Need Information?
Contact:
sales@ahpwelds.com
925-391-3599

Technical Issues?
Contact:
tech@ahpwelds.com
925-391-3599 (Ext. 102)

alphaMIG 190MP

OPERATOR'S MANUAL

SAFETY AND USE INSTRUCTIONS

Purchase Date (Attach Receipt to Cover For Proof of Purchase)

Serial Number

Issue Date: 03/07/2022
Publication: AHP190MP-0307

WELDING SYSTEMS
380 Swift Ave. #11 South San Francisco, CA 94080

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NOTICE: *This AHP welding product is designed for use by individuals with a both knowledge and skills in MIG ,TIG and Stick welding. It is designed with commercial operation in mind. AHP cannot be held accountable for instruction and training of inexperienced users or damage or malfunctions that may result from use by inexperienced users or improper installation. If you do not have the skill level or knowledge base to properly operate and install this machine, do not use this machine until proper training and instruction has been received. This manual is not intended to be an exhaustive welding guide or a "how-to" manual for beginners. Please seek out qualified instruction on welding that focuses on welding safety and operation if you are unsure of your capabilities before attempting to use this unit .*

SHIPPING ISSUES?

IMPORTANT! This unit has been thoroughly tested and inspected for function at the factory. However, you should be prepared to inspect and test this unit completely within 72 hours after receipt. Please do not delay in doing this. Ahp needs to know if there is any damage caused in shipping as soon as possible. Damage caused by shipping and discovered after 30 days due to lack of inspection will not be covered under the free 30 day shipping policy.

Please contact us immediately should you have any questions or concerns about the welder after delivery. We'll be glad to help.

⚠ 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

NOTICE:

Due to our constant effort to improve our products, specifications are subject to change without notice or revision to this manual. In addition, minor changes in product cosmetics, accessory type and quantity may change without notice. These do not constitute a major change in function or operation.

Ahp Welding Systems makes no warranty for merchantability or fitness for a particular purpose or application. Any claims of such are expressly denied by Ahp Welding Systems. Furthermore, Ahp Welding Systems 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.

SAFETY FIRST!

Ahp Welding Systems takes safety seriously. You should as well. Please read this entire manual before using. Keep a copy of this manual available for all employees or potential users of this machine to read and thoroughly review before use.

No matter how detailed may be nothing can substitute for careful planning and common sense required to operate and safe work environment.

Welding is an inherently dangerous activity. Failure to follow safety protocols while welding may result in severe burns, blindness, severe shock, or death from electrocution.

BE AWARE OF YOUR WORK AREA AND THE WHO OR WHAT IS IN IT!

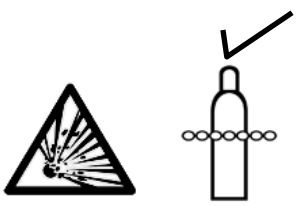
AS THE USER OF THIS PRODUCT YOU ARE RESPONSIBLE FOR YOUR OWN PERSONAL SAFETY AND FOR THE SAFETY AND SECURITY OF THE PEOPLE AND ITEMS AROUND YOU!

If you feel you do not have the resources to provide a safe work environment, or do not have the skills or (for whatever reason) the capability to safely operate this unit, do not use this unit until you seek professional instruction in safe operation and care of this unit.

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 AHP welding support 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. Visual-
	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 TIG 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. Severe electrical shock leading to injury or death may occur while using the plasma cutter if the user becomes part of the circuit path. While the Amp output of the plasma cutter is limited, the unit may produce an OCV of 300V or greater. 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).
	CAUTION! Trip Hazards exist around welders. 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.

Safety Warnings, Dangers, Cautions and Instructions

	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 untrained, unqualified bystanders to observe welding. 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 welder 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.
 	DANGER! Never touch connectors or fittings while this machine is turned on. Keep all safety covers in place when not in use.

About the AlphaMIG 190MP

The AlphaMIG 190MP is a class-leading multi-process design welder from AHP. It is capable of MIG, DC TIG, and DC Stick welding. This combination of functions allows the user to cover a broad spectrum of welding needs. This unit's design lends itself well to small fabrication and body shops.

The MIG process gives the user the ability to nearly any metal, even aluminum with ease. Additonally, this unit has the ability to operate with the optional spool gun which allows the user to weld Aluminum (1/8" to 1/4").

The DC TIG function provides for three higher level TIG functions, not found on most competitor's models:

1) It provides HF start capability for DC TIG, which means a touch-less start, which yields the highest quality contamination-free welds.
2) It provides a gas solenoid, so gas flow is automatically controlled in TIG mode. This eliminates the need for a gas valve TIG torch.
3) It provides the ability to be used with the optional TIG foot pedal, so amps can be varied and controlled within the range set on the panel. provides the ability to make high quality welds on virtually any metal *except* aluminum and magnesium.

The stick welding process provides excellent "on the job site" capability for manufacturing and repair. This unit utilizes the latest in digitally controlled IGBT inverter welding technology, while providing the user with an easy-to-use interface. This unit will run most electrodes up to 1/8" smoothly. However, E6010 is not recommended for use. Please consider using E6011 if cellulose-type electrodes are needed.

The unit comes standard with the following items and features:

- Dual Voltage 120/240V operation capability
- 200A MIG, 180A DC TIG, 160A DC Stick Output
- Foot Pedal capable (Foot Pedal is sold separately)
- Spool Gun capable (Spool Gun is sold separately)
- Built in gas solenoid for MIG and TIG operation
- HF or Lift Start Modes for TIG arc starting
- 15 series MIG gun 2m (6.5 ft)
- 26 series TIG torch 4m (12.5 ft)
- 250A Stick Electrode Holder 2m (6.5ft)
- 200A work clamp 2m (6.5 ft)
- Billet Brass Floating Ball type MIG/TIG Gas regulator
- TIG starter kit of consumables
- 240V to 120V Stepdown pigtail adapter

Ahp Warranty Statement

WARRANTY ONLY APPLIES TO UNITS WITH PROOF OF PURCHASE FROM AN AUTHORIZED DEALER. NO EXCEPTIONS. PLEASE FEEL FREE TO REQUEST A LIST OF AUTHORIZED DEALERS.

The AHP Golden Circle Warranty:

All new AHP welders, shall be warrantied to the original owner for a period to extend for 3 years from date of purchase against breakage, malfunction, or other unit failure resulting from manufacturing defect. The faulty unit will either be repaired or an exchange will be made for a new or factory reconditioned unit at AHP Welds discretion. The customer must contact the technical support team to review unit failure so that the warranty claim can be established. Items such as electrodes, contact tips, nozzles, cups, shields, liners etc, considered to be consumable items, are NOT covered under warranty. Torches, foot pedals and spool guns are warrantied for a period of 6 months. Additionally, certain items such as torches, foot pedals and easily serviced parts may be individually exchanged without returning the entire unit assembly should a failure with these items occur, at AHP Welds discretion. AHP Welds will not be responsible for time/contract loss from unit failure, damages occurring from improper or unskilled operation, damages resulting from improper maintenance, improper wiring, poor quality power sources, abuse or neglect. Nor will AHP assume responsibility for the customer's failure to heed/read safety instructions, to read and understand operator's manual, obey occupational laws or to ensure the unit's safe operation complies with state or local laws, personal injury arising from the inherent risks involved with welding, including burns, electric shock or death. Warranty extends only to the machine, its accessories and parts contained inside as stated above. No other warranty is expressed or implied.

In the event of unit failure or malfunction, the customer must contact AHP to obtain a location of a designated return/repair facility. The replacement/repaired unit will then be returned to the customer. Additionally for USA customers, AHP offers shipping coverage in the lower 48 states for a limited time. Please call with receipt to verify shipping coverage status. After the shipping coverage time ends, the customer shall be responsible for all shipping and handling costs both ways of non-functioning units for repair or replacement. **Customers located outside of the USA lower 48 states will have to pay shipping and handling charges both ways from the purchase date.** It is the customer's responsibility to adequately insure the unit, as AHP is not responsible for lost or damaged returns. Labor coverage only applies if the unit is serviced at our facility or one of our authorized dealers. We will not reimburse the labor if the customer decides to have a third-party or unauthorized repair technicians work on the unit. **View full warranty, terms of sale and shipping details here: https://ahpwelds.com/**

AlphaMIG 190MP Specifications

Input/Output Operating Range

Input Voltage	Welding Process	Operating Range A/V	OCV
120V (± 10%)	DC MIG	30-120A, 15.5-20V	70V
120V (± 10%)	DC TIG	10-120A, 10.4-15V	70V
120V (± 10%)	DC Stick	20-100A, 20.8-24V	70V
240V (± 10%)	DC MIG	30-200A, 15.5-24V	75V
240V (± 10%)	DC TIG	10-180A, 10.4-17.2V	75V
240V (± 10%)	DC Stick	20-160A, 20.8-26.4V	75V

Duty Cycle Range

Input Voltage	Welding Process	25%	60%	100%
120V (± 10%)	DC MIG	120A @ 20V	80A @ 18V	63A @ 17V
120V (± 10%)	DC TIG	125A @ 15V	60A @ 13.2V	110A @ 12.5V
120V (± 10%)	DC Stick	100A @ 24V	65A @ 22.6V	50A @ 22V
240V (± 10%)	DC MIG	180A @ 23V	120A @ 20V	90A @ 18.5V
240V (± 10%)	DC TIG	180A @ 17.2V	120A @ 14.8V	90A @ 13.6V
240V (± 10%)	DC Stick	160A @ 26.4V	100A @ 24V	80A @ 23.2V

Input Demand Inrush / Rated Effective Current

Consult a local, licensed electrician before wiring your electrical connections.
Reference Article 630 of the NEC for correct welder wiring code information.

Voltage	I_{1Max} / I_{1Eff} (Inrush/Rated)
120V 1Ph 50/60Hz	28.7 / 15A
240V 1Ph 50/60Hz	28A / 15A

Weight / Dimensions / Other

33 lbs. / 12.5" H X 8.5" W X 17.5" L / Ingress Rating IP21S
Use between 14°F and 104°F
Store between –20°F and 120°F

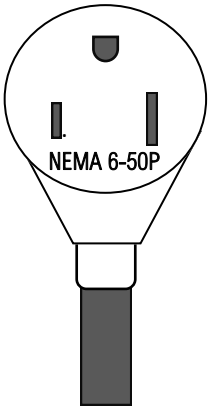
CAUTION: Use only with extension cords 50 feet long or less, rated for 240V welder 50A use, or damage may result. For 120 operation, use only with 30A rated cords, less than 25 feet in length.

Feature and Range

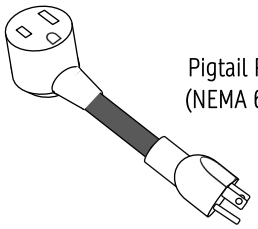
Feature	Range
Process	DC MIG, DC TIG and Stick
MIG Wire Speed	60-425 IPM (No load)
MIG Wire Feeder	2 roller system with .023-.030" (.6-.8mm) V-groove roller inc.
TIG Start Type	HF, Live Lift, Lift Start (with torch switch/Pedal)
Remote Function	2T/4T Switch Control Sequencer or Pedal Control
Pre/Post-Flow	Auto/Off
Stick Electrodes	E6013, E6011, E7014, E7018, 309L and others. NOTICE: Not for use with E6010

IMPORTANT: Be responsible. *Consult a local, licensed electrician before wiring your electrical connections.* Reference Article 630 of the NEC for correct welder wiring code information. The code is different for wiring a welder circuit than for household circuits.

This unit uses a NEMA 6-50P for 240V use. This is the standard welder plug for 240V 1 phase use in North America.

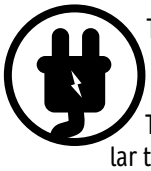


This unit is supplied with a 240V to 120V pigtail adapter. No internal adjustment or change is required to use it on 120V. Simply install the adapter. The unit will adjust automatically.



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

Generator Operation Information



This unit may be used with any clean power rated 240V generator with a 7000W Surge Watt rating. Clean Power is defined as 5% or less Total Harmonic Distortion (THD). This means the generator produces a clean sine wave similar to what is produced by power companies. If operating on a 120V generator, a 30A receptacle must be available and adapted for use. Additionally 5% or less THD is still required. The generator must not share "duties" with other tools or appliances.

NOTICE: Operation with generators not rated by the generator manufacturer as a "clean power" source is prohibited and will void the warranty. Many manufacturers produce a version or series of their generators that produce clean power. This is usually stated up front. If not, consult the manufacturer of the generators to confirm THD. Clean power generators are made in both inverter types and conventional types of generators. Do not assume all inverter type generators produce clean power unless the manufacturer states it. Clean power is needed for most electronic equipment to prevent damage.

Duty Cycle Performance

The MIG/TIG/Stick duty cycle of this machine has been established at 25% while operating at the following Amperages. 120V MIG: 120A, 120V TIG: 125A, 120V Stick 100A. 240V MIG: 180A, 240V TIG: 180A, Stick: 160A

Duty Cycle is the amount of time, out of a solid 10 minute block of time that the unit may operate at the rated setting. For the example of 25% @ 180A, this means the unit may be operated up to 2.5 minutes continuously, or intermittently out of 10 minutes of time before overheating. The balance of time remaining in the 10 minutes (6.5 minutes in this example) should be while the unit is left to rest, while continuing to run. As Amps are lowered, or as the ambient temperature decreases below the 40°C testing benchmark, duty cycle will increase. **NOTICE: Maximum MIG output is at less than 25% duty cycle. Wire diameters over .030" may cause the unit to exceed duty cycle frequently.**

It is not necessary to try to keep up with the duty cycle exactly by timing it or recording it. The unit is equipped with a thermal sensor which will trigger an interruption of operation if the temperature has been exceeded. Keep in mind this is not a timed feature. A duty cycle statement is based on time welding at a particular amperage, but because so many variables exist, and ultimately the unit's temperature is the regulating concern, duty cycle is determined by a preset operating temperature threshold, rather than a timed one.

If you have triggered the duty cycle interrupt on this machine, allow the unit to cool for a full 15 minutes. The unit should automatically reset during this time, but allow a few more minutes so the machine can cool sufficiently so as not to overheat quickly. If it does not reset during this time, turn the machine off and back on to reset it.

Even though this unit is equipped with a duty cycle safety feature, intentionally and repeatedly surpassing the duty cycle will shorten the lifespan of the unit. Routine overheating damage will usually leave signs that can be determined during warranty repair. Damage caused by intentional abuse of the duty cycle will not be covered under warranty.

If you find that you are constantly running into duty cycle issues, it is likely you will need a bigger machine, or need to adjust your welding strategies to comply with the duty cycle limits of this machine.

To assure maximum lifespan of the unit, never block the cooling vents in the rear, sides, or front. Keep the unit 16" away, on all sides, from any obstacle to free air flow such as a wall or partition.

Required Routine Maintenance

Most places where a welder is in operation floating and flying debris is a factor. Dust, dirt and sparks are often present in the air. The machine will draw these contaminants in during operation and they can be deposited inside the machine onto critical components. These particles can conduct electricity and create new circuit paths, not only causing poor operation, unit lock up, but it can also cause long term damage. **For this reason, the machine should be opened up and cleaned with dry, compressed air on a regular basis, once every month in heavy use, and ever 3 to 6 months under light use. If the unit remains stored most of the time, dust still will accumulate, and this should be done at least every 6 months. When not in use, keep the machine covered. Failure to do so constitutes neglect and may void the warranty.**

To clean and service this welder:

1. Unplug the welder. Wait 10 minutes for the capacitors to discharge. (To prevent electrical shock or electrocution.)
2. Put on a pair of safety glasses to prevent debris from blowing into your eyes during this operation.
3. Remove the top handle.
4. Remove the steel cover screws.
5. Pull the cover up and to the rear while carefully watching for wires that may catch on the louvered vents of the cover.
6. Check all wires and connections to make sure they are seated and/or tight.
7. Use dry compressed air (or "canned" air) to blow the air off connections, boards, and fittings. If the unit is particularly dirty, unseat the affected connectors themselves, and blow out the connections as well.
8. Reassemble the unit. Do not forget the handle!

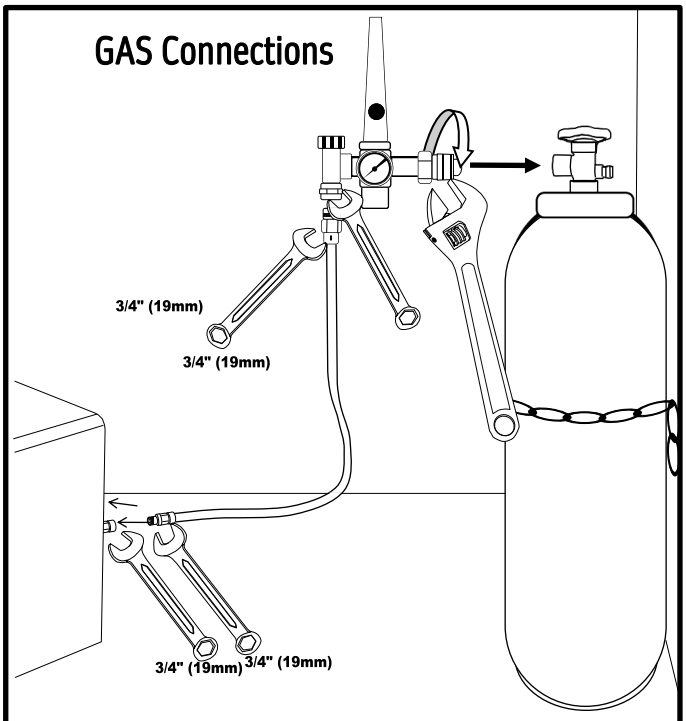
NOTICE: *Opening the unit to clean and check connections will not void the warranty. In fact it is required to maintain your in-warranty status during the duration of your warranty. However, under no circumstances should you attempt to modify or make unauthorized changes to the welder or its programming. To do so will void the warranty.*

Shielding Gas Information

This unit features two rear connectors for shielding gas. The MIG and TIG gases are separated in this system and do not share components and operate off of separate gas solenoids.

Before you connecting the shielding gas, please note that there are actually two (2) connections on the rear for gas. One is for MIG and the other is for TIG. Each connection is marked, but facing the rear of the unit, the gas connection for TIG is on the left, and the gas connection from MIG is on the right. Always double check which connection you are using. The unit is only supplied with one regulator, so keep the other connection capped with the supplied plastic cap when not in use to prevent dirt and debris from entering the unit's fittings and clogging and sticking your gas solenoid. You may also purchase another regulator and keep both tanks connected while welding. Just remember to always keep any unused cylinder valve is closed. *Always close the gas valve when turning off the welder to prevent unwanted leakage and wasted gas. Shielding gas may fill a room if leaks occur and can cause asphyxiation.*

The regulator is a floating ball type. This means that when gas is flowing the ball in the clear cylinder will float, indicating not only that gas is actively flowing, but also the amount of gas flowing through the regulator. This type is more accurate in general than the gauge type, and is easier to read at a distance. When installing the regulator and making it ready for use, be sure to snug all fittings using two wrenches. One will hold the stationary fitting, the other will be used to turn the rotating fitting. If you do not hold the stationary fitting, either on the regulator, or on the back of the unit, you can crack or damage the fitting. Once installed, and all fittings have been tightened, test all fittings for leaks with a spray of warm soapy water (or leak detector) to check for leaks. If bubbles are present, retighten. Do not use thread sealant, locking compound, anti-seize or tape to seal the threads. If the threads do not seal, remove and check the connections for debris or pieces of metal on the sealing surfaces.



Remember to select the proper gas for the type of welding you are performing. Also double check the correct gas line is connected to the correct fitting. This happens more often than you may realize!

When you open the cylinder valve, do so slowly and stand to the opposite side of the cylinder. Do not stand directly in front or behind the regulator, in case of damage to or malfunction of the regulator. Open the cylinder slowly, but open the cylinder valve completely. Cylinder valves may leak if they are not fully open or fully closed.

Gas flow rates will vary by process and cup/nozzle size For standard TIG cup sizes, use at approximately 2.5 to 3 times the gas flow rate than the cup number. As an example a 7 cup would be 17.5 CFH to 21 CFH, in a good work environment. Fpr MIG, gas flow rates typically range from 20 to 30 CFH, and may need up to 35 CFH for welding Aluminum. Of course, the larger the nozzle, and greater the turbulence in the area, greater gas flow rates may be needed. These is just general rules. More or less gas may be used, depending upon the circumstances.

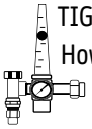
To utilize this unit for both MIG and TIG, you will need more than one type of gas. Use the information below to select the correct gas.

- **All TIG:** 100% Argon. No other gas is needed.
- **MIG Steel:** 75/25 Argon/CO_2. (75% Argon/25% CO_2). No other gas should be used with this unit for steel.
- **Stainless:** Trimix or 98/2 Argon/CO_2. Trimix is expensive. 98/2 is a cheaper alternative. Pure Argon should not be used.
- **MIG Aluminum:** 100% Argon. This is the only gas to be used with Aluminum MIG.

IMPORTANT: This unit is not suitable for axial spray (a.k.a Spray Arc) of steel or stainless stee because it is not large enough to sustain the volts and amps to create a spray arc. However, for Aluminum, since Aluminum sprays at a much lower threshold, and is the recommended way of welding Aluminum with the MIG process, this unit may be used for light spray arc use with welding aluminum from 1/8" to 1/4".

NOTICE: Place the unit at least 6 feet away from the weld area. The cooling fan is powerful enough to blow the shielding gas off the weld. Porosity, rapid tungsten consumption, and dirty welds may result.

Adjusting The Regulator

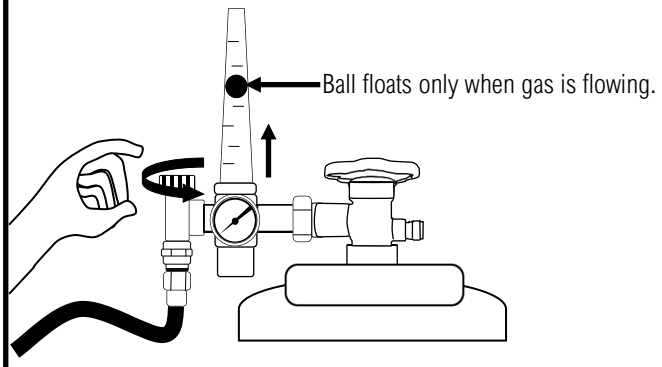


TIG and MIG flow rate requirements are different, typically. However, the way you adjust them are centered around the same principle. Use the guide below to adjust both.

- Switch the unit on. While holding the MIG gun or TIG torch trigger (or while depressing the optional TIG torch pedal), start opening the the regulator valve by twisting the regulator adjustment knob counter clockwise As you open the valve, the floating ball will begin to rise. **NOTICE:** *To avoid spooling out and wasting wire during this time, release the tension on the drive wheels by flipping the tensioning lever to the down position before you begin. This will release tension and allow the drive rolls to safely turn without feeding any wire.*
- For MIG, increase the gas flow rate to a beginning point of 20-25 Cubic Feet Per Hour (indicated on the clear gauge with the floating ball by CFH). If MIG/Spool Gun welding Aluminum, increase flow rate to 35 CFH. Read the middle of the ball for the best reading. For TIG, use multiply the cup size by 2 to 3 to find the approximate flow rate. **Do not confuse pressure on the cylinder gauge with the flow rate on the floating ball gauge. Pressure present on the cylinder gauge does not mean gas is flowing. However, a lack of pressure on the gauge may mean there is no gas flowing.**
- Once adjustment is completed release the trigger. The gas will delay slightly until the post flow timer automatically shuts off the gas flow. The ball will settle. **If gas continues to flow after the arc has stopped for more than a few seconds, the gas solenoid may have stuck. Contact AHP for maintenance (cleaning) and repair solutions.**
- When welding it may be necessary to increase or decrease gas flow rate to compensate for conditions. If you are welding outdoors or in drafty conditions, increase the flow rate until weld porosity disappears. In extreme cases, you may need to set up a tarp or plywood to serve as a wind-break. In mild conditions, if a breeze is lightly blowing you can position your body to block the wind. *Alternatively, you can choose to weld with flux-cored wire or use the stick function to eliminate this problem.*
- If you are concerned about wasting gas, or think gas consumption is too high, you may turn down the gas. While testing on scrap metal, turn the gas down incrementally until bubbles and porosity just begin to appear. Once they appear, adjust the regulator slightly so that they once again disappear. Once they fully disappear, add another full CFH and you will have a properly adjusted regulator.
- When pressure on the cylinder drops below 300 to 500 psi, it is common to have to readjust the flow regulator to compensate for the lower pressure. Pressures under 100 psi may create unstable gas flow. Once you reach 200 psi, have a replacement cylinder ready to change out. If you completely run out of shielding gas while welding it is likely you may have some hidden porosity in your welds, creating weak welds. Always change the cylinder out when gas levels reach 75 psi.

NOTICE: *If you are planning on welding during holidays or during weekends, always take notice of the cylinder pressure well before hand. This will allow you time to get another cylinder before stores close for the holidays or weekends. If possible, you may want to purchase a 20CFH cylinder in addition to the regular gas cylinder that you lease or purchase so that you have a backup cylinder in case of an emergency. A 20CFH cylinder will last an hour or two of welding. These are relatively inexpensive and can even be bought "pre-loaded" with gas in many chain hardware stores and farm stores. These can also be refilled when empty.*

Adjust the Regulator

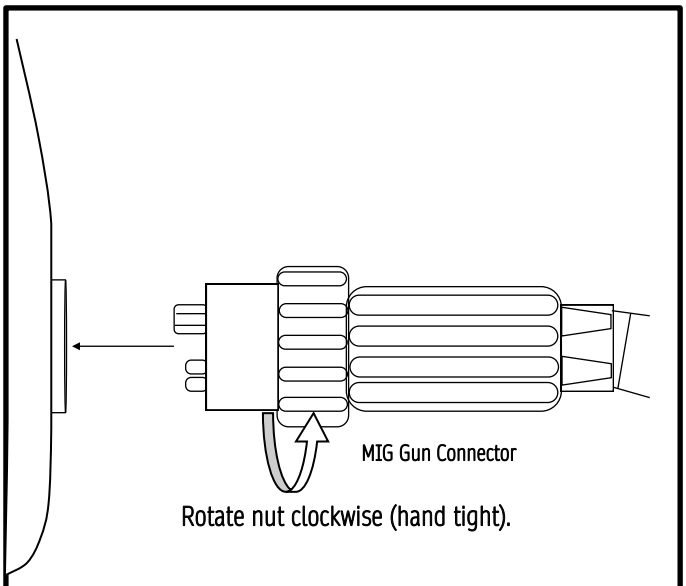


Turning the adjustment knob counterclockwise (when viewed from the top) increases flow rate. Turning the knob clockwise until it seats will shut off gas flow at the regulator. Do not use the regulator to shut off the gas flow. Shut off the gas flow at the cylinder when the welder is not in use for more than 20 minutes.

Installing the MIG Gun

After inspecting the unit for power up, it is necessary to confirm wire feed operation. This is a simple process that requires you to install the MIG gun on the unit. To install the MIG gun:

- Locate the MIG gun in the accessory box. Uncoil the gun and straighten it out.
- **Refer to the drawing below.** Line up the Euro-Connector on the end of the gun with the connector on the unit, making sure the protruding pins are lining up with the corresponding hole.
- Once the pins are lined up, push the connector in until it is seated. Hand tighten the collar nut clockwise. Do not overtighten or use tools.
- Once the nut is tight, gently shake the connector to confirm that the gun is fully seated and the nut is still tight.
- After you install the MIG gun, set the wire speed knob to maximum. Open the MIG door so that you can see the drive feeder mechanism. Set the wire feed control to the maximum setting. Pull the trigger to check that the drive mechanism is turning. If it does not turn, check the MIG gun connection once again. If the drive wheel fails to rotate, contact technical support for further assistance.



IMPORTANT! Remove MIG Gun while using TIG and Stick processes. Gun will remain live if connected. If it comes into contact with metal, the MIG Gun may short out, and may cause damage to the unit. Personal injury may also occur.

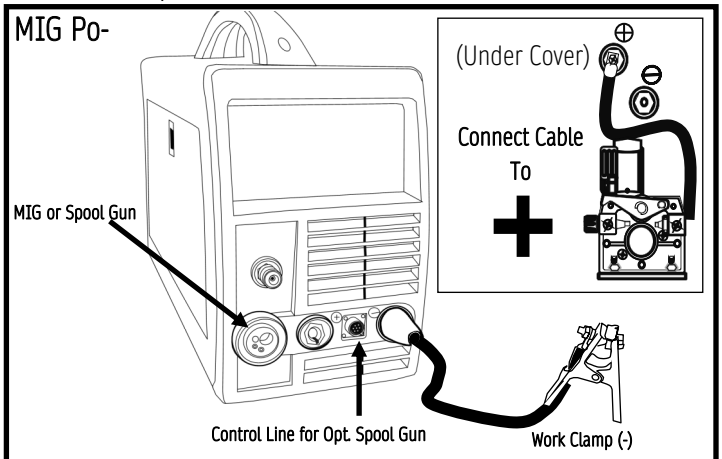
Selecting Polarity

Selecting the correct polarity for the welding Without the correct polarity, weld quality and weldability of a metal will be an issue. Incorrect polarity can also cause undesirable operation of the welder such as excess spatter, birds nesting of the wire, wire/electrode sticking, excessive Tungsten/consumable wear, poor penetration and even arc instability. See the following images to determine which polarity should be used with your process. Always double check, especially after switching over processes that you have the correct polarity. **In MIG, if you forget to change the work clamp but change the polarity under the cover, or vice versa, you will not even get a spark.** If something doesn't seem right about the way the welder is welding, or there is no arc at all, always check your gun/torch polarity first. Then check your work clamp location and make sure it is direct to the part being welded. If this has been checked and things still don't seem to weld well, consider replacing the work clamp. Inspect it for burns, corrosion, missing copper strap, damaged hinge joint. Stop and inspect the cable for tightness also.

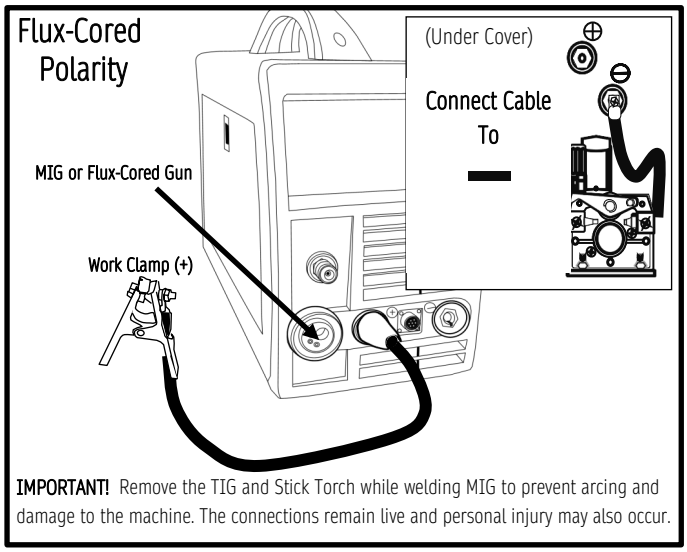
MIG/ Flux-Cored Polarity

MIG and self-shielded Flux-Cored are similar processes. However MIG uses a shielding gas, while self-shielded Flux-Cored wire inner core provides the shielding without gas. Because of the difference in the way solid MIG wire is formulated and the way self-shielded Flux-Cored wire is formulated, the polarity required to weld is different. For MIG, the torch will be used with the wire feeder connected to the positive terminal under the cover and the work clamp will be located in the negative terminal on the front panel of the machine. For Flux-Cored wire, the torch will be used with the wire feeder connected to the negative terminal under the cover, and the work clamp will be connected to the positive terminal.

The pictures below are shown with the MIG/Flux-cored gun removed to clearly illustrate the work clamp location.



IMPORTANT! Remove the TIG and Stick Torch while welding MIG to prevent arcing and damage to the machine. The connections remain live and personal injury may also occur.



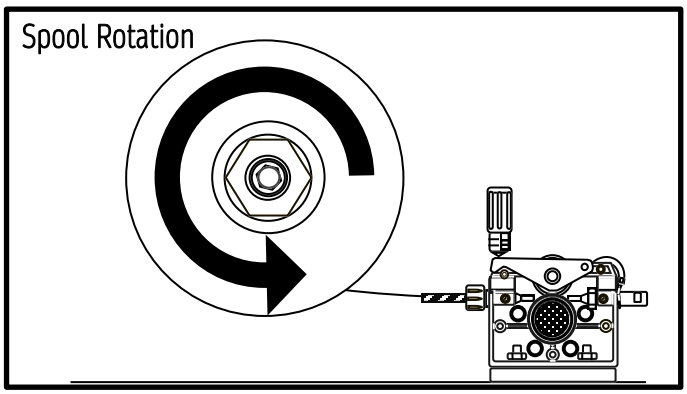
IMPORTANT! Remove the TIG and Stick Torch while welding MIG to prevent arcing and damage to the machine. The connections remain live and personal injury may also occur.

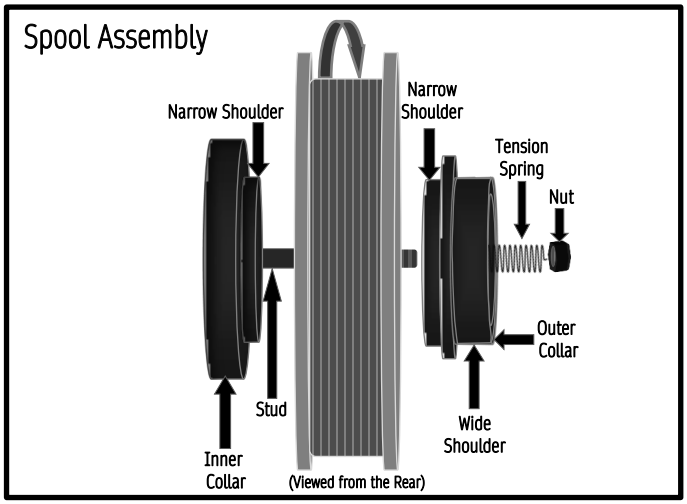
MIG is particularly susceptible to issues with poor work clamp connections. Improper connection can lead to arc outages, and spatter. When connecting the work clamp, always be sure that you have it connected directly to the part being welded. Connecting to the table, through a vice or fixture may cause arc instability and even loss of weld power through resistance. If you are not able to connect directly to the part being welded, consider using a jumper wire, or at least connect as close as possible and grind a clean connection point where the work clamp will be. This will help achieve the best weld and offer the best transfer of power to the weld

MIG Wire Installation and Tension

The spool carrier assembly consists of several parts. Each part must be assembled correctly. See the illustration below. There are two collars that support the 8" spool. There is an inner collar and an outer collar. The roll is held in place by tension placed on the outer collar by a small spring and a small finger nut. During installation of the wire spool, pay attention to the outer collar direction when you remove it. Viewing from the rear, the narrow shoulder of the collar faces the inside. The wider side of the collar should be turned toward the outside of the welder, facing the welder door when closed. If the outer collar direction is reversed, you will have difficulty installing the spring and the tension will be too tight. Installation of the wire spool is slightly different depending upon the spool size. For 8" spools, the spool rides on the narrow shoulders of the two collars. The spool rotates on these collars. To install 4" spools, the spool is installed so that it sits between the two collars and rotates on the spindle stud.

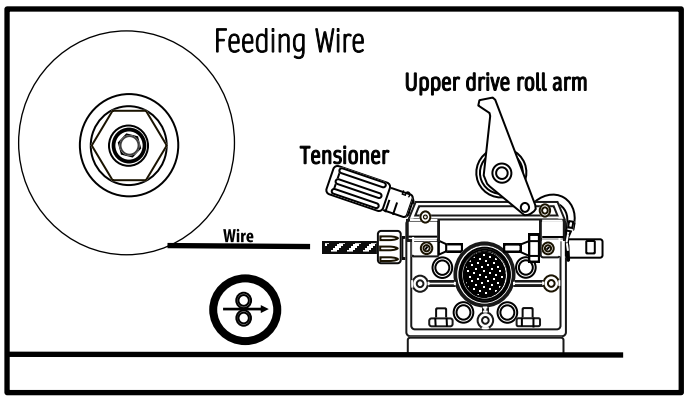
NOTICE: The wire spool must be installed so that the wire unwraps and feeds from the bottom of the spool. It should never be installed so the wire comes over the top. When installed properly, the spool will





turn counter clockwise. See the following illustration for proper rotation direction. Tension the spring with the finger nut until the spool will only free wheel 1/4" turn when spun by hand. Do not let the spool free wheel completely or the wire will unwind itself and can get tangled. Don't over tighten the spool, as this will cause rapid wear to the feeder components. If you wish to extend the gun's reach, or desire to use 4" diameter rolls of wire, you may be interested in using the spool gun function. Small diameter wire such as .023" wire is not recommended to feed in standard MIG guns over 10 ft in length. .030" wire should not be fed in guns over 12 ft in length. 4" rolls can be fed directly from the machine however. But if you want maximum convenience, the spool gun option is best. If you need to feed long distances, you may want to purchase the SM100N or SM3035 spool gun for use with this unit. However, .035" Aluminum wire is the best choice for use in the unit whether you are welding with the main gun with the poly liner, or if you using the spool gun. With .030" wire, the maximum wire feed speed will be barely enough to keep up with the burn back rate of the wire and many "burn back" to the tip events will occur. Larger wire requires a slower wire feed speed to deliver the same Amperage. This is why .035" wire is recommended while welding Aluminum. Minimum weld thickness for Aluminum is usually considered between 14 gauge and 1/8" due to the spray arc nature of it. The SM100N gun is calibrated and best synchronized for this unit. Typically spool guns are used to weld Aluminum, and occasionally

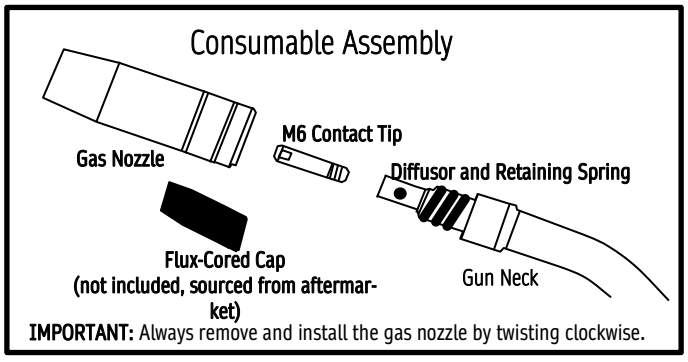
small spools of flux-cored wire or stainless. Spool Gun polarity connections are the same as in regular MIG or Flux-Core.



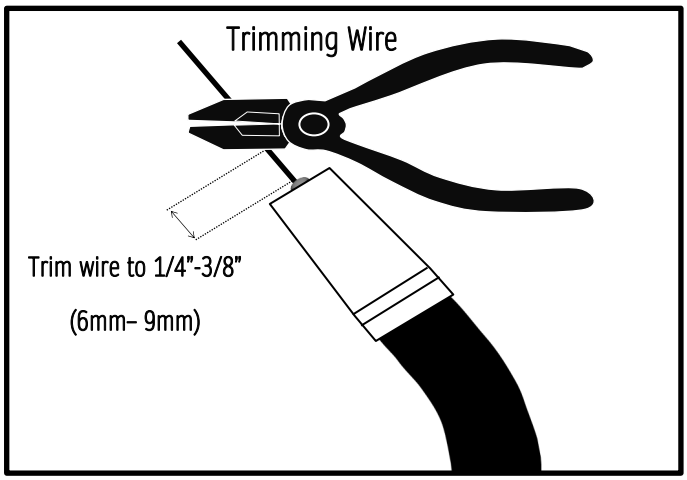
Once the wire spool has been installed, flip the tensioner lever down and raise the top drive roll to the upper position. See the illustration above. Gently guide the wire from the spool over through the wire feeder and into the front section of the gun at least 6 inches. Make sure the wire lays neatly 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.

Turn the welder on and adjust wire feed speed (IPM) to maximum.

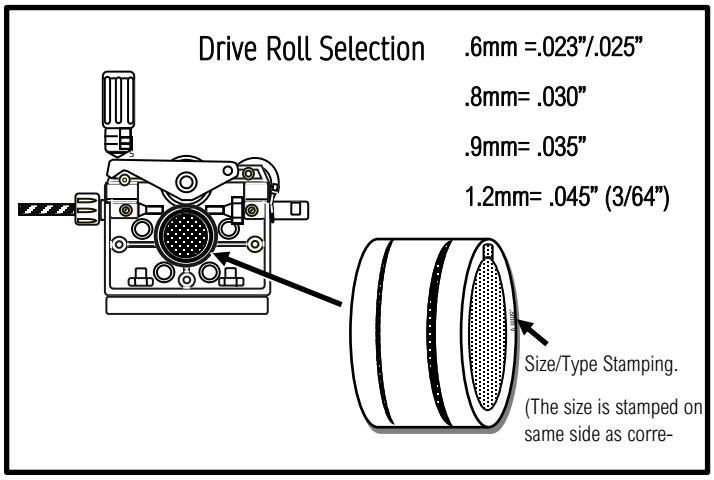


Remove the gas nozzle by twisting it clockwise and pull. Unscrew the contact tip as shown in the illustration below. Hold the gun cable and gun straight as possible. Pull the trigger on the gun. The wire should slowly begin to feed through the gun cable and eventually through the gun. As the wire exits the gun, allow 3 to 4 extra inches of wire to be fed out past the diffusor. Re-install the contact tip over the wire and screw it in clockwise until it is tight. Be careful not to strip the threads. Install the gas nozzle. Trim the wire before welding. See the illustration below.



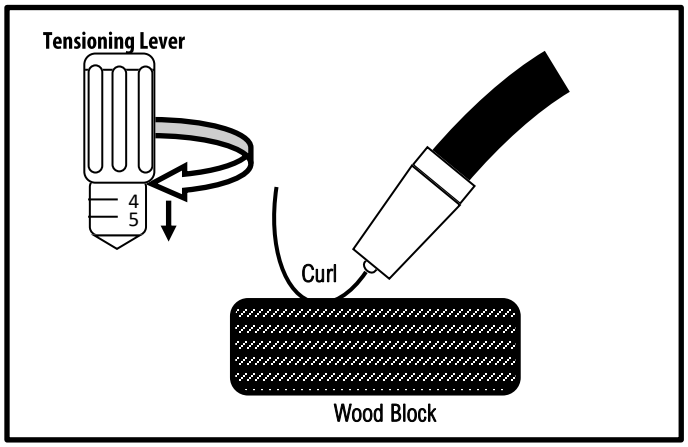
The unit comes equipped with .023" and .030" drive rolls. NOTICE: *For most purposes you will likely want to use .030" wire in this unit since it covers the greatest range of metal thicknesses and amperages within the capability of this unit.* However, if you change wire size or type, you will need to change the drive roll to the correct size and type.

This unit uses two drive rolls to feed the wire. 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 .023(.025") and .030" 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 or stainless wire 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 a "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, replace it before replacing the drive roll.

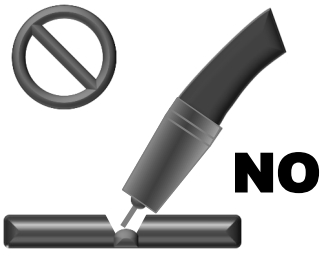
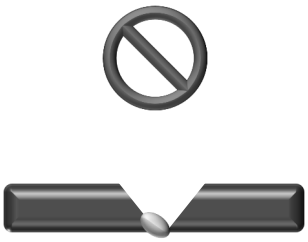
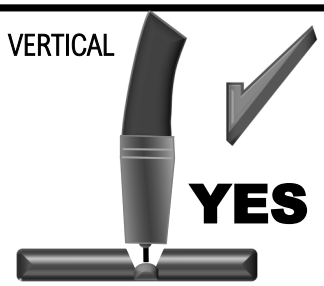
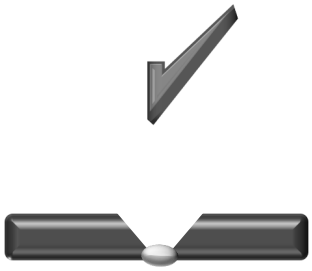
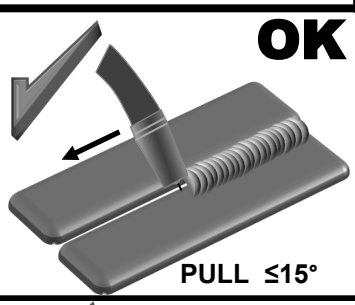
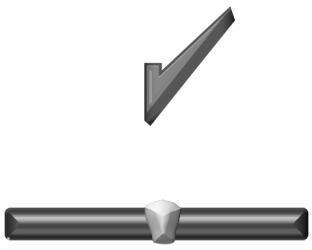
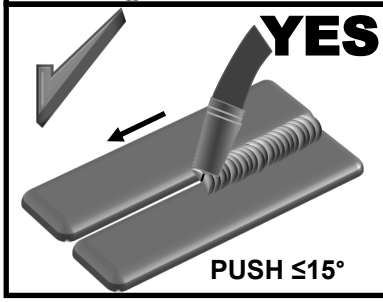
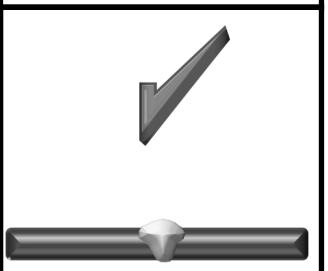


To feed properly, the wire needs to be tensioned before you begin welding. The tensioning lever has numbers on the dial. To increase tension, rotate the tension lever clock-wise. Different types of wires require different tensions. There is no exact tension that works for all wire types. However, for 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.

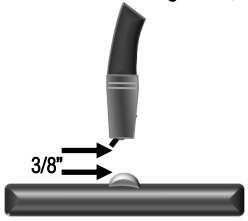
- Find a small block of wood, such as a two by four, and secure it to the welding table or other solid object. Do not test this on metal!
- Hold the gun approximately 2 inches off the wood. Aim the gun at the block of wood so that the nozzle is at a 30 degree angle to the wood.
- Pull the trigger and 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.

DRAGGING VERSUS PUSHING:

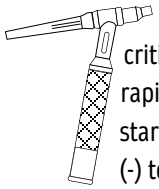
MIG Welding is fairly simple if you keep travel angle and direction in mind when welding. MIG in general works best with a push motion. This will provide the smoothest weld and best bead profile. Dragging in MIG can cause excess spatter. However, If you are welding flux-core, the gun angle is reversed and it is welded at a drag angle due to the flux accumulation possibility in front of the weld. **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.	

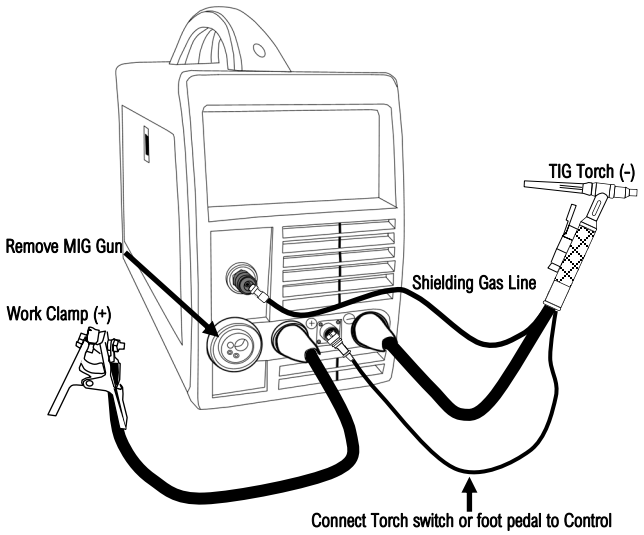
The overall stick-out of MIG and Flux-Cored wire is important to creating a good weld. The distance of the stick-out of the wire from the end of the contact tip to the weld puddle is the Contact-Tip-to-Work-Distance. For a small MIG like this typically hold 3/8-1/2" CTWD. Flux-Cored wire is similar but is a bit more forgiving and able to hold a longer arc, up to 3/4".



TIG Polarity and Tungsten Type



Selecting the correct TIG polarity of the connections is critical for correct operation. Incorrect polarity can lead to rapid Tungsten consumption, bad arc stability, and refusal to start. The TIG torch will always be connected to the negative (-) terminal. This is called Direct Current, Electrode Negative (DCEN -) or as "Straight Polarity". (Polarity always refers to the connection of the torch, not the work clamp.) The work clamp will always be connected to the positive (+) terminal.



IMPORTANT! Remove MIG Gun while using TIG and Stick processes. Gun will remain live if connected. If it comes into contact with metal, the MIG Gun may short out, and may cause damage to the unit. Personal injury may also occur.

NOTICE: *The work clamp is often referred to as a "ground" since negative (-) polarity is often viewed being connected directly to earth. However this is technically incorrect and a cause of confusion since the negative polarity only completes the circuit, rather than being grounded directly to Earth. A common issue is that people still refer to this as "ground" and mistakenly connect the work clamp the negative terminal as a result.* ***Don't forget that while TIG welding, the work clamp will always remain in the positive terminal (+). When transferring back to MIG or Stick, don't forget to change the polarity.***

Ahp recommends Lanthanated 2% (blue band) Tungsten for all TIG welding, whether welding in DC or AC modes. 1.5% Lanthanated (gold band) is also a good choice. Alternatively, 2% Ceriated (gray or orange band) also exhibits good performance, but does not have quite the resistance to erosion/consumption at higher amperages that are found in Lanthanated. Overall, however, Ceriated is a suitable Tungsten type for most inverter welder general applications. ***Never use pure tungsten (green band) or Zirconiated (usually brown band).*** These are designed and intended for transformer use only. Arc instability and over-balling will result. 2% Thoriated Tungsten (red band) may be used. However, as an Alpha particle emitter, Thoriated tungsten is a slightly radioactive emitter. Some areas of the world have banned Thoriated Tungsten for this. But in general, Thoriated is still the standard for DC welding and has excellent arc properties. It's been in use in the industry for many years. The main risk is inhalation while grinding. Research Thoriated Tungsten before you make your mind up one way or the other. Be informed.

There are other types and colors of tungsten rapidly becoming available that are being promoted as 3-in-ones, tri blends, rare earth blends, special treatments, etc. Keep in mind for general welding purposes, these are still considered "novelty" products and most have very little research to support their claims of superiority for or suitability for particular applications Some include Zirconium, which has little or no value to inverter welders. Additionally, quality control is typically very poor. The amount included of the "special" blend of each rare earth metal oxides is often miniscule and are allowed to vary by as much as 40%. Again, research and make your own decision concerning this. In particular, be sure to read the Safety Data Sheets regarding the Tungsten that should be available on these products to assist you in comparing apples to apples. Standard coloring is being changed arbitrarily by some manufacturer's to confuse the buyer, or to try to promote and differentiate their own "special" product. Reading the SDS can help clear up confusion and give you an indication of formulation and quality control standards.

Tungsten Preparation

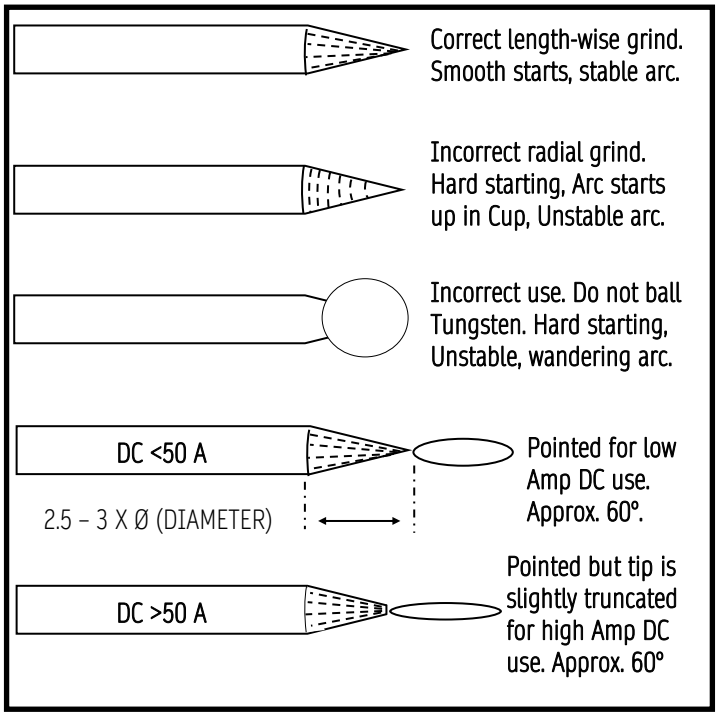
Proper Tungsten electrode preparation is important to arc stability and cone shape. It even has a significant effect on penetration. Different grind angles affect arc cone shape and penetration. Experiment with them to find what works best for you. In general though, a the length of the grind should not exceed 2.5 to 3 times the diameter of the Tungsten.

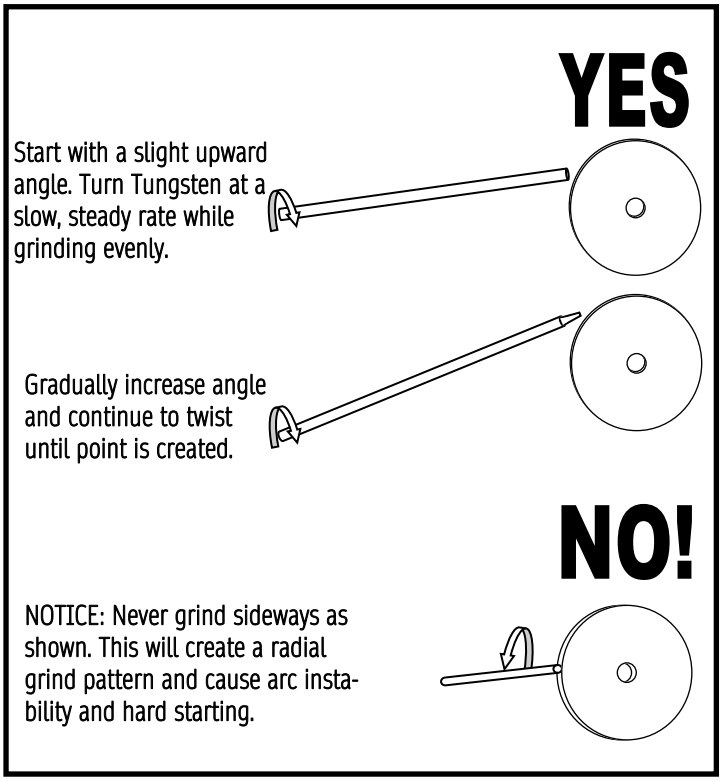
The way you grind is as important is as important as the angle you grind. Always grind the tungsten so that the grind marks line up with the length of the Tungsten. Grinding radially will cause arc instability.

NOTICE: ***On a DC Inverter TIG, you should never ball your Tungsten electrode. A ball is only used on older transformer models for welding Aluminum. If your tungsten balls, it's likely the cause is incorrect***

polarity. Stop and check your polarity and gas flow is the Tungsten is rapidly consumed.

Use the guide below to help you get the best performance out of your Tungsten electrodes.

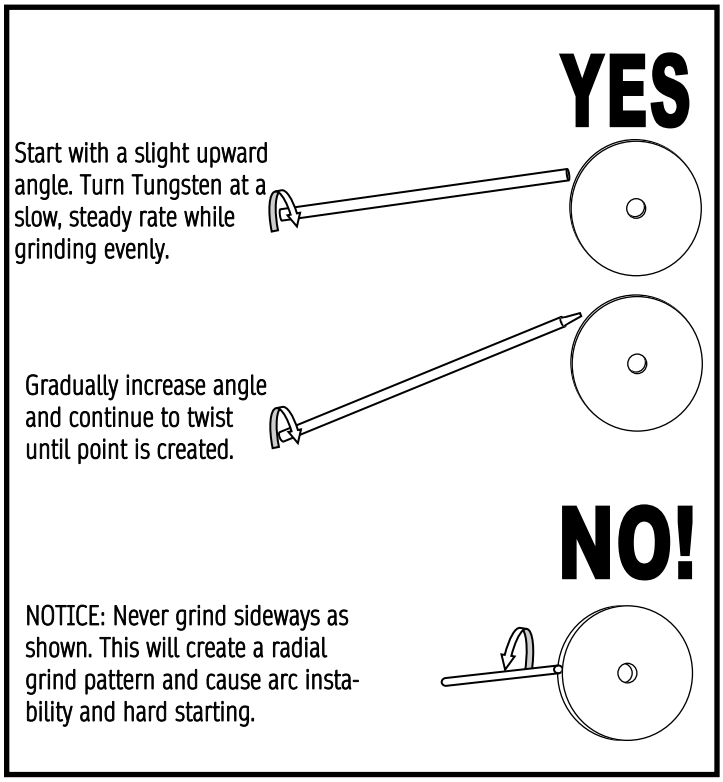




Low cost, economical purpose-built Diamond coated Tungsten grinders have revolutionized the industry. These will usually have predrilled holes/slots to guide you to quickly and safely grinding the correct angle.

However, if you do not have one, you may use a bench grinder with a fine grit stone. Keep the stone dedicated to the task of only grinding Tungsten to prevent contamination of the electrode.

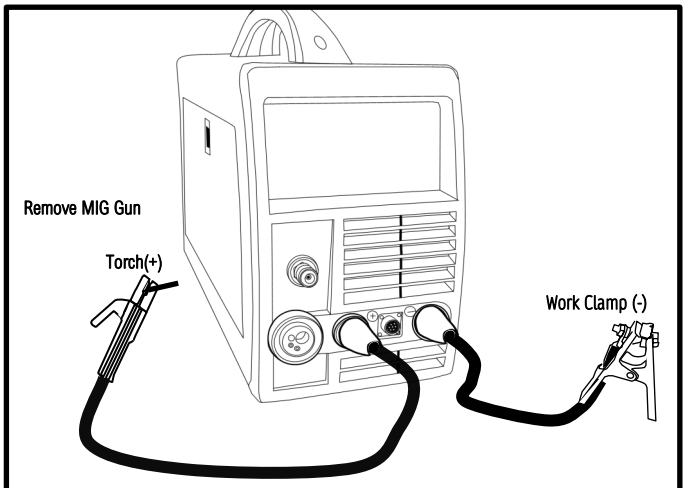
CAUTION: ***Grip your Tungsten firmly so the Tungsten is not snatched from your hands. Use safety glasses, and gloves when grinding.***



See below for proper and improper grinding examples.

Stick Polarity and Electrode Types

Stick welding is usually performed in DC with the electrode positive (DCEP+), or " Reverse Polarity". Some electrodes may be used in either polarity. For example, the E6011 may be operated either in DCEP, DCEN. Some people mistake it for an AC only rod, because of its ability to be used with old style transformer "buzz box" welders that only produce AC current, but in reality it will operate just as well, if not better on DCEP. In most cases, even if a welding rod allows operation with DCEN,it will typically perform better in DCEP. a very rare occurrence. The illustration on the next page depicts the standard connection for most welding rods. Always consult your welding rod manufacturer's recommendation as an ultimate source of information. Usually the box or can will have polarity and Amp range recommendations on it if you are in doubt about settings or polarity.



IMPORTANT! Remove MIG Gun while using TIG and Stick processes. Gun will remain live if connected. If it comes into contact with metal, the MIG Gun may short out, and may cause damage to the unit. Personal injury may also occur.

This welder is designed to weld with a variety of welding rods, including E6011, E7014, E6013, E7018, E7024, and even stainless rods like E309L. **However, this unit is not designed to weld with E6010 and should not be attempted.** Performance with E6011 may be brand dependent. You may need to experiment with different brands to find the best one for your use. This is of course true for all welding rods, but especially for E6011 with this machine. For general purpose fabrication, and practical use, consider using E7014. This is considered a "fabrication rod". With this rod, high-quality, rapid, self-releasing welds can be made, without having to have a hot box that is required to maintain low-hydrogen type rods such as E7018, which has similar tensile strength. E7014 rods are particularly easy to use, and leave a smooth, high quality appearance, even in the hands of novice users. The E7014 can be easily drug along the work piece while maintaining an arc. The slag is medium heavy and will self release if the amp range and technique is correct.

IMPORTANT: Whenever welding, this unit performs best with a short arc distance. Long arc lengths will create arc outages. A light drag works best.

This welder has a maximum output of 160 Amps while operating on 240V. This is sufficient to weld with most 1/8" welding rods. Running larger rods may be difficult and may make the duty cycle interrupt or over current interrupt engage. When operating on 120V, use a 3/32" or smaller welding rod. Operation at higher than 85A while on 120V may trip a 20A circuit breaker,

HF Point Gap Maintenance (TIG)

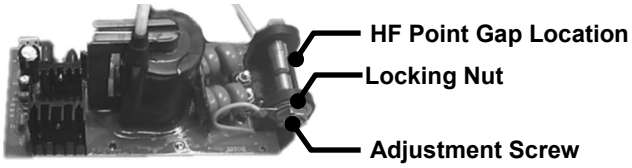
This unit is equipped with adjustable high frequency points that generate the High Frequency Voltage to create the touchless HF start of the unit. Occasionally, adjustment may be needed, particularly in the first few months of operation, and periodically thereafter. This is a simple adjustment after you've done it once or twice. The point gap should be set between 0.029" to .040" for best operation. The target point gap should be between .030" and .035". A point gap that is too small may cause weak starts. A point gap that is too wide may cause electrical interference with surrounding equipment and electronic items.

The location of the points can be identified by quickly pressing the torch switch/foot pedal while looking up through the front vents of the welder. The points should arc briefly. If they do not, they may only need adjustment or cleaning. (But if after adjustment they do not fire, contact Ahp technical support at the number listed on the front of this manual.) If you do not see the arc location, look up and to the left of the unit. There will be a small board with a brass and black plastic holder along with carbon contacts in them. They will be located on a small square board with a couple rows of small capacitors and a coil/transformer on the same board.

To gain access to the points and adjust them, follow steps 1– 6 on the previous page. You will need a small jeweler's or mechanic's screwdriver, and small ignition wrench and a feeler gauge to set the points. Do not overtighten the jam nut securing the adjustment screw. Hold the screwdriver in place on the screw while tightening the jam nut with an ignition wrench. See the image below.

The board in the image below is shown inverted for demonstration purposes and is removed from the unit. Removal is not necessary. The points will be in the "hanging" position and can be adjusted through the left side of the machine. (Whole board is not pictured.)

For more detailed written and illustrated directions on how to locate and adjust the point gap, contact Ahp technical support.



NOTICE: *Point Gap adjustment is a part of regular maintenance and is a normal responsibility of the customer. Point gap adjustment and normal cleaning/maintenance does not fall under the warranty terms for this welder. If you have any issues or questions concerning point gap adjustment, call or contact Ahp tech support before attempting the adjustment. The HF system used in this unit is only used for starting the arc. They do not stay on while welding in DC or in AC. They have no effect other than arc starting efficiency. Inverters switch so quickly in AC that HF is not needed to maintain a stable arc.*

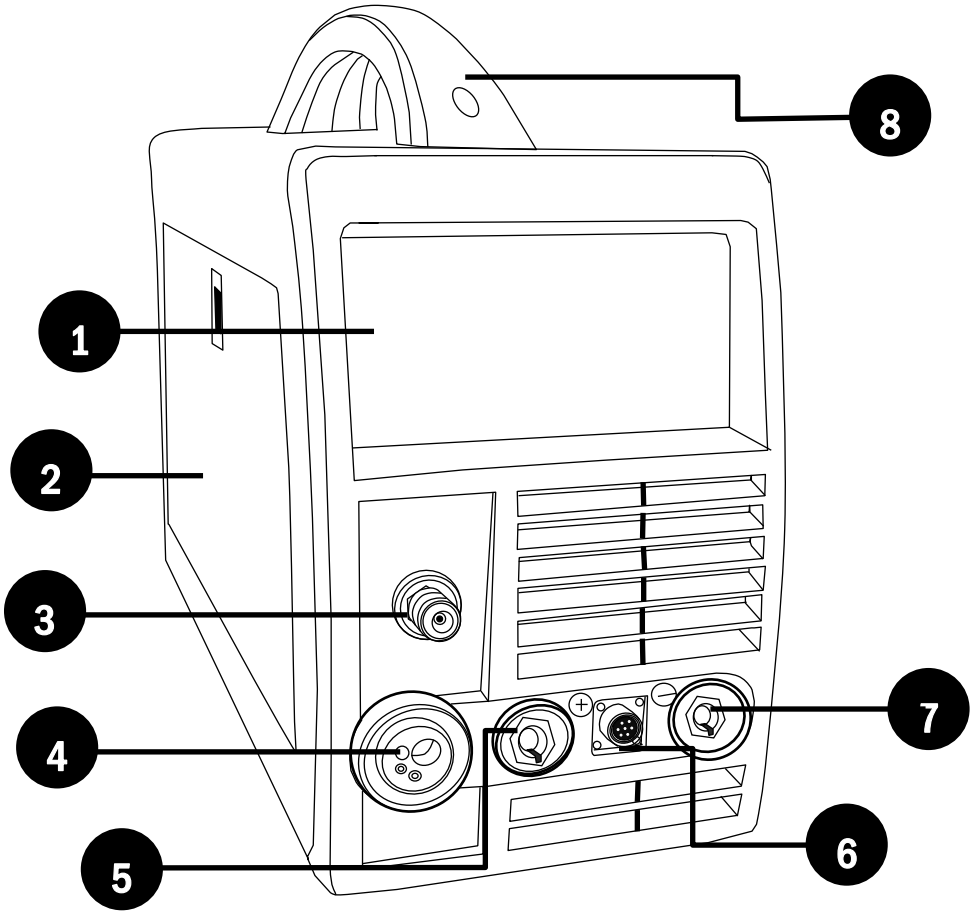
IMPORTANT: *Do not needlessly adjust the point gap in order to try to resolve operational issues not related directly to arc starting. Arc starting is the only purpose of the HF points inside this unit. Before assuming you have an HF starting issue, check the work clamp, the work clamp cable and connections under the rubber boot on the DINSE connector to make sure the connections are tight, and corrosion free. Connect the work clamp directly to a freshly ground spot on the work piece and attempt to weld before assuming you have an HF point gap issue. Also make sure polarity is correct. Most commonly, a poor connection to the work piece, corrosion or wrong polarity is the cause of poor arc starting rather than a point gap issue.*

Other items that may also cause poor arc starting:

- Wrong shielding gas, or not enough flow.
- Too much gas flow creating turbulence.
- Welder is too close to the weld area and fans are blowing gas coverage off weld. Move to 6-8 feet away.
- Dirty or contaminated metal. Preclean aluminum with Stainless brush or special aluminum grinding wheel. Decontaminate with acetone or aluminum cleaner made specifically for welding Aluminum. Grind steel with hard stone on grinder. Refrain from using flap disks which often polish the mill scale rather than remove it.
- Too long of an arc gap between tungsten and metal.
- Too much stick-out of the Tungsten, not enough shielding gas flowing around Tungsten.
- No Pre-Flow. Set to .3 to .5 Seconds.
- Wrong Tungsten. Use Lanthanated or Ceriated Tungsten for all processes. Do not use pure, zirconiated. Use caution when trying new or proprietary "blends". Often these have poor quality control.
- Work Clamp is not connected directly to what is being welded.
- Work clamp, cable, or connector is corroded or bad. Check all connections, including where the cable attaches to the DINSE type connector. (You must pull rubber boot back).
- Dirty Tungsten. This is often indicated by a green flare or spitting while starting the arc or while welding.

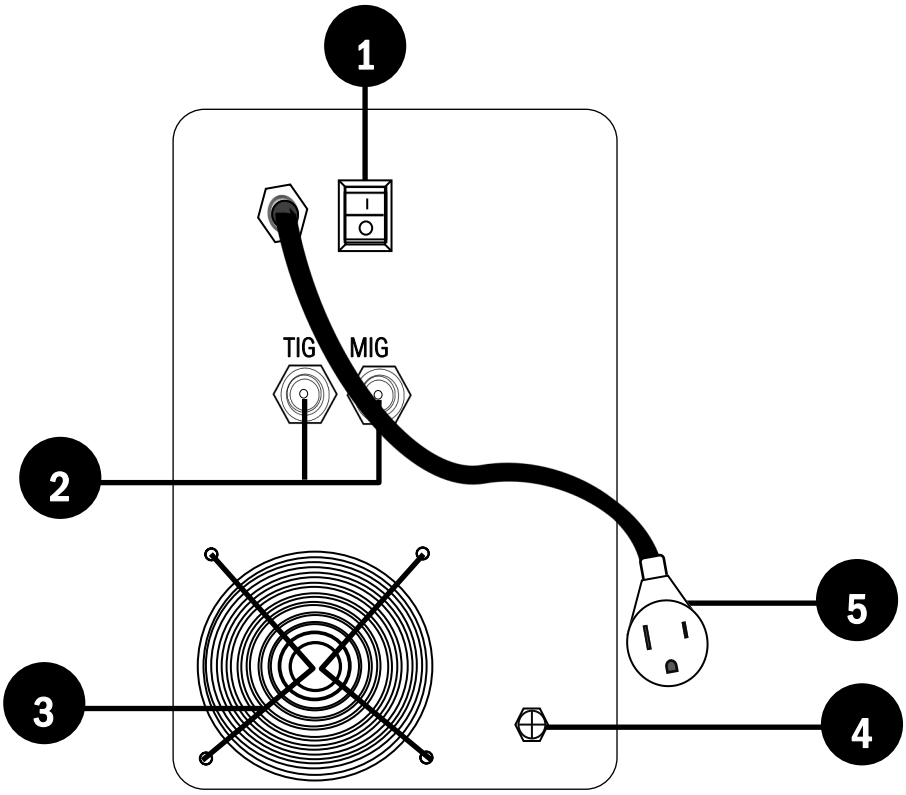
IMPORTANT: Don't confuse the TIG HF start capability of this unit with the old term "High Frequency" that was often erroneously used to refer to AC TIG welding. HF start with this welder only refers to the contactless method of starting the arc. With old transformer type AC/DC TIG welders, HF was required both to start the arc, and maintain the arc while welding, so it became synonymous, with AC welding required for welding Aluminum. This machine is DC output only. It is not suitable for welding aluminum with the TIG process. Also even though this machine can weld Aluminum in MIG mode, this does not mean the unit outputs AC in MIG mode. DC+ (Reverse Polarity) is used for welding aluminum with MIG. This is due to several reasons, including the fact that the electrode is also the filler metal and is meant to be consumed. Aluminum MIG is a spray process (when performed correctly) and fast movement is necessary to prevent burn-through. It is not a delicate, easily controlled process. Minimum suggested welding thickness for MIG on Aluminum is 1/8" or greater.

Front Panel View



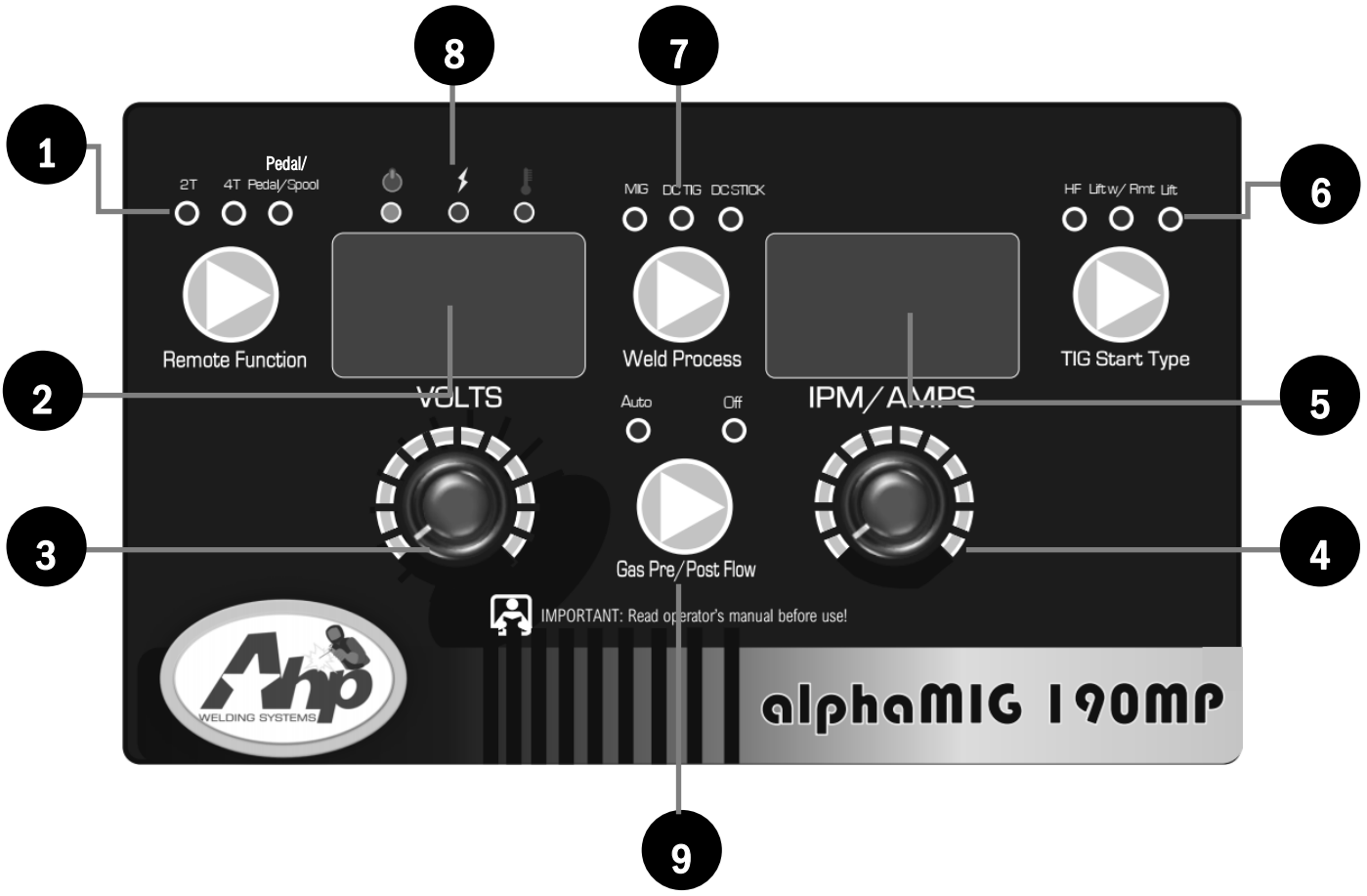
Number	Component Identification	Component Note
1	Operator Panel Interface	See Operator Panel Page for detailed information
2	Door and Latch	Keep door closed while in use. Only open for wire replacement and starting.
3.	TIG quick connect type “B” 9mm Gas Connection	The TIG torch gas connection is inserted here. The quick coupler collar should snap forward once the fitting on the torch is fully inserted. To release, move the collar rearward.
4.	MIG and Spool Gun Euro Style Connector	The MIG gun and spool gun connect to this same fitting. The MIG gun must be removed to connect the spool gun. Both cannot connect at the same time.
5.	Positive Terminal (+) (DINSE 25 Type, 3/8” approximate dia.)	For MIG (GMAW): This is the location of the wire feeder lead (terminal under the cover) For Gasless (self-shielded) Flux-Cored (FCAW): This is the location of the work clamp. For TIG: This is the location of the work clamp. For Stick: This is the location of the electrode holder (torch).
6.	7 Pin Control Connector	This connector is the control connector for the Spool Gun, TIG Torch switch or TIG foot pedal. Do not leave connected with other processes selected
7.	Negative Terminal (-) (DINSE 25 Type, 3/8” approximate dia.)	For MIG (GMAW): This is the location of the work clamp. For Gasless (self-shielded) Flux-Cored (FCAW): This is the location of the wire feeder lead (terminal under the cover). For TIG: This is the location of the Torch. For Stick: This is the location of the work clamp.
8	Handle	

Rear Panel View



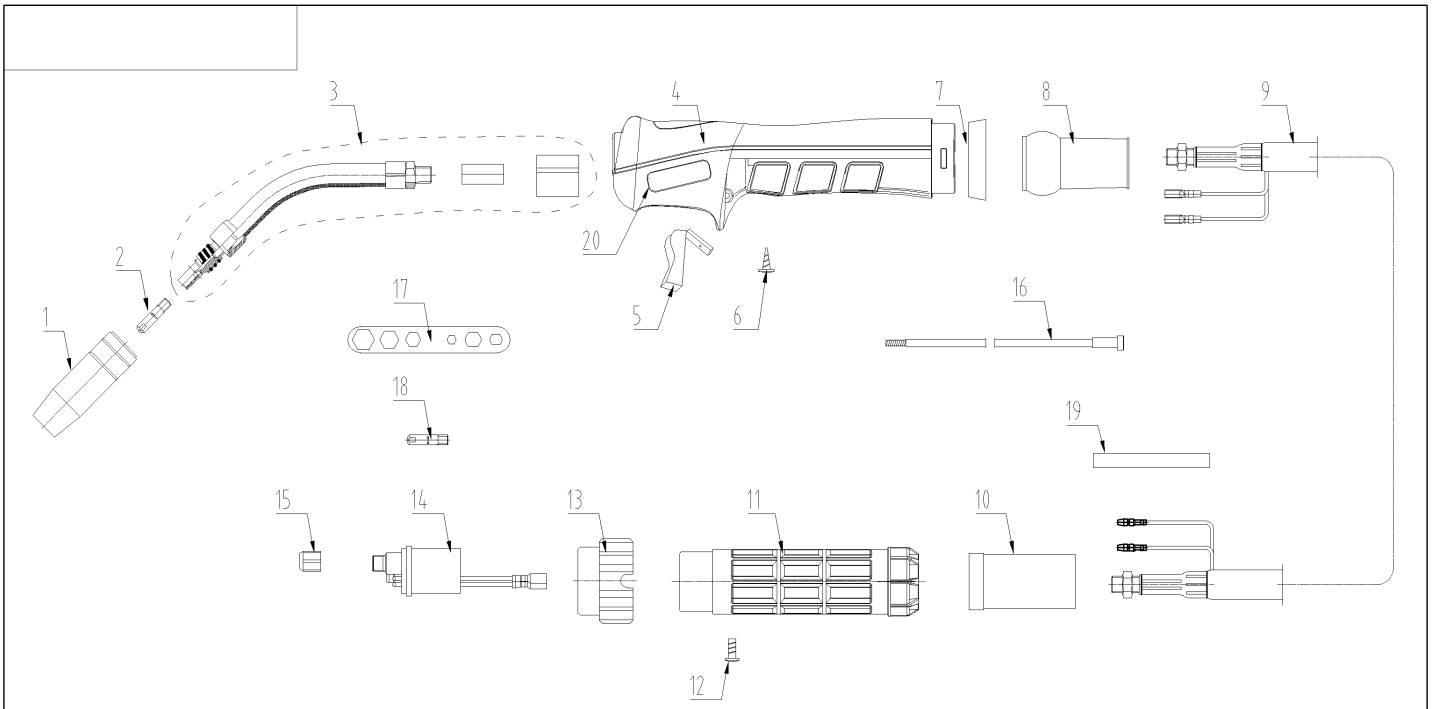
Number	Component Identification	Component Note
1	Power Switch	This is used to switch the unit on and off.
2	TIG and MIG Shielding Gas Connection (5/8" CGA)	5/8" CGA Fitting is used in North American Markets. Other markets may use a hose barb connection. These are compression type fittings and do not require thread tape or pipe sealant.
3	Fan location	Periodically check for proper fan function and cleanliness.
4	HF Ground Service Bolt**	For use in a combined effort to mitigate any electrical interference that may be caused by this unit. Normally not used unless electrical interference is of concern or experienced. If used, connect it with a 12 gauge insulated wire directly to a separate ground rod driven in the ground outside the shop. All metal items in the shop should additionally be grounded to prevent interference. Consult with an electrician for proper application and grounding.
5	Power Cord and NEMA 6-50P (12 Gauge, 6 ft.)	This plug and cable is correctly sized for the rated amps, duty cycle and length of the cable. Consult Article 630 of the NEC for more connection and wiring details. For 120V use, add the 240V to 120V adapter to the end of this plug.

Operator Panel



Number	Component Identification	Component Note
1	Remote/Trigger/Spool	This is used to set the function of the trigger. MIG/TIG 2T: Press and Hold, 4T Press, hold and release to start the arc/Press and release to terminate the arc. Pedal is used with TIG to vary Amperage within range (up and down) Spool is used with MIG only.
2	Volt Display	The Voltage Display displays voltage for MIG, TIG and Stick. While welding it displays dynamically, to read actual output of the machine. In MIG mode the voltage can be adjusted. In TIG and Stick, since they are constant current machines, voltage is not able to be adjusted on the machine. The voltage reflected in TIG and Stick mode is OCV. It is not adjustable in those modes.
3	Volt Adjustment Knob	This is only used in MIG/Flux-Cored/Spool Gun modes. In Stick and TIG, this knob has no function.
4	Amp Adjustment Knob	This is used to adjust weld Amperage in TIG and Stick. In MIG/Flux Cored/Aluminum modes the knob adjusts wire feed speed in Inches Per Minute.
5	IPM/Amp Display	This display reads in Inches per minute while it is being adjusted in MIG mode. In TIG and Stick modes this display reflects Amps being adjusted. In MIG, TIG and Stick modes, while welding it changes and reads actual Amps output.
6	TIG Start Type	This is used to select the type of TIG start, whether Lift with Remote, Live lift (always on) and HF Start. It is only used for TIG and becomes inactive while in other modes.
7	Process Selector	Choose between MIG, TIG and Stick Processes.
8	Warning/On Indicators	The green "power button" LED should be lit while the machine is on. The temperature symbol will light up in the event of a duty cycle event (machine runs too long or hot) and interrupt the welding output. Allow to cool for 15 minutes. If the light does not go out automatically, turn the machine off and restart it. If it does not clear, call Everlast Tech Support at number found in this manual. The lightning bolt symbol indicates an over current and will also interrupt welding output. If this occurs, turn the machine off, examine/remedy cause and turn back on. If overcurrent does not clear upon restart, call Everlast Tech Support at the number found in this manual.
9	Auto Pre/Post Flow Selector	This turns the Auto Pre/Post Flow feature on and off.

Series 15AK Torch



serial number	drawing number	name	quantity	note
14	ITB0059	Euro Central Adaptor Body/Spring pins	1	
13	IHJ0063	Gun Plug Nut/Plastic Nut	1	
12	IFT0063	SCREW M4X6 UNI 6107	1	
11	IHJ0645	Back Box Hole	1	
10	IHJ0028	Front Cable Support 12-16-25 MMQ	1	
9	ICN0663	COAXIAL CABLE 16mmq 3m	1	
8	IHJ0782	Joint For 15AK	1	
7	IHJ0715	HOUSING FOR HANDLE	1	
6	IFT0874	SCREW D.3x10 UNI9707	3	
5	IHQ0070	TRIGGER RED	1	
4	ICV0757	MIG HANDLE BLUE/INNO/GRIP	1	
3	ICZ6087	TORCH HEAD 15AK	1	
2	ICU0003-08	Contact Tip 0.8/M6×25	2	
1	ICS0063	Gas Nozzle Φ12 14-15AK	1	

serial number	drawing number	name	quantity	note
20	IFT0103	LABEL ERGO 15AK	1	
19	IHQ0050	INSULATOR TUBE/Φ5 M	0.13m	
18	ICU0003-10	Contact Tip 1.0/M6×25	1	
17	ICG6000	SPANNER FOR MIG	1	
16	IIC0500-02	Insulated Steel Liner 0,6-0,8 3.1m Blue/TORCH	1	
15	IZT0071	Liner Nut	1	

marking	Places	Revised file NO	Signature	date
designer			standardization	
drafted			craft	
proofread			approval	
Audit			date	2016-08-15

ICT2098-26

description: MIG 15AK Torch 3m With Spring Pins GRIP/INNO/BLUE HANDLE

Shanghai Innotec Co.,Ltd

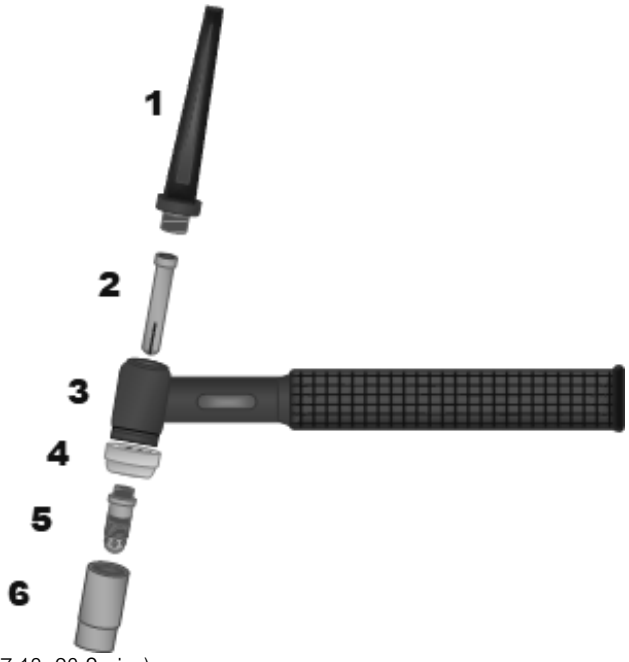
range of tolerance			
a<6	6<a<30	30<a<120	a>120
±0.1	±0.2	±0.3	±0.5

reference number	material	weight(g)	edition
			A

page one | one page in total

innoTec a step ahead

26 Series Air-Cooled Welding Torch (Typical Type) Parts and Assembly.



Typical AHP and NOVA Torch Assembly (17,18, 26 Series)

(Some parts may not appear exactly the same but are equal in assembly order and type.)

Tungsten not included.

#	Description	Size/Type	Part#	Alternate Ref.	Note
1	Back Cap	Long	NVA57Y04-3	57Y02	
1	Back Cap	Medium	NVA41V35-3	41V35	Or 300M
1	Back Cap	Short	NVA57Y04-3	57Y04	
2	Collet	.040”	NVA10N22-3	10N22	1.0mm
2	Collet	1/16”	NVA10N23-3	10N23	1.6mm
2	Collet	3/32”	NVA10N24-3	10N24	2.4mm
2	Collet	1/8”	NVA10N25-3	10N25	3.2mm
3	Torch Body/Handle	17,26, or 18	Call for App.		Varies by Type
4	Heat Shield	17/26/18	NVA-HS172618	Heat Shield	Interchanges with similar aftermarket
5	Collet Body	Universal one size fits 1/16” to 1/8”	Stock	Stock	Universal Collet Body and Collets supplied with original starter kit
5	Collet Body	.040”	NVA-10N30	10N30	1.0mm, match to collet size
5	Collet Body	1/16”	NVA-10N31	10N31	1.6mm, match to collet size
5	Collet Body	3/32”	NVA10N	10N32	2.4mm, match to collet size
5	Collet Body	1/8”	NVA10N28	10N28	3.2mm, match to collet size
6	Cup	4	NVA-10N50-3	10N50	Standard, non gas lens 1/4”
6	Cup	5	NVA-10N49-3	10N49	Standard, non gas lens 5/16”
6	Cup	6	NVA-10N48-3	10N48	Standard, non gas lens 3/8”
6	Cup	7	NVA-10N47	10N47	Standard, non gas lens 7/16”
6	Cup	8	NVA-10N46-3	10N46	Standard, non gas lens 1/2”

MIG Recommended Settings

Gas Type/Mode	Wire Size	Metal Thickness	WFS Range	Volt Range
MIG C25	.023"	18 Gauge	251-271 IPM	15.1-17.1 V
MIG C25	.023"	16 Gauge	261-281 IPM	15.5-17.5 V
MIG C25	.030"	18 Gauge	166-186 IPM	15.4-17.4 V
MIG C25	.030"	16 Gauge	175-185 IPM	15.8-17.8 V
MIG C25	.030"	14 Gauge	180-200 IPM	16.0-18.0 V
MIG C25	.030"	1/8"	230-250 IPM	17.7-19.7 V
MIG C25	.035"	18 Gauge	149-169 IPM	15.8-17.8 V
MIG C25	.035"	16 Gauge	165-185 IPM	16.2-18.2 V
MIG C25	.035"	14 Gauge	193-213 IPM	18.3-19.3 V
MIG C25	.035"	1/8"	265-285 IPM	19.2-21.0 V
MIG C25	.035"	3/16"	290-310 IPM	19.8-21.0 V
MIG C25	.035"	1/4"	365-375 IPM	21.3-22 V
MIG C100	.023"	18 Gauge	250-270 IPM	16.0-18.0 V
MIG C100	.023"	16 Gauge	290-310 IPM	16.5-18.5 V
MIG C100	.030"	18 Gauge	130-150 IPM	15.4-17.4 V
MIG C100	.030"	16 Gauge	195-215 IPM	16.2-18.2 V
MIG C100	.030"	14 Gauge	210-230 IPM	17.0-19.0 V
MIG C100	.030"	1/8"	250-270 IPM	18.0-20.0 V
MIG C100	.035"	18 Gauge	153-173 IPM	15.8-17.8 V
MIG C100	.035"	16 Gauge	170-190 IPM	17.0-19.0 V
MIG C100	.035"	14 Gauge	194-214 IPM	18.0-20.0 V
MIG C100	.035"	1/8"	220-240 IPM	19.0-21.0 V
MIG C100	.035"	3/16"	265-375 IPM	23.5-24 V
Flux-Cored	.030"	18 Gauge	82-102 IPM	14.5-16.5 V
Flux-Cored	.030"	16 Gauge	100-120 IPM	15.2-17.2 V
Flux-Cored	.030"	14 Gauge	157-177 IPM	15.7-17.7 V
Flux-Cored	.030"	1/8" Gauge	340-360 IPM	19.7-21.0 V
Flux-Cored	.035"	18 Gauge	63-83 IPM	14.5-16.5 V
Flux-Cored	.035"	16 Gauge	72-92 IPM	14.5-16.5 V
Flux-Cored	.035"	14 Gauge	123-143 IPM	16.0-18.0 V
Flux-Cored	.035"	1/8"	273-293 IPM	19.9V-21 V
Flux-Cored	.045"	16 Gauge	72-92 IPM	14.5-15.5 V
Flux-Cored	.045"	14 Gauge	76-96 IPM	15.3-17.3 V
Flux-Cored	.045"	1/8"	121-141 IPM	19.0-21.0 V
Flux-Cored	.045"	3/16"	165-185 IPM	19.9-21.0 V
Aluminum	.035"	12 Gauge	370-380 IPM	20.8-21V
Aluminum	.035"	11 Gauge	385-395 IPM	21V

TIG Recommended Settings

Tungsten Dia	Steel Thickness	Amps	Filler Dia.
1/16	24 Gauge	22-26A	.023"
1/16"	22 Gauge	27-33A	.030"
1/16"	20 Gauge	33-37A	.045"
1/16"	18 Gauge	43-48A	.045"
1/16-3/32"	16 Gauge	55-65A	1/16"
3/32"	14 Gauge	65-80A	1/16-3/32"
3/32"	12 Gauge	85-100A	3/32"
3/32"	1/8"	90-120A	3/32"
3/32"	3/16"	135-150A	3/32"-1/8"
3/32"-1/8"	1/4"+	150-180a	3/32"-1/8"

Stick Recommended Settings

Rod Dia.	Steel Thickness	Amps Range	Rod Type
3/32"	16-1/8"	50-75A	E6011
1/8"	1/8"-3/8"	80-120A	E6011
1/16"	18-16Gauge	30-50A	E7014/7018
3/32"	14 Gauge to 1/8"	70-80A	E7014/7018
1/8"	12 Gauge to 3/8"	80-140A	E7014/7018

IMPORTANT: Use these settings as a guide only. They are a basic starting point. Many factors will affect the actual setting like weld position, ambient temperature, and even personal welding style. The maximum and minimum limits given are considered industry accepted limits. This may not be the actual limit, but it is designed to give the best weld and outcome. MIG settings are intended for single pass short circuit transfer. Multiple passes may be made to weld thicker materials using these basic settings to determine the thickness of pass. Maximum settings are regulated by maximum output voltage. Higher settings may result in globular transfer with high amounts of spatter and arc wandering.

Explanation of Terms and Features

To help understand the settings and features of this basic machine, a basic explanation of the terms and proper use is necessary. The following information should be used to help setup and weld with the machine.

Getting Familiar With MIG, TIG and Stick Basics.

MIG 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. **However, while actively welding, the display will change function and display actual amp output.** 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.

Starting the Arc in MIG Mode

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

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NOTICE:

While using the optional foot pedal, or the optional slider switch, the welder's digital display will revert back to the minimum amp setting on the welder after the arc is terminated and it will not display maximum set amps. **(Basically the welder reads the position of the foot pedal when not in use. To recall the setting of the maximum Amperage. Simply touch or press the main Amp control knob. It'll then briefly display maximum Amp setting until no input is sensed and it reverts back to its default state.)** It will only display maximum set amps while the unit is being adjusted for amperage. While welding the display will read actual weld amperage. After 3-4 seconds the display will default back to the minimum amp reading. When using 2T or 4T control modes, the amps will register the maximum set amps before the arc is started. To see the maximum set amperage in the pedal mode without the arc on, simply make a small adjustment in the main adjustment knob. The unit will revert to the "setting" mode and display selected maximum amperage.

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. This includes MIG, TIG and Stick processes. Stringers are simply straight beads that move forward with little or no side to side travel, stepping or oscillation. These will offer the most sound and reliable welds for a beginner. 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 and TIG welding requires a well prepped surface to obtain a sound weld. The removal of paint, rust mill scale, or other contaminate such as grease should be done before welding. Stick welding is more forgiving of rust and mill scale, but when MIG welding, contaminates will result in porosity and inclusions in the weld, weakening it. In TIG welding it can be disastrous. TIG requires the most cleaning effort. A grinder will usually prep the metal sufficiently to remove oxidation and paint. However, to remove grease a degreaser such as acetone should be used. Do not use any degreaser such a brake cleaner with chlorinated solvents or death or serious injury may occur!

MIG and TIG filler wires such as ER70S-6 or ER70S-2 include a sufficient level of deoxidizers such as silicone and copper that are formu-

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lated 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. MIG and TIG ER70S-2 and ER70S6 are the same except that TIG wire is cut to lengths and MIG wire is continuous. When welding fine gauge materials in TIG, you can substitute sections of thinner MIG wire.

Multiple Pass Welds.

One of the common misunderstandings that people have when beginning to weld is that if the welder has the power, then a single heavy pass should be used to weld it up. This is wrong, whether it is MIG, TIG or Stick. 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. On this unit, we suggest no more than 3/16". 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.

MIG and TIG 2T/4T and Pedal Operation.

2T and 4T are functions common to both MIG and TIG. These settings allow you to change how the weld cycle is controlled through the up and down (or in and out) motions of the torch switch. Only in TIG mode can the pedal function be used. The optional pedal is designed to vary the Amps from the default minimum (10A) up to the maximum Amperage set on the panel. . The MIG and TIG torch has a switch that has two possible modes of operation. The first, 2T, is a simple "press and hold". The second, 4T, requires the switched to be pressed and released to start the arc and weld. A second press and release allows the arc to terminate and the post flow to automatically begin. For TIG, however, an optional foot pedal may also be used to control both the Amps and the On/Off cycle of the arc

MIG and TIG Pre-Flow and Post Flow.

Pre and Post Gas Flow are invaluable tools that can be used for both MIG and TIG welding. This feature provides an automatic flow of gas before the arc starts and after the arc terminates. The duration of the pre and post flow are different and are determined automatically according to the machine settings for Amps. The use of Pre and Post Flow is optional as it can be turned on and off. However, whenever possible it is recommended to use this feature. Doing so will increase weld quality on start up as well as at arc termination by providing a protective shield of gas around the weld area to prevent porosity and oxidation around the weld.

TIG HF, Live Lift, and Remote Lift Start.

The AHP AlphaMIG 190MP is unique in its class by offering all three forms of arc starting. Live lift is a simple function where the Tungsten remains live all the time and the torch is simply touched down to the metal and lifted back up to start. This is a style often used while pipe welding or doing basic DC welds out in the field. With this unit, when the tungsten is touched to the metal, the gas flow will start automatically but will bypass the pre-flow cycle. Remote lift allows the use of a torch switch or optional foot pedal. A similar method of touching the Tungsten to the metal and lifting up is used, *except* the foot pedal or torch switch must be pressed to energize the torch first. HF start (High Frequency) is only available for use with the torch switch or the optional foot pedal. To start the arc with HF engaged, the torch held 1/8" or less of the metal and the foot pedal or torch switch is activated. Then, the arc will automatically fire and transfer to the metal without touching it. The HF method of starting the arc is the easiest and preserves the tungsten the longest, preventing frequent regrinding of the Tungsten.

Setting up for TIG welding.

If you are needing basic help getting started TIG welding, here are some general settings and selections to get you started. This guide is

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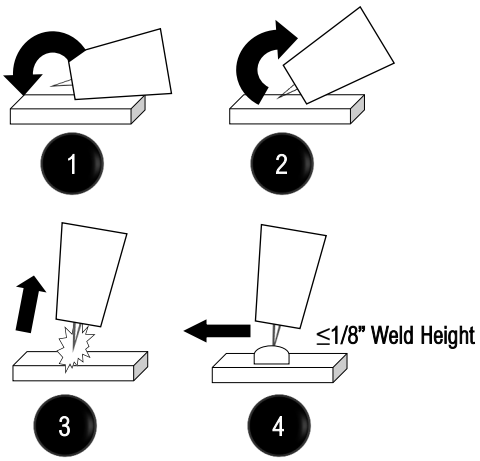
intended to be only a starting point, not a completely exhaustive source. Keep in mind that no guide is a substitute for practice and experience. You may find that your final settings may be different from the ones listed. **The following guide does not represent the maximum capability, or even the recommended capability of the unit.**

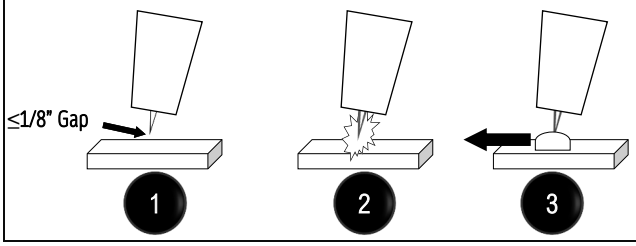
Using Lift Start

1. Rest the edge of the cup on the work piece so that the tungsten is slightly off the work. (If using Remote Lift, Press the trigger or foot pedal at this point.) 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. Travel forward with a "push" angle of 10-20 degrees.



Using HF Start

1. Place the point of the tungsten 1/8" or less over the work piece.
2. Press the torch trigger or foot pedal, whichever is connected, and the HF spark will be emitted. It may appear as small sparks or lighting if the arc doesn't start immediately.
3. Once continuity establishes, the welding arc will begin. You may begin to advanced the torch when a puddle forms. Maintain 1/8" height or less while welding. Continue to use a "push" angle of 10 to 20 degrees.



Amp Range	Metal Thickness Single Pass Weld	Electrode Dia.	Cup Number	Flow Rate (CFH) Standard Lens
10-30A	.010" to .035"	.040 (1.0	4 or 5	5 to 7
10-70A	.010" to .093"	1/16	4, 5, 6	6 to 12
10-180A	.010" to .375"	3/32"	5,6, 7 or 8	10 to 18

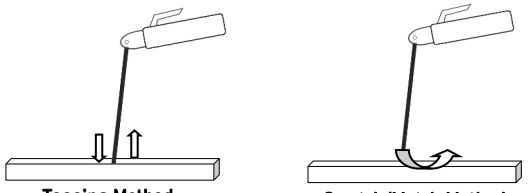
TIG Cup Size	Inside Diameter
4	1/4"
5	5/16"
6	3/8"
7	7/16"
8	1/2"
10	5/8"
11	11/16"
12	3/4"

Welding with Stick.

The most challenging part of learning stick is starting an arc. There are a couple of different starting techniques used and are depicted below. Once the arc is started, simply drag the rod along the metal in a straight line at a 10 to 20 degree drag angle. As mentioned earlier, weaving isn't necessary. Amp selection is more tied to rod diameter than metal thickness, although thickness is a component of it. For best results, take a look at the manufacture's on-box recommendations on Amp range for the rod type and diameter. For best all around performance select a 3/32" E7014.

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.



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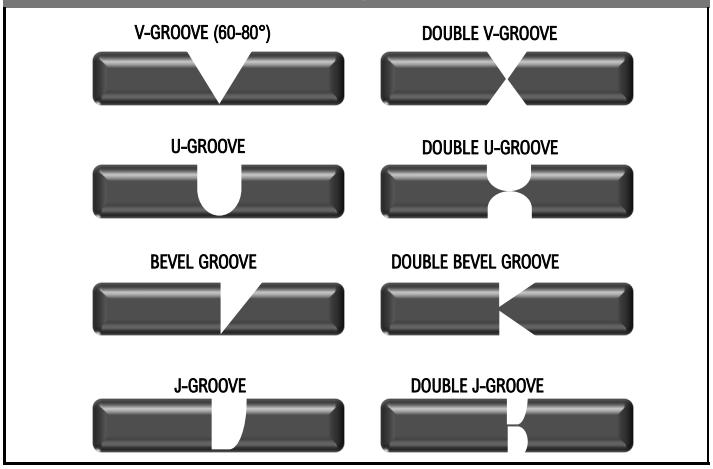
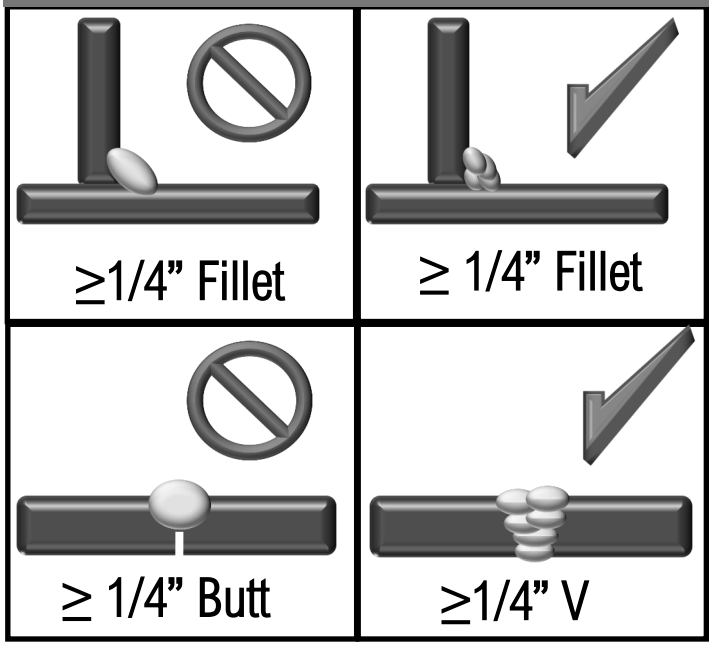
Different Types of Welds

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.

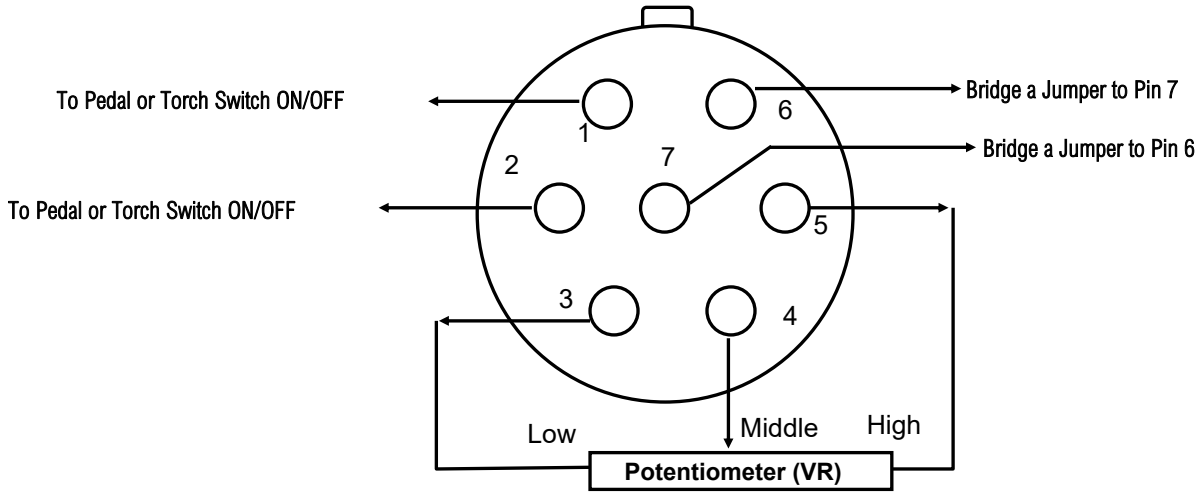
Joint Preparation



Weld Pass Examples



7 PIN CONNECTOR



Troubleshooting

Trouble	Possible Cause	Solution
Unit is switched on, but the power light isn't on.	Switch damaged. Service Breaker/ Input Line Damaged	Check. Replace.
After welding machine is overheating and the fan does not work.	Fan damaged. Fan connector plus is loose	Replace. Check. Reinstall.
Intermittent, wandering arc.. (TIG or MIG)	Work Clamp not connected directly to part being welded. Work Clamp worn/damaged Torch height too high. Draft	Reconnect. Replace work clamp and/or cable. Reduce MIG torch height to under 3/8". Reduce TIG torch height to <1/8". Use a small candle to test for fluttering flame.. Move welder further away.
MIG wire burns back	Wire feed speed is too low Voltage is too high Wrong drive rolls installed Tension is too low Kinked or damaged or wrong liner/tip	Reduce Wire feed speed. Lower Voltage. Check drive roll size. Increase tension on drive roll. Check liner and Tip size.
MIG wire balls up/Creates bird's nest	Damaged liner Wire is too small of diameter to feed in long gun	Check liner. Use shorter gun length.
MIG spatters badly,	Wire polarity is incorrect Settings are too high for the capability of the wire diameter	Check wire polarity. Use larger wire diameter, or thinner material.
Porosity of the Weld. Discolored weld color. (MIG or TIG) Tungsten is discolored. (TIG)	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. Lower Gas Flow rate. Clean metal thoroughly with approved metal cleaner, or use acetone and a rag to clean metal.
Weld quality is poor. Weld is dirty/oxidized, or porous.	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.
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.
Continuous Overheating	Settings too high. Too large of wire for job. Unit has 25% duty cycle at an output of 180A.	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.
Tungsten is Rapidly consumed	Wrong Polarity. No gas. Wrong gas. Bad gas. Draft. Wrong Tungsten	Check Gas. Check for Drafts. Move welder away from work area. Make sure correct gas is connected at rear. Use Blue 2% Lanthanated Tungsten.
Electrode sticks or won't light (Stick)	Too large of electrode for amperage set "Wet" rods (in the case of low hydrogen types) Using E6010 Wrong polarity	Increase amperage. Use fresh sealed rods from sealed canister. Do not use E7018 from paper boxes. Use a rod oven. Use E6011. Use Electrode positive.
Other.		Contact Everlast.

TROUBLE CODE WITH WARNING LIGHT/UNIT	DIAGNOSIS
01	OVER TEMPERATURE/ DUTY CYCLE EXCEEDED. Allow unit to rest for 15 minutes. Check for obstacles, clean welder, and heat sinks. Make sure unit is unplugged for 30 minutes before
02	OVER CURRENT. Check to make sure input power cable is correct length and size. Internal unit fault or low input voltage. Possible issue running on generator with dirty power. Identify cause, plug directly into the receptacle. Cycle the switch one time. If the code does not
OTHER	CONTACT EVERLAST