

# Keysight N432A Thermistor Power Meter

Installation  
Guide

# Notices

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## Manual Part Number

N432A-90000

## Edition

Edition 5, December 1, 2017

## Printed in:

Printed in Malaysia

## Published by:

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

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### 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.

## Certification

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

## General Warranty

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## Warranty Service

For warranty service or repair, this product must be returned to a service facility designated by Keysight. For products returned to Keysight for warranty service, the Buyer shall prepay shipping charges to Keysight and Keysight shall pay shipping charges to return the product to the Buyer. However, the Buyer shall pay all shipping charges, duties, and taxes for products returned to Keysight from another country.

## Limitation of Warranty

The foregoing warranty shall not apply to defects resulting from improper or inadequate maintenance by the Buyer, Buyer-supplied products or interfacing, unauthorized modification or misuse, operation outside of the environmental specifications for the product, or improper site preparation or maintenance.

The design and implementation of any circuit on this product is the sole responsibility of the Buyer. Keysight does not warrant the Buyer's circuitry or malfunctions of Keysight products that result from the Buyer's circuitry. In addition, Keysight does not warrant any damage that occurs as a result of the Buyer's circuit or any defects that result from Buyer-supplied products.

To the extent allowed by local law, Keysight makes no other warranty, expressed or implied, whether written or oral with respect to this product and specifically disclaims any implied warranty or condition of merchantability, fitness for a particular purpose, or satisfactory quality.

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To the extent allowed by local law, the remedies provided herein are the Buyer's sole and exclusive remedies. Keysight shall not be liable for any direct, indirect, special, incidental, or consequential damages (including lost profit or data), whether based on warranty, contract, tort, or any other legal theory.

## 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)		Off (mains supply)
	Alternating current (AC)		On (mains supply)
	Both direct and alternating current		Caution, risk of electric shock
	Three-phase alternating current		Caution, risk of danger (refer to this manual for specific Warning or Caution information)
	Earth (ground) terminal		Caution, hot surface
	Protective earth (ground) terminal		Out position of a bi-stable push control
	Frame or chassis (ground) terminal		In position of a bi-stable push control
	Equipotentiality		Equipment protected throughout by double insulation or reinforced insulation
	This symbol indicates that a device, or part of a device, may be susceptible to electrostatic discharges (ESD) which can result in damage to the product. Observe ESD precautions given on the product, or its user documentation, when handling equipment bearing this mark.		This symbol indicates the operating switch for 'Stand-by' mode. Note, this 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.

## 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.

## General Safety Information

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 the instrument is likely to make the instrument dangerous. Intentional interruption is prohibited.

**WARNING**

- 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 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 Keysight 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 Keysight for service and repair to ensure the safety features are maintained.
-

## Environmental Conditions

The N432A is designed for indoor use and in an area with low condensation. The table below shows the general environmental requirements for this instrument.

Environmental condition	Requirement
Temperature	Operating condition – 0 °C to 45 °C
	Storage condition – –40 °C to 70 °C
Humidity	Operating condition – 15% to 95% RH at 40°C (non-condensing)
	Storage condition – Up to 90% RH at 65°C (non-condensing)
Altitude	Up to 4600 m (15000 ft.)

# Ventilation and Cleaning

## Ventilation requirements

To provide adequate ventilation, an air gap of approximately 75 mm (3 in.) should be maintained around the vented sections of the N432A.

## Cleaning

Use a soft, lint-free, slightly dampened cloth to wipe the front-panel and side covers. Do not use detergent. Disassembly is not required or recommended for cleaning.

### **WARNING**

- An appliance coupler (mains input power cord) is a power disconnect device. Do not position the instrument such that access to the coupler is impaired.
  - For continued protection against fire, replace the line fuse only with the same type and line rating (250 V, T2.5 H, 20 mm slow blow fuse with high breaking capacity). The use of other fuses or materials is prohibited.
  - No operator serviceable parts inside. Refer servicing to qualified personnel. To prevent electric shock, do not remove instrument covers.
  - If this instrument is not used as specified, the built-in safety protection features could be impaired. This instrument must be used in normal conditions only (in which all means for protection are intact).
-

# Compliance and Markings

## Electromagnetic compatibility (EMC)

This product complies with the essential requirements of the following applicable European (EC) Directives, and carries the CE marking in accordance to the Low Voltage Directive (2006/95/EC) and EMC Directive (2004/108/EC).

The EMC test conforms to the IEC61326- 2- 1:2005/EN61326- 2- 1:2006 and CISPR11:2003/EN55011:2007 (Group 1, Class A). To preserve the EMC performance of this product, any cable that is worn out or damaged must be replaced with the same type and specification.

This product also complies with the following EMC standards:

- Canada: ICES/NMB- 001:2004
- Australia/New Zealand: AS/NZS CISPR11:2004

## Safety

This product conforms to the requirements of the following safety standards:

- IEC 61010- 1:2001/EN 61010- 1:2001
- Canada: CAN/CSA- C22.2 No. 61010- 1- 04
- USA: ANSI/UL 61010- 1:2004

## 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).

## Responsibilities of the Customer

The customer shall provide:

- access to the products during the specified periods of coverage to perform maintenance
- adequate working space around the products for servicing by Keysight personnel.
- access to and use of all information and facilities determined necessary by Keysight to service and/or maintain the products. (Insofar as these items may contain proprietary or classified information, the customer shall assume full responsibility for safeguarding and protection from wrongful use.)
- routine operator maintenance and cleaning as specified in the Keysight Operating and Service Manuals.
- consumables such as replacement fuses, and so on.

## 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 a 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>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>The RCM mark is a registered trademark of the Australian Communications and Media Authority.</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/support/N432A](http://www.keysight.com/support/N432A)  
(product-specific information and support, software and documentation updates)
- [www.keysight.com/find/assist](http://www.keysight.com/find/assist)  
(worldwide contact information for repair and service)

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## Introduction

This guide provides you the information on how to:

- physically check the N432A thermistor power meter.
- adjust the carrying handle.
- switch on the N432A and confirm that it passes the power-on self-test.
- connect the N432A to a compatible Keysight thermistor sensor.
- perform a zeroing routine on the thermistor sensor.
- make connections to the rear panel.
- use the Keysight IO Libraries Suite to configure the remote programming interfaces.
- attach the rack mount kits (supplied with Option 908 or Option 909).

### Initial inspection

When you receive your N432A, inspect the unit for any obvious damage such as broken terminals or cracks, dents, and scratches on the chassis that may occur during shipment. If any damage is found, notify the nearest Keysight Sales Office immediately.

Keep the original packaging in case the N432A has to be returned to Keysight in future. If you return the N432A for service, attach a tag identifying the owner and model number. Also include a brief description of the problem.

#### **NOTE**

**Ensure that you have read and understood the preceding safety information before you proceed.**

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## Documentation Information

This guide is only part of the information provided. The documentation for the N432A consists of:

- the *Installation Guide* (this manual)

Provides the procedures on how to check your N432A, switch it on, and connect it to a compatible Keysight thermistor sensor. *This information is presented in English and Japanese.*

- the *User's Guide*

Describes how to operate your N432A from the front panel interface to make measurements using a compatible Keysight thermistor sensor. You can locate the *User's Guide* on the supplied CD-ROM as a PDF file in English and Japanese.

- the *Programming Guide*

Explains how to operate your N432A over a remote interface. You can locate the *Programming Guide* on the supplied CD-ROM as a PDF file in English only.

- the *Service Guide*

Describes how to carry out performance verification tests and adjustments on your N432A, as well as provides the disassembly and troubleshooting information. You can locate the *Service Guide* on the supplied CD-ROM as a PDF file in English only.

Printed guides are available by ordering the following options:

- English-language user's guide – Option ABA and Option 0BK (additional copy)
- Japanese-language user's guide – Option ABJ

### NOTE

A printed *Programming Guide* is also provided with Option 0BK and ABJ, but in English only. For Option ABA, the printed *Programming Guide* is available only by ordering Option 0BF.

There is also a *Connectivity Guide* available on the *Keysight IO Libraries Suite CD-ROM* as a PDF file. This guide helps you to configure your N432A over GPIB, LAN, and USB remote interfaces.

## Overview

This guide is divided into the following categories:

- adjusting the carrying handle
- front panel outlook
- rear panel outlook
- turning on the N432A
- connecting a thermistor sensor
- remote interface configurations
- rack mounting the N432A
- general specifications
- compliance and markings
- regulatory information
- responsibilities of the customer

For more detailed operating information, refer to the *N432A Thermistor Power Meter User's Guide* and *Programming Guide*.

## Conventions Used in This Guide

The following conventions are used throughout this guide.

	This symbol and text represents a labeled key on the N432A front panel
<b>Softkey</b>	This symbol and text represents a labeled softkey, and is used to indicate that you should press the unmarked key beside the displayed text
<b>Message</b>	This text represents a displayed message
<b>Parameter</b>	This is used to represent a parameter, value, or title

## Sensor Compatibility

The N432A is compatible with the Keysight 478A and 8478B thermistor sensors. The following table lists the frequency range and operating resistance for each of these thermistor sensors:

Thermistor sensor model	Frequency range (GHz)	Operating resistance ( $\Omega$ )
478A	0.01 to 10	200
478A Option H63	0.0001 to 1	200
478A Option H75	0.001 to 1	200
478A Option H76	0.001 to 1	200
8478B	0.01 to 18	200

### NOTE

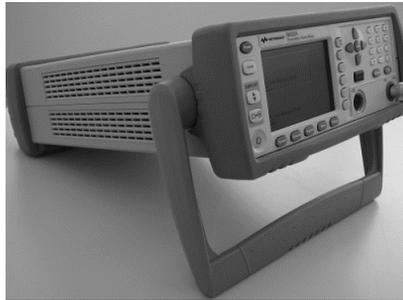
For further information on the thermistor sensors, refer to their respective manuals.

## Adjusting the Carrying Handle

Adjust the carrying handle to carry the N432A or to view the display.

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The carrying handle can be locked into three different positions.



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



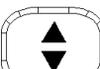
To remove the handle, refer to [“Rack Mounting the N432A”](#) on page 49.

## Front Panel Outlook

This section briefly describes the functions of the front panel keys and connectors. The user's guide provides more detailed information on how to use them.



These keys are located to the left of the display.

Key	Function
	Press this key to preset the N432A to its default state
	Press this key to control the N432A from the front panel when it is operating via the remote interfaces (when Local Lock Out is disabled)
	Press this key to select the upper or lower measurement window. The selected window is highlighted by a blue line on the right of the window. Any measurement setup you create is performed in the selected window.
	Press this key to select a windowed, expanded, or full-screen display of a numeric measurement
	Press this key to switch the N432A between on and standby. When power is supplied, the background LED turns red. Pressing the key switches on the N432A and the background LED turns yellow. When the N432A is powered on, the startup will take approximately 25 seconds.

# 1 Getting Started



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

Key	Function
	Press this key to access general configuration menus, such as the remote interface configuration. You can also access some measurement configuration menus. The measurement screen remains visible.
	Press this key to access the channel configuration menu. Channel parameters such as voltage averaging and offsets are configured from this menu.
	Press this key to access the triggering menu
	Press this key to configure measurements for the selected measurement window, such as display offsets and relative measurements
	Press this key to access the measurement display menu. You can select the displayed measurement resolution, unit, and display format.  Use this key together with  to configure measurement displays.



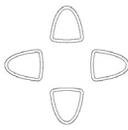
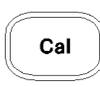
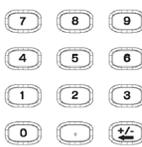
These keys are associated with the menu labels and data entry. They are located to the right of the display.

Key	Function
	Press this key to return to the previous screen. This key also cancels pop-up entries.
    	<p>These unmarked keys are called 'softkeys' and are referred to by the text on the display next to them.</p> <p>For example, during a preset, you are given an option to confirm the command. Press <b>Confirm</b> to continue, that is, press the softkey beside the displayed word <b>Confirm</b>.</p>
	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 the second page (a 2 of 2 is displayed).

# 1 Getting Started



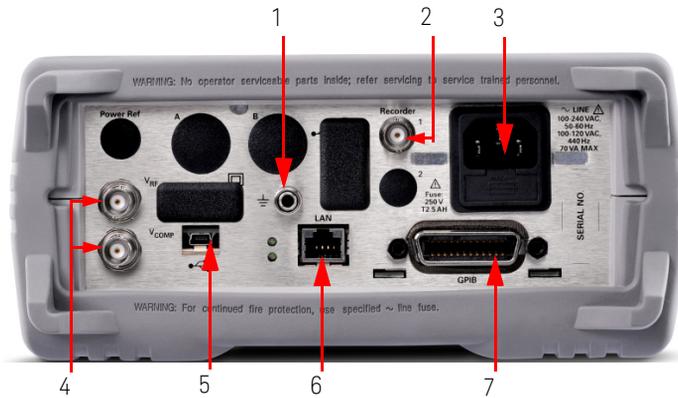
These keys and connectors are associated with the measurement channel and are located on the right of the front panel.

Key	Function
	The arrow keys are used for navigation around the parameter entry screens. The up and down arrows are used for selecting values from a pop-up list. They are also used to enter text such as table names.
	Press this key to select a highlighted field to allow data entry, select a check box, or confirm the entry of a pop-up list
	Press this key to access the zeroing menu
	Press this key to reset the MAX HOLD and MIN HOLD measurements
	Press these keys to enter numeric values in the pop-up fields, for example, the offset values. To complete the entry, use the softkey.

Connector	Function
 A photograph of a circular connector with a silver faceplate. The text 'REF' is printed at the top left, '50 MHz' at the top right, and 'LXI' at the bottom right. A small yellow LED is visible on the left side of the faceplate.	<p>The power reference is a 1 mW (0 dBm), 50 MHz signal available from a 50 W type-N connector. It is used for calibrating a 478A or 8478B thermistor sensor and meter system.</p> <p>The yellow LED beside the connector is lit when turned on.</p>
 A photograph of a circular connector with a silver faceplate. The text 'ATH' is printed at the top left. The center of the faceplate is dark with several small, indistinct markings.	<p>Thermistor mount input connector for 1.5 m, 3 m, and 6.1 m cables that connect to the 478A and 8478B thermistor sensors</p>

## Rear Panel Connections

The following connectors are available on the rear panel. To set up the remote interfaces, refer to “Remote Interface Configurations” on page 38.



No.	Connection
1	Ground connector
2	Recorder output terminal 1 Recorder output connection is made via a BNC connector. This output produces a DC voltage that corresponds to the power level of the channel input.
3	AC inlet The N432A has an autoconfiguring power supply. This allows it to operate over a range of voltages without manually being set to a certain voltage.
4	$V_{RF}$ and $V_{COMP}$ output terminals The $V_{RF}$ BNC terminal outputs the RF bridge voltage, while the $V_{COMP}$ BNC terminal outputs the compensation bridge voltage. Both the $V_{RF}$ and $V_{COMP}$ outputs are used for calibrating the N432A and for precision power measurements.
5	USB Mini-B port Allows the N432A to be controlled remotely over the USB interface
6	LAN interface Allows the N432A to be controlled remotely over the LAN interface
7	GPIB interface Allows the N432A to be controlled remotely over the General Purpose Interface Bus (IEEE-488) standard interface

## Turning On the N432A

You can turn on the N432A without connecting a thermistor sensor or a thermistor sensor cable.

**NOTE**

The N432A has an autoranging power supply. Ensure the supplied voltage is within the range of 100 Vac to 240 Vac and 50 Hz to 60 Hz and 400 Hz.

- 1 Connect the power cord.



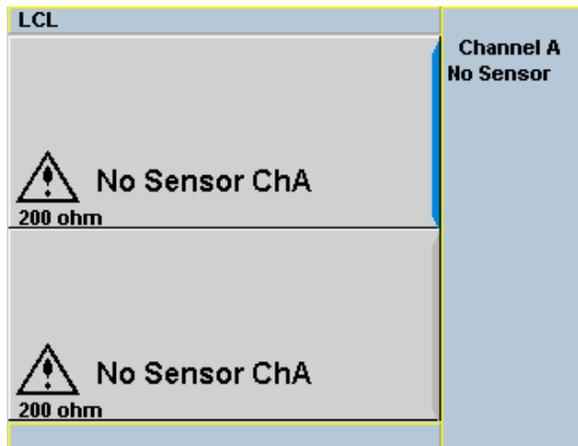
- 2 Check that the background LED is red.



- 
- 3 Turn on the N432A and confirm that the background LED is yellow.



- 
- 4 The N432A will power up within ~25 seconds, and you should see the following display:



- 
- 5 The N432A is now ready for use.

**NOTE**

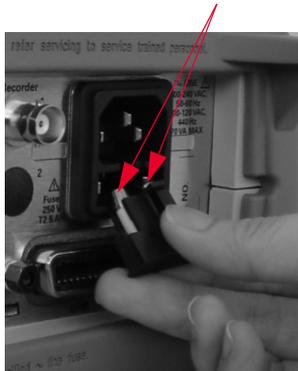
If the N432A has been stored in extremely cold conditions, beyond its normal operating range, the display may require a few minutes to warm up and operate normally.

## What can go wrong?

Problem	Troubleshooting step
<b>The red LED is not lit</b>	<ul style="list-style-type: none"> <li>– Check that power is supplied to the N432A</li> <li>– Check the N432A fuses (refer to Step 6 below)</li> </ul>
<b>Self-test(s) fails</b>	If there is any self-test failure, the N432A is defective. Contact the nearest Keysight Service Center (refer to “Sales and Technical Support” on page 14).

**6** Check the in-line fuses.

### In-line fuses



## Connecting a Thermistor Sensor

### 478A and 8478B thermistor sensor models

Using a Keysight thermistor sensor cable, any Keysight 478A or 8478B thermistor sensor can be connected to the N432A.

Follow the procedure below to connect a thermistor sensor to the N432A:

- 
- 1 Connect one end of the thermistor sensor cable to the sensor.



- 
- 2 Connect the other end of the cable to the channel A input connector.

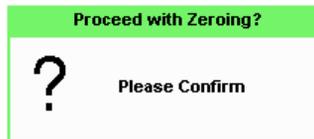


- 
- 3 Turn on the N432A.

- 
- 4 A message will appear to inform you of the current bridge resistance value and require you to select a new resistance value or reconfirm the current resistance value. Use the softkeys to select the desired value.



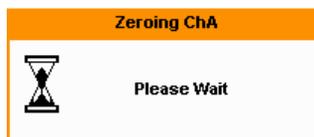
- 
- 5 You will then be prompted for confirmation to proceed with zeroing. Press Confirm to proceed.



- 
- 6 Another message will appear, prompting you to confirm whether the thermistor sensor has been disconnected from the RF source. Press Confirm once you have verified that there is no RF source connected.



- 
- 7 Zeroing will start automatically. The Zeroing pop-up message will be displayed during the zeroing process,



## Remote Interface Configurations

The N432A can be remotely controlled via LAN, USB, and GPIB (IEEE-488) programming interfaces. This section describes how to set up and configure these interfaces.

Only one interface should be used at any one time.

To connect the N432A to your PC, configure and verify the connection, you can use the *Keysight IO Libraries Suite* or an equivalent.

- To install the Keysight IO Libraries Suite, follow the instructions in the *Keysight Automation-Ready CD with Keysight IO Libraries Suite* provided with the standard purchase of the N432A.
- You can also access other information on Keysight IO Libraries at [www.keysight.com/find/iolib](http://www.keysight.com/find/iolib).

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 from the IO Libraries Control icon. Alternatively, you can access the connectivity guide via the Web at [www.keysight.com/find/connectivity](http://www.keysight.com/find/connectivity).

## USB

The USB interface requires no front panel configuration. The USB operation and configuration is supported by the version of VISA and SICL IO libraries on your PC.

### NOTE

Before connecting the USB cable, ensure that the I/O software has been installed on your PC.

Refer to **“Remote Interface Configurations”** on page 38 for the information on Keysight IO Libraries software. If you have installed other I/O software, refer to the documentation that accompanies the software.

- 1 After the I/O software has been installed on your PC, connect the N432A to your PC using the supplied Type A – Mini 5-pin USB cable.
- 2 The PC will confirm the hardware connection.
- 3 The Found New Hardware Wizard will automatically start and guide you through the configuration of the N432A as a USB device. Click Next to install the software automatically and accept all defaults to complete the installation.



**Figure 1-1** Found New Hardware Wizard

**NOTE**

If you have installed the Keysight IO Libraries software, you have also installed low-level drivers. Therefore, you do not need to insert the CD when requested by the Found New Hardware Wizard.

---

- 4 You can use the Connection Expert in the IO Libraries Suite to check the instrument identification.
- 5 Now, you can use various programming environments to control the N432A. For an overview on programming the N432A via USB, refer to the connectivity guide and the programming guide.

## LAN

The N432A 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**

The N432A uses the standard VXI-11 protocol for emulating GPIB over a TCP/IP link.

---

### Configuring the N432A

- 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 N432A for a site LAN or an isolated (non-site) LAN.

- A site LAN is defined as a local area network (LAN) in which PCs 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 is defined as a local area network (LAN) in which PCs and LAN-enabled instruments are not connected to a site LAN.

Select the LAN network type you will use to connect the N432A to your PC. 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 the 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 N432A will return to the auto IP mode, then static mode.

- 1 Using a standard LAN patch cable, connect both the PC and the N432A to LAN outlets.
- 2 Turn on the N432A.
- 3 Press  > **Remote Interfaces** to access the Remote Interface display. Ensure that DHCP is enabled (factory-default state).

To enable the DHCP operation, use the arrow and Select keys to highlight and select DHCP.

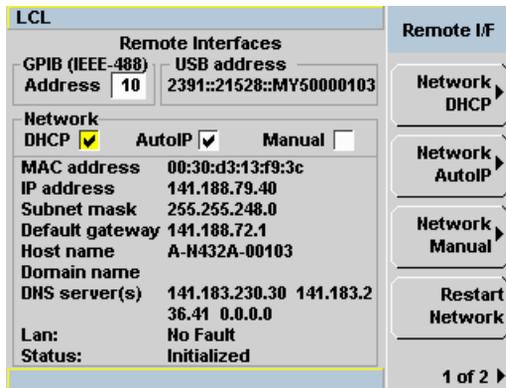


Figure 1-2 Enabling DHCP

**NOTE**

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

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

5 Press **Restart Network**.

A pop-up message will appear for 5 seconds as shown below. Monitor the Status at the bottom of the display to determine when the server has assigned an address.



**Figure 1-3** LAN network restart pop-up

6 Press , to return to a measurement screen.

7 If you intend to program over the LAN interface, make sure that you have installed the I/O software on your PC.

8 Use the Connection Expert utility of the IO Libraries Suite to add the N432A and verify the connection. When identifying the N432A, it is easiest to use the IP address that you noted in step 5 above.

**NOTE**

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

9 You can use various programming environments to control the N432A. For an overview on programming the N432A via LAN, refer to the connectivity guide and the programming guide.

### Auto IP mode

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

- 1 Connect the PC to the N432A.
- 2 Turn on the N432A.
- 3 Press  > **Remote Interfaces** to access the Remote Interface display (Figure 1-2). Ensure that AutoIP is selected.
- 4 Press **Network AutoIP** if you need to configure any optional settings.
- 5 Press **Restart Network**.  
A pop-up message will appear for 5 seconds (Figure 1-3). Monitor the Status at the bottom of the display to determine when the server has assigned an address.
- 6 Press  to return to a measurement screen.
- 7 If you intend to program over the LAN interface, make sure that you have installed the I/O software on your PC.
- 8 Use the Connection Expert utility of the IO Libraries Suite to add the N432A and verify the connection.

#### NOTE

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

- 
- 9 You can use various programming environments to control the N432A. For an overview on programming the N432A via LAN, refer to the connectivity guide and the programming guide.

## Static mode (configuring the LAN manually)

In static mode, you must set up the IP address, subnet mask, default gateway, and DNS servers that are compatible with your network infrastructure. If they are not set up correctly, the N432A will not be visible on your network.

- 1 Turn on the N432A.

### 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 sending the `SYSTEM:ERROR?` query.

- 2 Press  > **Remote Interfaces** to access the Remote Interface display (see Figure 1-2).

- 3 Press **Network Manual** to set the IP address and subnet mask. The default gateway and DNS servers are optional settings.

To individually configure the settings, use the arrow keys, Select key, and numeric keys to enter the required IP address, subnet mask, default gateway, and DNS servers.

The values can range between 0.0.0.0 and 255.255.255.255.

LCL					Network Manual				
<b>Network - Manual</b>									
<b>IP Address</b>	141	188	79	40					
<b>Subnet mask</b>	255	255	0	0					
<b>The following settings are optional:</b>									
<b>Default Gateway</b>	0	0	0	0					
<b>DNS servers:</b>	1	0	0	0	0				
	2	0	0	0	0				
	3	0	0	0	0				

Figure 1-4 LAN network manual setup

- 4 Press , to return to the Remote Interface display.
- 5 Press **Restart Network**.  
A pop-up message will appear for 5 seconds (see [Figure 1-3](#)). Monitor the Status at the bottom of the Remote Interface display to determine when the server has assigned an address.
- 6 Press , to return to a measurement screen.
- 7 If you intend to program over the LAN interface, make sure that you have installed the I/O software on your PC.
- 8 Use the Connection Expert utility of the IO Libraries Suite to add the N432A and verify the connection.

**NOTE**

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

- 9 You can use various programming environments to control the N432A. For an overview on programming the N432A via LAN, refer to the connectivity guide or programming guide.

### Configuring the LAN remotely

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

To individually specify the settings, use the following commands:

- `SYSTEM:COMMunicate:LAN:ADDRESS`
- `SYSTEM:COMMunicate:LAN:SMASK`
- `SYSTEM:COMMunicate:LAN:DGATeway`
- `SYSTEM:COMMunicate:LAN:AIP[:STATe]`
- `SYSTEM:COMMunicate:LAN:REStart`

## GPIB

- 1 Install, or ensure that you have installed, the I/O software on your PC.
- 2 Follow your GPIB interface card vendor's instructions for installing GPIB hardware on your PC.
- 3 Connect a GPIB cable between your PC and the N432A.
- 4 Configure the installed GPIB card based on the vendor's instructions.
- 5 Use the Connection Expert utility of the IO Libraries Suite to verify that the N432A is displayed under the GPIB interface node.

**NOTE**

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

---

- 6 You can use various programming environments to control the N432A. For further information, refer to your GPIB card vendor's guide.

Refer to the connectivity guide and the programming guide for an overview on programming the N432A via GPIB.

### Changing the GPIB address

The GPIB address is an integer between 0 and 30. The N432A is shipped with a default address of 10. The GPIB address is stored in a non-volatile memory.

**NOTE**

GPIB address 21 cannot be used as Keysight GPIB interface card default address is 21. Other GPIB interface card may use a different integer as the default address.

---

To change the GPIB address manually, proceed as follows:

- 1 Press  > **Remote Interfaces**.

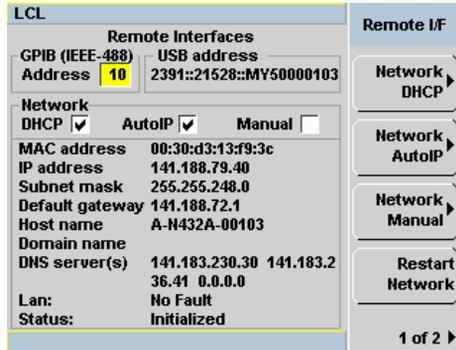


Figure 1-5 Changing the GPIB address

- 2 Use the arrow keys to highlight the GPIB Address entry field.
- 3 Press the Select key and use the numeric keys to enter the GPIB address in the pop-up dialog.
- 4 Press **Enter**.

### Changing the GPIB address remotely

You can set/query the GPIB address remotely using the following command:

**SYSTEM:COMMunicate:GPIB:ADDRESS**

## Rack Mounting the N432A

### Rack mounting information

#### **Disconnect device requirements**

During rack mounting, a disconnect device, for example, an IEC320 appliance coupler, must be used. Consideration must be given to the following requirements when installing the N432A in a rack:

- An adequately rated switch (250 V, 10 A) or a circuit breaker (250 V, 5 A) shall be included in the rack.
- It should be in close proximity to the N432A and within easy reach of the operator.
- It shall be marked as a disconnect device.

#### **Ventilation requirements**

When installing the N432A in a cabinet, the convection into and out of the N432A must not be restricted. If the total power dissipated in the cabinet is greater than 800 W, then forced convection must be used.

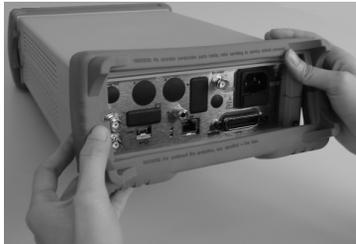
# 1 Getting Started

## Rack mounting a single N432A (using the Option 908 rack mount kit)

- 
- 1 Remove the carrying handle.



- 
- 2 Remove the front and rear rubber bumpers.



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



- 
- 4** Ready for installation.



# 1 Getting Started

Rack mounting two N432As together (using the Option 909 rack mount kit)

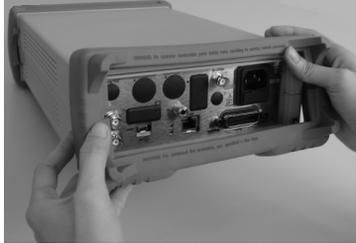
---

**1** Remove the carrying handle.



---

**2** Remove the front and rear rubber bumpers.



- 
- 3** The hardware below is required to link the N432As together.



- 
- 4** Fit a small rack mount flange to the opposite sides of each N432A.  
(Parts available separately: 5061-9694 and 5063-9212)



- 
- 5** Fit two front linking plates to each N432A.



# 1 Getting Started

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**6** Engage the linking plates at the front of the N432As.



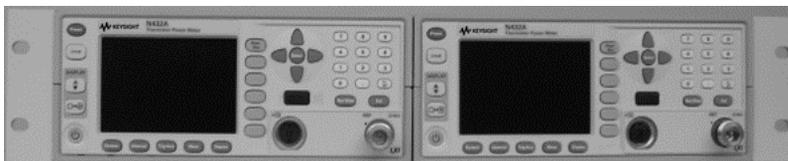
---

**7** Attach the rear linking brackets.



---

**8** Ready for installation.



## 2 Characteristics and Specifications

For the characteristics and specifications of the N432A Thermistor Power Meter, refer to the datasheet at <http://literature.cdn.keysight.com/litweb/pdf/5990-5740EN.pdf>.

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

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Edition 5, December 1, 2017

Printed in Malaysia



N432A-90000

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