

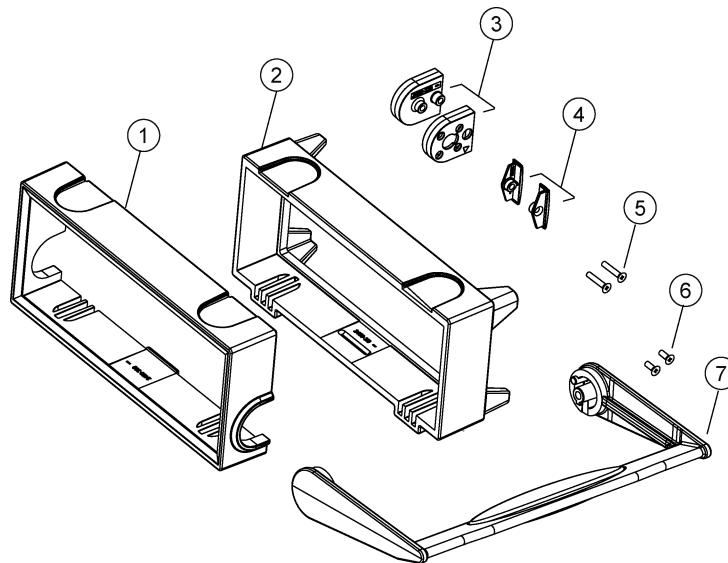
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Introduction

The Keithley Instruments Model 2450-BenchKit contains the hardware that you need to set up any of the following instruments for use on a benchtop:

- 2450-RACK
- 2450-NFP-RACK
- 2460-RACK
- 2460-NFP-RACK
- 2461-RACK
- 2461-NFP-RACK
- 2470-RACK
- DMM7510-RACK
- DMM7510-NFP-RACK

Figure 1: Model 2450-BenchKit



Number	Description	Quantity	Keithley part number
1	Front bumper	1	2450-309
2	Rear bumper	1	2450-310
3	Handle mounts	2	2450-330
4	Handle mount caps	2	2450-329
5	6-32 × 3/4 Phillips flat-head screws	2	N/A
6	6-32 × 3/8 Phillips flat-head screws	2	N/A
7	Handle assembly	1	2450-331



Installation precautions

⚠ WARNING

Turn off instrument power and unplug all cables before installing the Model 2450-BenchKit hardware. Failure to remove power before installation may cause personal injury or death from electrical shock.

CAUTION

To prevent overheating and ensure specified performance, keep the exhaust vents free of obstructions. Adequate airflow ensures that air temperatures around the instrument remain within specified limits under all operating conditions. Even partial blockage may impair proper cooling.

Installing the Model 2450-BenchKit

To install the bench kit:

1. [Assemble and install the handle mounts](#) (on page 2)
2. [Install the handle](#) (on page 4)
3. [Install the bumpers](#) (on page 4)

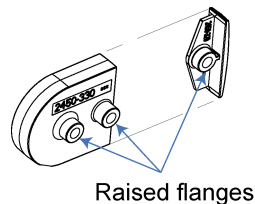
The following topics contain instructions for each of these steps.

Assemble and install the handle mounts

To install the handle-mount assemblies:

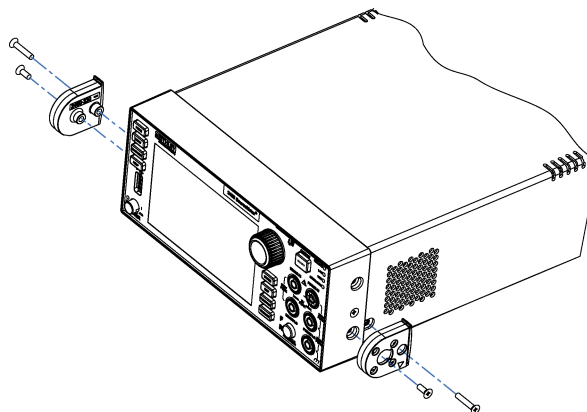
1. Insert one of the handle-mount caps into the flat end of one of the handle mounts. Make sure that the raised flange on the handle-mount cap is facing the same direction as the raised flanges on the handle mount.

Figure 2: Inserting handle-mount caps



2. Align the handle-mount and cap assembly with the two lower mounting holes on one side of the instrument. Make sure that the flat edge of the assembly is facing the rear of the instrument and the raised flanges are placed inside the mounting holes.

Figure 3: Installing the handle-mount assembly



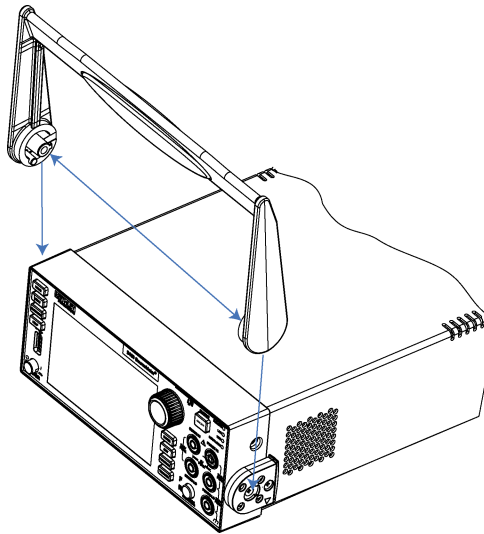
3. Insert one of the 6-32 \times 3/4 screws through the handle-mount assembly into the mounting hole that is closer to the rear of the instrument. Tighten using a Phillips screwdriver.
4. Insert one of the 6-32 \times 3/8 screws through the handle-mount assembly into the mounting hole that is closer to the front of the instrument. Tighten using a Phillips screwdriver.
5. Repeat steps 1 through 4 to attach the remaining handle-mount assembly to the other side of the instrument.

Install the handle

To install the handle assembly:

1. Holding the handle assembly above the top of the instrument, gently pull the handle ends apart to widen the handle as you slide it over the instrument case.

Figure 4: Installing the handle



2. Align the raised flanges in the handle with the large holes in the handle-mount assembly and release the ends of the handle.
3. Swing the handle below the bottom surface of the instrument to tilt the instrument up for easier front-panel viewing.

Install the bumpers

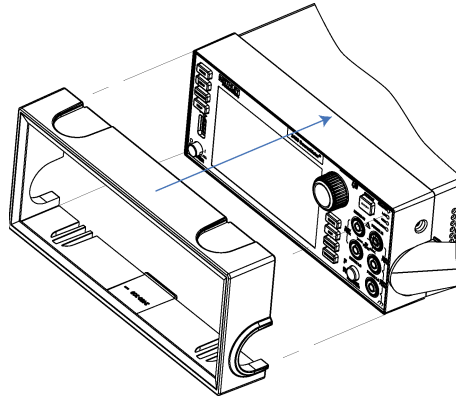
The instrument bumpers are shaped differently for the front and rear panels:

- The front-panel bumper has a large notch on each side to allow the handle to move freely.
- The rear-panel bumper has feet to protect the rear panel connectors when it is in a standing position.

To install the front and rear bumpers

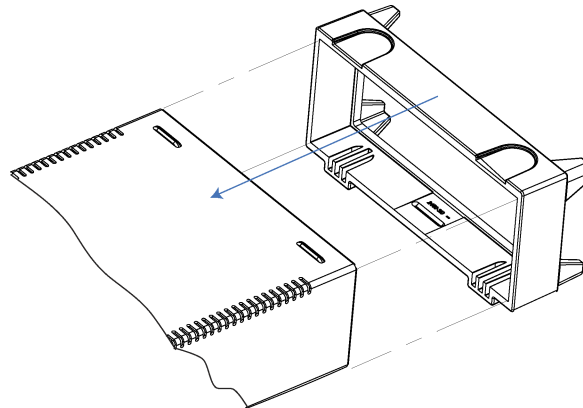
1. Align the front bumper so that the side notches are closer to the bottom of the instrument.
2. Slide the bumper over the front panel of the instrument.

Figure 5: Installing the front bumper



3. Push the bumper evenly toward the instrument until it snaps into place.
4. Align the rear bumper so that the feet of the bumper face away from the rear panel.
5. Slide the bumper over the rear panel of the instrument.

Figure 6: Installing the rear bumper



6. Push the bumper evenly toward the instrument until it snaps into place.

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 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 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 hazards 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. 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 to maintain accuracy and functionality of the product). If you are unsure about the applicability of a replacement component, call a Keithley office for information.

Unless otherwise noted in product-specific literature, Keithley 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.