

Keysight N1911A and N1912A P-Series Power Meters

Installation
Guide

Notices

Copyright Notice

© Keysight Technologies 2005-2017
No part of this manual may be reproduced in any form or by any means (including electronic storage and retrieval or translation into a foreign language) without prior agreement and written consent from Keysight Technologies as governed by United States and international copyright laws.

Manual Part Number

N1912-90009

Edition

Edition 9, September 8, 2017

Printed in:

Printed in Malaysia

Published by:

Keysight Technologies
Bayan Lepas Free Industrial Zone,
11900 Penang, Malaysia

Technology Licenses

The hardware and/or software described in this document are furnished under a license and may be used or copied only in accordance with the terms of such license.

Declaration of Conformity

Declarations of Conformity for this product and for other Keysight products may be downloaded from the Web. Go to <http://www.keysight.com/go/conformity>. You can then search by product number to find the latest Declaration of Conformity.

U.S. Government Rights

The Software is “commercial computer software,” as defined by Federal Acquisition Regulation (“FAR”) 2.101. Pursuant to FAR 12.212 and 27.405-3 and Department of Defense FAR Supplement (“DFARS”) 227.7202, the U.S. government acquires commercial computer software under the same terms by which the software is customarily provided to the public. Accordingly, Keysight provides the Software to U.S. government customers under its standard commercial license, which is embodied in its End User License Agreement (EULA), a copy of which can be found at <http://www.keysight.com/find/sweula>. The license set forth in the EULA represents the exclusive authority by which the U.S. government may use, modify, distribute, or disclose the Software. The EULA and the license set forth therein, does not require or permit, among other things, that Keysight: (1) Furnish technical information related to commercial computer software or commercial computer software documentation that is not customarily provided to the public; or (2) Relinquish to, or otherwise provide, the government rights in excess of these rights customarily provided to the public to use, modify, reproduce, release, perform, display, or disclose commercial computer software or commercial computer software documentation. No additional government requirements beyond those set forth in the EULA shall apply, except to the extent that those terms, rights, or licenses are explicitly required from all providers of commercial computer software pursuant to the FAR and the DFARS and are set forth specifically in writing elsewhere in the EULA. Keysight shall be under no obligation to update, revise or otherwise modify the Software. With respect to any technical data as defined by FAR 2.101, pursuant to FAR 12.211 and 27.404.2 and DFARS 227.7102, the U.S. government acquires no greater than Limited Rights as defined in FAR 27.401 or DFAR 227.7103-5 (c), as applicable in any technical data.

Warranty

THE MATERIAL CONTAINED IN THIS DOCUMENT IS PROVIDED “AS IS,” AND IS SUBJECT TO BEING CHANGED, WITHOUT NOTICE, IN FUTURE EDITIONS. FURTHER, TO THE MAXIMUM EXTENT PERMITTED BY APPLICABLE LAW, KEYSIGHT DISCLAIMS ALL WARRANTIES, EITHER EXPRESS OR IMPLIED, WITH REGARD TO THIS MANUAL AND ANY INFORMATION CONTAINED HEREIN, INCLUDING BUT NOT LIMITED TO THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. KEYSIGHT SHALL NOT BE LIABLE FOR ERRORS OR FOR INCIDENTAL OR CONSEQUENTIAL DAMAGES IN CONNECTION WITH THE FURNISHING, USE, OR PERFORMANCE OF THIS DOCUMENT OR OF ANY INFORMATION CONTAINED HEREIN. SHOULD KEYSIGHT AND THE USER HAVE A SEPARATE WRITTEN AGREEMENT WITH WARRANTY TERMS COVERING THE MATERIAL IN THIS DOCUMENT THAT CONFLICT WITH THESE TERMS, THE WARRANTY TERMS IN THE SEPARATE AGREEMENT SHALL CONTROL.

Safety Information

CAUTION

A CAUTION notice denotes a hazard. It calls attention to an operating procedure, practice, or the like that, if not correctly performed or adhered to, could result in damage to the product or loss of important data. Do not proceed beyond a CAUTION notice until the indicated conditions are fully understood and met.

WARNING

A WARNING notice denotes a hazard. It calls attention to an operating procedure, practice, or the like that, if not correctly performed or adhered to, could result in personal injury or death. Do not proceed beyond a WARNING notice until the indicated conditions are fully understood and met.

General

The material contained in this document is provided “as is,” and is subject to being changed, without notice, in future editions. Further, to the maximum extent permitted by applicable law, Keysight disclaims all warranties, either express or implied with regard to this manual and any information contained herein, including but not limited to the implied warranties of merchantability and fitness for a particular purpose. Keysight shall not be liable for errors or for incidental or consequential damages in connection with the furnishing, use, or performance of this document or any information contained herein. Should Keysight and the user have a separate written agreement with warranty terms covering the material in this document that conflict with these terms, the warranty terms in the separate agreement will control.

Legal Information

Certification

Keysight Technologies certifies that this product met its published specifications at the time of shipment from the factory. Keysight Technologies further certifies that its calibration measurements are traceable to the United States National Institute of Standards and Technology, to the extent allowed by the Institute’s calibration facility, and to the calibration facilities of other International Standards Organization members.

Cooling, Cleaning, and Usage Requirements

Cooling requirements

To provide adequate cooling, an air gap of approximately 75mm (3ins) should be maintained around the vented sections of the instrument.

Cleaning

Use a soft, clean, damp cloth to clean the front-panel and side covers.

Use

This instrument is designed for indoor use only.

WARNING

Appliance coupler (mains input power cord) is the power disconnect device. Do not position the instrument such that access to the coupler is impaired.

WARNING

For continued protection against fire hazard, replace the line fuse only with the same type and line rating (250V, F3.15A, 20mm fast blow fuse with high breaking capacity, Keysight part number 2110-0957). The use of other fuses or materials is prohibited.

WARNING

No operator serviceable parts inside. Refer servicing to qualified personnel. To prevent electrical shock do not remove covers.

WARNING


















If this instrument is not used as specified, the protection provided by the equipment could be impaired. This instrument must be used in a normal condition only (in which all means for protection are intact).

CAUTION

This instrument is designed for use in Installation Category II and Pollution Degree 2 per IEC61010 and 60664 respectively.

Safety Symbols

The following symbols on the instrument and in the documentation indicate precautions which must be taken to maintain safe operation of the instrument.

	Direct current (DC).		Alternating current (AC).
	Off (mains supply).		On (mains supply).
	Caution, risk of electric shock.		Caution, risk of danger (refer to this manual for specific Warning or Caution information).
	Earth (ground) terminal.		Frame or chassis (ground) terminal.
	Protective earth (ground) terminal.		Equipment protected throughout by double insulation or reinforced insulation.
	Both direct and alternating current.		Out position of a bi-stable push control.
	Caution, hot surface.		In position of a bi-stable push control.
	This symbol indicates the operating switch for 'Stand-by' mode. Note, the instrument is NOT isolated from the mains when the switch is pressed. To isolate the instrument, the mains coupler (mains input cord) should be removed from the power supply.		Three-phase alternating current.
	Equipotentiality.		

Safety Considerations

Read the information below before using this instrument.

The following general safety precautions must be observed during all phases of operation, service, and repair of this instrument. Failure to comply with these precautions or with specific warnings elsewhere in this manual violates safety standards for design, manufacture, and intended use of the instrument. Keysight Technologies assumes no liability for the customer's failure to comply with these requirements.

This is a Safety Class I instrument (provided with a protective earthing ground, incorporated in the power cord). The mains plug shall only be inserted in a socket outlet provided with a protective earth contact. Any interruption of the protective conductor inside or outside of the instrument is likely to make the instrument dangerous. Intentional interruption is prohibited.

DO NOT operate the product in an explosive atmosphere or in the presence of flammable gases or fumes.

DO NOT use repaired fuses or short-circuited fuseholders: For continued protection against fire, replace the line fuse(s) only with fuse(s) of the same voltage and current rating and type.

DO NOT perform procedures involving cover or shield removal unless you are qualified to do so: Operating personnel must not remove equipment covers or shields. Procedures involving the removal of covers and shields are for use by service-trained personnel only.

DO NOT service or adjust alone: Under certain conditions, dangerous voltages may exist even with the equipment switched off. To avoid dangerous electrical shock, service personnel must not attempt internal service or adjustment unless another person, capable of rendering first aid and resuscitation, is present.

DO NOT operate damaged equipment: Whenever it is possible that the safety protection features built into this product have been impaired, either through physical damage, excessive moisture, or any other reason, REMOVE POWER and do not use the product until safe operation can be verified by service-trained personnel. If necessary, return the product to a Keysight Sales and Service Office for service and repair to ensure the safety features are maintained.

DO NOT substitute parts or modify equipment: Because of the danger of introducing additional hazards, do not install substitute parts or perform any unauthorized modification to the product. Return the product to a Keysight Sales and Service Office for service and repair to ensure the safety features are maintained.

Regulatory Information

Sound emission

Herstellerbescheinigung

Diese Information steht im Zusammenhang mit den Anforderungen der Maschinenlarminformationsverordnung vom 18 Januar 1991.

- Sound Pressure LpA < 70 dB.
- Am Arbeitsplatz.
- Normaler Betrieb.







Nach DIN 45635 T. 19 (Typprüfung).

Manufacturers Declaration

This statement is provided to comply with the requirements of the German Sound DIN 45635 T. 19 (Typprüfung).

- Sound Pressure LpA < 70 dB.
- At operator position.
- Normal operation.
- According to ISO 7779 (Type Test).

Regulatory Markings

 <p>The CE mark is a registered trademark of the European Community. This CE mark shows that the product complies with all the relevant European Legal Directives.</p> <p>ICES/NMB-001 indicates that this ISM device complies with the Canadian ICES-001.</p> <p>Cet appareil ISM est conforme à la norme NMB-001 du Canada.</p> <p>ISM GRP.1 Class A indicates that this is an Industrial Scientific and Medical Group 1 Class A product.</p>	 <p>The CSA mark is a registered trademark of the Canadian Standards Association.</p>
 <p>This symbol is a South Korean Class A EMC Declaration. This is a Class A instrument suitable for professional use and in electromagnetic environment outside of the home.</p>	 <p>The RCM mark is a registered trademark of the Australian Communications and Media Authority.</p>
 <p>This symbol indicates the time period during which no hazardous or toxic substance elements are expected to leak or deteriorate during normal use. Forty years is the expected useful life of the product.</p>	 <p>This instrument complies with the WEEE Directive (2002/96/EC) marking requirement. This affixed product label indicates that you must not discard this electrical or electronic product in domestic household waste.</p>

Waste Electrical and Electronic Equipment (WEEE) Directive 2002/96/EC

This instrument complies with the WEEE Directive (2002/96/EC) marking requirement. This affixed product label indicates that you must not discard this electrical or electronic product in domestic household waste.

Product category:

With reference to the equipment types in the WEEE directive Annex 1, this instrument is classified as a “Monitoring and Control Instrument” product.

The affixed product label is as shown below.



Do not dispose in domestic household waste.

To return this unwanted instrument, contact your nearest Keysight Service Center, or visit <http://about.keysight.com/en/companyinfo/environment/takeback.shtml> for more information.

Sales and Technical Support

To contact Keysight for sales and technical support, refer to the support links on the following Keysight websites:

- www.keysight.com/find/powermeter
(product-specific information and support, software and documentation updates)
- www.keysight.com/find/assist
(worldwide contact information for repair and service)

Compliance and Markings

Electromagnetic Compatibility (EMC)

This product conforms with the protection requirements of European Council Directive 89/336/EEC for Electromagnetic Compatibility (EMC).

The conformity assessment requirements have been met using the technical construction file route to compliance, using EMC test specifications EN 55011:1991 (Group 1, Class A) and EN 50082-1:1992.

In order to preserve the EMC performance of the product, any cable which becomes worn or damaged must be replaced with the same type and specification.

Refer to the [“Declaration of Conformity”](#) on page Notices.

Safety

This instrument has been designed and tested in accordance with publication EN61010-1(2001) / IEC 1010-1(2001) / CSA C22.2 No. 61010-1-04 Safety Requirements for Electrical Equipment for Measurement, Control and Laboratory Use, and has been supplied in a safe condition. The instruction documentation contains information and warnings which must be followed by the user to ensure safe operation and to maintain the instrument in a safe condition.

Table of Contents

General	3
Legal Information	3
Certification	3
Cooling, Cleaning, and Usage Requirements	4
Cooling requirements	4
Cleaning	4
Use	4
Safety Symbols	6
Safety Considerations	7
Regulatory Information	9
Sound emission	9
Regulatory Markings	10
Waste Electrical and Electronic Equipment (WEEE) Directive 2002/96/EC	11
Product category:	11
Sales and Technical Support	11
Compliance and Markings	12
Electromagnetic Compatibility (EMC)	12
Safety	12
1 Getting Started	
Welcome	4
Initial inspection	4
Documentation Information	5
Conventions Used in this Guide	6
Power Meter and Sensor Capability	7
Specifications	7
Adjusting the Carrying Handle	8
Turning the Power Meter On	9

What can go wrong?	11
Front Panel Keys and Connections	12
Connecting a Power Sensor	17
P-Series sensor	17
E-Series, 8480 and N8480 Series sensor models	18
Rear Panel Connections	21
Remote Interface Configurations	23
USB	23
LAN	26
Rack Mounting the Power Meter	34
Rack mounting information	34
Rack mounting one meter (using the Option 908 rack mount kit)	35
Rack mounting two meters together (using the Option 909 rack mount kit)	37

2 Characteristics and Specifications

List of Figures

Figure 1-1	Example of initial connection Windows	24
Figure 1-2	USB configuration complete	25
Figure 1-3	Typical LAN remote interface	27
Figure 1-4	LAN network restart pop-up	28
Figure 1-5	Typical manual entry LAN network interface	30
Figure 1-6	Typical GPIB remote interface	33

THIS PAGE HAS BEEN INTENTIONALLY LEFT BLANK.

Keysight N1911A and N1912A P-Series Power Meters Installation Guide

1 Getting Started

Welcome	4
Documentation Information	5

For more detailed operating information, refer to the P-Series power meter user's guide and programming guide.

Welcome

Welcome to the Keysight Technologies P-Series Power Meters' Installation Guide. This guide shows you how to:

- physically check the power meter
- adjust the carrying handle
- switch it on and confirm the meter passes the power-on self test
- connect it to a P-Series power sensor
- connect it to an 8480, N8480 Series or E-Series power sensor
- perform a zero and calibration routine on an 8480, N8480 Series or E-Series power sensor
- make connections to the rear panel
- use the *Keysight IO Libraries Suite* to configure the remote programming interfaces
- attach the rack mounting kits (supplied with Option 908 or Option 909)

NOTE

Both single and dual channel power meters with a variety of rear panel configurations have been used for the illustrations in this guide. Your power meter may differ in detail to those shown.

Initial inspection

Please inspect the shipping container for damage. If the shipping container or packaging material is damaged, it should be kept until the contents have been checked mechanically and electrically. If there is mechanical damage, notify the nearest Keysight Technologies office. Keep the damaged shipping materials (if any) for inspection by the carrier and a Keysight representative. If required, you can find the [“Sales and Technical Support”](#) on page 11.

Before continuing, please ensure you have read and understood the preceding safety information.

Documentation Information

This guide is only part of the information supplied. The documentation consists of:

- The installation guide (this book) - Shows you how to check your power meter, switch it on and connect it to a Keysight power sensor. *This information is presented in English and Japanese.*
- The user's guide - Shows you how to operate your power meter from the front panel interface to make measurements using the Keysight P-Series, E-Series E9320, E-Series E9300, E-Series E4410, N8480 Series and 8480 Series power sensors. You can find the user's guide as an Adobe Acrobat PDF (Portable Document Format) file on the supplied CD-ROM.
- The programming guide - Shows you how to operate your power meter using the remote interfaces. You can find the programming guide as an Adobe Acrobat PDF file on the supplied CD-ROM. This guide is supplied in English language only.

Printed guides are available by ordering the following options:

- English language user's guide - ABA.
- Japanese language user's guide - ABJ.


NOTE

A printed programming guide is also supplied with Option ABJ but in English language only.

There is also a connectivity guide supplied as an Adobe Acrobat PDF file on the *Keysight IO Libraries Suite* CD-ROM. This is to help you configure your P-Series power meter using the GPIB, LAN, or USB remote connections.

Conventions Used in this Guide

The following conventions are used to show the difference between a front panel key and a softkey.

	This symbol and text represents a labeled key on the power meter front panel.
Softkey	This symbol and text represents a labeled softkey and is used to indicate you should press the unmarked key beside the displayed text.
Message	This text represents a displayed message.
Parameter	This is used to represent a parameter, value, or title.
"Channel"	<p>This user's guide describes the operation for both the single channel and the dual channel power meter. To identify channels on a dual channel meter a Channel softkey on an N1911A meter becomes Channel A and Channel B on N1912A.</p> <p>When you are asked to press "the channel" Softkey in a procedure, make sure you select the relevant channel.</p>

Power Meter and Sensor Capability

Your P-Series power meter is compatible with Keysight P-series, E-Series E9320, E-Series E9300, E-Series E4410, N8480 Series and the 8480 Series power sensors. However, not all sensor and meter combinations have the same features or capabilities. The main differences are:

Features	P-Series N1920	E-Series E9320	E-Series E9300	E-Series E4410	8480 Series	N8480 Series
Average Power of CW Signal	*	*	*	*	*	*
Average Power of modulated signal	*	*	*		*	*
Peak Power	*	*				
Cal Factors stored on EEPROM	*	*	*	*		*[a]
≥200 Readings/sec.	*	*	*	*		
Rising Edge Trigger	*	*				
Falling Edge Trigger	*	*				

[a] Not applicable for N8480 Series power sensors with Option CFT.

Specifications

For the characteristics and specifications of the N1911A and N1912A P-Series Power Meters, refer to the datasheet at

<http://literature.cdn.keysight.com/litweb/pdf/5989-2471EN.pdf>

Adjusting the Carrying Handle

Adjust the carrying handle to carry the meter or view the display.
The carrying handle can be locked into three different positions.



Pull the handle outwards, rotate it to the required position and release it into one of the three locks.



If you want to remove the handle, refer to **“Rack Mounting the Power Meter”** on page 34.

Turning the Power Meter On

You can turn the power meter on without connecting a power sensor or power-sensor cable.

The instrument has an autoranging power supply. Ensure the supply voltage is within the range 100 V_{ac} to 240 V_{ac} and 50 Hz to 60 Hz and 440 Hz.

- 1 Connect the power cord.



- 2 Check that the background LED is red.

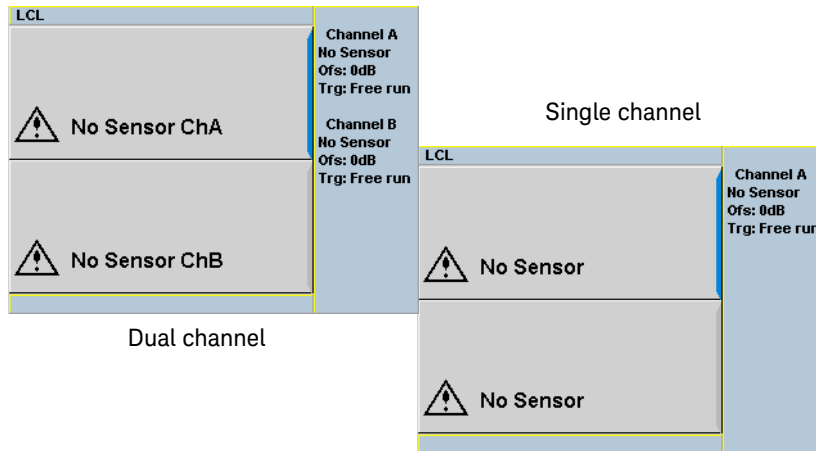


1 Getting Started

- 3 Turn the meter on and confirm the background LED is green.



- 4 The meter automatically steps through a self test routine. After this routine you should see one of the following displays.



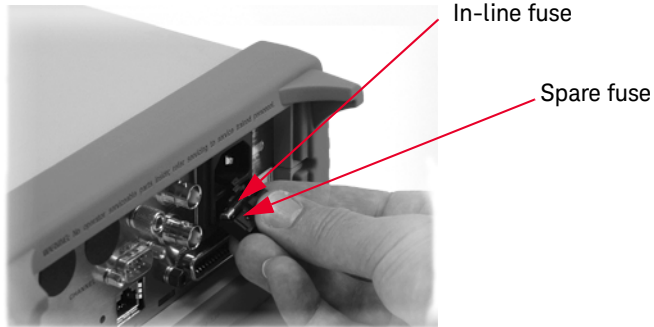
NOTE

If the meter has been stored in extremely cold conditions, beyond its normal operating range, the display may require a few minutes to warm up and operate normally.

What can go wrong?

See this	Do this
Red LED not lit	Check that power is supplied to the meter. Check the power meter fuse. (see step 5)
Fails self test(s)	If there are any self-test failures the meter is defective. Contact your nearest Keysight Service Center (Refer to “Sales and Technical Support” on page 11).

5 Line input fuse and spare.



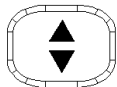
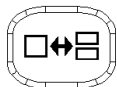



Front Panel Keys and Connections

This section briefly describes the functions of the front panel keys and connectors. The user's guide shows you how to use them in more detail.









These keys are located to the left of the display.

Key	Function
	Press this key to preset the power-meter. An option list of pre-installed measurement configurations is presented. Select an option and press the confirm key.
	Press this key to control the power meter from the front panel when it is operating via the remote interfaces (when Local Lock Out is not enabled).
	Press this key to select the upper or lower measurement window. The selected window is highlighted by a blue line on the right side of the window. Any measurement setup you create is performed in the selected window.
	Press this key to choose windowed, expanded, or full-screen display of a numeric measurement. It also provides quick access to the Gate Control screen and menu when a trace window is selected.
	Press this key to switch the meter between on and standby. When power is supplied, the background LED is red. Pressing the key, switches the power meter on and the background LED is green.









These keys are located along the lower edge of the display.

Key	Function
	Press this key to access general configuration-menus, such as GPIB address. You can also access some measurement configuration-menus. The measurement screen remains visible.
	Press this key to access the channel configuration menus. Channel parameters such as averaging and offsets are configured from this menu.
	Press this key to access the triggering menu. Unless a P-Series or an E-Series E9320A sensor is connected, all the menu keys are disabled (greyed out).
	Press this key to setup relative measurements or set display offsets. Use this key to configure the selected measurement.
	Press this key to access the measurement display menu. You can choose the displayed measurement resolution, units and display format.
	Use this key together with  to configure measurement displays.

1 Getting Started

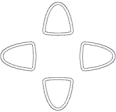



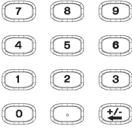


These keys are all associated with the menu labels and data entry. They are located to the right of the display.


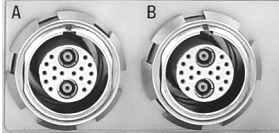
Key	Function
	Press this key to return to the previous screen. This key also cancels pop-up entry.
   	These unmarked keys are called 'softkeys' and are referred to by the text on the display next to them. For example, during a Preset, you are given an option to confirm the command. Press Confirm to continue, that is, press the softkey beside the displayed word 'confirm'.
	The lowest of the unmarked softkeys is used when there is a two page menu to be displayed. For example, a 1 of 2 is displayed beside the key indicating the first page of a two page menu. Press the key to access the next page or second page. (A 2 of 2 is displayed).



These keys and connectors are associated with the measurement channels and are located on the right-hand side of the front panel.

Key	Function
	The arrow keys are used to highlight measurement setups and change parameters such as instrument state names. The user's guide shows how these keys are used in more detail.
	Press this key to check the highlighted parameter On/ Off or select the highlighted field. Refer to the user's guide for more information.
	Press this key to access the zero and calibration menus. Refer to the user's guide for more information.
	Press this key to when in Single Trigger mode to start and stop the acquisition of the measurement. Refer to the user's guide for more information.
	Press these keys to enter numeric values in the pop-up fields, for example, the offset values. To complete the entry use the softkey. Refer to the user's guide for more information.

1 Getting Started

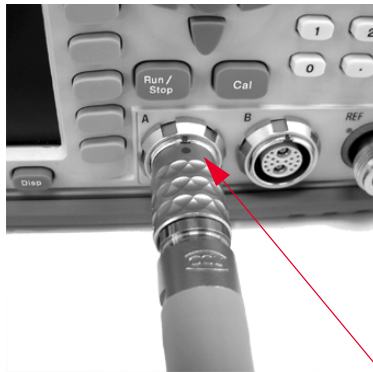
Connector	Function
	<p>The power reference is a 1 mW (0 dBm) 50 MHz signal available from a 50 Ω type-N connector. It is used for calibrating an 8480, N8480 Series or E-Series power sensor and meter system. If the meter is configured with Option 003, the connector is fitted to the rear panel. The green LED beside the connector is lit when the calibrator is turned on.</p>
	<p>The sensor input connectors (N1912A shown, the N1911A has one input). If the meter is configured with Option 003, the connectors are fitted to the rear panel.</p>

Connecting a Power Sensor

P-Series sensor

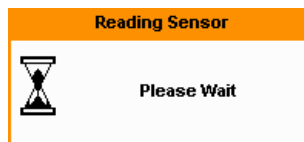
P-Series sensors are supplied with a permanently connected sensor cable.

- 1 Connect the P-Series sensor cable to the CHANNEL A (or CHANNEL B) input connector.

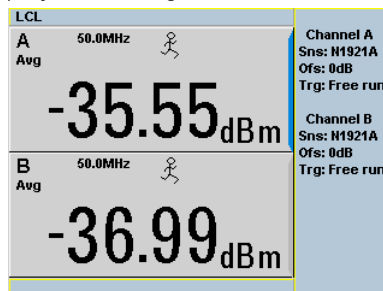


Ensure you line up the red dots on the sensor cable and power meter's connector

- 2 Confirm a reading sensor pop-up message appears briefly.



- 3 Confirm the display has changed to a measurement reading.



Dual channel

1 Getting Started

E-Series, 8480 and N8480 Series sensor models

Using the N1917A/B/C/D cable, any Keysight 8480, N8480 Series or E-Series power sensor can be connected to the N1911A or N1912A power meters.

The following shows the procedure for single channel meters configured with front panel mounted POWER REF and CHANNEL connectors. The procedure is similar for meters configured with rear panel connectors. Also, for dual channel meters (N1912A), you should repeat the procedure for the channel B sensor.

- 1 Connect the sensor to a Keysight N1917A cable.



- 2 Connect the other end of the N1917A cable to the CHANNEL A (or CHANNEL B) input connector.



- 3 Confirm a reading sensor pop-up message appears briefly.



This message does not appear when connecting an 8480 Series power sensor.

- 4 Confirm the display has changed to a measurement reading.

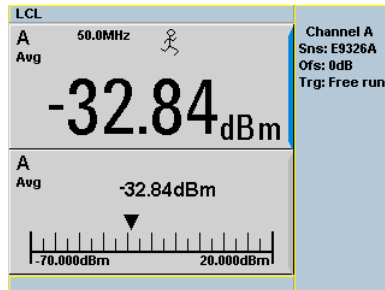



Diagram shows display with an E-Series E9320 power sensor connected.

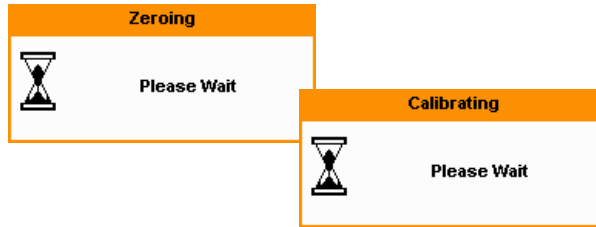
Single channel

- 5 Connect the sensor to the POWER REF connector.



1 Getting Started

- 6 When the sensor is connected to the POWER REF, you can zero and calibrate the measurement path quickly by pressing  , **Zero + Cal** . On dual channel meters, press **Zero + Cal A** or **Zero + Cal B** .



The **Zeroing** pop-up is displayed during the zeroing process, the **Calibrating** pop-up during calibration. The meter-sensor measurement path is calibrated when the **Calibrating** pop-up disappears.

Rear Panel Connections

The following connections are available on the rear panel. To setup the remote interfaces, refer to **“Remote Interface Configurations”** on page 23.

1 GPIB



2 LAN



3 USB



1 Getting Started

- 4 Trigger Input and Output connections are made via BNC connectors



- 5 Recorder output (two outputs are fitted to dual channel meters) connections are made via BNC connectors.



Remote Interface Configurations

The power meter can be remotely controlled by LAN, USB, and GPIB (IEEE488) programming interfaces. This section shows you how to set the interface configurations.

Only one interface should be used at any one time.

NOTE

To connect the power meter to your PC, configure and verify your connection, you can use the *Keysight IO Libraries Suite*, the E2094M Keysight IO Libraries for Windows, or an equivalent.

- Keysight IO Libraries Suite for Windows 98/2000/ME/XP. For information and to install, use the *Automation-Ready CD with Keysight IO Libraries Suite* which is shipped with the power meter.
- E2094M Keysight IO Libraries for Windows 98/NT/2000/ME/XP. You can find information and install this application via the Web at www.keysight.com/find/iolib.
- You can also access other information about Keysight IO Libraries at www.keysight.com/find/iolib.

NOTE

For more information on configuring the remote interface connectivity, refer to the *Keysight Technologies USB/LAN/GPIB Interfaces Connectivity Guide*. If you have installed the IO Libraries Suite, you can access the connectivity guide via the Keysight IO Libraries Control icon. Alternatively, you can access the connectivity guide via the Web at www.keysight.com/find/connectivity.

USB

The USB interface requires no front panel configuration.

USB operation and configuration is supported by the version of VISA and SICL IO libraries on your PC.

NOTE

Before connecting the USB cable, make sure that I/O software is installed on your computer.

See “**Remote Interface Configurations**” on page 23 for information about the Keysight IO Libraries software. If you have installed other I/O software, refer to documentation that accompanies the software.

- 1 After I/O software is installed on your computer, connect your P-Series power meter to your PC using the supplied Type A - Mini 5 pin USB cable.
- 2 The PC confirms the hardware connection as shown in **Figure 1-1**.

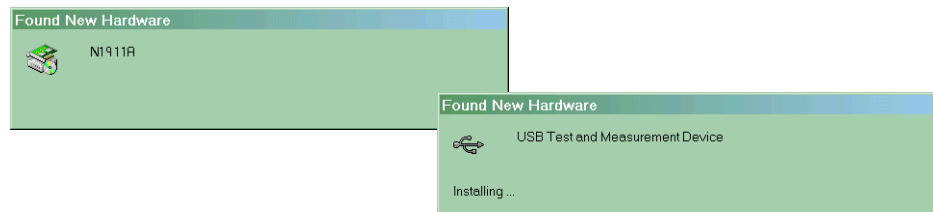


Figure 1-1 Example of initial connection Windows

- 3 The Found New Hardware Wizard automatically starts and guides you through configuring the power meter as a USB device. Click **Next** to install the software automatically, accept all defaults to complete the installation.

NOTE

If you installed Keysight IO Libraries software, you also installed low-level drivers. Therefore, you do not need to insert the CD when Found New Hardware Wizards requests you to do so.

- 4 When the Wizard has completed configuring the power meter, a window appears on your PC, [Figure 1-2](#) shows an example. If required, enter an **Alias** name to easily identify the power meter.

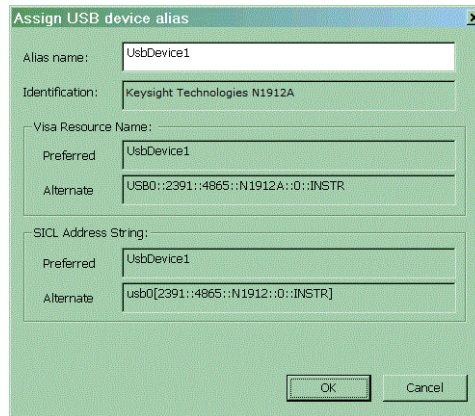


Figure 1-2 USB configuration complete

- 5 You can use Connection Expert in the IO Libraries Suite to check instrument identification.
- 6 Now you can use various programming environments to control the power meter. For an overview about programming the power meter via USB, refer to the connectivity guide and the programming guide.

LAN

The power meter has three LAN operating modes:

- Dynamic IP (Dynamic Host Configuration Protocol or DHCP)
- Auto IP (Local PC Control or isolated (non-site) LAN)
- Static IP (Manual mode)

NOTE

Your power meter uses standard VXI-11 protocol for emulating GPIB over a TCP/IP link. The emulated GPIB address is fixed at 13.

Configuring the power meter

The IP address, subnet mask, and default gateway, can be changed manually or remotely.

The IP address, subnet mask, and default gateway values are stored in non-volatile memory and are not part of the save-recall function.

Selecting the LAN network type

You can connect and configure your power meter for site LAN or isolated (non-site) LAN.

A site LAN network is defined as a local area network (LAN) in which computers and LAN-enabled instruments are connected to a site LAN (workgroup LAN, intranet, or enterprise LAN) via optional routers, hubs, and/or switches.

An isolated (non-site) LAN network is defined as a local area network (LAN) in which computers and LAN-enabled instruments are not connected to a site LAN.

Select the LAN network type you will use to connect the power meter to your computer. Then follow the procedure that corresponds to your selected LAN network type.


Dynamic mode

In dynamic mode the IP address, subnet mask, and default gateway values are obtained from a DHCP server. When you use DHCP operation you cannot configure the IP address, subnet mask, and default gateway values from the front panel.

Using this dynamic mode does not require a detailed knowledge of your network configuration.

NOTE

If the DHCP server cannot be found on your network, the power meter returns to the AutoIP mode, then static mode.

- 1 Using a standard LAN patch cable, connect both the computer and the power meter to LAN outlets.
- 2 Turn the power on the power meter.
- 3 Press , **Remote Interfaces** to display the Remote Interface display. Ensure that DHCP to ON (ON is the factory default state).
To enable DHCP operation using the arrow and Select keys to highlight and check DHCP is checked.

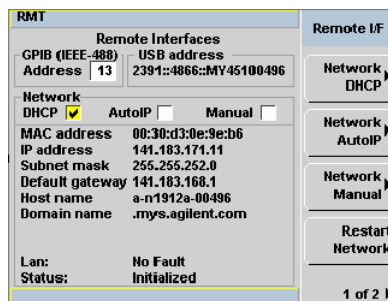


Figure 1-3 Typical LAN remote interface

NOTE

If your LAN does not support DHCP, refer to the connectivity guide.


4 Press **Network DHCP** if you need to set any optional settings.

5 Press **Restart Network**.

A pop-up appears for 5 seconds (see [Figure 1-4](#)). Monitor the Status at the bottom of the display to see when the server has assigned an address.



Figure 1-4 LAN network restart pop-up

6 Press , to return to a measurement screen.

7 If you intend to program over LAN or use such programs, make sure you have installed I/O software on your computer.

8 Use the Connection Expert utility of the IO Libraries Suite to add the power meter and verify a connection. When identifying the instrument, it is easiest to use the IP address that you noted in step 6 above.



NOTE

If you have installed other I/O software, refer to documentation that accompanies the software.

9 You can use various programming environments to control the power meter. For an overview about programming instruments via LAN, refer to the connectivity guide.

Auto IP mode

Use this procedure if you require local PC Control or you are working in an isolated (non-site) LAN.

- 1 Connect the computer to the power meter.
- 2 Switch the power on to the power meter.
- 3 Press  , **Remote Interfaces** to display the Remote Interface display (see [Figure 1-3](#)). Ensure that AutoIP is checked.
- 4 Press **Network AutoIP** if you need to set any optional settings.
- 5 Press **Restart Network**.
A pop-up appears for 5 seconds (see [Figure 1-4](#)). Monitor the Status at the bottom of the display to see when the server has assigned an address.
- 6 Press  , to return to a measurement screen.
- 7 If you intend to program over LAN or use such programs, make sure you have installed I/O software on your PC.
- 8 Use the Connection Expert utility of the IO Libraries Suite to add the power meter and verify a connection.

NOTE

If you have installed other I/O software, refer to documentation that accompanies the software.

- 9 You can use various programming environments to control the power meter. For an overview about programming instruments via LAN, refer to the connectivity guide.

Static mode (configuring the LAN manually)


In static mode you must set up the IP address, subnet mask, and default gateway that is compatible with your network infrastructure. If it is not correctly setup, the power meter is not be visible on your network.

NOTE

If you configure an invalid IP address or an IP address that is used by another device or host, an error message is generated. This error can be read by pressing



, **Error List** or by using the `SYSTEM:ERROR?` command.

- 1 Switch the power on to the power meter.
- 2 Press , **Remote Interfaces** to display the Remote Interface display (see [Figure 1-3](#)).
- 3 Press **Network Manual** to set the IP Address, Subnet Mask. The Default Gateway value is an optional setting.

To individually specify the settings use the arrow keys, Select key, and use the numeric keys followed by **Enter** keys to enter the required IP address, subnet mask, and default gateway.

The values can range between 0.0.0.0 and 255.255.255.255.

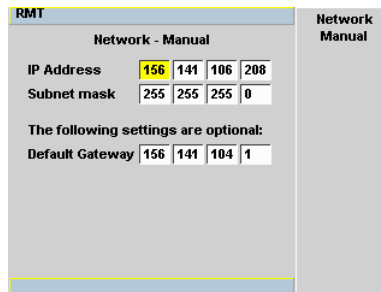




Figure 1-5 Typical manual entry LAN network interface

- 4 Press , to return to the Remote Interface display.
- 5 Press **Restart Network**.

A pop-up appears for 5 seconds (see [Figure 1-4](#)). Monitor the Status at the bottom of the Remote Interface display to see when the server has assigned an address.

- 6 Press , to return to a measurement screen.
- 7 If you intend to program over LAN or use such programs, make sure you have installed I/O software on your PC.
- 8 Use the Connection Expert utility of the IO Libraries Suite to add the power meter and verify a connection.

NOTE

If you have installed other I/O software, refer to documentation that accompanies the software.

- 9 You can use various programming environments to control the power meter. For an overview about programming instruments via LAN, refer to the connectivity guide.

Configuring the LAN remotely

To automatically configure the LAN settings enable DHCP operation using the `SYSTem:COMMunicate:LAN:DHCP[:STATe]` command.

To individually specify the settings use the `SYSTem:COMMunicate:LAN:ADDRess`, `SYSTem:COMMunicate:LAN:SMASK`, `SYSTem:COMMunicate:LAN:DGATeway`, `SYSTem:COMMunicate:LAN:AIP[:STATe]`, and `SYSTem:COMMunicate:LAN:REStart` commands.

GPIB

- 1 Install, or make sure you have installed, I/O software on your computer.
- 2 Follow your GPIB interface card vendor's instructions for installing GPIB hardware on your computer.
- 3 Connect a GPIB cable between your computer and the power meter.
- 4 Configure the installed GPIB card as the vendor instructs.
- 5 Use the Connection Expert utility of IO Libraries Suite to verify that the power meter is displayed under the GPIB interface definition.

NOTE

If you have installed other I/O software, refer to documentation that accompanies the software.

- 6 You can use various programming environments to control the power meter. For further information, refer to your GPIB card vendor's guide.
Refer to the refer to the connectivity guide and the programming guide for an overview about programming the power meter.

Changing the GPIB address

The GPIB address is an integer between 0 and 30. The power meter is shipped with a default address set to 13. The GPIB address is stored in non-volatile memory.

To change the GPIB address manually proceed as follows.

- 1 Press , **Remote Interfaces**.

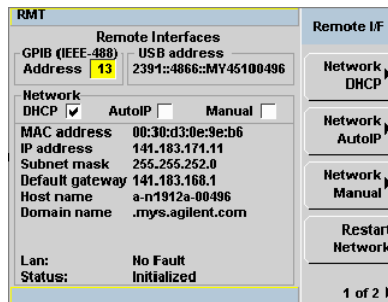



Figure 1-6 Typical GPIB remote interface

- 2 Use the arrow keys to highlight GPIB Address entry field.

- 3 Press  and use the numeric keys to enter the GPIB address in the Pop-up.

- 4 Press the Enter key

To change the address remotely.

You can set/query the GPIB address remotely using the following command
SYSTem:COMMunicate:GPIB:ADDRESS.

Rack Mounting the Power Meter

Rack mounting information

Disconnect device requirements

In rack mounting operation a disconnect device, for example, an IEC320 appliance coupler, must be used. Consideration must be given to the following when installing the power meter in a rack:

- An adequately rated switch (250V, 10A) or circuit breaker (250V, 5A) shall be included in the rack.
- It should be in close proximity to the power meter and within easy reach of the operator.
- It shall be marked as a disconnect device.

Ventilation requirements

When installing the power meter in a cabinet, the convection into and out of the power meter must not be restricted. If the total power dissipated in the cabinet is greater than 800 Watts, then forced convection must be used.

Rack mounting one meter (using the Option 908 rack mount kit)

- 1 Remove the carrying handle.

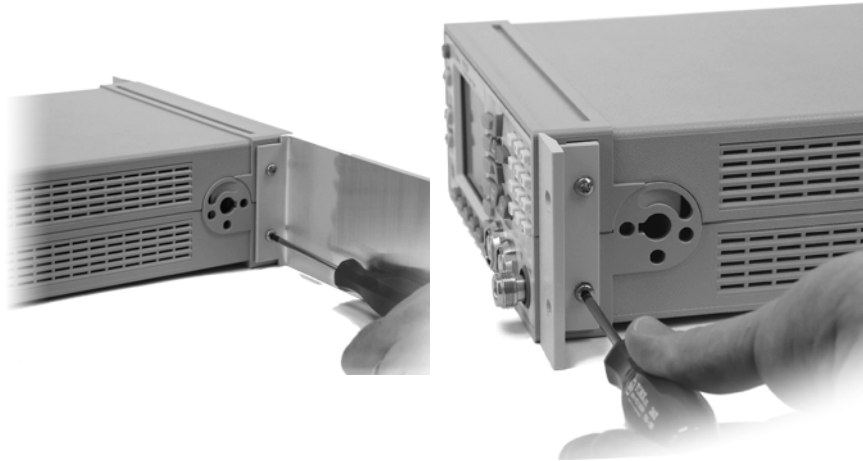


- 2 Remove the front and rear rubber bumpers.



1 Getting Started

- 3** Fit the rack mount flanges.
(Parts available separately: 5063-9240).



- 4** Ready for installation.



Rack mounting two meters together (using the Option 909 rack mount kit)

- 1 Remove the carrying handle.



- 2 Remove the front and rear rubber bumpers.



- 3 Hardware required to link meters together.



1 Getting Started

- 4** Fit one small rack mounting flange to opposite sides of each power meter. (Parts available separately: 5061-9694 and 5063-9212).



- 5** Fit two front linking plates to each power meter.



- 6** Engage the linking plates at the front of the power meters.



7 Attach the rear linking brackets.



Ready for installation.



THIS PAGE HAS BEEN INTENTIONALLY LEFT BLANK.

2 Characteristics and Specifications

For the characteristics and specifications of the N1911A and N1912A P-Series Power Meters, refer to the datasheet at <http://literature.cdn.keysight.com/litweb/pdf/5989-2471EN.pdf>.

THIS PAGE HAS BEEN INTENTIONALLY LEFT BLANK.



This information is subject to change without notice. Always refer to the English version at the Keysight website for the latest revision.

© Keysight Technologies 2005-2017
Edition 9, September 8, 2017

Printed in Malaysia



N1912-90009

www.keysight.com