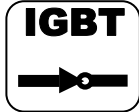


# EVERLAST

## POWERTIG 250EX

**A DIGITALLY CONTROLLED PULSE TIG/STICK INVERTER WELDER**



### ***Operator's Manual for the PowerTig 250EX Safety, Setup and General Use Guide***

Rev. 6 0 01001-15

[everlastwelders.com](http://everlastwelders.com)



**1-877-755-9353**  
329 Littlefield Ave. South San Francisco, CA 94080 USA

Specifications and Accessories subject to change without notice.

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**NOTE:** Product Specifications and features are subject to change without notice. While every attempt has been made to provide the most accurate and current information possible at the time of publication, this manual is intended to be a general guide and not intended to be exhaustive in its content regarding safety, welding, or the operation/maintenance of this unit. Everlast Power Equipment INC. does not guarantee the accuracy, completeness, authority or authenticity of the information contained within this manual. The owner of this product assumes all liability for its use and maintenance. Everlast Power Equipment INC. does not warrant this product or this document for fitness for any particular purpose, for performance/accuracy or for suitability of application. Furthermore, Everlast Power Equipment INC. does not accept liability for injury or damages, consequential or incidental, resulting from the use of this product or resulting from the content found in this document or accept claims by a third party of such liability.

## Dear Customer,

**THANKS!** You had a choice, and you bought an Everlast. We appreciate you as a customer and hope that you will enjoy years of use from your welder.

Please go directly to the Everlast website to register your unit and receive your warranty information. Your unit registration is important should any information such as product updates or recalls be issued. It is also important so that we may track your satisfaction with Everlast products and services. If you are unable to register by website, contact Everlast directly through the sales department through the main customer service number in your country. Your unit will be registered and warranty will be issued and in full effect. Keep all information regarding your purchase. **In the event of a problem you must contact technical support before your welder can be a candidate for warranty service and returned.**

**Please review and download the official warranty statement, located on our website [www.everlastwelders.com](http://www.everlastwelders.com). If you are not in the United States, visit the distributor's website warranty information nearest to your region or country. Print it for your records and become familiar of its terms and conditions.**

Everlast offers full technical support in several different forms. We offer domestic based phone support and online support. Online support is available through email and through our website contact forms. We also provide a welding support forum designed for customers and noncustomer interaction. Technical advisors are active on the forum on a regular basis. We also divide our support into two divisions: technical and welding performance. Should you have an issue or question concerning your unit, please contact performance/technical support available through the main company headquarters available in your country. For best service, call the appropriate support line and follow up with an email. In the event you do not reach a live person, particularly during heavy call volume times, holidays, or off hours, leave a message and your call will normally be returned within 24 hours. For quick answers to basic operating or service questions, join the company owned forum linked through the US website. You should be able to find knowledgeable, helpful people and staff available to answer your questions, and perhaps find a topic that already addresses your question at <http://www.everlastgenerators.com/forums/>.

Should you need to call or write, always know your model name, purchase date and welder manufacturing inspection date. This will assure the quick and accurate customer service. **REMEMBER: Be as specific and informed as possible. Technical and performance advisors rely upon you to carefully describe the conditions and circumstances of your problem or question. Take notes of any issues as best you can. You may be asked a series of questions by the advisors meant to clarify problems or issues. Some of these questions may seem basic or fundamental, but even with experienced users technical advisors can't assume that correct operating procedures are being followed for proper operation, and must cover all aspects to properly diagnose the problem. Depending upon your issue, it is advisable to have basic tools handy such as screwdrivers, wrenches, pliers, and even an inexpensive test meter with volt/ohm functions before you call.**

**Please note: To establish a warranty claim and return a unit for repair or replacement, you must call technical support first and go through basic diagnosis before an Return Authorization will be issued.**

Let us know how we may be of service to you should you have any questions.

Sincerely,

Everlast Customer Service

Serial number: \_\_\_\_\_

Model number: \_\_\_\_\_

Date of Purchase \_\_\_\_\_

**EVERLAST**

Contact Information

**Everlast US:**

Everlast consumer satisfaction email: [sales@everlastwelders.com](mailto:sales@everlastwelders.com)

Everlast Website: [everlastwelders.com](http://everlastwelders.com)

Everlast Technical Support: [support@everlastwelders.com](mailto:support@everlastwelders.com)

Everlast Support Forum: <http://www.everlastgenerators.com/forums/index.php>

Main toll free number: 1-877-755 WELD (9353) 9am—5pm PST M-F

11am-4pm PST Sat.

FAX: 1-650-588-8817

**Everlast Canada:**

Everlast consumer satisfaction email: [sales@everlastwelders.ca](mailto:sales@everlastwelders.ca)

Everlast Website: [everlastwelders.ca](http://everlastwelders.ca)

Everlast Technical Support: [sales@everlastwelders.ca](mailto:sales@everlastwelders.ca)

Telephone: 905-637-1637 9am-4:30pm EST M-F

10am-1pm EST Sat.

FAX: 1-905-639-2817

**Everlast Australia:**

Sydney: 5A Karloo Parade Newport NSW 2106

(02) 9999 2949

Port Macquarie: 2B Pandorea Place Port Macquarie

(02) 8209 3389

After hours support: 0413 447 492

Everlast Technical Support: [support@pickproducts.com](mailto:support@pickproducts.com)

## SAFETY PRECAUTIONS

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Everlast is dedicated to providing you with the best possible equipment and service to meet the demanding jobs that you have. We want to go beyond delivering a satisfactory product to you. That is the reason we offer technical support to assist you with your needs should an occasion occur. With proper use and care your product should deliver years of trouble free service.



Safe operation and proper maintenance is your responsibility.

We have compiled this operator's manual, to instruct you in basic safety, operation and maintenance of your Everlast product to give you the best possible experience. Much of welding and cutting is based upon experience and common sense. As thorough as this welding manual may be, it is no substitute for either. Exercise extreme caution and care in all activities related to welding or cutting. Your safety, health and even life depends upon it. While accidents are never planned, preventing an accident requires careful planning.

**Please carefully read this manual before you operate your Everlast unit.** This manual is not only for the use of the machine, but to assist in obtaining the best performance out of your unit. Do not operate the unit until you have read this manual and you are thoroughly familiar with the safe operation of the unit. If you feel you need more information please contact Everlast Support.

The warranty does not cover improper use, maintenance or consumables. **Do not attempt to alter or defeat any piece or part of your unit, particularly any safety device.** Keep all shields and covers in place during unit operation should an unlikely failure of internal components result in the possible presence of sparks and explosions. If a failure occurs, discontinue further use until malfunctioning parts or accessories have been repaired or replaced by qualified personnel.



***Note on High Frequency electromagnetic disturbances:***

Certain welding and cutting processes generate High Frequency (HF) waves. These waves may disturb sensitive electronic equipment such as televisions, radios, computers, cell phones, and related equipment. High Frequency may also interfere with fluorescent lights. Consult with a *licensed* electrician if disturbance is noted. Sometimes, improper wire routing or poor shielding may be the cause.



HF can interfere with pacemakers. See EMF warnings in following safety section for further information. Always consult your physician before entering an area known to have welding or cutting equipment if you have a pacemaker.

## SAFETY PRECAUTIONS



These safety precautions are for protection of safety and health. Failure to follow these guidelines may result in serious injury or death. Be careful to read and follow all cautions and warnings. Protect yourself and others.



**Welding and cutting processes produce high levels of ultraviolet (UV) radiation that can cause severe skin burn and damage.** There are other potential hazards involved with welding such as severe burns and respiratory related illnesses. Therefore observe the following to minimize potential accidents and injury:



**Use appropriate safety glasses with wrap around shields while in the work area, even under welding helmets to protect your eyes from flying sparks and debris.** When chipping slag or grinding, goggles and face shields may be required.



**When welding or cutting, always use an approved shielding device, with the correct shade of filter installed.** Always use a welding helmet in good condition. Discard any broken or cracked filters or helmets. Using broken or cracked filters or helmets can cause severe eye injury and burn. Filter shades of no less than shade 5 for cutting and no less than shade 9 for welding are highly recommended. Shades greater than 9 may be required for high amperage welds. Keep filter lenses clean and clear for maximum visibility. It is also advisable to consult with your eye doctor should you wear contacts for corrective vision before you wear them while welding.



**Do not allow personnel to watch or observe the welding or cutting operation unless fully protected by a filter screen, protective curtains or equivalent protective equipment.** If no protection is available, exclude them from the work area. Even brief exposure to the rays from the welding arc can damage unprotected eyes.



**Always wear hearing protection because welding and cutting can be extremely noisy. Ear protection is necessary to prevent hearing loss.** Even prolonged low levels of noise has been known to create long term hearing damage. Hearing protection also further protects against hot sparks and debris from entering the ear canal and doing harm.



**Always wear personal protective clothing.** Flame proof clothing is required at all times. Sparks and hot metal can lodge in pockets, hems and cuffs. Make sure loose clothing is tucked in neatly. Leather aprons and jackets are recommended. Suitable welding jackets and coats may be purchased made from fire proof material from welding supply stores. Discard any burned or frayed clothing. Keep clothing away from oil, grease and flammable liquids.



**Leather boots or steel toed leather boots with rubber bottoms are required for adequate foot protection.** Canvas, polyester and other man made materials often found in shoes will either burn or melt. Rubber or other non conductive soles are necessary to help protect from electrical shock.



**Flame proof and insulated gauntlet gloves are required whether welding or cutting or handling metal.** Simple work gloves for the garden or chore work are not sufficient. Gauntlet type welding gloves are available from your local welding supply companies. Never attempt to weld with out gloves. Welding with out gloves can result in serious burns and electrical shock. If your hand or body parts comes into contact with the arc of a plasma cutter or welder, instant and serious burns will occur. **Proper hand protection is required at all times when working with welding or cutting machines!**

## SAFETY PRECAUTIONS



**WARNING!** Persons with pacemakers should not weld, cut or be in the welding area until they consult with their physician. Some pacemakers are sensitive to EMF radiation and could severely malfunction while welding or while being in the vicinity of someone welding. *Serious injury or death may occur!*



**Welding and plasma cutting processes generate electro-magnetic fields and radiation.** While the effects of EMF radiation are not known, it is suspected that there may be some harm from long term exposure to electromagnetic fields. Therefore, certain precautions should be taken to minimize exposure:

- Lay welding leads and lines neatly away from the body.
- Never coil cables around the body.
- Secure cables with tape if necessary to keep from the body.
- Keep all cables and leads on the same side the body.
- Never stand between cables or leads.
- Keep as far away from the power source (welder) as possible while welding.
- Never stand between the ground clamp and the torch.
- Keep the ground clamp grounded as close to the weld or cut as possible.



**Welding and cutting processes pose certain inhalation risks.** Be sure to follow any guidelines from your chosen consumable and electrode suppliers regarding possible need for respiratory equipment while welding or cutting. Always weld with adequate ventilation. Never weld in closed rooms or confined spaces. Fumes and gases released while welding or cutting may be poisonous. Take precautions at all times. Any burning of the eyes, nose or throat are signs that you need to increase ventilation.

- Stop immediately and relocate work if necessary until adequate ventilation is obtained.
- Stop work completely and seek medical help if irritation and discomfort persists.



**WARNING!** Do not weld on galvanized steel, stainless steel, beryllium, titanium, copper, cadmium, lead or zinc without proper respiratory equipment and or ventilation.



**WARNING!** This product when used for welding or cutting produces fumes and gases which contains chemicals known to the State of California to cause birth defects and in some cases cancer. (California Safety and Health Code §25249.5 *et seq.*)



**WARNING!** Do not weld or cut around Chlorinated solvents or degreasing areas. Release of Phosgene gas can be deadly. Consider all chemicals to have potential deadly results if welded on or near metal containing residual amounts of chemicals.



**Keep all cylinders upright and chained to a wall or appropriate holding pen.** Certain regulations regarding high pressure cylinders can be obtained from OSHA or local regulatory agency. Consult also with your welding supply company in your area for further recommendations. The regulatory changes are frequent so keep informed.



**All cylinders have a potential explosion hazard.** When not in use, keep capped and closed. Store chained so that overturn is not likely. Transporting cylinders incorrectly can lead to an explosion. Do not attempt to adapt regulators to fit cylinders. Do not use faulty regulators. Do not allow cylinders to come into contact with work piece or work. Do not weld or strike arcs on cylinders. Keep cylinders away from direct heat, flame and sparks.

## SAFETY PRECAUTIONS

continued



**WARNING! Electrical shock can kill.** Make sure all electrical equipment is properly grounded. Do not use frayed, cut or otherwise damaged cables and leads. Do not stand, lean or rest on ground clamp. Do not stand in water or damp areas while welding or cutting. Keep work surface dry. Do not use welder or plasma cutter in the rain or in extremely humid conditions. Use dry rubber soled shoes and dry gloves when welding or cutting to insulate against electrical shock. Turn machine on or off only with gloved hand. Keep all parts of the body insulated from work, and work tables. Keep away from direct contact with skin against work. If tight or close quarters necessitates standing or resting on work piece, insulate with dry boards and rubber mats designed to insulate the body from direct contact.



**All work cables, leads, and hoses pose trip hazards.** Be aware of their location and make sure all personnel in area are advised of their location. Taping or securing cables with appropriate restraints can help reduce trips and falls.



**WARNING! Fire and explosions are real risks while welding or cutting.** Always keep fire extinguishers close by and additionally a water hose or bucket of sand. Periodically check work area for smoldering embers or smoke. It is a good idea to have someone help watch for possible fires while you are welding. Sparks and hot metal may travel a long distance. They may go into cracks in walls and floors and start a fire that would not be immediately visible. Here are some things you can do to reduce the possibility of fire or explosion:

- Keep all combustible materials including rags and spare clothing away from area.
- Keep all flammable fuels and liquids stored separately from work area.
- Visually inspect work area when job is completed for the slightest traces of smoke or embers.
- If welding or cutting outside, make sure you are in a cleared off area, free from dry tender and debris that might start a forest or grass fire.
- Do not weld on tanks, drums or barrels that are closed, pressurized or anything that held flammable liquid or material.



**Metal is hot after welding or cutting!** Always use gloves and or tongs when handling hot pieces of metal. Remember to place hot metal on fire-proof surfaces after handling. Serious burns and injury can result if material is improperly handled.



**WARNING! Faulty or poorly maintained equipment can cause injury or death.** Proper maintenance is your responsibility. Make sure all equipment is properly maintained and serviced by qualified personnel. Do not abuse or misuse equipment. Keep all covers in place. A faulty machine may shoot sparks or may have exploding parts. Touching uncovered parts inside machine can cause discharge of high amounts of electricity. **Do not allow employees to operate poorly serviced equipment.** Always check condition of equipment thoroughly before start up. Disconnect unit from power source before any service attempt is made and for long term storage or electrical storms.



Further information can be obtained from The American Welding Society (AWS) that relates directly to safe welding and plasma cutting. Additionally, your local welding supply company may have additional pamphlets available concerning their products. Do not operate machinery until your are comfortable with proper operation and are able to assume inherent risks of cutting or welding.



**PowerTIG 250EX**



Argon Regulator



Consumable Kit  
(Does not include Tungsten)



22K  $\Omega$   
Foot Pedal Assembly



Water-Cooled  
18 Series Torch Assembly



Work Clamp



Stick Electrode Holder

**NOTE: Appearance and quantity of accessories are subject to change without notice.**

PowerTIG 250 EX TIG/Stick Welder	Specification
Process	AC/DC GTAW-P/DC SMAW
Inverter Type	DIGITAL IGBT Construction
Minimum/Maximum Rated Output TIG	AC/DC: 5A/10.2V - 250 A/20V ( $\pm 3A$ )
Minimum/Maximum Rated Output Stick	5A/20.2V - 200A/28V ( $\pm 3A$ )
Start Type	Solid State HF and Lift Start
HF Point Gap	Solid state/ non adjustable
TIG Duty Cycle @ Rated Amps/Volts	60% @ 250A/20 .0V 100% @ 200A/18 .0V
Stick Duty Cycle @ Rated Amps/Volts	35% @ 200A/28.0V 60% @ 160A/26.4V 100% @ 130A/25.2V
OCV ( $U_0$ )	80V
Voltage Input ( $U_1$ )	Standard 220/240V; 50/60Hz 1 and 3 Phase
Maximum Inrush Amps ( $I_{1MAX}$ )	40A @ 220V 1 Phase/21A @ 220V 3 Phase
Maximum Operating Amps (Rated Effective) ( $I_{1EFF}$ )	32 A @ 220V 1 Phase/16A @ 220V 2 Phase
Gas Pre-Flow /Post Flow Time	0-10 Seconds/ 0-25 Seconds
Start Amps/End Amps	5-250A/5-250A ( $\pm 3A$ )
Up/Down Slope	0-10/0-25 Seconds
AC Frequency Control	20-250 Hz
AC Balance Control	10-90% of Electrode Positive (EP)
Pulse Frequency Hz (Pulses Per Second)	.5-500 Hz
Pulse Amps (Ratio)	5-95%
Pulse Time On (Balance)	10-90%
Stick Arc Force Control	0-100%
Minimum Water Ingress Protection Standard	IP21S
Efficiency	>85%
Cooling Method	One Single Speed Full-Time High Velocity Fan
Dimensions (approximate)	18" H X 10" W X 25" L
Weight (Bare Unit)	65 lbs


## SECTION 1

## INTRODUCTION AND SPECIFICATIONS

**General overview:** The latest generation of the PowerTIG 250EX has performance and reliability has been boosted by a complete redesign that incorporates a digitally controlled inverter with an analog style controls for an easy to operate control panel. The main features of this welder include:

- A. Digital control and componentized design reduces complex wiring and circuitry of components, reducing the overall number and size of discrete components. This is aimed at improving lifespan and long term serviceability of the PowerTIG 250EX platform.
- B. Digital control offers more precise setting and control over parameters, offering a more satisfactory operating experience.
- C. Full-wave bridge rectifier inverter design also features soft switching technology which further extends IGBT component life.
- D. HF point gap adjustment issues have been eliminated with the introduction of new solid state HF board.
- E. Digital components offer reduced weight and improved operating efficiency over past analog controlled generations.
- F. The digitally controlled square wave design creates a stable arc in AC, with a fast melting puddle and good wet-in.
- G. Adjustable arc force control and adaptive hot start helps improve the SMAW process performance.

**General Use and Care:** With proper care, the PowerTIG 250EX's digitally controlled inverter components are designed to withstand years of use in many different welding environments. However, remember to keep the unit out of direct contact with water spray and corrosive areas. The unit has an ingress rating of IP21S, for light dripping water (condensation). It is a good idea to remove the welder from the vicinity of any water or moisture source to reduce the possibility of electrocution or shock. Never operate in standing water or where water spray is an issue. Every 1-2 months, depending upon use, the welder should be unplugged, opened up and carefully cleaned with compressed air. Regular maintenance will extend the life of the unit. Metallic dust build up may lead to premature board and component failure.


 **CAUTION:** Before opening the unit for any reason, make sure the unit has been unplugged for at least 10 minutes to allow time for the capacitors to fully discharge. Severe shock and/or death can occur.

Free, unobstructed air flow is critical to cooling and duty cycle. Do not restrict air flow or movement of air around

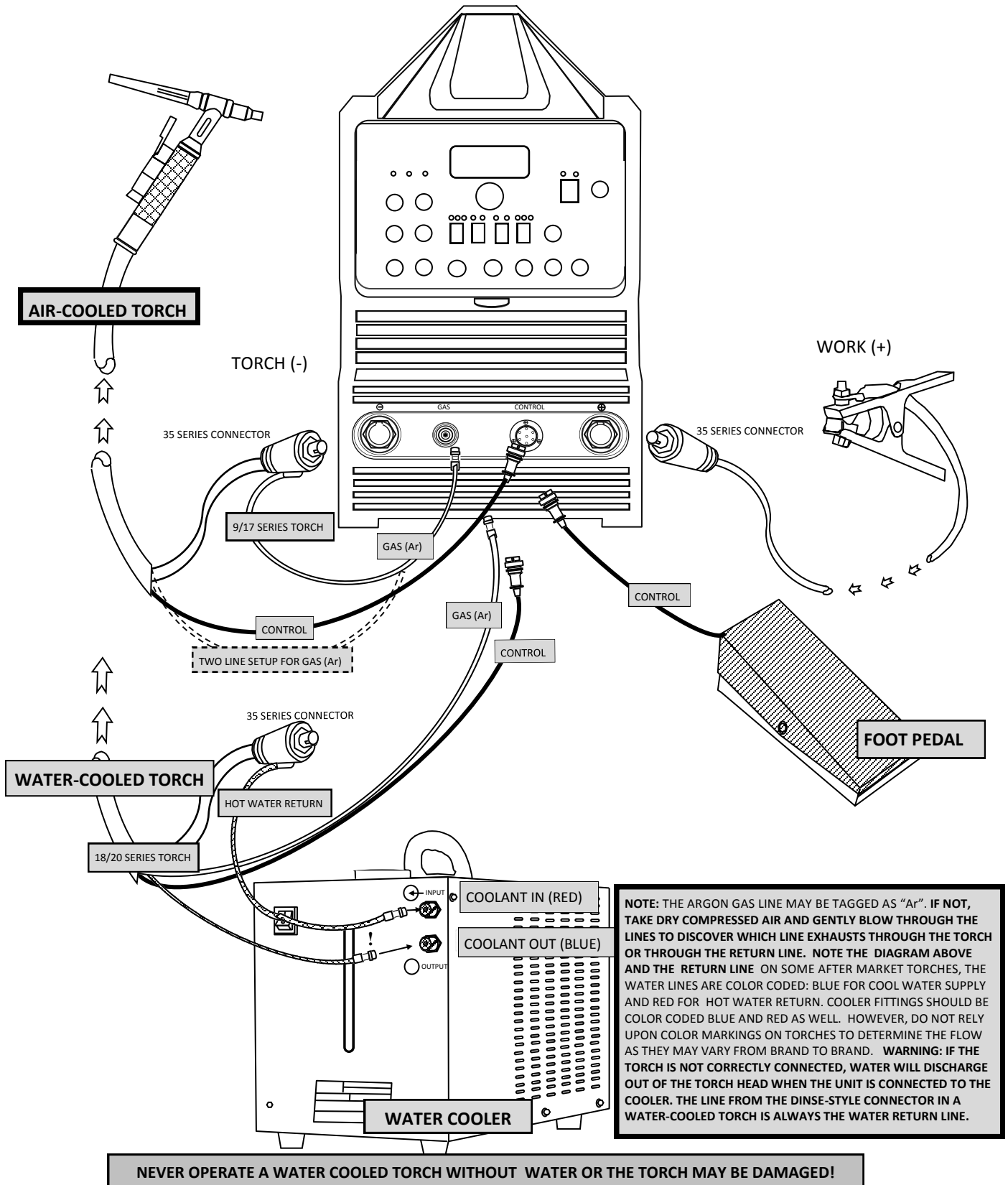
the welder. Allow a buffer distance of 2 ft from all sides, with a minimum distance of 18" clearance. Do not operate the welder in the immediate vicinity of the weld area or the discharge of air from the fan will cause turbulence and will destabilize the arc and cause weld porosity. Do not mount in areas that are prone to severe shock or vibration. Do not drop the unit. Lift and carry the welder by the handle. Strap the welder down for maximum stability during use. Do not direct metallic dust or any dirt toward the machine, particularly in grinding and welding operations. Flip down the clear front cover after completing adjustments and while in operation to protect the control panel.

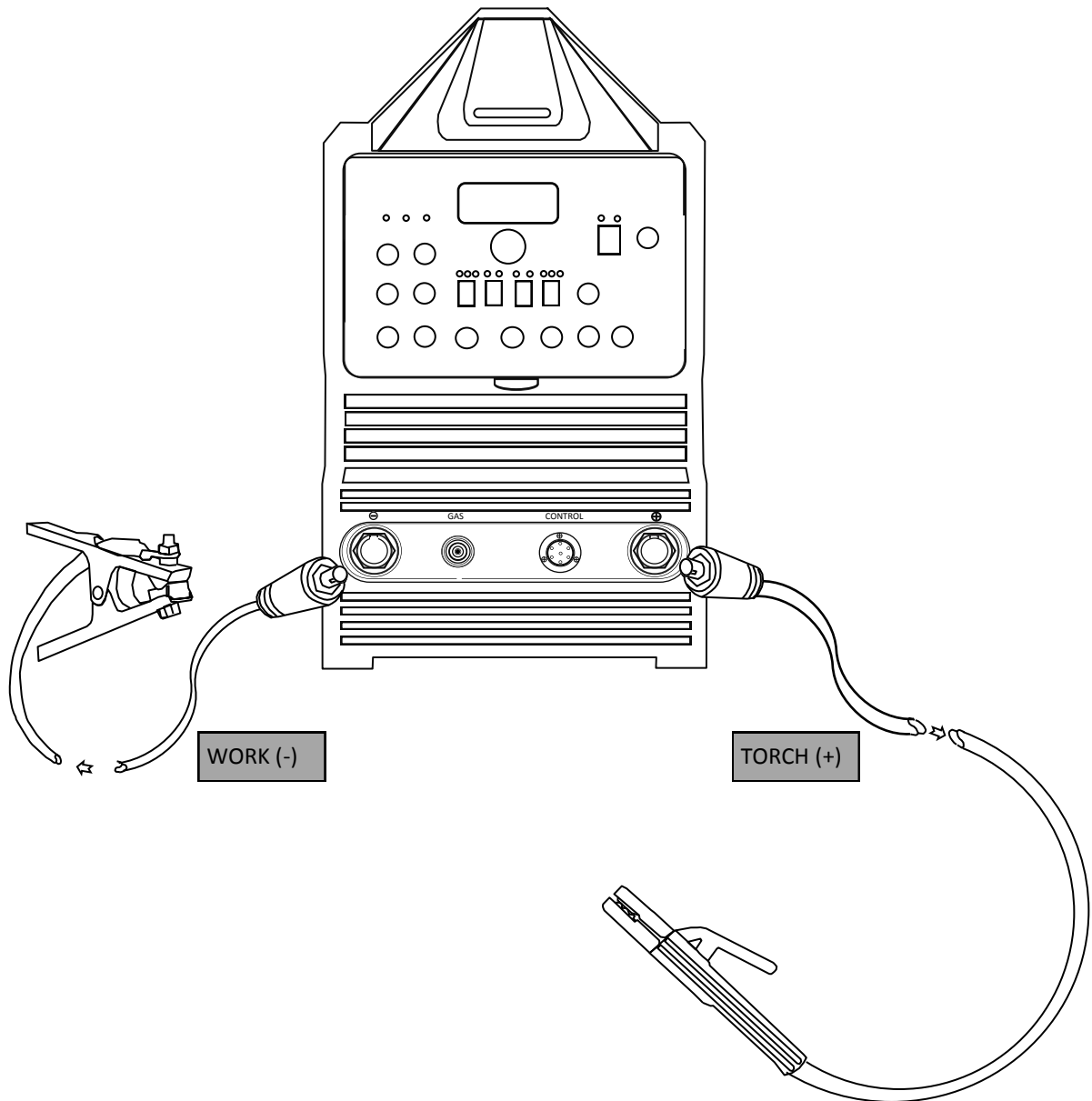
**Duty Cycle.** For the 250EX, the duty cycle is rated for 60% at 250 amps.(220/240 V 1 and 3 phase ). The duty cycle is based off a 10 minute duty cycle rating at 40°C. This means that the unit is capable of being operated at the stated amps for 6 out of every 10 minutes without a break to cool down the unit. This does NOT mean that the unit can work 60% of any greater length of time. A full 4 minute rest should be given to the welder for maximum life. The temperature light will come on and the welder will automatically stop welding when an overheat condition has occurred. The fan and display will continue to be on. Do not turn the unit off, or attempt to reset the unit for at least 15 minutes after an overheat condition has occurred as heat will continue to be generated by and transferred to the electronics after welding has ceased. Welding in humid or hot conditions greater than 40°C can negatively affect duty cycle. Once the overheated condition has cleared, welding can resume. Do not operate the welder with the covers removed.

**HF Start.** The welder uses High Frequency to start the arc. The new design of the 250EX features a new, solid state design that eliminates point gap adjustment issues and the related maintenance needs. A bright blue light as may still be seen emanating from the front panel during starts though as some of the HF components are translucent and is not a cause for concern.

 **This manual has been compiled to give an overview of operation and is designed to offer information centered around safe, practical use of the welder.** Welding has inherent dangers. Ultimately, only the operator of this welder can ensure that safe operating practices are followed, through the exercise of common sense practices and training. Do not operate this machine until you have thoroughly read the manual, including the safety section. If you do not have the skill or knowledge to safely operate this welder, do not use this welder until formal training is received.

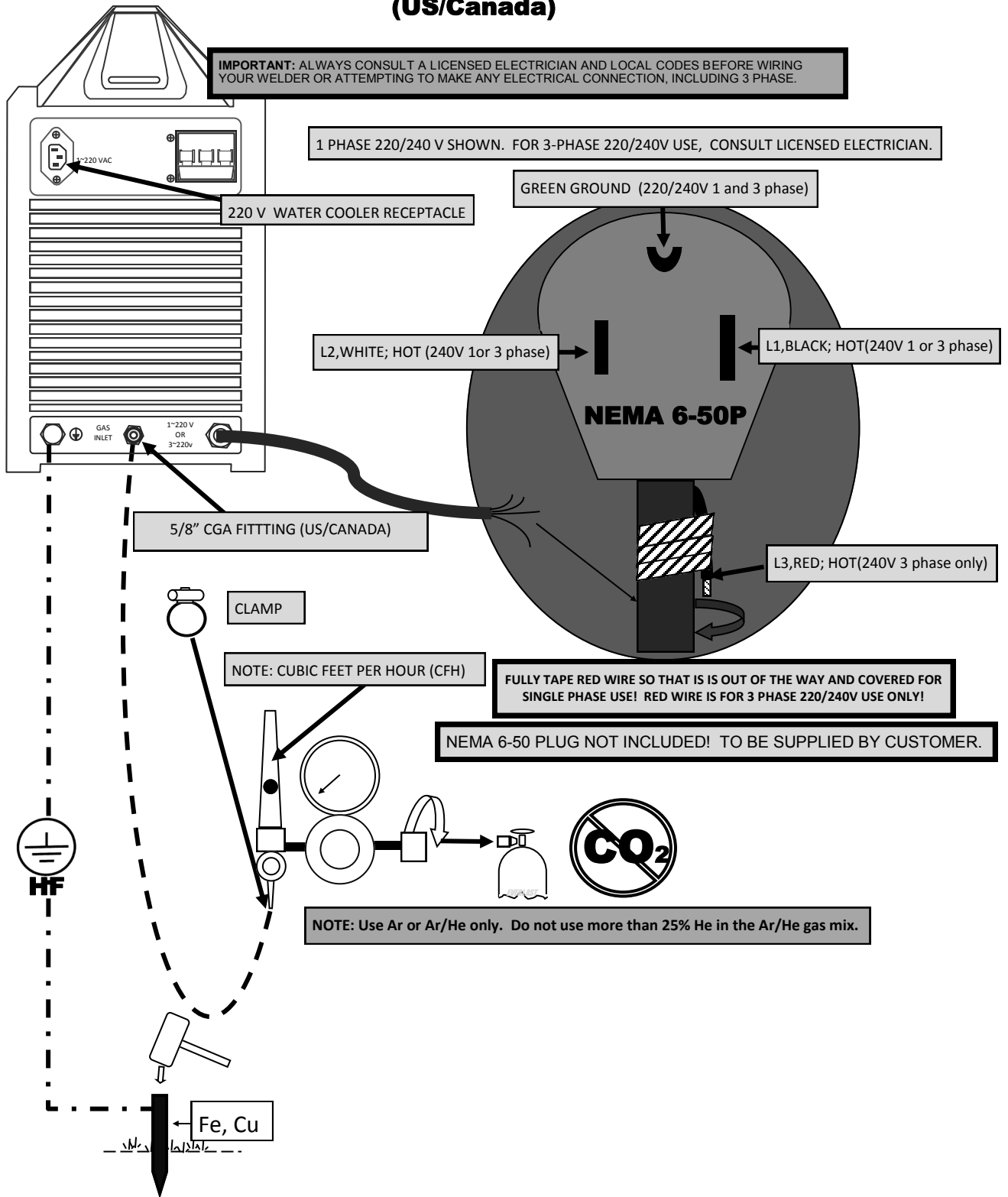
QUICK SETUP GUIDE: TIG CONNECTIONS



**QUICK SETUP GUIDE: STICK POLARITY AND CONNECTIONS**

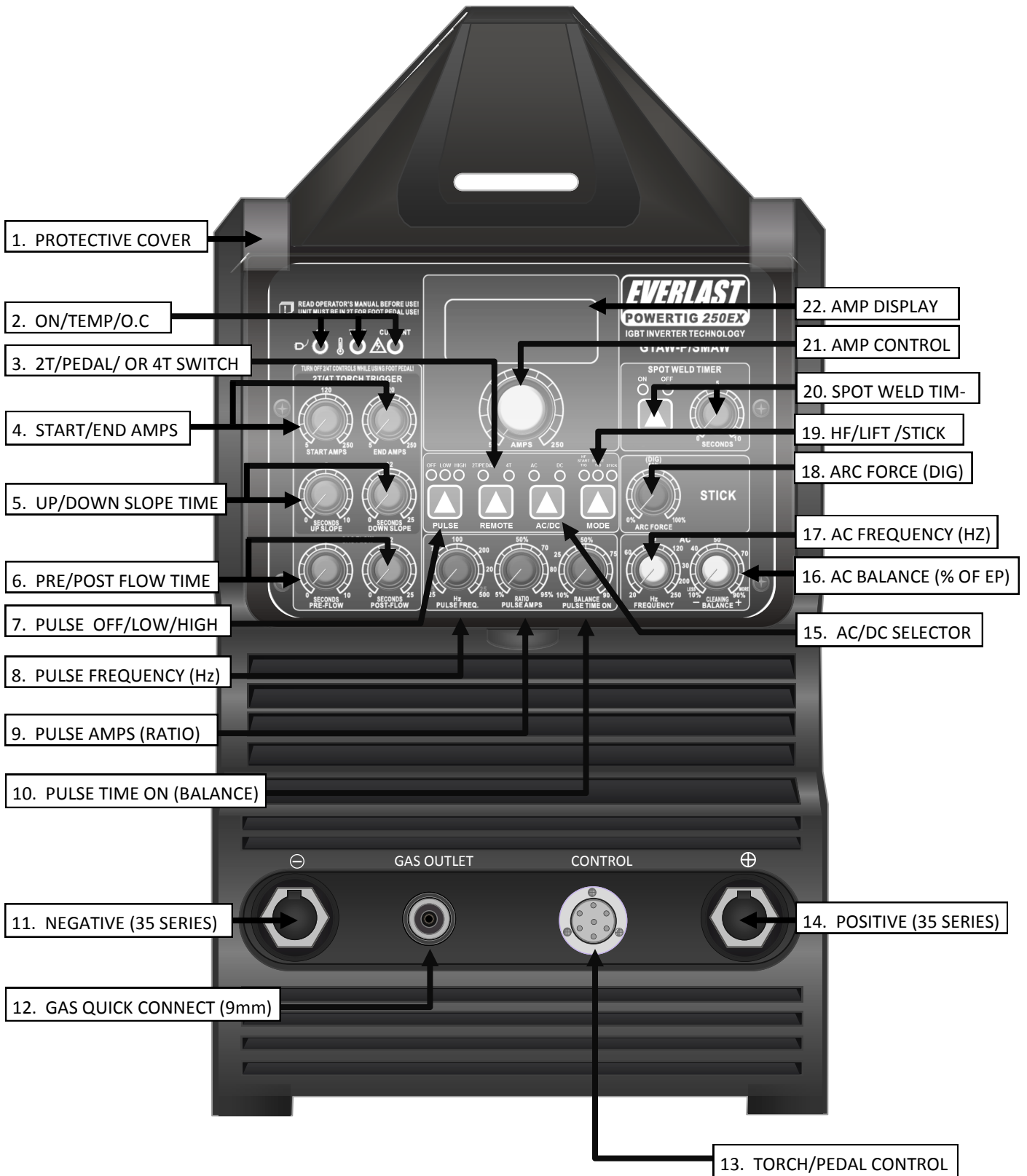
**NOTE:** Most stick (SMAW) electrodes require electrode positive (also referred to as DCEP + or reverse polarity) to weld correctly. Some welding electrodes (rods) may be rated for use with both electrode positive and electrode negative (DCEN(-) or straight polarity) by the electrode manufacturer. However, most electrodes are generally welded with an electrode positive connection regardless of the electrode negative polarity capability. When the electrode (welding rod) is rated for DCEN(-) use and is used that way, the arc may not penetrate as fully or may seem softer.

QUICK SETUP GUIDE: REAR CONNECTIONS AND WIRING (US/Canada)



**NOTE:** TO PREVENT STRAY HIGH FREQUENCY INTERFERENCE, THIS UNIT PROVIDES AN ADDITIONAL GROUNDING POINT AT THE REAR OF THE UNIT. IT SHOULD BE DIRECTLY GROUNDING THROUGH A SEPARATE WIRE TO AN OUTSIDE METAL ROD DRIVEN IN THE GROUND. THIS HELPS PREVENT BLEEDBACK OF HF INTO THE POWER GRID, AND HELPS MUTE HF INTERFERENCE. ADDITIONALLY, ALL SURROUNDING METAL OBJECTS SHOULD BE GROUNDING INCLUDING THE TABLE, PIPES, WALLS ETC. TO PREVENT ELECTRICAL INTERFERENCE WITH OTHER CIRCUITS. DO NOT

**FRONT PANEL FEATURES AND CONTROLS**



## FRONT PANEL FEATURES AND CONTROLS CONTINUED

POWERTIG 250EX FEATURES	PARAMETERS	PURPOSE
1. Protective Cover	N/A	Clear hinged cover protects control panel from damage. Keep the cover closed during welding operations and any time during storage.
2. On/Temperature/ Over Current	Warning Indicator Or Fault	On Indicator: Confirms unit is switched on. Temperature Indicator: Lights up and interrupts welding output until the welder has cooled within normal limits. Allow 15 minutes before attempting to reset the welder manually by cycling the power switch. If the light does not go out after cycling the power switch, and the cooling period has been observed, contact Everlast. Over Current Indicator: Lights up when an over/under voltage or current has been detected. Eliminate the source of the surge and manually cycle the power switch to reset the welder. If the light remains on after cycling the power switch, this may indicate an internal unit fault was created during the over current event. In this case, contact Everlast. Do not continue to reset the unit after two reset attempts.
3. 2T/4T /Remote Sequencer Switch	2T, Pedal/4T	Press the button to select the torch switch function mode. Select 2T for simple press-and-hold operation of the torch switch or for use with foot pedal. For 2T operation with the torch switch: 1) Press and hold the switch to start the arc and weld. Release the switch to cease welding. Select 4T for advanced use of the sequencer controls on the panel such as start/end amps, up/down slope. To operate in 4T mode with the torch switch/remote: 1) Press and release the switch to start arc. 2) The current will begin to upslope to reach normal welding current. 3) Press and hold switch to begin downslope. 4) Release switch to terminate the arc. In 4T mode, if the puddle becomes too hot, it can be cooled by lightly tapping the switch to begin downslope and tapping again to restart upslope before end current is reached. Setting a long downslope helps improve heat control in 4T as the torch switch is cycled between downslope and upslope before the arc is terminated. IMPORTANT: To use the foot pedal: Select 2T, then turn start/end amps and up/down slope to the minimum settings or the foot pedal will not operate correctly. Do not use the foot pedal in 4T mode as it will result in the inability to ramp amps up or down.
4. Start/End Amps Control (Part of 2T/4T sequencer)	5-250 Amps	Serves as the 2T/4T beginning and final amp value while using the torch switch. Allows the arc to be started and ended at a different amp value than normal welding while using the torch switch. Typically used to start the weld puddle more quickly/slowly and to fill the puddle at the end of the weld at a lower amp value to prevent cracking. May be used as a "hot start" when using the foot pedal to improve starting. If used this way, the amps will start hotter than the minimum amperage set by the foot pedal. This can cause the arc to flare briefly at start. Otherwise, all sequencer settings should be turned to the minimum setting (fully left) while the foot pedal is in use or there may be a arc flare or delay in arc start or termination. The foot pedal will not override these features.
5. Up/Down Slope Control (Part of 2T/4T sequencer)	0-10/ 0-25 Seconds	Up-Slope ramps amps from the selected start amp value up to the welding amp value according to the time selected while in 2T/4T mode. Down-Slope ramps amps from the welding amp value down to the end amps value to fill the weld crater according to the time selected while in 2T/4T mode. Set both controls to the minimum setting while using the foot pedal or irregular operation will occur.
6. Pre/Post Flow Control	0-10/ 0-25 Seconds	Pre-Flow selects the amount of shielding gas flow time before arc starts. It is used to purge and flood the weld area with shielding gas so the arc start is stable and weld is porosity free. The pre-flow will delay the arc start. Set pre-flow for .5 to 1 second for best starting. The arc will not start until the pre-flow time cycle has finished. The Post-Flow setting dictates the amount of shielding gas flow after arc ends to shield the weld to prevent oxidation and cool the torch. A starting point is to use 1 second post-flow for every 10 amps used. The torch should dwell over the puddle during this time.
7. Pulse Off/Low/High Switch	Off/ Low/ High	Press the touch-pad button to select the desired pulse mode. Low range offers a finer range of control over the pulse amps, ranging from .5 Hz to 25 Hz. High range operates with a more coarse range of control from 25 Hz to 500 Hz. Note: The low range is highlighted in green numbers.



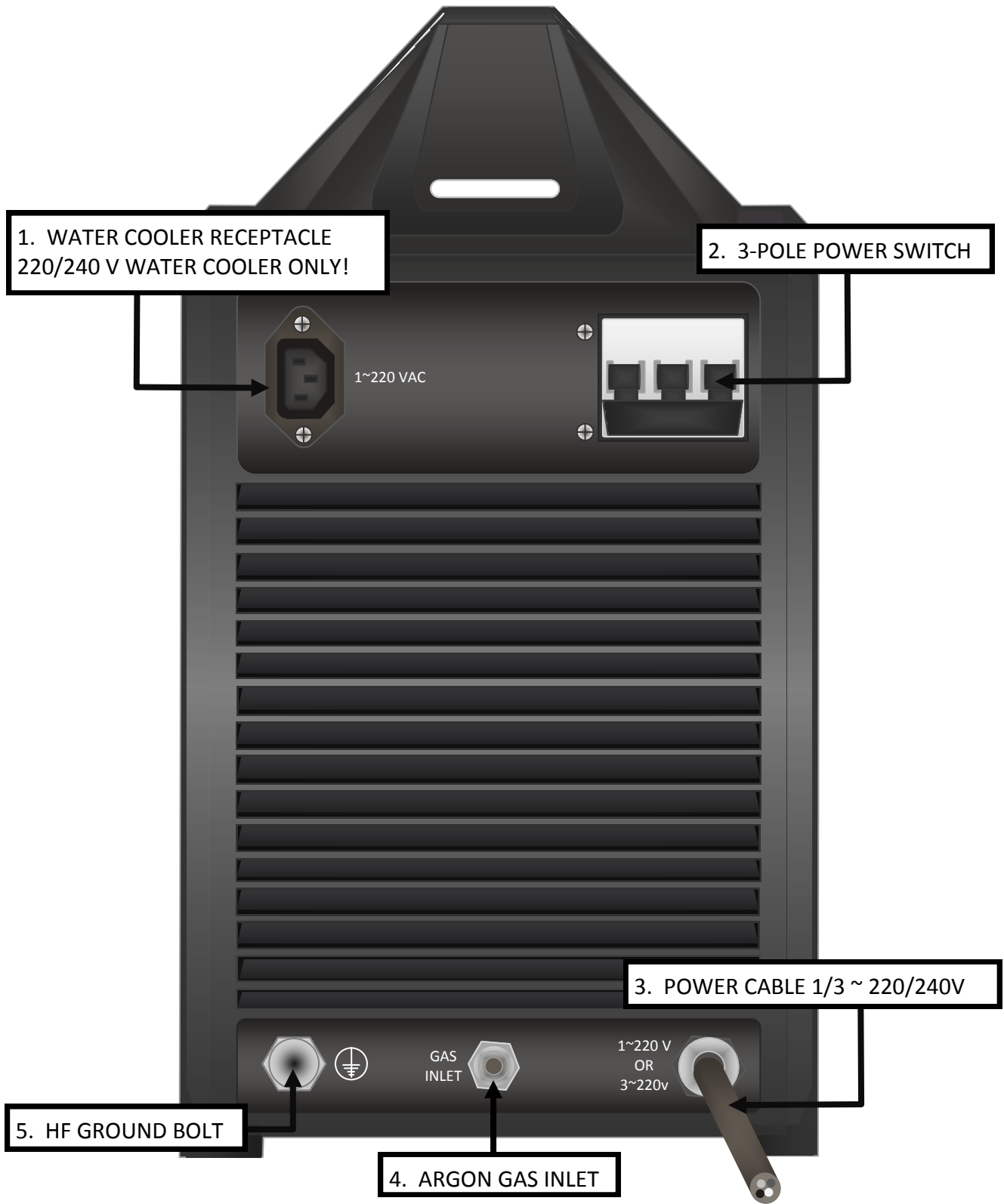
## FRONT PANEL FEATURES AND CONTROLS CONTINUED

POWERTIG 250EX FEATURES	PARAMETERS	PURPOSE
<b>8. Pulse Frequency Control</b>	.5-500 Hz	Represented as Hertz (Hz), the Pulse Frequency adjusts the actual number of times per second the pulse makes one complete cycle between the welding amp value (Peak) and the pulse amp value (Background or base amps). This is also commonly referred to as Pulses Per Second (PPS). Low pulse frequencies can be used to time the addition of the filler metal and improve weld appearance. High pulse frequencies are useful for preventing excessive puddle wicking on edges and thin seams. Also, it is useful for overall heat control while welding thicker gauges of metal, which can be used to help control warping. Higher pulse frequencies are often used in automated TIG welding processes. Caution: Welding at high pulse frequencies increases the decibel level of the arc. Wear hearing protection while welding at high pulse frequencies.
<b>9. Pulse Amps (Ratio) Control</b>	5-95%	Sets the value of the Pulse Amps (also referred to as the base or background current) during the pulse cycle. This is expressed as a percent of Welding Amps. For example, a welding amp value of 125 amps with a pulse amps setting of 50% will result in a pulse amp value of 50 amps. The Pulse Amp setting chosen represents the lowest amp value achieved during the pulse cycle. When the pulse mode is selected, the position of the main amp knob determines the Welding Amp (Peak) value.
<b>10. Pulse Time On (Balance) Control</b>	10-90%	Sets the duty cycle (balance) of the pulse. This is accomplished by dividing or skewing the amount of time the pulse spends at the maximum amp value of the pulse against the Pulse Amp (background current) stage which is the lowest part of the pulse. The pulse consists of two stages: Welding Amps (Peak) and Pulse amps (Base/Background current). This is represented by a % of total time during one full pulse cycle that the pulse spends in the upper (peak) stage. Practically speaking, the Pulse Time on control can be used to increase or decrease welding amp (Peak) time relative to the pulse amp time of the cycle to help manage heat input.
<b>11. Negative Connector</b>	35-70 mm <sup>2</sup>	Location of the negative terminal connection. DINSE-style connector. (35 Series) For Stick: Work Clamp connection. For TIG: Torch Connection.
<b>12. Quick Connect Gas Outlet</b>	9 mm	Connects the gas supply to the TIG torch. To connect: Push the torch fitting into the connector until the collar slides forward with a click. To Release: Slide the collar back.
<b>13. Control Connector</b>	7 Pin	Connect the foot pedal or torch switch to this socket to control the welder. Only the foot pedal or torch control connector can be plugged in at one time. If the torch has a torch switch feature, tie the loose connector back or leave it hanging while using the pedal.
<b>14. Positive Connector</b>	35-70 mm <sup>2</sup>	Location of the negative terminal connection. Dinse-style. (35 series) For Stick: Electrode Holder Connection. For TIG: Work clamp Connection
<b>15. AC/DC Selector</b>	AC/DC process	Select DC output for Steel, Stainless and most metals. Select AC output for Aluminum and Magnesium alloys.
<b>16. AC Balance Control</b>	10-90% of EP	Selects the percentage of Electrode Positive (EP) used during the AC welding mode to provide to provide the needed cleaning. Represented as a percent of EP, it actually divides the relative amount of time that the AC cycle spends in Electrode Positive and Electrode Negative polarity during one full AC cycle. In short, it controls the balance between cleaning and penetration to achieve the best balance or desired effect while welding in the AC mode. When the control knob is rotated left, more Electrode Negative is present and more penetration will be achieved. When the control knob is rotated clockwise, more Electrode Positive is present and more cleaning (cathodic etching) action will be achieved. Too much cleaning action will result in the balling of the tungsten tip, nodules or splitting, requiring the use of a larger tungsten necessary for the same amperage range to prevent tungsten issues. Too little cleaning action will result in a dull, dirty or sooty looking weld. Remember: This is expressed as a percent of full Electrode Positive. This unit uses 100% Electrode Positive as the point of reference, which may be contrary to what the user may find in some other brands. Using the welder in excess of 50% EP can quickly vaporize the tungsten and reduce welding capability when all other variables are the same. For most welds, no more than 45% cleaning is needed. Ideally, start with 30% EP as a reference point, then adjust it up or down to achieve best results.

## FRONT PANEL FEATURES AND CONTROLS CONTINUED

POWERTIG 250EX FEATURES	PARAMETERS	PURPOSE
17. AC Frequency Control	20-250 Hz	Defines the number of times per second that the current alternates polarity while being used in the AC mode. To achieve greater arc focus (constriction) and increase puddle agitation while welding in AC mode, increase AC frequency. This will allow pinpoint use on thin materials, and improve penetration on thicker materials. Ideal adjustment range is usually 100-150 Hertz. For comparison most transformer welders in the US operate on 60 Hz. Impressive results can be achieved through using the middle or upper frequency range of this welder. Lowering AC frequency will widen as well as soften the arc but can reduce the overall level of arc control. On the other hand, lowering the AC frequency can help to extend the capability of the welder to weld thick metals if a lower AC balance setting is used. Caution: Increasing the AC frequency also increases the decibel level and can injure hearing. Wear hearing protection to prevent hearing damage.
18. Arc Force Control (DIG)	0-100%	Expressed as a percent, arc force regulates the arc response in a short arc condition as the voltage begins to drop. Used only in the stick mode, the Arc force automatically compensates for the voltage drop by modifying the volt/amp curve to maintain the energy needed to weld. The percentage referred to is the percentage over the actual welding amperage that the selected arc force setting provides.
19. HF Start/Lift Start/Stick Switch	HF/Lift/ Stick	This button selects the type of TIG start used. HF is touch free and activates during start only. Lift start requires brief touch to metal to draw an arc and is good for applications where sensitive electronics are present. This also selects the Stick welding process.
20. Spot Weld Timer Control/Switch	On/Off	Activates Spot Weld Timer circuit. To activate, press button to turn on. Then select desired amount of arc time on. Select 2T and use with either the torch switch or foot pedal. The arc will start and stay activated for the period defined by the control knob. After it times out, the arc will automatically terminate. This is feature is good for spot welding panels or tacking up during fabrication. This will help make consistent sized spot welds and tacks. It may also be used with CNC circuits to time spot welds. (Use pins 1 and 2). Contact Everlast for further support and use of the Spot weld timer with CNC related equipment if needed.
21. On/Temperature/ Over Current	Warning Indicator Or Fault	On Indicator: Confirms unit is switched on. Temperature Indicator: Lights up and stops welding output until the welder has cooled within normal limits. Allow 10 minutes before attempting to reset manually by cycling the power switch. If the light does not go out after the cool down period by cycling the switch, or if comes on again when the arc is struck, contact Everlast. Over Current Indicator: Lights up when a voltage /amp surge has surpassed the units capabilities. Eliminate the source of the surge and manually cycle the power switch to reset. If the light remains on after cycling the switch, this may indicate a unit fault created during the over current event. In this case, contact Everlast.
22. Amp Control Knob	5-250 Amps	Sets Maximum limit for Amps with foot pedal or torch. Sets higher amp value for pulse.
23. Amp Display	N/A	Displays maximum selected amps until the weld is started. Displays actual amps while welding. Display may cycle rapidly and randomly after pulse has been turned on. This is normal. The meter "samples" the pulse at a fixed rate and is not synchronized with the pulse. Immediately after the pulse is turned on, a short delay is built in that prevents the display from cycling to allow the pulse to be adjusted. Once the adjustment is finished, pulse will begin to cycle after a few seconds if no input is made.

**REAR PANEL FEATURES AND CONTROLS**



## REAR PANEL FEATURES AND CONTROLS CONTINUED

POWERTIG 250EX FEATURES	PARAMETERS	PURPOSE
1. Water Cooler Receptacle	IEC 60320-1 "C-14"	This connection supplies power to the Everlast PowerCool 300 water cooler. This is a 220 VAC outlet. Do not use this connection to power any other device. 4 amp max.
2. HF Ground Bolt	N/A	HF energy can be devastating to surrounding electronic equipment. If the operating environment includes electronic equipment, this connection can serve as a direct path to an outdoor grounded metal rod that is isolated from the main electrical circuit to help bleed off excess HF circuit. All metal parts inside the building should be grounded as well, including pipes, tables, and even metal siding. HF energy has been known to bleed back into the power grid and disrupt electronic devices further down the grid. If the point gap becomes out of adjustment, more HF energy may build up, or even jump across circuitry within the welder. It is recommended that a small, separate ground wire (minimum 14 gauge) be attached at this point while in use.
5. Gas Input Connection	5/8" CGA Fitting ( )	This is the connection point where the regulator connects to the welder. The unit is supplied with tubing and clamps which connect this fitting to the regulator. Welders for the US and Canada use an industry standard 5/8" CGA fitting for compatibility with different brands of regulators. Use two wrenches to tighten the regulator to the welder, one to hold the welder fitting and the other to tighten the regulator fitting. Do not overtighten. Do not use one wrench or the fitting will eventually turn in the plastic housing and cause damage. If you suspect leaking, test the connection switch a solution of mild soapy water. If bubbles are seen, retighten or reinstall the tubing. Use any thread tape sparingly to prevent clogging of the system.
4. Power Cord	220/240 V 1 and 3 phase.	The PowerTIG 250 EX can be used with either one or three phase 220/240 V power, including good quality 208 V power. The power cord contains 4 separate wires. Everlast uses standard wire color codes for welders. Standard welder wire colors are L-1 black (hot), L-2 white (hot), and green (ground) for 1 phase 220/240 V. Standard wire colors for 3 phase 220/240 V are L-1 black (hot), L-2 white, L-3 red (hot) and green (ground). Do not attempt to use a 4 wire 1 phase 220/240 connection. <b>NOTE: In many home circuits, red and black are the power wires. But in standard welding circuitry, white and black are hot wires. Green is always the ground in both circuits. There is NO neutral in a standard welder circuit.</b> The suggested single phase plug for the PowerTIG 250 EX is the NEMA 6-50, which is the standard 50 amp welder plug used on single phase welders in the US and Canada. See wiring diagram for more details on wiring this plug. Always consult a licensed electrician who is aware of local codes before attempting any wiring of the welder or of the power circuits. Everlast is not responsible for any miswiring or damage caused to the unit by miwiring the welder. If additional help is needed, contact Everlast. <b>WARNING: DO NOT CONNECT THE WELDER TO 460/ 480 V 1 OR 3 PHASE POWER , OR SEVERE DAMAGE WILL RESULT TO THE WELDER!</b>
5. 3-Pole Power Switch	On/Off	The breaker switch has 3 poles. It serves as the On/Off switch for the welder. Always turn the welder on and off by the switch first before using any disconnect. In single phase, only two poles are active. The remaining pole is inactive until it is connected to three phase power.

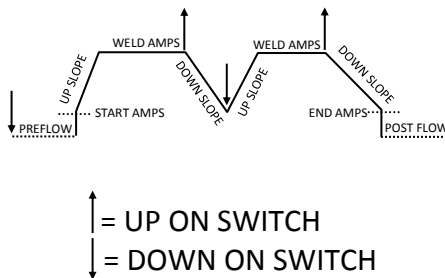
## NOTE:

Never operate welder on a generator that is not certified by its manufacturer to be "clean" power, which is usually considered to be less than 10% total harmonic distortion. Less than 5% is preferred. Operating the unit on a square wave output or modified sine wave generator is strictly prohibited. Contact the manufacturer of the generator for this information. Everlast does not have an "approved" list of generators. But, if the generator is not listed as clean power by its manufacturer, then operation is prohibited. Generators that do not at least meet the operating input requirements of the welder should not be used with the welders. Surge amp capability of the generator should equal or exceed the maximum inrush demand of the welder. But the surge capability should not be used as the only factor. The regular, running output of the generator should match or exceed the running or "rated" demand of the welder. Any damage done by operating the welder on a generator not specified by its manufacturer to be "clean", will not be covered under warranty. This also includes suspect power sources where voltage is below 208 V and above 250 V.

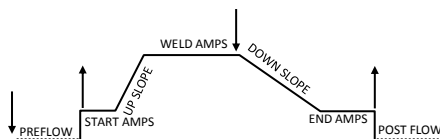
**Welder Function Summary and Explanations.**

1. *2T/4T sequencer.* The 2T/4T feature allows operation of the TIG welder without a foot pedal. In many circumstances, a foot pedal is not practical for use. So, the 2T/4T function has been created to allow programming of the welder to simulate the activities of the foot pedal while providing more accurate control. The “T” refers to the number of “travels” of the remote switch required to operate the programming of the sequencer. 2T is essentially a “press and hold” operation and all programming is cycled automatically. Releasing the switch begins the final stage of programming. 4T operates differently in the fact that each touch activates a different stage of the programming, allowing for greater control. Also, in 4T, while actually welding at full amps, no finger contact with the switch is required. Following the graphic lines below, you can visually trace the activity and function of each part of the welding cycle. In either 2T or 4T operation the programming can be reset to “upslope” before reaching the end amp stage by pressing the switch once more. See the graphics below for further explanation. The up and down arrows indicate the switch travel direction.

**2T Torch Operation Effect on Weld Cycle**



**4T Torch Operation Effect on Weld Cycle**

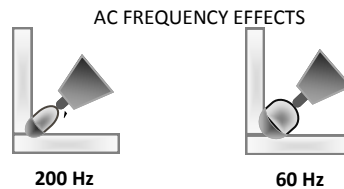


Most of the green coded controls on the welder panel are devoted to the use of the 2T/4T operation and should not be used with foot pedal. The following features are exclusive features that can only be used with the 2T/4T sequencer function:

- 1) Start/End Amps
- 2) Up Slope/Down Slope

Pre-Flow and Post-Flow are features that work in conjunction with both the foot pedal and the 2T/4T sequencer. The start will be delayed until the preflow cycle has finished. Set for .5-1 seconds for best results. Add more pre/post flow time for larger welds.

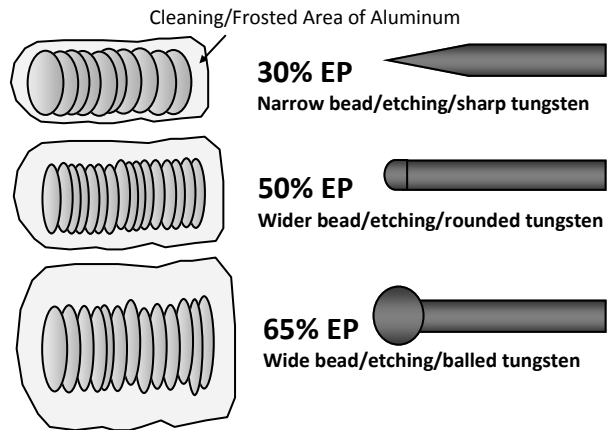
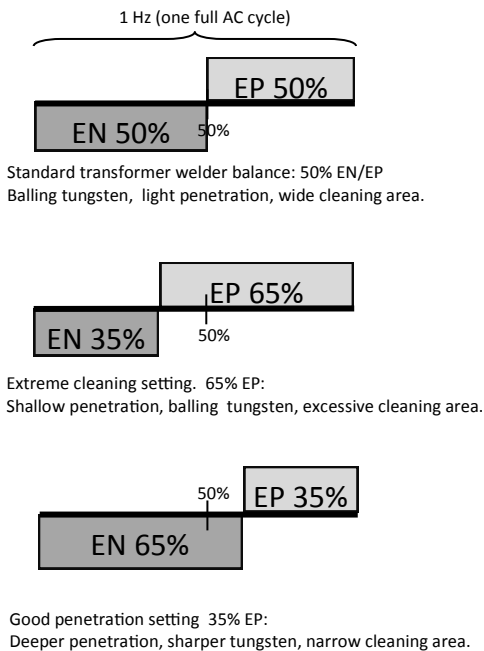
2. *AC Frequency.* The AC frequency only applies to the AC mode TIG mode. Standard transformer welders typically have a fixed frequency of 60 Hz which is essentially the line input frequency supplied by the power company. But with inverters, the AC frequency adjustment is practically limitless due to the IGBT components that create the welding power. Frequency adjustment is useful to help improve the directional control of the arc, and to focus the arc so that a narrower bead profile can be achieved. Also, at higher frequencies, the puddle agitation is greater which improve the breakup of undesirable oxides. A setting of 100-120 Hz is a good starting point. See the graphic below.



3. *AC Balance.* The advanced form of AC square wave output is formed by alternating polarity rapidly between electrode negative and electrode positive, creating a wave form that resembles a square “sine” wave when viewed on an oscilloscope. Normally, with standard transformer welders, both standard sine wave and even square wave welders have little or no way to adjust the balance of EN to EP, which results in having to weld with a molten ball at the tip of the tungsten and a less stable arc. Electrode negative (EN) provides penetration in the TIG welding process. Electrode positive (EP) creates a strong reverse flow of electricity that breaks up the weld-resistant oxidation that covers aluminum and magnesium components. EP also places a lot of heat on the tungsten. In a “balanced” wave where both EP and EN are equal in time length (50%), penetration is reduced and overcleaning results in wide etch lines running parallel to

the side of the weld. Not all weld conditions will be alike, so more cleaning is required at times than others. Similarly, more penetration will be required at times than others. Ordinarily, about 30-35% electrode positive is considered an ideal amount (65-70% electrode negative). This means that more heat is put into the work than is placed on the tungsten. A sharper point can be used. Cleaning is still sufficient at that level. Good results can be achieved with about 30% EP or less. The cleaning action is still visible even at these levels. Ideally, the cleaning action should be adjusted until a small amount of frosting can be seen no more than 1/8" distance from the edge of the weld. If a piece of metal is particularly heavily oxidized or dirty, more cleaning action will be required. If too much cleaning action is used, the tungsten will begin to ball and even may start to burn away. If this much cleaning action is needed, then switch to a larger size of tungsten that can handle the increased heating level. Signs of too little cleaning action while welding aluminum include soot, porosity, and dull looking (scummy) welds. A dedicated stainless steel brush and suitable aluminum cleaner such as acetone should be used before starting any aluminum weld to help break up the heaviest oxide layer so less EP is needed and better penetration can be achieved.

**EXAMPLE: AC EP (+) BALANCE**



**NOTES:**

1. Due to the rapid cycling of the inverter, High Frequency (HF) is not used except to start the arc. In a transformer welder, the HF would remain on to stabilize the AC arc, but in an inverter, this is not necessary. So, the HF switch refers only to the Start of the arc, and not to AC operation. However to reduce tungsten contamination, you should only operate the AC mode with the HF start selected.
2. The addition of Helium to Argon can increase the welding capacity of the welder and alter the amount of cleaning typically needed. Do not exceed 25% or arc starts may become more difficult and erratic.
3. If arc wandering in AC is a problem, reduce cleaning percent, then if it continues, reduce gas flow and then check for drafts.
4. Yellow-coded AC controls only apply during AC TIG operation and do not affect DC settings .
5. If cleaning lines are excessive at low settings, it is likely not a welder issue, but rather, a speed/heat issue. The longer the electrode remains in the same place, the more the cleaning area will widen. If you find yourself with this issue, try increasing the amperage to travel faster. If overheating is feared, then use pulse to increase forward travel speed to reduce the cleaning lines. You should only suspect a welder issue if adjusting the AC balance to above 40-60% does not begin to ball the tungsten.
6. If tungsten balling is experienced at settings below 40%, make sure that the torch is in the negative connector and that pure or Zirconiated tungsten is NOT being used.
7. Do NOT use pure tungsten or Zirconiated tungsten in an inverter to weld in AC or DC mode.

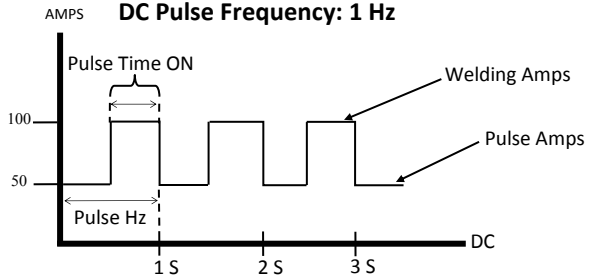
4. *Pulse*. The pulse creates two amp values, a high and a low value that cycle back and forth between each other while welding. The upper amperage is called the Welding Amps (sometimes called Peak current) and the lower amperage is called pulse amps (sometimes called “background” or “base” current). This creates a situation where penetration can be achieved without overheating the metal, particularly on metals that are prone to structural deterioration or burn through. In effect, you are creating an average of amps but receiving the benefits of both high and low amperages. The PowerTIG series feature three adjustable parameters concerning the pulse:

1. *Pulse Amps*. Both welding amps and pulse amps are independently set. Adjust the welding amps with the main control knob and the pulse amps with the pulse amp knob. However, when you adjust the pulse amps, you are actually setting a fixed ratio of amps expressed as a percentage of Welding Amps. When setting Welding Amps, the welder will display actual amp value when the pulse is turned on. However, after about 3-5 seconds, if you do not begin adjustment of the pulse amps, the meter will begin to fluctuate rapidly (depending upon frequency setting), sampling the pulse setting at odd points along the pulse cycle. To be able to read and set the pulse after the default setup time expires, turn the pulse frequency to the minimum setting first, then adjust the pulse amps. (If the default time expires before you are able to set the pulse amps, you may get a fairly accurate reading of the pulse amperage while it is pulsing slowly.) Alternatively, you can turn the pulse off and back on to reset the default display time. The display is not synchronized with the pulse so it samples at a set rate that is independent of pulse changes, which yields randomly fluctuating numbers. As you increase welding amperage, the pulse will maintain the same ratio of amps you have selected. To adjust the pulse amps to a desired setting using an example of 100 Welding Amps, setting the pulse amps to 50% yields a 50 amp value for the pulse amps. The foot pedal will control both Welding Amps and Pulse Amps according to the percent selected on the panel.

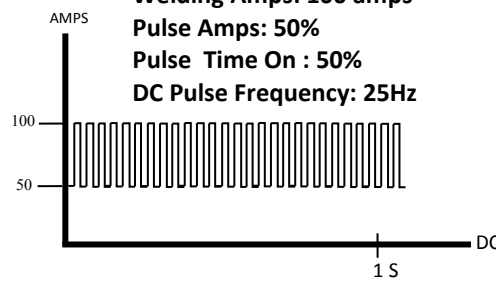
2. *Pulse Frequency*. Pulse speed is the same as frequency is measured in the standard unit “Hertz”. Simply explained, it is the number of pulses per second that occur. Pulse frequency controls the arc constriction and also helps with heat management.

3. *Pulse Time On (Balance)*. Pulse Balance is the per-

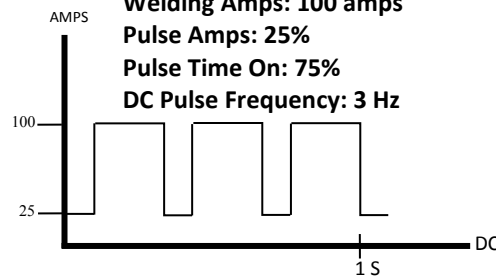
**EXAMPLE 1**  
**Welding Amps: 100 amps,**  
**Pulse Amps: 50%**  
**Pulse Time On: 50%**  
**DC Pulse Frequency: 1 Hz**



**EXAMPLE 2**  
**Welding Amps: 100 amps**  
**Pulse Amps: 50%**  
**Pulse Time On : 50%**  
**DC Pulse Frequency: 25Hz**



**EXAMPLE 3**  
**Welding Amps: 100 amps**  
**Pulse Amps: 25%**  
**Pulse Time On: 75%**  
**DC Pulse Frequency: 3 Hz**



centage (%) of time that the pulse spends in the peak (welding) amp stage of the cycle. Increasing the Pulse time will increase the duration the welding amp stage of the cycle which in turn will increase heat and wetting in of the puddle. Pulse Balance is also known in the industry as duty cycle. For welding purposes the term “Pulse Time On” is used here.

Setting up the pulse is not a process with a fixed adjustment procedure. Changes to frequency, balance, and time will skew the final result. A slow pulse with a equal 50% pulse time and somewhere around a

30-50% Pulse Amp setting is typically used to help with timing the addition of filler metal to the weld puddle. A higher pulse frequency level combined with variations in Pulse Time On and a narrow/wider ratio can be used to prevent burn through and speed up welding on thin materials. It can also help maintain a proper bead on a thin edge weld or prevent burn through on extremely thin metal. A fast pulse speed will make fine ripples in the weld while a slow pulse speed will give a much more coarse, but visually appealing result. There are limitless ways to adjust the pulse. Keep in mind though, that the basic purpose of the pulse is to average the heat input while maintaining penetration. **Do not attempt to use pulse while in stick mode.**

5. *Arc Force Control/Surge Amp Control.* When stick welding, arc force is used to help improve the performance of the welder with certain metals and welding rods. The arc force boosts current flow to match the demands of arc length and position. As an arc is held shorter, voltage tends to drop so extra amps are introduced to help maintain a steady arc. Surge amps boost the starting amperage briefly to heat up the welding electrode and weld area so the arc starts cleanly, without sticking or porosity. Both controls are inactive while welding in TIG mode.

6. *Foot Pedal. 22k  $\Omega$ .* Select 2T on the panel. Select the maximum amp value desired on the panel. The foot pedal will only control amps up to the range governed by the main amp control. If more amperage is needed raise the amp level on the panel. The foot pedal also controls both Welding Amps, and Pulse Amps through the ratio established by selecting the pulse Amp % on the panel. Welding with pulse and the foot pedal takes practice, as it will seem the welder is welding at less amps than it is. Always set the panel amps to about 25% more than what is needed. Increasing the amps more than this margin on the panel will reduce the accuracy of the foot pedal by lowering the resolution of the foot pedal. Be sure to turn the start/end amps and up/down slope to the minimum settings or the 2T programming will be active and interfere with pedal operation. The pedal cannot override the 2T amp and slope controls. For more accurate and responsive control, Everlast offers a US made foot pedal available as an additional option.

7. *Water-cooled torch.* A water cooler is necessary for use with the PowerTIG 250 EX torch. The units are equipped with a WP 18 water-cooled torch. Using a

water-cooled torch even briefly without water can seriously and permanently damage your torch. Torches used without water-coolers cannot be warranted unless cleared by Everlast. Everlast carries water-coolers designed to cool the maximum amp capacity of the welder. If you are not able to provide a water cooler or have not purchased a water cooler, you will need to use an air cooled (gas cooled) torch such as a 17 or 26 series, purchased separately.

All consumables should be interchangeable with other brand torches with similar designations. They should be available for local purchase. No special consumables are required. Although a small starter kit of consumables is included, you will need more consumables fairly quickly. **No Tungsten is included with the starter kit. Actual starter kit contents may vary.** Contact Everlast if you desire to purchase an air cooled torch that is complete, ready to go.

8. *DINSE style connector.* Everlast uses a 35-70mm<sup>2</sup> connector for both negative and positive connectors, which is a standard connector within the welding industry. This is referred to by different manufacturers as a 1/2" or 35 series DINSE-style connector. The connector allows the use of almost any brand or style of TIG torch.

9. *7 pin remote/foot pedal connector.* This 7 pin connector is available from Everlast should it become damaged. See the Pin-out reference found near the end of this manual.

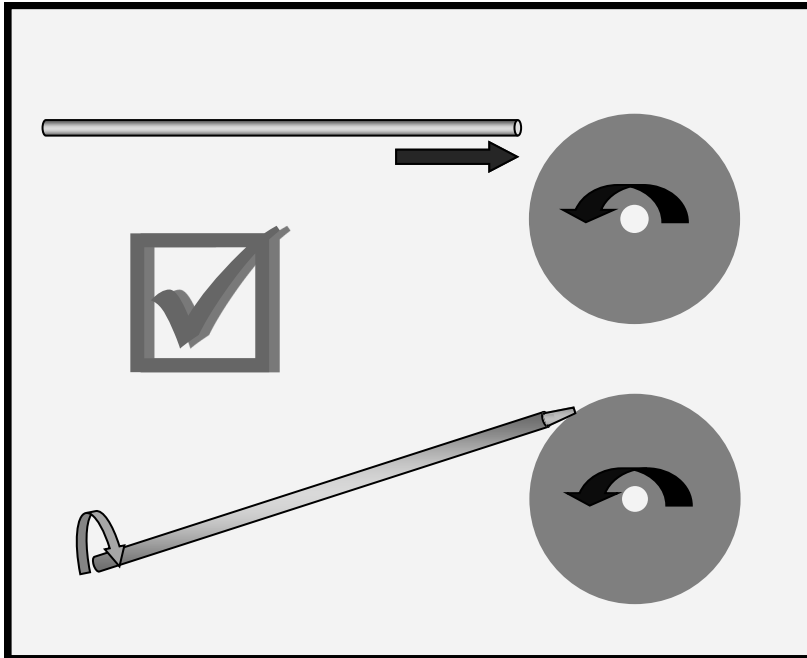
10. *Argon quick connect.* This is a 9 mm size quick connect nipple. These are commonly available from Everlast or online sites which carry torches and fittings. Should you need a new one for your torch or damage yours, consult Everlast. Do not use a nipple that is scarred, bent or otherwise deformed. Damage to the female connector may result. Serious leaks may occur.

12. *Low amp starts.* The units have been configured to be able to start and weld at approximately 5( $\pm$ 3) amps. However, to obtain the most stable starts, a slightly higher amp setting may be required, or a smaller tungsten may be necessary. After the arc is started, amps may be reduced to a minimum level. This is accomplished with setting a higher start amp value (2T/4T) or by pressing down more on the foot pedal until the arc stabilizes, then backing the amps down slowly until the arc stabilizes at the minimum selected amps.

13. *Argon Regulator.* The argon regulator is calibrated in cfh. (subject to change)



TUNGSTEN PREPARATION

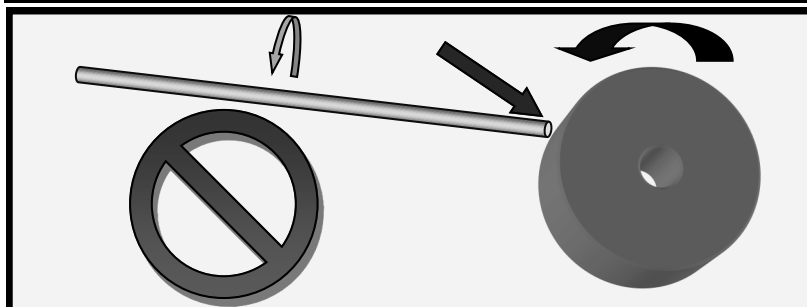


1. Use a dedicated grinding wheel or contamination may result. Do not breath grinding dust! Wear eye protection and gloves.

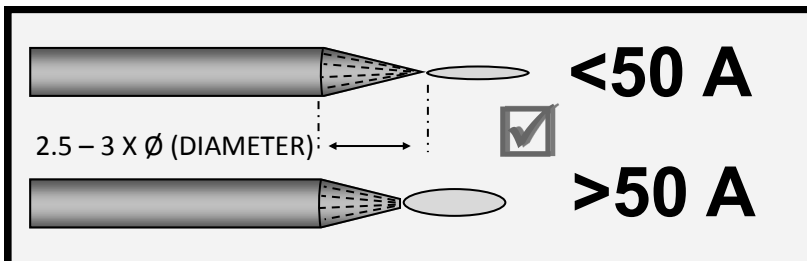
2. Hold Tungsten firmly.

3. Grind perpendicular to grinding wheel face. Allow tungsten to grind away slowly, creating point.

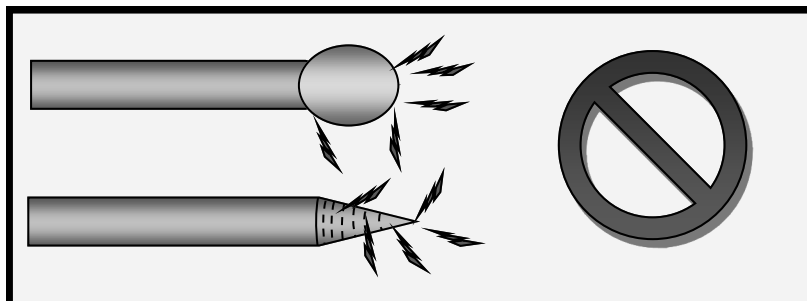
4. Rotate tungsten quickly as it is being ground to keep point even and symmetrical.



DO NOT GRIND TUNGSTEN PARALLEL TO WHEEL FACE OR AN UNSTABLE ARC WILL RESULT.



Use a point for low amp use to help control the arc. Create a slight truncation on the tip for higher amp use for best arc stability. Grind the tip so that it is 2.5- 3 times longer than the tungsten is wide (Diameter).



In AC mode, do not ball the tungsten as you would with a transformer welder. An erratic arc will result. Make sure that all grinding marks run parallel to the tip. Concentric grinding marks will cause an erratic arc.

NEVER USE PURE (GREEN) TUNGSTEN IN AN INVERTER WELDER TO WELD ALUMINUM.  
SEE FOLLOWING RECOMMENDATIONS ABOUT TUNGSTEN SELECTION FOUND IN THIS MANUAL ON NEXT PAGE.

## LIFT START TIG OPERATION

**Note:** A Lift TIG start should be done with a nearly seamless motion. Use a light touch and a quick motion for best results.

**FOR DC USE. NOT RECOMMENDED FOR AC.**

1. Position the edge of the ceramic cup on the metal. Press and hold the torch switch or press the foot pedal. Wait for the Pre-flow to start. (Make sure pre-flow is set for less than .5 seconds or start will be delayed.)
2. Quickly rotate cup so that the tungsten comes in brief contact (< .5 seconds) with the metal.
3. After contact with the metal, quickly rock the torch back so that the tungsten breaks contact with the metal.
4. An arc should form. As the arc grows, raise the cup up off the metal and slowly rotate the torch into welding position.
5. Leave 1/8" or less gap between the tungsten tip and the metal. Proceed with welding, leaving the torch inclined at a 15° angle.

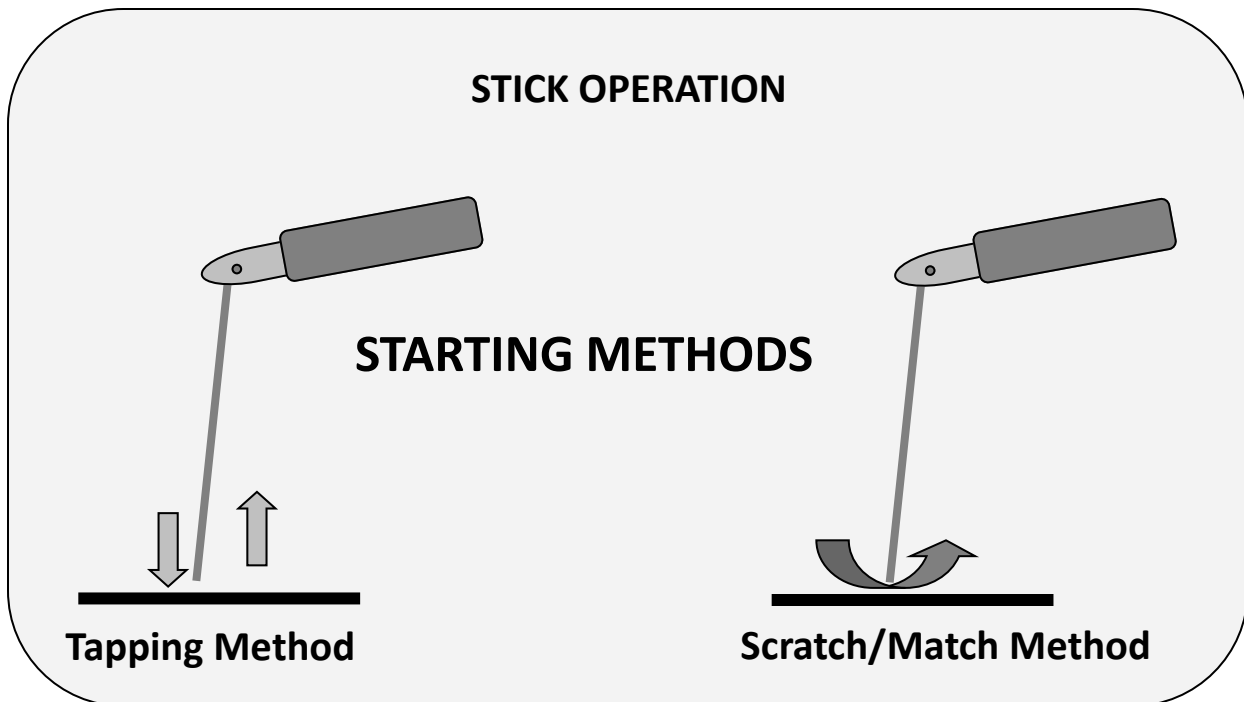
## HIGH FREQUENCY START TIG OPERATION

**FOR AC OR DC USE.**

1. Position the point of the sharpened tungsten about 1/8" or less above the metal.
2. Press the torch trigger or press the foot pedal to initiate the arc. The HF arc will be initiated. It may appear briefly as a blue spark.
3. An arc should form, almost immediately after the pre-flow cycle is completed. HF arc initiation will be delayed by the amount of pre-flow time used. If arc does not start after the pre-flow interval, and the HF is creating a spark, then check the work clamp contact with the work piece. Move the tungsten closer to the work. Repeat steps 1 and 2.
4. Leave 1/8" or less gap between the tungsten tip and the metal and proceed with welding, leaving the torch inclined at a 15° angle.

## General TIG Arc Starting Steps

1. Turn unit on, allow time for power up cycle to complete its start up process.
2. Select either HF or Lift Start TIG with the HF/Lift Start/Stick selector switch. Select DC mode with the AC/DC torch switch.
3. Plug in Torch and select 4T or 2T mode with the selector switch **OR** plug in foot pedal and select 2T.
4. If using the torch switch select start/end amps amperage by rotating the knob to increase or decrease amps for starting and ending the weld.
5. If using the torch switch, select up/ down slope time by rotating the knob to increase/decrease the ramp up or ramp down time of the amperage.
6. Adjust amps with amp control knob.
7. Start arc as depicted above.
8. If using 2T, continue to hold the torch switch until you are ready to stop welding. Release the switch. The Arc will then cease.  
If using pedal raise foot fully off the pedal and arc will stop automatically.
9. If using 4T, release the switch, after arc initiates. Continue to weld without holding the switch down. To stop, press and release the switch again.



1. Turn on the power switch on the rear of the unit. Allow unit to cycle through its start up program.
2. Select the Stick mode with the HF/Lift Start/Stick selector switch.
3. Make sure electrode holder is connected to the positive terminal and the work clamp is connected to the negative connector. Make sure the connectors are twisted until light resistance is met.
4. Select the amps desired. Use the electrode diameter selection chart in this manual to determine the approximate range of amps suitable for the rod size selected. Consult the welding electrode manufacturer's recommendation for proper amperage range. Each manufacturer has specific recommendations for its electrodes. Usually these can be found on the packaging or on the respective manufacturer's website.
5. Use the arc force control to select the desired arc characteristics, creating the desired arc characteristic and automatic amp response needed to maintain the arc when voltage falls below the threshold. 6011 Cellulose electrodes will require more arc force control than other rods, but each brand and size will weld a little differently. The arc force control setting will vary from person to person as well, with different rod angles, positions, and arc lengths all factoring into the arc force control performance.
6. Strike the arc with either the tapping method or the match strike method. Beginners usually find that the match strike method yields best results. Professionals tend to gravitate toward the tapping method because of its placement accuracy which helps prevent arc striking outside of the weld zone.
7. Terminate the arc by flipping the tip of the electrode up quickly with a quick flick of the wrist. Alternately pull directly back on the rod with a brisk smooth motion.

**IMPORTANT:** Do not weld in the TIG mode with the stick electrode holder still attached.

**GENERAL POLARITY RECOMMENDATIONS\***

\*Follow manufacturer of stick electrode for complete polarity recommendations

PROCESS	TORCH POLARITY	WORK POLARITY
TIG (GTAW)	-	+
STICK (SMAW)	+	-

**TIG (GTAW) OPERATION GUIDE FOR STEEL (ALUMINUM)\***

\*As a general rule, set amperage using 1 amp for every .001" of metal thickness for aluminum. Less is required for DC.

METAL THICKNESS	WELDING AMPS (A)	TUNGSTEN DIA.	Ar FLOW RATE
1-3 mm/.040"-1/8"	40-80 (60-125)	1-2 mm/.040"-3/32"	8-15 CFH /4-7 lpm
3-6 mm/ 1/8"-1/4"	80-200 (125-200)	2-3 mm/ 3/32"-1/8"	15-25 CFH/ 7-14 lpm
6-10 mm 1/4"-3/8"	150-200 (200-250)	3-6 mm/ 1/8"-1/4"	20+ CFH/10-15 lpm.

**STICK (SMAW) OPERATION GUIDE**

METAL THICKNESS	ELECTRODE SIZE	WELDING AMPS
< 1 mm/.040"	1.5 mm/ 1/16"	20-40
2 mm/.080"	2 mm/3/32"	40-50
3 mm/ 1/8"	3.2 mm/1/8"	90-110
4-5 mm/ 3/16"	3.2-4 mm/ 1/8"	90-130
6-10 mm/ 1/4"-3/8"	4-5 mm/ 1/8"-5/32"	130-200

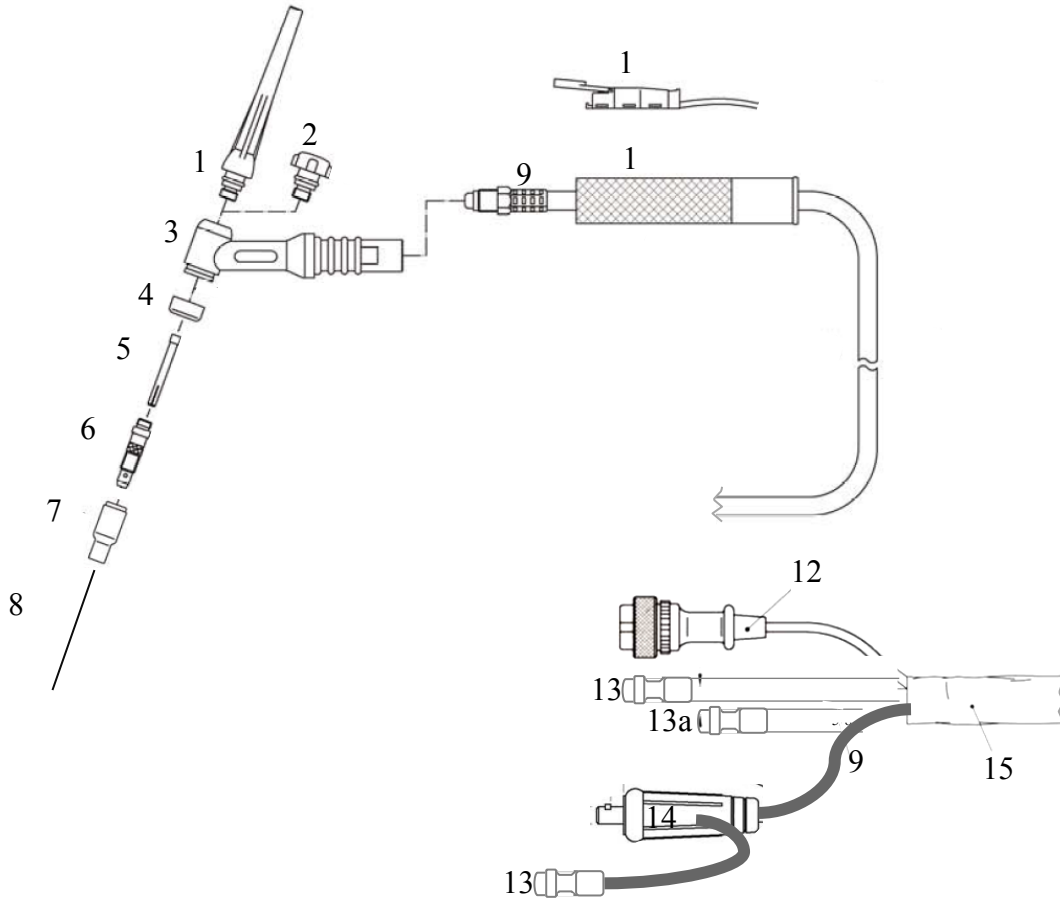
**TUNGSTEN SELECTION GUIDE FOR AN INVERTER**

TYPE	PERCENT	COLOR	PROCESS	RECOMMENDATION
Pure	100% Tungsten	Green	AC	NOT RECOMMENDED! Do not use in an inverter.
Thoriated (slightly radioactive)	2% Thorium	Red	AC/DC	YES. Great for all purpose welding. Most economical.
Ceriated	2% Ceria	Orange	AC/DC	YES. Good for low amp use.
Lanthanated	1.5% Lanthanum	Gold	AC/DC	YES. Best alternative to 2% Thoriated. Tough performer.
Lanthanated	2% Lanthanum	Blue	AC/DC	YES. Slight advantage over 1.5% Lanthanated.
Zirconiated	1% Zirconia	Brown	AC	NOT RECOMMENDED! Do not use in an inverter.

NOTE: Thoriated tungsten is slightly radioactive, but is commonly used in the US. Care should be used when grinding so as not to breath the dust. If you have concerns about Thoriated (red) tungsten, choose from Lanthanated or Ceriated tungsten.

### EXPANDED VIEW OF TIG TORCH

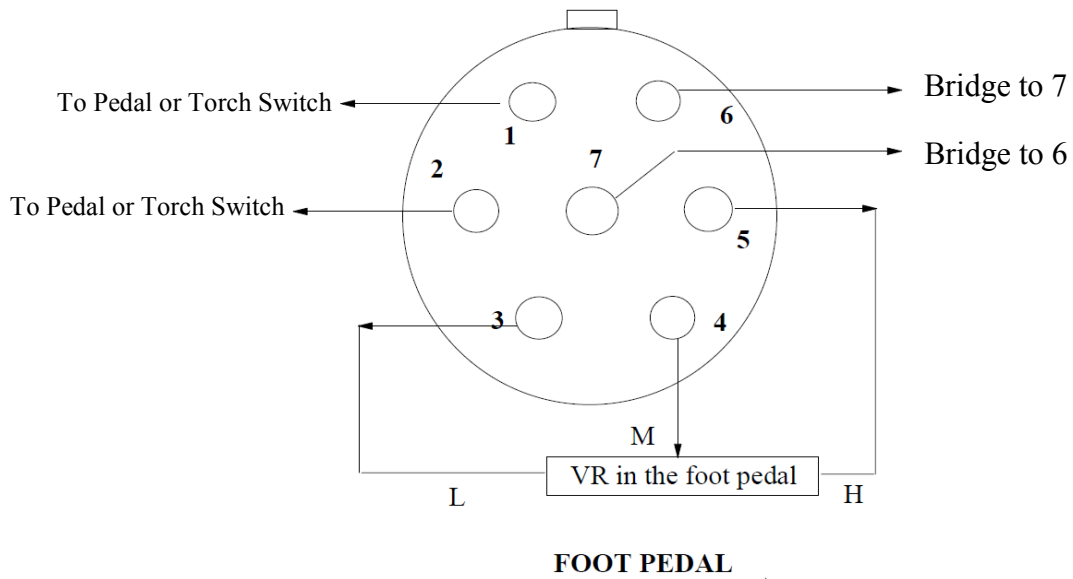
(Actual appearance may vary slightly from what is listed.)



NO.	PARTS FOR 18 Series Torch ( STYLE MAY VARY)	QTY.
1	Long Back Cap with O-Ring	1
2	Short Back Cap	Opt.
3	Torch Head	1
4	Insulator	1
5	Collet 1/16 or 3/32	1
6	Collet Holder	1
7	Ceramic Cup Assorted	1
8	Tungsten (customer supplied)	0
9	Torch Cable	1
10	Torch Handle (Blue ergo handle std, not pictured)	1
11	Torch Switch (Built into ergo handle, separate on straight handle)	1
12	Torch Switch Connector	1
13	9mm (1/8") b quick connect coupling (male) gas/water	1
13a		1
14	Power Connector with water return cable and fitting	1
15	Protective Synthetic Rubber Cover	1

**7 PIN CONNECTOR FOR 22K  $\Omega$  FOOT PEDAL**

Note: Previous models before mid 2015 typically used a 47k pedal. 22k is only for digital models of the PowerTIG 250EX.



TROUBLE:	CAUSE/SOLUTION
Machine will not turn on.	Check cords and wiring in the plug. Check circuit breaker.
Machine runs, but will not weld in either mode.	Check for sound work clamp and cable connections. Make sure work cable and TIG Torch are securely fastened to their terminal connectors. Reset main power switch if overcurrent light is on. Contact Technical Support.
Arc will not start unless lift started.	Check for good work clamp and all connections. Ground directly to the work. If all connections are secure, contact Everlast.
Tungsten is rapidly consumed.	Inadequate gas flow. Tungsten is too small of a diameter for amps used. Wrong shielding gas. Use only Ar. Using green tungsten. Use red thoriated or other color. Wrong polarity. Too much AC cleaning.
Tungsten is contaminated, arc changes to a green color. Weld is discolored or a dusty brown.	Tungsten is dipping into weld. Check and adjust stick out to minimum 1/8 inch. Tungsten is melting. Reduce amperage or increase tungsten size.
Porosity of the Weld. Discolored weld color. Tungsten is discolored.	Low flow rate of shielding gas. High flow rate of shielding gas. Too short of post flow period. Wrong TIG cup size. Possible gas leaks internally or externally due to loose fittings. Base metal is contaminated with dirt or grease.
Weld quality is poor. Weld is dirty/oxidized.	Eliminate drafts. Check if there is sufficient shielding gas left in tank. Check gas flow. Adjust for higher flow of gas. Listen for audible click of gas solenoid. If no click is heard, then contact Everlast Support. Clean weld properly, especially in Aluminum. Too short of post flow. Check tungsten stick out.
Over current/Duty cycle LED illuminates. Machine runs, but no output.	Duty cycle exceeded or Over current. Allow machine to cool. Reset main power switch after full cool down period. Make sure fan is not blocked. Check wiring.
Unstable Arc.	Poorly ground or shaped tungsten. Regrind to proper point. Too much AC positive polarity. Reduce balance to 30% or less. Increase AC Frequency. Bad work clamp or work clamp cable connection.
Other issues.	Contact Everlast support.

OPTIONAL ACCESSORIES:

	
EV-FP22DL Deluxe Foot Pedal	PC-250M Welding Cart
	
EV-FP22SSC US Foot Pedal	PCW300-240 Water Cooler
	
EV-200UW US Deluxe Regulator (CFH)	Everlast Brand Deluxe Torches*

\*Visit our website to view full selection of optional torches, and cable lengths and consumable kits. Also, be sure to ask us about our full line of CK-Worldwide TIG welding products and accessories.