Schedule of Accreditation

issued by

United Kingdom Accreditation Service

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0725

Accredited to ISO/IEC 17025:2017

Proserv UK Limited

Issue No: 033 **Issue date:** 01 March 2021

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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
ELECTRICAL			
DC RESISTANCE			
Measurement	0 mΩ to 100 mΩ 100 mΩ to 1 Ω 1 Ω to 10 Ω 10 Ω to 100 Ω 100 Ω to 1 kΩ 1 kΩ to 10 kΩ 10 kΩ to 100 kΩ 100 kΩ to 1 MΩ 1 MΩ to 10 MΩ 10 MΩ to 100 MΩ 100 MΩ to 1 GΩ	120 ppm + 2.9 μΩ 72 ppm + 17 μΩ 58 ppm + 120 μΩ 38 ppm + 0.92 mΩ 38 ppm + 9.2 mΩ 38 ppm + 92 mΩ 54 ppm + 0.92 Ω 110 ppm + 12 Ω 190 ppm + 140 Ω 0.12 % + 12 kΩ 0.87 % + 1.0 MΩ	Measurement of DC resistance values using 2-wire or 4-wire configurations, as appropriate.
Generation	0 Ω to 10 Ω 10 Ω to 100 Ω 100 Ω to 1 k Ω 1 kΩ to 10 kΩ 10 kΩ to 100 kΩ 100 kΩ to 1 MΩ 1 MΩ to 10 MΩ 10 MΩ to 100 MΩ 100 MΩ to 1 GΩ	120 ppm + 5.8 mΩ 58 ppm + 5.8 mΩ 46 ppm + 46 mΩ 46 ppm + 470 mΩ 46 ppm + 4.7 Ω 120 ppm + 48 Ω 400 ppm + 490 Ω 0.58 % + 6.4 kΩ 1.2 % + 400 kΩ	Known DC resistance values for application to resistance measuring instruments.
DC VOLTAGE			
Measurement	0 mV to 10 mV 10 mV to 100 mV 100 mV to 300 mV 300 mV to 1 V 1 V to 10 V 10 V to 100 V 100 V to 3000 V	36 ppm + 4.3 μV 36 ppm + 4.4 μV 36 ppm + 10 μV 23 ppm + 8.1 μV 23 ppm + 69 μV 36 ppm + 0.70 mV 40 ppm + 9.2 mV	Measurement of DC voltages provided by power supplies, calibrators and similar instruments.

Measured Quantity Instrument or Gauge	Range	Calibration and Measurement Capability (CMC) Expressed as an Expanded Uncertainty (k = 2)	Remarks
DC VOLTAGE (continued)			
Generation	0 mV to 200 mV 200 mV to 2 V 2 V to 20 V 20 V to 200 V 200 V to 1020 V	35 ppm + 4.3 µV 35 ppm + 9.1µV 29 ppm + 81 µV 35 ppm + 110 mV 35 ppm + 810 mV	Known DC voltages for application to voltage measuring instruments.
DC CURRENT			
Measurement	0 µA to 10 µA 10 µA to 100 µA 100 µA to 1 mA 1 mA to 10 mA 10 mA to 100 mA 100 mA to 1 A 1 A to 10 A 10 A to 20 A	460 ppm + 7.2 nA 190 ppm + 1.2 nA 150 ppm + 12 nA 150 ppm + 0.12 µA 150 ppm + 1.2 µA 310 ppm + 12 µA 0.10 % + 0.23 mA 0.10 % + 2.3 mA	Measurement of DC currents provided by power supplies, calibrators and similar instruments.
Generation	0 µA to 200 µA 200 µA to 2 mA 2 mA to 20 mA 20 mA to 200 mA 200 mA to 2 A 2 A to 30 A	120 ppm + 35 nA 92 ppm + 57 nA 58 ppm + 430 nA 92 ppm + 4.5 µA 170 ppm + 110 µA 460 ppm + 24 mA	Known DC currents for application to current measuring instruments.
AC RESISTANCE *at 50 Hz*	0.05 Ω to 10 Ω 10 Ω to 100 Ω 100 Ω to 1 kΩ	0.58 % + 7.6 mΩ 0.58 % + 19 mΩ 0.58 % + 35 mΩ	Known AC Resistance values for the calibration of earth bond testers and loop impedance testers.
AC VOLTAGE			
Measurement	*40 Hz to 1 kHz* 0 mV to 20 mV 20 mV to 200 mV 200 mV to 2 V 2 V to 20 V 20 V to 200 V 200 V to 1 kV	 0.070 % + 60 µV 0.070 % + 74 µV 0.070 % + 4.6 mV 0.070 % + 46 mV 0.23 % + 140 mV 0.23 % + 1.4 V	Measurement of AC voltages provided by power supplies, calibrators and similar instruments.
	1 kV to 3 kV	0.25 % + 1.4 V	At 50 Hz only.
Generation	*10 Hz to 44 Hz* 0 mV to 200 mV 200 mV to 2 V 2 V to 20 V	 0.23 % + 87 µV 0.23 % + 0.74 mV 0.23 % + 8.3 mV	Known AC voltages for application to voltage measuring instruments.
	30 Hz to 44 Hz 20 V to 200 V 200 V to 700 V	 0.069 % + 130 mV 0.069 % + 470 mV	
	44 Hz to 1 kHz 0 mV to 200 mV 200 mV to 2 V 2 V to 20 V 20 V to 200 V 200 V to 700 V	 460 ppm + 48 µV 460 ppm + 420 µV 400 ppm + 7.0 mV 460 ppm + 120 mV 460 ppm + 370 mV	

Measured Quantity Instrument or Gauge	Range	Calibration and Measurement Capability (CMC) Expressed as an Expanded Uncertainty (k = 2)	Remarks
AC VOLTAGE (continued)			
Generation (continued)	*1 kHz to 20 kHz*		
	0 mV to 200 mV	0.10 % + 220 µV	
	200 mV to 2 V	0.10 % + 2.2 mV	
	2 V to 20 V	0.081 % + 20 mV	
	20 V to 200 V	0.10 % + 310 mV	
	1 kHz to 10 kHz		
	200 V to 700 V	0.17 % + 700 mV	
AC CURRENT			
Measurement	*40 Hz to 1 kHz*		Measurement of AC currents provided by power supplies, calibrators and similar instruments.
	0 µA to 200 µA	0.25 % + 0.10 µA	
	200 µA to 2 mA	0.25 % + 1.2 µA	
	2 mA to 20 mA	0.25 % + 12 µA	
	20 mA to 200 mA	0.25 % + 0.12 mA	
	200 mA to 2 A	0.25 % + 1.2 mA	
	2 A to 10 A	0.25 % + 12 mA	
	10 A to 20 A	0.25 % + 12 mA	At 45 Hz only
Generation	*40 Hz to 1 kHz*		Known AC currents for application to current measuring instruments.
	25 µA to 200 µA	0.12 % + 0.30 µA	
	200 µA to 2 mA	0.10 % + 0.77 µA	
	2 mA to 20 mA	0.10 % + 7.7 µA	
	20 mA to 200 mA	0.10 % + 68 µA	
	200 mA to 2 A	0.44 % + 1.8 mA	
	2 A to 30 A	0.40 % + 58 mA	
CAPACITANCE			
Measurement	0 nF to 30 nF	0.29 % + 23 pF	Using capacitance meter.
	30 nF to 300 nF	0.29 % + 0.23 nF	
	300 nF to 3 µF	0.29 % + 2.3 nF	
Generation	*At 1 kHz:*		Fixed values of capacitance for the calibration of capacitance meters and similar instruments.
	1 nF	0.29 % + 23 pF	
	10 nF	0.29 % + 31 pF	
	20 nF	0.29 % + 46 pF	
	50 nF and 100 nF	0.29 % + 110 pF	
	1 µF	0.46 % + 23 nF	
	10 µF	0.69 % + 33 nF	
FREQUENCY			
Generation	1 Hz to 10 MHz	17 ppm + 1.3 Hz	Generation of known frequencies for application to frequency measuring instruments.
Measurement	1 Hz to 100 kHz	17 ppm + 1.3 Hz	Using frequency meter.

Measured Quantity Instrument or Gauge	Range	Calibration and Measurement Capability (CMC) Expressed as an Expanded Uncertainty (k = 2)	Remarks
17th Edition Equipment			Calibrations to support equipment designed for testing to the IET Requirements for Electrical Installations (BS 7671:2008, Amds 1,2 and 3)
Line Voltage	*At 50 Hz:* 240 V to 250 V	0.23 % + 1.2 V	
Output Voltage	*At 50 Hz:* 100 V to 400 V	0.20 % + 1.2 V	
Continuity Current	0 mA to 300 mA	2.6 % + 0.80 mA	
Continuity Resistance	0.1 Ω to 20 Ω 100 Ω 1 kΩ	1.2 % + 30 mΩ 1.2 % + 30 mΩ 1.2 % + 34 mΩ	
Insulation Resistance	0 Ω to 20 kΩ 20 kΩ to 100 kΩ 100 kΩ to 600 kΩ 600 kΩ to 1 MΩ 1 MΩ to 5 MΩ 5 MΩ to 100 MΩ 100 MΩ to 600 MΩ 600 MΩ to 1 GΩ	0.35 % + 0.61 Ω 0.35 % + 2.1 Ω 0.35 % + 14 Ω 0.35 % + 23 Ω 0.35% + 0.43 kΩ 3.5 % + 64 kΩ 3.5 % + 4.9 MΩ 3.5 % + 8.1 MΩ	
Insulation Test Voltage	50 V to 1 kV	1.2 % + 1.5 V	
Loop Resistance	0.06 Ω 0.11 Ω 0.22 Ω 0.33 Ω 0.5 Ω 1 Ω 5 Ω 10 Ω 100 Ω 1 kΩ	0.60 % + 4.7 mΩ 0.60 % + 4.7 mΩ 0.60 % + 4.8 mΩ 0.60 % + 4.8 mΩ 0.60 % + 4.8 mΩ 0.60 % + 4.9 mΩ 0.60 % + 4.9 mΩ 0.60 % + 7.6 mΩ 0.60 % + 19 mΩ 0.60 % + 35 mΩ	
PAT Earth Bond Current	0 mA to 100mA 0.1 A to 10 A 10 A to 20 A	1.7 % + 7.1 mA 1.7 % + 71 mA 1.7 % + 73 mA	
PAT Earth Bond Resistance	0 Ω to 10 Ω 10 Ω to 100 Ω 100 Ω to 1 kΩ	0.58 % + 7.6 mΩ 0.58 % + 19 mΩ 0.58 % + 35 mΩ	

Measured Quantity Instrument or Gauge	Range	Calibration and Measurement Capability (CMC) Expressed as an Expanded Uncertainty (k = 2)	Remarks
17th Edition Equipment (continued)			
PAT Insulation Resistance	See *Insulation resistance* on previous page.	See *Insulation resistance* on previous page.	
PAT Leakage Current	240 µA to 7.7 mA	1.7 % + 9.6 µA	
PAT Load Test	At 0.13 kVA	5.8 % + 120 mΩ	
RCD Current	0 mA to 300 mA *0 ms to 190 ms* 0 mA to 300mA *190 ms to 5 s* 300 mA-2 A *0 ms to 190 ms* 300 mA to 2 A *190 ms to 5 s*	 5.8 % + 840 µA 1.4 % + 840 µA 5.8 % + 3.0 mA 1.4 % + 3.0 mA	
RCD Time	20ms to 390ms 900ms	5.9 ms 10 ms	
PRESSURE			Methods consistent with EURAMET CG3 and CG17.
Gas Pressure (gauge)			
Calibration of pressure indicating instruments and gauges	-90 kPa to 0 kPa 0 kPa to 13.8 MPa	44 ppm + 0.16 kPa 54 ppm + 3.4 kPa	Calibration of pressure transmitters and transducers with an electrical output may be undertaken. Absolute pressures across this range can be generated which will attract an additional 580 Pa uncertainty.
Hydraulic Pressure (gauge)			
"Pressure equivalent" calibration of Dead Weight Testers (pressure balances supplied with an associated mass set)	600 kPa to 6 MPa 6 MPa to 120 MPa	79 ppm 77 ppm	
Calibration of pressure indicating instruments and gauges	0 kPa to 600 kPa 600 kPa to 6 MPa 6 MPa to 120 MPa 120 MPa to 413 MPa	82 ppm + 0.90 kPa 79 ppm 77 ppm 0.020 %	

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 uncertainty of measurement 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 CIPM-ILAC definition of the CMC is as follows:

A CMC is a calibration and measurement capability available to customers under normal conditions:
(a) as published in the BIPM key comparison database (KCDB) of the CIPM MRA; or
(b) as described in the laboratory's scope of accreditation granted by a signatory to the ILAC Arrangement.

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 CMC is calculated according to the procedures given in M3003 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 CMC in certificates issued under its accreditation.

The CMC may be described using various methods in the Schedule of Accreditation:

As a single value that is valid throughout the range.
As an explicit function of the measurand or of a parameter (see below).
As a range of values. The range is stated such that the customer can make a reasonable estimate of the likely uncertainty at any point within the range.
As a matrix or table where the CMCs depend on the values of the measurand and a further quantity.
In graphical form, providing there is sufficient resolution on each axis to obtain at least two significant figures for the CMC.

Expression of CMCs - symbols and units

In general, only units of the SI and those units recognised for use with the SI are used to express the values of quantities and of the associated CMCs. Nevertheless, other commonly used units may be used where considered appropriate for the intended audience. For example, the term "ppm" (part per million) is frequently used by manufacturers of test and measurement equipment to specify the performance of their products. Terms like this may be used in Schedules of Accreditation where they are in common use and understood by the users of such equipment, providing their use does not introduce any ambiguity in the capability that is being described.

When the CMC is expressed as an explicit function of the measurand or of a parameter, this often comprises a relative term (e.g., percentage) and an absolute term, i.e. one expressed in the same units as those of the measurand. This form of expression is used to describe the capability that can be achieved over a range of values. Some examples are shown below. It should be noted that these expressions are *not* mathematical formulae but are instead written in a commonly used shorthand for expressing uncertainties - therefore, for purposes of clarity, an indication of how they are to be interpreted is also provided below.

DC voltage, 100 mV to 1 V: 0.0025 % + 5.0 µV

Over the range 100 mV to 1 V, the CMC is 0.0025 %·V + 5.0 µV, where V is the measured voltage.

Hydraulic pressure, 0.5 MPa to 140 MPa: 0.0036 % + 0.12 ppm/MPa + 4.0 Pa

Over the range 0.5 MPa to 140 MPa, the CMC is $0.0036\ \%\cdot p + (0.12\cdot 10^{-6}\cdot p\cdot 10^{-6}) + 4.0$ Pa, where p is the measured pressure in Pa.

It should be noted that the percentage symbol (%) simply represents the number 0.01. In cases where the CMC is stated only as a percentage, this is to be interpreted as meaning percentage of the measured value or indication.

Thus, for example, a CMC of 1.5 % means $1.5 \cdot 0.01 \cdot i$, where i is the instrument indication.