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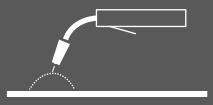
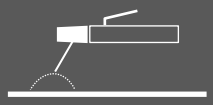
EVCYCLONE212i Rev. 1
USA/North America

EVERLAST
IGBT INVERTER TECHNOLOGY



DC 230A



DC 160A

Cyclone 212i

Safety, Setup and General Use Guide For The Cyclone 212i

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

120/240V

Operator's Manual

www.everlastwelders.com
Need Parts? Need Technical Help? Call: 1-877-755-9353
380 Swift Ave. Unit 12 South San Francisco, CA 94080, USA

EVERLAST
IGBT INVERTER TECHNOLOGY
Welders, Plasma Cutters, Multi-Process

TABLE OF CONTENTS

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 purpose 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!

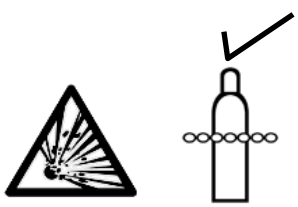
While accidents are never planned, preventing an accident requires careful planning. Stay alert!

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

MINIMUM REQUIRED SURGE WATT RATING: 10,000W
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.

Dual Voltage Single Phase 120/240V Operation:

This unit can be used with either single phase 120V or 240V output. Output will be reduced automatically when operating on 120V. However, for the higher voltage (since the standard of 240V is nominal and actual voltage may vary somewhat), the unit may be used with single phase 208V if the voltage does not drop below 205V. If using this unit on 208V, duty cycle and display accuracy may be affected. Rated and Inrush Amperage will rise proportionately as well. If you decide to use this machine on 208V, before installing permanently, have an licensed electrician monitor voltage fluctuations, particularly under load and during peak use times. If the voltage remains constant, and steady without dropping below the 205V threshold, this unit may be used. Damage caused by using on undervoltage power sources is not covered by the warranty. Always be aware of the voltage output and the quality of the power source being used.

REAR OUTLET WARNING!

If equipped, never use the electrical power outlet on the back of this machine for anything other than powering an Everlast brand water cooler. This is a special outlet designed to produce 240V with limited amperage draw. No other device or brand should be used in conjunction with this unit's outlet. This outlet is designed to supply 240V only. Do not attempt to modify, or change this outlet for use with anything else other than an Everlast brand water cooler designed for 240V operation. Severe damage, fire or injury may occur if other devices or other brand equipment is connected. **Not for use while operating on 120V!**

Specifications

Duty Cycle Information and Explanation

Duty Cycle is defined per North American Specifications as the amount of time out of a 10 minute period in which the unit can operate when tested at 40° C (104° F). For example, this unit has a stated duty cycle of 35% at 200A MIG output. That means that the unit can be actively welding for at total of 3.5 minutes out of a 10 minute time period at the maximum output of the welder (200A MIG, 230A TIG output and 175A Stick output). Everlast uses a standard output rating to figure duty cycle on this unit. A duty cycle of 35% is considered to be a commercial duty cycle class welder and is suitable for daily commercial use for light to medium manufacturing and production welding. Reducing the output of the machine will increase the duty cycle if all environmental factors are equal. Lowering the ambient air temperature and relative humidity will also help to increase duty cycle somewhat. Notice: MIG Duty Cycle at 230A maximum output is 15%.

The duty cycle rating of this welder is tested at an ambient temperature of 40°C (104° F) to ensure conformance to the North American Standard Standards . Operating the welder above this temperature point, or in extremely humid conditions, or while obstructing free flow of air in and around the unit may reduce the duty cycle of the welder. Additionally dirty units may suffer loss of duty cycle. As indicated previously, under normal conditions, the duty cycle will increase somewhat as ambient air temperature drops so long as the unit has access to clean, dry air.

The welder's duty cycle is not actually limited or controlled by a timer. Nor is it required to manually tabulate use time while welding. Rather than a timer, the welder is equipped with a heat sensor located on a heat sink near the critical power components of the welder. The sensor circuit is designed to interrupt the welding output of the welder if the unit overheats and exceeds the factory-set maximum operating temperature. 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. The unit will continue to run the fans and act normally except no welding output will be allowed until it cools below the trigger threshold. **If a duty cycle event is registered, do not switch 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 quickly triggered again since the unit resets just below the set temperature threshold.* 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 all welding activity and have been welding continuously for extended periods of time at moderate to high Amperages, keep the welder switched on for an additional 10 minutes without actively welding to allow it to cool.

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 welder. and can lead to early failure of internal components, guns and torches.

WARNING!

This unit is not designed for Air Carbon Arc Gouging or Cutting. Do not this unit for this application. It is not designed to sustain the high volt and long arc characteristics needed for Carbon-Arc use.

WARNING: Any Carbon-Arc use will instantly void the warranty! Do not be tempted to use Carbon-Arc Gouging or Cutting under any circumstances, regardless of the gouging electrode diameter that is intended for use.

NOTICE:

This manual has been written to guide the user in safe operation of the "Cyclone" series MIG/TIG/Stick welder. Due to Everlast's continual effort to improve and advance the design of the Cyclone series, units currently in production may have updated designs and programming improvements not found in earlier production models. Older models may not always be updateable without returning the units for major service (at customer's expense). Additionally, if an update is ruled to be possible, this is not considered to be a part of warranty work and is not eligible for return/exchange, unless it is an update designed to address and to correct a critical malfunction of the welder. *Some functions and specifications, not significantly affecting overall appearance or operation of the welder, may change from time to time without notice. Everlast holds no obligation and offers no promise, guaranty or any form of assurance to the customer or user to update older units to newer programming, features, accessories or styles found on subsequent model updates and releases, except those deemed by Everlast to be warrantable items related to welder malfunction or inadequate performance.*

Specifications

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.

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 INTERFERANCE 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.

NOTICE: DO NOT USE WITH DUAL SHIELD OR FLUX CORED OPERATION WITH GAS (FCAW-G)

This unit is not designed or recommended for use with Dual shield type welding. This is considered a heavy industrial process that this unit does not have typically enough output in voltage, amperage and duty cycle to sustain welding at recommended settings. Most dual shield applications use welding machines that are 300A and over. The synergic feature of the unit does not support dual shielded operation either. The Flux-Cored mode is a gas-less type of operation and does not include a gas shield function.

IMPORTANT!

This unit is designed to operate with most welding rods except for E6010. If 6010 operation is desired, consider using E6011. This welding rod has similar characteristics, but has arc stabilizers in the flux that allows it to be used in similar situations with welding machines that cannot run the higher arc voltages generated by the E6010. Always select a good quality brand for best arc stability. If arc instability is observed, switch brands or change the rod suffix designation. This unit operates best with a short arc, so either drag the rod, or hold a very short arc length so that arc outages are not experienced. A dragging motion, or a slight weave is recommended, but increasing the arc length may result in arc outages. Rods like E7018, and E7014,308, 309L, 316 and hard surfacing rods are excellent choices for use with this machine.

WARNING!

This unit is not designed for Air Carbon Arc Gouging/Cutting or scarfing operations. Do not this unit for these applications. It is not designed to sustain the high volt and long arc characteristics needed for Carbon Arc cutting/gouging use.

Specifications

Cyclone 212i Product Specifications	
Construction Type	Inverter (IGBT based, Digital Control)
Input Voltage	120V OR 240 V (± 10%) 50/60 Hz Auto-Adjusting
Phase	1 Phase 50/60Hz
I1MAX Current Rating (Inrush Amps)	120V: 33A 240V: 40A
I1EFF Current Rating (Rated Amps)	120V: 20A 240V: 20A
OCV	70V MIG/ Stick
MIG Duty Cycle @ Rated Outputs (Rated at 40° C/104° F)	120V: 35% @ 125A, 60% @ 100A,100% @ 80A 240V: 15% @ 230A, 35% @ 200A, 60% @ 160A,100% @ 130A
Stick Duty Cycle @ Rated Outputs (Rated at 40° C/104° F)	120V: 35% @ 100A, 60% @ 80A, 100% @ 60A 240V: 35% @ 160A, 60% @130A, 100% @ 100A
DC Lift TIG Duty Cycle @ Rated Outputs (Rated at 40° C/104° F)	120V: 35% @ 125A, 60% @ 100A, 100% @ 80A 240V: 35% @ 230A, 60% @180A, 100% @ 140A
MIG Output Range V/A (DC Output Only)	120V: 15.5-20.25V/ 30-125A 240V: 15.5-25.5V/ 30-230A
Stick Output Range V/A (DC Output Only)	120V: 20.4-24V/10-100A 240V: 20.4-26.4V/10-160A
DC Lift TIG Output Range V/A (DC Output lift TIG Only, not suitable for aluminum)	120V: 10.4-15V/10-125A 240V: 10.4-19.2V/10-230A
MIG Wire Feed Speed:	120V: 60-400 IPM 240V: 60-600 IPM
MIG Inductance	1-100%
MIG Burn Back Time	0-2 Seconds
MIG Spot Time	.5-15 Seconds
MIG Stitch Time	0-15 Seconds
MIG Wire Size Handling Capability	.023"-.045" (with optional drive roll and contact tip sizes)
MIG Spool Size	4" or 8"
MIG Drive Roll Sizes Included	.030" / .035" (.8mm / .9mm) V-Groove for MIG .030" / .035" (.8mm / .9mm) Serrated Groove for Flux-Core
Pre Flow Time	Auto, 1-10S
Post Flow Time	Auto, 0-10S
Stick Hot Start Time	0-2 Seconds
Stick Hot Start Intensity	0-100% above set Amperage)
Stick Arc Force	0-100% above set Amperage
Stick 6010 Capable	No. Use E6011 as substitute.
MIG Gun Type/Length/ Connector Type	North SN24 Series 12.5 ft/ 3m w/ Euro Quick Connect
250A Work Clamp with Cable Length	6.5 ft (2m) DINSE 35/50 (1/2 nom. dia.)
250A Stick Electrode Holder Length	9.5 ft (3m) DINSE 35/50 (1/2" nom. dia.)
Power Cable Length	6.5 ft (2m)
Power Plug Type for Single Phase Operation 240V	NEMA 6-50P (Standard 240V Welder Type)
Cooling Type	Full Time, High Volume Fan(s)
Dimensions (Approximate)	17.5" H X 9.75" W X 26" L (445mm X 248mm X 661mm)
Weight (Bare Unit with Cord and Handles Attached)	59 lbs.
Ingress Protection Rating	IP21S

Setup Guide

Getting Started

UNPACK THE 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. First, 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.

You should have the following in your box:

1. Cyclone 212i MIG/Stick welder (bare unit).
2. Floating Ball Regulator for MIG. (hose included but not pictured).
3. 24 Series MIG Gun/Torch. (MB24KD style)
4. 250A Work Clamp (approx. 9.5 ft with cable).
5. 250A Stick Electrode Holder (approx. 9.5 ft with cable).
6. 240V to 120V power cord adapter.

NOTICE:

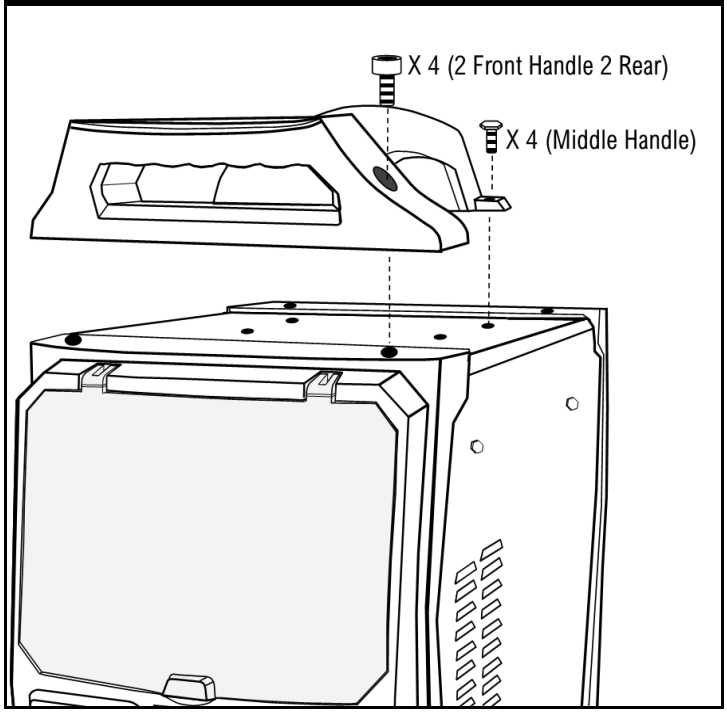
This unit includes an additional MIG contact Tip but does not contain any other MIG consumables, including filler (MIG or Flux-Cored) wire. Additional sizes of contact tips, nozzles and basic gun parts are available direct from Everlast's website, from other online sources and may be also available locally at welding supply stores that carry parts for similar 24 Series styled MIG guns. *Additionally, 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 .035" and .030" wire. For flux core or aluminum use, you must purchase the correct type for proper wire feeding. See more drive roll information found later in this manual.**

NOTE: If you think you are missing a needed part, check the consumable kit bag and box before calling Everlast for replacement. If you are missing parts, call 1-877-755-9353 ext. 206 for help. (Only in the USA, for other areas, contact the distributor in your region).

ASSEMBLE AND READY THE UNIT.

Assemble the front, middle and rear handles with the supplied screws. Do not overtighten. *Screws are usually found pre-mounted in the case.* Remove the factory shipped plastic over the screen. Install cut-to-fit screen protector (not included, customer supplied) on the screen, if desired, before use.

ASSEMBLE THE HANDLES



POWER UP AND TEST THE UNIT.

You will need to fully test the unit as soon as possible. Within 72 hours after delivery 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. 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 keys, cycling through each as required. *Make sure the fan is operating via the control panel menu setting.* After the test is completed, turn the unit off, connect the accessories, and shielding gas (customer supplied) to conduct live testing. Test all of the functions and features of the machine. For testing and welding, make sure the work clamp is connected directly to the part being welded (the work). Check for arc starting and stability. If problems are observed, contact Everlast for further guidance. See page 5 for more information.

NOTICE: *Cosmetic damage claims made 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 deployment or sudden disability).*

CHECK FOR GAS LEAKS.

This unit has a gas connection on the rear. The connection should be tested for leaks before attempting to weld. You can best test this by first installing the MIG torch to the welder. Use a soapy water mixture in a spray bottle and apply it to all fittings and visible connections starting at the gas valve on the gas cylinder.

Setup Guide

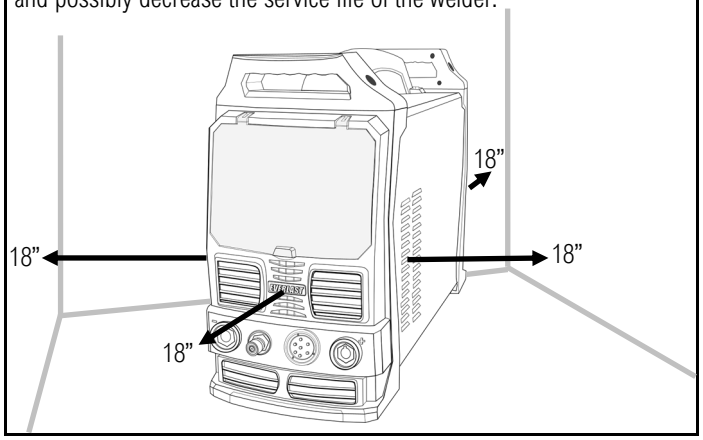
Getting Started

GIVE YOUR WELDER 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.

Allow Air Flow Space of at least 18"

Keep a distance of 18" from all sides to promote cooling and preserve duty cycle. Less air space will reduce duty cycle, accelerate overheating and possibly decrease the service life of the welder.



DISTANCE YOUR WELDER FROM YOUR WORK.

As a best practice technique, be sure to locate the welder away from the immediate welding area. The fan found in your unit is powerful enough to create strong air turbulence in the weld area. When the fan cycles on, it can disrupt the smooth, even flow of shielding gas around your weld creating unstable arcs and porous welds, resulting in dull finished weld. If possible, the welder should be located at least 6 feet away from the weld area and should be placed on a different level to prevent weld porosity and defects being created by the welder's fan system. Keep in mind that air flow exits from both the front and the sides of the welder.

Setup Guide

Getting Started

NOTICE:

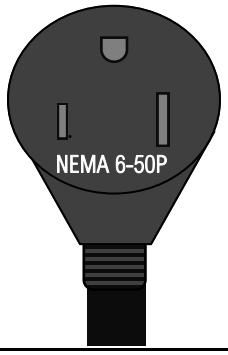
There are special rules centered around wiring an outlet for service with a welding machine. The National Electric Code under Article 630 has developed specific regulations for wiring electrical service for welding equipment. These are different than for other types of service such as a stove or dryer in a household or even in a commercial application. You need to consult and/or employ a locally licensed electrician before installing this unit to make sure all national and local codes are followed. If you are not qualified to make these connections, do not try to make them. Everlast is in no way liable for any damages caused by improper connection of your welder. Your welder should be on a dedicated branch circuit not far from an electrical disconnect box. It is very important that the welder not share circuits with other shop or household items. Do not attempt to adapt existing household circuits because conductor wire colors are different for welders. Additionally, only 3 wires are used for single phase welders. No neutral is used in a welder circuit. The white and black wires are used as conductors in a single phase welder service. A red wire is not used. *The input power cable and plug conforms to North American standards for size, length, with consideration given to inrush amperage, rated amperage and duty cycle. Do not modify, or attempt to rewire your unit. This will void your warranty.*

CONNECT THE WELDER TO THE OUTLET.

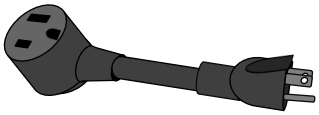
Your unit has been shipped with a NEMA 6-50P plug and 6.5 ft. (2m) cable installed on the unit. This is the standard type plug used for 240V 1 phase welders in North America. For single phase 240V connection, select a NEMA 6-50 Receptacle for operation with this unit. (Other regions/ countries vary). A neutral is not used. In a dedicated circuit, the wire wires supplying power (the conductors and ground) are black, white and green. A red wire, which is traditionally used as a "hot" leg (power conducting wire) of power is not present in a three-wire 240V wire circuit of a plasma cutter. From the panel box, the Black wire serves as L1(Hot), White serves as L2 (Hot) and Green serves as G (Ground). No neutral wire is needed, so white is used as a "hot" conductor wire in this instance. It is recommended to either install a receptacle as close to the main panel as possible or install a subpanel cutoff as close to the outlet and welder as possible. Always follow local codes when making these connections. **Do not share or piggy-back another device with this unit.**

When 120V operation is required, simply connect the supplied 240V to 120V pig tail adapter. This adapts the unit from the NEMA 6-50 Plug to the NEMA 5-15 Plug to allow the unit to be used with 120V input without further modification of the welder. No wiring or buss bar changes are required. Once the unit is plugged in, it will automatically detect the new power and boot up in 120V mode. To verify 120V mode, the display screen will reflect the power input mode with one of the center tree information boxes displaying "120V". To change back to 240V input, shut the machine down, unplug the adapter, and reconnect to the 240V power supply. Turn the welder back on to reboot the unit back to 240V operation. Keep in mind that this is a commercial welder and operation in home garages or other similar spaces may require rewiring to meet code and/or to prevent electrical interference with other electrical devices. If electrical interference is observed, contact a local electrician to resolve the issue.

Standard Plug Configuration 1 Phase 240V



240V to 120V Pigtail Adapter (Supplied)



Pigtail Power Adapter
(NEMA 6-50R to 5-15P)

Selecting A Breaker and Wire Size

Select a breaker based off of the I_{1MAX} rating of this unit. This is the maximum inrush current of the unit. The inrush is not a sustained current. The I_{1EFF} 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 needed to supply the welder, Refer your electrician to Article 630 and the specification page of this manual (or the specification grid printed on your unit) when selecting the correct breaker and wire size. Use a delayed trip breaker, or slow blow fuse.

Using with 208V 1 Phase

This unit may be operated with 208V service 1 phase service. However voltage should be checked under load before allowing permanent installation. Voltage should not fall below 206V or damage may occur to the unit. Most modern 208V service runs several volts above 208V and is not usually a concern. Older installations where service wiring may be degraded or not up to code may produce sub standard or low voltage not suitable for use with this unit.

Setup Guide

Getting Started

CONNECT YOUR UNIT TO THE CORRECT SHIELDING GAS.

Always wear safety glasses when changing a cylinder. Before installing the regulator, stand to the side of the cylinder valve, away from the discharge, and give a quick blast of Argon gas by slightly opening and closing the valve rapidly. This will dislodge any dirt or particles stuck in the valve or the threads. This will help reduce the chance of dirt particles making its way into the solenoid valve, causing future sticking and failure issues.

This unit is equipped with two 5/8" CGA rear gas connections, one for MIG shielding gas(es) and one for TIG shielding gas. This allows both cylinders to be connected at the same time. These connectors are clearly marked on the rear of the welder. When connecting be sure to match the gas to the correct gas connector.

The welder is supplied with a single regulator, which must be swapped from one cylinder to the other unless another regulator is purchased. If only one connecter is connected, be sure to keep one of the red plastic plug (supplied during shipping) inserted into the vacant gas fitting. Both plugs should be kept inserted when the machine is disconnected from service or stored to prevent debris and insects from entering the connector opening.

Connecting the cylinder will require a cylinder wrench (1 1/16") to connect the regulator to the cylinder (North American Cylinders with CGA 580 valve). If you do not have a cylinder wrench, a large, adjustable wrench will work. However, make sure it is properly adjusted to prevent rounding of the shoulders of the fitting. Do not use pliers, or a serrated jaw wrench such as a pipe wrench to tighten the fitting.

Connect the regulator tubing to the regulator. The regulator tubing may have either a hose barb connection (Non-North American Markets) or a threaded connection (North American markets). If the regulator supplied has a hose barb, make sure the hose barb fitting is tight on the regulator. Tighten with a 3/4" (19mm) wrench. **If it is a threaded connection, use 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 and to ensure maximum sealing. After connecting the tubing to the regulator, connect the other end of the tubing to the 5/8" CGA fitting on the unit. **Hold the fitting on the unit with one 3/4" (19mm) wrench firmly while tightening the hose fitting with another 3/4"(19mm) wrench.** Other markets outside of North America may feature a hose barb connection in the rear.

IMPORTANT: This is a compression fitting! Do not use thread tape or pipe sealant on any cylinder, regulator or other unit connection. The residue and debris may get into the gas solenoid and cause operational issues. It is recommended that NPT 90° elbow fittings not be used in conjunction with these fittings to reroute the angle of the connection. Use only CGA 5/8" elbow fittings if rerouting of gas line is required.

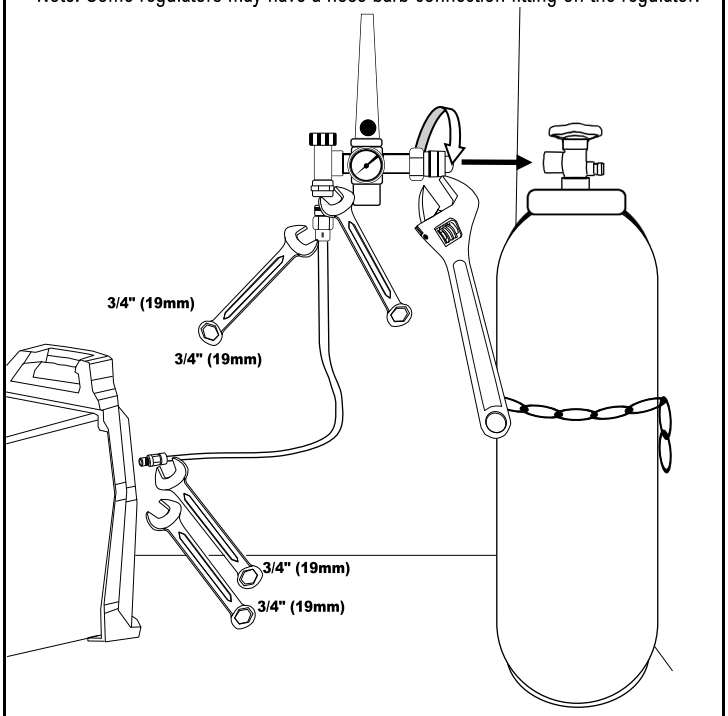
REMEMBER: *Do not tighten the rear unit connection without holding the female fitting on the unit side with another wrench. If you fail to do so, damage is likely occur to the bezel and the female fitting as the fitting may turn in the plastic housing. Overtightening will cause the fitting to snap-off in the solenoid housing or crack down the threads.*

CAUTION!

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

Connect Regulator To Cylinder And Unit.

Note: Some regulators may have a hose barb connection fitting on the regulator.



Setup Guide

Getting Started

What Shielding Gas Should Be Used?

The Cyclone 212li is a synergic unit which incorporates on screen recommendations for the type of gas needed for each process. The MIG gas recommended may change due to the settings of the unit. This recommendation change occurs when the wire settings cross over into the spray arc range when C25 (Steel) is selected on the panel. This is not an absolute guide. But it is based off of general accepted standards and thresholds. When this change occurs, the numbers will also change to yellow to reflect the process limit has been reached and to achieve best performance the gas should be changed. If the gas is not changed, performance will begin to become erratic as the spray threshold is reached and surpassed. Even with the proper gas selected welding performance may become erratic as the limit of the wire to handle the volt and amps applied to it is exceeded.

The following gases should be used with this unit:

MIG
Steel: 75%/25% Ar/CO_2 (75/25 or C25) (for Short Circuit Transfer)
90%/10% Ar/CO_2 (90/10 or C10) (for Spray Transfer)
100% CO_2 (C100) (for Short Circuit Transfer only)

Stainless (Inox): 98%/2% Ar/CO_2 (98/2)
Aluminum: 100% Ar (Argon)

TIG

Steel: 100% Ar (Argon)

For MIG, Steel has a two steel settings on the panel, C25 and C100. In the North American Market, 75/25 is the standard gas choice for short circuit MIG. If 75/25 gas mix is not available for use, and 80/20 is an option, then this gas may be used in place of 75/25. Doing so may require more tuning in power set mode to achieve best performance. The C100 setting is more economical, but will produce more spatter while welding.

This unit is designed to be used with 98/2 Ar/CO_2 blend when welding Stainless Steel. While, there are other gas choices, such as "Tri-mix", 98/2 is typically the most widely available and economical gas for welding Stainless Steel (Inox). It can be used to short circuit or spray arc and works best with the PowerSet setting. Tri-mix may be used but it does not offer spray capability and will require more adjustment in PowerSet mode.

Aluminum 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. Aluminum is designed to only be welded in a spray transfer setting. Short circuit should only be used for thin, non structural applications. Regardless, only pure Argon should be used.

For DC TIG, gas selection is simple. There is only one gas used. 100% pure Argon. No other gas will be needed for this unit when welding in TIG mode.

NOTICE: The on-screen programming will remind you what polarity to use, but in case you forget, refer to the illustrations on the next page. Also remember that the shielding gas recommendations are not adjustable or selectable. These are to remind you to use the gas that the unit was optimized to use. This does not exclude the possibility of using other MIG gases. 90/10 or at least an 85/15 Ar/CO_2 combination may be used when the wire begins to transition to spray arc ranges.

If the wire begins to sputter or act like the unit is throttling/surging the output at higher settings, lower the wire speed and voltage until the arc stabilizes. This happens for two main reasons:

1) The wire speed with the larger diameter wires (throttling mostly occurs with .035" or while operating on 120V) is exceeding the amp (or wattage) output capability of the machine. Lower the wire speed and voltage until the arc smooths out. The unit will likely hit the duty cycle fairly quickly if operating above 200A.

2) The wire diameter's physical limitations have been exceeded or the wire has reached the transition range between short circuit and globular transfer or even spray range. Smaller diameter wires begin to transition to globular or spray transfer well below the maximum amp output of the machine. Generally limit .030" steel wire to below 160A and .023" to below 90A output with 75/25 gas for smooth short circuit transfer. Spray transfer is achievable with the smaller wires, but results are often poor with wires smaller than .035" in diameter. But if the wire must be operated at a higher setting that is in the spray threshold, transition to 90/10 or at least an 85/15 Ar/CO_2 gas.

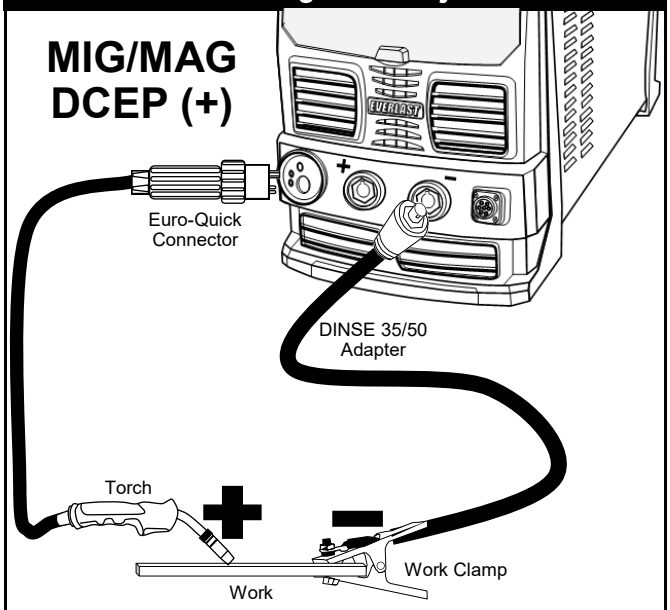
Setup Guide

Getting Started

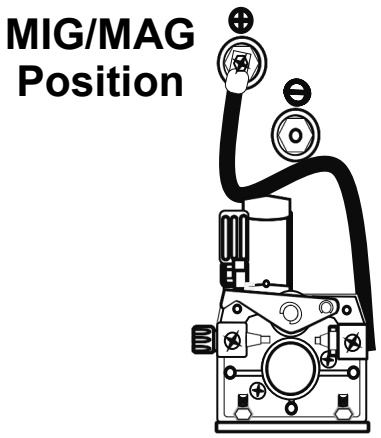
SELECT THE CORRECT MIG AND FLUX-CORED POLARITY.

Even though similar in concept, MIG/MAG (GMAW) and Gas-less Flux-Cored (FCAW) welding require a polarity change when transitioning between the two. The unit will remind you with an on-screen prompt to change polarity when you change between the processes, but this is an often over-looked issue, even when reminded by the machine. Failure to change polarity will result in erratic operation, bird's nesting of the wire, poor fusion and excess spatter. Use illustrations below as a guide.

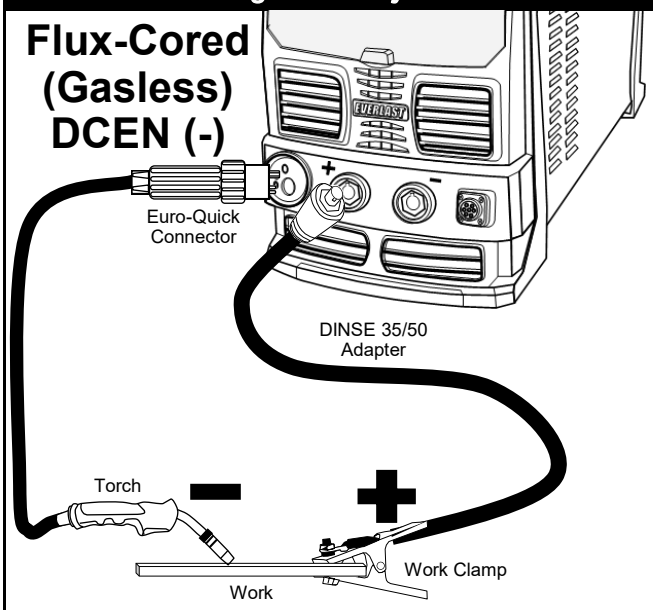
How Do I Change Polarity For MIG?



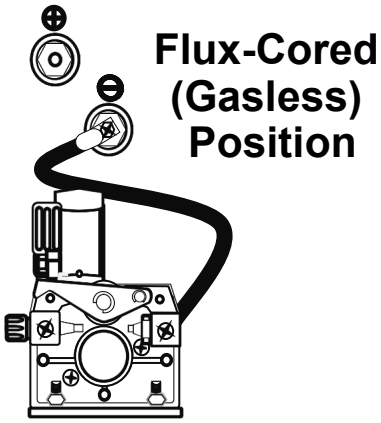
The MIG gun must also be correct in polarity. Drop open the cover on the left side of the MIG to access the wire spool and feeder. Just above the feeder, the are two terminal lugs. The upper is Positive, and the lower is negative. If there are no positive (+) or negative (-) symbols, there may also be a label that says "Gas MIG" and "Gasless" or something similar. Regardless, the top terminal is positive and the bottom terminal is negative. For MIG, the wire feeder cable should be connected to the top, positive (+) terminal with via the provided screw. See below.



How Do I Change Polarity For Flux-Cored?



When welding most all gasless flux-cored wires, polarity will be negative. There are a small number of exceptions. However, if the manufacturer doesn't state the polarity, assume it is negative. Drop open the cover on the left side of the MIG to access the wire spool and feeder. Just above the feeder, the are two terminal lugs. The upper is Positive, and the lower is negative. If there are no positive (+) or negative (-) symbols, there may also be a label that says "Gas MIG" and "Gasless" or something similar. Connect the wire feeder cable to the bottom terminal lug via the provided screw.



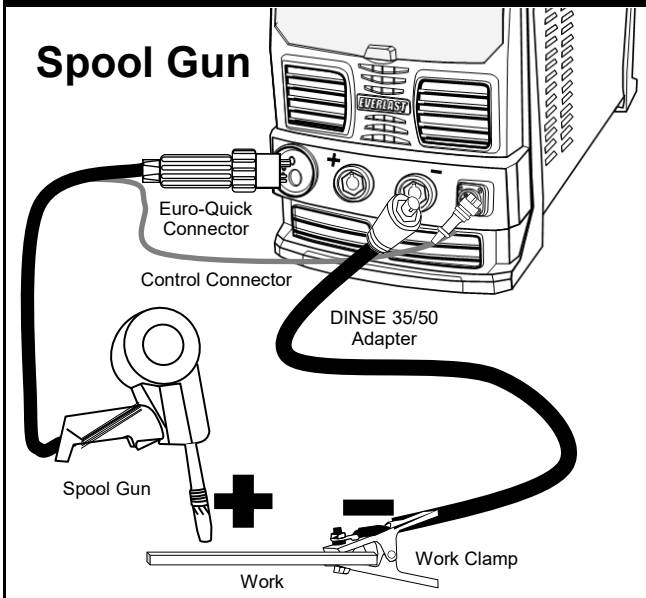
NOTICE:

This unit is not specifically designed for dual shield operation (FCAW -G). The Flux-cored operation that this machine supports is a gasless process (FCAW). The PowerSet and manual function is programmed for this type of operation. Below 200A, Flux-Cored may be used in the Gas Mix or CO2 mode, but the unit is not

Setup Guide

Getting Started

Where Do I Install The Spool Gun?

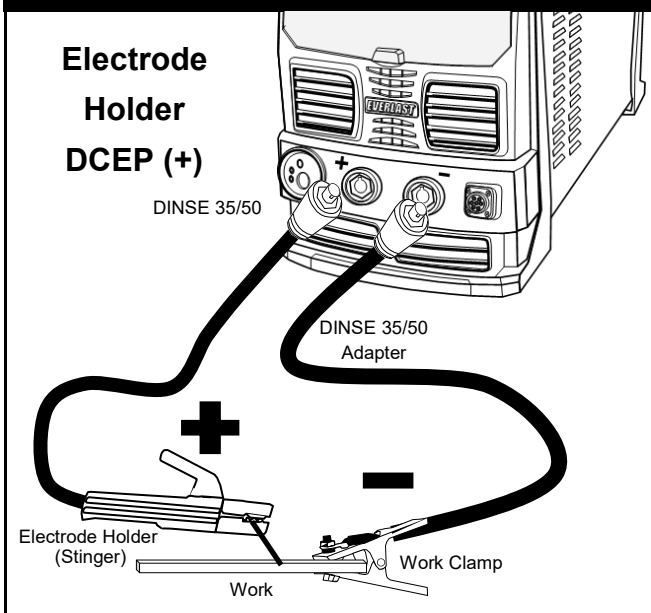


The spool gun connection process is similar to the MIG torch connection and uses the same Euro Quick Connect connection. Polarity is the same as MIG except when Flux-Cored wire is being used.

SELECT THE CORRECT STICK POLARITY.

Selecting the right stick polarity is simple since most all welding is done electrode positive, regardless of rod classification or brand. The main exception to this is that E6011 may be used electrode negative, but in most cases it will still be used with electrode positive configuration.

Where Do I Connect The Stick Torch?



For most all applications, connect the electrode holder to the positive terminal. Connect the work clamp to the negative terminal.

WARNING!

Remove the stick torch while MIG welding to prevent accidental arc striking and damage. Remove the MIG torch while stick welding for the same reason. The stick and MIG torch terminals will remain live despite the mode that has been selected. The power is not disconnected to the output terminals on the machine while welding other processes. Do not touch exposed terminals while welding in either process.

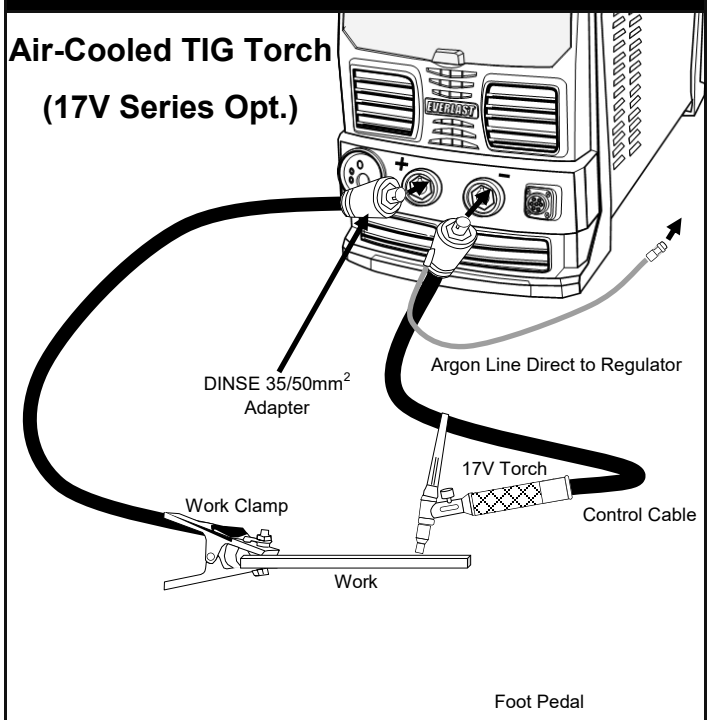
SELECT THE CORRECT TIG POLARITY.

While the unit has a DC Lift TIG dunxrion, the torch is sold separately as an option. The 17V series torch with the gas valve should be used since the solenoid does not control TIG gas flow. The torch must be connected directly to the regulator. A quick connector should be purchased as well to make use of the quick connect gas fitting.

The unit does not have HF Start or remote control of the Amperage. Amperage is set on the welder panel and the arc is struck via a lift arc process.

Since the unit is DC output, the unit is not considered to be capable of welding aluminum. The polarity will always be negative.

Where Do I Connect The TIG Torch?

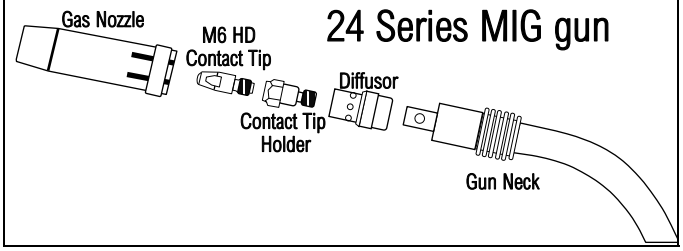


NOTICE: Choose between the torch switch operation (2T/4T) or the foot pedal operation. Only one can be connected at the same time.

Setup Guide

Getting Started

How Do I Disassemble the MIG Gun?



CHECK AND CHANGE YOUR DRIVE ROLL.

The unit comes equipped with .030" and .035" drive rolls. **NOTICE:** *For most purposes up to 3/16" thick material you will likely want to use .030" wire in this unit since it covers the greatest range of metal thicknesses and amperages within the capability of this unit. .030" wire typically can handle up to about 160A before it transitions to globular transfer.* For upper range use and materials 3/16" and over, .035" is advisable. Remember, if you change wire size or type, you will need to either flip the lower drive roll over or completely change the drive roll to the correct size and type.

The top drive roll is actually an idler roll used to hold tension and keep the wire in the groove and is not changeable. Only the bottom drive roll needs to be changed. The bottom drive roll has two small grooves that are sized for .030" (.8mm) and .035" (.9mm) 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. 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 closest to the corresponding groove. 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 roll is held in place by a black thumbscrew. Remove the screw to expose and change the drive roll. The drive roll is mounted on a bushing. The bushing should be held in place with one finger of one hand while the other hand removes the drive roll. This will prevent both bushing and drive roll from being removed from the wire feeder drive shaft. When removing make sure that the square locating key is not dismounted. If the key falls out of the keyway, replace it before replacing the drive roll.

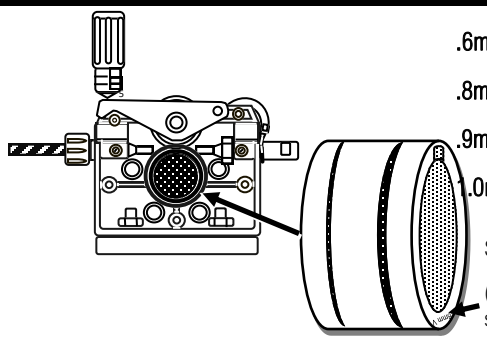
INSTALLING THE WIRE SPOOL

Once the wire spool has been installed, flip the tensioner lever down and raise the top drive roll 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 groove. Hold it with your finger if necessary as you lower the top drive roll down and raise the tensioning lever with your other hand. When complete the wire should look like the illustration on the previous page. *Hint: The wire on the spool is usually bent and threaded through a small 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 despoiling and cut the wire loose with a pair of wire cutters. Trim the wire to make sure the end of the wire is straight and able to be threaded through the wire feeder mechanism and gun.* After the tensioner is raised back to the vertical position, confirm the wire is still in the groove and is not riding up on the shoulders of the drive roll.

Next, turn the welder on and set to a desired MIG or Flux-Cored mode. Unscrew the contact tip as shown in the illustration "How Do I Disassemble the MIG Gun?" Hold the gun cable and gun straight as possible. Press and hold the wire jog button. The wire should slowly begin feed through the gun cable and on through to the gun tip. As the wire exits the gun, allow 3 to 4 extra inches of wire to be fed out past the diffusor. Release the wire jog button. Re-install the contact tip over the wire and screw it in clockwise until it is tight, but not to the point of stripping. Install the gas nozzle.

Make sure that the ceramic diffusor is carefully handled. Tipping the gun upside down with the contact tip holder removed may cause the diffusor to drop out and break on the floor. Ordinarily, the diffusor has a long life and

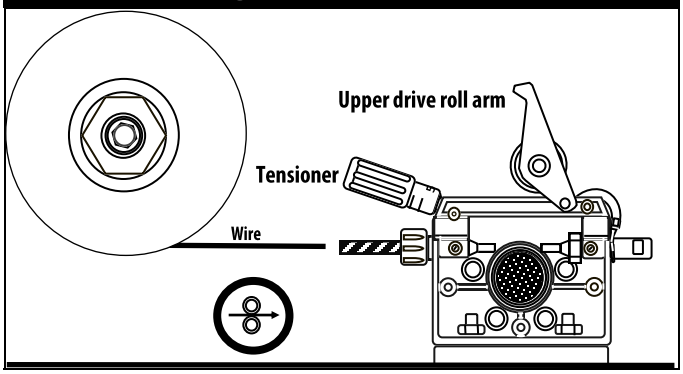
Drive Roll Size and Location Info



Drive rolls consist come in 3 groove types. Each type is designated by a letter stamped after the size.

"V" mark is a V Groove: For Solid Steel and Stainless Steel wires.

Installing MIG Wire Spools



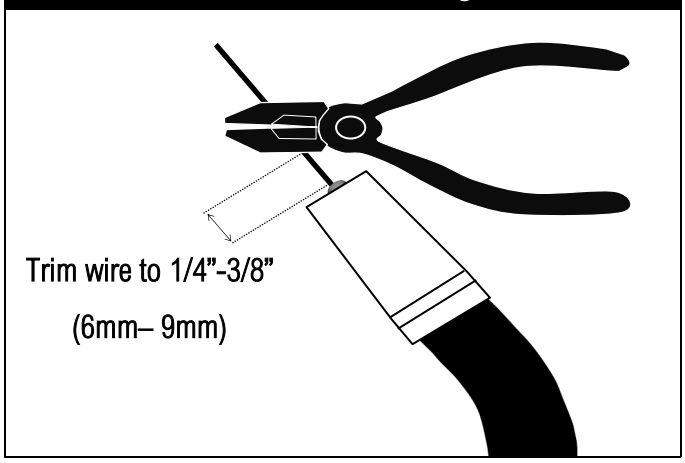
Setup Guide

Getting Started

is durable. But dropping the gun while hot or while the gun is nozzle is removed, may cause the diffusor to crack or shatter. The diffusor design provides superior gas coverage over the weld and allows a cleaner weld to be produced, and will last a long time if these precautions are observed. (A minor chip will not require a new diffusor.)

TRIM THE WIRE AFTER INSTALLATION.

Trim Wire Before Starting a Weld



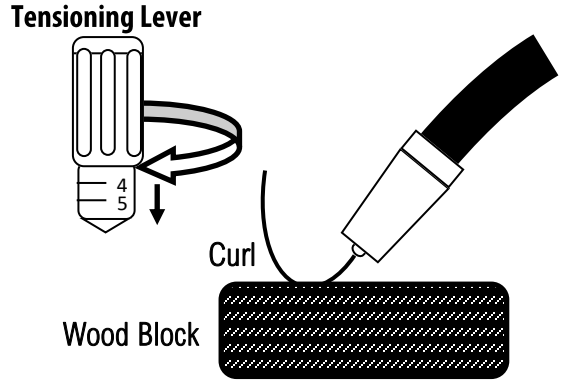
Trim the wire sticking out of the nozzle to 1/4" to 3/8" (6mm to 9mm) in length with wire cutters. See the illustration below. The gun is now ready for welding. *Hint: Always make sure that you re-trim the wire before beginning a new weld if the wire is not already trimmed to this length. This will help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

PROPERLY TENSION THE WIRE FEEDER.

To feed properly, the wire needs to be tensioned before you begin welding. The tensioning lever has 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 at least 4 on the dial. For flux-cored wire, it may be only two or three. Wire diameter also plays a small part in the amount of required tension that is needed. Regardless of the wire type or wire diameter, 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!**
- 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.

Test Wire Tension Before Welding



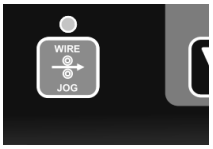
NOTICE: Wire Speed Calibration

While the wire speed of the machine can be recalibrated, the wire speed cannot be accurately calibrated using the manual time/distance method. Instead, calibration must be performed under load, using a load bank to simulate controlled welding conditions. Once under load, the machine can then only be checked and calibrated with an rpm meter or a strobe that has been calibrated to determine RPM. This can only be done at an appropriate facility equipped with the necessary equipment. While any appropriately equipped facility may be used with approval and supervision from Everlast, Everlast does maintain a calibration facility at our service center.

NOTICE: Periodic calibration checks and re-calibration certification are not covered under warranty.

What is the Wire Jog?

The wire jog button is used to feed wire when setting up the unit with a new spool of wire, or for feeding wire into a new gun without having to press the trigger.



Setup Guide

Getting Started

SELECTING A PROPER MIG WIRE SIZE AND TYPE.

As previously covered, this unit has been equipped with a 2 roll MIG wire feeder. While the welder's programming and design offers more than these two sizes and metals, this unit has shipped with a V groove drive roll that accommodates the two most common sizes of solid steel wires for this class of welder: .030 and .035" (.8 and .9). Smaller or larger drive rolls can be purchased as optional items.

To cover the entire range of wire sizes and metal types that the unit supports, the purchase of additional drive rolls, guns and or gun liners will be required. This unit provides a wide range of voltage and wire feed speed. That does not necessarily mean that the smallest wire can be forced to weld the thickest materials or that the largest gun and wire supplied is best for welding the thinnest metals with the thinnest wires. The following general recommendations are intended to help guide the user through the thought process of wire type and size selection. However, user knowledge and skill will ultimately determine what wire size choice is best to use and the appropriate settings to use.

For Steel/Stainless Wire (V groove):

040" (1.0mm) is the largest wire size recommended for this machine and is the largest size for steel allowed. This is because the maximum wire speed of this unit will not support the amperage output of the machine with larger wires. Even with .035", the wire speed will exceed the Amp output capability of this machine. The reason it is recommended is that the he short circuit limit of .035" wire is a little under 200A before it enters globular/ spray transfer mode. Keep in mind that .023-.025" (.6mm) wire is used for lighter gauge material but only offers about a 7 Amp advantage on the low end of settings over .030". It will also reach a useful service limit of about 90A. Feeding and results will become erratic at higher settings. .030" wire can service up to about 150A in short circuit transfer before it begins to enter globular transfer range.

Even though .023" Stainless wire is supported, it may not be available in all markets and will experience feeding difficulty in the standard gun. In this case the spool gun is the best option. Also even with .030" stainless wire there may also some difficulty feeding wire, especially with smaller 2 lb. rolls when used in the main feeder.

For Aluminum Wire (U groove drive roll required with polymer liner installed or use spool/push pull gun):

Even though smaller drive rolls exist, to achieve best results, .035" wire should be the smallest wire used with this unit (not to be used with 4043 due to the softness of the wire) in the main gun, although the wire speed will be nearly maxed out for most applications. .035" aluminum wire also provides a very narrow range of welding of 1/8" to 3/16".

For better results, .040" or .045" is recommended is used since it can weld a broader range of material from 1/8 to 1/4" and can also be used with 4043 wire. The optional spool and push pull guns are also equipped with either a .040" (1.0) or .045"/.047" /3/64" drive rolls, but smaller sized drive rolls are available as an option. Overall, MIG welding aluminum is not a delicate process and is typically recommended for use on 1/8" materials and thicker, though some success can be achieved in skilled hands down to 14 gauge with .030" wires used in a spool gun with the correct sized drive rolls.

For Gasless Flux-Cored (Zippered, or serrated drive roll):

This unit is designed to support only gasless flux-cored use and should not be used with Dual-Shield, which is typically reserved for structural use and use din over 200A heavy applications for long periods of time. In general, no smaller than .035" flux-cored wire should be used. In general .045" wire is considered the best. Flux-Cored wire in general is a heavier penetrating wire and is not meant for light gauge work. Typically Flux-Cored wire is used on 14 gauge and heavier materials. Since the nature of Flux-Cored wire carries less amperage per inch of wire delivered to the weld puddle, a larger wire may be used to deliver lower amperage. However, even though available, smaller flux cored wires than recommended above suffer from weakness and the column strength of the wire is low and cannot feed longer distances. If considering using this unit for flux-cored use, to save money on shielding gas,

NOTICE: Although the maximum selectable size offered in the welder's programming for solid steel wires is .040" (1.0mm), for the US and North American market, it is recommended to use .035" (.9mm) as the maximum wire size for this unit for use solid steel wires. This is because .035" (.9mm) is the largest size commonly available for up to 200A welding range. Although technically available in North America, .040" (1.0mm) wire is more common in other regions of the world. For welding with Aluminum and gasless flux-cored wires larger size selections are available.

GUN AND LINER SELECTION.

This welder uses a common Euro Style Connection for the MIG gun. This allows any Everlast gun or any after market gun with the same connection to be connected to this unit. To match the 230A output of this welder at this unit is equipped with a 24 series gun. This gun is a larger gun suitable for welding up to 250A. This gun is a medium sized gun suitable for all types of commercial fabrication and maintenance. However, if lighter work is required, such as welding body panels, the smaller 15 series gun is recommended as an optional purchase. It is smaller and is a good choice for welding up to 180A for longer periods of time and up to 200A for brief periods of time. The 24 gun comes with a red .040" to .045" liner which can technically accommodate .035" if needed. However, for wires .035" and smaller diameter purchase a blue liner for the 24 gun to achieve the best welding performance and to reduce spatter. Using too large of a liner will result in unstable feeding and extra coast out of wire at the end of the weld.

Both steel liners and polymer liners (PTFE) for aluminum, are color coded for wire diameter sizes. See sizes below:

Blue Liner: .023"-.035" (.6-.9mm)
Red Liner: .040"-.045/ .047/ 3/64" (1.0-1.2mm)
Yellow Liner: .045"-.062"/ 1/16" (1.2mm– 1.6mm) ***(Do not use for Steel.)***

Setup Guide

Getting Started

It is also important to check and change the contact tips as well to match the wire diameter. In the case of Aluminum, order special Aluminum tips that are slightly oversized. These tips will use the standard size, but typically are followed by an "A" or "AL" to designate these are designed for use with Aluminum. Alternatively, you may use a one size larger standard contact tip if an Aluminum sized tip is not available.

INSTALLING / REPLACING THE MIG LINER.

The liner of the gun is critical to proper wire feeding and welding performance. A liner is responsible for securely carrying the wire into the gun head from the machine connection. An undersized liner may be difficult to load or feed without bird nesting in the cabinet. An over sized liner will cause spatter and irregular behavior. While burn-back control can eliminate some of this excess wire , the best solution is to use the correct sized liner for the wire.

A steel liner should only be used with steel or stainless wire. If steel wire is used with a polymer liner, the liner will wear extremely fast. A polymer PTFE type liner or graphene type liner (or other similar smooth plastic type liner) should be used with Aluminum or soft natured wires. Liners designed for Steel use and Aluminum use look different but install the same way. Each must be cut to fit because they are always slightly longer than needed. This is done to custom fit liners in guns that may have stretched from use over time.

Liners do wear and are sometimes kinked from rolling or wrapping the gun cable too tight during storage or bending the gun in too tight of a radius at the base of the handle. More commonly, it can be caused running over or stepping on the gun cable. This will necessitate liner replacement. Also with an oversized liner, the wire may appear to jump or feed out extra wire after wire feeding is terminated. It can even cause bird nesting in the liner, making wire removal almost impossible. In this case, the liner will almost always need to be replaced due to the damage it causes as the wire is removed.

If a liner needs to be removed and it is difficult to remove this is almost always an indication of a damaged liner. Sometimes a damaged liner may also cause damage to the gun head or outer conduit when it is removed. If so, the whole gun may need to be replaced if the damage is severe enough. Usually this is not the case and a worn liner or a damaged liner can be replaced fairly quickly.

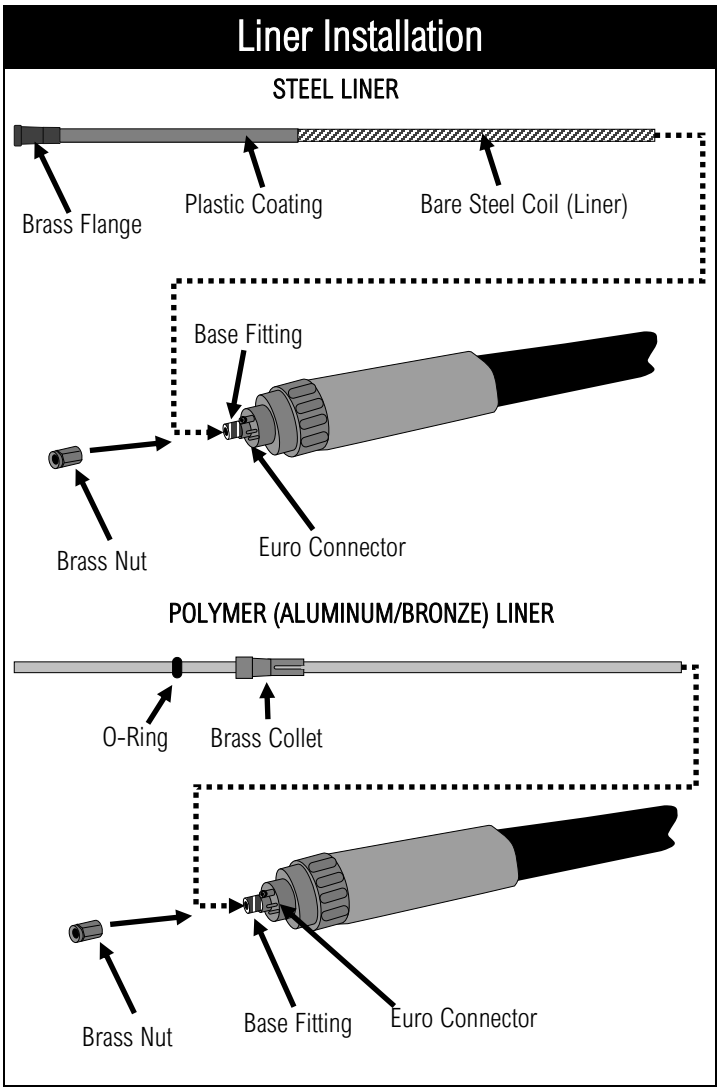
A damaged liner should be checked and replaced as soon as any damage is suspected.

A steel liner is a tightly coiled hardened wire similar to a lawn mower or automobile choke cable. The bottom half of the liner will be plasticized and color coded. The top part of the liner will typically be bare steel. The bottom of the liner will have a brass flange crimped to the liner.

The Aluminum liner will be smooth and will be composed of three pieces, the liner tube, brass collet and o-ring.

Both liners are installed from the rear of the gun and not from the top of the gun. See the information below.

IMPORTANT! Read these instructions carefully before attempting to remove the old liner or before trimming the new one. It is better to have to retrim a new liner than to cut too much off.



Steel Liner Removal and Installation.

1. Remove the brass nut from the base fitting on Euro Connector. Hold the base fitting while using a wrench to do this. Do not allow the base fitting to unscrew. If the fitting unscrews, it must be reinstalled before proceeding.
2. Grab the brass flange of the liner that was originally held in place by the brass nut. Pull on the flange to remove the old liner completely. Once removed, set aside. (If the liner is stuck, carefully work it back and forth, and twist slightly to remove. The liner can break or stretch if the liner is badly damaged inside the outer cable conduit.
3. Make sure the gun and gun cable is held straight. Install the new liner

Getting Started

as far as it will go. (Do not cut the liner yet.) Make sure the liner isinserted into the base of contact tip holder. Typically the liner will be visible with the contact tip holder installed. If the liner is not visible, remove the contact tip hold to check for visibility (some guns the contact tip hold is part of the gun neck and cannot be removed). If the liner is still not visible and/or does not appear to be inserted into the end of the contact tip holder manipulate the liner gently until it is visible and in position to mate with the contact tip holder once it is re -inserted. It may be necessary to move the gun handle around gently until the liner slides home.

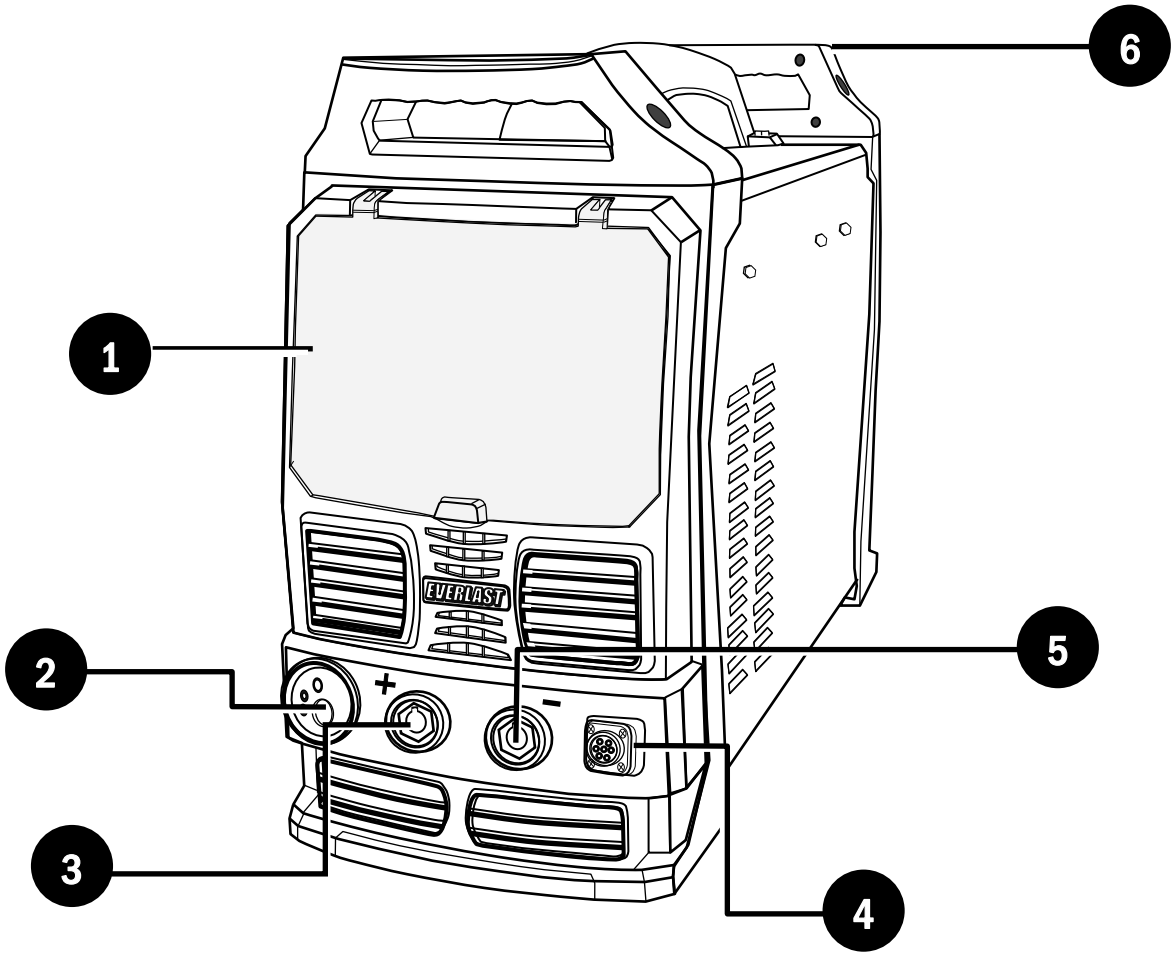
4. With the liner inserted fully home, measure and record the distance from the top of the threaded base fitting to the flange (measure to the base fitting side of the flange). This is the amount that will need to be cut off. Double check that the liner is still seating and that the gun is held perfectly straight. **IMPORTANT: Do not cut the liner on the flange side. This is only for measuring the amount needing to be cut off the other end (Gun side of the liner).**
5. Remove the new liner.
6. From the gun end of the liner (the end that contacts the contact tip), measure and mark the length to be removed. Mark it with a metal marking pen or small file. Carefully cut the steel liner to length with pair of lineman's pliers or a similar sharp cutting tool. Make a clean flat cut. A small cut off wheel may also be used if a suitable cutter cannot be found. Carefully dress the end of the liner and chamber end with a small file removing any burrs. Do not use dull cutters or the liner may collapse.
7. Reinsert the new liner and test fit. The brass flange should fit flush against the base fitting and it should fit fully home in the contact tip.
8. Reinstall the brass nut to hold the liner in place.
9. Reassemble the gun if it has not already been reassembled.

Polymer (Aluminum) Liner Removal and Installation.

1. Remove the brass nut from the base fitting on Euro Connector. Hold the base fitting while using a wrench to do this. Do not allow the base fitting to unscrew. If the fitting unscrews, it must be reinstalled before proceeding.
2. Grab the brass flange of the liner that was originally held in place by the brass nut. Pull on the flange to remove the old liner completely. Once removed, set aside. (If the liner is stuck, carefully work it back and forth, and twist slightly to remove. The liner can break or stretch if the liner is badly damaged inside the outer cable conduit.
3. Make sure the gun and gun cable is held straight. Install the new liner as far as it will go. (Do not cut the liner yet.) Make sure the liner isinserted into the base of contact tip holder. Typically the liner will be visible with the contact tip holder installed. If the liner is not visible, remove the contact tip hold to check for visibility (some guns the contact tip hold is part of the gun neck and cannot be removed). If the liner is still not visible and/or does not appear to be inserted into the end of the contact tip holder manipulate the liner gently until it is visible and in position to mate with the contact tip holder once it is re -inserted. It may be necessary to move the gun handle around gently until the liner slides home.
4. Once the liner is fully inserted, install the collet over the liner and slide the collet down the liner until it is fully seated into the base fitting. (Depending upon the manufacturer, the collet may be more like a ferrule)
5. Slide the O-ring down until it contacts the collet.
6. Slide the brass retaining nut down over the liner and screw the nut down until the collet slightly compresses the liner and holds it in place.
7. Trim excess liner flush with the end of the brass nut.

Component Identification and Operation

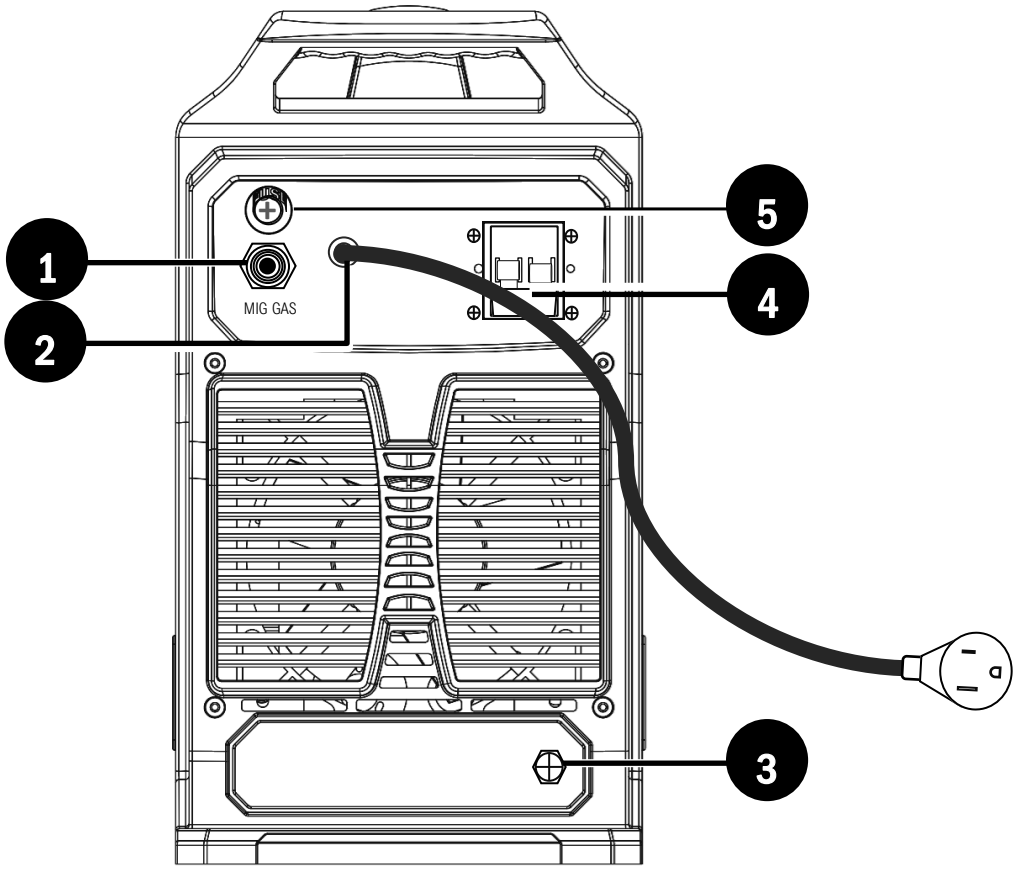
Front Panel View



Number	Component Identification	Component Note
1	Protective Cover	Keep cover down and in place during welding activities and in storage.
2	Euro-Style Quick Connector	Connect this to the MIG gun or Spool Gun.
3	Positive Terminal (+) DINSE 35/50 Type	For Stick, connect to the Torch. For MIG, this remains vacant. For Flux-Cored connect the work clamp
4	Control Connector	For the Spool Gun, the control circuit wire goes here.
5	Negative Terminal (-) DINSE 35/50 Type	For Stick connect to the work clamp. For MIG, connect to the work clamp. For Flux-Cored, this remains vacant.
6	Handles	Install handles with provided screws. If their use is not desired, you may leave them off and install just the screws.

Component Identification and Operation

Rear Panel View



#	Component Identification	Component Note
1	MIG inlet connector (from regulator)	5/8" CGA
2	Input Cable and Plug* NOTICE: Always consult national codes and a local licensed electrician before wiring this welder to any service.	*North America only:* The unit may be operated on either 208-240V 1 phase (or on 120V 1 phase with the included pigtail adapter). North American standards require only 3 wires for 1 phase operation of welders. A neutral is not used or required. **For wiring a 1 phase connection to the unit:** Use Black for L1, White for L2, and Green for ground (not neutral) use. Red is not typically used in wiring a welder circuit. This is in accordance with North American codes for weldercutter wiring (see Article 630 of the NEC for more infoWhen operating on 120V, the white wire (internally) becomes the neutral, and the green still serves as the ground. *The supplied NEMA 6-50P is the proper plug used for wiring single phase 240V welders in North America. It should not be changed or removed unless wiring directly into a cut-off switch. Other regions may vary and may have a different plug type or no plug at all.* **Use the supplied adapter to convert to 120V operation.**
3	HF Ground Service Bolt**	For use in a combined effort to mitigate any electrical interference that may be caused by the operation of this unit.
4	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 *may* have occurred. If this occurs, immediately remove from service and mark/tag according to regulations and contact Everlast Tech Support for further diagnosis and/or repair options.
5	Fuse	This fuse protects the wire feeder and certain components from damage. If the wire feeding stops or the machine suddenly powers down without warning, check the fuse. Replace the fuse 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.

Component Identification and Operation

Control Panel Layout

#	Component I.D.	Component Note
1	Process Selector	Use the left and right arrow keys (◄ ►) to select the desired welding or cutting process.
2	Display	This color LCD display provides all the information relative to setting the machine and indicating set parameters.
3	Left Adjustment Knob	The left adjustment knob is used change the desired status of a function (i.e. voltage, turn on/off, electrode type, thickness etc.) and to set all adjustable values to the left side of the black dividing hash mark just above the "EVERLAST" logo. If you push in on the knob while adjusting, it will adjust in larger increments, usually in whole numbers or increments of 10.
4	Left/Right Dividing Hash-mark	This mark divides the functions between left side controlled functions and right side controlled functions of the machine. The left side adjustment knob and navigation buttons control the left side of the machine. The right side adjustment knob and navigation buttons control the right side of the machine.
5	Wire Jog	This feeds the wire through the machine to assist in threading the wire through the drive rolls and into gun without engaging the gas solenoid to conserve gas and simplify setup. **CAUTION: The wire will become electrically live while using the wire jog function. Keep the direction of the gun controlled and away from the work piece to prevent accidental arc striking.**
6	Left Side Navigation	Use the up and down arrow keys (▲▼) to navigate and select the parameter on the left side of the hash mark that you wish to change or adjust. The actual direction may go either up and down or left and right, depending upon the function level you are adjusting or selecting.
7	Right Side Navigation	Use the up and down arrow keys (▲▼) to navigate and select the parameter on the left side of the hash mark that you wish to change or adjust. The actual direction may go either up and down or left and right, depending upon the function level you are adjusting or selecting.
8	PowerSet	The PowerSet function, when selected, enters a synergic mode which gives automated settings based off of the diameter of electrode, type of metal, type of gas, and thickness you input into the unit. This simplifies operation and reduces the knowledge base needed to make the correct adjustments needed to weld properly. **When PowerSet mode is selected, some functions of the machine will be set to automatic and will not be adjustable.**
9	Right Adjustment Knob	The right adjustment knob is used change the desired status of a function (i.e. Wire Speed, Amperage, Spool-gun operation etc.) and to set all adjustable values to the left side of the black dividing hash mark just above the "EVERLAST" logo. If you push in on the knob while adjusting, it will adjust in larger increments, usually in whole numbers or increments of 10.

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.

Component Identification and Operation

Starting-up the Welder

WHAT TO EXPECT ON START UP.

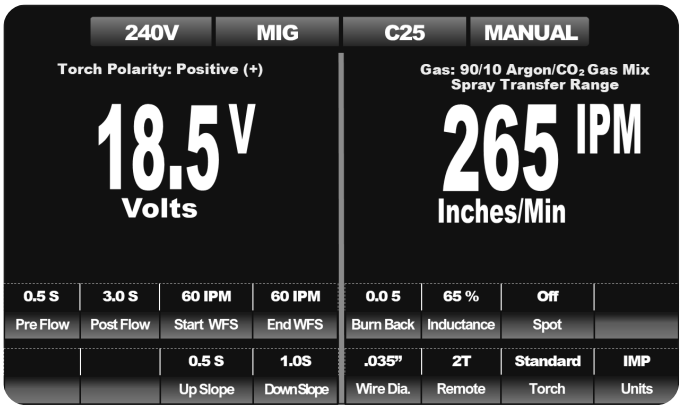
Before the first start and use of the machine, check all your connections. Make sure all fittings are tight and that your gas cylinder valve is fully open. Put on proper safety equipment (PPE) and fire resistant clothing. Make sure all accessories are uncoiled and properly connected. Inspect the accessories and ensure that they are in good working order.

WARNING! *Accidental arc flashes and burns could be possible if the foot pedal or torch switch is depressed at the time of start up. Uncoiling accessories and dismounting them from the cart is important to prevent accidental triggering, arc flashing, welder damage and possible injury.*

When the welder is switched on at the rear of the unit and the start-up process begins, the welder will greet you with the start-up screen while it is booting up. All LED lights on the front panel will light up on the front to allow you to inspect their functionality. The boot-up will take up to 5 or 6 seconds as the machine re-adjusts for the voltage input and recalls the last settings used. *The boot up screen will look similar to this:*

During the boot-up process you may hear a series of slight clicks, thuds, or thumps as the machine switches relays and solenoids. This is normal. It is important to note that similar thuds or clicks that are heard on start up can also be heard as the machine swaps processes or when certain functions are selected. This is normal and should not be of concern.

When fully booted up, the screen arrangement should look similar to this, depending upon the actual process and functions selected:



It is recommended that all functions be checked for proper operation every few months so that any malfunction can be noted and reported before it is needed. If any malfunction of the control screen or the welder is observed, contact Everlast Tech Support.

TAKE CARE OF THE LCD SCREEN.

The screen is a high resolution 4.3" TFT color LCD screen. It is important to take care of it. Keep the cover shut when welding or when not in use. *Additionally, cut-to-fit screen protectors can be used with the screen (and it is recommended to do so) to offer a second layer of protection and keep the screen in like new conditions. These are customer-supplied and available at local stores that sell electronic items such as computers or mobile phones.* These should be periodically removed and replaced. Lightly clean the screen only when needed with standard screen cleaning solution and lint free cloth designed for cleaning screens or lenses. Do not use harsh detergents or alcohol. The front protective cover is plastic and may get scratched if it is wiped dry. If heavy dust has accumulated, use dry compressed air to blow off the screen. Do not try to dry wipe with dirty rags, sleeves or gloves or the screen may become scratched or unreadable.

Functions vs. Parameters vs. Status

This manual makes frequent use of the words "mode", "settings" "functions", "parameters", "values" and "status". In some cases it may seem that some words are interchangeable. And in a number of cases, there may be indeed some limited interchangeability in the terms since a function may also double (when turned on) as an adjustable parameter or could indicate a mode. To clear up the confusion between the terms, here is a brief explanation of Settings, Functions, Parameters, Values and Status and the general intended use of these words in this manual.

A **mode** can refer to the selection of a particular function, or a welding process. The welder has several different processes. Each process can also be considered a mode. For example, you may select "DC TIG Mode" to weld. But you can also select the Spool Gun mode from the torch function on the screen. The term mode is broadly used.

Settings is a broad term inclusive of both functions and parameters. When the term settings is used it is meant to refer to both generally and can also refer to status or value.

Functions are features and modes of the machine. Functions will dictate the way the welder behaves and what parameters are offered for adjustment to the user. A function can indicate a mode of operation, such as 2T torch switch operation as opposed to Foot Pedal operation. A function will typically be associated with words like On or OFF, or even indicate a gun type or mode.

A **parameter** is an adjustable feature of the machine. Pre-Flow, Post-Flow, Up-Slope, Down-Slope, Welding Amps, Pulse Time On, etc. are all examples of parameters.

A parameter is defined by its **value**. The value can be expressed in Seconds, Amps, Wire Feed Speed, or Percent. Values are expressed in numbers. Each parameter has a range of values.

Status indicates the *condition* of a function (On, Off, etc.). It can also indicate the static operating condition or welding mode of the welder on the status bar at the top of the menu screen.

Component Identification and Operation

GENERAL INFORMATION ON SETUP AND USE.

Selecting the Process.

At the top of the panel **(1)** use the process selector buttons to select the desired welding or cutting process. Use either the right or left arrow directional (◄ ►) buttons to advance to the next process. Pressing the left or right arrow button too quickly multiple times in succession may cause the LED to appear to skip a process. Advance through the processes at a moderate, deliberate pace. If desired welding process is accidentally passed or skipped over, instead of cycling back through all the processes, use the opposite directional arrow button to scroll back to the desired process rather than scrolling all the way through again.

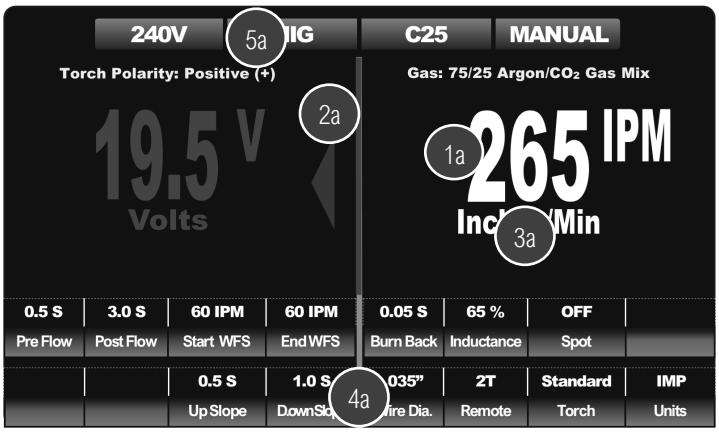
Navigating the On-Screen Menu.

The LCD screen is divided visually into a right and left half **(2)** by a vertical green bar on screen and black line above and below the screen. The left half side is controlled by the left side panel controls. The right half is controlled by the right side panel controls. The left side left **(3)** left pointing and down pointing arrows (◄ ▼) are used to navigate the left half of the screen and the right side **(4)** right pointing and down pointing arrows (► ▼) are used to navigate the right half of the screen. The left and right control knobs **(5,6)** are used to increase or decrease the selected parameter value of that side or to change the status of a function of the related side. The menu is also divided horizontally into 2 functional areas. 1) The top tier, or main display/default parameter display area, and the two lower tiered rows of parameters and functions.

There are two types of information located on-screen in the two lower tiered rows **(7,8)** of the on-screen menu: Parameters and Functions. *Functions are menu items that may change in status, such as ON/OFF, or Gun Selection. Parameters are menu items that change in value throughout a range such as pre-flow time or inductance percent.* Some selectable items on the menu screen serve both as functions and parameters. For example, the Spot weld function can be set to "OFF". That indicates the status of the function. But when selected and the control knob is rotated, and the status is changed to "ON", the function automatically changes to represent the parameter value and displays the seconds.

UNDERSTANDING THE ANATOMY OF THE MENU SCREEN.

Quick Steps to Setting-Up the Welder.



1. The main display in the upper area serves to display the status, or value of a function or parameter. (1a)

- After startup, while welding or when the unit is not in the adjustment mode, Voltage is displayed on the left side of the menu screen and the Wire Feed Speed (IPM or M/M) or Amps on the right side of the menu screen. These are the default parameters displayed unless the unit is in adjustment mode and other parameters or functions are selected for adjustment. These default parameters can be adjusted simply by turning the relevant side control knob. The display will turn red to indicate adjustment

- After adjustment is finished and no further adjustment or changes are made, the unit will re-enter the default mode within approximately 5 seconds and display the Voltage and Wire Feed Speed/Amps.

2. Entering adjustment mode allows the user to make changes to all functions statuses and parameter values.

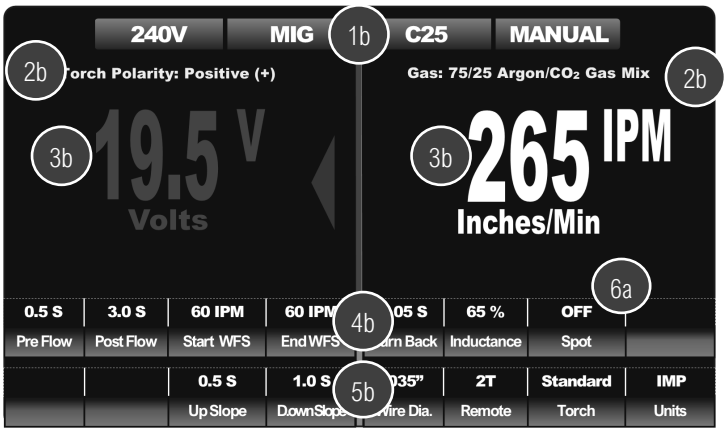
- To enter the adjustment mode, press once on the down arrow key (▼) on either the right or left side, depending upon which side the desired function or parameter is located on. This will turn the main display on that side red in color, the middle vertical line will turn red and either a left or right red arrow (◄ or ►)will appear to indicate which side is ready for adjustment. (2a) *Alternatively, to enter the adjustment mode, a slight turn of the control knob will enter the welder into the adjustment mode unless the default displayed is non adjustable and displayed in green (TIG/Stick modes).*

- Continue to use the down arrow key (▼) to navigate vertically down to the desired row.

- In TIG and Stick modes, a single press on the down arrow on the left side will automatically navigate to the first lower row.

- Use the left or right arrow button (◄ or ►) to navigate over to the desired parameter or function to highlight for adjustment.

Component Identification and Operation



- The middle red line will extend to the row and over to the desired parameter and the selected parameter will be highlighted in red.

3. The control knobs are used to increase or decrease a selected parameter value, or make a status change in a selected function.

- Use the control knob on the side closest to the desired function or parameter to make changes to status or value.
- When making large changes in value to a parameter, press in on the control knob while continuing to turn it to make larger increment changes in value. This will speed up the adjustment process.

Detailed Menu Information and What to Expect During Adjustment

The menu screen utilizes a combination of symbols, words, numbers, colors and graphical indicators to assist the user in making adjustments. It is designed to create a fluid, intuitive and easy to understand interface for the user.

The menu is divided into several basic areas and conveys useful information to the user.

1. Top Information Bar. (1B) This area conveys information to the user about basic process selection, operating mode, and input voltage.
2. Torch Polarity and Gas Selection Information (2b). This row is in yellow lettering for contrast. This is area is designed to serve as a important reminder to the user to check and confirm both gas type and torch/gun polarity. The gas selection information may change in Steel MIG mode (C25) depending upon the settings of the unit. At higher volts and wire speed settings the gas recommendation may change from 75/25 Ar/CO_2 (C25) to 90/10 Ar/CO_2 (C10).
3. The main display area, or top tiered row (3b). This area on both left and right sides of the machine will display default Volt and Wire Feed Speed/ Amp settings unless the adjustment mode is entered into. During active welding, it will also display the actual measured Volt and Amp output of the machine. During adjustment, the display will reflect the chosen parameters and values of the parameters. During adjustment, the main display area values and parameters will change color to red. Appoximately 5 seconds after adjustments are completed the main display area will revert to the default setting and colors.
4. The lower parameter rows/tiers. (4b and 5b) This area displays all the information related to adjustable parameters and selectable functions of the unit. *In the PowerSet mode, only one line may be displayed due to the simplified input design.*

When a parameter or a function is selected, the screen will display the value or status of the function in two places:

1) At the top of the screen in the main display area.

2) Just above the selected parameter in the lower rows

The value-based parameters are also accompanied at the top of screen by the parameter's unit of measure in an abbreviated exponent form such as V, S, or % to as a reminder of the value being adjusted. Underneath the parameter value or function status, the actual name of the selected function or parameter appears. This redundant arrangement makes the display easier to read during adjustment and helps to eliminate bottle necks in navigation.

After adjusting is completed, the machine will default back to the main adjustment value (Volts, Amps or Inches per Minute) after approximately 5 seconds if no further input is made. The purpose of displaying the value or status of the lower tiered rows and the upper default value is to provide an at-a-glance view of all parameters simultaneously on the single screen at any time during operation. This eliminates the need for pop up menus and bottle necks in setup while promoting operator awareness of settings.

The screen makes use of colors to indicate condition, mode and status and serves to aid the user in general in interpreting the on screen information.

1. Green:

- The green color (4b, 5b) of the two lower rows/tiers of boxes indicates normal operation or that the unit is ready for use. The two lower tiered rows of boxes are normally green, unless the parameter of the box has been selected for adjustment by the user. Green is used to indicate a set function status or relay a parameter value to the user.
- Green is used at the top information bar to communicate basic status information. It is used to confirm the mode and basic operating information. *If the Voltage box in the information bar turns yellow, this indicates the unit is operating on 120V. This is to serve as a reminder that output is limited in 120V and some settings may not have a full range of adjustment or selection.*
- When the large numbers turn green in the top, main display area, this indicates the value cannot be adjusted. However, it is communicating an important measured value, such as TIG or Stick welding Voltage and OCV.

2. Gray:

- Gray, blank areas in the lower rows of boxes are non-selectable areas. These emptied boxes can be ignored and no function is assigned to them in the current menu configuration or process.

- In some cases a gray area will become an adjustable area if certain functions like Spot weld is selected for use. If so, the area(s) will turn from gray to green and will display additional parameters related to the function. When the items are green and the blank areas filled by additional parameter information, they are then adjustable. The grayed-out areas help eliminate confusion over what needs to be adjusted. Some gray areas have no func tion and may only be a place holder and will not change status or offer adjustment. Due to the nature of each process, some areas will have more gray areas than others. In a couple of instances where a function is selected that limits the ability of other necessary functions, and the restricted function remains active, the area will remain green, but will not be adjustable.

3. Red.

- Red indicates the machine has entered the adjustment mode. The numbers/words at top of the screen, the middle vertical line, middle line extension and any parameter box on a row that turns red indicates that the machine is in adjustment mode.
- If a parameter box is highlighted in red, the main display area will display of the chosen function status or parameter value.

4. White.

- White letters or numbers in the main display area indicates that the unit is displaying the default setting and is not being adjusted.
- In any wire feed process, when both upper numbers are in white the unit is displaying welding volts (left side) and welding wire speed feed rate (right side).
- When the main display area is white this indicates the unit is not in adjustment mode and is ready to weld.
- In TIG and Stick modes, only the right Amp box will be displayed in white. The other box will be in green to indicate a non adjustable voltage value. When the white appears in only the Amp box, and the other side is in green, the unit has exited the adjustment mode.

5. Yellow.

- Yellow is used to convey important basic information.
- Yellow can also be used to alert the user to a change in status or warn of an unwise setting (PowerSet mode).
- In manual mode for steel the colors of the numbers may change when a wire begins to reach its short circuit limit and transitions to globular transfer and into axial spray transfer. The on screen recommendations for shielding gas will also change from 75/25 to 90/10. The information just above the main display area reminds the user to observe the indicated polarity and the gas type to use.
- The voltage input reading found in top information bar will change to yellow when the unit is operating on 120V input power.

Why Are Some Settings Limited or Blank?

There are two basic reasons some settings are limited in adjustment or completely blank. The first reason is that the unit is being used on 120V and output is limited. With limited output, the machine must limit certain range of adjustments to protect itself from malfunction. In PowerSet mode this is obvious by the limit on selecting electrode /wire or thickness sizes. The second reason is that a function is not active or has been set to "OFF". When functions such as spot weld or pulse are set to "ON", the unit will add additional settings and allow adjustment of those functions or parameters.

Component Identification and Operation

USING THE PROGRAM MENUS AND MEMORY FUNCTION.

The memory function on this machine allows the user to save and name up to 30 different programs. (There are 30 programs but only 10 programs per page.) Not only can the programs be saved, they can also be locked to prevent unwanted or accidental tampering for WPS work requirements. The process to save and recall the memory is relatively simple. However, there are some differences in the way the machine is controlled from the main menu screens. There are no longer any left or right division of control in this mode. Only the right side control knob and Save/Recall Program button will be used for navigation and selecting. The PowerSet button is used for selecting or deselecting the lock function. Most programs will say "Empty" until they are filled by a program. But if there are some form of program stored, these were stored during factory testing and not intended to be functional settings. These programs can be saved over, after being unlocked. Any recalled program can be fine tuned or adjusted, but the new settings or changes made to the machine will not be kept.

NOTICE: There are no useful pre-stored programs on this machine.

IMPORTANT: It is advised not to use any programs designed for 240V input with 120V input. However, if saving in 120V mode and 240V mode is expected, be sure to include the voltage in the program name .

Navigating and Using the Recall Screen.

The program function consists of two screens: the recall screen and the save screen. Both look alike except at the top information bar location, the words "Recall" or "Save" are used. Be sure to notice which word is at the top so that the unit is in the correct screen to perform the action desired. The recall screen is used to "recall" or bring up a desired program for use.

The recall mode does not allow any saving or any permanent modification of the programming. A recalled program will allow adjustments to be made, but the base program cannot be modified unless it is unlocked in the save mode and completely resaved or saved over. Recall mode will always be a safe mode to use for any user since programming cannot be saved over in this mode.

1. To recall any program, quickly press and release the save program button (1). This may be done from any process, even if the desired process is not selected at the top of the selector. (The selected program will override the process selector and display the saved program and process.)
2. The Recall menu screen will appear and will be confirmed by the green "Recall" bar (2) at the top of the screen.
3. Navigate to the desired program by rotating the right side adjustment knob (3). A green bar will highlight the line chosen.
4. Press the right side adjustment knob (3) to select and enter and open the program. The screen will display the program and settings like a normal screen, but it will not allow it to be overwritten. The programming will allow the user to make adjustments, but these will not be permanent to the program.

NOTICE: If the recall mode is not being actively used, and no choice has been selected/entered by pressing the right adjustment knob, the machine will return back to the previous setting. It will not recall (bring up on screen) the program, even if it has been highlighted.

Navigating and Using the Save Screen.

The Recall and Save screen are similar but the Save screen allows programs to be stored and features the lock/unlock (🔒🔓) function which will allow a new program to be saved in the old memory slot.

1. To save, complete all normal setup for the process desiring to be saved. Make sure all settings are correct before proceeding to step 2.
2. To access the save menu screen, press and hold the save/recall button (1) for at least three seconds before releasing.
3. When the button is released the Save screen will appear and the green "Save" bar at the top of the screen will confirm the selection.
4. Navigate to the desired line by rotating the right side adjustment knob (3). Each line will highlight in green as the adjustment knob is rotated.
5. Each line will have either a lock symbol or unlock symbol (🔒 🔓) located on each line on the right side (4). This indicates whether or

Component Identification and Operation

not the selected line is available for a new program to be saved. If the unlock symbol is displayed, this line will allow a new program to be saved. If a locked symbol is displayed, this line must be unlocked before saving. To unlock a line, quickly press and release the PowerSet button (5). The symbol will change to the unlocked status. **WARNING! If a line is purposefully unlocked, or left unlocked after saving a new program, this program will be subject to permanent change or over-writing without an extra layer of protection.** If available, always save in an "Empty" space. If a new program must be saved over an old one, make sure that it has no value or future use or write down the settings so that the values can be re-entered in the future.

6. Press the right side adjustment knob (3) to select the line and access the 'QWERTY" Popup key pad (6). Rotate the adjustment knob (3) to highlight a letter or a command (save or cancel). Press the adjustment knob (3) to enter the letter or number desired. Continue until the program name is complete or until the maximum character limit has been reached. *The maximum number of letters, numbers and other characters that can be entered to name a program is a total of 15 in any combination. The keypad will not hold more than a 15 total character program and will block more from being entered once the maximum is reached. To eliminate future confusion over which programs are which, be sure that program names are carefully chosen to be distinctive without exceeding the character limit.*
7. Once the program has been entered, rotate the adjustment knob (3)to save selection or press cancel to exit the screen. *If cancel is selected the program will not be saved on that line and the name or status of the line will not be changed.*
8. After selecting "save" on the popup key pad, the program screen will reappear with the newly named program. As an extra layer of security, and to prevent unwanted or otherwise accidentally tampering with the program, press the PowerSet button (5) to lock the program as soon as the program returns from the keypad menu screen. *It is always a good idea to keep all programs locked for program integrity.*
9. If no further input is made (i.e. locking or selecting another line) after saving the program, the menu will default back to the welding mode after approximately 5 seconds. Instead of waiting for the 5 seconds to expire, quickly press and release the "Save/Recall" button (1) once all programming is complete and saved. This will quickly exit and return to the menu normal welding/adjustment mode.

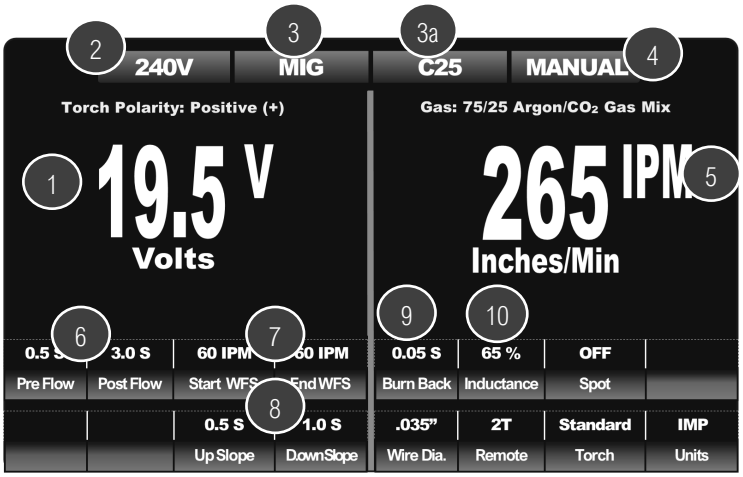
Component Identification and Operation

USING THE MANUAL MENUS

Each process menu operates in the basic same way. Navigation is similar between all the functions. See the below menus and notes about navigation of each of the following menus.

MIG/Flux-Cored Manual Menu:

The MIG manual menu is essentially the same between all MIG process selections, whether selecting C25, C100, Aluminum, or Stainless Steel.



1. Main Left Display, Default Voltage Display. Adjust the voltage with left adjustment knob. To adjust other parameters or functions, enter the adjustment mode with left down arrow key to navigate to the desired parameter to highlight and enable adjustment. When a parameter or function is selected for adjustment, the numbers will turn from white to red. Voltage is the default setting of the left side. After 5 seconds of no input or adjustment of other parameters or functions, the selected setting will default back to the Voltage setting and exit adjustment mode.

2. Voltage Input Confirmation. This confirms which voltage the machine is being supplied. This also serves as a diagnostic tool. If the machine shows 120V, while operating on 240V input, then the power supply to the welder is likely faulty. With 120V output, the bar will turn yellow to remind that the welding output is limited. NOTE: Maximum output of the machine is governed by the input voltage. Some selections may not be possible on reduced input power.

3. Process and Gas Reminders. When viewed together, both 3 and 3a reminds the user which process has been selected. In one of the MIG process modes MIG will always display with either C25 (75/25 Ar/CO2 for Steel), C100 (100% CO2 for Steel), Mix Gas (98/2 Ar CO2 for Stainless/Inox), Ar Gas (100% Argon for Aluminum), or No Gas (For Flux-Cored on Steel) in wire feeding modes.

4. Manual/PowerSet Mode. This indicates which mode the machine is operating in, whether in full manual mode or in PowerSet mode which is a synergic, more automated mode. In PowerSet mode, many functions may not be available for adjustment and will be preset. (See the MIG PowerSet section).

5. Main Right Display, Default Wire Feed Speed Display. Adjust the wire feed speed (WFS) with right adjustment knob. This display can indicate the wire feed speed in either Inches Per Minute (IPM) or in Meters Per Minute) M/Min. This is the default setting of the right side. Other parameters and functions will be represented in the display when in adjustment mode. When the Wire Feed Speed or other parameter is selected for adjustment the display will turn red in color. After 5 seconds of no input or adjustment of any parameter or function, the selected setting will default back to the Wire Speed setting and return to white. *While actively welding, the display function will change to read actual measured amperage output.*

6. Pre-Flow/Post Flow Timers. Pre and Post Flow provide adjustable shielding gas flow time before and after the weld. This is important to reducing contamination in the weld. The arc start and wire feed will be delayed slightly by the amount of pre-flow time used but helps provide a gas envelope around the weld. Post flow helps cool the torch and provides shielding around the weld after the arc is terminated. This helps prevent oxidation of the weld. NOTICE: In gasless Flux-Cored mode, Pre and Post Flow will be unavailable for adjustment and the space will be blank. Typically a setting of about 0.5 seconds for Pre-flow and 3-5 seconds for Post Flow are used.

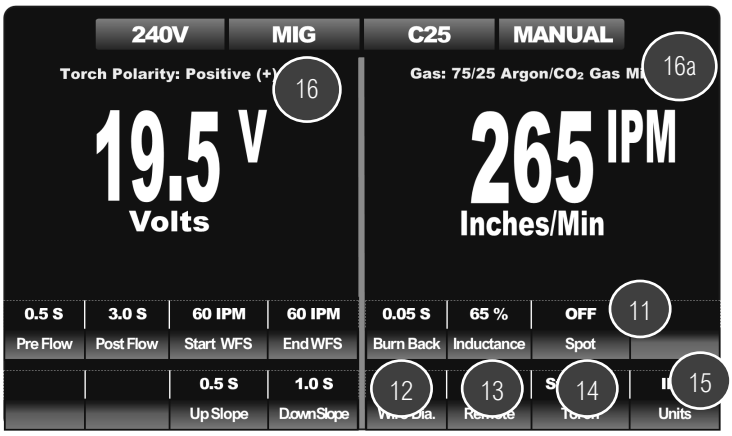
7. Start/End WFS. The starting wire feed speed helps the unit start cleanly and smoothly. It can be used with up-slope to helps to improve the quality of the start and transition into the welding amperage. This provides a type of "soft start" which is similar to a hot start setting. The end wire feed speed is used as finishing wire speed feed, and is used to fill the crater left at the end of the weld at arc termination. To reduce the impact of this function, set to 60 IPM (.5 M/M) and set up and down-slope to 0.0 Seconds.

8. Up/Downslope Timers. The slope is used to ramp wire speed up or down, at the start of the weld or at weld termination. Up-slope is used with Start Amps to increase wire speed (or decrease it, depending upon the setting desired) from the starting wire feed speed. Down-slope is used to decrease wire speed from welding wire feed speed to the end wire speed. This provides the time necessary to complete the crater fill process at the end of the weld. Either Up or Down Slope can be set to "0.0" if the function is not desired.

9. Burn Back. This is the amount of time the arc stays on after the wire stops feeding. It is used to help prevent the wire from sticking in the weld and to reduce the need for constant trimming of the wire before restarting. Use a setting of .1 to .3 seconds to begin with for most applications. Smaller diameter wires need less burn back time.

10. Inductance. This improves the wet-in of the weld. A low setting will result in a very poor arc, with a high pitch. The result will be a raised ridge in the middle and poor wet-in. Excess spatter may be observed. The result of a excessively high setting will result in a very fluid, flat

Component Identification and Operation



puddle. The pitch of the arc will be raspy and not smooth. Starts will not be as smooth. Generally, a setting of 65 to 75% is a good starting point on Steel with C25. With Steel and C100, 70 to 80% is a good starting point. Generally, pure CO2 is not very smooth on many welders, but with inductance control, high quality welds can be achieved. Stainless requires the highest inductance with 90% or greater. Aluminum can range depending upon the wire from 60 to 80% or so. Flux-Cored behaves a little differently with a 40 to 50% starting point. Of course, different weld positions, joint designs and thicknesses of metal can affect the inductance requirement slightly. NOTICE: The units will ship with the last settings used in performance testing. Often Inductance will be set to 0% after testing the range of function. If the unit is used with 0% Inductance, bad arc quality will result.

11. Spot and Stitch Timers. *The Spot timer must be turned on for the Stitch function to appear. When Spot is turned off as shown in the picture above, the Stitch function is no longer selectable.* The Spot function is a timer that sets a defined "Arc on" time. The timer allows the arc to stay energized for the period set. After the time has expired the arc will automatically stop, if the trigger is still held down. While it can be used with 4T, the spot function is best used in 2T mode, especially for relatively short tack welds. **NOTE:** Keep in mind that If the spot timer is turned on accidently, the wire feed will stop suddenly soon after the trigger is pressed. In fact it may barely feed and just seem to quit if the time is set low. This is normal, but often a source of tech support calls. If your wire feeder stops feeding unexpectedly after the trigger is pressed, check this function first. Stitch is defined as "Arc-off" time. This function is dependent upon the use of the Spot weld function. While the Spot function may be used independently with the Stitch timer set to "0.0", the use of the Stitch is predicated on the use of the Spot Timer. Using the spot timer together with the stitch timer creates an endless "On and Off" cycle of the arc for as long as the trigger is held. The Spot Timer sets an "arc-off" interval between a series of spot welds as the trigger is continued to be held down. This is useful for tacking up long seams on thin sheet metal such as body panels. It helps to provide regular spacing between the weld as long as the forward travel speed provided by the user remains fairly consistent. **IMPORTANT: If the spot is accidentally engaged, the user will experience a short cycle of the arc. This typically happens with new or inexperienced users or after another user has made adjustments. If the arc suddenly dies after the arc is started or starts/stops starts, check and make sure the Spot timer is set to "OFF".**

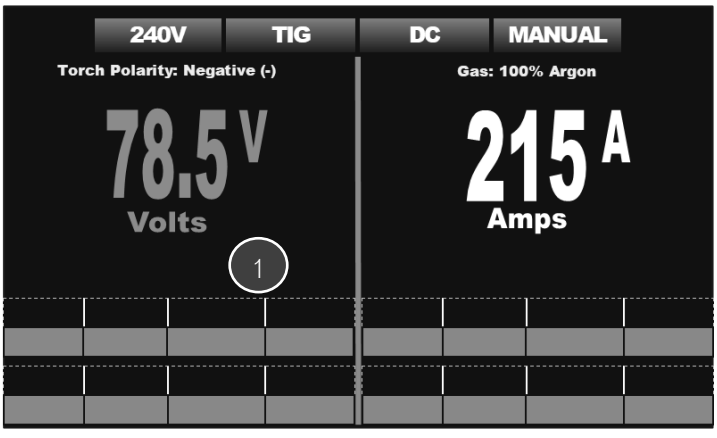
12. Wire Dimeter. The input of the wire diameter helps to put limits around output for the wire and make suggestions in gas selection when the wire approaches the short-circuit limits and begins to transition to globular/spray transfer.

13. Remote/Torch Trigger Function. This controls how the welder reacts to the torch trigger. In 2T, the trigger is pressed and held to weld. In 4T, the trigger is pressed briefly to start the arc, then released to continue to weld. The weld is continued without the torch trigger being held down. The trigger is once again pressed, held and then released to terminate the arc. See more detailed 2T/4T Remote information and explanation found later in this manual.

14. Torch Type. Select between the main MIG gun or Spool Gun function.

15. Units. Everlast recognizes that there is a need to provide different units of measures to different industries and regions of the world. This unit is equipped to read in Standard Imperial (US or English) units such as inches per minute or decimal inch equivalents. The unit is also equipped to read in Metric (SI) units such as Meters/ Minute and millimeters. Choose between MET (Metric) or IMP (Imperial) on the screen to convert all relevant measurements to the desired or required units.

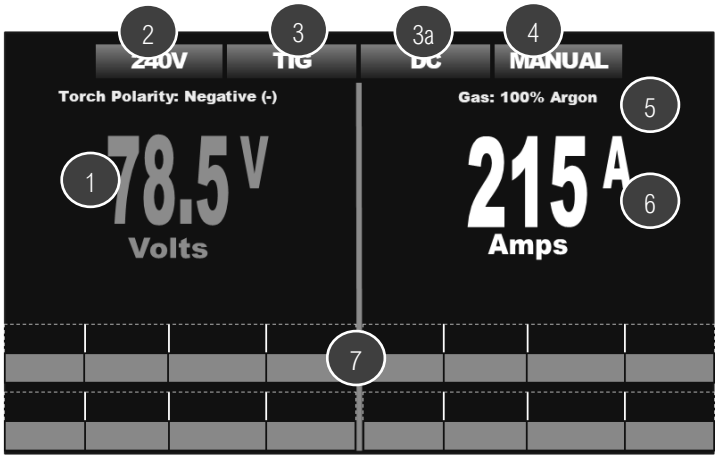
16. Reminder/ Information Areas. This informs the user about which torch polarity (16) to use and which gas to use (16a). Both the Torch polarity and gas recommendations are subject to change according to the process used and the actual output of the machine. If improper operation is observed, check this area and the information it is displaying and confirm the polarity and gas mix being used. These areas are not selectable or adjustable.



Component Identification and Operation

DC TIG Manual Menu:

DC TIG Function is a basic lift arc unit. This means the menu has few functions and there are basically no controls other than the amperage on the welder panel. It does not support foot pedal or other remote control of the Amperage. Most items are gray or non existent, indicating there is no adjustment available. Voltage is not adjustable and only reflects actual output at the arc, or the OCV when not welding. The unit is DC only and is not meant to weld Aluminum. However it can be used to perform basic maintenance and fabrication on pipe and structural metals as well as most types of weldable stainless. The torch is optional. It must be a gas valve (V designation) torch that manually controls gas flow via a valve on the torch neck. The recommended torch is the Everlast/Nova 17V series.



1. Main Left Display, Default Voltage Display. The voltage displayed in the Main display in TIG mode is a measured reading of output. It is not adjustable. The voltage will always be displayed in green color to remind the user that the voltage is non adjustable. The left control knob will not be able to adjust voltage. While adjusting other parameters, the voltage will change function and display the selected parameter. It will also turn red indicate that it is in the adjustment mode.

2. Voltage Input Confirmation. This confirms which voltage the machine is being supplied. This also serves as a diagnostic tool. If the machine reads 120V, while operating on 240V, then the power supply to the welder is likely faulty. As demonstrated above, during when 120V input is supplied, the voltage bar will turn yellow to remind the user that the welding output is limited. NOTE: Maximum output of the machine is governed by the input voltage. Some selections may not be possible and some ranges will be reduced on 120V input power.

3. Process Reminders. When viewed together, both 3 and 3a reminds the user which process has been selected. For TIG, there is no touchless HF or HV Start. It is lift start only.

4. Manual/PowerSet Mode. This indicates which mode the machine is operating in, whether in full manual mode or in PowerSet mode which is a synergic, more automated mode. In PowerSet mode, many functions may not be available for adjustment and will be preset. (See the TIG PowerSet section).

5. Reminder/Information Area. The area in yellow is designed to inform or remind the user to check or change polarity and to confirm which shielding gas (5a) should be used. For TIG, this area will remain unchanged. Torch polarity in TIG mode will always be negative (-). The recommended shielding gas will always be 100% Argon.

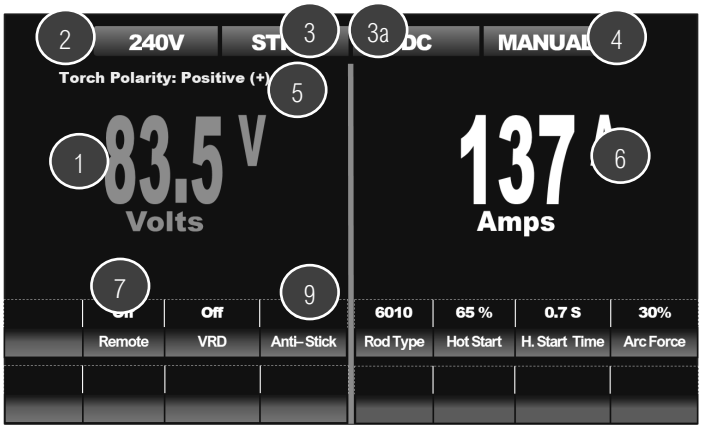
6. Main Right Display, Default Amp Display. Adjust with right adjustment knob. By default this display area indicates the Amperage. In adjustment mode, the function or parameter selected will display and the display numbers/letters will turn red to indicate adjustment mode. *While actively welding, the display function will change to read actual measured amperage output.*

7. Lower Area. *Lower area will remain blank. There are no adjustable functions or items located here.*

Component Identification and Operation

.DC Stick Manual Menu:

The stick manual menu is simplest menu of all the manual menus. However, there are a few functions that the user should take note of. Ignoring these setting and not providing a setting for them, may make arc starting difficult or may make maintaining a satisfactory arc impossible.



1. Main Left Display, Default Voltage Display. The voltage displayed in the Main display in Stick mode is a measured reading of output. It is not adjustable. The voltage will always be displayed in green color to remind the user that the voltage is non adjustable. The left control knob will not be able to adjust voltage. While adjusting other parameters, the voltage will change function and will display the selected parameter. It will also turn red to indicate it has entered the adjustment mode.
2. Voltage Input Confirmation. This confirms which voltage the machine is being supplied. This also serves as a diagnostic tool. If the machine reads 120V, while operating on 240V, then the power supply to the welder is likely faulty. As demonstrated above, during when 120V input is supplied, the voltage bar will turn yellow to remind the user that the welding output is limited. NOTICE: Maximum output of the machine is governed by the input voltage. Some selections may not be possible and some ranges will be reduced on 120V input power. Notably, Amp output will be limited and may not always provide a satisfactory result with electrodes over 3/32. In some cases, depending upon the type of rod selected, 3/32" size rods may not perform as well either.
3. Process Reminders. When viewed together, both 3 and 3a reminds the user which process has been selected. For Stick, DC will also be highlighted on this machine to remind the user that this unit is DC, and not AC mode. (This welder supplies DC output only for Stick)
4. Manual/PowerSet Mode. This indicates which mode the machine is operating in, whether in full manual mode or in PowerSet mode which is a synergic, more automated mode. In PowerSet mode, some functions may not be available for adjustment and will be preset. (See the Stick PowerSet section).
5. Reminder/Information Area. The area in yellow is designed to inform or remind the user to check or change polarity and to confirm which shielding gas (5a) should be used. For Stick, this area will remain unchanged. Torch polarity in Stick mode will always be positive (+). Some rods that may allow use on electrode negative, but those are typically not considered standard types or preferred polarity in most cases.
6. Main Right Display, Default Amp Display. Adjust with Right adjustment knob. By default this display area indicates the Amperage. In adjustment mode, the function or parameter selected will display and the display numbers/letters will turn red to indicate adjustment mode. After 5 seconds of no input or adjustment of any parameter or function, the selected setting will default back to the amperage reading and return to the default white color. *While actively welding, the display function will change to read actual measured amperage output.*
7. Remote. The remote function allows the stick function to be used with an adjustable remote to control amperage at the electrode holder.
8. Voltage Reduction Device (VRD). The VRD acts as a safety device by lowering the OCV while the unit is not welding to below 24V. This helps prevent accidental shock and electrocution.
9. Anti-Stick. The anti-stick helps prevent the rod from sticking fast in the weld puddle by reducing the output when it is shorted accidentally while welding. This makes the stuck rod easier to remove. It will not actually prevent the rod from sticking, but it will help prevent it from sticking fast in the weld and flaming up.
10. Rod Type. This feature helps improve overall rod performance and provides a base for the machine to fine tune parameters.
11. Hot Start. This is a rush of amperage over the set amount that is provided to help improve the starting of the rod. NOTICE: Hot Start may be limited and seem to be muted due to the amount of amperage available left over to operate the hot start. The closer to the maximum amperage the machine is set, the impact of the hot start will be softened. Typically iron powder and titania fluxed rods require less than cellulose. For iron powder/titania fluxed rods, 40-50% is typical. For cellulose 70-90% may be required. Low-Hydrogen rods that are not properly stored or used and are considered "wet" (open, non heated storage of greater than 4 to 8 hours), may require higher settings similar to cellulose to keep the rod burning properly. But fresh rods or rods stored in rod ovens will use the lower settings.
12. Hot Start Time. This is the duration of the Hot Start This keeps the hot start active and helps heat up the puddle.
13. Arc Force. As the rod is held closer, the arc voltage will drop and the total wattage will fall. In some cases this may cause the rod to stick in the puddle. The Arc Force offsets this by supplying additional amperage (over the amount set) to help maintain welding wattage. This allows the user to use a tight arc, to prevent impurities from entering the weld. The Arc Force will be triggered when welding voltage falls below approximately 20V. Adding Arc Force will improve the feel and wet in of the puddle. Typically iron powder and titania fluxed rods require less than cellulose. For iron powder/titania fluxed rods, 20 to 40% is typical. For cellulose 60-85% may be required. Low-Hydrogen rods that are not properly stored or used and are considered "wet" (open, non heated storage of greater than 4 to 8 hours), may require higher settings to keep the rod burning properly. But fresh rods or rods stored in rod ovens will use the lower settings.

Component Identification and Operation

Using the PowerSet Menus.

The PowerSet function is a synergic function designed to provide the user with a simplified set up process. It provides the user with a recommended setting while simultaneously allowing a workable range of settings based off of industry accepted norms. It can be used as a general guide for set-up and eliminates the need for complicated charts and user guides.

To use the PowerSet menu properly, the user must input basic operating parameters, such as wire type (selected by the process), wire diameter and material thickness to provide useable results. These are all the same type settings you'd have to reference in a user setup chart. Although the settings provided to the user are based off of industry accepted "norms," the provided settings may not work for every user in every application. The programming is designed to provide a target, or recommended setting, but the unit also provides a range of adjustment both higher and lower than the recommended setting to allow fine tuning to accommodate differences of joint design, user welding style and weld position. Although the range of adjustment is fairly generous, there are limits set by the machine's programming to attempt to keep the unit from going too far off track. The programming will block further adjustment after the limits of the range are reached. The PowerSet is also equipped with visual graphical aids to help the user see and visualize the settings. The settings will have a tapered graphic is also color coded to indicate a normal range of a setting and guide the user further in fine tuning. As the setting is fine-tuned, away from the recommended settings and toward the setting limits, the graphic will eventually change from green to yellow, and finally to red to indicate the general "safeness" of a permitted adjustment.

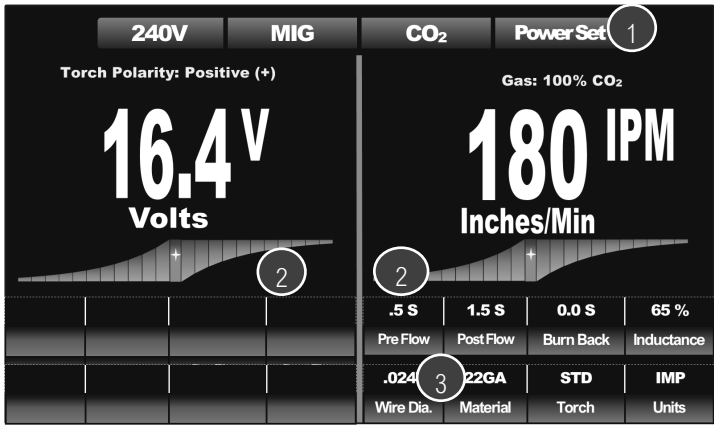
Keep in mind that synergic settings cannot take into account every variable and allows the user independent control to manually correct the provided settings to accommodate differences in welding environment, user experience and skill. Also, weld position, joint fit-up, and cleanliness all are "hidden variables" that can make a difference in the accuracy and effectiveness of the PowerSet settings. There is no perfect synergic system for every eventuality. The settings provided are given based off of in-position welding, good fit-up/joint design and assumes at least an intermediate level of understanding and skill of the operator. The PowerSet function has been tested for acceptable function under industry recommended operating conditions and parameters.

It should also be noted that welds greater than 3/16" with the unit are generally performed in multiple passes for best results for short circuit welding. The unit does offer higher settings and may recommend a gas change as the wire speed and voltage enter the Globular and Spray transfer range to perform single pass welds (MIG C25 process selection). If the user is not informed on the differences between the types of MIG wire transfers and does not understand the requirements and expectations and limits of different forms of wire transfer and observe the recommendations given, the unit may not perform satisfactorily.

NOTICE: To prevent completely unworkable mismatches in wire, tungsten or electrode capability, selection choices of inputs or parameter adjustments may be limited or completely blocked, even if further adjustment is represented graphically on the screen (such as metal thickness if MIG wire diameter is too small). This is intended to remind the user that there are physical limits to choices of wire, tungsten or electrode (welding rod) can support. Even with these limits, it does not always mean that performance will be perfect or desirable. Near or at the physical limits of wire or electrodes (or input voltage), spatter may increase and weld performance or arc stability will decrease. **The limitation of adjustment with some settings or combination of user inputs is not a malfunction of the unit.**

All PowerSet Menus.

In comparison to the Manual Menus, the PowerSet Menus are simplified in regards to the amount of controls and functions needed for proper adjustment. The menu is reduced to more basic functions, but still allows all critical adjustments to be made. The rest are preset by the factory or all together eliminated. The basic layout, operational information provided on screen and method of navigation/adjustment are mostly unchanged from the manual mode, so the information will not be repeated, unless there is a difference in function or process of setup.



1. When the PowerSet mode button is activated, this box will change from Manual to PowerSet to confirm the setting.

2. The adjustment range graphic is designed to aid the user a visually by indicating how the adjustment is affecting the setting. Depending upon the parameter being adjusted, the graphic may change in appearance. For Volts, Amps and Wire Feed Speed, the graphic appears as shown above in the picture. As the user makes progresses further away from the recommended adjustment, the graphic will also change color, turning from green to yellow and finally to red. The red and yellow areas indicate that the adjustment is not recommended and serves as a general warning that performance may not be optimal, even if it is allowed. For other adjustable parameters or input functions the graphics will change in appearance to better illustrate the. **Input functions such as Wire Diameter or Material thickness have no target or recommended value and simply relay the chosen input value in the form of a graphic as a visual aid.** Other basic parameters such as torch or pre/post flow have no recommendation so there is no adjustment graphic for those. For specific parameters, such as in-

ductance, the graphic indicates the recommended preset and allows the user to make adjustments, but indicates settings that may not be ideal as the graphic slopes up or down, away from the center setting. Other types of graphic representations are:

- Material Thickness: 

- MIG Inductance or Stick Arc Force: 
- Diameter (wire, tungsten or electrode): 

3. PowerSet requires user defined input parameters.

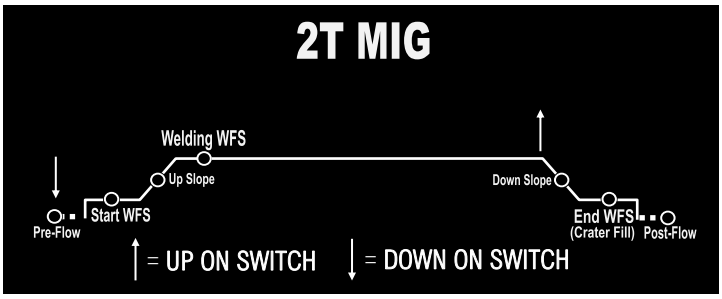
- For MIG, the required input parameters, after selecting the correct process (for wire feed processes, the correct wire and gas type are assumed by the selection of the wire process) are the input of the wire diameter and material thickness.
- For TIG, the required user input parameters are Tungsten Diameter, and Material Thickness.
- For Stick, the required user input parameters are Rod type (Electrode Selection, Rod Diameter and Material Thickness.

Component Identification and Operation

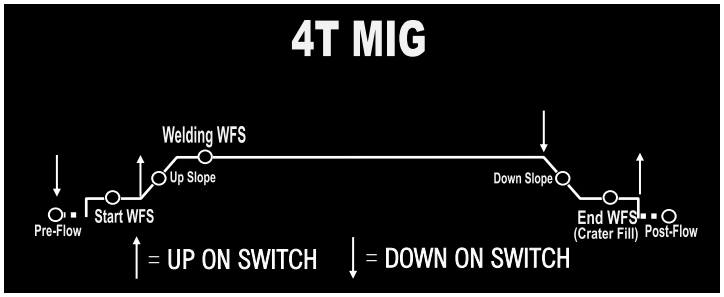
Using The Trigger/Torch Switch Remote Functions

Operating the 2T/4T Remote Function

The Remote Torch Trigger function works with the MIG/Flux-cored processes. The Trigger function is designed to allow the user to program the welder so that the stages of the weld cycle can be controlled via operation of the torch switch. This should not be confused with a Remote Amp control like a Foot Pedal or a Spool Gun Amp control wheel. The switch itself provides no adjustable control. It is only designed to cycle a stage or stages of the weld cycle.



2T function controls all of the weld cycle with a simple press-and-hold and release action. This is the conventional "pull the trigger" mode that is familiar to most users, but it involves controlling more functions than a simple "on and off" of the weld arc. This is also called a 2 step function. The torch trigger moves in two directions, each change of direction signals the welder to advance to another part of the weld cycle



4T function controls each stage of the weld cycle by multiple press and hold actions of the torch trigger. This is used to retain manual control over the slope stages and start and end portions of the weld cycle through each movement of the torch trigger. Press the trigger and hold to start the Pre-flow cycle and start the weld. Once the arc has started release the trigger to upslope and weld at the normal set Amperages. Pull and hold the trigger to allow the down slope cycle to occur. Once the down slope cycle has completed and the weld crater is adequately filled, release the trigger to end the weld. The arc will terminate and the Post Flow cycle will begin. A common error is to simply click the torch trigger rather than hold the trigger during the down slope. The only time the trigger should be clicked is in the middle of the down slope cycle to toggle the weld back to the welding cycle Amperage. If the cycle has fully reached the bottom of the down slope the cycle cannot be restarted and the arc will terminate when the trigger is released. This is useful for managing the weld heat once it begins to get hot. This toggling feature can be repeated during the weld. It's not meant to be a adjustable amp substitute, but it is useful to help manage heat temporarily when a weld gets too hot to manage.

With the Spool Gun in MIG mode, the selecting the torch type automatically gives you control over the Amperage. However, it still cycles all of the 2T/4T programming through the separate trigger pulls. The Wire Speed/ Welding Amps are adjusted on the gun, while the max amperage is set on the screen.

See the next column for a visual explanation of the 2T and 4T MIG function. Notice that the arrow buttons indicate an up (in or press) or down (out or release) movement of the torch trigger.

Component Identification and Explanation

EXPLANATION OF MIG FUNCTIONS

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 x Amps = Inches per minute (IPM)

.025": 3.1 x Amps = Inches per minute (IPM)

.030": 2 x Amps = Inches per minute (IPM)

.035": 1.6 x Amps = Inches per minute (IPM)

.045": 1 x Amps = Inches per Minute (IPM)

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

.023": IPM ÷ 3.5 = Amps

.025": IPM ÷ 3.1 = Amps

.030": IPM ÷ 2 = Amps

.035": IPM ÷ 1.6 = Amps

.045": IPM ÷ 1 = 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.

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.

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.

Even though the PowerSet feature has been provided, sometimes additional adjustment may need to be made based off of welding position or joint type. With this unit, we've tried to provide plenty of adjustment range in the PowerSet function. Normally, this will still allow a functional setting. However, when the welding wire is pushed to its maximum limits with Volts and Wire Speed limit, welding may not be smooth and spatter, undercut, and burn back (when the wire melts back to the tip) may occur.

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 1/2" above the weld. The gun should be in the vertical position, with no 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 open-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 contaminates 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 manage 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 Cleaning.

MIG 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, contaminates will result in porosity and inclusions in the weld, weakening it. 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 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 contaminates 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.

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 contaminates 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 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 contaminates 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.

Component Identification and Explanation

Explanation of General Parameters, Functions and Terms

Amps (TIG/Stick). Shortened from "Amperes." Amps is a measurable value of Current. Amperage is used to refer to the magnitude of Current. *Amps will also be displayed while actively welding in MIG mode as well instead of wire feed speed.*

Anti-Stick (Stick). This is a special function that helps make removing stuck rods easier. When the mode is activated, the unit senses the low voltage ouput of the stuck rod and drops current to prevent the rod from sticking fast in the weld puddle, overheating and flaming out. The goals is to make releasing and removing the stuck rod easier so that it can be salvaged.

Arc Force (Stick) Arc force is used to offset the loss of overall wattage (V x A = W) as the arc length is shortened and voltage begins to drop while stick welding with short arc conditions. It offsets the drop in voltage by injecting extra amps into the weld when voltage drops below the 20V threshold. This enables the amperage to react aggressively or mildly, depending upon settings. It also helps to prevent arc outages, and allows the user to hold a tight arc and maintain better control. This function is also referred to as "Dig" and "Inductance" in the industry. Arc force is set as a percent of Amps over the set welding Amps. As the welder nears the top end of the Amp rating for stick welding, Arc Force action will be reduced due to less compensating Amperage being available for use. This will happen regardless of Arc Force Setting. Typically Arc force settings with rods such as E7018 and E6013 should be set to around 20 to 35%. Arc force for Cellulose based Flux rods such as E6010 and E6011 is 60% or greater.

Direct Current or **DC (MIG/TIG/Stick).** Used to describe one way flow of electrons. Used in TIG to weld Steel, Stainless Steel (Inox), Chrome Moly, Titanium, and more. Not used with Aluminum and Magnesium. For MIG this is the standard method of MIG welding with all metals. This is the preferred method of stick welding. For most MIG and Stick applications, DC polarity of the torch will be positive (DCEP +). For Flux-Cored and TIG use the DC polarity will be negative (DCEN -). The welder will remind you of this polarity.

Down Slope (MIG) Downslope is the duration of time that it takes for the programming to transition the from the Welding Wire feed speed down to the End Wire Feed Speed.

End Wire Feed Speed (MIG). This is the final feed speed set for the end of the weld cycle. This helps slow the wire feed rate and makes a more gentle termination and better crater fill.

Hot Start Amps (Stick). This setting controls the intensity of the arc start by boosting the initial amps at the start of the weld cycle. It is used to improve arc starting and reduce the time needed to establish a puddle and helps to prevent porosity at the beginning of the weld. The Hot Amps are set as a percent of Amperage over the welding Amps. Maximum Hot Start action may be limited by available Amperage for stick welding. As the current is raised near the top Amperage of the welder, Hot Start Action will be less forceful due to less Amperage being available, regardless of machine setting. Typical settings can be between 30 and 70%, depending on electrode type. Iron Powder and Low Hydrogen rods will require less Hot Start action from 30 to 50%. Cellulosic rods may require 60 to 75%.

Hot Start Time (Stick). This is the time the Hot Start Stays engaged. The Hot Start Time will be increased on thicker plates, but in general, .5 to .7 seconds works well for plate thicknesses up to 3/8".

Inductance (MIG). Although the action is different, this is similar to arc force in stick that helps change the puddle characteristics and defines the feel of the arc, whether stiff, or soft and fluid. It is a relative amount and cannot be turned off completely. The user may also notice that the arc width is also controlled to a small extent. If in doubt as to a proper setting.in manual mode check the PowerSet mode. The PowerSet function gives excellent range recommendations for each wire feed function. Inductance should never be set lower than the minimum settings provided in PowerSet mode or unsatisfactory performance may be experienced.

Lift Start (TIG). Lift start requires touchdown and lifting up of the Tungsten to start the Arc. *There are two types of Lift Start that this unit has.* The first is a live lift start. This means the tungsten is always electrically live until the arc is started. When the tungsten is touched to the metal, continuity is sensed and the welder sends welding power as soon as the continuity is broken. The other type of lift start is a "remote lift start". It functions essentially the same except, the tungsten is not electrically live and the torch switch or foot pedal must be used to make the torch live. This is a safer form of lift start and helps prevent accidental starting of the arc. It also means that the start type can be used with the welder programming in 2T and 4T mode, or with the foot pedal.

Open Circuit Voltage (OCV). OCV is the voltage that is present when the arc is not struck. OCV is particularly important to stick arc starting. OCV is reflected in the left main display area as the default when not welding.

Post Flow (MIG/TIG). Post Flow is the amount of time (in seconds) that the shielding gas flows after the arc is terminated. This is an important function. The flow of shielding gas after welding is stopped helps to 1) Cool the torch and/or tungsten and prevents oxidation of the tungsten/ filler wire as it cools. 2) Provide cooling and shielding while the weld puddle solidifies and cools. This helps to prevent the weld from forming porosity and prevents oxidation of the weld as it cools. Post Flow should be increased at the Amperage increases. **For TIG use, use one second of Post Flow for every 15 to 25 Amps used. At a minimum, 2 to 3 seconds should always be used. For MIG use, use 2 to 3 seconds for every 50-70 Amps.** To properly use Post Flow, the torch should be held in place over the weld after termination until the gas shuts off.

Pre-Flow (MIG/TIG). Pre Flow is the amount of time (in seconds) that the shielding gas flows before the weld starts. It is very important that the Pre Flow be set for at least a short flow before any weld. The Pre-Flow not only purges the torch of any contamination, but it also establishes a protective envelope of shielding gas around the weld before the arc initializes. In TIG mode this is controlled manually on this machine. The operator

Explanation of General Parameters, Functions and Terms

rotates a valve on the torch to start gas flow. This protects the tungsten, and helps to establish an arc more quickly by surrounding the tungsten and work with more easily ionized gas so that arc starts are more efficient. The manual control afforded by the gas valve torch can be tailored for use in any situation. The amount of preflow needed for TIG is typically about 1 second to allow the gas flow to stabilize before the tungsten is lifted and the arc is struck. For MIG, it provides a stable gas pocket to strike the arc and helps prevent inclusions at the beginning of the weld. It also allows time for the gas flow to stabilize before the arc is struck. When initializing the Pre Flow a "rush" of gas can often be heard just ahead of the arc strike. Then the gas flow will quieten down as the weld begins. This is normal. This rush of gas is caused by several things, but it is in part due to regulator attempting to regulate the sudden rush of gas. As it does this, extra gas may be consumed until the regulator has had time to react. The extra flow of gas may create turbulence around the weld. The Gas flow rate may also temporarily increase due to the back pressure "ballooning" of the gas lines. As the slightly swollen gas lines stabilize, extra gas is propelled as the solenoid opens relieving the back pressure. For MIG using .3 to .7 seconds is usually enough to allow the "gas rush" to stabilize, unless extra large shielding cups are used. .

PowerSet (MIG/TIG/Stick). The welder offers a unique power set menu mode that allows the user to input several operating parameters such as Tungsten/Wire/Electrode Diameter, Metal type, and Material Thickness. In return, the unit will provide a usable range of settings based off the user inputs. It will limit and preset most all other parameters and functions so that the user doesn't have to go through an extensive set-up routine. for the user. For users that are new to the welder, unfamiliar with basic welding functions or setup, this should be the mode that is used. It is also used to provide settings in lieu of a weld chart. Consider the PowerSet settings to be the weld chart on this unit, but expressed in a digital format.

Regulator./Flow Meter (MIG/TIG). Controls the flow rate of the shielding gas at the cylinder. The regulator should never be left turned on. Leaks can and do develop over time or suddenly. Gas solenoids can fail to close properly. Whenever a regulator is not in use, the pressure should be relieved so that the diaphragm/spring will not prematurely fail or lose accuracy. The regulator for MIG can also be used with TIG on this unit. However the regulator may need to be adapted to fit directly to the optional torch.

CAUTION*: Always open the regulator slowly, while standing to the side so that if it were to fail parts will be ejected away from you. Never stand over a regulator while opening.*

Remote (MIG). Remote refers to the ability to start the arc and control the weld cycle at a distance.

Shielding Gas (MIG/TIG). Shielding Gas is necessary while MIG or TIG welding. It is not use for Flux-Cored welding on this machine. Shielding gas protects the weld from oxidation by the atmosphere while the weld puddle is still molten. Gas flow rates are controlled by the supplied regulator. Too little gas flow will cause porosity, heavy scale and or oxidation. Too much gas flow is wasteful and can also create a turbulent flow, which can pull the atmosphere into the weld, creating oxidation. *The recommended shielding gas type is always listed on the display as a reminder.*

Start Wire Feed Speed (MIG). This is the starting wire feed speed in MIG mode. This is the starting stage of the weld cycle, at which the arc initiates. MIG Start Wire Feed Speed is the beginning wire feed speed used to initiate the arc and controls how smooth the arc starts, when combined with upslope. This can serve as a "reverse" hot start by slowing the wire speed at the beginning of the weld while providing a higher voltage.

Spot Weld Timer (MIG). The Spot weld timer simply is an Arc-On timer for MIG/TIG and is calibrated in tenths of a second. The function is intended to help the user create better tack welds with improved consistency in weld size and penetration. Once the torch switch trigger is activated and held, the arc will stay turned on for the amount of time selected. After the time has expired, the welding arc will shut down. The Spot function should be used with 2T only. This is not meant to be used with or serve as a controller for tong-type Spot welders.

Stitch (MIG). Whereas the Spot function is an "Arc-On" timer, the Stitch timer is an "Arc-Off" timer which works in a continuous cycle as long as the switch is continually held. This creates a repeating on/off cycle that is useful for welding long seams on sheet metal, or creating regular sized spot welds along a object while tacking up an object for fitment.

Up-Slope (MIG). Upslope is the duration in time that it takes for the programming to transition the TIG Start Amperage (or MIG Wire Feed Speed) from the TIG Start Amp/ MIG Start WFS value to the Welding Amp value. If TIG Start Amps/MIG Start WFS are set higher than the Welding Amp values, then technically it will down slope to the Welding Amp value. However high TIG start values can increase Tungsten wear. Used with all remote functions except the foot pedal in manual mode.

Voltage (MIG/TIG/Stick). Voltage is the main default control in the left screen. For TIG and Stick, Voltage is not adjustable because the length of the arc will dictate the voltage. This is a static function and only reflects the output voltage and will be displayed in green for TIG and Stick. For MIG/Flux-Cored use, the voltage is able to be set and controlled. Voltage is also referred commonly to "Heat" when referring to MIG and helps to control the arc length. Too much voltage will cause undercut, while too little will cause poor wet-in of the weld and cold lap at the toes of the weld.

Voltage Reduction Device or VRD (Stick). This function reduces Open Circuit Voltage (OCV) while welding stick. This is required in some applications to comply with safety standards. This reduces high OCV down to 20V or less. This can also make arc starting slightly more difficult. A quick double tap can offset the hard starting. *See specifications on page 12 for OCV data to determine if the use of the VRD is required.*

Welding Amps (TIG/Stick) or Wire Feed Speed(MIG WFS). This is the main default current control in the right screen. For TIG, when used in the context of Pulse, this is the "Peak" part of the pulse while the Pulse Amps is the "Base Amp" part of the pulse. Without Pulse, the main welding amps

Explanation of General Parameters, Functions and Terms

simply controls the Amperage of the welder. For MIG, Wire feed speed is expressed in inches per minute or in meters per minute, depending upon the units selected.

Component Identification and Explanation

EXPLANATION OF MIG FUNCTIONS AND TERMS

NOTICE:

This unit features a slow run-in. This means the wire will feed slowly until the arc is started. It is used to improve arc initiation and reduce weld porosity which results in poor fusion during the arc starting process. Once the arc is sensed, the wire speed will ramp up and weld at the selected wire speed.

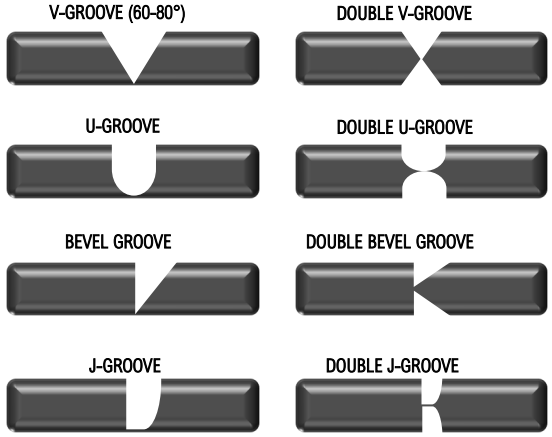
What Are the Different Kinds of Welds?

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.

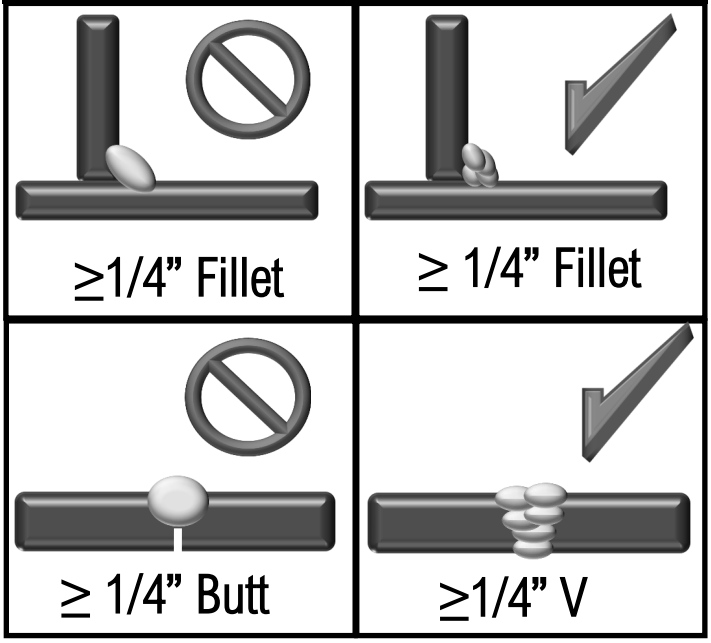
When Do I Use Multi-Pass Welds?

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



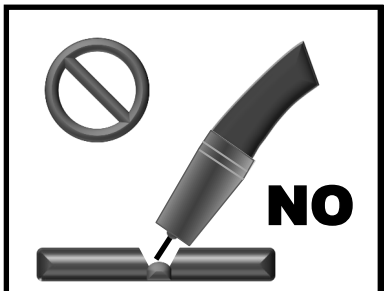
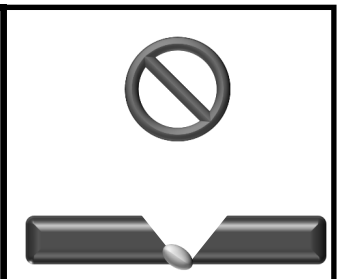
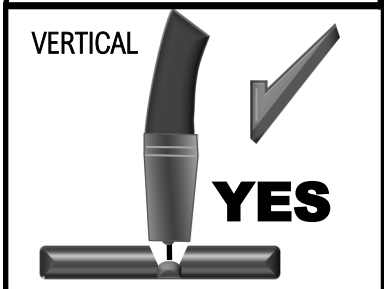
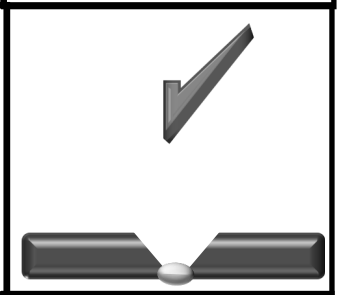
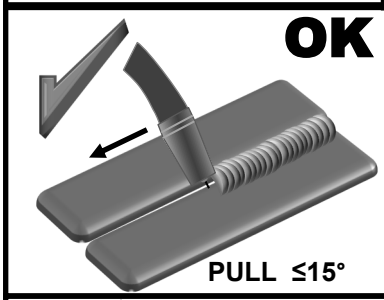
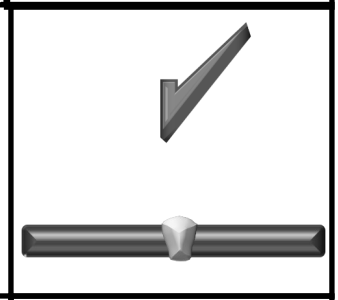
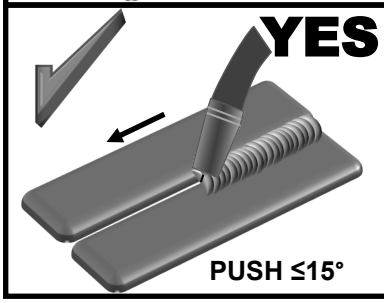
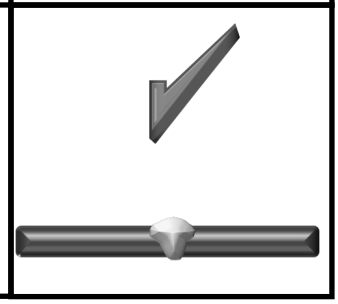
Weld Pass Examples



Component Identification and Explanation

EXPLANATION OF MIG FUNCTIONS AND TERMS

Drag or Push?
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.*

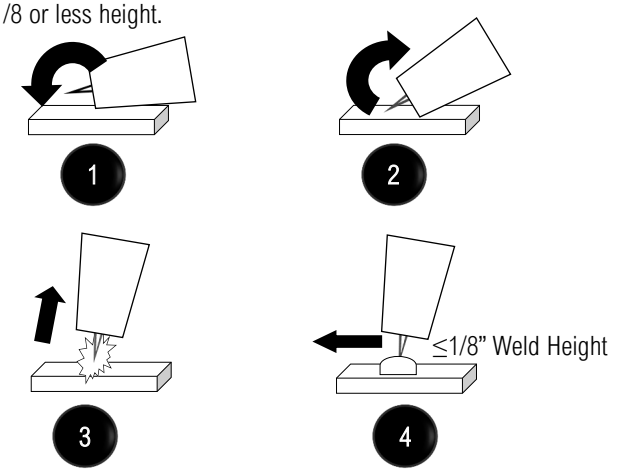
	**Problem Technique:** The Gun is not being held vertical from side to side. Wire is not being directed to the center of the puddle. This concentrates heat on one side of the joint and results in poor fusion on the neglected side. It also can create more buildup on one side of the joint than the other. **Correction:** Hold the gun so that the angle of the neck stands perpendicular from side to side.	
	**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.	
	**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.	
	**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

EXPLANATION OF TIG AND STICK FUNCTIONS

How Do I Perform a Lift Start?

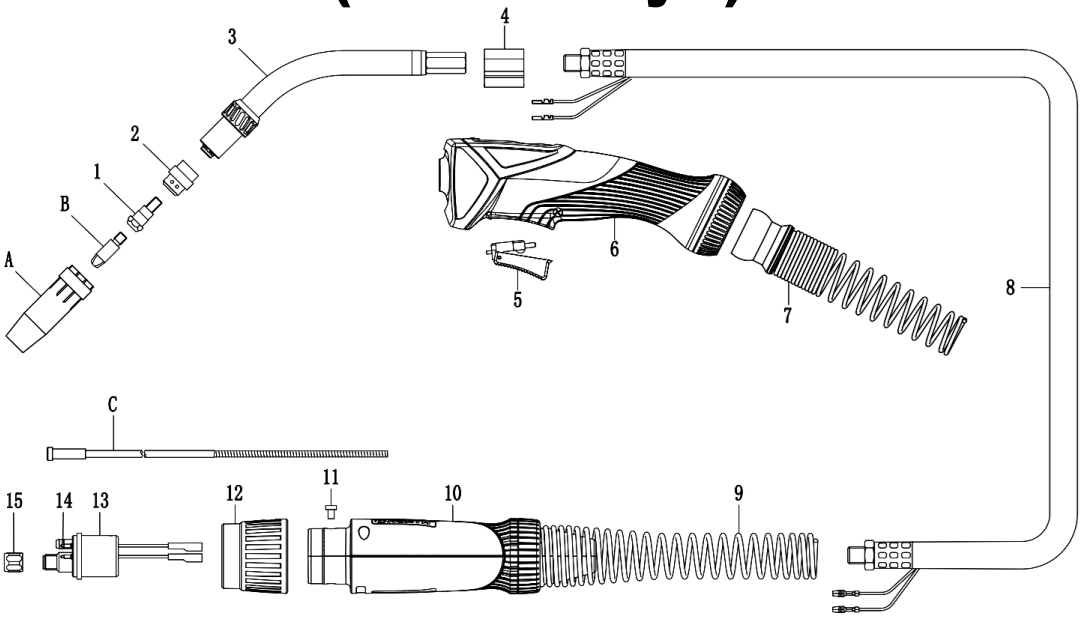
1. Rest the edge of the cup on the work piece so that the tungsten is slightly off the work. Press the trigger or foot pedal. Quickly rotate the tungsten to the work using the cup edge as a pivot.
2. A small spark may be noticed as it touches. Once the Tungsten touches, quickly and seamlessly rotate the cup back to draw an arc.
3. Raise the cup to establish the arc to 1/8" or less in height.
4. Allow the puddle to form and move the torch forward maintaining 1/8 or less height.



Component Identification and Explanation

North SN24 SERIES MIG TORCH PARTS BREAKDOWN

(MB24KD Style)



North SN 24 Series MIG Gun (MB24KD Style)		
Item	Part Number	Description
A	200300	Gas Cone/Nozzle 12.5mm
B	EB2206	Contact Tip .6mm M6x8x26 (.023" Heavy Style)
	EB2208	Contact Tip .8mm M6x8x28 (.030" Heavy Style)
	EB2209	Contact Tip .9mm M6x8x28 (.035" Heavy Style)
	EB2212	Contact Tip 1.2mm M6x8x28 (.045" Heavy Style)
C	302530	Red Liner .9 to 1.2 mm (.035"-.045") Opt. Blue liner for .6 and .8mm (.023"-.030") Steel. Optional polymer liner for Aluminum
1	EC2001	Contact Tip Holder
2	ED2001	Ceramic Diffusor
3	300624	Gun Neck 45°
4	305500	Plastic Receiver Body
5	EJ0001B	Trigger
6	NH0102HGG	Gun Handle
7	NS0101	Gun End Strain Relief Spring
8	EL2530	Cable Assembly 3m (9.5 ft
9	8M8500	Connector Spring Relief
10	NH0202HGG	Connector Body
11	Q210406B	Screw M4x6
12	NH020203	Connector Flaring Nut
13	EU1001A	Brass Power and Gas Connector Plate
14	Q504010	O-Ring 4mm x 1mm
15	EU1011	Liner Retaining Nut M10x1

NOTE: Some components may appear slightly different as design/supplier changes are made from time to time. At time of publication, the standard MIG gun provided with the Cyclone 212i is commonly known as the 24 series and is manufactured by North™. This torch is a MB24KD style torch which has been used as a OEM gun by multiple manufacturers. Consumables should interchange between other 24 series guns made by other manufacturers such as Trafimet ®, Binzel®, Innotec® or similar manufacturer with a 24 series designation. Contact Tips are also interchangeable with TWECO™ 11 series consumables. The connector is a standard Euro Type connector.

Component Identification and Explanation

STICK WELDING INFORMATION

HELPFUL HINT:

Pay particular attention to the Arc Force setting as it affects the aggressiveness of the arc and the amp response. Set the Arc force to approximately 30-50% and readjust it from that point to find the optimum setting. Adjust in increments of 5% up or down from there to obtain the best results Usually, an increase in the arc force for cellulose based flux welding rods is helpful. Lowering the Arc force setting is generally desirable for rods iron powder/Titania based flux. Too much arc force will create overheating of the welding rod, and even cause them to flame up. Too little can lead to sticking and arc snuffing. Use the Hot Start features to improve arc starting and cut down on failed arc strikes. Hot Start Amps refers to the % over the set amps that the amps will be boosted during arc striking until the arc is established. Hot Start Intensity controls the amount of time that the Hot Start stays engaged after the arc is struck. Start by setting Hot Start to somewhere between 30% and 50% and set hot start time to .5-1 seconds. Adjust in increments of 5% up or down to obtain best starting results.

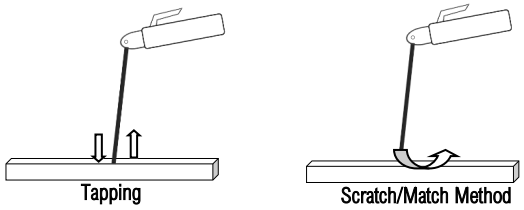
When welding, the weld will be slower than MIG speed. One of the most common mistakes for users transitioning from MIG to Stick welding is the travel speed. Allow the metal to fill the puddle as the rod travels forward. Be sure to try to separate the difference between the slag and the molten pool of 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 E6011, a slight stepping motion in front of the puddle about 1/8"-1/4" in front of the puddle can be used as a key hole opens up in the weld joint, ahead of the puddle. This is also called "whipping" the rod. Do not flip the end of the rod away from the puddle in a arc motion or the arc may terminate while using E6011 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.

IMPORTANT!

This unit is designed for operation with E6010 and E6011. To get the maximum performance and use with these rods, the PowerSet mode should be engaged, and the correct rod type and size selected. Improved function of all rods can be obtained through the use of the PowerSet function. In manual mode, rods such as E7014 and E7018 work well, but selecting the Power-Set mode can simplify operation and improve performance. 120V operation will reduce the capability of the E6010 setting however since arc force action is limited and hot start action is reduced. Keep in mind that a tight arc should be used rather than a long one in this mode. Large open roots may cause arc outages if the arc voltage is sensed to be too high. For best operation, keep tight gaps between the parts for cellulose type rods.

How Do I Start an Arc With Stick?

There are two basic types of arc starting methods used. The tapping motion allows pin point placement of the arc, while the scratch start method is similar to a match strike and is easier for beginners.



Troubleshooting

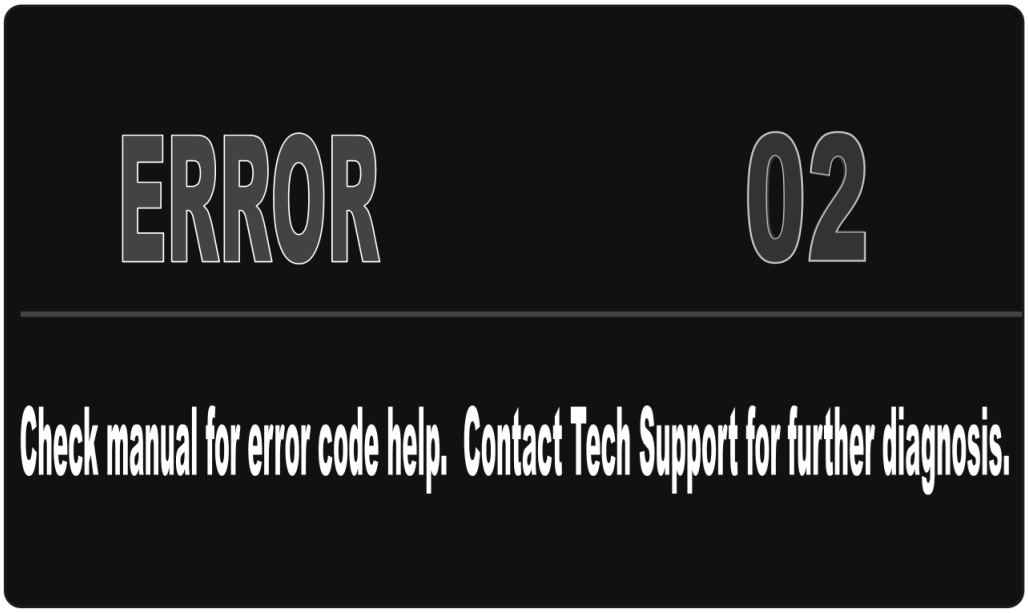
Common Operating Issues

NO.	Trouble	Possible Cause	Solution
1.	Unit is switched on, but the power light isn't on.	Switch damaged.	Check.
	Wire will not feed.	Service Breaker/ Input Line Damaged	Replace.
		Fuse	Check. Replace.
2.	After welding machine is overheating and the fan does not work.	Fan damaged.	Replace.
		Fan connector plug is loose	Check. Reinstall.
4.	Intermittent, wandering arc.	Work Clamp not connected directly to part being welded.	Reconnect.
		Work Clamp worn/damaged	Replace.
		Torch height too high.	Reduce MIG torch height to under 3/8" (for short circuit)
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.	Drafty conditions. The welder is located on the workpiece and is blowing gas off due to fan activity. Solenoid is sticking.	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.
	Weld is dirty/oxidized, or porous.	For Flux Core, a certain amount of spatter, haxe and smoke is common.	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.	Reduce Settings, use smaller wire
		Fan not running.	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 Electrodes are hard to start or stick	Old or wet welding rods, low Hot Start settings	Use new electrodes . Increase hot start and/or Arc Force
9.	Other.		Contact Everlast.

Troubleshooting

WARNING SCREENS

IMPORTANT!
Occasionally a warning screen may pop up and interrupt welding. Pay attention to the code and follow the directions. In most cases it will explain the problem and cause. If the condition cannot be resolved, contact Everlast Tech Support for further help and diagnosis.



TROUBLE CODE WITH WARNING. STOPS WELDING BUT UNIT IS SWITCHED ON.	DIAGNOSIS
E01	OVER TEMPERATURE/ DUTY CYCLE EXCEEDED. Allow unit to rest for 15 minutes while running. The unit should reset. If it does not or condition reoccurs, check for obstacles near unit blocking cooling. Then clean unit internals paying close attention to boards and heat sinks. Make sure unit is unplugged for 10 minutes before opening up for cleaning. Check for proper fan operation.
E02	OVER OR UNDER CURRENT. Check power input cable for length/size, check input voltage. Running on poor quality power supply or dirty power from generator. Possible Internal Issue.
E05	TORCH SWITCH IS STUCK CLOSED. This simply means that the arc has been trying to start and for too long. If this does not clear after releasing the switch, turn off unit immediately and check torch switch for stuck contact. If the pilot arc or HF Start is engaged without attempting to cut or weld for more than 3 seconds this will activate.
OTHER	CONTACT EVERLAST