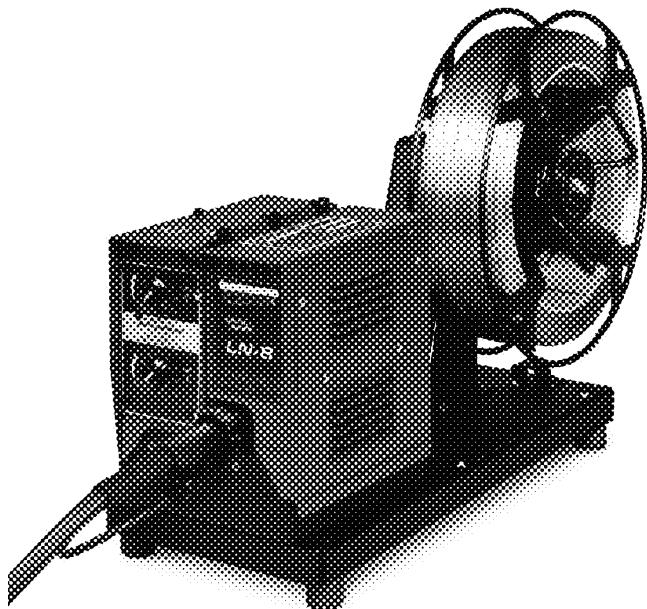


## Operator's Manual

# LN-8 WIRE FEEDER



For use with machines having Code Numbers:

**7238; 7239; 7240; 7241; 7349; 7428;  
7580; 7581; 7582; 7583; 7627; 7683;  
7926; 7927; 7928; 7929; 7970; 8027;  
8799; 8800; 8801; 8819; 8820; 8821;  
9081; 9082; 9132; 9133; 9962; 9963;  
9964**



**Register your machine:**

[www.lincolnelectric.com/register](http://www.lincolnelectric.com/register)

**Authorized Service and Distributor Locator:**

[www.lincolnelectric.com/locator](http://www.lincolnelectric.com/locator)

Save for future reference

Date Purchased

Code: (ex: 10859)

Serial: (ex: U1060512345)

# THANK YOU FOR SELECTING A QUALITY PRODUCT BY LINCOLN ELECTRIC.

## PLEASE EXAMINE CARTON AND EQUIPMENT FOR DAMAGE IMMEDIATELY

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

## SAFETY DEPENDS ON YOU

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

### **WARNING**

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

### **CAUTION**

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



## KEEP YOUR HEAD OUT OF THE FUMES.

**DON'T** get too close to the arc. Use corrective lenses if necessary to stay a reasonable distance away from the arc.

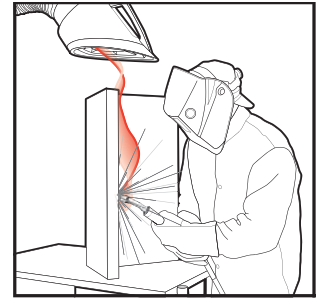
**READ** and obey the Safety Data Sheet (SDS) and the warning label that appears on all containers of welding materials.

**USE ENOUGH VENTILATION** or exhaust at the arc, or both, to keep the fumes and gases from your breathing zone and the general area.

**IN A LARGE ROOM OR OUTDOORS**, natural ventilation may be adequate if you keep your head out of the fumes (See below).

**USE NATURAL DRAFTS** or fans to keep the fumes away from your face.

If you develop unusual symptoms, see your supervisor. Perhaps the welding atmosphere and ventilation system should be checked.



## WEAR CORRECT EYE, EAR & BODY PROTECTION

**PROTECT** your eyes and face with welding helmet properly fitted and with proper grade of filter plate (See ANSI Z49.1).

**PROTECT** your body from welding spatter and arc flash with protective clothing including woolen clothing, flame-proof apron and gloves, leather leggings, and high boots.

**PROTECT** others from splatter, flash, and glare with protective screens or barriers.

**IN SOME AREAS**, protection from noise may be appropriate.

**BE SURE** protective equipment is in good condition.

Also, wear safety glasses in work area **AT ALL TIMES.**



## SPECIAL SITUATIONS

**DO NOT WELD OR CUT** containers or materials which previously had been in contact with hazardous substances unless they are properly cleaned. This is extremely dangerous.

**DO NOT WELD OR CUT** painted or plated parts unless special precautions with ventilation have been taken. They can release highly toxic fumes or gases.

## Additional precautionary measures

**PROTECT** compressed gas cylinders from excessive heat, mechanical shocks, and arcs; fasten cylinders so they cannot fall.

**BE SURE** cylinders are never grounded or part of an electrical circuit.

**REMOVE** all potential fire hazards from welding area.

**ALWAYS HAVE FIRE FIGHTING EQUIPMENT READY FOR IMMEDIATE USE AND KNOW HOW TO USE IT.**



## SECTION A: WARNINGS



### CALIFORNIA PROPOSITION 65 WARNINGS

#### Diesel Engines

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

#### Gasoline Engines

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

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

Read and understand the following safety highlights. For additional safety information, it is strongly recommended that you purchase a copy of "Safety in Welding & Cutting - ANSI Standard Z49.1" from the American Welding Society, P.O. Box 351040, Miami, Florida 33135 or CSA Standard W117.2-1974. A Free copy of "Arc Welding Safety" booklet E205 is available from the Lincoln Electric Company, 22801 St. Clair Avenue, Cleveland, Ohio 44117-1199.

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



### FOR ENGINE POWERED EQUIPMENT.

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



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

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



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



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

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

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

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



### ELECTRIC AND MAGNETIC FIELDS MAY BE DANGEROUS



- 2.a. Electric current flowing through any conductor causes localized Electric and Magnetic Fields (EMF). Welding current creates EMF fields around welding cables and welding machines
- 2.b. EMF fields may interfere with some pacemakers, and welders having a pacemaker should consult their physician before welding.
- 2.c. Exposure to EMF fields in welding may have other health effects which are now not known.
- 2.d. All welders should use the following procedures in order to minimize exposure to EMF fields from the welding circuit:
- 2.d.1. Route the electrode and work cables together - Secure them with tape when possible.
- 2.d.2. Never coil the electrode lead around your body.
- 2.d.3. Do not place your body between the electrode and work cables. If the electrode cable is on your right side, the work cable should also be on your right side.
- 2.d.4. Connect the work cable to the workpiece as close as possible to the area being welded.
- 2.d.5. Do not work next to welding power source.



## ELECTRIC SHOCK CAN KILL.



- 3.a. The electrode and work (or ground) circuits are electrically “hot” when the welder is on. Do not touch these “hot” parts with your bare skin or wet clothing. Wear dry, hole-free gloves to insulate hands.
- 3.b. Insulate yourself from work and ground using dry insulation. Make certain the insulation is large enough to cover your full area of physical contact with work and ground.

**In addition to the normal safety precautions, if welding must be performed under electrically hazardous conditions (in damp locations or while wearing wet clothing; on metal structures such as floors, gratings or scaffolds; when in cramped positions such as sitting, kneeling or lying, if there is a high risk of unavoidable or accidental contact with the workpiece or ground) use the following equipment:**

- Semiautomatic DC Constant Voltage (Wire) Welder.
  - DC Manual (Stick) Welder.
  - AC Welder with Reduced Voltage Control.
- 3.c. In semiautomatic or automatic wire welding, the electrode, electrode reel, welding head, nozzle or semiautomatic welding gun are also electrically “hot”.
  - 3.d. Always be sure the work cable makes a good electrical connection with the metal being welded. The connection should be as close as possible to the area being welded.
  - 3.e. Ground the work or metal to be welded to a good electrical (earth) ground.
  - 3.f. Maintain the electrode holder, work clamp, welding cable and welding machine in good, safe operating condition. Replace damaged insulation.
  - 3.g. Never dip the electrode in water for cooling.
  - 3.h. Never simultaneously touch electrically “hot” parts of electrode holders connected to two welders because voltage between the two can be the total of the open circuit voltage of both welders.
  - 3.i. When working above floor level, use a safety belt to protect yourself from a fall should you get a shock.
  - 3.j. Also see Items 6.c. and 8.



## ARC RAYS CAN BURN.



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



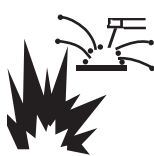
## FUMES AND GASES CAN BE DANGEROUS.



- 5.a. Welding may produce fumes and gases hazardous to health. Avoid breathing these fumes and gases. When welding, keep your head out of the fume. Use enough ventilation and/or exhaust at the arc to keep fumes and gases away from the breathing zone. **When welding hardfacing (see instructions on container or SDS) or on lead or cadmium plated steel and other metals or coatings which produce highly toxic fumes, keep exposure as low as possible and within applicable OSHA PEL and ACGIH TLV limits using local exhaust or mechanical ventilation unless exposure assessments indicate otherwise. In confined spaces or in some circumstances, outdoors, a respirator may also be required. Additional precautions are also required when welding on galvanized steel.**
- 5.b. The operation of welding fume control equipment is affected by various factors including proper use and positioning of the equipment, maintenance of the equipment and the specific welding procedure and application involved. Worker exposure level should be checked upon installation and periodically thereafter to be certain it is within applicable OSHA PEL and ACGIH TLV limits.
- 5.c. Do not weld in locations near chlorinated hydrocarbon vapors coming from degreasing, cleaning or spraying operations. The heat and rays of the arc can react with solvent vapors to form phosgene, a highly toxic gas, and other irritating products.
- 5.d. Shielding gases used for arc welding can displace air and cause injury or death. Always use enough ventilation, especially in confined areas, to insure breathing air is safe.
- 5.e. Read and understand the manufacturer’s instructions for this equipment and the consumables to be used, including the Safety Data Sheet (SDS) and follow your employer’s safety practices. SDS forms are available from your welding distributor or from the manufacturer.
- 5.f. Also see item 1.b.




## WELDING AND CUTTING SPARKS CAN CAUSE FIRE OR EXPLOSION.



- 6.a. Remove fire hazards from the welding area. If this is not possible, cover them to prevent the welding sparks from starting a fire. Remember that welding sparks and hot materials from welding can easily go through small cracks and openings to adjacent areas. Avoid welding near hydraulic lines. Have a fire extinguisher readily available.
- 6.b. Where compressed gases are to be used at the job site, special precautions should be used to prevent hazardous situations. Refer to "Safety in Welding and Cutting" (ANSI Standard Z49.1) and the operating information for the equipment being used.
- 6.c. When not welding, make certain no part of the electrode circuit is touching the work or ground. Accidental contact can cause overheating and create a fire hazard.
- 6.d. Do not heat, cut or weld tanks, drums or containers until the proper steps have been taken to insure that such procedures will not cause flammable or toxic vapors from substances inside. They can cause an explosion even though they have been "cleaned". For information, purchase "Recommended Safe Practices for the Preparation for Welding and Cutting of Containers and Piping That Have Held Hazardous Substances", AWS F4.1 from the American Welding Society (see address above).
- 6.e. Vent hollow castings or containers before heating, cutting or welding. They may explode.
- 6.f. Sparks and spatter are thrown from the welding arc. Wear oil free protective garments such as leather gloves, heavy shirt, cuffless trousers, high shoes and a cap over your hair. Wear ear plugs when welding out of position or in confined places. Always wear safety glasses with side shields when in a welding area.
- 6.g. Connect the work cable to the work as close to the welding area as practical. Work cables connected to the building framework or other locations away from the welding area increase the possibility of the welding current passing through lifting chains, crane cables or other alternate circuits. This can create fire hazards or overheat lifting chains or cables until they fail.
- 6.h. Also see item 1.c.
- 6.i. Read and follow NFPA 51B "Standard for Fire Prevention During Welding, Cutting and Other Hot Work", available from NFPA, 1 Batterymarch Park, PO box 9101, Quincy, MA 02269-9101.
- 6.j. Do not use a welding power source for pipe thawing.



## CYLINDER MAY EXPLODE IF DAMAGED.

- 7.a. Use only compressed gas cylinders containing the correct shielding gas for the process used and properly operating regulators designed for the gas and pressure used. All hoses, fittings, etc. should be suitable for the application and maintained in good condition. 
- 7.b. Always keep cylinders in an upright position securely chained to an undercarriage or fixed support.
- 7.c. Cylinders should be located:
  - Away from areas where they may be struck or subjected to physical damage.
  - A safe distance from arc welding or cutting operations and any other source of heat, sparks, or flame.
- 7.d. Never allow the electrode, electrode holder or any other electrically "hot" parts to touch a cylinder.
- 7.e. Keep your head and face away from the cylinder valve outlet when opening the cylinder valve.
- 7.f. Valve protection caps should always be in place and hand tight except when the cylinder is in use or connected for use.
- 7.g. Read and follow the instructions on compressed gas cylinders, associated equipment, and CGA publication P-1, "Precautions for Safe Handling of Compressed Gases in Cylinders," available from the Compressed Gas Association, 14501 George Carter Way Chantilly, VA 20151.



## FOR ELECTRICALLY POWERED EQUIPMENT.



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

**Refer to**  
**<http://www.lincolnelectric.com/safety>**  
**for additional safety information.**

## PRÉCAUTIONS DE SÛRETÉ

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

### Sûreté Pour Soudage A L'Arc

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

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

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

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

## NOTES

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## SEC. K1 — INDEX

### Sec. K2 — Sequence of Installation

#### Mechanical Installation

- 1a. Install the wire feed unit and wire reel mounting at the work station (except LN-8F).....Sec. K2.2.1
- 1b. Install the LN-8F on the boom or fixture.....Sec. K2.2.2
- 2. Install the wire feed rolls for the wire size to be used.....Sec. K2.2.3
- 3. Install the gun and cable assembly.....Sec. K2.2.4
- 4. Connect the continuous flux feed tank (submerged arc welding only).....Sec. K2.2.6
- 5. Install the LN-8N or LN-8S input cable to the wire feed unit.....Sec. K2.2.9
- 6. Install the LN-8NE or LN-8SE input cable and extension cables.....Sec. K2.2.10

#### Electrical Installation

- 7. Install the power source where desired and connect it to input power lines per the operating manual shipped with the power source.
- 8. Check whether a constant voltage or variable voltage power source is to be used.....Sec. K2.3.1
- 9. Connect the input cable to the power source. Set the wire feeder and power source for constant or variable voltage as appropriate.....Sec. K2.3.2
- 10. Use the appropriate connection diagram for the power source being used.....Sec. K2.3.3

#### Optional Feature Installation

- K261 & K262 Wire Feed Speed-Voltmeter Kits.....Sec. K2.5.1
- K165 Ammeter-Voltmeter Kit.....Sec. K2.5.2
- K207 Wire Feed Speed Meter-Voltmeter Kit.....Sec. K2.5.3
- Auxiliary Equipment Contacts.....Sec. K2.5.4
- Squirtmobile®.....Sec. K2.5.5
- K161 Mechanized Travel Power Pack (For K110 or Squirtmobile with K114 Submerged Arc Gun).....Sec. K2.5.6
- K202 Contactor Dropout Delay Kit (For Squirtmobile and/or Electrode Overrun).....Sec. K2.5.7
- K178 Mounting Platform — LN-8 on Idealarc® R3S.....Sec. K2.5.8
- 10 and 25 lb. (4.5 and 11 Kg) Spool Spindle.....Sec. K2.5.9
- Wire Reel Enclosure Door.....Sec. K2.5.10
- Undercarriage (LN-8N or LN-8NE).....Sec. K2.5.12
- K200 Portable Field Control (With SAF-600, SA-800 or SAN Only).....Sec. K2.5.13
- Variable Voltage Conversion Parts.....Sec. K2.5.14
- K224 Solid-State Field Control (With SAF-600, SA-800 or SAN Only).....Sec. K2.5.15
- K317 Dual Process Kit (no polarity change).....Sec. K2.5.16
- K318 Dual Process Contactor Kit (with polarity change).....Sec. K2.5.17

### Sec. K3 — Operating Instructions

#### Control Adjustments and Loading the Machine

- Introduction.....Sec. K3.1.1
- Welding with a Constant Voltage Power Source.....Sec. K3.1.2
- Welding with a Constant Current Power Source.....Sec. K3.1.3
- Linc-Fill™ Long Stickout Welding.....Sec. K3.1.4
- Wire Reel Loading.....Sec. K3.1.8
- Flux Tank Loading.....Sec. K3.1.10

For Innershield operating techniques and procedures request "Innershield Production Welding Guide," Bulletin N675.



**Sec. K3 — Operating Instructions (cont'd)****Making Submerged Arc Welds**

Gun Operating Positions: Squirtgun K114.....	Sec. K3.2.3
Fillet Guide (Optional): K70.....	Sec. K3.2.4

For additional submerged arc operating techniques request "How to Make Submerged Arc Welds," Bulletin S604.

**Sec. K6 — Maintenance****Wire Drive and Controls**

Drive Rolls and Guide Tubes.....	Sec. K6.1.1
Wire Drive Motor and Gear Box.....	Sec. K6.1.2
Wire Reel Assembly.....	Sec. K6.1.3
Control Box.....	Sec. K6.1.4
Circuit Protection.....	Sec. K6.1.5

**Gun Cable, Gun and Hand Travel Kit**

Gun Cable.....	Sec. K6.2.1
Gun Disassembly (Innershield Squirtguns K115 & K126 and Submerged Arc Squirtguns K112 & K113).....	Sec. K6.2.2
Gun Disassembly (Innershield Squirtgun K116).....	Sec. K6.2.3
Gun Nozzle (All).....	Sec. K6.2.4
Gun Disassembly (Submerged Arc Squirtgun K114).....	Sec. K6.2.5
Hand Travel Kit (K110).....	Sec. K6.2.6

Flux Feeding System.....	Sec. K6.3.1
Troubleshooting.....	Sec. K6.4
Electrical Sequence of Operations.....	Sec. K6.7

**Sec. K7 — Parts Lists**

Index.....	Sec. K7.1
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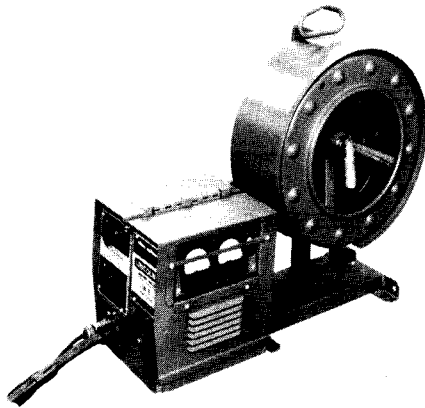
**Wiring Diagrams** .....Filed at back of this manual

## SEC. K2.2 — MECHANICAL INSTALLATION

### Sec. K2.2.1

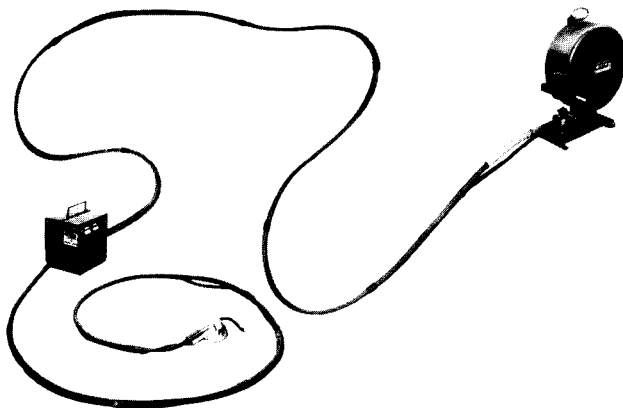
#### Wire Feed Unit and Wire Reel

1. LN-8N wire feed unit and wire reel mount are shipped separately. To connect:
  - a. Remove the three 3/8" (9.5 mm) screws from the back of the wire drive unit.
  - b. Place the wire reel mounting bracket in position against the back of the wire drive unit.
  - c. Replace and tighten the screws. The long screw goes into the top hole.



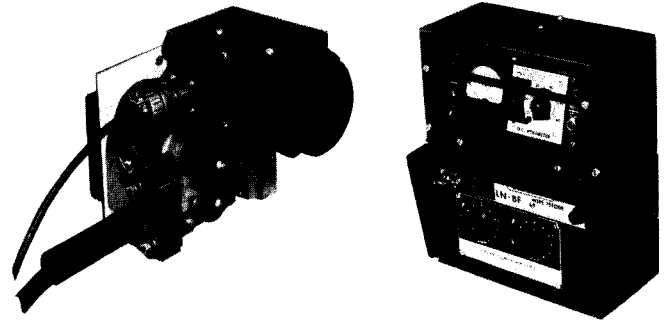
LN-8N (Meters Optional)

2. LN-8NE wire feed unit, wire reel with hand crank, and extension cables are shipped separately. Install per Sec. K2.2.10.



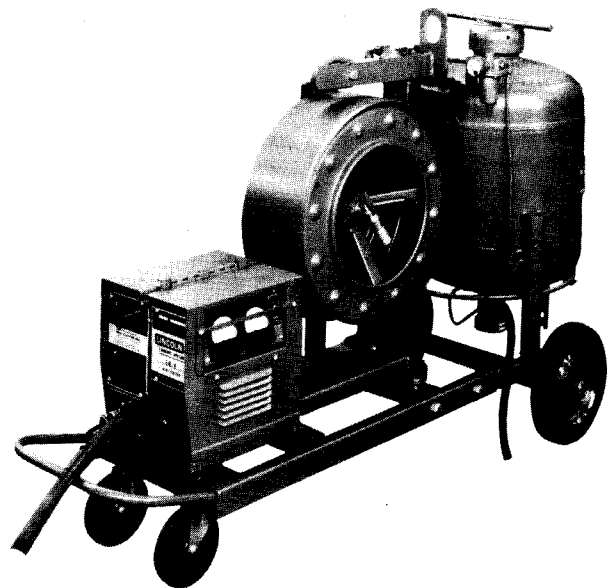
To convert LN-8N to LN-8NE order the appropriate equipment indicated in the photo above.

3. LN-8F is designed for mounting on a boom or other fixture as appropriate to the installation. It consists only of a wire feed unit, a control box and a 15' (4.5 m) extension cable assembly to join the two units. See Sec. K2.2.2 for installation instructions.



LN-8F (Meters Optional)

4. LN-8S is shipped with the wire reel mount and flux tank installed on the undercarriage. See Sec. K2.2.1 for mounting the wire feed unit to the wire reel. The four basic sections — wire feed unit, flux tank, reel mount, and undercarriage — can be separated and mounted where most convenient for specific application needs.



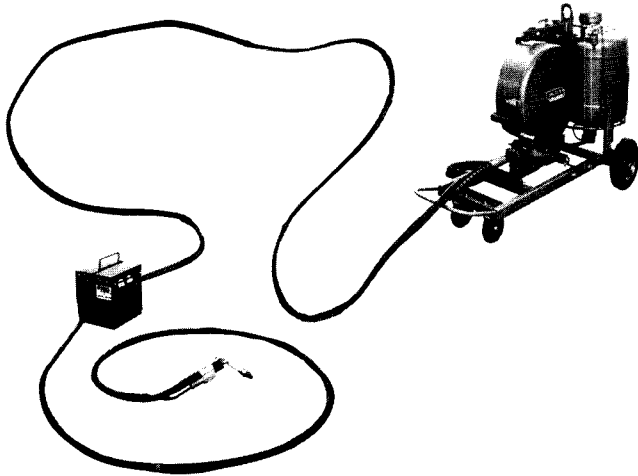
LN-8S (Meters Optional)

Sec. K2.2.1(Continued)

5. LN-8SE is shipped with the wire reel mount (including door and hand crank), and flux tank installed on the undercarriage. Bolt the handle to the front of the undercarriage base.

Place the wire feed unit near the welding location and install the extension cable per Sec. K2.2.10.

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



LN-8SE (Meters Optional)

November 1990

Sec. K2.2.2

**LN-8F Installation**

**1. Wire Feed Unit**

Install the wire feed unit in the desired location using the mounting plate attached to the gear box. See the dimension drawing included in this manual for hole location and size. Since the wire feed unit is at welding potential when welding, **be certain there is no electrical contact** between the gear box and the structure on which it is mounted.

Locate the unit so the drive rolls are in the vertical plane to minimize dirt accumulation around the rolls. Also position the unit so the electrode feed cable points down at about a 45° angle to avoid a sharp bend in the gun cable where connected to the wire drive mechanism.

**2. Control Box**

- a. Place the control box in a convenient location close enough to the wire drive unit that the 15' (4.5 m) extension cable assembly will reach between them.
- b. The control box includes two keyhole slots as indicated in the dimension drawing included in this manual. Drill the required matching holes in the mounting surface.
- c. Install two 1/4-20 screws but do not tighten.

- d. Remove the L-shaped cover from the top and upper front of the control box.
- e. Mount the control box and tighten the screws.

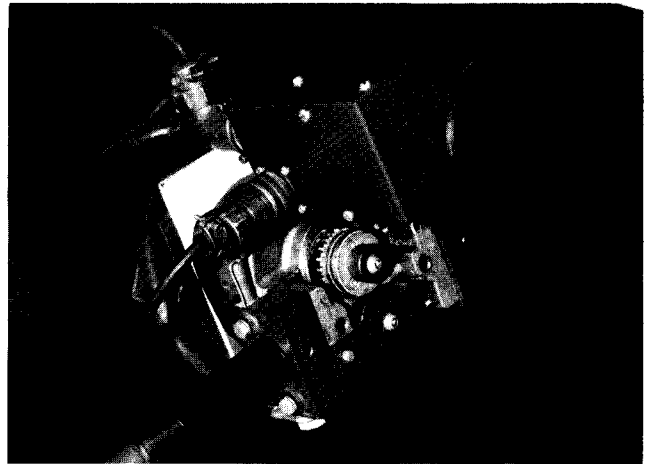
**3. Extension Cable**

The extension cable between the wire feed unit and the control box consists of a multiconductor control cable and an electrode cable. Insert the right-angled polarized connector on the control cable into the mating receptacle on the wire feed unit. If more convenient for the installation, this receptacle can be rotated 180° by removing the four mounting screws, rotating the receptacle and replacing the screws. Feed the other end of the control cable thru the cable clamp on the control box and connect the leads to the like number terminals on the terminal strip. Tighten the cable clamp. Connect the electrode cable to the *front* brass block on the wire feed unit. Connect the other end to the left side of the shunt\* at the LN-8F control box.

**4. Input Cable**

The input cable consists of a multicolor control cable and an electrode cable. Insert the polarized connector on one end of the control cable into the matching connector on the LN-8F control box. Bolt the electrode cable to the right side of the shunt\* at the LN-8F control box. Replace the cover.

\* Old LN-8F controls below code 7575 have no shunt. Bolt electrode cables from the extension and input cables together and insulate with electricians tape.

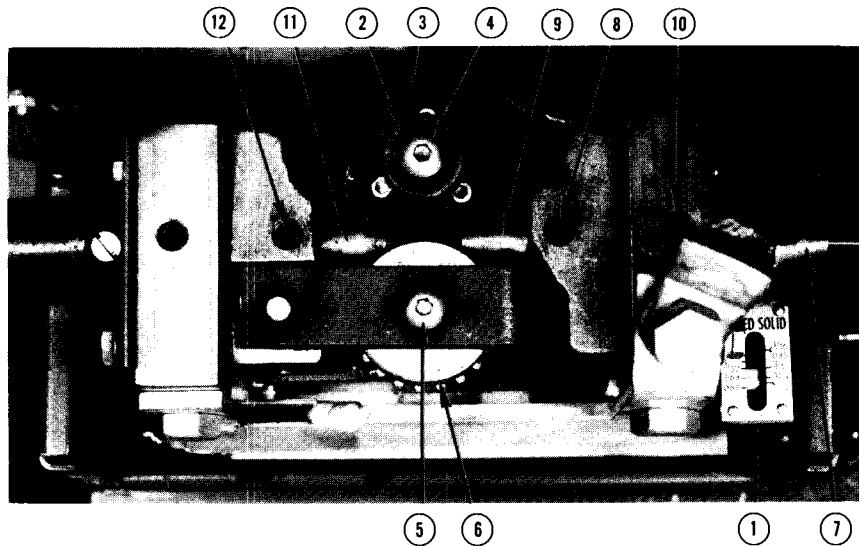


Boom mounted LN-8F Wire Feed Unit

**5. Electrode Routing**

The LN-8F wire reel mounting and the system of routing the electrode to the wire feed mechanism must be engineered by the fixture designer to fit the requirements of the specific installation. When designing this system, minimize bends in the wire and the force required to pull the electrode from the reel. Pulling the electrode through a tube may cause the electrode to spiral as it leaves the gun. For best results, use eyelets spaced far enough away

## SEC. K2.2 — MECHANICAL INSTALLATION (CONTINUED)



Wire Feed Mechanism set for 3/32" (2.4 mm) electrode diameter.

### Sec. K2.2.2 (Continued)

from the beam and far enough apart to let the wire spiral naturally as it goes into the ingoing guide of the wire drive mechanism. **CAUTION:** Since the electrode is at welding potential when welding, the wire and reel mounting *must be insulated* from the boom or fixture.

November 1990

### Sec. K2.2.3

#### Wire Feed Rolls and Guide Tube Kits

**WARNING:** Turn off power source before installing or changing drive roll and/or guide tubes.

The drive rolls and guide tube kits are ordered separately. Install these parts per the following instructions:

1. Loosen idle roll spring pressure screw (1).
2. Remove clamping collar (2) from the drive shaft.
3. Install drive roll (3) and replace clamping collar (2). Tighten screw (4).
4. Remove idle roll shaft screw (5) — install idle roll (6). Replace screw and tighten.
5. Remove the large ingoing guide (7) from rear brass block by loosening screw (10).
6. Loosen the ingoing guide tube clamping screw (8). Install the guide tube (9) which is stenciled "in" through the rear brass block. Tighten the locking screw.
7. Replace the large ingoing guide (7) tube into the rear brass block. Tighten the locking screw (10).
8. Install the outgoing guide tube (11) with its plastic insert through the front brass block. Tighten the locking screw (12), so the dog point goes into the groove in the O.D. of the guide tube.
9. Setting the Drive Roll Spring Pressure.
  - a. For wire sizes from .030 thru .052 (.8 thru 1.3 mm) — with wire in the system, the idle roll pressure

indicator should be set to the proper wire size shown on the "solid" side of the nameplate. (For .030 (.8 mm) solid wire, set the pressure indicator slightly less than the .035 (.9 mm) marking.) This setting is a starting point and may have to be changed depending upon type of wire, surface condition, lubrication and hardness. The optimum idle roll setting can be determined when there are wire stoppages. If the wire "bird nests" between the drive roll and the guide tube, the idle roll spring pressure is too high. When properly set, during a stoppage the drive rolls will slip and if the electrode is removed from the cable, there will be a slight waviness in the electrode for about a foot beyond the slip marks on the electrode. If there is no waviness, the pressure is set too low.

- b. For 1/16 solid or .062 (1.6 mm) cored wire (use the "1/16" drive roll) — The idle roll pressure should be set with wire in the system. For 1/16 (1.6 mm) solid wire, the indicator should be lined up with the "solid" 1/16 mark. For **.062 (1.6 mm) cored** wire, adjust the idle roll pressure so that the indicator is lined up with the "**cored**" 3/32 (2.4 mm) mark.

These indicator settings are accurate enough so that there is no need to readjust unless the electrode is unusually soft.

- c. For wire sizes from .068 through .120 (1.7 thru 3.0 mm) — idle roll pressure should be set with wire in the system. For solid wire, the indicator should be lined up with the "solid" wire settings. For cored wire, the indicator should be lined up with the "cored" wire settings. When using 7/64 (2.8 mm) diameter 'Innershield' wire, adjust the idle roll pressure so that the indicator is between the .120 and 3/32 (3.0 and 2.4 mm) setting.

Sec. K2.2.3 (Continued)

The indicator settings for these larger wire sizes are accurate enough so that there is no need to readjust, unless the electrode is unusually soft.

The drive rolls are stamped with the wire size for which they are designed. If a wire size is used that is not stamped on the drive roll, the drive rolls and guide tubes will have to be changed.

August 1996

Sec. K2.2.4

**Gun and Gun Cable**

**1. Gun Handling Procedures to Avoid Wire Feeding Problems**

- a. Do not kink or pull cable around sharp corners.
- b. Keep the electrode cable straight as practical when welding or starting the electrode through cable.
- c. Do not allow dolly wheels or trucks to run over cables.
- d. Keep cable clean by following maintenance instructions.
- e. Use only clean rust-free electrode.
- f. Replace contact tip when the arc starts to become unstable or the contact tip end is fused or deformed.

**2. General**

The LN-8 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 cored) and size to be used.

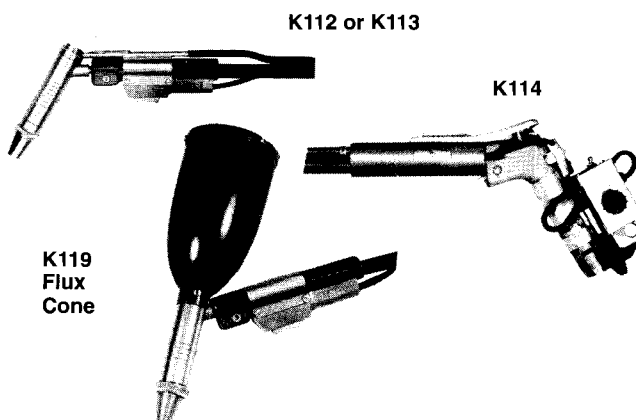
**Note:** The guns described below were available at the time this sheet was printed. They may not be today. See Lincoln Specification literature for up-to-date information.

**3. Gun Cable: LN-8 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-8. Make sure it is in all the way and tighten the locking screw with a 3/16" (4.8mm) Allen wrench. Keep this connection clean and bright. Connect the control cable polarized plug into the receptacle next to the coupling.

**4. Submerged Arc Guns**

- For 1/16" (1.6 mm) wire, use Squirtgun K112
- For 5/64" (2.0 mm) wire, use Squirtgun K113-5/64
- For 3/32" (2.4 mm) wire, use Squirtgun K114 (also can be

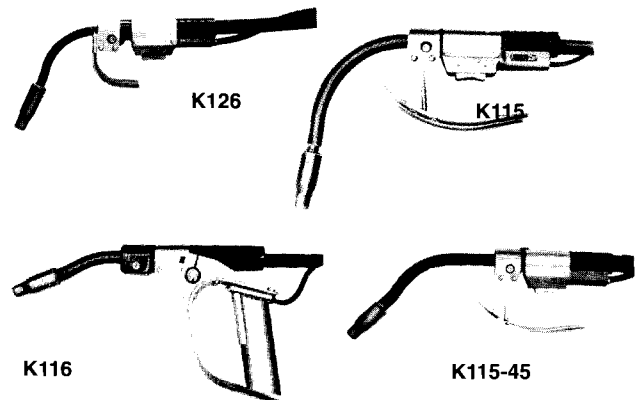


used for 5/64" (2.0 mm) wire) or K113-3/32. The K114 is designed for use only with the continuous flux feed system.

If the flux tank is not used with the K112 and K113 guns, attach the optional gravity feed flux cone (K119) to the 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.

**5. Innershield® Guns**

Squirtgun K126 is recommended for most welding with .062 through 3/32" (1.6 through 2.4 mm) 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" (2.4 mm) wire use either Squirtgun K115-3/32, K115-45-3/32 or K116-3/32. K116 has an adjustable handle and is used for higher welding currents. K115 is lighter. Install 3/32" (2.4mm) contact tip and the insulated nozzle extension for the stickout being used.

For welding with 7/64" and .120" (2.8 and 3.0 mm) wire, use K115-.120, K115-45-.120 or K116-.120. Install the insulated nozzle extension and the contact tip for the stickout and wire size being used.

**6. Linconditioner™ Guns**

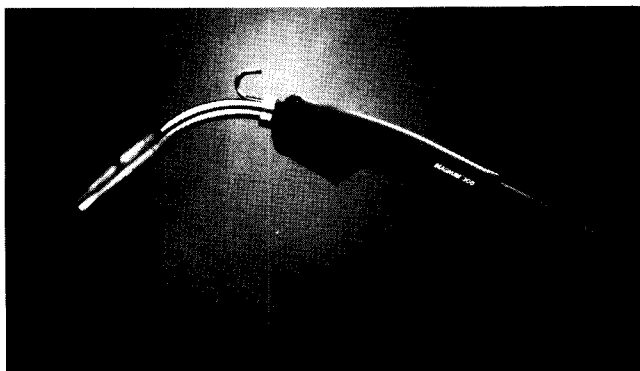
For locations where smoke accumulation is a problem and conventional exhaust systems are ineffective, the available smoke removal type Innershield guns and vacuum units can be used. Instructions are shipped with the equipment.

**7. Magnum™ Guns**

Magnum 300 and 400 represent a line of gas shielded welding guns utilizing a new handle design. The new handle is ergonomically styled combining form and function. The guns, cables and connectors provide excellent performance and serviceability. Magnum guns are capable of welding with either solid or flux cored wire electrode using the GMAW (Gas Metal Arc Welding) or FCAW-GS (Gas Shielded Flux Cored Arc Welding) processes. For wire sizes .035" through 5/64" (0.9 through 2.0 mm) see bulletin E893 for more details.

## SEC. K2.2 — MECHANICAL INSTALLATION (CONTINUED)

### Sec. K2.2.4 (Continued)



November 1990

### Sec. K2.2.6

#### LN-8S and LN-8SE Continuous Flux Feed (Submerged Arc)

##### 1. 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.

##### 2. Input Air Connection

(See S14121 for installation of K320 Flux Tank to wire feeder with K163 undercarriage.)

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 (414 and 827 kPa). The tank is equipped with a pressure regulator to reduce the input pressure to the 30 psi (207 kPa) required for the flux feeding system. This pressure is set at the factory before the machine is shipped. When the LN-8SE with the 22-1/2 or 45' (6.9 or 13.7 m) extension is used, and the flux hose is long, set the air pressure at 45 psi (310 kPa) for 1/2" (12 mm) I.D. hose and 55 psi (379 kPa) for 3/8" (9.5 mm) I.D. hose. Exact pressure is indicated on the pressure gage. Air consumption is normally less than 1.5 cubic feet per minute of welding.

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.

November 1990

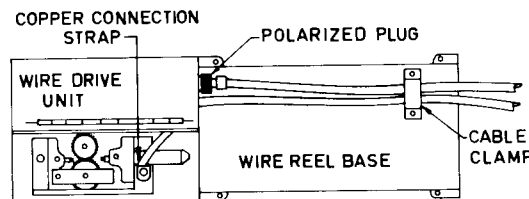
### Sec. K2.2.9

#### LN-8N and LN-8S Input Cable Installation

The input cable consists of an electrode cable and multiconductor control cable. The control cable has a polarized plug on the wire feeder end. To install:

1. Connect the polarized plug of the control cable to the mating connector on the back of the wire feeder.
2. Remove the screws holding the cable clamp located near the rear of the wire reel base. Put the control cable and the electrode cable under the clamp and install the screws. (On cables with more than one electrode cable, leave the junction between the two or more cables and the single 4/0 stub behind the clamp so only the single electrode lead is under the clamp.)
3. Pass the single electrode cable through the holes provided in the back corner of the control section and fasten it to the tab on the copper conductor above the rear brass block of the wire drive unit.

(See Sec. K2.2.2 for LN-8F input cable connector instructions.)



September 1979

### Sec. K2.2.10

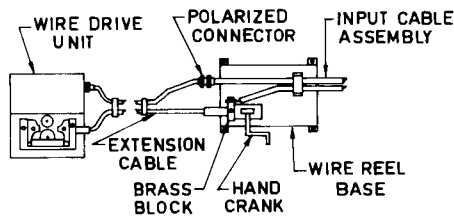
#### LN-8NE and LN-8SE Input Cable, Extension Cable and Reel Housing Installation.

The extension unit consists of a wire reel mount with a hand crank and either a 22-1/2 or 45' (6.9 or 13.7 m) 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 10. The extension cable can be used for .068 thru .120" (1.7 thru 3.0 mm) flux-cored electrode and 5/64 thru 3/32" (2.0 thru 2.4 mm) solid electrode. 22-1/2' (6.9 m) cables can also be used for 1/16" (1.6 mm) solid electrodes.

1. When shipped, the hand crank on the wire reel mount is equipped to feed 1/16" — .120" (1.6 — 3.0 mm) electrode.
2. The standard input cable consists of an electrode cable and a control cable with a polarized plug on the wire feeder end. Position the input cable with the polarized plug at the wire reel mount.
3. Connect the electrode cable of the input cable to the brass block on the hand crank assembly using the screw provided.
4. Position the 22-1/2' or 45' (6.9 or 13.7 m) extension cable assembly so the polarized connector with the threads on its O.D. is at the wire reel mount.

Sec. K2.2.10 (Continued)





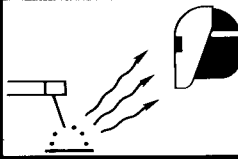
5. Connect the polarized connectors of the extension cable and input cable together.
6. Place both control and electrode cables of the input cable assembly under the clamp on the wire reel mount and tighten the screws.
7. Insert the connector on the electrode cable of the extension assembly into the brass block of the hand crank assembly and tighten with a 3/16" (4.8 mm) Allen wrench.
8. At the wire drive unit, connect the polarized plug of the extension control cable into the mating receptacle on the back of the wire drive unit.
9. Remove the ingoing guide tube from the rear brass block of the wire drive unit and plug the connector of the conductor cable into the brass block. Tighten the locking screw with a 3/16" (4.8 mm) Allen wrench. The guide tube removed is not used when the extension assembly is installed.



10. If using over 450 amperes, connect a length of 1/0 cable between the brass block on the wire reel housing and copper strap on the rear brass block of the wire drive unit. Tape this cable to the extension assembly. Proper cable lengths are as follows:  
22-1/2' (6.9 m) extension use 23-1/2' (7.2 m) — order M5906-106  
45' (13.7 m) extension use 46' (14 m) — order M5906-104
11. 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.
12. If the extension is being used with a K306 Wire Reel Flux Tank assembly, the hose attached to the bottom of the flux tank may have to be shortened. This hose is 64 feet (19.5 m) long and is the correct length for use with the 45 foot (13.7 m) extension. If a 22-1/2 foot (6.9 m) extension is to be used, cut off 22-1/2 feet (6.9 m) of the flux hose to give the correct length of 41-1/2 feet (12.6 m). (The conductor cable of the extension assembly is 22-1/2 feet (6.9 m) long, tip to tip, and can be used to measure the length cut off.) If the flux hose is taped to the extension cables or the gun cable, it should be done in such a manner as not to deform or collapse the flux hose.

## SEC. K2.3 — ELECTRICAL INSTALLATION

**WARNING:** Turn the power source off when installing the wire feeder.

 <b>WARNING</b>	
	<ul style="list-style-type: none"><li>• Do not touch electrically live parts or electrode with skin or wet clothing.</li><li>• Always wear dry insulating gloves.</li><li>• Insulate yourself from work and ground.</li></ul>
<b>ELECTRIC SHOCK</b> can kill.	
	<ul style="list-style-type: none"><li>• Keep your head out of fumes.</li><li>• Use ventilation or exhaust to remove fumes from breathing zone.</li></ul>
<b>FUMES AND GASES</b> can be dangerous.	
	<ul style="list-style-type: none"><li>• Keep flammable material away.</li><li>• Do not weld upon containers which have held combustibles.</li></ul>
<b>WELDING SPARKS</b> can cause fire or explosion.	
	<ul style="list-style-type: none"><li>• Wear eye, ear and body protection.</li></ul>
<b>ARC RAYS</b> can burn.	

### Sec. K2.3.1

#### Constant Voltage or Constant Current

Use the type of power source required for the specific welding application.

A **constant voltage** power source is required for Innershield electrode and other open arc welding. It is often preferred for small, single pass submerged arc welds at fast travel speeds.

In the past a **constant current** power source was recommended for most submerged arc welding.

**CV Submerged Arc** — With the innovation of the new DC power sources a special mode, (“CV Sub-Arc”) is available and is preferred for most sub-arc welding.

When shipped, the LN-8N, LN-8NE and LN-8F can *only* be used with a constant voltage power source. These models

can be converted to weld with a constant current power source with installation of the proper parts. (See Sec. K2.5.14.)

When shipped, the LN-8S and LN-8SE welds with either a constant voltage or constant current power source. Be sure both the power source and the wire feeder are properly set for the required procedure. (See Sec. K2.3.2.)

November 1990

### Sec. K2.3.2.

#### Connection of Input Cable to Power Source

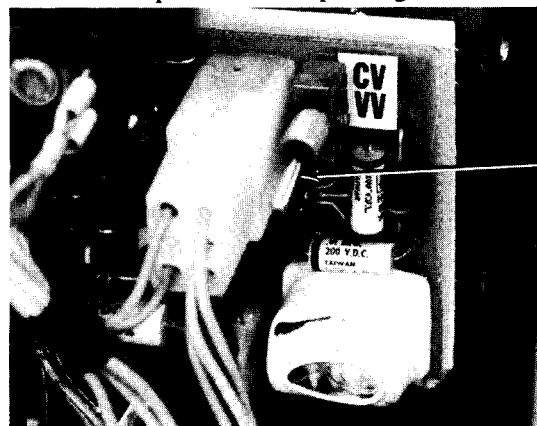
##### LN-8N, LN-8NE and LN-8F

Use a constant voltage type power source. (If the LN-8 has been converted to weld with a constant current power source, use the instructions for the LN-8S below.)

1. If using a multipurpose power source (DC-600, SAM, SA-800, SAF-600), be sure it is properly set for constant voltage welding per instructions in the power source operating manual.
- 2a. Connect the LN-8 input cable to the power source exactly as specified on the appropriate connection diagram in Sec. K2.3.3. Include all jumpers on the terminal strips as shown on the diagrams.
- 2b. To connect to Lincoln power sources not equipped with an output contactor, order a K240 Contactor Kit and see S15416 connection diagram in Sec. K2.3.4-A.
- 2c. To connect to power sources equipped with a contactor but not included in Sec. K2.3.3, see K2.3.4-B for connection instructions.
3. Connect a work lead of sufficient size and length (per the table on the next page) between the “To Work” stud on the power source and the work. Be sure the connection to the work makes tight metal-to-metal contact.

##### LN-8S and LN-8SE (Or converted LN-8N, LN-8NE or LN-8F)

1. Use either a constant voltage or constant current type power source as required for the application. Be sure the power source is properly set for constant voltage or constant current welding as appropriate per the instructions in the power source operating manual.



Switch



Sec.K2.3.2 (Continued)

2. Set the wire feeder for a constant voltage or constant current power source as appropriate per the following instructions:
  - a. There are two nameplates on the front of the wire feed unit — one mounted on top of the other. Be sure the 'Constant Current Power Source' (formerly Variable Voltage) nameplate is on top when using a constant current power source. When connected to a constant voltage power source, be sure the 'Constant Voltage Power Source' nameplate is on top.
  - b. Turn the power to the wire feeder off. Open the door to the control section and switch the power source selection switch to constant current 'CC' or constant voltage 'CV' as appropriate
- 3a. Connect the LN-8 input cable to the power source exactly as specified on the wiring diagrams in Sec. K2.3.3. Include all jumpers on the terminal strips as shown on the wiring diagrams.
- 3b. To connect to Lincoln power sources not equipped with an output contactor, order a K240 Contactor Kit and see S15416 connection diagram in Sec. K2.3.4-A.
- 3c. To connect to power sources equipped with a contactor but not included in Sec. K2.3.3, see Sec. K2.3.4-B for connection instructions.
4. Connect a work lead of sufficient size and length (per the following table) between the 'To Work' stud on the power source and the work. Be sure the connection to the work makes tight metal-to-metal contact.

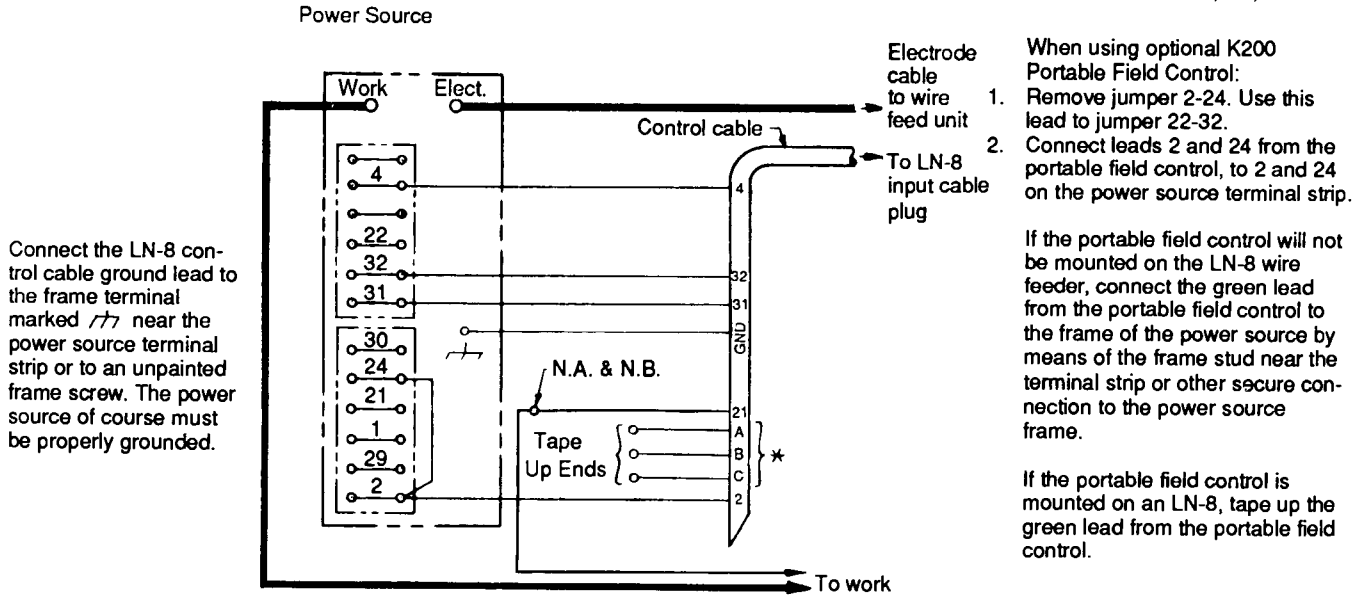
Current Amps 60% Duty Cycle	Copper Work Cable Length		
	25' (7.5m)	50' (15m)	100' (45m)
300	0	0	000
400	00	00	0000
500	00	000	0000
600	000	000	Two 000

**CAUTION:** Never operate a Lincoln Squirt welder wire feeder with a power source that has a jumper from #2 to #4 on the terminal strip or with a power source without a contactor. To do so would defeat the grounding lead protector circuit and could result in overheating of the electrical ground circuit to the wire feeder.



Sec. K2.3.3-C  
**Connection of LN-8 to a SAN Welder**

\* Older LN-8 control cables are tagged #75, #76 and #77 instead of "A", "B", "C".



Connect the LN-8 control cable ground lead to the frame terminal marked ⚡ near the power source terminal strip or to an unpainted frame screw. The power source of course must be properly grounded.

- Electrode cable to wire feed unit
1. Remove jumper 2-24. Use this lead to jumper 22-32.
  2. Connect leads 2 and 24 from the portable field control, to 2 and 24 on the power source terminal strip.
- To LN-8 input cable plug

When using optional K200 Portable Field Control:

If the portable field control will not be mounted on the LN-8 wire feeder, connect the green lead from the portable field control to the frame of the power source by means of the frame stud near the terminal strip or other secure connection to the power source frame.


If the portable field control is mounted on an LN-8, tape up the green lead from the portable field control.

N.A. Extend lead 21 using #14 or larger insulated wire physically suitable for the installation. An S16586 - [ ] remote voltage sensing work lead is available for this purpose. Connect it directly to the work piece keeping it electrically separate from the welding work lead circuit and connection. For convenience, this extended #21 lead should be taped to the welding work lead. (This extended #21 lead connection replaces the need to employ the remote work lead accessory on LN-8 meter kits which have a direct work lead jack.)

N.B. Tape up bolted connection.

S14609  
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**⚠ WARNING**

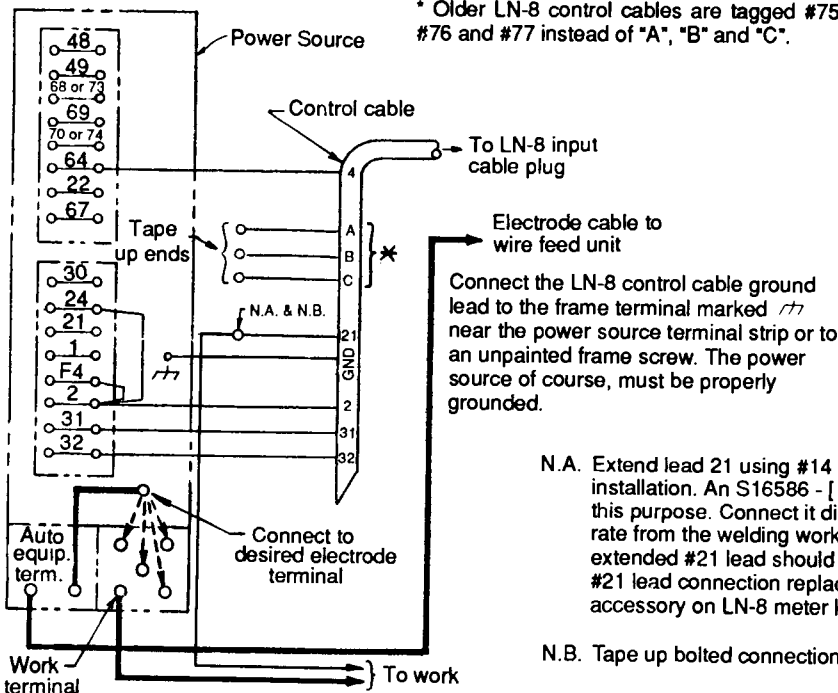


- Do not operate with covers removed.
- Disconnect welding power source before servicing.
- Do not touch electrically live parts.
- Only qualified persons should install, use or service this machine.

**ELECTRIC SHOCK can kill.**

Sec. K2.3.3-D  
**Connection of LN-8 to a SAF-600 ("—O" or "—OF"), SA-800 ("—O" or "—OF") or SAF-600-B ("—OA") Welder**

\* Older LN-8 control cables are tagged #75, #76 and #77 instead of "A", "B" and "C".



- When using optional K200 Portable Field Control:
1. Remove jumper 2-24. Use this lead to jumper 22-32.
  2. Connect leads 2 and 24 from the portable field control, to 2 and 24 on the power source terminal strip.

If the portable field control will not be mounted on the LN-8 wire feeder, connect the green lead from the portable field control to the frame of the power source by means of the frame stud near the terminal strip or other secure connection to the power source frame.

If the portable field control is mounted on an LN-8, tape up the green lead from the portable field control.

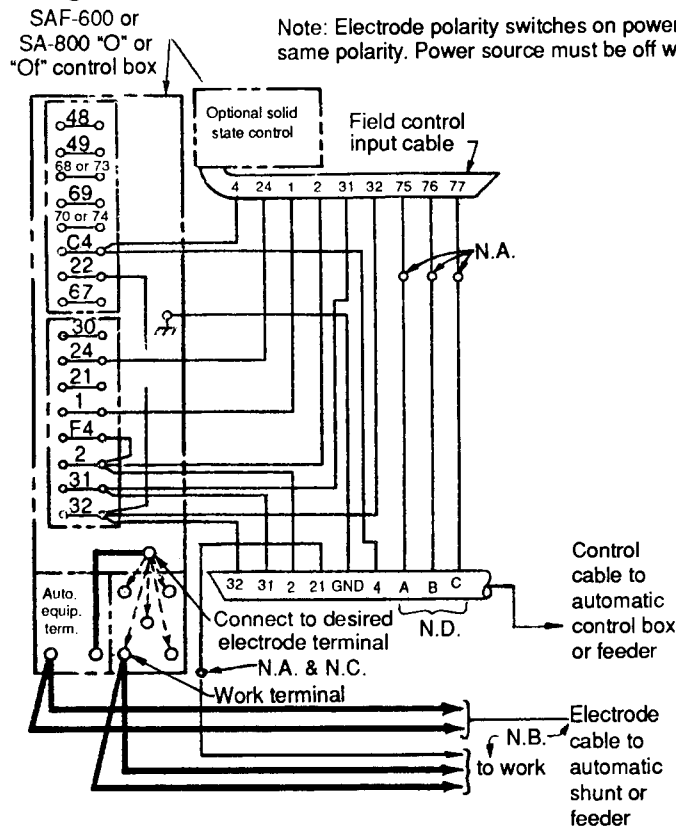
N.A. Extend lead 21 using #14 or larger insulated wire physically suitable for the installation. An S16586 - [ ] remote voltage sensing work lead is available for this purpose. Connect it directly to the work piece keeping it electrically separate from the welding work lead circuit and connection. For convenience, this extended #21 lead should be taped to the welding work lead. (This extended #21 lead connection replaces the need to employ the remote work lead accessory on LN-8 meter kits which have a direct work lead jack.)

N.B. Tape up bolted connection.

S14614  
4-20-79

Sec. K2.3.3-E

**Connection of LN-8 to a SAF-600 ("—O" or "OF") or SA-800 ("—O" or "—OF")  
Using a K224 Solid-State Field Control**



Note: Electrode polarity switches on power source, and field control must be set for same polarity. Power source must be off when changing polarity.

Connect the control cable ground lead to the frame terminal marked  $\llcorner$  near the power source terminal strip or to an unpainted frame screw. The power source must be properly grounded.

If optional solid state motor generator field control is not used, tape up separately the A, B & C leads from the control cable. Also connect a jumper from #2-#24 on the power source terminal strip.

N.A. Bolt and tape connection.

N.B. Welding cables must be of proper capacity for the current and duty cycle of immediate and future applications.

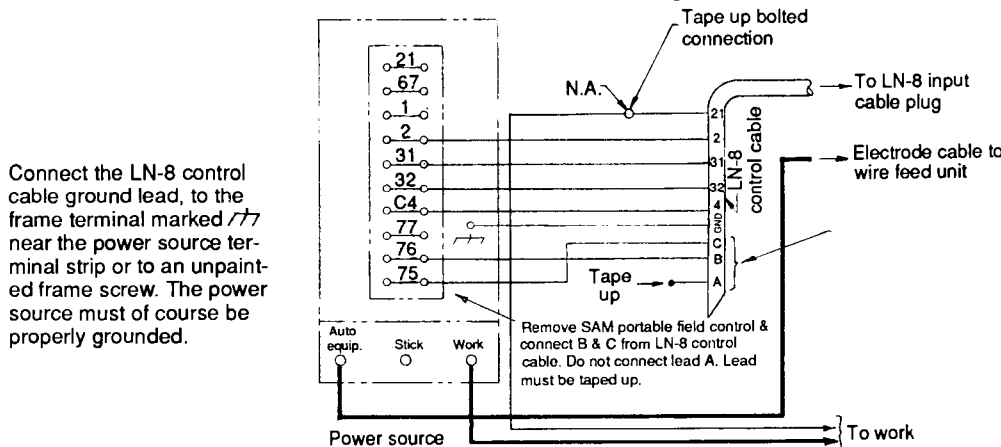
N.C. Extend lead 21 using #14 or larger insulated wire physically suitable for the installation. An S16586-[ ] remote voltage sensing work lead is available for this purpose. Connect it directly to the work piece keeping it electrically separate from the welding work lead circuit and connection. For convenience, this extended #21 lead should be taped to the welding work lead. (This extended #21 lead connection replaces the need to employ the remote work lead accessory on LN-8 meter kits which have a direct work lead jack.)

N.D. If using an older control cable: connect lead #75 to lead #75 of field control, connect lead #76 to lead #76 of field control, connect lead #77 to lead #77 of field control.

S15268  
1-25-80

Sec. K2.3.3-F

**Connection of LN-8 to a SAM Motor-Generator or Engine Driven Welder**




Connect the LN-8 control cable ground lead, to the frame terminal marked  $\llcorner$  near the power source terminal strip or to an unpainted frame screw. The power source must of course be properly grounded.

If using older LN-8 control cable (prior to use of A, B, C marking): Connect lead #76 to #76 on terminal strip, connect lead #77 to #75 on terminal strip, and tape up lead #75.

Remove SAM portable field control & connect B & C from LN-8 control cable. Do not connect lead A. Lead must be taped up.

**⚠ WARNING**



**ELECTRIC SHOCK  
can kill.**

- Do not operate with covers removed.
- Disconnect welding power source before servicing.
- Do not touch electrically live parts.
- Only qualified persons should install, use or service this machine.

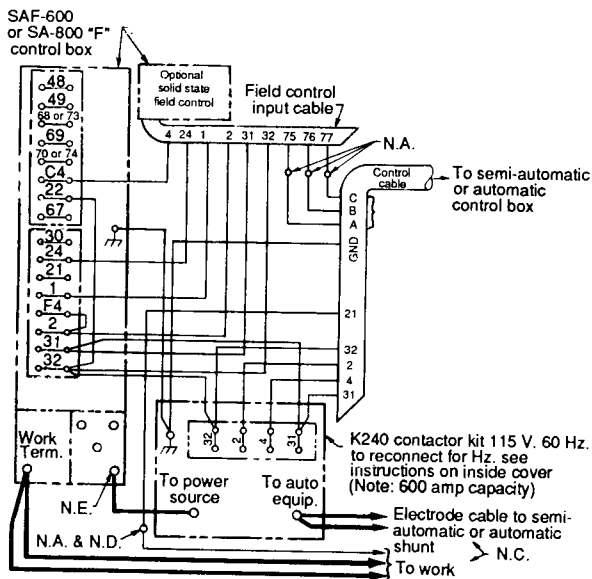
N.A. Extend lead 21 using #14 or larger insulated wire physically suitable for the installation. An S16586-[ ] remote voltage sensing work lead is available for this purpose. Connect it directly to the work piece keeping it electrical separate from the welding work lead circuit and connection. For convenience, this extended #21 lead should be taped to the welding work lead. (This extended #21 lead connection replaces the need to employ the remote work lead accessory on LN-8 meter kits which have a direct work lead jack.)

S14610  
4-20-79

Sec. K2.3.3-G

**Connection of LN-8, NA-3 or LT-7 to SAF-600-F or SA-800-F and M.G. Solid State Field Control and K240 Contactor Kit**

Note: Electrode polarity switches on power source and field control must be set for same polarity. Power source must be off when changing polarity.



Connect the control cable ground lead to the frame terminal marked  $\text{///}$  near the power source terminal strip or to an unpainted frame screw. The power source must be properly grounded.

If optional solid state motor generator field control is not used, tape up separately the A, B and C leads from the control cable. Also connect a jumper from #2 to #24 on the power source terminal strip.

N.A. Bolt and tape connection.

N.B. If using an older control cable: connect lead #75 to lead #75 of field control, connect lead #76 to lead #76 of field control, connect lead #77 to lead #77 of field control.

N.C. Welding cables must be of proper capacity for the current and duty cycle of immediate and future applications.

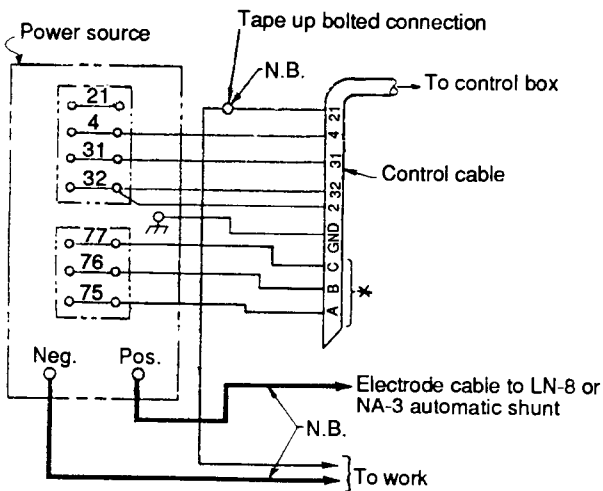
N.D. Extend lead 21 using #14 or larger insulated wire physically suitable for the installation. An S16586- [ ] remote voltage sensing work lead is available for this purpose. Connect it directly to the work piece keeping it electrically separate from the welding work lead circuit and connection. For convenience, this extended #21 lead should be taped to the welding work lead. (This extended #21 lead connection replaces the need to employ the remote work lead accessory on LN-8 meter kits which have a direct work lead jack.)

N.E. Connect to desired electrode terminal.

S15481  
1-25-80

Sec. K2.3.3-H

**Connection of LN-8 or NA-3 to R3S-250 and R3S-325.**




Above diagram shows electrode connected positive. To change polarity, reverse the electrode and work leads at the power source.

N.A. Welding cables must be of proper capacity for the current and duty cycle of immediate and future applications.

N.B. Extend lead 21 using #14 or larger insulated wire physically suitable for the installation. An S16586- [ ] remote voltage sensing work lead is available for this purpose. Connect it directly to the work piece keeping it electrically separate from the welding work lead circuit and connection. For convenience this extended #21 lead should be taped to the welding work lead. (This extended #21 lead connection replaces the need to employ the remote work lead accessory on LN-8 meter kits which have a direct work lead jack.)

**! WARNING**



- Do not operate with covers removed.
- Disconnect welding power source before servicing.
- Do not touch electrically live parts.
- Only qualified persons should install, use or service this machine.

**ELECTRIC SHOCK can kill.**

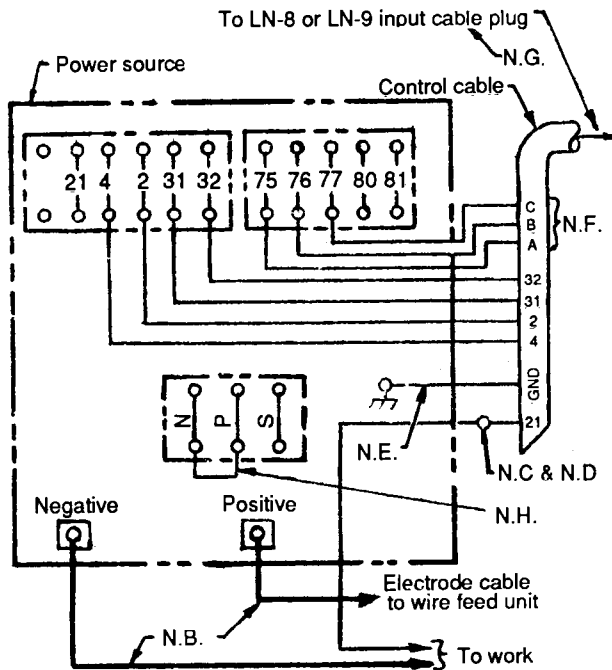
If a variable voltage board is present in the NA-3 automatic controls, the jumper lead on the V.V. Board must be connected to pin "L".

\* If using an older control cable: Connect lead #75 to #75 on Term. strip, Connect lead #76 to #76 on Term. strip, Connect lead #77 to #77 on Term. strip.

Connect the control cable ground lead to the frame terminal marked  $\text{///}$  near the power source terminal strip or to an unpainted frame screw. The power source must be properly grounded.

S15293  
1-25-80

Sec. K2.3.3-J  
**Connection of LN-8 or LN-9 to DC-600**



<b>WARNING</b>	
	<ul style="list-style-type: none"> <li>• Do not operate with covers removed.</li> <li>• Disconnect welding power source before servicing.</li> <li>• Do not touch electrically live parts.</li> <li>• Only qualified persons should install, use or service this machine.</li> </ul>
<b>ELECTRIC SHOCK can kill.</b>	

Above diagram shows electrode connected positive. To change polarity, turn power off, reverse the electrode and work leads at the power source and position the switch on power source to proper polarity.

For optimum performance with the LN-9, DC-600's with codes 8288 and above are preferred.

**N.B.** Welding cables must be of proper capacity for the current and duty cycle of immediate and future applications.

**N.C.** Extend lead 21 using #14 or larger insulated wire physically suitable for the installation. An S16586- [ ] remote voltage sensing work lead is available for this purpose. Connect it directly to the work piece keeping it electrically separate from the welding work lead circuit and connection. For convenience, this extended #21 lead should be taped to the welding work lead. (This extended #21 lead connection replaces the need to employ the remote work lead accessory on LN-9's which have a direct work lead jack.)

**N.D.** Tape up bolted connection.

**N.E.** Connect the LN-8 or LN-9 control cable ground lead to the frame terminal marked near the power source terminal strip. The power source must be properly grounded.

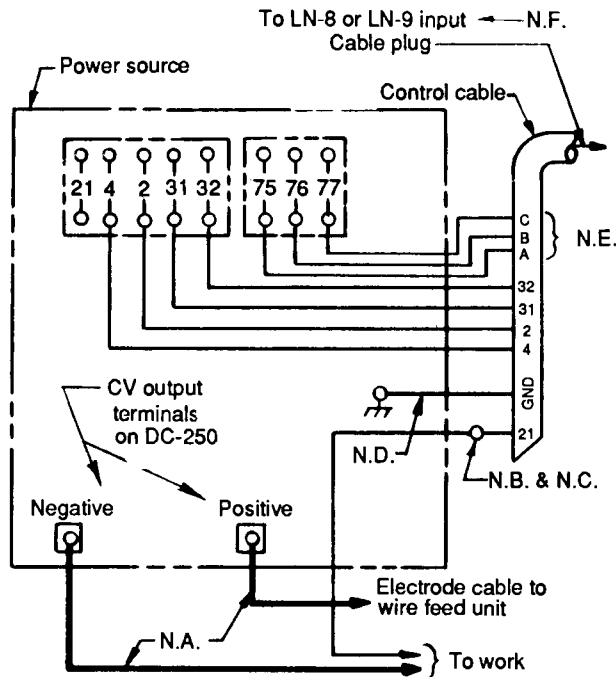
**N.F.** If using an older LN-8 control cable: connect lead #75 to #75 on terminal strip, connect lead #76 to #76 on terminal strip, connect lead #77 to #77 on terminal strip.

**N.G.** The LN-9 voltage control jumpers must be connected as follows (refer to LN-9 Operating Manual):  
White jumper on voltage board to pin 'S'  
Blue jumper on voltage board (later units only) or on start board (earlier units) to pin 'B'.

**N.H.** For DC-600 codes below 8200:  
Connect a jumper from 'N' to 'P' on LN-9 only.  
Connect a jumper from 'N' to 'S' on LN-8 only.  
There is no NPS terminal strip on codes above 8200.

Sec. K2.3.3-K

Connection of LN-8 or LN-9 to DC-250, 400 and CV/CVI Power Sources



<b>⚠ WARNING</b>	
	<ul style="list-style-type: none"> <li>• Do not operate with covers removed.</li> <li>• Disconnect welding power source before servicing.</li> <li>• Do not touch electrically live parts.</li> <li>• Only qualified persons should install, use or service this machine.</li> </ul>
<b>ELECTRIC SHOCK can kill.</b>	

Above diagram shows electrode connected positive. To change polarity, turn power off, reverse the electrode and work leads at the power source and position the switch on power source and wire feeder (if equipped) to proper polarity. Also refer to note N.G.

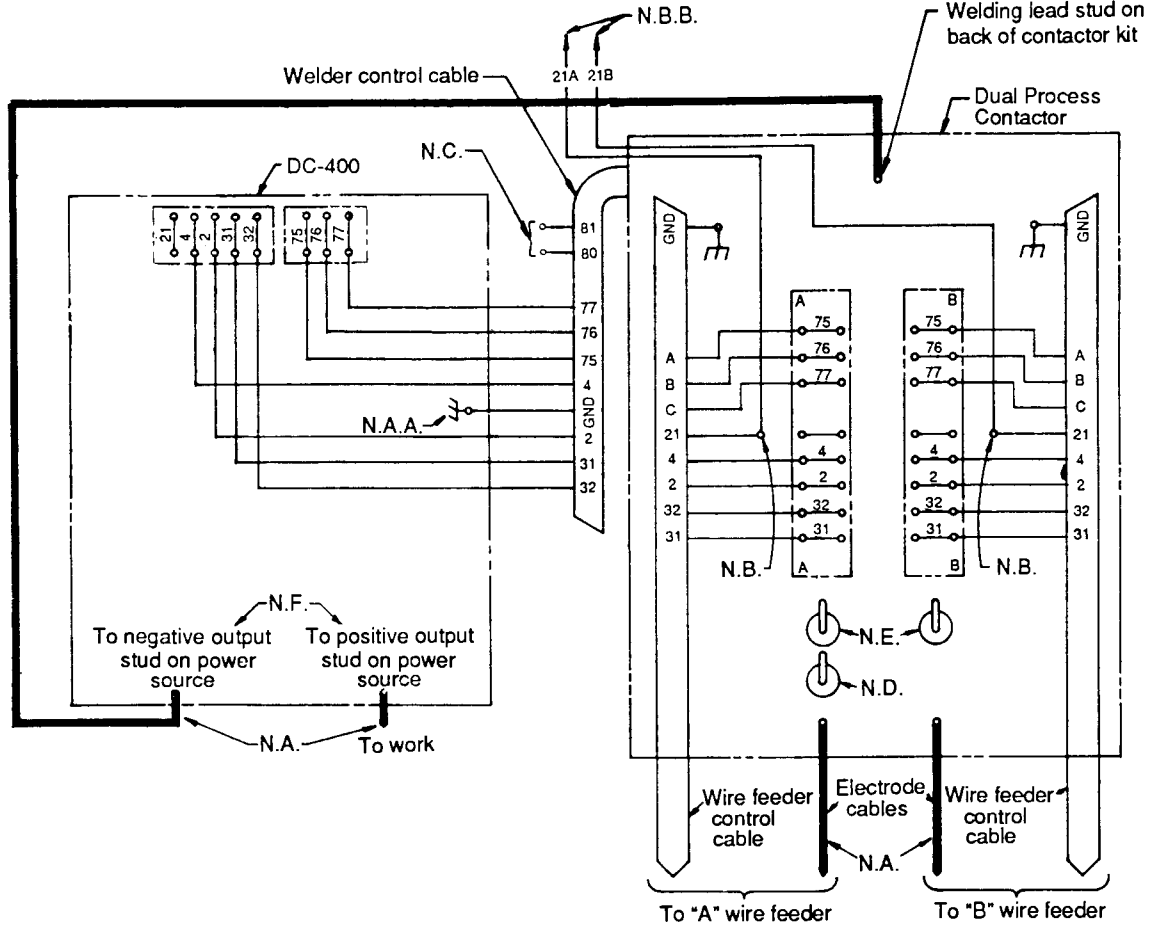
- N.A. Welding cables must be of proper capacity for the current and duty cycle of immediate and future applications.
- N.B. Extend lead #21 using #14 AWG or larger insulated wire physically suitable for the installation. An S16586- [ ] remote voltage sensing work lead is available for this purpose. Connect it directly to the work piece keeping it electrically separate from the welding work lead circuit and connection. For convenience, this extended #21 lead should be taped to the welding work lead. (If the length of work lead circuit is short, and connections can be expected to be reliable, then control cable lead #21 does not need to be extended and can be directly connected to terminal #21 on the terminal strip. Note that this is not the preferred connection because it adds error to the wire feeder voltmeter reading.)
- N.C. Tape up bolted connection.
- N.D. Connect the control cable ground lead to the frame terminal marked ⚡ near the power source terminal strip. The power source grounding terminal (marked ⚡ and located near the power source input power connections) must be properly connected to electrical ground per the power source operating manual.
- N.E. If using an older LN-8 control cable: Connect lead #75 to #75 on terminal strip, connect lead #76 to #76 on terminal strip, connect lead #77 to #77 on the terminal strip.
- N.F. The LN-9 voltage control jumpers must be connected as follows (refer to LN-9 Operating Manual):  
White jumper on voltage board to pin 'S'.  
Blue jumper on voltage board (later units only), or on start board (earlier units), to pin 'B'.
- N.G.\* If lead #21 is to be connected to the terminal strip, connect to the #21 terminal that matches work polarity. This connection must be changed whenever the electrode polarity is changed.

\* Does not apply to DC-400 below code 9200 with polarity switch.

Sec. K2.3.3-L

**K318 Dual Process Contactor Kit**

**DC-400, CV-400 and CVI-500 Connection to LN-8 or LN-9 for the same Polarity Operation**



- N.A.A. Connect the control cable ground lead to the frame terminal marked near the power source terminal strip or to an unpainted frame screw. The power source must be properly grounded.
- N.B.B. Extend lead 21A & 21B using #14 or larger insulated wire physically suitable for the installation. An S16586 remote voltage sensing work lead is available for this purpose. Connect it directly to the work piece keeping it electrically separate from the welding lead circuit & connection. For convenience, these extended #21A & #21B leads should be taped to the welding work lead. Each lead must be connected directly to the work & leads must not be connected together.
- N.A. Welding cables must be of proper capacity for the current and duty cycle of immediate and future applications.
- N.B. Bolt and tape connections.
- N.C. Tape up separately.
- N.D. Put transfer switch in "Same polarity on feeders" position.
- N.E. Mode switches on contactor kit are not functional when used with the power source.
- N.F. Connection shown for negative polarity. For positive polarity reverse electrode and work cables connected to power source output studs.

For 50 HZ. operation  
Disconnect both brown leads from terminal 31B and tape up each lead. Untape both red leads and connect to 31B.

**WARNING**

- Do not operate with covers removed.
- Disconnect welding power source before servicing.
- Do not touch electrically live parts.
- Only qualified persons should install, use or service this machine.

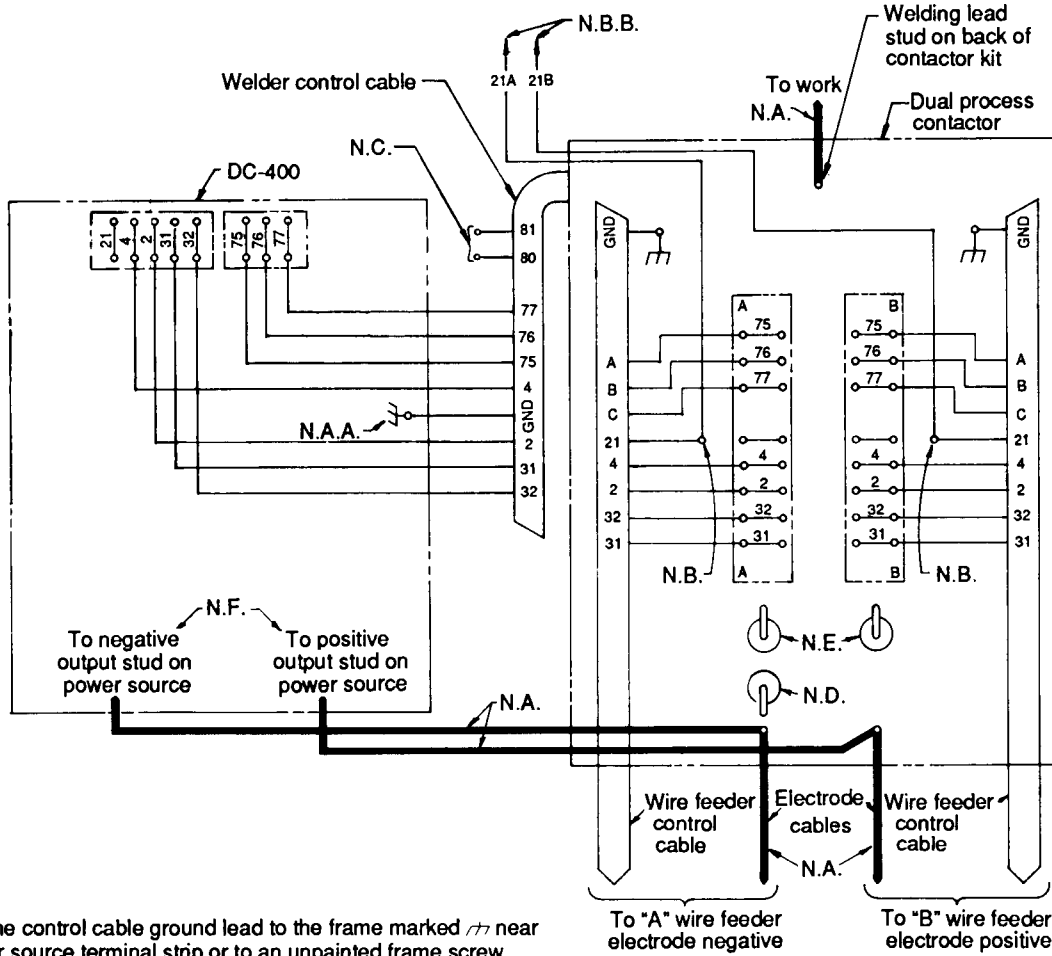
**ELECTRIC SHOCK can kill.**




Sec. K2.3.3-M

**K318 Dual Process Contactor Kit**

**DC-400, CV-400 and CVI-500 Connection to LN-8 or LN-9 for Opposite Polarity Operation**



N.A.A. Connect the control cable ground lead to the frame marked  near the power source terminal strip or to an unpainted frame screw. The power source must be properly grounded.

N.B.B. Extend lead 21A & 21B using #14 or larger insulated wire physically suitable for the installation. An S16586 remote voltage sensing work lead is available for this purpose. Connect it directly to the work piece keeping it electrically separate from the welding work lead circuit & connection. For convenience, these extended #21A & #21B leads should be taped to the welding work lead. Each lead must be connected directly to the work & leads must not be connected together.

N.A. Welding cables must be of proper capacity for the current and duty cycle of immediate and future applications.


N.B. Bolt and tape connections.


N.C. Tape up separately.

N.D. Put transfer switch in "Opposite Polarity on Feeders" position.

N.E. Mode switches on contactor kit are not functional when used with the power source.

N.F. To make "A" feeder positive polarity and "B" feeder negative polarity, reverse electrode cables connected to power source output studs.

 **WARNING**

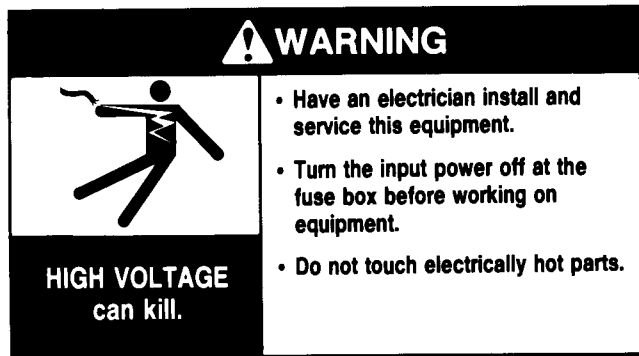


**ELECTRIC SHOCK**  
can kill.

- Do not operate with covers removed.
- Disconnect welding power source before servicing.
- Do not touch electrically live parts.
- Only qualified persons should install, use or service this machine.

For 50 HZ. Operation  
Disconnect both brown leads from terminal 31B and tape up each lead. Untape both red leads and connect to 31B.

## SEC. K2.5 — OPTIONAL FEATURES



### Sec. K2.5.1

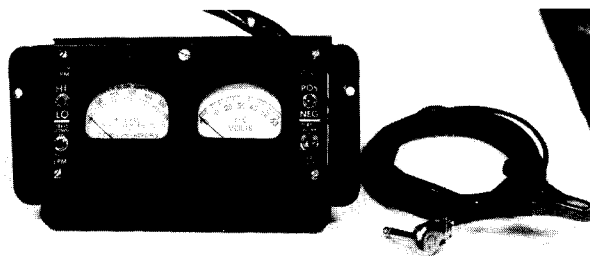
#### K261 and K262 Meter Kits

The K261 and K262 meter kits can be installed on all models built to Codes above 7575 (manufactured after July 1975). Installation instructions (L5649) are included with the kits.

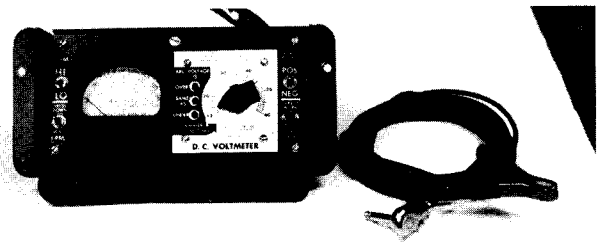
Both kits include a combination ammeter and wire feed speed meter which operates while welding. It normally reads amperes. To read wire feed speed in in./min, set the toggle switch next to the meter for "Hi" or "Low" speed range as desired and press the spring loaded switch next to the meter.

Both kits include a voltmeter polarity switch and a "Direct Work Lead Jack". A 15' (4.5 m) lead with a jack plug on one end and an alligator clip on the other is included in the K262 kit and can be ordered as Part No. S15636 for the K261. When this lead is plugged into the jack, the normal voltmeter work sensing lead (#21 in the input cable) is disconnected from the circuit removing the work lead and its connection to work from the voltmeter reading. The voltmeter then reads between the shunt in the wire feeder and the alligator clip connection (usually on the work).

It is *not* necessary to employ the "Direct Work Lead" if #21 lead is extended directly to the work per the connection diagrams in Sec. K2.3.3 dated after 6-15-79A.



K-261 (Analog) (Lead Optional)



K262 (Electronic)

The K261 kit includes an analog voltmeter which indicates voltage directly on a scale.

The K262 kit includes an electronic voltmeter with indicator lights. A green light glows when the actual voltage matches the voltage preset on the voltmeter dial. Either red light glows when the voltage is higher or lower than the preset voltage. (The wire feeder must be recalibrated if the motor or the control P.C. board is replaced.)

November 1990

### Sec. K2.5.2

#### K165 Ammeter-Voltmeter Kit (Obsolete)

[For all models (except LN-8F) built to codes under 7575 (manufactured before August 1975).]

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

June 1975

### Sec.K2.5.3 (Obsolete)

#### K207 Wire Feed Speed Meter-Voltmeter Kit

[For LN-8N and LN-8NE models built to codes under 7575 (manufactured before August 1975).]

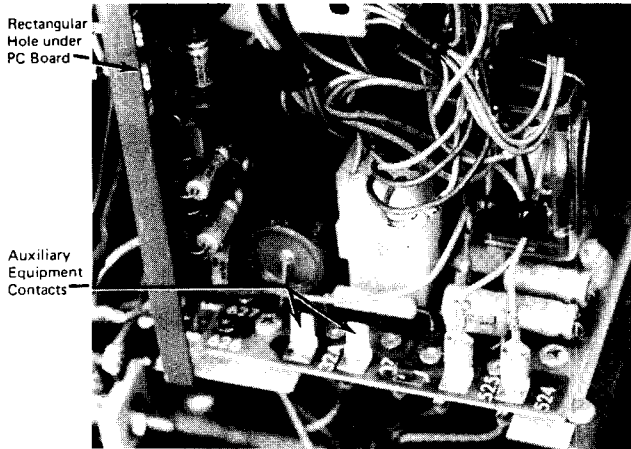
The kit included a wire feed speed meter and range switch, a voltmeter and polarity switch, mounting parts, and a calibration tool. Installation and calibration instructions (M12657) were included with the kit.

Because of the variations in wire feed motors, calibrate the wire feed speed meter when the kit is installed. The meter should need recalibration *only* with *major* changes in feed speeds, addition or removal of 22-1/2 or 45' (6.9 or 13.7 m) extension cables (NE or SE) or replacement of the feed motor.

November 1990

Sec. K2.5.4  
**Auxiliary Equipment Contacts**

The power for 115 volt AC auxiliary equipment can be obtained from the terminals inside the control box. The contacts are "hot" only when the welding circuit is "on".



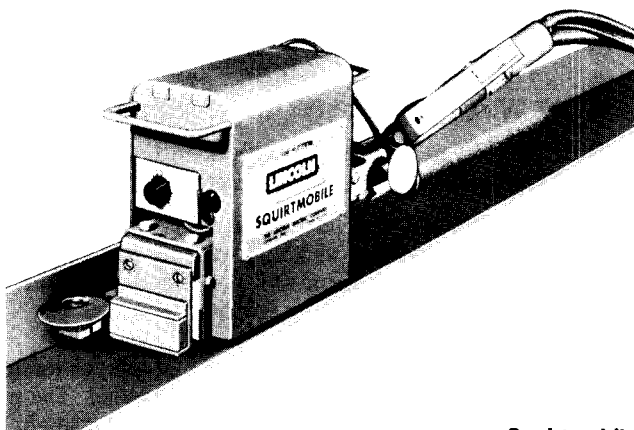
The current draw of this circuit must not exceed 1/4 ampere.

**CAUTION:** Do not connect the power source contactor to these terminals — see Sec K2.3.4-B.

Turn the power source off.

Install 1/4" (6.0 mm) quick connect terminals to the leads from the auxiliary equipment. Route the leads through the rectangular hole in the back of the control panel and connect to terminals #32A and 7 on the bottom PC board.

November 1990



Squirtmobile

Sec. K2.5.5  
**Squirtmobile®**

The Squirtmobile is a self-propelled trackless carriage that carries the K114 submerged arc gun on long welds for automatic welder economy without high fixture costs.

To use the LN-8S or LN-8SE with the Squirtmobile install a K161 Power Pack Kit per Sec. K2.5.6.

August 1974

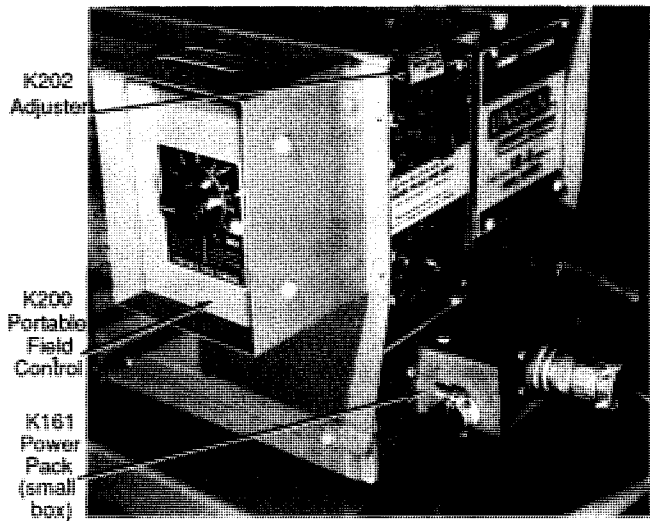
Sec. K2.5.6  
**K161 Mechanized Travel Power Pack**

The K161 power pack supplies the power needed by the K110 mechanized hand travel unit or Squirtmobile when used with the K114 submerged arc welding gun.

With the power source off, 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 LN-8 wire feed unit (the K161 is not designed for use with an LN-8F). Connect the K114 gun control cable to the polarized plug built into this small box.

Complete installation instructions are shipped with the kit.

December 1981



Sec. K2.5.7  
**K202 Burnback Kit**

This kit is useful to help prevent the electrode from sticking in the crater at the end of the weld in two types of welding applications:



K202 Kit P.C. Board

## OPTIONAL FEATURES — CONT'D.

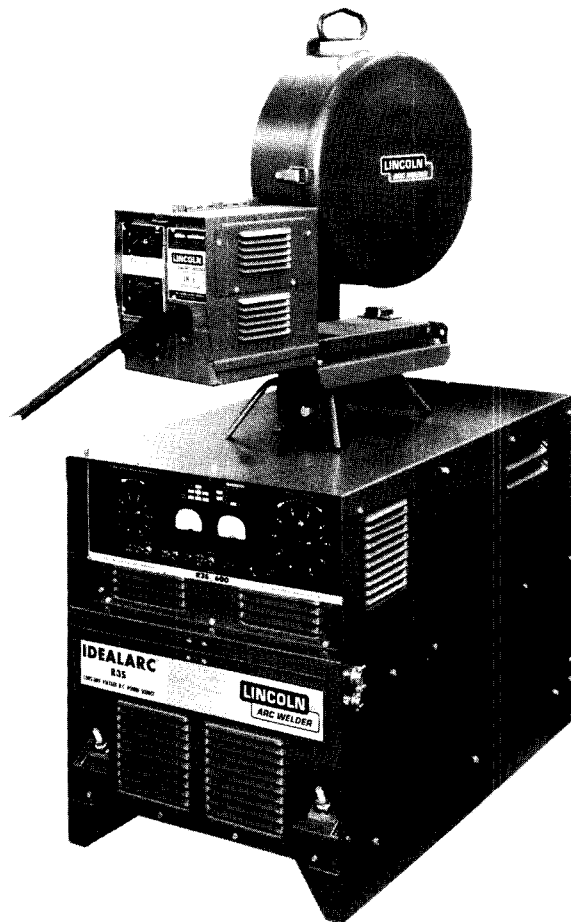
### Sec.K2.5.7 (Continued)

1. Welding with small diameter [.035 thru 1/16" (0.9 thru 1.6 mm)] wires at fast wire feed speed when there is a tendency for wire overrun.
2. When the semiautomatic gun is mounted in a fixture or on the Squirtmobile in such a manner that it cannot be lifted from the work at the end of the weld.

The kit delays the dropout of the contactor allowing the electrode to burn back from the crater at the end of the weld. The delay time is adjustable for optimum burnback for different wire sizes, processes, procedures, etc.

Installation instructions are shipped in the kit.

November 1990



### Sec. K2.5.8

#### **K178 Mounting Platform — LN-8 on Idealarc R3S**

This is a turntable type platform for mounting the LN-8 on the top of Idealarc R3S power sources. Bolt the platform to the lift bail per instructions supplied with the platform.

August 1973

### Sec. K2.5.9

#### **K162 Spindle for Mounting Readi-Reels and 10 thru 30 Pound (4.5 thru 13.5 Kg) Spools** (For use with K303 Wire Reel Stand)

To mount the spindle kit for 10 thru 30 pound (4.5 thru 13.5 Kg) spools, remove the shaft for the standard 50-60 pound (22.5-27.2 Kg) wire coils from the mounting framework. Install the spindle per the instructions shipped with the kit.



Adjust the brake tension screw (see Sec. K3.1.8-B) on the spindle as needed.

When used with Readi-Reels the K363 Readi-Reel Adapter is required.

November 1990

### Sec. K2.5.10

#### **Wire Reel Enclosure Door**

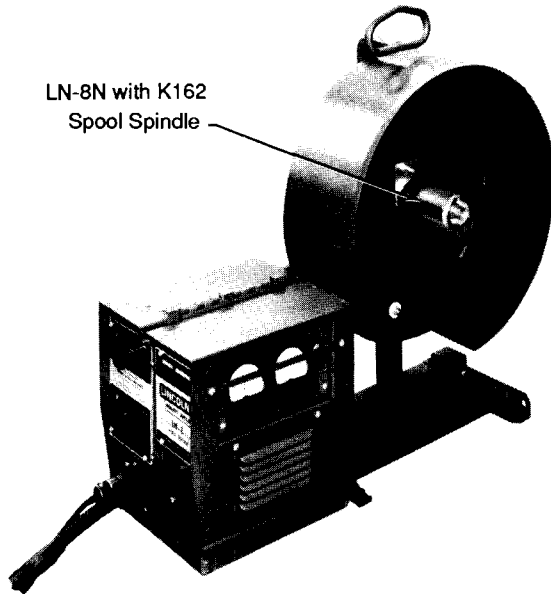
This door is standard on the LN-8NE (with an enclosed wire reel mount) and the LN-8SE machines. It is optional for LN-8S and LN-8N.

The door kit (M11514) includes a hinged door and a sliding bottom seal. When installed, the wire reel mounting becomes a completely enclosed housing. Instructions are included in the kit. Put the bottom seal panel in the forward

Sec. K2.5.10 (Continued)

position when using .035 thru 1/16" (0.9 thru 1.6 mm) electrode and in the rear position when using 5/64 thru .120" (2.0 thru 3.0 mm) electrode.

November 1990



Sec. K2.5.11  
**K185 Voltage Indicator**

A rugged, portable arc voltage monitoring device with "High" and "Low" warning lights which indicate when the welding voltage varies more than about 1/2 volt on either side of the value preset on the calibrated dial. Covers a range of 12 to 60 volts, DC only. Valuable where arc voltage must be closely maintained. Instructions are permanently on the back of the device.

May 1974

Sec. K2.5.12  
**K-163 Undercarriage**

The undercarriage is standard for LN-8S and LN-8SE machines. It is optional for LN-8N and LN-8NE.

Wheels, handle and hardware are shipped with the undercarriage. Mount the casters at the front and wheels to the rear of the platform. Be sure the round rear axle is to the 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-8 can be tilted back and wheeled like a two-wheeled truck. Holes for installing the wire reel support are provided in the platform.

August 1973

Sec. K2.5.13  
**K200 Portable Field Control**

For SAF-600, SA-800 and SAN motor-generator type power sources, this control moves the output adjustment

from the power source to the wire feeder. It is a rheostat in a box to be mounted to the control (left) side of the LN-8 wire drive unit using the holes provided. A 25' (7.5 m) three-conductor cord connects the rheostat to #2 and 24 on the power source terminal strip. The cord can be lengthened as needed using #16 or larger wire. Installation instructions are included with the kit. See photo under Sec. K2.5.6. The K224 (see Sec. K2.5.15) can be substituted for the K200.

November 1990

Sec. K2.5.14  
**Constant Current Conversion Parts (Formerly Variable Voltage)**

To convert an LN-8N, LN-8NE or LN-8F for welding with a constant current power source, purchase a constant current PC board (shipped with mounting insulation), constant current dial plate and either a flux tank or K119 flux cone for use with a K112 or K113 submerged arc gun.

To install, turn all power off. Mount the PC board and its insulation on the LN-8N and LN-8NE panel between the switches and the circuit breaker or the LN-8F left wall of the control section. Use the screws provided with the PC board. Locate the connector on the end of the harness lead assembly and, grasping both connectors, remove the plug. This jumper plug will no longer be needed as long as the constant current PC board is installed in the unit. Plug the connector into the constant current PC board receptacle making certain it is seated properly.

Install the new dial plate over the old one. Be sure the wire feeder and power source are properly set for constant voltage or constant current as appropriate (see Sec. K2.3.2).

November 1990



## OPTIONAL FEATURES — CONT'D.

Sec. K2.5.15

### **K224 Solid-State Remote Control**

Can be substituted for the K200 Portable Field Control to move the full range output control from the power source to the LN-8 when using SAF-600, SA-800 and SAN motor-generator power sources. It mounts on the power source. Installation instructions are shipped with the kit.

June 1975



Sec. K2.5.16

### **K377 Small Mounting Stand for Readi-Reel® Coils or 10-30 Pound (4.5-13.5 Kg) Spools with 2" (50 mm) I.D.**

This assembly includes a small frame to which is attached a wire reel spindle similar to the K162 Spindle. The unit is supplied with the K363P Readi-Reel Adapter so the Lincoln "Readi-Reel Electrode Coils" can be used. Without the adapter the unit is capable of handling spools with a two inch (50 mm) I.D., a 12 inch (305 mm) max. O.D., and 4.06 inch (103 mm) max width. A spacer for 10 pound (4.5 Kg) coils is also supplied. The spindle has an adjustable braking system.

November 1990

Sec. K2.5.17

### **K378 — Small Mounting Stand for 13-14 Pound (6.0-6.4 Kg) Innershield® Coils.**

This assembly includes the same smaller frame as used in the K377 and a fully enclosed canister system for dereeling of the 14 pound (6.4 Kg) coil. This system has a fixed brake for the 14 pound (6.4 Kg) coil.

November 1990

## OPTIONAL FEATURES — CONT'D.

Sec. K2.5.18  
(File as Sec. N3.5.1 in IM-294)

### K317 Dual Process Kit (No Polarity Change)

The Dual Process Kit is a transfer device that connects two wire feeders to a single power source and enables each wire feeder to weld at a different procedure without changing any dials. Simply actuating the circuit of the desired wire feeder turns the unit on and its controls set the complete procedure including the power source output level. When used with a DC-600, the wire feeders can be set for different modes — “CV Innershield” or “CV Submerged Arc”. Both wire feeders will operate at the same polarity.

The unit is a small control box that mounts on the side of the power source and is connected to the welder terminal strip. Each wire feeder control cable is connected to the Kit.

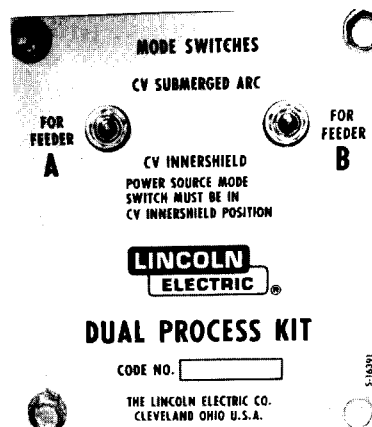
The electrode of the wire feeder not being used will be “hot” although, of course, there will be no wire feed. This usually is no problem since the unused gun or nozzle can be placed safely out of the way. If, however, it is desired to have the unused electrode “cold”, use a K318 Dual Process Contactor Kit connected for same polarity operation.

Maximum versatility is obtained when the Kit is used with a DC-600 power source. The following chart shows the advantages that a DC-600 has over other welders. The K317 should not be used with power sources other than those shown below.

Power Source	Voltage Range	Mode Change	Mounting Adapter
DC-400	Full	No	No
DC-600	Full	Yes	Yes
SAF-600 or SA-800 with K224 Solid State Remote Control	Full	No	No
SAM	Partial*	No	No
R3S	Limited*	No	No

\*The output range is limited by the voltage change obtainable by the remote control. The voltage range between the two procedures required may be outside the range covered by the remote control and it would be impossible to set the procedure without adjustment at the power source.

Although designed primarily for use with the LN-8 or LN-9 wire feeders, the kit will also work with two LN-7's when they are used with two remote control units or with two NA-3's, NA-4's or NA-5's.

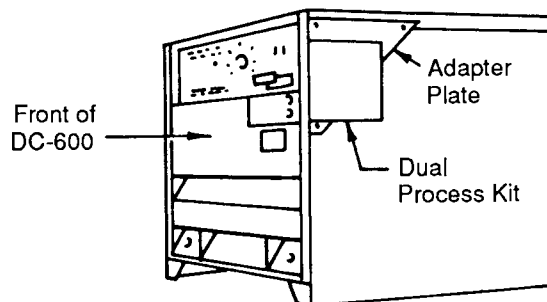


Closeup of controls for the K317 dual process kit. Note, when used with a DC-600, each mode switch should be set in the proper position for the process being used. K317 mode switches have no function with any other power source.

### INSTALLATION

Refer to the following connection diagrams to connect the Dual Process Kit to the power source and LN-8 or LN-9 wire feeders.

DC-400	M14549
DC-600	M13751
R3S and SAM	M13702
SAF-600 or SA-800 with Solid State Remote Field Control	M13701



Turn the power source off. On the DC-600, fasten the adapter plate of the Dual Process Kit to the control terminal strip side of the power source using two roof screws and one front panel screw.

On all other power sources, remove the adapter plate from the Kit and fasten Kit to the side of the power source or some convenient location so its control cable can be connected to the power source terminal strip. Use control box as a template to locate the four 5/32" (4.0 mm) diameter holes that must be drilled in the case side. Mount unit with the four #10 self-tapping screws provided.

Remove cover from Kit and connect wire feeder control cables to the terminal strips in the Kit. Connect the Kit control cable to the power source terminal strip per the appro-

Sec. K2.5.18 (Continued)

appropriate connection diagram. Replace cover on Kit and unit is ready to operate.

**OPERATION**

For DC-600, set the mode switch on the front of the power source to "CV Innershield". Set the mode switches on the kit to the position required by the process used on the wire feeder. On all other power sources the mode switches have no effect.

To set procedures, weld with "A" wire feeder and set procedure with its control dials. Then weld with "B" wire feeder and set the procedure with its control dials. With the LN-9, it is not necessary to weld. Each unit will now weld at its required procedure when its gun trigger is actuated. Do not try to weld with both units simultaneously because the procedure will not be correct and the power source may be overloaded.

**WARNING:** Place unused gun so electrode does not touch work, wire feeder case or other metal because both electrodes become electrically hot when either gun trigger is pulled.

**TROUBLESHOOTING**

- |   |   |
|---|---|
| <p>1. No control of power source output</p>                               | <p>a. DC-600 or R3S power source toggle switch not set to remote. Set power source per its instruction manual.</p> <p>b. Defective K317 relay — replace relay.</p> <p>c. Defective wire feeder control rheostat. Refer to operating manual.</p> |
| <p>2. Poor bead shape or arc response when using DC-600 power source.</p> | <p>a. Mode switch in wrong position on Dual Process Contactor Kit or on welder. Place in correct position.</p> <p>b. Defective K317 relay — replace relay.</p>  |
| <p>3. Poor starting when using DC-600 (below Code 8200).</p>              | <p>a. Improper connection on power source terminals N, P, and S. Refer to connection diagram to connect properly.</p>   |



## OPTIONAL FEATURES — CONT'D

Sec. K2.5.19

(File as Sec. N3.5.2 in IM-294)

### K318 DUAL PROCESS CONTACTOR KIT (With Polarity Change)

The dual process contactor kit is a control box (transfer device) that permits connection of two wire feeders to a single power source and enables each wire feeder to weld at a different procedure and polarity without changing any dials or switches. Simply actuating the gun trigger of the desired wire feeder turns the unit on, selects the polarity and sets the complete procedure, including power source output level. When used with a DC-600, the wire feeders can also be set for different modes — “CV Innershield” or “CV Submerged Arc”. The kit can also be connected to operate with the same polarity on each wire feeder. The kit is rated 600 amperes at 100% duty cycle.

Maximum versatility is obtained when the kit is used with a DC-600 power source. The following chart shows the advantage that a DC-600 has over other welders.

Power Source	Voltage Range	Mode Change
DC-400	Full	No
DC-600	Full	Yes
SAF-600 or SA-800 with K224 Solid-State Remote Control	Full	No
SAM	Partial*	No
R3S	Limited*	No

\* The output range is limited by the voltage change obtainable by the remote control. The voltage range between the two procedures required may be outside the range covered by the remote control and it would be impossible to set the procedure without adjustment at the power source.

Although designed primarily for use with the LN-8 or LN-9 wire feeders, the kit will also work with two LN-7's when they are used with two remote control units.

### Installation

If it is desired to mount the K318 on top of a DC-600, an S16552 mounting bracket is available.

Refer to the following connection diagrams to connect the dual process contactor kit to the power source and LN-8 or LN-9 wire feeders.

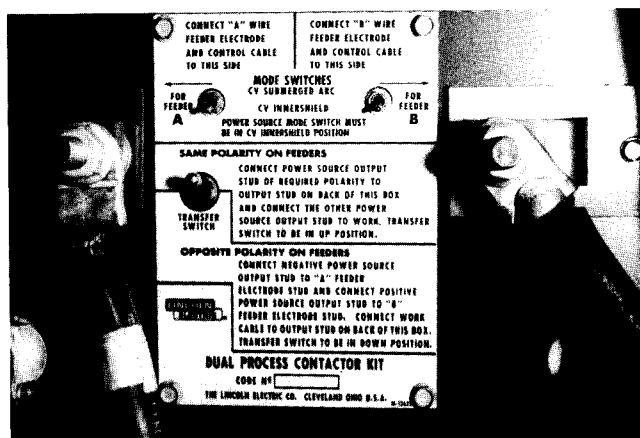
To connect the two wire feeder control cables, remove the cover from the contactor kit for access to the terminal strips. Run the cables through the two box connectors, then under the “L” shaped brackets mounted on the bottom to keep the cables away from the contactors. Connect the leads to the two terminal strips per the appropriate connection diagram.

If 50 hertz is used, reconnect contactor coil leads per the wiring diagram.

K318 Kit	Below Code 8020	Above Code 8020
Opposite polarity operation:		
DC-400	—	M14551
DC-600	M13720	M13918
R3S and SAM	M13706	M13916
SAF-600 and SA-800 with solid-state remote field control	M13704	M13914
Same polarity operation:		
DC-400	—	M14550
DC-600	M13736	M13917
R3S and SAM	M13705	M13915
SAF-600 and SA-800 with solid-state remote field control	M13703	M13913

Connect the dual process contactor kit control cable to the power source per the connection diagram. Two 3/0 leads are provided to connect the power source output studs to the kit for opposite polarity operation. Only one lead is used for same polarity operation. Connect work lead and wire feeder electrode leads as shown on the diagram. Put cover back on control box and unit is ready to operate.

**CAUTION:** When fixture mounted wire feeders are used, the wire reels must be insulated from each other and insulated from their mounting structure.



Closeup of controls for the K318 dual process contactor kit. NOTE: when used with a DC-600, each mode switch should be set in the proper position for the process being used. K318 mode switches have no function with any other power source.

Sec. K2.5.19 (Continued)

**Operation**

For DC-600, set the mode switch on the front of the power source to "CV Innershield". Set the mode switches on the kit to the position required by the process used on the wire feeder. On all other power sources the mode switches have no effect. Check that transfer switch on the dual process contactor kit is in the proper position. When wire feeders are connected for opposite polarity operation, wire feeder "A" will be negative polarity and "B" will be positive polarity.

**Codes Above 8020:**



Before welding, actuate gun trigger once to interlock contactor and set procedure. Subsequent welding with the same gun can be done in a normal manner. If the trigger is not operated once when changing feeders, the first weld start may be poor if the voltage setting of the two feeders is far apart.

**Troubleshooting**

Trouble	Cause and Remedy
1. Electrode feeds, but is electrically cold.	1. Transfer switch is in wrong position. Place in correct position.
2. Poor bead shape or arc response when using DC-600 power source.	2. Mode switch in wrong position on dual process contactor kit or on welder. Place in correct position.
3. No control of power source output.	3. a. Power source voltage control switch not set to "remote". Set power source per its instruction manual. b. Defective relay in kit. Check operation of 1CR and replace if defective. c. Defective wire feeder control rheostat. Refer to operating manual.
4. Poor starting when using DC-600 (below Code 8200).	4. Improper connection on power source terminals N, P and S. Refer to connection diagram to connect properly.
5. Poor starting or burn back on the first weld when changing wire feeders.	5. Relays not transferred properly. Actuate gun trigger once before starting when changing from one wire feeder to another.

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## SEC. K3 — OPERATING INSTRUCTIONS CONTROL ADJUSTMENTS AND LOADING THE MACHINE

<b>⚠ WARNING</b>	
	<ul style="list-style-type: none"><li>• Do not operate with covers removed.</li><li>• Turn off power source before installing or servicing.</li><li>• Do not touch electrically hot parts.</li><li>• Turn the input power to the welding power source off at the fuse box before working in the terminal strip.</li></ul>
<b>ELECTRIC SHOCK can kill.</b>	
	<ul style="list-style-type: none"><li>• Keep away from moving parts.</li></ul>
<b>MOVING PARTS can injure.</b>	
<ul style="list-style-type: none"><li>• Only qualified personnel should install, use or service this equipment.</li></ul>	

Sec. K3.1.1

### Introduction

Input power (115VAC, 2.5A) is supplied by the Power Source.

**Duty Cycle:** The amount of welding performed in a 10 minute period, expressed as a percentage.

#### 1. Optional Meters (See descriptions in Sec. K2.5.1, .2 and .3)

The **Ammeter** indicates welding current in amps.

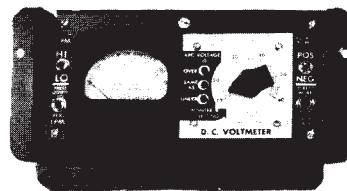
The **Wire Feed Speed Meter** is normally used only when the LN-8 is connected to a constant voltage power source. To read wire feed speed in in./min (rather than reading amps) press the spring loaded switch next to the meter. Set the range switch next to the meter to 'Lo' when using speeds below 300 in./min (7.6 m/min) and read the feed speed on the red [0-300 in./min (0-7.6 m/min)] scale. For higher feed speeds, set the range switch to 'Hi' and read the speed on the back [0-600 in./min (0-15 m/min)] scale.

The **Electrode Polarity Switch** must be set so the analog voltmeter reads up scale or the electronic voltmeter indicator lights operate.

The **Analog Voltmeter** indicates voltage directly on a scale.

To **Operate the Electronic Voltmeter** first set the appropriate voltmeter sensitivity on the rear terminal strip. Jumper A to B for the Innershield process and the green "Same As" light will remain on over a sensitivity range of 1 volt. Jumper B to C for the submerged arc process and the green "Same As" light will remain on over a sen-

sitivity range of 2 volts. Set the electronic voltmeter pointer knob to the welding voltage desired. While welding, if the arc voltage is within the sensitivity range, the green "Same As" light will remain on, though fluctuations of the welding voltage may cause occasional blinking. If the arc voltage is either high or low the green light will be off and the appropriate "Over" or "Under" light will turn on. The wire feeder or power source voltage control should then be adjusted until the voltage is within the range where the green "Same As" light remains on. The center of this range indicates that the welding voltage matches the electronic voltmeter pointer knob setting within  $\pm 1/2$  volt.



Lincoln Specified Procedures give voltmeter readings taken between the work and the gun cable brass connection block inside the LN-8. To match these voltage readings, the #21 lead must be extended directly to the work per the connection diagrams in Sec. K2.3.3 dated after 6-15-79A or the "Direct Work Lead" must be used.

#### 2. Inching the Electrode

Press the trigger on the gun to inch the electrode. Direction of inching is controlled by the 'Direction of Wire Feed' switch. If the electrode is inching in the wrong direction, reverse the position of the switch. If the drive rolls do not turn, check to see that the grounding lead protector is set.

**WARNING:** When inching, the electrode and drive mechanism are always "hot" to work and ground and remain "hot" several seconds after the gun trigger is released.



## Sec. K3.1.1 (Continued)

**3. Trigger Interlock**

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.

**4. Wire Reel Brake**

The mount for standard 50 and 60 pound (22.7 and 27.2 Kg) 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 in./min. It should be at the outer position for faster wire speeds. 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.

Instructions for adjusting the brake tension of the spindle for 25 pound (11 Kg) spools, see Sec. K3.1.8-B.

**5. Constant Voltage or Constant Current**

Use a constant voltage or constant current type power source as required for the application (see Sec. K2.3.1). Be sure the power source and wire feeder are properly connected and set for either constant voltage or constant current as appropriate (see Sec. K2.3.2).

**6. Circuit Protection**

The LN-8 includes a circuit breaker, field circuit fuse, motor thermal protector and ground lead protector. See Sec. K6.1.5 for a description of the function of these components.

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## Sec. K3.1.2

**Welding with a Constant Voltage Power Source****1. Adjusting Current and Voltage****'Amps' Control — All Power Sources**

Set the welding current (or wire feed speed) with the LN-8 'Amps' control.

**'Volts' Control — DC-600 Power Source**

Set mode switch to CV Innershield or CV Subarc, as required.

Place machine output control toggle switch in the 'Output Control Remote' position.

Total voltage control is now at the LN-8.

**'Volts' Control — Idealarc R3S Power Sources**

Set the power source for about the voltage required per the R3S instruction manual. Make final adjustments with the LN-8 'Volts' control (or the 'Fine Voltage Control' on the optional 'Line Voltage Compensator').

**'Volts' Control — SAM Power Sources**

Set the power source for about the voltage required per the SAM instruction manual. Make final adjustments with the LN-8 'Volts' control.

If using the variable inductance control (see SAM instruction manual), set the SAM 'Current Control' as desired in the 8 o'clock range.

**'Volts' Control — SAF-600, SA-800 and SAN Power Sources**

Be sure the SA-800 or SAF-600 'Voltage Range' switch is set to 'Low' and the cable from the power source contactor box is connected to the 'Innershield' stud. (Exception: When a slightly drooping output curve is needed with the SAF-600 — usually when welding with less than 30 volts — connect the input cable to the '450-Max. Sub-Arc' stud.)

To adjust output voltage:

1. If the K200 Portable Field Control (see Sec. K2.5.13) is installed, use the field control rheostat mounted to the side of the LN-8.
2. If the K224 Solid-State Field Control (see Sec. K2.5.15) is installed, use the LN-8 'Volts' control.
3. If neither field control is installed, use the 'Voltage' control on the power source.

**2. Making Test Welds [3/32" (2.4 mm) NS-3M Electrode with 2-3/4" (70 mm) Electrical Stickout]**

- a. Be sure the power source and wire feeder are properly set for constant voltage welding (see Sec. K2.3.2).
- b. Set the polarity switch on the power source for positive polarity. With an Idealarc R3S, connect the electrode cable to the 'Positive' stud.
- c. Set the 'Electrode Polarity' switch on the optional meter kit so the voltmeter reads upscale.
- d. Set the 'Direction of Wire Feed' switch so the wire feeds out of the gun.
- e. Set the power source for about 30-31 volts. Set the LN-8 'Volts' control to 6.
- f. Set the LN-8 'Amps' control to 4.
- g. Set up and ground a piece of 3/8 – 1/2" (9.5-13 mm) scrap steel. Inch the electrode so it extends about 1/2 – 3/4" (13-19 mm) beyond the end of the gun for starting.
- h. Hold the gun with the electrode 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 "Innershield Welding Guide" for detailed Innershield welding techniques.
- i. Adjust the electrical stickout and the actual welding current and voltage as needed.

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## SEC. K3 — OPERATING INSTRUCTIONS (CONT'D)

### Sec. K3.1.3

### Welding With Constant Current Power Sources

#### 1. Adjusting Current and Voltage

##### 'Volts' Control — All Power Sources

Set the welding voltage with the LN-8 'Volts' control.

##### 'Amps' Control — DC-600 Power Source

Place mode switch in the CC submerged arc position.

Place machine output control toggle switch in the 'Output Control Remote' position.

Total current control is now at the LN-8.

*Semiautomatic or automatic welding in CC mode. DC-600's with stick option*

1. Codes between 8000 and 8045 — Turn the input power off. Open the control box cover behind the nameplate for easy access to the upper terminals of the terminal strip. Remove the double ("piggy-back") terminal from #32. Separate the red lead and the black lead and tape up the red lead. Reconnect the black lead to #32. Check to be sure there is still 115V AC between terminals #31 and #32 when the DC-600 is turned on.

2. Codes 8046-8212 — Turn the input power off. Open the terminal strip access door. Remove and tape up the DC-600 red lead #32 on the upper screw of the terminal strip.

##### 'Amps' Control — SAM Power Sources

Set the 'Current Control' on the power source for about the current required. Make final adjustments with the LN-8 'Amps' control.

##### 'Amps' Control — SAF-600 and SA-800 Power Sources

Be sure the power source 'Voltage Range' switch is set to 'High'. Connect the cable from the power source contactor box to the sub-arc stud with the lowest current range that still permits welding at the desired current. For example, if you want 500 amps welding current, use the '300-575' stud and not the '450-Max.' stud.

To make the final adjustments:

1. If the K200 Portable Field Control (see Sec. K2.5.13) is installed, use the field control rheostat mounted to the side of the LN-8.
2. If the K224 Solid-State Field Control (see Sec. K2.5.15) is installed, use the LN-8 'Amps' control.
3. If neither field control is installed, use the 'Voltage' control on the power source.

2. Making Test Welds [5/64" (2.0 mm) electrode with 3/4" (19 mm) stickout]

- a. Be sure the power source and wire feeder are properly set for constant current welding (see Sec. K2.3.2).
- b. Set the polarity switch on the power source for positive polarity.
- c. Set the 'Voltmeter Polarity' switch so the voltmeter reads up scale.
- d. Set the 'Direction of Wire Feed' switch so the wire feeds out of the gun.
- e. Set the power source for about 500 amps. If using a SAM power source set the LN-8 'Amps' control to 5.
- f. Set the LN-8 'Volts' control to 5.
- g. Set up and ground a piece of at least 1/2" (13 mm) steel scrap. Cut the wire at the gun to a sharp point using a pair of side cutters or diagonal cutters. Improperly clipped electrode may produce poor starts and arcing of the contact tip. Do not let the clipped end of the wire fall back into the gun.
- h. Hold the gun over the work, allow a mound of flux to form, press the trigger and start the arc by scratching through the flux. See "How To Make Submerged Arc Welds" for additional submerged arc techniques.
- i. Adjust welding current and voltage when welding as needed.

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### Sec. K3.1.4

### Linc-Fill Long™ Stickout Welding

The built-in controlled acceleration of the LN-8 wire feed motor gives good starting with normal stickout and Linc-Fill (long electrical stickout) procedures. No rewiring is needed. Simply install the proper stickout extension on the gun, set the procedures and weld. The electrode should be lightly touching the work when the trigger is pressed.

When submerged arc welding using 3-1/4" (80 mm) stickout and a constant current power source at currents over 500 amps, there may be a tendency for the electrode to blast off in the extension guide at the start. This problem can be corrected by reducing the current to 500 amps for the start. When the arc starts, quickly increase the control setting as desired for welding. Do *not* change any other control. (Installation of the K200 or K224 field control is required when using motor-generator power sources to have output control at the wire feeder.)

If the electrode continues to "blast off," a slower acceleration can be obtained by modifying the LN-8 (Codes 7926 and up) as follows:



1. Turn off the control power to the LN-8 at the power source.
2. Remove five screws holding the control section cover in place and swing upward.
3. Move the jumper plug on the control P.C. board from pin "F" to "S".
4. Reassemble.

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# NOTES

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## LOADING THE MACHINE

<b>⚠ WARNING</b>	
	<ul style="list-style-type: none"> <li>• Do not operate with covers removed.</li> <li>• Turn off power source before installing or servicing.</li> <li>• Do not touch electrically hot parts.</li> </ul>
<b>HIGH VOLTAGE can kill.</b>	<ul style="list-style-type: none"> <li>• Turn the input power to the welding power source off at the fuse box before working in the terminal strip.</li> </ul>
	<ul style="list-style-type: none"> <li>• Keep away from moving parts.</li> </ul>
<b>MOVING PARTS can injure.</b>	
<ul style="list-style-type: none"> <li>• Only qualified personnel should install, use or service this equipment.</li> </ul>	

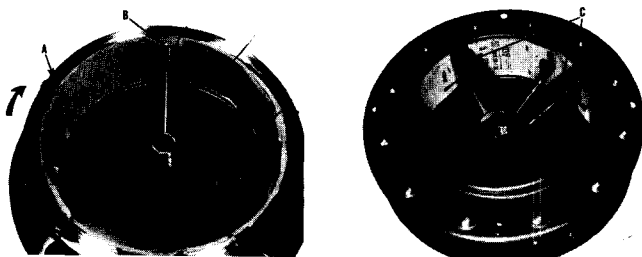
Sec. K3.1.8-A

### Wire Reel Loading — 60 and 50 Pound (27.2 and 22.7 Kg) Reels

#### 1. Loading the Reel

Be sure the drive roll pressure is properly set for the wire size being used. See Sec. K2.2.3.

- 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.
- Lay the reel flat on the floor and remove the cover plate.
- Place a coil of wire on the reel so it unwinds as the reel rotates clockwise.
  - Be sure the coil is placed so the spring loaded arms will not interfere with the later removal of the coil tie wires.



- When loading .035, .045 and .052" (0.9, 1.1 and 1.3 mm) 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.

- Put the cover plate on the reel so the four arms of the cover straddle the spring loaded arms of the reel proper.
- Tighten the cover as much as possible by hand. Do NOT hammer on the spinner nut arms.
- 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.

- Replace the reel on the wire feeder.

#### 2. To thread Wire into LN-8N or LN-8S 50-60# (22.7-27.2 Kg) 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 the free end through the incoming guide tube. Press the gun trigger and push the electrode into the drive roll. Inch the electrode through the gun. (If the electrode is not properly straightened, it may not feed or may not go into the outgoing guide tube causing a "birdnest".)

**WARNING: The electrode and drive mechanism are always "hot" to work and ground while inching with the gun trigger.**

#### 3. To thread Wire into LN-8NE and LN-8SE (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 into 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° 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.

Sec.K3.1.8-A (Continued)

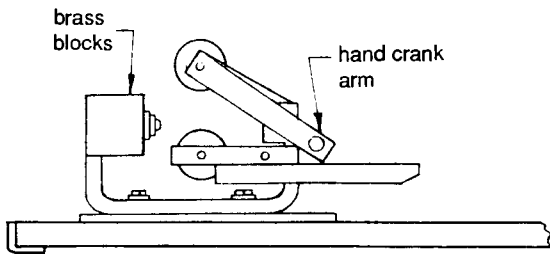
Crank until the wire touches the drive roll and then pull the gun trigger and this will start the drive rolls and feed the wire the rest of the way through the cable and gun assembly.

**WARNING:** The electrode and drive mechanism are always "hot" to work and 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.

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**K3.1.8-B  
Wire Reel Loading — Readi-Reels and to 30 Pound (13.5 Kg) Spools (K377 and K162)**

To mount a 30lb. (13.5 Kg) Readi-Reel package using the formed sheet metal K363 type adapters, remove the locking collar and remove the outside Readi-Reel adapter arm.. Engage the inside Readi-Reel adapter arm in the brake driving pin and rotate the spindle until the inside adapter arm is in the vertical position. Set the Readi-Reel on the adapter arm. The Readi-Reel must be installed so that it will rotate in a *clockwise* direction when feeding (wire is dereeled from the bottom of the coil). The outside adapter arm is then to be placed on the spindle at an angle of 90° from the inside adapter and the locking collar installed. Tighten the locking collar securely.

To mount a 30lb. (13.5 Kg) Readi-Reel package using the molded plastic K363P type adapter, rotate the spindle and adapter so the retaining spring is at the 12 o'clock position.

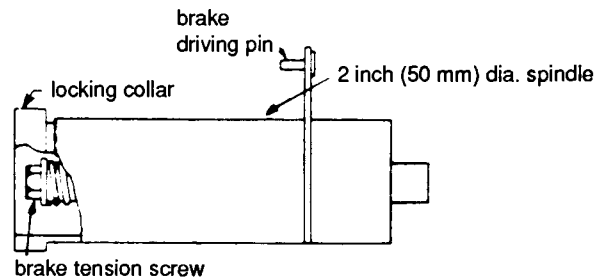
Position the Readi-Reel so that wire will be dereeled in the proper direction for the wire feeder to be used. Set one of the Readi-Reel inside cage wires on the slot in the retaining spring tab. Lower the Readi-Reel to depress the retaining spring and align the other inside cage wires with the grooves in the molded adapter. Slide cage all the way onto the adapter until the retaining spring "pops up" fully.

**WARNING:** Check to be sure the retaining spring has securely locked the Readi-Reel in place.

To remove Readi-Reel from adapter:

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

To mount 15 to 30lb. (6.8 to 13.5 Kg) spools, remove the locking collar from the 2 inch (50 mm) dia. spindle. Place the spool on the spindle making certain the brake driving pin enters one of the holes in the backside of the spool. Be certain the wire comes off the reel in a *clockwise* direction. Replace and tighten the locking collar.



To feed the electrode, turn the Readi-Reel or spool until the free end of the electrode is accessible. While tightly holding the electrode, cut off the bent end. Straighten the first six inches (150 mm) and cut off the first inch (25 mm). Insert the free end through the incoming guide tube. Press the gun trigger and push the electrode into the drive roll. Inch the electrode through the gun. (If the electrode is not properly straightened, it may not feed or may not go into the outgoing guide tube causing a "birdnest".) Adjust the brake tension with the hex head screw or thumb screw on the spindle hub, until the reel turns freely but with little or no overrun when wire feeding is stopped.

**WARNING:** When inching, the electrode and wire feeding system are always "hot" to work and ground.

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**Sec. K3.1.8-C  
Wire Reel Changing**

Generally with most LN-8 installations the end of the coil can be removed from the gun cable by either laying the gun and cable out straight and pulling the electrode end out through the nozzle or by reversing the wire feed direction and pressing the gun trigger.

**WARNING:** The electrode is electrically "hot" to work and ground when inching. Be sure the free end of the electrode is kept from touching the work or any part of the ground system as it is fed back out of the wire feeder.



With the LN-8NE or LN-8SE 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-8 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. (Older K112 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. K3.1.8-A or K3.1.8-B.

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## 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 (45 Kg) 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" (1.6–1.9 mm) openings and be put through a magnetic separator. The K310 vibrated screen and K58 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 K58 is a permanent magnet type separator designed to fit the top of the standard fill funnel of the continuous flux feed system of the top of the K219 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 flux — 760, 761, 780, 781, 860, and 880. Do not use the magnetic separator with any stainless steel, alloy, or hardsurfacing flux except H535. The magnetic separator removes some of the alloying elements from these fluxes thus changing their characteristics.



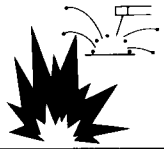

#### 3. K310 Screen (Optional)

The unit was designed to fit the top of either the standard fill funnel of a continuous flux feed system or a K58 magnetic separator. The unit has a steel screen with .065 to .075 (1.6 to 1.9 mm) 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 (137 thru 689 kPa).

For ease of handling, the user should connect the incoming air line to the 1/8" (3.2 mm) 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 K310 screen or its equivalent.

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<b>! WARNING</b>	
	<ul style="list-style-type: none"> <li>• Do not touch electrically live parts or electrode with skin or wet clothing.</li> <li>• Always wear dry insulating gloves.</li> <li>• Insulate yourself from work and ground.</li> </ul>
<b>ELECTRIC SHOCK can kill.</b>	
	<ul style="list-style-type: none"> <li>• Keep your head out of fumes.</li> <li>• Use ventilation or exhaust to remove fumes from breathing zone.</li> </ul>
<b>FUMES AND GASES can be dangerous.</b>	
	<ul style="list-style-type: none"> <li>• Keep flammable material away.</li> <li>• Do not weld upon containers which have held combustibles.</li> </ul>
<b>WELDING SPARKS can cause fire or explosion.</b>	
	<ul style="list-style-type: none"> <li>• Wear eye, ear and body protection.</li> </ul>
<b>ARC RAYS can burn.</b>	

Sec. K3.2.3

(File as Sec. N4.4.15 in IM-294)

### MAKING SUBMERGED ARC WELDS Gun Operating Positions: K114 Squirtgun

The K114 Squirtgun is used either with or without the mechanized hand travel unit (K110). With the LN-6, LN-8 and LN-9 a K161 "Mechanized Travel Power Pack" must be installed when using the K110. 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.

90No

#### Flux Depth

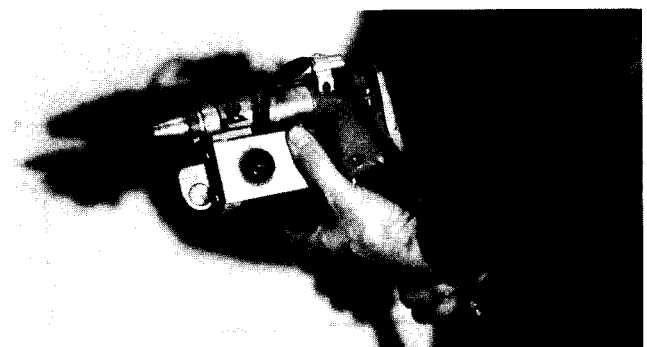
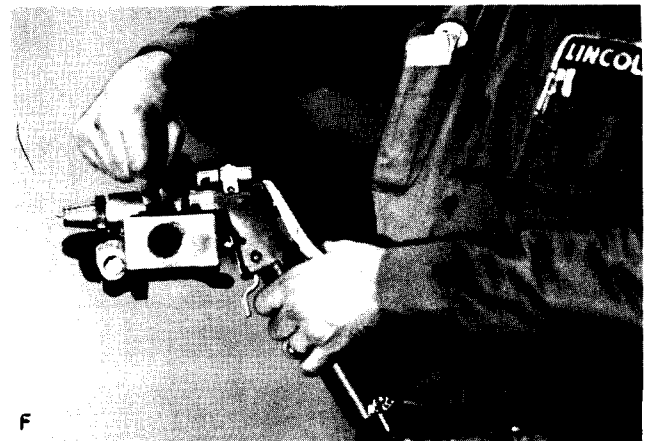
The depth of the flux pile is controlled by the gun height. Gun height is measured from the lower tip of the nozzle flux cone to the plate. Proper gun height is the height at which a minimum of flux is used without excessive arcing. As a general rule the required gun height increases as the travel speed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

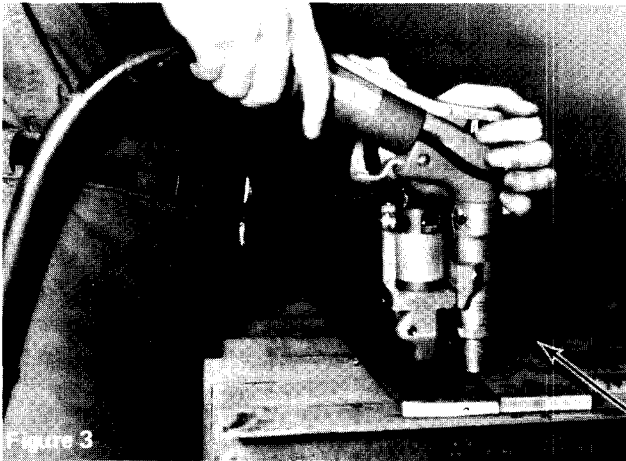
On some fillet welds a drag technique without the travel unit is used. In this instance the amount of flux is controlled by the internal diameter of the nozzle flux cone. For sufficient flux on some applications, use the nozzle flux cones with larger I.D.

#### Travel Speed

Set the speed of travel with the rheostat on the mechanized travel unit. Speed range is 7 to 60 inches per minute (0.2 to 1.5 m/min), but will vary with AC input variations. Operate the toggle switch on the unit to change direction of travel.

The K161 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. **NOTICE:** Be sure this switch is set on "off" when plugging in the travel motor or conductor cables.





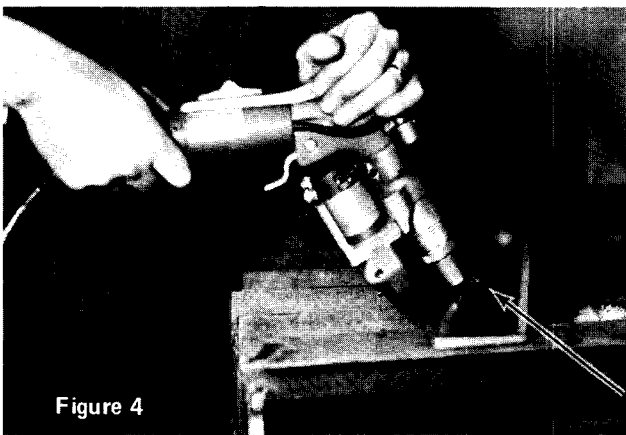
**Figure 3**

**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 4 and Figure 5**

**Horizontal Fillet Weld — Arrow shows 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 accomplished 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.

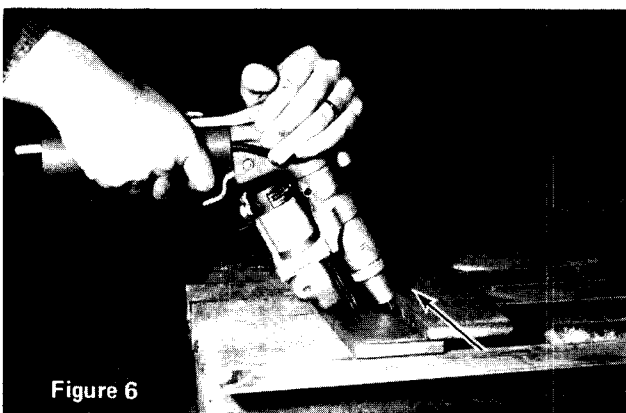
Guide the gun with two hands. Place one hand on the gun to steady it. Press down lightly with this hand to increase the weight on the drive roll. Place the other hand on the cables just back of the gun handle. When making the weld, lean the gun slightly forward into the direction of travel. Let the weight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



**Figure 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.

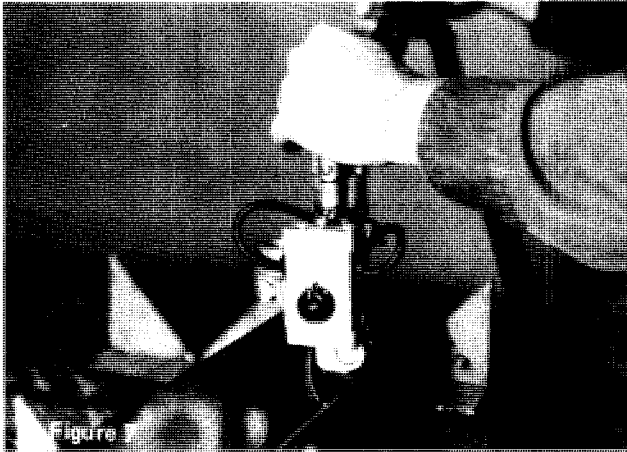


Sec. K3.2.3 (Continued)

## 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.



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Sec K3.2.4

### Fillet Guide (Optional): K70

The Fillet Guide is designed to help guide Squirtgun K114 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 K114

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 (180 to 280 mm) 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. See following drawing M9715A-B.

#### 2. Operation

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

- Position the travel unit so the nozzle flux cone is at the right height to deposit enough flux to cover the arc.
- 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" (0.8 mm). The gun handle must be 90° to the vertical plate when looking down from above. Be certain the electrode has not been bent when making these adjustments.
- 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.
- Slide 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.

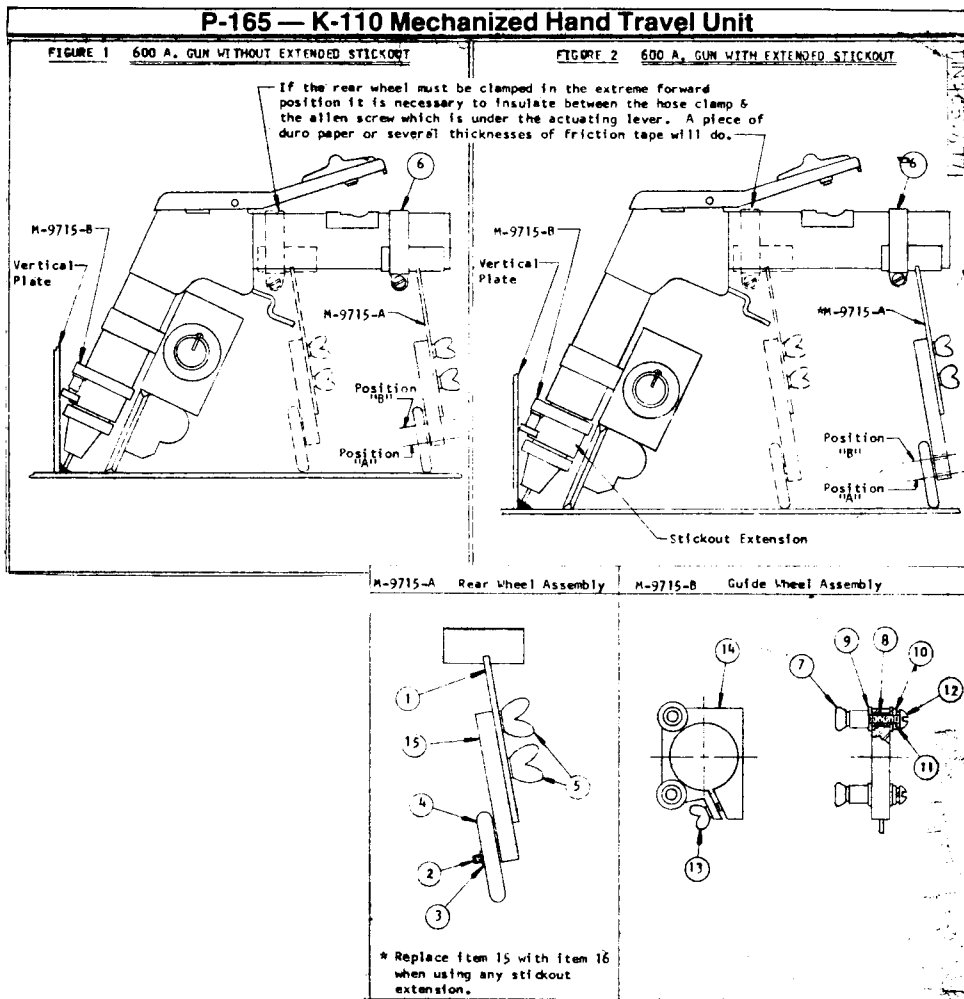
If the fillet angle varies from one weld to another, readjustment of the roller guide may be necessary. For example, assume the Fillet Guide was adjusted for an angle of 90°. If the fillet angle of the next weld is 95°, the cone may drag on the vertical plate. Readjust the roller guide.

- 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.



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## P-165 — K-110 Mechanized Hand Travel Unit



### Parts List P-165

Item	Part No.	Description	Req.
1	T11690	Wheel Holder Asbly.	1
2	T9447-22	Socket Hd. Screw	1
3	T8892	Guide Roller	1
4	T11692	Rubber Tire	1
5	T9078-1	Wing Screw	2
6	S10888-16	Clamp	1
7	T11695	Guide Roll Asbly.	2
8	T6675-2	Insulating Tube	2
9	S10773-35	Insulating Washer	4
10	S9262-27	Plain Washer	2
11	E106-A-1	Lockwasher	2
12	#10-24 x 7/8	Round Head Screw	2
13	T9078-3	Wing Screw	1
14	S-11867	Guide Roll Holder	1
15	T11688	Short Guide Roll Arm	1
16	T11688-1	Long Guide Roll Arm	1

## SEC. K6.1 — WIRE DRIVE AND CONTROLS MAINTENANCE

 <b>WARNING</b>	
	<ul style="list-style-type: none"><li>• Have an electrician install and service this equipment.</li></ul>
	<ul style="list-style-type: none"><li>• Turn the input power off at the fuse box before working on equipment.</li></ul>
<b>HIGH VOLTAGE can kill.</b>	<ul style="list-style-type: none"><li>• Do not touch electrically hot parts.</li></ul>

**WARNING:** Turn off power source before installing or changing drive roll and/or guide tubes.

### 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" (1.7 thru 3.0 mm) 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 1/6" (1.6 mm) and smaller wire have no teeth. They are not reversible.

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### 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" (6.4 mm) or less. When ordering feed motor brushes, give all information from the motor nameplate.

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### Sec. K6.1.3

#### Wire Reel Assembly For 50 & 60 Pound (22.7 & 27.2 Kg) 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.

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### 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 tripping. 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 constant current 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 round white 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.

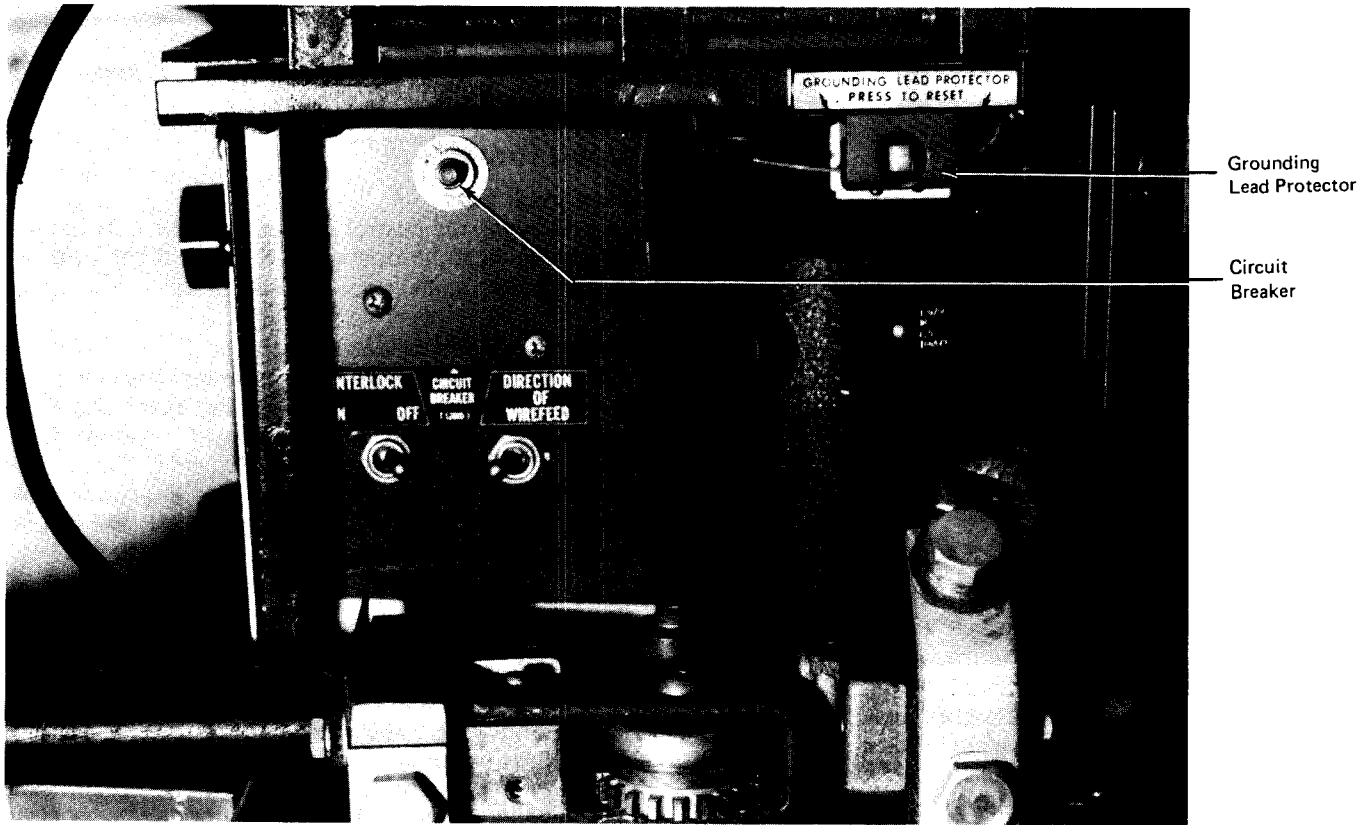
**Avoiding Shutdowns Caused by the Grounding Lead Protector Being Activated**

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.

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

**NOTE: Always replace the gun contact tip when it becomes badly grooved.**

**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 Cables (All)

A dirty gun cable can cause rough and erratic wire feeding. Therefore, the cable liner must be cleaned periodically. Clean Innershield gun cables after using approximately 300 pounds (136 Kg) of electrode; clean submerged arc gun cables after using approximately 600 pounds (272 Kg) of electrode.

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. Work the full length of the cable by bending it back and forth and then blow it out again. Repeat this procedure until no more dirt comes out.

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### Sec. K6.2.2

#### Gun Disassembly

##### “Innershield” Squirtguns K115 and K126 and Submerged Arc Squirtguns K113 and K112

To remove the nozzle from the gun, loosen (do not remove) the 1/4-20 socket head screw in the gun handle with a 3/16” (4.8 mm) Allen wrench 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 K115 and K126, first loosen the four screws which hold the heat shield in place. Remove the heat shield.

To disassemble the switch housing from all guns, remove the four screws holding the saddle around the gun handle.

Then hold the housing 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 mid-point of the trigger travel.

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

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### Sec. K6.2.3

#### Gun Disassembly

##### “Innershield” Squirtgun K116

Remove 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 Squirtguns

Remove the cable from the wire feeder. To disassemble the gun from the conductor cable proceed as follows (refer to Sec. K7.2, page E):

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 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 the gun tube clamping screw (item 3), and remove the gun tube. A slight back and forth twisting action will help.

Sec. K6.2.4 (Continued)

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 18), 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. 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 this 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. K6.2.5  
**Gun Nozzles (All)**

1. Replace worn contact tips as required.
2. On Innershield guns, remove spatter from tip or extension guide after each ten minutes of arc time or as required.
3. Replace worn spring liners in nozzles. The life of the liner can be doubled by rotating liner 180°. The liner can be pulled out of the back end of the nozzle by wedging the blade of a small screwdriver in the I.D. and pulling.
4. Inner parts of nozzles can be removed and replaced by removing the internal hollow-lock set screw from the contact tip end of the nozzle with a 5/32 or 3/16" (4.0 or 4.8 mm) Allen wrench.

The insert and retainer will normally fall out of the end of the nozzle but if they do not, gently drive the spring liner towards the outgoing end of the nozzle.

See appropriate parts list page for construction details and replaceable parts. For guns using similar nozzles for different wire sizes, note the identifying wire size that is stenciled-or-molded-in an area close to the incoming end.

When re-assembling nozzle, make certain the ceramic nozzle insert (if used) is placed next to the spring liner. The hollow-lock set screw is to be tightened to give the dimension specified below as measured from the end of the nozzle to the hollow-lock set screw.

Gun	"A"
K112 (500)	.38
K113	.38
K114	.38
K115	.75
K116	.75
<hr/>	
K126	.38
K206	.38
K289-5/64" (2.0 mm)	.44
K289-3/32 & .120" (2.4 & 3.0 mm)	.75
K309	.38

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Sec. K6.2.6  
**Hand Travel Unit (K110)**




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 through the output shaft opening. Do not put grease through the motor mounting side. Use about 0.6 of a cubic inch (9.8 cc) of grease. This is a pad 1/2 inch (25 mm) in diameter by 3 inches (75 mm) 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.

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## SEC. K6.4 — TROUBLESHOOTING

 <b>WARNING</b>	
	<ul style="list-style-type: none"> <li>• Do not operate with covers removed.</li> <li>• Turn off power source before installing or servicing.</li> <li>• Do not touch electrically hot parts.</li> <li>• Turn the input power to the welding power source off at the fuse box before working in the terminal strip.</li> </ul>
<b>ELECTRIC SHOCK can kill.</b>	
	<ul style="list-style-type: none"> <li>• Keep away from moving parts.</li> </ul>
<b>MOVING PARTS can injure.</b>	
<ul style="list-style-type: none"> <li>• Only qualified personnel should install, use or service this equipment.</li> </ul>	

### Sec. K6.4.1

#### LN-8 Troubleshooting Guide

TROUBLE	CAUSE	WHAT TO DO
1. Drive rolls turn but wire will not feed or wire feeding is rough or uneven.	<ul style="list-style-type: none"> <li>a. Gun cable kinked and/or twisted</li> <li>b. Wire jammed in gun and cable.</li> <li>c. Incorrect drive rolls and guide tubes.</li> <li>d. Gun cable dirty.</li> <li>e. Worn drive rolls.</li> <li>f. Electrode rusty and/or dirty.</li> <li>g. Worn nozzle liner.</li> <li>h. Partially flashed or melted contact tip.</li> </ul>	<ul style="list-style-type: none"> <li>a. Keep as straight as possible. Inspect cable and replace if necessary.</li> <li>b. Remove wire from gun and cable — feed in new wire. Note any obstruction. Replace gun and cable if necessary.</li> <li>c. Be sure the wire diameter being used is stamped on drive rolls and guide tubes. Replace if necessary.</li> <li>d. Clean per Sec. K6.2.1.</li> <li>e. Replace or reverse split drive roll type.</li> <li>f. Replace the electrode if it is rusty. If conditions are extremely dirty or electrode is old (solid wire only) put a wiper on the wire before it enters the guide tube. Use a piece of cloth or felt saturated with "Pyroil B" held around the wire with a light clamp.</li> <li>g. Replace nozzle liner.</li> <li>h. Replace the contact tip.</li> </ul>
2. Variable or "hunting" arc.	<ul style="list-style-type: none"> <li>a. Contact tip worn or incorrect size.</li> <li>b. Worn or undersize work cables or poor work connections.</li> <li>c. Loose electrode connections.</li> </ul>	<ul style="list-style-type: none"> <li>a. Replace contact tip.</li> <li>b. Inspect — repair or replace as necessary.</li> <li>c. Be sure the following connections are tight: electrode cable to wire feeder and power source, work cable to power source and work, gun cable to wire feeder contact block, gun nozzle to body, and contact tip to nozzle.</li> </ul>
3. Poor arc striking with sticking or "blast-offs", weld porosity, narrow and ropey looking bead or electrode stubbing into plate while welding.	<ul style="list-style-type: none"> <li>a. Improper procedures or techniques.</li> </ul>	<ul style="list-style-type: none"> <li>a. See Sec. K3.2, "How to Make Submerged Arc Welds" (S604) or "Innershield Production Welding Guide" (N675).</li> </ul>

## Sec. K6.4.1 (Continued)

TROUBLE	CAUSE	WHAT TO DO
4. LN-8 circuit breaker trips or motor thermostat opens while welding. (Also see Sec. K6.1.5).	a. Motor overload. b. Field fuse blown. c. Electrical problems.	a. See Problem 1 and correct trouble. b. Replace fuse. c. Contact Lincoln Field Service Shop.
5. No welding current. Cannot establish arc. (Wire feed motor runs and feeds wire.)	To find cause, pull gun trigger and determine whether contactor is operating. a. If the contactor is not operating. b. If the contactor is operating, check the voltage across the output terminals of the welder.	a. Look under "Grounding Lead Protector" in Sec. K6.1.5. b. If voltage is present, check welding cable for an open circuit. If voltage is not present, check the troubleshooting guide of power source in question.

September 1980

## Sec. K6.4.4

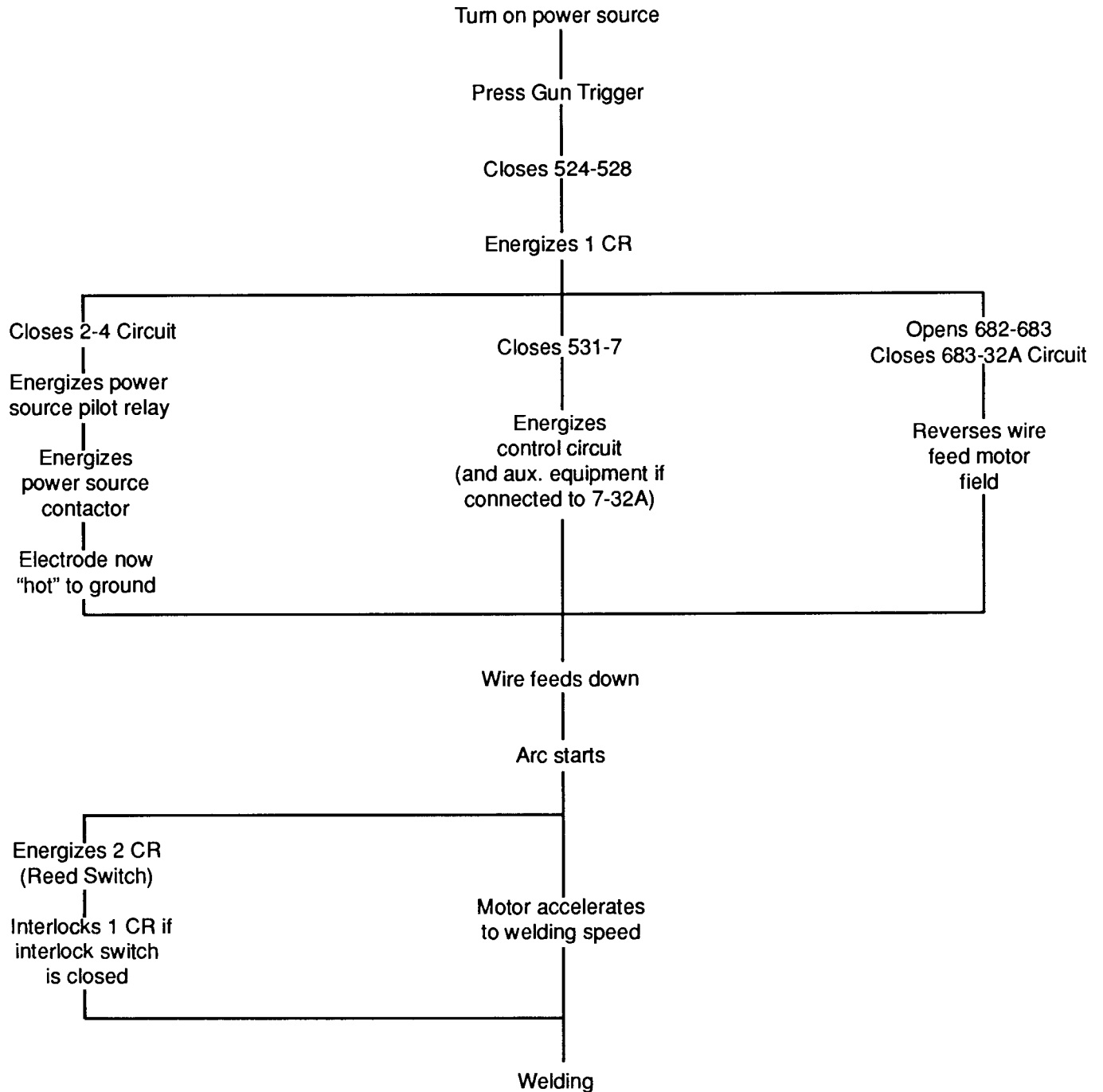
## Flux Feeding (Submerged Arc)

TROUBLE	CAUSE	WHAT TO DO
1. Flux flow stops while welding. If there is flux in the hose right behind the gun (test by squeezing), the stoppage is in the gun.	Flux tube in the gun may be blocked.  Magnetic particles may cause bridging at the nozzle tip. Bridging only occurs when welding.	Remove the gun from the cable. Check the tube in the gun and the cable handle.  Pass flux over a magnetic separator when filling the flux tank.
2. Flux stoppage not in the gun. (Be certain there are no kinks or collapsing of the hose.)	There may be a piece of slag in the hose.  Flux tank outlet may be clogged.  Pressure in the tank may be set improperly.	Work back along the hose squeezing it until flux can be felt. Shake the hose and feel for slag at this point. Blow out hose with air if necessary.  If there is no flux in the hose, check the tank outlet for large pieces of slag or paper.  Set pressure regulator for 30lbs./sq. in. (206KPa). Set pressure for 45lbs./sq. in. (310KPa) with 1/2" (12 mm) I.D. hose and 55lbs./sq. in. (379KPa) with 3/8" (37 mm) I.D. hose when using a gun cable extension assembly (LN-8NE, LN-8SE). Check screen (29) in fitting (28) at top of flux tank. (See Sec. K7.3, Page T.) If screen is clogged tank may not have proper pressure even when gauge reads O.K. (Tanks manufactured prior to 1/80 have screen at bottom of tank.)
3. Excessive air blow and uneven flux flow from the gun.	Tank may be almost empty. (May look like the tank is full at the sides but it will be down to the bottom in the center.)  Flux may be falling away from the weld faster than it is being fed.  Pressure in the tank may be too high.	Refill the tank.  Alter procedure or make a flux dam.  Set pressure regulator as specified in 2.
4. Flux in tank gets wet.	There may be too much water in the air line.  The copper bleeder may be clogged.	If too much water goes into the water disposal system, the overflow goes into the tank. It is possible to get this much water from air lines when first starting in the morning. Blow out air lines before connecting them to the tank.  Be certain that a slight amount of air is escaping from the crimped end of the copper tube below the flux tank.

November 1990

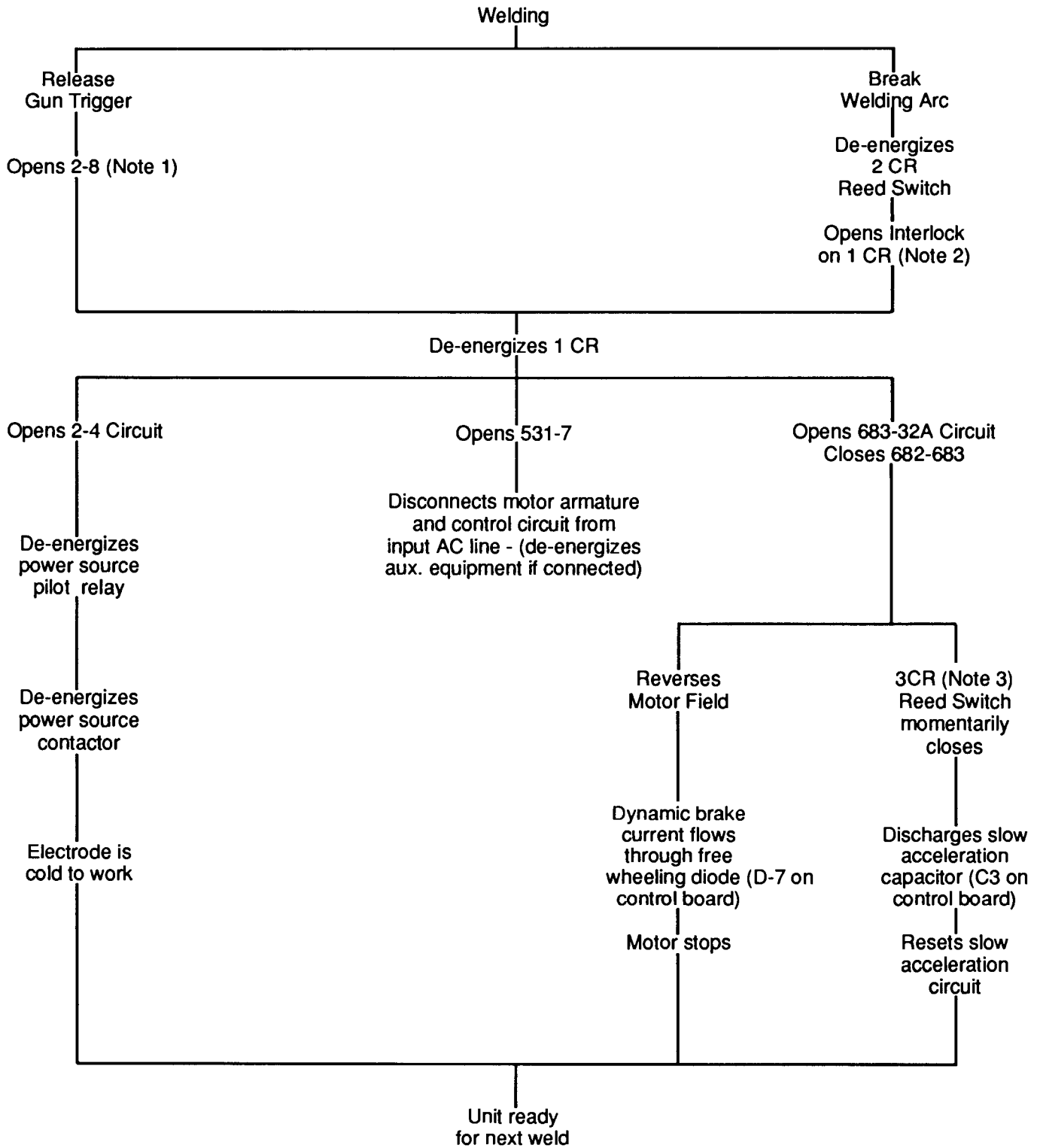
## SEC. K6.7 LN-8 ELECTRICAL SEQUENCE OF OPERATION

### LN-8 SEQUENCE OF OPERATION



Continued on next page

Sec. K6.7 (Continued)

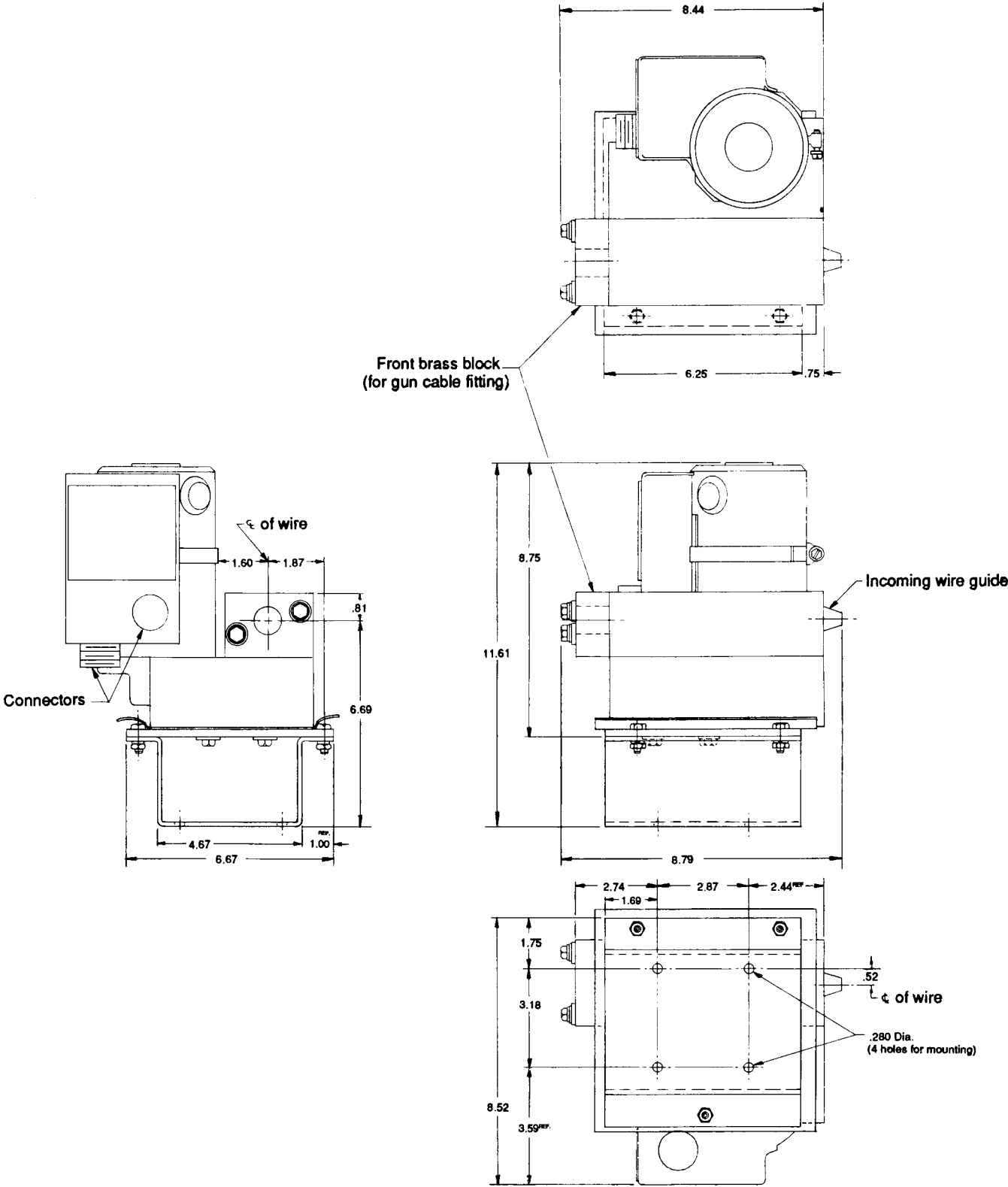


NOTE 1: When Interlock is open.

NOTE 2: When Interlock is closed.

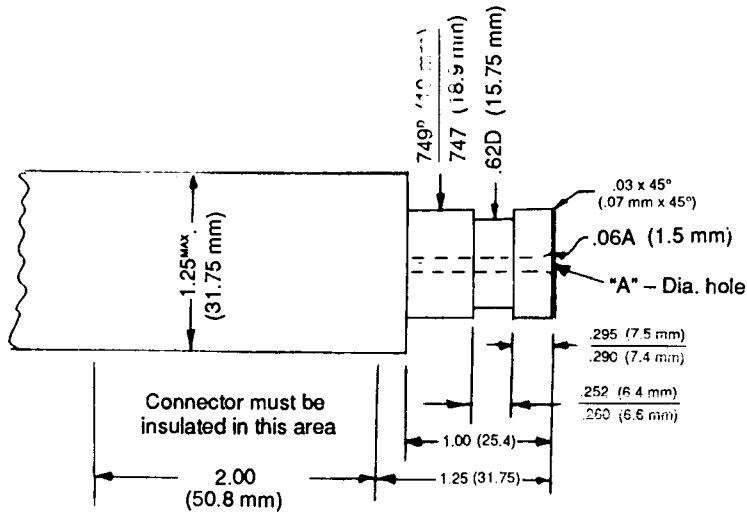
NOTE 3: 3CR is not used on units with Code No.7926 and up.

### LN-8F WIRE DRIVE UNIT DIMENSIONS



## GUN CABLE CONNECTION REQUIREMENTS

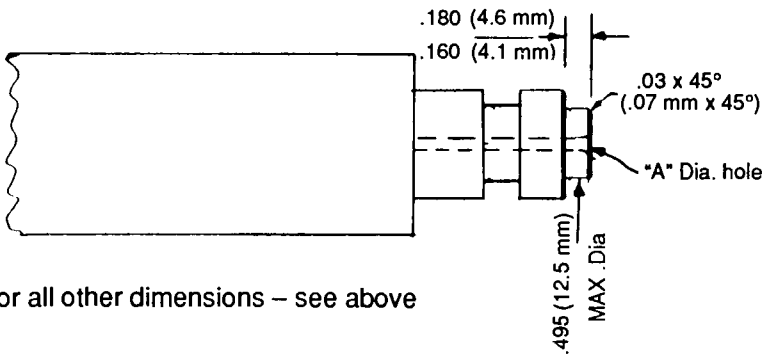
**NOTE:** These are general specifications for gun cable connections with the LN-8. Contact your local Lincoln Welding distributor listed under "welding" in the Yellow Pages for details.



Gun cable connector requirements to permit proper connection to Lincoln wire feeders.  
LN-8 & LN-9

Wire Size	"A" Dia. Hole To be Concentric to .749/.747 Dia. (19/18 mm) within .008 (.20 mm) F.I.M.
7/64 & .120 (2.8 & 3.0 mm)	.152 #24 drill (3.86 mm)
.068 thru 3/32 (1.7 thru 2.4 mm)	.125 (1/8 drill) (3.18 mm)
1/16 (.062) (1.6 mm)	.078 (5/64 drill) (1.98 mm)
.045 & .052 (1.1 & 1.3 mm)	.062 (1/16 drill) (1.6 mm)
.030 & .035 (0.8 & 0.9 mm)	.055 (#54 drill) (1.4 mm)

LN-8 & LN-9 Cable connector for 1/16 through .120 (1.6 through 3.0 mm) wire.

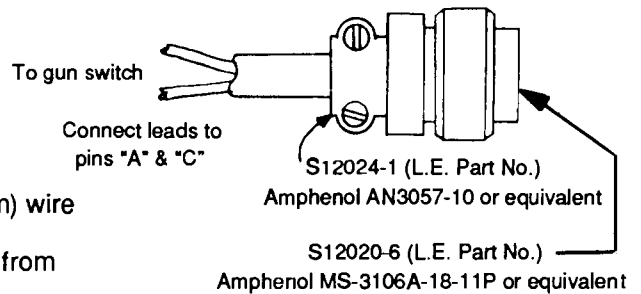


For all other dimensions – see above

LN-8 & LN-9 Cable connector for .030 through .052 (0.8 through 1.3 mm) wire

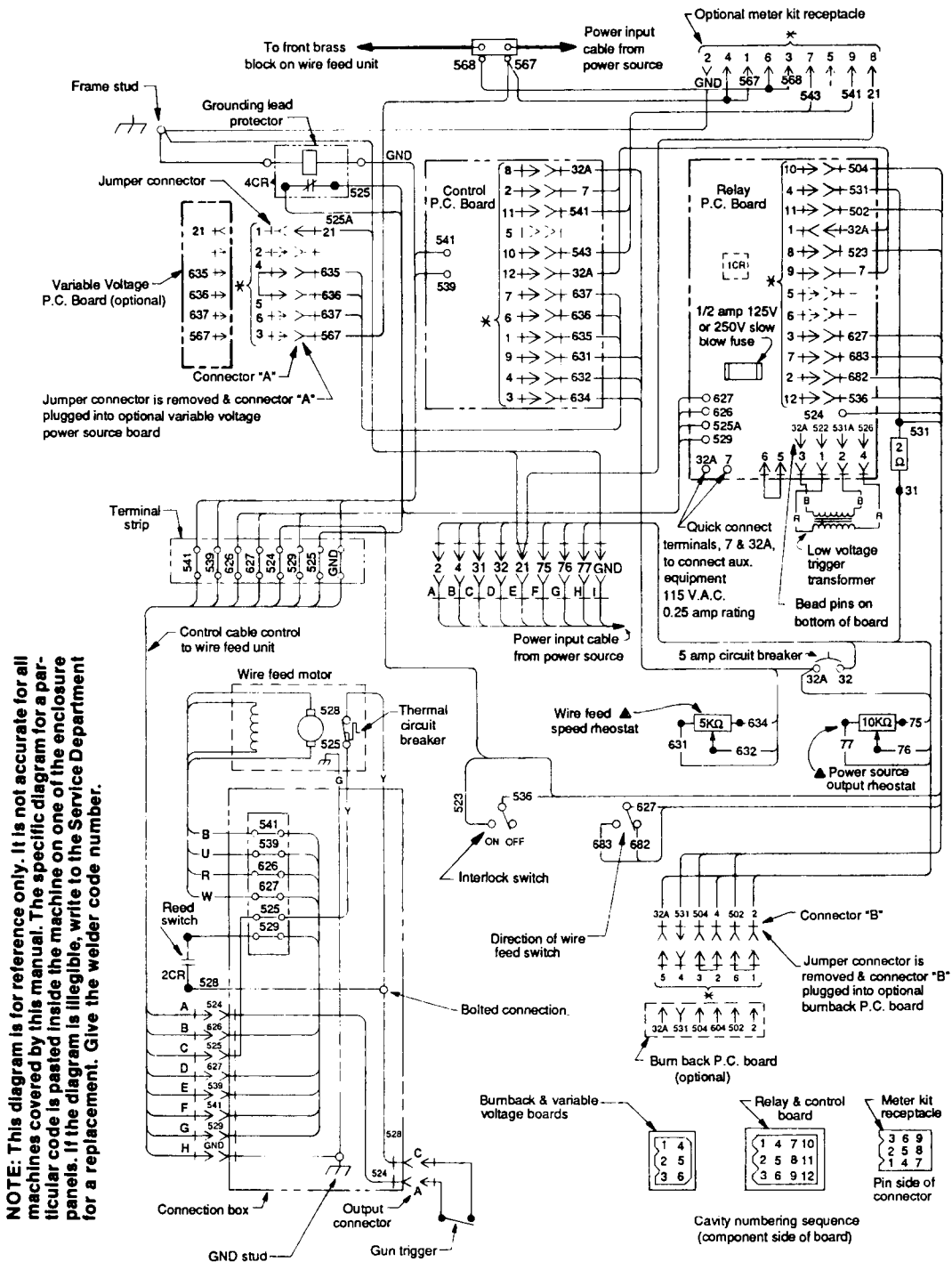
**NOTE:** Connector part with .749/.747 (19/18 mm) Dia. should be made from brass if it is to be part of the welding current carrying circuit.

Switch requirements  
1/2 Amp. A.C. 24 volts – Inductive  
1/2 Amp D.C. 24 volts – Inductive





# LN-8F WIRING DIAGRAM



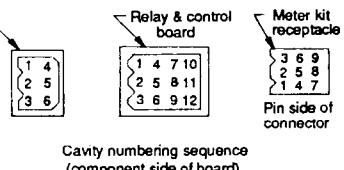
**NOTE:** This diagram is for reference only. It is not accurate for all machines covered by this manual. The specific diagram for a particular code is pasted inside the machine on one of the enclosure panels. If the diagram is illegible, write to the Service Department for a replacement. Give the welder code number.

Electrical symbols per E-1537

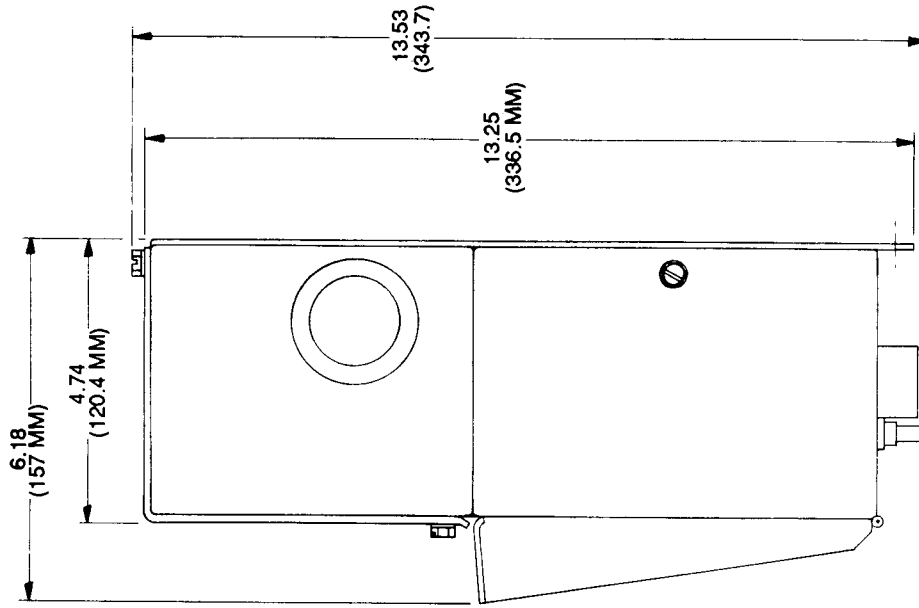
\* Connector Cavity Number  
▲ Connection as viewed from back of rheostat

**Lead Color Coding**

B = Black  
G = Green  
R = Red  
W = White  
U = Blue  
Y = Yellow

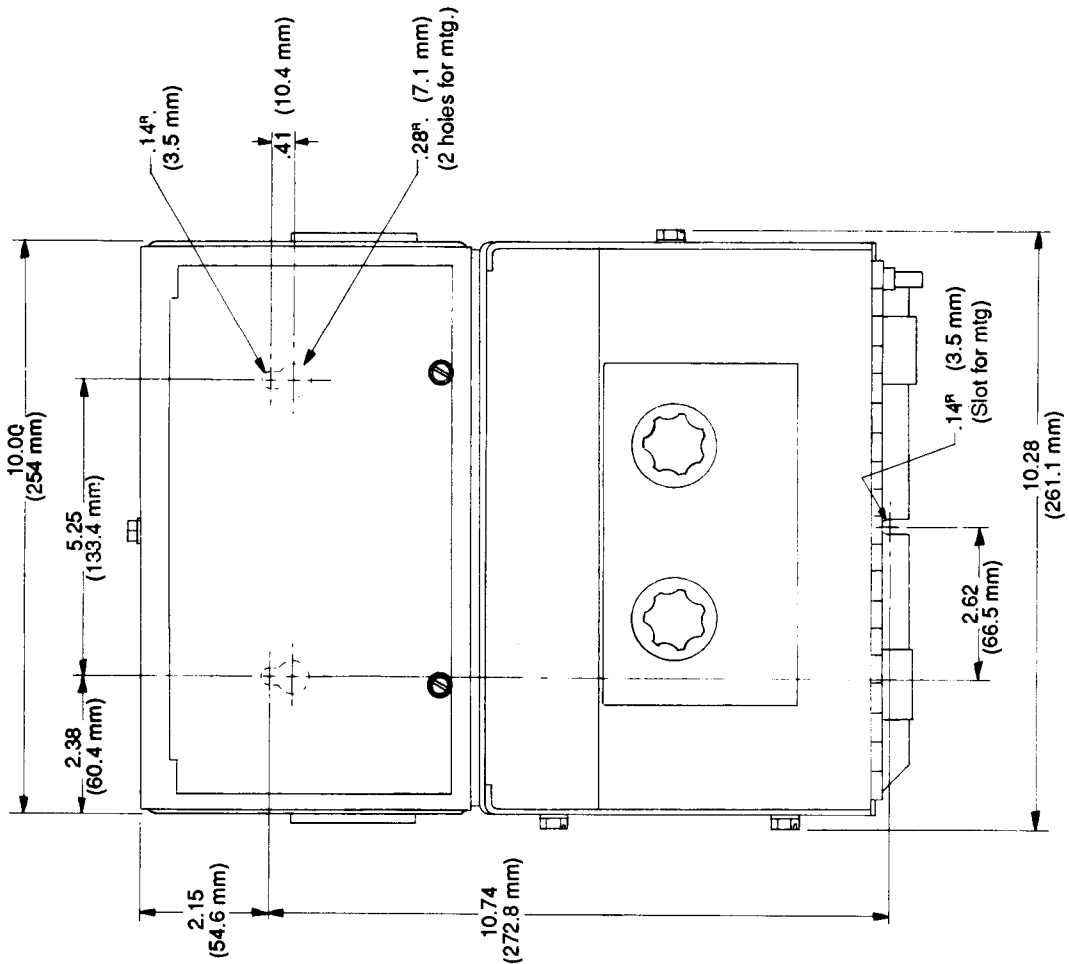


### LN-8F CONTROL BOX DIMENSIONS



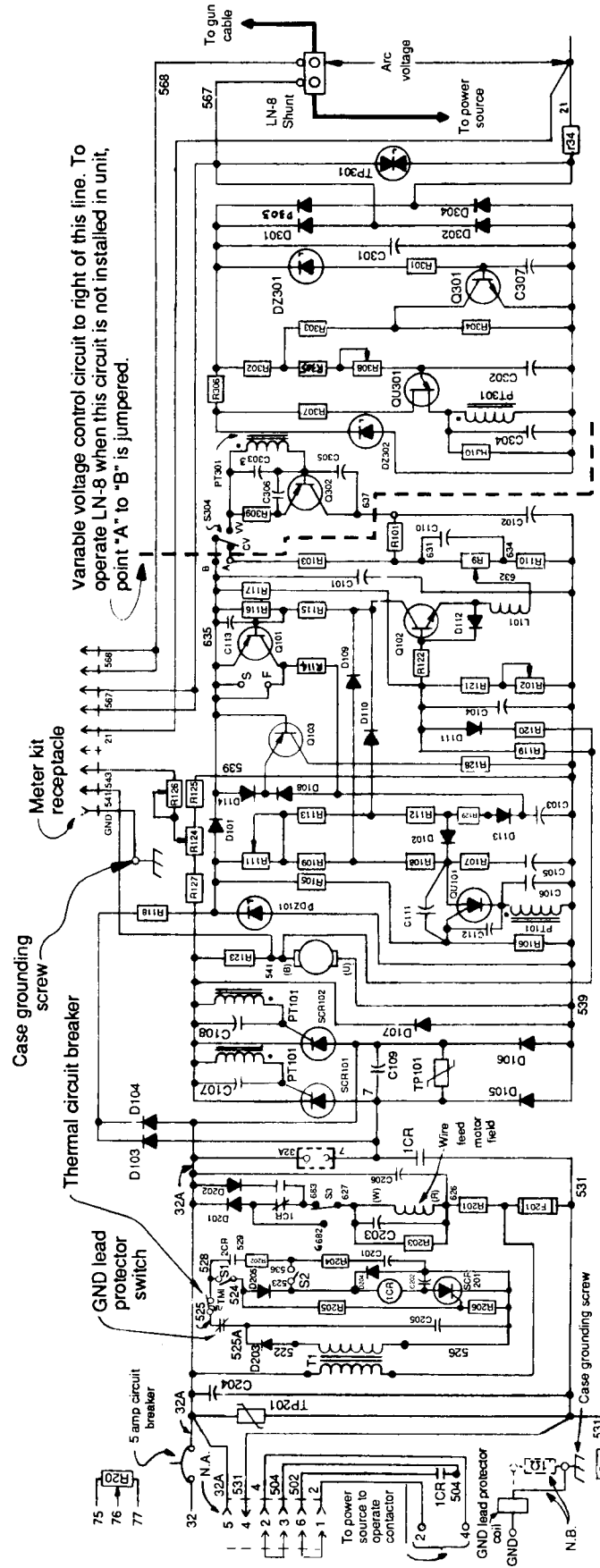
All dimensions in Inches and Millimeters

Date: 11-14-75



Drawing: M-13170

# LN-8F OPERATING SCHEMATIC



Control Circuit (Board #1)		Variable Voltage Circuit (Board #3)		Relay Circuit (Board #2)	
C101	1MFD	C301	10MFD	C201	50MFD
C102	2MFD	C302	1MFD	C202	.02MFD
C103	3MFD ± 10%	C303	0.1MFD	C203	50MFD
C104	4.7MFD	C304	0.47MFD	C204	.005MFD
C105	.10MFD	C305	0.1MFD		
C106, C110, C111	.02MFD	C306, C307	.02MFD		
C112, C113	.047MFD				
C107, C108	.005MFD				
C109					
D101	1A	R301	6.8KΩ	1CR	3PDT 24 V.D.C.
D102	1A	R302	5.8KΩ(2%)	D201	1A
D103	1A	R303	1KΩ(2%)	D202	1A
D104	1A	R304	3.9KΩ(2%)	D203	1A
D105	16A	R305	3.3KΩ	D204	1A
D106	16A	R306	4.7KΩ	D205	1A
D107	16A	R307	10KΩ	R201	400.12W
D108	1A	R308	4.7KΩ	R202	100KΩ
D109	1A	R309	4.7KΩ 2W	R203	100KΩ
D110	1A	R310	5KΩ Trimmer	R204	27KΩ
D111	1A	R311	68Ω	R205	4.7KΩ
D112	27KΩ	SS304	Power Source	R206	1KΩ
D113	1A	2N1393	2N1393	F201	1/2A, 125 V. CR 250 V.
D114	1A	2N4125	2N4125		Slow Blow Fuse
DZ101	20V	UL101	1:1:1 Pulse Transformer	SCR201	4A 400V
R4	20.50W	TP201	Transient Protection		
R9	5KΩ 2W Pot.				
R20	10KΩ 2W Pot.				
T1	110-24V Transformer				
ZCR	Read switch (actuated by welding current)				
4CR	Grounding lead protector				
S1	SPST Gun switch				
S2	SPDT Interlock switch				
S3	SPDT Direction switch				

**Notes:**  
 N.A. Jumper plug is removed and connector "B" is plugged into optional burmback P.C. Board. See S15123 for operating schematic.  
 N.B. Resistor used on codes 9090 and below only. For codes above 9090 the grounding lead protector connects directly to the case grounding screw.

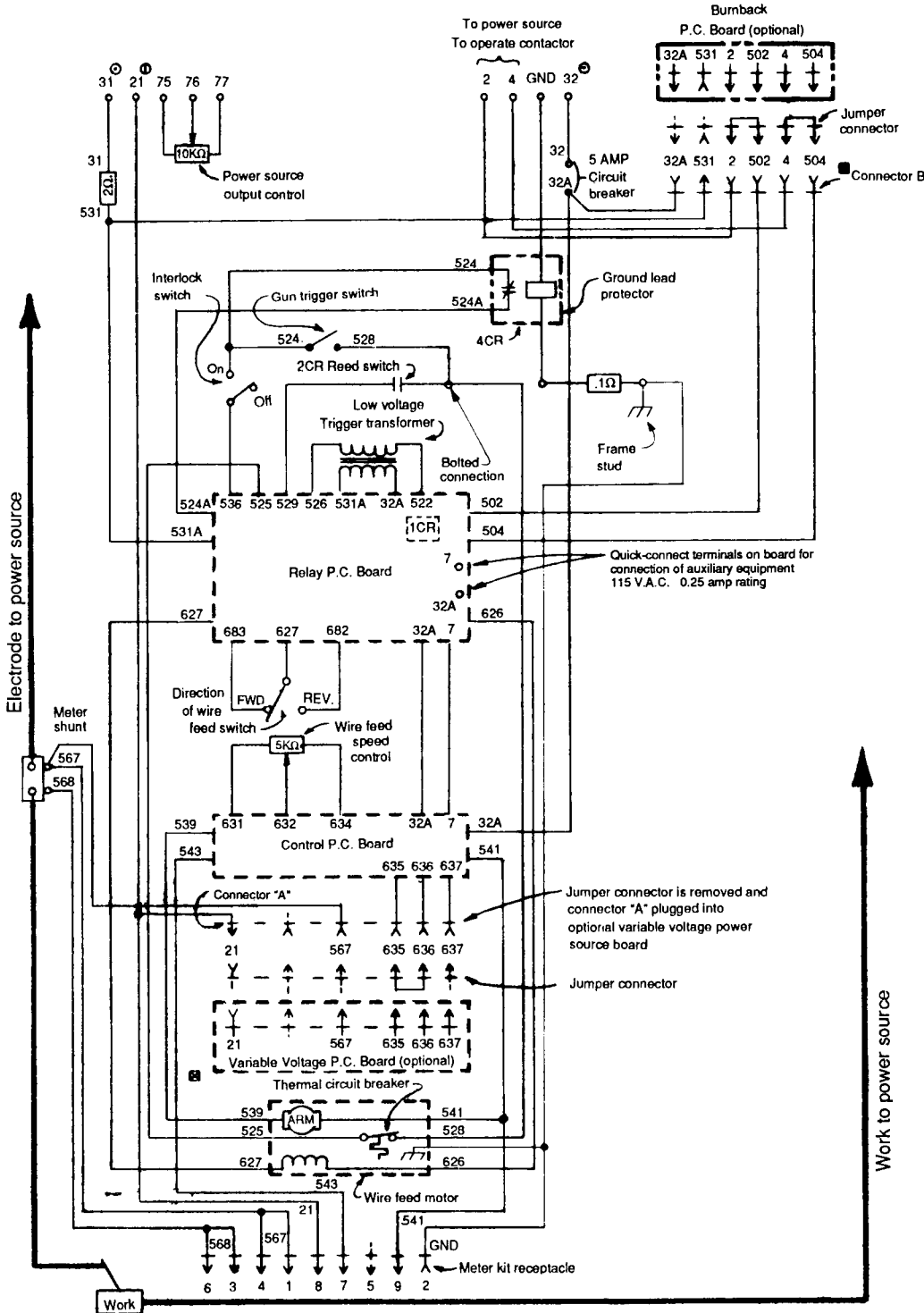
Electrical Symbols Per E-1537.  
 Since components or circuitry on a printed circuit board may change without affecting the interchangeability of a complete board, this diagram may not show the exact components or circuitry of controls having a common code number.

# NOTES

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# LN-8 CONNECTION SCHEMATIC

(All Models)

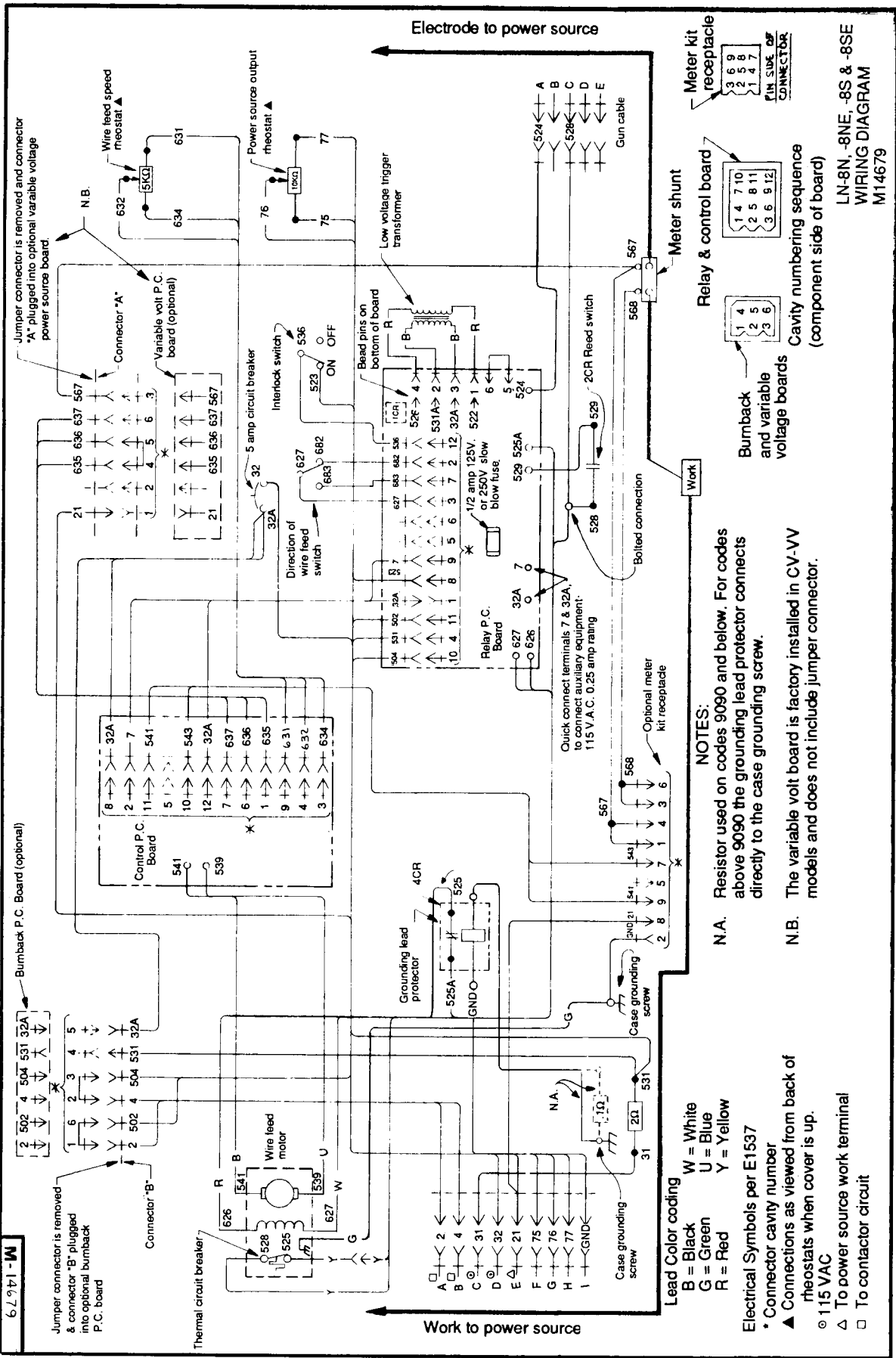


- ⊙ 115 V.A.C. (31 and 32)
- ⊕ To power source work terminal
- Jumper connector is removed and connector "B" is plugged into optional burnback p.c. board
- Actuated by motor temperature

DIAGRAM	CODE
M-12250	Below 7575
M-13073	7575 - 7900

This diagram applies for machines in production at the time this manual was assembled. For earlier codes, request the appropriate diagram as listed in the table.

**NOTE:** This diagram is for reference only. It is not accurate for all machines covered by this manual. The specific diagram for a particular code is pasted inside the machine on one of the enclosure panels. If the diagram is illegible, write to the Service Department for a replacement. Give the welder code number.



Electrode to power source

Work to power source

**Lead Color coding**  
 W = White  
 B = Black  
 G = Green  
 R = Red  
 U = Blue  
 Y = Yellow

**Electrical Symbols per E1537**  
 \* Connector cavity number  
 ▲ Connections as viewed from back of rheostats when cover is up.  
 ⊙ 115 VAC  
 △ To power source work terminal  
 □ To contactor circuit

**NOTES:**

- N.A. Resistor used on codes 9090 and below. For codes above 9090 the grounding lead protector connects directly to the case grounding screw.
- N.B. The variable volt board is factory installed in CV-VV models and does not include jumper connector.

- Burmback and variable voltage boards  
Cavity numbering sequence (component side of board)  

1	4
2	5
3	6
- Relay & control board  

1	4	7	10
2	5	8	11
3	6	9	12
- Meter kit receptacle  

3	5	8
1	4	7

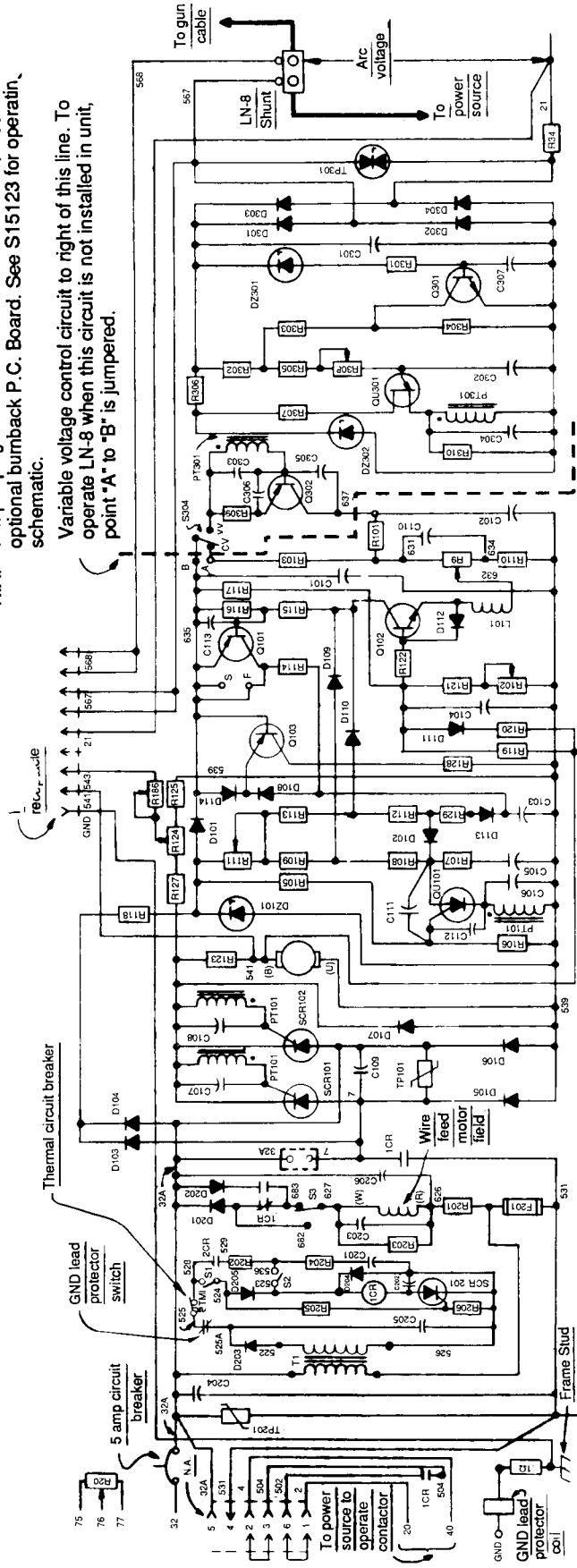
LN-8N, -8NE, -8S & -8SE  
 WIRING DIAGRAM  
 M14679

**NOTE:** This diagram is for reference only. It is not accurate for all machines covered by this manual. The specific diagram for a particular code is pasted inside the machine on one of the enclosure panels. If the diagram is illegible, write to the Service Department for a replacement. Give the welder code number.

# LN-8N, LN-8S OPERATING SCHEMATIC

(All Models)

Notes:  
N.A. Jumper plug is removed and connector "B" is plugged in optional burnback P.C. Board. See S15123 for operating schematic.  
Variable voltage control circuit to right of this line. To operate LN-8 when this circuit is not installed in unit, point "A" to "B" is jumpered.



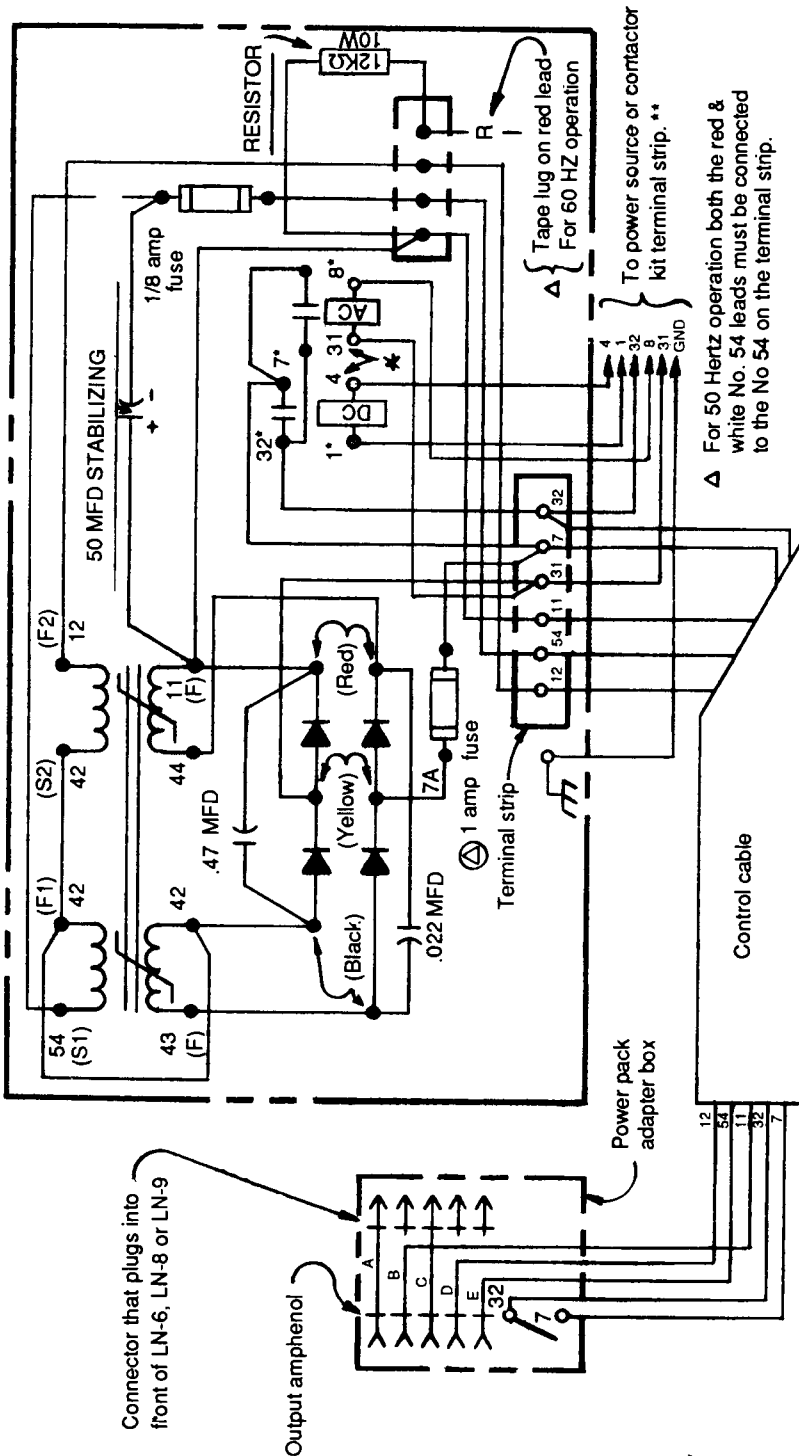
Control Circuit (Board #1)		Relay Circuit (Board #2)		Variable Voltage Circuit (Board #3)	
C101	1MFD	C201	50MFD	C301	2MFD
C102	2MFD	C202	.02MFD	C302	.10MFD
C103	39MFD ±10%	C203	50MFD	C303	.01MFD
C104	4.7MFD	C204	.005 MFD	C304	.047MFD
C105	.10MFD			C305	.01MFD
C106, C10, C11	.02MFD			C306, C307	.02MFD
C112, C113	.047 MFD			D301	1A
C107, C108	.005MFD			D302	1A
C109				D303	1A
D101	1A	D201	1A	D304	1A
D102	1A	D202	1A	DZ301	62V
D103	1A	D203	1A	DZ302	10V
D104	16A	D204	1A	Q301	2N3983
D105	16A	D205	1A	Q302	2N4125
D106	16A	R201	400Ω/2W	PT301	1:1:1 PULSE TRANSFORMER
D107	16A	R202	100Ω	TP301	TRANSIENT PROTECTION
D108	1A	R203	100KΩ		
D109	1A	R204	27Ω		
D110	1A	R205	4.7KΩ		
D111	1A	R206	1KΩ		
D112	1A	F201	1/2A 125V CR 250 V. SLOW BLOW FUSE		
D113	1A	SCR201	4A 400V		
D114	1A	TP201	TRANSIENT PROTECTION		
DZ101	20V				
L101	5.6MH				
Q101	2N4125				
Q103	2N5815				
OU101	2N6027				
PT101	TRANSIENT PROTECTION				
SCR101	12A 400V				
SCR102	12A 400V				
PT101	1:1:1 PULSE TRANSFORMER				
R101	6.8KΩ				
R102	2KΩ Trimmer				
R103	10KΩ				
R104	4.7KΩ				
R105	4.7KΩ				
R106	4.7KΩ				
R107	15Ω				
R108	38KΩ				
R109	38KΩ				
R110	750Ω				
R111	50KΩ Trimmer				
R112	27KΩ				
R113	38KΩ				
R114	10KΩ				
R115	68KΩ				
R301	6.8KΩ				
R302	5.6KΩ (2%)				
R303	1KΩ (2%)				
R304	3.9KΩ (2%)				
R305	3.3KΩ				
R306	4.7KΩ/2W				
R307	100Ω				
R308	5KΩ TRIMMER				
R309	15Ω				
R310	47Ω				
R311	68Ω				
S304	POWER SOURCE SELECTOR SW				

NOTE: This diagram is for reference only. It is not accurate for all machines covered by this manual. The specific diagram for a particular code is pasted inside the machine on one of the enclosure panels. If the diagram is illegible, write to the Service Department for a replacement. Give the welder code number.

CODE	DIAGRAM
Below 7575	M-12251
7575 - 7900	M-13072

This diagram applies for machines in production at the time this manual was assembled. For earlier codes, request the appropriate diagram as listed in the table.

# K-161 POWER PACK WIRING DIAGRAM



S-15803  
 10-15-82L

⊗ Lamp fuse not use on earlier units.

\*\* If the power source or contactor kit has terminals 31, 32, and 4, but no terminal 1, connect leads 31 and 32 from the power pack to their respective terminals on the terminal strip. Connect lead 8 from the power pack to terminal 4 on the terminal strip. Tape separately the lugs on leads 1 and 4. Connect the green lead from the power pack to the frame of the power source or contactor kit by means of the frame stud near the terminal strip or other secure electrical connection.

If the power source or contactor kit has terminals 31, 32, 4, and 1, connect leads 31, 32, 4, and 1 from the power pack to their respective terminals on the terminal strip. Tape up the lug on lead 8. Connect the green lead from the power pack to the power source or contactor kit by means of the frame stud near the terminal strip or other secure electrical connection.

Δ For 50 Hertz operation both the red & white No. 54 leads must be connected to the No 54 on the terminal strip.

• These numbers refer to circuit numbers only, and not to any number that may appear on the relay housing.

RESISTOR  
 12KΩ  
 10W  
 R  
 Tape lug on red lead  
 For 60 HZ operation  
 Δ  
 To power source or contactor  
 kit terminal strip. \*\*

Connector that plugs into  
 front of LN-6, LN-8 or LN-9

Output amphenol

⊗ 1 amp fuse

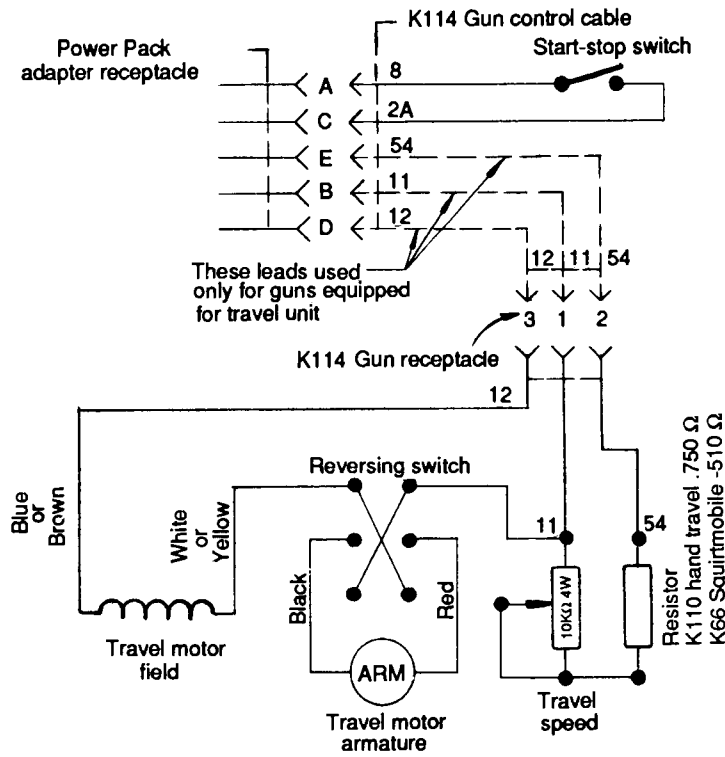
Terminal strip

Control cable

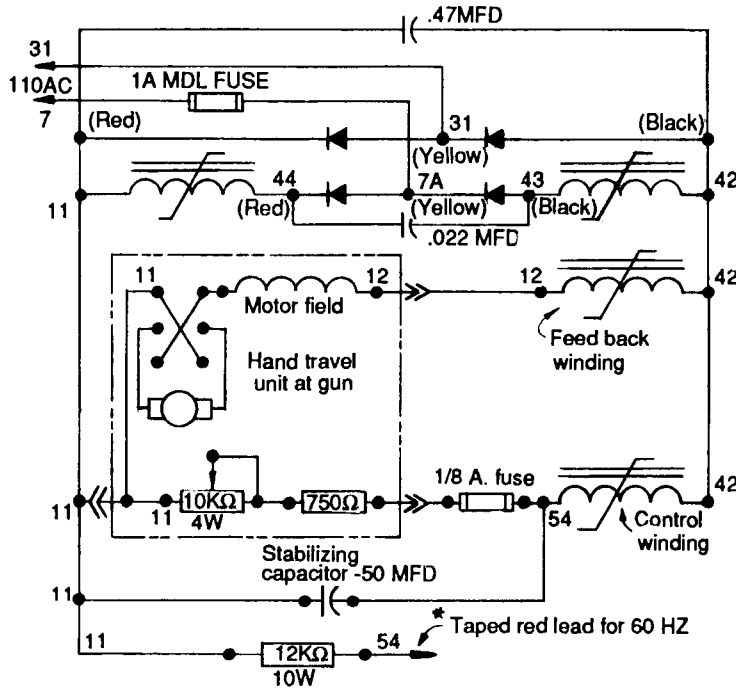
Power pack  
 adapter box



## K114 GUN CABLE AND K110 DRIVE UNIT



## MECHANIZED TRAVEL SCHEMATIC



T12834  
 Wiring Diagram  
 10-15-82L

\* For 50 HZ operation both red & black No. 54 leads must be connected to No. 54 on power pack terminal strip.

# NOTES

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

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

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.

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.

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

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

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

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

請詳細閱讀並理解製造廠提供的說明以及應該使用的銀擇材料，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.



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