


Schedule of Accreditation

issued by

United Kingdom Accreditation Service

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

	TDC Calibration	
	Issue No: 001	Issue date: 08 September 2005
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SUMMARY OF ACCREDITATION

Calibration performed on permanent laboratory premises

ELECTRICAL

Ammeters, ac
Ammeters, dc
Calibrators, multimeter
Calibrators, temperature simulation
Capacitance meters
Frequency counters
Frequency meters
Frequency standards
Multimeters, analogue
Multimeters, digital
Oscilloscopes
Power supply units
Pulse generators
Resistance boxes
Resistance meters
Resistors, dc
Resistance thermometer indicators,
electrical calibration
Timers
Thermocouple indicators, electrical
calibration
Voltmeters, ac
Voltmeters, dc

PRESSURE

Gas gauge, indicating instruments
Hydraulic gauge, indicating instruments

TEMPERATURE

Liquid-in-glass thermometers, mercury filled
Liquid-in-glass thermometers, spirit filled
Temperature indicators and recorders, with
temperature sensors



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DETAIL OF ACCREDITATION

Measured Quantity Instrument or Gauge	Range	Best Measurement Capability Expressed as an Expanded Uncertainty (<i>k</i> =2)	Remarks
ELECTRICAL MEASUREMENTS			
DC VOLTAGE			
Measurement	Up to 200 mV 200 mV to 2 V 2 V to 20 V 20 V to 200 V 200 V to 1000 V	10 ppm + 1.6 μV 7.5 ppm + 1.7 μV 7.4 ppm + 2.8 μV 13 ppm + 50 μV 15 ppm + 500 μV	
DC CURRENT			
Measurement	Up to 200 μA 200 μA to 2 mA 2 mA to 20 mA 20 mA to 200 mA 200 mA to 2 A	120 ppm + 500 pA 120 ppm + 5 nA 120 ppm + 50 nA 120 ppm + 1.2 μA 240 ppm + 25 μA	
Generation	2 A to 3 A 3 A to 11 A 11 A to 20.5 A	450 ppm + 50 μA 600 ppm + 600 μA 0.12 % + 870 μA	
DC RESISTANCE			
Measurement	Up 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	23 ppm + 23 μΩ 15 ppm + 70 μΩ 12 ppm + 700 μΩ 12 ppm + 7 mΩ 15 ppm + 70 mΩ 26 ppm + 1.6 Ω 47 ppm + 10 Ω 390 ppm + 10 kΩ 0.37 % + 100 kΩ	
AC VOLTAGE			
Measurement	2 mV to 200 mV 20 Hz to 40 Hz 40 Hz to 10 kHz 10 kHz to 30 kHz 30 kHz to 100 kHz 200 mV to 2V 20 Hz to 40 Hz 40 Hz to 10 kHz 10 kHz to 30 kHz 30 kHz to 100 kHz 100 kHz to 300 kHz 300 kHz to 1 MHz	200 ppm + 7.5 μV 200 ppm + 7.5 μV 400 ppm + 11 μV 900 ppm + 25 μV 140 ppm + 25 μV 140 ppm + 25 μV 200 ppm + 50 μV 600 ppm + 250 μV 0.35% + 2.3 mV 1.2 % + 23 mV	



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Measured Quantity Instrument or Gauge	Range	Best Measurement Capability Expressed as an Expanded Uncertainty ($k=2$)	Remarks
AC VOLTAGE (cont'd)			
Measurement (cont'd)	2 V to 20 V 20 Hz to 40 Hz 40 Hz to 10 kHz 10 kHz to 30 kHz 30 kHz to 100 kHz 100 kHz to 300 kHz 300 kHz to 1 MHz 20 V to 200 V 20 Hz to 40 Hz 40 Hz to 10 kHz 10 kHz to 30 kHz 30 kHz to 100 kHz 100 kHz to 300 kHz 200 V to 300 V 40 Hz to 10 kHz 10 kHz to 30 kHz 300 V to 1 kV 40 Hz to 10 kHz 10 kHz to 30 kHz	140 ppm + 27 μ V 140 ppm + 27 μ V 200 ppm + 48 μ V 600 ppm + 230 μ V 0.35% + 230 μ V 1.2 % + 23 mV 140 ppm + 260 μ V 140 ppm + 260 μ V 200 ppm + 480 μ V 600 ppm + 2.3 mV 0.35% + 2.3 mV 120 ppm + 26 mV 340 ppm + 48 mV 0.14 % + 26 mV 0.14 % + 48 mV	
AC CURRENT			
Measurement	2 μ A to 200 μ A 50 Hz to 1 kHz 1 kHz to 5 kHz 200 μ A to 2 mA 50 Hz to 1 kHz 1 kHz to 5 kHz 2 mA to 20 mA 50 Hz to 1 kHz 1 kHz to 5 kHz 20 mA to 200 mA 40 Hz to 1 kHz 1 kHz to 5 kHz 200 mA to 2 A 40 Hz to 1 kHz 1 kHz to 5 kHz	380 ppm + 20 nA 700 ppm + 20 nA 380 ppm + 0.23 μ A 700 ppm + 0.23 μ A 360 ppm + 2.3 μ A 700 ppm + 2.3 μ A 380 ppm + 23 μ A 700 ppm + 23 μ A 800 ppm + 460 μ A 0.24% + 920 μ A	
CAPACITANCE	3 nF to 10 μ F	0.5% + 50 pF	Simulated capacitance suitable for the calibration of capacitance meters
FREQUENCY			
Measurement	1 Hz to 3 GHz	6 in 10^{11}	
Generation	1 Hz to 3 GHz	6 in 10^{11}	Also suitable for calibration of timer counters averaged over a minimum of 10 seconds gate time



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TIME			
Elapsed time	Up to 1000 s Up to 1000 s	6 in 10^{11} time base plus 5 μ s trigger 0.2 s	For electronically triggered events Manually triggered events
OSCILLOSCOPES			
Vertical deflection	Up to \pm 33 V	0.3% + 120 μ V	
Horizontal deflection	2 ns to 1 ms 1 ms to 100 ms 100 ms to 5 s	0.003% 0.015% 0.6%	
Bandwidth			
Levelled sine wave	10 mV to 100 mV 100 mV to 5.5 V	3 % 2 %	The 3 dB point and associated uncertainty will be reported as a frequency
ELECTRICAL TEMPERATURE SIMULATION			
Resistance thermometer (Pt 100)	-200°C to 800°C	0.08°C	
Temperature simulators, calibration by electrical simulation			
Type K thermocouple	-200°C to 0°C	0.1°C	excluding cold junction compensation
Type K thermocouple	0°C to 1370°C	0.08°C	excluding cold junction compensation
Type K thermocouple	-200°C to 0°C	0.13°C	including cold junction compensation
Type K thermocouple	0°C to 1370°C	0.12°C	including cold junction compensation
			Other thermocouple types may be calibrated, the degrees equivalent to μ V will be calculated in accordance with the prevailing ITS 90 tables
Cold junction compensation	At ambient temperature	0.1°C	20°C \pm 3°C
Temperature indicators, calibration by electrical simulation			As per simulators plus resolution and stability of UUT
PRESSURE			
<u>Gas pressure (gauge)</u>			
Calibration of pressure indicating instruments and gauges	3.5 kPa to 2.6 MPa	0.01%	Pressure Instruments with an electrical output may be calibrated



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PRESSURE (cont'd) <u>Hydraulic pressure (gauge)</u> Calibration of pressure indicating instruments and gauges	500 kPa to 121 MPa	0.01% + 100 Pa	
TEMPERATURE Temperature indicators and recorders, with temperature sensors	-30 °C to 0 °C above 0 °C to 125 °C above 125 °C to 400 °C	0.3 °C 0.15 °C 1.0 °C	

END