

Di-LOG

...measurably better

operating manual

DL9206

AUTORANGING MULTIMETER







EN
61010-1
CAT III
600V

CE

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.
-  **CE** Symbol of conformity, confirms conformity with relevant EU directives. The meter complies with EMC directives (2014/30/EU). Specifically standards EN 50081-1 and EN 50082-1 as well as the Low Voltage Directive (2014/35/EU) described in the standard EN 61010-1.

Safety Information

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.

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.

Safety Information

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.

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.

Safety Information

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

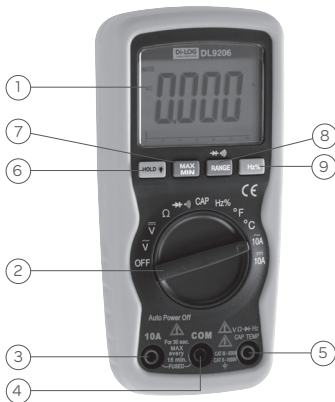
Never apply voltage or current to the meter that exceeds the specified maximum:

Function	Maximum
V DC or V AC	1000V DC, 750V AC
A DC/AC	10A DC/AC (30 seconds max every 15 minutes)
Frequency, Resistance, Capacitance, Duty Cycle, Diode test, Continuity	250V DC/AC
Temperature	250V DC/AC

Symbols and Annunciators

	Continuity
BAT	Low Battery
	Diode
HOLD	Data Hold
AUTO	AutoRanging
AC	Alternating Current or Voltage
DC	Direct Current or Voltage

Controls and Inputs



1. 6000 count Liquid Crystal Display with symbolic signs.
2. Function rotary switch.
3. 10A (positive) input terminal for 10A DC or AC measurements.
4. COM (negative) input terminal.
5. Positive input terminal.
6. HOLD pushbutton.
7. Max/Min pushbutton.
8. Range/↔ Diode pushbutton.
9. Hz/Duty pushbutton.

Specifications

The instrument complies with: EN61010-1.

Insulation: Class2, Double insulation.

Overvoltage category: CATIII 600V.

Display:

6000 counts LCD display with function indication.

Polarity: Automatic, (-) negative polarity indication.

Overrange: "OL" mark indication.

Low battery indication: The "BAT" is displayed when the battery voltage drops below the operating level.

Measurement rate: 2 times per second, nominal.

Auto power off: Meter automatically shuts down after approx. 15 minutes of inactivity.

Operating environment: 0 °C to 50 °C (32 °F to 122 °F) at < 70 % relative humidity.

Storage temperature: -20 °C to 60 °C (-4 °F to 140 °F) at < 80 % relative humidity.

For inside use, max height: 2000m

Pollution degree: 2

Power: One 9V battery , NEDA 1604, IEC 6F22.

Dimensions: 150 (H) x 70 (W) x 48 (D) mm

Weight: Approx.: 255g.

Accuracy is given at 18 °C to 28 °C (65 °F to 83 °F), less than 70 % RH

Specifications

DC Voltage

Range	Resolution	Accuracy
600.0mV	0.1mV	$\pm 0.5\%$ of rdg + 2 dgts
6.000V	1mV	$\pm 1.2\%$ of rdg + 2 dgts
60.00V	10mV	
600.0V	100mV	
1000V	1V	$\pm 1.5\%$ of rdg + 2 dgts

Input Impedance: 7.8M Ω .

Maximum Input: 1000V dc or 750V ac rms.

AC Voltage

Range	Resolution	Accuracy
6.000V	1mV	+1.2% of rdg + 3 dgts
60.00V	10mV	+1.5% of rdg + 3 dgts
600.0V	100mV	
750V	1V	+2.0% of rdg + 4 dgts

Input Impedance: 7.8M Ω .

Frequency Range: 50 to 60Hz .

Maximum Input: 1000V dc or 750V ac rms..

DC Current (Auto-ranging for μ A and mA)

Range	Resolution	Accuracy
10A	1mA	$\pm 2.5\%$ of rdg + 5 dgts

Overload Protection: 10A / 250V Fuse.

Maximum Input: 10A dc or ac rms on 10A DC range..

AC Current (Auto-ranging for μ A and mA)

Range	Resolution	Accuracy
10A	1mA	$\pm 3.0\%$ of rdg + 7 dgts

Overload Protection: 10A / 250V Fuse.

Frequency Range: 50 to 60 Hz.

Maximum Input: 10A dc or ac rms on 10A AC range.

Specifications

Resistance (Auto-ranging)

Range	Resolution	Accuracy
600.0 Ω	0.1 Ω	$\pm 1.2\%$ of rdg + 4 dgts
6.000k Ω	1 Ω	$\pm 1.0\%$ of rdg + 2 dgts
60.00k Ω	10 Ω	$\pm 1.2\%$ of rdg + 2 dgts
600.0k Ω	100 Ω	
6.000M Ω	1k Ω	
60.00M Ω	10k Ω	$\pm 2.0\%$ of rdg + 3 dgts

Input Protection: 250V dc or 250V ac rms.

Capacitance (Auto-ranging)

Range	Resolution	Accuracy
40.00nF	10pF	$\pm 5.0\%$ of rdg + 7 dgts
400.0nF	0.1nF	$\pm 3.0\%$ of rdg + 5 dgts
4.000 μ F	1nF	
40.00 μ F	10nF	
400.0 μ F	0.1 μ F	$\pm 5.0\%$ of rdg + 5 dgts
4000 μ F	1 μ F	$\pm 5.0\%$ of rdg + 5 dgts

Input Protection: 250V dc or 250V ac rms.

Frequency (Auto-ranging)

Range	Resolution	Accuracy
6.999Hz	0.001Hz	
69.99Hz	0.01Hz	$\pm 1.5\%$ of rdg + 5 dgts
699.9Hz	0.1Hz	$\pm 1.2\%$ of rdg + 3 dgts
6.999kHz	1Hz	
69.99kHz	10Hz	
699.9kHz	100Hz	
2.999MHz	1kHz	$\pm 1.5\%$ of rdg + 4 dgts

Sensitivity: $>0.5V$ RMS while $\leq 1MHz$;

Sensitivity: $>3V$ RMS while $>1MHz$;

Overload protection: 250V dc or ac rms.

Specifications

Duty Cycle

Range	Resolution	Accuracy
0.1%~99.9%	0.1%	$\pm 1.2\%$ of rdg + 2 dgts

Pulse width: >100us, <100ms; **Frequency width:** 5Hz - 150kHz

Sensitivity: >0.5V RMS **Overload protection:** 250V dc or ac rms.

Temperature

Range	Resolution	Accuracy
-20°C~+760°C	1°C	$\pm 3\%$ of rdg
-4°F~+1400°F	1°F	$\pm 5^\circ\text{C}/9^\circ\text{F}$

Sensor: Type K Thermocouple.

Overload protection: 250V dc or ac rms.

Diode Test

Range	Resolution	Accuracy
0.3mA typical	1mV	$\pm 10\%$ of rdg + 5 dgts

Open circuit voltage: 1.5V dc typical.

Overload protection: 250V dc or ac rms.

Audible continuity

Audible threshold: Less than 30 Ω ;

Test current: <0.3mA

Overload protection: 250V dc or ac rms.

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. This meter has Auto OFF that automatically shuts the meter OFF if 15 minutes elapse between uses.
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.

Operation

Range Button

When the meter is first turned on, it automatically goes into AutoRanging. This automatically selects the best range for the measurements being made and is generally the best mode for most measurements. For measurement situations requiring that a range be manually selected, perform the following:

1. Press the RANGE button. The “AUTO” display indicator will turn off.
2. Press the RANGE button to step through the available ranges until you select the range you want.
3. Press and hold the RANGE button for 2 seconds to exit the Manual Ranging mode and return to AutoRanging. (If backlight is turn on, please press BACKLIGHT button it will turn off).
4. To select Diode/continuity.

Data Hold Button

The Hold function allows the meter to “freeze” a measurement for later reference.

1. Press the HOLD button to “freeze” the reading on the indicator. The indicator “HOLD” will be appear in the display.
2. Press the HOLD button to return to normal operation.

Operation

Hz/duty

1. Switch to Hz/Duty range.
2. Press the Hz/Duty button to show the reading in the display and the “**Hz/Duty**” indicator will appear on the display.

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 V DC position .
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.
3. Connect the test probe tips to the circuit under test. Be sure to observe the correct polarity (red lead to positive, black lead to negative).
4. Read the voltage in the display. 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 position.
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.
3. Connect the test probe tips to the circuit under test.
4. Read the voltage in the display. The display will indicate the proper decimal point, value and symbol (AC, V, etc.).

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 DC current measurements, set the function switch to the DC 10A position and insert the red test lead banana plug into the 10A terminal.
3. Remove power from the circuit under test, then open up the circuit at the point where you wish to measure current.
4. 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.
5. Apply power to the circuit.
6. Read the current in the display. The display will indicate the proper decimal point, value and symbol.

AC Current Measurements



Warning:

TO AVOID ELECTRIC SHOCK, DO NOT MEASURE AC CURRENT ON ANY CIRCUIT WHOSE VOLTAGE EXCEEDS 250V AC.



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 AC current measurements, set the function switch to the AC 10A position and insert the red test lead banana plug into the 10A terminal.
3. Remove power from the circuit under test, then open up the circuit at the point where you wish to measure current.
4. Connect the black test probe tip to the negative side of the circuit. And connect the red test probe tip to the positive side of the circuit.
5. Apply power to the circuit.
6. Read the current in the display. The display will indicate the proper decimal point, value and symbol.

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 across 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. The display will indicate the proper decimal point, value and symbol.

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. Press the  button until the  symbol appears in the display.
4. Connect the test probe tips to the circuit or wire you wish to check.
5. If the resistance is less than approximately 30Ω , the audible signal will sound. The display will also show the actual resistance.

Diode Test

 **Warning:**

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

1. Set the function switch to  position.
2. Press the  button until the  symbol appears in the display.
3. Insert the black test lead banana plug into the negative (-) terminal (COM) and the red test lead banana plug into the positive (+) terminal (Ω).
4. Connect the test probe tips to the diode or semiconductor junction you wish to test. Note the meter reading.
5. Reverse the probe polarity by switching probe position. Note this reading.
6. The diode or junction can be evaluated as follows:
 - A. If one reading shows a value and the other reading shows OL, the diode is good.
 - B. If both readings show OL, the device is open.
 - C. If both readings are very small or 0, the device is shorted.

Note:

The value indicated in the display during the diode check is the forward voltage.

Frequency Measurements

1. Set the function switch to the FREQ position.
2. Insert the black test lead banana plug into the negative (-) terminal (COM) and the red test lead banana plug into the positive (+) terminal (F).
3. Connect the test probe tips to the circuit under test.
4. Read the frequency in the display. The digital reading will indicate the proper decimal point, symbols (Hz, kHz) and value.

Capacitance Measurements

 **Warning:**

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

1. Set the function switch to the CAP position. (“nF” and a small value will appear in the display).
2. Insert the black test lead banana plug into the negative (-) terminal (COM) and the red test lead banana plug into the positive (+) terminal (CAP).
3. Connect the test leads to the capacitor to be tested. The display will indicate the proper decimal point, value and symbol.

Temperature Measurement

 **Warning:**

TO AVOID ELECTRIC SHOCK, DISCONNECT BOTH TEST PROBES FROM ANY SOURCE OF VOLTAGE BEFORE MAKING A TEMPERATURE MEASUREMENT.

1. If you wish to measure temperature in °F, set the function switch to the °F range. If you wish to measure temperature in °C, set the function switch to the °C range.
2. Insert the type K thermocouple probe black test lead banana plug into the negative **COM** terminal and the red test lead banana plug into the positive **Temp** terminal.
3. Connect the Temperature Probe head to the part whose temperature you wish to measure. Keep the probe connected to the part under test until the reading stabilizes (about 30 seconds).
4. Read the temperature in the display. The digital reading will indicate the proper decimal point and value.

 **Warning:**

TO AVOID ELECTRIC SHOCK, BE SURE THE THERMOCOUPLE HAS BEEN REMOVED BEFORE CHANGING TO ANOTHER MEASUREMENT FUNCTION.

Replacing 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. Disconnect the test leads from the meter.
3. Open the battery cover by loosening the screw using a Phillips head screwdriver.
4. Insert the battery into battery holder, observing the correct polarity.
5. Put the battery cover back in place. Secure with the two screws.
6. Follow instructions for installing battery. See the Battery Installation section of this manual.

 **Warning:**

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

Note:

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

Replacing the Fuses

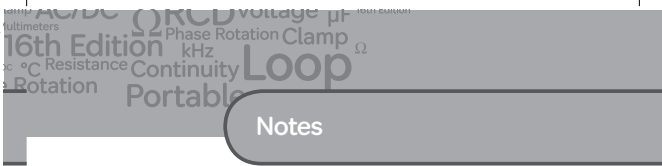
 **Warning:**

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 door 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 400mA 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.

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Voltage 16th Edition Phase Rotation Clamp
kHz
Resistance Continuity Loop
Phase Rotation Portable