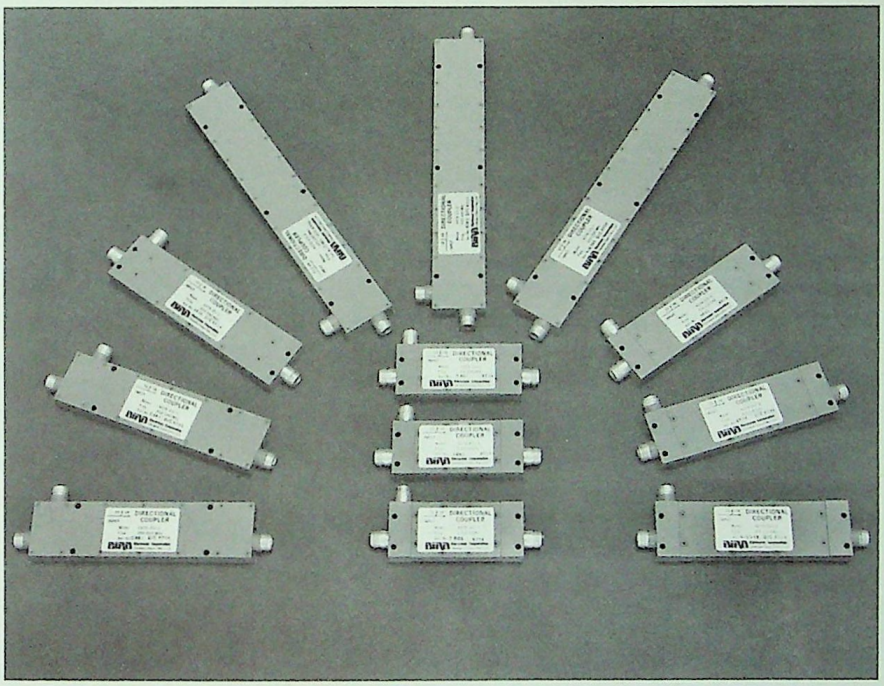
4278-Series Directional Couplers

The 4278-series consists of 12 different coaxial directional couplers which provide 10, 20, or 30dB coupling over 4 frequency ranges from 125MHz to 2GHz.

The 4278-series couplers offer a means of sampling power flowing in one direction in 50-ohm systems while excluding power flowing in the opposite direction. This directivity assures that any reflected power will have only a minimal effect on the accuracy of forward power measurements, and vice versa. VSWR measurements may be performed conveniently by using two couplers in a series-opposing connection.



GENERAL SPECIFICATIONS:

Frequency Range: 125MHz - 2GHz
Insertion Loss: 0.25dB maximum
Power: 200W CW, 3kW peak
Impedance: 50 ohms, nominal
Temperature Range: -55 to +85 deg. C
Connectors: N
Coupling Accuracy: +1.0dB, including variation and deviation from nominal
Finish: Gray paint per MIL-E-15090 Type II CL2

Freq. Range	Model 4278-xxx-x			Min. Directivity	Max. VSWR	Nominal Length
	Coupling Coefficient					
(MHz)	10dB	20dB	30dB	(dB)		(in)
125-250	111-1	111-2	111-3	25	1.20	11.5
250-500	211-1	211-2	211-3	25	1.20	7.5
500-1000	311-1	311-2	311-3	25	1.20	6.3
1000-2000	411-1	411-2	411-3	20	1.20	4.4

Nominal length excludes connectors
Nominal width = 1.9 in. Nominal thickness = 0.75 in.

The **Directional Coupler** is a simple, accurate, and convenient method of measuring RF power flowing through a transmission line without disrupting transmission to the load. Uses include simple power or waveform monitoring, calibrated power measurements, and VSWR measurements.

Directional couplers are superior to other methods for sampling RF power. The operation of a directional coupler does not rely on probes, coupling loops, or other methods which can be affected by mechanical distortion, motion, or physical positioning. The accuracy of a modern directional coupler is highly consistent because of its mechanical construction.

Further, directional couplers sample power which is flowing in only one direction. When a transmission line feeds a less than perfectly matched load, a portion of the forward power will be reflected back through the transmission line. A measurement made through a non-directional sampler will be affected by this reflected power, and thus be inaccurate. By using a directional coupler, energy flowing in either the forward or reflected direction can be measured separately, and will include only a very small amount of energy flowing in the opposite direction. The amount of this energy is defined by the DIRECTIVITY of the coupler.

Figure 1 shows the general design of a typical coaxial coupler. The body of the coupler is a machined casting which contains the strip line section, connectors, and internal termination.

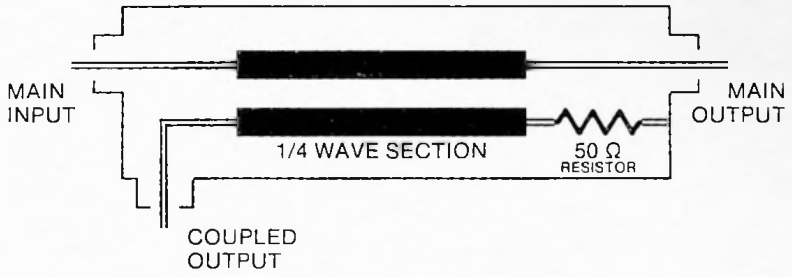


Figure 1. Coupler Cross-Section

DEFINITION OF SPECIFICATIONS

Coupling Coefficient — Ratio of the power applied to the input port to the power received from the coupled port, expressed in dB. All ports should be terminated in reflectionless terminations. Typical coupling coefficient values are 6, 10, 20, and 30dB.

Coupling Accuracy — The maximum variation in coupling coefficient which occurs over a specified frequency range. A common expression of sensitivity is as a variation of coupling, expressed in dB, over the specified frequency range.

Directivity — The ratio in dB of the power levels read from a coupled port when an amount of power is applied to the main ports in the forward direction and then the reverse direction. All ports should be terminated in reflectionless terminations. The ideal directional coupler will have a directivity of infinity, i.e. zero power will appear at the coupled port when power is applied to the main ports in the reverse direction.

Frequency Range — the range of frequencies over which the specified coupling coefficient, directivity, and other performance characteristics are valid. Generally, wider bandwidth comes at the expense of directivity and uniformity of sensitivity.

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