


Schedule of Accreditation

issued by

United Kingdom Accreditation Service

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

 <p style="text-align: center;">0819</p> <p style="text-align: center;">Accredited to ISO/IEC 17025:2005</p>	<h3 style="margin: 0;">TDC Calibration</h3> <p style="margin: 0;">Issue No: 005 Issue date: 20 May 2009</p>	
	<p>Bankhead Industrial Estate</p> <p>Bankhead Avenue</p> <p>Bucksburn</p> <p>Aberdeen</p> <p>AB21 9ET</p>	<p>Contact: Mr Bill Findlay</p> <p>Tel: +44 (0)1224 710033</p> <p>Fax: +44 (0)1224 710099</p> <p>E-Mail: bill.findlay@tdcaberdeen.co.uk</p> <p>Website: www.tdcaberdeen.co.uk</p>
<p>Calibration performed at the above address only</p>		

DETAIL OF ACCREDITATION

Measured Quantity Instrument or Gauge	Range	Best Measurement Capability Expressed as an Expanded Uncertainty ($k=2$)	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 μ V 7.5 ppm + 1.7 μ V 7.4 ppm + 2.8 μ V 13 ppm + 50 μ V 15 ppm + 500 μ V	
	1 kV to 10 kV 10 kV to 40 kV	1.5 % 2.0 %	
DC CURRENT			
Measurement	Up to 200 μ A 200 μ A 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 μ A 240 ppm + 25 μ A	
Generation	2 A to 3A 3 A to 11 A 11 A to 20.5 A	450 ppm + 50 μ A 600 ppm + 600 μ A 0.12 % + 870 μ A	
	20 A to 150 A 150 A 1000 A	0.3 % + 0.02 A 0.3 % + 0.06 A	Using a multi turn coil
DC RESISTANCE			
Measurement	Up to 20 Ω 20 Ω to 200 Ω 200 Ω to 2 k Ω 2 k Ω to 20 k Ω 20 k Ω to 200 k Ω 200 k Ω to 2 M Ω 2 M Ω to 20 M Ω 20 M Ω to 200 M Ω 200 M Ω to 1 G Ω	23 ppm + 23 μ Ω 15 ppm + 70 μ Ω 12 ppm + 700 μ Ω 12 ppm + 7 m Ω 15 ppm + 70 m Ω 26 ppm + 1.6 Ω 47 ppm + 10 Ω 390 ppm + 10 k Ω 0.37 % + 100 k Ω	



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Measured Quantity Instrument or Gauge	Range	Best Measurement Capability Expressed as an Expanded Uncertainty (k=2)	Remarks
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 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 1 kV to 25 kV @ 50 Hz	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 140 ppm + 27 μV 140 ppm + 27 μV 200 ppm + 48 μV 600 ppm + 230 μV 0.35% + 230 μV 1.2 % + 23 mV 140 ppm + 260 μV 140 ppm + 260 μV 200 ppm + 480 μV 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 4.0 %	Measurement only
AC CURRENT Measurement	2 μA to 200 μA 50 Hz to 1 kHz 1 kHz to 5 kHz 200 μA 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	380 ppm + 20 nA 700 ppm + 20 nA 380 ppm + 0.23 μA 700 ppm + 0.23 μA 360 ppm + 2.3 μA 700 ppm + 2.3 μA	



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AC CURRENT (cont'd)			
Measurement (cont'd)	20 mA to 200 mA 40 Hz to 1 kHz 1 kHz to 5 kHz	380 ppm + 23 μ A 700 ppm + 23 μ A	
	200 mA to 2 A 40 Hz to 1 kHz 1 kHz to 5 kHz	800 ppm + 460 μ A 0.24% + 920 μ A	
Generation	2 A to 3A 45 Hz to 1 kHz 3 A to 11 A 45 Hz to 400 Hz 11 A to 20.5 A 45 Hz to 400 Hz	0.07 % + 120 μ A 0.08% + 2.3 mA 0.14 % + 6 mA	
	20 A to 150 A 45 Hz to 400 Hz 150 A to 1000 A 45 Hz to 400 Hz	0.33 % + 0.02 A 0.35 % + 0.1 A	Using a multi turn coil
CAPACITANCE	3 nF to 10 μ F	0.6% + 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
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.
Additional Measurements in support of 17 th Edition type test equipment.			
RCD Current	3 mA to 3 A (50 Hz)	0.2 % + 0.2 mA	
RCD Time	20 ms to 5 s	1 ms	
Loop Impedance	50 m Ω to 1 k Ω	1.5 % + 1 m Ω	



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OSCILLOSCOPES (cont'd)			
Earth bond resistance	50 mΩ to 1 kΩ	0.2 % + 2.5 mΩ	
Earth bond current	100 mA 10 A and 20 A	0.1 % + 1 mA	
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 1372 °C	0.5 °C	excluding cold junction compensation
Type K thermocouple	-200°C to 1372 °C	0.5°C	including cold junction compensation
			Other thermocouple types may be calibrated, the degrees equivalent to μV will be calculated in accordance with the prevailing BS EN 60584-1 tables
Cold junction compensation	At ambient temperature	0.1 °C	20°C ± 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	0.007%	Pressure Instruments with an electrical output may be calibrated.
<u>Hydraulic pressure (gauge).</u>			
Calibration of pressure indicating instruments and gauges	600 kPa to 7 MPa 7 MPa to 120 MPa	0.008% + 100 Pa 0.01%	



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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			