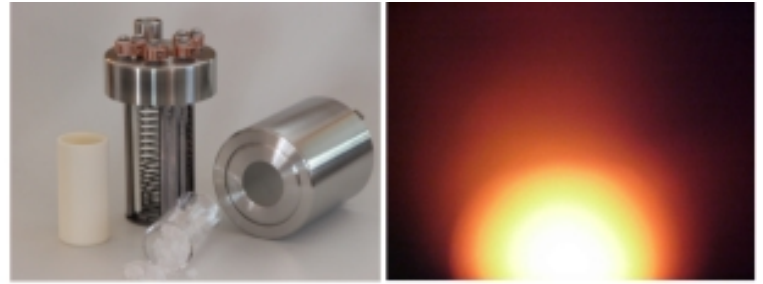




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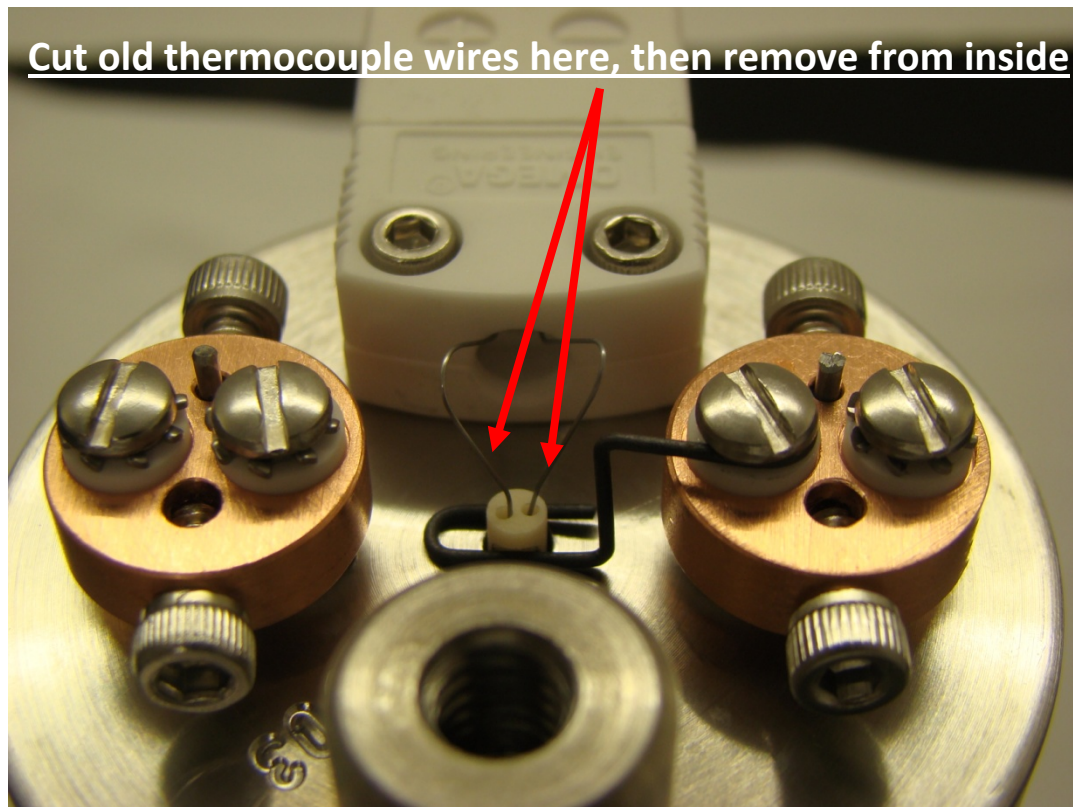
# Thermocouple Replacement Instructions



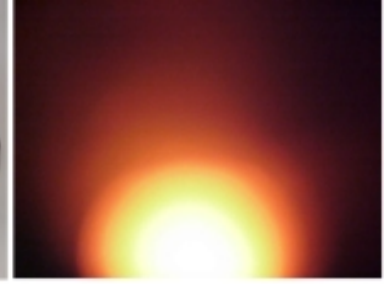
### Thermocouple Replacement Instructions

The thermocouple in your RADAK furnace has been made, installed, and inspected with great care. The junction, which is formed by spot-welding, is subject to failure due to mechanical or chemical stress. Vibration or some metal vapors, such as zinc, will occasionally cause failure in these thermocouple materials. If it is necessary to replace a thermocouple, please begin by taking a close look at the existing thermocouple leads. Then, we suggest the following:

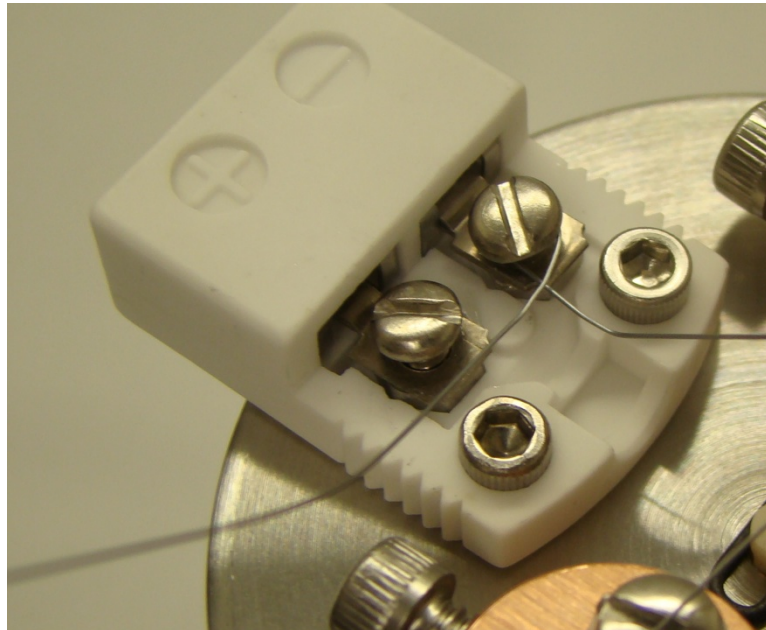
1. Remove the open thermocouple by cutting the leads just above the insulation tube. Pull the thermocouple through the furnace interior (top) and remove the remnant ends from the bottom.



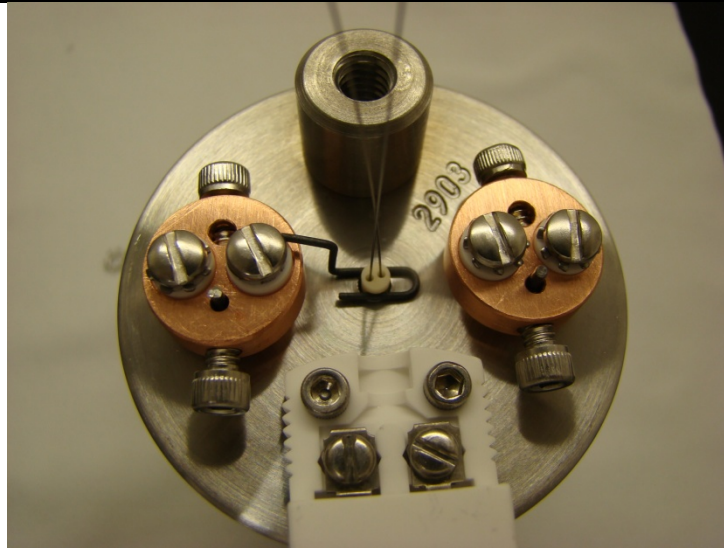
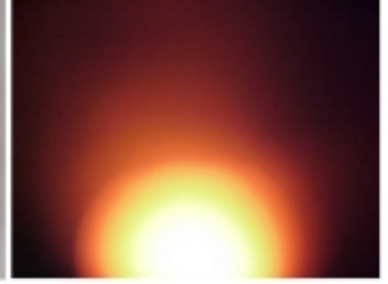
2. For Radak I and II models, remove the ceramic insulator post by removing the 4/40x7/16 screw that holds it to the power terminal. Then disconnect the spring by removing it from the notches in the ceramic post. For Radak III models, remove only the inner ceramic insulator which should be free to slide out once the thermocouple wires are removed.



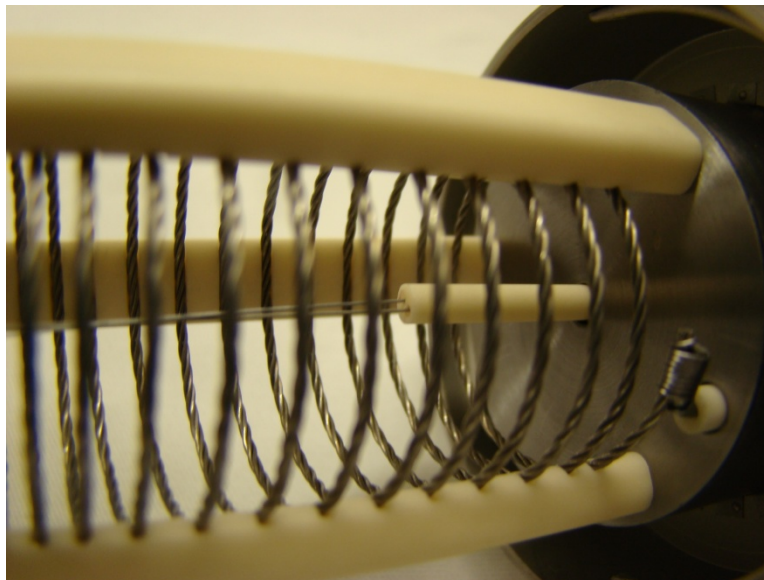
3. Remove the two 4-40 x 3/8 socket cap screws to gain access to the inside of the ceramic thermocouple plug.
4. Re-secure the ceramic thermocouple plug to the furnace base without the cover using the two 4-40x3/8 socket cap screws you just removed.
5. Remove the remaining thermocouple wire by loosening the two retaining screws.



6. For Radak I and II models, the installation procedure is a little different depending on which type of new thermocouple you are installing. For Radak III models, skip to step 9.
7. **For C-Type Thermocouples:** Insert the thermocouple wires into the ceramic insulator post from the non-notched end. Install the spring onto the post by pushing it into the notches. Push the thermocouple assembly through the hole in the bottom of the furnace. Orient the post so that the negative wire (red or longer wire) ends up on the same side as the negative plug terminal. This way the thermocouple wires will not cross. Determine which binding screw will hold the spring and remove it, discarding the lock washer on that screw in place of the spring loop. Tighten down the screw with the spring.

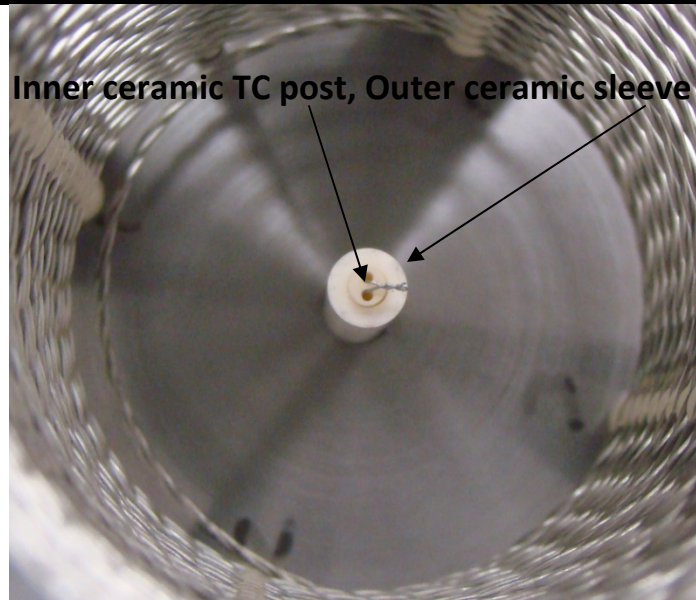


8. **For K-Type Thermocouples:** Install the spring onto the thermocouple post by pushing it into the notches. Push the post through the hole in the bottom of the furnace. Re-attach the spring into the ceramic notches and tighten down the spring screw. Insert the thermocouple (longer/red wire is negative) through the ceramic post **from the inside of the furnace**. Be sure it is oriented so that the negative wire ends up on the same side as the negative plug terminal. This way the thermocouple wires will not cross.

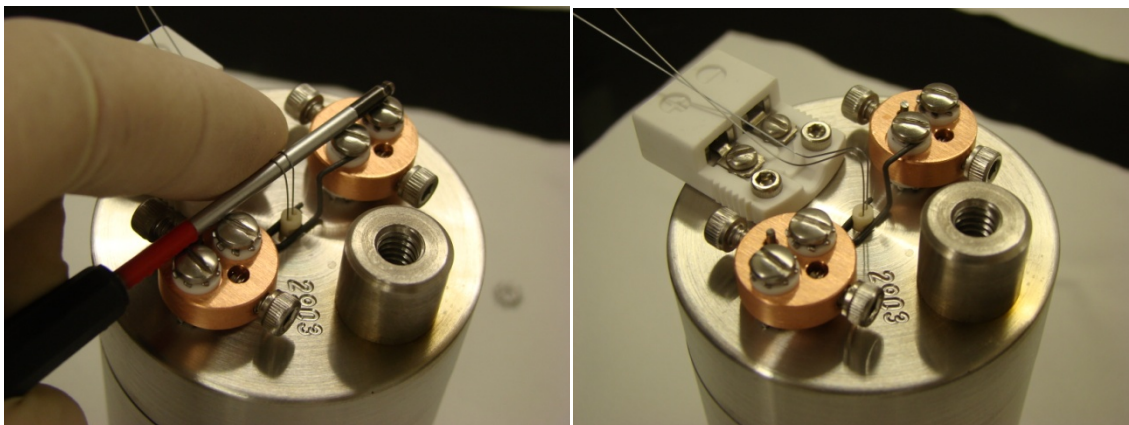


9. **For Radak III Furnaces:** Slide the new thermocouple leads into the inner ceramic post. Insert this ceramic post through the outer ceramic sleeve from the inside of the furnace.

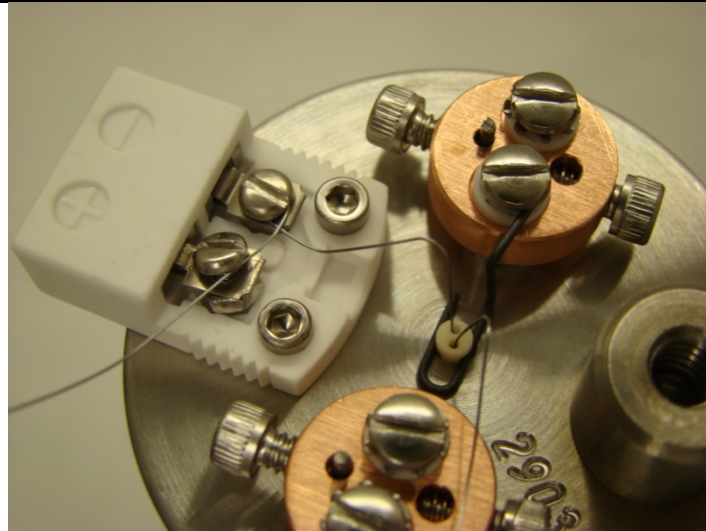




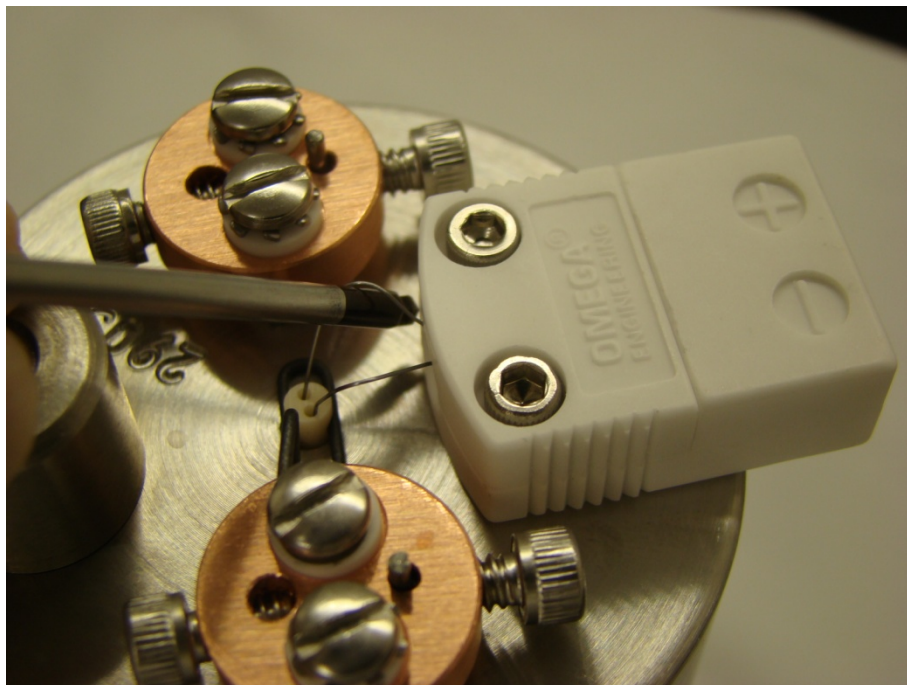
10. Put a small radius bend in the TC wires down toward the TC plug (a screwdriver shaft is useful for bending the wires).

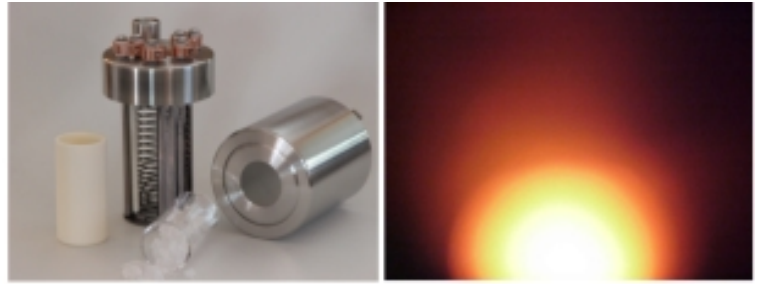


11. Loosen the terminal screws on the plug and wrap each wire around the appropriate screw about  $\frac{3}{4}$  of a full turn. Wrap from the inside of the plug to the outside. Tighten down the screws.

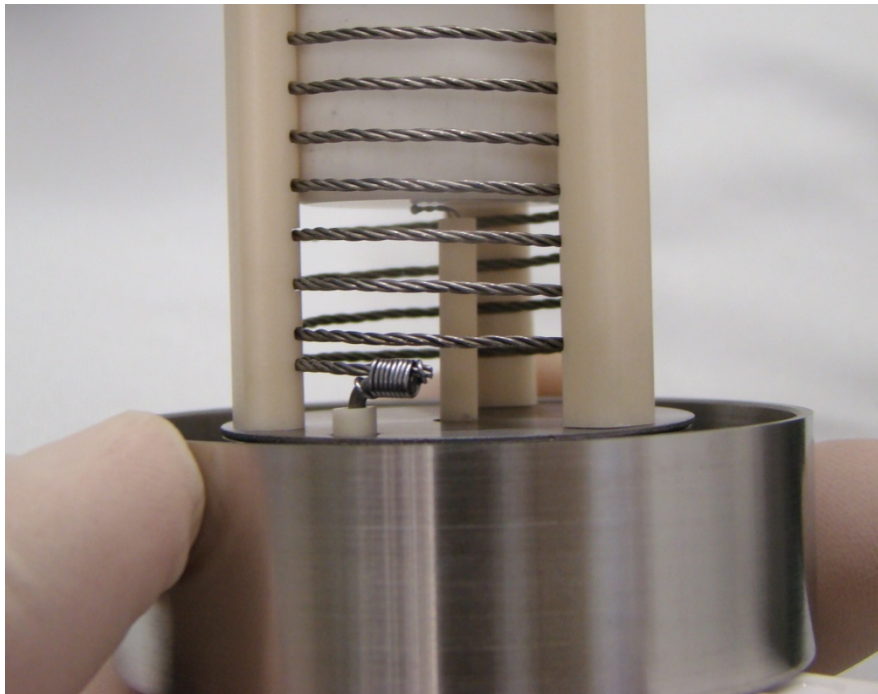


12. Ensure that the TC wires exit the plug neatly without touching each other. Cut off the excess wire at the terminal screw.
13. Install cover on ceramic plug. Make sure TC wires do not get crushed by the cover when it is installed. Check that TC wires are not in danger of shorting to the furnace body, spring, or power terminals.
14. Give a slight separation to the TC wires by gently bending them away from each other as they come out of the ceramic post.





15. Inside the furnace, check that the thermocouple junction is pushed down as close to the ceramic post as possible. **Gently** give the thermocouple junction a **slight** bend so that the crucible will push it all the way down to one side when it is installed. For Radak III furnaces, the TC junction should be bent far enough to the side that the crucible sandwiches the straight part of the wires on the post (not the twists or the junction weld).



16. Install the crucible and check for good spring action. The spring should deflect a small distance when the outer can is screwed down tight. You can also gauge the amount of spring movement by the space formed between the outer can and the furnace base before the can is screwed down tight.





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