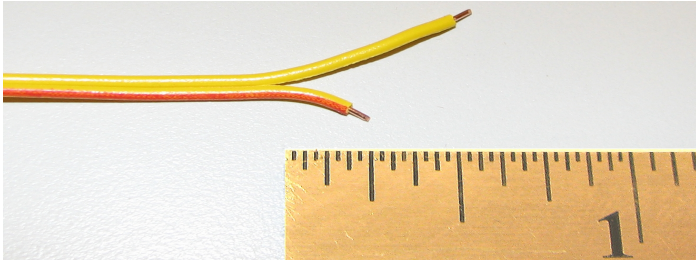
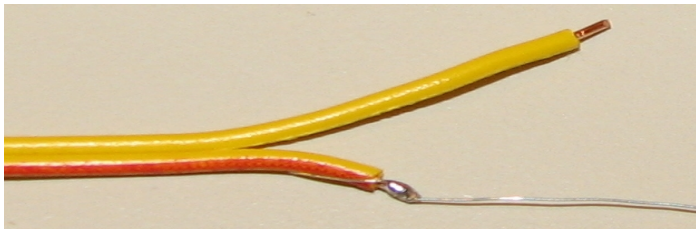


# E-MATCH SUBSTITUTES FOR THE HA45 & SL100

If you are having difficulty finding commercial electric matches for your altimeter, you can make suitable replacements easily and inexpensively by following the procedure outlined below (note: these substitute ematches are NOT suitable for capacitive discharge altimeters such as the MAWD). Remember that the reliability of your deployment system is only as good as the weakest point in the system; if you don't feel that you have the ability to fabricate these ematches consistently and accurately, don't try! It is imperative that the connections between the bridgewire and leadwire be soldered – if you don't have tools or skills to do the soldering properly, please enlist the help of someone that does.



Separate individual conductors on the twinlead, cut one to 1/4" and other to 5/8". Strip 1/8" insulation from each end. Bend the ends slightly into a "Y" formation to make the next step easier.



Hold 40 gauge bridgewire parallel to shorter prepared end and wrap several turns around stripped end. Solder bridgewire to stripped leadwire end.



Straighten both leadwires and wrap five to seven turns of bridgewire around the insulation on the longer leadwire end. You should avoid sharp bends in the bridgewire where it meets the leadwire. When you get to the end of the insulation continue wrapping a few turns of nichrome onto the stripped end of the leadwire.

Carefully brush on a small amount of water-soluble liquid flux, then solder both joints and trim any excess bridgewire. Clean all flux residue under HOT water and allow the match to dry. Use a magnifier to inspect the finished end for breaks and poor solder joints.

## You will need:

- 24 to 26 gauge solid duplex wire (leadwire)
- 40 gauge bare nichrome wire (bridgewire)
- Solder, water-soluble flux, and soldering tools

(check IEKN, SFLX at [www.perfectflitedirect.com](http://www.perfectflitedirect.com))

## Using your ematches:

Store the ematches carefully (e.g. inside a soda straw) so that the wound end does not get damaged. Check the resistance of each ematch before installing it in an ejection charge, it should be in the 4 to 7 ohm range. These matches will require about 1 amp of current to fire, easily within the abilities of a good 9V alkaline battery. Two parallel matches can be used for redundancy, increasing the current requirement to 2 amps (still fine with a good 9V Duracell or Energizer). If you use two matches within a single charge, make sure that the bare wires (bridge and lead) from each match are not touching each other.

The bridgewire will glow with a nice orange heat when energized, but since it does not have a flammable pyrogen coating it is *imperative* that the entire coil be in contact with your black powder charge. Make sure you make your ejection charges with wadding and a cap (which can be as simple as masking tape) so that the BP will not shift away from the coil in flight.

Practice making a dozen ematches before using them in flight; test them with your altimeter and make sure that you have 100% success rate before proceeding. After your tests you can trim the burned end back and wrap on a new bridgewire so that your tests will be nearly waste-free.