WR1500 and WR1800 UHF Magic Tee Switchless Combiners

Electronics Research manufactures UHF switchless Magic Tee combiner systems for combining two, three and four cabinet UHF transmitters. The systems are configured in sets of sub components for a wide range of power levels and different input and output configurations.

The switchless combiner systems are built around a pair WR1500 or and WR1800 waveguide two position phase shifters (0 degrees and 90 degrees) and a 180 degree Magic Tee Hybrid. System that require a three-cabinet combiner system include an additional 3-position phase shifter. The phase shifters can be configured for 230 or 115 VAC, 50 or 60 Hz and are available for either 12 VDC or 24 VDC control voltage.

To configure a complete system requires adding:

Input Hybrid and Transition Set(s)
Reject Load Output Transition Set(s)
Output Transition Set

Optionally available components include:
Liquid cooled coaxial or waveguide reject and system test loads
Switching of the system output to a test load
Switching between main and auxiliary antennas at system output

Two Cabinet Waveguide Phase Shifter Operating Modes:

Phase Shifter 1	Phase Shifter 2	Input A	Input B
0 degrees	0 degrees	Output	Output
90 degrees	0 degrees	Load	Output
0 degrees	90 degrees	Output	Load

Three Cabinet Phase Shifter Operating Modes:

Phase Shifter 1	Phase Shifter 2	Phase Shifter 3	Phase Shifter 4	Input A	Input B	Input C	
90 degrees	0 degrees	0 degrees	90 degrees	Output	Load	Load	
0 degrees	90 degrees	0 degrees	90 degrees	Load	Output	Load	
0 degrees	90 degrees	90 degrees	0 degrees	Load	Load	Output	
90 degrees	0 degrees	90 degrees	0 degrees	Load	Load	Output	
0 degrees	0 degrees	0 degrees	90 degrees	Output	Output	Load	
90 degrees	0 degrees	0 degrees	0 degrees	Output	Load	Output	[1]
0 degrees	90 degrees	0 degrees	0 degrees	Load	Output	Output	[1]
0 degrees	0 degrees	0 degrees	19.5 degrees	Output	Output	Output	

[1]Modes E1+ E3 & E2 + E3 require additional conditional phase shifting for some of the signals in order for them to sum properly. This phase shifting may be performed within the transmitter

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Equipment Specifications

Frequency Range:	UHF Band
VSWR:	
Fc at position	1.05:1 maximum
During transition	1.25:1 maximum
Fc ±3.0 MHz	1.10:1 maximum
Fc ±9.0 MHz	1.15:1 maximum
Insertion Loss at Fc:	0.2 dB maximum
Input Isolation Fc ±3.0 MHz:	32 dB minimum
Ambient Temp:	14 degrees to 122 degrees F. (-10 degrees to 50 degrees C.)
Ambient Humidity:	0 - 90% R
Altitude:	Sea Level to 15,000 feet (4,572 meters)

Input Hybrid and Transition Sets

The Input Hybrid and Transition Sets include two waveguide to coaxial transitions to interface with the phase shifter WR1500 or WR1800 waveguide inputs. These sets also include a 90 degree input hybrid which is either waveguide or coaxial. Each hybrid input includes a voltage probe, Type N female connector.

Coaxial hybrids available are 3-1/8-inch, 4-1/16-inch, or 6-1/8-inch, all 50 ohms. Waveguide hybrids are also an available option for higher power applications.

Reject Load Transition Sets

The reject load transition sets to coaxial outputs include a transition to 3-1/8-inch, 4-1/16-inch, or 6-1/8-inch, a 90 degree coaxial elbow with a voltage probe (Type N female), and a coaxial fine matcher. The waveguide transition sets include one E-Plane waveguide elbow with a Voltage Probe (Type N female connector), and a H-Plane waveguide elbow. ERIO's waveguide water column loads include an integrated fine matcher.

Output Transition Sets

The output transition sets to coaxial outputs from 3-1/8-inch to 8-3/16-inch include a waveguide to coaxial transition, a four port coaxial directional coupler and a coaxial fine matcher. The waveguide output transition sets include a four port waveguide directional coupler and a waveguide fine matching section.

Optional Components

Switching to a System Test Load

Systems are available with coaxial switches with elbows and a coaxial fine matcher to switch the system output between a Test Load and Air. The option sets also include waveguide switches and fine matchers for higher power applications.

Switching Between Main and Auxiliary Antennas

Systems are available with coaxial switches with elbows and an additional fine matcher to switch the system output between a Main Antenna and an Auxiliary Antenna. The option sets also include waveguide switches and fine matchers for higher power applications.

Liquid Cooled Reject and System Test Loads

ERI can also provide Coaxial liquid cooled loads and for higher power applications WR1500 and WR1800 water column loads.

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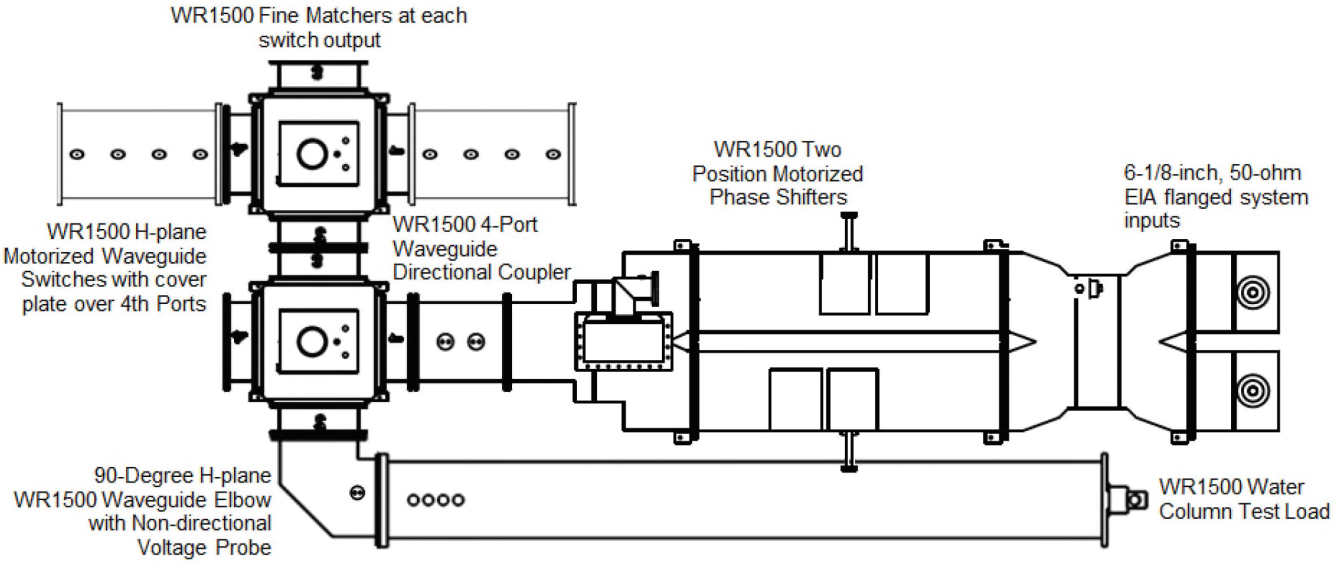
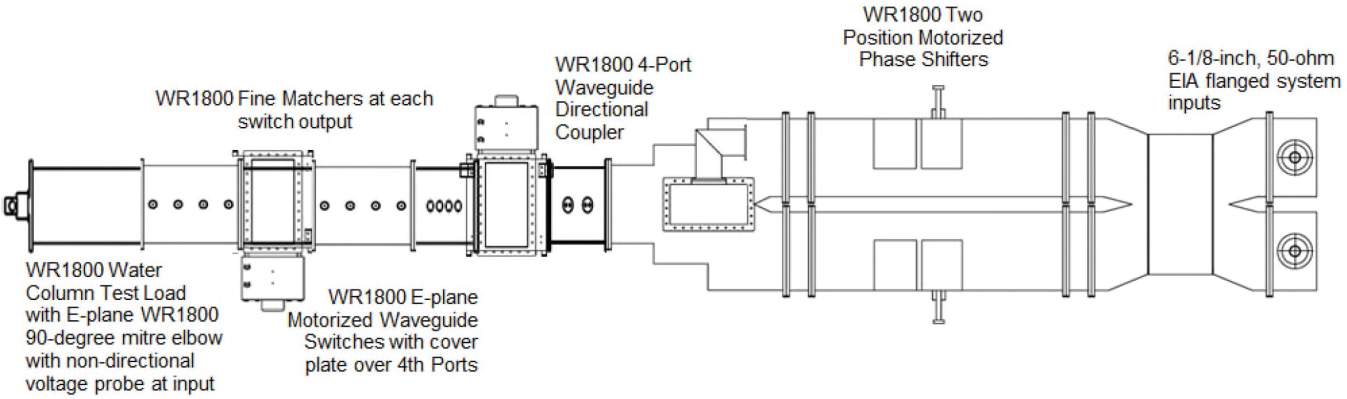
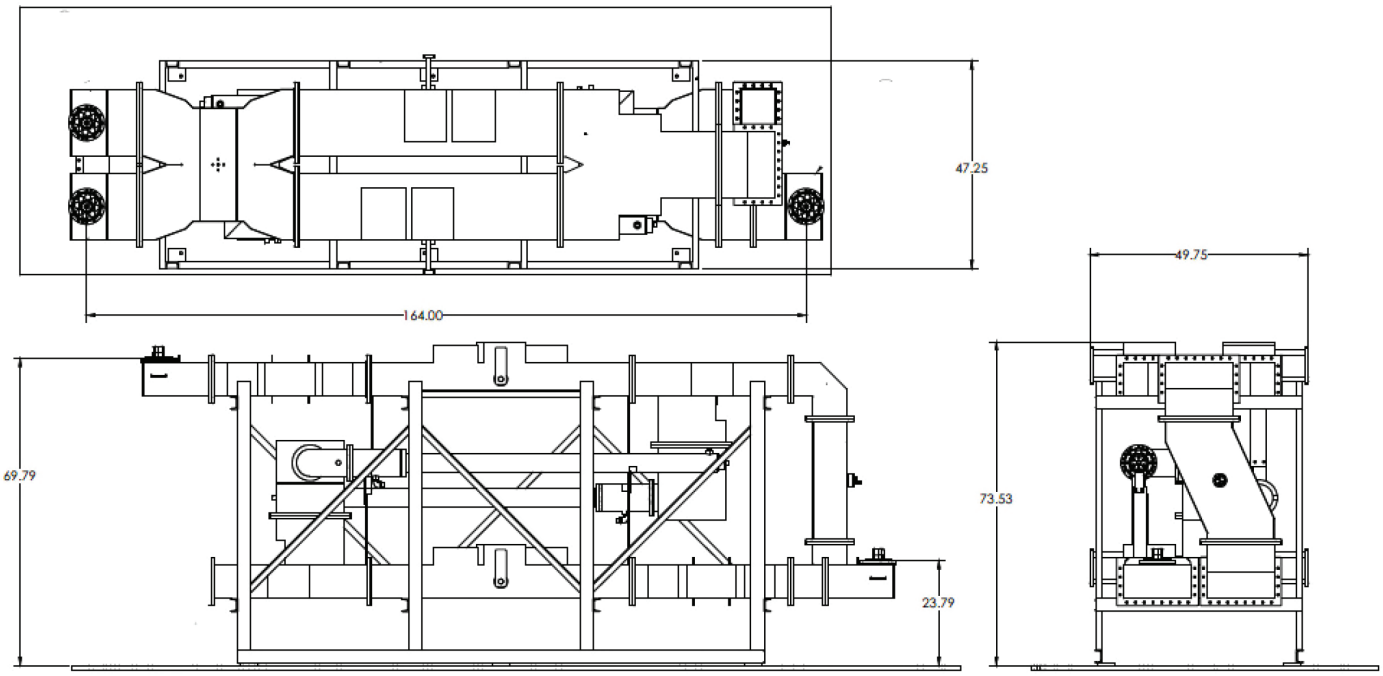


Typical Two Cabinet WR1500 UHF Switchless Combiner. Reject load is customer supplied.



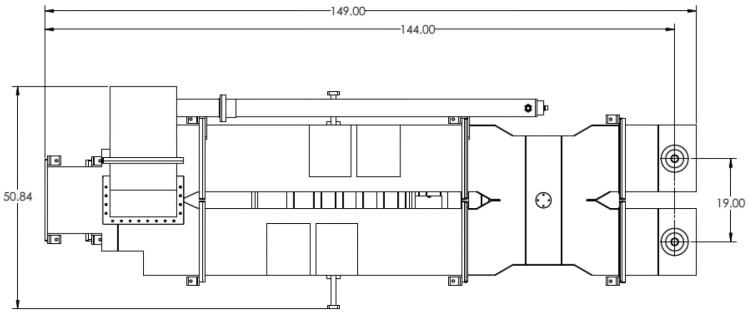
Typical Two Cabinet WR1800 UHF Switchless Combiner. Reject load is customer supplied.

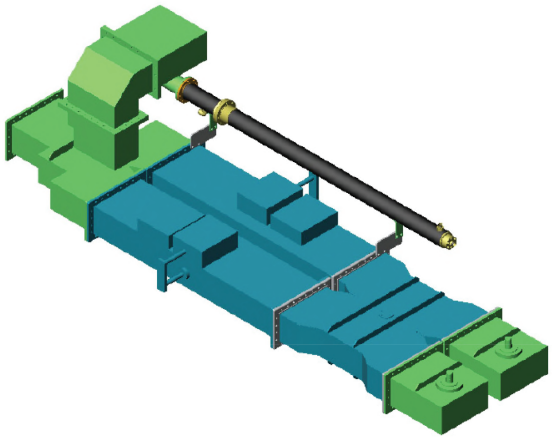
WR1500 and WR1800 UHF Magic Tee Switchless Combiners

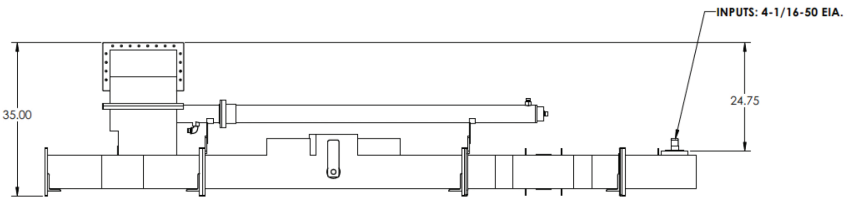


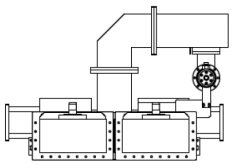
Typical Three Cabinet WR1500 UHF Switchless Combiner. Reject loads are included with the system shown.

WR1500 and WR1800 UHF Magic Tee Switchless Combiners



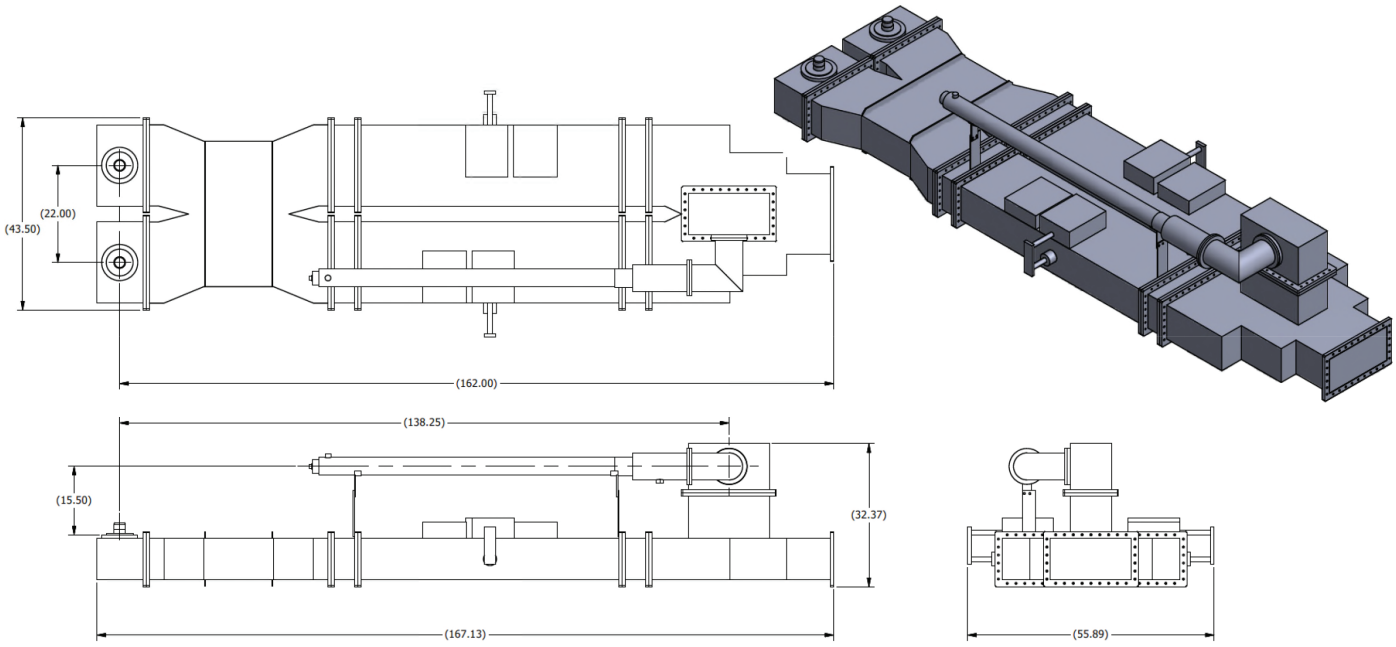






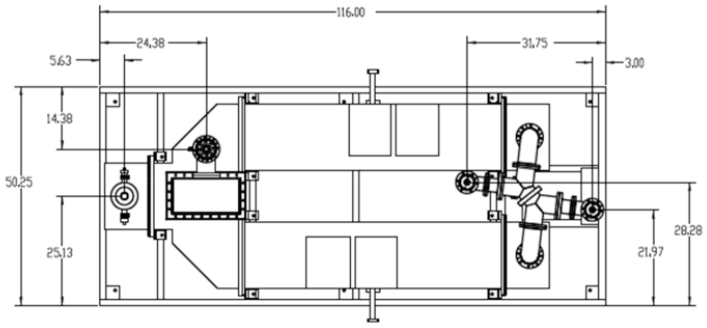
WR1500 Magic Tee Switchless Combiner with 4-1/16-inch, 50-ohm, coaxial input transitions, reject load transition kit with optional eplane elbow, and CL411 reject load and WR1500 waveguide output.

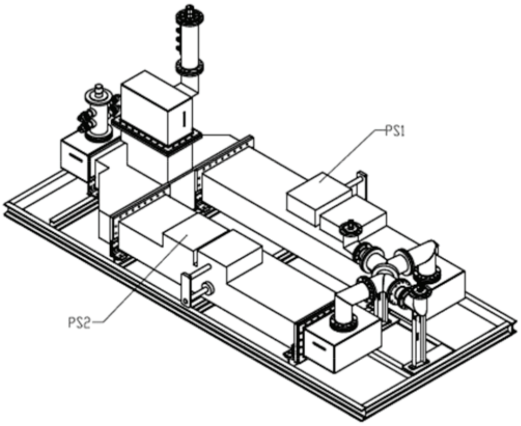
WR1500 and WR1800 UHF Magic Tee Switchless Combiners

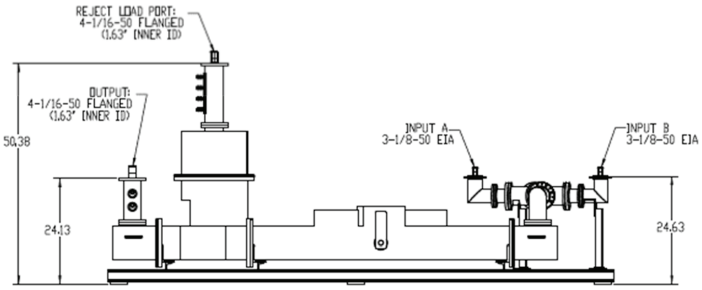


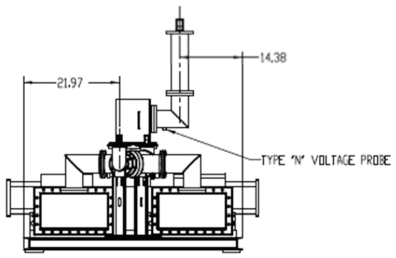
WR1800 Magic Tee Switchless Combiner with 6-1/8 coaxial input transitions, reject load transition kit with CL611 reject load and WR1800 waveguide output.

WR1500 and WR1800 UHF Magic Tee Switchless Combiners









WR1500 Magic Tee Switchless Combiner with 3-1/8 coaxial input transitions, 4-1/16-inch coaxial reject load transition kit and 4-1/16-inch flanged, male, coaxial output.