

# Schedule of Accreditation

issued by

## United Kingdom Accreditation Service

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



0057

Accredited to  
ISO/IEC 17025:2005

### H Tinsley & Co

Issue No: 024 Issue date: 28 April 2011

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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
DC VOLTAGE			
Generation	0 V to 200 mV 200 mV to 2 V 2 V to 20 V 20 V to 200 V 200 V to 1000 V	9.1 ppm + 0.50 $\mu$ V 3.2 ppm + 0.20 $\mu$ V 1.6 ppm + 4.6 $\mu$ V 5.8 ppm 3.8 ppm	
Measurement	0 V to 100 mV 100 mV to 1 V 1 V to 10 V 10 V to 100 V 100 V to 1000 V	9.5 ppm + 0.60 $\mu$ V 2.7 ppm + 0.70 $\mu$ V 1.7 ppm + 4.6 $\mu$ V 6.1 ppm + 58 $\mu$ V 5.4 ppm + 1.2 mV	
DC CURRENT			
Generation	0 $\mu$ A to 220 $\mu$ A 220 $\mu$ A to 2.2 mA 2.2 mA to 22 mA 22 mA to 220 mA 220 mA to 2.2 A 2.2 A to 11 A	22 ppm + 0.90 nA 16 ppm + 5.0 nA 16 ppm + 50 nA 16 ppm + 500 nA 26 ppm + 6.0 $\mu$ A 65 ppm + 200 $\mu$ A	
Specific Values	100 mA 500 mA 1 A 5 A 10 A	17 ppm 46 ppm 30 ppm 44 ppm 43 ppm	
Measurement	20 $\mu$ A to 200 $\mu$ A 200 $\mu$ A to 2 mA 2 mA to 20 mA 20 mA to 200 mA 200 mA to 2 A	27 ppm + 1.2 nA 40 ppm + 12 nA 27 ppm + 20 nA 132 ppm + 0.18 $\mu$ A 94 ppm + 1.4 $\mu$ A	



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Measured Quantity Instrument or Gauge	Range	Calibration and Measurement Capability (CMC) Expressed as an Expanded Uncertainty ( $k = 2$ )	Remarks
<b>DC RESISTANCE</b>			
Specific values	1 $\Omega$ 10 $\Omega$ 25 $\Omega$ 100 $\Omega$ 1 k $\Omega$ 10 k $\Omega$ 100 k $\Omega$ 1 M $\Omega$ 10 M $\Omega$ 100 M $\Omega$ 1 G $\Omega$ 10 G $\Omega$ 100 G $\Omega$	0.35 ppm 0.35 ppm 0.35 ppm 0.35 ppm 0.77 ppm 0.65 ppm 4.0 ppm 9.0 ppm 10 ppm 55 ppm 110 ppm 185 ppm 335 ppm	Intermediate values may be calibrated at increased uncertainties.
Other values	0 $\Omega$ 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 $\Omega$ 100 M $\Omega$ to 1 G $\Omega$ 1 G $\Omega$ to 10 G $\Omega$  10 G $\Omega$ to 100 G $\Omega$ 100 G $\Omega$ to 1 T $\Omega$	6.5 n $\Omega$ 62 ppm 56 ppm 51 ppm 60 ppm  60 ppm 35 ppm 15 ppm 15 ppm 15 ppm  100 ppm 210 ppm 250 ppm 580 ppm 750 ppm  0.18 % 0.72 %	Current carrying resistors  Minimal power resistor  Coaxial resistors above 100 M $\Omega$
<b>AC RESISTANCE</b>			
Specific Values (Shunts)	0.01 $\Omega$ , 0.02 $\Omega$ , 0.05 $\Omega$ , 0.1 $\Omega$ , 0.2 $\Omega$ , 0.5 $\Omega$ , 1 $\Omega$ , 5 $\Omega$ and 10 $\Omega$ 45 Hz to 55 Hz, 125 Hz to 135 Hz	0.070 %	Up to 20 Amperes
Other Values (Shunts)	0.5 m $\Omega$ to 5 m $\Omega$ 60 Hz	280 ppm	Up to 10 Amperes
Specific Values (Precision)	10 $\Omega$ , 25 $\Omega$ , 100 $\Omega$ and 1 k $\Omega$ 75 Hz	3.0 ppm	
Other Values	10 $\Omega$ to 1 k $\Omega$ 75 Hz	4.7 ppm	



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AC VOLTAGE			
Specific values	<i>1 kHz:</i> 10 mV 100 mV 1 V 10 V 100 V 1 kV	270 ppm 160 ppm 71 ppm 36 ppm 34 ppm 240 ppm	
Other values	<i>40 Hz to 1 kHz:</i> 10 mV to 22 mV 22 mV to 220 mV 220 mV to 2.2 V 2.2 V to 22 V 22 V to 220 V 220 V to 1.1 kV  <i>1 kHz to 40 kHz:</i> 10 mV to 22 mV 22 mV to 220 mV 220 mV to 2.2 V 2.2 V to 22 V 22 V to 220 V 220 V to 1.1 kV  <i>40 kHz to 50 kHz:</i> 10 mV to 22 mV 22 mV to 220 mV 220 mV to 2.2 V 2.2 V to 22 V 22 V to 220 V 220 V to 1.1 kV  <i>50 kHz to 100 kHz:</i> 10 mV to 22 mV 22 mV to 220 mV 220 mV to 2.2 V 2.2 V to 22 V 22 V to 219 V	260 ppm + 7.0 $\mu$ V 140 ppm + 12 $\mu$ V 60 ppm 50 ppm 66 ppm 170 ppm  530 ppm + 7.0 $\mu$ V 180 ppm + 12 $\mu$ V 88 ppm 65 ppm 70 ppm 290 ppm  1100 ppm + 7.0 $\mu$ V 920 ppm + 12 $\mu$ V 280 ppm 220 ppm 280 ppm 460 ppm  980 ppm + 10 $\mu$ V 470 ppm + 35 $\mu$ V 650 ppm 280 ppm 840 ppm	
AC CURRENT	<i>40 Hz to 1 kHz</i> 50 $\mu$ A to 100 $\mu$ A 100 $\mu$ A to 1 mA 1 mA to 10 mA 10 mA to 100 mA 100 mA to 1 A 1 A to 10 A	110 ppm + 35 nA 69 ppm + 48 nA 32 ppm + 470 nA 47 ppm + 4.7 $\mu$ A 100 ppm + 48 $\mu$ A 200 ppm + 240 $\mu$ A	



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TIME INTERVAL	1 ms to 40 ms 40 ms to 400 ms 400 ms to 4 s 4 s to 10 s	0.020 ms 0.20 ms 2.0 ms 20 ms	Appropriate for the calibration of RCD testers.
	10 s to 24 Hrs	200 ms	Stop watch calibration
FREQUENCY			
Measurement	1 Hz to 10 Hz 10 Hz to 120 MHz	10 nHz 5.0 in $10^9$	
Generation	10 Hz to 1 MHz	1.0 in $10^6$	
RPM	60 rpm to 6000 rpm	15 in $10^5 + 1$ LSD	
Temperature indicators and simulators, calibration by electrical simulation			
Base metal thermocouples	-200 °C to 0 °C 0 °C to 1370 °C	0.044 °C to 0.015 °C 0.015 °C to 0.033 °C	excluding cold junction compensation
	-200 °C to 1370 °C	0.22 °C	including cold junction compensation
Noble metal thermocouples	-50 °C to 1768 °C	0.15 °C to 0.067 °C	excluding cold junction compensation
	-50 °C to 1768 °C	0.27 °C to 0.23 °C	including cold junction compensation
Resistance thermometers (Pt 100)	-200 °C to 100 °C	0.0050 °C	
	100 °C to 320 °C	0.0090 °C	
	320 °C to 650 °C	0.016 °C	
	650 °C to 800 °C	0.019 °C	
Specific value Normal method	0 °C	0.090 m°C	
END			