

Keysight E5092A Configurable Multiport Test Set

Caution



Do not exceed the operating input power, voltage, and current level and signal type appropriate for the instrument being used, refer to your instrument's Function Reference.



Electrostatic discharge(ESD) can damage the highly sensitive microcircuits in your instrument. ESD damage is most likely to occur as the test fixtures are being connected or disconnected. Protect them from ESD damage by wearing a grounding strap that provides a high resistance path to ground. Alternatively, ground yourself to discharge any static charge built-up by touching the outer shell of any grounded instrument chassis before touching the test port connectors.

Safety Summary

When you notice any of the unusual conditions listed below, immediately terminate operation and disconnect the power cable.

Contact your local Keysight Technologies sales representative or authorized service company for repair of the instrument. If you continue to operate without repairing the instrument, there is a potential fire or shock hazard for the operator.

- Instrument operates abnormally.
- Instrument emits abnormal noise, smell, smoke or a spark-like light during operation.
- Instrument generates high temperature or electrical shock during operation.
- Power cable, plug, or receptacle on instrument is damaged.
- Foreign substance or liquid has fallen into the instrument.

Herstellerbescheinigung

GERÄUSCHEMISSION

LpA < 70 dB
am Arbeitsplatz
normaler Betrieb
nach DIN 45635 T. 19

Manufacturer's Declaration

ACOUSTIC NOISE EMISSION

LpA < 70 dB
operator position
normal operation
per ISO 7779

Regulatory compliance information

This product complies with the essential requirements of the following applicable European Directives, and carries the CE marking accordingly:

The Low Voltage Directive 73/23/EEC, amended by 93/68/EEC

The EMC Directive 89/336/EEC, amended by 93/68/EEC

To obtain Declaration of Conformity, please contact your local Keysight Technologies sales office, agent or distributor.

Safety notice supplement

- This equipment complies with EN/IEC61010-1:2001.
- This equipment is MEASUREMENT CATEGORY I (CAT I). Do not use for CAT II, III, or IV.
- Do not connect the measuring terminals to mains.
- This equipment is POLLUTION DEGREE 2, INDOOR USE product.
- This equipment is tested with stand-alone condition or with the combination with the accessories supplied by Keysight Technologies against the requirement of the standards described in the Declaration of Conformity. If it is used as a system component, compliance of related regulations and safety requirements are to be confirmed by the builder of the system.

NOTICE: This document contains references to Agilent Technologies. Agilent's former Test and Measurement business has become Keysight Technologies. For more information, go to www.keysight.com.



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Manual Printing History

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September 2008 First Edition (part number: E5092-90000)

August 2014 Second Edition (part number: E5092-90000)

Safety Summary

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 may impair the protection provided by the equipment. Such noncompliance would also violate safety standards of design, manufacture, and intended use of the instrument. Keysight Technologies assumes no liability for the customer's failure to comply with these precautions.

NOTE The E5092A complies with INSTALLATION CATEGORY II as well as POLLUTION DEGREE 2 in IEC61010-1. The E5092A is an INDOOR USE product.

NOTE The LEDs in the E5092A are Class 1 in accordance with IEC60825-1, CLASS 1 LED PRODUCT

NOTE  This equipment is MEASUREMENT CATEGORY I (CAT I). Do not use for CAT II, III, or IV.

NOTE This equipment is tested with stand-alone condition or with the combination with the accessories supplied by Keysight Technologies against the requirement of the standards described in the Declaration of Conformity. If it is used as a system component, compliance of related regulations and safety requirements are to be confirmed by the builder of the system.

- **Ground the Instrument**
To avoid electric shock, the instrument chassis and cabinet must be grounded with the supplied power cable's grounding prong.
- **DO NOT Operate in an Explosive Atmosphere**
Do not operate the instrument in the presence of inflammable gasses or fumes. Operation of any electrical instrument in such an environment clearly constitutes a safety hazard.
- **Keep Away from Live Circuits**
Operators must not remove instrument covers. Component replacement and internal adjustments must be made by qualified maintenance personnel. Do not replace components with the power cable connected. Under certain conditions, dangerous voltage levels may remain even after the power cable has been disconnected. To avoid injuries, always disconnect the power and discharge circuits before touching them.
- **DO NOT Service or Adjust the Instrument Alone**
Do not attempt internal service or adjustment unless another person, capable of rendering first aid and resuscitation, is present.
- **DO NOT Substitute Parts or Modify the Instrument**
To avoid the danger of introducing additional hazards, do not install substitute parts or perform unauthorized modifications to the instrument. Return the instrument to a Keysight Technologies Sales and Service Office for service and repair to ensure that

safety features are maintained in operational condition.

- Dangerous Procedure Warnings

Warnings, such as the example below, precede potentially dangerous procedures throughout this manual. Instructions contained in the warnings must be followed.

WARNING

Dangerous voltage levels, capable of causing death, are present in this instrument. Use extreme caution when handling, testing, and adjusting this instrument.

Safety Symbols

General definitions of safety symbols used on the instrument or in manuals are listed below.



Instruction Manual symbol: the product is marked with this symbol when it is necessary for the user to refer to the instrument manual.



Alternating current.



Direct current.



On (Supply).



Off (Supply).



In-position of push-button switch.



Out-position of push-button switch.



A chassis terminal; a connection to the instrument's chassis, which includes all exposed metal structure.



Stand-by.

WARNING

This warning sign denotes a hazard. It calls attention to a procedure, practice, or condition that, if not correctly performed or adhered to, could result in injury or death to personnel.

CAUTION

This Caution sign denotes a hazard. It calls attention to a procedure, practice, or condition that, if not correctly performed or adhered to, could result in damage to or destruction of part or all of the instrument.

NOTE

This Note sign denotes important information. It calls attention to a procedure, practice, or condition that is essential for the user to understand.

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 Institution's calibration facility or by the calibration facilities of other International Standards Organization members.

Exclusive Remedies

The remedies provided herein are Buyer's sole and exclusive remedies. Keysight Technologies shall not be liable for any direct, indirect, special, incidental, or consequential damages, whether based on contract, tort, or any other legal theory.

Assistance

Product maintenance agreements and other customer assistance agreements are available for Keysight Technologies products.

For any assistance, contact your nearest Keysight Technologies Sales and Service Office. Addresses are provided at the back of this manual.

Typeface Conventions

Sample (bold)

Boldface type is used when a term is defined or emphasized.

Sample (Italic)

Italic type is used for emphasis and for titles of manuals and other publications.

Sample menu/button/box/tab

Indicates a menu/button/box/tab on the screen labeled “Sample” which can be selected/executed by clicking. “menu”, “button”, “box”, or “tab” may be omitted.

Sample key

Indicates a hardkey (key on the front panel or external keyboard) labeled “Sample.” “key” may be omitted.

[Sample]

Indicates the hardkey whose key label is “Sample”.

[Sample] - Item

Indicates a series of key operations in which you press the **[Sample]** key, make the item called “Item” on the displayed menu blink by using the **[-]** or in other ways, and then press the **[Enter]** key.

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1 Introduction

This chapter introduces the documentation for Keysight E5092A and the overview of this manual to use this manual efficiently.

Manuals for E5092A

Keysight provides the following three manuals for E5092A.

- o Installation Guide

The installation guide (this manual) provides start up setup information when you use the E5092A for the first time and maintenance information.

- o User Guide

The user guide (*Online Help*) provides information about connecting the E5071C ENA Series Network Analyzer and the E5092A configurable multiport test set, setting, measurement operation and controlling the configurable multiport test set. For more information, refer to E5071C ENA Network Analyzer Online Help.

- o Service Guide

The service manual provides information about the parts, troubleshooting, performance test, adjustment and service menu.

Contents of This Manual

The following shows the contents of this manual.

- o **Chapter 1, “Introduction”**

This chapter introduces the documentation for Keysight E5092A and the overview of this manual to use this manual efficiently.

- o **Chapter 2, “Installation”**

This chapter describes the setup of E5092A.

- o **Chapter 3, “Supplementary Information”**

This chapter describes information related to E5092A.

- o **Chapter 4, “Information on Maintenance”**

This chapter explains the measures you should take to maintain the Keysight E5092A.

- o **Appendix A, “Manual Changes,”**

This appendix contains the information required to adapt this manual to versions or configurations of the E5092A manufactured earlier than the current printing date of this manual.

Introduction
Contents of This Manual

2 Installation

This chapter describes the setup of E5092A.

Incoming inspection

When you receive the product, follow the below steps to perform the incoming inspection.

WARNING

When unpacking the configurable multiport test set, if the external face of the device (such as, the cover, front/rear panel, power switch, and port connectors) appear to be damaged during transport, do not turn on the power. Otherwise, you may get an electrical shock.

Step 1. Check that the packing box or shock-absorbing material used to package the E5092A has not been damaged.

NOTE

If the packing box or shock-absorbing material has been damaged, leave the packing box or shock-absorbing material as is until other inspections items are checked as follows.

Step 2. Check the packaged items supplied with the configurable multiport test set for any damage or defects..

Step 3. By referring to the box contents list that is separately appended, check that all packaged items supplied with the configurable multiport test set have been provided as per the specified options.

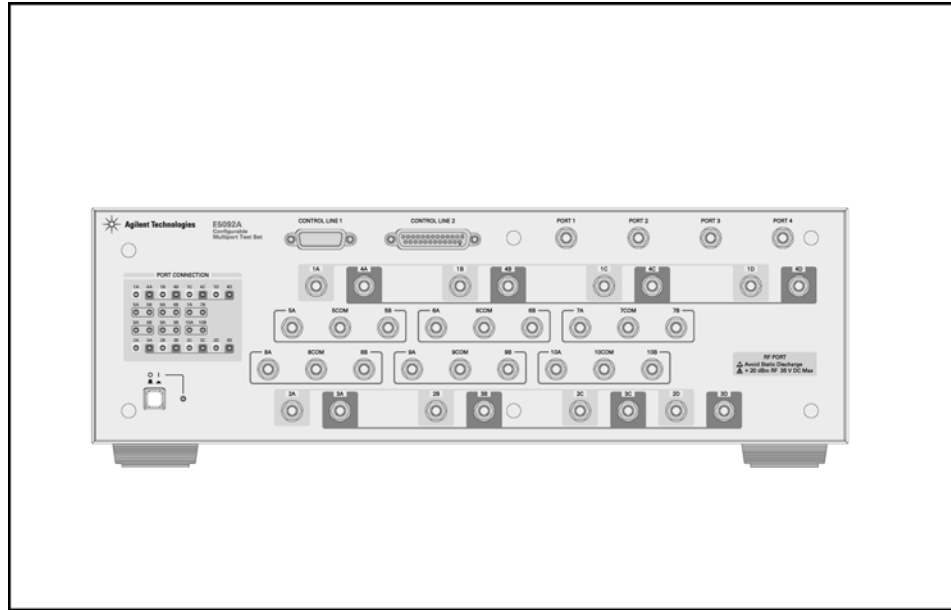
Step 4. After checking, if one of the following applies, contact your nearest Keysight Technologies sales and service office.

1. If the packing box or shock-absorbing material is damaged or the shock-absorbing material has traces where extreme force has been applied.
2. A packaged item supplied with the configurable multiport test set has mechanical damage or defects.
3. A packaged item supplied with the configurable multiport test set is missing.
4. A fault has been detected in the subsequent operation check of the configurable multiport test set.

If an abnormality is detected in step 1, contact the company that transported the configurable multiport test set as well as your nearest Keysight Technologies sales and service office. For inspection by the transport company, save the packing box, shock-absorbing material, and packaged items as you received them.

Figure 2-1

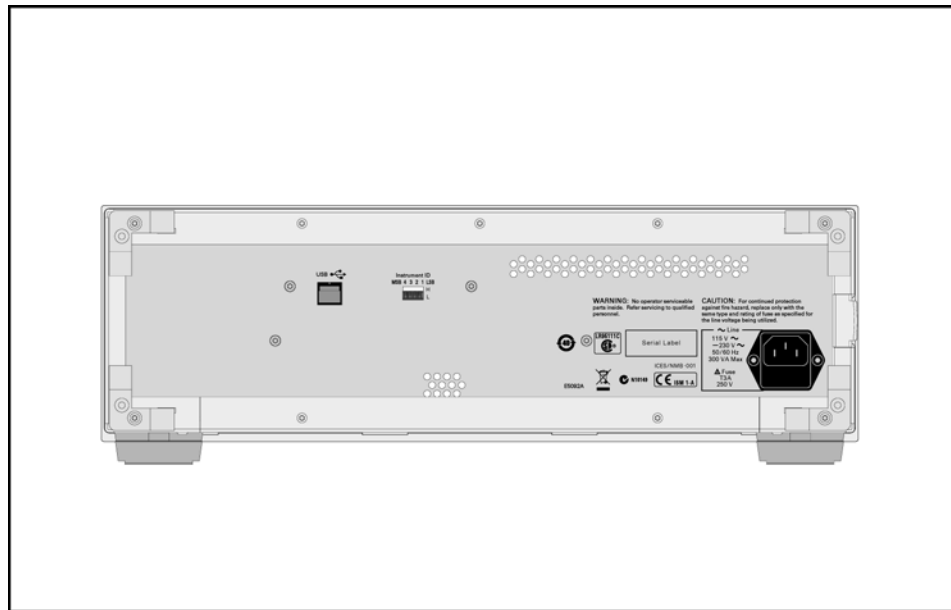
Front Panel



e5092cue8006

Figure 2-2

Rear Panel



e5092cue8007

Requirements for installation environment

Install the E5092A under an environment that satisfies the following conditions.

Operating environment

Use the E5092A under the following environment.

Table 2-1

Temperature	5 °C to 40 °C
Temperature range during calibration	23 °C ± 5 °C (90 minutes after the instrument has turned ON)
Humidity	20-80% at wet bulb temperature < +29 °C (no condensation)
Altitude	0 m to 2,000 m (0 feet to 6,561 feet)
Vibration	0.21 G max, 5 Hz to 500 Hz

CAUTION

The above operating environment does not mean the conditions under which all the specifications and measurement accuracy of the E5092A are satisfied but those under which the E5092A operates normally.

Heat dissipation clearance

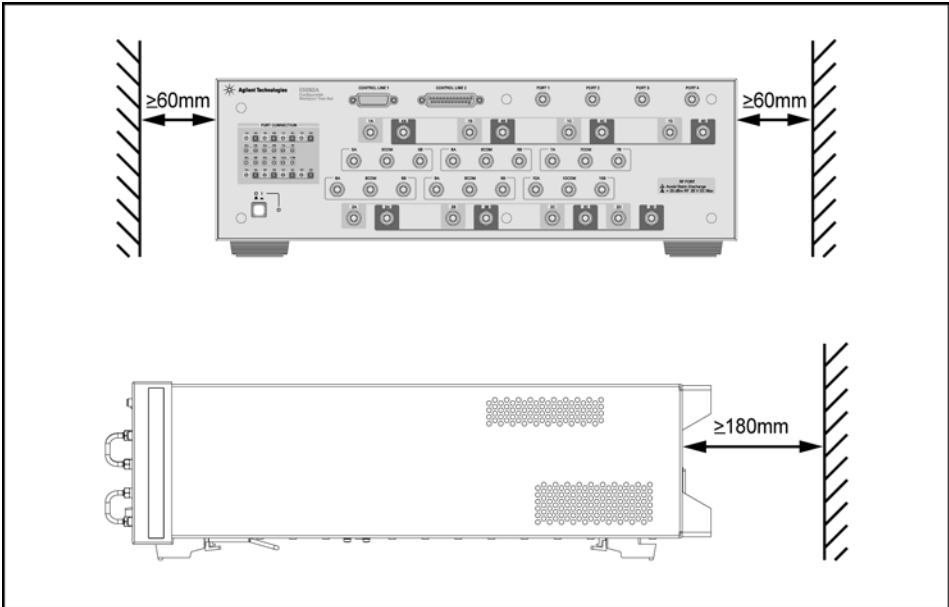
To satisfy the safety, specifications, and measurement accuracy of the product, you need to keep the temperature around the product within a specific range by providing proper heat dissipation clearance around the product or by air-cooling the inside of the rack forcefully when you mount the product in the rack. For information on ambient temperature to satisfy the specifications and measurement accuracy of the product, refer to the “Specifications” Chapter in *E5071C ENA Network Analyzers Online Help*.

When the temperature around the product is kept within the temperature range in the operating environmental specifications (see “**Operating environment**” on page 10), the product complies with the safety standards. Furthermore, when the product is installed providing the following heat dissipation clearance under the above temperature environment, the product complies with the safety standards.

Table 2-2

	Condition
Rear	≥ 180 mm
Sides	≥ 0 mm (each for right and left)

Figure 2-3 Providing heat dissipation clearance



e5092aue050

Installation

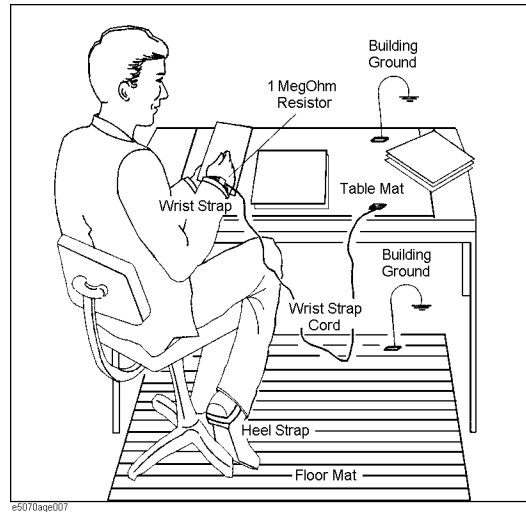
Requirements for installation environment

Antistatic measures

To protect electronic components from static damage, take antistatic measures as shown in [Figure 2-4](#).

Figure 2-4

Example of antistatic measures



Providing space to disconnect the plug of the power cable

As described in [“Cutting supply of power” on page 18](#), the disconnecting device (the device to cut the supply of power) of the E5092A is the plug of the power cable. When installing the E5092A, provide sufficient clearance not to hinder the operation of disconnecting the plug of the power cable (on the power outlet side or the E5092A side) in an emergency to cut the supply of power.

Mounting front handles/flanges for rackmount

You can use the E5092A on a workbench or mounted in a rack. This section describes how to mount the front handles used to move/transport it (Option 1CN) and how to mount it into a rack as part of a measurement system (Option 1CM: without handles/Option 1CP: with handles).

Table 2-3 **Handle/rack options for the E5092A**

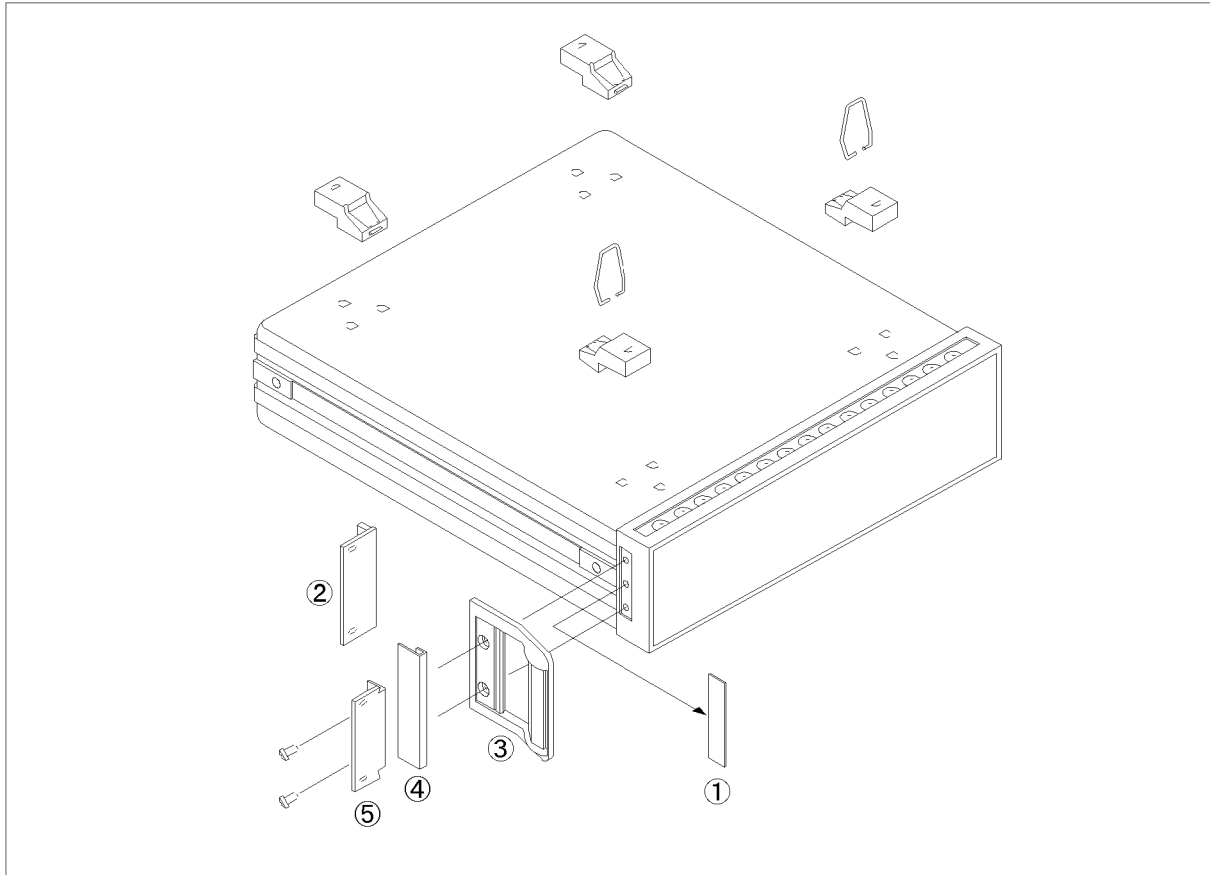
Option	Name	Keysight part number
1CM	Rackmount kit	5063-9214
1CN	Handle kit	5063-9227
1CP	Rackmount/handle kit	5063-9221

Table 2-4 **Contents of each option kit**

Option	Contents	Quantity
1CN	Front handle	2
	Screw	4
	Trim strip	2
1CM	Flange for rackmount (side plate for securing)	2
	Screw	4
1CP	Flange for rackmount (side plate for securing)	2
	Front handle	2
	Screw	4

Installation
Mounting front handles/flanges for rackmount

Figure 2-5 Mounting the handle/rackmount kit



e5091auj007

Mounting handle kit (Option 1CN)

The handle kit is a kit that contains a pair of front handles used to move/transport the E5092A. Follow these steps to mount it, referring to the [Figure 2-5](#).

- Step 1.** Remove the trim strips (1) stuck to both the sides of the front panel (stuck to the frame).
- Step 2.** Mount the front handles (3) to both the sides of the front panel of the E5092A with the attached screws.
- Step 3.** Attach the trim strips for the handle (4) so that they cover the screws securing the front handles.

WARNING

If a front handle you mounted is damaged, replace it with new one immediately. If you use a damaged front handle to move/transport the instrument, the handle may break, which may injure the operator or break the instrument.

Mounting rackmount kit (Option 1CM)

The rackmount kit is a kit that contains 2 flanges (side plates for securing) to mount the E5092A into the standard rack (width: 482.6 mm) of the EIA standard. Follow these steps to mount it, referring to the [Figure 2-5](#).

- Step 1.** Remove the trim strips (1) stuck to both the sides of the front panel (stuck to the frame).
- Step 2.** Mount the flanges for rackmount (2) to both the sides of the front panel of the E5092A with the attached screws.
- Step 3.** Remove the four legs on the bottom of the E5092A (pull up the part with the **(TAB** indication and slide it to the arrow direction).
- Step 4.** Mount the E5092A into the rack.

Mounting rackmount/handle kit (Option 1CP)

The rackmount/handle kit is a kit that contains both the flanges for rackmount and the front handles for the E5092A. Follow these steps to mount it, referring to the [Figure 2-5](#).

- Step 1.** Remove the trim strips (1) stuck to both the sides of the front panel (stuck to the frame).
- Step 2.** Mount the front handles (3) and the flanges for rackmount (5) to both the sides of the front panel of the E5092A with the attached screws.
- Step 3.** Remove the 4 legs on the bottom of the E5092A (pull up the part with the **(TAB** indication and slide it to the arrow direction).
- Step 4.** Mount the E5092A into the rack.

Power supply and fuse

Before turn ON the E5092A, check the following.

Checking the supply of power

Check that the power supplied to the E5092A satisfies the following conditions.

Table 2-5

	Condition
Voltage	90 to 132 Vac or 198 to 264 Vac *1
Frequency	47 to 63 Hz
Power consumption	Max. 150 VA

*1. The E5092A automatically switches between them depending on the voltage.

Setting up fuse

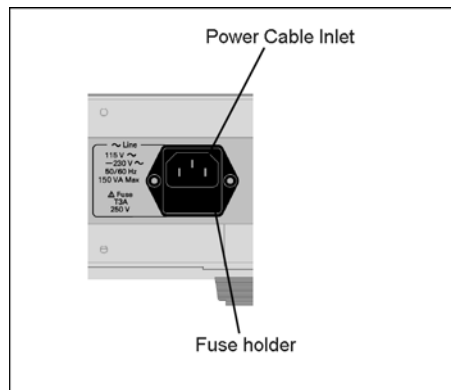
Use the fuse that meets the following specifications.

UL/CSA type, Slo-Blo, 5×20 mm miniature fuse, 3A 250V (Keysight part number: 2110-1017)

Spare fuses are available from Keysight Technologies sales office. To check or replace the fuse, disconnect the power cable and pull out the fuse holder.

Figure 2-6

Fuse holder and power cable inlet



Checking and connecting power cable

The power cable that comes with the E5092A has 3-wire structure and one of them is the grounding wire. This power cable grounds the E5092A through an outlet, protecting the operator from shock hazards.

Step 1. Check that the power cable you use for damage.

WARNING Never use a power cable that may be damaged. You may get an electrical shock.

Step 2. Connect the attached power cable between the power cable receptacle on the rear panel of the E5092A and a 3-pole outlet whose grounding terminal is grounded securely.

WARNING Securely ground the E5092A with the attached 3-wire power cable with the grounding wire.




Power cord list, 16000-99101 shows the power cable options.


Starting up E5092A

This section describes how to turn ON/OFF the E5092A and how to cut the supply of power in an emergency.

Turning ON/OFF the power



Turning ON power

Step 1. Check that the line switch in the lower left part of the front panel is pulled up (). If it is pushed in () which means the power is OFF, push the standby switch to pull it up ().

Step 2. Push the line switch to push it in ().

Turning OFF power

To turn OFF the E5092A, do the following.

- Push the line switch in the lower left part of the front panel so that the switch pushed in () is pulled up ().

NOTE

To turn OFF the E5092A in normal times, press the line switch. **In normal times, never disconnect the power cable to cut the supply of power to the power cable receptacle on the rear panel.**

Cutting supply of power

For the E5092A, the disconnecting device (the device to cut the supply of power) is the plug of the power cable (on the power outlet side or the E5092A side). If you need to cut the supply of power to avoid danger of electric shocks, disconnect the plug of the power cable (on the power outlet side or the E5092A side).

NOTE

Follow the description in [“Providing space to disconnect the plug of the power cable” on page 12](#) so that you can perform this operation reliably.

To turn OFF the power in normal times, be sure to follow the procedure in [“Turning OFF power”](#).

3 **Supplementary Information**

This chapter describes information related to E5092A.

Product Overview

For more information on the overview and setting of E5092A Configurable multiport test set, refer to "Controlling the Multiport Test Set" in *E5071C ENA Network Analyzer Online Help*.

Specifications and Supplemental Information

For more information on Specifications and Supplemental of E5092A Configurable multiport test set, refer to E5071C Data Sheet in *E5071C ENA Network Analyzer Online Help*.

Supplementary Information
Specifications and Supplemental Information

4 Information on Maintenance

This chapter explains the measures you should take to maintain the Keysight E5092A.

Cleaning this Instrument

This section describes how to clean the instrument.

WARNING

To protect yourself from electrical shock, be sure to unplug the power cable from the outlet before cleaning the instrument.

Never clean the internal components of the instrument.

Maintenance of Test Ports

Test ports on the front panel of the E5092A are fitted with 3.5mm SMA type connectors (f). Stains or other damage to these connectors would significantly affect the accuracy in measurements in the RF range. Always pay attention to the following precautions.

- Always keep the connectors free from stains and dust.
- Do not touch the contact surface on the connectors.
- Do not plug damaged or scratched connectors into the test ports.
- Use compressed air for cleaning connectors. Do not use abrasives under any circumstance.

Cleaning a Display Other than Test Ports

To remove stains on parts other than test ports of the instrument, wipe them gently with a soft cloth that is dry or wetted with a small amount of water and wrung tightly.

Cautions Applicable to Requesting Repair, Replacement, Regular Calibration, etc.

Devices to be Sent Back for Repair or Regular Calibration

If it is necessary to send the unit to the Service Center of Keysight Technologies for repair or regular calibration, please follow the instructions below.

Equipment to be Sent

When requesting repair or regular calibration of the unit by our Service Center, send only the E5092A main unit without any installed option you may have ordered. Unless specifically instructed, it is not necessary to send accessories and calibration kits.

Packing

Use the original package and shock absorbers, or equivalent antistatic packing materials, when sending the unit.

Shipping Address

For the location of the nearest Keysight Technologies Service Center, contact the Customer Contact listed at the end of this brochure.

Recommended Calibration Period

The recommended calibration period for this instrument is one year. The user is recommended to request the Company's Service Center to perform regular calibration every year.

Information on Maintenance

Cautions Applicable to Requesting Repair, Replacement, Regular Calibration, etc.

A **Manual Changes**

This appendix contains the information required to adapt this manual to versions or configurations of the E5092A manufactured earlier than the current printing date of this manual.

Manual Changes

To adapt this manual to your E5092A, refer to [Table A-1](#).

Table A-1 **Manual Changes by Serial Number**

Serial Prefix or Number	Make Manual Changes

Keysight Technologies uses a two-part, ten-character serial number that is stamped on the serial number plate ([Figure A-1](#)). The first five characters are the serial prefix and the last five digits are the suffix.

Figure A-1 **Example of Serial Number Plate**



e5091auj3004

A

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REGIONAL SALES AND SUPPORT OFFICES

For more information about Keysight Technologies test and measurement products, applications, services, and for a current sales office listing, visit our web site: <http://www.keysight.com/find/tmdir>. You can also contact one of the following centers and ask for a test and measurement sales representative. 21/01/2004

United States:

Test and Measurement Call Center
(tel) 1 800 452-4844
(fax) 1 888 900-8921

Australia/New Zealand:

(tel) (61 3) 9210-5555 (Australia)
(fax) (61 3) 9210-5899
(tel) (64 4) 939-0636 (New Zealand)
(fax) (64 4) 972-5364

Canada:

Test and Measurement Call Center
(tel) 1 877 894-4414
(fax) 1 888 900-8921

Asia Pacific:

(tel) (65) 6375-8100
(fax) (65) 6836-0252 Email:
tm_asia@keysight.com

China:

(tel) 800 810-0189
(fax) 800 820-2816

Europe:

(tel) (31 20) 547-2323
(fax) (31 20) 547-2390

Japan:

Call Center
(tel) 0120 421-345
(tel) (81) 426 56-7832
(fax) (81) 426 56-7840

Korea:

(tel) (82 2) 2004-5004
(fax) (82 2) 2004-5115

Latin America:

(tel) (305) 269-7500
(fax) (305) 269-7599

Taiwan:

(tel) 0800 047 866
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