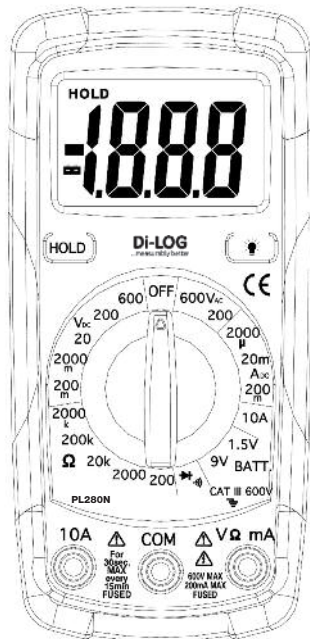


Di-LOG

Instruction Manual

PL280N

Digital Multimeter



EN 61010-1
CAT III 600V



SAFETY NOTICES

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.

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

	Input Limits
Function	Maximum Input
VAC	600V DC/AC
V DC or V AC	600V DC/AC, 200Vrms on 200mV range
mA DC	200mA 250V fast acting fuse
A DC	10A 250V fast acting fuse (30 seconds max every 15 minutes)
Resistance, Continuity	250Vrms for 15sec max

Caution! Dangerous voltage. Danger of electrical shock

Continuous double or reinforced insulation complies with IEC536, class 11

CE 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.

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.

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.

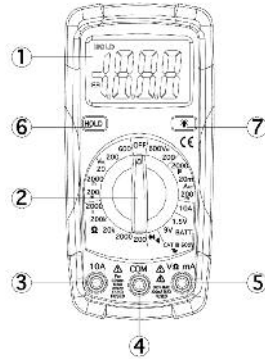
Replace the battery as soon as the low battery indicator appears. If the battery is low the meter may give false readings.

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.

CONTROLS AND INPUTS

1. LCD Display
2. Function switch
3. 10A Input Terminal
4. COM Input Terminal
5. Positive Input Terminal
6. Data Hold Button
7. Backlight Button



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	±(0.8% reading + 2 digits)
	200V	0.1V	
600V	1V		
AC Voltage (V AC)	200V	0.1V	±(1.2% reading + 10 digits (50/60Hz))
	600V	1V	
DC Current (A DC)	2000mA	1μA	±(1.0% reading + 2 digits)
	20mA	10μA	
	200mA	100μA	±(1.2% reading + 2 digits)
	10A	10mA	
Resistance	200W	0.1Ω	±(0.8% reading + 2 digits)
	2000W	1Ω	
	20kW	0.01kΩ	
	200kW	0.1kΩ	
	2000kW	1kΩ	±(1.0% reading + 2 digits)
Battery Test	9V	10mV	±(1.0% reading + 2 digits)
	1.5V	1mV	

NOTE: Accuracy specifications consist of two elements:

- (% reading) – This is the accuracy of the measurement circuit.
- (+ digits) – This is the accuracy of the analogue to digital converter.

NOTE: Accuracy is stated at 65oF to 83oF (18oC to 28oC) and less than 75% RH.

SPECIFICATIONS

Diode Test	Test current of 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	>1MΩ
ACV Bandwidth	45Hz to 450Hz
DCA voltage drop	200mV
Display	3½ 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, μA 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)
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.

BATTERY INSTALLATION

WARNING: To avoid electric shock, disconnect the test leads from any source of voltage before removing the battery cover.

1. Disconnect the test leads from the meter.
2. Open the battery cover by loosening the screw using a Phillips head screwdriver.
3. Insert the battery into battery holder, observing the correct polarity.
4. Put the battery cover back in place. Secure with the screw.

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 batteries to make sure that they are still good and that they are properly inserted.

OPERATING INSTRUCTIONS

DATA HOLD BUTTON

The Data Hold function allows the meter to "freeze" a measurement for later reference.

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

BACK LIGHT BUTTON

1. The BACK LIGHT button is used to turn the back light on or off. Press the BACK LIGHT BUTTON to turn the back light on.
2. Press the BACK LIGHT BUTTON to turn the back light off.

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) input terminal. Insert the red test lead banana plug into the positive (V) input terminal.
3. Touch the black test probe tip to the negative side of the circuit. Touch 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 Electrocutation. 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.

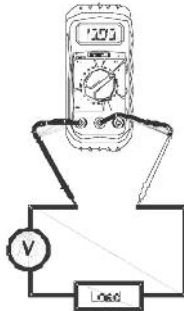
1. Set the function switch to the highest V AC position.
2. Insert the black test lead banana plug into the negative (COM) input terminal. Insert red test lead banana plug into the positive (V) input terminal.
3. Touch the black test probe tip to the negative side of the circuit. Touch the red test probe tip to the positive side of the circuit.
4. Read the voltage in the display. Reset the function switch to successively lower V AC 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) input 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) input 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) input terminal.
4. Remove power from the circuit under test, then open up the circuit at the point where you wish to measure current.
5. Touch the black test probe tip to the negative side of the circuit. Touch 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 highest W position.
2. Insert the black test lead banana plug into the negative (COM) input terminal. Insert the red test lead banana plug into the positive W input terminal.
3. Touch 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 and then set the function switch to the lowest W 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 (COM) input terminal. Insert the red test lead banana plug into the positive (Ω) input terminal.
3. Touch 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

1. Insert the black test lead banana plug into the negative **COM** input terminal and the red test lead banana plug into the positive diode input terminal.
2. Turn the rotary switch to the $\blacktriangleright / \bullet)))$ position.
3. Touch 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. Shorted devices will indicate near 0mV and an open device will indicate "1" in both polarities.

BATTERY TEST

1. Insert the black test lead banana plug into the negative **COM** input terminal and the red test lead banana plug into the positive **V** input terminal.

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 THE BATTERIES

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 batteries should be replaced.
2. Follow instructions for installing batteries. See the Battery Installation section of this manual.
3. Dispose of the old batteries properly.

WARNING: To avoid electric shock, do not operate your meter until the battery cover is in place and fastened securely.

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 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 (0.2A/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.

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.

Di-Log Test Equipment
28 Wheel Forge Way
Trafford Park
Manchester
M17 1EH
UK

Tel + 44 161 877 0322
Fax + 44 161 877 1614
Website: www.dilog.co.uk
Email: sales@dilog.co.uk