

MILLIMETER-WAVE DEVICES

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WAVEGUIDE PRODUCTS

X-Band (8.2 to 12.4GHz) WR-90 (UG 39/U)

PRODUCT	DESCRIPTION			MODEL
ATTENUATORS	FULL BAND 8.2-12.4 GHz			
Fixed	3 dB ±0.5 dB		VSWR ≤1.15	FA-90-3
Fixed	6 dB ±1.0 dB		VSWR ≤1.15	FA-90-6
Fixed	10 dB ±1.5 dB		VSWR ≤1.15	FA-90-10
Fixed	20 dB ±2.0 dB		VSWR ≤1.15	FA-90-20
Fixed	30 dB ±3.0 dB		VSWR ≤1.15	FA-90-30
Variable	0.5 to 30 dB (min)		VSWR ≤1.15	VA-90
BENDS - E	E-Plane 90°		VSWR ≤1.15	BE-90
BENDS - H	H-Plane 90°		VSWR ≤1.15	BH-90
CIRCULATORS	(CONTACT DORADO FOR SPECIAL REQUIREMENTS) SEE CATALOG'S FERRITE SECTION			
COUPLERS	FULL BAND 8.2-12.4 GHz			
Cross Guide	Coupling: 20 dB ±2 dB	Directivity ≥15 dB	VSWR ≤1.15	CG-90
Directional	Coupling: 3 dB ±1 dB	Directivity ≥25 dB	VSWR ≤1.15	DCG-90-3C
Directional	Coupling: 3 dB ±1 dB	Directivity ≥30 dB	VSWR ≤1.15	DCG-90-3D
Directional	Coupling: 6 dB ±1.2 dB	Directivity ≥25 dB	VSWR ≤1.15	DCG-90-6C
Directional	Coupling: 6 dB ±1.2 dB	Directivity ≥30 dB	VSWR ≤1.15	DCG-90-6D
Directional	Coupling: 10 dB ±1.5 dB	Directivity ≥25 dB	VSWR ≤1.15	DCG-90-10C
Directional	Coupling: 10 dB ±1.5 dB	Directivity ≥30 dB	VSWR ≤1.15	DCG-90-10D
Directional	Coupling: 10 dB ±1.5 dB	Directivity ≥38 dB	VSWR ≤1.15	DCG-90-10E
Directional	Coupling: 20 dB ±2.0 dB	Directivity ≥25 dB	VSWR ≤1.15	DCG-90-20C
Directional	Coupling: 20 dB ±2.0 dB	Directivity ≥30 dB	VSWR ≤1.15	DCG-90-20D
Directional	Coupling: 20 dB ±2.0 dB	Directivity ≥38 dB	VSWR ≤1.15	DCG-90-20E
Directional	Coupling: 40 dB ±3.0 dB	Directivity ≥25 dB	VSWR ≤1.15	DCG-90-40C
Directional	Coupling: 40 dB ±3.0 dB	Directivity ≥30 dB	VSWR ≤1.15	DCG-90-40D
Directional	Coupling: 40 dB ±3.0 dB	Directivity ≥38 dB	VSWR ≤1.15	DCG-90-40E
DETECTOR	Crystal Detector: Tunable; 200 mV/mW; Full Waveguide Band			CD-90
E-H TUNER	8.2-12.4 GHz	Adjustable	VSWR ≤20 to 1.03	EHT-90
PHASE SHIFTER	8.2-12.4 GHz; Variable Phase Shifter; 0° to 180°; VSWR ≤1.15			VPS-90
SHORTS	8.2-12.4 GHz; Tunable: Mechanical Range: 10 mm; VSWR>20:1			TS-90
STRAIGHTS*	FULL BAND 8.2-12.4 GHz *			
	1.0 inch length straight waveguide w/flanges			S-90A
	2.0 inch length straight waveguide w/flanges			S-90B
	3.0 inch length straight waveguide w/flanges			S-90C
	4.0 inch length straight waveguide w/flanges			S-90D
	6.0 inch length straight waveguide w/flanges			S-90F
	12.0 inch length straight waveguide w/flanges			S-90L
TEES	FULL BAND 8.2-12.4 GHz			
E-Plane	Balance ≤0.3 dB	Phase Division: 180°		EPT-90
H-Plane	Balance ≤0.3 dB	Phase Division: 0°		HPT-90
Magic	Bandwidth: 20%	Unsymmetry: ≤0.3 dB	Isolation ≥30 dB	HTW-90
TERMINATION	Power Rating 0.5 W	VSWR ≤1.06		FT-90
TWISTS	FULL BAND 8.2-12.4 GHz			
	90° Waveguide Twist			TW-90-90
	45° Waveguide Twist			TW-90-45
WAVEGUIDE	Copper Waveguide: Unfinished in 1 meter lengths (Inside: 0.90x0.40 inches)			WR-90(1M)

NOTES:

* - Waveguide straights are available in any length up to 36 inches

DELIVERY:

Most full band devices and some narrow band devices are carried in stock. Non-stock items may require up to 60 days for shipment.

WAVEGUIDE PRODUCTS (10 to 15GHz) WR-75 (UBR-120)

	DESCRIPTION			MODEL
ATTENUATORS	FULL BAND 10.0-15.0 GHz			
Fixed	3 dB ±0.5 dB	VSWR ≤1.15		FA-75-3
Fixed	6 dB ±1.0 dB	VSWR ≤1.15		FA-75-6
Fixed	10 dB ±1.5 dB	VSWR ≤1.15		FA-75-10
Fixed	20 dB ±2.0 dB	VSWR ≤1.15		FA-75-20
Fixed	30 dB ±3.0 dB	VSWR ≤1.15		FA-75-30
Variable	0.5 to 30 dB (min)	VSWR ≤1.15		VA-75
BENDS - E	E-Plane 90°	VSWR ≤1.15		BE-75
BENDS - H	H-Plane 90°	VSWR ≤1.15		BH-75
CIRCULATORS	(CONTACT DORADO FOR SPECIAL REQUIREMENTS) SEE CATALOG'S FERRITE SECTION			
COUPLERS	FULL BAND 10.0-15.0 GHz			
Cross Guide	Coupling: 20 dB ±2 dB	Directivity ≥15 dB	VSWR ≤1.15	CG-75
Directional	Coupling: 3 dB ±1 dB	Directivity ≥25 dB	VSWR ≤1.15	DCG-75-3C
Directional	Coupling: 3 dB ±1 dB	Directivity ≥30 dB	VSWR ≤1.15	DCG-75-3D
Directional	Coupling: 6 dB ±1.2 dB	Directivity ≥25 dB	VSWR ≤1.15	DCG-75-6C
Directional	Coupling: 6 dB ±1.2 dB	Directivity ≥30 dB	VSWR ≤1.15	DCG-75-6D
Directional	Coupling: 10 dB ±1.5 dB	Directivity ≥25 dB	VSWR ≤1.15	DCG-75-10C
Directional	Coupling: 10 dB ±1.5 dB	Directivity ≥30 dB	VSWR ≤1.15	DCG-75-10D
Directional	Coupling: 10 dB ±1.5 dB	Directivity ≥38 dB	VSWR ≤1.15	DCG-75-10E
Directional	Coupling: 20 dB ±2.0 dB	Directivity ≥25 dB	VSWR ≤1.15	DCG-75-20C
Directional	Coupling: 20 dB ±2.0 dB	Directivity ≥30 dB	VSWR ≤1.15	DCG-75-20D
Directional	Coupling: 20 dB ±2.0 dB	Directivity ≥38 dB	VSWR ≤1.15	DCG-75-20E
Directional	Coupling: 40 dB ±3.0 dB	Directivity ≥25 dB	VSWR ≤1.15	DCG-75-40C
Directional	Coupling: 40 dB ±3.0 dB	Directivity ≥30 dB	VSWR ≤1.15	DCG-75-40D
Directional	Coupling: 40 dB ±3.0 dB	Directivity ≥38 dB	VSWR ≤1.15	DCG-75-40E
DETECTOR	Crystal Detector: Tunable; 200 mV/mW; Full Waveguide Band			CD-75
E-H TUNER	10.0-15.0 GHz	Adjustable	VSWR ≤20 to 1.03	EHT-75
PHASE SHIFTER	10.0-15.0 GHz; Variable Phase Shifter; 0° to 180°; VSWR ≤1.15			VPS-75
SHORTS	10.0-15.0 GHz; Tunable: Mechanical Range: 10 mm; VSWR>20:1			TS-75
STRAIGHTS*	FULL BAND 10.0-15.0 GHz *			
	1.0 inch length straight waveguide w/flanges			S-75A
	2.0 inch length straight waveguide w/flanges			S-75B
	3.0 inch length straight waveguide w/flanges			S-75C
	4.0 inch length straight waveguide w/flanges			S-75D
	6.0 inch length straight waveguide w/flanges			S-75F
	12.0 inch length straight waveguide w/flanges			S-75L
TEES	FULL BAND 10.0-15.0 GHz			
E-Plane	Balance ≤0.3 dB	Phase Division: 180°		EPT-75
H-Plane	Balance ≤0.3 dB	Phase Division: 0°		HPT-75
Magic	Bandwidth: 20%	Unsymmetry: ≤0.3 dB	Isolation ≥30 dB	HTW-75
TERMINATION	Power Rating 0.5 W	VSWR ≤1.06		FT-75
TWISTS	FULL BAND 10.0-15.0 GHz			
	90° Waveguide Twist			TW-75-90
	45° Waveguide Twist			TW-75-45
WAVEGUIDE	Copper Waveguide: Unfinished in 1 meter lengths (Inside: 0.75x0.38 inches)			WR-75(1M)

NOTES:

* - Waveguide straights are available in any length up to 36 inches

DELIVERY:

Most full band devices and some narrow band devices are carried in stock. Non-stock items may require up to 60 days for shipment.

WAVEGUIDE PRODUCTS

Ku-Band (12.4 to 18GHz) WR-62 (UG 419/U)

	DESCRIPTION			MODEL
ATTENUATORS	FULL BAND 12.4-18.0 GHz			
Fixed	3 dB ±0.5 dB	VSWR ≤1.15		FA-62-3
Fixed	6 dB ±1.0 dB	VSWR ≤1.15		FA-62-6
Fixed	10 dB ±1.5 dB	VSWR ≤1.15		FA-62-10
Fixed	20 dB ±2.0 dB	VSWR ≤1.15		FA-62-20
Fixed	30 dB ±3.0 dB	VSWR ≤1.15		FA-62-30
Variable	0.5 to 30 dB (min)	VSWR ≤1.15		VA-62
BENDS - E	E-Plane 90°	VSWR ≤1.15		BE-62
BENDS - H	H-Plane 90°	VSWR ≤1.15		BH-62
CIRCULATORS	(CONTACT DORADO FOR SPECIAL REQUIREMENTS) SEE CATALOG'S FERRITE SECTION			
COUPLERS	FULL BAND 12.4-18.0 GHz			
Cross Guide	Coupling: 20 dB ±2 dB	Directivity ≥15 dB	VSWR ≤1.15	CG-62
Directional	Coupling: 3 dB ±1 dB	Directivity ≥25 dB	VSWR ≤1.15	DCG-62-3C
Directional	Coupling: 3 dB ±1 dB	Directivity ≥30 dB	VSWR ≤1.15	DCG-62-3D
Directional	Coupling: 6 dB ±1.2 dB	Directivity ≥25 dB	VSWR ≤1.15	DCG-62-6C
Directional	Coupling: 6 dB ±1.2 dB	Directivity ≥30 dB	VSWR ≤1.15	DCG-62-6D
Directional	Coupling: 10 dB ±1.5 dB	Directivity ≥25 dB	VSWR ≤1.15	DCG-62-10C
Directional	Coupling: 10 dB ±1.5 dB	Directivity ≥30 dB	VSWR ≤1.15	DCG-62-10D
Directional	Coupling: 10 dB ±1.5 dB	Directivity ≥38 dB	VSWR ≤1.15	DCG-62-10E
Directional	Coupling: 20 dB ±2.0 dB	Directivity ≥25 dB	VSWR ≤1.15	DCG-62-20C
Directional	Coupling: 20 dB ±2.0 dB	Directivity ≥30 dB	VSWR ≤1.15	DCG-62-20D
Directional	Coupling: 20 dB ±2.0 dB	Directivity ≥38 dB	VSWR ≤1.15	DCG-62-20E
Directional	Coupling: 40 dB ±3.0 dB	Directivity ≥25 dB	VSWR ≤1.15	DCG-62-40C
Directional	Coupling: 40 dB ±3.0 dB	Directivity ≥30 dB	VSWR ≤1.15	DCG-62-40D
Directional	Coupling: 40 dB ±3.0 dB	Directivity ≥38 dB	VSWR ≤1.15	DCG-62-40E
DETECTOR	Crystal Detector: Tunable; 200 mV/mW; Full Waveguide Band			CD-62
E-H TUNER	12.4-18.0 GHz	Adjustable	VSWR ≤20 to 1.03	EHT-62
PHASE SHIFTER	12.4-18.0 GHz; Variable Phase Shifter; 0° to 180°; VSWR ≤1.15			VPS-62
SHORTS	12.4-18.0 GHz; Tunable: Mechanical Range: 10 mm; VSWR>20:1			TS-62
STRAIGHTS*	FULL BAND 12.4-18.0 GHz *			
	1.0 inch length straight waveguide w/flanges			S-62A
	2.0 inch length straight waveguide w/flanges			S-62B
	3.0 inch length straight waveguide w/flanges			S-62C
	4.0 inch length straight waveguide w/flanges			S-62D
	6.0 inch length straight waveguide w/flanges			S-62F
	12.0 inch length straight waveguide w/flanges			S-62L
TEES	FULL BAND 12.4-18.0 GHz			
E-Plane	Balance ≤0.3 dB	Phase Division: 180°		EPT-62
H-Plane	Balance ≤0.3 dB	Phase Division: 0°		HPT-62
Magic	Bandwidth: 20%	Unsymmetry: ≤0.3 dB	Isolation ≥30 dB	HTW-62
TERMINATION	Power Rating 0.5 W	VSWR ≤1.06		FT-62
TWISTS	FULL BAND 12.4-18.0 GHz			
	90° Waveguide Twist			TW-62-90
	45° Waveguide Twist			TW-62-45
WAVEGUIDE	Copper Waveguide: Unfinished in 1 meter lengths (Inside: 0.62x0.31 inches)			WR-62(1M)

NOTES:

* - Waveguide straights are available in any length up to 36 inches

DELIVERY:

Most full band devices and some narrow band devices are carried in stock. Non-stock items may require up to 60 days for shipment.

WAVEGUIDE PRODUCTS (15 to 22GHz) WR-51 (UBR-180)

DESCRIPTION		MODEL
ATTENUATORS	FULL BAND 15.0-22.0 GHz	
Fixed	3 dB ±0.5 dB VSWR ≤1.15	FA-51-3
Fixed	6 dB ±1.0 dB VSWR ≤1.15	FA-51-6
Fixed	10 dB ±1.5 dB VSWR ≤1.15	FA-51-10
Fixed	20 dB ±2.0 dB VSWR ≤1.15	FA-51-20
Fixed	30 dB ±3.0 dB VSWR ≤1.15	FA-51-30
Variable	0.5 to 30 dB (min) VSWR ≤1.15	VA-51
BENDS - E	E-Plane 90° VSWR ≤1.15	BE-51
BENDS - H	H-Plane 90° VSWR ≤1.15	BH-51
CIRCULATORS	(CONTACT DORADO FOR SPECIAL REQUIREMENTS) SEE CATALOG'S FERRITE SECTION	
COUPLERS	FULL BAND 15.0-22.0 GHz	
Cross Guide	Coupling: 20 dB ±2 dB Directivity ≥15 dB VSWR ≤1.20	CG-51
Directional	Coupling: 3 dB ±1 dB Directivity ≥25 dB VSWR ≤1.20	DCG-51-3C
Directional	Coupling: 3 dB ±1 dB Directivity ≥30 dB VSWR ≤1.20	DCG-51-3D
Directional	Coupling: 6 dB ±1.2 dB Directivity ≥25 dB VSWR ≤1.20	DCG-51-6C
Directional	Coupling: 6 dB ±1.2 dB Directivity ≥30 dB VSWR ≤1.20	DCG-51-6D
Directional	Coupling: 10 dB ±1.5 dB Directivity ≥25 dB VSWR ≤1.20	DCG-51-10C
Directional	Coupling: 10 dB ±1.5 dB Directivity ≥30 dB VSWR ≤1.20	DCG-51-10D
Directional	Coupling: 10 dB ±1.5 dB Directivity ≥38 dB VSWR ≤1.20	DCG-51-10E
Directional	Coupling: 20 dB ±2.0 dB Directivity ≥25 dB VSWR ≤1.20	DCG-51-20C
Directional	Coupling: 20 dB ±2.0 dB Directivity ≥30 dB VSWR ≤1.20	DCG-51-20D
Directional	Coupling: 20 dB ±2.0 dB Directivity ≥38 dB VSWR ≤1.20	DCG-51-20E
Directional	Coupling: 40 dB ±3.0 dB Directivity ≥25 dB VSWR ≤1.20	DCG-51-40C
Directional	Coupling: 40 dB ±3.0 dB Directivity ≥30 dB VSWR ≤1.20	DCG-51-40D
Directional	Coupling: 40 dB ±3.0 dB Directivity ≥38 dB VSWR ≤1.20	DCG-51-40E
DETECTOR	Crystal Detector: Tunable; 200 mV/mW; Full Waveguide Band	CD-51
E-H TUNER	15.0-22.0 GHz Adjustable VSWR ≤20 to 1.05	EHT-51
PHASE SHIFTER	15.0-22.0 GHz; Variable Phase Shifter; 0° to 180°; VSWR ≤1.15	VPS-51
SHORTS	15.0-22.0 GHz; Tunable; Mechanical Range: 10 mm; VSWR >20:1	TS-51
STRAIGHTS*	FULL BAND 15.0-22.0 GHz *	
	1.0 inch length straight waveguide w/flanges	S-51A
	2.0 inch length straight waveguide w/flanges	S-51B
	3.0 inch length straight waveguide w/flanges	S-51C
	4.0 inch length straight waveguide w/flanges	S-51D
	6.0 inch length straight waveguide w/flanges	S-51F
	12.0 inch length straight waveguide w/flanges	S-51L
TEES	FULL BAND 15.0-22.0 GHz	
E-Plane	Balance ≤0.3 dB Phase Division: 180°	EPT-51
H-Plane	Balance ≤0.3 dB Phase Division: 0°	HPT-51
Magic	Bandwidth: 20% Unsymmetry: ≤0.3 dB Isolation ≥30 dB	HTW-51
TERMINATION	Power Rating 0.5 W VSWR ≤1.06	FT-51
TWISTS	FULL BAND 15.0-22.0 GHz	
	90° Waveguide Twist	TW-51-90
	45° Waveguide Twist	TW-51-45
WAVEGUIDE	Copper Waveguide: Unfinished in 1 meter lengths (Inside: 0.51x0.26 inches)	WR-51(1M)

NOTES:

* - Waveguide straights are available in any length up to 36 inches

DELIVERY:

Most full band devices and some narrow band devices are carried in stock. Non-stock items may require up to 60 days for shipment.

ABBREVIATIONS:

B/W = Bandwidth;
PWR = Power

MILLIMETER WAVEGUIDE PRODUCTS K-BAND (18 to 26.5GHz) WR-42 (UG 595/U)

DESCRIPTION		MODEL
ATTENUATORS	FULL BAND 18-26.5 GHz	
Fixed	3 dB \pm 0.5 dB VSWR \leq 1.15	FA-42-3
Fixed	6 dB \pm 1.0 dB VSWR \leq 1.15	FA-42-6
Fixed	10 dB \pm 1.5 dB VSWR \leq 1.15	FA-42-10
Fixed	20 dB \pm 2.0 dB VSWR \leq 1.15	FA-42-20
Fixed	30 dB \pm 3.0 dB VSWR \leq 1.15	FA-42-30
Variable	0.5 to 30 dB (min) VSWR \leq 1.15	VA-42
BENDS - E	E-Plane 90° VSWR \leq 1.15	BE-42
BENDS - H	H-Plane 90° VSWR \leq 1.15	BH-42
COUPLERS	FULL BAND 18-26.5 GHz	
Cross Guide	Coupling: 20 dB \pm 2 dB Directivity \geq 15 dB VSWR \leq 1.20	CG-42
Directional	Coupling: 3 dB \pm 1 dB Directivity \geq 25 dB VSWR \leq 1.20	DCG-42-3C
Directional	Coupling: 3 dB \pm 1 dB Directivity \geq 30 dB VSWR \leq 1.20	DCG-42-3D
Directional	Coupling: 3 dB \pm 1 dB Directivity \geq 40 dB VSWR \leq 1.20	DCG-42-3E
Directional	Coupling: 6 dB \pm 1.2 dB Directivity \geq 25 dB VSWR \leq 1.20	DCG-42-6C
Directional	Coupling: 6 dB \pm 1.2 dB Directivity \geq 30 dB VSWR \leq 1.20	DCG-42-6D
Directional	Coupling: 6 dB \pm 1.2 dB Directivity \geq 40 dB VSWR \leq 1.20	DCG-42-6E
Directional	Coupling: 10 dB \pm 1.5 dB Directivity \geq 25 dB VSWR \leq 1.20	DCG-42-10C
Directional	Coupling: 10 dB \pm 1.5 dB Directivity \geq 30 dB VSWR \leq 1.20	DCG-42-10D
Directional	Coupling: 10 dB \pm 1.5 dB Directivity \geq 40 dB VSWR \leq 1.20	DCG-42-10E
Directional	Coupling: 20 dB \pm 2.0 dB Directivity \geq 25 dB VSWR \leq 1.20	DCG-42-20C
Directional	Coupling: 20 dB \pm 2.0 dB Directivity \geq 30 dB VSWR \leq 1.20	DCG-42-20D
Directional	Coupling: 20 dB \pm 2.0 dB Directivity \geq 40 dB VSWR \leq 1.20	DCG-42-20E
DETECTOR	Crystal Detector: Tunable; 200 mV/mW; Full Waveguide Band	CD-42
E-H TUNER	18-26.5 GHz Adjustable VSWR \leq 20:1 to 1.05:1	EHT-42
LOADS	FULL BAND 18-26.5 GHz	
Terminations	Power Rating: 0.5 W VSWR \leq 1.06	FT-42
Low Power	Power Rating: 10 W VSWR \leq 1.10	HPL-42-10
Medium Power	Power Rating: 100 W; VSWR \leq 1.10	HPL-42-100
High Power	Power Rating: 200 W; VSWR \leq 1.15	HPL-42-200
High Power	Power Rating: 500 W; VSWR \leq 1.15	HPL-42-500
PHASE SHIFTER	18-26.5 GHz; Variable Phase Shifter; 0° to 180°; VSWR \leq 1.15	VPS-42
SHORTS	18-26.5 GHz; Tunable: Mechanical Range: 10 mm; VSWR $>$ 20:1	TS-42
SLIDE TUNER	18-26.5 GHz; Slide Screw Tuner; VSWR: 20 to 1.03	SST-42
STANDS	Waveguide Stands (Adjustable Height)	STW-42
STRAIGHTS*	FULL BAND 18-26.5 GHz *	
	1.0 inch length straight waveguide w/flanges	S-42A
	2.0 inch length straight waveguide w/flanges	S-42B
	3.0 inch length straight waveguide w/flanges	S-42C
	4.0 inch length straight waveguide w/flanges	S-42D
	6.0 inch length straight waveguide w/flanges	S-42F
SWITCHES	SINGLE POLE DOUBLE THROW - 18-26.5 GHz	
Mechanical	S.P.D.T. 3 Port E-Plane	EPS-42
Mechanical	S.P.D.T. 3 Port H-Plane	HPS-42
Magic	Bandwidth: 20% Unsymmetry: \leq 0.5 dB Isolation \geq 30 dB	HTW-42

MILLIMETER WAVEGUIDE PRODUCTS K-BAND (18-26.5GHz) WR-42 (UG 595/U)

DESCRIPTION		MODEL
TEES	FULL BAND 18-26.5 GHz	
E-Plane	Balance ≤ 0.3 dB Phase Division: 180°	EPT-42
H-Plane	Balance ≤ 0.3 dB Phase Division: 0°	HPT-42
E-H Plane	Balance: ≤ 0.3 dB; Phase Division: E= 180° /H= 0°	EHW-42
Magic	Bandwidth: 20% Unsymmetry: ≤ 0.5 dB Isolation ≥ 30 dB	HTW-42
TRANSITIONS	Cosine Function Electroformed Transition WR-28 to WR-42	WT28-42
	Linear Transition WR-62 to WR-42	WLT42-62
	Linear Transition WR-34 to WR-42	WLT42-34
	Linear Transition WR-28 to WR-42	WLT28-42
TWISTS	FULL BAND 18-26.5 GHz	
	90° Waveguide Twist	TW-42-90
	45° Waveguide Twist	TW-42-45
WAVEGUIDE	Copper Waveguide: Unfinished in 1 meter lengths (Inside: 0.42x0.17 inches)	WR-42(1M)

NOTES:

* - Waveguide straights are available in any length up to 36 inches

WARRANTY:

All products purchased from "Dorado" are warranted to meet the published specifications and to be free from defects in workmanship and materials for a period of 12 months from date of delivery.

DELIVERY:

Most full band devices and some narrow band devices are carried in stock. Non-stock items may require up to 60 days for shipment.

ABBREVIATIONS:

B/W = Bandwidth;
PWR = Power

MILLIMETER WAVEGUIDE PRODUCTS (22 to 33GHz) *WR-34 (UG 1530/U)*

DESCRIPTION		MODEL
ATTENUATORS	FULL BAND 22.0-33.0 GHz	
Fixed	3 dB \pm 0.5 dB VSWR \leq 1.15	FA-34-3
Fixed	6 dB \pm 1.0 dB VSWR \leq 1.15	FA-34-6
Fixed	10 dB \pm 1.5 dB VSWR \leq 1.15	FA-34-10
Fixed	20 dB \pm 2.0 dB VSWR \leq 1.15	FA-34-20
Fixed	30 dB \pm 3.0 dB VSWR \leq 1.15	FA-34-30
Variable	0.5 to 30 dB (min) VSWR \leq 1.15	VA-34
BENDS - E	E-Plane 90° VSWR \leq 1.15	BE-34
BENDS - H	H-Plane 90° VSWR \leq 1.15	BH-34
COUPLERS	FULL BAND 22.0-33.0 GHz	
Cross Guide	Coupling: 20 dB \pm 2 dB Directivity \geq 15 dB VSWR \leq 1.20	CG-34
Directional	Coupling: 3 dB \pm 1 dB Directivity \geq 25 dB VSWR \leq 1.20	DCG-34-3C
Directional	Coupling: 3 dB \pm 1 dB Directivity \geq 30 dB VSWR \leq 1.20	DCG-34-3D
Directional	Coupling: 6 dB \pm 1.2 dB Directivity \geq 25 dB VSWR \leq 1.20	DCG-34-6C
Directional	Coupling: 6 dB \pm 1.2 dB Directivity \geq 30 dB VSWR \leq 1.20	DCG-34-6D
Directional	Coupling: 10 dB \pm 1.5 dB Directivity \geq 25 dB VSWR \leq 1.20	DCG-34-10C
Directional	Coupling: 10 dB \pm 1.5 dB Directivity \geq 30 dB VSWR \leq 1.20	DCG-34-10D
Directional	Coupling: 10 dB \pm 1.5 dB Directivity \geq 38 dB VSWR \leq 1.20	DCG-34-10E
Directional	Coupling: 20 dB \pm 2.0 dB Directivity \geq 25 dB VSWR \leq 1.20	DCG-34-20C
Directional	Coupling: 20 dB \pm 2.0 dB Directivity \geq 30 dB VSWR \leq 1.20	DCG-34-20D
Directional	Coupling: 20 dB \pm 2.0 dB Directivity \geq 38 dB VSWR \leq 1.20	DCG-34-20E
Directional	Coupling: 40 dB \pm 3.0 dB Directivity \geq 25 dB VSWR \leq 1.20	DCG-34-40C
Directional	Coupling: 40 dB \pm 3.0 dB Directivity \geq 30 dB VSWR \leq 1.20	DCG-34-40D
Directional	Coupling: 40 dB \pm 3.0 dB Directivity \geq 38 dB VSWR \leq 1.20	DCG-34-40E
DETECTOR	Crystal Detector: Tunable; 200 mV/mW; Full Waveguide Band	CD-34
E-H TUNER	22.0-33.0 GHz Adjustable VSWR \leq 20 to 1.05	EHT-34
PHASE SHIFTER	22.0-33.0 GHz; Variable Phase Shifter; 0° to 180°; VSWR \leq 1.15	VPS-34
SHORTS	22.0-33.0 GHz; Tunable; Mechanical Range: 10 mm; VSWR $>$ 20:1	TS-34
STRAIGHTS*	FULL BAND 22.0-33.0 GHz *	
	1.0 inch length straight waveguide w/flanges	S-34A
	2.0 inch length straight waveguide w/flanges	S-34B
	3.0 inch length straight waveguide w/flanges	S-34C
	4.0 inch length straight waveguide w/flanges	S-34D
	6.0 inch length straight waveguide w/flanges	S-34F
	12.0 inch length straight waveguide w/flanges	S-34L
TEES	FULL BAND 22.0-33.0 GHz	
E-Plane	Balance \leq 0.3 dB Phase Division: 180°	EPT-34
H-Plane	Balance \leq 0.3 dB Phase Division: 0°	HPT-34
Magic	Bandwidth: 20% Unsymmetry: \leq 0.3 dB Isolation \geq 30 dB	HTW-34
TERMINATION	Power Rating 0.5 W VSWR \leq 1.06	FT-34
TWISTS	FULL BAND 22.0-33.0 GHz	
	90° Waveguide Twist	TW-34-90
	45° Waveguide Twist	TW-34-45
WAVEGUIDE	Copper Waveguide: Unfinished in 1 meter lengths (Inside: 0.34x0.17 inches)	WR-34(1M)

NOTES:

* - Waveguide straights are available in any length up to 36 inches

DELIVERY:

Most full band devices and some narrow band devices are carried in stock. Non-stock items may require up to 60 days for shipment.

ABBREVIATIONS:

B/W = Bandwidth;
PWR = Power

MILLIMETER WAVEGUIDE PRODUCTS KA-BAND (26.5 to 40GHz) WR-28 (UG 599/U)

DESCRIPTION		MODEL
ATTENUATORS	FULL BAND 26.5-40 GHz	
Fixed	3 dB \pm 0.5 dB; VSWR \leq 1.15	FA-28-3
Fixed	6 dB \pm 1.0 dB; VSWR \leq 1.15	FA--28-6
Fixed	10 dB \pm 1.5 dB; VSWR \leq 1.15	FA-28-10
Fixed	20 dB \pm 2.0 dB; VSWR \leq 1.15	FA-28-20
Fixed	30 dB \pm 3.0 dB; VSWR \leq 1.15	FA-28-30
Variable	0.5 to 30 dB (min); VSWR \leq 1.15	VA-28
BENDS - E	E-Plane 90° VSWR \leq 1.15	BE-28
BENDS - H	H-Plane 90° VSWR \leq 1.15	BH-28
COUPLERS	FULL BAND 26.5-40 GHz	
Cross Guide	Coupling: 20 dB \pm 2 dB Directivity \geq 15 dB VSWR \leq 1.20	CG-28
Directional	Coupling: 3 dB \pm 1 dB Directivity \geq 25 dB VSWR \leq 1.20	DCG-28-3C
Directional	Coupling: 3 dB \pm 1 dB Directivity \geq 30 dB VSWR \leq 1.20	DCG-28-3D
Directional	Coupling: 3 dB \pm 1 dB Directivity \geq 40 dB VSWR \leq 1.20	DCG-28-3E
Directional	Coupling: 6 dB \pm 1.2 dB Directivity \geq 25 dB VSWR \leq 1.20	DCG-28-6C
Directional	Coupling: 6 dB \pm 1.2 dB Directivity \geq 30 dB VSWR \leq 1.20	DCG-28-6D
Directional	Coupling: 6 dB \pm 1.2 dB Directivity \geq 40 dB VSWR \leq 1.20	DCG-28-6E
Directional	Coupling: 10 dB \pm 1.5 dB Directivity \geq 25 dB VSWR \leq 1.20	DCG-28-10C
Directional	Coupling: 10 dB \pm 1.5 dB Directivity \geq 30 dB VSWR \leq 1.20	DCG-28-10D
Directional	Coupling: 10 dB \pm 1.5 dB Directivity \geq 40 dB VSWR \leq 1.20	DCG-28-10E
Directional	Coupling: 20 dB \pm 2.0 dB Directivity \geq 25 dB VSWR \leq 1.20	DCG-28-20C
Directional	Coupling: 20 dB \pm 2.0 dB Directivity \geq 30 dB VSWR \leq 1.20	DCG-28-20D
Directional	Coupling: 20 dB \pm 2.0 dB Directivity \geq 40 dB VSWR \leq 1.20	DCG-28-20E
Directional	Coupling: 30 dB \pm 3.0 dB Directivity \geq 30 dB VSWR \leq 1.20	DCG-28-30D
Directional	Coupling: 40 dB \pm 4.0 dB Directivity \geq 30 dB VSWR \leq 1.20	DCG-28-40D
DETECTOR	Crystal Detector: Tunable; 200 mV/mW; Full Waveguide Band 26.5-40 GHz	CD-28
E-H TUNER	26.5-40 GHz Adjustable VSWR \leq 20:1 to 1.05:1	EHT-28
LOADS	FULL BAND 26.5-40 GHz	
Terminations	Power Rating: 0.5 W VSWR \leq 1.06	FT-28
Low Power	Power Rating: 10 W VSWR \leq 1.10	HPL-28-10
Medium Power	Power Rating: 100 W VSWR \leq 1.10	HPL-28-100
Power	Power Rating: 200 W VSWR \leq 1.15	HPL-28-200
High Power	Power Rating: 500 W VSWR \leq 1.15	HPL-28-500
PHASE SHIFTER	26.5-40 GHz; Variable Phase Shifter; 0° to 180°; VSWR \leq 1.15	VPS-28
SHORTS	26.5-40 GHz; Tunable: Mechanical Range: 10 mm; VSWR $>$ 20:1	TS-28
SLIDE TUNER	26.5-40 GHz Slide Screw Tuner VSWR: 20 to 1.03:1	SST-28
STANDS	Waveguide Stands (Adjustable Height)	STW-28
STRAIGHTS*	FULL BAND 26.5-40 GHz*	
	1.0 inch length straight waveguide w/flanges	S-28A
	2.0 inch length straight waveguide w/flanges	S-28B
	3.0 inch length straight waveguide w/flanges	S-28C
	4.0 inch length straight waveguide w/flanges	S-28D
	6.0 inch length straight waveguide w/flanges	S-28F

MILLIMETER WAVEGUIDE PRODUCTS KA-BAND (26.5 to 40GHz) WR-28 (UG 599/U)

DESCRIPTION		MODEL
TEES	FULL BAND 26.5-40 GHz	
E-Plane	Balance ≤ 0.3 dB Phase Division: 180°	EPT-28
H-Plane	Balance ≤ 0.3 dB Phase Division: 0°	HPT-28
E-H Plane	Balance: ≤ 0.3 dB Phase Division: E= 180° /H= 0°	EHW-28
Magic	Bandwidth: 20% Unsymmetry: ≤ 0.5 dB Isolation ≥ 30 dB	HTW-28
TRANSITIONS	WAVEGUIDE TO WAVEGUIDE	
	Linear Transition WR-28 to WR-28	WLT28-28
	Linear Transition WR-34 to WR-28	WLT28-34
	Linear Transition WR-62 to WR-28	WLT28-62
	Low Loss Cosine Function Electroformed Transition WR-28 to WR-90	WT28-90
	Low Loss Cosine Function Electroformed Transition WR-28 to WR-62	WT28-62
	Low Loss Cosine Function Electroformed Transition WR-28 to WR-42	WT28-42
	Low Loss Cosine Function Electroformed Transition WR-28 to WR-22	WT28-22
	Low Loss Cosine Function Electroformed Transition WR-28 to WR-19	WT28-19
	Low Loss Cosine Function Electroformed Transition WR-28 to WR-15	WT28-15
	Low Loss Cosine Function Electroformed Transition WR28 to WR-12	WT28-12
	Low Loss Cosine Function Electroformed Transition WR-28 to WR-10	WT28-10
	Low Loss Cosine Function Electroformed Transition WR28 to WR-8	WT28-8
	Low Loss Cosine Function Electroformed Transition WR-28 to WR-6	WT28-6
	Low Loss Cosine Function Electroformed Transition WR-28 to WR-5	WT28-5
	Low Loss Cosine Function Electroformed Transition WR-28 to WR-4	WT28-4
	Low Loss Cosine Function Electroformed Transition WR-28 to WR-3	WT28-3
TWISTS	FULL BAND 26.5-40 GHz	
	90° Waveguide Twist	TW-28-90
	45° Waveguide Twist	TW-28-45
WAVEGUIDE	Copper Waveguide: Unfinished in 1 meter lengths (Inside: 0.28x0.17 inches)	WR-28(1M)

NOTES:

* - Waveguide straights are available in any length up to 36 inches

DELIVERY:

Most full band devices and some narrow band devices are carried in stock. Non-stock items may require up to 60 days for shipment.

ABBREVIATIONS:

B/W = Bandwidth;
PWR = Power

MILLIMETER WAVEGUIDE PRODUCTS Q-BAND (33 to 50GHz) WR-22 (UG 383/U)

DESCRIPTION		MODEL
ATTENUATORS	FULL BAND 33-50 GHz	
Fixed	3 dB ±0.5 dB VSWR ≤1.15	FA-22-3
Fixed	6 dB ±1.0 dB VSWR ≤1.15	FA--22-6
Fixed	10 dB ±1.5 dB VSWR ≤1.15	FA-22-10
Fixed	20 dB ±2.0 dB VSWR ≤1.15	FA-22-20
Fixed	30 dB ±3.0 dB VSWR ≤1.15	FA-22-30
Variable	0.5 to 30 dB (min) VSWR ≤1.15	VA-22
BENDS – E	E-Plane 90° VSWR ≤1.15	BE-22
BENDS – H	H-Plane 90° VSWR ≤1.15	BH-22
COUPLERS	FULL BAND 33-50 GHz	
Cross Guide	Coupling: 20 dB ±2 dB Directivity ≥15 dB VSWR≤ 1.20	CG-22
Directional	Coupling: 3 dB ±1 dB Directivity ≥25 dB VSWR ≤1.20	DCG-22-3C
Directional	Coupling: 3 dB ±1 dB Directivity ≥30 dB VSWR ≤1.20	DCG-22-3D
Directional	Coupling: 3 dB ±1 dB Directivity ≥40 dB VSWR ≤1.20	DCG-22-3E
Directional	Coupling: 6 dB ±1.2 dB Directivity ≥25 dB VSWR ≤1.20	DCG-22-6C
Directional	Coupling: 6 dB ±1.2 dB Directivity ≥30 dB VSWR ≤1.20	DCG-22-6D
Directional	Coupling: 6 dB ±1.2 dB Directivity ≥40 dB VSWR ≤1.20	DCG-22-6E
Directional	Coupling: 10 dB ±1.5 dB Directivity ≥25 dB VSWR ≤1.20	DCG-22-10C
Directional	Coupling: 10 dB ±1.5 dB Directivity ≥30 dB VSWR ≤1.20	DCG-22-10D
Directional	Coupling: 10 dB ±1.5 dB Directivity ≥40 dB VSWR ≤1.20	DCG-22-10E
Directional	Coupling: 20 dB ±2.0 dB Directivity ≥25 dB VSWR ≤1.20	DCG-22-20C
Directional	Coupling: 20 dB ±2.0 dB Directivity ≥30 dB VSWR ≤1.20	DCG-22-20D
Directional	Coupling: 20 dB ±2.0 dB Directivity ≥40 dB VSWR ≤1.20	DCG-22-20E
DETECTOR	Crystal Detector: Tunable; 200 mV/mW; Full Waveguide Band	CD-22
E-H TUNER	33-50 GHz Adjustable VSWR: 20:1 to 1.05:1	EHT-22
PHASE SHIFTER	33-50 GHz; Variable Phase Shifter; 0° to 180°; VSWR ≤1.15	VPS-22
LOADS	FULL BAND 33-50 GHz	
Terminations	Power Rating: 0.5 W VSWR ≤1.06	FT-22
Low Power	Power Rating: 10 W VSWR ≤1.10	HPL-22-10
Medium Power	Power Rating: 100 W VSWR ≤1.10	HPL-22-100
High Power	Power Rating: 200 W VSWR ≤1.15	HPL-22-200
High Power	Power Rating: 500 W VSWR ≤1.15	HPL-22-500
SHORTS	33-50 GHz; Tunable: Mechanical Range: 10 mm; VSWR>20:1	TS-22
SLIDE TUNER	33-50 GHz Slide Screw Tuner VSWR: 20 to 1.03:1	SST-22
STANDS	Waveguide Stands (Adjustable Height)	STW-28
STRAIGHTS*	FULL BAND 33-50 GHz*	
	1.0 inch length straight waveguide w/flanges	S-22A
	2.0 inch length straight waveguide w/flanges	S-22B
	3.0 inch length straight waveguide w/flanges	S-22C
	4.0 inch length straight waveguide w/flanges	S-22D
	6.0 inch length straight waveguide w/flanges	S-22F
TEES	FULL BAND 33-50 GHz	
E-Plane	Balance: ≤0.3 dB Phase Division: 180°	EPT-22
H-Plane	Balance: ≤0.3 dB Phase Division: 0°	HPT-22
E-H Plane	Balance: ≤0.3 dB Phase Division: E=180°/H=0°	EHW-22
Magic	Bandwidth: 20% Unsymmetry: ≤0.5 dB Isolation: 30 dB	HTW-22

MILLIMETER WAVEGUIDE PRODUCTS Q-BAND (33 to 50GHz) WR-22 (UG 383/U)

PRODUCT	DESCRIPTION	MODEL
TRANSITIONS	WAVEGUIDE TO WAVEGUIDE	
	Low Loss Cosine Function Electroformed Transition WR-22 to WR-19	WT-22-19
	Low Loss Cosine Function Electroformed Transition	WT-28-22
	Linear Waveguide Transition WLT-22 to WR-19	WLT-22-19
	Linear Waveguide Transition WR-28 to WR-22 (50mm length)	WLT-28-22
TWISTS	FULL BAND 33-50 GHz	
	90° Waveguide Twist	TW-22-90
	45° Waveguide Twist	TW-22-45
WAVEGUIDE	Copper Waveguide: Unfinished in 1 meter lengths (Inside: 0.22x0.17 inches)	WR-22(1M)

NOTES:

* - Waveguide straights are available in any length up to 36 inches

DELIVERY:

Most full band devices and some narrow band devices are carried in stock. Non-stock items may require up to 60 days for shipment.

ABBREVIATIONS:

B/W = Bandwidth;
PWR = Power

MILLIMETER WAVEGUIDE PRODUCTS U-Band (40 to 60GHz) WR-19 (UG 383/UM)

PRODUCT	DESCRIPTION			MODEL
ATTENUATORS	FULL BAND 40-60 GHz			
Fixed	3 dB ±0.5 dB	VSWR ≤1.15		FA-19-3
Fixed	6 dB ±1.0 dB	VSWR ≤1.15		FA--19-6
Fixed	10 dB ±1.5 dB	VSWR ≤1.15		FA-19-10
Fixed	20 dB ±2.0 dB	VSWR ≤1.15		FA-19-20
Fixed	30 dB ±3.0 dB	VSWR ≤1.15		FA-19-30
Variable	0.5 to 30 dB (min)	VSWR ≤1.15		VA-19
BENDS - E	E-Plane 90°			BE-19
BENDS - H	H-Plane 90°			BH-19
COUPLERS	FULL BAND 40-60 GHz			
Cross Guide	Coupling: 20 dB ±2 dB	Directivity ≥15 dB	VSWR ≤1.20	CG-19
Directional	Coupling: 3 dB ±1 dB	Directivity ≥25 dB	VSWR ≤1.20	DCG-19-3C
Directional	Coupling: 3 dB ±1 dB	Directivity ≥30 dB	VSWR ≤1.20	DCG-19-3D
Directional	Coupling: 3 dB ±1 dB	Directivity ≥40 dB	VSWR ≤1.20	DCG-19-3E
Directional	Coupling: 6 dB ±1.2 dB	Directivity ≥25 dB	VSWR ≤1.20	DCG-19-6C
Directional	Coupling: 6 dB ±1.2 dB	Directivity ≥30 dB	VSWR ≤1.20	DCG-19-6D
Directional	Coupling: 6 dB ±1.2 dB	Directivity ≥40 dB	VSWR ≤1.20	DCG-19-6E
Directional	Coupling: 10 dB ±1.5 dB	Directivity ≥25 dB	VSWR ≤1.20	DCG-19-10C
Directional	Coupling: 10 dB ±1.5 dB	Directivity ≥30 dB	VSWR ≤1.20	DCG-19-10D
Directional	Coupling: 10 dB ±1.5 dB	Directivity ≥40 dB	VSWR ≤1.20	DCG-19-10E
Directional	Coupling: 20 dB ±2.0 dB	Directivity ≥25 dB	VSWR ≤1.20	DCG-19-20C
Directional	Coupling: 20 dB ±2.0 dB	Directivity ≥30 dB	VSWR ≤1.20	DCG-19-20D
Directional	Coupling: 20 dB ±2.0 dB	Directivity ≥40 dB	VSWR ≤1.20	DCG-19-20E
DETECTOR	Crystal Detector: Tunable; 200 mV/mW; Full Waveguide Band			CD-19
E-H TUNER	40-60 GHz	Adjustable	VSWR: 10:1 to 1.05:1	EHT-19
LOADS	FULL BAND 40-60 GHz			
Terminations	Power Rating: 0.5 W	VSWR: 1.06:1		FT-19
Low Power	Power Rating: 10 W	VSWR: 1.10:1		HPL-19-10
Medium Power	Power Rating: 100 W	VSWR: 1.10:1		HPL-19-100
High Power	Power Rating: 200 W	VSWR: 1.15:1		HPL-19-200
High Power	Power Rating: 500 W	VSWR: 1.15:1		HPL-19-500
PHASE SHIFTER	40-60 GHz; Variable Phase Shifter; 0° to 180°; VSWR: 1.15			VPS-19
SHORTS	40-60 GHz; Tunable: Mechanical Range: 10 mm; VSWR>20:1			TS-19
STANDS	Waveguide Stands (Adjustable Height)			STW-28
STRAIGHTS*	FULL BAND 40-60 GHz*			
	1.0 inch length straight waveguide w/flanges			S-19A
	2.0 inch length straight waveguide w/flanges			S-19B
	3.0 inch length straight waveguide w/flanges			S-19C
	4.0 inch length straight waveguide w/flanges			S-19D
	6.0 inch length straight waveguide w/flanges			S-19F
TEES	FULL BAND 40-60 GHz			
E-Plane	Balance: ≤0.3 dB	Phase Division: 180°		EPT-19
H-Plane	Balance: ≤0.3 dB	Phase Division: 0°		HPT-19
E-H Plane	Balance: ≤0.3 dB	Phase Division: E=180°/H=0°		EHW-19
Magic	Bandwidth: 20%; ≤Unsymmetry: ≤0.5 dB; Isolation: 30 dB			HTW-19
TRANSITIONS	WAVEGUIDE TO WAVEGUIDE			
	Low Loss Cosine Function Electroformed Transition WR-19 to WR-15			WT19-15
	Low Loss Cosine Function Electroformed Transition WR-22 to WR-19			WT22-19
	Low Loss Cosine Function Electroformed Transition WR-28 to WR-19			WT28-19
TWISTS	FULL BAND 40-60 GHz			
	90° Waveguide Twist			TW-19-90
	45° Waveguide Twist			TW-19-45
WAVEGUIDE	Copper Waveguide: Unfinished in 1 meter lengths (Inside: 0.19x0.17 inches)			WR-19(1M)

MILLIMETER WAVEGUIDE PRODUCTS V-Band (50 to 75GHz) WR-15 (UG 385/U)

DESCRIPTION		MODEL
ATTENUATORS	FULL BAND 50-75 GHz	
Fixed	3 dB \pm 0.5 dB VSWR \leq 1.15	FA-15-3
Fixed	6 dB \pm 1.0 dB VSWR \leq 1.15	FA--15-6
Fixed	10 dB \pm 1.5 dB VSWR \leq 1.15	FA-15-10
Fixed	20 dB \pm 2.0 dB VSWR \leq 1.15	FA-15-20
Fixed	30 dB \pm 3.0 dB VSWR \leq 1.15	FA-15-30
Variable	0.5 to 30 dB (min) VSWR \leq 1.15	VA-15
BENDS - E	E-Plane 90° VSWR \leq 1.15	BE-15
BENDS - H	H-Plane 90° VSWR \leq 1.15	BH-15
COUPLERS	FULL BAND 50-75 GHz	
Cross Guide	Coupling: 20 dB \pm 2 dB Directivity \geq 15 dB VSWR \leq 1.20	CG-15
Directional	Coupling: 3 dB \pm 1 dB Directivity \geq 25 dB VSWR \leq 1.20	DCG-15-3C
Directional	Coupling: 3 dB \pm 1 dB Directivity \geq 30 dB VSWR \leq 1.20	DCG-15-3D
Directional	Coupling: 3 dB \pm 1 dB Directivity \geq 40 dB VSWR \leq 1.20	DCG-15-3E
Directional	Coupling: 6 dB \pm 1.2 dB Directivity \geq 25 dB VSWR \leq 1.20	DCG-15-6C
Directional	Coupling: 6 dB \pm 1.2 dB Directivity \geq 30 dB VSWR \leq 1.20	DCG-15-6D
Directional	Coupling: 6 dB \pm 1.2 dB Directivity \geq 40 dB VSWR \leq 1.20	DCG-15-6E
Directional	Coupling: 10 dB \pm 1.5 dB Directivity \geq 25 dB VSWR \leq 1.20	DCG-15-10C
Directional	Coupling: 10 dB \pm 1.5 dB Directivity \geq 30 dB VSWR \leq 1.20	DCG-15-10D
Directional	Coupling: 10 dB \pm 1.5 dB Directivity \geq 40 dB VSWR \leq 1.20	DCG-15-10E
Directional	Coupling: 20 dB \pm 2.0 dB Directivity \geq 25 dB VSWR \leq 1.20	DCG-15-20C
Directional	Coupling: 20 dB \pm 2.0 dB Directivity \geq 30 dB VSWR \leq 1.20	DCG-15-20D
Directional	Coupling: 20 dB \pm 2.0 dB Directivity \geq 40 dB VSWR \leq 1.20	DCG-15-20E
DETECTOR	Crystal Detector: Tunable; 200 mV/mW; Full Waveguide Band	CD-15
E-H TUNER	50-75 GHz Adjustable VSWR: 10:1 to 1.05:1	EHT-15
LOADS	FULL BAND 50-75 GHz	
Terminations	Power Rating: 0.5 W VSWR \leq 1.06	FT-15
Low Power	Power Rating: 10 W VSWR \leq 1.10	HPL-15-10
Medium Power	Power Rating: 100 W VSWR \leq 1.10	HPL-15-100
High Power	Power Rating: 200 W VSWR \leq 1.15	HPL-15-200
High Power	Power Rating: 500 W VSWR \leq 1.15	HPL-15-500
PHASE SHIFTER	50-75 GHz; Variable Phase Shifter; 0° to 180°; VSWR \leq 1.15	VPS-15
SHORTS	50-75 GHz; Tunable: Mechanical Range: 10 mm; VSWR $>$ 20:1	TS-15
STANDS	Waveguide Stands (Adjustable Height)	STW-28
STRAIGHTS*	FULL BAND 50-75 GHz*	
	1.0 inch length straight waveguide w/flanges	S-15A
	2.0 inch length straight waveguide w/flanges	S-15B
	3.0 inch length straight waveguide w/flanges	S-15C
	4.0 inch length straight waveguide w/flanges	S-15D
	6.0 inch length straight waveguide w/flanges	S-15F
TEES	FULL BAND 50-75 GHz	
E-Plane	Balance: \leq 0.3 dB Phase Division: 180°	EPT-15
H-Plane	Balance: \leq 0.3 dB Phase Division: 0°	HPT-15
Magic	Bandwidth: 20% Unsymmetry: \leq 0.5 dB Isolation: 30 dB	HTW-15
TRANSITIONS	WAVEGUIDE TO WAVEGUIDE	
	Low Loss Cosine Function Electroformed Transition WR-10 to WR-15	WT10-15
	Low Loss Cosine Function Electroformed Transition WR-28 to WR-15	WT28-15
	Low Loss Cosine Function Electroformed Transition WR-90 to WR-15	WT90-15
TWISTS	FULL BAND 50-75 GHz	
	90° Waveguide Twist	TW-15-90
	45° Waveguide Twist	TW-15-45
WAVEGUIDE	Copper Waveguide: Unfinished in 1 meter lengths (Inside: 0.15x0.17 inches)	WR-15(1M)

MILLIMETER WAVEGUIDE PRODUCTS E-Band (60 to 90GHz) WR-12 (UG 387/U)

DESCRIPTION		MODEL
ATTENUATORS	FULL BAND 60-90 GHz	
Fixed	3 dB \pm 0.5 dB; VSWR \leq 1.15	FA-12-3
Fixed	6 dB \pm 1.0 dB; VSWR \leq 1.15	FA--12-6
Fixed	10 dB \pm 1.5 dB; VSWR \leq 1.15	FA-12-10
Fixed	20 dB \pm 2.0 dB; VSWR \leq 1.15	FA-12-20
Fixed	30 dB \pm 3.0 dB; VSWR \leq 1.15	FA-12-30
Variable	0.5 to 30 dB (min); VSWR \leq 1.15	VA-12
BENDS – E	E-Plane 90°	BE-12
BENDS – H	H-Plane 90°	BH-12
COUPLERS	FULL BAND 60-90 GHz	
Cross Guide	Coupling: 20 dB \pm 2 dB Directivity \geq 15 dB VSWR \leq 1.20	CG-12
Directional	Coupling: 3 dB \pm 1 dB Directivity \geq 25 dB VSWR \leq 1.20	DCG-12-3C
Directional	Coupling: 3 dB \pm 1 dB Directivity \geq 30 dB VSWR \leq 1.20	DCG-12-3D
Directional	Coupling: 3 dB \pm 1 dB Directivity \geq 40 dB VSWR \leq 1.20	DCG-12-3E
Directional	Coupling: 6 dB \pm 1.2 dB Directivity \geq 25 dB VSWR \leq 1.20	DCG-12-6C
Directional	Coupling: 6 dB \pm 1.2 dB Directivity \geq 30 dB VSWR \leq 1.20	DCG-12-6D
Directional	Coupling: 6 dB \pm 1.2 dB Directivity \geq 40 dB VSWR \leq 1.20	DCG-12-6E
Directional	Coupling: 10 dB \pm 1.5 dB Directivity \geq 25 dB VSWR \leq 1.20	DCG-12-10C
Directional	Coupling: 10 dB \pm 1.5 dB Directivity \geq 30 dB VSWR \leq 1.20	DCG-12-10D
Directional	Coupling: 10 dB \pm 1.5 dB Directivity \geq 40 dB VSWR \leq 1.20	DCG-12-10E
Directional	Coupling: 20 dB \pm 2.0 dB Directivity \geq 25 dB VSWR \leq 1.20	DCG-12-20C
Directional	Coupling: 20 dB \pm 2.0 dB Directivity \geq 30 dB VSWR \leq 1.20	DCG-12-20D
Directional	Coupling: 20 dB \pm 2.0 dB Directivity \geq 40 dB VSWR \leq 1.20	DCG-12-20E
E-H TUNER	60-90 GHz Adjustable VSWR: 1.05 to 6.0	EHT-12
LOADS	FULL BAND 60-90 GHz	
Terminations	Power Rating: 0.5 W; VSWR \leq 1.06	FT-12
Low Power	Power Rating: 10 W; VSWR \leq 1.12	HPL-12-10
Medium Power	Power Rating: 100 W; VSWR \leq 1.12	HPL-12-100
High Power	Power Rating: 200 W; VSWR \leq 1.20	HPL-12-200
High Power	Power Rating: 500 W; VSWR \leq 1.20	HPL-12-500
PHASE SHIFTER	60-90 GHz; Variable Phase Shifter; 0° to 180°; VSWR \leq1.20	VPS-12
SHORTS*	60-90 GHz; Tunable: Mechanical Range: 10 mm; VSWR > 15:1*	TS-12
STANDS	Waveguide Stands (Adjustable Height)	STW-28
STRAIGHTS*	FULL BAND 60-90 GHz*	
	1.0 inch length straight waveguide w/flanges	S-12A
	2.0 inch length straight waveguide w/flanges	S-12B
	3.0 inch length straight waveguide w/flanges	S-12C
	4.0 inch length straight waveguide w/flanges	S-12D
	6.0 inch length straight waveguide w/flanges	S-12F
TEES	FULL BAND 60-90 GHz	
E-Plane	Balance: \leq 0.3 dB Phase Division: 180°	EPT-12
H-Plane	Balance: \leq 0.3 dB Phase Division: 0°	HPT-12
E-H Plane	Balance: \leq 0.3 dB Phase Division: E=180°/H=0°	EHW-12
Magic	Bandwidth: 20% Unsymmetry: \leq 0.5 dB Isolation: 30 dB	HTW-12
TRANSITIONS	WAVEGUIDE TO WAVEGUIDE	
	Low Loss Cosine Function Electroformed Transition WR-10 to WR-12	WT10-12
	Low Loss Cosine Function Electroformed Transition WR-28 to WR-12	WT28-12
	Low Loss Cosine Function Electroformed Transition WR-90 to WR-12	WT90-12
TWISTS	FULL BAND 60-90 GHz	
	90° Waveguide Twist	TW-12-90
	45° Waveguide Twist	TW-12-45
WAVEGUIDE	Copper Waveguide: Unfinished in 1 meter lengths (Inside: 0.12x0.17 inches)	WR-12(1M)

MILLIMETER WAVEGUIDE PRODUCTS

W-Band (75 to 110GHz) WR-10 (UG 387/UM)

DESCRIPTION		MODEL
ATTENUATORS	FULL BAND 75-110 GHz	
Fixed	3 dB \pm 0.5 dB VSWR \leq 1.15	FA-10-3
Fixed	6 dB \pm 1.0 dB VSWR \leq 1.15	FA--10-6
Fixed	10 dB \pm 1.5 dB VSWR \leq 1.15	FA-10-10
Fixed	20 dB \pm 2.0 dB VSWR \leq 1.15	FA-10-20
Fixed	30 dB \pm 3.0 dB VSWR \leq 1.15	FA-10-30
Variable	0.5 to 30 dB (min) VSWR \leq 1.15	VA-10
BENDS	FULL BAND 75-110 GHz	
	E-Plane 45° VSWR \leq 1.15	BE-10-45
	E-Plane 90° VSWR \leq 1.15	BE-10-90
	H-Plane 45° VSWR \leq 1.15	BH-10-45
	H-Plane 90° VSWR \leq 1.15	BH-10-90
COUPLERS	FULL BAND 75-110 GHz	
Cross Guide	Coupling: 20 dB \pm 2 dB Directivity \geq 15 dB VSWR: \leq 1.20	CG-10
Directional	Coupling: 3 dB \pm 1 dB Directivity \geq 25 dB VSWR: \leq 1.20	DCG-10-3C
Directional	Coupling: 3 dB \pm 1 dB Directivity \geq 30 dB VSWR: \leq 1.20	DCG-10-3D
Directional	Coupling: 3 dB \pm 1 dB Directivity \geq 40 dB VSWR: \leq 1.20	DCG-10-3E
Directional	Coupling: 6 dB \pm 1.2 dB Directivity \geq 25 dB VSWR: \leq 1.20	DCG-10-6C
Directional	Coupling: 6 dB \pm 1.2 dB Directivity \geq 30 dB VSWR: \leq 1.20	DCG-10-6D
Directional	Coupling: 6 dB \pm 1.2 dB Directivity \geq 40 dB VSWR: \leq 1.20	DCG-10-6E
Directional	Coupling: 10 dB \pm 1.5 dB Directivity \geq 25 dB VSWR: \leq 1.20	DCG-10-10C
Directional	Coupling: 10 dB \pm 1.5 dB Directivity \geq 30 dB VSWR: \leq 1.20	DCG-10-10D
Directional	Coupling: 10 dB \pm 1.5 dB Directivity \geq 40 dB VSWR: \leq 1.20	DCG-10-10E
Directional	Coupling: 20 dB \pm 2.0 dB Directivity \geq 25 dB VSWR: \leq 1.20	DCG-10-20C
Directional	Coupling: 20 dB \pm 2.0 dB Directivity \geq 30 dB VSWR: \leq 1.20	DCG-10-20D
Directional	Coupling: 20 dB \pm 2.0 dB Directivity \geq 40 dB VSWR: \leq 1.20	DCG-10-20E
DETECTOR	Crystal Detector: Tunable; 200 mV/mW; Full Waveguide Band	CD-10
E-H TUNER	75-110 GHz Adjustable VSWR: 20:1 to 1.05:1	EHT-10
LOADS	FULL BAND 75-110 GHz	
Terminations	Power Rating: 0.5 W VSWR \leq 1.06	FT-10
Low Power	Power Rating: 10 W VSWR \leq 1.15	HPL-10-10
Medium Power	Power Rating: 100 W VSWR \leq 1.15	HPL-10-100
High Power	Power Rating: 200 W VSWR \leq 1.20	HPL-10-200
High Power	Power Rating: 500 W VSWR \leq 1.20	HPL-10-500
PHASE SHIFTER	75-110 GHz; Variable Phase Shifter; 0° to 180°; VSWR: 1.15	VPS-10
SHORTS	75-110 GHz; Tunable: Mechanical Range: 10 mm; VSWR>20:1	TS-10
STANDS	Waveguide Stands (Adjustable Height)	STW-10
STRAIGHTS*	FULL BAND 75-110 GHz*	
	1.0 inch length straight waveguide w/flanges	S-10A
	2.0 inch length straight waveguide w/flanges	S-10B
	3.0 inch length straight waveguide w/flanges	S-10C
	4.0 inch length straight waveguide w/flanges	S-10D
	6.0 inch length straight waveguide w/flanges	S-10F
SWITCHES	SINGLE POLE DOUBLE THROW - 75-110 GHz	
Mechanical	S.P.D.T. 3 Port E-Plane	EPS-10
Mechanical	S.P.D.T. 3 Port H-Plane	HPS-10
TEES	FULL BAND 75-110 GHz	
E-Plane	Balance: \leq 0.3 dB Phase Division: 180°	EPT-10
H-Plane	Balance: \leq 0.3 dB Phase Division: 0°	HPT-10
E-H Plane	Balance: \leq 0.3 dB Phase Division: E=180°/H=0°	EHW-10
Magic	Bandwidth: 20% Unsymmetry: \leq 0.5 dB Isolation: 30 dB	HTW-10

MILLIMETER WAVEGUIDE PRODUCTS W-Band (75 to 110GHz) WR-10 (UG 387/UM)

PRODUCT	DESCRIPTION	MODEL
TRANSITIONS	Low Loss Cosine Function Electroformed Transition WR-10 to WR-8	WT10-08
	Low Loss Cosine Function Electroformed Transition WR-28 to WR-10	WT28-10
	Low Loss Cosine Function Electroformed Transition WR-10 to WR-12	WT10-12
	Low Loss Cosine Function Electroformed Transition WR-10 to WR-15	WT10-15
	Low Loss Cosine Function Electroformed Transition WR-10 to WR-62	WT10-62
	Low Loss Cosine Function Electroformed Transition WR-10 to WR-90	WT10-90
	TWISTS	FULL BAND 75-110 GHz
90° Waveguide Twist		TW-10-90
45° Waveguide Twist		TW-10-45
WAVEGUIDE	Copper Waveguide: Unfinished in 1 meter lengths (Inside: 0.10x0.17 inches)	WR-10(1M)

NOTES:

* - Waveguide straights are available in any length up to 36 inches

DELIVERY:

Most full band devices and some narrow band devices are carried in stock. Non-stock items may require up to 60 days for shipment.

ABBREVIATIONS:

B/W = Bandwidth;
PWR = Power

WAVEGUIDE TO COAXIAL ADAPTERS (2.6 to 42GHz)

MODEL NUMBER	FREQ. RANGE (GHz)	WAVE GUIDE (EIA)	FLANGE TYPE	COAXIAL CONNECTOR f-FEMALE m-MALE	VSWR (MAX)	DIMENSIONS (mm)			FIG.
						A	B	C	
WA284-N	2.60-3.95	WR-284	CPR284	N(f)/N(m)	1.25	60.0	65.0	38.0	1
WA229-N	3.60-4.20	WR-229	CPR229	N(f)/N(m)	1.25	60.0	60.0	40.0	1
WA187-N	4.40-5.80	WR-187	CPR187	N(f)/N(m)	1.25	55.0	52.0	36.0	1
WA137-N	5.80-8.20	WR-137	CPR137	N(f)/N(m)	1.25	48.0	45.0	31.5	1
WA112-N	7.70-9.60	WR-112	CPR112	N(f)/N(m)	1.25	45.0	41.5	30.0	1
WA90-N	8.20-12.40	WR-90	UG39/U	N(f)/N(m)	1.25	42.0	40.0	31.0	1
WA75-N	10.0-15.0	WR-75	UBR120	N(f)/N(m)	1.25	38.0	38.0	27.0	1
WA62-N	12.4-18.0	WR-62	UG419/U	N(f)/N(m)	1.25	32.0	27.0	24.5	1
WA284-S	2.60-3.95	WR-284	CPR284	SMA(f,m)	1.25	60.0	49.0	38.0	2
WA229-S	3.60-4.20	WR-229	CPR229	SMA(f,m)	1.25	60.0	44.0	40.0	2
WA187-S	4.40-5.80	WR-187	CPR187	SMA(f,m)	1.25	55.0	38.0	36.0	2
WA137-S	5.80-8.20	WR-137	CPR137	SMA(f,m)	1.25	48.0	31.0	31.5	2
WA112-S	7.70-9.60	WR-112	CPR112	SMA(f,m)	1.25	45.0	28.0	30.0	2
WA90-S	8.20-12.40	WR-90	UG39/U	SMA(f,m)	1.30	42.0	25.5	31.0	2
WA75-S	10.0-15.0	WR-75	UBR120	SMA(f,m)	1.30	38.0	24.5	27.0	2
WA62-S	12.4-18.0	WR-62	UG419/U	SMA(f,m)	1.30	32.0	22.0	24.5	2
WA42-K	18.0-26.5	WR-42	UG595/U	K(f)/K(m)	1.25	30.0	19.1	21.0	3
WA34-K	22.0-33.0	WR-34	UG1530/U	K(f)/K(m)	1.30	30.0	19.1	21.0	3
WA28-K	26.5-40.0	WR-28	UG599/U	K(f)/K(m)	1.30	22.0	17.3	13.7	3
WA28-KL	26.5-30.0	WR-28	UG599/U	K(f)/K(m)	1.20	22.0	17.3	13.7	3
WA28-KM	32.0-36.0	WR-28	UG599/U	K(f)/K(m)	1.20	22.0	17.3	13.7	3
WA28-KH	36.0-40.0	WR-28	UG599/U	K(f)/K(m)	1.20	22.0	17.3	13.7	3
WA22-K	33.0-42.0	WR-22	UG383/U	K(f)/K(m)	1.30	20.0	16.9	13.7	3

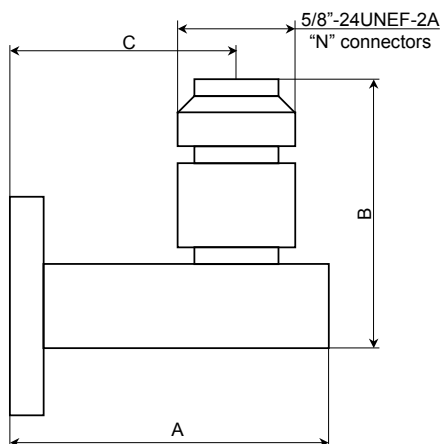


Fig. 1

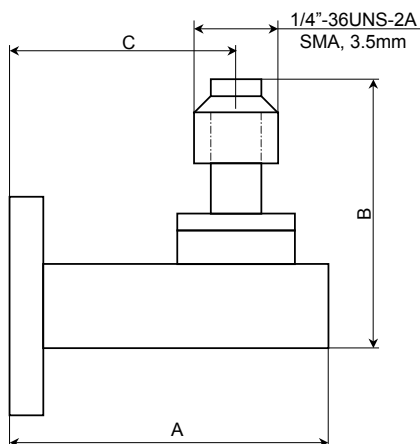


Fig. 2

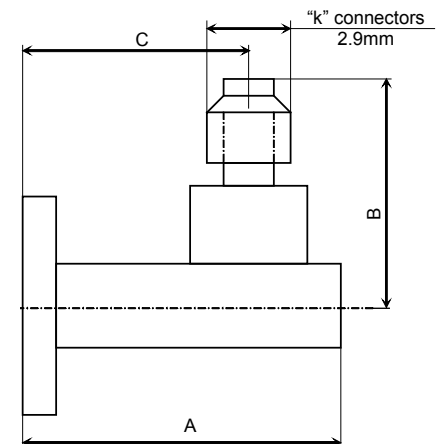


Fig. 3

WAVEGUIDE ISOLATORS & CIRCULATORS

SECTION IV

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NOTES FOR WAVEGUIDE DEVICES

DORADO waveguide isolators and circulators are designed for a wide range of high performance applications at a low cost. These devices operate at frequencies from 1.70 to 110GHz. All units have standard flanges associated with the particular waveguide size.

- **Features.**
 - Custom design
 - Wide range of standard products
 - High Performance
 - All standard flange types are available
- **Frequency range.**
 - Standard frequency range of 1.70 to 110GHz
 - Non standard waveguide bands can be offered.
- **Waveguide and Flanges**
 - Standard waveguide size from WR-430 to WR-10
 - Standard EIA flanges with the particular waveguide sizes
 - Other waveguide and flange types available
- **Temperature range.**
 - Standard temperature range –30 to +70°C
 - Electrical parameters perform at the standard operating temperature range.
 - Other temperature ranges are available (Please contact DORADO)
- **Materials and Plating.**
 - Clear anodized aluminum or silver plated brass
 - Painting available on request
- **Mechanical mounting.**
 - The gap between the ferrite waveguide device and the adjacent device to which it is to be connected must be tightly controlled. This becomes very critical at the higher frequencies.
- **Custom features.**
 - DORADO has the ability to provide a wide range of solutions to meet most applications

WAVEGUIDE ISOLATORS & CIRCULATORS WR-90, WR-75, WR-62, WR-51 (8.2 to 22GHz)

FREQ. RANGE, (GHz)	MODEL NUMBER	BAND WIDTH (%)	INS. LOSS dB (MAX)	ISOLATION dB (MIN)	VSWR (MAX)	FORWARD POWER (W)	LOAD POWER (W)	DIMENSIONS (mm)			FLANGE
								W	L	H	
STANDARD WAVEGUIDE ISOLATORS, WR-90											
8.2-9.6	3IWN89-1	full	0.20	20	1.20	10	0.5, 2.0	31.75	69.85	41.40	UBR-100
8.5-9.6	3IWN90-1	full	0.20	22	1.18	10	0.5, 2.0	31.75	69.85	41.40	UBR-100
9.0-10.0	3IWN95-2	full	0.20	22	1.18	10	0.5, 2.0	31.75	69.85	41.40	UBR-100
10.4-11.0	4IWN11-1	full	0.20	22	1.18	10	0.5, 2.0	31.75	69.85	41.40	UBR-100
8.2-12.4	3IWN(xx)-1Y	10%	0.20	20	1.22	10	0.5, 2.0	31.75	69.85	41.40	UBR-100
8.5-10.5	3IWN(xx)-1B	8%	0.50	18	1.20	10	0.5	35.20	41.40	41.40	UBR-100
8.2-12.4	4IWY10-1**	full**	0.50	17	1.35	10	0.5	TBD	TBD	TBD	TBD
STANDARD WAVEGUIDE CIRCULATORS, WR-90											
8.2-9.6	3CWN89-2	full	0.20	20	1.20	10		60.00	50.50	41.00	UBR-100
9.0-10.0	3CWN95-2	full	0.20	22	1.18	10		50.00	55.00	42.20	UBR-100
9.5-10.0	4CWN10-2	full	0.20	22	1.18	10		50.00	55.00	42.20	UBR-100
10.4-11.8	4CWN11-1	full	0.25	20	1.20	10		50.00	55.00	42.20	UBR-100
8.2-12.4	3CWN(xx)-1Y	10%	0.20	20	1.20	10		50.00	55.00	42.20	UBR-100
8.2-12.4	3CWN(xx)-2Y	10%	0.20	20	1.20	10		60.00	50.50	41.00	UBR-100
8.2-12.4	4CWY10-1**	full**	0.50	17	1.35	5		TBD	TBD	TBD	TBD
STANDARD WAVEGUIDE ISOLATORS, WR-75											
10.5-11.5	4IWN11-3	full	0.20	20	1.22	10	0.5, 2.0	38.10	76.20	38.10	UBR-120
11.5-12.6	4IWN12-6	full	0.20	20	1.22	10	0.5, 2.0	38.10	76.20	38.10	UBR-120
12.75-13.5	4IWN13-1D	full	0.20	20	1.22	10	0.5, 2.0	38.10	76.20	38.10	UBR-120
13.0-14.5	4IWN14-1D	full	0.20	20	1.22	10	0.5, 2.0	38.10	76.20	38.10	UBR-120
10.0-15.0	4IWN(xx)-1X	7%	0.20	20	1.22	10	0.5, 2.0	38.10	76.20	38.10	UBR-120
10.0-15.0	4IWY13-1	full	0.50	18	1.35	5	0.5, 2.0	38.10	76.20	38.10	UBR-120
STANDARD WAVEGUIDE CIRCULATORS, WR-75											
10.5-11.5	4CWN11-3	full	0.25	20	1.22	10		44.45	44.45	38.10	UBR-120
11.5-12.6	4CWN12-1	full	0.25	20	1.22	10		44.45	44.45	38.10	UBR-120
12.75-13.5	4CWN13-3	full	0.25	20	1.22	10		44.45	44.45	38.10	UBR-120
13.0-14.5	4CWN14-2	full	0.25	20	1.22	10		44.45	44.45	38.10	UBR-120
10.0-15.0	4CWN(xx)-1X	7%	0.25	20	1.22	10		44.45	44.45	38.10	UBR-120
STANDARD WAVEGUIDE ISOLATORS, WR-62											
12.7-15.2	4IWN14-6	full	0.40	20	1.22	5	0.5, 2.0	35.00	50.80	33.26	UBR-140
12.7-15.2	4IWN14-8B	full	0.50	18	1.30	5	0.5, 2.0	35.00	41.00	33.32	UBR-140
16.0-17.0	4IWN16-2	full	0.25	20	1.22	5	0.5, 2.0	35.00	50.80	33.26	UBR-140
12.4-18.0	4IWN(xx)-1Y	10%	0.30	20	1.22	5	0.5, 2.0	35.00	50.80	33.26	UBR-140
12.4-18.0	4IWY15-1**	full**	0.50	18	1.35	5	0.5	35.00	50.80	33.26	UBR-140
STANDARD WAVEGUIDE CIRCULATORS, WR-62											
14.0-15.3	4CWN15-3	full	0.20	21	1.20	5		33.32	45.72	33.30	UBR-140
12.4-18.0	4CWN(xx)-1Y	10%	0.30	20	1.22	5		TBD	TBD	TBD	TBD
12.4-18.0	4CWY15-1**	full**	0.50	18	1.35	5		33.32	45.72	33.30	UBR-140
STANDARD WAVEGUIDE ISOLATORS, WR-51											
17.7-21.2	4IWN19-1C	full	0.30	19	1.30	5	0.5, 2.0	20.32	50.80	33.26	UBR-180
18.5-22.0	4IWN20-1C	full	0.30	19	1.30	5	0.5, 2.0	20.32	50.80	33.26	UBR-180
15.0-22.0	4IWN(xx)-1X	10%	0.30	20	1.22	5	0.5, 2.0	TBD	TBD	TBD	TBD
STANDARD WAVEGUIDE CIRCULATORS, WR-51											
17.3-19.7	4CWN19-1	full	0.30	20	1.22	5		40.60	40.60	31.00	UBR-180
18.5-22.0	4CWN20-1	full	0.30	19	1.30	5		40.60	40.60	31.00	UBR-180
15.0-22.0	4CWN(xx)-1X	10%	0.30	20	1.20	5		TBD	TBD	TBD	TBD

NOTES:

1. OPERATING TEMPERATURE RANGE FOR ALL DEVICES IS -30° to +70° C EXCEPT:** - +15° to +35° C
2. (xx) IDENTIFIES THE CENTER FREQUENCY OF THE DEVICE IN GHz
3. LOAD POWER RATING CAN BE 0.5W OR 2W - SPECIFY HIGHER POWER RATING IF REQUIRED
4. FIG. 38 SHOWS THE SKETCH OF THE CIRCULATORS AND FIG. 39 SHOWS THE SKETCH OF THE ISOLATORS
5. CIRCULATION IS CLOCKWISE UNLESS OTHERWISE SPECIFIED

WAVEGUIDE ISOLATORS & CIRCULATORS WR-42 (17.7 to 26.5GHz)

FREQ. RANGE, (GHz)	MODEL NUMBER	BAND WIDTH (%)	INS. LOSS dB (MAX)	ISOLATION dB (MIN)	VSWR (MAX)	FORWARD POWER (W)	LOAD POWER (W)	DIMENSIONS (mm)			FLANGE
								W	L	H	
STANDARD WAVEGUIDE ISOLATORS, WR-42											
17.7-19.7	4IWN18-1	full	0.30	20	1.22	5	0.5, 2.0	22.22	38.10	22.22	UG595/U
18.0-21.0	4IWN19-2	full	0.35	18	1.25	5	0.5, 2.0	22.22	38.10	22.22	UG595/U
18.4-19.1	4IWN19-1	full	0.25	20	1.18	5	0.5, 2.0	22.22	38.10	22.22	UG595/U
18.6-21.6	4IWN20-1	full	0.35	18	1.25	5	0.5, 2.0	22.22	38.10	22.22	UG595/U
21.2-23.6	4IWN22-4	full	0.30	20	1.22	5	0.5, 2.0	22.22	38.10	22.22	UG595/U
21.2-23.6	4IWN22-6*	full*	0.30	20	1.22	5	0.5	31.75	31.75	22.22	UG595/U
21.2-24.25	4IWN23-4	full	0.30	20	1.22	5	0.5, 2.0	22.22	38.10	22.22	UG595/U
23.0-25.0	4IWN24-1	full	0.30	20	1.22	5	0.5, 2.0	22.22	38.10	22.22	UG595/U
23.0-26.5	4IWN25-7	full	0.40	18	1.30	5	0.5, 2.0	22.22	38.10	22.22	UG595/U
24.0-26.0	4IWN25-5	full	0.30	20	1.22	5	0.5, 2.0	22.22	38.10	22.22	UG595/U
24.0-26.5	4IWN26-7S	full	0.30	20	1.25	5	0.5, 2.0	12.70	33.02	22.22	UG595/U
24.5-26.5	4IWN25-1B	full	0.30	20	1.25	5	0.5, 2.0	27.94	38.10	22.22	UG595/U
26.1-27.1	4IWN25-004	full	0.30	20	1.22	5	0.5, 2.0	27.94	38.10	22.22	UG595/U
18.0-26.5	4IWN(xx)-1Y	10%	0.30	20	1.22	5	0.5, 2.0	22.22	38.10	22.22	UG595/U
18.0-26.5	4IWN(xx)-2Y	15%	0.30	20	1.25	5	0.5, 2.0	22.22	38.10	22.22	UG595/U
18.0-26.5	4IWN(xx)-3Y	20%	0.40	18	1.30	5	0.5	22.22	38.10	22.22	UG595/U
18.0-26.5	4IWN(xx)-4Y	25%	0.45	17	1.35	5	0.5	22.22	38.10	22.22	UG595/U
18.0-26.5	4IWN(xx)-5Y*	10%*	0.30	20	1.22	5	0.5	31.75	31.75	22.22	UG595/U
24.0-27.1	4IWN(xx)-6Y	10%	0.30	20	1.22	5	0.5, 2.0	27.94	38.10	22.22	UG595/U
18.5-26.5	4IWN(xx)-1S	10%	0.30	18	1.30	2	0.5, 2.0	12.70	38.10	22.22	UG595/U
19.0-26.5	4IWN(xx)-2S	15%	0.40	18	1.35	2	0.5, 2.0	12.70	38.10	22.22	UG595/U
18.0-26.5	4IWY22-1**	full**	0.50	16	1.40	2	0.5	22.22	38.10	22.22	UG595/U
STANDARD WAVEGUIDE CIRCULATORS, WR-42											
17.7-19.7	4CWN18-1B	full	0.30	20	1.22	5		22.22	31.75	22.22	UG595/U
21.2-23.6	4CWN22-4	full	0.30	20	1.22	5		22.22	31.75	22.22	UG595/U
21.2-24.25	4CWN22-3	full	0.30	20	1.22	5		22.22	31.75	22.22	UG595/U
24.0-26.0	4CWN25-3	full	0.30	20	1.22	5		22.22	31.75	22.22	UG595/U
24.0-26.5	4CWN25-2	full	0.30	20	1.22	5		22.22	31.75	22.22	UG595/U
24.0-27.0	4CWN26-2	full	0.35	18	1.30	5		22.22	31.75	22.22	UG595/U
24.5-26.5	4CWN25-4	full	0.30	20	1.25	5		22.22	31.75	22.22	UG595/U
18.0-26.5	4CWN(xx)-1Y	10%	0.30	20	1.22	5		22.22	31.75	22.22	UG595/U
18.0-26.5	4CWN(xx)-2Y	15%	0.30	20	1.25	5		22.22	31.75	22.22	UG595/U
18.0-26.5	4CWN(xx)-3Y	20%	0.40	18	1.30	5		22.22	31.75	22.22	UG595/U
18.0-26.5	4CWN(xx)-4Y	25%	0.45	17	1.35	5		22.22	31.75	22.22	UG595/U
18.0-26.5	4CWN(xx)-5Y	10%	0.30	20	1.22	5		25.40	29.21	22.22	UG595/U
18.0-26.5	4CWY22-1**	full**	0.50	16	1.40	5		22.22	31.75	22.22	UG595/U

NOTES:

1. OPERATING TEMPERATURE RANGE FOR ALL DEVICES IS -30° to +70° C EXCEPT: ** - +15° to +35° C
2. (xx) IDENTIFIES THE CENTER FREQUENCY OF THE DEVICE IN GHz
3. * - RIGHT ANGLE H-PLANE ISOLATORS (ANGLE BETWEEN INPUT AND OUTPUT IS 90°). FIG. 41
4. MODIFIED VERSIONS OF ALL DEVICES ARE AVAILABLE
5. LOAD POWER RATING CAN BE 0.5W OR 2W - SPECIFY HIGHER POWER RATING IF REQUIRED
6. FIG. 38 SHOWS THE SKETCH OF THE CIRCULATORS AND FIG. 39 SHOWS THE SKETCH OF THE ISOLATORS
7. CIRCULATION IS CLOCKWISE UNLESS OTHERWISE SPECIFIED

WAVEGUIDE ISOLATORS & CIRCULATORS

WR-34 (22 to 33GHz)

FREQ. RANGE, (GHz)	MODEL NUMBER	BAND WIDTH (%)	INS. LOSS dB (MAX)	ISOLATION dB (MIN)	VSWR (MAX)	FORWARD POWER (W)	LOAD POWER (W)	DIMENSIONS (mm)			FLANGE
								W	L	H	
STANDARD WAVEGUIDE ISOLATORS, WR-34											
24.4-26.5	4IWN25-6	full	0.30	20	1.22	2	0.5, 2.0	15.00	38.00	22.22	UG1530/U
24.4-26.5	4IWN25-3H	full	0.30	20	1.22	2	0.5, 2.0	15.00	38.00	22.22	UBR-260
25.0-27.5	4IWN26-4	full	0.30	20	1.22	2	0.5, 2.0	15.00	38.00	22.22	UG1530/U
26.2-26.7	4IWN26-3I	full	0.25	20	1.22	2	0.5, 2.0	15.00	38.00	22.22	UBR-260
26.2-26.7	4IWN26-6	full	0.30	20	1.22	2	0.5, 2.0	15.00	38.00	22.22	UG1530/U
27.3-31.3	4IWN30-5	full	0.30	20	1.22	2	0.5, 2.0	15.00	38.00	22.22	UG1530/U
27.4-31.3	4IWN30-2	full	0.30	20	1.22	2	0.5, 2.0	15.00	38.00	22.22	UBR-260
30.0-31.0	4IWN31-5	full	0.25	20	1.22	2	0.5, 2.0	15.00	38.00	22.22	UG1530/U
22.0-33.0	4IWN(xx)-1X	10%	0.30	20	1.22	2	0.5, 2.0	15.00	38.00	22.22	UG1530/U
22.0-33.0	4IWN(xx)-2X	15%	0.30	20	1.25	2	0.5, 2.0	15.00	38.00	22.22	UG1530/U
22.0-33.0	4IWN(xx)-3X	20%	0.40	18	1.30	2	0.5	15.00	38.00	22.22	UG1530/U
22.0-33.0	4IWN(xx)-4X	25%	0.45	16	1.40	2	0.5	15.00	38.00	22.22	UG1530/U
22.0-33.0	4IWN(xx)-5X	10%	0.30	20	1.22	2	0.5, 2.0	15.00	38.00	22.22	UBR-260
22.0-33.0	4IWN(xx)-6X	15%	0.30	20	1.25	2	0.5, 2.0	15.00	38.00	22.22	UBR-260
22.0-33.0	4IWN(xx)-7X	20%	0.40	18	1.30	2	0.5	15.00	38.00	22.22	UBR-260
22.0-33.0	4IWN(xx)-9X	25%	0.45	16	1.40	2	0.5	15.00	38.00	22.22	UBR-260
25.2-32.0	4IWN(xx)-3S	7%	0.30	18	1.30	2	0.5, 2.0	9.53	39.75	22.22	UG1530/U
25.2-32.0	4IWN(xx)-4S	7%	0.30	18	1.30	2	0.5, 2.0	9.53	39.75	22.22	UBR-260
22.0-33.0	4IWY27-1**	full**	0.50	16	1.40	2	0.5	15.00	38.00	22.22	UG1530/U
22.0-33.0	4IWY27-2**	full**	0.50	16	1.40	2	0.5	15.00	38.00	22.22	UBR-260
STANDARD WAVEGUIDE CIRCULATORS, WR-34											
22.0-27.5	4CWB25-1*	full*	0.50	18	1.30	2		22.22	25.40	22.22	UG1530/U
24.0-27.0	4CWN26-3	full	0.30	18	1.25	2		22.22	25.40	22.22	UBR-260
24.0-31.3	4CWB28-1	full	0.35	17	1.30	2		22.22	25.40	22.22	UG1530/U
24.3-27.5	4CWN26-1	full	0.30	20	1.22	2		22.22	25.40	22.22	UG1530/U
25.4-31.3	4CWN27-1	full	0.30	18	1.30	2		22.22	25.40	22.22	UG1530/U
27.5-33.0	4CWB30-1*	full*	0.50	18	1.30	2		22.22	25.40	22.22	UG1530/U
22.0-33.0	4CWN(xx)-1X	10%	0.30	20	1.22	2		22.22	25.40	22.22	UG1530/U
22.0-33.0	4CWN(xx)-2X	15%	0.30	18	1.25	2		22.22	25.40	22.22	UG1530/U
22.0-33.0	4CWN(xx)-3X	20%	0.40	17	1.30	2		22.22	25.40	22.22	UG1530/U
22.0-33.0	4CWN(xx)-4X	25%	0.45	16	1.40	2		22.22	25.40	22.22	UG1530/U
22.0-33.0	4CWN(xx)-5X	10%	0.30	20	1.22	2		22.22	25.40	22.22	UBR-260
22.0-33.0	4CWN(xx)-6X	15%	0.30	18	1.25	2		22.22	25.40	22.22	UBR-260
22.0-33.0	4CWN(xx)-7X	20%	0.40	17	1.30	2		22.22	25.40	22.22	UBR-260
22.0-33.0	4CWN(xx)-8X	25%	0.45	16	1.40	2		22.22	25.40	22.22	UBR-260
22.0-33.0	4CWY27-1**	full**	0.50	16	1.40	2		22.22	25.40	22.22	UG1530/U
22.0-33.0	4CWY27-2**	full**	0.50	16	1.40	2		22.22	25.40	22.22	UBR-260

NOTES:

- OPERATING TEMPERATURE RANGE FOR ALL DEVICES IS -30° to +70° C EXCEPT:
* - -10° to +50° C
** - +15° to +35° C
- (xx) IDENTIFIES THE CENTER FREQUENCY OF THE DEVICE IN GHz
- MODIFIED VERSIONS OF ALL DEVICES ARE AVAILABLE
- LOAD POWER RATING CAN BE 0.5W OR 2W - SPECIFY HIGHER POWER RATING IF REQUIRED
- FIG. 38 SHOWS THE SKETCH OF THE CIRCULATORS AND FIG. 39 SHOWS THE SKETCH OF THE ISOLATORS
- CIRCULATION IS CLOCKWISE UNLESS OTHERWISE SPECIFIED

WAVEGUIDE ISOLATORS & CIRCULATORS WR-28 (26.5 to 40GHz)

FREQ. RANGE, (GHz)	MODEL NUMBER	BAND WIDTH (%)	INS. LOSS dB (MAX)	ISOLATION dB (MIN)	VSWR (MAX)	FORWARD POWER (W)	LOAD POWER (W)	DIMENSIONS (mm)			FLANGE
								W	L	H	
STANDARD WAVEGUIDE ISOLATORS, WR-28											
26.5-36.5	4IWB30-1*	full*	0.45	16	1.40	2	0.5	12.70	31.75	19.05	UG599/U
27.0-33.0	4IWB31-2*	full*	0.40	17	1.35	2	0.5	12.70	31.75	19.05	UG599/U
27.0-29.0	4IWN28-6	Full	0.30	18	1.25	2	0.5, 2.0	12.70	31.75	19.05	UG599/U
27.0-32.0	4IWN30-1A	Full	0.30	18	1.30	2	0.5, 2.0	12.70	31.75	19.05	UG599/U
27.5-30.0	4IWN29-1	Full	0.25	20	1.25	2	0.5, 2.0	24.50	38.10	19.05	UG599/U
30.0-32.0	4IWN31-1	Full	0.30	18	1.25	2	0.5, 2.0	19.05	30.48	19.05	UG599/U
32.0-34.0	4IWN33-1A	Full	0.30	18	1.30	2	0.5, 2.0	12.70	31.75	19.05	UG599/U
33.0-35.0	4IWN34-5A	Full	0.30	18	1.30	2	0.5, 2.0	12.70	31.75	19.05	UG599/U
35.0-37.0	4IWN36-2	full	0.30	18	1.30	2	0.5, 2.0	12.70	31.75	19.05	UG599/U
36.0-38.0	4IWN37-1	full	0.30	18	1.30	2	0.5, 2.0	12.70	31.75	19.05	UG599/U
36.1-39.9	4IWN38-2	full	0.40	18	1.30	2	0.5	12.70	31.75	19.05	UG599/U
37.0-40.0	4IWN39-2	full	0.30	20	1.30	2	0.5, 2.0	13.00	31.75	19.05	UG599/U
37.5-38.5	4IWN38-1	full	0.25	20	1.25	2	0.5, 2.0	12.70	31.75	19.05	UG599/U
38.0-40.0	4IWN39-6	full	0.30	18	1.25	2	0.5, 2.0	19.05	30.48	19.05	UG599/U
26.5-40.0	4IWN(xx)-1Y	10%	0.30	18	1.30	2	0.5, 2.0	12.70	31.75	19.05	UG599/U
26.5-40.0	4IWN(xx)-2Y	15%	0.30	18	1.35	2	0.5, 2.0	12.70	31.75	19.05	UG599/U
26.5-40.0	4IWN(xx)-3Y	20%	0.40	17	1.35	2	0.5	12.70	31.75	19.05	UG599/U
26.5-40.0	4IWN(xx)-4Y	25%	0.45	16	1.40	2	0.5	12.70	31.75	19.05	UG599/U
26.5-40.0	4IWN(xx)-5S	10%	0.30	18	1.30	2	0.5, 2.0	9.53	31.75	19.05	UG599/U
26.5-40.0	4IWN(xx)-2B	7%	0.30	18	1.30	2	0.5, 2.0	12.70	25.40	19.05	UG599/U
26.5-40.0	4IWN(xx)-3B	5%	0.30	18	1.30	2	0.5, 2.0	10.00	25.40	19.05	UG599/U
26.5-40.0	4IWN(xx)-2H**	8%**	0.15	27	1.10	0.5	0.5	TBD	TBD	TBD	UG599/U
26.5-40.0	4IWY33-1**	full**	0.50	16	1.40	2	0.5	12.70	31.75	19.05	UG599/U
STANDARD WAVEGUIDE CIRCULATORS, WR-28											
26.5-33.0	4CWB29-1*	full*	0.50	16	1.40	2		19.05	25.40	19.05	UG599/U
27.0-32.0	4CWN28-1	full	0.30	18	1.30	2		19.05	25.40	19.05	UG599/U
30.0-36.0	4CWN33-1A*	full*	0.50	16	1.40	2		19.05	25.40	19.05	UG599/U
32.0-34.0	4CWN33-1	full	0.30	18	1.30	2		19.05	25.40	19.05	UG599/U
34.0-36.0	4CWN35-3	full	0.30	18	1.30	2		19.05	25.40	19.05	UG599/U
36.0-40.0	4CWN37-3*	full*	0.50	17	1.35	2		19.05	25.40	19.05	UG599/U
37.0-40.0	4CWN38-2	full	0.30	18	1.30	2		19.05	25.40	19.05	UG599/U
26.5-40.0	4CWN(xx)-1Y	10%	0.30	18	1.30	2		19.05	25.40	19.05	UG599/U
26.5-40.0	4CWN(xx)-2Y	15%	0.30	18	1.30	2		19.05	25.40	19.05	UG599/U
26.5-40.0	4CWN(xx)-3Y	20%	0.40	17	1.35	2		19.05	25.40	19.05	UG599/U
26.5-40.0	4CWN(xx)-4Y	25%	0.45	16	1.40	2		19.05	25.40	19.05	UG599/U
26.5-40.0	4CWY33-1**	full**	0.50	16	1.40	2		19.05	25.40	19.05	UG599/U

NOTES:

1. OPERATING TEMPERATURE RANGE FOR ALL DEVICES IS -30° to +70° C EXCEPT:
 - * - -10° to +50° C
 - ** - +15° to +35° C
2. (xx) IDENTIFIES THE CENTER FREQUENCY OF THE DEVICE IN GHz
3. MODIFIED VERSIONS OF ALL DEVICES ARE AVAILABLE
4. LOAD POWER RATING CAN BE 0.5W OR 2W - SPECIFY HIGHER POWER RATING IF REQUIRED
5. FIG. 38 SHOWS THE SKETCH OF THE CIRCULATORS AND FIG. 39 SHOWS THE SKETCH OF THE ISOLATORS
6. CIRCULATION IS CLOCKWISE UNLESS OTHERWISE SPECIFIED

CUSTOM DESIGN WAVEGUIDE ISOLATORS AND CIRCULATORS

Cryogenic Isolators and Circulators IN WAVEGUIDE CIRCUITS (8.2 to 50GHz)

The Dorado Cryogenic waveguide isolators and circulators operate over the frequency range of 8.2 to 50GHz with up to 15% bandwidth. These units are specified to meet all electrical specifications for temperatures from -269°C to +50°C. Typical maximum insertion loss varies between 0.2 and 0.4dB depending on bandwidth. Full waveguide bandwidth devices are also offered that operate at these cryogenic temperatures with increased insertion loss. Standard EIA waveguide flanges or special flanges to the customer's requirement are available.

Isolation will be a minimum of 20dB and the maximum VSWR will be 1.30:1

Faraday Rotation Isolators (18 to 110GHz)

The waveguide Faraday isolators operate over the full waveguide band for all waveguide sizes from 18 GHz to 170GHz. All models will have a minimum isolation of 20dB across the 40% bandwidth. Insertion loss and VSWR varies with the waveguide band. The operating temperature range for all Faraday Isolators will be -30°C to +70°C.

The maximum power handling is 0.5 Watts

High Power Isolators and Circulators

Dorado has designed and built hundreds of different types of waveguide isolators and circulators for frequencies from 1.7GHz (WR-430) to 60GHz (WR-19). Power handling is usually limited by waveguide size with a capability of up to 5 megawatts at the lowest frequency to up to 500 Watts at 60GHz in both peak and average power. The devices are available in Y-Junction two port isolators and three port circulators. The Differential Phase shift type isolators and circulators are configured as two, three or four port type devices for handling the higher powers. Cooling may be conductive, forced air or liquid depending on environment and power level conditions. Power handling of the loads for isolators can be specified up to 100% of the forward power.

All high power isolators and circulators are built to the customer's requirements

High Performance Waveguide Isolators and Circulators

A wide range of high performance waveguide isolators and circulators have been designed and built to meet very special and difficult requirements. Dorado Has developed manufacturing techniques for obtaining extremely low insertion losses of under 0.1dB and multiple circuits for high isolation as examples.

Special waveguide isolators and circulators are available for all frequencies up to 100GHz

Figures

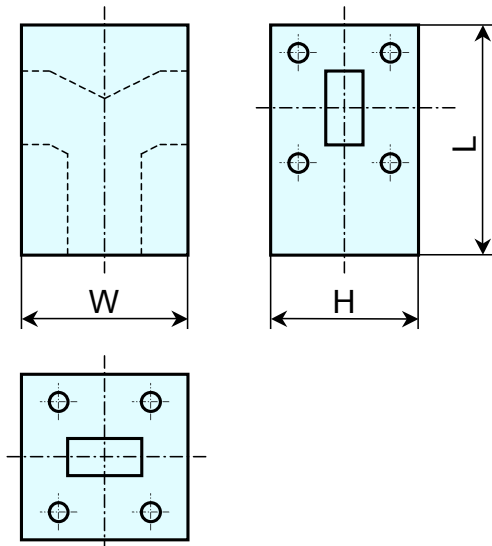


Fig. 38 Waveguide Circulator

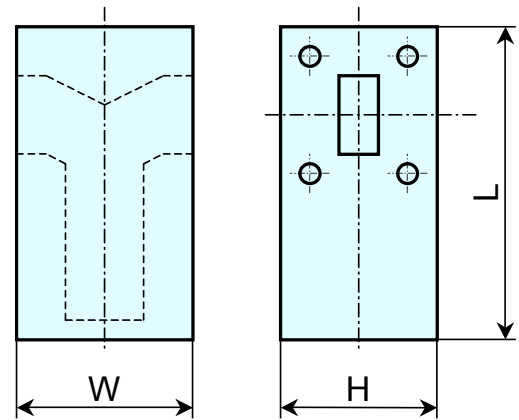


Fig. 39 Waveguide Isolator

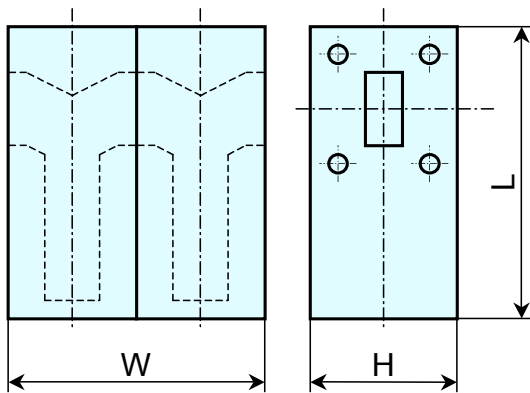


Fig. 40 Dual Junction Waveguide Isolator

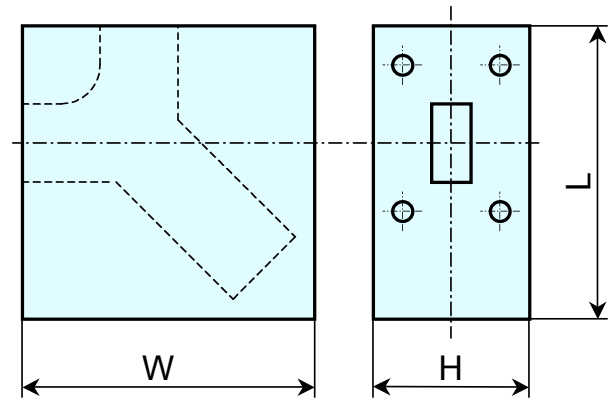


Fig. 41 Right Angle Waveguide Isolator