

## Installation Notes for Baluns & Ununs

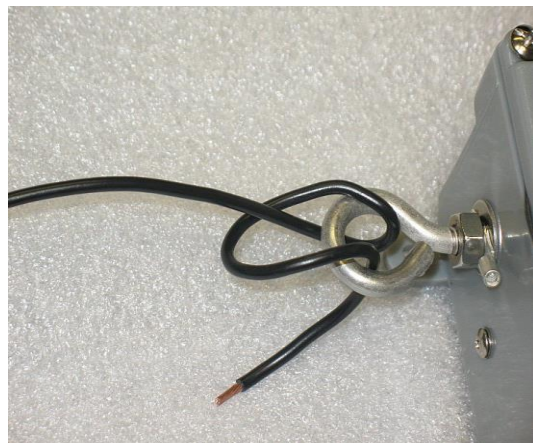
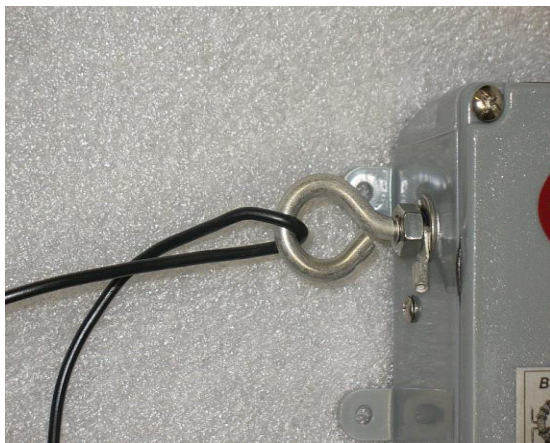
Thank you for purchasing from **Balun Designs**. Your balun or unun is built to provide a very long service life by following a few simple installation procedures. Please be sure to read through both this section and the second section titled “**Recommended wire lengths and Configuration Notes for Unun models 4130, 4132, 4134, 4932, 4935, 9130, 9132 & 9135**”.

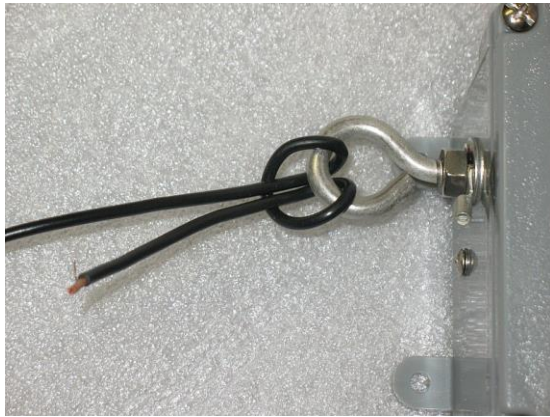
- Although the balun enclosure is weatherproof, connectors are not. Please be sure to wrap all coax connections in coax seal or your favorite weather sealant to prevent moisture from seeping in through the openings. To avoid problems caused by corrosion, ring terminals supplied with your unit **should be soldered, not just crimped!**
- Neoprene gasket material for the cover of the grey Carlon enclosures is applied at the factory as a liquid. Consequently, the area where the beginning and end overlap becomes thicker when the mixture cures. In some cases you might notice a “bulge” in this material when the cover is secured. This is normal and does not detract from the integrity of the seal. Please **do not trim** this material as it will degrade the long term effectiveness of the gasket.
- Weep holes are intentionally omitted on most models because the units final mounted orientation is unknown. **However, weep holes are very important** to the longevity of your balun/unun. If they are not installed, weather changes over a period of time can cause condensate to build up inside the enclosure and potentially cause a short or abnormal operation. They may be added by drilling **two** 1/16<sup>th</sup> holes at the low point of the enclosure using the baluns final mounted orientation. Holes are usually drilled in the corners or sides, opposite each other, but can be added in any location. Weep holes are installed during production on models where the final orientation is known. Models with weep holes already installed should be mounted with the holes pointing down. If your balun/unun will be used strictly indoors then weep holes are not required.
- **Do not to over tighten the cover of the enclosure.** The neoprene gasket under the cover is very effective and will provide the best seal by leaving gap the thickness of a penny (1.5 mm) at the corners under the securing screws. Over tightening the screws can **warp the cover** over time causing the middle of the cover’s sides to bow up. This will create a gap under the seal compromising the weatherproof integrity of the enclosure.
- Any of the baluns with a ratio other than 1:1 and most ununs **will show a dead short at DC**. This is caused by the manner in which they are wound and is not the case when RF is present. Terminals that show a short when checked with a DVM are not an indication of incorrect assembly.
- After installation, **MAKE SURE ALL LOCKING NUTS ARE SECURE!!!** Failure to tighten stud or eyebolt outer locking nuts can cause erratic operation and/or create high contact resistance. This resistance leads to excessive heating and can ultimately cause failure of the ferrite core(s). This type of failure is not covered under our Warranty.
- **Current baluns will not have a polarity marking as current baluns have no polarity.** 1:1 baluns with dual SO-239 connectors are **bidirectional** and can be installed without regard to input or output.
- **Power limits shown are measured at resonance and should not be exceeded. Elevated SWR will decrease power rating i.e. at 3:1 SWR rating is reduced by 50%**
- If you are installing a **choke/isolation balun** in your coax feedline at the equipment end of your feedline, it is good practice to use a short coax jumper of 3 to 5 feet in length between the balun and any piece of equipment. Some transceivers, amps and/or tuners do not like a balun installed directly on their output and the jumper will eliminate any possible issues. To provide the best RFI suppression and the most efficient operation, the balun should be installed between the last piece of equipment in the transmit chain (tuner, amp) and before the beginning of the coax feedline.

- If you purchased a **Tuner Balun**, there will be markings for connection polarity. Following polarity markings is required only when the antenna in use has a direct ground at the feed point such as a long wire. Reversing these connections can potentially cause damage to your equipment and/or the balun or unun. Polarity of the connections is not a concern if you are using the balun with ladder line or window line feeding a balanced antenna such as a loop or dipole. **All ununs have polarity markings** unless an SO239 is used for the output which provides its own polarity.
- Scratches and scuffs on the sides and/or bottom of the enclosure are from the manufacturer's bulk shipping method and not from prior use. These enclosures are purchased in large quantities to help maintain low pricing for our products and movement in the boxes sometimes cause minor scratches and scrapes.

### Installing Models with Eyebolts

If you purchased a model with eyebolts, the solder lugs are easily removed by holding the eyebolt with one hand while using a 7/16ths open end wrench to loosen the external locking nut with the other. The lug has been modified for easy removal once the nut has been loosened. **It is not necessary to open the enclosure.** **Nylok** nuts are used on the inside of the eyebolt to prevent any movement of the internal locking nut. Failure to remove the lugs before soldering can permanently damage the enclosure!





**[Recommended wire lengths and Configuration Notes for Unun models 4932, 4935, 9130, 9132 & 9135](#)**

The following tables show the recommended lengths to use for the antenna wire based on the bands you wish to cover. These are based on the use of a sloper configuration with the unun near ground level but final SWR across the HF frequencies **will** vary based on topography, proximity of nearby structures, configuration of the antenna wire and choice of ground or counterpoise.

Installing the antenna wire as an Inverted L will change the feed point impedance due to top loading and may require “tweaking” the overall length of the wire for best coverage of all HF bands. Should you decide to install your unun in a high location, the use of a counterpoise wire is required as any long wire run to a ground or radial field can cause erratic performance of the installation.

Please keep in mind this design is a **compromise antenna** and intended primarily for use by those living in restricted antenna areas or for temporary / emergency installations where simplicity and broad HF coverage is important.

**Recommended Wire Lengths for 9:1 ratio (in feet) for Coverage of 160m through 10m**

<b>53</b>	59	72	88.5	98.5	<b>124.5</b>	146	162	175
-----------	----	----	------	------	--------------	-----	-----	-----

Values in color are best overall lengths to use for optimum HF spectrum coverage. SWR for all lengths should typically be under 2.2:1 and in most cases will be under 1.8:1 for 160-10m allowing onboard tuners to match the antenna on all bands. **Initial installation should utilize a length longer than the recommended length shown.** Experimenting by slightly changing the wire length (+ or -) is encouraged to provide best overall performance for individual installations.

If your need for band coverage is limited to **40m through 6m**, the lengths shown below may also be used.

36	44	49
----	----	----

If you have difficulty obtaining an acceptable SWR on all bands, consider trying one of the alternative lengths shown below. These lengths are non-resonant on any band and **should on be used only if all others fail.**

**Alternative Lengths (in feet) for Coverage of 160m through 10m**

58	71	84	107	119	148	203
----	----	----	-----	-----	-----	-----

By design, ununs are wound in such a manner that they provide no RF choking. Although not necessary, a 1:1 isolation/choke balun (models, 1110, 1115, 1115d, 1116d etc.) at the **transmitter end** of feedline will stop RF from entering your equipment and can also reduce receiver noise caused by common mode currents.

**Installing a 1:1 choke balun at or near the unun will not allow the coax shield of the feed line to be used as a counterpoise.**

### Wire lengths for the 4:1 ratio in models 4130, 4132, 4134, 4932 and 4935.

Usually any wire length that is non resonant, like those shown above, will work with the 4:1 ratio. As an example, a 28-31 foot wire will typically allow 40 thru 10 meter coverage and a 43-50 foot wire will provide access to 80 thru 10 meters. Longer wire is always more efficient but is usually best kept under 300 feet as the characteristics of a Beverage antenna begin to show up beyond this length. **Always keep the non-resonant length requirement in mind.** The same counterpoise, radials or ground as described above for the 9:1 ratio is also required.

### Any of the ratios can be installed using three different methods.

**Ideal:** Sloper configuration with one elevated counterpoise is good but several different length counterpoises maybe better. Length of counterpoise should be a minimum of 30-40 feet but not the same length of the antenna wire. Shorter length counterpoise wires can be used if operation is confined to 40m or higher. Any counterpoise should be at least 1 foot **above ground** running away from or perpendicular to the antenna wire. Do not ground the counterpoise stud when using a counterpoise(s) or radial field. Counterpoise wire(s) close to or laying on the ground will couple and become radials with reduced efficiency.

You may also use the unun with no counterpoise or ground if your feedline is at least 25+ feet long. In this configuration the coax shield will act as your counterpoise and there should be no ground at the unun. With this installation there is a high probability of common mode currents on the shield so a good 1:1 choke balun should be installed in the feedline at or near the point it enters your operating position.

**Good:** Attach counterpoise stud to a radial field of 8 wires minimum, each 10 -20 feet long. More radials are always better and will increase efficiency, but longer length radials are not necessary.

**Workable:** Attach the counterpoise stud to a good ground rod at or near the feed point of the antenna.

---

In no case will **Balun Designs** be liable for any incidental or consequential damages, which include, but is not limited to, damage to equipment connected or attached to any product we sell. Some states do not allow the exclusion or limitation of incidental or consequential damages, so the above limitation or exclusion may not apply to you.

**Balun Designs** makes no representations or warranties, either express or implied, of any kind with respect to products sold by **Balun Designs**, including but not limited to, merchantability and fitness for a particular purpose. You agree that the sole and exclusive maximum liability that **Balun Designs** has arising from any product sold by **Balun Designs** shall be the price of the product ordered. In no event shall **Balun Designs**, its owners, its officers, employees or other representatives be held liable for special, indirect, consequential, or punitive damages related to products sold.