

Product Datasheet - Technical Specifications



More information in our Web-Shop at ► www.meilhaus.com

Your contact

Technical and commercial sales, price information,
quotations, demo/test equipment, consulting:

Tel.: **+49 - (0)81 41 - 52 71-0**

E-Mail: sales@meilhaus.com

Meilhaus Electronic GmbH
Am Sonnenlicht 2
82239 Alling/Germany

Tel. **+49 - (0)81 41 - 52 71-0** E-
Mail sales@meilhaus.com

Mentioned company and product names may be registered trademarks of the respective companies. Errors and omissions excepted. © Meilhaus Electronic.

www.meilhaus.com

SMM3000X Series

Source Measure Unit



Data Sheet

EN02A



SIGLENT TECHNOLOGIES CO., LTD.

SMM3311X SMM3312X

Product Overview

The SMM3000X series is a precise Source/Measure Unit (SMU) instrument that can simultaneously output and measure voltage and current. It integrates the functions of a current source, voltage source, voltmeter, and ammeter within the instrument, allowing for easy switching between these functions.

The graphical user interface (GUI) it employs, along with advanced capacitive touchscreen technology, allows for intuitive operation.

The SMM3000X is the SMU for everyone: a versatile instrument, particularly well-suited for characterizing modern scaled semiconductors, nano-scale devices and materials, organic semiconductors, printed electronics, and other small-geometry and low-power devices.

It is widely used in fields such as research and educational applications, industrial development, testing, and manufacturing.

Product functionality

- Integrated 4-quadrant sourcing and measuring capabilities
- Measurement range: ± 210 V, ± 3 A (DC), ± 10.5 A (pulsed)
- Source and measurement resolution down to 10 fA and 100 nV
- Pulse, Sweep, List Sweep, Output Filter, Resistance measurement, Math Expression, Limit Test, Trace Buffer, Protection, Trigger System, etc.
- Versatile trigger modes,
- 12 external trigger ports, 6 inputs, 6 outputs
- Supports Web-server

Application fields

- Testing semiconductors, discrete and passive components
 - Diodes, laser diodes, LEDs
 - Photodetectors, sensors
 - Field effect transistors (FETs), bipolar junction transistors (BJTs)
 - ICs (ICs, RFICs, MMICs)
 - Resistor, Varistor, thermistors, switches
- Testing precision electronics and green energy devices
 - Photovoltaic cells
 - Power transistors, power devices
 - Battery, Automotive, Medical instruments
 - Power and DC bias source for circuit test
- Research and education
 - New material investigations
 - Nano devices characterization (e.g. CNT)
 - Giant magnetic resistance (GMR)
 - Organic devices, Any precise voltage/current source and measurement

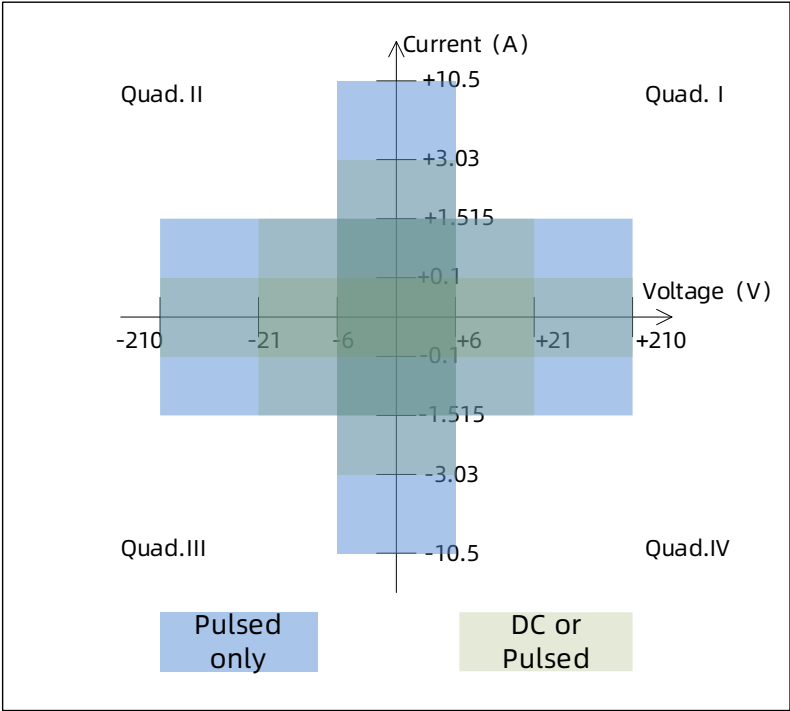
Key Features

- Five-inch, high resolution capacitive touchscreen GUI
- Source and measurement resolution down to 10 fA and 100 nV
- The maximum display digits: $6\frac{1}{2}$ (21,000,00 count)
- The maximum sampling rate is 100ksps, the sampling interval is 0.0005 PLC, and the maximum setting is 100 PLC.
- Minimum trigger interval 10 μ s.
- Up to 100k points of internal storage space, supporting timestamps.
- Four-quadrant precision power supply with single/dual-channel output and measurement
- Voltage (± 210 V) and current (± 3 A DC and ± 10.5 A pulsed) sourcing capability
- Five basic functions: voltage/current sourcing, voltage/current/resistance measurement
- The minimum programmable pulse width is 50 μ s.
- With arbitrary waveform generation and list scanning capabilities (minimum interval of 10 μ s)
- Supports two-wire/four-wire measurement modes
- Supports SCPI remote control commands
- Settable output filter
- Configuration Interfaces: USB Device (optional USB-GPIB adapter), USB Host, LAN

Comparison Table

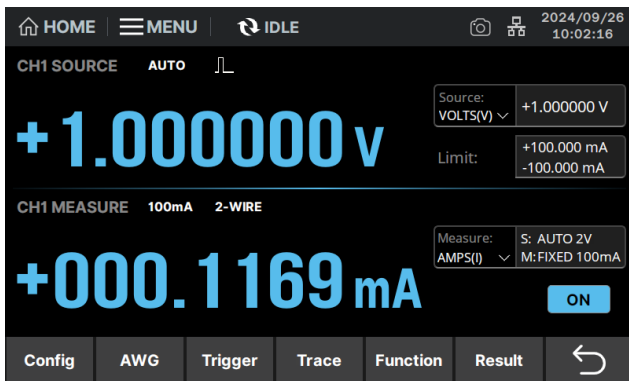
Model		SMM3311X	SMM3312X
source (DC)	Voltage	±210 V	±210 V
	Current	±3.03 A	±3.03 A
Pulsed		±10.5 A	±10.5 A
Maximum Resolution	source	2,100,000	2,100,000
	measurement	2,100,000	2,100,000
Current resolution	source	10 fA	10 fA
	measurement	10 fA	10 fA
Current range (DC)		10 nA – 3 A	10 nA – 3 A
Voltage resolution	source	100 nV	100 nV
	measurement	100 nV	100 nV
Voltage range		200 mV – 200 V	200 mV – 200 V
Minimum trigger interval		10 μs	10 μs
Channel		1	2

Power envelope diagram

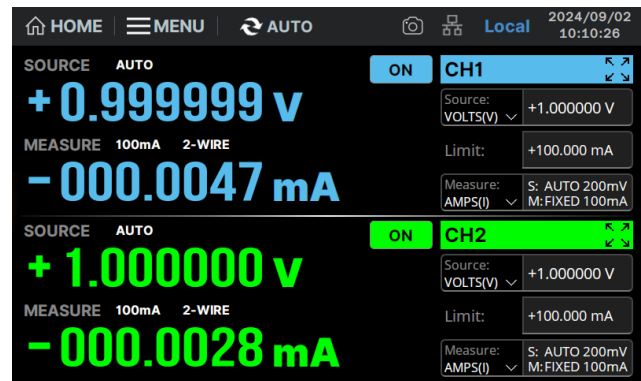


Functions & Characteristics

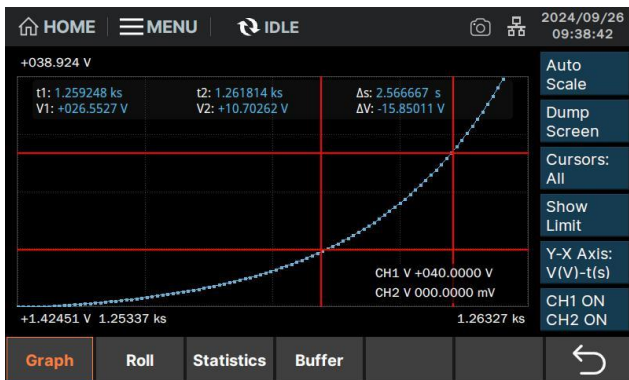
Single view



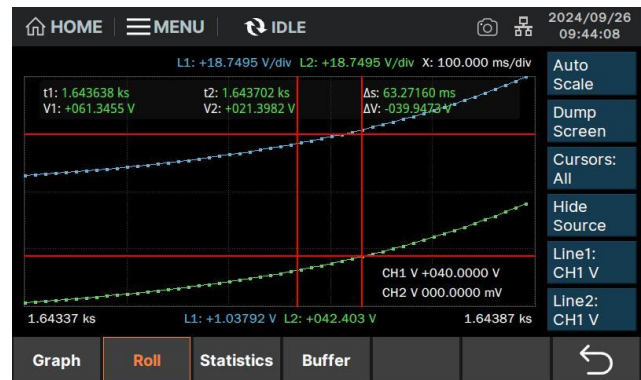
Dual view



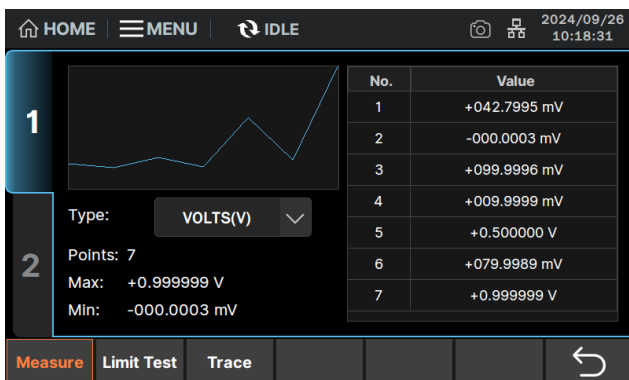
Graph



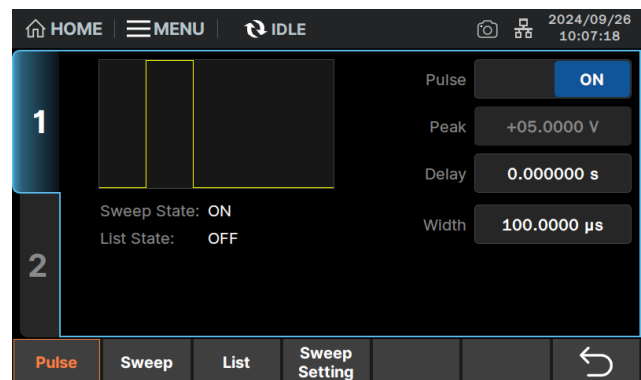
Roll



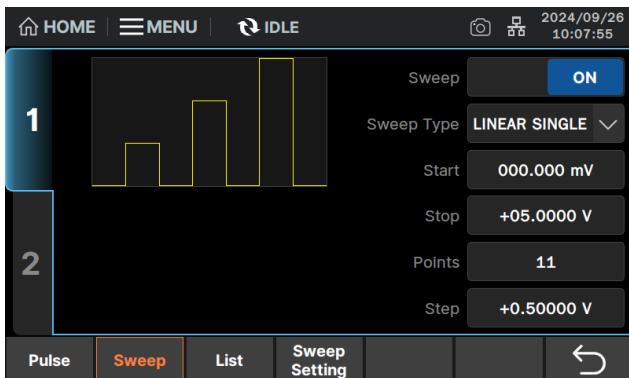
Data result



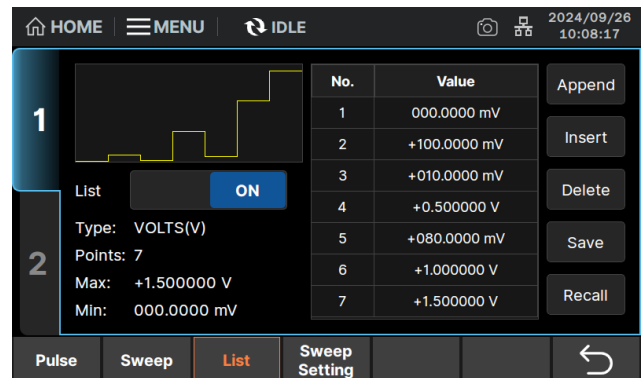
Pulse



Sweep



List



Specifications

Siglent	SMM3311X	SMM3312X
Specification conditions		
Temperature	23 °C ±5 °C	
Humidity	30% to 80% RH	
Calibration period	1 year	
Measurement speed	1 PLC （power line cycle）	
After 60 minutes warm-up	Ambient temperature change less than ±3 °C after self-calibration execution	
Outputs		
Quadrants	4	
Max. acquisition rate	100,000 points/s	
Number of output channels	1	2
Max. output/sink power	31.8 W	
DC or pulsed	±210 V ≤0.105 A	
	±21 V ≤1.515 A	
	±6 V ≤3.03A	
Pulsed only	±200 V ≤1.515 A	
	±6 V ≤10.5 A	
Maximum current limitation		
Max current limitation: For 21 V/1.515 A and 6 V/3.03 A ranges, total max current is limited by the table below for using 2 channels. Max current is not limited for using 1 channel only.		
I 1: CH1 current I 2: CH2 current	I 1(CH1:±6V) + I 2(CH2:±6V) ≤4A	
	I 1(CH1:±6V) + I 2(CH2:±6-21V)X1.6 ≤4A	
	I 1(CH1:±6-21V) + I 2(CH2:±6V)X0.625 ≤2.5A	
	I 1(CH1:±6-21V) + I 2 (CH2:±6-21V) ≤2.5A	

Voltage source specifications

	SMM3311X	SMM3312X
Voltage source Programming resolution		
±200 mV	100 nV	100 nV
±2 V	1 μV	1 μV
±20 V	10 μV	10 μV
±200 V	100 μV	100 μV
Voltage Programming accuracy		
±200 mV	± (% of setting + offset)	
±2 V	0.015 % + 225 μV	
±20 V	0.02 % + 350 μV	
±200 V	0.015 % + 5 mV	
±200V	0.015 % + 50 mV	

Voltage ripple and noise		Noise Vpp (peak to peak) 0.1 Hz to 10 Hz
	±200 mV	20 μ V
	±2 V	40 μ V
	±20 V	400 μ V
	±200 V	4 mV

Current source specifications

	SMM3311X	SMM3312X
Current Programming resolution		
±10 nA	10 fA	10 fA
±100 nA	100 fA	100 fA
±1 μ A	1 pA	1 pA
±10 μ A	10 pA	10 pA
±100 μ A	100 pA	100 pA
±1 mA	1 nA	1 nA
±10 mA	10 nA	10 nA
±100 mA	100 nA	100 nA
±1 A	1 μ A	1 μ A
±1.5 A	1 μ A	1 μ A
±3 A	10 μ A	10 μ A
±10 A	10 μ A	10 μ A
Current Programming accuracy	± (% of setting + offset)	
±10 nA	0.1 % + 100 pA	0.1 % + 100 pA
±100 nA	0.06 % + 100 pA	0.06 % + 100 pA
±1 μ A	0.025 % + 500 pA	0.025 % + 500 pA
±10 μ A	0.025 % + 1.5 nA	0.025 % + 1.5 nA
±100 μ A	0.02 % + 25 nA	0.02 % + 25 nA
±1 mA	0.02 % + 200 nA	0.02 % + 200 nA
±10 mA	0.02 % + 2.5 μ A	0.02 % + 2.5 μ A
±100 mA	0.02 % + 20 μ A	0.02 % + 20 μ A
±1 A	0.03 % + 1.5 mA	0.03 % + 1.5 mA
±1.5 A	0.05 % + 3.5 mA	0.05 % + 3.5 mA
±3 A	0.4 % + 7 mA	0.4 % + 7 mA
±10 A	0.4 % + 25 mA	0.4 % + 25 mA
10A Measurement speed: 0.01 PLC		

Source supplemental characteristics

Temperature coefficient (per °C)+0 °C to +18 °C and +28 °C to +50 °C	
Voltage	$\pm (0.1 \times \text{accuracy}) / ^\circ\text{C}$
Voltage limit/compliance	Accuracy is same as voltage source. Minimum value is 1 % of range (Limit for Each Polarity Enable) , or 20 mV in 200 mV range
Current limit/compliance	Accuracy is same as current source. Minimum value is 1 % of range (Limit for Each Polarity Enable) , or 1 nA in 10 nA range.
Over range	101 % of source range for 1.5 A and 3 A ranges. 105 % of source range other than 1.5 A and 3 A ranges. No over range for 200 V range with current exceeding 105 mA pulse only condition.
Over temperature protection	Output turns off then resets at over temperature sensed internally
Voltage output settling time	Time required to reach within 0.1 % (0.3 % for 3 A range) of final value at short condition. Step is 10 % to 90 % range
200mV, 2 V ranges	>5 μs
20 V ranges	>30 μs
200 V ranges	>300 μs
Current output settling time	Time required to reach within 0.1 % (0.3 % for 3 A range) of inal value at short condition. Step is 10 % to 90 % range
10 nA, 100 nA ranges	< 10 ms
1 μA range	< 500 μs
10 μA , 100 μA ranges	< 250 μs
1 mA to 3 A ranges	< 80 μs
Slew rate	>0.36 V/ μs , 20 V and 10 mA ranges, 10 M Ω load resistance
Noise 10 Hz to 20 MHz (V source)	4 mVrms, 20 V range
V source overshoot (RC)	< $\pm (0.1 \% + 10 \text{ mV})$. Step is 10 % to 90 % range, resistive load
I source overshoot (RC)	< $\pm 0.1 \% (< \pm 0.3 \% \text{ for } 3 \text{ A range})$. Step is 10 % to 90 % range, resistive load
Voltage source range change overshoot (RC)	$\leq 250 \text{ mV } 100 \text{ k}\Omega \text{ load, } 20 \text{ MHz bandwidth}$
Current source range change overshoot (RC)	$\leq 250 \text{ mV/R load, } 20 \text{ MHz bandwidth}$

Measurement functions

Voltage measurement specifications	
Voltage measurement resolution	
$\pm 200 \text{ mV}$	100 nV
$\pm 2 \text{ V}$	1 μV
$\pm 20 \text{ V}$	10 μV
$\pm 200 \text{ V}$	100 μV
Voltage measurement accuracy	$\pm (\% \text{ of reading} + \text{offset})$
$\pm 200 \text{ mV}$	0.015 % + 225 μV
$\pm 2 \text{ V}$	0.02 % + 350 μV

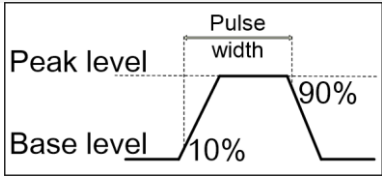
±20 V	0.015 % + 5 mV	
±200 V	0.015 % + 50 mV	
Current measurement specifications		
Current measurement resolution	SMM3311X	SMM3312X
±10 nA	10 fA	10 fA
±100 nA	100 fA	100 fA
±1 µA	1 pA	1 pA
±10 µA	10 pA	10 pA
±100 µA	100 pA	100 pA
±1 mA	1 nA	1 nA
±10 mA	10 nA	10 nA
±100 mA	100 nA	100 nA
±1 A	1 µA	1 µA
±1.5 A	1 µA	1 µA
±3 A	10 µA	10 µA
±10 A	10 µA	10 µA
Current measurement accuracy	± (% of reading + offset)	
±10 nA	0.1 % + 100 pA	0.1 % + 100 pA
±100 nA	0.06 % + 100 pA	0.06 % + 100 pA
±1 µA	0.025 % + 500 pA	0.025 % + 500 pA
±10 µA	0.025 % + 1.5 nA	0.025 % + 1.5 nA
±100 µA	0.02 % + 25 nA	0.02 % + 25 nA
±1 mA	0.02 % + 200 nA	0.02 % + 200 nA
±10 mA	0.02 % + 2.5 µA	0.02 % + 2.5 µA
±100 mA	0.02 % + 20 µA	0.02 % + 20 µA
±1 A	0.03 % + 1.5 mA	0.03 % + 1.5 mA
±1.5 A	0.05 % + 3.5 mA	0.05 % + 3.5 mA
±3 A	0.4 % + 7 mA	0.4 % + 7 mA
±10 A	0.4 % + 25 mA	0.4 % + 25 mA
10A range Measurement speed :		
0.01 PLC		

Measurement supplemental characteristics

Temperature coefficient (per °C)+0 °C to +18 °C and +28 °C to +50 °C		
Current	± (0.1 x accuracy) /°C	
10nA	0.01%+10pA	
100nA	0.006%+10pA	
1uA	0.0025%+50pA	
10uA	0.0025%+0.15nA	
100uA	0.002%+2.5nA	

1mA	0.002%+20nA	
10mA	0.002%+0.25uA	
100mA	0.008%+2uA	
1.5A	0.005%+0.35mA	
3A	0.004%+2.5mA	
Over range	102 % of measurement range for 1.5 A and 3 A ranges 106 % of measurement range other than 1.5 A and 3 A ranges	
Voltage limit/compliance	Accuracy is same as voltage source. Minimum value is 1 % of range, or 20 mV in 200 mV range	
Voltage measurement range change overshoot	< 250 mV 100 k Ω load, 20 MHz bandwidth	
Current measurement range change overshoot	< 250 mV/R load, 20 MHz bandwidth	
Derating accuracy for measurement speed less than 1 PLC	Add % of range using the following table for measurement with PLC < 1	
Derating accuracy with PLC setting < 1 PLC	Voltage range	Current range
0.1 PLC	0.2V to 200 V (0.01%)	10 nA (0.1%) 100 nA (0.01%) 1 μ A to 100 mA (0.01%) 1 A to 3 A (0.01%)
0.01 PLC	0.2V (0.05%) 2 V to 200 V (0.02%)	10 nA (1%) 100 nA (0.1%) 1 μ A to 100 mA (0.05%) 1 A to 3 A (0.02%)
0.001 PLC	0.2V (0.5%) 2 V to 200 V (0.2%)	10 nA (5%) 100 nA (1%) 1 μ A to 100 mA (0.5%) 1 A to 3 A (0.2%)

Pulse functions

Pulse source supplemental characteristics	
Minimum programmable pulse width	50 μ s
Pulse width programming	1 μ s
Pulse width programming resolution	The time from 10 % leading to 90 % trailing edge as follows
	

	Pulsed								DC	
	Max voltage	Max base voltage	Max peak current	Max base current IB1	CH2 Max base current IB2		Pulse width	Max duty cycle	Max voltage	Max current
					±6V	±21V				
DC or pulsed	210 V	210 V	0.105 A	0.105 A	/	/	50 μ s to 99999.9 s	0.999999	210 V	0.105 A
	21 V	21 V	1.515 A	1.515 A	(2.5-IB1)/0.625	2.5-IB1	50 μ s to 99999.9 s	0.999999	21 V	1.515 A
	6 V	6 V	3.03 A	3.03 A	4-IB1	(4-IB1)/1.6	50 μ s to 99999.9 s	0.999999	6 V	3.03 A
Pulsed only	200 V	200 V	1.515 A	50 mA	/	/	50 μ s to 2.5 ms	0.025		
	180 V	200 V	1.05 A	50 mA	/	/	50 μ s to 10 ms	0.025		
	6 V	6 V	5.25 A	0.1 A	/	/	50 μ s to 3 ms	0.03		
	6 V	6 V	10.5 A	0.5 A	/	/	50 μ s to 1 ms	0.025		

Max current limitation: For 21 V/1.515 A and 6 V / 3.03 A ranges, total max current is limited by the table in page 12 for using 2 channels. Max current is not limited for using 1 channel only.

Max base current limitation: The maximum base current at 10A range is 0.5A.

Minimum pulse width at the given voltage, current and settling conditions

Source value	Limit value	Load	Source settling (% of range)	Min pulse width
200 V	1.5 A	200 Ω	0.1 %	1 ms
6 V	10.5 A	0.6 Ω	0.1 %	0.2 ms
1.5 A	200 V	65 Ω	0.1 %	2.5 ms
10.5 A	6 V	0.5 Ω	0.1 %	0.2 ms
Transient speed mode is set to FAST				
10.5 A	6 V	0.1 Ω	0.1 %	0.1 ms

Timer and triggering functions

Timer and triggering specification		
Time	Time stamp	TIMER value automatically saved when each measurement is triggered
	Trigger timing resolution	1 μ s to 100 ms
	Accuracy	±50 ppm
	Arm/trigger delay	0 μ s to 100,000 s
	Arm/trigger interval	10 μ s to 100,000 s
	Arm/trigger event	1 to 100,000
Triggering Supplemental characteristics		Digital I/O Trigger in to trigger out $\leq$ 5 μ s
		Digital I/O Trigger in to source change $\leq$ 5 μ s
		Minimum trigger interval: 10 μ s

High capacitance mode

The high capacitance mode permits the measurement of devices with capacitances greater than the normal mode maximum load value of 0.01 μF .

In high capacitance mode the maximum allowed value of the load capacitance is 50 μF .

Voltage output settling time		Time required to reach within 0.1 % of final value with 4.7 μF capacitive load on a fixed range at specified current range and limit value.
	200 mV, 2 V ranges	600 μs , at 1 A limit
	20 V range	1.5 ms, at 1 A limit
	200 V range	20 ms, at 100 mA limit
Noise (10 Hz to 20 MHz)		4.5 mVrms (20 V range)
High Capacitance mode working conditions	V/I mode	Voltage source mode only
	Range	Current measurement range is limited to fixed range only. 10 nA and 100 nA ranges are not available. 10 nA and 100 nA ranges are not available.
Current limit		$\geq 1 \mu\text{A}$

Resistance measurement

Resistance measurement	Resistance measurement can be performed under either auto or manual test conditions. Auto resistance measurement is performed in current source and voltage measurement mode. The total auto resistance measurement error is shown in the table below. The total error of a manual resistance measurement can be calculated using the voltage and current accuracy information as shown below.
Measurement speed	1 PLC
Applicable for temperature	23 °C ± 5 °C
Source I mode, manual ohm measurement (4-wire)	Total error = $V_{\text{meas}}/I_{\text{src}} = R$ reading $\times$ (gain error % of V range + gain error % of I range + offset error of I range/ I_{src} value %) + (offset error of V range/ I_{src} value)
Source V mode, manual ohm measurement (4-wire)	Total error = $V_{\text{src}}/I_{\text{meas}} = 1/[1/R \text{ reading} \times (\text{gain error \% of I range} + \text{gain error \% of V range} + \text{offset error of V range}/V_{\text{src}} \text{ value \%}) + (\text{offset error of I range}/V_{\text{src}} \text{ value})]$
Example of total error calculation	I source value = 1 mA at 1 mA range V measure range = 2 V range Total error (% reading + offset) = (0.02 % + 0.02 % + 200 nA/1 mA) + (350 μV /1 mA) = 0.06 % + 0.35

Typical performance of auto resistance measurement (4-wire), 2 V range

Range	Resolution	Test current/Current range	Total error (% reading + offset)
2 Ω	1 $\mu\Omega$	1 A	0.2 % + 0.00035 Ω
20 Ω	10 $\mu\Omega$	100 mA	0.06 % + 0.0035 Ω
200 Ω	100 $\mu\Omega$	10 mA	0.065 % + 0.035 Ω
2 k Ω	1 m Ω	1 mA	0.06 % + 0.35 Ω
20 k Ω	10 m Ω	100 μA	0.065 % + 3.5 Ω
200 k Ω	100 m Ω	10 μA	0.06 % + 35 Ω

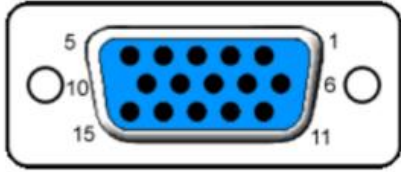
2 M Ω	1 Ω	1 μ A	0.095 % + 350 Ω
20 M Ω	10 Ω	100 nA	0.18 % + 3.5 k Ω
200 M Ω	100 Ω	10 nA	1.08 % + 35 k Ω

System speeds

System speeds (Auto): Maximum sweep operation reading rates (reading/second) for 50 Hz		
Measure to memory Source measure to memory	<0.01 PLC	3300
	0.1 PLC	500
	1 PLC	49
Measure to GPIB Source measure to GPIB	<0.01 PLC	3300
	0.1 PLC	490
	1 PLC	49

Other supplemental characteristics	
Output characteristics	
Sensing Modes	2-wire or 4-wire (Remote-sensing) connections
Low terminal connection	Chassis grounded or floating
Output connectors	Banana jack. Triaxial connections are recommended for sourcing and measuring less than 1 nA. A banana jack to triaxial adapter is available for low current measurement.
Output location	Channel 1 at front, and channel 2 at rear
Maximum voltage to ground	± 250 VDC
Maximum load	Normal mode: 0.01 μ F High Capacitance mode: 50 μ F
Guard offset voltage (V source)	< 4 mV
Remote sense operation range	Max voltage between High Force and High Sense = 1.5 V Max voltage between Low Force and Low Sense = 1.5 V
Common mode isolation	> 1 G Ω , < 4500 pF
Sense input impedance	> 10 G Ω
Maximum sense lead resistance	1 k Ω for rated accuracy

Display and interfaces	
Display	5" TFT color display (480x272, with LED backlight)
Front panel connections	input banana jacks
USB	USB 2.0 host controller (front)
	USB 2.0 host controller (rear), USB 2.0 device interface (rear)
Optional: USB-GPIB adapter	IEEE-488.2
Ethernet	100BASE-T / 10BASE-T
Digital I/O	

Connector type	DB 15-pin 
output pins: 1–6	pulled up to +5 V with 4.7 k Ω resistance, Falling edge activation
Input pins: 7–12	TTL COMS driver input, High level activation
13 pins	+5V,Limited to 50 mA, No fuse
14 pins	Safety interlock pin : One active high pin of 14 pins enables output voltage > 42 V
15 pins	GND
max input voltage	5.25 V
min input voltage	-0.25 V
Max logic L input voltage	0.25 V
Min logic H input voltage	2 V
Max source current	1 mA @ Vout = 0 V
Max sink current	10 mA @ Vout = 5 V
Maximum number of simultaneously triggered units (using Digital I/O)	8

Program	
Programming	SCPI
LXI compliance	LXI
Drivers available	IVI-C, LabVIEW drivers
General data	
Environmental conditions	
operating temperature range	0 °C to +50 °C, 30 % to 80 %
storage temperature range	-30 °C to 70 °C, 10 % to 90 %
Humidity	noncondensing
Altitude	Operating: 0 m to 2000 m, Storage: 0 m to 4600 m
Warm-up	1 hour
Overvoltage category	II
Pollution degree	2
Power rating	
Mains nominal voltage	100 V to 240 V
Mains frequency	47 Hz to 63 Hz
Maximum power consumption	250 VA maximum
Mains fuses	3.15A/250V AC

Mechanical data	
Dimensions	Length x Width x Height = 490*261*103 mm
Weight	4.8 kg (1CH) 、 6.2 kg (2CH)

Standards			
Electromagnetic compatibility	Meets EMC directive (2014/30/EU), meets or exceeds IEC 61326-1:2020/EN61326-1:2021 (Basic)		
	Conducted disturbance	CISPR 11/EN 55011	CLASS A group 1 , 150 kHz-30 MHz
	Radiated disturbance	CISPR 11/EN 55011	CLASS A group 1 , 30 MHz-1 GHz
	Electrostatic discharge (ESD)	IEC 61000-4-2/EN 61000-4-2	4.0 kV (Contact) , 8.0 kV (Air)
	Radio-frequency electromagnetic field Immunity	IEC 61000-4-3/EN 61000-4-3	10 V/m (80 MHz to 1 GHz) 3 V/m (1.4 GHz to 2 GHz) 1 V/m (2.0 GHz to 2.7GHz)
	Electrical fast transients (EFT)	IEC 61000-4-4/EN 61000-4-4	2 kV (Input AC Power Ports)
	Surges	IEC 61000-4-5/EN 61000-4-5	1 kV (Line to line) 2 kV (Line to ground)
	Radio-frequency continuous conducted Immunity	IEC 61000-4-6/EN 61000-4-6	3 V , 0.15-80 MHz
	Voltage dips and interruptions	IEC 61000-4-11/EN 61000-4-11	Voltage Dips: 0% UT during 1 cycle 40% UT during 10/12 cycles 70% UT during 25/30 cycles Voltage interruptions:0% 0% UT during 250/300 cycles
Safety	EN61010 – 1:2010 EN61010 – 2-030:2010 UL 61010-1:2012 Ed.3+R:06Jun2023, CSA C22.2#61010-1:2012 Ed.3+U1;U2;A1;U3; UL 61010-2-030:2018 Ed.2,CSA C22.2#61010-2-030:2018 Ed.2;		

Ordering Information

Product No.	Product Description
SMM3311X	Precision Source/Measure Unit, 1 ch, 10 fA, 210 V, 3 A DC/10.5 A pulse
SMM3312X	Precision Source/Measure Unit, 2 ch, 10 fA, 210 V, 3 A DC/10.5 A pulse
Standard Accessories	
USB cable	1
QuickStart	1
Calibration certificate	1
Power cord	1
output test cord	1(SMM3311X), 2(SMM3312X)
Optional Accessories	
USB-GPIB adapter	
STC6P4W	Banana to Triaxial – 4-Wire Adapter
STC6P2W	Banana to Triaxial – 2-Wire Adapter
STC6P2W-B	Banana to Triaxial – 2-Wire Adapter

Warranty

Three-year warranty, excluding accessories.