WELD-PAK™ 125

IM470
April, 1996

For use with machines having Code Numbers above 9900.

This manual covers equipment which is obsolete and no longer in production by The Lincoln Electric Co. Specifications and availability of optional features may have changed.

IM470
Weld-Pak 125
April, 1996
9966

Safety Depends on You

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

Damage Claims

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

OPERATOR'S MANUAL

World's Leader in Welding and Cutting Products
LINCOLN® ELECTRIC
Premier Manufacturer of Industrial Motors
Sales and Service through Subsidiaries and Distributors Worldwide
22801 St. Clair Ave. Cleveland, Ohio 44117-1199 U.S.A. Tel. (216) 481-8100

⚠ WARNING

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.

ELECTRIC SHOCK can kill.

1.a. The electrode and work (or ground) circuits are electrically "hot" when the welder is on. Do not touch these "hot" parts with your bare skin or wet clothing. Wear dry, hole-free gloves to insulate hands.

1.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.**

1.c. In semiautomatic or automatic wire welding, the electrode, electrode reel, welding head, nozzle or semiautomatic welding gun are also electrically "hot".

1.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.

1.e. Ground the work or metal to be welded to a good electrical (earth) ground.

1.f. Maintain the electrode holder, work clamp, welding cable and welding machine in good, safe operating condition. Replace damaged insulation.

1.g. Never dip the electrode in water for cooling.

1.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.

1.i. When working above floor level, use a safety belt to protect yourself from a fall should you get a shock.

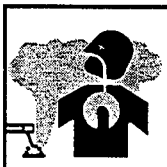
1.j. Also see Items 4.c. and 6.

ARC RAYS can burn.

2.a. Use a shield with the proper filter and cover plates to protect your eyes from sparks and the rays of the arc when welding or observing open arc welding. Headshield and filter lens should conform to ANSI Z87. I standards.

2.b. Use suitable clothing made from durable flame-resistant material to protect your skin and that of your helpers from the arc rays.

2.c. Protect other nearby personnel with suitable non-flammable screening and/or warn them not to watch the arc nor expose themselves to the arc rays or to hot spatter or metal.



FUMES AND GASES can be dangerous.

3.a. Welding may produce fumes and gases hazardous to health. Avoid breathing these fumes and gases.When welding, keep your head out of the fume. Use enough ventilation and/or exhaust at the arc to keep fumes and gases away from the breathing zone. **When welding 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.**

3.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.

3.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.

3.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.

3.e. Also see item 7b.

WELDING SPARKS can cause fire or explosion.

4.a..Remove fire hazards from the welding area. If this is not possible, cover them to prevent the welding sparks from starting a fire. Remember that welding sparks and hot materials from welding can easily go through small cracks and openings to adjacent areas. Avoid welding near hydraulic lines. Have a fire extinguisher readily available.

4.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.

4.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.

4.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).

4.e. Vent hollow castings or containers before heating, cutting or welding. They may explode.

4.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.

4.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.

4.h. Also see item 7c.

CYLINDER may explode if damaged.

5.a. Use only compressed gas cylinders containing the correct shielding gas for the process used and properly operating regulators designed for the gas and pressure used. All hoses, fittings, etc. should be suitable for the application and maintained in good condition.

5.b. Always keep cylinders in an upright position securely chained to an undercarriage or fixed support.

5.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.

5.d. Never allow the electrode, electrode holder or any other electrically "hot" parts to touch a cylinder.

5.e. Keep your head and face away from the cylinder valve outlet when opening the cylinder valve.

5.f. Valve protection caps should always be in place and hand tight except when the cylinder is in use or connected for use.

5.g. Read and follow the instructions on compressed gas cylinders, associated equipment, and CGA publication P-I, "Precautions for Safe Handling of Compressed Gases in Cylinders,"available from the Compressed Gas Association 1235 Jefferson Davis Highway, Arlington, VA 22202.

FOR ELECTRICALLY powered equipment.

6.a. Turn off input power using the disconnect switch at the fuse box before working on the equipment.

6.b. Install equipment in accordance with the U.S. National Electrical Code, all local codes and the manufacturer's recommendations.

6.c. Ground the equipment in accordance with the U.S. National Electrical Code and the manufacturer's recommendations.

FOR ENGINE powered equipment.

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

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

7.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.

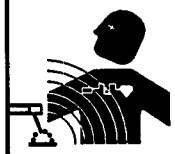
7.d. Keep all equipment safety guards, covers and devices in position and in good repair. Keep hands, hair, clothing and tools away from V-belts, gears, fans and all other moving parts when starting, operating or repairing equipment.

7.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.

7.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.

7.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.

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



ELECTRIC AND MAGNETIC FIELDS may be dangerous

8.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.

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

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

8d. All welders should use the following procedures in order to minimize exposure to EMF fields from the welding circuit:

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

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

8.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.

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

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

PRÉCAUTIONS DE SÛRETÉ

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

Sûreté Pour Soudage A L'Arc

1. Protegez-vous contre la secousse électrique:

   a. Les circuits à l'électrode et à la piéce 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 vétements mouillés. Porter des gants secs et sans trous pour isoler les mains.

   b. Faire trés attention de bien s'isoler de la masse quand on soude dans des endroits humides, ou sur un plancher metallique ou des grilles metalliques, 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 defonctionnement.

   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 precautions pour le porte-électrode s'applicuent 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 ou on recoit 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 soliel, 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 lateraux 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 une endroit isolé de la masse. Un court-circuit accidental peut provoquer un échauffement et un risque d'incendie.

8. S'assurer que la masse est connectée le plus prés 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 chaines de levage, câbles de grue, ou autres circuits. Cela peut provoquer des risques d'incendie ou d'echauffement des chaines et des câbles jusqu'à ce qu'ils se rompent.

9. Assurer une ventilation suffisante dans la zone de soudage. Ceci est particuliérement important pour le soudage de tôles galvanisées plombées, ou cadmiées ou tout autre métal qui produit des fumeés 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 phosgéne (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 chassis du poste conformement au code de l'électricité et aux recommendations du fabricant. Le dispositif de montage ou la piece 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 faires des travaux à l'interieur de poste, la debrancher à l'interrupteur à la boite de fusibles.

4. Garder tous les couvercles et dispositifs de sûreté à leur place.

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THANK YOU for selecting a Lincoln Electric Company product. We want you to have pride in owning a Lincoln product... proud as we are in bringing this product to you.

PRODUCT DESCRIPTION

The WELD-PAK 125 is a compact, lightweight, and portable wire feeder/power source. It has been designed for workshop, hobby, and light maintenance applications, and is capable of general purpose welding with self-shielded flux-cored (Innershield®) wire or solid wire electrode. The use of solid wire requires a supply of weld shielding gas, and the optional K610-2 MIG conversion kit for the WELD-PAK 125.

The WELD-PAK 125 operates on 208/230 volt 60 Hz AC input power, making it easy to install. A convenient chart is located on the inside of the wire feed section door to aid in setting welding procedures. It has been designed for dependable service and long life.

RECOMMENDED PROCESSES AND EQUIPMENT

The WELD-PAK 125 can be used for welding mild steel using the self-shielded (FCAW) Innershield® process or it can be used for the GMAW (MIG) single pass process which requires a supply of shielding gas and the installation of the gas solenoid included in the K610-2 MIG Conversion Kit for the WELD-PAK 125. It will feed .035″ (0.9mm) Innershield flux-cored wire electrode or .023″ through .030″ (0.6 through 0.8mm) solid wire electrode.

The recommended electrode for the self-shielded process is .035″ (0.9mm) diameter Lincoln Innershield NR-211-MP supplied on 1 lb. (.45kg) and 10 lb. (4.5kg) spools. This electrode can be used with the WELD-PAK 125 for welding 20 gauge through 9 gauge (1.0-3.9mm) steel. The .035″ (0.9mm) NR-211-MP can also be used for the welding of galvanized coated sheet metal.

The recommended electrode for the GMAW process is .025″ (0.6mm) diameter L-56 mild steel welding wire, supplied on 2 lb. (.90kg) spools and 12½ lb. (5.7kg) spools. This solid wire electrode can be used with the WELD-PAK 125 to weld 24 gauge through 12 gauge (0.6-2.5mm) steel.

The recommended gases for the GMAW process are welding grade CO_2 gas or an argon-CO_2 blended gas (75 to 80% argon and 25 to 20% CO_2). The blended gas is recommended for welding on heavier steel, 14 gauge (2.0mm), for example.

A comparison of the two processes is at the bottom of this page.

SPECIFICATIONS

TYPE	(K609-1) WELD-PAK 125	
Input Power (AC Only) at Rated DC Output	230 Volts 60 Hz 20 amps	208 Volts 60 Hz 22 amps
Rated DC Output	130 amps @ 20 V 30% Duty Cycle	130 amps @ 20V 25% Duty Cycle
Maximum Open Circuit Voltage (DC)	33 Volts	
Wire Speed Range	50 to 400 in/min (1.3 to 10.2m/min)	
Wire Sizes	.035″ (0.9mm) Flux-Cored .023″ (0.6mm) through .030″ (0.8mm) Solid Steel	
Spool Sizes	8″ OD x 2″ ID x 2.2″ wide (200mm OD x 51mm ID x 55mm wide) 4″ OD x 5/8″ ID x 1.7″ wide (100mm OD x 16mm ID x 43mm wide)	
Weight: Welder Shipping	57 lbs. (25.9kg) 60 lbs. (27.3kg)	
Dimensions H x W x D Less Handle	12″ x 9¾″ x 16½″ (305mm x 248mm x 419mm)	

Electrode Wire	.035″ (0.9mm) Dia. NR-211-MP Innershield (FCAW)[1]	.025″ (0.6mm) Dia. L-56 (GMAW)
Shielding Gas	None (self-shielded)	CO_2 or Blended
Minimum Gauge	18 ga. (1.2mm) — requires more skill to use on light gauge material than is required with .025″ (0.6mm) L-56.	24 ga. (0.6mm)
Maximum Gauge[2]	10 ga. (3.5mm)	12 ga. (2.5mm)
Penetration into Base Metal	Excellent	Good
Smoke Level	Higher than (GMAW)	Low
Amount of Slag	Slag must be removed	Low, little or no cleaning required

[1] At the time of this printing, Lincoln NR-211-MP Innershield® Electrode is recommended for the FCAW process, other electrodes may become available at a later date.

[2]

⚠ WARNING

USE OF THE WELD-PAK 125 ON THICKER MATERIALS THAN RECOMMENDED MAY RESULT IN POOR WELDS. THE WELDS MAY "LOOK" GOOD, BUT MAY JUST BE "SITTING" ON TOP OF THE PLATE. THIS IS CALLED "COLD CASTING" AND WILL RESULT IN WELD FAILURE.

OPTIONAL ACCESSORIES

1. **K610-2 MIG Conversion Kit for the WELD-PAK 125** — Complete kit for use with .025″ (0.6mm) electrode wire and either CO_2 or Argon-mixed gas. Includes .025-.030″ (0.6-0.8mm) cable liner, two .025″ (0.6mm) contact tips, gas nozzle, 2 lb. spool of .025″ (0.6mm) L-56 electrode, gas regulator, gas hose, regulator adapter for CO_2 cylinders and gas solenoid assembly, with all necessary hardware and easy instructions for installing gas solenoid. Use with .030″ (0.8mm) wire requires additional .030″ (0.8mm) contact tip and electrode wire.

2. **K520 Utility Cart** — Designed to transport the Lincoln family of small welders. Has provisions for mounting a single gas cylinder. Has front casters and large rear wheels. Handle height is easily adjustable. Bottom tray provided for tools and accessories. Easy assembly required; takes less than 15 minutes.
3. **M15445 Spindle** — Mounts onto standard spool shaft for 4″ (100mm) spools to provide for mounting 8″ (200mm) diameter spools with 2″ (51mm) I.D. and up to 2.2″ (56mm) wide.

INSTALLATION

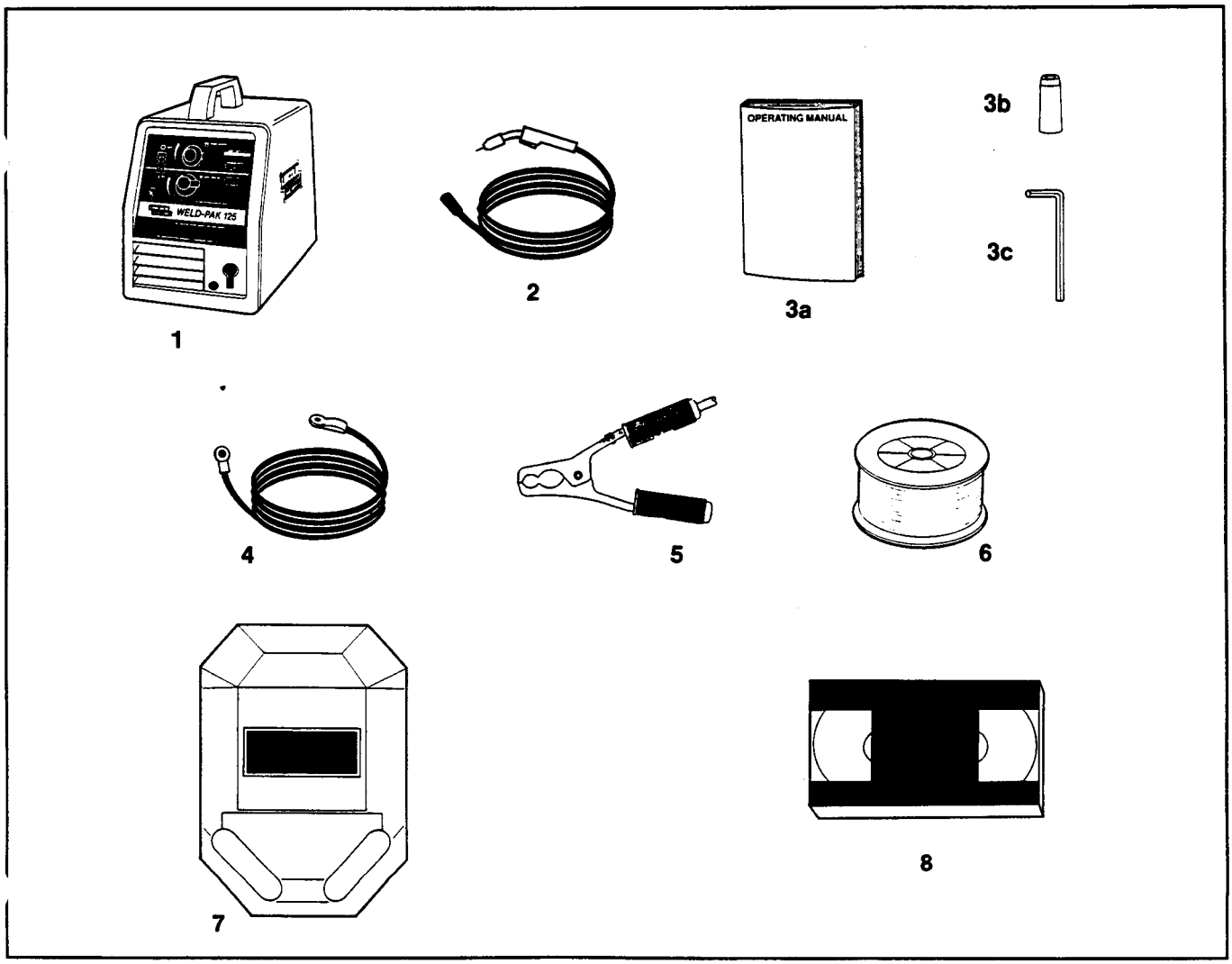
SAFETY PRECAUTIONS

- Read "ARC WELDING SAFETY PRECAUTIONS" on pages 2, 3 and 4 of Operating Manual before proceeding.
- Only personnel that have read and understood the Operating Manual should install and operate this equipment.
- Machine must be plugged into receptacle and connected to system ground per the National Electrical Code and any applicable local codes.
- Turn power switch to the off position (marked "O") when installing work cable and gun and when connecting power cord to input power.

UNPACKING THE WELD-PAK 125

Carefully open the carton and make sure you have the following loose items:

1. Weld-Pak 125.
2. Gun and cable assembly — ready to feed .035″ (0.9mm) diameter cored wire.
3. Literature package envelope which contains: a) operating manual; b) extra contact tip for .035″ (0.9mm) diameter wire; c) a hex key wrench for removal of the drive roll.
4. 10 ft. (3.0m) work cable.
5. Work clamp.
6. Sample spool of Innershield .035″ (0.9mm) NR-211-MP electrode.
7. Handshield with filter plate and lens.
8. Instructional video.



FAMILIARIZATION OF THE WELD-PAK 125

Become familiar with the Weld-Pak 125 controls and components before attempting to weld. Refer to illustrations and numbered items below for brief descriptions and view the video included with the unit.

1. Power on/off switch — when the power is on, the fan motor will run and air will be exhausted out the louvers in the front of the machine.

2. Wire speed control — controls wire speed from 50-300 inches per minute (1.3 - 7.6m/min). This control is marked o|o.

3. Voltage control — a four-position tap switch control provides full range adjustment of power source output voltage. DO NOT ADJUST WHILE WELDING. This control is marked "V."

4. Work cable access hole.

5. Gun cable and control lead access hole.

6. Wire feed section door — with gauge chart and machine setting procedures.

7. Circuit breaker — protects machine from damage if maximum output is exceeded. (Manual reset.)

8. Gun trigger lead connectors.

9. Wire feed gearbox and gun connector block.

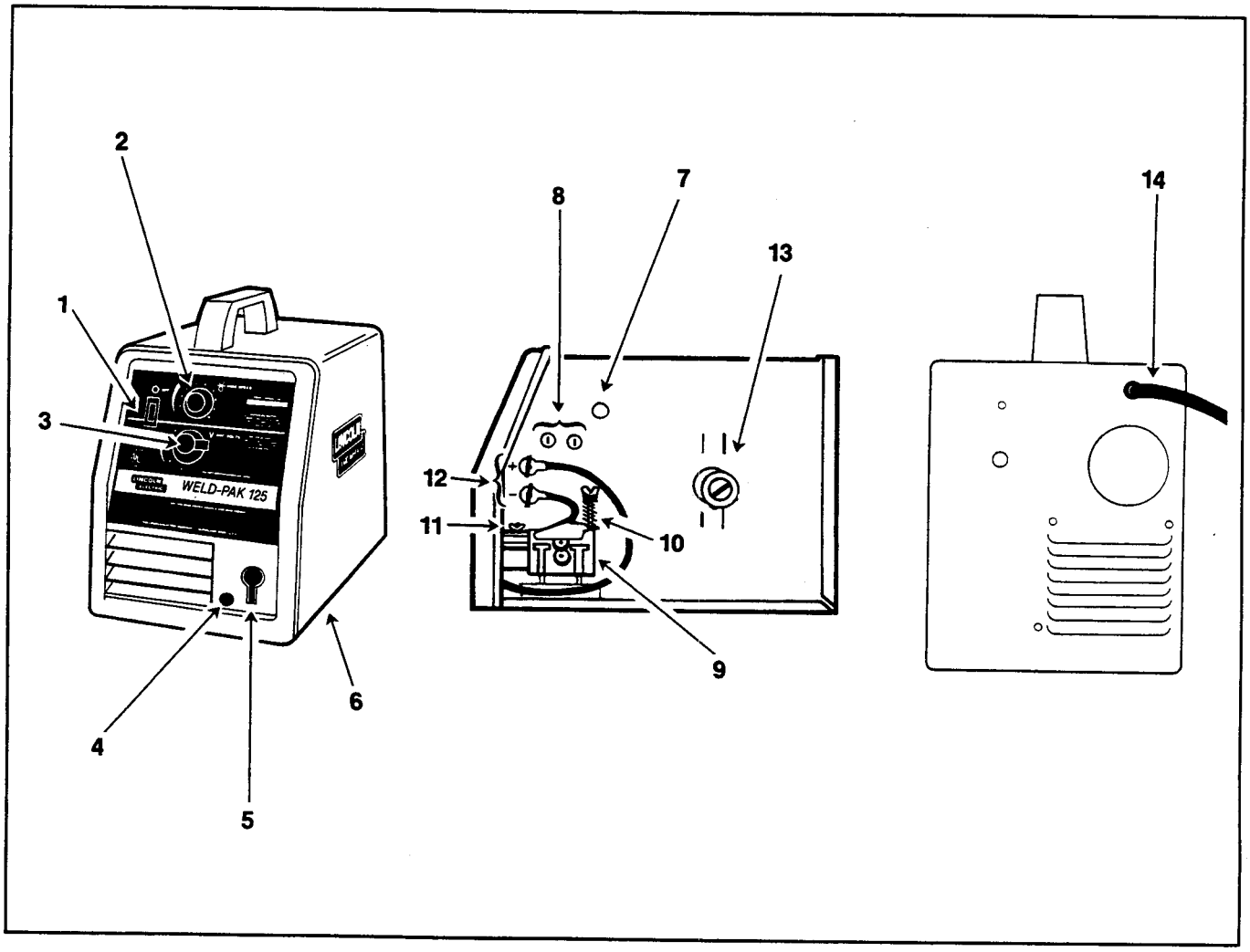
10. Spring loaded pressure arm — adjusts pressure of idle roll on wire.

11. Thumbscrew — secures gun and cable assembly.

12. (+) Positive and (-) negative output terminals.

13. Wire spool spindle.

14. Input cable.

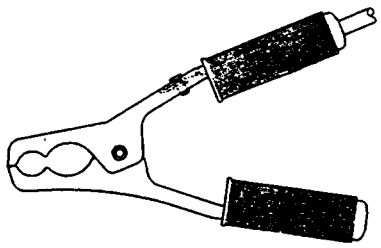


WORK CABLE AND CLAMP INSTALLATION

Work Clamp Installation

Attach the work clamp to the work cable per the following:

1. Remove the screw, pressure plate and backing nut from clamp.
2. Remove plastic handle from same side of clamp by pulling steadily on handle until it slides off clamp.
3. Insert the work cable terminal lug with the larger hole through the hole in the end of the plastic handle. Slide plastic handle several inches further onto cable to allow easy and clear access to terminal lug.
4. Secure work cable to clamp by inserting screw through hole in clamp, attaching cable lug on inside of clamp, and installing pressure plate and backing nut. Make sure pressure plate is installed such that it prevents nut from turning. Tighten screw securely.
5. Slide plastic handle back onto clamp and into original position.



Work Cable Installation

1. Open the wire feed section door on the right side of the machine.
2. Pass the end of the work cable that has the terminal lug with the smaller hole through the work cable access hole next to the louvers in the case front.
3. Route the cable under and around the back of the wire feed unit through the plastic retainer.
4. Using provided nut, connect the terminal lug to the positive (+) output terminal located above the wire feed unit (make certain that **both** nuts are **tight**).

NOTE: This connection gives the correct negative (–) electrode polarity for the self-shielded FCAW process. If using the GMAW (MIG) process, see Output Polarity Connection Section below for positive electrode polarity connection.

MIG CONVERSION

Several changes are needed to convert the unit for operation with the MIG (GMAW) process. The K610-2 MIG Conversion Kit for the WELD-PAK 125 includes all the necessary accessories for this conversion and is provided for this purpose. The following conversions should be made using the contents of this kit:

1. Install the gas solenoid. Complete instructions are included with the kit.
2. Change the output polarity to DC(+). See "Output Polarity Connection" section for details.
3. Change drive roll orientation (if required) for the wire size selected. See "Wire Drive Roll" section for details.
4. Install the proper gun liner and tip for the wire size selected. See "Gun Installation" section for details.
5. Remove gasless nozzle (if installed) and install gas nozzle. To remove, simply unscrew.
6. Load wire into machine and thread into gun and cable per "Welding Wire Loading" section.

OUTPUT POLARITY CONNECTION

The welder, **as shipped,** is connected for (DC–) negative electrode polarity.

To connect for positive electrode polarity (required for the MIG process), connect the short cable attached to the gun connector block to the positive (+) output terminal and the work cable to the negative (–) terminal using the provided nuts (make certain that **both** nuts are **tight**).

GUN INSTALLATION

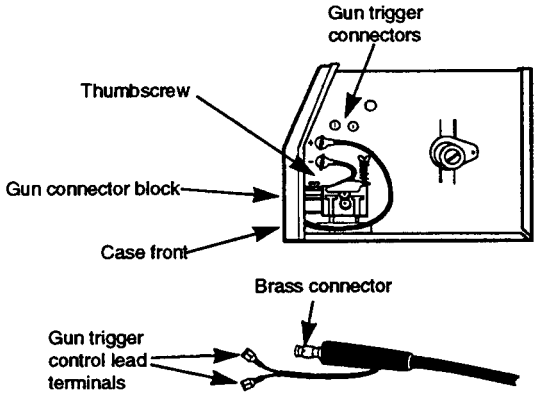
As shipped from the factory, the gun is ready to feed .035″ (0.9mm) flux-cored wire with a gasless nozzle for the Innershield® (FCAW) process. If .023″-.025″ (0.6mm) or .030″ (0.8mm) wire is to be used for the GMAW (MIG) process, install the .023-.030″ (0.6-0.8mm) gun liner, included in the K610-2 MIG Conversion Kit for the WELD-PAK 125. Also change the contact tip to the appropriate size for the wire being used, and install the gas nozzle included with the MIG Conversion Kit for the WELD-PAK 125. See Maintenance section for instructions to change the gun parts.

Connect the gun cable to the machine per the following:

1. Unplug the Weld-Pak 125 or turn the power switch to the off "O" position.
2. Pass the insulated terminals of the gun trigger control leads, one at a time, through the rectangular "keyhole" opening in the case front. The leads are to be routed up the inside of the case front and behind the gas line.
3. Insert the brass connector on the gun conductor cable through the large hole in the case front. Brass connector must be all the way in the gun connector block to obtain proper gas flow. Rotate the brass connector so control leads are on the underside and tighten the thumb screw in the gun connector block.
4. Connect the insulated gun trigger control lead terminals to the two insulated 1/4 inch (6.4mm) gun trigger connectors located above the wire drive in the wire feed section. Either lead can go to either connector.

⚠ CAUTION

The gun trigger switch must be a normally open, momentary switch. The terminals of the switch must be insulated from the welding circuit. Malfunction of the machine will result if this switch shorts to the welding output circuit or is common to any electrical circuit other than the trigger circuit.

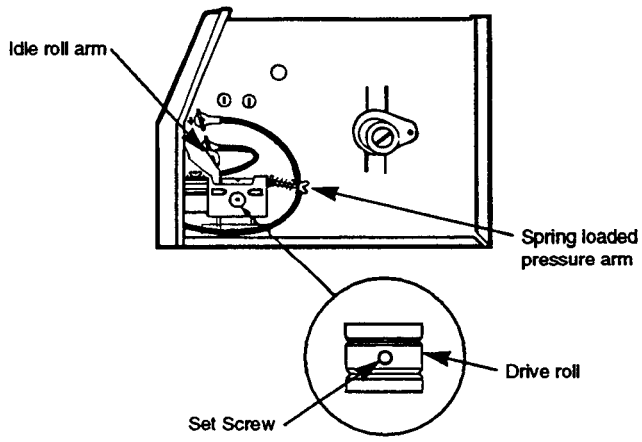


WIRE FEED DRIVE ROLL

The machine drive roll has two grooves; one for .023 – .025" (0.6 mm) solid steel electrode and the other for .030" (0.8 mm) solid and .035" (0.9 mm) flux-cored steel electrode. As shipped, the drive roll is installed in the .030/.035" (0.8/0.9 mm) position (larger groove closest to the gearbox).

If .023 – .025" (0.6mm) wire is to be used, the drive roll must be reversed as follows:

1. Make certain the machine power switch is OFF ("O").
2. Open the quick release arm; lift up the idle roll arm.
3. Remove the drive roll set screw with a 5/64" (2.0mm) wrench supplied.
4. Remove the drive roll, flip over and install with the smaller groove closest to the gearbox.
5. Replace the set screw and tighten.
6. Push a length of straightened welding wire through the wire feeder guide tubes and adjust the position of the drive roll so that the groove is centered on the wire. Make certain the set screw is located on the flat portion of the shaft and tighten.



WELDING WIRE LOADING

⚠ WARNING

The machine power switch should be turned to the ("O") position before working inside the wirefeed enclosure.

The machine is shipped from the factory ready to feed 4" (100 mm) diameter spools. A 4 inch (100mm) diameter spool is mounted directly on the 5/8 inch (16mm) diameter shaft and held in place with the thumbscrew. The spindle has a built-in, adjustable* friction brake to prevent overrun of the spool and excess slack in the wire.

Make certain that the thumbscrew is tightened full clockwise and the end of the wire which may protrude through the side of the spool does not contact any metallic part.

*Earlier spindle shafts did not include a set screw to adjust brake friction. If set screw is desired, order Lincoln part number T12932-2.

⚠ CAUTION

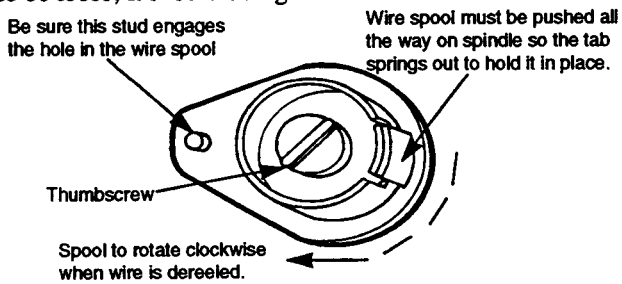
If full tightening of the spindle thumbscrew causes too much feed force to rotate the wire spool, the thumbscrew stop point can be adjusted as follows:

A. Remove the thumbscrew.

B. Using a 3/16" (4.8mm) hex wrench, turn the set screw, located inside the tapped hole in the spindle shaft, one or two turns counterclockwise.

C. Fully reinstall the thumbscrew and check for proper brake force to prevent spool overrun, but allow smooth and easy wire feeding. If not, repeat.

To use 8" (200 mm) diameter spools, the optional 2 inch (51mm) diameter M15445 spindle must be used. Remove the thumbscrew at the end of the shaft and install the spindle. The thumbscrew at the end of the shaft is not intended to be loose; it should be tight.



Thread the welding wire through the wire feeder guide tubes per the following instructions:

1. Release the idle roll pressure arm and rotate the idle roll arm away from the drive roll. (Check that visible, stenciled size on drive roll matches wire size being used — See Wire Drive Roll Section.)
2. Carefully detach the end of the wire from the spool. To prevent the spool from unwinding, do ***not*** release the wire yet.
3. Cut the bent portion of wire off and straighten the first 4" (100 mm).

4. Thread the wire through the ingoing guide tube, over the drive roll, and into the outgoing guide tube.
5. Close the idle roll arm and latch the pressure arm in place.
6. The idle roll pressure adjustment wing nut is usually set for approximately mid-position on the pressure arm threads. Slightly less pressure may be required when using .023-.025" (0.6mm) wire. If the drive roll slips while feeding wire, the pressure should be increased until the wire feeds properly. If feeding problems occur because the wire is flattened excessively, turn the pressure adjustment counterclockwise to reduce distortion of the wire. Also see "Welding Wire Loading."

ELECTRICAL INPUT CONNECTION FOR RATED OUTPUT

⚠ WARNING

ELECTRIC SHOCK can kill

- **Have an electrician install and service this equipment.**
- **Do not remove Weld-Pak 125 welder case.**
- **Use only grounded receptacle.**

230 Volt Input Connection

The WELD-PAK 125 is shipped from the factory connected for 230 volt input power. If the welder has been reconnected for 208 volt input power and 230 volt input is desired, perform the following reconnection instructions:

⚠ WARNING

MAKE CERTAIN THAT THE INPUT POWER IS ELECTRICALLY DISCONNECTED BEFORE REMOVING THE SCREWS THAT HOLD THE CASE SIDE IN PLACE.

1. Disconnect welder from input power and remove case side panel.
2. Remove lead marked "H3" from CR1 on the control P.C. Board.
3. Remove tape securing H1 lead to lead sleeving and connect H1 to CR1.
4. Insulate unused H3 lead for 300 volts with electrical tape and secure to lead sleeving.
5. Reinstall case side before connecting input power.

208 Volt Input Connection

To connect the WELD-PAK 125 for 208 volt input power, perform the following reconnect instructions (which are also included on the wiring diagram located on the inside of the case side panel):

1. Disconnect welder from input power and remove case side.
2. Remove lead marked "H1" from CR1 on the control P.C. Board.
3. Remove tape securing H3 to lead sleeving and connect H3 to CR1.
4. Insulate unused H1 lead for 300V with electrical tape and secure to lead sleeving.
5. Reinstall case side before connecting input power.

Line Cord Connection

A line cord (NEMA Type 6-50P) with a 50 amp, 250 volt, three-prong plug is factory installed. Connect this plug to a mating grounded receptacle which is connected to an appropriate power supply per the U.S. National Electric Code and any applicable local codes.

Code Requirements

The United States National Electrical Code (Article 630-B, 1987 Edition) provides standards for amperage handling capability of supply conductors based on duty cycle of the welding power source.

⚠ WARNING

THIS WELDING MACHINE MUST BE CONNECTED TO POWER SOURCE IN ACCORDANCE WITH APPLICABLE ELECTRICAL CODES.

AVERTISSEMENT: LE RACCORDEMENT DE CETTE MACHINE DE SOUDAGE À L'ALIMENTATION DOIT ÊTRE CONFORME AUX CODES D'ÉLECTRICITÉ PERTINENTS.

If there is any question about the installation meeting the National Electrical Code and local code requirements, consult a qualified electrician.

Recommended Extension Cord

If an extension cord is required, use one that is rated for the application and is #12 AWG* (3.3mm^2) 3-conductor or larger. The recommended **maximum** length is 50 feet (15m) if #12 AWG* (3.3m^2) or larger is used.

*American Wire Gauge

SHIELDING GAS

When using the GMAW process, install the gas solenoid included in the K610-2 MIG Conversion Kit for the WELD-PAK 125. Provide a cylinder of carbon dioxide (CO_2) or argon-carbon dioxide mixed shielding gas. The MIG Conversion Kit for the WELD-PAK 125 also includes the gas regulator, gas hose, and adapter for CO_2 cylinders required for using these shielding gases.

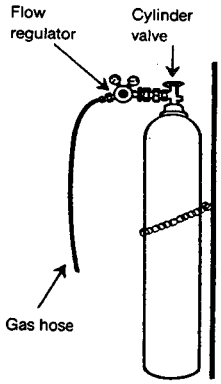
Weld shielding gas may be obtained from a welding supply distributor.

⚠ WARNING

CYLINDER may explode if damaged

- **Keep cylinder upright and chained to support.**
- **Keep cylinder away from areas where it may be damaged.**
- **Never lift welder with cylinder attached.**
- **Never allow welding electrode to touch cylinder.**
- **Keep cylinder away from welding or other live electrical circuits.**

SEE AMERICAN NATIONAL STANDARD Z-49.1, "SAFETY IN WELDING AND CUTTING" PUBLISHED BY THE AMERICAN WELDING SOCIETY.



1. Chain the cylinder to a wall or other stationary support to prevent the cylinder from falling over.
2. With the cylinder securely installed, remove the cylinder cap. Stand to one side away from the outlet and open the cylinder valve **very slightly for an instant.** This blows away any dust or dirt which may have accumulated in the valve outlet.

⚠ WARNING

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

3. Attach the flow regulator to the cylinder valve and tighten the union nut securely with a wrench.

   NOTE: If connecting to 100% CO_2 cylinder, insert regulator adapter (provided with MIG Conversion Kit for the WELD-PAK 125) between regulator and cylinder valve. If adapter is equipped with a plastic washer, be sure it is seated for connection to the CO_2 cylinder.
4. Attach one end of inlet gas hose to the outlet fitting of the flow regulator and tighten the union nut securely with a wrench. Connect the other end to the inlet gas fitting on rear of the Weld-Pak 125 (5/8-18 female threads — for CGA-032 fitting). Make certain the gas hose is not kinked or twisted.
5. Open the cylinder valve slowly.

⚠ WARNING

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

6. Keep the cylinder valve closed, except when using the welder. When finished welding: a) first close the cylinder valve to stop gas flow, b) then depress the gun trigger briefly to open the gas solenoid in the Weld-Pak 125 (this releases pressure in the hose), and c) turn off the welder.

NOTE: If using a regulator with an adjustable flowmeter, close the gun trigger and adjust the flow to give 15-20 cubic feet per hour (7-9 liters per minute). Use 20-25 cubic feet per hour (9-12 liters per minute) when welding out of position or in a drafty location.

OPERATING INSTRUCTIONS

SAFETY PRECAUTIONS

⚠ 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 upon containers which have held combustibles.**

ARC RAYS can burn.

- **Wear eye, ear and body protection.**

⚠ WARNING

SEE ADDITIONAL WARNING INFORMATION UNDER "ARC WELDING SAFETY PRECAUTIONS" ON INSIDE OF FRONT COVER OF OPERATING MANUAL.

DUTY CYCLE AND RATED OUTPUT

The duty cycle of the Weld-Pak 125 is based upon the industry standard 10 minute time period. A 30% duty cycle rating means the Weld-Pak 125 can be operated for 3 minutes out of every 10 minute cycle, at 130 amps maximum output. The remaining 7 minutes are required for cooling.

Type K609-1, WELD-PAK 125			
Input Voltage	Duty Cycle	Output Amps	Output Volts
230	30%	130	20
208	25%	130	20

SELECTING WIRE SPOOL SIZE

Select a spool size so that the wire is used up within a six month period. This eliminates needless waste of wire due to oxidation and rusting. Dirty, oxidized, or rusty wire results in poor wire feeding and poor welding performance. This wire should be discarded.

FEEDING WELDING WIRE

⚠ WARNING

WHEN INCHING THE WELDING WIRE, THE DRIVE ROLLS, THE GUN CONNECTOR BLOCK, AND THE GUN CONTACT TIP ARE ALWAYS ELECTRICALLY ENERGIZED RELATIVE TO WORK AND GROUND AND REMAIN ENERGIZED SEVERAL SECONDS AFTER THE GUN TRIGGER IS RELEASED.

1. Remove the gas nozzle (if GMAW welding) and contact tip from end of the gun cable assembly according to the instructions in the maintenance section of this manual.
2. Turn the machine on (marked "I").
3. Hold the gun and cable assembly out straight **(point gun away from yourself and others while feeding wire).**
4. Depress the gun trigger switch and hold it down, feeding welding wire through the gun and cable. Release gun trigger after wire appears at end of gun.
5. Replace contact tip and gas nozzle.
6. Cut the wire off 3/8 to 1/2 inch (9.5 to 12.5mm) from the end of the tip. The Weld-Pak 125 is now ready to weld.

OVERLOAD PROTECTION SHUTDOWN

CAUTION: Exceeding the rating can reduce the life of the machine.

Weld-Pak 125 Protection

The Weld-Pak 125 has both a thermostat and a circuit breaker to protect the machine from damage if the maximum output is exceeded. If either device is tripped, there will be no wire feed or output voltage when the gun trigger is depressed.

If the machine shuts down due to an output overload, first check the circuit breaker which is located on the inside panel of the wire feed section. If the button is extended, reset, after several minutes of cooling, by depressing the button.

If there is no output and the circuit breaker is not tripped, the internal thermostat has probably tripped. This device will automatically reset after several minutes of cooling. (Leaving the machine on with the fan motor running will cool the machine at a faster rate, allowing the thermostat to reset sooner.)

If the machine does not operate and the fan does not run with the machine "ON," the power supply branch circuit protection (circuit breaker or fuse) has tripped.

LEARNING TO WELD

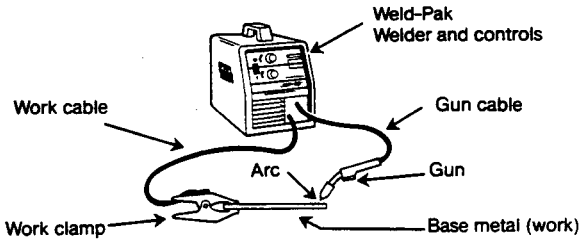
The serviceability of a product or structure utilizing this type of information is and must be the sole responsibility of the builder/user. Many variables beyond the control of The Lincoln Electric Company affect the results obtained in applying this type of information. These variables include, but are not limited to, welding procedure, plate chemistry and temperature, weldment design, fabrication methods and service requirements.

No one can learn to weld simply by reading about it. Skill comes only with practice. The following pages will help the inexperienced operator to understand welding and develop this skill. For more detailed information, order a copy of "New Lessons in Arc Welding" listed inside the back cover of this manual.

THE ARC-WELDING CIRCUIT

The operator's knowledge of arc welding must go beyond the arc itself. The operator must know how to control the arc, and this requires a knowledge of the welding circuit and the equipment that provides the electric current used in the arc. Following is a drawing of the welding circuit for the Weld-Pak 125. The circuit begins where the gun cable is attached to the welding machine. Current flows through the gun cable, gun, and contact tip, to the wire and across the arc. On the work side of the arc, current flows through the base metal to the work cable and back to the welding machine. This circuit must be complete for the current to flow.

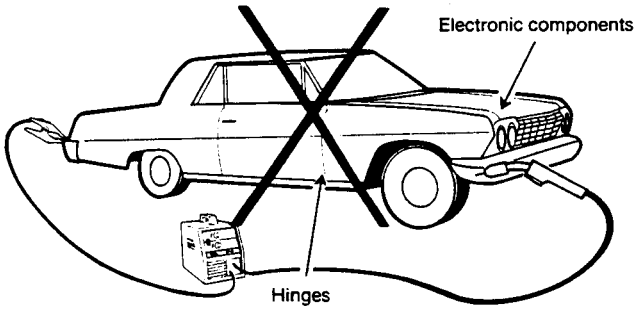
The Weld-Pak 125 welding circuit has a voltage output of 32 volts maximum. This voltage is quite low and is only present when the gun trigger is depressed.



The Weld-Pak 125 welding circuit.

To weld, the work clamp must be **tightly** connected to **clean** base metal. Remove paint, rust, dirt or oil as necessary and connect the work clamp as **close** as possible to the area you wish to weld. This helps prevent current from going through an unwanted path. Avoid allowing the

welding circuit to pass through hinges, bearings, electronic components, or similar devices that can be damaged. Always disconnect electrical devices before welding upon them.



⚠ WARNING

ELECTRIC SHOCK can kill.

- **Do not touch wire electrode or work with bare skin or wet clothing.**
- **Insulate yourself from work and ground using dry insulation.**
- **Always wear dry insulating gloves.**
- **Read section on Electric Shock on page 2 of this manual.**

The gun and cable assembly is held by the operator who guides the automatically fed wire along the joint, maintaining a contact tip to work distance of about 3/8 to 1/2 inch (10-12mm) (this is called electrical stickout). This electrical stickout (ESO) must be properly maintained by the operator. The electric arc is made in the gap between the work and the tip end of a small diameter wire. When the power source is properly set, the arc gap is maintained automatically.

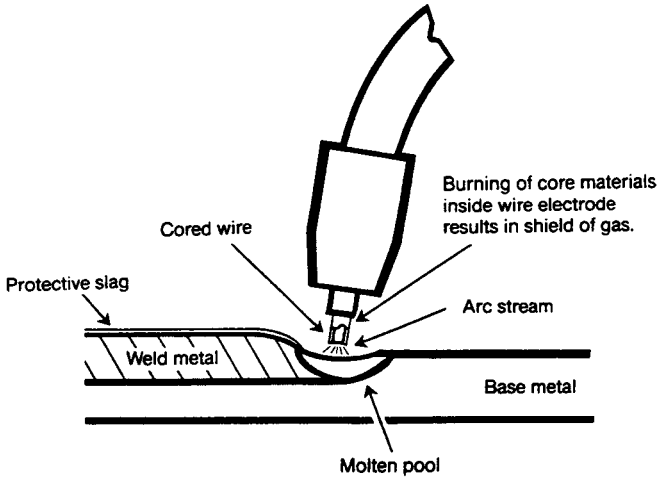
Arc welding is a manual skill requiring a steady hand, good physical condition, and good eyesight. The operator controls the welding arc and, therefore, the quality of the weld made.

THE SELF-SHIELDED FCAW WELDING ARC

The following drawing illustrates the action taking place in the self-shielded FCAW (Innershield) welding arc. It closely resembles what is actually seen while welding.

The "arc stream" is seen in the middle of the picture. This is the electric arc created by the electric current flowing through the space between the end of the wire electrode and the base metal. The temperature of this arc is about 6000°F, which is more than enough to melt metal. The arc is very bright, as well as hot, and cannot be looked at with the naked eye without risking painful injury. **The very dark lens, specifically designed for arc welding, must be used with the hand or face shield whenever viewing the arc.**

The arc melts the base metal and actually digs into it, much as water through a nozzle on a garden hose digs into the earth. The molten metal forms a molten pool or crater and tends to flow away from the arc. As it moves away from the arc, it cools and solidifies.



The self-shielded FCAW welding arc.

The function of the Innershield cored wire electrode is much more than simply to carry current to the arc. The wire core is composed of fluxes and/or alloying ingredients around which a steel sheath has been formed. It is simply a stick electrode turned inside out in a continuous wire form.

The cored wire melts in the arc and tiny droplets of molten metal shoot across the arc into the molten pool. The wire sheath provides additional filler metal for the joint to fill the groove or gap between the two pieces of the base metal.

The core materials also melt or burn in the arc and perform several functions. They make the arc steadier, provide a shield of smoke-like gas around the arc to keep oxygen and nitrogen in the air away from the molten metal, and provide a flux for the molten pool. The flux picks up impurities and forms the protective slag on top of the weld during cooling.

After running a weld bead, the slag may be removed with a chipping hammer and wire brush. This improves appearance and allows for inspection of the finished weld.

Since machine size and output characteristics limit the size and type of wire electrode which can be used, Lincoln .035" (0.9mm) NR-211-MP Innershield electrode is recommended for Self-Shielded Flux Cored Arc Welding on the Weld-Pak 125.

MACHINE SET UP FOR THE SELF-SHIELDED FCAW PROCESS

1. See "Recommended Processes and Equipment" for selection of welding wire and shielding gas, and for range of metal thicknesses that can be welded.
2. See the "Welding" chart on the inside of wire feed section door for information on setting the controls. (Also at back of this manual.)

3. Set the "Voltage" and "Wire Speed" controls to the settings suggested on the chart for the welding wire and base metal thickness being used. The voltage control is marked "V" and the wire feed speed is marked "o|o."
4. Check that the polarity is correct for the welding wire being used. Set the polarity for **DC-** when welding with NR-211-MP Innershield electrode. (See installation instructions on how to make output polarity connection.)
5. When using Innershield electrode, the gasless nozzle (thread protector) may be used instead of a gas nozzle to give improved visibility.
6. Connect work clamp to metal to be welded. Work clamp must make good electrical contact to the workpiece. The workpiece must also be grounded as stated in "Arc Welding Safety Precautions" section of this manual.

WELDING TECHNIQUES FOR THE SELF-SHIELDED FCAW PROCESS

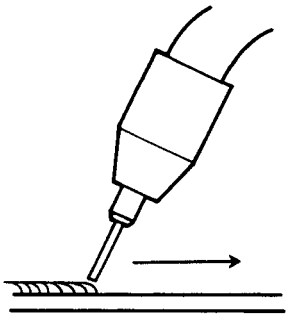
Four simple manipulations are of prime importance. With complete mastery of the four, welding will be easy.

The Correct Welding Position.

Illustrated below is the correct welding position for right-handed people. (For left-handed, it is opposite.)

Hold the gun (of the gun and cable assembly) in your right hand, and hold the hand shield with your left hand. (Left handers simply do the opposite.)

When using the self-shielded FCAW process, weld from left to right (if you are right handed). This enables you to clearly see what you are doing. (Left handers do the opposite.) Tilt the gun toward the direction of travel holding the electrode at an angle as shown below.



The Correct Way to Strike an Arc.

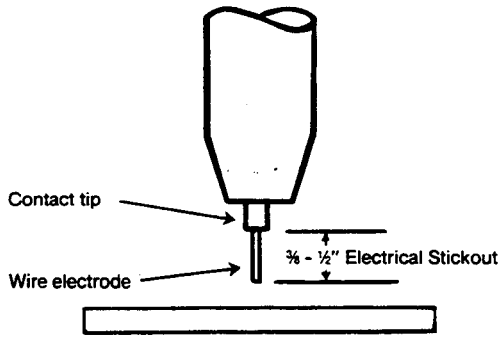
⚠ WARNING

ARC RAYS can burn.

- **When using an open arc process, it is necessary to use correct eye, head and body protection.**
- **Protect yourself and others; read section on Arc Burn on page 2 of this manual.**

1. Be sure the work clamp makes good electrical contact to the work.
2. Position gun over joint. End of wire may be lightly touching the work.
3. Place faceshield to protect face and eyes, close gun trigger, and begin welding. Hold the gun so the contact tip to work distance is about 3/8 to 1/2 inch (10-12mm).
4. To stop welding, release the gun trigger and then pull the gun away from the work after the arc goes out.
5. A ball may form at the tip end of the wire after welding. For easier restrikes (with Innershield wire), the ball may be removed by feeding out a few inches of wire and simply bending the wire back and forth until it breaks off.
6. When no more welding is to be done, turn off the machine.

The Correct Electrical Stickout.



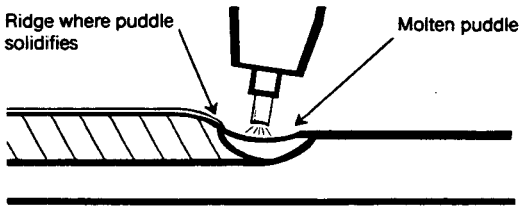
The electrical stickout (ESO) is the distance from the end of the contact tip to the end of the wire.

Once the arc has been established, maintaining the correct ESO becomes extremely important. The ESO should be approximately 3/8 to 1/2 inch (10-12mm) long.

The easiest way to tell whether the ESO is the correct length is by listening to its sound. The correct ESO has a distinctive "crackling" sound, very much like eggs frying in a pan. A long ESO has a hollow, blowing or hissing sound. If the ESO is too short, you may stick the contact tip or nozzle to the weld puddle and/or fuse the wire to the contact tip.

The Correct Welding Speed.

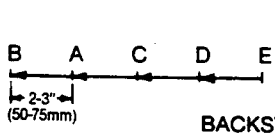
The important thing to watch while welding is the puddle of molten metal right behind the arc. Do not watch the arc itself. It is the appearance of the puddle and the ridge where the molten puddle solidifies that indicate correct welding speed. The ridge should be approximately 3/8" (10mm) behind the wire electrode.



Most beginners tend to weld too fast, resulting in a thin, uneven, "wormy" looking bead. They are not watching the molten metal.

Helpful Hints.

1. For general welding, it is not necessary to weave the arc; neither forward or backward nor sideways. Weld along at a steady pace. You will find it easier.
2. When welding on thin plate, you will find that you will have to increase the welding speed, whereas when welding on heavy plate, it is necessary to go more slowly in order to get good penetration.
3. When welding sheet metal 16 gauge (1.5mm) and lighter, heat buildup may cause part warpage and burnthrough. One way to eliminate these problems is to use the backstepping method.



First weld from A to B; then from C to A; then from D to C; then from E to D, and so on.

BACKSTEPPING

Practice.

The best way of getting practice in the four skills that enable you to maintain:

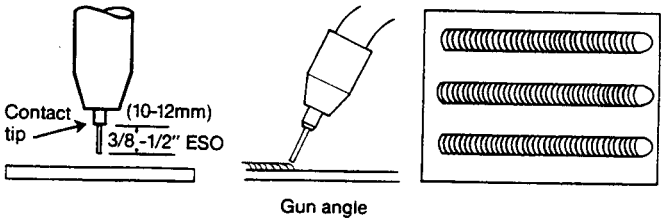
1. Correct welding position
2. Correct way to strike an arc
3. Correct electrical stickout
4. Correct welding speed

is to spend a little more time on the following exercise.

Use the following:

Mild Steel	12 gauge or 1/8 inch (2.5 or 3.0mm)
Electrode	.035" (0.9mm) NR-211-MP Innershield wire
Voltage setting "V"	D
Wire feed speed o|o	3

1. Learn to strike an arc by positioning the gun over the joint and touching the wire to the work.
2. Position handshield to protect face and eyes.
3. Depress gun trigger, hold gun so contact tip to work distance is about 3/8 to 1/2 inch (10-12mm) and the gun is at proper angle.
4. After you strike the arc, practice the correct electrical stickout. Learn to distinguish it by its sound.
5. When you are sure that you can hold the correct electrical stickout, with a smooth "crackling" arc, start moving. Look at the molten puddle constantly, and look for the ridge where the metal solidifies.
6. Run beads on a flat plate. Run them parallel to the top edge (the edge farthest away from you). This gives you practice in running straight welds, and also gives you an easy way to check your progress. The 10th weld will look considerably better than the first weld. By constantly checking on your mistakes and your progress, welding will soon be a matter of routine.



COMMON METALS

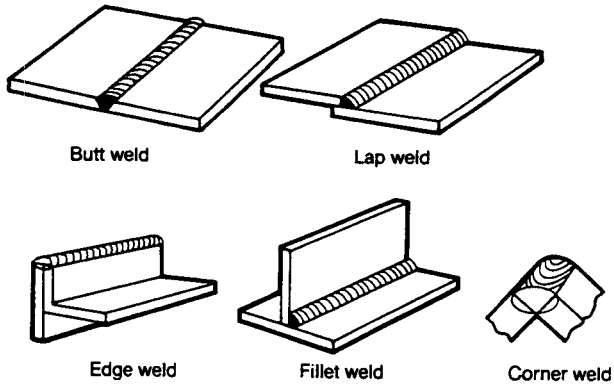
Most metals found around the farm, small shop or home are low carbon steel, sometimes referred to as mild steel. Typical items made with this type of steel include most sheet metal, plate, pipe and rolled shapes such as channels and angle irons. This type of steel can usually be easily welded without special precautions. Some steels, however, contain higher carbon levels or other alloys and are more difficult to weld. The Weld-Pak 125 is not recommended for such materials. Basically, if a magnet sticks to the metal and if you can easily cut the metal with a file, chances are good that you will be able to weld the material with the Weld-Pak 125. For further information on identifying various types of steels and other metals, and for proper procedures for welding them, we again suggest you purchase a copy of "New Lessons in Arc Welding."

Regardless of the type of metal being welded, it is important in order to get a quality weld that it be free of oil, paint, rust or other contaminants.

TYPES OF WELDS

Five types of welding joints are: Butt Welds, Fillet Welds, Lap Welds, Edge Welds and Corner Welds.

Of these, the Butt Weld and Fillet Weld are the two most common welds.

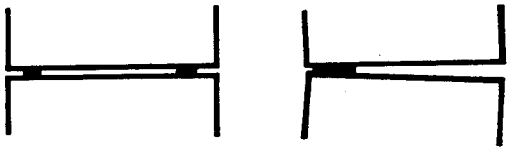


WELDING PROCEDURES

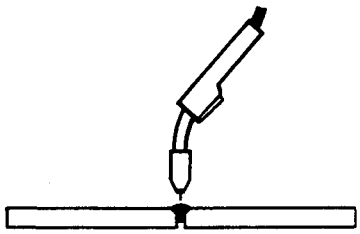
Butt Welds

Place two plates side by side, leaving a space approximately one half the thickness of the metal between them in order to get deeper penetration.

Securely clamp or tack weld the plates at both ends, otherwise the heat will cause the plates to move apart (see drawing):



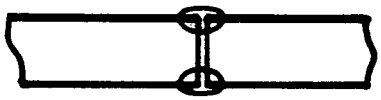
Now weld the two plates together. Weld from left to right (if right handed). Point the wire electrode down in the crack between the two plates, keeping the gun slightly tilted in the direction of travel.



Watch the molten metal to be sure it distributes itself evenly on both edges and in between the plates.

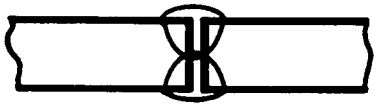
Penetration

Unless a weld penetrates close to 100% of the metal thickness, a butt weld will be weaker than the material welded together. In this example, the total weld is only half the thickness of the material; thus the weld is only approximately half as strong as the metal.



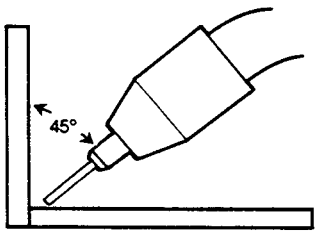
Poor

In this example, the joint has been welded so that 100% penetration could be achieved. The weld, if properly made, is as strong as or stronger than the original metal.



Fillet Welds

When welding fillet welds, it is very important to hold the wire electrode at a 45° angle between the two sides, or the metal will not distribute itself evenly. The gun nozzle is generally formed at an angle to facilitate this.



WELDING IN THE VERTICAL POSITION

Welding in the vertical position can be done either vertical-up or vertical-down. Vertical-up is used whenever a larger, stronger weld is desired. Vertical-down is used primarily on sheet metal 5/32″ (3.9mm) and under for fast, low penetrating welds.

⚠ WARNING

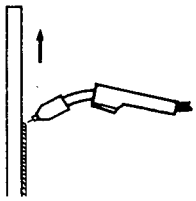
USE OF THE WELD-PAK 125 ON THICKER MATERIALS THAN RECOMMENDED MAY RESULT IN POOR WELDS. THE WELDS MAY "LOOK" GOOD, BUT MAY JUST BE "SITTING" ON TOP OF THE PLATE. THIS IS CALLED "COLD CASTING" AND WILL RESULT IN WELD FAILURE. SEE "RECOMMENDED PROCESSES AND EQUIPMENT."

Vertical-Up and Overhead Welding

The problem, when welding vertical-up, is to put the molten metal where it is wanted and make it stay there. If too much molten metal is deposited, gravity will pull it downwards and make it "drip." Therefore, a certain technique has to be followed.

When welding out-of-position, run stringer beads. Don't whip, break the arc, move out of the puddle, or move too fast in any direction. Use WFS in the low portion of the range. General techniques are illustrated below.

Maximum plate thickness 5/32″ (3.9mm)

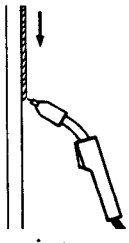


Generally, keep the electrode nearly perpendicular to the joint as illustrated. The maximum angle above perpendicular may be required if porosity becomes a problem.

Vertical-Down Welding

Vertical-down welds are applied at a fast pace. These welds are therefore shallow and narrow, and as such are excellent for sheet metal. Vertical-down welds may be applied to 5/32″ (3.9mm) and lighter material. This material is within the range of the Weld-Pak 125 when used with .035″ (0.9mm) NR-211-MP Innershield electrode.

Use stringer beads and tip the gun in the direction of travel so the arc force helps hold the molten metal in the joint. Move as fast as possible consistent with desired bead shape.



The important thing is to continue lowering the entire arm as the weld is made so the angle of the gun does not

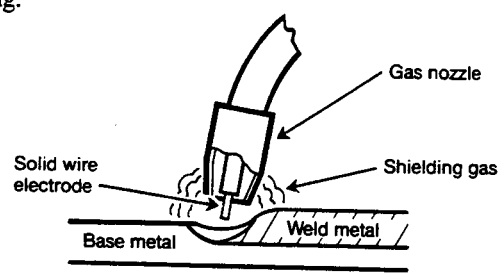
change. Move the electrode wire fast enough that the slag does not catch up with the arc. Vertical-down welding gives thin, shallow welds. It **should not** be used on heavy material where large welds are required.

THE GMAW (MIG) WELDING ARC

The drawing below illustrates the GMAW (MIG) welding arc. Solid wire does not contain fluxes or ingredients to form its own shielding and no slag forms to protect the molten weld metal. For this reason, a continuous even flow of shielding gas is needed to protect the molten weld metal from atmospheric contaminants such as oxygen and nitrogen. Shielding gas is supplied through the gun and cable assembly through the gas nozzle, and into the welding zone.

The shielding gas has several other functions besides protecting the molten weld metal. It helps shape the cross section of the weld deposit, may increase or decrease arc temperature, stabilizes the arc, and regulates penetration.

When comparing the GMAW and FCAW processes, you can see that the principal difference between the two lies in the type of shielding used. GMAW uses gas for shielding, thus we have Gas Metal Arc Welding. FCAW uses the melting or burning of the core ingredients for shielding, and is thus termed Self-Shielded Flux Cored Arc Welding.



The GMAW (MIG) Welding Arc.

The recommended wire for Gas Metal Arc Welding (MIG) is Lincolnweld® .025" L-56 electrode. Lincolnweld® L-56 is capable of welding a wide range of mild steels in all positions, however, more skill is required for out-of-position welding with the GMAW process.

PROCESS SELECTION

By gaining knowledge of the differences between the two processes, you will be able to select the best process for the job you have at hand. In selecting a process, you should consider:

For GMAW (MIG) process

1. Is most of my welding performed on 16 gauge and lighter materials?
2. Can I afford the extra expense, space, safety precautions, and lack of portability required for gas cylinders and gas supply lines?
3. Do I require clean, finished-looking welds?

If you have answered yes to all the above questions, GMAW may be the process for you. If you have answered no to any of the above questions then you should consider using the FCAW process.

For FCAW (Innershield) process

1. Do I want simplicity and portability?
2. Will welding be performed outdoors or under windy conditions?
3. Do I require good all position welding capability?
4. Will most welding be performed on 16 gauge and heavier, somewhat rusty or dirty materials?
5. Weld must be cleaned prior to painting.

MACHINE SETUP FOR THE GMAW (MIG) PROCESS

1. See "Recommended Processes and Equipment" for selection of welding wire and shielding gas and for range of metal thicknesses that can be welded.
2. See the "Welding" chart on the inside of wire feed section door for information on setting the controls. (Also at back of this manual.)
3. Set the "Voltage" and "Wire Speed" controls to the settings suggested for the welding wire and base metal thickness being used. The voltage control is marked "V" and the wire feed speed is marked o|o.
4. Check that the polarity is correct for the welding wire being used. Set the polarity for DC+ when welding with the GMAW (MIG) process. (See Installation Instructions on how to make output polarity connections.)
5. Check that the gas nozzle and proper size liner and contact tip is being used, and that the gas supply is turned on. If adjustable, set for 15 to 20 Cubic Feet per Hour (7 to 10 liters/min.) under normal conditions; increase as high as 35 CFH (17 liters/min.) under drafty (slightly windy) conditions.

   NOTE: The gas regulator included in the optional K610-2 is preset and nonadjustable.
6. Connect work clamp to metal to be welded. Work clamp must make good electrical contact to the workpiece. The workpiece must also be grounded as stated in "Arc Welding Safety Precautions."

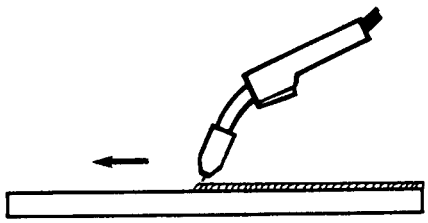
WELDING TECHNIQUES FOR THE GMAW (MIG) PROCESS

The welding techniques for the GMAW (MIG) process on light gauge material are basically the same as welding with .035 (0.9mm) NR-211-MP Innershield electrode.

(Review welding techniques in the self-shielded FCAW Innershield section.) The few exceptions are noted below.

The Correct Welding Postion

When using the GMAW process on light gauge material, weld from right to left (if right handed) pushing the electrode ahead of the arc (see figure following). This technique results in a colder weld and has less tendency for burnthrough. You may weld in the opposite direction as long as you are obtaining desirable results.



Push Technique.

The Correct Way to Strike an Arc

1. The arc is struck the same as for self-shielded FCAW welding. However, for easier restrikes, the ball at the tip end of the wire which forms after completing a weld may be removed with wire cutters.

2. When no more welding is to be done, don't forget to first close valve on gas cylinder (if used), momentarily operate gun trigger to release gas pressure, then turn off the machine.

The Correct Electrical Stickout

The electrical stickout (ESO) for GMAW (MIG) welding is 3/8 to 1/2 inch (10-12mm). The same rules apply as welding with .035" (0.9mm) NR-211-MP Innershield wire.

The Correct Welding Speed

The same rules apply as those for self-shielded FCAW welding. At first, it may be more difficult to judge speed since no slag is forming behind the molten pool. Watch the ridge where the molten puddle solidifies.

Practice

To practice your GMAW (MIG) welding skills, use the following:

Mild steel:	16 gauge (about 1/16 inch)
Electrode:	Lincolnweld® .025 L-56 electrode
Shielding gas:	CO_2
Voltage setting "V":	C
Wire feed speed o|o:	4

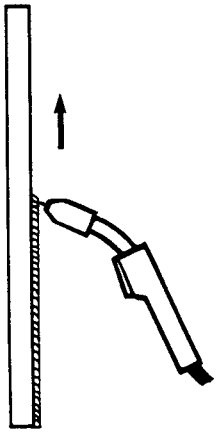
Then follow the instructions in the practice section on self-shielded FCAW welding.

WELDING PROCEDURES

When GMAW (MIG) welding on sheet metal, remember to use the "forehand" push technique, and review the welding procedures section on self-shielded FCAW Innershield welding.

Welding in the Vertical Position

One variation of welding procedure is welding in the vertical-up position. When welding in the vertical-up position, use the proper gun angle shown below.



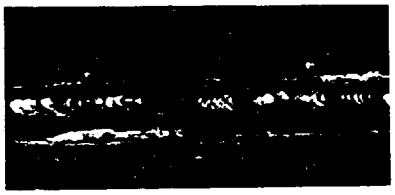
Gun angle for the GMAW process welding in the vertical-up position.

TROUBLESHOOTING WELDS

Good welds have excellent appearance.

To Eliminate Porosity (in order of importance) — Turn on gas supply, if used

1. Decrease voltage
2. Increase stickout
3. Increase WFS (wire feed speed)
4. Decrease drag angle
5. Decrease arc speed



To Eliminate a Ropey Convex Bead (in order of importance)

1. Increase voltage
2. Decrease stickout
3. Decrease WFS (wire feed speed)
4. Decrease arc speed
5. Decrease drag angle
6. Check for correct gas, if used

To Reduce Spatter (in order of importance)

1. Increase voltage
2. Increase drag angle
3. Decrease stickout
4. Increase WFS (wire feed speed)
5. Decrease arc speed
6. Check for correct gas, if used

To Correct Poor Penetration (in order of importance)

1. Decrease stickout
2. Increase WFS (wire feed speed)
3. Decrease voltage
4. Increase speed
5. Decrease drag angle
6. Check for correct gas, if used

If Arc Blow Occurs (in order of importance)

1. Decrease drag angle
2. Increase stickout
3. Decrease voltage
4. Decrease WFS (wire feed speed) and voltage
5. Decrease arc speed

To Eliminate Stubbing (in order of importance)

1. Increase voltage
2. Decrease WFS (wire feed speed)
3. Decrease stickout
4. Increase drag angle

Stubbing occurs when the electrode drives through the molten puddle and hits the bottom plate tending to push the gun up.

PROPER GUN HANDLING

Most feeding problems are caused by improper handling of the gun cable or electrodes.

1. Do not kink or pull the cable around sharp corners.
2. Keep the electrode cable straight as practical when welding.
3. Do not allow dolly wheels or trucks to run over the cables.
4. Keep the cable clean per maintenance instructions in this Operation Manual.
5. Innershield electrode has proper surface lubrication. Use only clean, rust-free electrode.
6. Replace the contact tip when it becomes worn or the end is fused or deformed.

MAINTENANCE

SAFETY PRECAUTIONS

⚠ WARNING

ELECTRIC SHOCK can kill.

- **Have an electrician install and service this equipment.**
- **Unplug the Weld-Pak 125 before performing any maintenance.**
- **Do not remove Weld-Pak 125 welder case.**

ROUTINE MAINTENANCE

Power Source (fixed) Section

No user serviceable parts inside! Do not attempt to perform service in the power source (fixed) side of the Weld-Pak 125. Take the unit to an authorized Lincoln service center if you experience problems. NO maintenance is required.

Wire Feed Section

1. When necessary, vacuum accumulated dirt from gearbox and wire feed section.
2. Occasionally inspect the incoming guide tube and clean inside diameter if necessary.
3. Motor and gearbox have lifetime lubrication and require no maintenance.

Fan Motor

Has lifetime lubrication — requires no maintenance.

Wire Reel Spindle

Requires no maintenance. Do **not** lubricate shaft.

GUN AND CABLE MAINTENANCE For Magnum™ 100L Gun

Gun Cable Cleaning

Clean cable liner after using approximately 300 lbs. (136kg) of solid wire or 50 lbs. (23kg) of flux-cored wire. 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 the dirt to form a plug.

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

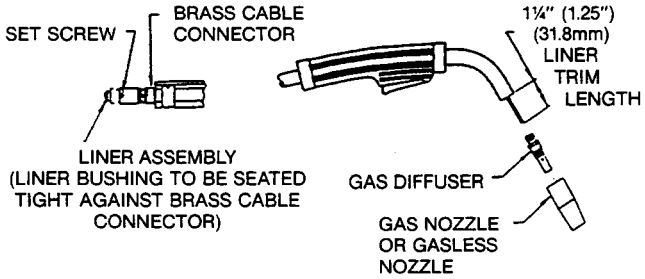
Contact Tips, Nozzles, and Gun Tubes

1. Dirt can accumulate in the contact tip hole and restrict wire feeding. After each spool of wire is used, remove the contact tip and clean it by pushing a short piece of wire through the tip repeatedly. Use the wire as a reamer to remove dirt that may be adhering to the wall of the hole through the tip.
2. Replace worn contact tips as required. A variable or "hunting" arc is a typical symptom of a worn contact tip. To install a new tip, choose the correct size contact tip for the electrode being used (wire size is stenciled on the side of the contact tip) and screw it snugly into the gas diffuser.
3. Remove spatter from inside of gas nozzle and from tip after each 10 minutes of arc time or as required.
4. Be sure the gas nozzle is fully screwed onto the diffuser for gas shielded processes. For the Innershield® process, the gasless nozzle should be screwed onto the diffuser.
5. To remove gun tube from gun, remove gas nozzle or gasless nozzle and remove diffuser from gun tube. Remove both collars from each end of the gun handle and separate the handle halves. Loosen the locking nut holding the gun tube in place against the gun end cable connector. Unscrew gun tube from cable connector. To install gun tube, screw the locking nut on the gun tube as far as possible. Then screw the gun tube into the cable connector until it bottoms. Then unscrew (no more than one turn) the gun tube until its axis is perpendicular to the flat sides of the cable connector and pointed in the direction of the trigger. Tighten the locking nut so as to maintain the proper relationship between the gun tube and the cable connector. Replace the gun handle, trigger and diffuser. Replace the gas nozzle or gasless nozzle.

Liner Replacement

NOTICE: The variation in cable lengths prevents the interchangeability of liners. 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.

1. Remove gun and cable assembly from the machine.
2. Remove the gas nozzle or gasless nozzle.
3. Remove the gas diffuser from the gun tube.
4. Lay the gun and cable out straight on a flat surface. Loosen the set screw located in the brass cable connector at the wire feeder end on the cable. Pull the liner out of the cable.
5. Insert a new untrimmed liner into the connector end of the cable. Be sure the liner bushing is stenciled appropriately for the wire size being used.
6. Fully seat the liner bushing into the connector. Tighten the set screw on the brass cable connector. The gas diffuser, at this time, should not be installed onto the end of the gun tube.
7. With the gas nozzle and diffuser removed from the gun tube, be sure the cable is straight, and then trim the liner to the length shown in the following diagram. Remove any burrs from the end of the liner.

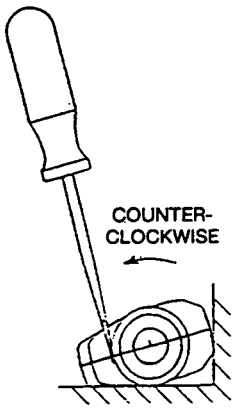


8. Screw the gas diffuser onto the end of the gun tube and securely tighten.

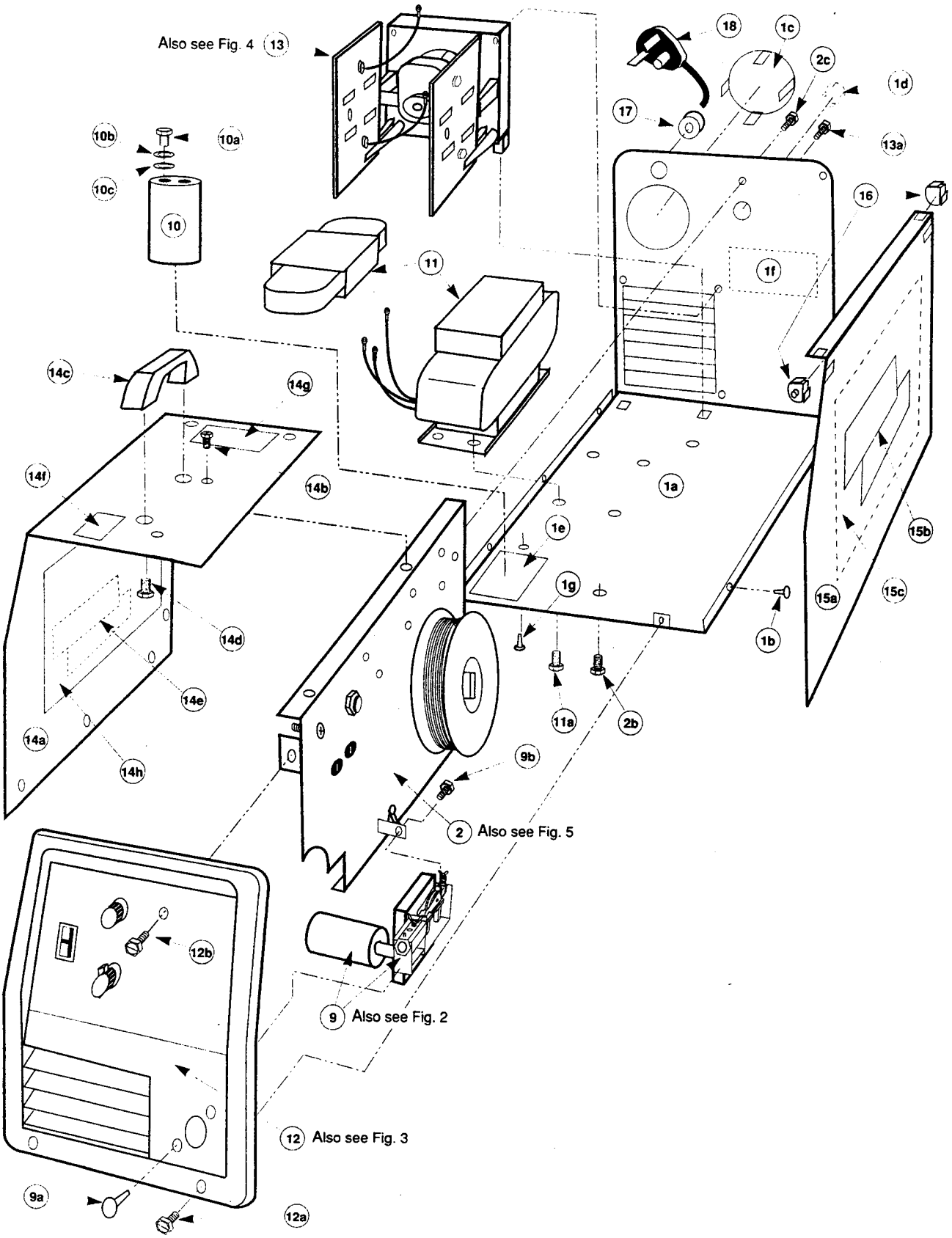
Gun Handle Disassembly

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.



WELD-PAK 125
Figure 1



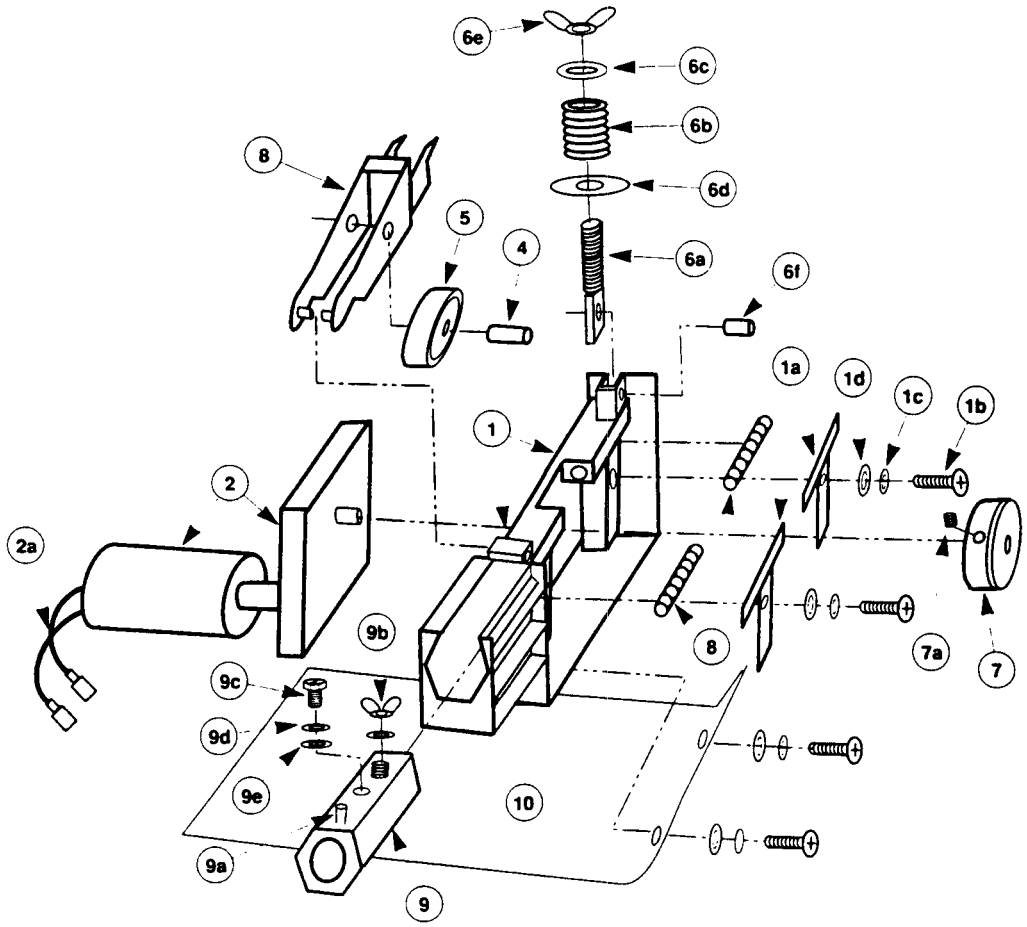
MAIN EXPLODED DIAGRAM
Figure 1

ITEM	PART NO.	PART DESCRIPTION	NO. REQ'D
1	S20156-6	Case Back & Bottom Assembly, Includes 1a-1g	1
1a	NSS	Case Back & Bottom (Sheet Metal)	1
1b	T14659-1	Door Stop Button (if present)	2
1c	M15820	Hole Plug (Large) Back (if present)	1
1d	T10397-22	Hole Plug (Small) Back	1
1e	NSS	Capacitor Cushion (Foam), Sits on bottom	1
1f	NSS	Decal, "Electrical Shock Hazard" (Purchase Decal Pkg. Item 19)	1
1g	T14659-1	Capacitor Fastener Button Bottom Tap	1
2	See Fig. 5	Center Panel Assembly	1
2b	S8025-70	Slotted Hex Head Screw, #10-3/8" long, blunt point	2
2c	S8025-65	Slotted Hex Head Screw, #10-1/2" long, gimlet point	2
9	See Fig. 2	Complete Drive Assembly/Motor	1
9a	T14659-3	Fastener Button	2
9b	S8025-70	Slotted Hex Head Screw, #10-3/8" long, gimlet point, fine thread	1
10	S13490-122	Capacitor, Includes 10a-10c	1
10a	T8833-54	Hex Head Cap Screw, 1/4"-28, 0.50" long	2
10b	E106A-2	1/4" Lock Washer	2
10c	S9262-93	1/4" Plain Washer	2
11	Contact Factory	Transformer & Choke Assembly	1
11a	S8025-70	Slotted Hex Head Screw, #10-3/8" long, blunt point	4
12	See Fig.3	Case Front Assemlby	1
12a	S8025-65	Slotted Hex Head Screw #10-3/8" long, blunt point	2
12b	S8025-70	Slotted Hex Head Screw, #10-3/8" long, gimlet point, fine thread	1

NSS - Not Sold Separately

ITEM	PART NO.	PART DESCRIPTION	NO. REQ'D
13	See Fig. 4	Rectifier, Fan Motor & Bracket Assembly	1
13a	S8025-65	Slotted Hex Head Screw #10-3/8" long, blunt point	2
14	L7572-2	Case Side Assembly, Includes 14a-14h	1
14a	NSS	Side Panel (Sheet Metal)	1
14b	S8025-65	Hex/Slotted Screws	8
14c	M15446	Handle	1
14d	S9225-53	Indented Hex Head	2
14e	NSS	Decal, "Lincoln Logo", Purchase decal package Item 19	1
14f	NSS	Decal, "3-Year Warranty", Purchase decal package Item 19	1
14g	NSS	Decal, "Warning: Electrical Shock Hazard, Fume Hazard, Spark Hazard, Arc Ray Hazard", Purchase decal package Item 19	1
14h	M16496	Wiring Diagram	1
15	S20156-5	Case Door Assembly, Includes 15a-15c	1
15a	NSS	Case Door (Sheet Metal0	1
15b	NSS	Decal, "Lincoln Logo", Purchase decal package Item 19	1
15c	L8977	Welder Procedure Sheet, Purchase decal package Item 19	1
16	M15451	Door Hinge	2
17	T9724-3	Power Plug Grommet	1
18	S15254	Power Plug & Cord	1
19	S20156-7	Decal Package (not shown)	1

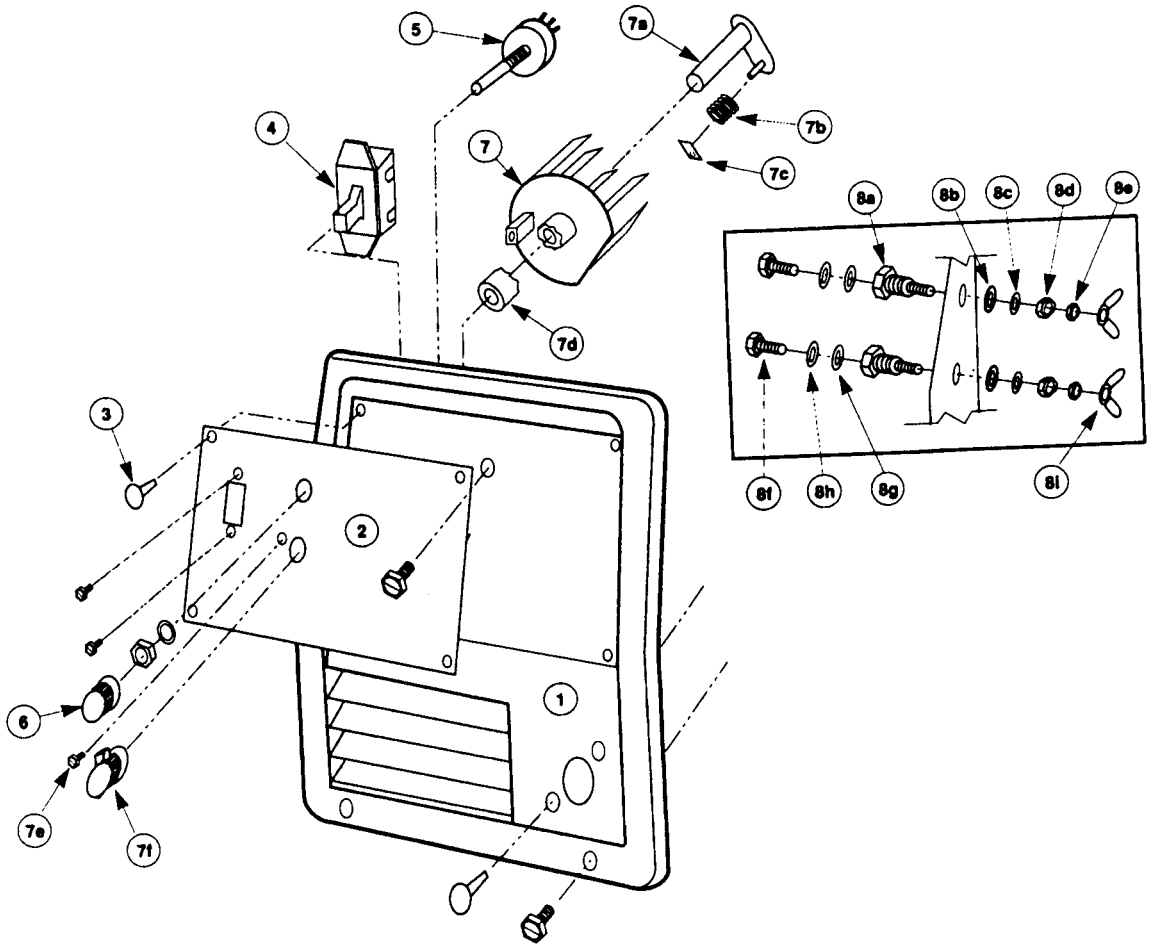
COMPLETE DRIVE ASSEMBLY/MOTOR
Figure 2



ITEM	PART NO.	PART DESCRIPTION	NO. REQ'D
	M15759-4	Complete New Drive Assembly/Motor, Includes All Items 1-10 below	1
1	L7829	Gearbox Mounting Plate	1
1a	S19127	Guide Tube Retainer	2
1b	CF000096	Round Head Screw, #8-32, 0.75" Long	4
1c	T9695-3	#8 Shakeproof Lockwasher	4
1d	S9262-3	#8 Flatwasher	4
2	L7801-1	Motor & Gearbox Assembly, Includes 1-1d and 2a	1
2a	NSS	Motor Leads	2
3	L7562	Idle Roll Arm	1
4	S18436	Idle Roll Shaft	1
5	M9300-55	Idle Roll	1
6	S20156-3	Idle Roll Pressure Parts, Includes 6a-6f	1
6a	S18442	Idle Roll Arm Clevis	1

ITEM	PART NO.	PART DESCRIPTION	NO. REQ'D
6b	T11862-41	Spring	1
6c	S9262-98	1/4" Plain Washer	1
6d	S9262-70	Plain Washer	1
6e	T9968-1	Wing Nut	1
6f	T9967-48	Roll Pin	1
7	M16190	Drive Roll, Includes 7a	1
7a	S18436	Drive Roll Set Screw	1
8	S18685-6	Guide Tube	2
9	S18879	Conductor Block	1
9a	S18884	Hose Nipple	1
9b	T9078-3	Thumb Screw	1
9c	CF0000170	Hex Head Cap Screw, 1/4"-20, 0.375" Long	1
9d	E106A-2	1/4" Lock Washer	1
9e	S9262-23	1/4" Plain Washer	1
10	S19133	Gearbox Insulation Plastic	1

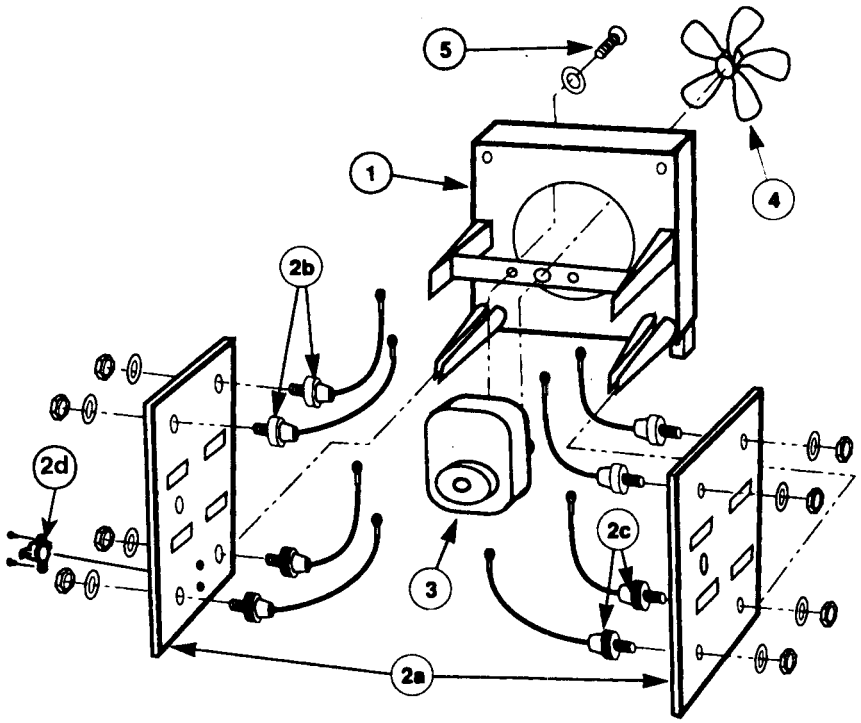
CASE FRONT ASSEMBLY
Figure 3



ITEM	PART NO.	PART DESCRIPTION	NO. REQ'D
1	A464	Molded Case Front	1
2	M16776	Nameplate	1
3	T14659-1	Fastener Buttons	4
4	S18815	On/Off Switch, Includes 4a, 4b	1
4a	S20001-1	Line Switch Mounting Bracket	1
4b	S8025-62	Phillips self-tapping screw #6-1/2"	2
5	T10812-32	Wire Speed Potentiometer, 5k, 2w, Linear (Includes lock washer, hex nut)	1
6	S18425-1	Wire Speed Potentiometer Knob	1
7	M15750-1	Arc Volts Selector Switch Assembly, Includes 7a-7f	1
7a	S18873	Rotor	1
7b	T6778	Spring	1
7c	S18923	Moving Contact	1
7d	S18872	Indexing Cam	1

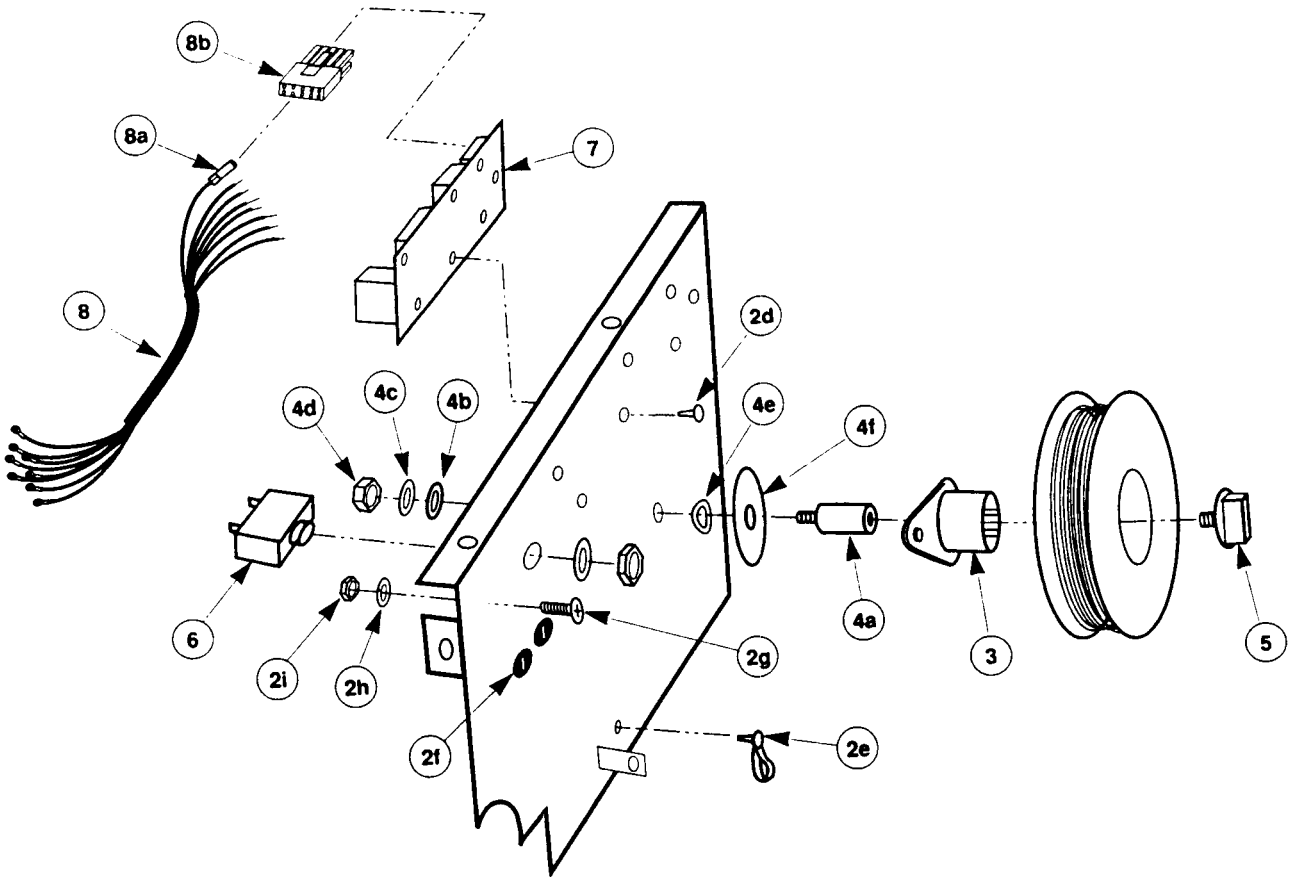
ITEM	PART NO.	PART DESCRIPTION	NO REQ'D
7e	S8025-77	#8 Hex Self Tapping Screws .62"	1
7f	M15796	Knob for Voltage Switch	1
8	S20156-4	Output Polarity Stud Mountings, Includes 8a-8i	2
8a	S18432	Polarity Stud	
8b	S9262-120	Plain Washer, .41ID/.81OD/.081" thick	1
8c	T9695-15	3/8" Shakeproof Washer	1
8d	CF000121	3/8"-16 Hex Jam Nut	1
8e	CF000300	1/4"-20 Brass Hex Nut	1
8f	CF000012	1/4"-20 Hex Cap Screw 0.50" long	1
8g	S9292-98	1/4" Plain Washer	1
8h	E106A-2	1/4" Lock Washer	1
8i	CF000017	1/4"-20 Nut	1

RECTIFIER, FAN, AND BRACKET ASSEMBLY
Figure 4



ITEM	PART NO.	PART DESCRIPTION	NO. REQ'D
	L7999-1	Complete Assembly, Includes Items 1-5 below	1
1	G1839	Bracket for Fan & Rectifier	1
2	M15966-1	Rectifier Assembly (both sides with leads)	1
2a	M15962	Rectifier Plate	2
2b	M9661-39R	Rectifier Diode, 85A, 300V, Anode Stud	4
2c	M9661-39	Rectifier Diode, 85A, 300V, Cathode Stud	4
2d	T13359-12	Thermostat	1
2e	S8025-80	Phillips Self-Tapping, Blunt Point, #6-1/4" long	2
3	M15787-1	Fan Motor	1
4	M15432	Fan Blade	1
5	T10082-27	Sems Screw to mount motor	2

CENTER PANEL ASSEMBLY
Figure 5

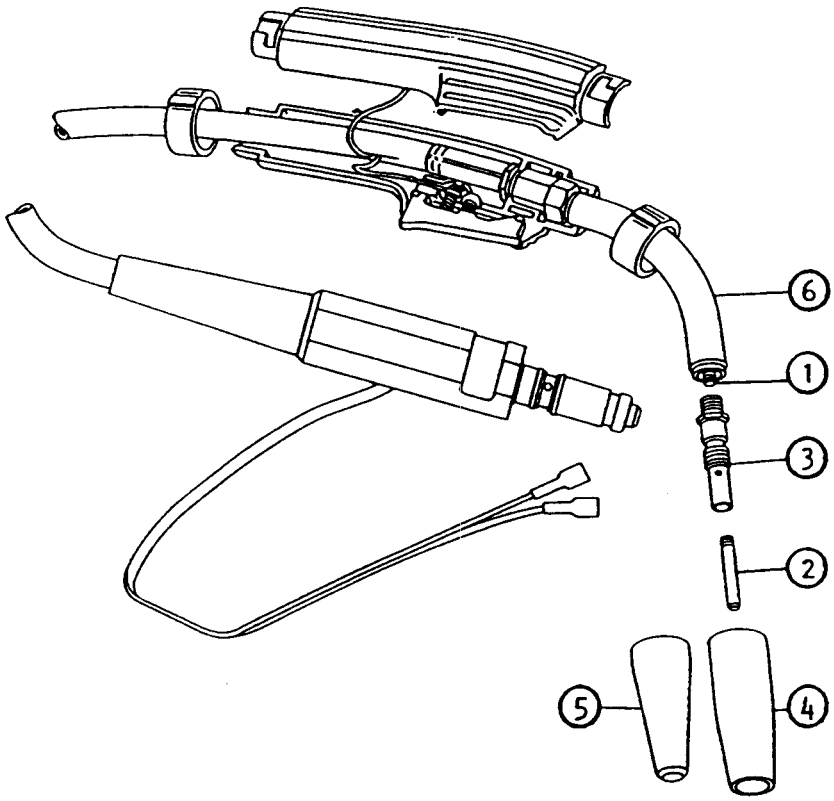


ITEM	PART NO.	PART DESCRIPTION	NO. REQ'D
2	L7569-7	Center Panel (Sheet Metal), Includes 2a-2i, and Items 4, 5, 6	1
2a	NSS	Center Panel (Sheet Metal)	1
2b	S8025-70	Slotted Hex Head Screw, #10-3/8" long, blunt point	2
2c	S8025-65	Slotted Hex Head Screw, #10-1/2" long, gimlet point	2
2d	S19300-2	P.C. Board Snap-In Support	7
2e	T13496-2	Cable Hanger	1
2f	T14530-1	Gun & Trigger Connection Receptacle	2
2g	S9225-36	Ground Screw, Pan Head Phillips, #10-24 Thread Forming Screw	1
2h	T9695-1	Ground, #10 Shakeproof Lock Washer	1
2i	CF000010	Ground, #10-24 Hex Nut	2
3	M15445	8" Spool Adapter (optional)	1

NSS - Not Sold Separately

ITEM	PART NO.	PART DESCRIPTION	NO. REQ'D
4	S20156-2	Spindle Shaft Mountings, Includes 4a-4f	1
4a	NSS	Spindle Shaft	1
4b	NSS	Plain Washer, .41ID/.81OD/.081" thick	1
4c	NSS	3/8" Split Ring Type Lock Washer	1
4d	NSS	3/8"-16 Hex Nut	1
4e	T10781-10	Bow Washer	1
4f	S18423	Wear Plate	1
4g	T12932-2	Hollow lock screw (Not Shown)	1
5	S18438	Wire Spool Thumb Screw	1
6	T12287-21	Circuit Breaker/Lock Washer & Hex Nut (25A, 250VAC)	1
7	L9073-1	Control P.C. Board	1
8	S18250-52	Plug and Lead Assembly, Includes 8a and 8b	1
8a	S18249-10	Control P.C. Board Plug (10-pin)	1
8b	S8053-123	Control P.C. Board Plug Terminals (pins)	8

MAGNUM 100L ASSEMBLY
Figure 6



ACCESSORIES AND EXPENDABLE REPLACEMENT PARTS FOR MAGNUM 100L

DESCRIPTION	PART NUMBER	SIZE
1. CABLE LINER	M16291-1	.035-.045" (0.9-1.2 mm)
For cables 15' (4.5 m) and less	-2	.025-.030" (0.6-0.8 mm)
2. CONTACT TIPS	S19726-1	.025" (0.6 mm)
Standard Duty	-2	.030" (0.8 mm)
	-3	.035" (0.9 mm)
	-4	.045" (1.2 mm)
3. Gas Diffuser	S19728	
4. GAS NOZZLE — Fixed	M16294	.50" (12.7 mm)
5. GASLESS NOZZLE	M16418	
6. GUN TUBE — 60°	S19703	

LINCOLN® ARC WELDER

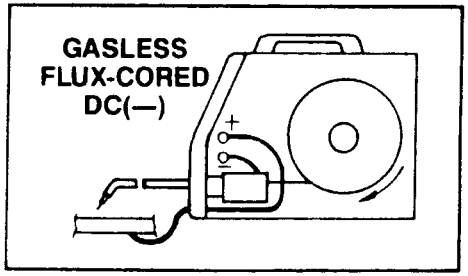
SUGGESTED SETTINGS FOR WELDING

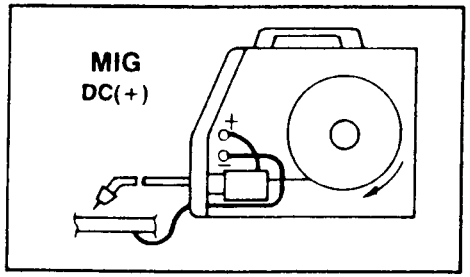
ADJUST FOR OPTIMUM WELDING

LINCOLN® ARC WELDER

PROCESS	WELDING WIRE	SHIELDING GAS	STEEL THICKNESS							
			24 ga/ .024 in. 0.60 mm	22 ga/ .030 in. 0.80 mm	20 ga/ .036 in. 1.0 mm	18 ga/ .048 in. 1.2mm	16 ga/ .060 in. 1.6 mm	14 ga/ .075 in. 2.0 mm	12 ga/ .105 in. 2.5 mm	10 ga/ .135 in. 3.5 mm
GASLESS FLUX-CORED DC(—)	.035 in. (0.9 mm) DIA. INNERSHIELD® NR®-211-MP	NONE				A-1.5	A-1.5	B-2	C-2.5	C-2.5
MIG DC(+)	.025 in. (0.6 mm) DIA. SOLID STEEL WIRE	CO_2	A-2	B-3	B-3	C-4	C-4	D-6	E-8	
		C20 or C25 (75-80% Argon, 25-20% CO_2)	A-2	A-2	B-3	C-4.5	C-4.5	D-7	E-10	
	.030 in. (0.8mm) DIA. SOLID STEEL WIRE	CO_2		B-2	B-2	C-2.5	C-2.5	D-4	E-6	
		C20 or C25 (75-80% Argon, 25-20% CO_2)		A-2	B-2.5	B-2.5	C-3.5	D-5.5	E-7.5	E-7.5

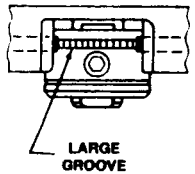
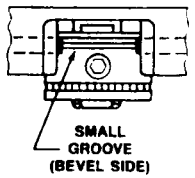
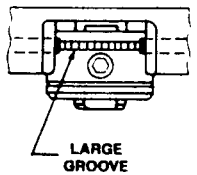
OUTPUT POLARITY





DRIVE ROLL ORIENTATION

ALIGN GROOVE WITH CENTER OF GUIDE TUBES, SECURE DRIVE ROLL WITH SET SCREW CENTERED ON FLAT

GASLESS FLUX-CORED DC(—)	MIG DC (+)	
.035 (0.9 mm) DIA. INNERSHIELD NR-211-MP	.025 (0.6 mm) DIA. SOLID STEEL WIRE	.030 (0.8 mm) DIA. SOLID STEEL WIRE
		

See manual for other required MIG conversions.

Be sure to read and understand the warnings on this welding machine and the section on ARC WELDING SAFETY PRECAUTIONS in the Operating Manual. Because design, fabrication, assembly and welding variables affect the results obtained in applying this type of information, the serviceability of a product or assembly is the responsibility of the builder/user.

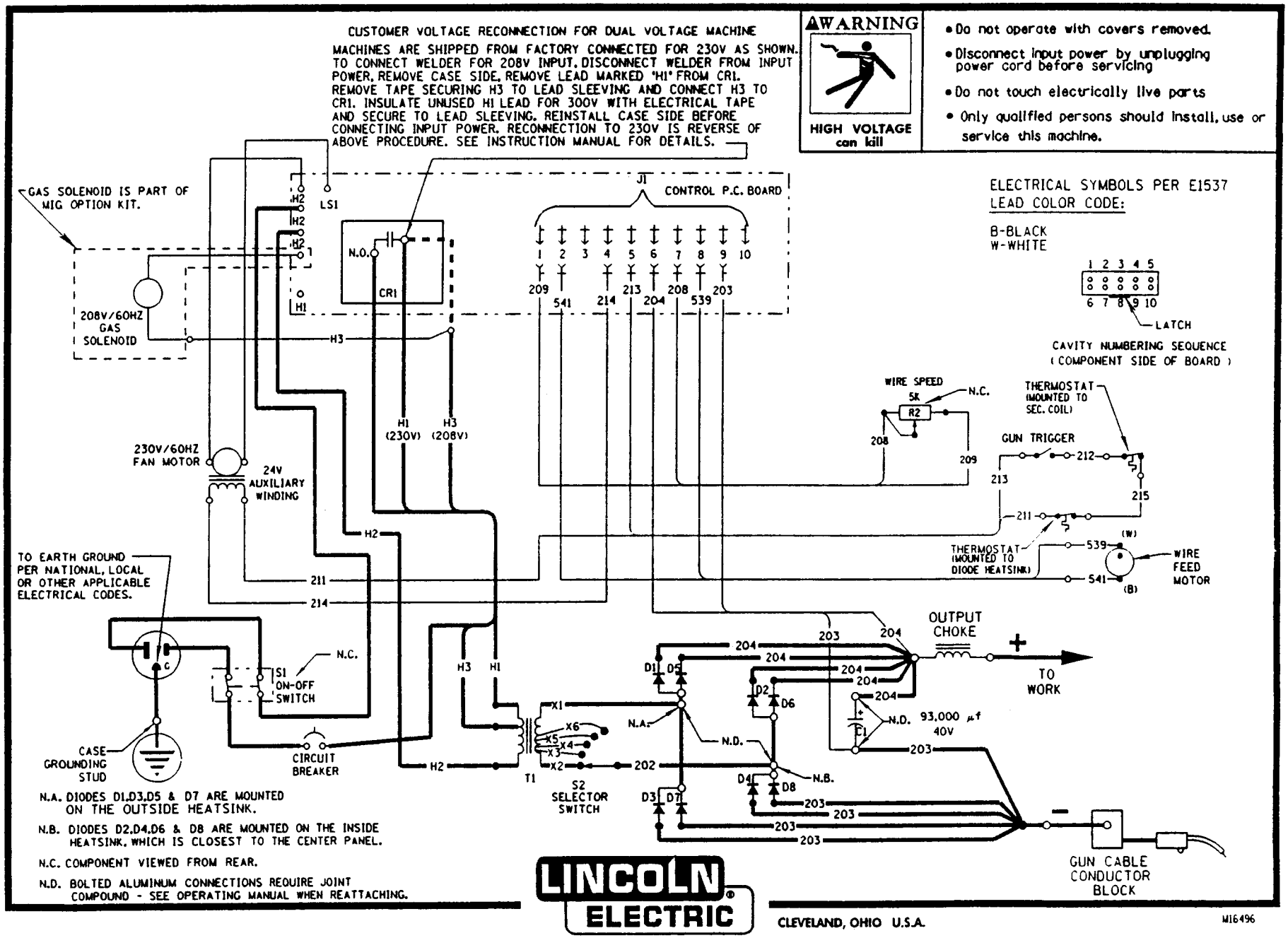
WARNING:
WHEN THE WELDING POWER SOURCE IS ON AND THE GUN TRIGGER DEPRESSED, FEED ROLLS, WIRE REEL AND ELECTRODE ARE ELECTRICALLY HOT.

AVERTISSEMENT:
LORSQUE LE POSTE DE SOUDAGE EST BRANCHE ET QUE LA DETENTE DU PISTOLET EST ENFONCEE, LES ROULEAUX D'ENTRAINMENT, LE DEVIDOIR ET L'ELECTRODE SONT MIS SOUS TENSION.

sl

L8977

WELD-PAK 125 WIRING DIAGRAM



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Procedure Handbook "Twelfth Edition"	6.50	PH		
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The American Century of John C. Lincoln	3.00	AC		
Plastic Shield	7.50	WC-37		
Welding Preheat Calculator	3.00	WC-8		
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WARNING	• Do not touch electrically live parts or electrode with skin or wet clothing. • Insulate yourself from work and ground.	• Keep flammable materials away.	• Wear eye, ear and body protection.
Spanish **AVISO DE PRECAUCION**	• No toque las partes o los electrodos bajo carga con la piel o ropa mojada. • Aislese del trabajo y de la tierra.	• Mantenga el material combustible fuera del área de trabajo.	• Protéjase los ojos, los oídos y el cuerpo.
French **ATTENTION**	• Ne laissez ni la peau ni des vêtements mouillés entrer en contact avec des pièces sous tension. • Isolez-vous du travail et de la terre.	• Gardez à l'écart de tout matériel inflammable.	• Protégez vos yeux, vos oreilles et votre corps.
German **WARNUNG**	• Berühren Sie keine stromführenden Teile oder Elektroden mit Ihrem Körper oder feuchter Kleidung! • Isolieren Sie sich von den Elektroden und dem Erdboden!	• Entfernen Sie brennbarres Material!	• Tragen Sie Augen-, Ohren- und Körperschutz!
Portuguese **ATENÇÃO**	• Não toque partes elétricas e electrodos com a pele ou roupa molhada. • Isole-se da peça e terra.	• Mantenha inflamáveis bem guardados.	• Use proteção para a vista, ouvido e corpo.
Japanese **注意事項**	• 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。 • 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。	• 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。	• 目、耳及び身体に保護具をして下さい。
Chinese **警 告**	• 皮肤或濕衣物切勿接觸帶電部件及銲條。 • 使你自己與地面和工件絕緣。	• 把一切易燃物品移離工作場所。	• 佩戴眼、耳及身體勞動保護用具。
Korean **위 험**	• 전도체나 용접봉을 젖은 헝겁 또는 피부로 절대 접촉치 마십시요. • 모재와 접지를 접촉치 마십시요.	• 인화성 물질을 접근 시키지 마시요.	• 눈, 귀와 몸에 보호장구를 착용하십시요.
Arabic **تحذير**	• لا تلمس الاجزاء التي يسري فيها التيار الكهربائي أو الالكترود بجلد الجسم أو بالملابس المبللة بالماء. • ضع عازلا على جسمك خلال العمل.	• ضع المواد القابلة للاشتعال في مكان بعيد.	• ضع أدوات وملابس واقية على عينيك وأذنيك وجسمك.

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.

			
● Keep your head out of fumes. ● Use ventilation or exhaust to remove fumes from breathing zone.	● Turn power off before servicing.	● Do not operate with panel open or guards off.	**WARNING**
● Los humos fuera de la zona de respiración. ● Mantenga la cabeza fuera de los humos. Utilice ventilación o aspiración para gases.	● Desconectar el cable de alimentación de poder de la máquina antes de iniciar cualquier servicio.	● No operar con panel abierto o guardas quitadas.	Spanish **AVISO DE PRECAUCION**
● Gardez la tête à l'écart des fumées. ● Utilisez un ventilateur ou un aspirateur pour ôter les fumées des zones de travail.	● Débranchez le courant avant l'entretien.	● N'opérez pas avec les panneaux ouverts ou avec les dispositifs de protection enlevés.	French **ATTENTION**
● Vermeiden Sie das Einatmen von Schweibrauch! ● Sorgen Sie für gute Be- und Entlüftung des Arbeitsplatzes!	● Strom vor Wartungsarbeiten abschalten! (Netzstrom völlig öffnen; Maschine anhalten!)	● Anlage nie ohne Schutzgehäuse oder Innenschutzverkleidung in Betrieb setzen!	German **WARNUNG**
● Mantenha seu rosto da fumaça. ● Use ventilação e exhaustão para remover fumo da zona respiratória.	● Não opere com as tampas removidas. ● Desligue a corrente antes de fazer serviço. ● Não toque as partes elétricas nuas.	● Mantenha-se afastado das partes moventes. ● Não opere com os paineis abertos ou guardas removidas.	Portuguese **ATENÇÃO**
● ヒュームから頭を離すようにして下さい。 ● 換気や排煙に十分留意して下さい。	● 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下さい。	● パネルやカバーを取り外したままで機械操作をしないで下さい。	Japanese **注意事項**
● 頭部遠離煙霧。 ● 在呼吸區使用通風或排風器除煙。	● 維修前切斷電源。	● 儀表板打開或沒有安全罩時不準作業。	Chinese **警 告**
● 얼굴로부터 용접가스를 멀리하십시요. ● 호흡지역으로부터 용접가스를 제거하기 위해 가스제거기나 통풍기를 사용하십시요.	● 보수전에 전원을 차단하십시요.	● 판넬이 열린 상태로 작동치 마십시요.	Korean **위 험**
● ابعد رأسك بعيداً عن الدخان. ● استعمل التهوية أو جهاز ضغط الدخان للخارج لكي تبعد الدخان عن المنطقة التي تتنفس فيها.	● اقطع التيار الكهربائي قبل القيام بأية صيانة.	● لا تشغل هذا الجهاز اذا كانت الاغطية الحديدية الواقية ليست عليه.	Arabic **تحذير**

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説明以及應該使用的銀捍材料，並請遵守貴方的有関勞動保護規定。

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.

PERFORMANCE PLUS PROTECTION

3 YEAR WARRANTY PARTS & LABOR

LINCOLN® ELECTRIC

LIMITED WARRANTY

STATEMENT OF WARRANTY:

The Lincoln Electric Company (Lincoln) warrants to the original purchaser (end-user) of new equipment that it will be free of defects in workmanship and material.

This warranty is void if Lincoln finds that the equipment has been subjected to improper care or abnormal operation.

WARRANTY PERIOD:

All warranty periods date from the date of shipment to the original purchaser and are as follows:

Three Years:

Transformer Welders
Motor-generator Welders
Inverter Welders
Automatic Wire Feeders
Semiautomatic Wire Feeders
Plasma-cutting Power Source
Engine Driven Welders (except engine and engine accessories) with operating speed under 2,000 RPM

Two Years:

Engine Driven Welders (except engine, engine accessories and Power-Arc 4000 generator/welders) with operating speed over 2,000 RPM

All engine and engine accessories are warranted by the engine or engine accessory manufacturer and are not covered by this warranty.

One Year:

Equipment not listed above such as gun and cable assemblies, water coolers, FAS TRAK or MIG-TRAK equipment, Power-Arc 4000 generator/welders, Wire Feed Module (Factory Installed) and field-installed optional equipment.

TO OBTAIN WARRANTY COVERAGE:

You are required to notify Lincoln Electric, your Lincoln Distributor, Lincoln Service Center or Field Service Shop of any defect within the warranty period. Written notification is recommended.

WARRANTY REPAIR:

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

WARRANTY COSTS:

You must bear the cost of shipping the equipment to a Lincoln Service Center or Field Service Shop as well as return shipment to you from that location.

IMPORTANT WARRANTY LIMITATIONS:

- Lincoln will not accept responsibility for repairs made without its authorization.
- Lincoln shall not be liable for consequential damages (such as loss of business, etc.) caused by the defect or reasonable delay in correcting the defect.
- Lincoln's liability under this warranty shall not exceed the cost of correcting 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.

WARRANTY SUPERSEDED SEE IMWS-1

March, '96