

Loop Couplers

MDL waveguide loop coupler cover the frequency spectrum from WR90 to WR2100, and are widely used in RF circuits requiring directional power injection or extraction.

These units are available as uni- or bi-directional couplers. Modifications to the standard designs are available on request.

W/G SIZE	FREQ. RANGE (GHz)	MIN COUPLING VALUE (dB)	WITH BI-DIRECTIONAL CONNECTORS					
			WITH UNI-DIRECTIONAL CONNECTORS (FIG)	SAME SIDE (FIG)	ONE TOP/ ONE BOTTOM (FIG)	(FIG)	(FIG)	(FIG)
WR90	8.20-12.40	20 to 70	90LT16	1*	90LT26	2*	90LT36	3*
WR112	7.05-10.00	25 to 70	112LT16	1*	112LT26	2*	112LT36	3*
WR137	5.85-8.20	30 to 70	137LT16	4	137LT26	5	137LT36	6
WR159	4.90-7.05	30 to 70	159LT16	4	159LT26	5	159LT36	6
WR187	3.95-5.85	30 to 70	187LT16	4	187LT26	5	187LT36	6
WR229	3.30-4.90	35 to 70	229LT16	4	229LT26	5	229LT36	6
WR284	2.60-3.95	35 to 70	284LT16	4	284LT26	5	284LT36	6
WR430	1.70-2.60	40 to 70	430LT16	7	430LT26	8		
				4	430LT46	5	430LT56	6
WR650	1.12-1.70	40 to 70	650LT16	7	650LT26	8		
				4	650LT46	5	650LT56	6

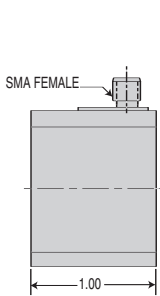


FIGURE 1

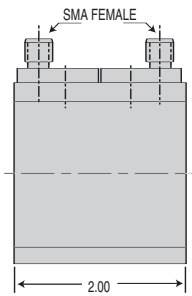


FIGURE 2

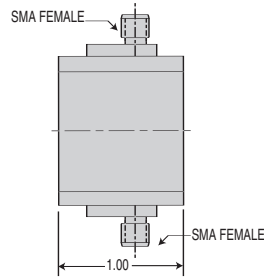


FIGURE 3

Flange faces equivalent to STD cover flange except tapped holes.

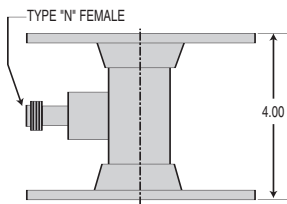


FIGURE 4

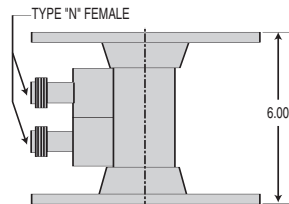


FIGURE 5

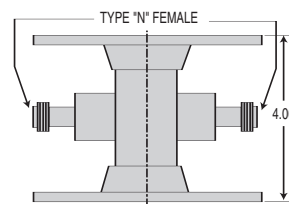


FIGURE 6

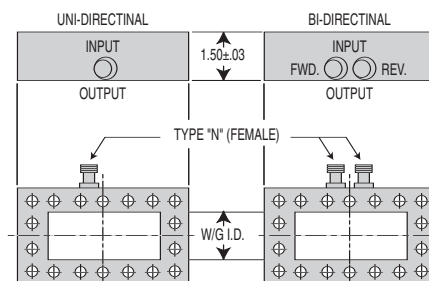


FIGURE 7

FIGURE 8

*All lengths as shown are for cover flanges only. When couplers are made with choke, cover or choke, choke lengths are greater.

ELECTRICAL DATA

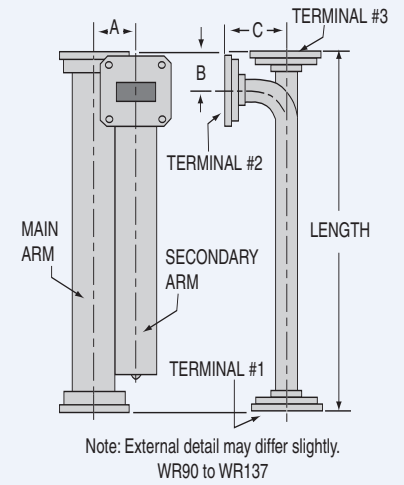
- Frequency:** Bandwidth to be specified.
- Coupling Value:** To be specified.
- Coupling Sensitivity:** Approximately +/- 1dB for 20% bandwidth.
- Directivity:** 25dB for 2% of the waveguide band
20dB for 20% of the waveguide band
15dB for coupling values < 30dB for 20% of the waveguide band.
- VSWR:** Main arm: 1.05 max. typical for coupling values greater than 30dB.
- Power:** The main arm will handle approximately 90% of waveguide rating. The internal load in the loop will handle 5 watts average power at 25°C.
- Output Connectors:** WR90 to 112 SMA female
WR137 to 2100 type "N" female.

Narrow-wall couplers

NARROW-WALL COUPLERS

W/G SIZE	FREQ. RANGE (GHz)	MDL MODEL NUMBERS	MEAN COUPLING (dB)	VAR. FROM MEAN COUPLING vs FREQ. (dB)	PEAK POWER MAIN ARM (KW)	DIRECTIVITY (dB min)	MECHANICAL DIMENSIONS (INCHES)			INPUT TERMINAL FLANGES EQUIV. TO	
							LGT.	A	B		C
WR90	8.20-12.40	90CS136-1	10 ± 0.7	±1.5	200	30	11.50	0.95	0.90	1.60	UG39/U
		90CS146-1	20 ± 0.7	±1.5	200	30	10.25	0.95	0.90	1.60	UG135/U
		90CS156-1	30 ± 0.7	±1.5	200	30	10.25	0.95	0.90	1.60	
	8.50-10.50	90CS76-1	10 ± 1.0	Included in mean coupling	200	25	8.25	0.95	0.90	1.60	
		90CS86-1	20 ± 1.0		200	25	8.25	0.95	0.90	1.60	
		90CS96-1	30 ± 1.0		200	25	8.25	0.95	0.90	1.60	
WR112	8.50-9.60	112CS106-1*	30 ± 1.0	Included in mean coupling	350	25	7.00	1.06	0.90	1.60	Main arm: UG51/U
		112CS116-1*	40 ± 1.0		350	25	7.00	1.06	0.90	1.60	UG138/U
		112CS126-1*	50 ± 1.0		350	25	7.00	1.06	0.90	1.60	Secondary arm: UG39/U
	7.05-10.00	112CS66-1	10 ± 0.7	±1.5	350	30	12.75	1.17	1.00	2.00	UG135/U
		112CS76-1	20 ± 0.7	±1.5	350	30	11.25	1.17	1.00	2.00	UG138/U
		112CS86-1	30 ± 0.7	±1.5	350	30	11.25	1.17	1.00	2.00	UG51/U
WR137	6.50-8.00	137CS16-1	10 ± 1.0	-	500	25	16.50	1.44	1.80	2.30	UG441/U
		137CS26-1	20 ± 1.0	-	500	25	16.50	1.44	1.80	2.30	UG344/U

*WR90 waveguide in the auxiliary arm. Auxiliary arm load: 3 watts average.



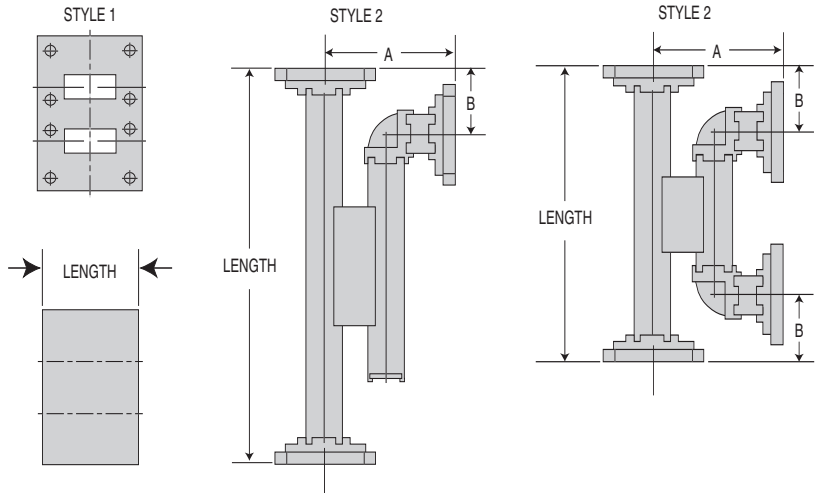
Branch Guide Couplers

These waveguide directional couplers offer characteristics which cannot be met by cross-guide, multi-aperture or slot type couplers, especially in the 6-12dB coupling range. They are of very short length and can handle almost full waveguide peak-pulse power capacity. Full waveguide band-widths may be specified: but for flat coupling, the bandwidth should be limited to approximately 10 percent.

Computer aided design for specified parameters enables MDL to reduce design and manufacturing time and assure optimum performance. Mean coupling can be held to a tighter tolerance than for other types of couplers. Directivity is 20dB min. Repeatability in production is facilitated by new manufacturing techniques.

W/G SIZE	FREQ. RANGE (GHz)	MDL MODEL NO.			MEAN COUPLING- (dB)	VAR. FROM MEAN COUPLING (dB)	MECHANICAL DIMENSIONS				
		STYLE 1	STYLE 2	STYLE 3			STYLE 1	LENGTH STYLE 2	STYLE 3	A	B
WR62	15.50-18.00	62CB16	62CB316	62CB416	3.0±.3	±.2	2.00	5.65	4.43	1.20	.81
		62CB36	62CB336	62CB436	6.0±.4	±.2	2.00	5.65	4.43	1.20	.81
		62CB56	62CB356	62CB456	10.0±.5	±.2	2.00	5.65	4.43	1.20	.81
WR90	8.50-9.60	90CB16	90CB316	90CB416	3.0±.3	±.3	2.50	6.00	5.00	2.00	.80
		90CB36	90CB336	90CB436	6.0±.4	±.3	2.50	6.00	5.00	2.00	.80
		90CB56	90CB356	90CB456	10.0±.5	±.3	2.50	6.00	5.00	2.00	.80
WR112	7.50-8.50	112CB16	112CB316	112CB416	3.0±.3	±.2	3.00	8.00	6.00	2.50	1.19
		112CB36	112CB336	112CB436	6.0±.4	±.2	3.00	8.00	6.00	2.50	1.19
		112CB56	112CB356	112CB456	10.0±.5	±.2	3.00	8.00	6.00	2.50	1.19
WR137	5.90-6.60	137CB16	137CB316	137CB416	3.0±.3	±.2	4.00	11.00	8.00	3.00	1.75
		137CB36	137CB336	137CB436	6.0±.4	±.2	4.00	11.00	8.00	3.00	1.75
		137CB56	137CB356	137CB456	10.0±.5	±.2	4.00	11.00	8.00	3.00	1.75
WR159	5.00-5.90	159CB16	159CB316	159CB416	3.0±.3	±.4	4.50	12.00	10.00	3.25	1.50
		159CB36	159CB336	159CB436	6.0±.4	±.5	4.50	12.00	10.00	3.25	1.50
		159CB56	159CB356	159CB456	10.0±.5	±.4	4.50	12.00	10.00	3.25	1.50
WR187	5.30-6.10	187CB16	187CB316	187CB416	3.0±.3	±.2	5.00	14.00	12.00	3.25	2.32
		187CB36	187CB336	187CB436	6.0±.4	±.2	5.00	14.00	12.00	3.25	2.32
		187CB56	187CB356	187CB456	10.0±.5	±.2	5.00	14.00	12.00	3.25	2.32
WR229	3.70-4.20	229CB16	229CB316	229CB416	3.0±.3	±.2	6.10	18.00	12.00	3.50	1.50
		229CB36	229CB336	229CB436	6.0±.4	±.3	6.10	18.00	12.00	3.50	1.50
		229CB56	229CB356	229CB456	10.0±.5	±.2	6.10	18.00	12.00	3.50	1.50
WR284	2.70-3.05	284CB16	284CB316	284CB416	3.0±.3	±.3	8.00	24.00	12.35	5.00	2.60
		284CB36	284CB336	284CB436	6.0±.4	±.3	8.00	24.00	12.35	5.00	2.60
		284CB56	284CB356	284CB456	10.0±.5	±.3	8.00	24.00	12.35	5.00	2.60

*Cross-guide couplers are available for loose coupling values only, and multi-aperture couplers are too lengthy for tight couplings. Short slot couplers, while capable of handling high power are usually available only in the 3.5 dB range. With reduced bandwidths the directivity can be greater than 30 dB.



Broadwall couplers

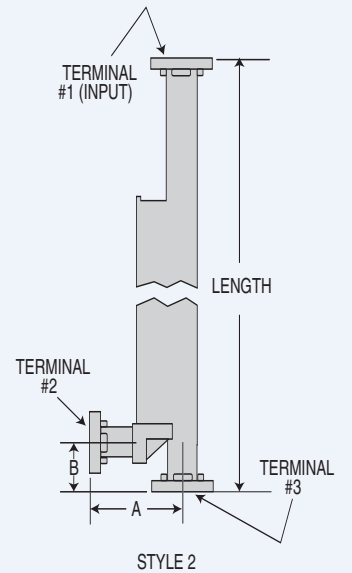
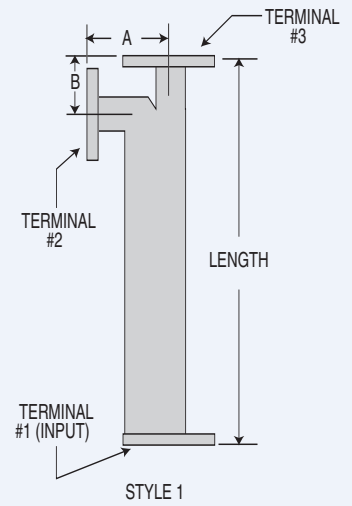
BROADWALL

W/G SIZE FREQ. RANGE (GHz)	MDL MODEL NUMBERS	MEAN COUPLING (dB) *	VAR. FROM MEAN COUPLING vs FREQ. (dB)	DIRECT- IVITY (dB min)	STYLE *	MECHANICAL DIMENSIONS (INCHES)			INPUT TERMINAL FLANGES EQUIVALENT TO
						LGT.	A	B	

Multihole

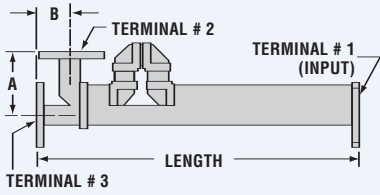
WR51 15.00-22.00	51CT16-1	3	±0.5	30	1	6.00	1.14	0.81	51FA52 (1.13 x 1.31 cover flange with four 0.144 dia. holes.)
	51CT26-1	6	±0.5	30	1	5.62	1.14	0.81	
	51CT36-1	10	±0.5	30	1	5.25	1.14	0.81	
	51CT46-1	20	±0.5	30	1	4.87	1.14	0.81	
	51CT56-1	30	±0.5	30	1	4.87	1.14	0.81	
WR62 12.40-18.00	62CT16-1	3	±0.5	30	1	7.00	1.20	0.81	UG419/U UG1665/U
	62CT26-1	6	±0.5	30	1	6.50	1.20	0.81	
	62CT36-1	10	±0.5	30	1	6.00	1.20	0.81	
	62CT46-1	20	±0.5	30	1	5.50	1.20	0.81	
	62CT56-1	30	±0.5	30	1	5.50	1.20	0.81	
WR75 10.00-15.00	75CT16-1	3	±0.5	25	1	8.25	1.50	0.80	75FA22 (1.50x1.50- cover flanges with four 6-32 threads.)
	75CT26-1	6	±0.5	25	1	7.50	1.50	0.80	
	75CT36-1	10	±0.5	25	1	7.00	1.50	0.80	
	75CT46-1	20	±0.5	25	1	6.50	1.50	0.80	
	75CT56-1	30	±0.5	25	1	6.50	1.50	0.80	
WR90 8.20-12.40	90CT86-1	3	±0.5	30	1	9.25	1.53	0.80	UG39/U, UG135/U except 8-32 threads
	90CT96-1	6	±0.5	30	1	8.50	1.53	0.80	
	90CT106-1	10	±0.5	30	1	7.75	1.53	0.80	
	90CT116-1	20	±0.5	30	1	7.25	1.53	0.80	
	90CT126-1	30	±0.5	30	1	7.25	1.53	0.80	
	90CT136-1	40	±0.5	30	1	7.25	1.53	0.80	
WR102 7.05-11.00	102CT16-1	3	±0.6	30	1	11.00	1.78	0.90	UG1493/U except 8-32 threads
	102CT26-1	6	±0.6	30	1	10.25	1.78	0.90	
	102CT36-1	10	±0.6	30	1	9.50	1.78	0.90	
	102CT46-1	20	±0.6	30	1	8.75	1.78	0.90	
	102CT56-1	30	±0.6	30	1	8.75	1.78	0.90	
	102CT86-1	10	±0.7	40	2	15.50	1.78	1.00	
	102CT96-1	20	±0.7	40	2	15.50	1.78	1.00	
WR112 7.00-10.00	112CT86-1	3	±0.4	30	1	12.00	1.75	1.19	UG51/U, UG138/U except 8-32 threads
	112CT96-1	6	±0.4	30	1	11.00	1.75	1.19	
	112CT106-1	10	±0.4	30	1	10.00	1.75	1.19	
	112CT116-1	20	±0.4	30	1	9.50	1.75	1.19	
	112CT126-1	30	±0.4	30	1	9.50	1.75	1.19	
	112CT136-1	40	±0.4	30	1	9.50	1.75	1.19	
WR137 5.40-8.20	137CT16-1	3	±0.5	30	1	15.00	2.38	1.75	UG441/U, UG344/U
	137CT26-1	6	±0.5	30	1	14.00	2.38	1.75	
	137CT36-1	10	±0.5	30	1	13.00	2.38	1.75	
	137CT46-1	20	±0.5	30	1	12.00	2.38	1.75	
	137CT56-1	30	±0.5	30	1	12.00	2.38	1.75	

*Style 1 not available with choke flange on input terminal



When ordering Style 2, contact factory for length.

MULTIHOLE COMPENSATED



Broadwall couplers

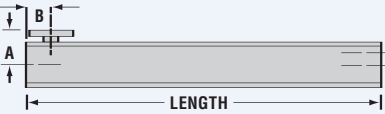
Multihole Compensated

MDL's broadwall compensated directional couplers feature minimum coupling variation with frequency – making them ideal for use in leveling circuits and broadband power monitoring. In contrast to most broadwall couplers, in which variation from mean coupling is ± 0.5 dB over a waveguide bandwidth, MDL's new compensated directional couplers reduce variation from mean coupling to only ± 0.2 to ± 0.3 dB.

W/G SIZE FREQ. RANGE (GHz)	MDL MODEL NUMBERS	MEAN COUPLING (dB)	VAR. FROM MEAN COUPLING vs FREQ. (dB)	DIRECT- IVITY (dB min)	MAIN ARM	SECOND ARM	MECHANICAL DIMENSIONS (INCHES)			INPUT TERMINAL FLANGES EQUIV TO†
							LGT.	A	B	
WR62 12.40-18.00	62FC16-1	20 \pm 0.50	± 0.20	25	1.08	1.25	8.00	1.20	0.81	UG419/U
WR90 8.20-12.40	90FC86-1	3 \pm 0.40	± 0.20	30	1.10	1.25	11.50	1.53	0.80	UG36/U
	90FC106-1	10 \pm 0.40	± 0.20	30	1.08	1.20	10.00	1.53	0.80	UG135/U except 8-32 thread
	90FC176-1	17 \pm 0.40	± 0.20	30	1.08	1.20	10.00	1.53	0.80	
WR102 7.00-11.00	102FC106-1	10 \pm 0.40	± 0.30	25	1.08	1.20	12.00	1.78	0.90	UG1493/U except 8-32 thread

† Terminal 1 (input) not available with choke flanges.

MULTIHOLE HIGH DIRECTIVITY



Multihole High Directivity

MDL high directivity couplers are made using broached waveguides. Walls on the waveguide are extremely thick to prevent changes in characteristics caused by physical distortion. The electrical design assures a minimum directivity of at least 45 dB and typically 50 dB over the entire band, making possible the design of high performance reflectometers: These couplers available with cover flanges only. Material aluminum only.

W/G SIZE FREQ. RANGE (GHz)	MDL MODEL NUMBERS	MEAN COUPLING (dB)	VAR. FROM MEAN COUPLING vs FREQ. (dB)	DIRECTIVITY (dB min)	MECHANICAL DIMENSIONS (INCHES)		
					LGT.	A	B
WR90 8.20-12.40	90CT336-1	10 \pm 0.40	± 0.50	50	13.62	1.25	0.80

Crossguide Couplers

MDL directional crossguide couplers, utilizing a new type of coupling aperture, exhibit high power-handling characteristics and are excellent for flat coupling over a given bandwidth. When calibrated, these couplers also perform efficiently as secondary standards for attenuating by known factors. MDL crossguide couplers are organized by WR number waveguide designations. For specific applications, MDL can design couplers to meet critical requirements for mean coupling values and directivity over limited bandwidths. Type "N" and "SMA" connectors can be supplied on the secondary arm output upon request overall dimensions remaining the same, or a standard AC adapter may be attached.

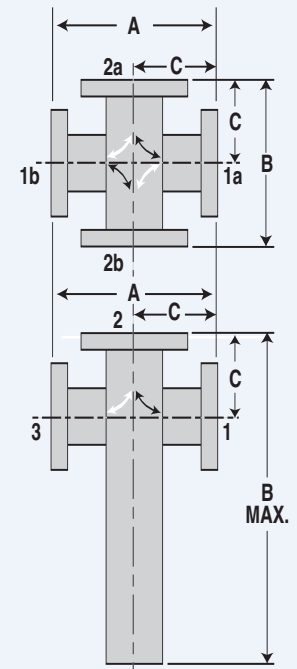
Either left or right directions of coupling are available. Left coupling will be supplied as standard, unless otherwise specified.

W/G SIZE FREQ. RANGE (GHz)	MDL MODEL NUMBERS	STYLE NO. OF PORTS	MEAN COUPLING (dB) *	DIRECT- IVITY (dB MIN)	MAX . VSWR	MECHANICAL DIMENSIONS (INCHES)		
						A	B	C
WR28 26.50 GHz to 39.00 GHz	28XT326	3	20 ¹	15	1.25	1.50	2.50	.75
	28XT336		30 ²	20	1.10	1.50	2.50	.75
	28XT346		40 ³	20	1.10	1.50	2.50	.75
	28XT426		20 ¹	20	1.25	1.50	1.50	.75
	28XT436		30 ²	20	1.10	1.50	1.50	.75
	28XT446	40 ³	20	1.10	1.50	1.50	.75	
WR42 18.00 GHz to 26.50 GHz	42XT326	3	20 ⁴	20	1.25	2.00	3.50	1.00
	42XT336		30	20	1.15	2.00	3.50	1.00
	42XT346		40	20	1.10	2.00	3.50	1.00
	42XT356		50	20	1.08	2.00	3.50	1.00
	42XT366		60	20	1.08	2.00	3.50	1.00
	42XT426		20 ⁴	20	1.25	2.00	2.00	1.00
	42XT436		30	20	1.15	2.00	2.00	1.00
	42XT446		40	20	1.10	2.00	2.00	1.00
	42XT456		50	20	1.08	2.00	2.00	1.00
	42XT466	60	20	1.08	2.00	2.00	1.00	
WR51 15.00 GHz to 22.00 GHz	51XT326	3	20 ⁴	20	1.25	2.25	4.00	1.12
	51XT336		30 ⁵	20	1.15	2.25	4.00	1.12
	51XT346		40 ⁵	20	1.10	2.25	4.00	1.12
	51XT356		50	20	1.08	2.25	4.00	1.12
	51XT366		60	20	1.08	2.25	4.00	1.12
	51XT426		20 ⁴	20	1.25	2.25	2.25	1.12
	51XT436		30 ⁵	20	1.15	2.25	2.25	1.12
	51XT446		40 ⁵	20	1.10	2.25	2.25	1.12
	51XT456		50	20	1.08	2.25	2.25	1.12
	51XT466	60	20	1.08	2.25	2.25	1.12	
WR62 12.40 GHz to 17.50 GHz	62XT326	3	20 ⁴	20	1.25	2.25	4.00	1.12
	62XT336		30 ⁴	20	1.15	2.25	4.00	1.12
	62XT346		40	20	1.10	2.25	4.00	1.12
	62XT356		50	20	1.08	2.25	4.00	1.12
	62XT366		60	20	1.08	2.25	4.00	1.12
	62XT426		20 ⁴	20	1.25	2.25	2.25	1.12
	62XT436		30 ⁴	20	1.15	2.25	2.25	1.12
	62XT446		40	20	1.10	2.25	2.25	1.12
	62XT456		50	20	1.08	2.25	2.25	1.12
	62XT466	60	20	1.08	2.25	2.25	1.12	

Notes: *Tolerance all values +/- 1.0dB

- 1 Variation = +/- .3dB, 26.5GHz to 39GHz
- 2 Variation = +/- 2.5dB, 26.5GHz to 40GHz
- 3 Variation = +/- 1.0dB, 26.5GHz to 40GHz
- 4 Variation = +/- .8dB
- 5 Variation = +/- .6dB
- 6 Variation = +/- .5dB

CROSSGUIDE COUPLERS

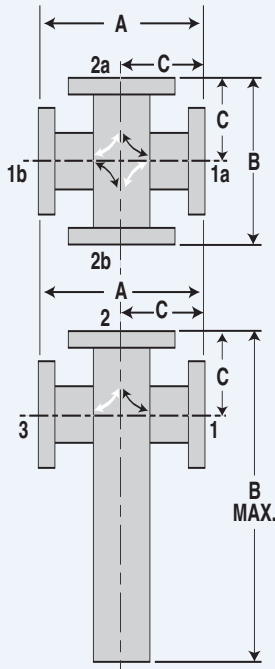


Right coupling indicated by white arrows
Left coupling indicated by black arrows

Variation

- 20 = +/- .5dB
- 30 = +/- .5dB
- 40 = +/- .4dB
- 50 = +/- .3dB
- 60 = +/- .3dB

Crossguide Couplers



Right coupling indicated by white arrows
 Left coupling indicated by black arrows

Variation
 20 = +/- .5dB
 30 = +/- .5dB
 40 = +/- .4dB
 50 = +/- .3dB
 60 = +/- .3dB

W/G SIZE FREQ. RANGE (GHz)	MDL MODEL NUMBERS	STYLE NO. OF PORTS	MEAN COUPLING (dB) *	DIRECT- IVITY (dB MIN)	MAX. VSWR	MECHANICAL DIMENSIONS (INCHES)		
						A	B	C
WR75 10.00 GHz to 14.50 GHz	75XT326	3	20 ⁴	20	1.25	2.50	5.25	1.25
	75XT336		30 ⁴	20	1.15	2.50	5.25	1.25
	75XT346		40 ⁶	20	1.10	2.50	5.25	1.25
	75XT356	4	50	20	1.08	2.50	5.25	1.25
	75XT366		60	20	1.08	2.50	5.25	1.25
	75XT426		20 ⁴	20	1.25	2.50	2.50	1.25
	75XT436		30 ⁴	20	1.15	2.50	2.50	1.25
	75XT446	4	40 ⁶	20	1.10	2.50	2.50	1.25
	75XT456		50	20	1.08	2.50	2.50	1.25
	75XT466		60	20	1.08	2.50	2.50	1.25
WR90 8.20 GHz to 14.50 GHz	90XT326		3	20 ⁵	20	1.15	2.63	5.81
90XT336	30 ⁵	20		1.10	2.63	5.81	1.31	
90XT346	40	20		1.07	2.63	5.81	1.31	
90XT356	4	50	20	1.05	2.63	5.81	1.31	
90XT366		60	20	1.05	2.63	5.81	1.31	
90XT426		20 ⁵	20	1.15	2.63	2.63	1.31	
90XT436		30 ⁵	20	1.10	2.63	2.63	1.31	
90XT446	4	40	20	1.07	2.63	2.63	1.31	
90XT456		50	20	1.05	2.63	2.63	1.31	
90XT466		60	20	1.05	2.63	2.63	1.31	
WR102 7.00 GHz to 11.00 GHz		102XT326	3	20 ⁹	20 ^{**}	1.30	2.75	6.00
102XT336	30 ⁸	20 ^{**}		1.15	2.75	6.00	1.37	
102XT346	40	20 ^{**}		1.10	2.75	6.00	1.37	
102XT356	4	50	20 ^{**}	1.08	2.75	6.00	1.37	
102XT366		60	20 ^{**}	1.08	2.75	6.00	1.37	
102XT426		20 ⁹	20 ^{**}	1.30	2.75	2.75	1.37	
102XT436		30 ⁸	20 ^{**}	1.15	2.75	2.75	1.37	
102XT446	4	40	20 ^{**}	1.10	2.75	2.75	1.37	
102XT456		50	20 ^{**}	1.08	2.75	2.75	1.37	
102XT466		60	20 ^{**}	1.08	2.75	2.75	1.37	

Notes: *Tolerance all values +/- 1.0dB
 **15dB from 7.0 to 7.5GHz
 4 Variation +/- .8dB
 5 Variation +/- .6dB
 6 Variation +/- .5dB
 7 Variation +/- 1.5dB
 8 Variation +/- 1.0dB
 9 Variation +/- 1.4dB

Crossguide Couplers

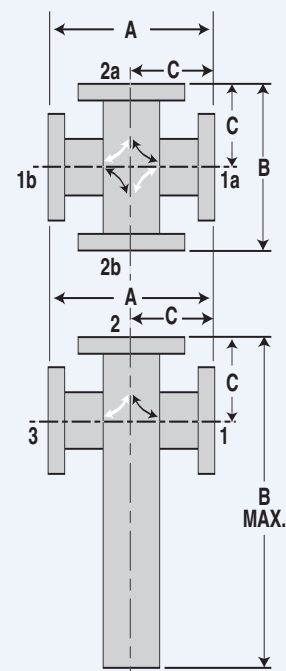
W/G SIZE FREQ. RANGE (GHz)	MDL MODEL NUMBERS	STYLE NO. OF PORTS	MEAN COUPLING (dB) *	DIRECT- IVITY (dB MIN)	MAX. VSWR	MECHANICAL DIMENSIONS (INCHES)		
						A	B	C
WR112 7.00 GHz to 10.00 GHz	112XT326	3	20	20	1.15	3.25	5.00	1.62
	112XT336		30	20	1.10	3.25	5.00	1.62
	112XT346		40	20	1.07	3.25	5.00	1.62
	112XT356	4	50	20	1.05	3.25	5.00	1.62
	112XT366		60	20	1.05	3.25	5.00	1.62
	112XT426		20	20	1.15	3.25	3.25	1.62
	112XT436		30	20	1.10	3.25	3.25	1.62
	112XT446	4	40	20	1.07	3.25	3.25	1.62
	112XT456		50	20	1.05	3.25	3.25	1.62
	112XT466		60	20	1.05	3.25	3.25	1.62
112XT466	60		20	1.05	3.25	3.25	1.62	
WR137 5.40 GHz to 8.20 GHz	137XT326	3	20	20	1.15	4.00	8.00	2.00
	137XT336		30	20	1.10	4.00	8.00	2.00
	137XT346		40	20	1.07	4.00	8.00	2.00
	137XT356	4	50	20	1.05	4.00	8.00	2.00
	137XT366		60	20	1.05	4.00	8.00	2.00
	137XT426		20	20	1.15	4.00	4.00	2.00
	137XT436		30	20	1.10	4.00	4.00	2.00
	137XT446	4	40	20	1.07	4.00	4.00	2.00
	137XT456		50	20	1.05	4.00	4.00	2.00
	137XT466		60	20	1.05	4.00	4.00	2.00
137XT466	60		20	1.05	4.00	4.00	2.00	
WR159 4.90 GHz to 6.85 GHz	159XT326	3	20 ⁷	20	1.25	4.50	9.50	2.25
	159XT336		30	20	1.15	4.50	9.50	2.25
	159XT346		40 ⁶	20	1.10	4.50	9.50	2.25
	159XT356	4	50	20	1.08	4.50	9.50	2.25
	159XT366		60	20	1.08	4.50	9.50	2.25
	159XT426		20 ⁷	20	1.25	4.50	4.50	2.25
	159XT436		30	20	1.15	4.50	4.50	2.25
	159XT446	4	40 ⁶	20	1.10	4.50	4.50	2.25
	159XT456		50	20	1.08	4.50	4.50	2.25
	159XT466		60	20	1.08	4.50	4.50	2.25
159XT466	60		20	1.08	4.50	4.50	2.25	

Notes: *Tolerance all values +/- 1.0dB

⁶ Variation +/- .5dB

⁷ Variation +/- 1.5dB

CROSSGUIDE COUPLERS



Right coupling indicated by white arrows
Left coupling indicated by black arrows

Variation

20 = +/- .5dB

30 = +/- .5dB

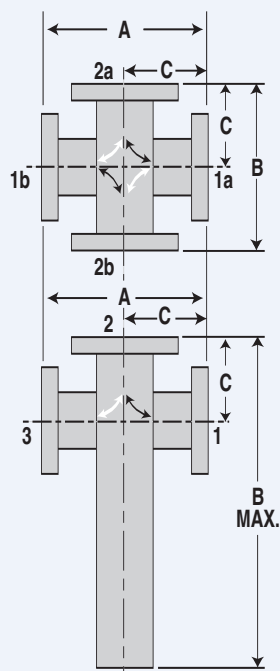
40 = +/- .4dB

50 = +/- .3dB

60 = +/- .3dB

Crossguide Couplers

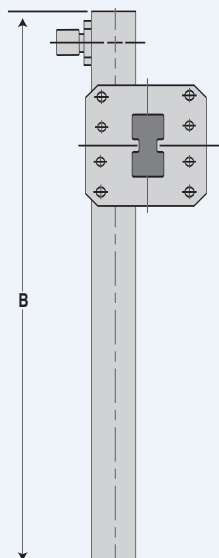
CROSSGUIDE COUPLERS



Right coupling indicated by white arrows
Left coupling indicated by black arrows

Variation

- 20 = +/- .5dB
- 30 = +/- .5dB
- 40 = +/- .4dB
- 50 = +/- .3dB
- 60 = +/- .3dB



W/G SIZE FREQ. RANGE (GHz)	MDL MODEL NUMBERS	STYLE NO. OF PORTS	MEAN COUPLING (dB) *	DIRECT- IVITY (dB MIN)	MAX. VSWR	MECHANICAL DIMENSIONS (INCHES)		
						A	B	C
WR187 3.95 GHz to 5.85 GHz	187XT326	3	20	20	1.15	5.00	10.00	2.50
	187XT336		30	20	1.10	5.00	10.00	2.50
	187XT346		40	20	1.07	5.00	10.00	2.50
	187XT356	4	50	20	1.05	5.00	10.00	2.50
	187XT366		60	20	1.05	5.00	10.00	2.50
	187XT426		20	20	1.15	5.00	5.00	2.50
	187XT436		30	20	1.10	5.00	5.00	2.50
187XT446	40	20	1.07	5.00	5.00	2.50		
187XT456	50	20	1.05	5.00	5.00	2.50		
187XT466	60	20	1.05	5.00	5.00	2.50		
WR229 3.30 GHz to 4.90 GHz	229XT326	3	20 ⁴	20	1.15	7.00	12.00	3.50
	229XT336		30 ⁴	20	1.10	7.00	12.00	3.50
	229XT346		40 ⁶	20	1.07	7.00	12.00	3.50
	229XT356	4	50	20	1.05	7.00	12.00	3.50
	229XT366		60	20	1.05	7.00	12.00	3.50
	229XT426		20 ⁴	20	1.15	7.00	7.00	3.50
	229XT436		30 ⁴	20	1.10	7.00	7.00	3.50
	229XT446	40 ⁶	20	1.07	7.00	7.00	3.50	
	229XT456	50	20	1.05	7.00	7.00	3.50	
	229XT466	60	20	1.05	7.00	7.00	3.50	
WR284 2.60 GHz to 3.95 GHz	284XT326	3	20 ⁵	20	1.15	8.00	13.00	4.00
	284XT336		30 ⁵	20	1.10	8.00	13.00	4.00
	284XT346		40	20	1.07	8.00	13.00	4.00
	284XT356	4	50	20	1.05	8.00	13.00	4.00
	284XT366		60	20	1.05	8.00	13.00	4.00
	284XT426		20 ⁵	20	1.15	8.00	8.00	4.00
	284XT436		30 ⁵	20	1.10	8.00	8.00	4.00
	284XT446	40	20	1.07	8.00	8.00	4.00	
	284XT456	50	20	1.05	8.00	8.00	4.00	
	284XT466	60	20	1.05	8.00	8.00	4.00	

W/G SIZE FREQ. RANGE (GHz)	MDL MODEL NUMBERS	STYLE NO. OF PORTS	MEAN COUPLING (dB) *	DIRECT- IVITY (dB MIN)	MAX. VSWR	MECHANICAL DIMENSIONS (INCHES)		
						A	B	C
WRD-750 8.00-16.00	D750XT346	3	40	15	1.05	2.50	6.00	1.25
	D750XT356		50	15	1.05	2.50	6.00	1.25
WRD-475 5.00-9.50	D475XT346	3	40	15	1.05	4.50	8.50	2.25
	D475XT356		50	15	1.05	4.50	8.50	2.25

Notes: *Tolerance all values +/- 1.0dB

⁴ Variation +/- .8dB

⁵ Variation +/- .6dB

⁶ Variation +/- .5dB

Section 5

Directional Couplers

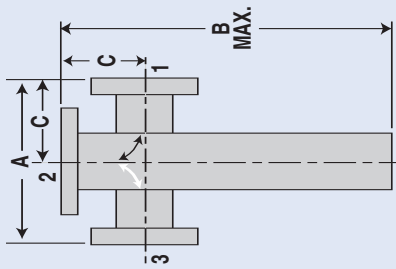


Introduction

At MDL, directional couplers have always received the engineering and manufacturing attention due a major component. A wide variety of types are offered, often tailored to specific applications. Included in the MDL line are cross-guide couplers with a coupling aperture design that is exclusive with MDL – broadwall, sidewall and branchguide couplers that were designed using our own computer program – waveguide loop couplers – a line of high directivity couplers featuring a minimum directivity of 45 dB over a full waveguide frequency band – and, the most recent addition, ridged waveguide couplers. Our experienced design group is also prepared to modify one of our standard models or design an entirely new coupler for your special applications.

Ordering Information*

Example: 90XT326-R-20P-1-A



MODEL NUMBER COUPLING DIRECTION PRESSURIZED TERMINAL FLANGES MATERIAL

90XT326-R-20P - 1 - A

Coupling Direction
Insert "R" for right-handed coupling.

Omit "R" for left-handed coupling.

Pressurized for 20PSIG.
Number indicates desired pressure

For non-pressurized, omit numerals and "P".

Flange Termination - 3 Flanges & Load

Flange	Port 1	Port 2	Port 3
1	Cover	Cover	Cover
2	Cover	Cover	Choke
3	Cover	Choke	Cover
4	Cover	Choke	Choke
5	Choke	Cover	Cover
6	Choke	Cover	Choke
7	Choke	Choke	Cover
8	Choke	Choke	Choke

Flange Termination - 4 Flanges

Flange	Port 1a	Port 2a	Port 1b	Port 2b
1	Cover	Cover	Cover	Cover
2	Cover	Cover	Cover	Choke
3	Cover	Cover	Choke	Cover
4	Cover	Cover	Choke	Choke
5	Cover	Choke	Cover	Cover
6	Cover	Choke	Cover	Choke
7	Cover	Choke	Choke	Cover
8	Cover	Choke	Choke	Choke
9	Choke	Cover	Cover	Cover
10	Choke	Cover	Cover	Choke
11	Choke	Cover	Choke	Cover
12	Choke	Cover	Choke	Choke
13	Choke	Choke	Cover	Cover
14	Choke	Choke	Cover	Choke
15	Choke	Choke	Choke	Cover
16	Choke	Choke	Choke	Choke

Material and Finish

Code	Material	Finish
A	Aluminum Alloy	No Finish
B	Copper Alloy	No Finish
C	Aluminum Alloy	Chromated
D	Copper Alloy	Silver Plated
E	Aluminum Alloy	Chromated and Painted Blue
F	Copper Alloy	Silver Plated and Painted Blue
G	Copper Alloy	Cadmium Plated
H	Copper Alloy	Silver Plated and Rhodium flashed
L	Copper Alloy	Silver Plated, Rhodium flashed and Painted Blue

* MDL reserves the right to discontinue or change specifications without notice.

Crossguide Couplers

MDL directional crossguide couplers, utilizing a new type of coupling aperture, exhibit high power-handling characteristics and are excellent for flat coupling over a given bandwidth. When calibrated, these couplers also perform efficiently as secondary standards for attenuating by known factors. MDL crossguide couplers are organized by WR number waveguide designations. For specific applications, MDL can design couplers to meet critical requirements for mean coupling values and directivity over limited bandwidths. Type "N" and "SMA" connectors can be supplied on the secondary arm output upon request overall dimensions remaining the same, or a standard AC adapter may be attached.

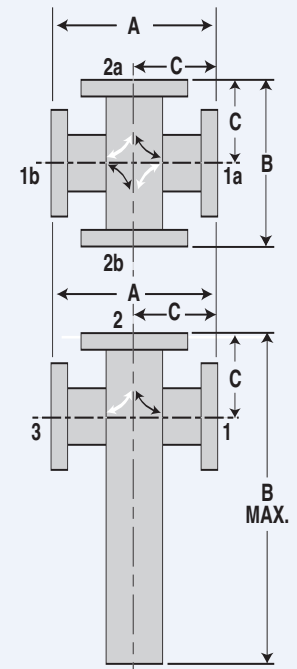
Either left or right directions of coupling are available. Left coupling will be supplied as standard, unless otherwise specified.

W/G SIZE FREQ. RANGE (GHz)	MDL MODEL NUMBERS	STYLE NO. OF PORTS	MEAN COUPLING (dB) *	DIRECT- IVITY (dB MIN)	MAX . VSWR	MECHANICAL DIMENSIONS (INCHES)		
						A	B	C
WR28 26.50 GHz to 39.00 GHz	28XT326	3	20 ¹	15	1.25	1.50	2.50	.75
	28XT336		30 ²	20	1.10	1.50	2.50	.75
	28XT346		40 ³	20	1.10	1.50	2.50	.75
	28XT426	4	20 ¹	20	1.25	1.50	1.50	.75
	28XT436		30 ²	20	1.10	1.50	1.50	.75
28XT446		40 ³	20	1.10	1.50	1.50	.75	
WR42 18.00 GHz to 26.50 GHz	42XT326	3	20 ⁴	20	1.25	2.00	3.50	1.00
	42XT336		30	20	1.15	2.00	3.50	1.00
	42XT346		40	20	1.10	2.00	3.50	1.00
	42XT356	4	50	20	1.08	2.00	3.50	1.00
	42XT366		60	20	1.08	2.00	3.50	1.00
	42XT426		20 ⁴	20	1.25	2.00	2.00	1.00
	42XT436		30	20	1.15	2.00	2.00	1.00
	42XT446		40	20	1.10	2.00	2.00	1.00
	42XT456		50	20	1.08	2.00	2.00	1.00
42XT466	60	20	1.08	2.00	2.00	1.00		
WR51 15.00 GHz to 22.00 GHz	51XT326	3	20 ⁴	20	1.25	2.25	4.00	1.12
	51XT336		30 ⁵	20	1.15	2.25	4.00	1.12
	51XT346		40 ⁵	20	1.10	2.25	4.00	1.12
	51XT356	4	50	20	1.08	2.25	4.00	1.12
	51XT366		60	20	1.08	2.25	4.00	1.12
	51XT426		20 ⁴	20	1.25	2.25	2.25	1.12
	51XT436		30 ⁵	20	1.15	2.25	2.25	1.12
	51XT446		40 ⁵	20	1.10	2.25	2.25	1.12
	51XT456		50	20	1.08	2.25	2.25	1.12
51XT466	60	20	1.08	2.25	2.25	1.12		
WR62 12.40 GHz to 17.50 GHz	62XT326	3	20 ⁴	20	1.25	2.25	4.00	1.12
	62XT336		30 ⁴	20	1.15	2.25	4.00	1.12
	62XT346		40	20	1.10	2.25	4.00	1.12
	62XT356	4	50	20	1.08	2.25	4.00	1.12
	62XT366		60	20	1.08	2.25	4.00	1.12
	62XT426		20 ⁴	20	1.25	2.25	2.25	1.12
	62XT436		30 ⁴	20	1.15	2.25	2.25	1.12
	62XT446		40	20	1.10	2.25	2.25	1.12
	62XT456		50	20	1.08	2.25	2.25	1.12
62XT466	60	20	1.08	2.25	2.25	1.12		

Notes: *Tolerance all values +/- 1.0dB

- 1 Variation = +/- .3dB, 26.5GHz to 39GHz
- 2 Variation = +/- 2.5dB, 26.5GHz to 40GHz
- 3 Variation = +/- 1.0dB, 26.5GHz to 40GHz
- 4 Variation = +/- .8dB
- 5 Variation = +/- .6dB
- 6 Variation = +/- .5dB

CROSSGUIDE COUPLERS

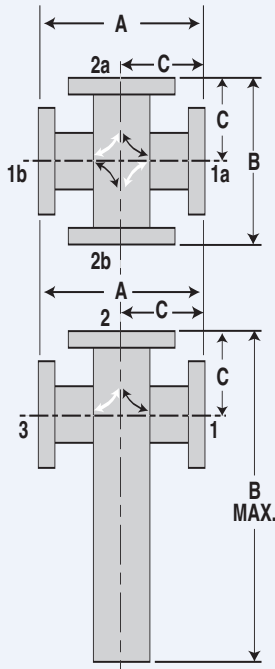


Right coupling indicated by white arrows
Left coupling indicated by black arrows

Variation

- 20 = +/- .5dB
- 30 = +/- .5dB
- 40 = +/- .4dB
- 50 = +/- .3dB
- 60 = +/- .3dB

Crossguide Couplers



Right coupling indicated by white arrows
 Left coupling indicated by black arrows

Variation
 20 = +/- .5dB
 30 = +/- .5dB
 40 = +/- .4dB
 50 = +/- .3dB
 60 = +/- .3dB

W/G SIZE FREQ. RANGE (GHz)	MDL MODEL NUMBERS	STYLE NO. OF PORTS	MEAN COUPLING (dB) *	DIRECT- IVITY (dB MIN)	MAX. VSWR	MECHANICAL DIMENSIONS (INCHES)		
						A	B	C
WR75 10.00 GHz to 14.50 GHz	75XT326	3	20 ⁴	20	1.25	2.50	5.25	1.25
	75XT336		30 ⁴	20	1.15	2.50	5.25	1.25
	75XT346		40 ⁶	20	1.10	2.50	5.25	1.25
	75XT356	4	50	20	1.08	2.50	5.25	1.25
	75XT366		60	20	1.08	2.50	5.25	1.25
	75XT426		20 ⁴	20	1.25	2.50	2.50	1.25
	75XT436		30 ⁴	20	1.15	2.50	2.50	1.25
	75XT446	4	40 ⁶	20	1.10	2.50	2.50	1.25
	75XT456		50	20	1.08	2.50	2.50	1.25
	75XT466		60	20	1.08	2.50	2.50	1.25
75XT466	60		20	1.08	2.50	2.50	1.25	
WR90 8.20 GHz to 14.50 GHz	90XT326	3	20 ⁵	20	1.15	2.63	5.81	1.31
	90XT336		30 ⁵	20	1.10	2.63	5.81	1.31
	90XT346		40	20	1.07	2.63	5.81	1.31
	90XT356	4	50	20	1.05	2.63	5.81	1.31
	90XT366		60	20	1.05	2.63	5.81	1.31
	90XT426		20 ⁵	20	1.15	2.63	2.63	1.31
	90XT436		30 ⁵	20	1.10	2.63	2.63	1.31
	90XT446	4	40	20	1.07	2.63	2.63	1.31
	90XT456		50	20	1.05	2.63	2.63	1.31
	90XT466		60	20	1.05	2.63	2.63	1.31
90XT466	60		20	1.05	2.63	2.63	1.31	
WR102 7.00 GHz to 11.00 GHz	102XT326	3	20 ⁹	20**	1.30	2.75	6.00	1.37
	102XT336		30 ⁸	20**	1.15	2.75	6.00	1.37
	102XT346		40	20**	1.10	2.75	6.00	1.37
	102XT356	4	50	20**	1.08	2.75	6.00	1.37
	102XT366		60	20**	1.08	2.75	6.00	1.37
	102XT426		20 ⁹	20**	1.30	2.75	2.75	1.37
	102XT436		30 ⁸	20**	1.15	2.75	2.75	1.37
	102XT446	4	40	20**	1.10	2.75	2.75	1.37
	102XT456		50	20**	1.08	2.75	2.75	1.37
	102XT466		60	20**	1.08	2.75	2.75	1.37
102XT466	60		20**	1.08	2.75	2.75	1.37	

Notes: *Tolerance all values +/- 1.0dB
 **15dB from 7.0 to 7.5GHz
 4 Variation +/- .8dB
 5 Variation +/- .6dB
 6 Variation +/- .5dB
 7 Variation +/- 1.5dB
 8 Variation +/- 1.0dB
 9 Variation +/- 1.4dB

Crossguide Couplers

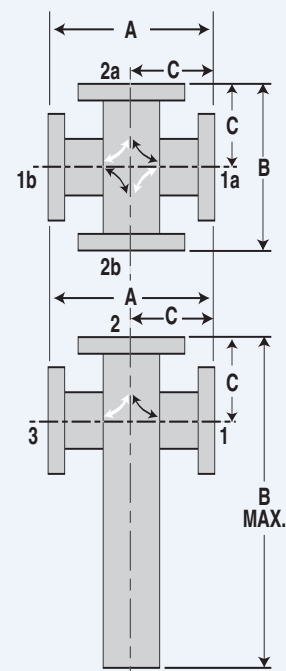
W/G SIZE FREQ. RANGE (GHz)	MDL MODEL NUMBERS	STYLE NO. OF PORTS	MEAN COUPLING (dB) *	DIRECT- IVITY (dB MIN)	MAX. VSWR	MECHANICAL DIMENSIONS (INCHES)		
						A	B	C
WR112 7.00 GHz to 10.00 GHz	112XT326	3	20	20	1.15	3.25	5.00	1.62
	112XT336		30	20	1.10	3.25	5.00	1.62
	112XT346		40	20	1.07	3.25	5.00	1.62
	112XT356	4	50	20	1.05	3.25	5.00	1.62
	112XT366		60	20	1.05	3.25	5.00	1.62
	112XT426		20	20	1.15	3.25	3.25	1.62
	112XT436		30	20	1.10	3.25	3.25	1.62
	112XT446	4	40	20	1.07	3.25	3.25	1.62
	112XT456		50	20	1.05	3.25	3.25	1.62
	112XT466		60	20	1.05	3.25	3.25	1.62
112XT466	60		20	1.05	3.25	3.25	1.62	
WR137 5.40 GHz to 8.20 GHz	137XT326	3	20	20	1.15	4.00	8.00	2.00
	137XT336		30	20	1.10	4.00	8.00	2.00
	137XT346		40	20	1.07	4.00	8.00	2.00
	137XT356	4	50	20	1.05	4.00	8.00	2.00
	137XT366		60	20	1.05	4.00	8.00	2.00
	137XT426		20	20	1.15	4.00	4.00	2.00
	137XT436		30	20	1.10	4.00	4.00	2.00
	137XT446	4	40	20	1.07	4.00	4.00	2.00
	137XT456		50	20	1.05	4.00	4.00	2.00
	137XT466		60	20	1.05	4.00	4.00	2.00
137XT466	60		20	1.05	4.00	4.00	2.00	
WR159 4.90 GHz to 6.85 GHz	159XT326	3	20 ⁷	20	1.25	4.50	9.50	2.25
	159XT336		30	20	1.15	4.50	9.50	2.25
	159XT346		40 ⁶	20	1.10	4.50	9.50	2.25
	159XT356	4	50	20	1.08	4.50	9.50	2.25
	159XT366		60	20	1.08	4.50	9.50	2.25
	159XT426		20 ⁷	20	1.25	4.50	4.50	2.25
	159XT436		30	20	1.15	4.50	4.50	2.25
	159XT446	4	40 ⁶	20	1.10	4.50	4.50	2.25
	159XT456		50	20	1.08	4.50	4.50	2.25
	159XT466		60	20	1.08	4.50	4.50	2.25
159XT466	60		20	1.08	4.50	4.50	2.25	

Notes: *Tolerance all values +/- 1.0dB

⁶ Variation +/- .5dB

⁷ Variation +/- 1.5dB

CROSSGUIDE COUPLERS



Right coupling indicated by white arrows
Left coupling indicated by black arrows

Variation

20 = +/- .5dB

30 = +/- .5dB

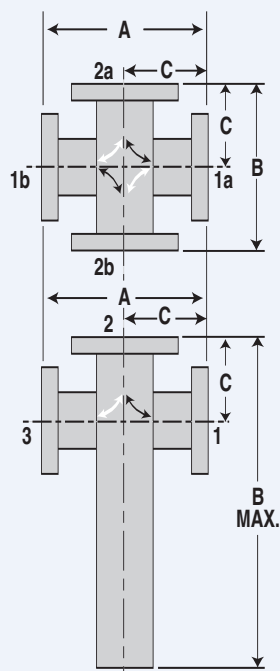
40 = +/- .4dB

50 = +/- .3dB

60 = +/- .3dB

Crossguide Couplers

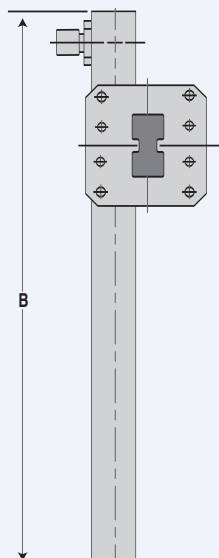
CROSSGUIDE COUPLERS



Right coupling indicated by white arrows
Left coupling indicated by black arrows

Variation

- 20 = +/- .5dB
- 30 = +/- .5dB
- 40 = +/- .4dB
- 50 = +/- .3dB
- 60 = +/- .3dB



W/G SIZE FREQ. RANGE (GHz)	MDL MODEL NUMBERS	STYLE NO. OF PORTS	MEAN COUPLING (dB) *	DIRECT- IVITY (dB MIN)	MAX. VSWR	MECHANICAL DIMENSIONS (INCHES)		
						A	B	C
WR187 3.95 GHz to 5.85 GHz	187XT326	3	20	20	1.15	5.00	10.00	2.50
	187XT336		30	20	1.10	5.00	10.00	2.50
	187XT346		40	20	1.07	5.00	10.00	2.50
	187XT356	4	50	20	1.05	5.00	10.00	2.50
	187XT366		60	20	1.05	5.00	10.00	2.50
	187XT426		20	20	1.15	5.00	5.00	2.50
	187XT436		30	20	1.10	5.00	5.00	2.50
187XT446	40	20	1.07	5.00	5.00	2.50		
187XT456	50	20	1.05	5.00	5.00	2.50		
187XT466	60	20	1.05	5.00	5.00	2.50		
WR229 3.30 GHz to 4.90 GHz	229XT326	3	20 ⁴	20	1.15	7.00	12.00	3.50
	229XT336		30 ⁴	20	1.10	7.00	12.00	3.50
	229XT346		40 ⁶	20	1.07	7.00	12.00	3.50
	229XT356	4	50	20	1.05	7.00	12.00	3.50
	229XT366		60	20	1.05	7.00	12.00	3.50
	229XT426		20 ⁴	20	1.15	7.00	7.00	3.50
	229XT436		30 ⁴	20	1.10	7.00	7.00	3.50
	229XT446	40 ⁶	20	1.07	7.00	7.00	3.50	
	229XT456	50	20	1.05	7.00	7.00	3.50	
	229XT466	60	20	1.05	7.00	7.00	3.50	
WR284 2.60 GHz to 3.95 GHz	284XT326	3	20 ⁵	20	1.15	8.00	13.00	4.00
	284XT336		30 ⁵	20	1.10	8.00	13.00	4.00
	284XT346		40	20	1.07	8.00	13.00	4.00
	284XT356	4	50	20	1.05	8.00	13.00	4.00
	284XT366		60	20	1.05	8.00	13.00	4.00
	284XT426		20 ⁵	20	1.15	8.00	8.00	4.00
	284XT436		30 ⁵	20	1.10	8.00	8.00	4.00
	284XT446	40	20	1.07	8.00	8.00	4.00	
	284XT456	50	20	1.05	8.00	8.00	4.00	
	284XT466	60	20	1.05	8.00	8.00	4.00	

W/G SIZE FREQ. RANGE (GHz)	MDL MODEL NUMBERS	STYLE NO. OF PORTS	MEAN COUPLING (dB) *	DIRECT- IVITY (dB MIN)	MAX. VSWR	MECHANICAL DIMENSIONS (INCHES)		
						A	B	C
WRD-750 8.00-16.00	D750XT346	3	40	15	1.05	2.50	6.00	1.25
	D750XT356		50	15	1.05	2.50	6.00	1.25
WRD-475 5.00-9.50	D475XT346	3	40	15	1.05	4.50	8.50	2.25
	D475XT356		50	15	1.05	4.50	8.50	2.25

Notes: *Tolerance all values +/- 1.0dB

⁴ Variation +/- .8dB

⁵ Variation +/- .6dB

⁶ Variation +/- .5dB

Loop Couplers

MDL waveguide loop coupler cover the frequency spectrum from WR90 to WR2100, and are widely used in RF circuits requiring directional power injection or extraction.

These units are available as uni- or bi-directional couplers. Modifications to the standard designs are available on request.

W/G SIZE	FREQ. RANGE (GHz)	MIN COUPLING VALUE (dB)	WITH BI-DIRECTIONAL CONNECTORS					
			WITH UNI-DIRECTIONAL CONNECTORS (FIG)	SAME SIDE (FIG)	ONE TOP/ ONE BOTTOM (FIG)	(FIG)	(FIG)	(FIG)
WR90	8.20-12.40	20 to 70	90LT16	1*	90LT26	2*	90LT36	3*
WR112	7.05-10.00	25 to 70	112LT16	1*	112LT26	2*	112LT36	3*
WR137	5.85-8.20	30 to 70	137LT16	4	137LT26	5	137LT36	6
WR159	4.90-7.05	30 to 70	159LT16	4	159LT26	5	159LT36	6
WR187	3.95-5.85	30 to 70	187LT16	4	187LT26	5	187LT36	6
WR229	3.30-4.90	35 to 70	229LT16	4	229LT26	5	229LT36	6
WR284	2.60-3.95	35 to 70	284LT16	4	284LT26	5	284LT36	6
WR430	1.70-2.60	40 to 70	430LT16	7	430LT26	8		
				4	430LT46	5	430LT56	6
WR650	1.12-1.70	40 to 70	650LT16	7	650LT26	8		
				4	650LT46	5	650LT56	6

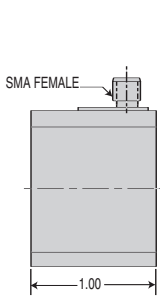


FIGURE 1

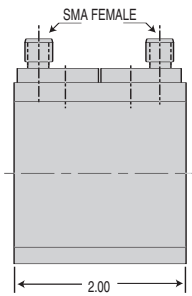


FIGURE 2

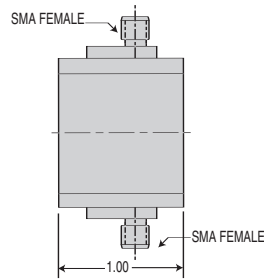


FIGURE 3

Flange faces equivalent to STD cover flange except tapped holes.

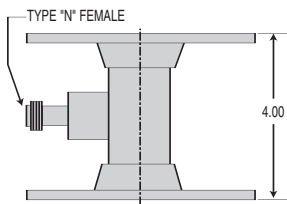


FIGURE 4

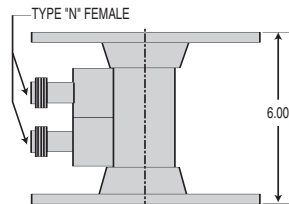


FIGURE 5

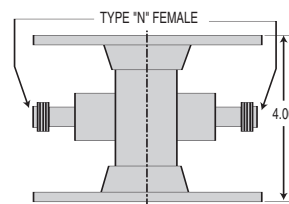


FIGURE 6

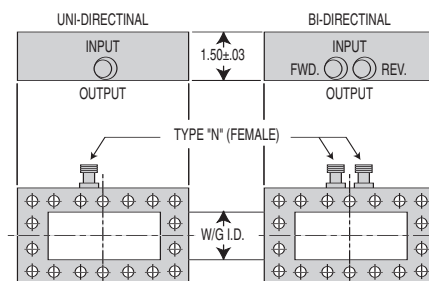


FIGURE 7

FIGURE 8

*All lengths as shown are for cover flanges only. When couplers are made with choke, cover or choke, choke lengths are greater.

ELECTRICAL DATA

- Frequency:** Bandwidth to be specified.
- Coupling Value:** To be specified.
- Coupling Sensitivity:** Approximately +/- 1dB for 20% bandwidth.
- Directivity:** 25dB for 2% of the waveguide band
20dB for 20% of the waveguide band
15dB for coupling values < 30dB for 20% of the waveguide band.
- VSWR:** Main arm: 1.05 max. typical for coupling values greater than 30dB.
- Power:** The main arm will handle approximately 90% of waveguide rating. The internal load in the loop will handle 5 watts average power at 25°C.
- Output Connectors:** WR90 to 112 SMA female
WR137 to 2100 type "N" female.

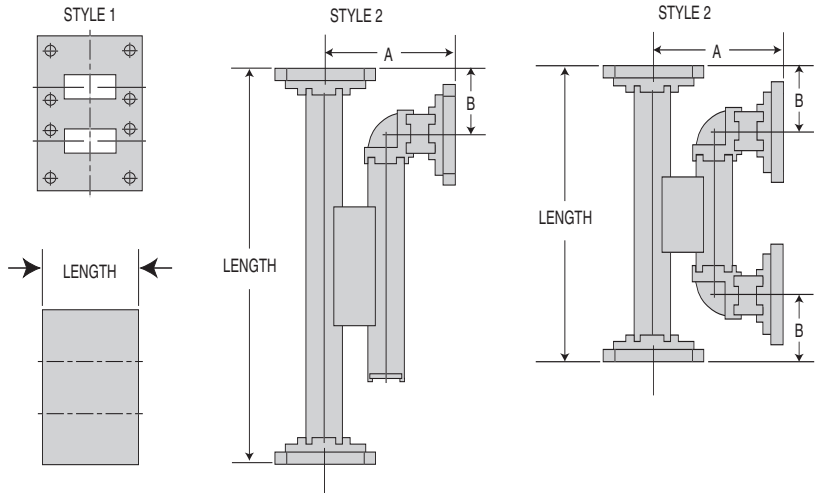
Branch Guide Couplers

These waveguide directional couplers offer characteristics which cannot be met by cross-guide, multi-aperture or slot type couplers, especially in the 6-12dB coupling range. They are of very short length and can handle almost full waveguide peak-pulse power capacity. Full waveguide band-widths may be specified: but for flat coupling, the bandwidth should be limited to approximately 10 percent.

Computer aided design for specified parameters enables MDL to reduce design and manufacturing time and assure optimum performance. Mean coupling can be held to a tighter tolerance than for other types of couplers. Directivity is 20dB min. Repeatability in production is facilitated by new manufacturing techniques.

W/G SIZE	FREQ. RANGE (GHz)	MDL MODEL NO.			MEAN COUPLING- (dB)	VAR. FROM MEAN COUPLING (dB)	MECHANICAL DIMENSIONS				
		STYLE 1	STYLE 2	STYLE 3			STYLE 1	LENGTH STYLE 2	STYLE 3	A	B
WR62	15.50-18.00	62CB16	62CB316	62CB416	3.0±.3	±.2	2.00	5.65	4.43	1.20	.81
		62CB36	62CB336	62CB436	6.0±.4	±.2	2.00	5.65	4.43	1.20	.81
		62CB56	62CB356	62CB456	10.0±.5	±.2	2.00	5.65	4.43	1.20	.81
WR90	8.50-9.60	90CB16	90CB316	90CB416	3.0±.3	±.3	2.50	6.00	5.00	2.00	.80
		90CB36	90CB336	90CB436	6.0±.4	±.3	2.50	6.00	5.00	2.00	.80
		90CB56	90CB356	90CB456	10.0±.5	±.3	2.50	6.00	5.00	2.00	.80
WR112	7.50-8.50	112CB16	112CB316	112CB416	3.0±.3	±.2	3.00	8.00	6.00	2.50	1.19
		112CB36	112CB336	112CB436	6.0±.4	±.2	3.00	8.00	6.00	2.50	1.19
		112CB56	112CB356	112CB456	10.0±.5	±.2	3.00	8.00	6.00	2.50	1.19
WR137	5.90-6.60	137CB16	137CB316	137CB416	3.0±.3	±.2	4.00	11.00	8.00	3.00	1.75
		137CB36	137CB336	137CB436	6.0±.4	±.2	4.00	11.00	8.00	3.00	1.75
		137CB56	137CB356	137CB456	10.0±.5	±.2	4.00	11.00	8.00	3.00	1.75
WR159	5.00-5.90	159CB16	159CB316	159CB416	3.0±.3	±.4	4.50	12.00	10.00	3.25	1.50
		159CB36	159CB336	159CB436	6.0±.4	±.5	4.50	12.00	10.00	3.25	1.50
		159CB56	159CB356	159CB456	10.0±.5	±.4	4.50	12.00	10.00	3.25	1.50
WR187	5.30-6.10	187CB16	187CB316	187CB416	3.0±.3	±.2	5.00	14.00	12.00	3.25	2.32
		187CB36	187CB336	187CB436	6.0±.4	±.2	5.00	14.00	12.00	3.25	2.32
		187CB56	187CB356	187CB456	10.0±.5	±.2	5.00	14.00	12.00	3.25	2.32
WR229	3.70-4.20	229CB16	229CB316	229CB416	3.0±.3	±.2	6.10	18.00	12.00	3.50	1.50
		229CB36	229CB336	229CB436	6.0±.4	±.3	6.10	18.00	12.00	3.50	1.50
		229CB56	229CB356	229CB456	10.0±.5	±.2	6.10	18.00	12.00	3.50	1.50
WR284	2.70-3.05	284CB16	284CB316	284CB416	3.0±.3	±.3	8.00	24.00	12.35	5.00	2.60
		284CB36	284CB336	284CB436	6.0±.4	±.3	8.00	24.00	12.35	5.00	2.60
		284CB56	284CB356	284CB456	10.0±.5	±.3	8.00	24.00	12.35	5.00	2.60

*Cross-guide couplers are available for loose coupling values only, and multi-aperture couplers are too lengthy for tight couplings. Short slot couplers, while capable of handling high power are usually available only in the 3.5 dB range. With reduced bandwidths the directivity can be greater than 30 dB.



Broadwall couplers

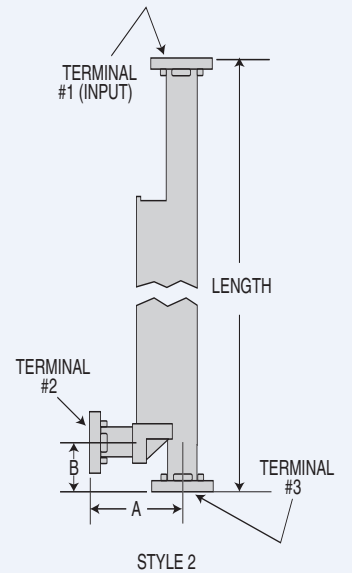
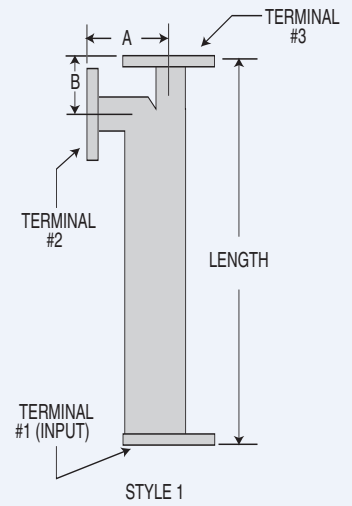
BROADWALL

W/G SIZE FREQ. RANGE (GHz)	MDL MODEL NUMBERS	MEAN COUPLING (dB) *	VAR. FROM MEAN COUPLING vs FREQ. (dB)	DIRECT- IVITY (dB min)	STYLE *	MECHANICAL DIMENSIONS (INCHES)			INPUT TERMINAL FLANGES EQUIVALENT TO
						LGT.	A	B	

Multihole

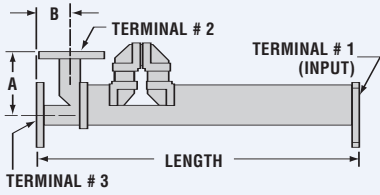
WR51 15.00-22.00	51CT16-1	3	±0.5	30	1	6.00	1.14	0.81	51FA52 (1.13 x 1.31 cover flange with four 0.144 dia. holes.)
	51CT26-1	6	±0.5	30	1	5.62	1.14	0.81	
	51CT36-1	10	±0.5	30	1	5.25	1.14	0.81	
	51CT46-1	20	±0.5	30	1	4.87	1.14	0.81	
	51CT56-1	30	±0.5	30	1	4.87	1.14	0.81	
WR62 12.40-18.00	62CT16-1	3	±0.5	30	1	7.00	1.20	0.81	UG419/U UG1665/U
	62CT26-1	6	±0.5	30	1	6.50	1.20	0.81	
	62CT36-1	10	±0.5	30	1	6.00	1.20	0.81	
	62CT46-1	20	±0.5	30	1	5.50	1.20	0.81	
	62CT56-1	30	±0.5	30	1	5.50	1.20	0.81	
WR75 10.00-15.00	75CT16-1	3	±0.5	25	1	8.25	1.50	0.80	75FA22 (1.50x1.50- cover flanges with four 6-32 threads.)
	75CT26-1	6	±0.5	25	1	7.50	1.50	0.80	
	75CT36-1	10	±0.5	25	1	7.00	1.50	0.80	
	75CT46-1	20	±0.5	25	1	6.50	1.50	0.80	
	75CT56-1	30	±0.5	25	1	6.50	1.50	0.80	
WR90 8.20-12.40	90CT86-1	3	±0.5	30	1	9.25	1.53	0.80	UG39/U, UG135/U except 8-32 threads
	90CT96-1	6	±0.5	30	1	8.50	1.53	0.80	
	90CT106-1	10	±0.5	30	1	7.75	1.53	0.80	
	90CT116-1	20	±0.5	30	1	7.25	1.53	0.80	
	90CT126-1	30	±0.5	30	1	7.25	1.53	0.80	
	90CT136-1	40	±0.5	30	1	7.25	1.53	0.80	
WR102 7.05-11.00	102CT16-1	3	±0.6	30	1	11.00	1.78	0.90	UG1493/U except 8-32 threads
	102CT26-1	6	±0.6	30	1	10.25	1.78	0.90	
	102CT36-1	10	±0.6	30	1	9.50	1.78	0.90	
	102CT46-1	20	±0.6	30	1	8.75	1.78	0.90	
	102CT56-1	30	±0.6	30	1	8.75	1.78	0.90	
	102CT86-1	10	±0.7	40	2	15.50	1.78	1.00	
	102CT96-1	20	±0.7	40	2	15.50	1.78	1.00	
WR112 7.00-10.00	112CT86-1	3	±0.4	30	1	12.00	1.75	1.19	UG51/U, UG138/U except 8-32 threads
	112CT96-1	6	±0.4	30	1	11.00	1.75	1.19	
	112CT106-1	10	±0.4	30	1	10.00	1.75	1.19	
	112CT116-1	20	±0.4	30	1	9.50	1.75	1.19	
	112CT126-1	30	±0.4	30	1	9.50	1.75	1.19	
	112CT136-1	40	±0.4	30	1	9.50	1.75	1.19	
WR137 5.40-8.20	137CT16-1	3	±0.5	30	1	15.00	2.38	1.75	UG441/U, UG344/U
	137CT26-1	6	±0.5	30	1	14.00	2.38	1.75	
	137CT36-1	10	±0.5	30	1	13.00	2.38	1.75	
	137CT46-1	20	±0.5	30	1	12.00	2.38	1.75	
	137CT56-1	30	±0.5	30	1	12.00	2.38	1.75	

*Style 1 not available with choke flange on input terminal



When ordering Style 2, contact factory for length.

MULTI HOLE COMPENSATED



Broadwall couplers

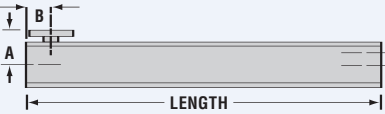
Multihole Compensated

MDL's broadwall compensated directional couplers feature minimum coupling variation with frequency – making them ideal for use in leveling circuits and broadband power monitoring. In contrast to most broadwall couplers, in which variation from mean coupling is ± 0.5 dB over a waveguide bandwidth, MDL's new compensated directional couplers reduce variation from mean coupling to only ± 0.2 to ± 0.3 dB.

W/G SIZE FREQ. RANGE (GHz)	MDL MODEL NUMBERS	MEAN COUPLING (dB)	VAR. FROM MEAN COUPLING vs FREQ. (dB)	DIRECT- IVITY (dB min)	MAIN ARM	SECOND ARM	MECHANICAL DIMENSIONS (INCHES)			INPUT TERMINAL FLANGES EQUIV TO†
							LGT.	A	B	
WR62 12.40-18.00	62FC16-1	20 ± 0.50	±0.20	25	1.08	1.25	8.00	1.20	0.81	UG419/U
WR90 8.20-12.40	90FC86-1	3 ± 0.40	±0.20	30	1.10	1.25	11.50	1.53	0.80	UG36/U
	90FC106-1	10 ± 0.40	±0.20	30	1.08	1.20	10.00	1.53	0.80	UG135/U except 8-32 thread
	90FC176-1	17 ± 0.40	±0.20	30	1.08	1.20	10.00	1.53	0.80	UG1493/U except 8-32 thread
WR102 7.00-11.00	102FC106-1	10 ± 0.40	±0.30	25	1.08	1.20	12.00	1.78	0.90	UG1493/U except 8-32 thread

† Terminal 1 (input) not available with choke flanges.

MULTI HOLE HIGH DIRECTIVITY



Multihole High Directivity

MDL high directivity couplers are made using broached waveguides. Walls on the waveguide are extremely thick to prevent changes in characteristics caused by physical distortion. The electrical design assures a minimum directivity of at least 45 dB and typically 50 dB over the entire band, making possible the design of high performance reflectometers: These couplers available with cover flanges only. Material aluminum only.

W/G SIZE FREQ. RANGE (GHz)	MDL MODEL NUMBERS	MEAN COUPLING (dB)	VAR. FROM MEAN COUPLING vs FREQ. (dB)	DIRECTIVITY (dB min)	MECHANICAL DIMENSIONS (INCHES)		
					LGT.	A	B
WR90 8.20-12.40	90CT336-1	10 ± 0.40	±0.50	50	13.62	1.25	0.80

Narrow-wall couplers

NARROW-WALL COUPLERS

W/G SIZE	FREQ. RANGE (GHz)	MDL MODEL NUMBERS	MEAN COUPLING (dB)	VAR. FROM MEAN COUPLING vs FREQ. (dB)	PEAK POWER MAIN ARM (KW)	DIRECTIVITY (dB min)	MECHANICAL DIMENSIONS (INCHES)			INPUT TERMINAL FLANGES EQUIV. TO	
							LGT.	A	B		C
WR90	8.20-12.40	90CS136-1	10 ± 0.7	±1.5	200	30	11.50	0.95	0.90	1.60	UG39/U
		90CS146-1	20 ± 0.7	±1.5	200	30	10.25	0.95	0.90	1.60	UG135/U
		90CS156-1	30 ± 0.7	±1.5	200	30	10.25	0.95	0.90	1.60	
	8.50-10.50	90CS76-1	10 ± 1.0	Included in mean coupling	200	25	8.25	0.95	0.90	1.60	
		90CS86-1	20 ± 1.0		200	25	8.25	0.95	0.90	1.60	
		90CS96-1	30 ± 1.0		200	25	8.25	0.95	0.90	1.60	
WR112	8.50-9.60	112CS106-1*	30 ± 1.0	Included in mean coupling	350	25	7.00	1.06	0.90	1.60	Main arm: UG51/U
		112CS116-1*	40 ± 1.0		350	25	7.00	1.06	0.90	1.60	UG138/U
		112CS126-1*	50 ± 1.0		350	25	7.00	1.06	0.90	1.60	Secondary arm: UG39/U
	7.05-10.00	112CS66-1	10 ± 0.7	±1.5	350	30	12.75	1.17	1.00	2.00	UG135/U
		112CS76-1	20 ± 0.7	±1.5	350	30	11.25	1.17	1.00	2.00	UG138/U
		112CS86-1	30 ± 0.7	±1.5	350	30	11.25	1.17	1.00	2.00	UG51/U
WR137	6.50-8.00	137CS16-1	10 ± 1.0	-	500	25	16.50	1.44	1.80	2.30	UG441/U
		137CS26-1	20 ± 1.0	-	500	25	16.50	1.44	1.80	2.30	UG344/U

*WR90 waveguide in the auxiliary arm. Auxiliary arm load: 3 watts average.

