

## 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

## DLRO10HD and DLRO10HDX

### 10 Amp Digital Low Resistance Ohmmeters

#### 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.

#### 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:  $>200\text{ k}\Omega$

Maximum lead resistance at 10 A  $<100\text{ m}\Omega$

| Test current      | Resistance range | Resolution (as displayed) | Basic accuracy*                           | Full scale voltage | Max. power output |
|-------------------|------------------|---------------------------|-------------------------------------------|--------------------|-------------------|
| 100 $\mu\text{A}$ | 0 - 2.5 kΩ       | 0.1 Ω                     | $\pm 0.2\%$<br>$\pm 200\text{ m}\Omega$   | 25 mV              | 25 $\mu\text{W}$  |
| 100 $\mu\text{A}$ | 0 - 250 Ω        | 0.01 Ω                    | $\pm 0.2\%$<br>$\pm 20\text{ m}\Omega$    | 25 mV              | 2.5 $\mu\text{W}$ |
| 1 mA              | 0 - 25 Ω         | 1 mΩ                      | $\pm 0.2\%$<br>$\pm 2\text{ m}\Omega$     | 25 mV              | 25 $\mu\text{W}$  |
| 10 mA             | 0 - 2.5 Ω        | 0.1 mΩ                    | $\pm 0.2\%$<br>$\pm 200\text{ }\mu\Omega$ | 25mV               | 250 $\mu\text{W}$ |
| 100 mA            | 0 - 250 mΩ       | 0.01 mΩ                   | $\pm 0.2\%$<br>$\pm 20\text{ }\mu\Omega$  | 25 mV              | 2.5 mW            |
| 1 A               | 0 - 25 mΩ        | 1 $\mu\Omega$             | $\pm 0.2\%$<br>$\pm 2\text{ }\mu\Omega$   | 25 mV              | 25 mW             |
| 10 A              | 0 - 2.5 mΩ       | 0.1 $\mu\Omega$           | $\pm 0.2\%$<br>$\pm 0.2\text{ }\mu\Omega$ | 25 mV              | 0.25 W            |
| 1 A **            | 0 - 2.5 Ω        | 0.1 mΩ                    | $\pm 0.2\%$<br>$\pm 200\text{ }\mu\Omega$ | 2.5 V              | 2.5 W             |
| 10 A **           | 0 - 250 mΩ       | 0.01 mΩ                   | $\pm 0.2\%$<br>$\pm 50\text{ }\mu\Omega$  | 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.

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

Basic accuracy at reference conditions.

## DLRO10HD and DLRO10HDX 10 Amp Digital Low Resistance Ohmmeters

### GENERAL SPECIFICATIONS

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

### 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.



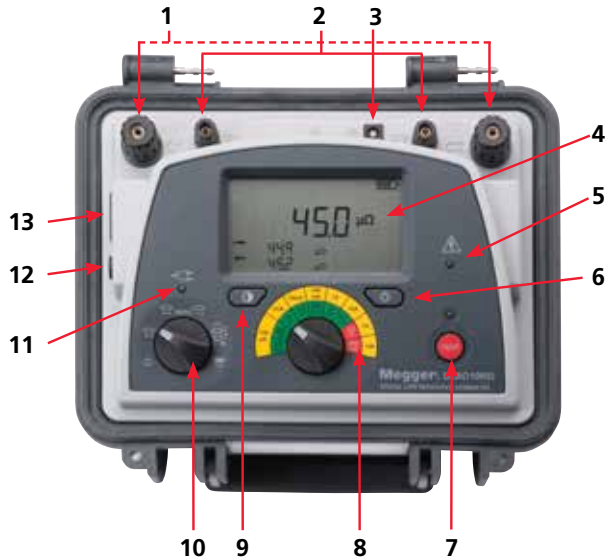
### SUPPLIED LEADSET OPTIONS

- 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)

## DLRO10HD and DLRO10HDX

### 10 Amp Digital Low Resistance Ohmmeters

#### 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) |

# DLRO10HD and DLRO10HDX

## 10 Amp Digital Low Resistance Ohmmeters

### 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  | *US NEMA, UK BS1363 and EU SCHUKO mains leads included |           |

### ORDERING DLRO10HDX

| Item (Qty)                                                                             | Order No. | Item (Qty)                                                                                                                                                                                  | Order No. |
|----------------------------------------------------------------------------------------|-----------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|
| DLRO10HDX no test leads (UK BS1363 mains lead)                                         | 1008-046  | DLRO10HDX + KC1-C (2x Connect Kelvin clip 3m test leads (UK BS1363 mains lead)                                                                                                              | 1008-093  |
| DLRO10HDX no test leads (EU SCHUKO mains lead)                                         | 1008-047  | DLRO10HDX + KC1-C (2x Connect Kelvin clip 3m test leads (EU SCHUKO mains lead)                                                                                                              | 1008-094  |
| DLRO10HDX no test leads (US NEMA mains lead)                                           | 1008-052  | DLRO-10HDX + KC1-C (2x Connect Kelvin clip 3m test leads (US NEMA mains lead)                                                                                                               | 1008-095  |
| DLRO10HDX + DH4-C (2x Connect Duplex handspikes 1.5m test leads (UK BS1363 mains lead) | 1008-069  | Other mains lead types are available. Please contact your local sales office or visit <a href="http://megger.com/support/distributors">megger.com/support/distributors</a> for information. |           |
| DLRO10HDX + DH4-C (2x Connect Duplex handspikes 1.5m test leads (EU SCHUKO mains lead) | 1008-070  |                                                                                                                                                                                             |           |
| DLRO10HDX + DH4-C (2x Connect Duplex handspikes 1.5m test leads (US NEMA mains lead)   | 1008-075  |                                                                                                                                                                                             |           |

### OPTIONAL MAINS LEADS (DLRO10HDX ONLY)

| Item (Qty)                                 | Order No. | Item (Qty)                     | Order No. |
|--------------------------------------------|-----------|--------------------------------|-----------|
| (CH) Swiss Mains Plug                      | 1013-843  | (IT) Italian mains plug IEC320 | 1013-844  |
| (AUS/NZ) Australian/New Zealand Mains Plug | 1009-623  | (IN) Indian BS546 Mains Plug   | 1014-309  |

### 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 :<br><b>DLRO test leads fitted with duplex connector</b><br>For more details visit <a href="http://www.megger.com">www.megger.com</a> |           |
| 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  |                                                                                                                                                                                                                                |           |

#### SALES OFFICE

Megger Limited  
Archcliffe Road Dover  
CT17 9EN England  
T +44 (0) 1304 502101  
E [UKsales@megger.com](mailto:UKsales@megger.com)

#### DLRO10HD-HDX\_DS\_en\_V18

[www.megger.com](http://www.megger.com)  
ISO 9001  
The word 'Megger' is a registered trademark

**Megger** <sup>R</sup>