

Please read and save these instructions. Read carefully before attempting to assemble, install, operate or maintain the product described. Protect yourself and others by observing all safety information. Failure to comply with instructions could result in personal injury and/or property damage! Retain instructions for future reference.



Wire Feed Arc Welder



Description

This line of Campbell Hausfeld wire feed welders is designed to be used on standard 115V household current. The welders are equipped with infinite wire speed control to accurately select the proper wire feed rate needed for various welding conditions. Internal components are thermostatically protected.

These welders are designed for use with Flux Core Arc Welding (Gasless) or Gas Metal Arc Welding (Mig) process. As delivered from the factory, this welder can weld with .024" (.6 mm) to .035" (.9 mm) diameter wire. A starter spool of .035" (.9 mm) flux-cored wire and a .040 tip are included.

Unpacking

Some welder components may be found in the wire feed compartment.

When unpacking, inspect carefully for any damage that may have occurred during transit. Report any damaged or missing items by calling (800) 746-5641.

Circuit Requirements

CAUTION This equipment requires a dedicated 115 volt circuit. Refer to the following chart for the correct circuit breaker or fuse rating. Do not run other appliances, lights, or tools on this circuit while operating this equipment. Extension cords are not recommended. Blown fuses and tripped circuit breakers can result from failure to comply with this recommendation.

Heat Selector	Circuit Breaker or Slow Blow Fuse	
Low	15 amp	
High	20 amp	

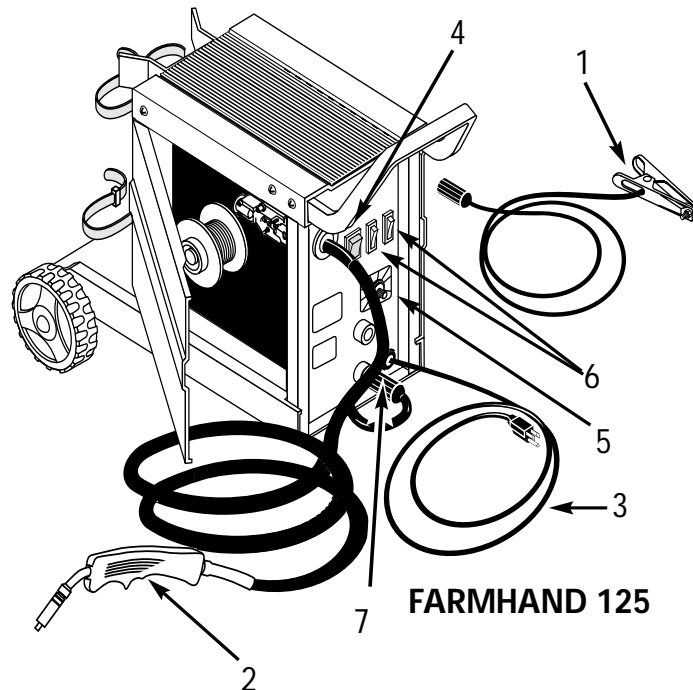


Figure 1

Components and Controls

- Ground Clamp** - connect to work piece.
- Wire Feed Gun with .040 tip**
- Power Cord** - plug into 115 volt outlet.
- On/Off Switch**
- Infinite Wire Speed Control** - turn clockwise to increase wire speed and counterclockwise to decrease wire speed.
- Heat Selector** - Selects welding power. Four selections are possible
- Polarity Hook-up** - Attach torch cable to (+) for MIG and (-) for flux core wire.

General Safety

DANGER Danger means a hazard that will cause death or serious injury if the warning is ignored.

WARNING Warning means a hazard that could cause death or serious injury if the warning is ignored.

CAUTION Caution means a hazard that may cause minor or moderate injury if the warning is ignored. It also may mean a hazard that will only cause damage to property.

NOTE: Note means any additional information pertaining to the product or its proper usage.

General Safety

(Continued)

⚠ WARNING Torch is "live" (has current potential) at all times when machine is turned on.

⚠ WARNING Always keep a fire extinguisher accessible while performing arc welding operations.



- Before starting or servicing any electric arc welder, read and understand all instructions. Failure to follow safety precautions or instructions can cause equipment damage and/or serious personal injury or death.
- All installation, maintenance, repair and operation of this equipment should be performed by qualified persons only in accordance with national, state, and local codes.

⚠ WARNING Improper use of electric arc welders can cause electric shock, injury, and death!



Take all precautions described in this manual to reduce the possibility of electric shock.

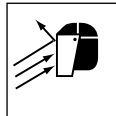
- Verify that all components of the arc welder are clean and in good condition prior to operating the welder. Be sure that the insulation on all cables, wire feed gun, and power cords is not damaged. Always repair or replace damaged components before operating the welder. Always keep welder panels, shields, etc. in place when operating the welder.
- Always wear dry, protective clothing and welding gloves, and insulated footwear.
- Always operate the welder in a clean, dry, well ventilated area. Do not operate the welder in humid, wet, rainy, or poorly ventilated areas.
- Be sure that the work piece is properly supported and grounded prior to beginning any electric arc welding operation.
- Coiled welding cable should be spread out before use to avoid overheating and damage to insulation.

⚠ DANGER Never immerse the wire or wire feed gun in water. If the welder becomes

wet for any reason, be absolutely certain that it is completely clean and dry prior to attempting use!

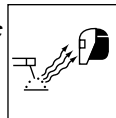
- Always shut the equipment off and unplug the power prior to moving the unit.
- Always attach the work lead first.
- Verify that the work piece is securely grounded.
- Always shut off electric arc welding equipment when not in use, and cut off any excess wire from the wire feed gun.
- Never allow any part of the body to touch the wire and ground or grounded work piece at the same time.
- Awkward welding conditions and positions can be electrically hazardous. When crouching, kneeling or at elevations, be sure to insulate all conductive parts, wear appropriate protective clothing, and take precautions to prevent injury from falls.
- Never attempt to use this equipment at current settings or duty cycles higher than those specified on the equipment labels.
- Never use an electric arc welder to thaw frozen pipes.

⚠ WARNING Flying sparks and hot metal can cause injury. As welds cool, slag can be thrown off. Take all precautions described in this manual to reduce the possibility of injury from flying sparks and hot metal.



- Wear ANSI approved face shield or safety glasses with side shield protection when chipping or grinding metal parts.
- Wear ear plugs when welding overhead to prevent spatter or slag from falling into ears.

⚠ WARNING Electric arc welding operations produce intense light and heat and ultraviolet (UV) rays. This intense light and UV rays can cause injury to eyes and skin. Take all precautions described in this manual to reduce the possibility of injury to eyes and skin.



- All persons operating this equipment or in the area while equipment is in use must wear protective welding gear including: welding helmet or shield with at least shade 10, flame resistant clothing, leather welding gloves, and full foot protection.

⚠ WARNING Never look at arc welding operations without eye protection as described above. Never use a shade filter lens that is cracked, broken, or rated below number 10. Warn others in the area not to look at the arc.

⚠ WARNING Electric arc welding operations cause sparks and heat metal to temperatures that can cause severe burns! Use protective gloves and clothing when performing any metal working operation. Take all precautions described in this manual to reduce the possibility of skin and clothing burns.



- Make sure that all persons in the welding area are protected from heat, sparks, and ultraviolet rays. Use additional face shields and flame resistant barriers as needed.
- Never touch work pieces until completely cooled.

⚠ WARNING Heat and sparks produced during electric arc welding and other metal working operations can ignite flammable and explosive materials! Take all precautions described in this manual to reduce the possibility of flames and explosions.



- Remove all flammable materials within 35 feet (10.7 m) of welding arc. If removal is not possible, tightly cover flammable materials with fire proof covers.
- Do not operate any electric arc welder in areas where flammable or explosive vapors may be present.
- Take precautions to be sure that flying sparks and heat do not cause flames in hidden areas, cracks, behind bulkheads, etc.

⚠ WARNING Fire hazard! Do not weld on containers or pipes that contain or have contained flammable materials or gaseous or liquid combustibles.



⚠ WARNING Arc welding closed cylinders or containers such as tanks or drums can cause explosion if not properly vented! Verify that any cylinder or container to be welded has an adequate ventilation hole, so that expanding gases can be released.



General Safety

(Continued)

⚠WARNING

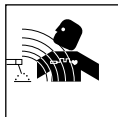
Do not breathe fumes that are produced by the arc welding operation. These fumes are dangerous. If the welding area cannot be adequately ventilated, be sure to use an air supplied respirator.



- Keep the head and face out of the welding fumes.
- Do not perform electric arc welding operations on metals that are galvanized or cadmium plated, or contain zinc, mercury, or beryllium without completing the following precautions:
 - a. Remove the coating from the base metal.
 - b. Make sure that the welding area is well ventilated.
 - c. Use an air-supplied respirator.
 Extremely toxic fumes are created when these metals are heated.

⚠WARNING

The electromagnetic field that is generated during arc welding may interfere with the operation of various electrical and electronic devices such as cardiac pacemakers. Persons using such devices should consult with their physician prior to performing any electric arc welding operations.



- Route the wire gun and work cables together and secure with tape when possible.
- Never wrap arc welder cables around the body.
- Always position the wire gun and work leads so that they are on the same side of the body.
- Exposure to electromagnetic fields during welding may have other health effects which are not known.

⚠WARNING

Always be sure that the welding area is secure and free of hazards (sparks, flames, glowing metal or slag) prior to leaving. Be sure that equipment is turned off and excess wire is cut off. Be sure that cables are loosely coiled and out of the way. Be sure that all metal and slag has cooled.

⚠DANGER

Cylinders can explode if damaged. Shielding gas



cylinders contain gas under high pressure. If damaged, a cylinder can explode. Since gas cylinders are normally part of the welding process, be sure to treat them carefully.

- Protect compressed gas cylinders from excessive heat, mechanical shocks, and arcs.
- Install and secure cylinders in an upright position by chaining them to stationary support or equipment cylinder rack to prevent falling or tipping.
- Keep cylinders away from any welding or other electrical circuits.
- Never allow a welding electrode to touch any cylinder.
- Use only correct shielding gas cylinders, regulators, hoses, and fittings designed for the specific application; maintain them and associated parts in good condition.
- Turn face away from valve outlet when opening cylinder valve.
- Keep protective cap in place over valve except when cylinder is in use or connected for use.
- Read and follow instructions on compressed gas cylinders, associated equipment, and CGA publication P-1 listed in Safety Standards.

⚠DANGER

Never use flammable gases with MIG welders. Only inert or non-flammable gases such as carbon dioxide, argon, helium, or mixtures of one or more of these gases are suitable for MIG welding.

⚠WARNING

Never lift cylinders off the ground by their valves, caps, or with chains or slings.

ADDITIONAL SAFETY STANDARDS

ANSI Standard Z49.1 from American Welding Society, 550 N.W. LeJune Rd. Miami, FL 33126

Safety and Health Standards

OSHA 29 CFR 1910, from Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402

National Electrical Code

NFPA Standard 70, from National Fire Protection Association, Batterymarch Park, Quincy, MA 02269

Safe Handling of Compressed Gases in Cylinders

CGA Pamphlet P-1, from Compressed Gas Association, 1235 Jefferson Davis Highway, Suite 501, Arlington, VA 22202

Code for Safety in Welding and Cutting

CSA Standard W117.2, from Canadian Standards Association, Standards Sales, 178 Rexdale Boulevard, Rexdale, Ontario, Canada M9W 1R3

Cutting And Welding Processes

NFPA Standard 51B, from National Fire Protection Association, Batterymarch Park, Quincy, MA 02269

Safe Practices For Occupational And Educational Eye And Face Protection

ANSI Standard Z87.1, from American National Standards Institute, 1430 Broadway, New York, NY 10018

Refer to the Material Safety Data Sheets and the manufacturers instructions for metals, wire, coatings and cleaners.

Installation

Selecting the proper location can significantly increase performance, reliability and life of the arc welder.

- For best results locate the welder in an environment that is clean and dry. Dust and dirt in the welder retain moisture and increase wear of moving parts.
- Place the welder in an area that provides at least 12" (30,48 cm) of ventilation space at both the front and rear of the unit. Keep all obstructions away from this ventilation space.
- Store wire in a clean, dry location with low humidity to preserve the wire coating.
- The receptacle used for the welder must be properly grounded and the welder must be the only load on the power supply circuit. Refer to the Circuit Amps chart on page 1 for correct circuit capacity.
- The use of an extension cord is not recommended for electric arc welding machines. The voltage drop in the extension cord may significantly degrade the performance of the welder.

Assembly

Welder components listed below are in the wire feed compartment. Open and remove.

HANDLE ASSEMBLY

1. Remove screws from handle. Slide handle between welder front panel

Wire Feed Arc Welder

Assembly (Continued)

and top cover aligning the holes in handle with holes in top cover.

2. Fasten screws through top cover and into handle.

WHEEL AND AXLE ASSEMBLY

1. Insert axle supports into slots in the welder housing.
2. Insert axle through the axle supports and firmly push wheels onto axle.
3. Secure wheel with e-clips and wheel caps.

GAS CYLINDER BRACKET ASSEMBLY

1. Place bracket on welder aligning the holes in welder housing.
2. Fasten screws through bracket and into cabinet.

FOOT ASSEMBLY

1. Place foot on welder and align holes in the welder housing.
2. Fasten screws through foot into cabinet.

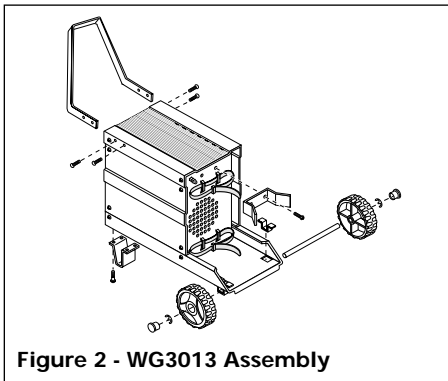


Figure 2 - WG3013 Assembly

Ground Clamp

1. Loosen hex nut on work clamp.
2. Insert cord through clamp handle and slide bare wire under the clamp block. Tighten hex nut making sure bare wire is clamped securely (Figure 3).

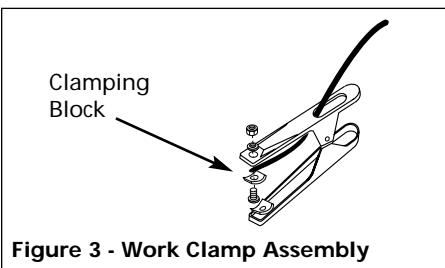


Figure 3 - Work Clamp Assembly

Wire Installation

⚠WARNING Welding power may be applied to the output terminals, feed roll, work clamp, gun cable connection and

welding wire even when the the gun switch is not activated. Do not touch these parts when the welding machine is on.

NOTE: Before installing welding wire, be sure that the diameter of the welding wire matches the groove in the drive roller on the wire feed mechanism and the wire matches the contact tip in the end of the gun. A mismatch on any item could cause the wire to slip or bind.

1. Verify the unit is off and open the panel on the welder to expose the wire feed mechanism.
2. Remove the spool quick lock, by pushing in and rotating 1/4 turn counterclockwise. The knob, spring, and spool spacer can now be removed.

NOTE: Spool spacer and spindle spacer act as an 8" spool spindle adapter. Purchase of an adapter is not necessary.

* See Figure 4 for assembly.

3. Loosen the wire feed tensioning screw on the drive mechanism. This allows initial feeding of the wire into the gun liner by hand.

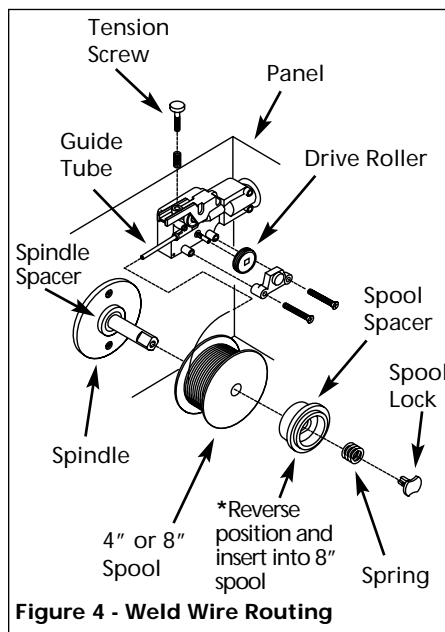


Figure 4 - Weld Wire Routing

4. Install the wire spool onto the spindle so that the wire can come off the spool on the end closest to the wire feed guide tube. **Do not cut the wire loose yet.** Install the spool spacer, spring, and quick lock knob by pushing in, and turning the knob 1/4 rotation clockwise.
5. Hold the wire and cut the wire end from the spool. Do not allow the wire to unravel. Be sure that the end of the wire is straight and free of burrs.

6. Feed the wire through the wire feed guide tube, over the groove in the drive roll and into the gun liner. Tighten the wire feed tensioning screw so that it is snug. Do not over tighten.
7. Remove the nozzle by turning **counterclockwise**. Then unscrew the contact tip from the end of the welding torch (See Figure 5). Plug the welder into the proper power supply receptacle.

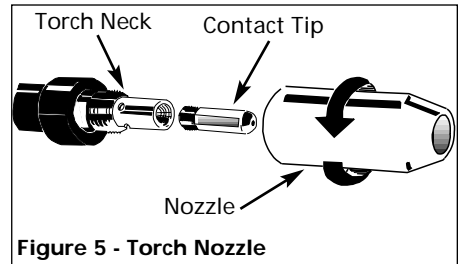


Figure 5 - Torch Nozzle

HINT: Keep torch cable straight when feeding wire.

8. Turn on the welder and set the wire speed rate to 5. Activate the gun switch until the wire feeds out past the torch end. Turn welder off.
9. Carefully slip the contact tip over the wire and screw it into the torch neck. Install the nozzle by turning **clockwise** (See Figure 6). Cut the wire off approximately 1/4" from the end of the nozzle.

Contact Tip Markings	Wire Size	
	mm	
.024"	or	.6
.030"	or	.8
.035"	or	.9
.040"	or	1.0

POLARITY

For gas shielded welding, connect the cable coming out of the torch to the (+) socket and the ground clamp cable to the (-) socket on the front panel. For flux-core (no-gas) welding, connect torch to (-) and work clamp to (+).

DUTY CYCLE / THERMOSTATIC PROTECTION

Welder duty cycle is the percentage of actual weld time that can occur in a ten minute interval. For example, at a 10% duty cycle, actual welding can occur for one minute, then the welder must cool for nine minutes.

Internal components of this welder are protected from overheating with an automatic thermal switch. A yellow lamp is illuminated on the front panel

Assembly (Continued)

if the duty cycle is exceeded. Welding operations may continue when the yellow lamp is no longer illuminated.

Handshield Assembly

1. Cut retainer stiffeners and detachable handle away from shield. Trim the excess plastic to remove sharp edges.
2. Insert filter lens.
3. Attach the stiffeners over the pins on the lens retainers (See Figure 6).

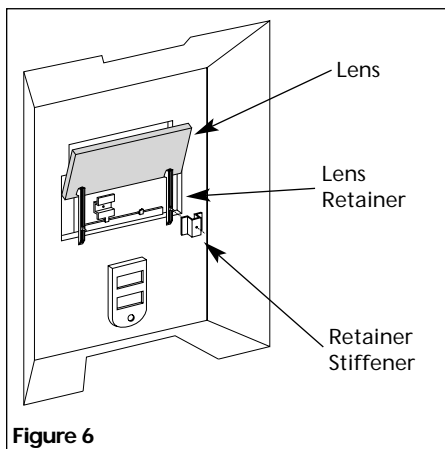


Figure 6

4. To attach the handle, place shield on a flat surface and press handle into place (See Figure 7).

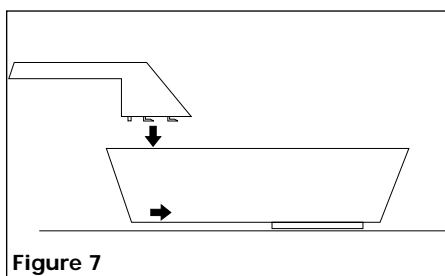


Figure 7

NOTE: If you have never welded before or have little experience, a full face helmet is recommended. Both hands are needed to stabilize and control the angle and arc length of the torch.

Shielding Gas Installation

⚠ DANGER *Improper handling and maintenance of compressed gas cylinders and regulators can result in serious injury*

or death! Always secure gas cylinders to the tank bracket kit, a wall or other fixed support to prevent the cylinder from falling over. Read, understand, and follow all the compressed gases and equipment hazards in the safety instructions.

NOTE: Shielding gas is not required if flux-cored welding wire is used.

GAS TYPES

There are 3 types of gas generally used for gas metal arc welding; 100% argon, a mixture of 75% argon and 25% carbon dioxide (C25) or 100% carbon dioxide. However, 100% carbon dioxide is not recommended due to unsatisfactory weld beads. This welder does not perform well with 100% carbon dioxide. The 75/25 mixture is recommended for general steel welding. For aluminum welding, use 100% argon. Cylinders of either type gas may be obtained at your local welding supply outlet. Secure cylinder in place on your welding machine or other support to prevent the cylinder from falling over.

NOTE: Use of incorrect gas may lead to little or no penetration of welding bead.

REGULATOR (NOT INCLUDED)

The regulator provides a constant shielding gas pressure and flow rate during the welding process.

HOOKUP PROCEDURE

⚠ WARNING *Cylinder gas is under high pressure. Point cylinder outlet away from yourself and any bystanders before opening.*

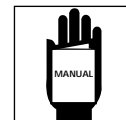
1. These units fit a 20 cubic ft bottle.
2. With the cylinder securely installed, remove the cylinder cap, stand to the side of the cylinder opposite the outlet, and open the valve slightly, turning counterclockwise. When gas is emitted from the cylinder, close the valve by turning clockwise. This will blow out dust or dirt that may have accumulated around the valve seat.
3. Install the regulator onto the cylinder valve, keeping the face of the gauges in the vertical position and tighten the stem nut securely to the gas valve.
4. Install one end of the gas hose (not included) to the fitting on the rear of the welder and the other end to the fitting on the regulator using hose clamps (not included) on each

connection. Make sure the gas hose is not kinked or twisted.

5. Once again, stand opposite the cylinder outlet and slowly open the cylinder valve. Inspect for leaks in the connections.
6. Pull the trigger on the gun to allow the gas to flow. While the trigger is pulled and gas is flowing, adjust the gas regulator to 30-35 cfh (cubic feet per hour). Release the trigger.
7. Remember to close the gas valve when finished welding.

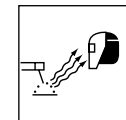
Operation

1. Be sure to read, understand, and comply with all precautions in the General Safety Information section. Be sure to read the entire section entitled Welding Guidelines prior to using this equipment.
2. Verify welder is off.
3. Verify that the surfaces of metals to be joined are free from dirt, rust, paint, oil, scale or other contaminants. These contaminants make welding difficult and cause poor welds.



⚠ DANGER

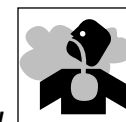
All persons operating this equipment or in the area while equipment is in use must wear protective welding gear including: eye protection with proper shade, flame resistant clothing, leather welding gloves, and full foot protection.



⚠ CAUTION **WHETHER OR NOT THE TRIGGER IS PULLED, the welding wire is LIVE whenever the welder is turned ON.**

⚠ WARNING

If heating, welding, or cutting materials that are galvanized, zinc plated, lead, or cadmium plated refer to the General Safety Information Section for instructions. Extremely toxic fumes are created when these metals are heated.



4. Connect the work clamp to the work piece or workbench (if metal). Make sure the contact is secure. Avoid surfaces with paint, varnish, corrosion, or non-metallic materials.
5. Position the Heat Selector on the front panel to the desired setting.

Wire Feed Arc Welder

Operation (Continued)

See application decal inside door of wire feed compartment for proper heat settings.

NOTE: These settings are general guidelines only. Heat setting may vary according to welding conditions and materials.

6. Rotate the Wire Speed Control to setting number 5 to start with, then adjust as needed after test weld.
7. Plug the input cord into a proper voltage receptacle with proper circuit capacity (See Chart under circuit requirements on page 1).
8. Switch the welder ON.
9. Verify that the wire is extended 1/4" from the contact tip. If not, squeeze the trigger to feed additional wire, release the trigger, and cut wire to proper length.
10. Position the wire feed gun near the work piece, lower the welding helmet by nodding the head, or position the hand shield, and squeeze the gun trigger. Adjust heat setting and wire speed as needed.
11. When finished welding, turn welder off and store properly.

Maintenance

⚠WARNING *Disconnect power supply and turn machine off before inspecting or servicing any components. Keep the wire compartment cover closed at all times unless the wire needs replacement.*

Before every use:

1. Check condition of weld cables and immediately repair or replace any cables with damaged insulation.
2. Check condition of power cord and immediately repair or replace any cord if damaged.
3. Inspect the condition of the gun tip and nozzle. Remove any weld slag. Replace gun tip or nozzle if damaged.

⚠WARNING *Do not operate this welding machine with cracked or missing insulation on welding cables, wire feed gun, or power cord.*

Every 3 months:

1. Replace any unreadable safety labels on the welder.
2. Use compressed air to blow all dust and lint from the ventilation openings.

3. Clean the wire groove on the drive roll. Remove wire from the feed mechanism, remove screws from the drive roll housing. Use a small wire brush to clean the drive roll. Replace if worn or damaged.

Consumer and Wear Parts

The following parts require routine maintenance:

- Wire feed drive roller
- Gun liner - replace if worn
- Nozzle/contact tips
- Wire - this welder will accept either 4" or 8" diameter spools. Welding wire is susceptible to moisture and oxidizes over time, so it is important to select a spool size that will be used within approximately 6 months. For mild steel welding, AWS ER70S6 solid wire or AWS E71T-GS flux-core wire is recommended.
- Contact tips - use Campbell Hausfeld, Tweco®, and other compatible tips.
- Nozzle - use Tweco® style or compatible nozzle. Use Campbell Hausfeld nozzle model WT5021 found at place of purchase of welder, or use Tweco® style nozzle (or compatible nozzle) found at local welding supply store.



MIG
WT5021

Figure 8 - Nozzle

Changing Wire Sizes

DRIVE ROLLER

There are two grooves in the Drive Roller. The small groove is for .024" (.6 mm) wire and the other is for .030" - .035" (.8 - .9 mm) wire. Remove the roller cover and flip the drive roll to choose the correct groove (see Parts Breakdown).

FLUX CORE WIRE

Due to small inconsistencies in wire diameter, using one size larger tip is recommended. For example:

- If wire diameter is .030, use .035 tip.
- If wire diameter is .035, use .040 tip.

This welder is setup for .035 (.9 mm) wire and has a .040 tip. Since this welder uses .030 and .035 Flux Core Wire, the drive roller should be in its factory pre-set condition.

MIG WIRE

Since MIG wire maintains fair wire diameter consistency, the contact tip used should match the wire size used. When using .024 (.6 mm) wire, use the small groove on the drive roller. When using .030 - .035 (.8 - .9 mm) MIG or Aluminum wire, use the factory set large groove.

ALUMINUM WIRE

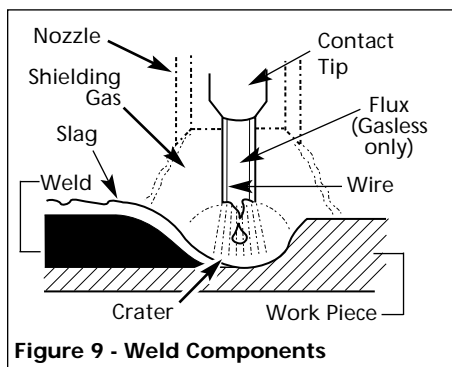
When using Aluminum wire, it is best to use a larger size tip than the wire size being used. For example:

- If wire diameter is .030, use .035 tip.
- When using .030 - .035 (.8 - .9 mm) MIG or Aluminum wire, use the factory set large groove. Aluminum wire is very weak and should not have the same tension on the drive roller as Flux Core or MIG wire should. When tensioning Aluminum wire down to the Drive Roller, turn the tension screw three full turns or until the Drive Roller begins to grip the wire and feed it through the torch cable.

**Call (800) 746-5641
for replacement parts.**

Welding Guidelines

General



This line of welding machines can utilize the Flux Cored Arc Welding (Gasless) process or the Gas Metal Arc Welding (MIG) process. The weld must be protected (shielded) from contaminants in the air while it is molten. The gasless process uses a tubular wire with a flux material inside. The flux creates a shielding gas when melted. The MIG process uses inert gas to shield the weld while molten. When current is produced by a transformer (welding machine) and flows through the circuit to the weld wire, an arc is formed between the end of the weld wire and the work piece. This arc melts the wire and the work piece. The melted metal of the weld wire flows into the molten crater and forms a bond with the work piece as shown (Figure 9).

Arc Welding Basics

Five basic techniques affect weld quality. These are: wire selection, heat setting, weld angle, wire speed, and travel speed. An understanding of these techniques is necessary for effective welds.

HEAT SETTING

The correct heat involves the adjustment of the welding machine to the required setting. Heat or voltage is regulated by a switch on the welder. The heat setting used depends on the size (diameter) and type of wire, position of the weld, and the thickness of the work piece. Consult specifi-

ications listed on the welder. It is suggested that the welder practice with scrap metal to adjust settings and compare welds with Figure 11.

WIRE TYPE AND SIZE

The correct choice of wire type involves a variety of factors, such as welding position, work piece material type, thickness and condition of surface to be welded. The American Welding Society, AWS, has set up certain requirements for each type of wire.

FLUX-CORE WIRE

E - 7 0 T - GS

—	Weld strength, times 10,000 psi
—	Welding positions (0 for flat or horizontal, 1 for any position)
—	Tubular flux core wire
—	Flux type

AWS E71T-GS or E71T-11 is recommended for this welder.

SOLID WIRE

ER - 70 S - 6

—	Weld strength, times 1,000 psi
—	Solid wire
—	Wire composition

ER-70S6 is recommended for this welder.

WELD ANGLE

Weld angle is the angle at which the nozzle is held during the welding process. Using the correct angle ensures proper penetration and bead formation. As different welding positions and weld joints become necessary, nozzle angle becomes an increasingly important factor in obtaining a satisfactory weld. Weld angle involves two positions - travel angle and work angle.

Travel angle is the angle in the line of welding and may vary from 5° to 45° from the vertical, depending on welding conditions.

Work angle is the angle from hori-

zontal, measured at right angles to the line of welding. For most applications, a 45° travel angle and 45° work angle is sufficient. For specific applications, consult an arc welding handbook.

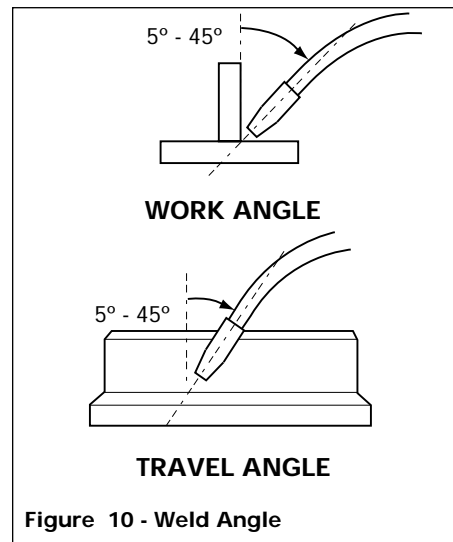


Figure 10 - Weld Angle

WIRE SPEED

The wire speed is controlled by the knob on the front panel. The speed needs to be "tuned" to the rate at which the wire is being melted in the arc. Tuning is one of the most critical functions in wire feed welding. Tuning should be performed on a scrap piece of metal the same type and thickness as that to be welded. Begin welding with one hand "dragging" the gun nozzle across the scrap piece while adjusting the wire speed with the other hand. Too slow of speed will cause sputtering and the wire will burn up into the contact tip. Too fast a speed will also cause a sputtering sound and the wire will push into the plate before melting. A smooth buzzing sound indicates the wire speed is properly tuned. For **aluminum**, wire speed is typically set higher (7 - 9 speed range).

NOTE: Repeat the tuning procedure each time there is a change in heat setting, wire diameter or type, or work piece material type or thickness.

TRAVEL SPEED

The travel speed is the rate at which the torch is moved across the weld area. Factors such as diameter and type of weld wire, amperage, position, and

Welding Guidelines (Continued)

work piece material thickness all affect the speed of travel necessary for completing a good weld (See Fig. 11). When the speed is too fast, the bead is narrow and bead ripples are pointed as shown. When the speed is too slow, the weld metal piles up and the bead is high and wide. For **aluminum**, travel speed is typically faster.

SLAG REMOVAL (FLUX-CORE WIRE ONLY)

⚠WARNING *Wear ANSI approved safety glasses (ANSI Standard Z87.1) and protective clothing when removing slag. Hot, flying debris can cause personal injury to anyone in the area.*

After completing the weld, wait for the welded sections to cool. A protective coating called slag now covers the weld bead which prevents contaminants in the air from reacting with the molten metal. Once the weld cools to the point that it is no longer glowing red, the slag can be removed. Removal is done with a chipping hammer. Lightly tap the slag with the hammer and break it loose from the weld bead. The final clean-up is done with a wire brush.

NOTE: When making multiple weld passes, remove the slag before each pass.

WELDING POSITIONS

Four basic welding positions can be used; flat, horizontal, vertical, and

overhead. Welding in the flat position is easier than any of the others because welding speed can be increased, the molten metal has less tendency to run, better penetration can be achieved, and the work is less fatiguing. Welding is performed with the wire at a 45° travel angle and 45° work angle.

Other positions require different techniques such as a weaving pass, circular pass, and jogging. A higher skill level is required to complete these welds.

Overhead welding is the least desirable position as it is the most difficult and dangerous. Heat setting and wire selection will vary depending upon the position.

All work should be performed in the flat position if possible. For specific applications, consult an arc welding technical manual.

WELD PASSES

Sometimes more than one pass is necessary to fill the joint. The root pass is first, followed by filler passes and the cover pass. If the pieces are thick, it may be necessary to bevel the edges that are joined at a 60° angle.

NOTE: Remember to remove the slag before each pass for gasless process.

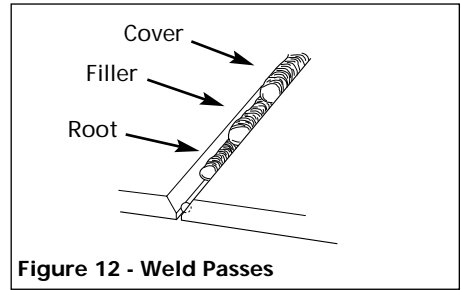


Figure 12 - Weld Passes

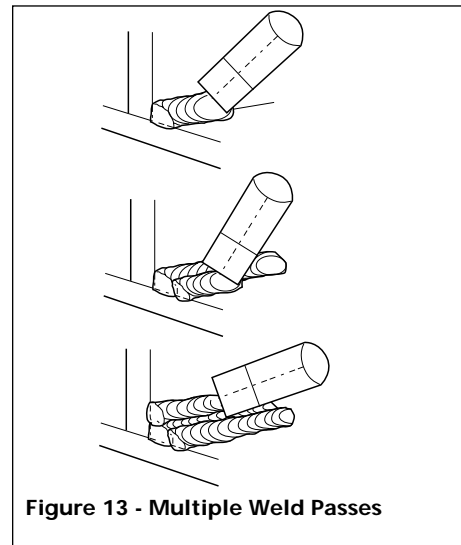


Figure 13 - Multiple Weld Passes

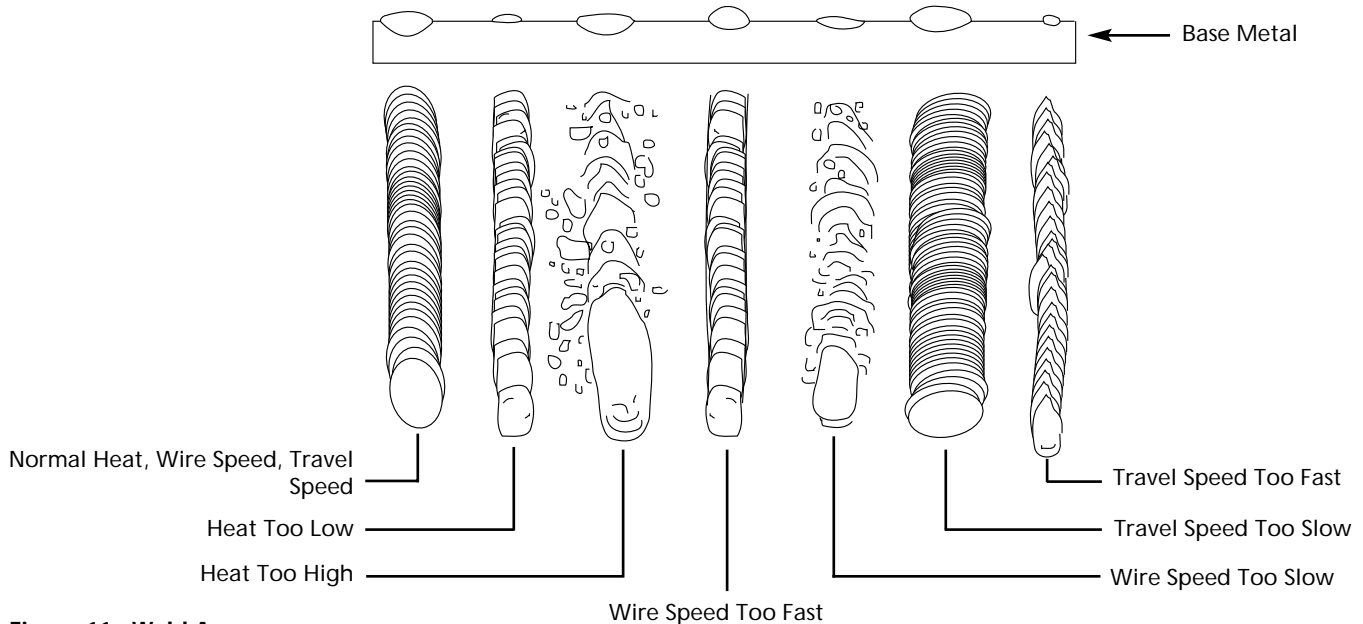
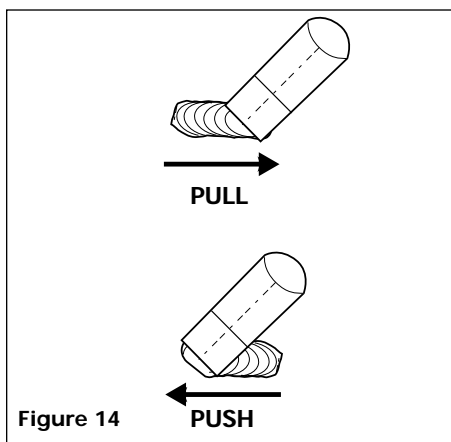


Figure 11 - Weld Appearance

Welding Guidelines (Continued)

PUSH VS PULL TECHNIQUE

The type and thickness of the work piece dictates which way to point the gun nozzle. For thin materials (18 gauge and up) and all aluminum, the nozzle should point out in front of the weld puddle and **push** the puddle across the workpiece. For thicker steel, the nozzle should point into the puddle to increase weld penetration. This is called backhand or **pull** technique (See Figure 14).



ALUMINUM WELDING

Any aluminum surface to be welded, must be cleaned thoroughly with a stainless steel brush to eliminate any oxides on the **weld** and **grounding** surface. 100% Argon **must** be used when welding aluminum. If Argon is not used, metal penetration is unlikely.

Supply Cable Replacement

1. Verify that welder is OFF and power cord disconnected.
2. Remove welder cover to expose the ON/OFF switch.
3. Disconnect the black and white power cord wires connected to the ON/OFF switch.
4. Disconnect the green power cord wire connected to welder frame.
5. Loosen the cord strain screw(s) and pull cord out of strain relief.
6. Install new cord in reverse order.

For Information About This Product, Call 1-800-746-5641

Troubleshooting Chart - Welder

Symptom	Possible Cause(s)	Corrective Action
No output	<ol style="list-style-type: none"> 1. Duty cycle exceeded 2. Poor ground clamp connection 3. Defective power switch 4. Blown breaker or fuse 	<ol style="list-style-type: none"> 1. Allow welder to cool until ON/OFF Switch lamp goes out 2. Be sure all connections are secure, and attaching surface is clean 3. Replace switch 4. Reduce circuit load, reset breaker or replace fuse
Wire tangles at drive roller	<ol style="list-style-type: none"> 1. Wrong size gun tip 2. Gun liner clogged or damaged 3. Gun tip clogged or damaged 4. Feed roller worn 5. Not enough tension 	<ol style="list-style-type: none"> 1. Use proper size gun tip 2. Clean or replace gun liner 3. Clean or replace gun tip 4. Replace 5. Tighten tensioning screw
Gun nozzle arcs to work surface	Slag inside gun nozzle	Clean slag from gun nozzle
Ground clamp and/or cable gets hot	<ol style="list-style-type: none"> 1. Poor contact 2. Using an extension cord with excessive length 	<ol style="list-style-type: none"> 1. Be sure all connections are secure, and attaching surface is clean 2. Never use an extension cord longer than 20 ft
Wire does not feed	<ol style="list-style-type: none"> 1. Wire jammed 2. Out of wire 3. Not enough tension 4. Wire liner worn 5. Wire disconnected internally 6. Contact tip clogged 	<ol style="list-style-type: none"> 1. Reload wire 2. Replace wire spool 3. Tighten tensioning screws if wire is slipping 4. Replace liner 5. Call 1-800-746-5641 for assistance 6. Replace contact tip
(Aluminum) Wire burns back into tip or (Aluminum) Metal bubbles or burns through	<ol style="list-style-type: none"> 1. Wire speed too slow 2. Travel speed too slow or heat is too high 	<ol style="list-style-type: none"> 1. Run speed in 7 - 10 range 2. Increase the travel speed or reduce heat settings

Troubleshooting Chart - Welds

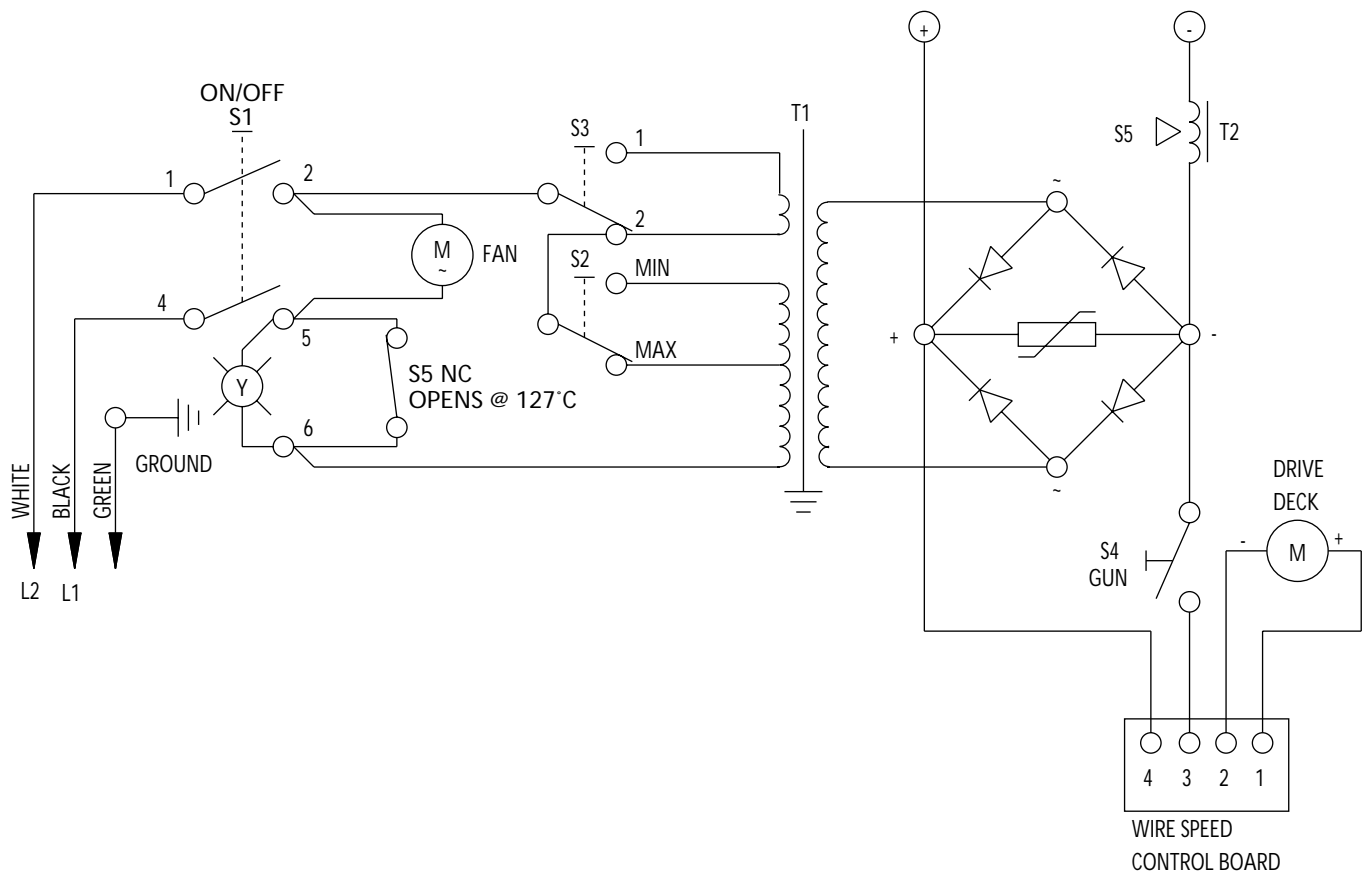
Symptom	Possible Cause(s)	Corrective Action
Bead is intermittently too thin	<ol style="list-style-type: none"> 1. Fast and/or inconsistent travel speed 2. Output heat setting too low 	<ol style="list-style-type: none"> 1. Decrease and maintain constant travel speed 2. Increase output heat setting
Bead is intermittently too thick	<ol style="list-style-type: none"> 1. Slow and/or inconsistent travel speed 2. Output heat setting too high 	<ol style="list-style-type: none"> 1. Increase and maintain travel speed 2. Reduce output heat setting
Ragged depressions at edge of weld	<ol style="list-style-type: none"> 1. Travel speed too fast 2. Wire speed too fast 3. Output heat setting too high 	<ol style="list-style-type: none"> 1. Decrease travel speed 2. Decrease wire speed 3. Reduce output heat setting
Weld bead does not penetrate base metal	<ol style="list-style-type: none"> 1. Inconsistent travel speed 2. Output heat setting too low 3. No or low shielding gas 4. Wrong shielding gas (aluminum) 5. Extension cord is too long 6. (Aluminum) Possible oxide build-up on surface 	<ol style="list-style-type: none"> 1. Decrease and maintain constant travel speed 2. Increase output heat setting 3. Use gas for MIG process or refill bottle 4. Use only 100% Argon gas 5. Never use an extension cord longer than 20 ft 6. Clean surface thoroughly with a stainless steel brush only
Wire sputters and sticks	<ol style="list-style-type: none"> 1. Damp wire 2. Wire speed too fast 3. Wrong type of wire 4. No or low shielding gas 	<ol style="list-style-type: none"> 1. Use dry wire and store in dry location 2. Reduce wire speed 3. Use flux core wire when not using gas 4. Use gas for MIG process or refill bottle

Limited 5-3-1 Warranty

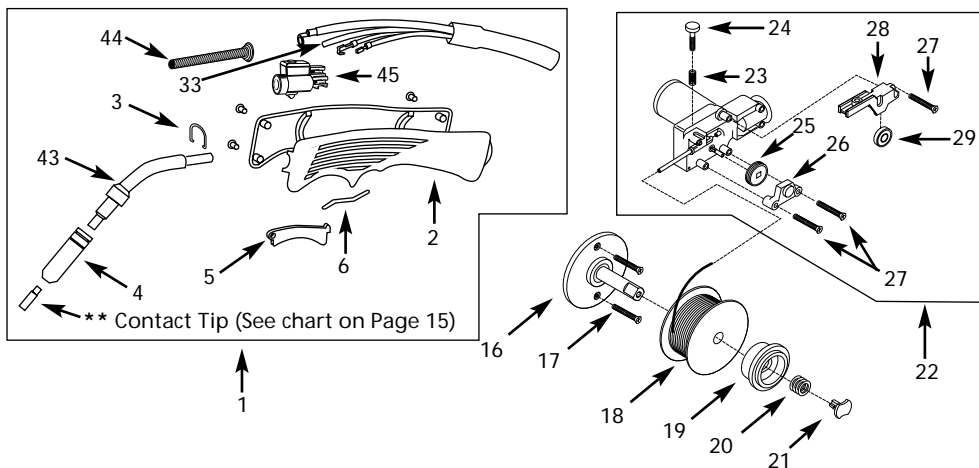
1. **Duration:** The manufacturer warrants that it will repair, at no charge for parts or labor, the Welder, Welding Gun, or Cables, proven defective in material or workmanship, during the following time period(s) after date of original retail purchase:
 - For 5 Years: The Welder Transformer and Rectifier
 - For 3 Years: The Entire Welder (excluding clamps, welding gun, electrode holder, cables, or accessories packed with welder)
 - For 1 Year: The Welding Clamps, MIG Gun, Electrode Holder, Accessories, and Welding Cables (as applicable)
2. **Who Gives This Warranty (Warrantor):**
 The Campbell Group / A Scott Fetzer Company
 100 Production Drive
 Harrison, OH 45030
 Telephone: (513)-367-4811
3. **Who Receives This Warranty (Purchaser):** The original purchaser of the Campbell Hausfeld product.
4. **What is covered under this warranty:** Defects in material and workmanship which occur within the duration of the warranty period. This warranty extends to the Welder, the Welders Transformer and Rectifier, Welding Gun or Electrode Holder, and cables only.
5. **What is not covered under this 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. Some states do not allow limitations on how long an implied warranty lasts, so above limitations may not apply to you.
 - B. ANY INCIDENTAL, INDIRECT, OR CONSEQUENTIAL LOSS, DAMAGE, OR EXPENSE THAT MAY RESULT FROM ANY DEFECT FAILURE OR MALFUNCTION OF THE CAMPBELL HAUSFELD PRODUCT. Some states do not allow limitations on how long an implied warranty lasts, so above limitations may not apply to you.
 - C. This warranty does not apply to any accessory items included with the product which are subject to wear from usage; the repair or replacement of these items shall be at the expense of the owner. These MIG items include but are not limited to: Contact Tips, Nozzles, Gun Liners, Drive Rollers, Felt Wire Cleaner. 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.
 - D. 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.
 - E. Pre-delivery service, i.e. assembly and adjustment.
7. **Responsibilities of Warrantor under this warranty:** Repair or replace, at Warrantor's option, products or components which have failed within duration of the warranty period.
8. **Responsibilities of purchaser under this warranty:**
 - A. Deliver or ship the Campbell Hausfeld product or component to Campbell Hausfeld. Freight costs, if any, must be borne by the purchaser.
 - B. Use reasonable care in the operation and maintenance of the products as described in the owner's manual(s).
9. **When Warrantor will perform repair or replacement under this warranty:** Repair or replacement will be scheduled and serviced according to the normal work flow at the servicing location, and depending on the availability of replacement parts.

This Limited Warranty gives you specific legal rights and you may also have other rights which vary from state to state.

WG3013 Wiring Diagram

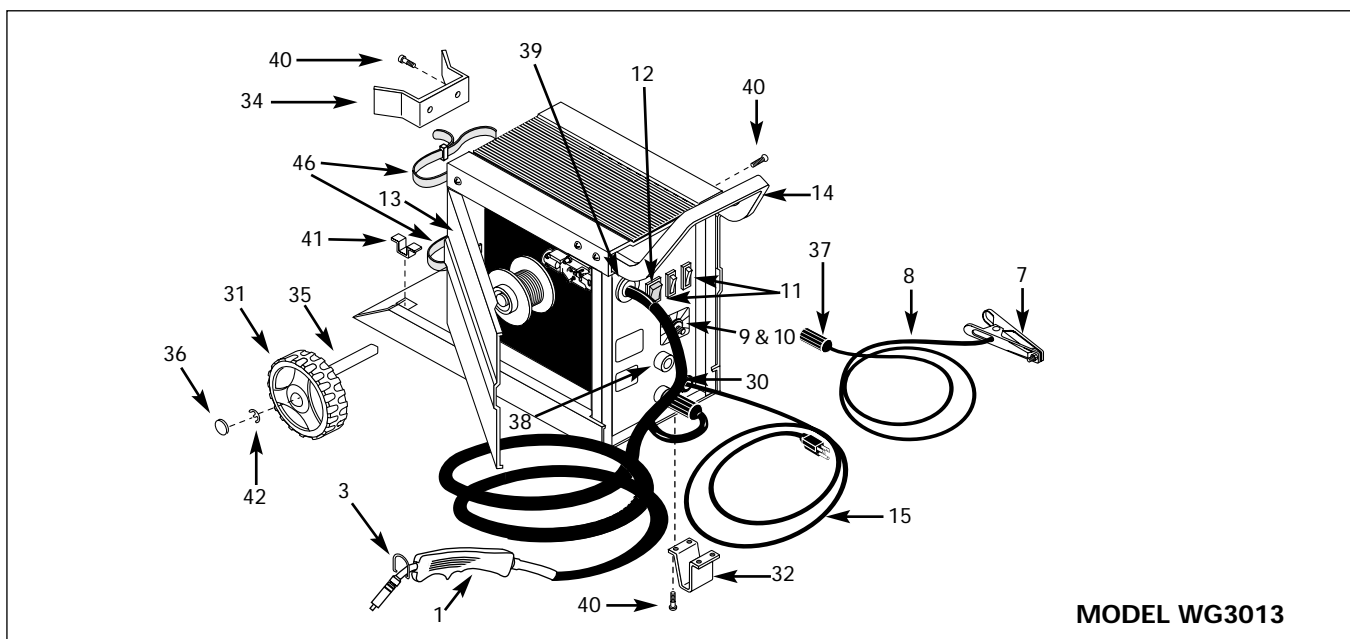


For Replacement Parts, call 1-800-746-5641



Please provide following information:
 - Model number
 - Serial number
 - Part description and number as shown in parts list

Address parts correspondence to:
 The Campbell Group
 Attn: Parts Department
 100 Production Drive
 Harrison, Ohio 45030 U.S.A.



MODEL WG3013

Wire Feed Arc Welder

Replacement Parts List - Models WG3013

Ref No.	Description	Part Number for Model: WG3013	Qty
1	Torch assembly and hose (Includes Nos. 2-6, 34, and 50-52)	WC600700AV	1
2	Torch body, front and back	WC600201AV	1
3	Hanger clip	WC600003AV	1
4	Nozzle, Tweco® Style	WT502100AJ	1
5	Trigger knob	WC600202AV	1
6	Torch contact spring	WC600203AV	1
7	Work clamp (Cord not included)	WC100100AV	1
8	Welding cable 8 AWG (6 ft)	*	1
9	Wire speed knob	WC400201AV	1
10	Wire speed control board	WC402100AV	1
11	Heat selector switch	WC400300AV	2
12	On/off switch	WC400000AV	1
13	Safety decal	DK670100AV	1
14	Handle	WC300600AV	1
15	Power cord 14-3 AWG (6 ft) Type SJT	*	1
16	Spool spindle	WC500300AV	1
17	#10-32 x .5" Pan head sheet metal screw	*	2
18	Wire	See Chart Below	1
19	Spool adapter	WC500200AV	1
20	Spool spring	WC500101AV	1
21	Spool locking hub	WC500100AV	1
22	Drive deck assembly (Includes Nos. 23-29)	WC500000AV	1
23	Tension spring	WC500003AV	1
24	Tension screw	WC500002AV	1
25	Roller .6-.9mm (.024-.035 in.)	WC500001AV	1
26	Roller cover	WC500004AV	1
27	#8-36 x 1.5" Pan head screw	*	3
28	Swing arm	WC500005AV	1
29	Swing arm roller	WC500007AV	1
30	Strain relief	WC102000AV	1
31	Wheel	WC701200AV	2
32	Front foot	WC702100AV	1
33	Liner, coated metal	WC600208AV	1
34	Gas cylinder bracket	WC702200AV	1
35	Axle	WC703100AV	1
36	Wheel hub	WC703500AV	1
37	Dinse connector	WC000200AV	2
38	Dinse socket	WC000300AV	2
39	Torch ring	WC600009AV	1
40	#10-24 x 1/2" Screw	*	9
41	Axle support	WC703600AV	2
42	5mm I.D. e-ring	*	2
43	Swan neck with Diffuser	WC600701AV	1
44	Trumpet liner	WC600305AV	1
45	Valve body	WC600204AV	1
46	Gas bottle strap	WC802000AV	1

* Standard hardware item, available at local hardware or welder supply store

OPTIONAL WIRE

Type	Description	Part Number (1 pound)	Part Number (10 pound)
Flux	E71T-GS .030"	WE200001AV	WE201000AV
Flux	E71T-GS .035"	WE200501AV	WE201500AV
MIG	ER70S6 .024"	WE300001AV	WE301500AV
MIG	ER70S6 .030"	WE300501AV	WE302000AV
MIG	ER70S6 .035"	WE301001AV	WE302500AV
Aluminum MIG	ER5356 .030"	WE303001AV	N/A

**OPTIONAL CONTACT TIPS (4/package)

Size		Part Number
mm	in.	
0.6	0.024	WT501200AJ
0.8	0.030	WT501300AJ
0.9	0.035	WT501400AJ

Glossary of Welding Terms

AC or Alternating Current - electric current that reverses direction periodically. Sixty cycle current travels in both directions sixty times per second.

Arc Length - the distance from the end of the electrode to the point where the arc makes contact with the work surface.

Base Metal - the material to be welded.

Butt Joint - a joint between two members aligned approximately in the same plane.

Crater - a pool, or pocket, that is formed as the arc comes in contact with the base metal.

DC or Direct Current - electric current which flows only in one direction. The polarity (+ or -) determines which direction the current is flowing.

DC Reverse Polarity - occurs when the electrode holder is connected to the positive pole of the welding machine. Reverse Polarity directs more heat into melting the electrode rather than the work piece. It is used on thinner material.

DC Straight Polarity - occurs when the electrode holder is connected to the negative pole of the welding machine. With straight polarity more heat is directed to the work piece for better penetration on thicker material.

Electrode - a coated metal wire having approximately the same composition as the material being welded.

Fillet Weld - approximately a triangle in cross-section, joining two surfaces at right angles to each other in a lap, T or corner joint.

Flux - a coating, when heated, that produces a shielding gas around the welding area. This gas protects the parent and filler metals from impurities in the air.

Flux Cored Arc Welding (FCAW) - also called Gasless, is a welding process used with a wire-feed welding machine. The weld wire is tubular with flux material contained inside for shielding.

Gas Metal Arc Welding (GMAW) - also called MIG, is a welding process used with a wire feed welding machine. The wire is solid and an inert gas is used for shielding.

Gas Tungsten Arc Welding (GTAW) - also called TIG, is a welding process used with welding equipment with a high frequency generator. The arc is created between a non-consumable tungsten electrode and the work piece. Filler metal may or may not be used.

Lap Joint - a joint between two overlapping members in parallel planes.

Open Circuit Voltage (OCV) - the voltage between the electrode and the work clamp of the welding machine when no current is flowing (not welding). The OCV determines how quickly the arc is struck.

Overlap - occurs when the amperage is set too low. In this instance, the molten metal falls from the electrode without actually fusing into the base metal.

Porosity - gas pockets, or cavities, formed during weld solidification. They weaken the weld.

Penetration - the depth into the work piece that has been heat effected by the arc during the welding process. A good weld achieves 100% penetration meaning that the entire thickness of the work piece has been heated and resolidified. The heat effected area should be easily seen on the opposite side of the weld.

Shielded Metal Arc Welding (SMAW) - also called Stick, is a welding process with uses a consumable electrode to support the arc. Shielding is achieved by the melting of the flux coating on the electrode.

Slag - a layer of flux soot that protects the weld from oxides and other contaminants while the weld is solidifying (cooling). Slag should be removed after weld has cooled.

Spatter - metal particles thrown from the weld which cool and harden on the work surface. Spatter can be minimized by using a spatter resistant spray on the work piece before welding.

Tack Weld - weld made to hold parts in proper alignment until final welds are made.

Travel Angle - the angle of the electrode in the line of welding. It varies from 5° to 45° depending on welding conditions.

T Joint - made by placing the edge of one piece of metal on the surface of the other piece at approximately a 90° angle.

Undercut - a condition that results when welding amperage is too high. The excessive amperage leaves a groove in the base metal along both sides of the bead which reduces the strength of the weld.

Weld Pool or Puddle - a volume of molten metal in a weld prior to its solidification as weld metal.

Weld Bead - a narrow layer or layers of metal deposited on the base metal as the electrode melts. Weld bead width is typically twice the diameter of the electrode.

Work Angle - the angle of the electrode from horizontal, measured at right angles to the line of welding.

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