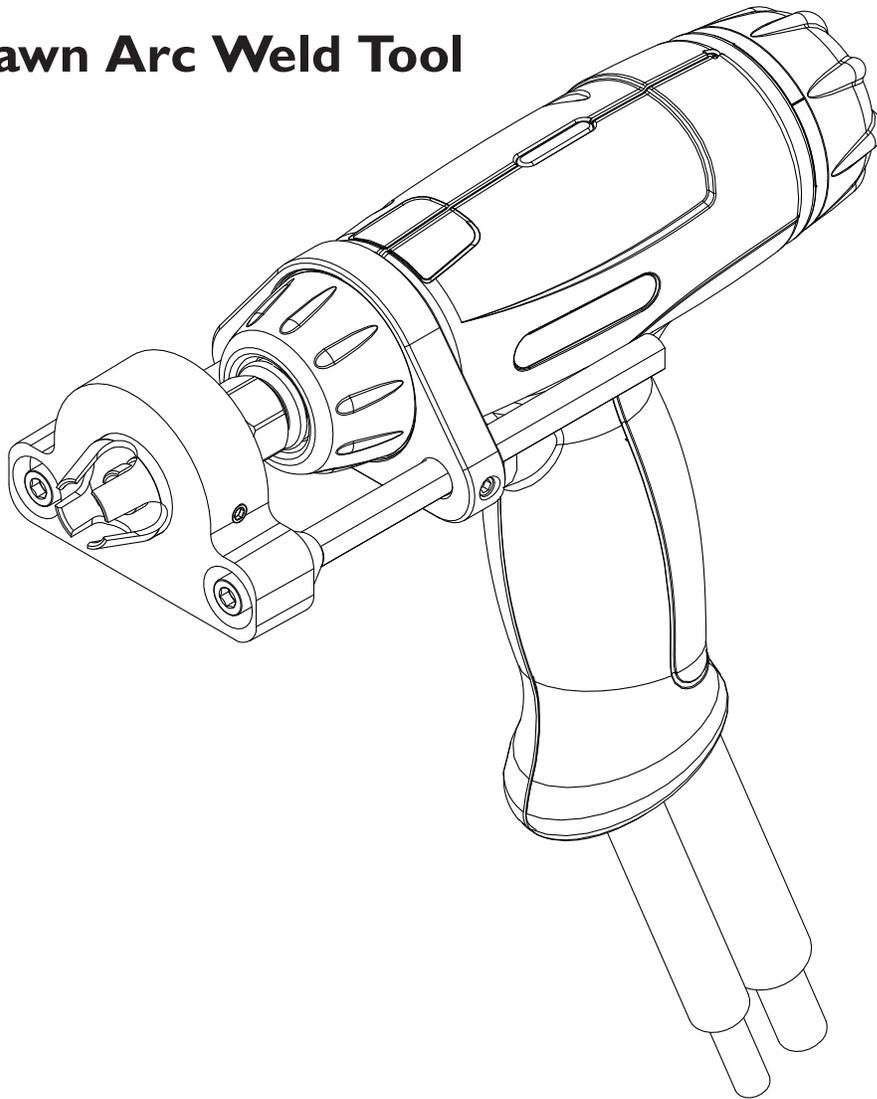


ILM011A
October, 2006

Price \$5.50 USA

Operation Manual

Instruction for Usage and Maintenance for AL Model Drawn Arc Weld Tool



BE SURE THIS INFORMATION REACHES THE OPERATOR. EXTRA COPIES ARE AVAILABLE THROUGH YOUR SUPPLIER.



CAUTION

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 AWS SP - "Safe Practices" available from the American Welding Society.

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 before installing or operating this equipment.

Table of Contents

SECTION 1:	Safety Precautions	3
SECTION 2:	Installation & Set Up	8
SECTION 3:	Normal Operation	12
SECTION 4:	Trouble Shooting	13
SECTION 5:	System Maintenance	15
SECTION 6:	Parts List	16

WARRANTY

Image warrants that the goods sold will be free from defects in workmanship and material. This warranty is expressly in lieu of other warranties, expressed or implied or for fitness for a particular purpose. The liability shall arise only upon return of the defective goods at Buyer's expense after notice to Image. The warranty shall be limited to replacement with like goods or, at Image's option, to refunding the purchase price. Image will not accept receipt of equipment returned unless buyer has previously afforded Image's personnel a reasonable opportunity to inspect and repair said equipment. Image will warrant components for 1 year and labor for 180 days from date of shipment. Image shall not be liable for any consequential damages including improper set up by customer.

USERS RESPONSIBILITY

This equipment will perform in conformity with the description contained in this manual and accompanying labels and/or inserts when installed, maintained and repaired in accordance with the instructions provided. This equipment must be checked periodically. Defective equipment should not be used. Parts that are broken, missing, worn, distorted or contaminated should be replaced immediately. Should such repair or replacement become necessary, the manufacturer recommends that a telephone or written request for service advice be made to the Authorized Distributor from whom purchased.

This equipment or any of its parts should not be altered without the prior written approval of the manufacturer. The user of this equipment shall have the sole responsibility for any malfunction which results from improper use, faulty maintenance, damage, improper repair or alteration by anyone other than the manufacturer or a service facility designated by the manufacturer.



This symbol appearing throughout this manual means
ATTENTION! BE ALERT!
Your safety is involved.

The following definitions apply to **DANGER, WARNING, CAUTION** found throughout this manual.



DANGER

Used to call attention to immediate hazards which, if not avoided, will result in immediate, serious personal injury or loss of life.



WARNING

Used to call attention to potential hazards which could result in personal injury or lost of life.



CAUTION

Used to call attention to hazards which could result in minor personal injury.



WARNING: These Safety Precautions are for your protection. They summarize precautionary information from the references listed in the 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.

Section 1

Safety Precautions



ARC RAYS CAN BURN EYES AND SKIN -

The arc, like the sun, emits ultraviolet and infrared (visible and in-visible) and other radiation and can injure skin and eyes. Sparks and hot metal can fly off the weld. 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 wearing a welding helmet, face shields and goggles are also required.
- 2) Always use a face shield fitted with the correct shade of filter to protect your face and eyes when welding or watching (See ANSI Z49.1 and Z87.1 listed in Safety Standards). Cover sparks and rays of the arc when operating or observing operations.
- 3) Use protective non-flammable screens or barriers to protect others from flash and glare. 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, trousers cuffs or pockets. Sleeves and collars should be kept buttoned, and open pockets eliminated from the front of clothing.
- 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.



ELECTRICAL SHOCK -

Contact with live electrical parts and ground can cause severe injury or death. The electrode (the weld stud and chuck) and work circuit (ground) are electrically live whenever the output is on. The input power circuit and the machine internal circuits are also live whenever power is on. Improperly installed or improperly grounded equipment is a hazard.

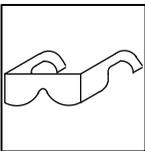
- 1) Disconnect input power before installing or servicing this equipment. Lock-out/tagout input power according to OSHA 29 CFR 1910.147 (see Safety Standards).
- 2) Do not touch live electrical parts. Do not touch the electrode (stud) if you are in contact with the work, ground, or another electrode from a different machine.
- 3) Be sure the power source frame (chassis) is connected to the ground system of the input power.
- 4) When making input connections, attach proper grounding conductors first and then double-check connections.
- 5) Always verify the supply ground - check and be sure that input power cord ground wire is properly connected to ground terminal in disconnect box or that cord plug is connected to a properly grounded receptacle outlet.
- 6) Refer to ANSI/ASC Standard Z49.1 (listed on page 6) for specific grounding recommendations. Do not mistake the work lead for a ground cable.
- 7) Clamp work cable with good metal-to-metal contact (spring and/or magnetic clamps are not recommended) to work piece as near the weld as practical.
- 8) DO NOT use welding current in damp areas, if movement is confined, or if there is danger of falling.
- 9) Properly install and ground this equipment according to this Owner's Manual and national, state and local codes.
- 10) Connect the work cable to the work piece. A poor or missing connection can expose you or others to a fatal shock.
- 11) Keep everything dry, including clothing, work area, cables, torch/electrode holder and power source.
- 12) Wear dry, hole-free insulated gloves & body protection before turning on power.
- 13) Insulate yourself from work and ground using dry insulating mats or covers big enough to prevent any physical contact with the work or ground.
- 14) Don't 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.
- 15) Turn off all equipment when not in use.
- 16) Use well-maintained equipment. Frequently inspect input power cord and output weld cables for damage or bare wiring. Replace worn or damaged cables immediately; bare wiring can kill. Repair or replace damaged parts at once. Maintain this unit according to the manual.
- 17) Do not use worn, damage, undersized or poorly spliced cables.
- 18) Do not drape cables over your body.
- 19) If earth grounding of the work piece is required, use a separate cable.
- 20) Wear a safety harness if working above floor level.
- 21) Keep all panels and covers securely in place.
- 22) Insulate work clamp when not connected to work piece to prevent contact with any metal object.
- 23) Don't connect multiple electrodes or work cables to a single weld output terminal.



ELECTRIC AND MAGNETIC FIELDS -

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 cables. Route cables on the same side of your body.
 - D) Connect the work cable to the work piece as close as possible to the area being welded.
 - E) Keep welding power source and cables as far away from your body as possible.



FLYING METAL CAN INJURE EYES -

- 1) Welding, chipping, wire brushing and grinding can cause sparks and flying metal. As welds cool, they can throw off slag.
- 2) Wear approved safety glasses with side shields even under your welding helmet.



BUILD UP OF GAS CAN INJURE OR KILL -

- 1) Shut off shielding gas supply when not in use.
- 2) Always ventilate confined spaces or use approved air-supplied respirator.

Section 1

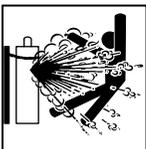
Safety Precautions



FUMES AND GASES -

Welding produces fumes and gases. Breathing these fumes and gases can be hazardous to your health, particularly in confined spaces. Do not breathe fumes and gases. Shielding gases can cause asphyxiation. Therefore:

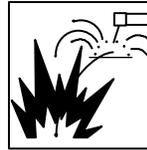
- 1) Keep your head out of the fumes. Do not breathe the fumes.
- 2) If inside, ventilate the area and/or use exhaust at the arc to remove welding fumes and gases.
- 3) If ventilation is poor, use an approved air-supplied respirator.
- 4) Read the Material Safety Data Sheets (MSDS) and the manufacturer's instructions for metals, consumables, coatings, cleaners and degreasers.
- 5) Work in a confined space only if it is well ventilated, or while wearing an air-supplied respirator. Always have a trained watch-person nearby. Welding fumes and gases can displace air and lower the oxygen level causing injury or death. Be sure the breathing air is safe.
- 6) Don't weld in locations near degreasing, cleaning or spraying operations. The heat & rays of an arc can react with vapors to form highly toxic & irritating gases.
- 7) Don't weld on coated metals, such as galvanized, lead or cadmium plated steel, unless the coating is removed from the weld area, the area is well ventilated, and if necessary, while wearing an air-supplied respirator. The coatings and any metals containing these elements can give off toxic fumes if welded.
- 8) 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.
- 9) 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 areas. Do not continue to operate if physical discomfort persists.
- 10) Refer to ANSI/ASC Standard Z49.1 for specific ventilation recommendations.



CYLINDER HANDLING -

Shielding gas cylinders contain gas under high pressure. If damaged or mishandled a cylinder can explode and violently release gas. Sudden rupture of cylinder, valve, or relief device can injure or kill. Since gas cylinders are normally part of the welding process, be sure to treat them carefully. Therefore:

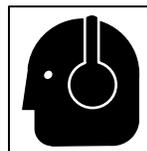
- 1) Protect compressed gas cylinders from excessive heat, mechanical shocks, slag, open flames, sparks and arcs.
- 2) Keep cylinders away from any welding or other electrical circuits
- 3) Never drape a welding tool over a gas cylinder
- 4) Never allow a welding electrode (weld stud) to touch any cylinder
- 1) Use the proper gas for the process and use the proper pressure reducing regulator, hoses and fittings designed to operate from the specific compressed gas cylinder. Do not use adaptors. Maintain hoses and fittings and other associated parts in good condition.
- 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 or weld on a cylinder; it will explode.
- 6) Turn face away from valve outlet when opening cylinder valve.
- 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



WELDING CAN CAUSE FIRES AND EXPLOSIONS -

Welding on closed containers, such as tanks, drums or pipes, can cause them to blow up. Sparks can fly off from the welding arc. The flying sparks, hot work piece, and hot equipment can cause fires and burns. Accidental contact of electrode to metal objects can cause sparks, explosion, overheating or fire. Check and be sure the area is safe before doing any welding. Therefore:

- 1) Protect yourself and others from flying sparks and hot metal.
- 2) Do not weld where flying sparks can strike flammable material.
- 3) Remove all combustible materials a minimum of 35ft away from the welding arc or cover the materials with a protective nonflammable covering. Combustible materials include wood, cloth, sawdust, liquid and gas fuels, solvents, paints and coatings, paper, etc.
- 4) 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.
- 5) Do not weld, cut, or perform other hot work until the work piece has been completely cleaned so that there are no substances on the work piece which might produce flammable or toxic vapors.
- 6) Be aware that welding on a ceiling, floor, bulkhead or partition can cause fire on the hidden side.
- 7) Do not weld on closed containers such as tanks, drums or pipes unless they are properly prepared according to AWS F4.1.
- 8) Connect work cable to the work as close to the welding area as practical to prevent welding current from traveling long, possibly unknown paths and causing electric shock and fire hazards.
- 9) Do not use welder to thaw frozen pipes.
- 10) Remove electrode (weld stud) from the stud weld tool when not in use.
- 11) Remove any combustibles, such as a butane lighter or matches from your person before doing any welding.
- 12) Have appropriate 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 for proper use.
- 13) Do not use equipment beyond its ratings. For example, overloaded welding cable can overheat and create a fire hazard.
- 14) 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.
- 15) For additional information, refer to NFPA Standard 51B, "Fire Prevention in Use of Cutting and Welding Processes," available from the National Fire Protection Association, Batterymarch Park, Quincy, MA 02269



NOISE CAN DAMAGE HEARING -

Noise from some processes or equipment can damage hearing.

- 1) Wear approved ear protection if noise level is high



FIRE OR EXPLOSION HAZARD -

- 1) Do not install or place unit on, over, or near combustible surfaces.
- 2) Do not install unit near flammables.
- 3) Do not overload electrical wiring - be sure power supply system is properly sized, rated and protected to handle the unit.

Section 1

Safety Precautions



FALLING UNITS CAN CAUSE INJURY -

- 1) Use lifting eye to lift unit only, NOT running gear, gas cylinders or any other accessories.
- 2) Use equipment of adequate capacity to lift and support unit.
- 3) If using lift forks to move unit, be sure forks are long enough to extend beyond opposite side of the unit.



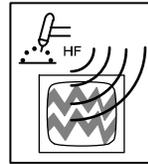
MOVING PARTS CAN CAUSE INJURY -

- 1) Keep hands, hair loose clothing and tools away from moving parts such as fans.
- 2) Keep all doors, panels, covers and guards closed and securely in place.
- 3) Always disconnect electrical power prior to service to prevent the fan from starting unexpectedly.



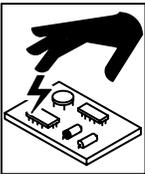
OVERUSE CAN CAUSE OVERHEATING -

- 1) Allow cooling period; follow rated duty cycle.
- 2) Reduce current or reduce duty cycle before starting to weld again.
- 3) Do not block or filter airflow to unit



H.F. RADIATION CAN CAUSE INTERFERENCE -

- 1) High-Frequency (H.F.) can interfere with radio navigation, safety services, computers and communications equipment.
- 2) Have only qualified persons familiar with electronic equipment perform this installation.
- 3) The user is responsible for having a qualified electrician promptly correct any interference problem resulting from the installation.



STATIC (ESD) CAN DAMAGE PC BOARDS -

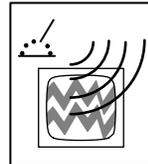
- 1) Put on grounded wrist strap BEFORE handling boards or parts.
- 2) Use proper static-proof bags and boxes to store, move or ship PC boards.

- 4) If notified by the FCC about interference, stop using the equipment at once.
- 5) Have the installation regularly checked and maintained.
- 6) Keep high-frequency source doors and panels tightly shut, keep spark gaps at correct setting, and use grounding and shielding to minimize the possibility of interference.



WELDING WIRE CAN CAUSE INJURY -

- 1) Do not press weld tool trigger until instructed to do so.
- 2) Do not point weld tool toward any part of the body, other people or any metal when threading welding wire.



ARC WELDING CAN CAUSE INTERFERENCE -

- 1) Electromagnetic energy can interfere with sensitive electronic equipment such as computers and computer-driven equipment such as robots.
- 2) Be sure all equipment in the welding area is electromagnetically compatible.
- 3) To reduce possible interference, keep weld cables as short as possible, close together, and down low, such as on the floor.



MOVING PARTS CAN CAUSE INJURY -

- 1) Keep hands, hair, loose clothing and tools away from moving parts.
- 2) Keep away from pinch points such as drive rolls.

- 4) Locate welding operation 100 meters from any sensitive electronic equipment.
- 5) Be sure this welding machine is installed and grounded according to this manual.
- 6) If interference still occurs, the user must take extra measures such as moving the welding machine, using shielded cables, using line filters, or shielding the work area.



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 do the work.



HOT PARTS CAN CAUSE SEVERE BURNS -

- 1) Do not touch hot parts with bare hands.
- 2) Allow cooling period before working on welding tool (gun or torch).

- 2) Before performing any work inside a power source, disconnect the power source from the incoming electrical power using the disconnect switch at the fuse box before working on the equipment.
- 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 and inclement weather
 - oil or grease
 - corrosive atmospheres.
- 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.

EMF Information

Considerations about welding and the effects of low frequency Electric and Magnetic Fields (EMF):

Welding current, as it flows through welding cables, will cause electromagnetic fields. There has been and still is some concern about such fields. However, after examining more than 500 studies spanning 17 years of research, a special blue ribbon committee of the National Research Council concluded that: "The body of evidence, in the committee's judgement, has not demonstrated that exposure to power-frequency electric and magnetic fields is a human-health hazard." However, studies are still going forth and evidence continues to be examined. Until the final conclusions of the research are reached, you may wish to minimize your exposure to electromagnetic fields when welding or cutting. See section on EMF on page 2.

California Proposition 65 Warnings

Welding or cutting equipment 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 Section 25249.5 et seq.)

Battery posts, terminals and related accessories contain lead and lead compounds, chemicals known to the State of California to cause cancer and birth defects or other reproductive harm. Wash hands after handling.

For Gasoline Engines:

Engine exhaust contains chemicals known to the State of California to cause cancer, birth defects, or other reproductive harm.

For Diesel Engines:

Diesel engine exhaust and some of its constituents are known to the State of California to cause cancer, birth defects, and other reproductive harm.

ADDITIONAL SAFETY INFORMATION -

For more information on safe practices for electric arc welding refer to the following publications:

American Welding Society

550 N.W. LeJuene Road, Miami, FL 33126, (phone 305-443-9353, website: www.aws.org)

- 1) ANSI/ASC Z49.1 - Safety in Welding, Cutting and Allied Processes
- 2) AWS CH5 - Recommended Practices for Stud Welding
- 3) AWS D1.1 - Structural Welding
- 2) AWS C5.1 - Recommended Practices for Plasma Arc Welding
- 3) AWS C5.6 - Recommended Practices for Gas Metal Arc Welding
- 4) AWS SP - Safe Practices - Reprint, Welding Handbook.
- 5) ANSI/AWS F4.1, Recommended Safe Practices for Welding and Cutting of Containers and Piping.

National Fire Protection Association

P.O. Box 9101, 1 Battery March Park, Quincy, MA 02269-9101 (phone 617-770-3000, website: www.nfpa.org and sparky.org)

- 1) NFPA Standard 70 - National Electrical Code
- 2) NFPA Standard 51B - Standard for Fire Prevention During Welding, Cutting and Other Hot Work

Compressed Gas Association

1735 Jefferson Davis Highway, Suite 1004; Arlington, VA 22202-4102 (phone 703-412-0900, website: www.cganet.com)

- 1) CGA Pamphlet P-1 - Safe Handling of Compressed Gas Cylinders

Canadian Standards Association

Standards Sales, 178 Rexdale Blvd, Rexdale, Ontario, Canada M9W 1R3 (phone 800-463-6727 in Toronto 416-747-4044, website: www.csa-international.org)

- 1) CSA Standard W117.2 - Code for Safety in Welding and Cutting

American National Standards Institute

11 West 42nd Street, New York, NY 10036-8002 (phone 212-642-4900, website: www.ansi.org)

- 1) ANSI Standard Z87.1 - Practice for Occupational and Educational Eye and Face Protection

U.S. Government Printing Office

Superintendent of Documents, P.O. Box 371954, Pittsburgh, PA 15250 (phone 312-353-2220, website: www.osha.gov)

- 1) Title 29, Code of Federal Regulations (CFR), Part 1910, Subpart Q, & Part 1926, Subpart J - Occupational Safety and Health Standards for General Industry

With any power source, it may or may not contain a battery which may contain hazardous materials. Please follow local battery disposal procedures when changing batteries or disposing of the power supply.

Section 2

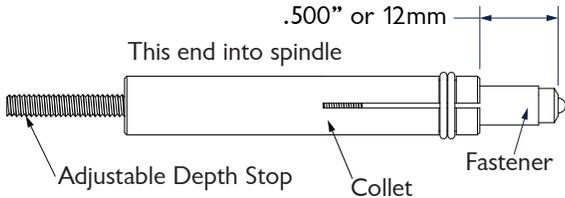
Installation & Set Up

Before you begin to weld it is important to review the set up. By making sure that the weld tool is set up properly, you will have the best welding results. A majority (about 95%) of all stud welding problems are due to improper weld tool set up or improper power settings.

COLLET ADJUSTMENT

Collet Adjustment with Adjustable Depth Stop

It is necessary to properly set up the collet for the size fastener you are welding. First select the proper diameter collet for the size fastener you are welding (see chart below). Secondly, the adjustable depth stop must be set to accommodate the length of the fastener. The stop should be set so that 12mm or .500" of the stud sticks past the end of the collet and the stud is firmly against the adjustable depth stop. Note: Some collets may have a jam nut. Adjust depth stop to required height and firmly tighten jam nut while holding the depth stop position with a screwdriver (not shown).

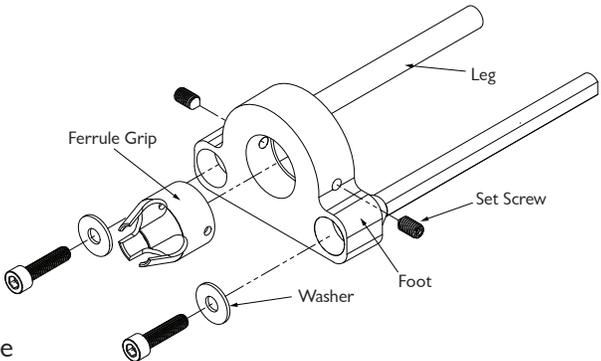


Fastener Size	IMAGE Collet Part #
#4	CLI10
#6	CLI13
#8	CLI16
#10	CLI19
1/4	CLI25
5/16	CLI31
3/8	CLI37
M3	CLIM3
M4	CLIM4
M5	CLIM5
M6	CLIM6
M8	CLIM8
M10	CLIM10

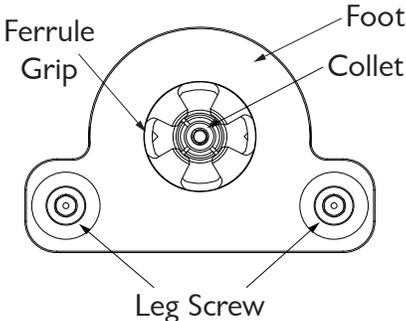
Fastener Size	IMAGE Ferrule Grip Part #
#10	G19
1/4	G25
5/16	G31
3/8	G37
6mm	G25
8mm	G31
10mm	GM10

FOOT & LEG SET UP

The AL model weld tool comes supplied with a foot for arc stud ferrule grips. The foot is installed on the ends of the legs. Alignment of the foot is important. The collet should be located in the center of the spark shield. To install the foot, unscrew the socket head screws from the ends of the legs. Place the washers on the socket head screws and place the screws through the counter bored holes in the foot. Reattach the screws to the legs.



When installing the legs on the foot be sure and align the flats of the legs to the outside. This allows the set screws in the tool faceplate to properly retain the legs without damage.



To remove or install the spark shield, find the set screw(s) that retain(s) the spark shield in the foot. Loosen the set screw and push the spark shield into the foot. The spark shield is sometimes a tight fit so press it firmly into the set screws in the foot so it seats against the back stop. Do not over tighten the set screws.

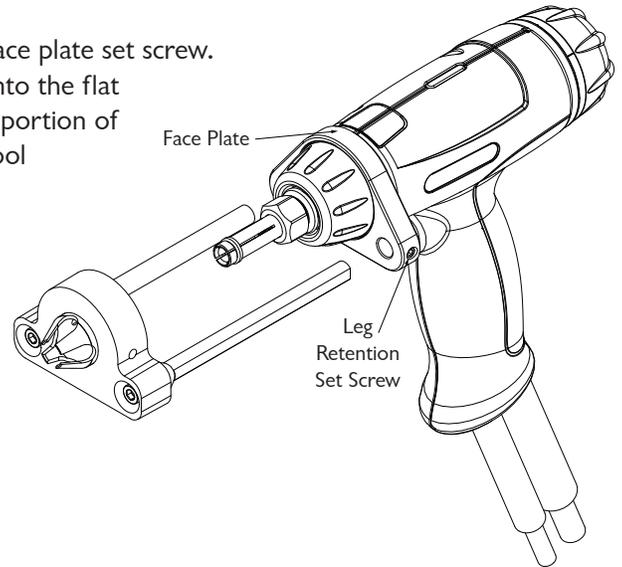
Section 2

Installation & Set Up

FOOT & LEG SET UP (CONT.)

Insert the legs into the face plate. Line up the flat on the leg with the face plate set screw. (Tighten the set screws in the side of the legs.) The set screw will bite into the flat region and hold the leg securely. If the set screw bites into the round portion of the leg it will cause damage to the leg so it won't insert into the weld tool face plate anymore.

Note: If the round part of the leg has a burr, remove the burr with a metal file so that it can slide easily in the face plate. If the leg is bent, replace the leg.

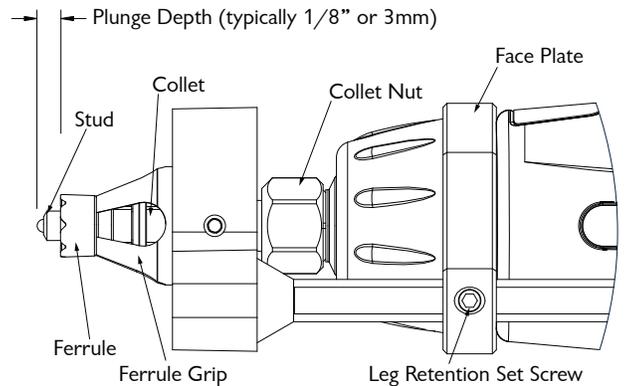


PLUNGE ADJUSTMENT

Plunge, or the amount of weld stud sticking past the end of the ferrule, should be set to 3mm (1/8").

Note: The collet depth stop should be set properly prior to adjusting the plunge. See section on adjusting collets.

To adjust plunge, loosen the leg retention set screw on both sides of the face plate. Slide the leg and foot assembly forward or backward until 3mm (1/8") of the weld stud protrudes past the end of the spark shield. Retighten the leg retention set screws.



Section 2

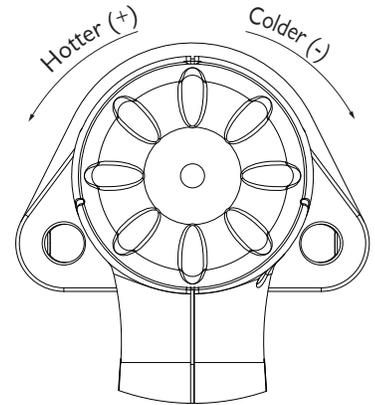
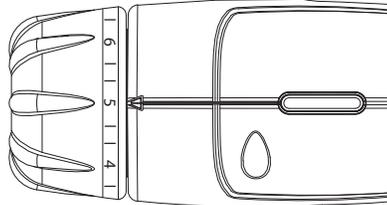
Installation & Set Up

ADJUSTING WELD PARAMETERS

The stroke setting can be changed by adjusting the rear knob. Stroke equals the plunge plus the lift. The default stroke setting is; 5mm, plunge is 3mm and the lift is 2mm as indicated in the shaded portion of the table below along with other examples.

Other Examples

STROKE (Rear Knob)	PLUNGE (Set by Leg & Foot)	LIFT (Stroke - Plunge)
5mm	3mm	2mm
6mm	4mm	2mm
6mm	3mm	3mm
4mm	2mm	2mm



The greater the lift the hotter the weld. Likewise, the shorter the lift the cooler the weld. So for a given plunge increasing the stroke with the rear knob will make the weld hotter.

Note 1: If there is so much plunge the lift mechanism bottoms out there will be no lift and no weld.

Note 2: If the stroke is very large the weld tool may not activate when test fired in the air. This is normal.

CONNECTING TO A POWER SUPPLY

Hooking the weld tool to a stud welding power supply is straight forward.

There are three steps:

Weld Tool

1. Connect the weld cable.
2. Connect the control cable.

Ground Cable

3. Connect the weld ground.

Weld Cable

The weld tool cable inserts in the following way. Line up the rectangular protrusion on the weld cable with the notch on the top side of the panel receptacle (typically the weld cable goes into the negative (- weld tool) receptacle). Push the weld cable connector straight in as far as it will go [Step 1]. Hand turn clockwise to tighten [Step 2]. See Figure 2.

Weld Ground

The ground cable is connected in the same fashion as the welding tool weld cable. The ground cable typically is inserted into the positive (+ ground) receptacle for straight polarity welding.

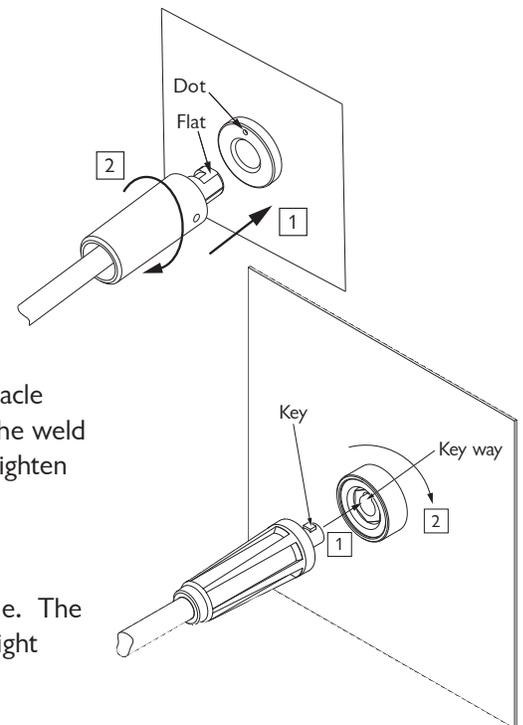


Figure 2

Control Cable

There is a key in the end of the control cable connector. Align the key in the cable connector with the key way in the front panel control cable receptacle. Push the cable connector into the front panel receptacle [Step 1]. When the two are seated turn the screw ring on the cable connector clockwise [Step 2]. This will lock the two together. See Figure 3. The screw ring does not need to be overly tight.

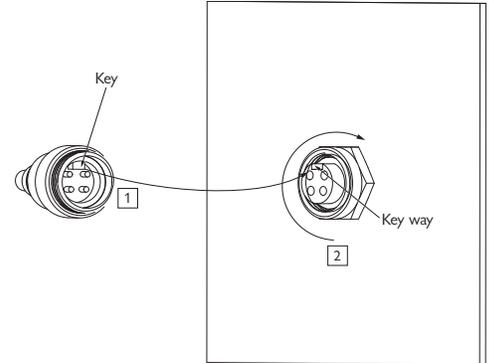


Figure 3

There are 3 basic types of connections. Connecting the control cable will vary with the style of the control cable that is on your new gun.

1. Screw Style which mates to Image Industries Equipment.

2. R&S (4 pins)

Align the bump on the shell of the connector with the relief in the receptacle. Push the cable connector firmly into the receptacle.

To remove, twist the outer shell of the cable connector counter clockwise. While holding the shell in a counter clockwise position pull the connector straight out.

3. Hubble (2 pins)

To connect a 2 pin style connector, line up the wide tab with the wide slot. Push forward on the connector when the connector housing contacts the receptacle turn the connector body 1/8 turn clockwise.

Cable Connections

Straight Polarity: In straight polarity the weld tool is connected to the negative (-) electrode. The ground lead is connected to the positive (+) receptacle (often ground). This cable arrangement is the preferred arrangement for welding ferrous metals with either the gap or contact processes.

Layout: The cables must be laid out straight. If the cables are coiled the amount of energy available for weld will be reduced. This will result in poor quality welds. This is true for both the weld tool weld cable and the ground cable.

**WARNING**

WARNING: To prevent accidental activation of the weld tool, always disconnect the weld cable from the power supply before making any weld tool adjustments or performing any service on the weld tool.

STUD GUN TOOL FUNCTIONS

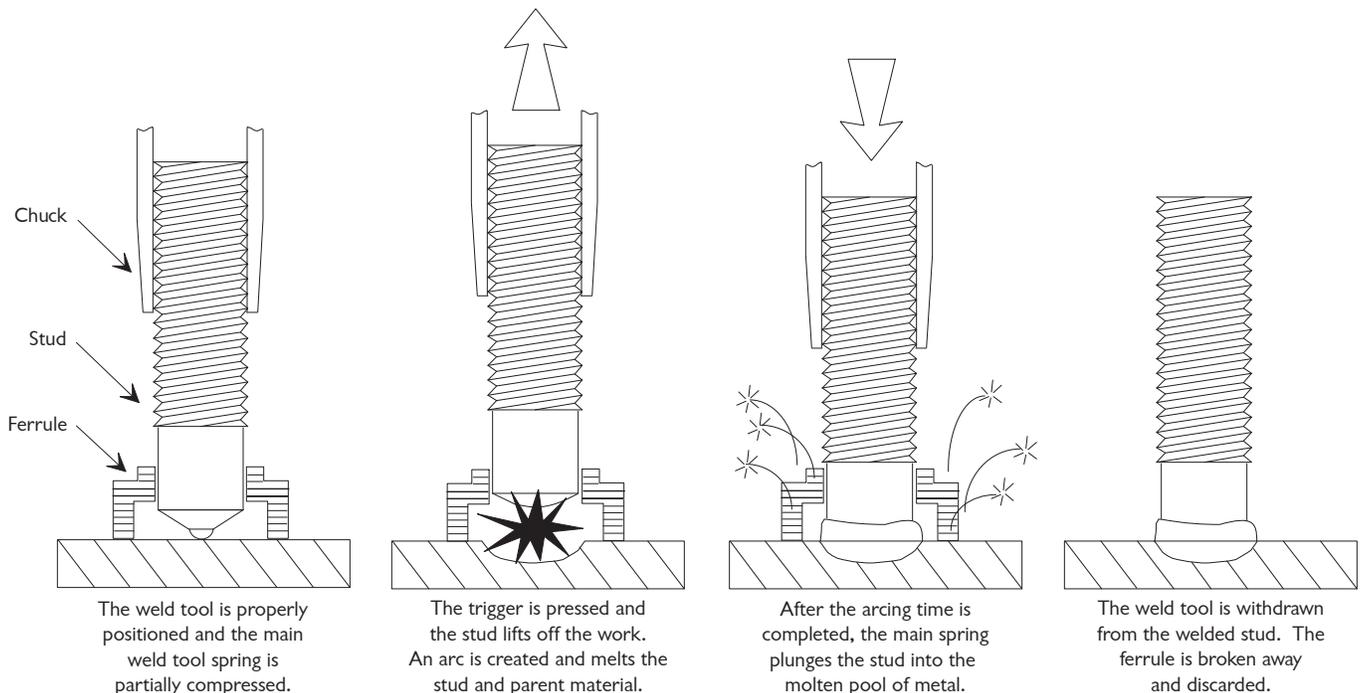
The stud weld tool automates the stud welding process. It performs several key functions:

1. It holds the stud.
2. It holds the ferrule grip and ferrule.
3. It controls the arc length during weld.

STUD WELDING STEPS

1. Place the stud to be welded into the weld.
2. Position the end of the stud onto a location where the stud is to be welded.
3. Press the weld tool downward so the ferrule is sitting on the base metal.
4. Ensure the stud is perpendicular to the base metal.
5. Pull the trigger to begin the weld sequence.
6. Hold the weld tool still during the welding process.
7. Hold for 1 second after the stud has plunged so the molten metal can cool.
8. Remove the weld tool from the welded stud. Be sure and pull the weld tool straight off of the welded stud to prevent damage to the collet.
9. Break the ferrule away.

ARC WELD SEQUENCE



Section 4

Trouble Shooting

TROUBLE SHOOTING

Possible Cause	Possible Solutions
Hang up. Stud looks like it is sitting on a pedestal with an hour glass shape.	Check alignment of the foot.
	Service the weld tool to ensure lift/release actions are functioning properly.
Undercutting or lack of fillet.	Too little plunge. Increase the amount of stud extending past the end of the ferrule or spark shield.
	Too much weld time or current. Check for base line power recommendations.
A lot of splatter or BBs shoot out from the weld zone.	Too much plunge. Decrease the amount of stud extending past the end of the ferrule or spark shield.
	Too much current or time. Check for base line power recommendations.
Stud breaks off and weld zone looks “crystallized”.	Not enough weld current or time. Check for base line power recommendations.
Bubbles in weld fillet.	If you are attempting short arc you may not be able to eliminate this condition. To improve this situation shorten time and increase current. If the results continue to be unsatisfactory then you may need to add a shielding gas.
	Check your gas flow/type of shielding gas.
	If you are using flux loaded studs, check to make sure there is a flux load present on the end of the stud.
No lift.	Check weld tool connections.
	Check for weld tool short or open. There should be 19 ohms of resistance in the gun coil.
	If there is a lot of stroke set in the tool, i.e. set on 7 then the tool may not air trigger. This is normal.
	Check trigger circuit for opens or shorts.
Short stud and can’t get enough to extend past the ferrule.	Adjust the internal stop in the chuck.
Arc extinguishes, or just get a tiny arc but no weld.	Too much lift. Review set up procedures in Operation Manual.
	Check ground path from the power supplies. All joints must be very tight.
No weld.	Broken weld cable.
	Broken or bad ground cable/connection.
	Check weld tool lift.
Tool’s shaft doesn’t move freely when compressed by hand.	Dirt is binding the mechanism. Service weld tool.
Weld tool spindle is sloppy and has a lot of free play.	The front bearing may be worn or missing. Replace bearing.



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WHEN IS MAINTENANCE REQUIRED?

Maintenance requirements will vary with environment and usage. Dirty work areas or high volume stud welding will require more frequent maintenance.

There are three prime reasons for maintenance:

1. **Dirt.** Dirt can enter the lifting mechanism and cause erratic plunge operations. Typically, cleaning is all that is required.
2. **Wear.** Components do wear out over time. Typically, items such as the plastic bearings or cables wear out and need to be replaced.
3. **Improper Use.** Components can arc out by inadvertently placing them against grounded materials during a weld sequence.

Maintenance Steps

Because the weld tool components are in a sealed housing the recommended maintenance procedure for this weld tool is to return it to your distributor or manufacturer for service.



WARNING

WARNING: To prevent accidental activation of the weld tool, always disconnect the weld cable from the power supply before making any weld tool adjustments or performing any service on the weld tool.

Section 6

Parts List

AL Model

Item	Description	Part Number
01	Weld Tool Body Right Side	GRB1
02	Weld Tool Body Left Side	GRB2
03	Spindle Bearing Assembly	GRM15
04	Spindle	GRM80
05	Gap Tool Main Spring	GRM23
06	Retaining Ring	GRM81
07	Bellows	GRM14
08	Collet Nut	GRM13
09	Key	GRM83
10	Internal Weld Cable Assembly	GRE30
11	Weld Cable Anchor	GRM32
12	Cup Point Set Screw M5X6	SSC5-6CP
13	Solenoid Sleeve	GRM42
14	Gap Solenoid with Nut	GRE4
15	Clutch	GRM40
16	Clutch Spring	GRM11
17	Trigger Switch	GAE1
18	Thread Forming Screw M3-12	TFC3-12ZP
19	Face Plate Nut	GRB17
20	Face Plate	GRM87
21	Face Plate Insulator	GRM88
22	Gap Adjust Knob	GRB32
23	Plug	GRB4
24	Small Foot	FTSJ
25	Leg	L31-7
26	Control Cable Screw Style	CC2BA-10
27	Weld Cable Assembly	CWIVC-09
28	Body Decal	GRD5
29	Collet Nut Wrench	GRM12
30	#10 Steel Lock Washer Zinc Plt.	WLC19ZP
31	10-32 X 3/4 SHCS Leg Screw	SHC19F-75
32	Ferrule Grip 1/4" (optional)	G25
	Ferrule Grip 5/16" (optional)	G31
	Ferrule Grip 3/8" (optional)	G37
33	Rear Knob Decal (not shown)	GRD108
	Body Decal Left (not shown)	GRD106
	Body Decal Right (not shown)	GRD107

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