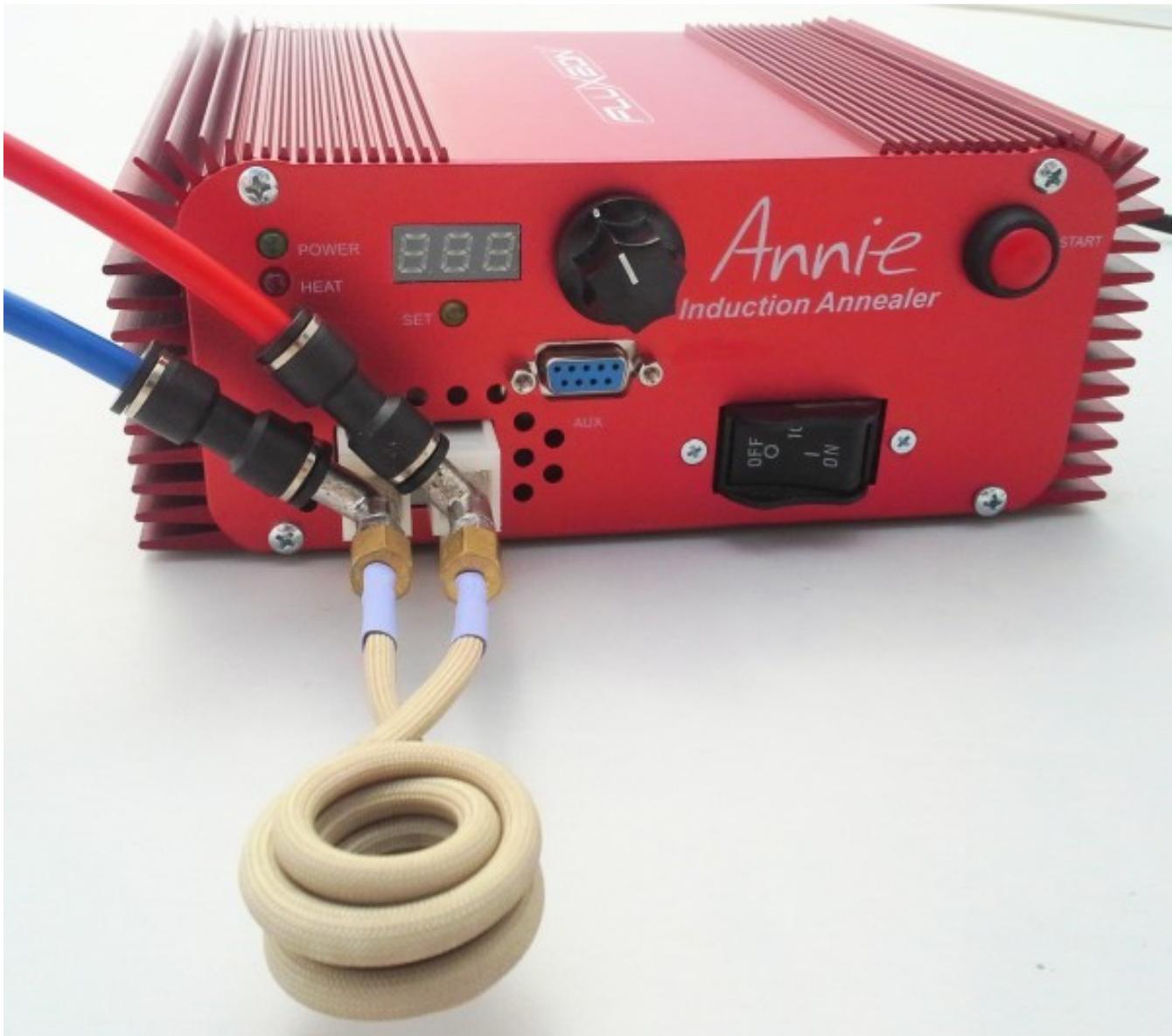




Annie[™]

Brass Annealing Induction Heater



Manual Version 1.7

07/26/18

WARNING ▪ WARNING ▪ WARNING

Do **not** use this heater around your reloading bench.
While Annie emits no sparks nor flames, it can heat objects inserted into its work coil hot enough to ignite powder and primers.
Serious harm or death could result.

SET UP A SEPARATE AREA FOR ANNEALING BRASS

NEVER anneal a primed case!
While Annie is fast enough to leave the case head cool, a piece of hot debris could fall off the mouth and land in the primer hole, detonating the primer.

ANNEAL ONLY DE-PRIMED CASES!

WARNING ▪ WARNING ▪ WARNING

Safety Warnings

- ***Do not get wet. This unit is not water resistant.*** If the unit does get wet, unplug it as quickly as possible and allow to thoroughly dry before trying to use it again. Low heat (150F or less) is recommended to aid drying.
- This equipment contains sensitive electronics. Do not use this instrument to drive nails, break rocks or otherwise subject it to excessive shock or vibrations. Try not drop it any more than necessary.
- Do not heat anything other than ammunition brass with this unit. No aerosol cans, air tanks, or any container that is sealed. Yeah, it's fun to heat things until they blow up but please don't use Annie for that purpose!
- Do not heat anything flammable or anything that contains flammable materials or substances. Automobile gas tanks, for example.
- Do not use the radio frequency output for anything other than case annealing. No this isn't a cute little ham radio transmitter!
- Do not remove the 3rd wire safety prong. The earth ground is vital to this unit's operation, and **YOUR SAFETY.**
- Do not carry the unit by its cables.
- Do not open the case. No user-serviceable parts inside. Warranty will be voided if the case is opened. **Yes, we will know....**
- Do not tamper with the circuit breaker. It is not adjustable.
- This unit emits strong radio frequency (RF) energy. Please do not use it around other sensitive electronic equipment. In the factory, that means don't plug it into the same power serving an instrumentation, PLC or industrial PC cabinet.
- Annie's case may get quite hot during extended operation. The over-temperature protection triggers at 70 deg C (158 deg F). This is quite hot to the touch and can cause mild burns. If Annie must be operated for an extended period then we suggest setting up a fan to blow on the case.
- If any of the cords become frayed or cut, please return the unit to the factory for replacement.

Introduction

Thank you for purchasing the Annie Brass Annealer! You will discover that induction heating brass and steel cases to be a pleasant, fast and fun experience. Please read this manual in its entirety before operating Annie for the first time. (It's not that long....)

Setting Up for the First Time

When you open the shipping container you will find a fully assembled Annie. The heating coil (work coil) has been disconnected and packed carefully for shipping.

The Annie is sold apart from the various coils, but they all connect to the front panel in the same way.

- To prepare Annie for operation, remove it from its packing material and attach the work coil to the front face terminals. Gently tighten the screws. **Note: 'Firm' is enough—don't tighten as if you need to ratchet it down.**
- **Re-tighten after your first 25 cartridges.** The solder-dipped ends will soften a little with use. If a good connection is compromised, the result will be a hot spot, and a melted connector.
- You might notice some brown 'gunk' inside the terminal housing. Don't worry, and don't clean it. It's conductive electrical grease and helps make a good connection with no hot spots.
- Attach the foot switch to the front panel jack and place it on the floor in a convenient location. After you finish reading these instructions, you are ready to start annealing your brass.

The Front Panel

The features are as follows:

- **Work coil connectors** – where the heating coil connects. Only use Fluxeon-provided coils. Any other type of coil will damage the Annie.
- **3-digit LED display.** Shows the time in tenths of a second that the timer is programmed to run.
- **"Set" LED.** Shows that the heater is in the "time set" mode. This mode is entered by pressing and releasing the "Set" knob.
- **"Heat" LED.** Shows when the induction heater is on.
- **"Set" knob.** This is a multi-function control. If you press and release it one time, Annie enters the "time set" mode. Turning the knob sets the desired time on the display. When the desired time is set, press the knob again ("set" LED goes out) and the heater is ready to run.

If you press and hold the "Set" knob for 4 or more seconds, the time setting is reset to "0.0".

Note: the Maximum time for the Annie is set to 19.9 seconds. Most cartridges are annealed in under 3 seconds, 50BMGs in about 10-12 seconds.

- **"Start" button.** This switch turns the heating on and off and starts the timer count-down. If you press the "Start" button while a heating cycle is underway, the cycle is paused.
- **Foot Switch.** (optional) is wired in parallel with the "Start" button, and so functions identically.
- **Power Breaker.** This hydraulic-magnetic circuit breaker is the power switch for Annie. We recommend that Annie be left in the "off" position when the unit is not in use, but no harm will come if left on. It consumes less than 10W while idle. On larger cartridges, the breaker may buzz. It's designed to put up with a small overload for a short time.
 - If Annie is overloaded, the breaker will trip. If it repeatedly trips then there might be something wrong with Annie or the coil. Contact support@fluxeon.com for troubleshooting.

Using Annie

Using the annealer is extremely simple.

- Switch on the breaker on the front panel. The heater will do an LED test and then recall the time from the last session if one was present.
- If the time is not correct, press and release the “set” knob (“set” LED illuminates) and adjust the time as necessary. Press the “set” knob again to exit the “set” mode.
 - Note: **“20.0” seconds is a special setting** (on some versions it's “999”). This allows for 'momentary' operation. This is not used in reloading where timing is important, but the Annie does occasionally get some odd jobs that need it.

******DOUBLE-CHECK TO MAKE CERTAIN THE CARTRIDGE IS NOT PRIMED******

- Insert a brass cartridge into the work coil approximately as deep as you want it heated. Normally that would be just the mouth of the case, especially for shouldered cases. For correct insertion depth, paint a line of Tempilaq along the length of the case, and observe where the melting happens first.
- Press the Start button to start the heat cycle. If you desire additional cycle speed, the Fluxeon Universal Foot Switch will be worth considering.
- The heating is so fast that you can hold most types of cases by the head. Annealing pistol cartridges will probably require gloves or a non-conductive holder.
- If you desire water quenching, drop the brass into a bucket of water. (However, this is not metallurgically necessary to the annealing process.)
- Repeat! Note that the power output will increase after the first 10 or so cartridges. This is because the internal transformer is warming up, which changes the output about 8%. so please give Annie a dozen or so ‘practice shots’ before ‘firing for effect’. Just put the first ten anneals back into the line to be annealed again (once they have cooled).
- If you are heating a large number of cartridges, and doing so at deafening speed, the thermal cut-out may engage. The Start button or foot switch will still initiate a countdown on the timer, but no heat will be produced. You will see the HEAT LED turn blue/magenta when the fault is in effect. You will also hear a tone from the Annie.
 - Go grab a cold one and let Annie cool off.
- For high duty-cycle operation, consider using the water-cooled coil.

Heating Times

Most shouldered cartridges up through .30 cal and straight walled pistol cases will anneal properly in 2-4 seconds. Shouldered cartridges larger than .30 cal will require more time. A 50 BMG, for example, will require about 10 seconds. For larger cartridges, allow more time in between heats. If you're using the flux concentrator output head, larger calibers should be slowly rotated to ensure evenness of heating. Just 90 degrees or a quarter turn during the length of the cycle. No rotation is needed for the water-cooled helical coil, as it is self-centering by the magnetic field.

For best results, obtain a Tempilaq® temperature measuring liquid or crayon and vary the time until you get exactly the temperature you desire. 750F Tempilaq will turn from a chalky appearance to translucent, exactly at 750 degrees F. Just paint a lengthwise line on the cartridge, which will also help with correct positioning. The tenth of a second resolution of the Annie timer is more than adequate for precision annealing.

- **Coil Options**

The Annie has several work coil options:

- **Water-Cooled Helical Coil.** The Water-Cooled Coil essentially gives the Annie virtually unlimited duty-cycle. The helical coil has the fastest cycle time of the three, and most even heat. The high frequency field will actually self-center the cartridge to magnetic center.

Connect the end to the white terminal block, just like the Litz coil.

You can position the water connections however you like—the copper is flexible. **You may have to re-tighten the compression fittings**, but try not to overdo it. Over-tightening can also cause a leak.

The Water-Cooled Coil includes 25 feet of 1/4" plastic tubing. Cut to the length desired, and insert the tube into the instant tube fitting on the coil. There is nothing to do except push the tube in. To release, push in the release ring, and then pull the tube out.

The water supply can be just about anything: tap water from a nearby faucet, pump-recirculated water, or if you have a high shelf, a gravity feed system will work. Only a dribble of flow is required, on the order of 1 gallon per hour. If you prefer to use a pump, the best choices are diaphragm, gear or vane pumps. But some small DC impeller pumps will work fine. You'll need about 5psi (or 3M of lift) to get the required flow.

Fluxeon now offers a pump/heat exchanger—please check the web store!

- **Litz Wire Split Ferrite Flux Concentrator.** Now there's a mouthful! Let's just call this the **FC Coil** and make it easy on ourselves.

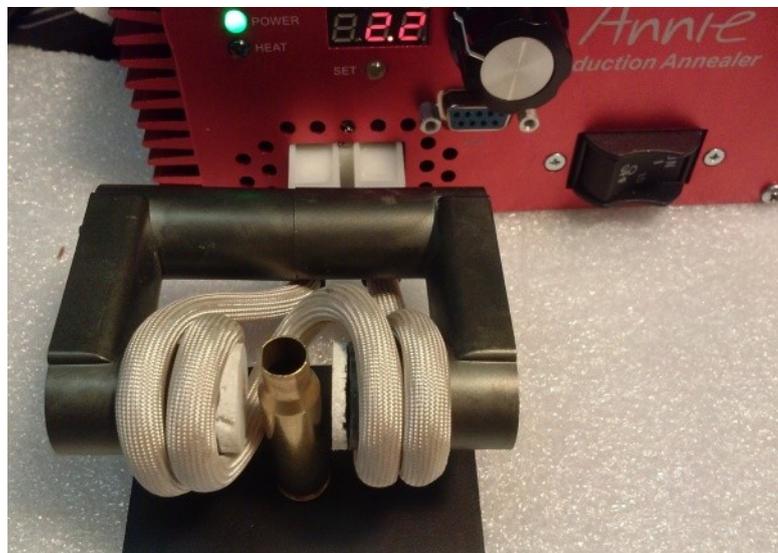
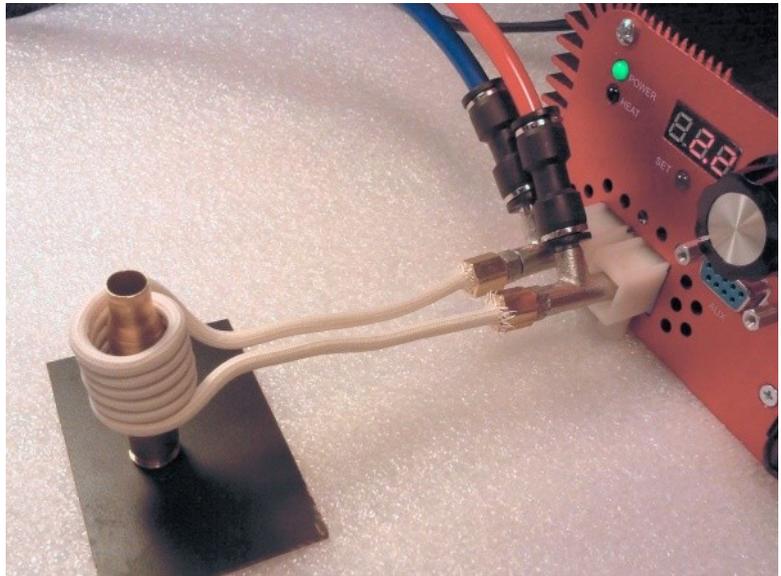
This coil is made of 1,750 strands of individually insulated 40AWG magnet wires, with a solid 12AWG core so that it keeps its shape. It will get warm, and can be ruined with too much usage so you'll have to go a little more slowly with this one.

It is, however, air-cooled and requires no water. It also features an open side, which some folks prefer.

The Annie FC coil kit comes with 4 ferrite halves, and hardware that bolts them together. The halves are color-coded according to cut size on the gap end. Mix and match until you get the right gap. The cartridge should be tight, but not touching the sides.

The white pad on the ends is solely present for spacing and evening out the magnetic field. If one comes off, you can reattach it with ordinary hardware store silicone adhesive.

For cartridges larger than 7.62mm, you'll want to rotate the cartridge 90 degrees as the timer counts down. It's not 100% necessary, but it will give a more even anneal.



- **Giraud Retrofit Cut Toroidal Coil.**

This is a coil made specially for the Giraud automatic annealing machine. The toroid is the most efficient of the open-sided coils, and since the cartridge is rotated by the machine, no spacers are required. We feature water-cooled versions of the Giraud Coil, for those interested in very fast cycling. If you plan to anneal large cases such as 50BMG, you'll need the 3/4" gap version. Because the power levels are highest with these larger cartridges, we do recommend that you buy the water-cooled version of this coil.

Contact Giraud Tool Company for information on their adapter kit. For those of you who already have one, certain of the parts must be replaced with non-conductive materials so they don't induction-heat themselves. Also included in the kit is mounting hardware you'll need.

*****TIMING ISSUE***** *please note that there is a timing sequence that must be observed with the Giraud system. The issue arises when the cycle time of the feeder is exceeded by that of the Annie timer. With the timer still counting down, the slide returns and triggers another 'start' signal. but doing this will cause the timer to stop. so the timer will show a frozen time setting until the slide returns to start the next cycle. this cycle will only get a partial heating since it's starting from where it was prematurely stopped.*

If your cartridge needs a longer heat from the Annie, please slow down the Giraud feeder.

And just holler at us if you need help. That's what we're here for!

- **The Fluxeon Universal Foot Switch**

The Universal Foot Switch is compatible with the Annie. Use it to actuate the timer, same as pressing the 'Start' button. It will give you an extra free hand to move your brass. Older versions of the foot switch connect to the front panel DB-9 connector, but we made a change. There is now a 3.5mm jack in the front panel as well, and the foot switch connector will now connect here.

This is because occasionally the DB-9 connector is needed for some other function, like supplying power to the recirculator pump.

- **The Water Recirculator/ Reservoir**

This is to supply water to the water-cooled helical coil, and also to cool the water as it passes through the radiator. It's a 120mm radiator and DC fan, with a pump and power cable that connects to the front panel DB-9 connector for power. A 4oz bottle of Anti-Corrosion Fluid concentrate is included. You need only 1 ounce to treat the whole volume of the recirculator and tubing. This corrosion inhibitor enables higher heat capacity and will remove heat more efficiently by decreasing surface tension and preventing oxide buildup.

You can use any available water, but make sure it is particulate-free. The coil ID is very small and easily plugged up. For best results use filtered water. You will want to change the water out once every year or so.

The pump is not self-priming, and relies on the pump fluid for lubrication. When the pump is properly primed, it is virtually silent. Make all your tubing connections from the pump to the coil prior to filling. It takes a little 'technique' to fill the radiator reservoir so that the pump gets the water it needs right away. Gently tilt up the side of the radiator on the side that has the fill port. Move back and forth, and slowly work it around until you don't see any more air bubbles.

Turn the system on by plugging the 2.5mm DC power cable into the jack at the bottom of the unit. You will likely have to cycle power a few times to remove any remaining air from the system. Recheck the coolant level at the fill port, and add more if necessary.

The newest revision of the Annie features an internal power supply. So it can be powered by plugging an included cable that connects the pump to the DB9 front panel connector. **IMPORTANT:** only Annies with serial numbers higher than 748 will have the larger internal power supply. If you are buying the new cooling system for an older Annie, please make note of it in your order. We'll ship you a 12VDC 2A wall adapter with a 2.5mm connector.

Some Notes About Duty-Cycle

The Annie has about a 50% duty-cycle. What does this really mean? **At 100% power, it can only be on half the time.** Since most cartridges will not draw full-power, and it takes time to move cartridges through, Annie is essentially a continuous-use machine. It features a thermal cut-out switch, but that only triggers when the case exceeds 70C (be careful—that's HOT!). And that happens only in extreme circumstances.

The power supply is one factor, the coil is another. The FC Coil coil is made up of over 1,750 individually insulated strands of 40AWG magnet wire. This is called "Litz Wire". Since electricity rides mostly on the surface of a conductor, the goal should be to have a conductor with the highest surface area possible. In a nutshell, this is the genius of Litz wire.

Coils are not *just* heated by heavy currents. The Annie coil can have well over 100 amps flowing at peak power. But, induction heating heats anything conductive in the field--including the coil itself. You'll notice that the portion of the coil closest to the ferrite gap will tend to get hotter first.

So it becomes necessary to monitor your usage of the Annie, not so much because of the power supply, but because of the FC coil. If you notice any smoke at all from the coil, that means the wire varnish is beginning to melt. Stop! Further use will damage the coil.

The current revision of the Annie includes an internal fan, which vents out the sides and the front, directly behind the coil mount. Make sure this airflow is not hampered or blocked by anything, and that it remains unclogged by 'dust bunnies'. If you cannot hear the fan, then please stop and contact us for repair.

For heavier, worry-free usage, please consider the water-cooled helical coil. It connects just like the Litz coil, but also has two 1/4" instant-tube connections to a water source. Since the flow rates required for cooling the coil are in the neighborhood of 1 gallon per hour, most users will see economy in just hooking up to a water faucet and sending the exiting water down the drain (or into the flower bed, etc.). Alternately, you may use a recirculating reservoir as complex as a refrigerated chiller, or something as simple as an aquarium pump and a bucket of water.

Fluxeon offers a simple, low-cost water recirculator/ reservoir that is a drop-in solution for this. See our web store for more details.

Care and Cleaning

Annie requires very little maintenance. There are no user-serviceable parts inside Annie. The only care required is to make sure the fins are clear and unobstructed. If there is a dust built-up, please vacuum the vents. **Do not use compressed air, as that only blows the dirt inside Annie.**

Also important: leave the Annie plugged in while vacuuming.

The outlet's ground will help dissipate any harmful static electricity buildup.

If Annie gets wet, as long as the power is off, it will not be harmed. Simply let it dry before using. Set it in the window sill or some other warm place. If you have any doubt at all that it's dry, please return it to us for service.

If Annie is powered up when it gets wet, immediately remove the power. If the spillage is beer, cola or anything else, then you should return Annie to the factory for a proper cleaning and testing. Get an RMA number from the web store, or email support@fluxeon.com.

(of course, you should be saving that adult beverage until AFTER annealing!)

Specifications

Rated input power	1200W	1200W
Rated input Current	10A	5A
Operating voltage	120 VAC $\pm 10\%$	230V $\pm 20\%$
Operating Frequency	50-90kHz, depending on load	50-90kHz, depending on load
Standby Watts	35W	35W
Ambient operating temperature	50 – 110 deg F	
Storage Temperature	-10 – 160 deg F	
Temperature Cutout	70C	
Duty cycle	Approximately 50%	
Maximum operating temperature	70 deg C.	

Frequently Asked Questions

-Are coils interchangeable?

Yes, the Annie is compatible with all the coils we sell.

-Is the Annie electrically dangerous?

No. The output is less than 80V. This may seem high, but because of the nature of high frequency electricity, you can touch a bare conductor on the output terminal and you won't feel a thing. As with Litz wire, the 'skin-effect' is in play here. The human nervous system is electrical, but doesn't perceive high frequency electricity which essentially rides on the outside of our nerves.

Additionally, the output is ground isolated by a transformer, so there is never any potential between the output and ground.

-Am I going to get cancer from the EM field?

No. There are no studies that conclude that electromagnetic fields cause cancer. There are dubious studies that try to make the case with cellular phones, but even if true it's apples to oranges. Cell phones operate near 1GHz, while the Annie works at 40-90KHz. 1 GHz is 1,000,000 KHz, so we're not even in the same universe here.

-Does the Water Cooled Helical Coil really need water, or can I run it at a slower pace and make do?

It really does need water. You can go for maybe 2-3 cycles before the sleeving will begin to smoke, but if you keep going, you will eventually cause the coil to glow red-hot. This is due to 'thermal runaway'. Copper is an excellent conductor, but we are passing over 100 amps through the coil. As the copper heats up, its resistance also rises. And this causes it to heat up more quickly, and the resistance goes even higher, etc. The heat load is not great, but it must be removed by flowing water.

-Do the coils ever wear out?

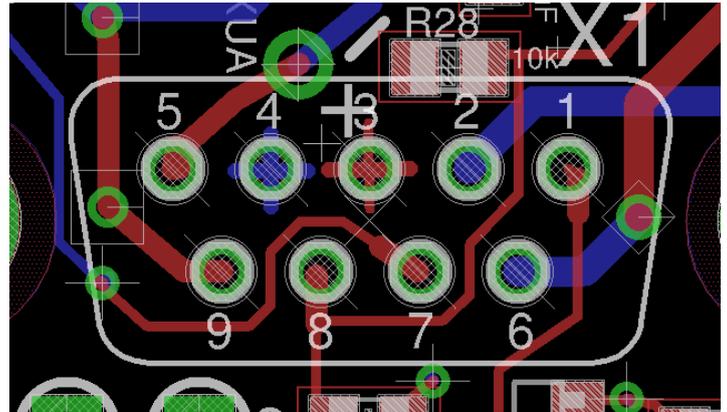
The Annie is a relatively low-power induction heater. We have taken a unit with the same basic circuitry up to 10kW, and there are large industrial heaters that output 300kW or more. While coils for these large systems do suffer metal fatigue due to powerful vibrations work-hardening of the copper, the amount of stress placed on the Annie coil is minuscule in comparison. For all practical purposes, the coils will last as long as the Annie, so long as they are cooled appropriately.

Appendix A

Auxiliary Connector

The Annie features an auxiliary connector on the front panel. This connector is designed to permit the external control and monitoring of Annie. The pinouts are as follows:

Pin Number	Function
1	End-of-Cycle pulse 5v+
2	DUMP Solenoid 12V+ 1.5A
3	Power 5V+ isolated
4*	Isolated Ground
5	12VDC Pump +pos 1.5A
6	LOAD Solenoid 12V+ 1.5A
7	Overtemp 12V+ isolated
8*	External Switch in **
9	12VDC Pump -neg 1.5A



* Pins 4 and 8 start the Annie timer when shorted (switched). It is wired in parallel with the 3.5mm audio jack and Start button on the front panel.

** Pins 4 and 8 are for connection to an external switch such as The Fluxeon Universal Foot Switch, or any other physical switch. Note, that this cannot be switched by a triac or solid-state relay. It must be a physical contact or mechanical relay. If you have an SSR output on your controller, just have it turn on a mechanical relay, and connect the Annie to that.

Do not use pin 5 for the pump with isolated ground pin 4. You could damage the heater. The pump will only work with pin 5 positive, pin 9 negative.

End-of-Cycle Pulse is a pin that goes high at the end of the timing cycle for a preset duration. It is intended to signal a PLC or other automation controller. Use with pin 4 Isolated Ground. **NO LOAD can be connected to this- it is a signal only.** That's what pins 2 and 6 are for.

Pins 2, 5, 6, 9 output 12VDC max 1.5A. Note that this is for the **combined load**. For example, if you are running your Recirculator/ Heat Exchanger @ 1A, then you only have .5A left for the Load and Dump feature. If power budget is an issue, you can always use a separate wall adapter to power the recirculator.

If you are putting together a special project with the Annie, we're more than happy to provide guidance. Just email us!

Technical Support

The Fluxeon crew is dedicated to supporting you the customer. The best way to get technical support is to email support@fluxeon.com. For non-technical support questions, email sales@fluxeon.com. We try to respond to requests within the hour during business hours and within a day regardless.

For telephone support, call us at 858-699-6096. This call goes directly into voice mail that in turn pages the person doing support at that moment. Someone will get back to you as quickly as possible.

We are a small company and telephone support takes up a **lot** of time so if your problem isn't a genuine emergency, ***please use the email support***. Even when you telephone us, the support ticket is going to end up back in email so that you can send us photos and such, so you might as well start with email in the first place.

Returns

If you need to return your unit for service (in warranty or out) then you must contact us for an RMA number. Email is the best method of contact. Write the RMA number on the outside of the package in large numbers so that it is easily visible. The RMA number lets us track your problems and associate them with the machine when it arrives. Packages without RMA numbers may be returned to sender. Please include a sheet of paper with your contact information inside the box, just in case.

Limited Warranty

The Annie is covered by our limited lifetime warranty. Please visit <http://fluxeon.com/warranty.html> for all the warranty details.

Notes