

Schedule of Accreditation

issued by

United Kingdom Accreditation Service

2 Pine Trees, Chertsey Lane, Staines-upon-Thames, TW18 3HR, UK

 <p>UKAS CALIBRATION 0152</p> <p>Accredited to ISO/IEC 17025:2005</p>	<p>ServiceCal Limited</p> <p>Issue No: 028 Issue date: 19 May 2017</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			
DC RESISTANCE			
Sourcing			
Specific Values	0.01 Ω 0.1 Ω 1.0 Ω 10 Ω 100 Ω 1.0 k Ω 10 k Ω 100 k Ω 1.0 M Ω 10 M Ω 100 M Ω	30 ppm 30 ppm 8.0 ppm 5.0 ppm 7.0 ppm 6.0 ppm 11 ppm 15 ppm 30 ppm 70 ppm 100 ppm	
Other Values	0.01 Ω to 20 Ω 20 Ω to 200 Ω 200 Ω to 200 k Ω 200 k Ω to 2.0 M Ω 2.0 M Ω to 20 M Ω 20 M Ω to 200 M Ω 200 M Ω to 2.0G Ω	30 ppm + 60 $\mu\Omega$ 20 ppm 15 ppm 30 ppm 70 ppm 650 ppm 0.65 %	
Measurement			
Specific Values	0.01 Ω 0.1 Ω 1.0 Ω 10 Ω 100 Ω 1.0 k Ω 10 k Ω 100 k Ω 1.0 M Ω 10 M Ω 100 M Ω	30 ppm 30 ppm 8.0 ppm 5.0 ppm 7.0 ppm 6.0 ppm 11 ppm 15 ppm 30 ppm 70 ppm 100 ppm	



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DC RESISTANCE (cont'd)			
Other Values	0.01 Ω to 20 Ω 20 Ω to 200 Ω 200 Ω to 200 k Ω 200 k Ω to 2.0 M Ω 2.0 M Ω to 20 M Ω 20 M Ω to 200 M Ω 200 M Ω to 2 G Ω	30 ppm + 60 $\mu\Omega$ 20 ppm 15 ppm 30 ppm 70 ppm 650 ppm 0.65 %	
DC VOLTAGE			
Generation	100 μ V to 200 mV 200 mV to 2.0 V 2.0 V to 20 V 20 V to 200 V 200 V to 1100 V	20 ppm + 3.0 μ V 10.0 ppm + 3.0 μ V 16 ppm 15 ppm 17 ppm	
Specific Values	100 mV 1.0 V 10 V 100 V 1.0 kV	15 ppm 8.0 ppm 8.0 ppm 10.0 ppm 10.0 ppm	
Measurement	100 μ V to 200 mV 200 mV to 20 V 20 V to 1100 V	12 μ V 8.0 ppm + 2.0 μ V 15 ppm	
DC CURRENT			
Generation	100 μ A to 200 μ A 200 μ A to 2.0 mA 2.0 mA to 20 mA 20 mA to 200 mA 200 mA to 2.0 A 2.0 A to 20 A 20 A to 1000 A	50 ppm + 10 nA 25 ppm + 200 nA 130 ppm 180 ppm 300 ppm 550 ppm + 190 μ A 610 ppm	Calibration of clampmeters only.
Specific values	100 μ A 1.0 mA 10 mA 100 mA 1.0 A 10 A	45 ppm 25 ppm 30 ppm 110 ppm 130 ppm 500 ppm	
Measurement	100 μ A to 200 μ A 200 μ A to 2.0 mA 2.0 mA to 20 mA 20 mA to 200 mA 200 mA to 2.0 A	130 ppm + 9.0 nA 130 + 90 nA 130 ppm 150 ppm 280 ppm	



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AC VOLTAGE			
Generation	30 Hz to 10 kHz 1.0 mV to 200 V	0.060 %	
	55 Hz to 10 kHz 200 V to 1100 V	0.080 %	
AC VOLTAGE			
Specific values	30 Hz to 100 kHz 1.0 mV 10 mV 100 mV	0.30 % + 25 µV 0.15 % + 25 µV 0.10 % + 25 µV	
	10 Hz to 100 kHz 1.0 V, 10 V, 100 V	0.050 %	
	55 Hz to 30 kHz 1.0 kV	0.060 %	
	100 mV 300 Hz, 1.0 kHz, 10 kHz, 30 kHz	0.030 %	
	1 V, 10 V, 100 V, 1 kV 300 Hz, 1.0 kHz, 10 kHz, 30 kHz	0.020 %	
Measurement	20 mV to 200 mV 20 Hz to 10 kHz 10 kHz to 100 kHz	0.040 % 0.15 %	
	200 mV to 200 V 20 Hz to 10 kHz 10 kHz to 100 kHz	0.020 % 0.15 %	
	200 V to 1000 V 55 Hz to 10 kHz 10 kHz to 30 kHz	0.020 % 0.15 %	
Specific values	300 Hz, 1.0 kHz, 10 kHz 100 mV 1.0 V, 10 V, 100 V, 1.0 kV	0.020 % 0.015 %	
	30 kHz 100 mV, 1.0 V, 10 V, 100 V, 1.0 kV	0.060 %	
AC CURRENT			
Generation	10 Hz to 1.0 kHz 100 µA 1.0 mA, 10 mA, 100 mA 1.0 A	0.060 % 0.050 % 0.070 %	
	2.0 A to 20 A 30 Hz to 500 Hz	0.17 %	



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AC CURRENT (cont'd)			
Generation (cont'd)	50 Hz 10 A to 1000 A	0.17 %	Calibration of clamp meters only.
Measurement	55 Hz to 5.0 kHz 20 μ A to 200 mA	0.15 %	
	55 Hz to 1.0 kHz 200 mA to 2.0 A	0.25 %	
Specific values	55 Hz, 300 Hz, 1.0 kHz 100 μ A, 1.0 mA, 10 mA, 100 mA 1.0 A	0.050 % 0.10 %	
FREQUENCY			
Measurement	0.10 Hz to 10 Hz 10 Hz to 1.0 GHz	1 in 10^6 2 in 10^9	Set Values
Generation	0.10 Hz to 10 Hz 10 Hz to 1.0 GHz	1 in 10^6 2 in 10^9	
Mechanical Tachometer	60 RPM to 600 RPM 600 RPM to 3700 RPM	2.5 RPM 7.0 RPM	
Optical Tachometers	6.0 RPM 60 RPM 600 RPM 1500 RPM 3000 RPM 6000 RPM 15000 RPM 30000 RPM 60000 RPM	0.007 RPM 0.007 RPM 0.02 RPM 0.10 RPM 0.10 RPM 0.10 RPM 1.0 RPM 1.0 RPM 1.0 RPM	
CALIBRATION OF 16TH/17TH EDITION TEST EQUIPMENT			
Insulation Resistance	10 k Ω to 1 M Ω 1 M Ω to 5 M Ω 5 M Ω to 10 M Ω 10 M Ω to 30 M Ω 30 M Ω to 100 M Ω 100 M Ω to 500 M Ω 500 M Ω to 1 G Ω 1 G Ω to 2 G Ω	12 k Ω 170 k Ω 350 k Ω 1.0 M Ω 3.5 M Ω 18 M Ω 36 M Ω 130 M Ω	



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CALIBRATION OF 16TH/17TH EDITION TEST EQUIPMENT (cont'd)			
Continuity Resistance	20 m Ω to 1.0 Ω	33 m Ω	
	1.0 Ω to 2.0 Ω	44 m Ω	
	2.0 Ω to 5.0 Ω	88 m Ω	
	5.0 Ω to 10 Ω	150 m Ω	
	10 Ω to 20 Ω	260 m Ω	
	20 Ω to 50 Ω	610 m Ω	
	50 Ω to 100 Ω	1.2 Ω	
	100 Ω to 1 k Ω	12 Ω	
Continuity Current	200 mA	3.7 mA	
Insulation Voltage	50 V to 1000 V	13 V	
Loop Resistance at 50 Hz	0.22 Ω	43 m Ω	
	0.33 Ω	43 m Ω	
	0.5 Ω	43 m Ω	
	1 Ω	44 m Ω	
	5 Ω	56 m Ω	
	10 Ω	80 m Ω	
	100 Ω	590 m Ω	
	1000 Ω	5.8 Ω	
RCD Current at 50 Hz	10 mA	1.90 mA	At 100 ms
	20 mA	2.20 mA	At 100 ms
	30 mA	2.60 mA	At 100 ms
	40 mA	3.10 mA	At 100 ms
	50 mA	3.60 mA	At 100 ms
	100 mA	6.20 mA	At 100 ms
	150 mA	9.10 mA	At 100 ms
	200 mA	12 mA	At 100 ms
	300 mA	18 mA	At 100 ms
	500 mA	29 mA	At 100 ms
1 A	58 mA	At 100 ms	
RCD Current at 50 Hz	100 mA	2.2 mA	At 1000 ms
	1000 mA	14 mA	At 1000 ms
RCD Trip Time	20 ms	0.96 ms	
	30 ms	0.96 ms	
	40 ms	0.96 ms	
	50 ms	0.96 ms	
	100 ms	0.96 ms	
	250 ms	0.96 ms	
	500 ms	0.96 ms	
	1000 ms	0.96 ms	
Earth Bond Current at 50 Hz	100 mA	22 mA	
	10 A	240 mA	
	20 A	420 mA	
Earth Bond Resistance at 50 Hz	0.0 Ω to 10 Ω	35 m Ω	
	10 Ω to 100 Ω	590 m Ω	



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CALIBRATION OF 16TH/17TH EDITION TEST EQUIPMENT (cont'd)			
Earth Leakage Current Test at 50 Hz	2.0 mA at 240 V 4.7 mA at 240 V 7.7 mA at 240 V	40 µA 85 µA 140 µA	
Flash Voltage Test At 50 Hz	1500 V (Class 1) 3000 V (Class 2)	170 V 260 V	
Flash Current Test At 50 Hz	1.00 mA at 1500 V (Class 1) 1.00 mA at 3000 V (Class 2)	63 µA 63 µA	
AC Voltage At 50 Hz	100 V to 400 V	4.5 V	
AC Line Voltage	240 V + 10 % - 6 %	2.9 V	
Oscilloscope Calibration			
Amplitude	5 mV to 190 mV 190 mV to 190 V	0.89 % 0.30 %	
Horizontal	0.5 ns to 10 ms	0.5 %	
Bandwidth	50 kHz to 1 GHz 1.1 GHz to 3.2 GHz	4.5 % 5.2 %	50 Ω and 1.0 MΩ 50 Ω Only
PRESSURE			
<u>Hydraulic pressure (gauge)</u>			
Calibration of pressure indicating instruments and gauges	0 MPa to 10MPa 10 MPa to 100 MPa	25 ppm +35 Pa 100 ppm + 30 kPa	Calibration of pressure devices with an electrical output may be undertaken
<u>Gas pressure (gauge)</u>			
Calibration of pressure indicating instruments and gauges	-98.5 kPa to -100 Pa -100 Pa to 100 Pa 100 Pa to 10 kPa 10 kPa to 0.50 MPa 0.5 MPa to 1.0 MPa 1.0 MPa to 2.0 MPa	75 Pa 100 ppm +40 Pa 40 ppm +40 Pa 75 Pa 150 Pa 300 Pa	Absolute pressure within these ranges can be generated and Will attract an additional Uncertainty of 72 Pa
AIR VELOCITY			
Calibration of 25 to 100 mm Vane Anemometers by comparison	0.5 m/s to 2 m/s 2 m/s to 5 m/s 5 m/s to 15 m/s 15 m/s to 25 m/s	0.72 % + 0.11 m/s 0.80 % + 0.27 m/s 0.81 % + 0.72 m/s 0.90 % + 1.4 m/s	
Calibration of Thermal Anemometers by comparison	0.3 m/s to 2 m/s 2 m/s to 5 m/s 5 m/s to 15 m/s 15 m/s to 25 m/s	0.70 % + 0.16 m/s 0.80 % + 0.41 m/s 0.81 % + 1.10 m/s 0.90 % + 1.83 m/s	



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AIR VELOCITY (cont'd)			
Temperature Simulation And Generation	Type K -160 °C to 0.0 °C 0.0 °C to 1300 °C	0.79 °C 0.47 °C	Internal Cold junction enabled
	Type K -160 °C to 0.0 °C 0.0 °C to 1300 °C	0.73 °C 0.36 °C	Internal Cold junction Disabled
Ambent Temperature Measurement	18 °C to 22 °C	0.15 °C	Mercury in glass thermometers
END			