Schedule of Accreditation

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Accredited to ISO/IEC 17025:2017

Testo Industrial Services Ltd

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Calibration performed at the above address only

Calibration and Measurement Capability (CMC)

Measured Quantity Instrument or Gauge	Range	Expanded Measurement 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 comparison unless otherwise stated in the remarks column			
ELECTRICAL MEASUREMENTS			
DC RESISTANCE			
Specific values (sourcing)	1 mΩ	35 μΩ/Ω	
	10 mΩ	12 μΩ/Ω	
	100 mΩ	8.0 μΩ/Ω	
	1 Ω	2.0 μΩ/Ω	
	10 Ω	2.5 μΩ/Ω	
	100 Ω	3.0 μΩ/Ω	
	1 kΩ	2.0 μΩ/Ω	
	10 kΩ	1.5 μΩ/Ω	
	100 kΩ	3.0 μΩ/Ω	
	1 MΩ	10 μΩ/Ω	
	10 MΩ	20 μΩ/Ω	
	100 MΩ	20 μΩ/Ω	
	1 GΩ	250 μΩ/Ω	
	10 GΩ	0.15 %	
Specific values (measurement)	1 mΩ	40 μΩ/Ω	
	10 mΩ	20 μΩ/Ω	
	100 mΩ	20 μΩ/Ω	
	1 Ω	4.0 μΩ/Ω	
	10 Ω	5.0 μΩ/Ω	
	100 Ω	3.0 μΩ/Ω	
	1 kΩ	2.0 μΩ/Ω	
	10 kΩ	2.0 μΩ/Ω	
	100 kΩ	5.0 μΩ/Ω	
	1 MΩ	7.0 μΩ/Ω	
	10 MΩ	15 μΩ/Ω	
	100 MΩ	28 μΩ/Ω	
	1 GΩ	220 μΩ/Ω	
	10 GΩ	0.14 %	

Measured Quantity Instrument or Gauge	Range	Expanded Measurement Uncertainty (k = 2)	Remarks
DC RESISTANCE (continued)			
Other values (measurement)	0 μΩ to 200 μΩ	40 nΩ	
	200 μΩ to 2 mΩ	200 μΩ/Ω	
	2 mΩ to 20 mΩ	180 μΩ/Ω	
	20 mΩ to 200 mΩ	180 μΩ/Ω	
	200 mΩ to 2 Ω	25 μΩ/Ω	
	2 Ω to 20 Ω	20 μΩ/Ω	
	20 Ω to 200 Ω	6.0 μΩ/Ω	
	200 Ω to 2 kΩ	3.5 μΩ/Ω	
	2 kΩ to 20 KΩ	4.0 μΩ/Ω	
	20 KΩ to 200 kΩ	6.0 μΩ/Ω	
	200 kΩ to 2 MΩ	10 μΩ/Ω	
	2 MΩ to 20 MΩ	60 μΩ/Ω	
	20 MΩ to 200 MΩ	65 μΩ/Ω	
	200 MΩ to 2 GΩ	700 μΩ/Ω	
	2 GΩ to 20 GΩ	0.60 %	
DC VOLTAGE			
Specific values			
	100 mV	6.0 μV/V	
	200 mV	6.0 μV/V	
	1 V	3.0 μV/V	
	2 V	4.0 μV/V	
	10 V	4.0 μV/V	
	20 V	4.0 μV/V	
	100 V	4.0 μV/V	
	200 V	5.0 μV/V	
	1 kV	6.0 μV/V	
Other values	0 mV to 20 mV	0.60 μV	
	20 mV to 200 mV	8.5 μV/V	
	200 mV to 2 V	5.0 μV/V	
		5.0 μV/V	
	2 V to 20 V		
	20 V to 200 V	7.0 μV/V	
	200 V to 1 kV	7.0 μV/V	
	1 kV to 30 kV	0.12 %	
	30 kV to 90 kV	0.15 %	
DC VOLTAGE RATIO 100 mV to 10 V reference	0.1 to unity	0.5 μV/V	
DC Voltage linearity	0 V to 10 mV	0.40 μV	
	0 V to 100 mV	0.60 μV	

Measured Quantity Instrument or Gauge	Range	Expanded Measurement Uncertainty (k = 2)	Remarks
DC CURRENT	0 μA to 1 μA 1 μA to 10 μA 10 μA to 100 μA 100 μA to 1 mA 1 mA and 10 mA 1 mA to 10 mA 10 mA to 100 mA 100 mA to 1 A 1 A to 10 A 10 A to 150 A	100 μA/A + 80 pA 120 μA/A 35 μA/A 30 μA/A 20 μA/A 30 μA/A 20 μA/A 30 μA/A 60 μA/A 500 μA/A	
DC Current linearity	0 A to 1 μA 0 A to 10 μA	7.5 pA 12 pA	
DC POWER	1 W to 20 kW	The arithmetic sum of the individual uncertainties of the corresponding voltages and current measurements	
AC VOLTAGE Specific values at specific frequencies	10 mV at 1 kHz	100 μV/V	
	100 mV *20 Hz, 55 Hz* *305 Hz, 1 kHz, 10 kHz* *30 kHz* *60 kHz* *100 kHz*	 100 μV/V 90 μV/V 100 μV/V 180 μV/V 190 μV/V	
	1 V *100 Hz* *20 Hz, 55 Hz, 305 Hz* *1 kHz* *3 kHz, 10 kHz* *30 kHz* *60 kHz* *100 kHz* *500 kHz* *1 MHz*	 55 μV/V 50 μV/V 40 μV/V 50 μV/V 60 μV/V 65 μV/V 160 μV/V 0.135 % 0.30 %	
	10 V 20 Hz, 55 Hz, 100 Hz, 305 Hz, 1kHz *3 kHz, 10 kHz* *30 kHz* *60 kHz* *100 kHz* *500 kHz* *1 MHz*	 50 μV/V 60 μV/V 80 μV/V 180 μV/V 190 μV/V 0.135 % 0.30 %	

Measured Quantity Instrument or Gauge	Range	Expanded Measurement Uncertainty (k = 2)	Remarks
AC VOLTAGE (continued)	100 V		
Specific values at specific Frequencies (continued)	20 Hz, 55 Hz, 305 Hz	60 μV/V	
	100 Hz, 1 kHz	55 μV/V	
	3 kHz, 10 kHz	60 μV/V	
	30 kHz	80 μV/V	
	60 kHz	180 μV/V	
	100 kHz	200 μV/V	
	500 V		
	55 Hz	80 μV/V	
	100 Hz	90 μV/V	
	305 Hz	80 μV/V	
	1 kHz	70 μV/V	
	3 kHz, 10 kHz	80 μV/V	
	30 kHz	150 μV/V	
	1 kV		
	55 Hz	80 μV/V	
	305 Hz, 1 kHz, 3 kHz, 10 kHz	80 μV/V	
	30 kHz	200 μV/V	
Specific values at other frequencies	1 V		
	20 Hz to 30 kHz	70 μV/V	
	30 kHz to 100 kHz	160 μV/V	
	100 kHz to 1MHz	0.30 %	
	10 V		
	20 Hz to 30 kHz	90 μV/V	
	30 kHz to 100 kHz	180 μV/V	
	100 kHz to 1MHz	0.30 %	
	100 V		
	20 Hz to 30 kHz	85 μV/V	
	30 kHz to 100 kHz	150 μV/V	
	1 kV		
	55 Hz to 10 kHz	100 μV/V	
	10 kHz to 30 kHz	200 μV/V	
Other values	50 Hz to 2 kHz		
	100 μV to 1 mV	0.75 %	
	1 mV to 10 mV	750 μV/V	
	10 mV to 100 mV	100 μV/V	
	100 mV to 200 mV		
	40 Hz to 10 kHz	150 μV/V	
	10 kHz to 30 kHz	360 μV/V	
	30 kHz to 100 kHz	850 μV/V	
	200 mV to 1 V		
	40 Hz to 10 kHz	160 μV/V	
	10 kHz to 30 kHz	250 μV/V	
	30 kHz to 100 kHz	0.13 %	

Measured Quantity Instrument or Gauge	Range	Expanded Measurement Uncertainty (k = 2)	Remarks
AC VOLTAGE (continued) Other values (continued)	1 V to 2 V *40 Hz to 10 kHz* *10 kHz to 30 kHz* *30 kHz to 100 kHz*	 120 μV/V 250 μV/V 650 μV/V	
	2 V to 10 V *40 Hz to 10 kHz* *10 kHz to 30 kHz* *30 kHz to 100 kHz*	 160 μV/V 350 μV/V 0.13 %	
	10 V to 20 V *40 Hz to 10 kHz* *10 kHz to 30 kHz* *30 kHz to 100 kHz*	 160 μV/V 300 μV/V 300 μV/V	
	20 V to 200 V *40 Hz to 10 kHz* *10 kHz to 30 kHz* *30 kHz to 100 kHz*	 150 μV/V 150 μV/V 150 μV/V	
	200 V to 1000 V *40 Hz to 10 kHz* *10 kHz to 30 kHz*	 200 μV/V 700 μV/V	
	1 kV to 40 kV *50 Hz*	 0.65 %	
Waveform analysis	3 μV to 300 V *20 Hz to 76 kHz*	 5.0 % of FSD*	* 15 ranges of 30 μV to 300 V FSD in 1-3-10 sequence
AC CURRENT Specific values and frequencies	100 μA *55 Hz, 305 Hz* *1 kHz* *5 kHz*	 150 μA/A 150 μA/A 200 μA/A	
	1 mA *55 Hz, 305 Hz* *1 kHz* *5 kHz* *10 kHz*	 150 μA/A 150 μA/A 150 μA/A 160 μA/A	
	10 mA *55 Hz, 305 Hz* *1 kHz, 5 kHz, 10 kHz*	 150 μA/A 150 μA/A	
	100 mA *55 Hz, 305 Hz* *1 kHz, 5 kHz, 10 kHz*	 150 μA/A 150 μA/A	
	1 A *55 Hz, 305 Hz, 1 kHz, 5 kHz* *10 kHz*	 150 μA/A 260 μA/A	

Measured Quantity Instrument or Gauge	Range	Expanded Measurement Uncertainty (k = 2)	Remarks
AC CURRENT (continued)	*10 A*		
Other Values (continued)	*55 Hz, 305 Hz, 1 kHz*	170 μA/A	
	5 kHz, 10 kHz	200 μA/A	
Other Values			
	20 μA to 100 μA		
	50 Hz to 5 kHz	0.12 %	
	100 μA to 200 μA		
	50 Hz to 5 kHz	400 μA/A	
	200 μA to 1 mA		
	55 Hz to 5 kHz	0.12 %	
	1 mA to 2 mA		
	50 Hz to 10 kHz	400 μA/A	
	2 mA to 10 mA		
	50 Hz to 10 kHz	0.12 %	
	10 mA to 20 mA		
	50 Hz to 10 kHz	400 μA/A	
	20 mA to 100 mA		
	50 Hz to 10 kHz	0.12 %	
	100 mA to 200 mA		
	40 Ha to 10 kHz	400 μA/A	
	200 mA to 1 A		
	1 kHz to 10 kHz	0.15 %	
	1 A to 2 A		
	55 Hz, 305 Hz, 1 kHz	750 μA/A	
	2 A to 10 A		
	50 Hz to 1 kHz	0.15 %	
	1 kHz to 10 kHz	0.32 %	
	10 A to 20 A		
	50 Hz to 1 kHz	0.10 %	
	1 kHz to 10 kHz	0.30 %	
	10 A to 150 A		
	50 Hz to 60 Hz	0.10 %	
AC RESISTANCE	*At 40 Hz to 60 Hz*		
	10 mΩ to 100 mΩ	300 μΩ/Ω	
	100 mΩ to 1Ω	300 μΩ/Ω	
	1 Ω to 100 k Ω	75 μΩ/Ω	
	100 kΩ to 10 MΩ	0.10 %	

Measured Quantity Instrument or Gauge	Range	Expanded Measurement Uncertainty (k = 2)	Remarks
FREQUENCY			
Generation			
Specific values	100 kHz, 1 MHz, 5 MHz and 10 MHz	2.0 in 10^{10}	Sine wave generation
	0.02 Hz to 10 MHz in 2-5-10 sequence	2.0 in 10^{10}	Square wave generation
Range values			
	1 Hz to 100 kHz 100 kHz to 10 MHz	2.0 in 10^{10} 5.0 in 10^{11}	Sine wave generation
	1 Hz to 10 kHz 10 kHz to 100 kHz 100 kHz to 100 MHz 100 MHz to 1 GHz	1.2 in 10^{8} 1.2 in 10^{9} 1.2 in 10^{9} 1.2 in 10^{10}	Measurement of sources These values may also be reported as the reciprocal; seconds, for repetative signals.
TIME INTERVAL	0 s to 500s 0 s to 500s	1.0 us 50 ms	Electronically triggered devices Mechanically triggered devices
Pulse period	1 µs to 1 s	5.0 ns	
Rise time	1 ns to 1 ms	3.0 ns	Into 50 Ω
RCD testers			
Trip time	10 ms to 5 s	0.25 ms	
Trip Current	3 mA to 3 A	1.0 %	
Earth Loop	8 mΩ to 330 mΩ 330 mΩ to 500 mΩ 500 mΩ 10 1.8 Ω 1.8 Ω to 5 Ω 5 Ω to 10 Ω 10 Ω to 18 Ω 18 Ω 50 Ω 50 Ω to 100 Ω 100 Ω to 180 Ω 180 Ω to 500 Ω 500 Ω to 1 kΩ 1 kΩ to 1.8 kΩ	8.0 mΩ 10 mΩ 12 mΩ 36 mΩ 70 mΩ 120 mΩ 350 mΩ 600 mΩ 1.2 Ω 3.0 Ω 6.0 Ω 12 Ω	

Measured Quantity Instrument or Gauge	Range	Expanded Measurement Uncertainty (k = 2)	Remarks
Temperature indicators, calibration by electrical simulation			The claims below cover test items with a resolutiuion of 10 m°C
ELECTRICAL SIMULATION OF TEMPERATURE Thermocouple capabilities listed below are given for type K Base and Type S Noble, using EMF sensitivity values as listed in BS EN 60584-1:2013. Other Thermocouple types can be calibrated, the uncertainties will correspond to the appropriate sensitivities listed. Calibrations which include the internal reference junction (CJC) are available for types: J, K, N, T, E, R, S, B & C			
Base Metal Thermocouples	-200 °C to -100 °C -100 °C to -50 °C -50 °C to 0 °C 0 °C to 100 °C 100 °C to 700 °C 700 °C to 900 °C 900 °C to 1370 °C	0.20 °C 0.15 °C 0.14 °C 0.14 °C 0.19 °C 0.18 °C 0.21 °C	Excluding automatic CJC
Noble Metal Thermocouples	0 °C to 1500 °C	0.35 °C	
Base Metal Thermocouples	-200 °C to -100 °C -100 °C to 120 °C 120 °C to 1000 °C 1000 °C to 1372 °C	0.40 °C 0.24 °C 0.31 °C 0.43 °C	Including automatic CJC
Noble Metal Thermocouples	0 °C to 1500 °C	0.50 °C	
Cold Junction Compensation	0 °C to 30 °C	0.10 °C	
Resistance thermometer (Pt 100)	- 200 °C to + 800 °C	0.020 °C	
Supporting temperature measurements for electrical simulation and cold junction verification	At Nominal 0 °C Nominal ambient between 17 °C to 23 °C	0.050 °C 0.30 °C	
Capacitance	350 pF 480 pF 600 pF 1 nF 3.0 nF 4.0 nF 10 nF 30 nF 40 nF 100 nF 120 nF 300 nF 400 nF 1.0 µF 3.0 µF 4.0 µF 10 µF 30 µF 100 µF 300 µF 800 µF	12 pF 12 pF 12 pF 13 pF 22 pF 26 pF 59 pF 150 pF 170 pF 310 pF 520 pF 1.1 nF 1.7 nF 3.1 nF 13 nF 16 nF 32 nF 280 nF 590 nF 2.5 µF 9.3 µF	These values are sourced by simulation.

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