TRACEABLE MEASUREMENT CAPABILITY

MEASURED QUANTITY	RANGE	BEST 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	13 ppm + 250 µV	
	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	20 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	
	100 MΩ	200 ppm	@ 10, 250, 500, 1 kV
	1 GΩ	500 ppm	@ 100, 250, 500, 1 kV
	10 GΩ	500 ppm	@ 100, 250, 500, 1 kV
	100 GΩ	0.2 %	@ 250, 500, 1 kV
	1 TΩ	0.3 %	@ 250, 500, 1 kV

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TRACEABLE MEASUREMENT CAPABILITY

MEASURED QUANTITY	RANGE	BEST MEASUREMENT CAPABILITY (±)	REMARKS
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 %	
	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	
	4 kHz to 30 kHz:		
	200 mV to 2 V	0.040 % + 50 µV	
	2 V to 20 V	0.040 % + 0.50 mV	
	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 %	

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TRACEABLE MEASUREMENT CAPABILITY

MEASURED QUANTITY	RANGE	BEST MEASUREMENT CAPABILITY (±)	REMARKS
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 %	
Generation	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

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TRACEABLE MEASUREMENT CAPABILITY

MEASURED QUANTITY	RANGE	BEST MEASUREMENT CAPABILITY (±)	REMARKS
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	
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	

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TRACEABLE MEASUREMENT CAPABILITY

MEASURED QUANTITY	RANGE	BEST MEASUREMENT CAPABILITY (±)	REMARKS
Capacitance			
Measurement	1 kHz		
	1 pF to 160 µF	0.1 % + 0.01 pF	
Generation	1 kHz		
Specific Values	100 pF	0.03 % + 0.1 pF	
	1 nF	0.03 % + 0.1 pF	
	10 nF	0.03 % + 0.1 pF	
	100 nF	0.03 % + 0.1 pF	
	1 uF	0.03 % + 0.1 pF	
Other Values	DC		
	100 pF to 100 µF	0.1 %	
	≤ 350 Hz		
	0.5000 nF to 4.0000 nF	0.3 + 15pF	
	4.0001 nF to 40.000 nF	0.3 + 30pF	
	40.001 nF to 400.00 nF	0.3 + 160pF	
	400.01 nF to 4.0000 mF	0.4 + 1.6nF	
	4.0001 mF to 40.000 mF	0.5 + 16.0nF	
	40.001 mF to 400.00 mF	0.5 + 160nF	
	400.01 mF to 4.0000 mF	0.5 + 1.6mF	
	4.0001 mF to 40.000 mF	1.0 + 60mF	
	350 Hz to 1.5 kHz		
	0.5000 nF to 4.0000 nF	0.6 + 30.0pF	
	4.0001 nF to 40.000 nF	0.6 + 60.0pF	
	40.001 nF to 400.00 nF	0.6 + 320pF	
	400.01 nF to 4.0000 mF	0.8 + 3.2nF	
	4.0001 mF to 40.000 mF	1.0 + 32.0nF	
	40.001 mF to 400.00 mF	1.0 + 320nF	
	400.01 mF to 4.0000 mF	1.0 + 3.2mF	
	4.0001 mF to 40.000 mF	2.0 + 120mF	
Inductance			
Measurement	1 kHz		
	0 H to 1600 H	0.1 + 0.1 µH	
Generation	1 kHz		
Specific Values	100 µH	0.02 % + 0.12 µH	
	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	

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TRACEABLE MEASUREMENT CAPABILITY

MEASURED QUANTITY	RANGE	BEST MEASUREMENT CAPABILITY (±)	REMARKS
Temperature			
Electrical Calibration	Type Range ºC		
Thermocouples	K - 200 to 1370	0.10 ºC	
	J - 200 to 1200	0.10 ºC	
	T - 200 to 400	0.10 ºC	
	E - 100 to 1000	0.10 ºC	
	N - 50 to 1300	0.15 ºC	Backing Off Method
	R + 100 to 1750	0.50 ºC	
	S + 100 to 1750	0.50 ºC	
	B + 250 to 450	1.00 ºC	
	B + 450 to 1800	0.60 ºC	
Resistance Thermometers	Pt100 - 200 to 850 ºC	0.02 ºC	
Nominal Ambient	20 ºC	0.06 ºC	
System Calibration	- 20 ºC to 500 ºC	0.06 ºC	
iR (Blackbody) Calibration	Ambient to 300 ºC	0.5 % reading + 0.1 ºC	
Sound Level	94 dB, 104 dB, 114 dB	0.2 dB	Sourcing Only
Relative Humidity	5 %RH to 95 %RH	2 %RH	At 0 ºC to 60 ºC
Air Flow	1 L/min to 26 L/min	0.2 L/min	
Torque	0.04 Nm to 1000 Nm	1 %	
Crimp Pull Tests	≤ 250 N	0.2 N	
	250 N to 1000 N	2.5 N	
Air Speed / Velocity			
	0 to 10 m/s	0.5 % + 0.2 m/s	
	10 to 20 m/s	0.5 % + 0.3 m/s	

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TRACEABLE MEASUREMENT CAPABILITY

MEASURED QUANTITY	RANGE	BEST MEASUREMENT CAPABILITY (±)	REMARKS
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	These 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			
	10 mg to 100 mg 200 mg to 500 mg 1 g to 5 g 10g to 20 g 50g to 100 g >100 g to 600 kg	0.1 mg 0.2 mg 0.3 mg 0.5 mg 1 mg 0.005 %	Sourcing Only
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 %	These uncertainties are for guidance only. The actual "Quoted" uncertainties are derived from the current Calibration Certificate of the Standard used.
Luminance	Nominal Value		
	2 cd m^{-2} 20 cd m^{-2} 30 cd m^{-2} 200 cd m^{-2} 2000 cd m^{-2} 20 000 cd m^{-2}	4.4 % 4.4 % 4.4 % 4.4 % 4.4 % 4.4 %	These uncertainties are for guidance only. The actual "Quoted" uncertainties are derived from the current Calibration Certificate of the Standard used.

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TRACEABLE MEASUREMENT CAPABILITY

MEASURED QUANTITY	RANGE	BEST MEASUREMENT CAPABILITY (±)	REMARKS
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
pH Buffer Solutions	Nominal Value		
	pH 4 pH 7 pH 10	0.01 pH 0.01 pH 0.01 pH	Sourcing Only

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