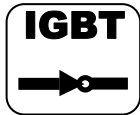


EVERLAST

POWERPRO 205Si

A DIGITALLY CONTROLLED PULSE TIG/STICK/PLASMA MULTI-PROCESS WELDER/CUTTER



Operator's Manual for the PowerPro 205Si ***Safety, Setup and General Use Guide***

Rev. 2 0 00328-18

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 accuracy of performance or for particular 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 via 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. 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: _____

Contact Information

Everlast US:

Everlast consumer satisfaction email: sales@everlastwelders.com

Everlast Website: everlastwelders.com

Everlast Technical Support: 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

Everlast Website: everlastwelders.ca

Everlast Technical Support: 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

SAFETY PRECAUTIONS

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 the welding and cutting environment can be extremely noisy. Ear protection is necessary to prevent hearing loss. Even prolonged low levels of noise is 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 you are comfortable with proper operation and are able to assume inherent risks of cutting or welding.

PowerPro 205Si



**Consumable Starter Kit
(Does not include Tungsten)**



iPT 60 Plasma Torch



**22K Ω
Foot Pedal Assembly**



Argon Regulator



**Air-Cooled
26 Series Torch Assembly**



Work Clamp



Stick Electrode Holder

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

SECTION 1**INTRODUCTION AND SPECIFICATIONS**

PowerPRO 205Si TIG/Stick Welder/Plasma Cutter	Specification
Process	AC/DC GTAW-P, DC SMAW and PAC
Inverter Type	DIGITAL IGBT Construction
Minimum/Maximum Rated Output TIG	AC: 20A/10.8V - 200A/18V (± 3A) DC: 5A/10.2V-200A/18V(± 3A)
Minimum/Maximum Rated Output Stick	5A/20.2V - 160A/28V (±3A)
Start Type	Solid State HF only (No lift TIG start available for this model)
HF Point Gap	Solid state/non adjustable
TIG Duty Cycle @ Rated Amps/Volts	60% @ 200A/18.0V 100% @ 200A/18 .0V
Stick Duty Cycle @ Rated Amps/Volts	35% @ 160A/26.4V 60% @ 130A/25.2V 100% @ 100A/24V
Plasma Cutter Duty Cycle @ Rated Amps/Volts	50A/100V @ 35% 40A/96V @ 60% 30A/92V @ 100%
OCV (U0)	TIG/Stick: 70V Plasma: 250V
Voltage Input (U1)	Standard 220/240V; 50/60Hz 1 phase
Maximum Inrush Amps (I1MAX)	34A
Maximum Operating Amps (Rated Effective) (I1EFF)	27 A
Maximum Air Supply Pressure (Plasma cutter)	90 psi from Air Compressor
Recommended Operating Pressure (Plasma cutter)	70-80 psi while air is flowing.
Recommended Minimum Air Compressor Size	5 CFM @90 psi, 20 gallons
Gas Pre-Flow /Post Flow Time	0-10 Seconds/ 0-25 Seconds
Start Amps/End Amps	DC: 5-200A/5-200A (±3A) AC: 20-200A/20-200A (±3A)
Up/Down Slope Time	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)	.5-250Hz
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 Multi-Process PowerPro 205Si offers an improved design with a new modular structure. This new design includes digital control and a more robust internal design to improve reliability and performance while simplifying circuitry and reducing weight. The key features of the PowerPro 205Si 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 Multi-Process TIG/Stick Plasma platform.
- B. Digital control offers more precise setting and control over parameters, offering a more satisfactory operating experience by minimizing the number of weak spots found in the typical TIG/Stick/Plasma multi-process welder/cutter unit.
- 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.
- H. Plasma operation has been improved with a new generation of torches featuring the new PT 60 torch.


General Use and Care: With proper care, the PowerPro'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 dis-

charge. 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 adjustment to protect the control panel.

Duty Cycle. For the PowerPro 205Si, the TIG duty cycle is rated for 60% at 200 amps. The duty cycle is based off a 10 minute duty cycle rating at 40°C. (35% for Stick/Plasma at 160/50 Amps.) This means that the unit is capable of being operated at the stated amps for 6 out of every 10 minutes without a break in welding to cool down the unit. (3.5 out of 10 minutes for stick/plasma operation.) A full 4 (6.5 stick/plasma) minute rest should be given if operating at or near maximum capacity of 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 operate. 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. The welder duty cycle interrupt is controlled by temperature sensors and not time sensors, so the duty cycle limiter function will differ somewhat from the actual time used based off the operating conditions in the welding environment.

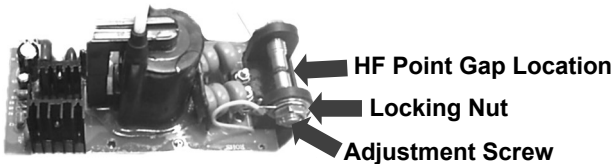
 **Operating the PowerPro unit in such a way that causes the unit to repeatedly surpass the duty cycle limit will significantly decrease the life-span of the electronics or cause permanent damage to the welder.** However, an occasional duty cycle interrupt event should not be an issue if the prescribed cool-down procedures are followed. If you find that the unit is being repeatedly operated up to and beyond the duty cycle limit of the machine, it is likely that a larger welder/cutter is needed for the job. Keep in mind many things can affect the stated duty cycle, including temperature, internal dirt and air flow around the welder.

HF Start. The welder uses High Frequency to start the arc. A bright blue light as may 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. To prevent wear to the contacts and possible damage to the circuitry, do not engage the HF with the foot pedal or torch switch without the intention of starting the arc. Overtime or when operated in dusty/dirty conditions, the point gap will need to be checked and readjusted.

Note: Although point gap adjustment is usually considered a part of regular maintenance, and is not an item covered by warranty, the following adjustment process is intended for experienced users only. If you suspect you have a problem with the point gap due to hard starting of the arc, contact Everlast Tech Support before proceeding with point gap adjustment for proper diagnosis and a more detailed adjustment procedure.

To open the unit to adjust the point gap:

- 1) **Unplug the welder. Wait 20 minutes to allow capacitors to discharge to prevent possible shock and injury. WARNING: If possible, do not touch unrelated circuits and components, especially capacitors, during this adjustment process to reduce the chance of possible shock and injury.**
- 2) Remove the Rear plastic cover by removing screws with a small screw driver, remembering to remove screws holding the cover that are located on the bottom. There is no need to remove the front cover.
- 3) Remove screws in metal cover. Gently spread the bottom of the cover with your fingers about 1" on either side. Simultaneously slide the metal cover toward the rear and pull up to remove the cover from the chassis.



- 4) Locate the HF board located toward the front of the unit. This board is mounted under the top metal pan and the points should be visible from the left side (side determined by facing the front of the unit). The points will have two carbon contacts hanging under the bottom of the metal pan. These will be held in place by two brass nuts that are used to lock the contacts in place. Check the point gap with either a feeler gauge by sliding it between the

points. Access may be tight, but try several angles to get the feeler gauge in between the points. The gap should be set to anywhere between .029" and .045", with .035" being preferred.

- 5) If adjustment is needed, loosen the locking nuts slightly so that the end of the brass contact holder can be rotated with a small flat bladed screw driver. Slowly adjust the points until slight contact is made with the feeler gauge. When completed hold the contact in place with the screw driver while the lock nut is retightened, making sure the contact holder does not rotate in the process.
- 6) Recheck the point gap. Make any necessary re-adjustments. Reassemble the unit.

General usage and design purpose.

Keep in mind, this unit has been designed to be a portable, all-in-one solution to many daily welding needs, where portability and space limitations are chief concerns. This unit is not intended or designed for production welding and fabrication duties. Rather this unit performs well as a go-almost-anywhere solution for on-the-spot general repairs, prototyping, or one-off work. The unit does have many useful features, but the portable nature of the unit requires that the torches and gases be changed over if swapping between welding and cutting operations. In environments where there is a constant need to go back and forth between welding and cutting, this changeover process may become time consuming. In this case, consider purchasing separate units for TIG/Stick and Plasma cutting duties.

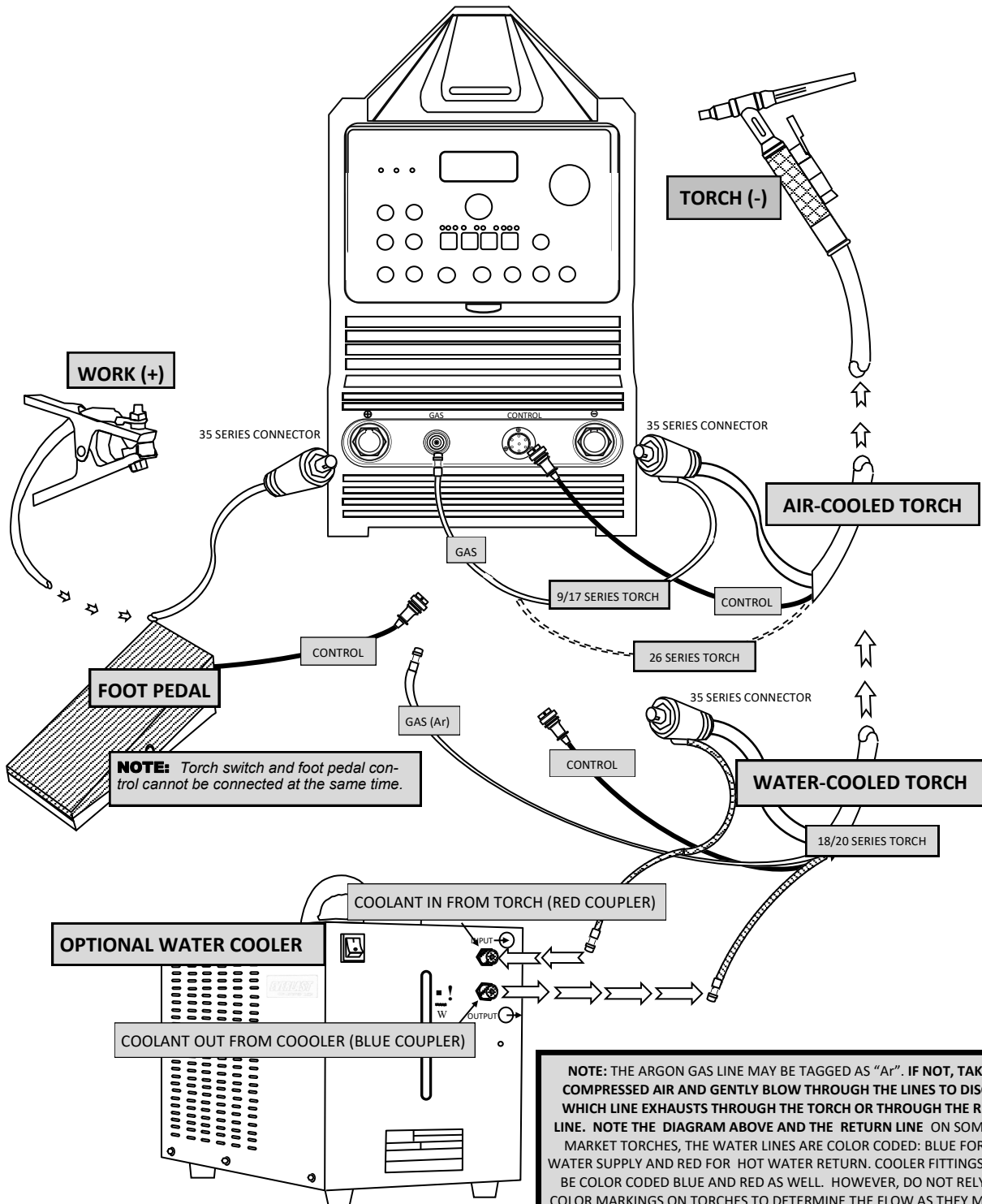
NOTE:

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 and/or knowledge to safely operate this welder/plasma cutter, then do not use this machine until formal training and instruction is received.

Important:

Do not use this machine with any type of CNC device intended for plasma cutting. It is not designed or intended for this type of extended service. Always purchase a dedicated Plasma cutter for this type of cutting. For CNC plasma cutting needs, consider the Everlast PowerPlasma line, and for dedicated CNC cutting, consider one of our PowerPlasma "C" series.

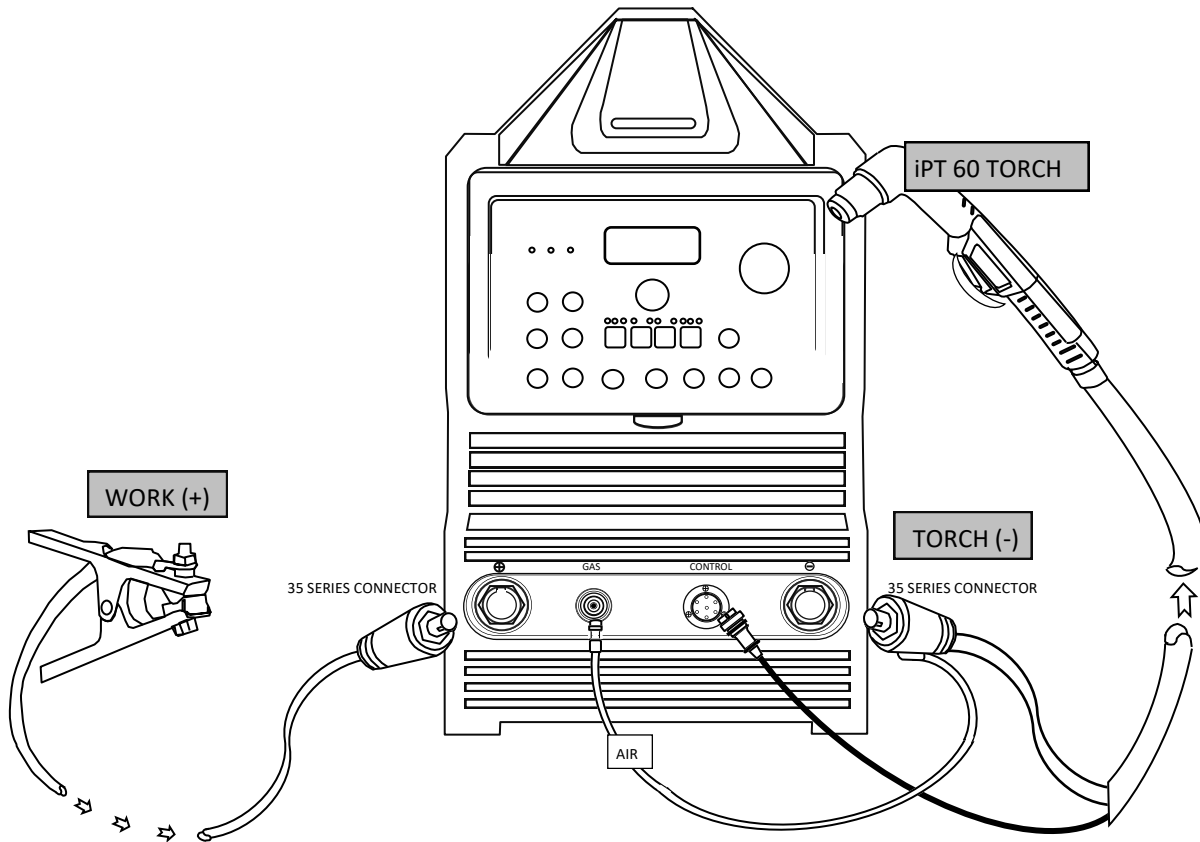
QUICK SETUP GUIDE: TIG CONNECTIONS



NOTE: THE ARGON GAS LINE MAY BE TAGGED AS "Ar". IF NOT, TAKE DRY COMPRESSED AIR AND GENTLY BLOW THROUGH THE LINES TO DISCOVER WHICH LINE EXHAUSTS THROUGH THE TORCH OR THROUGH THE RETURN LINE. NOTE THE DIAGRAM ABOVE AND THE RETURN LINE ON SOME AFTER MARKET TORCHES, THE WATER LINES ARE COLOR CODED: BLUE FOR COOL WATER SUPPLY AND RED FOR HOT WATER RETURN. COOLER FITTINGS SHOULD BE COLOR CODED BLUE AND RED AS WELL. HOWEVER, DO NOT RELY UPON COLOR MARKINGS ON TORCHES TO DETERMINE THE FLOW AS THEY MAY VARY FROM BRAND TO BRAND. WARNING: IF THE TORCH IS NOT CORRECTLY CONNECTED, WATER WILL DISCHARGE OUT OF THE TORCH HEAD WHEN THE UNIT IS CONNECTED TO THE COOLER. THE LINE FROM THE DINSE-STYLE CONNECTOR IN A WATER-COOLED TORCH IS ALWAYS THE WATER RETURN LINE.

NEVER OPERATE A WATER COOLED TORCH WITHOUT WATER OR THE TORCH MAY BE DAMAGED!

QUICK SETUP GUIDE: PLASMA CONNECTIONS



OPERATING NOTES:

1. For safest operation, be sure 2T is selected. Do not attempt to use the foot pedal to control the amps.
2. Do not attempt to use the plasma torch in any other mode or test in any other mode with torch connected.
3. Attempt to operate only with sufficient air pressure. If pressure is too low, the unit will cease output and the green indicator light next to the pressure gauge will go out to indicate the air pressure is too low to operate safely.
4. See torch manual included in this manual for best pressure settings and parts identification.
5. Do not exceed 90 psi air supply pressure from compressor or failure or leakage of internal line components may result.
6. Do not use with an oiler or with an air line that has had oil run through the line.
7. Adjust torch operation pressure to 72 psi (5 bar) for best results while post flow is flowing.
8. When using lower amperage levels, the nozzles will need to be changed out for ones with a smaller diameter orifice. Everlast is an OEM supplier of the torch but not the torch manufacturer. Smaller diameter nozzles are available through authorized distributors of the Innotec IPT60 torches or contact Everlast to purchase direct.

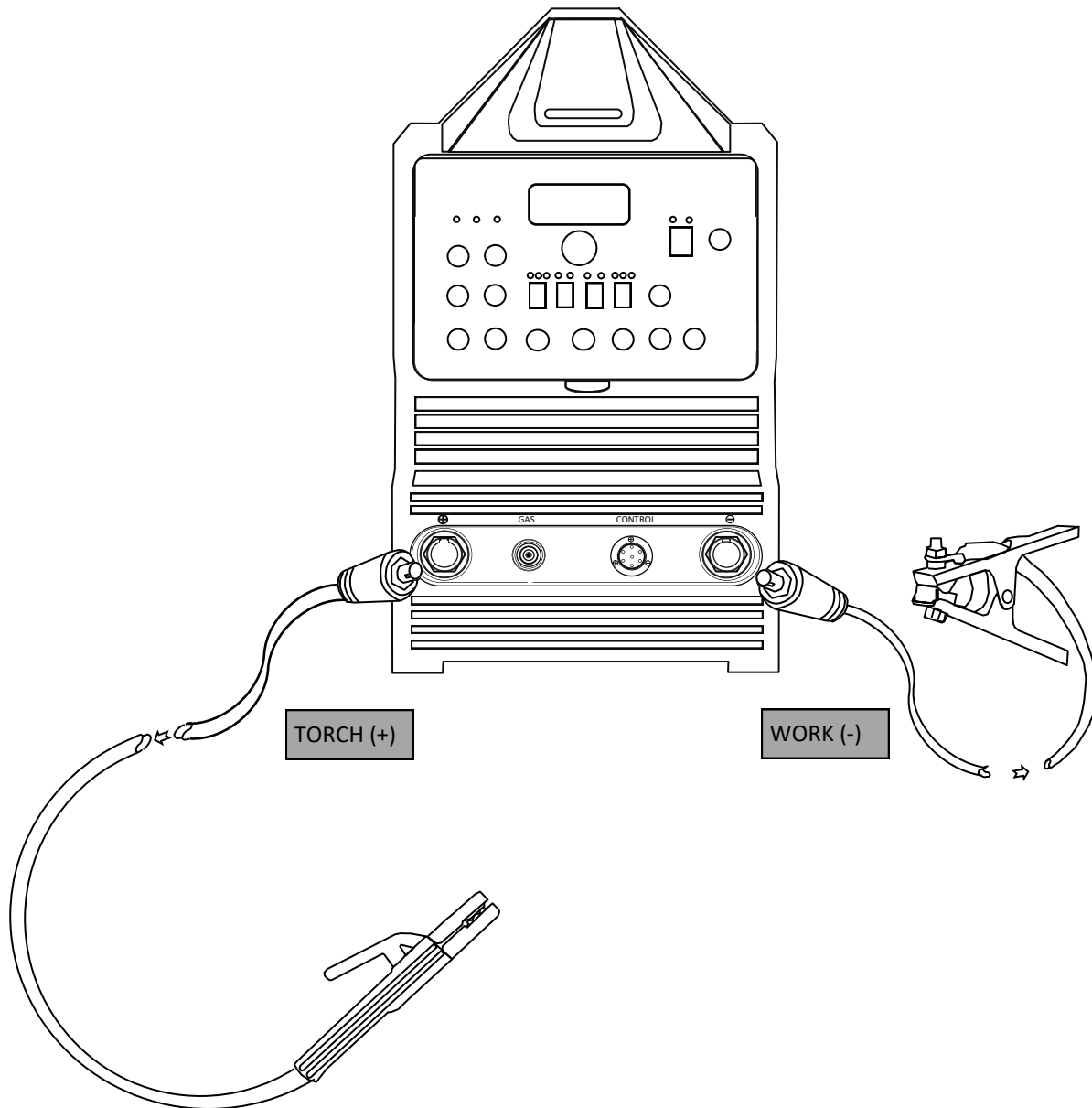
NOTE: Not all parts or consumables listed may be stocked, sold or serviced individually by Everlast.



STOP: Do not fire the torch continuously without attempting to make a cut. Doing so will keep the pilot arc engaged and will drastically shorten the life of the consumables. The Pilot arc should only be used to initiate the arc to start a cut. Always make sure the work clamp is directly connected to a deoxidized, unpainted location on the part being cut. Use a grinder to ensure proper contact is being made between the work clamp and the metal if necessary. Turn the unit off while changing torches to prevent accidental firing.

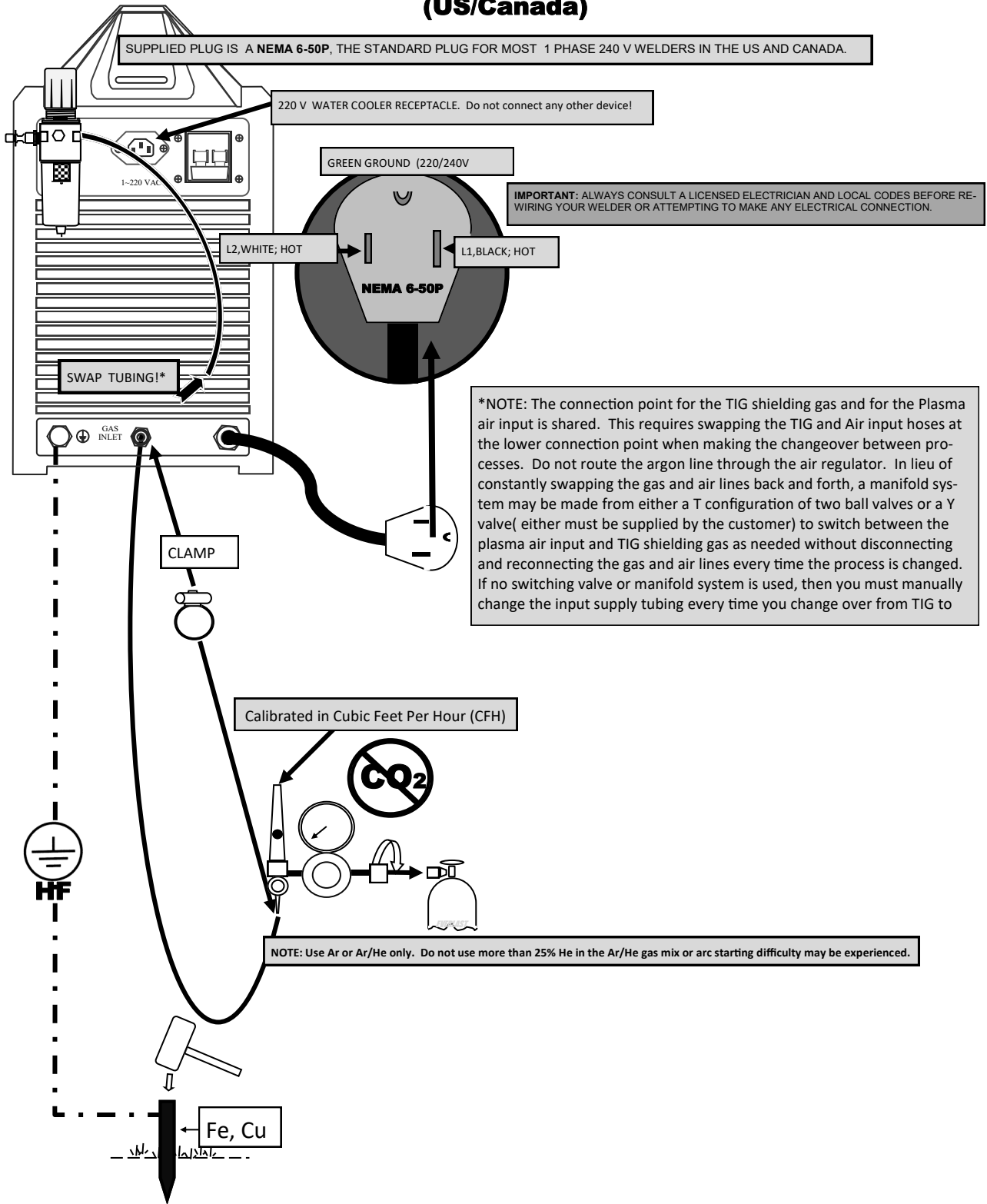
WARNING: Plasma cutting uses a high voltage, high temperature arc. **Do not touch any part of the consumable while cutting or with the torch energized even if the arc is not present!** Always switch the unit off while changing consumables. Do not disable the yellow safety cover over the torch switch.

CAUTION: Never attempt to use the torch while hooked up to the positive (+) connector or damage may occur to the consumables and/or the torch. Always verify correct torch polarity before each use. Do not change processes while the Plasma torch is connected or severe damage may result to the machine and torch.

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 (-) (also referred to as 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.

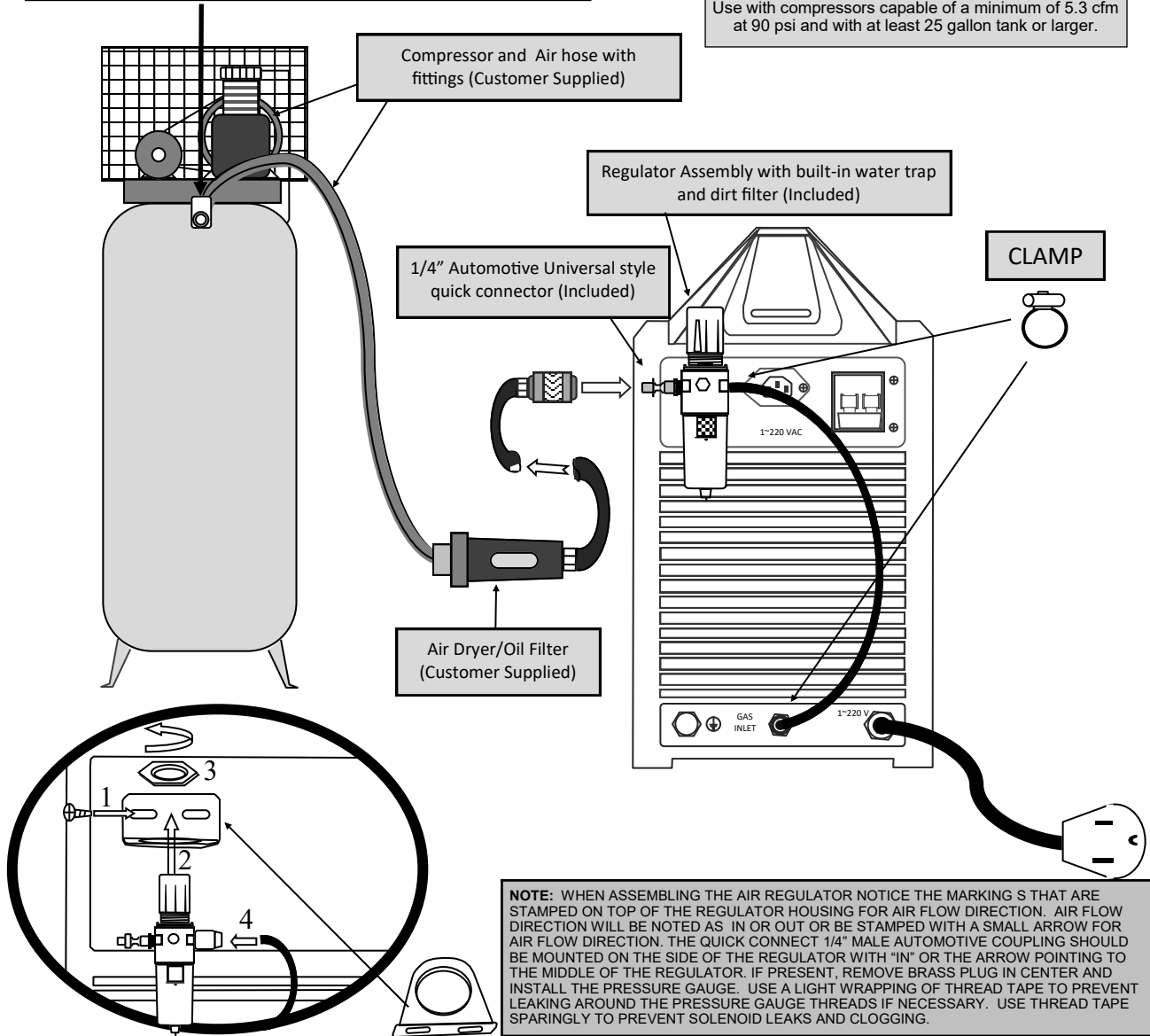
QUICK SETUP GUIDE: REAR CONNECTIONS AND WIRING (US/Canada)



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

Caution: Do not exceed 90 psi supply pressure from air compressor!

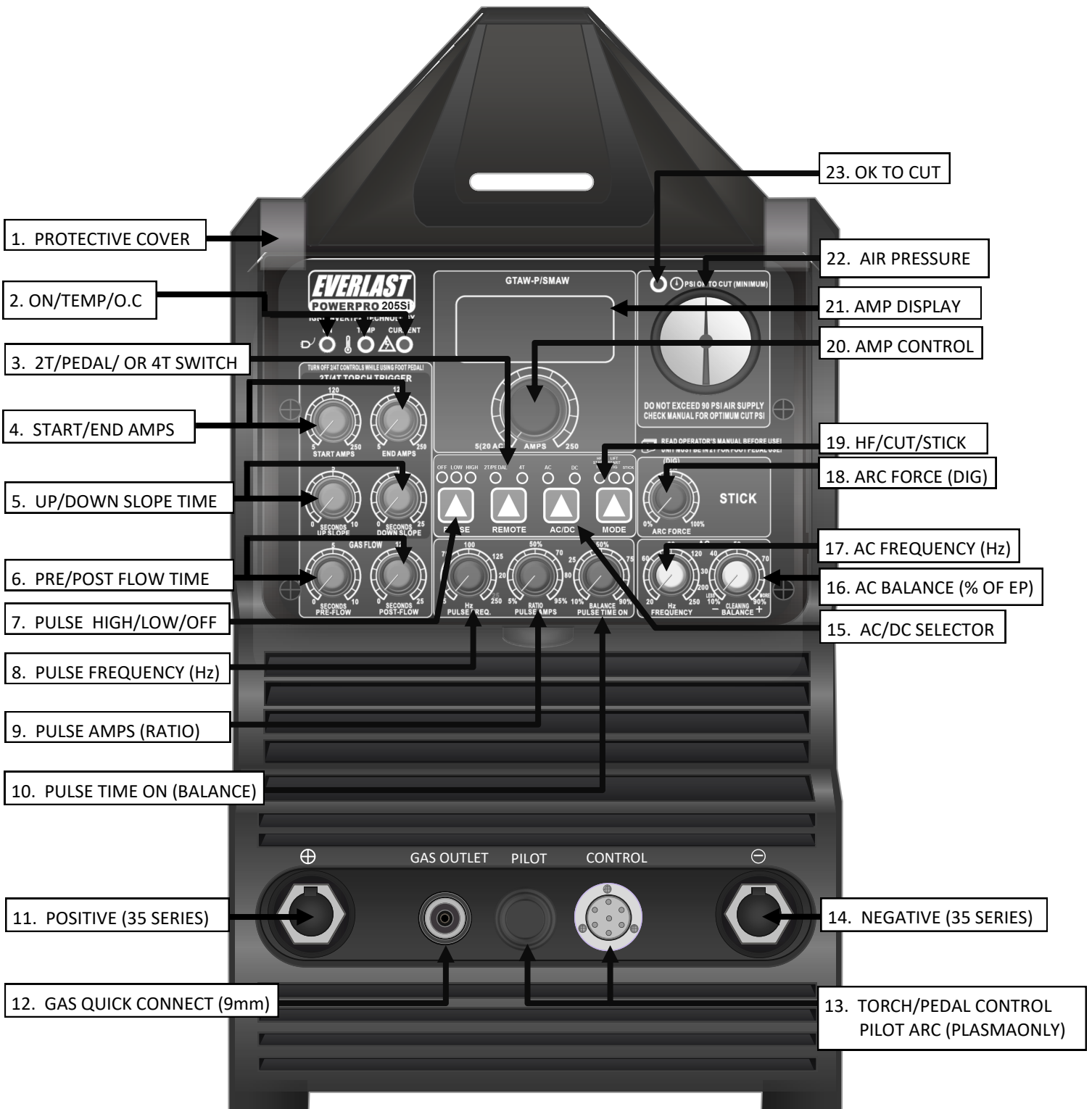
Use with compressors capable of a minimum of 5.3 cfm at 90 psi and with at least 25 gallon tank or larger.



NOTE: WHEN ASSEMBLING THE AIR REGULATOR NOTICE THE MARKINGS THAT ARE STAMPED ON TOP OF THE REGULATOR HOUSING FOR AIR FLOW DIRECTION. AIR FLOW DIRECTION WILL BE NOTED AS IN OR OUT OR BE STAMPED WITH A SMALL ARROW FOR AIR FLOW DIRECTION. THE QUICK CONNECT 1/4" MALE AUTOMOTIVE COUPLING SHOULD BE MOUNTED ON THE SIDE OF THE REGULATOR WITH "IN" OR THE ARROW POINTING TO THE MIDDLE OF THE REGULATOR. IF PRESENT, REMOVE BRASS PLUG IN CENTER AND INSTALL THE PRESSURE GAUGE. USE A LIGHT WRAPPING OF THREAD TAPE TO PREVENT LEAKING AROUND THE PRESSURE GAUGE THREADS IF NECESSARY. USE THREAD TAPE SPARINGLY TO PREVENT SOLENOID LEAKS AND CLOGGING.

NOTE: A SEPARATE AIR DRYER BETWEEN THE AIR COMPRESSOR AND REGULATOR ASSEMBLY MUST BE INSTALLED. IT SHOULD BE INSTALLED AS CLOSE TO THE WELDER AS PRACTICAL. **THIS IS A CUSTOMER SUPPLIED ITEM.** THIS WILL REDUCE CUTTING ISSUES SUCH AS SPITTING, POPPING AND RAPID CONSUMABLE WEAR. THE REGULATOR/FILTER THAT IS INCLUDED WITH THE WELDER IS NOT SUFFICIENT TO REMOVE ALL MOISTURE. IT SERVES ONLY AS A WATER TRAP AND FINE SEDIMENT FILTER. ANY AIR COMPRESSOR SYSTEM WILL PRODUCE AT LEAST SOME MOISTURE REGARDLESS OF HUMIDITY LEVELS AND ENVIRONMENT. DAILY DRAINING THE AIR COMPRESSOR SUPPLYING AIR TO THE PLASMA CUTTER IS RECOMMENDED. THE AIR SUPPLIED TO THE PLASMA CUTTER SHOULD BE OF SIMILAR QUALITY USED FOR AUTOMOTIVE PAINTING. DIFFERENT STYLES OF DRYERS ARE AVAILABLE. THE MOST INEXPENSIVE AND COMMONLY AVAILABLE IS THE REPLACEABLE DESSICANT TYPE USED FOR AUTOMOTIVE PAINTING. DAMAGE DONE TO THE TORCH AND THE PLASMA CUTTER (INCLUDING BUT NOT LIMITED TO: SHORTING, CORROSION, AND DETERIORATION OF INTERNAL LINES AND COMPONENTS) AS A RESULT OF EXCESS MOISTURE IS NOT COVERED UNDER THE WARRANTY. ADDITIONALLY, A FILTER SHOULD BE INSTALLED IN-LINE AT THE COMPRESSOR TO FILTER ANY EXCESS OIL OR OIL BLOW-BY FROM THE LINE IF NECESSARY. DO NOT USE WITH OILING SYSTEMS DESIGNED TO AUTOMATICALLY LUBRICATE AIR TOOLS. OIL WILL DAMAGE THE TORCH AND CONSUMABLES AS WELL. DAMAGE DONE TO THE CUTTER OR THE TORCH BY OIL IS NOT COVERED UNDER THE WARRANTY. IT IS ADVISABLE TO USE THE PLASMA CUTTER WITH A NEW AIR HOSE/LINE THAT IS FRESH WITHOUT MOISTURE OR LUBE CONTAMINATION AND DEDICATE IT FOR PLASMA USE ONLY. IF THERE IS AN AIR PRESSURE DROP GREATER THAN 5-10 PSI FROM THE COMPRESSOR OR AIR FLOW IS SUSPECTED TO BE INSUFFICIENT, INCREASE TO A LARGER SIZE EXTERNAL DRYER/FILTER AND AIR LINE. FAILURE TO USE A DRYER/FILTER IS A LEADING CAUSE OF PLASMA CUTTING AND CONSUMABLE WEAR ISSUES.

FRONT PANEL FEATURES AND CONTROLS



FRONT PANEL FEATURES AND CONTROLS CONTINUED

POWERTIG 205Si 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. Use only in 2T for plasma cutting.
4. Start/End Amps Control (Part of 2T/4T sequencer)	DC: 5-200A AC: 20-200A	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 an arc flare or delay in arc start or termination. The foot pedal will not override these features. Set to the minimum settings while plasma cutting.
5. Up/Down Slope Control (Part of 2T/4T sequencer)	0-10/ 0-25 Seconds	Up-Slope ramps current 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 current 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. Set to the minimum while plasma cutting.
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. For plasma cutting, set preflow to the minimum setting. Set postflow to equal 3-5 seconds of post flow for every 10 amps used.
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 250 Hz. Note: The low range is highlighted in green numbers.

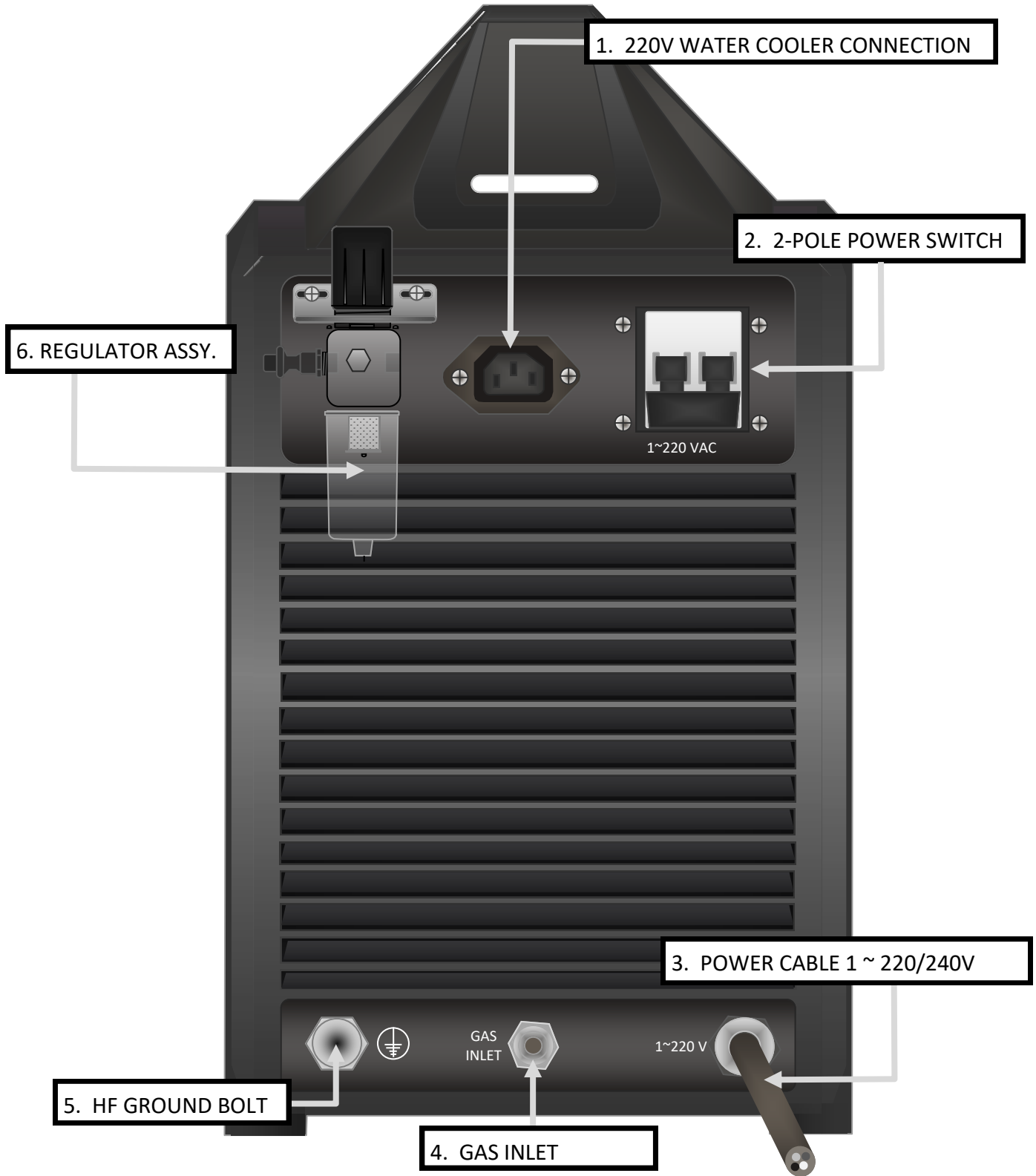
FRONT PANEL FEATURES AND CONTROLS CONTINUED

POWERPRO 205Si FEATURES	PARAMETERS	PURPOSE
8. Pulse Frequency Control	.5-250 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 current 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.
9. Pulse Amps (Ratio) Control	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.
10. Pulse Time On (Balance) Control	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.
11. Positive Connector	35-70 mm ²	Location of the Positive terminal connection. DINSE-style connector. (35 Series) Stick: Electrode Holder. TIG: Work Clamp. Plasma: Work Clamp.
12. Quick Connect Gas Outlet	9 mm	Connects the gas supply to the TIG and air supply to the Plasma torch. To connect: Push the torch fitting into the connector until the collar slides forward with a click. To Release: Slide the collar back.
13. Control and Pilot Arc Connector	7 Pin	Connect the foot pedal or torch switch to the pinned 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. Loosen the black thumb screw to connect the pilot arc wire to the plasma cutting torch. The thumbscrew is only used with the plasma torch.
14. Negative Connector	35-70 mm ²	Location of the positive terminal connection. Dinse-style. (35 series) Stick: Work Clamp Connection. TIG: Torch Connection. Plasma: Torch Connection.
15. AC/DC Selector	AC/DC	Select DC output for Steel, Stainless and most metals. Select AC output for Aluminum and Magnesium alloys.
16. AC Balance Control	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

POWERPRO 205Si 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/Cut/Stick Switch	HF/Cut/ Stick	This button is used to select one of three processes: HF TIG, Plasma Cutting (Cut) or stick mode. The TIG mode features HF start for a touchless arc initiation. The cut mode is used to select for the plasma cutting mode. The stick mode is used for stick welding only. Note: Cut and Stick modes only allow DC operation.
20. Amp Control Knob	5-250 Amps	Sets Maximum limit for Amps with foot pedal or torch. Sets higher amp value for pulse.
21. 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.
22. Air Pressure Gauge	70-80 psi	This unit features a front mounted air pressure gauge to help adjust and monitor cutting pressure. This does not indicate actual incoming supply pressure from the air compressor. To set the cutting pressure, turn the post flow control to maximum after selecting the "Cut" option on the front panel. Then quickly tap and release the torch switch to activate post flow. Adjust the air pressure with the regulator found on the rear of the unit until the pressure gauge reads approximately 75 psi. After the unit is adjusted and post-flow terminates, make sure that the gauge reads no more than 90 psi or internal leaks may develop over time. If the proper cutting pressure cannot be maintained at 90psi static pressure, make sure that the supply air hose is properly sized as well as the compressor. If cutting pressure still cannot be maintained, check for internal leaks.
23. OK-To-Cut indicator	Minimum 35 psi	This feature acts as a safety to prevent damage to the plasma cutting torch if air pressure drops too low. This light should stay lit while plasma cutting to indicate the unit has at least the minimum pressure needed to cut. The minimum threshold setting allowed before the light turns off and the torch will fire is approximately 35 psi. If the air pressure drops below this, the unit will stop cutting and the OK-To-Cut light will go out. If this happens while cutting, make sure something hasn't become disconnected. If not then, listen for internal leaks. Also check air compressor for proper size and function. If you suspect internal leaks, contact Everlast. Over-pressurization of the system, greater than 90 psi will likely result in internal leaking.

REAR PANEL FEATURES AND CONTROLS



REAR PANEL FEATURES AND CONTROLS CONTINUED

POWERPRO 205Si 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. This remains live while the unit is plugged in. The power switch on the unit does not turn the cooler outlet off.
2. 2-Pole Power switch	On/Off	The breaker switch has 2 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. The Water cooler outlet on the rear remains live after the switch is turned off.
3. Power Cord	220/240 V 1 phase, 50/60 Hz.	This unit is prewired with a standard NEMA 6-50 plug. This is the standard plug for welders in the US and Canada. Other countries vary plug configuration as well as input.
4. Gas Input Connection	1/4-5/16” barb Some versions: 5/8 CGA	This is the point where the shielding gas from the regulator connects. The unit is supplied with tubing and clamps which connect this fitting to the regulator. The hose barb design allows universal connection of the welder to almost any regulator or setup found throughout the world. Make sure the tubing slides fully over the connector, then thoroughly tighten the clamp. Use an additional clamp if necessary to prevent leaking. If you suspect leaking, test the connection with a solution of mild soapy water. If bubbles are seen, retighten or reinstall the tubing. While changing processes, the tubing must be swapped. Do not run the Argon gas through the air regulator/filter. A T-fitting or Y-fitting may be placed inline at the connection to leave both argon and air hooked up without having to swap out the lines. This is not supplied by Everlast and is up to the customer to responsibly install if not using the standard change over method recommended by Everlast. This can usually be purchased from online sources or at any well equipped welding supply store. Some versions use a standard 5/8” CGA fitting.
5. 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 line. It is recommended that a separate ground wire (minimum 14 gauge) be attached at this point while in use.
6. Air Regulator Assembly	90 psi maximum Supply pressure. 70-80 psi operating pressure while cutting	The regulator serves two basic purposes. 1) It controls air pressure while plasma cutting. 2) It helps to filter fine particulates and large drops of water from the system. The regulator is not designed to regulate Argon flow or have argon flowing through it. NOTE: A separate air dryer must be installed inline to prevent rapid torch and consumable wear (customer supplied). The regulator assembly is not designed to remove moisture from the air, only large drops of water that may be created during the coupling and de-coupling process. Everlast does not warranty damage caused to torches or consumables by moisture. Residual moisture in the line will also contaminate the system, causing problems while TIG welding. So, keeping the internal lines of the unit dry is of utmost importance. One of the leading issues experienced with Plasma cutting and the cause of many different symptoms in TIG is the presence of moisture in the air line. To adjust the pressure for cutting, simply pull up slightly on the knob until it clicks. Then, rotate it clockwise to increase the pressure and rotate it counter clockwise to decrease the pressure. To adjust the pressure correctly, adjust the pressure while the air is flowing. To do so, first, adjust the post-flow time to the maximum, then fire the torch briefly and allow the post-flow to continue flowing while the air pressure is adjusted. Adjust the air pressure to 70-80 psi, with 75 psi being the optimum target pressure. Push the knob down until it clicks to lock the regulator and complete the adjustment process.

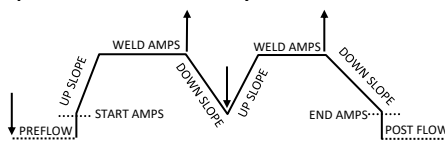
NOTE:

Never operate the welder on a generator that is not certified by its manufacturer to be “clean” power, which is considered to be less than 5% total harmonic distortion. 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.

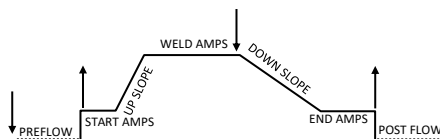
1. *2T/4T sequencer.* The 2T/4T feature allows operation of the TIG welder without a foot pedal. In many circumstances, a foot pedal is not practical for use. So, the 2T/4T function has been created to allow programming of the welder to simulate the activities of the foot pedal while providing more accurate 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 below, you can visually trace the activity and function of each part of the welding cycle as the torch switch is cycled. 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



↑ = UP ON SWITCH
 ↓ = DOWN ON SWITCH

4T Torch Operation Effect on Weld Cycle

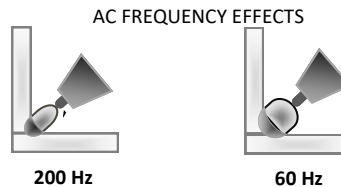


Most of the green coded controls on the welder panel are devoted to the use of the 2T/4T operation and should not be used with foot pedal. The following features are exclusive features that can only be used with the 2T/4T sequencer function:

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

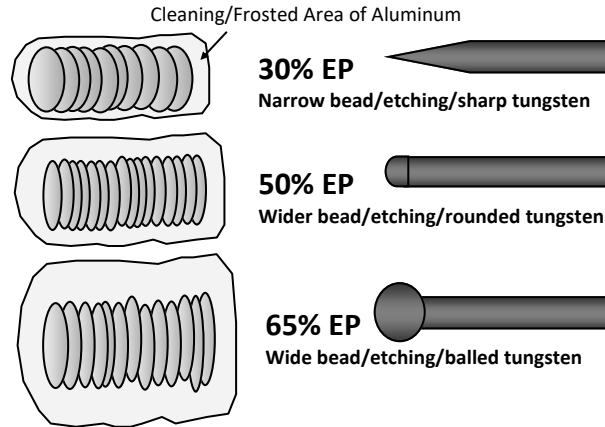
Pre-flow and post-flow are features that work in conjunction with both the foot pedal and the 2T/4T sequencer. The start will be delayed until the pre-flow cycle has finished. Set for preflow .5-1 seconds for best results. As a starting point, use approximately 1 second of post-flow for every 10 amps set. Of course, fine tune post-flow time as needed to suit your needs.

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

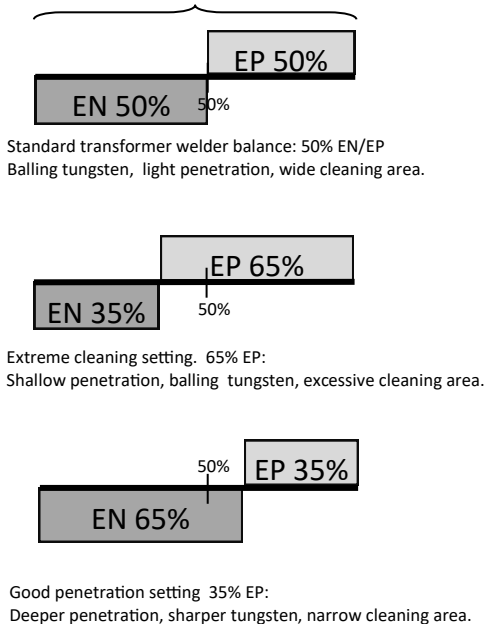
time length (50%), penetration is reduced and over-cleaning results in wide etch lines running parallel to the side of the weld. Not all weld conditions will be alike, so more cleaning is required at times than others. Similarly, more penetration will be required at times than others. Ordinarily, about 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. A ball is not needed or recommended. Cleaning is still usually sufficient at a 25% level. The cleaning action is still visible even at these levels. Settings greater than 40% will result in balling and a less stable arc. 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.



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. However, 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. If it continues, reduce gas flow and check for drafts, open doors or welder placement.
4. Yellow-coded AC controls only apply during AC TIG operation and do not affect DC settings or plasma cutting.
5. If cleaning action becomes excessive at low settings, it is likely a speed/ heat issue and not machine issue. The longer the electrode remains in the same place, the more the cleaning action will have an effect. 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. You should only suspect a welder issue if adjusting the AC balance 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 with an inverter to weld in AC or DC mode.

EXAMPLE: AC EP (+) BALANCE
1 Hz (one full AC cycle)



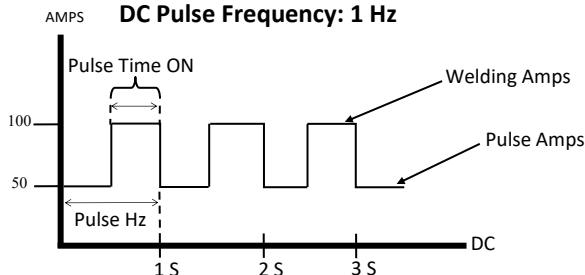
4. *Pulse.* The pulse creates two amp values, a high and a low value that cycle back and forth between each other while welding. The upper amperage is called the Welding Amps (sometimes called Peak current) and the lower amperage is called pulse amps (sometimes called “background” or “base” current). 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. This welder features three adjustable parameters concerning the pulse:

A. *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.

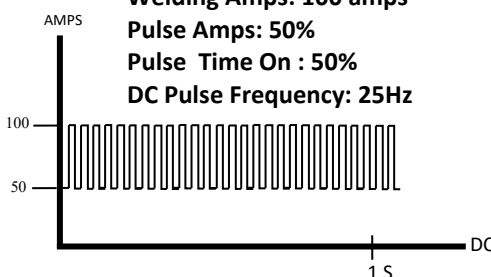
B. *Pulse Frequency.* Pulse speed is the same as frequency is measured in the standard unit “Hertz”. Simply explained, it is the number of pulses per second that occur. Pulse frequency controls the arc constriction and also helps with heat management.

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

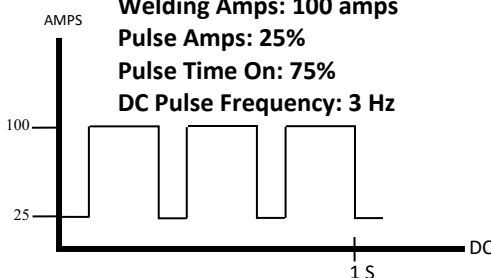
EXAMPLE 1
Welding Amps: 100 amps,
Pulse Amps: 50%
Pulse Time On: 50%
DC Pulse Frequency: 1 Hz



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 portion of the pulse cycle. Increasing the Pulse time-on 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.

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 Ω* 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 may be necessary when operating at higher amperages for extended periods of time. If you select this option, keeping mind that using a water-cooled torch even briefly without

water can seriously and permanently damage your torch. Everlast and most other manufacturer's water-cooled torches used without water-coolers cannot be warranted as a general rule. If you have not purchased an Everlast water cooler or do not already have a water cooler, you will need to use an air cooled (gas cooled) torch such as a 9, 17, or 26 series, but will need to observe the stated duty cycle of the torch and not the duty cycle of the welder.

All consumables should be interchangeable with other brand torches of similar model/series designations. This means that most TIG torch consumables should be available for purchase at local welding supply houses. 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 additional ready-to-go TIG torch options designed to fit your welder or if

8. *DINSE style connector.* Everlast uses a 35-70mm² 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.

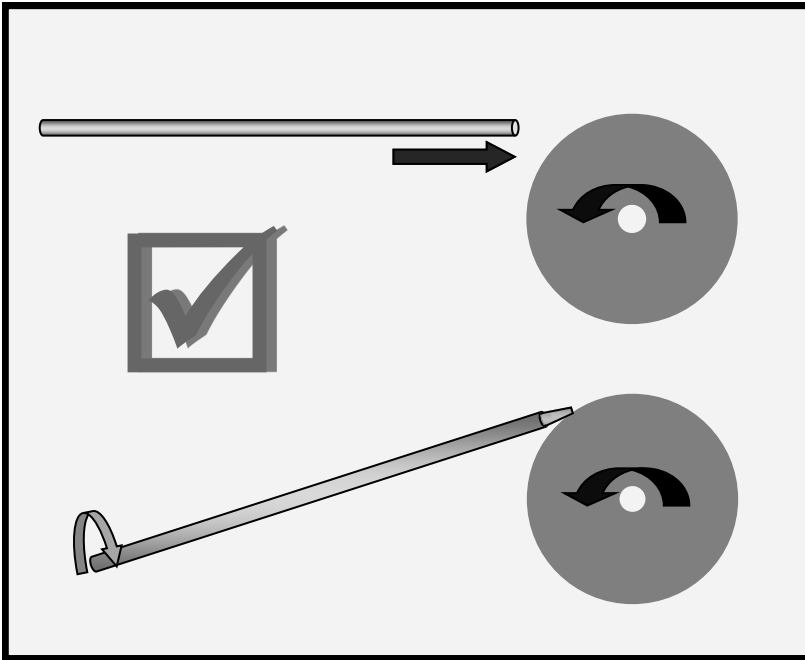
9. *7 pin remote/foot pedal connector.* This 7 pin connector is available from Everlast should it become damaged. See the Pin-out reference found near the end of this manual.

10. *Argon quick connect.* This is a 9 mm size quick connect nipple. These are commonly available from Everlast or online supply 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 DC and 20 amps(\pm 3) amps AC. However, to obtain the most consistent and stable start, 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 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

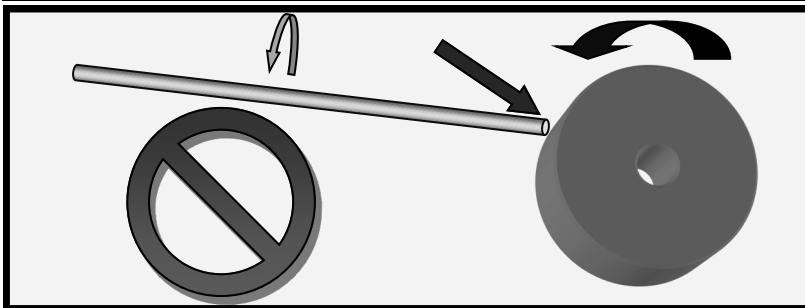


1. Use a dedicated grinding wheel or contamination may result. Do not breath grinding dust! Wear eye protection and gloves.

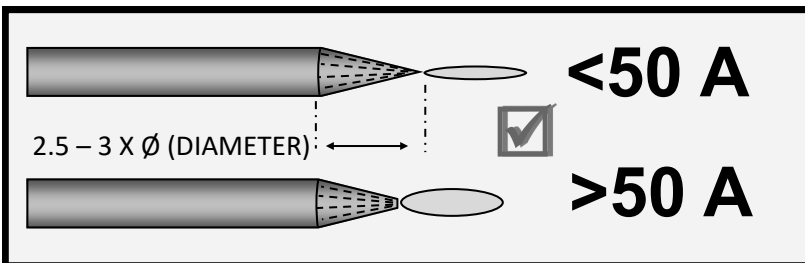
2. Hold Tungsten firmly.

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

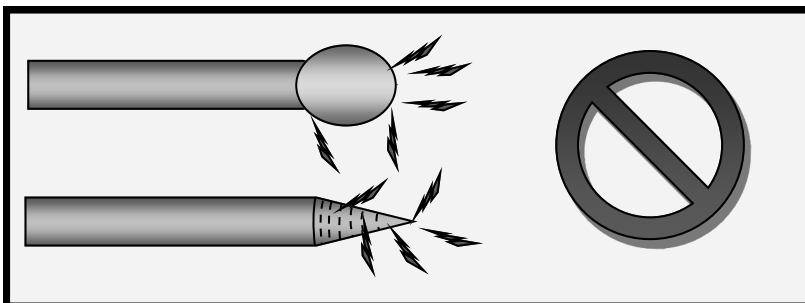
4. Rotate tungsten quickly as it is being ground to keep point even and symmetrical.



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



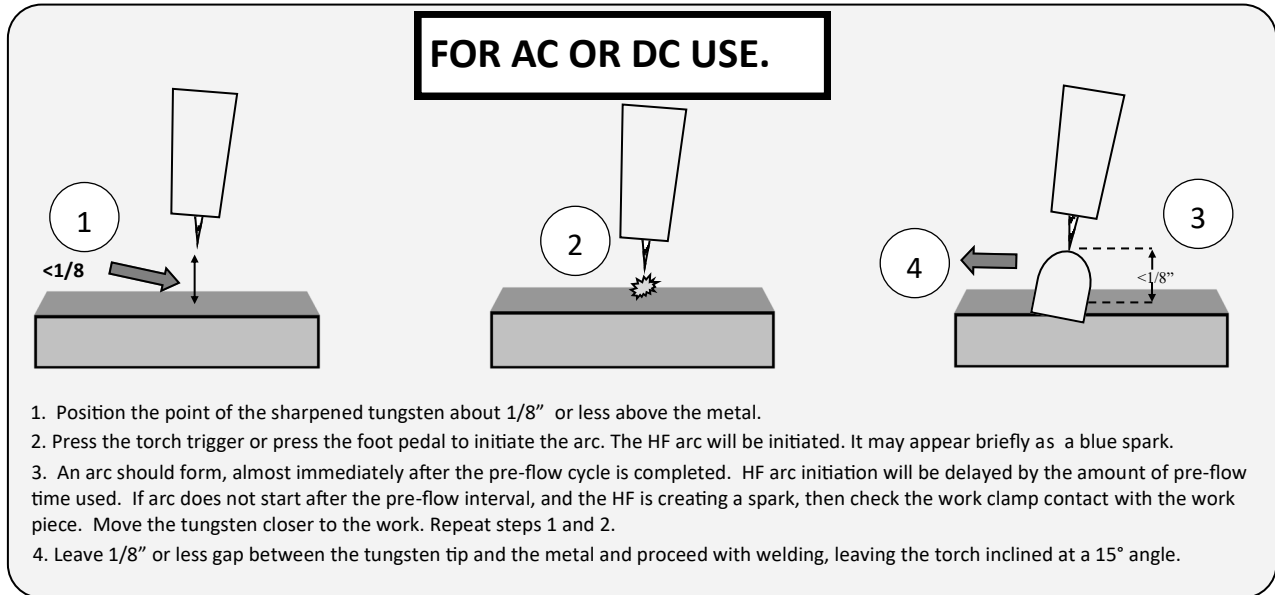
Use a point for low amp use to help control the arc. Create a slight truncation on the tip for higher amp use for best arc stability. Grind the tip so that it is 2.5-3 times longer than the tungsten is wide (Diameter).



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 THE FOLLOWING RECOMMENDATIONS ABOUT TUNGSTEN SELECTION FOUND IN THIS MANUAL ON PAGE 31.

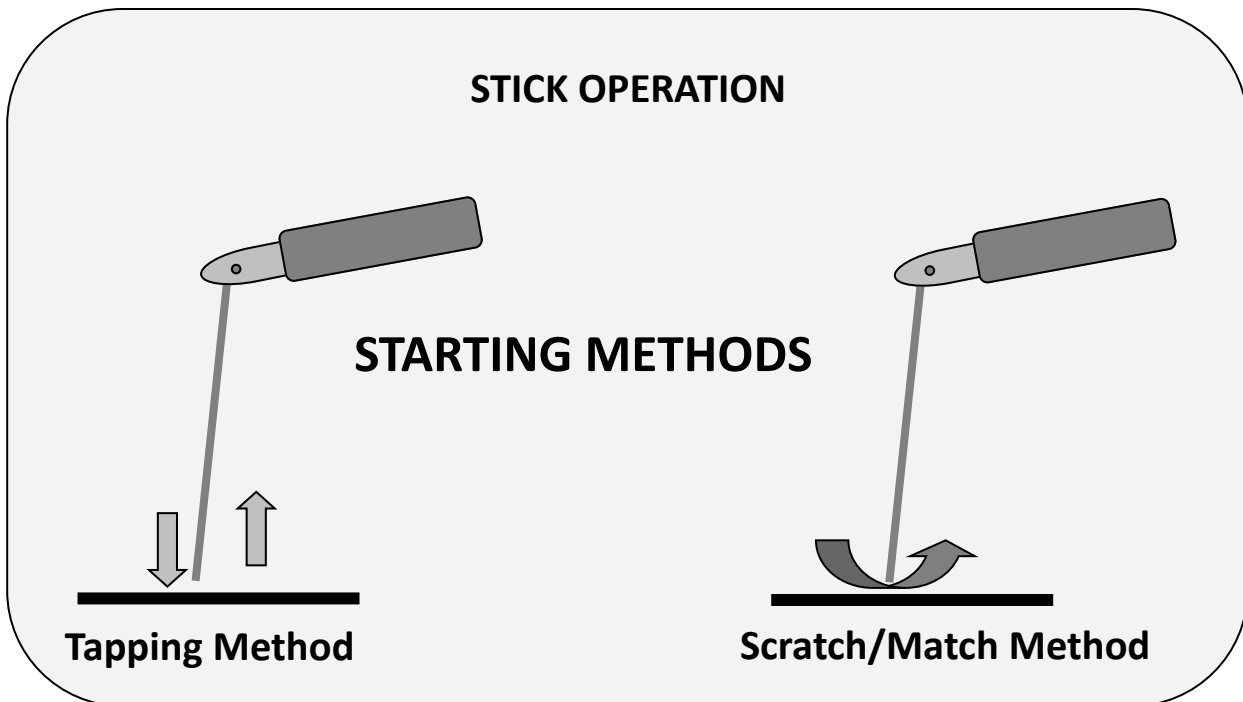
HIGH FREQUENCY START TIG OPERATION



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 TIG with the HF/Cut/Stick selector switch. Select DC mode with the AC/DC 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/Cut/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

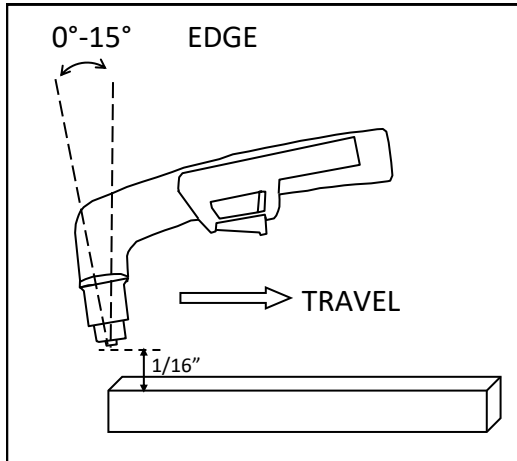
METAL THICKNESS	ELECTRODE SIZE	WELDING AMPS
< 1 mm/.040"	1.5 mm/ 1/16"	20-40
2 mm/.080"	2 mm/3/32"	40-50
3 mm/ 1/8"	3.2 mm/1/8"	90-110
4-5 mm/ 3/16"	3.2-4 mm/ 1/8"	90-130
6-10 mm/ 1/4"-3/8"	4-5 mm/ 1/8"-5/32"	130-200

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.

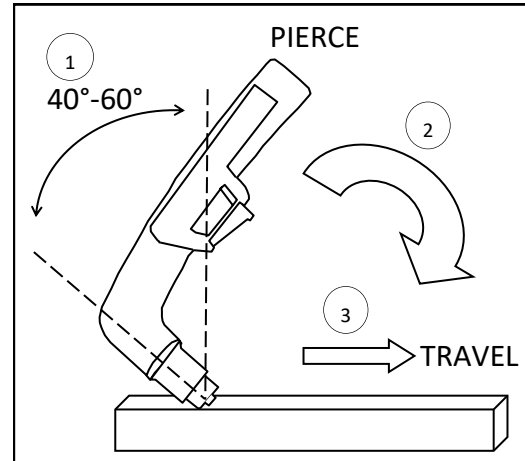
NOTE: Thoriated tungsten is slightly radioactive, but is commonly used in the US. Care should be used when grinding so as not to breath the dust. If you have concerns about Thoriated (red) tungsten, choose from Lanthanated or Ceriated tungsten.

Plasma Cutting Technique



Edge Starts are the best type of start to use if possible to promote consumable and torch life. This reduces blow back of molten material and allows a smooth gradual start of the cut.

1. Line up the hole on the tip of the electrode on the edge of the cut. Hold torch perpendicular to the cut initially, about 1/16" off the metal. Slide the yellow safety lock and squeeze the trigger. Wait for arc to start.
2. Once the arc starts, wait for the arc to penetrate all the way through the metal.
3. As the torch penetrates its flame all the way through the metal, tilt the torch so there is a slight lead in the flame if metal is thin. If it is thick, keep holding torch in a nearly vertical position.
4. Begin moving the torch in the direction of the cut. Maintain 1/16" standoff height.
5. Move the torch fast enough so the sparks and flame trails from the bottom edge at an angle of no more than 30° and no less than 10° from perpendicular to the metal. Excess angle of sparks/flame indicate too fast of travel speed or practical cut capacity has been reached. Little or no angle indicates too slow of travel speed.



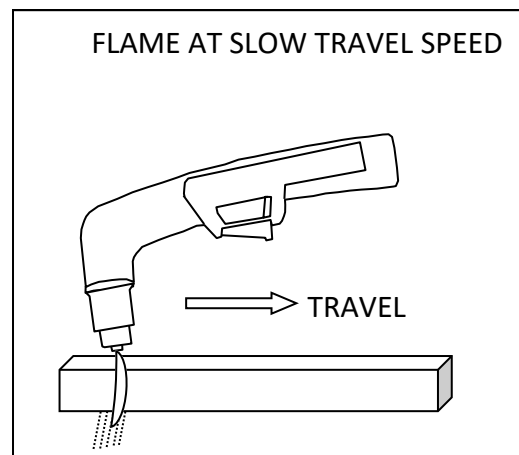
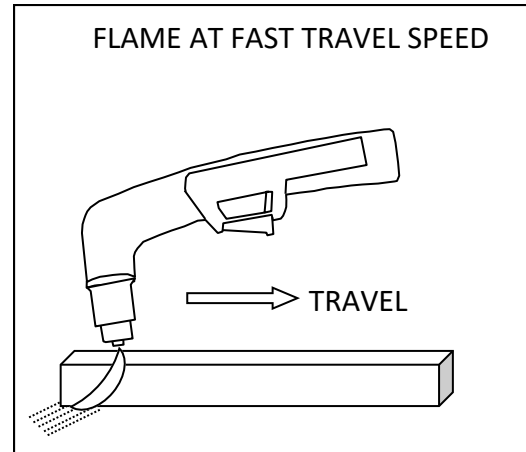
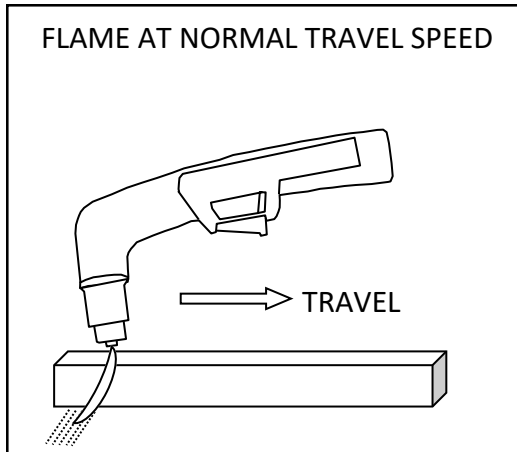
Piercing starts often result in rapid consumable wear and excess blow back of molten metal deposited onto torch and consumables. This should be performed only as necessary.

1. Tilt the torch in the direction of travel or toward the side of the metal to be discarded or wasted at a 40° to 60° angle. Slide the yellow safety lock and squeeze the trigger. Wait for arc to start.
2. Once the arc starts, wait for the arc to transfer from pilot arc to the cutting arc.
3. As the torch penetrates it flame at an angle rotate the torch slowly to the vertical position, as the arc penetrates the metal. Tilt the torch from 0°-15° for thin metal cuts, or hold it nearly perpendicular for thicker metal cuts.
4. Begin moving the torch in the direction of the cut. Maintain 1/16" standoff height.
5. Move the torch fast enough so the sparks and flame trails from the bottom edge at an angle of no more than 30° and no less than 10° from perpendicular to the metal. Excess angle of sparks/flame indicate too fast of travel speed or practical cut capacity has been reached. Little or no angle indicates too slow of travel speed.

IMPORTANT PLASMA CUTTER OPERATING NOTES:

- 1) If you use a standoff guide with the torch, it must be adjusted to provide no more than 1/8" standoff, less if possible. Too much standoff reduces cut capacity and quality. Kerf and dross will be increased. It will also increase consumable wear and may prevent the pilot arc from correctly transferring to the work piece. However, do not drag the consumables unless you are using shielded consumables.
- 2) If arc fails to transfer check the work clamp connection. Make sure the work clamp is directly contacting the metal to be cut and is on a clean section of metal. If not reroute the work-clamp so that it directly contacts the metal. If necessary, grind a spot clean to ensure good contact.
- 3) The design of the blow back start *may* cause a slight delay in the arc as the air pressure must built inside the torch tubing and head to create the pressure needed to force the electrode off the nozzle seat. This may take up to two seconds. Restarting the arc with the post flow going may not cause a delay. If the torch does not light after 3 seconds, let go of the trigger and press it again. **If arc or arc start is inconsistent or otherwise unstable check the nozzle and electrode for tightness and wear. Also make sure the swirl ring is installed and not damaged.**

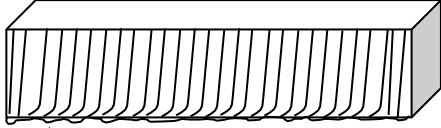
TIP: For longer consumable life do not use the pilot arc unnecessarily. Keeping the pilot arc engaged for long periods of time will quickly wear consumables and cause poor quality cuts and eventual torch malfunction. Routinely check the consumable orifice for wear. While the pilot arc is engaged, amperage will automatically be lowered to reduce wear.



NOTE: When stepping down amps to cut thinner material, you must change to smaller orifice nozzle. Standard nozzle supplied is rated for 50-60 amp cutting. Nozzles are offered in different sizes which are appropriate for different amp levels. Too large of a diameter orifice will result in arc instability and a rough cut. Lowering the air pressure below 65 psi to try to get the torch to cut will only result in a lazy, wandering or sputtering arc.

IMPORTANT: Check consumables regularly for wear and change them out before they are completely worn. Allowing the consumables to wear until they quit working may damage related torch components, creating a more costly repair.

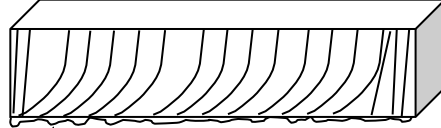
**RESULTS OF CUT AT CORRECT SPEED,
AIR PRESSURE AND TORCH ANGLE**
SMOOTH, EVEN CUT LINES WITH A S REARWARD SWEEP



MINIMAL EASY TO CLEAN DROSS

This diagram shows a 3D perspective of a rectangular metal block with a cut. The cut surface is smooth and features a series of closely spaced, slightly curved lines that sweep from the front towards the back. An arrow points to the bottom edge of the cut, which is labeled as having minimal, easy-to-clean dross.


RESULTS OF CUT AT FAST SPEED
ROUGH, DISTINCT CUT LINES SPACED FAR APART



NOTICEABLE SMALL, HARD DROSS

This diagram shows a 3D perspective of a rectangular metal block with a cut. The cut surface is rough, with distinct, widely spaced lines that curve away from the front. An arrow points to the bottom edge, which is labeled as having noticeable, small, hard dross.

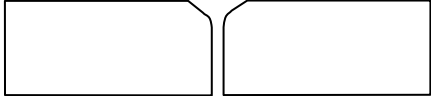
RESULTS OF CUT AT SLOW SPEED
VERTICAL CUT LINES



SIGNIFICANT SOFT, POROUS DROSS

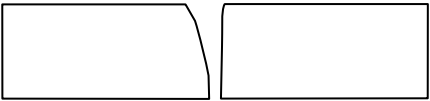
This diagram shows a 3D perspective of a rectangular metal block with a cut. The cut surface is characterized by numerous vertical, parallel lines. The bottom edge of the cut is irregular and jagged, with a significant amount of dross. An arrow points to this dross, which is labeled as significant, soft, and porous.

**RESULTS OF TOO MUCH CURRENT OR
TOO MUCH STAND OFF HEIGHT
(SIDE VIEW)**
MELTED TOP EDGE



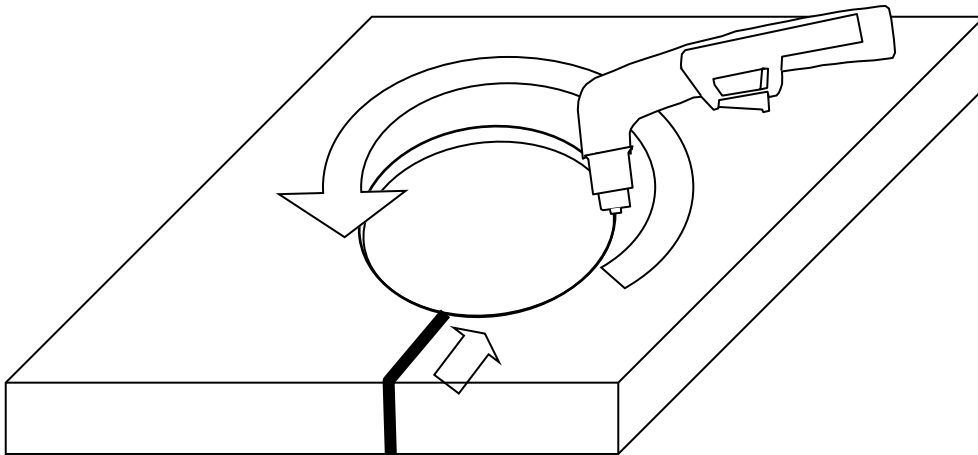
This block contains two side-view diagrams of a cut. The left diagram shows a rectangular cut with a rounded, melted top edge. The right diagram shows a similar cut with a more pronounced, rounded top edge, indicating a melted top edge due to excessive current or stand-off height.

**RESULTS OF WORN CONSUMABLE(S)
OR LOW AIR PRESSURE
(SIDE VIEW)**
SEVERELY ANGLED CUT AT TOP

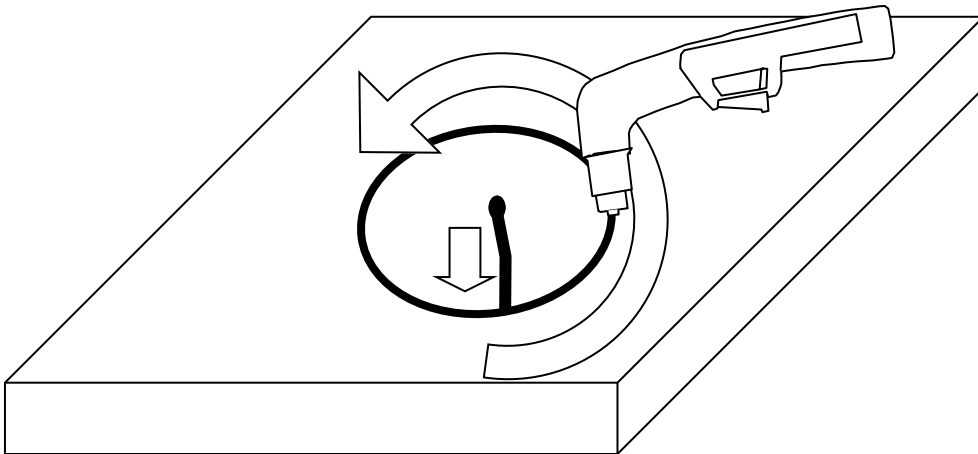


This block contains two side-view diagrams of a cut. The left diagram shows a rectangular cut with a severely angled top edge. The right diagram shows a similar cut with a more pronounced, angled top edge, indicating a severely angled cut at the top due to worn consumables or low air pressure.

AN EXAMPLE OF CUTTING A LEAD-IN WHEN CUTTING OUT A DISK SHAPED OBJECT



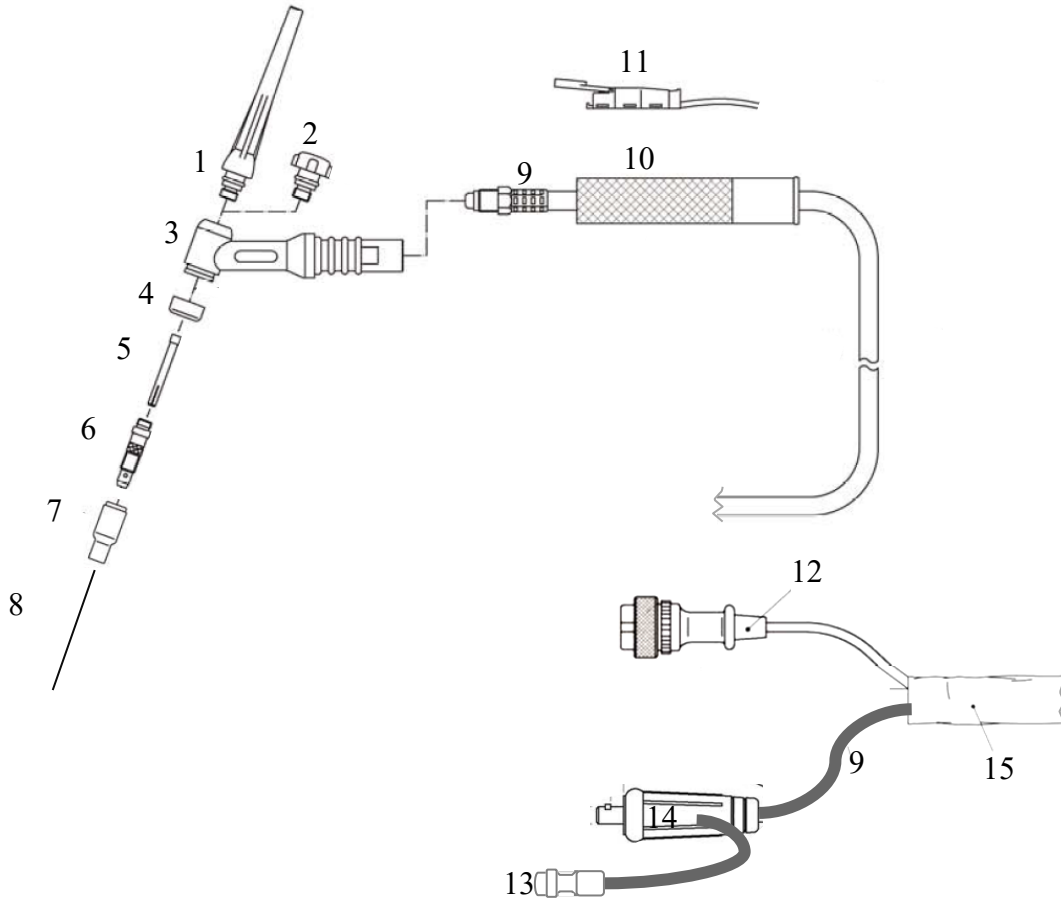
AN EXAMPLE OF CUTTING A LEAD-IN WHEN CUTTING HOLE IN AN OBJECT



NOTE: When cutting an object, particularly a pattern shape, where the torch must pierce or re-fire in-line at an intersection of a cut, a lead-in cut should be employed. A lead-in is a cut that is made in the disposable part (also known as a drop) of the object to “lead” into the main part of the cut so that the destructive force of the arc is not directed into the desirable side of the cut itself. Also, all plasma cutters exhibit some angularity or bevel in the cut which is greater on one side than the other. Keep this in mind when cutting an object to size to prevent too much metal from being accidentally removed.

EXPANDED VIEW OF TIG TORCH

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



NO.	PARTS FOR 26 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	1
14	Power Connector with water return cable and fitting	1
15	Protective Cable Cover	1

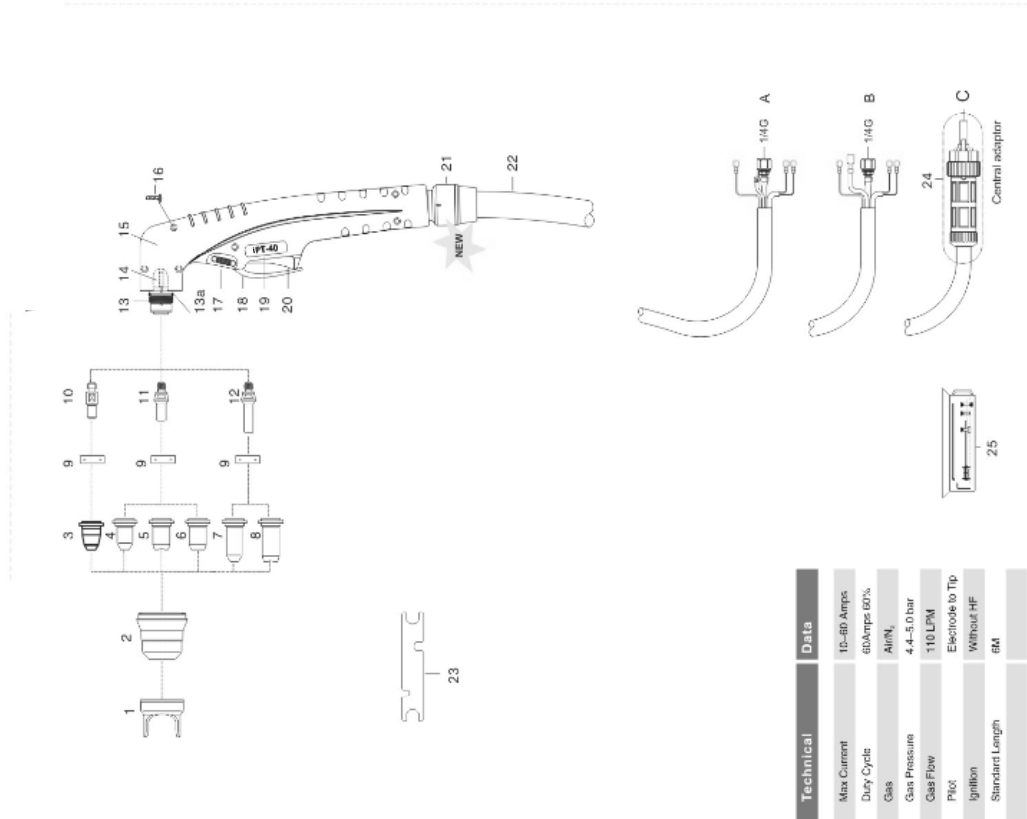
SECTION 3

BASIC THEORY AND FUNCTION

Complete Torch

Code	Ref.1	Ref.2	Description	Code	Ref.1	Ref.2	Description
A	IVT0847		PT60/6M connection 1/4G	C	IVT0846		PT60/6M central adaptor
A	IVT0847-01	09638	PT60/6M connection 1/4G	C	IVT0846-01		PT60/6M central adaptor/back striking
B	IVT0846		PT60/6M connection 1/4G separated				
B	IVT0846-01		PT60/6M connection 1/4G				

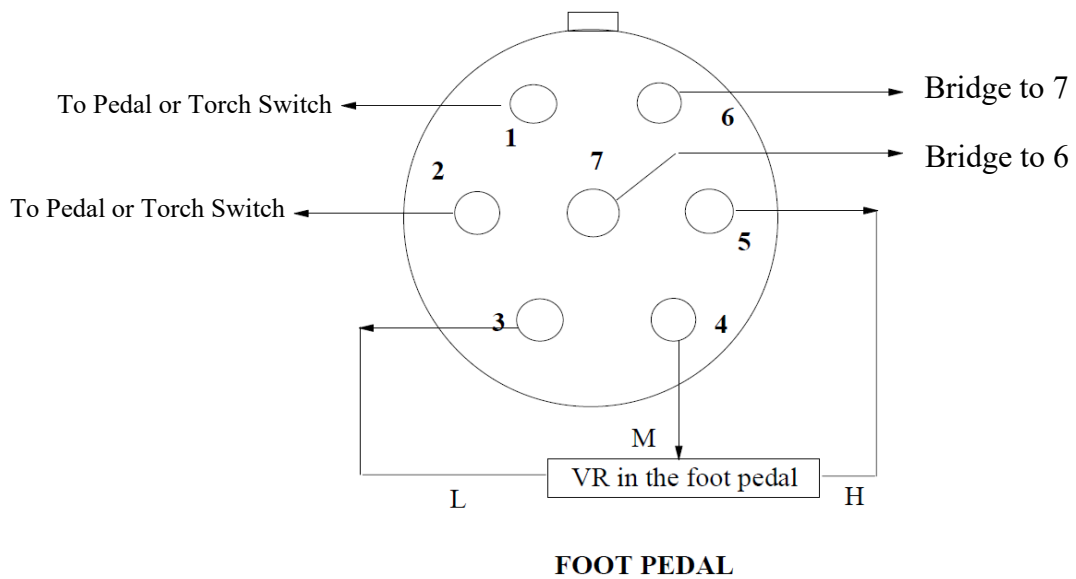
Position	Code	Ref.1	Ref.2	Description
1	ISM0098		60432	Double pointed spacer/PT40-60 (used only with n. 4 and n. 6)
2				Outside nozzle
2.1	IVS0661	PC0116	60389	Outside nozzle 6 holes
2.2	IVS0671		60389S	Outside nozzle 6 holes/maximum life
3				Tip
3.1	IVU0661-03	PD0116-06	51316.06	Tip Ø0.6mm/10-20A
3.2	IVU0661-08	PD0116-08	51316	Tip Ø0.8mm/20-30A
3.3	IVU0661-09	PD0116-09	51316.09	Tip Ø0.9mm/30-40A
4				Tip
4.1	IVU0660-03		51318.03	Tip Ø0.6mm/10-20A back striking
4.2	IVU0660-08		51318.08	Tip Ø0.8mm/20-30A back striking
4.3	IVU0660-09		51318.09	Tip Ø0.9mm/30-40A back striking
4.4	IVU0660-10		51318.10	Tip Ø1.0mm/40-50A back striking
5	IVU0062-03		51312P.09	Tip Ø0.3mm/30-40A back striking
6				Tip
6.1	IVU0668-09		51313P.09	Flat tip Ø1.0mm/30-40A back striking
6.2	IVU0668-10		51313P.10	Flat tip Ø1.0mm/40-50A back striking
7				Tip
7.1	IVU0609-06		51318L.06	Extended tip Ø0.6mm/10-20A back striking
7.2	IVU0609-08		51318L.08	Extended tip Ø0.8mm/20-30A back striking
8	IVU0603-09		51314.09	Extended tip Ø0.9mm/30-40A back striking
9	IVF0601	PE0106	60028	Diffuser
10	IVB0660	PR0110	56531	Electrode
11	IVB0660		52582	Electrode back striking
12	IVB0049		52583	Extended electrode/back striking
13	IVZ0673		06603	Plasma torch head PT40
13a	IVT0706		51620.60	*Orfing Ø10x1.8mm Silicon Red
14	IZ46915		01000.33	Spring pin complete wire Ø3-1.60mm
15	IVY0058			Plasma handle manual PT20-60/Red
16	IFT0873			Screw M2.5x10mm
17	IFT0806		51620.80	Spring for Plasma handle
18	IHJ0722			Protection part Plasma/Yellow
19	IFT105			Label for PT40
20	IHC0070			Trigger
21	IHL0893			Plasma joint/small/new type
22				Cable assembly
22.1	IVN0905			Cable assembly/PT60/6M connection 1/4G separated
22.2	IVN0907			Cable assembly/PT60/6M central adaptor
22.3	IVN0908			Cable assembly/PT60/6M connection 1/4G
23	ICG6005		60388	Spanner for Plasma
24	IZK0078		04290.10	Central adaptor torchside Plasma 5 pins
25	ISM0707		51666	Circle cutting attachment



* Note: Not all items, accessories or parts are sold directly through Everlast. In this case parts are provided as general information. Everlast is not the manufacturer of the Innotec IPT 60 torch nor is it affiliated with the company other than as an OEM supplier of the torches. More Innotec torch parts and consumables are available from national distributors of the Innotec/Tec.no brands. Innotec and Tec.no brands. Information courtesy of Innotec.

7 PIN CONNECTOR FOR 22K Ω FOOT PEDAL

Note: Previous models before mid 2015 typically used a 47k pedal. 22k is only for digitally controlled models of the PowerPro line after the mid 2015 model year.



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. Wrong polarity. Use a negative torch connection for TIG and plasma. Use Positive for Stick.
Other issues.	Contact Everlast support.

SECTION 4

TROUBLE SHOOTING

PLASMA TROUBLE SHOOTING:	CAUSE/SOLUTION
Air Flows but arc does not start within 2-3 seconds.	Check consumables for wear and tightness. Check fuse. Check Air Pressure. Sticky or slow spring/piston on torch blow back mechanism. Release trigger and try again. Preflow turned on.
Air Flows but arc does not start or spark when nozzle is rubbed on the metal.	Pre Flow is turned on. Fuse blown. Missing swirl ring. Worn or loose consumables. IGBT issue. PCB issue.
OK to cut light is not on. Will not start arc.	Increase air Pressure. Make sure air is connected.
Pilot arc will not light.	Fuse blown. Check fuse. Make sure consumables are correct.
Pilot arc will not transfer and amps read approximately 25-27 amps while switch is held. (Arc barely cuts or only "scratches" the surface of the metal or cut is extremely slow on thin materials.)	Check work clamp connection. Make sure rust is removed from work clamp contact area. Faulty Clamp. Arc continuity is not being sensed. If these steps do not correct the issue, contact Everlast.
Arc Sputters.	Inadequate air flow or air pressure. Improperly sized nozzle. Decrease size as amps are lowered. Increase air pressure to 70-75 psi while air is flowing through torch. Loose consumables. Check tightness.
Consumables are dirty, smutty looking upon inspection. Premature wear on consumables. Shortened consumable life.	Moisture, oil contamination of consumable. Wrong consumables. Poor quality aftermarket consumables.
Premature wear on consumables. Short consumable life. Uneven wear of consumables, melting of cup.	Moisture, oil contamination of consumable. Excessive pilot arc time. Improper cutting technique. Wrong piercing technique. Wrong/mismatched consumables.
Arc will not start. Air will not flow. Machine runs.	Torch cup is loose, safety contact pins dirty or not making contact with cup face. Torch switch wire is loose. Problem with connector. Torch is not properly connected.
Arc will not start. Air flows. Machine runs.	Swirl Ring damaged or missing. Wrong Polarity. Wrong process selected.
Unstable Arc at lower amps.	Consumable orifice size is too large. Reduce orifice size. Wrong air pressure. Poor work clamp connection. Check clamp and connectors.
Arc tries to start but irregular, dancing arc and/or arc melts through side of nozzle.	Missing swirl ring, or worn electrode or both. Check and replace. Make sure swirl ring is not cracked.
Arc will try to start if touched to the metal, but no air flow while switch is pressed.	Stuck or dirty solenoid valve. Contact Everlast. Wrong Process selected.
Air flows continuously.	Post flow turned set too long. Preflow is turned on. Solenoid is stuck. Contact Everlast.
Excessively Beveled Cut.	Worn consumables, too high of stand-off height.
Cup and/or nozzle is melting or cracking.	Improper cutting technique/excessive piercing.
Power input circuit breaker trips repeatedly.	Improperly sized circuit. Internal issue. Contact Everlast.
Arc "Blows Out" when ready to cut.	Too high of air pressure. Reduce to 72 psi. Use smaller nozzle
Arc will not stop when switch is released.	Unit is in 4T. Switch to 2T. Torch trigger is stuck.

OPTIONAL ACCESSORIES:

	
EV-FP22DL Deluxe Foot Pedal	PC-250M Welding Cart
	
EV-FP22NWI Long Life Foot Pedal	PCW300-240 Water Cooler
	
EV-200UW US Deluxe Regulator (CFH)	Everlast and NOVA 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 NOVA TIG welding products and accessories.