

Di-LOG

...measurably better

operating manual


DL9204


DIGITAL MULTIMETER





Safety Information

This manual contains information that must be followed for operating the meter safely and maintaining the meter in a safe operating condition. If this meter is not used in the manner specified, the protection provided may be impaired.

 **Warning!** Warns of potential danger, refer to the instruction manual to avoid personal injury or damage to the meter.

 **Caution!** Dangerous voltage. Danger of electrical shock.

 Continuous double or reinforced insulation complies with IEC536, class II

 Symbol of conformity, confirms conformity with relevant EU directives. The meter complies with EMC directives (89/336/EEC). Specifically standards EN 50081-1 and EN 50082-1 as well as the Low Voltage Directive (73/23/EEC) described in the standard EN 61010-1.

The meter has been designed in accordance with the safety regulations for electronic measuring instruments, EN 61010-1, IEC 61010

Voltages above 75V DC or 50V AC may constitute a serious shock hazard.

Safety Information

Before using the meter check for physical damage to the casing in particular around the connectors. If the case is damaged do not use the meter.

Check the test leads for damaged insulation or exposed metal. Check the leads for continuity. Replace damaged leads with identical model or specification before using the meter.

Where applicable use GS38 approved leads (not supplied) these are available from Di-Log. When using test leads keep fingers behind the finger guards.

Do not apply more than the rated voltage, as marked on the meter between the terminals or between any terminal and ground.

Before making a measurement ensure that the rotary switch is set to the appropriate range. Do not turn the rotary switch whilst making a measurement.

Use the appropriate terminals, function and range for your measurements. If the value to be measured is not known use the maximum measurement position and reduce the range step by step until a satisfactory reading is obtained.

Safety Information

Do not use or store the meter in an environment of high temperature, humidity, fumes, vapour, gaseous, inflammable and strong magnetic field. The performance and safety of the use may be compromised in such circumstances.

Disconnect circuit power and discharge all high voltage capacitors before testing resistance, continuity, diodes, capacitance or current.

Before measuring current check the meters fuses and turn off power to the circuit before connecting the meter to the circuit.

Replace the battery as soon as the low battery indicator appears. If the battery is low the meter may give false readings.

Turn the meter power off when not in use. Remove the battery if the meter is in use for a long period. Constantly check the battery as it may have leaked. A leaking battery will damage the meter.

The meter may only be opened by a qualified service technician for calibration and repair.

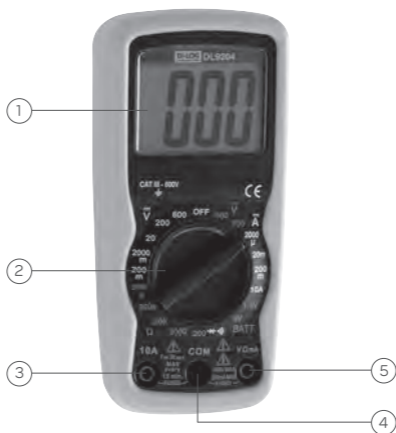
Input Limits

Never apply voltage or current to the meter that exceeds the specified maximum:

Function	Maximum Input
V AC	600V DC/AC
V DC OR V AC	600V DC/AC, 200Vrms on 200mV range
mA DC	200mA 250V fast acting fuse (30 seconds max every 15 minutes)
Resistance, Continuity	250Vrms for 15sec max

Use extreme caution when working with high voltages.

Controls and Inputs



1. LCD Display.
2. Rotary switch.
3. 10A terminal.
4. COM terminal.
5. Positive terminal

Note:

Tilt stand, fuse and battery compartment are on rear of unit.

Symbols and Annunciators

.)))	Continuity
→	Diode test
μ	micro (amps)
m	milli (volts, amps)
k	kilo (ohms)
Ω	ohms
VDC	volts direct current
VAC	volts alternating current
ADC	amps direct current
BAT	Battery test

Specifications

Function	Range	Resolution	Accuracy
DC Voltage (V DC)	200mV	0.1mV	±(0.5% reading + 2 digits)
	2000mV	1mV	
	20V	0.01V	
	200V	0.1V	±(0.8% reading + 2 digits)
	600V	1V	
AC Voltage (V AC)	200V	0.1V	±(1.2% reading + 10 digits)
	600V	1V	±(1.2% reading + 10 digits)
DC Current (A DC)	2000μA	1μA	±(1.0% reading + 2 digits)
	20mA	10μA	
	200mA	100μA	±(1.2% reading + 2 digits)
	10A	10mA	±(2.0% reading + 2 digits)
Resistance	200Ω	0.1Ω	±(0.8% reading + 2 digits)
	2000Ω	1Ω	
	20kΩ	0.01kΩ	
	200kΩ	0.1kΩ	
	2000kΩ	1kΩ	±(1.0% reading + 2 digits)
Battery Test	9V	10mV	±(1.0% reading + 2 digits)
	1.5V	10mV	

Note: Accuracy specifications consist of two elements:

(% reading) – This is the accuracy of the measurement circuit.

(+ digits) – This is the accuracy of the analog to digital converter.

Note: Accuracy is stated at 65°F to 83°F (18°C to 28°C) and less than 75% RH.

Specifications

Diode Test:

Test current: 1mA maximum.

Open circuit voltage: 2.8V dc typical.

Continuity Check: Audible signal will sound if the resistance is less than approximately 30Ω

Battery test current: 9V (6mA); 1.5V (100mA)

Input Impedance: $>1M\Omega$

ACV Bandwidth: 45Hz to 450Hz

DCA voltage drop: 200mV

Display: 3 ½ digit, 2000 count LCD, 1.1" digits

Overrange indication: "1" is displayed

Polarity: Automatic (no indication for positive polarity); Minus (-) sign for negative polarity.

Measurement Rate: 2 times per second, nominal

Low Battery Indication: "BAT" is displayed if battery voltage drops below operating voltage

Battery: One 9 volt (NEDA 1604) battery

Fuses:

mA, μ A ranges: 0.2A/250V fast blow

A range: 10A/250V fast blow

Operating Temperature: 32°F to 122°F (0°C to 50°C)

Storage Temperature: -4°F to 140°F (-20°C to 60°C)

Specifications

Relative Humidity: <70% operating, <80% storage

Operating Altitude: 7000ft. (2000) meters maximum.

Weight: 255g

Size: 150mm x 70mm x 48mm

Safety:

For indoor use and in accordance with Overvoltage Category II, Pollution Degree 2. Category II includes local level, appliance, portable equipment, etc., with transient overvoltages less than Overvoltage Category III.

Operation



Warning:

RISK OF ELECTROCUTION. HIGH-VOLTAGE CIRCUITS, BOTH AC AND DC, ARE VERY DANGEROUS AND SHOULD BE MEASURED WITH GREAT CARE.

1. ALWAYS turn the function switch to the OFF position when the meter is not in use.
2. If "OL" appears in the display during a measurement, the value exceeds the range you have selected. Change to a higher range.

Note:

On some low AC and DC voltage ranges, with the test leads not connected to a device, the display may show a random, changing reading. This is normal and is caused by the high-input sensitivity. The reading will stabilize and give a proper measurement when connected to a circuit.

DC Voltage Measurements

Caution:

DO NOT MEASURE DC VOLTAGES IF A MOTOR ON THE CIRCUIT IS BEING SWITCHED ON OR OFF. LARGE VOLTAGE SURGES MAY OCCUR THAT CAN DAMAGE THE METER.

1. Set the function switch to the highest V DC position.
2. Insert the black test lead banana plug into the negative (COM) terminal and insert the red test lead banana plug into the positive (V) terminal.



3. Connect the black test probe tip to the negative side of the circuit. Connect the red test probe tip to the positive side of the circuit.
4. Read the voltage in the display. Reset the function switch to successively lower V DC positions to obtain a higher resolution reading. The display will indicate the proper decimal point and value. If the polarity is reversed, the display will show (-) minus before the value.

AC Voltage Measurements

Warning:

RISK OF ELECTROCUTION. THE PROBE TIPS MAY NOT BE LONG ENOUGH TO CONTACT THE LIVE PARTS INSIDE SOME 240V OUTLETS FOR APPLIANCES BECAUSE THE CONTACTS ARE RECESSED DEEP IN THE OUTLETS. AS A RESULT, THE READING MAY SHOW 0 VOLTS WHEN THE OUTLET ACTUALLY HAS VOLTAGE ON IT. MAKE SURE THE PROBE TIPS ARE TOUCHING THE METAL CONTACTS INSIDE THE OUTLET BEFORE ASSUMING THAT NO VOLTAGE IS PRESENT.

Caution:

DO NOT MEASURE AC VOLTAGES IF A MOTOR ON THE CIRCUIT IS BEING SWITCHED ON OR OFF. LARGE VOLTAGE SURGES MAY OCCUR THAT CAN DAMAGE THE METER.

1. Set the function switch to the V AC.
2. Insert the black test lead banana plug into the negative (COM) terminal and the red test lead banana plug into the positive (V) terminal.



AC Voltage Measurements

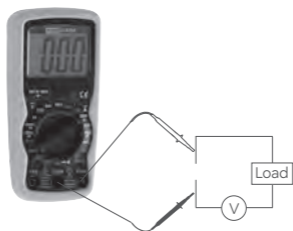
3. Connect the test probe tips to the circuit under test. Connect the red test probe tip to the positive side of the circuit.
4. Read the voltage in the display. Reset the function switch to successively lower V DC positions to obtain a higher resolution reading. The display will indicate the proper decimal point and value.

DC Current Measurements

⚠ Caution:

DO NOT MAKE CURRENT MEASUREMENTS ON THE 10A SCALE FOR LONGER THAN 30 SECONDS. EXCEEDING 30 SECONDS MAY CAUSE DAMAGE TO THE METER AND/OR THE TEST LEADS.

1. Insert the black test lead banana plug into the negative (COM) terminal.
2. For current measurements up to 200mA DC, set the function switch to the highest DC mA position and insert the red test lead banana plug into the (mA) terminal.



3. For current measurements up to 10A DC, set the function switch to the 10A range and insert the red test lead banana plug into the (10A) terminal.
4. Remove power from the circuit under test, then open up the circuit at the point where you wish to measure current.

DC Current Measurements

5. Connect the black test probe tip to the negative side of the circuit. Connect the red test probe tip to the positive side of the circuit.
6. Apply power to the circuit.
7. Read the current in the display. For mA DC measurements, reset the function switch to successively lower mA DC positions to obtain a higher resolution reading. The display will indicate the proper decimal point and value.

Resistance Measurements

Warning:

TO AVOID ELECTRIC SHOCK, DISCONNECT POWER TO THE UNIT UNDER TEST AND DISCHARGE ALL CAPACITORS BEFORE TAKING ANY RESISTANCE MEASUREMENTS. REMOVE THE BATTERIES AND UNPLUG THE LINE CORDS.

1. Set the function switch to the Ω position.
2. Insert the black test lead banana plug into the negative (COM) terminal and the red test lead banana plug into the positive Ω terminal.
3. Connect the test probe tips to the circuit or part under test. It is best to disconnect one side of the part under test so the rest of the circuit will not interfere with the resistance reading.
4. Read the resistance in the display and then set the function switch to the lowest Ω position that is greater than the actual or any anticipated resistance. The display will indicate the proper decimal point and value.




Continuity Check



Warning:


TO AVOID ELECTRIC SHOCK, NEVER MEASURE CONTINUITY ON CIRCUITS OR WIRES THAT HAVE VOLTAGE ON THEM.

1. Set the function switch to the  position.
2. Insert the black lead banana plug into the negative (-) terminal (COM) and the red test lead banana plug into the positive (+) terminal (Ω).
3. Connect the test probe tips to the circuit or wire you wish to check.
4. If the resistance is less than approximately 30Ω , the audible signal will sound. If the circuit is open, the display will indicate "1".

Diode Test

 **Warning:**

TO AVOID ELECTRIC SHOCK, DO NOT TEST ANY DIODE THAT HAS VOLTAGE ON IT.

1. Insert the black lead banana plug into the negative (-) terminal (COM) and the red test lead banana plug into the positive (+) terminal (Ω).
2. Turn the rotary switch to the  position.
3. Connect the test probes to the diode under test. Forward voltage will indicate 400 to 700mV. Reverse voltage will indicate "1". Shorted devices will indicate near 0mV and an open device will indicate "1" in both polarities.

Battery Test

1. Insert the black lead banana plug into the negative (-) terminal (COM) and the red test lead banana plug into the positive (+) terminal (Ω).
2. Select the 1.5V or 9V BAT position using the function select switch.
3. Connect the red test lead to the positive side of the **1.5V** or **9V** battery and the black test lead to the negative side of the 1.5V or 9V battery.
4. Read the voltage in the display.

	Good	Weak	Bad
9V battery	>8.2V	7.2 to 8.2V	<7.2V
1.5V battery	>1.35V	1.22 to 1.35V	<1.22V

Replacing & Installing the Battery

Warning:

TO AVOID ELECTRIC SHOCK, DISCONNECT THE TEST LEADS FROM ANY SOURCE OF VOLTAGE BEFORE REMOVING THE BATTERY COVER.

1. When the batteries become exhausted or drop below the operating voltage, "BAT" will appear in the right-hand side of the LCD display. The battery should be replaced.
2. Dispose of the old battery properly.
4. Disconnect the test leads from the meter.
5. Open the battery cover by loosening the screw using a Phillips head screwdriver.
6. Insert the battery into battery holder, observing the correct polarity.
7. Put the battery cover back in place. Secure with the screw.

Warning:

TO AVOID ELECTRIC SHOCK, DO NOT OPERATE YOUR METER UNTIL THE BATTERY COVER IS IN PLACE AND FASTENED SECURELY

Note:

If your meter does not work properly, check the fuses and batteries to make sure that they are still good and that they are properly inserted.

Replacing the Fuses

Warning:

TO AVOID ELECTRIC SHOCK, DISCONNECT THE TEST LEADS FROM ANY SOURCE OF VOLTAGE BEFORE REMOVING THE FUSE COVER.

1. Disconnect the test leads from the meter and any item under test.
2. Open the fuse cover by loosening the screw on the back cover using a Phillips head screwdriver.
3. Remove the old fuse from its holder by gently pulling it out.
4. Install the new fuse into the holder.
5. Always use a fuse of the proper size and value (0.5A/250V fast blow for the 200mA range, 10A/250V fast blow for the 10A range).
6. Put the fuse cover back in place. Insert the screw and tighten it securely.

Warning:

TO AVOID ELECTRIC SHOCK, DO NOT OPERATE YOUR METER UNTIL THE FUSE COVER IS IN PLACE AND FASTENED SECURELY.

Notes

Warranty & Maintenance

24 Month Warranty

Di-Log instruments are subject to stringent quality controls. If in the course of normal daily use a fault occurs we will provide a 24 month warranty (only valid with invoice).

Faults in manufacture and materials defect will be rectified by us free of charge, provided the instrument has not been tampered with and returned to us unopened.

Damage due to dropping abuse or misuse is not covered by the warranty.

Outside the warranty period we offer a full repair and re-calibration service.

Maintenance

WARNING Do not attempt to repair or service you meter unless you are qualified to do so and have the relevant calibration, performance test and service information. To avoid electrical shock or damage to the meter do not get water inside the case.

Periodically wipe the case with a damp cloth and mild detergent. Do not use chemical solvent.

Clean the input terminal with cotton bud, as dirt or moisture in the terminal can affect readings.

Di-Log Test Equipment

28 Wheel Forge Way,
Trafford Park,
Manchester
M17 1EH, UK

tel: + 44 161 877 0322

fax: + 44 161 877 1614

email: sales@dilog.co.uk

website: www.dilog.co.uk