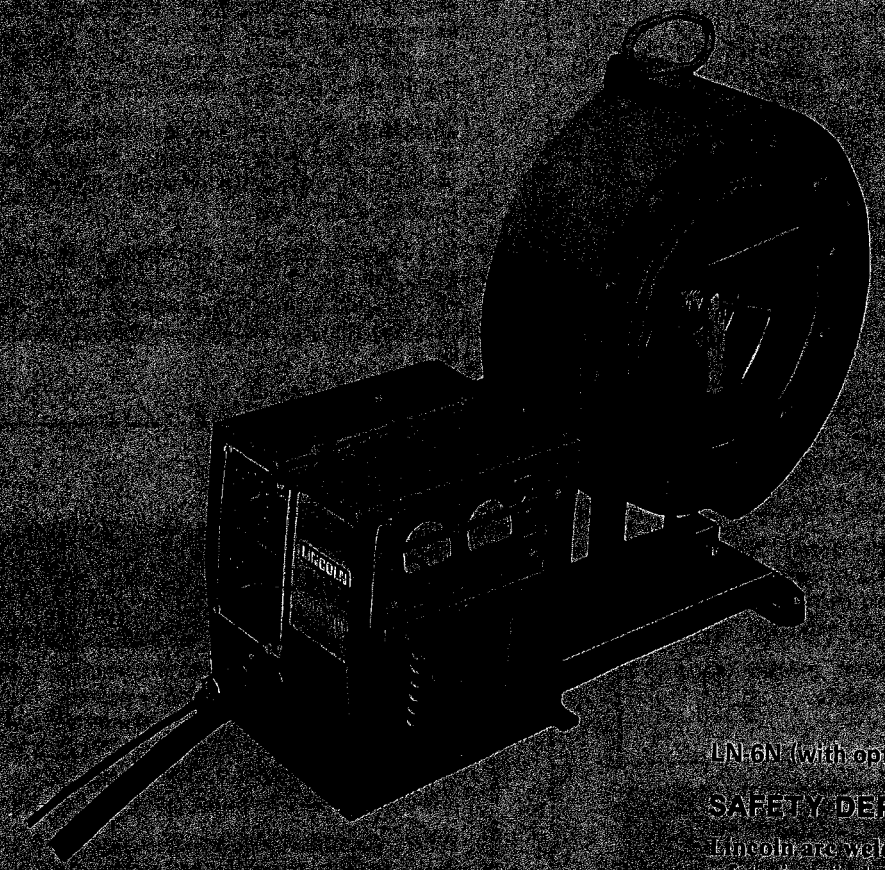
IM-260
IM260
LN-6
November, 1990
6755; 6756;
6773; 6801

LN-6
WIRE FEEDER

For Submerged Arc, Innershield® and other Open Arc Semi-Automatic Arc Welding Processes.

Operates with other Constant Voltage or Variable Voltage Power Sources.



This manual covers equipment which is obsolete and no longer in production by The Lincoln Electric Co. Specifications and the availability of optional features may have changed.

LN-6N (with optional meters)

SHIPPING DAMAGE CLAIMS

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

SAFETY DEPENDS ON YOU

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

THE LINCOLN ELECTRIC COMPANY
Cleveland, Ohio, U.S.A.

ARC WELDING SAFETY PRECAUTIONS

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

ELECTRIC SHOCK can kill.

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

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

   c. Insulate yourself from work and ground using dry insulation. When welding in damp locations, on metal framework such as floors, gratings or scaffolds, and when in positions such as sitting or lying, make certain the insulation is large enough to cover your full area of physical contact with work and ground.

   d. Always be sure the work cable makes a good electrical connection with the metal being welded. The connection should be as close as possible to the area being welded.

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

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

   g. Never dip the electrode in water for cooling.

   h. Never simultaneously touch electrically "hot" parts of electrode holders connected to two welders because voltage between the two can be the total of the open circuit voltage of both welders.

   i. When working above floor level, protect yourself from a fall should you get a shock.

   j. Also see Items 4c and 6.

ARC RAYS can burn.

2. a. Use a shield with the proper filter and cover plates to protect your eyes from sparks and the rays of the arc when welding or observing open arc welding. Headshield and filter lens should conform to ANSI Z87.1 standards.

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

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

FUMES AND GASES can be dangerous.

3. a. Welding may produce fumes and gases hazardous to health. Avoid breathing these fumes and gases. When welding, keep your head out of the fume. Use enough ventilation and/or exhaust at the arc to keep fumes and gases away from the breathing zone. When welding on galvanized, lead or cadmium plated steel and other metals which produce toxic fumes, even greater care must be taken.

   b. Do not weld in locations near chlorinated hydrocarbon vapors coming from degreasing, cleaning or spraying operations. The heat and rays of the arc can react with solvent vapors to form phosgene, a highly toxic gas, and other irritating products.

   c. Shielding gases used for arc welding can displace air and cause injury or death. Always use enough ventilation, especially in confined areas, to insure breathing air is safe.

   d. Read and understand the manufacturer's instructions for this equipment and the consumables to be used, including the material safety data sheet (MSDS) and follow your employer's safety practices.

   e. Also see item 7b.

WELDING SPARKS can cause fire or explosion.

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

   b. Where compressed gases are to be used at the job site, special precautions should be used to prevent hazardous situations. Refer to "Safety in Welding and Cutting" (ANSI Standard Z49.1) and the operating information for the equipment being used.

   c. When not welding, make certain no part of the electrode circuit is touching the work or ground. Accidental contact can cause overheating and create a fire hazard.

   d. Do not heat, cut or weld tanks, drums or containers until the proper steps have been taken to insure that such procedures will not cause flammable or toxic vapors from substances inside. They can cause an explosion even though they have been "cleaned." For information purchase "Recommended Safe Practices for the Preparation for

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

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

f. Sparks and spatter are thrown from the welding arc. Wear oil free protective garments such as leather gloves, heavy shirt, cuffless trousers, high shoes and a cap over your hair. Wear ear plugs when welding out of position or in confined places. Always wear safety glasses with side shields when in a welding area.

g. Connect the work cable to the work as close to the welding area as practical. Work cables connected to the building framework or other locations away from the welding area increase the possibility of the welding current passing through lifting chains, crane cables or other alternate circuits. This can create fire hazards or overheat lifting chains or cables until they fail.

h. Also see item 7c.

CYLINDER may explode if damaged.

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

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

c. Cylinders should be located:
- Away from areas where they may be struck or subjected to physical damage.
- A safe distance from arc welding or cutting operations and any other source of heat, sparks, or flame.

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

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

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

g. Read and follow the instructions on compressed gas cylinders, associated equipment, and CGA publication P-1, "Precautions for Safe Handling of Compressed Gases in Cylinders," available from the Compressed Gas Association, 1235 Jefferson Davis Highway, Arlington, VA 22202.

FOR ELECTRICALLY powered equipment.

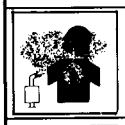
6. a. Turn off input power using the disconnect switch at the fuse box before working on the equipment.

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

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.



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

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

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

e. In some cases it may be necessary to remove safety guards to perform required maintenance. Remove guards only when necessary and replace them when the maintenance requiring their removal is complete. Always use the greatest care when working near moving parts.

f. Do not put your hands near the engine fan. Do not attempt to override the governor or idler by pushing on the throttle control rods while the engine is running.

g. To prevent accidentally starting gasoline engines while turning the engine or welding generator during maintenance work, disconnect the spark plug wires, distributor cap or magneto wire as appropriate.

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

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

For more detailed information, it is strongly recommended that you purchase a copy of "Safety in Welding & Cutting — ANSI Standard Z49.1" from the American Welding Society, P.O. Box 351040, Miami, Florida 33135 or CSA Standard W117.2-1974.

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 vètements 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 de fonctionnement.
   d. Ne jamais plonger le porte-électrode dans l'eau pour le refroidir.
   e. Ne jamais toucher simultanément les parties sous tension des porte-électrodes connectés à deux machines à souder parce que la tension entre les deux pinces peut être le total de la tension à vide des deux machines.
   f. Si on utilise la machine à souder comme une source de courant pour soudage semi-automatique, ces précautions pour le porte-électrode s'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 protèger 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 èchauffement 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 particulièrement 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.

SEC. H1 INDEX

Sec. H2 Sequence of Installation

The Lincoln Electric Company
Cleveland, Ohio 44117

Sec. H3 Operating Instructions

Sec. K6 Maintenance

April 1981

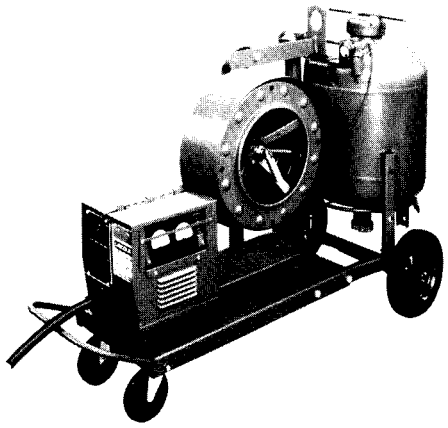
SEC. H2 ASSEMBLY AND INSTALLATION

SEC. H2.2 MECHANICAL INSTALLATION

Sec. H2.2.1

Wire Feed Unit and Wire Reel

1. **LN-6S** is shipped with the wire feed unit, wire reel mount and flux tank installed on the undercarriage.



LN-6S

If the wheels are not installed, mount the casters in the front and wheels at the rear. Be sure the round rear axle is to the rear of the mounting bolts that hold the u-shaped axle members to the frame. Bolt the handle to the front of the base.

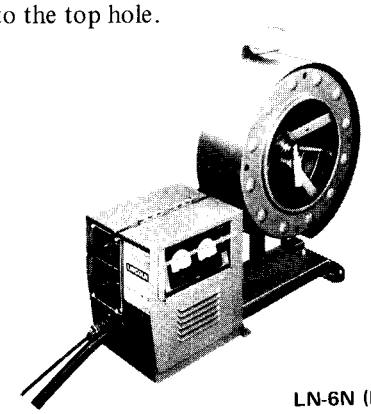
The four basic sections – wire feed unit, flux tank, reel mount, and undercarriage – can be separated and mounted where most convenient for the specific application needs.

2. **LN-6SE** is shipped with the wire feed unit, wire reel mount including door and hand crank, and flux tank installed on the undercarriage. Install the handle to the undercarriage per instructions for "LN-6S" above.

Remove the three bolts that hold the wire feed unit to the wire reel mount. Place the wire feed unit near the welding location and install the extension cable per Sec. H2.2.12.

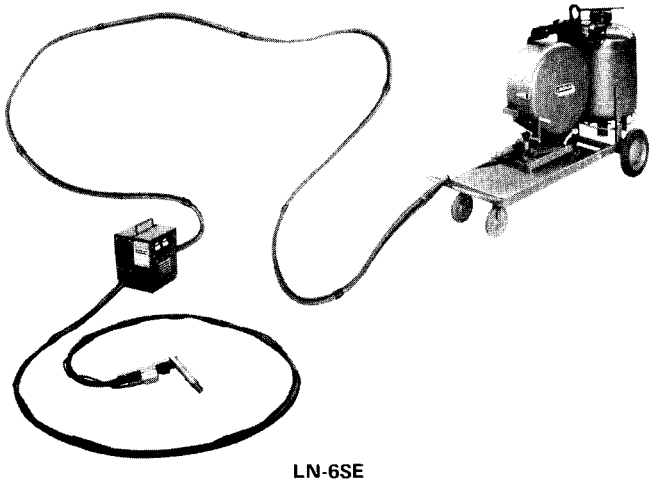
The wire reel mount and flux tank can be removed from the undercarriage and located where convenient for a particular installation.

3. **LN-6N** wire feed unit and wire reel mount are shipped separately. To connect:
   a. Remove the three 3/8" screws from the back of the wire drive unit.
   b. Place the reel mounting bracket in position.
   c. Replace and tighten the screws. The long screw goes into the top hole.

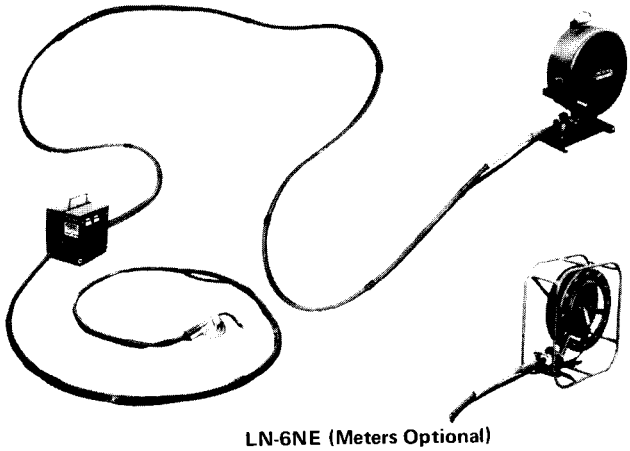


LN-6N (Meters Optional)

4. **LN-6NE** wire feed unit, wire reel with hand crank, and extension cables are shipped separately. Install per Sec. H2.2.12.



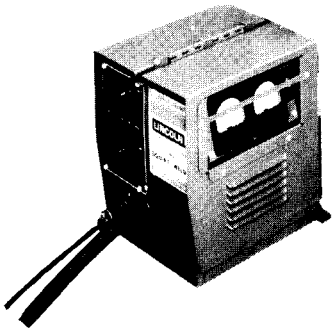
LN-6SE



LN-6NE (Meters Optional)

To convert LN-6N to LN-6NE order the appropriate parts indicated in the photo above.

5. **LN-6F** includes no wire reel mounting. The customer must build the wire reel, Speed Feed Drum, or Speed Feed Reel pay-off equipment for his specific needs.



LN-6F (Meters Optional)

October 1971

Sec. H2.2.2

Wire Feed Rolls and Guide Tubes

The drive rolls and guide tubes for the wire size specified on the machine order are shipped loose with the wire feed unit. Install these parts per the following instructions:

1. Loosen idle roll spring pressure screw.
2. Remove clamping collar from the drive shaft.
3. Install drive roll with the key and replace clamping collar. Tighten screw.
4. Remove idle roll shaft screw – install idle roll. Replace screw and tighten.
5. Remove the large ingoing guide from rear brass block.
6. Loosen the ingoing guide tube clamping screw. Install the guide tube which is stenciled "in" through the rear brass block. Tighten the locking screw.
7. Replace the large ingoing guide tube into rear brass block. Tighten the locking screw.
8. Install the outgoing guide tube with its plastic insert through the front brass block. Tighten the locking screw.
9. Tighten the idle roll tension screw to the proper tension with wire between the drive rolls.

The drive rolls are stamped with the wire size for which they are designed. If a wire size other than that stamped on the drive roll is to be used, the drive rolls and guide tubes may have to be changed. See parts list Sec. H7.3 page 107-G, in the back of this manual for the necessary parts.

July 1970

Sec. H2.2.3

Gun and Gun Cable

GENERAL

The LN-6 is used with various guns. In all cases the gun is shipped connected to the cable ready-to-weld. Use the gun recommended for the wire type (solid or 'Innershield') and size to be used.

Note: The guns described below were available at the time this sheet was printed. They may not be today. See Lincoln Specification literature for up-to-date information.

GUN CABLE: LN-6 TO GUN

Lay the cable out straight. Insert the male end of the welding conductor cable into the brass block on the front of the LN-6. Make sure it is in all the way and tighten the locking screw with a 3/16" allen wrench. Keep this connection clean and bright. Insert the control cable polarized plug into the receptacle next to the coupling.

SUBMERGED ARC GUNS

For 1/16" wire, use Squirtgun K-112.
For 5/64" wire, use Squirtgun K-113.
For 3/32" wire, use Squirtgun K-114 (also can be used for 5/64" wire). This gun is designed for use with the mechanized travel units.

These Squirtguns can be used with the continuous flux feed system. If the flux tank is not used, attach the optional gravity feed flux cone (K-119) to the K-112 or K-113 gun with the screws provided. The cone also includes a new clamp to be used to hold the trigger pod to the gun. Use it in place of the clamp shipped with the gun.

INNERSHIELD GUNS

Squirtgun K-126 is recommended for most welding with .068 through 3/32" wire. Install insulated nozzle extension (or thread protector) and the nozzle contact tip for the stickout and wire size being used.

For heavy duty welding with 3/32" wire use either Squirtgun K-115-3/32, K-115-45-3/32 or K-116-3/32. K-116 has an adjustable handle and is used for higher welding currents. K-115 is lighter. Install 3/32" contact tip and the insulated nozzle extension for the stickout being used.

For welding with 7/64" and .120" wire, use K-115-120, K-115-45-120 or K-116-120. Install the nozzle insulated nozzle extension and the contact tip for the stickout and wire size being used.

July 1970

Sec. H2.2.6

LN-6S and LN-6SE Continuous Flux Feed (Submerged Arc)

a. Flux Hose

Connect the loose end of the hose to the tube at the back end of the welding gun. Tighten the hose clamp. If the hose is taped to the gun cable, be sure it is not collapsed or deformed because this could cause flux feeding problems.

b. Input Air Connection

The air for the automatic flux feeding system is obtained from the regular plant compressed air system providing the plant system pressure is between 60 and 120 psi. The tank is equipped with a pressure regulator to reduce the input pressure to the 26 to 30 psi required for the flux feeding system. This pressure is set at the factory before the machine is shipped. When the LN-6SE with the 22-1/2 or 45' extension is used, increase the pressure setting to 55-60 psi. Exact pressure is indicated on the pressure gage. Air consumption is normally less than 1.5 cubic feet per minute of welding.

MECHANICAL INSTALLATION – CONT'D

Connect the input air hose to the street elbow located at the right side of the flux tank. A quick disconnect connector should be installed between the elbow and the input hose.

The tank air system is equipped with a water and dirt separator. Water separated from the input air feeds down through the long flux filled tube located at the input connection. It is exhausted from the system through the coiled tube below the flux tank. There is always a small amount of air and possibly water coming out of the end of this tube.

July 1969

Sec. H2.2.9

Remote Control Box Mounting

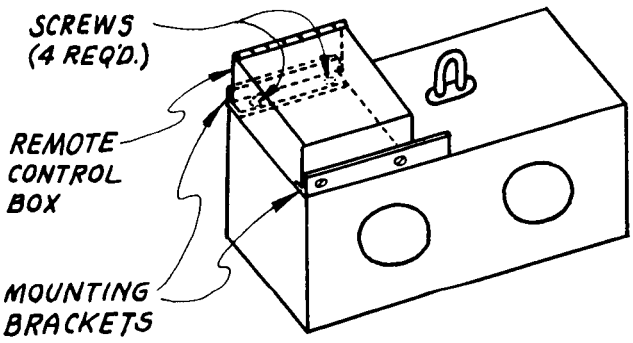
The mounting location of the remote control box varies depending upon the type of power source. Its usual locations are as follows:

1. On the control box of a motor-generator (see below).
2. Inside engine driven welders (see the appropriate page in Sec. H2.3.1).
3. On the Contactor/Power Pack Kit (see below).
4. On the side panel of Idealarc R3S (see Sec. H2.3.1-G).

Two holes are provided in the back of the case if it is to be mounted elsewhere.

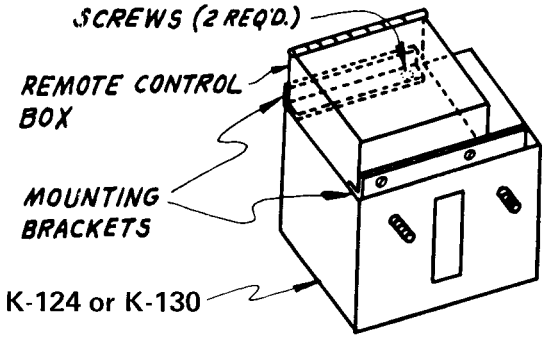
To mount on a motor generator control box:

1. Remove four of the screws holding top of control box per the sketch.
2. Put brackets supplied with the remote control box in place and replace screws.
3. Place remote box with the hinges toward the back of the power source control box. Mount it with screws provided.



To mount on the K-124 and K-130:

1. Remove two screws holding top of contactor kit.
2. Put brackets supplied with the remote control box in place and replace screws.
3. Mount remote box with screws provided.



July 1969

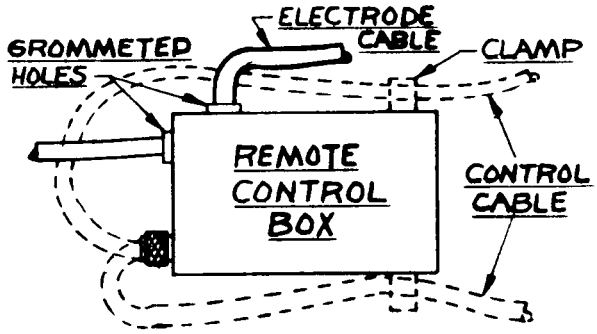
Sec. H2.2.11

LN-6N, LN-6F or LN-6S Input Cable Installation

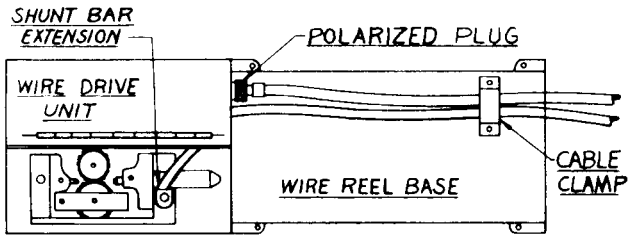
For installation of the wire reel and input cable of the LN-6NE and LN-6SE with the 22-1/2 and 45' extension unit, see Sec. H2.2.12.

The input cable consists of an electrode cable and a multiconductor control cable. The control cable has polarized plugs on both ends. To install:

1. On the end of the cable with the longer electrode cable, connect the polarized plug to the mating connector on the remote control box.
2. Clamp the control cable to either side of the remote control box as shown in the sketch. When shipped the clamp and self tapping screw are taped to the input control cable. A screw hole is punched in both of the clamp locations.
3. Run the electrode cable through the grommet holes in the remote control box. If the cable assembly has two or three electrode leads, only run one 4/0 cable through the grommets. Connect the lead to the electrode stud on the power source (or on the Power Pack/Contactor Kit if one is used).



4. Loosen the clamp on the wire reel base and pass the control cable through the clamp. Connect the polarized plug on the control cable to the receptacle on the back of the wire feed unit.
5. Pass the electrode cable through the clamp. (On cables with more than one electrode lead, leave the junction between the two or more leads and the short 4/0 stub behind the clamp.) Then pass the single electrode cable through the hole in the back of the control section next to the center channel and fasten it to the shunt bar extension. Tighten the clamp.



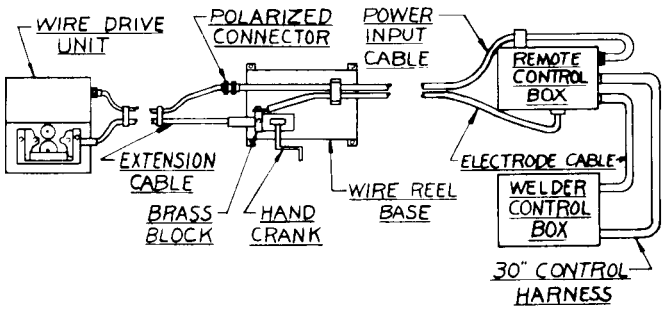
July 1970

Sec. H2.2.12

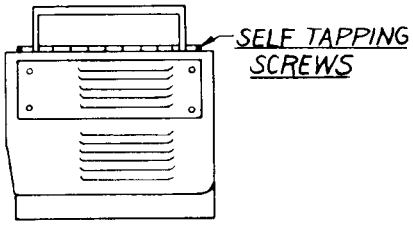
LN-6NE and LN-6SE Wire Reel Housing & Input Cable Installation

The extension unit consists of a wire reel mounting and either a 22-1/2' or 45' extension cable assembly. The cable is rated at 450 amps, 50% duty cycle. For higher currents install a parallel length of 1/0 cable per paragraph 12. The extension cables can be used for .068 thru .120" tubular wire and 5/64 thru 3/32" solid wire. 22-1/2 cables can also be used for 1/16" wires.

1. When shipped, the hand crank on the wire reel support is equipped to feed 3/32 - .120" wire. A roll for feeding .068 - 1/16 - 5/64" wire is shipped with the unit. The rolls are stenciled for identification.
2. The multiconductor control cable of the input cable assembly has a polarized plug on both ends. Take the end with a longer electrode cable. Connect the polarized plug to the mating connector on the remote control.
3. Clamp the control cable to either side of the remote control box as shown in the sketch in Sec. H2.2.11. When shipped the clamp and self tapping screw are taped to the input control cable. A screw hole is punched in both of the clamp locations.
4. Run the electrode cable of the input cable assembly through the grommets in the remote control box. If the cable assembly has two or three electrode leads, run only one 4/0 cable through the grommets. Connect the lead to the electrode stud on the power source (or on the Power Pack/Contactor Kit if one is used).
5. At the other end of the input cable assembly, connect the electrode cable to the brass block on the hand crank assembly using the screw provided.
6. Position the 22-1/2' or 45' extension cable assembly so the polarized connector with the threads on its OD is at the wire reel housing.



7. Connect the polarized connectors on the extension cable and the input cable together.
8. Place both the control and electrode cables of the input cable assembly under the clamp and fasten them to the bottom of the wire reel housing.
9. Insert the connector on the electrode cable of the extension assembly into the brass block of the hand crank assembly and tighten with a 3/16" Allen wrench.
10. At the wire drive unit connect the polarized plug of the extension control cable to the receptacle on the back of the LN-6.
11. Remove the ingoing guide tube from the rear brass block and plug the connector of the conductor cable into the brass block. Tighten the locking screw with 3/16 inch Allen wrench. The guide tube removed is not used when the extension assembly is installed.
12. If using currents over 450 amperes, connect a length of 1/0 cable between the brass block on the wire reel housing and the shunt bar extension in the wire drive unit. Tape this cable to the extension assembly. Proper cable lengths are as follows:
    22-1/2' extension use 23-1/2' – order M-5906-106
    45' extension use 46' – order M-5906-104
13. To mount the wire drive unit handle provided with the extension unit, remove the two self tapping screws that hold the hinge pin in the top of the wire feed unit. Push the hinge pin out leaving the covers intact. Place the handles into the slots provided, push the hinge pin back into the assembly making sure the pin goes through the holes in the handle. Put the two self tapping screws back into the respective positions.



14. If the extension is used for submerged arc welding, replace the 18' flux hose attached to the bottom of the flux tank with the hose shipped with the extension. If the hose is taped to the extension cables, be sure it is not collapsed or deformed because this will cause feeding problems.

July 1969

SEC. H2.3 ELECTRICAL INSTALLATION

WARNING: Have qualified personnel do all installation, maintenance and troubleshooting work. Turn the input power off at the fuse box before working inside the machine.

Sec. H2.3.1-A

Power Source Connection

Connection of the LN-6 and remote control box to the power source varies depending upon the power source. See the following pages of Sec. H3.1 for instructions covering the specific power source to be used.

Do not connect more than one LN-6 or any leads other than those shown on the connection diagrams to the terminal strip on the power source or the Power Pack/Contactor Kit. If other equipment must be connected to this terminal strip, consult the factory giving full information.

For connecting to Lincoln power sources not covered in Sec. H2.3.1, write to the factory. Give the code number for the equipment to be used.

The LN-6 control circuit requires the following power to operate:

1. An isolated source of 115 volt AC, 350 V.A. capacity (connected to leads # 31 and # 32).
2. An isolated supply of 115 volt DC, 1 amp capacity (connected to leads # 1 and # 2).

Also to have the wire electrically "cold" when not welding, the following equipment is needed:

3. A 115 volt DC pilot relay (2 CR) to operate the welding contactor.
4. A welding output contactor. The power to operate this contactor is not included in the 350 V.A. supply listed in item 1.

If this power and equipment is not included in the power source, installation of a separate Power Pack/Contactor Kit (K-124 or K-130) is required.

February 1970

The Lincoln Electric Company
Cleveland, Ohio 44117

Sec. H2.3.1-B

Connection of LN-6 to Idealarc TM or R3M and Power Pack/ContactorKit

1. Turn off input power to power source at the disconnect switch. Place the Power Pack/Contactor Kit in its permanent location near the welder.

2. Remove the cover of the contactor box. Connect two #14 input voltage wires from the transformer side of the power source input starter to the contactor box. Route these leads through the box connector provided. Make the proper connections in the contactor box to the transformer, pilot relay and contactor coil according to the welder input voltage and the connection table on the wiring diagram pasted inside the contactor box cover. These are high voltage leads and should be installed in a manner consistent with good electrical practice. Replace the cover on the contactor box leaving out top two screws until step #3.

3. Mount the LN-6 remote control box on top the contactor box per Sec. H2.2.9.

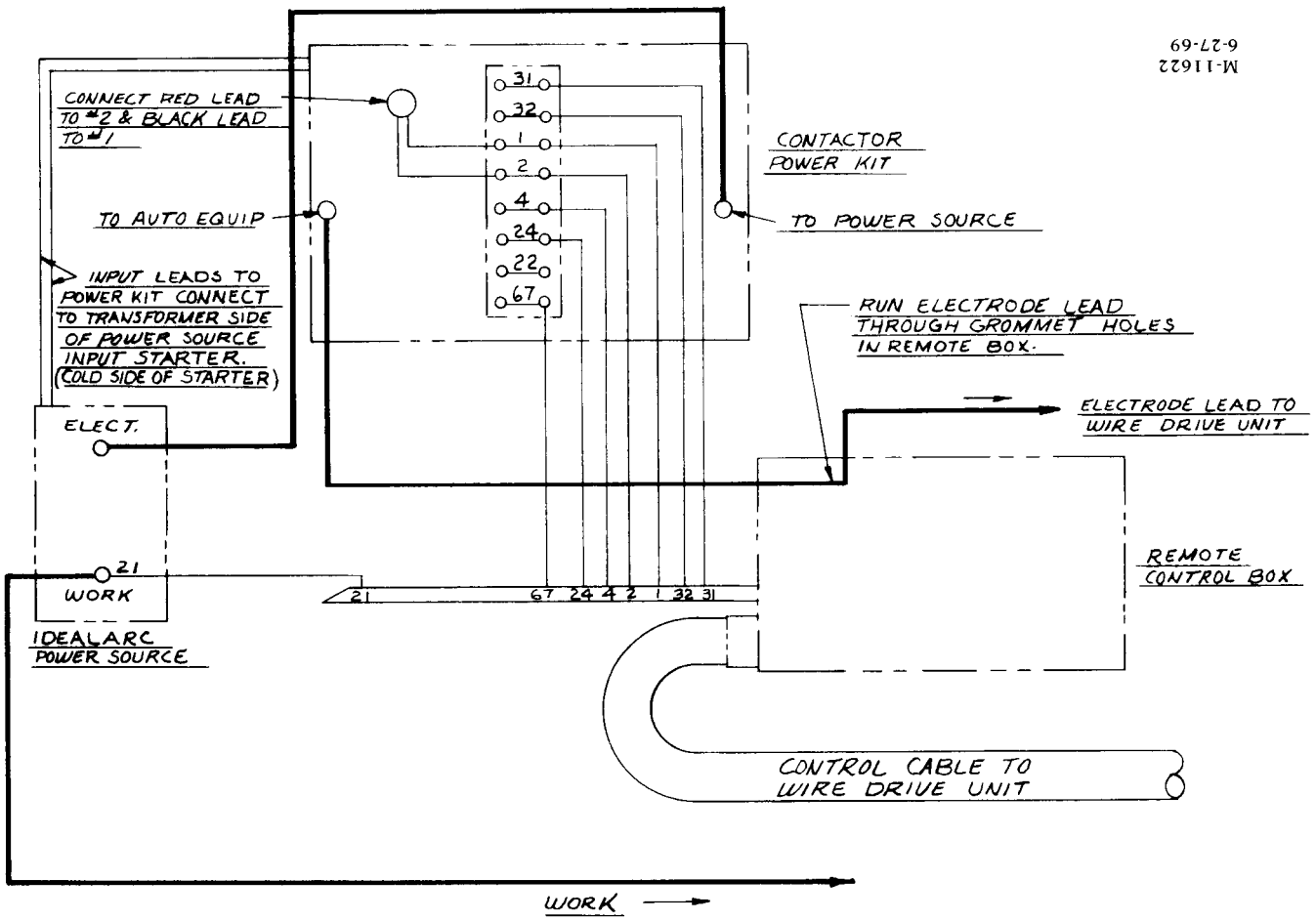
4. Make connections exactly as specified on wiring diagram below. Use the proper size welding cable for leads shown as heavy lines on the diagram. The cable to the 'To Automatic Equip'. stud is part of the standard LN-6 input cable.

5. Connect the input cable between the remote control box and the wire feed unit. Be certain the control cable is clamped to the side of the remote control box. See Sec. H2.2.11 or Sec. H2.2.12 for complete instructions.

6. On the inside of the remote control box, place the switch in the position for variable voltage power sources. Be sure the 'Variable Voltage Power Source' nameplate is on top (see Sec. H2.3.4).

7. With this connection the 'Amps' control on the LN-6 is not in the circuit and has no function. Use the LN-6 'volts' control and the power source current control to set procedures.

July 1969



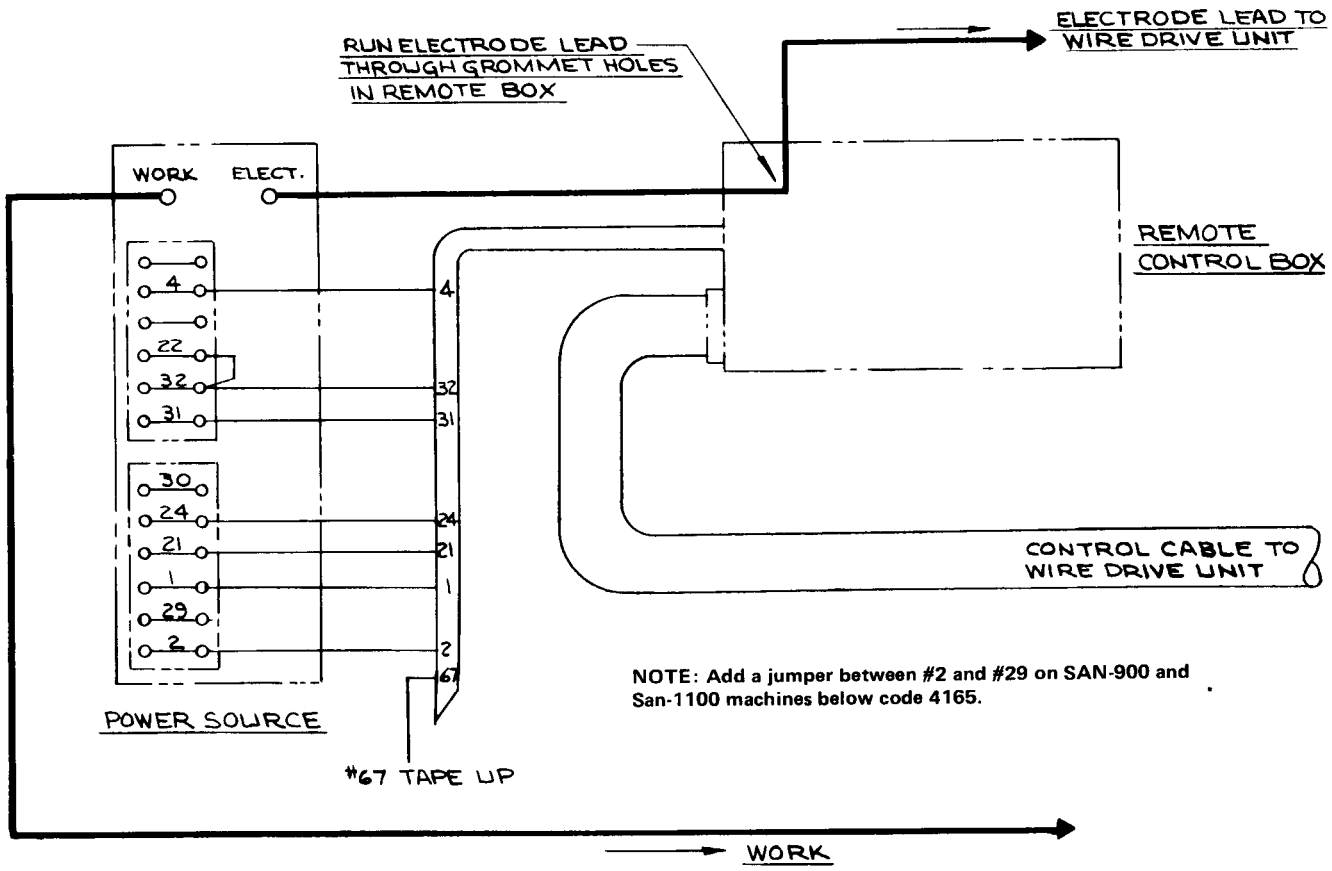
Sec. H2.3.1-C

Connection of LN-6 to SAN-600, SAN-900 or SAN-1000

1. Turn power source off.
2. Mount the LN-6 remote control box on top of the welder control box at the starter end per Sec. H2.2.9.
3. Make connections exactly (including jumpers on terminal strips) as specified on wiring diagram below. Use the proper size welding cable for leads shown as heavy lines. The electrode lead is part of the standard LN-6 input cable.
4. Connect the input cable between the remote control box and the wire feed unit. Be certain the control cable is clamped to the side of the remote control box. See Sec. H2.2.11 or Sec. H2.2.12 for complete instructions.
5. On the inside of the remote control box place the switch in the position for constant voltage power sources. Be sure the 'Constant Voltage Power Source' nameplate is on top (see Sec. H2.3.4).

February 1978

M-11623
6-27-69



The Lincoln Electric Company
Cleveland, Ohio 44117

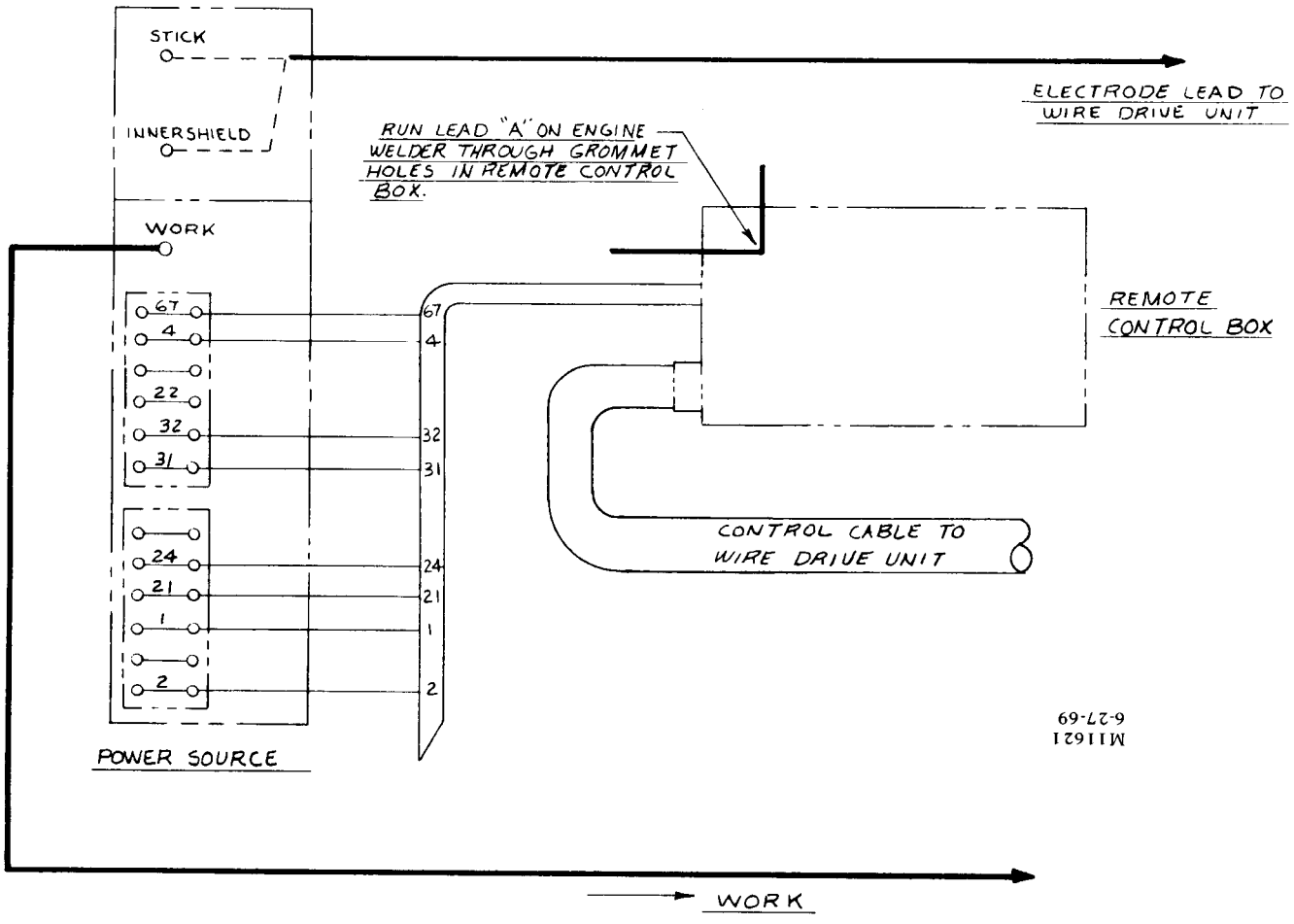
Sec. H2.3.1-D

Connection of LN-6 to SAF-300-F162 and -F163

This welder is especially suited as a power source for the LN-6 squirt welder. Connection instructions are as follows (turn power source off):

1. A mounting panel for the LN-6 remote control box is located inside this power source. For access to this panel, open the door on the side where the oil fill pipe is located.
2. Locate the 1/0 lead "A" that passes through a clamp on the remote control box mounting panel.
3. Disconnect this lead at the 'Slope Selector' switch.
4. Mount the LN-6 remote control box to the panel using the two mounting holes provided in the panel.
5. Route lead "A" through the grommet in the corner of the LN-6 remote control box as shown in the sketch in Sec. H2.2.11. Reconnect the lead to the 'Slope Selector' switch. Make sure the connection is tight.
6. Make the connections exactly as specified on wiring diagram below. Use the proper size cables for the leads shown as heavy lines. The electrode lead is part of the LN-6 standard input cable.
7. Per Sec. H2.2.11 or Sec. H2.2.12 plug the input cable into the receptacle and clamp it to the side of the remote control box. Route the cable under the doors of the power source and connect it to the wire feed unit.
8. The AC output of the SAF-300 is 50 cycle. Therefore, when using this power source, reconnect the LN-6 for 50 cycle operation per the LN-6 wiring diagram or Sec. H2.3.3. Tape the unused leads.
9. On the inside of the remote control box place the toggle switch in the proper position (constant voltage or variable voltage) for the output stud to be used. Be sure the appropriate LN-6 nameplate is on top (see Sec. H2.3.4).

February 1978



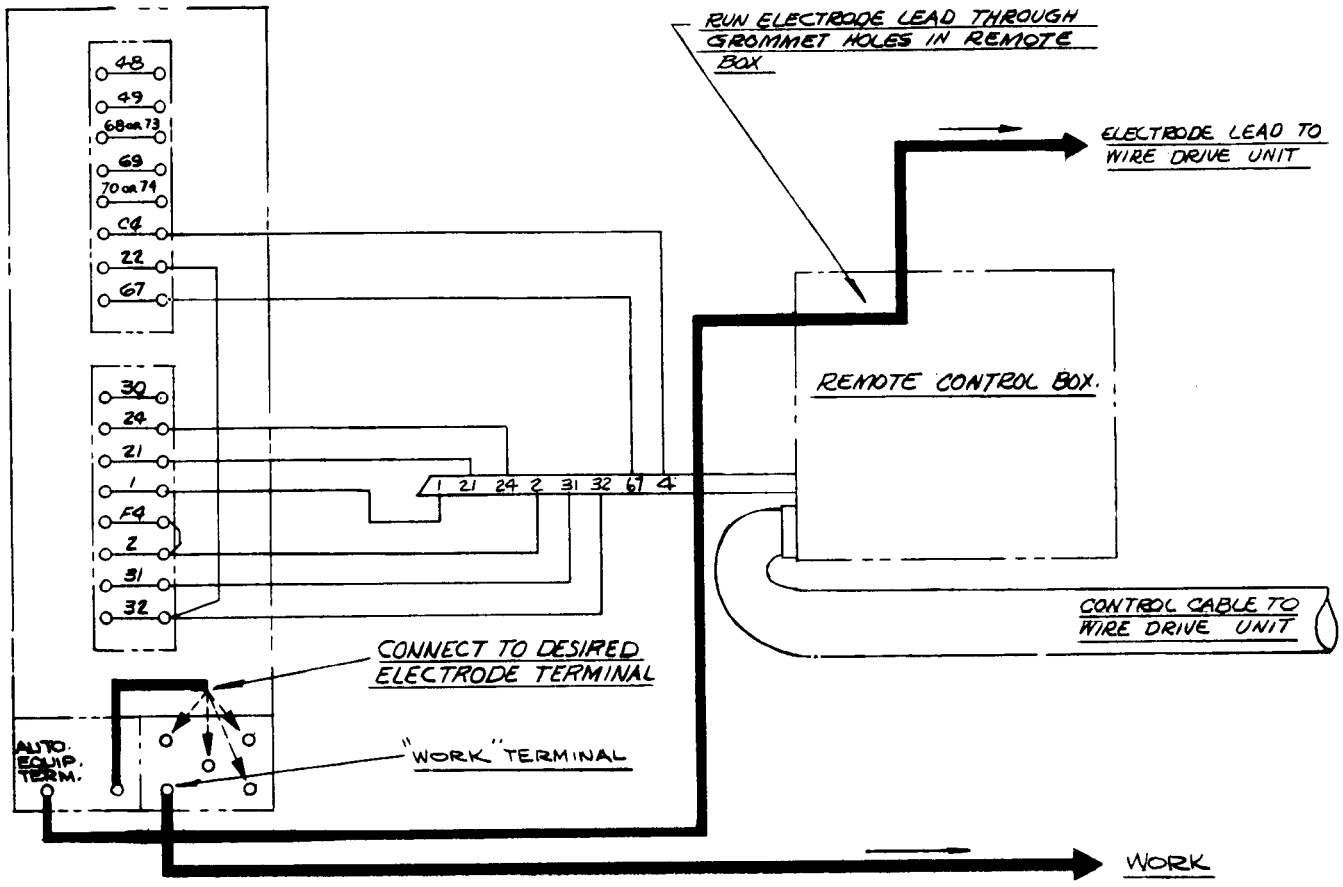
Sec. H2.3.1-E

Connection of LN-6 to SAF-600, SA-800 (Types "-0" or "-OF") or SAF-600-B (Belted Type "-AO") Equipped With Contactor

1. Turn power source off.
2. Mount the LN-6 remote control box on top of the power source control box at the starter end per Sec. H2.2.9.
3. Make connections exactly (including jumpers on terminal strips) as specified on wiring diagram below. Use the proper size welding cable for leads shown as heavy lines. The electrode lead is part of the standard LN-6 input cable. Connect this lead to the contactor box stud as specified in the diagram.
4. Connect the input cable between the remote control box and the wire feed unit. Be certain the control cable is clamped to the side of the remote control box. See Sec. H2.2.11 or Sec. H2.2.12 for complete instructions.
5. On the inside of the remote control box, place the switch in the proper position – constant voltage or variable voltage – for the power source stud to be used. Be sure the appropriate nameplate is on top (See Sec. H2.3.4.

February 1978

M-11620
6-27-69



The Lincoln Electric Company
Cleveland, Ohio 44117

Sec. H2.3.1-F

Connection of LN-6 to SAM

- Turn power source off.

Motor Generator Machines

1. Mount the LN-6 remote control box on top of the power source control box per Sec. H2.2.9.
2. Make the connections exactly as specified on the connection wiring diagram below. Use the proper size welding cable for the leads shown as heavy lines on the diagram. See Sec. H2.2.11 for connecting the input cable to the LN-6.
3. Connect the input cable between the remote control box and the wire feed unit. Be certain the control cable is clamped to the side of the remote control box. See Sec. H2.2.11 or Sec. H2.2.12 for complete instructions.
4. Install the 'Portable Field Control' shipped with the SAM Power Source as specified in the instructions shipped with the control.
5. Set the toggle switch inside the remote control box for constant or variable voltage as appropriate. Be sure the LN-6 nameplate is set for constant or variable voltage as appropriate (see Sec. H2.3.4).

Engine Driven Machines Only

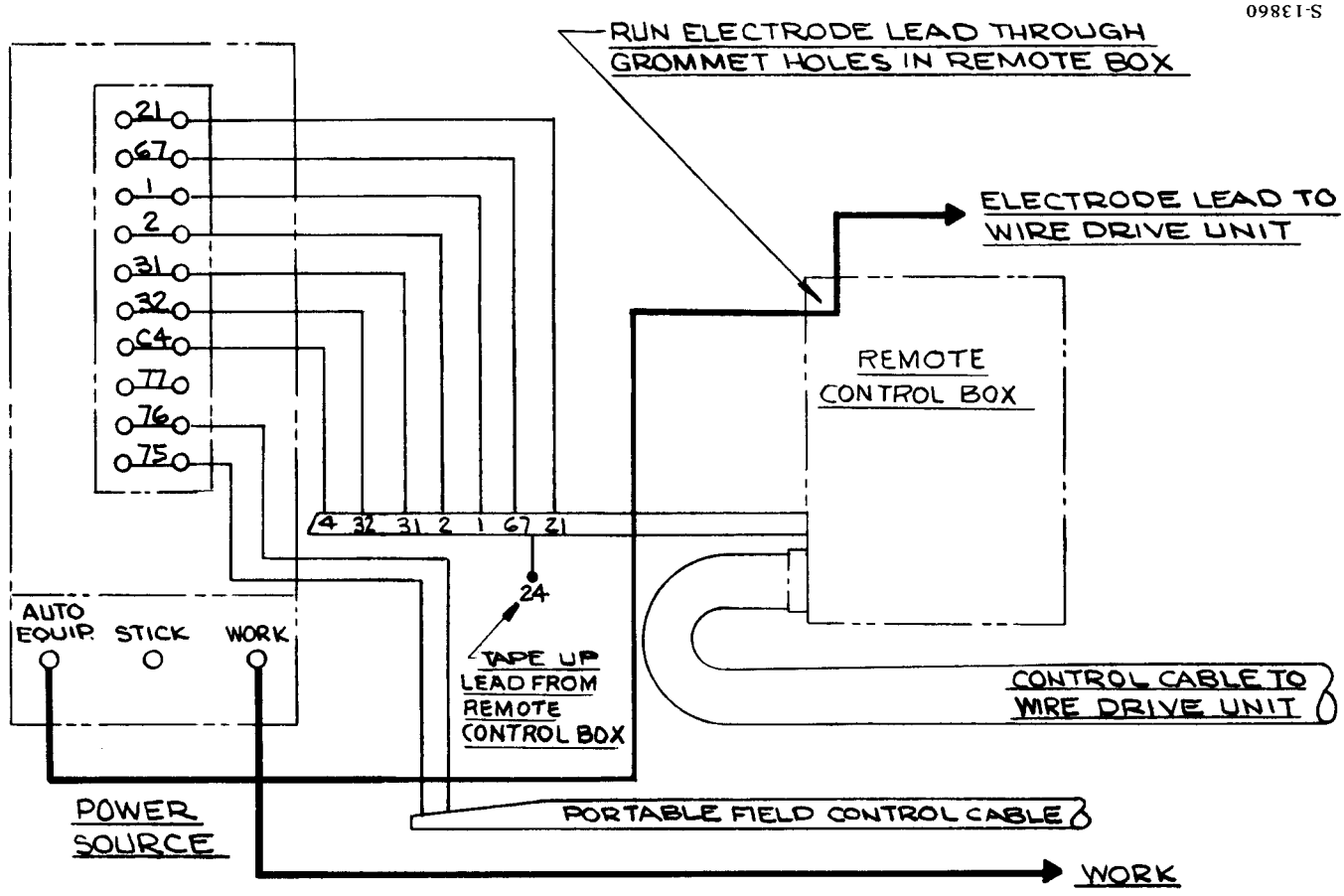
a. A mounting panel for the LN-6 remote control box is located inside this power source. For access to this panel on SAM-300 and 400 machines, remove the 24" x 24" panel below the controls. On SAM-650 machines the mounting is on the gas tank mounting rail.

b. Open the cover of the LN-6 remote control box. Mount the box to the two studs located on the mounting panel. The holes are already in the bottom of the box.

c. Make the connections per steps 2 thru 5 above. Close the remote control box cover and replace the SAM-300 or 400 lower panel.

February 1978

S-13860
10-24-69A



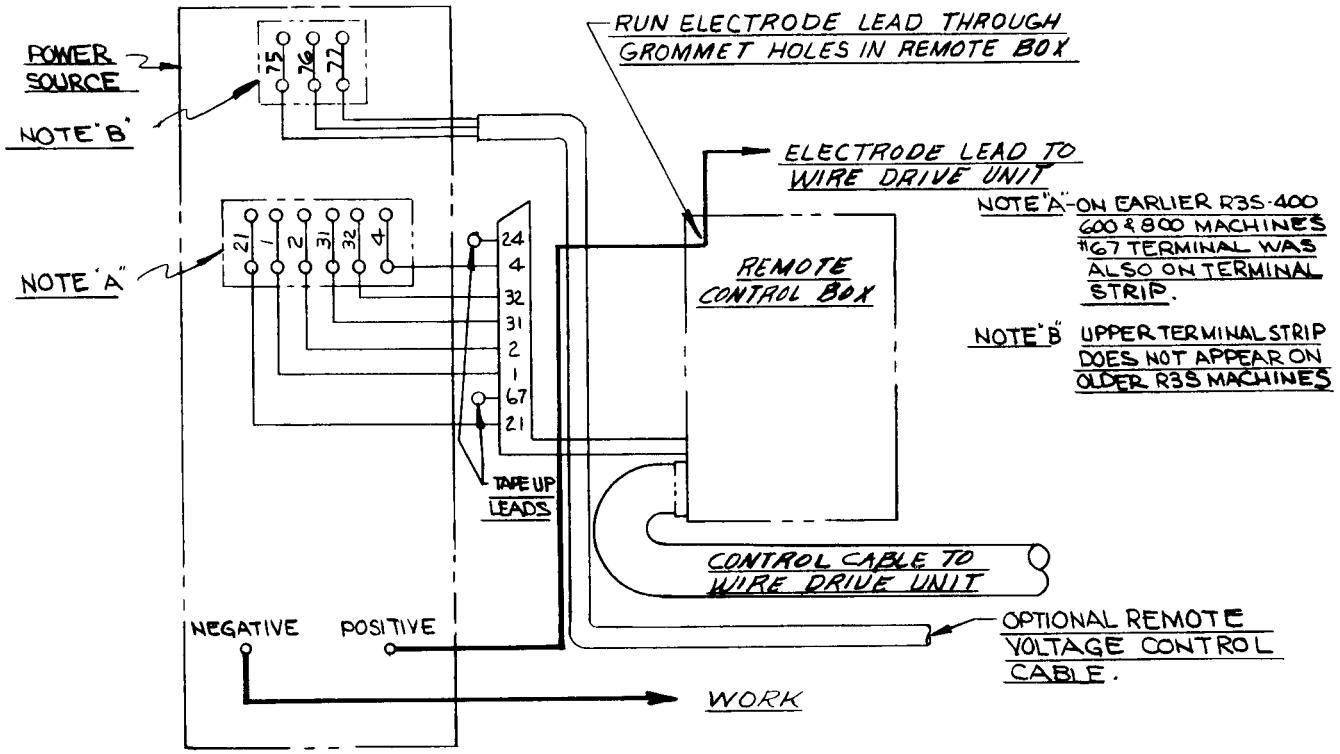
Sec. H2.3.1-G

Connection of LN-6 to Idealarc® R3S-300, 400, 600 and 800

1. Mount the LN-6 remote control box to the R3S right side panel using the screws and threaded holes provided in the side panel.
2. Make connections exactly as specified on the wiring diagram below. Use the proper size welding cable for leads shown as heavy lines on the diagram.
3. Connect the input cable between the remote control box and the wire feed unit. Be certain the control cable is clamped to the side of the remote control box. See Sec. H2.2.11 or Sec. H2.2.12 for complete instructions.
4. On the inside of the remote control box place the switch in the position for constant voltage power sources. Be sure the 'Constant Voltage Power Source' nameplate is on top (see Sec. H2.3.4).
5. This diagram shows electrode connected to positive. To change polarity, reverse the electrode and work leads at the power source and throw the control circuit switch on power source.

October 1971

M-11504
1-28-72F



CONNECTION DIAGRAM - IDEALARC R3S-400, 600 OR 800 TO LN-6

ABOVE DIAGRAM SHOWS ELECTRODE CONNECTED POSITIVE
TO CHANGE POLARITY, REVERSE THE ELECTRODE AND WORK LEADS AT THE POWER SOURCE AND THROW THE "CONTROL CIRCUIT SWITCH" ON POWER SOURCE

ELECTRICAL INSTALLATION – CONT'D.

Sec. H2.3.3

60 or 50 Cycle Input

When shipped the LN-6 is wired for 60 cycle operation. For 50 cycle input connect the red leads from the wire feed mag-amp coil in the remote control box per the wiring diagram for the machine. Tape the lugs on the unused leads.

July 1969

Sec. H2.3.4

Constant and Variable Voltage Setting

There are two nameplates on the front of the wire feeder unit, one mounted on top of the other. When using a variable voltage (constant current) power source as is usually used with the submerged arc welding, be sure the 'Variable Voltage Power Source' nameplate is on top. When connected to a constant voltage (constant potential) power source as is usually used with 'Innershield' and other open arc processes, be sure the 'Constant Voltage Power Source' nameplate is on top.

Set the toggle switch inside the remote control box for variable or constant voltage power source as appropriate.

July 1969

SEC. H2.5 OPTIONAL FEATURES

Sec. H2.5.2

K-165 Meter Kit

Meters are shipped installed on LN-6S and LN-6SE machines. The meter kit is optional for LN-6N, LN-6F and LN-6NE machines.

The kit includes a voltmeter, ammeter, voltmeter polarity switch and mounting parts. Installation instructions are included with the kit.

July 1969

Sec. H2.5.3

K-166 Linc-Fill™ Starting Circuit

This circuit improves starting when welding with Linc-Fill long stickout welding procedures. It accelerates the wire feed speed from inching to full welding speed slowly. Once the arc is established it does not affect the welding circuit. Install this kit in the remote control box per instructions shipped with the kit. To change back to normal starting, remove the jumper between #503 and #41 on the terminal strip in the remote control box.

October 1971

Sec. H2.5.5

Squirtmobile®

To use the LN-6S or LN-6SE with the Squirtmobile, the proper Power Pack kit must be installed depending upon the gun being used:

With the recommended K-114 gun, install a K-161 per the instructions in Sec. H2.5.6.

With K-112 or K-113 guns two things are needed:

1. A K-67 power pack is needed to drive the 'Squirtmobile'. Installation instructions are in IM-235 shipped with the 'Squirtmobile'.
2. An adapter ring for Squirtguns K-113 and K-112 is shipped with the 'Squirtmobile'.

To install the adapter ring, remove the brass collar ring and flux cone from the Squirtgun. Screw the split adapter ring, shoulder end first, onto the threads of the gun housing.

Continue to screw until the adapter clears the threads. Line the slot in the adapter up with the screw in the gun housing and slip the adapter up to the desired position. Reassemble the flux cone and brass collar ring to the gun. The gun can now be used with any of the standard Squirtmobile gun holders.

July 1969

Sec. H2.5.6

K-161 Mechanized Travel Power Pack

The K-161 power pack supplies the power needed by the K-110 mechanized hand travel unit or Squirtmobile when used with the K-114 submerged arc welding gun.

Connect the leads of the power kit box (the one with the handle) to the power source. Extend the control cable to the wire feed unit. Mount the small box at the end of the cable to the front of the wire feed unit. Connect the K-114 gun control cable to the polarized plug built into this small box.

Complete installation instructions are shipped with the kit.

July 1969

Sec. H2.5.7

Kit to Delay Contactor Dropout

To prevent the electrode from sticking in the crater the gun is usually lifted from the work at the end of the weld. However, if the gun is mounted in a fixture or on the 'Squirtmobile' in such a manner that the gun cannot be lifted, a capacitor-resistor assembly is available to delay the dropout of the contactor to prevent sticking.

The same kit is useful when feeding small (.035 to 1/16") wire where there is a tendency for wire overrun at the end of the weld. The kit is shipped loose with all 'Squirtmobiles'. Installation instructions are in the kit. Order kit T-12631 for other installations.

July 1969

Sec. H2.5.9

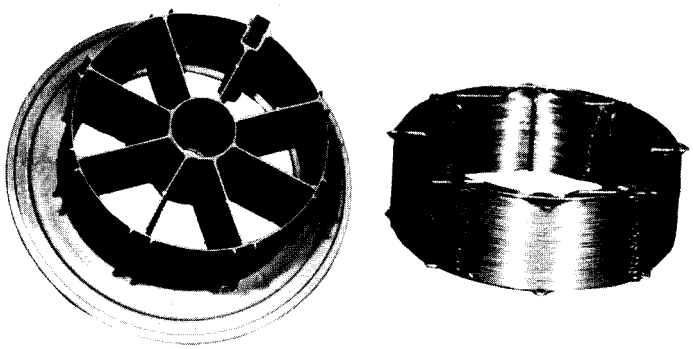
K-162 Spindle for Mounting Readi-Reels and 10 thru 30 Pound Spools (For use with K-303 or K-376 Wire Reel Stand)

To mount the spindle kit for 10 thru 30 pound spools, remove the shaft for the standard 50-60 pound wire coils from the mounting framework. Install the spindle per the instructions shipped with the kit.

Sec. H2.5.9 (Cont'd)

When used with Readi-Reels the K-363-P Readi-Reel Adapter is required.

July 1985



Sec. H2.5.10

Wire Reel Dust Shield for K-376

If the user desires to protect the wire from falling dirt and dust, there is a shield available to cover the wire reel. Order S-14543. Instructions are included with the kit.

July, 1985

Sec. H2.5.11

Wire Reel Dust Shield Door for K-303 and K-376 (when equipped with an S-14543 shield)

In extremely dusty and dirty locations there is a door kit available (M-11514) which can be added to those units having the shield kit (S-14543). This door kit includes a hinged door and sliding bottom seal. When these parts are attached to the reel support per the instructions included, the unit becomes a completely enclosed housing.

July 1985

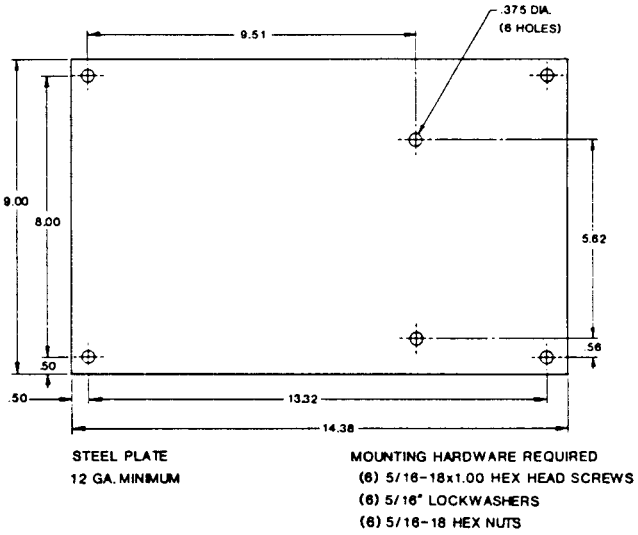
Sec. H2.5.12

K-163 Undercarriage (LN-6 Requires K-303, K-376, K-377 or K-378)

The undercarriage includes the wheels, handle and hardware. Mount the casters at the front and the wheels to the rear of the platform. Be sure the round, rear axle is to rear of the mounting bolts that hold the U-shaped axle member to the frame. Bolt the handle to the front of the platform so the LN-6 can be tilted back and wheeled like a two-wheel truck. Holes for installing the K-303 or K-376 wire stand are provided in the platform.

Newer models also include holes for installing the K-377 or K-378 wire reel stand. With older style K-163's, the plate below is required for mounting these smaller wire reel stands.

July 1985



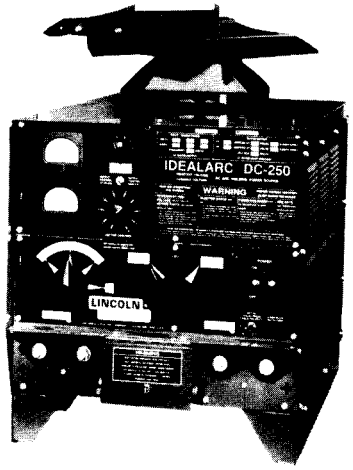
Sec. H2.5.13

K-178 Mounting Platform — LN-6 on Idealarc Power Sources

(Requires a K-303, K-376, K-377 or K-378 Wire Reel Assembly)

This is a turntable type platform for mounting the LN-6 on the top of Idealarc power sources. Bolt the platform to the lift bail per instructions (S-14817) supplied with the platform.

July 1985



Sec. H2.5.15

K-376 50-60 Lb. Wire Reel Mounting Stand

(without dust shroud)

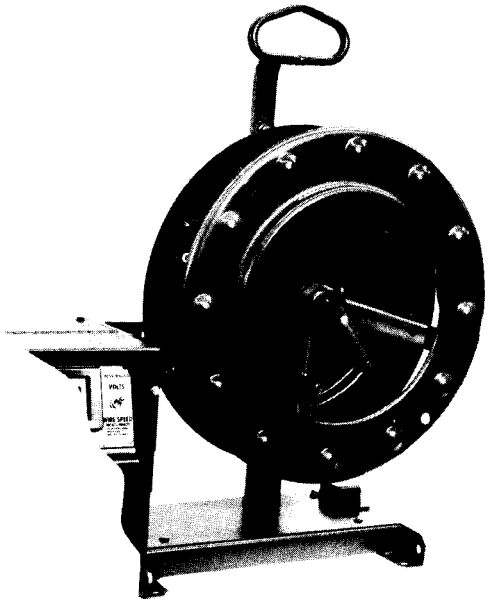
K-303 50-60 Lb. Wire Reel Mounting Stand

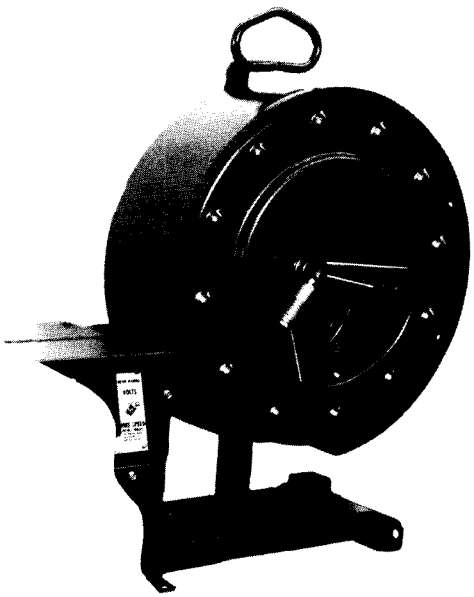
(with dust shroud)

The assembly includes a framework to which is attached the 50-60 lb. wire reel, mounting spindle, a lift bale, and a cable clamp for fastening the input cable assembly. It is easily mounted to the basic wire feed unit by three bolts (see Sec. H2.2.1). The reel mounting spindle is the pull knob type with a built-in brake.

The brake pad is adjustable for proper braking at low or high wire feed speeds.

July 1985





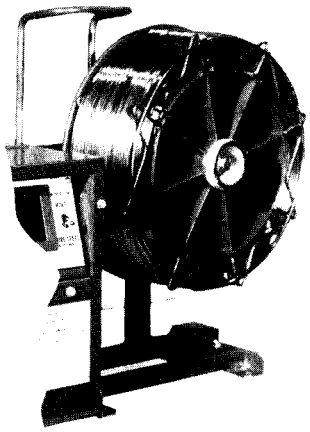
K-303

Sec. H2.5.17

K-377 Small Mounting Stand for Readi-Reel Coils or 10-30 Pound Spools with 2" I.D.

This assembly includes a small frame to which is attached a wire reel spindle similar to the K-162 Spindle. The unit is supplied with the K-363 Readi-Reel Adapters so the Lincoln "Readi-Reel Electrode Coils" can be used. Without the adapters the unit is capable of handling spools with a two inch I.D., a 12 inch max. O.D., and 4.06 max. width. A spacer for 10 pound coils is also supplied. The spindle has an adjustable braking system. (See Sec. H2.2.1)

July 1985



K-377

Sec. H2.5.18

K-378 Small Mounting Stand for 13-14 Pound Innershield Coils

This assembly includes the same smaller frame as used in the K-377 and the fully enclosed canister system used on the LN-22 and LN-23P for de-reeling of the 14 pound coil. This system has a fixed brake for the 14 pound coil. (See Sec. H2.2.1)

July 1985

K-378

Sec. H2.5.19

K-320 Flux Tank

A flux tank is available to permit the LN-6 to be used for submerged arc welding.

Install per the instructions shipped with the kit.

July 1985

SEC. H3 OPERATING INSTRUCTIONS

CONTROL ADJUSTMENTS AND LOADING THE MACHINE

Sec. H3.1.1

Introduction

a. Variable Voltage or Constant Voltage

When using this wire feeder for submerged arc welding, a variable voltage power source is recommended. When it is used for Innershield and other open arc processes, a constant voltage power source is used. See Sec. H2.3.1 for instructions for connecting the LN-6 to various Lincoln power sources.

Before starting to weld, be sure the LN-6 is properly set for variable voltage or constant voltage power source as appropriate (see Sec. H2.3.4).

b. Meters (Standard on LN-6S & 6SE, Optional on other models)

Welding current is indicated on the ammeter in the meter kit.

The voltmeter indicates the total of the arc voltage plus other voltage drops in the system. To prevent false arc voltage readings, always be sure the ground connection is good. Do not use a ground cable of excessive length or small diameter. Or, if necessary, compensate for large voltage drops in the ground system by increasing the wire feeder 'Volts' setting so the voltmeter indicates a higher total voltage.

Be sure the 'Voltmeter Polarity' switch is set so the voltmeter reads up scale.

c. 'Amps Range Switch'

This switch is located on the remote control box.

For most applications, set the switch on 'High'.

With .068 to 3/32" 'Innershield' at low currents, set the 'Amps Range Switch' on 'Low'. Then the wire feed speed range as controlled by the 'Amps' control is 50 to 175"/min. This permits easy setting of the 'Amps' control for fine adjustment of welding current for critical jobs.

It is not in the circuit when the LN-6 is set for operation with a variable voltage power source.

d. Inching the Electrode

Inching speed is critical to good arc starting with both standard stickout and Linc-Fill long stickout welding. Set the speed to a slow rate with the 'Inch Speed' rheostat on the remote control box. If the arc flutters on and off, increase the speed. If the 'Inch Speed' is too fast, the electrode will tend to stub on starting.

Press the trigger on the gun to inch the electrode. Direction of inching is controlled by the 'Direction of Wire Feed' switch located inside the wire drive unit above the rolls. If the electrode is inching in the wrong direction, reverse the position of the switch.

e. Adjustable Wire Reel Brake

The mount for standard *50 and 60 pound* electrode coils includes a two position brake assembly. Generally the brake should be at the inner position (nearest to the wire reel shaft) for wire feed speeds below 400"/min. It should be at the outer position for the faster wire speeds often used when feeding small diameter electrode.

To adjust the brake position, remove the wire reel. Pull the cotter pin that holds the brake shoe to the arm, move the shoe and replace the cotter pin. Do not bend the cotter pin – it is held in place by a friction fit.

Machines built before November 1972 do not have an adjustable brake.

See Sec. H3.1.8-B for adjustment instructions for the brake on the spindle for 10-25 pound spools.

November 1972

Sec. H3.1.2

Adjusting Current and Voltage

a. Submerged Arc Welding – Variable Voltage

Generally the current is set at the power source. Make small current adjustments for each particular application with the 'Amps' control on the LN-6 (or 'Portable Field Control' used with SAM welders). Adjust the welding voltage for each particular application with the 'Volts' control on the LN-6.

Adjustment of current and voltage varies depending upon which of the available power sources is being used. Basic instructions are given below. See the power source manual for more information.

1. If the power source is equipped with a toggle or voltage range switch, set it for the high or variable voltage range.

2. Set the voltage (or 'Output Control' or 'Job Selector') rheostat on the power source near maximum.

3a. If the power source is equipped with a series of submerged arc output studs, connect the electrode lead from the contactor to the stud with the lowest current range that still permits welding at the desired current. (i.e., if you want 500 amps welding current, use the '300-575' stud and not the '450-Max' stud.)

3b. If equipped with a continuous current control (SAE or SAM), set the high current scale for a welding current a little higher than you expect to use.

4. If using an 'Idealarc' R3M or TM, set the power source current control for the current you want to use. The LN-6 'Amps' control does not work when connected to this power source. Set the arc voltage with the LN-6 'Volts' control.

b. Welding with 'Innershield' or Other Open Arc Processes.

Adjustment of current and voltage varies depending upon which of the available power sources is being used. Basic instructions are given below. See the power source instruction manual for more information.

1. If the power source is equipped with a toggle or voltage range switch, set the switch for the low or constant voltage range.

2. The 'Volts' control on the LN-6 (or 'Portable Field Control' used with SAM welders) is wired in series with the voltage (or 'Output Control' or 'Job Selector') control on the power source. Use the power source control to set the desired welding voltage. Use the LN-6 'Volts' control (or 'Portable Field Control' used with SAM welders) to make minor adjustments of welding voltage.

   Exception 1: R3S – Set the voltage at the power source or the optional Remote Control. The LN-6 'Volts' control is not in the circuit.

3. If the power source is a combination variable voltage/constant voltage machine, be sure the electrode lead is connected to the 'Innershield' stud.

   Exception 1: SAF-600 – When a slightly drooping curve is needed (usually when welding with less than 30 volts) connect to the '450-Max' Sub-Arc stud.

   Exception 2: SAM – A common 'To Auto Equipment' stud is used for both constant and variable voltage.

4. Set the welding current with the 'Amps' control on the LN-6.

5. Note: If the power source is equipped with a continuous current control or a current range selector, this control is not in the circuit when connected for constant voltage welding.

   Exception 1: SAM-When using this welder under 100 amps and 18 volts, set the 'Polarity Switch' to variable voltage and the 'Current Control' in the 8 to 1 o'clock area.

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Sec. H3.1.4

Trigger Interlock

The toggle switch is located inside the wire feed unit just above the drive rolls.

With the 'Trigger Interlock' switch 'Off', the wire feed motor runs and the welding circuit is energized only when the gun trigger is pressed. The operator must hold the trigger in from the start to finish of the weld. To stop the arc, release the trigger and lift the gun from the work.

With the 'Trigger Interlock' switch 'On', the operator holds the trigger until the arc is established, then the trigger can be released. When the weld is completed, the operator raises the gun from the work to break the arc. This stops the wire feed and de-energizes the welding circuit.

July 1969

Sec. H3.1.6

Circuit Protection

The mag-amp circuit and wire feed motor are protected by a circuit breaker. There can be several reasons for the circuit breaker to open. The most common are overloading the motor because of wire feeding problems or operating the gun trigger rapidly. To reset the circuit breaker, allow a few minutes cooling time and press the red button on the remote control box.

There are two fuses on the end of the remote control box. They are in each lead of the polarity rectifier circuit. The purpose of these fuses is the protection of the rectifier and other components against possible shorts, grounds, or mistakes when connecting to the power source.

July 1969

CONTROL ADJUSTMENT – CONT'D.

Sec. H3.1.7

Making Test Welds

a. **With Variable Voltage Power Source (3/4" Stickout* With 5/64" Wire)**

1. Be sure the LN-6 nameplate and the switch in the remote control box are properly set for variable voltage welding (see Sec. H2.3.4).
2. Set the power source polarity switch for positive polarity.
3. Set the 'Direction of Wire Feed' switch so the wire feeds out the gun.
4. Set the 'Voltmeter Polarity' switch next to the meters so the voltmeter reads up scale.
5. Set the power source for welding output of about 500 amps. See Sec. H3.1.2 for specific instructions for setting each type of power source.
6. Set the LN-6 'Volts' control to 5.
7. Set the LN-6 'Amps' control (or 'Portable Field Control' used with SAM welders) to 9. This control does not function when the LN-6 is connected to 'Idealarc' power sources.
8. Set the 'Inch Speed' control on the remote control box to about 6.
9. Ground a piece of 1/2" scrap for practice welding. Cut the wire at the gun to a sharp point using a pair of side cutters or diagonal cutters. Improperly clipped wire may produce poor starts and arcing of the contact tip. Do not let the clipped end of the wire fall back into the gun.
10. Hold the gun over the work, allow the mound of flux to form, press the trigger, and start the arc by scratching through the flux. See the appropriate Lincoln literature for additional submerged-arc welding techniques.
11. Adjust the actual arc current and the voltage with the LN-6 controls as needed for good weld quality.

b. **With Constant Voltage Power Source (2-3/4" Electrical Stickout* and 3/32" NS-3M Wire)**

1. Be sure the LN-6 nameplate and the switch in the remote control box are properly set for constant voltage welding (see Sec. H2.3.4).
2. Set the polarity switch on the power source for positive polarity. With the 'Idealarc' R3S connect the electrode cable to the 'Positive' stud.
3. Set the 'Voltmeter Polarity' switch on the optional meter kit so the voltmeter reads up scale.
4. Set the 'Direction of Wire Feed' switch so the wire feeds out the gun.
5. With the LN-6 'Volts' control (or 'Portable Field Control' used with SAM welders) set at about 6, adjust the power source for about 30-31 volts (see Sec. H3.1.lb). The LN-6 'Volts' control is not in the circuit when connected to an 'Idealarc' R3S.
6. Set the LN-6 'Amps' control to 4.
7. Set the 'Inch Speed' control on the remote control box to about 6.
8. Set the 'Amps Range Switch' in the remote control box to 'High'.
9. Set up and ground a piece of 3/8 –1/2" scrap steel. Inch the wire so it extends about 1-1/4" beyond the gun end.
10. Hold the gun with the wire just off or lightly touching the work. Do not push the wire into the work. Press the gun trigger to start to weld. See the appropriate Lincoln literature for additional Inner-shield welding techniques.
11. Adjust the actual current and voltage with the LN-6 controls as needed.

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* To use Linc-Fill long stickout welding techniques, order a K-166 Linc-Fill Starting Circuit. (See Sec. H2.5.3.)

LOADING THE MACHINE

Sec. H3.1.8-A

Wire Reel Loading – 60 and 50 Pound Reels

a. Loading the Reel

Be sure the drive roll pressure is properly set for the wire size being used. See Sec. H2.2.2.

1. To remove the wire reel from its shaft, grasp the spring loaded knob and pull it out. This straightens the knob so it seats into the shaft when released.
2. Lay the reel flat on the floor and remove the cover plate.
3. Place a coil of wire on the reel so it unwinds as the reel rotates clockwise.
   a. Be sure the coil is placed so the spring loaded arms will not interfere with the later removal of the coil tie wires.
   b. When loading .035 and .045" L-50 wire, be certain the coil is placed on the reel so the spring loaded arms are at the center of the slots in the cardboard coil liner. This provides the positive compression of the coil needed for trouble free wire feeding.
   c. Put the cover plate on the reel so the four arms of the cover straddle the spring loaded arms of the reel proper.
4. Tighten the cover as much as possible by hand. Do NOT hammer on the spinner nut arms.
5. Cut and remove the tie wire holding the free end of the coil. Insert the free end into one of the holes in the cover and secure it by bending it back. Cut and remove the remaining tie wires.

   NOTE: Always be sure the free end of the coil is securely held while the tie wires are being cut and until the wire is feeding through the drive rolls. Failure to do this will result in "back lashing" of the coil, which may tangle the wire and cause poor unreeling.
6. Replace the reel on the wire feeder.

NOTE: Always be sure the free end of the coil is securely held while the tie wires are being cut and until the wire is feeding through the drive rolls. Failure to do this will result in "back lashing" of the coil, which may tangle the wire. A tangled coil will not feed so it must either be untangled or discarded.

b. To thread Wire into LN-6N or LN-6S: 50-60 # Reel Mounting:

Turn the reel until the free end of the electrode is accessible. While tightly holding the electrode, cut off the bent end. Straighten the first six inches and insert it through the wire guide to the drive rolls. Press the gun trigger until the rolls pick up the wire and feed it through the gun cable.

CAUTION: When inching, the electrode is always "hot" to ground.

c. To thread Wire into LN-6NE and LN-6SE (With Extension):

Slide the ingoing guide tube of the hand crank to the forward position.

Remove start end of coil from hole in wire reel cover, straighten the first six inches or so of the wire and then insert this end in the ingoing guide tube. Push a foot or so of wire through.

Now pull the ingoing guide tube back to the rear position and rotate it 90^{o} so that it will remain in this position during the cranking operation.

Pull the plastic hand crank handle to the out position in the arm.

Pull the shaft and drive roll assembly to the out position with the left hand.

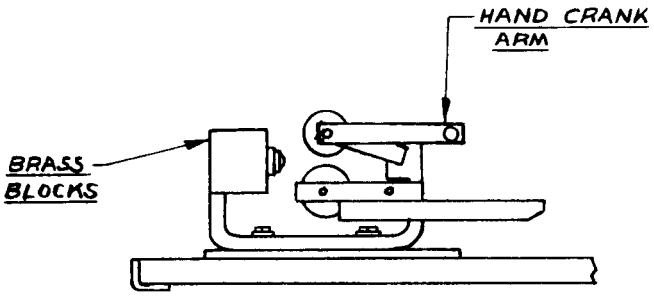
Apply a downward pressure to the idler roll pressure arm with the right hand. Maintain this pressure and start cranking the wire thru the system. Keep the conductor cable as straight as possible during the loading operation. This will make it much easier to crank the wire through. Crank until the wire touches the drive roll and then pull the gun trigger and this will start the drive rolls and feed the wire the rest of the way through the cable and gun assembly.

CAUTION: The electrode is always "hot" to ground while inching with the gun trigger.

Push the plastic of the hand crank to the in position, also shift the ingoing guide tube to the forward position.

The proper position for the hand crank arm, when it is not being used is shown in the sketch below. Close the wire reel door.

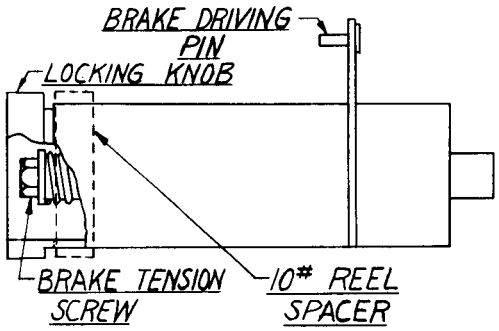
Sec. H3.1.8-A (Cont'd)



July 1985

Sec. H3.1.8-B

Wire Reel Loading — 25 and 10 Pound Spools



Remove the locking knob and 10 lb. reel spacer from the shaft. Place the 25 lb. spool on the shaft making certain the brake driving pin enters one of the holes in the back side of the spool. Replace and tighten the locking knob. When 10 lb. spools are used place the spacer between the locking knob and the outside of the spool. Be certain the wire comes off the reel in a clockwise direction. The spool should turn freely without any overrun. Adjust the brake tension with the hex head screw on the shaft hub, until the reel turns freely but with little or no overrun.

July 1969

Sec. H3.1.8-C

Wire Reel Changing

Generally with most LN-6 installations the end of the coil can be removed from the gun cable by simply reversing the wire feed direction and pressing the gun trigger.

With the LN-6NE or LN-6SE extension unit, use the following procedures to remove the end of the coil from the gun cable:

1. Cut the end of the electrode off at the gun end. Do not break it off because this puts a slight kink in the wire and makes it difficult or impossible to back it through the nozzle.
2. Uncouple the gun cable from the LN-6 wire drive unit.
3. Lay the cable out straight.
4. Grip the electrode with pliers and pull it out of the cable from the connector end. (K-112 cables have a removable liner. This liner may tend to slide out with the electrode. If this happens, remove the electrode from the liner and replace the liner in the cable.)
5. Load a new reel as described in Sec. H3.1.8-A or H3.1.8-B.

July 1969

LOADING THE MACHINE — CONT'D

Sec. K3.1.10
Flux Tank Loading

1. **Flux Tank (Optional)**

Either turn off the incoming air line or remove the quick disconnect if one has been installed. Slightly loosen the tank cap and let the air in the tank escape through the holes in the side of the cap. After pressure has been released, remove cap from the tank. Using the funnel provided, put 100 pounds of flux into the tank. It is very important that only new or properly reclaimed flux be put in the tank. Coarse particles and or magnetic particles will stop the flux feeding process. New Lincoln flux is properly screened at the factory. All reclaimed flux must be separately screened through a vibrated screen having .065 .075 openings and be put through a magnetic separator. The K-310 vibrated screen and K-58 Magnetic Separator are available for this purpose. The screen in the funnel supplied with the tank has much larger openings and its only purpose is to keep paper and slag out of the tank. Screw the tank cap back on and tighten hand tight. Reconnect the incoming air line to the tank.

There will always be a small amount of air and possibly drops of water coming out of the end of the tube coiled under the tank. This is an automatic disposal system in case the plant air has water and dirt in it.

2. **Magnetic Separator (Optional)**

The K-58 is a permanent magnet type separator designed to fit the top of the standard fill funnel of the continuous flux feed system or the top of the K-219 flux hopper of a full automatic head.

The purpose of the separator is to remove magnetic materials such as mill scale and any other extraneous magnetic materials which may have been recovered along with the flux to be processed.

It is important to remove these magnetic particles from the flux which is to be reused in the continuous flux feeding system. If the magnetic material is not removed it will gather around the nozzle of the gun and impede or shut off the flux flow when making relatively long welds or welding continuously. The magnetic particles can also cause porosity in the weld.

Fit the magnetic separator into the funnel or hopper. Pour the flux to be reclaimed into the top pan of the separator. The separator is designed so the flux flows around three permanent magnets. The magnets remove all magnetic particles. When the magnets become covered with their full load, they automatically stop the flux flow. When the flux flow stops, remove the separator from the funnel or hopper. Turn it over and open the panel that covers the magnets. Remove the magnetic particles with brushing or an air blast. Be careful to protect yourself and others in the area from flying particles.

The magnetic separator is used with all Lincoln mild steel fluxes 760, 761, 780, 781, 860, and 880. Do not use the magnetic separator with any stainless steel, alloy, or hardsurfacing flux except H-535. The magnetic separator removes some of the alloying elements from these fluxes thus changing their characteristics.

3. **K-310 Screen (Optional)**

The unit was designed to fit the top of either the standard fill funnel of a continuous flux feed system or a K-58 magnetic separator. The unit has a steel screen with .065 to .075 openings and an air vibrator attached to the frame. The vibrator can be used with air line pressures ranging from 20 psi thru 100 psi.

For ease of handling, the user should connect the incoming air line to the 1 8" pipe elbow with the aid of a fast disconnect type air coupling.

It is very important that reclaimed flux to be used in the continuous flux feeding system be passed through the K-310 screen or its equivalent.

September 1979

SEC. K3.2 – MAKING SUBMERGED ARC WELDS

Sec. K3.2.3

Gun Operating Positions: Squirtgun K-114

The squirtgun K-114 is used either with or without the mechanized hand travel unit (K-110). With the LN-6 and LN-8, a K-161 "Mechanized Travel Power Pack" must be installed when using the K-110. Since the travel unit assures uniform travel at the maximum usable speed and reduces the tendency to waver off the seam, it is recommended for most applications. The following photographs show suggested gun positions to produce the best welds in the least time. For proper flux feeding these same positions should be maintained when the gun is hand held and the mechanized travel is not used.

Figure 1 and Figure 2

Travel Unit Adjusting

Loosen the motor mounting wing nut to adjust the travel unit (Figure 1). Move the travel unit up and down or around the gun nozzle to suit different welding applications (Figure 2). Pull the motor controlled plug out to remove the travel unit from the gun.

Flux Depth

The depth of the flux pile is controlled by the gun height. Gun height is measured from the lower tip of the nozzle flux cone to the plate. Proper gun height is the height at which a minimum of flux is used without excessive arcing. As a general rule the required gun height increases as the travel speed decreases and the voltage and current increase.

On some fillet welds a drag technique without the travel unit is used. In this instance the amount of flux is controlled by the internal diameter of the nozzle flux cone. For sufficient flux on some application, use the nozzle flux cones with larger I.D.

Travel Speed

Set the speed of travel with the rheostat on the mechanized travel unit. Speed range is 7 to 60 inches per minute, but will vary with AC input variations. Operate the toggle switch on the unit to change direction of travel.

The K-161 Power Pack has a pod which is mounted to the front of the LN-8 and LN-9. To set an exact travel speed turn the switch on the pod (or the 'Weld Travel Only' switch on LN-4 or ML-3 machines) to 'On' (or to 'Travel Only'). This turns the travel motor on without energizing the welding circuit. Adjust the speed dial until you have the exact speed set. Return this switch to the 'Off' position and you are ready to weld. CAUTION: Be sure this switch is set on 'Off' when plugging in the travel motor or conductor cables.

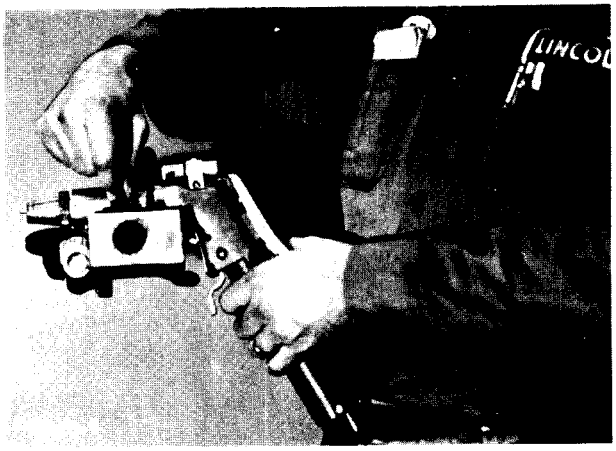
Figure 3

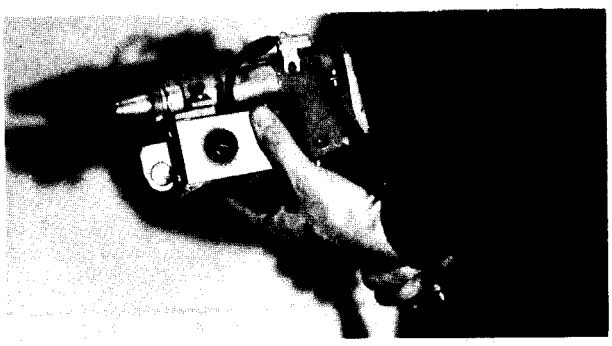
Butt Weld – Arrow shows direction of travel.

Position the gun over the seam so the electrode feeds directly into the seam and the gun nozzle is perpendicular to the plate. Swing the gun handle horizontally to a comfortable position for welding. Be sure the travel drive wheel is parallel to the seam.

Operate the gun trigger to open the flux valve, start the travel and start the arc.

Guide the gun with two hands. Place one hand on the gun to steady it. Place the other hand on the cables just back of the gun handle. When making the weld, lean the gun slightly forward into the direction of travel. Let the weight rest on the drive roll. Let the travel unit do the work.





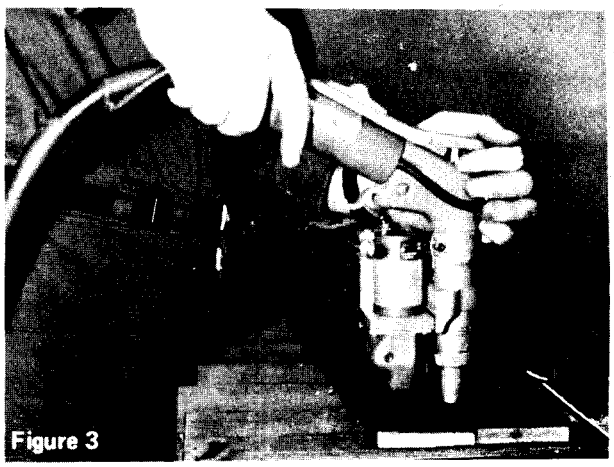


Figure 3

Sec. K3.2.3 (Continued)

Figure 4 and Figure 5

Horizontal Fillet Weld – Arrows show direction of travel.

Position the gun so the electrode feeds directly into the corner of the seam. Do this with the electrode sticking out and the flux valve closed. This position is usually obtained when the gun handle is approximately perpendicular to the vertical plate. Once the correct angle is established, guiding is simply done by keeping the flux cone lightly in contact with the vertical plate. Be sure the travel guide wheel is parallel to the seam.

Operate the gun trigger to open the flux valve, start the travel and start the arc.

Guide the gun with two hands. Place one hand on the gun to steady it. Press down lightly with this hand to increase the weight on the drive roll. Place the other hand on the cables just back of the gun handle. When making the weld, lean the gun slightly forward into the direction of travel. Let the weight rest on the drive roll. Let the travel unit do the work.

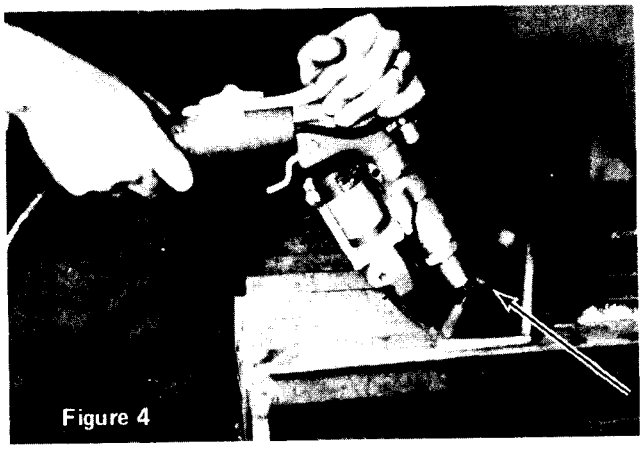


Figure 4

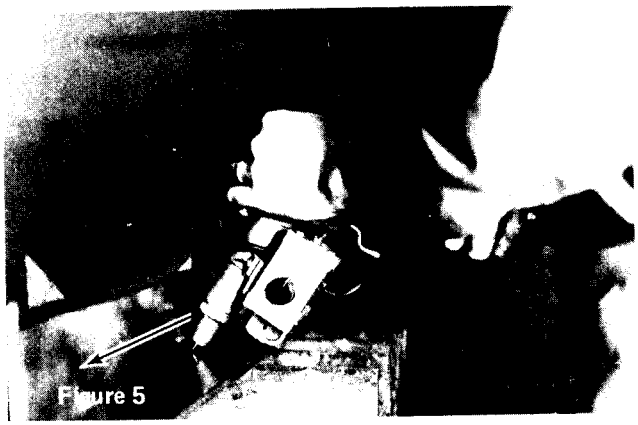


Figure 5

Figure 6

Horizontal Lap Weld – Arrow shows direction of travel.

The above horizontal fillet weld instructions also apply in making horizontal lap welds. However, since there is no vertical plate to lightly hold the cone against, keeping the proper electrode angle must be done by eye.

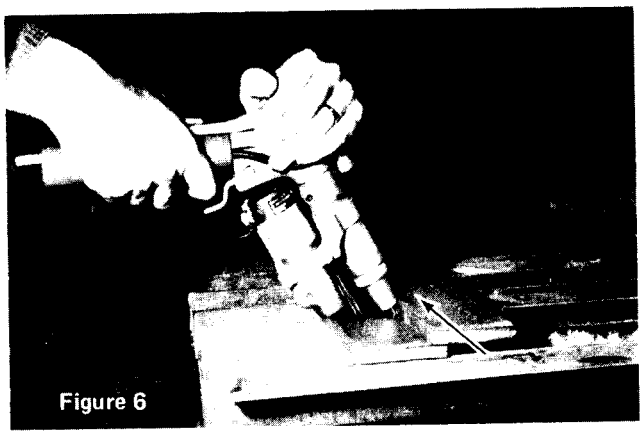
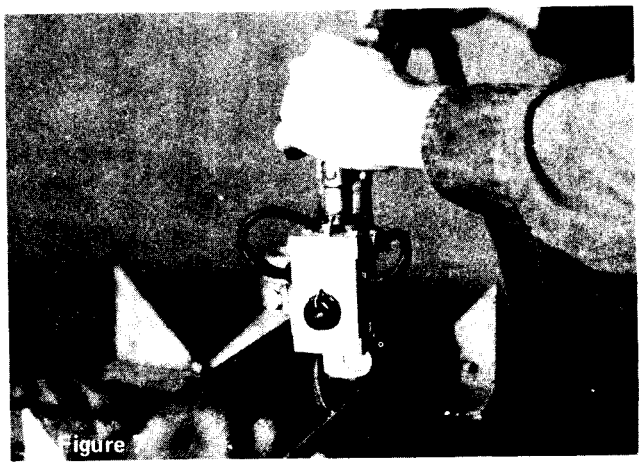


Figure 6

Figure 7

Positioned Fillet Weld

Attach the positioned fillet adapter. Rotate the travel unit and adapter so the drive wheel rides in the seam ahead of the weld. Position the gun with the gun nozzle perpendicular to the seam. Guide the gun with two hands. Tilt it slightly forward in the direction of travel when making the weld.



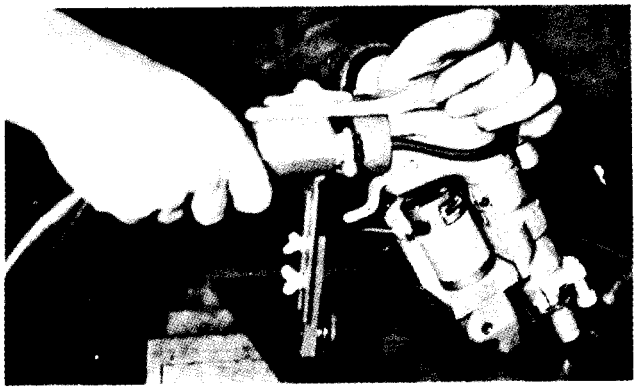
Figure

MAKING SUBMERGED ARC WELDS – CONT'D

Sec. K3.2.4

Fillet Guide (Optional): K-70

The Fillet Guide is designed to help guide Squirtgun K-114 so the operator can make more uniform horizontal fillet welds with less effort. It consists of a vertical plate roller guide and a rear wheel assembly. Once the roller guide and rear wheel are adjusted, the weld is easily made by gently pushing the gun into the fillet. The operator does not have to constantly control the drag of the flux cone against the vertical plate nor carefully watch the angle of the gun.



1. Installation: Squirtgun K-114

Fit the vertical plate roller guide directly on the gun nozzle.

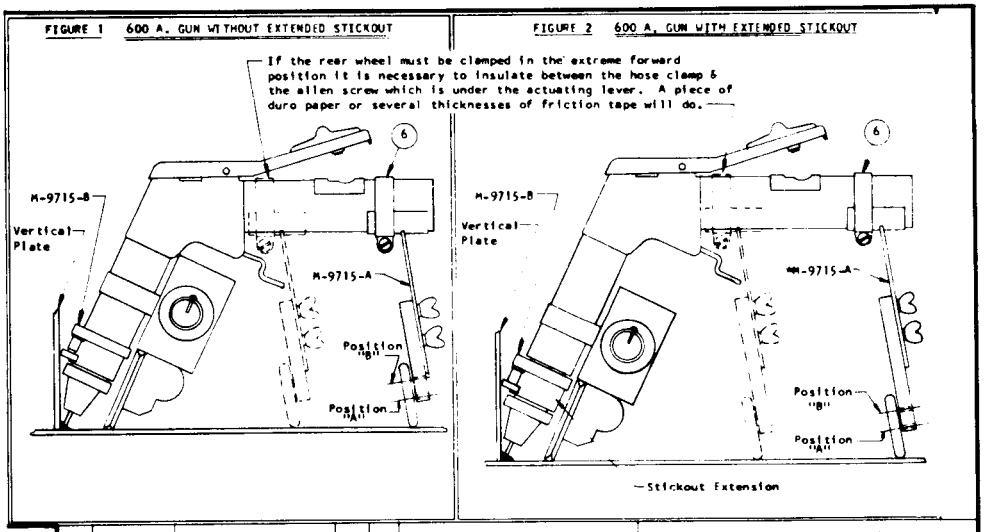
Clamp the rear wheel to the gun as shown in the sketches. Use of the rear wheel requires a riding surface under the handle 7 to 11 inches from the vertical plate. Exact location of the rear wheel is not critical. However, the greater distance provides better stability and ease of operation. Even if the horizontal surface is not available, using the roller guide without the rear wheel still aids in making fillet welds.

If the nozzle extension used with long stickout procedures is installed, replace item 15 with the long guide roll arm, item 16. This is shipped loose with the fillet guide kit.

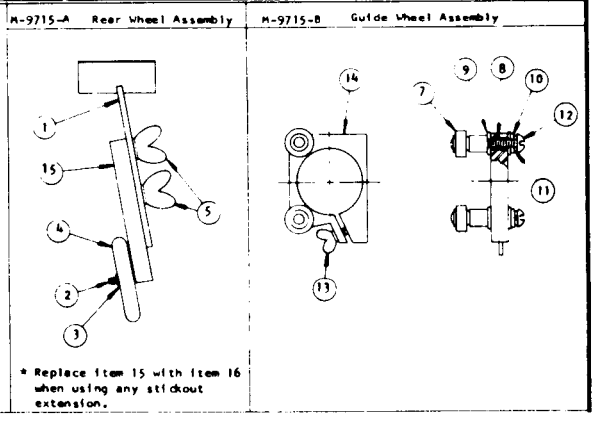
2. Operation

After the Fillet Guide is installed with the rear wheel placed as required for the application (see "Installation"), proceed as follows:

a. Position the travel unit so the nozzle flux cone is at



ITEM	PART NO.	DESCRIPTION	REQ.	
1	T-11690	Wheel Holder Asbly.	1	
2	T-9447-22	Socket Hd. Screw	1	
3	T-8892	Guide Roller	1	
4	T-11692	Rubber Tire	1	
5	T-9078-1	Wing Screw	2	
6	S-10888-16	Clamp	1	
7	T-11695	Guide Roll Asbly.	2	
8	T-6675-2	Insulating Tube	2	
9	S-10773-35	Insulating Washer	4	
10	S-9262-22	Flat Washer	2	
11	E-106-A-1	Lockwasher	2	
12	#10-24 x 7/8	Round Head Screw	2	
13	T-9078-3	Wing Screw	1	
14	S-11867	Guide Roll Holder	1	
15	T-11688	Short Guide Roll Arm	1	
16	T-11688-1	Long Guide Roll Arm	1	*
17	S-11865	Adapter Ring	1	Δ



the right height to deposit enough flux to cover the arc.

b. Inch the electrode out so the point will just miss touching the plate when the gun is held in the proper position for welding. The electrode end should slightly favor the horizontal plate. The nozzle flux cone should miss the vertical plate by about 1/32". The gun handle must be 90^{o} to the vertical plate when looking down from above. Be certain the electrode has not been bent when making these adjustments.

c. Hold the gun in proper position for welding. Lower the rear wheel until it touches the horizontal plate. Lock it into position. The adjustment range of the rear wheel can be increased by moving the wheel from position "A" to "B". If using the nozzle extensions for long stickout procedures, replace item 15 with the long guide roll arm, item 16.

d. Slip the roller guide down until the two small rollers touch the vertical plate. Lock it in position. The nozzle flux cone should never drag on the vertical plate when welding. The roller guides and rear wheel should be parallel to the travel unit drive wheel.

   If the fillet angle varies from one weld to another, readjustment of the roller guide may be necessary. For example, assume the Fillet Guide was adjusted for an angle of 90^{o}. If the fillet angle of the next weld is 95^{o}, the cone may drag on the vertical plate. Readjust the roller guide.

e. Recheck the electrode alignment after tightening the guides and before making the welds. When welding, apply slight pressure down and forward on the gun. This insures contact of guide wheels and the drive wheel with the plates.

August 1973

SEC K6.1 — WIRE DRIVE AND CONTROLS MAINTENANCE

WARNING: Have qualified personnel do the maintenance and troubleshooting work. Turn the input power off at the power source before working inside the wire feeder.

Sec. K6.1.1
Drive Rolls and Guide Tubes

After every coil of wire inspect the drive rolls and guide tubes and clean as necessary. The drive rolls can be brushed with a wire brush. Do not use a solvent on the outside drive roll as it may wash the lubricant out of the drive roll bearing.

The drive rolls and guide tubes are stamped with the wire size for which they are designed. If a wire size other than that stamped on the drive roll is to be used, the drive rolls and guide tubes may have to be changed. See the parts List Sec. K7.3, page G, in the back of this manual for the necessary parts.

The inner drive rolls for .068 thru .120" wire have a double set of teeth so they can be reversed for additional life. Between the two knurled rolls is a shim washer which limits the damage to the wire to a minimum should wire feeding problems occur. When drive rolls are interchanged, leave the three socket head screws of the roll assembly loose until it is re-assembled on the drive shaft. Then tighten all three. **Be sure the roll faces and spacer faces are thoroughly cleaned before re-assembly.**

Drive rolls for 1/16" and smaller wire have no teeth. They are not reversible.

August 1973

Sec. K6.1.2
Wire Drive Motor and Gear Box

Every year examine the gear box. Coat the gear teeth with moly-disulfide filled grease. Do not use graphite grease.

Check the motor brushes. Replace if they are worn down to 1/4" or less. When ordering feed motor brushes, give all information from the motor nameplate.

April 1985

Sec. K6.1.3
Wire Reel Assembly (For 50 & 60 Pound Coils)

To prolong its life, periodically coat the reel shaft with a thin layer of grease. No maintenance on the brake assembly is required. If the brake shoe wears through to metal, replace the brake assembly.

August 1973

Sec. K6.1.4
Control Box

Every six months open and inspect the control section. The accumulated dirt should be gently blown off all of the electrical components. Be sure the air that is being used is dry. Check relay contacts.

August 1973

Sec. K6.1.5
Circuit Protection

Field Circuit Fuse

The fuse inside the control box protects the field circuit. This fuse blows if the field shorts or if one of the field circuit components on the relay P.C. board fails.

Motor Thermal Protection

The temperature sensing thermal protector mounted in the motor opens the relay circuit when the motor overheats because of excessive loading or frequent triggering. This protects the motor without nuisance tripping. The thermal protector automatically resets itself after the motor cools sufficiently (may take 10-15 minutes). Reset time can be shortened by cooling the motor with an air hose or fan.

Circuit Breaker

The 5 amp circuit breaker located above the drive rolls normally trips only when an overload occurs because of excessive loading in the wire feed cable or a defective motor or control component. After allowing a minute for cooling, push the reset button and weld. If it trips again, be sure the wire feed cable is clean and the proper size for the wire diameter being fed. If it still trips, look for a defective electrical component.

Grounding Lead Protector

The frame of the LN-8 wire feed unit and the drive motor are grounded to the frame of the power source by a lead in the control cable. An overload protector prevents welding current from damaging this lead if the electrode circuit touches the wire feeder frame while the gun trigger is pressed.

When the protector is tripped, the welding contactor in the power source will not close when the gun trigger is pressed. As a result:

1. When set for variable voltage welding (most submerged arc), the LN-8 wire feed *rolls will not turn,* and the arc will not strike.

Sec. K6.1.5 (Continued)

2. When set for constant voltage welding (open arc), the wire feed rolls turn but the *arc will not strike.*

To locate the protector reset button, open the door covering the wire drive roll section and look for the white rectangular button above the wire feed motor. Push the button in to reset. If the button does NOT move when pushed, the protector is set and ready for welding.

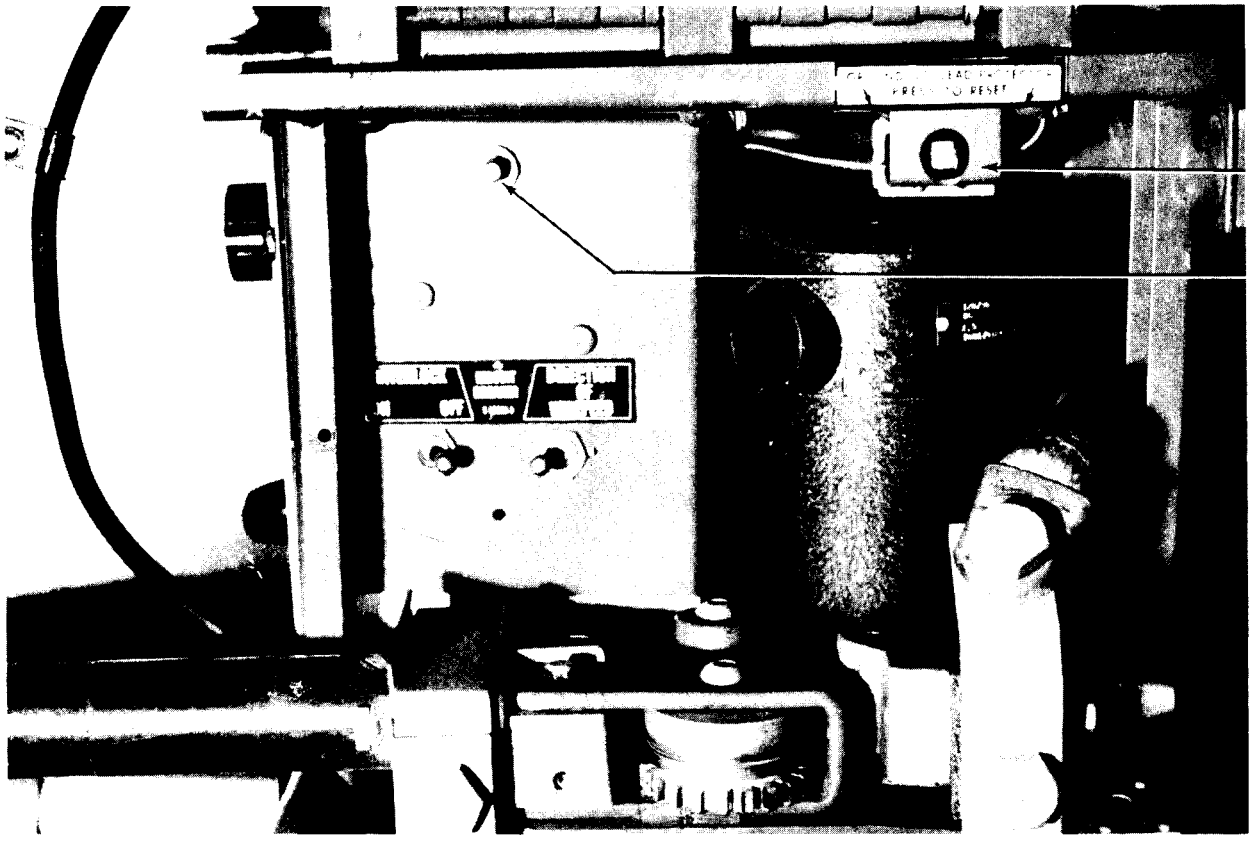
. Avoiding Shutdowns Caused by the Grounding Lead Protector Being Activated

Do not allow the electrode to contact the case of the wire feeder or uninsulated part of its wire reel stand when the gun trigger is activated.

Be sure that all work lead connections to the work make tight metal-to-metal electrical contact.

Do not allow excess electrode cable or work cable that is coiled up to be placed closer than three feet to the wire feeder. The magnetic field that is generated by welding current going through the coiled cable can falsely activate the GLP.

September 1979



SEC. K6.2 — GUN CABLE, GUN AND HAND TRAVEL KIT

WARNING: Before any gun is serviced or disassembled remove it from the wire feeder, or turn off the power source.

Sec. K6.2.1
Gun Cable

A dirty gun cable can cause rough and erratic wire feeding. Therefore, the cable liner must be cleaned periodically. Procedures differ depending upon whether the cable has a permanent core or removable liner.

1. **Permanent Core Cables**

   Remove the cable from the wire feeder. Lay it out straight on the floor. Remove the contact nozzle tip from the gun. Using an air hose and only partial pressure, gently blow out the cable *from the gun end.* Too much pressure at the start will 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 more dirt is blown out of the cable.

2. **Cable With Removable Liner (Obsolete)**

   To clean the liner, first disconnect the cable from the wire feeder and remove the gun nozzle from the gun handle.

   To remove the liner from the cable insert a 3/16" diameter rod about 18" long into the gun end. Push the liner out of the cable far enough that it can be pulled from the opposite end. If the liner does not pull out easily, do not force it. Continue to push the liner until it pulls freely.

   To clean the liner soak it in degreasing solvent for one hour. Flex short lengths of the liner around a 3" diameter to spread the coil turns and blow compressed air across and between the turns at 90° to the liner axis. This is needed to remove particles from between the turns. Do not blow compressed air through the master cable.

   Be sure the outside diameter of the liner is clean when inserting it into the cable. Insert by short sections about 3" in length. Do not let the liner bend sharply because this may cause a permanent bend in the liner.

October 1977

Sec. K6.2.2
Gun Disassembly

'Innershield' Squirtguns K-115 and K-126 and Submerged Arc Squirtguns K-113 and K-112

Remove the cable from the wire feeder. To remove the nozzle from the gun, loosen the 3/16" socket head screw in the gun handle and pull the nozzle straight out. To reinstall insert the nozzle into the gun handle. Push it in as far as possible and tighten the socket head screw.

Remove the cable from the wire feeder. To disassemble 'Innershield' Squirtguns K-115 and K-126, first loosen the four screws which hold the heat shield in place. Remove the heat shield.

To disassemble the switch housing from all these guns, remove the four screws holding the saddle around the gun handle. Then hold the gun with the cable toward the floor and look into the switch cavity. The tight side of the larger roll pins is to the right. Drive these pins to the left. They can be easily removed when they clear the right side of the casting. Do not remove the smaller roll pins unless the trigger is being replaced. The height of the Z spring controls the operating point of the switch with respect to the trigger movement. Set the spring so the switch operates at about the midpoint of the trigger travel.

To remove the handle from the cable, slip the spatter shield out of the front of the handle. Remove the 1/4-20 socket head screw through the hole in the side of the handle. Then pull the handle back on the cable. Remove the snap ring and connector clamp and the handle can then be slipped off the cable.

August 1973

Sec. K6.2.3
Gun Disassembly

'Innershield' Squirtgun K-116

Remove the cable from the wire feeder. Remove the pistol grip assembly from the gun by removing the four screws which clamp the assembly to the handle.

To disassemble the switch, remove the one screw which holds the housing in the pistol grip handle. Slip the aluminum housing out of the handle. Hold the housing with the leads toward the floor and look into the switch cavity. The tight side of the larger roll pins is to the right. Drive these pins to the left. They can be easily removed when they clear the right side of the casting. Do not remove the smaller roll pins unless the trigger is being replaced. The height of the Z spring controls the operating point of the switch with respect to the trigger movement. Set the spring so the switch operates at about the midpoint of the trigger travel.

To remove the handle from the cable follow the instructions in the last paragraph of Sec. K6.2.2.

August 1973

Sec. K6.2.4
Gun Disassembly

Submerged Arc Squirtgun K-114

Remove the cable from the wire feeder. To disassemble the gun from the conductor cable proceed as follows:

1. Be sure the air is off and the pressure is released from the tank.

2. If the gun still has filler wire in it, clip the end of wire and back the wire out of the gun.
3. Loosen the screw holding the travel receptacle clamp (item 8). (Do not remove the nut from the screw.) This will allow the clamp and the travel plug to swing free.
4. Loosen the electrical connection clamping screw (item 33).
5. With the trigger bar (item 10) in the off position, grasp the gun tube (item 5) in one hand and the cable handle (item 28) in the other. Pull the two units apart using a slight back and forth twisting motion.

To disassemble the gun proceed as follows:

1. Using a pair of needle nose pliers, lift the end of the spring (item 9) out of the hole in the trigger bar (item 10).
2. Loosen gun tube clamping screw (item 3), and remove the gun tube. A slight back and forth twisting action will help.
3. Remove both the screws (item 21) which hold the two plastic halves together. After these screws have been removed, the left and right gun mounts (items 6 and 11) can be separated and the remaining parts, the nozzle (item 4), gun hanger (item 19), and the flux tube assembly (item 7) can be removed.

To disassemble the gun handle from the cable proceed as follows:

1. Remove the flux hose from the gun.
2. To remove the flux tube (item 29), take out the two flat head screws (item 32). The flux tube can then be removed by pulling it straight back. Be careful not to damage the ends of the tube.
3. To remove the cable (item 31) from the handle, take the snap ring (item 34) off the end of the brass connector. With the clamping screw (item 33) loose, the cable (item 31) can then be pulled back out of the handle.
4. To remove the switch, remove the three round head screws (item 37). This will allow the switch mounting plate (item 36) to be removed from the fiber handle. Remove the two small screws (item 40) which hold the switch to the plate. The leads that go to the switch can then be unsoldered.
5. To remove the clamping ring (item 26) from the handle, remove the screw (item 35) and tighten the clamp screw (item 33). The clamping ring may then be removed from the handle.

To reassemble the unit, follow the procedure in reverse.

When finished with the reassembly, make certain that the electrical connection locking screw (item 36) is loosened before assembling the gun and then retightened before attempting to weld.

September 1979

Sec. K6.2.6

Hand Travel Unit (K-110)

Check the lubrication in the gear box every three months. If the motor worm and its worm gear appear dry, wipe a thin coating of a good non-fluid grease (equivalent to Clark Oil Co. Sea Gull Speed Reducer Lubricant) on each. Do not add too much or the motor will be overloaded. Lubrication for this first reduction must be by spatter and drip, not by running in a pool of grease.

Once each year flush the gear box out and relubricate. To do this remove both the output shaft assembly and the motor assembly. Flush the box with a good solvent. Force fresh grease in through the output shaft opening. Do not put grease through the motor mounting side. Use about 0.6 of a cubic inch of grease. This is a pad 1/2 inch in diameter by 3 inches long. Replace the output shaft assembly. With a wire or screw driver work the grease around the input worm gear to apply a thin coat of grease to this gear. Replace the motor assembly.

Check the travel motor brushes every three months.

August 1973

SEC. K6.3 — FLUX SYSTEM

Sec. K6.3.1

Flux Feeding System

The only regular maintenance required on the flux feeding system is cleaning the water and dirt trap. Do this every six months or whenever air no longer escapes from the coiled tube located beneath the flux tank.

Remove the coiled tube from the bottom of water trap tube. Remove the copper end fitting and clean the tube thoroughly. The flattened end should have a .005 to .010" gap so a small amount of air leaks through the end at all times. If the tube is fully sealed replace or rework end fitting.

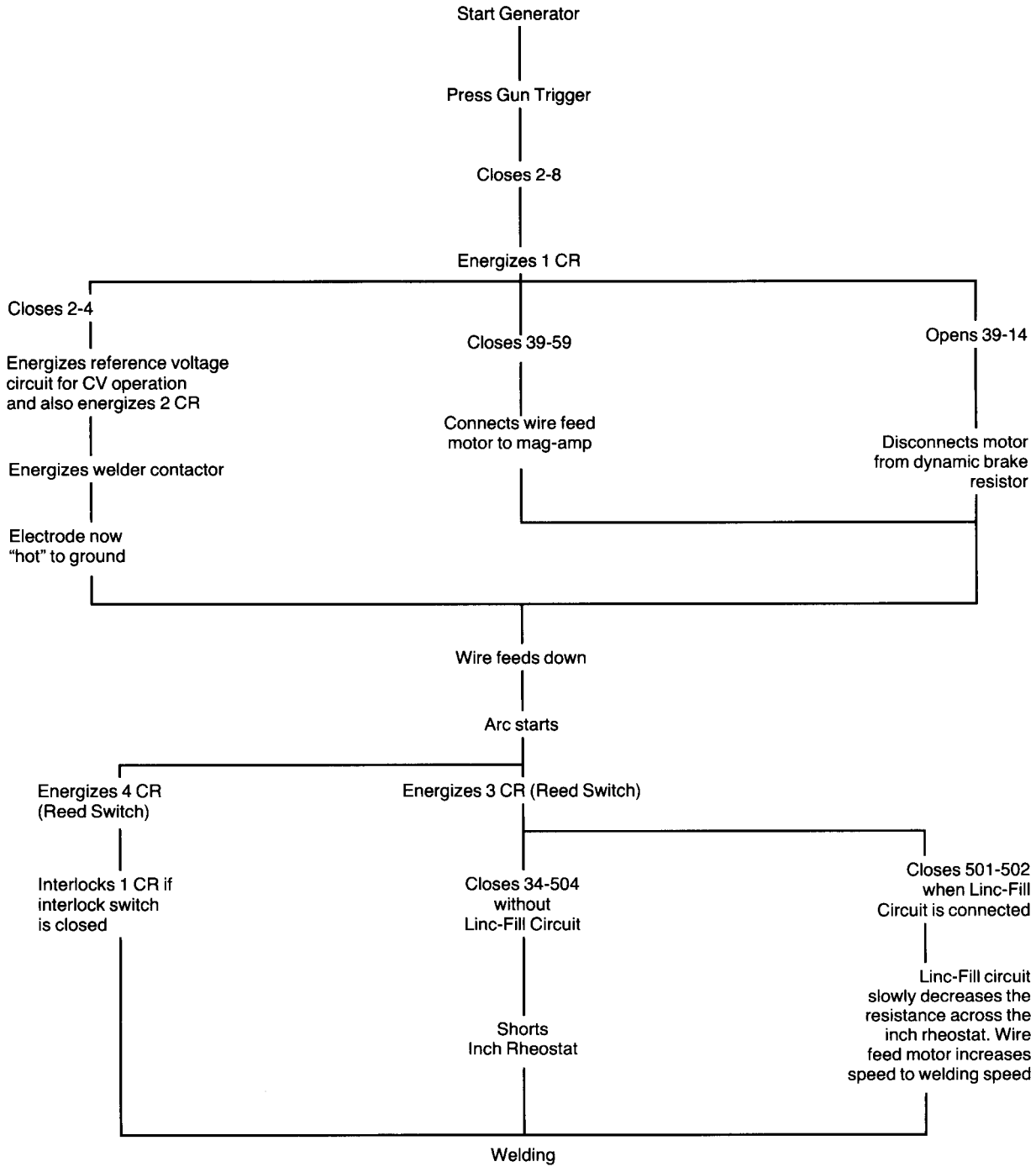
(On obsolete LN-4 or LN-5's *without* the copper end fitting, remove the coiled copper tube from the bottom of the trap tube. Saw about 3/4" off the pinched end. Wash all the material out of the copper tube. Squeeze the end of the tube closed again, but leave a .005 to .010" opening.)

Loosen the collar on the 2-1/8 inch steel filter tube and take the filter tube off the machine. Wash out completely. Fit steel tube back into its bracket and attach the coiled tube to its bottom. Fill steel tube to within 2 inches of the top with any clean Lincoln submerged arc welding flux.

Raise the steel tube into place and tighten the collar. When the air pressure is turned on again part of the flux in the steel tube will be forced into the coiled tube. Be certain a small amount of air is escaping from the pinched end of the copper tube.

August 1973

SEC. H6.7 ELECTRICAL SEQUENCE OF OPERATION



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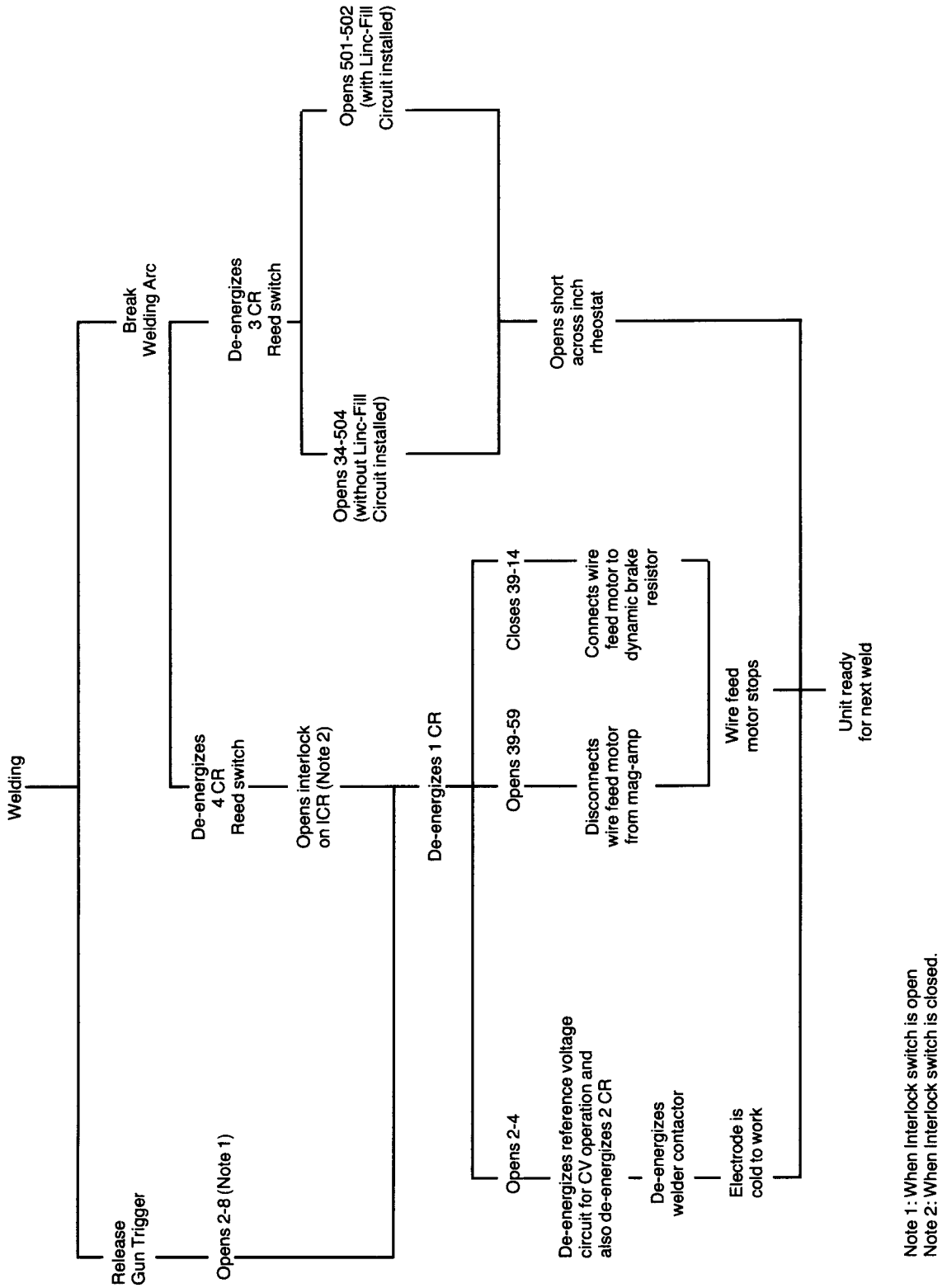
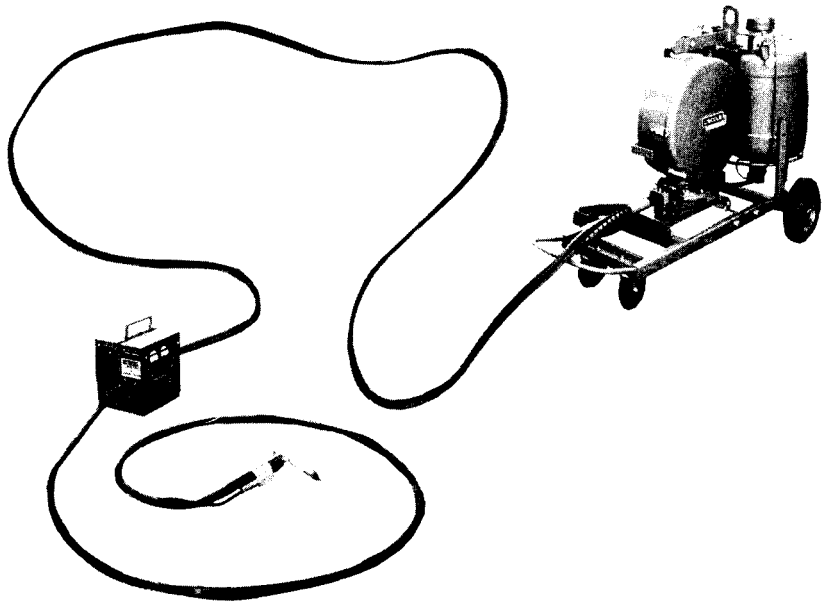
Sec. H6.7 Continued

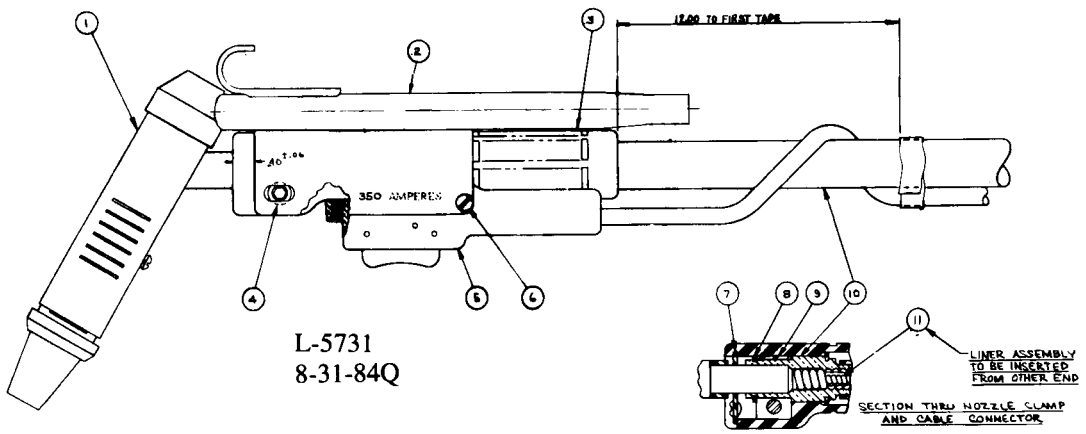


SEC. K7.1 — PARTS LIST INDEX



July 1985

K-112 AND K-113 SQUIRTGUNS AND CABLES



L-5731
8-31-84Q

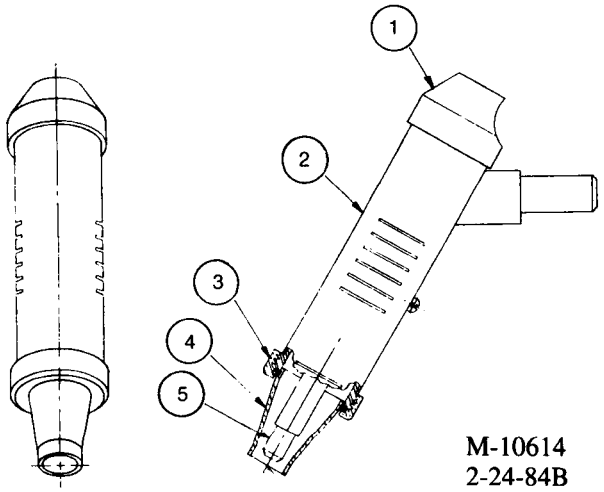
WHEN ORDERING GIVE: Item No., Part Name.
Parts List No., and Gun (K-112 or K-113)
K-112 is designed for 1/16" wire.
K-113 is designed for 5/64" wire.

NOTE: In 1977 the semiautomatic guns were redesigned to conform to NEMA STANDARDS. To identify a new design gun an ampere rating is stencilled on the clamp of the "Clamp and Tube Assembly" (item 2).

Parts List P-103-C

ITEM	PART NAME AND DESCRIPTION	NO. REQ'D.
	Gun & Cable Assembly (5/64" Electrode) (No Electrode Size Stencil)	1
	Gun & Cable Assembly (5/64" Electrode) (Stenciled 5/64)	1
	Gun & Cable Assembly (3/32" Electrode) (Stenciled 3/32)	1
1	Gun Assembly (350 Amp)	1
1	Gun Assembly (500 Amp)	1
	Gun Parts	
2	Clamp and Tube Assembly	1
3	Handle	1
4	Socket Head Cap Screw	1
5	Trigger and Control Cable Assembly	1
	Assembly Parts	
6	Pan Head Screw	4
7	Spatter Shield	1
8	Retaining Ring	1
9	Clamp	1
10	Conductor Cable, Includes: (350 Amp)	1
10	Conductor Calbe, Includes: (500 Amp)	1
10A	Handle and Stiffener, Wire Feeder End	1
10B	Connector, Wire Feeder End (350 Amp)	
10B	Connector, Wire Feeder End (500 Amp)	
10C	Connector, Gun End (350 Amp)	
10C	Connector, Gun End (500 Amp)	
10D	Clamping Tube, Both Ends	2
11	Cable Liner - For K-112 (1/16" Electrode, 350 Amp Only)	
	Adapter Kit to use Squirtguns K-113 with MN-1 and ML-3 (Not Illustrated)	
	Adapter Kit to use Squirtguns K-113 with ML-2 (Not Illustrated)	

GUN ASSEMBLY — SQUIRTGUNS K-112 AND K-113



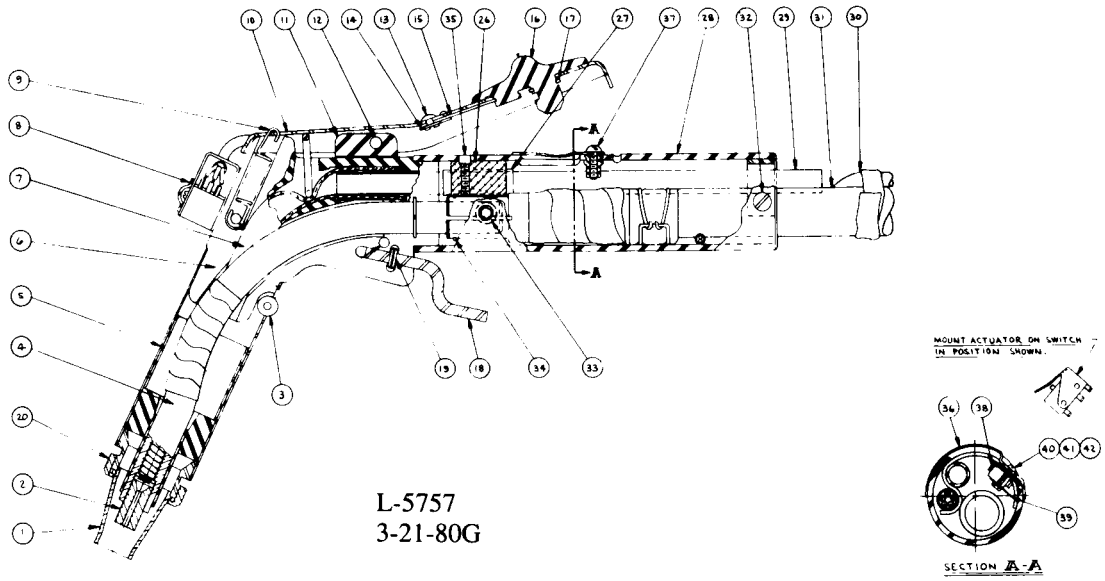
M-10614
2-24-84B

Parts List P-103-D April 1985

ITEM	PART NAME AND DESCRIPTION	NO. REQ'D.
1	Cap	1
2	Housing & Nozzle Assembly, Includes: (5/64, No Stencil)	1
2	Housing & Nozzle Assembly, Includes: (5/64, Stenciled)	1
2	Housing & Nozzle Assembly, Includes: (3/32, Stenciled)	1
2	Housing & Nozzle Assembly, Includes:	1
2A	Nozzle (5/64, No Stencil)	1
2A	Nozzle (3/32, Stenciled)	1
2A	Nozzle (5/64, Stenciled)	1
2A1	Nozzle Liner, Tight Wound Steel Spring (for 5/64, No Stencil)	1
2A1	Nozzle Liner, Tight Wound Steel Spring (for 5/64, Stenciled)	1
2A1	Nozzle Liner, Tight Wound Steel Spring (for 3/32, Stenciled)	1
2A2	Ceramic Insert	1
2A3	Insert Retainer	1
2A4	Hollow Lock Set Screw	1
2B	Housing	1
3	Collar	1
4	Nozzle Flux Cone	1
4	Chamfered 3/4" Nozzle Flux Cone	1
5	Contact Tip, 1/16" Electrode	*
5	Contact Tip, 5/64" Electrode	*
5	Contact Tip, 3/32" Electrode	*
	Nozzle Extension Parts Contact Service Dept.	
	* As Required	

The Lincoln Electric Company
Cleveland, Ohio 44117

K-114 SQUIRTGUN AND CABLE



WHEN ORDERING GIVE: Item No., Part Name, Parts List No., and Gun.

NOTE: In 1977 the semiautomatic guns were redesigned to conform to NEMA STANDARDS. To identify a new design gun an ampere rating is stencilled on the clamp of the "Clamp and Tube Assembly" (item 2).

Parts List P-103-E

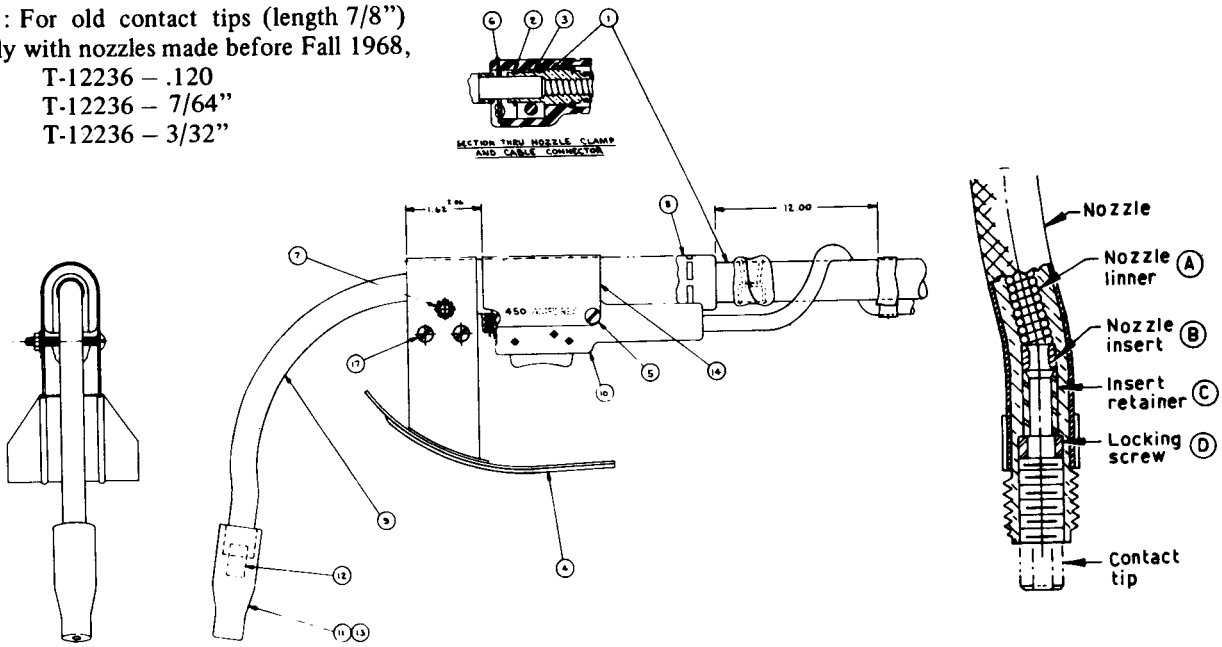
ITEM	PART NAME AND DESCRIPTION	NO. REQ'D.
1	Nozzle Flux Cone, 5/8" Opening (Standard)	1
1	Nozzle Flux Cone, 3/4" Opening (Optional)	1
1	Nozzle Flux Cone, 13/16" Opening (Optional)	1
1	Nozzle Flux Cone, 15/16" Opening (Optional)	1
2	Contact Tip	As Req
	Gun Assembly, Includes Items 3 Thru 20	1
3	Socket Head Capscrew	1
4	Nozzle, Includes:	
4A	Nozzle Liner, Tight Wound Steel Spring	1
4B	Liner Locking Screw	1
5	Gun Tube	1
6	Right Gun Mount	1
7	Flux Shut-Off Assembly	1
8	Receptacle Clamp	
9	Spring	1
10	Lever	1
11	Left Gun Mount	1
12	Pivot Pin	1
13	Rivet	1
14	Rivet Burr	1
15	Spring Clip	1
16	Trigger	1
17	Snap Ring	1
18	Gun Hanger	1
19	Roll Pin	1
20	Collar	1
	Handle and Conductor Cable Assembly, Includes:	
	Items 26 thru 42	1
26	Clamping Ring	1
27	Tube Insulator	1
28	Handle	1
29	Flux Tube	1

Parts List P-103-E

ITEM	PART NAME AND DESCRIPTION	NO. REQ'D.
30	Control Cable	1
	Micro Switch	1
30A	3 Contact Receptacle, Gun End	1
30B	5 Contact Receptacle, Wire Feeder End	1
31	Conductor Cable, Includes:	1
31A	Handle and Stiffener, Wire Feeder End	1
31B	Connector, Wire Feeder End	1
31C	Connector, Gun End	1
31D	Clamping Tube, Both Ends	2
32	Flat Head Screw	2
33	Socket Head Screw	1
34	Snap Ring	1
35	Socket Head Screw	1
36	Switch Mounting Plate	1
37	Round Head Screw	3
38	Actuator	1
40	Insulation	3
40	Round Head Screw	2
41	Lockwasher	2
42	Hex Nut	2
	Nozzle Extensions. 2-1/4" Stickout, and 3-1/4"	
	Stickout, Not Illustrated	1
	Housing	1
	Insert	1
	Tip	1
	Adapter Kit to Use Squirtgun K-114 with MN-1 and ML-3 (Not Illustrated)	1
	Adapter Kit to Use Squirtgun K-114 with ML-3 (Not Illustrated)	1

K-115 SQUIRTGUN AND CABLE

NOTE 1: For old contact tips (length 7/8") used only with nozzles made before Fall 1968, order:
T-12236 – .120
T-12236 – 7/64"
T-12236 – 3/32"



WHEN ORDERING GIVE: Item No., Part Name, Parts List No., and Gun

* Specify wire size.

NOTE: In 1977 the semiautomatic guns were redesigned to conform to NEMA standards. To identify a new design gun an ampere rating is stencilled on the "Switch Housing Clamp" (Item 14).

Parts List P-103-F

ITEM	PART NAME AND DESCRIPTION	NO. REQ'D.
	Gun & Cable Assy.(82° Nozzle)-.120" & 7/64"Wire	1
	Gun & Cable Assy.(82° Nozzle)-3/32" Wire	1
	Gun & Cable Assy.(45° Nozzle)-.120" & 7/64"Wire	1
	Gun & Cable Assy.(45° Nozzle)-3/32" Wire	1
1	Conductor Cable, Includes:	1
1A	Handle, Wire Feeder End	1
1B	Connector, Wire Feeder End	1
1C	Connector, Gun End	1
1D	Clamping Tube, Both Ends	2
2	Snap Ring	1
3	Clamp	1
4	Heat Shield Assembly	1
5	Pan Head Screw	4
6	Spatter Shield	1
7	Socket Head Screw	1
8	Handle	1
9	Nozzle (82°), Includes:	1

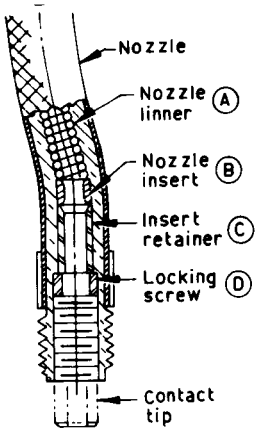
ITEM	PART NAME AND DESCRIPTION	NO. REQ'D.
9A	Nozzle Liner, Tight Wound Steel Spring	1
9B	Nozzle Insert	1
9C	Nozzle Insert Retainer	1
9D	Liner Locking Screw	1
10	Trigger and Control Cable Assembly	1
	Assembly Parts	
11	Insulated Guide, 2-3/4" Electrical Stickout	1
11	Insulated Guide, 3-3/4" Electrical Stickout	1
11	Insulated Guide, 1-1/4" Electrical Stickout	1
12	Contact Tip (Length 1-1/8") Note 1	As Req'd
14	Switch Housing Clamp	1
15	Shield Mounting Block	1
17	Round Head Screw	4
	Adapter Kit to use Squirtgun K-115 with MN-1 and ML-3 (Not Illustrated)	1
	Adapter Kit to use Squirtgun K-115 with ML-2 (Not Illustrated)	1

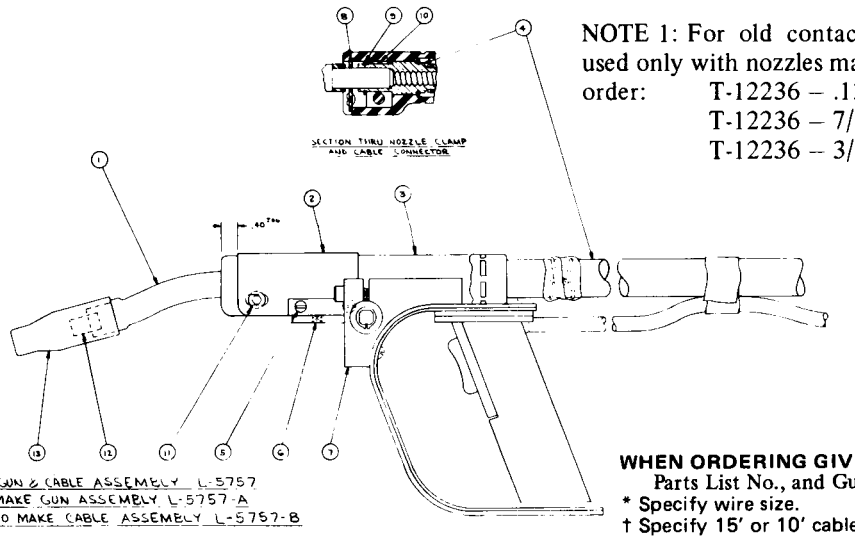
March 1979

The Lincoln Electric Company
Cleveland, Ohio 44117

K-116 SQUIRTGUN AND CABLE

(P-103-G)





NOTE 1: For old contact tips (length 7/8") used only with nozzles made before Fall 1968, order:
T-12236 – .120
T-12236 – 7/64"
T-12236 – 3/32"

ASSEMBLE ALL PARTS TO MAKE GUN & CABLE ASSEMBLY L-5757
ASSEMBLE ITEMS 3 THRU 20 TO MAKE GUN ASSEMBLY L-5757-A
ASSEMBLE ITEMS 26 THRU 42 TO MAKE CABLE ASSEMBLY L-5757-B

WHEN ORDERING GIVE: Item No., Part Name, Parts List No., and Gun
* Specify wire size.
† Specify 15' or 10' cable as appropriate.

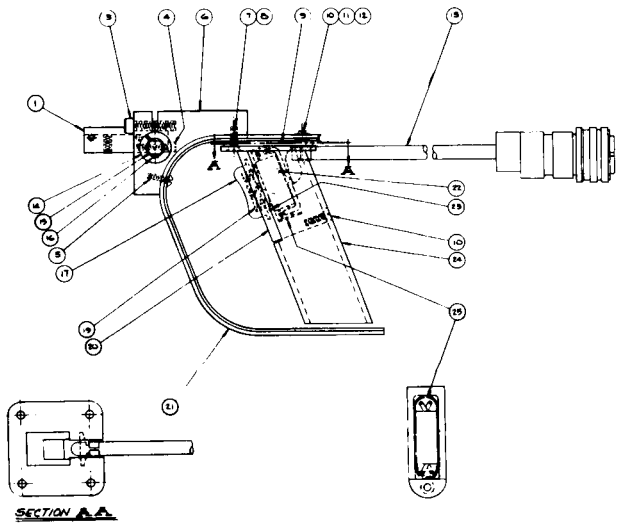
NOTE: In 1977 the semiautomatic guns were redesigned to conform to NEMA standards. To identify a new design gun an ampere rating is stencilled on the handle of "Assembly" (item 7).

Parts List P-103-G

ITEM	PART NAME AND DESCRIPTION	NO. REQ'D.
	Gun & Cable Assembly - .120" & 7/64" Electrode	1
	Gun & Cable Assembly - 3/32" Electrode	1
1	Nozzle, Includes:	1
1A	Nozzle Liner, Tight Wound Steel Spring	1
1B	Nozzle Insert	1
1C	Nozzle Insert Retainer	1
1D	Liner Locking Screw	1
2	Switch Housing Clamp	1
3	Handle	1
4	15' Conductor Cable, Includes:	1
4	10' Conductor Cable, Includes:	1
4A	Handle, Wire Feeder End	1
4B	Connector, Wire Feeder End	1
4C	Connector, Gun End	1
4D	Clamping Tube, Both Ends	2
5	Pan Head Screw	4
6	Socket Head Screw	2
7	Handle & Control Cable Assembly - 15' Length	1
7	Handle & Control Cable Assembly - 10' Length	1
	Assembly Parts	
8	Spatter Shield	1
9	Snap Ring	1
10	Clamp	1
11	Socket Head Cap Screw	1
12	Contact Tip (Length 1-1/8") Note 1	As Req'd
13	Insulated Guide, 2-3/4" Electrical Stickout	1
13	Insulated Guide, 3-3/4" Electrical Stickout	1
13	Insulated Guide, 1-1/4" Electrical Stickout	1
	Adapter Kit to use K-116 with MN-1 & ML-3	
	(Not Illustrated)	1
	Adapter Kit to use K-116 with ML-2 (Not Illus.)	1

K-116 SQUIRTGUN HANDLE AND CONTROL CABLE

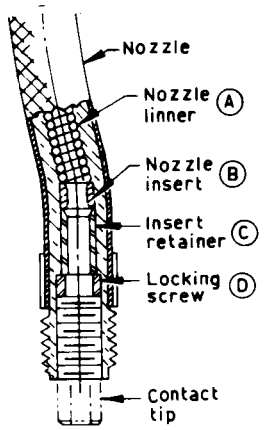
(P-103-H)



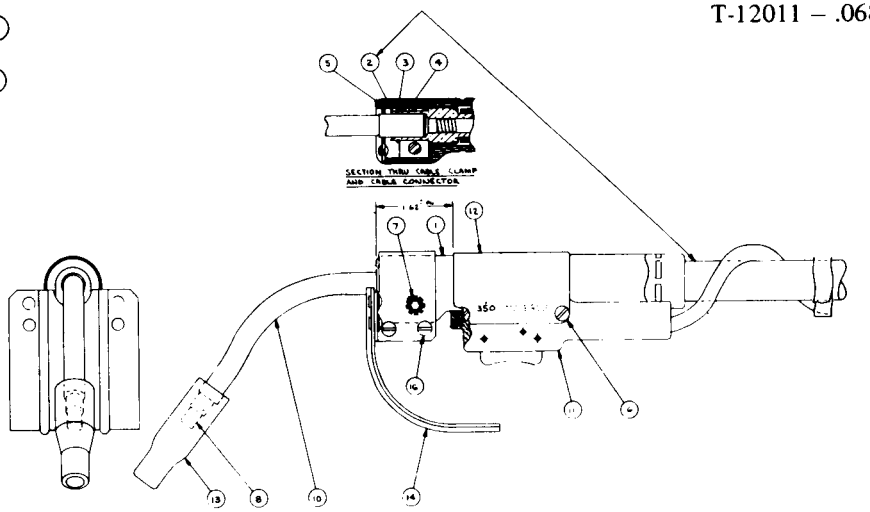
Parts List P-103-H

ITEM	PART NAME AND DESCRIPTION	NO. REQ'D.
	Handle & Control Cable Assembly - 15' Length	1
	Handle & Control Cable Assembly - 10' Length	1
1	Handle Mounting Bracket	1
3	Socket Head Cap Screw	2
4	Socket Head Cap Screw	2
5	Round Head Screw	2
6	Handle Pivot Block	2
7	Flat Head Screw	2
8	Lockwasher	2
9	Insulating Pad	1
10	Flat Head Screw	3
11	Lockwasher	2
12	Hex Nut	2
13	Control Cable Includes: 15' Length	1
13	Control Cable Includes: 10' Length	1
13A	Micro Switch	1
13B	Polarized Plug, Wire Feeder End	1
13C	Clamp at Plug	1
14	Friction Bushing	2
15	Handle Pivot Shaft	1
16	Snap Ring	2
17	Trigger Assembly	1
19	Spring	2
20	Trigger Mounting Block	1
21	Gun Shield	1
22	Roll Pin	2
23	Roll Pin	2
24	Handle	1
25	Switch Insulation	1

K-126 SQUIRTGUN AND CABLE



NOTE 1: For old contact tips (length 7/8") used only with nozzles made before Fall 1968, order: T-12011 – 5/64"
T-12011 – 3/32"
T-12011 – .068



NOTE: In 1977 the semiautomatic guns were redesigned to conform to NEMA standards. To identify a new design gun an ampere rating is stencilled on the "Clamp" (item 12).

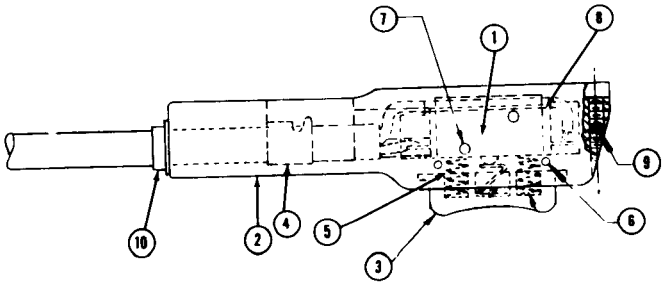
K-126 — Parts List P-103-J

ITEM	PART NAME AND DESCRIPTION	NO. REQ'D.
	Gun and Cable Assembly	1
1	Handle	1
2	Conductor Cable, Includes:	1
2A	Handle and Stiffener, Wire Feeder End	1
2B	Connector, Wire Feeder End	1
2C	Connector, Gun End	1
2D	Clamping Tube, Both Ends	2
3	Snap Ring	1
4	Clamp	1
5	Spatter Shield	1
6	Pan Head Screw	4
7	Socket Head Cap Screw	1
8	Contact Tip,5/64" Electrode (Length 1-1/8") Note 1	As Req'd.
8	Contact Tip,3/32" Electrode (Length 1-1/8") Note 1	As Req'd.
8	Contact Tip, .068" Electrode (Length 1-1/8") Note 1	As Req'd.
10	Nozzle, Includes:	1
10A	Nozzle Liner, Tight Wound Steel Spring	1
10B	Nozzle Insert	1
10C	Nozzle Insert Retainer	1
10D	Liner Locking Screw	1
11	Trigger and Control Cable Assembly Assembly Parts	1
12	Clamp	1
13	Insulated Guide,2-3/4" Electrical Stickout	1
13	Thread Protector, 3/4 to 1-1/2" Stickout	1
14	Heat Shield Assembly	1
16	Round Head Screw	4
	Adapter Kit to use K-126 with MN-1 or ML-3	1
	Adapter Kit to use K-126 with ML-2	1

TRIGGER AND CONTROL CABLE ASSEMBLY

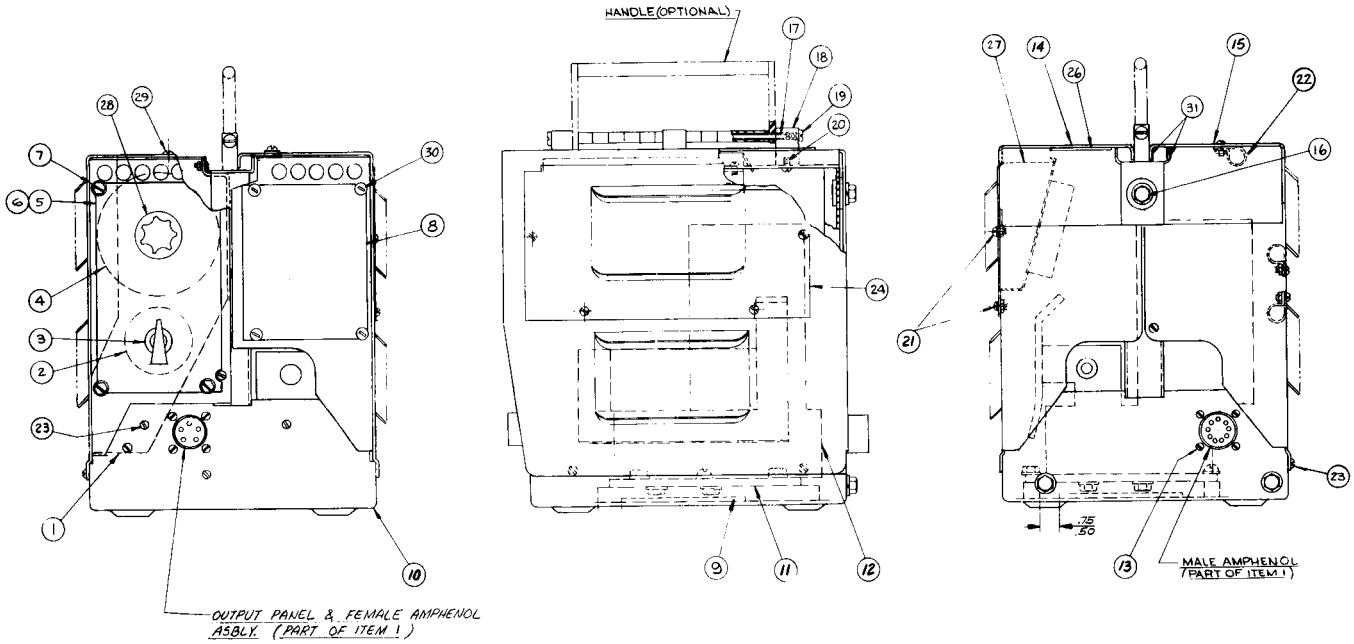
Cable Assembly — Parts List P-103-K

ITEM	PART NAME AND DESCRIPTION	NO. REQ'D.
	Trigger and Control Cable Assembly, Includes:	1
1	Micro-Switch	1
2	Switch Pod	1
3	Trigger Assembly	1
4	Cord Clamp	1
5	Coil Spring	2
6	Roll Pin	2
7	Roll Pin	2
8	Insulation Sleeving	1
9	Set Screw	1
12	Polarized Plug, Wire Feeder End, Not Illus.	1
12A	Clamp at Polarized Plug	1



March 1979

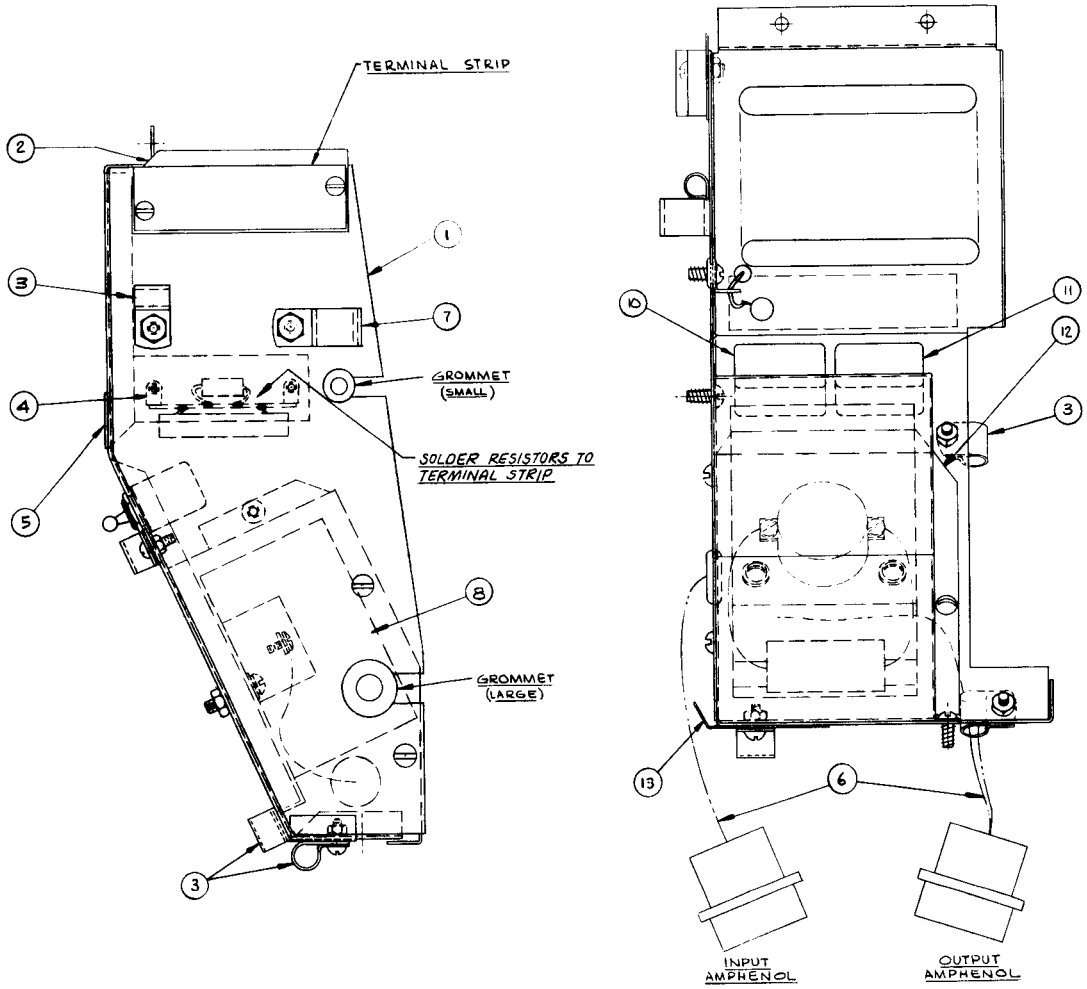
WIRE FEED UNIT



Parts List P-107-C

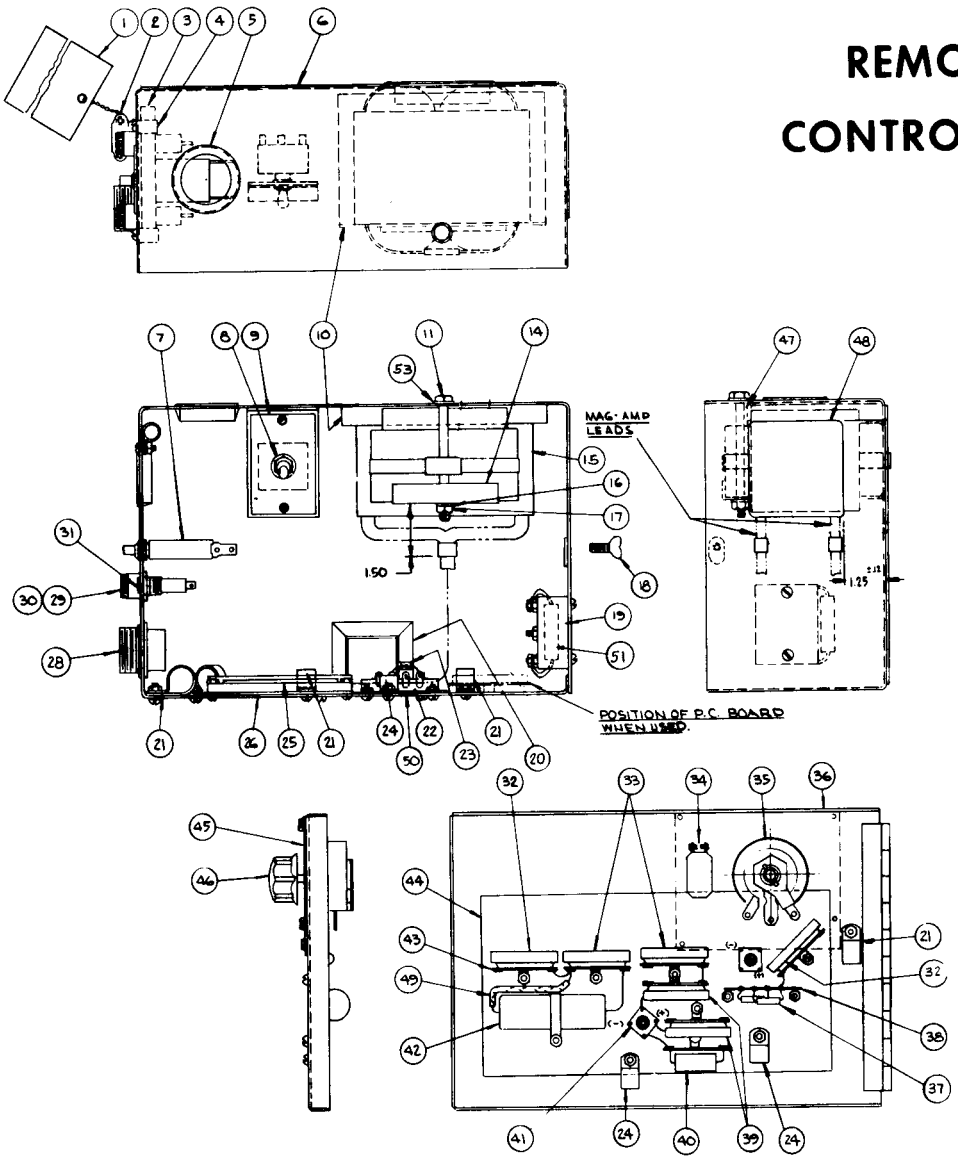
ITEM	PART NAME AND DESCRIPTION	NO. REQ'D.
1	Instrument Panel Assembly See P-107-D	
2	Rheostat	1
3	Knob	1
4	Rheostat	1
5	Dial Plate (Constant Voltage)	1
6	Dial Plate (Variable Voltage)	1
7	Self-Tapping Screw	4
8	Nameplate	1
10	Base Assembly	1
11	Gear Box Mounting Plate	1
12	Wire Drive Motor and Gear Box Assembly See P-107-F	
13	Self-Tapping Screw	8
14	Door Assembly	1
15	Cover Assembly	1
16	Hex Head Screw	3
	Lockwasher	3
17	Hinge Pin	1
18	Hinge Support Block	3
19	Self-Tapping Screw	2
20	Round Head Screw	3
21	Round Head Screw	4
	Lockwasher	4
	Hex Nut	4
22	Lead Clamp	3
	Round Head Screw	3
	Hex Nut	3
23	Self-Tapping Screw	7
24	Door Cover Panel (Units Without Meters)	1
26	Drive Roll Decal	1
27	Meter Kit See P-107-J	
28	Knob	1
29	Round Head Screw	1
	Hex Nut	1
30	Self-Tapping Screw	4

INSTRUMENT PANEL



Parts List P-107-D		
ITEM	**PART NAME AND DESCRIPTION**	**NO. REQ'D.**
	Instrument Panel Assembly, Includes:	1
1	Instrument Panel	1
2	Number Plate	1
3	Lead Clip	4
	Round Head Screw	4
	Hex Nut	4
4	Terminal Strip	1
	Terminal Strip Insulation	1
	Resistor (Small)	1
	Resistor (Large)	1
	Self-Tapping Screw	2
5	Switch Decal	1
6	Input Amphenol	1
6	Output Amphenol	1
7	Lead Clip	1
	Round Head Screw	1
	Hex Nut	1
8	Relay	1
	Capacitor Assembly	1
10	"Direction of Wire Feed" Switch	1
11	"Trigger Interlock" Switch	1
12	Relay Cover	1
	Self-Tapping Screw, Relay Cover Mounting	5

REMOTE CONTROL BOX

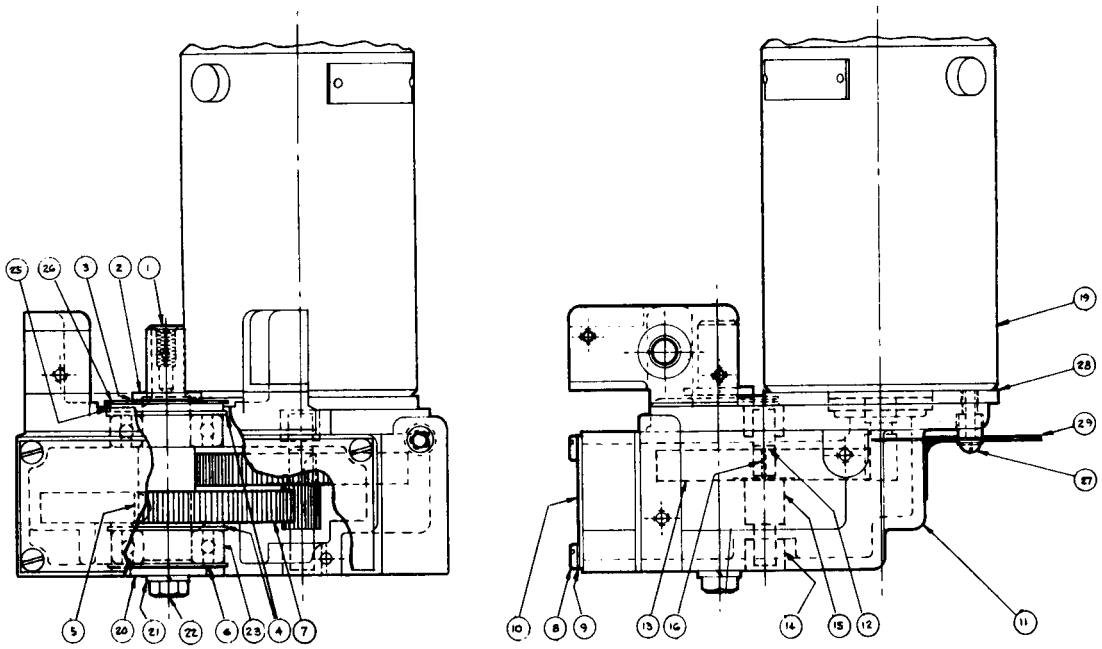


Parts List P-107-K

ITEM	PART NAME AND DESCRIPTION	NO. REQ'D.
1	Caution Tag (50 or 60 Cycle Operation)	1
2	Box Connector	1
3	Reed Switch	1
4	Clamp	2
5	Bushing	2
6	Case Assembly	1
7	Circuit Breaker	1
8	Switch	1
9	Nameplate	1
10	Insulation	1
11	Hex Head Screw	1
14	Coil Support Bracket	1
15	Wire Feed Mag Amp Coil and Core Assembly	1
16	Lockwasher	1
17	Hex Nut	1
18	Thumb Screw	1
19	Mag Amp Rectifier	1
20	Choke	1
21	Lead Clamp	5
22	Terminal Strip	1
23	Rectifier	1
24	Lead Clamp	3
25	Fanning Strip Assembly	1

ITEM	PART NAME AND DESCRIPTION	NO. REQ'D.
26	Number Plate	1
28	Amphenol Connector	1
29	Fuse Holder	2
30	Fuse (1 Amp)	2
31	Fuse Identification Sticker	2
32	Resistor	2
33	Resistor	2
34	Switch	1
35	Rheostat	1
36	Door and Hinge Assembly	1
37	Capacitor	2
38	Terminal Strip	1
39	Resistor	2
40	Thyrector Diode	1
41	Rectifier	2
42	Capacitor	1
43	Terminal Strip	7
44	Insulation	1
45	Nameplate	1
46	Rheostat Knob	1
47	Spacer	1
48	Decal	1
50	Insulation	1
51	Thyrector Diode and Lug Assembly	1
53	Flatwasher	1

WIRE DRIVE MOTOR AND GEAR BOX



L-5743
2-10-78D

Parts List P-107-F		
ITEM	PART NAME AND DESCRIPTION	NO. REQ'D.
	Wire Drive Motor and Gear Box Assembly, Includes:	1
1	Drive Shaft	1
2	Spacer	1
3	Shim	As Req'd
3	Shim	As Req'd
4	Snap Ring	2
5	Woodruff Key	1
6	Beveled Snap Ring	1
7	Drive Gear	1
8	Thread Cutting Screw	4
9	Lockwasher	4
10	Gear Box Cover	1
11	Gear Box	1
12	Retaining Ring	1
13	Helical Reduction Gear	1
14	Needle Bearing	2
15	Pinion Gear Shaft	1
16	Woodruff Key	1
19	Drive Motor Assembly, Includes:	1
	Pinion Gear	1
	Roll Pin, Gear to Shaft	1
20	Flatwasher	1
21	Lockwasher	1
22	Hex Head Bolt	1
23	Bearing	2
25	Shaft Seal	1
26	Spacer Washer	1
27	Screw Insulator, Includes:	3
	Plain Washer	3
	Lockwasher	3
	Rd. Hd. Screw	3
28	Motor Insulator	1
29	Insulation	1

October 1977

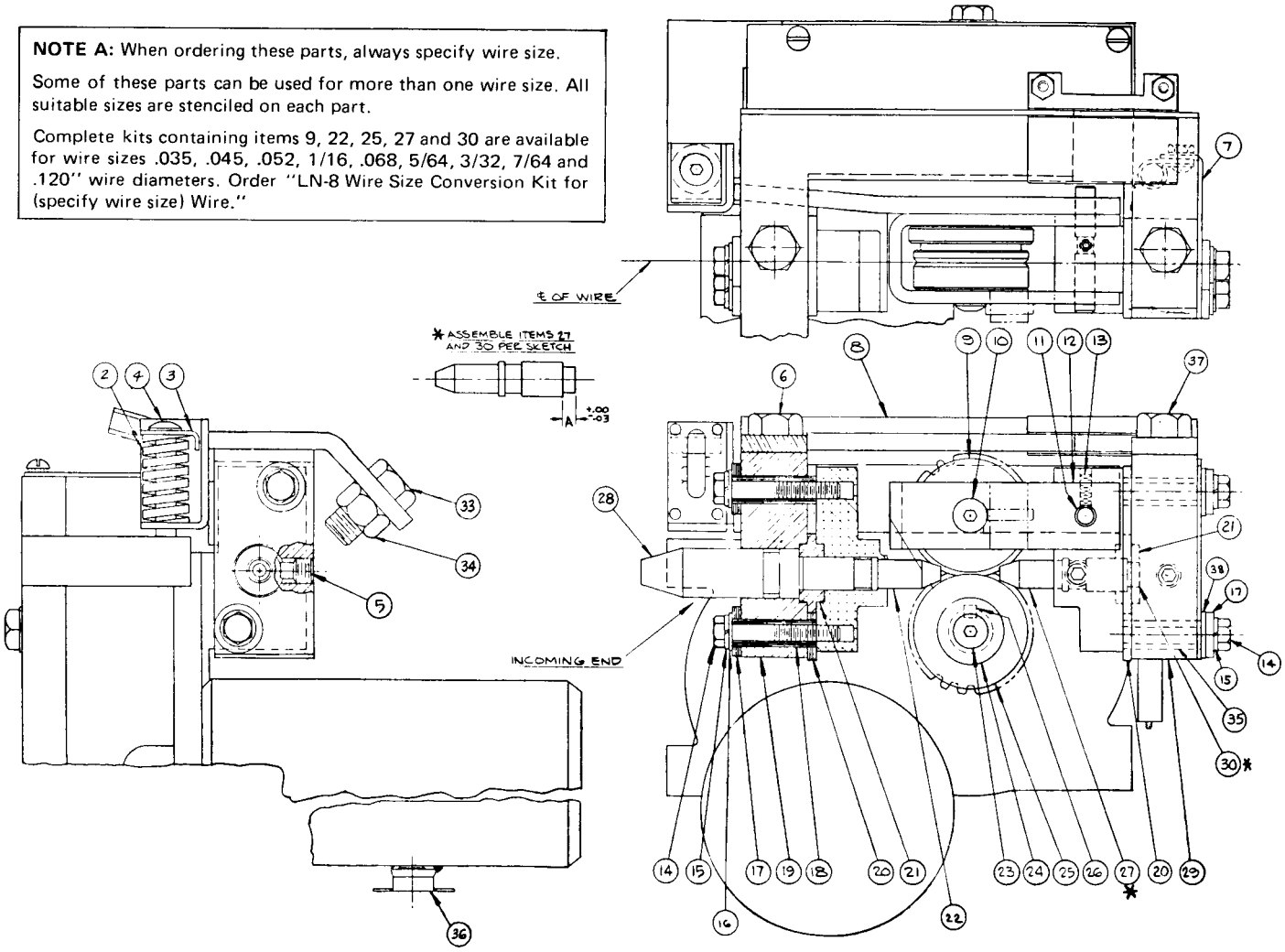
The Lincoln Electric Company
Cleveland, Ohio 44117

WIRE DRIVE MECHANISM

NOTE A: When ordering these parts, always specify wire size.

Some of these parts can be used for more than one wire size. All suitable sizes are stenciled on each part.

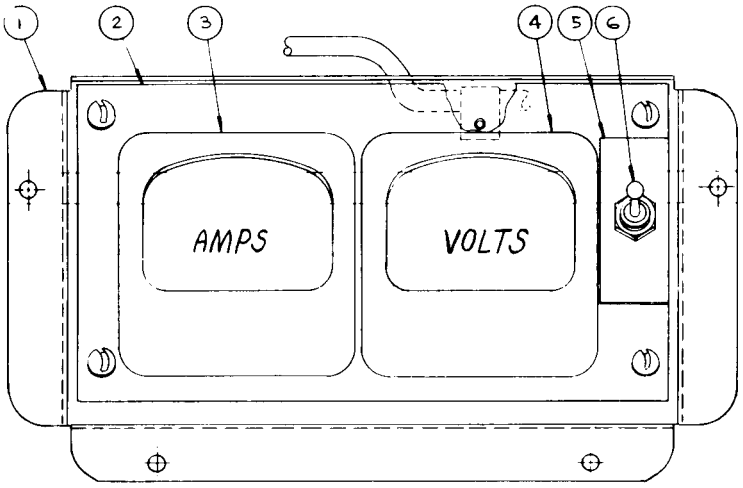
Complete kits containing items 9, 22, 25, 27 and 30 are available for wire sizes .035, .045, .052, 1/16, .068, 5/64, 3/32, 7/64 and .120" wire diameters. Order "LN-8 Wire Size Conversion Kit for (specify wire size) Wire."

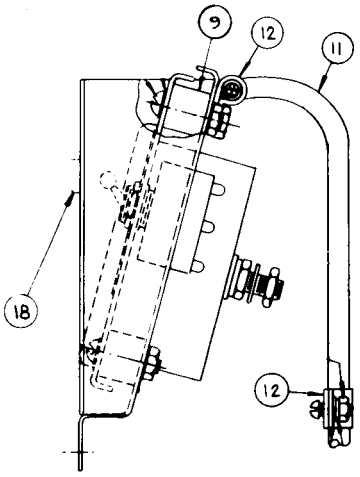


Parts List P-107-G

ITEM	PART NAME AND DESCRIPTION	NO. REQ'D.
	Wire Drive Mechanism Assembly, Includes:	1
1	Drive Motor and Gear Box Assembly See P-107-F	
2	Compression Spring	1
3	Yoke Setting Indicator	1
4	Button Head Socket Screw	1
5	Hollow Set Screw	4
6	Hex Head Cap Screw	2
7	Reed Switch Energizer Assembly, Includes:	1
	Reed Switch	1
8	Shunt Assembly (with Meters Only)	1
9*	Idle Roll Assembly - Specify Wire Size	1
10	Button Head Socket Screw	1
11	Pivot Pin	1
12	Yoke Assembly	1
13	Hollow Set Screw	1
14	Hex Head Cap Screw	4
15	Lockwasher	4
16	Flatwasher	4
17	Insulating Washer	4
18	Insulating Bushing	2

ITEM	PART NAME AND DESCRIPTION	NO. REQ'D.
19	Incoming Conductor Block	1
20	Block Insulation	2
21	Locator Bushing	2
22*	Incoming Guide Tube - Specify Wire Size	1
23	Button Head Socket Screw	1
24	Collar Assembly	1
25*	Drive Roll and Gear Assembly - Specify Wire Size	1+
26	Key	1
27*	Outgoing Guide Tube - Specify Wire Size	1
28	Incoming Wire Guide	1
29	Outgoing Conductor Block	1
30*	Outgoing Guide Insert - Specify Wire Size	1
33	Hex Head Screw	1
34	Hex Nut	1
35	Insulating Bushing	2
36	Thermostat (LN-8 Only --- Except LN-8F)	1
*	See NOTE A above	
+	For .068" and larger wire, this assembly includes a spacer shim between two knurled drive rolls.	





K-165 AMMETER-VOLTMETER KIT

For codes below 7575 only. See Sec. K7.3 Page AA for meter kits for higher codes.

K-165 Ammeter-Voltmeter Kit — Parts List P-107-J

ITEM	PART NAME AND DESCRIPTION	NO. REQ'D.
	Meter Housing and Panel Assembly, Includes:	1
1	Meter Housing	1
2	Meter Panel	1
3	Ammeter	1
4	Voltmeter	1
5	Polarity Switch Plate	1
6	Polarity Switch	1
9	Shock Mounting	4
11	Cable	1
12	Lead Clip	2
17	Hex Nut	1
18	Meter Guard	1

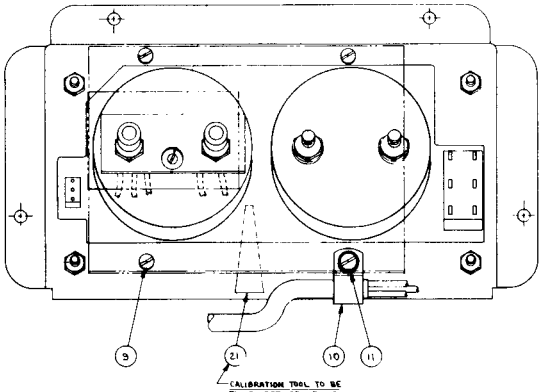
August 1973

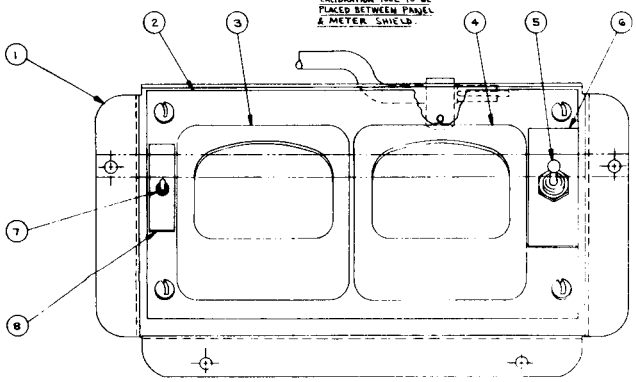
K-207 Feed Speed-Voltmeter Kit — Parts List P-107-L

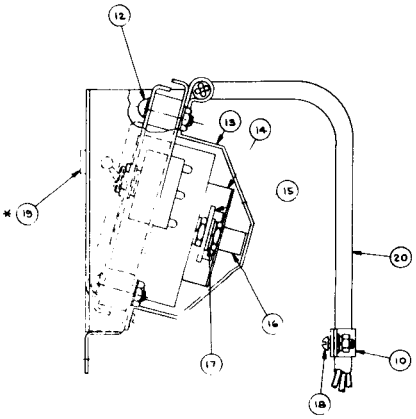
ITEM	PART NAME AND DESCRIPTION	NO. REQ'D.
1	Meter Housing	1
2	Meter Panel	1
3	Wire Feed Speed Meter	1
4	Voltmeter	1
5	Polarity Switch	1
6	Polarity Switch Plate	1
7	Toggle Switch	1
8	Switch Plate	1
13	Insulated Meter Shield	1
14	P.C. Board Insulation	1
15	P.C. Board Assembly	1
16	Tubing	2
17	Lockwasher	2
19	Meter Guard	1
20	Sleeving	1
	Calibration Tool	1

August 1973

REAR VIEW





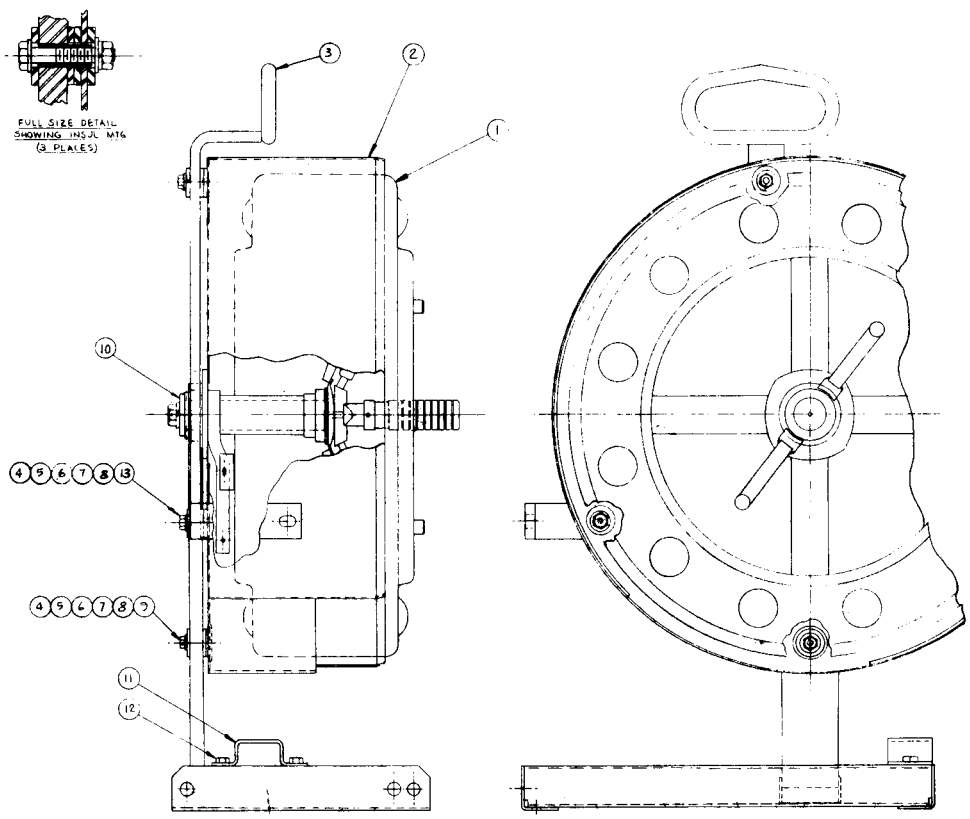


K-207 WIRE FEED SPEED METER-VOLTMETER KIT

For codes below 7575 only. See Sec. K7.3 Page AA for meter kits for higher codes.

The Lincoln Electric Company
Cleveland, Ohio 44117

50 AND 60# WIRE REEL SUPPORT



INPUT CABLE AND EXTENSION CABLE ASSEMBLIES

Parts List P-107-M

ITEM	PART NAME AND DESCRIPTION	NO. REQ'D.
	LN-6 Power Input Cable Assembly, Includes:	1
	Control Cable Assembly, Includes:	1
	Amphenol Connector (Female)	1
	Amphenol Connector (Male)	1
	Electrode Cable Assembly	1
	LN-8 & LN-9 Power Input Cable Assembly, Includes:	1
	Control Cable Assembly, Includes:	1
	Polarized Cable Assembly	1
	Electrode Cable Assembly	1
	LN-6NE & LN-6SE Extension Cable Assy., Includes:	1
	Control Cable Assembly, Includes:	1
	Amphenol Connector (Female)	1
	Amphenol Connector (Male)	1
	Conductor Cable Assembly	1
	LN-8NE, 8SE, 9NE & 9SE Extension Cable Assy., Includes:	1
	Control Cable Assembly, Includes:	1
	Amphenol Connector (Female)	1
	Amphenol Connector (Male)	1
	Conductor Cable Assembly	1
	Flux Hose, 22½ Ft. (Req'd. For All Submerged Arc Machines)	1
	Flux Hose, 45 Ft. (Req'd. For All Submerged Arc Machines)	1
	Electrode Cable 22½ Ft. (Req'd. On All Machines Above 450 Amps)	1
	Electrode Cable 45 Ft. (Req'd. On All Machines Above 450 Amps)	1

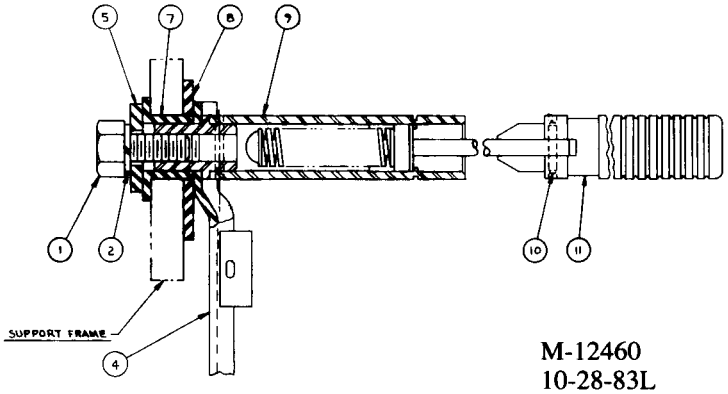
August 1978

Parts List P-107-O

ITEM	PART NAME AND DESCRIPTION	NO. REQ'D.
	LN-6, LN-8 & LN-9 Wire Reel Support Assy, Includes:	1
	LN-7 Wire Reel Support Assy., Includes:	1
1	Wire Reel	1
2	Wire Reel Housing (For LN-7, See Note 1)	1
3	Reel Support	1
4	Flatwasher	6
5	Lockwasher	3
6	Hex Nut	3
7	Hex Head Screw	3
8	Insulating Washer	12
9	Insulating Tube	1
10	Reel Mounting Shaft Assembly	1
11	Cable Clamp	1
12	Thread Cutting Screw	2
13	Insulating Tube	2
	Note 1: To equip an LN-7 with a wire reel cover kit order S-14543. Includes items 2, 4 through 9, and 13. For LN-7 S-14543 must also be installed when an M-11514 door is to be installed.	
	Optional Door Assembly, Includes:	1
	Door and Hinge Welded Assembly	1
	Catch	1
	Sealing Panel	1
	Sealing Panel Mounting Plate	2
	LN-XNE & LN-XSE Fully Enclosed Wire Reel Support Assembly, Includes all above plus:	1
	Hand Crank Assembly	1
	Wire Feed Unit Handle	1
	LN-XNE Lightweight Wire Reel Support Assembly, Includes:	1
	Wire Reel	1
	Hand Crank Assembly	1
	Cage Type Wire Reel Support	1
	Wire Feed Unit Handle	1
	Reel Mounting Shaft Assembly	1

August 1978

WIRE REEL SHAFT

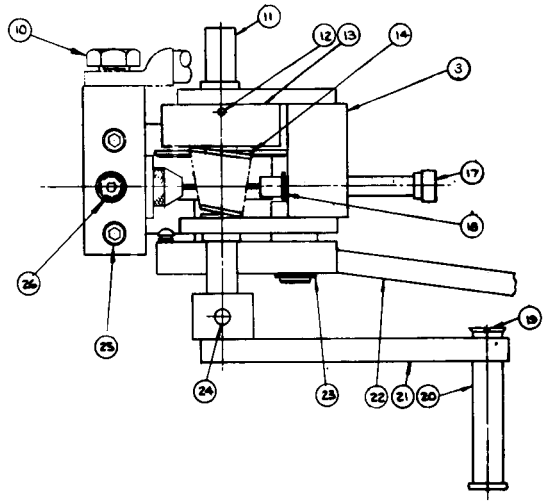


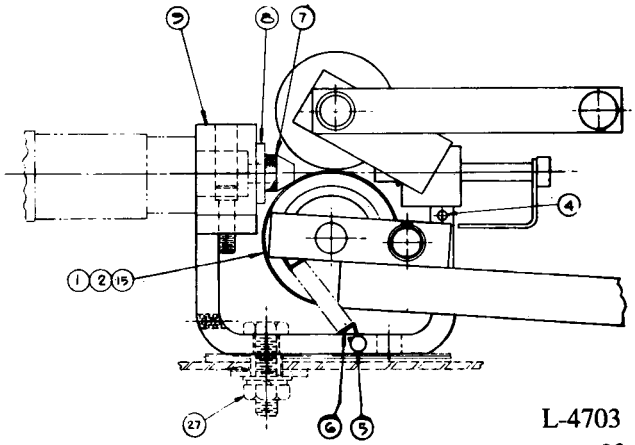
M-12460
10-28-83L

Parts List P-107-P

ITEM	PART NAME AND DESCRIPTION	NO. REQ'D.
	Reel Mounting Shaft Assembly, Includes:	1
1	Hex Head Bolt	1
2	Lockwasher	1
4	Brake Assembly, Includes:	1
	Brake	1
	Cotter Pin	1
5	Plain Washer	1
7	Insulator Bushing	1
8	Insulating Washer	1
9	Wire Reel Shaft Assembly	1
10	Roll Pin	1
11	Pull Knob	1
*	LN-6 and LN-7 welders built before November 1972 did not have the adjustable brake (Item 4). If a shaft or fixed brake assembly is needed, order the M-12460 Assembly.	

April 1985





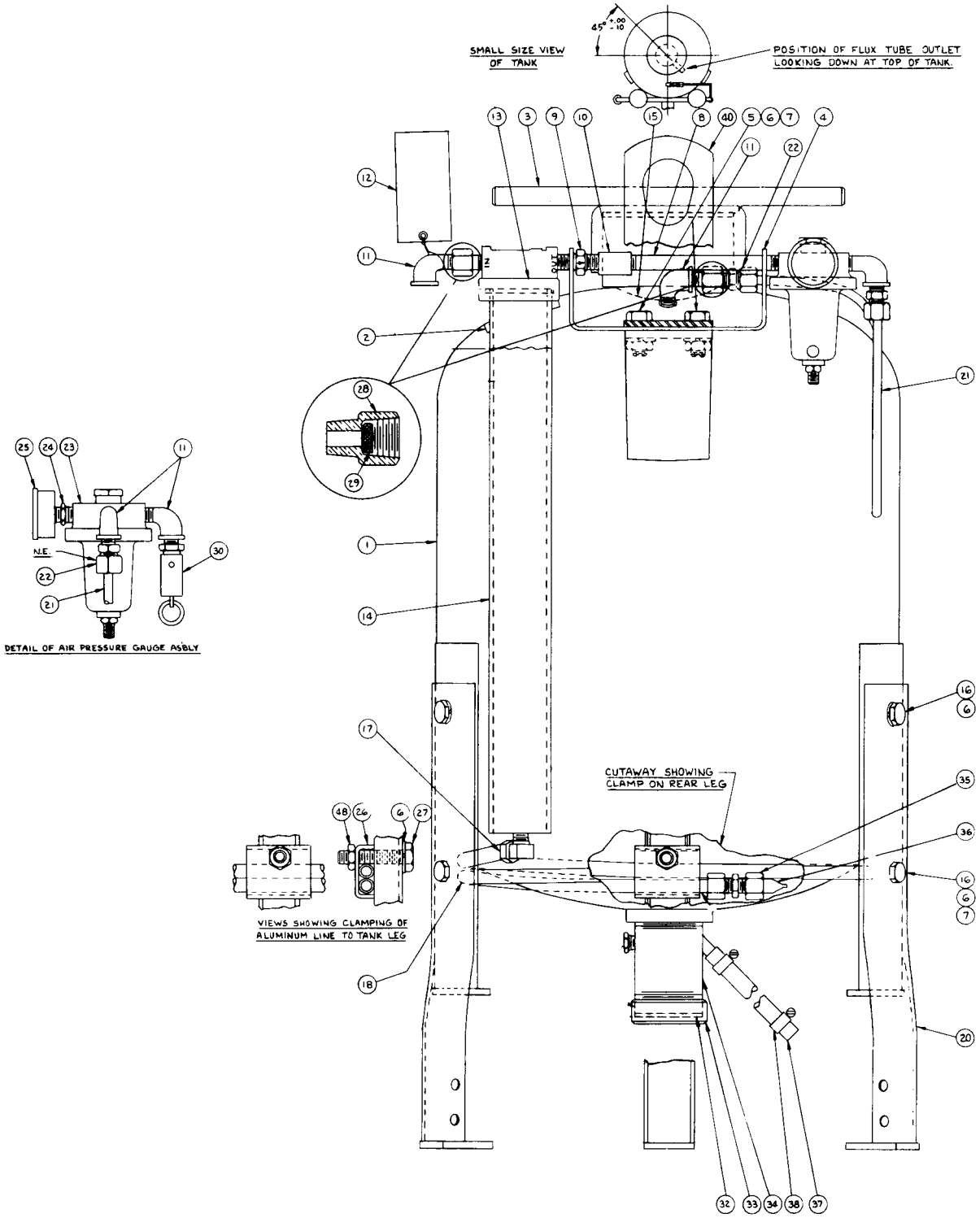
L-4703
3-21-80

HAND CRANK ASSEMBLY: LN-6NE, LN-6SE, LN-8NE & LN-8SE

Parts List P-107-R

ITEM	PART NAME AND DESCRIPTION	NO. REQ'D.
	Hand Crank Assembly, Includes:	1
1	Plainwasher	1
2	Hex Head Screw	1
3	Bracket Assembly	1
4	Lever Arm Stop Pin	1
5	Drive Screw	2
6	Tension Spring	1
7	Guide Tube	1
8	Spacer Washer	1
9	Conductor Block	1
10	Hex Head Screw	1
11	Shaft	1
12	Roll Pin	1
13	Drive Roll	1
14	Conical Spring	1
15	Idle Roll (1/16 thru .120)	1
17	Incoming Guide Tube	1
18	Retaining Ring	1
19	Flat Head Screw	1
20	Handle	1
21	Crank Arm Assembly	1
22	Lever Arm Assembly	1
23	Retaining Ring	1
24	Fiber Pin	1
25	Socket Head Cap Screw	1
26	Set Screw	1
27	Hex Head Screw	2
	Insulating Tube	2
	Insulating Washer	2
	Plain Washer	2
	Lockwasher	2
	Hex Nut	2
	Insulating Pad	1

April 1985


SMALL SIZE VIEW OF TANK
45° +.00 -.10
POSITION OF FLUX TUBE OUTLET LOOKING DOWN AT TOP OF TANK
CUTAWAY SHOWING CLAMP ON REAR LEG
VIEWS SHOWING CLAMPING OF ALUMINUM LINE TO TANK LEG
DETAIL OF AIR PRESSURE GAUGE ASBLY
N.E.

FLUX TANK

(LN-6S, LN-6SE, LN-8S and LN-8SE)

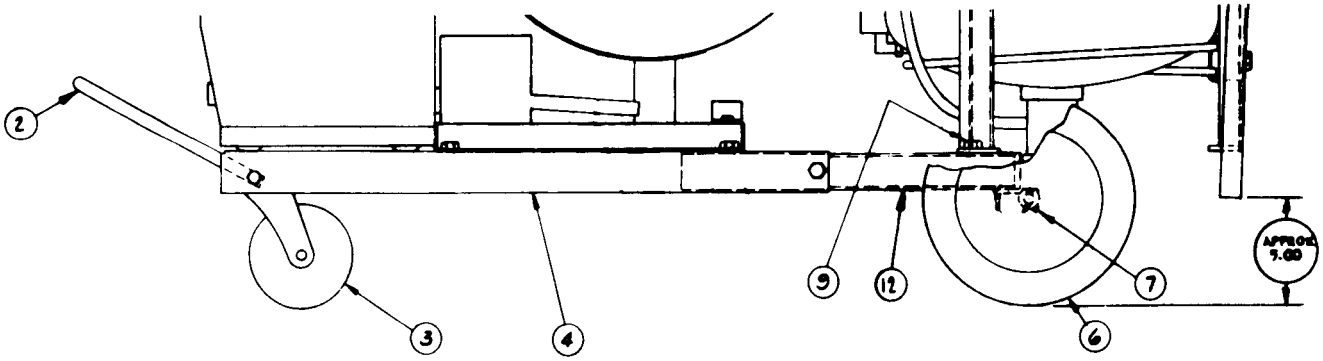
Parts List P-107-S

ITEM	PART NAME AND DESCRIPTION	NO. REQ'D.
	Flux Tank Assembly, Includes:	1
1	Flux Tank	1
2	Decal	1
3	Tank Cover	1
4	Instrument Mounting Bracket	1
5	Hex Head Screw	2
6	Lockwasher	8
7	Hex Nut	4 or 5
8	Pipe Nipple	1
9	Check Valve	1
10	Pipe Nipple	1
10	Pipe Coupling	1
11	Street Elbow	4
12	Caution Tag	1
13	Air Line Filter	1
14	Water Separator	1
15	Strainer	1
15	Top Screen	1
16	Hex Head Screw	5
17	Compression Elbow	1
18	Bleeder Line	1
20	Flux Tank Support	3
21	Copper Line	1
22	Male Connector	2
23	Pressure Regulator	1
24	Reducing Bushing	1
25	Pressure Gauge	1
26	Clamp	1
27	Hex Head Screw	1
28	Adaptor	2
29	Screen Cup	2
30	Safety Valve	1
31	Street Tee	1
32	Cap Gasket	1
33	Outlet Tube Cap	1
34	Outlet Assembly	1
35	Union	1
36	Flared Copper Tube	1
37	Flux Hose	1
38	Hose Clamp (Tank End)	2
40	Lift Ball Assembly	1
	Flux Funnel - Not Illustrated	1
	Air Line Connector - Not Illustrated	1

April 1980

UNDERCARRIAGE: K-163

Standard with LN-6S, LN-6SE, LN-8S and LN-8SE.



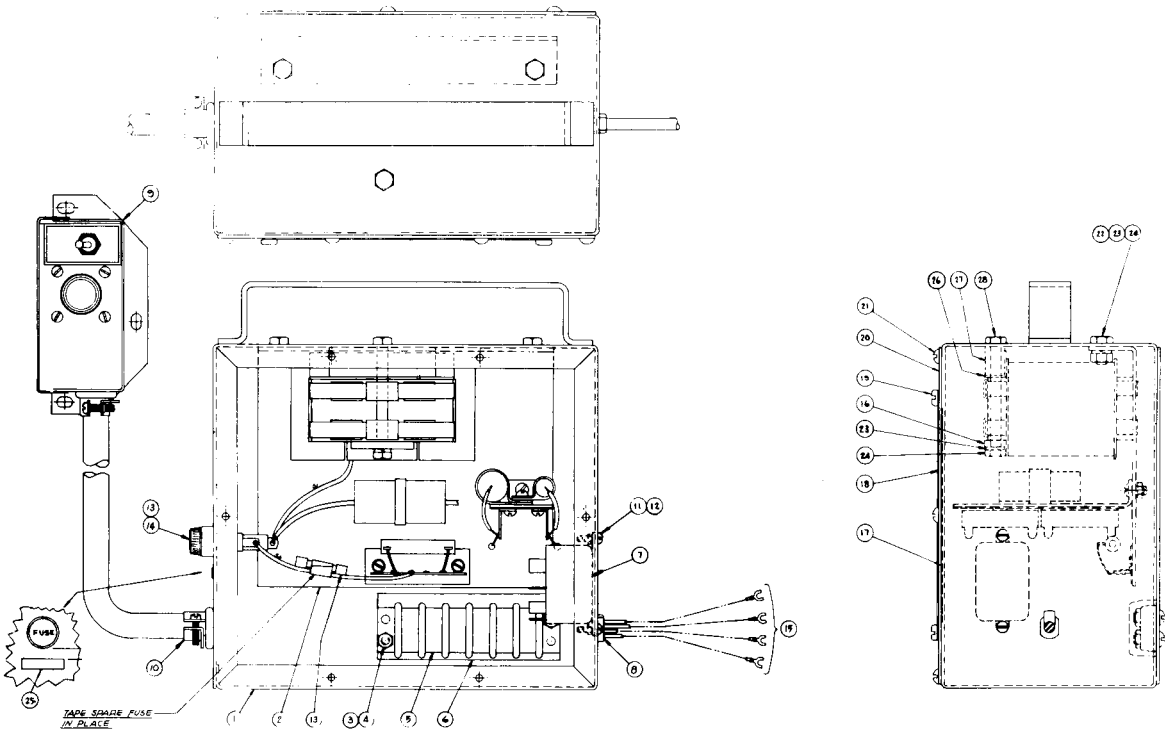
Parts List P-107-T

ITEM	PART NAME AND DESCRIPTION	NO. REQ'D.
	Undercarriage	1
2	Handle	1
3	Casters	2
4	Base	1
6	Wheels	2
7	Axle	1
12	Flux Tank Support (Not on K-163)	3

August 1973

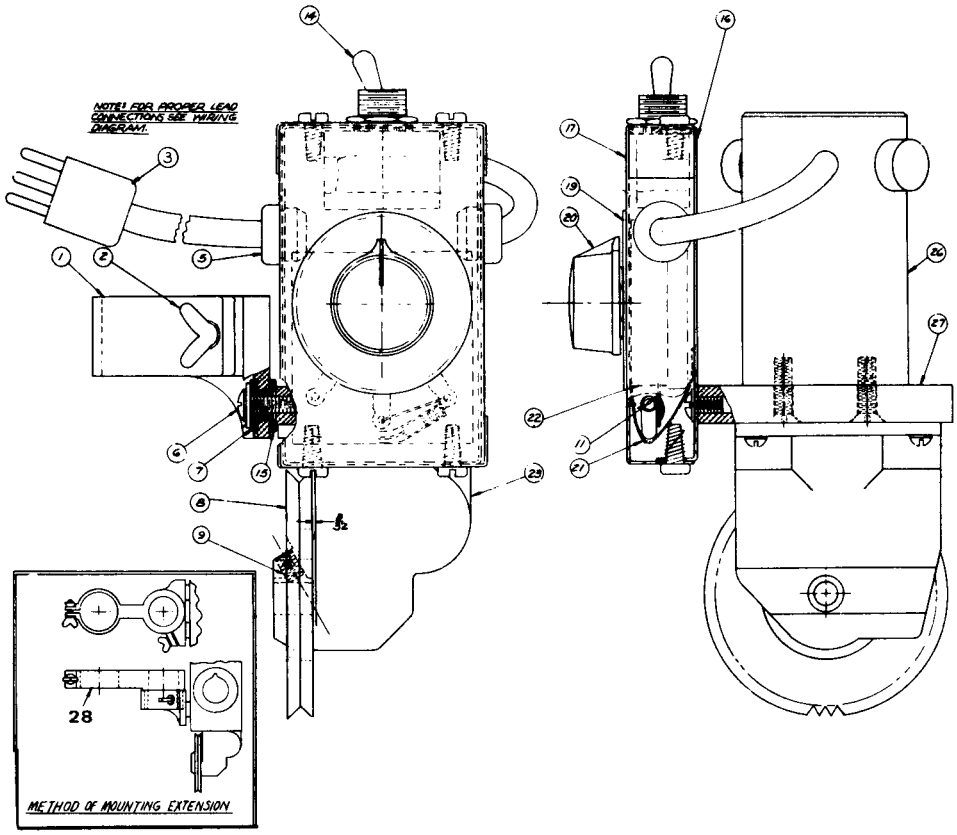
The Lincoln Electric Company
Cleveland, Ohio 44117

MECHANIZED TRAVEL POWER PACK: K-161



Parts List P-107-V		
ITEM	**PART NAME AND DESCRIPTION**	**NO. REQ'D.**
*	Mechanized Travel Power Pack, Includes:	1
1	Welded Case Assembly	1
2	Mag Amp Assembly, Includes:	1
	Core and Coil Assembly	1
	Resistor	1
	Insulation	1
	Terminal Strip	1
	Condenser	1
	Sleeving	1
	Rectifier Assembly	1
3	Round Head Screw	2
4	Hex Nut	2
5	Terminal Strip	1
6	Number Plate	1
7	Relay	1
8	Lead Grommet	1
9*	Adapter Box Assembly, Includes:	
	Amphenol Connector (Next to Toggle Switch)	1
	Toggle Switch	1
	Amphenol Connector (Opposite Side of Box from Switch)	1
10	Connector	1
11	Round Head Screw	2
12	Hex Nut	2
13	Fuse (1/8 Amp)	2
14	Fuse Holder	1
16	Spacer	1
17	Wiring Diagram	1
18	Nameplate	1
19	Self-Tapping Screw	4
20	Front Panel	1
21	Self-Tapping Screw	6
22	Hex Head Screw	2
23	Lockwasher	3
24	Hex Nut	3
25	Fuse Identification Sticker	1
26	Insulation	1
27	Spacer	1
28	Hex Head Screw	1
*	Specify Cable Length desired.	

MECHANIZED HAND TRAVEL UNIT: K-110



Parts List P-107-X

ITEM	PART NAME AND DESCRIPTION	NO. REQ'D.
	Gun Drive Unit Assembly, Includes All Below	1
1	Mounting Clamp	1
2	Thumb Screw	1
3	Control Cable and Plug	1
5	Grommet	2
6	Truss Head Screw	2
7	Insulator Bushing	2
8	Drive Wheel	1
9	Hollow Set Screw, Cup Point	1
11	Resistor	1
14	Reversing Switch	1
15	Insulating Plate	1
16	Control Box Back	1
17	Control Box Front	1
19	Dial Plate	1
20	Knob	1
21	Insulation	1
22	Rheostat	1
23	Gear Box Assembly	1
26	Motor	1
27	Adapter Plate	1
28	Mounting Clamp Extension	1

The Lincoln Electric Company
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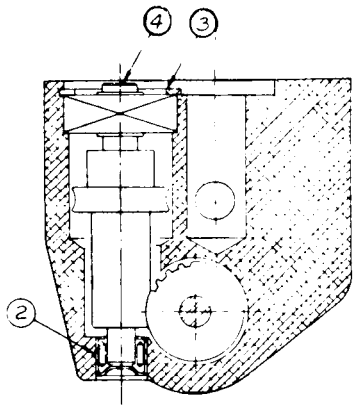
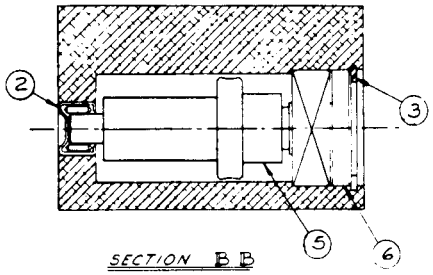
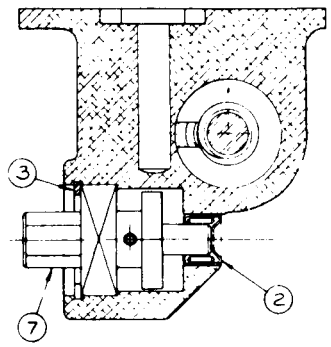
GEAR BOX FOR K-110



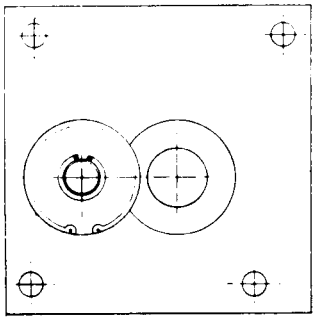
SECTION AA



SECTION BB

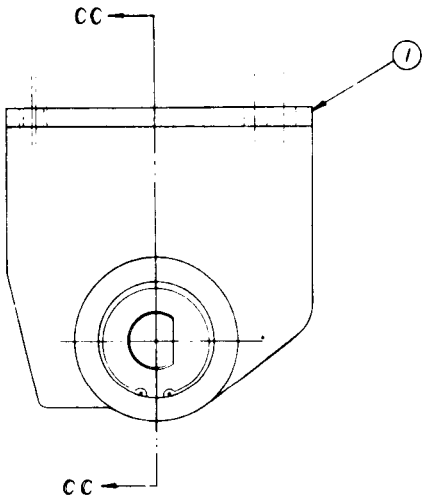


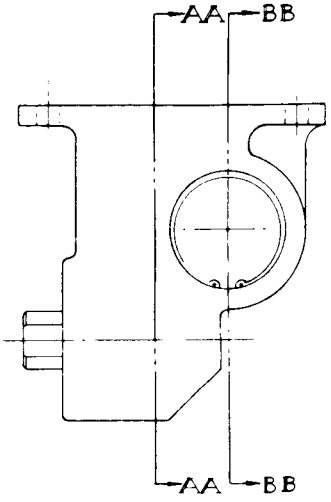
SECTION CC



NOTE

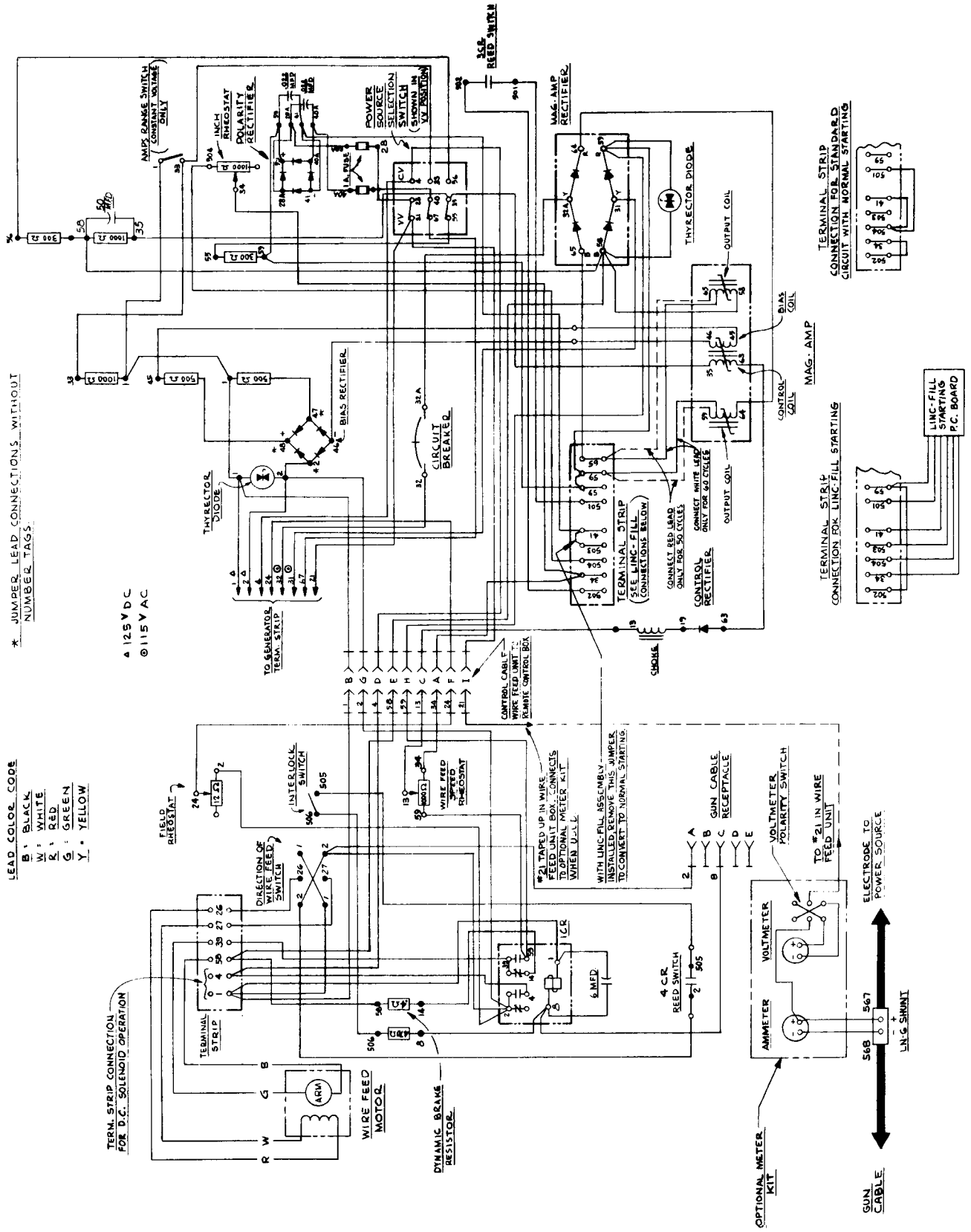
ASSEMBLE THE VERTICAL & HORIZONTAL SHAFT ASSEMBLIES TO GEAR BOX. INJECT TWO LITERS OF E-1882 GREASE THRU THE OUTPUT SHAFT CAVITY





Parts List P-107-Y		
ITEM	**PART NAME AND DESCRIPTION**	**NO. REQ'D.**
	Gun Drive Gear Case Assembly, Includes All Below:	1
1	Gear Box	1
2	Needle Bearing	3
3	Retaining Ring	3
4	Vertical Shaft Assembly	1
5	Cross Shaft Assembly	1
6	Shaft Cap	1
7	Output Shaft Assembly	1

LN-6 WIRING DIAGRAM

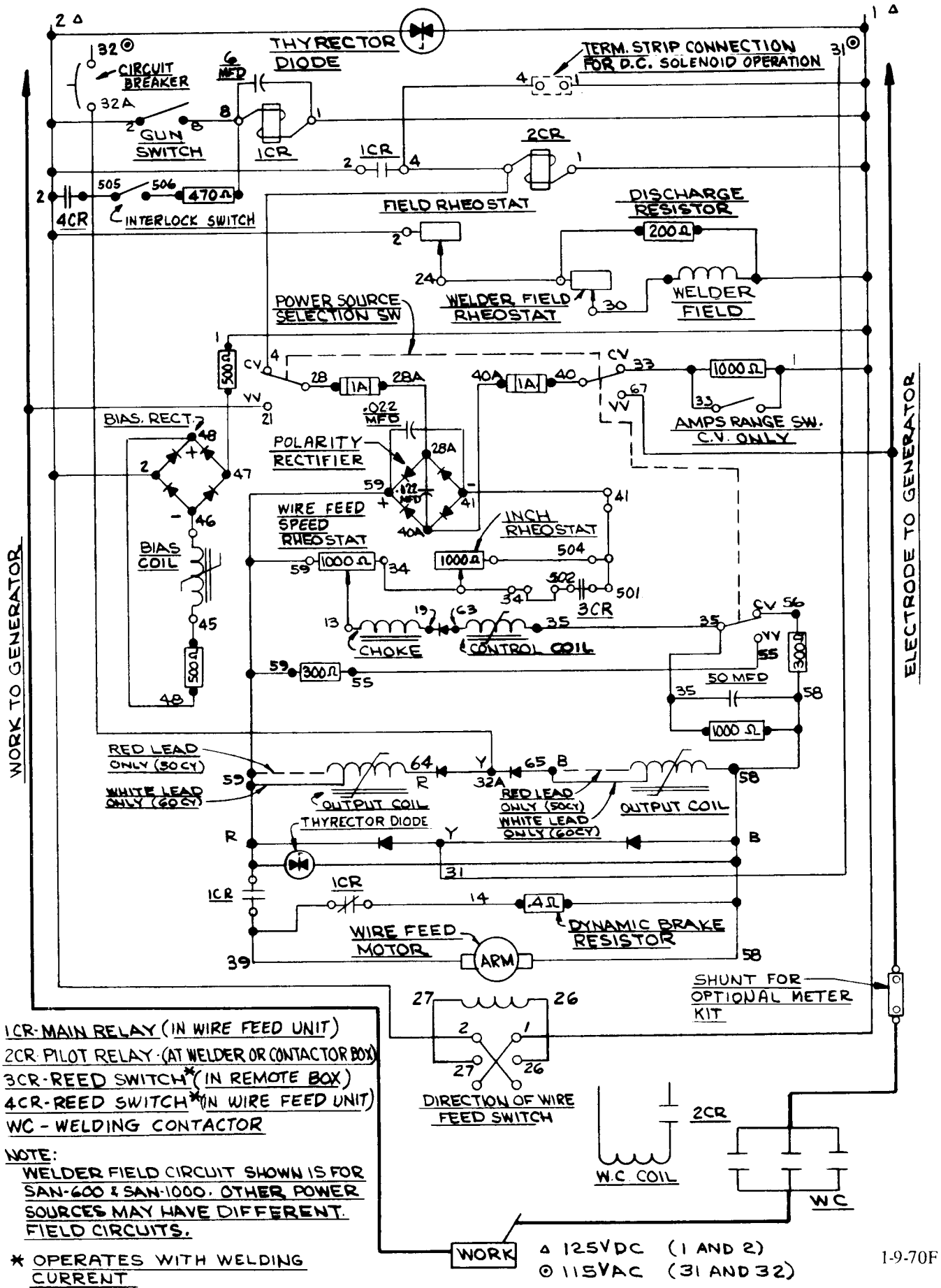


The Lincoln Electric Company
Cleveland, Ohio 44117

M-11624

LN-6 CONTROL CIRCUIT SCHEMATIC

Without Optional Linc-Fill Circuit



1CR-MAIN RELAY (IN WIRE FEED UNIT)
2CR-PILOT RELAY-(AT WELDER OR CONTACTOR BOX)
3CR-REED SWITCH* (IN REMOTE BOX)
4CR-REED SWITCH* (IN WIRE FEED UNIT)
WC - WELDING CONTACTOR

NOTE:
WELDER FIELD CIRCUIT SHOWN IS FOR SAN-600 & SAN-1000. OTHER POWER SOURCES MAY HAVE DIFFERENT FIELD CIRCUITS.

* OPERATES WITH WELDING CURRENT

Δ 125VDC (1 AND 2)
⊙ 115VAC (31 AND 32)

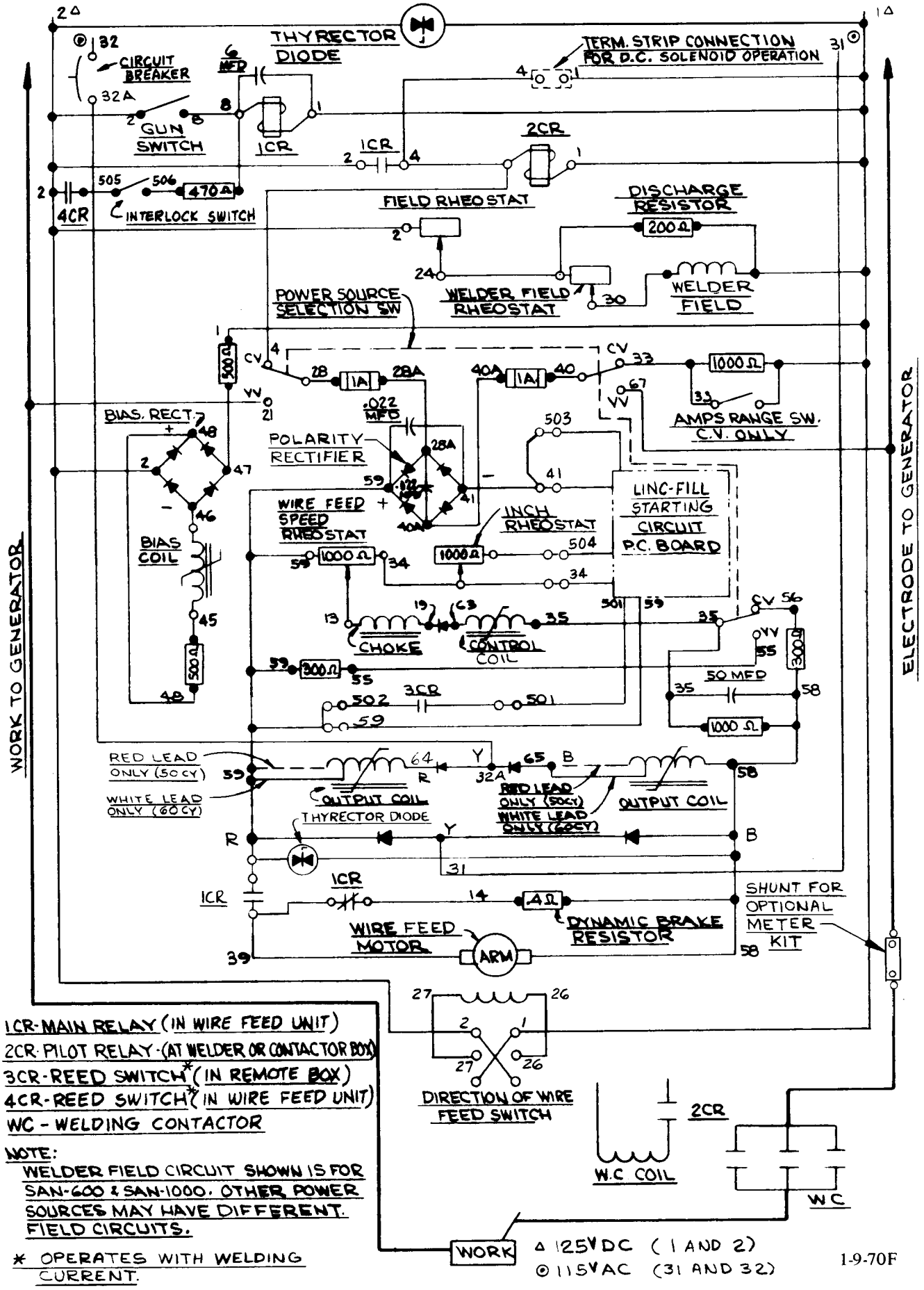
1-9-70F

70Fe

The Lincoln Electric Company
Cleveland, Ohio 44117

LN-6 CONTROL CIRCUIT SCHEMATIC

With Optional Linc-Fill Circuit



1CR-MAIN RELAY (IN WIRE FEED UNIT)
2CR-PILOT RELAY-(AT WELDER OR CONTACTOR BOX)
3CR-REED SWITCH* (IN REMOTE BOX)
4CR-REED SWITCH* (IN WIRE FEED UNIT)
WC - WELDING CONTACTOR

NOTE:
WELDER FIELD CIRCUIT SHOWN IS FOR SAN-600 & SAN-1000. OTHER POWER SOURCES MAY HAVE DIFFERENT FIELD CIRCUITS.

* OPERATES WITH WELDING CURRENT.

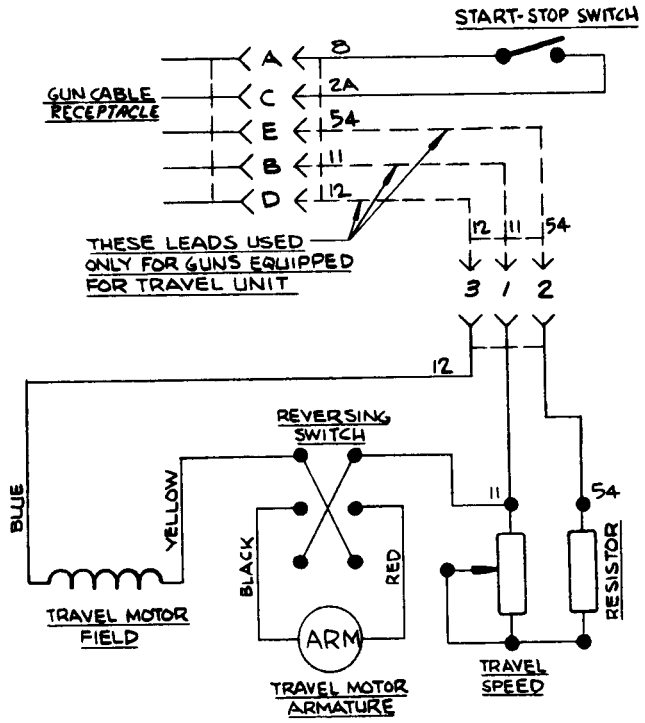
Δ 125VDC (1 AND 2)
⊙ 115VAC (31 AND 32)

1-9-70F

The Lincoln Electric Company
Cleveland, Ohio 44117

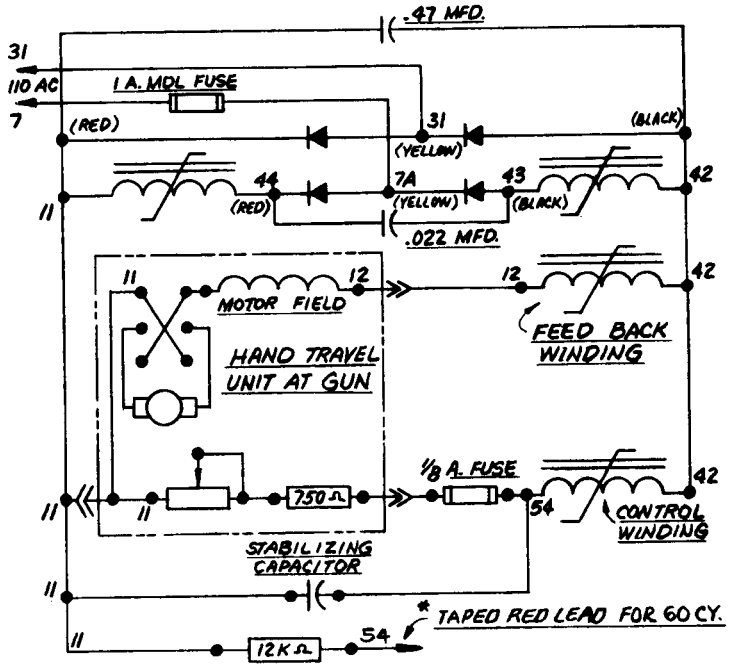
T-12309
Wiring Diagram
6-14-74A

K-114 GUN CABLE AND K-110 DRIVE UNIT



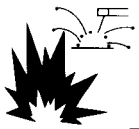
MECHANIZED TRAVEL SCHEMATIC

T-12834
Wiring Diagram
7-26-74D



* FOR 50 HZ. OPERATION BOTH RED & BLACK NO 54 LEADS MUST BE CONNECTED TO NO 54 ON POWER PACK TERMINAL STRIP.

A.S.A. ELECTRICAL SYMBOLS

			
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. ● Aíslese 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絶緣。	● 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 INSTRUCT ION 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 retirar los humos de la zona de respiración.	● 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 ayant l'entretien.	● N'opérez pas avec les panneaux ouverts ou avec les dispositifs de protection enlevés.	French ATTENTION
● Vermeiden Sie das Einatmen von Schweißrauch! ● Sorgen Sie für gute Be- und Entlüftung des Arbeitsplatzes!	● Strom vor Wartungsarbeiten abschalten! (Netzstrom vorher öffnen; Maschine anhalten!)	● Anlage nie ohne Schutzgehäuse oder Innenschutzverkleidung in Betrieb setzen!	German WARNUNG
● Mantenha seu rosto da fumaça. ● Use ventilação e exaustão 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 painéis 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、必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はずした状態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幫除煙霧。	● 維修前切斷電源。	● 當安板打開或沒有安全護件不準作業。	Chinese 警告
● 얼굴로부터 흄을 멀리하십시오. ● 호흡지역으로부터 흄을 제거하기 위해 가스제거기나 통풍기를 사용하십시오.	● 보수전에 전원을 차단하십시오.	● 판넬이 열린 상태로 작동치 마십시오.	Korean 위 험
● ابعد رأسك بعيدا عن الدخان. ● استعمل التهوية او جهاز شفط الدخان للخارج لكي يبعد الدخان عن المنطقة التي تتنفس فيها.	● اقطع التيار الكهربائي قبل القيام باية اصلاحات.	● لا تشغل هذا الجهاز اذا كانت الاغطية الحديدية الواقية ليست على.	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、また理解して下さい。そして貴社の安全規定に従って下さい。

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

이 제품에 동봉된 작업지침서를 숙지하시고 귀사의 작업자 안전수칙을 준수하시기 바랍니다.

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

LIMITED WARRANTY

STATEMENT OF 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
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 and engine accessories) 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.

Equipment not listed above such as gun and cable assemblies, automatic wire feeders and field-installed optional equipment is warranted for one year.

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 unreasonable 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 IMWS1

LINCOLN® ELECTRIC

THE LINCOLN ELECTRIC COMPANY

World's Leader in Welding and Cutting Products • Premier Manufacturer of Industrial Motors
Sales and Service through Subsidiaries and Distributors Worldwide
Cleveland, Ohio 44117-1199 U.S.A.

Eff. Nov. '90 Ram

9-89

Litho in U.S.A.