Keysight 16047A Test Fixture

Operation and
Service Manual

KEYSIGHT
TECHNOLOGIES

Notices

Trademark Acknowledgments

Manual Part Number

16047-90011

Print Date

April 2017

Printed by Keysight Technologies

International Japan GK, 1-3-3 Higashikawasaki-cho, Chuo-ku, Kobe-shi, Hyogo, Japan

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 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 WILL 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.

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 Operation

Introduction

This chapter provides complete information of the 16047A Test Fixture.

If you have any questions after reviewing this information, please contact your local Keysight Technologies Inc. representative or contact us through our support Website at http://www.keysight.com/support.

Product Description

The 16047A Test Fixture is designed for use with 4 terminal-pair LCR Meters and Impedance Analyzers..

It is a direct attachment,4-terminal pair configuration type test fixture for measurements on both axial and radial lead components. Three contact inserts (labeled 1, 2, and 3 in Figure 1-1) are available: (1), for measurements on axial components and (2) and (3), for measurements on radial lead components. These parts number is listed in Table 1-1. The dimensions of the contact inserts are given in Table 1-2.

Figure 1-1 16047A Test Fixture

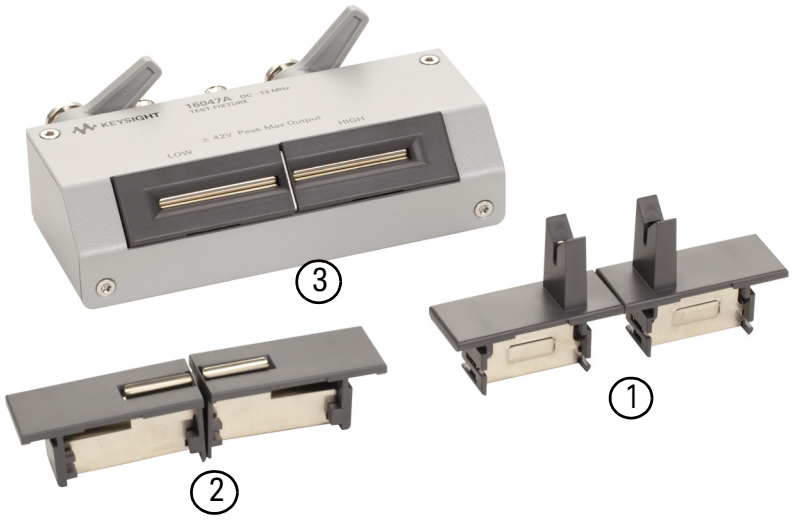
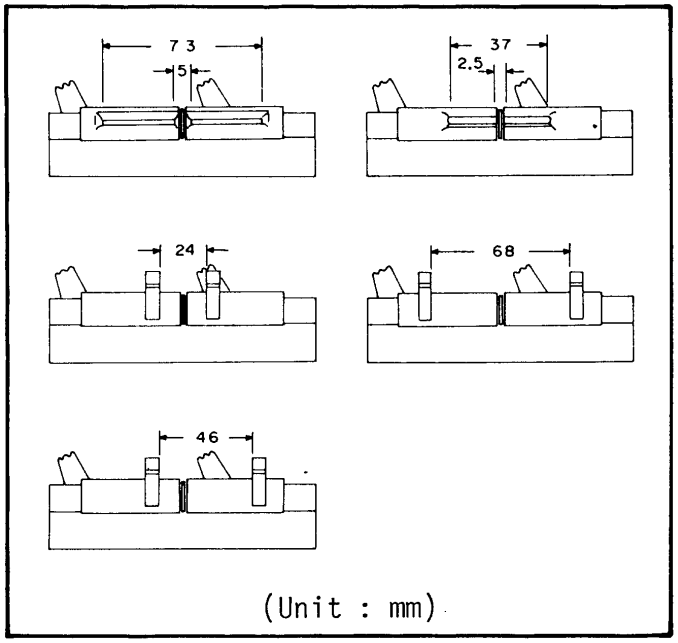


Table 1-1 Parts Number

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

Specifications

Table 1-2 Specification of the 16047A

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:	≤ 13 MHz
Maximum Voltage:	± 40V peak max. (AC+DC)
Dimensions of test fixture:	124 (W) ´ 31 (D) ´ 62 (H) mm
Weight:	205 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

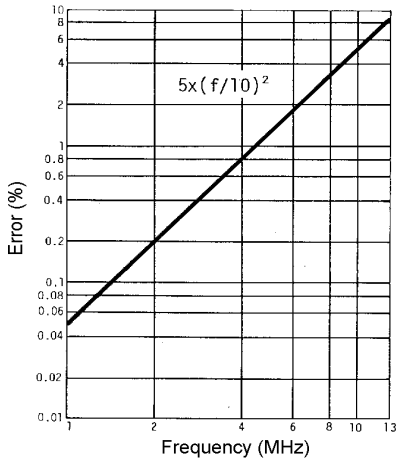
Typical Characteristics

Table 1-3 Typical characteristics

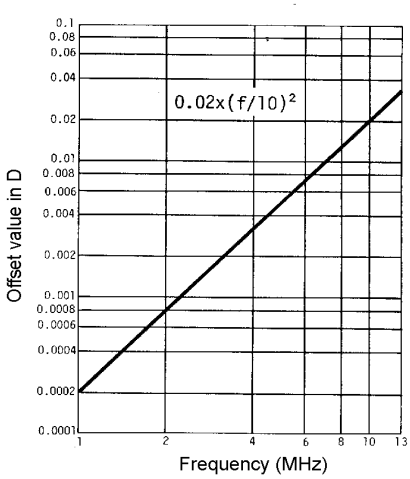
Incremental Error at f 1 ≤ MHz	
Parameter reading error	Offset Value for D
$\pm 5 \times \left(\frac{f}{10}\right)^2$	$\pm 0.02 \times \left(\frac{f}{10}\right)^2$

NOTE f is the measurement frequency in MHz. The incremental errors calculated from the equation in the table for measurements at frequencies above l MHz are additive.

Figure 1-2 Incremental error at frequency above 1 MHz



Parameter reading error vs frequency

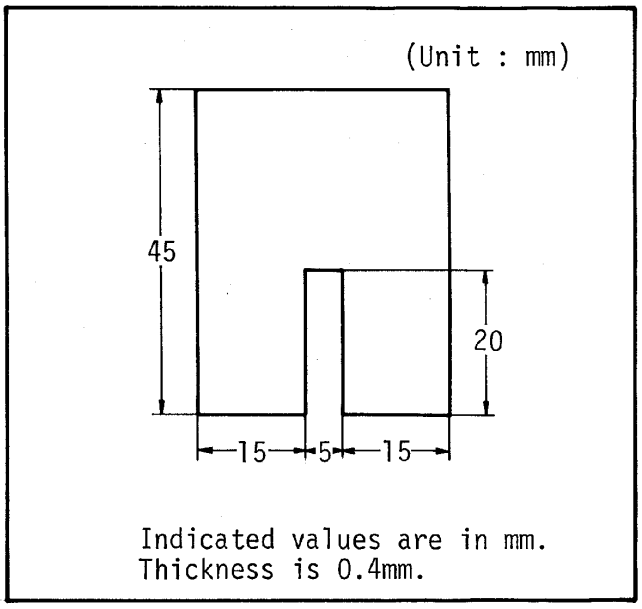


Offset value in D vs frequency

Compensation for Fixture Residual Impedance Error

The 16047A 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. For SHORT compensation a low impedance copper or phosphor bronze shorting bar such as the one shown in Figure 1-3 is recommended.

Figure 1-3 Shorting-bar dimensions



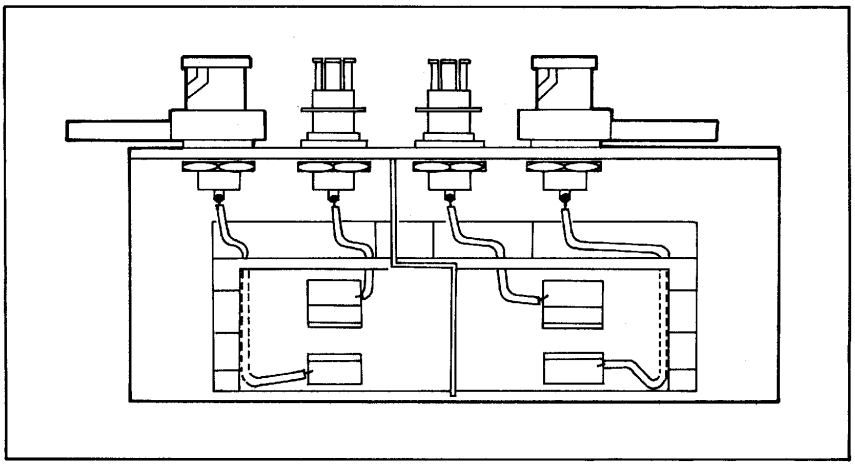
2 Service

Maintenance

The internal wiring of the 16047A is shown in Figure 2-1. Due to the non-RoHS conversion, there are two repair/replacement solution provided to fit two different generation of 16047A. The details of the replacement/repair is stated in "For non-RoHS 16047A (Serial Prefix: MY/SG441)" on page 12 and "For RoHS 16047A (Serial Prefix: MY/SG442 and above)" on page 16. Do not disassemble any further than shown in exploded view (for parts identification). Maintenance consists principally of cleaning contacts and replacing worn or damaged parts. Take special care when cleaning contacts. To order parts, use the Keysight Technologies part numbers listed in Table 2-1 and table Table 2-2. If a faulty part is located in an assembly that cannot be disassembled, order the next higher assembly or return the whole device to the nearest Keysight Technologies Sales/Service Office for repair or replacement.

Serial number for non-RoHS 16047A:
MY44100001-MY44199999/SG44100001-SG44199999
Serial number for RoHS 16047A:
MY44200001-MY44299999/SG44200001-SG44299999 and above

Figure 2-1 Internal Wiring of 16047A



For non-RoHS 16047A (Serial Prefix: MY/SG441)

The supported parts and their respective RoHS compliant replacement parts are shown in Figure 2-2. RoHS conversion involves with design and dimension change which result in the RoHS support part backward incompatible with non-RoHS 16047A. Special handling is needed while using the RoHS replacement part on non-RoHS 16047A. The original support part number is replaced by the “RoHS Compliant Replacement Part” in Table 2-1.

Figure 2-2 Parts Identification

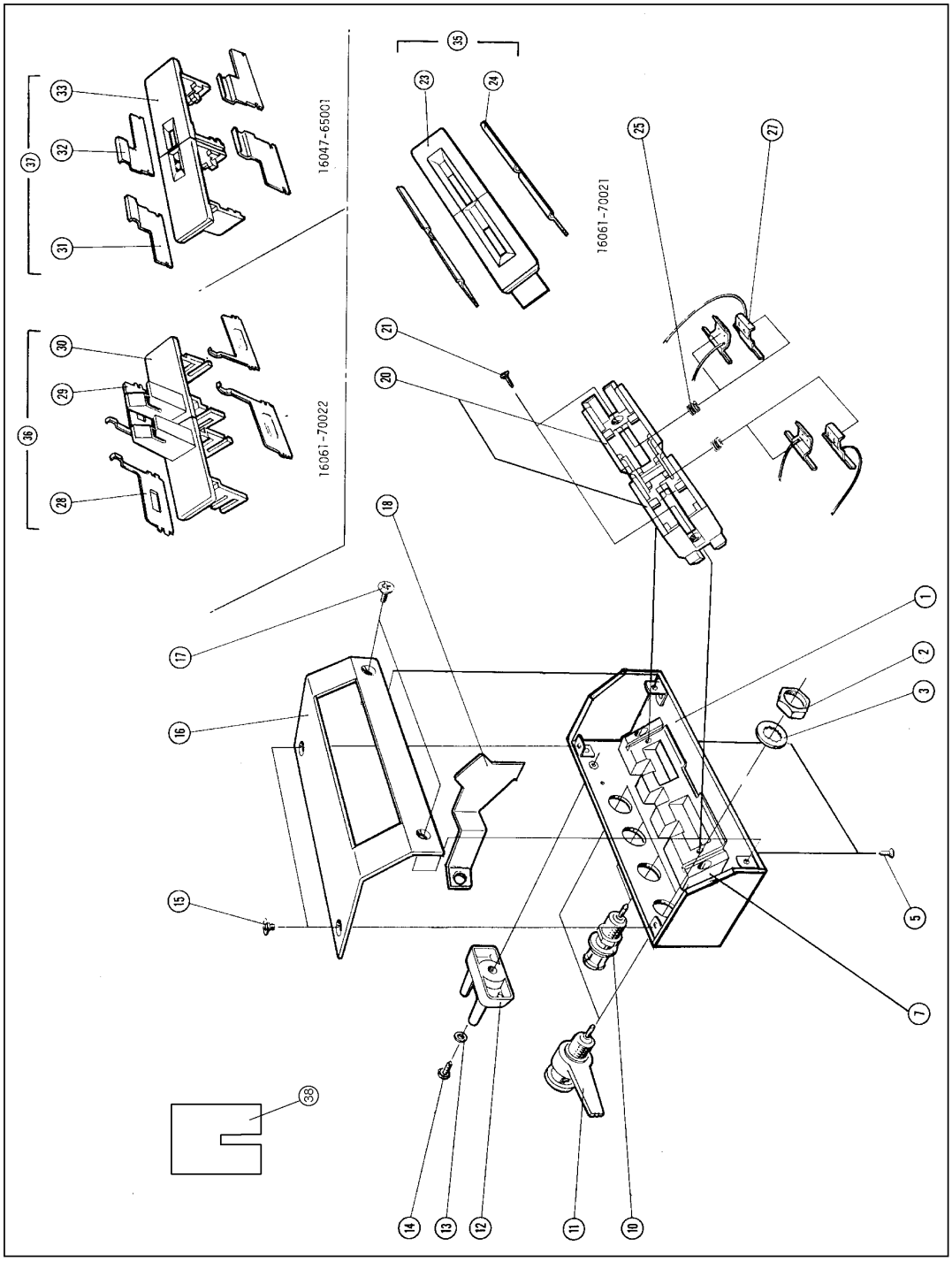


Table 2-1 Replaceable Parts List

Reference	Keysight Non-RoHS Part No	QTY	Description	RoHS Compliant Replacement Part No	QTY
1	16047-04013	1	COVER-BOTTOM	16047-04043	1
2	2950-0043	4	NUT	2950-0043	4
3	2190-0016	4	WASHER	2190-0016	4
5	0515-1467	2	SCREW	0515-5520	2
7	16061-50022	1	BASE	16061-50022	1
10	16047-60016	2	CONNECTOR-BNC	5012-8628	2
11	16012-7122	2	CONNECTOR-BNC	5012-8617	2
12	16047-40000	1	STOPPER	Not used	-
13	2190-0206	1	WASHER	Not used	-
14	0515-1550	1	SCREW	Not Used	-
15	0515-0914	2	SCREW	0515-1227	2
16	16047-04011	1	COVER-TOP	16047-04041	1
17	0515-0914	2	SCREW	0515-1227	2
18	16047-00618	1	SHIELD PLATE	16047-00618	1
20	16061-50024	2	SOCKET	16061-50024	2
21	0515-1467	2	SCREW	0515-5520	2
23	16061-50031	2	SOCKET-RADIAL	16061-50031	2
24	16061-10031	4	CONTACT-RADIAL	16061-10031	4
25	1460-0343	4	SPRING	1460-0343	4
27	16061-10026	4	CONTACT	16061-10026	4
28	16061-10033	2	CONTACT AXIAL	16061-10033	2
29	16061-10032	2	CONTACT AXIAL	16061-10032	2
30	16061-50032	2	SOCKET-AXIAL	16061-50032	2
31	16047-00604	2	CONTACT	16047-00604	2
32	16047-00605	2	CONTACT	16047-00605	2
33	16047-40001	2	SOCKET	16047-40001	2

Table 2-1 Replaceable Parts List

Reference	Keysight Non-RoHS Part No	QTY	Description	RoHS Compliant Replacement Part No	QTY
35	16061-70021	2	SOCKET ASSEMBLY (23 and 24)	16061-70021	2
36	16061-70022	2	SOCKET ASSEMBLY (28, 29 and 30)	16061-70022	2
37	16047-65001	2	SOCKET ASSEMBLY (31, 32 and 33)	16047-65001	2
38	5000-4226	1	Short Bar[a]	16047-00640	1

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

For RoHS 16047A (Serial Prefix: MY/SG442 and above)

Figure 2-3 shows the support parts for RoHS compliance 16047A Test Fixture for Axial and Radial Lead Components. All the listed items are changed at RoHS conversion. Due to limited availability of RoHS compliance station and technical difficulties in RoHS soldering, only parts and support level that do not require RoHS soldering are supported.

Figure 2-3 Parts Identification for RoHS 16047A

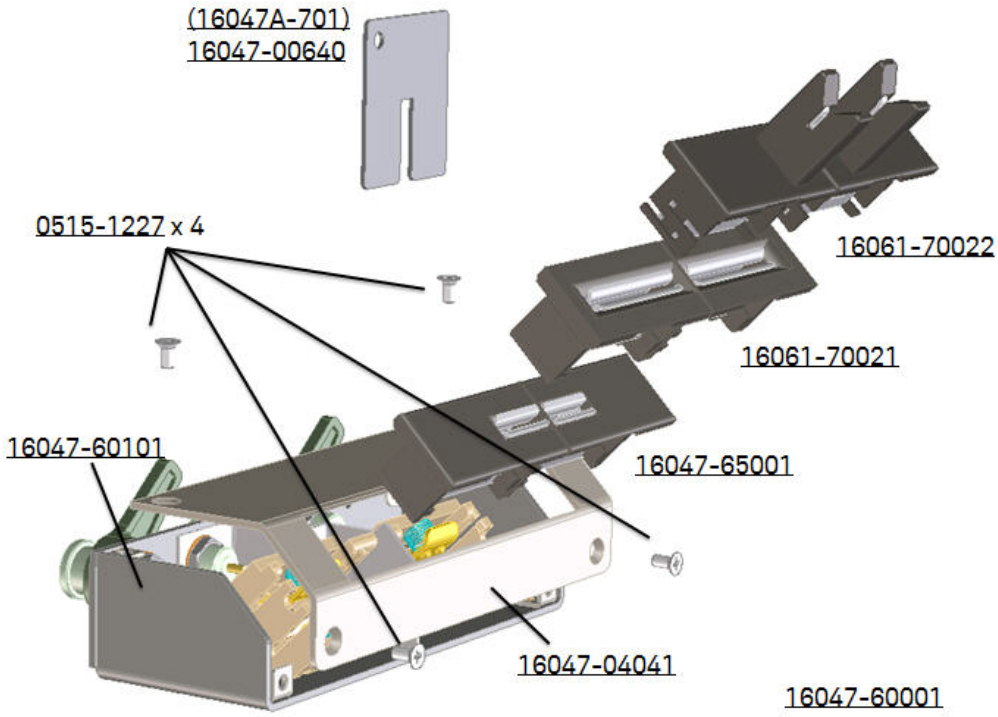


Table 2-2 Support parts for RoHS compliance 16047A

Reference	Keysight RoHS Part No	QTY	Description
15	0515-1227	2	SCREW
16	16047-04041	1	COVER-TOP
17	0515-1227	2	SCREW
35	16061-70021	2	SOCKET ASSEMBLY (23 and 24)
36	16061-70022	2	SOCKET ASSEMBLY (28, 29 and 30)
37	16047-65001	2	SOCKET ASSEMBLY (31, 32 and 33)
38	16047-00640	1	Short Bar[a]

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

Edition 5, April 2017

16047-90011

www.keysight.com