These INSTRUCTIONS are for experienced operators. If you are not fully familiar with the principles of operation and safe practices for arc welding equipment, we urge you to read our booklet, "Precautions and Safe Practices for Arc Welding, Cutting, and Gouging", Form 52-529. Do NOT permit untrained persons to install, operate, or maintain this equipment. Do NOT attempt to install or operate this equipment until you have read and fully understand these instructions. If you do not fully understand these instructions, contact your supplier for further information. Be sure to read the Safety Precautions (Section 1) before installing or operating this equipment.
SAFETY PRECAUTIONS

WARNING: These Safety Precautions are for your protection. They summarize precautionary information from the references listed in Additional Safety Information section. Before performing any installation or operating procedures, be sure to read and follow the safety precautions listed below as well as all other manuals, material safety data sheets, labels, etc. Failure to observe Safety Precautions can result in injury or death.

PROTECT YOURSELF AND OTHERS -- Some welding, cutting, and gouging processes are noisy and require ear protection. The arc, like the sun, emits ultraviolet (UV) and other radiation and can injure skin and eyes. Hot metal can cause burns. Training in the proper use of the processes and equipment is essential to prevent accidents. Therefore:

1. Always wear safety glasses with side shields in any work area, even if welding helmets, face shields, and goggles are also required.
2. Use a face shield fitted with the correct filter and cover plates to protect your eyes, face, neck, and ears from sparks and rays of the arc when operating or observing operations. Warn bystanders not to watch the arc and not to expose themselves to the rays of the electric-arc or hot metal.
3. Wear flameproof gauntlet type gloves, heavy long-sleeve shirt, cuffless trousers, high-topped shoes, and a welding helmet or cap for hair protection, to protect against arc rays and hot sparks or hot metal. A flameproof apron may also be desirable as protection against radiated heat and sparks.
4. Hot sparks or metal can lodge in rolled up sleeves, trouser cuffs, or pockets. Sleeves and collars should be kept buttoned, and open pockets eliminated from the front of clothing
5. Protect other personnel from arc rays and hot sparks with a suitable non-flammable partition or curtains.
6. Use goggles over safety glasses when chipping slag or grinding. Chipped slag may be hot and can fly far. Bystanders should also wear goggles over safety glasses.

FIRES AND EXPLOSIONS -- Heat from flames and arcs can start fires. Hot slag or sparks can also cause fires and explosions. Therefore:

1. Remove all combustible materials well away from the work area or over the materials with a protective non-flammable covering. Combustible materials include wood, cloth, sawdust, liquid and gas fuels, solvents, paints and coatings, paper, etc.
2. Hot sparks or hot metal can fall through cracks or crevices in floors or wall openings and cause a hidden smoldering fire or fires on the floor below. Make certain that such openings are protected from hot sparks and metal.
3. Do not weld, cut or perform other hot work until the workpiece has been completely cleaned so that there are no substances on the workpiece which might produce flammable or toxic vapors. Do not do hot work on closed containers. They may explode.
4. Have fire extinguishing equipment handy for instant use, such as a garden hose, water pail, sand bucket, or portable fire extinguisher. Be sure you are trained in its use.

5. Do not use equipment beyond its ratings. For example, overloaded welding cable can overheat and create a fire hazard.
6. After completing operations, inspect the work area to make certain there are no hot sparks or hot metal which could cause a later fire. Use fire watchers when necessary.
7. For additional information, refer to NFPA Standard 51B, “Fire Prevention in Use of Cutting and Welding Processes”, available from the National Fire Protection Association, Battery March Park, Quincy, MA 02269.

ELECTRICAL SHOCK -- Contact with live electrical parts and ground can cause severe injury or death. DO NOT use AC welding current in damp areas, if movement is confined, or if there is danger of falling.

1. Be sure the power source frame (chassis) is connected to the ground system of the input power.
2. Connect the workpiece to a good electrical ground.
3. Connect the work cable to the workpiece. A poor or missing connection can expose you or others to a fatal shock.
4. Use well-maintained equipment. Replace worn or damaged cables.
5. Keep everything dry, including clothing, work area, cables, torch/electrode holder, and power source.
6. Make sure that all parts of your body are insulated from electrical parts and ground can cause severe injury or death.
7. Do not stand directly on metal or the earth while working in tight quarters or a damp area; stand on dry boards or an insulating platform and wear rubber-soled shoes.
8. Put on dry, hole-free gloves before turning on the power.
9. Turn off the power before removing your gloves.
10. Refer to ANSI/ASC Standard Z49.1 (listed on next page) for specific grounding recommendations. Do not mistake the work lead for a ground cable.

ELECTRIC AND MAGNETIC FIELDS — May be dangerous. Electric current flowing through any conductor causes localized Electric and Magnetic Fields (EMF). Welding and cutting current creates EMF around welding cables and welding machines. Therefore:

1. Welders having pacemakers should consult their physician before welding. EMF may interfere with some pacemakers.
2. Exposure to EMF may have other health effects which are unknown.
3. Welders should use the following procedures to minimize exposure to EMF:
   A. Route the electrode and work cables together. Secure them with tape when possible.
   B. Never coil the torch or work cable around your body.
   C. Do not place your body between the torch and work cable. Route cables on the same side of your body.
   D. Connect the work cable to the workpiece as close as possible to the area being welded.
   E. Keep welding power source and cables as far away from your body as possible.
FUMES AND GASES -- Fumes and gases, can cause discomfort or harm, particularly in confined spaces. Do not breathe fumes and gases. Shielding gases can cause asphyxiation. Therefore:

1. Always provide adequate ventilation in the work area by natural or mechanical means. Do not weld, cut, or gouge on materials such as galvanized steel, stainless steel, copper, zinc, lead, beryllium, or cadmium unless positive mechanical ventilation is provided. Do not breathe fumes from these materials.
2. Do not operate near degreasing and spraying operations. The heat or arc rays can react with chlorinated hydrocarbon vapors to form phosgene, a highly toxic gas, and other irritant gases.
3. If you develop momentary eye, nose, or throat irritation while operating, this is an indication that ventilation is not adequate. Stop work and take necessary steps to improve ventilation in the work area. Do not continue to operate if physical discomfort persists.
4. Refer to ANSI/ASC Standard Z49.1 (see listing below) for specific ventilation recommendations.
5. **WARNING:** This product, when used for welding or cutting, produces fumes or gases which contain chemicals known to the State of California to cause birth defects and, in some cases, cancer. (California Health & Safety Code §25249.5 et seq.)

CYLINDER HANDLING -- Cylinders, if mishandled, can rupture and violently release gas. Sudden rupture of cylinder, valve, or relief device can injure or kill. Therefore:

1. Use the proper gas for the process and use the proper pressure reducing regulator designed to operate from the compressed gas cylinder. Do not use adaptors. Maintain hoses and fittings in good condition. Follow manufacturer's operating instructions for mounting regulator to a compressed gas cylinder.
2. Always secure cylinders in an upright position by chain or strap to suitable hand trucks, undercarriages, benches, walls, post, or racks. Never secure cylinders to work tables or fixtures where they may become part of an electrical circuit.
3. When not in use, keep cylinder valves closed. Have valve protection cap in place if regulator is not connected. Secure and move cylinders by using suitable hand trucks. Avoid rough handling of cylinders.
4. Locate cylinders away from heat, sparks, and flames. Never strike an arc on a cylinder.
5. For additional information, refer to CGA Standard P-1, "Precautions for Safe Handling of Compressed Gases in Cylinders", which is available from Compressed Gas Association, 1235 Jefferson Davis Highway, Arlington, VA 22202.

EQUIPMENT MAINTENANCE -- Faulty or improperly maintained equipment can cause injury or death. Therefore:

1. Always have qualified personnel perform the installation, troubleshooting, and maintenance work. Do not perform any electrical work unless you are qualified to perform such work.
2. Before performing any maintenance work inside a power source, disconnect the power source from the incoming electrical power.
3. Maintain cables, grounding wire, connections, power cord, and power supply in safe working order. Do not operate any equipment in faulty condition.
4. Do not abuse any equipment or accessories. Keep equipment away from heat sources such as furnaces, wet conditions such as water puddles, oil or grease, corrosive atmospheres and inclement weather.
5. Keep all safety devices and cabinet covers in position and in good repair.
6. Use equipment only for its intended purpose. Do not modify it in any manner.

ADDITIONAL SAFETY INFORMATION -- For more information on safe practices for electric arc welding and cutting equipment, ask your supplier for a copy of "Precautions and Safe Practices for Arc Welding, Cutting and Gouging", Form 52-529.

The following publications, which are available from the American Welding Society, 550 N.W. LeJuene Road, Miami, FL 33126, are recommended to you:
1. ANSI/ASC Z49.1 - "Safety in Welding and Cutting"
2. AWS C5.1 - "Recommended Practices for Plasma Arc Welding"
3. AWS C5.2 - "Recommended Practices for Plasma Arc Cutting"
4. AWS C5.3 - "Recommended Practices for Air Carbon Arc Gouging and Cutting"
5. AWS C5.5 - "Recommended Practices for Gas Tungsten Arc Welding"
6. AWS C5.6 - "Recommended Practices for Gas Metal Arc Welding"
8. ANSI/AWS F4.1, "Recommended Safe Practices for Welding and Cutting of Containers That Have Held Hazardous Substances."

MEANING OF SYMBOLS - As used throughout this manual: Means Attention! Be Alert! Your safety is involved.

- **DANGER** Means immediate hazards which, if not avoided, will result in immediate, serious personal injury or loss of life.
- **WARNING** Means potential hazards which could result in personal injury or loss of life.
- **CAUTION** Means hazards which could result in minor personal injury.
**SECTION 1**

**DESCRIPTION**

1.1 **GENERAL**

The MINI-PRO 110 is a 110 ampere single-phase input Welding Machine which comes equipped with the following:

A. Built-in Wire Feeder and Wire Spool Hub
B. MT-140 Quick Connect Welding Torch and Cable
C. Work Cable and Clamp
D. Input Cord and Plug
E. Spare Parts Kit (3 tips)
F. Operational Manual

The welding system is designed for use with the following processes.

A. **GMAW - Gas Metal Arc Welding (MIG)** - Requires the use of a shielding gas and regulator.
B. **FCAW - Flux-Cored Arc Welding** - Does not require the use of a shielding gas.

As delivered from the factory, the Welding Machine is set up for .023" diameter solid wire. Optional kits are available to convert the torch and feed system to use the following wires. Refer to **OPTIONAL EQUIPMENT LIST** included in this manual.

A. .023" Solid Wire (Mild Steel)
B. .030" Solid and Self-shielding Wire (Mild Steel and Stainless Steel)
C. .035" Solid and Self-shielding Wire (Mild Steel and Stainless Steel)
D. .045" Self-shielding Wire (Mild Steel)
E. .035" Aluminum (5356)

1.2 **RATED CONDITIONS**

A. Rated output amperage ............ 110 amps dc
B. Rated output voltage .............. 18 volts dc
C. Rated duty cycle .................... 20%
D. Maximum open circuit voltage ...... 28.0 volts

---

![Figure 1-1. Specifications](image-url)
E. Input voltage rating ................... 115 volts ac

F. Input current at rated load ............... 29 amps

G. Input frequency phases .............................. 60 Hz single-phase

H. Input kilowatt at rated load ............... 2.88 kW

I. Welding torch length ...................... 10 ft (3.1 m)

J. Input cord length ...................... 6.0 ft (1.83 m)

K. Shielding gas ............................... CO₂ or C₂₅

L. Maximum wire spool size ......... 8 in. (203 mm)

M. Work cable length ...................... 10 ft (3.05 m)

1.3 MISCELLANEOUS FEATURES

A. The power source contains output welding terminals to conveniently change the polarity of the welding output.

B. A thermal overload device will turn the Machine off automatically if the duty cycle of the Machine is exceeded or if the Machine overheats for any reason. It automatically resets after the Machine has cooled.

C. The unit will accept the following spool sizes:
   1. 1 or 2 lbs spool (4" in diameter)
   2. 10 lbs spool size (8" in diameter)
   3. 14 lbs spool size (8" in diameter)

1.4 DESCRIPTION OF CONTROLS/OUTLETS (Power Source and Wire Feeder) (Figure 1-2)

1. Wire Feed Speed Control - Adjusts the wire feed speed which changes the welding amperage.

2. Weld Voltage Range Switch - Selects voltage setting. Four steps (ranges) are provided; 1 thru 4. A purge "O" setting is provided which turns off the welding output but allows the cooling fan to run.

3. Input Power Switch - Turns the input power on or off.

Figure 1-2. Controls/Outlets
4. Wire Spool Hub - Wire spool mounting location.

5. Feedhead Assembly - The wire threads through this assembly and is driven through the torch with the motor-driven feed roll.

6. Negative (-) Welding output terminal.


9. Torch Switch Connector - Torch switch leads connect at this point.

10. Quick Disconnect Torch Inlet Hole - Weld power torch connector inserts through this hole and into the torch connector and wire guide adaptor and into the feedhead assembly.

11. Torch Switch Leads are routed through this hole.

12. Work Cable and Clamp - Connects to item being welded.

13. Gas Valve - Controls the flow of shielding gas when using the GMAW process. It is not used with the FCAW process.


15. Lifting Handle

1.5 VOLT-AMPERE CURVES (Figure 1-3)

The volt-ampere curves show the minimum and maximum voltage and amperage output capabilities of the unit.

1.6 DUTY CYCLE (Figure 1-4)

Duty cycle is the percentage of each 10-minute period of time that the Welding Machine may be operated under rated load conditions. For example, a duty cycle of 30% means that the Machine can be operated at rated load for an average of 3 minutes of each 10-minute period of operation. During the remaining 7 minutes, the Machine must idle to permit proper cooling. Figure 1-4 enables the operator to determine the duty cycle at various welding amperages.
Figure 1-3. Volt-Ampere Curves

Figure 1-4. Duty Cycle Chart
Figure 1-5. Functional Block Diagram
Proper installation can contribute to the satisfactory and trouble-free operation of the Welding Machine. It is suggested that each step in this section be studied carefully and followed as closely as possible.

2.1 UNPACKING AND PLACEMENT

A. Immediately upon receipt of the equipment, inspect for damage which may have occurred in transit. Notify the carrier of any defects or damage at once.

NOTE

A box containing the output terminal safety cover is packed inside the Welding Machine for protection during shipment. Remove the top cover to locate and install this item.

B. After removing the components from the shipping container(s), check the containers for any loose parts. Remove all packing materials.

C. Check air passages of Welding Machine for any packing materials that may obstruct air flow through the Machine.

D. If the equipment is not to be installed immediately, store it in a clean, dry, well-ventilated area.

E. The location of the Welding Machine should be carefully selected to ensure satisfactory and dependable service. Choose a location relatively close to a properly fused supply of electrical power.

f. The Welding Machine components are maintained at proper operating temperatures by forced air drawn through the cabinet by the fan unit on the rear panel. For this reason, it is important the Machine be located in an open area where air can circulate freely at the front and rear openings. If space is at a premium, leave at least 1 foot of clearance between the rear of the Welding Machine and wall or other obstruction. The area around the unit should be relatively free of dust, fumes, and excessive heat. It is also desirable to locate the unit so the cover can be removed easily for cleaning and maintenance.

2.2 GROUNDING

The internal frame of this Welding Machine should be grounded for personnel safety. Where grounding is mandatory under state or local codes, it is the responsibility of the user to comply with all applicable rules and regulations. Where no state or local codes exist, it is recommended that the National Electrical Code be followed.

2.3 ELECTRICAL INPUT REQUIREMENTS

A cord with plug attached is provided. Connect the plug to a properly grounded and protected (fuse or circuit breaker) 120 V ac receptacle capable of handling a minimum of 15 amperes.

CAUTION

INCORRECT INPUT VOLTAGE CAN DAMAGE MACHINE or affect operation. Input voltage to Machine must be between 108 and 132 V ac at all times.

Consult nameplate for proper input voltage and input amperage. The method of installation, conductor size, and overcurrent protection shall conform to the requirements of the local electrical code. All installation wiring and Machine connection shall be done by a competent electrician.

The National Electrical Code (Article 630B., 1984 Edition) provides standards for amperage handling capability of supply conductors based on the duty cycle of the welding power source. This unit has a 20% duty cycle (2 minutes out of every 10 minutes can be used for welding); therefore, the cord and plug supplied with this unit comply with these standards. Ensure that the building supply and receptacle comply with NEC standards and any additional state and local codes.
NOTE

The supply wiring for the welding power source must be capable of handling a minimum of 15 amps. The welding power source must be the only load connected to the supply circuit. Poor unit performance or frequently opening line fuses or circuit breakers can result from an inadequate or improper supply.

Use table 2-1 for selection of the minimum wire size for extension cords.

<table>
<thead>
<tr>
<th>WIRE SIZE</th>
<th>LENGTH OF EXTENSION CORD</th>
</tr>
</thead>
<tbody>
<tr>
<td>14</td>
<td>50 FEET OR LESS</td>
</tr>
<tr>
<td>12</td>
<td>50 FEET TO 200 FEET</td>
</tr>
</tbody>
</table>

2.4 INSTALLATION OF SHIELDING GAS (GMAW) PROCESS (See Figure 2-1)

NOTE

Shielding gas is not required if the unit is used with the FCAW process. The shielding gas cylinder regulator/flowmeter and gas hose are not included as part of the welding package. Contact your local ESAB distributor.

GAS CYLINDER - Two types of gas are generally used with Gas Metal ARC Welding (GMAW) of thin gauge sheet steel. Carbon dioxide (CO₂) is the gas recommended for use with this welding power source/torch combination. A mixture of 75 percent argon and 25 percent carbon dioxide (C₂O) can also be used. Obtain a cylinder of selected shielding gas.

Chain the cylinder to a wall or other support to prevent the cylinder from falling over. If an optional portable mounting is used, follow the instructions provided with it.

REGULATOR/FLOWMETER - Regulator/flowmeters provide a constant shielding gas pressure and flow rate during the welding process. Because gases have different properties, each regulator/flowmeter is designed to be used with a specific gas or mixture of gases. Regulator/flowmeters cannot be changed from one gas to another unless the proper adapters are installed. Be sure to obtain the proper regulator/flowmeter for the type of gas used.

With the cylinder securely installed, remove the cylinder cap, stand to one side of cylinder valve, and open valve slightly. When gas is emitted from cylinder, close valve. This will blow out dust or dirt that may have accumulated around the valve seat.

The regulator/flowmeter must be properly equipped with a stem, nut connectors, and gasket for use with either CO2 cylinders or an inert gas type cylinder.

Install gas regulator/flowmeter onto gas cylinder valve; keep the face of the regulator/flowmeter gauge in the vertical position and tighten stem nut securely to gas cylinder valve.

GAS HOSE - Obtain good quality 5/8 in. (16 mm) O.D. S.A.E. gas hose, and install 5/8-18 right-hand thread fittings on both ends of hose.

Install one end of gas hose to fitting on rear of welding power source.

Install remaining end of gas hose to fitting on regulator/flowmeter. Be sure the gas hose is not kinked or twisted.

2.5 ATTACHING THE TORCH AND CABLE ASSEMBLY TO POWER SOURCE

A. Open the door on the Machine.

B. Connect the torch cable to the power source by plugging the torch cable through the case and into the torch connector.

The torch liner has to go into the wire adapter guide.

C. Secure the quick-connect fitting in place with the thumb head torch locking screw, which sticks out on the side of the torch connector (See Figure 2-3).

NOTE

Be sure that the thumb head locking screw is “backed out” far enough to allow the quick-connect fitting to go all the way in.
NOTE

The liner spring will be installed in the cable and secured in place with a setscrew. See the Torch Manual supplied with the torch. The procedure for replacing the liner spring will be found under the Spring Liner Replacement section in the Installation chapter of the Torch Manual.

D. Route the torch switch leads through the hole just above the work cable and connect the leads to the torch switch receptacle (See Figure 2-3).

E. When assembling torch and cable to the Welding Machine, take note of the following:

1. Lubricate the O-ring on the quick-connect fitting with grease (Dow Company #4 compound or equivalent).

2. When disconnecting torch switch leads from the Machine, grasp the connectors and pull; do not pull on the wires.

F. To remove the torch, simply reverse these directions.
SECTION 2

2.6 THREAD WIRE INTO THE FEEDHEAD AND WELDING TORCH

WARNING

ELECTRIC SHOCK CAN KILL! MAKE CERTAIN THE MACHINE IS UNPLUGGED FROM THE POWER RECEPTACLE. DO NOT PLUG MACHINE IN UNTIL TOLD TO DO SO IN THESE INSTRUCTIONS.

A. Installation of Welding Wire Spool with 8 in. diameter (See Figure 2-3).

1. Open the door on the Machine.
2. Remove all packing from the spool of wire.
3. Grasp the spool nut and turn it counterclockwise, removing it from the hub.
4. Slide the wire spool onto the hub, loading it so that the wire will feed off of the spool as the spool rotates counterclockwise.
5. Make sure that the locating pin on the spool hub lines up with the hole in the spool.
6. When spool of wire is in place, replace the spool nut and tighten snug by hand.

NOTE

The hub tension has been preadjusted at the factory. However, if adjustment is required, simply rotate plastic wingnut counterclockwise to reduce tension and clockwise to increase tension.

B. Installation of Welding Wire Spool with 4 in. diameter and 5/8 in. hole (See Figure 2-4).

1. Open the door on the Machine.
2. Remove the spool hub and spool nut from metal hub shaft. This is done by removing the plastic wingnut(s) and two washers which secure the spool hub.
3. Store the spool hub and spool nut in the bottom of the Machine toward the rear.

C. Threading Wire (See Figure 2-3).

Use care in handling the spooled wire as it will tend to unravel when loosened from the spool. Grasp the end of the wire firmly, and don't let go of it. Make sure end of wire is free of any burrs and is straight.

1. Place end of wire into the Input Wire Guide, feeding it through the rear guide and over the drive roll groove. Make certain the proper groove is being used.

NOTE

It is best if the Drive Roll Pressure Arm is in the UP position when threading the wire into the feedhead.

The drive roll consists of two different sized grooves. As delivered from the factory, the drive roll is installed to feed .023 inch diameter wire. As shown in figure 2-2, the stamped marking on the end surface of the drive roll refers to the groove on the opposite side of the drive roll. The groove closest to the motor is the proper groove to thread.

This also applies to any optional drive roll for other wire sizes. To change the drive roll, simply remove the restraining screw and reinstall drive roll with proper groove next to motor.
SECTION 2

INSTALLATION

When changing feed rolls, make sure the Woodruff key is on the motor shaft and not in the old feed roll.

2. Pass the wire into the Wire Adapter Guide and into Torch Liner.

3. Close the Drive Roll Pressure Arm and lock in position. Tighten plastic nut on pressure arm to a snug position.

4. Plug the welding power source into 120-volt receptacle.

5. Turn the Welding Machine ON with the power switch on the front panel; set the Wire Feed Speed to 5. Set the Weld Voltage Range Switch to 1, 2, 3, or 4. Straighten the torch cable. Activate the torch switch until the wire feeds out past the torch nozzle. Cut off wire within 1/4 inch (6 mm) from the nozzle.

6. Turn the Welding Machine OFF and unplug input cord.

2.7 POLARITY CHANGEOVER (See Figure 2-5)

As delivered from the factory, the output polarity is connected for DCEP (reverse polarity). See table 2-2 and figure 2-5 for proper connections of cables to output terminals. The output terminals are located inside the door on the interior panel of the power source.

CAUTION

When changing feed rolls, make sure the Woodruff key is on the motor shaft and not in the old feed roll.

WARNING

ELECTRIC SHOCK CAN KILL! WITH THE TORCH SWITCH (LOCATED ON THE TORCH) ACTIVATED, WELDING POWER IS APPLIED TO THE OUTPUT TERMINALS, FEED ROLL, GROUND CLAMP, TORCH CABLE CONNECTION, AND WELDING WIRE. DO NOT TOUCH THESE PARTS WITH THE TORCH SWITCH ACTIVATED.

WARNING

IF GROUND CONNECTION CLAMP IS IN PLACE ON THE WORKPIECE, THE WIRE WILL ARC WITH THE WORKPIECE. THE ELECTRODE IS ELECTRICALLY "HOT" WHEN TORCH SWITCH IS ACTIVATED.
Figure 2-3. Threading Wire Into Feedhead and Torch

Figure 2-4. Installation of 4-inch Spool
Table 2-2. Polarity Changeover

<table>
<thead>
<tr>
<th>PROCESS</th>
<th>POLARITY</th>
<th>CABLE CONNECTIONS</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. GMAW - Solid Wire with Shielding Gas</td>
<td>1. DCEP - Reverse Polarity</td>
<td>1. Connect to (+) output terminal</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1. Connect to (-) output terminal</td>
</tr>
<tr>
<td>2. FCAW - Self-shielding Wire - No Shielding Gas</td>
<td>2. DCEN - Straight Polarity</td>
<td>2. Connect to (-) output terminal</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2. Connect to (+) output terminal</td>
</tr>
</tbody>
</table>

**Figure 2-5. Polarity Changeover**
3.1 GENERAL

**WARNING**

ELECTRIC SHOCK CAN KILL! DO NOT OPERATE THE MACHINE WITH THE DOOR OPEN.

**CAUTION**

Do not pull the Machine with the torch. Damage can occur to the torch, torch liner, and Machine. Avoid bending the torch cable with a sharp radius. Damage can occur to the torch liner.

3.2 GAS METAL-ARC WELDING (GMAW)

See Welding Guidelines chapter included in this manual.

- A. Make all necessary connections as instructed in the Installation chapter.
- B. Place the Weld Voltage Range Switch (see Figure 1-2) at the desired setting.

**CAUTION**

Do not turn Weld Voltage Range Switch clockwise past position 4. Damage can occur to the switch.

- C. Rotate the WIRE SPEED Control to the desired position.
- D. Plug the input cord into a 120-volt, 15-amp receptacle.
- E. Open the gas cylinder valve to supply shielding gas to the torch.
- F. Connect the WORK clamp to the workpiece (material to be welded).
- G. Place the welding machine Power ON/OFF switch to the ON position.

**WARNING**

BE SURE TO PUT ON PROPER PROTECTIVE CLOTHING AND EYE SAFEGUARDS (WELDING COAT, APRON, GLOVES, AND WELDING HELMET, WITH PROPER LENSES INSTALLED). SEE SAFETY INSTRUCTIONS AND WARNINGS CHAPTER INCLUDED IN THIS MANUAL. NEGLECT OF THESE PRECAUTIONS MAY RESULT IN PERSONAL INJURY.

- H. Extend wire from torch and cut to proper stickout for that type wire (when welding, always maintain this distance). See figure 6-7 in Welding Guidelines chapter of this manual.
- I. Position torch to where it is approximately right angles to the workpiece, with proper wire stickout, lower your welding helmet, and pull the torch switch (trigger).

**NOTE**

To help you overcome any problems that might arise, you will find useful information in the Welding Guidelines chapter, and in particular, under the Welding Techniques section in that chapter.

3.3 FLUX-CORED ARC WELDING (FCAW)

Follow the same general procedure as with the GMAW process above. Shielding gas is not required for this process. For differences in the process, see Welding Guidelines chapter included in this manual. Also included is information to solve any problem related to the Flux-Cored Arc Welding process.
SECTION 3  
OPERATION

3.4 SHUTDOWN PROCEDURE

A. Close gas cylinder valve (GMAW process only).

B. Press Torch Switch to vent gas line (GMAW process only).

C. Place the Welding Machine Power ON/OFF Switch in the OFF position.

D. Unplug the Machine.

![WARNING]

AFTER RELEASING TORCH SWITCH, THE WIRE WILL REMAIN ELECTRICALLY HOT FOR SEVERAL SECONDS.

3.5 WELDING GUIDE

Refer to table 3-1 for welding parameters of the MINI-PRO 110 single-phase Welding Machine.
Table 3-1. Welding Guide  
(Settings are approximate. Adjust as required.)

<table>
<thead>
<tr>
<th>TO WELD:</th>
<th>Thickness (Inches/Gauge)</th>
<th>Wire Size</th>
<th>Gas</th>
<th>Gas Flow (Cubic Ft/Hr)</th>
<th>Polarity</th>
<th>Welding Voltage</th>
<th>Wire Speed</th>
<th>Wire Stickout (Inches)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Auto body</td>
<td>.022&quot; 24 GA (.023)</td>
<td>CO₂ or C25</td>
<td></td>
<td>20</td>
<td>DCEP</td>
<td>1</td>
<td>5.5</td>
<td>1/4</td>
</tr>
<tr>
<td>Lawnmower handles, wagons, tricycles, duct</td>
<td>3/64&quot; 18 GA (.030) (.035)</td>
<td>CO₂ or C25</td>
<td></td>
<td>20</td>
<td>DCEP</td>
<td>1</td>
<td>6</td>
<td>1/4</td>
</tr>
<tr>
<td>work, auto door brackets, tailpipes, bicycles</td>
<td></td>
<td>CO₂ or C25</td>
<td></td>
<td>--</td>
<td>DCEN</td>
<td>16</td>
<td>4.5</td>
<td>5/16</td>
</tr>
<tr>
<td>Wheelbarrows, lawnmower decks, basketball</td>
<td>1/16&quot; 16 GA (.030) (.035)</td>
<td>CO₂ or C25</td>
<td></td>
<td>20</td>
<td>DCEP</td>
<td>2</td>
<td>6.5</td>
<td>5/16</td>
</tr>
<tr>
<td>posts, galvanized roofing, trailer sides,</td>
<td></td>
<td>CO₂ or C25</td>
<td></td>
<td>20</td>
<td>DCEP</td>
<td>2</td>
<td>6</td>
<td>5/16</td>
</tr>
<tr>
<td>garage door tracks, tailpipes, motorcycles</td>
<td></td>
<td>CO₂ or C25</td>
<td></td>
<td>--</td>
<td>DCEN</td>
<td>2</td>
<td>5.5</td>
<td>1/4</td>
</tr>
<tr>
<td>Fencing, lawnmower decks, trailers, trailer</td>
<td>1/8&quot; 11 GA (.023) (.030)</td>
<td>CO₂ or C25</td>
<td></td>
<td>20</td>
<td>DCEP</td>
<td>3</td>
<td>7</td>
<td>5/16</td>
</tr>
<tr>
<td>frames, wheelbarrows, garage door brackets,</td>
<td></td>
<td>CO₂ or C25</td>
<td></td>
<td>20</td>
<td>DCEP</td>
<td>3</td>
<td>6.5</td>
<td>1/2</td>
</tr>
<tr>
<td>grain wagons, balers, combines, bumpers</td>
<td></td>
<td>CO₂ or C25</td>
<td></td>
<td>--</td>
<td>DCEN</td>
<td>3</td>
<td>6</td>
<td>1/2</td>
</tr>
<tr>
<td>Trailer hitches, door hinge brackets, axles,</td>
<td>3/16&quot; 7 GA (.023) (.030)</td>
<td>CO₂ or C25</td>
<td></td>
<td>20</td>
<td>DCEP</td>
<td>4</td>
<td>8</td>
<td>1/2</td>
</tr>
<tr>
<td>&quot;A&quot; frames, farm equipment frames, basketball</td>
<td></td>
<td>CO₂ or C25</td>
<td></td>
<td>20</td>
<td>DCEP</td>
<td>4</td>
<td>7</td>
<td>1/2</td>
</tr>
<tr>
<td>rims, and brackets</td>
<td></td>
<td>CO₂ or C25</td>
<td></td>
<td>--</td>
<td>DCEN</td>
<td>4</td>
<td>6</td>
<td>1/2</td>
</tr>
<tr>
<td>Stainless steel fryers, counter tops, kitchen</td>
<td>1/16&quot; 16 GA (.030)</td>
<td>C25</td>
<td></td>
<td>20</td>
<td>DCEP</td>
<td>2</td>
<td>6.5</td>
<td>5/16</td>
</tr>
<tr>
<td>equipment</td>
<td></td>
<td>C25</td>
<td></td>
<td>--</td>
<td>DCEP</td>
<td>4</td>
<td>7.5</td>
<td>1/2</td>
</tr>
<tr>
<td>Aluminum</td>
<td>1/16&quot; 16 GA (.035)</td>
<td>Argon</td>
<td></td>
<td>20</td>
<td>DCEP</td>
<td>3</td>
<td>10</td>
<td>1/4</td>
</tr>
</tbody>
</table>

CO₂ = Carbon Dioxide  
C25 = 75% Argon + 25% Carbon Dioxide
SECTION 4  MAINTENANCE

4.1  GENERAL

If this equipment does not operate properly, stop work immediately and investigate the cause of the malfunction. Maintenance work must be performed by an experienced person, and electrical work by a trained electrician. Do not permit untrained persons to inspect, clean, or repair this equipment. Use only recommended replacement parts.

BE SURE THAT THE WALL DISCONNECT SWITCH OR CIRCUIT BREAKER IS OPEN BEFORE ATTEMPTING ANY INSPECTION OR WORK ON THE INSIDE OF THE POWER SOURCE.

4.2  CLEANING OF THE UNIT

Periodically remove the right side panel and blow out the interior with clean, dry, compressed air of not more than 25 psi air pressure. Do not strike any components with the air hose nozzle.

4.3  CLEANING OF THE DRIVE ROLLS

Clean the wire groove on the drive roll at frequent intervals. This cleaning operation can be done by using a small wire brush. To clean the wire groove, loosen the pressure nut and lift the drive roll pressure arm. Remove all wire from the feedhead. Wipe off the bearing roll (top roll).
Check the problem against the symptoms in the following troubleshooting guide. The remedy may be quite simple. If the cause cannot be quickly located, open up the Power Source and perform a simple visual inspection of all the components and wiring. Check for secure terminal connections, loose or burned wiring or components, or any other sign of damage or discoloration.

**WARNING**

BE SURE THAT ALL 3-PHASE PRIMARY POWER TO THE POWER SOURCE HAS BEEN EXTERNALLY DISCONNECTED. OPEN WALL DISCONNECT SWITCH OR CIRCUIT BREAKER BEFORE ATTEMPTING INSPECTION OR WORK INSIDE OF THE POWER SOURCE.

IF POWER SOURCE IS OPERATING IMPROPERLY, THE FOLLOWING TROUBLESHOOTING INFORMATION MAY BE USED TO LOCATE THE SOURCE OF THE TROUBLE.

**TROUBLESHOOTING GUIDE**

**Fan motor runs slow**

Low primary voltage

Connect welding power source to proper input voltage.

**Output normal; fan motor does not run**

Fan motor defective

Replace fan motor.

Loose connections to fan motor

Check connections to fan motor.

**No output; fan motor does not run**

Power switch defective

Replace power switch.

Line fuse open or circuit breaker tripped

Replace line fuse if necessary or reset circuit breaker.

Loose primary connections

Check tightness of all primary connections.
No open-circuit voltage; fan motor runs - wire feed motor does not run

   Contactor points defective
       Replace contactor.
   Contactor coil defective
       Replace contactor.

Wire does not feed; fan motor runs and open-circuit voltage is normal

   Circuit breaker tripped
       Check for defective feed motor.
   Wire speed adjustment control open
       Check rheostat.
   Rectifier defective
       Replace rectifier.
   Wire drive motor is defective
       Replace motor.

Erratic weld output

   Check leads and contacts of voltage range switch
       Discoloring of brass contacts could indicate heating caused by loose connections.
       Replace switch if necessary.
   Capacitor defective
       Replace capacitor.
   Loose connections on output terminals
       Secure connections.
   Ground clamp loose at WORK connection
       Check ground clamp for secure attachment.
   Torch liner dirty
       Check torch liner and replace if necessary.
SECTION 5  TROUBLESHOOTING

Voltage and wire feed settings are not correct

Readjust as necessary.

Wire feed motor operates, but wire does not feed

Too little pressure on wire feed roll

Increase pressure adjustment.

Incorrect wire groove

Check wire size stamped on outside of feed roll. Match to wire size. See Figure 2-2.

Restriction in torch or cable assembly

Examine cable, torch, and current contact tip for damage and correct size. Make sure correct contact tip and liner is being used.

Wire wraps around the drive roll

Too much feed roll pressure

Decrease the pressure adjustment on the drive roll pressure arm.

Incorrect liner or contact tip

Make sure that liner and/or contact tip is correct for the size of wire being fed.

No speed control

Broken or loose wires in wire feed control circuit

Correct by checking all connections.

Rheostat is open

Replace the rheostat.

Knob loose on rheostat

Tighten knob.

Wire feeds but no gas flows

Failure of gas valve solenoid

Replace.

Loose or broken wires to gas valve solenoid

Check all connections.
Gas cylinder valve not open or flowmeter not adjusted

Open gas valve at cylinder and adjust flowmeter.

Gas cylinder empty

Replace.

Restriction in gas line

Check gas hose between flowmeter and Machine, and gas hose in torch and cable assembly.

Torch nozzle plugged

Clean torch nozzle.

**Welding current not stable**

Wire slipping in rolls

Readjust pressure on the drive roll pressure arm.

Restriction in torch cable or torch

Check Welding Torch.

Wrong size liner or contact tip

Match liner and contact tip to electrode wire size.

Incorrect voltage adjustment for selected wire speed on the Welding Machine

Readjust. See Welding Guide in Operation chapter.

Loose connection on the welding leads or WORK table

Check and tighten all connections.

**Jerky or erratic wire feeding**

Liner dirty or damaged

Replace liner.

Worn or damaged contact tip

Replace contact tips.

Wrong groove used on drive roll

Use correct groove or correct drive roll.
SECTION 5 TROUBLESHOOTING

**Welding current stops during welding**

*Overtemperature device trips*

Allow Machine to cool for several minutes and resume welding.

*Input circuit breaker or fuses clear*

Reset breaker or replace fuses.

**Contact chatters**

*Low line voltage*

Check line voltage.

*Extension cord leads too small and too long*

Use larger leads and shorter extension cord.
Figure 5-1. MINI-PRO 110 Schematic Diagram
6.1 GENERAL

Two different welding processes are covered in this section, with the intention of providing the very basic concepts in using the semiautomatic mode of welding, where a welding torch is hand-held, the electrode (welding wire) is fed into a weld puddle, and the arc is shielded by a gas or gas mixture.

GAS METAL ARC WELDING (GMAW) -- This process, also known as MIG welding, CO₂ welding, short arc welding, dip transfer welding, wire welding, etc., is an electric arc welding process which fuses together the parts to be welded by heating them with an arc between a solid continuous, consumable electrode and the work. Shielding is obtained from an externally supplied gas or gas mixture. The process is normally applied semiautomatically; however, the process may be operated automatically and can be Machine operated. The process can be used to weld thin and fairly thick steels and some nonferrous metals in all positions.

FLUX-CORED ARC WELDING (FCAW) -- This process is an electric arc welding process which fuses together the parts to be welded by heating them with an arc between a continuous flux filled electrode wire and the work. Shielding is obtained through decomposition of the flux within the tubular wire. Additional shielding may or may not be obtained from an externally supplied gas or gas mixture. The process is normally applied semiautomatically, but can be applied automatically or by Machine. It is commonly used to weld medium to thick steels using large diameter electrodes in the flat and horizontal position and small electrode diameters in all positions. The process is used to a lesser degree for welding stainless steel and for overlay work.

6.2 WELD STARTING PROCEDURE

Follow these instructions only after referring to the Safety Instructions and Warnings section of this manual, and instructions in the Installation section.

6.3 CHECK LIST BEFORE STARTING

POLARITY (DCEP - Direct Current Electrode Positive) or (DCEN - Direct Current Electrode Negative)

WIRE FEED SPEED (1 to 10)

VOLTAGE RANGE SETTING (1 thru 4)

GAS FLOW RATE (15 to 25 CFH)

NOTE

See Table on inside of the Welding Machine.

ELECTRODE WIRE STICKOUT - See Figure 6-7 or Welding Guide, Table 3-1.

6.4 WELDING TORCH POSITIONS

The welding torch should be held at an angle to the weld joint. See paragraph C in Secondary Adjustable Variables section following, and see Figures 6-3 thru 6-9.

Hold the torch so that the welding seam is viewed at all times. Always wear the welding helmet with proper filter lenses.
Do not pull the welding torch back when the welding arc is established. This will create excessive wire extension (stickout) and make a very poor weld.

The electrode wire is not energized until the torch switch trigger is depressed. The wire may therefore be placed on the seam or joint prior to lowering the helmet.

6.5 MIG WELDING (GMAW) VARIABLES

Most of the welding done by all processes is on carbon steel. The items below describe the welding variables in short-arc welding of 24 gauge to 3/16 inch mild sheet or plate. The applied techniques and end results in the GMAW process are controlled by these variables.

6.6 PRESELECTED VARIABLES

Preselected variables depend upon the type of material being welded, the thickness of the material, the welding position, the deposition rate, and the mechanical properties. These variables are:

A. Type of electrode wire
B. Size of electrode wire
C. Type of gas (not applicable to self-shielding FCAW)
D. Gas flow rate (not applicable to self-shielding FCAW)

Tables 6-1, 6-2, and 6-3 are references for the new MIG welding process user.

6.7 PRIMARY ADJUSTABLE VARIABLES

These control the process after preselected variables have been found. They control the penetration, bead width, bead height, arc stability, deposition rate, and weld soundness. They are:

A. Arc voltage
B. Welding current (wire feed speed)
C. Travel speed
6.8 SECONDARY ADJUSTABLE VARIABLES

These variables cause changes in primary adjustable variables which in turn cause the desired change in the bead formation.

They are:

A. Stickout (distance between the end of the contact tube [tip] and the end of the electrode wire). See Figure 6-7. Maintain about 3/8” (9.5 mm) stickout.

B. Wire Feed Speed. Increase in wire feed speed increases weld current. Decrease in weld feed speed decreases weld current.

C. Nozzle Angle. Refers to the position of the welding torch in relation to the joint, as shown in Figures 6-3 thru 6-6, 6-8, and 6-9. The transverse angle is usually one-half the included angle between plates forming the joint. The longitudinal angle is the angle between the center line of the welding torch and a line perpendicular to the axis of the weld.

The longitudinal angle is generally called the nozzle angle, and is shown in Figure 6-9 as either trailing (pulling) or leading (pushing). Whether the operator is left-handed or right-handed has to be considered to realize the effects of each angle in relation to the direction of travel.

6.9 ESTABLISHING THE ARC AND MAKING WELD BEADS

Before attempting to weld on a finished piece of work, it is recommended that practice welds be made on sample metal of the same material as that of the finished piece.

The easiest welding procedure for the beginner to experiment with in MIG welding is the flat position. The equipment is capable of flat, vertical, and overhead positions.

For practicing MIG welding, secure some pieces of 16 or 18-gauge mild steel plate 6 inches X 6 inches. Use .023 wire and CO₂ shielding gas.
6.10 PREWELD PROCEDURE

A. Check the operational chapter of this manual for details on equipment.

B. Set the welding voltage range at position 1 or 2.

C. Set the Wire Feed Speed Control on about the number 6 setting. Readjust as necessary.

D. Adjust the gas flow rate to about 20 cubic feet per hour.

E. Recess the contact tip from the front edge of the nozzle from 0 to about 1/8 inch.

F. Review standard safe practice procedures in ventilation, eye and face protection, fire, compressed gas, and preventive maintenance. See Safety Precautions included with this manual.

6.11 WELDING PROCEDURE

A. Maintain the tip-to-work distance (stickout) at 5/16 to 3/8 inch (8 to 9 mm) at all times. See Figure 6-7.

B. For transverse and longitudinal nozzle angles, see welding torch positions.

C. Hold the torch about 3/8 inch from the work, lower the helmet by shaking the head and squeeze the trigger to start the wire feeding, and establish the arc.

NOTE

It is the best practice to form the habit of shaking the helmet down, rather than using the hands, since one hand must hold the torch, and the other is often needed to hold pieces to be tacked or positioned.

D. Make a single downhand (pulling) stringer weld bead.

E. Practice welding beads. Start at one edge and weld across the plate to the opposite edge.

NOTE

When the equipment is properly adjusted, a rapidly crackling or hissing sound of the arc is a good indicator of correct arc length.

F. Practice stopping in the middle of the plate, restarting into the existing crater and continuing the weld bead across the plate.

NOTE

When the torch trigger is released after welding, the electrode forms a ball on the end. To the new operator, this may present a problem in obtaining the penetration needed at the start. This can be corrected by cutting the ball off with wire cutting pliers.

6.12 REFERENCE TABLES

The following tables are provided for an aid to the user of the MIG or FLUX CORED Welding Mode. Also see table 3-1 in the Operation chapter.
### Table 6-1. Welding Electrode Selection

<table>
<thead>
<tr>
<th>WELDING ELECTRODE SELECTION</th>
<th>ESAB DESIGNATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>DESCRIPTION AND APPLICATION</td>
<td></td>
</tr>
<tr>
<td>A good general purpose self shielded flux cored wire suited to a broad line of general applications including galvanized and sheet metal. A good all position wire.</td>
<td>-FCA-737</td>
</tr>
<tr>
<td>A unique solid wire with powerful deoxidizers for CO2 welding where poor fit up, rusty or oily material may be used. Recommended for general shop fabrication.</td>
<td>ESAB -EASY GRND -65</td>
</tr>
<tr>
<td>A good general purpose solid stainless steel wire suited for welding types 304, 308, 321, and 347 steels.</td>
<td>ESAB -308L (.023 DIA)</td>
</tr>
</tbody>
</table>

### Table 6-2.

<table>
<thead>
<tr>
<th>Type of Gas</th>
<th>Typical Mixtures</th>
<th>Primary Uses</th>
</tr>
</thead>
<tbody>
<tr>
<td>Carbon Dioxide</td>
<td></td>
<td>Mild and Low Alloy Steel</td>
</tr>
<tr>
<td>Argon-Carbon Dioxide</td>
<td>75% Ar-25% CO₂</td>
<td>Mild and Low Alloy Steels</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Stainless Steel</td>
</tr>
<tr>
<td>WELDING VARIABLE</td>
<td>CHANGE REQUIRED</td>
<td>Arc Voltage</td>
</tr>
<tr>
<td>------------------</td>
<td>----------------</td>
<td>-------------</td>
</tr>
<tr>
<td>Deeper Penetration</td>
<td>¹Increase ²Trailing Max. 25 ³Decrease ⁴Smaller</td>
<td>⁵CO₂</td>
</tr>
<tr>
<td>Shallow Penetration</td>
<td>¹Decrease ²Leading ³Increase ⁵Larger*</td>
<td>⁴AR+CO₂</td>
</tr>
</tbody>
</table>

### Table 6-3.

<table>
<thead>
<tr>
<th>Bead Height and Bead Width</th>
<th>Larger Bead</th>
<th>Smaller Bead</th>
<th>Higher Narrower Bead</th>
<th>Flatter Wider Bead</th>
<th>Faster Deposition Rate</th>
<th>Slower Deposition Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Change required</td>
<td>¹Increase ²Decrease ³Increase*</td>
<td>¹Decrease ²Increase ³Decrease*</td>
<td>¹Decrease ²Trailing ³Increase</td>
<td>¹Increase ²90 or Leading ³Decrease</td>
<td>¹Increase ²Increase ³Smaller</td>
<td>¹Decrease ²Decrease ³Larger</td>
</tr>
</tbody>
</table>

**KEY:** (1) First Choice, (2) Second Choice, (3) Third Choice, (4) Fourth Choice, (5) Fifth Choice

**NOTE:** Same adjustment is required for wire feed speed.

*When these variables are changed, the wire feed speed must be adjusted so that the welding current remains constant. See deposition rate of welding variables section. This change is especially helpful on materials 20 gauge and smaller in thickness.
Figure 6-1. MINI-PRO 110 Schematic Diagram
7.1 GENERAL

Replacement Parts are illustrated on the following figures. When ordering replacement parts, order by part number and part name, as illustrated on the figure. DO NOT ORDER BY PART NUMBER ALONE.

Always provide the series or serial number of the unit on which the parts will be used. The serial number is stamped on the unit nameplate.

7.2 EQUIPMENT IDENTIFICATION

All identification numbers as described in the Introduction chapter must be furnished when ordering parts or making inquiries. This information is usually found on the nameplate attached to the equipment.

7.3 HOW TO USE THIS PARTS LIST

The Parts List is a combination of an illustration (Figure Number) and a corresponding list of parts which contains a breakdown of the equipment into assemblies, subassemblies, and detail parts. All parts of the equipment are listed except for commercially available hardware, bulk items such as wire, cable, sleeving, tubing, etc., and permanently attached items which are soldered, riveted, or welded to another part.

To determine the part number, description, quantity, or application of an item, simply locate the item in question from the illustration and refer to that item number in the corresponding Parts List.

Replacement parts may be ordered from your ESAB distributor or from:

The ESAB Group, Inc.
P.O. Box 100545
Ebenezer Road
Florence, SC 29501-0545

Be sure to indicate any special shipping instructions when ordering replacement parts.

For technical assistance from an ESAB service representative, call (803) 669-4411. Additionally, ESAB offers toll free facsimile (FAX) service via 1-800-446-5693.
Figure 7-1. MINI-PRO 110 Welding Package
### Table 7-1. MINI-PRO 110 Welding System

<table>
<thead>
<tr>
<th>ITEM NO.</th>
<th>QTY REQ.</th>
<th>PART NO.</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1</td>
<td>34654</td>
<td>WELDER, ASSEMBLY, PREST-O-WELD 110</td>
</tr>
<tr>
<td>1</td>
<td>1</td>
<td>951775</td>
<td>PANEL, TOP</td>
</tr>
<tr>
<td>2</td>
<td>1</td>
<td>951758</td>
<td>PANEL, INTERIOR</td>
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<tr>
<td>3</td>
<td>1</td>
<td>951688</td>
<td>ADAPTER, GAS INPUT</td>
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<td>1</td>
<td>951689</td>
<td>VALVE, SOLENOID</td>
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<td>5</td>
<td>1</td>
<td>951690</td>
<td>FITTING, BARBED</td>
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<td>6</td>
<td>18&quot;</td>
<td>951691</td>
<td>TUBE, TYGON, GAS LINE</td>
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<td>1</td>
<td>951692</td>
<td>RECTIFIER, BRIDGE, 10 AMP</td>
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<td>NUT, 1/4-20, HEX, FULL</td>
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<td>2</td>
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<td>INSULATOR, RESISTOR</td>
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<td>99512077</td>
<td>RESISTOR, 25 WATT, FIXED</td>
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<td>CIRCUIT BREAKER, 5 AMP</td>
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<td>13730583</td>
<td>BUSHING, TERMINAL, TORCH SWITCH</td>
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<td>WASHER, INSULATOR, OUTPUT</td>
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<td>SPRING, HUB BRAKE</td>
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<td>HEAT SINK, DIODE</td>
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Table 7-1. MINI-PRO 110 Welding System (cont.)

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### Optional Equipment

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- Parts supplied with MINI-PRO 110 Welding System
NOTES
ESAB Welding & Cutting Products, Florence, SC Welding Equipment
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Performance Features Technical Specifications Equipment Recommendations

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