

# Schedule of Accreditation

issued by

## United Kingdom Accreditation Service

21 - 47 High Street, Feltham, Middlesex, TW13 4UN, UK



0149

Accredited to  
ISO/IEC 17025:2005

### TER Calibration Ltd

Issue No: 020 Issue date: 05 September 2011

Measurement Standards Laboratory

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Calibration performed at the above address only

#### DETAIL OF ACCREDITATION

Measured Quantity Instrument or Gauge	Range	Calibration and Measurement Capability (CMC) Expressed as an Expanded Uncertainty ( $k=2$ )	Remarks
<b>ELECTRICAL MEASUREMENTS</b>			
<b>DC RESISTANCE</b>			
Specific values (measurement)	1 m $\Omega$ 10 m $\Omega$ 100 m $\Omega$ 1 $\Omega$ 10 $\Omega$ 100 $\Omega$ 1 k $\Omega$ 10 k $\Omega$ 100 k $\Omega$	40 ppm 20 ppm 20 ppm 4.0 ppm 5.0 ppm 3.0 ppm 3.0 ppm 3.0 ppm 5.0 ppm	
Specific values (sourcing)	1 m $\Omega$ 10 m $\Omega$ 100 m $\Omega$ 1 $\Omega$ 10 $\Omega$ 100 $\Omega$ 1 k $\Omega$ 10 k $\Omega$ 100 k $\Omega$	35 ppm 12 ppm 8.0 ppm 2.0 ppm 2.5 ppm 2.0 ppm 2.0 ppm 1.5 ppm 3.0 ppm	
Other values	0 $\mu\Omega$ to 100 $\mu\Omega$ 100 $\mu\Omega$ to 1 m $\Omega$ 1 m $\Omega$ to 10 m $\Omega$ 10 m $\Omega$ to 100 m $\Omega$ 100 m $\Omega$ to 1 $\Omega$ 1 $\Omega$ to 10 $\Omega$ 10 $\Omega$ to 100 $\Omega$ 100 $\Omega$ to 1 k $\Omega$ 1 k $\Omega$ to 10 k $\Omega$ 10 k $\Omega$ to 100 k $\Omega$ 100 k $\Omega$ to 1 M $\Omega$ 1 M $\Omega$ to 10 M $\Omega$ 10 M $\Omega$ to 100 M $\Omega$	20 n $\Omega$ 200 ppm 180 ppm 180 ppm 25 ppm 20 ppm 6.0 ppm 6.0 ppm 6.0 ppm 7.0 ppm 7.0 ppm 15 ppm 30 ppm	



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DC VOLTAGE			
Standard cell value	Nominal 1.018 V and 10 V	1.3 ppm	This uncertainty can be realised with cells only if they have their own temperature-controlled enclosure of appropriate thermal stability
Specific values	1 V 3 V 10 V 10.18 V 3 V 30 V 100 V 300 V 1 kV	3.0 ppm 4.0 ppm 4.0 ppm 4.0 ppm 4.0 ppm 5.0 ppm 6.0 ppm 6.0 ppm 6.0 ppm	
Other values	0 mV to 100 mV 100 mV to 1.1 V 1.1 V to 10 V 10 V to 100 V 100 V to 1 kV 1 kV to 30 kV 30 kV to 90 kV	0.80 $\mu$ V 6.0 ppm 7.0 ppm 8.0 ppm 8.0 ppm 0.12 % 0.15 %	
DC VOLTAGE RATIO	0.1 to unity	5.0 parts in $10^6$	Maximum voltage 10 V
DC CURRENT	0 $\mu$ A to 1 $\mu$ A 1 $\mu$ A to 10 $\mu$ A 10 $\mu$ A to 100 $\mu$ A 100 $\mu$ A to 1 mA 1 mA and 10 mA 1 mA to 10 mA 10 mA to 100 mA 100 mA to 1 A 1 A to 10 A 10 A to 150 A	100 ppm + 80 pA 120 ppm 35 ppm 30 ppm 20 ppm 30 ppm 20 ppm 30 ppm 30 ppm 60 ppm 500 ppm	
DC POWER	1 W to 20 kW	The arithmetic sum of the individual uncertainties of the corresponding voltages and current measurements	



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Measured Quantity Instrument or Gauge	Range	Calibration and Measurement Capability (CMC) Expressed as an Expanded Uncertainty ( $k = 2$ )	Remarks
AC VOLTAGE			
Specific values at specific frequencies	1 V 100 Hz 1 kHz, 10 kHz and 20 kHz 50 kHz	50 ppm 40 ppm 45 ppm	
	10 V 100 Hz 1 kHz 10 kHz 20 kHz 50 kHz 100 kHz 1 MHz	50 ppm 50 ppm 40 ppm 40 ppm 40 ppm 40 ppm 200 ppm	
	100 V 100 Hz 1 kHz, 10 kHz and 20 kHz 50 kHz 100 kHz	50 ppm 40 ppm 50 ppm 50 ppm	
	1 kV 100 Hz 1 kHz 10 kHz 50 kHz	90 ppm 80 ppm 60 ppm 150 ppm	
Specific values at other frequencies	1 V 40 Hz to 50 kHz 50 kHz to 100 kHz 100 kHz to 1MHz	60 ppm 100 ppm 800 ppm	
	10 V 40 Hz to 50 kHz 50 kHz to 100 kHz 100 kHz to 1MHz	80 ppm 120 ppm 850 ppm	
	100 V 40 Hz to 20 kHz 20 kHz to 100 kHz	60 ppm 180 ppm	
	1 kV 40 Hz to 20 kHz 20 kHz to 50 kHz	100 ppm 200 ppm	



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Measured Quantity Instrument or Gauge	Range	Calibration and Measurement Capability (CMC) Expressed as an Expanded Uncertainty ( $k=2$ )	Remarks
AC VOLTAGE (continued) Other values	50 Hz to 2 kHz <i>100 <math>\mu</math>V to 1 mV</i> <i>1 mV to 10 mV</i> <i>10 mV to 100 mV</i> <i>100 mV to 250 mV</i>	0.75 % 750 ppm 100 ppm 50 ppm	
	250 mV to 500 mV <i>40 Hz to 50 kHz</i> <i>50 kHz to 100 kHz</i> <i>100 kHz to 1 MHz</i>	200 ppm 250 ppm 250 ppm	
	500 mV to 1 V <i>40 Hz to 50 kHz</i> <i>50 kHz to 100 kHz</i> <i>100 kHz to 1 MHz</i>	100 ppm 140 ppm 750 ppm	
	1 V to 2 V <i>40 Hz to 50 kHz</i> <i>50 kHz to 100 kHz</i> <i>100 kHz to 1 MHz</i>	100 ppm 250 ppm 1000 ppm	
	2 V to 3 V <i>40 Hz to 50 kHz</i> <i>50 kHz to 100 kHz</i>	130 ppm 250 ppm	
	3 V to 5 V <i>40 Hz to 50 kHz</i> <i>50 kHz to 100 kHz</i>	160 ppm 260 ppm	
	5 V to 10 V <i>40 Hz to 50 kHz</i> <i>50 kHz to 100 kHz</i> <i>100 kHz to 1 MHz</i>	150 ppm 300 ppm 1000 ppm	
	10 V to 20 V <i>40 Hz to 50 kHz</i> <i>50 kHz to 100 kHz</i>	150 ppm 150 ppm	
	20 V to 30 V <i>40 Hz to 50 kHz</i> <i>50 kHz to 100 kHz</i>	150 ppm 300 ppm	
	30 V to 50 V <i>40 Hz to 50 kHz</i> <i>50 kHz to 100 kHz</i>	130 ppm 200 ppm	
	50 V to 100 V <i>40 Hz to 50 kHz</i> <i>50 kHz to 100 kHz</i>	150 ppm 150 ppm	
	100 V to 200 V <i>40 Hz to 50 kHz</i>	200 ppm	



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AC VOLTAGE (continued)			
Other values (cont'd)	200 V to 300 V 40 Hz to 50 kHz	200 ppm	
	300 V to 500 V 40 Hz to 30 kHz	200 ppm	
	500 V to 1 kV 40 Hz to 20 kHz 20 kHz to 50 kHz	400 ppm 700 ppm	
	1 kV to 40 kV 50 Hz	1.0 %	
Waveform analysis	3 $\mu$ V to 300 V 20 Hz to 76 kHz	5.0 % of FSD*	* 15 ranges of 30 $\mu$ V to 300 V FSD in 1-3-10 sequence
AC CURRENT			
	40 Hz to 10 kHz 2.5 mA to 5 mA 5 mA to 10 mA 50 mA to 100 mA	150 ppm 150 ppm 150 ppm	
	40 Hz to 10 kHz 500 mA to 1 A 5 A to 10 A	150 ppm 150 ppm	
	50 Hz to 60 Hz 10 A to 150 A	0.10 %	
AC RESISTANCE	At 40 Hz to 60 Hz 10 m $\Omega$ to 100 m $\Omega$ 100 m $\Omega$ to 1 $\Omega$ 1 $\Omega$ to 100 k $\Omega$ 100 k $\Omega$ to 10 M $\Omega$	300 ppm 300 ppm 75 ppm 0.10 %	
FREQUENCY			
Generation			
Specific values	100 kHz, 1 MHz, 5 MHz and 10 MHz	1.2 in 10 <sup>10</sup>	
	0.02 Hz to 10 MHz in 2-5-10 sequence	1.2 in 10 <sup>10</sup>	Square wave generation for calibration of frequency meters etc.



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FREQUENCY (cont'd)			
Measurement and Generation			
Other values	1 Hz to 10 Hz 10 Hz to 100 Hz 100 Hz to 1 kHz 1 kHz to 10 kHz 10 kHz to 100 kHz 100 kHz to 1 MHz 1 MHz to 10 MHz 10 MHz to 100 MHz 100 MHz to 500 MHz 500 MHz to 1 GHz 1 GHz to 12 GHz	2.0 in $10^8$ 2.0 in $10^8$ 2.0 in $10^8$ 2.0 in $10^8$ 4.0 in $10^9$ 15 in $10^{10}$ 15 in $10^{10}$ 15 in $10^{10}$ 3.0 in $10^{10}$ 2.0 in $10^8$ 1.0 in $10^7$	
TIME INTERVAL	0 s to 500s 0 s to 500s	1.0 us 50 ms	Electronically triggered devices Mechanically triggered devices
RCD testers			
Trip time	10 ms to 5 s	0.25 ms	
Trip Current	3 mA to 3 A	1.0 %	
<b>Temperature indicators, calibration by electrical simulation</b>			
Base metal thermocouples	-200 °C to + 1600 °C	0.050 °C	Using external ice pot reference, (devices with 10 m°C resolution)
Noble metal thermocouples	-200 °C to + 1760 °C	0.20 °C	Using external ice pot reference, (devices with 10 m°C resolution)
Resistance thermometer (Pt 100)	-200 °C to + 800 °C	0.020 °C	
Supporting temperature measurements for electrical simulation and cold junction verification	At Nominal 0 °C At ambient temperature of 20 °C Ambient temperatures of 5 °C to 30 °C	0.10 °C 0.50 °C 0.55 °C	



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<b>PRESSURE</b>			
<u>Hydraulic pressure (gauge).</u> Calibration of pressure indicating instruments and gauges	600 kPa to 120 MPa	0.010 %	Calibration of pressure measuring devices with an electrical output may be undertaken.
<u>Gas pressure (gauge).</u> Calibration of pressure indicating instruments and gauges	3.5 kPa to 132 kPa 132 kPa to 27.5 MPa	0.0060 % + 0.20 Pa 0.0065 %	Absolute pressure calibrations may be undertaken by associated barometric pressure measurement with an additional uncertainty of $\pm 20$ Pa
<u>Gas pressure (absolute).</u> Calibration of pressure indicating instruments and gauges	3.5 kPa to 132 kPa 132 kPa to 5.2 MPa	0.0065 % + 2.0 Pa 0.0070 % + 2.0 Pa	
END			