

PowerMTS 400

Safety, Setup and General Use Guide For The PowerMTS 400



FUNCTION: MIG/DC Stick/DC TIG Welder
PURCHASE DATE:
MODEL NAME:
SERIAL NUMBER:
OPTIONAL ACCESSORY SERIAL NUMBER:

**240V 1Ph
480V 3Ph**

Operator's Manual



Welders, Plasma Cutters, Multi-Process

www.everlastwelders.com
Need Parts? Need Technical Help? Call: 1-877-755-9353

380 Swift Ave. Unit 12 South San Francisco, CA 94080, USA

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NOTICE:

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

WARNING!

California Proposition 65 Warning:

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

 Warning: Cancer and/or Reproductive Harm

www.P65warnings.ca.gov

THANK YOU! We appreciate you as a valued customer and hope that you will enjoy years of use from your welder. We work to please the customer by providing a well supported, quality product. ***To make sure that you receive the best quality ownership experience, please see below for important information and time sensitive details.***

What to do right now:

1. Print your receipt from your confirmation email that should have been sent to you after your purchase and put it up for safe keeping. If you do not have one, contact us at 1-877-755-9353 (US customers) or 1-905-570-1818 (Canadian Customers). You will need this if anything should ever happen for original owner verification (if bought as a gift, original receipt will still be needed, or explanation sent to Everlast).
2. Read this manual! A large number of tech and service calls are a result of not reading the manual from start to finish. Do not just scan or casually peruse this manual. There are different features and functions that you may not be familiar with, or that may operate differently than you expect. Even if you have expertise in the field of welding, you should not assume this unit operates like other brands or models you have used.
3. Carefully unpack and inspect all items immediately. Look for missing or damaged items. Please report any issues within 48 hours (72 hours on weekend or holidays) of receiving your product,. Take pictures if you are able and contact us at 1-877-755-9353, ext. 207 if any issue is discovered between 9 am and 5 pm Eastern Time M-F (US customers) or at 1-905-570-1818 (Canadian Customers) between 9am and 4 pm weekdays except on Fridays when hours are from 9 am to 12pm Eastern. If outside of the US or Canada, contact your in-country/or regional distributor direct at their service number.

What to do within the next 2-3 days:

1. Make sure your electrical system is up to date and capable of handling the inrush and rated current of the unit. Consult and use a licensed and knowledgeable electrician. If you have downloaded this manual in expectation of delivery, get started now.
2. Make sure this machine is plugged in, turned on, and tested with every process and major feature, checking for proper function. You have a 30 day period to test and thoroughly check out the operation of this unit under our 30 day satisfaction period. If something is wrong, this policy covers shipping on the unit (30 day satisfaction policy applies to the USA only for the 48 lower states and D.C., territories and provinces are excluded) or any incidental parts that may be needed to resolve any issue. After this 30 day period, if you find something wrong with the unit, you will not receive the benefit of free shipping back and forth to resolve this issue. Your unit is still covered under the 5 year parts/labor warranty, but shipping is covered by the customer after the 30 day period is over. The first 30 days of operation with any electronic item is the most critical and if any issue will happen, it will often happen during this time. This is why it is very important that you put this unit to work as soon as possible. Any issue should be reported within 48 hours (72 if on the weekend or holiday). Everlast will not be liable for any shipping after that time.

What to do within the next 30 days:

Visit our website (US customers). Go to www.everlastwelders.com. Navigate to the resources tab and to the "product registration" page to register your product. While keeping your receipt/proof of purchase is still required for verification of ownership, registering will help us keep your details straight and establish a chain of ownership. Don't worry, though, your warranty is still valid if you can't do this. Remember: Always keep your receipt even if you register. You may want to staple a copy to your manual.

What to do if you have a warranty issue or problem with the unit:

1. Unplug the unit. (Also do this before any maintenance or cleaning is done.)
2. Do not attempt a self-repair until authorized by an Everlast representative. This does not include performing routine maintenance such as point gap adjustments or regular internal cleaning. Any third party repairs are not covered under warranty, and can further damage your unit.
3. Within 24-48hours, (or by the next working business day) you must contact U.S. tech support at 1-877-755-9353 ext 207 (U.S. hours are 9 am to 5pm Eastern for tech support and 9 am to 5 pm Pacific for the business/sales office). If you are in Canada contact 1-905-570-1818 (Canada hours are 9am to 4pm M-Th, 9am to 12pm Fri). Although phone contact is preferred to establish a warranty claim, you may send an email to tech@everlastwelders.com (US) or mike@everlastwelders.ca (Canada) along with your contact information and brief explanation of the issue and ask for a follow up call. If you contact us via phone, and you do not reach a live person, please leave a brief message with the nature of your problem and your contact information. You should expect a call back within 24 hours. It is also a good idea to follow up the message with an email.
4. Be prepared with as much information as possible when you talk with a tech advisor, including a details of the failure, settings, and application of the unit. ***NOTE: A Proof-Of-Purchase (receipt) is required before returning the unit for warranty or before warranty parts can be sent to you.***
5. Keep in mind that, you may be asked to check a few basic things. Before you call, having a screwdriver and volt/ohm meter at hand is a good idea and will save time. Many issues can be resolved over the phone. If the issue cannot be resolved over the phone/email, you may be given an option to return the unit, or have a part shipped to you, at Everlast's discretion. Keep in mind, you may be asked questions that seem basic, or elementary to your knowledge base. These are not meant to question your knowledge, but rather to make sure nothing is overlooked. However the tech chooses to proceed, please cooperate with the process, even if you think you know what the cause or issue is. You may be asked to check something or open the unit during the diagnosis. This does not void the warranty! Opening the unit is a part of routine maintenance and cleaning. This is an important step. The willingness of the customer to work with tech support can save lots of time and accelerate the warranty process. For

warranty to be honored, you will need to make sure that you follow these guidelines. *Units that are returned without an RMA (issued by the tech support department) may not be repaired under the warranty agreement and you may be charged for the repair and can result in a delayed repair as well.*

What to do if you need setup help, guidance, weld issue diagnosis or have general product compatibility questions.

Call us at 877-755-9353 ext. 204 for welding guidance and general welding issue diagnosis. Or email performance@everlastwelders.com with the basic issue you are having, along with your specific settings, and welding application.

Hey...wait, what is my warranty?

Warranties and service policies and procedures vary from country to country and are maintained and supported by the regional or in country distributor of Everlast welding equipment.

USA Customers Only: For full details on the 5 year parts and labor warranty, 30 day satisfaction policy, terms of sale, and how to proceed with a warranty claim, please visit: <https://www.everlastgenerators.com/standard-warranty>. Accessories are covered by a separate warranty and detailed information can also be found at the link above.

Canada Customers Only: For full details on the 3 year parts and labor warranty, terms of sale, and related policies and procedures, please visit: <https://www.everlastwelders.ca/terms.php>.

Who do I contact?

USA Technical Support:

Email: tech@everlastwelders.com
1-877-755-9353 ext. 207
9am-5pm Eastern (Closed holidays)
Monday-Friday

USA Welding Support and General Product Information:

Email: performance@everlastwelders.com
1-877-755-9353 ext 204
9am-6:30 pm Eastern (Closed holidays)
Monday-Friday

USA Sales and Main Office:

Email: sales@everlastwelders.com
1-877-755-9353 ext 201
9am-5pm Pacific (Closed holidays)
Monday-Friday

Canada Technical Support:

Email: mike@everlastwelders.ca
905-570-1818
9am-4pm Eastern Monday-Thursday
9am-12pm Eastern Friday

Canada Sales and Main Office:

Email: sales@everlastwelders.ca
905-570-1818
9am-4pm Eastern Monday-Thursday
9am-12pm Eastern Friday

Other Countries and Regions:

Visit the U.S. Website @ www.everlastwelders.com and click on the flag of the country or region represented that is closest to you. If your country or region is not found, call the U.S. office at 1-650-588-8588 between the hours of 9am to 5pm Pacific, Monday through Friday.



Safe operation and proper maintenance is your responsibility.

Everlast is dedicated to keeping safety a top priority. While we have compiled this operator's manual to instruct you in basic safe operation and maintenance of your Everlast product, it is no substitute for observing safe welding practices and behavior. Safe welding and related cutting operations require basic knowledge, experience and ultimately the exercise of common sense. **Welding does significant hazards to your health and life! Exercise extreme caution and care in all activities related to welding or cutting. Your safety, health and even life depends upon it.**

WARNING! If you do not have proper knowledge or capability to safely operate this machine, do not use this machine until proper training has been received!

While accidents are never planned, preventing an accident requires careful planning. Stay alert!

Please carefully read this manual before you operate your Everlast unit.

The warranty does not cover damage or harm created by improper use, neglect of the machine or failure to follow safe operating practices.

NOTICE:



Welding and cutting operations may generate undesirable High Frequency (HF) and EMF energy. This can interfere with surrounding electronic equipment such as computers, routers, CNC equipment, televisions, radios, fluorescent lighting etc. If disturbance in surrounding electrical and electronic equipment is noted, consult a licensed electrician to help properly ground surrounding equipment to limit the interference. This machine may cause GCFI and ground fault outlets to malfunction. This unit is designed to be operated on a dedicated, properly grounded circuit.

Safety Warnings, Dangers, Cautions and Instructions



NOTICE. This unit manual is intended for users with basic knowledge and skillset in welding. It is your responsibility to make certain that the use of this welder is restricted to persons who have read, understand and follow the warnings and instructions in this manual. If you or the operator needs further instruction, contact Everlast welding support at 1-877 755-9353 ext. 204 or seek qualified professional advice and training.



WARNING! High Frequency (HF) energy can interfere with the operation of pacemakers and can damage pacemakers. Consult with your physician and pacemaker manufacturer *before* entering an area where welding and cutting equipment is in operation and *before* using this welder. Some pacemakers have limited shielding. Alert any users or customers of this potential problem.



WARNING! Use approved safety glasses with wrap around shields and sides while welding and working in the weld area or serious eye damage or loss of vision may result. Use a grinding shield in addition to the safety glasses during chipping and grinding operations.



WARNING! When welding always use an approved welding helmet or shielding device equipped with at least an equivalent of a shade 9 or greater. Increase the shade number rating as amperage increase over 100 amps. Inspect helmet for cracks in lenses and in the helmet. Keep lens covers in good condition and replace as necessary.



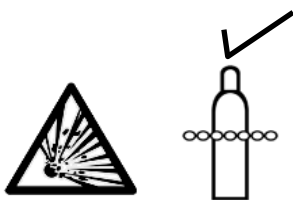
WARNING! Welding/cutting operations carry inherent risks which include but not limited to possible cuts burns, electrical shocks, lung damage, eye damage and even death. Take all appropriate measures to use proper Personal Protective Equipment (PPE). Always use leather welding gloves, closed toe (preferably reinforced or steel toe leather shoes, and long-sleeved flame resistant clothing (i.e. denim). Do not wear Poly/Nylon blend materials.



DANGER! Welding/cutting poses shock and electrocution risks. Keep this welding equipment dry. **Do not weld in the rain or where moisture accumulates.** Use dry, rubber soled shoes, gloves and clothing when welding. Do not rest or contact work clamp (ground) when welding. Keep all parts of the body insulated from the part being welded when possible. Do not touch terminals or connections while the unit is on. Consider all parts to be "live" at all times even if no live work is being performed. Do not use frayed welding cables.



CAUTION! Fires are possible but also preventable while welding. Always remove flammable rags, papers, and other materials from the weld area. Keep rags stored in an approved flame proof canister. Keep a fully charged fire extinguisher at hand. Remove any fuels, oils, paint, pressurized spray cans, and chemicals from the weld area. Make sure any smoke/fire detectors are function properly. Do not weld on tanks, drums or barrels, especially if pressurized or sealed. Do not weld on any container that previously held fuel or chemicals. Make sure the weld area is clear of flammable materials such as grass or wood shavings solvents and fuels. Do not wear frayed or loose clothing. Visually inspect and recheck the work area after welding looking for smoldering debris or flames.



WARNING! Welding gas cylinders are under high pressure. Keep all gas cylinders upright and chained to a cart or held safely in a safety holding pen. Never transport gas cylinders in an enclosed car van or other vehicle. Transport gas cylinders securely. Keep all cylinders capped while not in use or during transport. Replace the cap on the cylinder when it is going to be more than 24 hours before use. Do not use or attempt to repair faulty regulators. Never weld on gas cylinders. Keep gas cylinders away from direct sparks.

Safety Warnings, Dangers, Cautions and Instructions



DANGER! Welding and cutting operations pose serious inhalation hazards. Some of these hazards are immediate while others are cumulative in their effect. **Do not weld in enclosed spaces or in areas without adequate ventilation.** Fumes and gases released in the welding and cutting operations can be toxic. Use fans or respiration equipment to insure adequate ventilation if you are welding in a shop or garage area. **Do not weld on galvanized metal under any circumstance.** You may develop metal fume fever. Symptoms are similar to flu-like symptoms. Seek medical advice and treatment if you are exposed to galvanized welding fumes.

If you experience any eye burning, nose or throat irritation while welding, these are signs that you need more ventilation.

If you feel these symptoms:

- Stop work immediately and relocate work area with better ventilation.
- Wash and clean your face and hands.
- Stop work completely and seek medical help if irritation persists



DANGER! Never use brake cleaner or any chlorinated solvent to clean or degrease metal scheduled to be welded or other related equipment in the area being welded. The heating of this cleaner and its residue will create highly toxic phosgene gas. Small amounts of this vapor are harmful and can lead to organ failure and death. If degreasing of a part is necessary, use Acetone or an approved pre-weld cleaner. Use the proper personal protective equipment (PPE) when handling any cleaners/solvents.



DANGER! People with pacemakers should consult a physician and pacemaker manufacturer before welding. There is a potential for damage or serious malfunction resulting in death. High Frequency energy (HF)/Electromagnetic Fields generated during welding can interfere with pacemaker signals, even permanently damaging it. Some pacemakers offer some shielding, but restrictions regarding amperage and HF starting of welding arcs may be placed upon the individual. Warn all potential bystanders that they should exit the work area if they have a pacemaker or similar medical equipment before welding. In adverse conditions, severe electrical shock leading to injury or death may occur while using the welder if the user becomes part of the circuit path. Consult with a Physician if a pacemaker is expected to be implanted.



DANGER! Never defeat or modify any safety guards or shields. Keep all safety covers and shields in place.

Never place your fingers in or near a fan shroud or insert any object into the fan(s).



DANGER! Do not weld on the gas cylinder. Do not weld near fuel, cleaners, solvents or other flammable materials. Remove these items from the premises before welding. Severe injury or death may result from explosions or fires may occur.

Safety Warnings, Dangers, Cautions and Instructions

	CAUTION! Trip Hazards exist around this unit. Cords, cables, welding leads and hoses pose a trip hazard. Be aware of their location and inform others of their location. Tape and secure them so they will stay out of high traffic areas.
	CAUTION! Welded metal can stay hot long after welding is completed. Burns may occur. Always wear gloves or use tongs/pliers when handling welded or cut metal. Remember the heat from the metal may catch other material on fire. Always have a fire-proof area ready to place welded components until they fully cool. Use soap stone or a metal marking marker to label the metal as “HOT” to serve as a reminder to all present in the area.
	CAUTION! Welding and cutting operations generate high levels of ultraviolet (UV) radiation which can burn and damage skin and eyes. The intensity is so high that exposed skin and eyes can burn in a few minutes of exposure. Minimize direct skin and eye exposure to this intense form of radiation by using proper PPE and sun screen where appropriate.
	CAUTION! Do not allow bystanders. Do not allow others without proper Personal Protection Equipment (PPE) suitable for welding to stand in the welding area or to observe welding and welding related activities. If protection is not readily available, use a welding screen to separate the welding area from the rest of the area. If no protection or screen is available, physically exclude them from the welding area by a wall or other solid divider. Keep all pets and young children away from the welding area.
	CAUTION! Electromagnetic Fields can be generated by this unit and radiate into the work place. The effect of EMF is not fully known. Exercise caution when welding by: NOT draping welding leads (guns/cables) over your shoulders or arms, NOT coiling them around your body, NOT inserting yourself directly between the cables, and by NOT contacting the unit while welding. DO keep the work clamp connected as close as possible to the area of the weld and directly to the object being welded whenever possible.

IMPORTANT: Operating this unit with a generator or other off-grid service.

MINIMUM REQUIRED SURGE WATT RATING: 15,000W

MINIMUM REQUIRED THD: 5% or Less

This welder unit should only be operated on a generator certified by its manufacturer to produce clean power. Clean power is equivalent to the quality of household or shop/garage type power. This means the generator must have 5% or less total harmonic distortion (THD) of the Sine wave. If you are unsure of the power output type of the generator, contact the manufacturer of the generator for verification. *Do not operate on square wave or modified square wave generators or converters/inverters or damage or malfunction may occur. Damage caused by running this unit off of "dirty" power or modified sine waves may not be readily apparent and can be cumulative in nature. However, damage may present itself immediately. The damage caused by running this unit on "dirty" power usually leaves internal tell-tale signs and damages specific parts.*

NOTICE! Operation of this unit with generators not rated by its manufacturer as providing clean power (5% or less THD) is prohibited and will void the warranty. Operation with modified sine wave, or square wave generators and inverters/converters/UPS that do not produce "sine wave" output is prohibited and doing so will also void the warranty. Use only with generators/inverters/converters that produce an equivalent type of sine wave used in shops, homes and "shore" type systems. *The generator manufacturer determines the THD rating, not Everlast.* Do not assume that a name brand generator, or a "new" generator automatically provides clean power. Price paid does not guarantee a clean power output either. There are multiple brands at various price points capable of producing clean power. Investigate this before purchasing a generator. The manufacturer will usually state that a unit is clean power in the advertising information and will state actual THD. If the manufacturer does not state it, contact the manufacturer directly for a statement concerning actual THD.

WARNING! Do not start or stop the generator with the unit switched on. Never use the generator in ECO mode or an auto-idle mode. Even with a clean power rated generator, this action can damage the unit. *Turn the unit on only after full generator R.P.M. has been achieved and the engine is sufficiently warmed up.* Closely monitor generator fuel level so that the engine R.P.M doesn't drop or completely shut down with the unit plugged in. **For best practice: do not start or stop the generator with this unit plugged in, even if it is turned off. Unplug the unit before shutting down the generator.**

If using with a welder/generator, make sure the manufacturer has determined that the generator portion produces a clean sine wave. Many older models do not. Some newer models use "divided" power between welding and generating and cannot supply the full power to the unit unless the fine current control knob is turned to maximum. Do not use this unit with such welder/generators unless the Power/fine current control is turned to 100%. Some welder generators do have a separate alternator for generating power. If this is the case, be sure not to weld or load the machine while this unit is in use.

WARNING! Always make sure any generator or welder generator is properly wired and grounded, according to local and national code. Ground the machine per the generator manufacturers instructions to meet code requirements. Improperly grounded generators may damage the machine and more importantly may cause severe injury or death.

240V 1 Phase, 480V 3 Phase Operation

This unit is designed for 240V 50/60Hz single phase operation or 480V 50/60Hz three phase operation. This unit is shipped without a plug and must be wired for the voltage you supply. If your single phase voltage is derived from 208V 3 phase Wye Type power (or your local power company provides measured voltage 216V or less across each hot leg of power), then it is recommended that you install a buck-boost type transformer to provide 240V output. It cannot be operated using all 3 phases of 208, 220 or 240V power. It must be configured for single phase operation. If operating on 480V input, the welder must use all 3 phases of 480V power.

WARNING: Before connecting the unit to the power source make sure the correct voltage has been selected with the rear input voltage selector switch. Failure to do so may damage the welder.

Specifications

DUTY CYCLE

Duty Cycle is simply the amount of time out of a 10 minute period in which the unit can operate. For example, if this unit has a duty cycle of 60% at maximum output (400 A while operating on 480V 3 phase and 315A while operating on 250V 1phase) means that the unit can be operated for 6 minutes out of 10 minutes at the maximum setting. The unit may be operated continuously, or intermittently for 6 minutes during the 10 minute period of time while the machine is MIG welding at maximum output. This rating standard (United States) is based on a maximum ambient temperature of 40°C (104°F). Operating at or above this rated operation temperature point, or even at slightly lower temperatures with high humidity readings expect a reduction in duty cycle. In most cases, the duty cycle will increase somewhat as ambient temperature drops. Lowering the operating Amperage to will cause a rise in duty cycle. MIG welding at 315A (480V 3 phase)/250A (240V 1 phase) will increase the duty cycle to 100%. Duty cycle is important to determining what type of work welder is suitable for. However at 35% duty cycle while welding at maximum output, it is rare that manual welding will exceed the duty cycle of the machine, since there is a lot of "in between" work such as grinding, repositioning, cleaning etc. that is often needed between welds.

Even though the machine has a 100% duty cycle rating level of 315A/250A on this machine, this does not mean that the welder will operate continuously at this level beyond the 10 minute mark. This is not an infinite rating. Don't forget that the 100% rating is a rating based off a defined 10 minute period of time. Depending upon the circumstances, the welder could go into overheat mode at the 11 or 12 minute mark even though it is rated for 100% at 10 minutes.

Regardless of the duty cycle rating, this unit's duty cycle is not controlled by a timer. Rather, this unit is equipped with a heat sensor located on a heat sink near the critical power components of the welder. If the operating temperature of the unit is exceeded, welding output will stop and an over-temperature warning light/error code will be displayed on the panel. **If a duty cycle event is registered, do not turn the unit off!** Allow the welder to continue to run at idle for at least 10-15 minutes until the temperature has fallen enough to reset the sensor and over-temperature warning light. *Even if the unit resets, allow the unit to cool for a full 15 minutes, or the duty cycle will be more quickly triggered since the unit resets just below the heat threshold. The fan(s) must continue to run for a full 15 minutes to cool the unit properly after the duty cycle shut down has occurred.* After 15 minutes of cooling, you may switch the unit off if you are finished welding. If the unit does not automatically reset after 15 minutes, turn the unit off. Wait for 15 seconds before turning the machine back on. If the unit does not reset, contact technical support for further advice and assistance. As a best practice, when you have completed welding and have been welding continuously for extended periods of time, keep your unit on for 10 additional minutes without welding to allow it to cool.

Keeping the unit clean will help maintain the duty cycle of the welder. Removing the cover and blowing it out with dry compressed air, every 3 to 6 months will help maintain air flow and cooling surfaces and will allow the unit to operate at maximum efficiency.

The intentional and/or repeated triggering of the duty cycle protection feature on this unit will shorten the lifespan of the unit's electronics and can weaken internal components. The effect of overheating your unit repeatedly takes a cumulative toll on the unit.

NOTICE: These units are tested by an international and independent certifying agency for their ability to sustain the claims of duty cycle, under lab induced conditions which are typically more stringently controlled than average shop conditions.

Specifications

WARNING!

Before turning the machine on for the first time, make sure the voltage selector switch on the rear is set to the correct voltage or permanent damage may occur. Correct voltage selection and wiring is the customer's responsibility. Damage occurring from incorrect wiring or wrong voltage selection is

NOTICE:

The unit is designed with several features and functions in common between processes. The principles of setup and operation carry over from one process to another. In this case, **information may not be repeated in detail in this manual if it has been discussed previously in another process.**

BREAKER SIZING AND WIRING REQUIREMENTS

Before installation of this unit in any facility, always consult a licensed local electrician familiar with the requirements of properly wiring a welder into the electrical supply. Refer to the National Electric Code (NEC) and local codes. If needed, refer the electrician to Article 630 of the NEC during consultation to determine proper application and wiring needs. Use the I1MAX and the I1EFF ratings listed above to determine the proper breaker and conductor (wire) sizing required. Everlast welders are designed around use in industrial wiring applications and are intended to be used with modern electrical systems. Household wiring may need to be upgraded before this welder may be installed. Additional HF protection and isolation may be needed if this welder interferes with the operation of electrical/electronic equipment. This unit should be operated only on a dedicated branch circuit.

IMPORTANT: Do not modify this unit's wiring, power plug or conductors. This unit meets the standards for conductor sizing on the power cable and takes into account power cable length, duty cycle and rated current.

NOTICE: POSSIBLE HF INTERFERENCE FROM THE INVERTER AND WHAT TO DO IF IT OCCURS

If any electrical disturbance is noticed as a result of the high frequency interference that is possible with the operation of the inverter switching and operation, the HF service bolt should be connected directly to a 12 gauge wire that is bonded directly to an outside copper ground rod driven into moist soil. Additionally, all metal items including any metal frame or sheeting of the building should be connected and grounded to separate copper ground rods driven into the ground at 10 foot intervals around the perimeter of the building. This includes items such as tables, carts, rack material, metal surrounds, etc. that may act as "antenna" to radiate/absorb HF energy. Additionally, all cords and welding leads should be twisted together and run directly to the work without coils or excess cabling. Normally, this will not be required, but it is supplied in the case of any interference that may be observed. This is usually observed in older or non standard installations where grounding and ground isolation is a problem. Normally this is not needed, but if interference is observed, first try relocating the welder and affected objects, and re-route welding cables. If operation is not improved, contact an electrician to wire the ground and make proper ground connections to all metal objects.

NOTICE:

The unit is designed with several features and functions in common between processes. The principles of setup and operation carry over from one process to another. In this case, **information may not be repeated in detail in this manual if it has been discussed previously in another process.**

Specifications

PowerMTS Product Specifications		Duty Cycle
Construction Type	Inverter (IGBT based, Digital Control)	Duty Cycle is simply the amount of time out of a 10 minute period in which the unit can operate. For example, this unit has a duty cycle of 60% at maximum output, that means that the unit can be operated for 60 minutes out of 10 minutes. This is rated for continuous or intermittent use during the 10 minute period of time. This rating standard (United States) is based on a maximum ambient temperature of 40°C. Operating above this point, or at lower temperatures with high humidity may reduce the duty cycle rating. Of course, the duty cycle will increase somewhat as ambient temperature and output Amps drops as well. Regardless, the duty cycle is not controlled by a timer. Rather, a heat sensor located on a heat sink near the critical power components of the welder signals overheat. If the operating temperature of the unit is exceeded, welding output will stop and an over-temperature warning light/error code will be displayed on the screen. If a duty cycle event occurs, do not turn the unit off! Allow the welder to continue to run at idle for at least 10-15 minutes until the temperature has fallen enough to reset the sensor and over-temperature warning light. <i>Even if the unit resets, allow the unit to cool for a full 15 minutes, or the duty cycle will be more quickly triggered since the unit resets just below the heat threshold. The fan(s) should be allowed to continue to cool for a full 15 minutes without welding/cutting activity after a duty cycle shut down has occurred.</i> After 15 minutes of cooling, you may switch the unit off if you are finished welding. If the unit does not automatically reset after 15 minutes, turn the unit off. Wait for 15 seconds before turning the machine back on. If the unit does not reset, contact technical support for further advice and assistance. As a best practice, before shut down, if you have been welding continuously for extended periods of time, keep your unit on for 10 additional minutes to allow it to cool down. The intentional and/or repeated triggering of the duty cycle protection feature on this unit will shorten the lifespan of the unit's electronics and can weaken internal components. Overheating your unit repeatedly takes a cumulative toll
Input Voltage	240 V 1 Phase, 480V 3 Phase 50/60 Hz (Switched at rear.)	
I1MAX Current Rating (Inrush Amps) 240V 1 ph / 480V 3ph	60A / 24A	
I1EFF Current Rating (Rated Amps) 240V 1 ph / 480V 3ph	46A / 20A	
OCV	70V	
MIG Duty Cycle @ Rated Outputs (Rated at 40° C/104° F)	240V 1 ph: 60% @ 315A/29.8V, 100% @ 250A/26.6V 480V 3 ph: 60% @ 400A/34V 100% @ 315A/30V	
TIG Duty Cycle @ Rated Outputs (Rated at 40° C/104° F)	240V 1 ph: 60% @ 300A/22V, 100% @ 250A/20V 480V 3 ph: 60% @ 400A/26V, 100% @ 310A/22.6V	
Stick Duty Cycle @ Rated Outputs (Rated at 40° C/104° F)	240V 1 ph: 60% @ 300A/32V, 100% @ 250A/30V 480V 3 ph: 60% @ 400A/36V, 100% @ 310A/32.4V	
MIG Output Range V/A (DC Output Only) 240V 1 ph / 480V 3 ph	17-29.8V/60-315A / 17-34V/60-400A	
TIG Output Range V/A (DC Output Only) 240V 1 ph / 480V 3 ph	10.8-22V/20-300A / 11.2-26V/30-400A	
Stick Output Range V/A (DC Output Only) 240V 1 ph / 480V 3 ph	20.8-30V/20-300A / 21.2-36V/30-400A	
MIG Wire Feeder Series (Detachable Type)	FCS 203 (Non-water Cooled)	
Spool and Push Pull Gun Capable	Spool Gun Only. Use Parker DSP 360,	
MIG Wire Feed Speed (No load) 240 1 phase/480 3 phase:	60-600/60-750 IPM , Set on machine as a percent 0-100%.	
MIG 2T/4T Function	Yes	
MIG/ Stick Inductance (Arc Force)	0-10 (0-100% of range)	
MIG Burn Back Time	0-2 Seconds	
MIG Wire Size Handling Capability	.030"-.062" (Recommend to add 24 gun option and blue liner for .030-.035" wire.)	
MIG Spool Size	12" (Up to 44 lbs.)	
MIG Drive Roll Sizes Included	.045"-.062" V-Groove (Installed). .030"-.035" V-Groove	
Crater Voltage (Fill Voltage)	0-10 (0-100% of Available Voltage)	
Crater Current (Fill Wire Feed Speed)	0-10 (0-100% of Available Voltage)	
Pre/Post Flow Time	Auto	
Burn Back Voltage	0-10 (0-100% of Available Voltage)	
Stick Arc Force	0-100% above set Amperage	
Stick 6010 Capable	Yes	
TIG Start/ Torch Type	Scratch Start with 26V (gas-valve) rigid neck torch	
TIG Foot Pedal Capable	No	
MIG Gun Type/Length/ Connector Type	North Series 36KD Series 10ft/ 3m w/ Euro Quick Connect	
400A Work Clamp with Cable Length	10 ft (3m) DINSE 35/50 (1/2 nom. dia.)	
400A Stick Electrode Holder Length	10 ft (3m) DINSE 35/50 (1/2" nom. dia.)	
Power Output Adapter/Connectors	DINSE 35 series (35/50mm ² or 35/70mm ²)	
Power Cable Length	6.5 ft (2m)	
Power Plug Type for Single Phase Operation 240V	Customer Supplied according to voltage input.	
Cooling Type	Full Time, High Volume Fan(s)	
Dimensions (Approximate)	20" H X 11.25" W X 26" L (Power Source, not mounted)	
Weight (Bare Power Source)	105 lbs.	
Ingress Protection Rating	IP21S	

NOTICE:

The maximum output of the machine is reduced to when operating on 240V 1phase input power. For full power, use 480V 3 phase input power. See

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Getting Started

UNPACK YOUR UNIT.

Upon arrival, you will need to completely unpack your unit, and check things over. This is a time sensitive matter. Do not delay or hold the welder unopened in the box. Make sure the unit is opened from the top. Be careful with using knives and sharp objects so you won't cut cords and cables inside the boxes. Lay all items out and inspect them. The complete welder package arrives in separate boxes. Make sure no boxes or parts are missing.

You should have the following in your box:

1. DC MIG/DC TIG/DC Stick Power Source (bare unit).
2. Wire Feeder (FCS 203) with gas/power umbilical (15ft).
3. PowerCart 400.
4. Floating Ball Regulator for MIG. (hose included but not pictured).
5. 36 Series MIG Gun/Torch. (MB36KD style).
6. 250A Work Clamp (approx. 9.5 ft with cable).
7. 250A Stick Electrode Holder (approx. 9.5 ft with cable).
8. Drive Rolls: .045" and .062" (1.2mm and 1.6mm)
9. 26V Gas Valve Torch (12.5 ft with cable).



INSPECT AND ASSEMBLE YOUR UNIT.

When you receive your package, inspect the unit for damage. Check for the presence and general condition of the accessories. Some slight rubbing or chaffing of some of the accessories may be present, but this is considered normal. Most notably, the MIG torch may appear to be used or fired. This is because it has been live tested in the factory for proper operation before putting into the box. If any item is damaged or missing, please inform Everlast within 72 hours of product receipt. See pages 4 and 5 for more details.

First, assemble the cart with the main axle, casters, fasteners, washers and cotter pins provided in the package. Use the separate cart manual for assembly guidance. You will need to carefully lay the cart on its side for assembly. Use a soft cloth or foam pad under the cart to prevent scratching during assembly. The thumb screws in the cart package secure the welder to the cart from the bottom of the cart. The wire feeder is secured via the swivel post on the top grab bar of the cart.

IMPORTANT! Do not overtighten the screws. *If desired for proper fitment or for space saving, the unit may be used without the handle.*

However, install the screws and tighten them to the panel anyway. Do not leave them out. After 8 hours of use, check and retighten back plate assembly, casters and axle assembly. Check and inspect the cart periodically to ensure the undercarriage is tight and secure to the welder and the wire feeder. A good time to check is during routine cleaning of the unit.

NOTICE:

This unit includes an additional MIG contact tip, but does not contain any other MIG consumables, including filler (MIG or Flux-Cored) wire. Additional sizes of contact tips, nozzles and basic gun parts are available direct from Everlast's website, from other online sources and from select local welding supply stores that carry parts for similar MB36KD styled MIG guns. Some miscellaneous parts like a contact tip wrench may be found in the box, depending upon your region. Filler (MIG and Flux-Cored) wire should be purchased locally or direct from other online sources. **Other drive roll sizes and types should be purchased direct from Everlast.** The included drive roll is a V groove drive roll, designed for solid steel wire. Depending upon the region/country where purchased, drive rolls for flux core or aluminum use, must be purchased separately. Flux-Cored wire will have a serrated or zippered appearance in the groove. The Flux-Cored Drive rolls are indicated by an X or K letter after the size. Aluminum drive rolls will have a U-groove shape. Make sure you are ordering 4 roll kits designed to fit the FCS 203 feeder. They differ from other 4 roll kits used in self-contained wire feeder units where the feeder is located in the housing of the welder itself.

If you are considering using .030" or .035" wire, you should purchase the 24 series gun in addition to the supplied 36 series. You will need to order a blue liner to go with the 24 gun as well. This will feed wire better and arc performance will be much improved and will provide good performance up to 240A for short circuit or light spray arc use.

The 36 gun, as supplied, is designed primarily for heavy weldments that require spray arc welding. A different combination of consumables will be required to improve short arc performance with the 36 gun.

NOTE: If you think you are missing a needed part, check the consumable kit bag and related packaging before calling Everlast for replacement. If you are missing parts, call 1-877-755-9353 ext. 206 for help.

POWER UP AND TEST YOUR UNIT.

You will need to fully assemble (install cart and wire feeder) and test the unit as soon as possible. Within 72 hours after receipt of the unit, be sure to have every thing you need at hand to test the unit. Make sure the correct input power, wiring, and plug configuration is being used for your input voltage. Make sure you have the regulator is installed (See following section). Then, power up your machine without any accessories installed. Allow the unit to idle for 15 minutes. Check and observe operation of knobs, controls and buttons, cycling through each as required. Make sure the fan is running at full speed. After the static run-

Setup Guide

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ning test is completed, turn the unit off, connect the torches and cables. Then, conduct live testing of all the functions and features of the machine. For testing make sure work clamp is connected directly to the part being welded (work). Check for arc starting and stability. If any welding problems are observed and persist, contact Everlast. However, before you contact Everlast double check that polarity is correct for the process being used. Improper polarity will result in poor welding performance, and in some cases, can result in no arc at all. See page 5 for more contact information. **NOTICE:** *Cosmetic damage claims after 30 days will not be accepted, unless Everlast is contacted and informed of such delay and reason for such a required delay (i.e. Overseas, or while on deployment with the armed services etc.).*

GIVE YOUR UNIT SOME SPACE TO COOL.

This unit needs room to cool itself and maintain proper duty cycle. Place the unit in a place that will allow 18" from all sides to allow for proper cooling. This welder pulls air in from the rear, and pushes it through the unit's heat sinks to cool the electronics. The air is then exhausted through the front panel and side louvers of the unit. If any of sides is blocked or restricted, the duty cycle will be reduced, and overheating will occur, leading to possible damage if the restriction is severe enough. Never attempt to restrict air flow by attaching filters to the vents or by modifying your fans for "on demand" service. If the sound from the welder fans diminish or become non existent, check fans for proper operation. If, over time, you suspect one or more of the fans are not working, discontinue use until the unit can be repaired to prevent damage to the machine. One fan not working will cause duty cycle to drop drastically. If your duty cycle warning appears unexpectedly, and continues to do so, contact Everlast tech support for help on checking fan operation and diagnosing the cause.

CONNECT YOUR UNIT TO POWER.

WARNING: Before connecting your unit to power, be sure to select the appropriate power input via the switch on the rear of the welder.

This unit is designed only to operate on either 1 phase 240V or 3 phase 480V. It can be operated on a 3 phase 240V system, however, if you only use two of the balanced power legs and do not use the high (wild leg) of power. Single phase use will cause a higher Amp draw however.

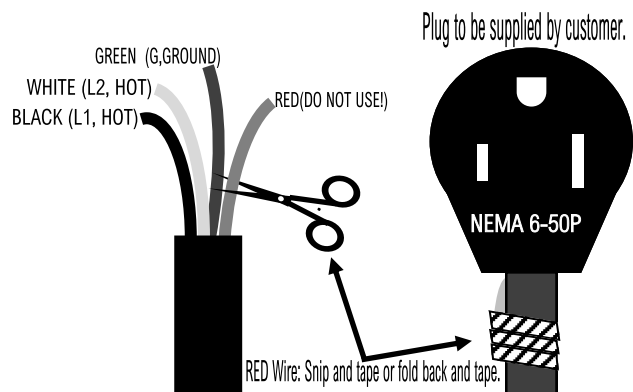
Your unit has been shipped without a power plug. This is because it is both single 240V and three phase 480V capable. For 240V 1 phase use, we suggest that you select the NEMA 6-50P. This is the standard plug used for 240V 1 Phase welders in North America. The red wire will not be used. It should be taped up and stored out of the way. It is also important to understand that welders do not require or need a neutral by code. However, the welder does always need to be properly grounded via the green wire. Black and white wires in a 1 phase 240V welder circuit are always used as the "Hot" wires, which measure 120V to ground and 240V phase to phase. Always consult a licensed electrician before making any electrical connection on this unit. **Never modify or attempt to rewire this unit in any way.**

If you are using on 480V 3 phase, all wires will be used, including the red wire. Use the red wire for the "High leg" input. Since there is no standard for 480V 3 phase welder plugs and design, amp rating and configuration can vary, consult with a licensed electrician before making any attempt to wire or connect your unit.

The unit should be used on a dedicated circuit and should not share op-

eration of another device on the same breaker.

Standard Plug Configuration 1 Phase 240V



Standard Wire Configuration 3 Phase 480V



IMPORTANT!

Select input voltage via the switch located on the lower rear of the welder before connecting the power or damage may occur to the unit.

Selecting A Breaker and Wire Size

Select a breaker based off of the I1MAX rating of this unit. This is the maximum inrush current of the unit. The inrush is not a sustained current. The I1EFF rating of the unit is the maximum "rated" current of the machine. When combined with the length of the run from the main panel, this determines the conductor size. Refer your licensed, local electrician to Article 630 of the NEC and the specification page of this manual (or the specification grid printed on your unit) to select the correct breaker and wire size. A delayed trip breaker, or slow blow fuse should be used with this unit.

WARNING!

Equipment Damage Hazard! When operating multiple welders in close proximity, each unit must be connected to an isolated ground using the ground terminal located on the rear of the unit. Proper isolated grounding of the unit is required to prevent current feed back between welding units. Failure to properly isolate and ground each unit may result in current back-feed, equipment malfunction or permanent damage to the welder. Do not operate multiple welders without verifying that each unit is properly connected to an isolated ground. Failure to do so will void the warranty.

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Getting Started

CONNECT YOUR UNIT TO THE CORRECT SHIELDING GAS

What Shielding Gas Should Be Used?

The following gases should be used and are the best choices in the gas selection during initial setup after powering the unit up:

MIG Steel Short Circuit: 75%/25% Ar/CO₂ (75/25 or C25) **OR** 100% CO₂ (C100)

MIG Steel Axial Spray: 90%/10% Ar/CO₂ (90/10 or C10) or similar less than 20% CO₂ with balance being Argon.

MIG Stainless (Inox): Short Circuit **OR** Spray 98%/2% Ar/CO₂ (98/2)

MIG Stainless Short Circuit Only: He/Ar/CO₂ (Stainless TriMix)

MIG: Aluminum or Brazing: 100% Ar (Argon)

All TIG: 100% Ar (Argon)

Notice that Steel has a couple of gas choices. *In the North American Market, 75/25 is the standard gas choice for short circuit MIG and Gas Shielded Flux-cored welding.* It provides less spatter than CO₂ and a cleaner, less oxidized weld in general. 100% CO₂ is cheaper, but can require more cleanup and descaling after the weld is completed. In other markets, 100% CO₂ is more commonly available, or may offer slightly different combinations. If 75/25 gas mix is not available for use and 80/20 is an option, then this gas may be used on the 75/25 setting. Any gas less than or equal to 20% CO₂ is generally considered suitable for Axial Spray welding.

Stainless gas mixes can range throughout the industry. However, in the industry, this unit is designed to be used with 98/2 Ar/CO₂ blend when welding Stainless Steel. While there are other gas choices, such as "TriMix" with He, Ar and CO₂, this is typically the most widely available and economic one for welding Stainless Steel (Inox).

MIG Aluminum and MIG Brazing will always require the use of pure Argon (100% Ar) shielding gas while welding in MIG mode. This is a widely available and a standard gas throughout the world.

TIG uses Argon for all metals. Never accept any other gas for DC TIG welding.

WARNING!

Always wear safety glasses and gloves when changing a gas cylinder. Always use safety chains to secure the cylinder to the welder.

Carefully lift and install the gas cylinder onto the welder back deck plate while safety cap is still on. Use the supplied safety chain to secure the cylinder to the cart as tightly as possible. Once the cylinder is installed, it may be uncapped when ready for use. Before connecting any cylinder, stand to the side of the cylinder valve, making sure you are away from the discharge side opening. Then, quickly open and shut the cylinder valve giving it a quick blast. This will dislodge any dirt or particles stuck in the valve or the connection seat. This will help reduce the chance of dirt particles making its way into the solenoid valve, causing sticking issues later on in service.

Connecting your cylinder will require a cylinder wrench (1 1/16") to connect the regulator to the cylinder (North American Cylinders with a

580 CGA valve). If you do not have a cylinder wrench, an adjustable type wrench will work, but make sure it is properly adjusted to prevent rounding of the fitting shoulders. Do not use pliers, or a serrated-jawed wrench such as a pipe wrench to tighten the fitting. The design of the fitting means that no thread sealing tape or compound needs to be used.

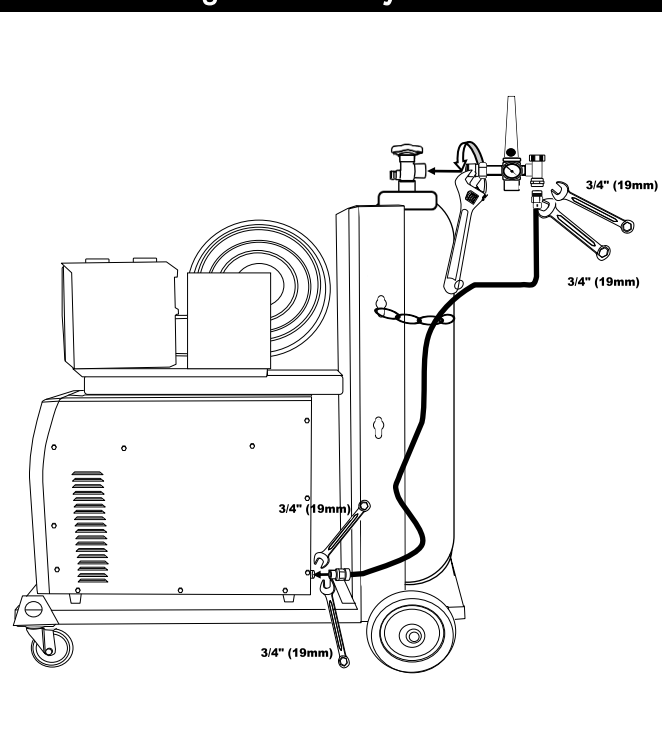
Connect the supplied tubing to the regulator. Tighten with two 3/4" (19mm) wrenches to hold both the regulator and the tubing connection at the same time. Hold counter pressure on the regulator connector while tightening the hose fitting to prevent damage to the regulator. After connecting the tubing to the regulator, connect the other end of the tubing to the 5/8" CGA fitting on the welder. Hold the fitting on the unit with one 3/4" (19mm) wrench firmly while tightening the hose fitting with another 3/4" (19mm) wrench. **NOTE:** Some regulators use an 11/16" (17mm) fitting.

Important: Do not use thread tape or pipe sealant on any cylinder, regulator or unit connection. The residue and debris may get into the gas solenoid and cause operational issues.

CAUTION!

Do not tighten the rear unit connection without holding the female 5/8 CGA fitting located on the back of the welder with a wrench, or damage may occur to the solenoid, housing or fitting as the fitting may turn in the housing while the hose fitting is being tightened.

Connect Regulator To Cylinder And Unit.



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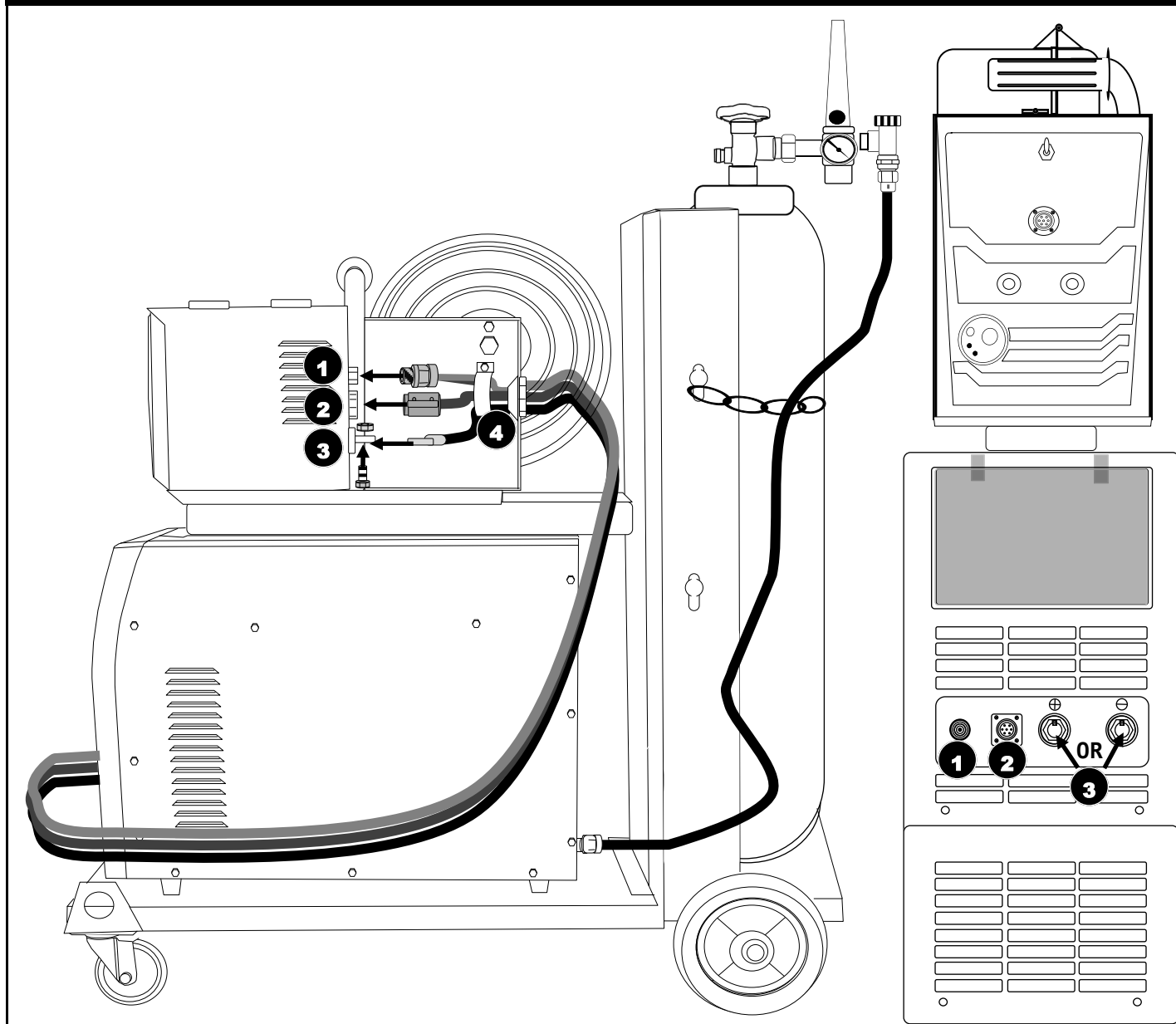
CONNECT THE UMBILICAL TO THE WIRE FEEDER .

The wire feeder controls all wire feed operations and is connected to the unit via the umbilical cable which is provided which provides separate connections for the gas (#1), control (#2) and power connections (#3). The umbilical is connected directly to the connections on the front of the power source and to the rear of the wire feeder. *The main power cable connects via the DINSE type connector on the front and is bolted to the copper lug on the rear (#3). The copper lug identifies which in should be connected.* It should be fully tightened, but not over torqued to prevent stripping of the connection bolt. **Make sure the strain relief (#4) is installed properly to secure the umbilical to the feeder.** Only use hand tools to complete the connection of both the power cable and the gas line. Use two wrenches when tightening the gas line to the wire feeder. Use only finger

pressure to tighten the control cable to the wire feeder and the welding power source. **NOTICE:** The power connection can be placed in either the positive (+) or the negative (-) DINSE type terminal on the front of the machine. The exact location is determined by process and recommended polarity. See next page for general wire feed polarity recommendations.

Use the guide below to make the proper connections before using with the wire feeder. *The wire feeder may be used or mounted separately without the cart. Longer cables are available up to 50 ft as an option if the wire feeder needs to be detached from the cart. If the feeder is being used but is not mounted to the cart, secure the feeder so it cannot be turned over. Be sure to inspect the gas line portion of the umbilical upon installation for leaks and tighten all fittings. Periodically recheck for leaks caused by abrasions caused by moving the welder and for holes created by welding.*

CONNECTING THE WIRE FEEDER TO THE POWER UNIT.



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SELECT THE CORRECT TORCH SETUP AND POLARITY.

The polarity of the welder is controlled on the main unit via the DINSE type connectors. These connectors that can be used are the DINSE 35/50mm² or the DINSE 35/70mm² style connectors. The both have the same diameter connecting pin, but the cable size that the connector is capable of accepting are different.

To change the welder's polarity, simply swap the cables on the main power source. This includes the wire feeder cable when switching from MIG to Gasless Flux-Cored wire.

NOTICE: For MIG and wire feed applications the wire feeder will connect directly to the power source via an umbilical cable (provided) and the gun will connect to the wire feeder. The work clamp will connect directly to the power source. The wire feeder is designed to be mounted directly to the PowerCart 400. However it may be used independently from the cart if precautions are taken to secure the feeder from overturn and moving. For all other applications the torch cables and the work clamp will connect directly to the power source.

See the general torch polarity recommendations below. These are the normal configurations for each process. But with wire feed operations and with stick, polarities may vary from what is listed. Confirm the recommended torch polarity with the maker of the filler metals (consult packaging paper work or box of filler metals or manufacturer's website for more information) as occasionally there are exceptions based off of application.

GMW (MIG, INCLUDING SPOOL GUN/ALUMINUM): Connect wire feeder to Positive (+), Work Clamp is connected to Negative (-). The Spool gun uses the same configuration when being used for welding Aluminum, Stainless and other solid wire metals.

FCAW (Self Shielded Flux-cored): Connect wire feeder to Negative (-), Work Clamp is connected to Positive (+). For gasless, self shielded flux cored wire use, purchase a flux-cored gun. Do not attempt to use the standard gun unless operating briefly. Performance with the stock gun will be limited. Everlast does not offer a flux-cored gun. This must be purchased aftermarket. The use of aftermarket guns does not affect warranty.

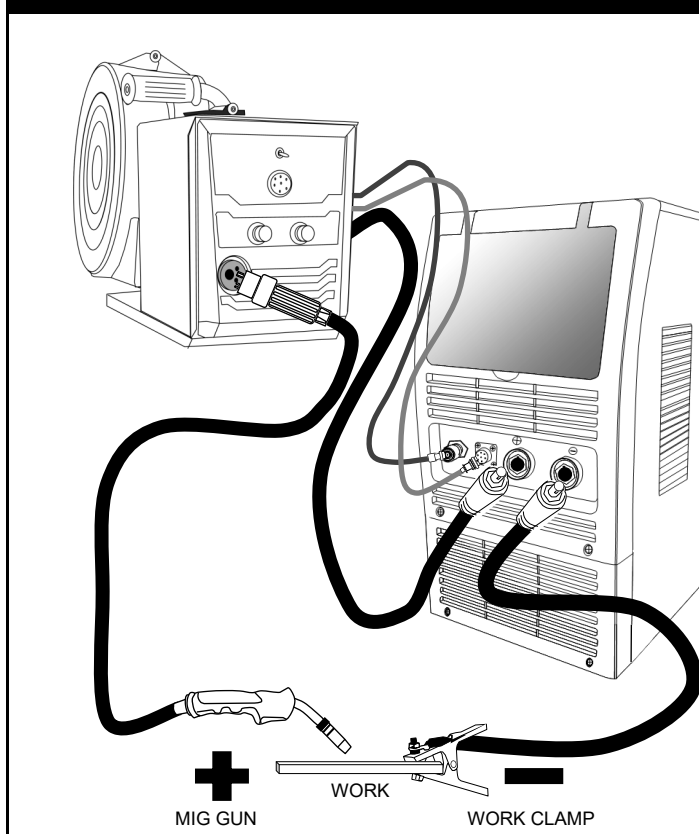
FCAW-G (Gas Shielded Flux-cored): Connect Flux-Cored Gun to Positive (+), Work Clamp is connected to Negative (-). The standard gun provided with the welder may be used with this unit with Gas shielded Flux Cored wire (also called "Dual-Shielded" wire).

GTAW (TIG): Connect the gas-valve TIG torch to Negative (-), Work Clamp is connected to Positive (+). The gas valve TIG torch is operated direct from the Regulator.

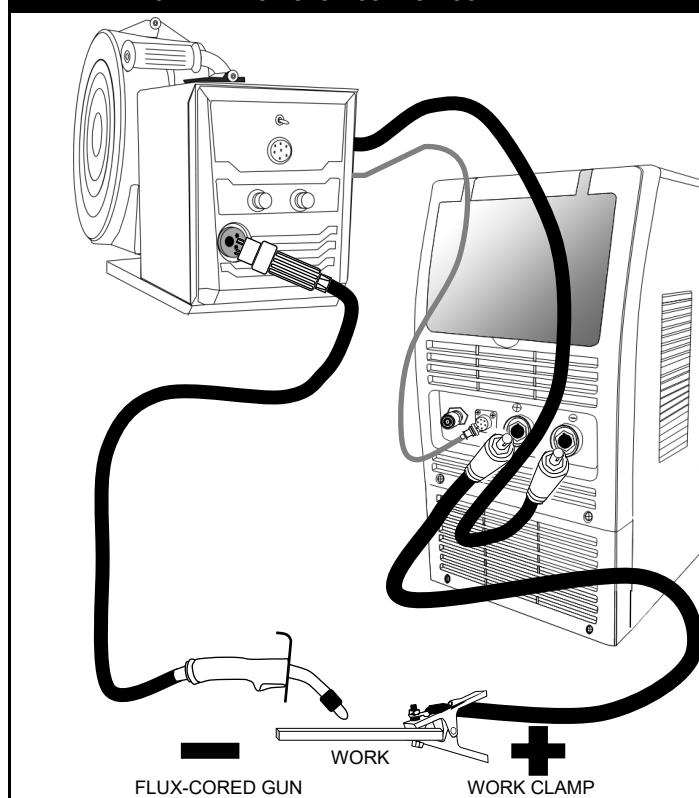
SMAW/MMA (Stick): Connect the stick electrode holder to Positive (+), Work Clamp is connected to Negative

CAC-A (Air Carbon Arc Gouging): Connect gouging torch to Positive (+),

POLARITY FOR SOLID WIRE MIG / GAS SHIELDED FLUX-CORED WIRE



POLARITY FOR GASLESS FLUX-CORED WIRE

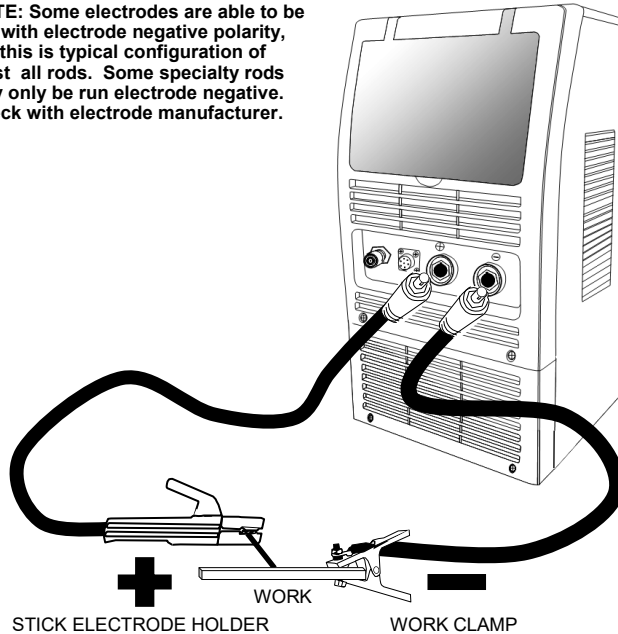


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POLARITY FOR STICK/MMA

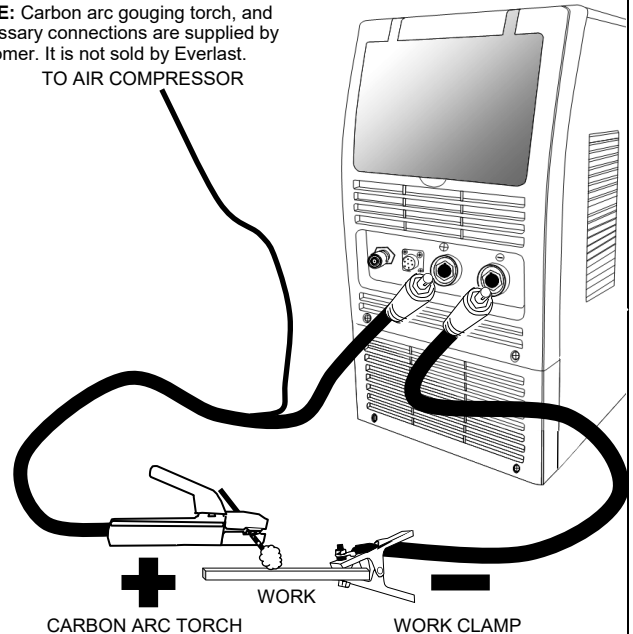
NOTE: Some electrodes are able to be run with electrode negative polarity, but this is typical configuration of most all rods. Some specialty rods may only be run electrode negative. Check with electrode manufacturer.



POLARITY FOR CARBON ARC GOUGING

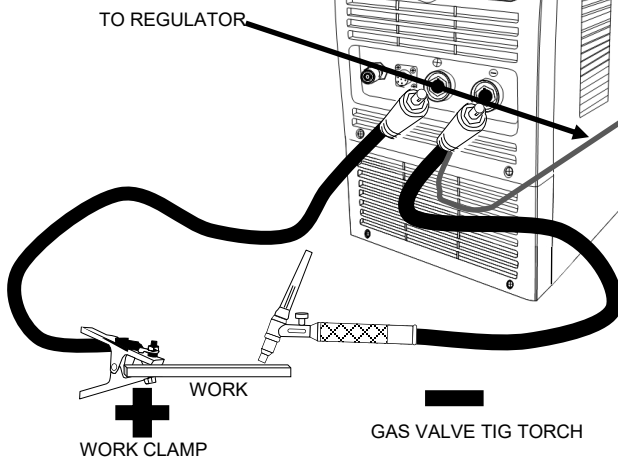
NOTE: Carbon arc gouging torch, and necessary connections are supplied by customer. It is not sold by Everlast.

TO AIR COMPRESSOR



POLARITY FOR TIG

NOTE: TIG torch connects direct to the regulator. Fittings to connect TIG torch directly to the Regulator are not included. Customer should purchase fittings separately at time of purchase, or source locally. Some adaptation of the gas fitting may be required.



WARNING!

Do not leave MIG/Wire Feed gun connected while welding other processes and remove all torches and accessories while welding wire feed processes. Disconnect all fittings and connections relating to the other welding processes. The power source terminals remain live while welding other processes. This can lead to accidental arcing and damage to the components and machine. It can also lead to accidental arc flashing of the eyes and burns, shock and injuries to the body. **Damage done to the welder from leaving the other accessories and torches connected while welding that are not required for use with the selected process will not be covered under warranty!**

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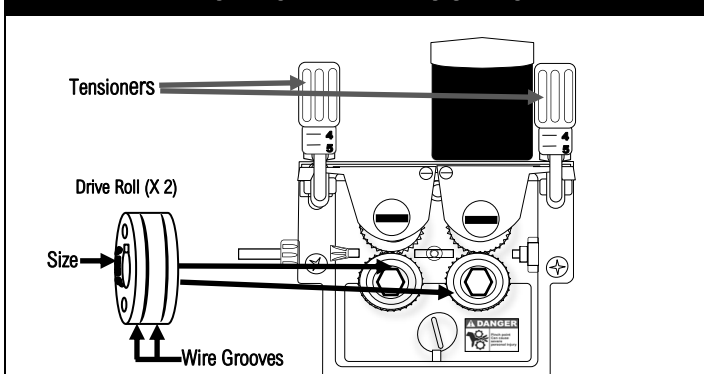
CHECK AND CHANGE YOUR DRIVE ROLL.

The unit comes with a pair of .045" and .062" drive rolls installed. Remember, if you change wire size or type, you will need to either flip both of the lower drive rolls over for the opposing size or completely change both of the drive rolls out with the ones of correct size and type that are sold as options (The change of wire diameter will also require change of gun and/or liner). When not in use, keep these "spares" put up where moisture and dust cannot get to them. They will rust if not used and stored properly.

The top drive rolls are actually idler rolls used to hold tension and keep the wire in the groove. These are not changeable. Only the bottom drive rolls need to be changed. Each of the bottom drive rolls has two small grooves that are sized for .045" (1.2mm) and .062" (1.6mm) solid wire. Additional sizes and types of drive rolls are available as options. The standard installed drive roll is meant to feed hard (solid) steel wire. The groove on this drive roll has a "V" shape designed for the solid wire. A Flux-Cored drive roll has a serrated edge to the groove, which grips the softer, cored wire. Viewing a flux-core drive roll from the top, you will see a "zipper" like pattern. It will be designated by either an "X" or a "K" stamp. This should never be used to feed hard steel, stainless or aluminum wire. This will result in damage to the wire, metal flaking and possible plugging of the MIG gun liner. To determine the exact size of wire and type you have, look at the side of the drive roll. The size of the drive roll groove is stamped on the side of the drive roll. The size of wire is on the opposite side from the groove. This means the size faces out toward the user for quick I.D. The type of the drive roll will also be stamped with a "V" if it is for solid, hard wire. If it is stamped with an "U", this is a special drive roll for feeding aluminum wire. Aluminum wire is best fed with a spool gun.

The drive rolls are held in place by thumb screws. Use a finger pressure to gently remove the screws to expose and change the drive roll. The drive rolls are mounted with a key and keyway. When removing the drive rolls, make sure that the square locating key are not dismounted. Keep on finger on the key to prevent it from sliding out with the drive roll. If the key falls out of the keyway, replace it before replacing the drive roll. If it does not stay in place use a small amount of grease on the key to hold the key in place. When the drive roll is reinstalled, just lightly snug the thumb-screws with fingertip pressure. Wipe off excess grease before using.

DRIVE ROLL SIZE AND LOCATION

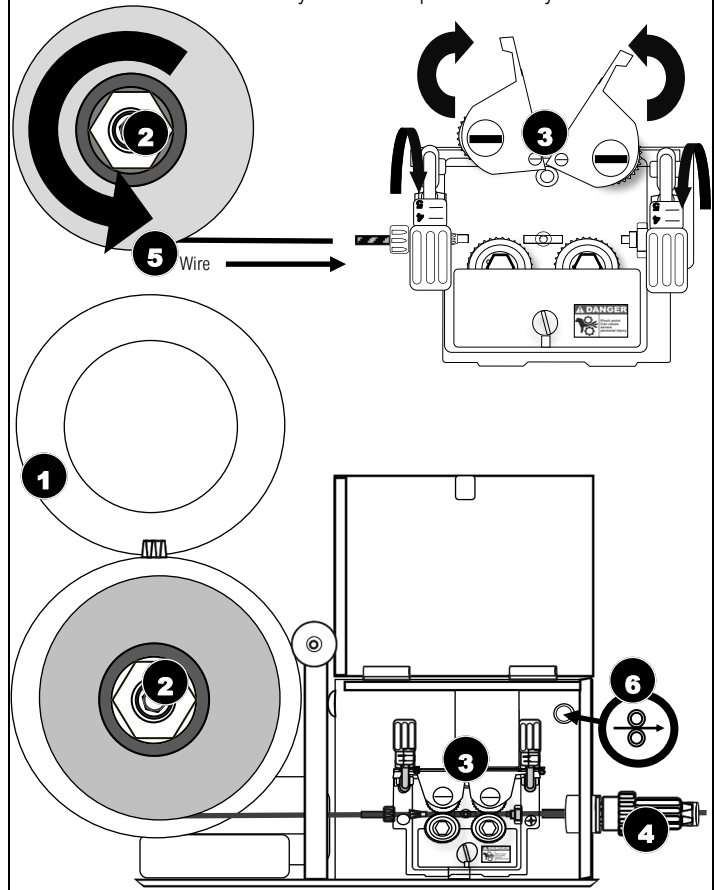


INSTALLING THE WIRE SPOOLS.

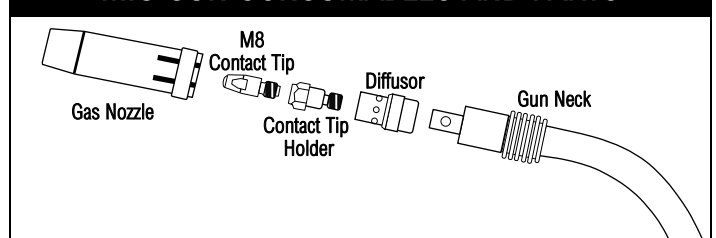
The wire feeder is designed to accept up to 12" diameter rolls, normally up to 44 lbs. *For heavier rolls, install and test for free rotation without sagging or bowing of the support arm and carrier bolt.* To remove or install a wire spool: Open clamshell (#1). Remove the spool retaining nut (#2). Flip down both tensioners so that upper drive roll arms raise (#3). Install wire spool on carrier with wire feeding from the bottom and rotating counter clockwise(#5). Replace spool retaining nut (#2). Feed wire through drive roll grooves and 6 inches into gun connector (#4). Lower drive roll arms and return tensioners to the upright position (#3). **See MIG gun consumable and parts below:** Remove gas nozzle and contact tip. Using inching button or gun trigger, feed wire until it exits the end of the gun about 4 inches (#6). Reinstall tip and nozzle over wire.

INSTALLING THE WIRE SPOOL

NOTE: Illustration immediately below is simplified for clarity and detail.



MIG GUN CONSUMABLES AND PARTS



Setup Guide

Getting Started

INSTALL THE WIRE AND FEED THE GUN.

Once the wire spool has been installed, flip the tensioner lever down and raise the top drive rolls to the upper position. See the illustration below. Gently guide the wire from the spool over through the wire feeder and into the front section of the gun at least 6 inches. Make sure the wire lays neatly in the grooves of both drive rolls. Hold it with your finger if necessary as you lower the upper drive roll arm down and raise the

the end of the wire is straight and able to be threaded through the wire feeder mechanism and gun.

TRIM THE WIRE AFTER INSTALLATION.

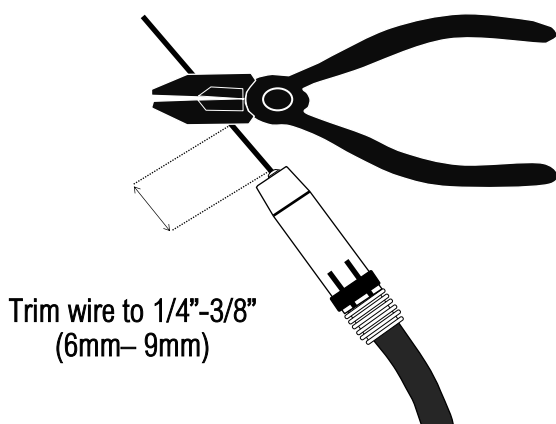
Trim the wire sticking out of the nozzle to 1/4" to 3/8" (6mm to 9mm) in length with wire cutters. See the illustration below. The gun is now ready for welding. *Hint: Always make sure that you re-trim the wire before beginning a new weld if the wire is not already trimmed to this length. This will help to improve arc restarts.*

PROPERLY TENSION THE WIRE FEEDER.

To feed properly, the wire needs to be tensioned before you begin welding. The tensioning levers have numbers on the dial. To increase tension, rotate the tension lever clock-wise. Different types of wires require different tensions. There is no exact tension that works for all wire types. However, for steel wire, you will generally tension to around 3 on the dial. Wire diameter can affect the tension requirement slightly. Wire quality also plays a small part in the amount of required tension that is needed. Lower quality wire may have slight variations in thickness, causing slippage of the drive rolls at various points, while no slipping is observed at others. For flux-cored wire, it will require a lighter amount of tension. For Aluminum, try 1.0 to 2.0 on the dial. Regardless of the wire type or wire diameters (and for best results), follow the process below and refer to the following illustration. Turn the unit on and pull the trigger so that the wire extends approximately 1" beyond the gas nozzle.

- Find a small block of wood, such as a two by four, and secure it to the welding table or other solid object. **Do not test this on metal or arcing may occur if the work clamp is connected!**
- Hold the gun approximately 2 inches off the wood. Aim the gun at the block of wood so that the nozzle is at a 30 degree angle to the wood.
- Pull the trigger and allow the wire to contact the block.
- Increase wire tension so that the wire contacts the block of wood and is forced to curl up. Continue holding the trigger so that two or three full spirals are made.
- If the wire stops, or stutters during this process, let go of the trigger immediately and increase tension.
- Adjust the wire until the stuttering or jerking disappears.
- Do not over-tighten the tensioner or use more tension than necessary. When the wire begins to curl without any stoppage, the tension is enough.

Trim Wire Before Starting a Weld

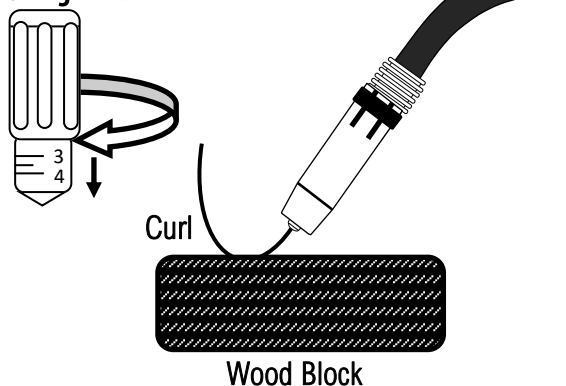


tensioning lever into position with your other hand. After the tensioner is raised back to the vertical position, confirm the wire is still in both grooves and is not riding up on the shoulders of either drive roll. Next, turn the welder on and set to a desired

Hint: The wire on the spool is usually bent and threaded through a small

Test Wire Tension Before Welding

Tensioning Lever X2



hole in the side of the spool to lock it in place and prevent de-spooling of the wire. Keep one hand on the wire spool to prevent despooling and cut the wire loose with a pair of wire cutters. Trim the wire to make sure

Component Identification and Explanation

Getting Started

SELECT THE PROPER TUNGSTEN TYPE.

TUNGSTEN SELECTION

Selecting the correct tungsten for your TIG welder is important. While Thoriated 2% Tungsten can be used in an inverter for DC welding, it is falling out of favor in the industry due to the slight radioactive nature of it. But as of now it is still an industry standard in North America. It should be noted that it has already been banned in some countries. Check your country or regions policy on Thoriated Tungsten. Other types are quickly becoming available everywhere. Call your local welding supplier or check online for sources.

For TIG welding with DC consider the following types.

- Lanthanated 2% (Blue Band). Overall this is one of the best choices for TIG welding and can be used for AC and DC welding. It has great arc starting characteristics, and its point holding capability is excellent.
- Ceriated 2% (Gray Band or Orange Band, depending upon brand and country of origin). This is a good choice for welding with both AC and DC, but doesn't hold up as well and starts to erode faster than Lanthanated at higher amperages. But arc starting is excellent.
- Lanthanated 1.5% (Gold Band). Holds up nearly as well as Lanthanated 2% and can be used for AC or DC welding. In some tests it has rivaled Lanthanated 2% performance.
- Tri-Mix/Rare Earth (Purple Band or Turquoise Band). Still relatively new. Some swear by it, and is being marketed as a replacement for Thoriated 2%. Overall, it does perform fairly well and even excels in many circumstances. But some problems have been seen with quality control. The primary metal oxide used is lanthanum 1.5%. Usually it also includes a small percent of Zirconium and Cerium to complete the mix. Some use Yttrium. But the balance of the composition blend are usually stated to be around .06 to .08%, but can be allowed to vary up or down from .04% to .01%, making the blend prone to inconsistency in quality control.
- Thoriated 2% (Red Band) Still considered the best for DC, works ok for AC, but has been banned in many markets outside the US due to a small radiation risk posed as an alpha emitter.

Do not use the following types of Tungsten.

- Pure Tungsten (Green Band). This will create arc instability. The tungsten will not stand up well to the more intense arc created by an inverter welder.
- Zirconiated Tungsten (White Band). This was created as an alternative for Pure Tungsten for Transformer welders. Similar issues welding issues are presented as with Pure Tungsten.

Purchasing Tungsten can be difficult. Local suppliers tend to put a premium price on Tungsten, and may be three times an online price direct from a distributor. In many areas, the choice of tungsten may be limited. However, many local welding suppliers are stepping up and offering competitive prices and range of selection, so don't rule them out until you have checked. Also, there are some companies that may send you free samples to test, so be sure to investigate their product, and give them a chance as well.

GRIND THE TUNGSTEN CORRECTLY.

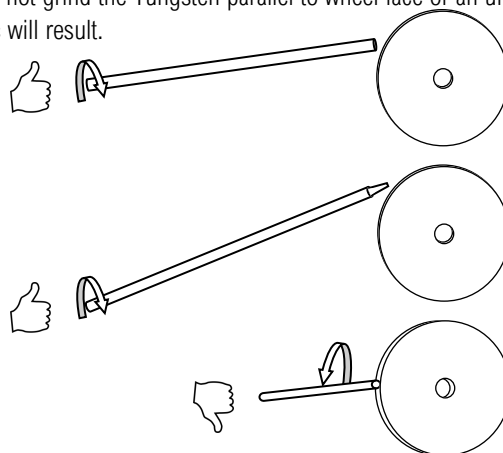
An improperly ground tungsten is a cause of many issues with arc stability, arc directability, and penetration. A bench grinder and a fine stone dedicated only for tungsten sharpening is all you need to put a point on the Tungsten. This is the age old standard. This does take practice to master. However, there are hand held special grinders that feature diamond stones with guided slots, designed to hold the tungsten at the proper angles. A chemical sharpener is available and is relatively inexpensive, and does an excellent job in seconds. An added bonus of it is that it can be done without getting up from the bench top without removing the tungsten from the cup. The tungsten should be hot before attempting as this activates the chemical.

! WARNING!

Wear safety glasses and leather gloves while grinding tungsten or serious injury may occur. On occasion tungsten may split or shatter.

How Do I Grind My Tungsten?

- Grip the Tungsten firmly. Grind with the tungsten secured.
- Grind the Tungsten perpendicular to the wheel face. Allow tungsten to grind slowly without much pressure.
- Rotate the Tungsten quickly as it is being ground to keep the point even and symmetrical.
- Do not grind the Tungsten parallel to wheel face or an unstable arc will result.



Component Identification and Explanation

Getting Started

Choosing the proper grind angle is important to achieving the weld penetration, bead appearance, and arc cone width that you desire. While there is no true “one size fits all” angle, there are some general rules of thumb to observe:

- Always grind in-line with the length of the tungsten. Never make radial grind (in the direction of the circumference) marks on the tungsten which will cause arc instability. Never grind with the tungsten held parallel to the stone face.
- For most applications, grind a point that is 2 –2.5 times in length than the tungsten is wide. This will create an angle of about 30° to 35°.
- For AC, a more blunt angle may be used (around a 60 degree) for best penetration. However, the 2 to 3 times in length rule will still work for many circumstances.
- For higher amperages, you will want to put a slightly truncated tip on the tungsten.
- Grip the tungsten firmly and slowly rotate it while grinding.

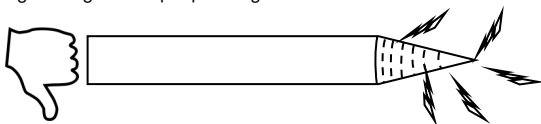
As you use the tungsten (depending upon the type you have selected) you will notice that the tungsten will gently form more of a pointed dome as it is used. This is normal and the arc will remain stable. Depending upon what arc properties you are looking for, you may periodically want to regrind your tungsten to maintain optimal arc characteristics.

The use of a scratch start TIG rig tends to accelerate wear on Tungsten. Experienced users, however, are able to get many starts out of the Tungsten before a regrind is necessary. Inexperienced users may find themselves regrinding nearly after every start!

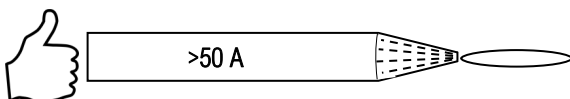
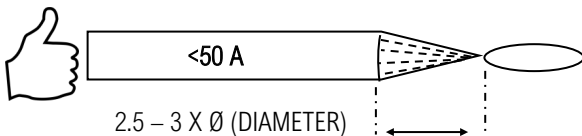
If the start is performed incorrectly, small bits of Tungsten will be left to contaminate the weld puddle. For best results, especially for beginners, leave a slightly blunt point on the end of the Tungsten so the end of the Tungsten will not snap off into the weld while striking an arc. The best key is to practice and follow the arc starting directions found in the “Explanation of MIG and TIG Operation” section.

GRINDING TUNGSTEN CORRECTLY

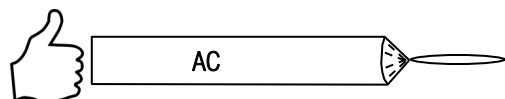
- Never use a radial grind pattern. This can be caused by grinding at the wrong angle, or spinning the tungsten too fast while grinding at the proper angle. The arc will be unstable.



- Grind the angle so that the length of the grind measures 2 to 2.5 times the wide of the tungsten (For general purpose use this should form about a 30° to 35° angle.) A slightly blunted end (truncated) may be used if the amperage is over 50A to prevent the tungsten from breaking off into the metal while welding.



- AC welding may require a blunter point for some applications where greater penetration is desired. It may seem counter-intuitive, but this will create a narrower arc cone and provide more penetration.



Component Identification and Explanation

Getting Started

NEED-TO-KNOWS ABOUT THIS WELDER

Before delving too deep into the setup and parts identification of the welder, it's important to discuss a few key design and operational features of this unit so that the user can fully understand and better take advantage of the design elements of the welding machine.

This unit is sold as a “package” which comprises three parts.

1. The “Power Source”. This is the main part of the welder. It is designed to produce the power and convey it to where ever it is needed via cables and control wires. As a power source, its job is to generate welding power. For wire welding, it depends on the wire feeder for the main controls. Other controls are located on the face of the power source. However, main voltage and wire feed speed are controlled via the wire feeder itself. For TIG, Stick and Arc Gouging applications the wire feeder plays not part in control. All other functions are controlled on the front of the machine.
2. The Wire Feeder. This wire feeder is used for all wire feed operations including MIG, Gasless Flux-Cored, Flux-Cored with gas and other similar wire feeding applications. The wire feeder uses an umbilical cord to connect to the power source. The umbilical allows the wire feeder to be detached and used up to 50-75 feet away from the power source (with optional umbilicals). When in wire feeding mode the main controls of Voltage and Wire/Speed Amps are controlled by the wire feeder. Other controls relating to the 4T functions of the wire feeder are set and adjusted on the main power source. Both the standard MIG gun and the optional Parker DSP 360 spool gun connect directly to the wire feeder.
3. The Cart. The cart ties everything together and keeps it secure. However, this does not mean the parts cannot be separated. If separating, please make sure that both the power source and the wire feeder are secure and not subject to over turn or tripping.

The power source itself can be used with umbilical cables up to 75 feet with MIG and wire feed processes. Additional cables can be added up to 100 feet to the work clamp and to the stick electrode holder to lengthen its reach. In some instances the reach for Stick can be greater, but some performance loss may be experienced.

The power source is connected directly to the work clamp. For TIG, Stick and Arc gouging, the torches are connected directly to the power source itself. This means the unit can be carried to where it is needed without the wire feeder assembly or the cart.

This unit operates on 240V 1 phase and 480V 3 phase. While operating on 240V 1 phase maximum output is reduces for wire feeding from 400A to 315 A. For TIG, Stick and Arc Gouging, it is reduced from 400A to 300A. For full 400A output the unit should be used on 480V 3 phase. However, whether operating on 240V 1 phase or 480V 3 phase the duty cycle remains unchanged at the maximum respective outputs at 60%.

When using with the wire feeder, the adjustments are made on the wire

feeder and the display on the power source changes to reflect changes made to the settings. Other aspects of the weld cycle and trigger operation are made on the power source itself. This splits control between the wire feeder and power source while giving main control functions to the wire feeder.

The Current Display on the power source displays in percentage of maximum wire speed available since the unit operates at two different maximum wire speeds depending upon the input voltage. When welding however, the display changes function and displays actual welding Amperage. This can help reduce difficulty in tuning the welder wire feed settings. As with all wire feed Constant Voltage (CV) types, the wirefeed speed controls Amps as well. Different amperages will be produced at the same given wire speed however, due to the differences in wire diameter and type. The best way to determine your exact setting is to make a quick estimation of the wire feed speed using simple math and then weld with it and observe the indicated Amperage. To determine approximate wire speed feed, multiply percent selected (0-100%) in decimal form by the maximum wire speed of the input voltage (240V 1ph= 600IPM; 480V 3ph= 750IPM).

The Voltage Display on the power source can only be adjusted in the wire feeding mode on the wire feeder. The wire feeder sets voltage and it is reflected in the display, and the display changes function when welding to display actual measured output voltage. This is normal. Stick, TIG and Arc Gouging control voltage via the arc length. This means that the display will reflect measured output voltage at all times when in any mode except wire feeding mode.

MIG is referred to as a generic wire feed term on the panel. There are no other special settings for this welder for wire feeding applications. All wire feed applications should use this setting.

Stick/MMA and arc gouging are essentially the same function, so it shares the same setting. A special Air-Carbon Arc Gouging torch, if required, should be purchased locally, along with an adequate air compressor to supply the demand of the torch.

The power source provides DC TIG output when the selector switch is set to TIG. This is a gas valve torch and no automatic control of gas on and off is provided (Gas is provided via solenoid control in wire feeding applications however). The gas must be cycled on and off manually. When in TIG mode, keep in mind the Tungsten is continuously live. An accidental contact with any weldable, connected surface will result in an accidental arc flash. The arc start type of this welder is sometimes called lift start, but more properly it is actually scratch start. This means that the Tungsten must be struck against the surface of the weld metal to start the arc. It can also be struck against the grounded filler wire for a cleaner, quicker arc start.

For general settings and advice we recommend downloading one of several excellent free online welding apps or purchasing an inexpensive “slide card” calculators available on line from welding supply stores. The MIG ones offer both wire feed settings and actual expected Amp settings that correspond to the wire feed recommendations, making setup easier.

Setup Guide

Getting Started

NOTICE:

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. Other factors control smooth wire feeding as well. Wires that are .023" to .035" (.6mm to .9mm) require a liner change from stock size of the gun and/or smaller gun to prevent wire balling/bird's nesting at the feeder. For wires .030-.035" and smaller, consider purchasing the 24 series gun along with a blue liner. The .030" wire diameter should not be used in a gun over 12.5 feet (4m). Purchase of an optional liner and possibly a smaller series gun such as the 15 or 24 series, which are available from Everlast, is recommended for use with these smaller sizes for best performance. This unit is not recommended for use with .023" wire unless a 10 ft 15 series gun is connected.

NOTICE:

If feeding difficulty is observed, first confirm that the liner is the proper size and torch is proper length for your wire diameter, then:

1. Remove the welding gun's gas nozzle, contact tip and contact tip's adapter.
2. With an air nozzle blow compressed air through the wire guide. Wear eye protection!
3. Blow out the wire feed mechanism and reel housing with dry compressed air.
4. Reassemble components. Tighten the contact tip and contact tip's adapter with the spanner included to ensure tightness. Do not overtighten any fittings or stripping of the threads may result.

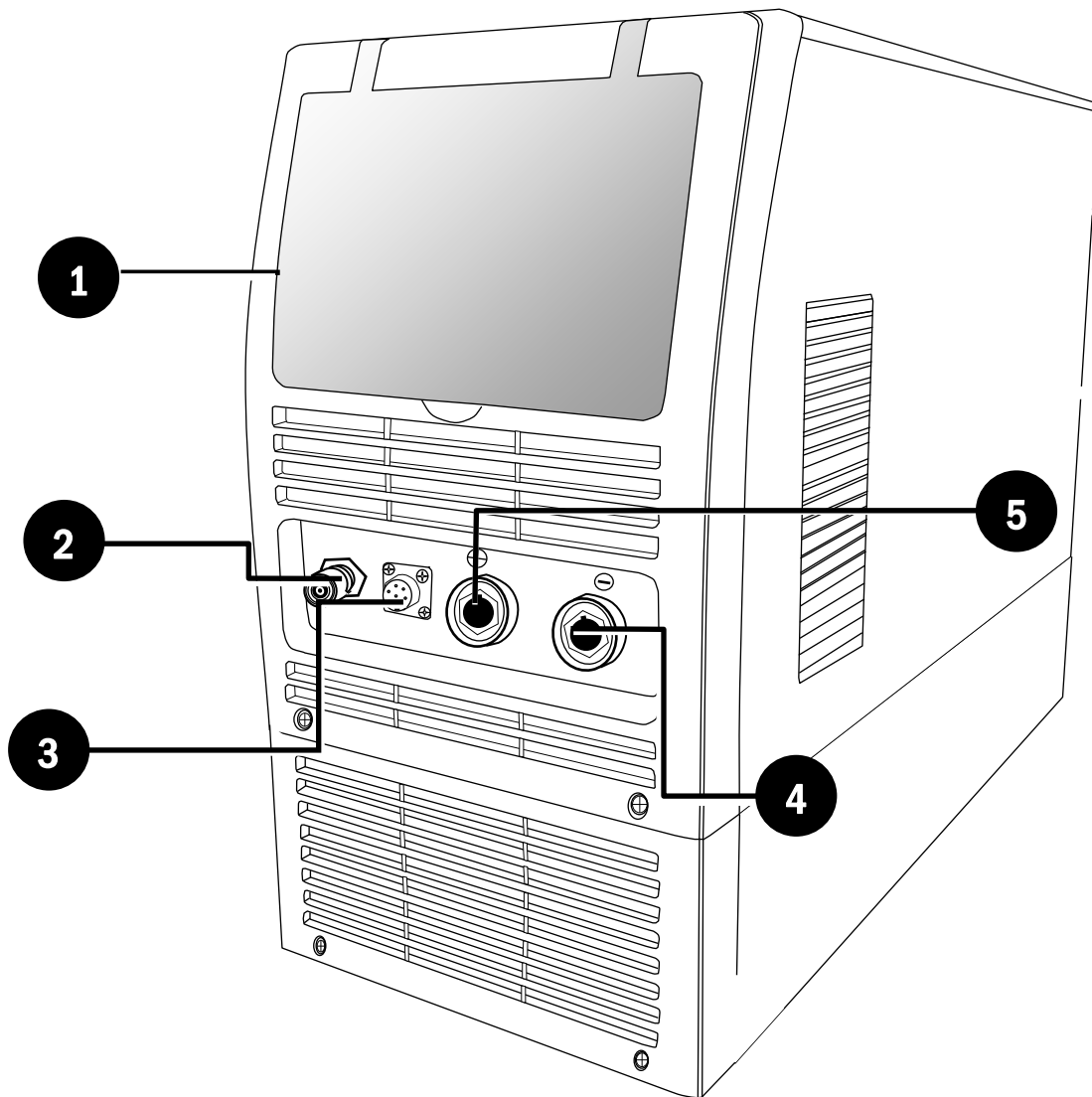
The MIG torch liner may eventually become worn and will need to be replaced. When welding aluminum with the main gun, a polymer liner must be used, which necessitates a liner change. A spool gun is the preferred method to weld Aluminum, but a polymer liner may be used with guns 10ft. and under to weld aluminum. In this case, you will need to change the standard liner intended for steel use to feed directly from the machine and use U groove drive rolls to prevent deformation to the wire.

To change the liner:

1. Remove the nozzle and the securing compression nut of the liner (#17) to expose the brass fitting end of the liner (if a polymer liner is already installed it will be a brass ferule and o-ring).
2. Straighten the gun cable and withdraw the liner slowly from the gun. *If the liner refuses to be withdrawn easily, this could indicate severe liner damage or gun cable damage.*
3. Carefully push a new wire guide in to the gun. Make sure that the wire guide travels all the way to the contact tip without interference with tip. Remove Contact tip once installed.
4. For Polymer liners, make sure the O-ring and brass ferule at the machine-end of the gun are installed. For steel liners make sure the fitting is flush and the O-ring is in place.
5. Tighten the liner in place without over tightening, especially with the polymer liner.
6. For polymer liners cut the line 1 to 2 mm from the rear compression nut (at the Euro quick connect fitting) and file the sharp edge of the liner. For steel liners, no trimming is required unless liner is sticking out gun handle too far. If the liner is passing the point where the contact tip screws in and seats, remove and trim the liner with a pair of side cutters or similar tool and file any sharp edges before reinserting the liner.
7. Reattach the gun and tighten all parts.
8. Re-thread wire through the feeder and gun, leaving contact tip off until wire feeds completely through the gun. Once the wire feeds through install contact tip and nozzle.

Component Identification and Explanation

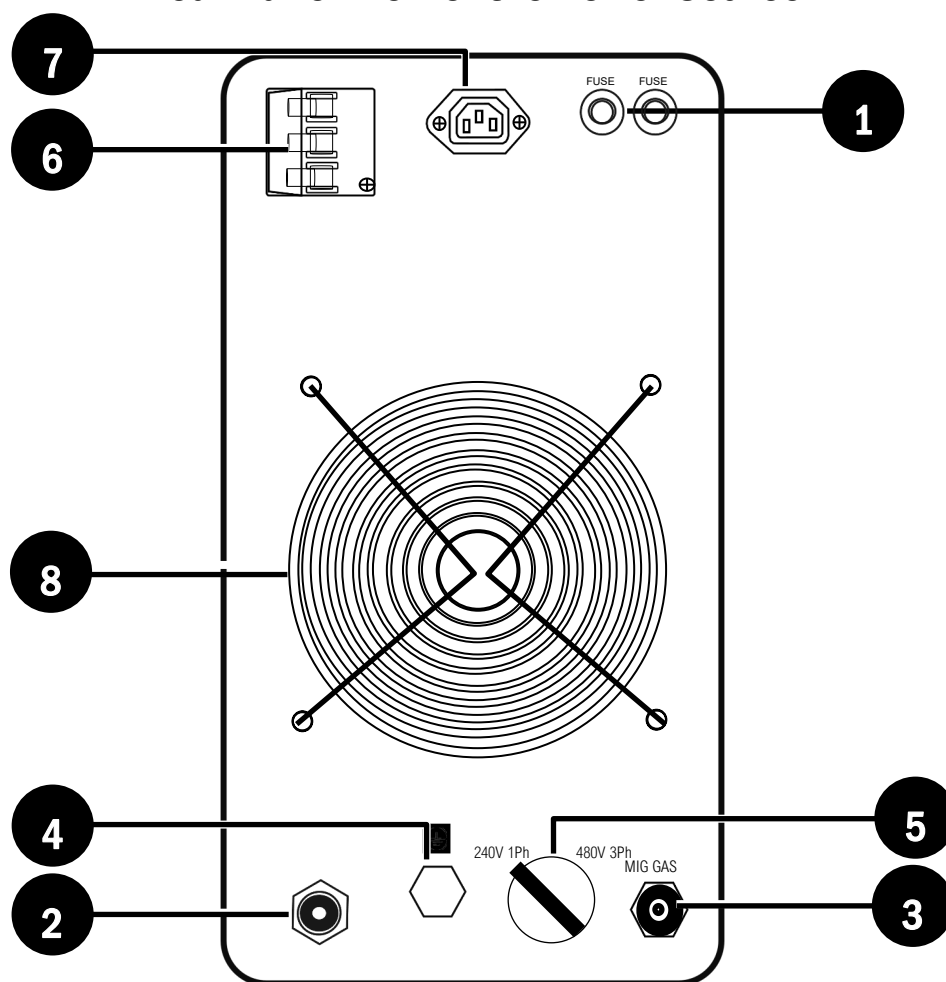
Front Panel View of the Power Source



Number	Component Identification	Component Note
1	Protective Cover	Keep cover down and in place during welding activities and in storage.
2	Quick Connect Gas Fitting for MIG	Connect to MIG Wire Feeder
3	Control Connector	This connects to the wire feeder assembly via the umbilical (not shown, but provided with wire feeder).
4	Positive Terminal (+) DINSE 35/50 Type	For MIG and gas shielded Flux-cored wire, connect to the Wire feeder cable via the umbilical. For Stick, connect to the electrode holder cable. For gasless (self shielded) Flux-Cored connect the cable of the work clamp. For TIG connect to the work clamp. For Carbon arc gouging, connect to the cable of the customer supplied torch.
5	Negative Terminal (-) DINSE 35/50 Type	For MIG and gas shielded Flux Cored wire, connect to the work clamp. For gasless Flux-Cored wire, connect to the wire feeder cable via the umbilical. For TIG connect to the TIG torch cable.

Component Identification and Explanation

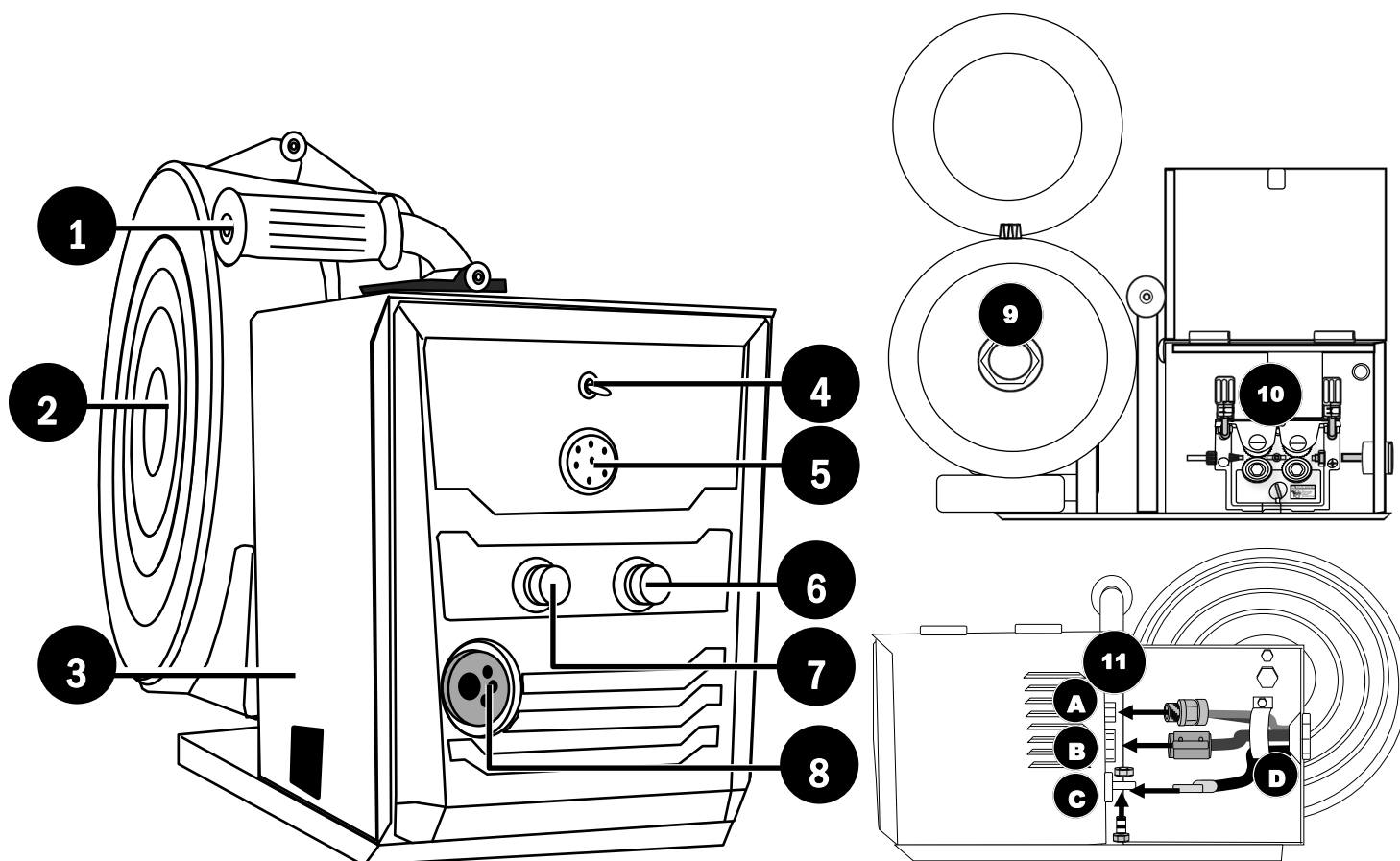
Rear Panel View of the Power Source



#	Component Identification	Component Note
1	Fuses	These fuses protect the the unit from damage. If the wire feeding stops or the machine suddenly powers down without warning, check both fuses. Replace the fuse(s) with the identical type supplied with the machine. Check the marking on the fuse for Amperage and type. Do not replace with smaller or larger Amperage fuses. This is a common type automotive fuse.
2	Input Cable	The unit may be operated on 220/ 240V 50/60Hz 1 phase input power or 480V 3 phase power. There is no one plug that can accommodate both power inputs, so the unit is supplied without a plug. The standard plug for 240V 1 phase operation is the NEMA 6-50, 3 prong power plug (see wiring instructions in this manual). The style and type of a 480V 3 phase plug may vary. The input power cable is sized properly for the length of run and wire strands used to accommodate the input amperage of the machine. Do not attempt to match the gauge of the input power cable when wiring the welder. Use article 630 of the NEC and a qualified, licensed electrician to properly size conductors.
3	MIG Gas inlet connector	5/8" CGA Inert Gas fitting. Use only for MIG. TIG is connected directly to the regulator and a manual gas valve torch on the TIG torch handle is used to control gas flow. This is a standard fitting use for connection of all argon and argon/CO2 gas fittings to regulators in the North American Market. <i>Other regions may vary the type supplied.</i>
4	Ground Service Bolt	For use in a combined effort to mitigate any electrical interference that may be caused by the operation of this unit. This should be connected (if needed) to an outside ground rod driven into the soil. Normally this is not used unless interference is observed. If it is needed, this represent an extensive grounding project. First try relocating the welder and affected objects. If no success is obtained, inspect building ground. If nothing is found then All metal objects should be attached to a separate ground outside the shop. Contact Everlast for further details.
5	Power Input Selector Switch	This is the selector switch for input power. WARNING: The input power should be determined before connection. The switch must be selected for the correct input power before plugging the unit into a power source.
6	3 Pole Breaker/Power Switch	This switch doubles as the main power switch and disconnect switch. If this switch trips and the welder power turns off, a significant internal event or failure of the switch <i>may</i> have occurred. If this occurs, immediately remove this unit from service and mark/tag according to regulations. Contact Everlast Tech Support for further diagnosis and/or repair options.
7	36V CO ₂ Heater connection	The unit is able to be used effectively while MIG welding with CO2 gas. This outlet supplies 36V for a heater used on CO2 regulators (consult regulator manufacturer for power requirements before use) to prevent icing. WARNING: Do not connect any other device to this outlet, including water coolers!
8	Fan	This fan runs continuously to provide high duty cycle output at maximum operating amperage.

Component Identification and Explanation

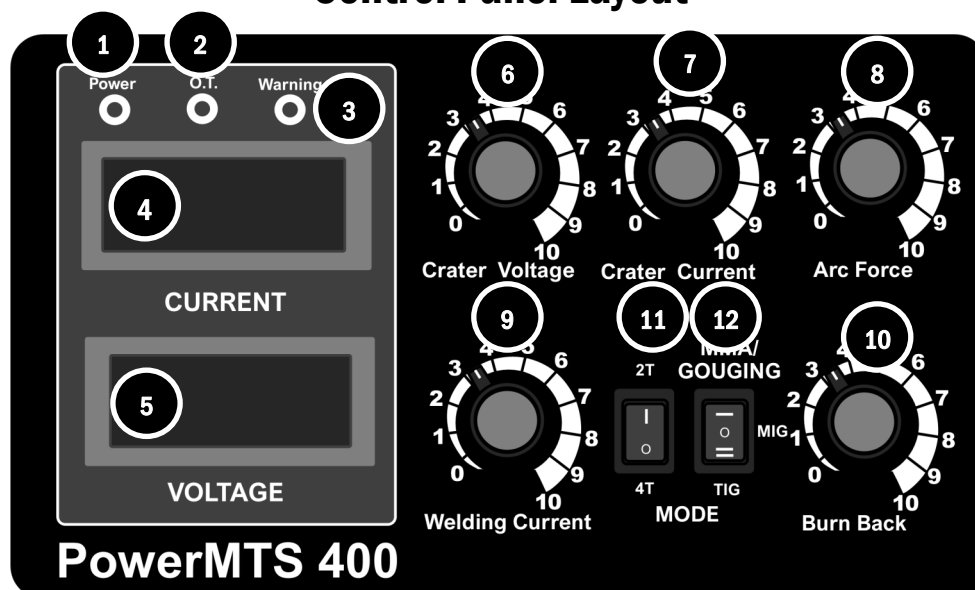
FCS 203 Wire Feeder View



#	Component Identification	Component Note
1	Lift Handle	This secure lifting handle is for lifting only. It should not be used to suspend the wire feeder. To suspend the wire feeder, tap into the bottom skid and use it to suspend the wire feeder.
2	Clam Shell Cover	The clam shell cover should not be removed and should be kept closed while in operation and storage. The only time the clam shell cover should be open is while servicing the wire or the unit.
3	Wire Feeder Cover	Keep cover closed while in operation and storage. The only time the feeder cover should be open is during service or exchanging wire.
4	MIG/Spool Gun Switch	Keep switch flipped up unless using a spool gun. Up For MIG, Down for Spool gun. (Spool gun attaches to the main euro connection and the control connection (5).
5	Control Connection	This provides operating service to the Spool gun motor and controls the wire speed.
6	Wire/Feed/Amp Control	The wire feeder controls the main adjustments for the welder while being used for wire feed operations. This controls wire feed speed/Amps while wire feed welding. The display on the machine will actually read on percent of maximum wire speed. As the knob is adjusted a value from 0 to 100% will be displayed on the power source. During welding the power source display will change to read in actual measured output of Amps.
7	Voltage Control	The wire feeder controls the main adjustments for the welder while being used for wire feed operations. This controls voltage while wire feed welding. The power source will display the range of voltage while the knob is being adjusted. The actual measured voltage will be displayed on the power source while welding. Actual output voltage is affected by arc length.
8	Euro Connector	The Euro quick connector is the connection for both the standard MIG gun and the Spool Gun. No tools are required to install/remove MIG gun.
9	Spool Carrier Assembly	The carrier supports the wire spool. The hand nut captures and holds the spool onto the carrier shaft. The nut must be installed during operation. Tighten hand tight only to prevent overtightening. If the nut cannot be completely tightened, check for obstructions and see that the locating pin seated home fully. Some brands of wire spools have shallow locating holes. The locating pin can be trimmed by hand to shorten the length.
10	4 Roller Wire Feeder Drive	This unit features 4 drive rolls that are fully driven top and bottom. The bottom rollers contains grooves to accommodate different wire sizes and can be changed to suit the wire size desired. Optional sizes are available. Smaller wire sizes will require gun and/or liner change. Only the bottom grooved rollers are changed and the replacement kits contain 2 drive rolls total. The top rollers are smooth and are not changed.
11	Wire Feeder Connections	The wire feeder is connected to the power source via an umbilical. This umbilical contains three supply lines. (A) Shielding Gas Line. (B) Control Line. (C) Welding Power Supply Cable. The umbilical is secured by the bracket (D).

Component Identification and Explanation

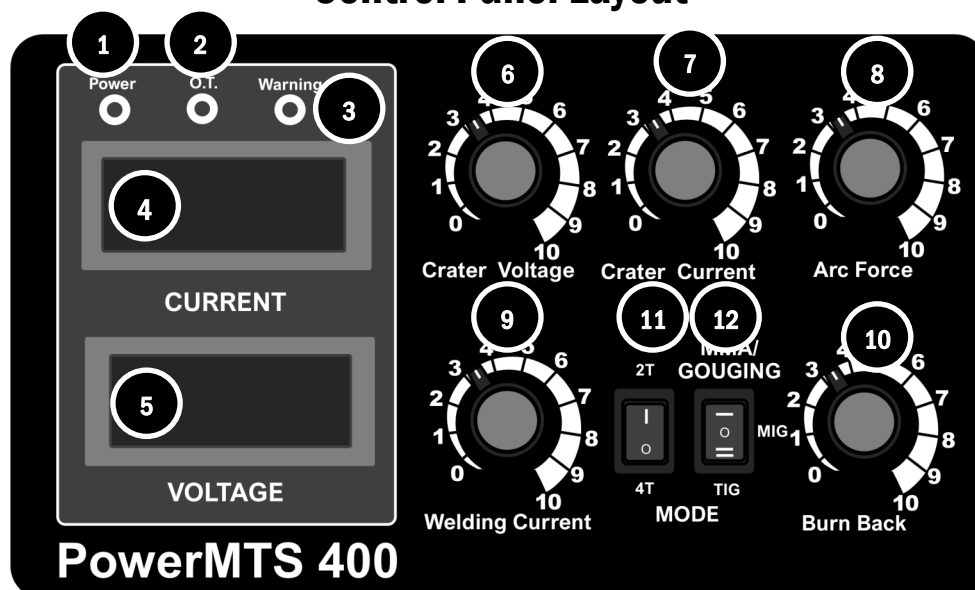
Control Panel Layout



#	Component I.D.	Component Note
1	Power On LED	This LED light should always be illuminated while the breaker is switched on in the rear. If the light goes off, but other displays work, check plug wiring and make sure no wires are loose. If problem cannot be resolved, contact Everlast Technical Support.
2	Over Temp/Duty Cycle LED	This LED light should only light when a thermal overload has been reached, which signals the duty cycle has been exceeded. If the light illuminates, output will be interrupted. <u>If it does illuminate, let the unit cool without welding, but while continuing to run for 15 minutes, even if the over temperature light does go out.</u> If the light does not go out, or illuminates early, check for proper fan operation. If fan is operating, remove cover and clean unit. If problem persists, discontinue use and contact Everlast Technical Support.
3	Over/Under Current Warning	If this LED light illuminates, check power input quality. Make sure input power has been selected properly with the switch on the rear of the unit. If cycling the power switch does not clear the fault or the problem reoccurs, discontinue use and contact Everlast Technical Support.
4	Current Display (Amps)	For CV wire feeding use, this unit displays a percentage of total wire speed while being adjusted, ranging from 0 -100%. Other wire sizes work best using a percent of wire speed. Keep in mind that maximum wire speed on 240V 1phase is 600 IPM while maximum wire speed for 480V is 750 IPM. So a setting of 50%, would result in approximately 300 IPM in 240V 1 phase and approximately 375IPM in 480V 3 phase. The machines actual Am-perage output can be verified by taking a look at the display while welding. <i>The wire feeder controls main Amps/ wirespeed output while MIG welding. Wirespeed combined with wire type/diameter controls Amp output on wire feed CV welders.</i> For other processes (Stick, TIG, Carbon Arc Gouging), the display will display selected current (amps) during adjustment and will reflect actual amp output while welding.
5	Voltage Display	For CV wire feeding use this welder displays voltage selected by the user on the wire feeder. While welding it displays actual voltage output. For the other processes (CV), voltage is a function of arc length and will not be adjustable. However, for observational purposes, actual voltage output, including OCV until the arc is struck, will be displayed continuously.
6	Crater Voltage (End Fill Volts)	The Crater Voltage is a wire feed function only and it only operates during 4T use. This is designed to provide a lower voltage at which to fill the crater at the end of the weld. This offers improved, precise control while using the 4T function to prevent weld cracking from the bottom of the weld crater. This is represented as an approxi-mate percentage of welding voltage. This is a 0-10 scale but represents 0-100%.
7	CraterCurrent (End Fill Amps)	The Crater Current is a wire feed function only and it only operates during 4T use. This is designed to provide a lower amperage/wire speed feed rate at which to fill the crater at the end of the weld. This is represented as an approximate percentage of wire feed speed/amps. This is a 0-10 scale but represents 0-100%.
8.	Arc Force	While Stick/MMA welding this controls the “dig” or the current reaction to the length of the arc. This provides an extra “boost” of amperage when arc length is short and voltage falls below desirable levels. This helps to prevent arc outage and allows greater heat control over the weld. Start around a base setting of 3 to 4 for most elec-trodes. Increase to 6 or 7 for cellulose EXX10 rods. Arc force should be set to minimum levels while TIG welding or Arc Gouging. For MIG this controls puddle fluidity and spatter. Start around 7 for a base setting for MIG.

Component Identification and Explanation

Control Panel Layout



#	Component I.D.	Component Note
9	Welding Current	This controls the current output (amps) of the power source while welding in Stick or TIG mode, and while arc gouging. This control is inactive while wire feed welding. Actual welding current (amps) will be reflected in the current display. The 0 to 10 scales serves as a rough visual guide and can be tic-marked with a marker to provide reference points for various established welding chores.
10	Burn Back Intensity	To prevent the wire from sticking in the weld after feeding after the arc is terminated during wire feed welding, burn back provides voltage for a short duration after the wire stops feeding. This is often caused by the freshly un-coiled wire spiraling down the MIG gun liner "decompressing" after feeding has stopped. This is most prevalent when using wire too small for the liner. Burn back should be adjusted for intensity of effect. Different wire diameters, weld positions, and even welding styles may require different amounts of burn back. For burn-back to work properly, the MIG gun must be held over the end of the weld for a brief second. If continuity is lost the wire may not burn back properly. Burn back also helps reduce the need for trimming the wire before the next weld. Sometimes this is referred to as a "wire trimming effect." This is a 0-10 scale adjusted for effect.
11	2T/4T Selector	2T and 4T are used only for wire feeding applications. This allows the user to select how the torch trigger functions and allows the user to incorporate the use of the more advanced wire feed functions such as Crater Voltage and Crater Current. 2T is simply a press and hold function. The trigger is pressed and held to start the arc and released to stop. 4T is more complicated, but still relatively straight forward. When 4T is used the trigger is pulled and held briefly while the arc is starting. When the arc is started, the trigger is released and welding will continue without the the trigger being held down. When the arc is ready to be terminated, the trigger is pressed and held again and the "Crater Fill" cycle will begin. The trigger is held until the crater has been properly filled. When crater is filled, the trigger will be released and then the arc will stop. The burnback cycle and brief post flow period will be started and finished automatically.
12	Process Selection	The process selector switches between different modes, MIG (all wire feed applications), DC scratch TIG with manual gas valve control and Stick (MMA). The arc gouging function is done in the Stick (MMA) mode. Keep in mind while arc gouging arc voltage is typically very high. Long arcs and use at the maximum settings may trigger an overcurrent or duty cycle event more quickly than realized since this is a near 100% duty cycle activity. The unit is designed to withstand carbon arc gouging, but some basic restraint should be observed when setting the maximum amps when 100% duty cycle arc gouging activity is expected.

Component Identification and Explanation

Explanation of MIG and TIG Operation

EXPLANATION OF WELDER FUNCTIONS

Volt and Amp Settings

When welding, the two main functions that require adjustment are Voltage and Wire feed speed. The function of voltage in MIG welding is to control the overall width and to a great extent, the height of the weld bead. In other words, voltage controls the bead profile. It controls wet-in at the toes of the weld, and arc length. Short arc lengths provide wider welds. The wire feed speed directly controls the amps, and in turn amps control penetration. When setting the welder up you will notice that the wire speed is displayed in Inches Per Minute. The relationship between wire diameter, wire speed and amps is easily figured with the following approximate industry conversions:

.023": $3.5 \times \text{Amps} = \text{Inches per minute (IPM)}$

.025": $3.1 \times \text{Amps} = \text{Inches per minute (IPM)}$

.030": $2 \times \text{Amps} = \text{Inches per minute (IPM)}$

.035": $1.6 \times \text{Amps} = \text{Inches per minute (IPM)}$

.045": $1 \times \text{Amps} = \text{Inches per Minute (IPM)}$

To convert wire speed (IPM) into approximate Amps, use the following conversion formula:

.023": $\text{IPM} \div 3.5 = \text{Amps}$

.025": $\text{IPM} \div 3.1 = \text{Amps}$

.030": $\text{IPM} \div 2 = \text{Amps}$

.035": $\text{IPM} \div 1.6 = \text{Amps}$

.045": $\text{IPM} \div 1 = \text{Amps}$

Keep in mind these are approximate conversions and do fall off in accuracy as amps are increased into the upper current limits for the given wire diameter. Also keep in mind that this machine displays settings in percent of maximum wire feed speed so some conversion to approximate Amp settings may be required.

Even though you will find general recommendations about setting the Amps, Volts and even shielding gas through a variety of free downloadable apps and online calculators, every filler metal manufacturer has its own specific parameters for Volt and Amp settings for each wire diameter and class of wire. The ranges of volt and amp parameters generally varies somewhat from brand to brand, so be sure to read the packaging and/or manufacturer literature to determine what range of settings are recommended. The wire diameter also limits the practical maximum thickness of what can be reasonably welded. The issue with following charts, graphs and calculator recommendations is that most people find them either too hot or too cold. For some people, it may not be close to the setting they are used to. However, nothing can substitute for watching and listening to the arc. If the arc is correct, a steady sound, similar to the sound of

bacon should be heard. The actual frying sound can vary somewhat and may have somewhat of a higher pitch whine to it. If these sounds are present, look at the arc to see if it is steady, and producing low amounts of spatter. If large amounts of spatter are present, the puddle seems fluid (appears wet) and the wire speed is within the targeted range, decrease volts a little at a time to reduce the spatter. If this does not correct the problem, change the torch angle and torch height. Hold the torch more vertical, with less than a 15 degree deviation from vertical and reduce stick-out of wire to 3/8" or less. If this still does not help, reduce the wire speed. Some spatter is normal, though it should be minimal overall.

NOTE: Another, often forgotten factor in torch spatter is using the wrong torch. The unit is equipped with a torch designed for heavy duty, large wire diameter use. The torch consumables have been selected to perform best with axial spray transfer, rather than short circuit. Select a smaller torch (from the selection of Everlast MIG torches), a smaller liner, or both for short circuit use with smaller wires. If you choose to stay with the stock gun, consider using larger diameter wires and using a spray capable gas such as 90/10 Ar/Co₂. The stock torch can be equipped with a smaller liner and different consumables, but it is often easier to weld with a smaller gun when smaller wire diameters ($\leq .035"$) are used. This allows greater flexibility and accuracy of the gun.

The wire can also pop and spatter if the voltage is too low for the wire speed and/or wire diameter. This is mostly observed as flying bits of red-hot but un-melted wire, along with popping as the wire inconsistently stubs into the puddle. This is followed by the wire pushing back against your hand pressure while the wire visibly turns white/red hot before burning off. Too low of voltage will also produce a high piled bead with the toes (edges) of the weld not properly wetting in resulting in poor fusion. Similarly too much voltage can cause spatter and undercut.

In fact, different diameter wires have a maximum "stability" range in which they physically perform best. With either too high of voltage or wire feed speed the capability of the wire may be easily exceeded. Once the maximum current carrying limits of a particular wire diameter has been reached, it can cause the wire to weld uncontrollably, burn back to the tip or even gas off alloys of steel with lower melting points directly and generally cause poor feeding performance which results in a poor weld.

Starting the Arc and Welding In the MIG Process.

Starting the arc is a relatively simple process. Before beginning, the wire should initially be trimmed to between 1/4 to 3/8". Once the wire is trimmed, the gun should be firmly grasped to prevent a phenomenon often referred to as "machine gunning". A light grasp, especially at start, can cause the arc to stutter as the wire pushes back on the gun, lengthening the wire stick-out and creating an irregular start and a porous weld.

The end of the wire should be positioned just barely above the metal when the trigger is pulled for the cleanest start. This will position the end of the contact tip about 3/8" above the weld for short circuit and 3/4" to 1" above the weld for axial spray. The gun should be in the vertical position, with no

Component Identification and Explanation

Explanation of MIG and TIG Operation

more than 5 degrees lean in either side to side direction.

Holding the wire too far off from the metal will result in rough starting and too long of wire stick out.

Once the arc has been established, the gun can then either be pushed or pulled in the direction of the weld. In either case, the gun nozzle should be positioned directly over the weld without angling the wire to one side or the other of the weld as already mentioned. The gun should have no more than 15 degrees lean pointed into (push) or pointed away from (pull) the direction of travel. In most cases a push motion is desired. However, a lot of texts offer conflicting information on whether to push or to pull the gun. In reality, both are correct if used correctly and with each having particular strength and weakness. Either one done with too much gun angle will result in undesirable results. Most learning minded people who are well versed in MIG quickly develop a sense of when to push and when to pull the gun. Even for novices, a sense of when to push and pull the gun comes quickly with a little practice. Pushing can result in shallower penetration but the molten puddle is easier to see and the arc sits easily on the leading edge. It will usually leave a aesthetically pleasing bead. However, be careful to prevent the gun from leaning toward or away from the direction of travel too much as spatter will increase and shielding gas flow may become turbulent, creating porosity in the weld. Pulling will result in deeper penetration, but can result in a narrow bead without much side fusion. It also can leave an undesirable humped appearance if not done correctly or if travel is too slow. **Whenever MIG welding with Aluminum, whether with the standard MIG gun or the Spool gun ALWAYS push the gun. If using Flux Cored wire, a dragging motion is almost always recommended.**

Weaving in Welding. Weaving (oscillating the torch or electrode from side to side in one pattern or the other), particularly in MIG, is a topic of controversy as much as whether to push or pull the MIG gun. Stringer beads are often best for novice welders. Stringers are simply straight beads that move forward with little or no side to side travel or oscillation. These will offer the soundest welds for a beginner in MIG or Stick. Stringer welds leave little or no room for contaminants to enter the weld and are the fastest to produce without creating an opportunity for cold lap. Moving too quickly however with a stringer can create undercut which will weaken the weld. The best policy is to move a slow steady speed, making sure the sides of the weld are filled. If undercut is present, it is either from too much voltage or moving before the wire has time to fill the area the arc has melted.

Think of weaving as a method of "sewing" the metal together. If weaving is of interest to you, start with the basic weave pattern. Simple weaves using one variation or the other of a cursive "e" motion are best to begin with. Other weave patterns can be used of course. C's, V's, U's, Triangles and many more weave patterns can be used depending upon the application. Weaves are employed for a number of reasons. Weaves are often considered to have a more pleasing appearance and can help bridge gaps where fit up is a problem. A weave is also frequently used to man-

age heat build up. For example: when welding vertically weaves are almost always used to prevent the molten metal from sagging due to the force of gravity. The major drawback of weaving is that it introduces a greater possibility of getting inclusions and other forms of contamination in the weld. Properly done weaving is a valuable tool, but it must be practiced before employing it in any structural or critical application.

Metal Pre-Cleaning.

MIG and TIG welding requires a well prepped surface to obtain a sound weld. The removal of paint, rust mill scale, or other contaminate such as grease should be done before welding. Stick welding is more forgiving of rust and mill scale, but when MIG welding, contaminants will result in porosity and inclusions in the weld, weakening it. In TIG welding it can be disastrous. TIG requires the most cleaning effort. A grinder will usually prep the metal sufficiently to remove oxidation and paint. However, to remove grease a degreaser such as acetone should be used. Do not use any degreaser such a brake cleaner with chlorinated solvents or death or serious injury may occur!

MIG and TIG filler wires such as ER70S-6 or ER70S-2 include a sufficient level of deoxidizers such as silicone and copper that are formulated to allow it to handle minor to moderate amounts of rust and mill scale. These deoxidizers will float out most moderate amounts of contaminants out of the weld and will appear in the usual form of glassy like deposits on top of the cooled metal. They are easily brushed off before starting the next pass. They should not be welded over. Any pinholes that appear are a result of trapped gas in the weld and should be ground out before the next pass. It should be noted that some MIG wires such as ER70S-3 have low levels of deoxidizers and must be thoroughly cleaned and ground before welding. MIG and TIG ER70S-2 and ER70S6 are the same except that TIG wire is cut to lengths and MIG wire is continuous. When welding fine gauge materials in TIG, you can substitute sections of thinner MIG wire.

Multiple Pass Welds.

One of the common misunderstandings that people have when beginning to weld is that if the welder has the power, then a single heavy pass should be used to weld it up. This is wrong. This technique is a good way to induce cold-lap and inclusions into the weld. Single pass welds should not exceed 1/4" even with the heaviest wire the welder is capable of handling. A thick pass may also begin to cool before contaminants and gas pockets have the time to float out to the surface. It's far better to make multiple smaller passes to complete a plate weld for a higher quality result. For best results, this requires that most joints 1/4" and over be prepared with a grinder to accept multiple weld passes. The weldment edges should be ground to form a V, U or J shaped groove to create a recess where the welds can be welded one on top of another. For welding

Component Identification and Explanation

Explanation of MIG and TIG Operation

with .035" wire and under, create a bead no thicker than 3/16" in a single pass, no more than 1/8" with .030" wire, and with .025" wire and smaller no more than 3/32 for best results. This will help maintain proper fluidity of the weld and prevent gas from being trapped in the weld and give time for any minor contaminants to float out of the weld. It will also help to maintain reasonable forward travel speeds. Too slow of travel speeds will create excess build up and can tend to create cold lap at the weld toes resulting in poor tie in. One issue created with a weaving technique even if the metal deposited is the correct thickness is that it can slow the forward progress down. If weaving is too wide, one side of the puddle will cool and oxidize before the torch is brought back across to that side. This is a point where porosity can be introduced.

Using the MIG Arc Force setting.

This unit features MIG Arc Force. It is also known as inductance and a few other names depending upon the manufacturer. The key to understanding MIG arc force is to understand that it controls the current ramp up time after the arc has short circuited. This affects how the arc sounds and performs. Since the arc force adjustment doubles for both MIG and Stick there are similarities but there are also differences. With MIG, as arc force increases the puddle fluidity increases, the sound of the arc lowers in intensity to a nice "frying sound". The resulting weld will look well formed in the toes and the puddle will be relatively flat. When 100% CO₂ is used or when welding stainless, arc force can be set to maximum for better wet in and reduced spatter. When the arc force is lowered, pitch increases and an high pitched whine is created while the arc grows stiff and doesn't wet in as well, but offers tight control of the puddle. The end result, especially if set too low will be a high ridged weld with a narrow bead. Deep penetration will be limited to the area directly under the bead center. For most basic welding chores start between 5 and 7.5 and adjust incrementally to achieve the best performance. Not all users will weld at the same setting since it is largely based on arc preference and previous brands/models used in welding.

Starting and ending an arc with a DC TIG Rig.

This unit is equipped with a traditional DC Scratch Start TIG Rig. This means torch connects directly to the regulator and the gas flow is controlled manually with a gas valve on the torch. There is no automatic solenoid control. Nor is there a HF start or even a true lift start.

To Start, the gas valve is opened on the torch neck so that Argon begins to flow freely. Then, once the gas has had time to cover the weld area, the arc is scratch started with a quick flicking motion of the Tungsten against the metal. (This is traditionally steel or stainless welding.) This scratching/flicking motion creates a small, sparking arc and the tungsten is quickly raised to establish a firm arc. With practice this can be a smooth seamless start to the naked eye. Experienced users will often ground their filler wire to the metal and flick against the filler metal itself to start the arc. This provides a cleaner start and reduces tungsten wear when mastered. The

down side to scratch arc start is that it wears Tungsten much more quickly, particularly when the Tungsten becomes hot and a restart is required. It is also more difficult to master than an improved lift start or an HF contactless start.

When the arc is ready to be terminated, the tungsten is quickly drawn above the work piece so that the arc is broken. This works best with a fast, snapping rotation of the wrist so that the torch head is parallel to the work. This must be done quickly or the arc may draw out and create issues with the weld, not to mention wandering excessively due to the long arc length.

Once the arc is terminated allow gas to flow to cool the tungsten and the torch for up to 20 seconds, depending on how much amperage was being used and how long the weld took to make. Don't forget to twist the valve shut or Argon will be lost.

Using the supplied DC TIG gas-valve torch.

Even though this welder is capable of producing 400A, it has been supplied with a 200A torch rated for 60% duty cycle. This is one of the most common sizes of gas valve torches and can handle most welding chores including running root pass welds on pipe and other general repair activities that require DC output. It is not uncommon to see this type torch equipped on similar multi-process machines for general service work. However, if more power output is needed than the torch is rated for, consider purchasing a larger air cooled torch locally or online from a specialty torch manufacturer that can provide the Amp and duty cycle specifications that are needed. Be sure to specify a "Gas-Valve" model. **The warranty cannot cover torches that have been over heated due to over-amping the torch or exceeding the torch duty cycle.**

Component Identification and Explanation

Explanation of MIG and TIG Operation

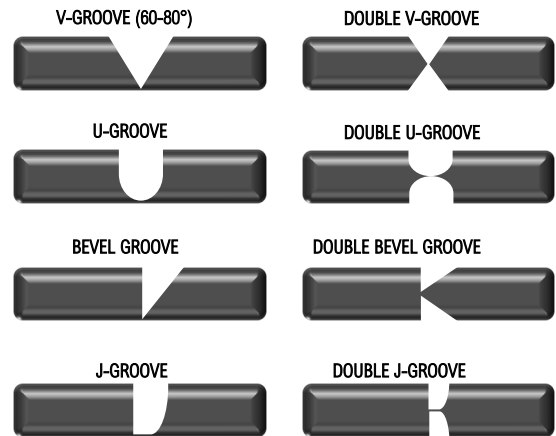
DIFFERENT COMMON TYPES OF WELD JOINTS

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

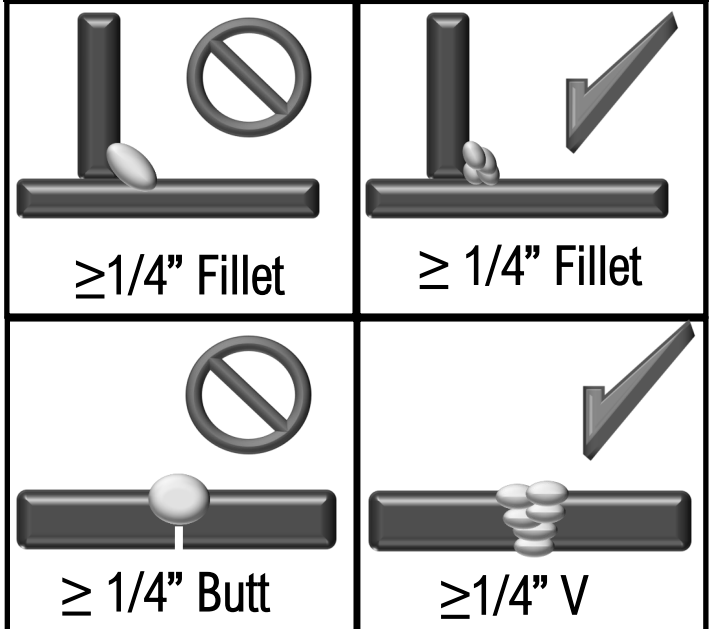
USE MULTI-PASS WELDS

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

Joint Preparation



Weld Pass Examples

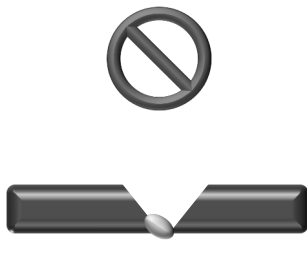
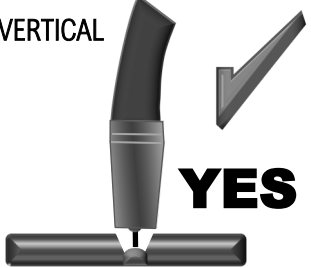
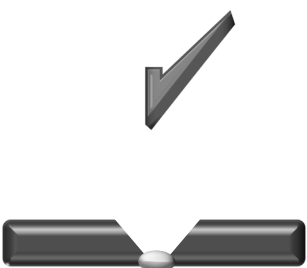
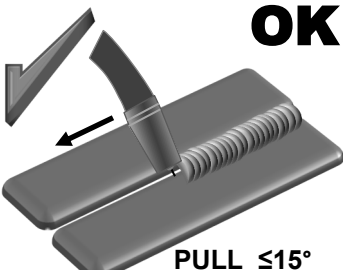
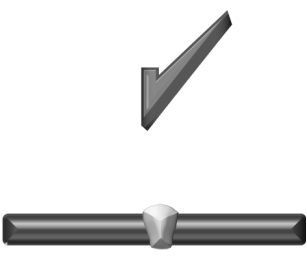
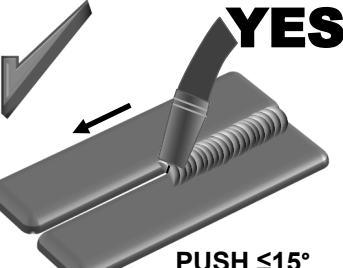
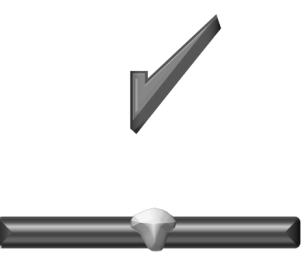


Component Identification and Explanation

Explanation of MIG and TIG operation

PUSHING VS. DRAGGING TECHNIQUES IN MIG

MIG Welding is fairly simple if you keep travel angle and direction in mind when welding. See below. If you are welding flux-core, the gun direction is reversed. **Remember: If it has gas, you use a push angle. If it is gas-less you use a drag angle.** *The old welder's saying "If it has slag, you drag." applies to Flux-Cored Wire welding.*

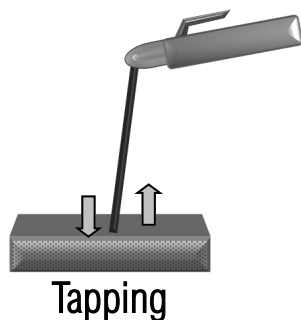
 NO	Problem Technique: The Gun is not being held vertical from side to side. Wire is not being directed to the center of the puddle. This concentrates heat on one side of the joint and results in poor fusion on the neglected side. It also can create more buildup on one side of the joint than the other. Correction: Hold the gun so that the angle of the neck stands perpendicular from side to side.	
VERTICAL  YES	Correct Technique: The gun is held in a near vertical position. A variance of 5 degrees or less is acceptable from side to side. The purpose is to prevent the arc from being concentrated on one side of the weld joint or the other. This balances the heat on both sides of the joint and keeps the bead centered. Don't confuse this with push or pull angle in the travel direction.	
 OK PULL $\leq 15^\circ$	Correct Technique: The gun is angled toward the back of the weld when traveling forward. This angle should not exceed 15 degrees. This provides a narrower but more deeply penetrating weld. Use this method when Flux Core wire is being used. Use this method where the unit may be reaching its maximum welding capacity. Not for use with Aluminum wire.	
 YES PUSH $\leq 15^\circ$	Correct Technique: The gun can be angled toward the front of the weld when traveling forward. This angle should not exceed 15 degrees. This provides a wider and generally more pleasing weld. However it is shallower penetrating. This method typically allows a much better view of the arc. Use for most types of welding unless deeper penetration must be achieved.	

Component Identification and Explanation

Stick Welding Information

STICK ARC STARTING METHODS

1. Make sure the unit is turned on and the boot cycle has finished.
2. Select the Stick Process on the Selector.
3. Make sure the electrode holder is in the Positive connector and the work clamp is in the negative connector.
4. Select the Amp level desired. No voltage adjustment is available. Select Hot Start Time and Hot Start Amps % (Intensity) to improve starting reliability. Use higher amounts of Hot Start %, over 50% with difficult to strike rods, or rods that aren't fresh or out of a sealed metal can.
5. Use the arc force control to select the desired arc characteristics, creating the desired arc characteristic and amp response needed to maintain the arc. Cellulose electrodes may not have the same arc force behavior as other welding electrodes, but each brand and size will weld a little differently. Typically rods such as the E6011 will require a setting 60-80% for best results. The arc force control setting will vary from person to person as well, with different rod angles, positions, and arc lengths all factoring into the arc force control performance. *If you are new to using an inverter welder, there are some aspects that will seem different. One of the main ones is that the arc is better controlled in most situations by "pushing in" when the arc seems to get weak or unstable and the arc force will kick in as the voltage drops. If the arc length is too long, the voltage rise will signal the inverter to shut down and will terminate welding output. This is done to limit amp draw on the circuit.* This threshold is shorter than most transformers, and an extremely long arc cannot be maintained. However, with a little practice, the arc will be easy to manage with some adaptation in technique.
6. Strike the arc with either the tapping method or the match strike method. Beginners usually find that the match strike method typically yields the best results.



HELPFUL HINT:

Pay particular attention to the Arc Force setting as it affects the aggressiveness of the arc and the amp response. Set the Arc force to approximately 3-4 and readjust it from that point to find the optimum setting. Adjust in half increments up or down from there to obtain the best results. Usually, an increase in the arc force for cellulose based flux welding rods is helpful. Lowering the Arc force setting is generally desirable for rods iron powder/Titania based flux. Too much arc force will create overheating of the welding rod, and even cause them to flame up. Too little can lead to sticking and arc snuffing. When welding, the weld will be slower than MIG speed. One of the most common mistakes for users transitioning from MIG to Stick welding is the travel speed. Allow the metal to fill the puddle as the rod travels forward. Be sure to try to separate the difference between the slag and the molten pool of metal. The slag will coalesce behind the puddle if travel and rod angle is correct. Do not let the slag travel in front of the puddle. Keep the top of the rod inclined to the direction of travel around 10-20 degrees while welding in the flat position (Electrode holder should be in front and inline of the puddle). To begin, simply start the arc, and then drag the rod slowly and carefully along the metal, allowing the rod flux to provide a standoff between the metal filler and the puddle. Be sure to keep feeding the rod steadily downward into the puddle as the rod melts. In the case of E6010, 6011, and other rods with a cellulose based flux, a slight stepping motion in front of the puddle about 1/8"-1/4" in front of the puddle can be used as a key hole opens up in the weld joint, ahead of the puddle. This is also called "whipping" the rod. Do not flip the end of the rod away from the puddle in a arc motion or the arc may terminate while using E6010 or similar cellulosic rods. When experience is gained, numerous manipulation methods may be used with rods such as E7018, 7014, 6013, and 7024. Weave the rod no more than 2.5 times the width of the welding rod. To begin weaving, weave small, tight patterns similar to C's, cursive E's, V's, or even figure 8's.

Component Identification and Explanation

North 36 Selekt Series MIG Torch Parts Breakdown

SELEKT SERIES

SN 36F/36S

额定值: 340A CO₂ 300A 混合气体, 60% 暂载率。焊丝直径: 0.8-1.6mm。

Rating: 340A CO₂ 300A mixed gas, 60% duty. wires: 0.8-1.6mm.



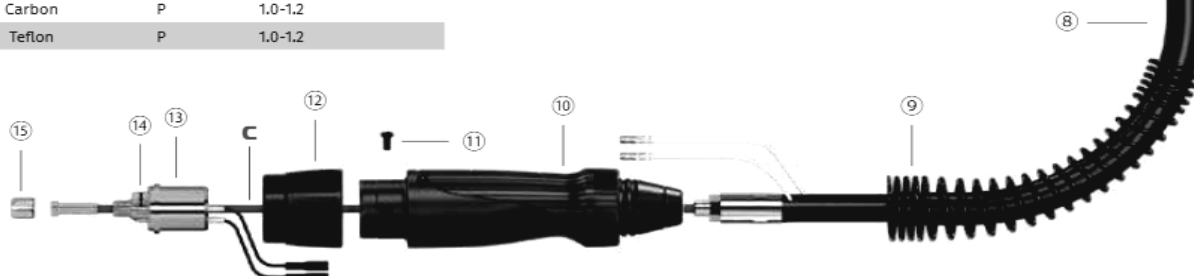
Model 型号		
Description 描述	Length 长度	Part Number 编号
SN 36F 欧式接头 4CE 枪头 Welding Gun c/w Euro Fitting	3M	SN 36F-3E
	4M	SN 36F-4E
	5M	SN 36F-5E
SN 36S 欧式接头 Klasik 枪头 Welding Gun c/w Euro Fitting	3M	SN 36S-3E
	4M	SN 36S-4E
	5M	SN 36S-5E

Components 部件					
No.	Part Number	Description	No.	Part Number	Description
1	EC3003*	Tip Adaptor M6X22 导电嘴座 M6X28	9	8M9500	Back Cable Support Spring 电缆后弹簧护套
	EC3001	Tip Adaptor M8X22 导电嘴座 M8X28	10	NH0202	Back Handle Assembly 后枪壳组件
2	ED3002*	Diffuser DMC 分流器	11	Q210406B	Screw M4x6 螺钉 M4x6
3	300636	Swan Neck 4CE-36 45° 4CE-36 枪颈 45°	12	NH020203	Gun Plug Nut 插件螺母
	3006362	Short Swan Neck 4CE-36 45° 4CE-36 短枪颈 45°	13	EU1001A	Euro Gun Plug 欧式接头
4	305500	Plastic Body 枪座	14	Q504010	O-ring 4x1 O 形圈 4x1
5	EJ0005B	Trigger PMS1585C 扳机 PMS1585C	15	EU1011	Nut M10x1, 螺母 M10x1
6	NH010216	Front Handle Assembly E16 前枪壳组件 E16			
7	NS0101	Front Cable Support Assembly 前弹簧护套组件			
8	SEL4530	Cable Assembly 3m 电缆总成 3m			

A Nozzles				
Part Number	Description	Material	Bore/mm	Length/mm
200600	Cylindrical	Copper	20.1	85
200610*	Conical	Copper	16	85
200620	Conical	Copper	14	85

C Liners			
Part Number	Description	Length/m	Wire Size/mm
302535	Steel	3	1.0-1.2
302545	Steel	4	1.0-1.2
302555	Steel	5	1.0-1.2
ER3412-P	Carbon	P	1.0-1.2
ER3312-P	Teflon	P	1.0-1.2

B Contact Tips				
Part Number	Description	Material	Wire Size/mm	Length/mm
EB2210	M6X8X28	ECU	1.0	28
EB2212*	M6X8X28	ECU	1.2	28
EB2214	M6X8X28	ECU	1.4	28
EB2210L	M6X8X28	CuCrZr	1.0	28
EB2212L	M6X8X28	CuCrZr	1.2	28
EB2214L	M6X8X28	CuCrZr	1.4	28



Component Identification and Explanation

North 36 Series MIG Consumables and Wear Parts (MB36KD Style)

GAS NOZZLES					
Part#	Shape	Material	Nozzle Dia. mm		Length mm
200600	Cylindrical	Copper	20.1	—	85
200620	Conical	Copper	14	—	85
200610	Conical	Copper	16	—	85
200630	Tapered	Copper	17	—	84



CONTACT TIPS					
Part#		Material	Nozzle Dia. mm		Length mm
EB2210	—	Copper	1.0	M6	28
EB2212	—	Copper	1.2	M6	28
EB2208L	—	CuCrZr	0.8	M6	28
EB2210L	—	CuCrZr	1.0	M6	28
EB2212L	—	CuCrZr	1.2	M6	28
EB3210	—	Copper	1.0	M8	30
EB3212	—	Copper	1.2	M8	30
EB3216	—	Copper	1.6	M8	30
EB3210L	—	CuCrZr	1.0	M8	30
EB3212L	—	CuCrZr	1.2	M8	30



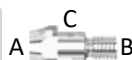
GUN LINERS			
Part#	Material	In/Out mm	Length meters
Blue Liner .030-.035"			
301535	Steel	1.5/4.5	3
301545	Steel	1.5/4.5	4
301555	Steel	1.5/4.5	5
Red Liner .035-.045"			
302535	Steel	2.0/4.5	3
302545	Steel	2.0/4.5	4
302555	Steel	2.0/4.5	5
Yellow Liner .045-.062"			
303635	Steel	2.5/4.5	3
303645	Steel	2.5/4.5	4
303655	Steel	2.5/4.5	5



GAS DIFFUSERS				
Part#		Material		
ED3002	—	DMC	—	—



CONTACT TIP HOLDERS					
Part#		Material	Thread A	Thread B	Length C
EC3001	—	Brass	M8	M8	28
EC3002	—	Brass	M8	M8	32
EC3003	—	Brass	M6	M8	28
EC3004	—	Brass	M6	M8	32



Troubleshooting

Common Welding Issues

NO.	Trouble	Possible Cause	Solution
1.	Unit is switched on, but the power light isn't on. Wire will not feed.	Switch damaged. Service Breaker/ Input Line Damaged Fuse	Check. Replace. Check. Replace.
2.	After welding machine is overheating and the fan does not work.	Fan damaged. Fan connector plus is loose	Replace. Check. Reinstall.
4.	Intermittent, wandering arc.	Work Clamp not connected directly to part being welded. Work Clamp worn/damaged Torch height too high. Wrong Liner or torch	Reconnect. Replace. Reduce MIG torch height to under 3/8" (for short circuit) Purchase smaller liner and/or 24 series Gun for smaller wire
5.	Porosity of the Weld. Discolored weld color.	Low flow rate of shielding gas. High flow rate of shielding gas. Possible gas leaks internally or externally due to loose fittings. Base metal is contaminated with dirt or grease.	Increase flow rate on regulator. Check for kinks in tubing. Increase post-flow time. Reduce stick-out to less than 1/4". Increase gas nozzle size. Clean metal thoroughly with approved metal cleaner, or use acetone and a rag to clean metal.
6.	Weld quality is poor. Weld is dirty/oxidized, or porous.	Drafty conditions. The welder is located on the work-piece and is blowing gas off due to fan activity. Solenoid is sticking. For Flux Core, a certain amount of spatter and smoke is common.	Eliminate drafts. Move welder. Check if there is sufficient shielding gas left in tank. Check gas flow. Adjust for higher flow of gas. Listen for audible click of gas solenoid. If no click is heard, then contact Everlast Support. Clean weld properly. Increase pre flow or post flow. Check polarity is correct for either MIG or Flux-Core, especially after changing between processes.
7.	Unstable Arc. Spatter.	Bad work clamp connection. Metal is indirectly connected through table or other item. Incorrect settings	Change Work Clamp. Use a direct connection to the part being welded. Check and adjust settings. Spatter usually increases when smaller wires are at the maximum welding capacity.
8.	Continuous Overheating	Settings too high. Too large of wire for job. Fan not running.	Reduce Settings, use smaller wire Check fan, repair or replace if not running or running at low speed. If it is not running correctly (fan should run continuously) contact Everlast.
9.	Stick arc will extinguish or stick	Holding too long of arc. Wet welding rods (high moisture in low hydrogen).	Shorten arc. Keep and maintain rods in a rod oven. Use only from sealed metal cans right after opening, then store balance in rod oven per rod mfg's recommendations.
10.	TIG Tungsten is consumed	Wrong Polarity Wrong gas Wrong Tungsten Too small of Tungsten for Amperage	Connect TIG to the negative terminal. Use only 100% Argon Recommended to use 2% Blue Lanthanated
	Other.		Contact Everlast.