Schedule of Accreditation

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Accredited to ISO/IEC 17025:2017

Megger Instruments Limited

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Calibration performed at the above address only

DETAIL OF ACCREDITATION

Measured Quantity Instrument or Gauge	Range	Expanded Uncertainty (k = 2)	Remarks
Values and uncertainties listed below are applicable for the calibration of both measurement instruments and for instruments with an output. The method used is by direct or ratio-metric comparison unless otherwise described in the remarks column.			
DC RESISTANCE			
Generation / Sourcing			
Specific Values	0.0001 Ω	90 μΩ/Ω	Source values for the calibration of ohmmeters.
	0.001 Ω	92 μΩ/Ω	
	0.01 Ω	60 μΩ/Ω	
	0.1 Ω	21 μΩ/Ω	
	0.2 Ω	66 μΩ/Ω	
	1 Ω	18 μΩ/Ω	
	10 Ω	5.4 μΩ/Ω	
	100 Ω	3.8 μΩ/Ω	
	1 kΩ	3.7 μΩ/Ω	
	10 kΩ	6.4 μΩ/Ω	
	100 kΩ	16 μΩ/Ω μΩ/Ω + 300 mΩ	
	1 MΩ	25 μΩ/Ω + 4 Ω	
	10 MΩ	82 μΩ/Ω + 200 Ω	
	100 MΩ	410 μΩ/Ω + 1.6 kΩ	
	1 GΩ	0.13 % + 3 MΩ	
	10 GΩ	0.13 % + 30 MΩ	
	100 GΩ	0.67 % + 15 MΩ	
	1 TΩ	1.6 % + 6.1 GΩ	
Other Values	0 Ω to 10 Ω	500 μΩ/Ω + 0.30 mΩ	
	10 Ω to 100 Ω	510 μΩ/Ω + 1.0 mΩ	
	100 Ω to 1 kΩ	500 μΩ/Ω + 2.7 mΩ	
	1 kΩ to 10 kΩ	500 μΩ/Ω + 29 mΩ	
	10 kΩ to 100 kΩ	500 μΩ/Ω + 780 mΩ	
	100 kΩ to 1 MΩ	500 μΩ/Ω + 12 Ω	
	1 MΩ to 10 MΩ	0.20 % + 690 Ω	
	10 MΩ to 100 MΩ	0.25 % + 32 kΩ	
	100 MΩ to 1 GΩ	1.0 % + 59 kΩ	
	1 GΩ to 10 GΩ	1.0 % + 10 MΩ	
	10 GΩ to 500 GΩ	2.3 % + 53 MΩ	

Measured Quantity Instrument or Gauge	Range	Expanded Uncertainty (k = 2)	Remarks
Values and uncertainties listed below are applicable for the calibration of both measurement instruments and for instruments with an output. The method used is by direct or ratio-metric comparison unless otherwise described in the remarks column.			
DC RESISTANCE (continued)			
Measurement	100 μΩ to 1 mΩ	91 μΩ/Ω	Resistance sources can be calibrated to these uncertainties at currents of up to 100 A
	1 mΩ to 10 mΩ	92 μΩ/Ω	
	10 mΩ to 100 mΩ	61 μΩ/Ω	
	100 mΩ to 1 Ω	58 μΩ/Ω	
	1 Ω to 10 Ω	58 μΩ/Ω + 14 μΩ	
	10 Ω to 100 Ω	59 μΩ/Ω + 280 μΩ	
	0 Ω to 2 Ω	17 μΩ/Ω + 0.12 mΩ	Resistance sources can be calibrated to these uncertainties using a Fluke 8508A
	2 Ω to 20 Ω	16 μΩ/Ω + 0.12 mΩ	
	20 Ω to 200 Ω	11 μΩ/Ω + 1.2 mΩ	
	200 Ω to 2 kΩ	8.9 μΩ/Ω + 1.2 mΩ	
	2 kΩ to 20 kΩ	9.4 μΩ/Ω + 12 mΩ	
	20 kΩ to 200 kΩ	8.8 μΩ/Ω + 48 mΩ	
	200 kΩ to 2 MΩ	12 μΩ/Ω + 1.0 Ω	
	2 MΩ to 20 MΩ	31 μΩ/Ω + 93 Ω	
	20 MΩ to 200 MΩ	150 μΩ/Ω + 9.3 kΩ	
	200 MΩ to 2 GΩ	0.15 % + 0.93 MΩ	
	2 GΩ to 20 GΩ	0.18 % + 9.3 MΩ	
	1 MΩ to 5 TΩ	0.12 % to 0.90 %	The applied voltage depends on the nominal resistance and may be up to 20 kV.
Simulated values to support Megger range of insulation testers			3 terminal devices
	2 TΩ to 12 TΩ	5.0 %	
	12 TΩ to 35 TΩ	11 %	
DC VOLTAGE			
Generation	0 mV to 330 mV	70 μV/V + 2.0 μV	Source values for the calibration of voltmeters
	330 mV to 3.3 V	58 μV/V + 6.0 μV	
	3.3 V to 33 V	58 μV/V + 61 μV	
	33 V to 330 V	64 μV/V + 660 μV	
	330 V to 1 kV	64 μV/V + 4.0 mV	
	1 kV to 20 kV	0.10 % + 20 V	
	20 kV to 40 kV	0.10 % + 120 V	
Measurement	0 mV to 200 mV	6.5 μV/V + 1.2 μV	Voltage sources can be calibrated to these uncertainties
	200 mV to 2 V	3.6 μV/V + 1.2 μV	
	2 V to 20 V	3.6 μV/V + 4 μV	
	20 V to 200 V	5.5 μV/V + 39 μV	
	200 V to 1 kV	5.6 μV/V + 40 μV	
	1 kV to 15 kV	0.20 % + 0.14 V	
	15 kV to 90 kV	1.20 %	
Thermocouple Simulation Type K	-25 °C to +120 °C	0.16 % + 0.19 °C	Simulated using Fluke 5500A

Measured Quantity Instrument or Gauge	Range	Expanded Uncertainty (k = 2)	Remarks
Values and uncertainties listed below are applicable for the calibration of both measurement instruments and for instruments with an output. The method used is by direct or ratio-metric comparison unless otherwise described in the remarks column.			
DC CURRENT			
Generation	0 μA to 330 μA	0.14 % + 290 nA	Ammeters can be calibrated to these uncertainties
	330 μA to 3.3 mA	0.12 % + 350 nA	
	3.3 mA to 33 mA	157 μA/A + 60 nA	
	33 mA to 330 mA	210 μA/A + 12 μA	
	330 mA to 2.2 A	210 μA/A + 13 μA	
	2.2 A to 11 A	800 μA/A + 870 μA	Simulated current using 50 turn coil, for the calibration of clamp-on ammeters.
	11 A to 550 A	0.76 % + 50 mA	
Measurement	0 pA to 200 pA	1.2 % + 220 fA	Current sources can be calibrated to these uncertainties.
	200 pA to 2 nA	0.23 % + 60 fA	
	2 nA to 20 nA	0.23 % + 660 fA	
	20 nA to 200 nA	0.23 % + 610 fA	
	200 nA to 2 μA	0.12 % + 9.0 pA	
	2 μA to 200 μA	14 μA/A + 0.31 nA	
	200 μA to 2 mA	14 μA/A + 3.1 nA	
	2 mA to 20 mA	15 μA/A + 31 nA	
	20 mA to 200 mA	47 μA/A + 620 nA	
	200 mA to 2 A	170 μA/A + 12 μA	
	2 A to 20 A	390 μA/A + 120 μA	
	20 A to 200 A	60 μA/A + 52 μA	
AC VOLTAGE			
Generation	*40 Hz to 10 kHz*		
	1 mV to 33 mV	0.17 % + 23 μV	Source values for the calibration of voltmeters
	33 mV to 330 mV	0.062 % + 26 μV	
	330 mV to 3.3 V	0.037 % + 136 μV	
	3.3 V to 33 V	0.048 % + 700 mV	
	33 V to 330 V	0.060 % + 23 mV	
	330 V to 1 kV	0.060 % + 95 mV	
	50 Hz		
	2 kV to 40 kV	1.7 % + 120 V	
AC POWER Generation	*45 Hz to 65 Hz* *1 VA to 1100VA*	0.40 %	
Measurement	1 mV to 200 mV		
	40 Hz to 10 kHz	0.011 % + 3.9 μV	Voltage sources can be measured to these uncertainties
	10 kHz to 100 kHz	0.067 % + 19 μV	
	200 mV to 2 V		
	40 Hz to 10 kHz	0.011 % + 19 μV	
	10 kHz to 100 kHz	0.050 % + 190 μV	
	2 V to 20 V		
	40 Hz to 10 kHz	0.011 % + 190 μV	
	10 kHz to 100 kHz	0.050 % + 1.9 mV	
	20 V to 200 V		
	40 Hz to 10 kHz	0.011 % + 1.9 mV	
	10 kHz to 100 kHz	0.051 % + 19 mV	

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AC VOLTAGE (Continued)			
	200 V to 1 kV *40 Hz to 10 kHz*	0.012 % + 19 mV	
	At 50 Hz 1 kV to 50 kV	1.7 % + 120 V	
AC VOLTAGE RATIO			
	40 Hz to 120 Hz 0.8 to 2000 2000 to 20000	 0.011 % 0.038 % + 0.0050	At voltages of up to 200 V
AC CURRENT Generation	*10 Hz to 1 kHz* 0.03 μA to 330 μA 330 μA to 3.3 mA 3.3 mA to 33 mA 33 mA to 330 mA	 0.29 % + 290 nA 0.23 % + 370 nA 0.23 % + 4.0 μA 0.23 % + 50 μA	Ammeters can be calibrated to these uncertainties
	10 Hz to 1 kHz 330 mA to 2.2 A 2.2 A to 11 A	 0.24 % + 410 μA 0.38 % + 2.7 mA	
	40 Hz to 400 Hz 11 A to 550 A	 0.31 % + 600 mA	Simulated current using 50 turn coil, for the calibration of clamp-on ammeters.
Measurement	*10 Hz to 5 kHz* 12 nA to 200 μA 200 μA to 2 mA 2 mA to 20 mA 20 mA to 200 mA	 490 μA/A + 19 nA 300 μA/A + 190 nA 290 μA/A + 1.9 μA 280 μA/A + 19 μA	Outputs of current sources can be measured with these uncertainties.
	10 Hz to 1 kHz 200 mA to 2 A 2 A to 20 A	 560 μA/A + 190 μA 720 μA/A +1.9 mA	
	5 kHz 200 mA to 2 A	 0.28 % + 650 μA	
	50 Hz 11 A to 2 kA	 0.85 % + 130 mA	
FREQUENCY			
Measurement	1 Hz to 10 MHz	1.0 part in 10^7	These outputs can be measured
Generation			
Specific Values	0.1 Hz, 1 Hz, 10 Hz, 100 Hz, 1 kHz, 10 kHz, 100 kHz, 1 MHz, 5 MHz and 10 MHz	1.4 parts in 10^7	Source values for measuring instruments
PHASE ANGLE	*50 Hz and 60 Hz* 0° to 360°	 70 m°	

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CAPACITANCE			
Generation			
Specific Values	*1 kHz* 100 pF 1000 pF, 10 nF, 100 nF and 1 μF 1 μF	 0.020 % 0.010 % 0.020 %	 Standard capacitors available for the calibration of capacitance bridges, meters etc.
Measurement	*1 kHz* 100 pF to 10 μF	 0.20 % to 0.050 %	 Capacitors can be calibrated to these uncertainties.
INDUCTANCE			
Generation Specific Values	 *1 kHz* 100 μH, 1 mH, 10 mH, 100 mH and 1 H	 0.010 %	 Standard inductors available for the calibration of inductance bridges, meters etc.
Measurement	*1 kHz* 100 μH to 1 H	 0.20 % to 0.050 %	 Inductors can be calibrated to these uncertainties.
AC RESISTANCE			
	40 Hz to 1 kHz 1 Ω to 10 kΩ	 0.10 %	Sourcing suitable for measuring devices
	50 Hz 0.02 Ω to 5 Ω 5 Ω to 1 kΩ	 0.58 % + 36 mΩ 0.58 % + 50 mΩ	 Nominal values suitable for the calibration of earth loop testers
	40 Hz to 1592 Hz 1 Ω to 10 kΩ	 0.050 % to 0.20 %	 Measurement of AC resistors
RCD TRIP TIMES	30 ms to 400 ms	0.010 % + 1.0 ms	Suitable for RCD testers
ELAPSED TIME	Nominal 60 s	5.0 ms	Electronically triggered
To support Megger products: Oil test set & check meters; The OTS range, Oil tan delta test set (otd) and otd cc.			
DC VOLTAGE	0 V to 1 kV	0.030 % + 0.10 V	
AC VOLTAGE	200 mV to 1 kV; *55 Hz* 10 kV to 100 kV; *50 Hz to 75 Hz*	0.070 % + 0.20 V 0.85 % + 80 V	

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DISSIPATION FACTOR			
750 V at 55 Hz	0 nominal 0.003 nominal 0.03 nominal 0.3 nominal 3 nominal	0.030 % + 0.00001 0.080 % + 0.00003 0.030 % + 0.00017 0.080 % + 0.0015 0.030 % + 0.015	
	0.003 nominal to 0.3 nominal	1.5 % + 0.00030	At temperatures of up to 100 °C
2 kV at 55 Hz			
	0.003 nominal 0.03 nominal	0.080 % + 0.00003 0.030 % + 0.00017	
PERMITTIVITY			
750 V and 2 kV at 55 Hz 200 pF applied	3 nominal	0.060 %	
RESISTANCE At 500 V	5 MΩ to 5 GΩ	0.15%	
RESISTIVITY At 500 V DC	40 MΩ·m to 40 GΩ·m	0.050 %	
CAPACITANCE 750 V and 2 kV at 55 Hz	200 pF	0.060 %	
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: $Q[a, b] = [a^2 + b^2]^{1/2}$