EVERLAST

POWER ® SERIES

COMBINATION TIG//SMAW/PLASMA CUTTER UNITS

Operator ’s Manual

Includes AC/DC PowerMaster and DC PowerUltra Units

Safety, Setup and General Use Guide

Rev. 1 0609-09

THANK YOU FOR PURCHASING AN EVERLAST PRODUCT. WE APPRECIATE YOUR PATRONAGE AND HOPE THAT YOU WILL ENJOY YEARS OF USE FROM OUR PRODUCT.

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 CONSUMER DEPARTMENT AT THE MAIN NUMBER. YOUR UNIT WILL BE REGISTERED AND WARRANTEE WILL BE ISSUED AND IN FULL EFFECT.

Serial number: _____
Model number: _____
Date of Purchase_____

EVERLAST

Contact Information

Everlast consumer satisfaction email: sales@everlastwelders.com

Everlast Website: everlastwelders.com

Everlast Technical Support: Support@everlastwelders.com

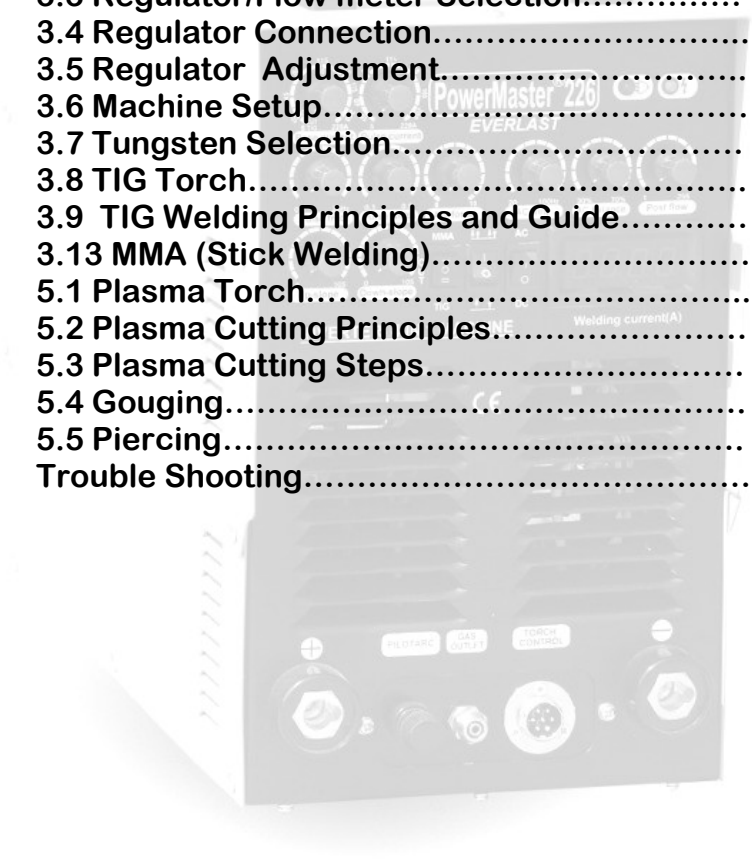
Main toll free number: 1-877-755 WELD（9353）9am—5pm PST M-F

11am-4pm PST Sat.

FAX: 1-650-588-8817

NOTES:

TABLE OF CONTENTS



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.

POWERTIG DX, LX AND EX MODELS, I-TIG MODELS

POWERMASTER SERIES
INCLUDES 164, 205, 226

POWERULTRA SERIES
INCLUDES164, 185, 205

POWER SERIES TIG (GTAW) WP 18/28 TORCH

POWER SERIES TIG (GTAW) FOOT PEDAL ASSEMBLY

POWER SERIES PLASMA TORCHES P-SERIES, S– SERIES

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 the rear of the machine.

1.3 **The Power® Series Combination units are used daily in the industry 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 transistors 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. Everlast's Power Series combination units allow non-contact starts, eliminating the problem of tungsten contamination. Depending upon the unit, precise control of the welding arc is allowed 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 contact 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.

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. Schematics are not offered due to the proprietary information that they contain. However, simple wiring diagrams may be obtained for basic diagnosis and may be obtained from technical support.

POWERMASTER COMBINATION UNITS

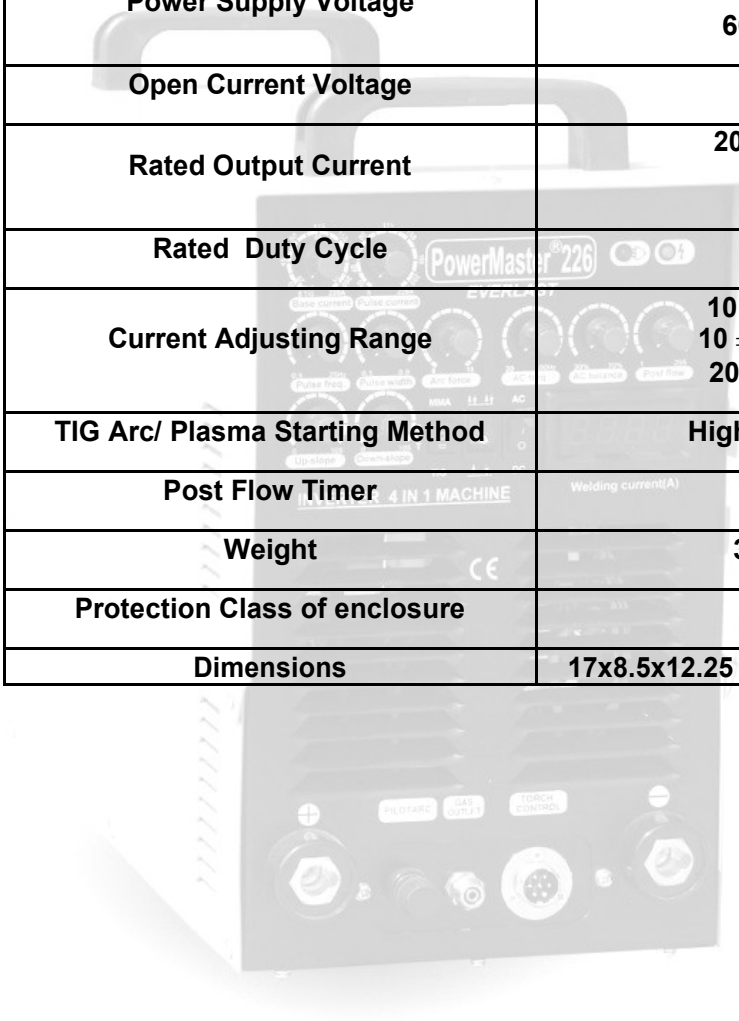
Table 1.1

MODEL		PowerMaster 226	PowerMaster 205
INPUT	Voltage	AC220/230/ 240V 50Hz	
AC TIG	Open Current Voltage	60 - 80V	
	Base Current Range	20~220A	20~200A
	AC balance Control	30%~70 %	
	AC Frequency Control	20~100Hz	
	Rated Duty Cycle	60%	
DC TIG	Pulse Current Range	5~220A	5~200A
	Rated Duty Cycle	60%	
	Current Down-slope Timer	0~10S	
	Base Current Range	5~220A	5A~200A
	Pulse Width Ratio	0.1~0.9	
	Pulse Frequency	0.5~25Hz	
	After Flow Time	1~25s	
	Arc Starting Method	High Frequency	
DC MMA	Open Current Voltage	60 - 80V	
	Base Current Range	5~180A	5~160A
	Rated Output Current	180A	160A
	Rated Duty Cycle	60%	
CUT	Cutting Current Range	20A~60A	20~50A
	Rated Duty Cycle	60%	
	Arc Starting Method	Pilot Arc	
Efficiency		≥ 80%	
Mass		55 lbs (25kg)	
Protection Class of enclosure		IP21S	
Dimensions		17x8x11.5 inches (430x200x290 mm)	

POWERULTRA COMBINATION UNITS
DC OUTPUT ONLY

Table 1.2

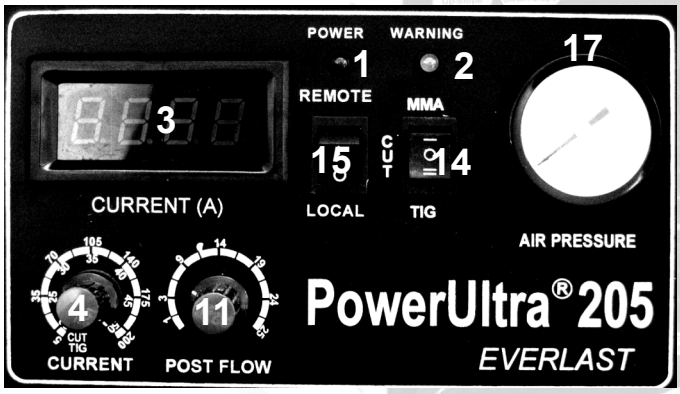
Model	**PowerUltra205**
Power Supply Voltage	**AC 220/230/240V 50/ 60Hz**
Open Current Voltage	**60-80V**
Rated Output Current	**200A(TIG/MMA) 50A(CUT)**
Rated Duty Cycle	**60%**
Current Adjusting Range	**10 ± 5-200A(TIG) 10 ± 5-200A(MMA) 20 ± 5-50A(CUT)**
TIG Arc/ Plasma Starting Method	**High Frequency/ Pilot Arc**
Post Flow Timer	**1S~25S**
Weight	**33lbs (15kg)**
Protection Class of enclosure	**I P21S**
Dimensions	**17x8.5x12.25 inches (30×210×310 mm)**



2.1 **Panel Face.** The following is a unit panel face from an EX 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. Names or designation of control features may slightly vary. 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.

Images 2.1.1 a, b



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. If frequent or continuous overheating is encountered, contact Everlast.

3. **Digital Display.** The display posts the approximate welding amps.

4. **Base Current Control**. This is the primary amperage control. Base amperage is set with this knob. If the pulse function is desired, first select your base (low amperage) with this control to attain you minimum amperage requirements for the pulse cycle. The amperage change will be reflected on the digital display. Since the Power Ultra has no pulse unit, its sole function is to set the Tig and cut currents (main amperage).

5. **Pulse Current.** This sets the peak (high) amperage of the pulse cycle. Select the Peak amperage with this control to achieve the maximum amperage requirements for the pulse cycle. The amperage change will be reflected on the digital display. Turn the pulse off by turning the pulse current control to lowest setting and use only the base amps to select main amperage without the pulse function.

6. **Pulse Frequency.** The pulse frequency controls the number of pulse cycles per second (Hz). By defining the pulse frequency, this directly sets the duration of each pulse cycle. This allows for fine control of heat input into the base metal.

7. **Pulse Width.** This allows the relative amount of time that the pulse spends in the base (low) current stage during a cycle length determined by the pulse frequency control to be adjusted. For example: A control knob setting of 90% or .9 will signal the pulse function of the machine to spend 90% as long in the base (low) current stage as spends in the peak (high) current stage of the pulse cycle. **Note:** The Pulse Width does not control the overall length of the pulse. The pulse frequency setting sets the cycle length, thereby determining the overall length of each leg of the cycle. Within each cycle length, there is a certain amount (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. 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. However, the pulse ratio continues to function within the compressed cycle proportionately.

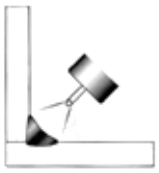
8. **Arc Force.** This controls the dig of the arc. The dig is a term used to describe the intensity

continued

of the arc. It determines how hard the arc penetrates the metal when the arc is held short. This is an exceptionally helpful feature in MMA (SMAW) operation. It helps hold the molten metal in place in out-of-position welds by providing a crisp, forceful arc. Or, it can provide a soft, buttery arc that easily washes the metal into the toes of the weld. This is a matter of operator preference. Rotating the knob clockwise increases dig. There are no recommended settings regarding this feature. Skill, operating styles and electrode selection are controlling variables that help determine the optimum setting of the arc force. Holding the arc close activates the arc force control and a increase of amps can be observed. With a little experimentation, the proper setting can be found for each task.

9. **AC Frequency Control.** This control narrows the welding arc and helps to control penetration and weld shape.

Image 2.1.9 Frequency effects on weld puddle.



200 AC Hz

20 AC Hz

10. **AC Balance.** This control determines the amount of time the AC cycle spends in DCEN (-) or DCEP (+). More DCEN is preferred for cleaning oxidation, particularly in aluminum. More DCEP is preferred for better penetration. A 50% setting equalizes the time spent in both. Try this setting first as a starting point for adjustment.

11. **Post 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

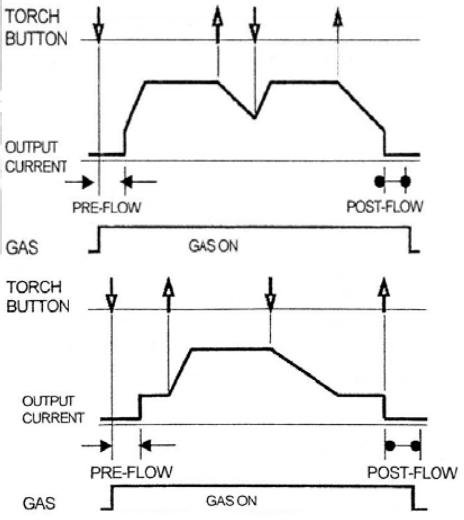
12. **Up Slope.** This controls the time that the machine takes to ramp up the current from the start current to the normal welding current. This provides for excellent control over the welding puddle after it is developed and allows the operator to adjust manipulation techniques as the puddle warms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

13. **Down Slope.** This controls 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.

14. **TIG/Cut/MMA rocker switch.** This switch allows you to select the use of either TIG , plasma cutting or the conventional arc welding features (stick). It is not recommended to weld with the stick setup while switched in TIG mode. However, scratch start TIG welding may be done in the ARC mode. This discontinues the HF in sensitive areas. Not all models are capable of this feature. Be sure to observe the lower duty cycles of the Arc setting if using TIG in Arc mode.

15. **4T/2T or Remote/Local Rocker Switch.** This switch selects for control of the TIG weld cycle via the TIG torch trigger. In the 2T /local 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.

Image 2.1.15 4t/2t operation



continued

4T/ Remote operation allows full control of the welding cycle. By touching and releasing the trigger once, the preflow, start current and up slope are initiated. By touching and releasing again, the down slope, crater current, and post flow are initiated. Only a momentary pause between touching and releasing is necessary to activate the up or down cycle.

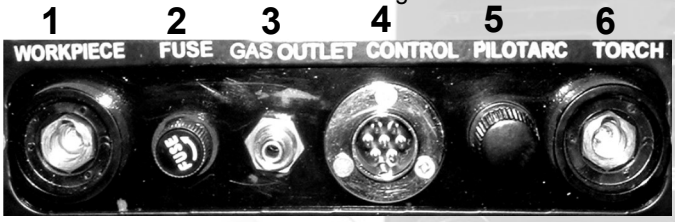
***Note:** The use of the foot pedal overrides these functions. Place the setting in the 2T position to use the foot pedal. The foot pedal is used to manually control the cycle. To connecting the foot pedal to the pin connector is done in lieu of connecting the torch control to the pin connector.

16. **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.

17. **Pressure Gauge**. Identifies the correct pressure setting for use in plasma mode. Set plasma for minimum of 60 psi.

2.2 **Lower Panel.** The lower front panel is depicted below. Each terminal or lug should be kept free of dirt or obstructions. Actual layout of items may vary.

Image 2.2



1. **Workpiece or positive(+) lug.** For TIG, use the work clamp (ground) in the positive lug. (Some units use a positive or negative sign for reference only.) Mate the work clamp cable lug into the hole by aligning the raised tab. Give a slight clockwise twist to lock the cable onto the machine. When using MMA/Stick, either terminal may be used for the work (ground). However, most stick electrodes require the use of Direct Current Electrode Positive (DCEP, or commonly known as reverse polarity). In the case of the electrode positive requirement, connect the electrode holder cable to this side of the panel. For Plasma cutting, , be sure to only use this lug terminal for the work clamp.

2. **Fuse.** This fuse is used to protect the pilot arc circuit from overloading. If blown, the pilot arc will not work. Only replace the fuse with the same amperage fuse if blown.

3. **Gas Outlet.** To secure the TIG torch the outlet, unscrew the outer ferrule and slide it onto the TIG torch gas hose. Slide the hose onto the barb protruding from the panel until it is completely seated. Slide the ferrule up the hose and lightly tighten it on the machine with a small wrench. Be careful not to over tighten the nut or hose as breakage or stripping may occur. Check for leaks.

4. **Torch Control.** Plug either the foot pedal or the torch trigger lead directly into this plug. Tighten the collar to secure the plug onto the machine. The use of the foot pedal substitutes for the use of the torch trigger. For Plasma , the torch switch must be used. Do not use the foot pedal for plasma torch operation.

5. **Pilot Arc.** The plasma torch switch is connected to this terminal. The torch wll not operate properly without this attached. Unscrew thumbscrew to attach.

6.**Torch or negative (-) lug.** For TIG operation, connect the TIG torch to this side in the same manner as described for the positive lug. Direct Current Electrode Negative (DCEN or Straight Polarity) is generally the best setting for TIG operation. For most MMA/Stick welding situations, connect the work clamp to this side. For plasma, insert torch lug into this side.

***Note:** For proper use of DCEN and DCEP while stick welding, consult enclosed information usually supplied with stick electrodes.

continued

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

Image 2.3

1. **Air regulator/filter/water trap.** To adjust air pressue, 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 a air dryer. A tank side air filter/dryer will increase consumable life and help keep moisture out of air lines.

2. **Gas Inlet.** This port is a dual pupose 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) 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 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.

3. **High Frequency Ground**. This unit provides a separate ground for the high frequency to help control interference that high frequency may cause. This ground must be connected to a separate 12 gauge wire that is grounded to a metal stake driven into the ground. It is strongly recommended that you connect this ground as prescribed. This will also help prevent shock from the high frequency while it is in operation. Temporary operation of the unit without the ground may lead to a High Frequency shock when touching the unit with bare skin while the high frequency is in operation. If the unit must be operated without HF ground, extreme care must be taken. Do not operate this unit if you have a pacemaker until you have consulted your doctor due to HF interference.

4. Specifications and Serial number. Because product design and improvement is continuous, the specifications on this panel face overrides any specifications found in this manual. Be sure to record the serial number in this manual and on the Everlast website. This will help track any problems and warranty issues should they occur.

5. **Air line.** Secure the air line with the hose clamps provided. Make sure the air line does not bulge or have leaks in it. Occasionally, stray sparks may burn a hole in the line. Keep it checked for proper operating condition. If needed, source extra hose clamps and tighten onto air line if air is leaking around the connection.

6. **Fan guard.** Keep fan away from objects that could block air flow. Keep away from walls, and other objects a distance of at least 12 inches.

7. **Power cord.** The power cord must not be kept in a strain or the unit pulled by the cord at any time. Notice that you will have 3 wires coming from the cord. You will see a green wire. This is the ground connection. A white wire and a black wire. These are your two hot connections. Follow the wiring connection directions for your type of welding power plug.

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 theTIG 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. If you have never developed a working relationship with your local welding supplier, then it is time to make a visit to purchase or lease a tank of shielding gas. Many sizes of tanks are available. Choose the size that best fits your long term needs.

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!

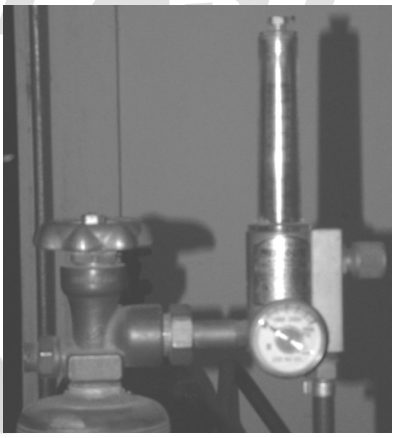


Image 3.3a Ball type flow meter

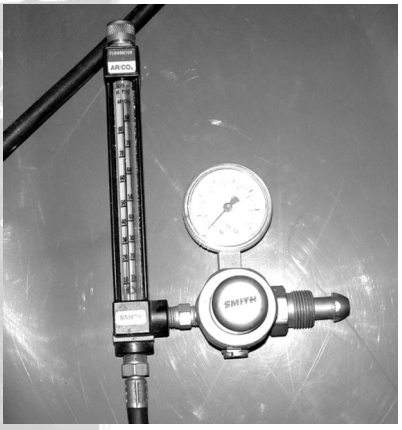


Image 3.3b Ball type flow meter

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.**

continued

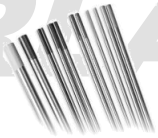
Adjust the flow meter per manufacturer's recommendations. Generally, the flow should be set around 15-25 CFH indoor for Argon. Helium settings are usually at least twice the flow rate of Argon. You will have to increase the flow of gas if weld porosity, sootiness, or weld discoloration is encountered. 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.** The Power Series combination unit may or may not be equipped with a service plug. Due to the lack of standards concerning 220V wall plug configurations, Everlast may choose to ship the unit without a plug for wall service and to allow for permanent connection by a licensed electrician to the shop circuit panel. However, if you do not desire permanent connection o f your unit, purchase of a 220V plug may be necessary. May types and styles of 220V plugs may be purchased. Select a plug rated for at least 40-50 amps. Also determine plug prong pattern of the existing 220V outlets in your shop or garage. Make sure both plug and receptacle match perfectly. Do not force plugs to mate .

Since Everlast seeks to stay up to date with ever changing electrical manufacturing standards, the exact wire color may vary from time to time. ***Generally ,*** a green wire may be recognized as the ground and the black and white wires as the "hot" legs. To make a 220V circuit work, two "hot" wires must be used. Attach the two remaining wires to the remaining two prongs. Three phase uses 3 "hot" wires with the red wire being the 3rd "high" leg. If a dual phase unit is to be used in single phase, simply ignore the red wire and cap it off with a wire connector or tape. Although Everlast offers broad information for your consideration, all local codes must be followed and it is recommended that you consult with a local licensed electrician if you are unsure of making the proper connection. Under no circumstances does Everlast encourage improper wiring techniques. If you have further questions, contact Everlast Support.

Image 3.7a Painted Tips



3.7 **Tungsten Electrode Selection.** Currently there are many choices available for tungstens. Tungstens are 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 tungstens are alike. Pure tungsten (Green) is not recommended for use in any Everlast PowerTig 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 become either a Ceriated (Orange) tungsten or Lanthanated (Gold) tungsten. Both are suitable for use in an Everlast PowerTig 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

Electrode Diameter			DIRECT CURRENT, A Straight Polarity DCEN	DIRECT CURRENT, A Reverse polarity DCEP	ALTERNATING CURRENT, A Unbalanced Wave	ALTERNATING CURRENT, A Balanced Wave
NR	.020"	.050mm	5-20	Not Recommended	5-15	10-20
NR	.040"	1.0mm	15-80		10-60	20-30
OK	1/16"	1.6mm	70-150	10-20	50-100	30-80
OK	3/32"	2.4mm	150-250	15-30	100-160	60-130
OK	1/8"	3.2mm	250-400	25-40	150-210	100-180
OK	5/32"	4.0mm	400-500	40-55	200-275	160-240
NR	3/16"	4.8mm	500-750	55-80	250-350	190-300
NR	¼ "	6.4mm	750-1100	80-125	325-450	325-450

	Material	United States	Europe	Japan
☢	4% Thoriated	(*)	Orange	(*)
☢	2% Thoriated	Red	Red	Red
OK	2% Lanthanated	Blue (+)	(*)	Yellow-Green
OK	1.5% Lanthanated	Gold (+)	(*)	(*)
OK	1% Lanthanated	Black	Black	Black
OK	2% Ceriated	Orange	Grey	Grey
OK	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.

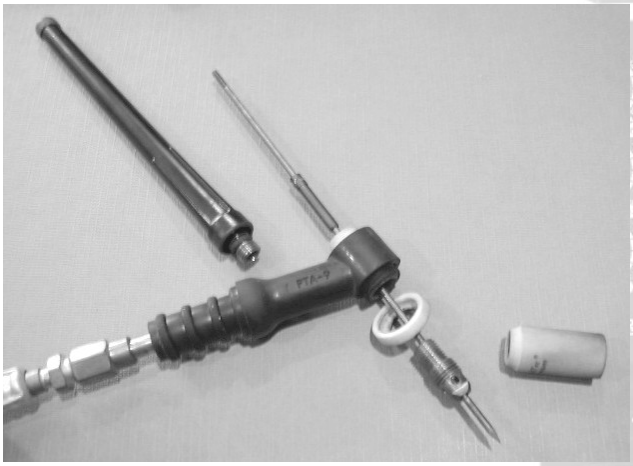
NOTES:

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 proper sized tungsten for job. Avoid use of green tungsten (pure) on Everlast PowerTig welders.

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.

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

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

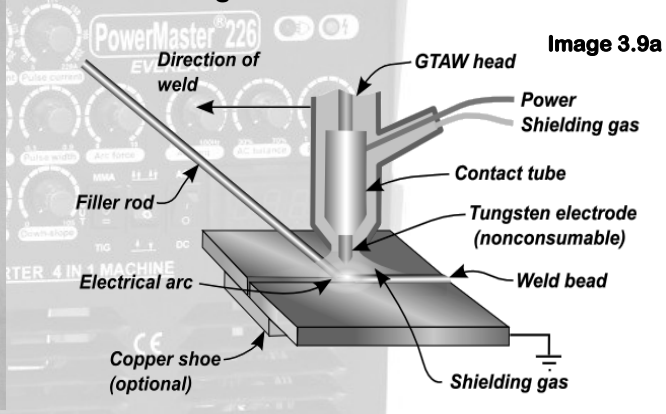
3.9 **TIG Operation and Principles.**

⚠ **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.

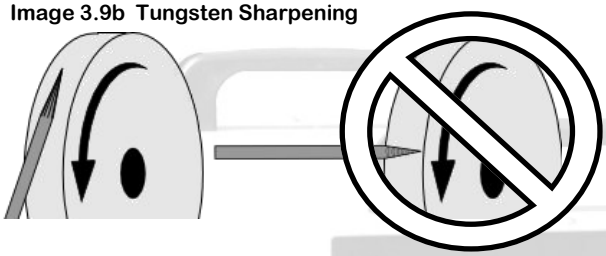
As you familiarize yourself with the above digest of basic TIG welding, there are a couple of basic knowledge items that need to be addressed.

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,

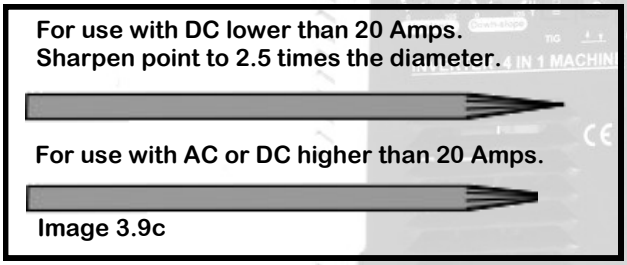


Image 3.9c

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 tungstens only on a dedicated stone, free of contamination from other metals. Hand held tungsten grinders usually grind perfect points.

Once the tungsten has been sharpened, install it into the torch, with approximately

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 glowing cone may be observed. This is the high frequency arc. 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. 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

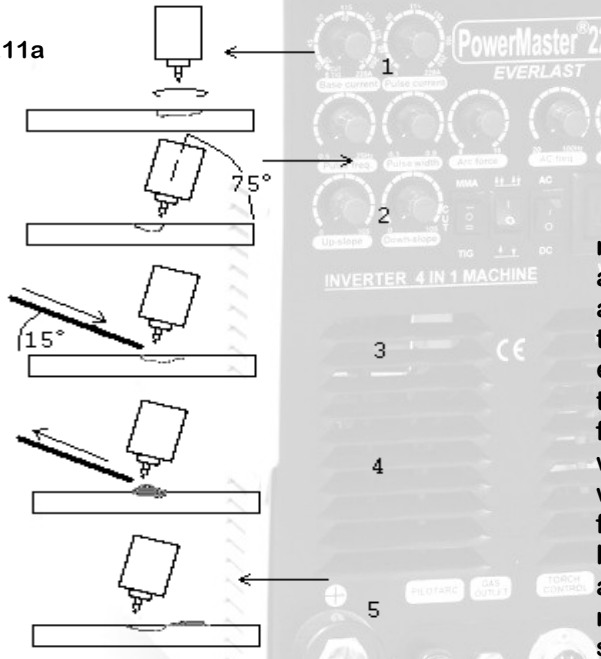
continued

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.

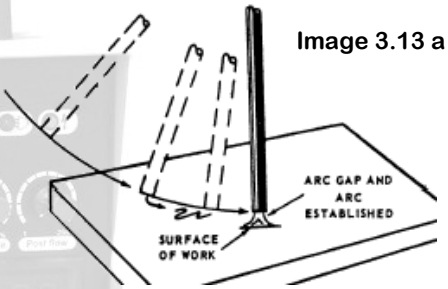
3.13 **Machine operation. MMA/Stick (SMAW)**
Select switch for MMA/Arc operation.

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

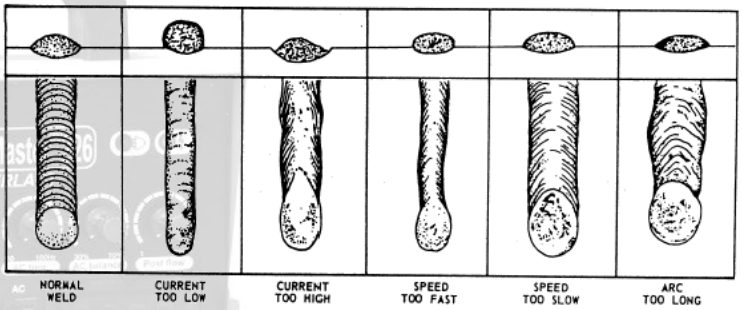


Image 3.14a

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.

5.1 **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.

Image 3.8a
PowerPlasma Torches

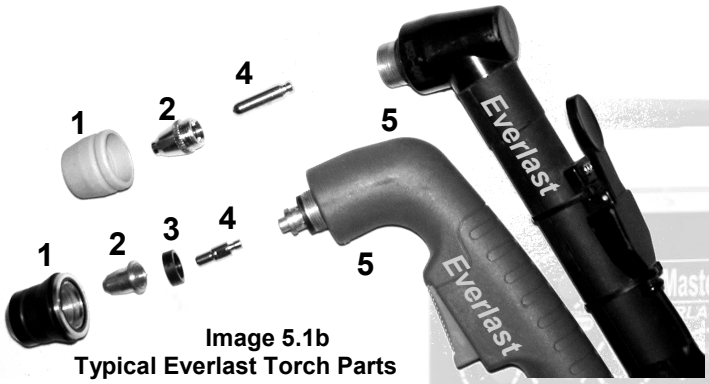


Image 5.1b
Typical Everlast Torch Parts

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.

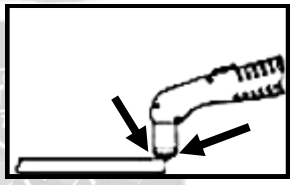
5. **Torch Body.** Keep the body of the torch in good condition. Inspect often for cracks and burns in the torch body to prevent electrocution. Make sure that the switch is functioning properly. Do not oil or grease the switch.

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

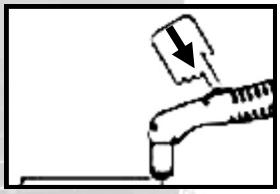
Plasma Cutting is an efficient and simple way to cut multiple metal types. The super sonic plasma stream, generated by ionized pressurized air, is capable of rapidly burning metal without overheating the surrounding area. This is helpful for preventing warpage and preventing the formation of Heat Affected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

5.3 **Simple and easy steps to cutting correctly with an Everlast PowerPlasma® Cutter.**

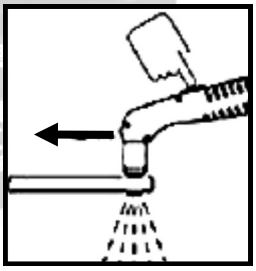
1. **Set Amperage and Air pressure to suit the units specifications.** Place the torch cutting tip directly on the edge of the metal. Alternatively, you may allow up to 1/8 inch of standoff to prevent extra wear and blow back of material.



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.

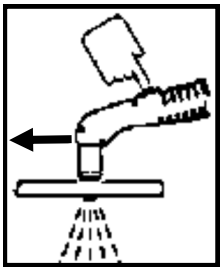


3. **Once Plasma stream is established and sparks exit the bottom of the piece of metal being cut, slowly move the torch forward into the cut.** Depending upon torch orientation, you may pull, push or move side-to-side to make the cut. Grip the torch only tight enough to keep the trigger pressed. A tight 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.

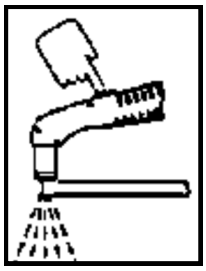


continued

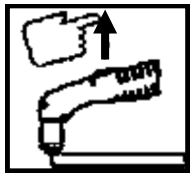
4. **Continue cutting following the desired path of cut.** Make sure that the sparks are exiting the piece of metal at a 10-15 degree angle. If the sparks are exiting straight down, then the cutting speed is too slow. Increase cutting speed until a change of the spark angle is observed. If excessive 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 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.

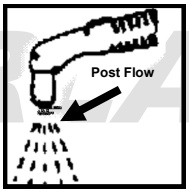


6. **Release the trigger to break the arc in the Standard mode setting.** In the Automatic mode setting, repress the trigger and release to discontinue the arc.



⚠ Caution! Breaking the arc in the auto mode by lifting the arc away will not satisfactorily terminate the arc and may 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.



5.4 **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 cut.** Do not lean or tilt the torch. The ergonomic design of Everlast's torches eases this problem. However, fatigue is a common cause for poor, uneven cuts.

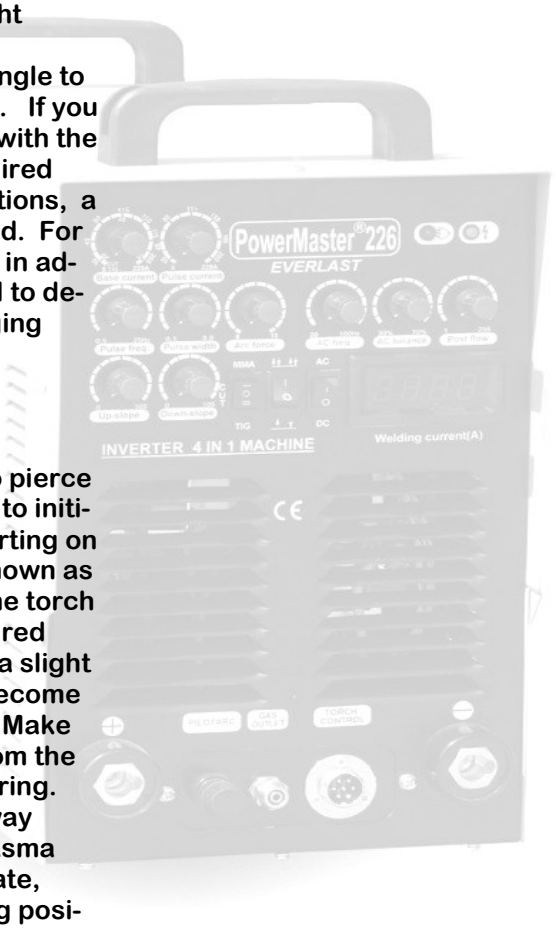
4. **Keep consumables checked for wear.** Tip wear can decrease cutting capacity and cut quality at an imperceptible rate until cutting ability is significantly affected.

continued

5.6 **Gouging.**

The Everlast Power Series Plasma function is able to perform light to medium gouging, depending upon the type of metal with the standard cutting tip and electrode. To gouge, simply lower the air pressure until the air pressure light signals low pressure. Allow the air pressure to stabilize and increase the air pressure 5-10 pounds above the warning light threshold.

Lean the torch at a 30-35 degree angle to the work piece and begin to gouge. If you experience problems, experiment with the air pressure to accomplish the desired type of gouge. For certain applications, a special gouging tip may be required. For this special need, contact Everlast in advance of the expected time of need to determine availability of special gouging electrodes.



5.7 **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 stream 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 blowback of molten metal. Protective gear is absolutely required, especially face shields and fire proof clothing.

TROUBLE:	CAUSE/SOLUTION
Machine will not turn on.	Check cords and wiring. Check circuit breaker. If no fault is found, contact Everlast Support.
Machine runs, but will not cut.	Check for a good ground. Make sure ground cable and PlasmaTorch is securely fastened to lug and receptacle. Check that the Auto/Standard switch is in the correct position for type of use desired (see Auto/Standard operation).
Pilot Arc will not energize.	Check machine fuse. Contact Everlast Support for further remedy.
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.
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).
Cut is beveled on one side.	All 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. Always orient bevel toward parent piece so that part remains true.
Air pressure warning light illuminates while there is adequate pressure displaying on pressure gauge.	Internal leakage around air fittings. Though typically an easy fix, consult with Everlast Support for instructions if needed.
Cut quality is poor.	Check and adjust settings. Increase/ decrease air pressure. Check for consumable wear.
Over current LED illuminates.	Duty cycle exceeded. Allow machine to cool. Make sure fan is not blocked.
Unstable Arc.	Poorly grounded unit or worn electrode.
Other issues.	Contact Everlast Support.

TROUBLE:	CAUSE/SOLUTION
Machine will not toggle from cut/ TIG/ MMA	Wires to switch have uncoupled. Contact Everlast Support
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 or MMA.
Machine welds, but displays will not illuminate.	Check machine fuse. Contact Everlast Support for further remedy.
Tungsten is rapidly consumed.	Inadequate gas flow. Too small of tungsten. Wrong shielding gas. Use only Ar. Using green tungsten. Use red or other.
Tungsten is contaminated.	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. 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 MMA.	Check that MMA has been selected. Make sure cables are securely in lugs. Make sure of good ground.
Weld quality is poor in MMA.	Check and adjust settings. Adjust polarity settings per electrode manufacturer.
Over current LED illuminates.	Duty cycle exceeded. Allow machine to cool. Make sure fan is not blocked.
Unstable Arc.	Poorly ground or shaped tungsten. Regrind to proper point.
Other issues.	Contact Everlast support.

EVERLAST