Setup.

When I first get a machine, or work with someone that has a machine, I check a few things:

1. Length of the electrode, as it sticks out of the argon stylus, when the nose cone is on. The electrode should be about 4mm long, as it sticks out. If it is longer than this, then the speed at which the argon gas is dispersed from the nose cone is in competition with the speed that the weld takes to be delivered. If the electrode is longer than 5mm, then you will see an increase in 'soot' around the weld site, and your welds will be brittle (or more brittle than you really want).
2. Pressure of the Argon. This is checked in two places (on most machines). You can look at the actual regulator on the tank, and see what the dial says (the side that reads the pressure to the line). And on most machines, you can look at the touch screen to see what the actual unit is registering as pressure that are hitting the check valves. I use the second as gospel, when I can. On most Orion's, you will want about 12psi to read on the screen. If this number gets above 20, there are safety valves that will cut all argon pressure off, so be sure to stay at about 12. Another reason for 12psi is for the shape of the inside of the nose cone. The shape is such that if you put a higher or lower velocity of pressure through the nose cone, it causes 'turbulence' in the argon flow. If you disrupt the 'smooth' flow of argon, as it comes out of the nose cone, your argon will 'billow' and suck oxygen into the mix and you have a lower quality of argon coverage. Less is not always better, if people think that they want to 'save' argon, with a low flow.
3. Energy levels. With each machine, I like to 'reset' the machine to factory settings, and then go through each of the buttons on the screen with them. This puts us all on the same page, as we begin to weld. If I don't do this, there can be any number of settings that might be off from what the factory set them at, that can affect the weld and the weld quality. When it comes to the amount of power, I make about 80% of my welds (with any Orion) at about 12ws of power. This level of power offers the energy that I need to melt most of my favorite wires, the base metal that I'm welding to, and it does not seem to affect the actual chemistry of the metal that I'm working on.
4. Favorite wires for adding metal. On most items that I work on, I prefer a 26 gage wire. I like to work with the same metal that the base item that I'm welding on is made of, so that the metals will 'mate' together naturally, and we are not making a new alloy for us to deal with. Sometimes this is possible, sometimes it is not. I carry a 26 gage fine silver (soft round) and a 26 gage 14k gold wire, wherever I go. Smaller gage wires can be done, but the balance of energy needed to melt the base substrate and the small wire require some testing and experience to achieve optimal results. The same goes for larger wires in my experience. The larger item in the equation of welding seems to require the most energy, and if the balance

needed is to different, the smaller of the two items can absorb to much energy, and will react in a way that you don't want.

5. Electrode placement. This is important, especially when welding items of different sizes. I have two favorite electrode placements. My first is to place the electrode at a 45 degree angle, between the base item and the 26 gage wire. If this does not give me what I want, I will place the electrode at a 90 degree angle, in reference to the base piece. There is more to it than this though. I don't let the tip of the electrode touch the base item. Instead, I will have the tip of the electrode ride on the side of the wire that I'm adding. What I mean by this is while the electrode is at a 90 degree angle, I touch the side of the electrode to the wire and hold the tip about 1mm above the surface of what I'm working on. What I find that this does for me is that the energy leaves the electrode, but as it leaves, it jumps over to the wire, grabs metal, and then slaps it down on the surface of whatever I'm working on. With these two techniques, I find that I'm able to do about 90 percent of what I need to do, with the welder.

Gold

1. With gold, I have one real rule of thumb, cut the time (ms) in half. In most of the world, people are using 10k or 14k gold. Gold likes to be melted, but it doesn't want to be over melted. I find that if I over melt it (or have the time to long) the gold will melt and then run like lava from a volcano. I don't want it to run, so when I shorten the time, it gives it the amount of energy to melt it, and it stays where I melted it. This being said, when I work with 18k and 22k gold, the time becomes less of a concern. Gold likes a sharp clean electrode in most cases.

Silver

1. The biggest trick that I find works with Silver is to blunt the electrode. After you sharpen the electrode, I take it to the diamond wheel, put it at a 90 degree angle and just 'scratch' it across about 10 times. It wouldn't seem that this is a big deal, but with silver it is an energy hog. If I us a sharp electrode, the silver will not release any of the energy, and will accept it. if I use a sharp electrode, the silver will have to release the surface tension on a scale that I don't like, so that the energy can 'dig in' and provide itself a greater amount of surface space to accept the energy. If I take a moment and 'blunt' the tip, then that seems to do the trick of giving the silver a broader surface to accept the energy from, so that it doesn't have to release the natural surface tension. When using a sharp electrode on silver, it can often look like when a meteor hits the earth, it digs in and splashes out, and makes a mess. Blunting the tip seems to help me a lot in this area.

Platinum

1. Platinum is so heat resistant that I have to 'light it up like a cherry'. I know this sounds dumb, but what I mean is I have to really focus the energy and provide more energy than most other metals, so that I can melt it to the core and let it all solidify at one rate. The Orion 150i and Orion 200i2 seem to do this the best, in my opinion. The key to welding platinum is the energy and the agitation. Depending on the diameter or size of what you're working on, the levels of power have to be elevated as compared to other metals. You read earlier that I like to weld at about 12ws on most items. For platinum, this is not true. If I am welding on a piece of platinum that is 3mm wide and 2mm thick, with an Orion 150i, then I would set the power at 90ws and on full agitation. The real trick is melting to the core. The platinum holds the heat in tighter than other metals. If you don't use higher energy levels, your only melting the surface. It might look good to the eye, but once you sand or buff it, you reveal your problem. By using the higher energy levels, you melt it to the core, and it can all solidify at the same rate, giving you a strong and solid weld. Platinum likes a sharp clean electrode.

Brass

Brass has a whole list of challenges, not beginning with no two brasses seem to have the same mixture of alloys or zinc in them. Also, it depends on if it is a 'cast brass' or an 'extruded brass'. There are so many things that play in here that I don't think I could begin to offer help. Let it stand that we can weld brass, but each sample is unique and needs attention on that level.

Bronze

I find that Bronze and White Bronze react positively to our welders. I treat them like Silver or Gold, and use low power and no agitation at first, and increasing as I need.

Copper

Depending on the quality of the copper, you can't guess if a sharp or a blunt electrode, agitation or no agitation, will be best. I find that copper takes several test welds, to determine the weld qualities needed to make it happy.

Stainless Steel

Stainless Steel generally welds with very positive results. One key to welding Stainless is the agitation. When welding stainless steel, you need more heat than other metals, because it is a harder metal. By using the agitation you are able to penetrate the harder metal and melt it deeper, there by getting a stronger weld. Stainless is a forgiving metal, and with proper argon coverage, it provides smooth and shiny welds.

Titanium

I find that this metal requires excellent argon coverage, and you have to move around a lot. When I say you have to move around, you need to weld in 'opposite' positions as you work on your piece. When you weld on Titanium, it likes to 'shrink' or 'pull'. If you run a line of welds, and you just weld right in a line, you will find that the piece will pull along that line, and when you get to the other side of the part, you now have a gap that you didn't have before. If you will do opposing welds on the piece that you're working on, it will level out the 'pulling' affect, and help your parts stay in line with each other. I like to use more agitation on Titanium, because as a harder metal, it reacts positive to this greater heat and power.

Aluminum

This can be a picky metal, because there are thousands of alloys. In general, I like to do sample welds on any Aluminum that I'm going to work on. Some weld nicely, and some do not. Some of the alloys are very soft and will melt and move like butter. Others are very stiff and will offer heat cracks as you make your welds. Because of the variety of alloys, I don't make promises on Aluminum, until I've had it in my hands and done my own set of welds.

Prongs

1. Angles and energy levels are very important when welding prongs. Keep in mind that molten metal wants to be 'round'. If you weld on prongs next to a stone, your power needs very special attention. If you use to much power, it will melt more metal than you intend, and the molten metal that becomes round on the stone side of the prong will increase your mechanical pressure on the stone. If your just doing light work, you can work on prongs without moving them. If you're doing heavier work on a prong, and you have the ability to move the prong about 1mm away from the stone, this is not a bad safety net. This allows you to work on the prong, and let the metal take it's natural shape (round) and then you can clean it up, and move it back into place, without gambling with the stone's shape or condition. This also allows you to work on prongs without removing the stones, and thereby you don't cause any damage to the other prongs on the ring, that were probably just fine and don't want to be messed with. There is more that can be said here, but we will leave it at this, unless you have questions on other prong applications.

Resizing

1. When resizing a ring, I here of three main things that people are using the Orion for.
    a. Tiny pulse arc welds on the side of a butt weld, to hold it so that they can solder the ring.
    b. Seam welding around the outside edges of the butt weld, so that they don't have to solder.
    c. Using a triangle file on a butt weld to make a 'V', and welding in the bottom of the root, and working your way out, filling it with filler wire as you go.

I am a fan of the third (c) choice. I like to know that my entire gap on the joint is solid, so that if someone puts the ring on a mandrel or drops it, it won't 'pop'. There are many schools of thought here, depending on who you ask, so this will also lend itself to personal preference. For me, I like to weld the bottom of the root, and then lay layers of wire down, and

work my way out. I also like to keep my energy as low as I can, as I do this. The 12ws of energy on this one is nice, because I can work with the ring with my bare hands, add line upon line, and just grind the excess off at the end. I find this gives me the strongest joints and is easy to clean up.

Orion 200i2
When using this machine, I use different settings than any other welder. When you turn on the welder, you will see that there are tabs across the top. "Metals", "Arc", "Tack" and "Videos". I like to go to the "Arc" tab. Once there, you will see many many options to choose from. To keep it simple I choose These:

Square Wave form
Standard Plus ignition
None on Agitation
Set power to 2.5kW
Set time to 2.5ms

Now these settings will take a moment to track down, so let's talk about what they mean. As you look at the screen on your welder, there is a nice picture at the top half. Just below the picture, you will see many icons to choose from. These icons are in 'groups' under the headings mentioned above. As you glance at them, I'll offer some insight onto what the different icons do for me, when I weld.

Wave forms:
Classic: Regular welding – Nice to use when you're doing very fine items, as it accesses a special set of capacitors inside the welder that allow for very fine welding. I like to use this for less than 10 ws and below.
Triangle: Very hot. I like to use this wave form when I'm trying to do Platinum, and I have to heat the part up very fast with a single weld, so that it will melt to the core in one weld.
Square: Very Gentle. This is my favorite setting, as it is the most predictable, and is the most gentle. I use this 90% of the time, and I just raise and lower the power, as needed.

Ignition:
Standard: Normal welding. For everyday welding, if needed.

Standard Plus: Beginner welding. This setting has a 'pre arc' that connects to the piece as you weld, so that if you're a little shaky or new to welding, it makes the weld easier to make.

Agitation:
None: Makes a very gentle weld. Doesn't dig in too deep and the weld spot is smaller. Minimal heat affected zone with this setting. I like this for most Gold's and Silvers.
Sloped: Moderate power boost, for welding metals that are harder than Gold & Silver, or thinner Platinum, or if you want a deeper weld on those metals. This setting will introduce greater heat into the part, and adds about 30% more power to a weld than the None setting will.
Sustained: Aggressive power. I use this setting when I am welding large Platinum, Stainless Steel or Titanium. These harder metals seem to respond to the extra power and drive behind it. The power boost will be about 60% more than if you were in the 'None' setting. Often if I am going to use this level of agitation, I will transfer to the Triangle mode also, because I'm looking for the maximum heat that I can focus on a weld. I use this setting with care, as it can do damage if I turn the numbers up to high on a single weld.

Power:
When in the 'Classic' mode, your power will red in ms (milli seconds). When in Triangle and Square modes, you will read the power in kW. The main thing to think of here is take it slow and low. With any set of welds, I want to 'get to know the metal' before I get to crazy on it. If I'm in Classic, I will make a weld at 3ws, then at 8ws, and I generally end up at about 13ws as a max power for the majority of my welds. In the Triangle mode, I start at 2kW power and 2ms time, then move up by 1kW at a time, as I get to know the metal, and the welds. In the Square mode I usually set the power at 2.5kW power and 2.5ms of time. I then move the power up by .5kW until I get the welds that I want or need. With anything, any metal that you work on is made in some factory that may have thrown in any sort of metals along the way. This is why I like to get to know how the metal is going to respond to the energy with lower power welds, before I hit it with the energy that I really need to make the welds. It saves me time from having to fix something twice.

Time:
For Classic mode, I don't mess with the time much, I just leave it to the 'factory setting' that comes up when I change the power. When I'm in Triangle and Square mode, I want to keep things simple, so I just put the time to the same number as the power. I find that if I have to many things to think about, the work is not fun anymore. This being said, once you get to know the welder, you can use the time to your benefit. Think of the time as the length of time that you hold your finger on a water hose gun. If you hold the lever on the water hose for 5 seconds, water comes out that long. If you hold it for just one second, it only comes out that long. This is the same for the ms on the welder. The number that you put on the time on the

welder is how long the power level that you have chosen will be maintained on your part. Triangle mode will offer the greatest length of any, if you are thinking of really lighting something up.

Sub Settings:
If you look closely at your different 'sections' of settings, you will see a very small arrow in the upper right corner of each word. This means that there is a 'sub setting' option for you to play with, if you choose. I don't mess with these much, but you should at least be aware that they exists, in case you choose to get super detailed.

Languages:
This is one of my favorite features of the Orion 200i2, it can speak any language in the world. It is built on an Android tablet, and if you go into the Settings section, you can choose to change the welder into any one that is loaded on your machine. Very helpful, when English is not your language of choice, and you still want to get work done.