Schedule of Accreditation

issued by

United Kingdom Accreditation Service

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

0318

Accredited to ISO/IEC 17025:2017

CoMech Metrology Limited

Issue No: 041 **Issue date:** 04 April 2022

Metrology Division **Calibration House** **Castings Road** **Derby** **DE23 8YL**	**Contact: Mr K Pallett** **Tel: +44 (0)1332 867 700** **E-Mail: sales@comech.co.uk** **Website: www.comech.co.uk**

Calibration performed by the Organisation at the locations specified

Locations covered by the organisation and their relevant activities

Laboratory locations:

Location details		Activity	Location code
Address Castings Road Derby DE23 8YL	**Local contact**	Dimensional Torque	A
Address 1 Pride Park View, Victoria Way, Pride Park, Derby DE24 8AN	**Local contact**	Electrical Pressure	B

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Calibration and Measurement Capability (CMC)

Measured Quantity Instrument or Gauge	Range	Expanded Measurement Uncertainty (k = 2)	Remarks	Location Code
RANGE IN MILLIMETRES AND UNDERTAINTY IN MICROMETRES UNLESS OTHERWISE STATED				
DIMENSIONAL				
Micrometers External Internal Depth	 BS 870:2008, 0 to 600 BS 959:2008, 0 to 600 BS 6468:2008, 0 to 300	 Heads 2.0 Setting and extension rods 1.0 + (5.0 x length in m)	Calibrations may be made in metric or imperial units.	A
Vernier gauges Caliper Height Depth Dial gauge type Digital type	 BS 887:2008 0 to 600 BS 1643:2008, 0 600 BS 6365:2008, 0 to 300 0 to 300 0 to 300	 Overall performance: 10 + (30 x length in m)		A
Dial gauges and dial test indicators	0 to 50 BS 907:2008 and BS 2795:1981	3.6		A
Surface texture of Gauges (excluding surface texture standards)	As BS 1134:Part 1:1988	7.0 % (minimum 1.0 μm Ra)		A
Length gauges, flat and spherical ended (excluding length bars	25 to 1200	1.0 + (5.0 x length in m)	Using a length measuring Machine or by comparison with End standards	A
Plain plug gauges parallel	0 to 100	2.1	Using a length measuring machine	A
Receiver and position gauges, jigs, fixtures	Track Grinding Gauges (HB221) 0 to 1440 Autocoupler Pin Checking Gauges (HB035) 0 to 1.0 Brake Pad Wear Gauge (HB100) 0 to 10.0 Back to Back Gauges (HB018) 0 to 1360	29 3.0 2.7 8.1	Procedure CM-C-686 Procedure CM-C-706 Procedure CM-C-705 Procedure CM-C-704	

Measured Quantity Instrument or Gauge	Range	Expanded Measurement Uncertainty (k = 2)	Remarks	Location Code
PRESSURE				
Gas pressure (gauge)			Methods consistent with EURAMET CG17	B
Calibration of pressure measuring instruments and gauges.	- 80 kPa to 2 MPa	0.48 kPa		
Gas pressure (absolute)				
Calibration of pressure measuring instruments and gauges.	70 kPa to 2 MPa	0.48 kPa		
Hydraulic pressure (gauge)				
Calibration of pressure measuring instruments and gauges.	500 kPa to 5.5 MPa 5 MPa to 110 MPa	0.039 % 0.030 %		
TORQUE				
Hand torque tools (excluding torque screwdrivers)	As BS EN ISO 6789 :2017 5 N·m to 1356 N·m	1.0 %	Calibrations may also be given in lbf.in and lbf.ft.	A
ELECTRICAL				B
Electrical 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 against laboratory standards unless otherwise stated in the remarks column.				
DC Voltage	0 mV to 100 mV 100 mV to 1 V 1 V to 10 V 10 V to 100 V 100 V to 1.1 kV	10 µV/V + 860 nV 9.2 µV/V + 3.5 µV 9.2 µV/V + 25 µV 12 µV/V + 340 µV 18 µV/V + 3.4 mV		B
High Voltage	1 kV to 40 kV	0.70 % + 15 V	These output values can be measured.	B
DC Current	0 µA to 100 µA 100 µA to 1 mA 1 mA to 10 mA 10 mA to 100 mA 100 mA to 1 A	23 µA/A + 3.3 nA 23 µA/A + 21 nA 23 µA/A + 200 nA 40 µA/A + 2.3 µA 130 µA/A + 43 µA		B
	1 A to 2 A 2 A to 20 A 20 A to 120 A	82 µA/A + 370 µA 76 µA/A + 9.8 mA 50 µA/A +	Values available for direct measurement	B
DC Current	1 A to 10.5 A 10.5 A to 20 A 20 A to 105 A 105 A to 525 A 525 A to 1000 A 1000 A to 2500 A	0.074 % + 1.2 mA 0.45 % + 26 mA 0.075 % + 12 mA 0.075 % + 60 mA 0.50 % + 1.3 A 0.069 % + 520 mA	Output values above 10 A – simulation Using a multiturn coil	B

Measured Quantity Instrument or Gauge	Range	Expanded Measurement Uncertainty (k = 2)	Remarks	Location Code
ELECTRICAL continued				
Resistance	0 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 100 MΩ 10 MΩ to 100 MΩ 100 MΩ to 1.1 GΩ 1 GΩ to 2 GΩ	17 µΩ/Ω + 180 µΩ 14 µΩ/Ω + 1.0 mΩ 12 µΩ/Ω + 58 mΩ 12 µΩ/Ω + 84 mΩ 12 µΩ/Ω + 1.0 Ω 17 µΩ/Ω + 61 Ω 58 µΩ/Ω + 320 Ω 0.058 % + 32 kΩ 0.58 % + 720 kΩ 21 MΩ		B
AC Voltage	1 mV to 100 mV *50 Hz to 1 kHz* *1 kHz to 10 kHz* *10 kHz to 50 kHz* 100 mV to 1 V *40 Hz to 1 kHz* *1 kHz to 10 kHz* *10 kHz to 50 kHz* 1 V to 10 V *40 Hz to 1 kHz* *1 kHz to 10 kHz* *10 kHz to 50 kHz* 10 V to 100 V *40 Hz to 1 kHz* *1 kHz to 10 kHz* *10 kHz to 50 kHz* 100 V to 750 V *40 Hz to 1 kHz* *1 kHz to 10 kHz* 750 V to 1050 V *10 Hz to 3 kHz* *3 kHz to 10 kHz* *10 kHz to 20 kHz*	 0.070 % + 17 µV 0.024 % + 16 µV 0.16 % + 67 µV 0.071 % + 130 µV 0.025 % + 130 µV 0.18 % + 1.5 mV 700 µV/V + 1.3 mV 250 µV/V + 1.3 mV 0.18 % + 4.9 mV 0.070 % + 13 mV 0.036 % + 12 mV 0.18 % + 50 mV 0.094 % + 240 mV 0.18 % + 460 mV 0.094 % + 160 mV 0.094 % + 250 mV 0.14 % + 370 mV		B
High Voltage	1 kV to 40 kV 50 Hz to 60 Hz	1.5 % + 45 V	These output values can be measured.	B
AC Current	1 µA to 100 µA *40 Hz to 1 kHz* 100 µA to 1 mA *40 Hz to 1 kHz* 1 mA to 10 mA *40 Hz to 1 kHz* *1 kHz to 5 kHz* 10 mA to 100 mA *40 Hz to 1 kHz*	 0.18 % + 38 nA 0.46 % + 270 nA 0.47 % + 2.8 µA 0.035 % + 5.3 µA 0.46 % + 15 µA		B

Measured Quantity Instrument or Gauge	Range	Expanded Measurement Uncertainty (k = 2)	Remarks	Location Code
AC Current (continued)	100 mA to 1 A *40 Hz to 1 kHz*	 0.46 % + 340 µA		B
	1 A to 3.2 A *10 Hz to 3 kHz* *3 kHz to 10 kHz*	 0.12 % + 560 µA 0.13 % + 3.0 mA		
	3.2 A to 10.5 A *10 Hz to 3 kHz* *3 kHz to 10 kHz*	 0.23 % + 4.4 mA 0.58 % + 12 mA		
	10.5 A to 120 A *50 Hz* *51 Hz to 100 Hz*	 0.36 % + 140 mA 0.58 % + 110 mA	Simulation using a Multiturn coil	
	10.5 A to 105 A *10 Hz to 400 Hz*	 0.28 % + 44 mA		
	105 A to 525 A *10 Hz to 400 Hz*	 0.28 % + 220 mA		
	500 A to 1000 A *50 Hz* *51 Hz to 100 Hz*	 0.043 % + 130 mA 0.043 % + 310 mA		
	1000 A to 2500 A *50 Hz to 100 Hz*	 0.043 % + 1.3 A		
Capacitance 1 kHz	0.5 nF to 4 nF 4 nF to 40 nF 40 nF to 400 nF 400 nF to 4 µF 4 µF to 40 µF 40 µF to 400 µF 400 µF to 4 mF 4 mF to 40 mF	0.50 % + 18 pF 0.40 % + 36 pF 0.40 % + 190 pF 0.50 % + 580 pF 0.60 % + 20 nF 0.60 % + 190 nF 0.60 % + 59 µF 0.20 % + 70 µF	Simulated values for the calibration of capacitance meters.	B
Oscilloscopes				
Vertical deflection	*At 1 kHz* 10 mV to 100 mV 100 mV to 120 V	 0.040 % + 27 µV 0.050 %		B
Horizontal deflection	2 ns to 5 s	0.12 %		
17th Edition capability				B
Insulation Resistance	10 kΩ to 40 kΩ 40 kΩ to 200 kΩ 200 kΩ to 10 MΩ 10 MΩ to 1 GΩ 1 GΩ to 2 GΩ	0.020 % + 15 Ω 0.025 % + 15 Ω 0.050 % + 590 Ω 0.22 % + 120 kΩ 0.52 % + 120 kΩ		
Insulation Resistance: test current	0 mA to 9.9 mA	76 µA		

Measured Quantity Instrument or Gauge	Range	Expanded Measurement Uncertainty (k = 2)	Remarks	Location Code
Continuity resistance	100 mΩ to 400 mΩ 400 mΩ to 5 Ω 5 Ω to 30 Ω 30 Ω to 200 Ω 200 Ω to 2 kΩ 2 kΩ to 10 kΩ	1.0 % + 1.5 mΩ 0.80 % + 8.3 mΩ 0.12 % 0.11 % 0.11 % 0.17 %		B
Continuity resistance current	50 mA to 400 mA	21 %		B
Voltage Output	3 V to 600 V 3 V *50 Hz* to 600 V *50 Hz*	0.15 % 0.18 %		
Voltage measurement	180 mV to 1 kV 130 mV *50 Hz* to 1 kV *50 Hz*	0.060 % + 180 mV 0.10 % + 130 mV		B
High Voltage 50 Hz	1 kV to 7 kV 10 kV to 25 kV	0.25 % + 24 V 0.25 % +120 V		B
High Voltage DC	1 kV to 10 kV 10 kV to 25 kV	0.060 % + 40 V 0.060 % + 120 V		B
High Voltage Current 50 Hz	300 µA 3 mA 30 mA 300 mA	0.36 % + 3.4 µA 0.24 % + 8.5 µA 0.58 % + 27 µA 0.23 % + 180 µA		B
High Voltage Current DC	300 µA 3 mA 30 mA 300 mA	0.36 % + 3.4 µA 0.24 % + 8.5 µA 0.58 % + 25 µA 0.23 % + 180 µA		B
Loop impedance 50 Hz	10 mΩ to 90 mΩ 90 mΩ to 320 mΩ 320 mΩ to 490 mΩ 490 mΩ to 1 Ω 1 Ω to 5 Ω 5 Ω to 500 Ω 500 Ω to 1.8 kΩ	3.7 % + 18 mΩ 1.8 % + 18 mΩ 0.90 % + 23 mΩ 0.60 % + 24 mΩ 0.30 % + 43 mΩ 0.10 % + 200 mΩ 0.10 % + 24 Ω		B
RCD Trip Current 50 Hz	1 mA to 30 mA 30 mA to 300 mA 300 mA to 3 A	0.20 % + 38 µA 0.20 % + 1.4 mA 0.20 % + 11 mA		B
RCD Trip time	0 ms to 5 s	0.10 % + 4.7 ms		B
PAT Insulation resistance	10 kΩ to 40 kΩ 40 kΩ to 200 kΩ 200 kΩ to 10 MΩ 10 MΩ to 1 GΩ 1 GΩ to 2 GΩ	0.020 % + 15 Ω 0.025 % + 15 Ω 0.050 % + 590 Ω 0.22 % + 120 kΩ 0.52 % + 120 kΩ		B
Earth Bond resistance	0 Ω to 10 Ω 10 Ω to 1 kΩ	0.30 % + 40 mΩ 0.11 % + 200 mΩ		B
Earth bond current	100 µA to 100 mA 100 mA to 20 A	4.0 mA 0.53 % + 32 mA		B
Leakage current	1 µA to 30 mA	0.52 % + 20 µA		B

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Measured Quantity Instrument or Gauge	Range	Expanded Measurement Uncertainty (k = 2)	Remarks	Location Code
Temperature simulation Thermocouple type				B
K	-180 °C to 0 °C	0.16 °C	Excluding internal reference junction compensation	
	0 °C to 1300 °C	0.14 °C		
J	-200 °C to 0 °C 0 °C to 1190 °C	0.15 °C 0.13 °C		
K	-180 °C to 0 °C	0.64 °C	Including internal reference junction compensation	
	0 °C to 1300 °C	0.63 °C		
J	-200 °C to 0 °C 0 °C to 1190 °C	0.63 °C 0.63 °C		
Resistance thermometer simulation				
PT 100	-200 °C to 0 °C 0 °C to 850 °C	0.21 °C 0.21 °C		
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: $Q[a, b] = [a^2 + b^2]^{1/2}$