

S2014C

12-Channel PXIe Precision SMU

Version 0.1



Product Description

Semight Instruments S2014C with compact structure and cost-efficient 12-channel PXIe SMU, is capable of outputting and measuring voltage and current simultaneously, providing $\pm 4.5V$, ± 10 mA (DC/pulse) output max, supporting traditional SMU SCPI commands, enable easy and fast transfer of test codes, support PXIe case in existing big factories, and can support multi-card synchronization, and can be integrated into the production test system for use, so as to improve test efficiency of the system and reduce the cost.

Product characteristics and advantages

Characteristics	Advantages
Adaptive PFC (Precision-fast control) System	The user can adjust the relevant parameters according to the load characteristics to obtain accurate and fast output characteristics.
12-channel integrated four-quadrant power and measurement functions	Easily and accurately measure current and voltage with a single device, without having to manually change connections.
$\pm 4.5V$, ± 10 mA (DC/Pulse)	LIV scanning can be easily implemented.
High-Speed Measurement	Support 1M maximum ADC sampling rate, with optional NPLC and sampling rate settings.
Free PC-end GUI control software	It can make remote measurement and control from PC without programming
It is applicable to PXIe case	It can realize multi-channel expansion with ease, and be integrated into rack and stack systems

Technical Indicators

Operating conditions:

Temperature $23\text{ }^{\circ}\text{C} \pm 5\text{ }^{\circ}\text{C}$

Humidity: relative humidity at 30% to 70%

It shall be measured after 60 minutes of preheating, and the change in the environmental temperature at the time of measurement shall $< \pm 3^{\circ}\text{C}$;

Calibrating cycle :1 year

Voltage Indicators

Voltage Precision	Measuring Range	Measuring Resolution	Precision (1 year) \pm (% Reading + Bias)	Typical Noise (RMS) 0.1 Hz-10Hz
	$\pm 4.5V$	1 μV	0.02%+100 μV	50 μV
Temperature Coefficient	$\pm(0.15 \times \text{Precision Indicator})/^{\circ}\text{C}$ (0°C - 18°C , 28°C - 50°C)			



Setting Time	<200µs (Typical Value)
Overshoot	<±0.1% (Typical Value, Normal, Step Range is 10% to 90%, Full Scale Point, Resistive Load Test)

- All channel outputs are electrically isolated from earth, but each channel output shares a common ground (LO).

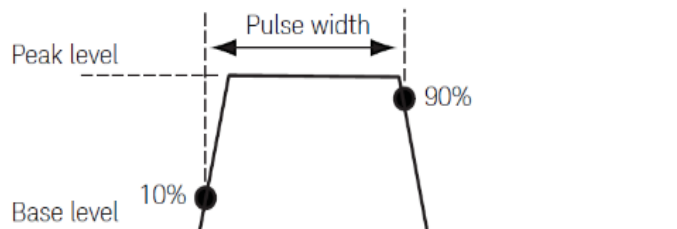
Current Indicators

	Measuring Range	Measuring Resolution	Precision (1 year) ± (% Reading + Bias)	Typical Noise (RMS) 0.1 Hz-10Hz
Current Precision	±10 mA	10 nA	0.05%+5µA	20 nA
	±1 mA	1 nA	0.05%+500nA	10 nA
	±100 µA	100 pA	0.05%+50nA	200 pA
	±10 µA	10 pA	0.05%+5nA	100 pA
Temperature Coefficient	±(0.15 × Precision Indicator)/°C (0°C-18°C,28°C-50°C)			
Setting Time	<2ms (Typical Value)			
Overshoot	<±0.1% (Typical Value, Normal, Step Range is 10% to 90%, Full Scale Point, Resistive Load Test)			

- All channel outputs are electrically isolated from earth, but each channel output shares a common ground (LO)

Pulse Source Indicators (4- lines)

Minimum Programmable Pulse-width	250µs
Pulse-width Programming Resolution	1µs
Pulse-width Programming Precision	±10µs
Pulse-width Jitter	2µs
Pulse-width Definition	The time from the 10 % leading edge to the 90 % trailing edge is shown in the following figure



Pulse source rise time (4 lines)

Output	Maximum Output	Typical Rise Time ¹	Typical stabilization	Test Load
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			time ²	
Voltage Source	4.5 V	100 μs	200 μs	No-Loaded
Current Source	10mA	60 μs	100 μs	Full-Loaded ³
	1mA	800 μs	1 ms	Full-Loaded ³
	100μA	120 μs	180 μs	Full-Loaded ³
	10 μA	1.5 ms	2 ms	Full-Loaded ³

1. Time required for the pulse leading edge from 10% to 90%.
2. Time required for the pulse to reach 1% of the final value.
3. Test conditions: normal pure resistance full load voltage rises to 4.5V

Sampling Rate and NPLC Settings

Configuration Method	Configuration Range
NPLC	0.00005PLC ~ 10PLC
Sampling Rate	5sps ~ 1.0Msps

Measurement Precision Derating (PLC<1)

Percentage of range with increased tolerance

PLC	Measuring Range				
	4.5V	10μA	100μA	1mA	10mA
0.1	0.01%	0.02%	0.01%	0.02%	0.01%
0.01	0.3%	0.2%	0.04%	0.04%	0.02%
0.001	3.2%	2.5%	0.4%	0.3%	0.03%

Additional Characteristics

Sensing Mode	2-lines or 4-lines (remote sensing) connection
Maximum Sensing Lead Resistance	1 kΩ (rated precision)
Maximum voltage between remote sensing output and sensing terminal	1V
Maximum output voltage of output connector	>105% of full scale
SWEEP scanning	Scan interval can be configured from 20μs to 16s, supporting up to 1K point for single channel scanning.
Auto-Ranging	Supported, overshoot-sensitive devices are recommended to shut down the output before switching ranges.



Delay Measurement (SOURCE DELAY)	Supported, it is recommended that the user sets the appropriate SOURCE DELAY for more accurate measurement values.
Over-Temperature Protection	If the internal temperature is detected to be too high, the output will shut down and restart when the temperature drops below 65 degrees.
Other Output Anomaly Protection	Power off and restart, can resume operation or restore hardware damage

Environmental Indicators

Environment	It shall be used in indoor facilities
Operating	0 °C ~ +50 °C, 30 % ~ 70 % relative humidity with no condensation
Storage	-30 °C ~ 70 °C, 10 % ~ 90 % relative humidity with no condensation
Dimension (mm)	210*130*20
Weight	Net weight: 0.46kg
Electricity Supply	Full load: 12V/3.5A;3.3V/0.5A
Altitude	Operating altitude:0 m to 2000 m, Storage altitude: 0 m to 4600 m
Preheating	1 hour

Ordering information

Output Connector, Quick Reference, USB flash drive (includes PDF manual, fast I/V measurement software and driver).

Product Model	
S2014C	12-Channel PXIe Precision SMU, pulse source



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*This information is subject to change without notice.