TRACEABLE MEASUREMENT CAPABILITY

Measured Quantity	Range	Calibration & Measurement Capability (±)	Remarks
DC Voltage			
Generation Only	0 mV to 200 mV	15 ppm + 3 µV	
	200 mV to 2 V	6 ppm + 2 µV	
	2 V to 20 V	5 ppm + 3 µV	
	20 V to 200 V	7 ppm + 50 µV	
	200 V to 1000 V	13 ppm + 250 µV	
	1 kV to 30 kV	0.5 %	
Measurement Only	0 mV to 200 mV	15 ppm + 3 µV	
	200 mV to 2 V	6 ppm + 2 µV	
	2 V to 20 V	5 ppm + 3 µV	
	20 V to 200 V	7 ppm + 50 µV	
	200 V to 1000 V	15 ppm	
	1 kV to 30 kV	0.5 %	
DC Resistance			
Measurement and Generation	0 to 20 Ω,	20 ppm + 0.15 mΩ	
	20 Ω to 200 kΩ,	15 ppm + 0.15 mΩ	
	200 kΩ to 2 MΩ,	24 ppm	
	2 MΩ to 10 MΩ	70 ppm	
Measurement Only	10 MΩ to 100 MΩ	0.025 %	
	200 MΩ to 1 GΩ	0.245 %	
	10 GΩ	0.18 %	
	100 GΩ	0.50 %	
	1 TΩ	1 %	
Generation Only Specific Values	100 µΩ	0.3 %	
	1 mΩ	0.035 %	
	10 mΩ	0.031 %	
	100 mΩ	80 ppm	
	1 Ω	55 ppm	
	10 Ω	25 ppm	
	100 Ω	15 ppm	
	1 kΩ	10 ppm	
	10 kΩ	9 ppm	
	100 kΩ	12 ppm	
	1 MΩ	25 ppm	
	10 MΩ	44 ppm	
Current Carrying Resistors	At 10 A:-		
	100 µΩ	0.33 %	
	1 mΩ	0.035 %	
	10 mΩ	0.015 %	
	At 1 A:-		
	100 mΩ	75 ppm	
	1 Ω	51 ppm	

---- Continued on Page 2 ----

TRACEABLE MEASUREMENT CAPABILITY

Measured Quantity	Range	Calibration & Measurement Capability (±)	Remarks
DC Resistance			
Generation Only	100 MΩ	0.03 %	@ 10, 250, 500, 1 kV
Specific Values	1 GΩ	0.04 %	@ 100, 250, 500, 1 kV
	10 GΩ	0.35 %	@ 100, 250, 500, 1 kV
	100 GΩ	0.5 %	@ 250, 500, 1 kV
	1 TΩ	1 %	@ 250, 500, 1 kV
Direct Current			
Measurement and Generation			
Specific Values	10 µA	30 ppm	
	100 µA	30 ppm	
	1 mA	35 ppm	
	10 mA	40 ppm	
	100 mA	65 ppm	
	1 A	90 ppm	
Other Values	0 µA to 200 µA	80 ppm + 0.5 nA	
	200 µA to 2 mA	80 ppm + 5 nA	
	2 mA to 20 mA	90 ppm + 50 nA	
	20 mA to 200 mA	80 ppm + 2 µA	
	200 mA to 2 A	100 ppm + 25 µA	
	2 A to 10 A	0.035 %	
	10 A to 20 A	0.05 %	
	20 A to 50 A	0.10 %	
Measurement Only	50 A to 250 A	0.11 %	
Generation Only	0 µA to 200 µA	40 ppm + 1 nA	
	200 µA to 2 mA	35 ppm + 10 nA	
	2 mA to 20 mA	35 ppm + 100 nA	
	20 mA to 200 mA	35 ppm + 1 µA	
	200 mA to 2 A	65 ppm + 10 µA	
	2 A to 10 A	140 ppm	
	20 A to 1000 A	0.3 %	Current Clamps Only
AC Voltage			
Measurement	40 Hz to 4 kHz:		
	10 mV to 200 mV	0.040 % + 5.0 µV	
	200 mV to 2 V	0.025 % + 30 µV	
	2 V to 20 V	0.025 % + 0.30 mV	
	20 V to 200 V	0.025 % + 3.0 mV	
	200 V to 1000 V	0.030 % + 30 mV	
	1 kV to 28 kV	1 %	@ 50 Hz only
	4 kHz to 30 kHz:		
	200 mV to 2 V	0.040 % + 50 µV	
	2 V to 20 V	0.040 % + 0.50 mV	

---- Continued on Page 3 ----

TRACEABLE MEASUREMENT CAPABILITY

Measured Quantity	Range	Calibration & Measurement Capability (±)	Remarks
AC Voltage Measurement (cont.)	30 kHz to 100 kHz:		
	200 mV to 2 V	0.04% + 0.5 mV	
	2 V to 20 V	0.04% + 5 mV	
	10 kHz to 500 MHz:		
	30 µV to 1 V	3.75 %	
	500 MHz to 1 GHz:		
	30 µV to 1 V	6.25 %	
AC Voltage Generation	10 mV to 20 mV:		
	40 Hz to 10 kHz	0.03 % + 5 µV	
	10 kHz to 100 kHz	0.05 % + 5 µV	
	20 mV to 200 mV:		
	40 Hz to 10 kHz	0.02 % + 5 µV	
	10 kHz to 100 kHz	0.06 % + 5 µV	
	200 mV to 2 V:		
	40 Hz to 10 kHz	0.013 %	
	10 kHz to 100 kHz	0.015 %	
	2 V to 20 V:		
	40 Hz to 10 kHz	0.013 %	
	10 kHz to 100 kHz	0.017 %	
	20 V to 200 V:		
	40 Hz to 30 kHz	0.013 %	
	200 V to 1000 V:		
	40 Hz to 1 kHz	0.013 %	
	1 kHz to 10 kHz	0.014 %	
	10 kHz to 30 kHz	0.017 %	
Alternating Current Measurement	40 Hz to 1 kHz:		
	20 µA to 200 µA	0.017 % + 5 nA	
	200 µA to 2 mA	0.016 % + 50 nA	
	2 mA to 20 mA	0.016 % + 0.5 µA	
	20 mA to 200 mA	0.016 % + 5 µA	
	200 mA to 2 A	0.027 % 50 µA	
	40 Hz to 400 Hz		
	2 A to 50 A	0.2 %	

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TRACEABLE MEASUREMENT CAPABILITY

Measured Quantity	Range	Calibration & Measurement Capability (±)	Remarks
Alternating Current			
Generation (cont.)	40 Hz to 1 kHz:		
	20 µA to 200 mA	0.020 %	
	200 mA to 2 A	0.030 %	
	2 A to 10 A	0.050 %	
	10 Hz to 100 Hz		
	20 A to 1000 A	0.8 %	Current Clamps Only
Frequency			
Measurement	0.1 Hz to 100 kHz	2 parts in 10^7 + 30 µHz	
	100 kHz to 1 MHz	2 parts in 10^7	
	1 MHz to 1 GHz	2 parts in 10^8	
Generation	1 MHz and 10 MHz	5 parts in 10^{10}	
	10 MHz to 26 GHz	2 parts in 10^8	
Time/Period	> 100 ns	2 parts in 10^7 to 0.5 %	
Risetime	1 ns to 20 ns	90 ps	
AC Power	10 MHz to 18 GHz		
	1 µW to 100 mW	2.5 %	50 Ω System
Modulation			
Carrier Frequency: 3 MHz to 1.5 GHz			
AM: 0 % to 100 %	50 Hz to 30 kHz	1 %	
FM: 0 kHz to 150 kHz	50 Hz to 30 kHz	1 %	
Distortion	20 Hz to 20 kHz	+/- 1 dB	
	20 kHz to 50 kHz	+ 1 dB, - 2 dB	
	50 kHz to 110 kHz	+ 1.5 dB, - 4 dB	

---- Continued on Page 5 ----

TRACEABLE MEASUREMENT CAPABILITY

Measured Quantity	Range	Calibration & Measurement Capability (±)	Remarks
Attenuation	40 Hz to 100 kHz + 60 dB to – 60 dB	0.2 %	
	10 kHz to 500 MHz 0 dB to – 60 dB	3.75 %	
	3 MHz to 18 GHz 0 dB to – 30 dB	0.005 dB/10 dB	
	10 MHz to 1.2 GHz 0 dB to – 120 dB	0.05 dB/10 dB	
Phase	10 Hz to 100 kHz 0 º to 360 º	0.1 º	
Capacitance Measurement	1 kHz 1 pF to 160 µF	0.1 % + 0.01 pF	
Generation Specific Values	1 kHz 100 pF 1 nF 10 nF 100 nF 1 uF	 0.05 % + 0.1 pF 0.09 % + 0.1 pF 0.03 % 0.02 % 0.02 %	
Other Values	DC 100 pF to 100 µF	0.1 %	
	≤ 350 Hz 0.5000 nF to 4.0000 nF 4.0001 nF to 40.000 nF 40.001 nF to 400.00 nF 400.01 nF to 4.0000 mF 4.0001 mF to 40.000 mF 40.001 mF to 400.00 mF 400.01 mF to 4.0000 mF 4.0001 mF to 40.000 mF	 0.3 % + 15pF 0.3 % + 30pF 0.3 % + 160pF 0.4 % + 1.6nF 0.5 % + 16.0nF 0.5 % + 160nF 0.5 % + 1.6mF 1.0 % + 60mF	
	350 Hz to 1.5 kHz 0.5000 nF to 4.0000 nF 4.0001 nF to 40.000 nF 40.001 nF to 400.00 nF 400.01 nF to 4.0000 mF 4.0001 mF to 40.000 mF 40.001 mF to 400.00 mF 400.01 mF to 4.0000 mF 4.0001 mF to 40.000 mF	 0.6 % + 30.0pF 0.6 % + 60.0pF 0.6 % + 320pF 0.8 % + 3.2nF 1.0 % + 32.0nF 1.0 % + 320nF 1.0 % + 3.2mF 2.0 % + 120mF	

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TRACEABLE MEASUREMENT CAPABILITY

Measured Quantity	Range	Calibration & Measurement Capability (±)	Remarks
Inductance	1 kHz		
Measurement	0 H to 1600 H	0.1 + 0.1 µH	
	1 kHz		
Generation	100 µH	0.02 % + 0.12 µH	
Specific Values	1 mH	0.02 % + 0.12 µH	
	10 mH	0.02 % + 0.12 µH	
	100 mH	0.02 % + 0.12 µH	
	1 H	0.02 % + 0.12 µH	
Installation Testers			
Loop Impedance		0.5 %	
Continuity Resistance		0.5 %	
Continuity Current		1.3 %	
RCD Current		1.2 % + 1 mA	
RCD Timing		0.5 % + 1 ms	
Earth Bond Resistance		1 %	
Earth Bond Current		1.5 %	
PAT Leakage		1.5 %	
RPM			
Simulation	6 RPM to 1200000 RPM	1 ppm + 0.002 RPM	Using an electrical calibration test rig.
Contact	300 RPM to 11000 RPM	0.1 RPM	Using a mechanical calibration test rig.

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TRACEABLE MEASUREMENT CAPABILITY

Measured Quantity	Range	Calibration & Measurement Capability (±)	Remarks
Temperature			
Electrical Calibration Thermocouples	Type Range ºC		
	K - 200 to 1370	0.10 ºC	Backing Off Method
	J - 200 to 1200	0.10 ºC	Backing Off Method
	T - 200 to 400	0.10 ºC	Backing Off Method
	E - 100 to 1000	0.10 ºC	Backing Off Method
	N - 50 to 1300	0.15 ºC	Backing Off Method
	R + 100 to 1750	0.50 ºC	Backing Off Method
	S + 100 to 1750	0.50 ºC	Backing Off Method
	B + 250 to 450	1.00 ºC	Backing Off Method
	B + 450 to 1800	0.60 ºC	Backing Off Method
Resistance Thermometers	Pt100 - 200 to 850 ºC	0.02 ºC	
Nominal Ambient	20 ºC	0.06 ºC	
System Calibration	- 20 ºC to 500 ºC:		
	≤ 100 ºC	0.03 ºC	
	> 100 ºC	0.06 ºC	
iR (Blackbody) Calibration	Ambient to 300 ºC	0.5 % reading + 0.1 ºC	
Sound Level	94 dB	0.12 dB	
	104 dB	0.12 dB	
	114 dB	0.14 dB	
Relative Humidity	5 %rh to 95 %rh	2 %rh	Sourcing Only @ 0 ºC to 60 ºC ± 0.3 ºC
Air Flow	1 L/min to 26 L/min	0.2 L/min	
Torque	0.04 Nm to 1000 Nm	1 %	

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TRACEABLE MEASUREMENT CAPABILITY

Measured Quantity	Range	Calibration & Measurement Capability (±)	Remarks
Crimp Pull Tests	≤ 250 N 250 N to 1000 N	0.2 N 2.0 N	
Air Speed / Velocity	0 to 10 m/s 10 to 20 m/s	0.5 % + 0.2 m/s 0.5 % + 0.3 m/s	
Pressure			
Air only	- 200 mbar to + 200 mbar - 0.95 bar to 3.5 bar 0 to 7 bar	0.06 mbar 0.35 mbar 3.5 mbar	Pressure uncertainties are for guidance only. The actual "Quoted" uncertainties are derived from the current Calibration Certificate of the Standard used.
Air and Hydraulic	0 to 20 bar 0 to 200 bar	5 mbar 50 mbar	
Hydraulic Only	0 to 700 bar	175 mbar	
Absolute (Air Only)	0.1 to 2.5 bar 0.1 to 25 bar	0.5 mbar 5 mbar	
Weight Generation Only	Available Weights: 10 mg (x 1) 20 mg (x 2) 50 mg (x 1) 100 mg (x 1) 200 mg (x 2) 500 mg (x 1) 1 g (x 2) 2 g (x 4) 5 g (x 2) 10 g (x 3) 20 g (x 6) 50 g (x 3) 100 g (x 3) 200 g (x 4) 500 g (x 2) 1 kg (x 13) 2 kg (x 4) 5 kg (x 3) 10 kg (x 12) 20 kg (x 19) 25 kg (x 4)	 0.1 mg/weight 0.1 mg/weight 0.1 mg/weight 0.1 mg/weight 0.2 mg/weight 0.2 mg/weight 0.2 mg/weight 0.3 mg/weight 0.3 mg/weight 0.4 mg/weight 0.5 mg/weight 0.6 mg/weight 1 mg/weight 2 mg/weight 5 mg/weight 10 mg/weight 20 mg/weight 50 mg/weight 100 mg/weight 200 mg/weight 250 mg/weight	

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TRACEABLE MEASUREMENT CAPABILITY

Measured Quantity	Range	Calibration & Measurement Capability (±)	Remarks
Inclinometers	0 to 360 º	12 Seconds of Arc	
Light Meters			
Illuminance	1 to 10 lux 10 to 20 lux 20 to 200 lux 200 to 1000 lux 1000 to 2000 lux 2000 to 20000 lux	3 % 5 % 3 % 3 % 3 % 8.5 %	Illuminance uncertainties are for guidance only. The actual "Quoted" uncertainties are derived from the current Calibration Certificate of the Standard used.
Conductivity Solutions	Nominal Value		
	1413 µS/cm 12 880 µS/cm 111 800 µS/cm	5 µS/cm 50 µS/cm 400 µS/cm	Sourcing Only Sourcing Only Sourcing Only
pH Buffer Solutions	Nominal Value		
	pH 4 pH 7 pH 10	0.01 pH 0.01 pH 0.01 pH	Sourcing Only Sourcing Only Sourcing Only
Dimensional	0 to 25 mm 25 mm to 300 mm	0.002 mm 0.03 mm	Measurements made using digital micrometers and digital calipers.

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