

# B2980B Series Femto/Picoammeter and Electrometer/High Resistance Meter



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

## Configure Your Keysight B2980B Series Femto/Picoammeter and Electrometer

Keysight B2980B Series consists of the following four models.

- B2981B Femto/Picoammeter, 0.01fA
- B2983B Femto/Picoammeter, 0.01fA, Battery
- B2985B Electrometer/High Resistance Meter, 0.01 fA, 1000V
- B2987B 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 and Electrometer and related accessories to meet your specific test requirements.

## Step 1. Select a B2980B 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 B2980B model is best for you. Please note that the B2980B Series are not upgradable later on.

		Measurement Parameters				Voltage Source	Battery Operation
		Current	Voltage	Resistance	Charge		
Femto/ Picoammeter	B2981B	√					
	B2983B	√					√
Electrometer	B2985B	√	√	√	√	√	
	B2987B	√	√	√	√	√	√
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 B2980B Series model:

Standard furnished items			Number of pieces			
Description		Orderable parts number	B2981B	B2983B	B2985B	B2987B
1	Quick startup poster/Quick reference	NA	1ea	1ea	1ea	1ea
2	Power cord	NA	1ea	1ea	1ea	1ea
3	Earthing wire (2 m)	NA		1ea		1ea
4	USB cable	8121-1696	1ea	1ea	1ea	1ea
5	Ground connection cable, Banana to Screw-lug	B2981-61715	1ea	1ea	1ea	1ea
6	Triax cable (1.5 m, 200 V)	16494A-001	1ea	1ea	1ea	1ea
7	Open cap for Triax connector	N1417A	1ea	1ea	2ea	2ea
8	Alligator clips (black and red)	U3606-60030			1ea	1ea
9	High voltage test leads (black and red, 1000 V)	U8201-60001			1ea	1ea
10	Thermocouple for B2985/B2987	N1423A			1ea	1ea
11	Interlock connector head	NA			1ea	1ea
12	Humidity probe connector head	NA			1ea	1ea



## Step 2. 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			
			B2981B	B2983B	B2985B	B2987B
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				

### Step 3. Choose optional accessories

#### Step 3-1. Choose a rack mount kit (optional)

Description	Product number	Additional Information	Applicable model			
			B2981B	B2983B	B2985B	B2987B
Rack Mount Kit	1CM124A	Includes a rack mount flange and front handle kit. Fits standard 19-inch rack and occupies two units of rack space.	√	√	√	√

#### Step 3-2. Choose additional accessories for current measurements (optional)

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

	Recommended Connection		Simple Connection <sup>1</sup>	
Typical connection example	Current measurement connection, Grounded		Current measurement connection, Grounded	
	<p>Shield</p> <p>N1416A/B Triax bulkhead connector</p> <p>16494A, N1412A/B/C Triax cable</p> <p>Banana-to-lug cable (furnished)</p>		<p>Shield</p> <p>N1215A Triax to alligator</p> <p>Banana-to-lug cable (furnished)</p>	
Recommended accessories	16494A-001	Low leakage Triax cable (200 V, 1.5 m, Furnished)	N1415A	Triax to alligator cable
	16494A-002/004	Low leakage Triax cable (200 V, 3.0 m/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)		
	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 3-3. Choose additional accessories for resistance measurements (optional)

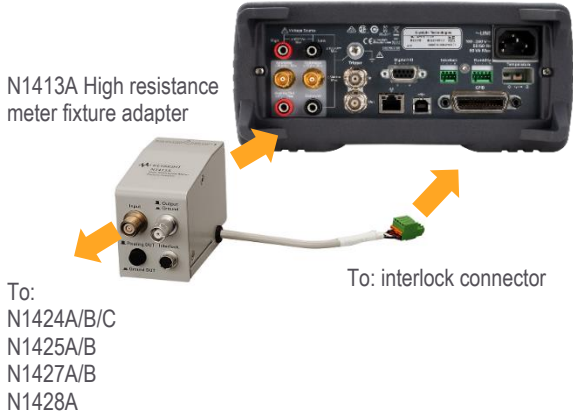
You can add the following accessories based on your measurement requirements.

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 <sup>1</sup>	
Typical connection example	<b>Floating device measurement</b> 		<b>Floating device measurement</b> 	
Recommended accessories	16494A-001	Low leakage Triax cable (200 V, 1.5 m, Furnished)	N1415A	Triax to alligator cable
	16494A-002/004	Low leakage Triax cable (200 V, 3.0 m/4.0 m)	U8201-60001	High voltage test lead (Furnished)
			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.

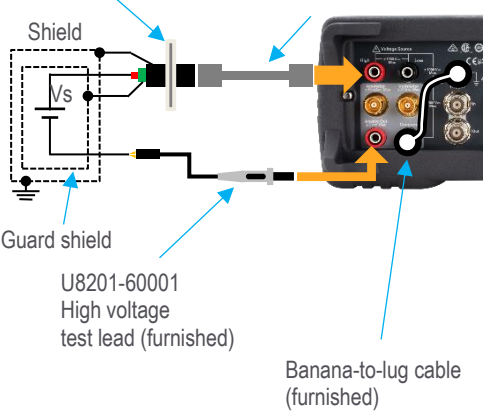
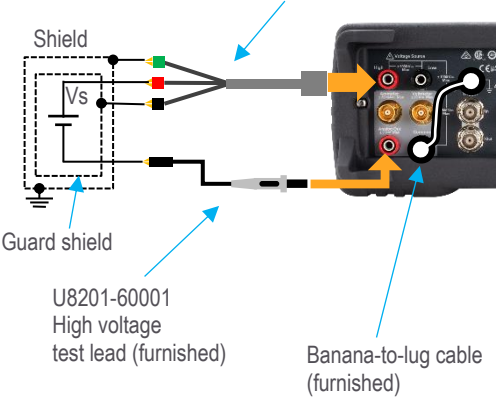
The B2985B/87B supports the Keysight's accessories for high resistance measurement. The N1413A High resistance meter fixture adapter is needed to use those accessories.

Description	Product number	Additional Information
High resistance meter fixture adapter	N1413A	
Resistivity Cell for N1413 with B2980 Series (50 mm Electrodes)	N1424A	<p>The N1413A High resistance meter fixture adapter is required to use these accessories.</p>  <p>N1413A High resistance meter fixture adapter</p> <p>To: N1424A/B/C N1425A/B N1427A/B N1428A</p> <p>To: interlock connector</p>
Resistivity Cell for N1413 with B2980 Series (26/50 mm Diameter Electrodes)	N1424B	
Resistivity Cell for N1413 with B2980 Series (26/50/76 mm Diameter Electrodes)	N1424C	
Low Noise Test Leads for N1413 with B2980 series (1.5 m/3.0 m)	N1425A/B	
Pin Probes for N1425	N1426A	
Soldering Sockets for N1425	N1426B	
Alligator Clips for N1425	N1426C	
Low Noise Test Cables for N1413 with B2980 series (1.5 m/3.0 m)	N1427A/B	
Component Test Fixture for N1413 with B2980 Series	N1428A	

The obsoleted accessories such as the 16008B, 16117B/C, and 16339A can be used with the B2985B/87B if you have them. The N1413A is also needed to use those accessories. The N1425A/B Low Noise Test Leads for N1413 with B2980 series requires one of the N1426A/B/C to connect the device under test.

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

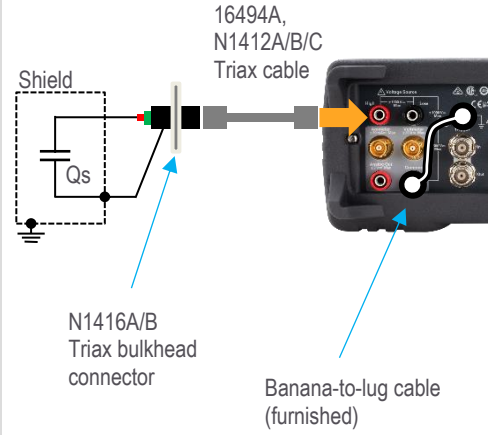
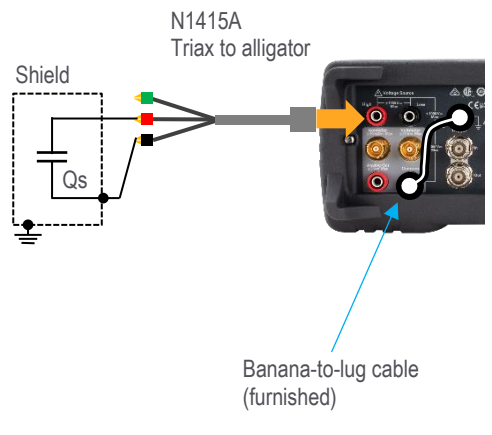
You can add the following accessories based on your measurement requirements

	Recommended Connection		Simple Connection <sup>1</sup>	
Typical connection example	Guarded measurement connection		Guarded measurement connection	
				
Recommended accessories	16494A-001	Low leakage Triax cable (200 V, 1.5 m, Furnished)	N1415A	Triax to alligator cable
	16494A-002/004	Low leakage Triax cable (200 V, 3.0 m/4.0 m)	U8201-60001	High voltage test lead (Furnished)
			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 3-5. Choose additional accessories for charge measurements (optional)

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

	Recommended Connection		Simple Connection <sup>1</sup>	
Typical connection example	Guarded measurement connection		Guarded measurement connection	
	 <p>16494A, N1412A/B/C Triax cable</p> <p>Shield</p> <p>Qs</p> <p>N1416A/B Triax bulkhead connector</p> <p>Banana-to-lug cable (furnished)</p>		 <p>N1415A Triax to alligator</p> <p>Shield</p> <p>Qs</p> <p>Banana-to-lug cable (furnished)</p>	
Recommended accessories	16494A-001	Low leakage Triax cable (200 V, 1.5 m, Furnished)	N1415A	Triax to alligator cable
	16494A-002/004	Low leakage Triax cable (200 V, 3.0 m/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)		
	B2981-61715	Ground connection cable, Banana to Screw-lug (Furnished)		

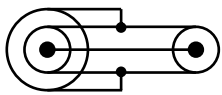
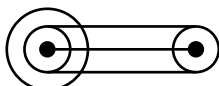

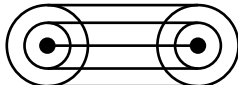
1. The "Recommended Connection" is preferred over the "Easy Connection" when making sensitive low-level measurements.



### Step 3-6. Choose additional accessories (optional)

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

Description	Product number	Additional Information	Applicable Model			
			B2981B	B2983B	B2985B	B2987B
High value resistor box for N1299A-301 evaluation kit	N1422A		√	√	√	√
Low leakage Triax cable, 200 V, 1.5 m	16494A-001	The B2981B/83B/85B/87B is furnished with one 16494A-001 cable. 16494A triax cable supports up to 200 V and 1 A. N1412A/B/C triax cable supports up to 500 V and 1 A	√	√	√	√
Low leakage Triax cable, 200 V, 3.0 m	16494A-002		√	√	√	√
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		√	√	√	√
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 B2981B/83B is furnished with one N1417A open cap and the B2985B/87B is furnished with two N1417A open caps.	√	√	√	√

Description	Product number	Additional Information	Applicable Model			
			B2981B	B2983B	B2985B	B2987B
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		√	√	√	√
Interlock cable, 4 pin terminal plug to 6 pin circular plug, 1.5 m	N1411A	The B2985B/87B 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	B2983B/87B is furnished with one N1418A battery.		√		√
Thermocouple for B2985/B2987	N1423A	The B2985B/87B is furnished with one N1423A thermocouple.			√	√
RS-232 cable kit for Digital I/O connector	34398A		√	√	√	√

## Step 4. Choose calibration plan

### Step 4-1. Choose calibration length (optional)

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

Description	Product number	Additional Information
Calibration + uncertainties + guardbanding (not accredited)	B2981B-1A7 B2983B-1A7 B2985B-1A7 B2987B-1A7	Calibration certificate with measurement results available only at time of purchase
ANSI Z540-1-1994 Calibration	B2981B-A6J B2983B-A6J B2985B-A6J B2987B-A6J	Calibration certificate with measurement results available only at time of purchase
Commercial Calibration Certificate with Test Data	B2981B-UK6 B2983B-UK6 B2985B-UK6 B2987B-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	

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