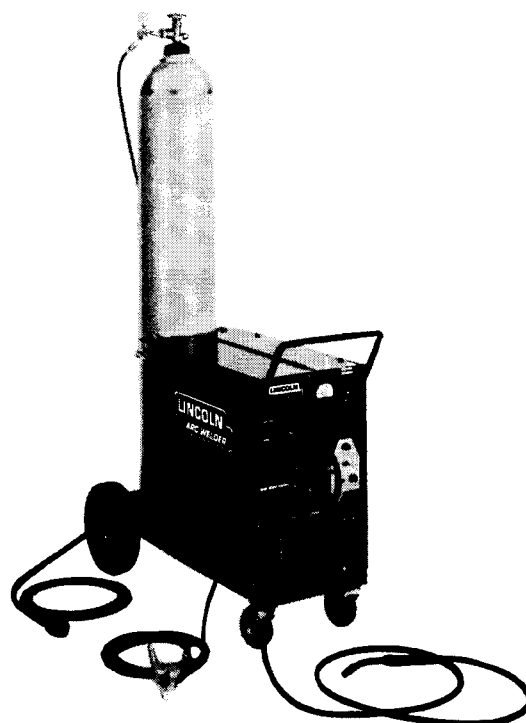


OPERATING MANUAL

IDEALARC[®] SP-150 SINGLE PHASE, CONSTANT VOLTAGE DC ARC WELDING POWER SOURCE AND SEMIAUTOMATIC WIRE FEEDER



This manual covers equipment which is obsolete and no longer in production by The Lincoln Electric Co. Specifications and availability of optional features may have changed.

DAMAGE CLAIMS

When this equipment is shipped, title passes to the purchaser upon receipt by the carrier. Consequently, claims for material damaged in shipment must be made by the purchaser against the transportation company at the time the shipment is received.

SAFETY DEPENDS ON YOU

Lincoln arc welding equipment is designed and built with safety in mind. However, your overall safety can be increased by proper installation . . . and thoughtful operation on your part. **DO NOT INSTALL, OPERATE OR REPAIR THIS EQUIPMENT WITHOUT READING THIS OPERATING MANUAL AND THE ARC WELDING SAFETY PRECAUTIONS ON THE INSIDE FRONT COVER.** And most importantly, think before you act and be careful.

ARC WELDING SAFETY PRECAUTIONS



WARNING: PROTECT YOURSELF AND OTHERS FROM POSSIBLE SERIOUS INJURY OR DEATH.



ELECTRIC SHOCK can kill.

1. a. The electrode and work (or ground) circuits are electrically "hot" when the welder is on. Do not touch these "hot" parts with your bare skin or wet clothing. Wear dry, hole-free gloves to insulate hands.
- b. In semiautomatic or automatic wire welding, the electrode, electrode reel, welding head, nozzle or semiautomatic welding gun are also electrically "hot".
- c. Insulate yourself from work and ground using dry insulation. When welding in damp locations, on metal framework such as floors, gratings or scaffolds, and when in positions such as sitting or lying, make certain the insulation is large enough to cover your full area of physical contact with work and ground.
- d. Always be sure the work cable makes a good electrical connection with the metal being welded. The connection should be as close as possible to the area being welded.
- e. Ground the work or metal to be welded to a good electrical (earth) ground.
- f. Maintain the electrode holder, work clamp, welding cable and welding machine in good, safe operating condition. Replace damaged insulation.
- g. Never dip the electrode in water for cooling.
- h. Never simultaneously touch electrically "hot" parts of electrode holders connected to two welders because voltage between the two can be the total of the open circuit voltage of both welders.
- i. When working above floor level, protect yourself from a fall should you get a shock.
- j. Also see Items 4c and 6.



ARC RAYS can burn.

2. a. Use a shield with the proper filter and cover plates to protect your eyes from sparks and the rays of the arc when welding or observing open arc welding. Headshield and filter lens should conform to ANSI Z87.1 standards.
- b. Use suitable clothing made from durable flame-resistant material to protect your skin and that of your helpers from the arc rays.
- c. Protect other nearby personnel with suitable non-flammable screening and/or warn them not to watch the arc nor expose themselves to the arc rays or to hot spatter or metal.



FUMES AND GASES can be dangerous.

3. a. Welding may produce fumes and gases hazardous to health. Avoid breathing these fumes and gases. When welding, keep your head out of the fume. Use enough ventilation and/or exhaust at the arc to keep fumes and gases away from the breathing zone. When welding on galvanized, lead or cadmium plated steel and other metals which produce toxic fumes, even greater care must be taken.
- b. Do not weld in locations near chlorinated hydrocarbon vapors coming from degreasing, cleaning or spraying operations. The heat and rays of the arc can react with solvent vapors to form phosgene, a highly toxic gas, and other irritating products.
- c. Shielding gases used for arc welding can displace air and cause injury or death. Always use enough ventilation, especially in confined areas, to insure breathing air is safe.
- d. Read and understand the manufacturer's instructions for this equipment and the consumables to be used, including the material safety data sheet (MSDS) and follow your employer's safety practices.
- e. Also see item 7b.



WELDING SPARKS can cause fire or explosion.

4. a. Remove fire hazards from the welding area. If this is not possible, cover them to prevent the welding sparks from starting a fire. Remember that welding sparks and hot materials from welding can easily go through small cracks and openings to adjacent areas. Have a fire extinguisher readily available.
- b. Where compressed gases are to be used at the job site, special precautions should be used to prevent hazardous situations. Refer to "Safety in Welding and Cutting" (ANSI Standard Z49.1) and the operating information for the equipment being used.
- c. When not welding, make certain no part of the electrode circuit is touching the work or ground. Accidental contact can cause overheating and create a fire hazard.
- d. Do not heat, cut or weld tanks, drums or containers until the proper steps have been taken to insure that such procedures will not cause flammable or toxic vapors from substances inside. They can cause an explosion even though they have been "cleaned." For information purchase "Recommended Safe Practices for the Preparation for

Welding and Cutting of Containers and Piping That Have Held Hazardous Substances", AWS F4.1-80 from the American Welding Society (see address below).

- e. Vent hollow castings or containers before heating, cutting or welding. They may explode.
- f. Sparks and spatter are thrown from the welding arc. Wear oil free protective garments such as leather gloves, heavy shirt, cuffless trousers, high shoes and a cap over your hair. Wear ear plugs when welding out of position or in confined places. Always wear safety glasses with side shields when in a welding area.
- g. Connect the work cable to the work as close to the welding area as practical. Work cables connected to the building framework or other locations away from the welding area increase the possibility of the welding current passing through lifting chains, crane cables or other alternate circuits. This can create fire hazards or overheat lifting chains or cables until they fail.
- h. Also see item 7c.



CYLINDER may explode if damaged.

- 5. a. Use only compressed gas cylinders containing the correct shielding gas for the process used and properly operating regulators designed for the gas and pressure used. All hoses, fittings, etc. should be suitable for the application and maintained in good condition.
- b. Always keep cylinders in an upright position securely chained to an undercarriage or fixed support.
- c. Cylinders should be located:
 - Away from areas where they may be struck or subjected to physical damage.
 - A safe distance from arc welding or cutting operations and any other source of heat, sparks, or flame.
- d. Never allow the electrode, electrode holder, or any other electrically "hot" parts to touch a cylinder.
- e. Keep your head and face away from the cylinder valve outlet when opening the cylinder valve.
- f. Valve protection caps should always be in place and handtight except when the cylinder is in use or connected for use.
- g. Read and follow the instructions on compressed gas cylinders, associated equipment, and CGA publication P-1, "Precautions for Safe Handling of Compressed Gases in Cylinders," available from the Compressed Gas Association, 1235 Jefferson Davis Highway, Arlington, VA 22202.



FOR ELECTRICALLY powered equipment.

- 6. a. Turn off input power using the disconnect switch at the fuse box before working on the equipment.
- b. Install equipment in accordance with the National Electrical Code, all local codes and the manufacturer's recommendations.
- c. Ground the equipment in accordance with the National Electrical Code and the manufacturer's recommendations.



FOR ENGINE powered equipment.

- 7. a. Turn the engine off before troubleshooting and maintenance work unless the maintenance work requires it to be running.



- b. Operate engines in open, well-ventilated areas or vent the engine exhaust fumes outdoors.



- c. Do not add the fuel near an open flame, welding arc or when the engine is running. Stop the engine and allow it to cool before refueling to prevent spilled fuel from vaporizing on contact with hot engine parts and igniting. Do not spill fuel when filling tank. If fuel is spilled, wipe it up and do not start engine until fumes have been eliminated.



- d. Keep all equipment safety guards, covers and devices in position and in good repair. Keep hands, hair, clothing and tools away from V-belts, gears, fans and all other moving parts when starting, operating or repairing equipment.
- e. In some cases it may be necessary to remove safety guards to perform required maintenance. Remove guards only when necessary and replace them when the maintenance requiring their removal is complete. Always use the greatest care when working near moving parts.
- f. Do not put your hands near the engine fan. Do not attempt to override the governor or idler by pushing on the throttle control rods while the engine is running.
- g. To prevent accidentally starting gasoline engines while turning the engine or welding generator during maintenance work, disconnect the spark plug wires, distributor cap or magneto wire as appropriate.



- h. To avoid scalding, do not remove the radiator pressure cap when the engine is hot.

HAVE ALL INSTALLATION, OPERATION, MAINTENANCE AND REPAIR WORK performed by qualified people.

For more detailed information, it is strongly recommended that you purchase a copy of "Safety in Welding & Cutting — ANSI Standard Z49.1" from the American Welding Society, P.O. Box 351040, Miami, Florida 33135.

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PRODUCT DESCRIPTION

A complete semiautomatic constant voltage DC arc welding machine. Includes a solid state controlled, single phase constant voltage transformer/rectifier power source, a wire feeder with timer functions and calibrated feed speed, and a wire reel spindle with Readi-Reel® adapter, all in a compact case. The SP-150 also features mobility with heavy duty wheels and casters that are factory installed; gas cylinder mounting capability; and a unique drive roll assembly for feeding .023" through .035" diameter wire with a single reversible drive roll.

The SP-150 Type K-410 and K-420 are suitable for operation on 208 or 230 volt, single phase, 60 hertz input power. Type K-411 is suitable for operation on 200 or 220 volt, single phase, 50 hertz input power.

INSTALLATION

WARNING: READ "ARC WELDING SAFETY PRECAUTIONS" ON PAGE 2 BEFORE PROCEEDING.

TURN THE INPUT POWER OFF AT THE DISCONNECT SWITCH BEFORE ATTEMPTING TO CONNECT THE INPUT POWER TO THE SP-150.

- Only qualified personnel should perform this installation.
- Machine must be connected to system ground per the National Electrical Code and any applicable local codes.
- Turn the power switch on the SP-150 "off" before connecting or disconnecting gun and cable, output cables or other equipment.

LOCATION

Locate the welder in a dry location where there is free circulation of clean air into the louvers in the back and out the front. A location that minimizes the amount of smoke and dirt drawn into the rear louvers reduces the chance of dirt accumulation that can block air passages and cause overheating.

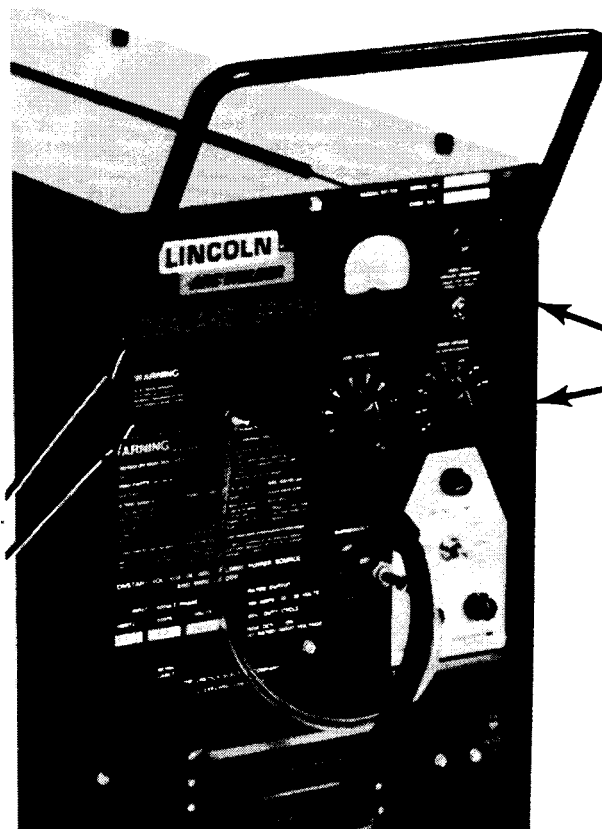
UNCRATING YOUR SP-150

Remove the staples from the bottom edge of the carton and lift off. Cut the tape securing the two rear wheels to the wooden shipping pallet. Using a 1/2 inch wrench or socket, remove the two screws which attach the pallet to the bottom of the SP-150.

HANDLE INSTALLATION

Attach the handle to the front of the welder as shown in the following figure using the four 1/4-20 x .50 hex head screws supplied.

THESE TWO SCREWS ARE INSTALLED FROM INSIDE OF WIRE DRIVE COMPARTMENT. LIFT LEFT CASE SIDE FOR ACCESS TO WIRE DRIVE COMPARTMENT.

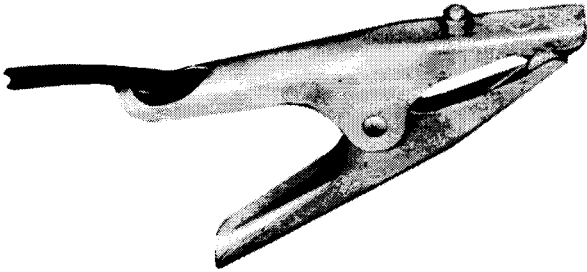


THESE TWO SCREWS MOUNT THE HANDLE TO THE CONTROL SIDE COVER.

WORK CLAMP INSTALLATION

Attach the work clamp provided to the cable which extends from the front of the machine per the following:

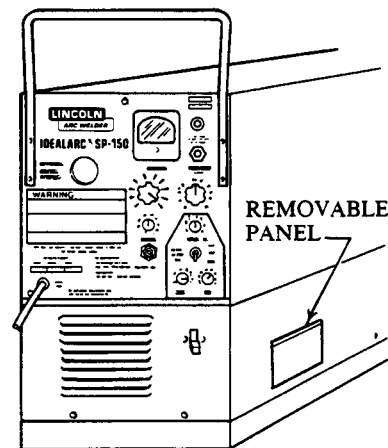
1. Insert the lug on the end of the cable through the strain relief hole in the work clamp as shown below.
2. Fasten securely with the bolt and nut provided.



INPUT POWER AND GROUNDING CONNECTIONS

	WARNING
	ELECTRIC SHOCK can kill. <ul style="list-style-type: none">• Do not touch electrically live parts such as output terminals or internal wiring.

WARNING: ALL INPUT POWER MUST BE ELECTRICALLY DISCONNECTED BEFORE PROCEEDING.

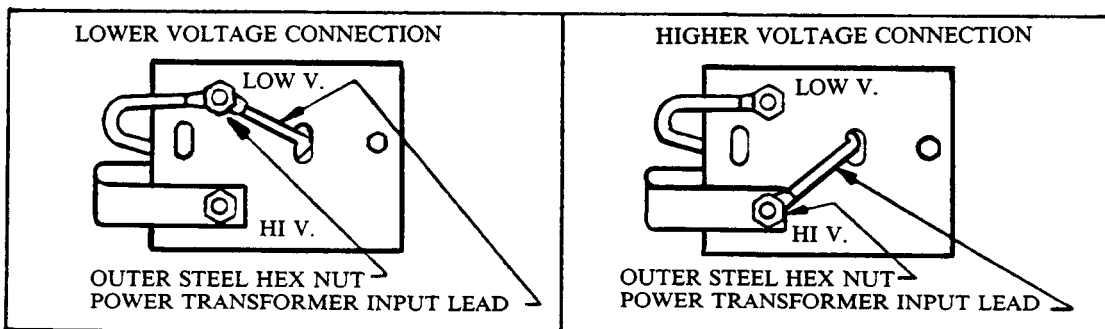


INPUT SUPPLY RECONNECT DIAGRAM

S-17827
4-4-85

WARNING: ALL INPUT POWER MUST BE ELECTRICALLY DISCONNECTED BEFORE TOUCHING PANEL.

All machines are shipped from the factory connected for the higher of the two input voltages listed on the nameplate.



TO CHANGE VOLTAGE CONNECTION PROCEED AS FOLLOWS:

1. Remove the outer steel hex nut from the terminal where the power transformer input lead is connected.
2. Shift the power transformer load to the terminal that the unit is to operate on and fasten securely with the hex nut removed in step 1. (Make certain brass nuts are tight.)

⚠ WARNING

ELECTRIC SHOCK can kill.

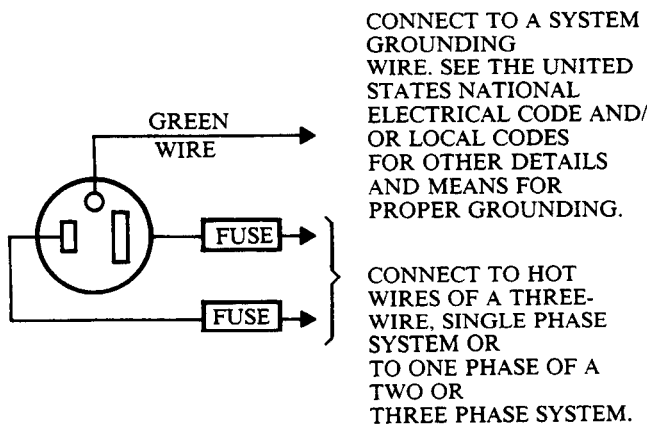
- Do not touch electrically live parts such as output terminals or internal wiring.

WARNING: MAKE CERTAIN THAT THE POWER CORD IS UNPLUGGED BEFORE REMOVING THE SCREW THAT HOLDS THE REMOVABLE SIDE PANEL IN PLACE.

- The 208/230 volt 60 Hz and 200/220 volt 50 Hz models are shipped with a 10 ft. input cable and plug connected to the welder. A matching receptacle is supplied with the machine. Mount the receptacle in a suitable location using the screws provided. Be sure it can be reached by the plug on the input cable attached to the welder. Mount with the grounding terminal at the top to allow the power cable to hang down without bending.

Units rated for higher than 230 volts are not equipped with a plug on the input cable nor a receptacle.

- Using the following instructions, have a qualified electrician connect the receptacle or input power cable to the input power lines and the system ground per the United States National Electrical Code and any applicable local codes. See the table for proper wire sizes. For long runs over 100', larger copper wires should be used. Fuse the two hot lines with super lag type fuses as shown in the following diagram. The center contact in the receptacle is for grounding connection. A green wire in the input cable connects this contact to the frame of the welder. This ensures proper grounding of the welder frame when the welder plug is inserted into a properly grounded receptacle.



Input Voltage	Hertz	Type 75°C Wire in Conduit, Copper Cond. AWG Size		Grounding Wire Copper Cond. AWG Size	Fuse Size (Super Lag)
		Runs to 100'	Runs over 100'		
208/230	60	10	8	10	40
200/220	50	10	8	10	40

OUTPUT POLARITY CONNECTION

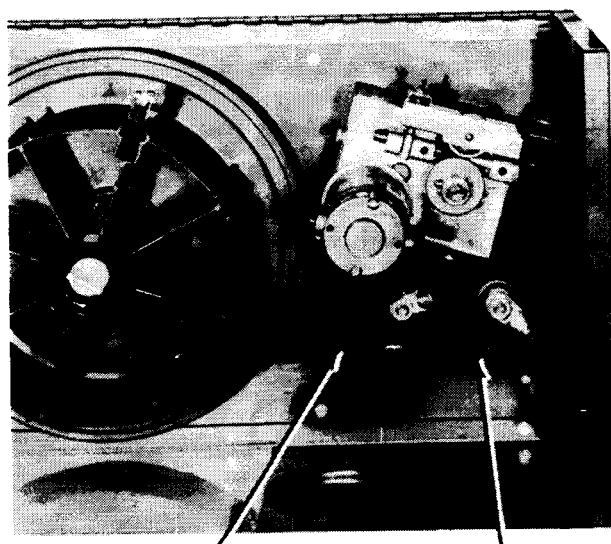
⚠ WARNING

ELECTRIC SHOCK can kill.

- Do not touch electrically live parts such as output terminals or internal wiring.

WARNING: TURN THE WELDER POWER SWITCH OFF BEFORE CHANGING OUTPUT CONNECTION.

The welder, as shipped from the factory, is connected for electrode positive (+) polarity. This is the normal polarity for GMA welding. If negative (−) polarity is required, interchange the two cables connected to the output studs which are located in the wire drive compartment below the wire drive gearbox. The short cable from the wire drive conductor block goes to the stud marked with the desired electrode polarity. Tighten both nuts with a wrench.



CONNECTOR TERMINALS FOR SPOOL GUN WITH MACHINES ABOVE CODE 9180 ARE LOCATED IN THIS AREA

SHIELDING GAS

Customer must provide cylinder of argon, CO₂, or argon mixed shielding gas.



CYLINDER may explode if damaged.

WARNING: GAS UNDER PRESSURE IS EXPLOSIVE. ALWAYS KEEP GAS CYLINDERS IN AN UPRIGHT POSITION AND ALWAYS KEEP CHAINED TO UNDERCARRIAGE OR STATIONARY SUPPORT. SEE AMERICAN NATIONAL STANDARD Z-49.1, "SAFETY IN WELDING AND CUTTING" PUBLISHED BY THE AMERICAN WELDING SOCIETY.

1. Set gas cylinder in rear platform of SP-150. Hook chain in place to secure cylinder to rear of welder.
2. Remove the cylinder cap. Stand to one side away from the outlet and open the cylinder valve very slightly for an instant. This blows away any dust or dirt which may have accumulated in the valve outlet.



CYLINDER may explode if damaged.

WARNING: BE SURE TO KEEP YOUR FACE AWAY FROM THE VALVE OUTLET WHEN "CRACKING" THE VALVE.

3. Attach the flow regulator to the cylinder valve and tighten the union nut securely with a wrench.
4. Attach the free end of the inlet gas hose to the outlet fitting of the flow regulator and tighten the union nut securely with a wrench.
5. Install the barbed gas outlet fitting on the front of the SP-150.
6. Open the cylinder valve slowly a fraction of a turn. When the cylinder pressure gage pointer stops moving, open the valve fully.

WARNING: NEVER STAND DIRECTLY IN FRONT OF OR BEHIND THE FLOW REGULATOR WHEN OPENING THE CYLINDER VALVE. ALWAYS STAND TO ONE SIDE.

7. The flow regulator included with current models of the SP-150 is not adjustable. It is preset by the manufacturer to deliver a nominal flow of 30 cubic feet per hour of argon or argon mixed gas.

WARNING: DO NOT ATTEMPT TO MAKE ANY ADJUSTMENTS TO THIS FLOW REGULATOR.

GUN AND CABLE



WARNING



ELECTRIC SHOCK can kill.

- Do not touch electrically live parts such as output terminals or internal wiring.

WARNING: TURN THE WELDER POWER SWITCH OFF BEFORE INSTALLING GUN AND CABLE.

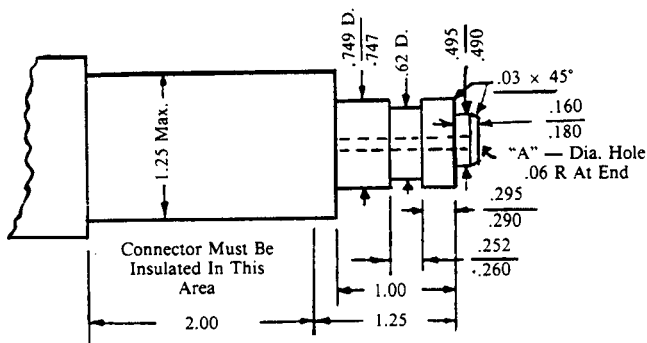
1. Lay the cable out straight. Insert the connector on the welding conductor cable thru the large hole in the front panel of the SP-150 and into the brass conductor block on the front of the wire drive.

Note that the connector handle is to be angled down approximately 15° for proper insertion into the angled connector receptacle on the machine. Make sure the connector is all the way in the conductor block and hand tighten the gun clamping screw securely. Keep this connection clean and bright.

2. Route the gun trigger switch control leads through the large hole along with the gun cable connector. Connect the insulated terminals to the two insulated 1/4 inch tab connector bushings located in the wire drive section below the negative output stud. Either lead can go to either connector. Squeeze the lead terminal insulators to get them started into the connector bushings.
3. Connect the 3/16 I.D. gas hose from the gun to the barbed gas outlet fitting on the front of the SP-150. This fitting can be easily removed by loosening the union nut.
4. If a gun and cable other than the one provided with SP-150 is to be used, or for SP-150 models which did not include a gun and cable, the cable connector should conform to the following:

SP-150 CABLE CONNECTOR FOR .023-.035 WIRE

Wire Size	"A" Dia. Hole To Be Concentric To .749/.747 Dia. Within .008 P.I.M.
.030 & .035	.055 (#54 Drill)
.023-.025	.047 (3/64 Drill)



NOTE — CONNECTOR PART WITH .749/.747 DIA. SHOULD BE MADE FROM BRASS IF IT IS TO BE PART OF THE WELDING CURRENT CARRYING CIRCUIT.

GUN TRIGGER SWITCH REQUIREMENTS

1/2 Amp. D.C. 24 Volts — Inductive

CONNECTION REQUIREMENTS *

Insulated terminals for .250 x .03 tabs.
(Lincoln part no. S-8053-97)

* Earlier SP-150 models required trigger leads to be connected to pins "A" and "C" of an MS-3106A-18-11P Amphenol connector (LE part no. S-12020-6) or equivalent.

CAUTION: The gun trigger switch connected to the gun trigger control cable must be a normally open, momentary switch. The terminals of the switch must be insulated from the welding circuit. Damage to the SP-150 will result if this switch is common to any electrical circuit other than the SP-150 trigger circuit.

OPTIONAL FEATURES INSTALLATION

WIRE DRIVE CONVERSION KITS FOR ALUMINUM ELECTRODE

For .035" aluminum wire — T-14629-.035A
For 3/64" aluminum wire — T-14629-3/64A

Install per the S-17083 instruction sheet shipped with the kit.

SPOOL GUN INSTALLATION (Codes above 9180)

A spool gun that is specifically designed for use with the SP-150 is installed as follows:

1. Remove the standard gun and cable, if previously installed, from the SP-150.
2. Route the spool gun cables through the gun cable hole in the SP-150 front panel.

3. Connect the electrode cable to appropriate (normally positive) polarity output stud located below the wire feeder motor gearbox.
4. Connect the two gun trigger switch leads to the two tab connector bushings that are labeled "gun trigger connection." **NOTE:** The gun trigger circuit must be isolated from all other circuits.
5. Connect the black and white motor leads to the two tab connector bushings labeled "Motor - Black - White."
6. Follow the operating instructions shipped with the spool gun. The SP-150 controls will operate in the normal manner except that the wire speed dial calibration may not be correct.

OPERATING INSTRUCTIONS



ELECTRIC SHOCK can kill.



FUMES AND GASES can be dangerous.



ARC RAYS can burn.

WARNING: ELECTRIC SHOCK CAN KILL. FUMES AND GASES CAN BE DANGEROUS TO YOUR HEALTH. ARC RAYS CAN INJURE EYES AND BURN SKIN. SEE ADDITIONAL WARNING INFORMATION UNDER "ARC WELDING SAFETY PRECAUTIONS" ON INSIDE OF FRONT COVER OF OPERATING MANUAL. WHEN INCHING, THE ELECTRODE AND DRIVE MECHANISM ARE ALWAYS ELECTRICALLY ENERGIZED AND REMAIN ENERGIZED SEVERAL SECONDS AFTER THE GUN TRIGGER IS RELEASED.

DUTY CYCLE

The SP-150 (Codes above 9180) is rated at the following duty cycles.

Process	Duty Cycle*	Amps	Volts
GMAW	30%	150	22
	40%	130	24

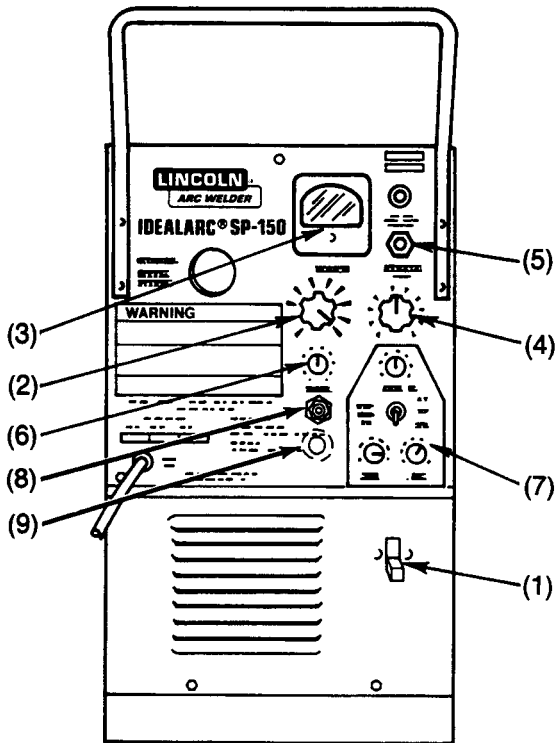
* Based upon 10 minute time period. (i.e.; For 30% duty cycle it is 3 minutes on and 7 minutes off.)

For Codes below 9180

Process	Duty Cycle**	Amps	Volts
GMAW	20%	150	22
	30%	130	24

** Based upon 10 minute time period. (i.e.; For 20% duty cycle it is 2 minutes on and 8 minutes off.)

CONTROL FUNCTION/OPERATION



ITEM

- (1) **Power Switch** — Place the lever in the "ON" position when welding output is desired. When the power is on, the red light to the right of the voltmeter will be lit.
- (2) **Arc Voltage Control** — A continuous control that gives full range adjustment of power source output. Can be adjusted while welding.
- (3) **Voltmeter** — This meter reads the voltage at the output studs of the machine. The actual arc voltage at the workpiece is slightly lower due to the voltage drop in the gun conductor cable and in the work cable. This voltage drop in the 12 ft. long No. 6 AWG work cable would typically be about 0.5 volt per 100 amps of weld current.
- (4) **Wire Speed** — Controls the wire speed from 50 to 500 inches per minute. The control can be preset on the calibrated dial to the desired wire speed.
- (5) **Wire Feed Circuit Breaker** — If the circuit breaker is tripped by a wire feed overload, the button will be extended. To reset the breaker and turn the wire feed back on, press the button. (See Maintenance Section.)

- (6) **Burnback Time Control** — Gives an adjustable burnback of the electrode to prevent it from sticking in the puddle at the end of a weld. Burnback is accomplished by providing an adjustable delay before turning off the welding power after the gun trigger is released. The control should be set at minimum (1 on the dial) and increased if the electrode sticks in the puddle. Increasing the setting should normally only be required at higher wire feed speeds. Increased setting may also give improved arc striking when "stitch" welding. The burnback control circuit is effective in all three modes of operation — seam, spot and stitch.

- (7) **Stitch Time/Spot Time Controls and Weld Mode Selector Switch** — The three position "Weld Mode Selector Switch" is used to select the following modes of operation.

- a. Up position is for the "SPOT" welding mode which gives single timed welds. To start the weld, close and hold the gun trigger switch on. The weld will start and then automatically stop after a timed interval. To produce another timed weld, release and re-close and hold the gun trigger. The time of the weld is adjustable from 1/2 to 3 seconds using the "SPOT WELD TIME" control. (Timer dials show increments from 1 to 10. They are not calibrated in seconds.) Since the timing starts when the gun trigger is pressed, for consistent welds it is important that the electrode is either lightly touching or very near the work when the trigger is pressed.
- b. The center position of the "Weld Mode Selector Switch" is for the "SEAM" welding mode which is normal continuous welding. The weld starts when the gun trigger is closed and stops when the gun trigger is released.
- c. The down position of the "Weld Mode Selector Switch" is for the "STITCH" welding mode. This mode gives repeated timed welds and timed off periods for as long as the gun trigger is held closed. The 1/2-2 seconds "on" and 1/4-1 second "off" time intervals are independently adjustable using the "STITCH OFF TIME" and "STITCH ON TIME" controls. (Timer dials show increments from 1 to 10. They are not calibrated in seconds.) This mode, which minimizes heat input, is very useful when welding light gauge sheet metal 18 through 24 gage (.048-.024) where warpage and/or burn through would otherwise be a problem. The controls and travel speed along the seam should be set to give a series of overlapping welds in which the glow is allowed to almost disappear from the previous weld before the next weld begins. Start with the "OFF TIME" control and the "ON TIME" control set at about 2.5 on the dials. Re-adjust the controls as required to give the best results.

- (8) **Gas Outlet** — The gas solenoid valve is activated to permit gas flow whenever the gun trigger is closed. A built-in post-flow of about 1/4 second is provided when the gun trigger is released (not shown).

- (9) **Amphenol Gun Connector (Below Code 9183)** — Older machines used the obsolete 5 pin connector on the front of the machine. This is no longer necessary with today's GMA guns.

WIRE DRIVE ROLL

The SP-150 drive roll has two grooves; one for .030 and .035" solid steel electrode and the other for .023, .024 and .025 solid steel electrode. The welder is shipped with the drive roll installed in .030/.035 position as indicated by the stenciling on the exposed side of the drive roll. If .023/.024/.025 wire is to be used, the drive roll must be reversed as follows:

1. Make certain the SP-150 power switch is "off".

2. Loosen the idle roll pressure wing screw, or on models with quick release arm, rotate the latch knob to "OPEN."
3. Remove the hex head drive roll hold down screw with a 1/2" socket or wrench.
4. Remove the drive roll cap, spacer, and drive roll.
5. Flip the drive roll over and install with the .023/.024/.025 stencil visible (away from gearbox). Make certain the key is in place in the keyway.
6. Install the spacer, cap and hex head screw. The spacer **must** be between the drive roll and the cap. The slot in the spacer allows clearance for the key.
7. Tighten the idle roll pressure wing screw until it bottoms and then back it out 3 1/2 turns. This is an approximate setting; see section on idle roll pressure setting for more information.

TO START THE WELDER

Turn the "Power Switch" to "ON". This lights the red pilot light. With the desired weld mode selected, operate the gun trigger for welder output and to energize the wire feed motor.

FAN CONTROL


The fan motor is thermostatically controlled to provide cooling for the transformer and other components only when required. Even though the power switch is on, a fan motor will not run when the machine does not require fan cooling, such as when first turned on, or when welding at low current or low duty cycle procedures.

WIRE REEL LOADING

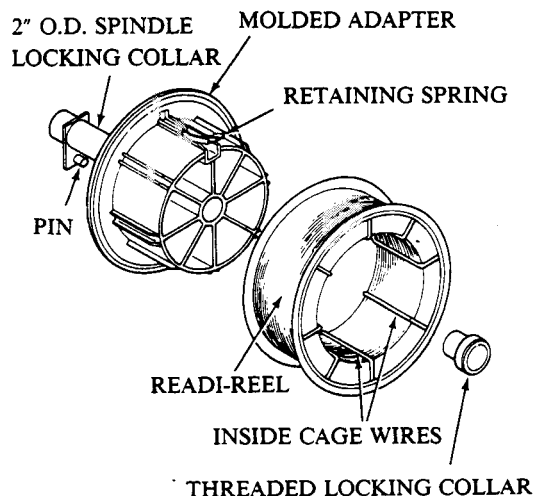
Two types of Readi-Reel® Adapters may be used with the SP-150; a molded plastic design and a two-piece formed sheet metal design.

To mount a 30 lb. Readi-Reel package using the molded plastic K-363-P type adapter:

1. Rotate the spindle and adapter so the retaining spring is at the 12 o'clock position.
2. Position the Readi-Reel so that it will rotate in a **clockwise** direction when feeding (wire is to be dereeled from **top** of the coil).
3. Set one of the Readi-Reel inside cage wires in the slot in the retaining spring tab.
4. Lower the Readi-Reel to depress the retaining spring and align the other inside cage wires with the grooves in the molded adapter.
5. Slide cage all the way onto the adapter until the retaining spring "pops up" fully.

	WARNING
	ELECTRIC SHOCK can kill. <ul style="list-style-type: none"> Do not touch electrically live parts such as output terminals or internal wiring.

WARNING: CHECK TO BE SURE THE RETAINING SPRING HAS FULLY RETURNED TO THE LOCKING POSITION AND HAS *SECURELY* LOCKED THE READI-REEL CAGE IN PLACE. RETAINING SPRING MUST REST ON THE CAGE, NOT THE WELDING ELECTRODE.



To remove Readi-Reel from Adapter, depress retaining spring tab with thumb while pulling the Readi-Reel cage from the molded adapter with both hands. Do not remove adapter from spindle.

To mount a 30 lb. Readi-Reel package using the formed sheet metal K-363 type adapters (obsolete):


1. Remove the locking collar and remove the outside Readi-Reel adapter arm.
2. Engage the inside Readi-Reel adapter arm in the brake driving pin and rotate the spindle until the inside adapter arm is in the vertical position.
3. Set the Readi-Reel on the adapter arm. The Readi-Reel must be installed so that it will rotate in a **clockwise** direction when feeding (wire is dereeled from the top of the coil).
4. The outside adapter arm is then to be placed on the spindle at an angle of 90° from the inside adapter and the locking collar installed. Tighten the locking collar securely.

To mount 10 to 30 lb. spools (12" diameter):

(For 8" spools an S-10731-26 spacer must be used.)

1. Remove the locking collar and the Redi-Reel adapter shipped on the 2 inch dia. spindle (adapter is not required).
2. Place the spool on the spindle making certain the brake driving pin enters one of the holes in the back side of the spool. Be certain the wire comes off the reel in a clockwise direction when dereeled from the top of the coil.
3. Replace and tighten the locking collar.

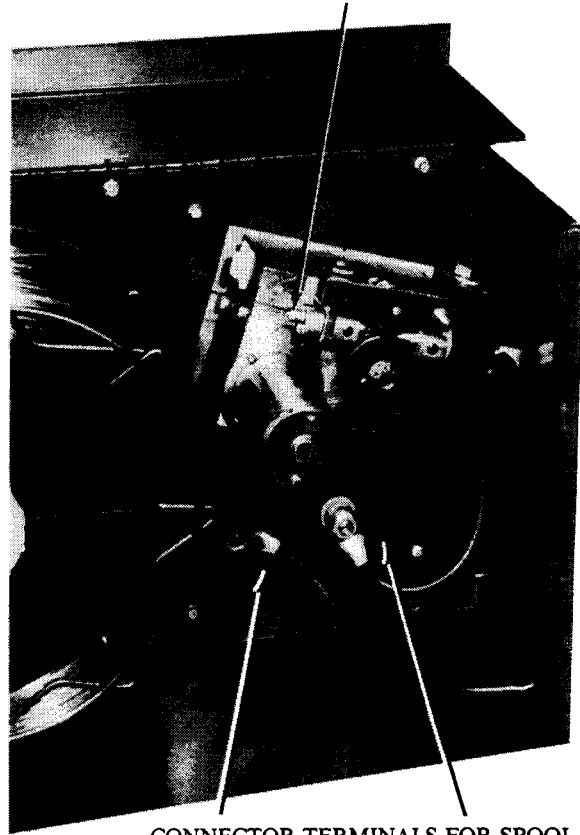
FEEDING ELECTRODE

	<p>! WARNING</p> <p>ELECTRIC SHOCK can kill.</p> <ul style="list-style-type: none">• Do not touch electrically live parts such as output terminals or internal wiring.
---	--

WARNING: WHEN INCHING, THE ELECTRODE AND DRIVE MECHANISM ARE ALWAYS "HOT" TO WORK AND GROUND AND REMAIN "HOT" SEVERAL SECONDS AFTER THE GUN TRIGGER IS RELEASED.

1. Turn the Redi-Reel or spool until the free end of the electrode is accessible.
2. **While tightly holding the electrode**, cut off the bent end and straighten the first six inches. Cut off the first inch to remove stubborn end kinks. (If the electrode is not properly straightened, it may not feed or may not go into the outgoing guide tube, causing a "birdnest".)
3. Insert the free end through the **incoming** guide tube.
4. Set the "Weld Mode Selector Switch" to "Seam". Press the gun trigger and push the electrode into the drive roll.
5. Inch the electrode through the gun.
6. It may be helpful to unscrew the contact tip while feeding the electrode. Once the wire is completely out of the gun, replace the contact tip.
7. Adjust the brake tension with the thumbscrew on the spindle hub, until the reel turns freely but with little or no overrun when wire feeding is stopped. Do not over tighten but make certain that the wire does not come loose on the reel or spool when feeding is stopped.

INCOMING GUIDE TUBE



CONNECTOR TERMINALS FOR SPOOL GUN WITH MACHINES ABOVE CODE 9180 ARE LOCATED IN THIS AREA

IDLE ROLL PRESSURE SETTING

The idle roll pressure wing screw is set at the factory backed out 3 1/2 turns from full pressure. This is an approximate setting. For small hard wire sizes and aluminum wire, the optimum idle roll pressure varies with type of wire, surface condition, lubrication and hardness. The optimum idle roll setting can be determined as follows:

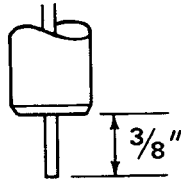
1. Press end of gun against a solid object that is electrically isolated from the welder output and press the gun trigger for several seconds.
2. If the wire "birdnests", jams or breaks at the drive roll, the idle roll pressure is too great. Back the wing screw out 1/2 turn, run new wire through gun, and repeat above steps.
3. If the only result was drive roll slippage, loosen the gun cable clamping screw in the gearbox conductor block and pull the gun cable forward about 6". There should be a slight waviness in the exposed wire. If there is no waviness, the pressure is too low. Tighten the wing screw 1/4 turn, lock the gun cable in place and repeat the above steps.

MAKING A WELD

1. See Wire Welding Chart (L-7147) attached to the inside of the wire drive section cover or on inside

back cover of this manual for information on modes of operation and suggested initial settings.

2. Set the "Arc Voltage" and "Wire Speed" controls to settings specified on the Wire Welding Chart for the thickness of metal to be welded.
3. Set the "Weld Mode Selector Switch" to either "Spot" "Seam" or "Stitch" depending on the type of welding to be done.
4. Inch the electrode through the gun and cable and then cut the electrode within approximately $\frac{3}{8}$ " of the end of the contact tip.



5. The gas flow regulator, when included with the SP-150, is preset for proper flow rate (nominally 30 cu. ft./hr.) by the manufacturer.
6. Connect work clamp to metal to be welded. Work clamp must make good electrical contact to the work. The work must also be grounded as stated in "Arc Welding Safety Precautions".



ARC RAYS can burn.

WARNING: WHEN USING AN OPEN ARC PROCESS, IT IS NECESSARY TO USE CORRECT EYE, HEAD, AND BODY PROTECTION.

7. Position electrode over joint. End of electrode may be lightly touching the work.
8. Lower welding helmet, close gun trigger, and begin welding. Hold the gun so the contact tip to work distance is about $\frac{3}{8}$ inch. To make it easier to follow the seam, drag the insulated cone on the work. This is especially important in the stitch mode both for seam following and arc starting.
9. To stop welding, release the gun trigger and then pull the gun away from the work after the arc goes out.

MAINTENANCE



ELECTRIC SHOCK can kill.

WARNING: HAVE QUALIFIED PERSONNEL DO THE MAINTENANCE AND TROUBLE-SHOOTING WORK. TURN THE INPUT POWER OFF USING THE DISCONNECT SWITCH AT THE FUSE BOX BEFORE WORKING INSIDE THE MACHINE. UNPLUG POWER CABLE IF IT IS CONNECTED TO A RECEPTACLE.

GENERAL MAINTENANCE

In extremely dusty locations, dirt may clog the air passages causing the welder to run hot. Blow dirt out of the welder with low-pressure air at regular intervals to eliminate excessive dirt and dust build-up on internal parts.

The fan motor has sealed ball bearings which require no service.

WELDING POWER OVERLOAD PROTECTION

The SP-150 has built-in protective thermostats that respond to excessive temperature. They open the wire feed and welder output circuits if the machine exceeds the maximum safe operating temperature because of a frequent overload, or high ambient temperature plus overload. The thermostats automatically reset when the temperature reaches a safe operating level.

WIRE FEED CIRCUIT BREAKERS

The circuit breaker above the "Wire Speed" control normally trips only when an overload occurs because of excessive loading in the wire feed cable, a defective wire feed motor, or a defective control component. The reset button gives a visual indication when the circuit breaker is tripped. After allowing a minute for cooling, push the reset button. If it trips again, be sure the wire feed cable is clean and that the cable and tip are the proper size for the wire diameter being fed. If it still trips, it may be caused by a defective electrical component.

DRIVE ROLLS AND GUIDE TUBES

After every coil of wire, inspect the wire drive mechanism. Clean it as necessary by blowing with low pressure compressed air. Eye protection should be worn. Do not use solvents for cleaning the idle roll, because it may wash the lubricant out of the bearing. The drive roll and guide tubes are stamped with the wire sizes they will feed. If a wire size other than that stamped on the roll is used, the drive roll and guide tubes must be changed.

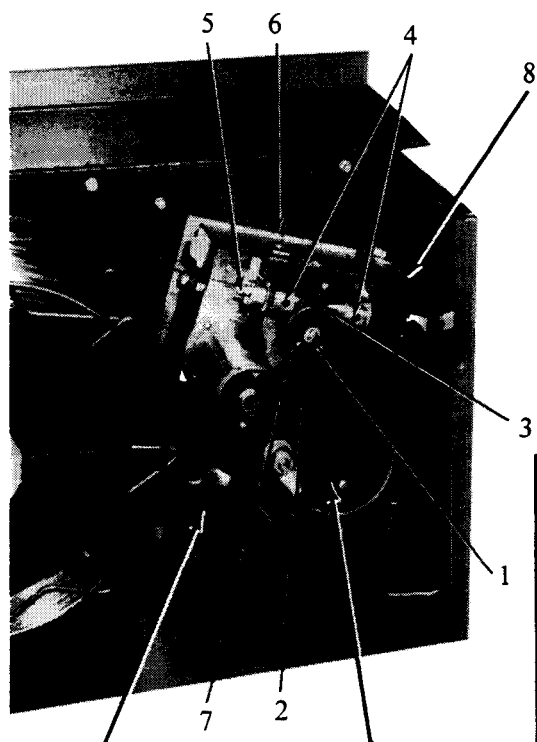
Instructions for replacing or changing drive roll and guide tubes are as follows:



ELECTRIC SHOCK can kill.

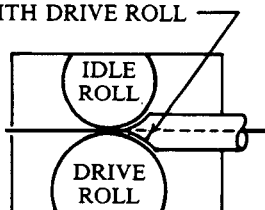
WARNING: TURN THE INPUT POWER OFF USING THE DISCONNECT SWITCH AT THE FUSE BOX BEFORE WORKING INSIDE THE MACHINE.

- A. Loosen the idle roll tension screw (Item 6). On models with quick release arm, rotate the latch knob (Item 8) to "Open."
- B. Remove hex head screw with $\frac{1}{2}$ " wrench (Item 1) and the drive roll clamping collar (Item 2). (On new machines remove the tape and drive roll key



CONNECTOR TERMINALS FOR SPOOL GUN WITH MACHINES ABOVE CODE 9180 ARE LOCATED IN THIS AREA

OUTGOING GUIDE MUST HAVE LARGE RADIUS ALIGNED WITH DRIVE ROLL



from the collar.) Insert the key into the keyway of the output shaft.

- C. Wipe the drive roll surfaces clean. A light lubricant such as WD-40 will aid cleaning.

Install the double grooved drive roll with the side stenciled for the wire size to be used away from the wire drive. (Stenciled size will be visible after installation.)

- D. Install the slotted spacer (Item 7) on top of the drive roll and then the drive roll clamping collar and hex head screw previously removed. Tighten hex head screw securely.
- E. Back out the two guide tube clamping set screws (Item 4).
- F. Insert the outgoing guide (Item 3) (the one with the plastic insert) into the front hole. The fine wire chisel point outgoing guide **must** have the side with the largest radius next to the drive roll. (See drawing below). Push the guide tube back as far as it will go and tighten the clamping set screw. Insert the ingoing guide tube (Item 5) into the rear hole as far as it will go and tighten the clamping set screw. These set screws are dog points. When the two tubes are installed properly these dog points will lock into the annular grooves that are in each of the guide tubes.
- G. Tighten the idle roll tension screw (Item 6) until it bottoms and then back it out $3\frac{1}{2}$ turns. This is an approximate setting. For fine hard wire sizes and aluminum wire, the optimum idle roll pressure varies with type of wire, surface condition, lubrication and hardness. See section on setting idle roll pressure for more information.

PERIODIC MAINTENANCE

Wire Drive Motor And Gear Box

Every year inspect the gear box and paint the gear teeth with a moly-disulfide filled grease.

Every six months check the motor brushes. Replace them if they are less than $\frac{1}{4}$ " long.

Gun And Cable Maintenance

A dirty gun cable can cause rough and erratic wire feeding; therefore, the cable liner must be cleaned periodically.

Remove the cable from the wire feeder. Lay it out straight on the floor. Remove the contact tip from the gun. Using an air hose and only partial pressure, gently blow out the cable from the gun end. Work the full length of the cable by bending it back and forth and then blow it out again. Repeat this procedure until no more dirt comes out.

PROCEDURE FOR REPLACING PC BOARDS

Before replacing a PC board which is suspected of being defective, visually inspect the PC board in question for any **electrical** or **mechanical** damage to any of its components and conductors on the back of the board.

- a. If there is **no** visible damage to the PC board, install a new one and see if this remedies the problem. If the problem is remedied, re-install the **old** PC board to see if the problem still exists. If it **does** no longer exist with old PC board:
 1. Check the PC board harness connector pins for corrosion, contamination, or looseness.
 2. Check leads in the plug harness for loose or intermittent connection.
- b. If PC board is visibly damaged **electrically**, before possibly subjecting the new PC board to the same

cause of failure check for possible shorts, opens, or grounds caused by:

1. Frayed or pinched lead insulation.
 2. Poor lead termination, such as a poor contact or a short to adjacent connection or surface.
 3. Shorted or open motor leads, or other external leads.
 4. Foreign matter or interference behind the PC boards.
- c. If PC board is visibly damaged **mechanically**, inspect for cause then remedy before installing a replacement PC board.

If there is damage to the PC board or if replacing PC board corrects problem, return it to the local Lincoln Electric Field Service Shop.

TROUBLESHOOTING GUIDE

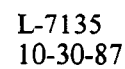


ELECTRIC SHOCK can kill.

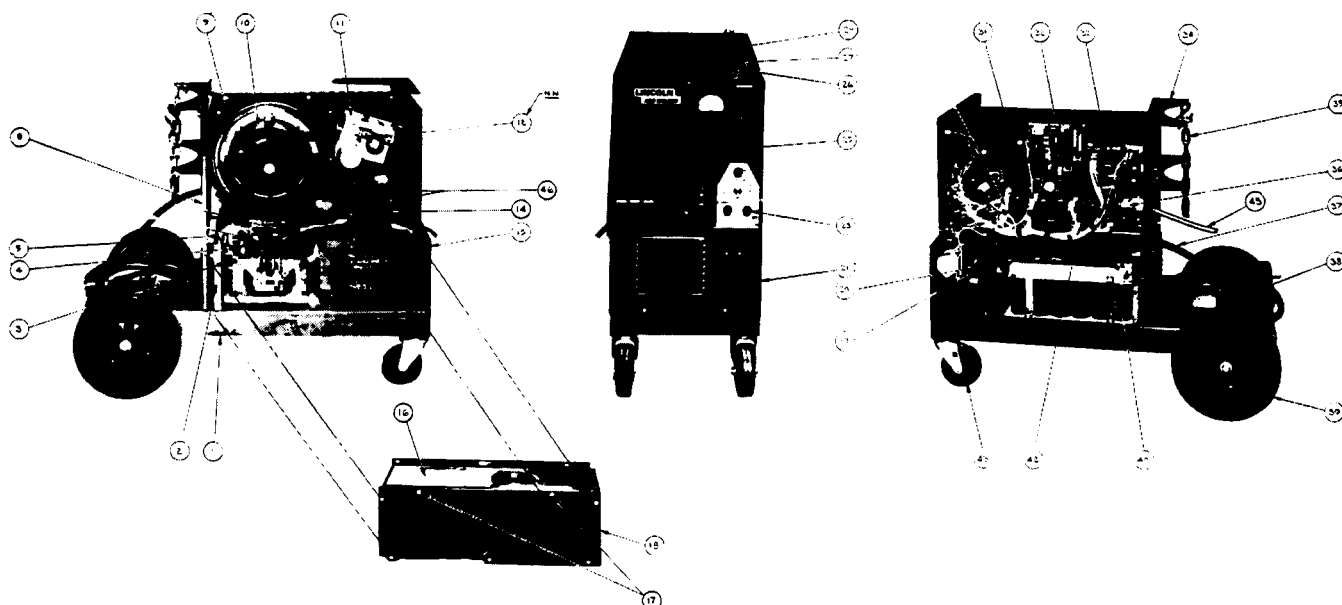
WARNING: HAVE QUALIFIED PERSONNEL DO THE MAINTENANCE AND TROUBLESHOOTING WORK. TURN THE INPUT POWER OFF USING THE DISCONNECT SWITCH AT THE FUSE BOX BEFORE WORKING INSIDE THE MACHINE. UNPLUG POWER CABLE IF IT IS CONNECTED TO A RECEPTACLE.

PROBLEM	POSSIBLE CAUSE	WHAT TO DO
1. Rough wire feeding or wire not feeding but drive rolls turning.	<ul style="list-style-type: none"> a. Gun cable kinked and/or twisted. b. Wire jammed in gun and cable. c. Incorrect position of drive roll with two grooves. d. Drive roll loose. e. Gun cable dirty. f. Worn drive roll. g. Electrode rusty and/or dirty. h. Worn nozzle or cable liner. i. Partially flashed or melted contact tip. j. Incorrect idle roll pressure. k. Wire reel brake tension set too high. 	<ul style="list-style-type: none"> a. Inspect gun cable and replace if necessary. b. Remove wire from gun and cable — feed in new wire. Note any obstructions in gun and cable. Replace gun and cable if necessary. c. See Section for proper installation of drive roll. d. Remove, clean, install and tighten. e. Clean cable or replace liner. f. Replace. g. Replace. h. Replace. i. Replace contact tip. j. Set idle roll pressure properly. k. Tension should be just high enough to prevent overrun.
2. Variable or “hunting” arc.	<ul style="list-style-type: none"> a. Worn and/or melted contact tip. b. Worn work cable or poor work connection. c. Loose electrode connections. d. Wrong polarity. 	<ul style="list-style-type: none"> a. Replace tip — remove any spatter on end of tip. b. Inspect — repair or replace as necessary. c. Be sure electrode lead is tight, gun cable tight in wire feeder contact block, gun nozzle and gun tip tight. d. Check connection at output studs for polarity required by welding process.
3. Weld porosity, narrow and ropey bead, or electrode stubbing into plate when welding.	<ul style="list-style-type: none"> a. Dirty plate or improper procedures. 	<ul style="list-style-type: none"> a. Check that controls are set per Wire Welding Chart inside of door.
4. Wire feed circuit breaker trips while welding.	<ul style="list-style-type: none"> a. See Problem 1 above. b. Defective wire feed motor or gearbox. 	<ul style="list-style-type: none"> a. Correct problems. b. Replace.
5. No wire feed or no control of wire feed. Voltmeter indicates output voltage.	<ul style="list-style-type: none"> a. Wire feed circuit breaker in “off” position. b. Defective 10K ohm Wire Speed potentiometer. c. Worn brushes or defective wire feed motor. d. Motor control printed circuit board has failed. Blown 15 amp fuse on motor control PC board indicates that either the PC board has failed or the gun trigger-thermostat circuit is shorted to electrode, work or ground. 	<ul style="list-style-type: none"> a. Re-set circuit breaker. b. Replace. c. Replace. d. See PC board replacement procedure if no fault is detected in trigger-thermostat circuit.

PROBLEM	POSSIBLE CAUSE	WHAT TO DO
6. No wire feed and no output voltage. Pilot light indicates input power to SP-150.	<ul style="list-style-type: none"> a. Protection circuit actuated due to overload or short. b. Faulty gun trigger switch or damaged control cable connected to gun trigger. c. Gun trigger circuit not electrically isolated. d. Defective SCR bridge. e. Motor control PC board has failed. f. SCR control PC board has failed. 	<ul style="list-style-type: none"> a. Allow machine to cool down and reduce on time and/or wire feed speed. b. Repair. c. If the gun trigger switch or control cable is in any way common to any electrical circuit other than the SP-150 trigger circuit, damage to the SP-150 can result. d. Replace if defective. e. See PC board replacement procedure. f. See PC board replacement procedure.
7. Output voltage continuously present with gun trigger off.	<ul style="list-style-type: none"> a. Gun trigger circuit not electrically isolated. b. Motor control PC board or SCR control PC board has failed. c. SCR(s) failed. 	<ul style="list-style-type: none"> a. A grounded gun trigger circuit can cause continuous wire feed and output voltage with trigger switch off. b. See PC board replacement procedure. c. Replace SCR bridge if defective.
8. Suspected defective timer operation.	<ul style="list-style-type: none"> a. Improperly set machine. b. Defective 100K ohm time potentiometer. c. Defective motor control PC board. 	<ul style="list-style-type: none"> a. Check position of "Weld Mode Selector" switch. Be certain that it is set for the mode desired. b. Replace. c. See PC board replacement procedure.
9. Poor welding characteristics and/or cannot obtain full rated output of 150 amps at 22 volts. The open circuit voltage of the machine should be adjustable from approximately 13 to 39 volts with gun trigger closed.	<ul style="list-style-type: none"> a. Capacitor(s) in power source output circuit failed. A failure is indicated if the small vent plug on top of a capacitor is raised or blown out. b. One SCR has failed. c. Defective 10K ohm Arc Voltage Control potentiometer. d. Defective SCR Control PC board. 	<ul style="list-style-type: none"> a. Replace entire bank of capacitors. Do not replace individual capacitors. WARNING: The liquid electrolyte in these capacitors is toxic. Avoid contact with any portion of your body. Clean up vented electrolyte using rubber gloves and a water dampened cloth. Any electrolyte which gets on skin, clean with soap and water. b. Check and replace SCR bridge if defective. c. Replace. d. See PC board replacement procedure.
10. No gas flow.	<ul style="list-style-type: none"> a. 1 amp fuse blown on SCR control board. b. Defective gas solenoid valve. 	<ul style="list-style-type: none"> a. Replace. b. Replace.



GENERAL ASSEMBLY



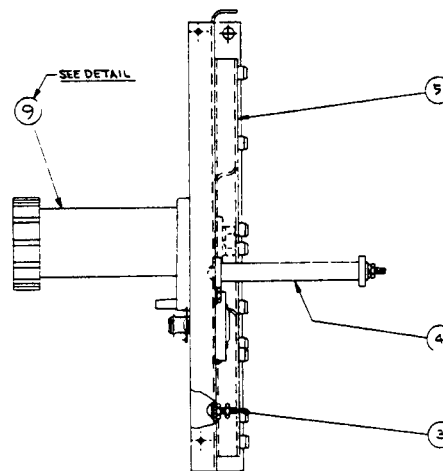
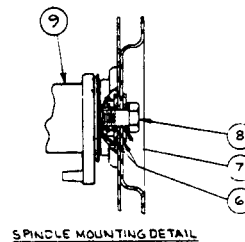
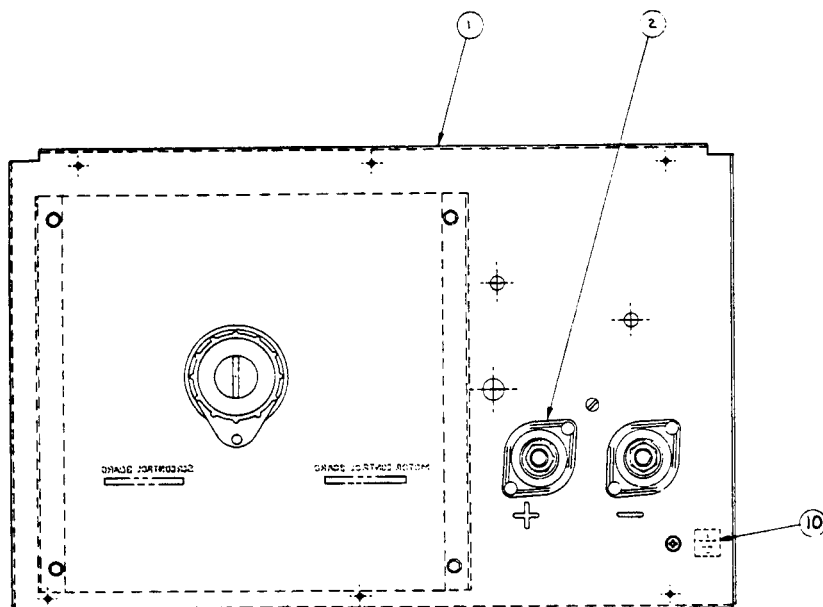
G-1695
S-24-85A

PARTS LIST P-168-C

ITEM	PART NAME AND DESCRIPTION	NO. REQ'D.
1	Base, Transformer, Choke & Bridge Assembly, Incl. Base	1
	SCR Bridge Assembly, Includes: Diode	1
	Choke Assembly, Includes: Choke Coil (Top or Bottom)	1
	Transformer Assembly-Specify Voltage	1
2	Fan Baffle	1
3	Fan Motor Bracket	1
4	Fan Motor Assembly	1
5	Fan Blade	1
8	Case Back	1
9	Vertical Panel Assembly Includes: Vertical Panel Parts	1
10	Readi-Reel Adapter	1
11	Wire Drive Assembly	1
	Wire Drive Parts	1
12	Drive Roll	1
	Collar Assembly	1
	Collar Spacer	1
	Sems Screw	1
	Key	1
14	Grommet	1
15	Case Front Assembly	1
16	Insulation	1
17	Door Bumper Button	2
18	Left Panel	1
19	Reconnect Panel Assembly, Includes: Right Side Baffle	1
	Reconnect Panel	1
20	Lead and Thermostat Assembly, Includes: Thermostat (S4)	1
21	Reconnect Access Door	1
23	Potentiometer Insulation	4
	Knob	4
25	Potentiometer Insulation	2
	Knob	2
26	Door Bumper Stop	2
27	Right Case Side	1
28	Door and Hinge Assembly	1
31	Grommet	1

ITEM	PART NAME AND DESCRIPTION	NO. REQ'D.
32	Motor Control PC Board	1
33	SCR Control PC Board	1
34	Gas Cylinder Bracket	1
35	Chain	1
	"S" Hook	1
36	Solenoid Valve Assembly	1
	Gas Line	1
37	Power Input Cable	1
	Grommet	1
38	Gas Cylinder Support	1
	Axle	1
39	Wheel	2
	Push Nut	2
40	Capacitor Bank Assembly, Includes: Capacitors	1
	Capacitor Jumper	6
	Mounting Bracket	2
	Capacitor Insulation	4
42	Horizontal Baffle	1
43	Caster	2
	Gas Cylinder Support	1
45	Gas Line (Above Code 9050 only)	1
46	Receptacle (Above Code 9050 only)	1
	<u>Items Not Illustrated:</u>	
	Lincoln Logo Decal	2
	Procedure Sheet	1
	Gun Assembly (Above Code 9050 only)	1
	Gun Parts - Contact Local Distributor	
	Handle - Mounts to Front of Machine	1
	Power Plug Receptacle	1
	Ground Clamp	1
	Pressure Regulator (Above Code 9050 only)	1

VERTICAL PANEL ASSEMBLY

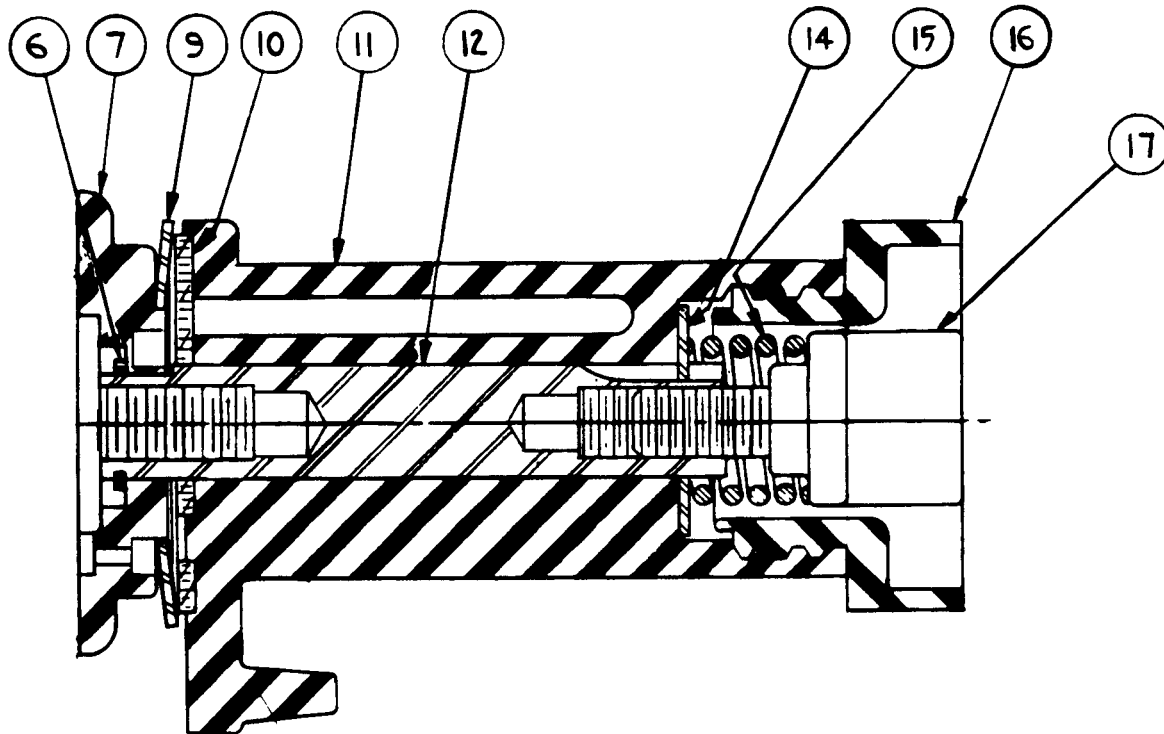


L-7143
9-25-87E

PARTS LIST P-168-D

ITEM	PART NAME AND DESCRIPTION	NO. REQ'D.
1	Vertical Panel	1
2	Output Terminal	2
	Self Tapping Screw	4
3	Thread Cutting Screw	1
	Lock Washer	1
4	Hex Nut	2
	Resistor	1
	Insulating Washer	2
	Round Head Screw	1
	Plain Washer	1
	Lock Washer	1
5	Hex Nut	1
	P.C. Board Mount	1
	Expansion Nut	16
6	Self Tapping Screw	16
7	Plain Washer	2
	Lock Washer	1
8	Hex Head Screw	1
9	Spindle Assembly	1
	Spindle Parts	
10	Ground Connection Decal	1

SPINDLE ASSEMBLY

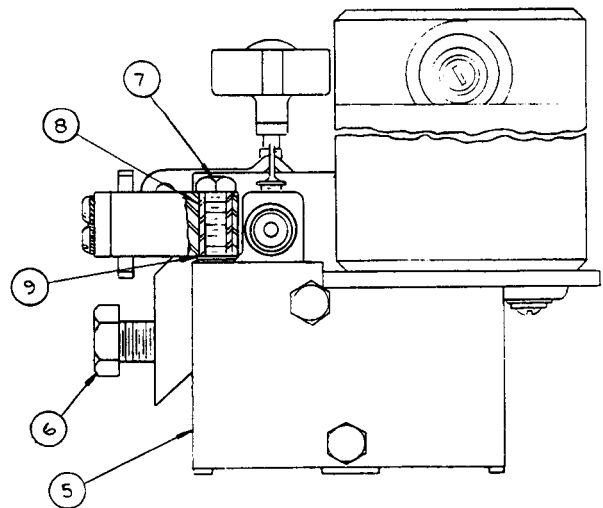
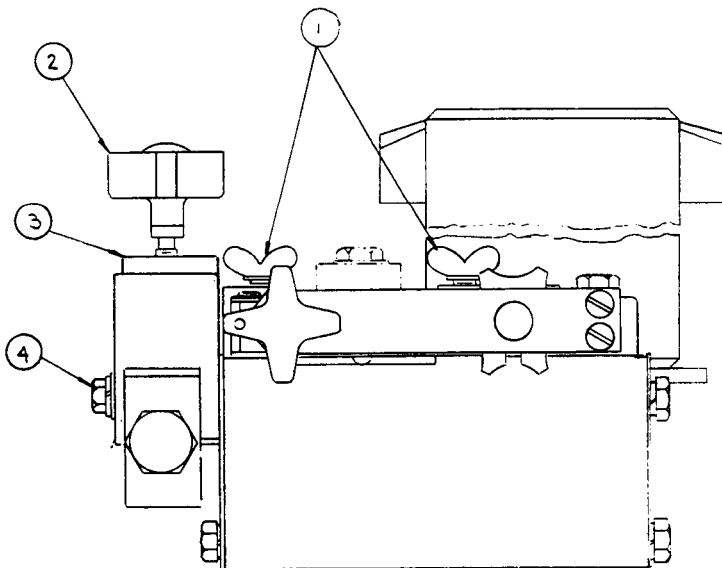
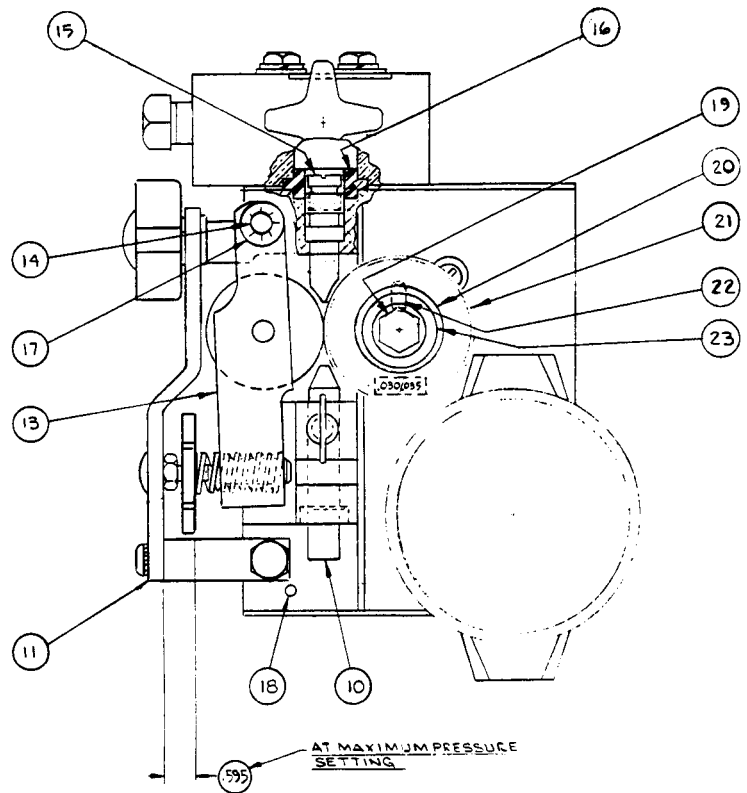


M-14935
3-15-85B

PARTS LIST P-168-E

ITEM	PART NAME AND DESCRIPTION	NO. REQ'D.
6	Retaining Ring	1
7	Spindle Hub	1
9	Keyed Washer	1
10	Friction Washer	1
11	Spindle	1
12	Spindle Shaft	1
14	Keyed Washer	1
15	Compression Spring	1
16	Retaining Collar	1
17	Thumb Screw	1

WIRE DRIVE ASSEMBLY



L-7516
7-30-87

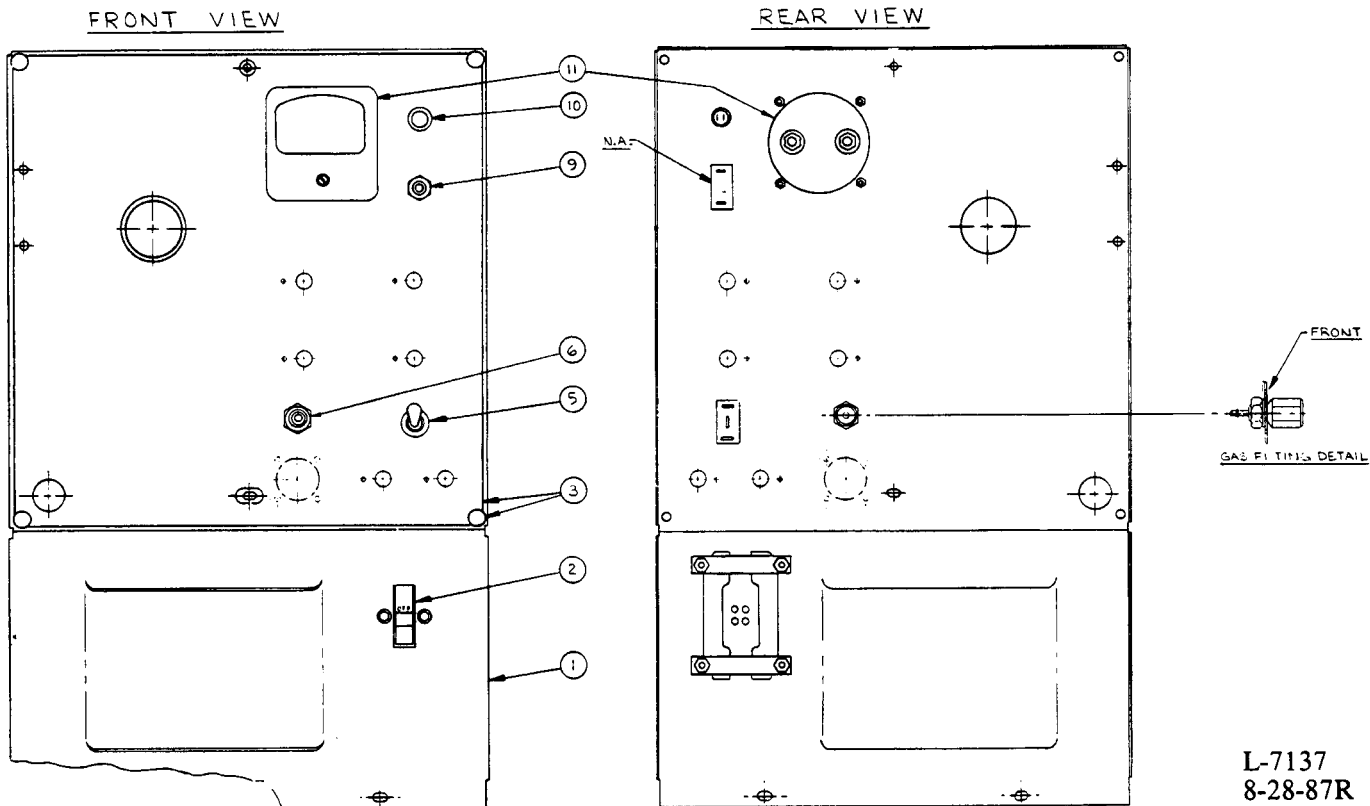
(Below Code 9100
See L-7123 5-2-86B)

Parts List P-168-F.3
(Below Code 9100 See P-168-F)

ITEM	PART NAME & DESCRIPTION	NO. REQ'D
1	Thumb Screw	2
2	Hand Screw	1
3	Conductor Block	1
4	Hex Head Screw	2
	Lock Washer	2
5	Plain Washer	2
	Gear Box Assembly, Includes:	1
	Drive Motor, Includes:	1
	Brush and Spring Assembly (Specialty Motor)	2
	Brush and Spring Assembly	2
	(Von Weise Motor)	
	Brush Cap (Specialty Motor)	2
6	Hex Head Screw	1
7	Hex Head Screw	1
8	Pivot Spacer	1
9	Plain Washer	1
10	Incoming Guide	1
11	Quick Release Assembly	1
12	Outgoing Guide Tube	1
13	Idle Roll Assembly	1
14	Groove Pin	1
15	Outgoing Guide Tube Insert	1
16	Locator Bushing	1
17	Speed Clip	1
18	Drive Screw	1
	These items are not part of the L7516 Assembly but are included with it for parts orders:	
19	Sems Screw	1
20	Collar Spacer	1
21	Drive Roll	1
22	Key	1
23	Collar Assembly	1

Wire Size	Drive Roll & Guide Tube Kit	Item 10 Incoming Guide Tube Assembly	Item 12 Outgoing Guide Tube	Item 15 Outgoing Guide Tube Insert	Item 21 Drive Roll	Spacer
.023-.035 Steel	T-15010-035S	T-13467-035	S-14352-035	S-14349-045	M-14932	T-14984
.035 Aluminum	T-14629-035A	T-13467-035	S-14352-035	S-14349-045	S-17092-035A	—
3/64 Aluminum	T-14629-3/64A	T-13467-052	S-14352-052	S-14349-045	S-17092-3/64A	—
1/16 Aluminum	T-14629-1/16A	T-13467-1/16	S-14352-1/16	S-14349-1/16	S-17092-1/16A	—

CASE FRONT ASSEMBLY



L-7137
8-28-87R

PARTS LIST P-168-G

ITEM	PART NAME AND DESCRIPTION	NO. REQ'D.
1	Case Front	1
2	Linc Switch	1
3	Self Tapping Screw	2
	Nameplate	1
	Fastener Button	4
5	Toggle Switch	1
6	Connector (Gas)	1
	Lock Washer	2
9	Hex Jam Nut	1
	Circuit Breaker	1
10	Pilot Light	1
11	Voltmeter	1
	Plain Washer	4
	Items Not Illustrated:	
	Wire Speed Potentiometer	1
	Arc Voltage Potentiometer	1
	Spot Weld Time Potentiometer	1
	Stitch Off Time Potentiometer	1
	Stitch On Time Potentiometer	1
	Burnback Time Potentiometer	1
	Multi Lead Connector (Gun - Below Code 9050 only)	1

WIRE WELDING WITH YOUR SP-150

This chart is a ready reference for using the Idealarc® SP-150. Refer to Lincoln bulletins and operating manuals for details. Be sure to read and understand the warnings on this power source and the section on ARC WELDING SAFETY PRECAUTIONS in the SP-150 Operating Manual.

Because design, fabrication, assembly and welding variables affect the results obtained in applying this type of information, the serviceability of a product or assembly is the responsibility of the builder/user.

INITIAL SETTINGS FOR GMA WELDING

Suggested settings for "SEAM", "STITCH" and "SPOT" welding are tabulated below. Adjustments may have to be made to achieve optimum results under various conditions. Also read section below on "GMA Welding".

Do not exceed the duty cycle rating of the SP-150.

Material Thickness Steel	Wire Speed Setting Inches Per Minute		Arc Voltage* (Elect. Pos.)	Approximate Dial Setting*
	.023	.030 L-50	.035 L-50/56	
10 ga (.135)	500	300	250	6.3
12 ga (.105)	450	275	225	6.0
14 ga (.075)	350	225	175	5.7
16 ga (.060)	275	175	150	5.2
18 ga (.048)	225	150	125	4.8
20 ga (.036)	150	125	100	4.6
22 ga (.030)	110	100	75	4.5
24 ga (.024)	100	75	Not Recommended	4.5

* These settings are for Argon-CO₂ mixed gas. If CO₂ is used, increase the dial setting to achieve a 2 volt increase over arc voltage shown. See Operating manual for connection and use of gas flow regulator.

GMA WELDING

THE SP-150 IS AN EXCELLENT MACHINE FOR GMA WELDING WITH MILD STEEL, STAINLESS STEEL, ALUMINUM, OR BRONZE (FOR GALVANIZED STEEL) FILLER WIRE, AS WELL AS FOR STITCH AND SPOT WELDING. THE MACHINE SETTING GUIDELINES SUPPLIED ABOVE SHOULD BE SUPPLEMENTED WITH APPROPRIATE GMA WELDING INFORMATION TO ENSURE THE CORRECT USE OF EQUIPMENT AND PROCEDURES.

BURNBACK CONTROL

This control sets the time the arc is on after wire feed stops. Start with a dial setting of 1 and increase time if welding wire sticks to the end of the weld.

STITCH WELD MODE

Used to weld thin material where warpage and burnthrough are a problem. Proper adjustment of ON and OFF times and arc travel speed permits welding 18 through 24 gage (.048" - .024") sheet metal with small welds, minimum distortion, and no burnthrough.

"STITCH ON TIME" control — sets welding time. Start with a dial setting of 2.5. Raise setting to increase penetration and weld size; lower setting to reduce burnthrough and distortion.

"STITCH OFF TIME" control — sets off time. Start with a dial setting of 2.5. Raise setting to reduce burnthrough; lower setting to make weld flatter and smoother.

To weld, set "WELD MODE SELECTOR" to "STITCH", and the other controls per the table. Close trigger and hold it closed for length of seam. Hold gun in one place during ON time and move gun just beyond edge of molten metal during OFF time.

NOTE: For smoothest welds on thinner metal, point gun slightly towards direction of travel.

SPOT WELD MODE

Arc spot plug welds are used when continuous welds are not needed or to hold thin sheet metal together prior to stitch welding or continuous welding. Plug welds are made by using a punch to make a 3/16" inch dia. hole in the top sheet and arc welding through the hole into the back sheet.

"SPOTWELD TIME" control — sets welding time. Start with a dial setting of 4. Higher settings increase penetration, diameter, and height of weld.

To make an arc spot plug weld, punch 3/16" holes in top sheet. Set "WELD MODE SELECTOR" to "SPOT", and the other controls per the table. Install spot weld nozzle (if available) on gun and press it against the top sheet so the top and bottom sheets are tight together. Close trigger and hold it closed till the arc goes out. If a spot weld nozzle is not used, smoother welds will result by moving the welding wire in a small circle during the weld.

METAL FILL

This procedure is used to fill gaps, holes and distorted areas in sheet metal.

NOTE: This procedure should not be used where weld strength is required. To Metal Fill on steel sheet metal, set "WELD MODE SELECTOR" to "SEAM" and set "Arc Voltage" control to a setting of 3. Set "WIRE SPEED" to 300 in/min for .035 wire or 375 in/min for .030 wire (metal fill with .023 dia wire is not recommended). Connect wire feeder output leads for electrode positive. An arc welding shield with a #8 filler should be used to protect the eyes from heat and brightness. Start with the wire sticking out about 1" beyond the gun tip and the wire lightly touching the sheet metal. Close the trigger

METAL SHRINKING

The SP-150 can be used with a carbon rod to produce localized heating and, when combined with water quenching, can remove small dents and distortion in sheet metal.

For Metal Shrinking, set "WELD MODE SELECTOR" to "SEAM" and "Arc Voltage" control to a setting of 3. Press "WIRE FEED CIRCUIT BREAKER" to turn wire feed off. Connect output leads for electrode positive. Attach a carbon rod to the welding gun using a special attachment or use a separate electrode lead and stick electrode holder with a carbon rod. Place the pointed end of the carbon rod (do not use copper coated carbon rods) firmly against the sheet metal in the distorted area. Close the gun trigger and move the rod in a circular motion keeping in contact with work. When distortion is reduced, release trigger, remove carbon, and immediately quench area with a water-soaked rag. Repeat if required. To prevent arcing, carbon must be firmly against sheet metal whenever trigger is closed or re-opened. Do not exceed the duty cycle rating of the SP-150.

PROCEDURE TO INSTALL DRIVE ROLL AND GUIDE TUBES

WARNING: Input power to be electrically disconnected while installing drive roll and guide tubes. When inching with gun trigger, electrode and drive mechanism are "hot" to work and ground.

1. Before installing gun cable, loosen idle roll pressure screw.
2. Remove hex screw and clamping collar from drive shaft with 1/2" wrench.
3. Install key and drive roll (wire sizes are stenciled on side of drive roll facing out.)
4. Install slotted spacer on top of double grooved drive roll. Replace collar and tighten hex screw.
5. Back out two guide tube set screws.
7. Install longer guide tube in rear hole.
6. With tubes properly sealed, tighten set screws, then install gun cable. Wire is 3 1/2 turns backed out from full pressure. See operating manual for more information.
8. To start electrode, install gun cable and straighten the first 6" and cut off first inch. Insert free end thru ingoing guide tube. Press gun trigger and push wire into drive roll.

HOW TO ORDER REPLACEMENT PARTS

Order parts only from Lincoln offices or from the Authorized Field Service Shops listed in the "Service Directory". Give the following information:

- (a) From the nameplate — machine model, code and serial numbers.
- (b) From this manual — complete part name and description, item number, quantity required and the number of the list used to get this information.

Any items indented in the "Parts Name" column are included in the assembly under which they are listed. The indented items may be ordered separately. If the entire assembly is needed, do **not** order the indented parts.

GUARANTEE

The Lincoln Electric Company, the Seller, warrants all new equipment except engines and accessories thereof against defects in workmanship and material for a period of one year from date of shipment, provided the equipment has been properly cared for, and operated under normal conditions. Engines and engine accessories are warranted free from defects for a period of ninety days from the date of shipment.

If the Buyer gives the Seller written notice of any defects in equipment or electrode or flux within any period of warranty and the Seller's inspection confirms the existence of such defects, then the Seller shall correct the defect or defects at its option, either by repair or replacement F.O.B. its own factory or other place as designated by the Seller. The remedy provided Buyer herein for breach of Seller's warranty shall be exclusive.

No expense, liability or responsibility will be assumed by the Seller for repairs made outside of the Seller's factory without

written authority from the Seller.

The Seller shall not be liable for any consequential damages in case of any failure to meet the conditions of any warranty. The liability of the Seller arising out of the supplying of said equipment or electrode or its use by the Buyer, whether on warranty or otherwise, shall not in any case exceed the cost of correcting defects in the equipment or replacing defective electrode in accordance with the above guarantee. Upon the expiration of any period of warranty, all such liability shall terminate.

The foregoing guarantees and remedies are exclusive and extend as above set forth. There are no guarantees or warranties with respect to engines, accessories, equipment, electrodes, or flux, either express or arising by operation of law or trade usage or otherwise implied, including without limitation the warranty of merchantability, all such warranties being waived by the Buyer.

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SEE INSTRUCTIONS



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World's Largest Manufacturer of Arc Welding Products • Manufacturer of Industrial Motors

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Ram

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