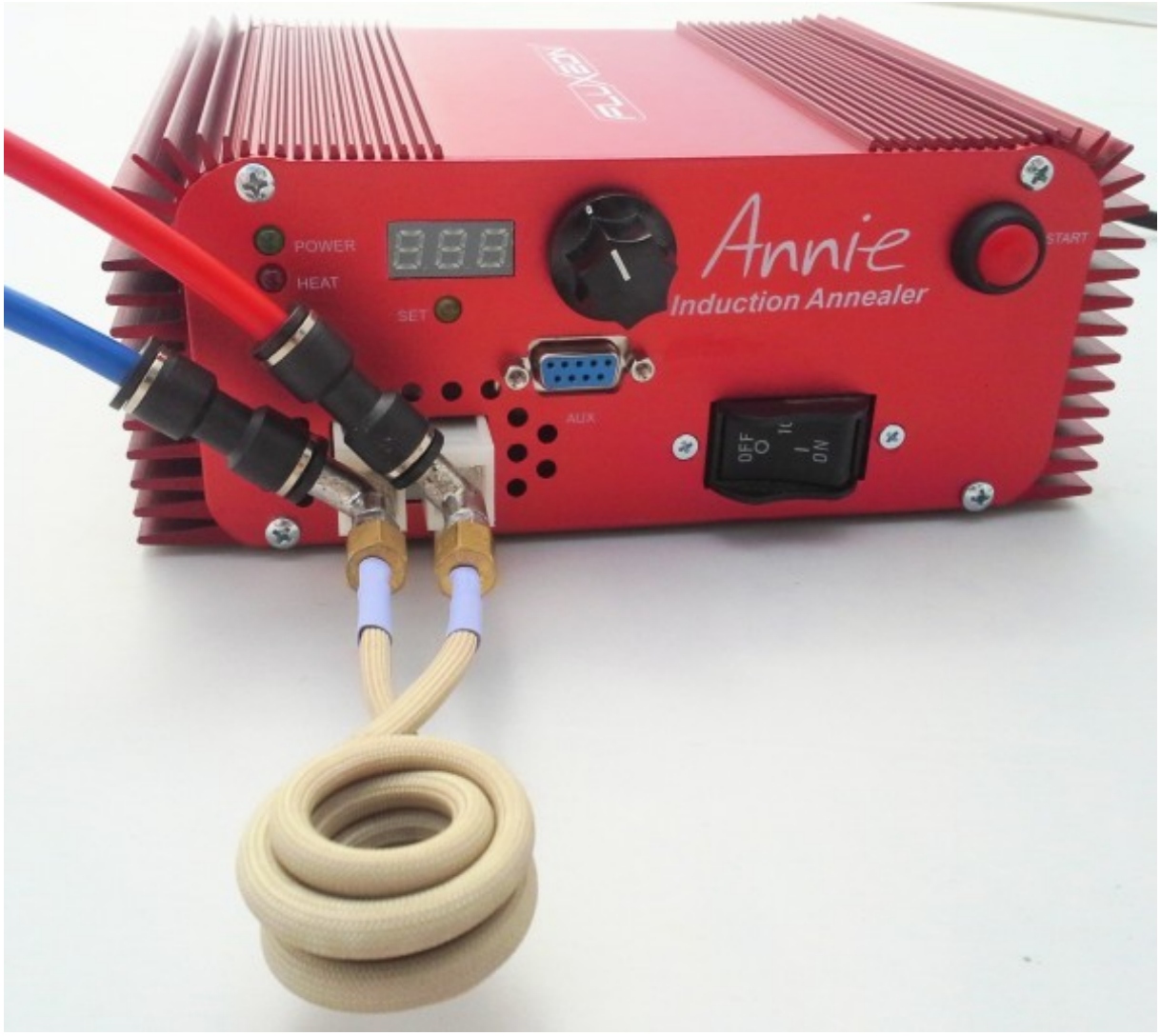
FLUXEON™

Annie™

Brass Annealing Induction Heater



Manual Version 1.91 06/22/26

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 very 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 contact the factory for replacement. We're pretty reasonable about such things.

Introduction

Thank you for purchasing the Annie Induction Annealer! You will soon discover induction heating brass cartridges 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 power cord to the IEC power inlet at the rear. Next, attach the work coil to the front face terminal. Make sure it is **fully inserted-no gaps** should exist between the connectors. Never change the coil while the Annie is powered on, even if no heating is taking place.
- 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 jack.
- Attach the Foot Switch or Slap Switch to the front panel jack just below the DB-9 connector and place 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 and void your warranty.
  - **MAKE SURE THE COIL IS 100% INSERTED WITH NO GAPS.**

    IT MAY BE DIFFICULT, BUT PUSH HARD!
- **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 999 seconds. Most cartridges are annealed in under 3 seconds, 50BMGs in about 10 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 and Slap 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 3W 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 no need to 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 a "Power On Self-Test" (POST). All LEDs will flash and you will hear a short beeping from the overtemp sensor. The recall the time from the last session will show. You will hear the 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 speed up. 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.
    - Note: **"0.0" seconds is a special setting**. This allows for 'momentary' operation wherein heating will take place as long as the button is pressed. This also allows for the use an external timer, or integration with a logic controller.
- **The Annie has both simple single segment or an advanced quartic timer firmware versions**.
- Press the encoder (dial) for three seconds to select between Simple Single Segment and Advanced Quartic modes. You will see on the display "SSS" or "Adv" as indication of which mode you are in. Your selection will be remembered between power cycles.
    - **Simple Single Segment** has one setting—you guessed it! Heating duration. Set to the desired time by pushing IN the knob. The yellow 'SET' light will come on. Turn the dial to your desired time, and press again to lock it in.
    - **Advanced Quartic** has 4 timing segments: two for relay-out functions, one for induction heating time, and one for pause between cycles. The induction heat comes on with the third segment. The second and fourth segments turn on separate relay outs, providing 12VDC @1.5A for the purpose of facilitating automation schemes. For example, a simple trap door can be integrated by connecting a linear solenoid to segment 4 output. more complex systems can integrate an additional trap door that advances the next cartridge.

      Segment 1: Delay only. Nothing happens for this duration.

      Segment 2: pins 5 and 2 close, energizing the first 12v relay-out for this set duration.

      Segment 3: Induction heat on time

      Segment 4: pins 5 and 6 close, energizing a second 12v relay-out for this set duration

      A 100ms 5V pulse will present to pin 1 (pin 4 ground). this timing segment cannot be changed. Most users will simply ignore this feature.

      To set the time, press and release the "SET" knob ("set" LED illuminates) and adjust the time as necessary. Press SET again when you have your desired time displayed to lock it in. The time setting for the next segment will now display. Repeat for segments 2, 3 and 4. When all 4 segments have been entered, the set LED will go out.

- **For simple trap door operation:** this timing scheme can open up a trap door after the induction heat is finished. This is easily done with a 12VDC linear solenoid.
  - Press SET, set time to 0.1 seconds
  - Press SET, set time to 0.1 seconds
  - Press SET, set **ANNEAL TIME**
  - Press SET, set time to approximately 0.5 seconds. You just want enough time for the cartridge to clear the mechanism. Programming is now finished, and SET light goes out.
  - The START button must be pressed for each cycle.

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

DETONATIONS ARE NOT FUN

- 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 segment 3 anneal time 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. Some fine-tuning may be necessary.
  - THE IDEA is, you are in control of the process. We recommend that you establish a baseline with the Tempilaq information. Anneal 10 cartridges or so. Adjust the time up or down, and do more batches of 10. and, get to the range, and make note of the grouping. That's the most important thing, right?
- If you desire additional cycle speed, the Fluxeon Universal Foot Switch or the Slap 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 tweezers.
- 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 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 **Super Annie** that is all water-cooled and capable of 100% duty-cycle. If you're really into 50BMG or you are cycling thousands of cartridges in an automated setup, this is something you should consider.

Heating Times

Most shouldered cartridges up through .30 cal and straight walled pistol cases will anneal properly in about 1.5 seconds. Shouldered cartridges larger than .30 cal will require more time. A 50BMG, for example, will take about 10 seconds. 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. Simply paint a line on the cartridge with Tempilaq®. It will turn from a chalky appearance to translucent, exactly at the stated temperature. You are looking for *translucent*, not *blackened*.

Tempilaq® is available in 750F, 800F, 850F and 900F.

- ## 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 front panel terminal block.

You can position the water connections however you like—the copper is flexible. But if you make frequent changes you should consider using a lab jack (scissors lift).

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 or red 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!

- **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 2,250 strands of individually insulated 40AWG magnet wires, with a solid copper 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 comes with either a .5" gap, .625" gap or .75". Choose according to what most closely accommodates your cartridge. The cartridge should be close to, but not touching the sides.

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, SASSYBrass, or FW Arms automatic annealing machine. The Annie replaces the 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 pushbutton 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. It was suggested that we come up with something more suited to the purpose. So 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 an 80mm radiator integrated into the Annie base unit, and makes use of the internal 80mm internal fan. A reservoir with a pump and power cable connects to the front panel DB-9 connector for power. Alternately, you may select to use a wall power adapter that can supply 12VDC and 1A. A 1oz bottle of Anti-Corrosion Fluid concentrate is included. This corrosion inhibitor protects the aluminum and copper surfaces, which removes heat more efficiently by decreasing surface tension and preventing oxide buildup.

For corrosion inhibition in addition to inhibition of biological contaminants, use at least a 40% concentration.

The water recirculator now features a 250ml reservoir. This better handles issues like expansion from heat, while also giving the user an immediate visual indication of the coolant level.

The setup is simple. Tubing connections should be in this order:

-center outlet comes from the pump. Connect that directly to one side of the coil (does not matter which).

-Next, the tubing will connect the other port on the coil and go to the LOWER port of the radiator on the rear of the Annie.

-the last leg is from the top connection on the radiator back to the reservoir.

Use as much or little tubing as you like. But it is important to keep the reservoir at or above the level of the coil, or else you may have leakage by gravity. The reservoir can be placed in a remote location if desired.

The tube fittings are 'instant tube'- just push the tube into the fitting until you feel it seat. Repeat for all connections. PUSH HARD—you will feel it when it seats.

Do not add the corrosion inhibitor until you have verified that all the connections are correct and leak-tight. It's tinted red, which may stain certain counter-tops.

Connect the power cable to the front panel connector cable, or to the wall adapter. You may need to work out some of the air trapped in the pump housing. This is done simply by cycling power to the pump a few times. When the air is gone the pump will be virtually silent.

Now, if you ever begin annealing and happen to see the plastic tubing jumping around when heat is applied, that is from water boiling inside the coil tubing. Either the pump is not turned on, or you have a clog. If you suspect a clog, try reversing the connections at the pump.

Some Notes About Duty-Cycle

The Annie has about a 75% duty-cycle. What does this really mean? **At 100% power, it can only be heating 2/3 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.

The power supply is one factor, but the coil is another major limitation. The FC Coil coil is made up of 2,250 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 duty, 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 covers are clear and unobstructed. The easiest way to clean the filters is with a shop vaccuum. 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!)

Troubleshooting

Please never open up the Annie. Even with the unit off, there can be lethal voltages present in undischarged capacitors.

The Annie is secured with tamper-evident seals. If we get a unit back with broken seals, your warranty will be null and void.

As such, just about any problem you have with the Annie will require a trip back home for repairs. We're pretty quick about fixing Annies.

Specifications

Rated input power	1200W	1200W
Rated input Current	10A	5A
Operating voltage	120 VAC ±10%	230V ±10%
Operating Frequency	50-90kHz, depending on load	
Standby Watts	34W max, 4W typical	
Ambient operating temperature	50 – 110 deg F	
Storage Temperature	-10 – 160 deg F	
Temperature Cutout	70C	
Duty cycle	Approximately 75%	
Maximum operating temperature	70 deg C.	

Frequently Asked Questions

-Why does my Annie stop heating when I release the start button?

You probably have it set to 99.9 seconds, which is a special setting that enables 'momentary action'. Set to any other time and it will function normally. (Note: on legacy units the setting is 20.0)

-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, unless you discuss your application with us first. You will likely break it, otherwise.

Note that Fluxeon has recently upgraded the coil connection terminal block to use the Anderson PowerPole spring-loaded connectors. The old system will be referred to as 'Legacy'.

-Is the Annie electrically dangerous?

No. The output is less than 75V. 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 1,000kHz, 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 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. In absolute terms, the heat load is not great--but it ***must*** be removed by flowing water.

-Do the coils ever wear out?

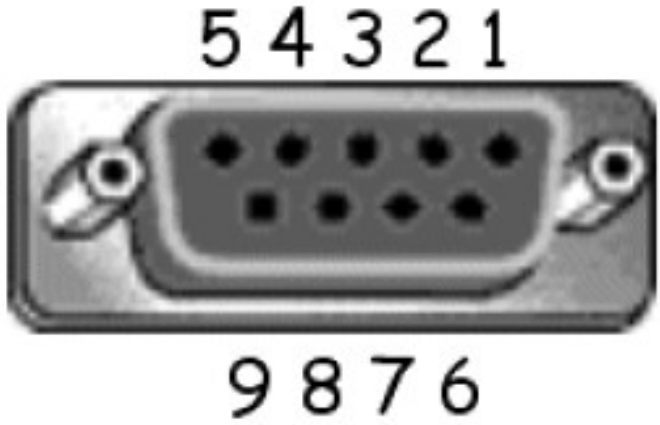
The Annie is a relatively low-power induction heater. We have taken a unit with the same basic circuitry up to 10kW, and there are large industrial heaters that output 100kW or more. While coils for these large systems do suffer metal fatigue due to powerful vibrations work-hardening of the copper, the 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+	
2	LOAD Solenoid 12V- 1.5A	
3	Power Indication 5V+ isolated	
4*	**Isolated Ground**	
5	**12VDC Pump +pos 1.5A**	
6	DUMP Solenoid 12V- 1.5A	
7	Unused	
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 connection cannot be closed 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 for 50ms 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

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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 support@fluxeon.com. We try to respond to requests within four hours 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.

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