

## Frequently Asked Questions about Power Splitters & Dividers. . .

### What Types of power splitters and dividers does Weinschel offer?

Weinschel offers a variety of broadband (dc-40 GHz) resistive power splitters and dividers with Type N, SMA, 3.5mm, 2.92mm connector options. Power Dividers are available in 2 and 4 way configurations.

### How does a resistive power splitter work?

Our resistive power splitters are intended for applications in which one of the two outputs are included in a leveling loop or used as a reference in a ratio measurement system, for the purpose of providing an output signal whose source impedance is essentially matched to 50 ohms. A basic design consists of three ports with a resistor on each of the two output ports, and is a unidirectional device.

### What are some applications for a resistive power splitter?

Resistive power splitters provide exceptional amplitude tracking and a very low equivalent output SWR over very broad frequency ranges. They are used in applications in which one of the two outputs is included in a leveling loop or as a reference in a ratio systems such as:

- /// A dual channel insertion loss measuring system where the resistive power splitter provides reference and a signal channel.
- /// A precision power source where a power meter of known characteristics is used, either by ratio or leveling to provide a calibrated output.
- /// Provide a sampled output used for leveling a signal source - for instance in single channel attenuation measurements.

### What applications use resistive power dividers?

- /// Broadband independent signal sampling - used in systems to simultaneously measure two different characteristics of one signal such as frequency and power.
- /// Distribution of a low power signals to two or more antennas.
- /// Laboratory measurements where a reference signal exactly tracking the reference signal is required.
- /// Resistive power dividers can be used as power combiners because they are bidirectional.

### When do I use a power splitter or divider?

In simple terms many are confused as to the difference between power splitters and power dividers. Here is some basic information that we hope will help.

### Power splitters are only used in a ratio systems or leveling loop.

- /// Power splitters can never be used to combined power. They are unidirectional.
- /// A basic power splitter has two resistors and three ports. Power dividers should not be used in ratio and leveling loop application because a mismatch condition of nominally 3:1 would exist.
- /// Power dividers can be used as power combiners because they are bi-directional. Power dividers can be used in a system to simultaneously measure different characteristics of one signal such as frequency and attenuation, power splitters can not.
- /// A basic power divider has three resistors and three ports. A simple description of the circuit shows that any one of the three ports has 50 ohm input impedance when the others are terminated in 50 ohms. The insertion loss between any two ports is 6 dB.



### What is a Resistive Power Divider?

An equivalent circuit of the resistive divider is shown below. A simple analysis of this circuit will demonstrate that any one of the three ports has a 50 ohm input impedance when the other two are terminated in 50 ohms, and that the insertion loss between any two ports is 6 dB. A microwave network of this type consists of a symmetrical resistive film deposited on a ceramic substrate having three conducting contacts, each connected to the center conductor of a coaxial connector. Resistive dividers provide well-matched signals of essentially equal magnitude and phase over a very broad band as opposed to the reactive and hybrid types which employ frequency limitive techniques. The resistive divider is intended for applications where the output signals are used independently, such as the simultaneous monitoring of power and frequency.

