

**Keithley Instruments**  
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## Introduction

The Model 4200A-RM Rack-Mount Kit is a fixed rack-mount kit for cabinet mounting of the 4200A-SCS Semiconductor Characterization System.

The 4200A-RM kit is for installation in standard 48.3 cm (19 in.) vertical rack configurations with 64.9 cm (25.6 in.), 60.9 cm (23 in.), or 62.9 cm (24.75 in.) mounting holes.

### NOTE

This rack-mount kit works with Keithley system cabinet numbers 437-0536-00, 437-0537-00, 437-0538-00, 437-0539-00, 437-0540-00, 437-0541-00, 437-0542-00, 437-0543-00.

## Parts list

Refer to the table below, and the 4200A-RM figure, for a list of parts included in the kit.

Item	Quantity	Description	Keithley part number
A	2	Instrument support shelves	60160-350
B	2	Rack mount ears	386-7967-00
C	2	Handles	HH-30-3
D	12	#10-32 x 5/8 Phillips truss-head fastener screws	10-32X5/8PHTRSH
E	8	#8-32 x 3/8 Flat-head fastener screws	8-32X3/8PFH
F	4	M5 thread cage nut fasteners	FA-274
G	8	#10-32 Keps® nuts	10-32KEPNUT



## Cabinet preparation

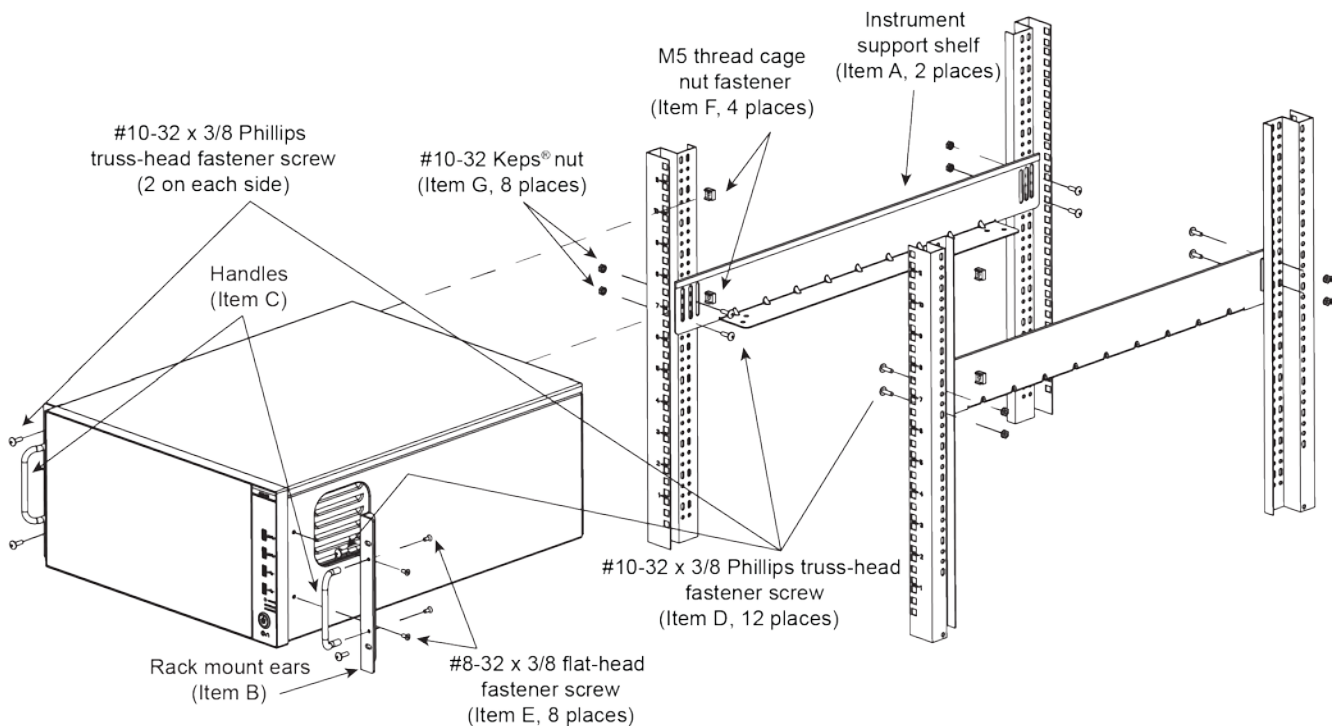
### To prepare the cabinet:

1. Select a location in the cabinet.
2. Hold the 4200A-SCS up to the selected location in the cabinet.
3. Determine and mark where the rack mount ears (item B) and instrument support shelves (item A) will be installed. Carefully set the 4200A-SCS to the side.
4. Install the cage nut fasteners (item F) for the rack mount ears and the instrument support shelves. Use the locations marked in the previous step.

## CAUTION

The 4200A-SCS Semiconductor Characterization System weighs more than 27 kilograms (60 pounds) and requires a two-person lift. Do not lift the 4200A-SCS alone and do not lift the instrument using the front bezel. Lifting the instrument by the front bezel can cause instrument damage.

Figure 1: Mounting kit installation



## 4200A-SCS preparation

### *To prepare the 4200A-SCS for mounting:*

1. Remove the feet. Remove rubber plug from bottom of the foot. You may need to insert a small screwdriver along the side and pry out the plug. Do this for all four feet.
2. Use a Phillips-head screwdriver to remove the screw holding the foot in place. Lift the foot off of the unit. Do not replace the screws when complete.

**Figure 2: Remove feet from the instrument**



3. Attach the handles (item C) to the rack-mount ears (item B) with screws (item E). Attach the rack-mount ears (item B) to the 4200A-SCS chassis using the supplied screws (item E).
4. Attach the instrument support shelves (item A) to the cabinet rack using the supplied screws (item D). Fasten the screws to the cage-nut fasteners referenced in the final step of the cabinet preparation instructions.
5. Position the 4200A-SCS in the cabinet to adjust the instrument support shelves. Note the location for the fastener screws on the front rails.
6. Once the shelves are positioned properly fasten the 4200A-SCS system to the rack rails with the cage nuts and screws (item D).

## 4200A-SCS installation

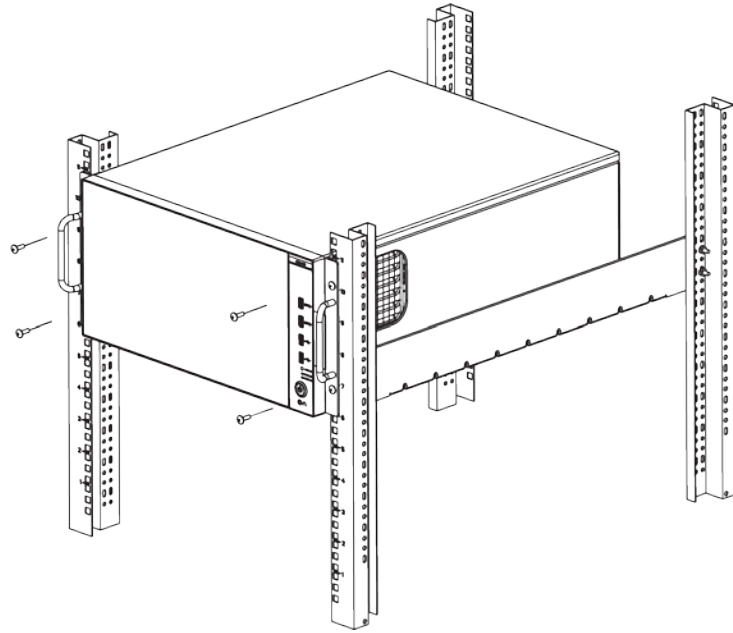
To install the 4200A-SCS in the rack:

1. With a second person assisting, grasp the 4200A-SCS chassis by the handles and insert it into the cabinet.
2. Once the shelves are positioned properly fasten the 4200A-SCS system to the rack rails with the cage nuts and screws (item D).

### **WARNING**

**The 4200A-SCS Semiconductor Characterization System must be separately connected to a safety earth ground to maintain protection against possible shock hazard. Failure to connect the instrument to a safety earth ground may result in personal injury or death due to an electric shock. Grounding instructions are available in the 4200A-SCS Semiconductor Characterization System User's Manual.**

**Figure 3: Assembled 4200A-RM**



The following safety precautions should be observed before using this product and any associated instrumentation. Although some instruments and accessories would normally be used with nonhazardous voltages, there are situations where hazardous conditions may be present.

This product is intended for use by personnel who recognize shock hazards and are familiar with the safety precautions required to avoid possible injury. Read and follow all installation, operation, and maintenance information carefully before using the product. Refer to the user documentation for complete product specifications.

If the product is used in a manner not specified, the protection provided by the product warranty may be impaired.

The types of product users are:

**Responsible body** is the individual or group responsible for the use and maintenance of equipment, for ensuring that the equipment is operated within its specifications and operating limits, and for ensuring that operators are adequately trained.

**Operators** use the product for its intended function. They must be trained in electrical safety procedures and proper use of the instrument. They must be protected from electric shock and contact with hazardous live circuits.

**Maintenance personnel** perform routine procedures on the product to keep it operating properly, for example, setting the line voltage or replacing consumable materials. Maintenance procedures are described in the user documentation. The procedures explicitly state if the operator may perform them. Otherwise, they should be performed only by service personnel.

**Service personnel** are trained to work on live circuits, perform safe installations, and repair products. Only properly trained service personnel may perform installation and service procedures.

Keithley Instruments products are designed for use with electrical signals that are measurement, control, and data I/O connections, with low transient overvoltages, and must not be directly connected to mains voltage or to voltage sources with high transient overvoltages. Measurement Category II (as referenced in IEC 60664) connections require protection for high transient overvoltages often associated with local AC mains connections. Certain Keithley Instruments measuring instruments may be connected to mains. These instruments will be marked as category II or higher.

Unless explicitly allowed in the specifications, operating manual, and instrument labels, do not connect any instrument to mains.

Exercise extreme caution when a shock hazard is present. Lethal voltage may be present on cable connector jacks or test fixtures. The American National Standards Institute (ANSI) states that a shock hazard exists when voltage levels greater than 30 V RMS, 42.4 V peak, or 60 VDC are present. A good safety practice is to expect that hazardous voltage is present in any unknown circuit before measuring.

Operators of this product must be protected from electric shock at all times. The responsible body must ensure that operators are prevented access and/or insulated from every connection point. In some cases, connections must be exposed to potential human contact. Product operators in these circumstances must be trained to protect themselves from the risk of electric shock. If the circuit is capable of operating at or above 1000 V, no conductive part of the circuit may be exposed.

For maximum safety, do not touch the product, test cables, or any other instruments while power is applied to the circuit under test. ALWAYS remove power from the entire test system and discharge any capacitors before: connecting or disconnecting cables or jumpers, installing or removing switching cards, or making internal changes, such as installing or removing jumpers.

Do not touch any object that could provide a current path to the common side of the circuit under test or power line (earth) ground. Always make measurements with dry hands while standing on a dry, insulated surface capable of withstanding the voltage being measured.


For safety, instruments and accessories must be used in accordance with the operating instructions. If the instruments or accessories are used in a manner not specified in the operating instructions, the protection provided by the equipment may be impaired.

Do not exceed the maximum signal levels of the instruments and accessories. Maximum signal levels are defined in the specifications and operating information and shown on the instrument panels, test fixture panels, and switching cards.

Chassis connections must only be used as shield connections for measuring circuits, NOT as protective earth (safety ground) connections.

The **WARNING** heading in the user documentation explains dangers that might result in personal injury or death. Always read the associated information very carefully before performing the indicated procedure.

The **CAUTION** heading in the user documentation explains hazards that could damage the instrument. Such damage may invalidate the warranty.

The **CAUTION** heading with the  symbol in the user documentation explains hazards that could result in moderate or minor injury or damage the instrument. Always read the associated information very carefully before performing the indicated procedure. Damage to the instrument may invalidate the warranty.

Instrumentation and accessories shall not be connected to humans.

Before performing any maintenance, disconnect the line cord and all test cables.

To maintain protection from electric shock and fire, replacement components in mains circuits — including the power transformer, test leads, and input jacks — must be purchased from Keithley Instruments. Standard fuses with applicable national safety approvals may be used if the rating and type are the same. The detachable mains power cord provided with the instrument may only be replaced with a similarly rated power cord. Other components that are not safety-related may be purchased from other suppliers as long as they are equivalent to the original component (note that selected parts should be purchased only through Keithley Instruments to maintain accuracy and functionality of the product). If you are unsure about the applicability of a replacement component, call a Keithley Instruments office for information.

Unless otherwise noted in product-specific literature, Keithley Instruments instruments are designed to operate indoors only, in the following environment: Altitude at or below 2,000 m (6,562 ft); temperature 0 °C to 50 °C (32 °F to 122 °F); and pollution degree 1 or 2.

To clean an instrument, use a cloth dampened with deionized water or mild, water-based cleaner. Clean the exterior of the instrument only. Do not apply cleaner directly to the instrument or allow liquids to enter or spill on the instrument. Products that consist of a circuit board with no case or chassis (e.g., a data acquisition board for installation into a computer) should never require cleaning if handled according to instructions. If the board becomes contaminated and operation is affected, the board should be returned to the factory for proper cleaning/servicing.

Safety precaution revision as of June 2017.