Keysight 16194A High Temperature Component Fixture

Operation and Service Manual

KEYSIGHT TECHNOLOGIES

Notices

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CAUTION

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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.

1 General Information

Introduction

The purpose of this manual is to enable you to use your 16194A High Temperature Component Fixture efficiently and confidently.

Manual Summary

This manual contains the following:

- The specification of the 16194A
- Installing the 16194A
- Operating the 16194A
- Ordering replaceable parts for the 16194A

Product Description

The 16194A is used to measure both axial/radial leaded devices and surface mount devices within the temperature range of –55 °C to +200 °C.

Applicable Instruments

The 16194A has been designed specifically for the measurements within the temperature range of –55 °C to +200 °C using the Impedance Analyzer with High Temperature Test Kit.

The 16194A can also be used in normal temperature measurements. The operating temperature depends on the specification of each instrument.

E4982A

E4990A[1] with 42942A

E4991B

E5061B-3L3/3L4/3L5[2] with 16201A

Options Available

The following option is supplied for the 16194A:

Option 010	Add EIA/EIAJ industry standard size short bar set
Option 701	Short bars set (1x1x2.4, 1.6x2.4x2, 3.2x2.4x2.4, 4.5x2.4x2.4) mm
Option ABA	Printed manual, English

1. Option E4990A-120 is required.
2. Option 005 is required.

Accessories Supplied

The following accessories are supplied with the 16194A:

Table 1-1 Furnished Accessories

Description	Part Number	Quantity
Operation and Service Manual	Option ABA	1
Option 701	P/N 16191-29001	1
	P/N 16191-29002	1
	P/N 16191-29003	1
	P/N 16191-29004	1
Case for shorting devices	P/N 1540-0692	1
Option 010[1]	P/N 16191-29005	1
	P/N 16191-29006	1
	P/N 16191-29007	1
	P/N 16191-29008	1
50 Ω Chip Resistor	P/N 0699-2829	10
Tweezers	P/N 8710-2081	1
Wrench	P/N 5188-4452	1

1. Option 010 sizes are the same as industry standard (EIA/EIAJ) SMD sizes. This short bar set has the following SMD sizes included : 1005 (mm)/0402 (inch), 1608 (mm)/0603 (inch), 2012 (mm)/0805 (inch), 3216 (mm)/1206 (inch). Order Option 010 if the SMD that is to be measured has the same size as the EIA/EIAJ sizes.

Specifications

This section lists the complete 16194A specifications. These specifications are the performance standards and limits against which the 16194A is tested. When shipped from the factory, the 16194A meets the following specifications:

Maximum DC Bias Voltage	±40 V
Operating Temperature	–55 to +200 °C
Operating Humidity (@wet bulb temperature <40 °C)	15% to 95% RH
Non-operating Temperature	–55 to +200 °C
Non-operating Humidity (@wet bulb temperature <65 °C)	Up to 90% RH
Weight	350 g
Dimension	150(W) × 40(H) × 80(D) [mm]

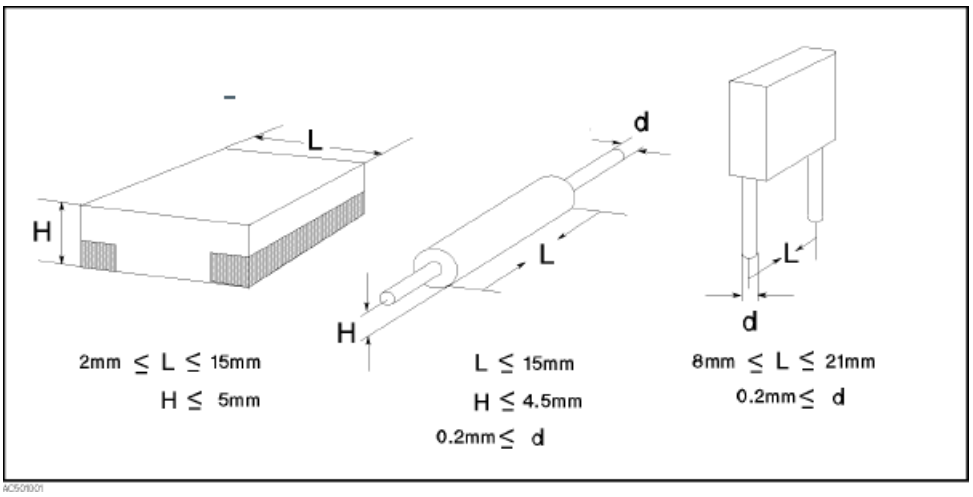
Supplemental Performance Characteristics

This section lists supplemental performance characteristics. Supplemental performance characteristics are not specifications, but are typical characteristics included as additional information for the operator. Supplemental performance characteristics are not guaranteed.

Frequency Range	
With OPEN/SHORT and electrical length compensation	DC to 500 MHz
With OPEN/SHORT/LOAD compensation	DC to 2 GHz
Electrical Length	50.0 mm
Additional Error[1] (With OPEN/SHORT and electrical length compensation)	$20 \times f^2$ [%]
Repeatability[1]	
Surface Mount Device	
Inductive Device	0.2 + 2.5 × f [Ω]
Capacitive Device	80 + 250 × f [µS]
Leaded Device	
Inductive Device	0.4 + 12.5 × f [Ω]
Capacitive Device	80 + 500 × f [µS]
Option 701 Shorting Device Size	
P/N 16191-29001	1 × 1 × 2.4 [mm]
P/N 16191-29002	1.6 × 2.4 × 2 [mm]
P/N 16191-29003	2.4 × 2.4 × 3.2 [mm]
P/N 16191-29004	2.4 × 2.4 × 4.5 [mm]
Option 010 Shorting Device Size	
P/N 16191-29005	0.5 × 0.5 × 1 [mm]
P/N 16191-29006	0.8 × 0.8 × 1.6 [mm]
P/N 16191-29007	0.8 × 1.2 × 2 [mm]
P/N 16191-29008	0.8 × 1.6 × 3.2 [mm]
DC Resistance Of Supplied Chip Resistor	50 Ω ± 0.1%

1. f: frequency (GHz)

Figure 1-1 Applicable Device Size



Supplied Shorting Device Inductance

P/N 16191-29001 (l = 1 mm)	0.2 nH*1
P/N 16191-29002 (l = 2 mm)	0.2 nH*1
P/N 16191-29002 (l = 1.6 mm)	0.2 nH*1
P/N 16191-29002 (l = 2.4 mm)	0.7 nH*2
P/N 16191-29003 (l = 3.2 mm)	0.6 nH*2
P/N 16191-29004 (l = 4.5 mm)	0.6 nH*2

2 Preparation for Use

Introduction

This chapter explains how to install the 16194A. The topics include the following:

- Initial inspection.
- Exchanging the device holder.
- Repackaging the test fixture for shipment.

Initial Inspection

The 16194A has been carefully inspected before being shipped from the factory. It should be in perfect physical condition, no scratches, dents or the like. It should also be in perfect electrical condition. Verify this by carefully performing an incoming inspection to check the 16194A set for signs of physical damage and missing contents. If any discrepancy is found, notify the carrier and Keysight Technologies. Your Keysight Technologies sales office will arrange for repair and replacement without waiting for the claim to be settled.

- Inspect the shipping container for damage. Keep the shipping materials until the inspection is completed.
- Verify that the shipping container contains everything shown in Figure 2-1 and listed in Table 2-1.
- Inspect the exterior of the 16194A for any signs of damage.

Figure 2-1 16194A Product Overview

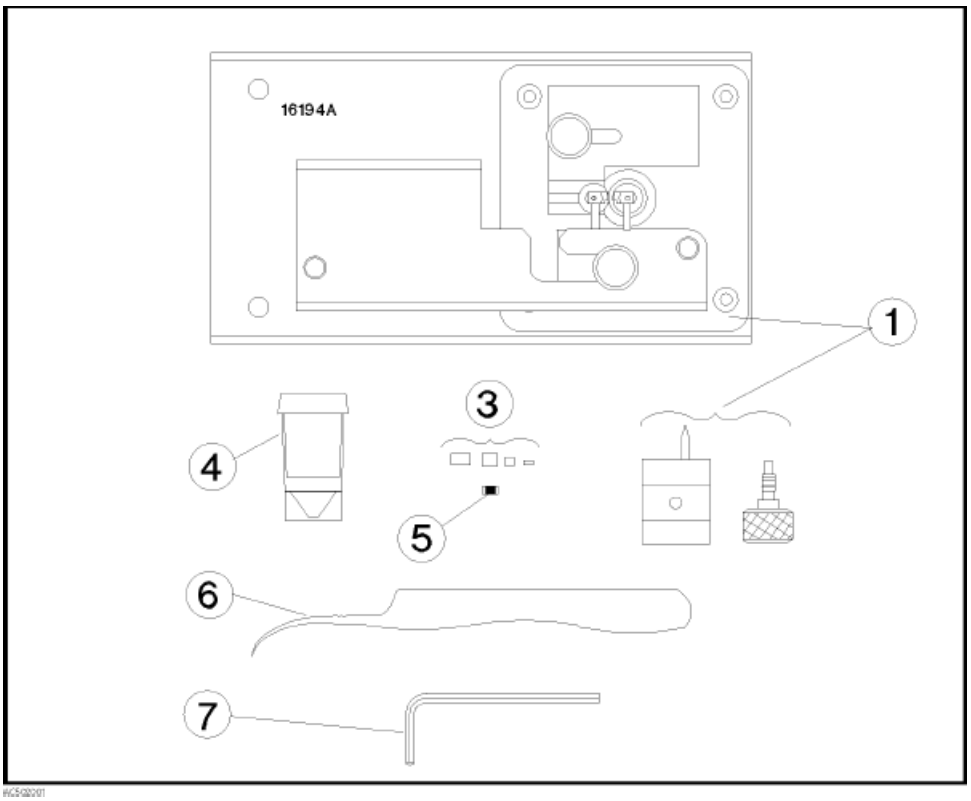


Table 2-1 16194A Contents

Description		Keysight Part Number	Quantity
1 Test Fixture		16194A	1
2 Operation and Service Manual[1]		Option ABA	1
3 Shorting Device[2]	(1×1×2.4 [mm])	P/N 16191-29001	1
	(1.6×2.4×2 [mm])	P/N 16191-29002	1
	(2.4×2.4×3.2 [mm])	P/N 16191-29003	1
	(2.4×2.4×4.5 [mm])	P/N 16191-29004	1
4 Case for Shorting Device		P/N 1540-0692	1
5 50 Ω Chip Resistor		P/N 0699-2829	10
6 Tweezers		P/N 8710-2081	1
7 Wrench		P/N 5188-4452	1

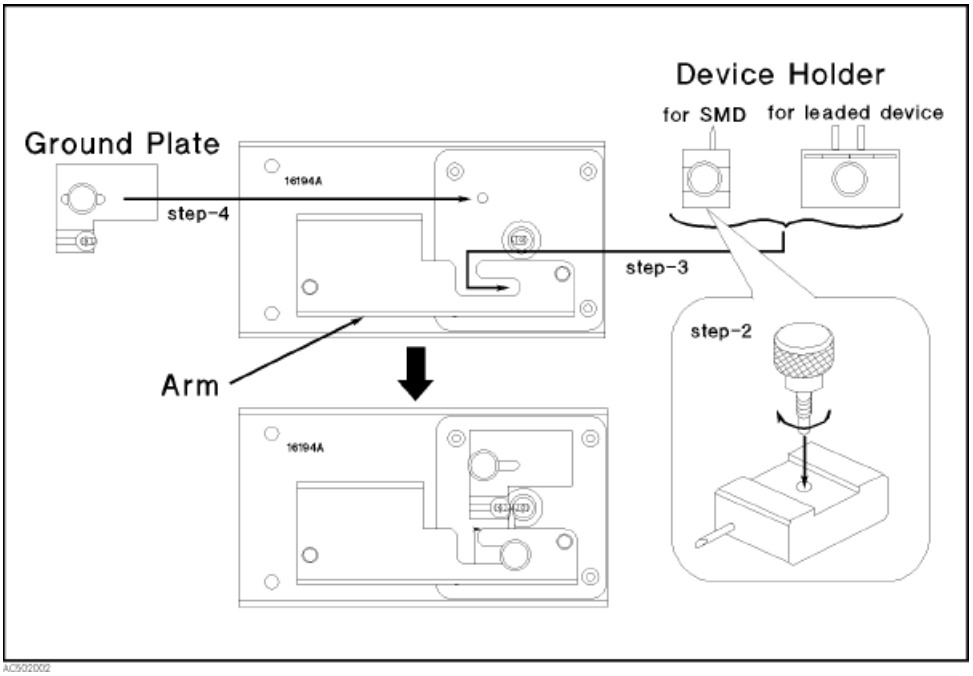
1. Operation and Service Manual is not shown in Figure 2-1.
2. Contained if you ordered the 16194A Option 701.

Exchanging the Device Holder

The 16194A can hold both leaded devices and surface mount devices by exchanging the device holder. The exchanging procedure is as follows.

1. Remove the ground plate.
2. When measuring a surface mount device, attach the knob on the device holder as shown in Figure 2-2.
3. Select the device holder suitable for the device type. Loosen its knob and insert it into the arm.
4. Set the ground plate.

Figure 2-2 Exchanging the Device Holder



Repackaging the Test Fixture For Shipment

If shipment to a Keysight Technologies service center is required, each test fixture should be repackaged using the original factory packaging materials.

If this material is not available, comparable packaging materials may be used. Wrap the 16194A in heavy paper and pack in anti-static plastic packing material. Use sufficient shock absorbing material on all sides of the 16194A to provide a thick, firm cushion and to prevent movement. Seal the shipping container securely and mark it *FRAGILE*.

3 Operation

Introduction

This chapter describes how to perform error compensation and how to measure the device with the 16194A. The topics include the following.

- Operating flow
- Connecting the test fixture for use
- Placing shorting device, load device, or device under test
- Setting the open condition

Operating Flow

The following shows typical operating procedure. Before performing a measurement, it is necessary to compensate for the residual error of the fixture. The error compensation functions are different for each instrument. For procedure on how to perform each error compensation, see the Help Manual supplied with your analyzer.

1. Perform calibration at the measurement terminal of your analyzer, and connect the 16194A.
2. Perform electrical length compensation (Fixture Select/Port Extension).
3. Perform SHORT compensation.

   For both surface mount device and leaded device measurements, use the shorting device.
4. Perform LOAD compensation, if necessary.

   For both surface mount device and leaded device measurements, use the 50 Ω chip resistor as a LOAD device. The reference value for LOAD compensation is R = 50 Ω/ L = 0 H.
5. Perform OPEN compensation.
6. Measure the device under test.

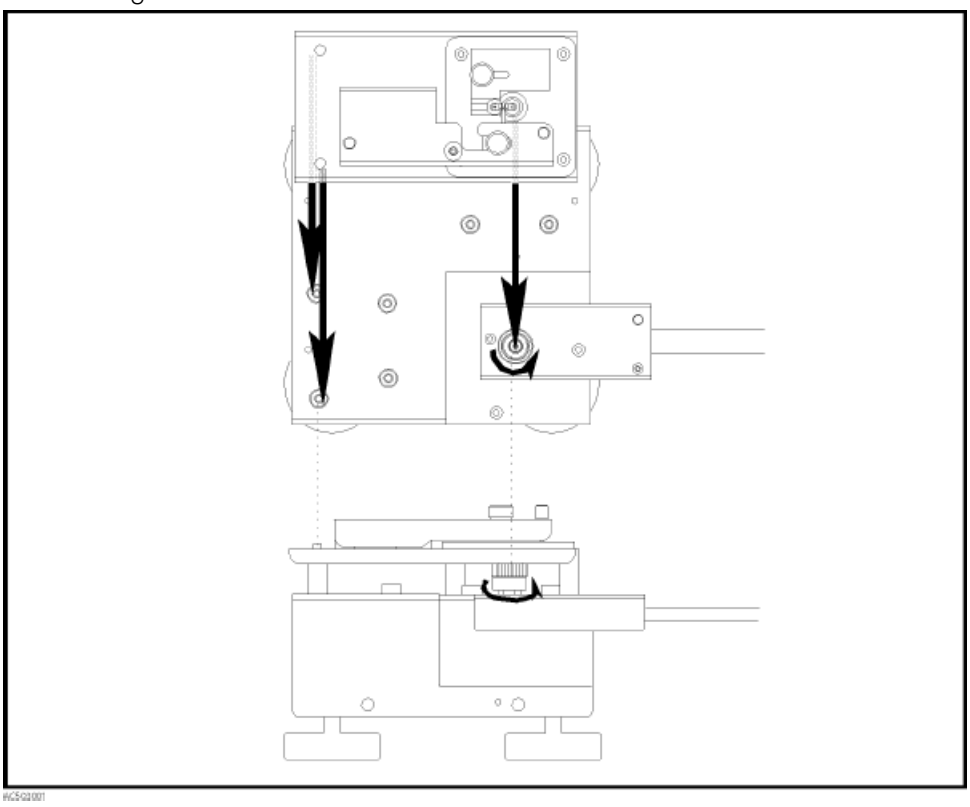
WARNING

The 16194A has the capability for –55 °C to +200 °C temperature measurement in environmental testing. Use gloves to prevent burns when handling heated parts.

Connecting the Test Fixture for Use

1. Calibrate your analyzer at the APC-7® connector plane before connecting the test fixture.
2. Place the fixture on the APC-7® connector.
3. Tighten (turn counterclockwise) the coupling nut of the APC-7® connector.

Figure 3-1 Connecting the 16194A to the Measurement Terminal

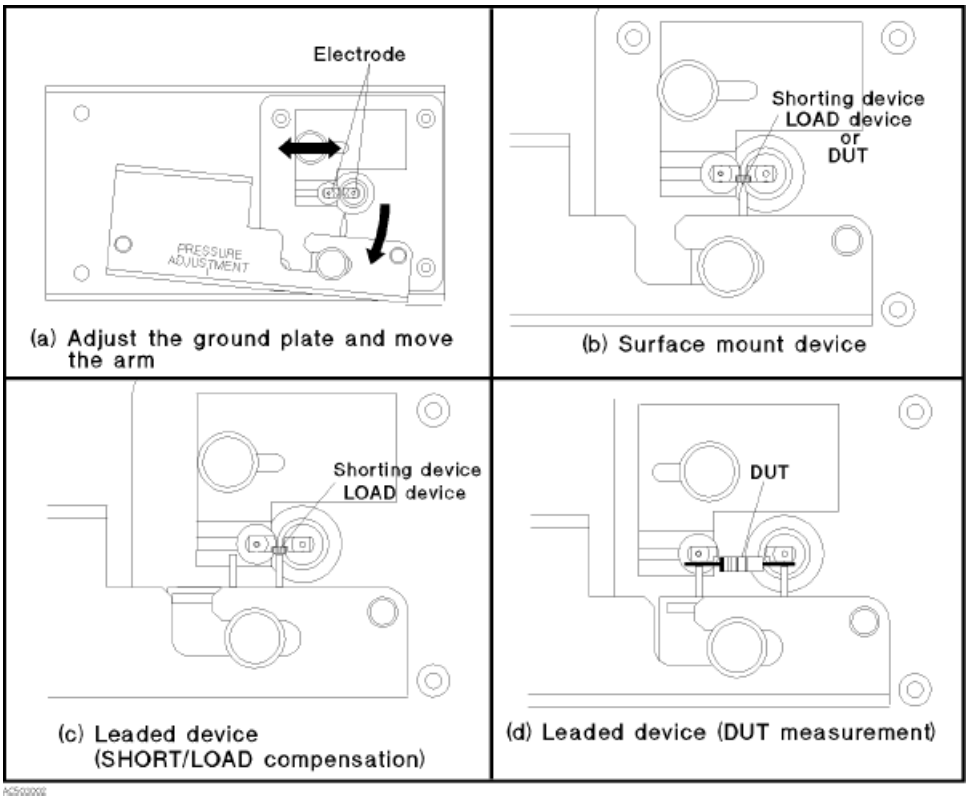


Placing Shorting Device, Load Device, or Device Under Test

1. Adjust the position of the ground plate and tighten its knob.
2. Adjust the position of the device holder so that it presses against the device. When measuring a leaded device, adjust the distance between the two pins to the device size. Then tighten the knob of the device holder.
3. Move the arm outward.
4. Place the device on the electrodes and press it with the device holder (Figure 3-2 (b) - (d)). When placing a leaded device, put its leads on the notch of the 16194A's electrodes.

You can adjust the pressure of the arm by turning the pressure adjustment using the wrench.

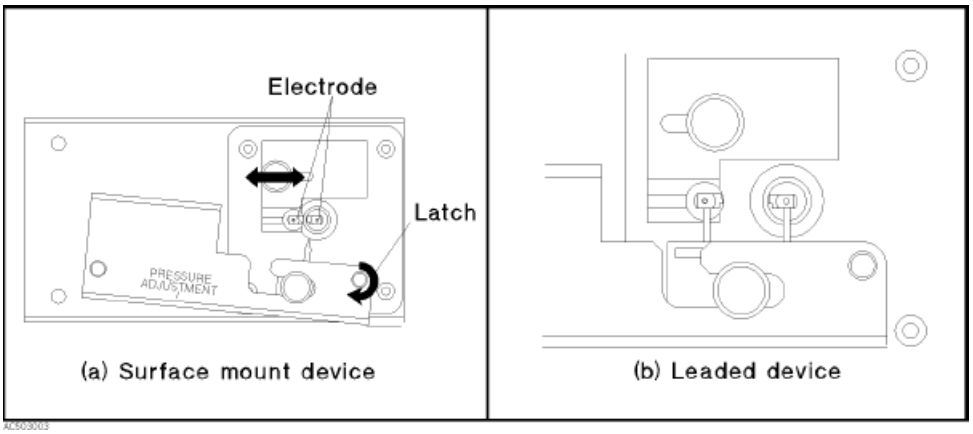
Figure 3-2 Placing the Device



Setting the Open Condition

1. If there is any device on the electrodes, remove it.
2. When measuring a surface mount device, move the arm outward and latch it. Then make the distance between the electrodes same as the device size by adjusting the ground plate (Figure 3-3 (a)).
3. When measuring a leaded device, make the distance between the electrodes and the distance between the device holder's pins same as the device size. Then press the electrodes with the device holder's pins, not latching the arm (Figure 3-3 (b)).

Figure 3-3 Setting Open Condition



4 Service

Serial numbers for Non-RoHS 16194A: “MY43200187 and below” / “SG43200187 and below”

Serial numbers for RoHS 16194A: “MY43200188 and above” / “SG43200188 and above”

Introduction

This chapter covers the following subjects:

- Assembly Replacement
  - Replaceable Parts
  - Replacement Procedure
- Troubleshooting

WARNING These servicing instructions are for use by qualified personnel only. Do NOT perform any servicing (other than that contained in the operating section) unless you are qualified to do so.

CAUTION When you repair the 16194A, put on lint-free groves to avoid contaminating inner parts of the 16194A.

Assembly Replacement

Replaceable Parts

Table 4-1 through Table 4-3 show and list the replaceable parts for the 16194A and their respective RoHS compliant replacement support part. RoHS conversion involves design and dimension change, which results in the RoHS support part backward incompatible with the non-RoHS 16194A. Special handling is needed while using the RoHS replacement part on the non-RoHS 16194A. The original support part number is replaced by the respective “RoHS Compliant Keysight Part No.”. Once the original support part is depleted, please proceed to obtain the RoHS compliant support part. The parts listed can be ordered from your nearest Keysight Technologies Office. Ordering information must include the Keysight part number and the quantity required.

Figure 4-1 Replaceable Parts for Main Assembly

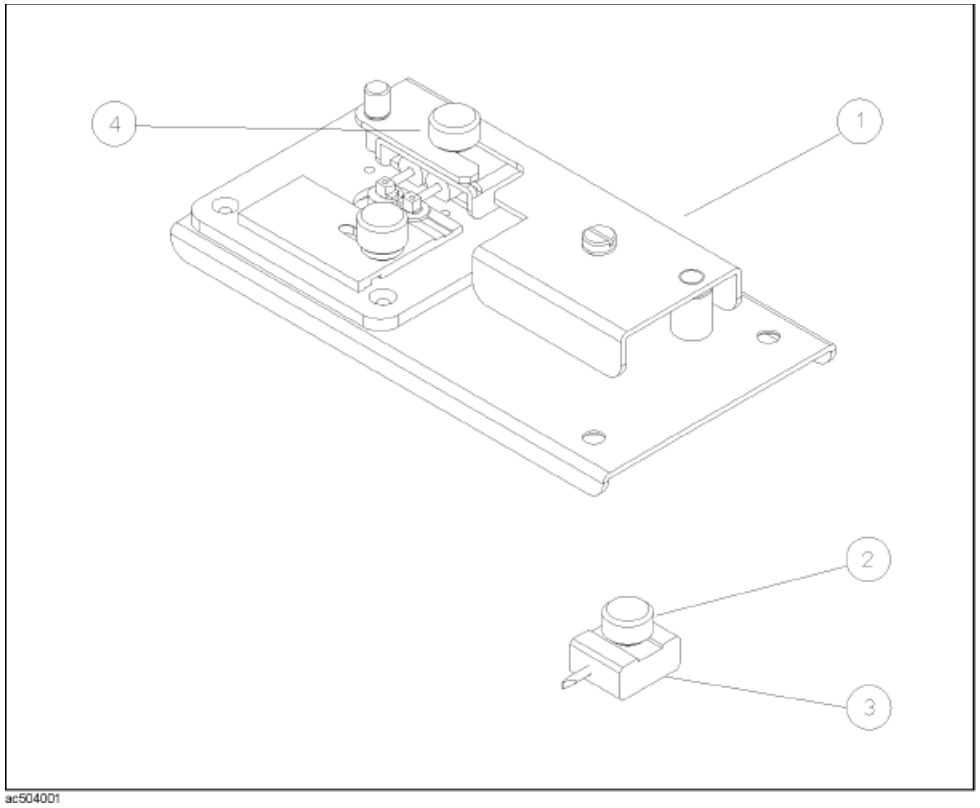


Table 4-1 Replaceable Parts for Main Assembly

Reference Designator	Keysight Part Number	RoHS Compliant Replacement Part Number	Qty	Description
1	(not assigned)	(not assigned)	1	Main Assembly
2	16194-24007	16194-24007	1	Knob
3	16194-60002	16194-60002	1	Device Holder for SMD
4	16194-60001	16194-60001	1	Device Holder for Leaded Device[1]

1. The parts in the Holder for Leaded Device cannot be replaced separately.

Figure 4-2 Replaceable Parts around the Holder Aim Assembly

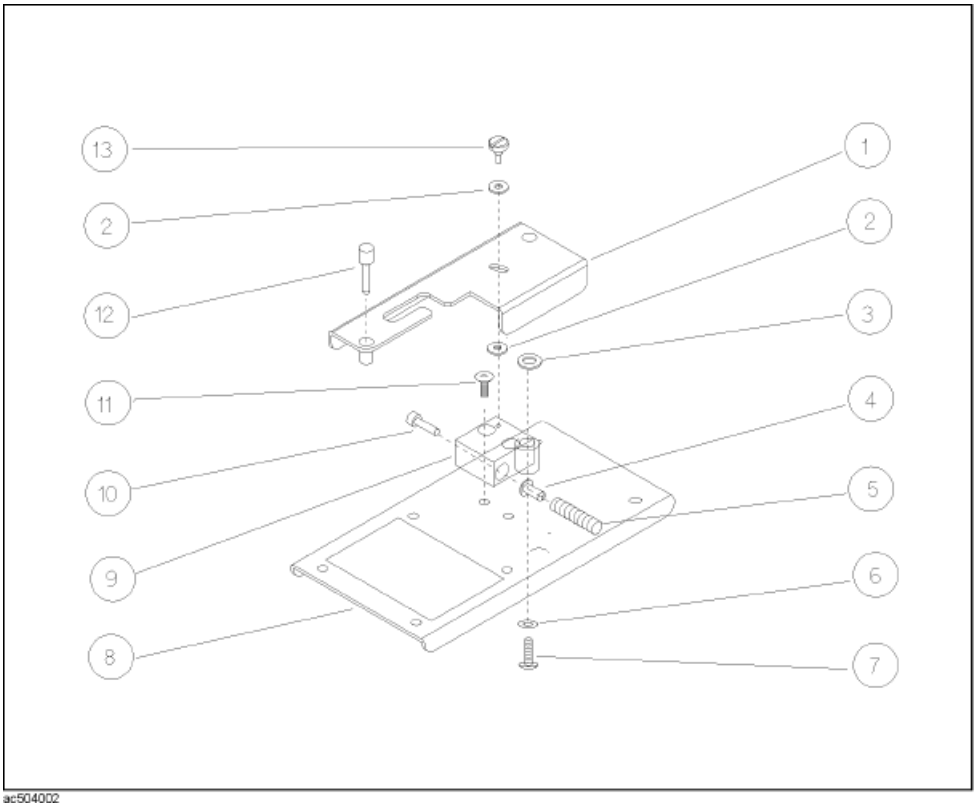


Table 4-2 Replaceable Parts around the Holder Aim Assembly

Reference Designator	Keysight Part Number	RoHS Compliant Replacement Part Number	Qty	Description
1	16194-01201	16194-01201	1	Arm
2	3050-1139	3050-1139	2	Washer, PTFE
3	16194-25003	16194-25003	1	Spacer
4	16191-24010	16191-24010	1	Pin
5	1460-2380	1460-2881	1	Spring
6	3050-0891	3050-0891	1	Washer
7	0515-1550	0515-0372	1	Screw, Pan Head, M3-L8
8	16194-00201	16194-00201	1	Fixture Chassis
9	16194-24008	16194-24008	1	Housing
10	0515-1052	0515-1052	1	Screw, Hex
11	0515-1550	0515-0372	2	Screw, Flat Head, M3-L6
12	16194-24009	16194-24009	1	Latch
13	16194-25004	16194-25004	1	Screw

Figure 4-3 Replaceable Parts for Test Stage

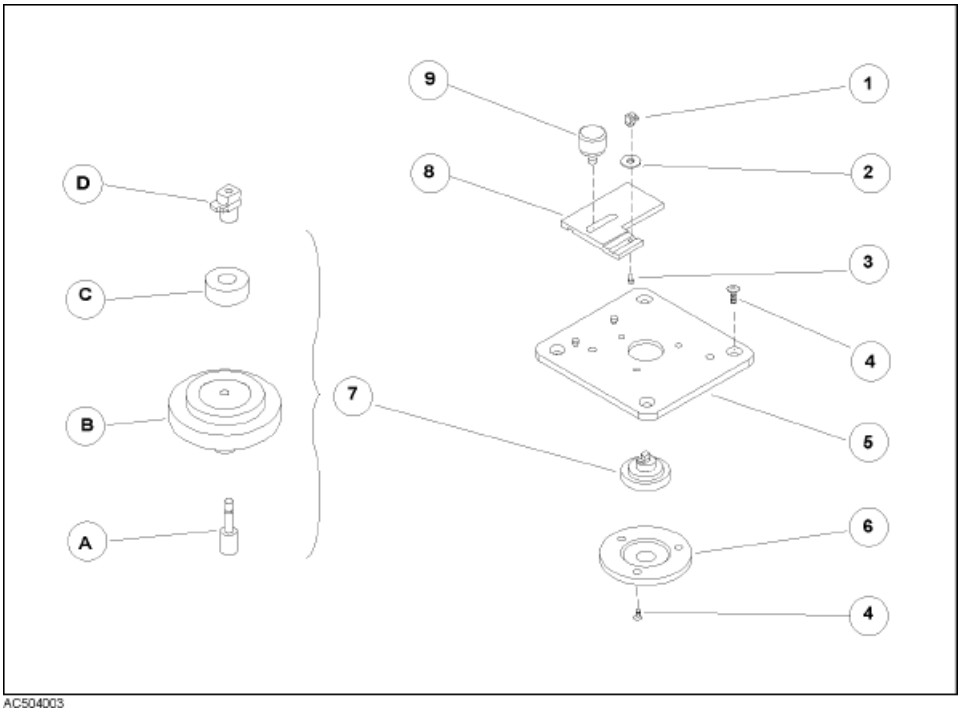


Table 4-3 Replaceable Parts for Test Stage

Reference Designator	Keysight Part Number	RoHS Compliant Replacement Part Number	Qty	Description
1	16194-24002	16194-24002	1	Electrode
2	3050-1139	3050-1139	1	Washer, PTFE
3	0515-2421	0515-5363	1	Screw, Pan Head, M1.4
4	0515-0914	0515-1946	7	Screw, Pan Head, M3
5	16194-20001	16194-20001	1	Test Stage
6	16453-24011	16453-24011	1	Flange
7	(not assigned)	(not assigned)	1	Center Conductor Assembly
8	16194-20002	16194-20002	1	Ground Plate
9	16194-24005	16194-24005	1	Knob
A	1250-0816	1250-0816	1	Contact of the APC-7® Center Pin
B	16453-60001	16453-60001	1	Bead Assembly
C	16194-25001	16194-25001	1	Insulator

Table 4-3 Replaceable Parts for Test Stage (Continued)

Reference Designator	Keysight Part Number	RoHS Compliant Replacement Part Number	Qty	Description
D	16194-24001	16194-24001	1	Contact of the Electrode

Replacement Procedure

This section covers the disassembling and assembling procedure of the center conductor assembly. See Table 4-3 for the reference designators.

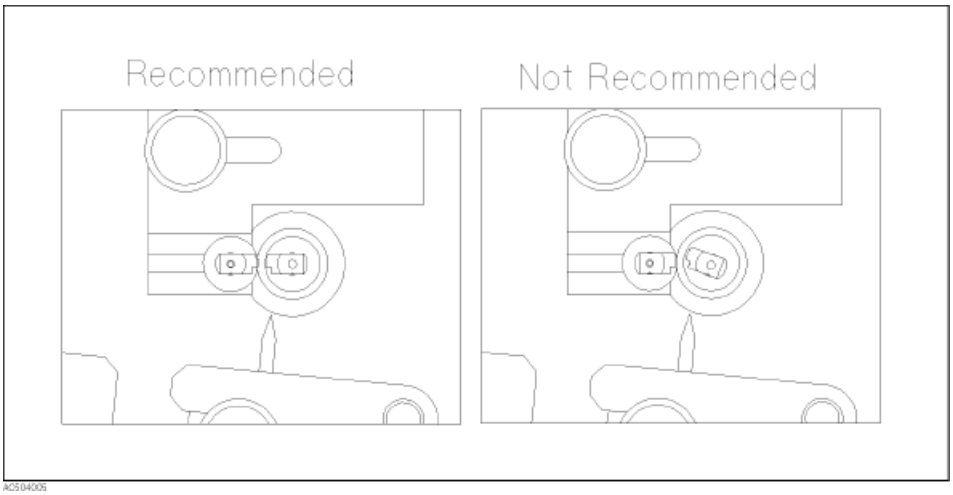
Disassembling Procedure

1. Remove the center conductor assembly ⑦ from the test stage ⑤.
2. Clamp the contact of the APC-7® Ⓐ using pliers which have rubber-covered noses.
3. Loosen the contact Ⓓ.

Assembling Procedure

1. Put thread sealant[1] to the screw part of the contact of the APC-7® Ⓐ.
2. Assemble the parts Ⓐ, Ⓑ, Ⓒ, and Ⓓ.
3. Set the angle of the contact assembly ⑦ as shown in Figure 4-4.

Figure 4-4 View Around the Electrode



1. Contact to a Keysight Technologies office for the part number of the thread sealant.

Troubleshooting

This section includes the procedure used to troubleshoot the 16194A.

Table 4-4 Required Equipment

Equipment	Recommended Model	Substitute Model
Impedance Analyzer	E4991B	E5061B with 16201A

Short and Open Impedance Check

1. Put the 2.4×2.4×3.2 mm Shorting Device (Keysight PN: 16194-29003) between the electrodes.
2. Place the fixture on the calibrated APC-7® terminal of the Impedance Analyzer.
3. Set the Impedance Analyzer as follows:

Measurement Parameter	Ls (series inductance)
Start Frequency	10 MHz
Stop Frequency	100 MHz
OSC Level	0.12 V
Number of Point	2
Point Averaging Factor	16
Point Averaging	ON

4. Perform a single sweep measurement.
5. Read the Ls value at 10 MHz and 100 MHz.
6. Keeping the electrode distance, remove the shorting device from the 16194A.
7. Set the Impedance Analyzer as follows:

Measurement Parameter	Cp (parallel capacitance)

8. Read the Cp value at 10 MHz and 100 MHz.:

The guideline for the short and open impedance value is as follows:

Table 4-5 Short and Open Impedance Value Guideline

Parameter	Frequency	Guideline (Absolute Value)
Short : Ls	10 MHz and 100 MHz	7 nH ± 4 nH
Open : Cp	10 MHz and 100 MHz	2.4 pF ± 0.5 pF

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