

Megger^R



DLRO10HD and DLRO10HDX 10 A Digital Low Resistance Ohmmeter

User Guide

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Instrument Safety

If the equipment is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired

- The instrument must be operated only by suitably trained and competent persons
- Users of this equipment and their employers are required by National Health and Safety Legislation to carry out valid risk assessments of all electrical work so as to identify potential sources of electrical danger and risk of electrical injury
- The instrument must NOT be used if any part of it is damaged
- Damaged test leads must NOT be used. Test leads, connectors and mechanical guards must be in good order, clean and have no broken or cracked insulation
- If the test subject to which the instrument is connected is energised while the instrument is turned off, protection devices may not prevent the instrument from overheating. In which case, parts of the case may become very hot and damage may occur
 - Set the instrument to ON before connecting to the test subject
 - The test subject must be set to OFF, de-energised and checked before test connections are made. Make sure that the test subject cannot be re-energised whilst the instrument is connected
 - Do not leave the equipment unattended when connected to the test subject
 - Do not leave the equipment connected to the test subject after the test is completed
- The user must exercise caution when connecting to and disconnecting from the test subject
 - Always connect test leads to the instrument before attaching to test subject
 - Keep hands behind any tactile barriers on probe clips and clamps when making or breaking connections.
 - High current connections between the instrument and test subject must be secured against accidental detachment and must not be disengaged whilst test current is flowing
 - Circuit terminals must not be touched during test
 - Do not disconnect the instrument from the test subject until the test current has stopped and the TEST warning indicator is extinguished
 - Test leads and connections may become hot during use. Exercise caution when handling
 - Disconnect from the test subject before switching the instrument OFF
- There are no user-serviceable parts inside the instrument; all servicing, including battery and fuse replacement, must be referred a Megger approved service centre
- When used on hazardous voltages the Megger terminal cover (part number 1002-390) must be used
- This product is not intrinsically safe. Do not use in an explosive atmosphere

Measurement Connection

Only Megger supplied test leads designed for this instrument provide the full safety rating.

Voltage

The rated measurement connection voltage is the maximum line to earth voltage at which it is safe to connect.

CAT IV

Measurement category IV: Equipment connected between the origin of the low-voltage Mains Power supply and the distribution panel.

CAT III

Measurement category III: Equipment connected between the distribution panel and the electrical outlets.







CAT II

Measurement category II: Equipment connected between the electrical outlets and the User's equipment.

Measurement equipment may be safely connected to circuits at the marked rating or lower. The connection rating is that of the lowest rated component in the measurement circuit.



Safety and Hazard Icons

This section details the various safety and hazard icons on the instruments outer case.

Icon	Description
	Caution: refer to User Guide
	Equipment protected throughout by Double Insulation
	Equipment complies with current EU directives
	Equipment complies with current "C tick" requirements
	Do not dispose of in the normal Waste stream
	Fuse

Warning Icons

This section details the warning icons that can show on the display.

Icon	Warning	Description
	External Voltage Warning	<p>If an external voltage is applied between the terminals and the instrument is set to On, the High Voltage warning will flash on the display. This is a warning that the item under test is live and might be dangerous and testing is disabled. The High Voltage warning message will flash if more than 50 V potential difference is applied between the Voltage terminals and the Current terminals. This warning will not show if all terminals are at the same high voltage.</p> <p>Note: The warning will not operate if the instrument is set to Off.</p>
	Discharge Voltage / Current Warning	<p>The High Voltage warning and the red High Voltage LED on the panel will flash if a current greater than 1 mA is still flowing after an inductive test is completed. This suggests that the inductive load has been tested and is discharging. Do not disconnect the current loop while the discharge warning is showing.</p>

Description

This User Guide details the DLRO10HD and the DLRO10HDX.

Both the DLRO10HD and the DLRO10HDX measure the same tests and parameters, in addition the DLRO10HDX can save, recall and download test results to PowerDB.

The DLRO10 range of digital low resistance ohm meters measure resistance in a range of 0.1 $\mu\Omega$ to 2 k. These instruments provide a maximum test current of 10 Amps. The DLRO10 range consist of four versions:

- DLRO10
- DLRO10X
- DLRO10HD
- DLRO10HDX

Key Features

- Simple operation
- High power ranges
- Simultaneous testing and battery charging
- Rugged case construction designed for use in demanding environments or the lab
- IP65 with the lid closed and IP54 with the lid open for protection against ingress during operation
- Multiple lead set options (Megger connect leads - see the lead set data-sheet)
- 10 A while measuring up to 250 m Ω and 1 A while measuring up to 2.5 Ω
- Monitors test lead contact, which reduces the chance of erroneous readings
- Rechargeable battery: Capacity <1000 10A test
- Auto power off
- Large, clear LCD for all light conditions
- Time and Date stamped memory for recording of results (DLRO10HDX only)
- Memory storage and USB download capability (DLRO10HDX only)
- CAT III 300 V: Protected against accidental connection to external voltages up to 600 V DC applied between any pair of the four terminals for up to 10 seconds

Applications

The DLRO10HD and DLRO10HDX measure low resistance values in applications ranging from railways and aircraft to resistance of components in industry.

Any metallic joint can be measured but users must be aware of measurement limitations depending on application. For example, if a cable manufacturer plans to make resistive measurements on a thin wire, a low test current should be selected to prevent heating the wire thereby changing its resistance.

Both instruments are well suited to measuring thick conductors, bonds and quality of welding because of their 10 A range for resistance values up to 250 mΩ. Measurements on electric motors and generators will be inductive and require the User to understand the inductive mode and charging process before a correct result is achieved.

Electromagnetic noise induced into the leads can interfere with a reading. A noise icon alerts the User, but does not prevent a measurement.

When dissimilar metals are joined a galvanic effect is created. Users should select a Bi-directional mode to make sure this effect is cancelled. The instrument measures with current flowing in both directions and averages the result.

Typical applications include DC resistance measurements of:

- Switch and contact breaker resistance
- Transformer and motor winding resistance
- Busbar and cable joints
- Rail and pipe bonds
- Aircraft frame bonds and static control circuits
- Metal alloys, welds and fuse resistance
- Integrity of welded joints
- Graphite electrodes and other composites
- Inter-cell connections on battery systems
- Wire and cable resistance
- 300 V peak
- Transmitter aerial and lightning conductor bonding
- Quality control of resistive components

Overview

This section details an over view of the instrument:

Controls and Connections

DLRO10HDX



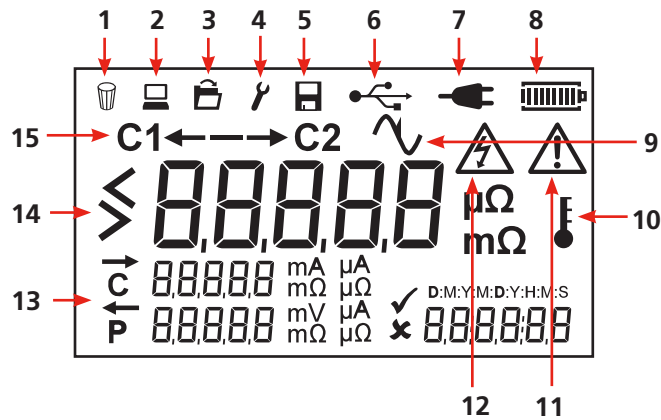
DLRO10HD



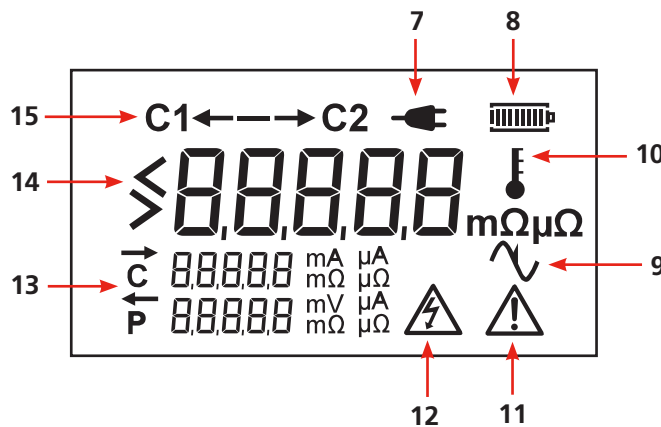
Item	Description	Item	Description
1	Current Terminals	9	Test button (Start and stop tests)
2	Potential Terminals	10	Navigation keypad (setup and stored results)
3	Test Lead LED Cable	11	Test modes and Off rotary switch
4	Display	12	Mains Power On LED
5	Save Button	13	Fuse
6	USB socket (download records)	14	Contrast button
7	Hazard warning LED during test	15	Mains Power Socket
8	Range Rotary Switch	16	Back-light

Display Icons

DLRO10HDX





DLRO10HD



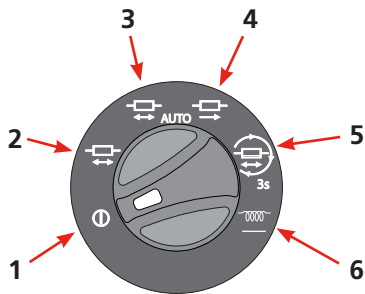
Item	Description	Item	Description
1	Delete	9	Noise (over 100 mV 50 / 60 Hz)
2	Test Result Download mode	10	Over Temperature
3	Recall Test Result Mode	11	Refer to User Guide
4	Date and Time mode	12	High Voltage Warning
5	Save mode	13	Secondary Display
6	USB connected	14	Primary Display
7	Mains Power connected	15	Direction of Current flow in a test
8	Battery Status		

Secondary Display

- 
 Directional arrow to show current flow above C indicator
- 
 Directional arrow to show current flow above P indicator

Test Mode Rotary Switch

Test modes and instrument Off are selected with the Test Mode rotary switch.



Available test modes are:

Item	Mode	Description
1	Off	Instrument is Off . Rotate the switch to any mode to start the instrument
2	Manual Bi-directional	Test current applied in both directions current flow. Continuity of all four connections is checked. Current is applied in both forward and reverse direction. See Manual Bi-directional Test (page 14)
3	Automatic Bi-directional	Test current applied in both directions current flow See Automatic Bi-directional Test (page 15) See Automatic Bi-directional Test (page 18) : Automatic save (DLRO10HDX)
4	Automatic Uni-directional	Current is applied in one direction only, to speed up the measurement process. Standing EMF's setup during the test are ignored so lower accuracy can result See Automatic Uni-directional Test (page 16) See Automatic Uni-directional Test (page 19) : Automatic save (DLRO10HDX)
5	Continuous	Test current is applied in both directions. The test repeats at three seconds intervals See Continuous Test (page 17) See Continuous Test (page 20) : Automatic save (DLRO10HDX)
6	Inductive	Test current applied in only one direction. See Inductive Test (page 13)

Warning: When inductive loads are measured the current carrying leads must be securely clamped to the item being tested.

Warning: Do not remove the current carrying leads before any stored charge has been discharged at the end of the test.

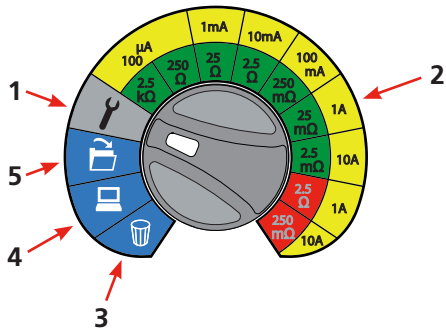
Warning: Failure to comply with these instructions might result in an arc being produced, which might be dangerous for the instrument and the operator.

Note: When inductive loads are measured it is necessary to wait for the voltage to stabilise, so the measurement process can take a few seconds or several minutes.

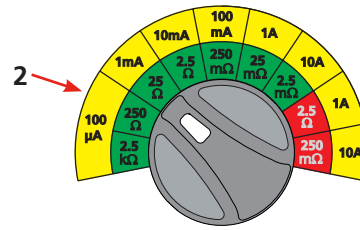
Range Rotary Switch

The instruments test range of resistance and current is selected with the Range rotary switch.

DLRO10HDX



DLRO10HD



- Green resistance ranges: Low output power (<0.25 W) outputs
- Red resistance ranges: Higher 2.5 W (1 A) and 25 W (10 A) power outputs (⚠ shows)

Item	Description
1	Date and Time Setup (page 21)
2	Resolution and Accuracy (page 10)
3	Delete Test Result Records (page 24)
4	Download Test Result Records (page 23)
5	Recall Test Result Records (page 22)

Resolution and Accuracy

- Test current accuracy $\pm 10\%$
- Voltmeter input impedance $>200\text{ k}\Omega$
- Maximum lead resistance at 10 A $<100\text{ m}\Omega$

Test Current	Resistance Range	Resolution (as shown)	Basic Accuracy*	Full Scale Voltage	Max. Power Output
100 μA	0 to 2.5 $\text{k}\Omega$	0.1 Ω	$\pm 0.2\%$ $\pm 200\text{ m}\Omega$	25 mV	25 μW
100 μA	0 to 250 Ω	0.01 Ω	$\pm 0.2\%$ $\pm 20\text{ m}\Omega$	25 mV	2.5 μW
1 mA	0 to 25 Ω	1 $\text{m}\Omega$	$\pm 0.2\%$ $\pm 2\text{ m}\Omega$	25 mV	25 μW
10 mA	0 to 2.5 Ω	0.1 $\text{m}\Omega$	$\pm 0.2\%$ $\pm 200\text{ }\mu\Omega$	25 mV	250 μW
100 mA	0 to 250 $\text{m}\Omega$	0.01 $\text{m}\Omega$	$\pm 0.2\%$ $\pm 20\text{ }\mu\Omega$	25 mV	2.5 mW
1 A	0 to 25 $\text{m}\Omega$	1 $\mu\Omega$	$\pm 0.2\%$ $\pm 2\text{ }\mu\Omega$	25 mV	25 mW
10 A	0 to 2.5 $\text{m}\Omega$	0.1 $\mu\Omega$	$\pm 0.2\%$ $\pm 0.2\text{ }\mu\Omega$	25 mV	0.25 W
1 A**	0 to 2.5 Ω	0.1 $\text{m}\Omega$	$\pm 0.2\%$ $\pm 200\text{ }\mu\Omega$	2.5 V	2.5 W
10 A**	0 to 250 $\text{m}\Omega$	0.01 $\text{m}\Omega$	$\pm 0.2\%$ $\pm 50\text{ }\mu\Omega$	2.5 V	25 W

* Basic accuracy stated assumes forward and reverse measurements.

** Higher 2.5 W (1 A) and 25 W (10 A) power outputs ( shows).

Inductive or Uni-directional mode can introduce an undefined error if an external EMF is present.

Basic accuracy at reference conditions.

Test Leads

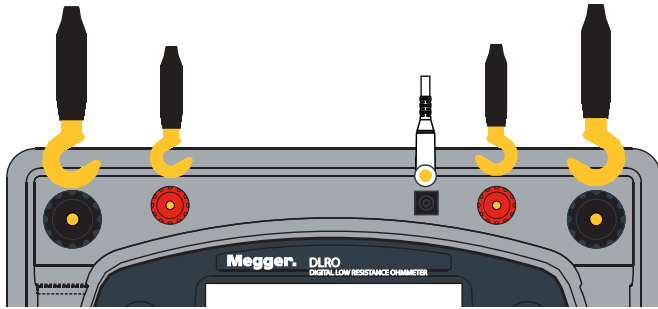
The test leads can be used with either:

- Hand-spikes or
- Clamps

See [Accessories \(page 28\)](#).

Connection to the Instrument

Connect the supplied test leads to the instrument as show below:



Tip: To help connect the test leads remove the instrument lid. Open the lid to approximately 45° and slide it to the right.

Test Lead Connection

A good test measurement requires both the Current carrying circuit and the Voltage detection circuit to be completed by the unit under test. The Instrument checks for continuity in both C and P circuits.

A test will not start until there is a good connection to the test piece by the test leads.

Confirmation of successful continuity:

- If **C 1----2** and **P 1----2** are constant the connectivity is good
- If either **C 1----2** and **P 1----2** flash there is no connectivity, and the test will not start

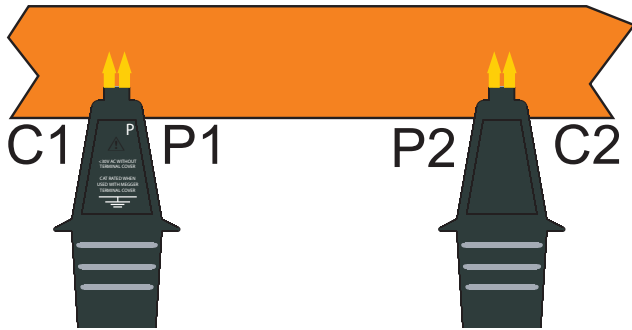
Successful Connection	Unsuccessful connection
<p>C 1----2</p> <p>P 1----2</p>	<p>C 1----2</p> <p>P 1----2</p>

The resistance result is shown on the display in either Ω , m Ω or $\mu\Omega$ ranging from 2500.0 Ω to 0.1 $\mu\Omega$.

The result in Bi-directional modes is the average of two readings shown by the two secondary displays, with arrows to show the direction of current flow. The large arrow at the top of the display between C1 and C2 shows the measurement current flow.

Connection to a Test Piece

Connect the test leads to the test piece in the Kelvin arrangement as shown:



The image shows the correct test lead connection of the current (C1, C2) and potential probes (P1, P2) to a test piece. To make sure test readings are accurate, the current terminals (C1 and C2) must be connected outside of the potential terminals (P1 and P2).

DH4-C Duplex Hand-spikes


Each hand-spike is marked with the letter **P** (potential terminals). These should always be the **inside** contacts when a test measurement is taken.

One of the test lead connectors has two LEDs (**L1** and **L2**) and an LED driver cable. The LED driver cable plugs into the terminal next to terminal **P2** (see [Connection to the Instrument \(page 11\)](#)).

LEDs **L1** and **L2**, give information to the User that would otherwise only be available on the display:

Lamp L1	Lamp L2	Description
On (red)	Off	Inadequate continuity at C or P contacts
Flashing (red)	Off	Voltage present between contacts
Off	On (green)	Current, 1mA, test complete
Off	On (red)	Measurement fail

For example, when the test leads are used in an Auto test mode:

1. Press .
2. **L1** shows a steady red to show there is a contact failure.
3. When all four contacts are connected, **L1** goes Off.
4. No LEDs show in a test, unless contact fails.
5. To signal end of test, **L2** shows a steady green when the current flow has decayed to less than 1 mA.
6. When the test leads are removed from the test piece, **L2** goes Off (end of test) and **L1** shows red (no contact).

When the DH4-C Duplex Hand-spikes are used, the instrument always makes sure that there is a good contact before the full test current is applied, so there should be no erosion of the contact tips. However, if the tips become worn or blunted, they can be replaced. Pull out the worn tips and install new ones.

Tests with the DH4-C Duplex Hand-spikes or Individual Leads

Connect the four leads as shown. In all cases make sure that the potential probes (P1 and P2) are inside the current (C1 and C2) probes.

Tests

This section details the instruments test procedures, which also can be manually saved (DLRO10HDX only).
For information on test lead connection to a test piece, see [Test Lead Connection](#) (page 11).

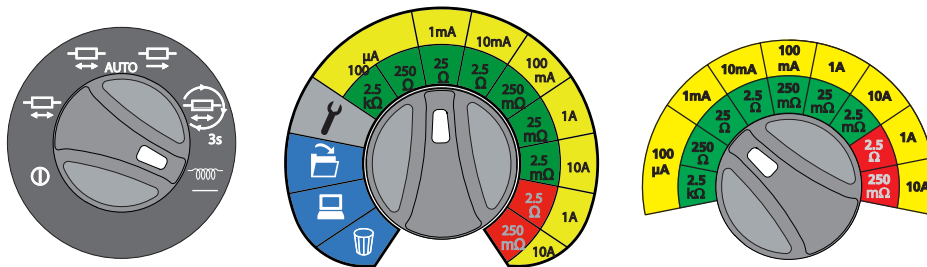
Inductive Test

Warning: When inductive loads are measured the current carrying leads must be securely clamped to the item being tested.




Warning: Do not remove the current carrying leads before any stored charge has been discharged at the end of the test.

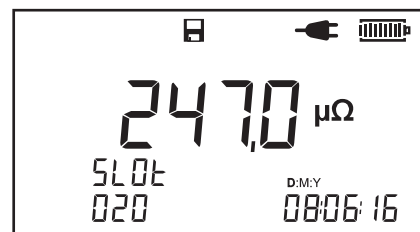
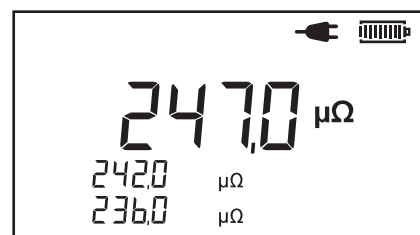
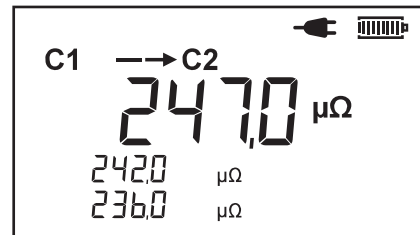
Warning: Failure to comply with these instructions might result in an arc being produced, which might be dangerous for the instrument and the operator.

Note: When inductive loads are measured it is necessary to wait for the voltage to stabilise, so the measurement process can take a few seconds or several minutes.

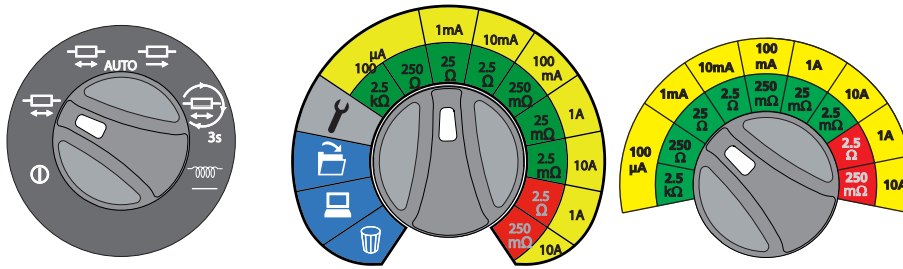


Tip: Use Clamp test leads (optional accessory).

- Press  .
Test starts (LED shows red).
Arrow direction animated (based on current direction) and plateau.
- Continuous measurements are taken on the connected test piece.
The last three test records show (new test result shows on the Primary display (rolling display)).
Last test record is shown while the next test is in progress.
- Press  to stop the test.
The last complete three test results are shown.
- DLRO10HDX only:** Save test results (if required).
Press  . The test result is saved and the memory slot number is shown.
The Save screen is shown for three seconds.



Manual Bi-directional Test



Tip: Use Clamp test leads (optional accessory).

Note: In Manual test mode both the Current and Voltage test leads must be connected across the test piece before **TEST** is pressed.

1. Press **TEST** (acknowledged by a beep sound).
Test starts (LED shows red).

Arrow direction animated (based on current direction) and plateau.

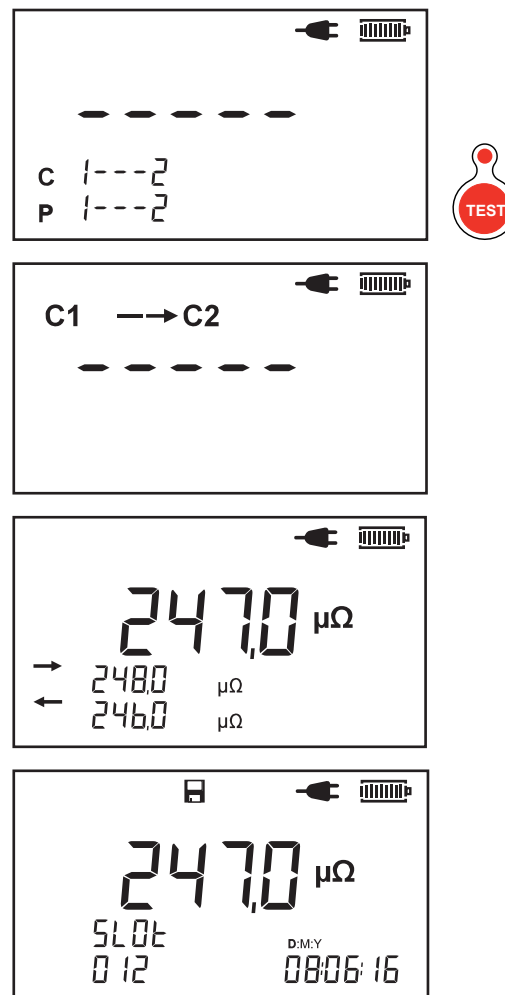
Test result for the currently connected test piece is shown.

2. **DLRO10HDX only:** Save test results (if required).

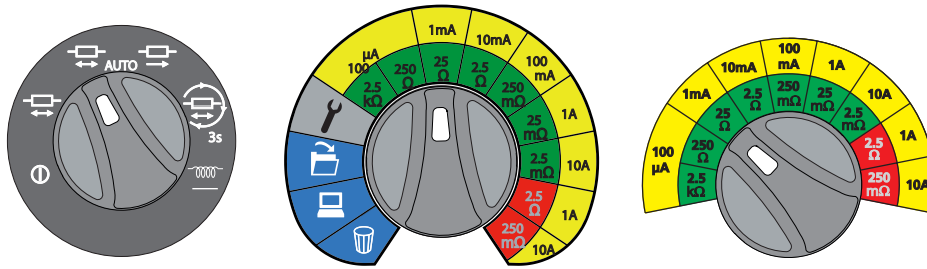
Press . The test result is saved and the memory slot number is shown.
The Save screen is shown for three seconds.

3. If the test piece is still connected, press **TEST** to do another test.

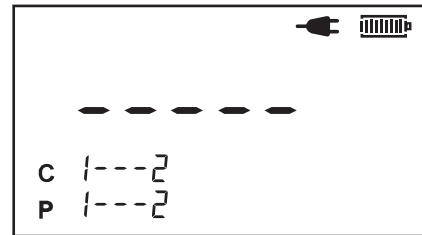
4. **DLRO10HDX only:** Press as required.



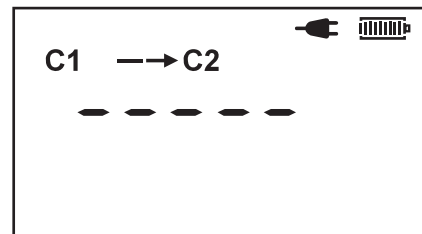
Automatic Bi-directional Test



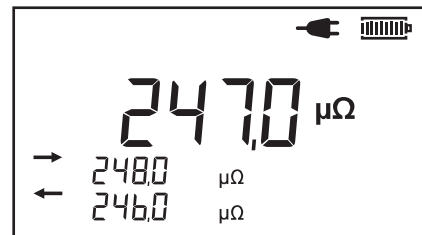
1. Connect the test leads to the test piece.
Test starts (LED shows red).




Arrow direction animated (based on current direction) and plateau.

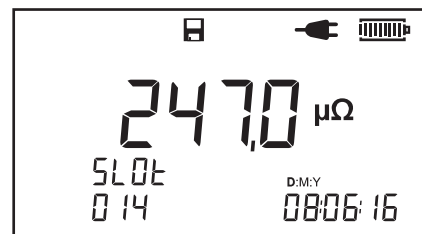


2. Test results for the currently connected test piece are shown.



3. **DLRO10HDX only:** Save test results (if required).

Press . The test result is saved and the memory slot number is shown.
The Save screen is shown for three seconds.



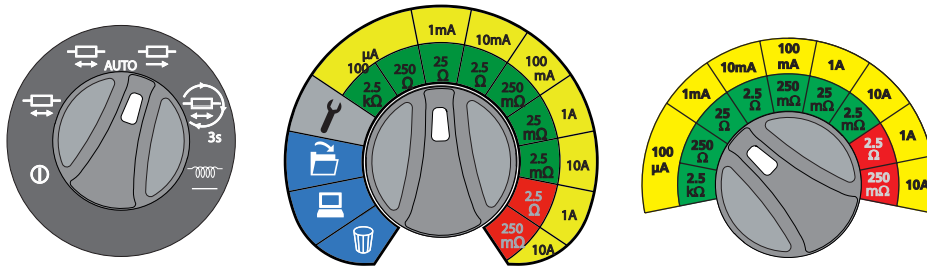
4. The test automatically continues for subsequent connected test piece.

5. **DLRO10HDX only:** Press  as required.

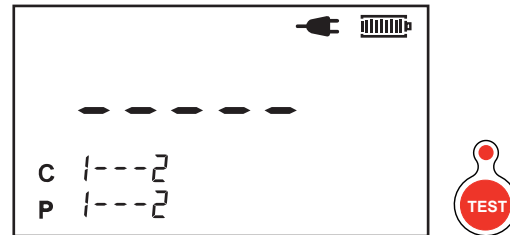
6. Press  to stop the test.



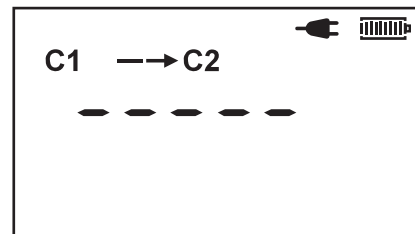
Automatic Uni-directional Test



1. Connect the test leads to the test piece.
Test starts (LED shows red).




Arrow direction animated (based on current direction) and plateau.

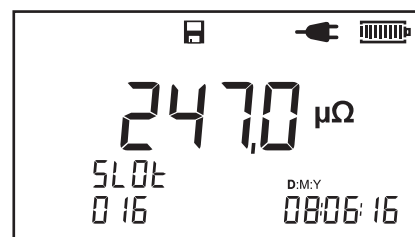


2. Test results for the currently connected test piece are shown.



3. **DLRO10HDX only:** Save test results (if required).

Press . The test result is saved and the memory slot number is shown.
The Save screen is shown for three seconds.

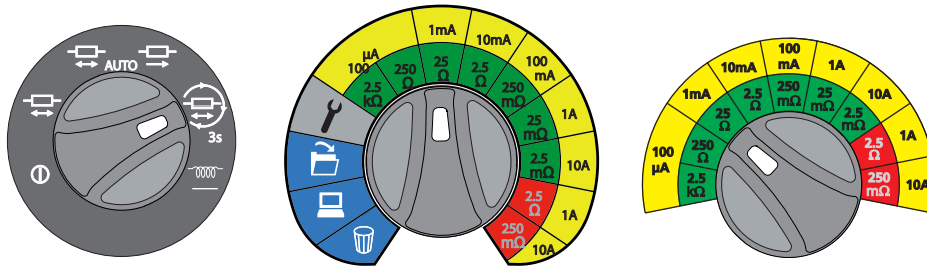


4. The test automatically continues for subsequent connected test piece.


5. **DLRO10HDX only:** Press  as required.

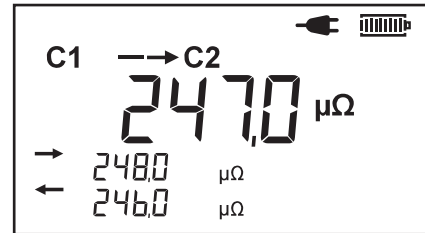
6. Press  to stop the test.

Continuous Test




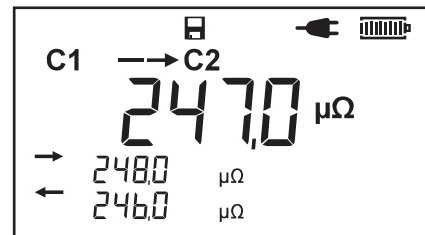
Tip: Use Clamp test leads (optional accessory).



1. Press  .
 Test starts (LED shows red).
 Arrow direction animated (based on current direction) and plateau.

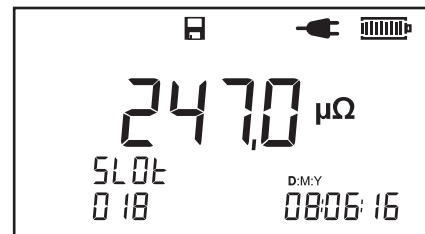




2. Continuous measurements are taken on the connected test piece.
 Tests are made every three seconds.
 Last test record is shown while the next test is in progress.

3. **DLROHD10X only:** Save test results (if required).
 At any point press  (acknowledged by a beep sound).
 Test results are saved until the test is stopped or the memory is full (2000 records).



4. Press  to stop the test.
DLROHD10X only: If  was pressed in Step 3, Test results are saved and the memory slot number is shown. The Save screen is shown for three seconds.



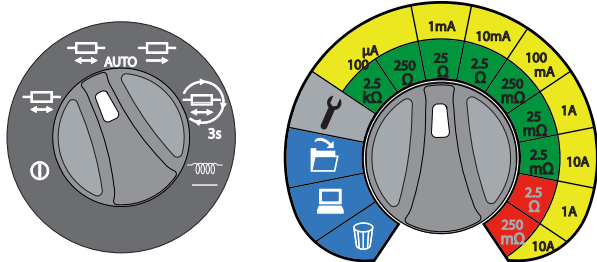
5. **DLROHD10X only:** If  was not pressed in Step 3, save test results if required.
 Press  . The last complete test result is saved and its memory slot number is shown.
 The Save screen is shown for three seconds.


Tests with Automatic Save (DLROHD10X)

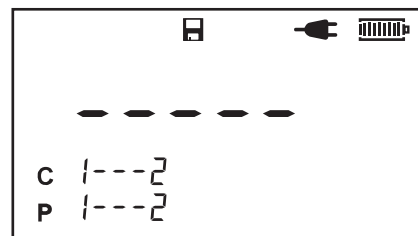
This section details the instruments test procedures, which can be automatically saved.

For information on test lead connection to a test piece, see [Test Lead Connection](#) (page 11).

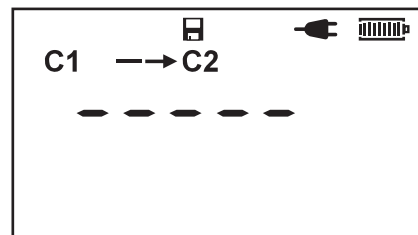
Automatic Bi-directional Test



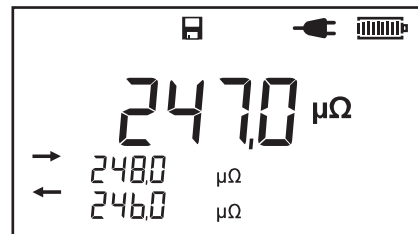
1. Press  (acknowledged by a beep sound).
Save function is available until the memory has 200 test records.



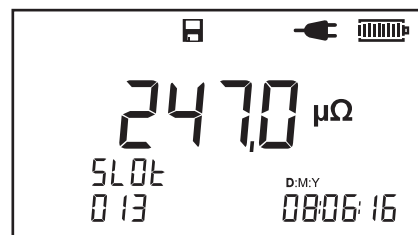
2. Connect the test leads to the test piece.
Test starts (LED shows red).
Arrow direction animated (based on current direction) and plateau.




3. Test results for the currently connected test piece are shown.

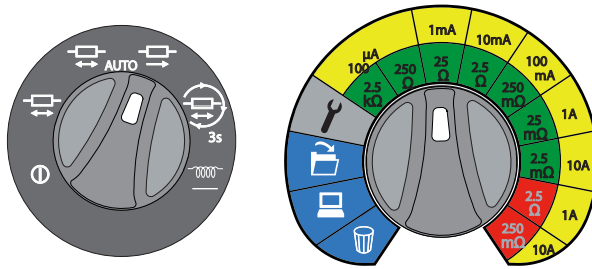




Test results are saved and their memory slot number is shown. The Save screen is shown for three seconds.

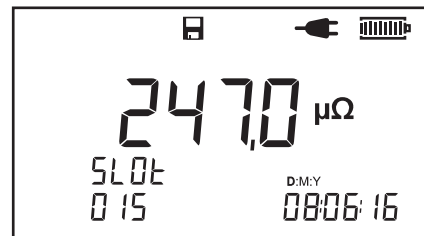
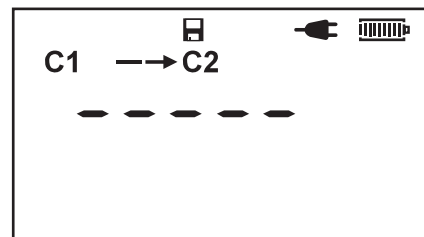
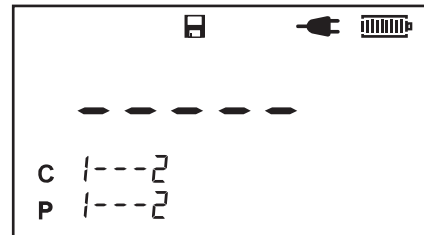


4. The test automatically continues for the next connected test piece.
5. Press  to stop the test.

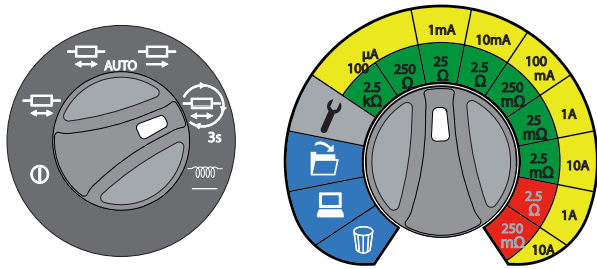
Automatic Uni-directional Test






1. Press  (acknowledged by a beep sound).
Save is available until the memory has 200 test records.
2. Connect the test leads to the test piece.
Test starts (LED shows red).
Arrow direction animated (based on current direction) and plateau.
3. Test results for the currently connected test piece are shown.
4. Test results are saved and their memory slot number is shown. The Save screen is shown for three seconds.
5. The test automatically continues for the next connected test piece.
6. Press  to stop the test.

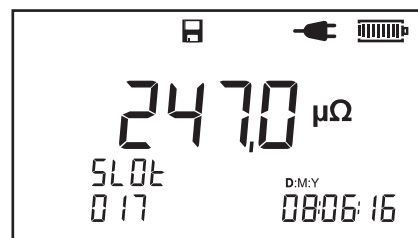
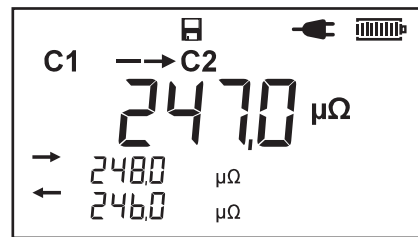
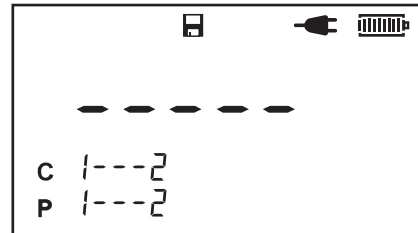


Continuous Test



Tip: Use Clamp test leads (optional accessory).

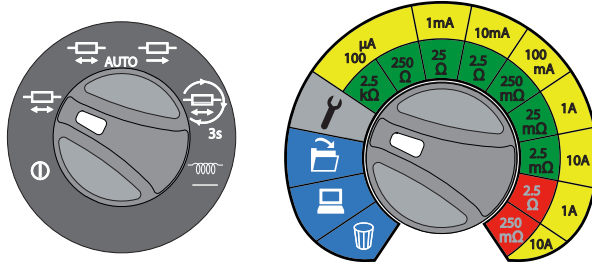
1. Press  (acknowledged by a beep sound).
Save is available until the memory has 200 test records.
2. Press . Test starts (LED shows red).
3. Arrow direction animated (based on current direction) and plateau.
4. Continuous measurements are taken on the connected test piece.
Tests are made every three seconds.
Last test record is shown while the next test is in progress.
5. Press  to stop the test.
Test results are saved and their memory slot number is shown. The Save screen is shown for three seconds.





Memory Features (DLRO10HDX)






The DLRO10HDX can record, saved and download test results, complete with a date and time stamp.
Up to 200 memory slots are available.

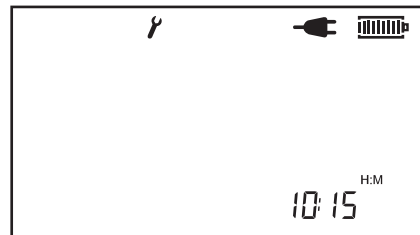
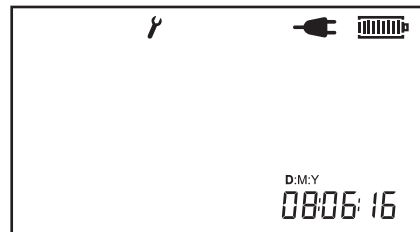
Date and Time Setup



To Set Date and Time

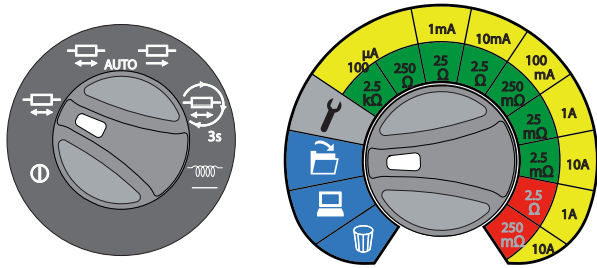
- Press  to toggle between D:M:Y or M:D:Y format (Default: DMY).
- Press  to toggle between Date and Time.


1. Press  to start adjustment.
2. Press  to toggle between D/M/Y and HM.
3. Press  to adjust.
4. Press  to scroll.
5. Press  to set.




Recall Test Result Records

Note: If no records are found nD rEE and  show on the display.



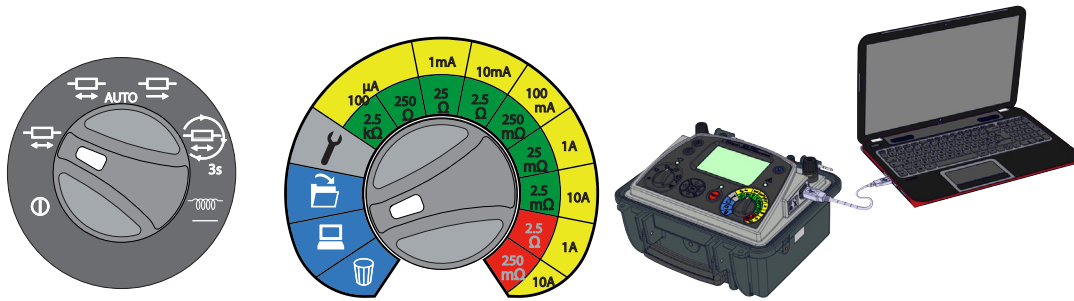
1. Last saved test result shows.
2. Press  to scroll through the test results records.



3. Press  to show a record for the selected slot.
Screen toggles between date and time when record was saved.

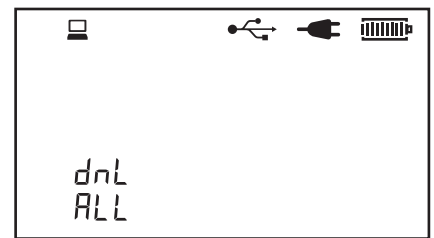
Download Test Result Records

To download and view test records install PowerDB to a Windows computer (see User Guide CD).



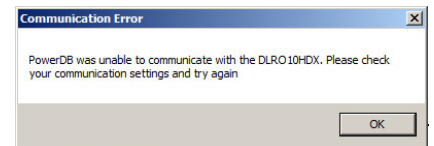
1. Connect the instrument to a Windows computer.
 - 1.1. Plug a USB cable to the instrument USB port (see [Controls and Connections](#) (page 6)).
 - 1.2. Connect the USB to the Windows computer.
2. Open PowerDB.

For information on how to use PowerDB and download test results refer to the PowerDB help files.



The USB icon (🔌) shows only while data download is in progress. If communication to the host Windows computer fails a Communication Error window shows in PowerDB.

Tip: If download does not start: Click **Initialise**, wait for **OK** to show, then click **Download DLRO10HDX Data** again.



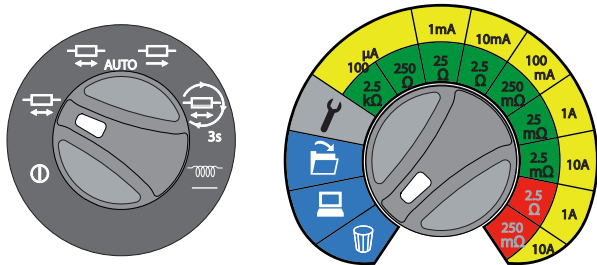
Delete Test Result Records

All test result records or a single test result record (last recorded test result) can be deleted.

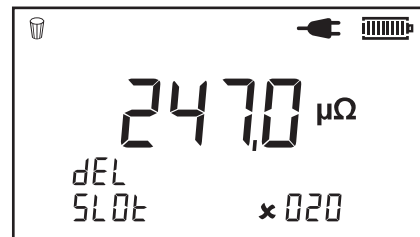
Note: If no records are found nD rEC and show on the display.



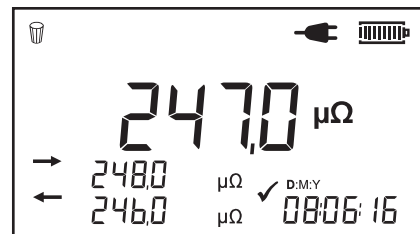
flashes to show Memory Delete mode.



1. Press to toggle **SLOt** (Single delete) or **ALL** (Delete All).
Single Delete: Only the last test record in the list can be deleted, at a time.



2. Press to confirm deletion (shows constant to confirm delete mode).



3. Press to delete.

Maintenance

Routine Inspection

Look for any cracks or other damage to the enclosure, missing ports, etc.

Cleaning

Disconnect the instrument from the Mains Power. Wipe it with a clean cloth slightly dampened with water or Isopropyl alcohol (IPA). Care should be taken near the terminals, the IEC Mains Power and USB sockets.

Allow the instrument to completely dry before it is used.

Instrument Care

The instrument should always be handled with care and not dropped. Always make sure that the instrument is secured when being transported to prevent mechanical shock.

Test Leads

Leads are silicone insulated and work well in all weather conditions. Always keep the leads in a suitable lead bag when in storage or transportation.

Regular inspection of leads is recommended to make sure that they are not damaged in any way. Damaged leads could affect resistance readings and are a safety hazard.

Mains Power Fuse

Always use the correct rated fuse (see [Specifications \(page 26\)](#)).

Battery Care

Caution: Batteries are only to be installed or removed by an Authorised Service Centre. Do not attempt to remove the batteries from this instrument.

- To prevent deep battery discharge, the battery should be charged at a minimum of three month intervals
- Never attempt to charge the battery below 0 °C (32°F) or above 40 °C (104 °F) ambient
- To improve battery life, store the instrument in a cool, dry location

Battery Charge

The battery is charged when Mains Power is connected (unless a test is in progress).

For optimum battery life, charge the battery after each use. A fully discharged battery takes eight hours to recharge.

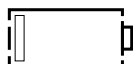
The charge level will go from low to full charge in incremental steps and continue as long as Mains Power is connected (unless a test is in progress). When the battery is fully charged the battery icon will stay steady.



Battery full charge




Battery charge low



Battery discharged: The instrument shuts down automatically.

Specifications

Item	Description
Temperature Coefficient	< 0.01% per °C, from 5 °C to 40 °C (41 °F to 104 °F)
Maximum Altitude	2000 m (6562 ft) to full safety specifications
Display Size and Type	Primary five digit and two five digit secondary displays
Supply rating	100 to 240 V 50 / 60 Hz 90 VA
Mains Power Input Fuse	T 1.25 A, 250 V, HBC ceramic 20 mm x 5 mm
Battery Type	6 V, 7 Ah sealed lead acid (return instrument to a Megger authorised repair agent for replacement) Lithium ion coin cell (DLRO10HDX)
Battery Charge Time	8 hours
Battery Life	>1000 Automatic (three seconds) tests
Back-light	LED
Auto Power Down	300 seconds after inactivity
Mode Selection	Rotary switch
Range Selection	Rotary switch
Memory Features	Rotary switch (DLRO10HDX only)
Memory Storage	200 test result records (DLRO10HDX only)
USB Connection	Download test results (DLRO10HDX only)
Weight	6.7 kg (14.8 lb)
Case Dimensions	315 x 285 x 181 mm (12.4 x 11.2 x 7.1 in)
Pouch for Test Leads	Yes (lid mounted)
Test Leads	Dependant on order code selected
IP Rating	IP65 case closed IP54 battery operation
Safety Rating	In accordance with IEC61010-1 CATIII 300 V when used with optional terminal cover (General Accessories (page 28))
Application	IEC 61010 defines measurement categories from I to IV relating transient over voltages and the location within electrical installations. Designed for use at Category III (Building installation level) on 300 V phase to earth systems, 520 V phase to phase
Operating Temperature and Humidity	-10 °C to 50 °C (14 °F to 122 °F) <90% RH
Storage Temperature and Humidity	-25 °C to 60 °C, <90%RH
Reference Conditions	20 °C (68 °F) (±3 °C / 5.4°F)
EMC	In accordance with IEC61326-1 (Heavy industrial)
Noise Rejection	Less than 1% (±20) digits additional error with 100 mV peak 50 / 60 Hz. on the potential leads  will show if hum or noise exceeds this level
Maximum lead resistance	100 mΩ total for 10 A operation irrespective of battery condition

Power Lead

If the power lead supplied is not suitable for your Mains Power connection, do not use an adaptor. Always use a power lead installed with the correct plug. The instrument has a two-pin IEC60320 Mains Power socket.

Most power leads are made with three-core cable, so the ground connection will not be used.

Power Lead Connection Table

Connection	K / International	USA
Earth / Ground	Yellow / Green	Green
Neutral	Blue	White
Live (Line)	Brown	Black

If a fused plug is used, make sure that it is installed with a 3 A fuse.

The instrument can be powered from 100 - 240 V 50 / 60 Hz 90 VA.

Accessories

General Accessories

Item	Order No.
Calibration shunt, 10 Ω , current rating 1 mA	249000
Calibration shunt, 1 Ω , current rating 10 mA	249001
Calibration shunt, 100 m Ω current rating 1A	249002
Calibration shunt, 10 m Ω current rating 10 A	249003
Certificate of Calibration for shunts, NIST CERT-NIST	CERT-NIST
Replacement tips for DH4 and DH5 handspike needle point	25940-012
Replacement tips for DH4 and DH5 handspike serrated end	25940-014
Terminal cover (use in conjunction with DH4 test leads, or DH5 test leads for CATIII 300 V compliance)	1002-390

Test Leads (No In-line connector)

Duplex Leads

Item	Length	Qty.	Order No.
DH5 straight duplex handspike (one has indicator lights)	2.5 m (8 ft)	2	6111-517
Duplex handspike with spring loaded helical contacts	2 m (7 ft)	2	242011-7
DH1 Duplex handspike	2.5 m (8 ft)	2	6111-022
DH1 Duplex handspike	5.5 m (18 ft)	2	242011-18
DH2 Duplex handspike	6 m (20 ft)	1	6111-023
DH2 Duplex handspike	9 m (30 ft)	1	242011-30
Straight duplex handspike heavy duty with fixed contacts	2 m (7 ft)	2	242002-7
Straight duplex handspike heavy duty with fixed contacts	5.5 m (18 ft)	2	242002-18
Straight duplex handspike heavy duty with fixed contacts	9 m (30 ft)	2	242002-30
Duplex heavy duty C-Clamps (5 cm (2 in))	2 m (7 ft)	2	242004-7
Duplex heavy duty C-Clamps (5 cm (2 in))	5.5 m (18 ft)	2	242004-18
Duplex heavy duty C-Clamps (5 cm (2 in))	9 m (30 ft)	2	242004-30
Duplex handspike with replaceable needle points	2 m (7 ft)	2	242003-7
Duplex kelvin clips gold plated (1.27 cm (0.5 in))	2 m (7 ft)	2	241005-7
Duplex kelvin clips silver plated (1.27 cm (0.5 in))	2 m (7 ft)	2	242005-7
Duplex kelvin clips (3.8 cm (1.5 in))	2 m (7 ft)	2	242006-7
Duplex kelvin clips (3.8 cm (1.5 in))	5.5 m (18 ft)	2	242006-18
Duplex kelvin clips (3.8 cm (1.5 in))	9 m (30 ft)	2	242006-30

Individual leads

Item	Length	Qty.	Order No.
Single handspike (potential connections)	2 m (7 ft)	1	242021-7
Single handspike (potential connections)	5.5 m (18 ft)	1	242021-18
Single handspike (potential connections)	9 m (30 ft)	1	242021-30
Current clip (current connections)	2 m (7 ft)	1	242041-7
Current clip (current connections)	5.5 m (18 ft)	1	242041-18
Current clip (current connections)	9 m (30 ft)	1	242041-30

Test leads (In-line Connector)

For details on the connection of lead accessories see 'DLRO test leads fitted with duplex Connectors' (DLROTestLeads_DS_en_V03).

Repair and Warranty

If the protection of an instrument has been impaired it should not be used, but sent for repair by suitably trained and qualified personnel. The protection is likely to be impaired if, for example, the instrument shows visible damage, fails to perform the intended measurements, has been subjected to prolonged storage under unfavourable conditions, or has been exposed to severe transport stresses.

New instruments are covered by a two year warranty from the date of purchase by the User, the second year being conditional on the free registration of the product on www.megger.com. You will need to log in, or first register and then login to register your product. The second year warranty covers faults, but not recalibration of the instrument which is only warranted for one year. Any unauthorised prior repair or adjustment will automatically invalidate the warranty.

These products contain no User repairable parts and if defective should be returned to your supplier in original packaging or packed so that it is protected from damage during transit. Damage in transit is not covered by this warranty and replacement / repair is chargeable.

Megger warrants this instrument to be free from defects in materials and workmanship, where the equipment is used for its proper purpose. The warranty is limited to making good this instrument (which shall be returned intact, carriage paid, and on examination shall disclose to their satisfaction to have been defective as claimed). Any unauthorised prior repair or adjustment will invalidate the warranty. Misuse of the instrument, from connection to excessive voltages, fitting incorrect fuses, or by other misuse is excluded from the warranty. The instrument calibration is warranted for one year.

This Warranty does not affect your statutory rights under any applicable law in force, or your contractual rights arising from a sale and purchase contract for the product. You may assert your rights at your sole discretion.

Calibration, Service and Spare Parts

For service requirements for Megger Instruments contact Megger or your local distributor or authorised repair centre.

Megger operates fully traceable calibration and repair facilities, to make sure your instrument continues to provide the high standard of performance and workmanship you expect. These facilities are complemented by a worldwide network of approved repair and calibration companies to offer excellent in-service care for your Megger products.

See the back of this User Guide for Megger contact details.

To find your local Authorised Service Centre email Megger on ukrepairs@megger.com and give details of your location.

Approved Repair Companies

A number of independent instrument repair companies have been approved to do repair work on most Megger instruments, complete with genuine Megger spare parts.

Consult the Appointed Distributor / Agent about spare parts, repair facilities and advice.

Return an Instrument for Repair

If an instrument is to be returned the manufacturer for repair, it should be sent freight pre-paid to the appropriate address. A copy of the Invoice and of the packing note should be sent simultaneously by airmail to expedite clearance through Customs. A repair estimate, which will show freight return and other charges, will be submitted to the sender, if required, before work on an instrument starts.

Note: The battery is a sealed Lead-acid type and if changed the disposal of old cells should be in accordance with local regulations.

End of Life Disposal

WEEE Directive



■ The crossed out wheeled bin icon placed on Megger products is a reminder that this instrument must not be disposed of in general waste at the end of its life.

Megger is registered in the UK as a Producer of Electrical and Electronic Equipment (Registration No.: WEE / HE0146QT).

For more information about the disposal of the product consult your local Megger company or distributor or visit your local Megger website.

Batteries

Battery replacement **must only be done** by a Megger authorised repair agent, who will correctly dispose of the 'end of life' battery or batteries.



■ The crossed out wheeled bin icon placed on the batteries is a reminder that the batteries must not be disposed of with general waste.

This instrument contains:

- One sealed lead acid battery (classified as a Portable Battery), and
- One Lithium ion coin cell battery (classified as an Industrial Battery (DLRO10HDX only))

See [Specifications \(page 26\)](#) for battery specifications.

Megger is registered in the UK as a producer of batteries (Registration No.: BPRN00142).

Declaration of Conformity

Hereby, Megger Instruments Limited declares that radio equipment manufactured by Megger Instruments Limited described in this User Guide is in compliance with Directive 2014/53/EU. Other equipment manufactured by Megger Instruments Limited described in this User Guide is in compliance with Directives 2014/30/EU and 2014/35/EU where they apply.

The full text of Megger Instruments EU declarations of conformity are available at the following internet address: megger.com/eu-dofc.

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OTHER TECHNICAL SALES OFFICES

Toronto CANADA, Sydney AUSTRALIA, Madrid SPAIN, Mumbai INDIA, and the Kingdom of BAHRAIN.

Megger products are distributed in 146 countries worldwide.

This instrument is manufactured in the United Kingdom.

The company reserves the right to change the specification or design without prior notice.

Megger is a registered trademark

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