

## Dipole Center Isolator with Balun

The Frequency Devices precision built Dipole Center Isolator with Balun is used to build your own antennas. The 1:1 current Balun is based on a W2FMI design and will handle the full legal limit provided the SWR is not above 2:1.

This Center isolator has been tested to withstand 100 pounds of strain over time without breaking. It can be installed as an antenna used as an inverted V or as a straight dipole. Our Center Isolator is built using 18-8 stainless steel hardware, all internal nuts are self-locking, and all holes are sealed with RTV sealant. A strip of coax seal is included to seal your connector to the Center Isolator.

To install the Center Isolator measure out the amount of wire that you will need for the two sides of the antenna (see Tuning the Antenna below). Take the included wire that comes from each side of the Center Isolator and form a drip loop (see picture) through the eyebolt. Insert your bare wire into the eyebolt and then twist your wire and the included wire around the main wire, cut off the excess, and solder.



## **Installing the Antenna**

There are two main ways to install the half-wave antenna: as a straight dipole and as an inverted V. In either case the antenna will work better the higher you can put it up.

As a straight dipole you tie ropes to both ends of the dipole and raise it as high as is possible. If what you are tying both of your ropes to are both fixed objects like buildings or towers you should have no problems. If, like most people, you are using trees then you have to allow for the trees to move. It is better to only tie one end securely and to use a spring or pulley and weight system to hold the other end. Most of the Antenna Handbooks that are available will go into detail about how to do this.

To install the half-wave dipole as an inverted V you need three tie points but only one of them needs to be up high. Using a rope tied to the top-center eye bolt on the Dipole Center Insulator pull the center of the antenna up as high as possible. Tie off the two ends to supports that are lower down. Again, if the supports can move, use springs or a pulley system to reduce the strain on the wires.

There are several alternate ways that people have installed half-wave dipoles and have had some success. Some people have installed them in their attic and stretched them from end to end. Others, who did not have much room, have installed them with twists and turns in various places. Be sure to use insulators at any point where the antenna wires can touch. If you do something like this you will have to carefully tune the antenna as is explained in the next section.

## Tuning the Antenna

The Half-Wave Dipole Kit antenna will need to have its length adjusted to tune the antenna to the frequency that you want to use it on. On the higher frequencies you should be able to tune the antenna to the center of the band and it will then work over the whole band. The 80 Meter band is so wide that you will have to pick a portion of the band over which you want to operate and tune for the center of that portion.

Tuning the antenna is done with some kind of meter that will measure reflected power. SWR bridges or watt meters are commonly used. Most transceivers now have a SWR bridge built in and that will work fine. You need to tune the antenna because of many factors like how high it is installed, what kind of ground is below it, what kind of buildings or structures are nearby, etc.

To tune the antenna first refer to the chart below and pre-cut both ends of the antenna to be about 12 inches longer than the lengths given for the frequency you want to use. Both sides of the antenna should be the exact same length. Then install the two end insulators at the end of the wires using the extra 12 inches. Do not solder or permanently attached the ends at this time.

Next install the antenna as close as possible at the point that you will be leaving it permanently. Check the SWR at intervals over the whole band and record the readings. Most likely the antenna will be too long which means that the antenna will be tuned below the frequency at which you want to use it. This will be shown by the SWR increasing as you move up in frequency across the band. If this is true shorten both ends of the antenna in stages until the lowest SWR point is at the center frequency of the band or the frequency you will use it at the most. At that time securely wrap the wire at the ends by the End Insulators and you can then solder the two wires together or tie them off with cable ties.

The chart below is based on the number that most people use for calculating how long a half-wave antenna should be for a given frequency. That number is 468

divided by the frequency in MHz<sup>1</sup>. That will give you a length in feet for the overall antenna length. Each side of the antenna should be the same length so each side will be one-half of that length. For instance if you want to tune your antenna to 14.25 MHz then  $468/14.25=32.84$  feet or 32 foot 10 inches. Each wire on the antenna should measure one-half of that number or 16 feet 5 inches long from the center of the Center Insulator to the end of the wire in the End Insulator. That is the length you should start with to tune your antenna. Don't forget to add 12 inches to the end of the wire to have some to wrap around the End Insulator.

BAND	CENTER FREQUENCY		OVERALL LENGTH	EACH SIDE LENGTH
80M	3.550	MHz	131 Ft - 10 inches	65 Ft - 11 inches
80M	3.700	MHz	126 Ft - 6 inches	63 Ft - 3 inches
80M	3.850	MHz	121 Ft - 7 inches	60 Ft - 9 inches
40M	7.050	MHz	66 Ft - 5 inches	33 Ft - 2 inches
40M	7.200	MHz	65 Ft - 0 inches	32 Ft - 6 inches
30M	10.125	MHz	46 Ft - 3 inches	23 Ft - 1 inches
20M	14.075	MHz	33 Ft - 3 inches	16 Ft - 8 inches
20M	14.175	MHz	33 Ft - 0 inches	16 Ft - 6 inches
20M	14.250	MHz	32 Ft - 10 inches	16 Ft - 5 inches
17M	18.118	MHz	25 Ft - 10 inches	12 Ft - 11 inches
15M	21.100	MHz	22 Ft - 2 inches	11 Ft - 1 inches
15M	21.275	MHz	22 Ft - 0 inches	11 Ft - 0 inches
15M	21.375	MHz	21 Ft - 11 inches	10 Ft - 11 inches
12M	24.940	MHz	18 Ft - 9 inches	9 Ft - 5 inches
10M	28.300	MHz	16 Ft - 6 inches	8 Ft - 3 inches
10M	29.000	MHz	16 Ft - 2 inches	8 Ft - 1 inches
10M	29.400	MHz	16 Ft - 0 inches	8 Ft - 0 inches

1. H. Ward Silver, N0AX, "Hands On Radio – Experiment 92 – The 468 Factor", *QST Magazine*, September 2010, pp 53-54.