EVERLAST

POWER ® SERIES

MULTIPROCESS TIG//SMAW/PLASMA CUTTER UNITS

Operator's Manual

Includes AC/DC PowerPro and DC PowerUltra Units

Safety, Setup and General Use Guide

Rev. 4 0516-12

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Serial number: _____
Model number: _____
Date of Purchase: _____

EVERLAST

Contact Information

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Everlast Technical Support: support@everlastwelders.com

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

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Dear Customer,

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

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

Please review the current online warranty statement and information found on the website of the Everlast division located in or nearest to your country. Print it for your records and become familiar of its terms and conditions.

Everlast offers full technical support, in several different forms. We have online support available through email, and a welding support forum designed for customers and noncustomer interaction. Technical advisors are active on the forum daily. 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, particularly if off hours, or you cannot reach a live person. In the event you do not reach a live person, particularly during heavy call volume times, holidays, and off hours, leave a message and your call will normally be returned within 24 hours. Also for quick answers to your basic questions, join the company owned forum available through the website. You'll 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 many questions by the advisors to clarify problems or issues that may seem very basic. However, diagnosis procedures MUST be followed to begin the warranty process. Advisors can't assume anything, even with experienced users, and must cover all aspects to properly diagnose the problem.**

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

Sincerely,
Everlast Customer Service

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

Safe operation and proper maintenance is your responsibility.

We have compiled this operator's manual, to instruct you in basic safety, operation and maintenance of your Everlast product to give you the best possible experience. Much of welding and cutting is based upon experience and common sense. As thorough as this welding manual may be, it is no substitute for either. Exercise extreme caution and care in all activities related to welding or cutting. Your safety, health and even life depends upon it. While accidents are never planned, preventing an accident requires careful planning.
Please carefully read this manual before you operate your Everlast unit. This manual is not only for the use of the machine, but to assist in obtaining the best performance out of your unit. Do not operate the unit until you have read this manual and you are thoroughly familiar with the safe operation of the unit. If you feel you need more information please contact Everlast Support.

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

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

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

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

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

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

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

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

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

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

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

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

continued

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

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

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

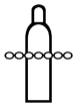
Welding and cutting processes pose certain inhalation risks. Be sure to follow any guidelines from your chosen consumable and electrode suppliers regarding possible need for respiratory equipment while welding or cutting. Always weld with adequate ventilation. Never weld in closed rooms or confined spaces.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

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

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

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

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



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

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

continued

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

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

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

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

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

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

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

PowerPro 164, 205, 236, (AU only), 256 and PowerUltra Models

PowerPro 256, 236 (AU)

PowerPro 205

PowerPro 164

PowerUltra 205P

Power Series TIG (GTAW)
WP 17/18/26 Torch Assembly

Power Series TIG (GTAW)
Foot Pedal Assembly

Power Series Plasma Torches
S45 - P80—A81

Power Series Deluxe Stick (SMAW, MMA)
Electrode Holder And Work Clamp

Power Series TIG (GTAW)
Torch Accessory Pack

1.1 **This manual has been compiled to give an overview of operation and is designed to offer information centered around safe, practical use of the machine.** It is not intended to teach welding technique. All suggestions and techniques given are approximations and should be used as a general guide only.

1.2 **To ensure that your Everlast product is in top condition, carefully inspect unit for damage upon opening the box, looking for damage on the surface of the unit and to the machine itself and all its accessories**. Do this immediately upon receipt of product. Any damage issues must be resolved right away. It is further recommended that the product be tested at the same time for proper operation, even if it is to be stored for a while. Check to make sure all passages, connections and fittings are clear of any packing material or other obstruction. Record the serial number on the page provided in this manual. Include purchase date for warranty reference. Serial numbers are located on either the rear or side of the machine.

1.3 **The Power® Series multi-process units are used in industrial settings performing day to day fabrication and repair activities.** The exceptional arc characteristics are provided by the inverter based technology that employs the use of reliable IGBT transistor technology from Germany. Lightweight inverters allow a machine to be finely tuned for precise arc characteristics, while consuming less power than the larger transformer based machines. Although it varies upon the model, precise control of the welding arc cycle is managed through the adjustments available on the panel face. The independent controls allow for a virtually limitless number of configurations to suit every type metal and weld condition encountered. The use of High Frequency arc starting in the TIG mode, greatly simplifies the TIG(GTAW) process. The incorporation of the advanced Pilot Arc in the Plasma Mode eliminates the need for touch starts and greatly improves consumable life.

1.4 **Be careful to observe duty cycles of the machine posted in this manual and on the machine itself.** A duty cycle is a rating of percentage of time out of 10 minutes the machine can be used at the rated power setting . Overheating may occur if the duty cycle is exceeded. On multi-voltage, multi-phased machines, note that the rated duty cycle will change. For example, the duty cycle of the PowerPro 256 is 35% at 250 amps which continuous operation is allowed for 6 out of 10 minutes before a cooling period of 4 minutes is needed. SMAW operation on all units is restricted to 35% at maximum amperage.

1.5 **The unit should be stored in a dry place for long term storage.** Humid/wet conditions can contribute to the eventual decay of the circuitry in the machine. For safety reasons, do not use this machine directly in the rain or with soaked clothing or protective gear.

1.6 **Use only the provided handles to lift the unit.** Do not suspend by cables or chains or use fork trucks to lift the units. If necessary, use two people to carry the unit.

1.7 **Make sure that the units cooling fan and exhaust vents are kept free of obstruction.** Before every operation, inspect the unit for unexpected obstructions such as insect and rat nests. From time to time, a cleaning of the machine with low pressure air and a small plastic bristle brush is necessary to ensure long life. On these occasions only, unplug unit and remove cover to access interior. Concentrate efforts on aluminum heat sinks and panel vents to remove dust and dirt.

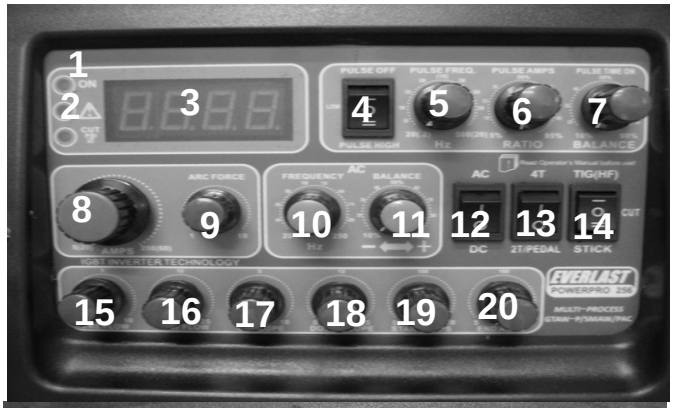
1.8 **Refer to the following pages to locate your particular unit and its specifications.** Note that product specifications are subject to change without notice due to product improvements. If any additional information is needed contact Everlast. Simple wiring diagrams may be obtained for basic diagnosis and may be obtained from technical support.

Everlast PowerPro and	PPro 164	PPro 205	PPro 256/236	PU 205P
Over current Warning	Yes	Yes	Yes	Yes
Start Type (plasma)	Blowback	Blowback	HF	Blowback
Start Type (Tig)	HF	HF	HF	HF
AC Square Wave (aluminum)	Yes	Yes	Yes	No (DC only)
AC Frequency	20-250 Hz	20-250 Hz	20-250Hz	None
AC Balance	10-90%	10-90%	10-90%	None
Pulse Frequency	.2-250 Hz	.2-250 Hz	.2-500 Hz	None
Pulse Amps (background)	5-95%	5-95%	5-95%	None
Pulse Time ON (width)	10-90%	10-90%	10-90%	None
Arc Force Control (dig)	Yes	Yes	Yes	No
2T/4T remote	Yes	Yes	Yes	Panel/Remote only
Pre-Gas Flow Timer	0-10 S	0-10 S	0-10 S	No
Post-Gas Flow Timer	0-25 S	0-25 S	0-25 S	0-60
Start Amps	5-150	5-175	0-100	None
End Amps	5-150	5-175	0-100	None
Up Slope Timer	0-10 S	0-10 S	0-10 S	None
Down Slope Timer	0-10 S	0-10 S	0-10 S	None
Voltage (OCV 60-80V)	220/240V 1 phase	220/240V 1 phase	220/240V 1 phase	110/220/240 1 phase
Duty Cycle TIG @ Max Rated amps	60% at 160	60% at 200	35% @250	60% @ 200
Duty Cycle Stick @ Max Rated Amps	35% @ 140A	35% @ 160A	35%@ 200A	35%@ 160A
Duty Cycle Plasma @ Max Rated Amps	60% @ 40 A	60% @ 50 A	35% @ 60 A	60% @ 50 A
Water Protection Class	IP21S	IP21S	IP21S	IP21S

2.1 **Panel Face.** The following is a unit panel face from the PPRO 256 and PU 205P series unit. Depending upon your unit, the panel face may vary with regard to quantity and location of controls and features. Use the appropriate referenced number to refer to equivalent features on your unit. Some numbers are omitted on each panel because the function does not apply to that unit.

1. **Power lamp.** This light illuminates while the unit is powered on.

2. **Over Current/Overheat lamp.** This lamp illuminates when the duty cycle has been exceeded or the machine has overheated due to improper ventilation. Discontinue use until lamp goes out. Allow the fan to continue to run. Once lamp goes out, you may resume using the unit and reset the breaker switch if necessary. If frequent or continuous overheating is encountered, contact Everlast.



3. **Digital Display.** The display posts the approximate welding amps within ±3 amps. Display will change to reflect actual welding amps. Pulse cycle amps will be displayed while welding, although when the machine is rapidly pulsing the meter may not catch up to the actual hi and low amperage when it is sampling the amperage.

4. **Pulse Power Control.** This 3 position rocker switch allows for use of the built in pulse. You may select: Off, Low (L), or High (H). This feature pulses (cycles) the amperage between base and peak amps to maintain fine control of welding on thin materials or on out-of-position welds. Noticeable fluctuation of the arc intensity occurs when the pulsing mechanism is on at low frequency levels. Using the Pulse Time ON switch will control the cycle length of the pulse should more regulation be needed.

5. **Pulse Frequency.** The pulse frequency controls the number of pulse cycles per second (Hz). Where applicable, when the pulse is selected for Low, the inner numbers are read. (.2 -25 cycles per second). When the pulse is selected for High, read the outer numbers. (25-500 for the PowerPro 256)
(25-250 for the PowerPro 164 & 205)

6. **Pulse Amps.** This gives proportional control of the Pulse Amps. Example: If the Amperage is set for 100 amps, and the Pulse Amps control knob is set for 95% (.9), then the low (base) amperage cycle of the pulse will be approximately 95 (90) amps. Regardless of nomenclature, the basic function of the control is the same.

7. **Pulse Time ON.** This controls the ratio of the relative amount of time that the pulse spends on during a defined cycle . For example: A setting of 50% will result in a balanced and equally shared amount of time between the Pulse current and the base current. A setting of 95% will result in the favoring of the Pulse stage of the cycle with only 5% of the time spent in the base stage (low) of the Pulse cycle.

Note: This does not control the overall length of the pulse. The pulse frequency
setting sets the cycle length, thereby predetermining the maximum possible length of each leg of the cycle. But within each cycle length, there is a definable length (ratio) of time that the pulse spends in the base (low) amperage stage of the cycle and in the peak (high) amperage stage of the cycle.

continued

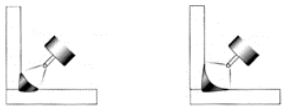
As the cycle frequency (Hz) increases, overall cycle length is shortened, thereby compressing the exact amount of time that the cycle spends in each stage. The Pulse Time on functions within this compressible period of time.

8. **Main Amperage Control.** Some models: Welding Amps . Locations may vary. This control knob allows for precise control over the welding current. This control knob also is used in the pulse mode to select maximum amps of the Pulse Time On cycle. In Plasma mode the outer scale is read for plasma amp adjustment.

9. **Arc Force Control.** It determines how forceful the arc penetrates when it is held short. It does so by automatically boosting amps in a short arc situation. This operates in SMAW/Stick operation. The force of the arc helps stiffen the arc to hold the molten metal in place in out of position welds soften the arc to easily wet in the toes of the weld. The settings are matter of operator preference, style and skill. Rotating the knob clockwise increases arc force There are no recommended settings regarding this feature. Experiment with this feature to find optimum the setting for you.

10. **AC Frequency Control.** This control focuses the welding arc and helps to control penetration, and bead contour.

Figure 2.1.10 Effects of AC Frequency on welding arc properties



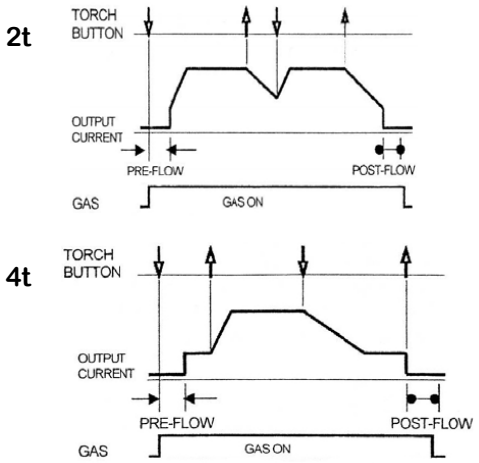
200Hz (AC) 20 Hz (AC)

11. **AC Balance.** This control determines the amount of time the AC cycle spends in DCEN (-) or DCEP (+). More DCEP is preferred for cleaning oxidation, particularly in aluminum. More DCEN is preferred for for better penetration. A 30% DCEP setting (+)is customarily preferred. Try this setting first as a starting point for adjustment.

12. **AC/DC Rocker Switch.** This switch selects the use of either AC or DC current. AC current is used primarily when TIG welding aluminum. Certain stick electrodes can be welded in this mode to prevent arc blow and increase penetration.

13. **4T/2T Rocker Switch, Panel/ Remote.** This switch selects for control of the TIG weld via torch trigger or foot pedal. **For the Power Ultra, simply press and hold torch switch while in panel mode to operate. In Pedal mode, connect foot pedal to operate torch.** For the PowerPro series, in the 2T mode, simply touch and hold the trigger to start the arc and continue holding while welding. The machine will cycle automatically according to the settings selected on the machine. Release the trigger to finish.

Figure 2.1.13 Graphic of 4t/2t operation



4T operation allows full control of the welding cycle. By touching and releasing the trigger once, the pre-flow, start current and up slope are initiated. By touching and releasing again, the down slope, end current, and post-flow are initiated. Only a momentary pause between touching and releasing is necessary to activate the up or down cycle. The use of the foot pedal does not override any pre-set functions on the panel face. ⚠ Place the switch in the 2T position to use the foot pedal.

continued

14. **TIG/Stick/Plasma rocker switch.** This switch allows you to select the use of either High Frequency TIG, Cut (Plasma) or the conventional SMAW (stick) welding features.

15. **Pre Gas Flow.** This timer allows the appropriate amount of shielding gas to flow to purge the gas lines and to provide adequate shielding gas coverage over the weld before the weld arc initiates. The gas flow rate is affected by the torch cup size and welding conditions.

16. **Post Gas Flow.** This timer controls the flow of shielding gas after the weld arc is terminated. Too little post flow time can cause weld contamination or torch overheating.

17. **Up Slope.** This controls the time that the machine takes to ramp up the current from the start current to the normal welding current. This provides for excellent control over the welding puddle after it is developed and allows the operator to adjust manipulation techniques as the puddle warms up.

18. **Down Slope.** This controls the end cycle of the weld by slowly ramping down the welding current. As the end of the weld is reached, the down slope helps prevent weld cracking and hole formation in the crater by allowing time to fill the weld crater with extra filler before the puddle cools completely.

19. **Start Amps**. This selects the initial starting current value used to develop a proper weld puddle before upslope is signaled to begin.

20. **End Amps.** This selects the destination current of the down slope cycle. This is the residual current value required for the operator to properly fill the weld crater to prevent cracking and holes at the end of the weld.

21. **Pressure Gauge.** On the PowerPro series, the gauge is screwed into the pressure regulator on the rear of the machine. Optimum pressure is 60-70 psi, this gauge is for Plasma function only.

2.2 Lower Panel. The lower front panel is depicted in figure 2.2.1 Each terminal or lug should be kept free of dirt or obstructions. Actual layout of items may vary depending on the unit.

Figure 2.2.1 Lower Front Panel

1. Positive(+) lug. For TIG and Plasma, connect the work clamp (ground) to the positive side. For Stick welding, connect electrode holder torch to this side for most operations depending upon the type welding rods used. Consult welding rod manufacturer's recommendation.

2. **Quick-Connect Gas Outlet.** To secure the TIG Argon or plasma air line from the torch to the outlet, slide collar back on female fitting, mate male torch fitting and hold the fitting in and release the female collar. Make sure collar returns flush with the front edge of the female fitting. Pull the collar forward manually if necessary. Operation is the same for any type of common quick connect air fitting. Check for leaks.

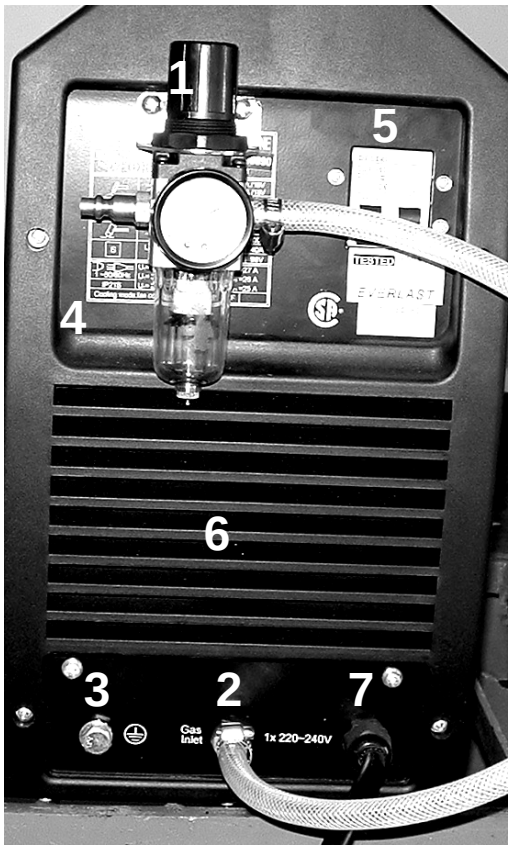
3. **Torch Control.** Plug either the foot pedal or the torch trigger lead directly into this plug. Finger tighten the collar to secure the plug onto the machine. Both the torch and the foot pedal cannot be connected at the same time. For Plasma , the torch switch must be used. Do not use the foot pedal for plasma torch operation.

4. **Pilot Arc.** The single plasma torch wire with the ring is attached to this to operate the pilot arc. Finger tighten.

5. **Negative (-) lug.** For TIG and Plasma operation, connect the TIG torch to the negative. For most MMA/Stick welding situations, connect the work clamp to the negative.

continued

2.3 **Rear Panel**. Reference the following image for guidance on rear panel setup and



function. Some panels vary slightly.

1. **Air regulator/filter/water trap.** To adjust air pressure, pull up slightly on the control knob on the top of the regulator until a click is heard. Twist clockwise to increase pressure or counter clockwise to decrease pressure. **Note: Do not exceed 80 psi. When installing observe directional arrow for air flow.** A step down regulator at the tank is highly recommended as well as an additional air dryer at the tank. A tank side air filter/dryer will increase consumable life and help keep moisture out of air lines. On the PowerPro series, be sure to install air pressure gauge in the middle plug on the regulator housing.

2. **Gas Inlet.** This port is a dual purpose port to provide the unit with either Argon or compressed air. As configured in the picture, it is set up for compressed air. To use Argon, you must remove air line (5) from port (2) and install the line from the argon regulator. Alternately, you may install a T-fitting with two shut off valves at the inlet to eliminate the need to change out the plumbing when switching functions. Do not attempt to operate the plasma cutter with argon connected and do not operate TIG with air pressure connected unless a suitable shut-off mechanism is in place and the lines have been sufficiently purged. Also, quick disconnect fittings may be used, but care must be taken not to introduce moisture to the system that collects on the couplings during change out.

3. **High Frequency Ground.** This unit provides a separate grounding point for the high frequency to help control interference that high frequency may cause. This ground must be connected to a separate wire that is grounded to a metal rod driven into the ground. It is strongly recommended that you connect this to a separate ground as prescribed. This will assist in draining the HF and help prevent interference with electronic products. Do not ground to cart, table or ground to the ground wire in the power supply circuit. Ground only to separate ground rod. Do not ground back to panel box! When operating with a generator the above grounding methods must be followed to ensure safe and correct operation of the unit.

4. **Specifications and Serial number**. These specifications override any other published specifications, as changes may occur from time to time. Register your unit's serial number online and record it here in the manual.

5. **Switch**. Flip switch up to turn the unit on. If the switch needs to be reset, due to over current or overheating, flip the switch fully down then back up to resume normal operation.

6. **Fan Area.** Keep area from being blocked. .Air flow must be free and unobstructed. Allow 12 inches of clearance behind fan area.

7. **Power cord.** The power cord must not be placed in a strain or the unit pulled by the cord at any time. To wire, use a standard NEMA 6-50 P male plug. Most plugs have wire color coding included in the instruction manual or printed on the plug itself. However, the white is typically wired to the smaller blade and the black wire to the larger flat blade. The green wire is for ground only (middle post). Other types of plugs may be used, but it is suggested to use the 6-50 series plugs as it meets most codes.

3.1 **These are general guidelines for use and maintenance for your Power Series unit.** Take into account all safety rules and recommendations first before operation and service. Do not let untrained personnel operate or service equipment in any way.

⚠ 3.2 **Shielding gas selection.** Do not attempt to operate the TIG function with out the proper shielding gas!

Proper shielding gas selection is crucial to satisfactory operation of your TIG machine. Shielding gas is a special gas or mixture of gases designed to cover and protect your weld from contamination from the atmosphere while welding and as it cools. Oxygen and other gases from the atmosphere can infiltrate the weld and make it unserviceable. Do not be fooled by the weld's appearance, because many defects are contained inside the weld without the use of proper shielding gas. The most economical and available gas is 100% Argon. Helium and Argon/Helium mixes are also available. Helium offers faster weld rates while Argon offers a more focused cone and better cleaning action. **Do not attempt to use common shielding gases designed for MIG welders. These will melt the tungsten and contaminate the weld.**

3.3 **Regulator/ flow meter selection.** You will need a flow meter/ regulator designed to be fitted onto your shielding gas tank. It controls the flow rate of shielding gas into your Power Series. There are two styles generally available. The first has two gauges, one for pressure the other for flow. The best regulator has a pressure gauge and a flow meter with a ball that floats when gas flows. Certain flow meters can regulate Helium, Argon or Helium/Argon mixes equally well. However, others cannot. It is advisable that a flow meter be selected that can regulate both.

⚠ Always be sure to select the correct flow meter for the type of shielding gas that is in use. Never substitute oxygen or acetylene regulators!

Image 3.3 Ball type flow meter

3.4 **Regulator/Flow meter connection.** After connecting regulator safely to tank, attach hose end to shielding gas inlet . (see 2.3.5) Firmly clamp and secure hose end to the unit. Depending upon the flow meter manufacturer, you may have to cut and remove the pre-crimped hose fitting to attach the hose to the shielding gas inlet barb. Open the tank valve slowly and gradually increase the regulator flow to check for leaks.

3.5. **Regulator /Flow meter adjustment.** Adjust the flow meter per manufacturer's recommendations. Generally, the flow should be set around 7-10 lpm (**Everlast Regulators register lpm or liters per miute!!!!**) or 15-25 CFH (cubic feet per hour) indoors for Argon.

continued

Helium settings are usually at least twice the flow rate of Argon. You will have to increase the flow of gas if weld porosity, sootiness, or weld discoloration is encountered. If a draft is present or welding is done outdoor, additional flow may be needed. Increase flow meter output until symptoms disappear.

3.6. **Machine set up .**

1. **Plug installation.** Due to the lack of standards concerning 220V plug configurations, Everlast chooses to ship most of our units without a plug for service. We recommend a license electrician be consulted to connect your welder for service to ensure all codes are followed. The following is provided as a general guide only. Determine the plug prong pattern of the existing 220V outlets in your shop or garage. Make sure both plug and receptacle match perfectly. We recommend the standard 50 amp NEMA 6-50 P welder plug. Higher amperage units require twist lock type connections. Do not force plugs to mate . The green wire is used as the ground and the black and white wires are "hot" 110 V wires. To make a 220V circuit work, two "hot" wires must be used from separate 110V wires from the panel box. Do not attempt to wire the unit from the same phase 110 V leg of the panel. Identify your green ground wire first and properly attach the wire to the ground prong. The remaining black and white wires are your 110V "hot" wires. Attach the two remaining wires to the remaining two blades. **The ground bolt on the rear of the machine is designed to help eliminate High Frequency interference from the machine. Ground the case bolt to a separate wire connected to a metal ground rod outside of the facility that is in moist soil.** Occasionally multiple ground points are required. Do not ground back to the electrical circuit ground as harmful HF feedback can occur. **Always consult your local, licensed electrician for proper installation!** If you used a generator (clean power). The ground bolt on the rear panel MUST be grounded.

Do not attach HF ground directly to table, cart, electrical circuit or panel box.!

Image 3.7a Painted Tips

3.7 **Tungsten Electrode Selection (TIG)).** Currently there are many choices available for tungsten electrodes. Tungsten is generally referred to by a colored band painted on the end of each electrode. Each color represents a certain alloying element that is present with the tungsten that helps to extend tungsten life. Sizes also vary. Each size tungsten is capable of handling a certain current range. Not all tungsten electrodes are alike. **Pure tungsten (Green) is NOT recommended for use in any Everlast Power Series Multi-process machine**! Pure tungsten is not capable of handling the heat and stress placed upon it by an inverter based welder. Although pure Tungsten is the most affordable, it forms a large ball that makes the arc erratic and difficult to control in inverter based machines. Old style transformer welders are better suited for pure tungsten.

The most widely used tungsten is thoriated (Red). It withstands the heat of inverter based welding quite well and retains its shape without over-melting. Red (thoriated) tungsten may pose a health risk as it is slightly radioactive. Inhalation of the grinding dust or microscopic particles is possible. Although it is suited for welding use in an Everlast machine, many people choose not to risk their health. Red tungsten has been available for a long time and is the standard tungsten in the industry today. However, as concerns rise, more companies are looking for alternatives.

The most favored alternatives have are either a Ceriated (Orange) tungsten or Lanthanated (Gold) tungsten. Both are suitable for use in an Everlast Power Series unit. Costs for these electrodes are considerably higher than pure or thoriated types of tungsten. Many welders experiment with several types, eventually finding one that they favor in all situations.

continued

The following table supplies basic information about Tungsten selection and suitability.

Table 3.7.1

			DIRECT CURRENT, A		ALTERNATING CURRENT, A	
Electrode Diameter			Straight Polarity DCEN	Reverse Polarity DCEP	Unbalanced Wave	Balanced Wave
NR	.020"	.050mm	5–20	Not Recommended	5–15	10–20
	.040"	1.0mm	15–80		10–60	20–30
OK	□□□"	1.6mm	70–150	10–20	50–100	30–80
	³/□□"	2.4mm	150–250	15–30	100–160	60–130
	⅛"	3.2mm	250–400	25–40	150–210	100–180
	□/□□"	4.0mm	400–500	40–55	200–275	160–240
NR	³/□□"	4.8mm	500–750	55–80	250–300	190–300
	¼"	6.4mm	750–1100	80–125	325–450	325–450

	Material	USA & Australia	Europe	Japan
	4% Thoriated	(*)	Orange	(*)
	2% Thoriated	Red	Red	Red
OK	2% Lanthanated	Blue (+)	(*)	Yellow–Green
	1.5% Lanthanated	Gold (+)	(*)	(*)
	1% Lanthanated	Black	Black	Black
	2% Ceriated	Orange	Grey	Grey
	1% Zirconiated	Brown	White	(*)
NR	Pure Tungsten	Green	Green	Green
(*) not standardized; (+) Pending 1997 revision to the ANSI/AWS A5.12 will add standardization.				

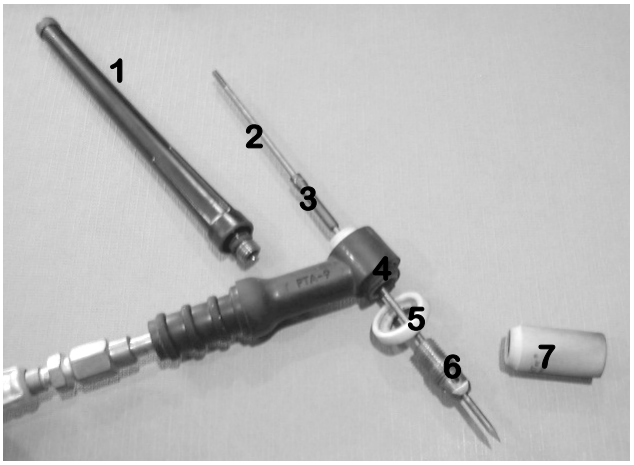
Note: Use only recommended sizes in Tig torches unless you purchase additional collets to fit the electrodes snugly. Loose fitting electrodes quickly ruin TIG torch parts.

continued

Image 3.8a PowerTig Torch Assembly

3.8 **TIG Torch.** Becoming familiar with a TIG torch is a necessary step to becoming proficient at TIG welding. Due to constant issues with sharpening and replacement of the tungsten, frequent adjustment and breakdown of the torch components is often required. Refer to the following image for a typical TIG torch breakdown.

Image 3.8b Typical Torch Parts



1. **Cap.** This is also referred to as a Spur or Rooster Spur. Short caps are available to provide easy access to tight places.

2. **Tungsten.** Be sure to select the proper size tungsten for each job. Avoid use of green tungsten (pure) on Everlast Power Series welders. See chart on page 19.

3. **Collet.** A snug fitting collet must be used to prevent slippage and internal arcing.

4. **Torch body.** All parts connect inside or to the outside of the torch body through threaded connections.

5. **Gas Insulator.** Prevents loss of shielding gas around cup. Replace if leaking or cracked.

6. **Collet body.** Holds collet.

7. **Cup.** Focuses and directs shielding gas around weld area. Replace if damaged.

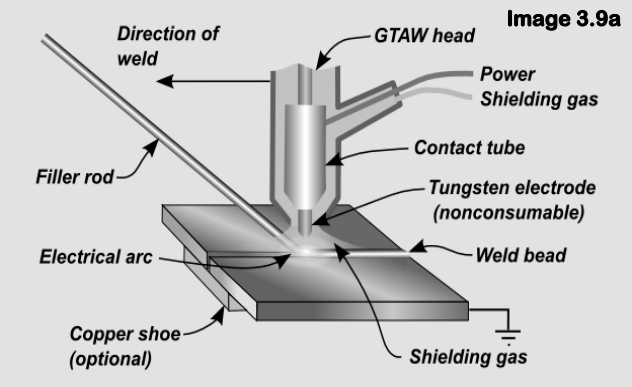
3.9 **TIG Operation and Principles.**

⚠ **Before any welding takes place, it is necessary to put on protective gear and familiarize yourself with safety precautions.**

TIG welding is an elite form of welding. Not many people learn to fully master the technique due to the patience and practice this art form requires. This manual cannot make you a good welder. Only practice and skill can do that. **Everlast provides this basic information as a general guideline to assist the operator in learning basic principles and techniques.**

Notice the basic components of the TIG process in the image below.

Image 3.9a



The shielding gas flows out from the torch head to cool and protect the molten puddle and the tungsten as the arc continues to melt the base metal. As the metal melts and a circular puddle is formed, the Tig torch is slowly moved forward. While the metal gently flows together, the filler rod is kept near the arc and in the gas cone to keep it hot and keep it from oxidizing. As the metal begins to form a "keyhole" shaped puddle and penetration of the metal is achieved, the filler rod is gently added to the molten puddle and then removed as a molten drop of filler material is added to the base material.

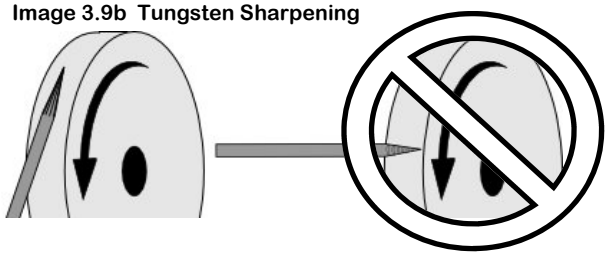
As you familiarize yourself with the above digest of basic TIG welding, there are a couple of basic knowledge items that need to be addressed.

The tungsten must be shaped prior to initiating an arc. With inverter based TIG welders,

continued

tungsten sharpness is important. Refer to the following diagram to correctly sharpen a Tungsten electrode. Notice the incorrect way of sharpening an electrode. Radially sharpening an electrode will cause an unstable, wandering arc, making it difficult to control the weld puddle. Carefully rotate the tungsten as it is being ground to prevent a flat spot or a hollow ground point. Also note that tapering the tungsten to 2.5 X's of its diameter is generally recommended

Image 3.9b Tungsten Sharpening



for most DC welding applications. For higher amperage DC welding, do not over sharpen the point, but leave a slight truncation on the end of the electrode. This prevents the tungsten tip from breaking away and falling into the weld. When AC welding, a small ball may form. This is normal. However, if a large globular ball begins to form, re-sharpen the tungsten and adjust the AC balance. It is also normal for a slight dome to form on the tungsten in DC mode. However, if the arc becomes erratic or the arc is difficult to start, regrinding will be necessary. If the tungsten is accidentally dipped into the weld puddle, re-grind the tungsten, particularly on aluminum. Grind tungsten electrodes only on a dedicated stone, free of contamination from other metals. Hand held tungsten grinders usually grind perfect points. Chemical sharpeners may be used.

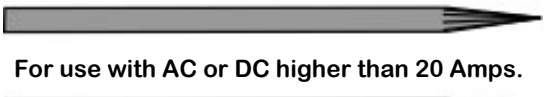


Image 3.9c

Once the tungsten has been sharpened, install it into the torch, with approximately 1/8 of an inch of the tungsten sticking out.

3.10. **Filler Rod Selection.** Depending upon the metal to be welded, filler rod selection is critical. Consult with your local welding supplier for the optimum filler rod to properly complete the weld. In certain applications, TIG welding can be performed without the use of a filler rod.

3.11 **Beginning the TIG weld.** One of the biggest issues for beginning welders is holding and maintaining an arc. Starting an arc with your High Frequency Everlast welder is quite simple. Select the machine for TIG operation. Then, select the desired amperage. Grip the torch in a manner that is comfortable to you. (Many skilled welders use an underhanded grip to steady themselves on the metal.) Place the torch so that the tungsten is no more than 1/8 inch from the weld surface. Depending upon the setup, either press the foot pedal down or touch the torch and hold (2T setting. See section 2.13) the trigger to initiate the high frequency arc. A small blue spark may be observed. This is the high frequency arc trying to start. Immediately after that, you should see a strong, stable arc flowing from the torch. As the arc begins to grow, a molten puddle will appear. If it does not appear, stop welding and increase the amperage or clean the area to be welded, including work clamp. Repeat the start sequence.

For the following, reference illustration 3.11a on the next page.

1. To help the molten puddle form, slowly make small circles with the torch to build the heat in the weld area. A bright, fluid puddle will begin to form.

2. Once a uniform puddle is established, tilt the torch head about 75 degrees from the weld surface into the direction of the weld. This will direct the arc to the front of the weld puddle.

3. Grip the filler rod at a 15 degree angle to the weld surface with the other hand. Hold the rod in the iridescent cone of gas that surrounds the weld puddle. Do not hold it in the arc. Keep it close to the

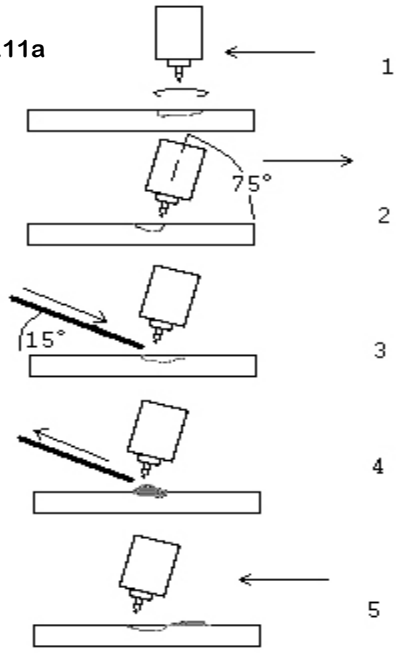
continued

weld. A "skeleton" keyhole will begin to form in front of the weld. The keyhole is evidence that you are ready to add filler material and move forward. Introduce the filler rod into the key hole area underneath the arc. Wait for a single molten drop to fall off the tip of the rod.

4. When a molten drop falls from the rod, quickly remove the rod, keeping it inside the gas cone. The molten drop of filler metal should blend quickly into the puddle.

5. Move the torch forward slightly, carrying the keyhole with the weld. If the key hole is lost, then forward travel was too fast or too far. When the keyhole shows good development, repeat the steps 3-5 until you have a proper weld bead established.

Image 3.11a



3.12 **Weld termination.** When the weld bead has reached the desired length, add a final drop of filler and slowly circle the torch over the end of the weld to fill the crater. If the weld crater is not correctly filled, cracking and weld failure may occur. This is a small but important step to properly completing a weld. Release the foot pedal or release the trigger to stop.

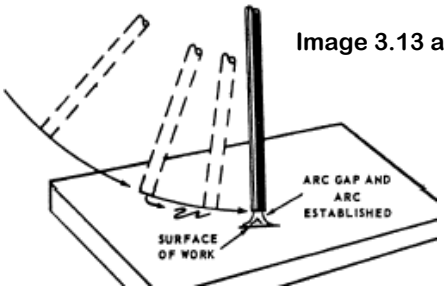
3.13 **Machine operation. MMA/Stick (SMAW)**
Select switch for MMA/Arc operation.

1. **Insert electrode into electrode holder**. Position the electrode for the most comfortable position so that the electrode can be held directly over the work piece with a slight angle.

2. **Set Amperage to the recommended amperage by the electrode manufacturer.**

Strike an arc by swiping it briskly across the work piece in the same manner as one would strike a match. Alternatively, you

Image 3.13 a



may strike an arc with firm tapping motion against the work piece. Either method is acceptable. An arc should initiate. Continue to keep the arc going by holding the electrode off the work piece no more than the electrode width. Continue the arc by feeding the electrode into the weld puddle while moving the electrode forward. This will take some coordination, but will be fairly easy to do after practice. Do not allow the arc to become too long, because air and slag can become entrapped in the metal. The sound of a proper arc will be similar to a gentle frying sound. A long arc will emit a humming sound. An arc that is too short may be extinguished and the electrode may stick to the work piece. If the electrode sticks, immediately release the electrode from the electrode holder and break the electrode loose by hand. If the flux breaks off, simply trim off the excess rod until flux and bare metal meet. A welding rod must have flux to shield the weld from the atmosphere or the weld will fail.

continued

4. **Use the Arc force and Amp adjustment to change arc qualities.** Adjust the amperage according to the recommendations of the electrode (welding rod) manufacturer for the type and size of the electrode used.

The arc force will affect how crisp the arc is whether it is smooth and buttery or deeply penetrating. Use it to suit the desired weld finish. Experimentation will be required to find the optimal setting desired. It is an excellent tool for out of position welding.

5. **Electrode selection.** Electrodes are usually given performance and characteristic ratings using a system of letters and numbers determined by the American Welding Society (AWS). The rating system includes the minimum tensile strength of the finished weld, the weld position (flat, vertical, horizontal, or overhead or a combination of two or more positions) and the flux type. Additional information may be given. Each manufacturer has their individual name and terminology as well. As there is no general recommendation that can be made about a particular electrode selection, except for practice welds, a electrode designated by the AWS as E 6011, E 6013, E 7014, or E 7018 may be used, each having its own distinct features and purpose. These are among the most common electrodes used in the industry and are not difficult to find. E 6011 electrodes are not as smooth running as some of the other electrodes, but offer the advantage of being able to weld on rusty metal and contaminated surfaces. It is widely used and requires very little skill to begin using. This is not a particular endorsement of an E6011, rather a simple example of what may be used in developing proficient technique. It is recommended that a variety of electrodes be used and practiced with. Consultation with an experienced local welding supplier will help greatly in determining what welding electrode is the best for your given situation. Many times, samples or small packages of electrodes are available at relatively low cost to determine for yourself the best electrode to use.

Be sure to observe the manufacturer recommendations regarding polarity. If the weld appears lumpy, porous or otherwise malformed, change the polarity of the ground cable and the electrode holder cable. Many electrodes run with a reverse, (DCEP) setting. A few run with a straight polarity (DCEN). Some will run either way.

3.14 **Proper weld identification.** The following image is designed to help you identify welding issues related to amperage and speed. These are the two major issues that are encountered when most people learn to weld. Notice that the weld bead

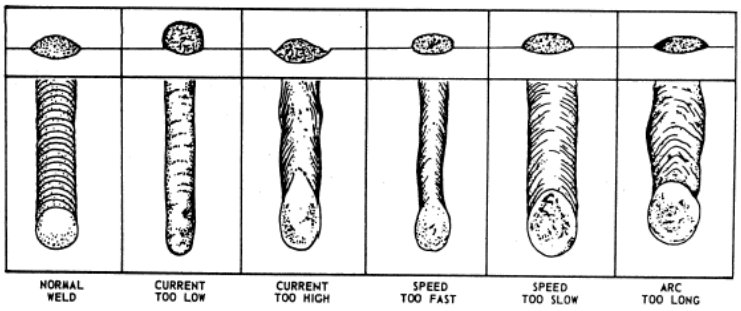


Image 3.14a

contour is affected as well. Overlap and undercutting are two main causes of weld failure. Proper washing of the weld bead into the sides or “toes” of the weld is important. Keep the welding electrode or the TIG tungsten and welding arc within the weld joint to prevent overlap. Pausing on the sides of the welds to wait for the sides to fill reduces the chance of undercutting, even if the current is a little too high. If it is possible, with any practice weld, cut the joint down the middle, lengthwise, or place the weldment in a vice and use a hammer to bend the metal over the weld area until it is either broken or bent 90 degrees. This destructive testing method will help you improve your skill by revealing faults and flaws in your welds.

3.15 **Plasma Torch.** Becoming familiar with a Plasma torch is a necessary step to becoming proficient at Plasma Cutting. Refer to the following image for a typical Plasma torch breakdown for the Plasma 50 and 60-80 torch assemblies.

Plasma Torches

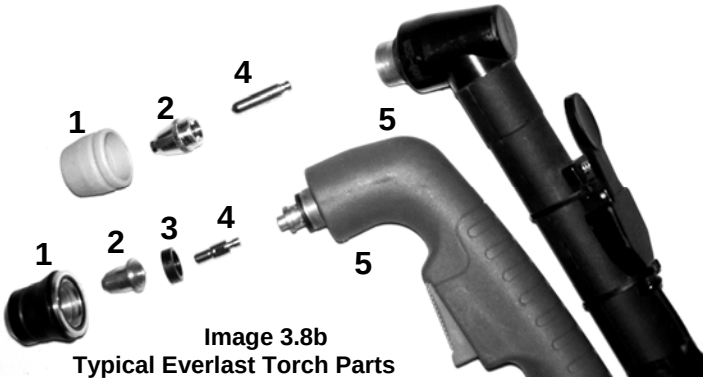


Image 3.8b
Typical Everlast Torch Parts

1. **Cup.** Screws to torch body. It focus the gas in the plasma stream. Replace when either severely burned or cracked.

2. **Cutting Tip.** Directs the plasma flame to the base metal. Either screws to torch or sits inside cup, depending upon model. Check tip frequently for wear or burn through.

3. **Swirl Ring.** Rapidly spins air into a tornado like stream to create plasma. Not found on all torch designs. If your torch (S-series in particular) has a swirl ring, it must be used.

4. **Electrode.** This forms the arc needed to create the plasma head. Often when tip is burned or worn, the plasma cutting ability of the unit becomes limited. Check condition when changing out cutting tips. Make sure they are tight or torch failure can occur.

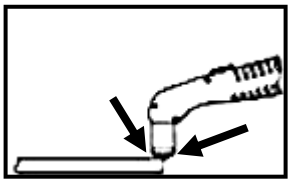
5. **Torch Body.** Keep the body of the torch in good condition. Inspect often for cracks and burns in the torch body to prevent electrocution. Make sure that the switch is functioning properly. Do not oil or grease the switch.

3.16 **Plasma Cutting Principles. ⚠ Before any welding or cutting takes place, it is necessary to put on protective gear and familiarize yourself with safety precautions.**

Plasma Cutting is an efficient and simple way to cut multiple metal types. The super sonic plasma stream, generated by ionized pressurized air, is capable of rapidly burning metal without overheating the surrounding area. This is helpful for preventing warpage and preventing the formation of Heat Affected Zones (HAZ) in the metal.

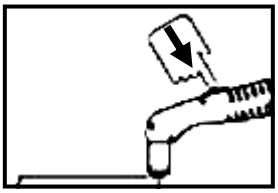
3.17 **Simple and easy steps to cutting correctly with an Everlast Power Series® Cutter.**

1. **Set Amperage and Air pressure to suit the units specifications.**



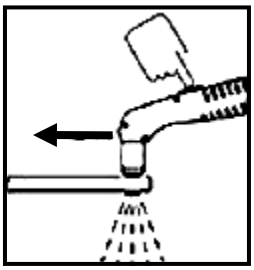
Place the torch cutting tip directly on the edge of the metal. Alternatively, you may allow up to 1/8 inch of standoff to prevent extra wear and blow back of material.

2. **Press trigger to begin cutting.** Hold torch



trigger down to continue cutting in Standard mode. To cut in Automatic mode, press trigger to allow arc to start and release trigger to continue cutting.

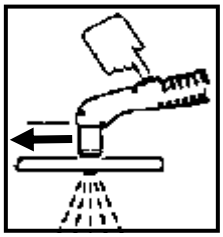
3. **Once Plasma stream is established and sparks exit the bottom of the piece of metal being cut, slowly move the torch forward into the cut.**



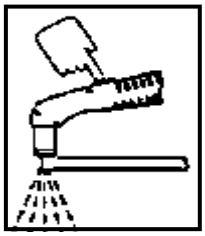
Depending upon torch orientation, you may pull, push or move side-to-side to make the cut. Grip the torch only tight enough to keep the trigger pressed. A tight grip will result in uneven cutting. Glide the hand gently across the metal, maintaining a drag style cut or a standoff. Use standoff wheels or ring if necessary on long cuts. If the torch tip sticks or fouls excessively, revert to standoff cutting.

continued

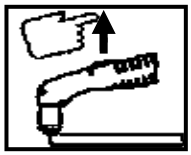
4. **Continue cutting following the desired path of cut.** Make sure that the sparks are exiting the piece of metal at a 10-15 degree angle. If the sparks are exiting straight down, then the cutting speed is too slow. Increase cutting speed until a change of the spark angle is observed. If excessive slag is building up on the bottom of the metal (more than 1/8 inch) then either increase amperage, travel speed or air pressure. Sometimes excessive slag build up on the bottom of the cut occurs because the machine has reached its severance limit. Occasionally excessive slag can be caused by rusty or contaminated metal. Note that cutting thicknesses posted in the specification page are specifically for mild carbon steel under ideal circumstances. Stainless, Aluminum and other metals have reduced ratings cut ratings. Cutting capacity of these metals are generally 10-20% less than mild steel.



5. **Exit the cut by pausing briefly to allow the spark stream to catch up and to be directed straight down.** This is usually the most challenging part of the cut because the bottom of the cut needs to be even with the top before exiting or the cut piece will remain stuck to the parent piece of metal. Carefully work the plasma stream to the very edge of the cut.

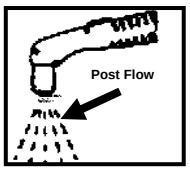


6. **Release the trigger to break the arc in the Standard mode setting.** In the Automatic mode setting, repress the trigger and release to discontinue the arc.



⚠ Caution! Breaking the arc in the auto mode by lifting the arc away will not satisfactorily terminate the arc and will restart the pilot arc. Precautions must be taken in this mode or serious injury can occur.

7. **Allow post/after flow cooling to occur.** Post flow will continue for up to a half a minute after the cut is completed. If additional cooling is required because of heavy cutting or extended cutting, switch the post flow switch to "Test" to start manual cooling of the torch. After the torch is sufficiently cooled, return the switch to cutting mode to discontinue the post/after flow cooling cycle.



3.8 **Helpful Hints for cutting.**

1. **Make several practice cuts first.** Adjust the amperage and air pressure throughout the range to see the effects it has on the cut. Each machine will have a slightly different range or "sweet spot".

2. **Use a substantial flat piece of metal to make a long, clean cut.** Attempting to cut odd objects or make short cuts cannot really train proper technique. It will also be difficult to ascertain the quality of the cut.

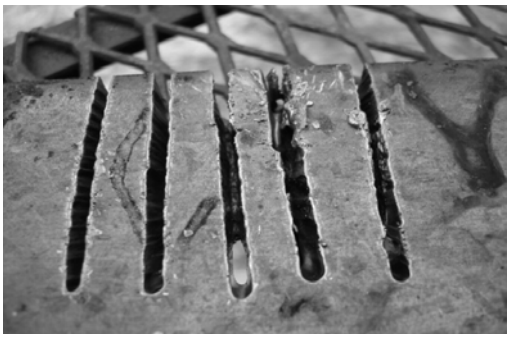


Image 3.11 Practice Cuts Using Different Settings.

3. **Keep torch straight in the cut.** Do not lean or tilt the torch excessively except at start. The ergonomic design of Everlast torches eases this problem. However, fatigue is a common cause for poor, uneven cuts.

4. **Keep consumables checked for wear.** Tip wear can decrease cutting capacity and cut quality at an imperceptible rate until

continued

33.18 **Piercing.**

Occasionally, the need will arise to pierce directly down into a piece of metal to initiate a cut with out the benefit of starting on the edge of the material. This is known as piercing. To pierce, simply start the torch with a 1/8 inch stand-off at the desired spot. If possible, lean the torch at a slight angle so that blowback does not become a problem and will not foul the tip. Make sure that you tilt the torch away from the piece being cut out to prevent marring. Allow the torch to slowly burn its way through the metal. As the torch plasma arc burns down through the plate, straighten the torch into the cutting position. As sparks begin to exit the bottom, you may shorten the stand-off and begin your cut. Excessive use of piercing will significantly reduce consumable life, particularly with an inexperienced operator. Do not attempt to pierce an object that is thicker than 50-60% of the rated cut capacity to ensure long torch life.

Note: Piercing can produce a lot of molten metal blow back. Protective gear is absolutely required, especially face shields and fire proof clothing.

TROUBLE:	CAUSE/SOLUTION
Machine will not turn on.	Check cords and plug wiring. Occasionally a terminal screw will loosen after installation and use. Check circuit breaker. If no fault is found, contact Everlast Support.
Machine runs, but will not cut.	Check for a good ground. Verify the torch is in the Negative terminal, that the pliot arc wire is firmly attached to the unit and that consumables are tight and in good condition. Check that the Timed Flow/Continuous Flow switch is in the correct position for type of use desired (see Time Flow/Continuous Flow operation).
Plasma Cutter pilot arc will not energize. Engergizes erractically.	Check electrode/cup tightness. Tighten electrode with supplied wrench or pliers. Torch switch wire disconnected inside torch
Electrodes and tips are rapidly consumed.	Inadequate air flow. Water in air supply. Poor cutting technique. Return to standoff cutting of no more than 1/8 inch. Check and tighten consumables.
Heavy slag on the underside of the cut with complete cut through.	Travel speed too slow. Either increase cutting speed or reduce cutting amperage to fit metal thickness. Too much standoff (more than 1/8 inch). Worn consumables.
Plasma cut is beveled on one side.	Plasma cutters tend to leave a slightly beveled side (up to 5 degrees). However, decreasing the standoff and increasing air pressure can help reduce or eliminate problems. Worn Consumables.
Okay air pressure light does not illuminate. (some models)	Internal leakage around air fittings. Consult with Everlast Support for repair instructions if needed. No air supply.
Cut quality is poor or irregular.	Check and adjust settings. Increase/ decrease air pressure. Check for consumable wear.
Over current LED illuminates.	Duty cycle exceeded. Allow machine to cool while running, unit power switch must be reset after cooling.
Unstable Plasma Arc.	Poorly grounded unit or worn consumables.
Surrounding lights, or electronic equipment malfunctions.	Use high frequency ground connected to an exterior ground rod to drain Electro magnetic frequencies. Use a shielded wire to drain if necessary.

TROUBLE: (TIG/STICK)	CAUSE/SOLUTION
Tig arc is unstable.	Check Polarity. Check for excess or inadequate argon flow. Install TIG torch DC— (negative) polarity. Install Stick electrode holder for DC+(positive) polarity. Contaminated tungsten. Grind tungsten to point 2.5x's diameter of the Tungsten. Wrong Color Tungsten. **Do not use green tungsten (pure) under any circumstance even for AC operation.** Poor work clamp location or connection. Change location or grind location area. Do not intentionally ball tungsten, use sharpened point. Inverters do not need a balled tungsten. Tungsten is contaminated, or "dipped" into weld pool. (Displayed as green arc or similar off color arc characteristic). Regrind tungsten.
Tig tungsten balls up excessively.	Check Polarity. For standard operation in almost all circumstances, DCEN, or straight polarity is used. If in AC operation, for aluminum, too much DC+ (positive) is being administered. Try and reduce to 35% DCEP
TIG tungsten is rapidly consumed.	Make sure of gas mix is Argon or Argon helium only and is not contaminated. Check torch polarity so that torch is DCEN or reduce DCEP setting in AC mode. Too small of tungsten. Increase to next size or reduce current. Check for proper shielding gas flow and adjustment.
Foot Pedal operates and torch comes on, but little or no amperage control or very low or high output.	Check foot pedal. Try to operate unit in 2T or 4T mode without foot pedal. If it operates normally, foot pedal down rod or rheostat may be bent or damaged. Contact Everlast support for simple repair solutions.
Unit will scratch start in TIG, but not start with HF.	HF points out of adjustment. Consult everlast support for proper point maintenance gaps. Possible HF ground wire disconnected or terminal plug disconnected internally. Check switch position is not placed in "stick" mode.
While in stick mode, weld quality is poor or the bead is piled up or ropy.	Use stick electrode holder in DC+ for most welding situations. Only certain electrodes can be used DCEN. Increase arc force control to improve penetration.
Weld is dull or contaminated in TIG.	Hold tighter arc. Make sure argon flow is correct . Start at 7 lpm or 15 cfh flow rate. Increase flow rate with larger cups. Check torch angle so that a Venturi effect is not created by too much angle.

TROUBLE:	CAUSE/SOLUTION
Machine runs, but will not weld in either mode.	Check for good ground. Make sure ground cable and TIG Torch is securely fastened to lug and receptacle. Check that the switch is correctly selected for TIG, MMA(Stick) or Plasma (Cut).
Tungsten is contaminated.	Tungsten is dipping into weld. Check and adjust stick out to meet welding conditions and torch angle. Reduce amperage or increase tungsten size.
Porosity of the weld. Discolored weld color. Tungsten is discolored.	Low 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 or no gas flow is heard, contact Everlast Support.
Will not operate in Stick mode	Check that STICK has been selected. Make sure cables are securely in lugs. Make sure of good work (ground) clamp contact and location.
Excessive weld spatter in Stick mode.	Hold tighter arc. Push electrode closer to metal.
Burn through in TIG or Stick modes	Reduce amperage.