DLRO test leads fitted with duplex Connectors

DLRO test leads

- Carry one lead set and swap terminations
- Simple push and twist for a quick change
- Lockable twist cap secures the leads
- Four terminal 10 A test lead system
- Warning / Indicator lights for DLRO10 range
- Extension leads available

DESCRIPTION

Duplex connect test lead system for use with any Megger 10 A DLRO and BT51 instruments

The Megger DLRO duplex connect four terminal test lead system is designed to provide the most cost effective and convenient way to provide the user with all of the test lead terminations and lead lengths required for the many different applications encountered in low resistance testing.

At the centre of this unique test lead system is a bespoke connector allowing terminations such as kelvin clips or duplex test probes to be changed as required. There are two connector versions, one being fitted with indicator LEDs that operate with the DLRO10 range of instruments. The indicator LEDs provide enhanced safety and convenience with indications as follows:

- DLRO10X adds
- Indication of pass / fail to user set test limits

All of these important indications are therefore seen near the point of connection without needing to view the instrument display. There is even a 6 m extension lead to provide the ultimate in flexibility.

SAFETY WARNINGS

These safety warnings must be read and understood before the instrument is used.

Always refer to the user manual of the instrument being used with these test leads.

Do not touch the universal connector during test or while connected to hazardous voltages.

Whenever possible, circuits should be de-energised before testing. If it is impossible to de-energise the circuit, (e.g. high voltage batteries cannot be switched off while their connections are tested) the user must be aware of the dangers. The instrument terminals will become live when connected to the circuit. Therefore when used on hazardous voltages the Megger terminal cover (available separately) must be used. See the accessories section of this user guide.

When running any test, or when attached to a test load, do not undo the modular connections. Isolate both test leads before changing any part of the modular leadset.

These test leads on their own not safety CAT rated due to the bare hook terminations. However when fitted with insulating instrument terminal covers and a suitably rated test termination the overall safety CAT rating will be the lowest of the ratings between the instrument, the terminal covers and the test termination.
Megger

For example if used with a DLRO10HD fitted with terminal cover part number 1002-390 and a pair of DP1-C duplex probes the safety rating of the complete system will be CAT III 300 V. However if the test terminations were changed to KC1-C Kelvin clips the safety rating would drop to <30 V as the KC1-C are un-rated.

Testing inductive circuits can be hazardous:
- After testing an inductive load there will be an amount of energy stored in the inductance. This energy is released in the form of a discharge current. Disconnecting an inductive load while current is still flowing will cause a high voltage arc, which is a danger to both the user and the item under test
- The DLRO connector lit lead sets are fitted with a 'test in progress lamp' associated with the TEST button which indicates that current is flowing in the C1-C2 loop. For testing large inductive resistances the current carrying leads should be connected securely to the item under test before starting the test
- It is not recommended that duplex handspikes be used to carry out tests on inductive loads. If inadvertently using the handspikes on an inductive load, the L1 lamp on the handspikes will flash amber while discharge current flows, thereby duplicating the function of the ‘I’ lamp on the instrument. It is important to maintain contact until the L1 light stops flashing amber and turns green indicating the end of the test

This product is not intrinsically safe. Do not use in an explosive atmosphere.

Do not operate the test leads or connect to any external system if any visible signs of damage are apparent or if they have been stored for prolonged periods in unfavourable conditions.

Inspection
Before each use of the test leads, perform a thorough visual inspection to confirm that their condition is good, with no damaged or broken insulation.

The Measurement Category rating of the measurement system is that of the lowest rated component. If any part of the measurement leads is unrated, the instrument is safe for connection only up to 30 V.

DLRO test leads fitted with duplex Connectors

APPLICATION

DUPLEX CONNECT SYSTEM – COMPONENT PARTS

CONNECT TEST LEADS WITH INDICATOR LIGHTS

These duplex test leads are single test leads supplied without terminations.

<table>
<thead>
<tr>
<th>Test Lead (1 supplied)</th>
<th>Order part number:</th>
</tr>
</thead>
<tbody>
<tr>
<td>TL1.5-CL 1.5 m connect lit</td>
<td>1006-456</td>
</tr>
<tr>
<td>TL3-CL 3 m connect lit</td>
<td>1006-458</td>
</tr>
<tr>
<td>TL6-CL 6 m connect lit</td>
<td>1006-459</td>
</tr>
</tbody>
</table>

Lead resistances - C hook termination to connector

<table>
<thead>
<tr>
<th>Lead length</th>
<th>Resistance</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.5 m lead (1 off)</td>
<td>20 m ohm</td>
</tr>
<tr>
<td>3 m leads (1 off)</td>
<td>30 m ohm</td>
</tr>
<tr>
<td>6 m leads (1 off)</td>
<td>40 m ohm</td>
</tr>
</tbody>
</table>

Description
These duplex test leads are fitted with hook terminations for connecting to an instrument and a connector plug equipped with ultra-bright LED indicator lights viewable from any direction.

Test connection terminations are supplied separately. The duplex connector incorporates a locking ring to prevent test connections being pulled off in use.

Indicator lights operate with DLRO10, DLRO10X and DLRO10HD via third connection plug. The function of these indicator lights are listed at the beginning of this document in the introduction.

These leads are designed to fit:
- DLRO10
- DLRO10X
- DLRO10HD
- DLRO10HDX
**CONNECT TEST LEADS WITHOUT INDICATOR LIGHTS**

These duplex test leads are single test leads supplied without terminations.

<table>
<thead>
<tr>
<th>Test Lead (1 supplied)</th>
<th>Order part number:</th>
</tr>
</thead>
<tbody>
<tr>
<td>TL1.5-C 1.5 m connect</td>
<td>1006-452</td>
</tr>
<tr>
<td>TL3-C 3 m connect</td>
<td>1006-454</td>
</tr>
<tr>
<td>TL6-C 6 m connect</td>
<td>1006-455</td>
</tr>
</tbody>
</table>

Lead resistances - C hook termination to connector:
- 1.5m lead (1 off) 20m ohm
- 3m leads (1 off) 30m ohm
- 6m leads (1 off) 40m ohm

**Description**

These duplex test leads are fitted with hook terminations for connecting to an instrument and a Connex plug. Test connection terminations are supplied separately. The duplex connector incorporates a locking ring to prevent test connections being pulled off in use.

**These leads are designed to fit:**
- DLRO10
- DLRO10X
- DLRO10HD
- DLRO10HDX

**There are separate versions available to fit the BT51 as follows:**

<table>
<thead>
<tr>
<th>Test Lead (1 supplied)</th>
<th>Order part number:</th>
</tr>
</thead>
<tbody>
<tr>
<td>TL3-C-BT51 3m connect for BT51</td>
<td>1007-023</td>
</tr>
<tr>
<td>TL6-C-BT51 6m connect for BT51</td>
<td>1007-024</td>
</tr>
</tbody>
</table>

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**CONNECT EXTENSION LEAD**

**EL6-C Extension Lead**

6 m connect (1 supplied) 1006-460

Lead resistance 40 m ohm

**Description**

This 6 m long duplex connect extension lead is designed to extend the duplex connect test leads that are without indicator lights. More than one extension lead can be used to create even longer test lead lengths. However, the overall lead resistance must be taken into account. The higher the overall loop resistance, including the test piece, the lower the maximum test current available will be.

Any 10 A DLRO instrument fitted with a pair of 3 m test leads and any test lead terminations (duplex probes or kelvin clips) can have up to 2 x 6 m extension leads used and still be able to supply 10 A test current. This is because the overall resistance of this combination is below the 100 m ohm lead resistance maximum specified.

**These extension leads are designed to fit any of these test leads:**
- TL1.5-C
- TL3-C
- TL3-C-BT51
- TL6-C
- TL6-C-BT51

Note: These extension leads will not fit any of the leads fitted with indicator lights.

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**DLRO test leads fitted with duplex Connectors**

DLRO test leads
DLRO test leads fitted with duplex Connectors

**DUPLEX CONNECT PROBE**

**Description**
Duplex connect handspike with sprung loaded tips fitted with a connector socket for easy connection to any connector test lead. Replaceable probe tips have hardened needle points, gold plated for excellent low resistance contact. Tips are sprung to provide 1.3 kg of force using stainless steel springs.

Ideal for general applications where a good reliable connection is required on none coated or corroded surfaces. To further limit the possibility of damage to test piece waffle tip, sometimes referred to a serrated tips are available as an option.

**Maximum current rating**
10 A

**Connector to probe tip resistance**
14 m ohm

**Probe spacing between P and C tips:**
6 mm

**Will fit**
Any duplex connect test lead and extension lead

**Safety**
CAT III 600 V only when suitable terminal covers are used

**Spare / optional parts**
Order part number:
- Replacement needle tips: 2003-551
- Waffle / serrated tips: 25940-014

**DUPLEX CONNECT TWIST PROBE**

**Description**
Duplex connect handspike with sprung twisting tips fitted with a connector socket for easy connection to any connect test lead. As the probe is pressed onto the test piece the tips compress and twist at the same time providing 2.4 kg of spring force. Probe tips are hardened and tempered before four equal-spaced flats are ground to provide a square shape tip, making these probes ideal for cutting through surface coatings or corrosion on test piece for a good contact.

To assist reliability the probes internal electrical connections are assisted by using an innovative volute spring eliminating the need for a separate current carrying brad.

**Maximum current rating**
10 A

**Connector to probe tip resistance**
14 m ohm

**Probe spacing between P and C tips:**
10 mm

**Will fit**
Any Duplex Connex test lead and extension lead

**Safety**
<30 V only
CONCENTRIC DUPLEX CONNECT PROBE

CP1-C
Concentric Probe 1 - connect  Order part number: 1006-448

Description
Duplex connect concentric handspike with sprung loaded potential tip fitted with a connector socket for easy connection to any connector test lead.
The C connection is made via an outer hardened and tempered steel crown with two contact points or tips.
The replaceable central potential probe tip has a hardened needle point, gold plated for excellent low resistance contact. The P tip is sprung to provide 1.3kg of force and uses a stainless steel spring.
Ideal for general applications where a good reliable connection is required on none coated or corroded surfaces. The long probe length and small diameter makes this probe ideal for reaching deeply recessed terminal screws. There are also applications where connection to rivet heads or screw/bolt heads are required. To further limit the possibility of damage to test piece waffle tip, sometimes referred to a serrated tip is available as an option.

Maximum current rating  10 A
Connector to probe tip resistance
10 m ohm

Probe tip spacing:
Between two outer C tips  7.6 mm
P tip central between two C tips with 3.8 mm spacing

Probe dimensions:
From finger guard to tip  110 mm
Diameter is tapered from 14 mm nearest the finger guard to 11 mm at tip crown

Will fit  Any duplex connect test lead and extension lead

Safety  <30 V only

Spare / optional parts  Order part number:
Replacement P needle tip  2003-551
Waffle / serrated P tip  25940-014

HEAVY DUTY KELVIN CLIP

KC1-C
Kelvin Clip 1 - connect  Order part number: 1006-447

Description
Duplex connect Kelvin Clip 1 is a heavy duty clip for general purpose applications.

Maximum current rating  10 A
Connector to probe tip resistance
14 m ohm

Clip capacity:  40 mm
Will fit  Any duplex connect test lead and extension lead

Safety  <30 V only
**Megger**

**LARGE TOUCH PROOF INSULATED CLIP – ADJUSTABLE JAW OPENING**

**KC2-C**  
Kelvin Clip 2 - connect  
Order part number: 1006-451

**Description**  
Duplex connect Kelvin Clip 2 is a fully insulated touch proof clip for applications where a high safety rating is required.

- **Maximum current rating**: 20 A  
- **Connector to clip resistance**: 10m ohm  
- **Clip capacity**: 52 mm to 7 5mm with sliding jaw
- **Will fit**: Any duplex connect test lead and extension lead  
- **Safety**: CAT IV 600 V

The actual safety CAT rating in use will always be the rating of the lowest part of the complete system. For example, if used with a DLRO10 without terminal covers, the system will be unrated and must not be connected to live voltages above 30 V. In this example, using a DLRO10HD, a terminal cover should also be used.

**DLRO test leads fitted with duplex Connectors**  
**COMPLETE DUPLEX CONNECT LEAD SETS AVAILABLE**  
**PROBE LEAD-SETS**

**DH1-C**  
3M Duplex Handspike lead set, with connect (x2)  
Order part number: 1006-442

**Description**  
Two wire, four terminal duplex twist probe lead set 3m long.  
**Consists of the following:**  
- **DTP1-C**  Duplex Twist Probe 2 off  
- **TL3-C-BT51**  3m lead connect 2 off
  
**Total leadset loop resistance**: 80m ohm  
**Will fit:**  
- **BT51**  
- **BT51 120V**

**DH2-C**  
6m / 20’ version of DH1-C above but only 1 included  
Order part number: 1006-443

**Description**  
Single duplex twist probe lead - 6m long.  
**Consists of the following:**  
- **DTP1-C**  Duplex Twist Probe 1 off  
- **TL6-C-BT51**  6m lead connect 1 off
  
**Total resistance - 1 lead + 1 probe**: 50m ohm  
**Will fit:**  
- **BT51**  
- **BT51 120V**
DLRO test leads fitted with duplex Connectors
DLRO test leads

KELVIN CLIP LEAD-SETS

DH4-C
Two wire, four terminal duplex probe lead set - 1.5 m
One lead fitted with indicator lights.
Order part number: 1006-444

Description
Two wire, four terminal duplex probe lead set 1.5 m long. One lead fitted with indicator lights.

Consists of the following:
- DP1-C Duplex Probe 2 off
- TL1.5-C 1.5 m connect lead 1 off
- TL1.5-CL 1.5 m connect lead with indicator lights 1 off

Will fit:
- DLRO10
- DLRO10X
- DLRO10HD
- DLRO10HDX

DH4-CHDC
Order part number: 1006-463
As DH4-C but supplied with DLRO10HD terminal Cover for CATIII 300 V rating

DH5-C
Order part number: 1006-445
as DH4-C but 3m long

KC1-TL3-C
KL1-C Kelvin Clip 3m Lead set - connect (x2)
Order part number: 1006-462

Description
Two wire, four terminal kelvin clip lead set 3m long.

Consists of the following:
- KC1-C Kelvin clip 2 off
- TL3-C 3m connect lead 1 off
- TL3-CL 3m connect lead with indicator lights 1 off

Will fit:
- DLRO10
- DLRO10X
- DLRO10HD
- DLRO10HDX

KC2-TL3-C
KL2-C Insulated Kelvin Clip - Test Lead 3 m connect (x2)
Order part number: 1006-461

Description
Two wire, four terminal insulated kelvin clip lead set 3m long.

Consists of the following:
- KC2-C Insulated kelvin clip 2 off
- TL3-C 3 m connect lead 1 off
- TL3-CL 3 m connect lead with indicator lights 1 off
### ORDERING INFORMATION

<table>
<thead>
<tr>
<th>Description</th>
<th>Order Code</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Duplex connect system</strong></td>
<td></td>
</tr>
<tr>
<td>Component parts - one of each supplied</td>
<td></td>
</tr>
<tr>
<td>TL1.5-CL Connect test leads with indicator light</td>
<td>1006-456</td>
</tr>
<tr>
<td>TL3-CL Connect test leads with indicator light</td>
<td>1006-458</td>
</tr>
<tr>
<td>TL6-CL Connect test leads with indicator light</td>
<td>1006-459</td>
</tr>
<tr>
<td>TL1.5-C Connect test lead without indicator light</td>
<td>1006-452</td>
</tr>
<tr>
<td>TL3-C Connect test lead without indicator light</td>
<td>1006-454</td>
</tr>
<tr>
<td>TL6-C Connect test lead without indicator light</td>
<td>1006-455</td>
</tr>
<tr>
<td>TL3-C-BTS1 Connect test leads for B51 - 3 m</td>
<td>1007-023</td>
</tr>
<tr>
<td>TL6-C-BTS1 Connect test leads for B51 - 6 m</td>
<td>1007-024</td>
</tr>
<tr>
<td>EL6-C Connect Extension Lead - 6 m</td>
<td>1006-460</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Description</th>
<th>Order Code</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Lead test connection terminations available</strong></td>
<td></td>
</tr>
<tr>
<td>Terminations sold individually</td>
<td></td>
</tr>
<tr>
<td>DP1-C Duplex connect probe</td>
<td>1006-450</td>
</tr>
<tr>
<td>DTP1-C Duplex connect twist probe</td>
<td>1006-449</td>
</tr>
<tr>
<td>CP1-C Concentric duplex connect probe</td>
<td>1006-448</td>
</tr>
<tr>
<td>KC1-C Heavy duty kelvin clip</td>
<td>1006-447</td>
</tr>
<tr>
<td>KC2-C Insulated connect Kelvin clip</td>
<td>1006-451</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Description</th>
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</tr>
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<tbody>
<tr>
<td><strong>Complete duplex connect lead sets</strong></td>
<td></td>
</tr>
<tr>
<td>DH1-C Two wire, four terminal duplex twist probe</td>
<td></td>
</tr>
<tr>
<td>DH2-C Single duplex twist probe - 6m</td>
<td>1006-443</td>
</tr>
<tr>
<td>DH4-C Two wire, four terminal duplex probe lead</td>
<td>1006-444</td>
</tr>
<tr>
<td>DH4-CHDC Two wire, four terminal duplex probe lead</td>
<td></td>
</tr>
<tr>
<td>DH5-C Two wire, four terminal duplex probe lead</td>
<td>1006-445</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Description</th>
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</tr>
</thead>
<tbody>
<tr>
<td><strong>Kelvin clip lead-sets</strong></td>
<td></td>
</tr>
<tr>
<td>Two wire, four terminal kelvin clip lead set</td>
<td>1006-462</td>
</tr>
<tr>
<td>Two wire, four terminal insulated kelvin clip lead</td>
<td>1006-461</td>
</tr>
</tbody>
</table>

Total leadset loop resistance 80 m ohm

Will fit:
- DLRO10,
- DLRO10X
- DLRO10HD
- DLRO10HDX