

DLRO10HD and DLRO10HDX 10 Amp Digital Low Resistance Ohmmeters



DLRO10HD

DLRO10HDX

- Onboard memory storage for test results up to 200 records (HDX only)
- Download to PowerDB
- Interchangeable test lead terminations
- High or low output power selection for condition diagnosis
- Operates from rechargeable battery or AC mains supply
- Protected to 600 V without blowing a fuse, test lead live voltage warning light
- Heavy duty case: IP 65 lid closed, IP54 operational
- Simple rotary switch selection of five test modes, including auto start on connection
- 10 A for 60 seconds, less time waiting to cool

DESCRIPTION

Augmenting Megger's DLRO10 and 10X range the DLRO10HD and HDX combine ultimate simplicity of operation with a rugged IP65 case designed for stable ground and bench operation.

These units are powered from either rechargeable battery or mains power making it suitable for continuous testing in production line/repetitive use environments.

Rotary switch controls are simple and easy to operate in all weather conditions and with gloved hands. A large, clear, backlit LCD display is easy to read from a distance. The DLRO10HDX provides significantly enhanced compliance and is capable of delivering 10 A into measurements up to 250 mΩ and 1 A into measurements up to 2.5 Ω. The duration of each test may be up to 60 seconds.

The unit is rated CAT III 300 V provided the **optional terminal cover is fitted** to the instrument. Details of which can be found in the ordering information panel of this data sheet.

Both units provide five test modes each of which is selected through a simple rotary control on the Mode selection rotary switch. On the DLRO10HDX, the memory functions; delete; download to PowerDB; and recalling test results are also accessible via the Range Selection rotary switch.

A simple control panel enables easy navigation for configuration settings.

History of 'Ducter' testing

For over 100 years the 'Ducter test' has been used to describe a simple test for measuring very low contact resistances and "Ducter", which is still used as a trade mark, was the name originally given to the low resistance ohmmeter manufactured by Megger. The name Ducter was registered by Megger in June 1908 and 'Ducter' has since become the industry standard.

ADDITIONAL FEATURES AND BENEFITS

- Rugged case well suited to transportation with shoulder strap and lead set pouch
- Removable lid facilitates easy test lead connection
- Operational ingress protection is IP 54 (battery power only) ensuring protection from the elements
- 7 Ah lead acid battery provides extended operation and can be charged whilst operating from mains power
- Rotary mode switch with bidirectional (current reversal with averaging cancels thermal EMFs), unidirectional, automatic, continuous and inductive modes
- Large, clear LCD display with backlight and contrast adjustment
- Auto power off function conserves battery

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APPLICATIONS

The DLRO10HD and HDX 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.

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.

The DLRO10HDX is well suited to measuring thick conductors, bonds and quality of welding because of its 10 A range for resistance values up to 250 mΩ.

Electromagnetic noise induced into the leads can interfere with a reading. A noise symbol alerts the user and prevents a measurement when the instrument detects noise above its threshold.

When dissimilar metals are joined a thermocouple effect is created. Users should select a bidirectional mode to ensure cancellation of this effect. The instrument measures with current flowing in both directions and averages the result.

Normal mode is initiated by pressing the 'Test' button after connecting the test leads to the unit under test. Continuity of all four connections is checked. Current is applied in both forward and reverse direction following which measurement is displayed.

Automatic mode is started as soon as the probes make contact. Forward and reverse current measurements are made and the average value is displayed. This mode is ideal when working with handspikes. Each time the probes are removed and reconnected to the load a new test will be performed without the need to press the test button.

TEST modes

Automatic unidirectional mode applies current in one direction only to speed up the measurement process. However thermal EMF resulting from dissimilar metal bonds can cause lower accuracy. Test starts automatically when probes are connected.

Continuous mode allows repeated measurements to be made on the same sample. Simply connect the test leads and press the test button. The measurement is updated every three seconds until the circuit is broken.

Inductive mode is selected when measuring resistance on, for example, motors and generators. When measuring inductive loads it is necessary to wait for the voltage to stabilise as the inductive element is charged. Test leads are firmly connected to the device under test and the 'Test' button pressed. The instrument will pass the selected current through the sample continuously in one direction only and take repetitive readings that will gradually decrease to the true value as the voltage stabilises. The operator decides when the result is stable and presses the 'Test' button to terminate the test.

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ELECTRICAL SPECIFICATIONS

Resistance/Current Ranges

The green resistance ranges on the keypad indicate low output power (<0.25 W) outputs. Red ranges indicate higher 2.5 W (1 A) and 25 W (10 A) power outputs.

Resolution and Accuracy

Test current accuracy: $\pm 10\%$

Voltmeter input impedance: >200 k Ω

Maximum lead resistance at 10 A <100 m Ω

Test current	Resistance range	Resolution (as displayed)	Basic accuracy*	Full scale voltage	Max. power output
100 μ A	0 - 2.5 k Ω	0.1 Ω	$\pm 0.2\%$ ± 200 m Ω	25 mV	25 μ W
100 μ A	0 - 250 Ω	0.01 Ω	$\pm 0.2\%$ ± 20 m Ω	25 mV	2.5 μ W
1 mA	0 - 25 Ω	1 m Ω	$\pm 0.2\%$ ± 2 m Ω	25 mV	25 μ W
10 mA	0 - 2.5 Ω	0.1 m Ω	$\pm 0.2\%$ ± 200 μ Ω	25mV	250 μ W
100 mA	0 - 250 m Ω	0.01 m Ω	$\pm 0.2\%$ ± 20 μ Ω	25 mV	2.5 mW
1 A	0 - 25 m Ω	1 μ Ω	$\pm 0.2\%$ ± 2 μ Ω	25 mV	25 mW
10 A	0 - 2.5 m Ω	0.1 μ Ω	$\pm 0.2\%$ ± 0.2 μ Ω	25 mV	0.25 W
1 A **	0 - 2.5 Ω	0.1 m Ω	$\pm 0.2\%$ ± 200 μ Ω	2.5 V	2.5 W
10 A **	0 - 250 m Ω	0.01 m Ω	$\pm 0.2\%$ ± 50 μ Ω	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.

Inductive mode or unidirectional mode will introduce an undefined error if an external EMF is present.

Basic accuracy at reference conditions.

GENERAL SPECIFICATIONS

Temperature coefficient	< 0.01% per $^{\circ}$ C, from 5 $^{\circ}$ C to 40 $^{\circ}$ C
Maximum altitude	2000 m (6562 ft) to full safety specifications
Display size/type	Main 5 digit + 2 x 5 digit secondary displays
Battery type	6 V, 7Ah sealed lead acid
Voltage input range	100 – 240 V, 50 / 60 Hz, 90 VA
Charge time	8 hours
Backlight	LED backlight
Battery life	>1000 Auto (3 sec) tests
Auto power down	300s
Mode selection	Left Rotary switch
Range selection	Right Rotary switch
Memory features (HDX only)	Right Rotary switch
Weight	6.7 kg
Case dimensions	L315 mm x W285 mm x H181 mm
Pouch for test leads	Yes (lid mounted)
Test leads	Choose from DH4C lead set or KC1 Kelvin Clip lead set
IP rating	IP65 case closed, IP54 battery operation
Record storage (HDX only)	200 test records
Safety rating	In accordance with IEC61010-1, CATIII 300V when used with optional terminal cover (order code: 1002-390)
Operating temperature and humidity	-10 $^{\circ}$ C to +50 $^{\circ}$ C (14 $^{\circ}$ F to 122 $^{\circ}$ F), <90% RH
Reference conditions	20 $^{\circ}$ C \pm 3 $^{\circ}$ C
Storage temperature and humidity	-25 $^{\circ}$ C to +60 $^{\circ}$ C, <90% RH

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. Warning will show if hum or noise exceeds this level.

Maximum lead resistance

100 m Ω total for 10 A operation irrespective of battery condition.

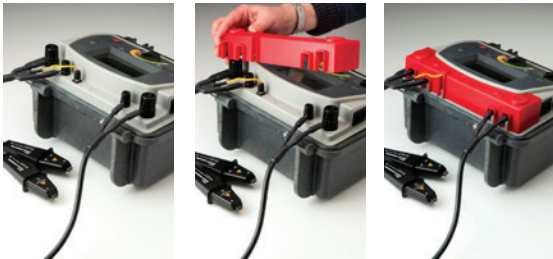
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OPTIONAL TERMINAL COVER



The CAT III 300 V rating on the DLRO10HDX is only valid when the instrument is fitted with the optional terminal cover to provide the required creepage and clearances at the instrument terminals.

Although the terminal cover may be used with any test leads, only the Megger DH4, DH5 and DP1-C duplex handspikes, and KC2-C insulated kelvin clips have suitable probe insulation to comply with the requirements of IEC61010-1 and the CATIII 300 V rating. Order code is 1002-390.



SUPPLIED LEADSET OPTIONS

- 1)  DH4-C probe
1.5 m leads
(1006-603)
- 2)  KC1 Kelvin clip
3 m leads
(1006-604)
- 3) No leadsets included (1006-657)

INDUSTRIAL APPLICATION KIT

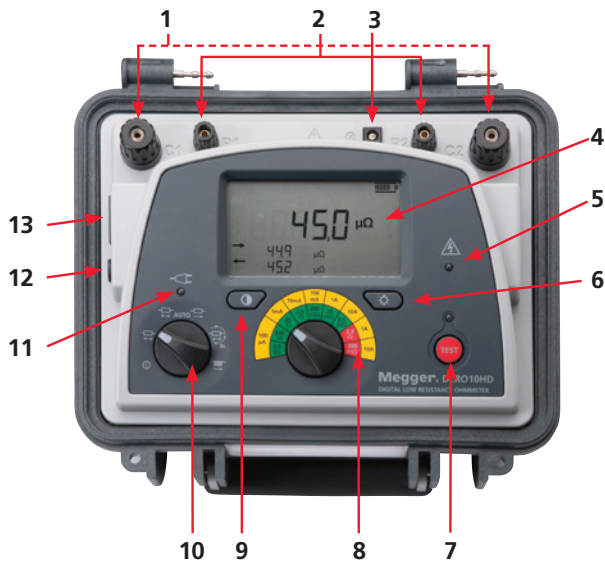
- Connect 4 mm shrouded plugs to the DLRO10HD and DLRO10HDX
- Ideal for testing in Industrial locations
- Maintains instruments CAT III 300 V rating of instrument
- Kelvin probe and clip lead sets supplied
- Bridging lead set supplied for accurately measuring cable resistance
- Supplied in heavy duty, water repellent nylon carry case.

Order code is 1011-376



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**DLRO10HD
Instrument Overview**



Item	Description
1	Current terminals
2	Potential terminals
3	Test lead LED cable
4	Display
5	Hazard warning LED during test
6	Back-light
7	Test button (start and stop tests)
8	Range rotary switch
9	Contrast button
10	Test modes and off rotary switch
11	Mains power on LED
12	Fuse
13	Mains power socket

**DLRO10HDX
Instrument Overview**



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

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ORDERING DLRO10HD

Item (Qty)	Order No.	Item (Qty)	Order No.
DLRO10HD + DH4-C probe 1.5m leads	1006-603	DLRO10HD no test leads supplied	1006-657
DLRO10HD + KC1 kelvin clip 3m leads	1006-604		

ORDERING DLRO10HDX

Item (Qty)	Order No.	Item (Qty)	Order No.
DLRO10HDX no test leads	1008-052	DLRO-10HDX + KC1-C (2x Connect Kelvin clip 3m test leads	1008-095
DLRO10HDX + DH4-C (2x Connect Duplex handspikes 1.5m test leads	1008-075	Other mains lead types are available. Please contact your local sales office for information.	

ACCESSORIES ORDERING INFORMATION

Item (Qty)	Order No.	Item (Qty)	Order No.
Terminal cover (use in conjunction with DH4 test leads supplied as standard, or optional DH5 test leads for CAT III 300 V compliance)	1002-390	Extension leads for use with Connect leads without light	1006-460
DLRO10HD and DLRO10HDX CAT III rated industrial application lead kit with terminal cover	1011-376	KL1-C Kelvin clip lead sets (3m)	1006-462
CP1-C Concentric Duplex connect probe	1006-448	KC1-C Heavy duty Kelvin clip	1006-447
DH1-C Duplex connect handspike lead set (3m)	1006-442	KC2-C Insulated connect kelvin clip	1006-451
DH4-C Duplex connect handspike lead set (1.5m)	1006-444	KC100 series test leads (1x100m/1x5m)	1000-809
DH5-C Duplex connect probe (3m)	1006-445	For detailed information on our range of test leads and comparisons, refer to data sheet : <u>DLRO test leads fitted with duplex connector</u>	
DP1-C Duplex connect probe (3m)	1006-450		
DTP-C Duplex connect twist probe	1006-449		
TL1.5-CL Duplex connect leads (1.5m)	1006-456		
TL3-CL Duplex connect leads (3m)	1006-458		
TL6-CL Duplex connect leads (6m)	1006-459		