EVERLAST

ULTRA-ARC 205

50 Amp Digital IGBT TIG/Stick/Plasma Cutter

CC

DC

GTAW-P

SMAW

PAC

IGBT

1 2 PHASE

DV 120/240V

Operator's Manual for the Ultra-Arc 205
Safety, Setup and General Use Guide

Rev. 1 0 000226-20

everlastwelders.com

EVERLAST IGBT INVERTER TECHNOLOGY

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NOTICE:

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

Dear Customer,

THANKS! You had a choice, and you bought an Everlast Product. 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/region. 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 the terms and conditions outlined in the warranty. Warranty terms vary from country to country and region to region. For this reason, the warranty is honored through the original national/regional branch of Everlast that originally sold the unit only. If a product is purchased in one country or region, another country or region is not responsible for the enforcement or backing the terms of the warranty and sale.

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. They 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.*

Serial number: _____
Model number: _____
Date of Purchase_____

Everlast USA:

Everlast consumer satisfaction email: sales@everlastwelders.com
Everlast Website: everlastwelders.com
Everlast Technical Support: tech@everlastwelders.com
Everlast Welding Support: performance@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

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

Everlast Australia:

Port Macquarie 4/18
Acacia Ave.
Port Macquarie NSW 2444
(02) 6581 23888
After Hours Support
0431 016 416
Sales: sales@everlastwelders.com.au
Support: support@everlsatwelders.com.au

Everlast is dedicated to providing you with the best possible equipment and service to meet the demanding job requirements that you may have. We want to go beyond delivering a satisfactory product to you. That is the reason we offer free technical and basic welding support to assist you with your needs, should an occasion occur where it is needed. 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 operator/owner experience. Welding and related cutting operations require basic experience and common sense. **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. Stay alert!

Please carefully read this manual before you operate your Everlast unit. This manual, if read in full, can assist the user in obtaining helpful information concerning the safe operation of this unit. Do not operate the unit until you have read this manual and you are thoroughly familiar ith the safe operation of the unit. If you feel you need more information please contact Everlast Support. The content of this manual is not meant to be an exhaustive primer on welding. It is written to an audience that, if not professional, will have at least some basic knowledge of welding terms and practices.

The 5 year warranty does not cover improper use, maintenance, accessories or consumables. Accessories are covered by a separate warranty (length varies), which is also listed on our website along with the full terms of the welder warranty. Consumables have no warranty.

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.

WARNING! 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.

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

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

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

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

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

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

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

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

Flame proof and insulated gauntlet or cuffed type 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

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 or limbs.
- 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! The use of this product can expose you to chemicals such as lead, which is known to the State of California to cause birth defects, reproductive harm and cancer. Proposition 65 Warning. For more information visit: www.P65Warnings.ca.gov

DANGER! 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.

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.

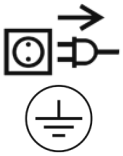
All work cables, leads, and hoses pose trip hazards. Be aware of their location and make sure all personnel in area are advised of their location. Taping or securing cables with appropriate restraints can help reduce trips and falls.

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. Remove any faulty cords, plugs or electrical equipment from service or access.
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. **If operating on a generator:** Always switch off and disconnect the unit before shutting the unit down. Never start the generator with the unit switched on or connected. Failure to do so may result in damage to the unit. **This damage is not covered under warranty.** Make sure that any required generator grounding is performed properly and to the manufacturer's recommendations.

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

ULTRA ARC 205 PACKAGE CONTENTS

S-45 Series Plasma Torch (12 ft.)

Consumable and Plasma Pressure Regulator Kit

TIG Regulator

240V to 120V Adapter

Work Clamp

NOTICE! Accessory and consumable style and quantities are subject to change without notice. Consumable starter kits provide only enough consumables to get started. Extra consumables can be purchased through Everlast or through other local and online iPT 60 Innotec distributors. Full original consumable kits are sold through Everlast. Various diameter consumables for lower amp use are available. The unit comes with a spare 30 Amp glass-type (slow-blow) fuse for the pilot arc. Set this fuse aside where you can find it. Replacement fuses may be bought locally (use part number printed on fuse for reference) or directly from Everlast.

ULTRA-ARC 205	Specifications
Inverter Type	Digital IGBT (DC Output only)
Memory Settings	Up to 9 possible memory slots
Minimum/Maximum Rated Output TIG	**120V:** 5A/10.2V-125A/15V **240V:** 5A/10.2V-200A/18V
Minimum/Maximum Rated Output Stick	**120V:** 5A/20.2V-100A/24V **240V:** 5A/20.2V-160A/26.4V
Minimum/Maximum Rated Output Plasma	**120V:** 20A/88V-25A/90V **240V:** 20A/88V - 50A/100V
TIG/Plasma Start Type	TIG: Live Lift/Lift/HF Plasma: Blow-Back Type
Torch Type and length	TIG: 26 Series Air-Cooled 12.5 ft. Plasma: S-45 12 ft. Stick: 250A 10ft. Electrode Holder
TIG Duty Cycle @ Max Rated Amps/Volts (40° C) (Output A/V)	**120V:** 60% @ 125A/15V **240V:** 60% @ 200A/18V
Stick Duty Cycle @ Max Rated Amps/Volts (40° C) (Output A/V)	**120V:** 35% @ 100A/24V **240V:** 35% @ 160A/26.4V
Plasma Duty Cycle @ Max Rated Amps/Volts (40° C) (Output A/V)	**120V:** 35% @ 25A/90V **240V:** 35% @ 50A/100V
TIG Start/End Amps	5-200A
TIG/Plasma Pre/Post Flow Time	Pre: 0-10 Seconds Post: 0-50 Seconds (Plasma 0-50 Seconds Post Flow Only)
TIG Upslope/Down Slope Time	Up: 0-10 Seconds Down: 0-10 Seconds
TIG Pulse Frequency:	.1-150Hz
TIG Pulse Time On/ Pulse Amps: P-TIG 1, P-TIG 2, P-TIG 3	Fixed. Time On/Pulse Amp values set @ P-TIG 1: 50% / 50%, P-TIG 2: 65% / 65%, P-TIG 3: 75% / 35%
Spot and Fast Tack Time	.1– 15S
Stick Hot Start %	0-100%
Stick Arc Force %	0-100%
E6010 Capable	**No**
OCV (U0) TIG/Stick/Plasma	TIG: 70V Stick: 70V Plasma: 250 V
Voltage Input (U1)	Dual Voltage: 120V/ 240V; 50/60Hz 1 Phase (±10%)
Maximum Inrush Amps (I1MAX)	120V: 30A 240V: 28A
Maximum Rated Effective Amps (I1EFF)	120V: 19A 240V: 18A
Air Post Flow Timer	Adjustable, 0-50 Seconds
Air Compressor Requirement and Recommendations for Plasma Cutting.	**4.5 - 5 CFM @ 90 PSI (127-142 lpm @ 6.2 bar)** Use a compressor with a minimum output of 5.3 CFM @ 90PSI (150lpm @ 6.2 bar), with 30 gallon (114 Liter) capacity or higher recommended for best operation**. Pancake type and small oil-less compressors are not suitable.**
Duty Cycle/ Over Current Protection	Yes, Self-diagnosing feature. *(See code references at the end of this manual.)*
Minimum Operating Plasma Cutting Air Pressure	Approximately **40 PSI (2.7 bar)** (safety cut-out threshold) **Low Pressure indicated by Error Code E06.**
Maximum Supplied Air Pressure	90 psi (This is incoming pressure from the air compressor, not operating, or (From Compressor/Tank) cutting pressure.) The air compressor **MUST** have a separate pressure regulator at the tank or inline to control maximum supply pressure.
Recommended Maximum Daily Average Cut Thickness *(Steel)*	3/8" (12mm) Decrease 35-40% for Aluminum and Stainless (INOX).
Rated Maximum Quality Cut @ 10-12 IPM (@ 250-300mm / min) *(Steel)*	5/8" (18mm) Decrease 35-40% for Aluminum and Stainless (INOX).
Max Severance Cut @ 3 IPM (75mm / min) *(Steel)*	7/8" (22mm) Decrease 35-40% for Aluminum and Stainless Steel (INOX).
Minimum Water Ingress Protection Standard	IP21S
Efficiency	>85%
Cooling Method	Full time High Velocity Fan
Dimensions (approximate)	12.5" H x 7.5" W x 14" L (320mm x190mm x 355mm)
Weight (Bare Unit)	44 lbs. (20 kg)
Generator Requirement	7,500 W Clean Power (<5% total harmonic distortion/Clean Power Output Rated)
Minimum Storage/ Minimum Operating Temperature	Storage: -10°F/-23°C Operating: 14°F/-10° C
HF Point Gap (TIG)	.029" to .045" (Target Point Gap: .035")

NOTICE:

This unit is DC output only and is not intended to be used for TIG welding Aluminum. This unit will weld with most welding electrodes (rods) in Stick mode, but it is not suitable for use with E6010 electrodes. E6011 may be used, but performance may be brand dependent and not as good as with E7018 or any iron powder electrodes such as E7014 or E6013. The plasma function on this unit is intended to be used in a support role for TIG and Stick welding and is not recommended to be used exclusively as a plasma cutter. Please be aware of duty cycle limits while plasma cutting. Adjust plasma Amperage and consumable size according to the application used. This unit is not suitable for Plasma Gouging.

Section 1 Introduction and Specifications

NOTICE:

This manual has been compiled to give an overview of operation and is designed to offer information centered around safe, practical use of the plasma cutter. Welding and cutting operations are inherently dangerous. Only the operator of this Welder/Plasma cutter can ensure that safe operating practices are being followed, through the exercise of common sense practices and training. **Do not operate this machine until you have fully read the manual, including the safety section.** If you do not have the skill or knowledge to safely operate this Welder/Plasma Cutter do not operate this unit until formal training is received. To prevent fire, always be aware of your surroundings.

GENERAL PRODUCT INFORMATION:

The Ultra-Arc 205 utilizes the latest in digital inverter design technology. This new design is an improvement over its predecessor, the PowerUltra 205Pi. This unit redesign has incorporated more advanced Stick and TIG welding features and even now includes a memory function with up to 9 memory slots to preserve favorite settings.

New features have been added to improve the TIG welding capabilities of the unit. The unit offers 3 TIG Pulse settings which have been carefully selected for best operation in a variety of conditions where pulse may be helpful. In each pulse program, pulse is adjustable up to 150Hz for optimal fine control by the user. The unit also features a spot weld timer to be used with the TIG mode to allow a timed arc that can produce consistently sized large spot welds or tacks welds. The new Fast Tack feature provides a intense burst of welding power. This allows tacking of very small or thin parts without over melting the component or seam. This is used in conjunction with the TIG torch switch in 2T mode.

Also, control over stick functions have been increased with the additions of hot start intensity and arc force control. *However, this unit is not rated for E6010 use however, or similar cellulosic rods.*

POWER INPUT:

This unit may be operated on either 120V or 240V single phase input. No changeover of wiring is required. Simply plug the supplied adapter to the NEMA 6-50 plug on the plasma cutter and the unit will automatically sense the voltage that is being supplied. When operating on 120V input, please note the maximum output will be limited. For Wiring and Breaker requirements, consult the Article 630 of the National Electric Code (NEC) for special information concerning proper wiring and breaker sizing of duty-cycle limited welding/cutting machines. Use the $I1_{MAX}$ and $I1_{EFF}$ ratings supplied on page 10 in this manual to determine correct breaker and wire sizing. **Always consult a licensed electrician before wiring this unit to new or existing service. Never attempt to adapt this unit to work with existing dryer or range plugs. Do not use on long or undersized extension cords. Use cords rated for a minimum of 30 amps for 120V and 40A for 240V. Use lengths no more than 25 ft in length.**

GENERAL MAINTENANCE AND CARE:

Care should be taken to keep the unit out of direct contact with water spray. The unit is rated IP21S, which rates it for light contact with dripping water. It is a good idea to remove the Welder/Plasma Cutter from the vicinity of any water or moisture source to reduce the possibility of electrocution or shock. Never operate this unit in standing water.

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

Every 1-2 months, depending upon use, the unit should be unplugged, opened up and carefully cleaned with dry compressed or canned air. To open, remove rear plastic cover and main cover. Do not remove the front plastic cover. Regular maintenance will extend the life of the unit. Carefully descale metal particles from the fan blades to prevent vibration and fan damage (if buildup is present).

- Do not restrict air flow or movement of air around the welder/plasma cutter. Allow a minimum clearance of at least 18" (500mm) on all sides.
- Lift and carry the unit by the handle. Do not mount in areas that are prone to severe shock or vibration.
- Do not operate the unit immediately next to the weld/cut area. Allow at least 6 feet separation.
- Do not direct metallic dust or any dirt intentionally toward the machine, particularly in grinding and cutting operations. Make sure the control panel is protected from damage.

DUTY CYCLE:

The duty cycle of this unit has been tested and established at 60% at full rated output for TIG welding. For Plasma and Stick use the duty cycle is 35% at full rated output. This duty cycle has been established under the standard rating temperature of 104 F (40 C). If you are not familiar with Duty Cycle ratings, duty cycle is the percent of time out of a 10 minute time period at which a welder or plasma cutter can operate continuously without overheating. Lowering output increases duty cycle. It is possible to achieve a 100% duty cycle by lowering the output Amps until the 100% duty cycle threshold has been reached. (Additional duty cycle levels at rated lower-than-maximum outputs are listed on the data plate on the welder. i.e. 60%, 100%) However, 100% duty cycle is still based off a 10 minute time period and does not mean it has an "infinite" duty cycle. Theoretically, if the machine were to go 11 minutes of uninterrupted operation even at a 100% Duty Cycle level of operation, you could incur an overheat condition. Duty cycle on this machine is not controlled by a timer, but rather by one or more temperature sensors strategically located on the heat sink(s) of the machines internal circuitry. If an overheat is detected the cutting output will be interrupted. A code of **"E01"** will be displayed. *If this happens, allow the unit to continue to run and cool for at least 15 minutes. Do not turn the unit off during this time!* If the unit does not automatically reset after this time, cycle the machine off and back on to clear the code. If the code does not clear at this time, contact Everlast for further remedy. Intentionally and repeatedly triggering the duty cycle can damage the unit over time. This type of damage becomes apparent during repair and service and is not covered under warranty.

OVER/UNDER VOLTAGE/CURRENT:

This unit is equipped with a over/under voltage/current device which senses under or over voltage conditions caused by poor power supply or internal faults and shuts down output. If you observe an error code **"E02"** immediately turn the machine off. Evaluate the input power supply for proper voltage. Also inspect the suitability of any extension cords for service. If code does not clear, after remedying common issues stated below, contact Everlast. Do not continue to try to clear the code if it does not appear to have been corrected.

Common Items That Can Trigger the Over/Under Voltage Current:

- Operating on too long or undersized extension cord or service wiring. Damaged wiring.
- Improperly grounded service/ power supply.
- Operating on too small of a generator or on a generator not rated as "Clean Power" (5% or less THD).
- Too long of a cutting arc.
- Excessively worn or missing consumables or damaged torch head.
- Internal machine fault. (If code cannot be cleared after correcting other issues, call Everlast.)

GENERATOR REQUIREMENTS AND OPERATION

This unit may be run on a generator capable of 7500 Surge Watts. Additionally, the generator must provide "clean power". Clean power is defined as having 5% or less Total Harmonic Distortion (THD). This is a rating given by the manufacturer of the generator, and not Everlast. This is similar to the power normally supplied at a wall outlet. This represents a sine wave (AC) that is mostly free of voltage spikes and electronic noise. Many general purpose (GP) generators are not rated to produce clean power and are designed for emergency or construction use with resistive loads such as lights or heaters. These generators can damage the plasma cutter. If damage does not occur immediately, the effect can be cumulative, depending on how "dirty" the power actually is. Damage created by running this unit off a generator, or welder/generator not rated for clean power output by its manufacturer will not be covered under warranty. If you are in doubt about your generator or welder/generator, contact the manufacturer. Everlast does not keep an authorized list of generator brands or models. However, if the manufacturer rates its generator for 5% or less THD, this is sufficient to meet our standards. However, do some additional research on the brand and model of the generator to make certain there are no issues, recalls or reported equipment (electronics in particular) damage related to malfunctioning generators from the manufacturer. The generator should be properly grounded, according to the generator manufacturer instructions.

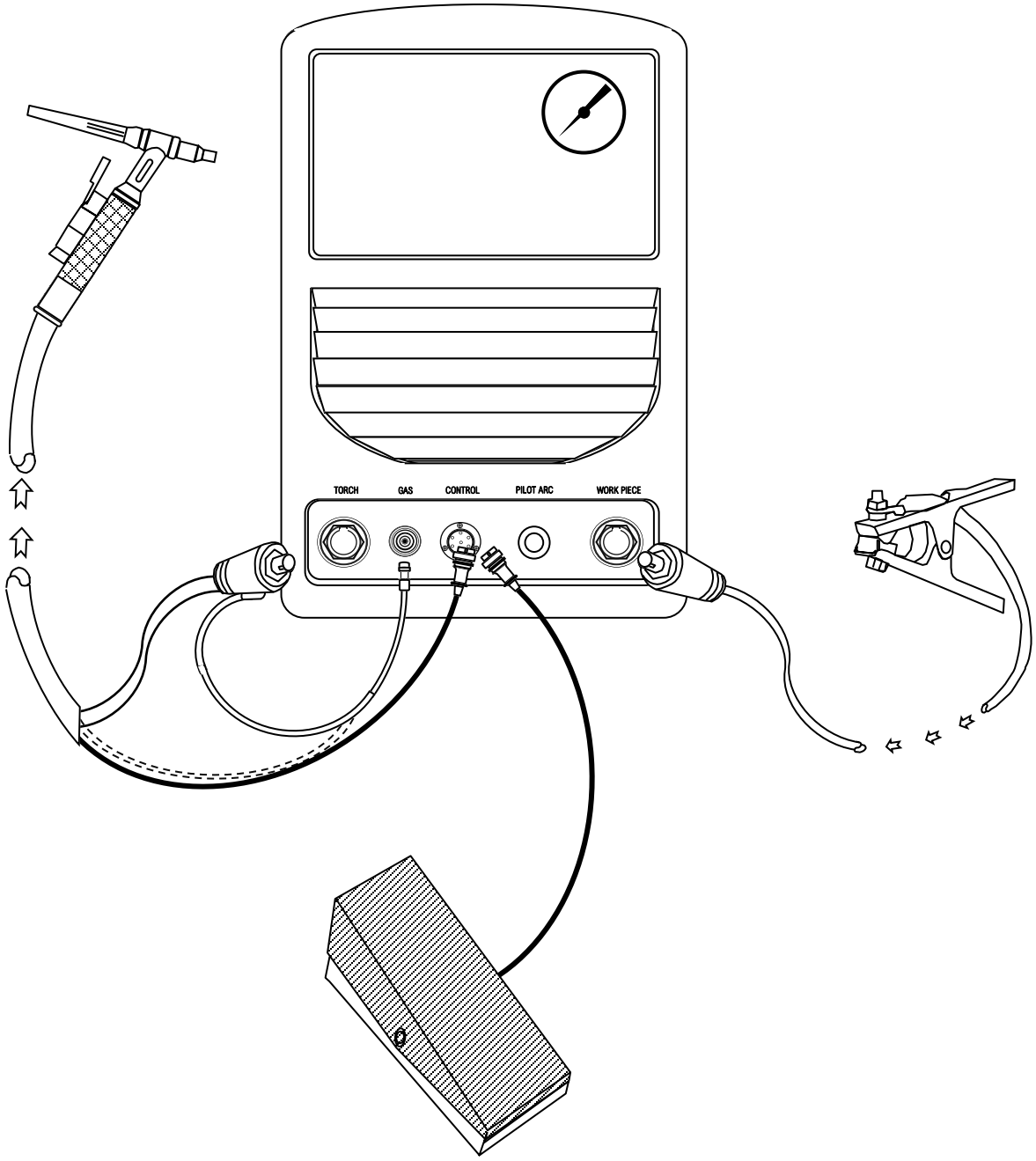
Never leave the unit on or connected while starting the generator. Never stop the generator while the unit is on or connected. Severe damage will occur. This includes running the generator low on or out of fuel. This damage is not covered under warranty, even if the unit is rated as "clean powered". Always allow the generator to warm up before plugging the unit in and using it. A cold engine may not develop or maintain proper RPM needed to provide stable, clean power even if the unit is rated to be "clean power". Never use economy idle (ECO mode), or auto idle modes with this unit. Always use maximum idle when this unit is plugged in and/or turned on.

NOTICE:

During TIG arc starting and during start up you may hear a quick "buzzing" sound coming from the machine. You may also observe a blue light coming from the front panel vents. This is normal and not an issue. It does not present a danger to the machine. This is the High Frequency (HF) circuit activating, allowing you to make a clean, touchless start. Inside the machine, toward the front of the welder, under the main metal pan is a small HF board, with small set of points that the HF energy jumps between, creating a "spark". You can view the HF points through the front vents at just the right angle. This spark can also be seen briefly during the start of the weld (if in HF start mode) at the tip of the Tungsten. Do not attempt to start the unit unless you are ready to weld. The unit discontinues the starting HF after approximately 3 seconds of attempting to start the arc for safety and unit protection. It also discontinues after the arc starts.

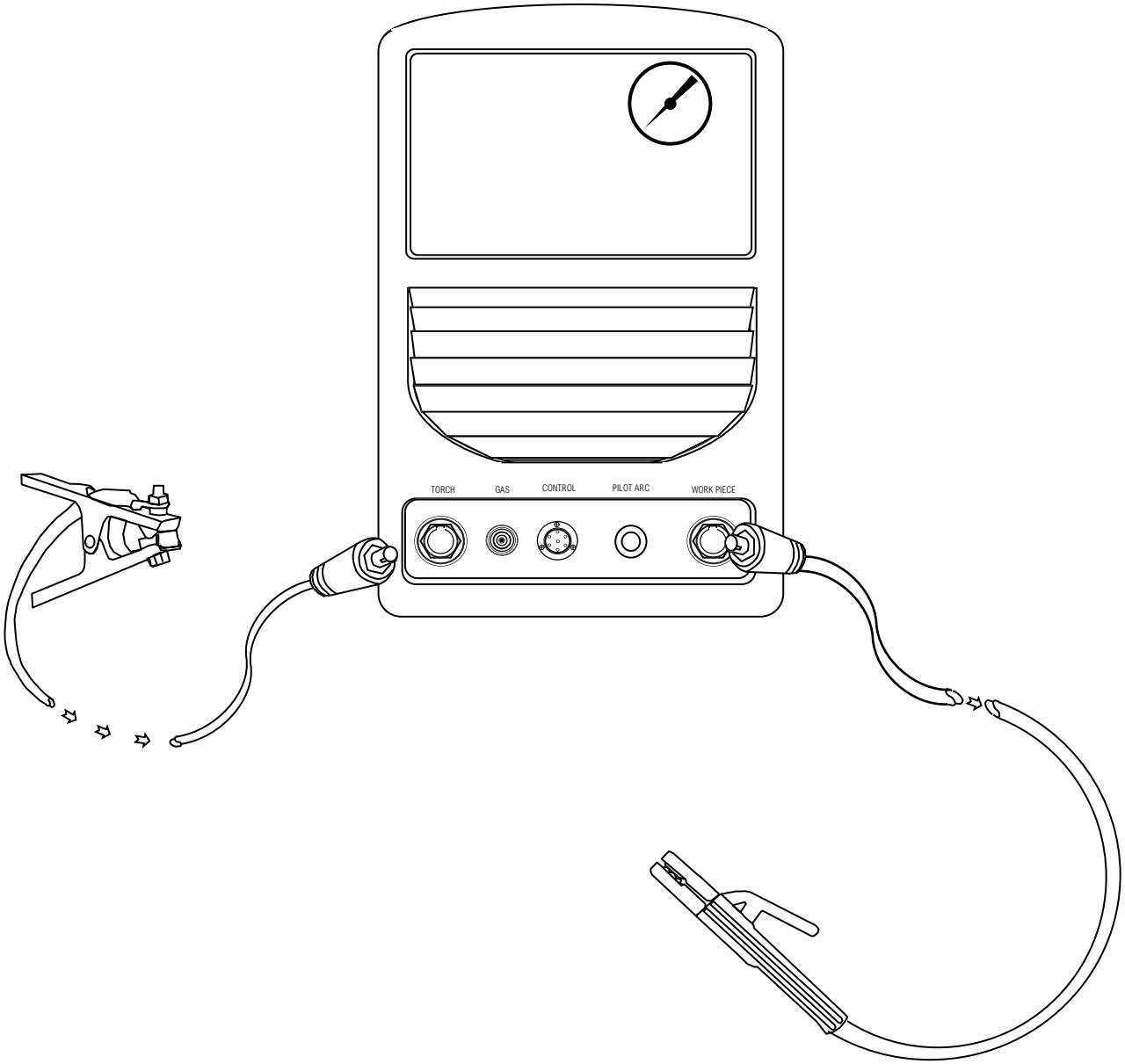
Over time the points may become dirty or out of adjustment, making the HF starting more difficult. If HF starting is difficult, first regrind the Tungsten, then make sure the work clamp is in direct contact with the work piece and not running through the work table or table leg. If starting is still difficult, adjustment of the point gap may be needed. This is not a candidate for warranty. Point Gap adjustment, just as cleaning out/blowing out the machine on a regular basis is considered a part of regular maintenance. Opening the machine for cleaning or point gap adjustment does not void the warranty. Always unplug the unit for 10 minutes before entering the machine for maintenance to allow capacitor bleed down. Remove only the rear plastic cover and the metal cover to access the unit. **Never remove the front plastic cover unless directed by Everlast. See specification page for point gap adjustment range.**

TIG Connections:
Front View of TIG Torch and Work Clamp



IMPORTANT:
The foot pedal and the torch switch cannot be connected at the same time.

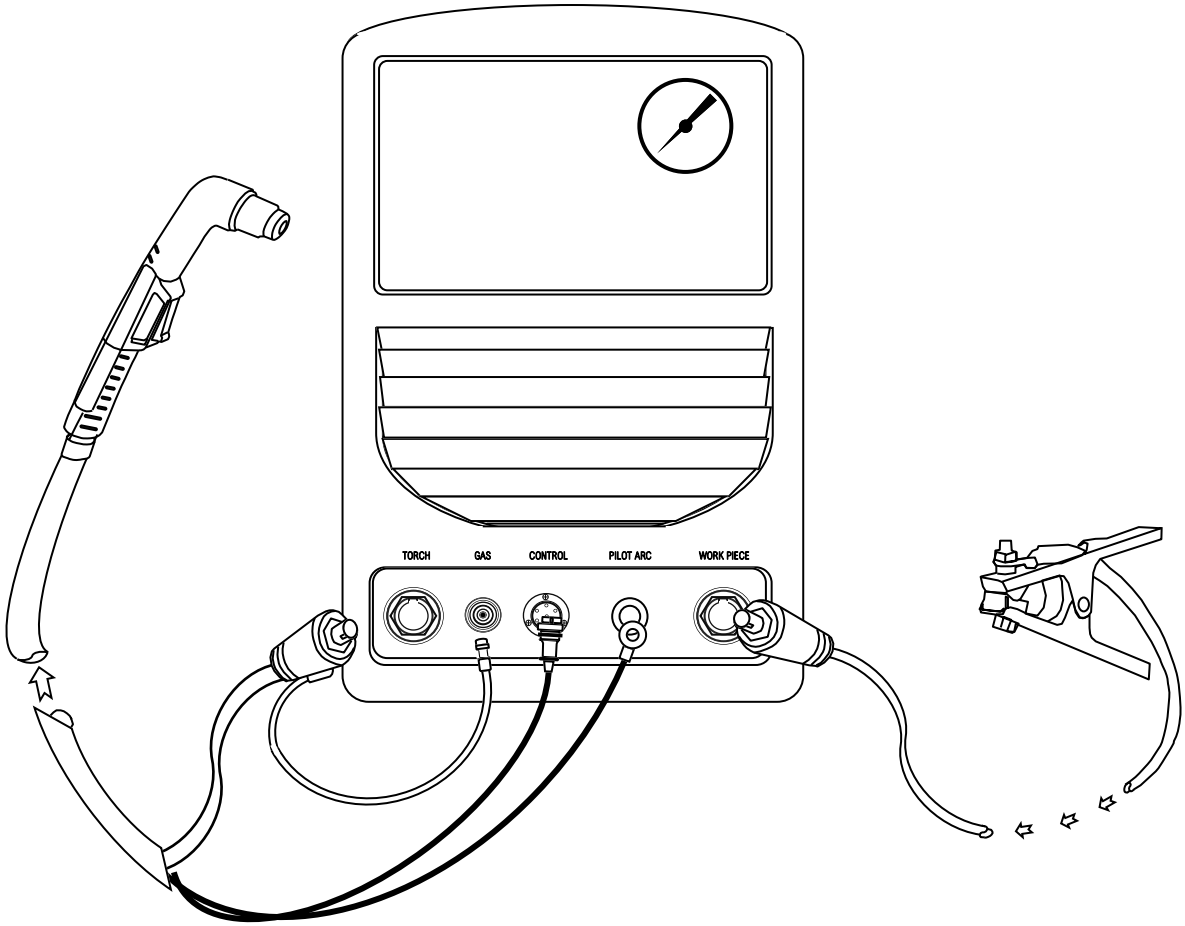
Stick Connections:
Front View of Electrode Holder and Work Clamp



NOTICE:

The stick function will require you to move the torch to the work piece setting for DCEP+ (Reverse Polarity). In this case, ignore the marking and remember the left terminal is negative and the right terminal is positive. Some electrodes can be run DCEN, however, consult the rod manufacturer suggestions for proper polarity. The picture above depicts the standard and most commonly used rod polarity (DCEP+).

Plasma Connections:
Front View of Plasma Torch and Work Clamp



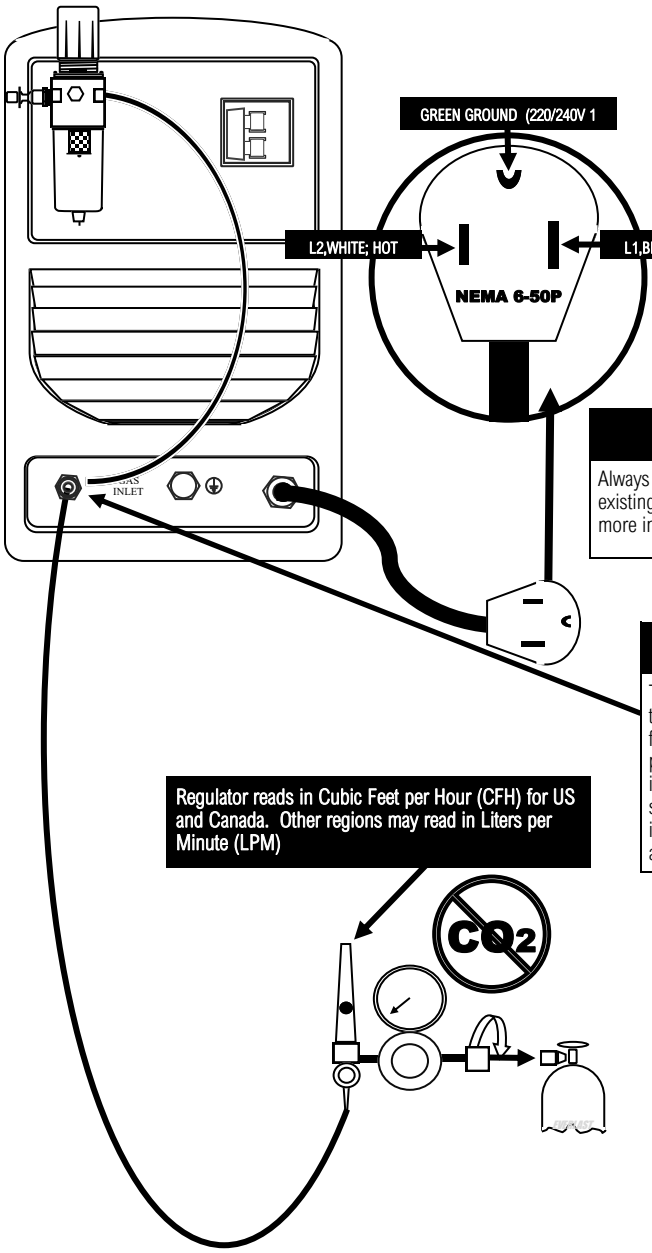
IMPORTANT:

Avoid firing the torch unless you are ready to cut. Excessive firing without cutting will wear the consumables at an accelerated rate. **Do not attempt to control the amperage with the foot pedal connected.**

NOTICE:

For correct operation, use the correct consumable for the amperage selected amperage. Cutting nozzles (tips) have different orifice sizes. If you are operating on 120V, the maximum output of the cutter will only be 25 amps. The stock consumable will not cut properly at 25 amps. See torch pages for alternative sizes and amp range. Always maintain proper cutting air pressure (65-75 PSI). Use the Purge button to adjust the cutting air pressure. Do not exceed 90 PSI supply pressure from the compressor to the regulator.

TIG Gas Connections and Power Connection



NOTICE:

The supplied plug is a **NEMA 6-50P**, This is the standard plug for welders in the USA and Canada. It is a 50 amp 3 prong plug. There is only a ground and no neutral in a welder circuit. For 120V use, use the supplied adapter. No switching or change of wiring is necessary for 120V use if the supplied adapter is used.

IMPORTANT!

Always consult a licensed Electrician and local codes before adding or modifying any existing wiring. Do not modify the welder wiring! Refer to Article 630 of the NEC for more information concerning proper wiring of welders.

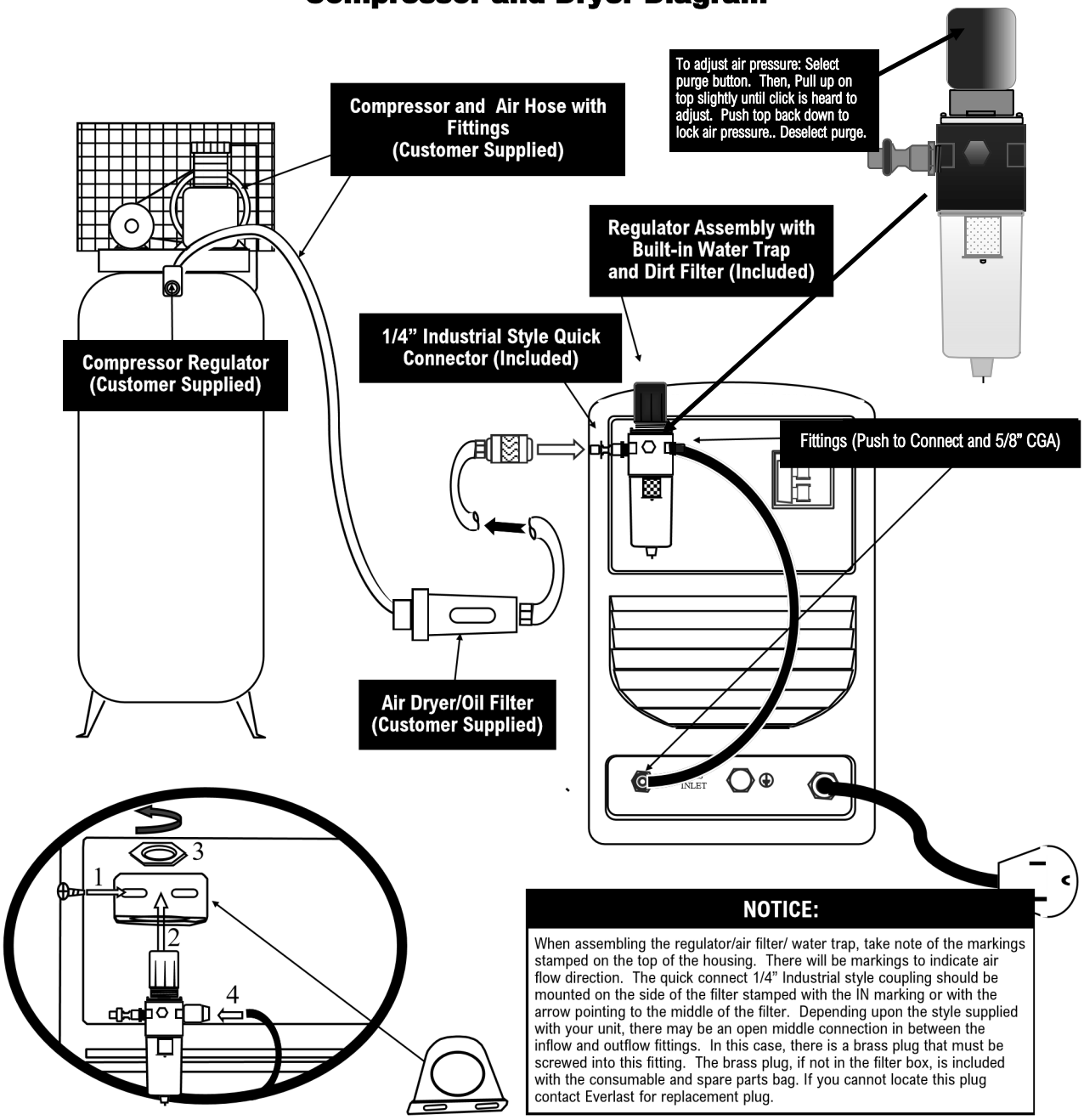
NOTICE:

The unit has a common connection point for both the plasma air supply and the TIG shielding gas. This means the gas hoses must be swapped back and forth when changing between processes. Do not run Argon through the plasma regulator. You make a manifold system to connect both TIG shielding gas and plasma air at the same time by using an Inert gas Y-valve or series of ball valves. The rear connection is a standard 5/8" CGA fitting for inert gas/TIG welding. These are available almost anywhere welding supplies are sold, both locally and online.

NOTICE:

TIG shielding gas must be 100% argon or Ar/He mix. If using Ar/He, never exceed 25% Helium. Never use CO2 or Ar/CO2 or other Ar mixes.

Plasma Connections: Compressor and Dryer Diagram



NOTICE:

When assembling the regulator/air filter/ water trap, take note of the markings stamped on the top of the housing. There will be markings to indicate air flow direction. The quick connect 1/4" Industrial style coupling should be mounted on the side of the filter stamped with the IN marking or with the arrow pointing to the middle of the filter. Depending upon the style supplied with your unit, there may be an open middle connection in between the inflow and outflow fittings. In this case, there is a brass plug that must be screwed into this fitting. The brass plug, if not in the filter box, is included with the consumable and spare parts bag. If you cannot locate this plug contact Everlast for replacement plug.

⚠ IMPORTANT:

A separate air dryer between the air compressor and filter assembly must be installed, usually at the compressor or right before the regulator. This is a customer supplied item. Failure to install a separate air dryer/filter will greatly decrease consumable life. It can also lead to contamination in the torch head which will cause failure. Moisture in a plasma system is detrimental to all parts, including the solenoid and torch head. The included filter/water trap is designed mainly to catch dirt and moisture created during the coupling and uncoupling process, or minute amounts of moisture that may escape the separate dryer/filter. Multiple styles of dryers/filters are available in a wide range of prices from a few dollars to several hundred dollars. A simple, economic desiccant type dryer used in automotive paining is enough to get started. **Damage caused by operating the unit without the additional dryer/filter is not covered under warranty!** Never use this plasma cutter with an oiler system, or with a worn air compressor which uses excessive oil. For best results, if installing this unit on an older system, install a new hose and plumbing components after the air dryer before connecting to the unit.

Drain the air compressor on a *daily* basis after use.

Do not supply more than 90 psi to the plasma cutter from the compressor. If the air pressure on the front gauge drops too far to maintain a good cut or falls out of spec while cutting, increase the size of the supply hose/line to the plasma cutter in lieu of increasing supply pressure.

STOP!

To set the air pressure or TIG torch Gas Flow Rate, use the "PURGE" feature to initiate air flow, then adjust the pressure while air is continually flowing. **Do not fire the torch to initiate air or shielding gas flow. Firing the Plasma torch without cutting significantly increases consumable wear. Firing the TIG torch without welding increases wear on the HF Points.**

STOP!

- Turn the unit off to check and change torch consumables. Shock, burn, injury or death may result if the torch trigger were accidentally pressed during removal.
- Turn the unit off to check and change power connections/torches.
- Do not become a ground path while using this unit. This means you need to insulate/isolate yourself from the work piece while welding or cutting. Refrain from touching or contacting the cutting tip or electrode while in use.
- Using in wet or damp material may increase your chances for shock or electrocution. Sweat can also increase your chances of shock/electrocution.
- Do not exceed 90 P.S.I. (6.2 bar) input supply pressure (from compressor) while plasma cutting.
- Do not attempt to repair a faulty regulator other than tightening leaking lines or repairing hoses.

STOP!

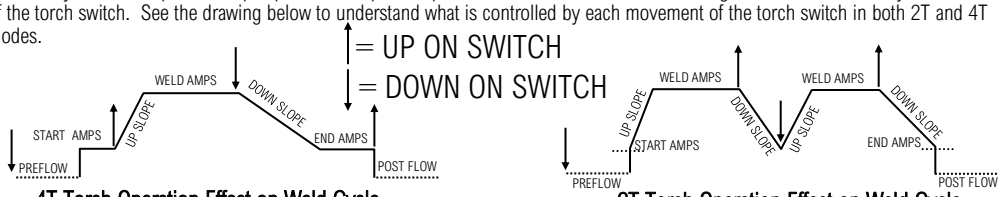
Don't forget to turn off the Argon cylinder while away. Leak down and loss of cylinder contents may occur. For best practice and safety concerns, disconnect the plasma air supply when the unit is not in use.

GENERAL PLASMA CUTTING OPERATING TIPS

- Keep torch standoff to less than 1/8" while plasma cutting.
- Do not drag the plasma torch directly on the metal unless using drag consumables.
- **Always use dry air.** Install inline air dryer. Do not rely on the supplied water trap/filter. Drain compressor daily to improve effectiveness of air dryers and to prevent them from prematurely failing.
- Don't greatly air pressure to try to reduce kerf or cut thinner material. Always reduce nozzle orifice size to match amperage.
- **See the Torch information page for different consumable sizes and amp ratings.** Use this as a general rule of thumb for good hand cutting speed and quality: For the first 1/8" of thickness, use 20 amps. After the first 1/8" add 10 amps for every 1/8" after that. For Stainless and Aluminum, use settings that are 40% higher.
- Do not attempt to operate with work clamp removed. Always connect the work clamp directly to the part being cut.
- Excessive pilot arc operation drastically reduces consumable life. Grind the area where the work clamp is attached for best contact. If the unit only lightly cuts or gouges the surface, the pilot arc is staying on too long and continuity to the cut is not being detected. This can blow your pilot arc fuse and cause the torch not to strike unless touched to the metal. If this happens, change the fuse and make sure your work clamp has a good, direct connection to the work piece.

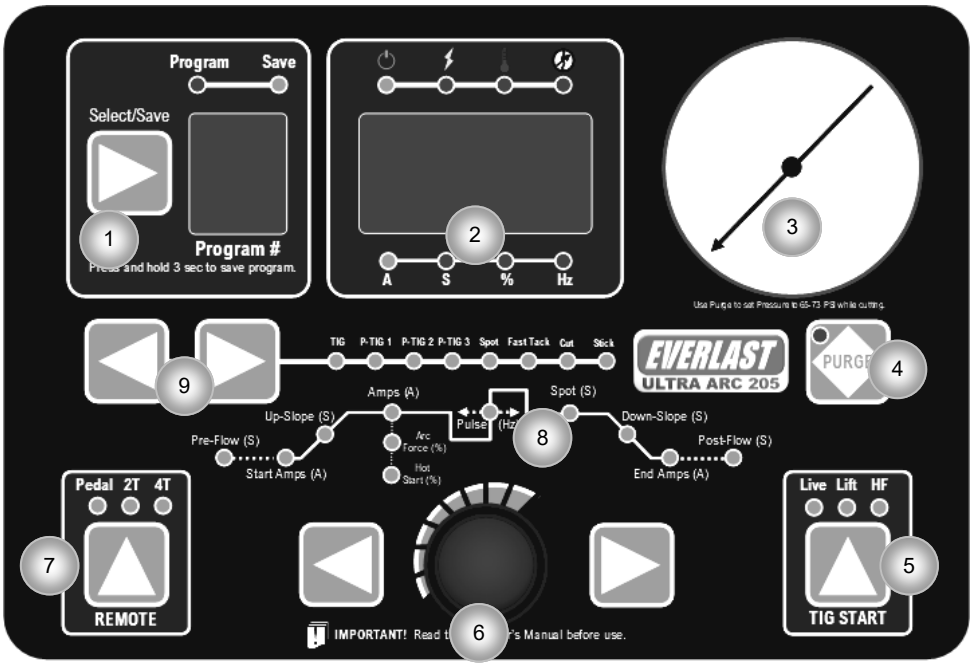
WARNING!

Never attempt to change processes with plasma torch connected or severe damage may result. Do not operate the Plasma with the foot pedal. Do not attempt to weld with TIG in stick mode. This can damage the unit.

TERM	DEFINITION AND EXPLANATION OF WELDING FEATURES AND TERMS
2T/4T	In 2T or 4T modes, the torch switch is used to start and control the weld cycle. Simply put, in 2T mode, the torch switch is simply pressed and held down to start the arc and begin welding. The switch is then released to terminate the arc and stop welding. In 4T mode the trigger is pressed and held to start the arc. It is then released to weld. Once welding is finished, the trigger is pressed and held and eventually released to terminate the arc. Between starting and stopping the weld, there are other things that happened during the weld cycle such as pre-flow, upslope, down slope, and post flow. Each of these actions are signaled and controlled by a movement of the torch switch. See the drawing below to understand what is controlled by each movement of the torch switch in both 2T and 4T modes.  4T Torch Operation Effect on Weld Cycle. 2T Torch Operation Effect on Weld Cycle.
Amps	In specific regards to the control and setup of this unit: this is a measure of the maximum current output of the welder. When no welding or cutting activity is taking place, the display is static, displaying the chosen maximum amperage. When welding or cutting, it becomes dynamic and displays the actual output of the welder/cutter. *Some variation is normal, especially when stick welding and arc force and hot start are set to a high value.* Amperage variation is normal due to several things including variation in arc length and variation in input voltage. With the TIG foot pedal plugged in, around three seconds after adjustment on the main control knob, the welder will actually default to the lowest Amp output because the unit begins to read the value of the foot pedal potentiometer instead of the maximum Amperage selected. This is usually around 5 to 7 amps. However, the display will revert to reading the maximum amperage selected if more Amperage adjustment is subsequently made with the main adjustment knob. Then, the unit will once again revert to the minimum output position reading of the foot pedal after the three second interval. Regardless of the reading with the foot pedal plugged in, the Maximum amps will always be what has been selected with the main adjustment knob. With the torch switch selected, the Amperage will not fluctuate from what is selected.
Arc Force	During Stick welding, arc length (the distance of the end of the electrode to the work piece) is constantly varying. As arc length decreases, voltage begins to fall with a Constant Current (CC) machine. This means the arc looses total wattage (W=V X A). Wattage is actually what keeps the weld puddle going. The combination of Volts and Amps are important and one cannot exist independently of the other as far as welding is concerned. Often focus is strictly on the Amperage value, but both are important. So as the Voltage falls, even if the amperage stays the same, the wattage begins to fall and the puddle begins to cool off. This means that in extreme cases, the arc can go out and the electrode can stick fast in the weld puddle. Inverters such as this one are designed to sense the fall of Voltage and attempt to offset the voltage loss in an effort to maintain total Wattage by increasing the amp output automatically. In this case, when Voltage falls below the threshold of 20V due to a short arc length, the arc force becomes active and the "injection" of extra Amps begin. This value is adjustable from 0 to 100% over the set Amperage. The crispness or softness of the arc is determined by the interplay and ratio between volts and amp output. Smooth and "buttery" arcs with "wet puddles" are usually a product of lower arc force values. Higher arc force values make a much more crisp, penetrating arc. For most applications with iron powder rods such as E7014 and E7018, and for rods like E7018, Arc force values of 20 to 40% are all that are usually required. For operation with more difficult rods, such as E6011, higher arc force values are required anywhere from 60-80% typically. It is worth noting that typical Amp selections will be lower than for traditional transformer and brush DC machines. This is because with proper use of the arc force you can actually control your heat and even increase it somewhat by "pushing" into the puddle with the electrode. With a transformer machine, it is customary to lengthen the arc rather than shorten it to accomplish something similar. However, pushing into the puddle actually is preferred because you have less chance of inclusions and discontinuities in the weld. **Hint: A "0" value for arc force will not typically render satisfactory results**. *NOTICE: Arc Force applies only in Stick mode. Arc force is also limited by the remaining amount amperage available for employment. The higher the set Amperage, the less Arc Force action is available, regardless of setting. Operation on 120V significantly reduces available Arc Force action.*
Base Amperage	This is a term referred only in terms of the Pulse function. Base amperage (sometimes called "Pulse Amps" or "Background Current" is the lowest Amperage value during the pulse cycle. On this unit, the Base Amperage is fixed at a different value in each Pulse Program.
Cut	This is the plasma cutting selection. Before selecting or deselecting "Cut" disengage the torch. *NOTICE: Do not switch the Cut mode to stick or TIG when the plasma torch connected or damage may occur.* Polarity for Plasma mode is DCEN, and the torch should be in the negative terminal (-) marked "torch".
Down-Slope	Down-Slope is the amount of time that it takes for the Amperage to decline from the Maximum selected Amperage to the minimum selected Amp value during the TIG welding cycle. Down-Slope is adjustable in seconds. On this unit the Down-Slope can be adjusted from 0-10 Seconds. *NOTICE: The Down-Slope only applies to 2T or 4T TIG modes. In foot pedal mode, the user determines the Down-Slope Time by backing down the pressure on the foot pedal, lowering the amperage.*
End Amps	During the TIG weld cycle, this is the final amperage, or "crater" current that is used to complete the weld. It follows the down slope cycle and is typically set at the minimum amperage for best tail out when using the foot pedal, or set at some desired value that keeps the arc from suddenly snapping off at a high amp value. This lower amp value, combined with the down slope cycle helps provide time for the arc to diminish and the weld puddle to gradually cool, helping to prevent large craters in the terminal end of the weld which create stress risers that lead to cracking of the weld.
Fast Tack	This feature allows the user to create fast, intense bursts of welding power perfect for tacking without over melting the edge. This feature can be set to repeat using the amps and pulse settings varying the intensity by changing the pulse frequency adjustment (Hz). This is similar to spot, but with spot, pulse cannot be employed. The employment of pulse helps to "vibrate" the puddle and bring two joint edges together without having to add filler. This is usually reserved for thin materials, but can be used for thicker materials though if needed, but with reduced effectiveness. For thicker materials, "Spot" is a better choice.
Hertz (Hz)	This term refers to the frequency at which the pulse operates. Or it is also sometimes called Pulses per Second (PPS). In other words, this is the number of times in one second that the pulse completes a full cycle. On this unit the Pulse frequency is adjustable .1-150Hz.

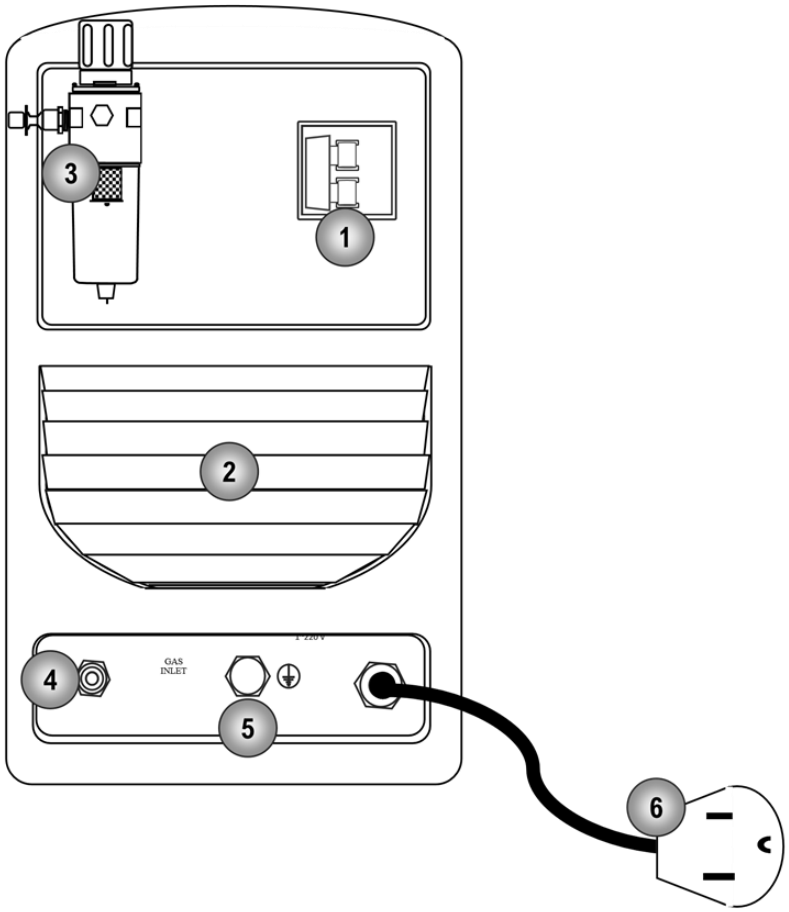
TERM	DEFINITION AND EXPLANATION OF WELDING FEATURES AND TERMS
High Frequency Start	This refers to the type of start in TIG mode. High Frequency (HF) provides an intense HF impulse from the internal HF board and point gap that jumps the gap between the Tip of the Tungsten and the Work Piece. This means no contact is made directly to the metal to start the arc. The foot pedal or torch switch is pressed and the arc will energize automatically after a brief HF spark is emitted. *NOTICE: The High Frequency Start feature does not pertain to AC welding and does not mean a welder will weld Aluminum or has an AC mode.* **Hint: If HF starting is difficult make sure work clamp is directly connected to the part being welded before checking HF point Gap.**
Hot Start	This is used in Stick mode to provide an extra burst of Amps during the arc striking process. This helps to improve arc starting capabilities and also helps to heat up the rod tip to prevent sticking and porosity at the start of the weld. The action is similar to "Arc Force" but is limited in duration automatically by the unit's programming. The value ranges from 0-100% over selected welding Amperage. NOTICE: The Hot Start is limited by the remaining available welding amperage, regardless of setting. On 120V Hot Start may be limited.
Memory	This is the ability of this unit to save different programmed settings. To save the setting, you should select a program # (sometimes referred to as a "channel") where you wish to save your settings ***before*** you begin to make any adjustments. After a program number has been selected, you can make any adjustments you wish to the settings of the machine. Once you are satisfied with the programming parameters, press the "Save/Select" arrow button in the Memory Display box and hold it for 3 seconds. While the button is held down, a green LED will light up to indicate that the program has been saved. **Hint: Any further adjustments to the programming will not be automatically saved. If you need to resave the program after more adjustments have been made, simply press and hold the Save/Select until the green LED lights again. Remember, to be careful not to save over old programs by changing the program number before. A saved over program cannot be recalled or recovered if it has been saved over.**
Pedal	This refers to the foot pedal operation. The foot pedal is used to start the arc and increase or decrease the Amperage. The range of Amperage controlled is limited at the panel by setting the maximum operating Amps. Usually set the max operating amperage 20% or so above the maximum intended operating range. *NOTICE: The pedal is used with TIG only. Do not use with Stick or Plasma Functions.*
Post-Flow	The Post-Flow is used for both TIG process and for Plasma Cutting. After terminating the Arc while TIG welding, the Argon gas should flow briefly after the arc is terminated to prevent porosity in the weld puddle and to cool the weld and torch. This can be adjusted using the Post-Flow feature. A good starting point is to set 1 second of Post-Flow for every 10-20 Amps selected for the weld. For Plasma this should be used 1 second for every 10 Amps is sufficient for light cutting. Add more for extended cutting. This helps preserve the torch and torch consumables.
Pre-Flow	The Pre-Flow is used for the TIG process only. This is used to establish a protective pocket of shielding gas around the weld area before starting the Arc preventing weld porosity or tungsten oxidation at the start. As a basic rule, any where from .5 to 1 second generally considered sufficient. However, if a large gas lens cup is used, the weld will require more Pre-Flow time, up to 3 seconds or more to adequately purge the cup and the weld area. *NOTICE: The Arc will not start until the Pre-Flow time is over.*
Pulse	The Pulse can used (for any single or combined purpose) to help control heat, deformation, puddle wicking or to improve the weld aesthetics by offering a defined "Dip" point of the filler rod. The Pulse consists of three basic parameters: Base Amp Setting, Pulse Time On (Balance) and Frequency. Of the three parameters, only Frequency is adjustable in each of the pre-programmed pulse programs. However, the Pulse programming for Base-Amps and Pulse Time On has been carefully chosen to offer three useful, but distinct pulse options. To fine tune each Pulse Program, the Pulse Frequency is fully adjustable from .1-150Hz.
Pulse Time On	The amount of time that the stays in the Peak Amp and the Base Amp stage of the Pulse cycle can be skewed to favor more time in the Peak stage, or less time in the Peak stage, in turn favoring more time in the Base stage. More time in the Peak stage offers a more fluid puddle, while more time in the Base stage offers a less fluid puddle. For this welder, each of the three pulse programs the Pulse Time On is fixed but is set to work in conjunction with the Base Amps % which is also fixed to offer 3 distinct but useful pulse programs.
Purge	The Purge feature is used to safely allow gas to flow freely while setting the TIG or Plasma Regulator without having to trigger the torch switch or foot pedal. Pressing the Purge button will lock on the Purge feature and allow it to flow until the Purge button is deselected.
Remote	The TIG Arc cycle and amperage must be controlled either via Torch Switch or Foot Pedal. TIG can be operated without the remote in the "Live Lift" mode, but the remote features allow you to signal the pre and post flow cycle, start and end of the weld cycle and increase or decrease the welding amperage while welding. The foot pedal is a seamless way to control all of this manually. However, where foot pedals aren't practical, the torch switch can be used in either 2T mode or 4T mode to start and end the arc, or even increase or decrease the amperage according to the programming set on the panel. *NOTICE: The Live Lift Mode does not use a triggering mechanism of any kind and the arc is started through touching the Tungsten to the metal.*
Start Amps	The Start Amps is used as a place where the Amperage is set once the arc starts. This can be set high for more aggressive starts, or low for soft, easy starts. Usually softer starts are preferred for steel and stainless. **Hint: Whether using the foot pedal or the torch switch, the size of the Tungsten will affect minimum low amp starts. Although the unit is rated for 5 Amp starting, 5 Amp starts are best achieved with a 1/16" tungsten or smaller. It's not impossible to start at 5 Amps with larger Tungsten, but the arc will be less easily struck and stabilized with larger Tungsten diameters. For 3/32" or 1/8" Tungsten, try setting Start Amps to 10 to 15 Amps for best results.**
Spot	The Spot Weld feature is used primarily to help improve tack size consistency. This feature is used for TIG only and is not meant to be used with traditional spot weld tongs, or similar mechanisms. The idea of the spot weld is to provide a controlled Arc-On time so that the weld will be repeatable and uniform. This is good for setting up auto body panels, tacking exhaust tubing or filling small plug welds.
TIG Start	This unit allow the user to choose from three distinct TIG Arc Starting Styles. The Lift Start is a contact type of arc starting method, which creates an arc once the Tungsten is quickly snapped up and away from the work piece. However, a remote (a foot pedal or torch switch) is required to turn on power output to the Tungsten. This is used in many places where HF is not allowed or could interfere with electronic equipment. Live Lift is similar to the Lift Start, but the Live lift means the Tungsten stays live and power is always present at the Tip of the Tungsten. Since no remote is required, the arc must be broken by quickly rotating the wrist and snapping the Tungsten up and away from the work. The High Frequency start is only able to be used with the torch switch or the foot pedal. This type of start is usually preferred since the Tungsten is held off the metal slightly and the pedal or torch switch is triggered to initiate the HF spark, providing a pilot path for the arc to jump across once the HF establishes continuity with the work piece. NOTICE: If selected, the Live Lift Start feature may cause accidental arc flashes if the Tungsten is not properly insulated from the work piece.

Front Panel Controls

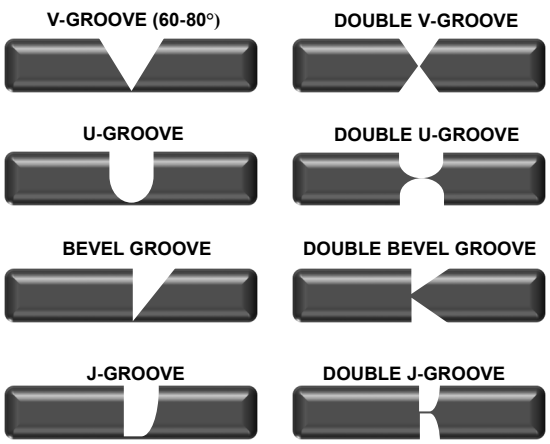


ITEM	DESCRIPTION
1.	**Memory.** If you intend to save a program, press select to toggle to the desired number where you wish to save a program before you attempt setup. Make desired adjustments to program parameters. Once completed, press and hold the select/save button for 3 seconds to save the program. Once the program has saved, the "SAVE" button will light. Release the button. Hint: Be sure to write down the program's location so that it is not saved over.
2.	**Display.** The display is a multi-function display. The display can display Amps (A), Seconds (S), Percent (%), or Frequency/Hertz (Hz) As parameters are selected the display will change and a corresponding LED will light up to alert you to which value you are adjusting. For example, for pre-flow or post flow adjustment, the "S" LED will light up when adjusting pre or post flow time. Also, the display indicates error status, whether over current (lighting symbol), Over Temp (thermometer symbol), or Low or No Air Pressure (Broken pressure gauge symbol). These LEDs will be accompanied by an error code found in the trouble shooting section of the manual. Other unrelated error codes may also be displayed that have no accompanying LED.
3.	**Air Pressure Gauge.** This gauge displays air pressure while cutting. To set air pressure, select "Purge" and adjust pressure while air is flowing. Set air pressure to 65-75 PSI for best cutting. Pressures below 35-40 psi will incur an error code of E06 and cutting will be interrupted. This is for safety and protection of the torch**. Hint: If E06 is displayed while switching to Cut Mode, this is likely because you have not connect the unit to the air compressor.** *Notice: The air pressure gauge may read a low pressure while TIG welding. This is not a concern. This is because the TIG and Air Pressure gauge shares the same plumbing. The pressure gauge reading while TIG welding is not relevant or meaningful so do not try to adjust TIG pressure with the Cylinder regulator. The pressure sensor reading is ignored during TIG welding making it impossible to have an E06 code.*
4.	**Purge.** The purge is used to allow the air or shielding gas to flow freely without having to trigger the plasma or TIG torch. This is so that air or gas flow can be set properly. The best air pressure for Cutting is 65 to 75 PSI. The starting point for TIG gas flow should be approximately 15 to 25 CFH.
5	**Live Lift/Lift/ HF.** This controls the type of TIG start that is employed while starting the arc. Live lift means the TIG torch will stay "live" all the time and allow a lift start without the use of a foot pedal or torch switch. Touching down and lifting up will initiate the arc and start gas flow. See instructions later in the manual on how to lift start both types of lift start. Lift Start requires the use of a remote (torch switch or foot pedal) to "turn on" the welding power to the torch. This is most helpful in areas where no HF starting is allowed. HF start is for starting arcs without having to touch the tungsten to the metal to initiate the start. The torch switch is touched, or the foot pedal is pressed and the arc jumps to the metal via a impulse of High Frequency.
6.	**Select Buttons and Adjustment knob.** The select buttons on either side of the adjustment knob are used to toggle through the welding cycle graphic immediately above the adjustment knob. As the buttons are pressed, the LEDs representing the adjustments or functions of the weld/cut cycle will highlight. Once the desired parameter has been selected the adjustment knob is used to increase or decrease the parameter value that is shown in the display (#2). **Hint: To adjust a parameter more quickly, push in on the adjustment knob and hold while turning to adjust by larger values.**
7.	**Remote Function.** The remote function can be used to select between foot pedal use or torch switch use for TIG. See the function of 2T/4T settings with torch switch explained later in this manual. For TIG foot pedal use, select only "Pedal" or the unit will not operate correctly.
8.	**Weld Cycle Functions and Parameters.** The select buttons on either side of the adjustment knob are used to scroll through each function/parameter. The graph represents the weld cycles as it progresses from start to end (left to right). See explanation of functions starting on the next page. *Notice: Depending upon what process has been selected, some functions will be skipped over if not relevant to the welding or cutting process. The graph is largely designed around the complete TIG welding cycle, but it shares some functions with other welding processes.*
9.	**Process Selector.** The two arrow buttons are used to toggle through the different available processes. The TIG process actually has several different available selections. The first is standard non-pulse TIG. P-TIG 1-3 offer three different pulse programs which only allows Hz adjustment. Spot weld is used for TIG welding when regular, large tack welds are required. Fast Tack is used for quick tacking of small, thin sheet metal without the addition of filler. This is a fast, intense burst of power. Cut is for Plasma cutting only. Stick, of course is for stick welding. **Warning! Do not attempt to switch processes while the plasma torch is connected or damage may occur.**

Rear Panel

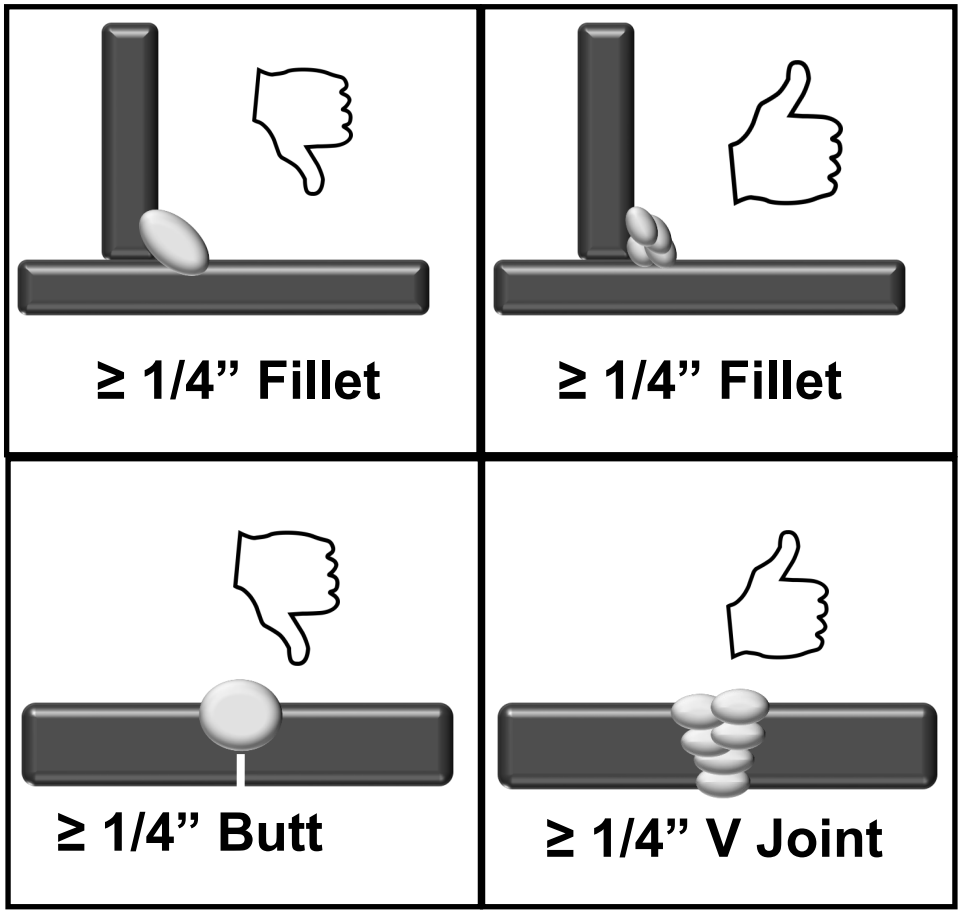


ITEM	DESCRIPTION
1	**Switch.** This switch serves as the main power switch for the unit. If a severe fault or short takes place, this breaker switch will trip. If the breaker trips, find and rectify fault before attempting to power the unit back on. If the switch does not reset, contact Everlast.
2	**Fan.** Keep the fan area clear and allow a minimum of 18" (500mm) clearance for proper air circulation and maximum duty cycle. The fan should run continuously.
3	**Regulator/Filter/Water Trap.** This regulates the cutting pressure of the unit. To adjust: Pull up firmly but gently on the regulator knob until the detent clicks (about 1/8" or 3mm). Rotate clockwise to increase pressure. Rotate counterclockwise to decrease pressure. Observe the pressure and indicator lights on the front of the machine to reach the ideal pressure for the process you have selected. Push the knob back down after adjusting to lock-in the pressure setting. **WARNING! Do not supply more than 90 psi to the regulator or damage and/or severe injury may occur.**
4	**Gas Inlet.** The gas inlet has a push-to-connect type fitting. When initially installing, make sure the connecting tubing from the regulator to the inlet is squarely cut on the end so that a good seal is formed. If the tubing must be removed, the outer collar must be pressed in gently to release the tubing. Hold the collar while removing the tubing.
5	**Ground Bolt.** This is to be used in cases where High Frequency (H.F.) interference is being caused or where a bonded ground is indicated by code. This should be connected directly to an outside copper clad rod driven into the ground with at least a # 12 gauge wire connecting the two together. All metal parts inside the building should be grounded as well, including pipes, tables, and even metal siding to help prevent stray H.F. emissions from causing interference or damage to the electronics and surrounding equipment.
6	**NEMA 6-50 Power Plug.** This is the standard 240V, single phase plug used for welders/plasma cutters in North America. This plug has only three wires and is used by all manufacturers for this type application. This unit requires and uses no neutral. There are two power legs and one ground (middle U-shaped, or rounded prong). Do not attempt to rewire or adapt this plug for other applications. This unit is also supplied with a 240V to 120V adapter for 120V use. No changeover or alteration of the unit is required to step down to 120V input. The unit automatically senses the change and adapts the circuits to operate on 120V. Consult with a licensed electrician before installing power service to the unit. *Refer to Article 630 of the NEC for information concerning wiring of welders and plasma cutting units.*



JOINT PREPARATION

Besides a butt joint and lap joint which are often used for thinner metal gauges, consider using one of these groove joints for best welding results. When grinding or cutting the bevels, especially with a single V-groove, it may be beneficial to leave a small land with a gap between the joint to achieve full penetration. In this case a temporary backer plate can be used to support the bottom of the weld to create the root pass. The root weld will weld the backer to the main plate. This backer can later be ground or cut off. However, in many cases a plain open root can be used as a backer plate adds to the time and labor involved. A knife edge is also acceptable so long as the joint is fully penetrated when the weld is completed. Open root gaps without a backer can range from 1/16" to 1/8" depending upon wire diameter and application.



NOTICE:

When welding material 1/4" and over be careful about trying to put too much metal down in a single pass. Use multiple passes to complete the weld along with any necessary joint preparation especially with wires of smaller diameter. As metal thickness goes up so does the number of required passes. Depending upon the filler diameter and power settings used, a 1/4" joint may only require 1 or 2 passes, but a 3/8" joint in plate metal or pipe will require not only beveling but 4 to 6 overlapping weld passes including a cap and root pass.

Basic TIG Operation

General Setup. The process to set up the welder for the basic TIG mode with a foot pedal is as simple as plugging in the TIG pedal and setting the amperage. TIG voltage is not conventionally adjustable and is a product of the arc length. This is not to say voltage is not important to TIG welding, but it is not something that can be adjusted on the unit. In practical terms, voltage is not a concern to the user as it is self regulating. Amperage however, is adjustable. Setting up Amperage correctly for TIG is different as there is no "sound" to listen for. But for each given thickness of metal, there is an acceptable range of adjustment for TIG. Traditionally, a general rule of thumb for TIG setup is to set approximately 1 amp for every .001" of metal thickness. For modern inverter technology, that may be too many amps in all but the thickest weld material, particularly for a DC inverter TIG welder such as this one. In many cases, you will only need to use 75% to 80% of that amperage. But if you are setting up the unit to use a foot pedal, use the rule of thumb to begin with as you can always back off the amperage as you are welding by letting up some on the foot pedal. If needed, there are several online TIG apps and calculators that you can give you starting points for welding almost any thickness as well as general settings for tungsten size, and gas flow rates. Use the general information on the following pages to help guide you through arc starting, tungsten preparation and basic welding techniques.

Welding. If you are new to TIG welding, it's important that you understand that TIG welding is much slower than other forms of welding. It requires patience and steady practice to become proficient at TIG welding. However, most people can achieve some level of proficiency at TIG welding if they are patient, and are willing to analyze and adjust the way they are welding. To start welding, set the amps desired for the metal thickness you are about to weld. Before striking the arc, make sure the shielding gas is on, and properly set. Also adjust your Tungsten stick-out to about 1/8" to begin with. If a gas lens is used, the stick out may increase up to 1/4"-1", depending upon gas lens size. Then follow the arc starting methods found later in this manual. Once the arc is started, keep a loose, but sure grip on the TIG torch to prevent cramping. An underhand hold is good, similar to the way a pencil is held. A foregrip may be used as well, but offers less fine control at the beginning and requires more propping to keep the torch steady. Practice running slowly without filler metal first. Keep the torch head inclined away from the direction of travel, so the Tungsten stays just above the puddle, pointed toward the front of the puddle. Move slowly and methodically, gauging your forward movement to make sure it is steady and paced. Imagine a thick coin is able to be placed between the tip of the Tungsten and the weld puddle. As your skill progresses, you will want to add filler wire to your practice. The angle created between the filler rod should be about 90 degrees. You should insert your head in between the rod and torch, so that your head is about at the 45 degree mark so that it bisects the angle. This will allow you clearly see the arc. Do not try to sit back and view the arc from above as detail may be easily seen and puddle will be obscured. When the puddle develops, feed the filler rod into the front edge of the puddle, being careful not to place the filler on top of the Tungsten, or touch it in any way. If you dip the tungsten into the filler rod or into the puddle, you must stop and regrind it or the Ar will become unstable. Feed the filler in regular, timed dips as the puddle forms. If you need, count as you time your dips until you can do it without thinking. As you proceed to dip your rod into the edge of the puddle, keep the rod close to the puddle, within the gas cone. If the filler metal starts to melt before you dip, you have it too close, or you have the rod inclined too much so that heat is being directed too far in front of the puddle. As you add the filler, be sure to pause momentarily with the forward travel of the torch. If desired, a tiny back step motion may be used to improve weld appearance. There are other ways to add filler and to create a sound weld. You can keep the filler wire in the puddle, with the rod laying in a flatter profile and weld. As the torch moves forward and the rod melts, the filler can be slid, with gentle pressure, into the puddle as needed to fill the weld. This is known as the Lay-Wire technique. Another method of welding has more to do with torch manipulation than it does filler addition, is called walking the cup. The cup is rested on the metal while the torch head is oscillated in a figure 8 pattern. This will require a forehand grip typically, and a good bit of motion of your forearm to accomplish. The filler metal should be moved from side to side to provide an evenly filled puddle under the Tungsten. This method requires much practice and effort, but yields beautiful welds when performed correctly. If you cannot see the puddle or your helmet flashes (auto darkening types), you need to change your settings. Practice feeding the filler wire without actually welding. Manipulating the wire takes practice and concentration at first. The wire should be held so that a flicking motion of two fingers and the thumb can propel the rod forward into the puddle without loosing grip on the filler rod. The rod should rest on the two fingers most away from the thumb, while the index and middle finger are used to advance the rod by sliding them down the rod while they fingers lightly pinch the rod against the thumb. If you need, count as you time your rod dips until you can do it without thinking. As you proceed to dip your rod into the edge of the puddle, keep the rod close to the puddle, within the gas cone. If the filler metal

Basic TIG Operation

starts to melt before you dip, you have it too close, or you have the rod inclined too much so that heat is being directed too far in front of the puddle. As you add the filler wire, be sure to pause momentarily with the forward travel of the torch. If desired, a tiny back step motion may be used to improve weld appearance. There are other ways to add filler and to create a sound weld. You can keep the filler wire in the puddle, with the rod laying in a flatter profile and weld. As the torch moves forward and the rod melts, the filler can be slid, with gentle pressure, into the puddle as needed to fill the weld. This is known as the Lay-Wire technique. Another method of welding has more to do with torch manipulation than it does filler addition, is called walking the cup. The cup is rested on the metal while the torch head is oscillated in a figure 8 pattern. This will require a forehand grip typically, and a good bit of motion of your forearm/wrist to accomplish. The filler metal should be moved from side to side to provide an evenly filled puddle under the Tungsten. This method requires much practice and effort, but yields beautiful welds when performed correctly. If you cannot see the puddle or your helmet flashes (auto darkening types), you need to change your settings. Practice feeding the filler wire without actually welding. Manipulating the wire takes practice and concentration at first. The wire should be held so that a flicking motion of two fingers and the thumb can propel the rod forward into the puddle without loosing grip on the filler rod. The rod should rest on the two fingers furthest from the thumb, while the index and middle finger grasp the rod with the thumb propelling it forward. Other rod manipulation variations may be used, but the key is to develop a comfortable, natural movement that is regular and consistent. If feeding difficulty is encountered, there are some feeding devices that reduce the effort to feed the filler wire and smooth out the feeding process. Do not let feeding the filler wire hold up the learning process. There are numerous accounts of welders making home-made jigs or devices that help feed the TIG rod smoothly. One helpful hint is to make sure you have gloves that offer protection without compromising dexterity. With a proper fitting TIG glove, you should be still able to pick the filler wire up from the table top with your fingers.

There are a lot of hurdles to becoming a proficient TIG welder. But if you will practice when you are not tired, and are comfortable in your surroundings, it will help you learn the art a lot faster than if you are practicing when you are too tired, or not alert.

TIG Pulse. The TIG 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 "TIG Pulse Amps" (sometimes referred to as "Peak" current.) The lower amperage is called "TIG Pulse Base Amps " (sometimes called "background" or "base" current). The number of times this happens per second is called TIG Pulse Frequency, or Hertz (Hz). Pulse is used to prevent overheating the metal, particularly on metals that are prone to structural deterioration or burn through. It is also used to constrict the arc, improving arc directability and stability. It can also be used for improving weld aesthetics and even for timing the addition of filler to the weld. Regardless of the use or application, in effect you are creating an average of amps, which will seem to "cool" the puddle.

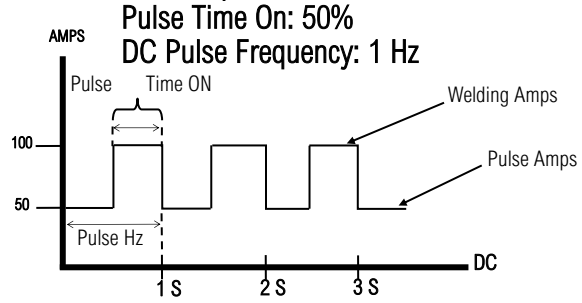
This welder offers three field proven preset programs that are typical of how the average user might employ pulse. However, the pulse frequency (Hz) is adjustable from .1 to 150Hz to allow the user to fine tune the programs to meet the demands of application. Lower frequencies up to 2 Hz are typically used to time the filler "dips" into the weld puddle and to create a freeze in the puddle. This helps form the highly regarded "stack-of-dimes" look that many are looking for. The stack-of-dimes look is aesthetically pleasing, but not always required or helpful to the TIG welding process.

An in crease of pulse frequency represents a less fluid puddle. However, the arc will be pinpointed more as frequency increases. This is usually used on outside edges on thin metal, or anywhere heat control or overwicking of the weld puddle becomes a concern.

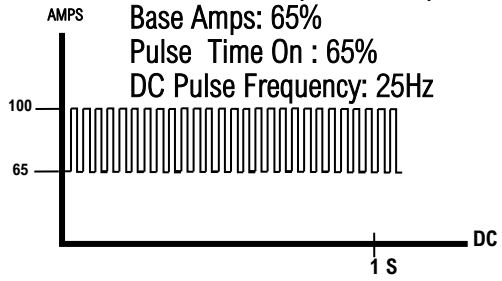
Since the three TIG pulse programs are already preset in terms of pulse time on and pulse balance, it does simplify the setup process and allows almost anyone to pick up the basics of pulse TIG operation. Even so, the user may have trouble visualizing the performance of the pulse. The following illustration on the next page give a visual representation in practical terms of what is happening during a typical pulse cycle.

Basic TIG Operation

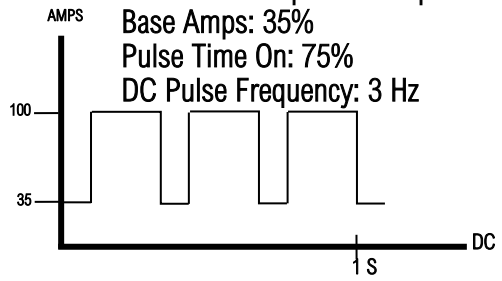
EXAMPLE 1
Peak Pulse Amps: 100 amps,
Base Amps: 50%
Pulse Time On: 50%
DC Pulse Frequency: 1 Hz



EXAMPLE 2
Peak Pulse Amps: 100 amps
Base Amps: 65%
Pulse Time On : 65%
DC Pulse Frequency: 25Hz



EXAMPLE 3
Peak Pulse Amps: 100 amps
Base Amps: 35%
Pulse Time On: 75%
DC Pulse Frequency: 3 Hz



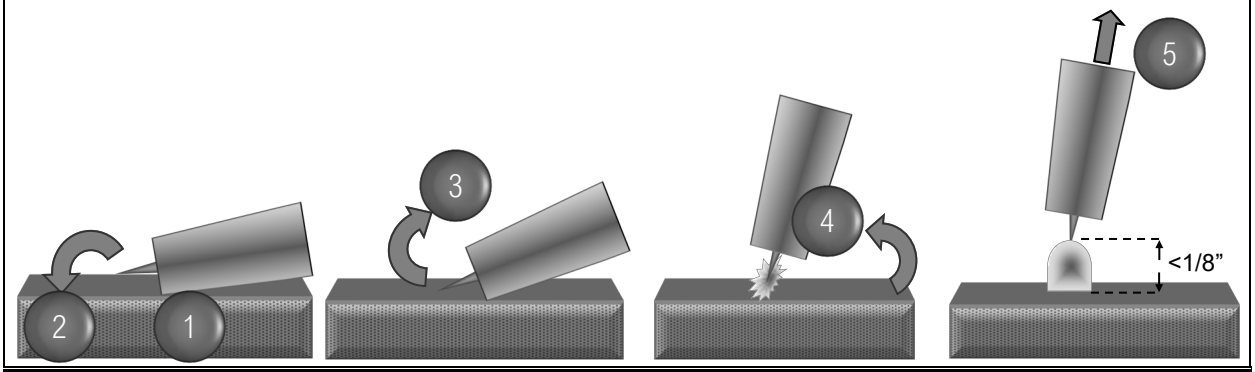
LIFT START OPERATION

NOTICE: *When using the TIG lift start function, the lift start should be performed using a light touch and a quick, seamless motion.*

Lift Start with a remote is often used anywhere HF use is restricted, particularly in hospitals, or where computers are in close proximity. Steel or Stainless are good candidates for Lift Start operation.

To start the arc with Lift Start or Live Lift Start:

1. Position the edge of the ceramic cup on the metal. *If using a lift start with a remote switch, or foot pedal: Press and hold the torch switch or press the foot pedal.*
2. Quickly rotate cup so that the tungsten comes in brief contact with the metal. If using Live Lift, the gas will flow automatically.
3. After contact with the metal, *immediately* rock the torch back so that the tungsten breaks contact with the metal.
4. An arc should form. As the arc grows, raise the cup up off the metal and slowly rotate the torch into welding position.
5. Leave 1/8" or less gap between the tip of the Tungsten and the metal. Proceed with welding, leaving the torch inclined at a 15° angle.



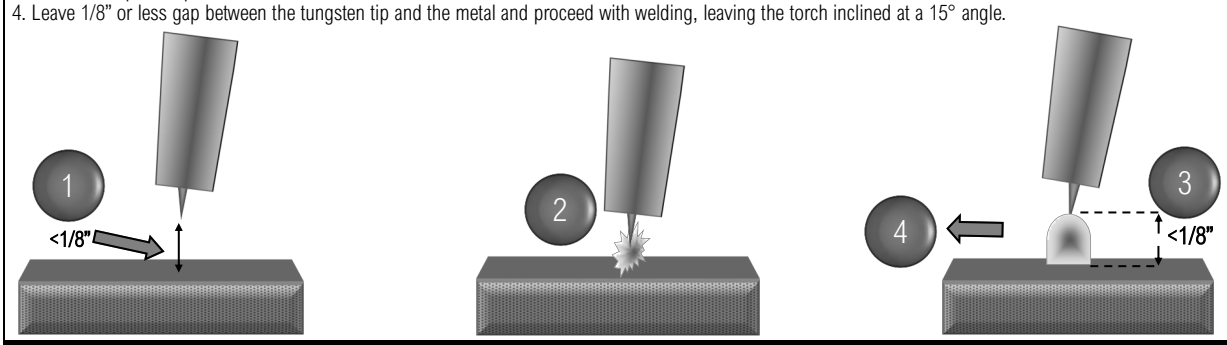
HIGH FREQUENCY (HF) START OPERATION

NOTICE: *Low Amp starts require a smaller distance between the workpiece and the tungsten. Smaller diameter tungsten offers the best arc starts at low amps.*

HF starts provide the cleanest, and least contaminating type of arc start. No touching of the tungsten is required. However, it can interfere with electronic devices.

To start the arc with HF:

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 or small lighting bolt.
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.

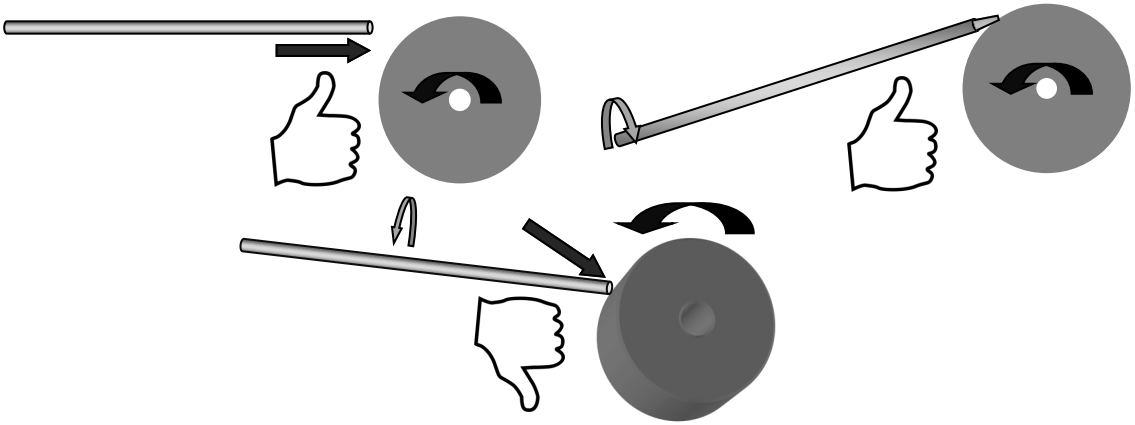


⚠CAUTION!

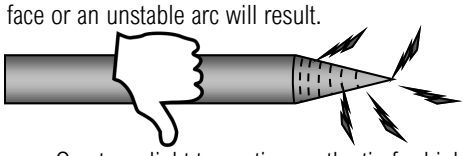
The use of HF does create an opportunity for a mild electrical shock if the Tungsten is contacting skin, or if damp gloves or clothes are being worn while coming into contact with the torch, table or the part that is being welded while the arc is being struck. Try to keep your body from coming into direct contact with the torch, table or parts while welding if this occurs. Use dry gloves to protect the hands.

TUNGSTEN SHARPENING

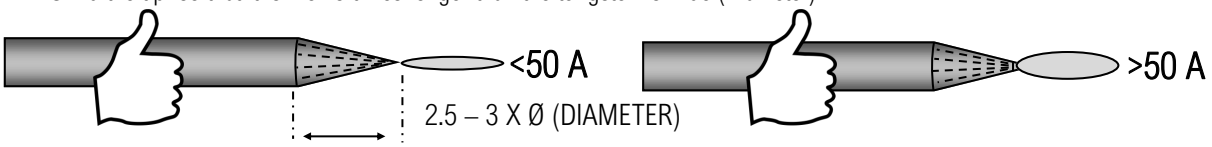
- Use a dedicated grinding wheel or contamination may result. Do not breath grinding dust! Wear eye protection and gloves.
- Grip the Tungsten firmly.
- Grind the Tungsten perpendicular to the wheel face. Allow tungsten to grind slowly without much pressure.
- Rotate the Tungsten quickly as it is being ground to keep the point even and symmetrical.
- Alternatively you may use a drill to hold the Tungsten. Rotate slowly.



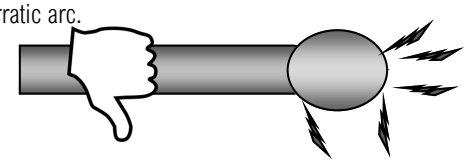
- Do not grind the Tungsten parallel to wheel face or an unstable arc will result.



- Use a point for low amp use to help control 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).



- **Do not ball the Tungsten while welding, or an erratic arc will result.** Make sure that the grinding marks run parallel to the tip. Concentric marks will also cause an erratic arc.



TUNGSTEN SELECTION

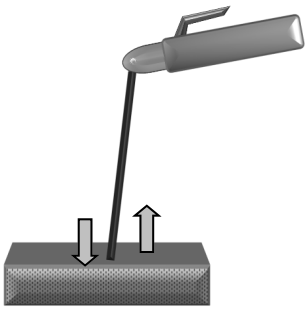
This unit is an inverter based welder. Tungsten types traditionally used in a Transformer machine do not work well and have issues with melting and splitting. Pure Tungsten (Green) should never be used with this unit. Zirconiated is not for use with this welder either. Thoriated 2% (Red) Tungsten works well with DC Inverters and is still the standard in the USA, but does have some low level radiation concerns as an alpha emitter, and is falling in popularity as new options have entered the market. Its use has been restricted or banned in many countries.

Consider the following tungsten types for use in this welder if Thoriated tungsten is of concern or not an option:

- Lanthanated 2% (Blue). Excellent choice for DC. Holds up good to higher inputs. Best for use in Power-Set mode at extreme Amps. Excellent arc starts. 1.5% works well, and in some tests lasts nearly as well as the 2% form of Lanthanated Tungsten.
- Ceriated 2% (Orange or Gray). Works well with DC. Performance begins to fade at higher Amps. Great arc starts at low amps.
- Rare Earth or Tri-Mix (Purple). Generally great and holds good point. However some quality issues have been reported with wide range of allowable percentages of rare earths. Primary rare earth component is usually an 1.5% oxided form of Lanthanum (Lanthanated). Secondary rare earths are usually Zirconia and Ceria oxides ranging from .04 to .08% composition. Some feature Yttrium as a secondary component. Use only quality, well known sources.

STICK ARC STRIKING METHODS

1.Make sure the unit is turned on and the boot cycle has finished.
2.Select the Stick Process on the Selector.
3.Make sure the electrode holder is in the Positive connector and the work clamp is in the negative connector.
4.Select the Amp level desired. No voltage adjustment is available. Select and adjust Hot Start Amps % (Intensity) to improve starting reliability. Use higher amounts of Hot Start %, over 50% with difficult to strike rods, or rods that aren't fresh or out of a sealed metal can.
5.Use the arc force control to select the desired arc characteristics, creating the desired arc characteristic and amp response needed to maintain the arc. Cellulose electrodes are not recommended for use, including E6010. In some circumstances E6011 may be used, but performance may be erratic or dependent upon brand. 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. *If you are new to using an inverter welder, there are some aspects that will seem different. One of the main ones is that the arc is better controlled in most situations by "pushing in" when the arc seems to get weak or unstable and the arc force will kick in as the voltage drops.* **Holding too long of an arc will signal the inverter to shut down and to terminate welding output.** This threshold is shorter than most transformers, and an extremely long arc cannot be maintained. However, with a little practice, the arc will be easy to manage with some adaptation in technique.
6.Strike the arc with either the tapping method or the match strike method. Beginners usually find that the match strike method typically yields the best results.



Tapping

Scratch/Match

HELPFUL HINT:

Pay particular attention to the Arc Force setting as it affects the aggressiveness of the arc and the amp response. Set the Arc force to approximately 30-50% and readjust it from that point to find the optimum setting. Adjust in increments of 5% up or down from there to obtain the best results Usually, an increase in the arc force for cellulose based flux welding rods is helpful. Lowering the Arc force setting is generally desirable for rods iron powder/Titania based flux. Too much arc force will create overheating of the welding rod, and even cause them to flame up. Too little can lead to sticking and arc snuffing. Use the Hot Start features to improve arc starting and cut down on failed arc strikes. Hot Start Amps refers to the % over the set amps that the amps will be boosted during arc striking until the arc is established. Hot Start Intensity controls the aggressiveness of the arc starting. Start by setting Hot Start to somewhere between 30% and 50%. Add more as needed. Hot start time is automatically regulated Adjust in increments of 5% up or down to obtain best starting results.

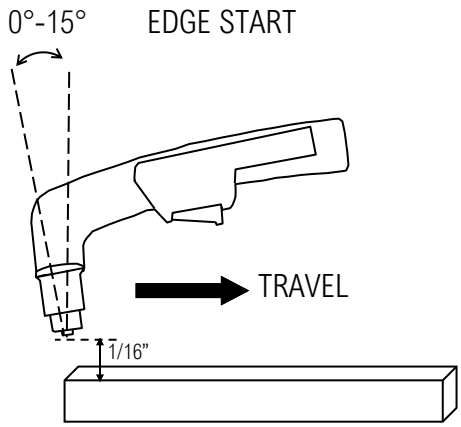
Once started, allow the metal to fill the puddle as the rod travels forward. Be sure to try to separate the difference between the slag and the molten pool of metal. The slag will coalesce behind the puddle if travel and rod angle is correct. Do not let the slag travel in front of the puddle. Keep the top of the rod inclined to the direction of travel around 10-20 degrees while welding in the flat position (Electrode holder should be in front and inline of the puddle). To begin, simply start the arc, and then drag the rod slowly and carefully along the metal, allowing the rod flux to provide a standoff between the metal filler and the puddle. Be sure to keep feeding the rod steadily downward into the puddle as the rod melts. In the case of E6011, a slight stepping motion in front of the puddle about 1/8"-1/4" in front of the puddle can be used as a key hole opens up in the weld joint, ahead of the puddle. This is also called "whipping" the rod. Do not flip the end of the rod away from the puddle in a arc motion or the arc may terminate while using E6011. When experience is gained, numerous manipulation methods may be used with rods such as E7018, 7014, 6013, and 7024. Weave the rod no more than 2.5 times the width of the welding rod. To begin weaving, weave small, tight patterns similar to C's, cursive E's, V's, or even figure 8's.

IMPORTANT!

This unit is not designed for operation with Cellulosic electrodes such as E6010. E 6011 may be used, but some experimentation with brands may be necessary to obtain the best weld performance. Occasional arc snuffing may be experienced. If you must use E6011, keep the rod firmly in the puddle and increase arc force and hot start. Do not "whip" out and raise the rod up.

NOTICE:

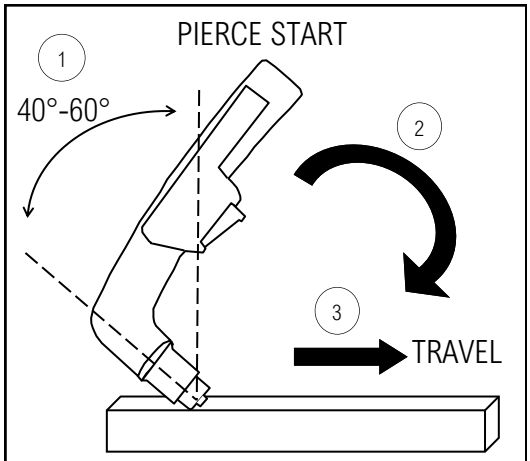
The design of the blow back start ***may*** cause a slight delay in the arc as the air pressure must built inside the torch tubing and head to create the pressure needed to force the electrode off the nozzle seat. This may take up to a second, especially when using longer torches or marginal air supply systems. Restarting the arc in tip saver mode requires retriggering the torch. If the torch does not light after 3 seconds, let go of the trigger and press it again. If the start or arc is erratic check nozzle and electrode for tightness and wear.



EDGE STARTS

Edge starts are the best type of start to promote consumable and torch life. This reduces blow back of molten material and allows a smooth gradual start of the arc and maximizes cutting capacity.

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 the flame all the way through the metal, tilt the torch so there is a slight lead in the flame if metal is thin. If the metal being cut 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 trail 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.



PIERCE STARTS

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

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 flame penetrates through the metal (at a sloped angle) rotate the torch slowly to the vertical position. 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 trail 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.

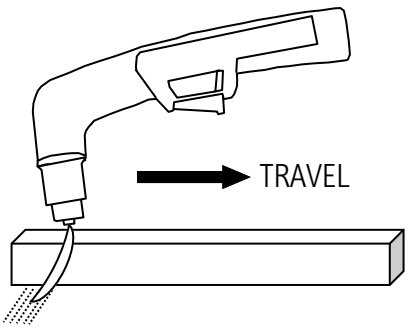
IMPORTANT:

If you use a standoff guide with the torch, it must be adjusted to provide no more than 1/8" standoff, less if possible. Long standoff heights reduce cut capacity and quality. It also promotes rapid consumable wear and can prevent the pilot arc from transferring.

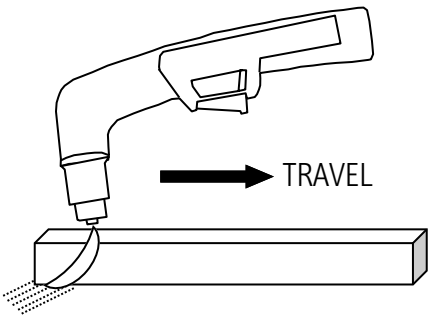
NOTICE:

For longer consumable life do not use the pilot arc unnecessarily.

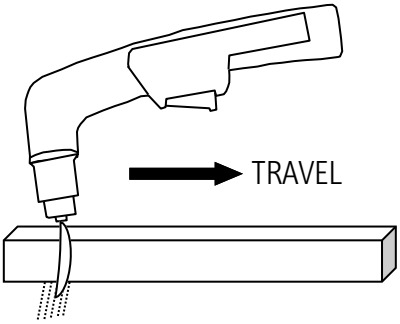
FLAME AT NORMAL TRAVEL SPEED



FLAME AT FAST TRAVEL SPEED



FLAME AT SLOW TRAVEL SPEED



IMPORTANT:

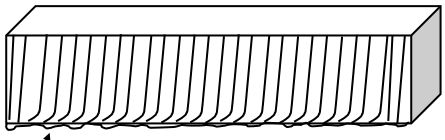
Check consumables regularly for wear and change them out before they are completely worn out. A good practice is to check consumables before turning the machine on each time you go to cut. It takes only a few seconds and can save yourself a lot of extra effort later. Allowing the consumables to wear until they quit working may damage torch related components, creating a more costly repair. Periodically, with the unit turned off, check the spring action of the electrode by removing the cup and tip and pushing your thumb or finger down on the electrode. The electrode should depress slightly and spring back quickly without a delay. If it does not, the torch head may need to be disassembled, cleaned and lightly lubricated with di-electric grease. In some cases the sealing O-rings may be broken or dirty causing sticking. Replacement torch head kits are available if repair is not an option. Sticking of the electrode like this causes starting issues. Most often this condition occurs because of moisture and dirt that makes it way into the system. **Additionally, do not overtighten the electrode or overheat the torch (by poor cutting techniques such as excessive piercing starts on thick metal) or the electrode threads may gall in the torch head and break off during removal.** This usually occurs on lower quality consumables (non-OEM) with poor chrome plating, but can occur if OEM consumables are overtightened.

NOTE:

When stepping down amps to cut thinner material, you must change to smaller orifice nozzle. Nozzles are offered in different sizes which are made for different amp levels. **See the torch parts page for amp range and size of consumables.** Everlast offers OEM size and configuration of consumables originally supplied with the torch for replacements and do not offer all configurations or sizes. OEM and aftermarket suppliers of the S-45 Style torches (local and online) offer extended range of sizes and configurations. An orifice that is too large for the amps being used will result in arc instability and a rough cut. Do not attempt to lower air pressure to compensate as this makes the issue worse.

RESULTS OF CUT AT CORRECT SPEED, AIR PRESSURE AND TORCH ANGLE

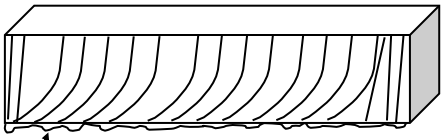
SMOOTH, EVEN CUT LINES WITH A S REARWARD SWEEP



MINIMAL EASY TO CLEAN DROSS

RESULTS OF CUT AT FAST SPEED

ROUGH, DISTINCT CUT LINES SPACED FAR APART



NOTICEABLE SMALL, HARD DROSS

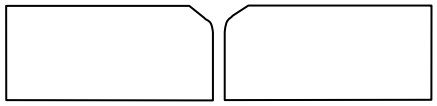
RESULTS OF CUT AT SLOW SPEED

VERTICAL CUT LINES

SIGNIFICANT SOFT, POROUS DROSS

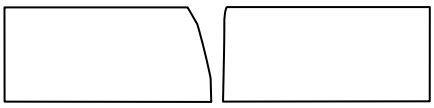
RESULTS OF TOO MUCH CURRENT OR TOO MUCH STAND OFF HEIGHT (SIDE VIEW)

MELTED TOP EDGE

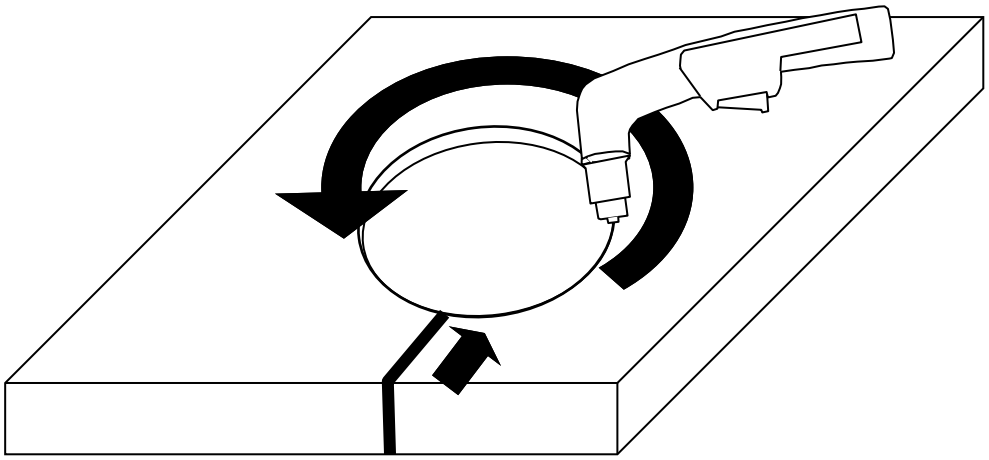


RESULTS OF WORN CONSUMABLE OR LOW AIR PRESSURE (SIDE VIEW)

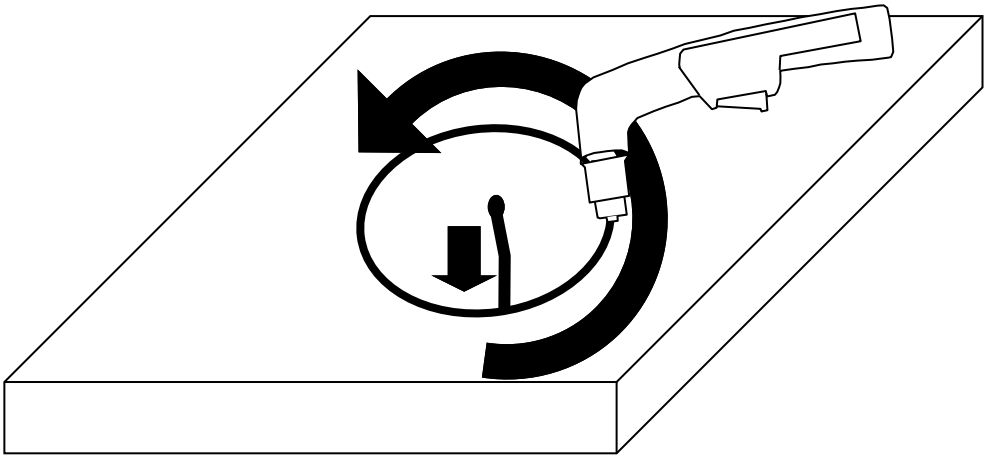
SEVERLY ANGLED CUT AT TOP



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

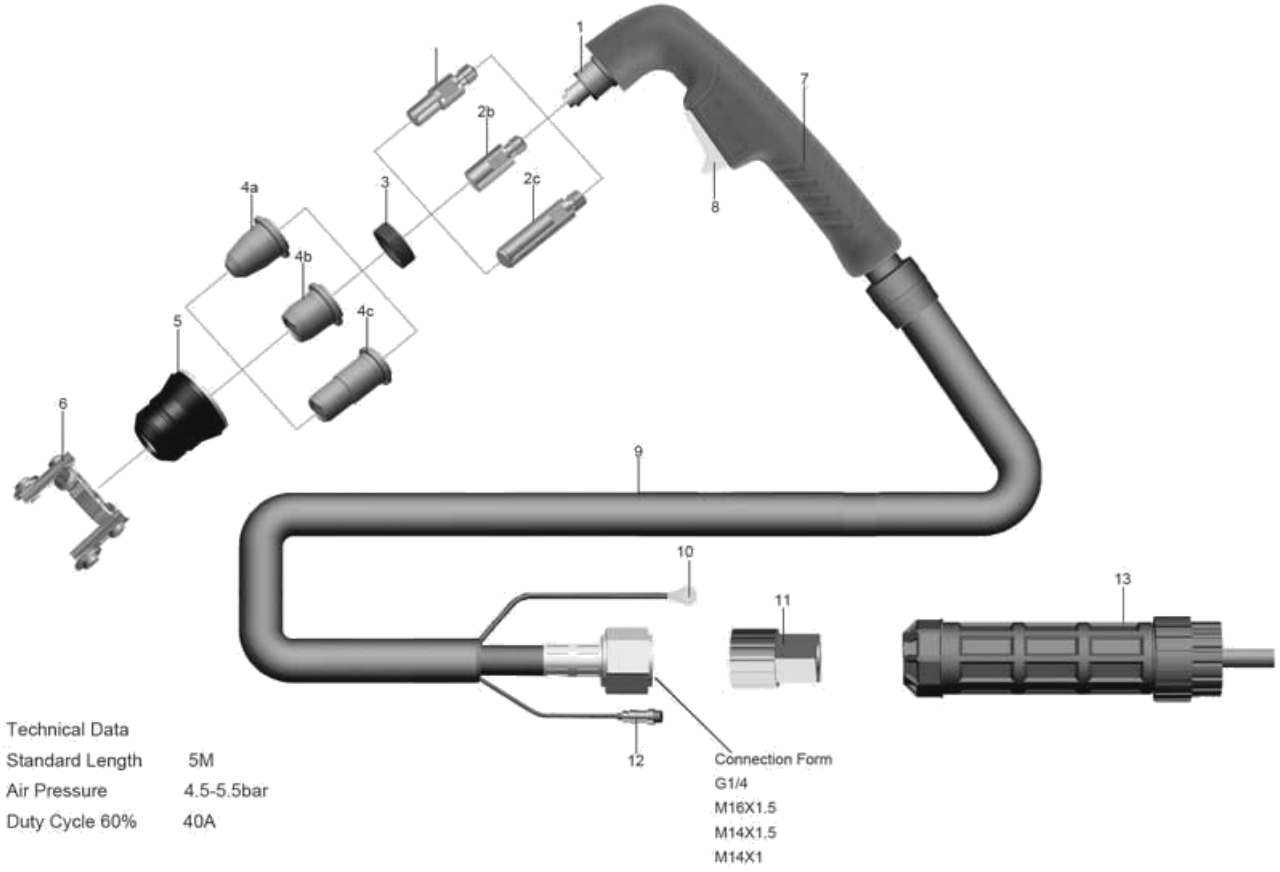


AN EXAMPLE OF CUTTING A LEAD-IN WHEN CUTTING HOLE IN AN OBJECT



NOTICE:

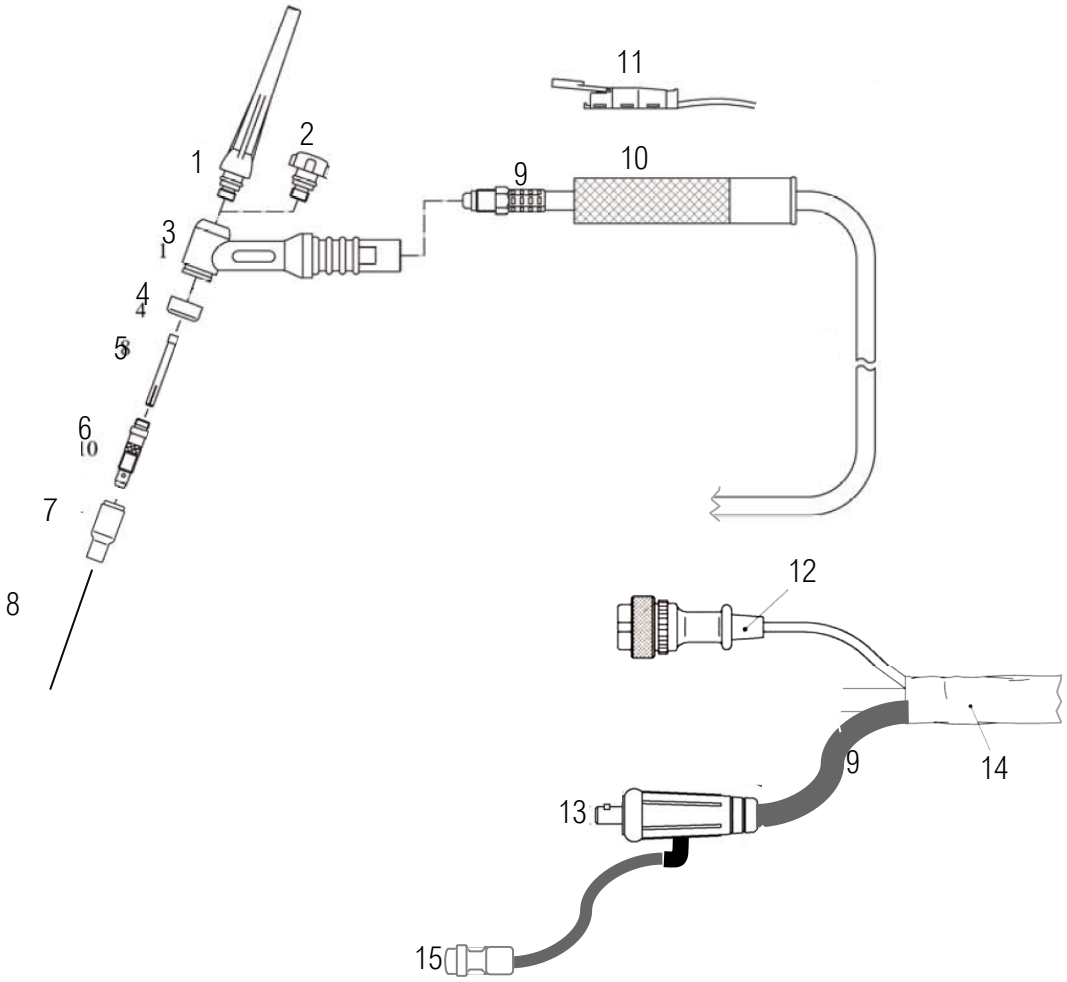
When cutting an object, particularly a pattern shape, where the torch must pierce or re-fire in-line at an intersection of a cut, a lead -in cut should be employed. A lead-in is a cut that is made in the disposable part (also known as a drop) of the object to "lead" into the main part of the cut so that 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 (and the direction you cut) when cutting an object to size so that too much metal is not accidentally removed and the object can be finished to the proper size.



No.	Description	Order	OEM p/n
	BW S-45 Complete Torch G1/4 5M	33013101	
	BW S-45 Complete Torch M16x1.5 5M	33013102	
	BW S-45 Complete Torch M14x1.5 5M	33013103	
	BW S-45 Complete Torch M14x1 5M	33013104	
	BW S-45 Complete Torch Central Adaptor 5M	33013105	
1	BW S-45 Torch Head	3302270	PF0125
2a	Electrode 20-30A	33031551	PR0110
2b	Short Electrode 40A	33031552	PR0105
2c	Long Electrode 20-40A	33031553	PR0106
3	Swirl Ring	3305140	PE0106
4a	Nozzle 0.8mm 20-30A	33031561	PD0116-08
4b	Short Nozzle 1.0mm 40A-50A	33031563	PD0102-10
4c	Long Nozzle 0.9mm 30-40A	33031562	PD0103
5	Shield	3304298	PC0116
6	Site Wheel	3306093	CV0024
7	Handle	34070192	TP0080
8	Switch	31120834	BX0020
9	Cable Assembly	3403091	PH0121
10	Pilot Cable	3403088	
11	Nut Cup	3112091	
12	Small 2-Pin Plug	31121401	
13	Central Adaptor (Not used on Ultra Arc)	3112193	FY0023

EXPANDED VIEW OF TIG TORCH

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



NO.	TYPICAL PARTS FOR Air-Cooled 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 #4, 5,6, or 7	1
8	Tungsten (customer supplied)	0
9	Torch Cable	1
10	Torch Handle (Style may vary)	1
11	Torch Switch (B	1
12	Torch Switch Connector	1
13	Power Connector	1
14	Protective Cover (Denim, synthetic rubber or nylon)	1
15	Gas IN	1

TIG/Stick Trouble shooting:	CAUSE/SOLUTION
Machine will not turn on.	Check cords and wiring in the plug. Check circuit breaker. Wrong Wiring.
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 the Dinse style connector. Reset main power switch if overcurrent light is on. Contact Technical Support. Running on a generator that is Dirty Power. Use only generators rated for 5% or less THD.
Arc will not start unless lift started.	Check HF point gap. Set to .035" See instructions on Point Gap adjustment or Contact Technical Support. Make sure unit is set to HF.
Tungsten is rapidly consumed.	Inadequate gas flow. Too small of tungsten. Wrong shielding gas. Use only Ar. Using green tungsten. Use red thoriated or other color. Wrong polarity. Contaminated Metal.
Tungsten is contaminated, arc changes to a green color.	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. Contaminated Tungsten. Regrind to proper point. Work Clamp not connected directly to part being welded. Grind a clean spot on work piece and relocate clamp directly to work piece .
Stick Arc is hard to Start/Rod Sticks/ Arc snuffs	Old or Moist electrodes. Too low of Hot Start Setting. Using E6010. Too long of arc length.
Other issues.	Contact Everlast support.

When TIG welding is your Tungsten burning up rapidly or is your weld turning gray or dull?

- Make sure your welder is at least 5 to 6 feet away from the area you are welding. The fans from the welder can blow your gas off the weld and create a draft that blows the shielding gas off the weld.
- Make sure you have 100% Argon. Contaminated gas can be a real issue. A cylinder can be mislabeled, or improperly filled. Even though you are sure you have 100% pure Argon, check the label to make sure that is what you were given.
- If you see gray/brown/ black haze or deposits around your weld, you can be sure that it is likely a gas contamination or draft issue. This is a sign of gas issues.

NOTICE:

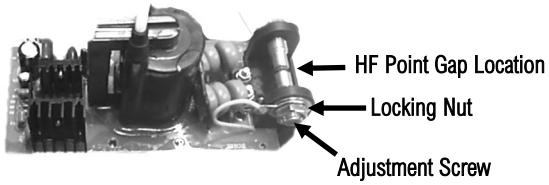
Occasionally as the product wears in or if the unit sits up you may need to adjust your point gap on your welder if in TIG mode. The HF spark may or may not be seen, but inconsistency in arc starting may be a sign that the point gap needs cleaning or readjusting. First make sure that you are starting your arc less than 1/8" away from the work. 1/16" is preferred. To help determine if there is an issue, first regrind your tungsten so no contamination is present. Contamination of the Tungsten can prevent clean starts. If no HF spark (similar to a small lightning bolt) is seen, try to perform a scratch or lift start on the metal to see if your unit will start. If it will not start or produce any type of arc, contact Everlast.

NOTICE: 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.

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.

To open the unit to adjust the point gap:

- **Unplug the welder. Wait 10 minutes to allow capacitors to discharge to prevent possible shock and injury.**
- 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
- 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.
- 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 the target setting.
- 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 locknut is retightened, making sure the contact holder does not rotate in the process.
- Recheck the point gap. Make any necessary re-adjustments.
- Reassemble the unit.



TROUBLE:	CAUSE/SOLUTION
Machine will not turn on. No fan, no display.	Check cords and wiring in the receptacle. Check circuit breaker. Check plug condition.
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.
Air flows but pilot arc does not start or spark but arc starts when nozzle is rubbed on the metal.	Pilot Arc Wire broken or disconnected. Consumables worn.
Will not start arc.	Air Pressure too low. Torch electrode/blow back mechanism stuck in rear position. Missing Swirl Ring (usually happens after consumable change).
Pilot arc will not light. Arc will start when torch is drug on the metal.	Pilot arc wire broken or not connected. Cap loose.
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. Change to nozzle/Tip with smaller diameter orifice as amps are lowered. Readjust air pressure. Loose consumables. Check tightness. Worn Consumables
Consumables are dirty, smutty looking upon inspection. Premature wear on consumables. Shortened consumable life. Tips are melted looking.	Moisture, oil contamination of consumable. Wrong consumables. Poor quality aftermarket consumables. Drag cutting with wrong consumables. Wrong cutting technique.
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.
Arc will not start with pilot arc or by drag/scratch starting nozzle directly on metal. Machine runs.	Torch cup is loose, safety contact pins dirty or not making contact with cup face. Torch switch wire is loose. Problem with Central connector. Torch is not properly connected. IGBT or PCB bad, contact Everlast.
Over current/Duty cycle Error Code. 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 and remove excess/undersized extension cords. Operated on "dirty power" generator and unit has failed.
Unstable arc at lower amps.	Nozzle orifice size is too large. Use nozzle with smaller orifice.
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. Loose solenoid wire connection. Bad PCB. Contact Everlast.
Air flows continuously. Erratic or unpredictable shutting off of air after post flow time has expired.	Place switch into "normal" or "cut" mode. Reduce post flow time. 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.

TIG/Plasma/ Stick ERROR CODES	
E01	Overtemperature/ Duty Cycle Exceeded
E02	Over/Under Voltage/Current/Unit Fault
E04	No Torch or Loose Torch Cap (Plasma)
E05	Torch Switch Stuck (TIG/Plasma)
E06	Too Low or High of Air Pressure (Plasma)

Section 3 Troubleshooting

Having trouble setting up your unit for best cutting? Try the following:

- Keep your standoff to **less** than 1/8" distance from the work piece.
- Always use dry air. Drain compressor daily to improve effectiveness of air dryers and to prevent them from prematurely failing.
- Make sure work clamp is attached directly to the part being cut. Make sure the work clamp is attached to freshly cleaned metal.
- Don't greatly lower air pressure to try to reduce kerf or cut thinner material. Always reduce nozzle orifice size to match amperage. See Torch pages for different consumable sizes.
- Use this as a general rule of thumb for good hand cutting speed and quality:
    1. For the first 1/8" of thickness, use 20 amps.
    2. After the first 1/8" add 10 amps for every 1/8" after that.
    3. For Stainless and Aluminum, use settings that are 40% higher.

NOTICE:

The pilot arc is not designed to be used to cut. The pilot arc is used to scour the surface to establish continuity so that the cutting arc will transfer. If you experience difficulty cutting and the arc seems to barely penetrate the metal, cutting speed is slow, or the consumable is wearing extremely fast, it is likely that the cutting arc has not engaged. While the pilot arc is engaged, the amperage is always going to drop to 20-27 amps. **If you notice the output amperage at this level while firing the torch or briefly before cutting, do not be alarmed. This is normal.** The reduction in amperage prevents the consumables from being damaged. When continuity is sensed, the cutting amperage will increase as the arc transfers from torch to the metal. If amperage does not increase while cutting, and amperage is set over 27 amps, it is likely that the pilot arc is not transferring to the metal. Check for proper connection of the work clamp. Connect it directly to piece of metal being cut. Do not rely on an indirect connection through a work bench table. If necessary, grind a clean place on the metal to expose fresh, un-oxidized area of metal to make the best possible connection.