

Keithley Instruments, Inc.

28775 Aurora Road
Cleveland, Ohio 44139
1-888-KEITHLEY
www.keithley.com

A. SPECIFICATION CONDITIONS

1. 23C +/-5C, 1 year
2. RH between 5% and 60% after 1 hour warm-up
3. All specs assume 2-wire operation.
4. Basic system V/A errors can be eliminated when used as a 4-wire system.
5. All specs are based on 1 year calibration cycle for individual instruments.
6. Measurement Specifications @ 1 PLC (Power Line Cycle) unless otherwise noted.

B. General I/V Source Specs

7. Maximum Output Power per SMU: 20W (four quadrant source or sink operation).
8. Compliance: Compliance resolution and accuracy are determined by the corresponding range used.

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S530 Basic Parametric Test System Specifications**Current Measure Specifications**

Current Range	Max Voltage	SOURCE		
		Resolution	Accuracy	
10 A	5 V	200 uA	0.50 % +	40 mA + 601 pA/V
1.5 A	20 V	50 uA	0.06 % +	4 mA + 601 pA/V
1 A	200 V	20 uA	0.05 % +	1.8 mA + 601 pA/V
100 mA	200 V	2 uA	0.03 % +	30 uA + 601 pA/V
10 mA	200 V	200 nA	0.03 % +	6 uA + 601 pA/V
1 mA	200 V	20 nA	0.03 % +	300 nA + 601 pA/V
100 uA	200 V	2 nA	0.03 % +	60.3 nA + 601 pA/V
10 uA	200 V	200 pA	0.03 % +	5.3 nA + 601 pA/V
1 uA	200 V	20 pA	0.03 % +	1101 pA + 601 pA/V
100 nA	200 V	2 pA	0.06 % +	401 pA + 601 pA/V

Current Measure Specifications

Current Range	Max Voltage	MEASURE		
		Resolution	Accuracy	
10 A	5 V	100 uA	0.40 % +	25 mA + 601 pA/V
1.5 A	20 V	10 uA	0.05 % +	3.5 mA + 601 pA/V
1 A	200 V	10 uA	0.03 % +	1.5 mA + 601 pA/V
100 mA	200 V	1 uA	0.02 % +	20 uA + 601 pA/V
10 mA	200 V	100 uA	0.02 % +	2.5 uA + 601 pA/V
1 mA	200 V	10 nA	0.02 % +	200.3 nA + 601 pA/V
100 uA	200 V	1 nA	0.02 % +	25.3 nA + 601 pA/V
10 uA	200 V	100 nA	0.03 % +	1.801 nA + 601 pA/V
1 uA	200 V	10 pA	0.03 % +	801 pA + 601 pA/V
100 nA	200 V	1 pA	0.06 % +	401 pA + 601 pA/V

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Voltage Measure Specifications

Voltage Range	Max Current	SOURCE			
		Resolution	Accuracy		
200 V	1 A	5 mV	0.02 % +	50 mV +	3 V/A
20 V	1.5 A	500 uV	0.02 % +	5 mV +	3 V/A
2 V	10 A	50 uV	0.02 % +	626 uV +	3 V/A
200 mV	10 A	5 uV	0.02 % +	401 uV +	3 V/A

Voltage Measure Specifications

Voltage Range	Max Current	MEASURE			
		Resolution	Accuracy		
200 V	1 A	1 mV	0.015 % +	50 mV +	3 V/A
20 V	1.5 A	100 uV	0.015 % +	5 mV +	3 V/A
2 V	10 A	10 uV	0.02 % +	376 uV +	3 V/A
200 mV	10 A	1 uV	0.015 % +	251 uV +	3 V/A

CV Measurement Specifications

4210-CVU Typical accuracy with 3m cables

Measured Capacitance	1kHz	10kHz	100kHz	1MHz	10MHz
1 pF	N/A	8.50 %	2.05 %	0.57 %	N/A
10 pF	N/A	0.96 %	0.23 %	0.21 %	1.00 %
100 pF	N/A	0.29 %	0.20 %	0.17 %	1.00 %
1 nF	0.72 %	0.17 %	0.12 %	0.18 %	2.00 %
10 nF	0.28 %	0.12 %	0.13 %	0.27 %	2.00 %
100 nF	0.12 %	0.13 %	0.22 %	1.16 %	N/A
1 uF	0.17 %	0.21 %	N/A	N/A	N/A

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S530 Low-Current Parametric Test System Specifications
Current Source Specifications

Current Range	Max Voltage	SOURCE		
		Resolution	Accuracy	
10 A	5 V	200 uA	0.50 % +	40.0 mA + 0.8 pA/V
1.5 A	20 V	50 uA	0.06 % +	4.0 mA + 0.8 pA/V
1 A	200 V	20 uA	0.05 % +	1.8 mA + 0.8 pA/V
100 mA	200 V	2 uA	0.03 % +	30.0 uA + 0.8 pA/V
10 mA	200 V	200 nA	0.03 % +	6.0 uA + 0.8 pA/V
1 mA	200 V	20 nA	0.03 % +	300.0 nA + 0.8 pA/V
100 uA	200 V	2 nA	0.03 % +	60.0 nA + 0.8 pA/V
10 uA	200 V	200 pA	0.03 % +	5.0 nA + 0.8 pA/V
1 uA	200 V	20 pA	0.03 % +	800.5 pA + 0.8 pA/V
100 nA	200 V	2 pA	0.06 % +	100.5 pA + 0.8 pA/V
10 nA	200 V	200 fA	0.15 % +	5.5 pA + 0.8 pA/V
1 nA	200 V	20 fA	0.15 % +	2.5 pA + 0.8 pA/V

Current Measure Specifications

Current Range	Max Voltage	MEASURE		
		Resolution	Accuracy	
10 A	5 V	100 uA	0.40 % +	25.0 mA + 0.76 pA/V
1.5 A	20 V	10 uA	0.05 % +	3.5 mA + 0.76 pA/V
1 A	200 V	10 uA	0.03 % +	1.5 mA + 0.76 pA/V
100 mA	200 V	1 uA	0.02 % +	20.0 uA + 0.76 pA/V
10 mA	200 V	100 uA	0.02 % +	2.5 uA + 0.76 pA/V
1 mA	200 V	10 nA	0.02 % +	200.0 nA + 0.76 pA/V
100 uA	200 V	1 nA	0.02 % +	25.0 nA + 0.76 pA/V
10 uA	200 V	100 nA	0.03 % +	1.5 nA + 0.76 pA/V
1 uA	200 V	10 pA	0.03 % +	500.5 pA + 0.76 pA/V
100 nA	200 V	1 pA	0.06 % +	100.5 pA + 0.76 pA/V
10 nA	200 V	100 fA	0.15 % +	3.5 pA + 0.76 pA/V
1 nA	200 V	10 fA	0.15 % +	750.0 fA + 0.76 pA/V
100 pA	200 V	1 fA	0.15 % +	630.0 fA + 0.76 pA/V

Specifications are subject to change without notice.

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Voltage Source Specifications

Voltage Range	Max Current	SOURCE			
		Resolution	Accuracy		
200 V	1 A	5 mV	0.02 % +	50.13 mV +	1.6 V/A
20 V	1.5 A	500 uV	0.02 % +	5.13 mV +	1.6 V/A
2 V	10 A	50 uV	0.02 % +	730 uV +	1.6 V/A
200 mV	10 A	5 uV	0.02 % +	505 uV +	1.6 V/A

Voltage Measure Specifications

Voltage Range	Max Current	MEASURE			
		Resolution	Accuracy		
200 V	1 A	1 mV	0.015 % +	50.13 mV +	1.6 V/A
20 V	1.5 A	100 uV	0.015 % +	5.13 mV +	1.6 V/A
2 V	10 A	10 uV	0.02 % +	480 uV +	1.6 V/A
200 mV	10 A	1 uV	0.015 % +	355 uV +	1.6 V/A

CV Measurement Specifications

4210-CVU Typical accuracy with 3m cables

Measured Capacitance	1kHz	10kHz	100kHz	1MHz	10MHz
1 pF	N/A	8.50 %	2.05 %	0.57 %	N/A
10 pF	N/A	0.96 %	0.23 %	0.21 %	1.00 %
100 pF	N/A	0.29 %	0.20 %	0.17 %	1.00 %
1 nF	0.72 %	0.17 %	0.12 %	0.18 %	2.00 %
10 nF	0.28 %	0.12 %	0.13 %	0.27 %	2.00 %
100 nF	0.12 %	0.13 %	0.22 %	1.16 %	N/A
1 uF	0.17 %	0.21 %	N/A	N/A	N/A

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S530 High-Voltage Parametric Test System Specifications
Current Source Specifications

Current Range	Max Voltage	SOURCE		
		Resolution	Accuracy	
10 A	5 V	200 uA	0.50 % +	40.0 mA + 4 pA/V
1.5 A	20 V	50 uA	0.06 % +	4.0 mA + 4 pA/V
1 A	200 V	20 uA	0.05 % +	1.8 mA + 4 pA/V
100 mA	200 V	2 uA	0.03 % +	30.0 uA + 4 pA/V
20 mA	1100 V	500 nA	0.05 % +	4.0 uA + 4 pA/V
10 mA	200 V	200 nA	0.03 % +	6.0 uA + 4 pA/V
1 mA	1100 V	50 nA	0.03 % +	300.1 nA + 4 pA/V
100 uA	1100 V	5 nA	0.03 % +	60.1 nA + 4 pA/V
10 uA	1100 V	500 pA	0.03 % +	5.1 nA + 4 pA/V
1 uA	1100 V	50 pA	0.04 % +	880.0 pA + 4 pA/V
100 nA	200 V	2 pA	0.06 % +	180.0 pA + 4 pA/V

Current Measure Specifications

Current Range	Max Voltage	MEASURE		
		Resolution	Accuracy	
10 A	5 V	100 uA	0.40 % +	25.0 mA + 4.01 pA/V
1.5 A	20 V	10 uA	0.05 % +	3.5 mA + 4.01 pA/V
1 A	200 V	10 uA	0.03 % +	1.5 mA + 4.01 pA/V
100 mA	200 V	1 uA	0.02 % +	20.0 uA + 4.01 pA/V
20 mA	1100 V	100 uA	0.04 % +	1.2 uA + 4.01 pA/V
10 mA	200 V	100 uA	0.02 % +	2.5 uA + 4.01 pA/V
1 mA	1100 V	10 nA	0.03 % +	200.1 nA + 4.01 pA/V
100 uA	1100 V	1 nA	0.03 % +	25.1 nA + 4.01 pA/V
10 uA	1100 V	100 nA	0.03 % +	1.6 nA + 4.01 pA/V
1 uA	1100 V	10 pA	0.03 % +	580.0 pA + 4.01 pA/V
100 nA	200 V	1 pA	0.06 % +	180.0 pA + 4.01 pA/V

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Voltage Source Specifications

Voltage Range	Max Current	SOURCE			
		Resolution	Accuracy		
1000 V	0.021 A	50 mV	0.02 % +	100.2 mV +	9.3 V/A
200 V	1 A	5 mV	0.02 % +	50.1 mV +	9.3 V/A
20 V	1.5 A	500 μ V	0.02 % +	5.1 mV +	9.3 V/A
2 V	10 A	50 μ V	0.02 % +	680.0 μ V +	9.3 V/A
200 mV	10 A	5 μ V	0.02 % +	680.0 μ V +	9.3 V/A

Voltage Measure Specifications

Voltage Range	Max Current	MEASURE			
		Resolution	Accuracy		
1000 V	0.021 A	10 mV	0.015 % +	50.2 mV +	9.3 V/A
200 V	1 A	1 mV	0.015 % +	50.0 mV +	9.3 V/A
20 V	1.5 A	100 μ V	0.015 % +	5.0 mV +	9.3 V/A
2 V	10 A	10 μ V	0.02 % +	374.0 μ V +	9.3 V/A
200 mV	10 A	1 μ V	0.015 % +	324.0 μ V +	9.3 V/A

CV Measurement Specifications**4210-CVU Typical accuracy with 3m cables**

Measured Capacitance	1kHz	10kHz	100kHz	1MHz	10MHz
1 pF	N/A	8.50 %	2.05 %	0.57 %	N/A
10 pF	N/A	0.96 %	0.23 %	0.21 %	1.00 %
100 pF	N/A	0.29 %	0.20 %	0.17 %	1.00 %
1 nF	0.72 %	0.17 %	0.12 %	0.18 %	2.00 %
10 nF	0.28 %	0.12 %	0.13 %	0.27 %	2.00 %
100 nF	0.12 %	0.13 %	0.22 %	1.16 %	N/A
1 μ F	0.17 %	0.21 %	N/A	N/A	N/A



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