Schedule of Accreditation

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United Kingdom Accreditation Service

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Accredited to ISO/IEC 17025:2017

ServiceCal Limited

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Calibration performed by the Organisation at the locations specified

Locations covered by the organisation and their relevant activities

Laboratory locations:

Location details	Activity	Location code
Unit A9 Axis Point Hareshill Business Park Hilltop Road Heywood Lancashire OL10 2RQ **Local contact** Mr G D Taylor Tel: +44 (0)1706 367008 Email: info@servicecal.co.uk	All	Lab

Site activities performed away from the locations listed above:

Location details	Activity	Location code
The customers' site or premises must be suitable for the nature of the particular calibrations undertaken and will be the subject of contract review arrangements between the laboratory and the customer.	Electrical	Site

Calibration and Measurement Capability (CMC)

Measured Quantity Instrument or Gauge	Range	Expanded Measurement Uncertainty (k = 2)	Remarks	Location Code
ELECTRICAL				
DC RESISTANCE				
Generation				
Specific Values	0.01 Ω 0.1 Ω 1 Ω 10 Ω 100 Ω 1 kΩ 10 kΩ 100 MΩ	25 μΩ/Ω 7.0 μΩ/Ω 7.0 μΩ/Ω 5.0 μΩ/Ω 5.0 μΩ/Ω 6.0 μΩ/Ω 11 μΩ/Ω 75 μΩ/Ω	Using standard resistors in a 2-terminal or a 4-terminal configuration as appropriate to the resistance value.	Site & Lab
	1 Ω 10 Ω 100 Ω 1 kΩ 10 kΩ 100 kΩ 1 MΩ 10 MΩ 100 MΩ	20.2 μΩ/Ω 7.0 μΩ/Ω 9.0 μΩ/Ω 6.0 μΩ/Ω 3.7 μΩ/Ω 6.5 μΩ/Ω 12 μΩ/Ω 35 μΩ/Ω 75 μΩ/Ω	Using multifunction calibrator in a 2-terminal or a 4-terminal configuration as appropriate to the resistance value.	Site & Lab
Other Values	0 Ω to 20 Ω 20 Ω to 200 Ω 200 Ω to 200 kΩ 200 kΩ to 2 MΩ 2 MΩ to 20 MΩ 20 MΩ to 200 MΩ 200 MΩ to 2 GΩ	30 μΩ/Ω + 60 μΩ 20 μΩ/Ω 15 μΩ/Ω 30 μΩ/Ω 70 μΩ/Ω 650 μΩ/Ω 0.65 %	By comparison with known resistance values.	Site & Lab
Measurement				
Specific Values	0.01 Ω 0.1 Ω 1 Ω 10 Ω 100 Ω 1 kΩ 10 kΩ 100 MΩ	25 μΩ/Ω 7.0 μΩ/Ω 7.0 μΩ/Ω 5.0 μΩ/Ω 5.0 μΩ/Ω 6.0 μΩ/Ω 11 μΩ/Ω 75 μΩ/Ω	By comparison with known resistance values.	Site & Lab

Measured Quantity Instrument or Gauge	Range	Expanded Measurement Uncertainty (k = 2)	Remarks	Location Code
ELECTRICAL (cont'd)				
DC RESISTANCE (cont'd)				
Other Values	0 Ω to 20 Ω 20 Ω to 200 Ω 200 Ω to 200 kΩ 200 kΩ to 2 MΩ 2 MΩ to 20 MΩ 20 MΩ to 200 MΩ 200 MΩ to 2 GΩ	25 μΩ/Ω 11.5 μΩ/Ω 12 μΩ/Ω 15 μΩ/Ω 35 μΩ/Ω 260 μΩ/Ω 0.27 %	Using digital multimeter.	Site & Lab
DC VOLTAGE				
Generation	0 mV to 220 mV 220 mV to 2.2 V 2.2 V to 22 V 22 V to 220 V 220 V to 1100 V	6 μV/V + 0.50 μV 2.3 μV/V + 0.80 μV 1.5 μV/V 4.0 μV/V 4.9 μV/V	Using multifunction calibrator	Site & Lab
Specific Values	100 mV 1 V 10 V 100 V 1 kV	6.8 μV/V 2.9 μV/V 3.2 μV/V 3.1 μV/V 3.5 μV/V		
Measurement	0 mV to 200 mV 200 mV to 2 V 2 V to 20 V 20 V to 1100 V	11 μV 4.3 μV/V 3.8. μV/V 6.4 μV/V	Using digital multimeter.	Site & Lab
DC CURRENT				
Generation	0 μA to 220 μA 220 μA 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 30 A	15 μA/A + 7.0 nA 9 μA/A + 8.0 nA 8 μA/A 30 μA/A 40 μA/A 300 μA/A	Using multifunction calibrator	Site & Lab
	20 A to 1000 A	425 μA/A	For calibration of clamp-on ammeters and similar devices, using a multi-turn coil method.	Site & Lab
Specific values	100 μA 1 mA 10 mA 100 mA 1 A 10 A	75 μA/A 12 μA/A 8 μA/A 30 μA/A 40 μA/A 140 μA/A	Using multifunction calibrator.	Site & Lab

Measured Quantity Instrument or Gauge	Range	Expanded Measurement Uncertainty (k = 2)	Remarks	Location Code
ELECTRICAL (cont'd)				
DC CURRENT (cont'd)				
Measurement	0 μA to 200 μA	45 μA/A + 9.0 nA	Using digital multimeter.	Site & Lab
	200 μA to 2 mA	14 μA/A + 8.5 nA		
	2 mA to 20 mA	22 μA/A		
	20 mA to 200 mA	80 μA/A		
	200 mA to 2 A	275 μA/A		
	2 A to 20 A	810 μA/A	Using digital multimeter and current shunt.	Site & Lab
AC VOLTAGE				
Generation	2 mV to 200 V *10 Hz to 100 kHz*	0.090 % + 50 μV	Using multifunction calibrator.	Site & Lab
	200 V to 1 kV *55 Hz to 1 kHz*	0.010 % + 50 μV		
Specific values	*10 Hz to 100 kHz:*		Using multifunction calibrator.	Site & Lab
	2 mV	0.10 %		
	20 mV	0.030 %		
	100 mV	0.030 %		
	1 V	0.017 %		
	10 V	0.017 %		
	100 V	0.017 %		
	55 Hz to 1 kHz			
	1000 V	0.010 %		
	100 mV			
	500 Hz	0.005 %		
	1 kHz	0.005 %		
	10 kHz	0.005 %		
	50 kHz	0.010 %		
	1 V			
	500 Hz	0.005 %		
	1 kHz	0.005 %		
	10 kHz	0.005 %		
	50 kHz	0.005 %		
	10 V			
	500 Hz	0.005 %		
	1 kHz	0.005 %		
	10 kHz	0.005 %		
	50 kHz	0.005 %		

Measured Quantity Instrument or Gauge	Range	Expanded Measurement Uncertainty (k = 2)	Remarks	Location Code
ELECTRICAL (cont'd)				
AC VOLTAGE (cont'd)				
Generation, Specific values (continued)	100 V			Site & Lab
	500 Hz	0.005 %		
	1 kHz	0.005 %		
	10 kHz	0.005 %		
	50 kHz	0.010 %		
	1000 V			
	105 Hz	0.030 %		
	500 Hz	0.007 %		
	1 kHz	0.007 %		
	10 kHz	0.016 %		
Measurement	12 mV to 121 mV		Using digital multimeter.	Site & Lab
	1 Hz to 10 kHz	0.017 %		
	10 kHz to 100 kHz	0.069 %		
	121 mV to 121 V			
	20 Hz to 10 kHz	0.016 %		
	10 kHz to 100 kHz	0.077 %		
	121 V to 1050 V			
	40 Hz to 10 kHz	0.0017 %		
Specific values	*105 Hz, 1 kHz, 10 kHz*			Site & Lab
	100 mV	0.016 %		
	1 V, 10 V, 100 V,	0.016 %		
	1 kV	0.030 %		
	30 kHz			
	100 mV, 1 V, 10 V, 100 V,			
	1 kV	0.031 %		
AC CURRENT				
Generation	*55 Hz to 5 kHz*		Using multifunction calibrator.	Site & Lab
	100 μA	0.031 %		
	1 mA	0.018 %		
	10 mA	0.005%		
	100 mA	0.009 %		
	1 A	0.063 %		
	2.1 A to 30 A			
	40 Hz to 1 kHz	0.11 %		
	50 Hz			
	10 A to 1500 A	0.12 %	For calibration of clamp-on ammeters and similar devices, using a multi-turn coil method.	Site & Lab

Measured Quantity Instrument or Gauge	Range	Expanded Measurement Uncertainty (k = 2)	Remarks	Location Code
ELECTRICAL (cont'd)				
AC CURRENT (cont'd)				
Measurement	*1 Hz to 10 kHz* 10 μA to 20.2 μA	0.27 %	Using digital multimeter.	Site & Lab
	1 Hz to 10 kHz 20.2 μA to 2.02 mA	0.08 %		
	10 Hz to 10 kHz *2.02 mA to 30 A*	0.15 %		
Specific values	*55 Hz, 305 Hz, 1.0 kHz* 100 μA, 1 mA, 10 mA, 100 mA	0.042 %		
	1 A	0.050 %		
	50 Hz and 140 Hz 10 A and 20 A	0.090 %	Using digital multimeter and current shunt.	Site & Lab

Measured Quantity Instrument or Gauge	Range	Expanded Measurement Uncertainty (k = 2)	Remarks	Location Code
CAPACITANCE				
Measurement	Up to 2 nF 2 nF to 20 nF 20 nF to 20 μF 20 μF to 2 mF 2 mF to 200 mF	0.6 % 0.22 % 0.12 % 0.16 % 0.19 %		
Generation Specific Values Two- and three-terminal configurations	*1 kHz* 1 nF 2 nF 5 nF 10 nF 100 nF 1 μF 10 uF	 13 pF 14 pF 19 pF 32 pF 300 pF 4.8 nF 6 mF	 Generation using capacitors of known value	
Inductance				
Specific Values	*1 kHz* 1 mH 10 mH 20 mH 30 mH 50 mH 100 mH 1 H 10 H	 120 μH 130 μH 180 μH 230 μH 360 μH 600 μH 5.8 mH 58 mH	 Generation using inductors of known value	
Frequency				
Measurement	0.1 Hz to 10 Hz 10 Hz to 1 GHz	1.0 in 10^6 2.0 in 10^9	Using frequency standard and divider.	Lab
Generation	0.1 Hz to 10 Hz 10 Hz to 1 GHz	1.0 in 10^6 2.0 in 10^9	Using frequency counter.	Lab
Optical Tachometers	6 rpm 60 rpm 600 rpm 1500 rpm 3000 rpm 6000 rpm 15000 rpm 30000 rpm 60000 rpm	0.0070 rpm 0.0070 rpm 0.020 rpm 0.10 rpm 0.10 rpm 0.10 rpm 1.0 rpm 1.0 rpm 1.0 rpm	Using light pulses synchronised to frequencies that correspond to the stated rpm values.	Lab

Measured Quantity Instrument or Gauge	Range	Expanded Measurement Uncertainty (k = 2)	Remarks	Location Code
CALIBRATION OF 16TH/17TH EDITION TEST EQUIPMENT			Using dedicated calibrator that covers all relevant functions.	Site & Lab
Insulation Resistance	10 kΩ	35 Ω		
	20 kΩ	70 Ω		
	30 kΩ	110 Ω		
	40 kΩ	140 Ω		
	60 kΩ	210 Ω		
	100 kΩ	350 Ω		
	200 kΩ	700 Ω		
	400 kΩ	1.4 kΩ		
	600 kΩ	2.2 kΩ		
	1 MΩ	3.6 kΩ		
	2 MΩ	7 kΩ		
	3 MΩ	11 kΩ		
	4 MΩ	14 kΩ		
	5 MΩ	18 kΩ		
	6 MΩ	210 kΩ		
	7 MΩ	250 kΩ		
	8 MΩ	280 kΩ		
	9 MΩ	320 kΩ		
	10 MΩ	350 kΩ		
	20 MΩ	700 kΩ		
	30 MΩ	1 MΩ		
	40 MΩ	1.4 MΩ		
	50 MΩ	1.7 MΩ		
	60 MΩ	2.2MΩ		
	70 MΩ	2.4 MΩ		
	80 MΩ	2.8 MΩ		
	90 MΩ	3.1 MΩ		
	100 MΩ	3.5 MΩ		
	200 MΩ	7 MΩ		
	400 MΩ	15 MΩ		
	600 MΩ	22 MΩ		
	800 MΩ	29 MΩ		
	1000 MΩ	36 MΩ		
	2000 MΩ	70 MΩ		
Continuity Resistance	20 mΩ to 1 Ω	30 mΩ		
	1 Ω to 2 Ω	41 mΩ		
	2 Ω to 5 Ω	52 mΩ		
	5 Ω to 10 Ω	87 mΩ		
	10 Ω to 20 Ω	150 mΩ		
	20 Ω to 50 Ω	260 mΩ		
	50 Ω to 100 Ω	1.2 Ω		
	100 Ω to 1 kΩ	20 Ω		
Continuity Current	100 mA	2,2 mA		Site & Lab
	200 mA	3.7 mA		

Measured Quantity Instrument or Gauge	Range	Expanded Measurement Uncertainty (k = 2)	Remarks	Location Code
CALIBRATION OF 16TH/17TH EDITION TEST EQUIPMENT (continued)				
Insulation Voltage (DC)	50 V 100 V 250 V 500 V 1000 V	1.6 V 2.2 V 3.8 V 6.8 V 13 V		
Loop Resistance *at 50 Hz*	0.22 Ω 0.33 Ω 0.5 Ω 1 Ω 5 Ω 10 Ω 100 Ω 1000 Ω	43 mΩ 43 mΩ 43 mΩ 43 mΩ 57 mΩ 79 mΩ 600 mΩ 5.8 Ω		Site & Lab
RCD Current *at 50 Hz*	10 mA 20 mA 30 mA 40 mA 50 mA 100 mA 150 mA 200 mA 300 mA 500 mA 1 A	220 μA 2.2 mA 510 μA 3.1 mA 790 μA 1.5 mA 9.1 mA 12 mA 4.3 mA 7.2 mA 14 mA	At 100 ms At 100 ms At 100 ms At 100 ms At 100 ms At 100 ms At 100 ms At 100 ms At 100 ms At 100 ms At 100 ms	Site & Lab
RCD Current *at 50 Hz*	100 mA 1000 mA	2.2 mA 14 mA	At 1000 ms At 1000 ms	
RCD Trip Time	20 ms to 390 ms 390 ms to 900 ms	0.97 ms 8.1 ms		Site & Lab
Earth Bond Current	*At 50 Hz:* 100 mA 10 A 20 A 25 A	 11 mA 250 mA 420 mA 510 mA		
Earth Bond Resistance *at 50 Hz*	0 Ω to 0.05 Ω 0.05 Ω to 0.15 Ω 0.15 to 0.2 Ω 0.2 to 0.3 Ω 0.3 to 0.4 Ω 0.4 to 1 Ω 1 to 2 Ω 2 Ω to 10 Ω 10 to 20 Ω 20 to 110 Ω 110 to 1010 Ω	5.1 mΩ 5.4 mΩ 5.7 mΩ 6.4 mΩ 7m Ω 7.9m Ω 11m Ω 35 m Ω 63 m Ω 590 m Ω 5.8 Ω		Site & Lab

Measured Quantity Instrument or Gauge	Range	Expanded Measurement Uncertainty (k = 2)	Remarks	Location Code
CALIBRATION OF 16TH/17TH EDITION TEST EQUIPMENT (continued)				Site & Lab
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	39 μA 85 μA 140 μA		
Flash Voltage Test *At 50 Hz*	1500 V (Class 1) 3000 V (Class 2)	90 V 180 V		
Flash Current Test *At 50 Hz*	1 mA at 1500 V (Class 1) 1 mA at 3000 V (Class 2)	63 μA 63 μA		
AC Voltage *At 50 Hz*	100 V to 400 V	1.1 V		
AC Line Voltage	225 V to 264 V	2.9 V		
Oscilloscope Calibration				
Amplitude	5 mV to 190 mV 190 mV to 190 V	0.89 % 0.30 %	Using signals of known peak to peak voltage.	Site & Lab
Timebase	0.5 ns to 10 ms	0.50 %	Using time markers.	
Bandwidth	50 kHz to 1.1 GHz 1.1 GHz to 3.2 GHz	4.5 % 5.2 %	50 Ω and 1 MΩ 50 Ω Only Results are normally reported in terms of the frequency at which the -3 dB points is reached, relative to a low frequency reference.	
Temperature simulation and measurement				
Calibration of temperature indicators, recorders and similar instruments.	Type K -100 ºC -50 ºC -20 ºC to 100 ºC 100 ºC to 1000 ºC 1000 ºC to 1300 ºC	 0.32 ºC 0.19 ºC 0.14 ºC 0.24 ºC 0.31 ºC	Using DC voltages corresponding to the equivalent temperature, with the internal cold junction enabled.	Site & Lab
	Type J -100 ºC to 100.0 ºC 100.0 ºC to 1200 ºC	 0.11 ºC 0.23 ºC	Using DC voltages corresponding to the equivalent temperature, with the internal cold junction disabled.	
Ambient Temperature Measurement	18 ºC to 22 ºC	0.15 ºC	Using mercury in glass thermometer; in support of cold junction calibration.	

Measured Quantity Instrument or Gauge	Range	Expanded Measurement Uncertainty (k = 2)	Remarks	Location Code
PRESSURE			Methods consistent with EURAMET CG17.	
Hydraulic pressure (gauge)				
Calibration of pressure indicating instruments and gauges	0 MPa to 10 MPa 10 MPa to 100 MPa 100 MPa to 400 MPa	4.3 kPa 28 kPa 790 kPa	Calibration of pressure devices with an electrical output may be undertaken	Lab
Gas pressure (gauge)				
Calibration of pressure Indicating instruments and gauges	-80 kPa to -1 kPa -1 kPa to 1 kPa 1 kPa to 10 kPa 10 kPa to 0.5 MPa 0.5 MPa to 1 MPa 1 MPa to 2 MPa 2.0 MPa to 10 MPa	60 Pa 20 Pa 20 Pa 67 Pa 150 Pa 250 Pa 1.0 kPa	Absolute pressure within these ranges can be generated and will attract an additional uncertainty of 60 Pa.	Lab
AIR VELOCITY				
Calibration of Vane Anemometers	0.3 m/s to 0.5 m/s 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	0.070 m/s 0.094 m/s 0.13 m/s 0.26 m/s 0.53 m/s	Comparison with reference anemometers in a characterised airstream.	Lab
Calibration of Thermal Anemometers by comparison	0.25 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	0.080 m/s 0.14 m/s 0.45 m/s 0.77 m/s		
END				

Appendix - Calibration and Measurement Capabilities

Introduction

The definitive statement of the accreditation status of a calibration laboratory is the Accreditation Certificate and the associated Schedule of Accreditation. This Schedule of Accreditation is a critical document, as it defines the measurement capabilities, ranges and boundaries of the calibration activities for which the organisation holds accreditation.

Calibration and Measurement Capabilities (CMCs)

The capabilities provided by accredited calibration laboratories are described by the Calibration and Measurement Capability (CMC), which expresses the lowest measurement uncertainty that can be achieved during a calibration. If a particular device under calibration itself contributes significantly to the uncertainty (for example, if it has limited resolution or exhibits significant non-repeatability) then the uncertainty quoted on a calibration certificate will be increased to account for such factors.

The CMC is normally used to describe the uncertainty that appears in an accredited calibration laboratory's schedule of accreditation and is the uncertainty for which the laboratory has been accredited using the procedure that was the subject of assessment. The measurement uncertainty is calculated according to the procedures given in the GUM and is normally stated as an expanded uncertainty at a coverage probability of 95 %, which usually requires the use of a coverage factor of $k = 2$. An accredited laboratory is not permitted to quote an uncertainty that is smaller than the published measurement uncertainty in certificates issued under its accreditation.

Expression of CMCs - symbols and units

It should be noted that the percentage symbol (%) represents the number 0.01. In cases where the measurement uncertainty is stated as a percentage, this is to be interpreted as meaning percentage of the measurand.
Thus, for example, a measurement uncertainty of 1.5 % means $1.5 \times 0.01 \times q$, where q is the quantity value.

The notation Q[a, b] stands for the root-sum-square of the terms between brackets: $Q[a, b] = [a^2 + b^2]^{1/2}$