

Selection Guide

Type	Uses	HP Model Number Series ¹	Frequency Coverage by Band – GHz							
			X	P	K	R	Q	U	V	W
			8.20-12.4	12.4-18.0	18.0-26.5	26.5-40.0	33.0-50.0	40.0-60.0	50.0-75.0	75.0-110.0
Adapters	Interconnect coaxial-waveguide system	281A ²	X			X	X	X	X	
		281B		X		X	X	X	X	
		281C	X	X	X				X	X
		281D							X	X
Variable Attenuators	Measure reflection coefficient, insertion loss, transfer characteristics by RF substitution source mismatch	382A	X	X	X	X				
Detectors	Detect RF power, CW or pulsed; measure reflection coefficient, insertion loss	422C			X	X				
Directional Couplers	Sample high power, level power, measure reflection coefficient, reduce mismatch	752C	X	X	X	X	X	X	X	X
		752D	X	X	X	X	X	X	X	
		752CS, DS				X				
Isolators	Reduce mismatch at mm-wave frequencies	365A				X	X	X	X	X
Mixers ³	Extend spectrum analyzer frequency range to millimeter band	11970K			X					
		11970R				X				
		11970Q					X			
		11970U							X	
		11970V								X
		11970W								
Network Analyzer ⁴	Waveguide calibration kits	11644A	X	X	X	X	X	X	X	X
	Waveguide verification kits	11645A				X	X	X	X	X
Terminations	Fixed loads for terminating waveguide systems, sliding loads for separating load reflections from other system reflections	910A		X		X	X	X		
		910B	X							
		910C								X
		914B	X							

¹ For complete model number, add the appropriate waveguide band designator as a prefix to the model number (except mixers)
e.g. the model number for a coax to waveguide adapter in "X" band would be X281A.

² Also available in the following bands (in GHz): S (2.6 to 3.95), G (3.95 to 5.85), J (5.3 to 8.2), and H (7.05 to 10).

³ See Mixer section of this catalog for product details.

⁴ See Network Analyzer section of this catalog for product details.

Coaxial to Waveguide Adapters

HP 281 Series

HP 281A,B,C series adapters transform waveguide transmission line into 50 Ω coaxial line. Power can be transmitted in either direction, and each adapter covers the full frequency range of its waveguide band with SWR less than 1.3.

Specifications

HP Model	Frequency Range (GHz)	Maximum SWR	Waveguide ¹ Designator EIA MIL-W-85/()	Flange ¹ Designator UG-()/U MIL-F-3922/()	Coaxial Connector	Length mm (in)	Shipping Weight kg (lb)
S281A	2.6 to 3.95	1.25	WR-284 1-041	584 56B-002	N (f)	140 (5.5)	0.54 (1.19)
G281A	3.95 to 5.85	1.25	WR-187 1-053	407 57B-001	N (f)	95 (3.75)	0.27 (0.5)
J281A	5.3 to 8.2	1.3	WR-137 1-065	441 55B-002	N (f)	51 (2)	0.45 (1)
H281A	7.05 to 10	1.25	WR-112 1-071	138 54C-006	N (f)	41 (1.63)	0.45 (1)
X281A	8.2 to 12.4	1.25	WR-90 1-077	135 54C-008	N (f)	35 (1.38)	0.45 (1)
X281C	8.2 to 12.4	1.05	WR-90 1-077	135 54C-008	APC-7 Opt. 012: N (m) Opt. 013: N (f)	73 (2.88)	0.5 (1)
P281B	12.4 to 18	1.25	WR-62 1-090	419 70A-008	APC-7 Opt. 013: N (f)	64 (2.5)	0.5 (1)
P281C	12.4 to 18	1.06	WR-62 1-090	419 70A-008	APC-7 Opt. 012: N (m) Opt. 013: N (f)	52 (2)	0.5 (1)
K281C	18 to 26.5	1.07	WR-42 1-103	597 54C-002	3.5 mm (f) Opt. 012: 3.5 mm (m)	35 (1.38)	0.5 (1)
R281A	26.5 to 40	1.13	WR-28 3-009	599 —	2.4 mm (f)	39 (1.5)	0.2 (0.5)
R281B	26.5 to 40	1.13	WR-28 3-009	599 —	2.4 mm (m)	39 (1.5)	0.2 (0.5)
Q281A	33 to 50	1.17	WR-22 3-013	383 67B-013	2.4 mm (f)	39 (1.5)	0.2 (0.5)
Q281B	33 to 50	1.17	WR-22 3-013	383 67B-013	2.4 mm (m)	39 (1.5)	0.2 (0.5)
U281A	40 to 60	1.17	WR-19 —	383 (mod) —	1.85 mm (f)	39 (1.5)	0.2 (0.5)
U281B	40 to 60	1.17	WR-19 —	383 (mod) —	1.85 mm (m)	39 (1.5)	0.2 (0.5)
V281A	50 to 64	1.17	WR-15 —	385 —	1.85 mm (f)	32 (1.25)	0.2 (0.5)
V281B	50 to 64	1.17	WR-15 —	385 —	1.85 mm (m)	32 (1.25)	0.2 (0.5)
V281C	50 to 75	1.16	WR-15 3-018	385 67B-002	1.0 mm (f)	32 (1.25)	0.1 (0.2)
V281D	50 to 75	1.16	WR-15 3-018	385 67B-002	1.0 mm (m)	32 (1.25)	0.1 (0.2)
W281C	75 to 110	1.16	WR-10 3-024	387 67B-010	1.0 mm (f)	32 (1.25)	0.1 (0.2)
W281D	75 to 110	1.16	WR-10 3-024	387 67B-010	1.0 mm (m)	32 (1.25)	0.1 (0.2)

¹ The Waveguide/Flange Designator is provided to determine interface dimensions and generic material of HP products.

Variable Attenuators



HP R382A

HP P382A



HP 382A Series

The attenuation value of these direct-reading, precision attenuators depends on the rotation angle of the resistive card, rather than on the resistivity value of the attenuating material. Therefore, they are insensitive to changes in temperature and humidity which can affect the resistive card of ordinary adjustable flap attenuators. The attenuation value is highly accurate and is stable from 0 to 50 dB. The instruments feature large, easy-to-read dials, and can handle considerable microwave power.

Specifications

HP Model	Frequency Range (GHz)	Maximum SWR	Attenuation Accuracy	Attenuation Range (dB)	Maximum Residual Attenuation (0 dB Setting) (dB)	Maximum Power (CW) (watts)	Waveguide ¹ Designator EIA MIL-W-85/()	Flange ¹ Designator UG-()/U MIL-F-3922/()	Dimensions mm (in)	Shipping Weight kg (lb)
X382A	8.2 to 12.4	1.15	±2% of reading or 0.1 dB, whichever is greater	0 to 50	1	10	WR-90 1-077	135 54C-008	397 x 194 x 119 (15.63 x 7.63 x 4.69)	3.6 (8)
P382A	12.4 to 18				1	5	WR-62 1-090	419 70A-008	318 x 197 x 121 (12.5 x 7.75 x 4.75)	3.6 (8)
K382A	18 to 26.5				1	2	WR-42 1-103	595 54C-002	194 x 156 x 121 (7.63 x 6.13 x 4.75)	2.7 (6)
R382A	26.5 to 40				1	1	WR-28 3-008	599 54C-003	162 x 156 x 121 (6.38 x 6.13 x 4.75)	2.7 (6)

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Detectors



HP K422C

HP K/R422C

The HP K422C (18 to 26.5 GHz) and R422C (26.5 to 40 GHz) are GaAs Planar-Doped Barrier diode detectors. They both have negative output polarity as standard, and the HP K422C is available with an optional square law load resistor to extend the dynamic range to approximately 0 dBm.

Specifications

HP Model	K422C	R422C
Frequency Range	18 to 26.5 GHz	26.5 to 40 GHz
Frequency Response (dB)	±0.6	±0.6
Maximum SWR	1.36	1.78
Low Level Sensitivity (mV/μW)	>0.42	>0.42
Maximum Input Power (avg)	100 mW	100 mW
Typical Short Term Power (max. < 1 minute)	1 W	1 W
Video Impedance	1.5 kΩ	1.5 kΩ
RF Bypass Capacitance (nominal)	10 pF	10 pF
Standard Output Polarity	Negative	Negative
Optional Square Law Load	Opt. 002	—
Waveguide Designator ¹		
EIA	WR-42	WR-28
MIL-W-85/()	1-103	3-008
Flange Designator ¹		
UG-()/U	595	599
MIL-F-3922/()	54C-002	54-003
Output Connector	BNC (f)	BNC (f)
Shipping Weight – kg (lb)	0.5 (1)	0.5 (1)

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Directional Couplers

HP X752C,D



HP R752DS



HP 752 Series

The HP 752 series couplers are an essential part of many microwave measurement applications. Attenuation measurements, reflectometer setups, power measurements, source leveling and network analysis are just a few areas in which directional couplers find use.

HP's X, P, K, and R band couplers have a conventional multi-hole design featuring greater than 40 dB directivities. The HP R752CS,DS and Q, U, V, W 752C,D couplers are designed with "split-block" technology, and provide greater than 33 dB directivity. Split-block designs are used to assure

greater precision in machining the ultra-small internal dimensions required by the 26.5 to 110.0 GHz waveguide. The split block units are equipped to interface with the precision circular cover flanges with matching alignment pins common to those applications.

Each coupler is swept-frequency tested to ensure that the main guide SWR and directivity specifications are accurate. Performance characteristics are unaffected by humidity, temperature and time. This makes these units especially useful in microwave "standards" measurements.

Specifications

HP Model	Frequency Range (GHz)	Nominal ¹ Coupling (dB)	Mean Coupling Accuracy (dB)	Maximum Coupling Variation (dB)	Minimum Directivity (dB)	Maximum Primary Line SWR	Maximum Auxiliary Arm SWR	Maximum Primary Line Power (CW) (Watts)	Waveguide Designator EIA MIL-W-85/()	Flange ² Designator UG-()/U MIL-F-3922/()	Length mm (in)	Shipping Weight kg (lb)
X752C	8.2 to 12.4	10	±0.4	±0.5	40	1.05	1.15	10	WR-90	39	399 (15.69)	1.4 (3)
X752D		20				1.05	1.15	100	1-079	54C-007	399 (15.69)	
P752C	12.4 to 18	10	±0.4	±0.5	40	1.05	1.2	10	WR-62	419	311 (12.25)	0.9 (2)
P752D		20				1.05	1.2	100	1-089	70A-007	311 (12.25)	
K752C	18 to 26.5	10	±0.7	±0.5	40	1.05	1.2	5	WR-42	595	252 (9.94)	0.45 (1)
K752D		20				1.05	1.2	50	1-102	54C-001	252 (9.94)	
R752C	26.5 to 40	10	±0.7	±0.5	40	1.05	1.2	5	WR-28	599	219 (8.63)	0.45 (1)
R752D		20		±0.6		1.05	1.2	50	3-006	54C-003	222 (8.72)	
R752CS	26.5 to 40	10	±0.7	±0.6	40	1.04	1.05	5	WR-28	381	165 (6.5)	0.24 (.5)
R752DS		20				1.04	1.05	50	3-009	67B-005	165 (6.5)	
Q752C	33 to 50	10	±0.7	±0.7	40	1.05	1.1	5	WR-22	383	140 (5.5)	0.45 (1)
Q752D		20				1.05	1.1	50	3-013	67B-013	140 (5.5)	
U752C	40 to 60	10	±0.7	±0.7	39	1.06	1.1	5	WR-19	383 (mod)	140 (5.5)	0.45 (1)
U752D		20				1.06	1.1	50	3-014	67B-007	140 (5.5)	
V752C	50 to 75	10	±1.0	±0.7	36	1.08	1.14	3	WR-15	385	97 (3.81)	0.45 (1)
V752D		20				1.08	1.14	30	3-017	67B-008	97 (3.81)	
W752C	75 to 110	10	±1.0	±0.7	33	1.08	1.14	2	WR-10	387 (mod)	97 (3.81)	0.45 (1)
W752D		20				1.08	1.14	20	3-023	67B-010	97 (3.81)	

¹ Nominal Coupling, Coupling Factor, and Coupling Attenuation are terms that describe the same parameter.

² The Waveguide/Flange Designator is provided to determine interface dimensions and generic material of HP products.

Isolators, Stand/Holders

HP 365A Series

These products are ideal isolators for test and measurement applications. Their high, broadband isolation (better than 25 dB) minimizes the reflection effects of a source. Their low SWR and low insertion loss help to improve accuracy without the attenuation of matching pads.

The HP 365A isolators use a Faraday-rotation design. It consists of a waveguide section that contains low-loss ferrite material and impedance matching elements. A permanent magnet supplies the external magnetic bias field to the ferrite core.



HP V365A

Specifications

HP Model	Frequency Range (GHz)	Max. SWR	Maximum Insertion Loss (dB)	Minimum Isolation (dB)	Minimum Input Power (avg)	Waveguide ¹ Designator EIA MIL-W-85/()	Flange ¹ Designator UG-()/U MIL-F-3922/()
R365A	26.5 to 40	1.4	1.5	25	1.5 W	WR-28 3-006	599 54C-003
Q365A	33 to 50	1.4	1.6	25	1.5 W	WR-22 3-010	383 67B-006
U365A	40 to 60	1.4	1.8	25	1.5 W	WR-19 3-014	383 (mod) 67B-007
V365A	50 to 75	1.5	2.0	25	1 W	WR-15 3-017	385 67B-008
W365A	75 to 110	1.5	2.5	25	1 W	WR-10 3-023	387 (mod) 67B-010

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HP 11540A Waveguide Stand

HP 11545/546/547/548A Waveguide Holders

The HP 11540A waveguide stand locks HP waveguide holders at any height from 70 to 133 mm (2.75 in to 5.25 in). The stand is 64 mm (2.5 in) high, and the base measures 121 mm (4.75 in) in diameter.

HP 11545/546/547/548A waveguide holders are offered in four sizes to hold waveguide covering frequencies from 8.2 to 40 GHz. They consist of a molded plastic cradle with a center rod, as follows: HP 11545A X-Band, 11546A P-Band, 11547A K-Band, 11548A R-Band.

HP 11540A Waveguide Stand Shipping Weight: 454 g (1 lb).

HP 11545A to 11548A Waveguide Holder Shipping Weight: 220 g (8 oz).



HP 11540A

HP 11545A

Terminations, Fixed and Sliding



HP P910A



HP X914B

HP 910 Series Fixed Terminations

HP 910 waveguide loads are designed for terminating test systems operating at low average powers. The loads are carefully designed to absorb virtually all of the applied power and ensure a lower SWR. They may be used wherever a matched load is required, as in the measurements of reflection, discontinuities, or obstacles in waveguide systems.

HP X914B Sliding Load

This sliding load consists of a movable, tapered, low-reflection load element mounted in a section of precision waveguide. A plunger controls the position of the load, and provides a controllable range of at least one-half wavelength at the lowest waveguide frequency. This movement permits the phase of the residual load reflection to be reversed so that this reflection can be separated from other small reflections in the waveguide system. Sliding loads are often used in calibration procedures.

Specifications

HP Model	Frequency Range (GHz)	Maximum SWR	Maximum Power (avg)	Waveguide ¹ Designator EIA MIL-W-85/()	Flange ¹ Designator UG- ()/U MIL-F-3922/()	Length mm (in)	Shipping Weight kg (lb)
X910B	8.2 to 12.4	1.015	1 W	WR-90 1-077	39 54C-008	168 (6.6)	0.9 (2)
P910A	12.4 to 18	1.02	1 W	WR-62 1-089	419 70A-007	111 (4.4)	0.45 (1)
R910A	26.5 to 40	1.025	1 W	WR-28 3-006	599 54-003	60 (2.4)	0.2 (0.5)
Q910A	33 to 50	1.03	1 W	WR-22 3-013	383 67B-013	71 (2.8)	0.2 (0.5)
U910A	40 to 60	1.04	1 W	WR-19 3-015	383 (mod) 67B-007	71 (2.8)	0.2 (0.5)
W910C	75 to 110	1.03	0.2 W	WR-10 3-024	387 (mod) 67B-010	56 (2.2)	0.013 (0.03)
X914B	8.2 to 12.4	1.01 (Load Element)	1 W	WR-90 1-077	39 54C-008	257 (10.1)	0.9 (2)

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Waveguide Accessories

HP Waveguide Products Data

HP Band Designation	Frequency Range TE ₁₀ mode (GHz)	Waveguide Band Designator ¹						Other Common Usage	Materials ¹	Flange Designator ¹					
		EIA WR-()	IEC R-()	British WG-()	JAN RG-()	MIL-W- 85/()	Cover JAN UG-()			EIA CMR-()	MIL-F 3922/()	Choke JAN UG-()	EIA CPR-()		
S	2.6 to 3.95	284	32	10	75	1-041		Alum Alloy	56B-002	584	284	61-001	585A	284	
G	3.95 to 5.85	187	48	12	95	1-053	C, H	Alum Alloy	57B-001	407	187	62-001	406B	187	
J	5.85 to 8.2	137	70	14	106	1-065	Xn, C, G	Alum Alloy	55B-002	441	137	60-002	440B	137	
H	7.05 to 10	112	84	15	51	1-073	Xb, W	Copper Alloy	54C-005	51	112	59D-015	522B		
					68	1-072		Alum Alloy	54C-006	138	—	59D-016	137B	112	
X	8.2 to 12.4	90	100	16	52	1-079		Copper Alloy	54C-007	39	90	59D-013	40B	—	
					67	1-078		Alum Alloy	54C-008	135	—	59D-014	136B	90	
M	10 to 15	75	120	17	346	1-085		Copper Alloy	70A-004	—	75	59D-010	—	—	
					347	1-084		Alum Alloy	70A-005	—	—	—	—	—	
P	12.4 to 18	62	140	18	91	1-089	Ku, Y, U	Copper Alloy	70A-007	419	—	59D-001	541A	—	
					349	1-091		Alum Alloy	70A-008	—	—	59D-002	—	—	
N	15 to 22	51	180	19	353	1-096		Copper Alloy	70A-010	—	—	69D-004	—	—	
					351	1-098		Alum Alloy	70A-011	—	—	69D-005	—	—	
K	18 to 26.5	42	220	20	53	1-102		Copper Alloy	54C-001	595	—	59D-003	596A	—	
					121	1-104		Alum Alloy	54C-002	597	—	59D-004	598A	—	
R	26.5 to 40	28	320	22	96	3-007	V, Ka, U, A	Copper Alloy	54C-003	599	—	59D-005	600A	—	
					—	3-009		Alum Alloy	—	—	—	—	—	—	
Q	33 to 50	22	400	23	272	3-011		Copper Alloy	67B-006	383	—	—	—	—	
					—	3-013		Alum Alloy	67B-013	—	—	—	—	—	
U	40 to 60	19	500	24	358	3-015		Copper Alloy	67B-007	383 (mod)	—	—	—	—	
					—	—		Alum Alloy	—	—	—	—	—	—	
V	50 to 75	15	620	25	273	3-018	M	Copper Alloy	67B-002	385	—	—	—	—	
					—	—		Alum Alloy	—	—	—	—	—	—	
W	75 to 110	10	900	27	359	3-024		Copper Alloy	67B-010	387 (mod)	—	—	—	—	
					—	—		Alum Alloy	—	—	—	—	—	—	

¹ The Waveguide/Flange Designator is provided to determine interface dimensions and generic material of HP products.

Abbreviations

EIA – Electronic Industries Association

IEC – International Electrotechnical Commission

JAN – Joint Army Navy

Waveguide Accessories

HP Band Designation	Waveguide Dimensions						Nom. Wall Thickness mm (in)	Cutoff Frequency (GHz)	Theoretical Attenuation Low to High Frequency (dB/100 ft)	Theoretical Peak Power Rating-Low to High Frequency megawatts (kw)	Theoretical CW Power Rating-Low to High Frequency kilowatts (watts)
	Inside Dimensions			Outside Dimensions							
	Width mm (in)	Height mm (in)	Tol ± mm (in)	Width mm (in)	Height mm (in)	Tol ± mm (in)					
S	72.14 (2.84)	34.04 (1.34)	0.15 (0.006)	76.20 (3.0)	38.10 (1.5)	0.15 (0.006)	2.03 (0.08)	2.08	0.950 - 0.651	7.645 - 10.85	13.42 - 19.59
G	47.55 (1.872)	22.15 (0.872)	0.13 (0.005)	50.80 (2.0)	25.40 (1.0)	0.13 (0.005)	1.63 (0.064)	3.155	1.785 - 1.238	3.296 - 4.69	5.165 - 7.446
J	34.85 (1.372)	15.80 (0.622)	0.10 (0.004)	38.10 (1.5)	19.05 (0.75)	0.10 (0.004)	1.63 (0.064)	4.285	3.532-1.999	1.975 - 2.53	2.076 - 3.667
H	28.50 (1.122)	12.62 (0.497)	0.10 (0.004)	31.75 (1.250)	15.88 (0.625)	0.10 (0.004)	1.63 (0.064)	5.260	4.114 - 3.197	1.284 - 1.702	1.607 - 2.067
								5.260	4.166 - 3.238	1.284 - 1.702	1.523 - 1.958
X	22.86 (0.900)	10.16 (0.40)	0.10 (0.004)	25.40 (1.0)	12.70 (0.5)	0.10 (0.004)	1.27 (0.05)	6.560	6.424 - 4.445	0.758 - 1.124	0.8621 - 1.246
								6.560	6.506 - 4.502	0.758 - 1.124	0.8169 - 1.180
M	19.05 (0.75)	9.53 (0.375)	0.08 (0.003)	21.59 (0.850)	12.07 (0.475)	0.08 (0.003)	1.27 (0.05)	7.847	7.601 - 5.309	0.622 - 0.903	0.6621 - 0.9479
								7.847	7.698 - 5.377	0.622 - 0.903	0.6273 - 0.8982
P	15.80 (0.622)	7.90 (0.311)	0.06 (0.0025)	17.83 (0.702)	9.93 (0.391)	0.08 (0.003)	1.02 (1.02)	9.490	9.578 - 7.041	0.457 - 0.633	0.4513 - 0.6139
								9.490	9.700 - 7.131	0.457 - 0.633	0.4276 - 0.5816
N	12.95 (0.51)	6.48 (0.255)	0.06 (0.0025)	14.99 (0.59)	8.51 (0.335)	0.08 (0.003)	1.02 (0.04)	11.54	13.08 - 9.477	0.312 - 0.433	0.2899 - 0.4000
								11.54	13.25 - 9.598	0.312 - 0.433	0.2746 - 0.3791
K	10.67 (0.42)	4.32 (0.17)	0.05 (0.002)	12.70 (0.5)	6.35 (0.25)	0.08 (0.003)	1.02 (0.04)	14.08	20.48 - 15.04	0.171 - 0.246	0.1565 - 0.2132
								14.08	20.74 - 15.23	0.171 - 0.246	0.1483 - 0.2020
R	7.11 (0.280)	3.56 (0.14)	0.04 (0.0015)	9.14 (0.36)	5.59 (0.22)	0.05 (0.002)	1.02 (0.04)	21.10	23.02 - 15.77	(96.0 - 146)	(109.7 - 160.1)
								21.10	34.46 - 23.59	(96.0 - 146)	(73.27 - 107.0)
Q	5.69 (0.224)	2.84 (0.112)	0.03 (0.001)	7.72 (0.304)	4.88 (0.192)	0.05 (0.002)	1.02 (0.04)	26.35	32.44 - 22.05	(64.4 - 97.0)	(68.89 - 101.4)
								26.35	48.53 - 32.99	(64.4 - 97.0)	(46.05 - 67.74)
U	4.78 (0.188)	2.39 (0.094)	0.03 (0.001)	6.81 (0.268)	4.42 (0.174)	0.05 (0.002)	1.02 (0.04)	30.69	39.81 - 28.60	(48.0 - 70.0)	(51.32 - 71.43)
								30.69	—	(48.0 - 70.0)	—
V	3.76 (0.148)	1.88 (0.074)	0.03 (0.001)	5.79 (0.228)	3.91 (0.154)	0.05 (0.002)	1.02 (0.04)	39.90	60.25 - 41.17	(30.0 - 40.0)	(30.27 - 44.30)
								39.90	—	(30.0 - 40.0)	—
W	2.54 (0.100)	1.27 (0.05)	0.03 (0.001)	4.57 (0.18)	3.30 (0.13)	0.05 (0.002)	1.02 (0.04)	58.85	105.6 - 74.26	(14.0 - 20.0)	(14.73 - 20.86)
								58.85	—	(14.0 - 20.0)	—

Waveguide Accessories

Frequency Band Data

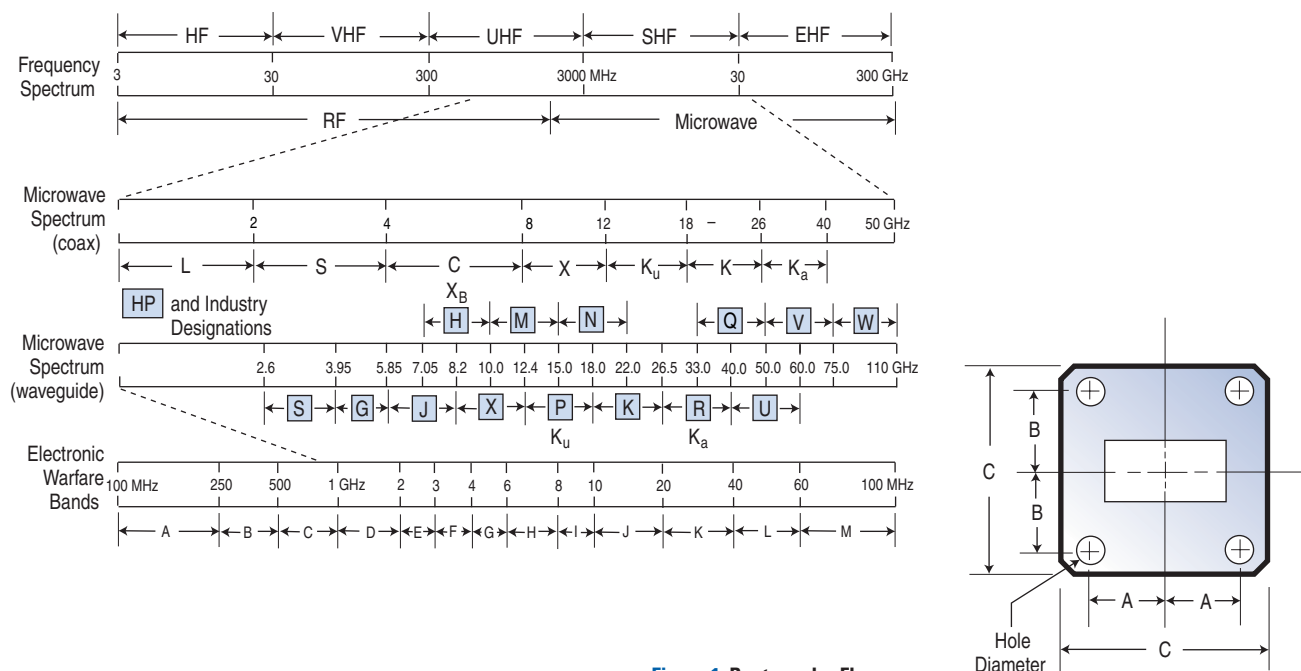


Figure 1. Rectangular Flanges

H, X, M, P, N, K, R Bands

Rectangular Flanges

HP Flange Data (7.05 to 40.0 GHz)¹

HP Band	Waveguide Designator			Flange Designator			Dimensions mm (in)			
	Frequency Range (GHz)	EIA	MIL-W-85(/)	Material B: Copper Alloy A: Alum. Alloy	JAN UG-()/U	MIL-F-3922(/)	A	B	C	Hole Diameter
H	7.05 to 10	WR-112	1-073	B	51	54C-005	17.2	18.7	47.6	4.3
			1-072	A	138	54C-006	(0.676)	(0.737)	(1.875)	(0.169)
X	8.2 to 12.4	WR-90	1-079	B	39	54C-007	15.5	16.3	41.3	4.3
			1-078	A	135	54C-008	(0.61)	(0.64)	(1.625)	(0.169)
M	10 to 15	WR-75	1-085	B	—	70A-004	13.2	14.2	38.1	3.6
			1-084	A	—	70A-005	(0.52)	(0.561)	(1.50)	(0.14)
P	12.4 to 18	WR-62	1-089	B	419	70A-007	12.6	12.1	33.5	3.7
			1-091	A	—	70A-008	(0.497)	(0.478)	(1.32)	(0.144)
N	15 to 22	WR-51	1-096	B	—	70A-010	10.3	11.3	30.1	3.6
			1-098	A	—	70A-011	(0.405)	(0.443)	(1.187)	(0.14)
K	18 to 26.5	WR-42	1-102	B	595	54C-001	8.1	8.5	22.2	2.9
			1-104	A	597	54C-002	(0.32)	(0.335)	(0.875)	(0.116)
R	26.5 to 40	WR-28	3-007	B	599	54-003	6.4	6.7	19.1	2.9
			3-009	A	—	—	(0.25)	(0.265)	(0.75)	(0.116)

¹ See Figure 1.

Waveguide Accessories

Figure 2a.

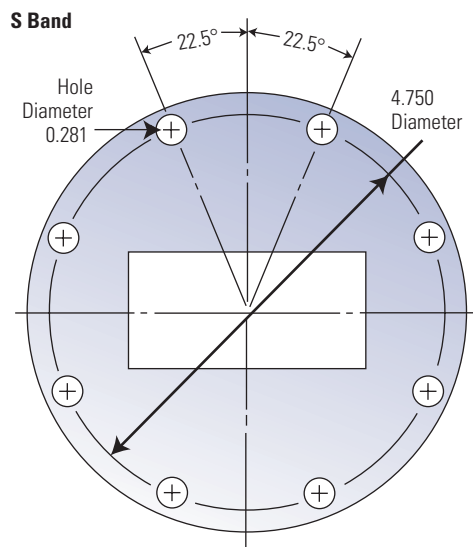


Figure 2b.

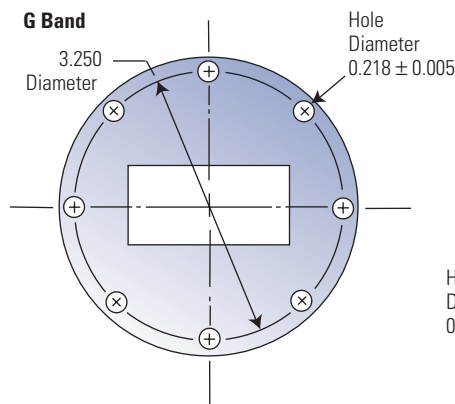
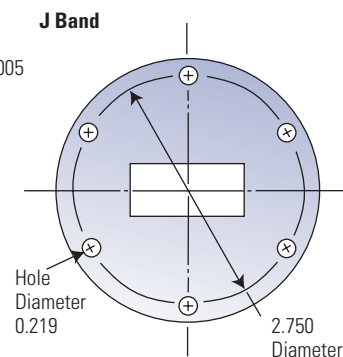
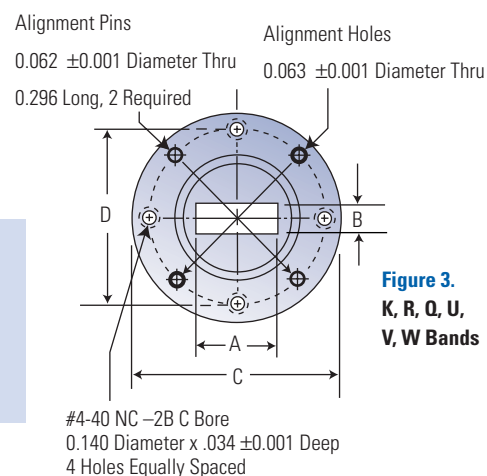


Figure 2c.

HP Circular Flange Data (2.6 to 8.2 GHz)¹

HP Band	Frequency Range (GHz)	Waveguide Designator			Flange Designator	
		EIA	MIL-W-85/()	Material	MIL-F-3922/()	JAN UG-()/U
S	2.60 to 3.95	WR-284	1-041	Alum. Alloy	56B-002	584
G	3.95 to 5.85	WR-187	1-053	Alum. Alloy	57B-001	407
J	5.85 to 8.20	WR-137	1-065	Alum. Alloy	55B-002	441

¹ See Figures 2a, 2b, and 2c.Figure 3.
K, R, Q, U,
V, W BandsHP Precision Circular Flange Data (18.0 to 110.0 GHz)²

HP Band	Frequency Range (GHz)	Waveguide Designator			Flange Designator		Dimensions mm (in)			
		EIA	MIL-W-85/()	Material B: Copper Alloy A: Alum. Alloy	MIL-F-3922/()	JAN UG-()/U	A	B	C Diameter	D Diameter
K	18 to 26.5	WR-42	1-102	B	67B-004	425	10.7	4.3	28.6	23.8
			1-104	A	67B-011	—	(0.42)	(0.17)	(1.125)	(0.9375)
R	26.5 to 40	WR-28	3-007	B	67B-005	381	7.1	3.6	28.6	23.8
			3-009	A	67B-012	—	(0.28)	(0.14)	(1.125)	(0.9375)
Q	33 to 50	WR-22	3-011	B	67B-006	383	5.7	2.8	28.6	23.8
			3-013	A	67B-013	—	(0.224)	(0.112)	(1.125)	(0.9375)
U	40 to 60	WR-19	3-015	B	67B-007	383 (mod)	4.8	2.4	28.6	23.8
			—	A	—	—	(0.188)	(0.094)	(1.125)	(0.9375)
V	50 to 75	WR-15	3-018	B	67B-002	385	3.8	1.9	19.1	14.3
			—	A	—	—	(0.148)	(0.074)	(0.75)	(0.5625)
W	75 to 110	WR-10	3-024	B	67B-010	387 (mod)	2.5	1.3	19.1	14.3
			—	A	—	—	(0.10)	(0.050)	(0.75)	(0.5625)

² See Figure 3.