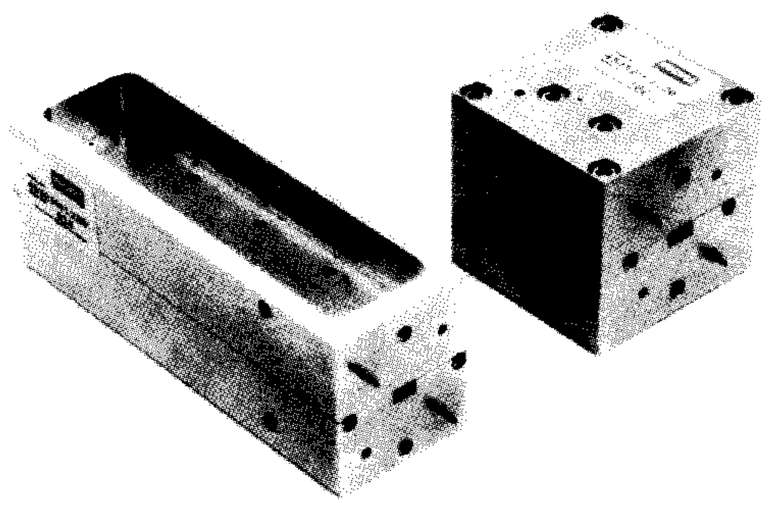
General Purpose and Crossguide Couplers



The Hughes General Purpose Coupler is a three port coupler made with rugged split block design. It is available with coupling values of 3, 6, 10, 20, 30 and 40dB. The directivity of these couplers is 20dB. They are available in nine waveguide bands from 18 to 170 GHz.

The compact Hughes Crossguide Coupler is available with 20 dB nominal coupling. For coupling values above 20 dB, consult factory. The directivity of this coupler is 20 dB at W-band or below and 15 dB at F-band and above. In Ka- through D-band, two designs of Crossguide Couplers

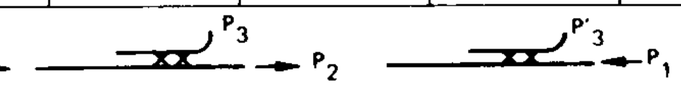
FEATURES: **± 0.7 dB Coupling Flatness**

ELECTRICAL SPECIFICATIONS

	Frequency Band (GHz)								
	K (18-26.5)	Ka (26.5-40)	Q (33-50)	U (40-60)	V (50-75)	E (60-90)	W (75-110)	F (90-140)	D (110-170)
General Purpose Split Block Coupling Value ① (dB)	3, 6, 10, 20 30, 40	3, 6, 10, 20 30, 40	3, 6, 10, 20 30, 40	3, 6, 10, 20 30, 40	3, 6, 10, 20 30, 40	3, 6, 10, 20 30, 40	3, 6, 10, 20 30, 40	3, 6, 10, 20 30, 40	3, 6, 10, 20 30, 40
Coupling Flatness ② (± dB)	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7
Insertion Loss ③ (dB max)	0.7	0.7	0.7	0.7	0.8	1.4	1.4	2.0	2.0
Directivity ④ (dB min)	20	20	20	20	20	20	20	20	20
Main Line VSWR (max)	1.2:1	1.2:1	1.2:1	1.2:1	1.2:1	1.2:1	1.2:1	1.2:1	1.25:1
Secondary Line VSWR (max)	1.2:1	1.2:1	1.2:1	1.2:1	1.2:1	1.25:1	1.25:1	1.25:1	1.3:1
Crossguide									
Bandwidth (GHz)									
Low Band	18-26.5	26.5-35	33-44	40-54	50-67	60-81	75-99	90-125	110-152
High Band		30-40	38-50	46-60	57-75	69-90	85-110	105-140	128-170
Coupling Value ① (dB)	20	20	20	20	20	20	20	20	20
Coupling Flatness (± dB)	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
Insertion Loss ③ (dB max)	0.5	0.5	0.5	0.6	0.6	1.0	1.0	1.5	1.7
Directivity ④ (dB min) ⑤	20	20	20	20	20	20	20	15	15
Main Line VSWR	1.15:1	1.15:1	1.15:1	1.15:1	1.15:1	1.2:1	1.2:1	1.2:1	1.25:1
Secondary Line VSWR	1.2:1	1.2:1	1.2:1	1.2:1	1.21:1	1.25:1	1.25:1	1.25:1	1.3:1

①Coupling value = $-10 \log_{10} (P_3/P_1)$ ②Over full waveguide bandwidth

③Insertion loss = $-10 \log_{10} [(P_2 + P_3)/P_1]$ ④ Directivity = $10 \log_{10} (P_3/P_3')$



⑤On 4 Port Couplers, directivity is dependent on impedance match at coupled ports.

HOW TO ORDER

4 Port Crossguide 4535xH-xx20
3 Port Crossguide (fourth port terminated) 4535xH-xx20
3 Port Split Block Style General Purpose 4532xH-x2xx

Frequency Band
0: K
1: Ka
2: Q
3: U
4: V
5: E
6: W
7: F
8: D

Flange Type
1: Round (Ka- through D-band only)
2: Square (Available in K- and Ka-bands only)

Coupling Value
03: 3 dB
06: 6 dB
10: 10 dB
20: 20 dB
30: 30 dB
40: 40 dB

Crossguide Coupler Type
2: 3 Port (4th port terminated) Low Frequency Band
3: 3 Port (4th port terminated) High Frequency Band
4: 4 Port Low Frequency Band
5: 4 Port High Frequency Band

Example: To order a W-band 94 GHz 3 Port Terminated Crossguide Coupler, specify a 45356H-1320.

are available per band. One design covers the lower 70% of the band, the other the upper 70%. The Crossguide Couplers are available in nine waveguide bands from 18 to 170 GHz.

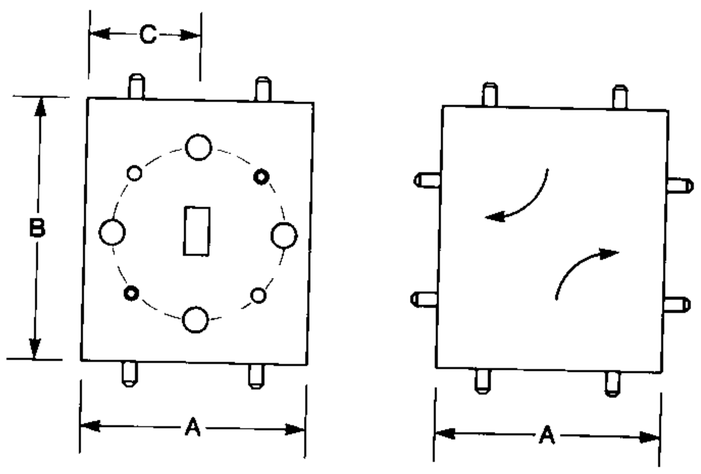
Hughes Directional Couplers are convenient devices for extracting or introducing RF power flowing in a transmission line without disturbing the other characteristics of the circuit. Some of the functions for which couplers offer ideal solutions are measuring and sampling RF power and comparing incident and reflected signals.

Insertion Loss As Low As 0.7 dB MAX

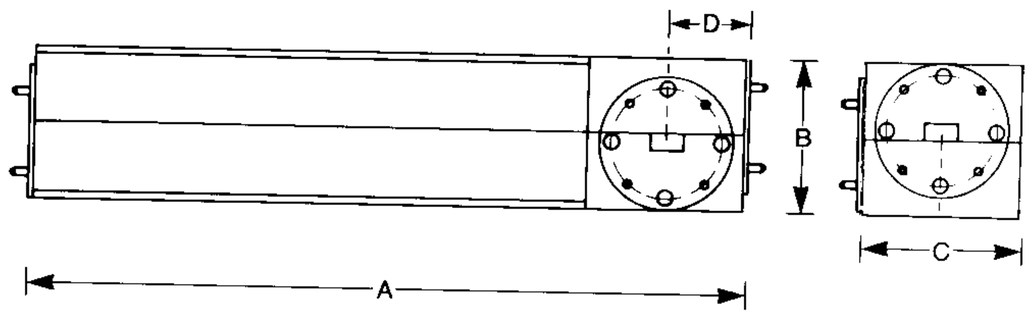
VSWR As Low As 1.2:1 MAX

OUTLINE DRAWINGS

Crossguide Coupler



General Purpose Split Block Coupler



MECHANICAL SPECIFICATIONS①

		Frequency Band (GHz)									
		K (18-26.5)	Ka (Round) (26.5-40)	Ka (Square) (26.5-40)	Q (33-50)	U (40-60)	V (50-75)	E (60-90)	W (75-110)	F (90-140)	D (110-170)
Dimensions (inches (cm))	A	4.5 (11.43)	3.70 (9.40)	3.29 (8.36)	3.70 (9.40)	3.70 (9.40)	3.20 (8.13)	3.20 (8.13)	3.20 (8.13)	3.20 (8.13)	3.20 (8.13)
	B	1.3 (3.30)	1.30 (3.30)	0.93 (2.36)	1.30 (3.30)	1.30 (3.30)	0.86 (2.18)	0.86 (2.18)	0.86 (2.18)	0.83 (2.10)	0.83 (2.10)
General Purpose Split Block Style	C	1.4 (3.56)	1.23 (3.12)	1.12 (2.84)	1.23 (3.12)	1.23 (3.12)	1.00 (2.54)	1.00 (2.54)	1.00 (2.54)	0.92 (2.34)	0.92 (2.34)
	D	.775 (1.97)	.689 (1.75)	0.51 (1.30)	.689 (1.75)	0.80 (2.03)	0.61 (1.55)	0.61 (1.55)	0.61 (1.55)	0.61 (1.55)	0.61 (1.55)
Crossguide Style	A	1.46 (3.70)	1.46 (3.70)	1.46 (3.70)	1.46 (3.70)	1.46 (3.70)	1.03 (2.61)	1.03 (2.61)	1.03 (2.61)	1.03 (2.61)	1.03 (2.61)
	B	1.50 (3.81)	1.50 (3.81)	1.50 (3.81)	1.50 (3.81)	1.50 (3.81)	1.00 (2.54)	1.00 (2.54)	1.00 (2.54)	1.00 (2.54)	1.00 (2.54)
	C	0.80 (2.02)	0.80 (2.02)	0.80 (2.02)	0.78 (1.98)	0.77 (1.96)	0.55 (1.39)	0.54 (1.37)	0.53 (1.36)	0.53 (1.36)	0.53 (1.36)
Waveguide Size②		WR-42	WR-28	WR-28	WR-22	WR-19	WR-15	WR-12	WR-10	WR-8	WR-6
Waveguide Flange②		UG-595/U	UG-381/U④	UG-599/U③	UG-383/U	UG-383/U (mod)	UG-385/U	UG-387/U	UG-387/U (mod)	UG-387/U (mod)	UG-387/U (mod)

① Aluminum Housing K Thru U-Bands
Brass Housing V Thru D-Bands
② Refer to page 157 for specifications and MIL specification cross reference.
③ Square flange
④ Round flange