

Keysight TS-8989 PXIe Functional Test System

Site Preparation
& Installation
Guide

Notices

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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.

Safety Symbols

Symbols and markings on the system, in manuals, and on instruments alert you to potential risks, provide information about conditions, and comply with international regulations.

	Caution, risk of electric shock		Alternating current (AC)
	Caution, hot surface		Both direct and alternating current
	Caution, risk of danger (refer to this manual for specific Warning or Caution information)		3-phase alternating current
	Laser radiation symbol: marked on products that have a laser output		Frame or chassis (ground) terminal
	Protective earth (ground) terminal		Earth (ground) terminal
	Terminal for a neutral conductor on permanently installed equipment.		Terminal for a line conductor on permanently installed equipment
	Terminal is at earth potential. Used for measurement and control circuits designed to be operated with one terminal at earth potential.		Standby (supply); units with this symbol are not completely disconnected from the AC mains when this switch is turned off. To completely disconnect the unit from the AC mains, either disconnect the power cord, or have a qualified electrician install an external switch.

General Safety Considerations

This product is provided with a protective earth terminal. The protective features of this product may be impaired if it is used in a manner not specified in the operation instructions.

WARNING

DO NOT OPERATE IN AN EXPLOSIVE ATMOSPHERE. Do not operate the product in the presence of flammable gases or flames.

DO NOT REMOVE RACK PANELS OR INSTRUMENT COVERS. Operating personnel must not remove any rack panels or instrument covers. Component replacement and internal adjustments must be made only by qualified service personnel. Products that appear damaged or defective should be made inoperative and secured against unintended operation until they can be repaired by a qualified service personnel.

The protection provided by the TS-8989 PXIe Functional Test System may be impaired if the system is used in a manner not specified by Keysight

Environmental Conditions

The PXIe Functional Test System is designed for indoor use only. [Table 0-1](#) shows the general environmental requirements.




Environmental condition	Requirement
Operating Temperature	5 °C to 40 °C
Relative Humidity	The test system is designed to operate in the range from 5% to 80% relative humidity (non-condensing)
Maximum Altitude	2000 m

Table 0-1 General environmental requirements

CAUTION

This product is designed for use in Installation Category II and Pollution Degree 2, per IEC 61010-1 and 664 respectively.

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. If accompanied by a year, it indicates the year the design was approved.</p>		<p>The CSA mark is a registered trademark of the Canadian Standards Association.</p>
	<p>The C-tick mark is a registered trademark of the Spectrum Management Agency of Australia. This signifies compliance with the Australian EMC Framework regulations under the terms of the Radio Communications Act of 1992.</p>	<p>ISM -1A</p>	<p>This text indicates that the instrument is an Industrial Scientific and Medical Group 1 Class A product (CISPER 11, Clause 4).</p>

End of Life: 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.

Services and Support

Any adjustment, maintenance, or repair of this product must be performed by qualified personnel. Contact your customer engineer through your local Keysight Service Center.

Keysight on the web

You can find information about technical and professional services, product support, and equipment repair and service on the web: <http://www.keysight.com/>

Double-click the link to Test & Measurement. Select your country from the drop-down menus. The web page that appears next has contact information specific for your country.

Safety Summary

The following general safety precautions must be observed during all phases of operation of this instrument. Failure to comply with these precautions or with specific warnings elsewhere in this manual violates 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 requirements.

Before Applying Power

Verify that the product is set to match the available line voltage and that all safety precautions are taken. Note the external markings of the instruments described in [Declaration of Conformity](#).

Ground the System

Keysight chassis' are provided with a grounding- type power plug. The instrument chassis and cover must be connected to an electrical ground to minimize shock hazard. The ground pin must be firmly connected to an electrical ground (safety ground) terminal at the power outlet. Any interruption of the protective (grounding) conductor or disconnection of the protective earth terminal will cause a potential shock hazard that could result in personal injury.

Fuses

Use only fuses with the required rated current, voltage, and specified type (fast acting). Do not use repaired fuses or short- circuited fuse holders. Doing so could cause a shock or fire hazard.

WARNING

To avoid electrical hazards, all system internal fuses must be replaced by trained and qualified personnel.

Operator Safety Information

WARNING

Module connectors and test signal cables connected to them cannot be operator-accessible.

Cables and connectors are considered inaccessible if a tool (such as a screwdriver, wrench, or socket) or a key (for equipment in a locked cabinet) is required to gain access to a conductive surface connected to any cable conductor (High, Low, or Guard).

WARNING

Do not touch the exposed connector pins or remove connected cables while the system is powered ON.



Figure 0-1 Examples of exposed connectors

WARNING

Do not use the DMM for measurement on mains circuits. The system is intended for measurement up to 60Vdc max working voltage.

Declaration of Conformity

The Declaration of Conformity (DoC) for this instrument is available on the Keysight website. You can search the DoC by its product model or description at the web address below.

<http://www.keysight.com/go/conformity>

NOTE

If you are unable to search for the respective DoC, contact your local Keysight representative.

Electrostatic Discharge (ESD) Precautions

Static electricity is destructive to your production process and the TS- 8989. Careless handling and poor site planning can cause system reliability problems and reduce your product yield. The system may not be as easily damaged as the modules you will be testing, but good anti- static planning will help ensure high reliability.

The ESD symbol below indicates areas where ESD caution must be exercised. This is to prevent damage to instruments and/or test disruption.



Caution: static sensitive

Electrostatic discharge in this area may cause equipment damage and/or test disruption.

While not an exhaustive list of anti-static precautions, [Table 0-2](#) provides suggestions to consider as you plan your system area.

Precaution	Suggested solution
Anti-static flooring	Plan to use an anti-static floor covering or mats.
Grounding straps	Plan for foot straps in conjunction with anti-static flooring and wrist straps for system operators.

Table 0-2 Suggested anti-static solutions for site planning

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Site Preparation and Power Requirements

Preparing Your Site for the System

WARNING

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

The protection provided by the TS-8989 system may be impaired if the system is used in a manner not specified by Keysight.

Typical test system configuration (Standalone)

Figure 1-1, Figure 1-2, and Figure 1-3 shows a typical hardware configuration of the PXIe functional test system.

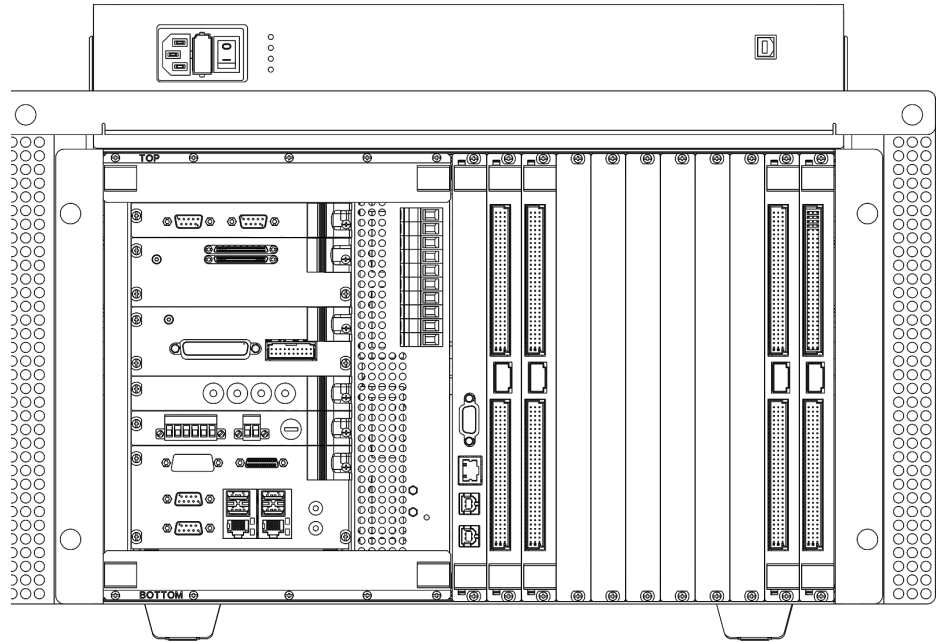


Figure 1-1 TS-8989 PXIe Functional Test System (instrument interface view)

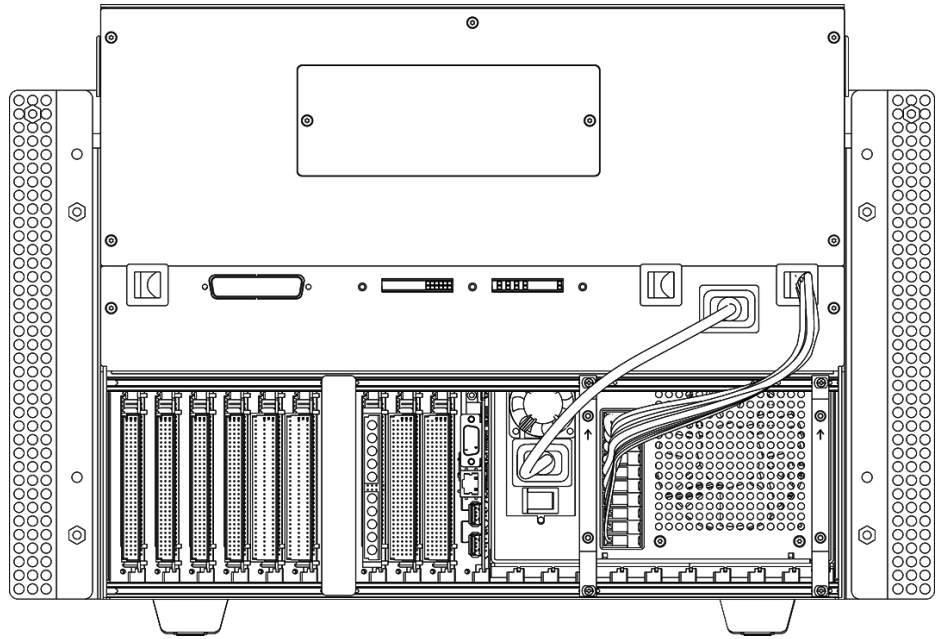


Figure 1-2 TS-8989 PXIe Functional Test System (DUT interface view)

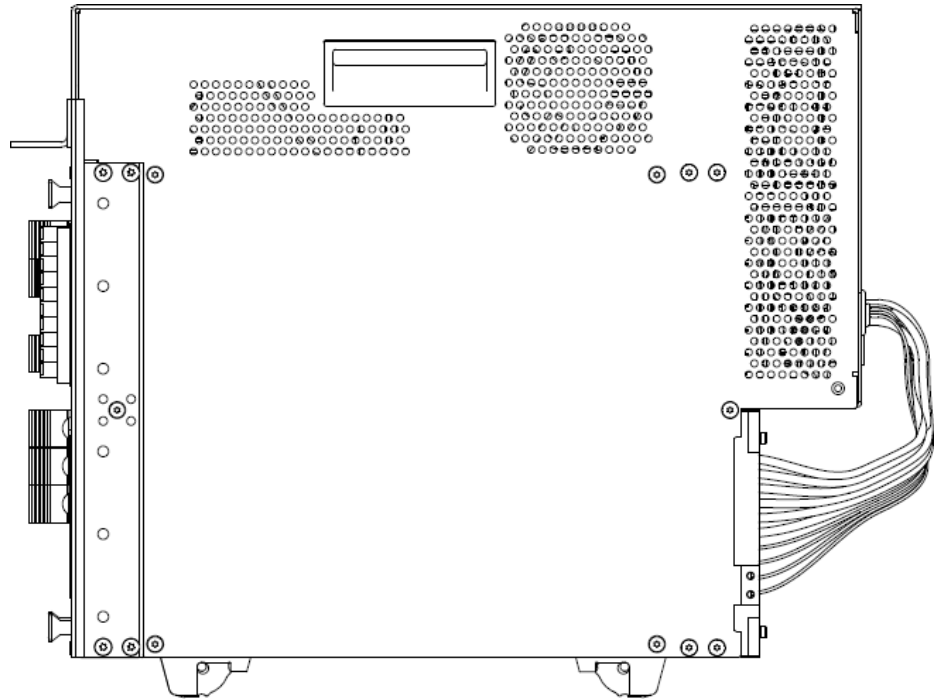


Figure 1-3 TS-8989 PXIe Functional Test System (side view)

System electrical specifications

Input voltage	100 - 240 VAC
Frequency	50/60Hz
Power	875 W maximum

Table 1-1 System electrical specifications details

NOTE

Main supply voltage fluctuations must not exceed 10% of the nominal supply voltage.

System mechanical specifications

Height	372.06mm(79.5in)
Weight	545.92mm(23.6in)
Depth	457.65mm(35.6in)
Estimated weight	50 kg (600 lbs)

Table 1-2 System mechanical specifications details

System Dimensions

The TS-8989 PXIe functional test system can be mounted in a 19- inch EIA rack cabinet. It fits in eight rack units (8U) of space.

Figure 1-4, Figure 1-5 and Figure 1-6 shows the isometric view of the TS-8989 system without the cable routing strain relief brackets, meanwhile Figure 1-7, Figure 1-8 and Figure 1-9 shows the isometric views with the cable routing strain relief brackets.

With the given dimensions in millimeters, you can further optimize your workspace by designing a custom structure rack to fit above or under a manufacturing workstation or conveyor system. Keysight recommends you to allocate an additional 100 mm of space in front of the system and 100 mm of space at the rear of the system for cabling.

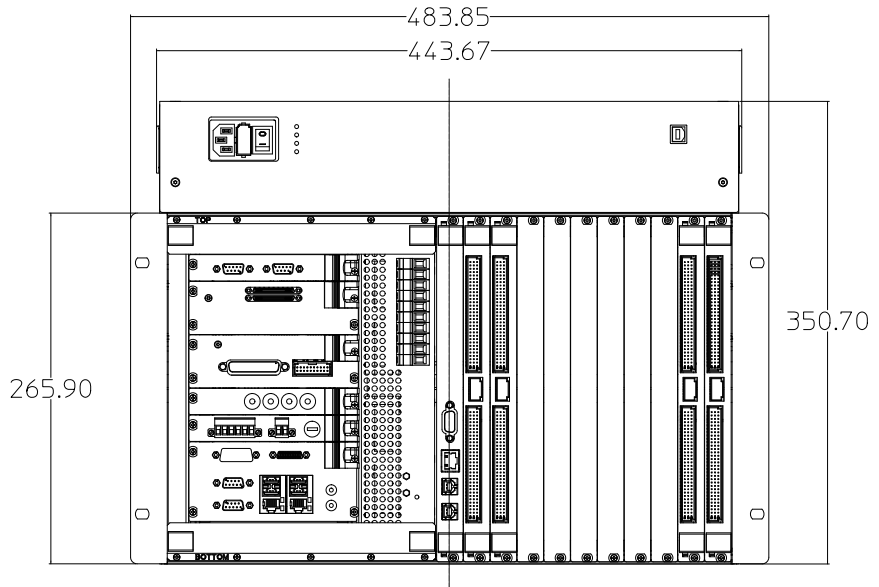


Figure 1-4 TS-8989 PXIe Functional Test System dimensions (front view without strain relief brackets)

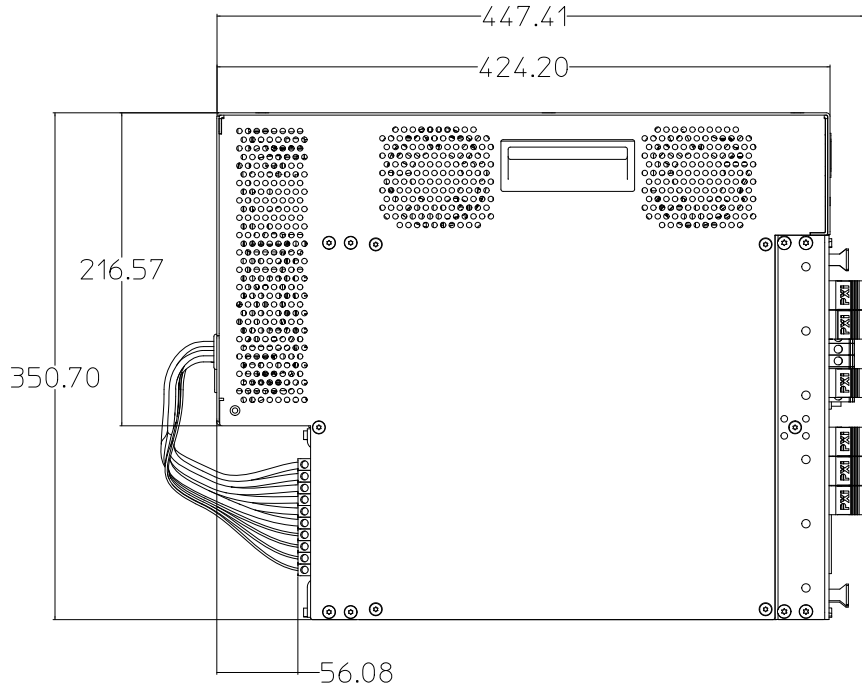


Figure 1-5 TS-8989 PXIe Functional Test System dimensions (side view without strain relief brackets)

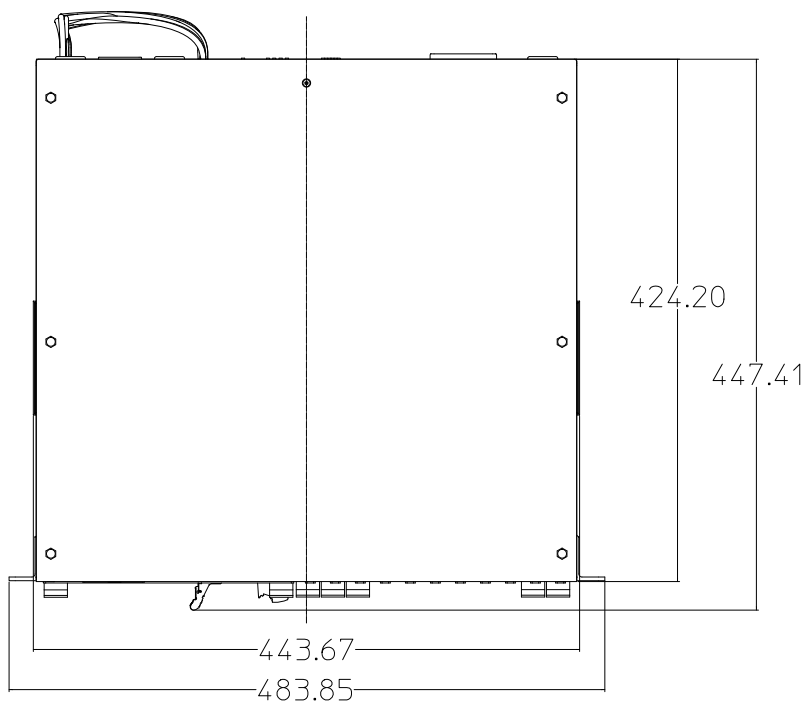


Figure 1-6 TS-8989 PXIe Functional Test System dimensions (top view without strain relief brackets)

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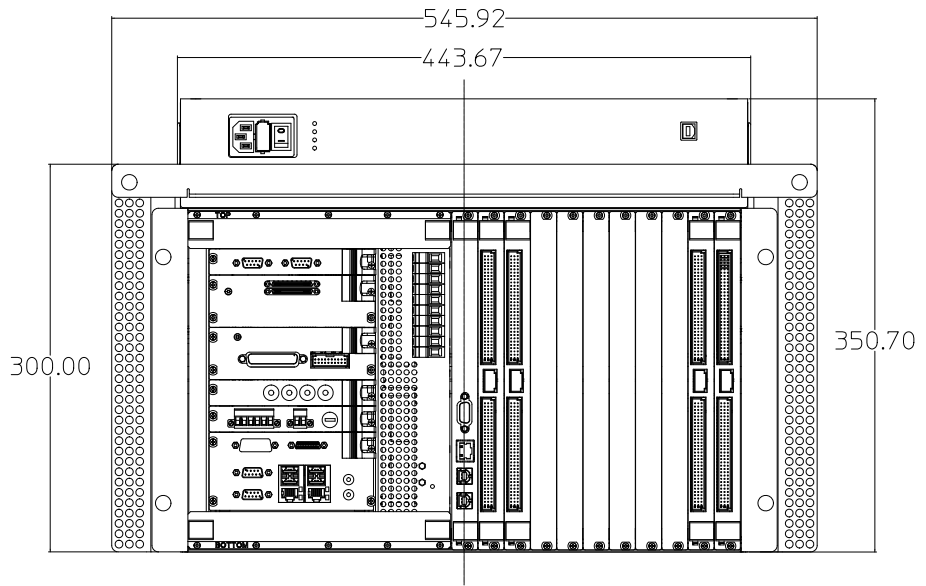


Figure 1-7 TS-8989 PXIe Functional Test System dimensions (front view with strain relief brackets)

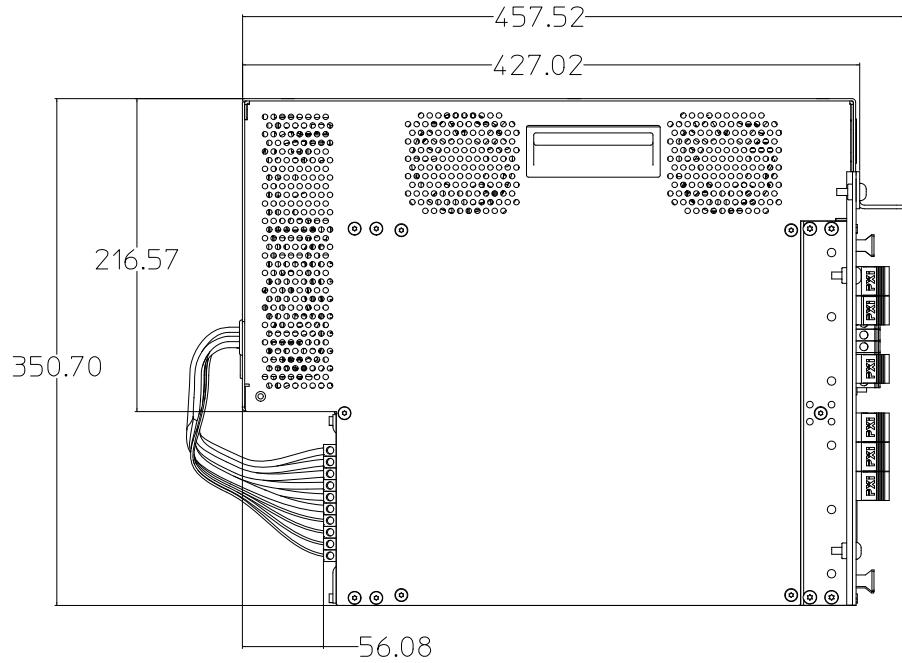


Figure 1-8 TS-8989 PXIe Functional Test System dimensions (side view with strain relief brackets)

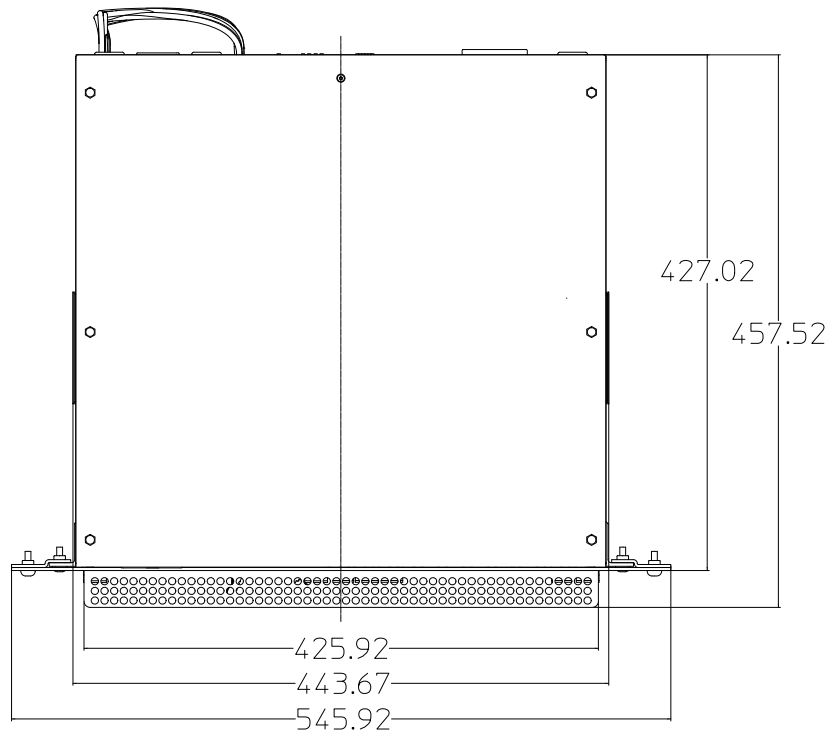


Figure 1-9 TS-8989 PXle Functional Test System dimensions (top view with strain relief brackets)

System Power Requirements

The TS-8989 PXIe functional test system has been designed for use with a single phase AC voltage of 100 - 240 VAC.

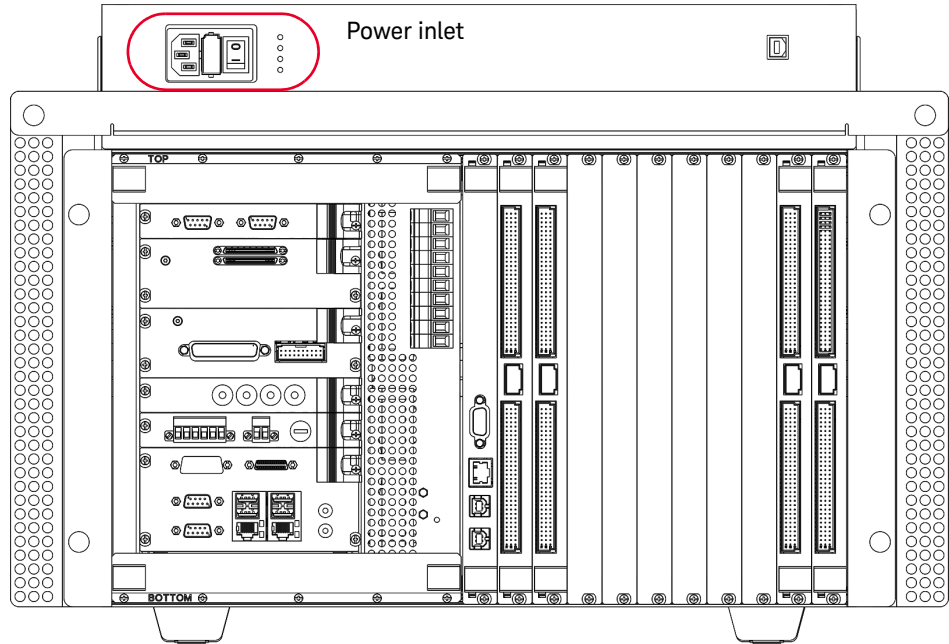


Figure 1-10 Power inlet location on the instrument interface of the TS-8989 test system

The TS-8989 power inlet requirements are listed below.

Input voltage	100 - 240 VAC
Frequency	50/60Hz
Fuses	8 A Fast- Acting High- Breaking Capacity Fuse

Table 1-3 System power inlet requirements details

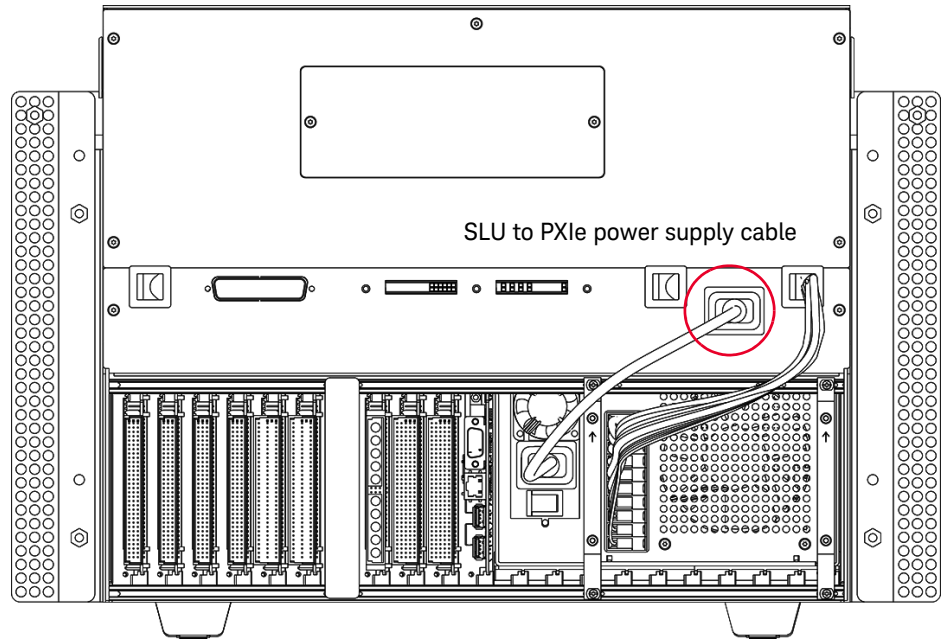
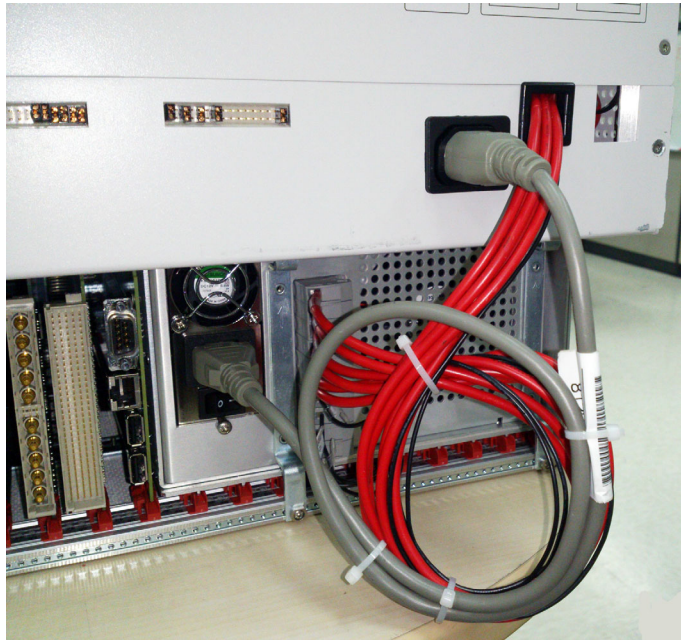


Figure 1-11 Cable connection from the SLU to the PXIe on the TS-8989 test system



System Transportation Requirements

The TS-8989 system is shipped from the factory in a big box on one pallet (i.e. a palletized box).

CAUTION

When transporting the system on its pallet, take note that the system must be transported in an upright position.

Always transport the system in a box with a pallet. It is recommended to reuse the shipping box provided by Keysight.

NOTE

Recommended pallet jack dimensions:

Width: 20.25 inches

Length: 36 inches and above

WARNING

Chassis exceeds 48 kg. Use a mechanical lift to lift the chassis. The chassis should be transported by using a rolling cart. Do not lift the chassis by the handles on the front and rear of the chassis. If you plan to mount the chassis at the top of a rack, the mechanical lift must be able to raise the chassis to approximately 60" (1.5 meters).

Installation

Tools Required

- Utility knife or scissors (to unpack the system)
- One #2 Phillips screwdriver

NOTE

Six screws and nuts are included in the accessory box, These screws and nuts are used to install the cable routing strain relief brackets on to the TS-8989 system.

Installation Procedure (Standalone)

Inspect for damage

Before unpacking the system, carefully inspect the shipping container for any shipping damage. Signs of damage may include a dented or torn shipping container or cushioning material that indicates signs of unusual stress or compacting. Report any damage to the shipping agent immediately, as such damage is not covered by the warranty.

To find the warranty information on your TS-8989 system, go to www.keysight.com/find/warranty and enter your model number (TS-8989) in the Product Number field, and enter the serial number from the chassis rear panel in the Serial No. field.

CAUTION

To avoid damage when handling the TS-8989 system and modules, do not touch the exposed connector pins.

Unpack the system

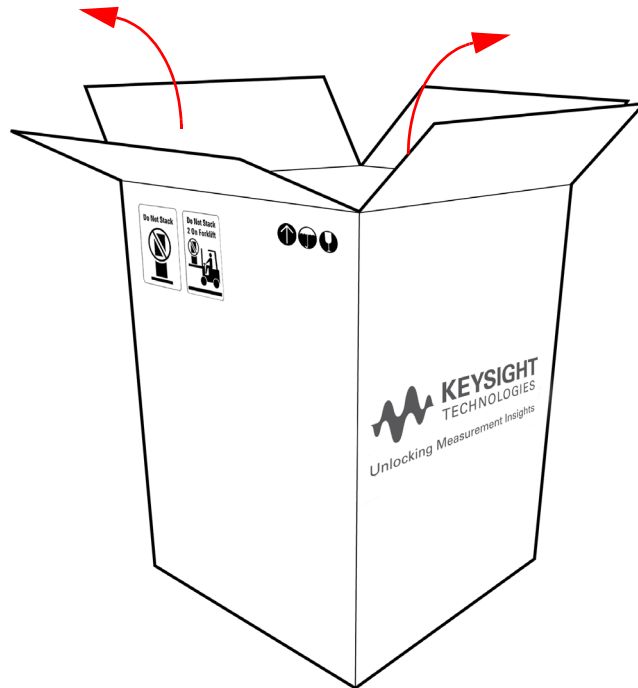
The TS-8989 PXIe functional test system and its accessories are packed in a cardboard carton with foam padding for protection during shipment.

Carefully unpack the system by referring to the figures below.

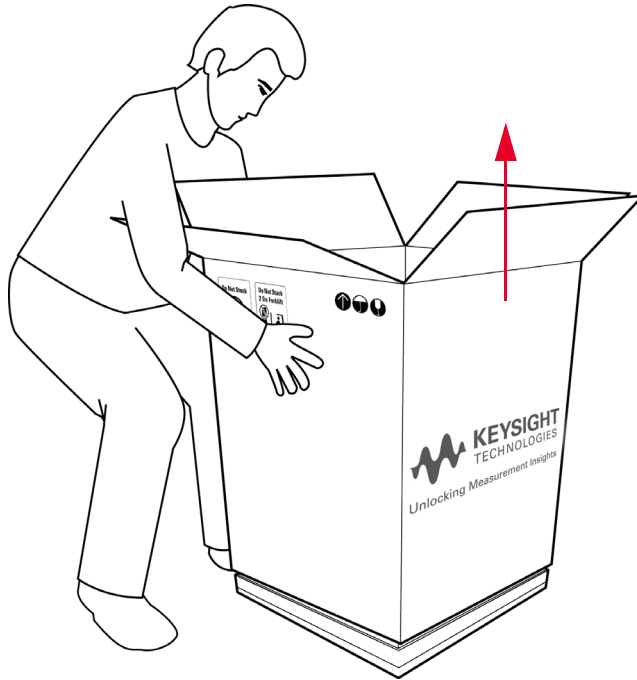
NOTE

- Keep the packing material to ensure that the test system can be moved safely to another location in the future.
- If repackaging is needed, please reverse the unpacking procedure.

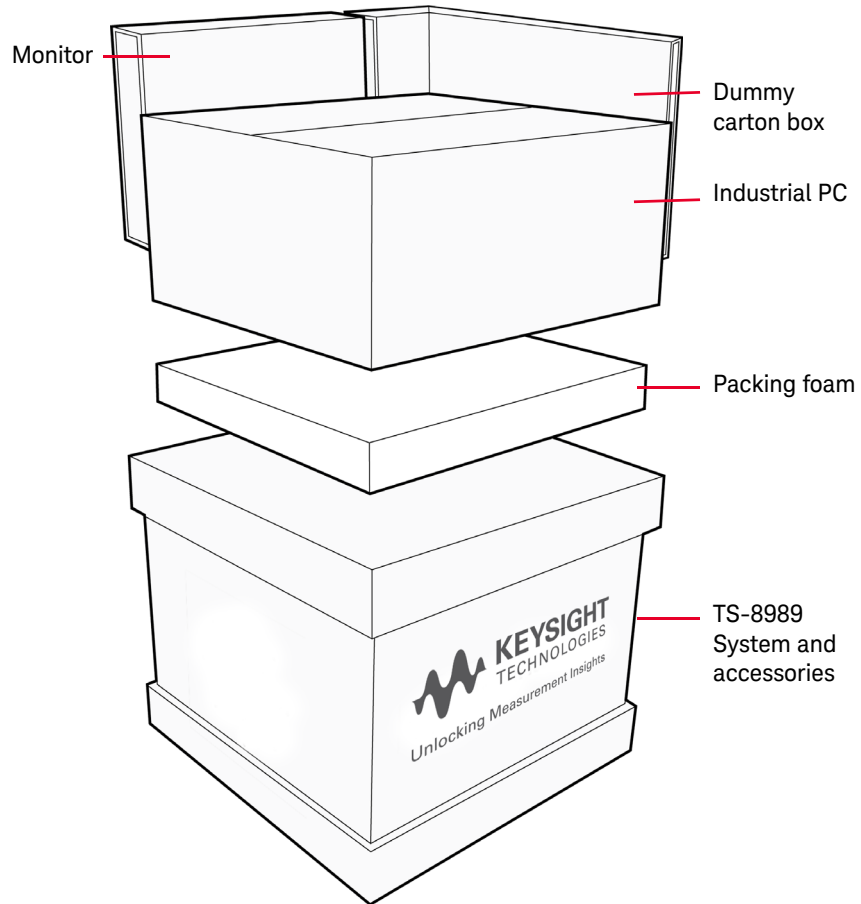
- 1 Using a utility knife or a pair of scissors – remove all the remaining packing tape and plastic wrap, and unfold the outer carton box flaps.



- 2 Gently lift the outer carton box straight up. Avoid using any sharp objects to cut or tear the outer carton box.



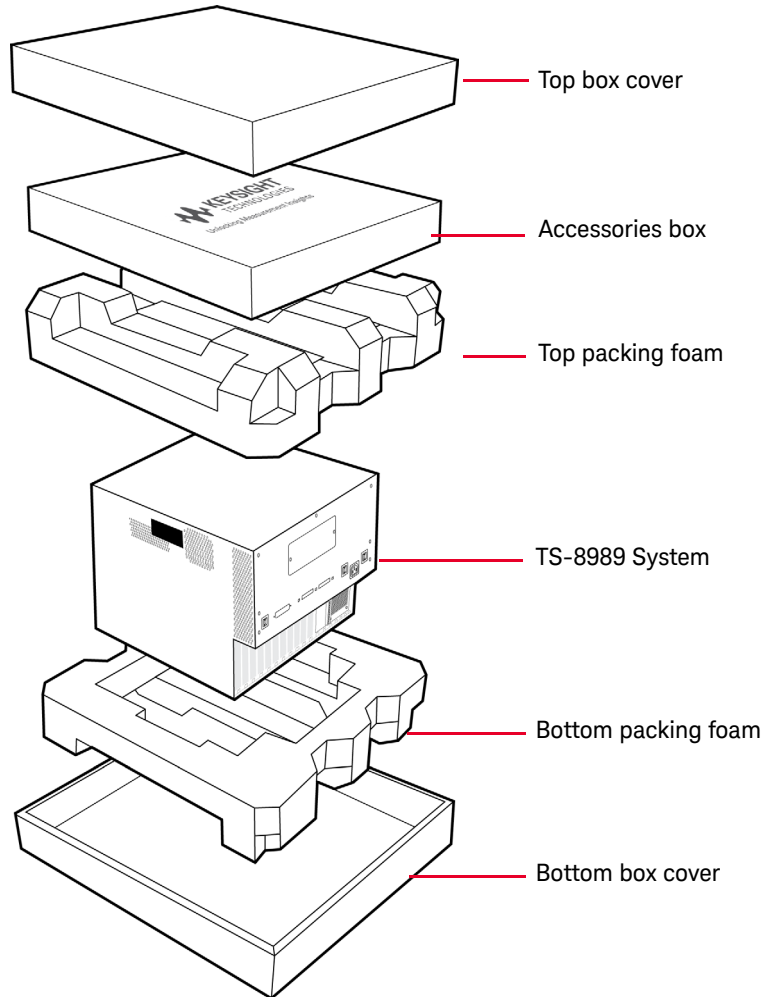
- 3 The figure below shows the contents of the package. Remove and unpack each item carefully.



NOTE

- If you did not opt to order the monitor and/or the industrial PC, the item(s) will be replaced by a dummy carton box in your shipment.
- Save all individual carton boxes and packing materials for future use.

- 4 The figure below shows the contents of the carton box containing the TS-8989 system and its accessories. Remove the TS-8989 system and place on a flat surface.

**CAUTION**

To avoid damage when handling the system, do not touch exposed connector pins.

- 5 The figure below shows the contents of the TS-8989 accessories box. Verify that the standard accessories and your ordered options are included in the shipment according to the list of accessories found in the TS-8989 Wiring Guide and Hardware Reference.

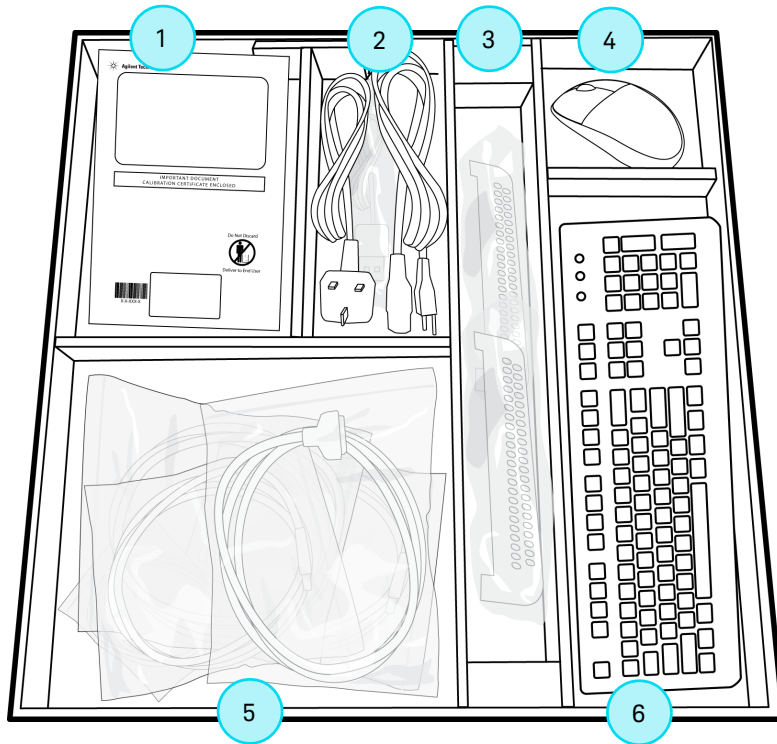


Figure 1-12 Contents of the TS-8989 accessories box

- 1 FTC/CoC reports and CD-ROMs containing manuals and software
- 2 Power cable and miscellaneous
- 3 Cable routing and SLU card strain relief brackets
- 4 Mouse
- 5 Interface cables
- 6 Keyboard

NOTE

- Some sections of the accessories box will be left empty if the corresponding accessory is not ordered (e.g. mouse, keyboard, and strain relief brackets).
 - For any questions or problems with the shipment, refer to the Keysight contact numbers on the back of this manual.
-

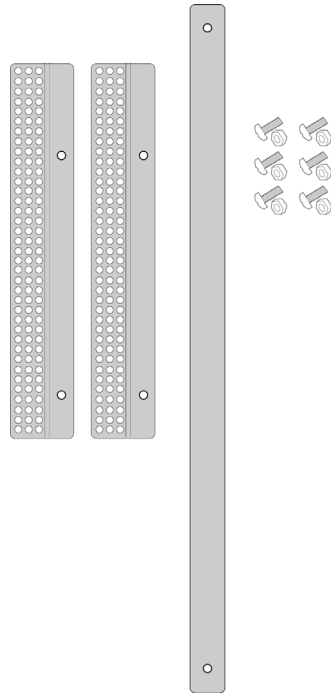
Install the cable routing strain relief bracket

The cable routing strain relief bracket eases the cable routing from the PXIe modules to the SLU cards, especially to the Universal Instrument Routing Cards.

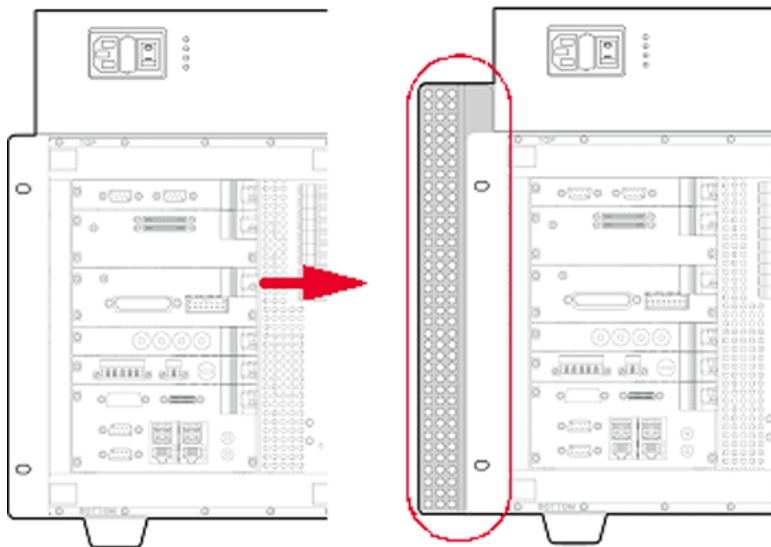
Using cable ties, tie the interface cables to the holes on the cable routing strain relief bracket to create a neat and tidy cable route on the instrument interface.

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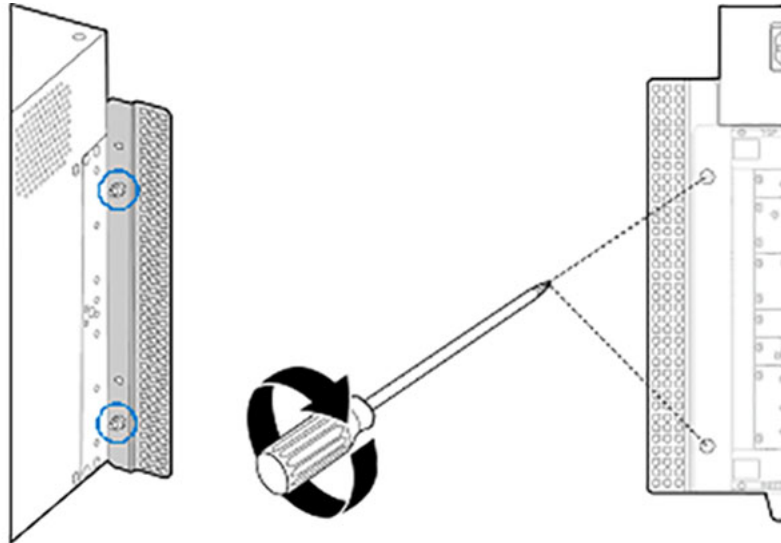
- 1 Locate the cable routing strain relief side brackets (P/N: U8989-01206), top bracket (P/N: U8989-01205), and bracket nuts (P/N: 2580-0211) and screws (P/N: E9900-06001).



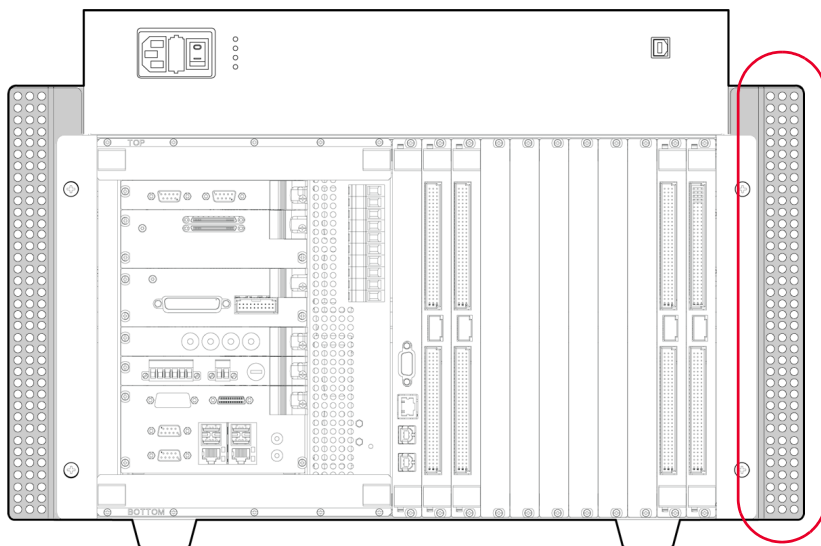
- 2 Place the left cable routing strain relief side bracket behind the TS-8989 system's side rail. Align the mounting holes.



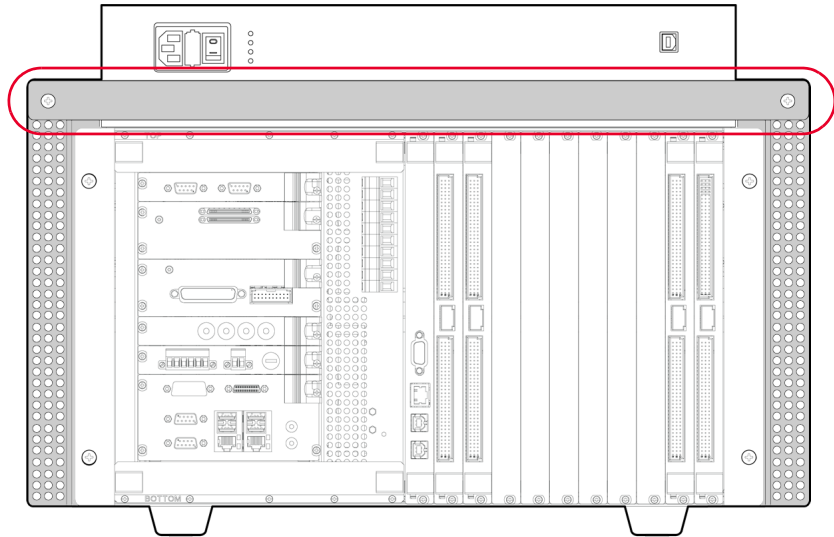
- 3** Using a #2 Phillips screwdriver, insert and tighten the nuts and screws securely.



- 4 Repeat step 2 and step 3 for the right cable routing strain relief side bracket.



- 5 Finally, place the cable routing strain relief top bracket in front of the installed cable routing strain relief side brackets. Align the mounting holes. Using the #2 Phillips screwdriver, insert and tighten the nuts and screws securely.

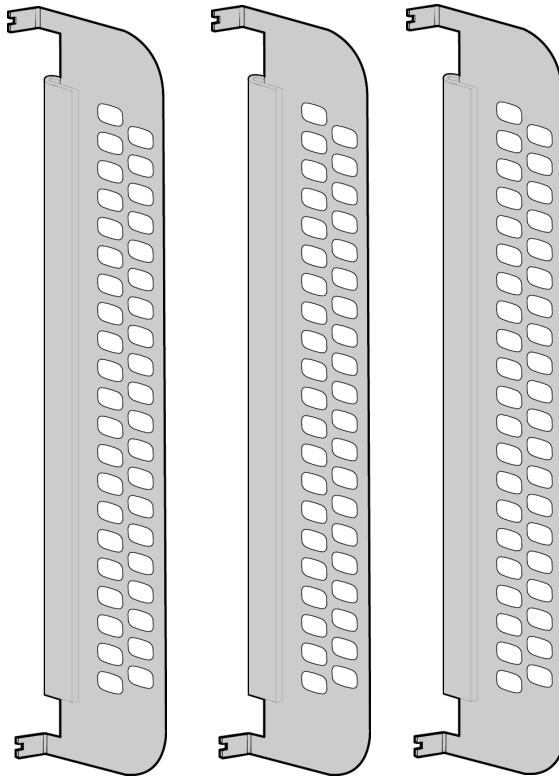


Install the SLU card strain relief bracket

The SLU card strain relief bracket is designed to help hold and secure the interface cables connected to the SLU cards.

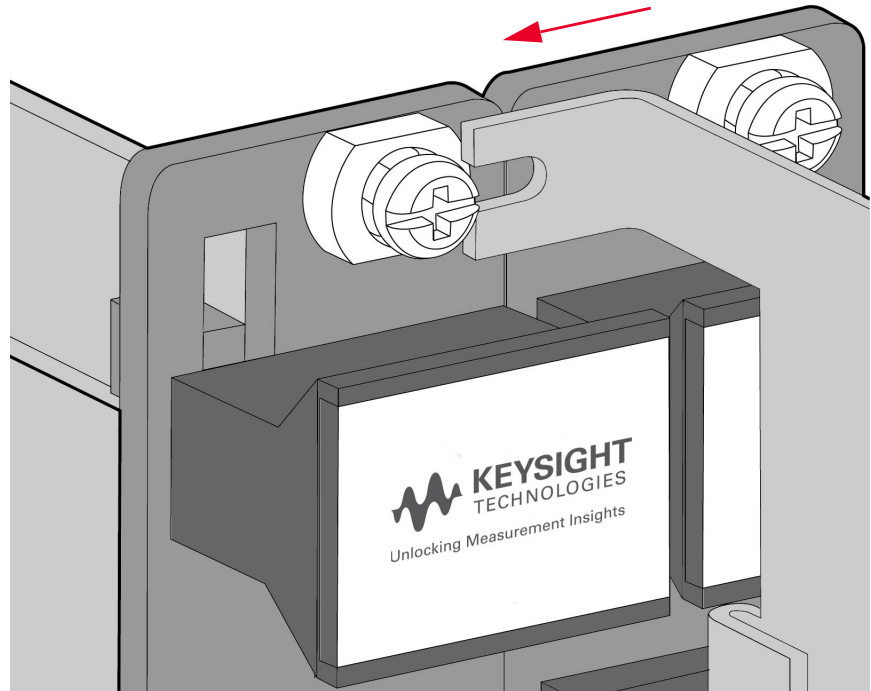
Using cable ties, tie the interface cables to the holes on the SLU card strain relief bracket to reduce the strain on the SLU card and to avoid accidentally disconnecting the interface cables.

- 1 Locate the SLU card strain relief brackets (P/N: U8989-01207).

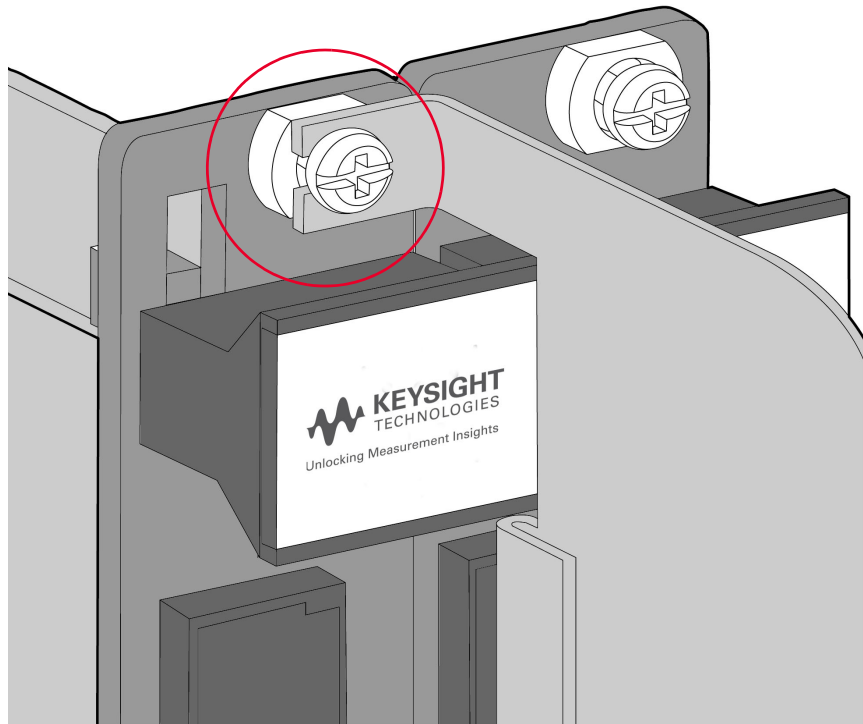


1 TS-8989 PXIe Functional Test System - U8989B

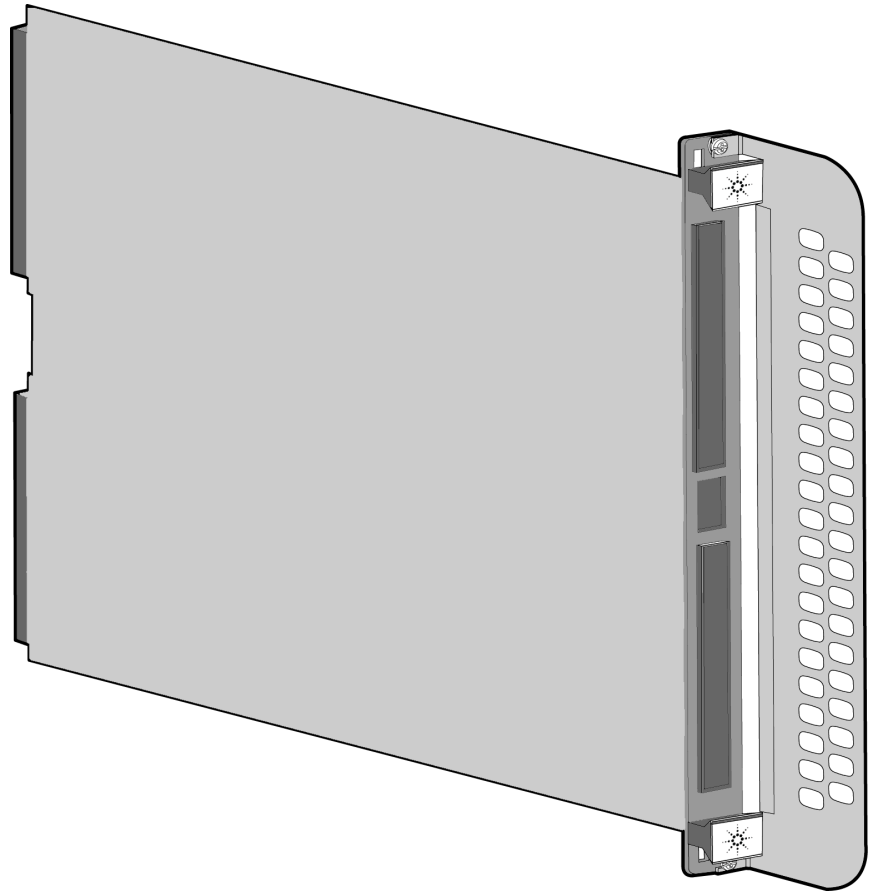
- 2 Using a #2 Phillips screwdriver, loosen the top and bottom screws on an SLU card slightly. Insert the SLU card strain relief bracket's grooves behind the screws.



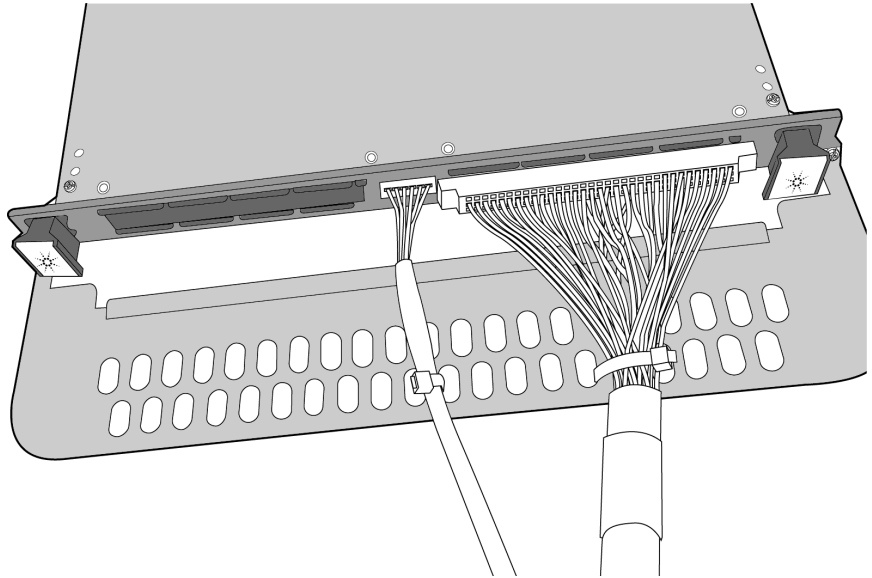
- 3 Tighten the top and bottom screws securely.



- 4 The SLU card with the strain relief bracket installed is shown below.



- 5 Using cable ties, tie the interface cables to the holes on the SLU card strain relief bracket.



Connect the power supply cable

Connect the female end of the power cable to the power connector on the instrument interface side of the TS-8989 system.

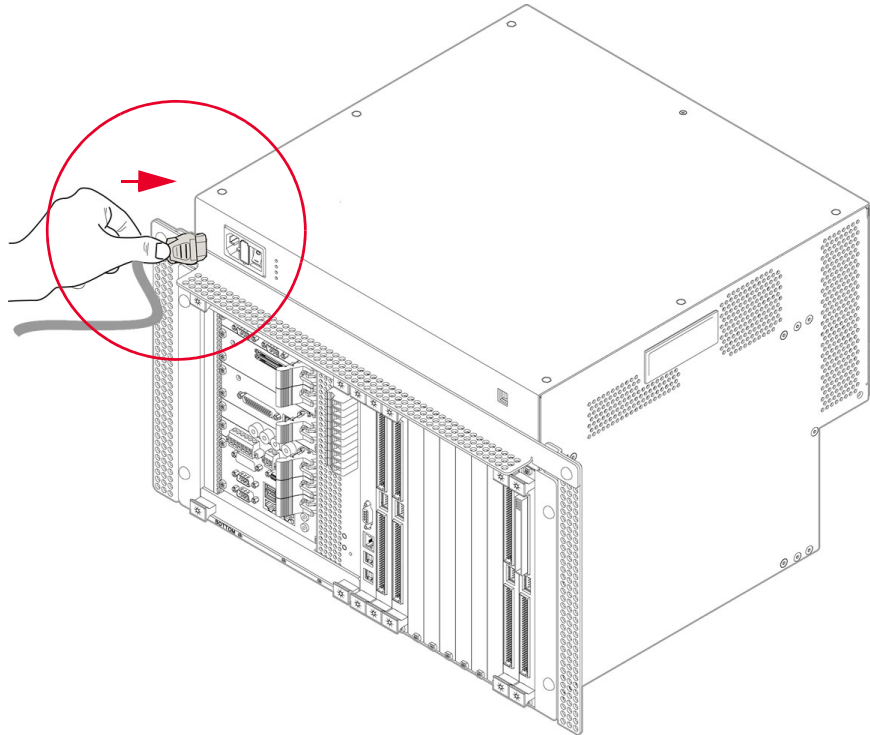


Figure 1-13 Plug the male end into a three- prong grounded electrical outlet.

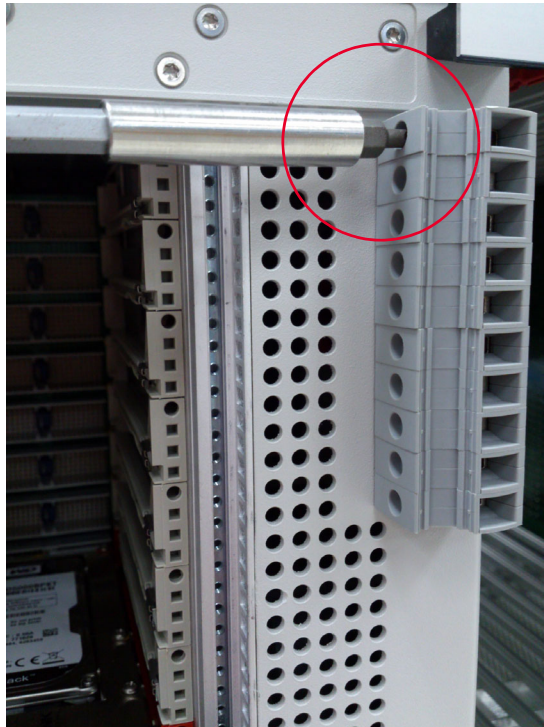
CAUTION

DO NOT turn on the TS-8989 system until the interface cables are connected. Turn off the power to the TS-8989 system when changing the connections between the cards or instrument.

Install the power bus

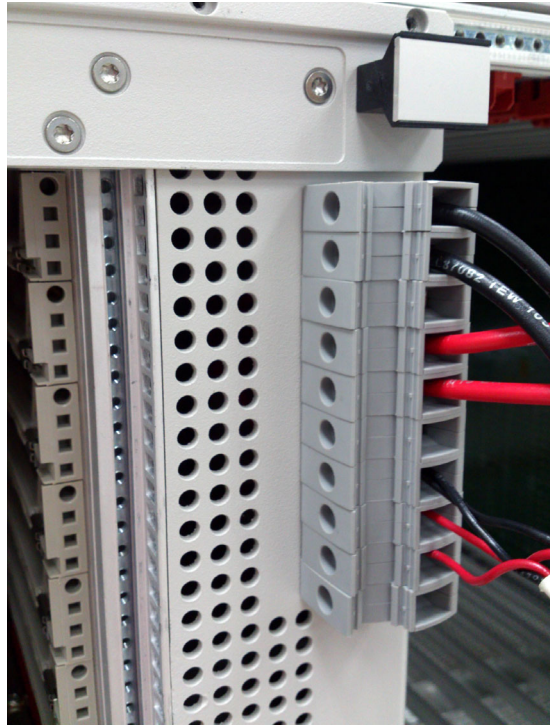
This section provides a step-by-step guide on the powerbus installation in the TS-8989.

- 1 Unscrew the screws in the powerbus connector according to your connection requirements.



1 TS-8989 PXIe Functional Test System - U8989B

- 2 Next, insert the custom made powerbus cables or the optional N6700 Power Supply to SLU cable (E2233-61602) into the powerbus block. Then, proceed to tighten the powerbus screw accordingly to fasten the cable.

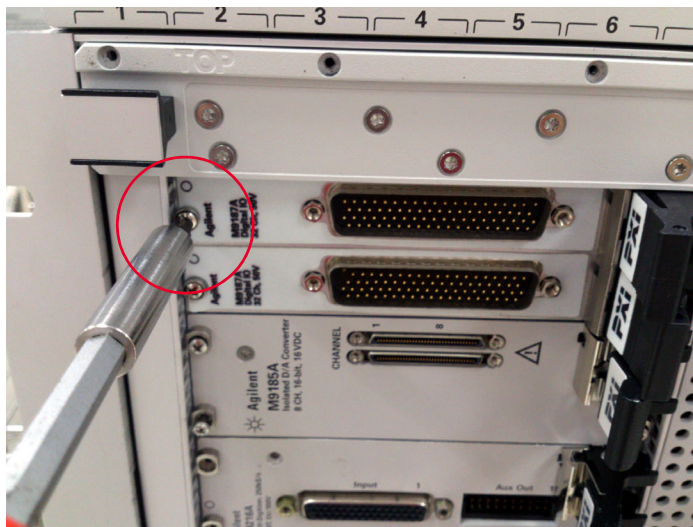


In the event that there are PXIe instruments installed in slot 4 to slot 8 in the 8-slot PXIe chassis, then additional steps are recommended to be taken prior to [step 1](#) in this guide. This is because the PXIe ejector of the PXIe instrument will impede access to the screws in the power bus connector adjacent to it.



Under these circumstances, please proceed with the following steps instead:

- 1 Unscrew the screws that fastens the PXIe module on the front panel.

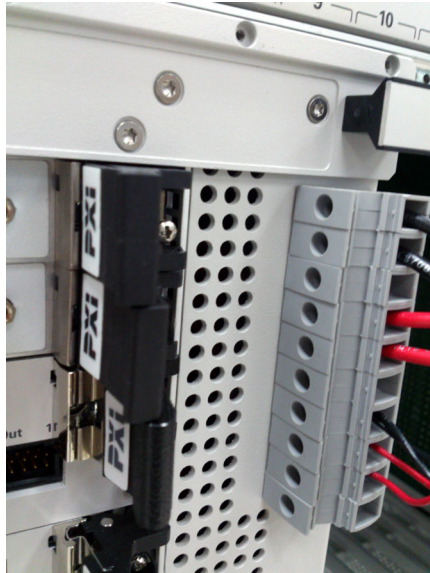


1 TS-8989 PXIe Functional Test System - U8989B

- 2 Next, proceed to remove the PXIe instrument from the slot by pressing the PXIe ejector button. Then, proceed to perform [step 1](#) and [step 3](#) in this guide.



- 3 Finally, proceed to install back the PXIe module in its respective slot.



Connect the interface cables

For ease of use, each individual interface cable is labeled at both ends to help you ascertain its proper connections.

The connection label is marked with an asterisk (*) in front and behind of the label name (e.g. *PXI_3_Input*).

The label name comprises three variables:

* <SUBSYSTEM>_<SLOT NUMBER>_<CONNECTOR NAME> *

Using the information provided by these three variables, you will be able to determine the proper subsystem section, slot number, and connector to connect the end of the cable to.

<SUBSYSTEM>

The <SUBSYSTEM> variable has three possible inputs: SLU, PXIe, or PCI.

The subsystem sections are shown in [Figure 1-14](#).

<SLOT NUMBER>

The <SLOT NUMBER> variable indicates the slot number in the subsystem that you should connect the end of the cable to.

The slot numbers are printed on the card or instrument.

<CONNECTORNAME>

The <CONNECTOR NAME> variable indicates the name of the connector on the card or instrument that you should connect the end of the cable to.

The connector names are printed on the card or instrument. See [page 33](#) for examples on how to read the cable labels.

NOTE

The pins on some interface cables are also labeled (e.g. PIN 0 or PIN 1). On the TS-8989 system, take note that for cables connected to the instrument routing card, J3 connector, the lowest pin (i.e. PIN 1) to the highest pin (i.e. PIN 6) is always counted from the bottom up.

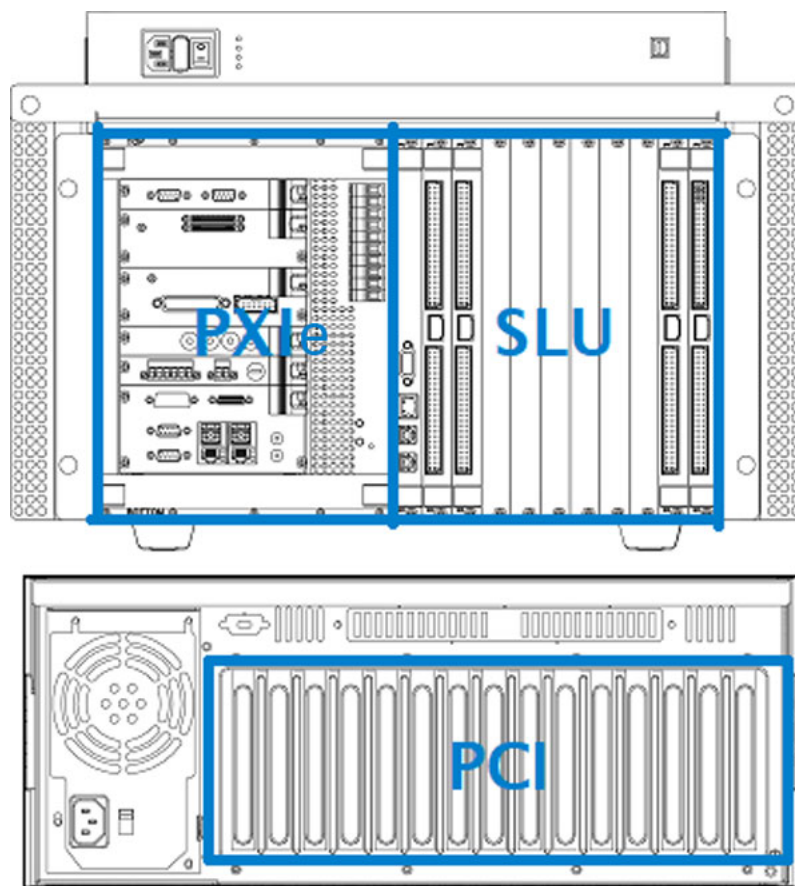


Figure 1-14 TS-8989 subsystem sections

Examples

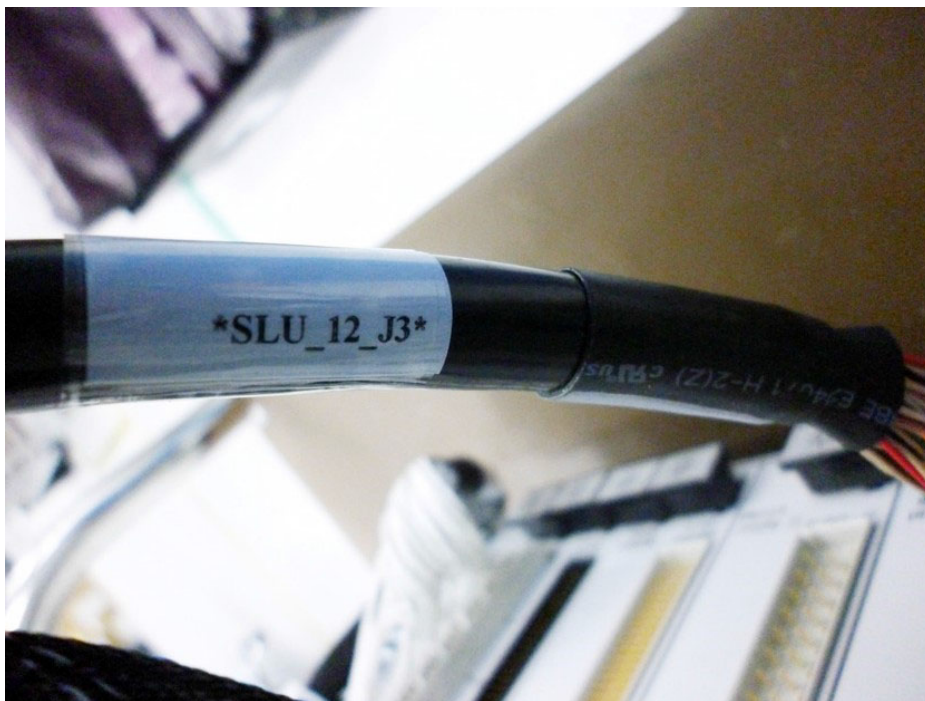


Figure 1-15 Interface cable label example (*SLU_12_J3*)

The label on this end of the cable reads *SLU_12_J3*. You should connect the end of that cable to the J3 connector, in Slot 12 of the SLU subsystem.



Figure 1-16 Interface cable label example (*PXI_5_AUXOUT*)

The label on this end of the cable reads *PXI_5_AUXOUT*. You should connect the end of that cable to the AUXOUT connector, in Slot 5 of the PXIe subsystem.



Figure 1-17 Interface cable label example (*SLU_Chassis*)

The label on this end of the cable reads *SLU_Chassis*. You should connect the end of that cable to the Chassis connector of the SLU subsystem.

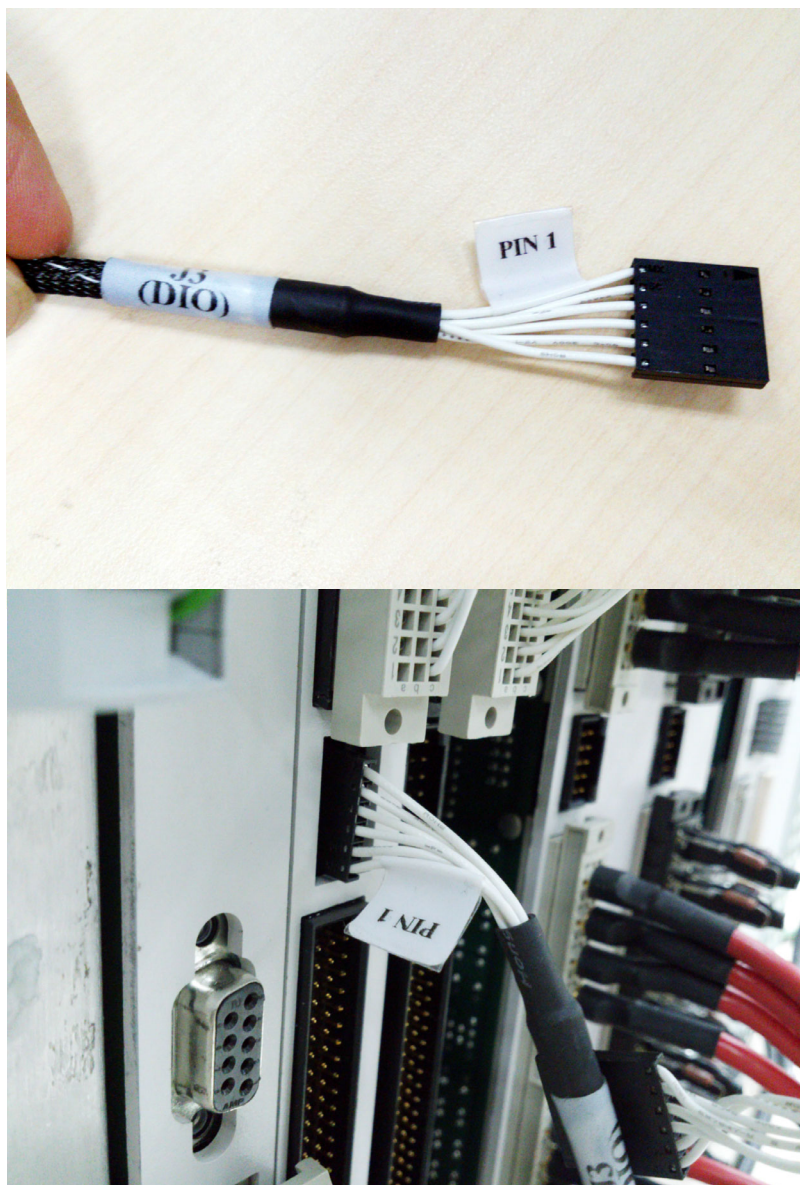


Figure 1-18 Interface cable label example (PIN 1)

The end of this cable connects to the J3 connector of the instrument routing card. PIN 1 is labeled to help you determine the proper connections.

For the 12- pin J2 connector, PIN 1 (the lowest pin) is counted from the bottom. Refer to the TS- 8989 Wiring Guide and Hardware Reference for more information about the instrument routing card's pinout.

Turn on the power

Turn on the power to the TS-8989 system. The power switch is on the right of the power connector. The STATUS LEDs light up when the TS- 8989 system is powered on.



Figure 1-19 TS-8989 system power switch (instrument interface view)

Ensure that the power switch on the PXIe subsystem is turned on as well on the DUT interface side.



PXIe subsystem power switch (DUT interface view)

2 TS-8989 PXIe Functional Test Rack System - U8989BS

TS-8989 PXIe Functional Test Rack System - U8989BS	65
Keyboard, Mouse, and Printer Installation	78

Site Preparation and Power Requirements

Preparing Your Site for the System

WARNING

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

The protection provided by the TS-8989 system may be impaired if the system is used in a manner not specified by Keysight.

Typical Test System Configuration

Figure 2-1 shows a typical hardware configuration of a rack integrated TS-8989 PXIe functional test system.

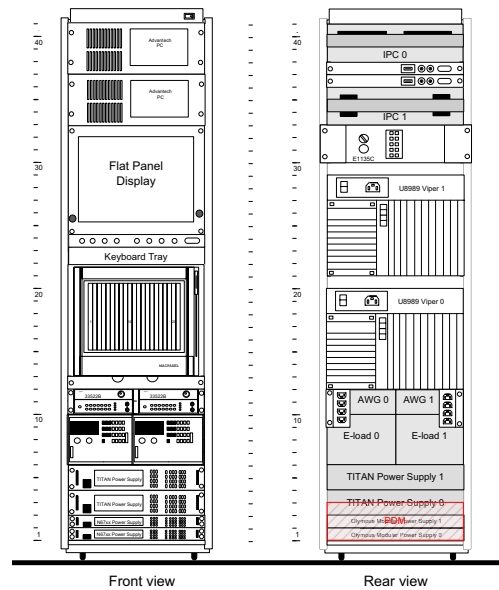


Figure 2-1 TS-8989 PXIe Functional Test System (rack integrated)

System Dimensions

Size	2.0m
No.of bays per pallet	1
Height	2020mm (79.5in)
Width	600mm (23.6in)
Depth	905mm (35.6in)
Estimated weight	272.155kg (600lbs)

Table 2-1 Primary rack dimensions

System Plan Drawing

A system plan diagram should be used for all aspects of site preparation. A complete drawing details power availability, communications cabling, and system placements with respect to other equipment. It can also service to verify physical access.

Figure 2-2 shows the recommended layout for a typical TS-8989 rack integrated functional test system. Allow 1m (3.3ft if space) behind the system for service.

WARNING

The Remote ON/Standby switch at the upper right corner of the system rack turns off all equipment. The Main ON/OFF switch is located on the Keysight E1135C Power Distribution Unit (PDU), behind the rear cabinet door of the system (see Figure 3-6). ALWAYS allow 1m (3.3ft of space).

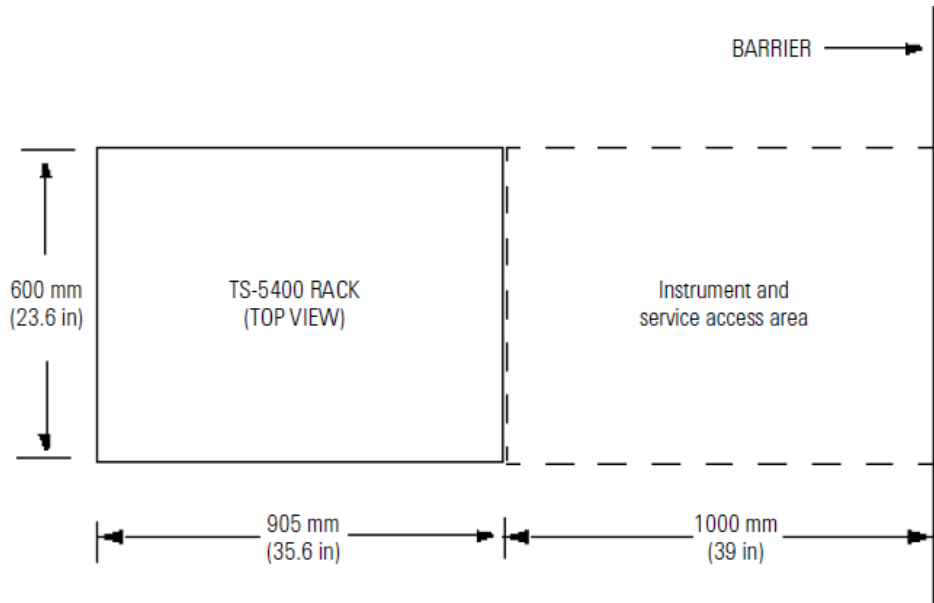


Figure 2-2 Recommended TS-8989 rack integrated system layout (overhead view)

System Power Requirements

The TS-8989 rack integrated system has been designed for use with a 208V 3-Phase Wye with Neutral or a 415V 3-Phase Wye with Neutral.

Figure 2-3 shows the location of the Keysight Power Distribution Unit (PDU) in your system.

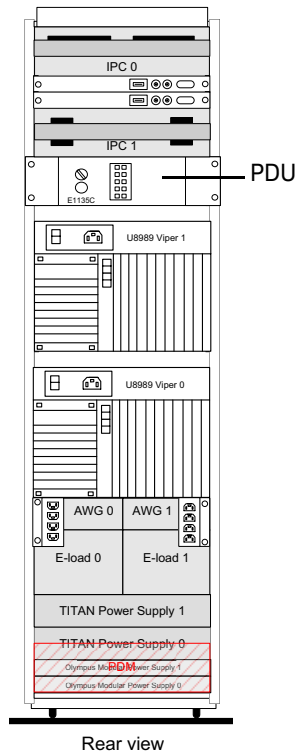


Figure 2-3 Rear view of TS-8989 rack integrated system.

The TS-8989 rack integrated system must have the following requirements.

- The AC mains power must be supplied to the E1135C PDU of the system.
- The system is powered by a 415V 3-Phase Wye with Neutral or a 208V 3-Phase Wye with Neutral.
- You must supply a power cord for all systems and power options. Use the power cord with a wire gauge specification that meets the product rating.
- Ensure that the same rating or higher is used for the plug and terminal lug (for connection to the PDU) as the product rating.
- The power cord must be wired by a qualified electrician.
- For the PDU, a jumper wire may need to be installed for some power options.

System electrical specifications

Input Voltage	No. of Phase	Frequency	Current
208 VAC	3	50/60	35A max
415 VAC	3	50/60	35A max

Table 2-2 System electrical specifications

NOTE

Main supply voltage fluctuations must not exceed 10% of the nominal supply voltage.

Configuring the Mains to the E1135C PDU Connection

240/415V 3-Phase Wye with Neutral

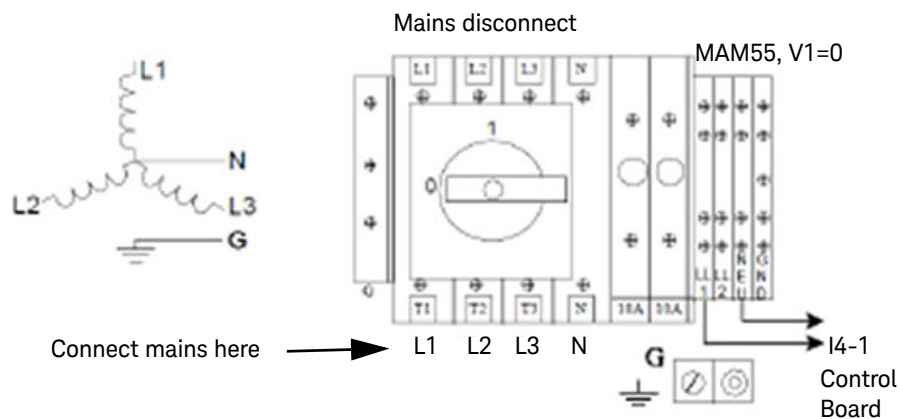


Figure 2-4 240/415V 3-Phase Wye with Neutral Connection

NOTE

If loads of 220V to 240V are required, the neutral must be connected.

CAUTION

The line-to-neutral voltage must not exceed 240V. The voltage between any two lines may be as high as 415V.

120/208V 3-Phase Wye with Neutral

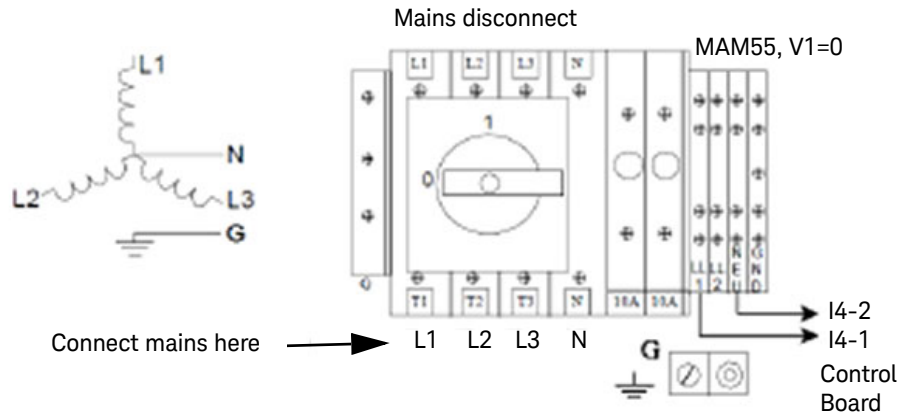


Figure 2-5 120/208V 3-Phase Wye with Neutral Connection

NOTE

If loads of 120V to 127V are required, the neutral must be connected.

CAUTION

The line-to-line voltage must not exceed 240V.

Power recommendations

- Provide a separate AC mains for the system due to the current requirements of the system.
- Use a copper wire for the system drop between the AC source and the system.
- For the E1135C PDU, a jumper wire may need to be installed for some options. This PDU has a mains disconnect switch that serves as the master power for the entire rack.
- The power service may have a mains disconnect installed adjacent to the system to quickly remove power in case of emergency (see “Mains Disconnect Requirements” for more information).

- On the E1135C PDU is a 25.4mm (1 in) hole to install a cable clamp and a power cord. Use a power cord with a locking plug (one that cannot be easily pulled from its outlet) or hard-wire the system to the AC power. You are required to provide both cable and strain relief (see [Figure 2-6](#)).
- To avoid electrical shock, physically remove the mains plug from the power outlet before servicing it.

CAUTION

Verify the AC source and that service conductors are sized correctly before connecting the system.

WARNING

Electrical Shock Hazard Protection. This is a Safety Class 1 Product (provide with a protective earthing ground incorporated in the power cord). The mains plug shall be inserted into only a socket outlet provide with a protective earth contact.

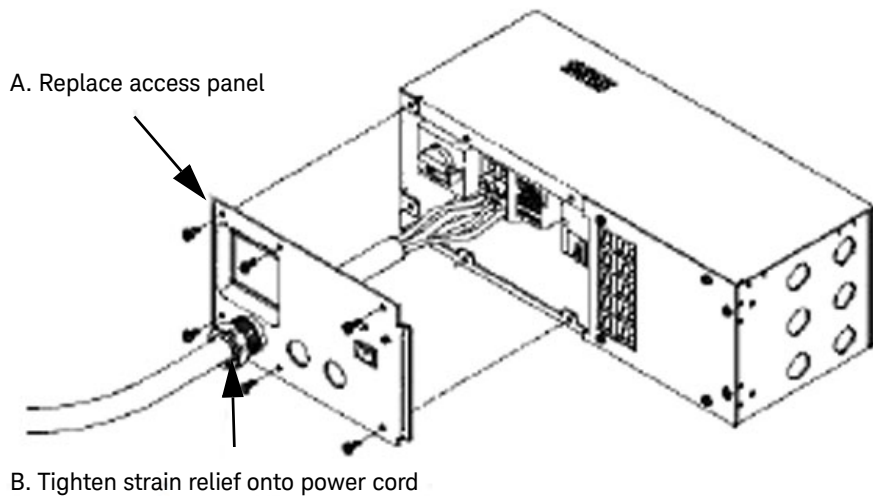


Figure 2-6 E1135C PDU power cord installation

Additional Power Information

- Conventional 50/60Hz current probes cannot make accurate input current measurements of the system's power supplies due to the harmonics on the currents. A current measuring instrument needs a bandwidth that is above 10Khz. Improper instruments may yield results that are 50% less than actual.
- For the E1135C PDU, system input power connections on the PDU are to an input connector block and the ground connection to a terminal bolted to the chassis. Power is connected to the mains disconnect switch and a ground terminal attached to the chassis. For ease of installation, in areas where it meets local code requirements, use a multi-strand wire from the AC mains to the PDU.

CAUTION

For the E1135C PDU, 10 thermally-activated circuit breakers designed to protect the output terminal block are located on the front of the PDU. Under normal operation, a detected fault sets the rocker on the breaker to the open position. Rest the rocker by gently pushing it back in place. These breakers must not be opened by force or permanent damage can result. Damage caused by intentionally opening the breaker is not covered by warranty.

Mains Disconnect Requirements

The PDU requires an external main circuit breaker sized appropriately for over-current and short-circuit protections. The mains disconnect should be in the form of a multi-pole circuit breaker.

Disconnect Circuit Breaker Requirements

The disconnect circuit breaker must be:

- comply with UL 489/CSA C22.2 No.5 standard; rated current 20A or below,
- approved for use in building installations in your locality,
- marked "Mains Disconnect" or equivalent in your local language,
- marked "I" for the "On" position and "O" for the "Off" position,
- capable of locking in the "Off" position instead of the "On" position,

- installed within 3 meters of the system, where it can be easily reached by system operator without requiring the system to be moved to access the disconnect,
- open for all line conductors and neutral conductor where your local code applies, but not the protective earth conductor.

Mains circuit breaker requirements

Requirements for the mains circuit breaker are the same as the “Disconnect circuit breaker requirements” above and the breaker must be rated a minimum 10000A interrupting capacity (AIC) for a 100 to 240VAC circuit, or 14000 AIC for a higher voltage circuit.

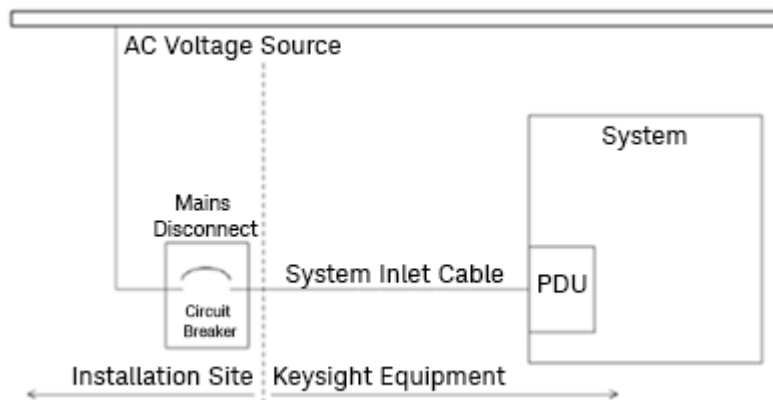


Figure 2-7 Wiring diagram

NOTE

The following requires that you:

- use a wire and not a conduit for the safety ground conductor.
- use the same size wire for all neutral and ground as is used for the phase conductors.
- bond the neutral and the ground wires together at the transformer, and not at the breaker box or anywhere else.

Important recommendations about wiring

- Make certain that the wire used for the neutral is the same size as the hot leads or larger.
- Do not rely on conduit for the ground; always use at least one wire for the ground - the more strands the better.
- Use the same lengths of wire for the phase conductors, neutral, and ground.
- It is extremely important that the neutral and ground be connected only at the transformer using an X-O bond.

Safety Ground Connection

As the TS-8989 is connected to the AC mains by means of a plug/socket connection, a permanent earth ground must be supplied to reduce the risk of electrical shock.

Make a permanent connection from the system rack to the protective earth ground. This connection will serve as a redundant Protective Earth Connection to the primary Protective Earth connection, which is part of the AC power cord. The “Earth (ground) terminal” found at the bottom of the system rack (see [Figure 2-8](#)) should be connected by a wire separate from the system AC power cord to the Protective Earth connection at the AC source where the system AC power cord is connected. The wire must be the same wire size as the protective conductor of the system AC power cord. The wire may be either a bare conductor or a green with yellow stripe insulated conductor.

The redundant Protective Earth connection wire must have a correctly sized wire lug on both ends. The wire lugs must also be sized to fit the “Earth (ground) terminal” stud or bolt as found on the system rack and for the Protective Earth connection at the source end of the system AC power cord. In some cases, the Protective Earth connection at the source end of the system AC power cord will receive the conductor without a wire lug.

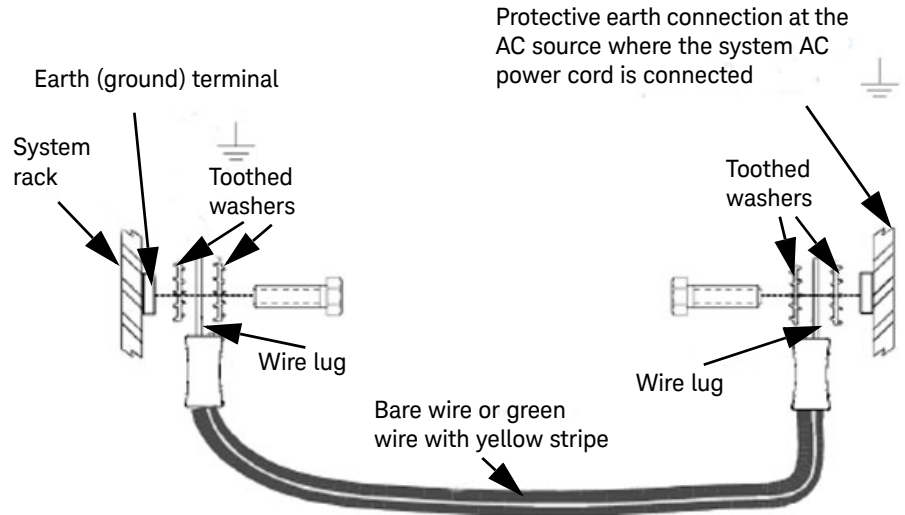


Figure 2-8 Safety ground connections

System Transportation Requirements (Rack Integrated)

The system is shipped from the factory on one pallet with a few smaller boxes.

Ramp requirements

The cabinet will negotiate ramps with inclines up to 8 degrees before the leveling feet drag on the floor when moved on its casters.

Hallway and door width requirements

Make sure that all doors, elevators, and passageways en-route to the system's final location are large enough to allow passage of the crated system. The crated system requires the use of a floor jack or fork lift to engage the pallet and lift the crated system. Consider this when evaluating hallways, doors and elevators along the route the system must travel.

If the system cannot be moved in the crate

If obstacles or lack of space restrict movement of the crated system, remove the system from the pallet in the receiving area and push it on the cabinet casters to the final destination.

The system is equipped with four rack-mounted casters for easy movement throughout the facility. Due to weight distribution of instrumentation, the system is most stable during movement when you push from the front with the back of the rack leading. Always push the rack in this front-to-back direction during movement. Avoid side-to-side or back-to-front movement except for final positioning.

WARNING

Deploying the rack from its shipping carton requires moving it in the back-to-front direction. NEVER stand directly in front of the rack when loading or unloading from a shipping carton.

Keyboard, Mouse, and Printer Installation

Tools Required

- One #2 Phillips screwdriver

NOTE

Four captive nuts are installed on the front of the test rack to receive the keyboard shelf screws. These nuts are located immediately below the flat panel display. If you need to locate the shelf elsewhere, four additional captive nuts are included with the shelf kit.

Installation Procedure

Attach the printer tray

NOTE

The following instructions assume a right-hand mouse and left-hand printer arrangement. You can reverse this orientation if necessary.

Attach the printer tray to the keyboard shelf. Make sure that the two hooks engage the shelf and the bottom of the tray is inserted into the tab under the keyboard shelf.

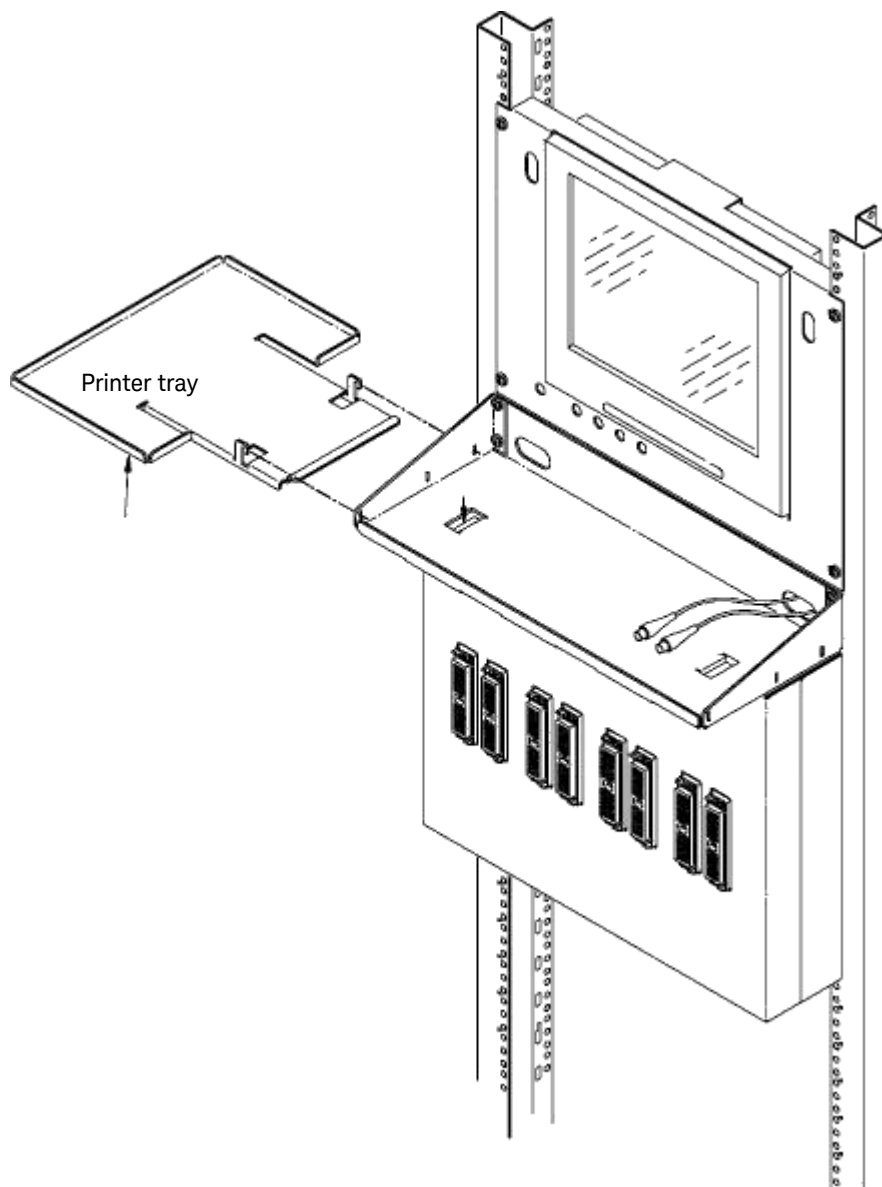


Figure 2-9 Attaching the printer tray

Attach the mouse tray

Attach the mouse tray to the keyboard shelf. Make sure that the two hooks engage the shelf and the bottom of the tray is inserted into the tab under the keyboard shelf.

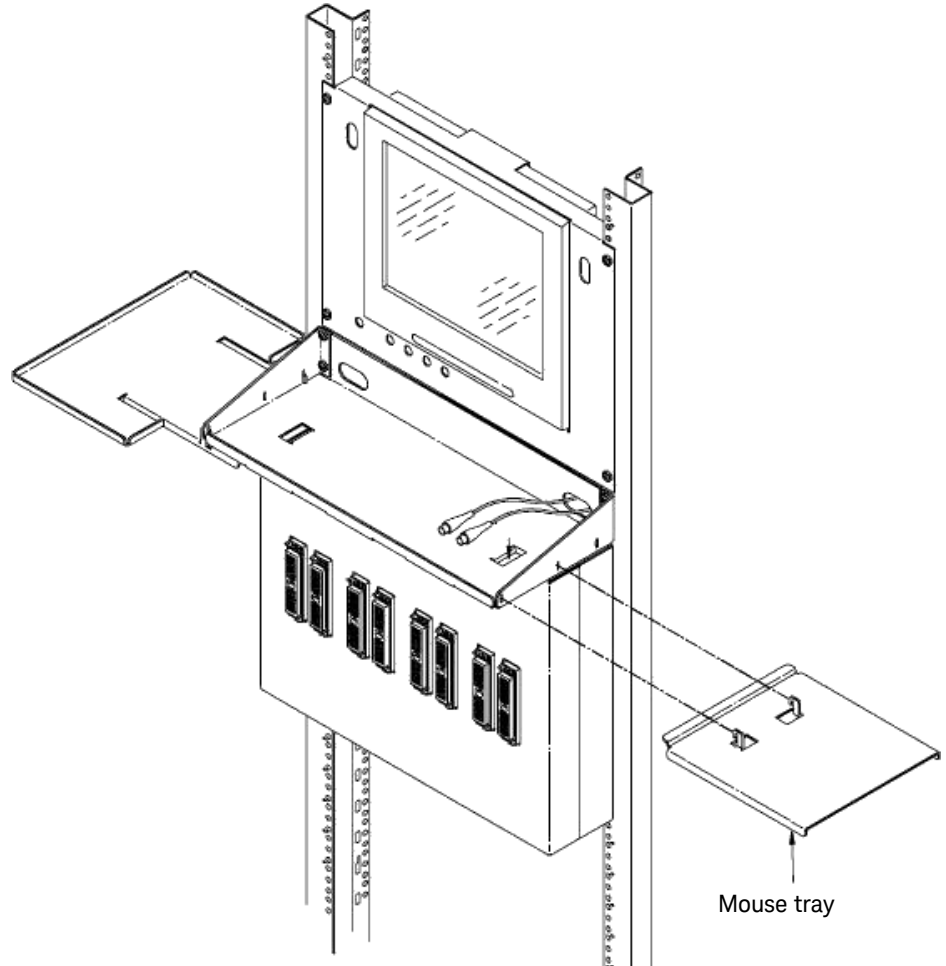


Figure 2-10 Attaching the mouse tray

Install the palm rest

Install the plastic palm rest by slipping it into the slots in the keyboard shelf.

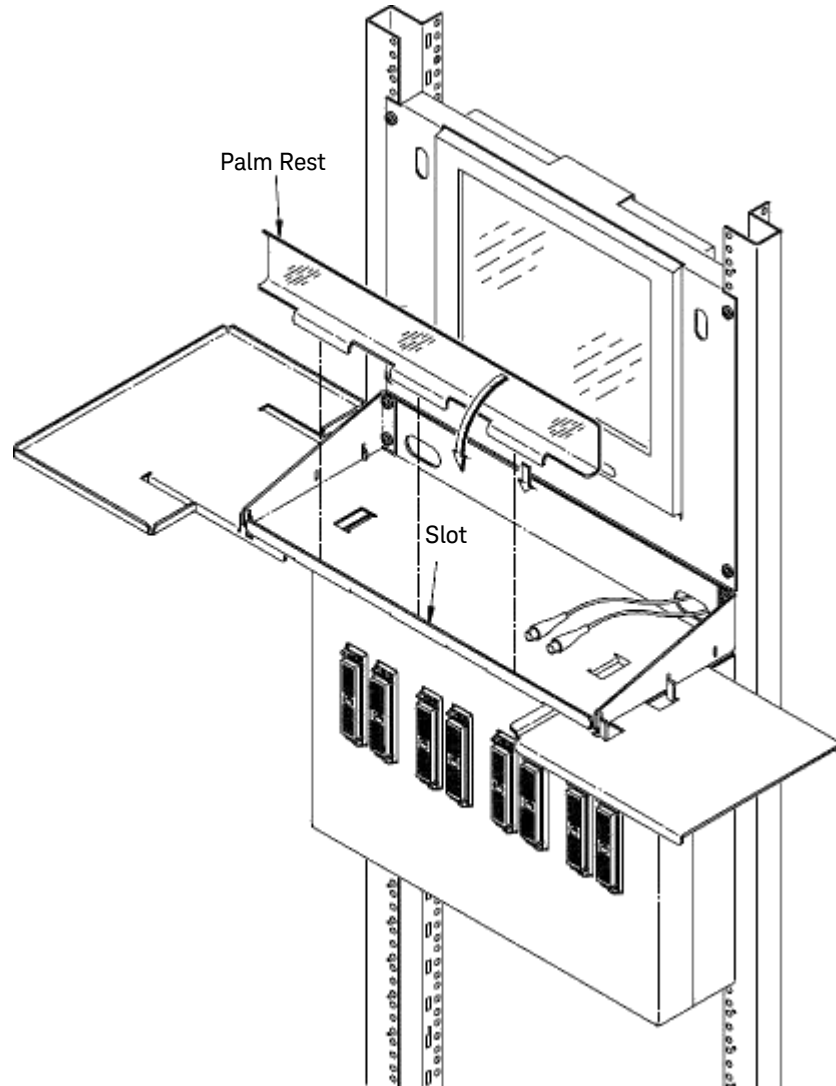


Figure 2-11 Installing the palm rest

Connect the keyboard and mouse

Connect the keyboard and mouse connectors to the extension cables (extension cables are labelled “Keyboard” and “Mouse”). Slide the excess cabling into the slot in the keyboard shelf.

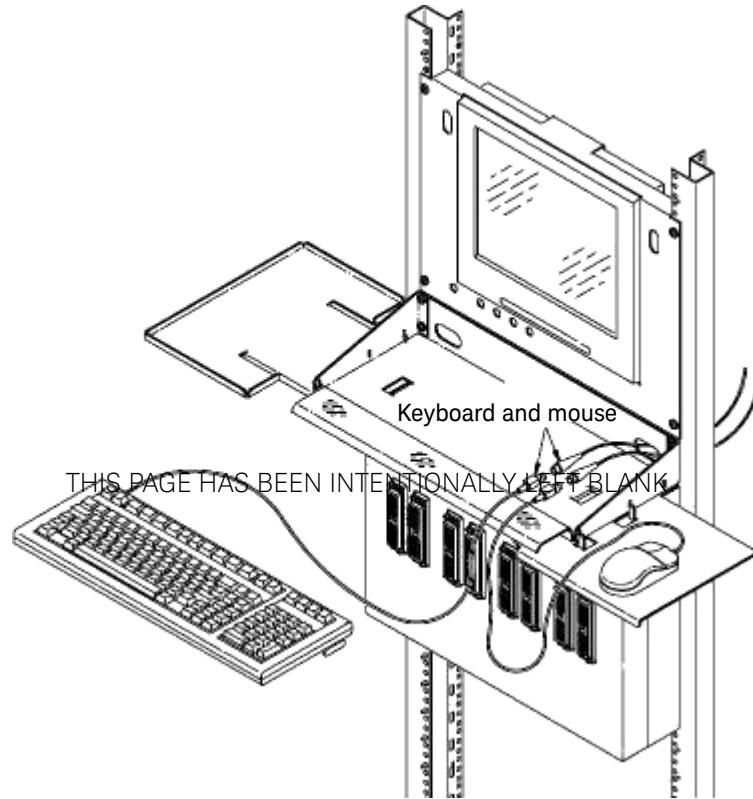


Figure 2-12 Connecting the keyboard and mouse

If you have an optional strip printer (not provided by Keysight), connect its serial cable to one of the PC serial ports. Power (AC mains) is provided at the PDU. You can route the AC power cable through the holes underneath the Test System Interface to the back of the system rack.



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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