



OPERATOR'S MANUAL

Metal Working



160A DUAL VOLTAGE INVERTER WIRE (MIG) WELDER MODEL: BW-160M

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THANK YOU & WARRANTY

Thank you for your purchase of a machine from Baileigh Industrial. We hope that you find it productive and useful to you for a long time to come.

Inspection & Acceptance. Buyer shall inspect all Goods within ten (10) days after receipt thereof. Buyer's payment shall constitute final acceptance of the Goods and shall act as a waiver of the Buyer's rights to inspect or reject the goods unless otherwise agreed. If Buyer rejects any merchandise, Buyer must first obtain a Returned Goods Authorization ("RGA") number before returning any goods to Seller. Goods returned without a RGA will be refused. Seller will not be responsible for any freight costs, damages to goods, or any other costs or liabilities pertaining to goods returned without a RGA. Seller shall have the right to substitute a conforming tender. Buyer will be responsible for all freight costs to and from Buyer and repackaging costs, if any, if Buyer refuses to accept shipment. If Goods are returned in unsalable condition, Buyer shall be responsible for full value of the Goods. Buyer may not return any special-order Goods. Any Goods returned hereunder shall be subject to a restocking fee equal to 30% of the invoice price.

Specifications. Seller may, at its option, make changes in the designs, specifications or components of the Goods to improve the safety of such Goods, or if in Seller's judgment, such changes will be beneficial to their operation or use. Buyer may not make any changes in the specifications for the Goods unless Seller approves of such changes in writing, in which event Seller may impose additional charges to implement such changes.

Limited Warranty. Seller warrants to the original end-user that the Goods manufactured or provided by Seller under this Agreement shall be free of defects in material or workmanship for a period of twelve (12) months from the date of purchase, provided that the Goods are installed, used, and maintained in accordance with any instruction manual or technical guidelines provided by the Seller or supplied with the Goods, if applicable. The original end-user must give written notice to Seller of any suspected defect in the Goods prior to the expiration of the warranty period. The original end-user must also obtain a RGA from Seller prior to returning any Goods to Seller for warranty service under this paragraph. Seller will not accept any responsibility for Goods returned without a RGA. The original end-user shall be responsible for all costs and expenses associated with returning the Goods to Seller for warranty service. In the event of a defect, Seller, at its sole option, shall repair or replace the defective Goods or refund to the original end-user the purchase price for such defective Goods. Goods are not eligible for replacement or return after a period of 30 days from date of receipt. The foregoing warranty is Seller's sole obligation, and the original end-user's exclusive remedy, with regard to any defective Goods. This limited warranty does not apply to: (a) die sets, tooling, and saw blades; (b) periodic or routine maintenance and setup, (c) repair or replacement of the Goods due to normal wear and tear, (d) defects or damage to the Goods resulting from misuse, abuse, neglect, or accidents, (e) defects or damage to the Goods resulting from improper or unauthorized alterations, modifications, or changes; and (f) any Goods that has not been installed and/or maintained in accordance with the instruction manual or technical guidelines provided by Seller.

EXCLUSION OF OTHER WARRANTIES. THE FOREGOING LIMITED WARRANTY IS IN LIEU OF ALL OTHER WARRANTIES, EXPRESS OR IMPLIED. ANY AND ALL OTHER EXPRESS, STATUTORY OR IMPLIED WARRANTIES, INCLUDING BUT NOT LIMITED TO, ANY WARRANTY OF MERCHANTABILITY OR FITNESS FOR ANY PARTICULAR PURPOSE ARE EXPRESSLY DISCLAIMED. NO WARRANTY IS MADE WHICH EXTENDS BEYOND THAT WHICH IS EXPRESSLY CONTAINED HEREIN.

Limitation of Liability. IN NO EVENT SHALL SELLER BE LIABLE TO BUYER OR ANY OTHER PARTY FOR ANY INCIDENTAL, CONSEQUENTIAL OR SPECIAL DAMAGES (INCLUDING, WITHOUT LIMITATION, LOST PROFITS OR DOWN TIME) ARISING FROM OR IN MANNER CONNECTED WITH THE GOODS, ANY BREACH BY SELLER OR ITS AGENTS OF THIS AGREEMENT, OR ANY OTHER CAUSE WHATSOEVER, WHETHER BASED ON CONTRACT, TORT OR ANY OTHER THEORY OF LIABILITY. BUYER'S REMEDY WITH RESPECT TO ANY CLAIM ARISING UNDER THIS AGREEMENT IS STRICTLY LIMITED TO NO MORE THAN THE AMOUNT PAID BY THE BUYER FOR THE GOODS.



Force Majeure. Seller shall not be responsible for any delay in the delivery of, or failure to deliver, Goods due to causes beyond Seller's reasonable control including, without limitation, acts of God, acts of war or terrorism, enemy actions, hostilities, strikes, labor difficulties, embargoes, non-delivery or late delivery of materials, parts and equipment or transportation delays not caused by the fault of Seller, delays caused by civil authorities, governmental regulations or orders, fire, lightening, natural disasters or any other cause beyond Seller's reasonable control. In the event of any such delay, performance will be postponed by such length of time as may be reasonably necessary to compensate for the delay.

Installation. If Buyer purchases any Goods that require installation, Buyer shall, at its expense, make all arrangements and connections necessary to install and operate the Goods. Buyer shall install the Goods in accordance with any Seller instructions and shall indemnify Seller against any and all damages, demands, suits, causes of action, claims and expenses (including actual attorneys' fees and costs) arising directly or indirectly out of Buyer's failure to properly install the Goods.

Work By Others; Safety Devices. Unless agreed to in writing by Seller, Seller has no responsibility for labor or work performed by Buyer or others, of any nature, relating to design, manufacture, fabrication, use, installation or provision of Goods. Buyer is solely responsible for furnishing, and requiring its employees and customers to use all safety devices, guards and safe operating procedures required by law and/or as set forth in manuals and instruction sheets furnished by Seller. Buyer is responsible for consulting all operator manuals, ANSI or comparable safety standards, OSHA regulations and other sources of safety standards and regulations applicable to the use and operation of the Goods.

Remedies. Each of the rights and remedies of Seller under this Agreement is cumulative and in addition to any other or further remedies provided under this Agreement or at law or equity.

Attorney's Fees. In the event legal action is necessary to recover monies due from Buyer or to enforce any provision of this Agreement, Buyer shall be liable to Seller for all costs and expenses associated therewith, including Seller's actual attorney fees and costs.

Governing Law/Venue. This Agreement shall be construed and governed under the laws of the State of Wisconsin, without application of conflict of law principles. Each party agrees that all actions or proceedings arising out of or in connection with this Agreement shall be commenced, tried, and litigated only in the state courts sitting in Manitowoc County, Wisconsin or the U.S. Federal Court for the Eastern District of Wisconsin. Each party waives any right it may have to assert the doctrine of "forum non conveniens" or to object to venue to the extent that any proceeding is brought in accordance with this section. Each party consents to and waives any objection to the exercise of personal jurisdiction over it by courts described in this section. Each party waives to the fullest extent permitted by applicable law the right to a trial by jury.

Summary of Return Policy.

- 10 Day acceptance period from date of delivery. Damage claims and order discrepancies will not be accepted after this time.
- You must obtain a Baileigh issued RGA number PRIOR to returning any materials.
- Returned materials must be received at Baileigh in new condition and in original packaging.
- Altered items are not eligible for return.
- Buyer is responsible for all shipping charges.
- A 30% re-stocking fee applies to all returns.

Baileigh Industrial makes every effort to ensure that our posted specifications, images, pricing and product availability are as correct and timely as possible. We apologize for any discrepancies that may occur. Baileigh Industrial reserves the right to make any and all changes deemed necessary in the course of business including but not limited to pricing, product specifications, quantities, and product availability.

For Customer Service & Technical Support:

Please contact one of our knowledgeable Sales and Service team members at:
(920) 684-4990 or e-mail us at sales@baileigh.com



INTRODUCTION

The quality and reliability of the components assembled on a Baileigh Industrial machine guarantee near perfect functioning, free from problems, even under the most demanding working conditions. However, if a situation arises, refer to the manual first. If a solution cannot be found, contact the distributor where you purchased our product. Make sure you have the serial number and production year of the machine (stamped on the nameplate). For replacement parts refer to the assembly numbers on the parts list drawings.

Our technical staff will do their best to help you get your machine back in working order.

In this manual you will find: (when applicable)

- Safety procedures
- Correct installation guidelines
- Description of the functional parts of the machine
- Capacity charts
- Setup and start-up instructions
- Machine operation
- Scheduled maintenance
- Parts lists

GENERAL NOTES

After receiving your equipment remove the protective container. Do a complete visual inspection, and if damage is noted, **photograph it for insurance claims** and contact your carrier at once, requesting inspection. Also contact Baileigh Industrial and inform them of the unexpected occurrence. Temporarily suspend installation.

Take necessary precautions while loading / unloading or moving the machine to avoid any injuries.

Your machine is designed and manufactured to work smoothly and efficiently. Following proper maintenance instructions will help ensure this. Try and use original spare parts, whenever possible, and most importantly; **DO NOT** overload the machine or make any modifications.



Note: *This symbol refers to useful information throughout the manual.*



IMPORTANT

PLEASE READ THIS OPERATORS MANUAL CAREFULLY

It contains important safety information, instructions, and necessary operating procedures. The continual observance of these procedures will help increase your production and extend the life of the equipment.



SAFETY INSTRUCTIONS

LEARN TO RECOGNIZE SAFETY INFORMATION

This is the safety alert symbol. When you see this symbol on your machine or in this manual, **BE ALERT TO THE POTENTIAL FOR PERSONAL INJURY!**



Follow recommended precautions and safe operating practices.

UNDERSTAND SIGNAL WORDS

A signal word – **DANGER**, **WARNING**, or **CAUTION** – is used with the safety alert symbol. **NOTICE**, which is not related to personal injury, is used without a symbol.

DANGER: Indicates a hazardous situation which, if not avoided, will result in death or serious injury.

WARNING: Indicates a hazardous situation which, if not avoided, could result in death or serious injury.

CAUTION: Indicates a hazardous situation which, if not avoided, could result in minor or moderate injury.

NOTICE: Indicates a situation which, if not avoided, could result in property damage.

DANGER

WARNING

CAUTION

NOTICE

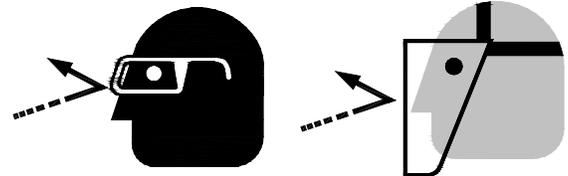


SAVE THESE INSTRUCTIONS.
Refer to them often and use them to instruct others.



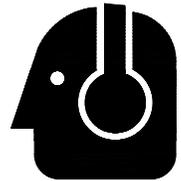
PROTECT EYES

Wear safety glasses or suitable eye protection when working on or around machinery.



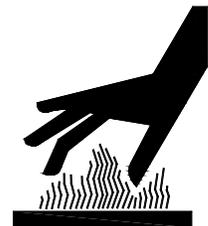
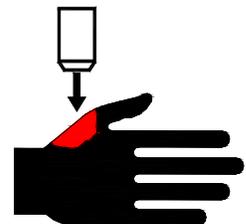
PROTECT AGAINST NOISE

Prolonged exposure to loud noise can cause impairment or loss of hearing. Wear suitable hearing protective devices such as ear muffs or earplugs to protect against objectionable or uncomfortable loud noises.



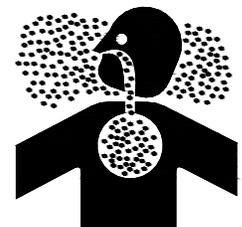
PROTECT SKIN

Keep hands and body protected from the weld arc and hot sparks. The heat from the weld arc is very intense and can pierce the skin resulting in serious burns. Always wear gloves and suitable clothing. **DO NOT** touch hot workpiece without gloves.



FUMES AND GASES

The welding process produces fumes and gases that can be hazardous to your health. If the area is not properly ventilated to remove them, use an air supplied respirator.





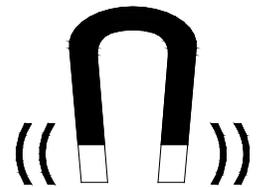
ELECTRICAL SHOCK CAN KILL

The welding arc process uses and produces high voltages that can **severely injure or kill**. Disconnect power source before performing service or repairs. Insulate yourself from the workpiece or other components in the weld circuit.



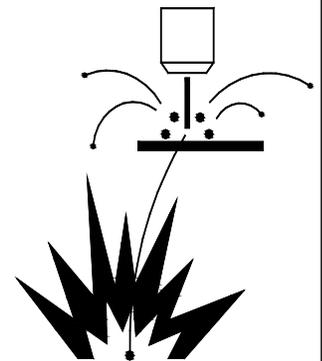
ELECTRICAL AND MAGNETIC FIELDS

Electric current and magnetic fields (EMF). These magnetic fields can influence pacemakers, medical implant, sensitive electronic equipment, and loose metallic objects. Persons with a pacemaker or medical implant must stay back at least 12 inches (30cm). Prolonged exposure to EMF may have other health effects which are not yet known.



WELDING SPARKS

A spark or piece of hot metal can fly out of the arc while welding. Remove all flammable materials from the welding area. Wear approved eye protection, and proper hand and body protection.



HIGH VOLTAGE

USE CAUTION IN HIGH VOLTAGE AREAS. DO NOT assume the power to be off.
FOLLOW PROPER LOCKOUT PROCEDURES.



Hazard



Arc Flash Hazard



Heat/Hot Surface



SAFETY PRECAUTIONS



Metal working can be dangerous if safe and proper operating procedures are not followed. As with all machinery, there are certain hazards involved with the operation of the product. Using the machine with respect and caution will considerably lessen the possibility of personal injury. However, if normal safety precautions are overlooked or ignored, personal injury to the operator may result.

Safety equipment such as guards, hold-downs, safety glasses, dust masks and hearing protection can reduce your potential for injury. But even the best guard will not make up for poor judgment, carelessness or inattention. **Always use common sense** and exercise **caution** in the workshop. If a procedure feels dangerous, don't try it.

REMEMBER: Your personal safety is your responsibility.



WARNING: FAILURE TO FOLLOW THESE RULES MAY RESULT IN SERIOUS PERSONAL INJURY

Dear Valued Customer:

- All Baileigh machines should be used only for their intended use.
- Baileigh does not recommend or endorse making any modifications or alterations to a Baileigh machine. Modifications or alterations to a machine may pose a substantial risk of injury to the operator or others and may do substantial damage to the machine.
- Any modifications or alterations to a Baileigh machine will invalidate the machine's warranty.

PLEASE ENJOY YOUR BAILEIGH MACHINE!PLEASE ENJOY IT SAFELY!

1. **FOR YOUR OWN SAFETY, READ INSTRUCTION MANUAL BEFORE OPERATING THE MACHINE.** Learn the machine's application and limitations as well as the specific hazards.
2. **Only trained and qualified personnel can operate this machine.**
3. **Make sure guards are in place and in proper working order before operating machinery.**
4. **Remove any adjusting tools.** Before operating the machine, make sure any adjusting tools have been removed.
5. **Dressing material edges.** Always chamfer and deburr all sharp edges.
6. **Do not force tool.** Your machine will do a better and safer job if used as intended. **DO NOT** use inappropriate attachments in an attempt to exceed the machine's rated capacity.
7. **Use the right tool for the job. DO NOT** attempt to force a small tool or attachment to do the work of a large industrial tool. **DO NOT** use a tool for a purpose for which it was not intended.



8. **Dress appropriately.** **DO NOT** wear loose fitting clothing or jewelry as they can be caught in moving machine parts. Protective clothing and steel toe shoes are recommended when using machinery. Wear a restrictive hair covering to contain long hair.
9. **Use eye and ear protection.** Always wear ISO approved impact safety goggles. Wear a full-face shield if you are producing metal filings.
10. **Do not overreach.** Maintain proper footing and balance at all times. **DO NOT** reach over or across a running machine.
11. **Stay alert.** Watch what you are doing and use common sense. **DO NOT** operate any tool or machine when you are tired.
12. **Check for damaged parts.** Before using any tool or machine, carefully check any part that appears damaged. Check for alignment and binding of moving parts that may affect proper machine operation.
13. **Keep work area clean.** Cluttered areas invite injuries.
14. **Observe work area conditions.** **DO NOT** use machines or power tools in damp or wet locations. Do not expose to rain. Keep work area well lit. **DO NOT** use electrically powered tools in the presence of flammable gases or liquids.
15. **Keep children away.** Children must never be allowed in the work area. **DO NOT** let them handle machines, tools, or extension cords.
16. Keep visitors a safe distance from the work area.
17. **Store idle equipment.** When not in use, tools must be stored in a dry location to inhibit rust. Always lock up tools and keep them out of reach of children.
18. **DO NOT operate machine if under the influence of alcohol or drugs.** Read warning labels on prescriptions. If there is any doubt, **DO NOT** operate the machine.
19. **Sparks and hot material** from welding can easily go through small cracks and openings into adjacent areas.
20. **Do not** weld where the atmosphere might contain flammable dust, gas, or liquid vapors such as from gasoline.
21. Wear oil-free protective garments such as leather gloves, heavy shirt, high shoes or boots, cuffless trousers, and a cap.
22. Watch for fire and keep a fire extinguisher close by.
23. **Turn off** power before checking, cleaning, or replacing any parts.
24. Be sure **all** equipment is properly installed and grounded according to national, state, and local codes.
25. Keep **all** cords dry, free from grease and oil, and protected from sparks and hot metal.
26. Inspect power and control cables periodically. Replace if damaged or bare wires are exposed. **Bare wiring can kill!** **DO NOT** touch live electrical components or parts.



TECHNICAL SPECIFICATIONS

Input Power	120VAC	230VAC
Frequency	50/60Hz	50/60Hz
Rated Input Current	20A	28A
Rated Input Capacitance	6.9KVA	8.3KVA
No-Load Voltage	54V	54V
Rated Working Voltage	18.5V	22V
MIG Welding Current	30 ~ 90A	30 ~ 160A
Rated Duty Cycle	40%	20%
Welding Current (10min)	40% @ 90A	20% @ 160A
10min/100%	57A	72A
Efficiency	η85%	
Power Factor	0.75 Cosφ	
Insulation Class	H	
Enclosure Protection	IP21S	
Cooling Type	Fan cooled	
Dimension L x W x H	17.32" x 7.68" x 11.02" (44 x 19.5 x 28cm)	
Weight	21.6lbs (9.8kg)	

TECHNICAL SUPPORT

Our technical support department can be reached at 920.684.4990, and asking for the support desk for purchased machines. Tech Support handles questions on machine setup, schematics, warranty issues, and individual parts needs: (other than die sets and blades).

For specific application needs or future machine purchases contact the Sales Department at: sales@baileigh.com, Phone: 920.684.4990, or Fax: 920.684.3944.



Note: The photos and illustrations used in this manual are representative only and may not depict the actual color, labeling or accessories and may be intended to illustrate technique only.



Note: The specifications and dimensions presented here are subject to change without prior notice due to improvements of our products.



UNPACKING AND CHECKING CONTENTS

Your Baileigh machine is shipped complete. Separate all parts from the packing material and check each item carefully. Make certain all items are accounted for before discarding any packing material.



WARNING: SUFFOCATION HAZARD! Immediately discard any plastic bags and packing materials to eliminate choking and suffocation hazards to children and animals.

If any parts are missing, **DO NOT** place the machine into service until the missing parts are obtained and installed correctly.

Remove cartons, bags or Styrofoam containing the welder and accessories. Check the contents with the packing list below.

Item	Qty.
DC Inverter MIG Welder	1 unit
Gas hose ϕ 5.5	3m
Gas regulator	1pcs
Operator's Manual	1pcs

After unpacking unit, inspect carefully for any damage that may have occurred during transit. Check for loose, missing, or damaged parts. Shipping damage claim must be filed with carrier.



INSTALLATION

IMPORTANT:

Consider the following when looking for a suitable location to place the machine:

- Overall weight of the machine.
- Weight of material being processed.
- Sizes of material to be processed through the machine.
- Space needed for auxiliary stands, work tables, or other machinery.
- Clearance from walls and other obstacles.
- Maintain an adequate working area around the machine for safety.
- Have the work area well illuminated with proper lighting.
- Keep the floor free of oil and make sure it is not slippery.
- Remove scrap and waste materials regularly, and make sure the work area is free from obstructing objects.
- If long lengths of material are to be fed into the machine, make sure that they will not extend into any aisles.
- **WORKING CLEARANCES:** Take into consideration the size of the material to be processed. Make sure that you allow enough space for you to operate the machine freely.
- **POWER SUPPLY PLACEMENT:** The power supply should be located close enough to the machine so that the power cord is not in an area where it would cause a tripping hazard. Be sure to observe all electrical codes if installing new circuits and/or outlets.

DESCRIPTION

The BW-160M series is a DC inverter MIG welder. This unit uses 1-Phase 120/230V, 50/60HZ AC power. It is recommended to use a proper sized time delay fuse or circuit breaker. The BW-160M series is ideal for Do-It-Yourself projects or for light maintenance. MIG weld carbon steel, stainless steel.





Know the Welder



- **POWER INDICATOR;** When the machine is turned on, the power indicator will be on.
- **ALARM INDICATOR;** When the thermal indicator is on, it shows the machine is overloaded and the internal temperature is too high. Weld output will turn off automatically, but the fan will continue to run. When the internal temperature is decreased, the overload light will turn off and the machine will be ready to weld.
- **WELDING VOLTAGE;** Set output voltage and wire speed. Refer to the “set up” chart inside the wire feed compartment.
- **WIRE SPEED ADJUST;** Adjusts the wire feeding/amperage speed.
- **MIG GUN;** The welding wire is driven through the welding cable and MIG gun to the work piece. It is attached to the drive system.
- **POWER SWITCH;** In the “OFF” position no power is being supplied. In the “ON” position power is supplied to the main transformer and control circuit.
- **POWER CORD;** The power cord connects the welder to the 120/230-volt power supply. Use a proper sized receptacle to supply power to the welder.
- **GROUNDING CABLE WITH CLAMP;** Use earth clamp to connect earth cable with work piece.



ELECTRICAL

 **CAUTION:** HAVE ELECTRICAL UTILITIES CONNECTED TO MACHINE BY A CERTIFIED ELECTRICIAN!
Check if the available power supply is the same as listed on the machine nameplate.

 **WARNING:** Make sure the grounding wire (green) is properly connected to avoid electric shock. DO NOT switch the position of the green grounding wire if any electrical plug wires are switched during hookup.

Power Specifications

Your machine is wired for 120/230 volts, 50/60hz alternating current. Before connecting the machine to the power source, make sure the power source is OFF.

Before switching on the power, you must check the voltage and frequency of the power to see if they meet with the requirement, the allowed range for the voltage is $\pm 5\%$, and for the frequency is $\pm 1\%$.

Considerations

- Observe local electrical codes when connecting the machine.
- The circuit should be protected with a time delay fuse or circuit breaker with an amperage rating slightly higher than the full load current of machine.
- A separate electrical circuit should be used for your machines. Before connecting the motor to the power line, make sure the switch is in the "OFF" position and be sure that the electric current is of the same characteristics as indicated on the machine.
- All line connections should make good contact. Running on low voltage will damage the motor.
- In the event of a malfunction or breakdown, grounding provides a path of least resistance for electric current to reduce the risk of electric shock. This machine is equipped with an electric cord having an equipment-grounding conductor and a grounding plug. The plug must be plugged into a matching outlet that is properly installed and grounded in accordance with all local codes and ordinances.

 **WARNING:** In all cases, make certain the receptacle in question is properly grounded. If you are not sure, have a qualified electrician check the receptacle.



- Improper connection of the equipment-grounding conductor can result in risk of electric shock. The conductor with insulation having an outer surface that is green with or without yellow stripes is the equipment-grounding conductor. If repair or replacement of the electric cord or plug is necessary, do not connect the equipment-grounding conductor to a live terminal.
- Check with a qualified electrician or service personnel if the grounding instructions are not completely understood, or if in doubt as to whether the machine is properly grounded.
- Repair or replace damaged or worn cord immediately.

Extension Cord Safety

Extension cord should be in good condition and meet the minimum wire gauge requirements listed below:

AMP RATING	LENGTH		
	25ft	50ft	100ft
1-12	16	16	14
13-16	14	12	12
17-20	12	12	10
21-30	10	10	No
WIRE GAUGE			

An undersized cord decreases line voltage, causing loss of power and overheating. All cords should use a ground wire and plug pin. Replace any damaged cords immediately.

Power cord connection:

1. Turn the main disconnect switch on the control panel to the OFF position.
2. Unwrap the power cord and route the cord away from the machine toward the power supply. It is recommended to use a 16-amp time delay fuse or circuit breaker.
 - a. Route the power cord so that it will NOT become entangled in the machine in any way.
 - b. Route the cord to the power supply in a way that does NOT create a trip hazard.
3. Connect the power cord to the power supply and check that the power cord has not been damaged during installation.
4. When the machine is clear of any obstruction. The main power switch may be turn ON to test the operation. Turn the switch OFF when the machine is not in operation.



WORK PIECE SET UP

Welding positions

There are two basic positions, for welding: Flat and Horizontal. Flat welding is generally easier, faster, and allows for better penetration. If possible, the work piece should be positioned so that the bead will run on a flat surface.

Preparing the Joint

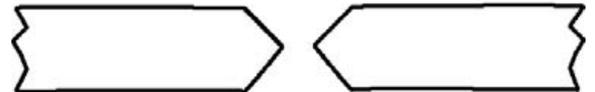
Before welding, the surface of the work piece needs to be free of dirt, rust, scale, oil or paint. If it is dirty it will create brittle and porous weld.

If the base metal pieces to be joined are thick or heavy, it may be necessary to bevel the edges with a metal grinder. The correct bevel should be around 60 degrees.

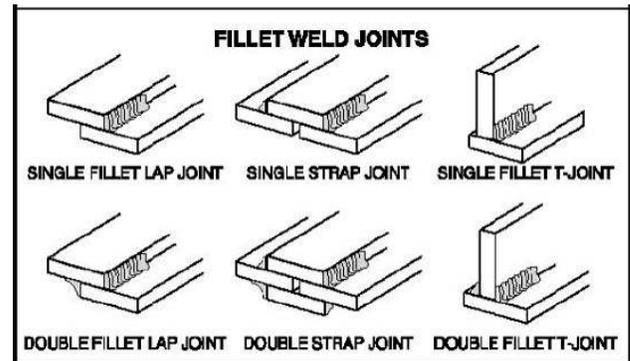
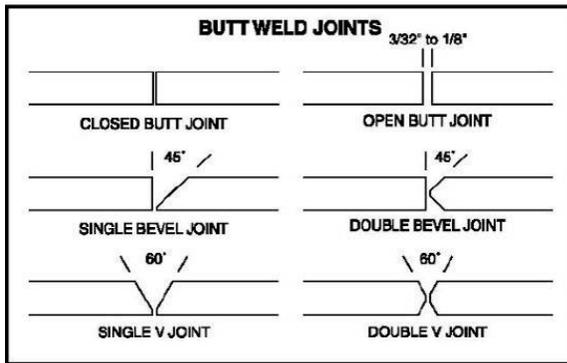
INCORRECT



CORRECT



Based on different welding position, there are different welding joint, see following images for more information:



Ground Clamp Connection

Clear any dirt, rust, scale, oil or paint on the ground clamp. Make certain you have a good solid ground connection. A poor connection at the ground clamp will waste power and heat. Make sure the ground clamp touches the metal.



Setting the Wire Tension

⚠ WARNING: Arc flash can injure eyes! To reduce the risk of arc flash, make certain that the wire coming out of the end of the torch does not come in contact with work piece, ground clamp or any grounded material during the drive tension setting process or arcing will occur.

1. Press the trigger on the torch.
2. Turn the drive tension adjustment knob clockwise, increasing the drive tension until the wire seems to feed smoothly without slipping.

Gas Installation

⚠ WARNING: Shielding gas cylinders and high-pressure cylinders can explode. if damaged, so treat them carefully.

- Never expose cylinders to high heat, sparks, open flames, mechanical shocks or arcs.
- Do not touch cylinder with MIG gun.
- Do not weld on the cylinder.
- Always secure cylinder upright to a cart or stationary object.
- Keep cylinders away from welding or electrical circuits.
- Use the proper regulators, gas hose and fittings for the specific application.

When MIG (solid) wires are used, the shielding gas is required.

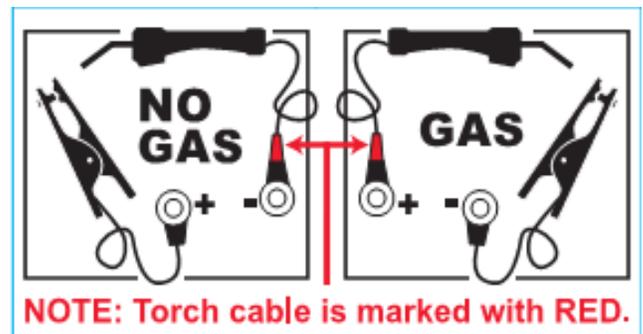
Polarity Changing

The factory polarity setting is for flux core welding (no shielding gas is required).

At this mode, the MIG gun lead is connect to “-” (negative) polarity and ground cable end is to “+” (positive).

If MIG welding with shielding gas the MIG gun lead is to “+”, and ground cable is connected to “-”.

Secure leads tight with fasteners. See the illustrations.





Gas Hose, Regulator And Gas Cylinder Connection

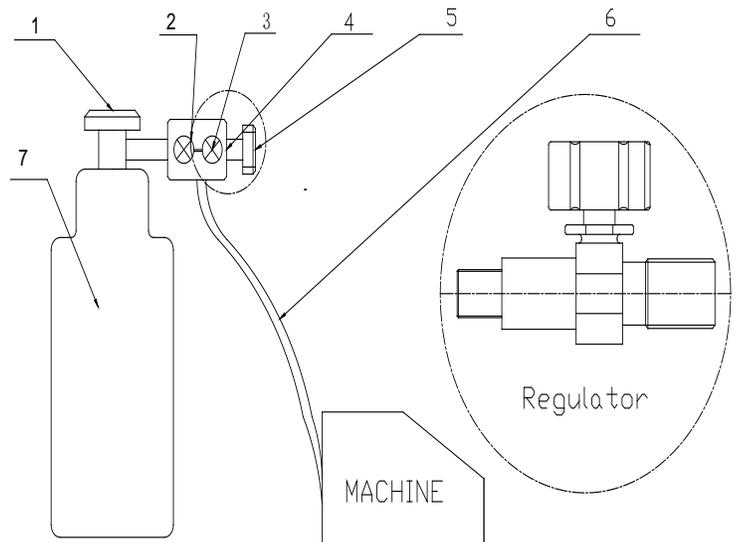
Attach one end of the gas hose to the gas solenoid valve (gas inlet) located on the back panel of the welder. Attach the other end to the gas regulator which is attached to the shielding gas cylinder. See illustration.

1	Cylinder valve: Controls GAS CYLINDER gas flow.
2	Cylinder pressure gauge
3	Gas flow gauge, set at 20 CFM
4	Regulator
5	Adjustment knob controls gas pressure to the welder.
6	Gas hose
7	Gas cylinder



Note: Slowly open the cylinder valve by turning it counterclockwise until the cylinder pressure gauge registers on the first gauge of the regulator. Turn the adjustment knob clockwise (right) slowly to increase gas flow to 20 cfm.

To reduce the gas flow turn the adjustment counterclockwise (left). The gas valve is located on the back panel of the welder and activated by the trigger. Gas flow should be heard when the trigger is activated. No gas flow will result in a harsh arc with excessive spatter, a smooth weld bead will be difficult to obtain. Avoid unnecessary gas loss by closing the tank valve when finished welding.



Gas Selection

Different materials require different shielding gas when MIG welding, refer to the set up chart inside the wire feed compartment.

- Mild steel: Use 75% Argon and 25% CO₂ for reduced spatter and reduced penetration for thinner materials. Do NOT USE Argon gas concentrations higher than 75% on steel. The result will be extremely poor penetration, porosity, and brittleness of weld.
- Mild Steel: Use CO₂ for deeper penetration but increased spatter.
- Stainless steel: Use a mixed gas consisting of Helium, Argon and CO₂.



OPERATION

 **WARNING:** High voltage danger from power source! Consult a qualified electrician for proper installation of receptacle at the power source. This welder must be grounded while in use to protect the operator from electrical shock. If you are not sure if your outlet is properly grounded, have it checked by a qualified electrician. Do not cut off the grounding prong or alter the plug in any way and do not use any adapters between the welder's power cord and the power source receptacle. Make sure the POWER switch is OFF before connecting your welder's power cord to a properly grounded 120/230VAC, 50/60Hz, single phase, proper sized power source.

 **CAUTION:** Always wear proper eye protection with side shields, safety footwear, and leather gloves to protect from burrs and sharp edges. When handling large heavy materials make sure they are properly supported.

Main Control Component

- Power switch - The power switch supplies electrical current to the welder. Whenever the power switch is in the ON position, the welding circuit is activated. **ALWAYS** turn the power switch to the OFF position and unplug the welder before performing any maintenance.
- Voltage selector - The voltage selector controls the welding heat. This unit has infinite voltage control. Refer to the label inside the welder side door for recommended voltage selector settings for your welding job.
- Wire speed control - The wire speed control adjusts the speed at which the wire is fed out of the welding torch. The wire speed needs to be closely matched (tuned-in) to the rate at which it is being melted off. Some things that affect wire speed selection are the type and diameter of the wire being used, the heat setting selected, and the welding position to be used.



Note: *The wire will feed faster without an arc. When an arc is being drawn, the wire speed will slow down.*

Hold The Torch

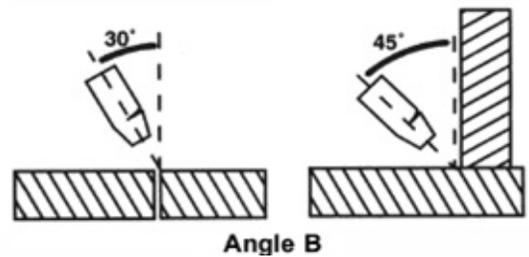
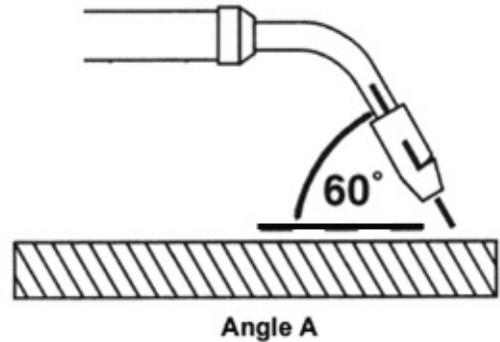
The best way to hold the welding torch is the way that feels most comfortable to you. While practicing to use the welder, experiment holding the torch in different positions until you find the one that seems to work best for you.



Position The Torch To The Work Piece

There are two angles of the torch nozzle in relation to the work piece that must be considered when welding.

- Angle A can be varied, but in most cases the optimum angle will be 60 degrees, the point at which the torch handle is parallel to the work piece. If angle A is increased, penetration will increase. If angle A is decreased, penetration will decrease also.
- Angle B can be varied for two reasons: to improve the ability to see the arc in relation to the weld puddle and to direct the force of the arc.



Distance From The Work Piece

If the nozzle is held off the work piece, the distance between the nozzle and the work piece should be kept constant and should not exceed 1/4 inch or the arc may begin sputtering, signaling a loss in welding performance.

Tuning In The Wire Speed

This is one of the most important parts of MIG welder operation and must be done before starting each welding job or whenever any of the following variables are changed: heat setting, wire diameter, or wire type.



WARNING: EXPOSURE TO A WELDING ARC IS EXTREMELY HARMFUL TO THE EYES AND SKIN!

Prolonged exposure to the welding arc can cause blindness and burns. Never strike an arc or begin welding until you are adequately protected. Wear flameproof welding gloves, a heavy long-sleeved shirt, trousers with no cuffs, high topped shoes, and an ANSI approved welding helmet.



1. Connect the Ground Clamp to a scrap piece of the same type of material which you will be welding. It should be equal to or greater than the thickness of the actual work piece, and free of oil, paint, rust, etc.
2. Select a heat setting. Refer to set up chart.
3. Hold the torch in one hand, allowing the nozzle to rest on the edge of the work piece farthest away from you, and at an angle similar to that which will be used when welding. (See HOLDING THE TORCH if you are uncertain of the angle at which you will be welding).
4. With your free hand, turn the Wire Speed Dial to maximum and continue to hold onto the knob.
5. Lower your welding helmet and pull the trigger on the torch to start an arc, then begin to drag the torch toward you while simultaneously turning the Wire Speed Dial counter-clockwise.
6. **LISTEN!** As you decrease the wire speed, the sound that the arc makes will change from a sputtering to a high-pitched buzzing sound and then will begin sputtering again if you decrease the wire speed too much. The point on the wire speed adjustment where the high-pitched buzzing sound is achieved is the correct setting.

You can use the wire speed control to slightly increase or decrease the heat and penetration for a given heat setting by selecting higher or lower wire speed settings.

Repeat this tune-in procedure if you select a new heat setting, a different diameter wire, or a different type of welding wire.

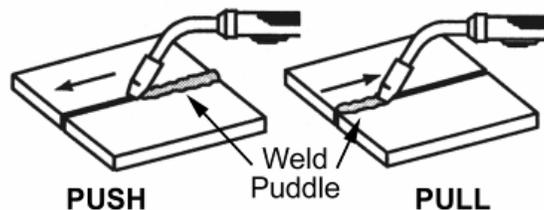
Welding Techniques



WARNING: EXPOSURE TO A WELDING ARC IS EXTREMELY HARMFUL TO THE EYES AND SKIN! Prolonged exposure to the welding arc can cause blindness and burns. Never strike an arc or begin welding until you are adequately protected. Wear flameproof welding gloves, a heavy long-sleeved shirt, trousers without cuffs, high topped shoes and an ANSI approved welding helmet. **ELECTRIC SHOCK CAN KILL!** To prevent ELECTRIC SHOCK, do not perform any welding while standing, kneeling, or lying directly on the grounded work.

Moving the torch

Torch travel refers to the movement of the torch along the weld joint and is broken into two elements: Direction and Speed. A solid weld bead requires that the welding torch be moved steadily and at the right speed along the weld joint. Moving the torch too fast, too slow, or erratically will prevent proper fusion or create a lumpy, uneven bead.





Travel direction is the direction the torch is moved along the weld joint in relation to the weld puddle. The torch is either PUSHED into the weld puddle or PULLED away from the weld puddle.

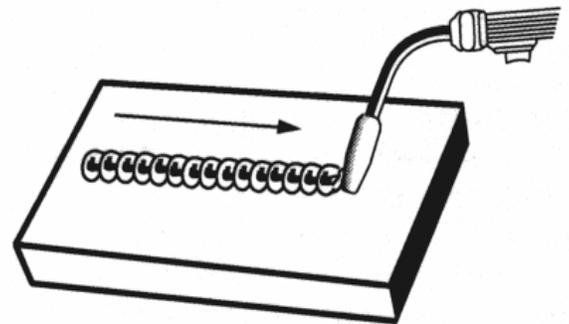
For most welding jobs you will pull the torch along the weld joint to take advantage of the greater weld puddle visibility.

Travel speed is the rate at which the torch is being pushed or pulled along the weld joint. For a fixed heat setting, the faster the travel speed, the lower the penetration and the lower and narrower the finished weld bead. Likewise, the slower the travel speed, the deeper the penetration and the higher and wider the finished weld bead.

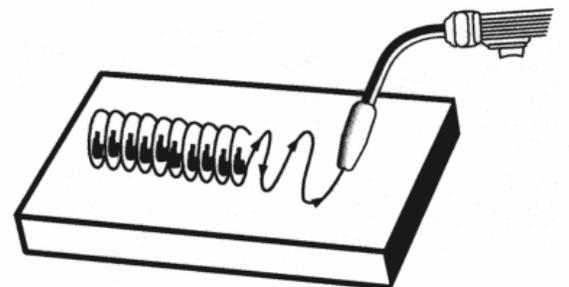
Types of welding beads

As you become more familiar with your new welder and better at laying some simple weld beads, you can begin to try some different weld bead types.

The STRINGER BEAD Is formed by traveling with the torch in a straight line while keeping the wire and nozzle centered over the weld joint (See following figure)



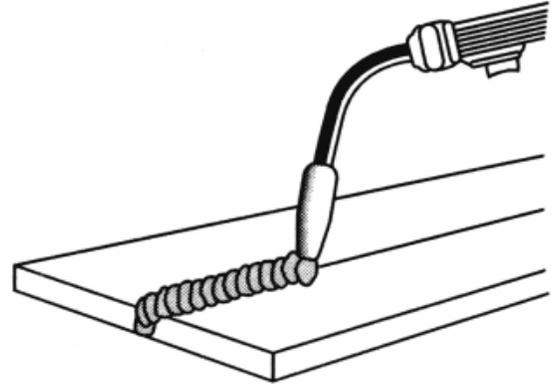
The WEAVE BEAD Is used when you want to deposit metal over a wider space than would be possible with a stringer bead. It is made by weaving from side to side while moving with the torch. It is best to hesitate momentarily at each side before weaving back the other way.





Welding position

FLAT POSITION Is easiest of the welding positions and is most commonly used. It is best if you can weld in the flat position if at all possible as good results are easier to achieve.

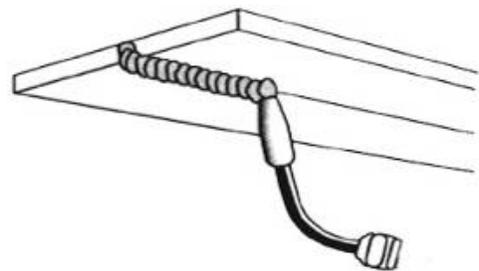


HORIZONTAL POSITION Is performed very much the same as the flat weld except that angle B (see **HOLDING THE TORCH**) is such that the wire is directed more toward the metal above the weld joint. This is to help prevent the weld puddle from running downward while still allowing slow enough travel speed. A good starting point for angle B is about 30 degrees **DOWN** from being perpendicular to the work piece.



VERTICAL POSITION Is easier for many people to Pull the torch from top to bottom. It can be difficult to prevent the puddle from running downward. Pushing the torch from bottom to top may provide better puddle control and allow slower rates of travel speed to achieve deeper penetration. When vertical welding, angle B (see **HOLDING THE TORCH**) is usually always kept at zero, but angle A will generally range from 45 to 60 degrees to provide better puddle control.

OVERHEAD POSITION Is the most difficult welding position. Angle A (see **HOLDING THE TORCH**) should be maintained at 60 degrees. Maintaining this angle will reduce the chances of molten metal falling into the nozzle. Angle B should be held at zero degrees so that the wire is aiming directly into the weld joint. If you experience excessive dripping of the weld puddle, select a lower heat setting. Also, the weave bead tends to work better than the stringer.





Multiple Pass Welding

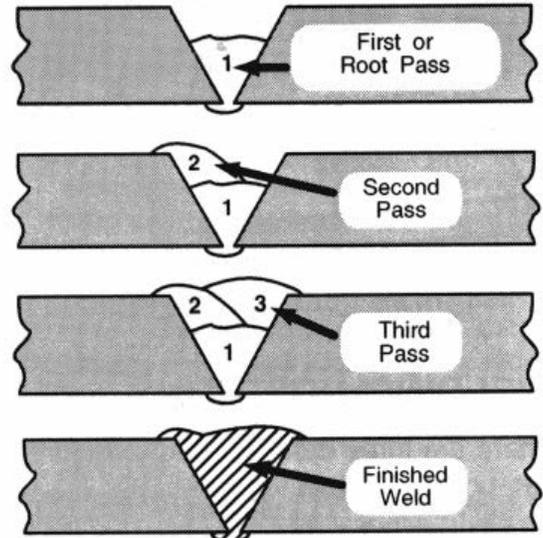
Butt Weld Joints When butt welding thicker materials you will need to prepare the edges of the material to be joined by grinding a bevel on the edge of one or both pieces of the metal being joined. When this is done, a “V” is created between the two pieces of metal that will have to be welded closed. In most cases more than one pass or bead will need to be laid into the joint to close the “V”.

Laying more than one bead into the same weld joint is known as a multiple-pass weld.

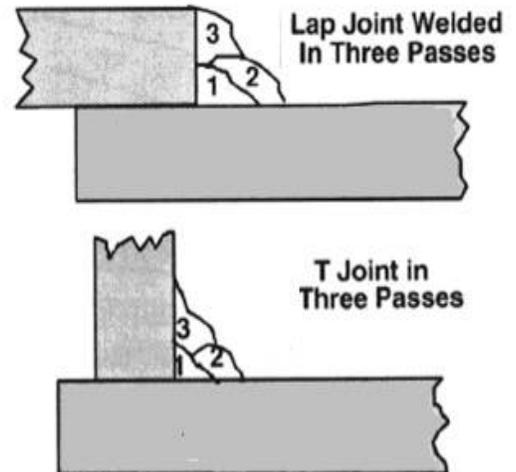
The illustrations in following figure show the sequence for laying multiple pass beads into a single “V” butt joint.



Note: WHEN USING SELF-SHIELDING FLUX-CORE WIRE it is very important to thoroughly chip and brush the slag off each completed weld bead before making another pass or the next pass will be of poor quality.

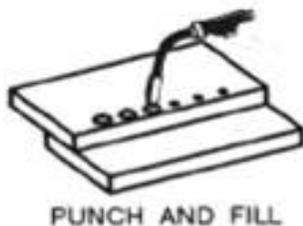


Fillet Weld Joints. Most fillet weld joints, on metals of moderate to heavy thickness, will require multiple pass welds to produce strong joint. The illustrations show the sequence of laying multiple pass beads into a T fillet joint and a lap fillet joint.



Spot Welding

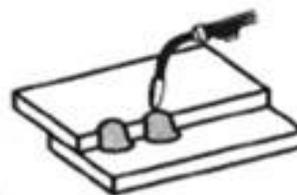
There are three methods of spot welding: Burn-Through, Punch and Fill, and Lap. Each has advantages and disadvantages depending on the specific application as well as personal preference.



PUNCH AND FILL



BURN THROUGH



LAP SPOT



- The PUNCH AND FILL METHOD produces a weld with the most finished appearance of the three spot weld methods. In this method, a hole is punched or drilled into the top piece of metal and the arc is directed through the hole to penetrate into the bottom piece. The puddle is allowed to fill up the hole leaving a spot weld that is smooth and flush with the surface of the top piece. Select the wire diameter, heat setting, and tune in the wire speed as if you were welding the same thickness material with a continuous bead.
- The BURN-THROUGH METHOD welds two overlapped pieces of metal together by burning through the top piece and into the bottom piece. With the burn-through method, larger wire diameters tend to work better than smaller diameters. Wire diameters that tend to work best, with the burn-through method are 0.035 inch self-shielding flux-core wire. Do not use .030 inch self-shielding flux core wires when using the burn-through method unless the metal is VERY thin or excessive filler metal build-up and minimal penetration is acceptable. Always select the HIGH heat setting with the burn-through method and tune in the wire speed prior to making a spot weld.
- The LAP SPOT METHOD directs the welding arc to penetrate the bottom and top pieces, at the same time, right along each side of the lap joint seam. Select the wire diameter, heat setting, and tune in the wire speed as if you were welding the same thickness material with a continuous bead.

Spot Welding Instructions

1. Select the wire diameter and heat setting recommended above for the method of spot welding you intend to use.
2. Tune in the wire speed as if you were going to make a continuous weld.
3. Hold the nozzle piece completely perpendicular to and about 1/4 inch off the work piece.
4. Pull the trigger on the torch and release it when it appears that the desired penetration has been achieved.
5. Make practice spot welds on scrap metal, varying the length of time you hold the trigger, until a desired spot weld is made.
6. Make spot welds on the actual work piece at desired locations.



LUBRICATION AND MAINTENANCE



WARNING: Make sure the electrical disconnect is OFF before working on the machine.

Maintenance should be performed on a regular basis by qualified personnel.

Always follow proper safety precautions when working on or around any machinery.

- Check daily for any unsafe conditions and fix immediately.
- Check that all nuts and bolts are properly tightened.
- On a weekly basis clean the machine and the area around it.
- Every six months, or as necessary, remove the cover panel from the welder and air-blow any dust and dirt that may have accumulated inside the welder.
- Replace power cord, ground cable, ground clamp, or electrode assembly when damaged or worn.



Note: *Proper maintenance can increase the life expectancy of your machine.*

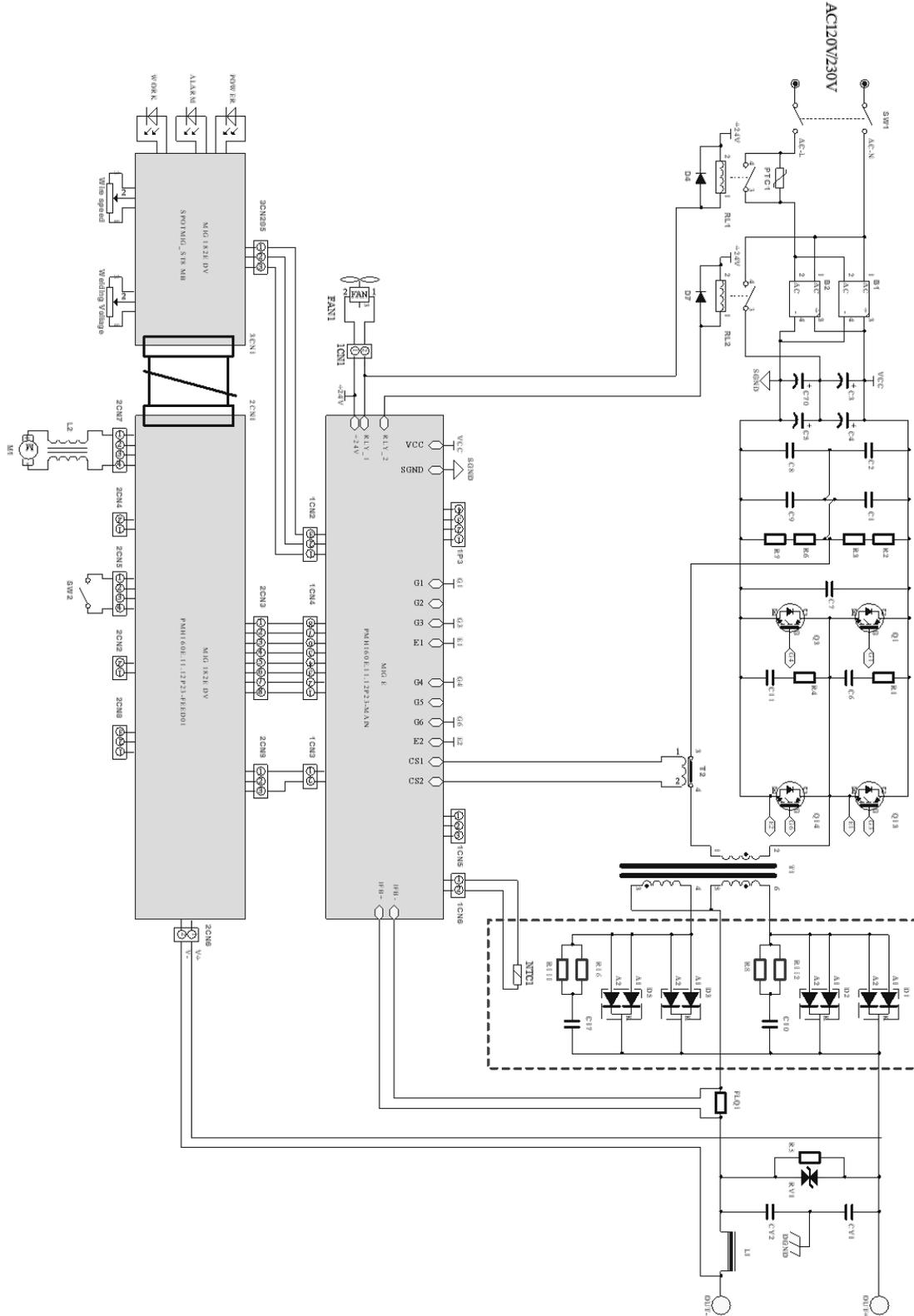
Storing Machine for Extended Period of Time

If this machine is to be inactive for a long period of time, prepare the machine as follows:

- Store in a clean dry facility free from corrosive gas, excess dust and high humidity. Temperature range from 10°F~120°F and the relative humidity not more than 90%.
- When transporting or storing the welder after use, it is recommended to repack the product as it was received for protection. (Cleaning is required before storage and you must seal the plastic bag in the box for storage.)

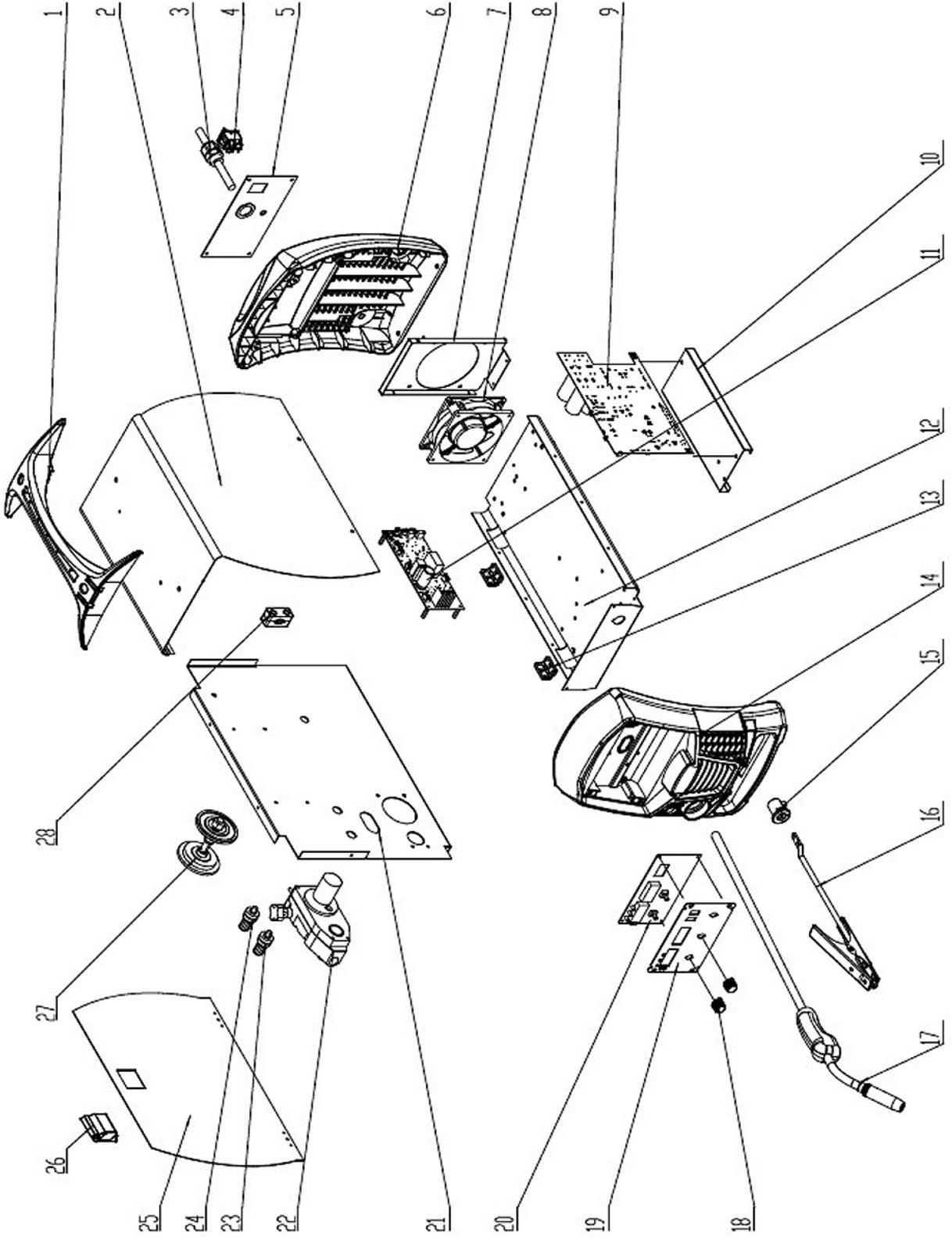


MAIN CIRCUIT CHART





SPARE PART DIAGRAM





Spare Parts List

Item	Code	Description	Qty.
1	20050080018	Handle	1
2	11010010441	Enclosure	1
3	20030320097	Power Line	1
4	20070800086	Power Switch	1
5	12010053860	Fixed Plate	1
6	20050050284	Back Panel	1
7	11020010771	Fan Plate	1
8	20070890095	Fan	1
9	11050020782	Main PC Board	1
10	11010060612	Motherboard	1
11	11050020962	Control PC Board	1
12	12010040219	Bottom	1
13	20050170009	Hinge	2
14	20050050766	Front Panel	1
15	20050050222	Cable Clamp	1
16	12080020582	Ground Cable with Clamp	1
17	20200010457	MIG Torch	1
18	20070110039	Potentiometer Knob	2
19	11020014450	Front Panel	1
20	11050070273	Front Panel PC Board	1
21	11010050027	Middle Board	1
22	20070400107	Wire Feeder	1
23	20050030020	Binding Post (Black)	1
24	20050030021	Binding Post (Red)	1
25	12010053861	Left Panel	1
26	20050050270	Wire Feeder Lock	1
27	12020160812	Spool	1
28	20050170013	Tension Disc	2



TROUBLESHOOTING



WARNING: Make sure the electrical disconnect is OFF before working on the machine.

No	Breakdown	Analysis	Solutions
1	Yellow indicator is on	Voltage is too high ($\geq 15\%$)	Switch off power source; Check the main supply; Restart welder when power recovers to normal state.
		Voltage is too low ($\leq 15\%$)	
		Bad power ventilation lead to over-heat protection	Improve the ventilation condition.
		Circumstance temperature is too high.	It will automatically recover when the temperature low down.
		Using over the rated duty-cycle.	It will automatically recover when the temperature low down.
2	Wire feeding motor does not work	Potentiometer not in the proper status	Change potentiometer
		Nozzle is blocked up	Change nozzle
		Feed roller is loose	Tighten the bolts
3	Cooling Fan Not Working or Turning Very Slowly	Switch broken	Replace the switch
		Fan broken	Replace or repair the fan
		Wire broken or falling off	Check the connection
4	Arc Is Not Stable and Splash Is Large	Too large contact tip makes the current unsteady	Change the proper contact tip or roller
		Too thin power cable makes the power astaticism	Change the power cable
		Too low input voltage	Enhance the input voltage
		Wire feeding resistance is too large	Clean or replace the liner and the torch cable had better in the line direction.
5	Arc cannot be pilot	Earth cable break	Connect earth cable
		Work piece has much greasy dirty or rusty stain	Clean greasy dirty or rusty stain
6	No shielded gas	Torch is not connected well	Connect the torch again
		Gas pipe is pressed or blocked up	Check gas system
		Gas system rubber pipe break	Connect gas system and bind firmly



NOTES

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