

# Schedule of Accreditation

issued by

## United Kingdom Accreditation Service

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

 <b>0043</b>  Accredited to <b>ISO/IEC 17025:2005</b>	<b>Roxspur Measurement and Control Calibration Laboratory</b>	
	Issue No: 056 Issue date: 28 June 2016	
	2 Downgate Drive Sheffield South Yorkshire S4 8BT	Contact: Mr M Donnelly Tel: +44 (0)114 244 2521 Fax: +44 (0)114 243 4838 E-Mail: Mark.Donnelly@ttelectronics.com Website: www.roxspur.com

Calibration performed by the Organisations at the locations specified below

### Locations covered by the organisation and their relevant activities

#### Laboratory locations:

Location details	Activity	Location code
<b>Address</b> 2 Downgate Drive Sheffield South Yorkshire S4 8BT	<b>Local contact</b> Mr Mark Donnelly  Tel: +44 (0)114 244 2521 Fax: +44 (0)114 243 4838 Email: Mark.Donnelly@ttelectronics.com Website: www.roxspur.com	<a href="#">Electrical</a> <a href="#">Flow</a> <a href="#">Pressure</a> <a href="#">Temperature</a>  P1

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

Location details	Activity	Location code
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.	<b>Local contact</b> Mr Mark Donnelly  Tel: +44 (0)114-244 2521 Fax: +44 (0)114-243 4838 Email: mark.donnelly@ttelectronics.com Website: www.roxspur.com	<a href="#">Electrical</a> <a href="#">Pressure</a> <a href="#">Temperature</a>  S



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DETAIL OF ACCREDITATION

Measured Quantity Instrument or Gauge	Range	Calibration and Measurement Capability (CMC) Expressed as an Expanded Uncertainty ( $k = 2$ )	Remarks	Location Code
<b>ELECTRICAL</b>				
DC Voltage	0 V to 200 mV 200 mV to 2 V 2 V to 20 V 20 V to 200 V 200 V to 1000 V	15 ppm + 0.70 $\mu$ V 10 ppm + 0.60 $\mu$ V 10 ppm 15 ppm 15 ppm		P1
DC Current	0 V to 30 V	5.0 mV		S
	0 $\mu$ A to 200 $\mu$ A 200 $\mu$ A to 2 mA 2 mA to 20 mA 20 mA to 200 mA 200 mA to 2 A	50 ppm + 2.0 nA 75 ppm + 15 nA 75 ppm 100 ppm 200 ppm		P1
	0 mA to 100 mA	0.010 mA		S
Generation	320 mA to 3.2 A 3.2 A to 10 A 10 A to 20 A	550 ppm + 150 $\mu$ A 500 ppm + 1.1 mA 0.11 % + 5.2 mA		P1
DC Resistance Measurement	20 A to 1000 A	0.31 %	For the calibration of clampmeters only	
	0 $\Omega$ to 20 $\Omega$ 20 $\Omega$ to 2 k $\Omega$ 2 k $\Omega$ to 20 k $\Omega$ 20 k $\Omega$ to 200 k $\Omega$ 200 k $\Omega$ to 2 M $\Omega$ 2 M $\Omega$ to 20 M $\Omega$ 20 M $\Omega$ to 200 M $\Omega$ 200 M $\Omega$ to 2 G $\Omega$	100 ppm + 2.0 m $\Omega$ 20 ppm + 2.0 m $\Omega$ 20 ppm 30 ppm 50 ppm 200 ppm 700 ppm 0.10 %		P1
AC Voltage	10 mV to 200 mV 20 Hz to 10 kHz 10 kHz to 100 kHz	280 ppm + 8.0 $\mu$ V 550 ppm + 10 $\mu$ V		P1
	200 mV to 200 V 20 Hz to 30 kHz 30 kHz to 100 kHz	400 ppm 480 ppm		
	200 V to 1100 V 45 Hz to 10 kHz 10 kHz to 30 kHz	450 ppm 510 ppm		



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AC Current	20 Hz to 1 kHz 10 $\mu$ A to 200 $\mu$ A 200 $\mu$ A to 200 mA 200 mA to 2 A	250 ppm + 41 nA 350 ppm 600 ppm		P1
	1 kHz to 5 kHz 10 $\mu$ A to 200 $\mu$ A 200 $\mu$ A to 200 mA 200 mA to 2 A	800 ppm + 30 nA 700 ppm 0.13 %		P1
Generation	10 Hz to 3 kHz 2 A to 20 A	0.25 % + 7.0 mA		
	40 Hz to 100 Hz 20 A to 1000 A	0.50 %	For the calibration of clampmeters only	
Frequency	0.1 Hz to 120 MHz	0.7 ppm		P1
Time interval	60 s to 8 hrs	0.40 s		P1
	60 s to 8 hrs	0.60 s		S
Electrical calibration of temperature indicators, controllers and recorders for the following sensors:				
Noble metal thermocouples				
Types R and S	0 °C to 200 °C	0.50 °C	with cold junction compensation	P1
	200 °C to 1700 °C	0.40 °C		
Type B	600 °C to 1700 °C	0.40 °C	with cold junction compensation	P1
Type R and S	0 °C to 200 °C	0.70 °C	with cold junction compensation	S
	200 °C to 1700 °C	0.60 °C		
Type B	600 °C to 1700 °C	0.60 °C	with cold junction compensation	S
Base metal thermocouples	- 200 °C to 0.0 °C	0.26 °C	with cold junction compensation	P1
	0 °C to 1372 °C	0.20 °C		
	- 200 °C to 0.0 °C	0.50 °C	with cold junction compensation	S
	0 °C to 1372 °C	0.40 °C		



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Electrical calibration of temperature indicators, controllers and recorders for the following sensors: (cont'd)				
Pt 100	- 200 °C to + 850 °C	0.050 °C		P1
	- 200 °C to + 850 °C	0.30 °C		S
<b>FLOW</b>				
Flow rate - Gas	0.005 l/min to 0.25 l/min 0.25 l/min to 2.5 l/min 2.5 l/min to 50 l/min	0.53 % 0.34 % 0.43 %	Calibrations medium: Compressed Air Oxygen Argon Carbon Dioxide Nitrous Oxide Helium Nitrogen	P1
<b>PRESSURE</b>				
Gas pressure (absolute)				
Calibration of pressure indicating instruments and gauges	3.5 kPa to 120 kPa 120 kPa to 3.1 MPa	0.015 % + 80 Pa 0.015 % + 80 Pa	Calibration of pressure devices with an electrical output may be undertaken	P1
	3 kPa to 80 kPa 80 kPa to 120 kPa 120 kPa to 2.1 MPa 2.1 MPa to 4.1 MPa	3.0 kPa 400 Pa 3.0 kPa 4.0 kPa		S
Gas pressure (gauge)				
Calibration of pressure indicating instruments and gauges	- 90 kPa to - 1.5 kPa 1.5 kPa to 3 MPa	0.015 % 0.015 %		P1
	- 100 kPa to + 2 MPa 2 MPa to 4 MPa	2.5 kPa 4.0 kPa		S
Hydraulic pressure (absolute)				
Calibration of pressure indicating instruments and gauges	700 kPa to 6.1 MPa 6.1 MPa to 120.1 MPa	0.016 % + 230 Pa 0.02 % + 230 Pa		P1
	10 kPa to 60 MPa	220 kPa		S
Hydraulic pressure (gauge)				
Calibration of pressure indicating instruments and gauges	600 kPa to 6 MPa 6 MPa to 120 MPa	0.016 % 0.020 %		P1
	0 to 70 MPa	220 kPa		S



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<b>TEMPERATURE</b>				
Resistance thermometers	- 196 °C 0 °C to - 80 °C Ice Point (0 °C) Triple Point of water (0.01 °C) Gallium Melt Point (29.7646 °C) 0 °C to 300 °C	0.040 °C 0.050 °C 0.031 °C 0.012 °C 0.010 °C 0.050 °C		P1
Platinum thermocouples	0 °C to 1100 °C 1100 °C to 1600 °C 1064.18 °C 1553.5 °C  0 °C to 1100 °C 1100 °C to 1600 °C  Fixed point calibrations  Gallium Melt Point (29.7646 °C) Tin (231.9 °C) Zinc (419.5 °C)	0.50 °C 1.8 °C 0.50 °C 1.8 °C  2.0 °C 4.0 °C  0.35 °C 0.50 °C 0.50 °C	Au and Pd wire bridge measurements	P1          P1
Other thermocouples	- 196 °C 0 °C to - 80 °C Gallium Melt Point (29.7646 °C) 0 °C to 300 °C 300 °C to 650 °C 650 °C to 1100 °C 1100 °C to 1300 °C  - 80 °C to + 200 °C 200 °C to 1000 °C 1000 °C to 1300 °C	0.26 °C 0.15 °C 0.10 °C 0.15 °C 0.25 °C 1.0 °C 2.5 °C  1.0 °C 3.0 °C 5.0 °C		P1          S
Compensating and extension cables for Noble metal thermocouples Base metal thermocouples	0 °C to 40 °C 0 °C to 40 °C	0.26 °C 0.15 °C		P1
Liquid-in-glass thermometers	- 80 °C to - 40 °C - 40 °C to 0 °C Ice point (0 °C) 0 °C to 100 °C 100 °C to 300 °C	0.11 °C 0.050 °C 0.050 °C 0.050 °C 0.050 °C		P1
Optical Pyrometers	800 °C to 1100 °C 1100 °C to 1600 °C	5.0 °C 8.0 °C	Using effective wavelength of 0.65 μm to 0.66 μm	P1
Radiation thermometers	500 °C to 1100 °C 1100 °C to 1600 °C	4.0 °C 5.0 °C		P1



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<b>TEMPERATURE</b> (cont'd)				
Electronic thermometers with sensors	Range as per sensors	As for sensors		P1
Electronic thermometers with sensors	0 °C to 200 °C	0.50 °C		S
Analogue	200 °C to 600 °C	1.3 °C		
Digital	600 °C to 1100 °C	2.0 °C		
	1100 °C to 1300 °C	3.4 °C		
Metal block calibrators	- 20 °C to + 300 °C	0.050 °C		P1
	300 °C to 1100 °C	1.0 °C		
Temperature surveys				
Autoclaves, incubators and Freezers	- 80 °C to + 200 °C	1.0 °C	Single and multipoint monitoring probes. Time dependent temperature profiling.	S
Ovens, furnaces and environmental chambers	0 °C to 600 °C	1.1 °C		
	600 °C to 1100 °C	1.9 °C		
	1100 °C to 1600 °C	3.5 °C		
END				