Agilent Technologies

281A/B Adapters

Operating and Service Manual

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Custom systems are warranted by contractual agreement between Agilent Technologies and the customer.

Certification

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

For assistance, call your local Agilent Technologies Sales and Service Office (refer to "Service and Support" on page vi).

Service and Support

By internet, phone, or fax, get assistance with all your test and measurement needs.

Online assistance: `www.agilent.com/find/assist`

United States	**Latin America**	**Canada**	**Europe**
(tel) 1 800 452 4844	(tel) (305) 269 7500 (fax) (305) 269 7599	(tel) 1 877 894 4414 (fax) (905) 282-6495	(tel) (+31) 20 547 2323 (fax) (+31) 20 547 2390
New Zealand	**Japan**	**Australia**	
(tel) 0 800 738 378 (fax) (+64) 4 495 8950	(tel) (+81) 426 56 7832 (fax) (+81) 426 56 7840	(tel) 1 800 629 485 (fax) (+61) 3 9210 5947	

Asia Call Center Numbers

Country	**Phone Number**	**Fax Number**
Singapore	1-800-375-8100	(65) 836-0252
Malaysia	1-800-828-848	1-800-801664
Philippines	(632) 8426802 1-800-16510170 (PLDT Subscriber Only)	(632) 8426809 1-800-16510288 (PLDT Subscriber Only)
Thailand	(088) 226-008 (outside Bangkok) (662) 661-3999 (within Bangkok)	(66) 1-661-3714
Hong Kong	800-930-871	(852) 2506 9233
Taiwan	0800-047-866	(886) 2 25456723
People's Republic of China	800-810-0189 (preferred) 10800-650-0021	10800-650-0121
India	1-600-11-2929	000-800-650-1101

Safety and Regulatory Information

Review this product and related documentation to familiarize yourself with safety markings and instructions before you operate the instrument. This product has been designed and tested in accordance with international standards.

WARNING

The WARNING notice denotes a hazard. It calls attention to a procedure, practice, or the like, that, if not correctly performed or adhered to, could result in personal injury. Do not proceed beyond a WARNING notice until the indicated conditions are fully understood and met.

CAUTION

The **CAUTION** notice denotes a hazard. It calls attention to an operating procedure, practice, or the like, which, 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.

Instrument Markings

	When you see this symbol on your instrument, you should refer to the instrument's instruction manual for important information.
	This symbol indicates hazardous voltages.
	The laser radiation symbol is marked on products that have a laser output.
	This symbol indicates that the instrument requires alternating current (ac) input.
	The CE mark is a registered trademark of the European Community. If it is accompanied by a year, it indicates the year the design was proven.
	The CSA mark is a registered trademark of the Canadian Standards Association.
1SM1-A	This text indicates that the instrument is an Industrial Scientific and Medical Group 1 Class A product (CISPER 11, Clause 4).
	This symbol indicates that the power line switch is ON.
	This symbol indicates that the power line switch is OFF or in STANDBY position.

Safety Earth Ground

This is a Safety Class I product (provided with a protective earthing terminal). An uninterruptible safety earth ground must be provided from the main power source to the product input wiring terminals, power cord, or supplied power cord set. Whenever it is likely that the protection has been impaired, the product must be made inoperative and secured against any unintended operation.

Before Applying Power

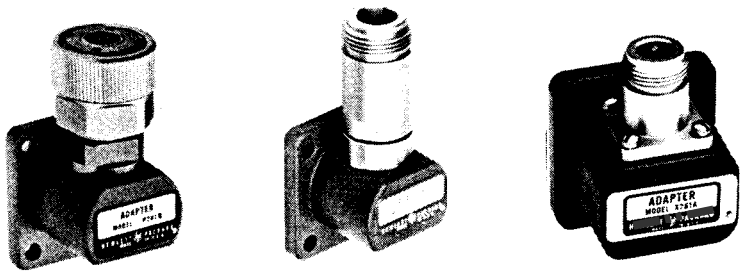
Verify that the product is configured to match the available main power source as described in the input power configuration instructions in this manual. If this product is to be powered by autotransformer, make sure the common terminal is connected to the neutral (grounded) side of the ac power supply.

Overview

Description

Agilent 281 adapters provide a convenient means of coupling between waveguide and coaxial systems. Power can be transmitted in either direction, and each adapter covers the full frequency range of its waveguide size with an SWR of less than 1.30. The flanges are lapped to a slight, controlled convexity to assure minimum leakage at the waveguide joint. A probe transforms the waveguide impedance to the 50-ohm impedance of coaxial line. Complete specifications for the adapters are given in Table 1.

Examples of the waveguide flange and coaxial connectors used on these adapters are shown in Figure 1. One type of flange and two types of coaxial connectors are used: Type N female connectors (which are compatible with connectors conforming to MILS-71), are available on all 281A adapters and Amphenol precision 7-mm connectors (available on the 281B adapters). The 7-mm connector features precise alignment, a clearly defined reference plane, and low RF leakage. In addition, any pair can be connected together without an adapter. Option 13 adapters have stainless steel Type N female connectors and are available on the P281B.



P281B | P281B Option 13 | X281A

281_adapt

Figure 1 Adapters Showing Flange Types and Coaxial Connector Styles

Specifications

Table 1 281A/B Specfications

Model	Frequency Range (GHz)[1]	Fits Waveguide Size Nom. OD(in.)	EIA	Equivalent Flange	Coaxial Connector[2]	Length (in)	(mm)	Weight (lb)	(kg)
X281A	8.20 to 12.40	1 x 1/2	WR90	UG135/U	N female	1-7/16	37	1/4	0. 1
P281B	12.40 to 18.00	0.702 -0.391	WR62	UG419/U	APC-7[3]	1	26	3/16	0. 1

1. Maximum Reflection Coefficient: 0.11 (1.25 SWR) over entire frequency range.
2. Typical maximum power handling capability for the Type N and APC-7 connectors is 200 W (refer to caution below).
3. Option 013 furnished with stainless steel Type N female connector.
   Option 012 furnished with Type N male connector.
   Option 006 adds additional alignment holes.

CAUTION

The power that can be handled will be a function of the size of the center conductor. The majority of the heat flow will be via conduction. The weak point is the coax portion. The waveguide portion is capable of higher power. These numbers are assuming an ambient temperature of 25 degrees centigrade and an altitude of sea level. Higher ambient temperatures and altitude would degrade power-handling capability.

Inspection and Shipping

Inspection

Mechanical Check

If external damage to the shipping carton is evident, the carrier's agent should be present when the adapter is unpacked. Check the adapter for external damage. If damage is evident, refer to Claims, below, for recommended claim procedure. If the shipping carton is not damaged, check the packaging material for signs of stress that indicate rough handling in transit. If the adapter appears undamaged, perform the electrical check.

Electrical Check

The electrical performance of the adapter should be checked as soon as possible after receipt against the specifications shown in Table 1. If the adapter does not perform within the specifications, see the following paragraphs for recommended claim procedure and repackaging the instrument.

Claims

If physical damage is evident, or if the adapter does not meet electrical specifications when received, notify the carrier and the nearest Agilent Technologies office

Shipping

Using Original Packaging

The same containers and material used in factory packaging can be obtained through Agilent offices.

If the adapter is being returned to Agilent Technologies for servicing, attach a tag indicating the type of service required, return address, and model number. Also, mark the container *FRAGILE* to assure careful handling

Using Other Packaging

The following general instructions should be used for repackaging with commercially available materials:

1. Wrap the adapter in heavy paper or plastic. (If shipping to a Agilent Technologies office or service center, attach a tag indicating the type of service required, return address, and model number.)
2. Use a strong shipping container. A double-wall carton made of 350-pound test material is adequate.

3. Use enough shock-absorbing material (3 to 4-inch layer) around all sides of the adapter to provide firm cushion and prevent movement inside the container.
4. Seal the shipping container securely
5. Mark the shipping container *FRAGILE* to assure careful handling.

Operation

Protest Flanges

Care should be taken to protect the face of the flange from any damage that would prevent close surface-to-surface contact. Any burring, denting, or scratching will increases RF leakage and the reflection coefficient of the joint. The supplied plastic cover should be used to protect the flange when the adapter is not in use.

Assemble Carefully

When connecting an adapter to a waveguide.

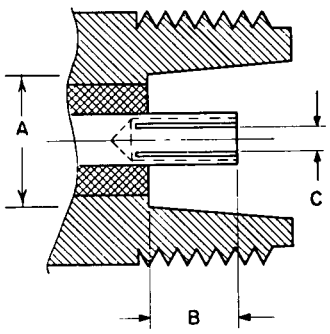
1. Make sure the rectangular ports are oriented the same way (i.e., not "cross-guided").
2. Align ports carefully to minimize reflections.
3. Clamp or bolt flanges securely together so that pressure is evenly distributed over the contacting surfaces. Loose joints and flange distortion result in leakage and mismatch.

Connector Types

Type N Connectors

Two versions of the Type N coaxial connector are used on the adapters: one is used on the 281A model, and the other is used in the Option 13B model. The version on the 281A model is plated brass and is compatible with connectors conforming to MIL-C-71. The version on the Option 13B model is stainless steel and is compatible with connectors conforming to MIL-C-71 or MIL-C-39012. Dimensions of these connectors are given in Figure 2.

Figure 2 Dimensions of Type N Connectors



	281A	281B
A	0.316 min 0.320 max	0.316 min 0.320 max
B	0.188 min 0.206 max	0.204 min 0.207 max
C	0.063 min 0.066 max	0.063 min 0.066 max

Precision 7 mm Connectors

Except for Option 13, the 281B model adapter has a APC-7 precision 7-mm coaxial connector. These connectors rely on uniform end-to end contact of both conductors for electrical continuity. Consequently, the condition of the contacting surfaces is critical: they should be kept clean and smooth. To prevent damage when the adapter is not in use, the connector's threaded sleeve should be fully extended.

Performance Test

The maximum SWR for the Adapters are listed in Table 1. When making these measurements, the test results must be less than those listed in Table 1 plus the measurement uncertainty of the measurement system. Measurement may be made using a standard reflectometer setup. To ensure satisfactory performance, make sure flanges and coaxial connectors are not damaged or worn.

Replaceable Parts

The 281A may be disassembled for part replacement, but the 281B should be returned to Agilent because liquid nitrogen and special wrenches and gauges are needed for assembly.

The exploded view of Figure 3 gives information for ordering replacement parts and can be used as an assembly guide. To obtain a replacement part give the adapter's full model number and the part number from Table 2, and address the order to the nearest Agilent Technologies office.

Figure 3 281A Replacement Parts

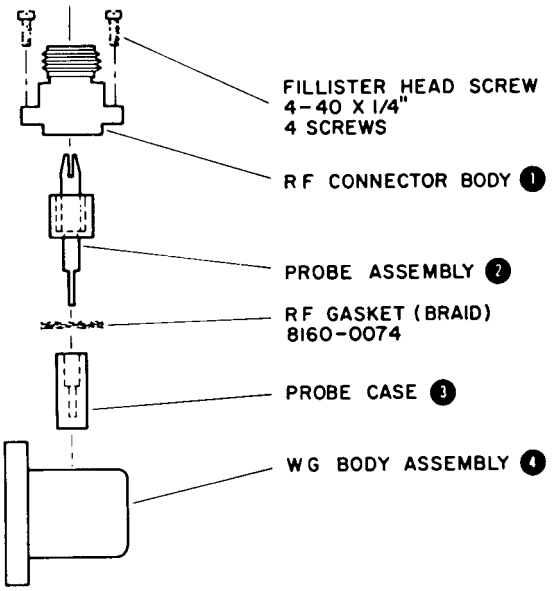


Table 2 281A Replaceable Parts

Item No.	Description	Model No.	Agilent Part No.
1	RF Connector Body	X281A	5020-0213
2	Probe Assembly	X281A	not applicable
	Probe Body[1]		00281-20025
	Probe Insulator[1]		00281-20106
3	Probe Case	X281A	X281A-5
4	X-band	X281A	00281-20017
	Flange Cap (not shown)		
	X-band	X281A	5040-0354
	P-band	P281B	5040-0358

1. This part is a subcomponent of item number 2 (Probe Assembly for X281A).

NOTE All 281B adapters should be returned for part replacement.