

# IDEALARC SP-255

For use with machine Code Numbers 10164, 10165

## Safety Depends on You

Lincoln arc welding and cutting 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 MANUAL AND THE SAFETY PRECAUTIONS CONTAINED THROUGHOUT.** And, most importantly, think before you act and be careful.

**This manual covers equipment which is obsolete and no longer in production by The Lincoln Electric Co. Specifications and availability of optional features may have changed.**



## OPERATOR'S MANUAL



World's Leader in Welding and Cutting Products



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## ⚠ WARNING

### ⚠ CALIFORNIA PROPOSITION 65 WARNINGS ⚠

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

The Above For Diesel Engines

The engine exhaust from this product contains chemicals known to the State of California to cause cancer, birth defects, or other reproductive harm.

The Above For Gasoline Engines

**ARC WELDING CAN BE HAZARDOUS. PROTECT YOURSELF AND OTHERS FROM POSSIBLE SERIOUS INJURY OR DEATH. KEEP CHILDREN AWAY. PACEMAKER WEARERS SHOULD CONSULT WITH THEIR DOCTOR BEFORE OPERATING.**

Read and understand the following safety highlights. For additional safety 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 or CSA Standard W117.2-1974. A Free copy of "Arc Welding Safety" booklet E205 is available from the Lincoln Electric Company, 22801 St. Clair Avenue, Cleveland, Ohio 44117-1199.

**BE SURE THAT ALL INSTALLATION, OPERATION, MAINTENANCE AND REPAIR PROCEDURES ARE PERFORMED ONLY BY QUALIFIED INDIVIDUALS.**



### FOR ENGINE powered equipment.

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



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



1.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.

1.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.

1.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.



1.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.

1.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.



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



### ELECTRIC AND MAGNETIC FIELDS may be dangerous

2.a. Electric current flowing through any conductor causes localized Electric and Magnetic Fields (EMF). Welding current creates EMF fields around welding cables and welding machines

2.b. EMF fields may interfere with some pacemakers, and welders having a pacemaker should consult their physician before welding.

2.c. Exposure to EMF fields in welding may have other health effects which are now not known.

2.d. All welders should use the following procedures in order to minimize exposure to EMF fields from the welding circuit:

2.d.1. Route the electrode and work cables together - Secure them with tape when possible.

2.d.2. Never coil the electrode lead around your body.

2.d.3. Do not place your body between the electrode and work cables. If the electrode cable is on your right side, the work cable should also be on your right side.

2.d.4. Connect the work cable to the workpiece as close as possible to the area being welded.

2.d.5. Do not work next to welding power source.

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## ELECTRIC SHOCK can kill.

- 3.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.
- 3.b. Insulate yourself from work and ground using dry insulation. Make certain the insulation is large enough to cover your full area of physical contact with work and ground.
- In addition to the normal safety precautions, if welding must be performed under electrically hazardous conditions (in damp locations or while wearing wet clothing; on metal structures such as floors, gratings or scaffolds; when in cramped positions such as sitting, kneeling or lying, if there is a high risk of unavoidable or accidental contact with the workpiece or ground) use the following equipment:**
- Semiautomatic DC Constant Voltage (Wire) Welder.
  - DC Manual (Stick) Welder.
  - AC Welder with Reduced Voltage Control.
- 3.c. In semiautomatic or automatic wire welding, the electrode, electrode reel, welding head, nozzle or semiautomatic welding gun are also electrically "hot".
- 3.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.
- 3.e. Ground the work or metal to be welded to a good electrical (earth) ground.
- 3.f. Maintain the electrode holder, work clamp, welding cable and welding machine in good, safe operating condition. Replace damaged insulation.
- 3.g. Never dip the electrode in water for cooling.
- 3.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.
- 3.i. When working above floor level, use a safety belt to protect yourself from a fall should you get a shock.
- 3.j. Also see Items 6.c. and 8.



## ARC RAYS can burn.

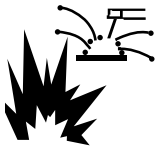
- 4.a. Use a shield with the proper filter and cover plates to protect your eyes from sparks and the rays of the arc when welding or observing open arc welding. Headshield and filter lens should conform to ANSI Z87. 1 standards.
- 4.b. Use suitable clothing made from durable flame-resistant material to protect your skin and that of your helpers from the arc rays.
- 4.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.

- 5.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 with electrodes which require special ventilation such as stainless or hard facing (see instructions on container or MSDS) or on lead or cadmium plated steel and other metals or coatings which produce highly toxic fumes, keep exposure as low as possible and below Threshold Limit Values (TLV) using local exhaust or mechanical ventilation. In confined spaces or in some circumstances, outdoors, a respirator may be required. Additional precautions are also required when welding on galvanized steel.**
- 5.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.
- 5.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.
- 5.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. MSDS forms are available from your welding distributor or from the manufacturer.
- 5.e. Also see item 1.b.

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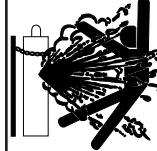


### WELDING SPARKS can cause fire or explosion.

6.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. Avoid welding near hydraulic lines. Have a fire extinguisher readily available.

- 6.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.
- 6.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.
- 6.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 from the American Welding Society (see address above).
- 6.e. Vent hollow castings or containers before heating, cutting or welding. They may explode.
- 6.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.
- 6.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.
- 6.h. Also see item 1.c.



### CYLINDER may explode if damaged.

7.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.

- 7.b. Always keep cylinders in an upright position securely chained to an undercarriage or fixed support.
- 7.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.
- 7.d. Never allow the electrode, electrode holder or any other electrically "hot" parts to touch a cylinder.
- 7.e. Keep your head and face away from the cylinder valve outlet when opening the cylinder valve.
- 7.f. Valve protection caps should always be in place and hand tight except when the cylinder is in use or connected for use.
- 7.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.

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

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## PRÉCAUTIONS DE SÛRETÉ

Pour votre propre protection lire et observer toutes les instructions et les précautions de sûreté spécifiques qui paraissent dans ce manuel aussi bien que les précautions de sûreté générales suivantes:

### Sûreté Pour Soudage A L'Arc

1. Protégez-vous contre la secousse électrique:
  - a. Les circuits à l'électrode et à la pièce sont sous tension quand la machine à souder est en marche. Eviter toujours tout contact entre les parties sous tension et la peau nue ou les vêtements mouillés. Porter des gants secs et sans trous pour isoler les mains.
  - b. Faire très attention de bien s'isoler de la masse quand on soude dans des endroits humides, ou sur un plancher métallique ou des grilles métalliques, principalement dans les positions assis ou couché pour lesquelles une grande partie du corps peut être en contact avec la masse.
  - c. Maintenir le porte-électrode, la pince de masse, le câble de soudage et la machine à souder en bon et sûr état de fonctionnement.
  - d. Ne jamais plonger le porte-électrode dans l'eau pour le refroidir.
  - e. Ne jamais toucher simultanément les parties sous tension des porte-électrodes connectés à deux machines à souder parce que la tension entre les deux pinces peut être le total de la tension à vide des deux machines.
  - f. Si on utilise la machine à souder comme une source de courant pour soudage semi-automatique, ces précautions pour le porte-électrode s'appliquent aussi au pistolet de soudage.
2. Dans le cas de travail au dessus du niveau du sol, se protéger contre les chutes dans le cas où on reçoit un choc. Ne jamais enrouler le câble-électrode autour de n'importe quelle partie du corps.
3. Un coup d'arc peut être plus sévère qu'un coup de soleil, donc:
  - a. Utiliser un bon masque avec un verre filtrant approprié ainsi qu'un verre blanc afin de se protéger les yeux du rayonnement de l'arc et des projections quand on soude ou quand on regarde l'arc.
  - b. Porter des vêtements convenables afin de protéger la peau de soudeur et des aides contre le rayonnement de l'arc.
  - c. Protéger l'autre personnel travaillant à proximité au soudage à l'aide d'écrans appropriés et non-inflammables.
4. Des gouttes de laitier en fusion sont émises de l'arc de soudage. Se protéger avec des vêtements de protection libres de l'huile, tels que les gants en cuir, chemise épaisse, pantalons sans revers, et chaussures montantes.
5. Toujours porter des lunettes de sécurité dans la zone de soudage. Utiliser des lunettes avec écrans latéraux dans les

zones où l'on pique le laitier.

6. Eloigner les matériaux inflammables ou les recouvrir afin de prévenir tout risque d'incendie dû aux étincelles.
7. Quand on ne soude pas, poser la pince à un endroit isolé de la masse. Un court-circuit accidentel peut provoquer un échauffement et un risque d'incendie.
8. S'assurer que la masse est connectée le plus près possible de la zone de travail qu'il est pratique de le faire. Si on place la masse sur la charpente de la construction ou d'autres endroits éloignés de la zone de travail, on augmente le risque de voir passer le courant de soudage par les chaînes de levage, câbles de grue, ou autres circuits. Cela peut provoquer des risques d'incendie ou d'échauffement des chaînes et des câbles jusqu'à ce qu'ils se rompent.
9. Assurer une ventilation suffisante dans la zone de soudage. Ceci est particulièrement important pour le soudage de tôles galvanisées plombées, ou cadmiées ou tout autre métal qui produit des fumées toxiques.
10. Ne pas souder en présence de vapeurs de chlore provenant d'opérations de dégraissage, nettoyage ou pistolage. La chaleur ou les rayons de l'arc peuvent réagir avec les vapeurs du solvant pour produire du phosgène (gas fortement toxique) ou autres produits irritants.
11. Pour obtenir de plus amples renseignements sur la sûreté, voir le code "Code for safety in welding and cutting" CSA Standard W 117.2-1974.

## PRÉCAUTIONS DE SÛRETÉ POUR LES MACHINES À SOUDER À TRANSFORMATEUR ET À REDRESSEUR

1. Relier à la terre le châssis du poste conformément au code de l'électricité et aux recommandations du fabricant. Le dispositif de montage ou la pièce à souder doit être branché à une bonne mise à la terre.
2. Autant que possible, l'installation et l'entretien du poste seront effectués par un électricien qualifié.
3. Avant de faire des travaux à l'intérieur de poste, la débrancher à l'interrupteur à la boîte de fusibles.
4. Garder tous les couvercles et dispositifs de sûreté à leur place.

Mar. '93

*Thank You* — for selecting a **QUALITY** product by Lincoln Electric. We want you to take pride in operating this Lincoln Electric Company product •• as much pride as we have in bringing this product to you!

**Please Examine Carton and Equipment For Damage Immediately**

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.

Please record your equipment identification information below for future reference. This information can be found on your machine nameplate.

Model Name & Number \_\_\_\_\_

Code & Serial Number \_\_\_\_\_

Date of Purchase \_\_\_\_\_

Whenever you request replacement parts for or information on this equipment always supply the information you have recorded above.

**Read this Operators Manual completely** before attempting to use this equipment. Save this manual and keep it handy for quick reference. Pay particular attention to the safety instructions we have provided for your protection. The level of seriousness to be applied to each is explained below:

**⚠ WARNING**

This statement appears where the information **must** be followed **exactly** to avoid **serious personal injury** or **loss of life**.

**⚠ CAUTION**

This statement appears where the information **must** be followed to avoid **minor personal injury** or **damage to this equipment**.



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## TECHNICAL SPECIFICATIONS – IDEALARC® SP-255

INPUT – SINGLE PHASE ONLY		
<u>Standard Voltage/Frequency</u> 208/230/60 Hz 230/460/575 Hz	<u>Input Current (@ Max Rated Output)</u> 53/49 Amps 50/25/20 Amps	
RATED OUTPUT		
<u>Duty Cycle</u> 35% 60% 100%	<u>Amps</u> 250 Amps 200 Amps 145 Amps	<u>Volts at Rated Amperes</u> 26 Volts 28 Volts 26 Volts
OUTPUT		
<u>Welding Current Range</u> 30-250 Amps	<u>Maximum Open Circuit Voltage</u> 40 Volts	<u>Wire Speed Range</u> 50-600 IMP (1.27-15.2 m/min)

RECOMMENDED INPUT CABLE AND FUSE SIZES					
Input Voltage/ Frequency	Fuse or Breaker Size (Super Lag)	Input Ampere Rating on Nameplate	75C Copper Wire in Conduit AWG (IEC) Sizes For lengths up to 100 ft.	75C Copper Wire in Conduit AWG (IEC) Sizes For lengths exceeding 100 ft.	Ground Wire
208	60	53	8 (10 mm <sup>2</sup> )	6 (16 mm <sup>2</sup> )	#10 (6 mm <sup>2</sup> )
230	60	50	10 (6 mm <sup>2</sup> )	8 (10 mm <sup>2</sup> )	#10 (6 mm <sup>2</sup> )
460	30	25	14 (2.5 mm <sup>2</sup> )	12 (4 mm <sup>2</sup> )	#10 (6 mm <sup>2</sup> )
575	25	20	14 (2.5 mm <sup>2</sup> )	12 (4 mm <sup>2</sup> )	#10 (6 mm <sup>2</sup> )

PHYSICAL DIMENSIONS			
Height	Width	Depth	Weight
28.2 in	18.8 in	40.1 in	222 lbs
719 mm	480 mm	1019 mm	101 kg

OPERATING TEMPERATURE	STORAGE TEMPERATURE
-20° C TO 40°C	±40°C

Read entire Installation section before starting installation.

## SAFETY PRECAUTIONS

### WARNING



#### ELECTRIC SHOCK can kill.

- Only qualified personnel should perform this installation.
- Only personnel that have read and understood the SP-255 Operating Manual should install and operate this equipment.
- Machine must be plugged into a receptacle which is grounded per any national, local or other applicable electrical codes.
- Turn the power switch on the SP-255 "off" before connecting or disconnecting gun and cable, output cables or other equipment.

## UNCRATING THE SP-255

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 (or 13 mm) wrench or socket, remove the two screws which attach the pallet to the bottom of the SP-255.

## 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.

## INPUT POWER AND GROUNDING CONNECTIONS

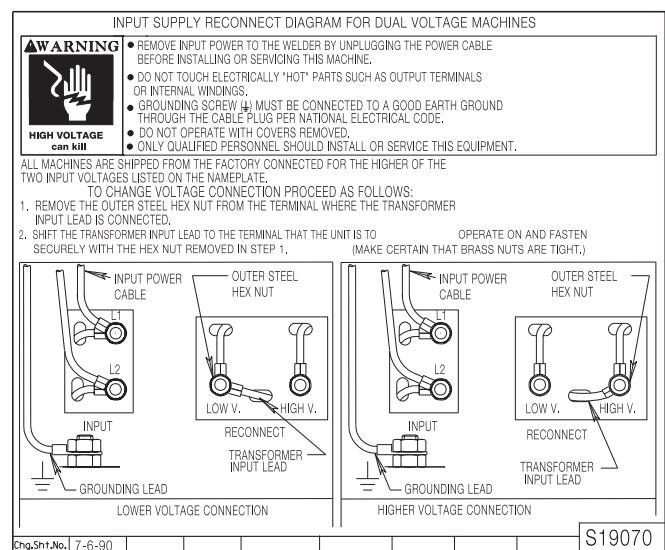
### WARNING



#### ELECTRIC SHOCK can kill.

- Do not touch electrically live parts such as output terminals or internal wiring
- All input power must be electrically disconnected before proceeding.

1. Before starting the installation, check with the local power company if there is any question about whether your power supply is adequate for the voltage, amperes, phase, and frequency specified on the welder nameplate. Also, be sure the planned installation will meet the U.S. National Electrical Code and local code requirements. This welder may be operated from a single phase line or from one phase of a two or three phase line.
2. Models that have multiple input voltages specified on the nameplate (e.g., 208/230) are shipped connected for the higher voltage. If the welder is to be operated on lower voltage, it must be reconnected according to the instructions on the inside of the removable panel near the top left side of the rear panel. These instructions are repeated below:



### WARNING

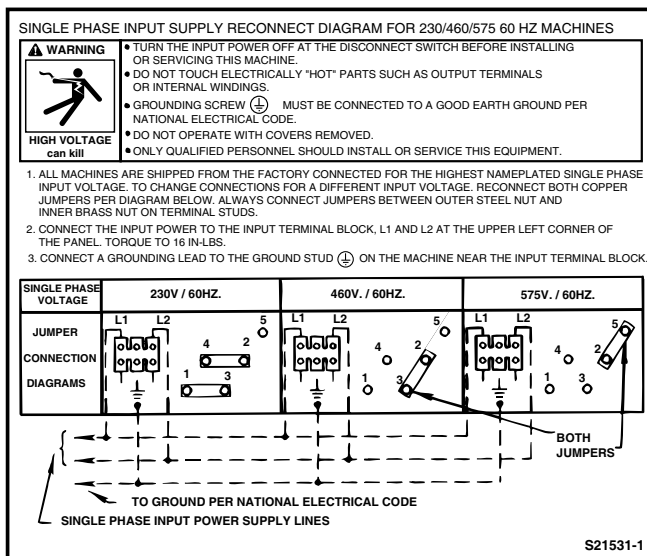
Make certain that the input power is electrically disconnected before removing the screw that holds the removable rear panel in place.

3. The 208/230 volt 60 Hz model SP-255 is shipped with a 10 ft. (3.0 m) 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.

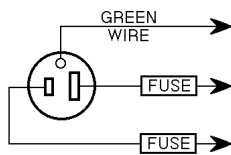
The 230/460/575 volt 60 Hz model is not equipped with a plug, input cable or receptacle.

- Using the following instructions have a qualified electrician connect the receptacle or cable to the input power lines and the system ground per the U.S. National Electrical Code and any applicable local codes. See the "Technical Specifications" page at the beginning of this chapter for proper wire sizes. For long runs over 100 feet (30 m), 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 the 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 the receptacle.



CONNECT TO A SYSTEM GROUNDING WIRE. SEE THE UNITED STATES NATIONAL ELECTRICAL CODE AND/OR LOCAL CODES FOR OTHER DETAILS AND MEANS FOR PROPER GROUNDING.



CONNECT TO HOT WIRES OF A THREE-WIRE, SINGLE PHASE SYSTEM OR TO ONE PHASE OF A TWO OR THREE PHASE SYSTEM.

## OUTPUT POLARITY CONNECTION

### 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 connections of the two cables located in the wire drive compartment near the front panel. The electrode cable, which is attached to the wire drive, is to be connected to the negative (-) labeled terminal and the work lead, which is attached to the work clamp, is to be connected to the positive (+) labeled terminal.

## GUN AND CABLE INSTALLATION

The Magnum™ 250SP gun and cable provided with the SP-255 is factory installed with a liner for .035-.045" (0.9-1.2 mm) electrode and an .035" (0.9 mm) contact tip. Install the .045 tip (also provided) if this wire size is being used. For other wire sizes, see Gun and Cable Maintenance.

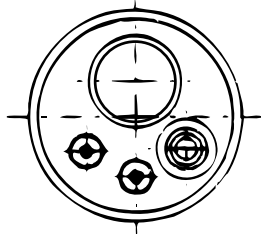
### WARNING

Turn the welder power switch off before installing gun and cable.

- Lay the cable out straight.
- Make sure all pins on the gun cable connector are aligned with the proper mating sockets on the front panel gun connector and then join the connectors and tighten the hand nut on the gun cable connector.

**NOTE:** If a gun and cable other than the Magnum 250SP is to be used, it must conform to standard European-style connector (Magnum Fast-Mate™) specifications. See diagram below.

## Gun - END VIEW



However, the thumbswitch functions available on the Magnum 250SP gun will only be operable from the front panel keypad. The gun trigger switch must be capable of switching 5 milliamps at 15 volts DC— resistive.

### ⚠ CAUTION

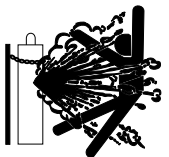
The gun trigger switch connected to the gun trigger control cable must be a normally open, momentary switch. The terminals of the switch must be insulated from the welding circuit. Improper operation of or damage to the SP-255 might result if this switch is common to an electrical circuit other than the SP-255 trigger circuit.

## SHIELDING GAS

(For Gas Metal Arc Welding Processes)

Customer must provide cylinder of appropriate type shielding gas for the process being used.

### ⚠ WARNING



**CYLINDER** may explode if damaged.

**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 Z49.1, "Safety in Welding and Cutting" published by the American Welding Society.**

1. Set gas cylinder in rear platform of SP-255. Hook chain in place to secure cylinder to rear of welder.
2. Remove the cylinder cap. Inspect the cylinder valves for damaged threads, dirt, dust, oil or grease. Remove dust and dirt with a clean cloth.

DO NOT ATTACH THE REGULATOR IF OIL, GREASE OR DAMAGE IS PRESENT! Inform your gas supplier of this condition. Oil or grease in the presence of high pressure oxygen is explosive.

3. Stand to one side away from the outlet and open the cylinder valve for an instant. This blows away any dust or dirt which may have accumulated in the valve outlet.

### ⚠ WARNING

**Be sure to keep your face away from the valve outlet when "cracking" the valve.**

4. Inspect the regulator for damaged threads, dirt, dust, oil or grease. Remove dust and dirt with a clean cloth.

DO NOT USE THE REGULATOR IF OIL, GREASE OR DAMAGE IS PRESENT! Have an authorized repair station clean the regulator or repair any damage.

5. Attach the flow regulator to the cylinder valve and tighten the union nut(s) securely with a wrench.

**NOTE:** If connecting to 100% CO<sub>2</sub> cylinder, insert regulator adapter provided between regulator and cylinder valve. If adapter is equipped with a plastic washer, be sure it is seated for connection to the CO<sub>2</sub> cylinder.

6. Attach one end of the inlet gas hose to the outlet fitting of the flow regulator, the other end to the SP-255 rear fitting, and tighten the union nuts securely with a wrench.
7. Before opening the cylinder valve, turn the regulator adjusting knob counter-clockwise until the adjusting spring pressure is released.
8. Open the cylinder valve slowly a fraction of a turn. When the cylinder pressure gauge 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.**

9. The flow regulator is adjustable. Set it for the flow rate recommended for the procedure and process being used before making the weld.

Read entire Operation section before operating the SP-255.

## **WARNING**



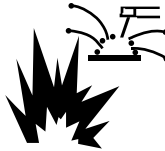
### **ELECTRIC SHOCK can kill.**

- Do not touch electrically live parts or electrode with skin or wet clothing. Insulate yourself from work and ground.
- Always wear dry insulating gloves.



### **FUMES AND GASES can be dangerous.**

- Keep your head out of fumes.
- Use ventilation or exhaust to remove fumes from breathing zone.



### **WELDING SPARKS can cause fire or explosion.**

- Keep flammable material away.
- Do not weld on closed containers.



### **ARC RAYS can burn eyes and skin.**

- Wear eye, ear and body protection.

Observe all safety information throughout this manual.

## PRODUCT DESCRIPTION

The SP-255 is a complete semiautomatic constant voltage DC arc welding machine built to meet NEMA specifications. It combines a constant voltage power source and a constant speed wire feeder with a micro-computer-based controller. This forms an intelligent welding system that really puts the automatic in semi-automatic. A touch key entry system with audible feedback, along with a two-line, 32 character alphanumeric display provide user friendly control of the system.

Multilingual display capability allows the SP-255 to communicate with the user in any of the following languages: English, German, French, Spanish, or Japanese (Katakana).

## RECOMMENDED PROCESSES AND EQUIPMENT

The SP-255 is recommended for GMA welding processes using 10 to 44 lb. (4.5 to 20 kg) 2" (51 mm) I.D. spools or Readi-Reel® coils of .025 through .045 (0.6-1.2 mm) solid steel using CO<sub>2</sub>, ArCO<sub>2</sub>, or ArO<sub>2</sub> shielding gas, .035" (0.9 mm) stainless steel using ArO<sub>2</sub> or HeArCO<sub>2</sub> shielding gas, 3/64" (1.2 mm) aluminum using Ar shielding gas, and .045" (1.2 mm) Outershield® electrodes using CO<sub>2</sub> or ArCO<sub>2</sub> shielding gas, as well as .035" (0.9 mm) and .045" (1.2 mm) Innershield® self-shielded electrodes.

The SP-255 is factory equipped to feed .035" (0.9 mm) and .045" (1.2 mm) electrodes and includes a 200A, 60% duty cycle rated, 12.5 ft. (3.8 m) GMA gun and cable assembly equipped for these wire sizes. The SP-255 is factory equipped with an adjustable CO<sub>2</sub> and Argon blend flow regulator. A supply of shielding gas is required for GMAW processes.

## WELDING CAPABILITY

The SP-255 is rated at 250 amps @ 26 volts at a 35% duty cycle on a ten minute basis. It is capable of higher duty cycles at lower output currents.

## LIMITATIONS

The SP-255 may not operate as designed if powered with a portable or in-plant generator.

## DESCRIPTION OF CONTROLS AND KEYS

### POWER SWITCH

Place the lever in the "ON" position to turn the SP-255 on. When the power is on, the red LED backlighting of the LCD display will be lit, and the screen will contain a readable display. The welding setup present when the power was shut off or disconnected will be restored when the power is restored.

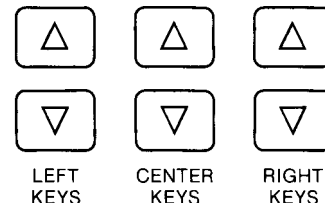
### SETUP KEYS

#### DISPLAY LANGUAGE SELECTION

The SP-255 has multilingual display capability permitting the SP-255 prompts, messages, and other display information to be in any of five languages: English, German, French, Spanish, and Japanese (Katakana). The user may select the chosen language by simultaneously pressing the PROCESS Key and the appropriate Number Key per the instructions given in the appropriate language on the Keypad Instruction Decal inside the SP-255 door, also shown below:

For ENGLISH display press both keys at the same time.	PROCESS WIRE/GAS	and	1
Für die optische Anzeige auf DEUTSCH sind beide Tasten gleichzeitig zu drücken.	PROCESS WIRE/GAS	und	2
Pour l'affichage en FRANCAIS appuyez les deux touches en même temps.	PROCESS WIRE/GAS	et	3
Para mostrar en ESPAÑOL pulsar las dos teclas a la vez.	PROCESS WIRE/GAS	y	4
ニホンゴノヒョージハ リョーホーノ キーラ ドージニ オス	PROCESS WIRE/GAS	ト	5

#### ARROW KEYS



There are three pairs of arrow keys: left, center, and right. The up arrow keys increase the selection displayed directly above them. The down arrow keys decrease the selection displayed directly above them. All of the arrow keys have a repeat function when they



are held closed. The left pair will automatically continue to increment or decrement the selection above it at a slow, steady rate as long as the key is pressed. The center and right pairs will continue to increment and decrement the selections above them at a slow rate, but then the rate will gradually increase until it becomes very rapid. This allows rapid setting from a small quantity to a large quantity or vice versa while maintaining an excellent resolution (i.e., 50 IPM to 600 IPM). However, when the trigger is closed, the changes will be at a steady, moderate rate to allow for proper “on the fly” control.

## START MODE SELECTIONS

The SP-255 permits selection of Fast/Slow Run-In wire feed speed as well as adjustment of the start striking voltage, to optimize arc starting, using the starting screen display.



The starting screen (see Figures below) is displayed by pressing and holding both the PROCESS key and the TIMERS OFF key at the same time.

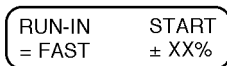


FIGURE 1

### 1. Run-In Speed

The SP-255 is factory set for FAST run-in (Figure 1) where the wire feed will accelerate directly to the preset speed. SLOW run-in will initially feed at 50 IPM until welding current is sensed, or for 2 seconds if feeding without welding (loading wire).

SLOW run-in may be selected using the left arrow keys which will toggle the starting screen display to SLOW (Figure 2) or back to FAST (Figure 1).

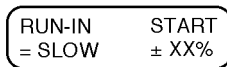


FIGURE 2

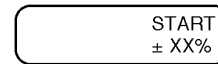
### 2. Start Voltage

The START voltage setting (Figure 1 or 2) may be offset from the factory programmed level (00%) by up to ±30% above or below programmed level using the right arrow keys, or from the gun thumbswitch by positioning the screen cursor beneath the START display using the IPM-VOLTS key. (see “Gun Switch Keys” in this section).

### 3. Spool Gun Start Mode

If using optional spool gun mode (see “Making a Weld with the Spool Gun” in Accessories section), the RUN-IN portion of the starting screen is not functional and will not be displayed. The START voltage is adjusted as described above (Figure 3).

FIGURE 3

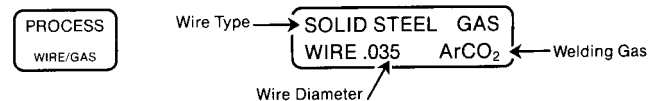


The starting screen is exited by pressing any key on the keypad except TIMERS OFF, IPM-VOLTS or any Arrow key. Closing Gun Trigger will also not clear the starting screen.

**NOTE:** It is not necessary to repeat the above procedure each time the unit is powered up. That is, the unit will remember the start mode settings from the previous power down and return you to that same state upon your next power up. thus, you need only perform the above procedure when you want to change the start mode settings.

When saving to Memory locations 1-5, the start mode at the time of saving will be saved into the memory location as well. Thus, the operator should be aware that when recalling a memorized procedure, he is also recalling particular start mode which will override any present start mode setting and remain in effect until either the mode is changed using the above procedure or until a memorized procedure containing another start mode is recalled.

## PROCESS (WIRE/GAS) KEY



This key is used to display the Wire Type, Wire Diameter, and Welding Gas. Each combination of wire and gas dictates a unique relationship between the wire feed speed and the arc voltage. The SP-255 uses this unique relationship, along with the metal thickness, to set the proper values of wire feed speed and arc voltage. **Therefore, it is very important that the wire type, wire diameter, and welding gas on the display match the actual wire type, wire diameter, and welding gas being used for the weld.**

Left arrow keys—set Wire Type



Center arrow keys—set Wire Diameter

Right arrow keys—set Welding Gas

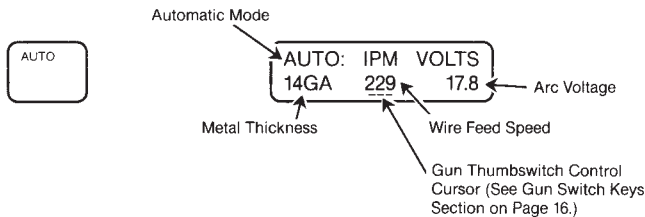
The following 16 processes are programmed into the SP-255:

Wire Type	Wire Diameter	Welding Gas
Solid Steel	.025 (0.6mm)	CO <sub>2</sub>
Solid Steel	.025 (0.6mm)	ArCO <sub>2</sub>
Solid Steel	.030 (0.8mm)	CO <sub>2</sub>
Solid Steel	.030 (0.8mm)	ArCO <sub>2</sub>
Solid Steel	.035 (0.9mm)	CO <sub>2</sub>
Solid Steel	.035 (0.9mm)	ArCO <sub>2</sub>
Solid Steel	.035 (0.9mm)	ArO <sub>2</sub>
Solid Steel	.045 (1.2mm)	CO <sub>2</sub>
Solid Steel	.045 (1.2mm)	ArCO <sub>2</sub>
Stainless	.035 (0.9mm)	ArO <sub>2</sub>
Stainless	.035 (0.9mm)	HeArCO <sub>2</sub>
Aluminum (5356)	3/64" (1.2mm)	Argon
Outershield®	.045 (1.2mm)	CO <sub>2</sub>
Outershield	.045 (1.2mm)	Ar/CO <sub>2</sub>
Innershield®	.035 (0.9mm)	None
Innershield	.045 (1.2mm)	None

**PROCEDURE KEYS**

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

**AUTO KEY**



Pressing the Auto Key once places the SP-255 into the automatic mode of operation. Auto mode provides automatic setup of the recommended wire feed speed and arc voltage based on the metal thickness selected and the process being used. The Auto mode screen displays metal thickness, set wire feed speed, the set arc voltage, and a cursor that indicates which parameter, wire feed speed, or arc voltage is being controlled by the thumbswitch on the SP-255 gun (see Gun Switches section).

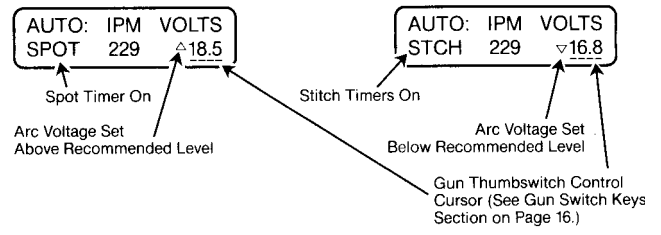
Left arrow keys — Increases (up arrow) or decreases (down arrow) metal thickness setting. Increasing or decreasing metal thickness automatically increases or decreases both wire feed speed and arc voltage simultaneously. See gauge chart on instruction label on inside of SP-255 door for

available sizes. (**NOTE:** If the spot or stitch timers are on, metal thickness is not displayed and, therefore, the left arrow keys will not function. Also, the left arrow keys do not function when the trigger is closed. (See Figures 1 and 2 following.)

Center arrow keys — Increases (up arrow) or decreases (down arrow) wire feed speed setting. Increasing or decreasing wire feed speed will simultaneously cause an increase or decrease in the arc voltage and can change the metal thickness setting.

Right arrow keys — Increases (up arrow) or decreases (down arrow) arc voltage setting. An up arrow indicator appears below the V in VOLTS if the arc voltage has been set higher than the recommended value, and a down arrow indicator appears below the V in VOLTS if the arc voltage is below the recommended value. No arrow indicates that you are set to the recommended value. (See Figures 4 and 5 following.)

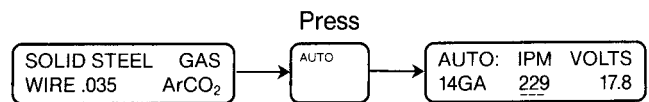
Repressing the Auto key resets the wire feed speed and arc voltage settings to the recommended values for the metal thickness displayed. (**NOTE:** If the spot or stitch timers are on, metal thickness is not displayed and, therefore, the repress function does not work.)



**Figure 4**

**Figure 5**

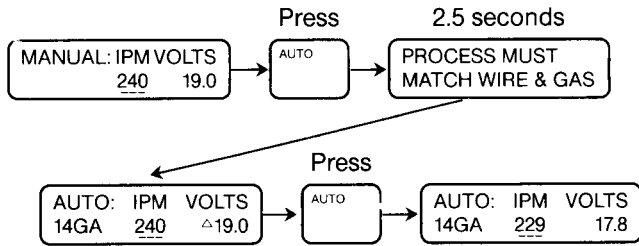
**TYPICAL AUTO KEY PRESS SEQUENCES**



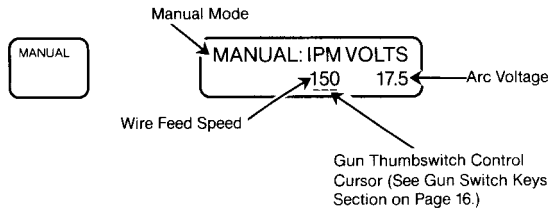
Process screen is being displayed prior to pressing Auto key. The Auto key is pressed, the Auto screen is now displayed.

If the unit was in a Manual configuration (see Manual Key) when the Auto key was pressed, the audio alarm will beep three times and a message (see below) will be displayed for 2.5 seconds reminding you that the process entered into the SP-255 (see Process Key) must match the wire and gas being used. After the 2.5 second period is over, the Auto screen will be displayed with the same procedure that was in Manual.

Repressing the Auto Key sets the recommended procedure for the metal thickness displayed.



## MANUAL KEY



Permits individual setting of wire feed speed and arc voltage for manual procedure setup. The manual screen displays wire feed speed, arc voltage, and a cursor that indicates which parameter, wire feed speed, or arc voltage is being controlled by the thumb-switch on the SP-255 gun (see "Gun Switches" in operation section).

Left arrow keys — Do not function in Manual mode.

Center arrow keys — Increase (up arrow) or decrease (down arrow) wire feed speed.

Right arrow keys — Increase (up arrow) or decrease (down arrow) arc voltage.

If the spot or stitch timers are on it will be indicated in the bottom left corner of the display. (See Figures 6 and 7 below.)

## TYPICAL MANUAL KEY PRESS SEQUENCE

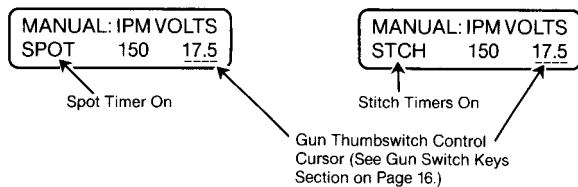
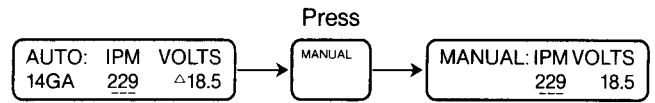


Figure 6

Figure 7

Auto screen is being displayed prior to pressing Manual key. The Manual key is pressed, the Manual screen is now displayed. The procedure is the same that was in Auto.



## MEMORY KEYS

### SAVE KEY



Saves present setup (including process, procedure, and timer functions, if used) to one of five memories chosen by pressing the desired memory number key.

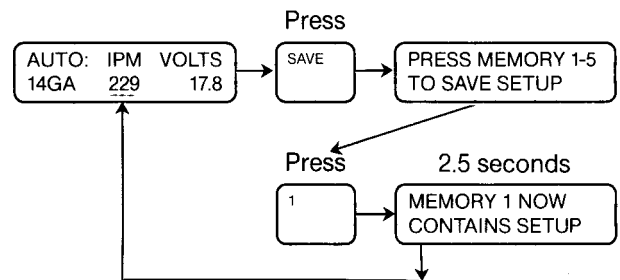
When the Save key is pressed, a prompting message instructing the operator to "PRESS MEMORY 1-5 TO SAVE SETUP" is displayed. This message will stay on the display until a memory number key is selected or one of the other keys, such as Auto, Manual, or Process, is pressed. If a memory number key is selected, a message will be displayed for 2.5 seconds that confirms that the setup was saved to that memory number (see Key Press Sequence following).

The six arrow keys perform no function when saving a setup.

**NOTE:** When a setup is saved to a memory, the previous content of that memory is lost because it is replaced by the present setup. Removing input power does not affect setups in memory.

## TYPICAL SAVE KEY PRESS SEQUENCE

Auto screen displayed prior to pressing Save key. Save key is pressed, and display changes to prompting message. Memory 1 key is pressed, and the display changes to a message that confirms the setup was saved to memory 1. The message is displayed for 2.5 seconds, and then the original Auto screen is displayed.



### MEMORY NUMBER KEY



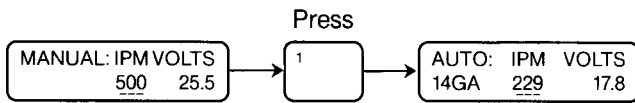
Pressing the desired Memory Number key recalls the setup saved in that memory (including process, procedure, and timer functions if used).

The six arrow keys perform no function during a recall.

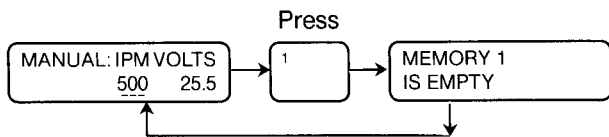
**NOTE:** The presently displayed setup is lost because it is replaced by the setup recalled from memory. If you wish to save the present setup, save it to an unused memory first (see Save key), and then recall the memory required.

TYPICAL MEMORY NUMBER KEY PRESS SEQUENCE

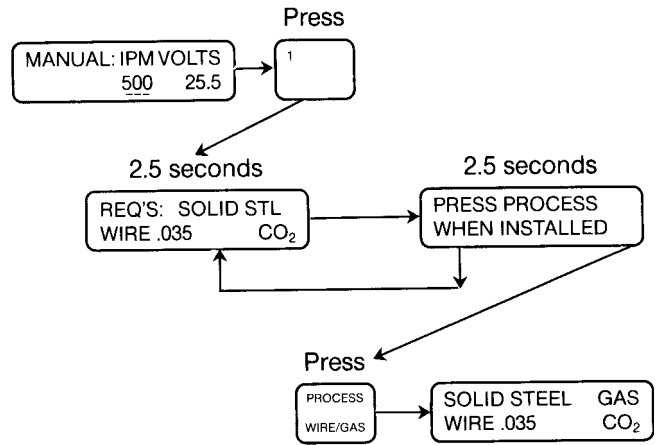
Manual screen displayed prior to pressing Memory Number key. Memory Number key is pressed, the display changes to the Auto setup that was in memory 1.



If the memory is empty (contains no setup yet), then a message indicating that (see below) will be displayed when the Memory Number key is pressed. The message will be displayed for 2.5 seconds, and then the display will change to the original display before the Memory Number key was pressed.

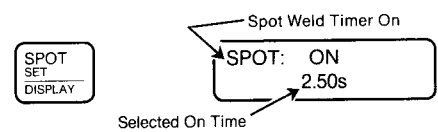


If the setup in memory is an Auto mode type and it requires a different wire type, wire size, or welding gas, the display will alternate messages (see below), once the Memory Number is pressed. The first message will tell you what process is required, and the second message will tell you to press the Process key once you have installed the process required into the SP-255. Once the required process has been installed, press the Process key and the setup will be recalled from memory 1 and the display will show the required process. Press Auto key or close the gun trigger to display the procedure stored in memory 1.



TIMER KEYS

SPOT KEY



Turns on the Spot weld timer and displays selection of the spot ON time. Pressing the Spot key a second time returns the screen to the previous display without turning off the spot timer. Any time the Spot weld timer is on and the display is in the Auto or Manual mode, the word SPOT will appear in the bottom left corner of the display.

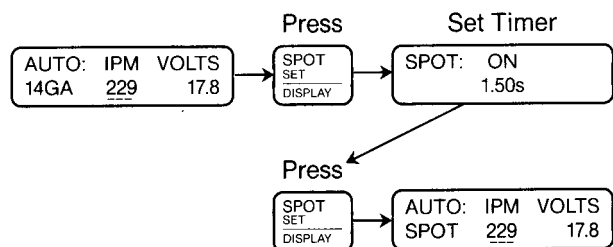
Left arrow keys — Do not function.

Center arrow keys — Increase (up arrow) or decrease (down arrow) Spot ON time in seconds (0.20 to 2.50s).

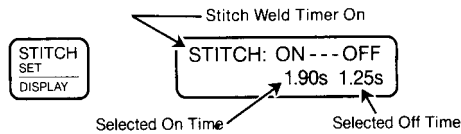
Right arrow keys — Do not function.

TYPICAL SPOT KEY PRESS SEQUENCE

Auto screen is displayed prior to pressing Spot key. Spot key is pressed, Spot On timer is activated and the display changes to Spot screen. Spot ON timer can now be adjusted using the center arrow keys. Once the timer has been set, pressing the Spot key again returns the display to the original Auto screen with the Spot timer status indicated in the bottom left corner.



## STITCH KEY



Turns on the Stitch weld timers and displays selections of the stitch ON and OFF times. Pressing the Stitch key a second time returns the screen to the previous display without turning off the stitch timers. Any time the Stitch weld timers are on and the display is in the Auto or Manual mode, the abbreviation STCH will appear in the bottom left corner of the display.

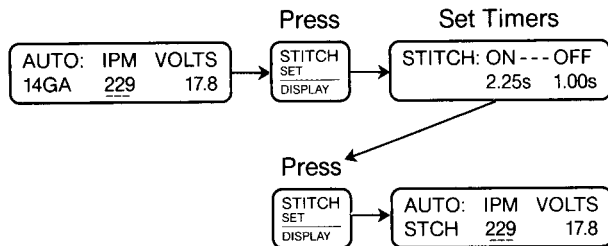
Left arrow keys — Do not function.

Center arrow keys — Increase (up arrow) or decrease (down arrow) Stitch ON time in seconds (0.20 to 2.50s).

Right arrow keys — Increase (up arrow) or decrease (down arrow) Stitch OFF time in seconds (0.20 to 2.50s).

## TYPICAL STITCH KEY PRESS SEQUENCE

Auto screen is displayed prior to pressing Stitch key. Stitch key is pressed, Stitch timers are activated and the display changes to Stitch screen. Stitch ON and OFF timers can now be adjusted using the center and right arrow keys. Once the timers have been set, pressing the Stitch key again returns the display to the original Auto screen with the Stitch timer status indicated in the bottom left corner.



## TIMERS OFF KEY



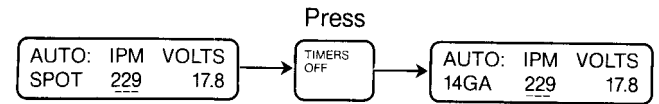
Turns off both Spot and Stitch timers and removes their indicating letters from the bottom left corner of the Auto and Manual mode displays.

The six arrow keys do not function with this key.

## TYPICAL TIMERS OFF KEY PRESS SEQUENCE

Auto screen is displayed prior to pressing Timers Off key. Timers Off key is pressed, all timers are turned

off, and the display no longer indicates in the bottom left-hand corner that any timers are on. (Timer status is replaced by gauge in the Auto mode.)



## GUN SWITCH KEYS

### IPM VOLTS KEY

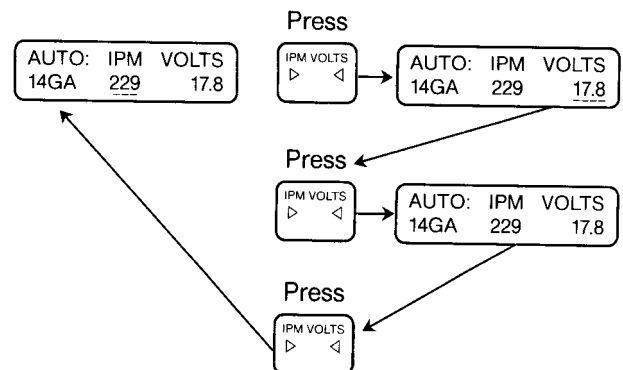


Sets the gun thumbswitch to control IPM or VOLTS. Pushing the gun thumbswitch forward (toward the tip) increases and pulling it back decreases IPM or VOLTS. The underlining cursor **always** indicates the selection being controlled by the gun thumbswitch. If the cursor is not present, the gun thumbswitch will not be functional which prevents any inadvertent actuations. Each time this key is pressed, it causes the cursor to go to the next step in the following sequence IPM to VOLTS to no cursor to IPM to VOLTS, etc.

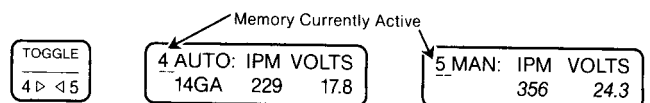
**NOTE:** In Auto mode, changing IPM will change arc voltage also and can cause a change in metal thickness as well.

## TYPICAL IPM VOLTS KEY PRESS SEQUENCE

Auto screen is displayed prior to pressing IPM VOLTS key. IPM VOLTS key is pressed, cursor moves from under IPM to under VOLTS. Pressing the IPM VOLTS key again causes the cursor to disappear. Pressing the IPM VOLTS key again causes the cursor to appear under IPM. This sequence continues each time the IPM VOLTS key is pressed.



## TOGGLE KEY



The first time this key is pressed it turns on toggle mode and recalls the setup in memory 4. This mode allows you to toggle between the setups in memory 4 and memory 5. Each time the key is pressed, it alternates between the two memories. The toggle screen displays the memory number the current setup was recalled from, indicates automatic (AUTO:) or manual (MAN:) mode, displays gauge if in Auto mode, set wire feed speed, and set arc voltage. The cursor underlines the memory number currently selected.

If in AUTO mode, an up or down arrow which shows whether the arc voltage has been adjusted above or below the recommended level can also be on the display (see "Procedure Keys" in operation section). Also Spot or Stitch timer status will be displayed in the lower left-hand corner if either timer is active.

The gun thumbswitch functions as a Toggle key in Toggle mode. Pushing the gun thumbswitch forward (toward the tip) selects the setup in memory 5, and pulling it back selects the setup in memory 4 (see Gun Thumbswitch Section). The gun thumbswitch also functions with the trigger closed for "on the fly" changes during a weld.

To turn toggle mode off, press Auto, Manual, or any Memory Number key.

### CAUTION

Any changes made to settings in toggle mode are not automatically saved when power is removed, or if toggle mode is turned off. To save these changes, press the Save key and then the memory number key that was currently displayed on the toggle screen (4 or 5), "toggle" then press the Save key and then the other Memory Number key that was displayed after the toggle (5 or 4). When power is returned, the machine will not be in toggle mode, but will contain the settings present when power was removed so you may continue to weld right where you left off or press Toggle key to return to toggle mode.

Left arrow keys — If metal thickness is displayed, these keys will increase (up arrow) or decrease (down arrow) it; otherwise, they perform no function.

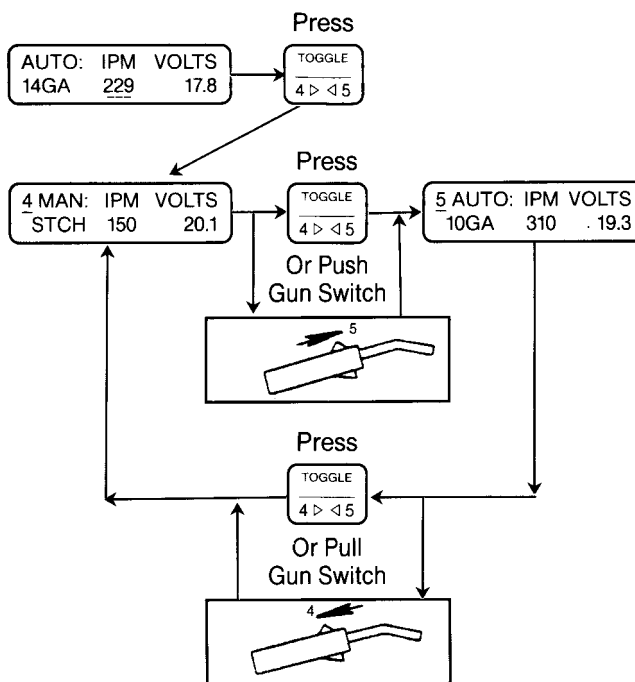
Center arrow keys — Increases (up arrow) or decreases (down arrow) wire feed speed setting. If in Auto mode, increasing or decreasing wire feed speed will simultaneously cause an increase or decrease in the arc voltage and can change the

metal thickness setting.

Right arrow keys — Increases (up arrow) or decreases (down arrow) arc voltage setting. If in Auto mode, an up arrow indicator appears below the V in VOLTS if the arc voltage has been set higher than the recommended value, and a down arrow indicator appears below the V in VOLTS if the arc voltage is below the recommended value. No arrow indicates that you are set to the recommended value.

### TYPICAL TOGGLE KEY PRESS SEQUENCE

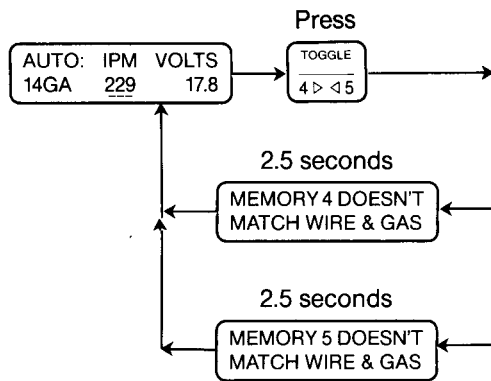
Auto screen is displayed prior to pressing Toggle key. Toggle key is pressed, memory 4 is recalled and appears on the display. The unit is now in toggle mode. Pressing the Toggle key again or pushing the gun thumbswitch forward (toward the gun tip) "toggles" the unit, and memory 5 is recalled and appears on the display. Pressing the Toggle key again or pulling the gun thumbswitch back (toward the gun cable) "toggles" the unit, and memory 4 is recalled and appears on the display. This whole cycle is repeatable as long as the unit remains in Toggle mode.



When the Toggle key is pressed and the setup in memory 4 or 5 is an Auto mode type and it requires a different wire type, wire diameter, or welding gas, a message (see below) will be displayed for 2.5 seconds telling you which memory does not match the process set in the machine, and then the screen will return to the previous display. In order to see what process is required, press the Memory Number key of



the one that did not match (see Memory Number Key Section).



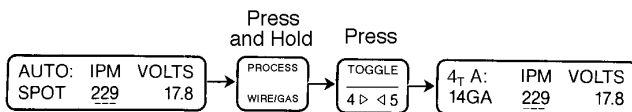
## 4-STEP TRIGGER INTERLOCK KEYS



Controls whether 4-step trigger interlock is activated or deactivated. (See “Using 4-Step Trigger Interlock Function” section.)

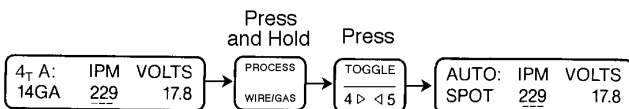
NOTE: 4-Step Trigger is automatically deactivated if either the spot or stitch timer mode is being used.

### TYPICAL ACTIVATE KEY PRESS SEQUENCE



Auto screen is displayed prior to pressing keys. Process key is pressed and held, then Toggle key is pressed. The auto screen now displays the 4T symbol in the upper left corner indicating that the 4-step trigger interlock is now active.

### TYPICAL DEACTIVE KEY PRESS SEQUENCE



Auto screen is displayed prior to pressing keys. Process key is pressed and held, then Toggle key is pressed. The 4T symbol is no longer displayed in the upper left corner indicating that the 4-step trigger interlock no longer functions.

## USING 4-STEP TRIGGER INTERLOCK FUNCTION

When the function is deactivated, the trigger will function in the normal mode which welds only when the trigger is closed.

When activated, the trigger will function as follows:

Once the arc has been struck, the gun trigger may be released and the welding will continue until welding is stopped by either of two methods:

1. The arc is extinguished by manually jerking the gun away from the work.
2. The gun trigger is depressed before the end of the weld returning the trigger function to normal mode so the weld will be stopped when the trigger is released. Releasing the trigger reinstates the trigger interlock function for the next weld.

The second trigger interlock stopping method permits the user better control at the finish of the weld and allows automatic burnback to prevent excessive wire feed speed overrun.

The 4-step trigger feature does not function when using SPOT or STITCH timed welding modes. (See “Spot and Stitch Weld Modes” in this section.)

## GUN SWITCHES

**Gun Trigger Switch** — Turns on arc voltage, wire feeder, and gas solenoid (except with Innershield) when closed. Also causes the screen to display the Auto or Manual screens (depending on which mode it is in), when the trigger is pulled. Turns off arc voltage, wire feeder, and gas solenoid when opened.

**NOTE:** If using Slow Run-In, when the trigger is pulled, the wire feeder feeds wire a low speed regardless of the set wire feed speed until the welding arc starts or 2 seconds has elapsed. This feature enhances starting and makes it easier to set the stick-out. The 2 second limit permits high speed loading of the gun and cable. To change Run-In mode, see "Start Mode Selections" in this section.

**Gun Thumbswitch (Magnum™ 250SP Only)** — Used to control wire feed speed, arc voltage, or selection of toggle memories 4 and 5. See IPM VOLTS key and Toggle key for control details. The increase or decrease function of the thumbswitch is the same as the center and right arrow key pairs for IPM or VOLTS setting. (See Arrow keys in "Setup Keys" section for details.)

## WIRE DRIVE ROLL

The drive roll provided with the SP-255 has two grooves, one for .030-.035" (0.8-0.9 mm) solid steel electrode, and the other for .045" (1.2 mm) solid steel electrode. The welder is shipped with the drive roll installed in the .030-.035" (0.8-0.9 mm) position as indicated by the stencilling on the exposed side of the drive roll. If .045" (1.2 mm) electrode is to be used or one of the optional drive rolls is required (see Accessories section). The drive roll must be reversed or changed.

## PROCEDURE FOR CHANGING DRIVE ROLL

Different wire sizes may require changing the drive roll. The applicable wire sizes are stamped on the drive roll. Dual groove rolls must be installed so the side with the proper wire size stamp faces out.

1. Turn off the power source.
2. Release the pressure on the idle roll by swinging the pressure arm off the idle roll arm.
3. Remove the wire from the drive system.

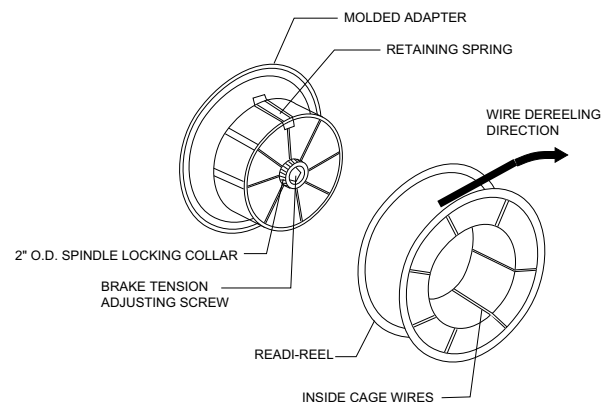
4. Remove the thumbscrew from the drive roll. Turn the drive roll over or change to another roll as required. Reinstall the thumbscrew.
5. Be sure the gun liner and contact tip are properly sized for wire being used. (See Gun and Cable Maintenance section.)

## WIRE REEL LOADING

### MOUNTING OF 22 TO 30 LB. READI-REELS

To mount a 22-30 lb. (10-14 kg) Readi-Reel® package using the optional Readi-Reel Adapter (K363P).

1. Remove the locking collar from the 2" O.D. spindle and mount the K363P Adapter so the spindle pin engages the hole provided in the Adapter. Replace and tighten the locking collar.
2. Rotate the spindle and adapter so the retaining spring is at the 12 o'clock position.
3. Position the Readi-Reel so that it will rotate in a **counterclockwise** direction (as viewed from retaining spring side of Adapter) when wire is dereeled from the **top** of the coil as shown below:



4. Set one of the Readi-Reel inside cage wires on the slot in the retaining spring tab.
5. Lower the Readi-Reel to depress the retaining spring and align the other inside cage wires with the grooves in the molded adapter.
6. Slide cage all the way onto the adapter until the retain spring "pops up" fully.



**⚠ 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. It is not necessary to remove adapter from spindle.

**MOUNTING OF 10 TO 44 LBS. SPOOLS**

**To mount 10 to 44 lb. spools (8" and 12" diameter):** (For 8" spools a K468 adapter must be used.)

1. Remove the locking collar and the Readi-Reel adapter (if installed) from the 2" dia. spindle.
2. If using an 8" spool, place the K468 adapter on the spindle first. The hole in the adapter arm is to engage the pin on the spindle.
3. 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.
4. Replace and tighten the locking collar for several seconds.

**TO START THE WELDER**

Turn the "Power" switch to "ON" This lights the red LED back lighting of the LCD display and a readable screen should be visible on the display. With the desired weld mode selected, operate the gun trigger for welder output and to energize the wire feed motor.

**FEEDING ELECTRODE****⚠ 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.**

**NOTE:** Check that drive rolls and gun parts are proper

for the wire size and type being used. (Refer to Accessories section.)

1. Turn the Readi-Reel or spool until the free end of the electrode is accessible.
2. While securely holding the electrode, cut off the bent end and straighten the first six inches (152 mm). Cut off the first inch (25 mm). (If the electrode is not properly straightened, it may not feed or may not go into the outgoing guide tube causing a "birdnest")
3. Push the wire through the guide tubes and close the idle roll assembly. For idle roll pressure settings, see Idle Roll Pressure Setting Section below.
4. Turn "OFF" weld timers by pressing TIMERS OFF key. Press the gun trigger and push the electrode into the drive roll. If the electrode fails to thread itself into the outgoing guide tube of the wire drive, open the quick release idle roll arm, thread the electrode manually, and reclose the arm.
5. Inch the electrode through the gun.

**NOTE:** If using the low speed starting feature of the SP-255, the wire will feed at low speed for 2 seconds while inching, then come up to the set speed.

6. Check that the welding process is set for the wire type, diameter, and gas per instructions on nameplate.

**IDLE ROLL PRESSURE SETTING**


The idle roll pressure thumbscrew is set at the factory backed out 2-1/2 turns from full pressure. This is an approximate setting. The optimum idle roll pressure varies with type of wire, wire diameter, surface condition, lubrication, and hardness. As a general rule, hard wires may require greater pressure, and soft, or aluminum wire, may require less pressure than the factory setting. The optimum idle roll setting can be determined as follows:

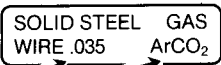
1. Press end of gun against a solid object that is electrically isolated from the welder output and press the gun trigger for several seconds.
2. If the wire "birdnests," jams or breaks at the drive roll, the idle roll pressure is too great. Back the thumbscrew out 1/2 turn, run new wire through gun, and repeat above steps.


- If the only result was drive roll slippage, loosen the gun cable Fast-Mate™ connection nut from the front of the SP-255 and pull the gun cable forward about 6" (152 mm). There should be a slight waviness in the exposed wire. If there is no waviness, the pressure is too low. Tighten the thumbscrew 1/4 turn, lock the gun cable in place and repeat the above steps.


### MAKING AN AUTO MODE WELD

- Check that the polarity is correct for the process being used, then turn power switch ON.


2. Press  then select:

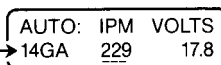
Wire Type being used with left arrow keys. 


Wire Diameter being used with center arrow keys. 


Welding Gas Type being used with right arrow keys. 

Left Keys    Center Keys    Right Keys

3. Press  then select:


Metal Thickness to be welded with left arrow keys. 

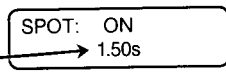






Left Keys    Center Keys    Right Keys

- If Spot or Stitch timing modes are required, perform either step 4.a. for Spot or step 4.b. for Stitch; otherwise, go to step 5.


4.a. Press  then select:


Spot On Time desired with center arrow keys. 

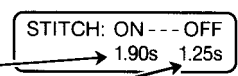





Left Keys    Center Keys    Right Keys


Press  again to return to previous display.

4.b. Press  then select:

Stitch On Time desired with center arrow keys. 

Stitch Off Time desired with right arrow keys. 

Left Keys    Center Keys    Right Keys

Press  again to return to previous display.

- Inch the electrode through the gun and cable and then cut the electrode within approximately 3/8 inch (9.5 mm) of the end of the contact tip [3/4 inch (19 mm) for Outershield® electrodes].
- If welding gas is to be used, turn on the gas supply and set the required flow rate [typically 25-35 CFH (12-16.5 l/min)].
- When using Innershield® electrode, the gas nozzle may be removed from the insulation on the end of the gun and replaced with the gasless nozzle. This will give improved visibility and eliminate the possibility of the gas nozzle overheating.
- 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".

### ⚠ WARNING

**When using an open arc process, it is necessary to use correct eye, head, and body protection.**

- Position electrode over joint. End of electrode may be lightly touching the work.
- Lower welding helmet, close gun trigger, and begin welding. Hold the gun so the contact tip to work distance is about 3/8 inch (9.5 mm), [3/4 inch (19 mm) for Outershield electrodes].
- To stop welding, release the gun trigger and then pull the gun away from the work after the arc goes out.

- When no more welding is to be done, close valve on gas cylinder (if used), momentarily operate gun trigger to release gas pressure, and turn off SP-255.

## 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 (4.8 mm) diameter hole in the top sheet and arc welding through the hole into the back sheet.

Spot On Time sets welding time. Start with a dial setting of about 1.2 seconds.

To make an arc spot plug weld, punch 3/16 inch (4.8 mm) holes in top sheet. Set the procedure for the metal thickness to be welded. 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 until 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.

## STITCH WELD MODE

Used to weld thin material where warpage and burn-through are a problem. Proper adjustment of ON and OFF times and arc travel speed permits welding thin sheet metal with small welds, minimum distortion, and no burnthrough.

Stitch On Time sets welding time. Start with a dial setting of 0.5 seconds. Raise setting to increase penetration and weld size; lower setting to reduce burn-through and distortion.

Stitch Off Time sets off time. Start with a dial setting of 0.5 seconds. Raise setting to reduce burnthrough; lower setting to make weld flatter and smoother.

To weld, set the procedure for the metal thickness to be welded. 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 toward direction of travel.

## AVOIDING WIRE FEEDING PROBLEMS

Wire feeding problems can be avoided by observing the following gun handling procedures:

- Do not kink or pull cable around sharp corners.
- Keep the electrode cable as straight as possible when welding or loading electrode through cable.
- Do not allow dolly wheels or trunks to run over cables.
- Keep cable clean by following maintenance instructions.
- Use only clean, rust-free electrode. The Lincoln electrodes have proper surface lubrication.
- Replace contact tip when the arc starts to become unstable or the contact tip end is fused or deformed.
- Keep wire reel spindle brake tension to minimum required to prevent excess reel over-travel which may cause wire "loop-offs" from coil.
- Use proper drive rolls and wire drive idle roll pressure for wire size and type being used. (See Drive Roll Kits in Accessories section.)

## 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, the 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 duty cycle procedures.

## INPUT LINE VOLTAGE PROTECTION

**HIGH LINE VOLTAGE**—If the line voltage exceeds 121% of rated input voltage, the output will be reduced to the lower level to protect voltage rating of the capacitor bank. A HIGH LINE message will be displayed if the output has been reduced (see Section on Explanation of Prompting and Error Messages).

**LOW LINE VOLTAGE**—You may not be able to get maximum output from the machine if the line voltage is less than rated input. If the output you want is not obtainable because of insufficient line voltage, a LOW

LINE message will be displayed (see Section on Explanation of Prompting and Error Messages). The unit will continue to weld, but the output will be less than what is set.

## WIRE FEED OVERLOAD PROTECTION

The SP-255 has solid state overload protection of the wire drive motor. If the motor becomes overloaded, the protection circuitry turns off the arc voltage, wire feed speed and gas solenoid and then causes the alarm to beep 3 times. The screen displays a message for 2.5 seconds stating that the motor is being overloaded and the gun and wire drive should be checked. Check for proper size tip, liner, and drive rolls, for any obstructions or bends in the gun cable, and any other factors that would impede the wire feeding. To resume welding, simply pull the trigger.

## WELDING THERMAL OVERLOAD PROTECTION

The SP-255 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.

## OVERCURRENT PROTECTION

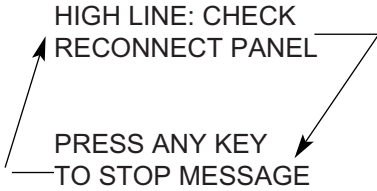
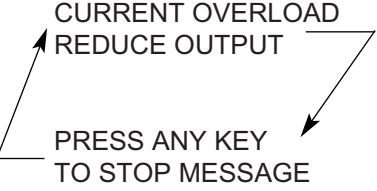
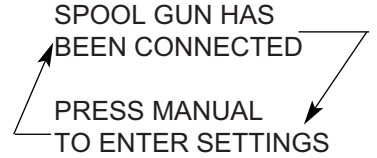
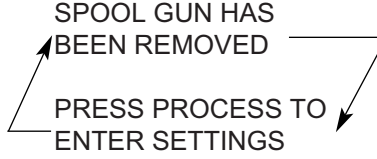
The machine will automatically reduce the output if the load on the machine exceeds 260 to 280 amperes. This protects the welding power SCR's from excessive short circuit currents and from exceeding their temperature rating before the thermostats can react. A CURRENT OVERLOAD message is displayed when the overcurrent protection is active (see Section on Explanation of Prompting and Error Messages).

## EXPLANATION OF PROMPTING AND ERROR MESSAGES

On Screen Error Message	Message Explanation
PROCESS MUST MATCH WIRE & GAS	Reminder that in Auto mode the process entered with the Process key must match the process installed in the machine.
ONLY SET UP FOR .035 STAINLESS	Unit is only programmed for .035 (0.9 mm) diameter in stainless steel wire. Other wire diameters can be accommodated by using the Manual mode.
ONLY ARGON USED WITH ALUMINUM	Unit is programmed to use only argon gas with aluminum electrodes. Other gases can be accommodated by using the Manual mode.
ONLY SET UP FOR .045 OUTERSHIELD	Unit is only programmed for .045 (1.1 mm) diameter in Outershield® electrode wire. Other wire diameters within the SP-255 rating can be accommodated by using the Manual mode.
NO GAS REQUIRED WITH INNERSHIELD	Innershield® electrode wire does not require a shielding gas. In the Auto mode the SP-255 automatically leaves the solenoid de-energized even when the trigger is closed.
MEMORY 1 NOW CONTAINS SETUP	Verifies that the setup was saved to memory number 1. The actual memory number is determined by the memory number key that was pressed following Save.
MEMORY 2 IS EMPTY	An attempt was made to recall a setup from a memory that does not contain one. The actual memory number is determined by the memory number key that was just pressed.
MEMORY 4 DOESN'T MATCH WIRE & GAS	An attempt was made to enter Toggle mode and the process of the Auto setup in memory 4 doesn't match the process in the machine. Press memory 4 to find out what process is required. The memory number indicates which memory, 4 or 5, doesn't match.

On Screen Error Message	Message Explanation
<p>REQ'S: STAINLESS WIRE .035 Ar0<sub>2</sub></p> <p style="text-align: center;">↓</p> <p>PRESS PROCESS WHEN INSTALLED</p>	<p>An attempt was made to recall from memory an Auto setup whose process doesn't match the process in the machine. This message indicates the process required and alternates with the second message until the Process key is pressed.</p>
<p>DATA ***ERROR*** CHECK SETTINGS</p> <p style="text-align: center;">↓</p> <p>PRESS PROCESS TO CHECK SETTINGS</p>	<p>An attempt was made to recall a setup from memory that has improper settings due to excessive electrical interference. The SP-255 will recall the setup and reset the improper data to within machine limits. However, all settings should be checked, properly set if needed, and then resaved to that memory. This message alternates with the second message until the Process key is pressed.</p>
<p>MOTOR OVERLOADED CHECK GUN, DRIVE</p>	<p>Unit shut down even though trigger was closed. There is an excessive current draw on the motor. Check for proper size tip, liner, and drive rolls, for any obstructions or bends in the gun cable, and any other factors that would impede the wire feeding. To resume welding, simply pull the trigger.</p>
<p>XXXX ***ERROR*** CHECK SETTINGS</p> <p style="text-align: center;">↓</p> <p>PRESS PROCESS TO CHECK SETTINGS</p>	<p>Indicates that an error has occurred due to excessive electrical interference. All of these error types turn off the arc voltage, wire feed speed, and solenoid. Press the Process key, per second message, and check all settings before continuing to weld.</p>
<p><u>XXXX</u></p> <p>IC31 RTI SWI IOT XIRQ PWOFF DATA</p>	<p>This table shows all of the actual lettering which appears in place of XXXX. There is no reason to note which of these occurred unless it occurs frequently.</p>
<p>GUN SWITCH BEING USED FOR TOGGLE</p>	<p>Reminds the operator that the gun switch is being used to toggle between memory 4 and memory 5 and, therefore, is not able to control IPM or arc VOLTS.</p>
<p>CONNECT FOR NEG. POLARITY</p>	<p>Reminds the operator to change the electrode polarity to negative when Innershield wire type is selected.</p>
<p>LOW LINE: CHECK RECONNECT PANEL</p> <p style="text-align: center;">↓</p> <p>PRESS ANY KEY TO STOP MESSAGE</p>	<p>Indicates to operator that the input line voltage is too low to obtain the output set on the machine. The operator can continue to weld, but the voltage will be less than what is set on the machine. This message occurs when the line voltage is less than 75% of nominal line or if the voltage level set on the machine is not obtainable at that line voltage and load current. The operator should check if the reconnect panel is wired properly. Lowering the set VOLTS and/or IPM can eliminate the message. Pressing any key or gun switch when the operator is not welding will stop the message from being displayed. Pressing any increment or decrement arrow keys or gun switch while welding will temporarily stop the message from being displayed (approximately 1.3 sec.) allowing the operator to view the increase or decrease in that setting.</p>



On Screen Error Message	Message Explanation
 <p>HIGH LINE: CHECK RECONNECT PANEL</p> <p>PRESS ANY KEY TO STOP MESSAGE</p>	<p>Indicates to operator that the line voltage is too high, and the output voltage has been reduced to protect the capacitor bank voltage rating limits. The operator can continue to weld, but the voltage will be less than what is set on the machine. This message occurs when the line voltage is greater than 121% of nominal line. The operator should check if the reconnect panel is wired properly. Pressing any key or gun switch when the operator is not welding will stop the message from being displayed. Pressing any increment or decrement arrow keys or gun switch while welding will temporarily stop the message from being displayed (approximately 1.3 sec.) allowing the operator to view the increase or decrease in that setting.</p>
 <p>CURRENT OVERLOAD REDUCE OUTPUT</p> <p>PRESS ANY KEY TO STOP MESSAGE</p>	<p>Indicates to operator that too much current is being drawn from the machine, and the output has been reduced to prevent the current from exceeding safe levels. This will typically occur in Manual mode using .045 (1.2mm) wire and WFS greater than 275 IPM (7.0m/min.). Lowering the WFS will reduce the output requirement and allow operation within the machine ratings. Pressing any key or gun switch when the operator is not welding will stop the message from being displayed. Pressing any increment or decrement arrow keys or gun switch while welding will temporarily stop the message from being displayed (approximately 1.3 sec.) allowing the operator to view the increase or decrease in that setting.</p>
<p>SXXXXX-X ROM ASSEMBLY</p>	<p>Only displayed at power-up. Displays the part number of the ROM ASSEMBLY currently on the PC board.</p>
<p>C SXXXXX-X ROM ASSEMBLY</p>	<p>Indicates a checksum error in the software. Turn power off and back on again. If this message persists, then replace the ROM assembly on the PC board.</p>
<p>R</p>	<p>Indicates a fault in system RAM. Turn power off and back on again. If this message persists, then replace the control PC board assembly.</p>
 <p>SPOOL GUN HAS BEEN CONNECTED</p> <p>PRESS MANUAL TO ENTER SETTINGS</p>	<p>Reminder that the Spool gun has been connected and the Manual key must be pressed to enter any Spool gun welding procedures.</p>
 <p>SPOOL GUN HAS BEEN REMOVED</p> <p>PRESS PROCESS TO ENTER SETTINGS</p>	<p>Reminder that the Spool gun has been removed and the Process key must be pressed to enter SP-255 weld settings. This message may also be displayed if there is an open lead in the spool gun 6 pin plug assembly.</p>

**DRIVE ROLL KITS**

Drive Rolls available to feed different sizes and types of electrode:

Drive Rolls	Drive Roll Part No.
Steel Wire Sizes: .025-.035" (0.6-0.9 mm) .030-.045" (0.8-1.2 mm) .045" Cored (1.2 mm)	KP674-035S KP674-045S KP674-045C
Aluminum Wire Sizes: 3/64" (1.2 mm)	KP674-3/64A

**3/64" (1.2 mm) ALUMINUM FEEDING KIT (K673-1)**

The kit provides gun and wire drive conversion parts to weld with 3/64" (1.2 mm) aluminum wire. 5356 alloy aluminum wire is recommended for best push feeding performance.

Kit includes drive roll and incoming guide tube for the wire drive, and a 45° gun tube, liner and two contact tips for the gun. Install per the S21529 Installation Instructions provided with the kit.

**8" SPOOL ADAPTER (K468)**

Permits use of 8" (200 mm) spools on the SP-255 spindle.

**DUAL CYLINDER MOUNTING KIT (K671-1)**

Permits stable side-by-side mounting of two full size (9" dia. x 5' high) gas cylinders, with "no-lift" loading. Simple installation with installation kick stand and easy instructions. Includes upper and lower cylinder supports, wheel axles and mounting hardware.

**SPOOL GUN DESCRIPTION**

The optional Magnum SG Spool gun is a lightweight, well-balanced, hand held semi-automatic wire feeder. It is available in two models, the K469-25 and the K487-25 with remote wire speed control.

**SPOOL GUN ADAPTER KIT (OPTIONAL K672-1)**

The K672-1 Spool Gun Adapter Kit provides recessed panel "up front" direct connection

for use of the K487 Spool Gun (with remote speed control), or the K469 Spool Gun (requires K518 Connection Adapter).

It also provides single switch transfer of Trigger and Wire Speed Controls between the 250SP gun or the spool gun for same polarity welding with different wire and gas processes.

The kit includes a spool gun adapter module assembly with plug for front installation and connects to the machine. Also includes a rear gas inlet fitting with hose, a gun and cable holder, mounting hardware, and installation and operation instructions. (L-9696).

For spool gun installation refer to L9696 instructions included with spool gun adapter kit (K672-1).

**⚠ CAUTION**

The spool gun module is intended for use with Lincoln Electric® Magnum™ Spool Guns only. Use with other units may cause damage to the equipment. For Spool Gun operation, refer to the instruction manual provided with the Magnum™ Spool Gun.

**MAKING A WELD WITH THE SPOOL GUN ADAPTER AND SPOOL GUN INSTALLED**

The toggle switch on the front of the spool gun adapter box permits quick transfer between the use of the SP-255 with its feeder gun and the connected spool gun for same polarity electrodes.

**⚠ CAUTION**

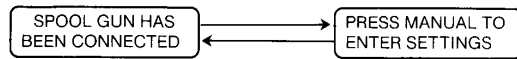
In either transfer switch position, closing the gun trigger will cause the electrode of both guns to be electrically "HOT". Be sure unused gun is positioned so that electrode or tip will not contact metal case or other metal common to work.

1. Transfer switch in FEEDER position:
  - a. Disables spool gun trigger, wire feed and gas output.

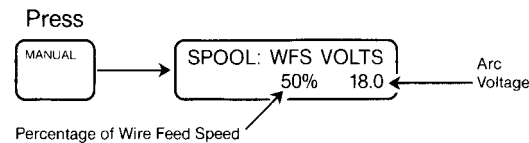


- b. Closing feeder gun trigger starts feeder gun welding and makes both electrodes electrically "HOT".
2. Transfer switch in SPOOL position:
- a. Disables feeder gun wire feed and gas output. However, closing feeder gun trigger will make both electrodes electrically "HOT" and activate spool gun gas output.
  - b. Closing spool gun trigger starts spool gun welding and makes both electrodes electrically "HOT".
3. Operation with SP-255:

- a. Turn the input power ON. With the transfer switch in SPOOL gun position, the display will flash the messages:



- b. Pressing the Manual key will change the display to the spool screen.



- c. Pressing the up or down arrow keys under volts on the display will increase or decrease your welding voltage.

The 1-99% on the display represents a percentage of wire feed speed. This is the set speed for the K469 spool gun and the maximum set speed for the K487 spool gun (with the remote control in gun handle at maximum). The remote control turned to minimum will give you approximately 50% of the maximum set WFS.

Left arrow keys — Do not function.

Center arrow keys — Increase (up arrow) or decrease (down arrow) percent of wire feed speed.

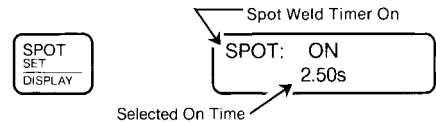
Right arrow keys — Increase (up arrow) or decrease (down arrow) arc voltage.

- d. Procedure settings may be stored in memory for later recall. (See "Memory Keys" in Operation section.)

4. The following procedure settings can be used as initial settings for making test welds to determine final settings:

Wire Diameter In. (mm)	WFS Setting	Arc Voltage Setting
.030 (0.8)	42%	15V
.035 (0.9)	39%	16V
3/64 (1.2)	32%	21V

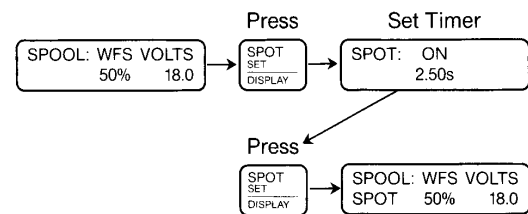
### SPOT KEY



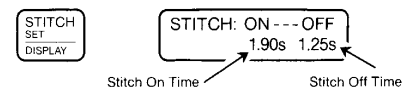
Anytime the Spot weld timer is on and the display is in Spool mode, the word SPOT will appear in the bottom left corner of the display.

### TYPICAL SPOT KEY PRESS SEQUENCE

Spool screen is displayed prior to pressing Spot key. Spot key is pressed, Spot On timer is activated and the display changes to Spot screen. Spot On timer can now be adjusted using the center arrow keys. Once the timer has been set, pressing the Spot key again returns the display to the original Spool screen with the Spot timer status indicated in the bottom left corner.



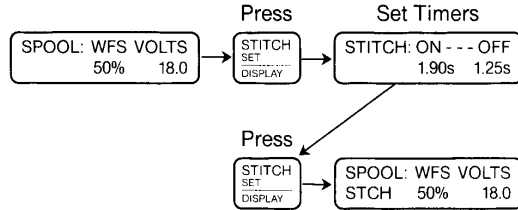
### STITCH KEY



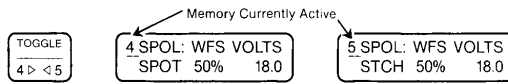
Anytime the Stitch weld timers are on and the display is in Spool mode, the abbreviation STCH will appear in the bottom left corner of the display.

## TYPICAL STITCH KEY PRESS SEQUENCE

Spool screen is displayed prior to pressing Stitch key. Stitch key is pressed, Stitch timers are activated and the display changes to Stitch screen. Stitch ON and OFF timers can now be adjusted using the center and right arrow keys. Once the timers have been set, pressing the Stitch key again returns the display to the original Spool screen with the Stitch timer status indicated in the bottom left corner.



## TOGGLE KEY

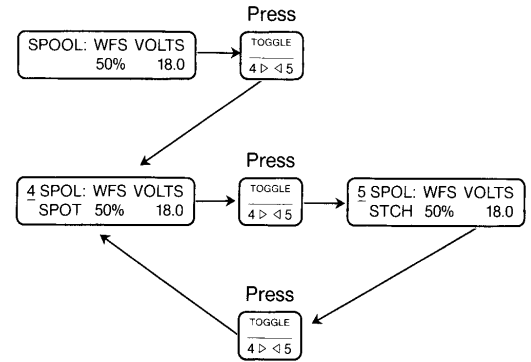


The first time this key is pressed it turns on toggle mode and recalls the setup in memory 4. This mode allows you to toggle between the setups in memory 4 and memory 5. Each time the key is pressed, it alternates between the two memories. The toggle screen displays the memory number the current setup was recalled from, indicates spool (SPOL:) mode, displays percentage of wire feed speed, and set arc voltage. The cursor underlines the memory number currently selected.

## TYPICAL TOGGLE KEY PRESS SEQUENCE

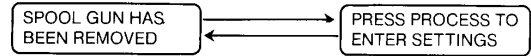
Spool screen is displayed prior to pressing Toggle key. Toggle key is pressed, memory 4 is recalled and appears on the display. The unit is now in toggle mode. Pressing the Toggle key again "toggles" the unit, and

memory 4 is recalled and appears on the display. This whole cycle is repeatable as long as the unit remains in Toggle mode.

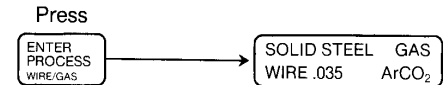


## DISABLING SPOOL GUN

When the Spool Gun Adapter box transfer switch is set to FEEDER Gun position, the display will flash between these two messages:



Pressing the Process key will return you to the last process entered before the Spool gun was attached.





## SAFETY PRECAUTIONS

### **WARNING**



**ELECTRIC SHOCK can kill.**

- **Have qualified personnel do the maintenance and trouble shooting work.**
- **Turn the input power off at the fuse box before working on equipment.**
- **Do not touch electrically hot parts..**

## ROUTINE MAINTENANCE

### 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 motors have sealed ball bearings which require no service.

### 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. Do not use solvents for cleaning the idle roll because it may wash the lubricant out of the bearing. All drive rolls 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 must be changed.

For instructions on replacing or changing drive roll, see "Wire Drive Roll" in Operation section or instruction decal inside the SP-255 door.

## GUN TUBES AND NOZZLES

1. Replace worn contact tips as required.
2. Remove spatter from inside of gas nozzle and from tip after each 10 minutes of arc time or as required.

## CABLE CLEANING

Clean cable liner after using approximately 300 pounds (136 kg) of electrode. Remove the cable from the wire feeder and 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 liner from the gas diffuser end.

### **CAUTION**

**Excessive pressure at the start may cause dirt to form a plug.**

Flex the cable over its entire length and gain blow out the cable. Repeat this procedure until no further dirt comes out.

## CONTACT TIP AND GAS NOZZLE INSTALLATION

1. Choose the correct size contact tip for the electrode being used (wire size is stencilled on the side of the contact tip) and screw it snugly into the gas diffuser.
2. Screw the appropriate fixed gas nozzle fully onto the diffuser. Either the standard .50" (12.7 mm) flush nozzle or other optional flush or recessed (spray arc) nozzle sizes may be used. (See Accessories section.)
3. Be sure the nozzle insulator is fully screwed onto the gun tube and does not block the gas holes in the diffuser.
4. If using an optional adjustable slip on nozzle, slip the appropriate gas nozzle onto the nozzle insulator. Either a standard .40" (12.7 mm) or optional .62" (15.9 mm) I.D. slip-on gas nozzle may be used and should be selected based on the welding application.

- Adjust the gas nozzle as appropriate for the GMAW process to be used. Typically, the contact tip end should be flush to .12" (3.2 mm) extended for the short-circuiting transfer process and .12" (3.2 mm) recessed for spray transfer.

## LINER REMOVAL AND REPLACEMENT

**NOTE:** Changing the liner for a different wire size requires replacement of the gas diffuser per the table below to properly secure the different liner.

Diameter of Electrodes Used	Replacement Liner Part Number	Size Stencilled on End of Liner Bushing	Fixed Nozzle Gas Diffuser Part No. (and Stencil)	Adjustable Nozzle Gas Diffuser Part No. (and Stencil)
.025-.030" Steel (0.6-0.8 mm)	M16087-2	.030" (0.8 mm)	S19418-3	S19418-2
.035-.045" Steel (0.9-1.2 mm)	M16087-1	.045" (1.2 mm)	S19418-3	S19418-1
3/64" Aluminum (1.2 mm)	M16107-1	(Plastic Liner)	S19418-3	S19418-1

## LINER REMOVAL, INSTALLATION, AND TRIMMING INSTRUCTIONS FOR MAGNUM 250SP

**NOTICE:** The variation in cable lengths prevents the interchangeability of liners between guns. Once a liner has been cut for a particular gun, it should not be installed in another gun unless it can meet the liner cutoff length requirement. Liners are shipped with the jacket of the liner extended the proper amount.

- Remove the gas nozzle (and nozzle insulator, if used) to locate the set screw in the gas diffuser which is used to hold the old liner in place. Loosen the set screw with a 5/64" (2.0 mm) Allen wrench.
- Remove the gas diffuser from the gun tube.
- Lay the gun and cable

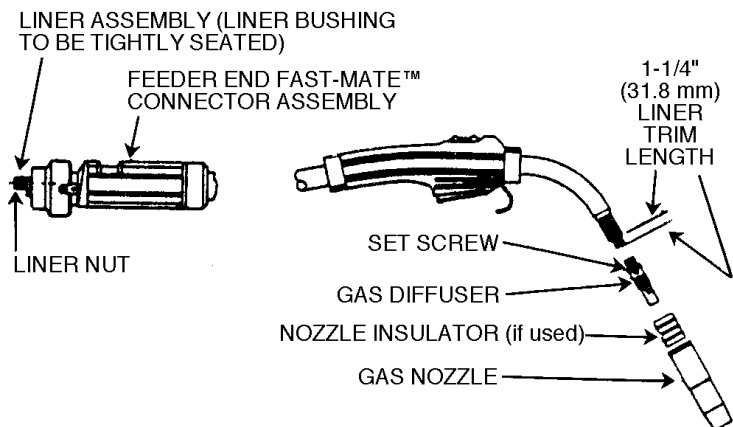
out straight on a flat surface. Remove the liner nut from the Fast-Mate™ connector end of the cable and pull the liner out of the cable.

- Insert a new untrimmed liner into the connector end of the cable. Be sure the liner busing is stencilled appropriately for the wire size being used.
- Fully seat the liner bushing into the connector. finger tighten the liner nut onto the cable connector. The gas diffuser, at this time, should **not** be installed onto the end of the gun tube.
- With the gas diffuser still removed from the gun tube, be sure the cable is straight, and then trim the liner to the length shown in Figure D.1. Remove any burrs from the end of the liner.
- Screw the diffuser onto the end of the gun tube and securely tighten. Be sure the gas diffuser is correct for the liner being used. (see table left and diffuser stencil.)
- Tighten the set screw in the side of the gas diffuser against the cable liner using a 5/64" (2.0 mm) Allen wrench.

### CAUTION

This screw should only be gently tightened. Overtightening will split or collapse the liner and cause poor wire feeding.

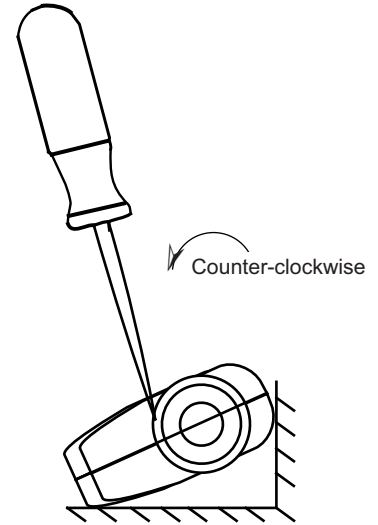
**FIGURE D.1**  
Liner trim length for the 250SP gun



## GUN HANDLE DISASSEMBLY

The internal parts of the gun handle may be inspected or serviced if necessary.

The gun handle consists of two halves that are held together with a collar on each end. To open up the handle, turn the collars approximately 60 degrees counterclockwise (the same direction as removing a right hand thread) until the collar reaches a stop. Then pull the collar off the gun handle. If the collars are difficult to turn, position the gun handle against a corner, place a screwdriver against the tab on the collar and give the screwdriver a sharp blow to turn the collar past an internal locking rib.



## MAGNUM 250SP GUN PARTS AND ACCESSORIES

Description	Part Number	English Size	Metric Size	
CABLE LINER For 15' (4.5 m) or shorter Cable	M16087-1	.025-.030"	0.6-0.8 mm	
	M16087-1 *	.035-.045"	0.9-1.2 mm	
	M17714-1 □	3/64" (Alum. wire)	1.2 mm (Alum. wire)	
CONTACT TIPS Standard Duty	S19391-6	.025"	0.6 mm	
	S19391-7	.030"	0.8 mm	
	S19391-1 *	.035"	0.9 mm	
	S19391-2 *	.045"	1.2 mm	
	Heavy Duty	S19392-1	.035"	0.9 mm
		S19292-2	.045"	1.2 mm
	Tapered	S19393-5	.025"	0.6 mm
		S19393-6	.030"	0.8 mm
		S19393-1	.035"	0.9 mm
	Tab (For Aluminum)	S19393-2	.045"	1.2 mm
		S18697-46 □	3/64 (Alum Wire)	1.2 mm
	GAS NOZZLES Fixed (Flush)	M16081-1	3/8"	9.5 mm
		M16081-2 *	1/2"	12.7 mm
M16081-3		5/8"	15.9 mm	
Fixed (Recessed)		M16080-1	3/8"	9.5 mm
		M16080-2	1/2"	12.7 mm
		M16080-3	5/8"	15.9 mm
Requires: Gas Diffuser As'bly		S19418-3	.025-.045	0.6-1.2 mm
Adjustable Slip-On		M16093-2	1/2"	12.7 mm
Requires: Nozzle Insulator As'bly		S19417-1		
Requires: Gas Diffuser As'bly		S19418-2	.025-.030"	0.6-0.8 mm
Gasless Nozzle (For Innershield)		S19418-1	.035-.045"	0.9-1.2 mm
		M16938 △		
GUN TUBE ASSEMBLIES Standard (60°)		S18920 *		
	S19890 □			
45°				

\* Included with Idealarc SP-255.

□ Included with K673-1 3/64" (1.2 mm) Aluminum Feeding kit.  
5356 alloy aluminum wire is recommended to alleviate potential soft wire feeding problems with push-type wire feeding.

△ Requires S19418-1 Gas Diffuser Assembly.





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## HOW TO USE TROUBLESHOOTING GUIDE

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### WARNING

This Troubleshooting Guide is designed to be used by the machine Owner/Operator. Unauthorized repairs performed on this equipment may result in danger to the technician and machine operator and will invalidate your factory warranty. For your safety, please observe all safety notes and precautions detailed in the Safety Section of this manual to avoid electrical shock or danger while troubleshooting this equipment.

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This Troubleshooting Guide is provided to help you locate and correct possible machine maladjustments. Simply follow the three-step procedure listed below.

**Step 1. LOCATE PROBLEM (SYMPTOM).** Look under the column labeled “PROBLEM (SYMPTOMS)”. This column describes possible symptoms that the machine may exhibit. Find the listing that best describes the symptom that your machine is exhibiting.

**Step 2. PERFORM EXTERNAL RECOMMENDED TESTS.**

The second column labeled “POSSIBLE AREAS OF MISADJUSTMENT(S)” lists the obvious external possibilities that may contribute to the machine symptom. Perform these tests/checks in the order listed. In general, these tests can be conducted without removing the case wrap-around cover.

**Step 3. CONSULT LOCAL AUTHORIZED FIELD SERVICE FACILITY.**

If you have exhausted all of the recommended tests in Step 2, consult your local Authorized Field Service facility.

### CAUTION

If for any reason you do not understand the test procedures or are unable to perform the tests/repairs safely, contact your **LOCAL AUTHORIZED LINCOLN ELECTRIC FIELD SERVICE FACILITY** for assistance before you proceed.

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## TROUBLESHOOTING GUIDE

Observe Safety Guidelines  
detailed in the beginning of this manual.

PROBLEMS (SYMPTOMS)	POSSIBLE AREAS OF MISADJUSTMENT(S)	RECOMMENDED COURSE OF ACTION
<b>OUTPUT PROBLEMS</b>		
Major physical or electrical damage is evident.	Contact your LOCAL LINCOLN AUTHORIZED FIELD SERVICE FACILITY.	If all recommended possible areas of misadjustment have been checked and the problem persists, <b>contact your local Lincoln Authorized Field Service Facility.</b>
There is no wire feed or open circuit voltage when the gun trigger is pulled. The LCD display is "ON" indicating input power to the SP-255..	<ol style="list-style-type: none"> <li>1. The gun trigger or cable may be faulty. check or replace gun assembly..</li> <li>2. The thermal protection circuit may be activated. Allow the machine to cool and then reduce the duty cycle and or wire feed speed.</li> <li>3. Make sure input voltage is correct and matches nameplate rating and reconnect panel configuration.</li> </ol>	
Output voltage and wire feed is present when gun trigger is not pulled (not activated).	<ol style="list-style-type: none"> <li>1. Remove gun assembly from machine. If problem is solved gun assembly is faulty. Repair or replace.</li> <li>2. If problem persists when gun assembly is removed from the machine, then the problem is within the SP-255.</li> </ol>	

 **CAUTION**

If for any reason you do not understand the test procedures or are unable to Perform the tests/repairs safely, contact your **LOCAL AUTHORIZED LINCOLN ELECTRIC FIELD SERVICE FACILITY** for assistance before you proceed.

Observe Safety Guidelines detailed in the beginning of this manual.

## TROUBLESHOOTING GUIDE

PROBLEMS (SYMPTOMS)	POSSIBLE AREAS OF MISADJUSTMENT(S)	RECOMMENDED COURSE OF ACTION
<b>OUTPUT PROBLEMS</b>		
<p>Machine does not put out full power. Welds are "cold".</p>	<ol style="list-style-type: none"> <li>1. If "HIGH LINE" or "LOW LINE" messages are displayed then check the input voltage. Make sure input voltage matches nameplate rating and reconnect panel configuration.</li> <li>2. Make sure settings for wire feed speed and voltage are correct for process being used.</li> <li>3. Make sure output polarity is correct for process being used.</li> <li>4. Check welding cables and gun assembly for loose or faulty connections.</li> </ol>	<p>If all recommended possible areas of misadjustment have been checked and the problem persists, <b>contact your local Lincoln Authorized Field Service Facility.</b></p>
<p>Poor arc striking with electrode sticking or blasting off.</p>	<ol style="list-style-type: none"> <li>1. Make sure settings for wire speed and voltage are correct for process being used.</li> <li>2. The Run-In (Fast or Slow) speed may be wrong for process and technique being used. See Operation section.</li> <li>3. The Start Voltage may be set wrong for process and technique being used. See Operation section.</li> <li>4. The gas shielding may be improper for process.</li> </ol>	

⚠ CAUTION

If for any reason you do not understand the test procedures or are unable to Perform the tests/repairs safely, contact your **LOCAL AUTHORIZED LINCOLN ELECTRIC FIELD SERVICE FACILITY** for assistance before you proceed.

## TROUBLESHOOTING GUIDE

Observe Safety Guidelines  
detailed in the beginning of this manual.

PROBLEMS (SYMPTOMS)	POSSIBLE AREAS OF MISADJUSTMENT(S)	RECOMMENDED COURSE OF ACTION
<b>OUTPUT PROBLEMS</b>		
<p>The welding arc is unstable or "hunting".</p>	<ol style="list-style-type: none"> <li>1. Check the work cable for loose or faulty connections.</li> <li>2. Check the contact tip and replace if worn or damaged.</li> <li>3. Make sure the welding polarity is correct for the process being used.</li> <li>4. Make sure the shielding gas is correct for the process being used.</li> <li>5. The gun and cable assembly may be faulty. Replace.</li> </ol>	<p>If all recommended possible areas of misadjustment have been checked and the problem persists, <b>contact your local Lincoln Authorized Field Service Facility.</b></p>

Observe Safety Guidelines detailed in the beginning of this manual.

## TROUBLESHOOTING GUIDE

PROBLEMS (SYMPTOMS)	POSSIBLE AREAS OF MISADJUSTMENT(S)	RECOMMENDED COURSE OF ACTION
<b>FUNCTION PROBLEMS</b>		
The SP-255 stops feeding wire while welding and the MOTOR OVERLOADED message appears on the LCD display.	<ol style="list-style-type: none"> <li>1. Check for any restriction in the wire feeding path.</li> <li>2. Make sure the correct size contact tip, gun liner and drive rolls are being used.</li> </ol>	<p>If all recommended possible areas of misadjustment have been checked and the problem persists, <b>contact your local Lincoln Authorized Field Service Facility.</b></p>
The voltage and/or wire feed speed are being changed even though the gun thumbswitch or front panel arrow keys are not activated.	<ol style="list-style-type: none"> <li>1. The thumbswitch circuit in the gun and cable assembly may be faulty. Repair or replace.</li> </ol>	
The LCD display is not readable even though the backlighting is functioning.	<ol style="list-style-type: none"> <li>1. There may have been an internal system "fault". Turn input power off for a few seconds. Turn power back on and check for proper machine operation.</li> <li>2. Check the input voltage. Make sure the input voltage matches the nameplate rating and the reconnect panel configuration.</li> </ol>	
Error messages or alarm continuously beeps in bursts of three.	<ol style="list-style-type: none"> <li>1. There may be an error in the system or the keypad entry. See Explanation of Prompting and Error Messages in the Operation section.</li> </ol>	

Observe Safety Guidelines detailed in the beginning of this manual.

## TROUBLESHOOTING GUIDE

PROBLEMS (SYMPTOMS)	POSSIBLE AREAS OF MISADJUSTMENT(S)	RECOMMENDED COURSE OF ACTION
<b>FEEDING PROBLEMS</b>		
Rough wire feeding or wire will not feed but drive rolls are turning.	<ol style="list-style-type: none"> <li>1. The gun cable may be kinked or twisted.</li> <li>2. The wire may be jammed in the gun cable, or gun cable may be dirty.</li> <li>3. Check drive roll tension and position of grooves.</li> <li>4. Check for worn or loose drive roll.</li> <li>5. The electrode may be rusty or dirty.</li> <li>6. Check for damaged or incorrect contact tip.</li> </ol>	<p>If all recommended possible areas of misadjustment have been checked and the problem persists, <b>contact your local Lincoln Authorized Field Service Facility.</b></p>
There is no wire feed but arc voltage is present.	<ol style="list-style-type: none"> <li>1. If the drive rolls are turning check the drive roll tension. Check for restrictions in the wire feeding path.</li> <li>2. If the drive rolls are not turning when the gun trigger is pulled there is a problem within the SP-255.</li> <li>3. If using a Spool Gun adapter kit, make sure transfer switch is in the correct position.</li> </ol>	

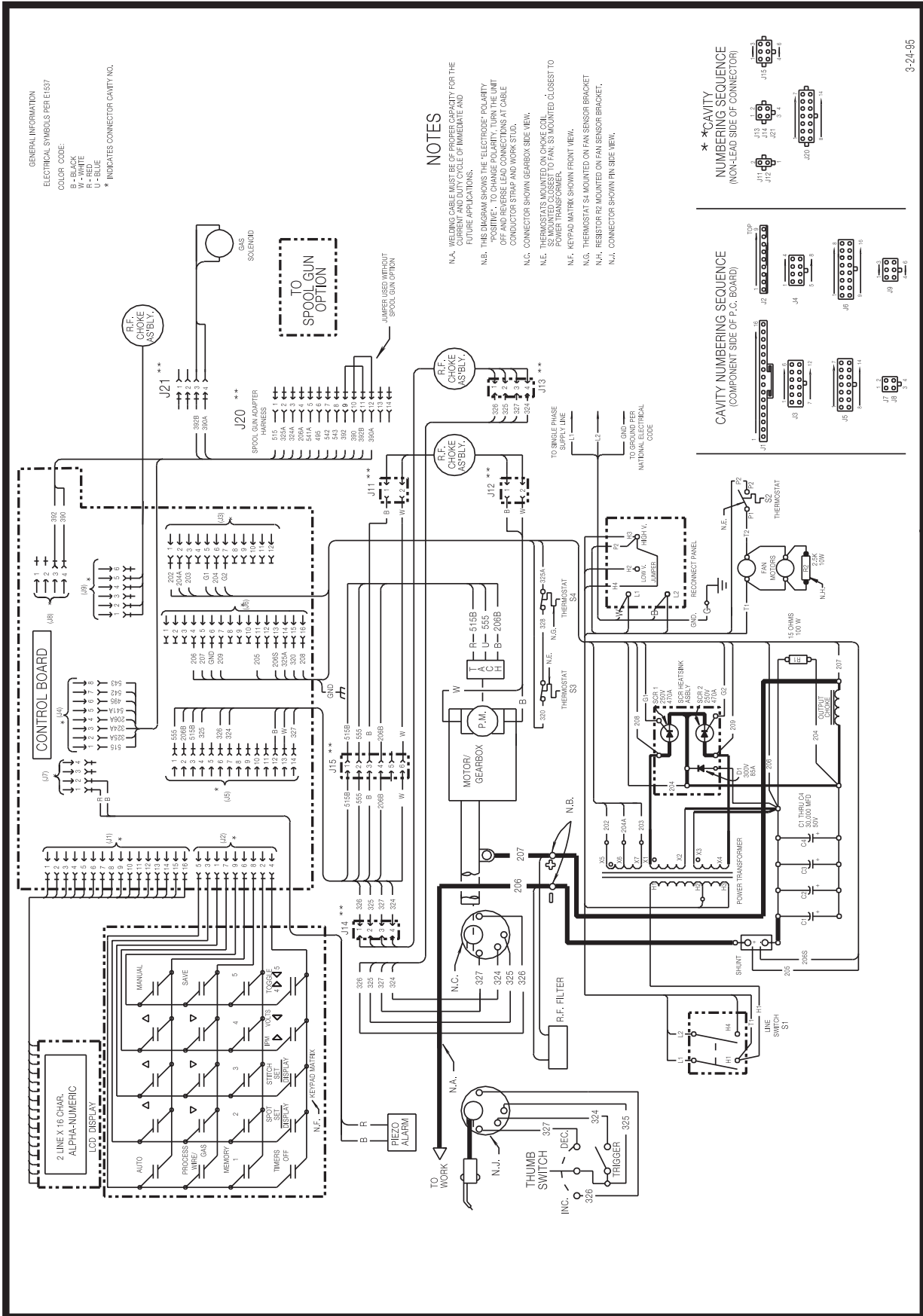
PROBLEMS (SYMPTOMS)	POSSIBLE AREAS OF MISADJUSTMENT(S)	RECOMMENDED COURSE OF ACTION
<b>GAS FLOW PROBLEMS</b>		
Gas does not flow when gun trigger is pulled.	<ol style="list-style-type: none"> <li>1. The Process gas type may be set to NONE for Innershield. Press Process key and enter correct process including gas.</li> <li>2. Make sure gas supply is connected properly and turned "on".</li> <li>3. If the gas solenoid does actuate when the gun trigger is pulled there may be a restriction in the gas supply line.</li> <li>4. The gun cable assembly may be faulty. Check or replace.</li> <li>5. If using a Spool Gun adapter kit, make sure transfer switch is in the correct position.</li> </ol>	<p>If all recommended possible areas of misadjustment have been checked and the problem persists, <b>contact your local Lincoln Authorized Field Service Facility.</b></p>

 **CAUTION**

If for any reason you do not understand the test procedures or are unable to Perform the tests/repairs safely, contact your **LOCAL AUTHORIZED LINCOLN ELECTRIC FIELD SERVICE FACILITY** for assistance before you proceed.

SP-255 WIRING DIAGRAM: L9688 (DUAL VOLTAGE)

SP - 255 (DUAL VOLTAGE)



3-24-95

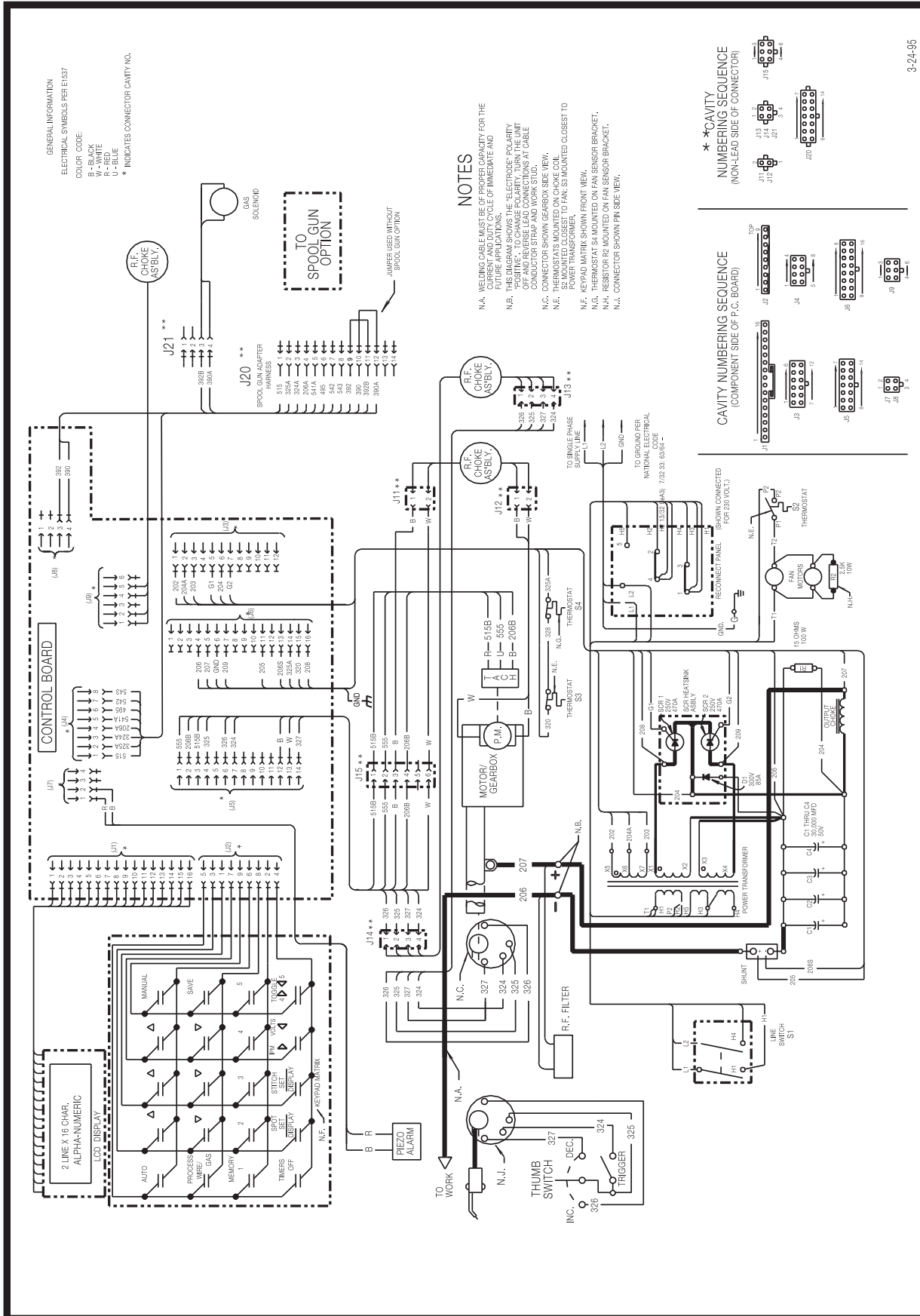
L9688

NOTE: This diagram is for reference only. It may not be accurate for all machines covered by this manual. The specific diagram for a particular code is pasted inside the machine on one of the enclosure panels.



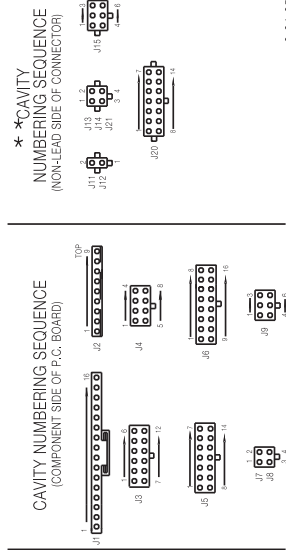
SP-255 WIRING DIAGRAM: L9689 (230/460/575V)

SP-255 (230 / 460 / 575V)



GENERAL INFORMATION  
ELECTRICAL SYMBOLS PER E I 517  
COLOR CODE:  
B - BLACK  
W - WHITE  
R - RED  
U - BLUE  
\* INDICATES CONNECTOR CAVITY NO.

NOTES  
N.A. WELDING CABLE MUST BE OF PROPER CAPACITY FOR THE CURRENT AND DUTY CYCLE OF IMMEDIATE AND FUTURE APPLICATIONS.  
N.B. ALWAYS DISCONNECT THE EXPOSURE POLARITY SWITCH TO CHARGE POLARITY. TURN THE LIMIT OFF AND REVERSE LEAD CONNECTIONS AT CABLE CONDUCTOR STRAP AND WORK STUD.  
N.C. CONNECTOR SHOWN GEARBOX SIDE VIEW.  
N.E. CONNECTOR SHOWN FRONT SIDE VIEW.  
N.F. KEYPAD MATRIX SHOWN FRONT VIEW.  
N.G. THERMISTAT S4 MOUNTED ON FAN SENSOR BRACKET.  
N.H. RESISTOR R2 MOUNTED ON FAN SENSOR BRACKET.  
N.I. CONNECTOR SHOWN PIN SIDE VIEW.

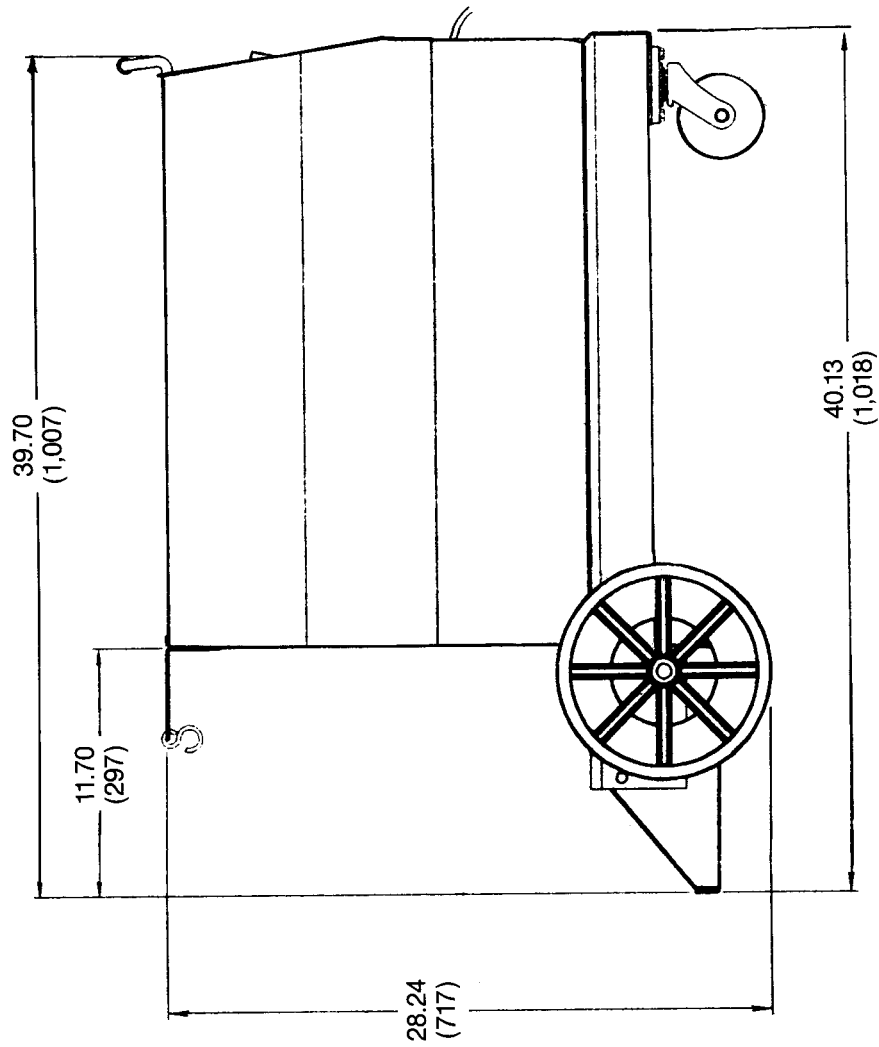
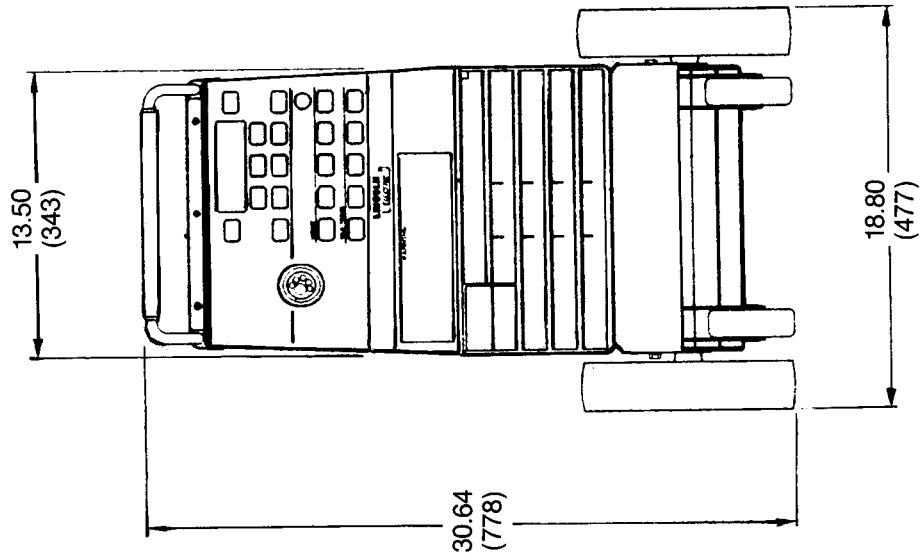


3-24-95

L9689

NOTE: This diagram is for reference only. It may not be accurate for all machines covered by this manual. The specific diagram for a particular code is pasted inside the machine on one of the enclosure panels.

SP-255 DIMENSION PRINT – M16352 (1-31-92B)



Inches (Millimeters)

# NOTES

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# NOTES

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# NOTES

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# NOTES

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<b>WARNING</b>	<ul style="list-style-type: none"> <li>Do not touch electrically live parts or electrode with skin or wet clothing.</li> <li>Insulate yourself from work and ground.</li> </ul>	<ul style="list-style-type: none"> <li>Keep flammable materials away.</li> </ul>	<ul style="list-style-type: none"> <li>Wear eye, ear and body protection.</li> </ul>
Spanish <b>AVISO DE PRECAUCION</b>	<ul style="list-style-type: none"> <li>No toque las partes o los electrodos bajo carga con la piel o ropa mojada.</li> <li>Aislese del trabajo y de la tierra.</li> </ul>	<ul style="list-style-type: none"> <li>Mantenga el material combustible fuera del área de trabajo.</li> </ul>	<ul style="list-style-type: none"> <li>Protéjase los ojos, los oídos y el cuerpo.</li> </ul>
French <b>ATTENTION</b>	<ul style="list-style-type: none"> <li>Ne laissez ni la peau ni des vêtements mouillés entrer en contact avec des pièces sous tension.</li> <li>Isolez-vous du travail et de la terre.</li> </ul>	<ul style="list-style-type: none"> <li>Gardez à l'écart de tout matériel inflammable.</li> </ul>	<ul style="list-style-type: none"> <li>Protégez vos yeux, vos oreilles et votre corps.</li> </ul>
German <b>WARNUNG</b>	<ul style="list-style-type: none"> <li>Berühren Sie keine stromführenden Teile oder Elektroden mit Ihrem Körper oder feuchter Kleidung!</li> <li>Isolieren Sie sich von den Elektroden und dem Erdboden!</li> </ul>	<ul style="list-style-type: none"> <li>Entfernen Sie brennbares Material!</li> </ul>	<ul style="list-style-type: none"> <li>Tragen Sie Augen-, Ohren- und Körperschutz!</li> </ul>
Portuguese <b>ATENÇÃO</b>	<ul style="list-style-type: none"> <li>Não toque partes elétricas e electrodos com a pele ou roupa molhada.</li> <li>Isole-se da peça e terra.</li> </ul>	<ul style="list-style-type: none"> <li>Mantenha inflamáveis bem guardados.</li> </ul>	<ul style="list-style-type: none"> <li>Use proteção para a vista, ouvido e corpo.</li> </ul>
Japanese <b>注意事項</b>	<ul style="list-style-type: none"> <li>通電中の電気部品、又は溶材にヒフやぬれた布で触れないこと。</li> <li>施工物やアースから身体が絶縁されている様にして下さい。</li> </ul>	<ul style="list-style-type: none"> <li>燃えやすいものの側での溶接作業は絶対にしてはなりません。</li> </ul>	<ul style="list-style-type: none"> <li>目、耳及び身体に保護具をして下さい。</li> </ul>
Chinese <b>警告</b>	<ul style="list-style-type: none"> <li>皮肤或湿衣物切勿接触带电部件及焊条。</li> <li>使你自已与地面和工作件绝缘。</li> </ul>	<ul style="list-style-type: none"> <li>把一切易燃物品移离工作场所。</li> </ul>	<ul style="list-style-type: none"> <li>佩戴眼、耳及身体劳动保护用具。</li> </ul>
Korean <b>위험</b>	<ul style="list-style-type: none"> <li>전도체나 용접봉을 젖은 형갑 또는 피부로 절대 접촉치 마십시오.</li> <li>모재와 접지를 접촉치 마십시오.</li> </ul>	<ul style="list-style-type: none"> <li>인화성 물질을 접근시키지 마십시오.</li> </ul>	<ul style="list-style-type: none"> <li>눈, 귀와 몸에 보호장구를 착용하십시오.</li> </ul>
Arabic <b>تحذير</b>	<ul style="list-style-type: none"> <li>لا تلمس الاجزاء التي يسري فيها التيار الكهربائي أو الألكترود بجسدك أو بالملابس المبللة بالماء.</li> <li>ضع عازلا على جسمك خلال العمل.</li> </ul>	<ul style="list-style-type: none"> <li>ضع المواد القابلة للاشتعال في مكان بعيد.</li> </ul>	<ul style="list-style-type: none"> <li>ضع أدوات وملابس واقية على عينيك وأذنيك وجسمك.</li> </ul>

READ AND UNDERSTAND THE MANUFACTURER'S INSTRUCTION FOR THIS EQUIPMENT AND THE CONSUMABLES TO BE USED AND FOLLOW YOUR EMPLOYER'S SAFETY PRACTICES.

SE RECOMIENDA LEER Y ENTENDER LAS INSTRUCCIONES DEL FABRICANTE PARA EL USO DE ESTE EQUIPO Y LOS CONSUMIBLES QUE VA A UTILIZAR, SIGA LAS MEDIDAS DE SEGURIDAD DE SU SUPERVISOR.

LISEZ ET COMPRENEZ LES INSTRUCTIONS DU FABRICANT EN CE QUI REGARDE CET EQUIPMENT ET LES PRODUITS A ETRE EMPLOYES ET SUIVEZ LES PROCEDURES DE SECURITE DE VOTRE EMPLOYEUR.

LESEN SIE UND BEFOLGEN SIE DIE BETRIEBSANLEITUNG DER ANLAGE UND DEN ELEKTRODENEINSATZ DES HERSTELLERS. DIE UNFALLVERHÜTUNGSVORSCHRIFTEN DES ARBEITGEBERS SIND EBENFALLS ZU BEACHTEN.

			
<ul style="list-style-type: none"> <li>● Keep your head out of fumes.</li> <li>● Use ventilation or exhaust to remove fumes from breathing zone.</li> </ul>	<ul style="list-style-type: none"> <li>● Turn power off before servicing.</li> </ul>	<ul style="list-style-type: none"> <li>● Do not operate with panel open or guards off.</li> </ul>	<b>WARNING</b>
<ul style="list-style-type: none"> <li>● Los humos fuera de la zona de respiración.</li> <li>● Mantenga la cabeza fuera de los humos. Utilice ventilación o aspiración para gases.</li> </ul>	<ul style="list-style-type: none"> <li>● Desconectar el cable de alimentación de poder de la máquina antes de iniciar cualquier servicio.</li> </ul>	<ul style="list-style-type: none"> <li>● No operar con panel abierto o guardas quitadas.</li> </ul>	Spanish <b>AVISO DE PRECAUCION</b>
<ul style="list-style-type: none"> <li>● Gardez la tête à l'écart des fumées.</li> <li>● Utilisez un ventilateur ou un aspirateur pour ôter les fumées des zones de travail.</li> </ul>	<ul style="list-style-type: none"> <li>● Débranchez le courant avant l'entretien.</li> </ul>	<ul style="list-style-type: none"> <li>● N'opérez pas avec les panneaux ouverts ou avec les dispositifs de protection enlevés.</li> </ul>	French <b>ATTENTION</b>
<ul style="list-style-type: none"> <li>● Vermeiden Sie das Einatmen von Schweißrauch!</li> <li>● Sorgen Sie für gute Be- und Entlüftung des Arbeitsplatzes!</li> </ul>	<ul style="list-style-type: none"> <li>● Strom vor Wartungsarbeiten abschalten! (Netzstrom völlig öffnen; Maschine anhalten!)</li> </ul>	<ul style="list-style-type: none"> <li>● Anlage nie ohne Schutzgehäuse oder Innenschutzverkleidung in Betrieb setzen!</li> </ul>	German <b>WARNUNG</b>
<ul style="list-style-type: none"> <li>● Mantenha seu rosto da fumaça.</li> <li>● Use ventilação e exaustão para remover fumo da zona respiratória.</li> </ul>	<ul style="list-style-type: none"> <li>● Não opere com as tampas removidas.</li> <li>● Desligue a corrente antes de fazer serviço.</li> <li>● Não toque as partes elétricas nuas.</li> </ul>	<ul style="list-style-type: none"> <li>● Mantenha-se afastado das partes moventes.</li> <li>● Não opere com os painéis abertos ou guardas removidas.</li> </ul>	Portuguese <b>ATENÇÃO</b>
<ul style="list-style-type: none"> <li>● ヒュームから頭を離すようにして下さい。</li> <li>● 換気や排煙に十分留意して下さい。</li> </ul>	<ul style="list-style-type: none"> <li>● メンテナンス・サービスに取りかかる際には、まず電源スイッチを必ず切ってください。</li> </ul>	<ul style="list-style-type: none"> <li>● パネルやカバーを取り外したまま機械操作をしないで下さい。</li> </ul>	Japanese <b>注意事項</b>
<ul style="list-style-type: none"> <li>● 頭部遠離煙霧。</li> <li>● 在呼吸區使用通風或排風器除煙。</li> </ul>	<ul style="list-style-type: none"> <li>● 維修前切斷電源。</li> </ul>	<ul style="list-style-type: none"> <li>● 儀表板打開或沒有安全罩時不準作業。</li> </ul>	Chinese <b>警告</b>
<ul style="list-style-type: none"> <li>● 얼굴로부터 용접가스를 멀리하십시오.</li> <li>● 호흡지역으로부터 용접가스를 제거하기 위해 가스제거기나 통풍기를 사용하십시오.</li> </ul>	<ul style="list-style-type: none"> <li>● 보수전에 전원을 차단하십시오.</li> </ul>	<ul style="list-style-type: none"> <li>● 판넬이 열린 상태로 작동치 마십시오.</li> </ul>	Korean <b>위험</b>
<ul style="list-style-type: none"> <li>● ابعد رأسك بعيداً عن الدخان.</li> <li>● استعمل التهوية أو جهاز ضغط الدخان للخارج لكي تبعد الدخان عن المنطقة التي تتنفس فيها.</li> </ul>	<ul style="list-style-type: none"> <li>● أقطع التيار الكهربائي قبل القيام بأية صيانة.</li> </ul>	<ul style="list-style-type: none"> <li>● لا تشغيل هذا الجهاز اذا كانت الاغطية الحديدية الواقية ليست عليه.</li> </ul>	Arabic <b>تحذير</b>

LEIA E COMPREENDA AS INSTRUÇÕES DO FABRICANTE PARA ESTE EQUIPAMENTO E AS PARTES DE USO, E SIGA AS PRÁTICAS DE SEGURANÇA DO EMPREGADOR.

使う機械や溶材のメーカーの指示書をよく読み、まず理解して下さい。そして貴社の安全規定に従って下さい。

請詳細閱讀並理解製造廠提供的說明以及應該使用的銀焊材料，並請遵守貴方的有關於勞動保護規定。

이 제품에 동봉된 작업지침서를 숙지하시고 귀사의 작업자 안전수칙을 준수하시기 바랍니다.

اقرأ بتمعن وافهم تعليمات المصنع المنتج لهذه المعدات والمواد قبل استعمالها واتبع تعليمات الوقاية لصاحب العمل.

# LIMITED WARRANTY

## STATEMENT OF LIMITED WARRANTY

The Lincoln Electric Company (Lincoln) warrants to the end user (purchaser) of all new welding and cutting equipment, electrode and flux (collectively called the "Goods") that it will be free of defects in workmanship and material.

This warranty is void if Lincoln or its Authorized Service Facility finds that the equipment has been subjected to improper installation, improper care or abnormal operations.

## WARRANTY PERIOD <sup>(1)</sup> <sup>(2)</sup> <sup>(3)</sup>

Lincoln will assume both the parts and labor expense of correcting defects during the full warranty period. All warranty periods date from the date of purchase to the original end user and are as follows:

### 7 Years

- Main power rectifiers on all non-inverter low frequency (50 and 60 Hz) type welders.

### 3 Years

- All Lincoln welding machines, wirefeeders and plasma cutting machines unless listed below.

### 2 Years

- Power Arc 5000  
Ranger 10, Ranger 10-LX  
Weldanpower 125, Weldanpower 150

### 1 Year

- AC-100  
Invertec V100-S, Invertec V130-S, Invertec V200-T  
Power Arc 4000  
Pro-Cut 20

- All water coolers (internal or external models)
- All stick electrode, welding wire and flux.
- Arc welding and cutting robots and robotic controllers
- All Environmental Systems equipment, including portable units, central units, gun and cable assemblies and accessories. (Does not include consumable items listed under 30 day warranty.)
- All welding and cutting accessories including gun and cable assemblies, TIG and plasma torches, spool guns, wire feed modules, undercarriages, field installed options that are sold separately, unattached options, welding supplies, standard accessory sets, replacement parts, and Magnum products. (Does not include expendable parts listed under 30 day warranty)

### 30 Days

- All consumable items that may be used with the environmental systems described above. This includes hoses, filters, belts and hose adapters.
- Expendable Parts - Lincoln is not responsible for the replacement of any expendable part that is required due to normal wear.

## CONDITIONS OF WARRANTY

### TO OBTAIN WARRANTY COVERAGE:

The purchaser must contact Lincoln or Lincoln's Authorized Service Facility about any defect claimed under Lincoln's warranty.

Determination of warranty on welding and cutting equipment will be made by Lincoln or Lincoln's Authorized Service Facility.

### WARRANTY REPAIR:

If Lincoln or Lincoln's Authorized Service Facility confirms the existence of a defect covered by this warranty, the defect will be corrected by repair or replacement at Lincoln's option.

At Lincoln's request, the purchaser must return, to Lincoln or its Authorized Service Facility, any "Goods" claimed defective under Lincoln's warranty.

### FREIGHT COSTS:

The purchaser is responsible for shipment to and from the Lincoln Authorized Service Facility.

### WARRANTY LIMITATIONS

Lincoln will not accept responsibility or liability for repairs made outside of a Lincoln Authorized Service Facility.

Lincoln's liability under this warranty shall not exceed the cost of correcting the defect of the Lincoln product.

Lincoln will not be liable for incidental or consequential damages (such as loss of business, etc.) caused by the defect or the time involved to correct the defect.

This written warranty is the only express warranty provided by Lincoln with respect to its products. Warranties implied by law such as the warranty of merchantability are limited to the duration of this limited warranty for the equipment involved.

This warranty gives the purchaser specific legal rights. The purchaser may also have other rights which vary from state to state.

<sup>(1)</sup> Equipment manufactured for the Lincoln Electric Company is subject to the warranty period of the original manufacturer.

<sup>(2)</sup> All engines and engine accessories are warranted by the engine or engine accessory manufacturer and are not covered by this warranty.

<sup>(3)</sup> SAE400 WELD N' AIR compressor is warranted by the compressor manufacturer and not covered by this warranty.



Dec, '97

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