


Schedule of Accreditation

issued by

United Kingdom Accreditation Service

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

 <p>UKAS CALIBRATION 0310</p> <p>Accredited to ISO/IEC 17025:2005</p>	<h3>RS Calibration</h3> <p>Issue No: 038 Issue date: 09 June 2011</p>	
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<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
ELECTRICAL MEASUREMENTS			
DC RESISTANCE			
Specific values	1 mΩ 10 mΩ 100 mΩ 1 Ω 10 Ω 100 Ω 1 kΩ 10 kΩ 100 kΩ 1 MΩ 10 MΩ 100 MΩ 1 GΩ	77 ppm 52 ppm 52 ppm 3.0 ppm 11 ppm 3.0 ppm 3.0 ppm 8.0 ppm 53 ppm 53 ppm 53 ppm 54 ppm 63 ppm	Specific values are those which fall within ± 0.5% of the stated values.
AC RESISTANCE at 50 Hz	80 mΩ 70 mΩ 0.22 Ω 0.4 Ω 1 Ω 5 Ω 10 Ω 100 Ω	5.0 mΩ 10 mΩ 2.0 mΩ 2.0 mΩ 3.0 mΩ 9.0 mΩ 6.0 mΩ 60 mΩ	Clean Line. For the calibration of earth loop testers with 1 mΩ resolution. Clean Line. For the calibration of general earth loop testers. Loads for the calibration of earth loop testers



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DC CURRENT	2 A to 10 A	280 ppm	
	10 A to 20 A	120 ppm	
	20 A to 100 A	150 ppm	Multi-turn calibration of clamp-on ammeters
	50 A to 500 A	590 ppm	
AC CURRENT	500 A to 2500 A	630 ppm	Multi-turn calibration of clamp-on ammeters
	10 μ A to 0.5 A, 30 Hz to 2 kHz	200 ppm	
	0.5 A to 10 A, 30 Hz to 2 kHz	250 ppm	
	10 A to 20 A, 30 Hz to 2 kHz	250 ppm	
	20 A to 50 A, 50 Hz to 60 Hz	0.11 %	Multi-turn calibration of clamp-on ammeters
	50 A to 100 A, 50 Hz to 60 Hz	0.16 %	
	50A to 250 A, 50 Hz to 800 Hz	0.12 %	
	250 A to 500 A, 50 Hz to 100 Hz	0.11 %	
	500 A to 1250 A, 50 Hz to 100 Hz	0.17 %	
	1250 A to 1750 A, 50 Hz to 100 Hz	0.19 %	
INDUCTANCE at 1 kHz	1750 A to 2500 A, 50 Hz to 60 Hz	0.19 %	
	Generation		
	100 μ H	330 ppm	For the calibration of inductance measuring instruments
	1 mH	190 ppm	
	10 mH	230 ppm	
	100 mH	160 ppm	
CAPACITANCE at 1 kHz	1 H	160 ppm	
	Generation		
	1 nF	0.33 %	For the calibration of capacitance measuring instruments
	2 nF	0.19 %	
	3 nF	0.12 %	
	4 nF	0.092 %	
	5 nF	0.076 %	
	6 nF to 9 nF	0.065 %	
	10 nF	0.050 %	
	20 nF to 80 nF	0.031 %	
	90 nF	0.037 %	
	100 nF to 900 nF	0.042 %	
	1 μ F	0.26 %	
	2 μ F	0.18 %	
	3 μ F and 4 μ F	0.10 %	
	5 μ F and 9 μ F	0.18 %	
	10 μ F to 30 μ F	0.20 %	
	40 μ F and 50 μ F	0.25 %	
	90 μ F and 100 μ F	0.20 %	
	FREQUENCY		
Measurement	10 Hz to 100 kHz	1.0 in 10^3	
	100 kHz to 1 MHz	1.0 in 10^7	
	1 MHz to 2 GHz	5.0 in 10^3	



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OSCILLOSCOPE CALIBRATION			
Timing markers	500 ps to 10 ms	0.29 ppm	The uncertainty quoted will be particularly dependent on the horizontal resolution of the oscilloscope being calibrated.
Voltage Amplitude	600 mV to 60 V 60 V to 120 V	0.12 % 0.20 %	The uncertainty quoted will be particularly dependent on the vertical resolution of the oscilloscope being calibrated.
Bandwidth	<i>Input VSWR up to 1.2:1</i> 50 kHz to 100 MHz 100 MHz to 250 MHz 250 MHz to 330 MHz 330 MHz to 600 MHz 600 MHz to 1 GHz <i>Input VSWR from 1.2:1 to 1.6:1</i> 550 MHz to 1 GHz	0.21 dB 0.23 dB 0.26 dB 0.41 dB 0.38 dB 0.53 dB	The uncertainty quoted will be dependent on the vertical resolution of the oscilloscope being calibrated.
Rise and fall times	Using 150 ps edge Using 500 ps edge	21 ps 50 ps	The uncertainty quoted will be dependent on the vertical and horizontal resolution of the oscilloscope being calibrated.
Input resistance (DC)	50 Ω 1 M Ω	0.13 % 0.13 %	For values within $\pm 20\%$ of the nominal values shown.
AUTOMATED SYSTEM FOR CALIBRATION OF MULTI-FUNCTION CALIBRATORS			
DC RESISTANCE	0 Ω 1 Ω 10 Ω 100 Ω 1 k Ω 10 k Ω 100 k Ω 1 M Ω 10 M Ω 100 M Ω	140 $\mu\Omega$ 140 ppm 40 ppm 25 ppm 25 ppm 25 ppm 35 ppm 60 ppm 90 ppm 0.13%	Generation of these parameters may also be undertaken but the uncertainties may be increased
DC VOLTAGE	0 V 100 mV 1 V 10 V 19 V 100 V 1000 V	2.1 μ V 25 ppm 15 ppm 15 ppm 15 ppm 15 ppm 15 ppm	



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DC CURRENT	0 μ A 100 μ A 1 mA 10 mA 100 mA 1 A 10 A	6.0 nA 65 ppm 65 ppm 60 ppm 65 ppm 120 ppm 160 ppm	
AC VOLTAGE	At 10 Hz, 20 Hz, 30 Hz, 40 Hz, 50 Hz, 55 Hz, 60 Hz, 300 Hz, 1 kHz, 10 kHz and 20 kHz: 1 mV 10 mV 100 mV At 30 kHz and 50 kHz: 1 mV 10 mV 100 mV At 100 kHz: 1 mV 10 mV 100 mV 1 V and 10 V: 10 Hz, 20 Hz and 30 Hz 40 Hz, 50 Hz, 55 Hz, 60 Hz, 300 Hz, 1 kHz, 10 kHz, 20 kHz and 30 kHz 50 kHz 100 kHz 300 kHz 500 kHz 1 MHz 19 V: 1 kHz 100 V: 10 Hz, 20 Hz and 30 Hz 40 Hz, 50 Hz, 55 Hz, 60 Hz, 300 Hz, 1 kHz, 10 kHz and 20 kHz 30 kHz and 50 kHz 100 kHz 200 kHz 1000 V: 50 Hz, 55 Hz, 60 Hz, 300 Hz and 1 kHz	1.4 % 0.16 % 310 ppm 1.4 % 0.17 % 400 ppm 2.1 % 0.25 % 660 ppm 80 ppm 80 ppm 150 ppm 220 ppm 500 ppm 740 ppm 0.15 % 80 ppm 90 ppm 80 ppm 150 ppm 220 ppm 430 ppm 120 ppm	1 mV and 10 mV are not available at 10 Hz



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AC CURRENT	100 μ A: 10 Hz and 20 Hz 30 Hz 40 Hz, 50 Hz, 55 Hz, 60 Hz, 300 Hz and 1 kHz 5 kHz	380 ppm 370 ppm 370 ppm 710 ppm	
	1 mA: 10 Hz and 20 Hz 30 Hz 40 Hz, 50 Hz, 55 Hz, 60 Hz, 300 Hz and 1 kHz 5 kHz	310 ppm 310 ppm 300 ppm 510 ppm	
	10 mA: 10 Hz and 20 Hz 30 Hz 40 Hz, 50 Hz, 55 Hz, 60 Hz, 300 Hz and 1 kHz 5 kHz	310 ppm 310 ppm 300 ppm 510 ppm	
	100 mA: 10 Hz and 20 Hz 30 Hz 40 Hz, 50 Hz, 55 Hz, 60 Hz, 300 Hz and 1 kHz 5 kHz	310 ppm 310 ppm 300 ppm 510 ppm	
	1 A: 10 Hz and 20 Hz 30 Hz 40 Hz, 50 Hz, 55 Hz, 60 Hz, 300 Hz and 1 kHz 5 kHz	330 ppm 330 ppm 310 ppm 540 ppm	
	10 A: 40 Hz, 55 Hz, 300 Hz and 1 kHz	0.14 %	
ELECTRICAL SIMULATION OF TEMPERATURE			
Base metal thermocouple indicators			Including Cold Junction Compensation
K type	- 200 °C to - 190 °C - 190 °C to - 100 °C - 100 °C to + 1300 °C	0.36 °C to 0.34 °C 0.34 °C to 0.20 °C 0.20 °C to 0.15 °C	
T Type	- 150 °C to - 100 °C - 100 °C to 0 °C 0 °C to 400 °C	0.26 °C to 0.22 °C 0.22 °C to 0.17 °C 0.17 °C to 0.12 °C	
J Type	- 100 °C to 0 °C 0 °C to 500 °C 500 °C to 1000 °C	0.16 °C to 0.14 °C 0.14 °C to 0.13 °C 0.13 °C	



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CALIBRATION OF 16TH/17TH EDITION TEST EQUIPMENT			
Insulation Resistance	10 k Ω to 5 M Ω	0.16 %	
	5 M Ω to 100 M Ω	1.2 %	
	100 M Ω to 1 G Ω	1.4 %	
Continuity Resistance	900 m Ω to 2 Ω	3.5 %	
	2 Ω to 6 Ω	1.1 %	
	6 Ω to 20 Ω	0.67 %	
	100 Ω	0.32 %	
	1 k Ω	1.2 %	
Continuity Current	100 mA	2.2 %	
	200 mA	1.9 %	
	300 mA	1.7 %	
Insulation Voltage	50 V	3.0 %	
	100 V	2.1 %	
	250 V	1.5 %	
	500 V	1.3 %	
	1000 V	1.3 %	
Current on Insulation resistance function			
1000 V range	0.5 mA	3.1 %	
	1.0 mA	2.1 %	
500 V range	0.5 mA	3.1 %	
	1.0 mA	2.1 %	
Loop Resistance at 50 Hz	0.33 Ω	5.8 %	
	0.5 Ω	3.9 %	
	1 Ω	2.1 %	
	5 Ω	0.76 %	
	10 Ω	0.65 %	
	100 Ω	0.58 %	
	1000 Ω	0.58 %	
RCD Current at 50 Hz	10 mA to 30 mA	2.1 %	
	30 mA to 300 mA	1.9 %	
	300 mA 2 A	1.6 %	
RCD Trip Time	20 ms to 40 ms	4.8 %	
	40 ms to 200 ms	2.4 %	
	200 ms to 390 ms	0.48 %	
	390 ms to 900 ms	0.90 %	



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PAT Insulation Resistance	1 M Ω to 4 M Ω 4 M Ω to 10 M Ω	0.16 % 1.2 %	
PAT Earth Bond Resistance at 50 Hz	0.1 Ω 0.22 Ω 0.33 Ω 0.5 Ω 1 Ω 5 Ω 10 Ω 100 Ω 1000 Ω	5.4 % 2.8 % 2.0 % 1.5 % 1.1 % 0.67 % 0.63 % 0.58 % 0.58 %	
PAT Earth Bond Current at 50 Hz	0 mA to 100 mA 100 mA to 10 A 10 A to 30 A	2.1 % + 6 mA 1.7 % + 60 mA 1.7 % + 60 mA	
PAT Leakage Current Test	2.7 mA at 240 V 4.7 mA at 240 V 7.7 mA at 240 V	1.9 % 1.8 % 1.8 %	
PAT Flash Voltage Test At 50 Hz	1000 V (Class 1) 1500 V (Class 1) 1000 V (Class 2) 3000 V (Class 2)	5.8 % 5.4 % 5.8 % 5.0 %	
PAT Flash Current Test At 50 Hz	0.67 mA at 1000 V (Class 1) 1.00 mA at 1500 V (Class 1) 0.34 mA at 1000 V (Class 2) 1.00 mA at 3000 V (Class 2)	6.0 % 5.9 % 6.8 % 5.9 %	
TEMPERATURE CALIBRATION			
Temperature indicators and recorders with temperature sensor(s)	- 20 $^{\circ}$ C to - 10 $^{\circ}$ C - 10 $^{\circ}$ C to + 20 $^{\circ}$ C 20 $^{\circ}$ C to 100 $^{\circ}$ C 100 $^{\circ}$ C to 200 $^{\circ}$ C 50 $^{\circ}$ C to 200 $^{\circ}$ C 200 $^{\circ}$ C to 550 $^{\circ}$ C	0.11 $^{\circ}$ C 0.048 $^{\circ}$ C 0.085 $^{\circ}$ C 0.094 $^{\circ}$ C 0.096 $^{\circ}$ C 0.13 $^{\circ}$ C	Using oil bath Using oil bath Using oil bath Using oil bath Using hot block Using hot block



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DIMENSIONAL MEASUREMENTS			
RANGE IN MILLIMETRES AND UNCERTAINTY IN MICROMETRES UNLESS OTHERWISE STATED			
LENGTH			NOTES
Micrometers			
External	As BS 870:1950 and above	<div style="display: flex; align-items: center;"> <div style="border-left: 1px solid black; border-right: 1px solid black; width: 10px; height: 15px; margin-right: 5px;"></div> <div> Heads: 2.0 Setting and extension rods: $1.0 + (8.0 \times \text{length in m})$ </div> </div>	1. Other similar items, including parts of measuring instruments and machines, may be calibrated to the uncertainties stated. Where the item or part calibrated is of lower quality due to wear, errors in geometry or form, or poor surface texture, or where any other factor adversely affects the measurement capability, greater uncertainties will be quoted. 2. The uncertainty quoted is for the departure from flatness, straightness, or squareness, i.e. the distance separating the two parallel planes that just enclose the surface under consideration.
Internal	As BS 959:1950		
Depth	As BS 6468:1984		
Vernier calipers, height and depth gauges	As BS 887:1982: BS 1643: 1983, 0 to 600 and BS 6365, 0 to 300	Overall performance $10 + (30 \times \text{length in m})$	
Dial gauges and dial test indicators	As BS 907:1965 and BS 2795:1981	1.0	
Feeler gauges	As BS 957	1.5	
Steel rules, engineers	0 to 1000	$5.0 + (10 \times \text{length in metres})$	
ANGLE			
Squares Blades Type	As BS 939:1977. 0 to 300 300 to 600	3.0 <div style="display: flex; align-items: center;"> <div style="border-left: 1px solid black; border-right: 1px solid black; width: 10px; height: 15px; margin-right: 5px;"></div> <div> On squareness See Note 2 </div> </div> 5.0	
MEASURING INSTRUMENTS AND MACHINES			
Road measuring wheels			
Derived road wheel calibration factor	0.95 to 1.05	0.0014	
END			