AC0199A Cable Discharger

For 1.85 mm and 2.92 mm connectors

KEYSIGHT

REFERENCE GUIDE

Notices

Manual Part Number

54155-97000

Edition

First edition, February 2026

Published by:
Keysight Technologies, Inc.
1400 Fountaingrove Parkway
Santa Rosa, CA, 95403

Warranty

The material contained in this document is provided "as is," and is subject to being changed, without notice, in future editions. Further, to the maximum extent permitted by applicable law, Keysight disclaims all warranties, either express or implied, with regard to this manual and any information contained herein, including but not limited to the implied warranties of merchantability and fitness for a particular purpose. Keysight shall not be liable for errors or for incidental or consequential damages in connection with the furnishing, use, or performance of this document or of any information contained herein. Should Keysight and the user have a separate written agreement with warranty terms covering the material in this document that conflict with these terms, the warranty terms in the separate agreement shall control.

Technology Licenses

The hardware and/or software described in this document are furnished under a license and may be used or copied only in accordance with the terms of such license.

Restricted Rights Legend

U.S. Government Rights. The Software is "commercial computer software," as defined by Federal Acquisition Regulation ("FAR") 2.101. Pursuant to FAR 12.212 and 27.405-3 and Department of Defense FAR Supplement ("DFARS") 227.7202, the U.S. government acquires commercial computer software under the same terms by which the software is customarily provided to the public. Accordingly, Keysight provides the Software to U.S. government customers under its standard commercial license, which is embodied in its End User License Agreement (EULA), a copy of which can be found at http://www.keysight.com/find/sweula. The license set forth in the EULA represents the exclusive authority by which the U.S. government may use, modify, distribute, or disclose the Software. The EULA and the license set forth therein, does not require or permit, among other things, that Keysight: (1) Furnish technical information related to commercial computer software or commercial computer software documentation that is not customarily provided to the public; or (2) Relinquish to, or otherwise provide, the government rights in excess of these rights customarily provided to the public to use, modify, reproduce, release, perform, display, or disclose commercial computer software or commercial computer software documentation. No additional government requirements beyond those set forth in the EULA shall apply, except to the extent that those terms, rights, or licenses are explicitly required from all providers of commercial computer software pursuant to the FAR and the DFARS and are set forth specifically in writing elsewhere in the EULA. Keysight shall be under no obligation to update, revise or otherwise modify the Software. With respect to any technical data as defined by FAR 2.101, pursuant to FAR 12.211 and 27.404.2 and DFARS 227.7102, the U.S. government acquires no greater than Limited Rights as defined in FAR 27.401 or DFAR 227.7103-5 (c), as applicable in any technical data.

Safety Notices

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.

Contents

Contents

1 Overview

About the AC0199A Cable Discharger

The AC0199A Cable Discharger is an ESD prevention device, designed to remove the electrostatic charge specifically from SMA cables, with 1.85 mm or 2.92 mm connectors. Prior to making cable connections, this Cable Discharger prevents any Cable Discharge Event (CDE) from causing any damage to the instrument or the system circuitry. See “Understanding Cable Discharge Events” on page 9 for an overview on Cable Discharge Events.

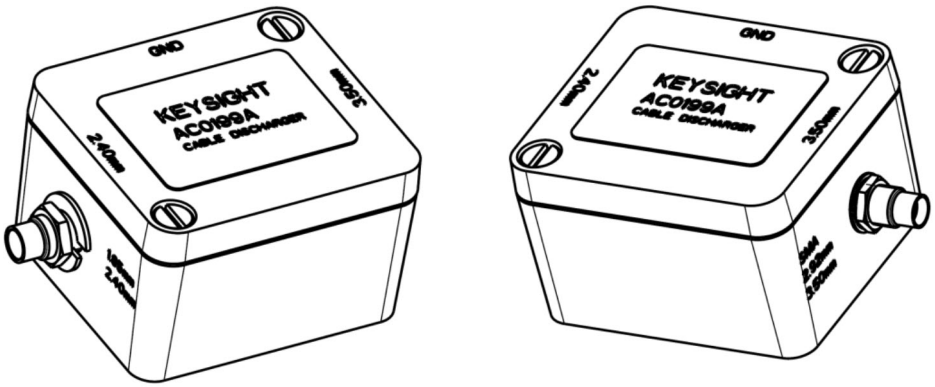

Figure 1 Left and right illustrations of the AC0199A Cable Discharger

Compatibility

The AC0199A Cable Discharger is compatible with any instrument (such as Oscilloscopes, Generators, Analyzers, and so on), which have a banana ground socket.

NOTE For proper ESD discharge operation of the cable, the AC0199A Cable Discharger must be connected to the Banana socket of the grounded instrument. Else, no discharge occurs.

Connecting the AC0199A Cable Discharger

CAUTION AC0199A Cable Discharger is designed for discharging cables with 1.85 mm and 2.92 mm connectors only and does not provide comprehensive ESD protection to the instrument or its accessories. Refer to the respective instrument's manual or Keysight's ESD handling documentation for standard ESD prevention procedures.

Figure 2 shows the connection between an AC0199A Cable Discharger and a grounded instrument (such as an oscilloscope as illustrated below), in order to proceed with the cable discharging.

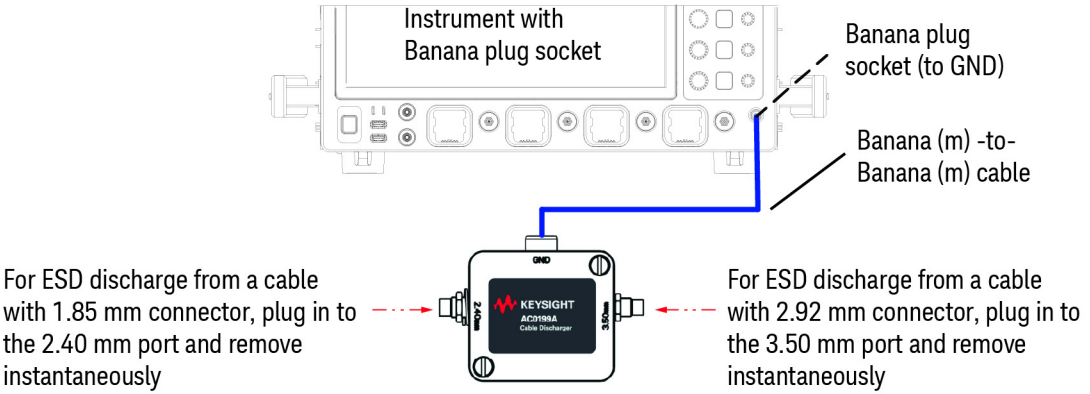

Figure 2 Connecting the AC0199A Cable Discharger to an instrument

Connection procedure

As mentioned earlier, you can use the AC0199A Cable Discharger with instruments that have a Banana plug socket for grounding.

1 Insert the GND connector of the AC0199A Cable Discharger to the Banana plug socket of the instrument using a Banana (male)-to-Banana (male) cable

NOTE The first step is imperative for cable discharging. If the AC0199A is not connected to the Banana socket, cable discharging does not occur.

2 To discharge a cable:

- insert and remove immediately the cable with the 1.85 mm connector to the port marked 2.40 mm on the housing
- insert and remove immediately the cable with the 2.92 mm connector to the port marked 3.50 mm on the housing

3 Repeat step 2 until all cables being used with the instrument or Device-Under-Test (DUT) are discharged.

WARNING **Even though it is possible to manually discharge a cable center conductor to its shield using uninsulated hand tools like metal tweezers; however, it is unsafe and Keysight does not recommend using this approach for cable discharging.**

Cleaning the AC0199A Cable Discharger

Disconnect the AC0199A Discharger from the instrument and clean the device with a soft cloth dampened with a mild soap and water solution. Make sure that the Discharger device is dry before reconnecting it to an instrument. Avoid using abrasive cleaners and chemicals containing benzene or similar solvents.

Understanding Cable Discharge Events

The ESD Association describes a Cable Discharge Event, or CDE, as a discharge that occurs when a cable is connected to an electronic equipment. CDE occurs because there is a differential between the charge on the center-conductor of a coaxial cable to be connected and the equipment that it is being plugged into; irrespective of whether the cable is charged or if the equipment to which it will be connected is charged. It is the differential that causes the discharge.

CDE is an ESD event. The CDE has an initial rise and spike very much like other ESD events. Because the ESD discharge current is directly into the pin of a connector, some kind of ESD protection directly at the input pins of a system is necessary to protect semiconductor devices that are likely to be directly connected to those pins.

Cables can easily become charged during installation or by contact of the connector with human hands. In the former case, the triboelectric charging causes a charge on the cable sheath which is transferred to the conductors in the cable, resulting in a static voltage that is discharged, when connected to an instrument. In the latter case, a person handling the cable could be charged enough to transfer change onto the cable connector pins. Discharges may occur when connecting Ethernet, USB, power, audio and other interconnecting cables. The difference with shorter cables is only the amount of charge the cable can hold and therefore the amount of energy that can be transferred during a discharge.

This document discusses how to discharge RF coaxial cables, which are widely used with instruments such as Oscilloscopes, Analyzers, Generators and so on. In such cables, the potential threat is the ESD like transient that occurs as the charged cable approaches its mating connector. To get a discharge, the mating connector pins do not need to be at ground potential, but only at a potential that is different that of the charged cable – the two will try and equalize through a discharge. High-speed instruments are more susceptible to damage because of such ESD discharges.

The static voltage that appears on the cable is determined by the triboelectric charging that occurs and the capacitance of the cable to everything around it. The longer the cable, the higher the capacitance. This static voltage can be calculated using the formula:

$$V = Q/C$$

where, V = voltage, Q = charge, C = capacitance

Safety Information

This manual provides information and warnings essential for operating the AC0199A Cable Discharger in a safe manner and for maintaining it in safe operating condition. Before using this equipment and to ensure safe operation and to obtain maximum performance, carefully read and observe the following warnings, cautions, and notes.

This product has been designed and tested in accordance with accepted industry standards, and has been supplied in a safe condition. The documentation contains information and warnings that must be followed by the user to ensure safe operation and to maintain the product in a safe condition.

WARNING **To avoid personal injury and to prevent fire or damage to this product or products connected to it, review and comply with the following safety precautions. Be aware that if you use this device in a manner not specified, the protection this product provides may be impaired.**

WARNING **Use Only Grounded Instruments.**
Do not connect the Discharger's ground connector to a potential other than earth ground. Always make sure the probes and the instruments, such as an oscilloscope, are grounded properly.

WARNING **Connect and Disconnect Properly.**
Connect the Discharger to the instrument and connect the ground lead to earth ground before connecting the probe to the circuit under test.

WARNING **Do Not Operate Without Covers. To avoid electrical shock or fire hazard, do not operate this Discharger with the covers removed.**

WARNING **Do Not Operate in Wet / Damp Conditions.**
To avoid electrical shock, do not operate this probe in wet or damp conditions.

WARNING **Do Not Operate in an Explosive Atmosphere.**
To avoid injury or fire hazard, do not operate this probe in an explosive atmosphere.

WARNING **Avoid Exposed Circuit. To avoid injury, remove jewelry such as rings, watches, and other metallic objects. Do not touch exposed connections and components when power is present.**

WARNING **For Indoor Use Only. Only use this device indoors.**

WARNING **Do Not Operate With Suspected Failures. If you suspect there is damage to this device, have it inspected by a qualified service personnel.**

Concerning the Oscilloscope or Voltage Measuring Instrument to Which the Discharger is Connected

WARNING **Whenever it is likely that the ground protection is impaired, you must make the instrument inoperative and secure it against any unintended operation.**

WARNING **If you energize the instrument by an auto transformer (for voltage reduction or mains isolation), the ground pin of the input connector terminal must be connected to the earth terminal of the power source.**

WARNING **Before turning on the instrument, you must connect the protective earth terminal of the instrument to the protective conductor of the (mains) power cord. The mains plug shall only be inserted in a socket outlet provided with a protective earth contact. You must not negate the protective action by using an extension cord (power cable) without a protective conductor (grounding). Grounding one conductor of a two-conductor outlet is not sufficient protection.**

WARNING **Only fuses with the required rated current, voltage, and specified type (normal blow, time delay, etc.) should be used. Do not use repaired fuses or short-circuited fuse holders. To do so could cause a shock or fire hazard.**

WARNING **Capacitors inside the instrument may retain a charge even if the instrument is disconnected from its source of supply.**

Inspecting the AC0199A Cable Discharger

- Inspect the shipping container for damage.

  Keep the damaged shipping container or cushioning material until the contents of the shipment have been checked for completeness and the discharger unit has been checked mechanically and electrically.
- If the contents are incomplete or damaged, notify your Keysight Technologies Sales Office.
- If the shipping container is damaged, or the cushioning materials show signs of stress, notify the carrier as well as your Keysight Technologies Sales Office. Keep the shipping materials for the carrier's inspection. The Keysight Technologies office will arrange for repair or replacement at Keysight Technologies' option without waiting for claim settlement.

Returning the Product for Service

If the AC0199A Cable Discharger is found to be defective, we recommend sending it to an authorized service center for all repair and calibration needs. Perform the following steps before shipping the unit back to Keysight Technologies for service.

1. Contact your nearest Keysight sales office for information on obtaining an RMA number and return address.
2. Write the following information on a tag and attach it to the malfunctioning equipment.
   - Name and address of owner
   - Product model number (for example, AC0199A)
   - Product Serial Number (for example, USXXXXXXXX)
   - Description of failure or service required.

NOTE Include probing and browsing heads if you feel the probe is not meeting performance specifications or a yearly calibration is requested.

3. Protect the probe by wrapping in plastic or heavy paper.
4. Pack the probe in the original carrying case or if not available, use bubble wrap or packing peanuts.
5. Place securely in sealed shipping container and mark container as “FRAGILE”.

NOTE If any correspondence is required, refer to the product by serial number and model number.

Contacting Keysight Technologies

For technical assistance, contact your local Keysight Call Center.

- In the Americas, call 1 (800) 829-4444
- In other regions, visit http://www.keysight.com/find/assist
- Before returning an instrument for service, you must first call the Call Center at 1 (800) 829-4444.

2 Specifications, Characteristics and Dimensions

This chapter list the specifications, characteristics and dimensions for the AC0199A Cable Discharger.

AC1990A Specifications and Characteristics

Table 1 AC0199A Cable Discharger materials (refer to fig. below for numbering)

No. on image	Material name	Material description
1	Housing	Aluminium, black coated, laser marked
2	Banana Connector	Brass, nickel plated
3	2.40 mm Connector	
4	3.50 mm Connector	

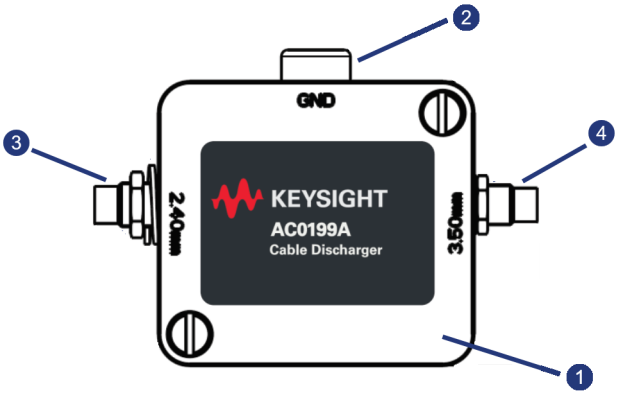

Figure 3 AC0199A Cable Discharger materials

Table 2 AC0199A Specifications

Specification	Rating
Electrical	
Safety resistance per channel	1M Ω, 0.1 W
Environmental	
Temperature range	-10 °C to +80 °C
RoHS	Compliant

Table 3 AC0199A Characteristics

Characteristic	Description
Weight	200 g per unit
Interface	
2.40 mm	RF Connector
3.50 mm	
Banana Connector	GND

AC1990A Cable Discharger Dimensions

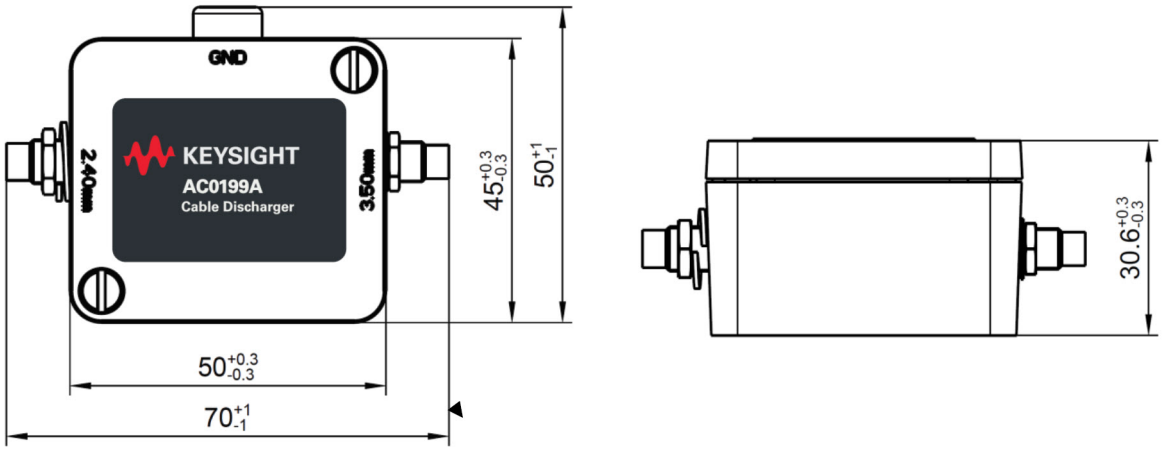

Figure 4 AC1990A Dimensions (in millimeters)