	0.1 μA	200.0 μA	200mA/600V

* 10A continuous, 20A for 30 seconds maximum.

HOW TO USE THE METER

Pushbuttons

→ Diode Test: Measures forward voltage of semiconductor junction(s) at approximately 1mA test current. Single 0-2V range.

Pushbuttons

This meter has two pushbuttons. Items 6-7 describe how to use the pushbuttons. The **[000]** annunciator is displayed to indicate that HOLD mode has been selected.

⑥ **(ON/OFF)** Power-On/Off

Press the ON/OFF button to turn the meter on. Press again to turn the meter off.

⑦ **(HOLD)** Display HOLD

WARNING

DO NOT USE DATA HOLD TO DETERMINE THAT CIRCUITS WITH DANGEROUS VOLTAGE ARE DEAD.

In the HOLD mode, the annunciator, **[000]**, is displayed and the last reading is held on the display. Press again to exit.

Table 2. Beeper Response In Continuity Test

Input Range	Beeper On If
200.0 Ω	<150 Ω

Digital Display

Items 8-9 describe the digital display.

⑧ **Digital Display**

Digital readings are displayed on a 2000-count display with polarity indication. The display updates three times per second.

⑨ **Overload Indication**

Displayed on digital display when input is too large to display.

HOW TO USE THE METER
Holster and Stand

Items 10-12 describe annunciators that indicate the mode or state in which the meter is operating:

⑩ **HOLD** Hold

The meter is operating in a Display HOLD mode.

⑪ **---** Negative Polarity

Automatically indicate negative inputs.

⑫ **BAT** Low Battery

Meter is powered by a single 9V battery, with a typical life of 200 hours with a regular battery. At least 8 hours of battery life remain when **BAT** is first displayed. A battery check is taken between measurements.

Holster and Stand

The meter comes with a snap-on holster that absorbs shocks and protects the meter from rough handling. The holster is equipped with a stand. Some uses of the holster with a stand are shown in Figure 2.

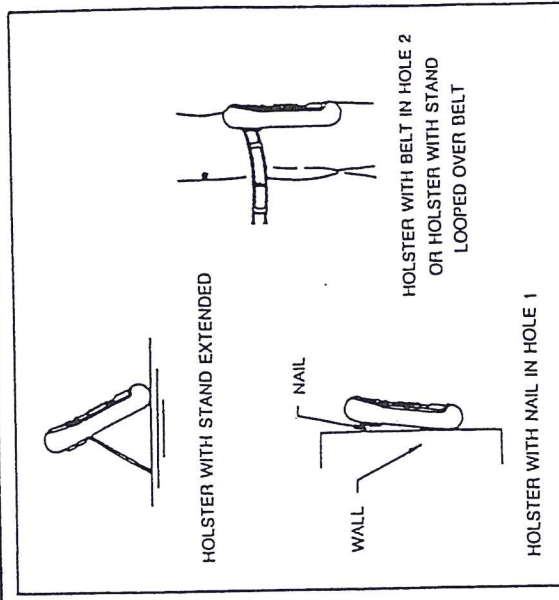


Figure 2. Holster and Stand

APPLICATIONS

Measuring Voltage (AC/DC)

APPLICATIONS

This section discusses some common applications for your meter, and alerts you to some considerations to keep in mind when taking measurements.

Measuring Voltage (AC/DC)

To measure voltage, connect the meter in parallel with the load or circuit under test. Each of the five ac/dc voltage ranges presents an input impedance of approximately 10 M Ω in parallel with less than 100 pF. AC Voltage is ac-coupled to the 10 M Ω input.

Measurement errors due to circuit loading can result when making either ac or dc voltage measurements on circuits with high source impedance. In most cases, the error is negligible (0.1% or less) if the measurement circuit source impedance is 10 Kilohms or less.

Measuring Current

WARNING

DO NOT ATTEMPT AN IN-CIRCUIT CURRENT MEASUREMENT WHERE THE POTENTIAL IS GREATER THAN 600V. YOU MAY DAMAGE THE METER OR BE INJURED IF THE FUSE BLOWS WHILE CURRENT IS BEING MEASURED IN A CIRCUIT WHICH EXHIBITS AN OPEN CIRCUIT VOLTAGE GREATER THAN 600V.

To measure current, connect the meter in series with the load or circuit under test.

If you do not know approximately what the current is, connect the circuit to the A input terminal first to see if you have a safe level for the mA μ A input terminal. Use the mA μ A input terminal for current up to 200mA.

When measuring current, the meter's internal shunt resistors develop a voltage across the meter's terminals called "burden Voltage." This voltage drop is very low in your meter, but it may affect precision circuits or measurements.

APPLICATIONS

Continuity Testing

Continuity Testing

Continuity testing verifies that circuit connections are intact. To perform audible continuity tests, see the rotary switch to the \bullet) position, and connect the meter to your circuit. Test resistance below the value listed in Table 2 cause the meter to emit a continuous tone.

The continuity mode is extremely fast and can be used to detect either shorts or opens that last for as little as 100 milliseconds. When a change is detected, the beeper tone is "stretched" to last at least 1/4 second so you can hear it and detect both shorts and opens. This can be a valuable troubleshooting aid when looking for intermittents associated with cables, connections, switchers, relays, etc. If the test value is very close to the threshold, erratic beeps can also occur due to environmental electrical noise (EMI).

Measuring Resistance

CAUTION

Turn off power on the test circuit and discharge all capacitors before attempting in-circuit resistance measurements. If an external voltage is present across a component, it will be impossible to take an accurate measurement of the resistance of that component.

The meter measures resistance by passing a known current through the external circuit or component, measuring the voltage drop, and calculating the resistance using Ohm's Law ($R = V/A$). Remember, the resistance displayed by the meter is the total resistance through all possible paths between the probes. This explains why in-circuit measurement of resistors does not often yield the ohms value indicated by the resistor's color code.

The resistance in the test leads can diminish accuracy on the lowest (200-ohm) range. The error is usually 0.1 to 0.2 ohms for a standard pair of test leads. To determine the error, short the test leads together and read the resistance of the leads.

APPLICATIONS

Diode Testing

When measuring resistance, be sure that the contact between the probes and the circuit under test is good. Dirt, oil, solder flux, or other foreign matter seriously affect resistance.

Most in-circuit resistance measurements can be made without removing diodes and transistors from the circuit. The full scale measurement voltage produced on ranges below 20 M Ω does not forward-bias silicon diodes or transistor junctions enough to cause them to conduct. Use the highest range you can (except 20 M Ω) to minimize the possibility of turning on diodes or transistor junctions. Full-scale measurement voltage in the 20 M Ω range does forward-bias a diode or transistor enough to cause it to conduct.

Diode Testing

To perform a diode or transistor junction test plug the test leads into the V Ω (positive) and COM inputs, turn the rotary switch to \rightarrow , and connect the test leads across the diode(s).

In diode test, voltage is developed across the component(s) by a test current (approximately 1mA with the test leads shorted) from the meter. Voltage is read on a single 0 to +2.000V range that can measure up to five silicon diode or transistor junctions in series. For a silicon diode, the typical forward voltage should be about 0.6V. Voltage greater than 2.00V or open test leads produce an overload (L.L.) reading. If the digital reading is the same in both directions, the diode junction is probably shorted. If the display reads L.L. in both directions, the diode junction is probably open. To protect sensitive devices, the open test lead voltage from the meter will not exceed 3.0V. Negative inputs (from an external power source, for example) are not suppressed.

MAINTENANCE

MAINTENANCE

Repairs or servicing should only be performed by qualified personnel.

General Maintenance

Periodically wipe the case with a damp cloth and detergent; do not use abrasives or solvents.

Water, dirt, or contamination in the A or mA terminals may cause bad effects on the meter. Clean and dry as required.

Calibration

Calibrate your meter once a year to ensure that it performs according to its specifications. Contact the nearest Distributor for calibration procedure. For replacement parts, see the parts list at the end of this manual.

WARNING

TO AVOID ELECTRICAL SHOCK, REMOVE THE TEST LEADS AND ANY INPUT SIGNALS BEFORE REPLACING THE BATTERY OR FUSES. TO PREVENT DAMAGE OR INJURY, INSTALL ONLY QUICK ACTING FUSES WITH THE AMP/VOLT

MAINTENANCE Battery Replacement

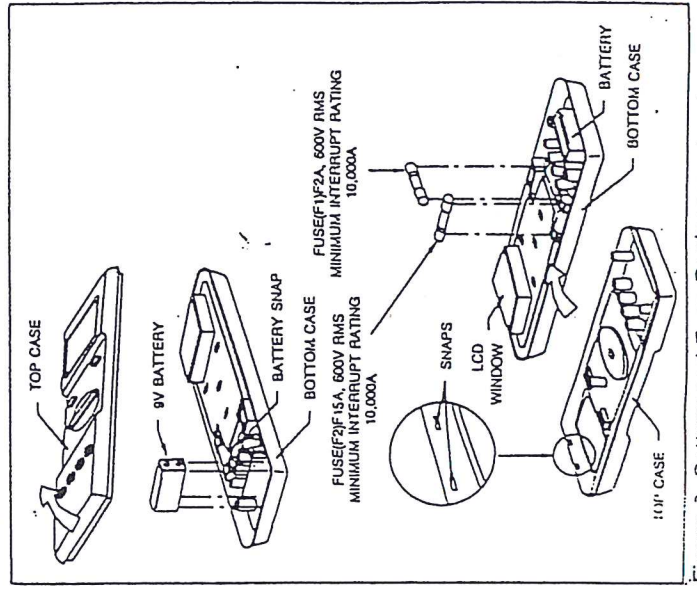


Figure 3. Battery and Fuse Replacement

MAINTENANCE

Battery Replacement

Battery Replacement

The meter is powered by a single 9V battery. Referring to Figure 3, use the following procedure to replace the battery:

1. Disconnect test leads from any live source, turn the meter off, and remove the test leads from the front terminals.
2. The case bottom is secured to the case top by three screws and two internal snaps (at the LCD end). Using a Phillips-head screwdriver, remove the three screws from the case bottom and turn the case over.
3. Lift the input terminal end of the case top until it gently unsnaps from the case bottom at the end nearest the LCD.
4. Lift the battery from the case bottom, and carefully disconnect the battery connector leads.
5. Snap the battery connector leads to the terminals of a new battery and reinsert the battery into the case bottom.
6. Replace the case top, ensuring that the two snaps on the case top (at the end near the LCD) are engaged. Reinstall the three screws.

Fuse Replacement

Referring to Figure 3, use the following procedure to examine or replace the meter's fuses:

1. Perform steps 1 through 3 of the battery replacement procedure.
2. Remove the defective fuse by gently prying one end of the fuse loose and sliding the fuse out of the fuse bracket.
3. Install a new fuse of the same size and rating. Make sure the new fuse is centered in the fuse holder.
4. Replace the case top, ensuring that the battery leads are properly dressed and the two snaps on the case top (at the end near the LCD) are engaged. Reinstall the three screws.

REPLACEMENT PARTS

Service

If the meter fails, check the battery and fuse(s) and replace as needed. If the meter still does not work properly, review this manual to make sure you are operating it correctly. If the meter still malfunctions, pack it securely in its original shipping container and forward it, postage paid, to the nearest DI-LOG'S distributor. Include a description of the malfunction. DI-LOG assumes No responsibility for damage in transit.

A meter under warranty will be promptly repaired or replaced (at DI-LOG'S option) and returned at no charge. If the warranty has lapsed, the meter will be repaired and returned for a fixed fee. Contact the nearest DI-LOG'S distributor for information and prices.

Table 3. Replacement Parts

ITEM	DESCRIPTION	Q'TY
AB9	Battery, 9V	1
AF112	FUSE, F2A, 600V RMS	1
AF113	FUSE, F15A, 600V RMS	1
ATL140	Test Lead Set	1
AH180	HOLSTER, Yellow	1

REPLACEMENT PARTS

NOTE



When servicing the meter, use only the replacement parts specified.

Replacement parts are shown in Figure 4 and listed in Table 3.

SPECIFICATIONS

General

Maximum Voltage between any Terminal and Earth Ground

1000V

Fuse Protection
mA or μ A

2A 600V HIGH ENERGY FAST FUSE
15A 600V HIGH ENERGY FAST FUSE

Display (LCD)
Digital

Counts: 2000, updates 3/sec

Operating Temperature
Storage Temperature
Temperature Coefficient

0°C to 40°C (32°F to 104°F)
-20°C to 60°C (-4°F to 140°F)
0.05 x (Specified ACCURACY)/°C
(< 18°C or > 28°C or; < 64°F or > 82°F)
0% to 80% (0°C to 35°C; 32°F to 95°F)
0% to 70% (35°C to 55°C; 95°F to 131°F)

Relative Humidity

9V, NEDA 1604 or 6F22 or 006P
200hrs typical with alkaline

Battery Type
Battery Life

3.2cm x 8.6cm x 18.7cm (1.25in x 3.39in x 7.35in)
4.7cm x 10.0cm x 20.3cm (1.85in x 3.94in x 7.99in)

Size (H x W x L)
Meter only
With Holster & Stand

Weight

399g (13.7 oz)
610g (21.5 oz)

Meter only
With Holster & Stand
Safety

Designed to Protection Class II per IEC 348, CSA C22.2 NO. 231, ISA-DS82, and UL 1244

SPECIFICATIONS

Specifications

FUNCTION	RANGE	RESOLUTION	ACCURACY	
AC CURRENT	200 μ A	0.1 μ A	$\pm 1\%$ rdg + 3 digits	
	2 mA	1 μ A		
	20mA	10 μ A		
	200mA	100 μ A		
	2A	1mA		
	10A	10mA		
	200 Ω	0.1 Ω		$\pm 3\%$ rdg + 10 digits
	2K Ω	1 Ω		$\pm 0.5\%$ rdg + 3 digits
	20K Ω	10 Ω		$\pm 0.5\%$ rdg + 1 digit
	200K Ω	100 Ω		
DIODE TEST	2M Ω	1K Ω	$\pm 1\%$ rdg + 2 digits	
	20M Ω	10K Ω		
CONTINUITY	OPEN CIRCUIT TEST VOLTAGE: <3V			
	SHORT CURRENT: APPROX 1mA			
	150 ohms or less			

SPECIFICATIONS

Specifications			
FUNCTION	RANGE	RESOLUTION	ACCURACY
DC VOLTAGE	200 mV	100 μ V	$\pm 0.5\%$ rdg + 1 digit
	2V	1mV	
	20V	10mV	
	200V	100mV	
	1KV	1V	
AC VOLTAGE	200mV	100 μ V	$\pm 0.8\%$ rdg + 3 digits
	2V	1mV	
	20V	10mV	
	200V	100mV	
	1KV	1V	
DC CURRENT	200 μ A	0.1 μ A	$\pm 1.2\%$ rdg + 3 digits
	2mA	1 μ A	
	20mA	10 μ A	
	200mA	100 μ A	
	2A	1mA	
	10A	10mA	$\pm 2\%$ rdg + 10 digits

* Accuracy is given as \pm [(% of reading) + (number of least significant digits)] at 18°C to 28°C with relative humidity up to 80%, for a period of one year after calibration.

REPLACEMENT PARTS

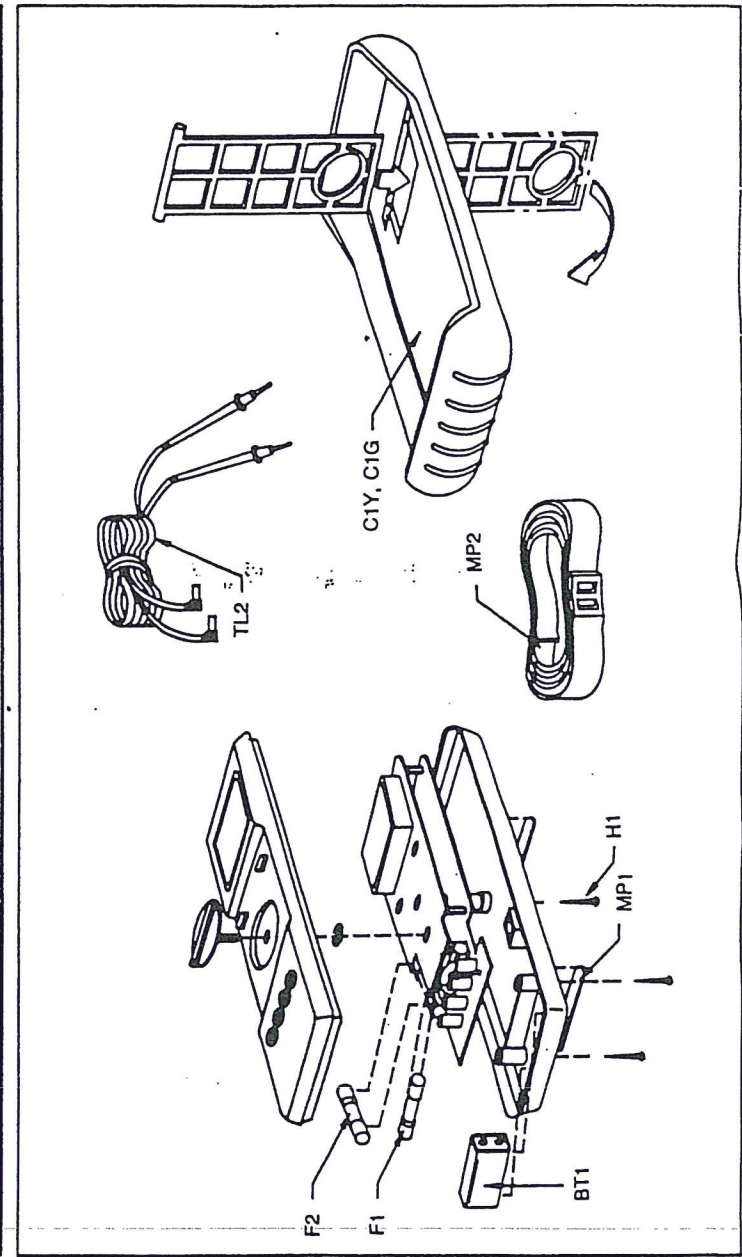


Figure 4 Replaceable Parts