

Keysight Technologies

Keysight B2980A Series

Femto/Picoammeter Electrometer/High Resistance Meter

Configuration Guide

The world's only graphical Picoammeter/Electrometer that can confidently measure down to 0.01 fA and up to 10 PΩ



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Configure Your Keysight B2980A Series Femto/Picoammeter & Electrometer

Keysight B2980A Series consists of the following four models.

- B2981A Femto/Picoammeter, 0.01fA
- B2983A Femto/Picoammeter, 0.01fA, Battery
- B2985A Electrometer/High Resistance Meter, 0.01 fA, 1000V
- B2987A Electrometer/High Resistance Meter, 0.01 fA, 1000V, Battery

This configuration guide contains a step-by-step process to help you configure your Femto/Picoammeter & Electrometer and related accessories to meet your specific test requirements. For detailed specifications, refer to the B2980A Series Femto/Picoammeter & Electrometer data sheet (literature number 5991-4878EN).

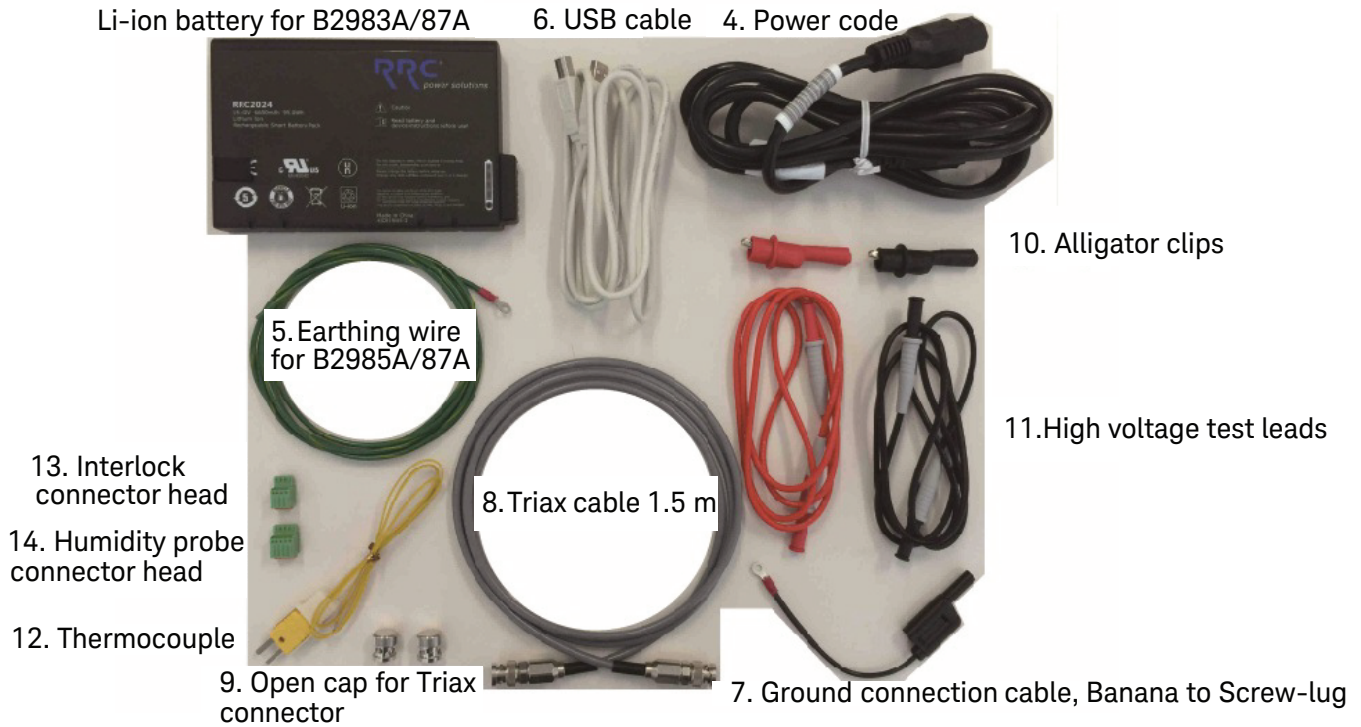
Step 1. Select a B2980A Series model

First, you'll need to decide on either a picoammeter or an electrometer based on your required measurement parameters and either a battery model or not based on your requirement for realizing low noise measurement. This will then determine which B2980A model is best for you. Please note that the B2980A Series are not upgradable later on.

		Measurement Parameters				Voltage Source	Battery Operation
		Current	Voltage	Resistance	Charge		
Femto/ Picoammeter	B2981A	√					
	B2983A	√					√
Electrometer	B2985A	√	√	√	√	√	
	B2987A	√	√	√	√	√	√
Additional information		0.01 fA to 20 mA	1 μV to 20 V	< 10 PΩ	1 fC to 2 μC	Up to ±1,000 V	

The following items are supplied as standard with each B2980A Series model:

Standard furnished items			Number of pieces			
Description	Orderable parts number	B2981A	B2983A	B2985A	B2987A	
1. Quick startup poster/Quick reference	NA	1ea	1ea	1ea	1ea	
2. Product reference (manuals) CD-ROM	NA	1ea	1ea	1ea	1ea	
3. Keysight IO Libraries CD-ROM	NA	1ea	1ea	1ea	1ea	
4. Power cord	NA	1ea	1ea	1ea	1ea	
5. Earthing wire (2 m)	NA		1ea		1ea	
6. USB cable	8121-1696	1ea	1ea	1ea	1ea	
7. Ground connection cable, Banana to Screw-lug	B2981-61715	1ea	1ea	1ea	1ea	
8. Triax cable (1.5 m, 200 V)	16494A-001	1ea	1ea	1ea	1ea	
9. Open cap for Triax connector	N1417A	1ea	1ea	2ea	2ea	
10. Alligator clips (black & red)	U3606-60030			1ea	1ea	
11. High voltage test leads (black & red, 1000 V)	U8201-60001			1ea	1ea	
12. Thermocouple for B2985/B2987	N1423A			1ea	1ea	
13. Interlock connector head	NA			1ea	1ea	
14. Humidity probe connector head	NA			1ea	1ea	



Step 2. Add optional localized User's Guide

The B2980A manuals (User's Guide etc.) are included in the CD-ROM shipped with the B2980A as PDF files. Printed manuals are not furnished. Order the following product number if required.

Description	Product Number	Additional Information
User Guide English for B2980 Series	N1403A-ABA	Printed copy
User Guide Japanese for B2980 Series	N1403A-ABJ	Printed copy

Step 3. Add optional productivity tools

There are several productivity tools that can help you startup your measurement quickly and maintain measurement integrity for your challenging sensitive measurements.

Description	Product Number	Additional Information	Applicable Model			
			B2981A	B2983A	B2985A	B2987A
Starter kit for B2985/ B2987	N1410A	The following items are included: N1415A Triax to alligator clip cable, 1ea N1414A High resistance measurement universal adapter, 1ea			√	√
Setup integrity checker for B2980 series, fixed perpetual license	N1420A	The Setup integrity checker measures and records the measurement setup's noise level, which enables you to isolate the cause of noise related to test setup elements including cables, adapters, shields, chambers, etc. Customer installable software license key	√	√	√	√
Evaluation kit for B2981/83/85/87A	N1299A-301	The following items are included: N1422A High value resistor box (100 GΩ),1ea N1415A Triax to alligator clip cable, 1ea N1411A Interlock cable, 4 pin terminal plug to 6 pin circular plug, 1.5 m, 1ea 16493B-001 Coaxial cable, 1.5 m, 1 ea N1254A-104 Triax (m) to BNC (f) adapter, outer shield open, 1 ea Carrying case, 1 ea Demonstration guide, 1 ea	√	√	√	√

Step 4. Choose optional accessories

Step 4-1. Choose a rack mount kit (optional)

Description	Product Number	Additional Information	Applicable Model			
			B2981A	B2983A	B2985A	B2987A
Rack Mount Kit	B2980A-1CM	Includes a rack mount flange and front handle kit. Fits standard 19-inch rack and occupies two units of rack space.	√	√	√	√

Step 4-2. Choose additional accessories for current measurements (optional)

You can add the following accessories based on your measurement requirements.

	Recommended Connection		Simple Connection ¹	
Typical connection example	Current measurement connection, Grounded		Current measurement connection, Grounded	
Recommended accessories	16494A-001	Low leakage Triax cable (200 V, 1.5 m, Furnished)	N1415A	Triax to alligator cable
	16494A-002	Low leakage Triax cable (200 V, 3.0 m)	B2981-61715	Ground connection cable, Banana to Screw-lug (Furnished)
	16494A-004	Low leakage Triax cable (200 V, 4.0 m)		
	N1412A/B/C	Low leakage Triax cable (500 V, 1.5 m/3 m/6 m)		
	N1416A/B	Triax bulkhead connector (200 V/500 V)		
	B2981-61715	Ground connection cable, Banana to Screw-lug (Furnished)		

1. The "Recommended Connection" is preferred over the "Easy Connection" when making sensitive low-level measurements

Step 4. Choose optional accessories

Step 4-3. Choose additional accessories for resistance measurements (optional)

You can add the following accessories based on your measurement requirements.

Also, you can add the optional N1414A High resistance measurement universal adapter which enables you to simplify the cabling and monitor source voltage at high resistance measurements.

	Recommended Connection		Simple Connection ¹	
Typical connection example	Floating device measurement		Floating device measurement	
Recommended accessories	16494A-001	Low leakage Triax cable (200 V, 1.5 m, Furnished)	N1415A	Triax to alligator cable
	16494A-002	Low leakage Triax cable (200 V, 3.0 m)	U8201-60001	High voltage test lead (Furnished)
	16494A-004	Low leakage Triax cable (200 V, 4.0 m)	B2981-61715	Ground connection cable, Banana to Screw-lug (Furnished)
	N1412A/B/C	Low leakage Triax cable (500 V, 1.5 m/ 3 m/6 m)		
	N1416A/B	Triax bulkhead connector (200 V/500 V)		
	U8201-60001	High voltage test lead (Furnished)		
	N1414A	High resistance measurement universal adapter (Optional)		
	B2981-61715	Ground connection cable, Banana to Screw-lug (Furnished)		

1. The "Recommended Connection" is preferred over the "Easy Connection" when making sensitive low-level measurements

The B2985A/87A supports the Keysight's accessories for high resistance measurement. The N1413A High resistance meter fixture adapter is needed to use those accessories which you have. (Now the 16008B, 16117B/C, and 16339A are obsolete.)

Description	Product Number	Additional Information
High resistance meter fixture adapter	N1413A	The N1413A High resistance meter fixture adapter is required to use these accessories.
Resistivity Cell	16008B	
Low noise test lead, clip end	16117B	
Low noise test lead, connector end, with bulkhead	16117C	
Component Test Fixture	16339A	

Step 4. Choose optional accessories (continued)

Step 4-4. Choose additional accessories for voltage measurements (optional)

You can add the following accessories based on your measurement requirements.

	Recommended Connection		Simple Connection ¹	
Typical connection example				
Recommended accessories	16494A-001	Low leakage Triax cable (200 V, 1.5 m, Furnished)	N1415A	Triax to alligator cable
	16494A-002	Low leakage Triax cable (200 V, 3.0 m)	U8201-60001	High voltage test lead (Furnished)
	16494A-004	Low leakage Triax cable (200 V, 4.0 m)	B2981-61715	Ground connection cable, Banana to Screw-lug (Furnished)
	N1412A/B/C	Low leakage Triax cable (500 V, 1.5 m/3 m/6 m)		
	N1416A/B	Triax bulkhead connector (200 V/500 V)		
	U8201-60001	High voltage test lead (Furnished)		
	B2981-61715	Ground connection cable, Banana to Screw-lug (Furnished)		

1. The “Recommended Connection” is preferred over the “Easy Connection” when making sensitive low-level measurements.

Step 4-5. Choose additional accessories for charge measurements (optional)

You can add the following accessories based on your measurement requirements.

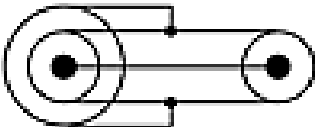
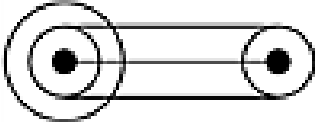
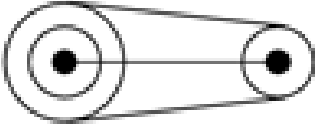
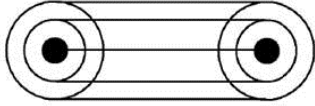
	Recommended Connection		Simple Connection ¹	
Typical connection example				
Recommended accessories	16494A-001	Low leakage Triax cable (200 V, 1.5 m, Furnished)	N1415A	Triax to alligator cable
	16494A-002	Low leakage Triax cable (200 V, 3.0 m)	B2981-61715	Ground connection cable, Banana to Screw-lug (Furnished)
	16494A-004	Low leakage Triax cable (200 V, 4.0 m)		
	N1412A/B/C	Low leakage Triax cable (500 V, 1.5 m/3 m/6 m)		
	N1416A/B	Triax bulkhead connector (200 V/500 V)		
	B2981-61715	Ground connection cable, Banana to Screw-lug (Furnished)		

1. The “Recommended Connection” is preferred over the “Easy Connection” when making sensitive low-level measurements.

Step 4. Choose optional accessories *(continued)*

Step 4-6. Choose additional accessories (optional)

You can add the following optional accessories to meet your system requirement.

Description	Product Number	Additional Information	Applicable Model			
			B2981A	B2983A	B2985A	B2987A
High value resistor box for N1299A-301 evaluation kit	N1422A		√	√	√	√
Low leakage Triax cable, 200 V, 1.5 m	16494A-001		√	√	√	√
Low leakage Triax cable, 200 V, 3.0 m	16494A-002	The B2981A/83A/85A/87A is furnished with one 16494A-001 cable. 16494A triax cable supports up to 200 V and 1 A.	√	√	√	√
Low leakage Triax cable, 200 V, 0.8 m	16494A-003		√	√	√	√
Low leakage Triax cable, 200 V, 0.4 m	16494A-004		√	√	√	√
Low leakage Triax cable, 200 V, 4.0 m	16494A-005		√	√	√	√
Low leakage Triax cable, 500 V, 1.5 m	N1412A		N1412A/B/C triax cable supports up to 500 V and 1 A	√	√	√
Low leakage Triax cable, 500 V, 3.0 m	N1412B		√	√	√	√
Low leakage Triax cable, 500 V, 6.0 m	N1412C		√	√	√	√
Coax cable, 1.5 m	16493B-001	16493B coax cable supports up to 40 V and 200 mA.	√	√	√	√
Coax cable, 3.0 m	16493B-002		√	√	√	√
BNC cable, 1.2 m	U2921A-100		√	√	√	√
Combo Test Lead Kit	U8201A		√	√	√	√
Triax bulkhead connector 200 V	N1416A		√	√	√	√
Triax bulkhead connector 500 V	N1416B		√	√	√	√
Open cap for triaxial connector	N1417A	The B2981A/83A is furnished with one N1417A open cap and the B2985A/87A is furnished with two N1417A open caps.	√	√	√	√
Triax (t) to BNC (m) adapter	N1254A-102	For current measurement, Floating DUT/sample	√	√	√	√
						
Triax (t) to BNC (m) adapter	N1254A-104	For current measurement, Grounded DUT/sample	√	√	√	√
						
Triax (t) to BNC (m) adapter	N1254A-105	For voltage measurement			√	√
						
Triaxial (f) to Triaxial (f) adapter, feedthrough	1250-2618		√	√	√	√
						

Step 4. Choose optional accessories *(continued)*

Description	Product Number	Additional Information	Applicable Model			
			B2981A	B2983A	B2985A	B2987A
Interlock cable, 4 pin terminal plug to 6 pin circular plug, 1.5 m	N1411A	The B2985A/87A is furnished with one 4 pin plug interlock connector head.			√	√
Interlock cable, 4 pin terminal plug to 6 pin circular plug, 3.0 m	N1411B				√	√
Lithium-ion battery pack for B2983/B2987	N1418A	B2983A/87A is furnished with one N1418A battery.		√		√
Benchtop battery charger for N1418A	N1419A			√		√
Thermocouple for B2985/B2987	N1423A	The B2985A/87A is furnished with one N1423A thermocouple.			√	√
RS-232 cable kit for Digital I/O connector	34398A		√	√	√	√

Step 5. Choose calibration plan

Step 5-1. Choose calibration length (optional)

Keysight factory calibration is provided as standard and free of additional charges.

Description	Product number	Additional Information
ANSI Z540-1-1994 Calibration	B2981A-A6J B2983A-A6J B2985A-A6J B2987A-A6J	Calibration certificate with measurement results available only at time of purchase
Commercial Calibration Certificate with Test Data	B2981A-UK6 B2983A-UK6 B2985A-UK6 B2987A-UK6	Calibration certificate with measurement results available only at time of purchase
Calibration Assurance Plan - Return to Service Center - 3 years	R-50C-011-3	
Calibration Assurance Plan - Return to Service Center - 5 years	R-50C-011-5	

Related Literature

Publication Number	Publication Title
5991-4978EN	Keysight B2980A Series Femto/Picoammeter & Electrometer, Datasheet
5991-3878EN	Accessories for the Keysight B2900 Precision Instrument Family

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