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Agilent 16047D TEST FIXTURE
Operation and Service Manual

Manual Change

Agilent Part No. N/A

November 2008

Change 2

Change the part number in Table 2-1 in Page 18, and add footnote to Item 31.

Table 2-1. Replaceable Parts List

Reference Designator	Agilent Part Number	Quantity	Description
1	16047-04014	1	BOTTOM COVER
2	2950-0043	4	NUT
3	2190-0016	4	WASHER
4	0515-1467	2	SCREW
5	16061-50022	1	BASE
6	16047-60016	2	CONNECTOR-BNC
7	16012-7122	2	BNC ASSY.
8	16047-40000	1	STOPPER
9	2190-0206	1	WASHER
10	0515-1550	1	SCREW
11	0515-0914	2	SCREW
12	16047-04012	1	TOP COVER
13	0515-0914	2	SCREW
14	16047-00619	1	SHIELD PLATE
15	16061-50024	2	SOCKET
16	16061-50031	2	SOCKET-RADIAL
17	16061-10031	4	CONTACT-RADIAL
18	16047-60003	1	CONTACT ASSY
19	16047-60004	1	CONTACT ASSY
20	16061-10026	2	CONTACT
21	16061-10033	2	CONTACT-AXIAL
22	16061-10032	2	CONTACT-AXIAL
23	16061-50032	2	SOCKET-AXIAL
24	16047-00604	2	CONTACT-RADIAL (SHORT)
25	16047-00605	2	CONTACT-RADIAL (SHORT)
26	16047-40001	2	SOCKET-RADIAL (SHORT)
27	16061-70021	2	RADIALSOCKET ASSEMBLY
28	16061-70022	2	AXIAL SOCKET ASSEMBLY

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29	16047-65001	2	RADIAL SOCKET ASSEMBLY
30	1460-2116	4	SPRING
31	5000-4226	1	Short Bar[1]

1 This short bar is not included in 16047D. It is prepared as option of 16047D. Option number is 16047D-701.

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Agilent 16047D Test Fixture

Operation and Service Manual

Third Edition

Agilent Technologies Japan, Ltd.

Agilent PN 16047-90300



May 2000

Printed in Japan

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Manual Printing History

The manual's printing date and part number indicate its current edition. The printing date changes when a new edition is printed. (Minor corrections and updates that are incorporated at reprint do not cause the date to change.) The manual part number changes when extensive technical changes are incorporated.

November 1985	First Edition (part number : 16047-90300)
August 1999	Second Edition (part number : 16047-90300)
May 2000	Third Edition (part number : 16047-90300)

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 Agilent Technologies assumes no liability for the customer's failure to comply with these requirements.

NOTE 16047D comply with INSTALLATION CATEGORY I and POLLUTION DEGREE 2 in IEC61010-1. 16047D are INDOOR USE product.

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- Ground The Instrument

  To avoid electric shock hazard, the instrument chassis and cabinet must be connected to a safety earth ground by the supplied power cable with earth blade.

- 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 Agilent Technologies 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

Agilent Technologies certifies that this product met its published specifications at the time of shipment from the factory. Agilent Technologies 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.

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

Limitation Of Warranty

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Assistance

Product maintenance agreements and other customer assistance agreements are available for Agilent Technologies products.

For any assistance, contact your nearest Agilent Technologies 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.

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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1 Operation

This operation note provides the information necessary to use and service the 16047D Test Fixture. Specifications are given in Table 1-2, the test fixture is shown in Figure 1-1, and the dimensions of the contacts are shown in Table 1-2. Table 2-1 is a list of part numbers and is used for parts identification.

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Product Description

The 16047D is a direct-attachment test fixture used for the general purpose measurement of axial and radial lead components. Three kinds of contact inserts are furnished to simplify connections. The 16047D connects directly to the UNKNOWN input terminals of Agilent Technologies's 4-terminal pair impedance measurement instruments, and converts the 4-terminal pair configuration to a 2-terminal Configuration.

Figure 1-1 shows three contact inserts. Contact assembly (1) is used for axial lead component measurements. For radial lead component measurements contact assemblies (2) or (3) are used. These parts number is listed in Table 1-1. Table 1-2 shows the dimensions of the contact inserts. The two-pair sockets of the contact assembly (1) can be configured three ways to match a component's lead length.

Figure 1-1 **16047D Test Fixture**

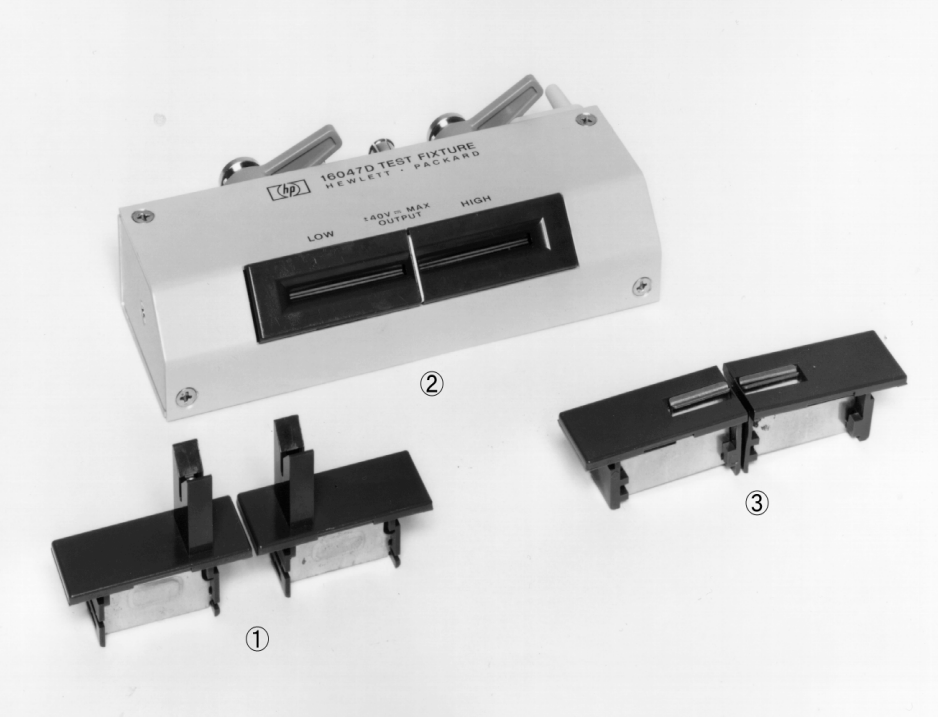


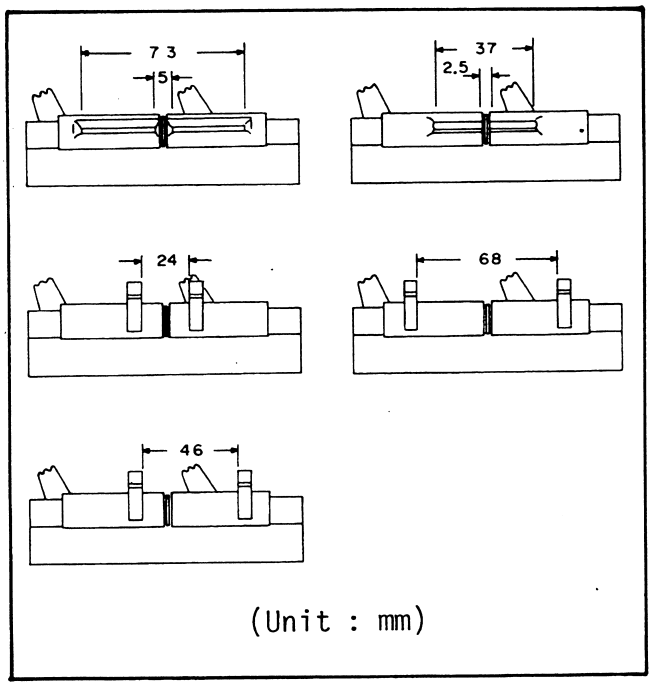
Table 1-1 **Part number**

	Agilent Part No.
1	16061-70022
2	16061-65001
3	16047-70021

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Specifications

Table 1-2 **Specifications of the 16047D**

Function:	For use with 4 terminal-pair LCR Meters and Impedance Analyzers.
Measurable components:	Axial and radial lead components.
Contact Inserts:	Three kinds: one for axial lead components, one for radial lead components, and one for radial short lead components.
Dimensions of Test Fixture Contacts:	
Frequency:	100 Hz to 40 MHz
Maximum Voltage:	± 40 V peak max. (AC+DC)
Dimensions of test fixture:	l24 (W) × 3l (D) × 62 (H) mm
Weight:	230 g
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

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Typical Characteristics

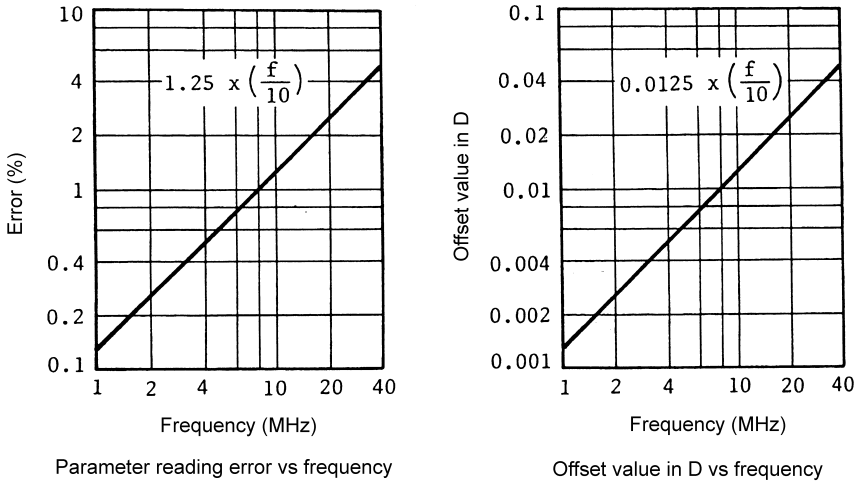
NOTE

Here, f is the test frequency in MHz. The incremental errors calculated from the equations given in this table are additive when measurements are made above l MHz. The incremental error is applicable after completion of the Open/Short compensation.

Table 1-3 **Typical characteristics**

Incremental Error at f ≥1MHz	
Parameter reading error	Offset Value for D
$\pm 1.25 \times \left(\frac{f}{10}\right)$	$\pm 0.0125 \times \left(\frac{f}{10}\right)^2$

Figure 1-2



Parameter reading error vs frequency

Offset value in D vs frequency

Table 1-4 **Uncertainty of residual impedance**

Frequency range: DC to 40 MHz	C < 0.1 pF
	L < 1 nH
	R < 0.1 Ω

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Compensation for Fixture Residual Impedance Error

The 16047D has inherent stray capacitance, residual inductance, and residual resistance that affect the accuracy of measured values. To compensate for, or negate, these residuals to minimize measurement error, the instrument's Open/Short compensation procedure should be performed. The procedure is given in the instrument's operating manual.

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2 Service

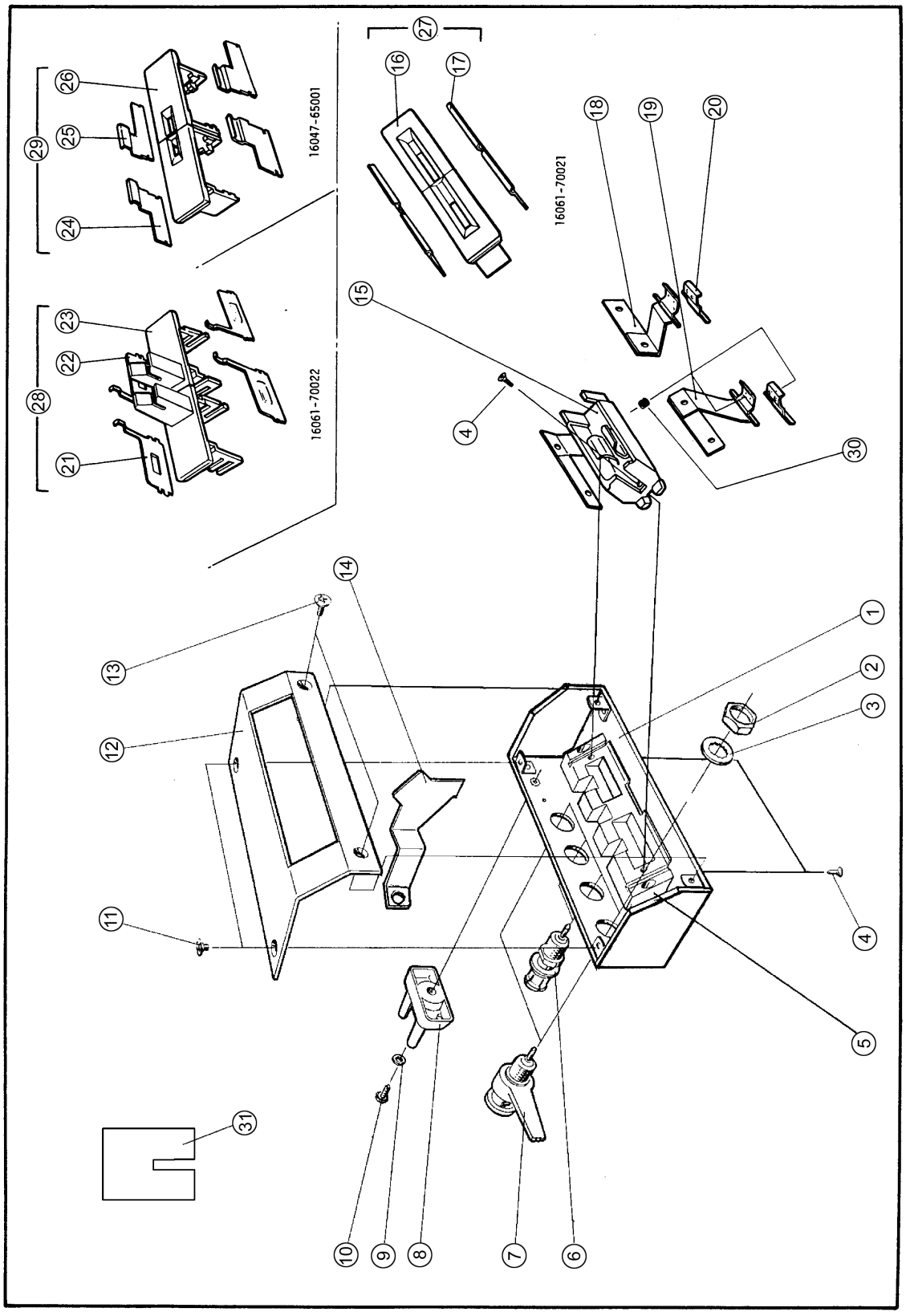
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Maintenance

Figure 2-1 shows an exploded view of the 16047D test fixture and a list of the replaceable parts. Do not disassemble the unit any further than shown. Maintenance consists principally of cleaning the contacts and replacing worn or damaged parts. Take special care when cleaning contacts. When ordering parts, use the Agilent part numbers listed in Table 2-1. If a faulty part is located in an assembly that can not be disassembled, order the next higher assembly or return the whole device to the nearest Agilent Technologies Sales/Service Office for repair or replacement. Note that part numbers 25 and 26 (Contact Assy.) are soldered assembles.

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Figure 2-1 Parts Identification



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Table 2-1 **Replaceable Parts List**

Reference	Agilent Part No.	Qty.	Description
1	16047-04014	1	BOTTOM COVER
2	2950-0043	4	NUT
3	2190-0016	4	WASHER
4	0515-1467	4	SCREW
5	16061-50022	1	BASE
6	1250-1798	2	BNC CONNECTOR
7	16012-7122	2	BNC ASSY.
8	16047-40000	1	STOPPER
9	2190-0206	1	WASHER
10	0515-1550	1	SCREW
11	0515-0914	2	SCREW
12	16047-04012	1	TOP COVER
13	0515-0914	2	SCREW
14	16047-00619	1	SHIELD PLATE
15	16061-50024	2	SOCKET
16	16061-50031	2	SOCKET-RADIAL
17	16061-10031	4	CONTACT-RADIAL
18	16047-60003	1	CONTACT ASSY.
19	16047-60004	1	CONTACT ASSY.
20	16061-10026	2	CONTACT
21	16061-10033	2	CONTACT-AXIAL
22	16061-10032	2	CONTACT-AXIAL
23	16061-50032	2	SOCKET-AXIAL
24	16047-00604	2	CONTACT.RADIAL (SHORT)
25	16047-00605	2	CONTACT-RADIAL (SHORT)
26	16047-40001	2	SOCKET-RADIAL (SHORT)
27	16061-70021	2	RADIAL SOCKET ASSY.
28	16061-70022	2	AXIAL SOCKET ASSY.

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Reference	Agilent Part No.	Qty.	Description
29	16047-65001	2	RADIAL SOCKET ASSY. (SHORT)
30	1460-2116	4	SPRING
31	5000-4226	1	SHORT BAR

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