

BencoDental
OptiSonicTM

**Ultrasonic Cleaning System
Tabletop & Recessed Models**

Instructions for Use

Operator Notes:

Operator Notes:

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Safety Precautions and Warnings

Before using your Ultrasonic Cleaner, please read and thoroughly understand these safety precautions. Failure to comply with these warnings and safety precautions may result in serious personal injury or property damage.

To avoid electrical shock:

- Unplug your machine from the power source before filling or emptying the tank.
- Keep the area around the ultrasonic cleaning machine clean and dry. Water and high voltage can cause electric shock.
- Ensure that the ultrasonic cleaning machine is properly grounded. Do not remove the grounding prong on the line cord plug.
- Do not immerse your ultrasonic cleaning machine in water.
- Do not disassemble your ultrasonic cleaning machine - Hazardous Voltages inside the tank are dangerous!
- **Warning:** Do not ever use alcohol, gasoline or flammable solutions. Doing so could cause a fire or explosion.
- **Warning:** Unplug the machine before moving it.
- **Warning:** Do not immerse the ultrasonic cleaning machine in water or any other liquid. To maintain the tank free of sediment and soap scum: Unplug, Rinse and Wipe Dry.

CAUTIONS:

- Do not use mineral acids or bleach. These liquids can damage the ultrasonic cleaning tank.
- Use only approved ultrasonic cleaning solutions for compatibility. CHANGE THE ULTRASONIC CLEANING SOLUTION DAILY OR AS NEEDED.
- Do not allow the solution to drop below the operating level of the tank while the ultrasonic cleaning machine is in operation.
- Cleaning solutions and surfaces of the cleaner will get HOT during use! Use Caution when handling hot solutions, these can cause burns! Never run the ultrasonic cleaning machine at solution temperatures over 160°F, 71°C.
- Do not place parts or containers directly on the bottom of the ultrasonic cleaning tank.
- When using beakers or an auxiliary pan, enough solution must be in the tank to act as a coupling agent. The beakers should be suspended below the solution level, but above the bottom of the tank.
- Do not leave the instruments in the ultrasonic cleaning machine overnight; it may cause corrosion (to the instruments).
- Avoid operating the ultrasonic cleaning machine in extremely dusty areas.
- Keep the ventilating louvers clean and free of obstructions.
- Do not disassemble your machine. Contact your Dealer.

FAILURE TO COMPLY WITH THESE WARNINGS AND PRECAUTIONS WILL VOID YOUR WARRANTY AND MAY CAUSE PERSONAL INJURY!

Foil Test

An aluminum foil test is a simple method to evaluate the general cleaning intensity and soundwave coverage throughout the tank. Perform this test as follows:

- Obtain any regular aluminum foil sold in a supermarket (not heavy duty). Cut a piece large enough to cover $\frac{1}{2}$ to $\frac{3}{4}$ of your tank bottom.
- Fill the tank as usual with room temperature General Purpose Cleaner Concentrate or Jewelry Cleaner Concentrate, diluted as specified.
- Run the machine for 10 minutes without a basket and with heat off, to de-gas the solution.
- Lower the foil into the operating tank vertically and centered to the bottom.
- Continue to hold the foil and let the machine run for 3 minutes.
- Turn the machine off and remove the foil.
- Examine your piece of foil. There should be a peening effect and/or some perforations on the foil. The location and size of those peening or perforation patterns indicate the cleaning intensity and uniformity of the ultrasonic sound waves in the tank.

Other Performance Tests

“Performance Validation Strips” are also available from some suppliers to measure the performance of the cleaner. These strips are inserted into the cleaning solution. The cleaner is then run for a predetermined time and test sample is visually inspected for cleaning results.

Troubleshooting

If your ultrasonic cleaner does not operate to your satisfaction, please consult the guide below before calling your authorized service center.

Cleaner will not start	- Cleaner not plugged in properly; - Timer not ON; - Timer Light Not on; - Blown fuse	<i>Plug into a functioning electrical outlet;</i> <i>Turn timer clockwise</i> <i>Turn rear power switch ON</i> <i>Call authorized service center</i>
Cleaner operates but does not heat solution	- Heat switch not ON; - Heater malfunctions	<i>Turn heat ON</i> <i>Call authorized service center</i>
Cleaner will not drain	Clogged drain	<i>Call nearest service center</i>
Decreased ultrasonic activity	- Solution is not degassed - Solution is spent - Solution level is incorrect for the load - Tank bottom is covered with soil particles - Using de-ionized water in the tank	<i>Make sure the tank was filled with warm tap water plus cleaning solution and has run 5 to 10 minutes</i> <i>Change solution</i> <i>Adjust solution level to one inch from the top of the tank with the load</i> <i>Empty, clean the tank with warm water and a non-abrasive cloth</i> <i>Do not use. De-ionized water does not cavitate as well as ultrasonic cleaning solutions.</i>

Chemicals Harmful To Your Ultrasonic Cleaner

Acetophenone	Ethyl Chloride
Aluminum Chloride	Ferric Chloride
Aluminum Fluoride	Ferrous Chloride
Aluminum Sulphate	Ferris Sulfate
Ammonium Bifluoride	Fluoboric Acid
Ammonium Chloride	Fluorine
Ammonium Hydroxide	Hydrobromic Acid
Amyl Chloride	Hydrochloric Acid
Antimony Trichloride	Hydrogen Peroxide
Aqua Regia	Hydrocyanic Acid
Benzethonium Chloride	Hydrofluoric Acid
Bromine	Hydrofluosilicic Acid
Calcium Bisulfate	Iodoform
Calcium Bisulfite	Mercuric Chloride
Calcium Hypochloride	Muriatic Acid
Chloracetic Acid	Nitric Acid
Chloric Acid	Phosphoric (crude)
Chlorine, Anhydrous	Sodium Hypochlorite
Chromic Acid	Potassium Chloride
Chlorine Bleach	Stannic Chloride
Citric Acid	Stannous Chloride
Copper Chloride	Sulfur Chloride
Copper Fluoborate	Sulfuric Acid
EDTA Acid	Zinc Chloride

THE USE OF THESE CHEMICALS WILL DAMAGE YOUR MACHINE AND VOID THE WARRANTY.

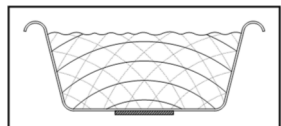
WARNING! NEVER USE FLAMMABLE SOLUTIONS IN OR NEAR THE CLEANER. DOING SO MAY CAUSE A FIRE OR EXPLOSION.
These Solutions Include, But Are NOT Limited To The Following:

Acetone	Methanol
Benzene	Petroleum Spirits
Gasoline	Propenol
Isopropyl Alcohol	

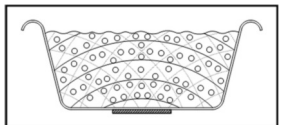
Congratulations on your purchase of an Ultrasonic Cleaning System. Your machine is part of a complete cleaning process which is thoroughly described in this owner/operator manual.

What is Ultrasonic Cleaning?

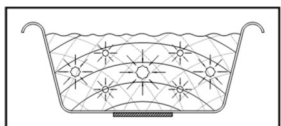
Ultrasonic cleaning is created by sound waves that are transmitted at frequencies beyond the range of human hearing. A generator located within your system develops the high frequency power which causes a transducer to radiate and produce the sound waves.



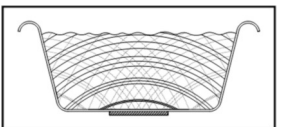
Sound waves are carried through the solution in the tank and create a unique vibrational pattern causing alternating high and low pressures in the liquid.



During the low pressure stage, millions of tiny bubbles form. This process is called CAVITATION, meaning the formation of cavities.



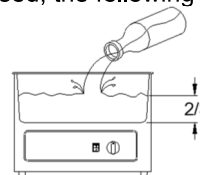
During the high pressure stage, the bubbles collapse or implode, releasing enormous amounts of energy. Working in all directions, the bubbles attack every surface and invade all recesses and crevices, pulling debris off the object being cleaned.



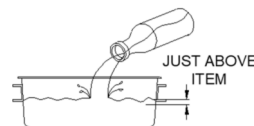
Sweep Technology enhances the ultrasonic activity by automatically changing frequencies, thus creating a cleaning grid which literally sweeps through the tank. A more uniform cleaning pattern and significantly shorter cleaning times result when "hot spots", present in traditional ultrasonics are eliminated.

Indirect Method

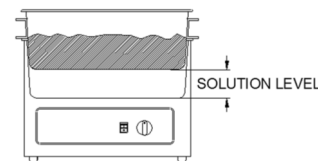
When a cleaning application necessitates a series of different solutions, or when a specialized solution which is not to be placed directly into the tank is to be used, the following procedure is recommended.



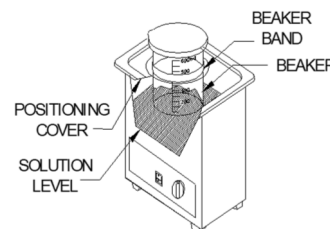
Fill the stainless steel tank approximately $\frac{2}{3}$ full with an appropriate solution or carrier bath.



Fill auxiliary pan or beaker (s) with an appropriate cleaning solution(s) to a level just above the item(s) to be cleaned.



Place auxiliary pan into main tank, resting it on its handles, making sure that the bottom of the auxiliary pan is below the solution level in the main tank, add water if necessary. This insures proper sound wave transference.

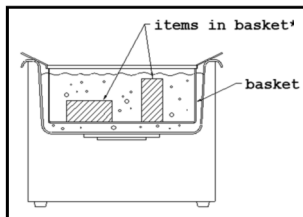


If a beaker or beakers are used, place the beaker in a positioning cover using the beaker band to adjust the depth of the suspension so that the beaker bottom is slightly below the surface of the solution in the main tank, but off the bottom.

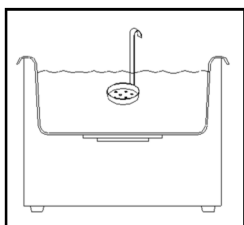
Cleaning Methods

Direct Method

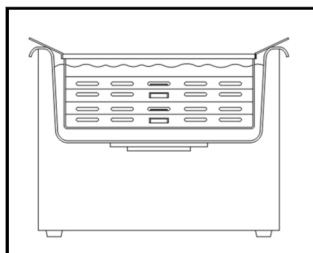
In this method, the part(s) to be cleaned are placed in your accessory basket. The basket is then placed directly into the main tank already containing an appropriate cleaning solution.



Cleaning times may vary depending on the amount and types of contamination on the items. We suggest that a 5-10 minute cycle be initiated and more time added if necessary. (6 or 12 minute for Digital Timer)



Bur tray suspended directly into the tank.



Instrument cassettes, held in a cassette rack and placed directly into the tank.

Unpack, Set-Up and Start-Up

Unpack

- Remove your ultrasonic cleaner from its shipping container and inspect it for any possible damage which may have occurred during shipping. (Claims for shipping damage should be made immediately against the carrier.)
- Check the serial number of your machine with the serial number on the shipping carton. If they are not the same, contact your dealer.

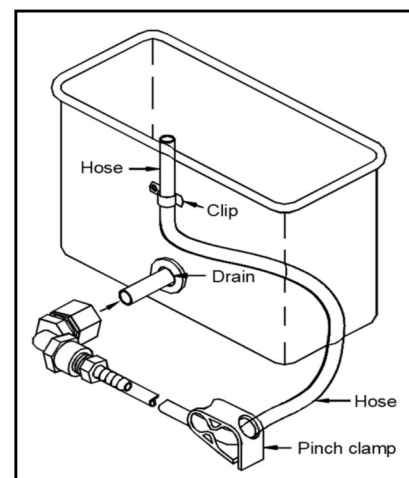
Set-Up

Table Top Machines

- Select your desired location for the cleaner. It should be in close proximity to a sink or waste lines to facilitate ease of draining. A drain assembly, supplied with the cleaners having drains, will allow you to place the unit on either side of the sink or to connect it directly into a waste line. Provide at least two inches all around the machine to allow for adequate cooling.

Directions for Attaching Pre-Assembled Drain Hose (Small, 3/4 and 1 Gallon Models without internal drain valve)

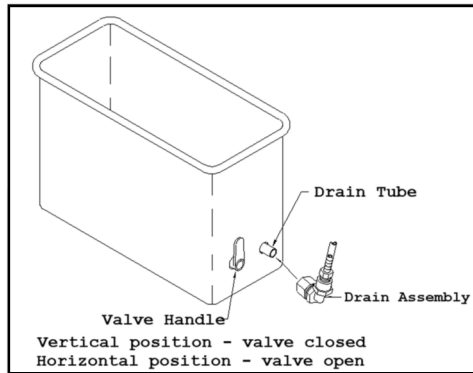
1. Remove the pre-assembled drain hose from inside the tank.
2. Loosen large black nut on the elbow (drain fitting) at end of the drain hose by turning 2 – 3 complete revolutions. (Be Careful: Excessive turns will result in the black nut falling off and the elbow coming apart.)
3. Turn the ultrasonic machine so the back of the unit is facing you. Locate the metal drain tube coming out of the machine. Slide the elbow (drain fitting) over the metal drain tube until elbow is almost flush with back of machine. (Note: Sliding the elbow will require some force and it is recommended to place one hand on the front of the machine for stability.)
4. To tighten elbow (drain fitting), turn the black nut counter-clockwise while holding the elbow in place. (Be careful not to over-tighten the black nut.)
5. Close drain hose by pressing down on pinch clamp until secure (approximately 4 "clicks").
6. Secure end of plastic tubing into clip at top of machine.



Small, 3/4 and 1 Gallon Models without internal drain valve

Attaching the Drain Assembly for 3 and 6 Gallon Models (1/2 inch drain)

1. Loosen large black nut on the elbow (drain fitting) at end of the drain hose assembly supplied. Turn 2 – 3 complete revolutions. (Be Careful: Excessive turns will result in the black nut falling off and the elbow coming apart.)
2. Turn the ultrasonic machine so the drain tube is facing you.
3. Slide the elbow (drain fitting) over the metal drain tube until elbow is almost flush with the machine. (Note: Sliding the elbow will require some force and it is recommended to place one hand on the front of the machine for stability.)
4. Adjust the position of the drain tube as desired. (Right, Left or Down)
5. To tighten elbow (drain fitting), turn the black nut counter-clockwise by hand while holding the elbow in place. If further tightening is needed, use an adjustable wrench or 1 inch open-ended wrench. (Be careful not to over-tighten the black nut.)



3 and 6 gallon models with 1/2" drain

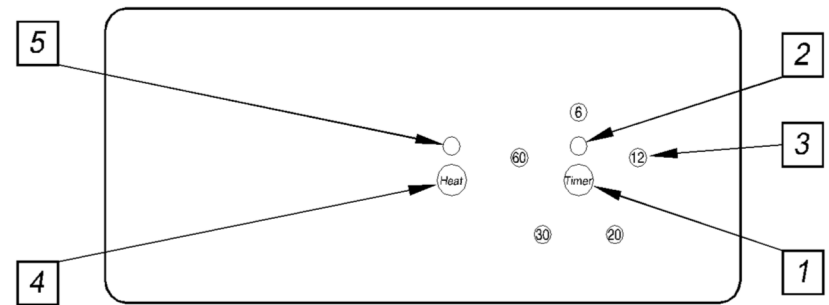
Recessed Machines

Installing the Tank in Your Countertop

Your recessed ultrasonic cleaner is designed to be a permanent installation into a countertop in your office or shop. It is recommended that the stainless steel mounting rim supplied with the cleaner be installed between the rim of the tank and the countertop to ensure a good, watertight seal at the countertop. A cable or cables (depending on the model) will connect the tank to the generator.

1. Select your desired location for the tank on your countertop. Close proximity to a sink is desirable for ease of drain connections. Make sure there are no drawers below your selected position on the countertop and that there are doors which allow easy access to the drain valve on the tank. If the cable(s) interconnecting the tank and generator cannot be routed behind the countertop, a separate hole will have to be drilled in the countertop to accommodate them.
2. Included with your recessed cleaner is a stainless steel mounting rim. Use it as a template and trace the required cut out on your countertop with a crayon or marker.
3. Drill a 1/2 inch hole anywhere within the section to be cutout.

Digital Timer



The **Digital Timer** controls the operation of the Ultrasonic cleaning machine and its options. There are three sections of control; Main Power, Timer, Heat.

The **Main power** on / off switch: Located on the rear panel of the machine near the line cord and fuse holder. This switch controls the main power to the unit. When this switch is in the on position, it is illuminated and the yellow standby light, on the front panel, is lit (item 2).

Timer Section: The timer section controls the Ultrasonic operation of the machine. There are five different selectable predefined timer settings (6, 12, 20, 30, 60 minutes). The timer set button (Item 1) is in the center of the time selection indicator lights (Item 3) just below the yellow standby indicator light (Item 2).

Pressing the timer button once, when the unit is in standby mode will start the ultrasonic cleaner and select an operating time of 6 minutes. If the Timer button is pressed again a second time then the 12 minute indicator will light and the unit will then run for 12 minutes and turn off when done. If the timer button is pressed while the machine is operating the next time interval is selected and the machine will continue to operate until the end of this preset time. Pressing the timer button will increment the time interval from 6 to 12 to 30 to 60 and then to Standby (off). The time indicator light remains lit until the end of the cycle.

Optional Heater Section: The heater section has the Heater push-button (Item 4) and a Red indicator light (Item 5). The light is active when the heater circuit is energized. The Heat remains on until the button is pressed again and the indicator light goes off. If the unit has not had any buttons pressed for 2 hours, the heat turns off as a safety precaution. **Heat should not be left on unattended.** The operator should not rely on this automatic feature to turn the heat function off automatically - this feature is for safety only.

Note: Recessed Machines do not have a heater option.

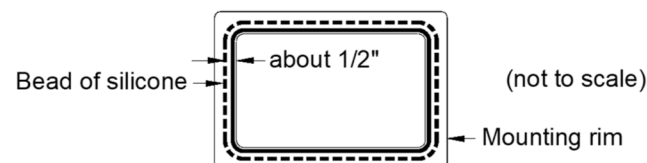
The **Main Power Switch** is intended to be turned off when the machine is not in use. None of the Digital timer functions will work if the main power switch is in the off position.

Start Up (Table Top and Recessed)

STEP	ACTION
1	Select the appropriate Cleaning Solution.
2	Dilute with warm tap water as specified and fill one half to two-thirds of the tank. Do not use De-Ionized water.
3	Add parts to be cleaned. Use a basket or other accessory which keeps material off the bottom of the tank. If necessary, add more solution to bring the level to about 1 inch from the top of the tank.
4	Plug the cleaner's line cord into a grounded outlet.
5	To activate your machine, simply set your timer (on mechanical timers turn knob clockwise) to the number of minutes desired for cleaning. These self-timing units will automatically shut themselves off at the end of the cycle. For recessed installations with an optional remote timer... connect the machine's power cord to the outlet on the rear of the remote timer and connect the remote timer's power cord to a grounded outlet as described in the previous section. Set the generator timer to the HOLD "∞" position by turning counter clockwise. Then set the timer on the remote to the number of minutes desired for cleaning.

NOTE: If this is the first time you are running the cleaner or you have changed the cleaning solution, you must degas the solution. Fresh solutions contain many dissolved gasses which reduce effective ultrasonic action. Although solutions will naturally degas over time, operating the machine for five to ten minutes before using it to clean will accelerate the degas process.

- Using a sabre saw, carefully cut the tank shape out of the countertop.
- Clean away saw dust. Position the mounting rim over the cut out and check fit. Adjust hole if required.
- Remove rim. Carefully apply a bead of clear silicone (GE 732 or equivalent) ½ inch wide, ⅛ inch high around the cut out.



- Position mounting rim over cut out.
- Carefully apply a bead of silicone ⅝ inch wide, ⅛ inch high around the inside edge of the mounting rim.
- Set the tank into the rim. Allow the silicone to squeeze out. Wipe the excess silicone.
- Allow the tank to set for at least eight hours without being disturbed.
- After the silicone has cured, carefully scrape any excess silicone, being careful not to scratch the rim or countertop.

Recessed rim option

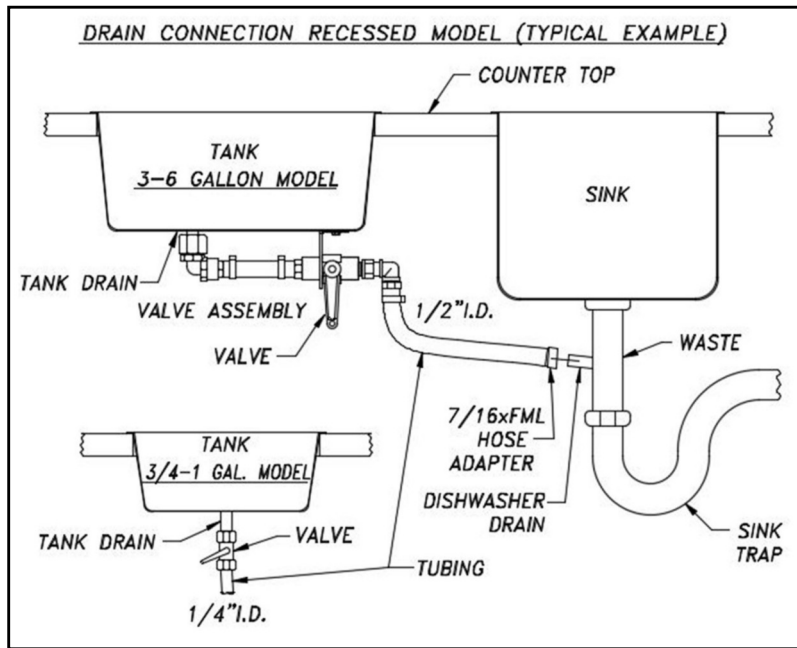
Recessed rim installation is similar. For specific details check instructions supplied with that option.

Connecting the Drain

On a Recessed Machine, protruding through the bottom of the tank assembly is a drain valve, associated fittings and a 36" length of tubing.

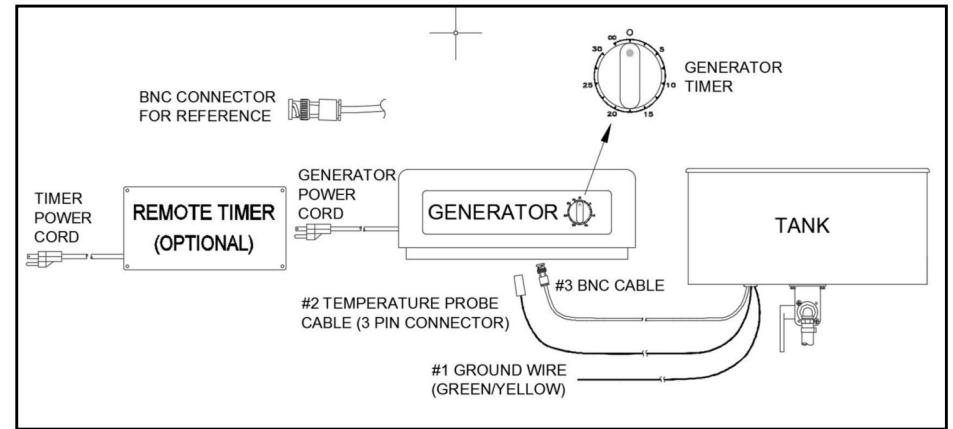
Every recessed installation is unique because of different counter sizes, access to waste lines, etc., and should be done by a plumber or technician in accordance with local plumbing codes.

If a sink and sink drain are near the location the recessed cleaner is to be installed, we recommend changing the sink's tailpiece to a "dishwasher tailpiece". Then, using an appropriate combination of adapters/fittings, the tubing can be connected to the tailpiece. See sketch.



Installing the Remote Timer (optional) and Generator Box

1. Determine the best location for the timer, it should have easy access to see and activate the controls. The area behind the timer should be free from obstructions with at least 5 inches of clearance from the mounting surface for the timer and cables. For reference the face of the timer is 11 inches wide by 5-1/2 inches high. (This is NOT the cut-out size)
2. Once the location has been determined a cut-out in the panel must be made. The cut-out should be 9-3/4 wide by 4-7/8 inches high.
3. Mount the timer on the panel using the 4 screws provided.
4. Determine the best location for the Remote Generator Box. This can sit on a shelf or base of the cabinet. It must have at least 2 inches of clearance on the sides, top and back for cooling and cable access.



Interconnecting The Tank, Generator and Remote Timer (optional)

CAUTION: Do not connect to power source until all other connections are made! Make connections in the order below.

1. Connect #1 Ground Wire (green/yellow) from the tank to an appropriate earth ground such as a cold water supply pipe using a grounding clamp or similar approved grounding device.
2. Connect #2 Temperature Probe Cable into the 3 pin connector on the rear of the generator. (Turn Clockwise to lock connector)
Caution: Failure to connect this cable may cause damage to the electronics!
3. Connect #3 BNC Cable from the tank into the connector on the rear of the generator. (Turn Clockwise to lock connector)
4. Plug in the Generator Power Cord into the rear of the Remote Timer (if equipped).
5. Secure all cables as required to prevent any tension on the connectors or cables. Make certain any cabinet doors can open without pulling on cables and connectors. Do not store any objects on cables.
6. After all connections are made, see the start-up section before plugging the Timer Power Cord into a power outlet. The wall outlet must be properly grounded. **No** modifications to the power cords should be made to remove any grounding pins.

Note: All wiring and power outlets must comply with local electrical codes.

DISCONNECT THE POWER BEFORE ATTEMPTING TO CONNECT OR DISCONNECT ANY CABLES ON THE SYSTEM.