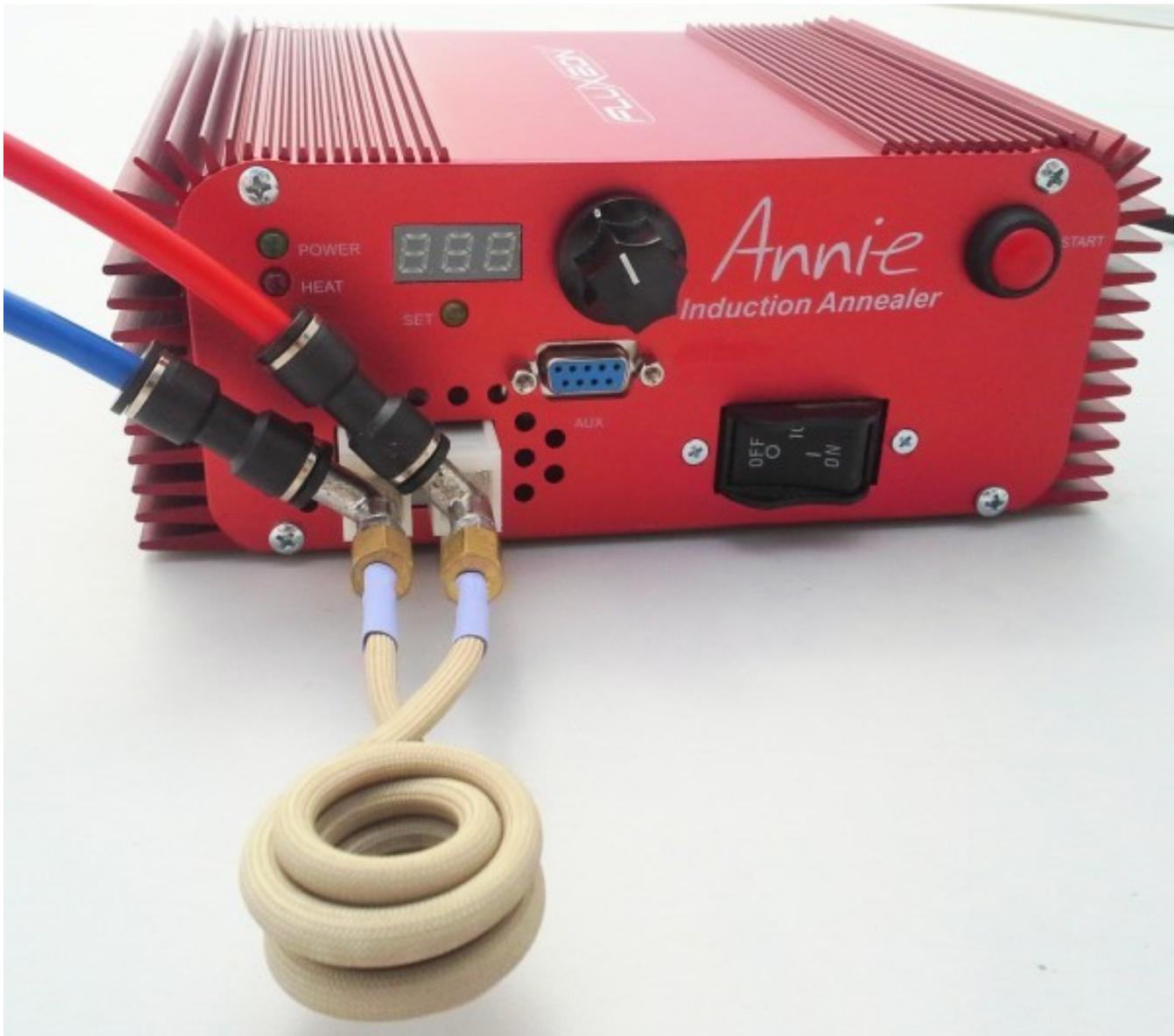




AnnieTM

Brass Annealing Induction Heater



Manual Version 1.81

10/08/20

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.

USE 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.

HEY YOU!!!

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 or hairspray bottles, 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 or coils.
- 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.
- 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. We're pretty reasonable about such things.

Introduction

Thank you for purchasing the Annie Induction 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. Tighten the screws with the included hex key wrench. **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.
- For the water recirculator, insert the DB-9 Cable into the front panel connector, and the female 2.5mm power connector into the recirculator's mating power cable.
- 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!
 - Key word: **AFTER**

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 and void your warranty.
- **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 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, with a maximum of 32W at full capacity of the internal power supplies. On larger cartridges, you may hear the breaker buzz. It's designed to put up with a small overload for a short time, so don't fret.
 - 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—we're happy to help!

Using Annie

Using the annealer is extremely simple.

- Switch on the power 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. You will hear the fan controller spin up the fan, and then drop down to a minimal speed. As you work and the Annie begins to warm, the fan controller will gradually increase speed. Working fast, and/or with large cartridges, you will probably be at maximum fan speed. But if you are working with smaller cartridges you may be afforded a little more quiet.
- 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 when you have your desired time displayed to lock it in.
 - Note: “20.0” seconds is a special setting (on some versions it's “999”). This allows for 'momentary' operation. This is so that you can use an external timer, or integrate with a logic controller.

******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.
- Put the timer on 10 seconds. While carefully observing the Tempilaq® line, press the start button. The moment you see the line turn translucent, press the start button again, which will stop the timer. Look at the cartridge--did it melt FIRST in the heat zone you wanted? make vertical adjustments to the coil position if not.
 - Take the time left on the timer and subtract it from 10, and that is your anneal time. Push the knob in and dial in this number, press again to set.
- 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.
- Repeat! Note that the power output will increase slightly after the first 10 or so cartridges. This is because the internal transformer is warming up, which can change the output 5-8%. so please give Annie a dozen or so practice shots before you ‘fire for effect’. Just put these “test 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 blinking blue when the fault is in effect. You will also hear a beeping tone from the Annie.
 - Go grab a cold one and let Annie cool off.
- For high duty-cycle operation, please use a water-cooled coil. Fluxeon also has an 1800W Annie that is all water-cooled and capable of 100% duty-cycle. If you're really into 50BMG and the like, this is something you should consider.

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 take about 10 seconds. For larger cartridges such as this, 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 (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 intense 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.

The Water-Cooled Coil includes 1/4" plastic tubing. Cut to the length desired, and insert the tube into the instant tube fitting on the coil. On connectors that have the blue retaining ring, remove it, insert the tubing, and put the retaining ring back in place. To release, remove the retaining ring, push in the release ring, and then pull the tube out. If you have difficulty getting the tube to fully seat, try putting a little dish soap on the end of the tubing. Push hard!

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.

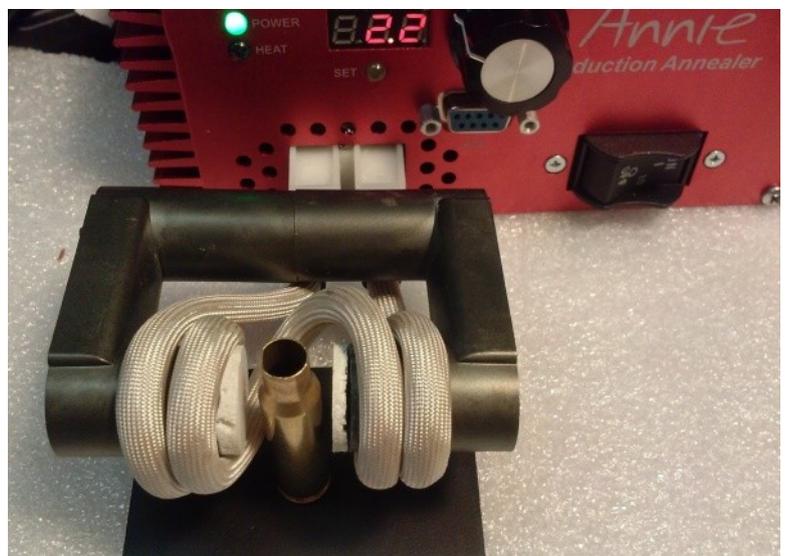
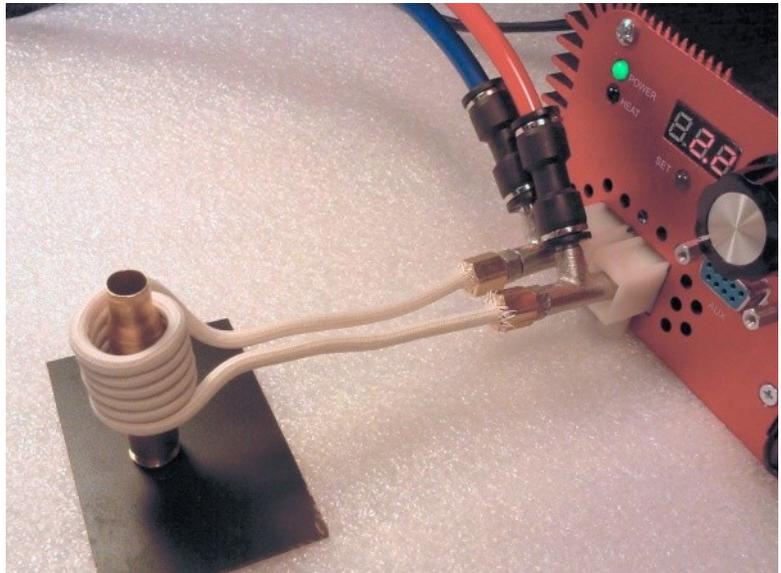
Fluxeon now offers a pump/heat exchanger—please check the web store!

- **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 access from the open side, which some applications or personal preferences demand.

The Annie FC coil kit comes with either a .5" gap, or .625" gap. Choose according to what most closely accommodates your cartridge. It's easy to remove the coil wire in order to change out ferrites for different sized cartridges. The cartridge should be close to, but not touching the sides. If you alternate between the ferrites, we recommend that you also get an additional Litz wire coil. In addition to being more convenient, it will save wear and tear on the fiberglass sleeving.

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.



- **Custom Flux-Concentrator Coils**

These are made for third-party annealers, such as the Annealeez, Giraud, or FW Arms automatic annealing machine. They are used in lieu of a gas torch.

We feature water-cooled versions of the Custom Flux-Concentrator 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.

- **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. There is a 3.5mm jack in the front panel that the foot switch cable plugs into. Don't plug your Dr. Dre headphones into it.

- **The Fluxeon Slap Switch**

This is a large push button mushroom switch in a NEMA enclosure. We noticed that some folks were using the foot switch on the tabletop, and smacking it with their hand to start the timing cycle. So it was suggested that we come up with something more intentional to the purpose. And we did.

The idea is that when you are moving your hands quickly it can become kind of inconvenient to locate and push the start button on the Annie front panel. The Slap Switch is a large button and easy for your hand to find, even without having to look.

- **The Water Recirculator/ Reservoir**

This is to supply pressurized 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 1oz bottle of Anti-Corrosion Fluid concentrate is included. You need only 2 droppers-full 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 internal diameter is very small and easily plugged up. For best results use distilled water.

The pump is not self-priming. Take time to rid the pump cavity of air bubbles by cycling power and tilting the unit. When the air is gone the pump 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 pump on and observe the fluid level. It's likely that the level will drop as the tubing and coil are filled. Just add more.

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

The recirculator also includes a 1oz dropper bottle of corrosion inhibitor. Put 2 full droppers in. The fluid is a custom formulation of our own that prevents scale build-up, reduces surface tension (which makes it flow more easily), and increases thermal capacity. Plus, it's fluorescent red and looks really cool.

Please see the Fluxeon website for the MSDS if you need it.

The current version of the Annie features an internal 12VDC auxiliary power supply. So accessories like the recirculator can be powered simply by plugging in an included cable that connects the pump to the DB9 front panel connector. **IMPORTANT:** only Annies with serial numbers higher than 750 will have the larger internal power supply. Whether you need it or prefer it, you can opt for 12VDC wall adapter when you place your order.

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!). There is also a thermal cutout switch on the internal transformer, but that happens only in extreme circumstances.

The power supply is one factor, but the coil is another major limitation. The FC Coil coil is made up of 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, to be sure. But also, 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.

For heavier, worry-free usage, please consider using 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, many 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.

*Do not use water temperature that is below the **dew point**. If you see condensation on the lines, then there will be condensation inside the Annie. Not good...!

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 ventilation holes are clear and unobstructed. You can always return your Annie to us for a deep cleaning, if desired. We don't charge a lot for that.

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 10%
Operating Frequency	50-90kHz, depending on load	
Standby Watts	33W max, 12W typical	
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 our standard coils. But please don't use the Annie for brazing or heat-treating or anything other than brass. You will break it.

-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 electrical conductor, but we are conduction 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. In absolute terms, the heat load is not great--but it **must** be removed by flowing water.

-Do the coils ever wear out?

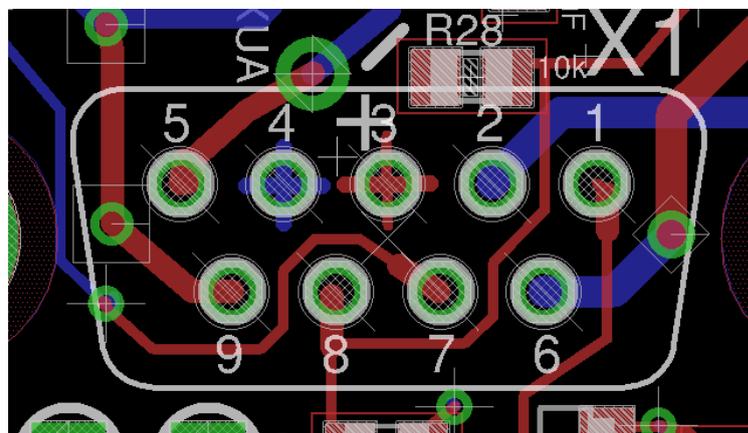
The Annie is a relatively low-power induction heater. We have taken a unit with the same basic circuitry up to 10kW, and there are large industrial heaters that output 100kW or more. While coils for these large systems do suffer metal fatigue due to powerful vibrations work-hardening of the copper, the 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 pin-outs are as follows:

Pin Number	Function	
1	End-of-Cycle pulse 5V+	coming soon!
2	DUMP Solenoid 12V+ 1.5A	coming soon!
3	Power Indication 5V+ isolated	
4*	Isolated Ground	
5	12VDC Pump +pos 1.5A	
6	LOAD Solenoid 12V+ 1.5A	coming soon!
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 an additional 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 may be connected to this- it is a signal only.**

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! support@fluxeon.com

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 is transcribed into a text and sent to the tech on duty. Please speak clearly and slowly so the transcription is accurate. 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, please, 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 also include 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