Schedule of Accreditation

issued by

United Kingdom Accreditation Service

21 - 47 High Street, Feltham, Middlesex, TW13 4UN, UK

0295

Accredited to ISO/IEC 17025:2005

Haven Automation Limited

Issue No: 032 **Issue date:** 19 October 2011

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Calibration performed at the above address only

DETAIL OF ACCREDITATION

Measured Quantity Instrument or Gauge	Range	Calibration and Measurement Capability (CMC) Expressed as an Expanded Uncertainty (*k*=2)	Remarks
ELECTRICAL			
DC Resistance			
Measurement	0 Ω to 20 Ω 20 Ω to 200 Ω 200 Ω to 2 kΩ 2 kΩ to 20 kΩ 20 kΩ to 200 kΩ 200 kΩ to 2 MΩ 2 MΩ to 20 MΩ 20 MΩ to 200 MΩ 200 MΩ to 1 GΩ	25 ppm + 100 μΩ 30 ppm 20 ppm 20 ppm 20 ppm 35 ppm 100 ppm 200 ppm + 15 kΩ 0.10 % + 1 MΩ	
Generation	0 Ω to 40 Ω 40 Ω to 400 Ω 400 Ω to 4 kΩ 4 kΩ to 40 kΩ 40 kΩ to 400 kΩ 400 kΩ to 4 MΩ 4 MΩ to 40 MΩ 40 MΩ to 400 MΩ	250 ppm + 100 μΩ 100 ppm 100 ppm 100 ppm 100 ppm 120 ppm 300 ppm 300 ppm	
DC Voltage			
Measurement	0 mV to 200 mV 200 mV to 2 V 2 V to 20 V 20 V to 200 V 200 V to 1 kV	2.0 μV 10 ppm 10 ppm 10 ppm 20 ppm	
Generation	0 mV to 320 mV 320 mV to 3.2 V 3.2 V to 32 V 32 V to 320 V 320 V to 1050 V	50 ppm + 2.5 μV 140 ppm 200 ppm 140 ppm 140 ppm	

Measured Quantity Instrument or Gauge	Range	Calibration and Measurement Capability (CMC) Expressed as an Expanded Uncertainty (*k*=2)	Remarks
ELECTRICAL (cont'd)			
DC Current			
Measurement	0 mA to 20 mA 20 mA to 200 mA 200 mA to 2 A	60 ppm + 10 nA 100 ppm 200 ppm	
Generation	0 μA to 320 μA 320 μA to 3.2 mA 3.2 mA to 32 mA 32 mA to 320 mA 320 mA to 3 A 3 A to 10 A	120 ppm + 6.0 nA 300 ppm 300 ppm 0.065 % 0.070 % 0.065 %	
AC Voltage			
Generation	*32 mV to 320 mV* 40 Hz to 30 kHz *320 mV to 320 V* 40 Hz to 30 kHz *320 V to 750 V* 40 Hz to 10 kHz *750 V to 1050 V* 40 Hz to 10 kHz	 0.050 % 0.050 % 0.060 % 0.10 %	
AC Current			
Generation	*32 μA to 320 mA* 10 Hz to 110 Hz 110 Hz to 3 kHz *320 mA to 3 A* 40 Hz to 110 Hz 110 Hz to 3 kHz *3 A to 10 A* 40 Hz to 110 Hz 110 Hz to 3 kHz	 0.045 % 0.13 % 0.060 % 0.080 % 0.080 % 0.18 %	
Capacitance			
Generation	1 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 30 mF	0.30 % 0.20 % 0.20 % 0.20 % 0.20 % 0.20 % 0.35 % 0.35 %	
Frequency			
Generation	0.5 Hz to 200 kHz	0.0020 % + 0.010 Hz	

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Measured Quantity Instrument or Gauge	Range	Calibration and Measurement Capability (CMC) Expressed as an Expanded Uncertainty (k=2)	Remarks
Temperature indicators, calibration by electrical simulation			
Base metal thermocouple	- 50 °C to + 1320 °C	0.30 °C	Including cold junction compensation
	- 50 °C to + 1320 °C	0.060 °C	Excluding cold junction compensation
Noble metal thermocouple	- 50 °C to + 1800 °C	0.70 °C	Including cold junction compensation
	- 50 °C to + 600 °C 600 °C to 1800 °C	0.50 °C to 0.17 °C 0.17 °C	Excluding cold junction compensation
Resistance thermometer (Pt 100)	- 200 °C to 0 °C 0 °C to 250 °C 250 °C to 800 °C	0.0020 °C to 0.012 °C 0.012 °C to 0.025 °C 0.025 °C to 0.030 °C	
Cold junction compensation	At lab ambient temperature	0.15 °C	
Temperature simulators, calibration by electrical simulation			
Base metal thermocouple	- 50 °C to + 1320 °C	0.35 °C	Including cold junction compensation
	- 50 °C to + 1320 °C	0.075 to 0.16 °C	Excluding cold junction compensation
Noble metal thermocouple	- 50 °C to + 1800 °C	0.90 °C	Including cold junction compensation
	- 50 °C to + 1800 °C	0.65 °C to 0.30 °C	Excluding cold junction compensation
Resistance thermometer (Pt 100)	- 200 °C to 0 °C 0 °C to 250 °C 250 °C to 800 °C	0.0020 °C to 0.012 °C 0.012 °C to 0.025 °C 0.025 °C to 0.030 °C	
Cold junction compensation	At lab ambient temperature	0.15 °C	
PRESSURE			NOTES
<u>Hydraulic pressure (gauge)</u>			1 Calibrations may be undertaken expressed in other units of pressure as required.
Calibration of pressure indicating instruments and gauges	550 kPa to 6 MPa 6 MPa to 70 MPa	0.0070 % + 0.16 kPa 0.011 %	
<u>Gas pressure (gauge)</u>			2 Calibration of pressure measuring devices with an electrical output may be undertaken.
Calibration of pressure indicating instruments and gauges	- 90 kPa to - 2.5 kPa 1.5 kPa to 2.5 kPa 2.5 kPa to 100 kPa 100 kPa to 690 kPa 690 kPa to 3.45 MPa	0.015 % 0.030 % 0.0055 % 0.0085 % 0.010 %	

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TEMPERATURE			
Resistance Thermometers	- 70 °C to 0 °C 0 °C 0 °C to 230 °C 230 °C to 420 °C 420 °C to 660 °C	0.070 °C 0.060 °C 0.10 °C 0.11 °C 0.20 °C	
Thermocouples			
Base metal (Type J, K, T & N)	-70 °C to 660 °C	0.42 °C	
Noble metal (Type R, S, B)	50 °C to 660 °C	1.0 °C	
Electronic thermometers with sensors		As for sensor type	
Solid state temperature sensors with indicators	- 70 °C to 0 °C 0 °C to 150 °C	0.070 °C 0.10 °C	
Metal Block calibrators	- 50 °C to + 300 °C 300 °C to 660 °C	0.30 °C 0.55 °C	
Liquid Baths	- 40 °C to + 250 °C	0.20 °C	
Furnaces and ovens	50 °C to 600 °C	3.0 °C	
END			