Keysight Technologies
B2900A Series
Precision Source/Measure Unit

Data Sheet

Introduction

The Keysight Technologies, Inc. B2900A Series of Precision Source/Measure Units are compact and cost-effective bench-top Source/Measure Units (SMUs) with the capability to output and measure both voltage and current. An SMU combines the capabilities of a current source, a voltage source, a current meter and a voltage meter along with the capability to switch easily between these various functions into a single instrument. The Keysight B2900A series of SMUs provide best-in-class performance at a lower price than ever before. They have broad voltage (210 V) and current (3 A DC and 10.5 A pulsed) sourcing capability, excellent precision (minimum 10 fA/100 nV sourcing and measuring resolution) and high measurement throughput. They also support an arbitrary waveform generation function. In addition, the Keysight B2900A series possess a superior graphical user interface with various viewing modes that dramatically improve test productivity, debug and characterization. The versatile integrated source and measurement capabilities of the Keysight B2900 series SMUs make them an ideal choice for testing semiconductors, active/passive components and a variety of other devices and materials. The B2900 series has a broad application range that spans from R&D and education uses to industrial development, test and manufacturing. Moreover, they work equally well as either stand-alone or system components. The Keysight B2900A series consists of four models, the B2901A, B2902A, B2911A and B2912A, differentiated through their available features (number of digits displayed, measurement resolution, minimum timing interval, supported viewing modes, etc.) and by the number of SMU channels (one or two) they contain. This makes it easy to select the exact price/performance point to meet your testing needs.

– Integrated voltage/current 4-quadrant precision source and measurement
  capabilities for easy and accurate I/V measurement
– Wide coverage up to 210 V, 3 A DC/10.5 A pulse
– 10 fA/100 nV minimum measurement resolution (6½ digits)
– 10 fA/100 nV minimum sourcing resolution (6½ digits)
– The 4.3" front panel color display supports both graphical and numerical view modes
– High resolution arbitrary waveform generation (AWG) and list sweep functions
  (10 µs minimum interval)
– High speed digitizing capability (maximum 100000 points/s sample rate)
– Free application software to facilitate PC -based instrument control
– IVI-COM drivers, and SCPI supporting conventional SMU command set for basic
  compatibility
– LXI Core Conformant, USB2.0, GPIB, LAN and digital I/O interface

> Cost-effective source/ measurement solutions offer superior performance and a best-in-class graphical user interface.

Key Specifications of B2900A Series

|			B2901A	B2902A	B2911A	B2912A
Number of channels			1	2	1	2
Max output	Voltage		210 V	210 V	210 V	210 V
	Current	DC	3.03 A	3.03 A	3.03 A	3.03 A
		Pulsed	10.5 A	10.5 A	10.5 A	10.5 A
	Power		31.8 W	31.8 W	31.8 W	31.8 W
Source	Max digits	Digits	5½	5½	6½	6½
	Min resolution	Voltage	1 µV	1 µV	100 nV	100 nV
		Current	1 pA	1 pA	10 fA	10 fA
Measurement	Max digits	Digits	6½	6½	6½	6½
	Min resolution	Voltage	100 nV	100 nV	100 nV	100 nV
		Current	100 fA	100 fA	10 fA	10 fA
Min programmable interval for List sweep/AWG waveform			20 µs	20 µs	10 µs	10 µs
Min trigger interval for digitizing (Max sample rate)			20 µs (50000 pts/s)	20 µs (50000 pts/s)	10 µs (100000 pts/s)	10 µs (100000 pts/s)
View modes	Single view		■	■	■	■
	Dual view			■		■
	Graph view		■	■	■	■
	Roll view				■	■

Specifications

Specification conditions

The source and measurement accuracy are specified under the conditions listed below.

1. Temperature: 23 °C ±5 °C
2. Humidity: 30 % to 80 % RH
3. After 60 minutes warm-up
4. Ambient temperature change less than ±3 °C after self-calibration execution
5. Calibration period: 1 year
6. Measurement speed: 1 PLC (Power Line Cycle)

Maximum voltage and current

	Max voltage	Max current
DC or pulsed[1]	210 V	0.105 A
	21 V	1.515 A[2]
	6 V	3.03 A[2]
Pulsed only[1]	200 V	1.515 A
	6 V	10.5 A

DC or pulsed[1]

Pulsed only[1]
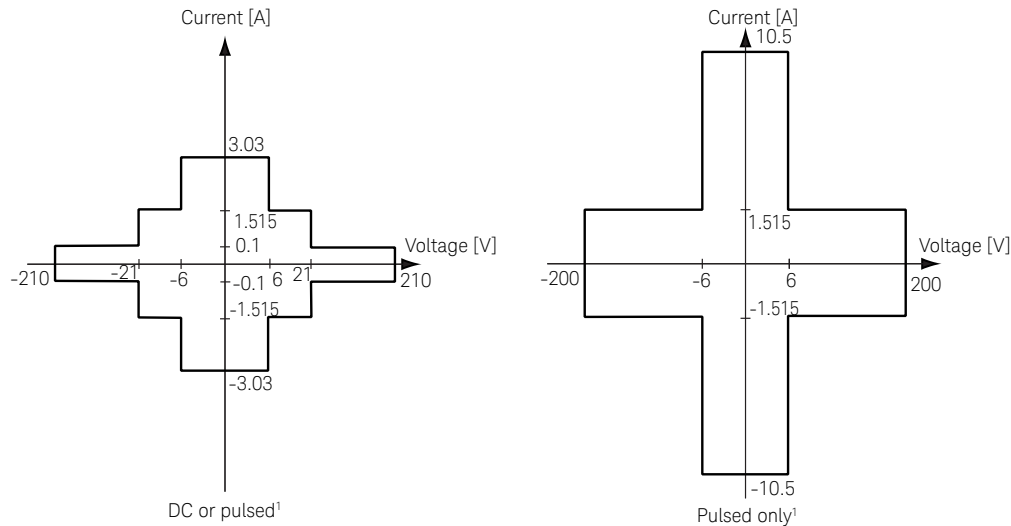
1. See "Maximum pulse width and duty cycle" in Pulse Source Supplemental Characteristics for applicable maximum voltage and current.
2. Max current limitation: For 21 V/1.515 A and 6 V/3.03 A ranges, total max current is limited by the table below for using 2 channels. Max current is not limited for using 1 channel only.

Maximum current limitation

Ch1 voltage	Ch2 voltage	Max total current limitation of Ch1 and Ch2
±(0 V < V ≤ 6 V)	±(0 V < V ≤ 6 V)	Ch1 current + Ch2 current ≤ 4 A
±(0 V < V ≤ 6 V)	±(6 V < V ≤ 21 V)	Ch1 current + Ch2 current x 1.6 ≤ 4 A
±(6 V < V ≤ 21 V)	±(0 V < V ≤ 6 V)	Ch1 current + Ch2 current x 0.625 ≤ 2.5 A
±(6 V < V ≤ 21 V)	±(6 V < V ≤ 21 V)	Ch1 current + Ch2 current ≤ 2.5 A

Source specifications

Voltage source specifications

Range	Programming resolution		Accuracy (% reading + offset)	Noise (peak to peak) 0.1 Hz to 10 Hz[1]	Max voltage (over range)
	B2901A/B2902A	B2911A/B2912A			
±200 mV	1 µV	100 nV	±(0.015 % + 225 µV)	≤ 10 µV	±210 mV
±2 V	10 µV	1 µV	±(0.02 % + 350 µV)	≤ 20 µV	±2.1 V
±20 V	100 µV	10 µV	±(0.015 % + 5 mV)	≤ 200 µV	±21 V
±200 V	1 mV	100 µV	±(0.015 % + 50 mV)	≤ 2 mV	±210 V

1. Supplemental characteristics

Current source specifications

Range	Programming resolution		Accuracy (% reading + offset)	Noise (peak to peak) 0.1 Hz to 10 Hz[1]	Max current (over range)
	B2901A/B2902A	B2911A/B2912A			
±10 nA[2]	–	10 fA	±(0.10 % + 50 pA)	≤ 1 pA	±10.5 nA
±100 nA	1 pA	100 fA	±(0.06 % + 100 pA)	≤ 2 pA	±105 nA
±1 µA	10 pA	1 pA	±(0.025 % + 500 pA)	≤ 25 pA	±1.05 µA
±10 µA	100 pA	10 pA	±(0.025 % + 1.5 nA)	≤ 60 pA	±10.5 µA
±100 µA	1 nA	100 pA	±(0.02 % + 25 nA)	≤ 2 nA	±105 µA
±1 mA	10 nA	1 nA	±(0.02 % + 200 nA)	≤ 6 nA	±1.05 mA
±10 mA	100 nA	10 nA	±(0.02 % + 2.5 µA)	≤ 200 nA	±10.5 mA
±100 mA	1 µA	100 nA	±(0.02 % + 20 µA)	≤ 600 nA	±105 mA
±1 A	10 µA	1 µA	±(0.03 % + 1.5 mA)	≤ 70 µA	±1.05 A
±1.5 A	10 µA	1 µA	±(0.05 % + 3.5 mA)	≤ 100 µA	±1.515 A
±3 A	100 µA	10 µA	±(0.4 % + 7 mA)	≤ 120 µA	±3.03 A
±10 A[3]	100 µA	10 µA	±(0.4 % + 25 mA)[4]		±10.5 A

1. Supplemental characteristics
2. 10 nA range is not available for B2901A/B2902A.
3. 10 A range is available only for pulse mode, not available for DC mode.
4. Measurement speed: 0.01 PLC

Source supplemental characteristics

Temperature coefficient (0 °C to 18 °C and 28 °C to 50 °C):
  ±(0.1 x accuracy specification)/°C.
Max output power and source/sink limits:
  31.8 W
  ±6 V @ ±3.03 A, ±21 V @ ±1.515 A, ±210 V @ ±105 mA, four quadrant source or sink operation.
Current limit/compliance:
  Accuracy is same as current source. Minimum value is 1 % of range, or 1 nA in 10 nA range.
Voltage limit/compliance:
  Accuracy is same as voltage source. Minimum value is 1 % of range, or 20 mV in 200 mV 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 % of final value at open load condition.
    Step is 10 % to 90 % range
  200 mV, 2 V ranges: < 50 µs
  20 V range: < 110 µs
  200 V range: < 700 µs
Slew rate:
  ≤ 0.36 V/µs, 20 V and 10 mA ranges, 10 MΩ load resistance
Current 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
    10 nA, 100 nA ranges: < 10 ms
    1 µA range: < 500 µs
    10 µA, 100µA ranges: < 250 µs
    1 mA to 3 A ranges: < 80 µs
Noise 10 Hz to 20 MHz (V source): 3 mVrms, 20 V range.
V source overshoot:
  < ±(0.1 % + 10 mV). Step is 10 % to 90 % range, resistive load.
I source overshoot:
  < ±0.1 % (< ±0.3 % for 3 A range). Step is 10 % to 90 % range, resistive load.
Voltage source range change overshoot:
  ≤ 250 mV. 100 kΩ load, 20 MHz bandwidth
Current source range change overshoot:
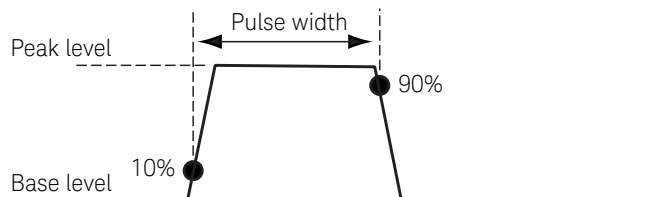 ≤ 250 mV/R load, 20 MHz bandwidth

Pulse source supplemental characteristics

Minimum programmable pulse width: 50 µs
Pulse width programming resolution: 1 µs
Pulse width definition: The time from 10 % leading to 90 % trailing edge as follows.

Maximum pulse width and duty cycle:

	Pulsed					DC	
	Max voltage	Max peak current	Max base current	Pulse width	Max duty cycle	Max voltage	Max current
DC or pulsed	210 V	0.105 A	0.105 A	50 µs to 99999.9 s	99.9999 %	210 V	0.105 A
	21 V	1.515 A[1]	1.515 A[1]	50 µs to 99999.9 s	99.9999 %	21 V	1.515 A[1]
	6 V	3.03 A[1]	3.03 A[1]	50 µs to 99999.9 s	99.9999 %	6 V	3.03 A[1]
Pulsed only	200 V	1.515 A	50 mA	50 µs to 2.5 ms	2.5 %		
	180 V	1.05 A	50 mA	50 µs to 10 ms	2.5 %		
	6 V	10.5 A	0.5 A	50 µs to 1 ms	2.5 %		

1. 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 3 for using 2 channels. Max current is not limited for using 1 channel only.

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

Measurement specifications

Voltage measurement specifications

Range	Measurement resolution		Accuracy
	B2901A/B2902A	B2911A/B2912A	(% reading + offset)
±200 mV	100 nV	100 nV	±(0.015 % + 225 µV)
±2 V	1 µV	1 µV	±(0.02 % + 350 µV)
±20 V	10 µV	10 µV	±(0.015 % + 5 mV)
±200 V	100 µV	100 µV	±(0.015 % + 50 mV)

1. Supplemental characteristics

Current measurement specifications

Range	Measurement resolution		Accuracy
	B2901A/B2902A	B2911A/B2912A	(% reading + offset)
±10 nA[1]	–	10 fA	±(0.10 % + 50 pA)
±100 nA	100 fA	100 fA	±(0.06 % + 100 pA)
±1 µA	1 pA	1 pA	±(0.025 % + 500 pA)
±10 µA	10 pA	10 pA	±(0.025 % + 1.5 nA)
±100 µA	100 pA	100 pA	±(0.02 % + 25 nA)
±1 mA	1 nA	1 nA	±(0.02 % + 200 nA)
±10 mA	10 nA	10 nA	±(0.02 % + 2.5 µA)
±100 mA	100 nA	100 nA	±(0.02 % + 20 µA)
±1 A	1 µA	1 µA	±(0.03 % + 1.5 mA)
±1.5 A	1 µA	1 µA	±(0.05 % + 3.5 mA)
±3 A	10 µA	10 µA	±(0.4 % + 7 mA)
±10 A[2]	10 µA	10 µA	±(0.4 % + 25 mA)[3]

1. 10 nA range is not available for B2901A/B2902A.
2. 10 A range is available only for pulse mode, not available for DC mode.
3. Measurement speed: 0.01 PLC

Measurement supplemental characteristics

Temperature coefficient (0 °C to 18 °C and 28 °C to 50 °C):
    ±(0.1 x accuracy specification)/°C.
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 measurement range change overshoot:
    < 250 mV. 100 kΩ 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			
	0.2 V	2 V to 200 V	10 nA	100 nA	1 µA to 100 mA	1 A to 3 A
0.1 PLC	0.01 %	0.01 %	0.1 %	0.01 %	0.01 %	0.01 %
0.01 PLC	0.05 %	0.02 %	1 %	0.1 %	0.05 %	0.02 %
0.001 PLC	0.5 %	0.2 %	5 %	1 %	0.5 %	0.2 %

Triggering and timing specifications

Triggering

Digital I/O trigger in to trigger out[1]: ≤ 5 µs
Digital I/O trigger in to source change[1]: ≤ 5 µs
LXI trigger in to source change[1]: Minimum 100 µs, Typical 200 µs, Maximum Unknown
LXI trigger in to measurement[1]: Minimum 100 µs, Typical 200 µs, Maximum Unknown
Internal event to external LXI trigger output[1]: Minimum 100 µs, Typical 200 µs,
    Maximum Unknown
LAN[0-7] Event Receiving Latency[1]: Unknown
LAN[0-7] Event Sending Latency[1]: Unknown
Minimum trigger interval: 10 µs

1. Supplemental characteristics

Timer

Trigger timing resolution: 1 µs to 100 ms
Timer accuracy: ±50 ppm
Arm/trigger delay: 0 to 100000 s
Arm/trigger interval: B2901A/B2902A: 20 µs to 100000 s
                           B2911A/B2912A: 10 µs to 100000 s
Arm/trigger event: 1 to 100000
Time stamp: TIMER value automatically saved when each measurement is
                           triggered.

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 load:
 Normal mode: 0.01 µF
 High Capacitance mode: 50 µF
DC floating voltage: Max ±250 V DC between low force and chassis ground.
Guard offset voltage (V source): < 4 mV
Remote sense operation range:
 Max voltage between High Force and High Sense = 3 V
 Max voltage between Low Force and Low Sense = 3 V
Common mode isolation: > 1 GΩ, < 4500 pF
Maximum sense lead resistance: 1 kΩ for rated accuracy
Sense input impedance: > 10 GΩ

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
Current measurement settling time:
 Time required to reach within 0.1 % of final value after voltage source is stabilized on
 fixed range. Vout is 5 V unless noted.
 1 µA range: 230 ms
 10 µA, 100 µA ranges: 23 ms
 1 mA, 10 mA ranges: 0.23 ms
 100 mA to 3 A ranges: 100 µs
Mode change delay:
 Delay into high cap mode:
 1 µA range: 230 ms
 10 µA, 100 µA ranges: 23 ms
 1 mA to 3 A ranges: 1 ms
 Delay out of high cap mode:
 All ranges: 10 ms
Noise 10 Hz to 20 MHz (20 V range): 4.5 mVrms
Voltage source range change overshoot (20 V range or below):
 < 250 mV, 20 MHz bandwidth
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.
Current limit: ≥ 1 µA

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.

Source I mode, manual ohm measurement (4-wire):
  Total error = Vmeas/Isrc = R reading x (gain error % of V range + gain error % of I range + offset error of I range/Isrc value %) + (offset error of V range/Isrc value)
Source V mode, manual ohm measurement (4-wire):
  Total error = Vsrc/Imeas = 1/ [1/R reading x (gain error % of I range + gain error % of V range + offset error of V range/Vsrc value %) + (offset error of I range/Vsrc value)]
Measurement speed = 1 PLC
Applicable for temperature: 23 °C ± 5 °C
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 Ω

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

Range	Resolution	Test current	Current range	Total error (% reading + offset)
2 Ω	1 µΩ	1 A	1 A	0.2 % + 0.00035 Ω
20 Ω	10 µΩ	100 mA	100 mA	0.06 % + 0.0035 Ω
200 Ω	100 µΩ	10 mA	10 mA	0.065 % + 0.035 Ω
2 kΩ	1 mΩ	1 mA	1 mA	0.06 % + 0.35 Ω
20 kΩ	10 mΩ	100 µA	100 µA	0.065 % + 3.5 Ω
200 kΩ	100 mΩ	10 µA	10 µA	0.06 % + 35 Ω
2 MΩ	1 Ω	1 µA	1 µA	0.095 % + 350 Ω
20 MΩ	10 Ω	100 nA	100 nA	0.18 % + 3.5 kΩ
200 MΩ	100 Ω	10 nA	100 nA	1.08 % + 35 kΩ

System speeds

Maximum sweep operation reading rates (reading/second) for 50 Hz

Measure speed	Measure to memory	Measure to GPIB	Source measure to memory	Source measure to GPIB
< 0.001 PLC	20000	12500	19500	12500
0.01 PLC	4500	3950	4500	3950
0.1 PLC	500	490	500	490
1 PLC	49	49	49	49

Operation reading rate varies by number of sweep steps. Number of sweep steps is specified

General Specifications

Environment	For use in indoor facilities
Temperature range	Operating: 0 °C to +55 °C Storage: –30 °C to +70 °C
Humidity range	Operating: 30 % to 80 % RH, non-condensing Storage: 10 % to 90 % RH, non-condensing
Altitude	Operating: 0 m to 2000 m Storage: 0 m to 4600 m
Power supply	AC voltage: 90 V to 264 V Line frequency: 47 Hz to 63 Hz Maximum volt-amps: 250 VA
Cooling	Forced air. Side intake and rear exhaust.
EMC	IEC61326-1/EN61326-1 AS/NZS CISPR 11 KC: RRA Notification amending Radio Waves Act Article 58-2
Safety	IEC61010-1/EN61010-1 CAN/CSA-C22.2 No. 61010-1-04, C/US
Certifications	CE, cCSAus, C-Tick, KC
Dimensions	Without handle & feet: 88 mm H x 213 mm W x 450 mm D
	Bench configuration (with handle & feet): 180 mm H x 260 mm W x 480 mm D
Weight	B2901A/B2911A: 5.0 kg B2902A/B2912A: 6.4 kg

Operation and Functions

Front panel interface

4.3" Color TFT WQVGA (480x272, with LED backlight) provides a graphical user interface (GUI) with the following features.
  – 4-view modes (Single, Dual, Graph, Roll view)
  – Easy-to-use key operations
  – Easy access to basic and advanced source/measurement capabilities

Single view

Single view provides basic and advanced settings and display capabilities for the selected channel from the front panel of the instrument. No additional controller or software is required.

Dual view

Dual view provides the basic settings and display capabilities for both channels 1 and 2. Up to 6½ digits can be displayed in dual view mode. This mode is available only for the B2902A/B2912A.

Operation and Functions, continued

Graph view

Graph View displays measurement results on XY graphs (such as I-V and I-t/V-t curves) on up to 2 channels. This is useful for quick evaluation of device characteristics, especially those obtained from sweep measurements.

Roll view

Roll view draws I-t or V-t curves similar to the curves drawn by a strip chart recorder. Up to 1000 acquired data points can be displayed and updated while the measurement is still in progress. Roll view's continuous measurement capability is especially useful for monitoring low frequency phenomena. Roll view is available only for the B2911A/B2912A.

Easy-to-use key operations

– 10-key, assist key and rotary knob for easy operation.
– 10-key enables direct input of alphanumeric values.
– Assist key guides operation on the front panel.

Easy access to source/measurement capabilities

Settings:
– V/I source mode
– Source value
– Limit (compliance) value
– Sweep parameters
– Pulse parameters
– Measure speed
– Range setting
– Trigger setting

Result displays:
– Numeric results fully up to 6½ digits both in Single and Dual view modes
– Characterization in Graph View and Roll View
– Data list

Advanced capabilities:
– Limit testing by user definable limits working with component handlers
– Trace memory for accumulating measurement (or math) result and collecting their statistics

File operations (USB memory):
– Save
    – System configuration
    – Measurement/math result
    – Limit test result
    – Trace data
    – Graph screen dump
– Load
    – System configuration
    – List sweep data

Source/measurement capabilities

Sweep measurement

Number of steps: 1 to 2500
Sweep mode: linear, logarithmic (log) or list
Sweep direction: single or double
Type: DC, or pulse
Min programmable value to create list sweep waveform:
 B2901A/B2902A: Min 20 µs with 1 µs resolution
 B2911A/B2912A: Min 10 µs with 1 µs resolution

Digitizing/sampling measurement

Digitizing/sampling measurement can be performed by appropriate setting of measure speed and trigger interval.
Min trigger interval (Max speed of measurement):
 B2901A/B2902A: 20 µs (50000 points/s)
 B2911A/B2912A: 10 µs (100000 points/s)

Data buffers

Data buffers are array of measurement elements. Each elements hold the following values.
- Measured voltage
- Measured current
- Measured resistance
- Time stamp
- Measurement status
- Source setting

Max buffer size: 100000 points / channel

Program and interface capabilities

Programming language

The Keysight B2900A series supports SCPI (Standard Commands for Programmable Instruments).
 Default command set:
  Supports all of the advanced features of Keysight B2900A series.
 Conventional command set:
  Supports industry standard conventional SCPI command set for basic compatibility

Program memory

Program memory allows you to store long strings of SCPI command lines once into the B2900A series' volatile memory and then recall those strings multiple times while the program is executing using a single SCPI command. By storing the command strings in memory, the time that would have been spent sending those same commands over a communication bus is eliminated. For tests that utilize lots of repeated code (such as subroutines), program memory can dramatically reduce test times.

Max number of characters of program name:
 32, with alphabets, numbers, hyphens and underscores.
Max memory size: 100 kB (2500 lines typical)

Program and interface capabilities, continued

LXI

LXI Core Conformant. The Keysight B2901A/B2902A/B2911A/B2912A follows specified LAN protocols and adhere to LXI requirements such as a built-in Web control server and IVI-COM driver.

Ethernet:	10/100Base-T
USB2.0:	USB-TMC488 protocol (Rear x 1)
GPIB:	IEEE-488.2 compliant

U USB file system

USB 2.0 high-speed mass storage (MSC) class device (Front x 1)

Digital I/O interface

Connector:	25-pin female D.
Input/output pins:	14 open drain I/O bits
Absolute max input voltage:	5.25 V
Absolute min input voltage:	−0.25 V
Max logic low input voltage:	0.8 V
Min logic high input voltage:	2.0 V
Max source current:	1 mA, Vout = 0 V
Max sink current:	50 mA, Vout = 5 V
5 V power supply pin:	Limited to 500 mA, solid state fuse protected.
Safety interlock pin:	One active high pin and one active low pin.
	Activation of both pin enables output voltage > 42 V.

Maximum number of simultaneously triggered units (using Digital I/O)[1]: 8

1. Supplemental characteristic

Furnished Accessories

Power cable
USB cable
Quick Reference (English)
Product Reference CD-ROM (including PDF manuals, Keysight B2900A Quick I/V
Measurement Software and drivers)
Keysight I/O Library Suite

Software and drivers

Keysight B2900A Quick I/V Measurement Software

The Keysight B2900A series includes PC-based Keysight B2900A Quick I/V Measurement
Software. This powerful software makes it easy to quickly setup and perform I/V
measurements and to display the measurement data in a table or graph without the need
to perform any programming. The software allows you to control up to four SMU channels
over a GPIB or LAN connection, or one B2900A series unit via a USB connection.

Operating environment:
Operating system: Windows 7 (64bit/32bit), XP SP3 (32-bit).
Other requirements: Microsoft .NET framework 4.0 or greater, and IO Libraries 16.0
                       or greater.

Keysight B2900A Graphical Web Interface

The Keysight B2900A Graphical Web Interface is a web browser based instrument
control panel. It enables you to set up and perform a measurement easily and quickly
from a web browser using the Keysight B2900A's built-in web server. This allows you to
control one Keysight B2900A series unit over a LAN connection.

IVI-C or IVI-COM drivers

Compatible with Windows 7 (64bit/32bit), XP SP2 (32-bit) IO Libraries 16.0 or greater.
Supports Keysight VEE, Microsoft Visual Studio (Visual Basic, Visual C++, Visual C#),
National Instruments LabWindows and LabVIEW.

LabVIEW driver (VI)

National Instruments LabVIEW 7.0 or greater. LabView drivers are available at NI.COM.

Ordering Information

Model number	
B2901A	Precision Source/Measure Unit, 1ch, 100 fA, 210 V, 3 A DC/10.5 A pulse
B2902A	Precision Source/Measure Unit, 2ch, 100 fA, 210 V, 3 A DC/10.5 A pulse
B2911A	Precision Source/Measure Unit, 1ch, 10 fA, 210 V, 3 A DC/10.5 A pulse
B2912A	Precision Source/Measure Unit, 2ch, 10 fA, 210 V, 3 A DC/10.5 A pulse
Options	
Printed manual (User's Guide)	
ABA	English
ABJ	Japanese
AB0	Traditional Chinese
AB2	Simplified Chinese
Calibration	
A6J	ANSI Z540 compliant calibration
UK6	Commercial calibration certificate with test data
Rack mount kit	
1CM	Rack mount kit
Accessories	
Banana to triaxial adapter	
N1294A-001	Banana - Triax adapter for 2-wire (non Kelvin) connection
N1294A-002	Banana - Triax adapter for 4-wire (Kelvin) connection
Interlock cable for 16442B	
N1294A-011	Interlock cable for 16442B (1.5 m)
N1294A-012	Interlock cable for 16442B (3.0 m)
BNC trigger adapter	
N1294A-031	GPIO-BNC trigger adapter
Test fixture	
N1295A	Device/component test fixture

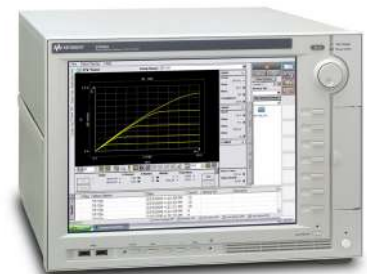For details of differences, refer to the comparison table in the page 2.

If you need more source capabilities or lower noise sourcing, the best choice is Keysight Power Source products.

Keysight B2961A/B2962A 6.5 Digit Low Noise Power Source
www.keysight.com/find/precisionSOURCE

Keysight B1500A Semiconductor Device Analyzer
www.keysight.com/find/B1500A

Keysight B1505A Power Device Analyzer/ Curve Tracer (1500 A/10 kV)
www.keysight.com/find/B1505A

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www.keysight.com/find/mykeysight
A personalized view into the information most relevant to you.

www.lxistandard.org

LAN eXtensions for Instruments puts the power of Ethernet and the Web inside your test systems. Keysight is a founding member of the LXI consortium.

Three-Year Warranty

www.keysight.com/find/ThreeYearWarranty
Keysight's commitment to superior product quality and lower total cost of ownership. The only test and measurement company with three-year warranty standard on all instruments, worldwide.

Keysight Assurance Plans

www.keysight.com/find/AssurancePlans
Up to five years of protection and no budgetary surprises to ensure your instruments are operating to specification so you can rely on accurate measurements.

www.keysight.com/go/quality
Keysight Technologies, Inc.
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Keysight Channel Partners

www.keysight.com/find/channelpartners
Get the best of both worlds: Keysight's measurement expertise and product breadth, combined with channel partner convenience.

www.keysight.com/find/b2900a

For more information on Keysight Technologies' products, applications or services, please contact your local Keysight office. The complete list is available at: www.keysight.com/find/contactus

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Mexico	001 800 254 2440
United States	(800) 829 4444

Asia Pacific

Australia	1 800 629 485
China	800 810 0189
Hong Kong	800 938 693
India	1 800 112 929
Japan	0120 (421) 345
Korea	080 769 0800
Malaysia	1 800 888 848
Singapore	1 800 375 8100
Taiwan	0800 047 866
Other AP Countries	(65) 6375 8100

Europe & Middle East

Austria	0800 001122
Belgium	0800 58580
Finland	0800 523252
France	0805 980333
Germany	0800 6270999
Ireland	1800 832700
Israel	1 809 343051
Italy	800 599100
Luxembourg	+32 800 58580
Netherlands	0800 0233200
Russia	8800 5009286
Spain	800 000154
Sweden	0200 882255
Switzerland	0800 805353
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	Opt. 2 (FR)
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United Kingdom	0800 0260637

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