

HP 42942A Terminal Adapter

Operation and Service Manual

First Edition



HP Part No. 42942-90000

April 1999

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Manual Printing History

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Safety Summary

The following general safety precautions must be observed during all phases of operation, service, and repair of this instrument. Failure to comply with these precautions or with specific WARNINGS elsewhere in this manual may impair the protection provided by the equipment. In addition it violates safety standards of design, manufacture, and intended use of the instrument.

The Hewlett-Packard Company assumes no liability for the customer's failure to comply with these requirements.

NOTE

HP 42942A comply with INSTALLATION CATEGORY I and POLLUTION DEGREE 2 in IEC 1010-1. HP 42942A are INDOOR USE product.

- DO NOT Operate In An Explosive Atmosphere

Do not operate the instrument in the presence of flammable gasses or fumes. Operation of any electrical instrument in such an environment constitutes a definite safety hazard.

- **Keep Away From Live Circuits**

Operating personnel must not remove instrument covers. Component replacement and internal adjustments must be made by qualified maintenance personnel. Do not replace components with the power cable connected. Under certain conditions, dangerous voltages may exist even with the power cable removed. To avoid injuries, always disconnect power and discharge circuits before touching them.

- **DO NOT Service Or Adjust Alone**

Do not attempt internal service or adjustment unless another person, capable of rendering first aid and resuscitation, is present.

- **DO NOT Substitute Parts Or Modify Instrument**

Because of the danger of introducing additional hazards, do not install substitute parts or perform unauthorized modifications to the instrument. Return the instrument to a Hewlett-Packard Sales and Service Office for service and repair to ensure that safety features are maintained.

- **Dangerous Procedure Warnings**

Warnings, such as the example below, precede potentially dangerous procedures throughout this manual. Instructions contained in the warnings must be followed.

WARNING

Dangerous voltages, capable of causing death, are presenting this instrument. Use extreme caution when handling, testing, and adjusting this instrument.

Certification

Hewlett-Packard Company certifies that this product met its published specifications at the time of shipment from the factory. Hewlett-Packard further certifies that its calibration measurements are traceable to the United States National Institute of Standards and Technology, to the extent allowed by the Institution's calibration facility, or to the calibration facilities of other International Standards Organization members.

Warranty

This Hewlett-Packard instrument product is warranted against defects in material and workmanship for a period corresponding to the individual warranty periods of its component products. Instruments are warranted for a period of one year. Fixtures and adapters are warranted for a period of 90 days. During the warranty period, Hewlett-Packard Company will, at its option, either repair or replace products that prove to be defective.

For warranty service or repair, this product must be returned to a service facility designated by HP. Buyer shall prepay shipping charges to HP and HP shall pay shipping charges to return the product to Buyer. However, Buyer shall pay all shipping charges, duties, and taxes for products returned to HP from another country.

HP warrants that its software and firmware designated by HP for use with an instrument will execute its programming instruction when properly installed on that instrument. HP does not warrant that the operation of the instrument, or software, or firmware will be uninterrupted or error free.

Limitation Of Warranty

The foregoing warranty shall not apply to defects resulting from improper or inadequate maintenance by Buyer, Buyer-supplied software or interfacing, unauthorized modification or misuse, operation outside the environmental specifications for the product, or improper site preparation or maintenance.

IMPORTANT

No other warranty is expressed or implied. HP specifically disclaims the implied warranties of merchantability and fitness for a particular purpose.

Exclusive Remedies

The remedies provided herein are buyer's sole and exclusive remedies. HP shall not be liable for any direct, indirect, special, incidental, or consequential damages, whether based on contract, tort, or any other legal theory.

Assistance

Product maintenance agreements and other customer assistance agreements are available for Hewlett-Packard products.

For any assistance, contact your nearest Hewlett-Packard Sales and Service Office. Addresses are provided at the back of this manual.

Safety Symbol

General definitions of safety symbols used on the instrument or in manuals are listed below.



Instruction Manual symbol: the product is marked with this symbol when it is necessary for the user to refer to the instrument manual.



Alternating current.



Direct current.



On (Supply).



Off (Supply).



In position of push-button switch.



Out position of push-button switch.



Frame (or shassis) terminal. A connection to the frame (shassis) of the equipment which normally include all exposed metal structure.

WARNING

This warning sign denotes a hazard. It calls attention to a procedure, practice, condition or the like, which, if not correctly performed or adhered to, could result in injury or death to personnel.

CAUTION

This Caution sign denotes a hazard. It calls attention to a procedure, practice, condition or the like, which, if not correctly performed or adhered to, could result in damage to or destruction of part or all of the product.

NOTE

Note denotes important information. It calls attention to a procedure, practice, condition or the like, which is essential to highlight.

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Incoming Inspection

Inspect the shipping container for damage. If the shipping container or cushioning material is damaged, it should be kept until the contents of the shipment have been checked for completeness and the HP 42942A has been checked mechanically and electrically. The contents of the shipment should be as listed in Table 1-1. If the contents are incomplete, if there is mechanical damage or defect, notify the nearest Hewlett-Packard office. If the shipping container is damaged, or the cushioning material shows signs of unusual stress, notify the carrier as well as the Hewlett-Packard office. Keep the shipping materials for the carrier's inspection.

Table 1-1

Contents

Description	HP Part Number	Qty.
HP 42942A Terminal Adapter	-	1
OPEN ^a	04191-85302	1
SHORT ^a	04191-85300	1
LOAD ^a	04291-60043	1
Operation and Service Manual	42942-90000	1
Carrying Case	42942-60011	1

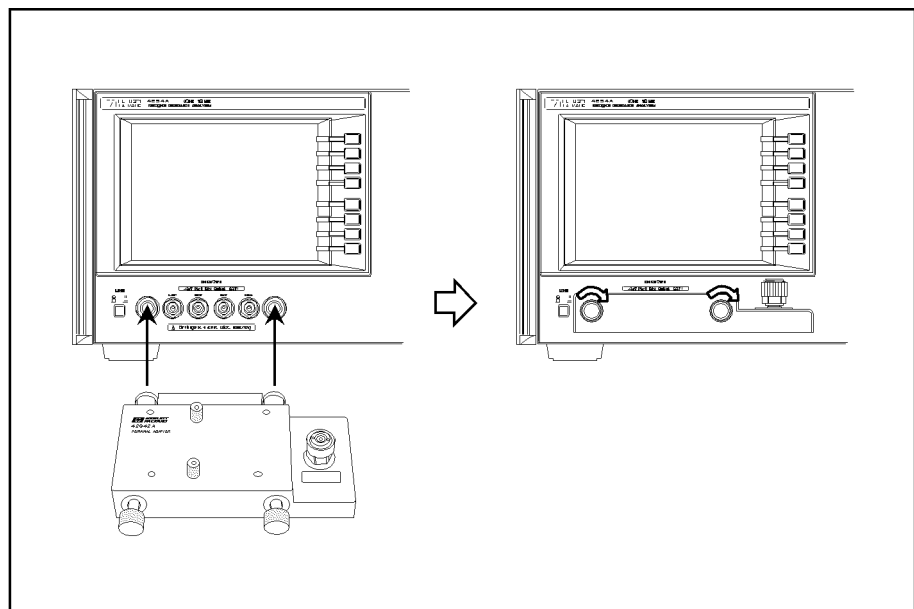
a. Not furnished with the Option 001.

Connecting the HP 42942A

Follow these steps below to connect the HP 42942A to the HP 4294A.

- Step 1.** Set the HP 42942A terminal adapter to the test connectors on the front panel of the HP 4294A by gradually coupling the four BNC connectors and fastening screws of the adapter with the test connectors and accessory mounting holes of the instrument until they come to complete contact.
- Step 2.** Turn clockwise the adapter's two fastening screws together, so that the fixture is secured to the instrument.

Figure 1-1 Connecting HP 42942A to HP 4294A



42942aoj0102

Cleaning

A tiny dirt on the 7-mm connector of the OUTPUT port would greatly degrade your measurement quality. Use lint-free cloth to clean the connector if it gets dirty.

Serial Number

Hewlett-Packard uses a two-part, nine-character serial number that is stamped on the serial number plate (see Figure 1-2) attached to the bottom of the adapter. The first four digits and the letter are the serial prefix and the last five digits are the suffix.

Figure 1-2

Serial Number Plate



Product Overview

The HP 42942A is an adapter that connects a test fixture furnished with the 7-mm coaxial connector to the HP 4294A Precision Impedance Analyzer.

Figure 2-1

Product Overview

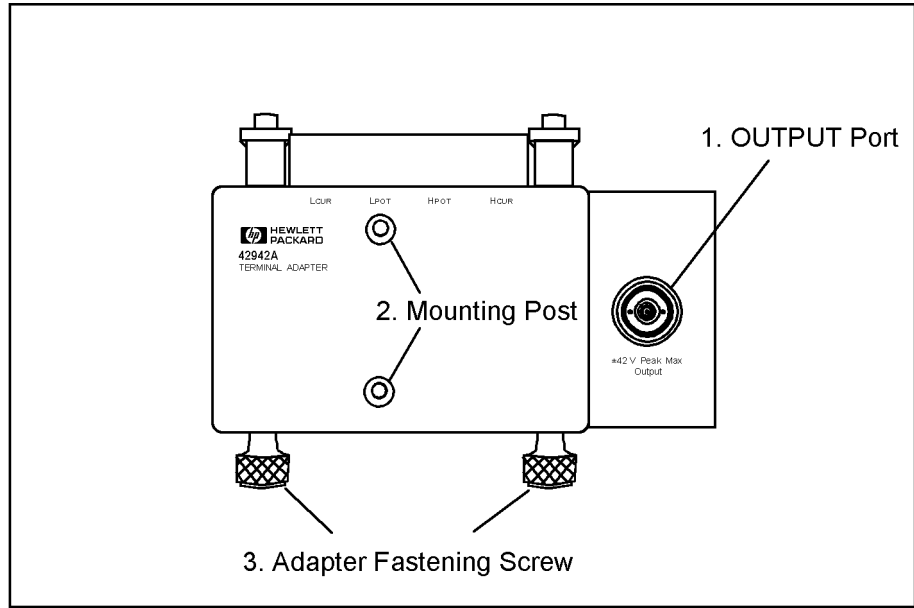


Functions

Figure 2-2 and Figure 2-3 show names of the parts of the HP 42942A and the accessories, respectively.

Figure 2-2

HP 42942A Parts



42942a0e0202

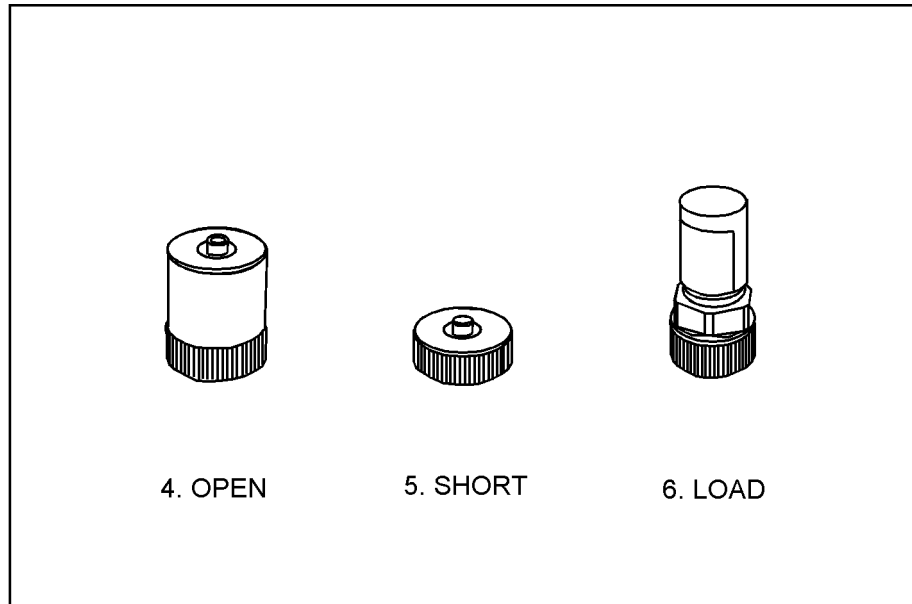
Table 2-1

HP 42942A Function

No.	NAME	FUNCTION
1	OUTPUT Port	Contact to the test fixture furnished with the 7-mm coaxial connector.
2	Mounting Post	Guide and support post for fixture connection.
3	Adapter fastening screws	Secures the fixture to the HP 4294A.

Figure 2-3

Accessories



42942aoj0203

Table 2-2

Accessories

No.	NAME	FUNCTION
4	OPEN	An open device (OPEN, 0S) used for the adapter setup.
5	SHORT	A short device (SHORT, 0W) used for the adapter setup.
6	LOAD	A load device (50 Ω) used for the adapter setup.

3 **Operation**

This chapter describes the proper methods for the adapter setup for the HP 42942A, connecting a fixture, and fixture compensation.

HP 4294A Setting

Before you begin your measurement, you should perform the adapter setup. Following procedure shows adapter setup for the HP 42942A. Also refer to the operation manual of the HP 4294A about the adapter setup.

CAUTION

When handling the HP 42942A, care must be taken not to give any mechanical shock, which may cause damage to the adapter. Never give any mechanical shock to the upper face having the 7-mm connector's mouth. Also, do not place the HP 42942A with the upper face down on the hard surface.

NOTE

If the ambient temperature deviates greater than 5°C from the temperature in which the adapter setup is done, it is recommended that you perform the adapter setup again in the current temperature.

Adapter Setup

Connect the HP 42941A to the HP 4294A and perform the adapter setup as described below.

1. Power on the HP 4294A. Allow 30 minutes or longer for warm-up.
2. Press **[Cal]** key to bring up the Calibration Menu.
3. Press **ADAPTER []** key to bring up the Adapter Setup Menu. [] should indicate current setups.
4. Select **7mm 42942A**. When selected, the softkey label will be underlined.
5. Press **SETUP** key to bring up the Adapter Setup Menu.
6. Turn clockwise the 7-mm connector of the OUTPUT port to make the connector sleeve fully exposed.

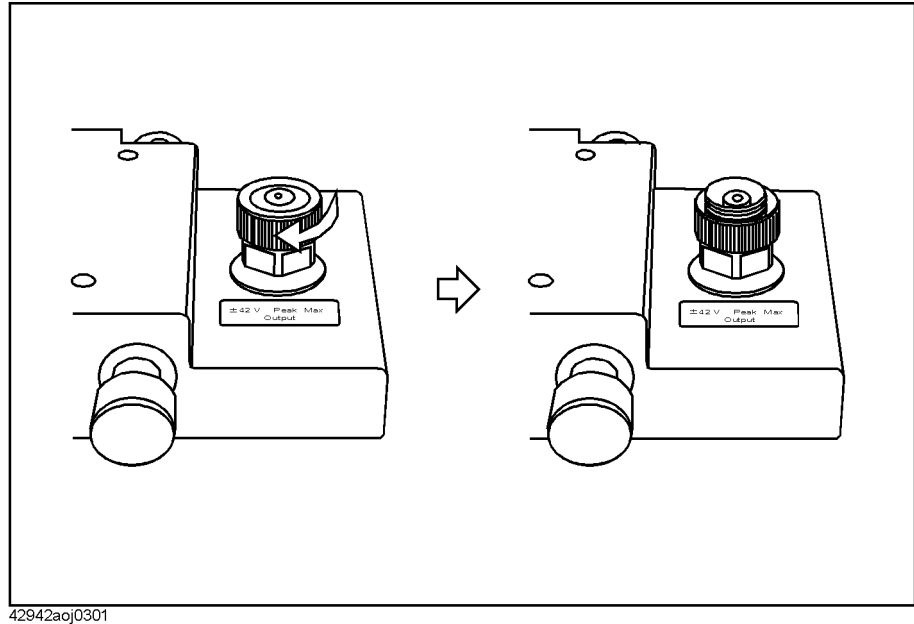
NOTE

A tiny dirt on the 7-mm connector of the OUTPUT port would greatly degrade your measurement quality. Keep the connector clean and never touch the mating plane surfaces. Use lint-free cloth to clean the connector if it gets dirty.

CAUTION

The 7-mm connector of the OUTPUT port is sensitive to damage thus requires careful handling. When not used, protect the mating plane surfaces with end caps.

Figure 3-1 Extending Connector Sleeve

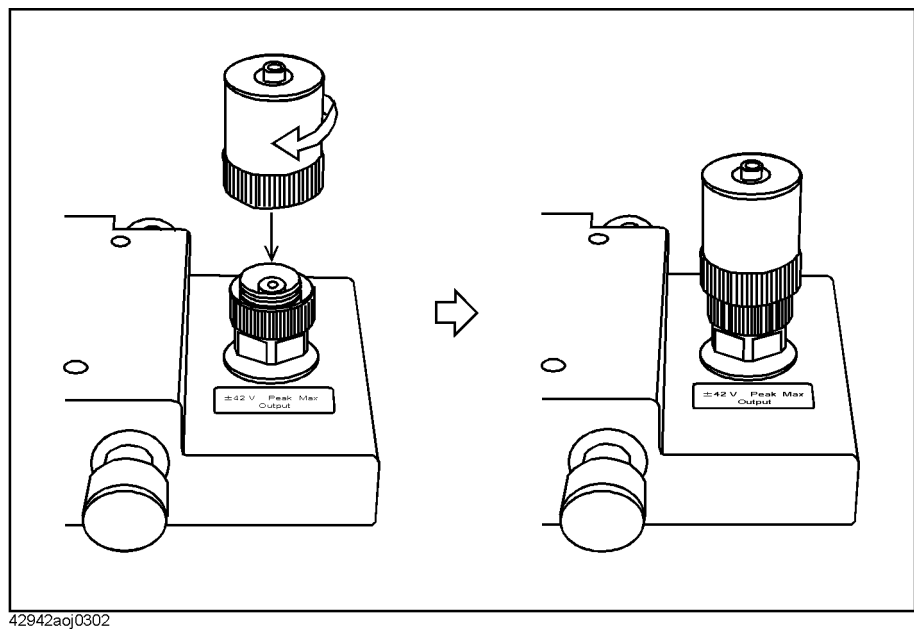


7. Connect the OPEN standard to the 7-mm port of the OUTPUT port.

CAUTION

Never store the OPEN standard loosely in the box or drawer, otherwise the mating plane surfaces will be damaged. Do not drop the OPEN, or give it any strong mechanical shock.

Figure 3-2 Connecting OPEN



8. Press **PHASE COMP [-]** key to start the phase compensation data measurement. When the phase compensation data measurement is completed, the softkey label

Operation
HP 4294A Setting

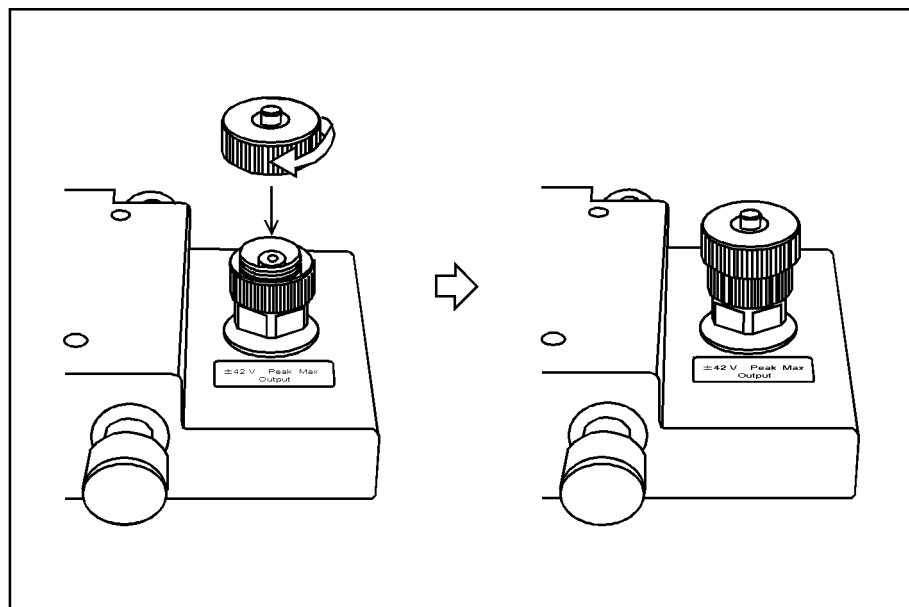
changes to **PHASE COMP [DONE]**.

9. Press **OPEN [-]** key to start open data measurement. When the open data measurement is completed, the softkey label changes to **OPEN [DONE]**.
10. Remove the OPEN standard and connect the SHORT standard to the 7-mm port.

CAUTION

Never store the SHORT standard loosely in the box or drawer, otherwise the mating plane surfaces will be damaged. Do not drop the SHORT, or give it any strong mechanical shock.

Figure 3-3 **Connecting SHORT**



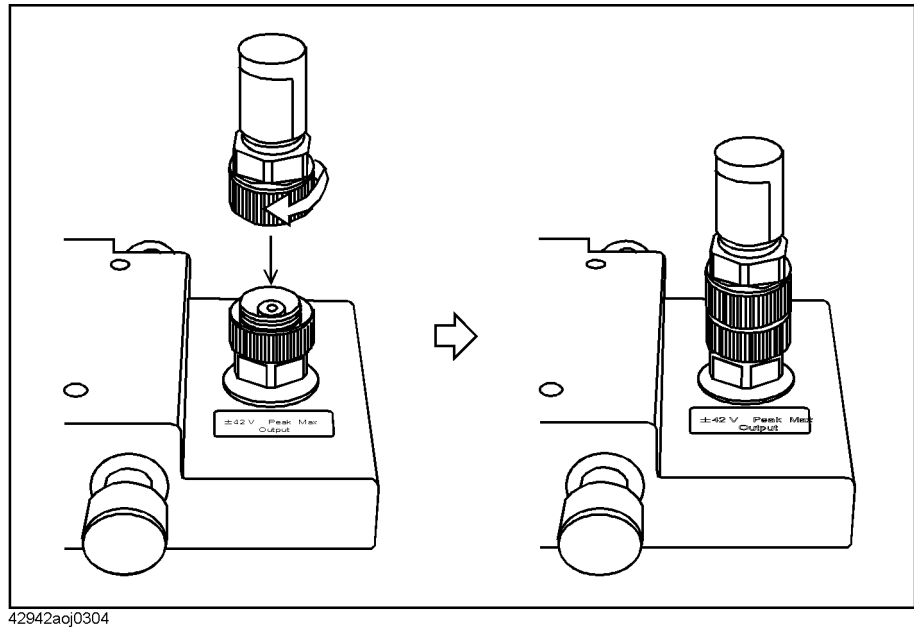
42942aoj0303

11. Press **SHORT [-]** key to start the short data measurement. When the short data measurement is completed, the softkey label changes to **SHORT [DONE]**.
12. Remove the SHORT standard from the 7-mm port of the HP 42941A. Then connect the LOAD standard to the 7-mm port.

CAUTION

Never store the LOAD standard loosely in the box or drawer, otherwise the mating plane surfaces will be damaged. Do not drop the LOAD, or give it any strong mechanical shock. When not used, protect the mating plane surfaces with end caps.

Figure 3-4 Connecting LOAD



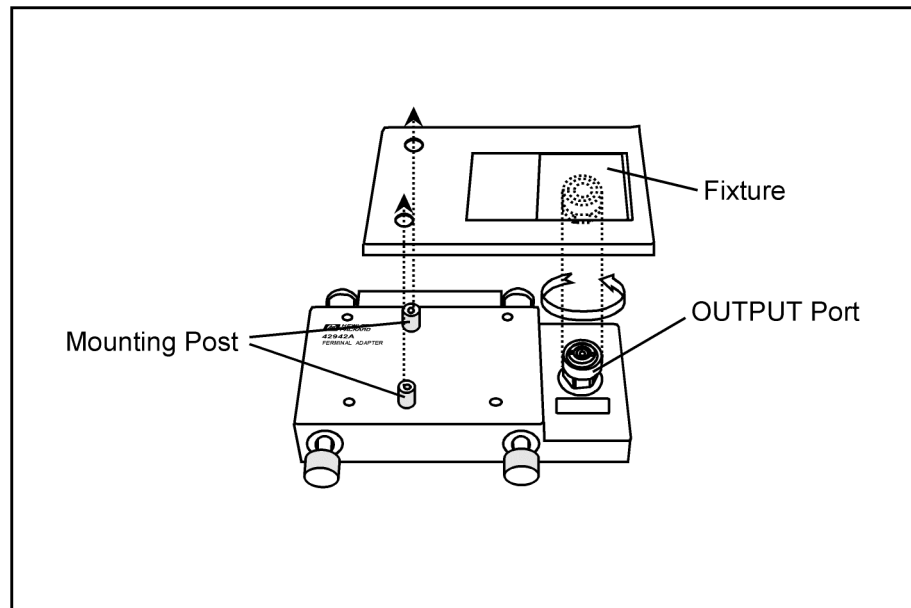
13. Press **LOAD [-]** key to start the load data measurement. When the load data measurement is completed, the softkey label changes to **LOAD [DONE]**.
14. Press **done** key.

Connecting Test Fixture

After the adapter setup, you can connect the test fixture to the terminal adapter. Refer to an appropriate manual that may come with the fixture for connection procedure. The connection procedure shown below is common to most fixtures.

1. Turn counterclockwise the 7-mm connector of the OUTPUT port on the terminal adapter to make the connector sleeve retracted fully.
2. Set the test fixture to the terminal adapter by keying the mounting posts and the OUTPUT port of the adapter.
3. Turn counterclockwise the 7-mm connector of the OUTPUT port on the terminal adapter to secure it to the connector on the lower side of the test fixture.

Figure 3-5 Connecting Test Fixture



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Fixture Compensation

To compensate residual impedance and admittance lying in the test fixture, perform fixture compensation. The fixture compensation requires measurements with the HP 42942A for open and short compensation data. Generally, there is no need to perform load compensation. About fixture compensation, refer to the HP 4294A Operation Manual.

NOTE

Electrical length is noted on the test fixture and its furnished manual. There is no need to set the electrical length in the HP 4294A using HP 42942A. Only OPEN/SHORT compensation will eliminate the error.

Performing Open Compensation

The following procedure shows the measurement for the open compensation data.

1. Be sure that the fixture is open, without any connection between the measurement terminals.
2. Press **[Cal]** key to bring up the Calibration Menu.
3. Press **FIXTURE COMPEN** key to bring up the Fixture Compensation Menu.
4. Press **OPEN** key to start OPEN compensation data measurement. When OPEN compensation data measurement is completed, the softkey label **OPEN on OFF** (if it is off) changes to **OPEN ON off**.

Performing Short Compensation

The following procedure shows the measurement for the short compensation data.

1. Set the terminal of the test fixture in the SHORT state. About shorting methods, refer to the manual that comes with the fixture.
2. Press **SHORT** key to start SHORT compensation data measurement. When SHORT compensation data measurement is completed, the softkey label **SHORT on OFF** (if it is off) changes to **SHORT ON off**.

Performing Load Compensation

Generally, there is no need to perform load compensation. If you have any standard device or you need to keep consistency in measured data, perform the load compensation using the device. When you perform load compensation, set a load value of the device to the instrument.

The following procedure shows the measurement for the short compensation data.

1. Connect the load device to the terminal of the test fixture. About connecting methods, refer to the manual that comes with the fixture.
2. Press **LOAD** key to start LOAD compensation data measurement. When LOAD

Operation
Fixture Compensation

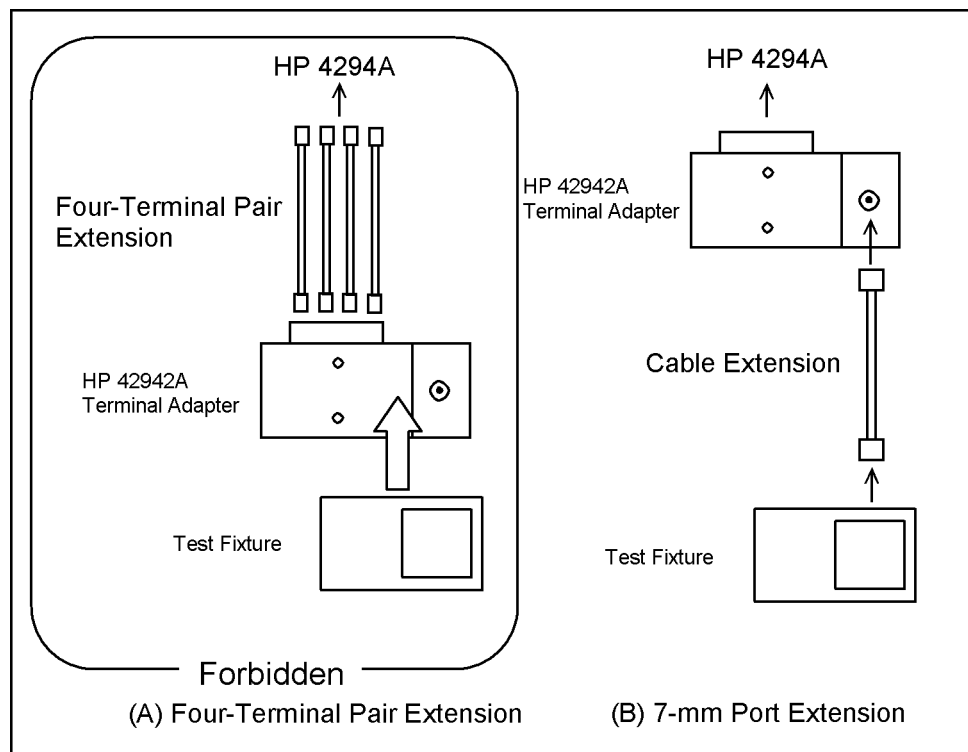
compensation data measurement is completed, the softkey label **LOAD on OFF** (if it is off) changes to **LOAD ON off**.

Fixture Extension

The HP 42942A is designed to connect directly to the HP 4294A for use. Thus, the measurement point on the four-terminal pair cannot be extended using four extension cables as shown in Figure 3-6 (A). The HP 42942A must be directly connected to the HP 4294A as shown in Figure 3-6 (B). For fixture extension, use a coaxial cable connected to the 7-mm port on the HP 42942A. Note that the HP 42942A's specified accuracy will no longer be assured with this extension. For calibration of the extended fixture, refer to the operation manual that comes with the HP 4294A.

Figure 3-6

Fixture Extension



42942ace0306

Operation
Fixture Extension

4 **Specifications**

This chapter provides specifications of the HP 42942A test fixture.

Specifications

Applicable Instruments		HP 4294A Precision Impedance Analyzer
Frequency		40 Hz to 110MHz
Maximum voltage		± 42V peak max. (AC+DC)
Operating Environment	temp.	0°C to +40°C
	humidity	15% to 95%RH(@ wet bulb temp. < 40°C)
Non Operating Environment.	temp.	-40°C to +70°C
	humidity	≤ 90 % RH (@ wet bulb temp. <65°C)
Dimension		300 (W) × 100 (H) × 280 (D) mm (Include carrying case)
Weight		2300g (HP 42942A body 800g)
Safety Standards		EN61010-1:1993 +A2:1995 IEC61010-1:1990 +A1:1992 +A2:1995 CSA C22.2 No.1010.1:1992 INSTALLATION CATEGORY I POLLUTION DEGREE 2 INDOOR USE

About impedance measurement accuracy at 3.5-mm port and additional error, refer to the HP 4294A Operation Manual.

Table 5-1 Replacable Parts (part 1 of 2)

Reference Designator	HP Part No.	Qty.	Description
1	42942-24007	2	SHAFT
2	0510-0083	2	RTNR-R
3	-	2	SPRING
4	42941-40002	2	BUSHING
5	1253-0476	4	ADPT BNC-SMB
6	3050-0067	4	WSHR-FL MTLC
7	3050-0789	4	WSHR-FL NM
8	2950-0054	2	TNUT-HEX-DBL-CHAM
9	2190-0054	2	WSHR-LK INTL
10	42942-00602	1	COVER BOTTOM
11	16047-40002	4	INSULATOR
12	0515-0914	2	SCR-MACH M3X0.5
13	42941-25002	2	SLEEVE
14	42942-25006	1	BNC-GUIDE
15	42941-24003	2	GUIDE
16	42942-00603	1	COVER
17	0515-0914	2	SCR-MACH M3X0.5
18	0515-1551	2	SCR M3-L 10 P-H

Figure 5-2 Replacable Parts (part 2 of 2)

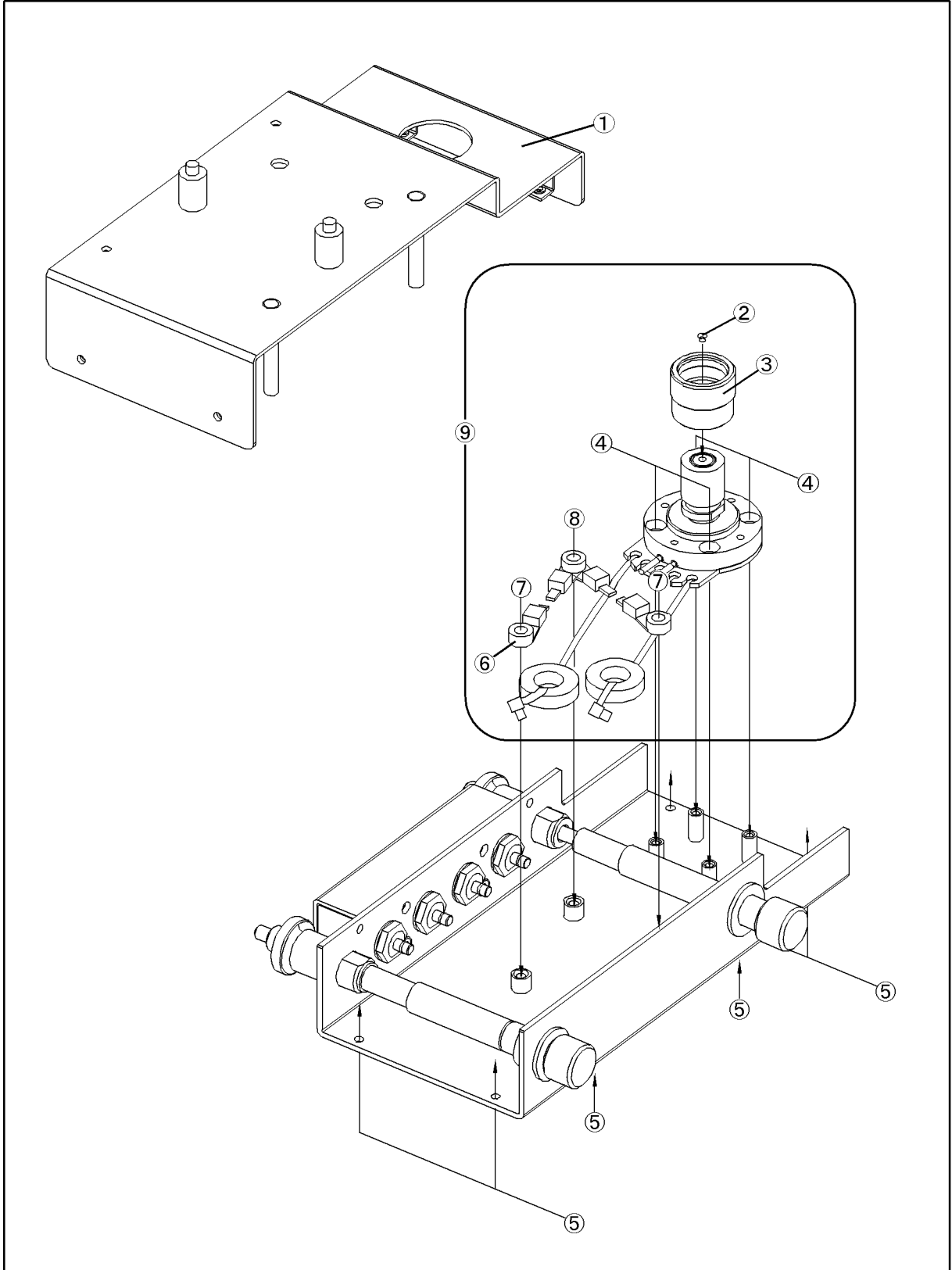


Table 5-2 Replacable Parts (part 2 of 2)

Reference Designator	HP Part No.	Qty.	Description
1	42942-00601	1	COVER TOP
2	1250-0907	1	CONTACT CENTER
3	1250-1466	1	CONN-RF 7mm
4	0515-1550	4	SCR M3-L 8 P-H
5	0515-0914	6	SCR-MACH M3X0.5
6	1400-0719	4	CABLE TIE
7	0515-1719	2	SCR M4X10
	3050-0893	2	WSHR-FL
8	0515-1718	1	SCR M4X12
	3050-0893	1	WSHR-FL
9	42942-60001	1	7mm ASSY (exclude 4.6.7.8)

Service
Maintenance