

Schedule of Accreditation

issued by

United Kingdom Accreditation Service

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

 <p>UKAS CALIBRATION</p> <p>4432</p> <p>Accredited to ISO/IEC 17025:2017</p>	<p>Caltest Instruments Limited</p> <p>Issue No: 014 Issue date: 30 August 2022</p>	
	<p>Unit 2 Viceroy Court Bedford Road Petersfield Hampshire GU32 3LJ</p>	<p>Contact: Ian Norman Tel: +44 (0)1483 302700 E-Mail: ian.norman@caltest.co.uk Website: www.caltest.co.uk</p>
<p>Calibration performed at the above address only</p>		

Calibration and Measurement Capability (CMC)

Measured Quantity Instrument or Gauge	Range	Expanded Measurement Uncertainty ($k = 2$)	Remarks
DC RESISTANCE	0 Ω 1 m Ω to 10 m Ω 10 m Ω to 100 m Ω 100 m Ω to 1 Ω 1 Ω to 10 Ω 10 Ω to 100 Ω 100 Ω to 1 k Ω 10 k Ω to 100 k Ω 1 M Ω to 10 M Ω 10 M Ω to 100 M Ω 100 M Ω to 1 G Ω 1 G Ω to 10 G Ω 100 G Ω	0.3 $\mu\Omega$ 230 $\mu\Omega/\Omega$ 60 $\mu\Omega/\Omega$ 8 $\mu\Omega/\Omega$ 5.0 $\mu\Omega/\Omega$ 5.0 $\mu\Omega/\Omega$ 3 $\mu\Omega/\Omega$ 4.0 $\mu\Omega/\Omega$ 7.0 $\mu\Omega/\Omega$ 8.0 $\mu\Omega/\Omega$ 15 $\mu\Omega/\Omega$ 35 $\mu\Omega/\Omega$ 185 $\mu\Omega/\Omega$	Outputs of instruments within these values can be measured to the listed uncertainties
Set Values	1.0 m Ω 10 m Ω 0.1 Ω 1.0 Ω 10 Ω 100 Ω 1.0 k Ω 10 k Ω 1 Ω 10 Ω 100 Ω 1 k Ω 10 k Ω 100 k Ω 1 M Ω 10 M Ω	105 $\mu\Omega/\Omega$ 40 $\mu\Omega/\Omega$ 80 $\mu\Omega/\Omega$ 3.0 $\mu\Omega/\Omega$ 3.0 $\mu\Omega/\Omega$ 3.0 $\mu\Omega/\Omega$ 3.0 $\mu\Omega/\Omega$ 3.0 $\mu\Omega/\Omega$ 12 $\mu\Omega/\Omega$ 3.0 $\mu\Omega/\Omega$ 3.0 $\mu\Omega/\Omega$ 3.0 $\mu\Omega/\Omega$ 3.0 $\mu\Omega/\Omega$ 3.0 $\mu\Omega/\Omega$ 6.0 $\mu\Omega/\Omega$ 9.0 $\mu\Omega/\Omega$	These values can be generated for the calibration of measuring instruments
DC VOLTAGE	0 V to 1.1 V 1.1 V to 11 V 11 V to 110 V 110 V to 1 kV	6.0 $\mu\text{V}/\text{V} + 0.1 \mu\text{V}$ 3.0 $\mu\text{V}/\text{V}$ 2.0 $\mu\text{V}/\text{V}$ 1.0 $\mu\text{V}/\text{V}$	These values can be measured and generated for the calibration of sourcing and measuring instruments



4432
Accredited to
ISO/IEC 17025:2017

Schedule of Accreditation
issued by
United Kingdom Accreditation Service
2 Pine Trees, Chertsey Lane, Staines-upon-Thames, TW18 3HR, UK

Caltest Instruments Limited
Issue No: 014 Issue date: 30 August 2022

Calibration performed at main address only

Measured Quantity Instrument or Gauge	Range	Expanded Measurement Uncertainty ($k = 2$)	Remarks
DC VOLTAGE (cont'd)	1 kV to 2 kV 2 kV to 10 kV	0.09 % 0.07 %	Measurements only
DC CURRENT	1 μ A to 100 mA 100 mA to 1 A 1 A to 10 A 10 A to 20 A 20 A to 1000 A	16 μ A/A 80 μ A/A 85 μ A/A 125 μ A/A 100 μ A/A	These values can be measured and generated for the calibration of sourcing and measuring instruments
AC VOLTAGE	2 mV to 200 mV 40 Hz to 1 kHz 1 kHz to 10 kHz 10 kHz to 20 kHz 20 kHz to 100 kHz	0.0070 % + 4.0 μ V 0.0090 % + 4.0 μ V 0.013 % + 8.0 μ V 0.041 % + 20 μ V	These values can be measured and generated for the calibration of sourcing and measuring instruments
	200 mV to 2 V 40 Hz to 1 kHz 1 kHz to 10 kHz 10 kHz to 20 kHz 20 kHz to 100 kHz	0.0030 % + 20 μ V 0.0080 % + 20 μ V 0.0080 % + 40 μ V 0.010 % + 200 μ V	
	2 V to 20 V 40 Hz to 1 kHz 1 kHz to 10 kHz 10 kHz to 20 kHz 20 kHz to 100 kHz	0.0030 % + 200 μ V 0.0050 % + 200 μ V 0.0060 % + 400 μ V 0.013 % + 2.0 mV	
	20 V to 200 V 40 Hz to 1 kHz 1 kHz to 10 kHz 10 kHz to 20 kHz 20 kHz to 100 kHz	0.0040 % + 2.0 mV 0.0040 % + 2.0 mV 0.0060 % + 4.0 mV 0.013 % + 20 mV	
	200 V to 500 V 40 Hz to 1 kHz 1 kHz to 10 kHz 10 kHz to 20 kHz	0.0070 % + 20 mV 0.0080 % + 20 mV 0.013 % + 40 mV	
	500 V to 700 V 40 Hz to 1 kHz 1 kHz to 10 kHz 10 kHz to 20 kHz	0.011 % + 20 mV 0.014 % + 20 mV 0.041 % + 40 mV	
	700 V to 1000 V 40 Hz to 1 kHz 1 kHz to 10 kHz 10 kHz to 20 kHz	0.022 % + 20 mV 0.024 % + 20 mV 0.077 % + 40 mV	
	50 Hz to 60 Hz 1 kV to 2 kV 2 kV to 10 kV	0.40 % 0.50 %	Measurement only



4432
Accredited to
ISO/IEC 17025:2017

Schedule of Accreditation
issued by
United Kingdom Accreditation Service
2 Pine Trees, Chertsey Lane, Staines-upon-Thames, TW18 3HR, UK

Caltest Instruments Limited
Issue No: 014 Issue date: 30 August 2022

Calibration performed at main address only

Measured Quantity Instrument or Gauge	Range	Expanded Measurement Uncertainty ($k = 2$)	Remarks	
AC CURRENT	40 Hz to 1 kHz 5 mA to 100 mA 100 mA to 1 A 1 A to 10 A 10 A to 20 A	36 μ A/A 53 μ A/A 86 μ A/A 140 μ A/A	These values can be measured and generated for the calibration of sourcing and measuring instruments	
	50 Hz to 400 Hz 20 A to 1000 A	400 μ A/A		
FREQUENCY	40 Hz to 225 MHz	2.0 parts in 10^8	Frequency results may be expressed in terms of average periodic time.	
ACTIVE POWER AND ENERGY	45 to 65 Hz 15 W to 2.4 kW 0.8 to unity PF 1 \emptyset 0.8 to unity PF 3 \emptyset	0.02 % 0.02 %	Limiting voltage 60 V to 480 V Limiting current 0.25 A to 5 A	
	0.5 Power Factor 1 \emptyset 0.5 Power Factor 3 \emptyset	0.02 % 0.02 %		
	0.3 Power Factor 1 \emptyset 0.3 Power Factor 3 \emptyset	0.02 % 0.02 %	Limiting voltage 60 V to 480 V Limiting current 0.01 A to 0.25 A and 5 A to 20 A	
	45 to 65 Hz 0.6 W to 120W, 300 W to 9.6 kW 0.8 to unity PF 1 \emptyset 0.8 to unity PF 3 \emptyset	0.02 % 0.02 %		
	0.5 Power Factor 1 \emptyset 0.5 Power Factor 3 \emptyset	0.02 % 0.02 %	Limiting voltage 60 V to 480 V Limiting current 0.01 A to 100 A	
	0.3 Power Factor 1 \emptyset 0.3 Power Factor 3 \emptyset	0.02 % 0.02 %		
	45 Hz to 65 Hz 0.6W to 48 kW 0.3 to unity PF 1 \emptyset 0.3 to unity PF 3 \emptyset	0.02 % 0.02 %		



4432
Accredited to
ISO/IEC 17025:2017

Schedule of Accreditation
issued by
United Kingdom Accreditation Service
2 Pine Trees, Chertsey Lane, Staines-upon-Thames, TW18 3HR, UK

Caltest Instruments Limited
Issue No: 014 Issue date: 30 August 2022

Calibration performed at main address only

Measured Quantity Instrument or Gauge	Range	Expanded Measurement Uncertainty ($k = 2$)	Remarks
REACTIVE POWER AND ENERGY	48 Hz to 52 Hz		Limiting voltage 60 V to 480 V Limiting current 0.05 A to 20 A
	3 VAr to 9.6 kVAr		
	Zero Power Factor 1 Ø	0.05 %	
	Zero Power Factor 3 Ø	0.05 %	
	0.866 Power Factor 1 Ø	0.05 %	
	0.866 Power Factor 3 Ø	0.05 %	
	48 Hz to 52 Hz		Limiting voltage 60 V to 480 V Limiting current 20 A to 100 A
	1.2 kVAr to 48 kVAr		
Zero Power Factor 1 Ø	0.05 %		
Zero Power Factor 3 Ø	0.05 %		
	0.866 Power Factor 1 Ø	0.05 %	
	0.866 Power Factor 3 Ø	0.05 %	
END			



4432
Accredited to
ISO/IEC 17025:2017

Schedule of Accreditation
issued by
United Kingdom Accreditation Service
2 Pine Trees, Chertsey Lane, Staines-upon-Thames, TW18 3HR, UK

Caltest Instruments Limited
Issue No: 014 Issue date: 30 August 2022

Calibration performed at main address only

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: $Q[a, b] = [a^2 + b^2]^{1/2}$