
HP 87300B,C,D and 87301B,C,D,E Directional Couplers

HP 87310B Hybrid Coupler

Product Overview



Features and Description

- Compact size
- Broadband up to 50 GHz
- Excellent performance

The HP 87300 series of compact, broadband directional/sampling and hybrid couplers are well suited for signal monitoring or, when combined with a coaxial detector, signal leveling. See page 2 for the wide range of product offerings.

Product Applications

These compact, broadband directional couplers are important components for many microwave measurement systems. Although most modern signal generators and sweepers supply signals whose power levels are stable with respect to frequency, variations in signal level are introduced due to the cable losses (which increase with

frequency) and the frequency response of other components in the signal path. Inserting a directional coupler into the system with a suitable microwave detector to supply feedback to the ALC circuit of a signal generator or sweeper provides a leveled signal at a particular point in the system (Figure 1).

HP 8474B,C,E detectors offer excellent broad-band frequency response and low SWR for this application. Other applications include power monitoring with an HP 848X series power sensor connected to the sampling port. Connect the sampled signal port to a microwave counter to monitor frequency or to a signal analyzer for frequency spectrum monitoring (Figure 2).

Product Specifications

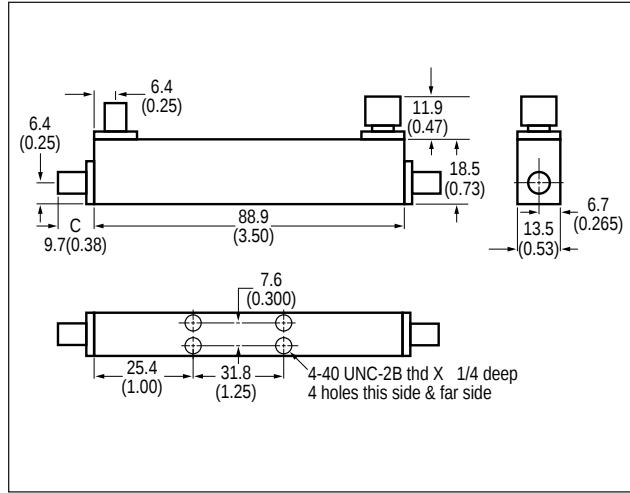
HP Model	HP 87300B	HP 87300C	HP 87300C #020	HP 87300D
Frequency range (GHz)	1 to 20 GHz	1 to 26.5 GHz	1.0 to 26.5 GHz	6 to 26.5 GHz
Nominal coupling and variation (with respect to output)	10 ±0.5 dB	10 ±1.0 dB	20 ±1.0 dB	10 ±0.5 dB
Frequency sensitivity	±0.35 dB, 1-20 GHz	±0.5 dB, 1-26.5 GHz	±0.5 dB	±0.3 dB
Directivity	>16 dB	>14 dB, 1-12.4 GHz >12 dB, 12.4-26.5 GHz	>14 dB	>13 dB
Maximum SWR	1.35	1.35, 1-12.4 GHz 1.50, 12.4-26.5 GHz	1.40	1.40
Insertion loss	<1.5 dB	<1.2 dB, 1-12.4 GHz <1.7 dB, 12.4-26.5 GHz	<1.2 dB	< 1.3 dB
Typical insertion loss (dB, f = freq. in GHz)	0.6+0.04f	0.6+0.04f	0.15+0.032f	.6 + 0.025f
Power rating				
Average	20 W	20 W	20 W	20 W
Peak	3 kW	3 kW	3 kW	3 kW
Connectors	SMA (f)	3.5 mm (f)	3.5 mm (f)	3.5 mm (f)
Weight in grams (oz)	74 (2.6)	60 (2.1)	59.5 (2.1)	31.2 (1.1)

HP Model	HP 87301B	HP 87301C	HP 87301D	HP 87301E
Frequency range (GHz)	10 to 46 GHz	10 to 50 GHz	1 to 40 GHz	2 to 50 GHz
Nominal coupling and variation (with respect to output)	10 ±0.7 dB	10 ±0.7 dB	13 ±1.0 dB	10 ±1.0 dB
Frequency sensitivity	±0.3 dB	±0.5 dB	±1.2 dB, 1 to 40 GHz	±0.6 dB, 2 to 26.5 GHz ±0.8 dB, 2 to 50 GHz
Directivity	>10 dB	>10 dB	>14 dB, 1 to 20 GHz >10 dB, 20 to 40 GHz	>13 dB, 2 to 26.5 GHz >10 dB, 26.5 to 50 GHz
Maximum SWR	1.80	1.80	1.5, 1 to 20 GHz 1.7, 20 to 40 GHz	1.5, 2 to 26.5 GHz 1.8, 26.5 to 50 GHz
Insertion loss	<1.9 dB	<1.9 dB	<1.2 dB, 1 to 20 GHz <1.9 dB, 20 to 40 GHz	<2.0 dB
Typical insertion loss	.8+0.022f	.8+0.022f	0.4 + 0.035f	0.55 + 0.025f
Power rating				
Average	20 W	20 W	20 W	20 W
Peak	3 kW	3 kW	3 kW	3 kW
Connectors	2.92 mm (f)	2.4 mm (f)	2.4 mm (f) or 2.92 mm (f) for Option 292	2.4 mm (f)
Weight in grams (oz)	28.4 (1.0)	28.4 (1.0)	37 (1.3)	34 (1.2)

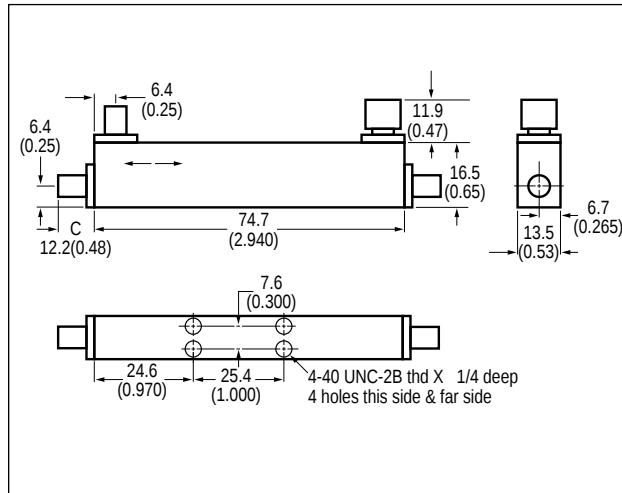
HP 87310B Specifications

Frequency range	1-18 GHz
Coupling	3 dB
Amplitude imbalance	± 0.5 dB at each port, centered at -3 dB
Phase imbalance	± 10 Degrees
Isolation	>17 dB
Maximum SWR	1.35
Insertion loss	<2.0 dB
Power rating	
Average	20 W
Peak	3 kW
Connectors	SMA (f)
Weight in grams (oz)	148 (5.2)

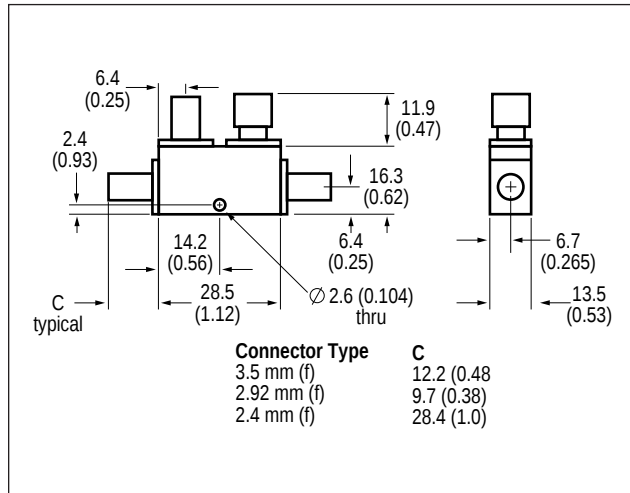
HP 87300B



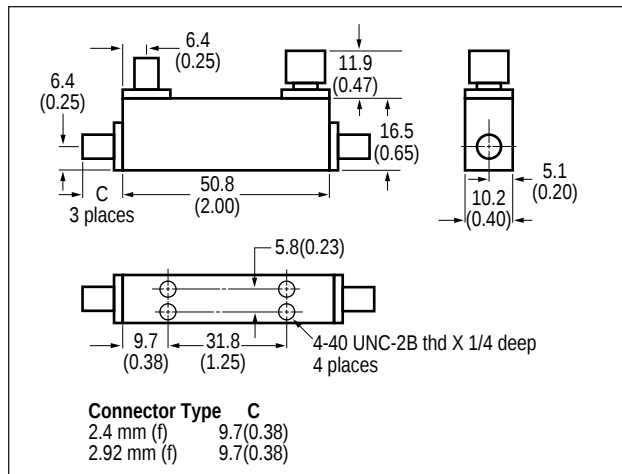
HP 87300C



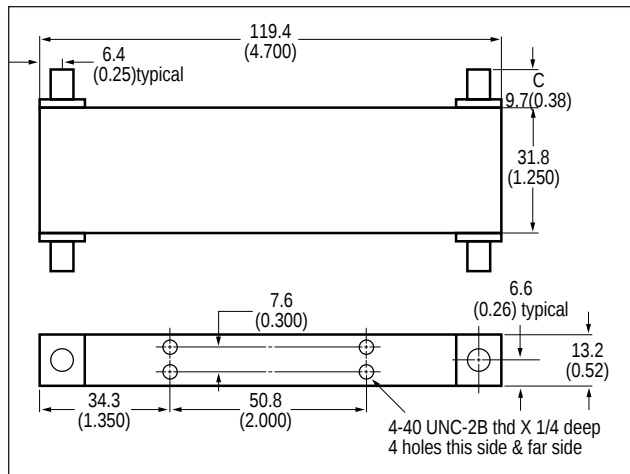
HP 87300D, 87301B, 87301C



HP 87301D,E



HP 87300D



**Dimensions are in millimeters
(inches) nominal unless otherwise
specified**

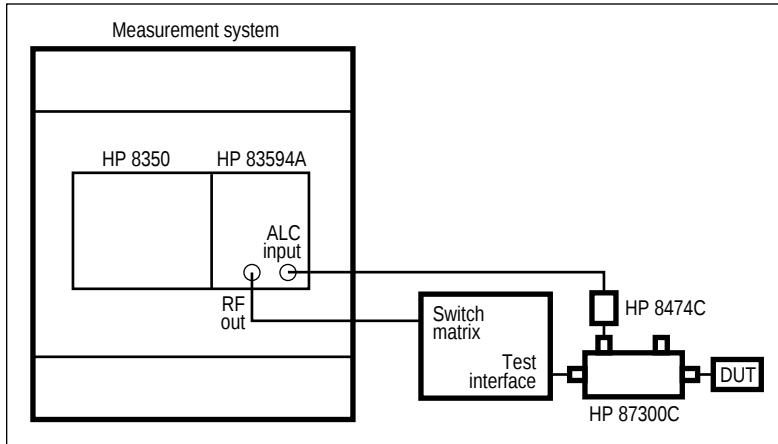


Figure 1

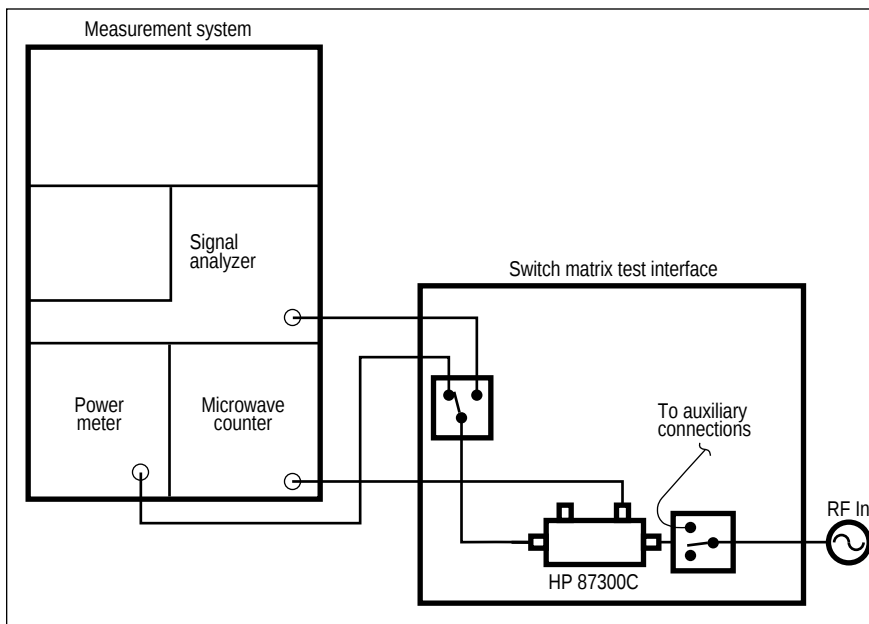


Figure 2

For more information about Hewlett-Packard test and measurement products, applications, services, and for a current sales office listing, visit our web site, <http://www.hp.com/go/tmdir>. You can also contact one of the following centers and ask for a test and measurement sales representative.

United States:

Hewlett-Packard Company
Test and Measurement Call Center
P.O. Box 4026
Englewood, CO 80155-4026
1 800 452 4844

Canada:

Hewlett-Packard Canada Ltd.
5150 Spectrum Way
Mississauga, Ontario L4W 5G1
(905) 206 4725

Europe:

Hewlett-Packard
European Marketing Centre
P.O. Box 999
1180 AZ Amstelveen
The Netherlands
(31 20) 547 9900

Japan:

Hewlett-Packard Japan Ltd.
Measurement Assistance Center
9-1, Takakura-Cho, Hachioji-Shi,
Tokyo 192, Japan
Tel: (81) 426-56-7832
Fax: (81) 426-56-7840

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Hewlett-Packard
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Hewlett-Packard Australia Ltd.
31-41 Joseph Street
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