

# 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</p> <p>0778</p> <p>Accredited to ISO/IEC 17025:2017</p>	<p><b>Eurotherm Limited</b></p> <p>Issue No: 016    Issue date: 20 August 2021</p>	
	<p>Faraday Close Durrington Worthing West Sussex BN13 3PL</p>	<p>Contact: Mr Karl Haigh Tel: +44 (0)1903 268500 E-Mail: karl.haigh@schneider-electric.com Website: www.eurotherm.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></p> <p>Faraday Close Durrington Worthing West Sussex BN13 3PL</p> <p><b>Local contact</b></p> <p>Mr Karl Haigh</p>	Electrical	Permanent Laboratory

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

Location details	Activity	Location code
<p><b>Customers' sites or premises</b></p> <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><b>Local contact</b></p> <p>Mr Karl Haigh</p>	<p>Electrical Pressure Temperature Time</p>	Site Calibration



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Calibration and Measurement Capability (CMC)

Measured Quantity Instrument or Gauge	Range	Expanded Measurement Uncertainty ( $k = 2$ )	Remarks	Location Code	
ELECTRICAL					
All electrical measurements a carried out using the method of direct comparison or transfer to laboratory reference standards unless otherwise determined in the remarks column.					
Temperature indicators and simulators, calibration by electrical simulation				Site Calibration	
Base metal thermocouples			including cold junction compensation		
Type T	-100 °C to +400 °C	0.40 °C			
Type N	-100 °C to +1300 °C	0.45 °C			
Type K	-100 °C to +1300 °C	0.40 °C			
Type J	-100 °C to +1200 °C	0.40 °C			
Type E	-200 °C to +1000 °C	0.45 °C			
Noble metal thermocouples			including cold junction compensation		
Type S	400 °C to 1760 °C	0.90 °C			
Type R	400 °C to 1760 °C	0.90 °C			
Type B	500 °C to 1820 °C	1.9 °C			
Pt 100 indicators	-100 °C to +400 °C	0.15 °C			
Pt100 simulators	-100 °C to +400 °C	0.11 °C			
DC VOLTAGE					
Generation	0 mV to 100 mV 100 mV to 10 V	0.0125 mV 2.5 mV			
Measurement	0 mV to 100 mV 100 mV to 10 V	0.020 mV 25 mV			
DC CURRENT					
Generation	0 mA to 20 mA	10 µA			
Measurement	0 mA to 20 mA	10 µA			
DC RESISTANCE					
Generation	0 Ω to 1 kΩ	0.35 Ω			
TIME					
Timers	10 s to 200 hr	3.0 s	Including absolute time		



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Measured Quantity Instrument or Gauge	Range	Expanded Measurement Uncertainty ( $k = 2$ )	Remarks	Location Code
<p>PRESSURE</p> <p><u>Gas Pressure (Gauge)</u></p> <p>Calibration of pressure indicating instruments and gauges</p>	-100 kPa to +2 MPa	2.5 kPa	<p>Methods consistent with EURAMET CG3</p> <p>Results may be expressed in other units of pressure as required</p> <p>Calibration of pressure measuring devices with an electrical output may be undertaken</p>	Site Calibration
<p>TEMPERATURE</p> <p>Electronic thermometers with sensors</p>	<p>-40 °C to -20 °C</p> <p>-20 °C to +100 °C</p> <p>100 °C to 140 °C</p>	<p>0.40 °C</p> <p>0.40 °C</p> <p>0.40 °C</p>	<p>Calibration by comparison with reference thermometers</p> <p>Calibration of temperature measuring devices with an electrical output may be undertaken</p>	
<p>Platinum resistance thermometers 3-wire and 4-wire</p>	<p>-40 °C to -20 °C</p> <p>-20 °C to +100 °C</p> <p>100 °C to 140 °C</p>	<p>0.65 °C</p> <p>0.45 °C</p> <p>0.65 °C</p>		
<p>Type T Thermocouples</p>	<p>-40 °C to -20 °C</p> <p>-20 °C to +100 °C</p> <p>100 °C to 140 °C</p>	<p>0.75 °C</p> <p>0.60 °C</p> <p>0.75 °C</p>		
<p>Temperature controlled ovens, furnaces and autoclaves</p>	<p>20 °C to 650 °C</p> <p>650 °C to 1100 °C</p> <p>1100 °C to 1200 °C</p>	<p>2.1 °C</p> <p>2.7 °C</p> <p>4.2 °C</p>	<p>Multiple point measurements Time dependent profiling spatial, survey(ing) or mapping</p>	



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Measured Quantity Instrument or Gauge	Range	Expanded Measurement Uncertainty ( $k = 2$ )	Remarks	Location Code
DC VOLTAGE				Permanent Laboratory
Generate	0 V to 100 mV 100 mV to 300 mV 300 mV to 1 V 1 V to 3 V 3 V to 10 V 10 V to 30 V 30 V to 100 V	3.0 $\mu$ V 6.0 $\mu$ V 13 $\mu$ V 31 $\mu$ V 130 $\mu$ V 350 $\mu$ V 3.0 mV		
Measure	0 V to 100 mV 100 mV to 1 V 1 V to 10 V 10 V to 100 V	3.1 $\mu$ V 29 $\mu$ V 290 $\mu$ V 3.1 mV		
DC CURRENT				
Generate	0 A to 100 $\mu$ A 100 $\mu$ A to 300 $\mu$ A 300 $\mu$ A to 1 mA 1 mA to 3 mA 3 mA to 10 mA 10 mA to 30 mA 30 mA to 100 mA 100 mA to 300 mA 300 mA to 1 A	30 nA 60 nA 200 nA 300 nA 1.2 $\mu$ A 2.7 $\mu$ A 12 $\mu$ A 27 $\mu$ A 200 $\mu$ A		
DC CURRENT (cont'd)				
Measure	0 A to 100 $\mu$ A 100 $\mu$ A to 1 mA 1 mA to 10 mA 10 mA to 100 mA 100 mA to 1 A	4.0 nA 110 nA 1.8 $\mu$ A 8.0 $\mu$ A 220		
Resistance				
Generate	0 $\Omega$ to 10 $\Omega$ 10 $\Omega$ to 100 $\Omega$ 100 $\Omega$ to 1 k $\Omega$	10 m $\Omega$ 20 m $\Omega$ 40 m $\Omega$		
Measure	0 $\Omega$ to 1 $\Omega$ 1 $\Omega$ to 10 $\Omega$ 10 $\Omega$ to 100 $\Omega$ 100 $\Omega$ to 1 k $\Omega$ 1 k $\Omega$ to 10 k $\Omega$	3.1 $\mu$ $\Omega$ 3.2 $\mu$ $\Omega$ 5.0 $\mu$ $\Omega$ 35 $\mu$ $\Omega$ 340 $\mu$ $\Omega$		



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Measured Quantity Instrument or Gauge	Range	Expanded Measurement Uncertainty ( $k = 2$ )	Remarks	Location
Temperature simulation				Permanent Laboratory
Source and Measure				
Thermocouples				
Type T	-200 °C to -150 °C -150 °C to 0 °C 0 °C to 120 °C 120 °C to 400 °C	0.49 °C 0.19 °C 0.13 °C 0.11 °C		
Type S	0 °C to 250 °C 250 °C to 1000 °C 1000 °C to 1400 °C 1400 °C to 1767 °C	0.37 °C 0.29 °C 0.29 °C 0.36 °C		
Type R	0 °C to 250 °C 250 °C to 1000 °C 1000 °C to 1400 °C 1400 °C to 1767 °C	0.45 °C 0.28 °C 0.26 °C 0.32 °C		
Type N	-200 °C to -100 °C -100 °C to -25 °C -25 °C to 120 °C 120 °C to 410 °C 410 °C to 1300 °C	0.32 °C 0.18 °C 0.15 °C 0.14 °C 0.21 °C		
Thermocouples (cont'd)				
Type K	-200 °C to -100 °C -100 °C to -25 °C -25 °C to 120 °C 120 °C to 1000 °C 1000 °C to 1372 °C	0.26 °C 0.15 °C 0.13 °C 0.21 °C 0.32 °C		
Type J	-210 °C to -100 °C -100 °C to -30 °C -30 °C to 150 °C 150 °C to 760 °C 760 °C to 1200 °C	0.21 °C 0.13 °C 0.11 °C 0.14 °C 0.18 °C		
Type E	-250 °C to -100 °C -100 °C to -25 °C -25 °C to 350 °C 350 °C to 650 °C 650 °C to 1000 °C	0.40 °C 0.13 °C 0.11 °C 0.13 °C 0.17 °C		
Type B	600 °C to 800 °C 800 °C to 1000 °C 1000 °C to 1550 °C 1550 °C to 1820 °C	0.35 °C 0.26 °C 0.24 °C 0.21 °C		
Cold junction measurement in thermocouple generate mode		90 m°C		



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Measured Quantity Instrument or Gauge	Range	Expanded Measurement Uncertainty ( $k = 2$ )	Remarks	
PT 100 Source	-200 °C to -80 °C -80 °C to 0 °C 0 °C to 100 °C 100 °C to 300 °C 300 °C to 400 °C 400 °C to 630 °C	40 m°C 40 m°C 55 m°C 70 m°C 80 m°C 95 m°C		
PT 100 Measure	-200 °C to 0 °C 0 °C to 232 °C 232 °C to 400 °C	5.0 m°C 7.0 m°C 14 m°C		
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 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:  $Q[a, b] = [a^2 + b^2]^{1/2}$