



# USER MANUAL

## ARC ALPHA ANNEALER

Thank you for purchasing our product,  
designed, and built with passion.

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## 1. Caution!! ..... Safety Notice

- This appliance is not intended for use by persons (including children) with reduced physical, sensory, or mental capabilities, or lack of experience and knowledge, unless they have been given supervision or instruction concerning use of the appliance by a person responsible for their safety.
- Children should be supervised to ensure they do not play with the appliance.
- Do not leave the appliance powered and un-attended.
- This appliance is for indoor use only.
- Do not obstruct the ventilation.
- This appliance is intended to anneal brass cases for reloading.
- Do not operate the appliance near a heat source or block the ventilation openings.
- Do not use near magnetic sensitive devices.
- Do not use near water or wet conditions.
- Do not operate or touch with wet hands.
- Do not open the Annealer, High and hazardous live voltages inside.
- Refer all servicing or repair to qualified service personnel only.
- Before replacing the fuse, identify and fix/repair any problems. It is best practice to contact us before replacing the fuse.
- ***The Annealer will heat the brass cartridge (neck and shoulder at least) to about 500°C. Do not handle with bare hands.***

## 2. General Information

- Our YouTube Channel:  
<https://www.youtube.com/channel/UCSdgn0gXjikkfEKTh3lqUuQ>
- On Facebook:  
<https://web.facebook.com/ARCPrecision/>
- Email: [info@arcprecision.net](mailto:info@arcprecision.net)
- Web: <https://www.arcprecision.net/>

## 3. Operating Voltages and Fuse

The ARC Alpha Annealer operates on 230V 50Hz AC and was tested as such. It is a 600W appliance and the current usage will vary dependant on cases annealed.

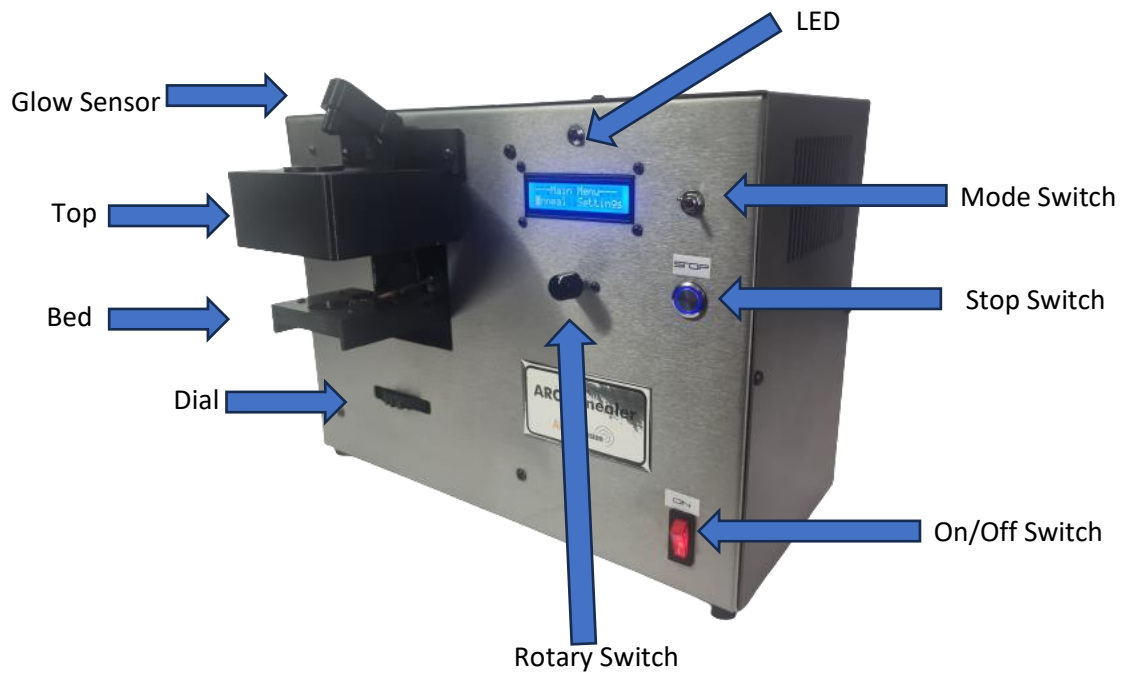
**Operating Power:** 230V AC nominal, 50Hz, Maximum 600 Watt

The following test results for indication only:

| Supply Voltage | Idle Current | Anneal Current |
|----------------|--------------|----------------|
| 239 V          | 0,27A        | 2,81A          |

The fuse installed at 230V is 3.15A slow blow, 20mm standard fuse.

## 4. User interface



### 4.1. Glow Sensor

The Glow Sensor is an optical sensor, detecting glow levels during heating and annealing. It is fixed into position for optimal performance. The Glow level can be adjusted.

### 4.2. Top

The Top houses the induction heating coil and is fixed. The top also houses the detector for detecting when a case is loaded.

### 4.3. Bed

The Bed is movable upwards and downwards by turning the dial to the left or to the right. Be aware of minimum and maximum settings, do not force outside of the limits when maximum or minimum height is reached.

The bed houses the drop mechanism by means of a servo controlled sliding door.

### 4.4. Dial

The dial is used to adjust the bed height with a screw mechanism.

### 4.5. Rotary Switch

The rotary switch is used to adjust by turning or pressing during use. When turned it will either change a value or move between options. Press to select.

#### 4.6. On/Off switch

Used to switch AC supply on or off to the Annealer. The switch is lighted in the On position. This is a secondary On/Off Switch. A second mains switch is situated on the back side as part of the Main AC input assembly. Switch the main switch at the back of if intended not to use the Annealer for longer periods as a safety pre-caution applicable to all electrical equipment.

#### 4.7. Stop Switch

This is a push button switch. Pushing the Stop switch will open the drop door and stop any annealing if active.

#### 4.8. Mode Switch

This is a 3-position toggle switch. Use this switch to toggle between None, Time or Glow mode.

#### 4.9. LED

The LED will flash during Annealing. The Led will also briefly light during the start up sequence.

#### 4.10. Feet

Alpha is supplied with qty 8 of 3D printed feet, suitable for the most common cases. These can be customized by users and the 'recipe' is not a secret. The case should not spend enough time on the bay for the heat to spread to the bottom of the case and burn the feet but accidents to happen.

Contact us for more feet or the ".STL" files for printing at your local 3D Shop.

Always make sure the case falls free through the feet by loading a case and pressing the stop button.

## 5. Operation

### 5.1. Switch On

- Ensure the AC Mains switch is switched on at the back. This switch is part of the AC Mains input assembly.
- Switch the on/off switch, when switched On, the switch will be illuminated in the on condition.
- A self-test is performed during startup, including a servo test to ensure a functional drop mechanism.
- The main screen is displayed when the self-test is completed.
  - During start up observe the following sequence:
    - LED lights briefly.
    - The product name is displayed.
    - The total number of anneals is displayed together with the current Glow setting. The total number of anneals

- increment automatically and the user does not have access to this total.
    - The Time setting in milli seconds and current resonator temperature is displayed.
    - The Main screen is displayed.
- The main screen displays two options, a) Annealing and b) Settings.
- The user to navigate between options and select by pushing the rotary switch.

## 5.2. Settings

- Select the Settings option by tuning the rotary switch whilst in the main menu and press the rotary switch button.
- Navigate between Glow and time.
- Once Glow or Time is selected by pressing the rotary switch button, the next screen will display the current related value.
- The value can be altered by rotating the rotary switch once again.
- Press the rotary switch to accept the setting and go back to the settings screen.
- Navigate to Back within the setting screen to exit the Settings screen back to the Main menu.
- Once settings are accepted, the new values are stored in volatile memory.

## 5.3. Anneal

- Select Anneal in the main menu by pressing the rotary switch.
- The drop door will always open when reaching the Anneal screen. This is to ensure the bay is empty.
- Alpha will prompt the user to switch no centre position if not in the centre position when reaching the anneal screen.
- Always ensure that the Mode switch is centred/middle position when not in use.
- Select mode, the mode to be displayed on the screen after selection.
- Upon dropping a case, the sensors will detect a loaded case automatically and start the anneal process.

\*\*\*\*\*

**Caution: Always check and ensure nothing obstructs the light path as that will enable the anneal mode without any case in the bay. This will damage your annealer.**

**There are light sensors at the bottom of the Top. These sensors sense when a case is loaded and will start the anneal process.**

**It can happen that a foot might come out during the operation and obstruct the light path.**

**Press STOP immediately in this case to cease annealing.**

.....

- Upon completion the drop door will open to drop the case.
- Do not touch the dropped cases as they are still extremely hot, wait for the cases to cool down to ambient temperatures before handling.

## 6. Additional Information

Many users anneal to extend case life, while others do so to achieve greater consistency in velocity and accuracy. For this reason, it is crucial for reloaders to follow a consistent process when reloading, avoiding numerous changes from one reloading session to another. The same principle applies to annealing. Define and maintain the same process, making adjustments, only when necessary, and ensure that the expected outcomes align.

Below are some basic principles that can assist with the annealing process and the use of the ARC annealer:

### 6.1. Applying heat

Keep in mind that when heat or energy is applied to the neck of the case, the remainder of the case, which remains at ambient temperature, will absorb the heat. As a result, anneal time will vary depending on the starting temperature of the case. It takes less time to heat a case from 40°C to 400°C than from 10°C to 400°C.

The ARC Annealer features a **Pre-Heat cycle** that increases the case temperature before annealing, greatly improving the process. The neck provides coaxial stiffness and some resistance to the release of the projectile. The more consistent the neck pressures, the more consistent the velocities will be, assuming all other requirements are met. Although efforts are made to ensure a homogeneous alloy, variances can still occur, sometimes visible as black spots in the annealed region if a case is significantly over-annealed. These variances contribute to inconsistent annealing results, as they can vary from case to case and are brand dependent.

Many users rely on discoloration as an indicator of proper annealing, which can be a considerable mistake. After thousands of annealing sessions, it has been noted that some brands (even expensive ones) do not give consistent discoloration. However, inconsistent discoloration is not necessarily a bad thing. It's merely an observation and a cautionary note if you rely on this method. Discoloration is only an indicator of the anneal results. If the glow were the same for all cases, the hardness should be the same for all, as the glow serves as a consistent giveaway.

#### 6.1.1. Height control

Review other information given in this document in conjunction with this section.

Being able to apply heat in a very specific region is advantageous. The disadvantage is that it would be opposing the objective to even try and provide for some fixed or height settings/table.

In some instances, heat is applied below the neck with a spread upwards to the thinner neck region whilst in more traditional cases heat is transferred from the neck downwards. It is this specific control and advantage that leaves some options open to the user.

The key information is to note the hole both side into the core inside the top which is the centre of the magnetic field. In most cases placing the case with the neck slightly above the centre should work fine or would be a good starting point.

### 6.1.2. Glow control

Review other information given in this document in conjunction with this section.

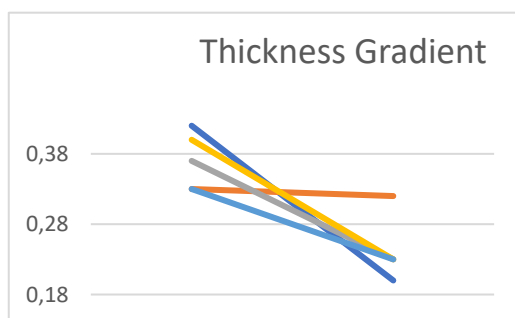
The default setting is 950 and this is a good starting point while you are getting used to your annealer.

A lower setting relates to more heat and a higher setting to less heat.

## 6.2. Thickness gradient and Thermal Centre

Cases can vary significantly in construction, particularly when comparing older calibres to more modern ones. Older calibers tend to have a gradually decreasing thickness, starting from the head and becoming thinner towards the mouth. In contrast, more modern calibers like the 6mmBR have a thickness gradient that reduces more rapidly than traditional cases. The thickness gradient measures the thickness before the shoulder and at the mouth, which are the regions applicable for annealing. Additionally, the shoulder region in modern cases can differ in length from that of traditional cases.

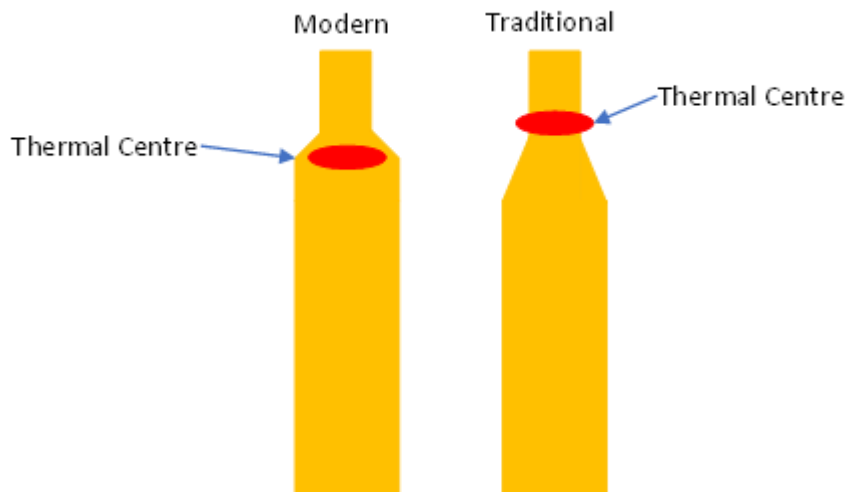
Take a look at the following thickness gradients.



The very steep gradient is that of 6mm BR, the same is applicable to the WSM.

Given the differences in case construction, heat flow or distribution will vary when heat is applied at the neck, depending on the case style. For traditional cases, applying heat in the neck area is adequate, but for those with a steep thickness gradient, it is necessary to position the case higher to achieve an even distribution between the neck and shoulder. In such cases, the Thermal Centre is located much lower, allowing the heat to flow more effectively from the shoulder to the neck, rather than from the neck to the shoulder.





### 6.3. Annealing Area

The following test was conducted to visually demonstrate the stretch that is annealed and provide explanatory images for users. In this test, the Time Based setting was set to 9 seconds (maximum time), and heat was applied to the case body by setting the bed at an unusually high position, enabling the achievement of these results.

The accompanying images show the case before annealing. For this test, the case was loaded at an abnormally high position, with the neck protruding approximately 6 mm, to allow for annealing the case body for visual demonstration. In the final image, after a 9-second anneal, the annealed stretch is visible, showing a reach of 40mm.



These test results help users understand what to expect while determining the appropriate bed height and the width of the heat application area from induction when the case is positioned in the bed.

It is important to note how the heat has spread to the neck area during this test, due to the extended annealing time. This visualization gives users valuable insight into how the annealing process works and how adjustments in height and time can impact the heat distribution across the case.

## 7. Specifications

**Size:** 37cm Wide, 27cm Deep(Length), 27cm High

**Power:** 220V, 50Hz, 600W maximum, a 3.15A 20mm SB fused used.

**Cartridge:** max 100m long and 18mm wide at base. Contact us for your custom product should your requirements fall outside of these specifications. WE try to accommodate as many as possible.

**Duty Cycle:** 50% maintained during Auto Mode

**Temperature:** Shut Down above 65 °C