



DUCTER® D203

- **A wide resistance range – from 0,1 $\mu\Omega$ to 1999 Ω**
- **Automatic elimination of thermal errors in measurement**
- **Simple controls and clear 3 $\frac{1}{2}$ digit liquid crystal display**
- **Rechargeable battery supply or mains supply both with a rapid warm-up time**

Low Resistance Ohmmeter

DESCRIPTION

The D203 is designed to automatically eliminate errors in measurement introduced by thermal E.M.F.s, also zero drift is automatically corrected thus giving a rapid warm-up time of less than 10 seconds.

Operating the instrument is simple; setting two rotary switches, one for range and one for units is all that is required. The display has annunciators for low battery voltage, over-range, reverse polarity and over compliance. A high compliance voltage is provided on all ranges. (Compliance voltage is the voltage available across the complete current circuit, i.e. the current test leads and the resistive component being measured). If, in a particular situation, sufficient compliance voltage is not available, then no measurement will be indicated.

Power is supplied by internal rechargeable cells, from the mains source. (A battery charger is built into the instrument). A four terminal lead set with crocodile clip connectors is supplied but other test leads may be used.

PRINCIPLE OF OPERATION

The D203 uses the 'four terminal method' of measurement as illustrated overleaf. The main advantage of this method is that the resistance of the test leads is not included in the measurement. This is an important factor when the value of the measured resistance is very low. In the diagram, resistance R, between points A and B is measured, other resistances in the current loop either side of A and B are ignored.

Good connections to the item whose resistance is being measured are very important. Test leads for the instrument may take the form of duplex hand spikes, which enable connections to such things as busbars and aircraft frames to be made easily. Crocodile type clip leads (as supplied) are used where a more rigid connection is necessary, e.g. when varying contact resistance tends to introduce errors. Sometimes the current connections are made with crocodile clips and the potential connections with spikes, this may be the case, for example, where multiple measurements have to be made. Use of the different methods of connection are illustrated by the diagrams overleaf.

APPLICATIONS

Instruments which measure low resistance accurately and give the result directly are invaluable in many applications. The DUCTER® D203 Micro-Ohmmeter is a stable, accurate, reliable low resistance ohmmeter, equally suited to precision laboratory applications and to applications in the field.

Examples of its uses are:—

- (a) In commissioning and maintenance of substation equipment, where measurements can be made on such things as:—
 - busbar joints
 - switch and circuit breaker contact resistance
 - fuse resistance
 - cold lap welded joints in aluminium earthing strip
 - earth bonding
- (b) In maintenance of overhead transmission lines, where 'hot' joints

can be tested before and after their remaking or recompression.

- (c) For bond testing aircraft frames, including the bonding of electronic dischargers and fuel tanks.
- (d) For testing earth bonds in mines.
- (e) For rail bond testing, where a rail is used as part of a communications system or for power transmission.
- (f) For testing the integrity of lightning conductors.
- (g) In electronic equipment, where measurements can be made on such things as:—
 - resistors
 - track resistance of printed circuit boards (quality control of P.C.B. plating thickness)
 - resistance of plated through holes on P.C.B.s
 - contact resistance of relays
 - resistance of shunts, thick film circuits etc.
- (h) In domestic and industrial wiring installations, where ring main continuity tests can be performed and the integrity of earth bonding checked.

Certain applications may require specific test current levels, the DUCTER® D203 uses a test current of 1 A. Different test currents can be provided on other DUCTER® and BIDDLE® instruments, namely BT51, D007, D201 and DLRO, Low Resistance Ohmmeters with currents ranging from 2 A to 100 A. The D203 is suitable for measuring the resistance of resistive components and air cored inductances. Where an application involves appreciable levels of inductance the D007 or the D201 should be used.

SPECIFICATION

Resistance Ranges

0–199,9 $\mu\Omega$ 0–19,99 m Ω 0–19,99 Ω
 0–1999 $\mu\Omega$ 0–199,9 m Ω 0–199,9 Ω
 0–1999 m Ω 0–1999 Ω

Resolution

0,1 $\mu\Omega$

Accuracy

$\pm 0,25\%$ of reading ± 2 digits for temperature range
 18°C to 28°C

Temperature Coefficient

0,009%/°C for 20 and 200 ranges, 0,025%/°C for 2000
 range over temperatures 0°C to 18°C and 28°C to 45°C

Test Current

$\mu\Omega$ ranges 1 A peak
 m Ω ranges 0,1 A peak
 Ω ranges 0,5 mA peak
 (through external circuit)

Test Lead Reversal Error

± 2 digits max.

Display

3½ digit L.C.D.

Reading Rate

1 reading per 1,6 seconds

Compliance Voltage Limit

2 V min.

Temperature Range

Operation– 0°C to +45°C using internal batteries
 0°C to +35°C using continuous mains power

Storage – –20°C to +60°C

Humidity

0–80% RH, no condensation

Overload Protection

Will withstand the following voltages at the input terminals:—
 black (current terminal, 'lo') to blue (potential terminal, 'lo') ± 50 V d.c.
 blue to yellow (potential input terminals) ± 20 V d.c.
 continuous, ± 50 V d.c. for 1 second
 red to black (current terminals)
 $\mu\Omega$ ranges ± 100 V d.c. fuse protected
 m Ω ranges ± 20 V d.c. for 1 second
 Ω ranges ± 20 V d.c. for 1 second
 Fully protected against voltage spikes when measuring inductive impedances. Additional protection to limit high transient voltages.

Power Supply

Internal rechargeable lead acid cells
 Battery life between recharges – 2½ hours continuous use on $\mu\Omega$ ranges, >30 hours with current leads o/c
 Battery charge time – 24 hours for full charge
 Mains supply (for battery charging or measurement)
 105 V to 130 V or 210 V to 250 V, 50 Hz/60 Hz

Fuses

Mains power supply fuse:—
 125 mA 20 mm x 5 mm glass time delay,
 to IEC 127/III for 230 V a.c. supply
 250 mA 20 mm x 5 mm glass time delay,
 to IEC 127/III for 115 V a.c.
 Battery protection fuse (internal):—
 2 A quick-acting 32 mm x 6 mm to IEC 127/IV
 Current generator fuse (internal):
 1 A quick-acting 32 mm x 6 mm to IEC 127/IV

Safety

The instrument meets the requirements for IEC 10101-1 (1992), EN61010-1 (1993).

The instrument is intended for use with non powered circuits only.

EMC

The instrument meets EN50081-1 and EN50082-1 (1992)

Dimensions

260 mm x 330 mm x 95 mm max.
 (10¼ in x 13 in x 3¾ in approx.)

Weight

2,8 kg (6 lb approx.)

ORDERING INFORMATION

Item (Qty)	Order Code	Optional Accessories	Order Code
Low Resistance Ohmmeter	D203	Carrying case	6320-217
Included Accessories		Pair of duplex hand spikes with 2,5 m leads	6111-024
A four terminal test lead set with crocodile clips, colour coded (lead length 3 m)	8100-448		
Mains power supply lead	25424-860		
Operating instruction book	6171-311		