



S2024H

24-Channel Precision Source Meter

Version 1.0



Product Description

The S2024H precision source meter is compact and cost-effective bench-top Source/Measure Units (SMUs) with the capability to source and measure both voltage and current. These capabilities make the S2024H ideal for IV (current versus voltage) measurement tasks that require both high resolution and accuracy.

The S2024H provides best-in-class performance for a modest price. It can provide maximum $\pm 4.5\text{V}$, $\pm 10\text{ mA}$ (DC/pulse) output and possess a superior color LCD graphical user interface (GUI).

The S2024H offers unmatched measurement throughput and supports conventional SMU SCPI commands for easy test code migration. These features improve efficiency and lower the cost of ownership when integrating the SMUs into systems for production test.

Key Features

Feature	Benefit
Integrated 4-quadrant sourcing and measuring capabilities	Easily and accurately measure current and voltage using a single instrument without the need to manually change any connections
Measurement range: $\pm 4.5\text{V}$, $\pm 10\text{mA}$ (DC/pulsed)	A single SMU product covers both high voltage and high current measurement needs, allowing for more standardization and simplifying inventory and support concerns
Source and measurement resolution down to 10pA and $1\mu\text{V}$	Can make low-level measurements using a low-cost bench-top SMU that were previously only possible using a more expensive semiconductor device analyzer
Fast measurement	Up to 1M ADC sampling rate, NPLC and sampling rate optional setting
User-friendly front panel GUI with 5.0 inch capacitive touchscreen supports both graphical and numerical view modes	Can quickly and easily perform measurements and display data on the front panel, thereby greatly speeding up interactive test, characterization and debug operations

Free quick V/I control software	Can make measurements remotely from a PC without the need to program
Supports both conventional and default SCPI commands	Conventional SCPI commands provide some compatibility with older SMU code (such as Keithley 2400 series) to minimize code conversion work
Works with PXIe chassis	Easily integrate multi-channel expansion into rack and stack systems
Small form factor with USB3.0, LAN	Easy integration into rack and stack systems

Technical Specification

Temperature :23 °C ± 5 °C

Humidity :30% to 70% RH

Calibration period:1 Year

Measurement speed: 1PLC (power line cycle)

After 60 minutes warm-up, ambient temperature changes less than ± 3 °C

Voltage source/ measurement specifications

Voltage programming accuracy	Range	Measurement resolution	Accuracy (1 Year) ± (% reading+ offset)	Typical Noise (RMS) 0.1 Hz-10 Hz
	±4.5V	1µV	0.02%+100uV	50uV
Temperature coefficient	±(0.15 × accuracy)/°C (0°C-18°C,28°C-50°C)			
Settling time	<100 µs (typical)			
Overshoot	<±0.1% (Typical. Norma mode. Step is 10 % to 90 % range, full range, resistive load)			

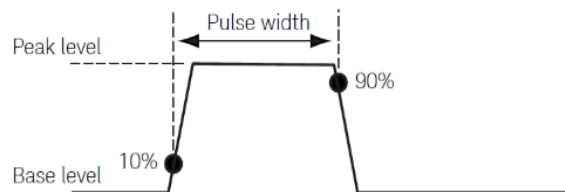
Current source/ measurement specifications

	Range	Measurement resolution	Accuracy (1 Year) ± (% reading+ offset)	Typical Noise (RMS) 0.1 Hz-10 Hz
Current programming accuracy	±10 mA	10 nA	0.05%+5µA	20 nA
	±1 mA	1nA	0.05%+500nA	10 nA
	±100 µA	100pA	0.05%+50nA	1nA
	±10 µA	10 pA	0.05%+5nA	100 pA
Temperature coefficient	±(0.15 × accuracy)/°C (0°C-18°C,28°C-50°C)			
Settling time	<2ms (typical)			
Overshoot	<±0.1% (Typical. Normal mode. Step is 10 % to 90 % range, full range, resistive load)			

1, Channels are isolated from earth ground but share a common LO.

Pulse source specifications (4W)

Minimum programmable pulse width	250 µs
Pulse width programming resolution	1 µs
Pulse width programming accuracy	±10 µs
Pulse width jitter	2 µs
Pulse width definition	The time from 10 % leading to 90 % trailing edge as follows



Typical Pulse Performance(4W)

Source	Maximum output	Typical rise time ¹	Typical Settling Time ²	Test load
Voltage	4.5 V	100 μs	200 μs	NO load
Current	10mA	60 μs	100 μs	Full load ³
	1mA	800 μs	1 ms	Full load ³
	100uA	120 μs	180 μs	Full load ³
	10 μA	1.5 ms	2 ms	Full load ³

1, Leading edge, the time from 10 % leading to 90 % leading

2, The time required from Pulse out 0 to reach within 1 % of final value

3, Test condition: Normal, resistive load 4.5V maximum output

Sampling rate and NPLC setting

Setting	Range
NPLC	0.00005 PLC ~ 10 PLC
Sampling Rate	5 sps ~ 1 Msps

Derating accuracy with PLC setting < 1 PLC

Add % of range using the following table for measurement with PLC < 1

PLC	RANGE				
	4.5V	10uA	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%

Supplemental characteristics

Sensing Modes	2-wire or 4-wire (Remote-sensing) connections
Maximum sense lead resistance:	1 k Ω for rated accuracy
Max voltage between Force and Sense	1 V
Maximum output voltage in output connector	>range 105%
DC floating voltage	Max ± 10 V DC between low force and chassis ground
Sweep	Sweep step time: from 20 μ s to 16 s, Max: 8K point
Auto range	Support, turn off output is recommended for overshoot sensitive equipment before range change
Source delay	Support, it is recommended that users set appropriate source delay to obtain higher accuracy
Over temperature protection	The output will be turned off (also disable operation) when the SMU internal temperature is detected higher than 85 degrees. When the temperature returns to less than 65 degrees, operation recover
Other abnormal protection	Power reset, recover operation or hardware damage

Communication port

LAN	1000BASE-T / 100BASE-T
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USB	USB 3.0 HOST (front)
	USB 3.0 DEVICE (back)

Environmental specifications

Environment	For use in indoor facilities
Operating	0 °C to +50 °C, 30 % to 70 % non-condensing
Storage	-30 °C to 70 °C, 10 % to 90 % non-condensing
Altitude	Operating: 0 m to 2000 m, Storage: 0 m to 4600 m
Power	LINE: 100-240VAC, 50/60Hz, 250W FUSE: T3.15AL 250 VAC
Warm-up	1 hour
Dimensions (mm)	404.5*217.5*105.5 (with foot pad/handle/ rotary Knob) 446*233*112 (with sheath)
Weight	Net weight 5.2Kg

Front Panel

Display	5.0" TFT color display (800x480), Capacitive touchscreen
Hardkeys	Home, Menu, Exit, Enter, Trigger, Up, Down power on, output on/off, rotary Knob
Softkeys	LCD Mapping function keys
Connectivity	USB Host, output, ground

Rear panel

Connectivity	OUTPUT interface, LAN, USB device, AC socket, Ground
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Ordering information

Power cable, USB cable, Output connector, Quick reference, U disk (including PDF manuals, quick I/V Measurement Software and drivers)

Model number	
S2024H	24-Channel Precision Source Meter, pulser

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Visit www.semight.com for more information.

*This information is subject to change without notice.