

### **COVERING LETTER**

Type of Organisation: SERVICE PROVIDER (AVIATION INDUSTRY)

**Tender Title:** REQUIREMENT OF DIGITAL MILLIOHMETER

Tender Ref. No. : PHL/NR/MAT/7009/TE-00103 Dt 23-01-2025

Product Category: REQUIREMENT OF DIGITAL MILLIOHMETER

Tender Type: SEALED QUOTATION

Type of Bidding : SINGLE BIDDING

Enter Location: Rohini Heliport, NEW DELHI-110085

First Announcement Date: 23-01-2025

Last Date of Submission: 13-02-2025 (14:30 Hours)

Opening Date: 13-02-2025 (15:00 Hours)

**Work Description :** REQUIREMENT OF DIGITAL MILLIOHMETER

For further information, contact:

Name: MR N K GARG. Mobile NO. 9654806305

PAWAN HANS LIMITED,

Rohini Heliport, Sector-36, Rohini

NEW DELHI-110085

Contd-2

1. TENDER NO: PHL/NR/MAT/7009/TE-00103
2. DATE: 23-01-2025
3. PRIORITY: URGENT
4. TENDER DUE DATE : 13-02-2025 (1430 Hours)
5. TENDER OPENING DATE: 13-02-2025 (1500 Hours)

**SUBJECT: : REQUIREMENT OF DIGITAL MILLIOHMETER**

Dear Sir/Madam,

**We are having requirement of the following items. Please fill your tender/quote as per our prescribed format only otherwise your quote will not be considered.**

S.N O	PART NO	DESCRIPTION	UNIT	QTY	PACKED SIZE	RATE	VALUE	PACKED SIZE	REMAINING LIFE	DELIVERY TIME
1	NR/0253 9	Digital milliohmeter range of 20 mΩ to 2000 Mω (Copy of specification is attached for ready reference)	EA	1	EA					

**BT51**  
Low Resistance Ohmmeter

**SPECIFICATION**

<b>Range</b>	2000 m $\Omega$ , resolution 1 m $\Omega$ 20,00 m $\Omega$ , resolution 0,01 m $\Omega$
<b>Nominal test current</b>	2 A nominal, with up to 2 $\Omega$ across the C terminals
<b>Accuracy (0°C to 50 °C)</b>	$\pm 1\% \pm 2$ digits
<b>Display</b>	3 1/2 digit LED display
<b>Operating temperature range and humidity</b>	0 to 50 °C (32 to 122 °F)
<b>Storage temperature range and humidity</b>	-20 to +50 °C (-4 to 122 °F)
<b>Safety protection</b>	Relay protection for up to 240 V mains supply applied from C1/Pl to C2/P2 100 mA (T) fuse, 20 x 5 mm, ceramic (for charging circuit)
<b>Power supply</b>	4 Ah capacity NiCad rechargeable cells with internal charging unit  Normal charging time of 10 hours on 240 V, 50 Hz mains supply
<b>Safety</b>	The instrument meets the require- ments for IEC 610101-1  The instrument is intended for use with non powered circuits only.
<b>EMC</b>	In accordance with IEC61326-1
<b>Dimensions</b>	245 x 344 x 158 mm
<b>Weight</b>	4,5 kg

**ORDERING INFORMATION**

<b>Description</b>	<b>Order Code</b>
BT51 milliohmeter (240 V) with DH1-C	1006-605
BT51 DLRO 120 V with DI11-C	1006-606
<b>Included Accessories</b>	
Supply lead for battery charger	25424-860
Duplex Handspikes (2) with spring loaded helical contacts 2.5 m/8 ft	6111-022
Operating instruction book	6170-921
DH1-C Two wire, four terminal duplex twist probe lead set - 3m	1006-442
<b>Optional Accessories</b>	
Connect test lead options – see data sheet DLROTestLeads_DS_en_V01	
Standard test lead option – see data sheet DI11-TL_DS_en_V01	
Accessory pouch, leather	6430-193

**SALES OFFICE**  
Megger Limited  
Archcliffe Road Dover

**BT51\_DS\_en\_V17**  
[www.megger.com](http://www.megger.com)  
ISO 9001

**Megger** 

## DLRO2

### Ducter™ Low Resistance Ohmmeter 2 A

#### DLRO2 keeps you testing and produces reliable measurements

To ensure the DLRO2 is always ready to test, the supplied fitted as standard HR6 rechargeable NiMH batteries can easily be swapped for non-rechargeable standard AA alkaline batteries to keep you testing.

Hand held is not a compromise in quality of measurement.

The DLRO2 provides 1% accuracy with a focus on repeatability making it ideal for repeated quality tests in production environments.

#### FEATURES AND BENEFITS

- Easily select functions using the rotary dial.
- Option to run the test in bidirectional mode or in unidirectional mode to save time and battery power.
- The ability to view 3 results on the screen at any time makes it ideal for 3-phase systems.
- Overcome the effects of standing EMF voltages using the bidirectional test mode. Forward and reverse results can be viewed on the secondary display.
- For stability of results, the instrument will warn you when electrical noise, or noise from poor clip/probe connections, is present.
- Keeps testing as long as you can, with as many as 500 x 2 A - 3 second tests from a full charge.
- Supplied with compact CATIII 600 V/CATIV 300 V rated kelvin clip test leads.

#### EXAMPLE APPLICATIONS

- Aviation – Lightning protection testing measuring mΩ resistance between receptors, wing tip to wing tip etc., using long test leads. Optional long cable reel test leads are available, can be used for assembly of components, interconnection of equipment, repair and maintenance.
- Wind turbines – Lightning protection, measuring mΩ resistance between wing tip to ground connection at base using long test leads. Optional long cable reel test leads are available.
- Rail, tram and underground – rolling stock and infrastructure, track high current joints, signalling systems.
- Marine – Power wiring systems, protection systems, ship-to-shore bonding, cathode protection system testing and cable laying applications.
- Oil and gas pipelines – Bonding between welded joints and grounding systems.
- Automotive and EV – Battery connections, weld quality, crimped connections quality, assembly robot welding cables.
- Cable manufacturers – Quality control, cable length.
- Component manufacturers – Quality control.
- Space exploration and engineering – Structural metal to metal, ground network metal to metal, carbon fibre to metal, carbon fibre to carbon fibre.
- Data centres – During electrical installation of main panel, generator and UPS systems. Verification of protective device contact resistance, busbar parallel feeds, busbar lapped joints, optimum resistance over torque and cable lug to busbar connections. During maintenance using trending data for all aspects of the above, verification after repair.
- Medical hand-held opportunity – Earthing and bonding systems for protection against microshock and macroshock.
- Panel/switchgear manufacturers – End of production line testing, site commissioning, maintenance and fault finding.
- Robotics – Wiring systems and connections which are subject to stress/movement/vibration, bonding of component parts to minimise static, grounding of machine, welding leads of robot spot welder.
- Electrical infrastructure – Cable resistance from one end, cable length, identification of parallel supplies while connected, cable to lug to connection fault finding. Checking assembled connections main supply cables and panels, switchgear and protective devices, UPS and changeover panels, interlinking busbars, interlinking cables, distribution and PDU boards, lightning protection systems, final circuits.

#### Test modes / options:

The DLRO2 has three main test modes

- Normal resistance mode (μΩ)
- Fast/long test leads test mode (mΩ)
- Inductive resistance mode (μΩ)

**Normal Resistance mode:** gives the most flexibility. The user can set any maximum test current range up to 2 A and the instrument will auto range to suit the measured resistance up to that value. Useful if the test piece has a limit to the current it can withstand. The user has full control of the instrument's test features which is suitable for many applications, as listed above.

# Megger®

DLRO2

Ducter™ Low Resistance Ohmmeter 2 A



- New 'Difference Meter' for quick data comparisons
- Use long leads at 1 A without compromising test speed
- Safely test the resistance of inductive loads at 1 A
- <600 V active protection against inadvertent live connections without blowing a fuse
- Ideal for outdoor use with protection against dust and moisture to IP54
- Industry standard safety rated at CATIII 600 V/CATIV 300

## DESCRIPTION

The DLRO2 is a tough, hand-held 2 A low resistance ohmmeter. It's designed to provide fast, accurate, repeatable measurements, even in electrically noisy locations. The DLRO2 is the latest in a long line of instruments to proudly display the Ducter™ brand, the Ducter™ testers being as well-known and relied upon as Megger insulation resistance testers.

For the utility or industrial user, a high level of safety is provided with a CATIII 600 V/CATIV 300 V rating to IEC61010. In addition, the instrument can protect itself from inadvertent connections to up to 600 V without blowing a fuse, thereby avoiding essential time lost due to repairs or finding a replacement fuse.

When working outside, the IP54 rating ensures that neither rain nor dust will prevent testing.

The DLRO2 measures low resistance values across a wide range of applications, from railways and aircraft to the resistance of industry components.

Applications requiring long test leads are not a problem for the DLRO2 as it has a dedicated long lead test to optimise the output. The long test lead function is able to provide up to 1 A of test current into 4 ohms resistance. This makes the DLRO2, with its optional cable reel test leads, ideal for testing wind turbine and avionic lightning protection applications.

To allow testing of smaller inductive loads, the DLRO2 can apply 2 A for at least 15 seconds, made possible by the high-capacity built-in rechargeable batteries, together with a separate inductive load function. The batteries can be fully recharged in 2.5 hours, minimising down time.

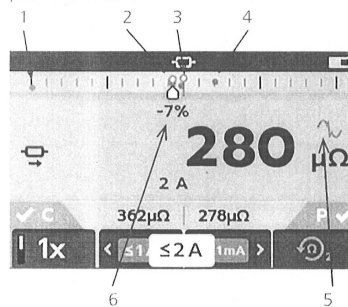
Note: The DLRO2 is not ATEX/intrinsically safe rated and must not be used in explosive gas environments.

## FEATURES

### New Difference Meter

The DLRO2 is also equipped with a new innovative feature called a 'difference' meter. This allows repetitive measurements to be easily compared with an initial reference measurement. The Difference Meter translates percentage difference to a needle/pointer movement to make it visually easy to see change.

New reference measurements can be set at the push of a button.



DLRO2 screen displays Difference Meter

Key to Difference Meter screen:

- 1 Difference Meter scale.
- 2 Previous result markers in red indicates noise was present.
- 3 Reference measurement.
- 4 Previous result markers.
- 5 Electrical noise warning.
- 6 Percentage difference between current measurement and initial reference measurement.

## DLRO2

### Ducter™ Low Resistance Ohmmeter 2 A

**Fast/long test leads mode:** only has one user option, which is manual/auto. 'Manual' starts the test when the TEST button is pressed, 'auto' starts the test automatically when the instrument detects continuity. In this mode, the instrument settings are optimised for speed and, if needed, the use of very long test leads. The test current is only in one direction for speed, 1 A and above, resistance is only displayed in mΩ. This test mode is ideal for many applications but is focused for applications where: -

- The user is not technically trained. Use is simple, there are no settings to change. Where test procedures need to be very simple, "switch on, select this range and press TEST" for example.
- The required minimum test current will be 1 A.
- The measurement will only be in mΩ. Non-technical users can simply read a number and compare it with a predetermined value.
- May need the use of very long test leads.

Example applications include:

- Wind turbine lightning protection (wing tip to ground at base resistance)
- Subsea cable laying, checking cable resistance and ground connections
- Manufacturing, including cable resistance, large cable looms or assemblies etc.

**Inductive resistance mode:** tests with the test current set to 1 A to speed up the charge time. The test current will be auto ranged up as the inductance is charged. Additional convenience is added with a clever 'auto stop' feature. The instrument will monitor the rate of change and automatically stop the test as soon as the result is stable.

Example applications include:

- Electric motors, small to medium in size, including railway traction motor stator winding resistance
- Small power distribution transformers
- Continuity detection at less than 2000 Ω

#### SPECIFICATIONS

##### PHYSICAL

<b>Dimensions:</b>	228 x 105 x 75 mm (8.98 x 4.1 x 2.95 in)
<b>Display:</b>	Full LCD colour screen with user configurable backlight.
<b>Weight:</b>	905 grams

##### SAFETY AND ELECTRICAL PROTECTION

**Safety rating:** CATIII 600 V / CATIV 300 V to EN 61010, IEC 61010-031 : 2015, IEC 61010-030.

Safety category rating valid to altitude of 3000 m.

**Live voltage:** Active live voltage protection to 600 V between any test terminals without blowing a fuse. Live voltage warning on display and audible when >5 V is applied between any test terminals. Fuse protected to 1000 V, fuses are not user changeable.

##### TEST CURRENT OUTPUT

Normal resistance test mode:

**Current ranges:** 2 A, 1 A, 100 mA, 10 mA and 1 mA

**Maximum compliance output voltage:**

3.24 V (1 A mode) 2.2 V (2 A mode)

**Current output accuracy:**

Normal and inductive mode: ±10 %  
Long lead test mode: +10 % -0 %  
at all battery conditions except with low battery indication.

**Thermal EMF/Seebeck effect compensation:**

Yes, average of forward and reverse test current measurements.

##### LOW RESISTANCE MEASUREMENT

**Resistance measurement test modes:**

Normal test mode, fast mΩ/long test lead mode and inductive test mode (resistance of inductive loads).

**Overall resistance range:** 1 μΩ – 2000 Ω

**Max resistance across C terminals:**

2 A with up to 1.1 Ω total resistance and 1 A with up to 3.2 Ω total resistance.

**Basic accuracy:** Bi-directional test current mode: +/- 1% +/- 2 digits.  
Uni-directional test current mode: +/- 1% +/- 10 digits.  
Inductive mode or unidirectional mode will introduce an undefined error if an external EMF is present

PHL Payment term:

1) Payment within 30 days after shipment.

- 2) Payment against proof of delivery.
  - 3) Payment through irrevocable letter of credit at sight in which case all the bank charges outside India are borne by the suppliers.
  - 4) Wire transfers against proof of shipment of goods.
  - 5) Advance payment against matching bank guarantee.
- Adopt one option from above.

Any Other Charges:\_\_\_

- GST:\_\_\_
- Validity of quote\_\_\_\_\_
- All the products must be accompanied with relevant quality documents
- Delivery of the goods at our Rohini Heliport Address with in \_\_\_\_\_days after PO.

OTHER GENERAL TERMS AND CONDITIONS:

1. **It is requested to send sealed quotation for the above on or before due date and due time. Quotation should be submitted in the given format only, falling which the quotation will not be considered.**
2. Quotation must be firm and should be valid for a minimum period of 60 days from the date of opening.
3. Actual Percentage of GST if any whatsoever where applicable/livable and intended to be claimed from PHL, whether as a part of the price or by way of tax in pursuance of any statutory provisions enabling the dealer to collect the IGST/CGST leviable on him, from the purchases should be clearly shown along with the price quoted. Wherever it is not done, all claims for payment (or) reimbursement of IGST/CGST of any description will be deemed to have been waived off and such claims shall not be entertained at any ground whatsoever at a later date.
4. GST Registration number may please be indicated on your quotation along with PAN copy.
5. The quantities mentioned in the Tender Notice are indicative only and shall be deemed to be only approximate and will not be in any manner, whatsoever will be binding on PHL.
6. Quotation received in sealed envelope shall only will be considered. Quotes received through fax or email will not be considered.
7. **Liquidated Damages** -Time and date of delivery of the stores shall be the essence of the Contract where applicable. Should the contractor fail to deliver the stores within the stipulated period for such delivery or dispatch the purchaser shall be entitled to withhold payment until the whole lot of the stores have been supplied.

After expiry of delivery date, LD will be recovered @ 0.5% (half percent) of the price of any stores which the contractor has failed to deliver or dispatch aforesaid for each and every week or part of a week subject to maximum 10% of the contract value.

8. The quotation has to be submitted keeping in mind our standard payment terms, i.e. after Receipt and Acceptance of item/s at our stores within 30days.
9. Printed Terms and Conditions on letter head or quotation form of renderers shall not be applicable. Quotation should be in Indian Rupees.
10. PHL Reserves the right to reject all (or) any of the tenders or to accept the tenderers either in full or in part or to split up the contract without assigning any reason.
11. Earned Money Deposit (EMD) of Rs. 9000/- (Nine Thousand only) will be deposited by the bidder through a demand draft/online in favour of Pawan Hans Limited through a nationalized bank. **The EMD amount will be refunded to unsuccessful bidders within 15 days of opening of tender. The EMD amount will be exempted if bidder attached the documents of NSIC/MSME certificate.**
12. Bank details for making online payment through RTGS/NEFT are given below:-  
BANK ACCOUNT NO. : 45770200000203  
IFSC CODE (11 DIGIT)BANK : BARBOSSIGAZ (fifth word is zero)  
Name of Bank – BANK OF BARODA, SME NOIDA BRANCH, NOIDA-201301

13. MIS-REPRESENTATION:-

If at any time during the period of contract, it comes to the notice of the PHL that the service provider has misled PHL by way of giving incorrect/false information, which has been material in the award of contract to him/her, the contract shall be liable for termination besides other legal action which may be initiated against him/her under law.

14. CONCILIATION/ARBITRATION:-

- 14.1 If any dispute(s) or difference(s) of any kind whatsoever arise between the Contractor and PHL, both the Parties hereto shall negotiate with a view to its amicable resolution and settlement through a committee appointed by CMD, PHL.
- 14.2 In the event, no amicable resolution or settlement is reached between the parties within 15 days after receipt of notice by one party, then the disputes or differences as detailed above shall be referred to and settled by the Sole Arbitrator to be appointed by CMD( PHL).
- 14.3 Notwithstanding the existence or any dispute or differences and/or reference for the arbitration, the Contractor shall proceed with and continue without hindrance the performance of the work under the contract with due diligence and expedition in a professional manner and the payment due to the Contractor shall not be withheld on account of such difference of arbitration proceedings unless such payment is a subject matter of the arbitration.



14.4 The arbitration proceedings shall be in accordance with the prevailing Arbitration and Conciliation Act, 1996 and laws of India as amended or enacted from time to time.

14.5 The venue of the arbitration shall be New Delhi, India as PHL Registered Office is located and managed, there from. The fee and other charges of Arbitrator shall be determined by the arbitrator in terms of the Act and shall be shared equally between the parties.

14.6 The Arbitrator will be given the speaking and the reasoned Award. The parties will not be entitled to any pendente-lite interest during arbitration proceedings.

**15. FORCE MAJEURE:**

15.1 In the event of either party being rendered unable by Force Majeure to perform any obligation required to be performed by them under the contract, the relative obligation of the party affected by such Force Majeure shall be suspended for the period during which such cause lasts.

15.2 The term "Force Majeure" as employed herein shall means acts of God, War, Civil, Riots, Fire directly affecting the performance of the contract, Flood and Acts and Regulation of respective Government of the two parties, namely PHL and Contractor.

15.3 Upon the occurrence of such cause and upon its termination, the party alleging that it has been rendered unable as aforesaid thereby, shall notify the other party in writing, the beginning of the cause amounting to Force Majeure as also the ending of the said clause by giving notice to the other party within 72 hours of the ending of the cause respectively. If deliveries are suspended by Force Majeure conditions lasting for more than 2 (two) months. PHL shall have the option of cancelling this contract in whole or part at his discretion without any liability on its part.

15.4 Time for performance of the relative obligation suspended by Force Majeure shall then stand extended by the period for which such cause lasts

16 All payments should be released to the suppliers through online i.e NEFT/RTGS. Please submit a copy of one cancelled cheque or Bank details along with your bill for making online payment.

17 You can contact PHL on Mobile no. 9654806305 (Mr. NIKESH KR GARG) for any clarification before submission of quotation.

18 The contract will be guided by "Fall clause", The fall clause provides that if the supplier reduces its price or sell the rate contracted goods following conditions of sale similar to those of the rate contract, at a price lower than the rate contract price, to any person or organization during the currency of the rate contract, the rate contract price, to any person or organization during the currency of the rate contract, the rate contract price will be automatically reduced with effect from the date for all the subsequent supplies under the rate contract amended accordingly.

19 In case of price tie (same price of both supplier), L-1 bidder will get preference based on the lowest quote mentioned including GST, etc. quoted rate should be PHL Stores, Delhi. Any changes in quotation after opening of the tender will not be considered.

20 The quotations received by 13/02/2024 (Till 1430.Hrs) will be opened by the tender opening

committee on 13/02/2024 at 1500 Hrs. and after scrutinizing their quotation, the successful bidders will be declared/informed.

**21 Address for Communication only through Courier/By hand since there is no Indian Postal facility is available at this location at present:-**

HOD (Materials) NR  
Pawan Hans Limited  
Sector-36, Rohini  
Rohini Heliport, New Delhi – 110085

Tender Enquiry Number must be mentioned on the sealed envelope.

Thanking you,

Yours faithfully,  
For Pawan Hans Limited

**(MUNISH BAHL)**  
**HOD (Materials) NR**