

# ***EVERLAST***

## **POWER MTS 200/250S**

### **CC/CV MULTI-PROCESS WELDER GMAW/GTAW/SMAW**



### ***Operator's Manual for the Power MTS 200/250S Safety, Setup and General Use Guide***

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

Rev. 3 0 101009-13



**1-877-755-9353**

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Specifications and Accessories subject to change without notice.

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**Dear Customer,**

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

Please go directly to the Everlast website to register your unit and receive your warranty information. Your unit registration is important should any information such as product updates or recalls be issued. It is also important so that we may track your satisfaction with Everlast products and services. If you are unable to register by website, contact Everlast directly through the sales department at 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. An over-the-phone review/diagnosis must be performed BEFORE a RMA is issued or before the unit can be sent in for service.**

**Please read the warranty statement published online and other important information found on the Everlast website of the division located in or nearest to your country. Print it for your records and become familiar of its terms and conditions. Guns, accessories and torches are covered under a separate, shorter warranty. Please be sure you visit the website and are familiar with all the warranty terms before you call for service.**

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. This support is free to all Everlast customers. 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, leave a message and your call will normally be returned within 24 hours, except for weekends and holidays. Also for quick answers to your basic questions, join the company owned forum available through the website. You'll find knowledgeable staff available to answer your questions. You also may 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. Depending upon your issue, it is advisable to have basic tools handy such as screwdrivers, wrenches, pliers, and even an inexpensive test meter with volt/ohm functions before you call.**

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

Sincerely,

Everlast Customer Service

Serial number: \_\_\_\_\_  
Model number: \_\_\_\_\_  
Date of Purchase: \_\_\_\_\_



Contact Information

**Everlast US:**

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

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

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

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

Main toll free number: 1-877-755 WELD (9353) 9am—5pm PST M-F  
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FAX: 1-650-588-8817

**Everlast Canada:**

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

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

**OTHER (Please record here for your records):**

## SAFETY PRECAUTIONS

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



Safe operation and proper maintenance is your responsibility.

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

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

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



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

Certain welding and cutting processes generate High Frequency (HF) waves. These waves may disturb sensitive electronic equipment such as televisions, radios, computers, cell phones, and related equipment. High Frequency may also interfere with fluorescent lights. Consult with 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.

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## SAFETY PRECAUTIONS

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



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



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



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



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



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



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



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



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

## SAFETY PRECAUTIONS



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



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

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



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

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



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



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



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



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



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

## SAFETY PRECAUTIONS



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



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



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

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



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



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



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



## Overview of Parameters and Features



**Power MTS 200 MIG TIG STICK Welder**



**PROCESS:** GMAW/SMAW/DC GTAW(LIFT START)  
**INPUT:** 240V 1 phase 50/60 Hz 34 A  
**OCV:** 60 V  
**TIG UP/DOWN SLOPE TIME:** 0-5 SECONDS

**MIG OUTPUT:** 30- 200 A/15.5-24 V  
**TIG OUTPUT:** 10-200 A  
**STICK OUTPUT:** 10-175 A  
**POSTFLOW TIME:** 1-10 S

**DUTY CYCLE @ RATED AMPS:** 35%  
**WIRE SIZE:** .023"-.045"/8" SPOOL  
**PRE-FLOW TIME:** 0-5 SECONDS  
**EFFICIENCY** >85%

**Power MTS 250S MIG TIG STICK Welder with Synergic Function MIG**

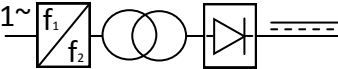









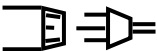


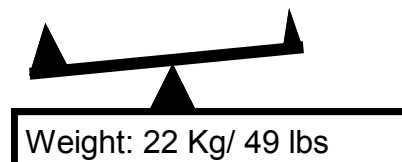
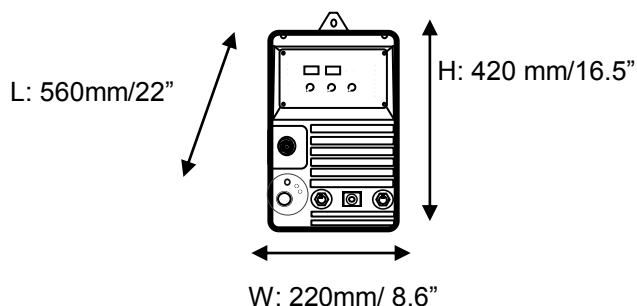
**PROCESS:** GMAW/SMAW/DC GTAW(LIFT START)  
**INPUT:** 240V 1 phase 50/60 Hz 40 A  
**OCV:** 60 V  
**TIG UP/DOWN SLOPE TIME:** 0-5 SECONDS

**MIG OUTPUT:** 30- 250 A/15.5-26.5V  
**TIG OUTPUT:** 10-250 A  
**STICK OUTPUT:** 10-200 A  
**POSTFLOW TIME:** 1-10 S

**DUTY CYCLE @ RATED AMPS:** 35%  
**WIRE SIZE:** .023"-.045"/8" SPOOL  
**PRE-FLOW TIME:** 0-5 SECONDS  
**EFFICIENCY:** >85%

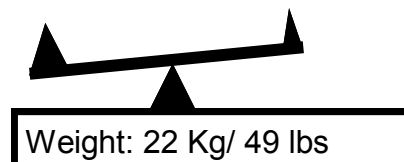
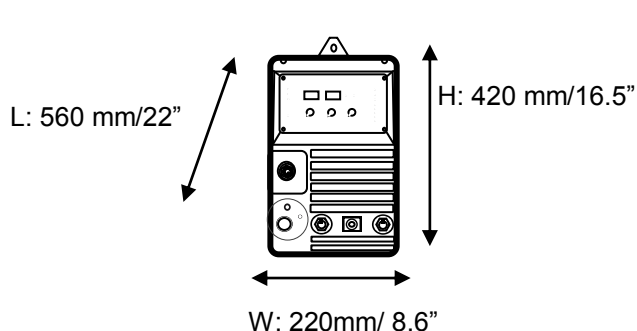
## Power MTS 200 Technical Parameters\*

| <div>EVERLAST</div> <div>MIG/TIG/STICK INVERTER</div>  |   |  |                  |        |        |
|--|---|--|------------------|--------|--------|
| MODEL: PowerMTS 200  |   |  | No.              |        |        |
|                   |   |  | EN/ IEC60974.1   |        |        |
|                   |    | DC: 30-200 A 15.5-24 V   |                  |        |        |
|  |   | X  | 35%              | 60%    | 100%   |
|                   | U <sub>0</sub> V<br>60  | I <sub>2</sub>   | 200 A            | 160 A  | 130 A  |
|  |   | U <sub>2</sub>   | 24V              | 22 V   | 20.5 V |
|                   |    | DC: 10-200 A ; 10.4-18V  |                  |        |        |
|  |   | X  | 35%              | 60%    | 100%   |
|                  | U <sub>0</sub> V<br>60  | I <sub>2</sub>   | 200 A            | 160 A  | 130 A  |
|  |   | U <sub>2</sub>   | 18 V             | 16.4 V | 15.2 V |
|                 |  | DC: 10-175 A ; 15.5-24 V   |                  |        |        |
|  |   | X  | 35%              | 60%    | 100%   |
|                 | U <sub>0</sub> V<br>60  | I <sub>2</sub>   | 175 A            | 130 A  | 100 A  |
|  |   | U <sub>2</sub>   | 27 V             | 25.2 V | 24 V   |
| <br>1~ 50/60 Hz | U <sub>1</sub><br>220-240V  | 220 V I <sub>1MAX</sub> : 36A I <sub>1EFF</sub> 22 A<br>230 V I <sub>1MAX</sub> : 35 A I <sub>1EFF</sub> 21 A<br>240 V I <sub>1MAX</sub> : 34 A I <sub>1EFF</sub> 20 A |                  |        |        |
| PROTECTION:<br>IP21S   | COOLING METHOD:<br>FAN  |  | INSULATION:<br>F |        |        |



## Power MTS 250S Technical Parameters\*

| <div>EVERLAST</div> <div>MIG/TIG/STICK INVERTER</div> |                            |  |                |                  |       |
|---|----------------------------|--|----------------|------------------|-------|
| MODEL: PowerMTS 250S                                  |                            |  | No.            |                  |       |
|   |                            |  | EN/ IEC60974.1 |                  |       |
|   |                            | DC: 30-250 A ; 15.5-26.5 V   |                |                  |       |
|   |                            | X  | 35%            | 60%              | 100%  |
|   | U <sub>0</sub> V<br>60     | I <sub>2</sub>   | 250 A          | 200 A            | 160 A |
|   |                            | U <sub>2</sub>   | 26.5           | 24 V             | 22 V  |
|   |                            | DC: 10-250 A ; 10.4-20 V   |                |                  |       |
|   |                            | X  | 35%            | 60%              | 100%  |
|   | U <sub>0</sub> V<br>60     | I <sub>2</sub>   | 250 A          | 200 A            | 160 A |
|   |                            | U <sub>2</sub>   | 20 V           | 18 V             | 16.4V |
|   |                            | DC: 10-200 A ; 20.4– 28V   |                |                  |       |
|   |                            | X  | 35%            | 60%              | 100%  |
|   | U <sub>0</sub> V<br>60     | I <sub>2</sub>   | 200 A          | 160 A            | 130 A |
|   |                            | U <sub>2</sub>   | 28 V           | 26 V             | 25.2  |
|   | U <sub>1</sub><br>220-240V | 220 V I <sub>1</sub> MAX: 40 A I <sub>1</sub> EFF 32 A<br>230 V I <sub>1</sub> MAX: 38 A I <sub>1</sub> EFF 31 A<br>240 V I <sub>1</sub> MAX: 36 A I <sub>1</sub> EFF 30 A |                |                  |       |
| 1~ 50/60 Hz   |                            |  |                |                  |       |
| INSULATION<br>IP21S                                   |                            | COOLING METHOD:<br>FAN   |                | INSULATION:<br>F |       |



**1.1 General Description, Purpose and Features.** The PowerMTS 200 and 250S, are compact lightweight CV/CC welders capable of handling most jobsite duties and portable repairs. Operating on 1 phase 220-240V 50/60Hz, the units are designed to strike an excellent balance between versatility and performance. The following processes are included in the PowerMTS series.

- 1) **GMAW (MIG)** offers wave form control which results in a smooth, stable arc. Digital controlled MIG components precisely control functions and give real-time feed back about the welding output parameters. The 250S also utilizes fully digital synergic technology with a manual override function for standard operation. (see below). The MTS 200 manually adjusts MIG function with no synergic capability. Wave form control adds an additional dimension of control to adjust the inductance. Both units are spool-gun ready. Spool Gun is optional.
- 2) **GTAW (TIG)** offers lift start DC TIG operation which includes a built in gas solenoid with pre and post flow control with up and down slope control, (Series 17 or 26 compatible). **Note:** DC Lift start is actuated by the remote contactor built into the handle (included) or by pressing the (optional) foot pedal. The TIG torch is not live until the switch or pedal is depressed. The user has a choice of either 2T or 4T operation while welding. Foot Pedal capability is standard on both units.
- 3) **SMAW (Stick)** delivers smooth spatter free welds. Arc force control increases performance, and improves out of position welding characteristics. Smooth spatter free welds are easily obtained on ER 7018, 309L, 6011 and many specialty rods.

**1.2 Basic Design and Construction.** The PowerMTS series units uses advanced Pulse Width Modulation coupled with IGBT module construction to produce a stable arc without consuming large amounts of power attributed to standard transformer welders. Welding power is typically generated as follows : Single phase 220V-240V AC power is fed into the welder, where it is rectified in to DC voltage. After it passes through an intermediate transformer, reducing the voltage, power is fed to the IGBT based inverter where it is converted to converted to AC power. Next power and passed back through diodes to rectify the power back to DC while being filtered through an inductor circuit. The circuit then uses current/voltage feedback sensing technology through the means of its CPU to maintain stable TIG/Stick performance, ensuring stable MIG performance as well. Welding parameters can be infinitely and continuously

adjusted while the unit is in operation, offering instant welding response for maximum control.

**1.3 Installation.** The basic construction of the PowerMTS is rugged and durable, and is considered ideal for circumstances where multiple welders may be required, but not available. Critical components are protected by coatings to make the welder environmentally resistant and has a water ingress rating of IP21S, the base standard in the welding industry to protect from vertically dripping water. However, some care and common sense should be taken to make sure that the welder offers the safest and best performance. Please note the following items regarding safe operation:

- 1) Do not use the welder in damp or wet areas. Perspiration and other forms of water in contact with the body can increase the risk of electrocution.
- 2) Do not use the welder in extremely corrosive environments. To maintain optimum power transfer, check main connections, clamps and cables frequently to ensure that components are not corroded. Excessive dirt, corrosion and oxidation can result in an unstable arc and excessive heat build-up.

**NOTE: Environment, Maintenance and Safety**

Keep welder at least 10-12 inches away from all objects for proper cooling. Do not exceed 40° C in environment or duty cycle will be reduced. Regularly inspect and clean the welder and circuitry on a quarterly basis with dry compressed air. Remove the covers only after the unit has been turned off and unplugged for 30 minutes to discharge the capacitors to prevent the possibility of electrocution. Do not grind or throw sparks near to the welder to prevent damage to the panel face and internal components. Damage of this nature is not covered by the warranty.

**SECTION 2****SETUP GUIDE AND COMPONENT IDENTIFICATION****GENERAL POLARITY RECOMMENDATIONS\***

Table 1

\*Consult manufacturer directions of filler material. There are exceptions!

| PROCESS          | TORCH POLARITY | WORK POLARITY |
|------------------|----------------|---------------|
| MIG (GMAW)       | +              | -             |
| FLUX CORE (FCAW) | -              | +             |
| TIG (GTAW)       | -              | +             |
| STICK (SMAW)     | +              | -             |

**GAS SELECTION GUIDE**

Table 2

| PROCESS              | GAS   |
|----------------------|---|
| MIG (GMAW) STEEL     | 80/20 Ar/CO2 or 75/25 Ar/CO2 (For optimum synergic operation) |
| MIG (GMAW) STAINLESS | 98/2 Ar/O2 (For optimum synergic operation)                   |
| MIG (GMAW) ALUMINUM  | 100% Argon  |
| DC TIG (GTAW)        | 100% Argon  |

**MIG (GMAW) CURRENT/WIRE/THICKNESS GENERAL SUGGESTIONS**

Table 3

| WIRE DIAMETER | WELDING AMPS (A) | PLATE THICKNESS       | GAS FLOW RATE        |
|---------------|------------------|-----------------------|----------------------|
| .023" (0.6)   | 25-110           | .040"-.063" (1.0-1.6) | 15-20 CFH /7-10 lpm  |
| .030" (0.8)   | 35-200           | .040"-.128" (1.0-3.2) | 20-25 CFH/ 10-14 lpm |
| .035" (0.9)   | 45-250           | .040"-.128" (1.0-3.2) | 20-30 CFH/ 10-16 lpm |
| .040" (1.0)   | 45-250           | .050"-.25"+(1.2-6.0+) | 25+ CFH/ 14+ lpm     |
| .045" (1.2)   | 60-250           | .25"+ (6.0+)          | 25+ CFH/ 14+lpm      |

**DC TIG (GTAW) OPERATION GUIDE**

Table 4

| METAL THICKNESS    | WELDING AMPS (A) | TUNGSTEN DIA.      | Ar FLOW RATE        |
|--------------------|------------------|--------------------|---------------------|
| 1-3 mm/.040"-1/8"  | 40-80            | 1-2 mm/.040"-3/32" | 8-15 CFH /4-7 lpm   |
| 3-6 mm/ 1/8"-3/16" | 80-200           | 2-3 mm/ 3/32"-1/8" | 15-25 CFH/ 7-14 lpm |
| 6mm + / 3/16"+     | 200+             | 2.4mm +/ 1/8"+     | 25 CFH+/ 14 lpm+    |

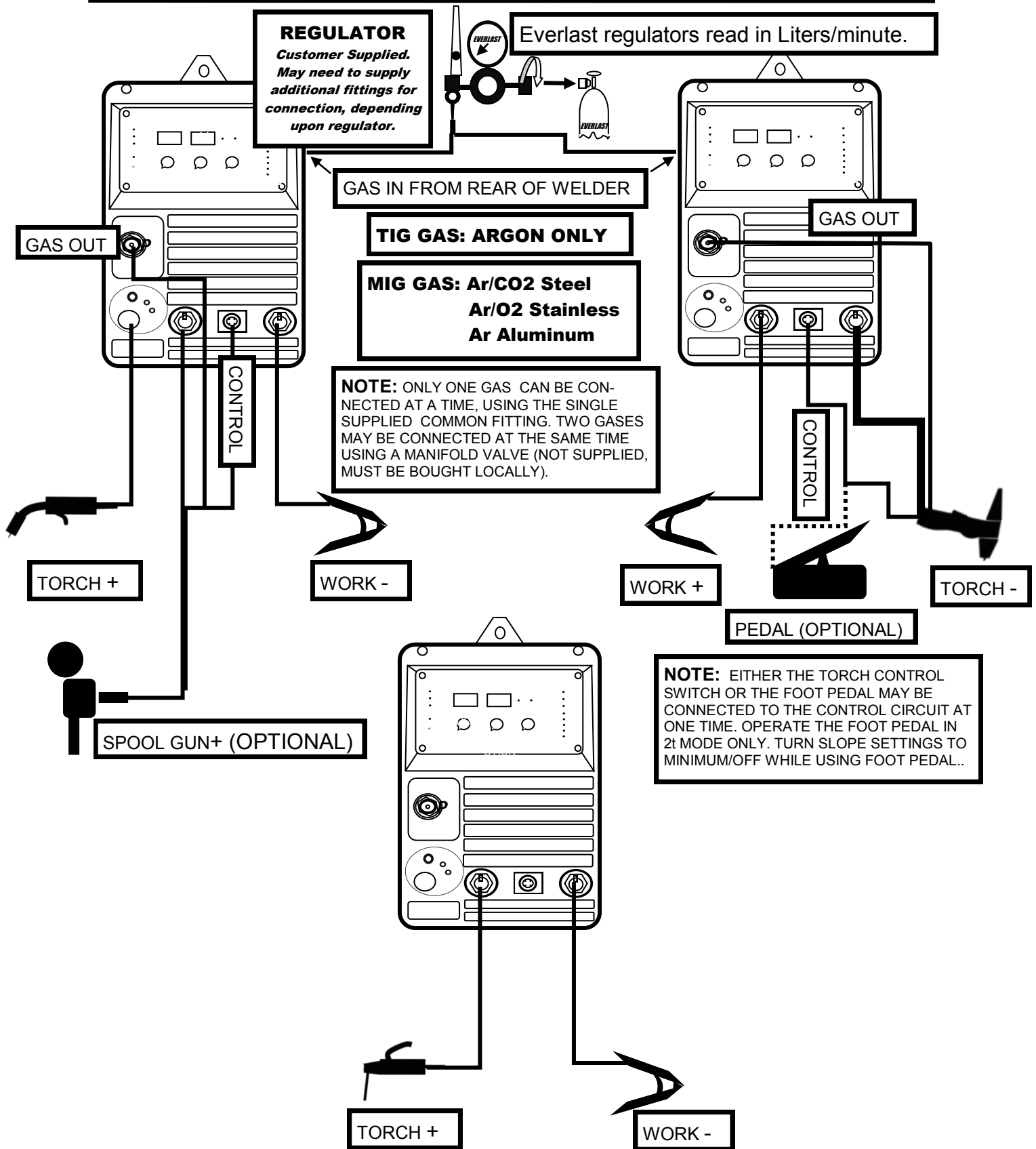
**DC STICK (SMAW) OPERATION GUIDE**

Table 5

| METAL THICKNESS    | ELECTRODE SIZE       | WELDING AMPS |
|--------------------|----------------------|--------------|
| < 1 mm/.040"       | 1.5 mm/ 1/16"        | 20-40        |
| 2 mm/.080"         | 2 mm/3/32"           | 40-50        |
| 3 mm/ 1/8"         | 3.2 mm/1/8"          | 90-110       |
| 4-5 mm/ 3/16"      | 3.2-4 mm/ 1/8"-3/16" | 90-130       |
| 6-12 mm/ 1/4"-1/2" | 4-5 mm/ 3/16"        | 130-200      |

## SECTION 2

## SETUP GUIDE AND COMPONENT IDENTIFICATION



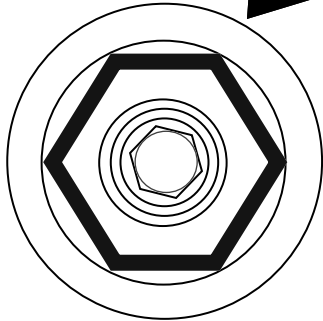
CONNECTIONS AND POLARITY

## SECTION 2

## SETUP GUIDE AND COMPONENT IDENTIFICATION

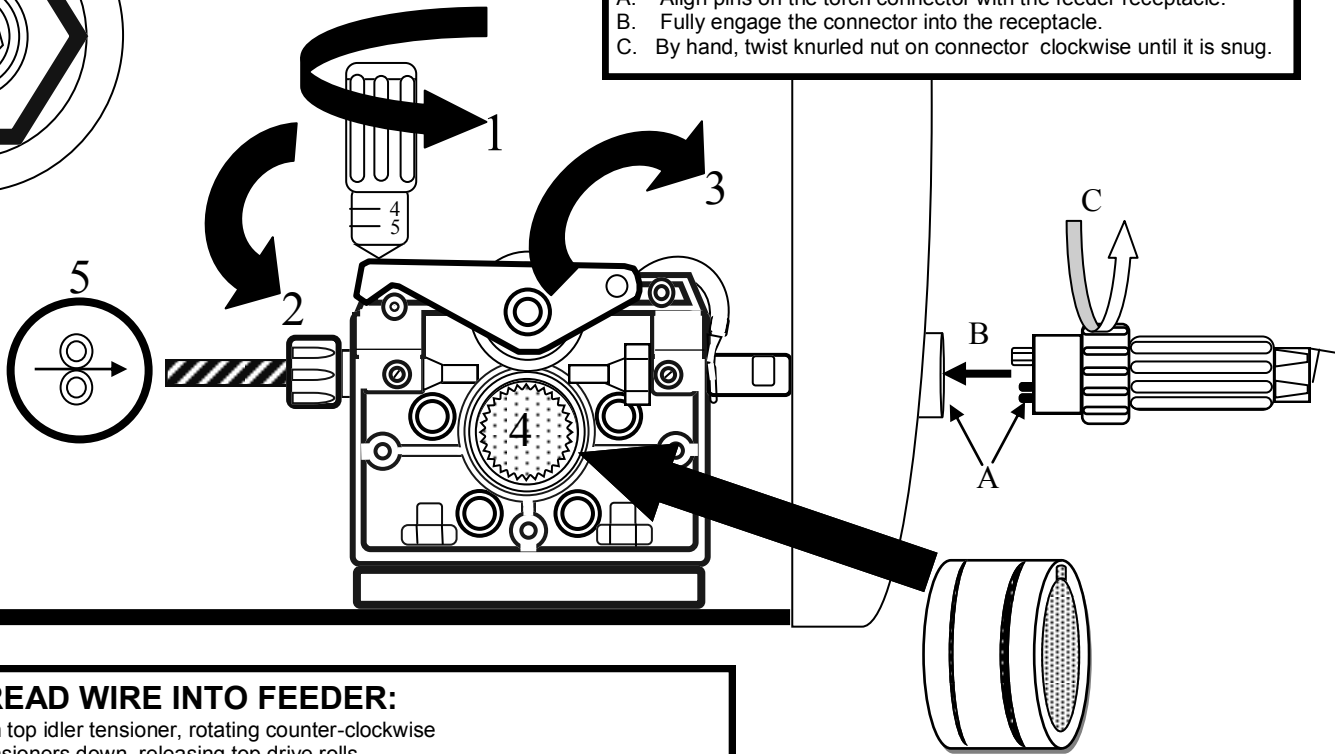
### TO LOAD WIRE SPOOL:

1. Loosen the hand nut (inside of cover) by turning it counter-clockwise.
2. Align the locating pin with the hole on the wire spool (if present).
3. Slide spool onto shaft. Make sure wire is unwrapping from bottom of the spool.
4. Reinsert and tighten the hand nut clockwise.
5. Tension the roll with hand nut so that the roll doesn't free wheel but turns easily.
6. Clip the end of the wire to feed the wire smoothly through drive mechanism.



### TO INSTALL MIG GUN/TORCH:

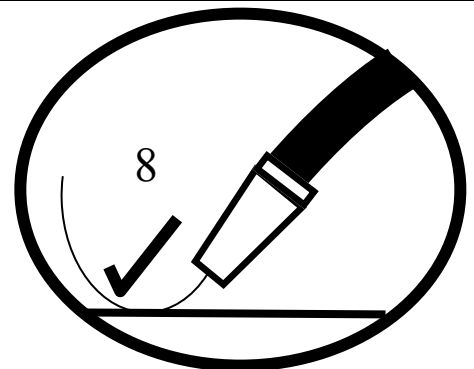
- A. Align pins on the torch connector with the feeder receptacle.
- B. Fully engage the connector into the receptacle.
- C. By hand, twist knurled nut on connector clockwise until it is snug.



### TO THREAD WIRE INTO FEEDER:

1. Loosen top idler tensioner, rotating counter-clockwise.
2. Flip tensioners down, releasing top drive rolls.
3. Raise top drive idler roller.
4. Inspect the drive roll to make sure that the groove size matches the wire diameter. Reversal of the lower roller may be necessary. To reverse the roller, remove the thumb screw securing the drive roll. Pull the drive roll off, and flip the drive roll over. Reassemble and tighten roller. If larger roller is needed, contact Everlast.
5. Thread straightened wire into coiled sheath and over grooves in lower drive roll. Thread through until it threads into the gun section 3"-4". Lower the upper drive roll onto lower drive roll, keeping the wire securely fixed in the groove of the feed roller. Make sure the correct size groove has been selected.
6. Raise tensioner back into place. Tighten slightly so wire will feed. Notice markings on tensioner for future reference.
7. Hold torch straight out as possible. Press gun trigger to feed wire until the wire exits the end of the torch.
8. Adjust tensioner clockwise until drive rolls will not slip when the wire comes into contact with surface and the wire will curl up on end. Remember to keep wire away

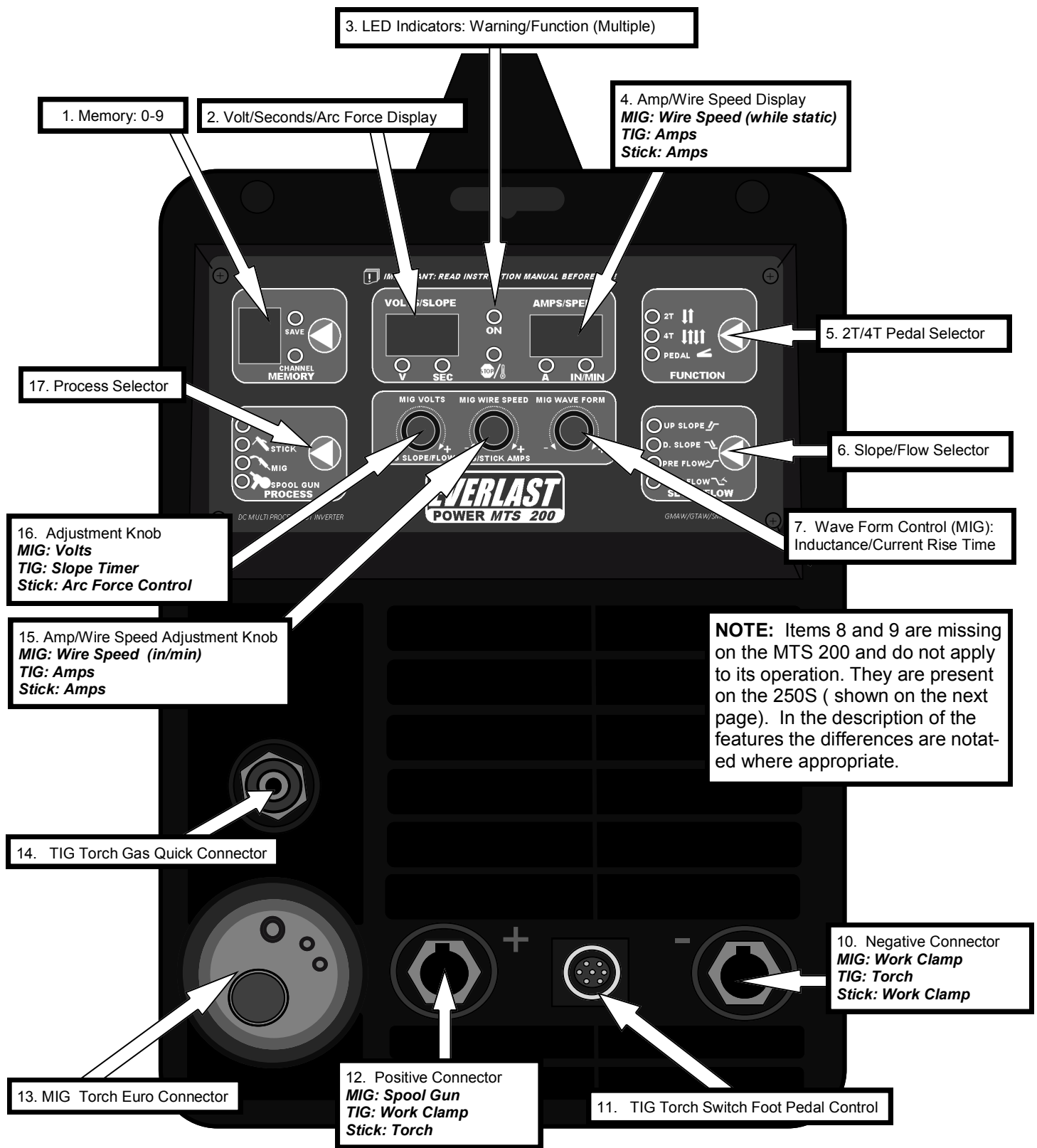
Bottom Drive Roll (Standard)  
.8mm=.030"-.035" 1.0mm=.040"-.045"



## INSTALLING MIG WIRE

## SECTION 2

## SETUP GUIDE AND COMPONENT IDENTIFICATION

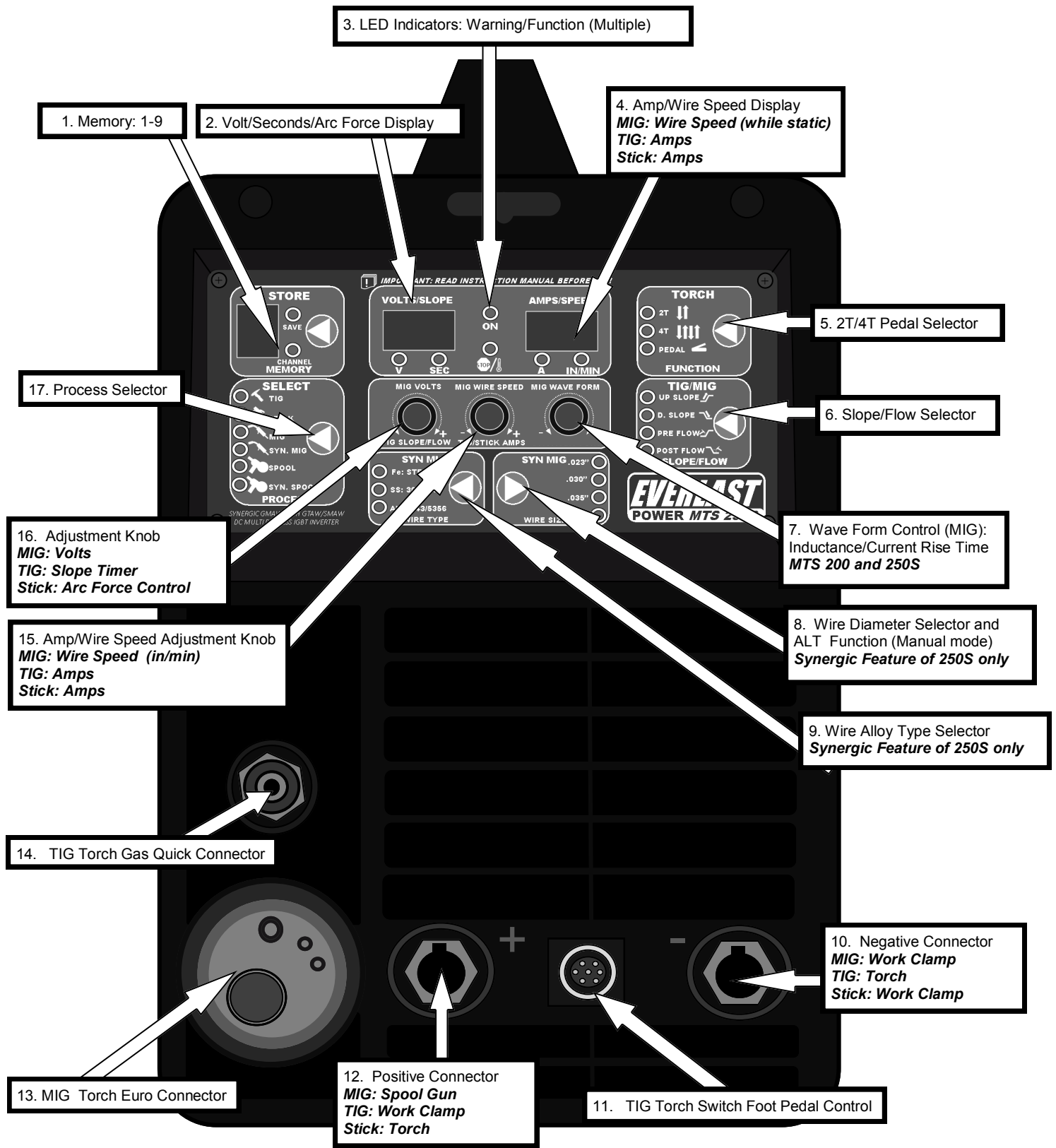


**FRONT VIEW/ MAIN PANEL POWER MTS 200**



## SECTION 2

## SETUP GUIDE AND COMPONENT IDENTIFICATION



**FRONT VIEW/ MAIN PANEL POWER MTS 250S**

*Front Panel:*

1. **Memory.** 1-9. Select the channel number desired with the button, and make desired adjustments to the welder. When ready to save your settings press and hold the button for 3 seconds and save light will flash and indicate it has been saved.
2. **Volt/Slope Display.** The readout displays MIG volts that are selected either through (250S) or through the manual adjustments made with the MIG Volt control knob. The function of the Volts display will change to reflect actual welding volts during welding. This may reflect a slightly different voltage than selected. This is normal and due to minor variations of arc length, power input etc. The Volt meter also registers Up/Down slope as well as arc force setting. The voltage is non adjustable on the TIG and Stick functions.
3. **LED Indicators.** These L.E.D. Indicate the current status of the machine. The On indicator is lit anytime the machine is turned on. The Duty Cycle/Overheat/ Overcurrent light, indicated by the warning symbol, is lit when the machine has been pushed to its thermal limits. When this is lit, welding will be interrupted. It is a dual colored LED. If it is a (green light) duty cycle issue, the light will go off and welding will resume when the welder has cooled. If it is an over current (red or amber light) the welder will have to be cycled off and on and the power circuit analyzed. The volt/amp/second /In/min LED's indicate which function the digital display is serving during setup and while welding.
4. **Amp/Wire Speed Display.** This displays wire speed while static and amps while welding MIG. Wire speed is calibrated to read in m/min or in/min (depending upon country). It displays actual amp output while welding. While welding in stick or TIG, amps are displayed while adjusting. While welding, it reads the dynamic amp output of the machine.
5. **2T/4T Torch Trigger Selector.** The torch trigger function is designed to operate with both MIG and TIG functions. To operate in 2T mode, the trigger on either the MIG or TIG torch should be simply held down. The 4T function operates as a torch "latch" in MIG mode that locks the MIG torch on without needing to hold the trigger. To operate 4T in the MIG mode, simply press the torch trigger and hold it down until the arc starts. To lock it on, release the trigger and weld without holding the trigger down. To stop, the trigger must be pressed again, and then released after 1-2 seconds. The 4T function in TIG mode acts similarly, but in conjunction with the up/ down slope timer. As the torch trigger is pressed for the second time, the trigger should be held in until the downslope timer completes its cycle. The trigger may then be released to end the arc. The unit should always be set in 2T mode for use with the foot pedal. The slope settings should be turned all the way down while using the foot pedal.
6. **Process Selector.** For the 250S, press to select TIG, Stick, MIG, Synergic MIG, Spool Gun, or Synergic Spool Gun operation. For the 200, use to select for TIG, Stick, MIG, or Spool gun operation.
7. **Gas/Slope Selector:** This isolates and selects the parameter that is to be adjusted by the corresponding control knob. (Two of the three control knobs serve to adjust more than one function). Gas pre-flow and post flow may be adjusted for MIG and TIG to allow for better shielding during starts and stops. Gas flow will delay starts when the trigger is pressed until the time selected for the gas to flow has been satisfied. Up and Down slope may be adjusted for TIG. This sets the parameters that work in conjunction with the 2t/4t feature. Make sure that up/down slope is turned to the minimum setting if using the foot pedal as it will conflict with foot pedal operation.
8. **Wave Form Control.** Varies the current rise time during short circuit MIG operation. This affects the actual point where the current has risen sufficiently to burn back the wire after the wire has "short circuited". The point at which it has burned back is considered the "pinch point". This is where the wire will begin to once again melt and transfer. To put it in more practical terms, the user will see that the wire is sticking out longer or shorter from the MIG torch before it burns away, depending upon the exact setting. This controls spatter, penetration and bead profile. When the wave form is changed from one extreme to the other, the operator will observe that the arc is more penetrating at one end or more fluid on the other end. Bead profile changes will occur as well. A stiffer arc will produce a deep but narrow profile. A fluid arc will produce a wider, shallower weld, usually with an improved bead appearance and less spatter. Wave form control is also known as inductance control, slope or arc force control (MIG). By changing the wave form, the user can achieve arc performance that is familiar to the operator. The arc

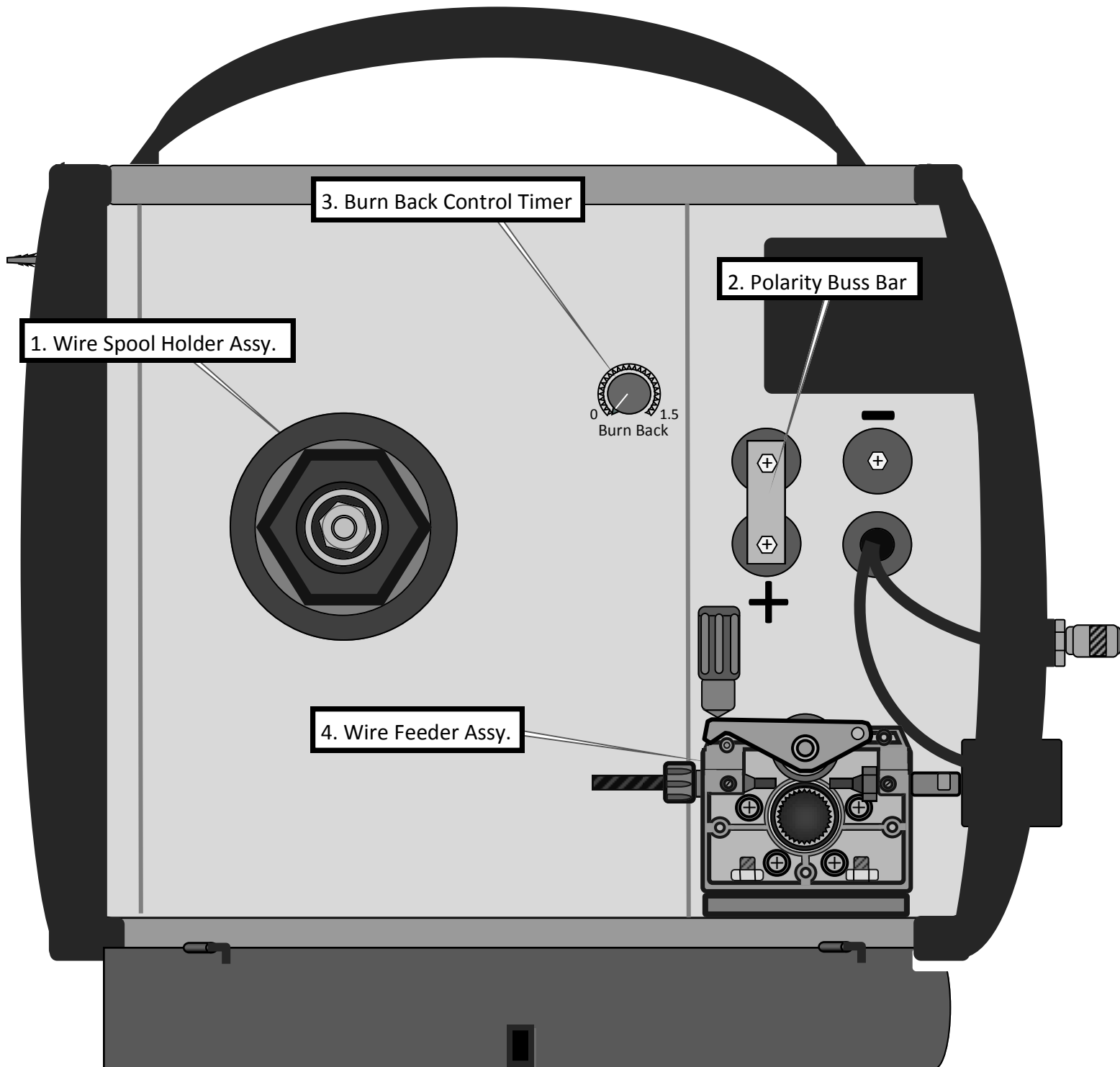
sound will change as the wave form is adjusted, going from a pitched whine to a frying sizzle. All brands with no wave form control have a fixed slope, though not all are set at the same level. A person using the MTS unit can achieve an arc that is very similar to what he/she is used to or use it to improve arc behavior.

9. **Wire Diameter Selector:** *This function applies only to the Synergic MIG function of the MTS 250S . Does not apply to the standard MTS 200.* Select your wire diameter according of the type wire you are using. Selecting the correct wire diameter is critical to optimum Synergic function of the welder, automatically compensating the voltage to keep pace with the change in wire speed. For full manual control of the welder allowing the welder to function in a normal mode, select MIG on the process selector. This will allow full and independent control of MIG wire speed and voltage.
10. **Wire Alloy Selector:** *This function applies only to the Synergic MIG function of the MTS 250S . Does not apply to the standard MTS 200.* Select your wire alloy type from the following: Mild Steel, Stainless, or Aluminum. Not all alloys may be suitable for welding in synergic mode. If a particular alloy class that is not listed on the panel of the welder is not optimized to weld in the synergic mode. Simply enter the standard mode. Then adjust the welder manually.
11. **Negative Polarity Connector (-).** Connect to the work clamp while in MIG/Stick mode. Connect to the TIG torch power cable with while in TIG mode.
12. **Control.** Plug the control wire from the torch switch directly into this receptacle. This allows the torch switch to initiate the arc through 2T or 4T mode. For foot pedal use with TIG the welder must be in 2T.
13. **Positive Polarity Connector (+).** Connects to Stick torch in Stick Mode. Connects to work clamp in TIG mode. Not used for MIG. On some models of the spool gun, the spool gun power cable will be directly plugged into this port.
14. **TIG Gas Connection.** The gas line from the TIG torch should be connected to control the gas flow while in TIG mode. This feature provides a solenoid controlled stop/start of gas flow while using the TIG torch eliminating the need for a manual gas flow valve mounted in the torch.
15. **Euro Quick Connect for MIG.** This style of connection makes the MTS unit compatible with many after market MIG torches/guns. Connect the MIG torch by aligning pins on the gun cable with the

receptacle and pushing in. Twist the collar on the cable connector to lock in place. Do not use pliers or other tools to tighten. Hand tighten only.

16. **MIG Volt/TIG Down Slope/ Stick Arc Force Control.** In each mode, the function of the control changes. In the regular MIG mode, the control is used to adjust the arc voltage. While in synergic MIG mode (250S Only ) it is linked directly to the amp control. Adjusting the amperage will increase or decrease the voltage automatically based off of the parameters selected on the panel, and the programming of the microprocessor of the welder. While in TIG mode, it functions to adjust the down slope of the arc current while the unit is used in 4T mode. In Stick mode, the control is used to vary the automatic arc force current response. When used for stick welding the arc force is also known as "dig". When welding in stick mode, the current is increased as the volts fall off due to a short arc length. This helps maintain the arc by providing more wattage, keeping the electrode from sticking.
17. **Amp/Wire Speed Control.** For Stick and TIG function, this adjusts the welding amps. During synergic MIG or Synergic Spool Gun operation (250S only) the voltage is adjusted automatically by increasing or decreasing the wire speed control. To adjust wire speed with the spool gun, use the control knob on the handle of the spool gun. For standard MIG operation, the amps are controlled by the wire feed speed. Increasing the wire feed speed increases the amps. This is a normal part of any true MIG CV (constant voltage) welding process. While the unit displays in in/min (or m/min) for MIG operation, a change in this control also results in a change of amps. On the MTS 200, there is no synergic setting and this control always maintains independent, manual control over the parameters.

**NOTE:** While in the synergic MIG mode, the unit will display in amps, and not actual wire speed. In normal MIG mode, the unit will display in inches per minute (wire feed speed). While actively welding in both modes the unit will display in actual amps output.

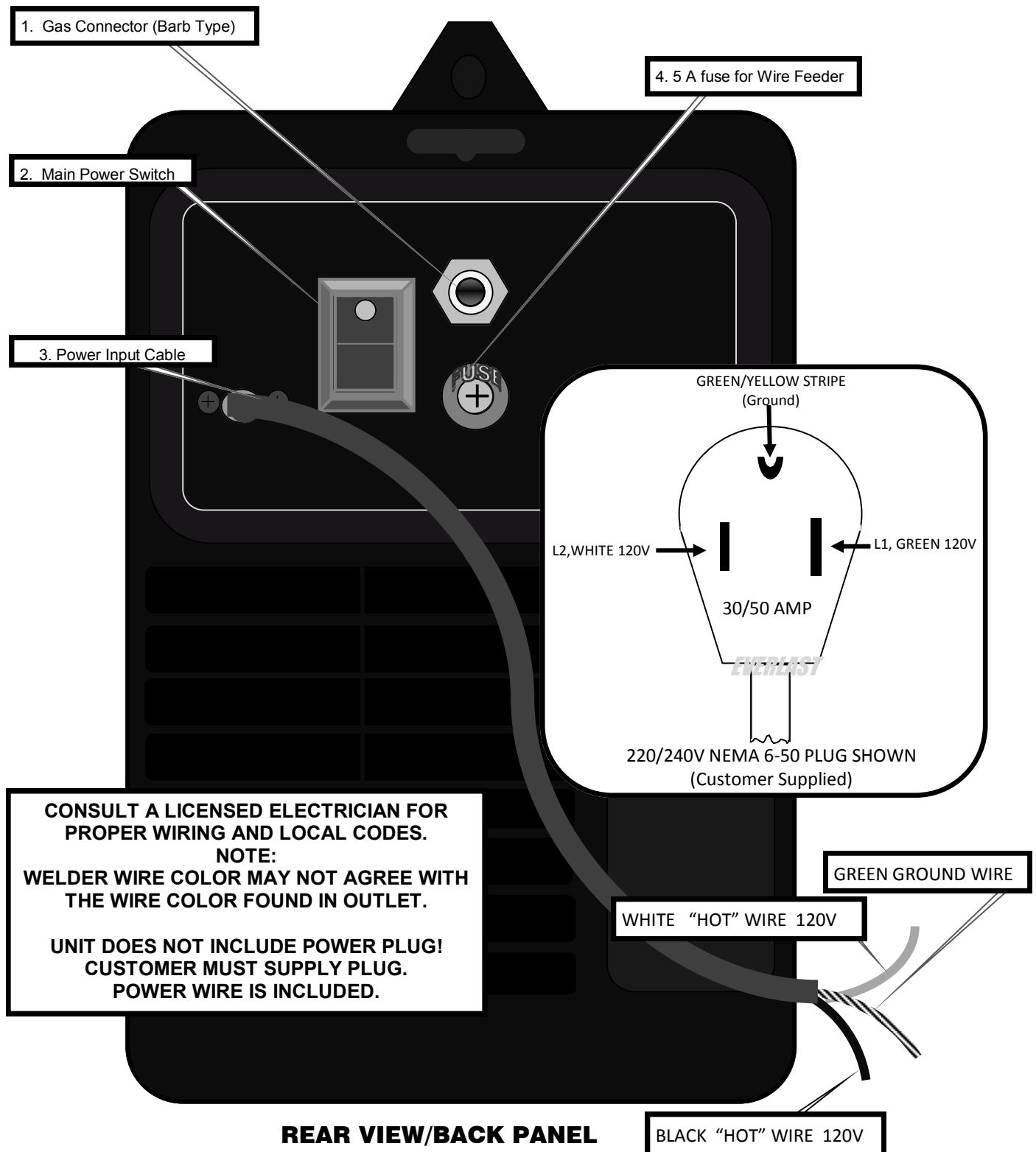
**SIDE VIEW MTS 200 and 250S**

*Side Panel:*

1. **Wire Spool Carrier Assembly.** See page 29 for the detailed view. Make note of the correct assembly order of the rubber tension washers and spring. *The order in which they are assembled is important to be able to provide enough resistance to prevent de-spooling of the wire.* When inserting the spool, make sure the small tab on the inside of the spool holder is located in one of the recesses made into the spool, if any. Tighten the outer hand nut after installing the wire spool so that the wire will not continue to keep rolling after wire has stopped feeding. Do not over tighten so that the drive rolls slip or the feeder strains to pull the wire due to excessive resistance. The tensioner assembly can accommodate either 8" spools of wire. However, a simple center adapter may be easily fabricated to accommodate the smaller 4" diameter roll.
2. **Polarity Buss Bar.** Note the "+" and "-" symbols located on the inside of the unit next to the buss bar terminals. To change the polarity of the MIG torch, simply loosen the middle screw and remove the top and bottom screws on the terminals. By pivoting the buss bar on the center, loosened screw, swing the buss bar into position over the desired polarity. Re-install the screws, lining up the holes in the buss bar with the terminal. Tighten all buss bar screws. Always remember to alter your work clamp to reflect the polarity change. If the terminal buss bar is oriented to negative, then the work clamp should be in the "+" positive output terminal. ***Standard polarity for MIG is "+" (DCEP) with the work clamp in the (-) negative output terminal. (Also known as reverse polarity). For flux core use see the wire manufacturer's direction for polarity recommendation. See TABLE 1 for complete recommendations.***
3. **Burn Back Timer Control.** The burn-back control helps to prevent too much stick out when stopping and restarting a weld, by keeping the arc energized for a short time after the wire feeder stops feeding and while the gas is post flowing. The wire will burn back to the length desired by adjusting the control. This improves re-starts and keeps the user from having to re-trim the wire between welds. Too much burn back will cause the wire to seize to the tip.
4. **Wire Feed Assembly.** Note the numbers on

the side of the tensioner. These numbers are a reference point to help properly tension the wire so that the drive roller will not slip. Do not over-tension the wire because it can create a condition known as birds nesting, where the wire will tangle up around the feeder and will not slip if wire burns back into tip, stuck fast in weld or other resistance is met. This will continue wrap the wire around the drive mechanism or jam wire inside the gun liner until trigger is released. Considerable effort is usually needed to clear out a bird's nest condition. Too little tension will result in wire slipping and fast wear on the drive components. Note that while welding aluminum, the tension is absolutely critical. Do not deform the wire. Use 50XX series wire for Aluminum, with a minimum diameter of .045" along with a Teflon line for best results if feeding from the main gun. Test the tension of the wire and inspect for proper feeding before beginning a weld. Occasional cleaning of the feeder mechanism is necessary to prevent wear and damage to the feeder and to the MIG gun liner. Regularly monitor any metal flaking and dirt build up that may occur. Clean it away gently with compressed air as necessary. Use proper safety attire while doing this, i.e. glasses, gloves etc to prevent injury. Do not use cleaners or solvents. Felt wire lubricators may be bought and used to keep feeding cleanly while using steel or stainless wire. You may purchase additional drive roll sizes from Everlast, but the standard drive roll will work with a wide range of wire sizes for steel and stainless wire. Each groove will hold two sizes of wire. For example the standard roll supplied with the welder has a .8 mm groove and a 1.0 mm groove. This allows for .030" and .035" wire to be used in the smaller groove. The larger groove allows .040" and .045" wire to be used. Do not forget to change contact tip size when going to another wire diameter. Depending upon the size wire used, the liner from the MIG gun may need to be changed to work properly.

**NOTE:** If erratic feeding is experienced, check wire feed tensioner, Spool Tension (rolling resistance) and for correct size groove. Also make sure the wire is riding in the groove and not on the shoulder of the lower drive roll.



*Rear Panel:*

1. **Gas Supply.** Connect the Gas regulator hose to this point via the brass barb fitting. (Regulator is customer supplied and not provided as standard equipment at time of publication.) The hose barb connection must be tight to prevent gas leakage. Install extra clamp if needed to prevent gas from escaping.
2. **Power Switch.** Turns unit on or off.
3. **Power Input Cable.** The MTS requires a 220/240 V single phase 50/60 Hz power input. Do not attempt to hook to any other power configuration. See page 22 and side note for proper wiring instructions. If used on a generator, the generator must be labeled as “clean power” and provide a sine wave with less than 10% variation. Consult your generator manufacturer for a “clean power” rating..
4. **Fuse.** This fuse controls the wire feeder. If it is blown it will not feed the wire, but gun will still be live when trigger is pressed. A fuse may blow over time, but it is generally a result of too much wire tension resulting in overload of the feeder.

## SYNERGIC AND BASIC MIG OPERATION

### Synergic vs. Manual Setup and Operation

#### How Synergic MIG operates:

The Synergic function of the PowerMTS 250S allows the user to automatically raise or lower the voltage by using only the amp /wire speed control. This function is based off a microprocessor controlled program that uses the operator's input of wire diameter and filler metal type. Increasing or decreasing wire speed simultaneously adjusts the voltage. Even in the Synergic mode, the user can make manual adjustments to the voltage to fine tune the programming if he chooses by turning the voltage knob up or down after adjusting the amps. If the voltage is readjusted after overriding the wire speed, the unit remains in the synergic mode and wire speed is once again adjusted automatically. However, the new ratio of volts and wire speed created by manual readjustment of the wire speed while in the synergic mode will be automatically be saved. It will be remembered and used by the micro processor in subsequent voltage adjustments during the synergic welding session. The unit will return to the factory default programming when the welder is cycled on and off or the process is changed. The welder may be used in a non synergic MIG mode, with independent control of the wire feed speed by simply selecting the MIG process. Settings will not be saved when the unit cycles off and back on and will restore factory settings unless a program has been saved. If you are going to use Flux Core, special flux core drive rolls must be used that have a knurled surface to properly feed the wire. The Synergic function is not optimized to weld with flux core (gasless or dual shield) wire. To use flux core or a dual shielded wire, with the 250S, you must select the MIG function to disengage the feature and manually configure the welder. Also please note that polarity with flux core wire varies.

#### How to setup the Synergic and Manual functions:

1. Turn unit on. Wait for it to go through the power up cycle. (MTS 200, 250S)
2. Select the MIG icon with the Process Selector button.



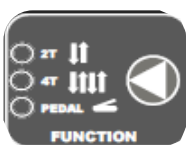
3. Select the wire diameter of the wire being used. (MTS 250S).



4. Select the filler wire type. Fe= Steel, Al= Aluminum, Ss= Stainless Steel. (MTS 250S)



5. Select 2T or 4T function. 2T is simply press and hold the torch trigger to start and activate the torch. 4T requires the trigger to be pressed to start the arc. Once started, the trigger should be released to weld. The trigger should once again be pressed, held briefly and then released to terminate the arc when ready. (MTS 200 and 250S)





6. If the MTS 250S is used in the manual mode (MIG), or you are welding with the MTS 200 select the appropriate wire feed speed (amp) and voltage to match wire type, and size. Listen for a steady frying sound while welding to give you a key as to when it is adjusted properly. If used while in Synergic mode, select the desired wire speed, and the voltage will adjust automatically. If a minor voltage adjustment is felt like it is needed while in the synergic mode, simply turn the voltage knob to increase the voltage from the automatically selected setting. If more wire feed speed is desired, the unit will default back to the automatic setting mode as the wire feed speed is increased or decreased. The unit will remember the new ratio of amps to volts created by the manual adjustment made during the welding session. Manual control can be asserted over the automatic setting by simply turning the voltage knob during any stage of synergic operation.

**Note the recommended gas choice for proper MIG operation in the Synergic mode located in table 2. Other gas mixes may not offer ideal adjustment while in the Synergic mode.**

7. Use the Wave Form control to select the desired arc qualities, and adjust the arc qualities, whether a stiff, penetrating arc with a narrow bead profile and slightly more spatter, or a wider, more fluid puddle that easily wets in with low amounts of spatter. Overhead welding usually requires a more stiff penetrating arc. Flat welding will accept a wider, more fluid puddle.

#### **Synergic Operation Note: 250S only**

Noticeable differences in operation of the synergic setting are possible when MIG gas mix percentages (%) are changed. The unit programming is optimized for a standard gas mixture. If use of a particular gas mix results in undesirable parameters while using the synergic setting, simply override the synergic control by adjusting the voltage knob while in the synergic mode. The welder will remember this program override during the current welding session and reprogram itself to compensate for this change. The reset ratio of volts to amps will be maintained during the current the session. If you leave the MIG mode or cycle the power on the machine, this ratio will be lost. If you desire to save a particular change or parameter, this can be best be done through the use of the memory setting. Also keep in mind that the wave form control can affect desirable operation while in the synergic mode. If you feel you are achieving poor results throughout the adjustment range and have tried to override the setting with poor results, make adjustments in the wave form to improve the arc characteristics of the weld. Keep in mind that the synergic function is designed as a starting point and will generally give you a useable setting. It cannot however accommodate every variable. Individual technique, environmental conditions, and even metal temperature can affect the suitability of these settings. That is why the unit allows you to fine tune the setting at any time while the synergic mode is engaged.

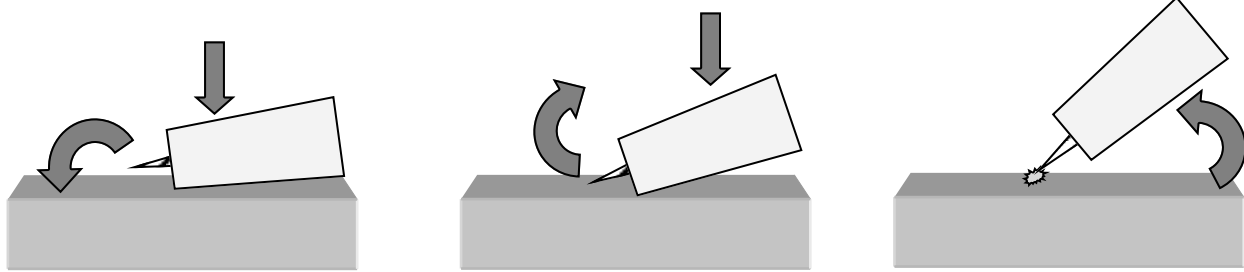
#### **Special technical note:**

The design of the MIG torch uses a electrical-ly conductive nozzle. This means that if the nozzle is touched to the metal, it can arc across the nozzle instead of the contact tip in some instances, especially on starts. If you experience an overcurrent when you try to start to weld and you get an over current light and the unit quits welding but continues to feed wire as soon as you pull the trigger, it is likely you have encountered one of two possible situations:

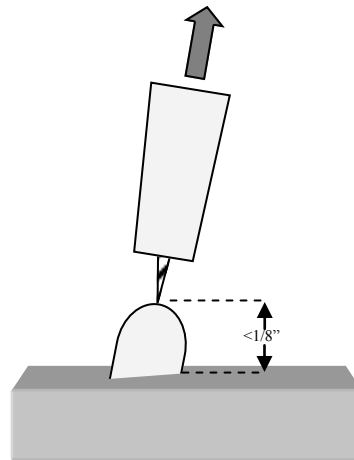
- 1) The nozzle is shorted to the work at the time you press the trigger. This will cause a sudden surge in current which will trigger the O.C. condition.
- 2) You have not properly trimmed your wire before starting or have not adjusted the burn back control properly so that the end of the wire has been left too long or with too big of ball. Leaving too much wire stick out will cause you to start the weld with the wire touching the metal. This too will cause a short circuit condition at startup occasionally. If this happens, adjust your burn back control or clip the wire so that no more than 1/8" is sticking out when the weld is being started.

Make sure you are maintaining proper technique to prevent this from happening. You may have the wire feed turned up too high at the start and the near instantaneous rush of current may be causing the wire to stick.

## LIFT START TIG OPERATION



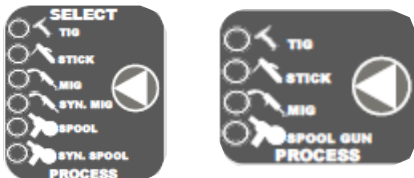
1. Position the edge of the ceramic cup on the metal.
2. Quickly rotate cup so that the tungsten comes in contact with the metal.
3. After contact with the metal, quickly rock the torch back so that the tungsten breaks contact with the metal.



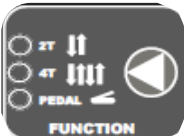
4. An arc should form. As the arc grows raise the cup up off the metal and slowly rotate the torch into welding position.
5. Leave 1/8" or less gap between the tungsten tip and the metal.

### General Operation of Lift Start TIG with torch switch of foot pedal

1. Turn unit on, allow time for power up cycle to complete its start up process.
2. Press process selection button until the TIG Icon LED is lit.



3. Select 2T, 4T or Pedal mode. 2T/4 affects torch switch operation. Pedal mode allows amp setting on the panel.



4. If using 2T/4T mode, select up/down slope time by rotating the left knob to increase/decrease default time. If using pedal mode turn slope or reduce to minimum value. Adjust Pre-Flow and Post flow. Remember: Pre-flow time will delay arc starting.



5. Adjust amps with amp control knob located in the center.
6. Start arc as depicted at the top of the previous page.
7. If using 2T, continue to hold the torch switch until you are ready to stop welding. Release switch. Arc will then cease.
8. If using 4T, release switch, after arc initiates. Continue to weld without holding the switch down. When you are ready to stop welding, press the switch again, and hold. Down slope will begin. Release switch when down slope is finished.
9. If you desire to use the foot pedal, make sure foot pedal is plugged in and the Pedal function is selected. Select Pre/Post Flow time. Turn down/off Up and Down slope functions to minimum setting. Position torch as shown in step 1 on previous page. Press pedal. Wait for preflow to engage and touch tungsten to metal as shown. Follow the rest of the steps depicted on the previous page. Once an arc is established, begin to raise the amperage by pressing down on the pedal. Failing to lower the up slope or down slope to a minimum setting may cause undesirable operation of the foot pedal. Also realize that if an excessive preflow time is set, it may delay starting. Usually .5 to 1 second of preflow is all that is necessary for a smooth, quick start.

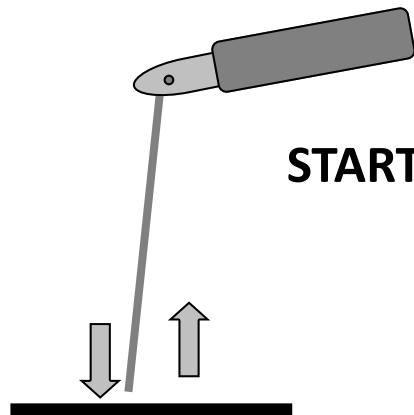
**NOTE: DC TIG is not generally considered capable of welding Aluminum. The MTS units are DC only and do not have AC capability. If you desire to weld Aluminum, please purchase a spool gun to weld aluminum with the MIG process. The spool gun is fast and is an economical solution. However, keep in mind that you must use pure Argon for this process and that it is not well suited to welding thin gauge aluminum less than 1/16". It is ideally suited for rapid welding of 1/8" material or more.**

**NOTE: Welding Aluminum**

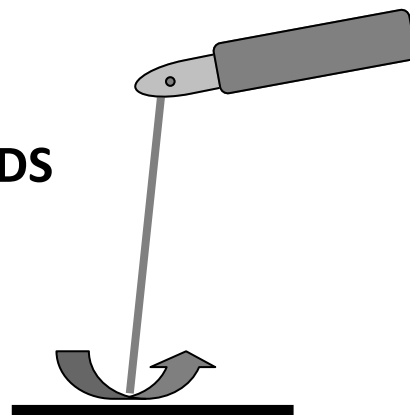
DC TIG is not generally considered practical to weld Aluminum. The MTS units are DC only and do not have AC TIG capability. However, Aluminum welding may be performed with the MIG process with pure Argon gas. It is recommended that a spool gun (optional) be used in lieu of the MIG gun. The spool gun provides better feeding, and uses small 4" rolls of aluminum which are more inexpensive to buy than larger rolls. A spool gun is also ideal for feeding 4" rolls of stainless wire. If feeding aluminum wire through the main feeder and gun, the recommended minimum wire size is .045" and a 5XXX series is recommended. A Teflon liner (available from MIG gun manufacturer.) for the main gun, and a U groove drive roll (optional) must be used if feeding through

## STICK OPERATION

## STARTING METHODS



Tapping Method



Scratch/Match Method

1. Turn on unit. Allow unit to cycle through its start up program.
2. Select the Stick icon on the Process Selector.



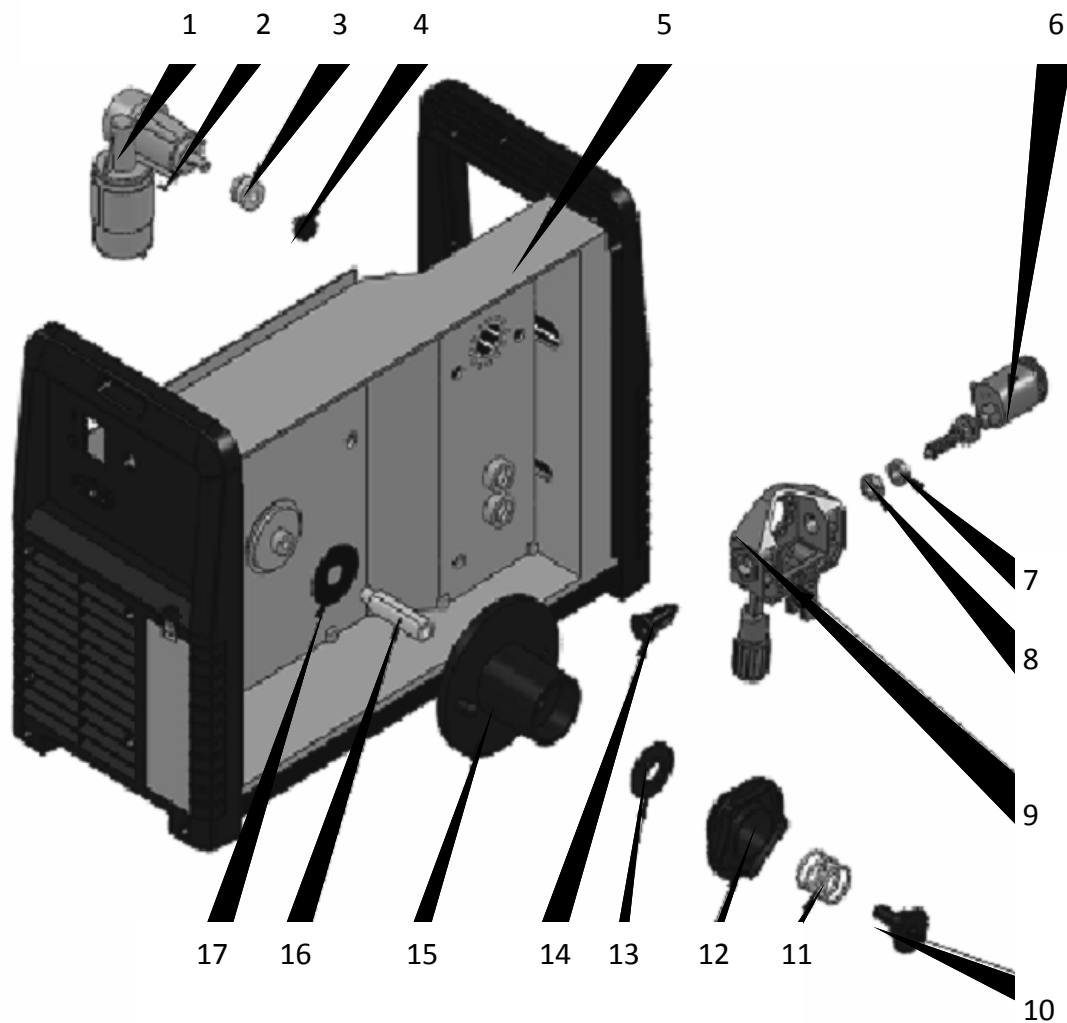
3. Make sure electrode holder is in the Positive side and the work clamp is in the negative connector.
4. Select the Amp level desired. Use table 5 to determine approximate amps suitable for the rod size selected. Consult the welding electrode manufacturer's recommendation as well for proper amperage. No voltage adjustment is available.
5. Use the arc force control to select the desired arc characteristics, creating the desired arc characteristic and amp response needed to maintain the arc. Cellulose electrodes may not have the same arc force behavior as other welding electrodes, but each brand and size will weld a little differently. The arc force control setting will vary from person to person as well, with different rod angles, positions, and arc lengths all factoring into the arc force control performance. If you are new to using a transformer welder, there are some aspects that will seem different. One of the main ones is that the arc is better controlled in most situations by "pushing in" when the arc seems to get weak or unstable and the arc force will kick in as the voltage drops. Holding too long of an arc will signal the inverter to shut down and quit welding. This threshold is shorter than most transformers, and an extremely long arc cannot be maintained. However, with a little practice, the advantages of an inverter become clear.
6. Strike the arc with either the tapping method or the match strike method. Beginners usually find that the match strike method yields best results.

## SECTION 2

## SETUP GUIDE AND COMPONENT IDENTIFICATION

### EXPANDED VIEW OF MAJOR MIG DRIVE COMPONENTS\*

\*Some non-significant variation may occur in component details. Not all components are individually serviceable, and are added for detail and explanation of assembly



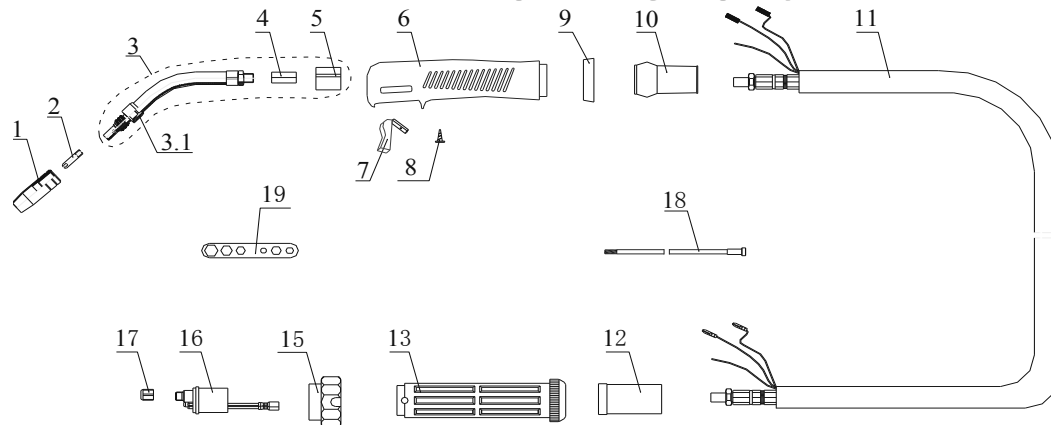
| NO. | Parts           | Qty |
|-----|-----------------|-----|
| 1   | Wire feed motor | 1   |
| 2   | Key             | 1   |
| 3   | Feed roller     | 1   |
| 4   | Locking screw   | 1   |
| 5   | Machine         | 1   |
| 6   | Connector       | 1   |
| 7   | Screw thimble   | 1   |
| 8   | Screw nut       | 1   |
| 9   | Feed strut      | 1   |

| NO. | Parts                | Qty |
|-----|----------------------|-----|
| 10  | Locking thumb screw  | 1   |
| 11  | Tensioning Spring    | 1   |
| 12  | Reel Retaining cover | 1   |
| 13  | Friction 7 washer    | 1   |
| 14  | Wire guide tube      | 1   |
| 15  | Wire reel shaft      | 1   |
| 16  | Shaft core           | 1   |
| 17  | Washer               | 1   |

## SECTION 2

## SETUP GUIDE AND COMPONENT IDENTIFICATION

### EXPANDED VIEW OF MIG TORCH



| NO. | PARTS                                      | QTY |
|-----|--|-----|
| 1   | Diffuser D.12 14-15AK                      | 1   |
| 2   | Contact Tip 0.8/M6*25                      | 1   |
| 3   | 15AK Goose gun neck assy.                  | 1   |
| 4   | Adapter for goose neck                     | 1   |
| 5   | Plastic adapter                            | 1   |
| 6   | MIG gun handle                             | 1   |
| 7   | Torch switch 21.8mm                        | 1   |
| 8   | Screw D.3*10                               | 3   |
| 9   | Handle locking ring                        | 1   |
| 10  | Articulating joint 15AK                    | 1   |
| 11  | Coaxial cable assy /16mmq/3m               | 1   |
| 12  | Cable thimble 12-16-25 MMQ                 | 1   |
| 13  | CO <sub>2</sub> Euro-rear connector handle | 1   |
| 14  | Retaining Screw M4*6 UNI 6107              | 1   |
| 15  | Knurled locking nut                        | 1   |
| 16  | Euro-main connector                        | 1   |
| 17  | Securing nut for gas input                 | 1   |
| 18  | Insulating feed pipe 0.6-0.8 3m, Blue      | 1   |
| 19  | Contact Tip Wrench                         | 1   |

**NOTE:** Some components may appear slightly different as design/supplier changes are made from time to time. At time of publication, the standard torch provided with MTS 200 is the Trafimet Ergoplus 15. The 250S uses either a Trafimet Ergoplus 24 or 25. The widely used Euro-connector on the MTS series MIG torches allows the customer to select and install about any brand after-market torch desired.

#### TO INSTALL MIG GUN/TORCH:

- Align pins on #16 with the feeder receptacle.
  - Fully engage the connector into the receptacle.
  - Twist knurled nut (#15) on connector until the nut is snug.
- DO NOT OVERTIGHTEN! USE HAND PRESSURE ONLY.**

**NOTE:** Over time, pressure on the drive rolls causes metal fragments from the filler wire's surface to find its way to the gun cable liner. If the wire guide is not cleaned, it can gradually clog up and causes wire feed malfunctions. If feeding difficulty is observed, clean the liner in the following manner:

- Remove the welding gun's gas nozzle, contact tip and contact tip's adapter.
- With an air nozzle below compressed air through the wire guide. Wear eye protection!
- Blow out the wire feed mechanism and reel housing with dry compressed air.
- Reassemble components. Tighten the contact tip and contact tip's adapter to spanner tightness.

**The MIG torch liner may eventually become worn and will need to be replaced. When welding aluminum, a Teflon liner must be used, necessitating a liner change. A spool gun is the preferred method to weld Al. To change the liner:**

- Remove the securing nut of the liner (#17) which exposes the end of the wire guide.
- Straighten the gun cable and withdraw the liner from the gun.
- Carefully push a new wire guide in to the gun. Make sure that the wire guide travels all the way to the contact tip.
- Make sure the O-ring at the machine-end of the gun is installed
- Tighten the wire guide in place.
- Cut the liner 2mm from the mounting nut and file the sharp edge of the liner.
- Reattach the gun and tighten all parts.
- Re-thread wire.

This diagram illustrates the exploded view of a medical device assembly, showing the following components:

- 1**: A small connector or plug.
- 2**: A small connector or plug.
- 3**: A main connector or plug.
- 4**: A small connector or plug.
- 5**: A small connector or plug.
- 6**: A small connector or plug.
- 7**: A small connector or plug.
- 8**: A cable or wire.
- 9**: A cable or wire.
- 10**: A cable or wire.
- 11**: A cable or wire.
- 12**: A cable or wire.
- 13**: A cable or wire.
- 14**: A cable or wire.
- 15**: A cable or wire.

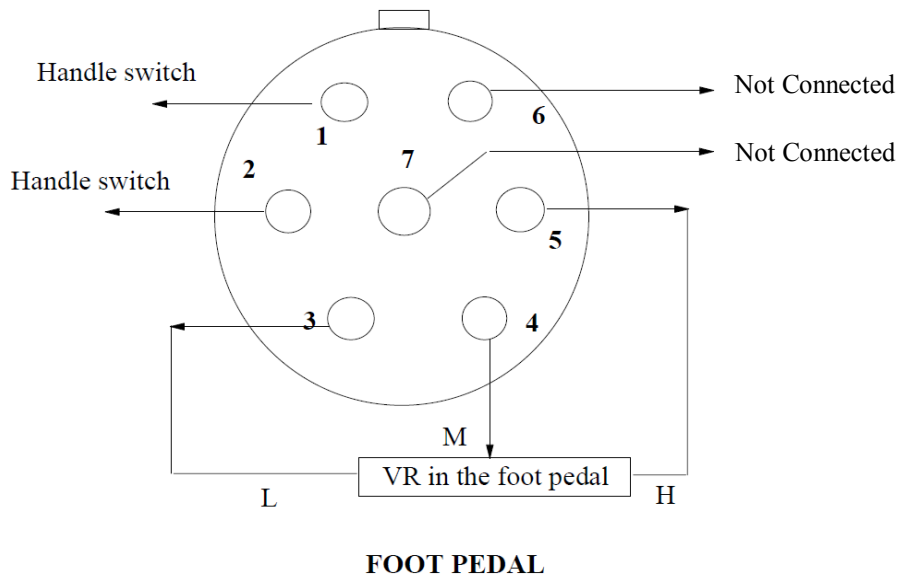
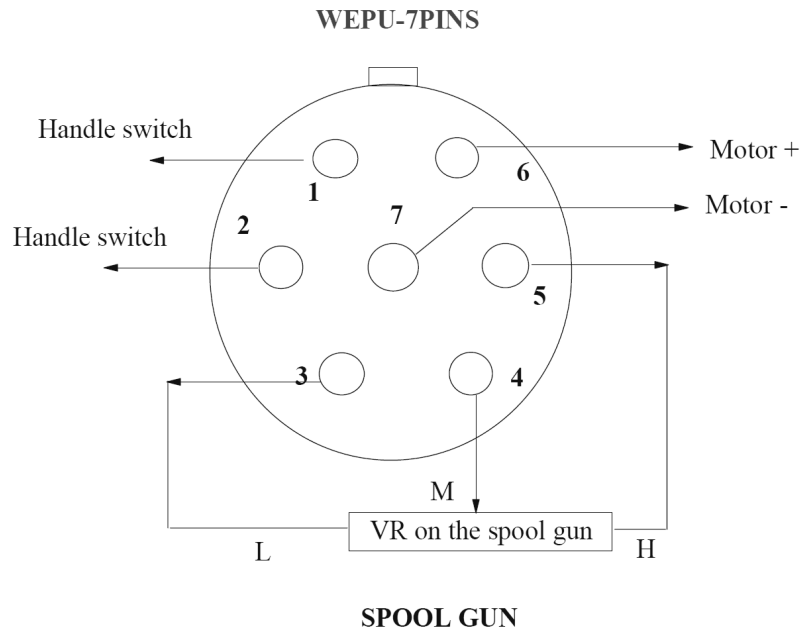
| NO. | PARTS FOR SR 17 TORCH (STYLE MAY VARY)                             | QTY. |
|-----|--|------|
| 1   | Long Back Cap with O-Ring  | 1    |
| 2   | Short Back Cap   | Opt. |
| 3   | Torch Head   | 1    |
| 4   | Insulator  | 1    |
| 5   | Collet 1/16 or 3/32  | 1    |
| 6   | Collet Holder  | 1    |
| 7   | Ceramic Cup #5,6, or 7   | 1    |
| 8   | Tungsten (customer supplied)                                       | 0    |
| 9   | Torch Cable  | 1    |
| 10  | Torch Handle (Blue ergo handle std, not pictured)                  | 1    |
| 11  | Torch Switch (Built into ergo handle, separate on straight handle) | 1    |
| 12  | Torch Switch Connector   | 1    |
| 13  | 9mm (1/8") b quick connect coupling (male)                         | 1    |
| 14  | Power Connector  | 1    |
| 15  | Protective Synthetic Rubber Cover                                  | 1    |

TABLE 6

| NO. | Trouble  |                         | Possible Cause   | Solution  |
|-----|--|-------------------------|--|---|
| 1   | Unit is switched on, but the power light isn't on              |                         | Switch damaged   | Replace   |
|     |  |                         | Fuse damaged   | Replace   |
|     |  |                         | Power damaged  | Replace   |
| 2   | After welding machine is overheating and the fan does not work |                         | Fan damaged  | Change it   |
|     |  |                         | Fan power connector is loose                           | Tighten wires, check for dislodged connectors   |
| 3   | When torch switch is pressed, no gas glows                     |                         | No gas in the gas cylinder                             | Replace   |
|     |  |                         | Gas pipe leaks gas                                     | Resolve   |
|     |  |                         | Gas solenoid valve damaged                             | Check and clean/replace   |
|     |  |                         | Torch switch damaged                                   | Repair or Replace   |
|     |  |                         | Control circuit damaged                                | Inspect the circuit   |
| 4   | Wire-feeder does not work                                      | Wire reel does not turn | Motor damaged/Fuse blown                               | Check and Replace   |
|     |  | Wire reel does not turn | Control circuit damaged                                | Check the board   |
|     |  | Wire reel turns         | The tensioner is loose or wire slips on rollers        | Increase tension  |
|     |  |                         | The drive roller doesn't fit the diameter of weld wire | Change roller or wire size to match   |
|     |  |                         | Wire Spool is damaged                                  | Change out wire spool   |
|     |  |                         | Gun liner is jammed                                    | Repair or change it, clear wire from liner/ clean liner with compressed air   |
|     |  |                         | Contact Tip is jammed because of slag or burn back     | Clean or replace. If with Aluminum, increase tip size to next size.   |
| 5   | No arc, or no output voltage                                   |                         | Work clamp engaged in wrong connector                  | Change polarity   |
|     |  |                         | Control circuit damaged                                | Check the circuit   |
| 6   | Welding stops, and warning light is on                         |                         | Self-protection has engaged                            | Check over-voltage, over-current, over-temperature, lower-voltage and over-temperature. Allow unit to cool if overheated. Check power plug for problems |
| 7   | Welding Voltage/Current is uncontrollable                      |                         | Potentiometer damaged                                  | Repair or Replace it  |
|     |  |                         | The control circuit damaged                            | Check the circuit   |
| 8   | The Up/Down Slope cannot be adjusted                           |                         | Main PCB damaged                                       | Repair or replace PCB   |
| 9   | No post-gas  |                         | Main PCB damaged                                       | Repair or replace PCB   |



# APPENDIX A: PLUG SCHEMATIC



## GENERAL NOTES:

1. While welding aluminum with the Spool gun or MIG gun you must use 100% argon. You cannot use a mix as you would with steel or stainless.
2. While welding aluminum with the Spool gun or MIG gun you must use the next size up tip or a special oversize tip for the wire because the heat will cause the aluminum wire to swell and it will either drag or seize in the tip.
3. While welding aluminum with the MIG process, best results are achieved by using a dedicated stainless steel brush to remove the oxide layer and acetone or aluminum cleaner before welding. Even though aluminum may appear shiny and clean, it still has an oxide layer, and a thin layer of oil left over from the manufacturing process. Some soot will appear in most MIG welds but if a lot is noticed, you have either contaminated metal, or insufficient gas flow. You can also induce turbulence by having too much of a torch angle. Start with a 90 degree angle and then lean the gun slightly (about 15 degrees) to the "push" position.
4. Welding aluminum is not a short circuit process. It is a spray transfer process. Spray transfer is a process that can be used to weld many metals, but in Aluminum it must be used to weld correctly. In spray transfer, the wire does not short out against the weld material. Instead a steady "spray" of droplets of molten metal pinches off before the wire can contact the material. It is a much quieter process. If you are not familiar with the spray transfer process, please research it before you try it. If you incorrectly adjust the welder while welding aluminum in the MIG process, you will burn up contact tips almost instantly.
5. If you are trying to weld Aluminum with .025 wire or smaller, you may not achieve adequate results because of the higher wire feed speeds needed. Try stepping up to the next wire size and wire feed speed rates will drop.
6. In stick mode, you may not achieve desirable results with cellulose based E 6010 electrodes (depending upon brand/type) but the welder should easily weld with a similar rod, the cellulose based E 6011.
7. While using the foot pedal for TIG, you will have the full range of amps up to the maximum amperage at all times available. The panel amp knob will not limit the amps.
8. If you notice a flare of the arc at the end of the weld or at the beginning of the weld while using the foot pedal, turn the up and down slope features to the minimum setting.
9. The memory function is limited to a total of 9 possible saved programs, regardless of the process. Any process and its settings can be saved to the 9 program channels.
10. When using the optional spool gun, the amp/wire speed control is located on the handle and serves for both synergic and manual adjustment modes. For synergic operation, the voltage readjustment feature must still be accomplished manually on the welder.