


# Schedule of Accreditation

issued by

## United Kingdom Accreditation Service

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

 <p><b>UKAS</b> CALIBRATION <b>0499</b></p> <p>Accredited to <b>ISO/IEC 17025:2005</b></p>	<p><b>PreSet Calibration Services Ltd</b></p> <p>Issue No: 043    Issue date: 29 January 2018</p>	
	<p>94A East Street Bridport Dorset DT6 3LL</p>	<p>Contact: Mr S S Kick Tel: +44 (0)1308 456539 Fax: +44 (0)1308 421676 E-Mail: lab@preset.com Website: www.preset.com</p>
<p>Calibration performed by the Organisations at the locations specified below</p>		

### Locations covered by the organisation and their relevant activities

#### Laboratory locations:

Location details	Activity	Location code
<p><b>Address</b> 94A East Street Bridport Dorset DT6 3LL</p> <p><b>Local contact</b> Mr S S Kick Tel: +44 (0)1308 456539 Fax: +44 (0)1308 421676 Email: lab@preset.com Website: www.preset.com</p>	<p>Electrical, Pressure, Humidity, Temperature, Time Interval and Weighing Instrument Calibration</p>	<p>Lab</p>

#### Site activities performed away from the locations listed above:

Location details	Activity	Location code
<p>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.</p>	<p>Electrical, Pressure, Humidity, Temperature, Time Interval and Weighing Instrument Calibration</p>	<p>Site</p>



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DETAIL OF ACCREDITATION

Measured Quantity Instrument or Gauge	Range	Calibration and Measurement Capability (CMC) Expressed as an Expanded Uncertainty ( $k = 2$ )	Remarks	Location Code	
TEMPERATURE				Lab	
Resistance thermometers	-95 °C to +100 °C 100 °C to 200 °C 200 °C to 600 °C	0.13 °C 0.17 °C 0.26 °C			
Thermocouples	-95 °C to +100 °C 100 °C to 200 °C 200 °C to 600 °C 600 °C to 1100 °C 1100 °C to 1200 °C	0.17 °C 0.19 °C 0.42 °C 1.3 °C 2.1 °C			
Electronic thermometers with sensors	As for sensor type above				
Temperature block calibrators	-95 °C to +200 °C 200 °C to 600 °C 600 °C to 1100 °C	0.27 °C 0.40 °C 1.9 °C			
Temperature controlled baths, fridges/refrigerators, freezers, autoclaves, ovens, furnaces and environmental chambers	-95 °C to +200 °C 200 °C to 500 °C 500 °C to 1100 °C	1.0 °C 2.0 °C 3.0 °C	Single and multipoint time dependent temperature profiling, also referred to as spatial temperature surveying or mapping	Site	
Pt100 sensors	-95 °C to +200 °C 200 °C to 300 °C 300 °C to 500 °C 500 °C to 800 °C	0.44 °C 0.62 °C 2.0 °C 3.0 °C			
Thermocouples	-95 °C to +200 °C 200 °C to 500 °C 500 °C to 1100 °C	1.0 °C 2.0 °C 3.0 °C			
Electronic thermometers with sensors	As for sensor types above	As for sensor types above			
Temperature block calibrators	-95 °C to +200 °C 200 °C to 400 °C 400 °C to 1100 °C	0.35 °C 0.50 °C 2.5 °C			
HUMIDITY					Lab
Relative Humidity	10 %rh to 50 %rh 50 %rh to 95 %rh for the temperature range 10 °C to 40 °C	1.8 %rh 1.8 %rh to 2.2 %rh			
	10 %rh to 50 %rh 50 %rh to 95 %rh for the temperature range 40 °C to 60 °C	1.7 %rh 1.7 %rh to 2.0 %rh			



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Measured Quantity Instrument or Gauge	Range	Calibration and Measurement Capability (CMC) Expressed as an Expanded Uncertainty ( $k = 2$ )	Remarks	Location Code
HUMIDITY (continued)				
Temperature sensors incorporated in humidity instruments	10 °C to 60 °C	0.37 °C		Site
Relative humidity	15 %rh to 95 %rh for the temperature range 10 °C to 60 °C	3.7 %rh		
Temperature (sensors incorporated in humidity instruments)	15 °C to 60 °C	0.60 °C		
<b>PRESSURE</b>				Lab & Site
Hydraulic Pressure (Gauge)				
Calibration of pressure indicating instruments and gauges	0 MPa to 20 MPa 20 MPa to 70 MPa	50 ppm + 6.4 kPa 50 ppm + 14 kPa		
Gas Pressure (Gauge)				
Calibration of pressure indicating instruments and gauges	- 100 kPa to 0 kPa 0 kPa to 2.5 kPa 2.5 kPa to 400 kPa 400 kPa to 2 MPa	0.65 kPa 0.80 % + 4.0 Pa 0.67 kPa 0.80 kPa		
Gas Pressure (Absolute)				Lab & Site
Calibration of pressure indicating instruments and gauges	3.5 kPa to 350 kPa	0.13 kPa		
<b>ELECTRICAL</b>				
<b>DC RESISTANCE</b>				
Generation				
Specific values	1 Ω 10 Ω 100 Ω 1 kΩ 10 kΩ 100 kΩ 1 MΩ 10 MΩ 100 MΩ 1 GΩ	1.7 mΩ 0.49 mΩ 3.7 mΩ 16 mΩ 0.42 Ω 3.6 Ω 63 Ω 3.3 kΩ 0.14 MΩ 67 MΩ		



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ELECTRICAL (continued) DC RESISTANCE (continued) Generation (continued) Other values	1 $\Omega$ to 20 $\Omega$ 20 $\Omega$ to 90 $\Omega$ 90 $\Omega$ to 1.1 k $\Omega$ 1.1 k $\Omega$ to 9 k $\Omega$ 9 k $\Omega$ to 90 k $\Omega$ 90 k $\Omega$ to 900 k $\Omega$ 900 k $\Omega$ to 9 M $\Omega$ 9 M $\Omega$ to 120 M $\Omega$	6.9 m $\Omega$ 6.3 m $\Omega$ 94 m $\Omega$ 2.6 $\Omega$ 4.0 $\Omega$ 0.72 k $\Omega$ 6.9 k $\Omega$ 0.13 M $\Omega$		Lab & Site
Measurement	0 $\Omega$ to 100 $\Omega$ 100 $\Omega$ to 1 k $\Omega$ 1 k $\Omega$ to 10 k $\Omega$ 10 k $\Omega$ to 100 k $\Omega$ 100 k $\Omega$ to 1 M $\Omega$ 1 M $\Omega$ to 10 M $\Omega$ 10 M $\Omega$ to 100 M $\Omega$	19 m $\Omega$ 120 m $\Omega$ 0.67 $\Omega$ 13 $\Omega$ 0.59 k $\Omega$ 4.0 k $\Omega$ 1.0 M $\Omega$		
DC Voltage Generation	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	7.9 $\mu$ V 11 $\mu$ V 47 $\mu$ V 520 $\mu$ V 21 mV 45 mV		
Measurement	0 mV to 100 mV 100 mV to 1 V 1 V to 10 V 10 V to 100 V 100 V to 1 kV	9.2 $\mu$ V 62 $\mu$ V 670 $\mu$ V 6.4 mV 62 mV		
DC Current Generation	0 $\mu$ A to 200 $\mu$ A 200 $\mu$ A to 2 mA 2 mA to 20 mA 20 mA to 200 mA 200 mA to 2 A 2 A to 20 A	31 nA 840 nA 11 $\mu$ A 34 $\mu$ A 420 $\mu$ A 7.2 mA		
	20 A to 50 A 50 A to 250 A 250 A to 500 A 500 A to 1000 A	0.29 A 0.91 A 1.5 A 1.5 A	Simulation using a 50 turn coil	



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ELECTRICAL (continued)				Lab & Site
DC Current (continued)				
Measurement	0 mA to 10 mA 10 mA to 100 mA 100 mA to 1 A 1 A to 3 A 3 A to 10 A 10 A to 240 A 240 A to 1000 A	4.3 $\mu$ A 35 $\mu$ A 0.82 mA 1.9 mA 1.5 A 6.0 A 25 A		
AC Voltage				
Generation	40 Hz to 1 kHz: 20 mV to 200 mV 200 mV to 2 V 2 V to 20 V 20 V to 200 V 200 V to 700 V	270 $\mu$ V 700 $\mu$ V 14 mV 120 mV 770 mV		
Measurement	40 Hz to 1 kHz: 10 mV to 100 mV 100 mV to 1 V 1 V to 10 V 10 V to 100 V 100 V to 750 V	78 $\mu$ V 960 $\mu$ V 8.6 mV 51 mV 580 mV		
AC Current				
Generation	40 Hz to 1 kHz: 10 $\mu$ A to 200 $\mu$ A 200 $\mu$ A to 2 mA 2 mA to 20 mA 20 mA to 200 mA 200 mA to 2 A 2 A to 20 A  20 A to 50 A 50 to 250 A 250 to 500 A 500 A to 1000 A	370 nA 1.0 $\mu$ A 8.4 $\mu$ A 1.5 mA 0.72 mA 25 mA  0.59 A 2.9 A 3.1 A 3.1 A	Simulation using a 50 turn coil	
Measurement	40 Hz to 1 kHz: 100 mA to 1 A 1 A to 3 A	1.6 mA 1.7 mA		



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ELECTRICAL (continued)  Additional measurements in support of IEE 17 <sup>th</sup> Edition test equipment  RCD testers  Trip current  Trip time  AC Resistance for loop testers at 50 Hz  Nominal values; additive to prevailing loop impedance	6 mA, 10 mA and 30 mA 100 mA, 300 mA, and 500 mA 1000 mA  20 ms to 390 ms 390 ms to 5 s  0.05 $\Omega$ , 0.15 $\Omega$ , 0.33 $\Omega$ , 1.8 $\Omega$ , 3.3 $\Omega$ , 18 $\Omega$ and 33 $\Omega$	7.0 % + 20 $\mu$ A 7.0 % + 160 $\mu$ A 7.0 % + 840 $\mu$ A  1.0 ms 8.9 ms  0.054 $\Omega$	Nominal laboratory loop impedance 0.4 $\Omega$ .	Lab & Site
Calibration of Portable Appliance Testers  Earth Bond  Insulation  Leakage  Load	20 m $\Omega$  190 m $\Omega$ , 210 m $\Omega$ , 950 m $\Omega$ , 1 $\Omega$ 1.05 $\Omega$ , 1.08 $\Omega$ , 2 $\Omega$ 10 $\Omega$ and 18 $\Omega$  0 V to 20 V  100 mA to 50 A 50 Hz 1 mA to 2 A 50 Hz 0 mA to 2 A dc  95 k $\Omega$ , 105 k $\Omega$ , 500 k $\Omega$ , 950 k $\Omega$ , 1.05 M $\Omega$ , 5 M $\Omega$ and 10 M $\Omega$ 100 M $\Omega$  0 kV to 1 kV 0 mA to 20 mA  At 50 Hz: 50 $\mu$ A to 20 mA  At 50 Hz 2 V to 500 V 5 mA to 13 A at 50 Hz	5.0 %  1.0 %  50 mV  0.50 % + 200 mA 0.50 % + 2.0 mA 0.10 % + 2.0 mA  0.10 % 1.0 %  2.5 V 50 $\mu$ A  50 $\mu$ A  1.2 V 6.5 mA		Lab & Site



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ELECTRICAL (continued)  Electrical calibration of temperature simulators, indicators, controllers and recorders for the following sensors:-				
Noble metal thermocouples	0 °C to 500 °C 500 °C to 1760 °C	1.2 °C to 0.50 °C 0.50 °C	including cold junction compensation	Lab
Base metal thermocouples	-160 °C to 0 °C 0 °C to 1370 °C	0.40 °C to 0.20 °C 0.20 °C	including cold junction compensation	
Resistance sensors (Pt100)	-200 °C to +800 °C	0.060 °C	Simulation	
	-200 °C to +800 °C	0.050 °C	Measurement	
Cold junction compensation	At ambient temperature	0.070 °C	Nominal laboratory ambient temperature 20 °C	
Noble metal thermocouples	0 °C to 500 °C 500 °C to 1760 °C	1.6 °C to 0.80 °C 0.80 °C	including cold junction compensation	Site
Base metal thermocouples	-160 °C to 0 °C 0 °C to 1000 °C 1000 °C to 1370 °C	1.0 °C to 0.40 °C 0.40 °C 0.50 °C	including cold junction compensation	
Resistance sensors (Pt100)	-200 °C to +800 °C	0.50 °C	Simulation	
	-200 °C to +800 °C	0.65 °C	Measurement	
TIME INTERVAL  Timers	10 s to 72 hr	0.80 s		Lab & Site



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WEIGHING INSTRUMENTS  Digital one pan non-automatic weighing instruments	Maximum capacity  200 mg 500 mg  1 g 2 g 5 g 10 g 20 g 50 g 100 g 200 g 500 g  1 kg 2 kg 5 kg 10 kg 20 kg 30 kg	CMC (mg)  0.003 1 0.003 9  0.004 7 0.062 0.077 0.093 0.13 0.17 0.28 0.52 1.4  7.8 16 390 770 1 600 2 300	Weights are available in OIML class:  E2 from 1 mg to 200 g, Max. grouped load 500 g  F1 from 100 mg to 1 kg, Max. grouped load 2 kg  M1 from 5 kg to 10 kg, Max. grouped load 30 kg	Lab & Site
END				





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**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, and an indication of how they are to be interpreted, are shown below.

DC voltage, 100 mV to 1 V:  $0.0025 \% + 5.0 \mu\text{V}$ :

Over the range 100 mV to 1 V, the CMC is  $0.0025 \% \cdot V + 5.0 \mu\text{V}$ , where  $V$  is the measured voltage.

Hydraulic pressure, 0.5 MPa to 140 MPa:  $0.0036 \% + 0.12 \text{ ppm/MPa} + 4.0 \text{ Pa}$

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