

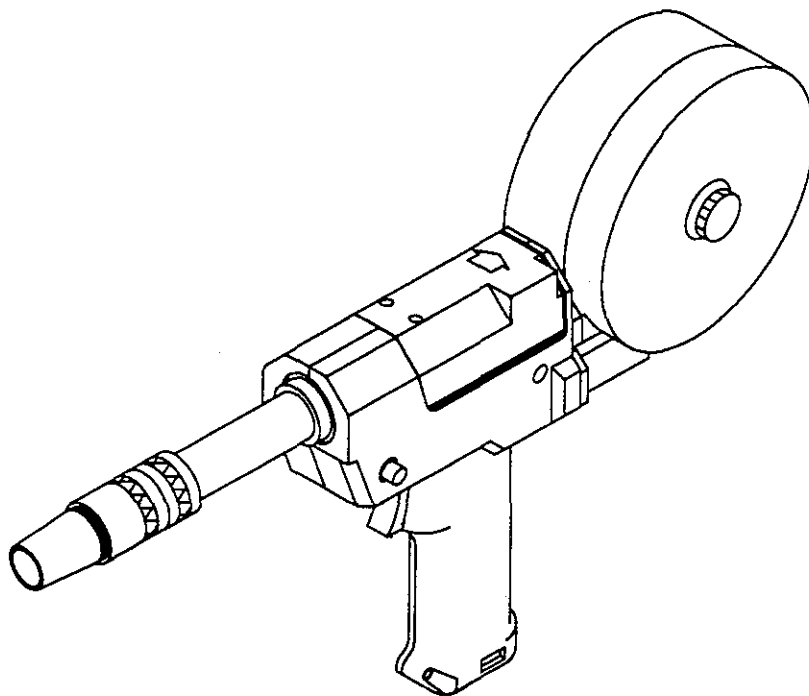


July 1991

FORM: OM-1213

Effective With Serial No. KB087733

**MODEL: SPOOLMATIC® 30A
SPOOLMATIC® 30W**



OWNER'S MANUAL

IMPORTANT: Read and understand the entire contents of both this manual and the power source manual used with this unit, with special emphasis on the safety material throughout both manuals, before installing, operating, or maintaining this equipment. This unit and these instructions are for use only by persons trained and experienced in the safe operation of welding equipment. Do not allow untrained persons to install, operate, or maintain this unit. Contact your distributor if you do not fully understand these instructions.

MILLER ELECTRIC Mfg. Co.
A Miller Group Ltd., Company

P.O. Box 1079
Appleton, WI 54912 USA
Tel. 414-734-9821

LIMITED WARRANTY

EFFECTIVE: AUGUST 6, 1990

This warranty supersedes all previous MILLER warranties and is exclusive with no other guarantees or warranties expressed or implied.

LIMITED WARRANTY – Subject to the terms and conditions hereof, MILLER Electric Mfg. Co., Appleton, Wisconsin warrants to its Distributor/Dealer that all new and unused Equipment furnished by MILLER is free from defect in workmanship and material as of the time and place of delivery by MILLER. No warranty is made by MILLER with respect to engines, trade accessories or other items manufactured by others. Such engines, trade accessories and other items are sold subject to the warranties of their respective manufacturers, if any. All engines are warranted by their manufacturer for two years from date of original purchase, except Deutz engines which have a one year, 2000 hour warranty.

Except as specified below, MILLER's warranty does not apply to components having normal useful life of less than one (1) year, such as spot welder tips, relay and contactor points, MILLERMATIC parts that come in contact with the welding wire including nozzles and nozzle insulators where failure does not result from defect in workmanship or material.

MILLER shall be required to honor warranty claims on warranted Equipment in the event of failure resulting from a defect within the following periods from the date of delivery of Equipment to the original user:

1. Arc welders, power sources, robots, and 1 year components
2. Load banks 1 year
3. Original main power rectifiers 3 years (labor – 1 year only)
4. All welding guns, feeder guns and torches 90 days
5. All other MILLERMATIC Feeders 1 year
6. Replacement or repair parts, exclusive of labor 60 days
7. Batteries 6 months

provided that MILLER is notified in writing within thirty (30) days of the date of such failure.

As a matter of general policy only, MILLER may honor claims submitted by the original user within the foregoing periods.

In the case of MILLER's breach of warranty or any other duty with respect to the quality of any goods, the exclusive remedies therefore shall be, at MILLER's option (1) repair or (2) replacement or, where authorized in writing by MILLER in appropriate cases, (3) the reasonable cost of repair or replacement at an authorized MILLER service station or (4) payment of or credit for the purchase price (less reasonable depreciation based upon actual use) upon return of the goods at Customer's risk and expense. MILLER's option of repair or replacement will be F.O.B., Factory at Appleton, Wisconsin, or F.O.B. at a MILLER authorized service facility, therefore, no compensation for transportation costs of any kind will be allowed. Upon receipt of notice of apparent defect or failure, MILLER shall instruct the claimant on the warranty claim procedures to be followed.

ANY EXPRESS WARRANTY NOT PROVIDED HEREIN AND ANY IMPLIED WARRANTY, GUARANTY OR REPRESENTATION AS TO PERFORMANCE, AND ANY REMEDY FOR BREACH OF CONTRACT WHICH, BUT FOR THIS PROVISION, MIGHT ARISE BY IMPLICATION, OPERATION OF LAW, CUSTOM OF TRADE OR COURSE OF DEALING, INCLUDING ANY IMPLIED WARRANTY OF MERCHANTABILITY OR OF FITNESS FOR PARTICULAR PURPOSE, WITH RESPECT TO ANY AND ALL EQUIPMENT FURNISHED BY MILLER IS EXCLUDED AND DISCLAIMED BY MILLER.

EXCEPT AS EXPRESSLY PROVIDED BY MILLER IN WRITING, MILLER PRODUCTS ARE INTENDED FOR ULTIMATE PURCHASE BY COMMERCIAL INDUSTRIAL USERS AND FOR OPERATION BY PERSONS TRAINED AND EXPERIENCED IN THE USE AND MAINTENANCE OF WELDING EQUIPMENT AND NOT FOR CONSUMERS OR CONSUMER USE. MILLER'S WARRANTIES DO NOT EXTEND TO, AND NO RESELLER IS AUTHORIZED TO EXTEND MILLER'S WARRANTIES TO, ANY CONSUMER.

August 7, 1991

FORM: OM-1213

ERRATA SHEET

After this manual was printed, refinements in equipment design occurred. This sheet lists exceptions to data appearing later in this manual.

AMENDMENT TO SECTION 9 – PARTS LIST

Amend to Parts List as follows:

FILE COPY
RETURN TO FOLDER

**	Part No.	Replaced With	Description	Quantity
24-45	.. 132 522	 148 488	.. POST, support spool (Eff w/KB102064)	1
24-47	.. 132 523	 148 489	.. WASHER, anti-turn (Eff w/KB102064)	1

**First digit represents page no – digits following dash represent item no.

BE SURE TO PROVIDE MODEL AND SERIAL NUMBER WHEN ORDERING REPLACEMENT PARTS.

RECEIVING-HANDLING

Before unpacking equipment, check carton for any damage that may have occurred during shipment. File any claims for loss or damage **with the delivering carrier**. Assistance for filing or settling claims may be obtained from the distributor and/or the equipment manufacturer's Transportation Department.

When requesting information about this equipment, always provide the Model Description and Serial or Style Number.

Use the following spaces to record the Model Designation and Serial or Style Number of your unit. The information is located on the data card or the nameplate.

Model _____

Serial or Style No. _____

Date of Purchase _____

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SECTION 1 – SAFETY RULES FOR OPERATION OF ARC WELDING POWER SOURCE

1-1. INTRODUCTION

We learn by experience. Learning safety through personal experience, like a child touching a hot stove is harmful, wasteful, and unwise. Let the experience of others teach you.

Safe practices developed from experience in the use of welding and cutting are described in this manual. Research, development, and field experience have evolved reliable equipment and safe installation, operation, and servicing practices. Accidents occur when equipment is improperly used or maintained. The reason for the safe practices may not always be given. Some are based on common sense, others may require technical volumes to explain. It is wiser to follow the rules.

Read and understand these safe practices before attempting to install, operate, or service the equipment. Comply with these procedures as applicable to the particular equipment used and their instruction manuals, for personal safety and for the safety of others.

Failure to observe these safe practices may cause serious injury or death. When safety becomes a habit, the equipment can be used with confidence.

These safe practices are divided into two Sections: 1-General Precautions, common to arc welding and cutting; and 2-Arc Welding (and Cutting) (only).

Reference standards: Published Standards on safety are also available for additional and more complete procedures than those given in this manual. They are listed in the Standards Index in this manual. ANSI Z49.1 is the most complete.

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

1-2. GENERAL PRECAUTIONS

Different arc welding processes, electrode alloys, and fluxes can produce different fumes, gases, and radiation levels. In addition to the information in this manual, be sure to consult flux and electrode manufacturers Material Safety Data Sheets (MSDSs) for specific technical data and precautionary measures concerning their material.

A. Burn Prevention

Wear protective clothing-gauntlet gloves designed for use in welding, hat, and high safety-toe shoes. Button shirt collar and pocket flaps, and wear cuffless trousers to avoid entry of sparks and slag.

Wear helmet with safety goggles and glasses with side shields underneath, appropriate filter lenses or plates (protected by clear cover glass). This is a **MUST** for

welding or cutting, (and chipping) to protect the eyes from radiant energy and flying metal. Replace cover glass when broken, pitted, or spattered. See 1-3A.2.

Avoid oily or greasy clothing. A spark may ignite them.

Hot metal such as electrode stubs and workpieces should never be handled without gloves.

Medical first aid and eye treatment. First aid facilities and a qualified first aid person should be available for each shift unless medical facilities are close by for immediate treatment of flash burns of the eyes and skin burns.

Ear plugs should be worn when working on overhead or in a confined space. A hard hat should be worn when others work overhead.

Flammable hair preparations should not be used by persons intending to weld or cut.

B. Toxic Fume Prevention

Severe discomfort, illness or death can result from fumes, vapors, heat, or oxygen enrichment or depletion that welding (or cutting) may produce. Prevent them with adequate ventilation as described in ANSI Standard Z49.1 listed in Standards Index. NEVER ventilate with oxygen.

Lead -, cadmium -, zinc -, mercury -, and beryllium-bearing and similar materials, when welded (or cut) may produce harmful concentrations of toxic fumes. Adequate local exhaust ventilation must be used, or each person in the area as well as the operator must wear an air-supplied respirator. For beryllium, both must be used.

Metals coated with or containing materials that emit toxic fumes should not be heated unless coating is removed from the work surface, the area is well ventilated and, if necessary, while wearing an air-supplied respirator.

Work in a confined space only while it is being ventilated and, if necessary, while wearing an air-supplied respirator.

Gas leaks in a confined space should be avoided. Leaked gas in large quantities can change oxygen concentration dangerously. Do not bring gas cylinders into a confined space.

Leaving confined space, shut OFF gas supply at source to prevent possible accumulation of gases in the space if downstream valves have been accidentally opened or left open. Check to be sure that the space is safe before re-entering it.

Vapors from chlorinated solvents can be decomposed by the heat of the arc (or flame) to form PHOSGENE, a highly toxic gas, and other lung and eye irritating products. The ultraviolet (radiant) energy of the arc can also decompose trichloroethylene and perchloroethylene vapors to form phosgene. **DO NOT WELD** or cut where solvent vapors can be drawn into the welding or cutting atmosphere or where the radiant energy can penetrate to

atmospheres containing even minute amounts of trichloroethylene or perchloroethylene.

C. Fire and Explosion Prevention

Causes of fire and explosion are: combustibles reached by the arc, flame, flying sparks, hot slag or heated material; misuse of compressed gases and cylinders; and short circuits.

BE AWARE THAT flying sparks or falling slag can pass through cracks, along pipes, through windows or doors, and through wall or floor openings, out of sight of the goggled operator. Sparks and slag can fly 35 feet.

To prevent fires and explosion:

Keep equipment clean and operable, free of oil, grease, and (in electrical parts) of metallic particles that can cause short circuits.

If combustibles are in area, do NOT weld or cut. Move the work if practicable, to an area free of combustibles. Avoid paint spray rooms, dip tanks, storage areas, ventilators. If the work cannot be moved, move combustibles at least 35 feet away out of reach of sparks and heat; or protect against ignition with suitable and snug-fitting, fire-resistant covers or shields.

Walls touching combustibles on opposite sides should not be welded on (or cut). Walls, ceilings, and floor near work should be protected by heat-resistant covers or shields.

Fire watcher must be standing by with suitable fire extinguishing equipment during and for some time after welding or cutting if:

- a. appreciable combustibles (including building construction) are within 35 feet
- b. appreciable combustibles are further than 35 feet but can be ignited by sparks
- c. openings (concealed or visible) in floors or walls within 35 feet may expose combustibles to sparks
- d. combustibles adjacent to walls, ceilings, roofs, or metal partitions can be ignited by radiant or conducted heat.

Hot work permit should be obtained before operation to ensure supervisor's approval that adequate precautions have been taken.

After work is done, check that area is free of sparks, glowing embers, and flames.

An empty container that held combustibles, or that can produce flammable or toxic vapors when heated, must never be welded on or cut, unless container has first been cleaned as described in AWS Standard A6.0, listed 7 in Standards Index.

This includes: a thorough steam or caustic cleaning (or a solvent or water washing, depending on the combustible's solubility) followed by purging and inerting with nitrogen or carbon dioxide, and using protective equip-

ment as recommended in A6.0. Waterfilling just below working level may substitute for inerting.

A container with unknown contents should be cleaned (see preceding paragraph). Do NOT depend on sense of smell or sight to determine if it is safe to weld or cut.

Hollow castings or containers must be vented before welding or cutting. They can explode.

Explosive atmospheres. Never weld or cut where the air may contain flammable dust, gas, or liquid vapors (such as gasoline).

D. Compressed Gas Equipment

Standard precautions. Comply with precautions in this manual, and those detailed in CGA Standard P-1, SAFE HANDLING OF COMPRESSED GASES IN CYLINDERS, listed 11 in Standards Index.

1. Pressure Regulators

Regulator relief valve is designed to protect only the regulator from overpressure; it is not intended to protect any downstream equipment. Provide such protection with one or more relief devices.

Never connect a regulator to a cylinder containing gas other than that for which the regulator was designed.

Remove faulty regulator from service immediately for repair (first close cylinder valve). The following symptoms indicate a faulty regulator:

Leaks-if gas leaks externally.

Excessive Creep-if delivery pressure continues to rise with downstream valve closed.

Faulty Gauge-if gauge pointer does not move off stop pin when pressurized, nor returns to stop pin after pressure release.

Repair. Do NOT attempt to repair. Send faulty regulators for repair to manufacturer's designated repair center, where special techniques and tools are used by trained personnel.

2. Cylinders

Cylinders must be handled carefully to prevent leaks and damage to their walls, valves, or safety devices:

Avoid electrical circuit contact with cylinders including third rails, electrical wires, or welding circuits. They can produce short circuit arcs that may lead to a serious accident. (See 1-3C.)

ICC or DOT marking must be on each cylinder. It is an assurance of safety when the cylinder is properly handled.

Identifying gas content. Use only cylinders with name of gas marked on them; do not rely on color to identify gas content. Notify supplier if unmarked. NEVER DEFACE or alter name, number, or other markings on a cylinder. It is illegal and hazardous.

Empties: Keep valves closed, replace caps securely; mark MT; keep them separate from FULLS and return promptly.

Prohibited use. Never use a cylinder or its contents for other than its intended use, **NEVER** as a support or roller.

Locate or secure cylinders so they cannot be knocked over.

Passageways and work areas. Keep cylinders clear of areas where they may be struck.

Transporting cylinders. With a crane, use a secure support such as a platform or cradle. Do NOT lift cylinders off the ground by their valves or caps, or by chains, slings, or magnets.

Do NOT expose cylinders to excessive heat, sparks, slag, and flame, etc. that may cause rupture. Do not allow contents to exceed 130°F. Cool with water spray where such exposure exists.

Protect cylinders particularly valves from bumps, falls, falling objects, and weather. Replace caps securely when moving cylinders.

Stuck valve. Do NOT use a hammer or wrench to open a cylinder valve that can not be opened by hand. Notify your supplier.

Mixing gases. Never try to mix any gases in a cylinder.

Never refill any cylinder.

Cylinder fittings should never be modified or exchanged.

3. Hose

Prohibited use. Never use hose other than that designed for the specified gas. A general hose identification rule is: red for fuel gas, green for oxygen, and black for inert gases.

Use ferrules or clamps designed for the hose (not ordinary wire or other substitute) as a binding to connect hoses to fittings.

No copper tubing splices. Use only standard brass fittings to splice hose.

Avoid long runs to prevent kinks and abuse. Suspend hose off ground to keep it from being run over, stepped on, or otherwise damaged.

Coil excess hose to prevent kinks and tangles.

Protect hose from damage by sharp edges, and by sparks, slag, and open flame.

Examine hose regularly for leaks, wear, and loose connections. Immerse pressured hose in water; bubbles indicate leaks.

Repair leaky or worn hose by cutting area out and splicing (1-2D3). Do NOT tape.

4. Proper Connections

Clean cylinder valve outlet of impurities that may clog orifices and damage seats before connecting regulator. Except for hydrogen, crack valve momentarily, pointing

outlet away from people and sources of ignition. Wipe with a clean lintless cloth.

Match regulator to cylinder. Before connecting, check that the regulator label and cylinder marking area, and that the regulator inlet and cylinder outlet match. **NEVER CONNECT** a regulator designed for a particular gas or gases to a cylinder containing any other gas.

Tighten connections. When assembling threaded connections, clean and smooth seats where necessary. Tighten. If connection leaks, disassemble, clean, and retighten using properly fitting wrench.

Adapters. Use a CGA adapter (available from your supplier) between cylinder and regulator, if one is required. Use two wrenches to tighten adapter marked **RIGHT** and **LEFT HAND** threads.

Regulator outlet (or hose) connections may be identified by right hand threads for oxygen and left hand threads (with grooved hex on nut or shank) for fuel gas.

5. Pressurizing Steps:

Drain regulator of residual gas through suitable vent before opening cylinder (or manifold valve) by turning adjusting screw in (clockwise). Draining prevents excessive compression heat at high pressure seat by allowing seat to open on pressurization. Leave adjusting screw engaged slightly on single-stage regulators.

Stand to side of regulator while opening cylinder valve.

Open cylinder valve slowly so that regulator pressure increases slowly. When gauge is pressurized (gauge reaches regulator maximum) leave cylinder valve in following position: For oxygen, and inert gases, open fully to seal stem against possible leak. For fuel gas, open to less than one turn to permit quick emergency shutoff.

Use pressure charts (available from your supplier) for safe and efficient, recommended pressure settings on regulators.

Check for leaks on first pressurization and regularly thereafter. Brush with soap solution (capfull of Ivory Liquid* or equivalent per gallon of water). Bubbles indicate leak. Clean off soapy water after test; dried soap is combustible.

E. User Responsibilities

Remove leaky or defective equipment from service immediately for repair. See User Responsibility statement in equipment manual.

F. Leaving Equipment Unattended

Close gas supply at source and drain gas.

G. Rope Staging-Support

Rope staging-support should not be used for welding or cutting operation; rope may burn.

*Trademark of Proctor & Gamble.

1-3. ARC WELDING

Comply with precautions in 1-1, 1-2, and this section. Arc Welding, properly done, is a safe process, but a careless operator invites trouble. The equipment carries high currents at significant voltages. The arc is very bright and hot. Sparks fly, fumes rise, ultraviolet and infrared energy radiates, weldments are hot, and compressed gases may be used. The wise operator avoids unnecessary risks and protects himself and others from accidents. Precautions are described here and in standards referenced in index.

A. Burn Protection

Comply with precautions in 1-2.

The welding arc is intense and visibly bright. Its radiation can damage eyes, penetrate lightweight clothing, reflect from light-colored surfaces, and burn the skin and eyes. Skin burns resemble acute sunburn, those from gas-shielded arcs are more severe and painful. **DON'T GET BURNED; COMPLY WITH PRECAUTIONS.**

1. Protective Clothing

Wear long-sleeve clothing (particularly for gas-shielded arc) in addition to gloves, hat, and shoes (1-2A). As necessary, use additional protective clothing such as leather jacket or sleeves, flame-proof apron, and fire-resistant leggings. Avoid outer garments of untreated cotton.

Bare skin protection. Wear dark, substantial clothing. Button collar to protect chest and neck and button pockets to prevent entry of sparks.

2. Eye and Head Protection

Protect eyes from exposure to arc. **NEVER** look at an electric arc without protection.

Welding helmet or shield containing a filter plate shade no. 12 or denser must be used when welding. Place over face before striking arc.

Protect filter plate with a clear cover plate.

Cracked or broken helmet or shield should **NOT** be worn; radiation can pass through to cause burns.

Cracked, broken, or loose filter plates must be replaced **IMMEDIATELY**. Replace clear cover plate when broken, pitted, or spattered.

Flash goggles with side shields **MUST** be worn under the helmet to give some protection to the eyes should the helmet not be lowered over the face before an arc is struck. Looking at an arc momentarily with unprotected eyes (particularly a high intensity gas-shielded arc) can cause a retinal burn that may leave a permanent dark area in the field of vision.

3. Protection of Nearby Personnel

Enclosed welding area. For production welding, a separate room or enclosed bay is best. In open areas, surround the operation with low-reflective, non-combustible screens or panels. Allow for free air circulation, particularly at floor level.

Viewing the weld. Provide face shields for all persons who will be looking directly at the weld.

Others working in area. See that all persons are wearing flash goggles.

Before starting to weld, make sure that screen flaps or bay doors are closed.

B. Toxic Fume Prevention

Comply with precautions in 1-2B.

Generator engine exhaust must be vented to the outside air. Carbon monoxide can kill.

C. Fire and Explosion Prevention

Comply with precautions in 1-2C.

Equipment's rated capacity. Do not overload arc welding equipment. It may overheat cables and cause a fire.

Loose cable connections may overheat or flash and cause a fire.

Never strike an arc on a cylinder or other pressure vessel. It creates a brittle area that can cause a violent rupture or lead to such a rupture under rough handling.

D. Compressed Gas Equipment

Comply with precautions in 1-2D.

E. Shock Prevention

Exposed hot conductors or other bare metal in the welding circuit, or in ungrounded, electrically-HOT equipment can fatally shock a person whose body becomes a conductor. **DO NOT STAND, SIT, LIE, LEAN ON, OR TOUCH** a wet surface when welding, without suitable protection.

To protect against shock:

Wear dry insulating gloves and body protection. Keep body and clothing dry. Never work in damp area without adequate insulation against electrical shock. Stay on a dry duckboard, or rubber mat when dampness or sweat can not be avoided. Sweat, sea water, or moisture between body and an electrically HOT part or grounded metal reduces the electrical resistance, and could enable dangerous and possibly lethal currents to flow through the body.

A voltage will exist between the electrode and any conducting object in the work circuit. Examples of conducting objects include, but are not limited to, buildings, electrical tools, work benches, welding power source cases, workpieces, etc. **Never touch the electrode and any metal object unless the welding power source is off.**

1. Grounding the Equipment

Arc welding equipment must be grounded according to the National Electrical Code, and the work must be grounded according to ANSI Z49.1 "Safety In Welding And Cutting."

When installing, connect the frames of each unit such as welding power source, control, work table, and water circulator to the building ground. Conductors must be adequate to carry ground currents safely. Equipment made

electrically HOT by stray current may shock, possibly fatally. Do NOT GROUND to electrical conduit, or to a pipe carrying ANY gas or flammable liquid such as oil or fuel.

Three-phase connection. Check phase requirements of equipment before installing. If only 3-phase power is available, connect single-phase equipment to only two wires of the 3-phase line. Do NOT connect the equipment ground lead to the third (live) wire, or the equipment will become electrically HOT—a dangerous condition that can shock, possibly fatally.

Before welding, check ground for continuity. Be sure conductors are touching bare metal of equipment frames at connections.

If a line cord with a ground lead is provided with the equipment for connection to a switchbox, connect the ground lead to the grounded switchbox. If a three-prong plug is added for connection to a grounded mating receptacle, the ground lead must be connected to the ground prong only. If the line cord comes with a three-prong plug, connect to a grounded mating receptacle. Never remove the ground prong from a plug, or use a plug with a broken off ground prong.

2. Electrode Holders

Fully insulated electrode holders should be used. Do NOT use holders with protruding screws.

3. Connectors

Fully insulated lock-type connectors should be used to join welding cable lengths.

4. Cables

Frequently inspect cables for wear, cracks and damage. IMMEDIATELY REPLACE those with excessively worn or damaged insulation to avoid possibly-lethal shock from bared cable. Cables with damaged areas may be taped to give resistance equivalent to original cable.

Keep cable dry, free of oil and grease, and protected from hot metal and sparks.

5. Terminals And Other Exposed Parts

Terminals and other exposed parts of electrical units should have insulating covers secured before operation.

6. Electrode

a. Equipment with output on/off control (contactor)

Welding power sources for use with the gas metal arc welding (GMAW), gas tungsten arc welding (GTAW) and similar processes normally are equipped with devices that permit on-off control of the welding power output. When so equipped the electrode wire becomes electrically HOT when the power source switch is ON and the welding gun switch is closed. Never touch the electrode wire or any conducting object in contact with the electrode circuit unless the welding power source is off.

b. Equipment without output on/off control (no contactor)

Welding power sources used with shielded metal arc welding (SMAW) and similar processes may not be equipped with welding power output on-off control devices. With such equipment the electrode is electrically HOT when the power switch is turned ON. Never touch the electrode unless the welding power source is off.

7. Safety Devices

Safety devices such as interlocks and circuit breakers should not be disconnected or shunted out.

Before installation, inspection, or service, of equipment, shut OFF all power and remove line fuses (or lock or red-tag switches) to prevent accidental turning ON of power. Disconnect all cables from welding power source, and pull all 115 volts line-cord plugs.

Do not open power circuit or change polarity while welding. If, in an emergency, it must be disconnected, guard against shock burns, or flash from switch arcing.

Leaving equipment unattended. Always shut OFF and disconnect all power to equipment.

Power disconnect switch must be available near the welding power source.

F. Protection For Wearers of Electronic Life Support Devices (Pacemakers)

Magnetic fields from high currents can affect pacemaker operation. Persons wearing electronic life support equipment (pacemaker) should consult with their doctor before going near arc welding, gouging, or spot welding operations.

1-4. STANDARDS BOOKLET INDEX

For more information, refer to the following standards or their latest revisions and comply as applicable:

1. ANSI Standard Z49.1, SAFETY IN WELDING AND CUTTING obtainable from the American Welding Society, 550 N.W. LeJeune Rd, Miami, FL 33126.
2. NIOSH, SAFETY AND HEALTH IN ARC WELDING AND GAS WELDING AND CUTTING obtainable from the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402.
3. OSHA, SAFETY AND HEALTH STANDARDS, 29CFR 1910, obtainable from the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402.
4. ANSI Standard Z87.1, SAFE PRACTICES FOR OCCUPATION AND EDUCATIONAL EYE AND FACE PROTECTION obtainable from the American National Standards Institute, 1430 Broadway, New York, NY 10018.
5. ANSI Standard Z41.1, STANDARD FOR MEN'S SAFETY-TOE FOOTWEAR obtainable from the American National Standards Institute, 1430 Broadway, New York, NY 10018.

6. ANSI Standard Z49.2, FIRE PREVENTION IN THE USE OF CUTTING AND WELDING PROCESSES obtainable from the American National Standards Institute, 1430 Broadway, New York, NY 10018.
7. AWS Standard A6.0, WELDING AND CUTTING CONTAINERS WHICH HAVE HELD COMBUSTIBLES obtainable from the American Welding Society, 550 N.W. LeJeune Rd, Miami, FL 33126.
8. NFPA Standard 51, OXYGEN-FUEL GAS SYSTEMS FOR WELDING, CUTTING, AND ALLIED PROCESSES obtainable from the National Fire Protection Association, Batterymarch Park, Quincy, MA 02269.
9. NFPA Standard 70, NATIONAL ELECTRICAL CODE obtainable from the National Fire Protection Association, Batterymarch Park, Quincy, MA 02269.
10. NFPA Standard 51B, CUTTING AND WELDING PROCESSES obtainable from the National Fire Protection Association, Batterymarch Park, Quincy, MA 02269.
11. CGA Pamphlet P-1, SAFE HANDLING OF COMPRESSED GASES IN CYLINDERS obtainable from the Compressed Gas Association, 1235 Jefferson Davis Highway, Suite 501, Arlington, VA 22202.
12. CSA Standard W117.2, CODE FOR SAFETY IN WELDING AND CUTTING obtainable from the Canadian Standards Association, Standards Sales, 178 Rexdale Boulevard, Rexdale, Ontario, Canada M9W 1R3.
13. NWSA booklet, WELDING SAFETY BIBLIOGRAPHY obtainable from the National Welding Supply Association, 1900 Arch Street, Philadelphia, PA 19103.
14. American Welding Society Standard AWSF4.1, RECOMMENDED SAFE PRACTICES FOR THE PREPARATION FOR WELDING AND CUTTING OF CONTAINERS AND PIPING THAT HAVE HELD HAZARDOUS SUBSTANCES, obtainable from the American Welding Society, 550 N.W. LeJeune Rd, Miami, FL 33126.
15. ANSI Standard Z88.2, PRACTICE FOR RESPIRATORY PROTECTION, obtainable from the American National Standards Institute, 1430 Broadway, New York, NY 10018.

SECTION 2 – SAFETY PRECAUTIONS AND SIGNAL WORDS

2-1. GENERAL INFORMATION AND SAFETY

A. General

Information presented in this manual and on various labels, tags, and plates on the unit pertains to equipment design, installation, operation, maintenance, and troubleshooting which should be read, understood, and followed for the safe and effective use of this equipment.

B. Safety

The installation, operation, maintenance, and troubleshooting of arc welding equipment requires practices and procedures which ensure personal safety and the safety of others. Therefore, this equipment is to be installed, operated, and maintained only by qualified persons in accordance with this manual and all applicable codes such as, but not limited to, those listed at the end of Section 1 – Safety Rules For Operation Of Arc Welding Power Source.

2-2. SAFETY ALERT SYMBOL AND SIGNAL WORDS

The following safety alert symbol and signal words are used throughout this manual to call attention to and identify different levels of hazard and special instructions.



This safety alert symbol is used with the signal words **WARNING** and **CAUTION** to call attention to the safety statements.



WARNING statements identify procedures or practices which must be followed to avoid serious personal injury or loss of life.



CAUTION statements identify procedures or practices which must be followed to avoid minor personal injury or damage to this equipment.

IMPORTANT statements identify special instructions necessary for the most efficient operation of this equipment.

SECTION 3 – SPECIFICATIONS

Table 3-1. Specifications

Model	Welding Output Rating	Electrode Wire Diameter Capacity	Wire Feed Speed Range	Spool Size Capacity	Weight	
					Gun Only	Gun With Cable Assembly
Air Cooled	200 Amps At 100% Duty Cycle	.025 in. (0.6 mm) thru 1/16 in. (1.6 mm) Aluminum Wire And .025 in. (0.6 mm) thru .045 in. (1.1 mm) Hard or Cored Wire	70 to 875 ipm (1.7 to 22.2 m/min)	4 in. (102 mm) Maximum Diameter	2.9 lbs. (1.3 kg)	14 lbs. (6.4 kg)
Water Cooled	400 Amps At 100% Duty Cycle				3.4 lbs. (1.5 kg)	14.5 lbs. (6.6 kg)

3-1. DUTY CYCLE

The duty cycle of a welding gun is the percentage of a ten minute period that a gun can be operated at a given load. The air-cooled model gun is rated at 200 amperes at 100% duty cycle using argon shielding gas. This means that the gun can be operated continuously at 200 amperes when using argon shielding gas. The water-cooled model gun is rated at 400 amperes at 100% duty cycle using argon shielding gas. This means that the gun can be operated continuously at 400 amperes when using argon shielding gas.

3-2. ELECTRODE WIRE DIAMETER CAPABILITY

The electrode wire diameter capability using aluminum wire is .025 - 1/16 in. (0.6 - 1.6 mm). The electrode wire diameter capability using hard wire is .025 - .045 in. (0.6 and 1.2 mm).

3-3. DESCRIPTION

This gun/feeder is of the constant wire feed speed and voltage sensing type and is designed for use with a weld control and a constant voltage or constant current welding power source for DC Gas Metal Arc Welding (GMAW).

SECTION 4 – INSTALLATION

4-1. LOCATION

The location depends on the length of interconnecting cables. The standard cables from the gun/feeder are 30 ft. (9.1 m) long. The cables from the welding power source can be 10 ft. (3 m) long when using a WC115 model weld control or 5 ft. (1.5 m) long when using a WC24 model weld control. If the welding power source is located near the work area, place the weld control on top of the welding power source.

IMPORTANT: The gun/feeder is shipped ready to feed .045/.047 in. (1.2 mm) welding wire. If using .045/.047 in. (1.2 mm) wire, start installation with Section 4-4. ADJUSTING SHIELDING GAS NOZZLE. If using 1/16 in. (1.6 mm) diameter wire, start installation with Section 4-3. CHANGING CONTACT TUBE AND LINER. If using .025, .030, or .035 in. (0.6, 0.8, or 0.9 mm) diameter wire, start installation with Section 4-2. REVERSING DRIVE ROLL POSITION.

4-2. REVERSING DRIVE ROLL POSITION (Figure 4-1)

This unit is equipped with a reversible drive roll that feeds .025 thru 1/16 in. (0.6 thru 1.6 mm) diameter wire. The smaller groove, Groove A, is designed for .025, .030 and .035 in. (0.6, 0.8 and 0.9 mm) diameter wire, and the larger groove, Groove B, is for .045, 3/64, and 1/16 in. (1.1, 1.2, and 1.6 mm) diameter wire. The unit is shipped with the drive roll ready to feed .045 thru 1/16 in. (1.1 thru 1.6 mm) wire. If a change to a smaller diameter wire is required, it is necessary to reverse the position of the drive roll (see Table 4-1).

If reversing or replacing the drive roll is necessary, proceed as follows:

IMPORTANT: If applicable, feed welding wire a few inches out gun nozzle before starting this procedure.

Table 4-1. Gun Replacement Parts

IMPORTANT: Contact tubes are stamped with wire size and the last two digits of the I. D. (inside diameter). For example, a contact tube stamped .035/52 is designed to run .035 wire (0.9 mm), and the tube has an I. D. of 0.052 in. (1.3mm) The contact tubes provided with this gun are designed to provide the longest service life for most applications. For some applications a contact tube with a smaller I. D. may be preferred by the user, and are optionally available.

Aluminum Wire					
Changing Parts	.025/31 (0.6/0.8 mm)	.030/41 (0.8/1 mm) *.030/36 (0.8/0.9 mm)	.035/52 (0.9/1.3 mm) *.035/41 (0.9/1 mm)	.047/61 (1.2/1.5 mm) *.047/52 (1.2/1.3 mm)	.062/81 (1.5/2.1 mm) *.062/73 (1.5/1.9 mm)
Drive Roll Groove A (Small groove)	X	X	X		
Drive Roll Groove B (Large Groove)				X	X
Contact Tube	X				
Contact Tube		X			
Contact Tube			X		
Contact Tube				X	
Contact Tube					X
Liner	X	X	X		
Liner				X	X

Hard And Flux-Cored Wire				
Changing Parts	.025/31 (0.6/0.8 mm)	.030/41 (0.8/1 mm) *.030/36 (0.8/0.9 mm)	.035/52 (0.9/1.3 mm) *.035/41 (0.9/1 mm)	.047/61 (1.2/1.5 mm) *.047/52 (1.2/1.3 mm)
Drive Roll Groove A (Small groove)	X	X	X	
Drive Roll Groove B (Large Groove)				X
Contact Tube	X			
Contact Tube		X		
Contact Tube			X	
Contact Tube				X
Liner	X	X	X	
Liner				X

*OPTIONAL



WARNING: ELECTRIC SHOCK can kill.

- Do not touch live electrical parts.
- Shut down wire feeder and welding power source, and disconnect input power employing lockout/tagging procedures before inspecting, maintaining, or servicing.

Lockout/tagging procedures consist of padlocking line disconnect switch in open position, removing fuses from fuse box, or shutting off and red-tagging circuit breaker or other disconnecting device.

- Do not touch welding wire or any metal part in contact with it when the power source is energized.

Welding wire and all metal parts in contact with it carry weld current when the welding power source is energized.

- Do not depress gun trigger when performing maintenance on gun.

MOVING PARTS can cause serious injury.

- Keep away from moving parts.

HOT SURFACES can cause severe burns.

- Allow cooling period before changing gun and feeder parts, if applicable.

A. Changing Gun Drive Roll (Figure 4-1)

1. Slide top cover toward rear of gun. While pressing cover against cover closure spring, pivot front of cover upward and remove top cover.
2. Remove drive roll from gun as follows:
 - a. Release tension arm, and pivot mounting arm outward.
 - b. Loosen wire canister securing thumbscrew, and pull conduit back away from drive roll.

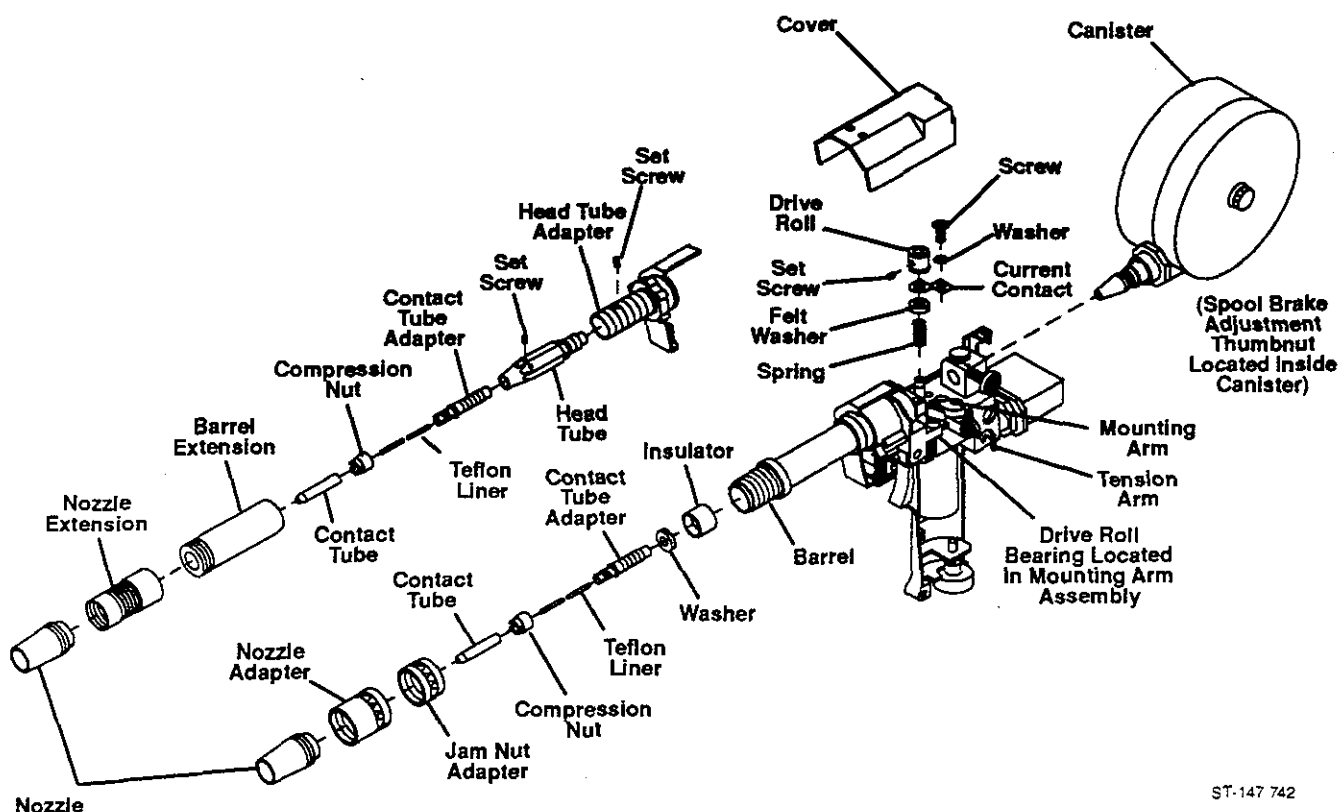


Figure 4-1. Gun Components

- c. If applicable, cut off welding wire at point where it enters drive roll, and pull wire out nozzle-end of gun.
- d. Loosen the two setscrews in the drive roll, and remove drive roll. (If setscrews are not accessible turn drive roll until screws are accessible.)
3. Reinstall drive roll removed in Step 2, or install new drive roll, with desired groove down, making sure that one drive roll securing setscrew coincides with flat area on drive roll shaft. Do not tighten setscrews.
4. Pivot mounting arm inward, and pivot tension arm downward over drive roll tension adjustment thumbnut.
5. Reposition wire canister as close as possible to the drive roll without touching it, and tighten wire canister securing thumbscrew.
6. Position drive roll vertically until drive roll groove aligns with groove in drive roll bearing and opening in gun liner. Retain drive roll in this position until the following steps are completed:
 - a. Release tension arm, and pivot mounting arm outward.
 - b. Tighten the two drive roll setscrews, making sure that one setscrew coincides with the flat area on the drive roll shaft.
 - c. Check vertical position of drive roll to be sure that drive roll groove is aligned with groove in drive roll bearing and opening in gun liner. If groove is not aligned, release tension arm, pivot mounting arm outward, and loosen drive roll setscrews. Repeat entire Step 6 until proper alignment is attained.
7. Pull wire through wire canister, and route wire along drive roll groove and into liner.
9. Pivot mounting arm inward, and pivot tension arm downward over drive roll tension adjustment thumbnut.
10. If necessary, adjust drive roll pressure according to Section 4-7.
11. Angle back end of top cover (with OPEN arrow) down and in toward rear gun. While pressing cover against cover closure spring, pivot front of cover downward until cover is fully inserted into gun. Slide top cover toward front of gun until cover is secure.

B. Insulating The Gun Drive Roll

This gun is equipped with a current contact which is located under the drive roll. The current contact provides an alternate path for weld current to help protect against arcing of the weld current inside the contact tube. Arcing in the contact tube may occur if aluminum welding wire is dirty, or has an oxide buildup.

Under some conditions, the user may prefer the performance obtained with an insulated drive roll. This will

isolate the welding wire from weld current until the welding wire passes through the contact tube. To obtain access and remove the current contact, see Figure 4-1, and follow the steps listed in Section 4-2A to remove and reinstall the drive roll.

4-3. CHANGING CONTACT TUBE AND LINER (Figure 4-1)



WARNING: ELECTRIC SHOCK can kill.

- Do not touch live electrical parts.
- Shut down weld control and welding power source, and disconnect input power employing lockout/tagging procedures before inspecting, installing, or adjusting.

Lockout/tagging procedures for weld control consist of disconnecting input power plug, and for welding power source consist of padlocking line disconnect switch in open position, removing fuses from fuse box, or shutting off and red-tagging circuit breaker or other disconnecting device. Stop engine, and disconnect negative (–) battery cable from battery on welding generators.

- Do not touch welding wire or any metal part in contact with it when the power source is energized.

Welding wire and all metal parts in contact with it carry weld current when the welding power source is energized.

MOVING PARTS can cause serious injury.

- Keep away from moving parts.

HOT SURFACES can cause severe burns.

- Allow cooling period before changing gun/feeder parts, if applicable.

Gun is shipped with contact tube and liner for .047 welding wire installed. As a result of wear or change of welding wire size, it may be necessary to replace the contact tube and liner with their associated components (see Table 4-1). If a replacement is necessary, proceed as follows:

IMPORTANT: A contact tube securing nut tool is included with the gun/feeder for replacing the contact tube and liner without removing the nozzle or nozzle extension.

1. Insert tool over contact tube, making sure that tool key engages in keyway of compression nut.
2. Rotate tool counterclockwise (approximately 1/4 turn) until contact tube can be pulled out.
3. Manually feed welding wire out through the contact tube adapter. The liner should ride the outgoing wire; if it doesn't, tip nozzle down, and remove liner when tip of liner becomes accessible.

4. Install new liner and new contact tube. Be sure that the contact tube butts tightly against the internal flange of the adapter.

IMPORTANT: Tighten compression nut only tight enough to secure contact tube. Overtightening compression nut will damage adapter.

5. Tighten compression nut.

4-4. ADJUSTING SHIELDING GAS NOZZLE (Figure 4-1)



WARNING: ELECTRIC SHOCK can kill.

- Do not touch live electrical parts.
- Shut down weld control and welding power source, and disconnect input power employing lockout/tagging procedures before inspecting, installing, or adjusting.

Lockout/tagging procedures for weld control consist of disconnecting input power plug, and for welding power source consist of padlocking line disconnect switch in open position, removing fuses from fuse box, or shutting off and red-tagging circuit breaker or other disconnecting device. Stop engine, and disconnect negative (–) battery cable from battery on welding generators.

- Do not touch welding wire or any metal part in contact with it when the power source is energized.

Welding wire and all metal parts in contact with it carry weld current when the welding power source is energized.

MOVING PARTS can cause serious injury.

- Keep away from moving parts.

HOT SURFACES can cause severe burns.

- Allow cooling period before changing gun/feeder parts, if applicable.

The nozzle extension can be adjusted so that the contact tube is recessed up to 1/4 in. (6.3 mm) inside the nozzle or so that the contact tube extends up to 1/16 in. (1.6 mm) beyond the nozzle. To adjust nozzle extension, proceed as follows:

1. Loosen nozzle extension jam nut.
 2. Rotate nozzle extension for desired contact tube position.
 3. Tighten nozzle extension jam nut.
- #### 4-5. INSTALLING GUN/FEEDER ONTO A 115 VAC WELD CONTROL

IMPORTANT: Refer to weld control Owner's Manual.

4-6. INSTALLING GUN/FEEDER ONTO A 24 VAC WELD CONTROL

IMPORTANT: Refer to weld control Owner's Manual.

4-7. INSTALLING WIRE SPOOL AND THREADING WELDING WIRE (Figure 4-1)



WARNING: ELECTRIC SHOCK can kill.

- Do not touch live electrical parts.
- Shut down weld control and welding power source, and disconnect input power employing lockout/tagging procedures before inspecting, installing, or changing welding wire.

Lockout/tagging procedures for weld control consist of disconnecting input power plug, and for welding power source consist of padlocking line disconnect switch in open position, removing fuses from fuse box, or shutting off and red-tagging circuit breaker or other disconnecting device. Stop engine, and disconnect negative (-) battery cable from battery on welding generators.

- Do not touch welding wire or any metal part in contact with it when the power source is energized.

Welding wire and all metal parts in contact with it carry weld current when the welding power source is energized.

MOVING PARTS can cause serious injury.

- Keep away from moving parts.

HOT SURFACES can cause severe burns.

- Allow cooling period before changing gun/feeder parts, if applicable.

WELDING WIRE can cause puncture wounds.

- Do not point gun toward any part of the body or other personnel.

IMPORTANT: Be sure that liner and contact tube match the size welding wire selected.

IMPORTANT: Spooled wire has a tendency to unravel when loosened from the spool. Maintain a firm grip on the wire during the wire threading operation.

1. Slide top cover toward rear of gun/feeder. Pivot front of cover upward, and remove top cover.
2. Loosen canister cover securing screw, and remove canister cover.
3. Release tension adjusting spring, and pivot pressure arm outward.
4. Unreel 6 to 8 in. (152 to 203 mm) of welding wire from wire spool, and cut off any wire that is not straight.
5. Route wire through the canister inlet guide, along the drive roll groove, and through liner and contact tube. (Be sure that wire extends beyond end of contact tube.)
6. Install wire spool onto spool support post so that the wire feeds off bottom of the wire spool.

IMPORTANT: When installing wire spool, it may be necessary to loosen the spool brake slightly to enable installation onto the spool support post.

7. Pivot pressure arm inward and tension adjusting spring downward over tension adjusting thumbnut. Be sure that welding wire is in drive roll groove.
8. If necessary, adjust spool brake pressure as follows:
 - a. If spool brake pressure must be increased, rotate spool brake adjustment thumbscrew clockwise.
 - b. If spool brake pressure must be decreased, rotate spool brake adjustment thumbscrew counterclockwise.

IMPORTANT: Adjust spool brake to apply just enough pressure to prevent backlash while the gun/feeder is operating.



CAUTION: EXCESSIVE BRAKE PRESSURE can damage equipment.

- Do not overtighten spool brake adjustment thumbscrew.

9. If necessary, adjust drive roll pressure as follows:
 - a. If drive roll pressure must be increased, rotate tension adjusting thumbnut clockwise.
 - b. If drive roll pressure must be decreased, rotate tension adjusting thumbnut counterclockwise.

IMPORTANT: Adjust drive roll to apply just enough pressure to prevent the wire from slipping on or against drive roll during operation.

10. Reinstall and secure canister cover.
11. Angle end of top cover with OPEN arrows toward rear of gun/feeder. Pivot front of cover downward until cover is fully inserted into gun/feeder. Slide top cover toward front of gun until cover is secure.

4-8. ROTATION OF CURVED WATER-COOLED BARREL ASSEMBLY



WARNING: ELECTRIC SHOCK can kill.

- Do not touch live electrical parts.
- Shut down wire feeder and welding power source, and disconnect input power employing lockout/tagging procedures before inspecting, installing, or adjusting.

Lockout/tagging procedures consist of padlocking line disconnect switch in open position, removing fuses from fuse box, or shutting off and red-tagging circuit breaker or other disconnecting device.

- Do not touch welding wire or any metal part in contact with it while welding.

Welding wire and all metal parts in contact with it carry weld current when the welding power source is energized.

HOT SURFACES can cause severe burns.

- Allow cooling period before changing gun and feeder parts, if applicable.

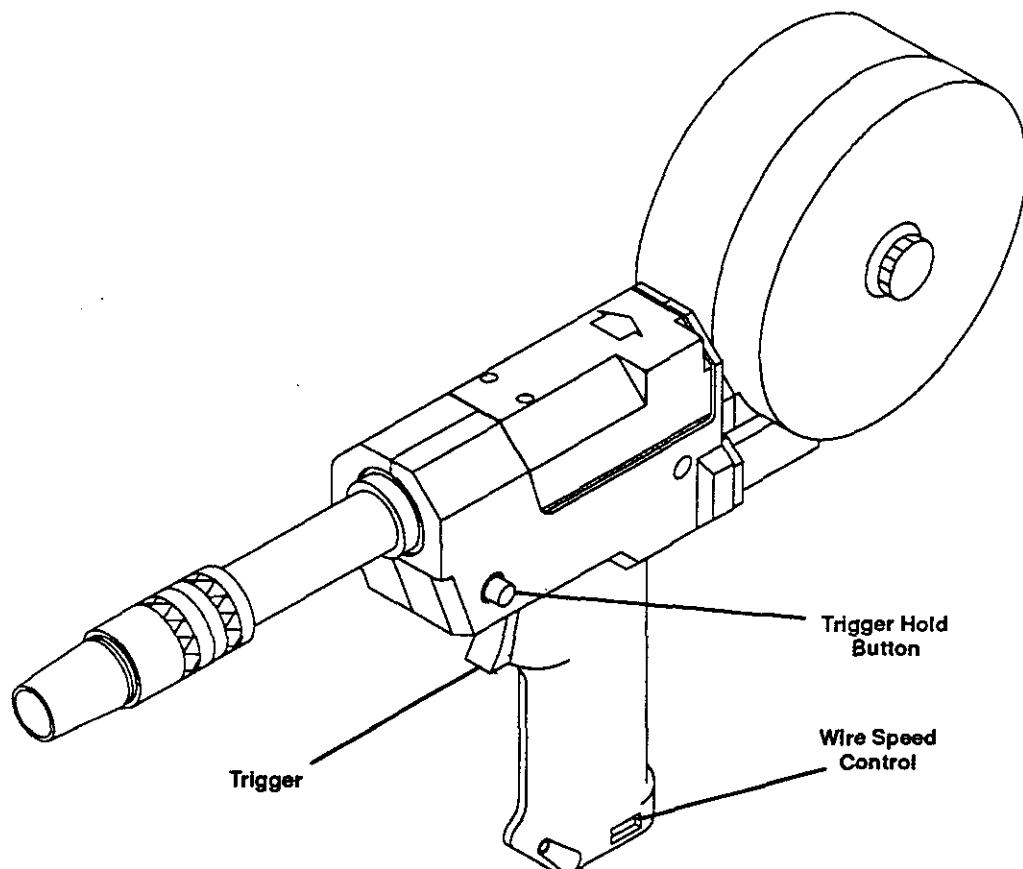
1. Equally loosen two socket-head cap screws on head tube clamp through holes provided in top cover of gun/feeder.

2. Rotate curved barrel assembly to desired position.

3. Equally tighten two cap screws on head tube clamp.

IMPORTANT: Be sure that screws securing head tube clamp and head tube to wire drive housing are tight. This prevents arcing and overheating in the gun/feeder.

SECTION 5 – OPERATOR CONTROLS



Ref. ST-147 741

Figure 5-1. Gun/Feeder Operator Controls

5-1. WIRE SPEED CONTROL (Figure 5-1)

The Wire Speed control is a single-turn potentiometer located in the bottom of the gun/feeder handle. It provides a means of adjusting the rate at which welding wire feeds into the weld. The scale surrounding the Wire Speed control is a relative scale only; it does not represent an actual inches per minute value. Rotating the control clockwise increases the wire feed speed, and rotating the control counterclockwise decreases the wire feed speed.

5-2. TRIGGER (Figure 5-1)

When the trigger is fully depressed, the welding power

source contactor is energized (if applicable), shielding gas flows, and welding wire feeds. Shielding gas preflow and postflow may be obtained by partially depressing the trigger at the beginning and end, respectively, of the welding operation.

5-3. TRIGGER HOLD BUTTON (Figure 5-1)

The trigger hold button allows the operator to continually feed wire without holding down the gun/feeder trigger. To use the trigger hold feature, depress the Trigger hold button while depressing the gun/feeder trigger. Release the trigger. Wire continues to feed until the gun/feeder trigger is depressed again, thereby releasing the button.

SECTION 6 – SEQUENCE OF OPERATION



WARNING: ELECTRIC SHOCK can kill; MOVING PARTS can cause serious injury; IMPROPER AIRFLOW AND EXPOSURE TO ENVIRONMENT can damage internal parts.

- Do not touch live electrical parts.
- Keep away from moving parts.
- Keep all covers and panels in place while operating.

Warranty is void if the weld control is operated with any portion of the outer enclosure removed.

ARC RAYS, SPARKS, AND HOT SURFACES can burn eyes and skin; NOISE can damage hearing.

- Wear correct eye, ear, and body protection.

FUMES AND GASES can seriously harm your health.

- Keep your head out of the fumes.
- Ventilate to keep from breathing fumes and gases.
- If ventilation is inadequate, use approved breathing device.

WELDING WIRE can cause puncture wounds.

- Do not point gun/feeder toward any part of the body, any conductive surface, or other personnel.

HOT METAL, SPATTER, AND SLAG can cause fire and burns.

- Watch for fire.
- Keep a fire extinguisher nearby, and know how to use it.
- Do not use near flammable material.
- Allow work and equipment to cool before handling.

MAGNETIC FIELDS FROM HIGH CURRENTS can affect pacemaker operation.

- Wearers should consult their doctor before going near arc welding, gouging, or spot welding operations.

See Section 1 - Safety Rules For Operation Of Arc Welding Power Source for basic welding safety information.



CAUTION: HIGH FREQUENCY can damage unit.

- Turn off high frequency when using unit.
- Disconnect weld cable between welding power source and weld control when high frequency is used.

6-1. GAS METAL ARC WELDING (GMAW) - CONTINUOUS



WARNING: Read and follow safety information at beginning of entire Section 6 before proceeding.

1. Install and connect unit according to Section 4.
2. Wear dry insulating gloves and clothing.
3. Prepare for welding by connecting work clamp to clean, bare metal at workpiece.
4. Connect voltage sensing cable clamp to the work clamp for constant current (CC) applications (see weld control Owner's Manual).
5. If applicable, place SPOT/CONTINUOUS switch on weld control in the CONTINUOUS position (models with spot welding options only; see weld control Owner's Manual).
6. Rotate RUN-IN SPEED control on weld control to desired setting, if applicable (see weld control Owner's Manual).
7. Rotate Wire Speed control on gun/feeder to desired setting (see Section 5-1)
8. Turn on and adjust shielding gas and water (if applicable).
9. Energize welding power source and weld control.
10. Wear welding helmet with proper filter lens according to ANSI Z49.1.



WARNING: ELECTRIC SHOCK can kill.

- Do not touch live electrical parts.
- Do not touch welding wire or any metal part in contact with it while welding.

The welding wire and all metal parts in contact with it carry weld output when the welding power source contactor is energized.

11. Hold tip of gun/feeder approximately 1/2 inch (13 mm) from workpiece, and depress gun/feeder trigger. Water flows (if applicable), gas flows, wire feeds, and an arc will be established. If drive roll pressure adjustment is necessary, see Section 4-7.

6-2. GAS METAL ARC WELDING (GMAW) - SPOT (Models With Spot Welding Option Only)



WARNING: Read and follow safety information at beginning of entire Section 6 before proceeding.

1. Make all connections as instructed in Section 4.
2. Wear dry insulating gloves and clothing.
3. Prepare for welding by connecting work clamp to clean, bare metal at workpiece.
4. Connect voltage sensing cable clamp to the work clamp for constant current (CC) applications (see weld control Owner's Manual).
5. Install appropriate shielding gas spot welding nozzle onto gun/feeder.
6. Place SPOT/CONTINUOUS switch on weld control in the SPOT position (see weld control Owner's Manual).

7. Rotate RUN-IN SPEED control on weld control to desired setting (see weld control Owner's Manual).
8. Place TIME RANGE switch on weld control in desired position (see weld control Owner's Manual).
9. Rotate SPOT TIME control on weld control to desired setting (see weld control Owner's Manual).
10. Rotate BURNBACK TIME control on weld control to desired setting (see weld control Owner's Manual).
11. Rotate Wire Speed control on gun/feeder to desired setting (see Section 5-1)
12. Turn on and adjust shielding gas and water (if applicable).
13. Energize welding power source and weld control.
14. Wear welding helmet with proper filter lens according to ANSI Z49.1.



WARNING: ELECTRIC SHOCK can kill.

- Do not touch live electrical parts.
- Do not touch welding wire or any metal part in contact with it while welding.

The welding wire and all metal parts in contact with it carry weld output when the welding power source contactor is energized.

15. Hold tip of gun/feeder approximately 1/2 inch (13 mm) from workpiece, and depress gun/feeder trigger. Water flows (if applicable), gas flows, wire feeds, and an arc will be established. If drive roll pressure adjustment is necessary, see Section 4-7.

IMPORTANT: The gun/feeder trigger must be held closed until the SPOT TIME control has timed out, completing the spot weld cycle. If the trigger is released before the cycle is complete, the cycle stops, and the unit resets for another cycle.

16. Reset TIME RANGE switch, SPOT TIME control, BURNBACK TIME control, and gun/feeder Wire Speed control as necessary.

6-3. SHUTTING DOWN

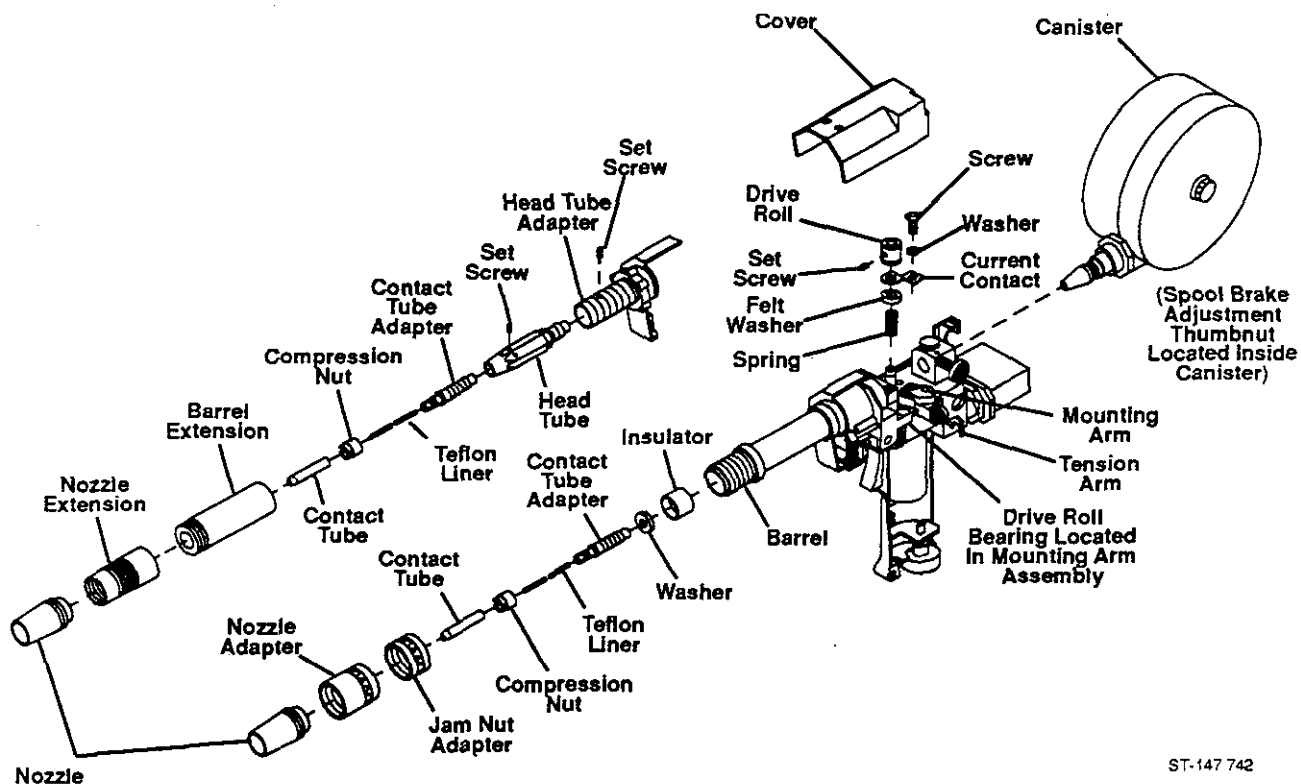
1. Stop welding.
2. Shut down welding power source and weld control.
3. Turn off all associated equipment.



WARNING: HIGH CONCENTRATION OF SHIELDING GAS can harm health or kill.

- Shut off gas supply when not in use.
4. Turn off shielding gas and water (if applicable) at the source.

SECTION 7 – MAINTENANCE & TROUBLESHOOTING



ST-147 742

Figure 7-1. Gun Maintenance

7-1. ROUTINE MAINTENANCE (Table 7-1)

IMPORTANT: Every six months inspect the labels on this unit for legibility. All precautionary labels must be maintained in a clearly readable state and replaced when necessary.



WARNING: ELECTRIC SHOCK can kill.

- Do not touch live electrical parts.
- Shut down weld control and welding power source, and disconnect input power employing lockout/tagging procedures before inspecting, maintaining, or servicing.

Lockout/tagging procedures for weld control consist of disconnecting input power plug, and for welding power source consist of padlocking line disconnect switch in open position, removing fuses from fuse box, or shutting off and red-tagging circuit breaker or other disconnecting device. Stop engine, and disconnect negative (-) battery cable from battery on welding generators.

MOVING PARTS can cause serious injury.

- Keep away from moving parts.

HOT SURFACES can cause severe burns.

- Allow cooling period before servicing.

Maintenance to be performed only by qualified persons.

Table 7-1. Maintenance Schedule

Frequency*	Maintenance
Every month.	Units in heavy service environments: Check labels, hoses, and cables; clean internal parts and drive rolls.
Every 6 months.	Check all labels (see IMPORTANT block, Section 7-1). Inspect gun and cables (see Section 7-1B). Clean drive rolls (see Section 7-2).
Whenever gun drive roll is changed.	Check and replace felt washer located under gun drive roll, if necessary.

*Frequency of service is based on units operated 40 hours per week. Increase frequency of maintenance if usage exceeds 40 hours per week.

A. Internal Cleaning



WARNING: Read and follow safety information at beginning of entire Section 7-1 before proceeding.

Every six months, blow out or vacuum dust and dirt from the inside of the gun/feeder. Remove the top cover, and use a clean, dry airstream or vacuum suction for the

cleaning operation. If dirty or dusty conditions are present, clean the unit monthly.

B. Inspection And Upkeep



WARNING: Read and follow safety information at beginning of entire Section 7-1 before proceeding.

Every six months, inspect the gun/feeder, hoses, and cables. If dusty or dirty conditions are present, inspect the unit monthly. Inspection should consist of the following:

1. Inspect gun/feeder for broken areas, cracks, and loose parts; tighten, repair, and replace as required.
2. Repair or replace, as required, all hose and cable; give particular attention to frayed and cracked insulation and areas where hose and cables enter equipment.
3. Remove grease and grime from components, moisture from electrical parts and cable.



CAUTION: FLYING DIRT AND METAL CHIPS can injure personnel and damage equipment.

- Point gun/feeder liner only in a safe direction away from personnel and equipment when cleaning with compressed air.

4. Blow out the gun/feeder wire guide liner with compressed air when changing wire. This will remove any metal chips and dirt that may have accumulated.

7-2. CLEANING DRIVE ROLL AND DRIVE ROLL BEARING (Figure 4-1)

After every spool of wire, inspect the wire groove on each drive roll. If a buildup of wire particles and dirt is present, clean the wire groove(s) as follows:



WARNING: ELECTRIC SHOCK can kill.

- Do not touch live electrical parts.
- Keep away from pinch points.
- Shut down weld control and welding power source, and disconnect input power employing lockout/tagging procedures before inspecting, maintaining, or servicing.

Lockout/tagging procedures for weld control consist of disconnecting input power plug, and for welding power source consist of padlocking line disconnect switch in open position, removing fuses from fuse box, or shutting off and red-tagging circuit breaker or other disconnecting device. Stop engine, and disconnect negative (-) battery cable from battery on welding generators.

- *Do not touch welding wire or any metal part in contact with it when power source is energized.*

Welding wire and all metal parts in contact with it carry weld current when the welding power source is energized.

- *Do not depress gun/feeder trigger when performing maintenance on gun/feeder.*

MOVING PARTS can cause serious injury.

- *Keep away from moving parts.*

HOT SURFACES can cause severe burns.

- *Allow cooling period before servicing.*

IMPORTANT: Failure to properly maintain the drive roll can result in a buildup of wire particles which will decrease the efficiency of the wire feeding operation.

1. Slide top cover toward rear of gun/feeder, and remove cover.
2. Release tension arm, and pivot mounting arm outward.
3. Cut welding wire where it enters drive roll.
4. Pull wire out nozzle end of gun/feeder.
5. Remove drive roll and drive roll bearing according to Sections 4-2 and 7-3, respectively.
6. Using a wire brush, clean groove in bearing and drive roll.
7. Reinstall drive roll and drive roll bearing according to Sections 4-2 and 7-3, respectively.
8. Route welding wire into wire inlet guide, along drive roll groove, and through liner and contact tube.
9. Pivot mounting arm inward and tension arm downward over drive roll tension adjustment thumbnut.
10. Adjust drive roll pressure as necessary (see Section 4-7).

7-3. REPLACING DRIVE ROLL BEARING (Figure 7-1)



WARNING: ELECTRIC SHOCK can kill.

- *Do not touch live electrical parts.*
- *Shut down weld control and welding power source, and disconnect input power employing lockout/tagging procedures before inspecting, maintaining, or servicing.*

Lockout/tagging procedures for weld control consist of disconnecting input power plug, and for welding power source consist of padlocking line disconnect switch in open position, removing fuses from fuse box, or shutting off and red-tagging circuit breaker or other disconnecting device. Stop engine, and disconnect negative (-) battery cable from battery on welding generators.

- *Do not touch welding wire or any metal part in contact with it when power source is energized.*

Welding wire and all metal parts in contact with it carry weld current when the welding power source is energized.

- *Do not depress gun/feeder trigger when performing maintenance on gun/feeder.*

MOVING PARTS can cause serious injury.

- *Keep away from moving parts.*

HOT SURFACES can cause severe burns.

- *Allow cooling period before servicing.*

1. Slide top cover toward rear of gun/feeder, and remove cover.
2. Release tension arm, and pivot mounting arm outward.
3. Remove screw and shoulder washers from mounting arm.
4. Remove drive roll bearing.
5. Install new drive roll bearing, and secure using shoulder washers and screw removed in Step 3.
6. Pivot mounting arm inward, and pivot tension arm downward over drive roll tension adjustment thumbnut. Be sure that welding wire is in drive roll groove.
7. Adjust drive roll pressure as necessary (see Section 4-7).
8. Reinstall and secure top cover.

7-4. REPLACING DRIVE ROLLS



WARNING: Read and follow safety information at beginning of entire Section 4-2 before proceeding.

Follow procedure in Section 4-2 for replacing and aligning drive rolls in gun/feeder.

7-5. REPLACING CONTACT TUBE AND LINER (Figure 4-1)



WARNING: Read and follow safety information at beginning of entire Section 4-3 before proceeding.

Follow procedure in Section 4-3 for replacing contact tube and liner in gun/feeder.

7-6. REPLACING CANISTER INLET GUIDE (Figure 4-1)



WARNING: ELECTRIC SHOCK can kill.

- Do not touch live electrical parts.
- Shut down weld control and welding power source, and disconnect input power employing lockout/tagging procedures before inspecting, maintaining, or servicing.

Lockout/tagging procedures for weld control consist of disconnecting input power plug, and for welding power source consist of padlocking line disconnect switch in open position, removing fuses from fuse box, or shutting off and red-tagging circuit breaker or other disconnecting device. Stop engine, and disconnect negative (–) battery cable from battery on welding generators.

- Do not touch welding wire or any metal part in contact with it when power source is energized.

Welding wire and all metal parts in contact with it carry weld current when the welding power source is energized.

- Do not depress gun/feeder trigger when performing maintenance on gun/feeder.

MOVING PARTS can cause serious injury.

- Keep away from moving parts.

HOT SURFACES can cause severe burns.

- Allow cooling period before servicing.

1. Slide top cover toward rear of gun/feeder. While pressing cover against cover closure spring, pivot front of cover upward and remove top cover.
2. Loosen canister cover securing screw, and remove canister cover.
3. Release tension arm, and pivot mounting arm outward.
4. Loosen wire spool brake thumbscrew, manually retract welding wire onto wire spool, and remove wire spool from spool canister.
5. Rotate canister inlet guide counterclockwise until loose, and remove canister inlet guide from spool canister.
6. Insert new canister inlet guide into spool canister, and rotate canister inlet guide clockwise until secure.
7. Install wire spool and thread welding wire (see Section 4-7).
8. Adjust spool brake pressure (see Section 4-7).
9. Adjust drive roll pressure as necessary (see Section 4-7).
10. Reinstall and secure canister cover.
11. Reinstall and secure top cover.

7-7. REPLACING SPOOL CANISTER (Figure 4-1)



WARNING: ELECTRIC SHOCK can kill.

- Do not touch live electrical parts.
- Shut down weld control and welding power source, and disconnect input power employing lockout/tagging procedures before inspecting, maintaining, or servicing.

Lockout/tagging procedures for weld control consist of disconnecting input power plug, and for welding power source consist of padlocking line disconnect switch in open position, removing fuses from fuse box, or shutting off and red-tagging circuit breaker or other disconnecting device. Stop engine, and disconnect negative (–) battery cable from battery on welding generators.

- Do not touch welding wire or any metal part in contact with it when power source is energized.

Welding wire and all metal parts in contact with it carry weld current when the welding power source is energized.

- Do not depress gun/feeder trigger when performing maintenance on gun/feeder.

MOVING PARTS can cause serious injury.

- Keep away from moving parts.

HOT SURFACES can cause severe burns.

- Allow cooling period before servicing.

1. Slide top cover toward rear of gun/feeder. While pressing cover against cover closure spring, pivot front of cover upward and remove top cover.
 2. Release tension arm, and pivot mounting arm outward.
 3. Cut welding wire where it enters the drive rolls.
 4. Pull wire out nozzle end of gun/feeder.
 5. Rotate spring plunger thumbscrew counterclockwise (approximately three turns).
 6. Carefully pull and remove spool canister from wire drive housing.
 7. Push new spool canister into wire drive housing until fully seated.
 8. Retighten spring plunger thumbscrew clockwise in wire drive housing until secure.
- IMPORTANT:** When thumbscrew is secure, intentional rotation (pivoting) of spool canister is allowed for 180 degree travel in 45 degree increments.
9. Thread welding wire (see Section 4-7).
 10. Adjust spool brake pressure (see Section 4-7).
 11. Adjust drive roll pressure as necessary (see Section 4-7).
 12. Reinstall and secure canister cover.
 13. Reinstall and secure top cover.

7-8. CHANGING THE CONTACT TUBE ADAPTER (Figure 7-1)

A. Air-Cooled Models

When changing the contact tube adapter on air cooled models proceed as follows:

1. Remove barrel extension
2. Loosen setscrews (2) on head tube that hold adapter in place
3. Remove and replace adapter
4. Reverse procedure to reassemble.

B. Water-Cooled Models

When changing the contact tube adapter on water cooled models proceed as follows:

1. Remove nozzle adapter
2. The adapter is held in place with a removable threadlocking compound. The adapter will turn out with a wrench
3. Before installing new adapter, coat adapter with removable threadlocking compound (such as Loc Tite No. 242) in a manner similar to the one that was just removed
4. Reverse procedure to reassemble.

7-9. TROUBLESHOOTING (Table 7-2)



WARNING: ELECTRIC SHOCK can kill.

- Do not touch live electrical parts.
- Shut down weld control and welding power source, and disconnect input power employing lockout/tagging procedures before inspecting, maintaining, or servicing.

Lockout/tagging procedures for weld control consist of disconnecting input power plug, and for welding power source consist of padlocking line disconnect switch in open position, removing fuses from fuse box, or shutting off and red-tagging circuit breaker or other disconnecting device. Stop engine, and disconnect negative (-) battery cable from battery on welding generators.

- Do not touch welding wire or any metal parts in contact with it.

Welding wire and all metal parts in contact with it carry weld current when the welding power source is energized.

WELDING WIRE can cause puncture wounds.

- Do not depress gun/feeder trigger when performing maintenance on gun/feeder.

MOVING PARTS can cause serious injury.

- Keep away from moving parts.

HOT SURFACES can cause severe burns.

- Allow cooling period before changing gun/feeder and weld control parts, if applicable.

It is assumed that the unit was properly installed according to Section 4 of this manual, the operator is familiar with the function of controls, the weld control was working properly, and that the trouble is not related to the welding process.

The following table is designed to diagnose and provide remedies for some of the troubles that may develop in this weld control. Use this table in conjunction with the circuit diagram while performing troubleshooting procedures. If the trouble is not remedied after performing these procedures, contact the nearest Factory Authorized Service Station. In all cases of equipment malfunction, strictly follow the manufacturer's procedures and instructions.

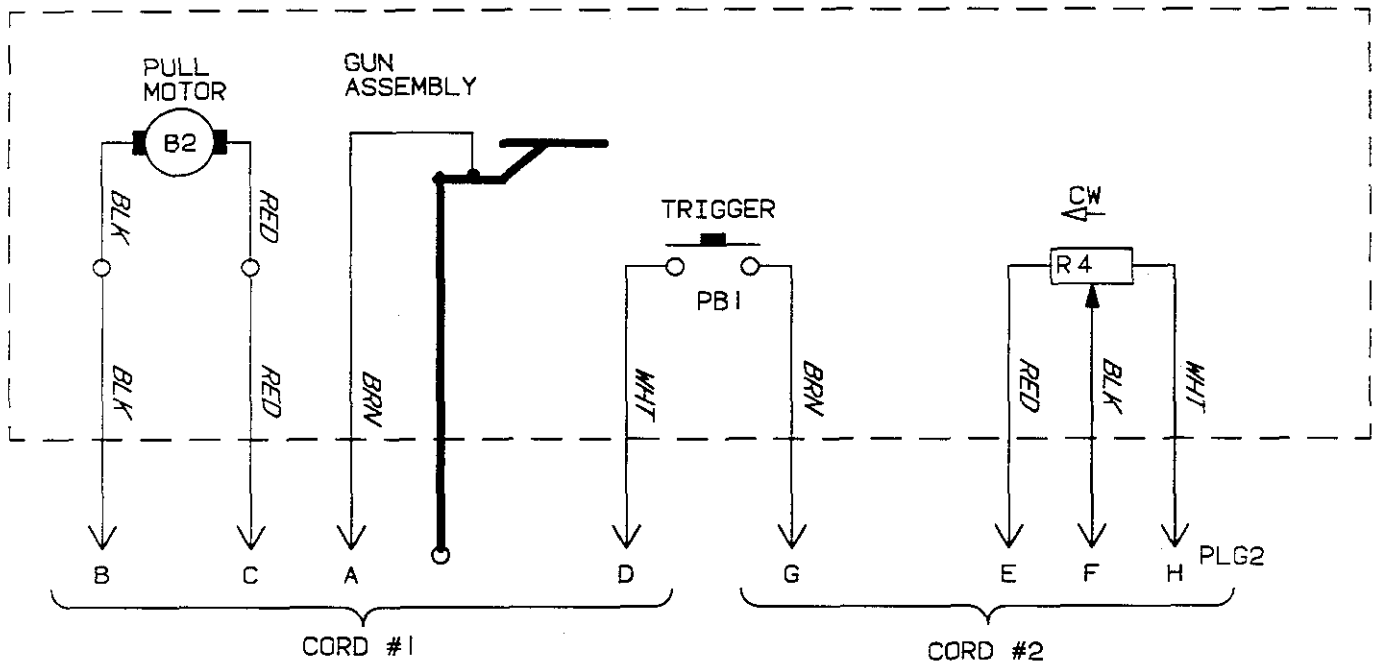
Table 7-2. Troubleshooting

TROUBLE	CAUSE	REMEDY
No weld output; gun/feeder inoperative.	Weld control plug PLG4 not secure in 115 volts ac receptacle.	Secure plug in receptacle.
	POWER switch S1 in the OFF position.	Place S1 in the ON position (see Section 5-1).
Erratic weld output.	Loose and/or dirty connections.	Be sure that all connections are clean and tight.
Depressing gun/feeder trigger PB1 does not energize weld control; welding wire is not energized; shielding gas does not flow.	Plug from gun/feeder trigger is not secure in GUN CONTROL receptacle RC3 on weld control.	Secure plug in receptacle RC3 (see Section 4-5 or 4-6).

Table 7-2. Troubleshooting (Continued)

TROUBLE	CAUSE	REMEDY
Wire feeds, shielding gas flows, but welding wire is not energized.	Contactors control cable leads not secure on terminal strip in weld control.	Secure connectors (see weld control Owner's Manual).
	Welding power source.	See Troubleshooting Section in welding power source Owner's Manual.
Wire feeds erratically.	Incorrect pressure on drive roll.	Check and correct drive roll pressure according to Section 4-7.
	Worn drive roll.	Replace drive roll (see Section 4-2).
	Dirt in drive roll.	Clean drive roll (see Section 7-3).
	Excessive spool brake pressure.	Decrease spool brake pressure (see Section 4-7).

SECTION 8 – ELECTRICAL DIAGRAMS



Circuit Diagram No. SA-138 956-A

Diagram 8-1. Circuit Diagram For Gun/Feeder

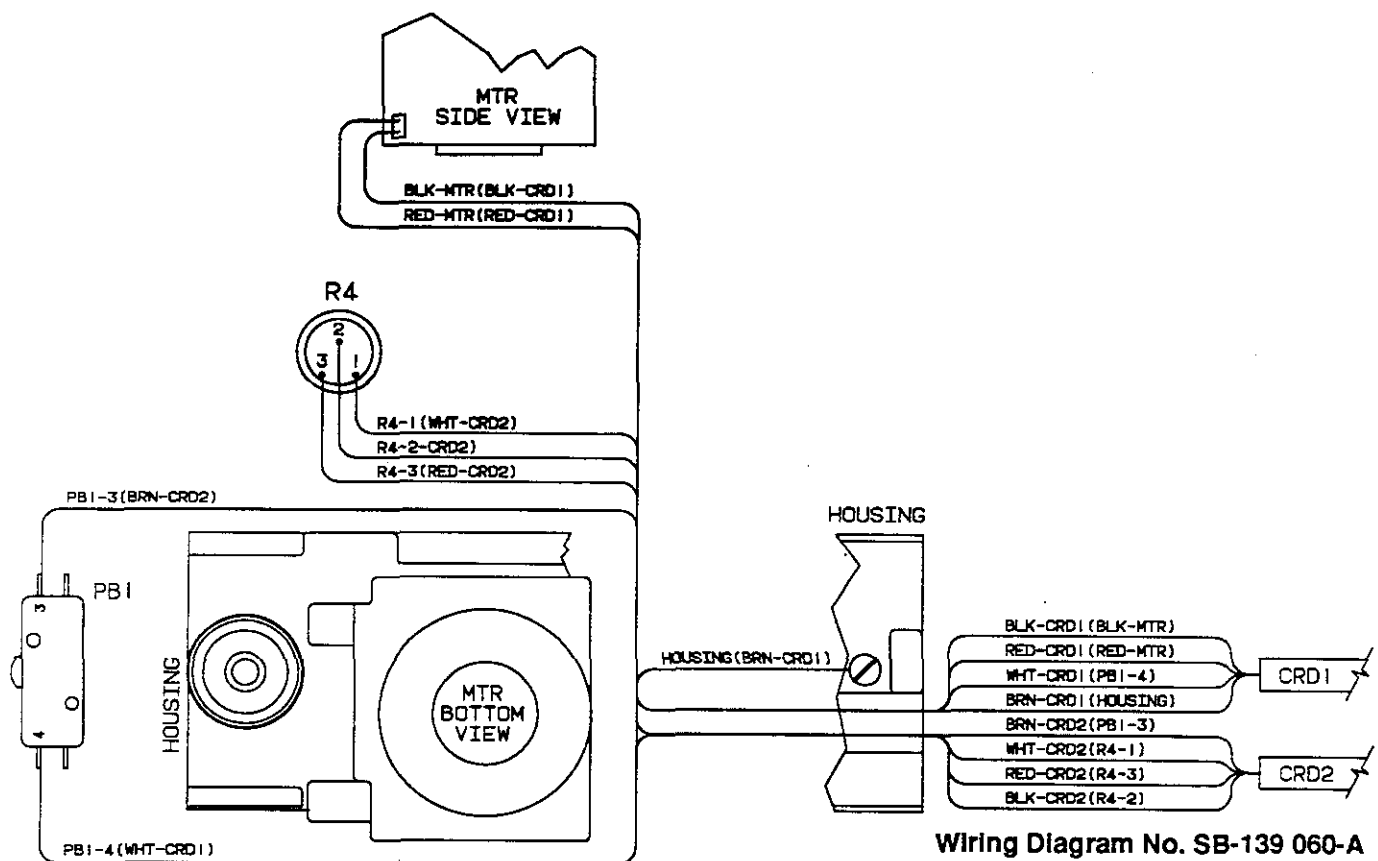
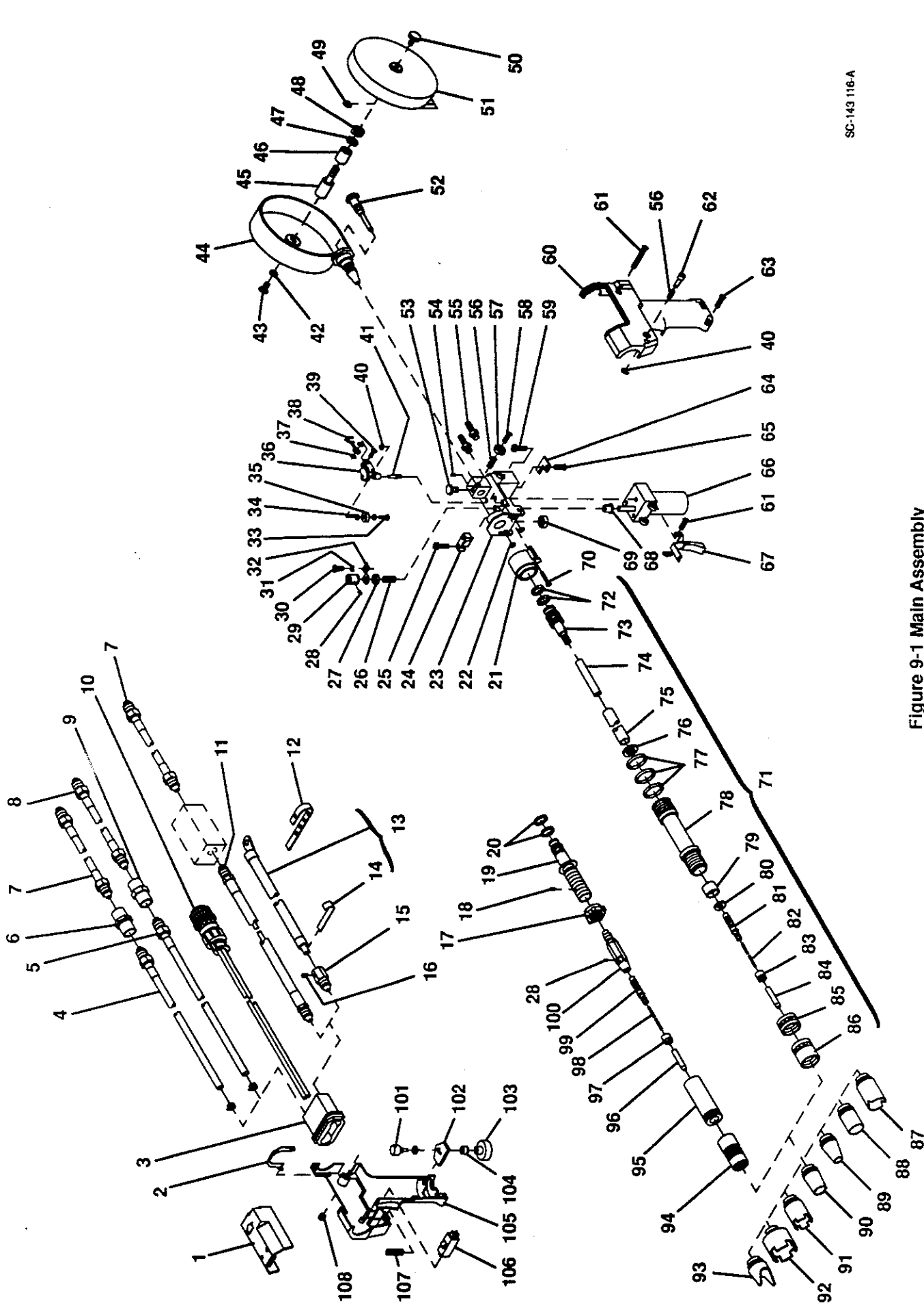


Diagram 8-2. Wiring Diagram For Gun/Feeder

SECTION 9 – PARTS LIST



SC-143 118-A

Figure 9-1 Main Assembly

Item No.	Dia. Mkgs.	Part No.	Description	Quantity
Figure 9-1. Main Assembly				
1		133 479	COVER	1
2		135 196	SPRING, closure cover	1
3		133 362	STRAIN RELIEF, cable	1
4		137 475	HOSE, water in (30W model only) (consisting of)	1
5		137 472	HOSE, gas in (consisting of)	1
		056 851	FITTING, hose brs barbed nipple 3/16tbg	1
		010 607	FITTING, hose brs nut .625-18LH (water hose)	1
		010 606	FITTING, hose brs nut .625-18RH (gas hose)	1
		056 108	FITTING, hose brs ferrule .425 ID x .718 lg	1
		134 834	HOSE, SAE .187 ID x .410 OD (order by ft)	31ft
		089 120	CLAMP, hose .375-.450clp dia slftng	1
6		057 020	FITTING, hose brs coupler .625-18LH/.625-18LH (30W model only)	1
7		000 571	HOSE, water (30W model only) (consisting of)	2
		056 851	FITTING, hose brs barbed nipple 3/16tbg	2
		010 607	FITTING, hose brs nut .625-18LH	2
		056 108	FITTING, hose brs ferrule .425 ID x .718 lg	2
		134 834	HOSE, SAE .187 ID x .410 OD (order by ft)	10ft
8		048 837	HOSE, gas (consisting of)	1
		010 603	FITTING, hose brs barbed nipple 1/4tbg	2
		010 606	FITTING, hose brs nut .625-18RH	2
		056 112	FITTING, hose brs ferrule .475 ID x .718 lg	2
		603 106	HOSE, nprn brd No. 1 x .250 ID (order by ft)	10ft
9		000 950	FITTING, hose brs coupler .625-18RH/.625-18RH	1
10		138 459	CABLE, control (consisting of)	1
	PLG2	146 212	PLUG, 10 pin MS-3106A-18-1PX	1
		138 033	CLAMP, cable 97-3057-1010	1
		053 212	CABLE, port No. 18 4/c (order by ft)	63ft
11		137 477	CABLE, power/water out 30ft (30W model only)	1
12		073 476	CLAMP, strap rbr 5 holes .375 wide x 4.625 lg	13
13		137 479	CABLE, power (30A model only) (consisting of)	1
		600 722	TERMINAL, ring tng .500 stud No. 4 cable	1
		600 318	CABLE, weld cop strd No.3 (order by ft)	31ft
		127 893	RING, crimp cable	1
14		019 833	STRIP, cop .010 x 2.500 x .750	1
15		137 495	FITTING, connection power weld (30A model only)	1
16		141 694	SCREW, set stl sch .312-18 x .375 cone point (30A model only)	1
17		058 685	NUT, jam nozzle extension (30A model only)	1
18		602 172	SCREW, set stl sch 10-32 x .187 cup point (30A model only)	1
19		136 730	ADAPTER, tube head (30A model only)	1
20		134 800	O-RING, .614 ID x .070 CS	2
21		132 985	MANIFOLD, water (30W model only)	1
22		134 799	O-RING, .176 ID x .070 CS (30A model only)	2
23		133 363	HOUSING, wire drive components	1
24		133 365	CLAMP, head tube	1
25		000 417	SCREW, cap stl sch 10-24 x1.000	2
26		143 836	SPRING, cprsn .445 OD x .023 wire x .370	1
27		008 033	WASHER, flat felt .234 ID x .500 OD x .093thk	1
28		604 612	SCREW, set stl sch 8-32 x .125 cup point (30A model only)	6
28		604 612	SCREW, set stl sch 8-32 x .125 cup point (30W model only)	2
29		136 135	ROLL, drive VK groove .023-1/16 wire	1
30		602 066	SCREW, mach stl trh 6-32 x .250	3
31		602 198	WASHER, lock stl split No. 6	1
32		146 558	KIT, current pick-up contact	1
33		132 270	SCREW, mach stl rdhph 6-32 x .500	1
34		134 624	BEARING, flg nyl .140 ID x .187 OD x .375flg x .031thk	2
35		134 623	BEARING	1
36		132 852	ARM, pressure	1
37		605 798	WASHER, shldr nyl .375 OD x .168 ID x .080	2

Item No.	Dia. Mkgs.	Part No.	Description	Quantity
Figure 9-1. Main Assembly (Continued)				
38		133 083	SPRING, tension adj drive roll	1
39		144 860	SCREW, mach stl flh 8-32 x .437	1
40		058 968	RING, retainer E	2
41		135 474	PIN, hinge	1
42		602 209	WASHER, lock stl intl tooth .250	1
43		132 530	SCREW, mach stl phtrh .250-20 x .500	1
44		132 527	CANISTER, spool	1
45		132 522	POST, support spool	1
46		132 529	PAD, brake	1
47		132 523	WASHER, anti-turn	1
48		132 524	NUT, thumb brake	1
49		000 364	RING, retainer ext .188 shaft x .025thk	1
50		132 528	SCREW, thumb canister	1
51		132 526	COVER, spool	1
52		132 521	GUIDE, inlet canister	1
53		135 498	SCREW, thumb spring plunger	1
54		135 126	SCREW, set stl sch 6-32 x .125 cup point	1
55		135 580	FITTING, gas (30A model)	1
55		135 580	FITTING, gas (30W model)	2
56		112 896	SPRING, cprsn .240 OD x .020 wire x .437	2
57		135 773	NUT, thumb tension adjusting 8-32	1
58		602 082	SCREW, mach stl rdh 8-32 x .500	1
59		604 638	SCREW, cap stl sch 6-32 x .375	3
60		136 128	CASE, gun LH	1
61		135 646	SCREW, mach stl rdhph 8-32 x 1.500	2
62		135 896	PLUNGER, trigger hold	1
63		135 645	SCREW, mach stl rdhph 8-32 x .875	1
64		136 679	CLAMP, strain relief	1
65		132 269	SCREW, mach stl rdhph 8-32 x .375	1
66	B2	134 248	MOTOR, gear PM 24VDC 420RPH 10.2:1 ratio	1
67		133 373	TRIGGER	1
68		135 473	BUSHING, shaft motor	1
69		058 262	CAP	1
70		135 128	SCREW, cap stl sch 6-32 x 1.000 (30W model only)	2
71		137 042	BARREL ASSEMBLY, water cooled (30W model only) (consisting of)	1
72		134 800	O-RING, .614 ID x .070 CS	2
73		136 955	FITTING, end tube head	1
74		136 956	TUBE, head	1
75		136 943	TUBING, teflon	1
76		136 834	WASHER, fbr .594 ID x .875 OD x .125thk	1
77		134 801	O-RING, .926 ID x .070 CS	3
78		137 041	BARREL, outer	1
79		136 836	INSULATOR, head tube from adapter	1
80		136 835	WASHER, flat brs .390 ID x .687 OD x .125thk	1
81		136 680	ADAPTER, contact tube	1
82		136 683	LINER, telfon .045-1/6 wire x 6.875 lg	1
83		136 748	NUT, compresson .375-24	1
84		135 424	TUBE, contact .047-.061 wire	1
85		136 833	NUT, jam adapter 1.000-8	1
86		136 832	ADAPTER, nozzle	1
		050 622	NOZZLE, 5/8 orf x 1-5/8 lg	1
87		◆009 925	NOZZLE, spot outside corner .937 ID x 2.375	1
88		◆050 116	NOZZLE, 13/16 orf x 1-5/8 lg	1
89		◆050 115	NOZZLE, 1/2 orf x 1-5/8 lg	1
90		050 622	NOZZLE, 5/8 orf x 1-5/8 lg	1
91		◆000 442	NOZZLE, spot	1
92		◆004 466	NOZZLE, spot	1

Item No.	Dia. Mkgs.	Part No.	Description	Quantity
Figure 9-1. Main Assembly (Continued)				
93		♦000 443	NOZZLE, spot inside corner	1
94		144 862	EXTENSION, nozzle (30A model only)	1
95		053 785	EXTENSION, barrel 2.875 lg (30A model only)	1
96		136 171	TUBE, contact .025/31 wire	1
96		♦135 427	TUBE, contact .030/36 wire	1
96		135 428	TUBE, contact .030/41 wire	1
96		♦147 314	TUBE, contact .035/41 wire	1
96		135 430	TUBE, contact .035/52 wire	1
96		♦135 429	TUBE, contact .047/52 wire	1
96		135 424	TUBE, contact .047/61 wire	1
96		♦135 426	TUBE, contact .062/73 wire	1
96		135 425	TUBE, contact .062/81 wire	1
		136 821	WRENCH, nut tube contact	1
97		136 748	NUT, compression .375-24	1
98		136 683	LINER, teflon .045-1/16 wire x 6.875 lg	1
98		136 682	LINER, teflon .023-.035 wire x 6.875 lg	1
99		136 680	ADAPTER, contact tube (30A model only)	1
100		136 681	TUBE, head (30A model only)	1
101	R4	137 854	POTENTIOMETER, C sltd sft 1/T .5W 10K ohm	1
102		144 861	WASHER, anti-turn	1
103		134 856	KNOB, speed control 1-10 .140 shaft x 1.125 OD	1
104		135 127	LOCK, shaft pot .250-32 x .125dia shaft	1
105		136 127	CASE, gun RH	1
106	PB1	000 369	SWITCH, lim 10A 125/250VAC DPST plgr	1
107		118 774	SPRING, cprsn .240 OD x .024 wire x 1.000	1
108		135 647	NUT, stl 8-32	3

♦OPTIONAL

BE SURE TO PROVIDE MODEL AND SERIAL NUMBER WHEN ORDERING REPLACEMENT PARTS.

