OPERATING AND SERVICE MANUAL

HP 281A
HP 281B
ADAPTERS

MARCH 1984

HEWLETT PACKARD

HP 281A/B

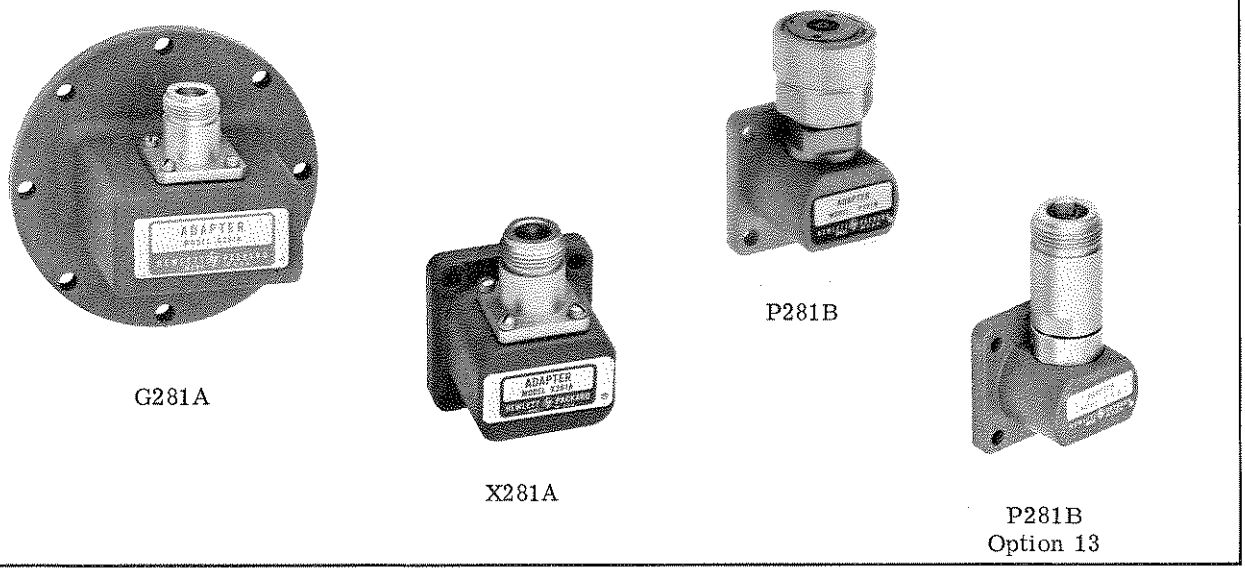


Figure 1. Typical Adapters Showing Flange Types and Coaxial Connector Styles

1. DESCRIPTION.

2. Hewlett-Packard Model 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.

3. Examples of the waveguide flanges and coaxial connectors used on these adapters are shown in Figure 1. Two types of flange and three versions of 7-mm coaxial connector are used. S, G and J adapters have circular flanges - H, X and P have rectangular flanges. Plated brass Type N female connectors, which are compatible with connectors conforming to MIL-C-71, are used on all A model adapters. Except for Option 13 adapters, B model adapters have Amphenol[1] precision 7-mm (APC-7) connectors. These APC-7 connectors feature 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 which are compatible with connectors conforming to MIL-C-71 or MIL-C-39012.

[1]Amphenol RF Division, Danbury, Connecticut.

4. INITIAL INSPECTION.

5. MECHANICAL CHECK.

6. 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 Paragraph 9 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.

7. ELECTRICAL CHECK.

8. The electrical performance of the adapter should be checked as soon as possible after receipt. A procedure for checking electrical performance against the specifications of Table 1 is given under Performance Test. If the adapter does not perform within the specifications, refer to Paragraph 9 for recommended claim procedure and Paragraph 11 for repackaging information.

Table 1. Specifications*

Model	Frequency Range GHz	Fits Waveguide Size Nom. OD(in.)	EIA	Equiv. Flange	Coaxial Connector	Length (in.)	(mm)	Weight (lb)	(kg)
S281A	2.60 - 3.95	3 x 1-1/2	WR284	UG584/U	N female	2-1/2	64	1-3/16	0.54
G281A	3.95 - 5.85	2 x 1	WR187	UG407/U		2-1/16	53	1/2	0.2
J281A	5.30 - 8.20	1-1/2 x 3/4	WR137	UG441/U		1-7/8	48	1/2	0.2
H281A	7.05 - 10.00	1-1/4 x 5/8	WR112	UG138/U		1-1/2	39	1/4	0.1
X281A	8.20 - 12.40	1 x 1/2	WR90	UG135/U		1-7/16	37	1/4	0.1
X281B	8.20 - 12.40	1 x 1/2	WR90	UG135/U	APC-7**	1-3/8	35	1/2	0.1
P281B	12.40 - 18.00	0.702 - 0.391	WR62	UG419/U	APC-7**	1	26	3/16	0.1

* Maximum Reflection Coefficient: 0.11 (1.25 SWR) over entire frequency range except J281A, 0.13 (1.30 SWR) from 5.3 to 5.5 GHz.

** Option 13. Furnished with stainless steel Type N female connector.

9. CLAIMS.

10. If physical damage is evident, or if the adapter does not meet electrical specifications when received, notify the carrier and the nearest Hewlett-Packard office.

11. REPACKAGING FOR SHIPMENT.

12. USING ORIGINAL PACKAGING. The same containers and material used in factory packaging can be obtained through Hewlett-Packard offices.

13. If the adapter is being returned to Hewlett-Packard 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.

14. In any correspondence, refer to the adapter by full model number (for example, X281B Option 13).

15. USING OTHER PACKAGING. The following general instructions should be used for repackaging with commercially available materials:

a. Wrap the adapter in heavy paper or plastic. (If shipping to a Hewlett-Packard office or service center, attach a tag indicating the type of service required, return address, and model number).

b. Use a strong shipping container. A double-wall carton made of 350-pound test material is adequate.

c. 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.

d. Seal the shipping container securely.

e. Mark the shipping container FRAGILE to assure careful handling.

16. OPERATION.

17. RECOMMENDATIONS.

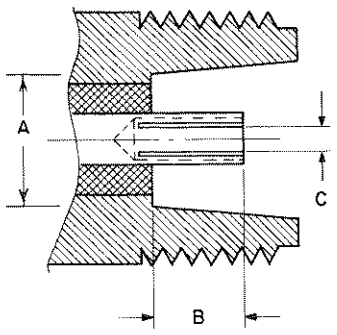
18. PROTECT FLANGES. Care should be taken to protect the face of the flange from any damage that would prevent close surface-to-surface contact. Any burring, denting, or scratching increases RF leakage and the reflection coefficient of the joint. The supplied plastic cover should be used to protect the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

19. ASSEMBLE CAREFULLY. When connecting an adapter to a waveguide.

a. Make sure the rectangular ports are oriented the same way (i.e., not "cross-guided").

b. Align ports carefully to minimize reflections.

c. 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.



	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

Figure 2. Dimensions of Type N Connectors

20. CONNECTOR INFORMATION.

21. TYPE N. Two versions of the Type N coaxial connector are used on the adapters — one is used on all A models, and the other is used in Option 13B models. The version on A models is plated brass and is compatible with connectors conforming to MIL-C-71. The version on Option 13B models 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.

22. PRECISION 7 MM. Except for Option 13, all B model adapters have APC-7 precision 7-mm coaxial connectors. 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. For more detailed information about the use and care of these connectors, request a free copy of the HP Service Note on precision 7-mm connectors. These notes are available through all HP offices.

23. PERFORMANCE TEST.

24. 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.

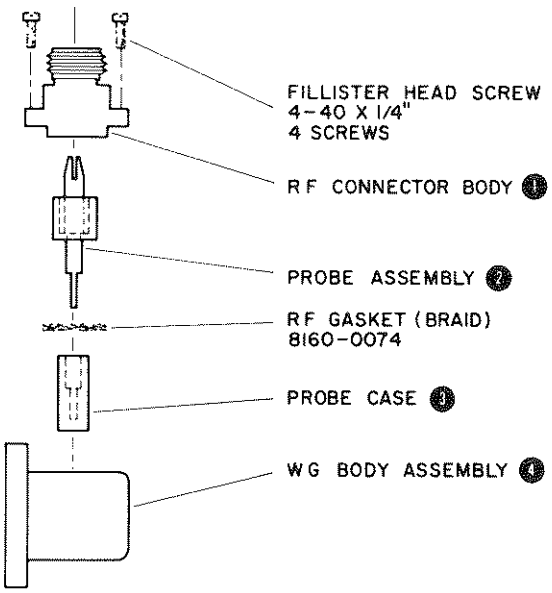
25. PART REPLACEMENT.

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

27. 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 with Check Digit (CD) from Figure 3, and address the order to the nearest Hewlett-Packard office.

NOTE

Within the USA, it is better to order directly from the HP Parts Center in Mt. View, California. Ask your nearest HP office for information and forms for the "Direct Mail Order System".



Item No.	Description	Model No.	HP Part No.	CD
1	RF Connector Body	J, X281A	5020-0213	6
		S,G,H281A	5020-0214	7
2	Probe Assembly	S281A	S281A-2	5
		G281A	G281A-2	8
		J281A	J281A-2	8
		H281A	H281A-2	9
		X281A	X281A-2	0
3	Probe Case	S281A	S281A-6	1
		G281A-1	G281A-1	7
		J281A	J281A-3	9
		H281A-	H281A-5	2
		X281A	X281A-5	3
4	S-band (moss gray)	S281A	00281-20016	5
	G-band (moss gray)	G281A	00281-20013	2
	J-band (moss gray)	J281A	00281-20015	4

Item No.	Description	Model No.	HP Part No.	CD
4	H-band (moss gray)	H281A	00281-20014	3
cont.	X-band (moss gray)	X281A	00281-20017	6
Flange Cap (not shown)				
	S-band (jade gray)	S281A	5040-0360	6
	G-band (jade gray)	G281A	5040-0356	0
	J-band (jade gray)	J281A	5040-0352	6
	H-band (jade gray)	H281A	5040-0352	7
	X-band (jade gray)	X281A	5040-0354	8

Note: All 281B Adapters should be returned to HP for part replacement. See Paragraph 26.

Figure 3. 281A Replaceable Parts

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 Bureau of Standards, to the extent allowed by the Bureau's calibration facility, and 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 of one year from date of shipment. During the warranty period, Hewlett-Packard Company will, at its option, either repair or replace products which 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 instructions 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.

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