

LPD, MPD, PD, SPD Series

Power dividers are manufactured in a broad range of styles and types for varied applications. Generally a power divider consists of a junction block with a multi-stage quarter wave transforming section. Unequal power division may be achieved by adding quarter wave transforming sections between the junction block and the outputs.

- Low VSWR
- Wide bandwidth
- Fully welded outer construction
- Connectors are DIN, EIA or IEC standards
- Temperature range -40 to +60 degrees C available
- EIA connectors have fixed male output spigots
- Available in four basic series – LPD, MPD, PD and SPD
- Unequal power dividers with a wide range of power division ratios available and engineered to customer requirements. Contact RFS for details.

Power dividers are available in four basic series: LPD series – Low cost , low power equal split dividers using N type connectors. MPD series – Low cost, low power equal split dividers (up to 4 way) using 7/8" EIA input connectors and N type output connector. PD series – Used for most common applications with up to 8 way division with ratios of up to 7dB in almost any combination. Wideband performance with multistage transforming sections, 7/8" EIA flanged input and EIA or DIN output connectors. Connectors are in-line to conserve space. SPD series – Similar to PD series but with up to 4 way split. EIA or IEC connectors, short circuit stub across the junction provides tuning and DC grounding. Additional low power arms are available where unequal power splits are required.



SPD power dividers.



PD and LPD power dividers.

SPECIFICATIONS	LPD	MPD	PD	SPD
Frequency Range, MHz	All Bands I, II, III, IV/V	All Bands I, II, III, IV/V	All Bands I, II, III, IV/V	All Bands I, II, III, IV/V
Input Return Loss, dB	26	30	34 Note#1	34
Input Impedance, ohm	50 unbalanced	50 unbalanced	50 unbalanced	50 unbalanced
Output Impedance, ohm	50 unbalanced	50 unbalanced	50 unbalanced	50 unbalanced
Number of Outputs	2 to 6	2 to 6	2 to 8	2 to 4
Power Division Ratio, dB	< 6	< 6	< 6	< 6
Power Division Variation, dB	within 0.5 of specified ratio	within 0.5 of specified ratio	within 0.5 of specified ratio	within 0.5 of specified ratio
Output Phase Variation, degrees	< +/-10	< +/-10	< +/-10	< +/-10

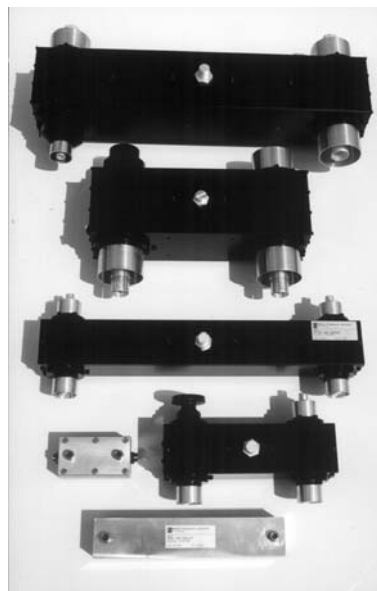
Note 1

Equal power divider with less than 4 way split will achieve 36dB

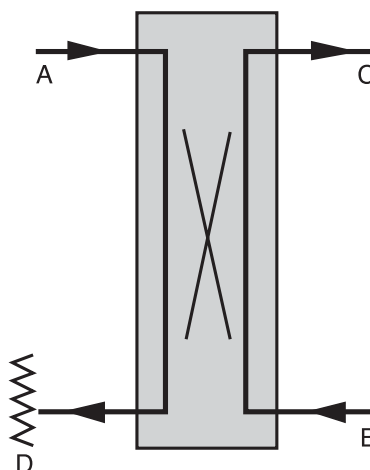
DC Series

This product range is most commonly used within combiners, diplexers and switchframes, but can be used as stand alone combiners and splitters. The flanged versions are fully pressurized to 70kPa and are of gas through construction via the connectors.

Crossed outputs (i.e. on same side of coupler) are standard in order to simplify equipment layout (not available in 'N' type versions). Each coupler size is defined by its "standard" connector size. For example: an FM 3dB coupler rated for 50kW usually has 3-1/8" connectors, so this coupler is defined as a model DC31BU. Using RFS developed R series adaptors for connector sizes 7/8" to 6-1/8", all coupler ports can be adapted to any size flanged or unflanged EIA or IEC standard. A coupler consists of a pair of strip lines approximately a quarter wavelength long configured in such a way to provide the required couplings. If two signals of similar amplitude in phase quadrature are applied to ports A and B (with B leading) the sum will appear at port C. The arrangement provides good isolation between inputs with low VSWR over a wide bandwidth without adjustment. If the inputs do not have the correct amplitude and/or phase relationship, an out of balance signal is dissipated in a load connected to port D. Conversely a signal applied to port C will split to give two outputs of equal amplitude in quadrature of port A and B.



Various power rating and frequency range 3dB couplers.





Directional 3dB Couplers

88 - 820 MHz

DC Series

SPECIFICATIONS (ALL MODELS)

Input Return Loss, dB	35
Isolation, dB	32
Output Phase, degrees	90 +/- 1 Note#2

SPECIFICATIONS	DCNB	DC78B	DC158B	DC318B
Frequency Range, MHz	88 - 108	88 - 108	88 - 108	88 - 108
Power Rating, kW	0.5 Note#1	5 Note#1	15 Note#1	50 Note#1
Standard Connector Size	N	7/8" EIA	1-5/8" EIA	3-1/8" EIA
Output Power Split, dB	3 +/- 0.15 Note#2	3 +/- 0.15 Note#2	3 +/- 0.15 Note#2	3 +/- 0.15 Note#2

SPECIFICATIONS	DC412B	DC478B	DC618B	DCNC
Frequency Range, MHz	88 - 108	88 - 108	88 - 108	174 - 230
Power Rating, kW	90 Note#1	100 Note#1	150 Note#1	0.5 Note#1
Standard Connector Size	4-1/2" IEC	4-7/8" EIA	6-1/8" EIA	N
Output Power Split, dB	3 +/- 0.15 Note#2	3 +/- 0.15 Note#2	3 +/- 0.15 Note#2	3 +/- 0.15 Note#2

SPECIFICATIONS	DC78C	DC158C	DC318C	DC412C
Frequency Range, MHz	174 - 230	174 - 230	174 - 230	174 - 230
Power Rating, kW	4 Note#1	10 Note#1	35 Note#1	60 Note#1
Standard Connector Size	7/8" EIA	1-5/8" EIA	3-1/8" EIA	4-1/2" IEC
Output Power Split, dB	3 +/- 0.15 Note#2	3 +/- 0.15 Note#2	3 +/- 0.15 Note#2	3 +/- 0.15 Note#2

SPECIFICATIONS	DC478C	DCNE	DC78E	DC158E
Frequency Range, MHz	174 - 230	526 - 820	526 - 820	526 - 820
Power Rating, kW	70 Note#1	0.25 Note#1	2.5 Note#1	5 Note#1
Standard Connector Size	4-7/8" EIA	N	7/8" EIA	1-5/8" EIA
Output Power Split, dB	3 +/- 0.15 Note#2	3 +/- 0.35 Note#2	3 +/- 0.35 Note#2	3 +/- 0.35 Note#2

SPECIFICATIONS	DC318E	DC412E
Frequency Range, MHz	526 - 820	526 - 820
Power Rating, kW	19 Note#1	30 Note#1
Standard Connector Size	3-1/8" EIA	4-1/2" IEC
Output Power Split, dB	3 +/- 0.35 Note#2	3 +/- 0.35 Note#2

Note 1

Power ratings are based on an ambient temperature of 40 degrees C and represent the maximum average power at any ports, at the highest operating frequency in each band.

Note 2

Across full band.

RF Monitor System

MS Series

This system provides a complete range of monitoring functions for output coaxial equipment, allowing broadcasters to display forward/reflected transmitter power and active mimic display of U link/motorized switch and multi-channel combiner configurations. The unit uses a single chip controller providing programmable functions and alarm outputs. Its power supply is used to power the external detectors.

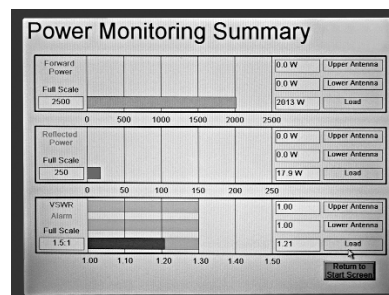
Dual RS485 inputs will accept up to 50 RFS detectors measuring RF power or temperature as required.

The RF monitoring system is expandable for alarming systems with up to 16 transmitters. Alarms can be reset from the PC touchscreen display. 24 opto-isolated inputs are available which are used to provide detailed status on equipment such as coaxial switches, U link panels or over-temperature switches on loads or dehydrator operation. (12 inputs standard, additional 12 inputs on optional daughter board).

Display is a bright 8.4" TFT colour touch screen PC with 800 x 600 pixel resolution and using Windows XP embedded operating system.

Ethernet output is available as an option to enable the system to be remotely viewed or integrated into a network.

Operated with a watchdog fail-safe timer to ensure the processor is operational and providing transmitter protection.



Typical Power Monitoring Screen



Typical Multichannel Power Monitoring Display Unit

- Accepts input from up to 50 detectors via RS485 ports
- High accuracy detectors available for measurement of power and temperature
- Custom detectors developed for rigid line inner conductor temperatures
- Can alarm up to 16 transmitters (8 transmitters standard, additional 8 on optional daughter board)
- U link & motorized switch inputs (12 standard, additional 12 on optional daughter board)
- Extensive display and setting of alarms options via PC
- PC based display can be extended to full networking capabilities

SPECIFICATIONS	MS1208	MS1216	MS2408	MS2416
Inputs Opto-isolated switch inputs	12	12	24	24
RS485 inputs (Suitable for up to 50 detectors)	2	2	2	2
Outputs Relay	8	16	8	16
Relay ratings	NO and NC contacts rated at 100Vdc at 0.5A)			
LCD Display	TFT Colour, 8.4" resistive touch screen 800 x 600, 16 bit Colors 230 nit brightness			
Other Connectors	2 x USB type A sockets, 1 x RJ-45 socket			
DC Output for external detectors	12V at 5A (current limited via resettable fuse)			
AC Input IEC Inlet Mains Fused (2A)	Universal power supply 90-264V, 47-63Hz			
Housing	Std 19" rack 4RU high approx 220 mm deep			
Weight, Kg	7			
Operating temperature	0 to +50 deg C			
Storage temperature	-20 to +80 deg C			

High Dynamic Range RMS RF Power Detectors

Power Detector Series

This product range potentially can measure true root-mean-square (RMS) RF power over a dynamic range of 60dB in a single carrier or complex multi channel digital waveform environment at frequencies up to 2.7 GHz.

The peak voltages of multiple transmitters statistically add. In a system of digital transmitters with individually high crest factors this can result in a system with peak to average voltages in excess of 20dB. Traditional power detectors using diode detection or log amps do not accurately measure power when the peak-to-average ratio of the transmitted signal is not fixed.

Designed for use with RFS directional couplers and the output polled by a master unit, multiple RF sensors and other RS485 devices can be simply paralleled on the one pair of wires. The RFS Monitor System display unit supplies DC power to the detectors and has a 8.4" TFT colour screen to provide multiple views of detector and RF switch arrays.

Alternatively the detector can be used without the control unit featuring a linear or log analogue output (0.05 to 4.75V, 100 ohms), requiring an external 8 to 30V dc power source at 60mA.



Wideband RF detector module.

- True RMS power detector
- Input dynamic range in excess of 50 dB
- RF power measurement is independent of signal peak-to-average ratio (crest factor).
- Measurement of power of multiple digital channels with crest factors approaching 20dB
- Standard frequency range of 30 MHz to 1 GHz
- Output is via a half duplex RS485 two - wire interface

SPECIFICATIONS	ASD
Application	High accuracy
Uncertainty*	<+/- 4%
Frequency Range**	30 to 1000 MHz
Impedance	50 ohms
RF Connector Type	N plug
Input Dynamic Range	>50 dB
Max no Damage Input power	+36 dBm
Max Continuous Input power	+24 dBm
Max DTV (10dB crest factor)	+13 dBm
Min Input Power	-27 dBm
Operating Temperature	0 to +50 deg C
Storage Temperature	-20 to +80 deg C

Notes:

*Applies to waveform and temperature effects over a 25 +/- 15 degree C range at the customer specified channel and rated power, excluding the accuracy of calibration standards.

**Standard models are available to cover the FM, VHF and UHF frequency bands, with extended bandwidth and frequency variations to order.

Suffix B for 45 to 250 MHz

Suffix E for 470 to 860 MHz

Suffix A for analogue output.

Rapid Release U Links

Rapid release U links provide manual switching for high power RF circuits. Typical applications include transmitter, antenna and test load patching.

Manufactured in custom built configurations ranging from simple patch panels to fully integrated multichannel switching.

Features

- Fast, simple lever action
- Slimline – low profile design
- Interlock circuits operate before the RF circuit is disturbed
- Available in five sizes to match RFS rigid line sizes/power ratings
- Standard EIA or IEC test adapters can be used
- Input/output line sizes can be varied to suit using RFS developed R series adapters

Available Options

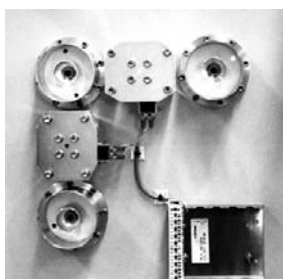
- Integrated with other components (combiners, etc)
- Housed in rack cabinet
- Blanking panels, side panels and locking rear doors
- Metering
- Mimic panel with/without LED display
- Interlock circuits wired to terminal blocks



1 5/8" 6 port patch panel integrated with combiner in a 19" rack complete with metering and mimic panel



3 1/8" 3 port patch panel housed in a 19" rack including mimic panel



Rear view of the unit above showing interlock switches wired to KRONE block.

Ordering Information

- U Link size
- Number of ports integrated with other components
eg power dividers, loads, combiners etc.
- Please provide schematic
- Rigid line and elbows for vertical entry and exit
- Adapters to change line size

Housed in rack cabinet

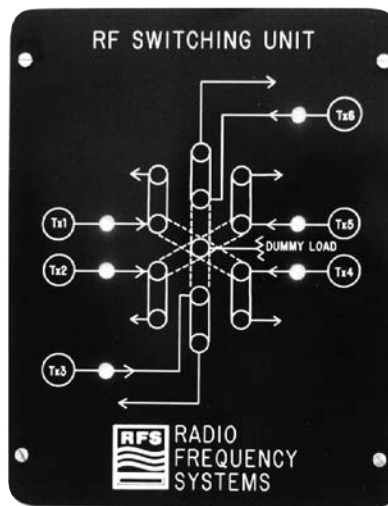
- 565 (19") x 545D x 27RU
- 725 x 855D x 39RU
- 565 (19") x 545D x 39RU
- 1100 x 855D x 39RU
- 565 (19") x 855D x 39RU
- 1100 x 1000 x 39RU
- Blanking panels
- Other rack size
- Side panels
- Rear doors

Metering

- Specify quantity and scale details
- Mimic Panel
- LED display available

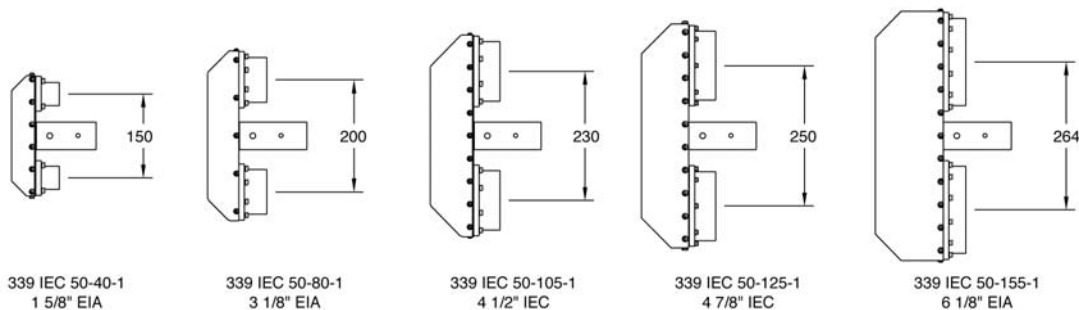
Microswitches

- Specify No. of circuits per U link position
1-4 standard (up to 8 are generally possible)
- Microswitches wired to KRONE terminal block



Mimic panel with LED display from a 13 port patch panel

U Link Sizes



GENERAL DATA

Frequency Range (MHz)	DC to 860 (6 1/8" max frequency is 650MHz)
Impedance (ohms)	50
U Link Return Loss (dB)	36
Power Rating (kW)	As for rigid line
Connector Diameters (mm)	As for rigid line

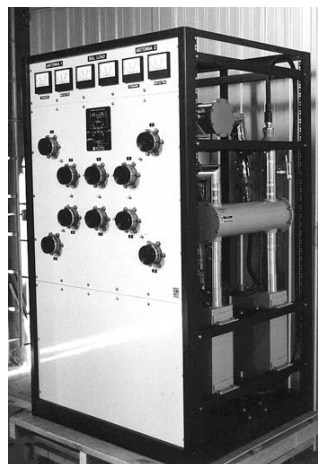
Rigid Line Components

RFS produces a range of 50 ohm rigid line components. Items for both unpressurized (indoor) systems and pressurized, flanged (outdoor) systems are available

in 7/8", 1 5/8", 3 1/8", 4 1/2", 4 7/8" and 6 1/8" sizes. All components are manufactured to the most exacting tolerances.

Features

- **High Conductivity Copper Lines:**
Line inner and outer tubing is of high conductivity, hard-drawn, copper, milled to exact dimensions. Unflanged components for indoor use are polished and sprayed with a clear lacquer to maintain a high luster finish
- **Welded Construction:**
Flanges and mitered elbow joints are TIG welded for maximum strength
- **Low Loss PTFE Dielectric:**
Captive PTFE dielectric insulators are used exclusively in lines and elbows to ensure precision mating and stability of components after assembly
- **Silver Plated Contacts:**
All inner conductor connectors are silver plated
- **Standard Sizes:**
All components conform to the relevant EIA or IEC standards



Switch frame without U-Links



Commutating line combiner

Rigid Line Components

RIGID LINE COMPONENTRY	7/8"	1 5/8"	3 1/8"	4 1/2"	4 7/8"	6 1/8"
Rigid Line 6m Lengths ,Unflanged	(3m length)	•	•	•	•	•
Flanged	-	•	•	•	•	•
90° Elbows Plug with Coupling Sleeves & Inner Connectors	•	•	•	•	•	•
90° Elbow Socket, Swivel Flanges	•	•	•	•	•	•
Flange Adapters with Hose Clamps	•	•	•	•	•	•
Flange Adapters, Hard Solder	-	•	•	•	•	•
Straight Coupling Complete	•	•	•	•	•	•
Rapid Release U-Links	(manual)	•	•	•	•	•
Tee, Plug with Couplings	•	•	•	•	•	•
Inner Joining Kits with Insulator, Bullet O Ring Bolts, etc.	•	•	•	•	•	•
End Seals/Witches Hats	•	•	•	•	•	•
Rigid Line Power divider hanger	-	•	•	•	•	•
1m Allthread Susp. hangers	-	•	•	•	•	•

Notes:

1. Rigid lines are available in standard lengths of 6 meters. Shorter lengths are also available - exact length must be specified.
2. Unflanged elbows, tees, etc., can be converted to socket (female) outputs, upon request.

• = available

ADAPTERS	6 1/8"	4 7/8"	4 1/2"	3 1/8"	1 5/8"	6 1/8"	4 7/8"	4 1/2"	3 1/8"	1 5/8"	7/8"
	UNFLANGED					FLANGED					
'N' Socket	•	•	•	•	•	•	•	•	•	•	•
7/8" flanged	•	•	•	•	•	•	•	•	•	•	•
1 5/8" flanged	•	•	•	•	•	•	•	•	•	•	•
3 1/8" flanged	•	•	•	•	•	•	•	•	•	•	•
4 1/2" flanged	•	•	•	•	•	•	•	•	•	•	•
4 7/8" flanged	•	•	•	•	•	•	•	•	•	•	•
6 1/8" flanged	•	•	•	•	•	•	•	•	•	•	•
1 5/8" unflanged	•	•	•	•	•	•	•	•	•	•	•
3 1/8" unflanged	•	•	•	•	•	•	•	•	•	•	•
4 1/2" unflanged	•	•	•	•	•	•	•	•	•	•	•
4 7/8" flanged	•	•	•	•	•	•	•	•	•	•	•

•For special adapters (4 1/16", AWA/Marconi, NEC, etc) please enquire.

•Premium VSWR adapters (typically 1.02:1) available on request.

LINE DIMENSIONS (METRIC)	1 5/8"	3 1/8"	4 1/2"	4 7/8"	6 1/8"
Outer conductor (OD)	41.3	79.4	106	123.2	155.6
(ID)	38.8	76.8	103	120	151.9
Inner conductor (OD)	16.9	33.4	44.8	52.1	66
(ID)	15	31.3	42.8	50.1	64
Flange weight (2 required)(kg)	0.3	1	1.5	1.5	1.7
Weight (kg/m)	1.75	3.6	5.5	7.1	10
Flange (OD)	*70	132	160	177	205
Bolt circle Ø	71.4	111.1	140	156	187.3
Bolt quantity	4	6	8	8	12
Bolt diameter	8	10	10	10	10

MAXIMUM SUPPORT DISTANCE BETWEEN CLAMPS

In free air ie. open to high winds (m)	1	1.1	1.2	1.2	1.3
In protected space ie. where high winds are not present (m)	1.2	1.5	2	2	2

Notes:

1. All dimensions in mm.

* Square flange standard.

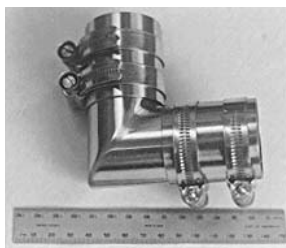
Rigid Line Components

Straight Coupling



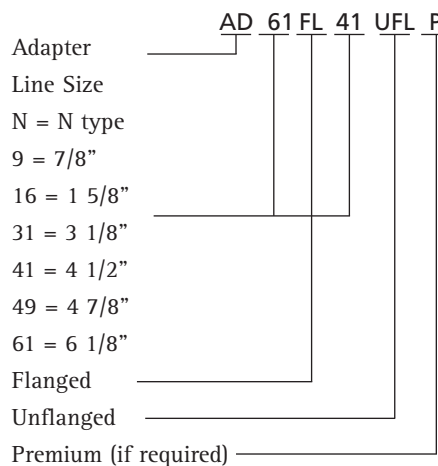
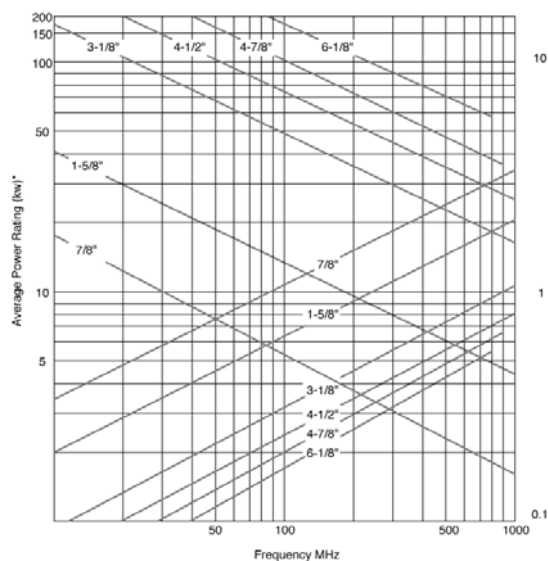
Inner and outer
and hose clamps.

90° Elbow



Male with coupling sleeves.

**EIA Flange Adapter,
Hard Solder**



Adapter Identification

Rigid Line Ratings*

*Average power ratings are based upon an ambient temperature of 40°C, unity VSWR termination, and free air circulation.

Inner conductor temperature rise 62°C.

Outer conductor temperature rise 23°C

Linearly derate to 0.5 for 80°C ambient temperature.

Rigid Line Components



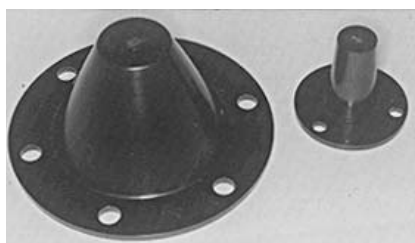
1 5/8" EIA to 'N' Type Socket Adapter



EIA Flange Adapter, Hose Clamp



Rigid Line Suspension Hangers: Complete with "all thread" 1 metre rod



End Cap Seals (Witch's Hats) .
Inner bullet, PTFE insulator
'O' Ring, stainless hardware



Three Port 'U' Link Panel



EIA Inner Joining Kit



7/8" 'U' Link Panel

Waveguide Components

This product range is most commonly used with RFS waveguide directional combiners, to connect the output port into an antenna feed system. The combiner spine uses a nominal 4:1 aspect ratio waveguide operating in the TE₁₀ mode.

RFS directional waveguide combiners utilize two different waveguide sizes to cover the entire UHF broadcasting band:

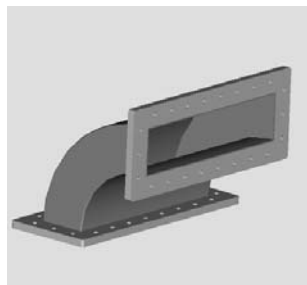
W381 covers 470 to 752 MHz and

W332 covers 548 to 860 MHz.

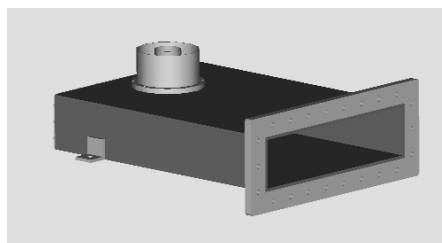
The accessories consist of sweeps and straight sections, adapters to other waveguide and coax sizes, and 2 and

4 way waveguide to coax splitters

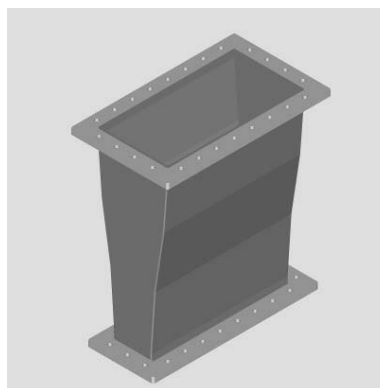
These components are characterized by full band operation with very low reflections to compliment the wideband performance that the combiners are capable of. Within this wide bandwidth capability considerable emphasis has been placed on component designs to ensure minimum sizes and high average and peak power rating.



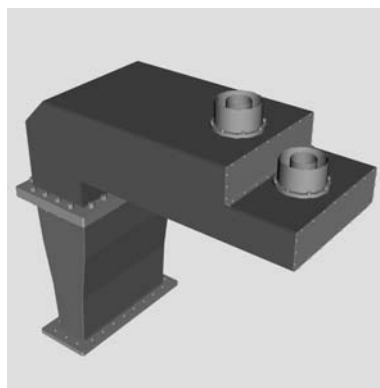
W381 900 E-Plane sweep



W381 4 7/8" Unflanged Adapter



W381 / WR1500 Adapter



W381 4 7/8" 2-way Splitter

Waveguide Components

WAVEGUIDE SWEEPS RETURN LOSS >36DB

	Frequency Range	Power Rating kW**		Centerline Radius
	MHz	LO MHz	HI MHz	(mm)
W381 90° E plane	470 to 752	200	270	200
W381 90° H plane	470 to 752	200	270	600
W332 90° E plane	548 to 860	150	195	175
W332 90° H plane	548 to 860	150	195	525

WAVEGUIDE ADAPTERS RETURN LOSS >36DB

	Frequency Range	Power Rating kW**		Length
	MHz	LO MHz	HI MHz	(mm)
W381 / WR1800	470 to 630	200	230	427
W381 / WR1500	470 to 752	200	270	512
W332 / WR1150	638 to 752	160	190	488
W381 Blanking plate	N/A	N/A	N/A	10
W332 Blanking plate	N/A	N/A	N/A	10

COAXIAL ADAPTERS RETURN LOSS >32DB

(FLANGED AND UNFLANGED VERSIONS AVAILABLE)

	Frequency Range	Power Rating kW**		Flange to Coax center
	MHz	LO MHz	HI MHz	Length (mm)
W381 / 6 1/8" EIA	470 to 752	73	60	435
W381 / 4 7/8"	470 to 752	47	39	435
W381 / 4 1/2"	470 to 752	37	30	435
W381 / 3 1/8" EIA	470 to 752	24	20	435
W381 / 1 5/8" EIA	470 to 752	7	5	435
W332 / 6 1/8" EIA	548 to 860	70	56	362
W332 / 4 7/8"	548 to 860	44	36	362
W332 / 4 1/2"	548 to 860	35	28	362
W332 / 3 1/8" EIA	548 to 860	22	18	362
W332 / 1 5/8" EIA	548 to 860	6	5	362

POWER SPLITTERS RETURN LOSS >32DB

	Frequency Range	Power Rating kW**		Height	Width
	MHz	LO MHz	HI MHz	(mm)	(mm)
W381 2 way	470 to 752	146	120	915	894
W381 4 way	470 to 752	200	240	1645	1300
W332 2 way	548 to 860	140	112	790	820

**Power Ratings are average and based on an ambient temperature of 40°C.

Coaxial components are 50 ohms characteristic impedance.

Power Splitter Ratings are quoted with 6 1/8" EIA outputs. Derate for smaller connectors.

W381 Splitters are constructed from a W381/WR1500 adapter and WR1500/coax splitter.