



## ORION FAQ

**Q: Can I use any attachment while in Tack Mode?**

A: NO: the pulse arc welding stylus should never be used while the Orion is in Tack Mode.



However, any other attachment can be used. Attachments sold as “tack” welding attachments have been designed to transfer more power to the weld. This helps the Orion work as not only a tack welder, but as a permanent fusion resistance welder.

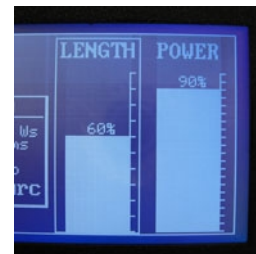
**Q: Can attachments labeled “tack” be used with the pulse arc welding stylus?**

A: Yes\*: The pulse arc welding stylus requires an electrical contact to the work piece. Tack welding attachments can be used for this purpose.

\*Please note that tack welding attachments will also transfer more power to the arc when used for Pulse Arc Mode. This means that you should use lower power settings than you would need with pulse arc attachments.

**Q: I want to get the most power possible out of the Orion. What can I do?**

A: The Orion is designed to deliver a tremendous amount of power in Tack / Fusion Mode. You can use up to 10AWG cabling to deliver more power to the work area. Using larger cabling (smaller AWG cable size) may damage the welder and will void your warranty.



**Q: Can I make my own welding attachments?**

A: Yes, the Orion welder is very versatile. You are welcome to make your own pulse arc and tack / fusion welding attachments. Please consult your Orion manual to ensure that you do not exceed manufacturer's specifications. 10 AWG is the largest cable that should be used with your Orion welder. The 10 AWG cable should not be shorter than 3.5 feet (1 m).



**Q: Can I make permanent welds in Tack Mode?**

A: Yes, the Orion has been designed with Sunstone Engineering's industrial spot welding (resistance welding) technology. By turning up the power and using tack welding attachments the Orion is a full fledged resistance welder, often called a fusion welder.

Alternatively, by using low energy or small cabling, the Orion will act as a temporary tack welder. This temporary tacking allows positioning of a weld piece before permanent welding in Pulse Arc Mode or Micro-Pulse Arc Mode.

**Q: What materials can you weld with the Orion?**

A: The Orion has designed to weld a wide variety of materials. Some examples include gold, silver, platinum, palladium, steel, stainless steel, titanium and virtually all other precious metals. In addition, cobalt alloys, aluminum, tin, brass, EVEN copper can be welded with the Orion.

Even with an ideal welder, some materials and alloys will be difficult to weld. Furthermore, some materials such as zinc should not be welded because they may produce fumes that will make the welding technician sick. Pulse Arc welding of solder is also not advised because of its low melting temperature. Solder will vaporize easily and leave your work piece looking blackened or burnt.

**Q: Can I build-up or add material to a weld location?**

A: Yes, the Orion is very versatile. In Pulse Arc Mode, filler wire can be used to add metal to a weld location. In Tack Mode, filler wire or sheet filler can be permanently affixed to a location.

Wire sizes up to and greater than 1mm in diameter can be added. However, the user should select wire diameters that match the size of the feature being welded. Users should also select wire with similar material to that of their work piece. For example: when retipping a gold ring, 0.25mm gold filler wire is an excellent choice. If filling a large gap in a steel work piece, 1mm steel wire may be more suitable. The Orion has the power and versatility to do weld both of these, and many more applications with ease.

**Q: Can the Orion weld silver?**

A: Yes, the Orion has been specifically designed with the more difficult-to-weld materials in mind. Silver requires appreciable power for a sustained period of time. The Orion has enough power and capacity to make quick work of your silver applications.

**Q: Can I weld different (dissimilar) metals together?**

A: Yes, in many instances different metals can be welded easily together with the Orion. In pulse arc welding the weld spot location becomes a new alloy of the two primary metals (this new alloy will adopt new properties that may be better or worse than the primary materials).



Dissimilar metals can also be joined in Tack / Fusion Mode. Again, weld strength and properties will depend on alloy properties.

**Q: How do I determine the best power settings for my particular weld application?**

A: In Pulse Arc Mode metals will weld according to thermal conductivity and melting point. For example, a metal with lower thermal conductivity (e.g. stainless steel, titanium, cobalt alloys) will weld easily because the weld heat stays concentrated in the spot. Therefore, less power is required to weld one of these metals (of the same thickness) than other metals that have a higher thermal conductivity.



Metals with higher thermal conductivity (e.g. copper, silver, gold) will require more power to create the same spot because much of the heat is conducted away quickly.

The melting temperature of the metal is also very important when determining the necessary power setting for a weld. Knowing the approximate or relative melting temperature of your working metal will enable you to estimate the amount of energy required to create a spot. High melting temperature translates to a large amount of energy required. Low melting temperature translates into a smaller amount of energy required to make the weld.

In Tack Mode, power is important but there are two other important factors that need to be remembered. These factors are electrical conductivity and contact pressure. In Tack Mode the Orion is a full fledged resistance welder. This means that the Orion uses a metal's electrical resistance to create the weld heat. Metals that conduct electricity well (e.g. copper) are more difficult to weld in Tack Mode and require special Tack attachments to obtain a proper weld. The second important factor when in Tack Mode is the weld contact pressure. The weld contact pressure can be controlled by how much force you apply to the two pieces that are being welded together. The harder you push the pieces together the lower you make the electrical contact resistance between them and the lower the created heat. Conversely, light pressure will result in high contact resistance and high heat.

For all welds, the size and thickness of the metal will play a significant role in the power settings that you choose. Orion Jewelry Welders recommends that users start at a low power and work upwards until an appropriate power setting is found. Please check the Orion Jewelry Welders forum for job specific power setting information and please post your preferred settings as well.

**Q: Can I weld right next to a ruby, diamond or other precious stone?**

A: Yes, the Orion welder is capable of incredibly fine energy adjustment and weld heat is very localized. These combinations of factors allow welds to be placed very close to precious stones. The Orion requires electrode to metal contact in order to create a weld; therefore, making contact with the stone inadvertently will not cause the welder to fire upon your precious stone. Orion Jewelry Welders does recommend that any user practice sufficiently prior to performing work next to a precious stone of significant value.



**Q: Will I contaminate my base material with the tungsten electrode?**

A: There is a possibility of tungsten contamination when the Orion user forces the welding electrode into the weld material. However, with proper practice using the pulse arc welding stylus contamination is very unlikely.

**Q: Do I need to use Argon to weld?**

A: Argon is necessary to produce a clean and repeatable pulse arc weld. Without protective argon, oxygen may combine with the weld metal to produce brittle and porous welds.

In Tack Mode, however, protective argon is not necessary.

Other protective gases can also be used, such as pure nitrogen. However Orion Jewelry Welders recommends high purity argon. This can be purchased at your local welding supply shop.



**Q: How do I control weld spot size and weld depth?**

A: The simplified answer: Your weld power adjusts your spot size while your weld time controls penetration. In reality both of these factors (power and time) influence both welding characteristics (spot size and weld depth). However, the above rule-of-thumb will allow good and intuitive control of your welding parameters. It is also important to keep your tungsten electrode sharp to maintain precise control over the characteristics of the weld spot size and weld depth.



**Q: How hot will my work piece be?**

A: The Orion is capable of extremely fine welds in Micro Mode. In Micro Mode, or low power settings in Pulse Arc Mode, small amounts of energy are added and cause virtually no heat to be added to the work piece. During small welds involving little energy it is possible to hold the work piece in hand. For applications that require higher power, the Orion is capable of adding up to 150 Joules of energy to a weld. In Pulse Arc Mode this can be a significant amount of heat and small parts may become extremely hot! Until the user is familiar with the welding characteristics of the Orion, we recommend holding all parts with the pulse arc attachments (e.g. alligator clip) and not with your fingers.

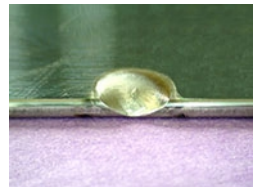
**Q: What are the smallest and largest spot size achievable?**

A: The answer to this question depends greatly on the material being welded. However, spot sizes of down to 0.1 mm and up to 4.0 mm are typical and simple to implement.



**Q: How deep can my pulse arc weld penetrate?**

A: As stated above the answer to this question depends greatly on the material being welded. However, spot depth of down to 1 mm can be achieved.



**Q: How long will electrodes last?**

A: Under normal use electrodes will last for approximately 2,000 welds. To ensure that you get the most life out of your electrodes use argon gas for pulse arc welding and maintain a sharpened electrode tip during the welding process.



**Q: Are there special joint preparations needed when pulse arc welding?**

A: Pulse arc joint preparation is very similar to that of general “tungsten inert gas” – TIG welding. Some different types of weld preparation include the simple “I” seam (but joint), X, Y and V joints (named for the way they look). The “I” seam may require no filler material, while the X, Y and V require filler material and may require successive layers of material to be added to the joint. For joints where the Orion can penetrate approximately ½ to ¾ of the way through through the material an “I” seam may be appropriate. All solder should be removed from the joint.

**Q: Are there special joint preparations needed with tack/fusion welding?**

A: Just as in pulse arc welding all solder should be removed if a strong metal to metal tack/fusion weld is desired. Tacking can be used to weld solder in place or to temporarily tack a work piece to a solder layer.

**Q: Can I use Tack Mode to place solder granules or pieces before a soldering torch is used?**

A: Yes, this is a very simple process. A variety of hand pieces are available depending on your work piece characteristics.