

## **BTC50/60 Brief Instructions and Applications**

*If your coil is factory assembled it is tuned for operation and includes the toroid terminal. Your coil may however be peaked for more output at user's discretion as shown steps 3, 4, 5. Use caution as this exposes you to dangerous high voltages.*

### **Application and operation**

Please note this device produces electromagnetic radiation that can damage or interfere with certain types of equipment. Operation inside of a screen room or Faraday cage may be required for FCC compliance.

**Danger! Remove power cord before making any of the following adjustments. Tap lead when ungrounded from primary is a shock hazard and can produce dangerous ground currents.**

Optimum output requires proper selection of the correct tap position on the primary coil. Start at end of outer most turn and reconnect tap to exposed sections changing a quarter of a turn at a time noting increasing or decreasing output. You may secure via soldering into place when proper position is determined. Caution: keep this lead flat, as breakdown to secondary will permanently damage windings. *Note tap lead clip position and mark when using different terminals. Note figure 18-10 of the information included with BTC40/50/60 (14-17 of BTC30) for proper routing of the tap lead that we found tuned reasonably close with this terminal.*

**The capacitance of the output terminal will greatly affect the tuning, requiring more turns the larger the terminal size and vice versa.**

1. Place coil on table away from sensitive electronic equipment. Computers must be removed from area or disconnected from power if on same line. **Observe, read and heed all warning labels.**

2. There is no front panel switch on the unit. Device is energized by plugging into a three wire grounded outlet. This is because you should not be that close to unit. Some customers used a switched power strip. Or switch may be added into the power cord. **Defeating the ground on the plug will result in system failure, potential fire and an extreme shock hazard**

3. Attach secondary coil as shown on completed view. If the coil has the aluminum brackets with the tapped hole, it may be now simply screwed on to the bottom brass stud. Do not over tighten as you can damage threads. Repeat for top terminal. All coils made after May 2011 have these brackets ***If your does has leads and not the aluminum brackets, you must make sure that leads from the coil are as short as possible. This allows only that necessary to make the connections to the bottom grounding screw and repeating for the top terminal. Failure to do this will result in unreversible damage to the coil form that must now be replaced.***

**4. The spark gap width is preset at the factory. Do NOT increase the spark gap width unless you are highly familiar with Tesla Coils and resonant theory. While you can obtain more output, it will be at the possible expense of blowing out the transformer, capacitor, or the secondary coil, and these parts are not covered for this action! However if you still choose to widen the gap, even if you know what you are doing, the coil should not be run for more than 5-10 sec intervals. Further spacing may also cause premature shutdown of the gap.**

***Kit or other builders using this data should always initially set both gaps at a spacing of 3/16” for BTC50. Gaps must not be opened any further if they are firing intermittently. Reliable steady firing is recommended for continued operation.***

The secondary coil should be terminated into a conductive object such as a sphere or toroid. ***All our assembled and kit BTC50 coils come with a toroid terminal and are tuned to this setup.***

5. The trick now is to adjust the tap lead for maximum spark output for the particular terminal used. Note the lead position along with the spark output of secondary coil noting increasing or decreasing discharge length as adjustments are made. A variance of several inches along primary coil winding can make a noticeable difference in output. The actual air discharges will be longer than the point to point.

**Factory made coils are reasonable tuned with good output as shown by the attachment mark on the primary copper coil**

### **Experiments using your coil**

**1. Adjustment** - Suspend a grounded metallic object above the device. Start at about 3" separation and make adjustments increasing separation until the optimum spark length is obtained. (Note grounding means connection to metal base).

**2. Effect on human body** - Use caution as this may cause a reflex secondary reaction.

Hold a metal object tightly and advance to coil terminal. You will receive a moderately painful shock that most people can tolerate. Fake out your pals by letting them think it is really painful. This demonstrates the "skin" or surface effect of high frequency electricity. **Caution!** Make sure you are standing on a dry non-conductive surface.

***NOTE: OUTPUT OF THE BTC50 WILL CAUSE A VERY PAINFUL AND BURNING SHOCK -- NOT ADVISED FOR THOSE LOW PAIN THRESHOLD INDIVIDUALS. THERE ARE WAYS TO SET UP TESLA COILS WHERE PERFORMERS ACTUALLY HAVE THE DISCHARGES COME FROM THEIR FINGERS AND OTHER BODY PARTS WITHOUT ANY NOTICABLE PAIN. THIS IS BEYOND THE SCOPE OF THESE INSTRUCTIONS BUT CAN BE DISCUSSED***

**3. Effect on insulators** - Place various objects on the top of the coil and note the effects of the high frequency electricity. Glass or other usual insulators do not stop the sparks. Experiment by placing objects such as light bulbs, bottles, glass, etc. on top

**4. Effect on partial insulators** - Place wood pieces about 12" X 1" x 3" and note red streaks and other weird phenomena occurring from within the piece. Try other materials

**5. Ionization of gases** - Obtain a fluorescent lamp or plasma globe and allow it to come within several feet of the device. It will glow and produce light without direct connection, clearly demonstrating the effects of the electric and magnetic fields on the gas. Note the distance from the coil that the lamp will glow. Experiment using neon and other lamps and note the colors, distances, and other phenomenon.

**6. Induction fields** - this is demonstrated by obtaining a small filament type lamp such as a flashlight bulb or similar and connecting between a large 1-1/2 to 2' diameter metal or wire loop. The lamp will now light due to energy coupled by induction. You will note that current is required to light this type of lamp and is entirely different than the radiation field that ionizes and causes the gas lamps to glow.

**7. Create special effects, pinwheels, and color fires** - by connecting pieces of nichrome wire as shown in sketches. Note - rotor rotates creating a ring of fire. Try different types of rotors.

**8. Ion motors** - Fabricate and carefully balance rotor as shown. Use piece of thin spring beryllium copper. Pin prick center of rotor with a punch for bearing point. Rotor will spin at high speeds if carefully balanced demonstrating ion propulsion.

**Special note KIT BUILDERS** - Your Tesla coil output is hungry for "capacitance". It is suggested to obtain an 18" toroid terminal such as our TO18 at [www.amazing1.com](http://www.amazing1.com). You may substitute two metal bowls and attach together for producing a spherical shaped object. The toroid however provides electrostatic shielding of the coil eliminating discharge at these points. Our assembled and kit versions of this Tesla coil includes this part.