

**Forney** SINCE 1932

## Operating Manual

Cat. 00304 8/1/09

# FLUX CORE WIRE WELDER

95FI



**Tweco® Style Torch**  
**Infinite Wire Speed Control**  
**Multiple Power Settings**  
**Thermal Overload Protection**

Welds all types of:

- Mild (Carbon) Steel
- Stainless Steel
- Cast Iron

### **Complete & Ready to Weld**

Comes with: Operating Manual,  
Set-Up Chart, Spool of Flux Cored  
Wire, Extra Contact Tips, Chipping  
Hammer & Brush Combo &  
Welding Face Shield

**5/3/1**  
WARRANTY

#### **Ideal For:**

Do-It-Yourself, Agriculture, Maintenance & Repair, Automotive,  
Contractor, Metal Fabrication, Hobbyist and More...

# Forney 5/3/1 Limited Warranty

Effective August 1st, 2009

- 1) **Limited Warranty** – Subject to the terms and conditions below, Forney Industries, Inc., Fort Collins, Colorado, warrants to its original retail purchaser that the new Forney equipment sold after the effective date of this limited warranty is free of defects in material and workmanship at the time it is shipped by Forney. This is in lieu of all other warranties, express or implied.
- 2) **Notification:** Please call 1-800-521-6038 with your warranty questions. You can also visit [forneywelding.forneyind.com](http://forneywelding.forneyind.com) for additional information about your new welder.
- 3) **Length of Warranty:** Within the warranty periods listed below, Forney will repair or replace any warranted parts or components that fail due to defects in material or workmanship. Warranty is effective from the date of original retail purchase. Warranty duration is as follows.
  - A) **5 years:** Original main power rectifiers only to include SCRs, diodes and discrete rectifier modules, transformers, stabilizers and reactors.
  - B) **3 years:** Drive Systems, PC Boards, Motors, and Switches and Controls
  - C) **1 year:** MiG guns, relays, contactors and regulators, plasma cutting torches, and accessories.
  - D) **90 days:** Replacement parts. Does not include labor.
- 4) Forney's limited warranty shall not apply to consumables such as contact tips, cutting nozzles, felt wire cleaner, drive rollers, gas diffusers, plasma torch tips and electrodes, weld cables, tips and parts that fail due to normal wear. In addition, this warranty does not extend to any damage caused by the untimely replacement or maintenance of any of the previously listed consumable parts.
- 5) **Warrantor:**  
Forney Industries  
1830 LaPorte Avenue  
Fort Collins, CO 80521  
1-800-521-6038  
[forneywelding.forneyind.com](http://forneywelding.forneyind.com)
- 6) **Purchaser / Warranty:** The original purchaser of the Forney Industries product. The warranty is not transferable. Forney Industries products are intended for purchase and use by persons trained and experienced in the use and maintenance of welding equipment.
- 7) **What is not covered under the warranty:**
  - A) Implied warranties, including those of merchantability and fitness for a particular purpose are limited in duration to this express warranty. After this period, all risks of loss, from whatever reason, shall be on the purchaser.
  - B) Any incidental, indirect, or consequential loss, damage, or expense that may result from any defect, failure or malfunction of the Forney product.
  - C) Any failure that results from accident, purchaser's abuse, neglect or failure to operate products in accordance with instructions provided in the owner's manual(s) supplied with the product.
  - D) Pre-delivery service, i.e. assembly and adjustment.
- 8) **Claim:** In the event of a warranty claim under this warranty, the exclusive remedies shall be, at Forney Industries sole option:
  - A) Repair; or
  - B) Replacement; or
  - C) Where authorized in writing by Forney Industries, the cost of repair or replacement at an authorized Forney Industries service station; or
  - D) Payment of or credit for the purchase price less reasonable depreciation based on actual use upon the return of the goods at the customer's risk and expense.
- 9) **Purchaser will:**
  - A) Contact Forney's customer service at 1-800-521-6038 within 30 days of the defect or failure.
  - B) Provide dated proof of purchase (typically a purchase receipt).
  - C) Provide the serial number. Registering your welder at [forneywelding.forneyind.com](http://forneywelding.forneyind.com) will speed up this process.
  - D) Deliver or ship welder to a Forney authorized service center. Freight &/or packaging costs, if any, must be borne by the purchaser.

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## SAFETY SUMMARY

Every welder respects the tools with which they work. They know that the tools represent years of constantly improved designs and developments. The true craftsman also knows that tools are dangerous if misused or abused.

Reading this operator's manual before using the welder will enable you to do a better, safer job. Learn the welder's applications and limitations as well as the specific potential hazards peculiar to welding.

### IMPORTANT SAFETY INFORMATION

The following safety information is provided as guidelines to help you operate your new welder under the safest possible conditions. Any equipment that uses electrical power can be potentially dangerous to use when safety or safe handling instructions are not known or not followed. The following safety information is provided to give the user the information necessary for safe use and operation.

A procedure step preceded by a **WARNING** is an indication that the next step contains a procedure that might be injurious to a person if proper safety precautions are not heeded.

A procedure preceded by a **CAUTION** is an indication that the next step contains a procedure that might damage the equipment being used.

A **NOTE** may be used before or after a procedure step to highlight or explain something in that step.

**READ ALL SAFETY INSTRUCTIONS CAREFULLY** before attempting to install, operate, or service this welder. Failure to comply with these instructions could result in personal injury and/or property damage.

**RETAIN THESE INSTRUCTIONS FOR FUTURE REFERENCE.**

#### Note:

- The following safety alert symbols identify important safety messages in this manual.

- When you see one of the symbols shown here, be alert to the possibility of personal injury and carefully read the message that follows.



This symbol indicates that the possibility of electric shock hazard exists during the operation of the step(s) that follow.



This symbol indicates that the possibility of fire hazard exists during the operation of the step(s) that follow.



This symbol indicates that the helmet must be worn during the step(s) that follow to protect against eye damage and burns due to flash hazard.



This symbol indicates that the possibility of toxic gas hazard exists during operation of the step(s) that follow.



This symbol indicates that the possibility of being burned by hot slag exists during operation of the step(s) that follow.



This symbol indicates that the eye protection should be worn to protect against flying debris in the following step(s).

- Published standards on safety are available. They are listed in **ADDITIONAL SAFETY INFORMATION** at the end of this **SAFETY SUMMARY**.

The National Electrical Code, Occupation Safety and Health Act regulations, local industrial codes and local inspection requirements also provide a basis for equipment installation, use, and service.

## SHOCK HAZARD



### WARNING

**ELECTRIC SHOCK CAN KILL!** To reduce the risk of death or serious injury from shock, read, understand, and follow the following safety instructions. In addition, make certain that anyone else who uses this welding equipment, or who is a bystander in the welding area understands and follows these safety instructions as well.

- **IMPORTANT! TO REDUCE THE RISK OF DEATH, INJURY, OR PROPERTY DAMAGE, DO NOT ATTEMPT OPERATION** of this welding equipment until you have read and understand the following safety summary.
- Do not, in any manner, come into physical contact with any part of the welding current circuit. The welding current circuit includes:
  - a. the work piece or any conductive material in contact with it,
  - b. the ground clamp,
  - c. the electrode or welding wire,
  - d. any metal parts on the electrode holder, or wire feed gun.
- Do not weld in a damp area or come in contact with a moist or wet surface.
- Do not attempt to weld if any part of clothing or body is wet.
- Do not allow the welding equipment to come in contact with water or moisture.
- Do not drag welding cables, wire feed gun, or welder power cord through or allow them to come into contact with water or moisture.
- Do not touch welder, attempt to turn welder on or off if any part of the body or clothing is moist or if you are in physical contact with water or moisture.
- Do not attempt to plug the welder into the power source if any part of body or clothing is moist, or if you are in physical contact with water or moisture.
- Do not connect welder work piece clamp to or weld on electrical conduit.
- Do not alter power cord or power cord plug in any way.
- Do not attempt to plug the welder

into the power source if the ground prong on power cord plug is bent over, broken off, or missing.

- Do not allow the welder to be connected to the power source or attempt to weld if the welder, welding cables, welding site, or welder power cord are exposed to any form of atmospheric precipitation, or salt water spray.
- Do not carry coiled welding cables around shoulders, or any other part of the body, when they are plugged into the welder.
- Do not modify any wiring, ground connections, switches, or fuses in this welding equipment.
- Wear welding gloves to help insulate hands from welding circuit.
- Keep all liquid containers far enough away from the welder and work area so that if spilled, the liquid can not possibly come in contact with any part of the welder or electrical welding circuit.
- Replace any cracked or damaged parts that are insulated or act as insulators such as welding cables, power cord, or electrode holder **IMMEDIATELY**.

## FLASH HAZARDS



### WARNING

#### **ARC RAYS CAN INJURE EYES AND BURN SKIN!**

To reduce the risk of injury from arc rays, read, understand, and follow the following safety instructions. In addition, make certain that anyone else that uses this welding equipment, or is a bystander in the welding area understands and follows these safety instructions as well. Headshields and filter should conform to ANSI Z87.1 standards.

- Do not look at an electric arc without proper protection. A welding arc is extremely bright and intense and, with inadequate or no eye protection, the retina can be burned, leaving a permanent dark spot in the field of vision. A shield or helmet with a number 10 shade filter lens (minimum) must be used.
- Do not strike a welding arc until all bystanders and you (the welder) have welding shields and/or helmets in place.
- Do not wear a cracked or broken

helmet and replace any cracked or broken filter lenses IMMEDIATELY.

- Do not allow the uninsulated portion of the wire feed gun to touch the ground clamp or grounded work to prevent an arc flash from being created on contact.
- Provide bystanders with shields or helmets fitted with a #10 shade filter lens.
- Wear protective clothing. The intense light of the welding arc can burn the skin in much the same way as the sun, even through light-weight clothing. Wear dark clothing of heavy material. The shirt worn should be long sleeved and the collar kept buttoned to protect chest and neck.
- Protect against REFLECTED ARC RAYS. Arc rays can be reflected off shiny surfaces such as a glossy painted surface, aluminum, stainless steel, and glass. It is possible for your eyes to be injured by reflected arc rays even when wearing a protective helmet or shield. If welding with a reflective surface behind you, arc rays can bounce off the surface, then off the filter lens on the inside of your helmet or shield, then into your eyes. If a reflective background exists in your welding area, either remove it or cover it with something non-flammable and non-reflective. Reflective arc rays can also cause skin burn in addition to eye injury.

## FIRE HAZARDS



### WARNING

**FIRE OR EXPLOSION CAN CAUSE DEATH, INJURY, AND PROPERTY DAMAGE!** To reduce the risk of death, injury, or property damage from fire or explosion, read, understand, and follow the following safety instructions. In addition, make certain that anyone else that uses this welding equipment, or is a bystander in the welding area, understands and follows these safety instructions as well. **REMEMBER!** Arc welding by nature produces sparks, hot spatter, molten metal drops, hot slag, and hot metal parts that can start fires, burn skin, and damage eyes.

- Do not wear gloves or other clothing that contains oil, grease, or other flammable substances.

- Do not wear flammable hair preparations.
- Do not weld in an area until it is checked and cleared of combustible and/or flammable materials. **BE AWARE** that sparks and slag can fly 35 feet and can pass through small cracks and openings. If work and combustibles cannot be separated by a minimum of 35 feet, protect against ignition with suitable, snug-fitting, fire resistant, covers or shields.
- Do not weld on walls until checking for and removing combustibles touching the other side of the walls.
- Do not weld, cut, or perform other such work on used barrels, drums, tanks, or other containers that had contained a flammable or toxic substance. The techniques for removing flammable substance and vapors, to make a used container safe for welding or cutting, are quite complex and require special education and training.
- Do not strike an arc on a compressed gas or air cylinder or other pressure vessel. Doing so will create a brittle area that can result in a violent rupture immediately or at a later time as a result of rough handling.
- Do not weld or cut in an area where the air may contain flammable dust (such as grain dust), gas, or liquid vapors (such as gasoline).
- Do not handle hot metal, such as the work piece or electrode stubs, with bare hands.
- Wear leather gloves, heavy long sleeve shirt, cuffless trousers, high-topped shoes, helmet, and cap. As necessary, use additional protective clothing such as leather jacket or sleeves, fire resistant leggings, or apron. Hot sparks or metal can lodge in rolled up sleeves, trouser cuffs, or pockets. Sleeves and collars should be kept buttoned and pockets eliminated from the shirt front.
- Have fire extinguisher equipment handy for immediate use! A portable chemical fire extinguisher, type ABC, is recommended.
- Wear ear plugs when welding overhead to prevent spatter or slag from falling into ear.
- Make sure welding area has a good, solid, safe floor, preferably concrete or masonry, not tiled, carpeted, or made of

- any other flammable material.
- Protect flammable walls, ceilings, and floors with heat resistant covers or shields.
- Check welding area to make sure it is free of sparks, glowing metal or slag, and flames before leaving the welding area.

## FUME HAZARDS



### WARNING

#### **FUMES, GASSES, AND VAPORS CAN CAUSE DISCOMFORT, ILLNESS, AND DEATH!**

To reduce the risk of discomfort, illness, or death, read, understand, and follow the following safety instructions. In addition, make certain that anyone else that uses this welding equipment or is a bystander in the welding area, understands and follows these safety instructions as well.

- Do not weld in an area until it is checked for adequate ventilation as described in ANSI standard #Z49.1. If ventilation is not adequate to exchange all fumes and gasses generated during the welding process with fresh air, do not weld unless you (the welder) and all bystanders are wearing air-supplied respirators.
- Do not heat metals coated with, or that contain, materials that produce toxic fumes (such as galvanized steel), unless the coating is removed. Make certain the area is well ventilated, and the operator and all bystanders are wearing air-supplied respirators.
- Do not weld, cut, or heat lead, zinc, cadmium, mercury, beryllium, or similar metals without seeking professional advice and inspection of the ventilation of the welding area. These metals produce **EXTREMELY TOXIC** fumes which can cause discomfort, illness, and death.
- Do not weld or cut in areas that are near chlorinated solvents. Vapors from chlorinated hydrocarbons, such as trichloroethylene and perchloroethylene, can be decomposed by the heat of an electric arc or its ultraviolet radiation. These actions can cause **PHOSGENE**, a HIGH-

LY TOXIC gas to form, along with other lung and eye-irritating gasses. Do not weld or cut where these solvent vapors can be drawn into the work area or where the ultraviolet radiation can penetrate to areas containing even very small amounts of these vapors.

- Do not weld in a confined area unless it is being ventilated or the operator (and anyone else in the area) is wearing an air-supplied respirator.
- Stop welding if you develop momentary eye, nose, or throat irritation as this indicates inadequate ventilation. Stop work and take necessary steps to improve ventilation in the welding area. Do not resume welding if physical discomfort persists.

### WARNING

This product contains chemicals, including lead, or otherwise produces chemicals known to the State of California to cause cancer, birth defects and other reproductive harm. **Wash hands after Handling.** (California Health & Safety Code Sec. 25249.5 et seq.)

## **ADDITIONAL SAFETY INFORMATION**

For additional information concerning welding safety, refer to the following standards and comply with them as applicable.

- ANSI Standard Z49.1 – SAFETY IN WELDING AND CUTTING – obtainable from the American Welding Society, 550 NW Le Jeune Road, Miami, FL 33126 Telephone (800) 443-9353, Fax (305) 443-7559 – [www.amweld.org](http://www.amweld.org) or [www.aws.org](http://www.aws.org)
- ANSI Standard Z87.1 – SAFE PRACTICE FOR OCCUPATION AND EDUCATIONAL EYE AND FACE PROTECTION – obtainable from the American National Standards Institute, 11 West 42nd St., New York, NY 10036 Telephone (212) 642-4900, Fax (212) 398-0023 – [www.ansi.org](http://www.ansi.org)
- NFPA Standard 51B – CUTTING AND WELDING PROCESS – obtainable from the National Fire Protection Association, 1 Batterymarch Park, P.O. Box 9101, Quincy, MA 02269-9101 Telephone (617) 770-3000 Fax (617) 770-0700 – [www.nfpa.org](http://www.nfpa.org)
- OSHA Standard 29 CFR, Part 1910, Subpart Q., WELDING, CUTTING AND BRAZING – obtainable from your state OSHA office or U.S. Dept. of Labor OSHA, Office of Public Affairs, Room N3647, 200 Constitution Ave., Washington, DC 20210 – [www.osha.gov](http://www.osha.gov)
- CSA Standard W117.2 – Code for SAFETY IN WELDING AND CUTTING. – obtainable from Canadian Standards Association, 178 Rexdale Blvd., Etobicoke, Ontario M9W 1R3 – [www.csa.ca](http://www.csa.ca)
- American Welding Society Standard A6.0. WELDING AND CUTTING CONTAINERS WHICH HAVE HELD COMBUSTIBLES. – obtainable from the American Welding Society, 550 NW Le Jeune Road, Miami, FL 33126 Telephone (800) 443-9353, Fax (305) 443-7559 – [www.amweld.org](http://www.amweld.org) or [www.aws.org](http://www.aws.org)



# WELDER SPECIFICATIONS

## DESCRIPTION

Your new flux core (FCAW) wire feed welder is designed for maintenance and sheet metal fabrication. The welder consists of a single-phase power transformer, and a unique built-in control/feeder. This welder is capable of welding with 0.030 (0.8mm) and 0.035 (0.9mm) self-shielding flux-core wire. Now you can weld sheet metal from 18 gauge up to 3/16 inch thick with a single pass. You can weld 1/4 inch steel with beveling and multiple pass techniques. Table 1 lists your wire feed welder specifications.

**Table 1.** Welder Specifications

Primary (input) volts	120 VAC
Welding Range	20-95Amps
Primary (input) Amps	13
Phase	Single
Frequency	60Hz
Secondary (output) volts	21
CSA rated output amps	60
Open Circuit Volts (Max.)	27 VDC
Duty Cycle Rating	20%

## DUTY CYCLE

The duty cycle rating of a welder defines how long the operator can weld and how long the welder must be rested and cooled. Duty cycle is expressed as a percentage of 10 minutes and represents the maximum welding time allowed. The balance of the 10-minute cycle is required for cooling.

Your new welder has a duty cycle rating of 20% at the rated output. This means that you can weld for two (2) minutes out of 10 with the remaining eight (8) minutes required for cooling. (See Table 2).

**Table 2.** Duty Cycle Ratings

Duty Cycle Rating	Maximum Welding Time	Required Resting Time
20%	2 minutes	8 minutes
40%	4 minutes	6 minutes
60%	6 minutes	4 minutes
80%	8 minutes	2 minutes
100%	10 minutes	0 minutes

# INTERNAL THERMAL PROTECTION

## CAUTION

Do not constantly exceed the duty cycle or damage to the welder can result. If you exceed the duty cycle of the welder, an internal thermal protector will open, shutting off all welder functions. After cooling, the thermal protector will automatically reset and the welder will function normally again. However you should wait at least ten minutes after the thermal protector opens before resuming welding. You must do this even if the thermal protector resets itself before the ten minutes is up or you may experience less than specified duty cycle performance.

# KNOW YOUR WELDER



Figure 1. Model Cat. 00304

**Handle** – Rugged, top mounted handle allows for easy transport of your welder.

**Wire Speed Control** – Use this dial to adjust the speed at which the welder feeds wire to the gun. 1 is the slowest wire feed speed, 10 is the highest. You will need to adjust or “tune-in” your wire speed for different welding conditions (thickness of metals, metal type, wire size, etc.). When the wire speed is properly “tuned-in” the welding wire will melt into the material you are welding as quickly as it is fed through the welding gun.

**Voltage Selector** – This two position switch adjusts the voltage or “heat” of your welder. Select MIN setting for lower voltage and MAX setting for higher voltage. Different materials and material thickness will require different voltage settings. You will need to adjust your voltage accordingly for different welding conditions. By properly adjusting your voltage settings and wire feed speed, you will enable clean, precision welds. (Refer to the Suggested Settings Chart on p.29 of this manual.)

**Power Switch** – This switch turns the welder ON and OFF. (Make sure the power switch is in the OFF position before performing any maintenance on the welder.)

**Power Cord** – This is a standard, grounded 120 volt power cord. (Make sure you are using a properly grounded 120 Vac, 60Hz, single phase, 20 amp power source.)

**Ground Clamp** – Attaching the ground clamp to your work piece “completes” the welding current circuit. You must attach the ground clamp to the metal you are welding. If the ground clamp is not connected to the metal work piece you intend to weld, the welder will not have a completed circuit and you will be unable to weld. A poor connection at the ground clamp will waste power and heat. Scrape away dirt, rust, scale, oil or paint before attaching the ground clamp.

**Ground Cable** – The ground cable connects the ground clamp to the internal workings of the welder.

**Welding Gun and Cable** – The welding gun controls the delivery of the welding wire to the material to be welded. The welding wire is fed through the welding cable and welding gun when the welding gun trigger is pulled. You will need to install a contact tip and welding nozzle to the end of the welding gun, as described later in this manual, prior to welding.

**Welding Terms** -Now that you are familiar with the main parts of the welder, make note of the following terms. You will see them used throughout this manual.

**weld puddle:** The localized volume of molten metal in a weld prior to its solidification.

**weld angle:** The angle of the welding wire, as it extends from the welding gun, in relation to the item being welded.

**slag:** The protective coating that forms on the surface of molten metal.

**arc:** A sustained luminous discharge of electricity across a gap in a circuit.

**welding bead:** The extended build up of a weld, made by pushing or pulling the weld puddle.

# WELDER INSTALLATION

## POWER SOURCE CONNECTION



### 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 then connect your welder's power cord to a properly grounded 120 Vac, 60 Hz, single phase, 20 amp power source. Do not operate this welder if the source voltage is less than 105 Vac or greater than 132 Vac. Contact a qualified electrician if this problem exists. Improper performance and/or damage to the welder will result if operated on inadequate or excessive power.

## EXTENSION CORDS

For optimum welder performance, an extension cord should not be used unless absolutely necessary. If necessary, care must be taken in selecting an extension cord appropriate for use with your specific welder.

Select a properly grounded extension cord that will mate directly with the ac power source receptacle and the welder power cord without the use of adapters. Make certain that the extension cord is properly wired and in good electrical condition. Extension cords must fit the following wire size guidelines:

- 0-25 ft. requires #12 gauge
- Do not use an extension cord over 25 ft. in length.

## ASSEMBLING THE WELDER

The following procedures describe the process required to assemble, install, maintain, and prepare to weld with your new wire feed welder.

## UNPACKING THE WELDER

1. Remove any cartons or bags containing parts/accessories. (Most parts are shipped inside the welder door.)
2. Open the cartons or bags packed with your welder and inspect their contents for damage.
3. Layout the parts and compare them to the the packing list in Table 3 to familiarize yourself with the parts and what they are called. This will help you when reading the manual.

## PACKING LIST

Table 3 contains a list of the items you will find packed in the carton.

Table 3. Packing List

ITEM	QTY.
Welder	1
Face Shield	1
Face Shield Handle	1
Face Shield Handle Cover	1
Face Shield Retaining Clips	2
Shaded Lens	1
Welder Handle	1
Handle Screws	2
Handle Caps	2
Wire Brush/Hammer	1
Parts Bag	1
Spool Holder Locking Pin	1
Contact Tip .040	1
Wire .035 Fluxcore	1/2 lb.
Manual, Instruction	1

## INSTALLING THE HANDLE

1. Insert the tabs of the welder handle into the slots provided on the top of the welder.
2. Insert a large flat head screw (included in the accessories bag) into each hole on the top of the welder handle.
3. With a flat tip screwdriver, securely tighten both screws. (see Figure 3)

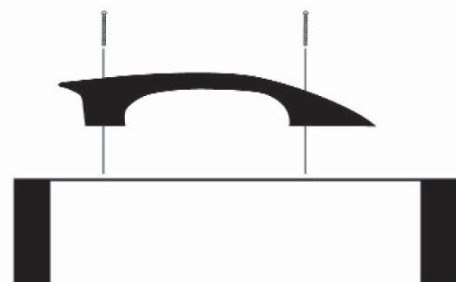


Figure 3. Handle Installation

## ASSEMBLE THE FACE SHIELD

1. Insert the upper tongue of the handle into the upper slot on the face shield.
2. Align the second tab on the handle with the second slot in the face shield by pushing the bottom of the handle in towards the face mask, while at the same time pushing upwards. (Alignment of the second tab is made easier by applying pressure to the point shown below.)
3. Once the handle tabs are properly seated in the face shield slots, install the handle cover by firmly pushing it into the recessed area on the face shield.
4. Install the dark glass by sliding it into place behind the glass retaining tabs.

Note: if your face shield was supplied with a 3" x 3.8" dark glass you may choose to remove the extra material from the face shield to allow a larger field of vision when welding. To remove the extra material, remove the glass from the face shield and carefully cut the material out of the face shield with a utility knife.

5. Once protective dark glass has been installed into face shield, secure it in place with the retaining clips. Align the holes on each of the retaining clips with the pins on the retaining tabs and firmly press into place.

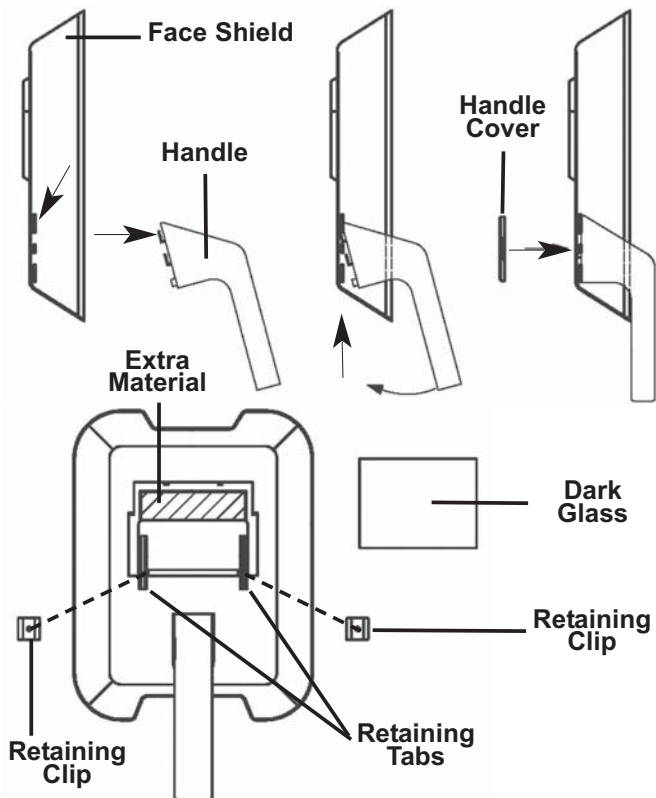


Figure 2. Face Shield Assembly

## SELECTING THE WELDING WIRE

This welder uses only four inch spools of 0.030 inch (0.8mm) or 0.035 inch (0.9mm) self shielding flux-core wire. Steel from 18 gauge up to 3/16 inch thick can be welded with this wire.

### NOTE:

- Metal thinner than 18 gauge cannot be welded with this machine. Attempting to do so will cause burn through (blowing holes) in the metal you are intending to weld.
- If a spool has developed heavy oxidation, the only solution to the problem is to discard the spool of wire.

If you have an oxidized spool of wire, do not discard it until you have unspooled a few turns of wire to see if the wire further down on the spool is in usable condition, if not, – discard the spool.

## INSTALLING THE WELDING WIRE



### WARNING

**Electric shock can kill!** Always turn the POWER switch OFF and unplug the welder's power cord from the ac power source before installing wire.

1. Remove the nozzle and contact tip from the end of the gun assembly.
2. Remove the spindle cap from spindle.
3. Unwrap the spool of wire and then find the leading end of the wire (it goes through a hole in the outer edge of the spool and is bent over the spool edge to prevent the wire from unspooling) BUT DO NOT UNHOOK IT YET.
4. Place the spool on the spindle in such a

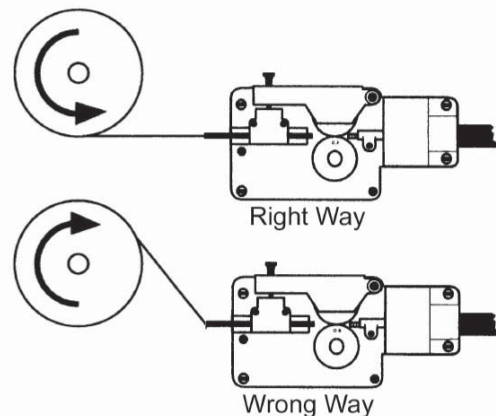


Figure 4. Wire Installation

manner that when the wire comes off the spool, it will look like the top illustration in Figure 4.

5. Insert the spool retaining tab into the spool shaft. The tab will lock into place, prohibiting the spool from coming loose during operation.
6. Use a wire cutter, cut the bent end off the leading end of the wire so that only a straight leading end remains.
7. Hold the tension arm up off the drive roller and insert the leading end of the wire into the inlet guide tube. Then push it across the drive roller and into the gun assembly about six inches.
8. Line the wire up in the outside groove of the drive roller, then allow the drive tension arm to drop onto the drive roller.
9. Tighten (turn clockwise) the tension adjusting screw until the tension roller is applying enough force on the wire to prevent it from slipping out of the drive assembly.
9. Let go of the wire.
10. Plug the welder's power cord into the ac power source. Adjust the HEAT selection switch, on the front of the welder, to either of the two heat settings.



## WARNING

### ARC RAYS CAN INJURE EYES!

To reduce the risk of arc flash, make certain that the welding wire, when it finally comes out of the end of the gun, does not touch the ground clamp or any grounded piece of metal. **IMPORTANT!** The welding wire is carrying welding current whenever the welder is turned on.

11. Pull the trigger on the welding gun to feed the wire through the gun assembly.
12. When at least an inch of wire sticks out past the end of the gun, release the trigger.
13. Install the supplied 0.040 inch (1.0mm) size contact tip.

**Note:** Due to inherent variances in flux-cored welding wire, it may be necessary to use a welding tip one size larger than your flux-core wire if jams occur.

14. Slide the contact tip over the wire (protruding from the end of the gun). Screw

the contact tip into the end of the gun and hand tighten securely.

15. Install the nozzle on the gun assembly.
16. Cut off the excess wire that extends past the end of the nozzle.



## WARNING

### ARC RAYS CAN INJURE EYES!

To reduce the risk of arc flash, make certain that the wire coming out of the end of the gun does not come in contact with the ground clamp or any grounded material during the drive tension setting process.

17. Set the wire drive tension.
  - a. Pull the trigger on the gun.
  - b. Turn the drive tension adjustment knob clockwise, increasing the drive tension until the wire seems to feed smoothly without slipping.

**Note:** If TOO MUCH tension is applied, the wire will slip on the drive roller or will not be able to feed at all. If TOO LITTLE tension is applied, the spool of wire will want to unspool itself.

When the drive tension is set correctly, there should be no slippage between the wire and the drive roller. But if an obstruction occurs along the wire feed path, the wire should then slip on the drive roller.

## OPERATION

Operation of this welder consists of selecting and adjusting operating controls for optimum voltage (welding heat) and wire speed settings.

### CONTROLS AND INDICATORS



#### WARNING

##### **ELECTRIC SHOCK CAN KILL!**

To remove the risk of electric shock, be aware that the POWER switch, when OFF, does not remove power from all internal circuitry in the welder.

The **POWER SWITCH** controls the main power to the welder and lights up when the welder is ON. When the switch is OFF, there is still power to some areas of the welder. When working inside the welder or when removing panels on the welder, make sure the welder is unplugged from the wall outlet.

The **VOLTAGE SELECTOR** allows you to select minimum and maximum heat settings. Refer to the Suggested Settings Chart on p.29 of this manual for suggestions on which heat setting to use for your welding job.

### PREPARATIONS FOR WELDING

An important factor in making a satisfactory weld is preparation. This includes studying the process and equipment and then practice welding before attempting to weld finished product. An organized, safe, convenient, comfortable, well-lighted work area should be available to the operator. The work area should specifically be free of all flammables with both a fire extinguisher and bucket of sand available.

To properly prepare for welding, it is necessary to:

- Prepare an organized, well lit work area (see Figure 5).

- Provide protection for the eyes and skin of the operator and bystanders.
- Set up the work piece and make the ground clamp connection.
- Select the electrode.
- Adjust the heat control.

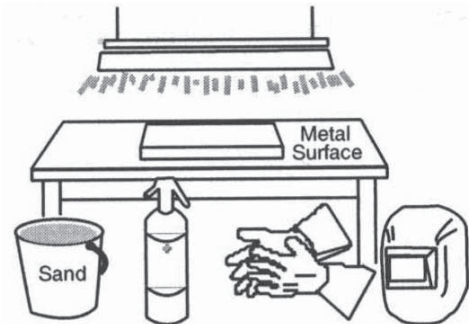


Figure 5. Work Area



#### WARNING

**Exposure to a welding arc is extremely harmful to the eyes and skin.** Prolonged exposure to a welding arc can cause blindness and burns. Never strike an arc or begin welding unless you are adequately protected. Wear flameproof welding gloves, heavy long sleeved shirt, cuffless trousers, high topped shoes and a welding helmet.

### SETTING UP THE WORK PIECE

#### Welding Positions

Welding with an ac wire welder can be done in any of three basic positions: Flat, Horizontal, and Vertical. Flat welding is generally easier, faster and allows for better penetration. The heat (amperage) selections will be affected by the positions. Vertical welding is usually only attempted when using a dc welder. If possible, the work piece should be positioned so that the bead will run on a flat surface.

#### PREPARING THE JOINT

For effective welding, the surfaces to be joined must be free of dirt, rust, scale, oil or paint. Welding on metals not properly cleaned will cause a 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, at the point of

contact, as in Figure 6. The angle of the bevel should be approximately 60 degrees.

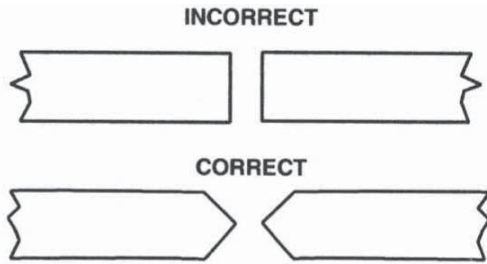


Figure 6. Edge Preparation



**WARNING**

To help prevent eye injuries when grinding, always wear goggles. The grinder must also be inspected to verify that it is in good condition.

See the chart, TYPES OF WELD JOINTS, in Figure 6, for detailed instructions for preparing the weld joint.

During the welding, the work pieces will become hot and will tend to expand. The

expansion may cause the pieces to shift from the regular position. If possible, the work pieces should be clamped into the position they are to occupy when the welding is complete.



**WARNING**

**ARC RAYS CAN INJURE EYES AND BURN SKIN!**

To reduce the risk of injury from arc rays, never strike a welding arc until you, and all bystanders in the welding area, have welding helmet or shield in place and are wearing the recommended protective clothing. DO NOT CONTINUE unless you have read, understand and intend to follow the entire SAFETY SUMMARY provided at the front of this manual.

**GROUND CLAMP CONNECTION**

The ground clamp connection is part of the current circuit. A poor connection at the ground clamp will waste power and heat. Scrape away dirt, rust, scale, oil or paint. Make sure the ground clamp touches the metal of the workpiece.

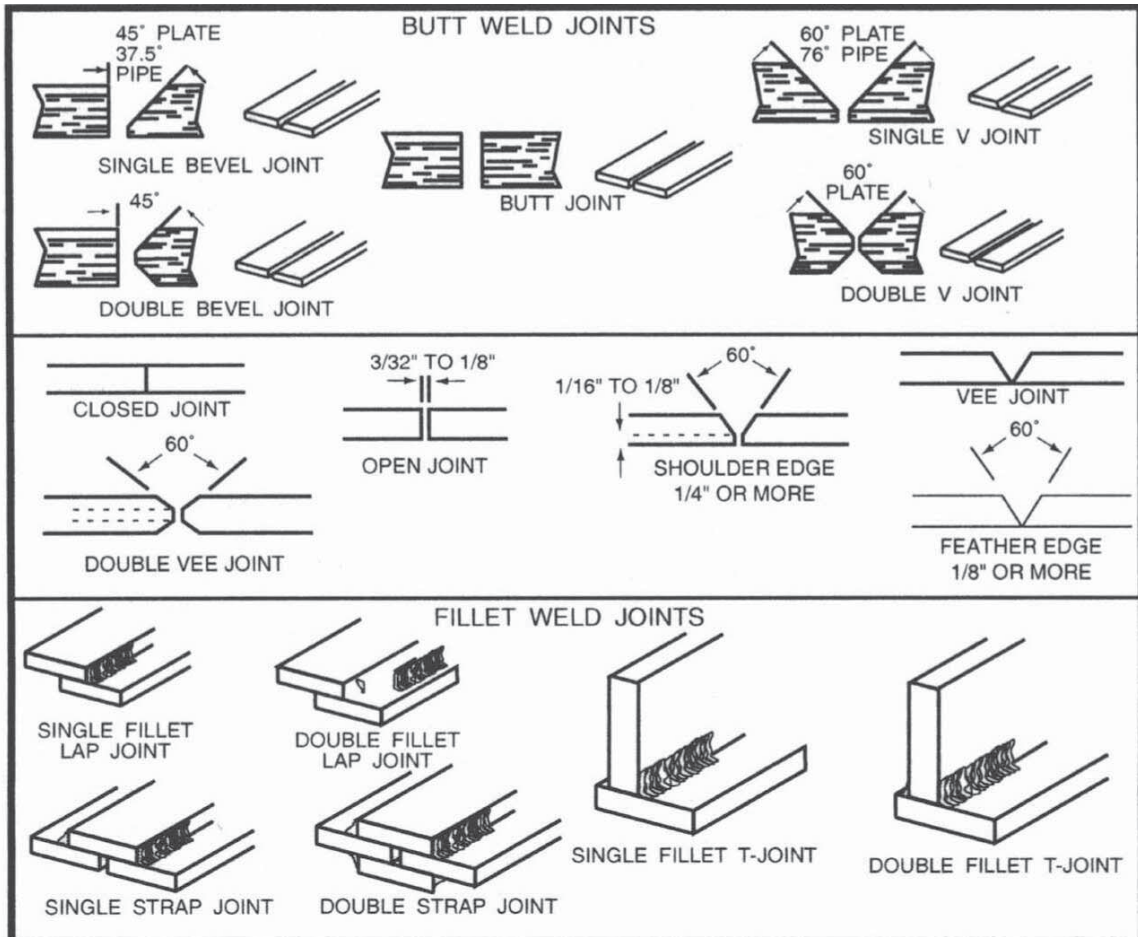


Figure 7. Types of Weld Joints

## LEARNING TO WELD

Flux core wire welding (FCAW) is the process of uniting metallic parts by heating and allowing the metals to flow together through the use of an electrical arc. The electrical arc is created between a continuous consumable wire electrode (the welding wire) and the work piece. An atmosphere created by the burning flux protects the weld puddle from contamination and enhance the welding capabilities of the electrical arc.

Whether you have welded before or not, it is important that you become familiar with your new welder, its controls, and the results achieved at different settings. We strongly recommend that you practice with your new welder on scrap metal trying different heat settings, base metal thicknesses, and welding positions for each type and size of wire you will be using. By doing this you will gain a feel for how changes in these welding variables affect the weld.

Of course, if you have not welded before, you will need to develop welding skills and techniques as well.

The self-taught welder learns through a process of trial and error. The best way to teach yourself how to weld is with short periods of practice at regular intervals. All practice welds should be done on scrap metal that can be discarded. Do not attempt to make any repairs on valuable equipment until you have satisfied yourself that your practice welds are of good appearance and free of slag or gas inclusions. What you fail to learn through practice will be learned through mistakes and re-welds later on.

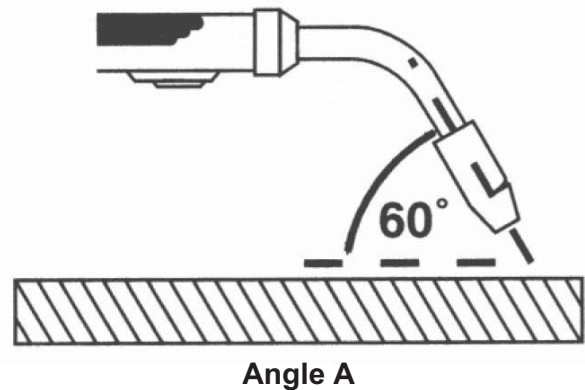
## HOLDING THE GUN

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

### Position the Gun to the Work Piece

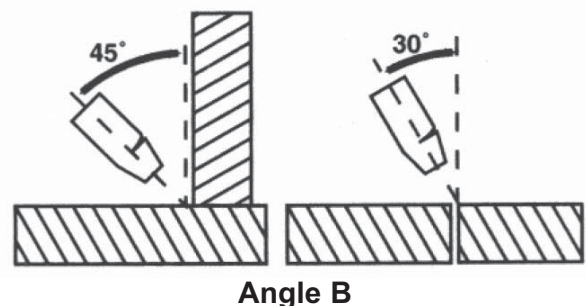
There are two angles of the gun nozzle in relation to the work piece that must be considered when welding.

1. Angle A (Figure 8) can be varied, but in most cases the optimum angle will be 60 degrees. The point at which the gun handle is parallel to the work piece. If angle A is increased, penetration will increase. If angle A is decreased, penetration will decrease also.



**Figure 8.** Gun Position, Angle A

2. Angle B (Figure 9) 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.



**Figure 9.** Gun Position, Angle B

The force of the welding arc follows a straight line out of the end of the nozzle. If angle B is changed, so will the direction of arc force and the point at which penetration will be concentrated.

On a butt weld joint, the only reason to vary angle B from perpendicular (straight up) to the work piece would be to improve visibility of the weld puddle. In this case, angle B can be varied anywhere from zero to 45 degrees with 30 degrees working about the best.

On a fillet weld joint, the nozzle is generally positioned in such a manner so as to split the angle between the horizontal and vertical members of the weld joint. In most cases, a fillet weld will be 45 degrees.



### Distance from the Work Piece

The end of the welding gun is designed with the contact tip recessed from the end of the nozzle and the nozzle electrically insulated from the rest of the gun. This permits the operator to actually rest the nozzle on the work piece and drag it along while welding. This can be very helpful to beginning welders to steady the gun, allowing the welder to concentrate on welding technique. 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

### LAYING A BEAD



#### 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, cuffless trousers, high topped shoes and a welding helmet.



#### WARNING

**ELECTRIC SHOCK CAN KILL!** To prevent ELECTRIC SHOCK, do not perform any welding while standing, kneeling, or lying directly on the grounded work.

### WELDING TECHNIQUES

#### MOVING THE GUN

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

**1. TRAVEL DIRECTION** is the direction the gun is moved along the weld joint in relation to the weld puddle. The gun is either PUSHED (see Figure 10) into the weld puddle or PULLED away from the weld puddle.

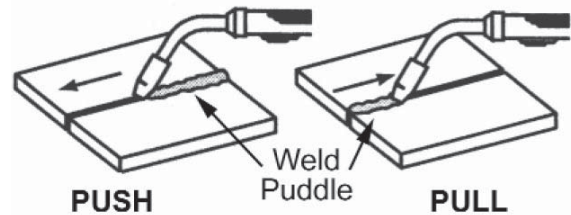


Figure 10. Travel Direction

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

**2. TRAVEL SPEED** is the rate at which the gun 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 WELD BEADS

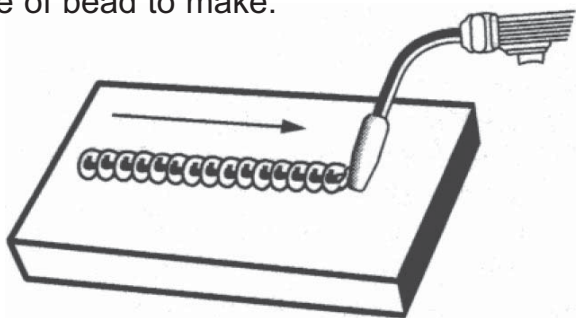
The following paragraphs discuss the most commonly used welding beads.

Once you have the gun in position with the wire lined up on the weld joint, lower your helmet, pull the trigger and the arc will start. In a second or two you will notice a weld puddle form and the base of the bead beginning to build. It is now time to begin to move with the gun. If you are just learning to weld, simply move the gun in a straight line and at a steady speed along the weld joint. Try to achieve a weld with the desired penetration and a bead that is fairly flat and consistent in width.

You can begin to try some different weld bead types.

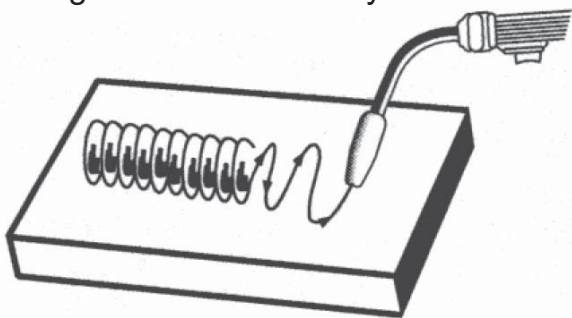
There are two basic types of weld beads, the stringer bead and the weave bead.

1. The **STRINGER BEAD** (Figure 11) is formed by traveling with the gun in a straight line while keeping the wire and nozzle centered over the weld joint. This is the easiest type of bead to make.



**Figure 11.** Stringer Bead

2. The **WEAVE BEAD** (Figure 12) 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 gun. It is best to hesitate momentarily at each side before weaving back the other way.

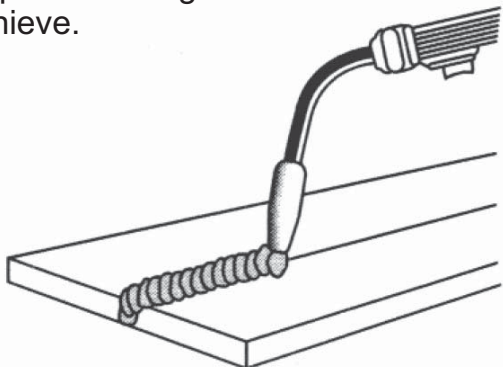


**Figure 12.** Weave Bead

### WELDING POSITIONS

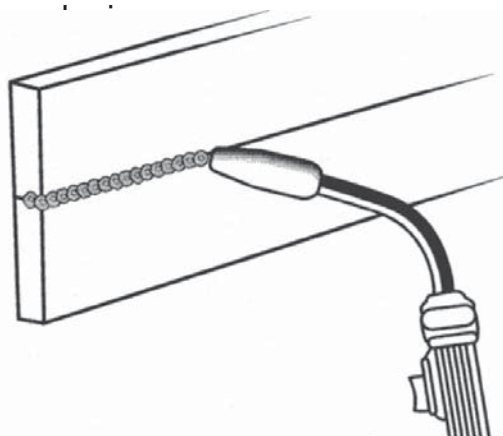
There are three basic welding positions: flat, horizontal, and vertical.

1. The **FLAT POSITION** (Figure 13) is the easiest of the welding positions and is probably the one you have been using thus far. It is best if you can weld in the flat position if at all possible as good results are easier to achieve.



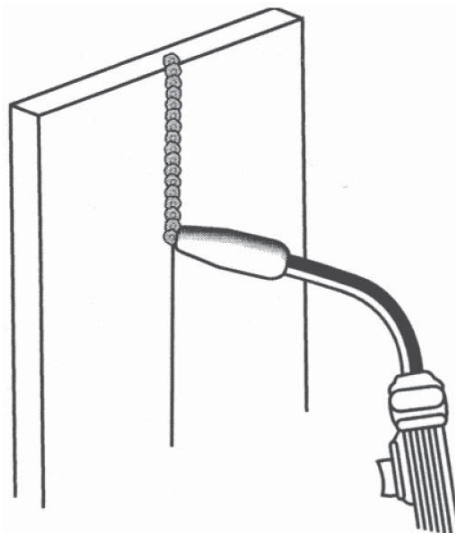
**Figure 13.** Flat Position

2. The **HORIZONTAL POSITION** (Figure 14) is next in difficulty level. It is performed very much the same as the flat weld except that angle B (see **POSITION THE GUN TO THE WORK PIECE** - p16) is such that the wire, and therefore the arc force, 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 to achieve good penetration. A good starting point for angle B is about 30 degrees **DOWN** from being perpendicular to the



**Figure 14.** Horizontal Position

3. The **VERTICAL POSITION** (Figure 15) is the next most difficult position. Pulling the gun from top to bottom may be easier for many people, but in some instances it can be difficult to prevent the puddle from running downward. Pushing the gun 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 **POSITION THE GUN TO THE WORK PIECE** - p16) is usually always kept at zero, but angle A will generally range from 45 to 60 degrees to provide better puddle control.



**Figure 15.** Vertical Position

## 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 Figure 16 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.

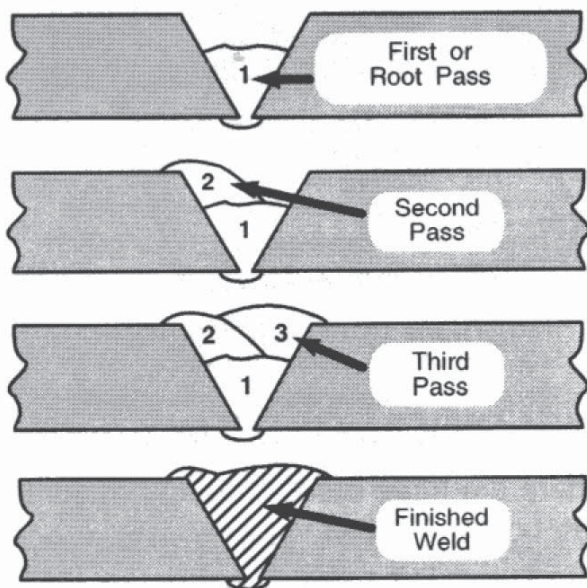


Figure 16. Butt Joints

**Fillet Weld Joints.** Most fillet weld joints, on metals of moderate to heavy thickness, will require multiple pass welds to produce a strong joint. The illustrations in Figure 17 show the sequence of laying multiple pass beads into a T fillet joint and a lap fillet joint.

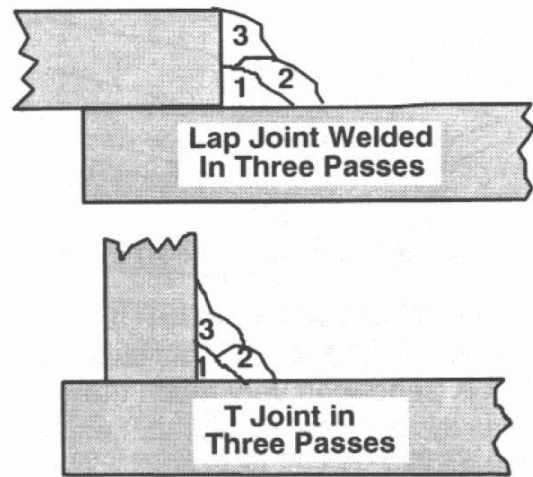


Figure 17. Fillet Weld Joints

## SPECIAL WELDING METHODS

### SPOT WELDING

The purpose of a spot weld is to join pieces of metal together with a spot of weld instead of a continuous weld bead. There are three methods of spot welding: Burn-Through, Punch and Fill, and Lap (see Figure 18). Each has advantages and disadvantages depending on the specific application as well as personal preference.

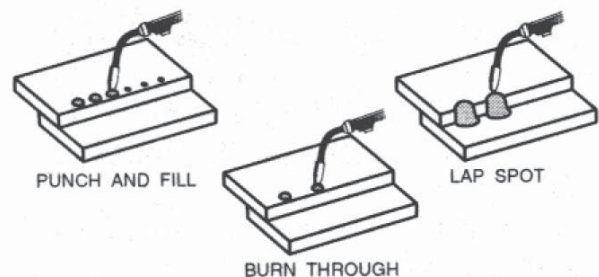


Figure 18. Spot Welding

1. 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 because they have greater current carrying capabilities allowing the arc to burn through very quickly while leaving a minimal amount of filler metal build up.

Do not use 0.030 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.

2. 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 this 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.

3. 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 gun 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.

## MAINTENANCE

### GENERAL MAINTENANCE

This welder has been engineered to give many years of trouble-free service providing that a few very simple steps are taken to properly maintain it.

1. Keep the wire drive compartment lid closed at all times unless the wire needs to be changed or the drive tension needs adjusting.
2. Keep all consumables (contact tips, nozzles, and gun liner) clean and replace when necessary. See CONSUMABLE MAINTENANCE and TROUBLESHOOTING later in this section for detailed information.
3. Replace power cord, ground cable, ground clamp, or gun assembly when damaged or worn.
4. Periodically clean dust, dirt, grease, etc. from your welder. Every six months or as necessary, remove the side panels from the welder and air-blow any dust and dirt that may have accumulated inside the welder.



### WARNING

**ELECTRIC SHOCK CAN KILL!** To reduce the risk of electric shock, always unplug the welder from its ac power source before removing side panels.

### CONSUMABLE MAINTENANCE

IT IS VERY IMPORTANT TO MAINTAIN THE CONSUMABLES TO AVOID THE NEED FOR PREMATURE REPLACEMENT OF THE GUN ASSEMBLY.

### MAINTAINING THE CONTACT TIP

The purpose of the CONTACT TIP is to transfer welding current to the welding wire while allowing the wire to pass through it smoothly.

Always use a contact tip stamped with the same diameter as the wire it will be used with. **Note:** Due to inherent variances in flux-cored welding wire, it may be necessary to use a contact tip one size larger than your flux core wire if wire jams occur.

1. If the wire burns back into the tip, remove the tip from the gun and clean the hole running through it with an oxygen-acetylene torch tip cleaner or tip drill.
2. Over time, the hole in the contact tip will become worn by the wire passing through it. The more worn this hole becomes, the less efficient is the transfer of welding current to the wire and eventually arc breakage and difficult arc starting will result. Replace contact tips when signs of wear become apparent.

## CAUTION

### KEEP THE NOZZLE CLEAN!

During the welding process, spatter and slag will build up inside the nozzle and must be cleaned out periodically. Failure to clean and/or replace the nozzle in a timely fashion WILL CAUSE DAMAGE TO THE FRONT-END OF THE GUN ASSEMBLY, which is NOT REPLACEABLE. The results of the inaction will REQUIRE THE REPLACEMENT OF THE ENTIRE GUN ASSEMBLY.

1. Stop welding and clean any accumulated slag or spatter from the nozzle every 5 to 10 minutes of welding time.
2. If slag cannot be thoroughly cleaned from the nozzle, REPLACE THE NOZZLE!

Failure to keep the nozzle adequately cleaned can result in the following problems:

A **SHORTED** nozzle results when spatter buildup bridges the insulation in the nozzle allowing welding current to flow through it as well as the contact tip. When shorted, a nozzle will steal welding current from the wire whenever it contacts the grounded work piece. This causes erratic welds and reduced penetration. In addition, a shorted nozzle overheats the end of the gun which can DAMAGE the front-end of the gun.

### TESTING FOR A SHORTED NOZZLE

Arcing between the nozzle and the work piece ALWAYS means the nozzle is shorted, but this can be hard to detect through the lens of a welding helmet. The following testing method is another way to tell if a nozzle is shorted.

With the welder unplugged from the ac power source, touch the probes of an ohmmeter or

continuity tester to the end of the contact tip and the outside of the nozzle. If there is any continuity at all, the nozzle IS shorted. Clean or replace as needed.

### REPLACE A GUN LINER

When installing a new gun liner, care must be taken not to kink or otherwise damage the gun liner. See Figure 19 for the drive assembly and Figure 20 for the gun assembly.

1. Turn OFF welder POWER SWITCH and unplug welder from power supply.
2. Open the welder side panel.
3. Loosen the tension arm and lift it up off the drive roller.
4. Turn the wire spool counter-clockwise (be sure to hold onto the wire itself while turning the spool or the wire will unspool itself when it becomes free of the gun liner), and remove wire from gun assembly.
5. Lay gun cable and gun handle straight out in front of unit.
6. Remove the 3 self tapping screws which secure the gun sleeve to the Feed Motor Assembly.
7. Take gun handle halves apart by removing five self tapping screws.
8. Unscrew the gun liner hexagonal nut.  
**Note:** By removing the liner from the gun, the live wire terminal will also be removed.
9. Remove liner from outer gun sleeve by pulling it out from the handle end.
10. Install new liner, starting from handle end and feeding towards unit with fitting end of liner going towards the block.
11. Return all components to the handle casing and realign them as they were originally. Be sure to also install the live wire terminal. **Note:** Be sure to assemble the new liner and live wire terminal as they were originally.
12. With both halves of the handle case in place, tighten the five self tapping screws.
13. Fit liner for length at feeder end by cutting liner with wire cutters.
14. Reinstall holding clamp at feeder, tightening the 3 self tapping screws.
15. Reinstall the welding wire according to specifications in INSTALL THE WELDING WIRE section.
16. Close side panel.
17. Plug welder into power supply and turn POWER SWITCH to ON position.

The following paragraphs describe the procedures required to maintain and troubleshoot your welder.

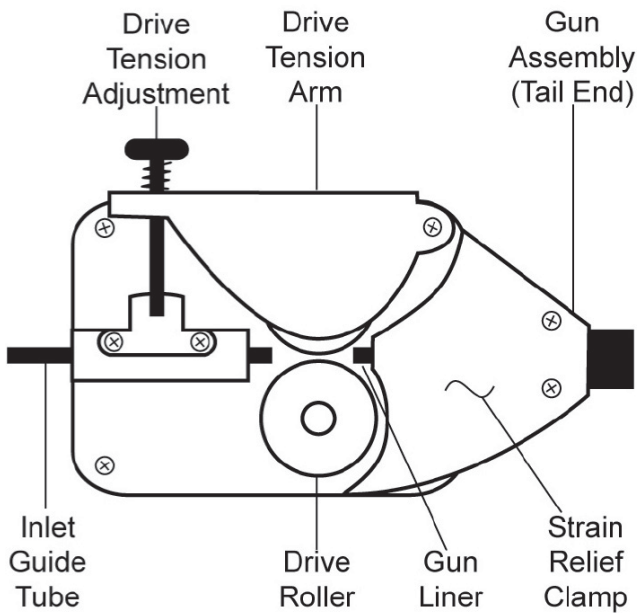
### MAINTAINING THE WELDER

Except for internal and external cleaning, cleaning the nozzle, and occasionally retightening screws, there is no periodic maintenance recommended for your welder.

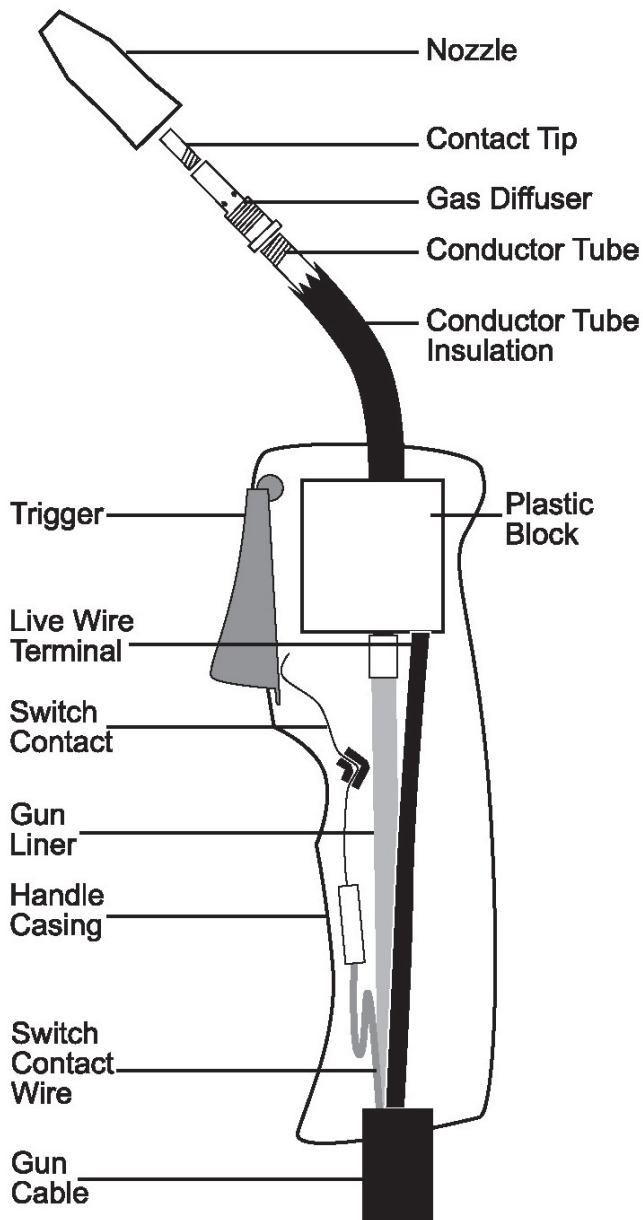
### TROUBLESHOOTING

The TROUBLESHOOTING information on the next page is provided as a guide to help resolve some of the more common problems that could be encountered.

Table 4 is a troubleshooting table provided to help you determine a possible remedy when you are having a problem with your welder. This table does not provide all possible solutions, only those possibilities considered to likely be common faults. The table consists of a TROUBLE or symptom, a POSSIBLE CAUSE for that symptom, and a POSSIBLE REMEDY for that symptom.



**Figure 19.** Drive Assembly

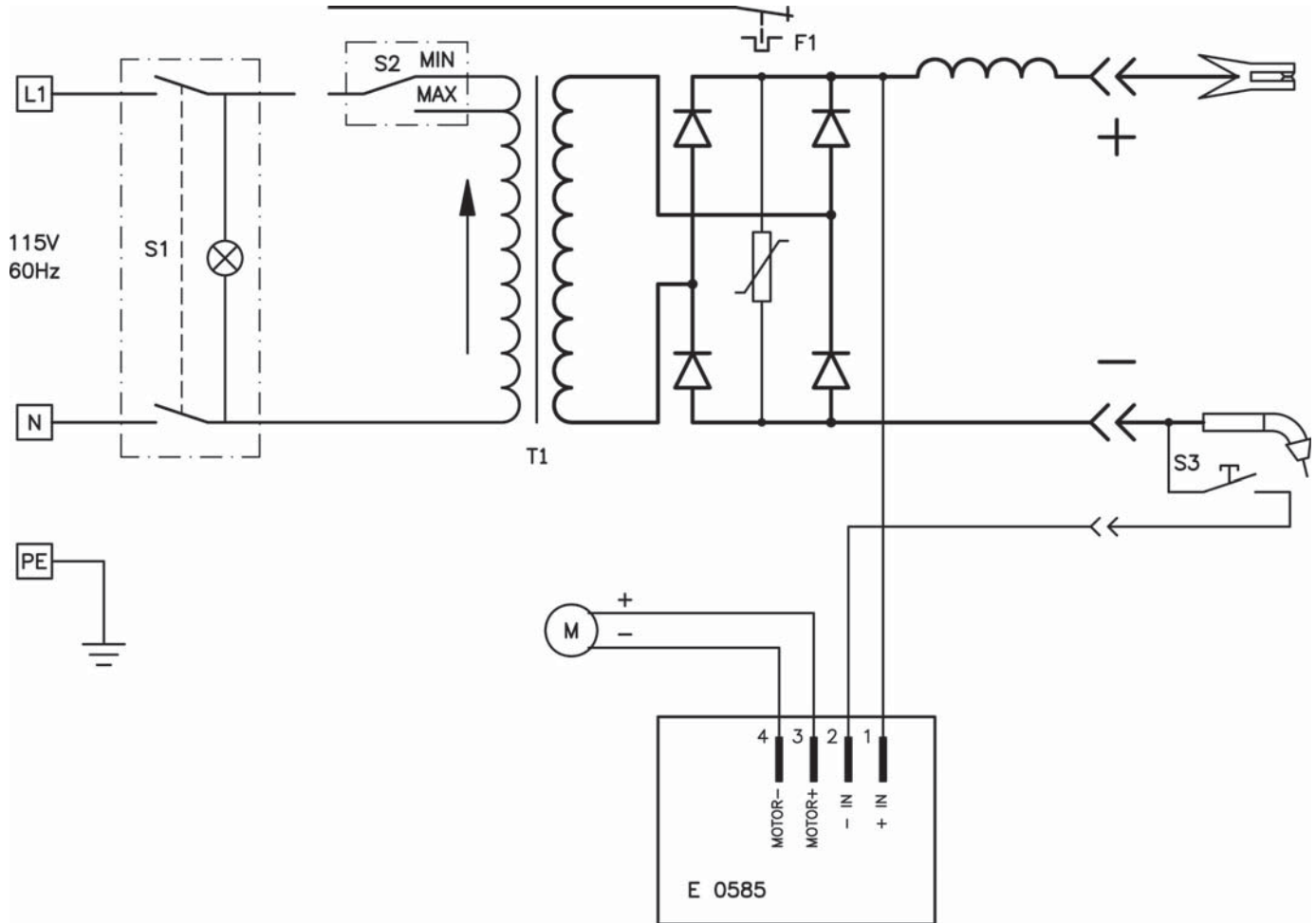


**Figure 20.** Gun Assembly

**TABLE 4 – TROUBLESHOOTING**

<b>TROUBLE</b>	<b>POSSIBLE CAUSE</b>	<b>POSSIBLE REMEDY</b>
Dirty, porous, brittle weld	Plugged welding nozzle	Clean or replace nozzle.
Wire feed works but no arc	1. Bad ground or loose connection 2. Bad connection to gun or faulty gun	1. Check ground and connections. Tighten as necessary. 2. Check connection to gun or replace gun
Arc works but no feeding wire	1. Faulty wire speed circuit board 2. No tension on the drive roller 3. Faulty drive motor ( very rare )	1. Replace wire speed circuit board 2. Adjust the drive tension 3. Replace the drive motor
Nothing works	1. Faulty trigger on gun 2. Exceeded duty cycle; thermal protector opened 3. Faulty transformer ( rare )	1. Replace trigger 2. Allow welder to cool at least 10 minutes ( observe and maintain proper duty cycle ) 3. Replace transformer
Low output or nonpenetrating weld	1. Loose connection inside machine 2. Too long or improper extension cord 3. Wrong type or size wire 4. Poor ground connection 5. Wrong size contact tip 6. Loose gun connection or faulty gun assembly	1. Blow inside of machine out with compressed air, clean and tighten all connections 2. See EXTENSION CORDS in this manual. 3. Use 0.030 inch ( 0.8mm ) or 0.035 inch ( 0.9 mm ) E71T-GS self shielding flux-core wire 4. Reposition clamp and check cable to clamp connection 5. Use 0.030 inch ( 0.8 mm ) or 0.035 inch ( 0.9 mm ) contact tip 6. Tighten gun or replace gun.
Wire is jamming or “birdnesting” at the drive roller	1. Too much tension on drive roller 2. Gun liner worn or damaged 3. Contact tip is clogged or damaged 4. Liner stretched or is too long	1. Adjust the drive tension. ( See INSTALLING THE WELDING WIRE ) 2. Replace gun liner 3. Replace contact tip 4. Trim liner to proper length
Wire burns back to contact tip	1. Gun liner is worn or damaged 2. Liner stretched or is too long 3. Wrong size contact tip 4. Contact tip is clogged or damaged	1. Replace gun liner 2. Trim liner to proper length 3. Use correct size contact tip 4. Replace contact tip
Ground clamp and/or ground cable gets hot	Bad connection from cable to clamp	Tighten connection or replace cable
Gun nozzle arcs to work surface	Slag building inside nozzle or nozzle is shorter	Clean or replace nozzle as needed

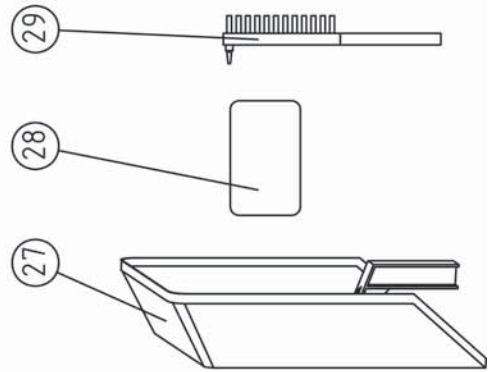
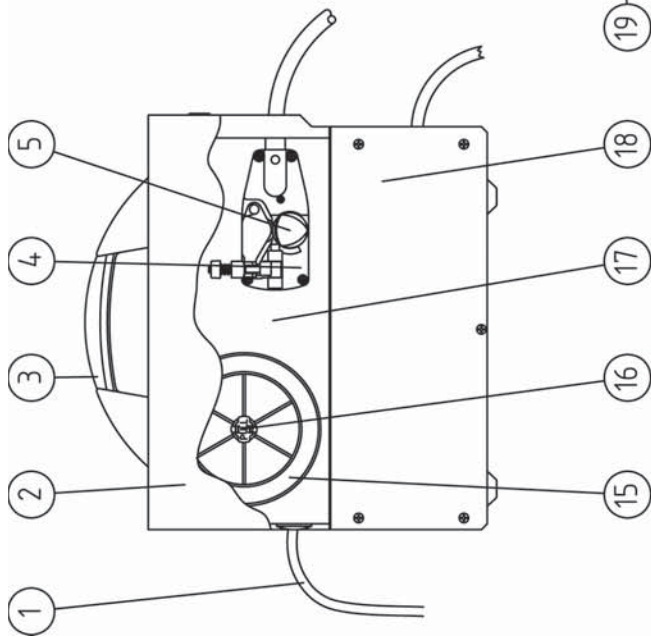
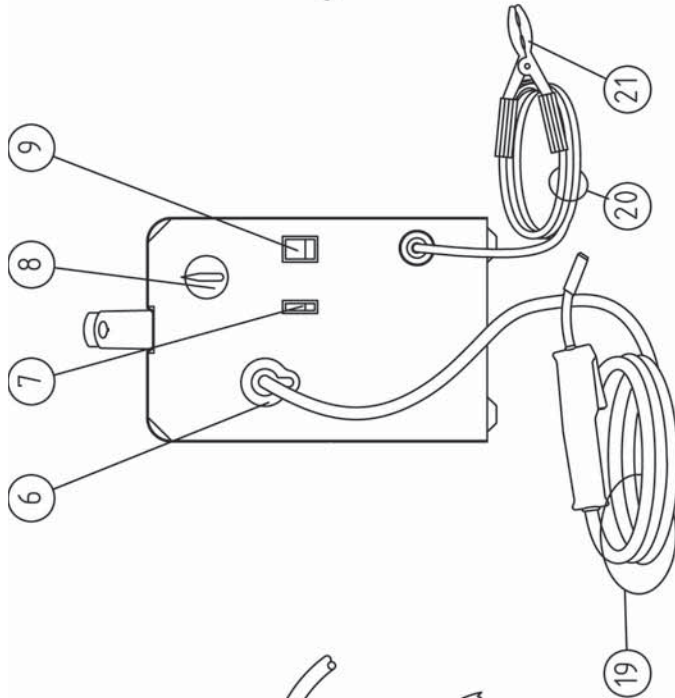
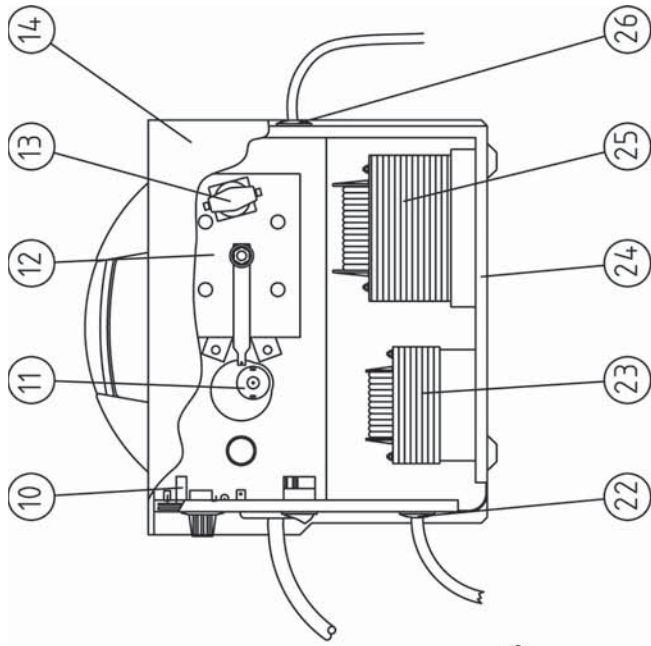
# WIRE FEED WELDER WIRING DIAGRAM





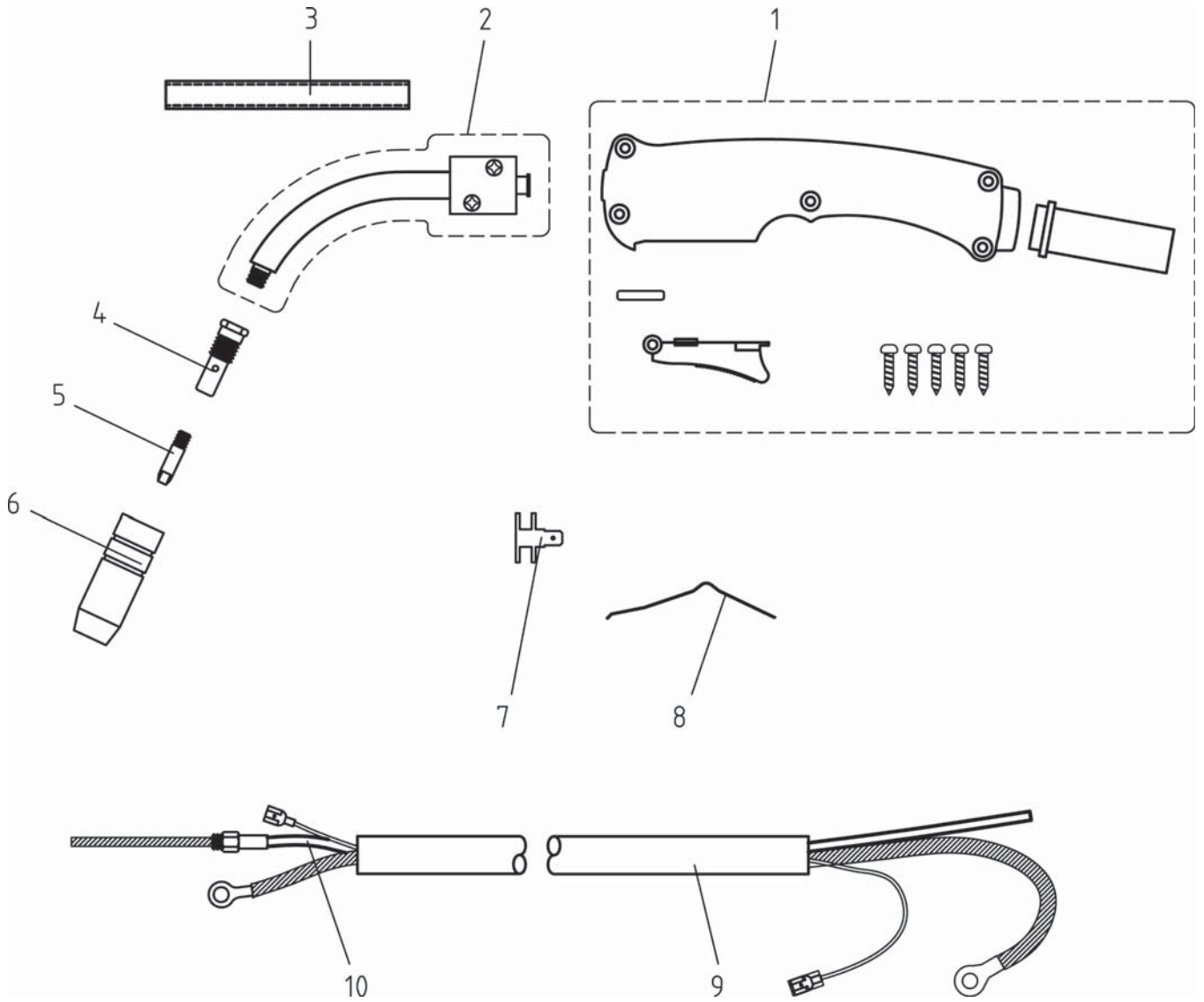
## WIRE FEED WELDER PARTS LIST

01	20220018	POWER CABLE 3X14 AWG 2.5M+5-15P PLUG	1
02	05000174	SIDE PANEL W/SCREEN PRINTING+LABEL	1
03	21600036	HANDLE	1
04	44400018	PLASTIC WIRE FEEDER $\varnothing$ 28	1
05	33805074	WIRE FEED ROLL $\varnothing$ .7X25	1
06	21690458	TORCH GROMMET (D.40 OPEN )	1
07	22200038	HIGH/LOW POWER SWITCH 16A 250V	1
08	04600323	KNOB FOR POTENTIOMETER $\varnothing$ 38, WIRE SPEED	1
09	22200039	GREEN PILOT LIGHT SWITCH 16A-250V ON/OFF	1
10	22710001	P.C. BOARD E0585.1 220V	1
11	04600144	MOTOR $\varnothing$ 28 +PINION	1
12	22400083	RECTIFIER PMS 30B F/1 TYPE	1
13	04600113	COMPLETE THERMOSTAT 100° + SUPPORT	1
14	05000173	RIGHT SIDE PANELW/SCREEN PRINTING+LABEL	1
15	21910046	FLUX CORED WIRE SPOOL 0.035 1/2LB	1
16	04600108	SPOOL HOLDER	1
17	05000175	DIVIDING PANEL +LABEL	1
18	33705325 5015	LEFT SIDE PANEL	1
19	23000094	TORCH AND CABLE ASSY. COMPLETE 2MM <sup>2</sup> 2M	1
20	43210021	EARTH CABLE 10MM <sup>2</sup> M1.6 C.120/CONN	1
21	22110005	EARTH CLAMP 120A	1
22	04600233	CABLE CLAMP + SCREW	1
23	44135097	CHOKE 40X25 AL	1
24	05000172	FRONT,BOTTOM,REAR PANEL	1
25	44120131	TRANSFORMER 60HZ 110V 40X60AL	1
26	04600234	CABLE CLAMP $\varnothing$ 10 + SCREW	1
27	21905041	PLASTIC MASK 50X105	1
28	21905007	DARK GLASS 75X98	1
29	21905039	HAMMER - BRUSH	1



## WIRE FEED WELDER GUN PARTS LIST

01	04600163	HANDLE ASSY. BLUE	1
02	23005342	SWAN NECK AND PLASTIC TORCH BODY	1
03	23005285	ISOLATING COVER FOR NECK	1
04	23005316	CONTACT TIP HOLDER	1
05	23005020	0.040 CONTACT TIP	1
06	23005147	TORCH GAS NOZZLE	1
07	21200010	FAST-ON CONTACT 6,3X0,8	1
08	33800032	TORCH CONTACT SPRING	1
09	30900019	RUBBER SLEEVE ø17,5+HOSE 1.7M	1
10	23005354	WIRE LINER 1.4X4.0 WITH CONNECTOR, 2.1 M	1
11	23005322	PLASTIC BLOCK + NECK + DIFFUSER	1



# SUGGESTED SETTINGS

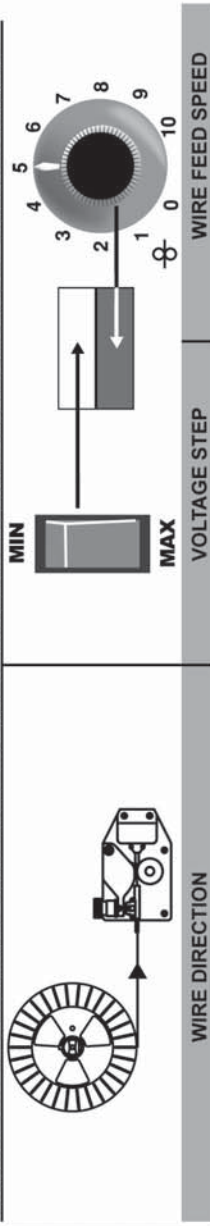


After installing new wire spool, make sure welding wire is inserted into torch hose liner and wire tension knob is correctly adjusted before pulling welding torch trigger

## SET UP – SUGGESTED SETTING GUIDE

These settings are suggested for initial set up. Variables including input voltage, wire and shielding gas will affect welding arc characteristics. Fine tune the arc to match travel speed and torch angle by adjusting the wire speed to achieve a smooth sounding arc.

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PROCEDURE	WELDING WIRE	WIRE DIRECTION				VOLTAGE STEP				WIRE FEED SPEED			
		18 gauge .045 in 1.2 mm	16 gauge .062 in 1.5 mm	14 gauge .075 in 1.9 mm	12 gauge .105 in 2.6 mm	10 gauge .135 in 3.4 mm	3/16 in 5.0 mm	MIN	MAX	MIN	MAX	MIN	MAX
GASLESS DC (-)	.030 in (0,8 mm) Flux-Core Wire	MIN	MIN	MIN	MAX	MAX	MAX	2	4	4	6	MAX	MAX
		2	4	5	2	4	6	1,5	3	1	3	4	4
	.035 in (0,9 mm) Flux-Core Wire	MIN	MIN	MIN	MAX	MAX	MAX	MIN	MAX	MAX	MAX	MAX	MAX
		1,5	3	4	1	3	4	1	3	3	4	4	4

# NOTES

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WELDING SUPPLIES AND ACCESSORIES  
SINCE 1932

AIR FITTINGS  
HOSE  
AIR CENTER  
CHUCKS TIRE GAUGES



**magswitch** Forney

- |                      |                     |
|----------------------|---------------------|
| <b>Weld It</b><br>   | <b>Cut It</b><br>   |
| <b>Square It</b><br> | <b>Hold It</b><br>  |
| <b>Hold It</b><br>   | <b>Guide It</b><br> |
| <b>Hang It</b><br>   | <b>Resaw It</b><br> |
- magswitch**



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