



## Wide range precision micro-ohmmeter

- *High basic accuracy of 0.1%*
- *Wide measurement range of  $1\mu\Omega$  to  $20k\Omega$*
- *Current reversal switch for detecting thermal emf effects*
- *Current diversion switch for easy zero setting*
- *Four terminal measurement using Kelvin clip leads*
- *Battery operation with built-in charger*
- *Switchable 20mV clamp for 'dry circuit' testing*

# BS407 wide range precision micro-ohmmeter

## A dedicated but versatile instrument

The BS407 is an instrument which is fully optimised for the task of accurate measurement of low resistances with a best resolution of  $1\mu\Omega$ .

It has applications beyond the testing of components such as measuring the resistance of motor or transformer windings, the properties of materials, the thickness of plates, the security of pipework joints or wiring installations and many others.

It uses a Direct Current technique to measure true resistance, rather than the resistive component of impedance which is shown by AC excited RLC bridges. The test current for each range has been carefully chosen to minimise heating of the sample under test while being sufficient to minimise the effects of thermal emf and noise.

This gives much greater accuracy at low resistances than can be obtained from the very low test currents used by general purpose high resolution multimeters. The low-noise low-drift bipolar amplifiers employed need much less noise filtering than alternative chopper stabilised technologies resulting in faster settling to the correct reading.

## Battery operation with built-in charger

The BS407 is a fully portable instrument which operates from NiMH rechargeable batteries. The battery charger is built into the instrument and can be operated continuously during bench use.

## RANGES AND ACCURACY

Accuracies apply for a one year period over a temperature range of  $18^{\circ}\text{C}$  to  $28^{\circ}\text{C}$  after a warm-up period of 5 minutes with the instrument and test connections in thermal equilibrium. Tempco outside this range  $\ll \pm 45\text{ppm}/^{\circ}\text{C}$

Range	Resolution	Test Current	F.S. Voltage	Accuracy
1999 $\mu\Omega$	1 $\mu\Omega$	250 mA	500 $\mu\text{V}$	$\pm 0.1\%$ reading $\pm 0.4\%$ scale
19.99 m $\Omega$	10 $\mu\Omega$	50 mA	1 mV	$\pm 0.1\%$ reading $\pm 0.2\%$ scale
199.9 m $\Omega$	100 $\mu\Omega$	10 mA	2 mV	$\pm 0.1\%$ reading $\pm 0.1\%$ scale
1999 m $\Omega$	1 m $\Omega$	5 mA	10 mV	$\pm 0.1\%$ reading $\pm 0.1\%$ scale
19.99 $\Omega$	10 m $\Omega$	500 $\mu\text{A}$	10 mV	$\pm 0.1\%$ reading $\pm 0.1\%$ scale
199.9 $\Omega$	100 m $\Omega$	50 $\mu\text{A}$	10 mV	$\pm 0.1\%$ reading $\pm 0.1\%$ scale
1999 $\Omega$	1 $\Omega$	50 $\mu\text{A}$	100 mV	$\pm 0.1\%$ reading $\pm 0.1\%$ scale
19.99 k $\Omega$	10 $\Omega$	10 $\mu\text{A}$	200 mV	$\pm 0.1\%$ reading $\pm 0.2\%$ scale

## FACILITIES

### 20mV Clamp

Operated by front panel switch. Limits the open circuit voltage across the unknown to 20mV (+0mV, -4mV) for "dry circuit" testing of switch and relay contacts. Not available on the 2000 $\Omega$  and 20k $\Omega$  ranges.

### Reverse Polarity

Operated by front panel switch. Reverses the polarity of the test current, enabling thermal emf effects to be detected and quantified.

### Set Zero

Rotary offset control. A front panel switch can be used to divert the test current way from the unknown, allowing zero adjustment to be undertaken with the test leads in place.

## MEASUREMENT SOURCE

Source EMF	18 mV $\pm$ 2mV with 20mV Clamp Active < 6V with 20mV Clamp Inactive
Compliance	> 1V (> 0.5V on 1999 $\mu\Omega$ range). <i>Compliance is the maximum voltage that can be tolerated from additional resistance in series with the force connections</i>

## Rapid 4-terminal measurement

The BS407 uses a four terminal measurement system via high quality Kelvin Clip leads (supplied).

For speed and convenience front panel switches are provided for current diversion (allowing in-situ zero adjustment) and current reversal (for identifying thermal emf errors).

An indicator lamp confirms correct flow of the measuring current thus preventing spurious results from being recorded.

## Wide measurement range

The BS407 has eight push-button selected decade measurement ranges from 1.999m $\Omega$  up to 19.99k $\Omega$ .

This unusually wide range makes it suitable for a greater variety of applications than other micro-ohmmeters.

A front panel operated 'clamp' switch is available to limit the maximum voltage across the unknown to 20mV. This is a requirement for the measurement of switch contact resistances to international standards.

## High resolution and accuracy

With a lowest range of 1999 $\mu\Omega$  the BS407 can resolve down to one micro-ohm. Rapid settling minimises delay between readings.

Precision analogue circuitry ensures a high measurement accuracy of up to 0.1% of reading  $\pm$  0.1% of scale.

## PROTECTION

The instrument is protected against the back-emf of its own test current from any inductance and against external short-term connection to voltage sources up to 50V.

Protection against greater abuse is provided by non-flammable fusible resistors.

## POWER SOURCE

### Battery

Four internal Ni-MH cells (non removable). Operating time depends upon the test current flowing - >150 hours with no test current, > 8 hours with maximum test current (1999 $\mu\Omega$  range). Low battery indication in display.

### AC Line

Built-in battery charger allows instrument operation while re-charging. Nominal re-charge time 12 hours.

## GENERAL

Display:	3.5 digit LCD with 12.5mm characters.
Casing:	ABS casing with metal tilt stand giving approx. $15^{\circ}$ angle.
Power:	220 - 240V, 110 - 120V or 100V $\pm 10\%$ , 50/60Hz, adjustable internally; 20VA max. Installation Category II.
Operating Range:	$+5^{\circ}\text{C}$ to $+40^{\circ}\text{C}$ , 20% to 80% RH.
Storage Range:	$-10^{\circ}\text{C}$ to $+50^{\circ}\text{C}$
Environmental:	Indoor use at altitudes to 2000m, Pollution Degree 2.
Electrical Safety:	Complies with EN61010-1.
EMC:	Complies with EN61326.
Size:	220(W) x 88(H) x 230(D) mm, (10.3 x 3.4 x 9.2") excluding feet and tilt stand.
Weight:	1.3 kg (3lb).

## ACCESSORIES

### SUPPLIED

Supplied with Kelvin Test Clip Leads, Operating Manual, IEC Mains Lead

### OPTIONAL

Carrying Case

Thurlby Thandar Instruments Ltd. operates a policy of continuous development and reserves the right to alter specifications without prior notice.

Designed and manufactured in Europe by:



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## Product Summary

### Laboratory Power Supplies

Bench and system power supplies from 30 watts up to 1200 watts using linear, mixed-mode and PowerFlex regulation technologies.



### Waveform Generators

Analog and digital (DDS) function generators, true arbitrary generators, arbitrary/function generators and pulse generators.



### Precision Measurement Instruments

Benchtop DMMs, frequency counters, component measurement instruments (LCR), electronic dc loads, current probes.



### RF and EMC Test Equipment

Spectrum analyzers, signal generators, frequency counters, power meters, emc measurement instruments.



## Company name and product brands

Thurlby Thandar Instruments Ltd. (TTi) is one of Europe's leading manufacturers of test and measurement instruments.

Products have been sold under two brand names: TTi and Aim.



In the future, however, the full product range will be branded Aim-TTi.



This changeover will be gradual and many products will continue to carry the TTi or Aim brands for some time to come.

## Web Addresses (URLs)

The preferred URL for obtaining information concerning Aim-TTi products is:

[www.aimtti.com](http://www.aimtti.com) (international customers)

Customers in the UK should use the URL:  
[www.aimtti.co.uk](http://www.aimtti.co.uk)

Customers in the USA should use the URL:  
[www.aimtti.us](http://www.aimtti.us)

Note that previous URLs such as [www.tti-test.com](http://www.tti-test.com) will continue to operate for the time being.

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