orion
by sunstone

Orion m Series Welding System
User Manual

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Orion mPulse Pulse Arc Welder	
Welder Type	Pulse–Arc
Weld Modes	1
Pre–Programmed Metal Settings	0
Customizable Save Settings	0
Languages	None
Display	4.4" Touch Screen
Energy (Ws)	3–30 Ws
Switching Power Supply	110/230VAC (Auto Detected)
Weld Spot Diameter	1 – 1.25mm
Footprint	5.5" x 5.25" x 3.625" (13.79 x 13.34 x 9.21cm)
Weight	2 lbs. 6 oz. (1.07 kg)
Pulse Frequency	1/3.5 Hrz
*Stereo Microscope Magnification	5x (> IR 16 / > UV 16)
*Darkening Shutter	Visibility: Shade 3 to Shade 12

*Depending on the model of mPulse you have

Chapter 1: Welder Setup & Assembly

What is in the Box

ALL ORION M SERIES SYSTEMS COME WITH:
(1) Orion mPulse Welder/Power Supply and
Stylus Hand Piece
(1) Orion mPulse Welder Power Cord (2 pieces)
(2) Alligator Clips
(1) Shielding Gas Hose
(1) Electrode Vile (5 – 0.5mm and 5 – 1.0mm
Electrodes)
(1) Fiberglass Brush

IF YOU PURCHASED THE DARKENING LENS SYSTEM:
(1) Darkening Lens Stand with attached RJ45 Cable

IF YOU PURCHASED THE MICROSCOPE ARM SYSTEM:
(1) Orion Microscope Arm
(1) Microscope Arm Table Mount
(1) Microscope Arm Support Bar

Darkening Lens & Power Supply Setup

SET UP THE BACK SIDE OF THE POWER SUPPLY
The Orion has an internal switching power supply that can accept both 120 and 240VAC.

The darkening lens or microscope will automatically darken when the weld takes place. This allows the user to have a view of the work-piece and protection from the flash during the welding process.

Remove the welder and Darkening Lens from the box and place them on the table.

1. Plug the female end of the power cable into the AC Power port on the back of the power supply. Then connect the male end into AC power.
2. Insert the 1/4" gas tube firmly into the "Gas" port on the back of the welder. *It may wiggle when connected, but should not come out if pulled on.
3. Insert the RJ45 Darkening Lens cable (from the back of the darkening lens) into the ACC port on the back of the welder.
4. Plug the alligator clip into the positive port. *Remember to attach the alligator clip to the work-piece before welding.
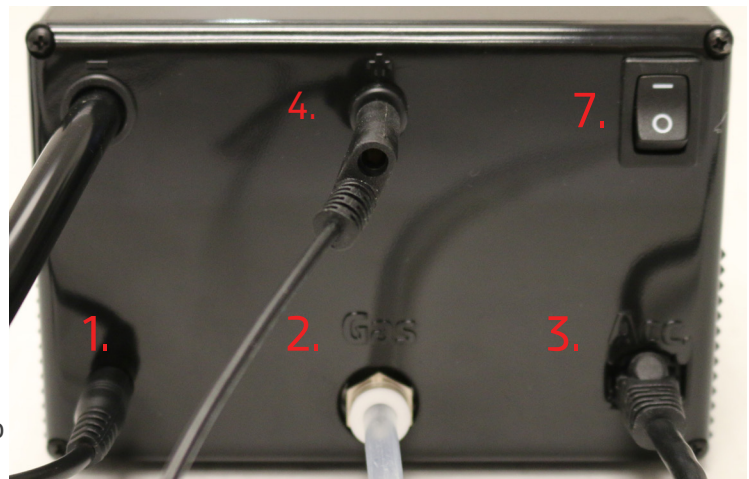
5. Insert the Orion stylus (from the back of the welder) into the Stylus Holder on the Darkening Lens stand.
6. Adjust the darkening lens shade by turning the shade dial above the darkening lens screen. Turn clockwise for a lighter shade and counter-clockwise for darker shade.
7. Power on the welder.

Articulating Arm and Microscope Setup

MOUNT THE ARTICULATING ARM TO THE TABLETOP
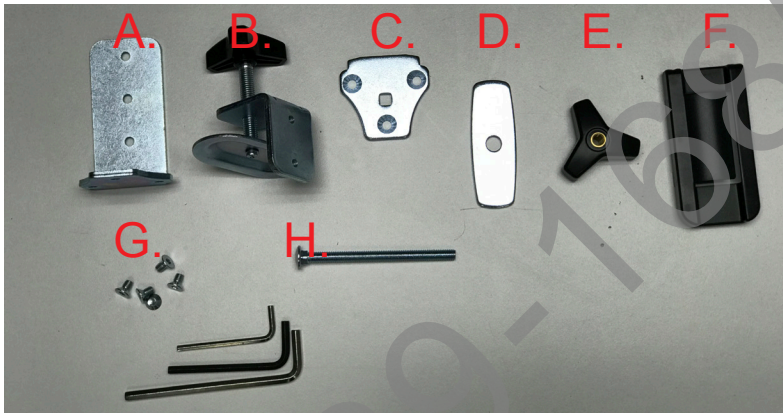
There are three available options for mounting the arm assembly to your table. Select one of the following methods and use the required mounting hardware shown in the image to the left.
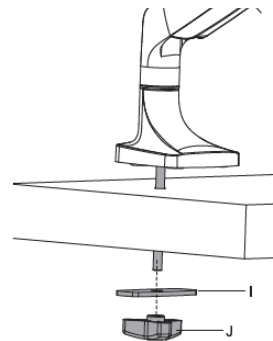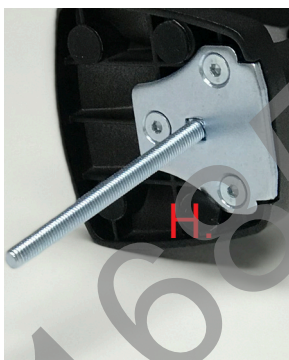
Mounting Option 1 – Clamp to table

- Determine the thickness of your tabletop.
- If it is thicker than 3–1/2' (9cm), follow mounting options 2 or 3.
- Lay the arm assembly down on the tabletop.
- Attach the angled bracket (A) to the bottom of the arm using three of the included allen screws (G). (4mm Allen wrench)
- Attach the clamp mechanism (B) to the angled bracket (A) using two of the included allen screws (G). Attach to the top two holes for skinny tabletop or bottom two holes for a thicker tabletop.
- Adjust the knob on the clamp mechanism until the gap is sufficient for the thickness of your table top.
- Lift the arm assembly up and slide the arm onto the tabletop.
- Lock it into place by turning the knob on the clamp mechanism until the clamp is pressed firmly against the bottom of the tabletop.
- A plastic cable guide cover (F) can be clipped on over the angled bracket if desired.
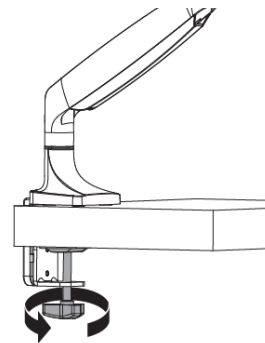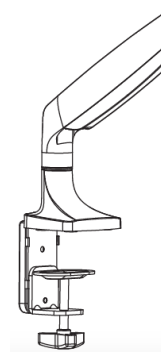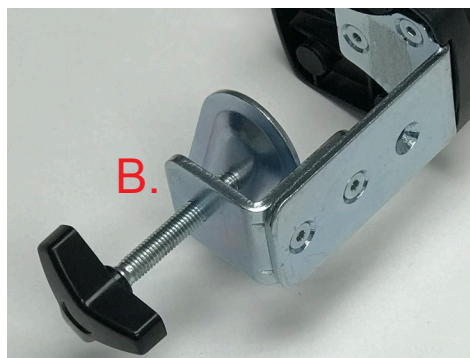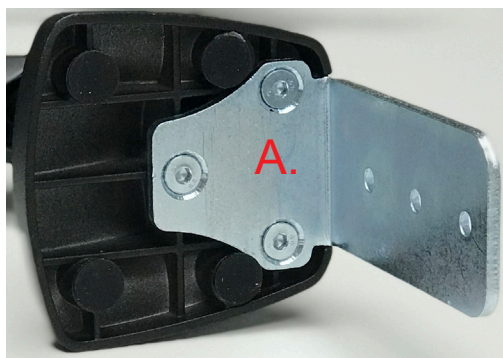
Mounting Option 2 – Bolt through table

- Put the included 8mm (5/16) bolt (H) through the included plate (C).
- Attach the plate (C) to the bottom of the arm using three of the included allen screws (G). (4mm Allen wrench)
- Drill a 3/8' (9.5mm) hole through the tabletop.
- Lower the bolt (H) at the bottom of the articulating arm into the hole.
- Slide the tightening plate (D) onto the bolt, then tighten the twist knob (E) onto the bolt until it is very snug.
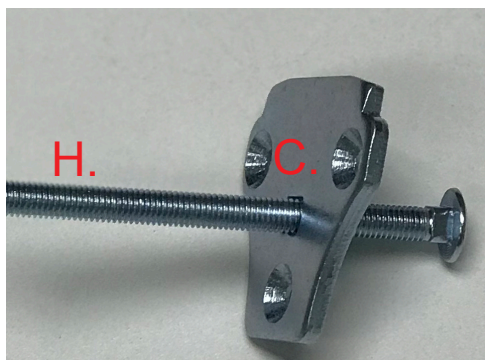
Mounting Option 3 – Bolt to table

- Attach the angled bracket (A) to the bottom of the arm assembly using three of the included flat head screws (G).
- Lift and position the arm assembly onto the table in the desired location.
- Run screws through the bracket and into vertical surface of the table.
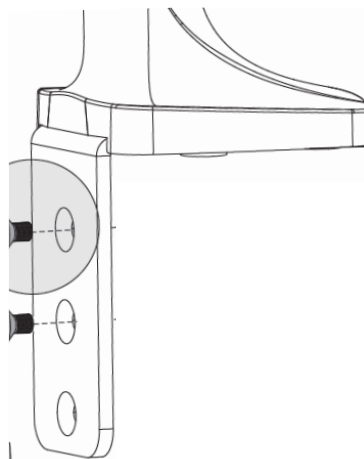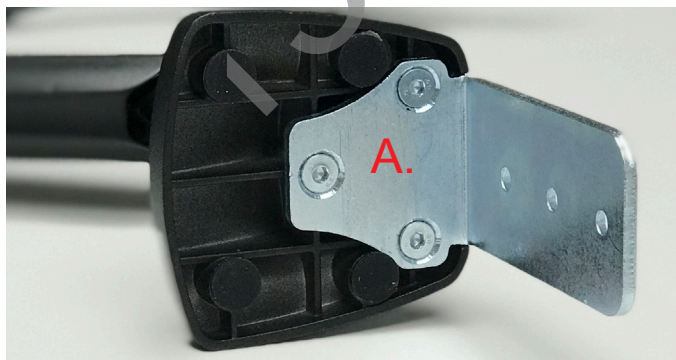
ATTACH WELDING STYLUS TO THE ARTICULATING ARM

1. Insert the welding stylus into the stylus holder underneath the microscope body.
2. Loosen the knob at the bottom of the stylus holder to move the stylus in and out.
3. When you look through the microscope, the tip of your stylus should be in the center of your view.
4. Turn the stylus holder knob clockwise until the stylus is secure.
5. Turn the allen-head bolt on the articulating arm clockwise if the arm does not hold the microscope and stylus up. Turn the allen-head bolt counter-clockwise if the articulating arm does not lower.

ADJUST THE MICROSCOPE FOCUS

1. While looking through the microscope, place your finger at the tip of the stylus.
2. With your other hand, twist the knob on the side of the microscope holder forward or backward to raise or lower the microscope body.
3. Raise or lower the microscope until your finger is clearly visible.

Microscope LCD Filter Shutter

The microscope LCD filter shutter allows an unobstructed working view before welding and completely protects the user's eyes during the welding process. The Orion's internal computer verifies the microscope LCD filter shutter has been closed before allowing the weld to take place. In the case that the shutter does not close, the microscope lens is equipped with >UV 16 and >IR 16 for maximum eye protection.

Become Familiar with the Microscope

The Orion Microscope has been designed to provide maximum visual clarity, eye protection and ease of use. One challenge using the microscope is getting used to bringing the work piece to the welding electrode while looking through the microscope. This is an easy challenge to overcome. To begin, follow these steps with the welder on pause. *While the welder is on pause, it will not be able to make a weld when the work piece touches the electrode.

- Rest your hands on the table and position the work piece close to the welding electrode before looking into the microscope.
- Make sure your focus is at the tip of the electrode.
- Use slow, controlled movements.
- It is helpful to have your hands resting and to only use your fingers to move the work piece up to the electrode.
- Place the work piece surface perpendicular to the point of the electrode. *As discussed in later chapters, the angle of the electrode tip relative to the work piece surface is very important and will take practice.
- Now practice making soft contact with the work piece to the electrode.
- *Once you feel comfortable, attach the alligator clip to the work piece and touch the play button to begin performing real welds.
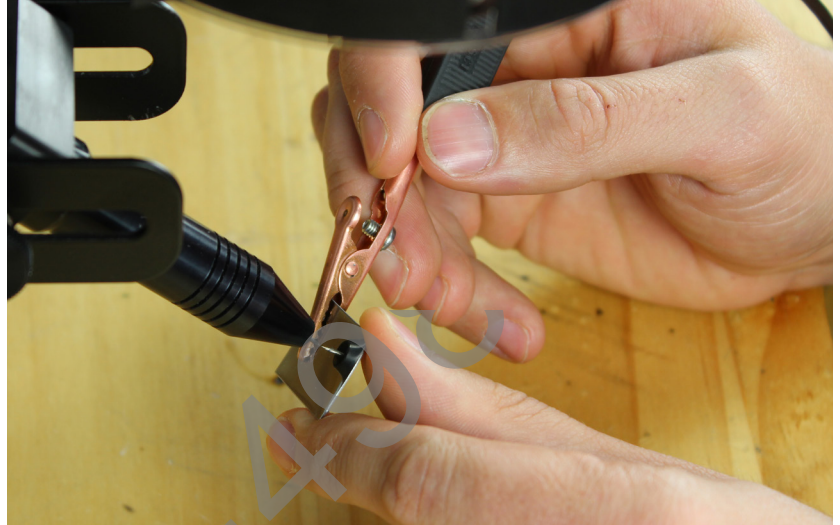
Electrode Setup

The Orion welder comes standard with a 0.5mm electrode collet and (5) 0.5mm electrodes; and a 1.0mm electrode collet and (5) 1.0mm electrodes. The 1.0mm electrodes are a good all around electrode while the 0.5mm electrode is more for very small applications (less than 5ws of energy).

STYLUS COMPONENTS:

1. Stylus Shaft   2. Collet   3. Collet Cap   4. Electrode   5. Stylus Hull

INSTALL THE TUNGSTEN ELECTRODE ONTO THE WELDING STYLUS

Follow these steps to properly install the tungsten electrode.

- Remove the stylus hull by pulling it away from the stylus shaft.
- Loosen the collet cap by twisting it counter-clockwise.
- The welder comes with 2 electrode collets. One that fits 0.5mm electrodes and one that fits 1.0mm electrodes. The electrode stylus will be shipped with the 1.0mm electrode collet installed.
- Insert a 1.0mm electrode into the collet. Helpful Tip: There is a groove cut around the stylus hull that will help measure the electrode length. Place the end of the stylus hull up against the collet cap, then make sure the electrode tip falls between groove.
- There should be between 0.6 - 0.7in (1.5 – 2cm) of the electrode protruding from the stylus shaft. This will allow the electrode enough room to stick out from the stylus once the stylus hull is placed back on the stylus.)
- Lock the electrode into place by hand tightening the collet cap in a clockwise direction.
- Replace the stylus hull by pushing it in until you feel it snap back into place (the electrode should stick out between 1/8 – 1/4in (3.75 – 6.75mm) after the stylus hull is snapped back into place).
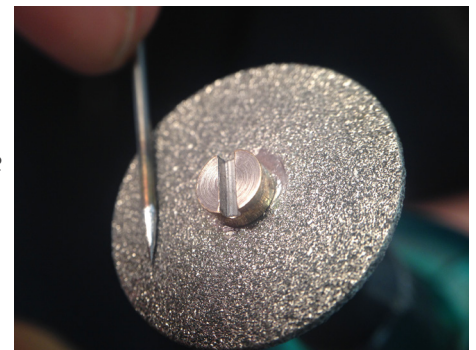
WORK PIECE TO ELECTRODE PRESSURE

Touch the work piece to the electrode with very light pressure. Too much pressure will cause the work piece to stick to the electrode and in turn cause the electrode to be contaminated (work piece material on the electrode). We recommend cleaning or changing the electrode any time it gets stuck to the work piece

WHEN TO SHARPEN THE ELECTRODE

It is recommended that the user pay close attention to the electrode condition. An electrode that appears to be dark colored or covered with material from previous welds can lead to inconsistent welding and poor igniting of the weld. When this occurs, simply sharpen the electrode with the included diamond disk. The diamond disk can be attached to a flex shaft or Dremel tool. Follow these steps for sharpening the electrode.

- Completely remove the electrode from the stylus.
- Pinch the electrode between the thumb and index and/or middle finger with the shaft going perpendicular to the fingers.
- Power on the Dremel or flex shaft then hold it with the opposite hand. *Place the electrode tip in the diamond disc in such a way that the grit of the disk is moving parallel with the electrode shaft and moving towards the tip.
- This will affect the quality of the weld if not done as explained above.
- Set the electrode on the diamond disk at a 10-degree angle and begin to spin the electrode with the thumb and middle finger. *A helpful way to get a sharp

electrode is to push down on the electrode with your index finger while twisting the electrode with the thumb and middle finger.

- Once the electrode is sharp and clean, turn the Dremel off and insert the electrode back into the stylus as explained above.

*As a general rule of thumb we recommend a freshly sharpened electrode anytime a new work piece is being welded.
*See Chapter 5 for additional information on the Tungsten Electrodes

WHEN TO FLATTEN/BLUNT THE ELECTRODE

When working with silver, copper, and other highly conductive metals in energy levels above 20ws, it is recommended to blunt the electrode instead of sharpening it.

- Completely remove the electrode from the stylus.
- Pinch the electrode between the thumb and middle finger with the point facing inward.
- Turn the Dremel or flex shaft on then hold it with the opposite hand. *Place the electrode tip in the diamond disc in such a way that the grit of the disk is moving parallel with the electrode shaft and moving towards the tip.
- This will affect the quality of the weld if not done as explained above.
- Set the electrode on the diamond disk at a 10-degree angle and begin to spin the electrode with the thumb and middle finger. *A helpful way to get a sharp electrode is to push down on the electrode with your index finger while twisting the electrode with the thumb and middle finger.
- Once the electrode is sharp and clean, turn the electrode to a 90-degree angle and push it against the dremel in order to place a flat/blunt tip on the electrode.
- Once the electrode has a flat/blunt tip, turn the Dremel off and insert the electrode back into the stylus as explained above.

Shielding Gas Setup

During the pulse-arc welding process high temperature plasma quickly melts metal into a molten pool. As the weld is performed, a small amount of shielding gas is released through the weld stylus to prevent oxygen from entering the molten pool. After the weld has occurred the protective gas turns off.

If oxygen from the air enters this molten pool, the result is a metal oxide that is brittle, porous and burnt-looking. Protective shielding gas is used, such as 99.996% pure Argon (Argon 4.6) or higher, to prevent these effects. Shielding gas is necessary to produce clean and repeatable pulse-arc welds. We recommend high purity argon. This can be purchased at your local welding supply shop.

PRESSURIZED GAS SAFETY

There are several important rules that should be followed when using a compressed shielding gas such as argon.

- Always secure the pressurized gas tank to a fixed location (such as a sturdy table leg). If the pressurized gas cylinder were to tip and become damaged there is possibility that the tank could become rocket-like, expelling the high pressure shielding gas as propellant.
- Always turn off the shielding gas at the main valve when finished. This will help your shielding gas supply last longer in case there is a small leak in the tubing. This is also a good safety practice. If the tube becomes dislodged shielding gas could fill the room and displace oxygen, which can lead to suffocation. Argon is heavier than air and will fill the room from the bottom upward. If you experience a large shielding gas leak, open all of the doors and windows in the room.

SHIELDING GAS TANK AND REGULATOR SETUP

- Ensure that your shielding gas tank is securely fastened to a stationary point near the welding area.
- Turn the regulator dial COUNTER CLOCKWISE (closed) until it is fully backed out. meaning the dial become loose, to prevent over–pressurization of the line.

Tank Levels

Gas Pressure
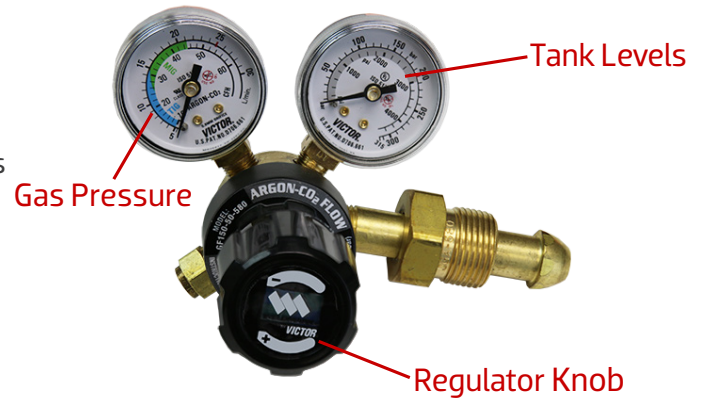
Regulator Knob

- Screw the gas regulator onto the shielding gas tank.

- Connect one end of the gas tubing to the gas regulator.
- Insert the other end of the gas tubing into the gas port on the back of the power supply. It will stop when it is fully connected. Tug gently on the tube to verify a tight fit.

- Open the gas tank slowly. The dial on the right should pressurize and the dial on the left should remain at zero (when the regulator dial is fully backed out or the dial becomes loose).

- Slowly turn the regulator dial CLOCKWISE until the gas pressure reads between 7–10 psi. (This will adjust the dial on the left side of the regulator.)
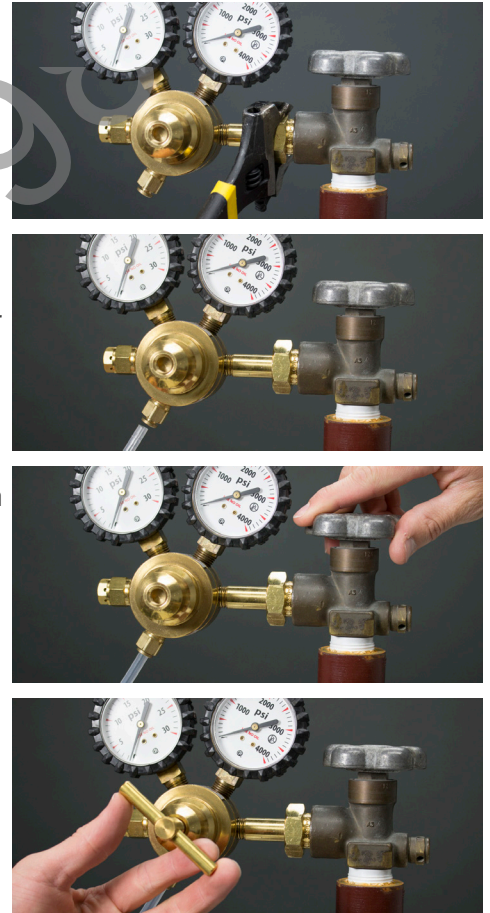
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Chapter 2: The Touch Screen Interface

The Orion touch screen interface is very user friendly. Users have access to every welding parameter with one touch. Below is an explanation of the various buttons and options found on the Orion mPulse interface. *Orion touch screens are resistive touch screens. This means they respond best to a little bit of pressure. The end of your fingernail or the tip of the alligator clip works best when touching the screen.

mPulse Interface
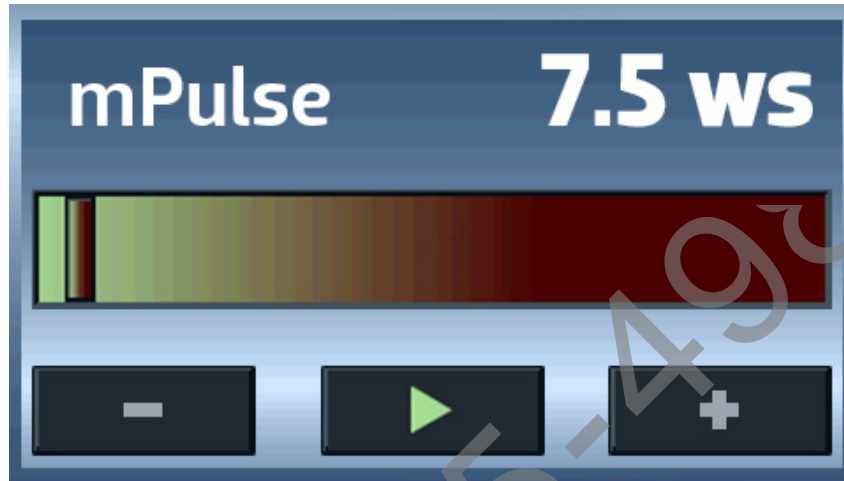
PLAY/PAUSE BUTTONS

Play – In order to weld, the play/pause button must show the green triangle "play" symbol.
Pause – If the welder is not going to be in use for a period of time, users can push the play/pause button (a pause symbol will appear).   This will keep the unit powered on, but welding functions will be disabled.

ENERGY BAR

The energy bar ranges from 3.0Ws (Watt–Seconds or Joules) to 30Ws. Users can slide their finger anywhere along the bar to move the energy up or down.
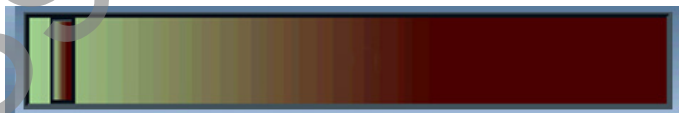
PLUS/MINUS BUTTONS

Another option for moving the energy up or down is to use the + and – buttons to the right of the energy bar.

Troubleshooting

Welder is not welding.
1. Is it on play?
2. Is the alligator clip attached?
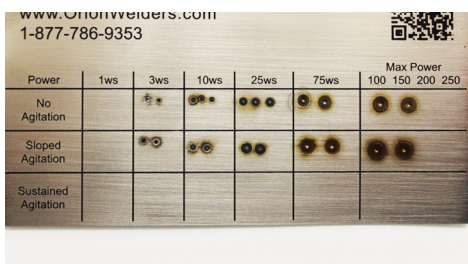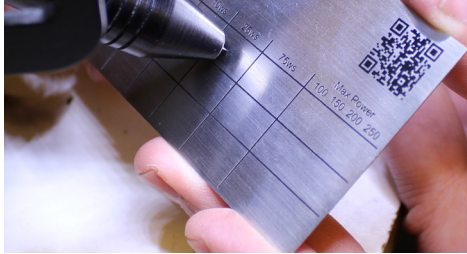3. Is the electrode clean?

Chapter 3: Make a Weld
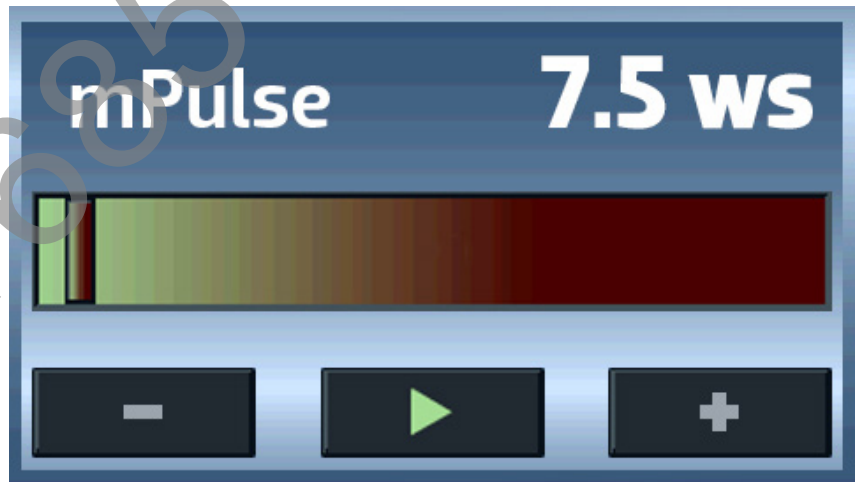
Make An Arc Weld (using the provided weld plate)

1. On the touch screen select 7.5 Ws on the Energy bar and then hit Play.
*Remember to verify the gas pressure and microscope connection.

2. Lightly touch the electrode in the box on the provided weld plate. Maintain contact & keep hands steady by resting them on the table.

3. Use the provided stainless steel weld plate as a guide to try different settings. Make several welds on the weld plate to get comfortable with the stylus and the different weld parameters.

www.OrionWelders.com
1-877-786-9353

Power	1ws	3ws	10ws	25ws	75ws	Max Power 100 150 200 250
No Agitation						
Sloped Agitation						
Sustained Agitation						

mPulse   7.5 ws
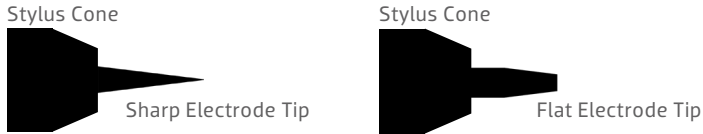
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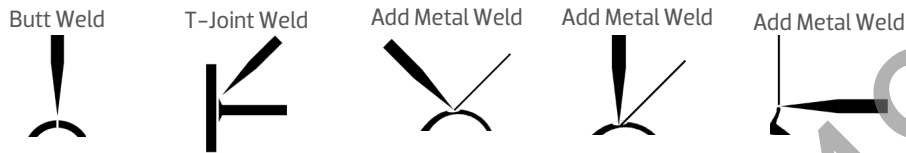
Chapter 4: Recommended Welder Settings

General Settings

- These settings are to help users get started. Remember to adjust the power up and down as needed.

Electrode Shaping:

Stylus Cone

Stylus Cone

Sharp Electrode Tip

Flat Electrode Tip

Electrode placement examples:

Butt Weld   T-Joint Weld   Add Metal Weld   Add Metal Weld   Add Metal Weld

26 AWG wire/chain/jump ring

Metal	Tip Shape	Energy	Notes
14k Gold	Sharp	10 ws	Butt weld with 90 degree electrode angle
24k Gold	Sharp	7.5 ws	
Silver	Sharp	10 ws	
Platinum	Sharp	10 ws	
Stainless Steel	Sharp	7.5 ws	**Butt Weld**
Palladium	Sharp	7.5 ws	
Titanium	Sharp	10 ws	
Brass	Sharp	10 ws	

Earring Post

Metal	Tip Shape	Energy	Notes
14k Gold	Sharp	10 ws	T joint with 45 degree electrode angle
24k Gold	Sharp	10 ws	
Silver	Sharp	12.5 ws	
Platinum	Sharp	12.5 ws	**T-Joint Weld**
Stainless Steel	Sharp	7.5 ws	
Palladium	Sharp	7.5 ws	
Titanium	Sharp	12.5 ws	
Brass	Sharp	10 ws	

0.5mm thick Ring

Metal	Tip Shape	Energy	Notes
14k Gold	Sharp	12.5 ws	Butt weld with 90 degree electrode angle
24k Gold	Sharp	10 ws	
Silver	Sharp	17.5 ws	
Platinum	Sharp	15 ws	**Butt Weld**
Stainless Steel	Sharp	15 ws	
Palladium	Sharp	15 ws	
Titanium	Sharp	15 ws	
Brass	Sharp	15 ws	

1mm thick Ring

Metal	Tip Shape	Energy	Notes
14k Gold	Sharp	22.5 ws	Butt weld with 90 degree electrode angle
24k Gold	Sharp	20 ws	
Silver	Semi Blunt	30 ws	
Platinum	Sharp	25 ws	**Butt Weld**
Stainless Steel	Sharp	22.5 ws	
Palladium	Sharp	20 ws	
Titanium	Sharp	25 ws	
Brass	Sharp	25 ws	

2mm thick Ring

Metal	Tip Shape	Energy	Notes
14k Gold	Sharp	30 ws	Butt weld with 90 degree electrode angle
24k Gold	Sharp	30 ws	
Silver	Blunt	30 ws	
Platinum	Sharp	30 ws	**Butt Weld**
Stainless Steel	Sharp	30 ws	
Palladium	Sharp	30 ws	
Titanium	Sharp	30 ws	
Brass	Sharp	30 ws	

Add Material (30 AWG laser wire)

Metal	Tip Shape	Energy	Notes
14k Gold	Sharp	12.5 ws	Wire at 45 degree angle. Electrode touching work piece next to wire.
24k Gold	Sharp	12.5 ws	
Silver	Sharp	15 ws	
Platinum	Sharp	15 ws	
Stainless Steel	Sharp	10 ws	**T-Joint Weld**
Palladium	Sharp	10 ws	
Titanium	Sharp	15 ws	
Brass	Sharp	12.5 ws	

Add Material (24 AWG wire)			
Metal	**Tip Shape**	**Energy**	**Notes**
14k Gold	Sharp	17.5 ws	Wire at 45 degree angle. Electrode touching work piece next to wire. Add Metal Weld
24k Gold	Sharp	15 ws	
Silver	Sharp	20 ws	
Platinum	Sharp	20 ws	
Stainless Steel	Sharp	15 ws	
Palladium	Sharp	15 ws	
Titanium	Sharp	20 ws	
Brass	Sharp	17.5 ws	

Retip Prong (26 AWG wire)			
Metal	**Tip Shape**	**Energy**	**Notes**
14k Gold	Sharp	10 ws	Butt weld with 90 degree electrode angle. Add Metal Weld
24k Gold	Sharp	7.5 ws	
Silver	Sharp	10 ws	
Platinum	Sharp	10 ws	
Stainless Steel	Sharp	7.5 ws	
Palladium	Sharp	7.5 ws	
Titanium	Sharp	10 ws	
Brass	Sharp	10 ws	

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