


Schedule of Accreditation

issued by

United Kingdom Accreditation Service

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

| | | |
|--|---|---|
|  <p>UKAS CALIBRATION</p> <p>0057</p> <p>Accredited to ISO/IEC 17025:2005</p> | <h3>H Tinsley & Co</h3> <p>Issue No: 022 Issue date: 26 April 2010</p> | |
| | <p>5 Optima Park Thomas Road (off Thames Road) Crayford DA1 4QX</p> | <p>Contact: Mr EA Thompson Tel: +44 (0)1322 556111 Fax: +44 (0)1322 520400 E-Mail: 17025@tinsley.co.uk Website: www.tinsley.demon.co.uk</p> |
| <p>Calibration performed at the above address only</p> | | |

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 μ V 3.2 ppm + 0.20 μ V 1.6 ppm + 4.6 μ 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 μ V 2.7 ppm + 0.70 μ V 1.7 ppm + 4.6 μ V 6.1 ppm + 58 μ V 5.4 ppm + 1.2 mV | |
| DC CURRENT | | | |
| Generation | 20 μ A to 200 μ A 200 μ A to 2 mA 2 mA to 20 mA 20 mA to 200 mA 200 mA to 2 A 2 A to 10 A | 29 ppm + 1.5 nA 11 ppm + 1.9 nA 19 ppm + 79 nA 15 ppm + 0.97 μ A 26 ppm + 21 μ A 88 ppm + 510 μ 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 μ A to 200 μ A 200 μ 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 μ A 94 ppm + 1.4 μ A | |



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|--|--|---|--|
| DC RESISTANCE | | | |
| Specific values | 1 Ω 10 Ω 25 Ω 100 Ω 1 k Ω 10 k Ω 100 k Ω 1 M Ω 10 M Ω 100 M Ω 1 G Ω 10 G Ω 100 G Ω | 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 Ω to 100 $\mu\Omega$ 100 $\mu\Omega$ to 1 m Ω 1 m Ω to 10 m Ω 10 m Ω to 100 m Ω 100 m Ω to 1 Ω 1 Ω to 10 Ω 10 Ω to 100 Ω 100 Ω to 1 k Ω 1 k Ω to 10 k Ω 10 k Ω to 100 k Ω 100 k Ω to 1 M Ω 1 M Ω to 10 M Ω 10 M Ω to 100 M Ω 100 M Ω to 1 G Ω 1 G Ω to 10 G Ω 10 G Ω to 100 G Ω 100 G Ω to 1 T Ω | 6.5 n Ω 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 Ω |
| AC RESISTANCE | | | |
| Specific Values (Shunts) | 0.01 Ω , 0.02 Ω , 0.05 Ω , 0.1 Ω , 0.2 Ω , 0.5 Ω , 1 Ω , 5 Ω and 10 Ω 45 Hz to 55 Hz, 125 Hz to 135 Hz | 0.070 % | Up to 20 Amperes |
| Other Values (Shunts) | 0.5 m Ω to 5 m Ω 60 Hz | 280 ppm | Up to 10 Amperes |
| Specific Values (Precision) | 10 Ω , 25 Ω , 100 Ω and 1 k Ω 75 Hz | 3.0 ppm | |
| Other Values | 10 Ω to 1 k Ω 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 μ V 140 ppm + 12 μ V 60 ppm 50 ppm 66 ppm 170 ppm 530 ppm + 7.0 μ V 180 ppm + 12 μ V 88 ppm 65 ppm 70 ppm 290 ppm 1100 ppm + 7.0 μ V 920 ppm + 12 μ V 280 ppm 220 ppm 280 ppm 460 ppm 980 ppm + 10 μ V 470 ppm + 35 μ V 650 ppm 280 ppm 840 ppm | |
| AC CURRENT | <i>40 Hz to 1 kHz</i> 50 μ A to 100 μ A 100 μ 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 μ A 100 ppm + 48 μ A 200 ppm + 240 μ 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 and stopwatches. |
| FREQUENCY | | | |
| Measurement | 0 Hz to 10 Hz 10 Hz to 120 MHz | 10 nHz 5.0 in 10^9 | |
| Generation | 0 Hz to 1 MHz | 1.0 in 10^6 | |
| RPM | 60 rpm to 6000 rpm | 15 in $10^5 + 1$ LSD | |
| Temperature indicators, calibration by electrical simulation | | | |
| Base metal thermocouple | - 200 °C to 1370 °C | 0.22 °C | Including cold junction compensation Excluding cold junction compensation |
| | - 200 °C to 1370 °C | 0.060 °C | |
| Resistance thermometer (Pt 100) | - 200 °C to 100 °C 100 °C to 320 °C 320 °C to 650 °C 650 °C to 800 °C | 0.0050 °C 0.0090 °C 0.016 °C 0.019 °C | |
| Specific value Normal method | 0 °C | 0.090 m°C | |
| Temperature simulators, calibration by electrical simulation | | | |
| Base metal thermocouple | - 200 °C to 1370 °C | 0.030 °C | Excluding cold junction compensation Including cold junction compensation |
| | - 200 °C to 1370 °C | 0.22 °C | |
| Resistance thermometer (Pt 100) | - 200 °C to 100 °C 100 °C to 320 °C 320 °C to 650 °C 650 °C to 800 °C | 0.0050 °C 0.0090 °C 0.016 °C 0.019 °C | |
| Specific value Normal method | 0 °C | 0.0030 °C | |
| END | | | |