



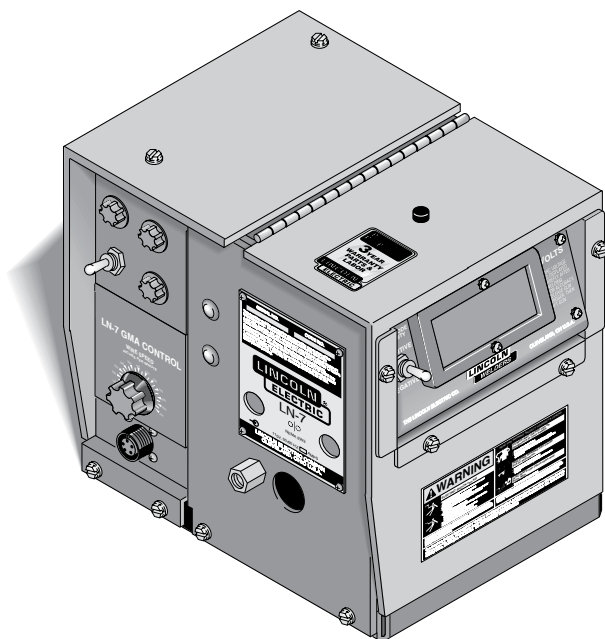
**NOTE:** This manual will cover most of the troubleshooting and repair procedures for the code numbers listed. Some variances may exist when troubleshooting/repairing later code numbers.

## LN-7™ GMA WIRE FEEDER

For use with machines having Code Numbers:

**9100, 9168, 9386, 9643, 9644, 9796, 9928, 9929, 9931, 10225, 10325, 10363, 10364, 10737**

# SERVICE MANUAL



LN-7™ GMA shown with optional K417 digital meter kit and K418 GMA timer kit.

## ⚠️ WARNING

### ⚠️ CALIFORNIA PROPOSITION 65 WARNINGS ⚠️

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

The Above For Diesel Engines

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

The Above For Gasoline Engines

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

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

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



### FOR ENGINE powered equipment.

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



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



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

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

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



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

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



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



### ELECTRIC AND MAGNETIC FIELDS may be dangerous

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

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

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

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

2.d.1. Rout 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.

LN-7™ GMA WIRE FEEDER





### ELECTRIC SHOCK can kill.

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

3.b. Insulate yourself from work and ground using dry insulation. Make certain the insulation is large enough to cover your full area of physical contact with work and ground.

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

- Semiautomatic DC Constant Voltage (Wire) Welder.
- DC Manual (Stick) Welder.
- AC Welder with Reduced Voltage Control.

3.c. In semiautomatic or automatic wire welding, the electrode, electrode reel, welding head, nozzle or semiautomatic welding gun are also electrically “hot”.

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

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

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

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

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

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

3.j. Also see Items 6.c. and 8.



### ARC RAYS can burn.

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

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

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



### FUMES AND GASES can be dangerous.

5.a. Welding may produce fumes and gases hazardous to health. Avoid breathing these fumes and gases. When welding, keep your head out of the fume. Use enough ventilation and/or exhaust at the arc to keep fumes and gases away from the breathing zone. **When welding with electrodes which require special ventilation such as stainless or hard facing (see instructions on container or MSDS) or on lead or cadmium plated steel and other metals or coatings which produce highly toxic fumes, keep exposure as low as possible and within applicable OSHA PEL and ACGIH TLV limits using local exhaust or mechanical ventilation. In confined spaces or in some circumstances, outdoors, a respirator may be required. Additional precautions are also required when welding on galvanized steel.**

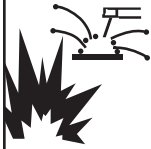
5.b. The operation of welding fume control equipment is affected by various factors including proper use and positioning of the equipment, maintenance of the equipment and the specific welding procedure and application involved. Worker exposure level should be checked upon installation and periodically 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 material safety data sheet (MSDS) and follow your employer’s safety practices. MSDS forms are available from your welding distributor or from the manufacturer.

5.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 022690-9101.
- 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 1235 Jefferson Davis Highway, Arlington, VA 22202.



## FOR ELECTRICALLY powered equipment.

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

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 soliel, donc:
  - a. Utiliser un bon masque avec un verre filtrant approprié ainsi qu'un verre blanc afin de se protéger les yeux du rayonnement de l'arc et des projections quand on soude ou quand on regarde l'arc.
  - b. Porter des vêtements convenables afin de protéger la peau de soudeur et des aides contre le rayonnement de l'arc.
  - c. Protéger l'autre personnel travaillant à proximité au soudage à l'aide d'écrans appropriés et non-inflammables.
4. Des gouttes de laitier en fusion sont émises de l'arc de soudage. Se protéger avec des vêtements de protection libres de l'huile, tels que les gants en cuir, chemise épaisse, pantalons sans revers, et chaussures montantes.
5. Toujours porter des lunettes de sécurité dans la zone de soudage. Utiliser des lunettes avec écrans latéraux dans les zones où l'on pique le laitier.

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

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

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

## Electromagnetic Compatibility (EMC)

### Conformance

Products displaying the CE mark are in conformity with European Community Council Directive of 15 Dec 2004 on the approximation of the laws of the Member States relating to electromagnetic compatibility, 2004/108/EC. It was manufactured in conformity with a national standard that implements a harmonized standard: EN 60974-10 Electromagnetic Compatibility (EMC) Product Standard for Arc Welding Equipment. It is for use with other Lincoln Electric equipment. It is designed for industrial and professional use.

### Introduction

All electrical equipment generates small amounts of electromagnetic emission. Electrical emission may be transmitted through power lines or radiated through space, similar to a radio transmitter. When emissions are received by other equipment, electrical interference may result. Electrical emissions may affect many kinds of electrical equipment; other nearby welding equipment, radio and TV reception, numerical controlled machines, telephone systems, computers, etc. Be aware that interference may result and extra precautions may be required when a welding power source is used in a domestic establishment.

### Installation and Use

The user is responsible for installing and using the welding equipment according to the manufacturer's instructions. If electromagnetic disturbances are detected then it shall be the responsibility of the user of the welding equipment to resolve the situation with the technical assistance of the manufacturer. In some cases this remedial action may be as simple as earthing (grounding) the welding circuit, see Note. In other cases it could involve construction of an electromagnetic screen enclosing the power source and the work complete with associated input filters. In all cases electromagnetic disturbances must be reduced to the point where they are no longer troublesome.

Note: The welding circuit may or may not be earthed for safety reasons according to national codes. Changing the earthing arrangements should only be authorized by a person who is competent to access whether the changes will increase the risk of injury, e.g., by allowing parallel welding current return paths which may damage the earth circuits of other equipment.

### Assessment of Area

Before installing welding equipment the user shall make an assessment of potential electromagnetic problems in the surrounding area. The following shall be taken into account:

- a) other supply cables, control cables, signaling and telephone cables; above, below and adjacent to the welding equipment;
- b) radio and television transmitters and receivers;
- c) computer and other control equipment;
- d) safety critical equipment, e.g., guarding of industrial equipment;
- e) the health of the people around, e.g., the use of pacemakers and hearing aids;
- f) equipment used for calibration or measurement
- g) the immunity of other equipment in the environment. The user shall ensure that other equipment being used in the environment is compatible. This may require additional protection measures;
- h) the time of day that welding or other activities are to be carried out.

## Electromagnetic Compatibility (EMC)

The size of the surrounding area to be considered will depend on the structure of the building and other activities that are taking place. The surrounding area may extend beyond the boundaries of the premises.

### Methods of Reducing Emissions

#### Mains Supply

Welding equipment should be connected to the mains supply according to the manufacturer's recommendations. If interference occurs, it may be necessary to take additional precautions such as filtering of the mains supply. Consideration should be given to shielding the supply cable of permanently installed welding equipment, in metallic conduit or equivalent. Shielding should be electrically continuous throughout its length. The shielding should be connected to the welding power source so that good electrical contact is maintained between the conduit and the welding power source enclosure.

#### Maintenance of the Welding Equipment

The welding equipment should be routinely maintained according to the manufacturer's recommendations. All access and service doors and covers should be closed and properly fastened when the welding equipment is in operation. The welding equipment should not be modified in any way except for those changes and adjustments covered in the manufacturer's instructions. In particular, the spark gaps of arc striking and stabilizing devices should be adjusted and maintained according to the manufacturer's recommendations.

#### Welding Cables

The welding cables should be kept as short as possible and should be positioned close together, running at or close to floor level.

#### Equipotential Bonding

Bonding of all metallic components in the welding installation and adjacent to it should be considered. However, metallic components bonded to the work piece will increase the risk that the operator could receive a shock by touching these metallic components and the electrode at the same time. The operator should be insulated from all such bonded metallic components.

#### Earthing of the Workpiece

Where the workpiece is not bonded to earth for electrical safety, not connected to earth because of its size and position, e.g., ships hull or building steelwork, a connection bonding the workpiece to earth may reduce emissions in some, but not all instances. Care should be taken to prevent the earthing of the workpiece increasing the risk of injury to users, or damage to other electrical equipment. Where necessary, the connection of the workpiece to earth should be made by a direct connection to the workpiece, but in some countries where direct connection is not permitted, the bonding should be achieved by suitable capacitance, selected according to national regulations.

#### Screening and Shielding

Selective screening and shielding of other cables and equipment in the surrounding area may alleviate problems of interference. Screening of the entire welding installation may be considered for special applications.<sup>1</sup>

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<sup>1</sup> Portions of the preceding text are contained in EN 60974-10: "Electromagnetic Compatibility (EMC) product standard for arc welding equipment."

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## TECHNICAL SPECIFICATIONS – LN-7™ and LN-7™ GMA

### INPUT VOLTAGE

Supplied by power source: 115 VAC, 50/60 Hz, 2.5 Amps

### WIRE FEED SPEED

LN-7™ GMA	75 to 700 in. per minute (1.90 to 17.8 m/min)
LN-7™	50 to 500 in. per minute (1.27 to 12.7 m/min)

### WIRE DIAMETERS

LN-7™ GMA	0.023 in. through 1/16 in. (0.6 through 1.6 mm)	solid electrode
	0.045 in. through 5/64 in. (1.2 through 2.0 mm)	cored electrode
LN-7™	0.023 in. through 3/32 in. (0.6 through 2.4 mm)	solid electrode
	0.045 in. through 7/64 in. (1.2 through 2.8 mm)	cored electrode

### PHYSICAL DIMENSIONS

		LENGTH	WIDTH	HEIGHT	TOTAL WEIGHT LESS ELECTRODE
TWO ROLL FEEDER	WITHOUT WIRE STAND	9.62 in. (244 mm)	9.76 in. (247 mm)	10.89 in. (277 mm)	24 lbs (10.9 kg)
	WITH WIRE STAND (K377)	20.68 in. (525 mm)	9.76 in. (247 mm)	17.00 in. (432 mm)	36 lbs (16.3 kg)
FOUR ROLL FEEDER	WITHOUT WIRE STAND	9.70 in. (246 mm)	11.60 in. (295 mm)	11.11 in. (282 mm)	30.5 lbs (13.8 kg)
	WITH WIRE STAND (K377)	20.76 in. (527 mm)	11.60 in. (295 mm)	17.00 in. (432 mm)	42.5 lbs (19.3 kg)

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

LN-7™ GMA WIRE FEEDER



## MOUNTING LOCATION

The LN-7™ and LN-7™ GMA wire feeder can be mounted directly on top of the power source providing that it is secure and level. It can also be mounted to an undercarriage when portability is required.

## MACHINE GROUNDING

The LN-7™ and LN-7™ GMA wire feeders are ground to the power source through the input cable. The power source grounding terminal must be properly connected to electrical ground per the power source operating manual.

## INPUT CABLE CONNECTIONS

Various input cable assemblies are available for the LN-7™ GMA wire feeder. See the **Accessories** section for complete descriptions.

### WARNING

**Turn input power off before connecting the LN-7™ GMA wire feeder.**

For connecting an LN-7™ GMA to a specific Lincoln power source follow steps 1 through 6, and see connection diagrams in **Figure A.3** through **A.17** for the specific power source. Table A.1 lists each figure number with its corresponding power source.

**TABLE A.1 - LN-7™ GMA CONNECTION DIAGRAMS**

Figure #	Power Source
A.3	LN-7™ GMA To DC-400, DC-250 and CV/CVI Power Sources With Terminal Strip - Connection Diagram
A.4	LN-7™ GMA To Pulsed Power 500 - Connection Diagram
A.5	LN-7™ GMA To CV/CVI Power Sources With 14 Pin Amphenol Connector - Connection Diagram
A.6	LN-7™ GMA To CV/CVI Power Sources With Twist-Mate Connector and 14 Pin Amphenol/Remote Control - Connection Diagram
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A.12	LN-7™ GMA To Most Lincoln Motor Generators - Connection Diagram
A.13	LN-7™ GMA To WP250 or G9 PRO - Connection Diagram
A.14	LN-7™ GMA To Ranger 9 - Connection Diagram
A.15	LN-7™ GMA To Ranger 10-LX - Connection Diagram
A.16	LN-7™ GMA To Power Sources With No Output Contactor - Connection Diagram
A.17	LN-7™ GMA To Power Sources With Contactor and No Terminal Strip - Connection Diagram

LN-7™ GMA WIRE FEEDER



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1. For K291 and K404 cables, connect the end of the control cable with the lugged leads to the power source. If lead #21 is extended to work, do not connect leads to terminal #21 on terminal strip. For K584, K594 or K480 cables connect the 14 pin amphenol connector to the power source. Include any jumpers called for on the connection diagram. Do not add any other jumpers or connections.

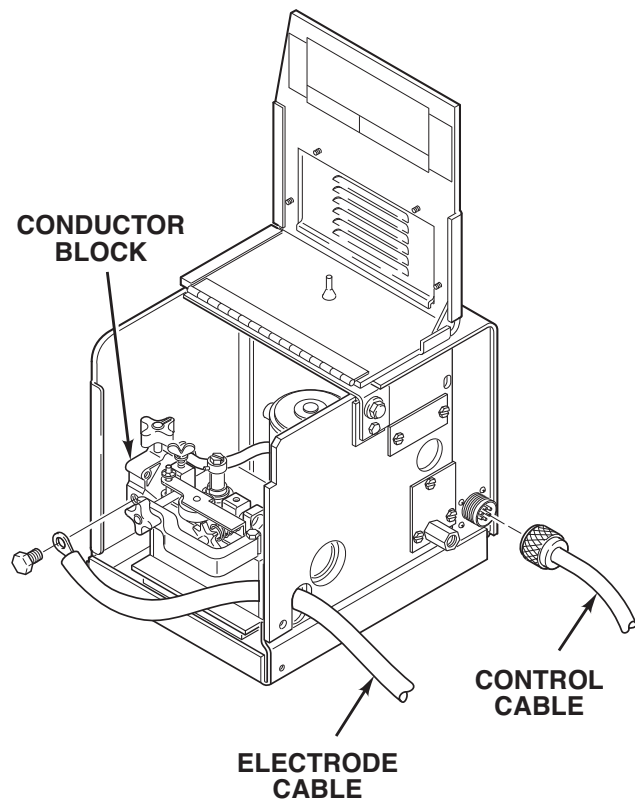
### **⚠ WARNING**

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

2. For constant voltage power sources with an output contactor but no terminal strip or 14-pin control receptacle, **See Figure A.17**. For constant voltage power sources without an internal output contactor, and requiring a K240 Contactor Kit, **See Figure A.16**.
3. If input cables longer than the standard length must be used, K292 extension cables (50 ft/15.2 m) can be installed. These have polarized plugs on each end of the control cable and include a 4/0 (107 mm<sup>2</sup>) electrode cable. Install the extensions between the standard input cable and the wire feeder. Total input cable length should not exceed 400 ft (122 m). When using longer lengths of extension cables, it may be necessary to add parallel electrode cables to minimize the voltage drop in the cable.

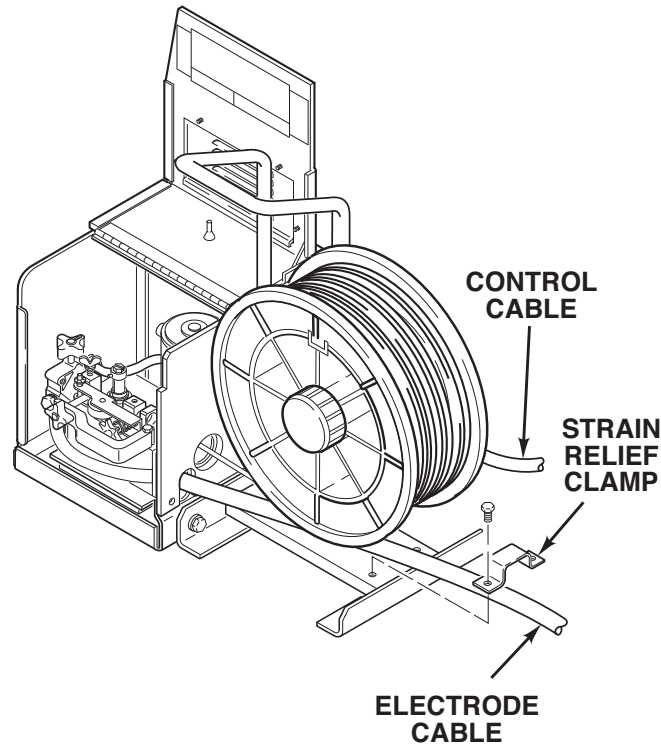
4. Referring to Figure A.1, rout the end of the electrode cable through the large hole in the back panel of the LN-7™ case. Connect the electrode cable to the brass conductor block on the front of the gear-box using the 1/2-13 x .75 bolt provided. **Be sure the cable is placed to allow easy access and clearance for the idle roll arm pressure adjustment and to allow the drive roll section cover to close.**

**FIGURE A.1 – INPUT CONTROL CABLE AND ELECTRODE CABLE CONNECTIONS**

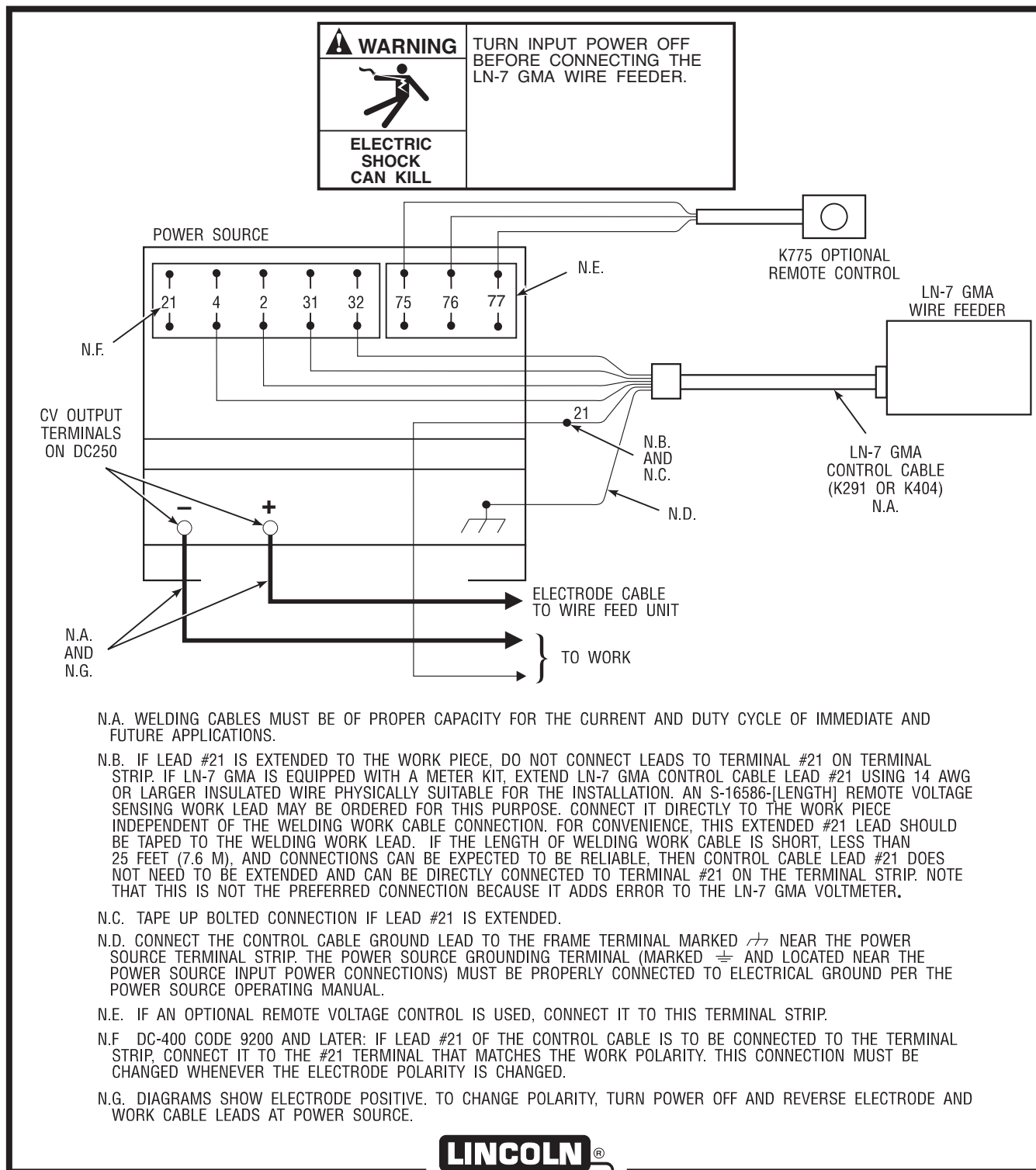


5. Connect the input control cable polarized Amphenol plug into the mating 6-pin receptacle on the rear of the control section.
6. Referring to Figure A.2, install the input cable under the wire reel mounting stand strain relief clamp. Remove the screws holding the clamp to the base of the wire reel mounting assembly, put the input cable assembly under the clamp and reinstall the screws.

FIGURE A.2 – STRAIN RELIEF CLAMP



**FIGURE A.3 – LN-7™ & LN-7™ GMA TO DC-400, DC-250 AND CV/CVI POWER SOURCES WITH TERMINAL STRIP - CONNECTION DIAGRAM**

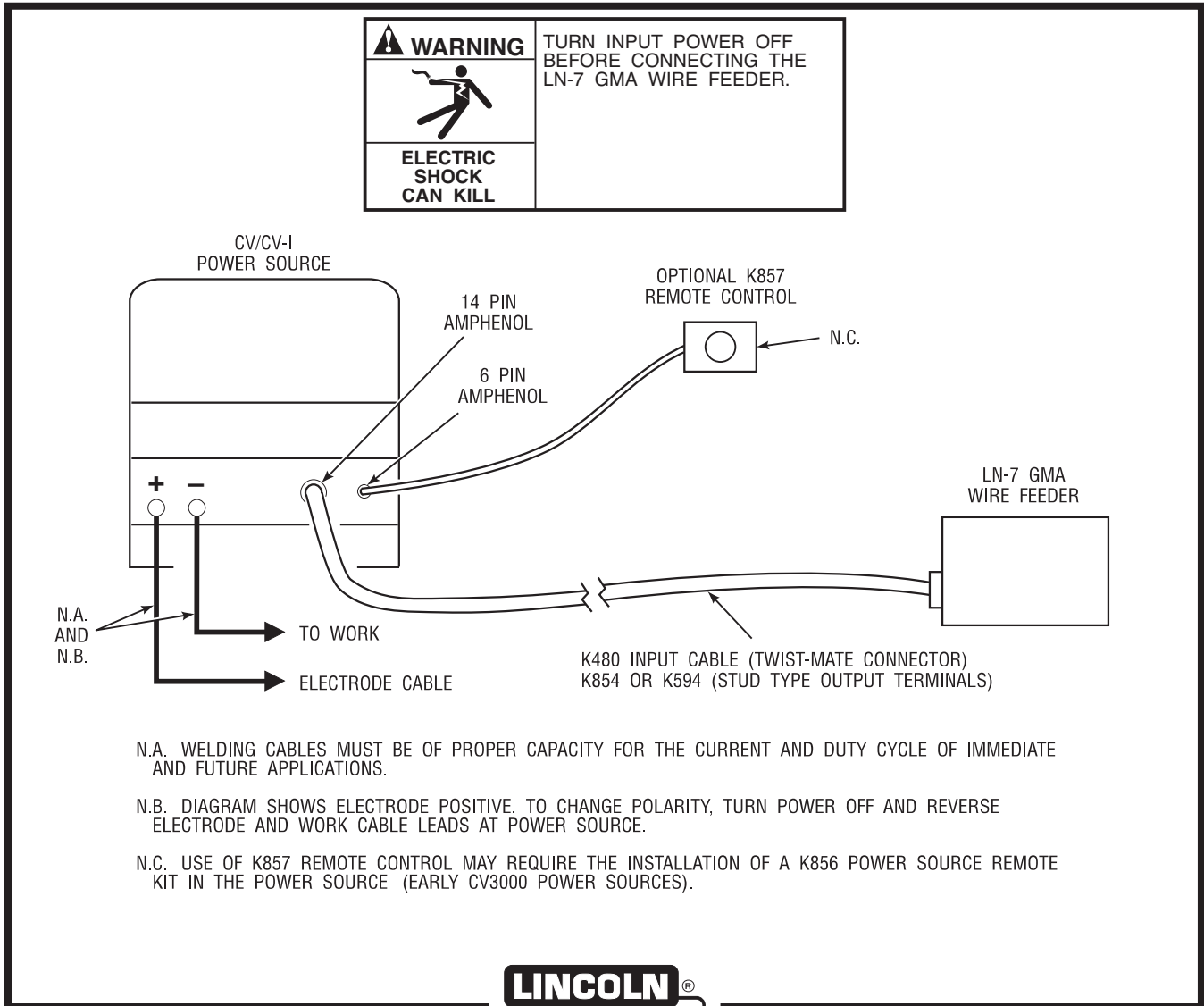


**LN-7™ GMA WIRE FEEDER**





**FIGURE A.5 – LN-7™ & LN-7™ GMA TO CV/CVI POWER SOURCES WITH 14 PIN AMPHENOL CONNECTOR - CONNECTION DIAGRAM**



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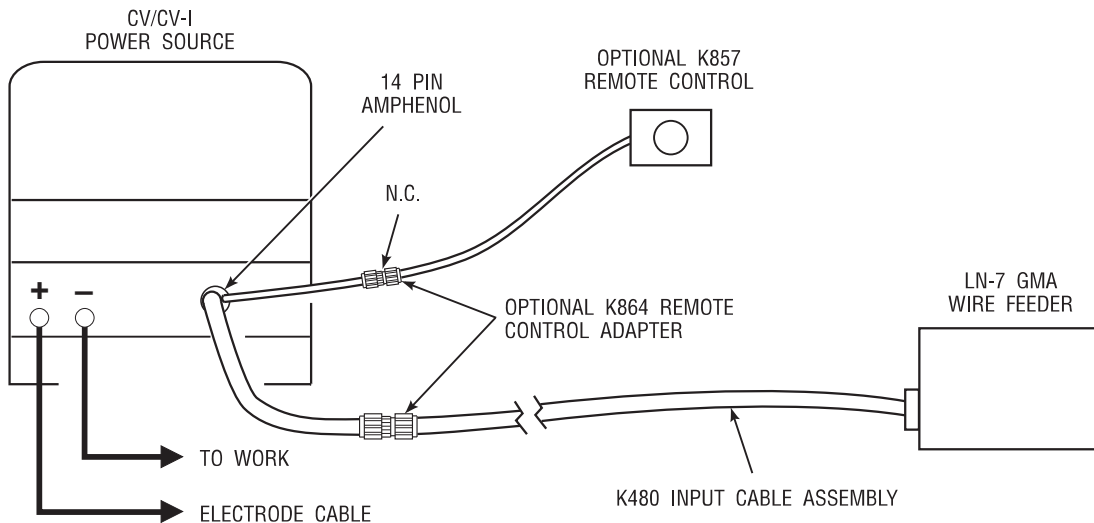
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### FIGURE A.6 – LN-7™ & LN-7™ GMA TO CV/VI POWER SOURCES WITH TWIST-MATE CONNECTOR AND 14 PIN AMPHENOL/REMOTE CONTROL - CONNECTION DIAGRAM

	<p><b>WARNING</b></p> <ul style="list-style-type: none"> <li>• TURN OFF INPUT POWER TO THE WELDING POWER SOURCE USING THE DISCONNECT SWITCH AT THE FUSE BOX BEFORE CONNECTING THE WIRE FEEDER.</li> </ul>
<p><b>ELECTRIC SHOCK CAN KILL</b></p>	<ul style="list-style-type: none"> <li>• ONLY QUALIFIED PERSONS SHOULD INSTALL, USE, OR SERVICE THIS MACHINE.</li> </ul>



N.A. WELDING CABLE MUST BE SIZED FOR CURRENT AND DUTY CYCLE OF APPLICATION.

N.B. DIAGRAM SHOWS ELECTRODE POSITIVE. TO CHANGE POLARITY, TURN POWER "OFF".

N.C. USE OF K857 REMOTE CONTROL REQUIRES THE INSTALLATION OF A K864 REMOTE CONTROL ADAPTER TO THE 14 PIN AMPHENOL OF THE POWER SOURCE. THE K480 INPUT CABLE CAN BE CONNECTED DIRECTLY TO THE POWER SOURCE IF A REMOTE CONTROL IS NOT REQUIRED.



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### LN-7™ GMA WIRE FEEDER



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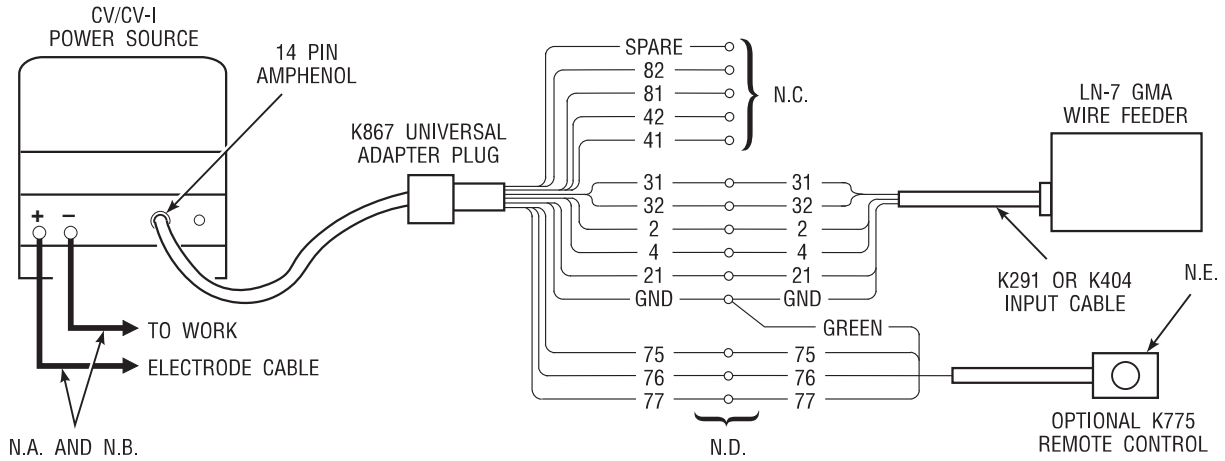
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## FIGURE A.7 – LN-7™ & LN-7™ GMA TO CV/CVI POWER SOURCE (K867/K775) - CONNECTION DIAGRAM

	<b>WARNING</b>
	TURN INPUT POWER OFF BEFORE CONNECTING THE LN-7 GMA WIRE FEEDER.
<b>ELECTRIC SHOCK CAN KILL</b>	



N.A. WELDING CABLES MUST BE OF PROPER CAPACITY FOR THE CURRENT AND DUTY CYCLE OF IMMEDIATE AND FUTURE APPLICATIONS.

N.B. DIAGRAM SHOWS ELECTRODE POSITIVE. TO CHANGE POLARITY, TURN POWER OFF AND REVERSE ELECTRODE AND WORK CABLE LEADS AT POWER SOURCE.

N.C. INSULATE EACH UNUSED LEAD INDIVIDUALLY.

N.D. SPLICE LEADS AND INSULATE.

N.E. USE OF K775 REMOTE CONTROL REQUIRES THE INSTALLATION OF A K856 POWER SOURCE REMOTE KIT IN THE POWER SOURCE.



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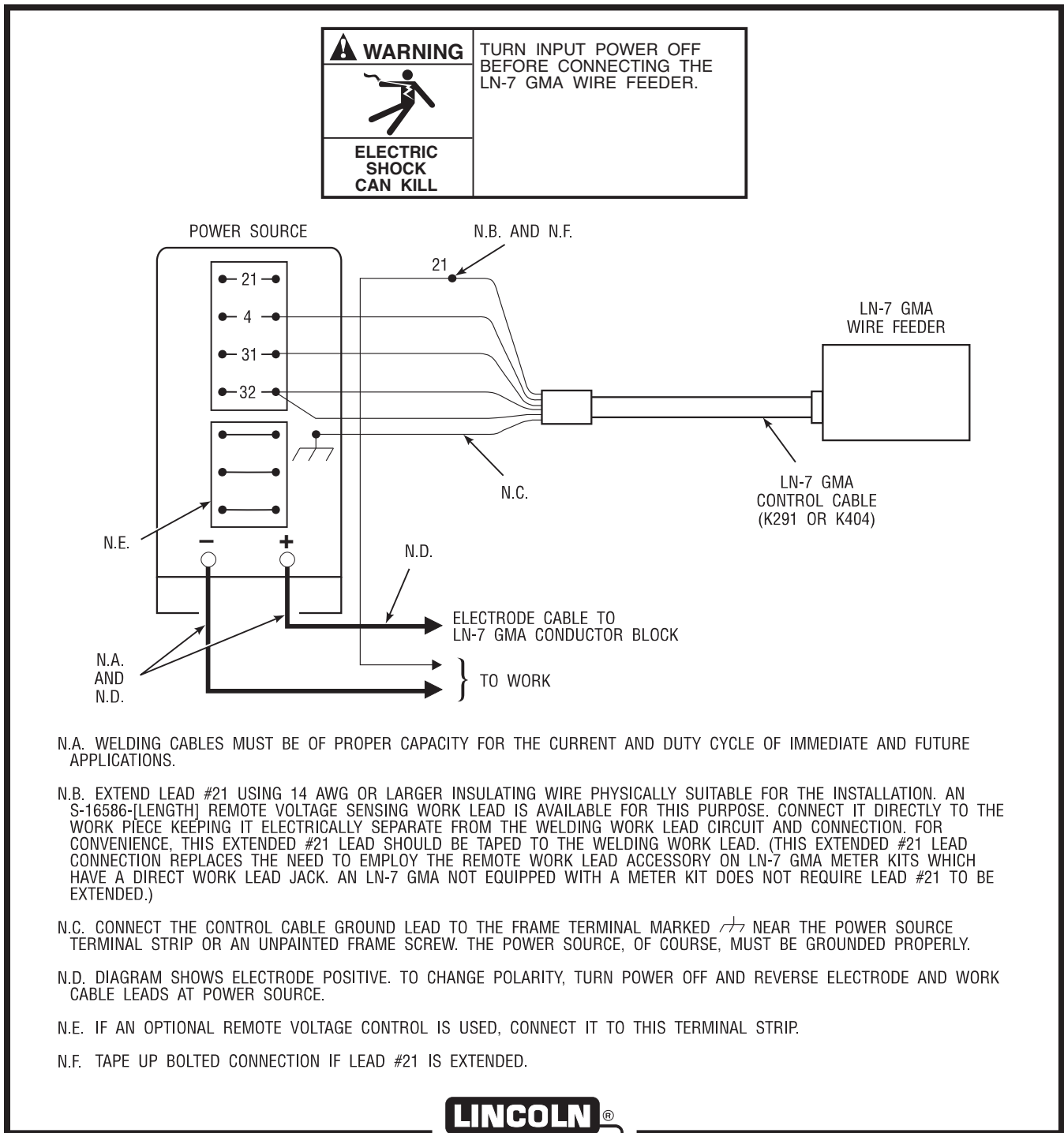
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FIGURE A.8 – LN-7™ &amp; LN-7™ GMA TO R3S-250 OR R3S-325 - CONNECTION DIAGRAM



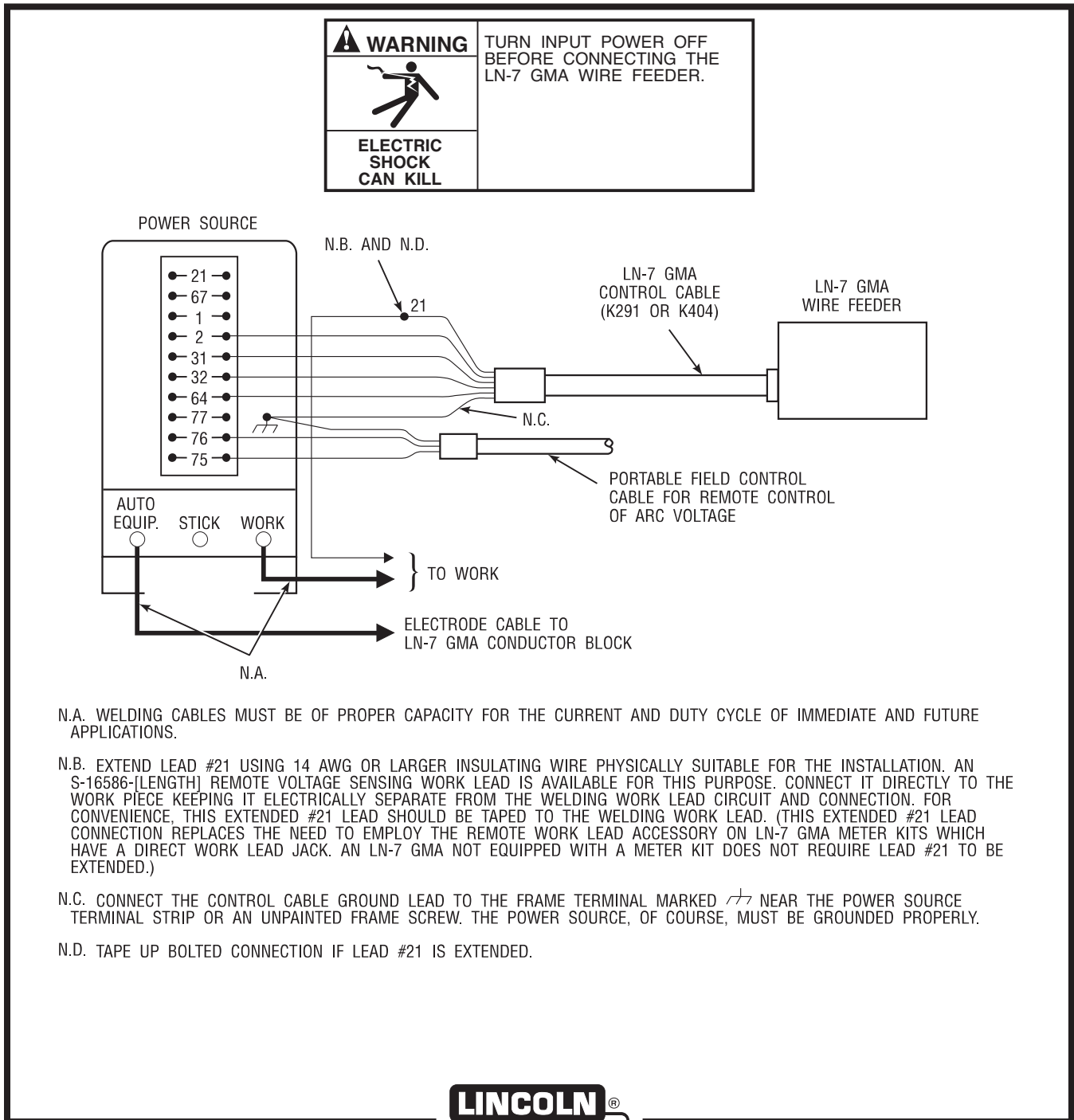
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LN-7™ GMA WIRE FEEDER

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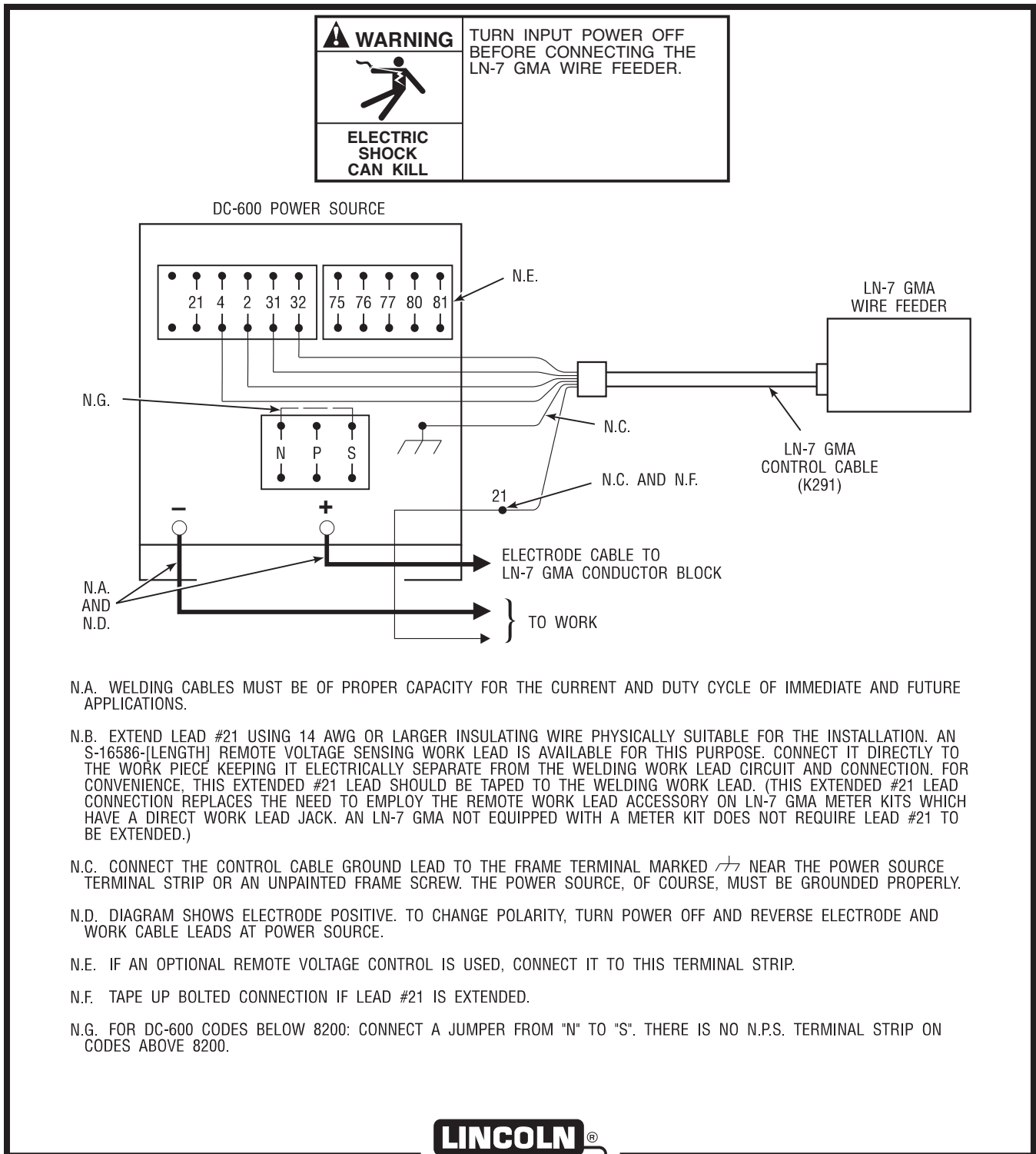
FIGURE A.9 – LN-7™ & LN-7™ GMA TO SAM MOTOR GENERATOR OR ENGINE WELDER - CONNECTION DIAGRAM



LN-7™ GMA WIRE FEEDER

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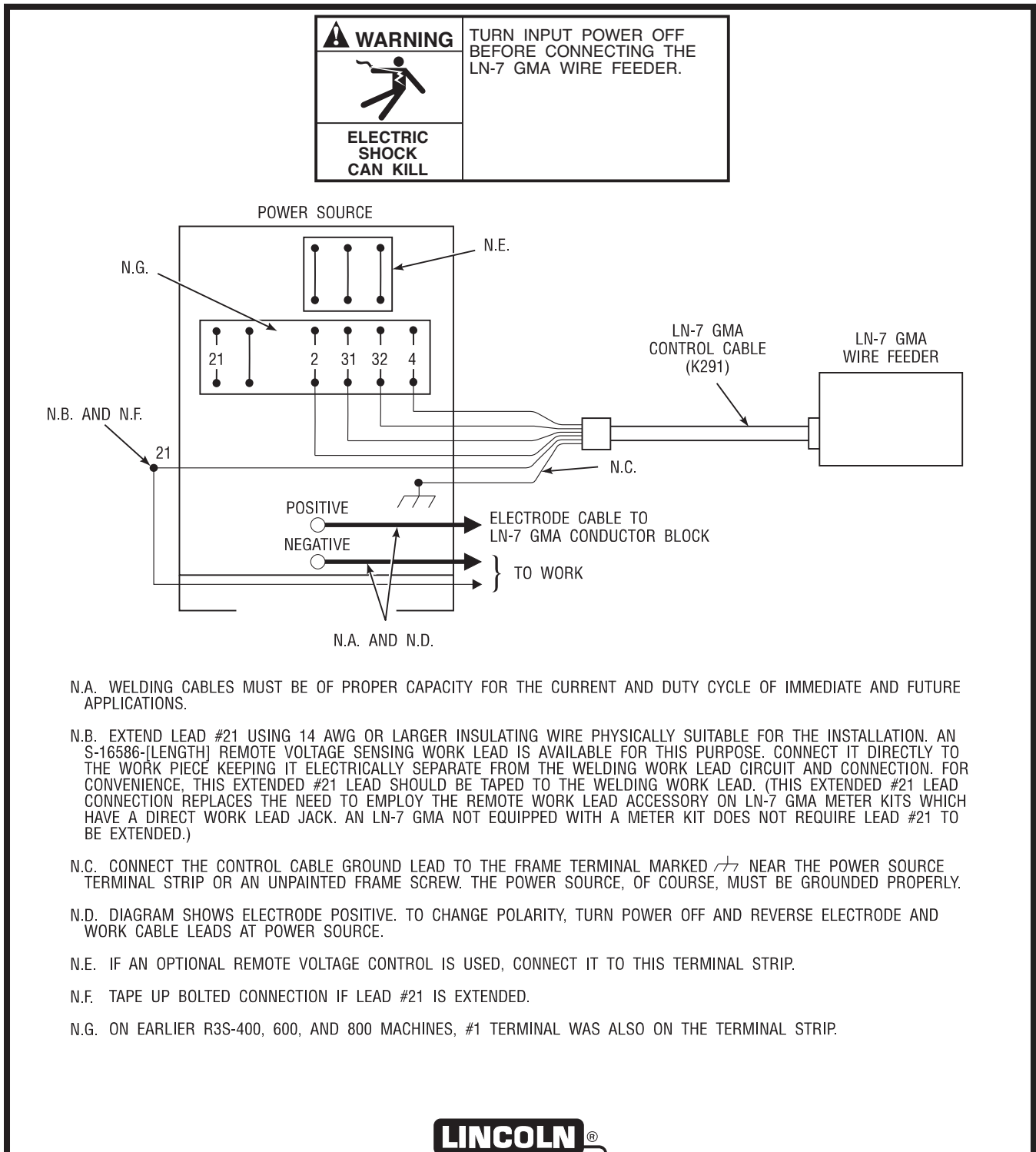
FIGURE A.10 – LN-7™ &amp; LN-7™ GMA TO DC-600 - CONNECTION DIAGRAM



LN-7™ GMA WIRE FEEDER



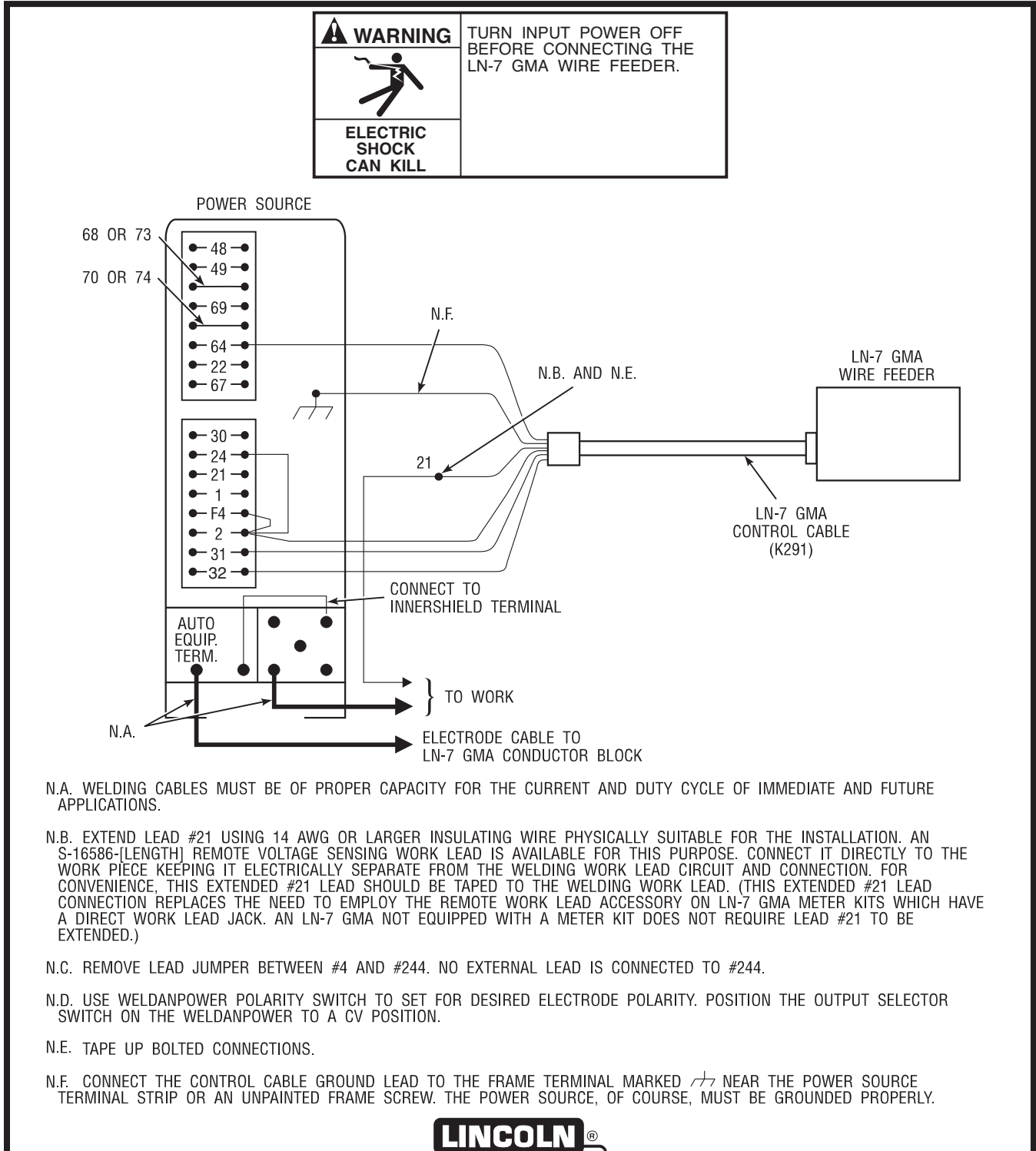
FIGURE A.11 – LN-7™ &amp; LN-7™ GMA TO R3S-400, 600, OR 800 - CONNECTION DIAGRAM



LN-7™ GMA WIRE FEEDER



**FIGURE A.12 – LN-7™ & LN-7™ GMA TO MOST LINCOLN MOTOR GENERATORS - CONNECTION DIAGRAM**




LN-7™ GMA WIRE FEEDER

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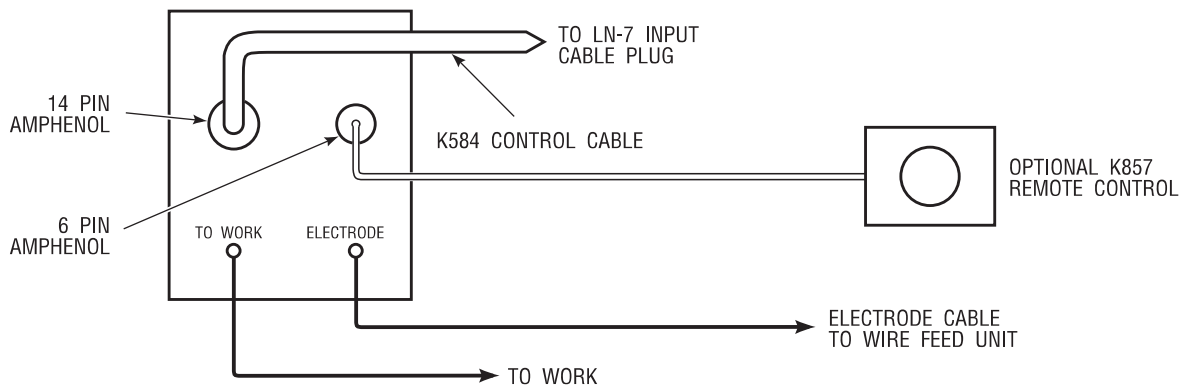




FIGURE A.15 – LN-7™ & LN-7™ GMA TO RANGER 10-LX – CONNECTION DIAGRAM

	<p><b>WARNING</b></p> <ul style="list-style-type: none"> <li>• DO NOT OPERATE WITH PANELS OPEN.</li> <li>• DISCONNECT NEGATIVE (-) BATTERY LEAD BEFORE SERVICING.</li> </ul>
	<p><b>ELECTRIC SHOCK CAN KILL</b></p> <ul style="list-style-type: none"> <li>• DO NOT TOUCH ELECTRICALLY LIVE PARTS.</li> </ul>

	<p><b>WARNING</b></p> <ul style="list-style-type: none"> <li>• KEEP GUARDS IN PLACE.</li> <li>• KEEP AWAY FROM MOVING PARTS.</li> <li>• ONLY QUALIFIED PERSONS SHOULD INSTALL, USE, OR SERVICE THIS MACHINE.</li> </ul>
	<p><b>MOVING PARTS CAN INJURE</b></p>



**CAUTION:**

ANY INCREASE OF THE HIGH IDLE ENGINE RPM BY CHANGING THE GOVERNOR SETTING OR OVERRIDING THE THROTTLE LINKAGE WILL CAUSE AN INCREASE IN THE AC AUXILIARY VOLTAGE. IF THIS VOLTAGE GOES OVER 140 VOLTS, WIRE FEEDER CONTROL CIRCUITS MAY BE DAMAGED. THE ENGINE GOVERNOR SETTING IS PRE-SET AT THE FACTORY - DO NOT ADJUST ABOVE RPM SPECIFICATIONS LISTED IN THE ENGINE WELDER OPERATING MANUAL.

N.A. USE POLARITY SWITCH TO SET FOR DESIRED ELECTRODE POLARITY. POSITION THE OUTPUT SELECTOR SWITCH TO A CV POSITION. PLACE WIRE FEEDER SWITCH TO "WIRE FEEDER WITH CONTROL CABLE" POSITION.

N.B. WELDING CABLES MUST BE OF PROPER CAPACITY FOR THE CURRENT AND DUTY CYCLE OF IMMEDIATE AND FUTURE APPLICATIONS. SEE OPERATING MANUAL.

N.C. IF OPTIONAL REMOTE OUTPUT CONTROL IS USED, PLACE OUTPUT CONTROL SWITCH IN "OUTPUT CONTROL REMOTE" POSITION.



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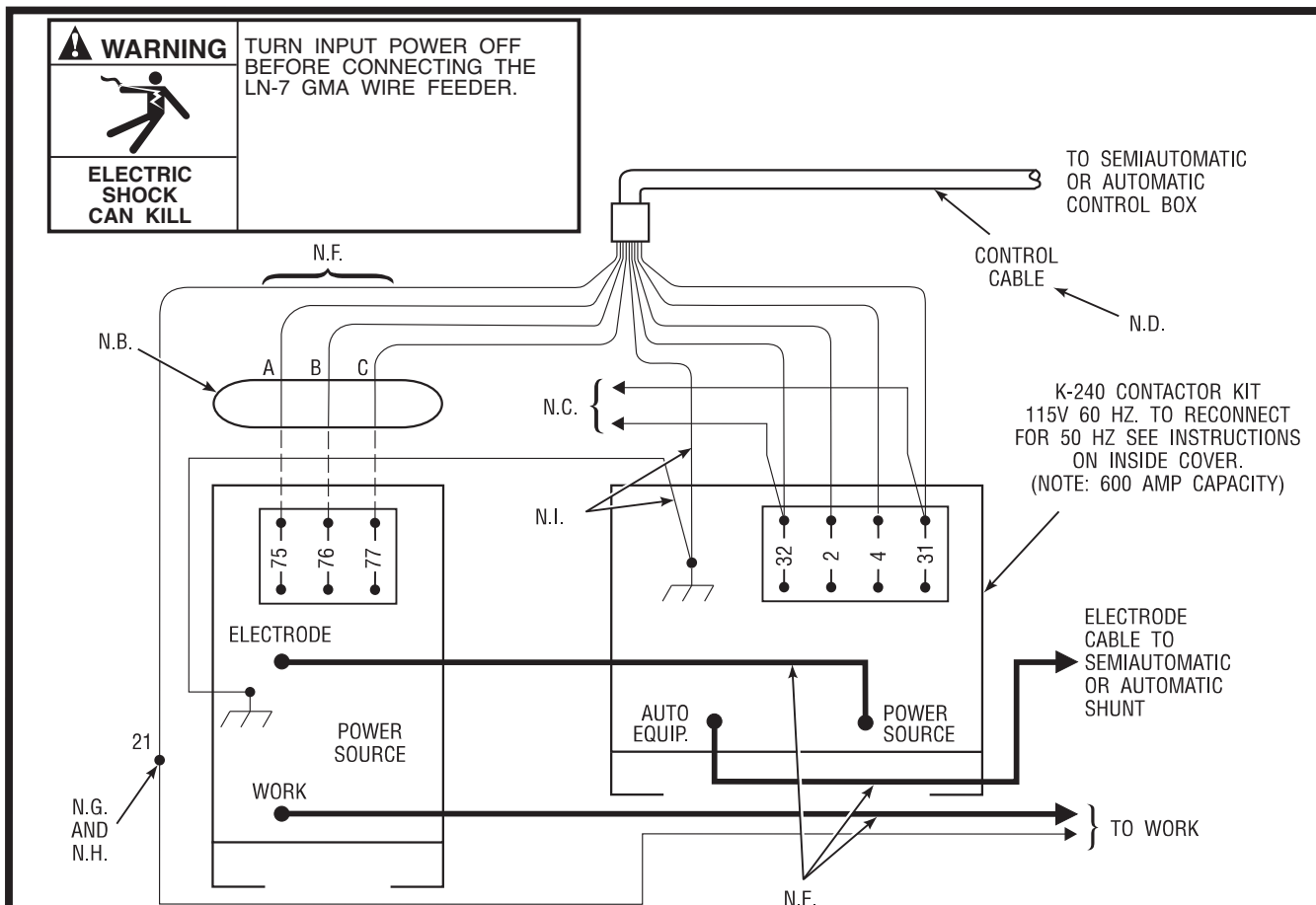
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**FIGURE A.16 – LN-7™ & LN-7™ GMA TO POWER SOURCES WITH NO OUTPUT CONTACTOR - CONNECTION DIAGRAM**



N.A. 115V AC WILL NOT BE TURNED OFF WHEN POWER SOURCE IS TURNED OFF. CONTACTOR KIT AND SEMIAUTOMATIC OR AUTOMATIC EQUIPMENT WILL STILL HAVE 115V CONTROL POWER SUPPLIED UNTIL POWER SUPPLIED TO TERMINALS #31 AND #32 IS TURNED OFF.

N.B. ON LINCOLN POWER SOURCES WITHOUT A REMOTE CONTROL TERMINAL STRIP HAVING THESE NUMBERS, OR WHEN USING NON-LINCOLN POWER SOURCES, TAPE UP THESE LEADS SEPARATELY.

N.C. TO 115V AC 500 V.A. PLUS 250 V.A. ADDITIONAL IF LINCOLN TRAVEL CARRIAGE IS USED.

N.D. LEADS #75, #76, #77, A, B, AND C DO NOT APPEAR ON LN-7 GMAS WITH CODES ABOVE 7026.

N.E. WELDING CABLES MUST BE OF PROPER CAPACITY FOR THE CURRENT AND DUTY CYCLE OF IMMEDIATE AND FUTURE APPLICATIONS.

N.F. IF USING AN OLDER 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. EXTEND LEAD #21 USING 14 AWG OR LARGER INSULATING WIRE PHYSICALLY SUITABLE FOR THE INSTALLATION. AN S-16586-[LENGTH] 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-7 GMA METER KITS WHICH HAVE A DIRECT WORK LEAD JACK. AN LN-7 GMA NOT EQUIPPED WITH A METER KIT DOES NOT REQUIRE LEAD #21 TO BE EXTENDED.)

N.H. TAPE UP BOLTED CONNECTION.

N.I. CONNECT THE CONTROL CABLE GROUND LEAD TO THE FRAME TERMINAL MARKED  $\text{⏏}$  NEAR THE POWER SOURCE TERMINAL STRIP OR AN UNPAINTED FRAME SCREW. THE POWER SOURCE, OF COURSE, MUST BE GROUNDED PROPERLY.

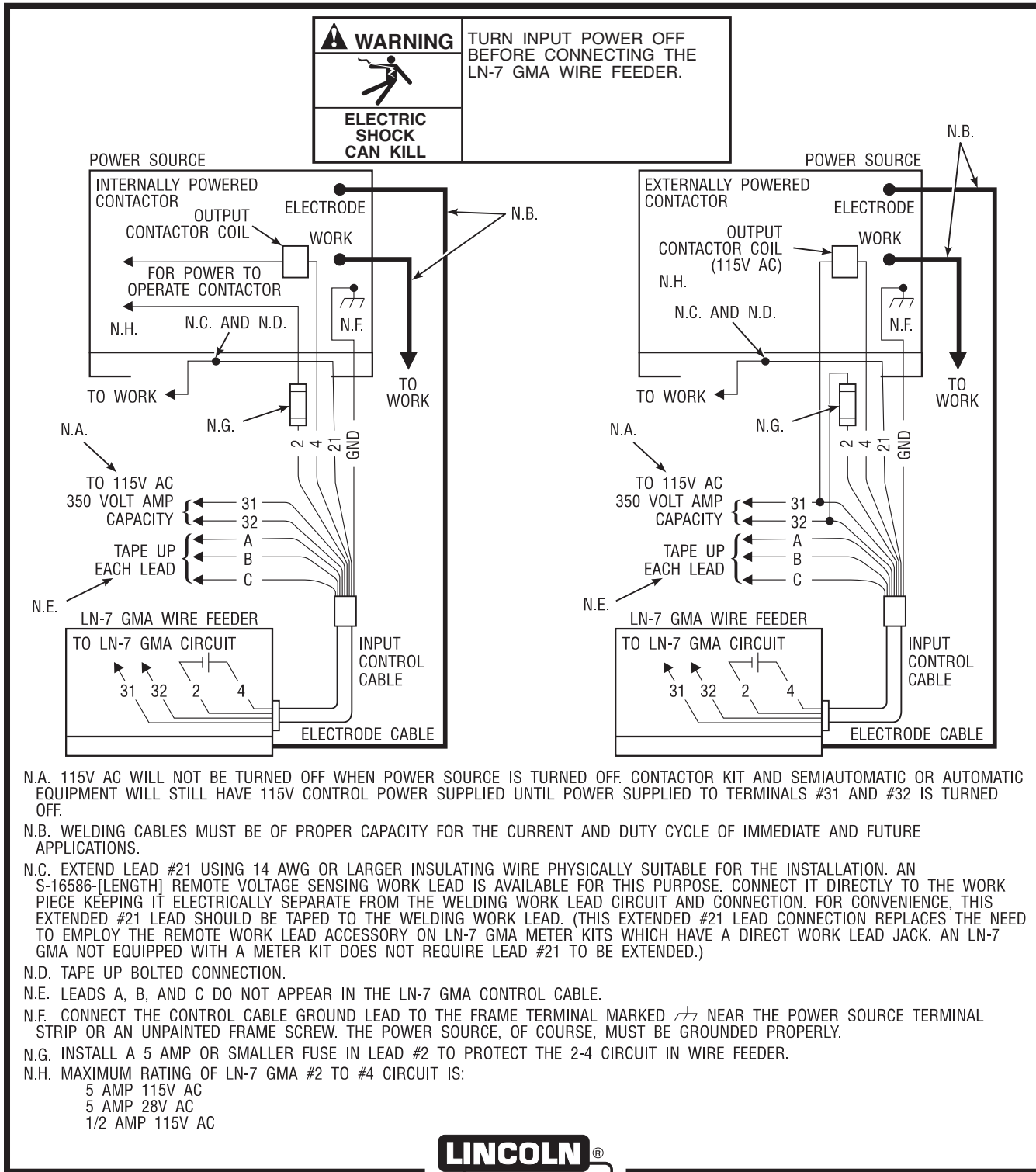
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LN-7™ GMA WIRE FEEDER

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**FIGURE A.17 – LN-7™ & LN-7™ GMA TO POWER SOURCES WITH CONTACTOR AND NO TERMINAL STRIP - CONNECTION DIAGRAM**



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**LN-7™ GMA WIRE FEEDER**



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## WORK CABLE

Connect a work lead of sufficient size and length (Table A.2) between the proper output stud on the power source and the work. Be sure the connection to the work makes tight metal-to-metal electrical contact. Poor work lead connections can result in the grounding lead protector being activated.

If using the K489-1 Fast-Mate Adapter, install per the S19389 instructions included with the kit.

**TABLE A.2 – WORK LEAD SPECIFICATIONS**

Current 60% Duty Cycle	Copper Work Cable Size, AWG	
	Up To 50 Ft (15.2 m <sup>2</sup> )	50 Ft-100 Ft (15.2-30.4 m <sup>2</sup> )
300 Amps	0 (53 mm <sup>2</sup> )	00 (67 mm <sup>2</sup> )
400 Amps	00 (67 mm <sup>2</sup> )	000 (85 mm <sup>2</sup> )
500 Amps	00 (67 mm <sup>2</sup> )	000 (85 mm <sup>2</sup> )
600 Amps	000 (85 mm <sup>2</sup> )	0000 (107 mm <sup>2</sup> )

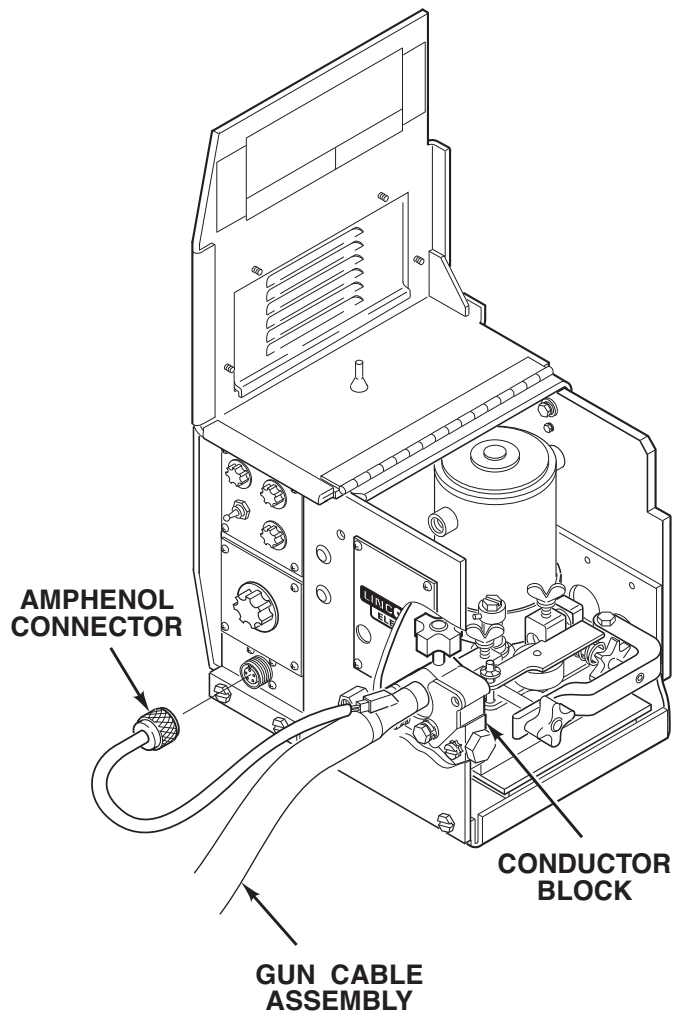
## GUN AND CABLE ASSEMBLIES

The LN-7™ and LN-7™ GMA can be used with several guns. In most cases, Lincoln guns and cables are shipped assembled, ready to weld. Use the gun and cable assembly for the electrode type (solid, Outershield, or Innershield) and electrode size to be used. See **Accessories Section** for different gun types.

## GUN CABLE CONNECTIONS

Lay the cable out straight. Insert the connector on the welding conductor cable through the large hole in the front panel of the LN-7™ and into the brass conductor block on the front of the gearbox. See Figure A.18. Make sure it is all the way in and tighten the hand wheel. Keep this connection clean and bright. Connect the control cable amphenol plug into the mating 5-cavity receptacle on the front of the control section below the nameplate.

**FIGURE A.18 – GUN CABLE CONNECTIONS**



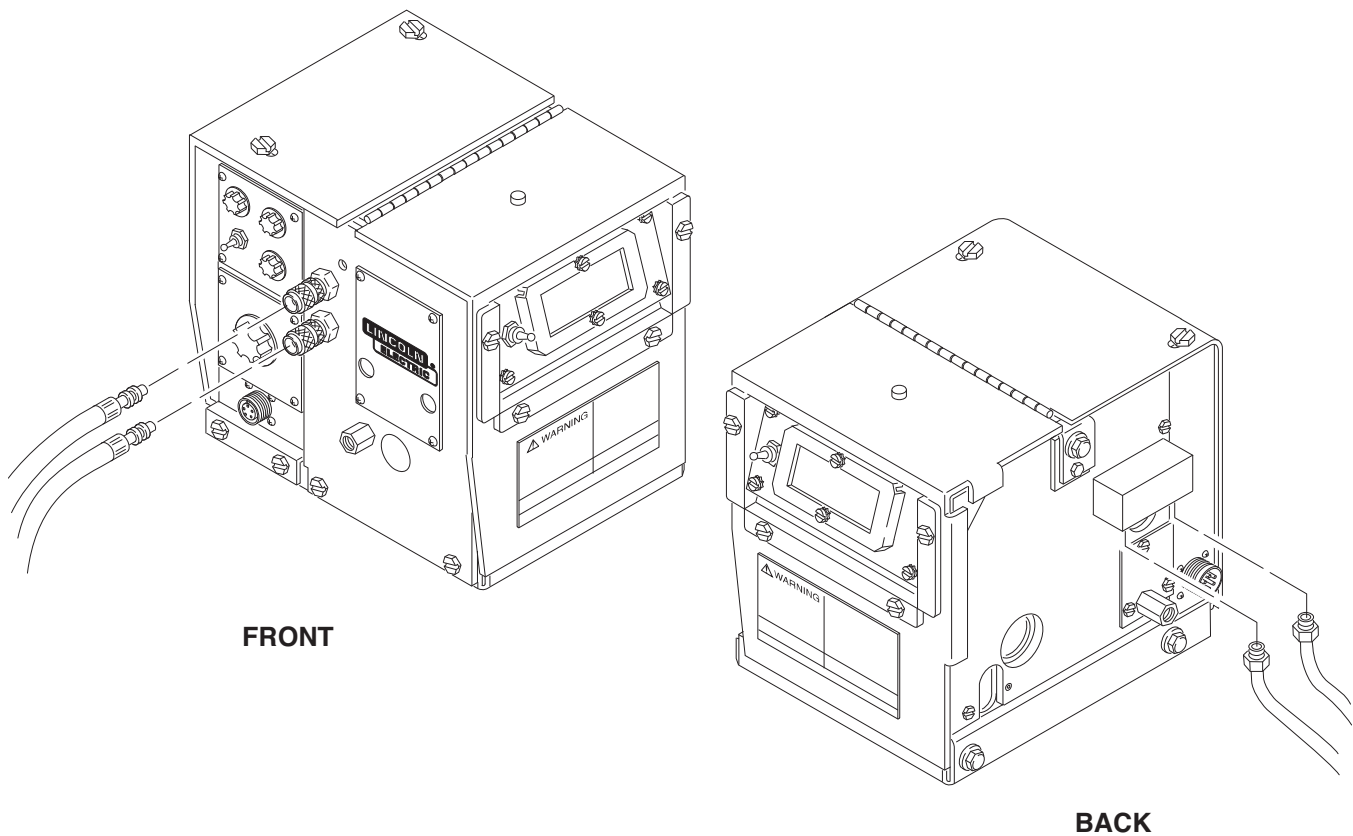
## WATER CONNECTIONS (FOR WATER COOLED GUNS)

The LN-7™ or LN-7™ GMA must have a K527 Water Solenoid Kit installed (see the **Accessories** Section). The K440-1 LN-7™ GMA model already has a water solenoid installed. See Figure A.19 and perform the following steps:

**NOTE:** If not using a Lincoln water cooler, and if your water cooling device is not designed for use with a waterline solenoid valve, you may remove the solenoid and screw the male fitting (after applying sealant) directly into the brass manifold block.

1. Using male 5/8-18 UNF left-hand thread fittings, connect appropriate water hoses to the coolant inlet and outlet on the back of the LN-7™. Connect the other ends of these hoses to the appropriate ports on your water cooling units.
2. In the event the water line fittings on your water cooled gun are incompatible with the female quick connects on the front of the LN-7™, male quick connects are provided for installation on 3/16 in. I.D. hose (customer to provide appropriate clamps). The feeder connectors self seal when disconnected.

FIGURE A.19 – WATER CONNECTIONS



LN-7™ GMA WIRE FEEDER



## SHIELDING GAS HOOKUP (LN-7™ GMA or LN-7™ with Optional K494 Gas Solenoid Installed)

### **⚠ WARNING**

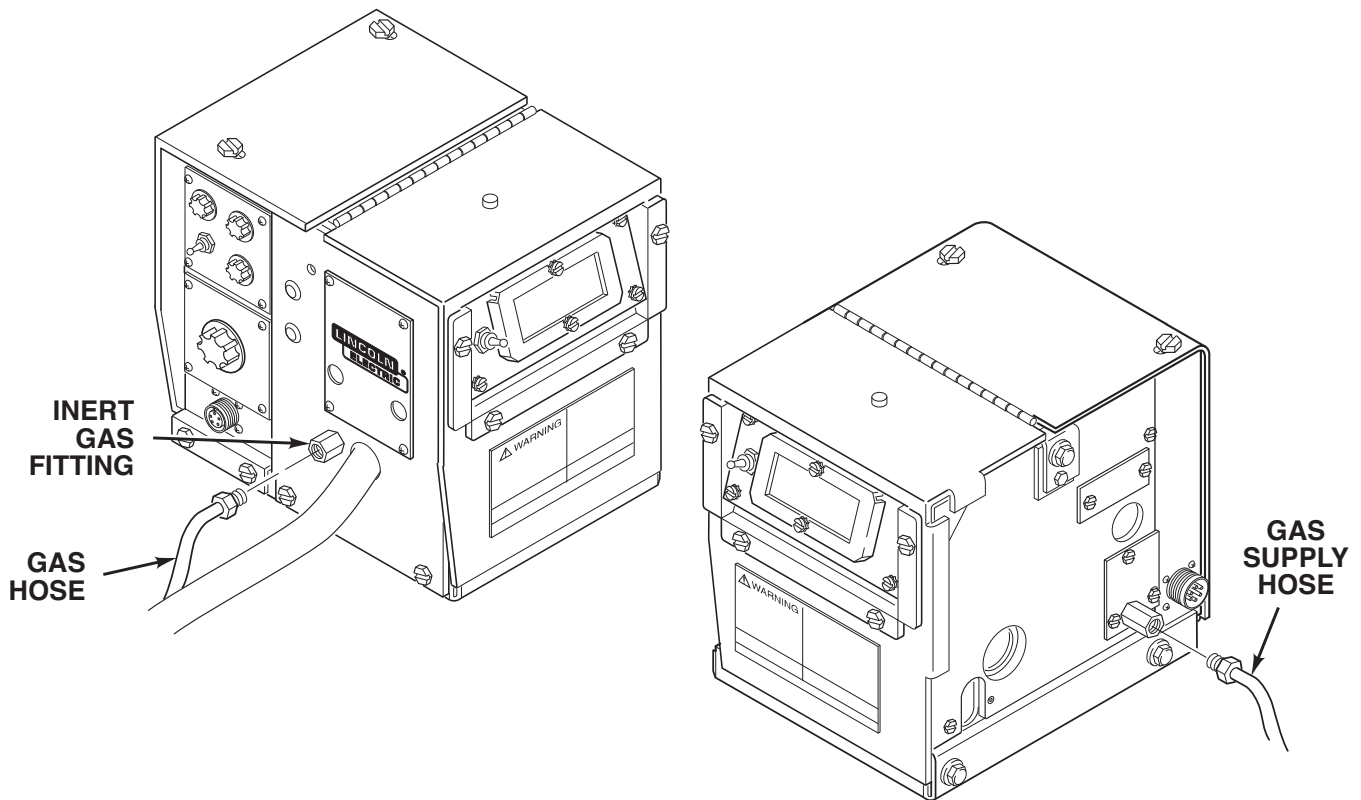
Gas under pressure is explosive. Always keep gas cylinders in an upright position and to the undercarriage or a stationary support. See American National Standard Z-49.1, "Safety In Welding And Cutting", published by the American Welding Society.

Customer must provide a cylinder of shielding gas, a pressure regulator, a flow control valve, and a hose from the flow valve to the gas inlet fitting of the LN-7™ GMA or the K494 Gas Solenoid Valve Kit installed on the LN-7™. Install per Figure A.20 and the following:

1. Connect the supply hose from the gas cylinder flow valve outlet to the 5/8-18 female inert gas fitting on the back panel of the LN-7™.
2. Install the barbed fitting and union nut to the 5/8-18 female inert gas fitting on the front of the LN-7™. Connect 3/16 in. (4.8 mm) I.D. gas hose from the gun to the barbed fitting.

When the gun is to be removed, this fitting can be easily detached by loosening the union nut.

FIGURE A.20 – SHIELDING GAS HOOKUP



LN-7™ GMA WIRE FEEDER



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LN-7™ GMA WIRE FEEDER



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    General Description ..... B-2

    Recommended Processes and Equipment ..... B-3

    Controls and Settings ..... B-3

    Circuit Protection ..... B-4

    Avoiding Ground Lead Protector (GLP) Activation ..... B-4

    Drive Roll Installation (2 Roll) ..... B-4

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    Idle Roll Pressure Setting ..... B-8

    Wire Loading ..... B-9

    Acceleration Setting ..... B-13

    Wire Speed and Voltage Adjustment ..... B-13

    Making a Weld ..... B-14

    Wire Reel Changing ..... B-14

    K417 Digital Voltmeter Kits ..... B-14

    Optional Flux Tank Loading ..... B-15

Read and understand this entire section before operating your machine.

## SAFETY INSTRUCTIONS

### ⚠ WARNING



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

- Do not touch electrically live parts such as output terminals or internal wiring.
- Insulate yourself from the work and ground.
- Always wear dry insulating gloves.



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

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



#### **WELDING, CUTTING and GOUGING SPARKS can cause fire or explosion**

- Keep flammable material away.
- Do not weld, cut or gouge on containers that have held combustibles.



#### **ARC RAYS can burn.**

- Wear eye, ear and body protection.

Only qualified personnel should operate this equipment. Observe all safety information throughout this manual.

## GENERAL DESCRIPTION

The K440 LN-7™ GMA semiautomatic constant speed wire feeder is specifically equipped for gas metal arc welding using flux-cored Outershield electrodes and solid wire. The LN-7™ GMA is also suitable for self-shielded flux-cored Innershield electrodes, submerged arc welding (if constant voltage is satisfactory), and other open arc welding. It has been factory assembled with the following features:

- Wire feed dial [75 to 700 in./min (1.9 to 17.8 m/min)].
- Factory installed gas solenoid valve and gas fittings.
- Wire drive uses a permanent magnet motor and includes tool-less “quick - release” idle roll pressure arm, outgoing guide tube and gun cable fastening.
- Optional factory installed water solenoid and fittings for use with water cooled welding guns.

The K567-1 LN-7™ GMA 4-Roll is designed to provide the additional feeding force required when using gun cables over 15 ft (4.6 m) long or when the wire is pulled long distances (such as when bulk packages are used). Because the four-roll feeder has twice the contact surface, it can also help when feeding softer wires by delivering the same or more feeding force as the two-roll with less overall wire deformation. Wire size range, speed and features are the same as other LN-7™ GMA models.

The K521 LN-7™ semiautomatic constant speed wire feeder is recommended for self-shielded flux-cored Innershield® electrodes, submerged arc welding, and other open arc welding. It has the following features:

- Wire feed dial [50 to 500 in./min (1.27 to 12.7 m/min)].
- Wire drive uses a permanent magnet motor and includes tool-less “quick- release” idle roll pressure arm, outgoing guide tube and gun cable fastening.
- Optional factory installed water solenoid and fittings for use with water cooled welding guns.

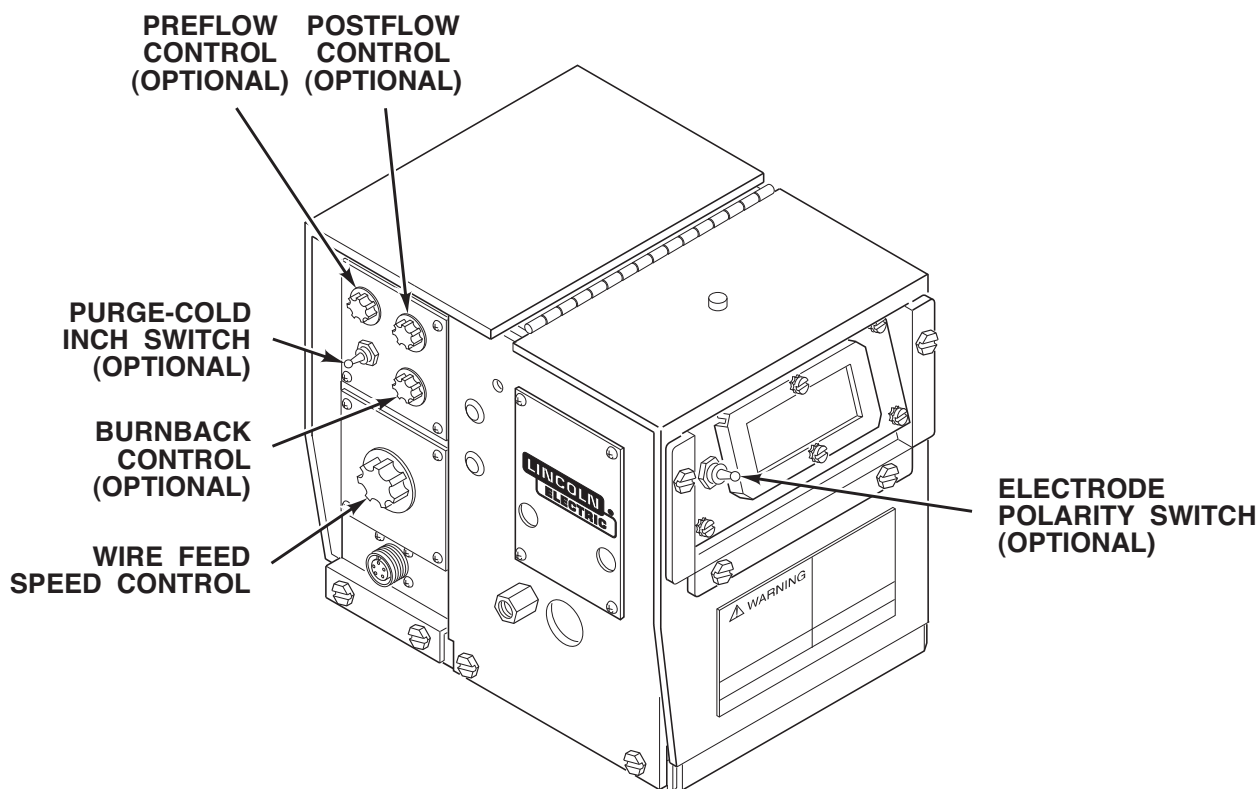
## RECOMMENDED PROCESSES AND EQUIPMENT

The LN-7™ GMA is recommended for use in MIG and Innershield welding applications, the LN-7™ is recommended for Innershield welding applications. Both are recommended for use with constant voltage power sources such as the Idealarc DC-250, 400, or 600, or CV types. The LN-7™ GMA is

capable of feeding wires ranging from 0.023 in. through 1/16 in. (0.6 through 1.6 mm) solid, 0.045 in. through 5/64 in. (1.2 through 2.0 mm) Innershield, and 0.062 in. through 5/64 in. (1.6 through 2.0 mm) Outershield electrodes.

The LN-7™ is capable of feeding wires ranging from 0.023 in. through 3/32 in. (0.6 through 2.4 mm) solid and 0.045 in. through 7/64 in. (1.2 through 2.8 mm) cored.

FIGURE B.1 – WIRE FEEDER CONTROLS



## CONTROLS AND SETTINGS

Operator controls are illustrated in Figure B.1. See the figure and the following explanations of the controls.

**WIRE FEED SPEED CONTROL.** This control sets the feed speed of the wire feeder. Turn the knob to the left for slower speeds and to the right for higher speeds. The control is calibrated. The nameplate shows the wire speed for the given setting of the control.

**BURNBACK CONTROL (OPTIONAL).** This control, located on the optional K419 Burnback Timer and K418 GMA Timer Kits, provides a precise time delay that allows the wire to be burned off at the end of the weld. This is useful for those applications where higher speed, fine wire feeding is used and there is a tendency for the electrode to overrun at the end of the weld and cause “sticking” in the crater. The delay is adjustable for optimum burnback depending on wire size, process, procedure, etc.

**PREFLOW CONTROL (OPTIONAL).** This control, located on the optional K418 GMA Timer Kit, provides flow of shielding gas to the work before the arc is established. The gas solenoid valve is energized immediately when the gun trigger is closed, but the time delay before the wire feeder is energized is adjustable from 0 to 1.5 seconds. Turn the knob to the left for shorter delays and to the right for longer delays.

**POSTFLOW CONTROL (OPTIONAL).** This control, located on the optional K418 GMA Timer Kit, provides flow of shielding gas to the work after welding has stopped. Delay for the gas solenoid valve shutoff is adjustable from 0 to 1.5 seconds. Turn the knob to the left for shorter delays and to the right for longer delays.

LN-7™ GMA WIRE FEEDER



**PURGE - COLD INCH SWITCH (OPTIONAL).** This control, located on the optional K418 GMA Timer Kit, provides control of some wire feeder functions without energizing the welding power source. The momentary up position energizes the gas solenoid but not the wire feeder or welding power source. The momentary down position energizes the wire feeder but not the gas solenoid or the welding power source.

**ELECTRODE POLARITY SWITCH (OPTIONAL).** This switch, located on the optional K416 Digital and K417 Analog Meter Kits, controls the polarity of the meter. Set this switch to the same polarity as the electrode lead to allow correct operation of the meter.

## CIRCUIT PROTECTION

A manual reset circuit breaker protects the AC supply line and the wire feeder from overloads, usually caused by excessive wire drag or other wire feed problems. To reset the circuit breaker, raise the cover of the wire drive compartment and push the white button on the side of the control box above the drive rolls.

The LN-7™ and LN-7™ GMA also include a Ground Lead Protector (GLP) circuit and fuse in the 2-4 contactor circuit.

The frame of the LN-7™ wire feed unit is grounded to the frame of the power source by a lead in the control cable. The GLP circuit 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 circuit is tripped, the wire feed rolls will not turn and the welding contactor in the power source will not close when the gun trigger is pressed. To reset the protector circuit, press the red button above the drive rolls and to the left of the circuit breaker. There is no visual indication when the protector circuit is tripped.

## AVOIDING GROUND LEAD PROTECTOR (GLP) ACTIVATION

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

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

DO NOT allow excess input cable or work cable to be placed closer than three feet from the wire feeder.

DO NOT coil excess input cable assembly or use a coiled assembly as shipped from the factory. Instead, loop the excess cable length back and forth in three to six foot straight lengths. Coiling the input cable results in a transformer action between the electrode conductor cable and the ground lead in the multiconductor control cable. This transformer action can cause a current to flow in the ground lead which will falsely activate the GLP circuit.

To reset the GLP circuit, press the red button above the drive rolls and to the left of the circuit breaker.

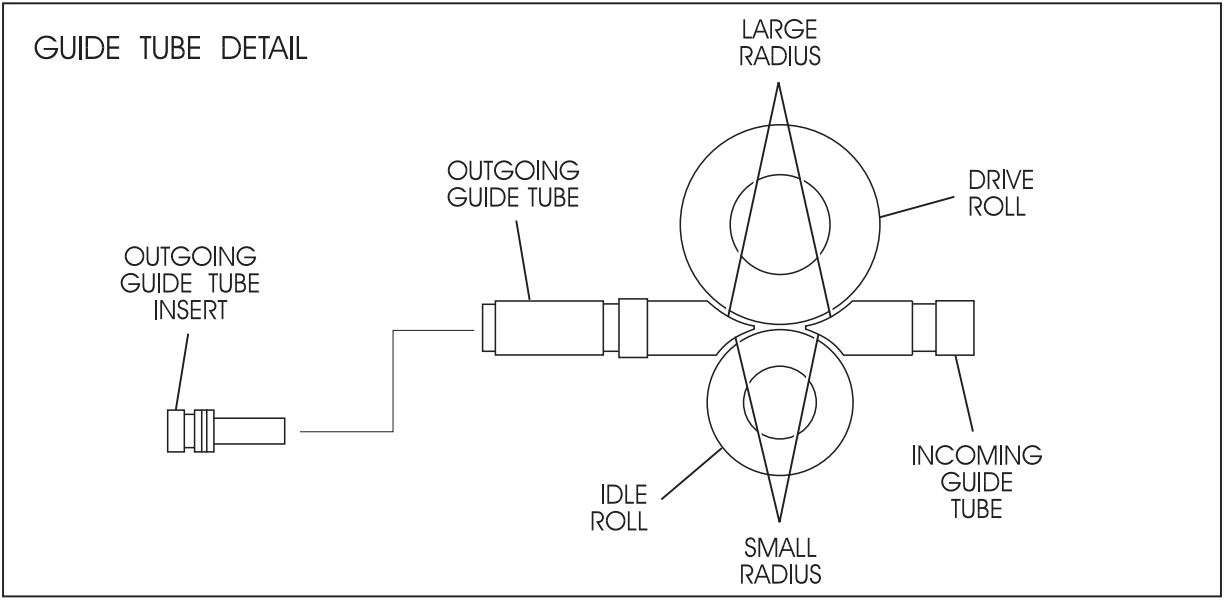
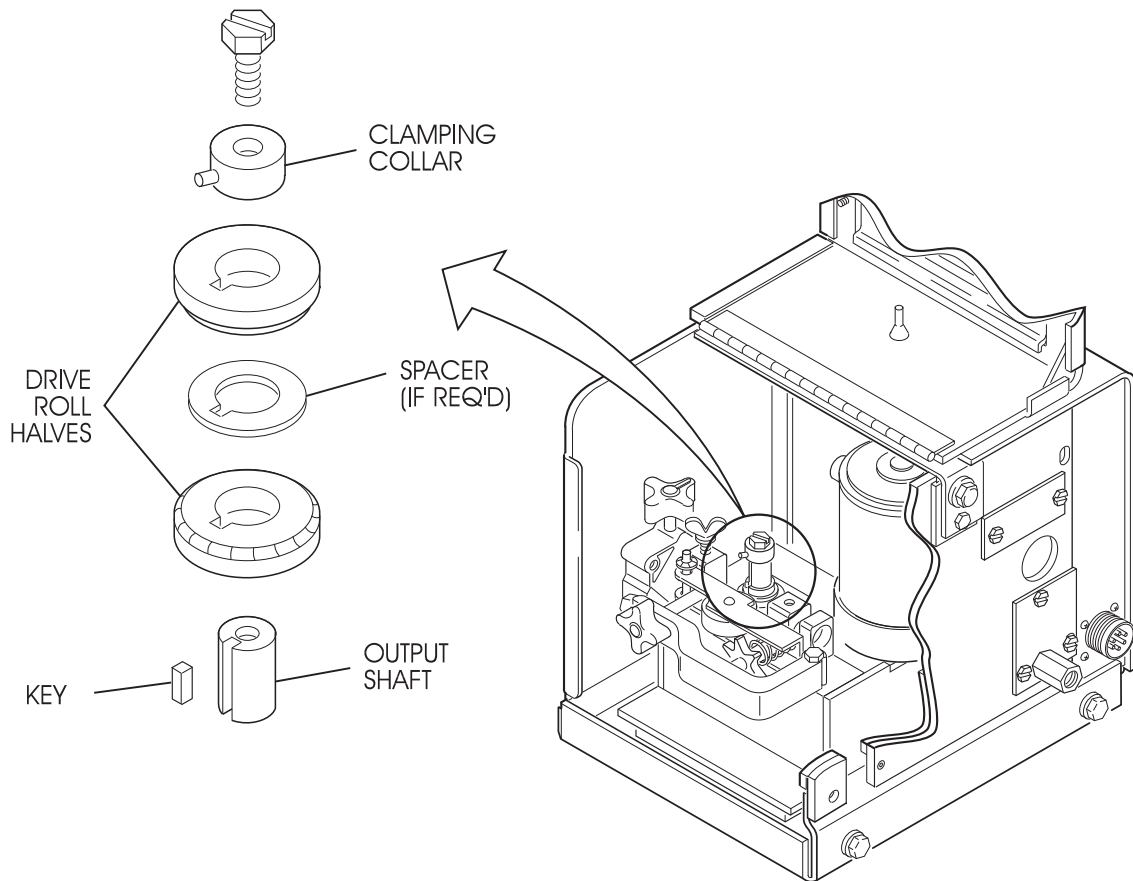
## DRIVE ROLL INSTALLATION

### CHANGING DRIVE ROLLS FOR TWO-ROLL WIRE FEEDERS:

To change drive rolls on a two-roll wire feeder, **See Figure B.2** and perform the following steps:

1. Rotate the latch knob on the quick release arm.
2. Remove the hex head screw and clamping collar. Remove the drive roll from the shaft.
3. The new roll to be installed is stamped for the size to be fed. An "A" after the size indicates aluminum wire. Remove the rolls from the kit and wipe them clean. Wipe the output shaft and locating shoulder clean.
4. Use the drive key, clamping collar, and hex head screw to install the roll on the output shaft. Certain size drive rolls consist of two roll halves, and may contain a spacer. If the drive roll you are installing contains a spacer, the spacer fits between the two halves of the drive roll. Tighten the hex head screw.
5. Back out the guide tube clamping screws. Remove the old guide tubes, if installed.
6. Insert the outgoing guide tube (the one with the plastic insert) into the front hole. If the guide tube has a non-symmetrical chisel end, the larger radius must face the drive roll. **See Figure B.2.** Push the guide tube back as far as it will go and tighten the clamping screw. Insert the incoming guide tube as far back as it will go and tighten the clamping screw. The clamping screws are dog points. When the guide tubes are properly installed these dog points will lock into the annular grooves in each of the guide tubes.
7. Set the idle roll pressure as detailed in the **Idle Roll Pressure Setting Procedure** detailed later in this section.

### FIGURE B.2 – INSTALLING DRIVE ROLLS ON A TWO-ROLL FEEDER



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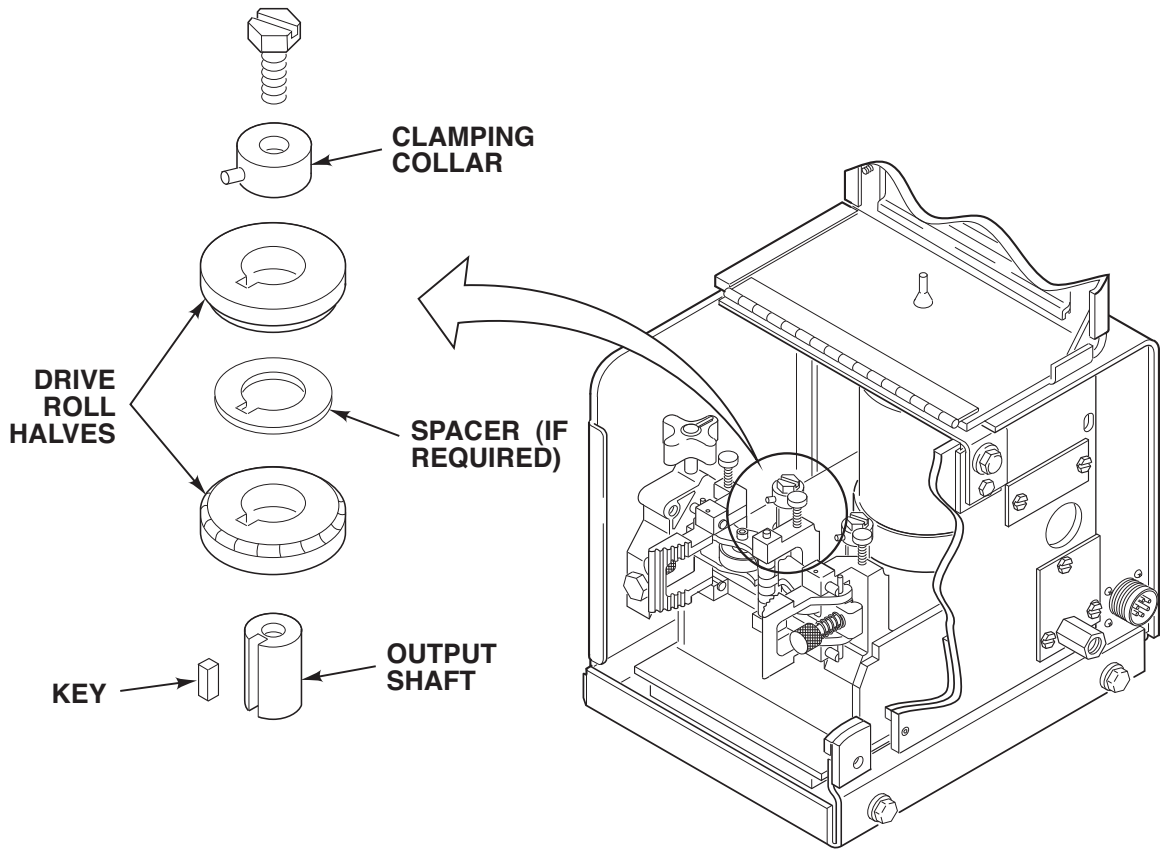
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## CHANGING DRIVE ROLLS FOR FOUR-ROLL WIRE FEEDERS:

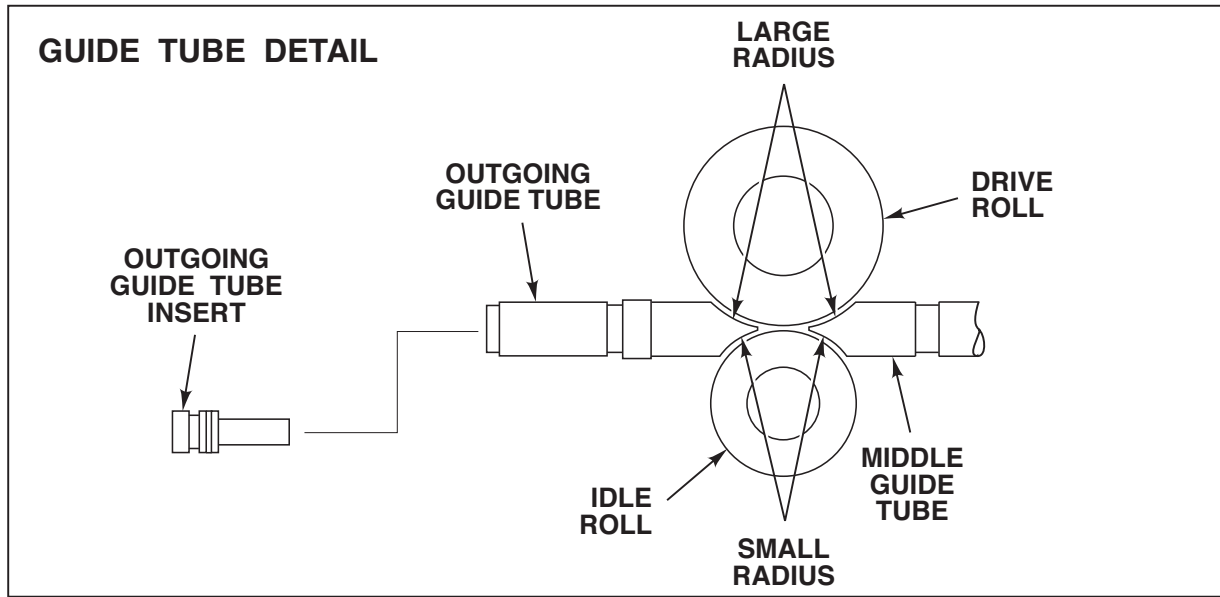
To change drive rolls on a four-roll wire feeder, **See Figure B.3** and perform the following steps:

1. Remove the gun and cable from the conductor block on the feeder by loosening the hand screw and pulling the gun straight out of the block.
2. Open both quick release levers by moving the levers outward and pulling them toward you.
3. Loosen the thumb screws holding the guide tubes in place. Remove the incoming and outgoing guide tubes, if installed.
4. Remove the hex head screws and clamping collars from the output shafts. Remove the drive rolls and middle guide tube, if installed.
5. The new rolls to be installed are stenciled with the wire size that will be fed. An "A" after the number indicates aluminum wire. Remove the rolls from the kit and wipe them clean. Wipe the output shafts and locating shoulders clean.
6. Install one roll onto either output shaft using the drive key, clamping collar, and hex head screw. Certain size drive rolls consist of two roll halves, and may contain a spacer. If the drive roll you are installing contains a spacer, the spacer fits between the two halves of the drive roll. Tighten the hex head screw.
7. Install the middle guide tube, but do not tighten at this time. When installing a 0.035" middle guide tube the larger radius should be aligned towards the drive roll. Slide the guide tube up against the drive roll.
8. Install the second drive roll on the remaining shaft the same way as the first. Center the middle guide tube between the rolls and tighten the thumbscrews holding it in place.
9. Close and latch both quick release levers.
10. Slide the incoming guide tube into the rear hole of the gearbox until it almost touches the drive roll and guide tube. Tighten the thumbscrew to hold it in place.
11. Install the outgoing guide tube into the front hole of the gearbox (through the conductor block) and tighten the thumb screw. The 0.035 in. outgoing guide tube should have the larger radius oriented toward the drive roll. For proper installation of the outgoing guide tube insert, **See Figure B.3**.
12. Be certain that the guide tubes do not touch the drive rolls or idle rolls. If they do touch, readjust them and tighten in place.

### FIGURE B.3 – INSTALLING DRIVE ROLLS ON A FOUR-ROLL FEEDER



### GUIDE TUBE DETAIL



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## IDLE ROLL PRESSURE SETTING

The idle roll pressure is set at the factory. Two-roll feeders are set with the pressure adjustment knob backed out two turns from full pressure, and four-roll feeders are set backed out three turns. This is an approximate setting. For small wire sizes and aluminum wire the optimum idle roll pressure varies with type of wire, surface condition, lubrication, and hardness. The optimum idle roll setting can be determined as follows:

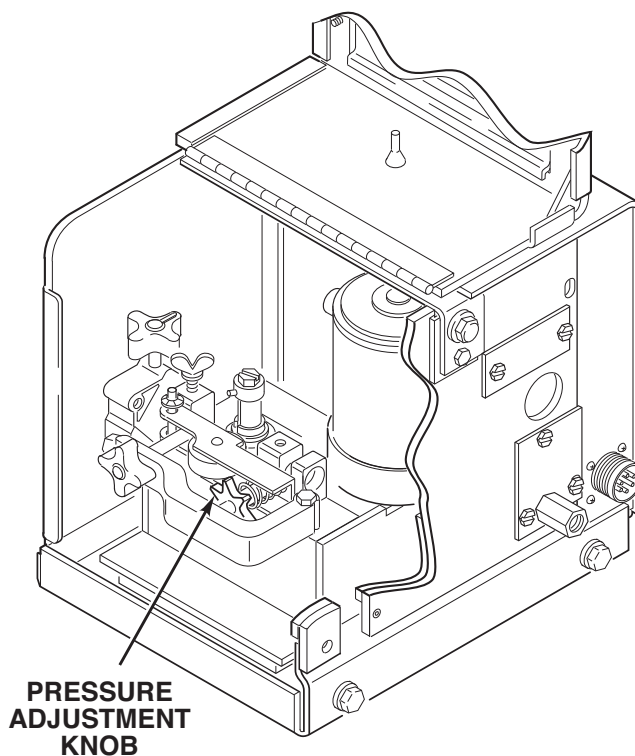
### Two-roll wire feeders:

1. Press the end of the gun against a solid object that is electrically isolated from the welder output and press the trigger for several seconds.
2. If the wire "birdnests", jams, or breaks at the drive roll, the idle roll pressure is set too high. Back the pressure adjustment knob, Figure B.4, out 1/2 turn. Run new wire through the gun and repeat step 1.
3. If the only result is drive roll slippage, loosen the gun cable clamping screw on the conductor block and pull the gun cable forward about six inches. There should be a slight waviness in the exposed wire. If there is no waviness, the pressure is too low. Increase the pressure setting 1/4 turn. Lock the gun cable in place and repeat steps 1 and 2.

### Four-roll wire feeders:

1. Release the incoming idle roll and perform the pressure setting procedure for two roll feeders to set outgoing idle roll pressure.
2. After outgoing pressure is set, determine how many turns away from full pressure the setting is.
3. Set both idle roll tensions to this setting. Engage both idle rolls before welding. For most applications, best wire feeding will occur when both idle roll pressures are set the same.

FIGURE B.4 – IDLE ROLL PRESSURE SETTING



PRESSURE  
ADJUSTMENT  
KNOB

## WIRE LOADING

### WIRE REEL LOADING – READI-REELS® AND SPOOLS

TO MOUNT A 30 LB READI-REEL® PACKAGE USING THE MOLDED PLASTIC K363-P TYPE ADAPTER:

1. Make certain that the threaded locking collar is tight and securely locks the adapter on the spindle. See Figure B.5.
2. Rotate the spindle and adapter so the retaining spring is at the 12 o'clock position.
3. Position the ReadI-Reel® so that it will rotate in a clockwise direction when feeding (wire is to be de-reeled from the bottom of the coil).
4. Set one of the ReadI-Reels® inside cage wires on the slot in the retaining spring tab.
5. Lower the ReadI-Reel® to depress the retaining spring and align the other inside cage wires with the grooves in the adapter.

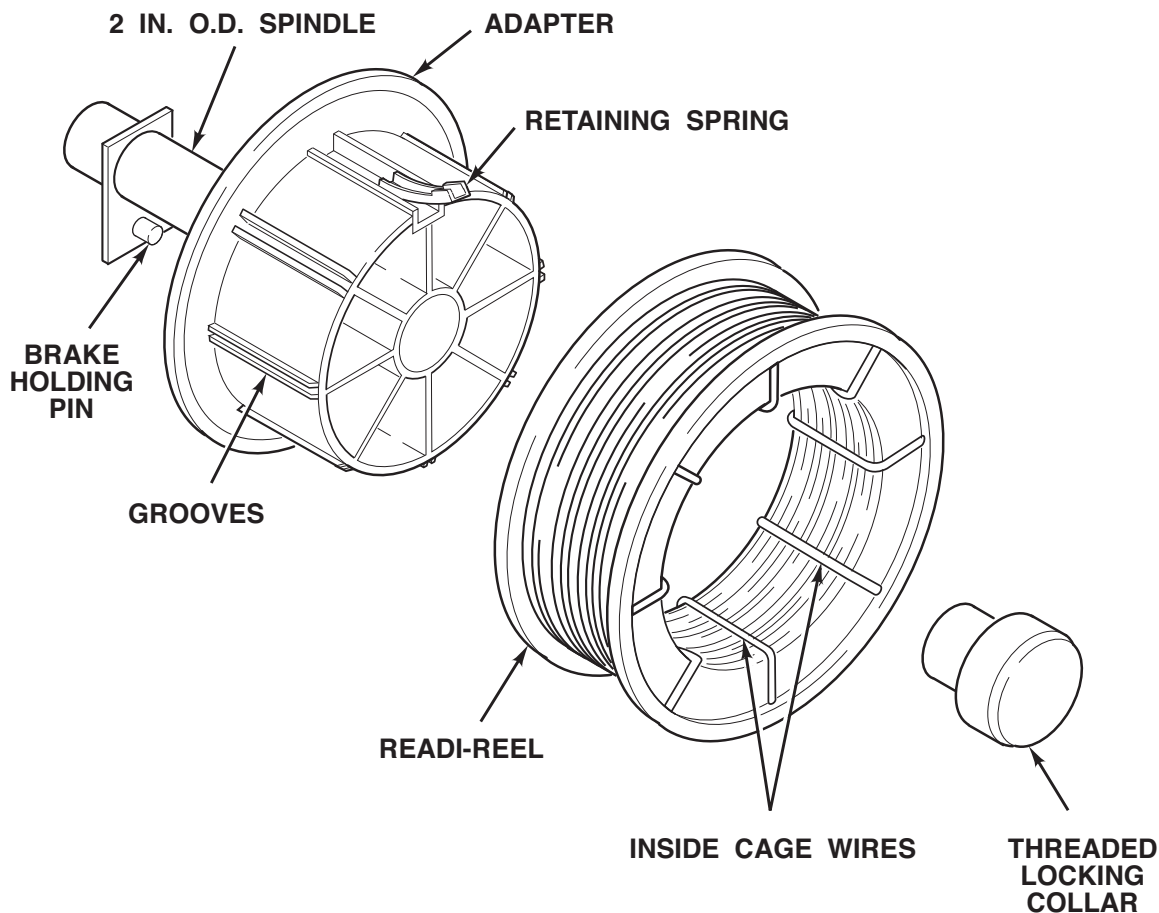
6. Slide the cage all the way onto the adapter until the retaining spring “pops up” fully.

### ⚠ WARNING

Check to be sure the retaining spring has been fully returned to the locking position and has **SECURELY** locked the ReadI-Reel® cage in place. Retaining spring must rest on the cage, not the welding electrode.

7. To remove the ReadI-Reel® from the adapter, depress the retaining spring with thumb while pulling the ReadI-Reel® cage from the adapter with both hands. Do not remove the adapter from the spindle.

FIGURE B.5 – INSTALLING A 30 LB READI-REEL® PACKAGE



LN-7™ GMA WIRE FEEDER



**TO MOUNT 10 TO 30 LB SPOOL (12" DIAMETER):**

(For 8 in. spools a K468 spindle adapter must be used.)

1. Remove the locking collar and Read-Reel adapter shipped on the 2 in. diameter spindle (adapter is not required).
2. Place the spool on the spindle making certain the brake holding pin enters one of the holes in the back side of the spool. Be certain the wire comes off the reel in a clockwise direction when de-reeled from the bottom of the coil.
3. Replace and tighten the locking collar.

**ELECTRODE FEEDING AND BRAKE ADJUSTMENT**

1. Turn the REDI-REEL® or spool until the free end of the electrode is accessible.
2. While tightly holding the electrode, cut off the bent end and straighten the first six inches. Cut off the first inch. (If the electrode is not properly straightened, it may not feed or may not go into the outgoing guide tube, causing a "birdnest".)
3. Insert the free end through the incoming guide tube.
4. Press the gun trigger and push the electrode into the drive roll.

**⚠ WARNING****ELECTRIC SHOCK can kill.**

- Do not touch electrically live parts such as output terminals or internal wiring.
- When inching with the gun trigger, electrode and drive mechanism are "hot" to work and ground.

- 
5. Inch the electrode through the gun.
  6. Adjust the brake tension with the thumbscrew on the spindle hub until the reel turns freely but with little or no overrun when wire feeding is stopped. Do not overtighten.

## WIRE REEL LOADING – 50 AND 60 LB COILS (K303 OR K376 WIRE REEL STAND)

### ADJUSTABLE WIRE REEL BRAKE

The mount for standard 50 and 60 pound electrode coils includes a two-position brake assembly. Generally the brake should be at the inner position (nearest to the wire reel shaft) for wire feed speeds below 400 in./min (10 m/min). It should be at the outer position for the faster wire speeds often used when feeding smaller diameter electrode.

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

### TO MOUNT A 50 OR 60 LB COIL:

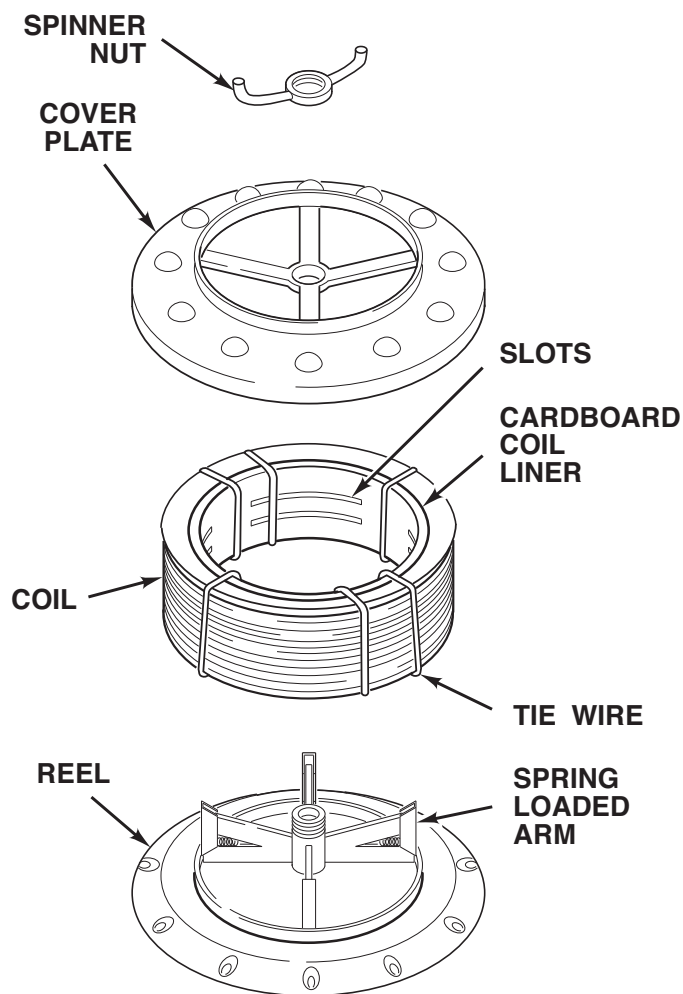
1. To remove the wire reel from its shaft, grasp the spring loaded knob and pull out. This straightens the knob so it seats into the shaft when released. Remove the reel.
2. Lay the reel flat on the floor. Loosen the spinner nut and remove the cover plate. See Figure B.6.
3. Place the coil of electrode on the reel so it unwinds as the reel rotates clockwise. DO NOT cut the tie wires at this time.
4. Be sure the coil is placed so the spring loaded arms will not interfere with the later removal of the coil tie wires.
5. When loading 0.030, 0.035, and 0.045" electrode, 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 sides needed for trouble-free wire feeding.
6. Put the cover plate on the reel so the four arms of the cover plate straddle and are in line with the spring loaded arms of the reel.
7. Tighten the cover as much as possible by hand. DO NOT hammer on the spinner nut arms.

## ⚠ CAUTION

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

8. Cut and remove only 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.
9. Replace the reel on the wire feeder. Grasp the shaft knob, pull it out and swing it across the reel hub, locking the reel in place.

FIGURE B.6 – LOADING A 50 OR 60 LB COIL



## FEEDING ELECTRODE

1. Turn the reel until the free end of the electrode is accessible.
2. While tightly holding the electrode, cut off the bent end and straighten the first six inches. Cut off the first inch. (If the electrode is not properly straightened, it may not feed or may not go into the outgoing guide tube causing a "birdnest".)
3. Insert the free end through the incoming guide tube.
4. Press the gun trigger and push the electrode into the drive roll.

### WARNING



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

- Do not touch electrically live parts such as output terminals or internal wiring.
- When inching with the gun trigger, electrode and drive mechanism are "hot" to work and ground.

5. Inch the electrode through the gun.

## WIRE LOADING – 13-14 LB INNERSHIELD COILS

The K378 small mounting stand for the 14 lb Innershield coil does not have an adjustable brake. It has a fixed drag built into the reel spindle.

### To load a 14 lb coil:

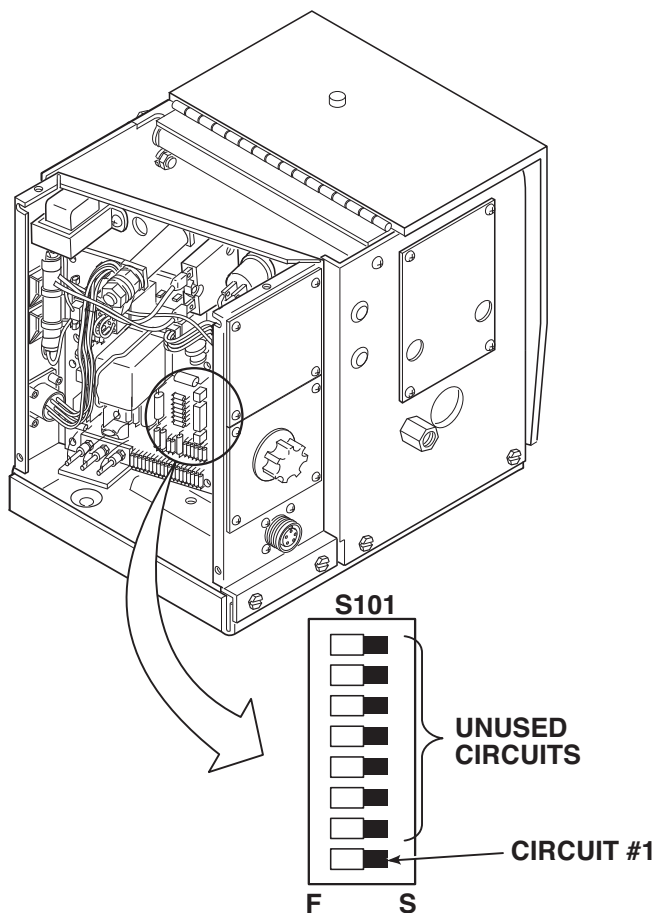
1. Remove the snap-on lid from the plastic canister.
2. Remove the center clamping nut and the cover plate from the wire reel.
3. Unpack the 14 lb coil of wire. Be sure not to bend the side tangs of the liner. Straighten any tangs that may have been bent.
4. Remove the start end of the coil from its holding slot in the coil liner. Cut off the bent end, straighten the first six inches, and cut off the first inch. (If the electrode is not properly straightened, it may not feed or may not enter the outgoing tube, causing a "birdnest".)
5. Thread the end through the canister wire feed liner until about four inches of electrode are exposed.
6. Place the coil onto the disc support.
7. Replace the front reel cover and center clamping nut. Keep the reel from turning and tighten the center clamping nut securely.
8. Thread the exposed end of the electrode into the wire feeder until it touches the drive rolls. Actuate the gun trigger and feed the electrode through the system.

## ACCELERATION SETTING

The LN-7™ and LN-7™ GMA can be configured for optimum starting for different procedures by selecting between two speeds of controlled wire acceleration. As shipped from the factory, the LN-7™ and LN-7™ GMA models are set for fast acceleration. Fast acceleration is typically the best for most smaller wire procedures. Slow acceleration may be more desirable for long stickout applications, or if a larger diameter electrode is being used.

Acceleration is set on the control PC board. To gain access to the control PC board, make certain the input power is off and remove the side cover on the control side of the LN-7™ or LN-7™ GMA. To change the acceleration on earlier control PC boards, reconnect the jumper to “F” (Fast) or “S” (Slow). Later control PC boards use a DIP switch (S101). S101 has 8 circuits (switches); only circuit #1 is used. Set circuit #1 in the “F” position for fast acceleration or in the “S” position for slow acceleration. See Figure B.7.

**FIGURE B.7 – ACCELERATION SETTING  
(LATER CONTROL PC BOARDS)**



## WIRE SPEED AND VOLTAGE ADJUSTMENT

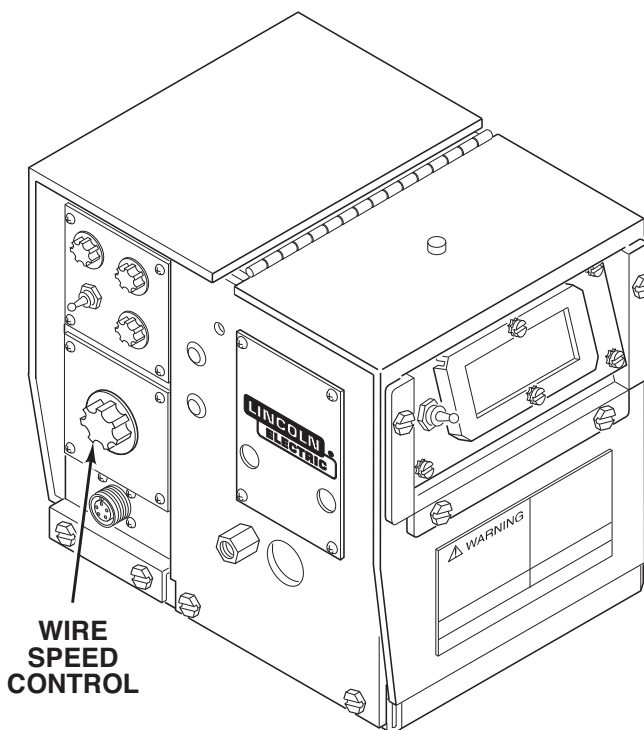
Use only constant voltage power type sources. If using a multiple process power source, be sure it is set for constant voltage output per instructions in the manual for the power source.

Set the power source polarity switch or properly connect the electrodes and work leads for the correct electrode polarity. If the wire feeder is equipped with an optional meter kit, set the meter polarity switch to the proper working polarity.

Set the voltage using the control on the power source or the optional remote voltage control, if used. Set the open circuit voltage to approximately 2 volts higher than the desired procedure voltage. The final setting must be made according to the arc voltage while welding.

The wire speed control on the front of the wire feeder, Figure B.8, has a dial that is calibrated directly in inches per minute. Set the control for the desired procedure wire speed.

**FIGURE B.8 – SETTING WIRE SPEED**



LN-7™ GMA WIRE FEEDER



## MAKING A WELD

1. Inch the electrode through the gun and cable. For solid wire, cut the electrode within approximately 3/8 in. of the end of the contact tip. If using cored wire, cut the electrode within 3/4 in. of the extension guide.
2. Connect the work cable to the metal to be welded. The work cable must make good electrical contact with the work. The work must also be grounded.

### **⚠ WARNING**

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

3. Position the electrode over the joint. The end of the electrode may be lightly touching the work.
4. Lower your welding helmet. Close the gun trigger and begin welding. Hold the gun so the contact tip to work distance gives the correct electrical stickout as required for the procedure being used.
5. To stop welding, release the gun trigger and then pull the gun away from the work after the arc goes out.

## WIRE REEL CHANGING

At the end of a coil, remove the last of the old electrode from the conductor cable. Either pull it out at the nozzle, or use the following procedure.

1. Cut off the end of the electrode at the gun end. Do not break it off by hand. Breaking by hand puts a slight bend in the wire, making it difficult to pull it back through the nozzle.
2. Uncouple the gun conductor cable from the conductor block on the wire feeder drive unit and lay the gun cable out straight.
3. Using pliers, grip the wire and pull it out of the cable from the connector end.
4. After the electrode has been removed, connect the gun conductor back to the wire feeder.
5. Load a new reel of electrode per the instructions for the specific reel type given previously in this section.

## K417 DIGITAL VOLTMETER KITS

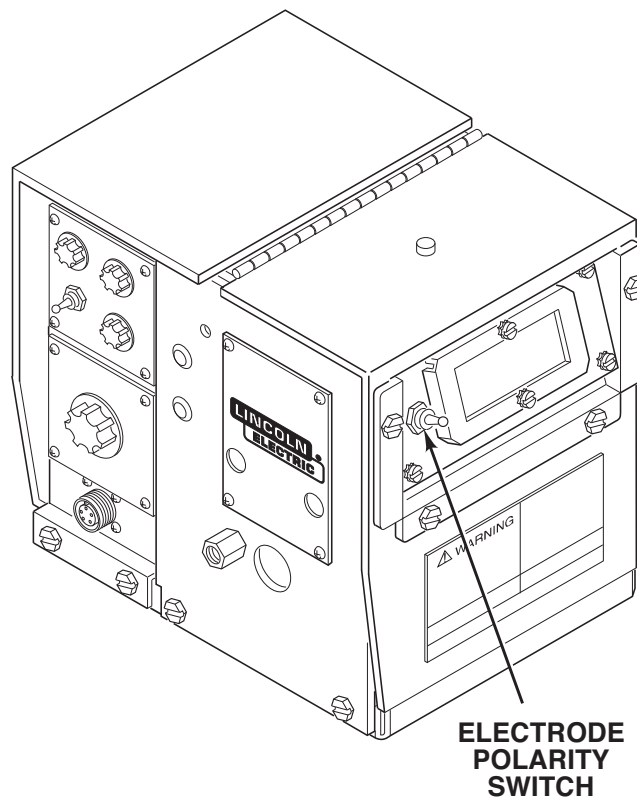
Lincoln Specified Procedures give voltmeter readings taken between the work and the gun cable brass connection block inside the LN-7™. To match these voltage readings, the #21 lead should be extended directly to the work per the instructions on the wire feeder to power source connection diagrams given in the **Installation** Section.

To read volts, set the “Electrode Polarity” switch, Figure B.9, to the same polarity as the electrode lead connection to the power source.

The K417 Digital Voltmeter Kit has a hold feature that will freeze the last arc voltage reading at the moment the trigger is released to stop welding. This feature allows the welding operator to easily check the arc voltage and make adjustments if necessary to match procedures. **For accuracy, it is important to release the gun trigger and the lift the gun away from the work.**

The hold circuit automatically releases about six seconds after the gun trigger is released. It is also released when the trigger is closed again to begin welding.

**FIGURE B.9 – ELECTRODE POLARITY SWITCH**



## FLUX TANK LOADING

### K320 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 in the holes in the side of the cap. After pressure has been released, remove the cap from the tank. Using the funnel provided, put 100 pounds of flux in 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 vibrating screen with 0.065 in. to 0.075 in. 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.

There will always be a small amount of air and possible 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.

### K310 FLUX SCREEN (OPTIONAL)

The unit was designed to fit the top of either the standard fill funnel or a K58 magnetic separator. The unit has a steel screen with 0.065 to 0.075 in. openings and an air vibrator attached to the frame. The vibrator can be used with air line pressures ranging from 20 through 100 psi.

For ease of handling, the user should connect the incoming air line to the 1/8 in. pipe elbow with the aid of a quick 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.

### K58 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 feeding system.

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 used in the continuous flux feeding systems. 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.

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LN-7™ GMA WIRE FEEDER



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    General ..... C-2

    Auxiliary Equipment Connection ..... C-3

    K162-1 Spindle ..... C-3

    K163 Undercarriage ..... C-3

    K419 Burnback Timer Kit ..... C-3

    K418 GMA Timer Kit ..... C-4

    K417 Digital Voltmeter Kit ..... C-4

    K320 Flux Tank ..... C-4

    Wire Reel Dust Shield Door For K303 ..... C-4

    Power Input Cables ..... C-4

    Welding Guns ..... C-4/C-5

    Attaching the Wire Reel Stand ..... C-5

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**GENERAL**

The following is a list of the accessories that can be used with the LN-7™ GMA wire feeder.

**TABLE C.1 – LN-7™ GMA ACCESSORIES**

Product Number	Name
K162-1**	Spindle Kit-Two inch Hub
K163**	Undercarriage
K419**	Burnback Timer kit
K418**	GMA Timer Kit
K417**	Digital voltmeter kit
K320**	Flux tank
K303**	50-60 lb Wire reel mounting stand
M-11514	Wire reel dust shield door for K303
	Weld Power Cables:
K1840-10	Twist-Mate to Lug- 1/0, 350A, 60% Duty Cycle, 25 ft.
K1841-25	Twist-Mate to Twist Mate- 1/0, 350A, 60% Duty Cycle, 25 ft.
K1841-50	Twist-Mate to Twist Mate- 2/0, 350A, 60% Duty Cycle, 25 ft.
K1842-10	Lug to Lug-3/0, 600A, 60% Duty Cycle, 10 ft.
K1842-35	Lug to Lug-3/0, 600A, 60% Duty Cycle, 35 ft.
K1842-60	Lug to Lug-3/0, 600A, 60% Duty Cycle, 60 ft.
K1842-110	Lug to Lug-4/0, 600A, 60% Duty Cycle, 110 ft.
	Welding Guns:
K126**	Innershield gun - 350 Amps
K115**	Innershield welding gun - 450 Amps
K112**	Submerged arc welding gun - 500 Amps
K113**	Submerged arc welding gun - 600 Amps
K497*	Magnum GMA welding gun - 200 Amps
K470*	Magnum GMA welding gun - 300 Amps
K471*	Magnum GMA welding gun - 400 Amps
K527**	Water solenoid kit
K494**	Gas solenoid valve kit (Included on LN-7™ GMA)
K1818-10	Wire Feeder Control Cable - 10 ft.
K1797-25	Wire Feeder Control Cable Extensions Requires K1818-10
K1797-50	Wire Feeder Control Cable Extensions Requires K1818-10
K1798	Adapter Cable for Control Cable to Terminal Strip Power Source
K1803-1	Work and Wire Feeder Power Cables Package

\*Magnum GMA welding guns require a K466-1 connector for use with the LN-7™ GMA wire feeder.

\*\*A detailed description of each item is given later in this section.

LN-7™ GMA WIRE FEEDER



## AUXILIARY EQUIPMENT CONNECTION

The power for 115 volt AC auxiliary equipment can be obtained from the 7 and 32A terminals inside the control box. The 7 and 32A circuit is energized when the gun trigger circuit is closed.

**NOTE:** The LN-7™ GMA already has the factory installed gas solenoid valve leads attached to terminals 7 and 32A. Additional auxiliary equipment connection is not recommended.

Install 1/4" quick connect terminals to the leads from the auxiliary equipment. Rout the leads through the same hole that the motor leads pass through to the inside of the control box and connect the terminals to #32A and #7 on the control PC Board. Rout the leads so that they are .50" or greater away from the chassis mounted power resistor. The current draw must NOT exceed 1/4 ampere.

### ⚠ CAUTION

**Do not connect the power source contactor to these terminals.**

**NOTE:** The auxiliary equipment contacts open when the trigger is released. When the optional K418 GMA Timer Kit is installed, the auxiliary contacts open after the postflow time delay.

## K162-1 SPINDLE

The K162-1 spindle is used for mounting Readi-Reels® and 2 in. I.D. spools with a 60 lb capacity on a K303 Wire Reel Stand. When used with Readi-Reels®, a Readi-Reel® Adapter is required. For 8 in. O.D. spools, a K468 Spindle Adapter is available.

The K162-1 is a high capacity design which replaces the original K162 30 lb spindle. The K162-1 spindle has a white spacer and has part no. M-14587-1 molded on. The original K162 spindle has a black spacer and the part no. M14587. Parts may not be exchanged from one design to the other.

### ⚠ WARNING

**Do not use coils or spools heavier than 30 lbs on the original K162 spindle.**

To mount the 2 in. spindle kit for Readi-Reels® and 10 through 60 lb spools, remove the shaft for the standard 50-60 pound wire coils from the mounting framework. Install the spindle per the instructions (M15241) shipped with the spindle kit.

## K163 UNDERCARRIAGE

The undercarriage includes casters, wheels, a handle, and related hardware. Casters are mounted at the front and wheels at the rear of the platform. The handle is bolted to the front of the platform so the wire feeder can be tilted back and wheeled like a two-wheel truck. Installation sheet M13424 is provided with the undercarriage.

## K419 BURNBACK TIMER KIT

The kit is available for those applications where the LN-7™ or LN-7™ GMA is used for higher speed, fine wire feeding (0.023 in. to 0.045 in. wire sizes) where there is a tendency for the electrode to overrun at the end of the weld causing "sticking" in the crater. The kit provides a precise time delay that allows the wire to be burned off at the end of the weld. The delay is adjustable for optimum burnback depending on wire size, process, procedure, etc. This kit also includes a cold inch switch.

The K419 Burnback Kit is also useful for those installations where the gun is clamped in a fixture and cannot be lifted from the work at the end of the weld.

Installation and operation instructions (M15060) are included with the kit.

### K418 GMA TIMER KIT

This kit is available to provide the following functions:

1. Preflow Control – Provides flow of shielding gas to the work before the arc is established. The solenoid valve is energized immediately when the gun trigger is closed, but the time delay before the wire feeder is energized is adjustable to between 0 and 1.5 seconds.
2. Postflow Control – Provides flow of shielding gas to the work after welding is stopped. Solenoid valve shutoff delay after the trigger is released is adjustable from 0.5 to 4.5 seconds.
3. Burnback Control – Provides a precise time delay that allows the wire to be burned off at the end of the weld. The delay is adjustable for optimum burnback depending on the wire size, process, procedure, etc.
4. Purge - Cold Inch Switch – Momentary Up position energizes the gas solenoid but not the wire feeder or welding power source. Momentary down position energizes the wire feeder but not the welding power source or the gas solenoid valve.

Installation and operation instructions (M15059) are included with the kit.

### K417 DIGITAL VOLTMETER KIT

Includes a three digit LED display and a polarity switch. Also includes a hold feature that freezes the display for approximately six seconds at the reading just prior to stopping welding. This feature allows the operator to easily check his procedure at the end of the weld and make adjustments if required. Installation instructions (M15080) are included with the kit.

### K320 FLUX TANK

The K320 flux tank is available to permit the LN-7™ or LN-7™ GMA to be used for submerged arc welding. Install per the instructions shipped with the kit.

### WIRE REEL DUST SHIELD DOOR FOR K303

In extremely dusty and dirty locations this door kit can be added to those units having the dust shield kit (S-14543). This door kit includes a hinged door and sliding bottom seal. When these parts are attached to the reel support per the instructions included, the unit becomes a completely enclosed housing. Order part no. M11514.

### POWER INPUT CABLES

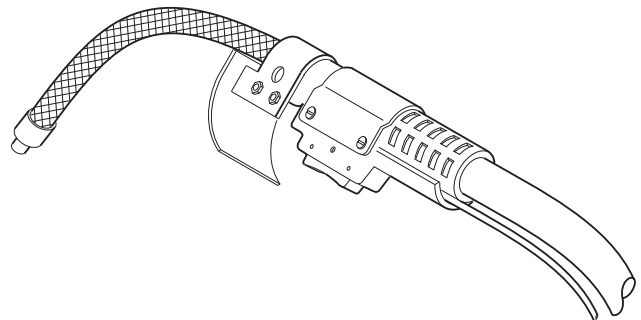
A variety of power input cable assemblies are available for various current ratings and power source connection types. All provide a polarized control cable plug (MS-3106A-18-12S) and a lugged electrode cable for connection to the wire feeder.

### WELDING GUNS

#### INNERSHIELD GUNS

The K126 gun and cable assembly is recommended for most welding with 0.062 in. through 3/32 in. Innershield electrodes at up to 350 amps. Install the insulated nozzle extension (or thread protector) and the nozzle contact tip for the stickout and electrode size being used. (See Figure C.1.)

FIGURE C.1 – THE K126 GUN



LN-7™ GMA WIRE FEEDER

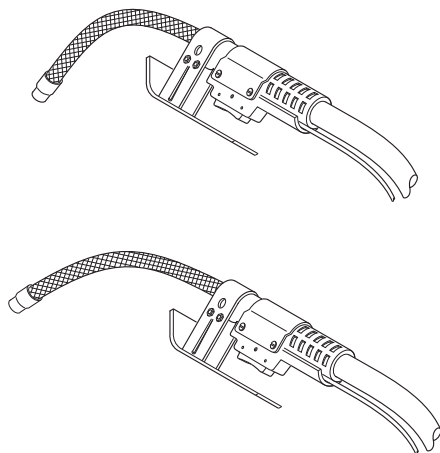


For heavy duty welding at up to 450 amps and with 0.068 in. through 3/32 in. Innershield electrode, use an appropriate K115 or K115-45 gun and cable assembly (See Figure C.2). Install the proper insulated nozzle extension and contact tip for the stickout and electrode size being used.

For welding with 7/64 in. Innershield electrode, use a K115-3/32 with an M11474-120 nozzle or a K115-45-3/32 with an M11510-120 nozzle. Also install a 7/64 in. contact tip and install the insulated nozzle extension for the stickout being used.

**NOTE:** Linconditioner™ guns are recommended 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 in these locations. Instructions are shipped with the equipment.

**FIGURE C.2 – THE K115 AND K115-45 GUNS**



## SUBMERGED ARC GUNS

The K112 gun and cable assembly is recommended for welding with 1/16 in. solid steel electrode at up to 500 amps. The K113 gun and cable is recommended for 5/64 in. and 3/32 in. (2.0 and 2.4 mm) solid steel electrodes (types L50, L60, L61, and L70) for use up to 600 amps.

## GMAW GUNS

An expanding line of Magnum GMA gun and cable assemblies are available to allow welding with solid and cored electrodes using the GMAW process. See the appropriate Magnum literature for descriptions of the 100-500 ampere air cooled gun and cables that are available. Gun cable lengths range from 10 to 25 ft. (3.0 to 7.5 m) and feed electrode sizes 0.023 in. to 3/32 in. (0.6 to 2.4 mm).

**NOTE:** Magnum GMA welding guns require a K466-1 connector for use with an LN-7™ GMA wire feeder.

## K527 WATER SOLENOID KIT

Install and connect per the instructions (M16261) shipped with the kit.

This kit is factory installed on the K440-1 LN-7™ GMA.

## K494 LN-7™ GAS SOLENOID KIT (STANDARD ON LN-7™ GMA)

Install per the instructions (M16057) shipped with the kit.

## K303 50 TO 60 LB WIRE REEL MOUNTING STAND

The K303 60 lb Wire Reel Mounting Stand includes a dust shield. The assembly includes a framework to which is attached the 50 to 60 lb wire reel, a mounting spindle, a lift bale, and a cable clamp for fastening the input cable assembly. It is easily mounted to the basic wire feed unit by following the Attaching the Wire Reel Stand procedure at the end of this section.

## ATTACHING THE WIRE REEL STAND

The mounting hardware for mounting the stands is included with the LN-7™ and LN-7™ GMA. Screws and washers are inserted in their respective mounting holes. To connect:

1. Remove the three 3/8 in. hex head bolts from the back of the wire feed unit.
2. Place the wire reel mounting stand mounting bracket in position against the back of the wire feed unit.
3. Replace and tighten the hex head bolts. The long screw and plain washer go into the top hole.

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LN-7™ GMA WIRE FEEDER



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    Gun Cable Connector Requirements To Permit Connection To LN-7™ GMA And LN-7™ Wire Feeders .D-4

    Sequence of Operation .....D-5

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## ROUTINE MAINTENANCE

### DRIVE ROLLS AND GUIDE TUBES

After feeding every coil of wire, inspect the drive roll section. Clean the assembly as necessary. Do not use solvent to clean the drive roll assembly as it may wash the lubricant out of the bearings. The drive rolls and guide tubes are stamped with the wire sizes they will feed. If a wire size other than that stamped on the rolls is to be used, the rolls and guide tubes must be changed.

The drive rolls for 0.045 and 0.052 cored electrode and 1/16, 0.068, 5/64, 3/32, and 7/64 electrode have a double set of teeth so they can be reversed for additional life. Between the two knurled rolls (except 1/16 and smaller rolls) is a shim washer which limits the damage to the electrode if wire feeding problems occur. Drive rolls for 0.023 through 0.052 solid electrodes have no teeth.

See the instructions included with the drive roll kit for installation and replacement of the drive rolls on the wire feeder.

### WIRE REEL MOUNTING

To prolong the life of the reel shaft on the 50 to 60 lb coils, periodically coat it with a thin layer of grease. No maintenance to the two position brake is required. If the brake shoe wears through to metal, replace the brake assembly.

No routine maintenance is required for Readi-Reels® and 10 to 30 lb spools. Do not lubricate the 2 in. spindles.

### CONTACTOR CIRCUIT FUSE

The 2 amp, 250 volt fuse (F1) on the control P.C. Board protects the contactor circuit (leads #4 and #2) from overloads or shorts which can be caused by a wrong connection at the power source.

## PERIODIC MAINTENANCE

### WIRE DRIVE MOTOR AND GEARBOX

Every year inspect the gearbox and coat the gear teeth with a moly-disulfide filled grease. Do not use graphite grease.

Every six months check the motor brushes. Replace them if they are less than 1/4 in. long.

## GUN AND CABLE MAINTENANCE

For instructions on periodic maintenance for the welding gun and cables, see the manual for your specific model of welding gun.

### 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 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 3/32 Allen wrench.

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

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	DIMENSION
K112 (500)	.38 IN.
K113	.38 IN
K114	.38 IN
K115	.75 IN
K116	.75 IN
K126	.38 IN
K206	.38 IN
K289-5/64	.44 IN
K289-3/32 & .120	.75 IN
K309	.38 IN

**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 of electrode; clean submerged arc gun cables after using approximately 600 pounds 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.

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

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

**AUTOMATIC FLUX FEEDING SYSTEM (K320)**

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

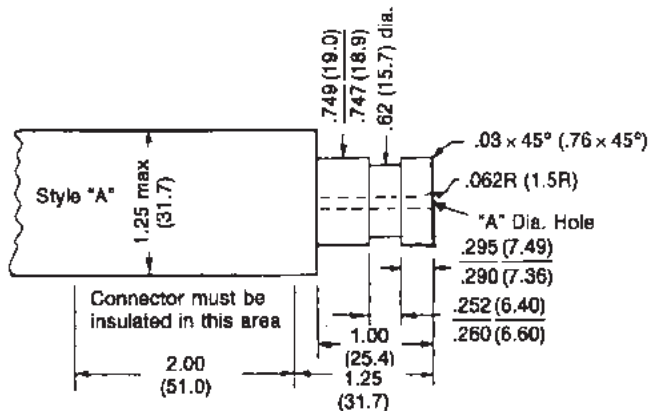
**TO CLEAN:**

Turn off the incoming air and release the tank pressure. Remove the coiled aluminum tubing from the bottom of the filter unit. Remove the pinched copper end piece from the end of the aluminum tube. Wash all the material out of the aluminum tube. Clean out the short pinched section; this should have a gap of between .005 to .050 in. to allow a small amount of air to escape when the equipment is being used. If this end piece is badly corroded, replace it with a new piece.

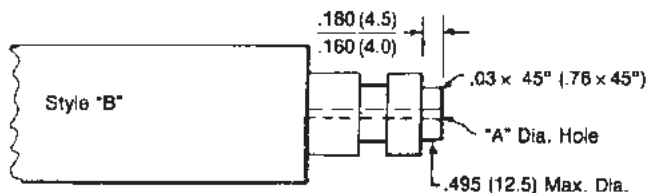
# GUN CABLE CONNECTOR REQUIREMENTS TO PERMIT PROPER CONNECTION TO LINCOLN LN-7™ GMA AND LN-7™ WIRE FEEDER

The following Figures D.1 and D.2 should serve as a guide to determine if a particular gun or switch can be connected to the LN-7™ GMA and LN-7™.

**FIGURE D.1 – LN-7™ CONNECTORS**



**LN-7™ CONNECTOR FOR 1/16-7/64" (1.6-2.0 mm) WIRE**



**LN-7™ CABLE CONNECTOR FOR .023-.052" (0.6-1.3 mm) WIRE (FOR ALL OTHER DIMENSIONS, SEE ABOVE)**

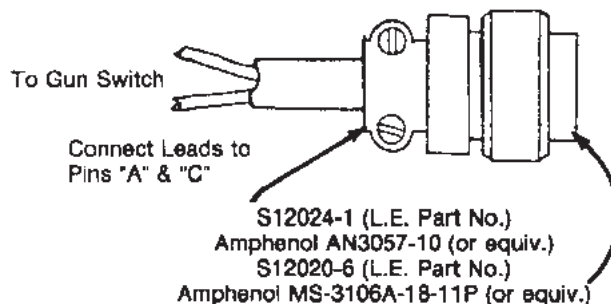
**NOTE:** Connector part with .7459/.747 (19.0/18.9) diameter should be made from brass if it is to be part of the welding current carrying circuit.

Wire Size in. (mm)	"A" Diameter Hole to be Concentric to .749/.747 (19.0/18.9) Diameter Within .008 (.20) F.I.M.
7/64	.152 [#24 Drill]
0.68-5/64 (1.7-2.0)	.125 [1/8" (3.2 mm) Drill]
1/16-0.062 (1.6)	.078 [5/64" (2.0 mm) Drill]
.045 & .052 (1.1 & 1.3)	.062 [1/16" (1.6 mm) Drill]
.023-.035 (0.6-0.9)	.055 [(1.4 mm) #54 Drill]

All dimensions in inches and (millimeters).

**FIGURE D.2 – SWITCH REQUIREMENTS**

1/2 Amp AC 24 Volts – Inductive  
1/2 Amp DC 24 Volts – Inductive



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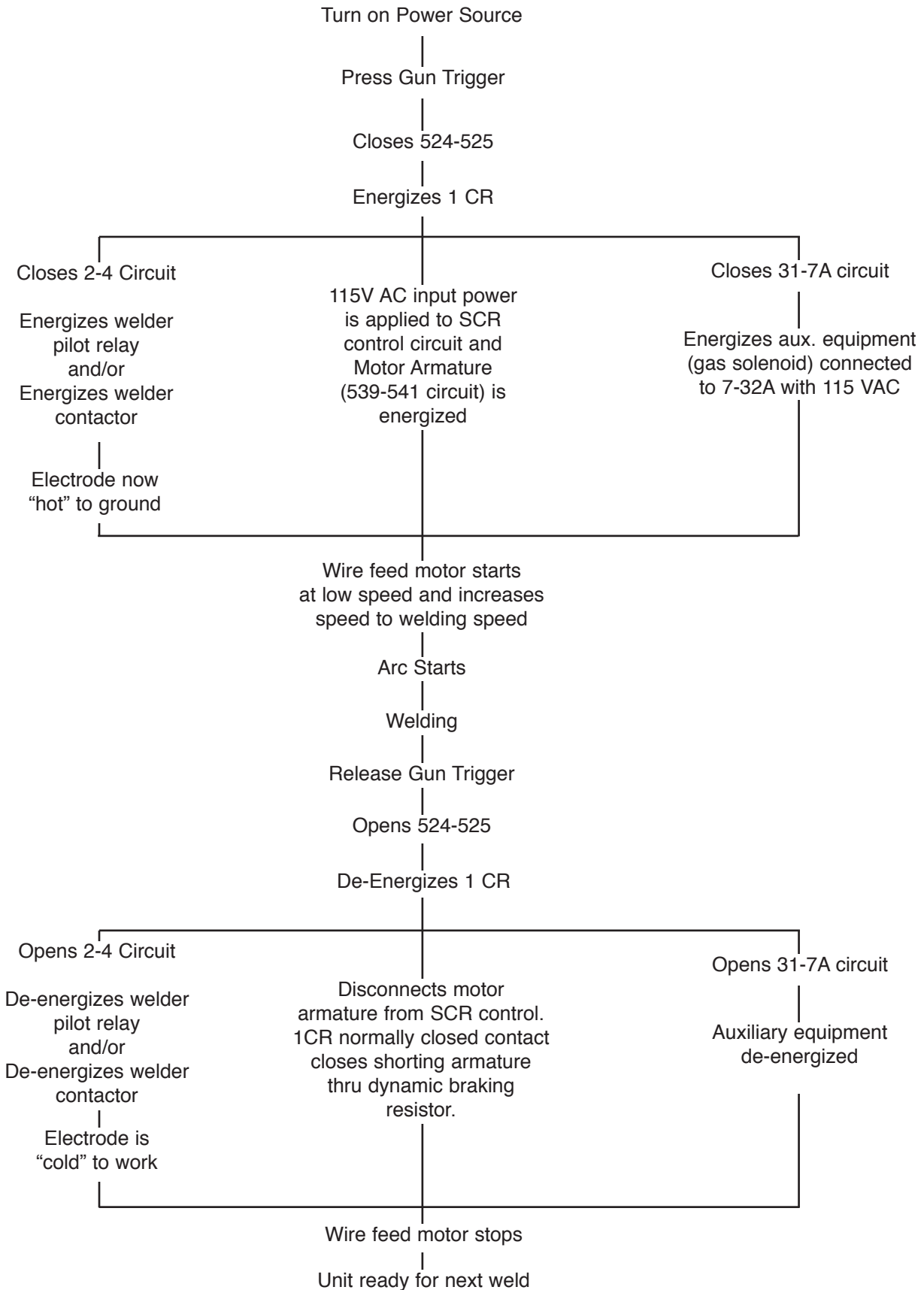
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## LN-7™ SEQUENCE OF OPERATION (Optional Timer Kit not Installed)



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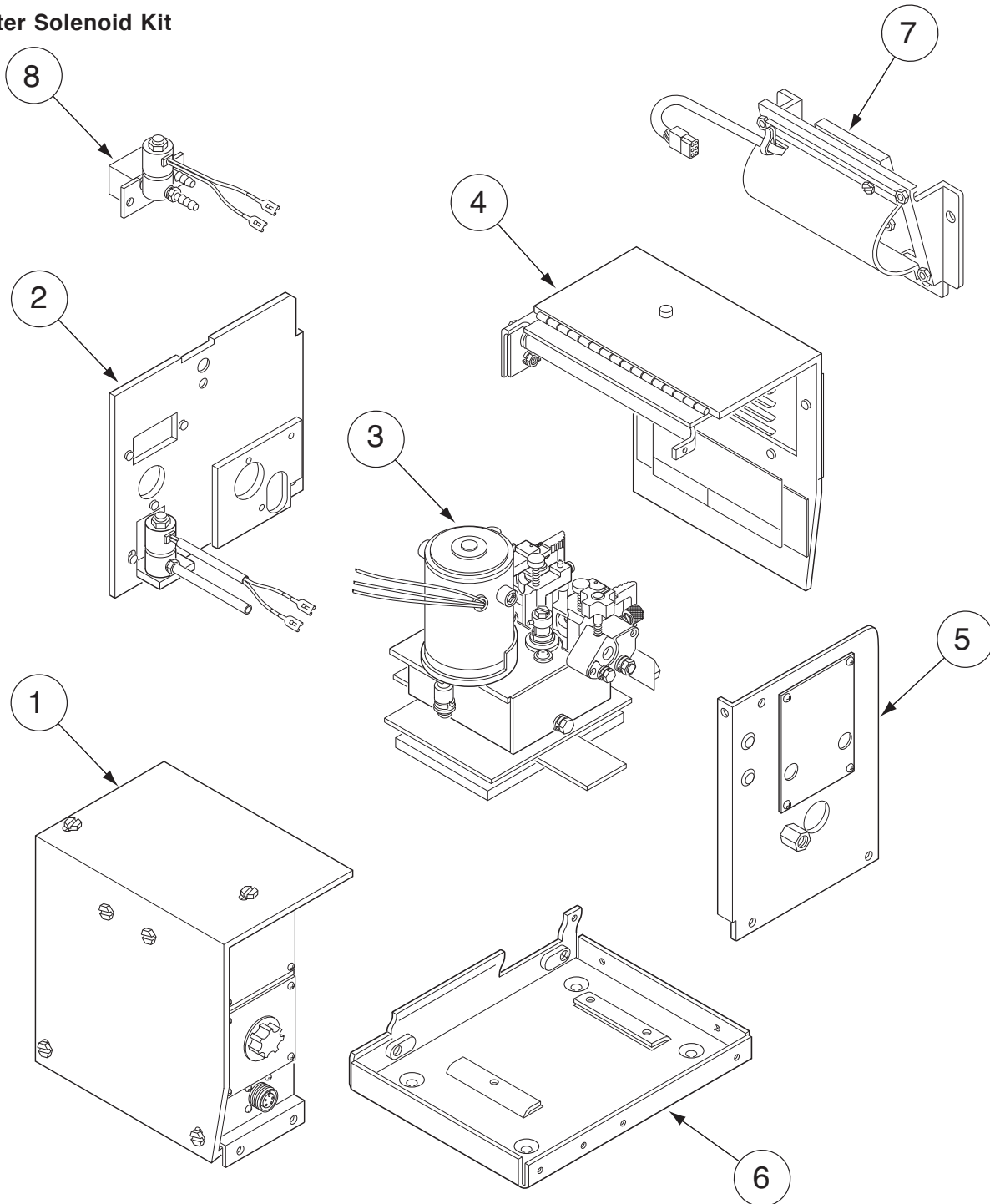
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FIGURE D.3 - MAJOR COMPONENT LOCATIONS

- 1. Control Box Assembly
- 2. Rear Panel Assembly
- 3. Wire Drive Assembly
- 4. Cover And Hinge Assembly
- 5. Case Front Assembly
- 6. Base Plate Assembly
- 7. Analog/Digital Voltmeter Kit
- 8. Water Solenoid Kit



LN-7™ GMA WIRE FEEDER



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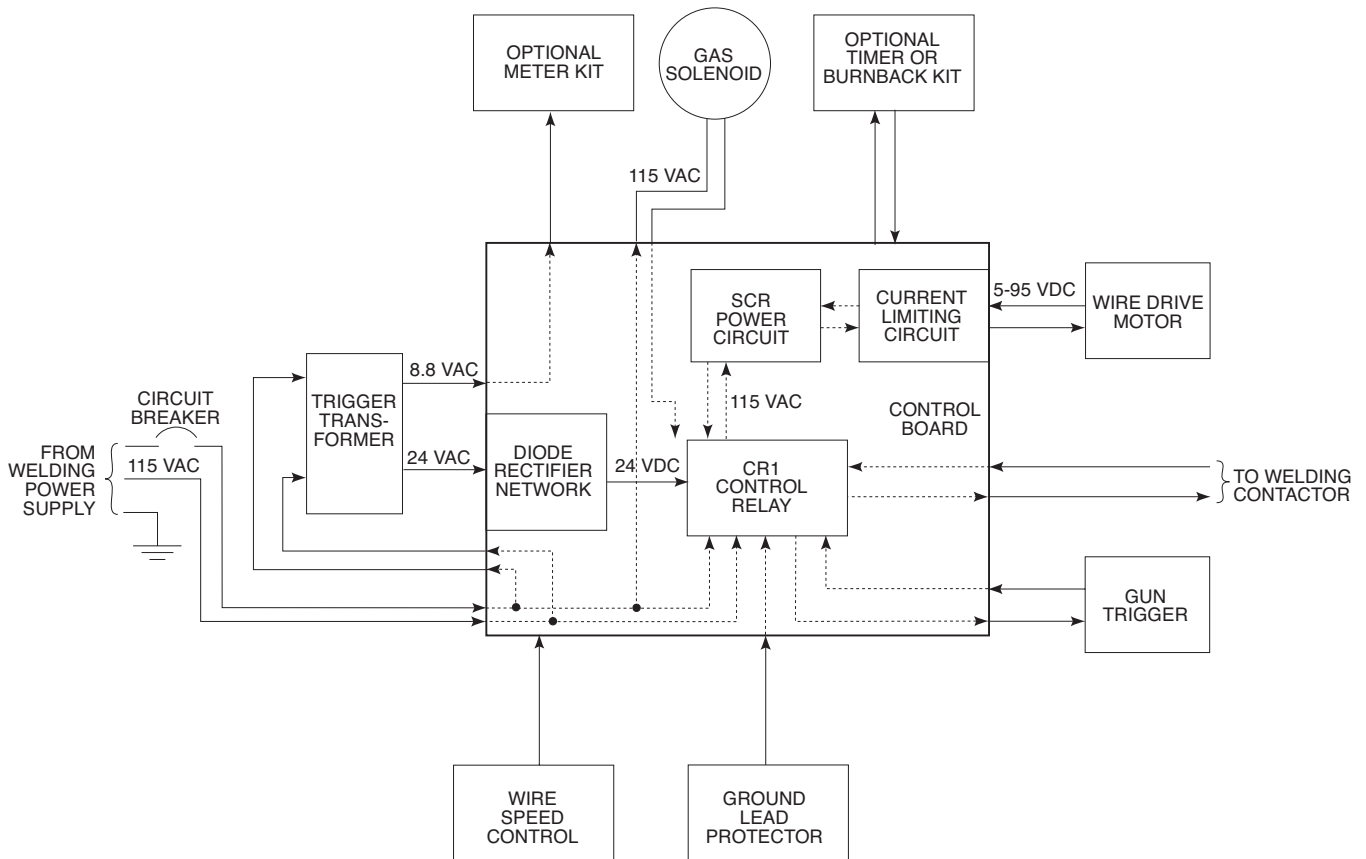
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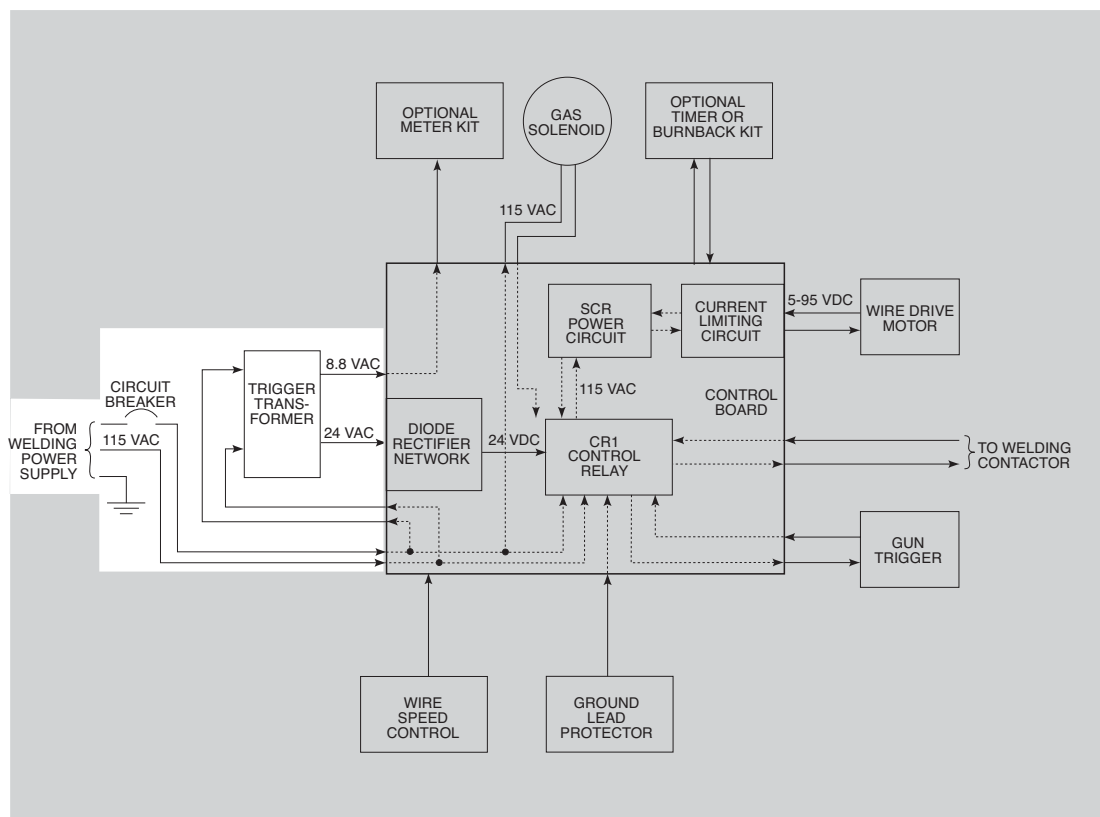
**FIGURE E.1 BLOCK LOGIC DIAGRAM**



**LN-7™ GMA WIRE FEEDER**



FIGURE E.2 - INPUT LINE VOLTAGE AND TRIGGER TRANSFORMER



## GENERAL DESCRIPTION

The LN-7™ GMA wire feeder is available in two versions; a two-roll and a four-roll wire feeder. The operation of the two versions is virtually identical. The following description of the operation of the wire feeders applies equally to both versions of the LN-7™ GMA.

## CONTROL CIRCUIT OPERATION

### POWER INPUT CIRCUITS

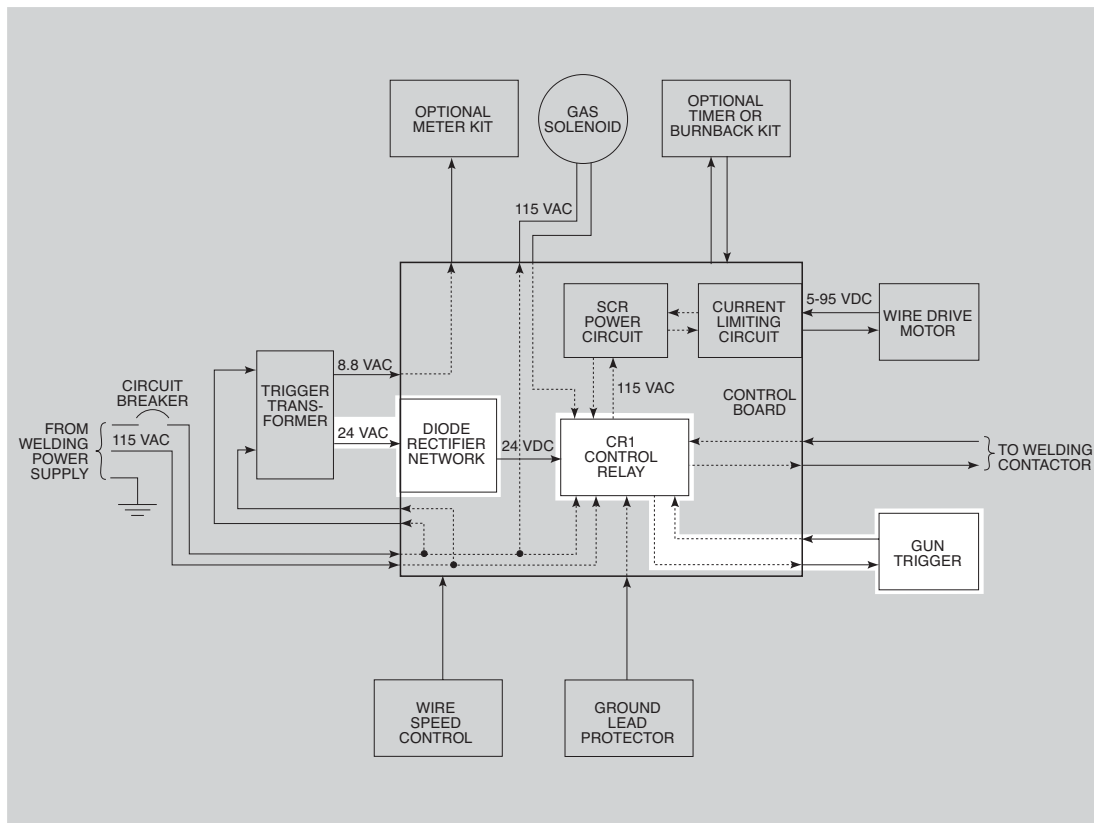
The LN-7™ GMA receives 115 VAC power from the welding supply. This power is applied to the trigger transformer which reduces the voltage for use by the LN-7™ electronics. The voltages produced are 24 VAC, used by the electronics and the trigger circuit, and 8.8, VAC used by the optional digital meter kit. The 115 VAC input power is also sent to the SCR circuitry which powers the wire feed motor. See Figure E.2.

NOTE: Unshaded areas of Block Logic Diagram are the subject of discussion

LN-7™ GMA WIRE FEEDER



FIGURE E.3 - TRIGGER CIRCUIT



## TRIGGER CIRCUIT

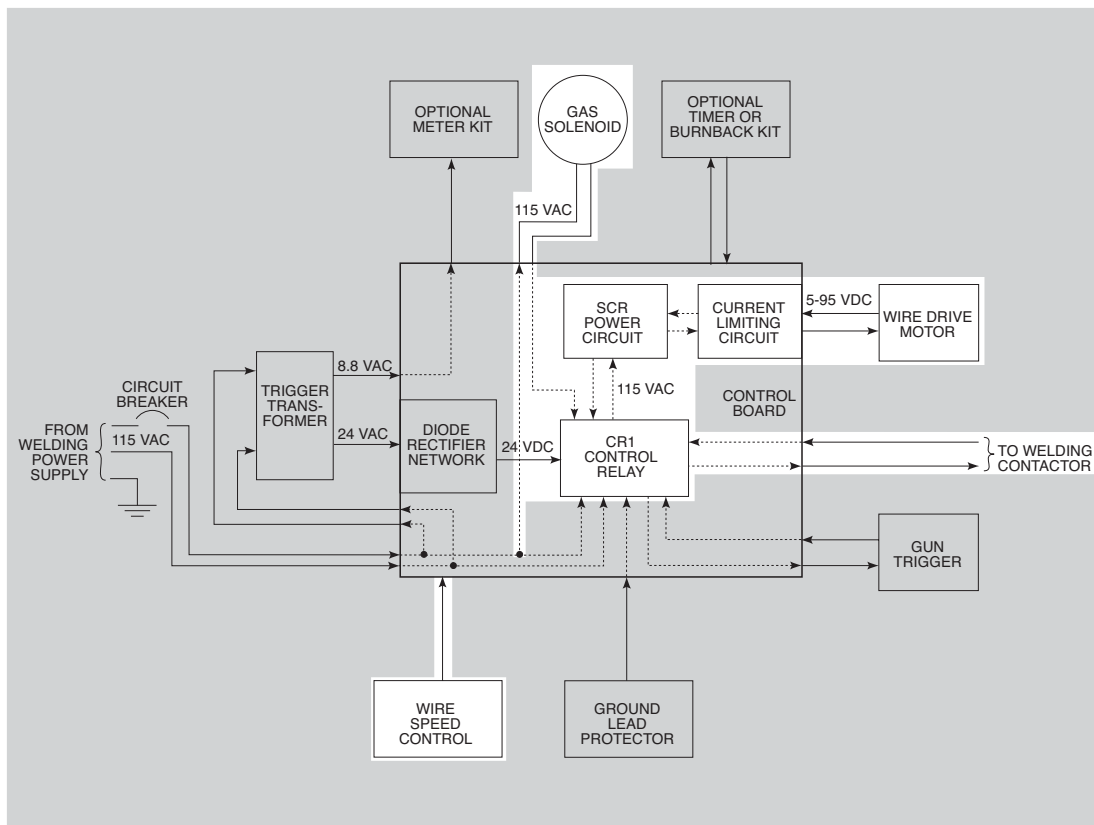
The 24 VAC output of the trigger transformer is sent to the control PC board and rectified by a diode network. When the gun trigger is pulled, a circuit is closed which energizes the control relay. The three sets of contacts in the relay close and energize the multiple functions of the wire feeder. See Figure E.3.

NOTE: Unshaded areas of Block Logic Diagram are the subject of discussion

LN-7™ GMA WIRE FEEDER



FIGURE E.4 - CONTROL CIRCUITS



## CONTROL RELAY CIRCUIT

The first contact closes to allow 115 VAC to energize the gas solenoid. This allows shielding gas to flow to the gun. The second contact of the control relay closes the circuit in the welding power source contactor circuit. This signals the welding power source to provide power to the gun. The last set of contacts on the control relay disables the motor dynamic braking circuit and closes the motor power supply circuit. See Figure E.4.

When the control relay closes the motor contacts, the SCR power circuit supplies a DC voltage to the wire drive motor. This voltage is dependent on the setting of the wire speed control. The faster the speed setting, the higher the voltage that is applied to the wire drive motor. The gearbox transfers the power of the rotating motor to the drive roll. On a four-roll wire feeder, the gearbox also splits the drive power to two separate drive rolls.

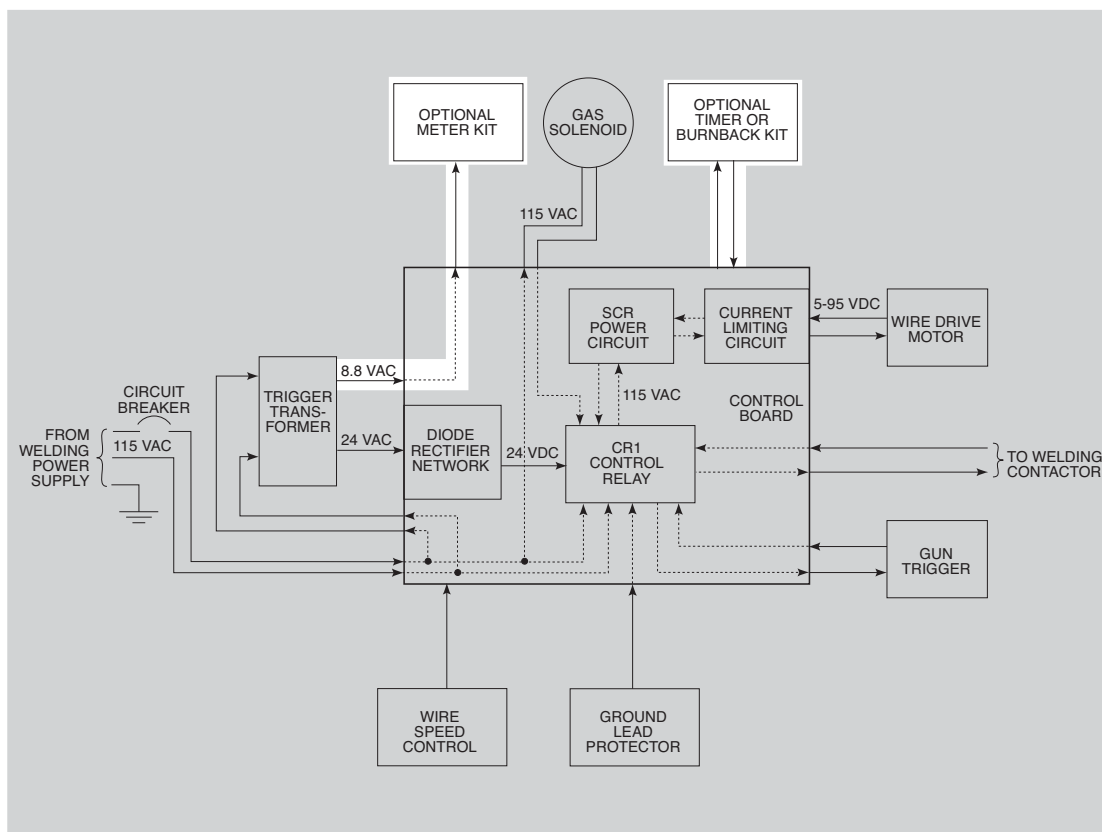
When the trigger is released, the control relay is de-energized. This opens the contacts which de-energize the gas solenoid, open the welding power source contactor circuit, and stop the wire drive motor. The dynamic braking circuit engages to rapidly stop the wire drive motor and prevent wire overrun.

NOTE: Unshaded areas of Block Logic Diagram are the subject of discussion

LN-7™ GMA WIRE FEEDER



FIGURE E.5 - AUXILIARY CIRCUITS



## AUXILIARY CIRCUITS

### TIMER KITS

The optional GMA Timer and Burnback kits can be added to provide time delays for these functions. Both kits provide a burnback control which maintains the welding power source contacts closed for a short time after the trigger is released. The timer kit also has controls which can provide a gas preflow and postflow by controlling the timing of the gas solenoid. See Figure E.5.

### METER KITS

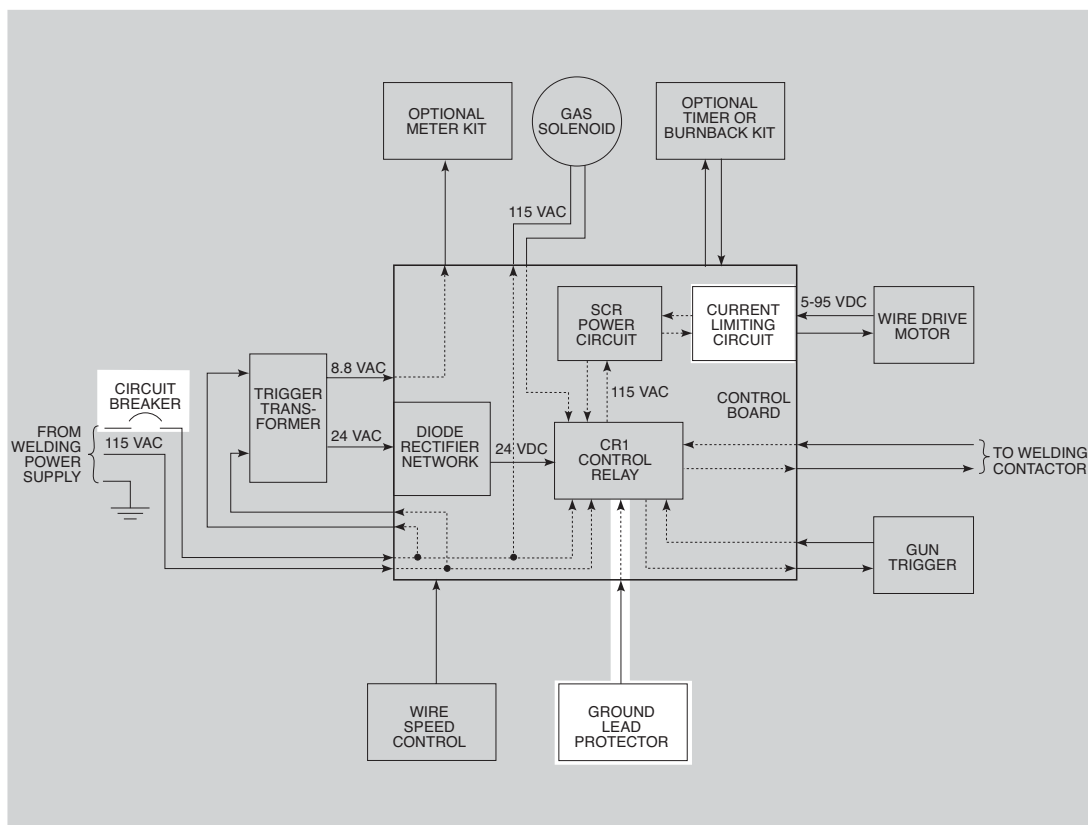
The optional meter kit indicates the welding voltage from the electrode to the work. This voltage is measured from the contact block in the wire drive compartment to the work. While the analog meter kit does not require any additional power, the digital meter kit is powered by an 8.8 VAC signal from the trigger transformer. See Figure E.5.

NOTE: Unshaded areas of Block Logic Diagram are the subject of discussion

LN-7™ GMA WIRE FEEDER



FIGURE E.6 - PROTECTIVE CIRCUITS



## PROTECTIVE CIRCUITS

Protective circuits are designed in to the LN-7™ GMA to detect trouble and shut down the wire feeder before any damage to the feeder can result. The wire feeder contains overload protection for the entire machine, a current limiting circuit for the feed motor, and a ground lead protection circuit.

## OVERLOAD PROTECTION

The wire feeder is equipped with a circuit breaker in the 115 VAC input power circuit to protect the feeder in the event of an electrical fault. See Figure E.6. If the feeder draws more than 2.5A, the circuit breaker will trip to prevent any damage to the wire feeder.

## CURRENT LIMITING CIRCUIT

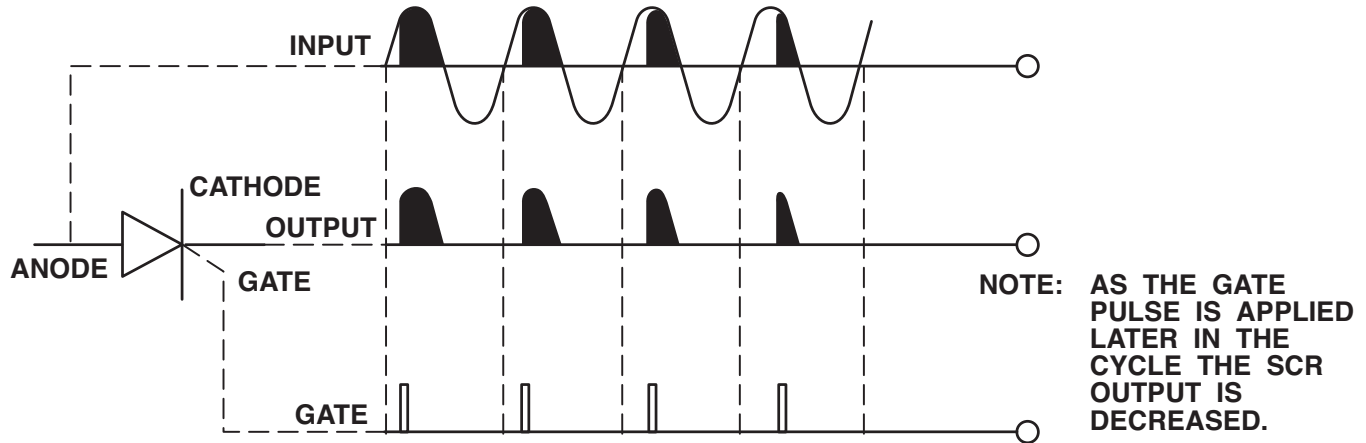
The current limiting circuit limits the current that is sent to the feed motor. A precision resistor in line with the feed motor produces a voltage drop that is directly proportional to the current draw of the motor. If the signal exceeds 10VDC, which equates to a 10A draw from the feed motor, the current limiter sends a signal to the SCR power circuit to limit feed motor current to 10A. See Figure E.6.

NOTE: Unshaded areas of Block Logic Diagram are the subject of discussion

LN-7™ GMA WIRE FEEDER



FIGURE E.7 – SILICON-CONTROLLED RECTIFIER OPERATION



## GROUND LEAD PROTECTION

The Ground Lead Protector (GLP) circuit protects the ground lead that connects the wire feeder to the welding power source. When the circuit detects any current flow in the ground lead, a contact closes in the control circuit which de-energizes the control relay. **See Figure E.6.** This opens the circuit for the welding relay in the welding power supply to remove power from the welding gun, shuts the gas and water solenoids, and stops the wire feed motor. The GLP circuit remains in this tripped state until the reset button on the wire feeder is pressed or power is removed from the wire feeder.

## SCR OPERATION

Since the wire speed of the LN-7™ GMA is controlled by SCR circuitry, a basic understanding of how an SCR functions is important. See Figure E.7 and the following explanation. A silicon controlled rectifier (SCR) is a three terminal semiconductor device used to control currents to a load. An SCR acts very much like a switch. When a gate signal is applied to the SCR, it is turned on and there is current flow from anode to cathode. In the on state the SCR acts like a closed switch. When the SCR is turned off there is no current flow, thus the device acts like an open switch. As the name suggests, the SCR is a rectifier, so it passes current only during positive half cycles of the AC supply. The positive half cycle is the portion of the sine wave in which the anode of the SCR is more positive than the cathode.

When an AC supply voltage is applied to the SCR, the device spends a certain portion of the AC cycle time in the on state and the remainder of the time in the off state. The amount of time spent in the on state is controlled by the gate.

An SCR is fired by a short burst of current into the gate. This gate pulse must be more positive than the cathode voltage. Since there is a standard pn junction between the gate and cathode, the voltage between these terminals must be slightly greater than 0.6 VDC. Once the SCR has fired it is not necessary to continue the flow of gate current. As long as current continues to flow from anode to cathode the SCR will remain on. When the anode to cathode current drops below a minimum value, called holding current, the SCR will shut off. This normally occurs as the AC supply voltage passes through zero into the negative portion of the sine wave. If the SCR is turned on early in the positive half cycle, the conduction time is longer, resulting in greater SCR output. If the gate firing time is later in the cycle the conduction time is less, resulting in lower SCR output.

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LN-7™ GMA WIRE FEEDER



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## HOW TO USE TROUBLESHOOTING GUIDE

**⚠ WARNING**

Service and Repair should only be performed by Lincoln Electric Factory Trained Personnel. Unauthorized repairs performed on this equipment may result in danger to the technician and machine operator and will invalidate your factory warranty. For your safety and to avoid Electrical Shock, please observe all safety notes and precautions detailed throughout this manual.

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

**Step 1. LOCATE PROBLEM (SYMPTOM).**

Look under the column labeled "PROBLEM (SYMPTOMS)". This column describes possible symptoms that the machine may exhibit. Find the listing that best describes the symptom that the machine is exhibiting. Symptoms are grouped into the following categories: output problems, function problems, wire feeding problems, and welding problems.

**Step 2. PERFORM EXTERNAL TESTS.**

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

**Step 3. RECOMMENDED COURSE OF ACTION**

The last column labeled "Recommended Course of Action" lists the most likely components that may have failed in your machine. It also specifies the appropriate test procedure to verify that the subject component is either good or bad. If there are a number of possible components, check the components in the order listed to eliminate one possibility at a time until you locate the cause of your problem.

All of the referenced test procedures referred to in the Troubleshooting Guide are described in detail at the end of this chapter. Refer to the Troubleshooting and Repair Table of Contents to locate each specific Test Procedure. All of the specified test points, components, terminal strips, etc. can be found on the referenced electrical wiring diagrams and schematics. Refer to the Electrical Diagrams Section Table of Contents to locate the appropriate diagram.

**⚠ CAUTION**

If for any reason you do not understand the test procedures or are unable to perform the tests/repairs safely, contact the Lincoln Electric Service Department for technical troubleshooting assistance before you proceed. Call 1-888-935-3877.

## PC BOARD TROUBLESHOOTING PROCEDURES

**WARNING**

**ELECTRIC SHOCK  
can kill.**

- Have an electrician install and service this equipment. Turn the input power OFF at the fuse box before working on equipment. Do not touch electrically hot parts.

**CAUTION**

Sometimes machine failures appear to be due to PC board failures. These problems can sometimes be traced to poor electrical connections. To avoid problems when troubleshooting and replacing PC boards, please use the following procedure:

1. Determine to the best of your technical ability that the PC board is the most likely component causing the failure symptom.
2. Check for loose connections at the PC board to assure that the PC board is properly connected.
3. If the problem persists, replace the suspect PC board using standard practices to avoid static electrical damage and electrical shock. Read the warning inside the static resistant bag and perform the following procedures:

**PC board can be damaged by static electricity.**

- Remove your body's static charge before opening the static-shielding bag. Wear an anti-static wrist strap. For safety, use a 1 Meg ohm resistive cord connected to a grounded part of the equipment frame.

- If you don't have a wrist strap, touch an un-painted, grounded, part of the equipment frame. Keep touching the frame to prevent static build-up. Be sure not to touch any electrically live parts at the same time.

- Tools which come in contact with the PC board must be either conductive, anti-static or static-dissipative.

- Remove the PC board from the static-shielding bag and place it directly into the equipment. Don't set the PC board on or near paper, plastic or cloth which could have a static charge. If the PC board can't be installed immediately, put it back in the static-shielding bag.

- If the PC board uses protective shorting jumpers, don't remove them until installation is complete.

- If you return a PC board to The Lincoln Electric Company for credit, it must be in the static-shielding bag. This will prevent further damage and allow proper failure analysis.

4. Test the machine to determine if the failure symptom has been corrected by the replacement PC board.

**NOTE:** It is desirable to have a spare (known good) PC board available for PC board troubleshooting.

**NOTE:** Allow the machine to heat up so that all electrical components can reach their operating temperature.

5. Remove the replacement PC board and substitute it with the original PC board to recreate the original problem.

a. If the original problem does not reappear by substituting the original board, then the PC board was not the problem. Continue to look for bad connections in the control wiring harness, junction blocks, and terminal strips.

b. If the original problem is recreated by the substitution of the original board, then the PC board was the problem. Reinstall the replacement PC board and test the machine.

6. Always indicate that this procedure was followed when warranty reports are to be submitted.

**NOTE:** Following this procedure and writing on the warranty report, "INSTALLED AND SWITCHED PC BOARDS TO VERIFY PROBLEM," will help avoid denial of legitimate PC board warranty claims.

Observe Safety Guidelines detailed in the beginning of this manual.

PROBLEMS (SYMPTOMS)	POSSIBLE AREAS OF MISADJUSTMENT(S)	RECOMMENDED COURSE OF ACTION
<b>FUNCTIONAL PROBLEMS</b>		
Major physical or electrical damage is present.	Contact Lincoln Electric Service Department 1-888-935-3877.	
When gun trigger is pulled there is no wire feed, no gas flow, and no arc voltage from power source.	<ol style="list-style-type: none"> <li>1. Make sure power source is on and supplying 115 VAC to the wire feeder.</li> <li>2. Check the 2.5 Amp circuit breaker. Reset if tripped.</li> <li>3. Check the Ground Lead Protector - reset if necessary.</li> <li>4. Check the gun trigger circuit.</li> <li>5. The control cable may be faulty. Repair or replace.</li> <li>6. If a burnback or timer kit is used, unplug J104* from the control PC board and install the jumper plug. See Wiring Diagram. If the problem is solved then the timer or burnback kit may be defective.</li> </ol> <p>* (J4 on earlier models)</p>	<ol style="list-style-type: none"> <li>1. Check for the presence of 115 VAC at the input control cable receptacle. Pin "D" (#31) to Pin "C" (#32).</li> <li>2. Test the R1 resistor. 2 Ohms - 25 Watts.</li> <li>3. Perform the <b>Control Relay Test</b>.</li> <li>4. Perform the <b>Trigger Transformer Test</b>.</li> <li>5. Check leads #524 and #525 for continuity (zero Ohms) from the gun control cable receptacle to the control board plug J102. (J2 on earlier models)</li> </ol>

**⚠ CAUTION**

If for any reason you do not understand the test procedures or are unable to perform the tests/repairs safely, contact the Lincoln Electric Service Department for technical troubleshooting assistance before you proceed. Call 1-888-935-3877.



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Observe Safety Guidelines detailed in the beginning of this manual.

PROBLEMS (SYMPTOMS)	POSSIBLE AREAS OF MISADJUSTMENT(S)	RECOMMENDED COURSE OF ACTION
<b>FUNCTIONAL PROBLEMS</b>		
<p>When the gun trigger is pulled there is no wire feed, but gas flows and arc voltage is present.</p>	<ol style="list-style-type: none"> <li>1. Check to see if the motor drive rolls are turning when the gun trigger is pulled. If the drive rolls are turning, then check for clogged gun liner or a mechanical restriction in the wire feeding path.</li> <li>2. If the drive rolls do not turn when the gun trigger is pulled then contact your Local Lincoln Authorized Field Service Shop.</li> </ol>	<ol style="list-style-type: none"> <li>1. With the trigger activated, check for the presence of drive motor armature voltage. 5 to 95 VDC at leads #539 to #541. <b>NOTE:</b> The armature voltage will be dependent on the wire speed setting.</li> <li>2. If the correct armature voltage IS present at leads #539 and #541 and the drive motor is NOT turning, then the drive motor may be defective. Also check the brushes in the drive motor; replace if less than 1/4 in. in length.</li> <li>3. If the correct armature voltage is NOT present at leads #539 and #541 then the CR1 control relay may be defective. Perform the <b>Control Relay Test</b>.</li> <li>4. If the armature voltage is not restored then the control PC board may be defective. Perform the <b>Control PC Board Replacement procedure</b>.</li> </ol>

**⚠ CAUTION**

If for any reason you do not understand the test procedures or are unable to perform the tests/repairs safely, contact the Lincoln Electric Service Department for technical troubleshooting assistance before you proceed. Call 1-888-935-3877.

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Observe Safety Guidelines detailed in the beginning of this manual.

PROBLEMS (SYMPTOMS)	POSSIBLE AREAS OF MISADJUSTMENT(S)	RECOMMENDED COURSE OF ACTION
<b>FUNCTIONAL PROBLEMS</b>		
<p>When the gun trigger is pulled the wire feeds, the gas flows, but there is NO arc voltage. (The wire does not arc on the work piece.)</p>	<ol style="list-style-type: none"> <li>1. Check the welding cable for loose or faulty connections.</li> <li>2. Check or replace the gun.</li> <li>3. If a burnback or timer kit is used, unplug J104* from the control PC board and install the jumper plug. See Wiring Diagram. If the problem is solved then the timer or burnback kit may be defective.</li> </ol> <p>* J4 on earlier models.</p> <ol style="list-style-type: none"> <li>4. Check to see if OCV (open circuit voltage) is present at the power source welding output terminals. If the OCV IS present at the power source output terminals then the problem is external to the power source. (The problem is in the welding cables, wire feeder, or gun.)</li> <li>5. If the OCV is NOT present at the power source output terminal then contact your Local Lincoln Authorized Field Service Facility.</li> </ol>	<ol style="list-style-type: none"> <li>1. Jumper the trigger leads at the power source. (Either #2 to #4 if on a terminal strip, or "C" to "D" if on a 14 pin amphenol type connector.) If the power source produces the correct open circuit voltage, then the power source is functioning correctly.* (The problem is with the control cable, the wire feeder, the welding cables, or the gun.) If the power source does not produce OCV, then the power source is faulty.</li> <li>2. The F101* fuse in the wire feeder may be faulty. Test or replace. * F1 on older codes.</li> <li>3. Perform the <b>Control Cable Continuity Test</b>.</li> <li>4. Perform the <b>Control Relay Test</b>.</li> <li>5. Check the continuity of leads #2 and #4 from the control cable receptacle to the control board plug J101. *J1 on older codes. See Wiring Diagram.</li> <li>6. The control PC board may be faulty. Perform the <b>Control PC Board Replacement Procedure</b>.</li> </ol> <p>* See service docs for power source to determine correct OCV.</p>

**⚠ CAUTION**

If for any reason you do not understand the test procedures or are unable to perform the tests/repairs safely, contact the Lincoln Electric Service Department for technical troubleshooting assistance before you proceed. Call 1-888-935-3877.

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Observe Safety Guidelines detailed in the beginning of this manual.

PROBLEMS (SYMPTOMS)	POSSIBLE AREAS OF MISADJUSTMENT(S)	RECOMMENDED COURSE OF ACTION
<b>FUNCTIONAL PROBLEMS</b>		
<p>When the gun trigger is pulled there IS wire feed and arc voltage but there is NO gas flow.</p>	<ol style="list-style-type: none"> <li>1. Check the shielding gas source for proper connections and pressures.</li> <li>2. Check for kinked or loose gas hose connections.</li> <li>3. If a timer kit is used, unplug *J104 from the control PC board and install the jumper plug. See Wiring Diagram. If the problem is solved then the timer kit may be defective.</li> </ol> <p>* J4 on older models.</p>	<ol style="list-style-type: none"> <li>1. When the gun trigger is pulled, check for the presence of 115 VAC at leads #7 and #32A. If 115 VAC is present and the gas solenoid does not activate then the solenoid may be defective. Perform the <b>Gas Solenoid and Connections Replacement Procedure</b>.</li> <li>2. If the 115 VAC is NOT present at #7 and #32A then perform the <b>Control Relay Test</b>.</li> <li>3. The control board may be faulty. Perform the <b>Control PC Board Replacement Procedure</b>.</li> </ol>
<p>Meter kit does not function.</p>	<ol style="list-style-type: none"> <li>1. Ensure lead #567 is connected to the conductor block in the wire drive compartment.</li> <li>2. Check lead #21 for proper connection. See connection diagrams in the <b>Installation Section</b>.</li> </ol>	<ol style="list-style-type: none"> <li>1. Check meter kit cable connector in the control box for a tight connection.</li> <li>2. For digital meter kit: ensure wires #508 and #509 are connected on the control PC board.</li> <li>3. Perform the <b>Trigger Transformer Test</b>.</li> </ol>

**⚠ CAUTION**

If for any reason you do not understand the test procedures or are unable to perform the tests/repairs safely, contact the Lincoln Electric Service Department for technical troubleshooting assistance before you proceed. Call 1-888-935-3877.

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Observe Safety Guidelines detailed in the beginning of this manual.

PROBLEMS (SYMPTOMS)	POSSIBLE AREAS OF MISADJUSTMENT(S)	RECOMMENDED COURSE OF ACTION
<b>FUNCTIONAL PROBLEMS</b>		
Wire feed speed adjustment is rough. Works only at certain portions of the speed range.	<ol style="list-style-type: none"> <li>1. Ensure setscrew on the potentiometer knob is tight.</li> <li>2. Check for a clogged gun liner or a mechanical restriction in the wire feeding path.</li> </ol>	<ol style="list-style-type: none"> <li>1. Check the resistance of the potentiometer over the entire range of travel. The potentiometer should adjust from 0 to 10K Ohms. If adjustment is not smooth and linear, Perform the <b>Wire Feed Speed Potentiometer Replacement Procedure</b>.</li> <li>2. The motor or motor brushes may be faulty. Check the motor brushes length, and replace them if they are less than 1/4 in. in length.</li> </ol>
Ground Lead Protector circuit tripping.	<ol style="list-style-type: none"> <li>1. Ensure all work lead connections to the work make tight metal-to-metal contact.</li> <li>2. Ensure that excess work and input cables are stored more than 3 ft (1 m) from the wire feeder.</li> <li>3. Is input cable coiled next to the work cable? Uncoil and loop back and forth in 3 to 6 ft (1 to 2 m) straight lengths to eliminate the coil.</li> </ol>	Check for grounded leads in the wiring harness. Pay particular attention to the leads connecting the input cable connector (J101 or J1) to the Control PC board. See Wiring Diagrams in the Electrical Diagrams Section.

**⚠ CAUTION**

If for any reason you do not understand the test procedures or are unable to perform the tests/repairs safely, contact the Lincoln Electric Service Department for technical troubleshooting assistance before you proceed. Call 1-888-935-3877.

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Observe Safety Guidelines detailed in the beginning of this manual.

PROBLEMS (SYMPTOMS)	POSSIBLE AREAS OF MISADJUSTMENT(S)	RECOMMENDED COURSE OF ACTION
<b>FUNCTIONAL PROBLEMS</b>		
Wire feeder circuit breaker tripping when the gun trigger is pulled.	Check for jammed wire or “birds-nest” inside wire drive compartment.	<ol style="list-style-type: none"> <li>1. Check the current draw for the wire feed motor. Insert a DC ammeter in series with lead #539 or #541 and the control PC board.</li> <li>2. If current draw IS excessive, greater than 2 Amps, check for rough turning gearbox by turning by hand. If gearbox turns roughly or grinds, Perform the <b>Wire Drive Assembly and Component Replacement Procedure</b>.</li> <li>3. If the gearbox is OK and the motor current draw IS excessive, then the motor or motor brushes may be defective. Check or replace.</li> <li>4. If motor current draw is NOT excessive, disconnect gas solenoid leads from control PC board terminals #7 and #32A. If circuit breaker no longer trips, solenoid may be defective. Replace solenoid. Perform the <b>Gas Solenoid and Connections Replacement Procedure</b>.</li> <li>5. The Control PC Board may be faulty. Replace the Control PC Board.</li> </ol>

**⚠ CAUTION**

If for any reason you do not understand the test procedures or are unable to perform the tests/repairs safely, contact the Lincoln Electric Service Department for technical troubleshooting assistance before you proceed. Call 1-888-935-3877.

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Observe Safety Guidelines detailed in the beginning of this manual.

PROBLEMS (SYMPTOMS)	POSSIBLE AREAS OF MISADJUSTMENT(S)	RECOMMENDED COURSE OF ACTION
<b>WIRE FEEDING AND WELDING PROBLEMS</b>		
Wire feeding rough or not feeding, but drive rolls turning.	<ol style="list-style-type: none"> <li>1. Check for kinked or twisted gun cable.</li> <li>2. Check for jammed wire in gun or cable.</li> <li>3. Check for worn nozzle or flashed or melted contact tip.</li> </ol>	<ol style="list-style-type: none"> <li>1. Check for correct size and installation of drive rolls and guide tubes. See the <b>Operation Section</b> - Drive Roll Installation for correct drive roll and guide tube installation.</li> <li>2. Check idle roll pressure, brake tension, and drive roll cleanliness. Set drive roll tension per <b>Operation Section</b> - Idle Roll Pressure Setting.</li> </ol>
Variable or "hunting" arc.	<ol style="list-style-type: none"> <li>1. Check for worn or melted contact tip.</li> <li>2. Inspect for worn work cable, poor work connection, or loose electrodes.</li> <li>3. Is electrode polarity correct?</li> <li>4. Check for rusty electrode wire.</li> <li>5. Check power source for proper operation.</li> </ol>	Possible problem with the weld procedure. Contact Lincoln Electric at 1-888-935-3877.
Weld bead is narrow or ropey. May have porosity with electrode stubbing into plate.	<ol style="list-style-type: none"> <li>1. Make sure the weld procedure and electrode polarity is correct for the process being used.</li> <li>2. Make sure shielding gas is correct and flow is proper.</li> <li>3. Make sure the weld joint is not "contaminated".</li> </ol>	The welding power source may be faulty. Check or replace.

**⚠ CAUTION**

If for any reason you do not understand the test procedures or are unable to perform the tests/repairs safely, contact the Lincoln Electric Service Department for technical troubleshooting assistance before you proceed. Call 1-888-935-3877.

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PROBLEMS (SYMPTOMS)	POSSIBLE AREAS OF MISADJUSTMENT(S)	RECOMMENDED COURSE OF ACTION
<b>WIRE FEEDING AND WELDING PROBLEMS</b>		
The wire feeds but starts and stops intermittently.	<ol style="list-style-type: none"> <li>1. The gun trigger may be faulty. Check or replace.</li> <li>2. Check for mechanical restrictions in the wire feed path.</li> </ol>	<ol style="list-style-type: none"> <li>1. The drive motor brushes may be faulty. Check and replace if less than 1/4 in. in length.</li> <li>2. The wire feed speed potentiometer may be faulty. Check the resistance of the potentiometer over the entire range of travel. The potentiometer should adjust from 0 to 10K Ohms. If adjustment is not smooth and linear, Perform the <b>Wire Feed Speed Potentiometer Replacement procedure</b>.</li> <li>3. The Control PC Board may be faulty. Replace.</li> </ol>

**⚠ CAUTION**

If for any reason you do not understand the test procedures or are unable to perform the tests/repairs safely, contact the Lincoln Electric Service Department for technical troubleshooting assistance before you proceed. Call 1-888-935-3877.

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LN-7™ GMA WIRE FEEDER



## CONTROL RELAY TEST

**⚠ WARNING**

Service and repair should be performed only by Lincoln Electric factory trained personnel. Unauthorized repairs performed on this equipment may result in danger to the technician or machine operator and will invalidate your factory warranty. For your safety and to avoid electrical shock, please observe all safety notes and precautions detailed throughout this manual.

If for any reason you do not understand the test procedures or are unable to perform the test/repairs safely, contact the Lincoln Electric Service Department for electrical troubleshooting assistance before you proceed. Call 1-888-935-3877.

**TEST DESCRIPTION**

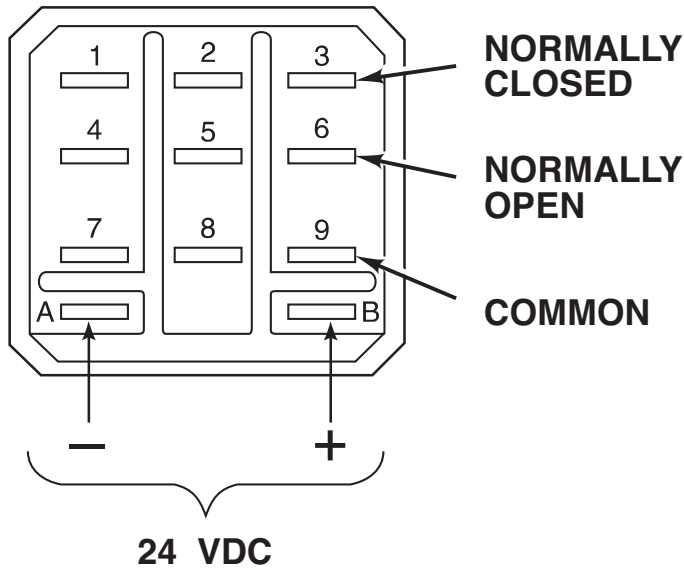
This test will determine if the Control Relay is functioning properly by measuring resistance across the contacts when the Relay is energized and de-energized.

**MATERIALS NEEDED**

- 24 VDC Power Supply
- Volt/Ohmmeter (Multimeter)
- Table Of Control Relay Contact Positions (**Table F.1**)

CONTROL RELAY TEST (continued)

FIGURE F.1 – CONTROL RELAY TEST POINTS



PROCEDURE

1. Perform the **Control Relay Replacement procedure**.
2. Connect a 24 VDC supply to terminals A and B on the control relay. See Figure F.1. Do not energize the power supply at this time.
3. Connect a multimeter across the first set of terminals shown in the table below.

TABLE F.1 – CONTROL RELAY CONTACT POSITIONS

Terminals	Terminals A&B Energized	Terminals A&B De-energized
7-1	Open	Closed
7-4	Closed	Open
8-2	Open	Closed
8-5	Closed	Open
9-3	Open	Closed
9-6	Closed	Open

4. Measure resistance across the contacts. A resistance of less than one Ohm indicates that the contacts are closed. An infinite resistance indicates that the contacts are open. Energize the 24 VDC power supply and measure the resistance again. Compare to the values given in the table for a good relay. If the readings do not match the table, the relay is faulty and should be replaced.
5. De-energize the 24 VDC power supply and connect the multimeter to the next set of contacts in the table. Repeat step 4 for all sets of contacts listed.
6. Perform the **Control Relay Replacement Procedure**.

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**TRIGGER TRANSFORMER TEST****⚠ WARNING**

Service and repair should be performed only by Lincoln Electric factory trained personnel. Unauthorized repairs performed on this equipment may result in danger to the technician or machine operator and will invalidate your factory warranty. For your safety and to avoid electrical shock, please observe all safety notes and precautions detailed throughout this manual.

If for any reason you do not understand the test procedures or are unable to perform the test/repairs safely, contact the Lincoln Electric Service Department for electrical troubleshooting assistance before you proceed. Call 1-888-935-3877.

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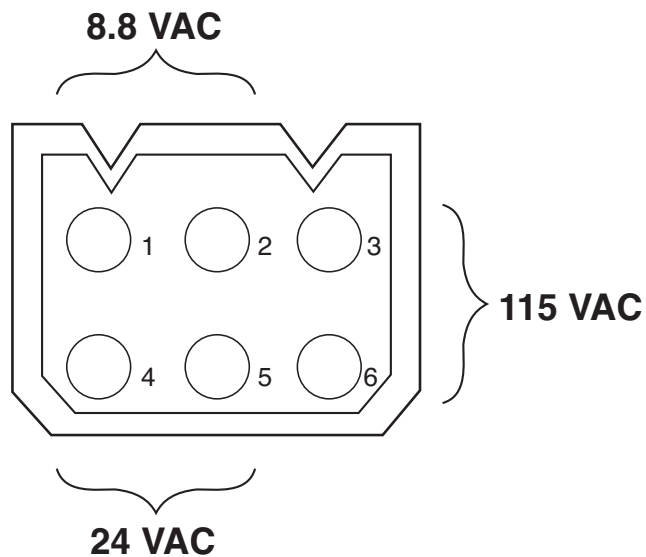
**TEST DESCRIPTION**

This test will determine if the correct voltages are being induced in the Secondary Windings of the Trigger Transformer.

**MATERIALS NEEDED**

- 115 VAC Power Supply
- Volt/Ohmmeter (Multimeter)
- 5/16 in. Wrench Or Straight Blade Screwdriver
- Wiring Diagrams

FIGURE F.2 – TRIGGER TRANSFORMER TEST POINTS



### PROCEDURE

1. Remove the cover from the control box by removing the four 5/16 in. screws from the top and sides of the unit.
2. Unplug the transformer wire connector (J103) from the control PC board.
3. Connect 115 VAC to pins 3 and 6 on the transformer plug. See the Wiring Diagrams and Figure F.2.
4. Measure the voltage across pins 4 and 5 of the transformer plug. The voltage for a good transformer is 24 VAC.
5. Measure the voltage across pins 1 and 2 of the transformer plug. The voltage for a good transformer is 8.8 VAC.
6. If the voltages measured are not correct, the transformer is faulty and should be replaced.
7. Plug the transformer wire connector into the socket on the control PC board.
8. Reinstall the cover on the control box using four hex head screws.

**NOTE:** Transformer secondary voltages are given for a primary voltage of 115 VAC. The transformer secondary voltage will vary if the primary voltage varies.

# TROUBLESHOOTING AND REPAIR

## CONTROL CABLE CONTINUITY TEST

### WARNING

Service and repair should be performed only by Lincoln Electric factory trained personnel. Unauthorized repairs performed on this equipment may result in danger to the technician or machine operator and will invalidate your factory warranty. For your safety and to avoid electrical shock, please observe all safety notes and precautions detailed throughout this manual.

If for any reason you do not understand the test procedures or are unable to perform the test/repairs safely, contact the Lincoln Electric Service Department for electrical troubleshooting assistance before you proceed. Call 1-888-935-3877.

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### TEST DESCRIPTION

This test will determine if the Control Cable from the Welding Power Supply to the Wire Feeder is functioning properly. The test checks for continuity of each Cable and for shorts between Cables.

### MATERIALS NEEDED

Volt/Ohmmeter (Multimeter)  
Wiring Diagrams

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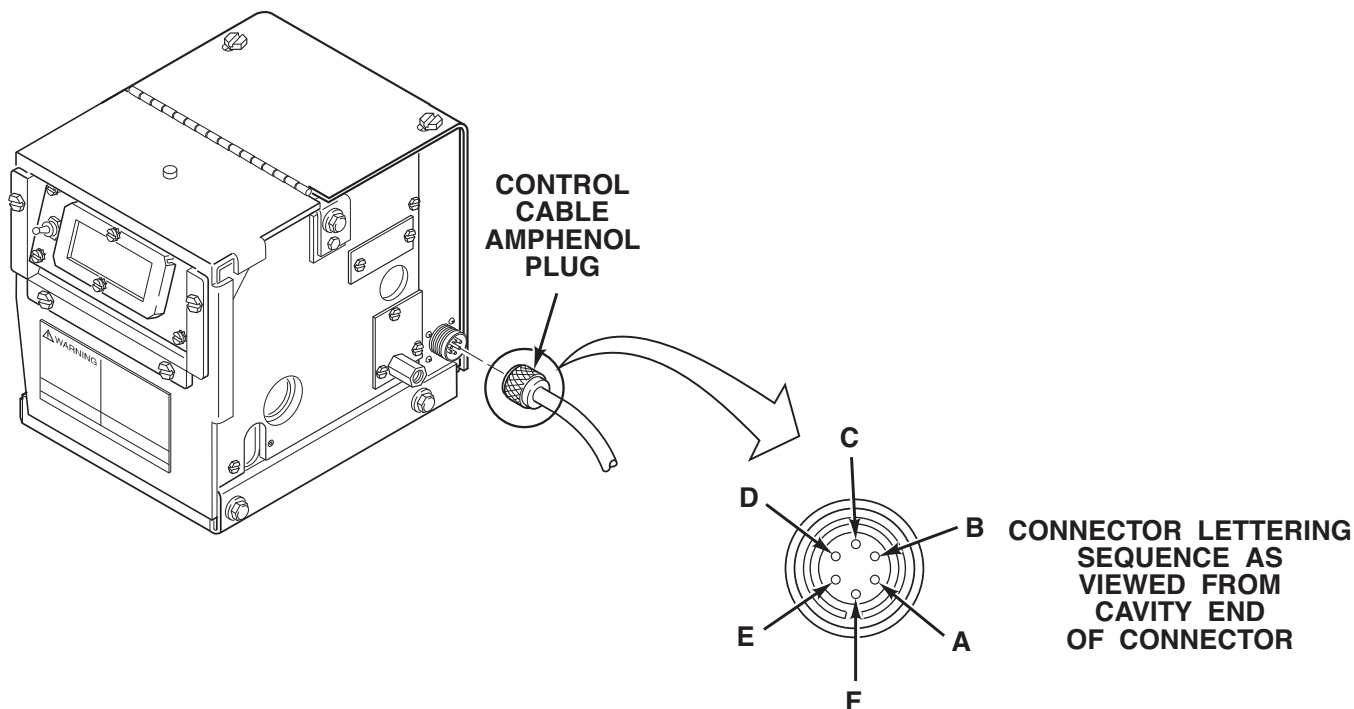
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**FIGURE F.3 – CONTROL CABLE CONTINUITY TEST POINTS**



**PROCEDURE**

1. Disconnect the control cable amphenol plug from the welding power source and the wire feeder.
2. Examine contact pins in both amphenol connectors. If pins are corroded, damaged or spread-out; replace cable.
3. Using a multimeter, measure the resistance of the control cable wiring from the amphenol plug on the wire feeder end to the terminal connectors or amphenol plug on the welding power source end. See Wiring Diagrams, Table F.2, and Figure F.3 for wire designations.
4. If the conductor resistance measures greater than 1.0 Ohm, the cable is faulty and should be replaced. If the resistance between conductors is less than 0.5 MOhm, the cable is faulty and should be replaced.

**TABLE F.2 – CONTROL CABLE PIN AND LEAD DESIGNATIONS**

SIX PIN AMPHENOL WIRE FEEDER END	LEAD NUMBERS MACHINE END	FOURTEEN PIN AMPHENOL MACHINE END
A	4	D
B	2	C
C	32	A
D	31	J
E	CASE GROUND	B
F	21	H

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## WIRE FEED SPEED POTENTIOMETER REMOVAL AND REPLACEMENT PROCEDURE

### WARNING

Service and repair should be performed only by Lincoln Electric factory trained personnel. Unauthorized repairs performed on this equipment may result in danger to the technician or machine operator and will invalidate your factory warranty. For your safety and to avoid electrical shock, please observe all safety notes and precautions detailed throughout this manual.

If for any reason you do not understand the test procedures or are unable to perform the test/repairs safely, contact the Lincoln Electric Service Department for electrical troubleshooting assistance before you proceed. Call 1-888-935-3877.

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### TEST DESCRIPTION

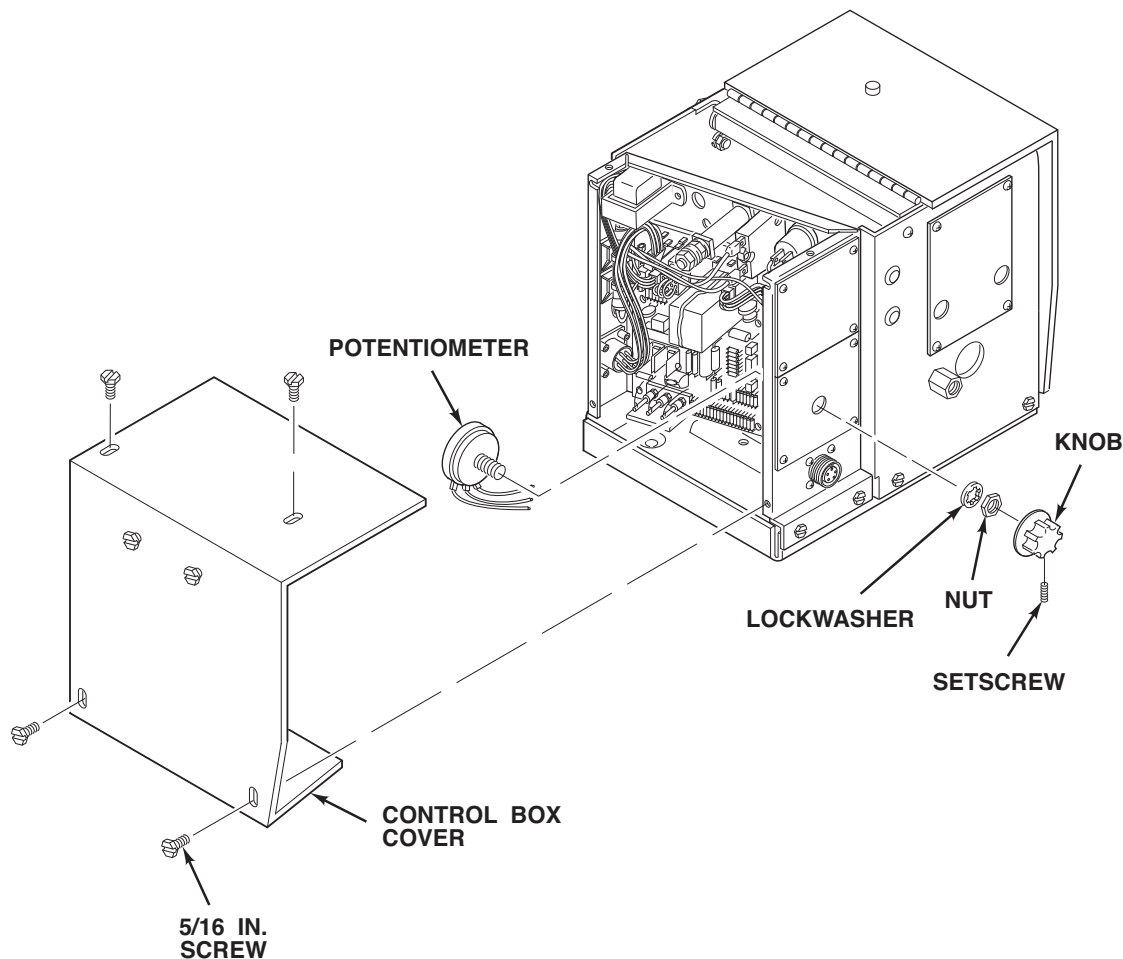
This procedure will aid the technician in the removal and replacement of the Wire Feed Speed Potentiometer.

### MATERIALS NEEDED

- 5/16 in. Wrench
- Straight Blade Jeweler's Screwdriver
- Adjustable Wrench
- Soldering Iron And Solder
- Wiring Diagram

## WIRE FEED SPEED POTENTIOMETER REMOVAL AND REPLACEMENT PROCEDURE (continued)

FIGURE F.4 – REMOVING WIRE FEED SPEED POTENTIOMETER



### PROCEDURE

1. Remove the cover from the control box by removing the four 5/16 in. screws from the top and side of the unit. See Figure F.4.
2. Loosen the setscrew on the potentiometer knob and remove the knob from the potentiometer.
3. Remove the nut and lockwasher holding the potentiometer to the case of the wire feeder. Remove the potentiometer through the inside of the case.
4. Tag the three wires on the potentiometer so that they can be reattached in the same location from which they were removed. Also refer to the Wiring Diagrams and Electrical Diagrams. Unsolder the three wires from the potentiometer.
5. Solder the three wires to the new potentiometer on the corresponding terminals from which they were removed.

## WIRE FEED SPEED POTENTIOMETER REMOVAL AND REPLACEMENT PROCEDURE (continued)

6. Place the new potentiometer through the case from the inside. Ensure that the index pin on the potentiometer fits in the locating hole on the case of the wire feeder. Install the lockwasher and nut on the potentiometer. Tighten until snug.
7. Install the knob onto the potentiometer and tighten the setscrew to lock the knob in place.
8. Reinstall the cover onto the control box using the four hex head bolts.
9. Measure the wire feed speed using a K283 Hand Held Wire Feed Speed Meter. To measure the wire feed speed if a K283 is not available, feed the wire for six seconds, measure the length of wire fed, and multiply by ten. The measured wire speed should approximately equal that shown on the potentiometer name plate. If the wire feed speed is not correct then check the motor brushes. Also, the motor or the control board may be faulty.

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LN-7™ GMA WIRE FEEDER



**CIRCUIT BREAKER REMOVAL AND REPLACEMENT PROCEDURE****⚠ WARNING**

Service and repair should be performed only by Lincoln Electric factory trained personnel. Unauthorized repairs performed on this equipment may result in danger to the technician or machine operator and will invalidate your factory warranty. For your safety and to avoid electrical shock, please observe all safety notes and precautions detailed throughout this manual.

If for any reason you do not understand the test procedures or are unable to perform the test/repairs safely, contact the Lincoln Electric Service Department for electrical troubleshooting assistance before you proceed. Call 1-888-935-3877.

**TEST DESCRIPTION**

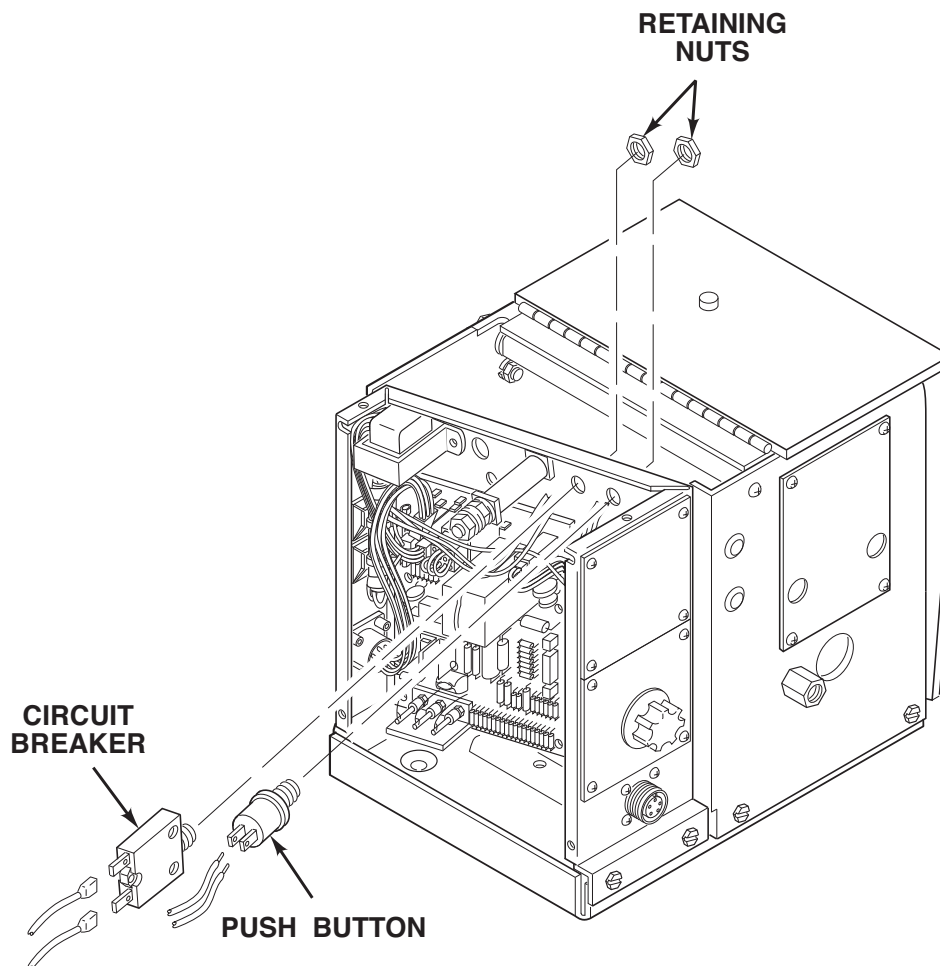
This procedure will aid the technician in the removal and replacement of the Circuit Breaker.

**MATERIALS NEEDED**

5/16 in. Wrench  
Adjustable Wrench

## CIRCUIT BREAKER REMOVAL AND REPLACEMENT PROCEDURE (continued)

FIGURE F.5 – CIRCUIT BREAKER AND PUSH BUTTON REPLACEMENT



### PROCEDURE

1. Remove the cover from the control box by removing the four 5/16 in. screws from the top and side of the unit.
2. Remove the two wires from the back of the circuit breaker. See Figure F.5.
3. Remove the retaining nut that secures the circuit breaker to the panel of the wire feeder. Remove the circuit breaker from the wire feeder.
4. Install the new circuit breaker through the panel of the control box. Secure the circuit breaker with the retaining nut.
5. Connect the two wires to the back of the circuit breaker.
6. Reinstall the cover on the wire feeder using four hex head screws.

## GROUND LEAD PROTECTOR PUSH BUTTON SWITCH REMOVAL AND REPLACEMENT PROCEDURE

### **WARNING**

Service and repair should be performed only by Lincoln Electric factory trained personnel. Unauthorized repairs performed on this equipment may result in danger to the technician or machine operator and will invalidate your factory warranty. For your safety and to avoid electrical shock, please observe all safety notes and precautions detailed throughout this manual.

If for any reason you do not understand the test procedures or are unable to perform the test/repairs safely, contact the Lincoln Electric Service Department for electrical troubleshooting assistance before you proceed. Call 1-888-935-3877.

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### **TEST DESCRIPTION**

This procedure will aid the technician in the removal and replacement of the Ground Lead Protector Push Button Switch.

### **MATERIALS NEEDED**

5/16 in. Wrench  
Adjustable Wrench  
Soldering Iron And Solder

## GROUND LEAD PROTECTOR PUSH BUTTON SWITCH REMOVAL AND REPLACEMENT PROCEDURE (continued)

### PROCEDURE

1. Remove the cover from the control box by removing the four 5/16 in. screws from the top and side of the unit.
2. Remove the retaining nut from the front of the push button and remove the push button from the control box. **See Figure F.5.**
3. Unsolder the two leads from the back of the push button.
4. Solder the two leads onto the new push button.
5. Install the new push button through the case of the control box.
6. Install the retaining nut onto the front of the push button.
7. Reinstall the cover on the control box using four hex head screws.

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**TRIGGER TRANSFORMER REMOVAL AND REPLACEMENT PROCEDURE****⚠ WARNING**

Service and repair should be performed only by Lincoln Electric factory trained personnel. Unauthorized repairs performed on this equipment may result in danger to the technician or machine operator and will invalidate your factory warranty. For your safety and to avoid electrical shock, please observe all safety notes and precautions detailed throughout this manual.

If for any reason you do not understand the test procedures or are unable to perform the test/repairs safely, contact the Lincoln Electric Service Department for electrical troubleshooting assistance before you proceed. Call 1-888-935-3877.

**TEST DESCRIPTION**

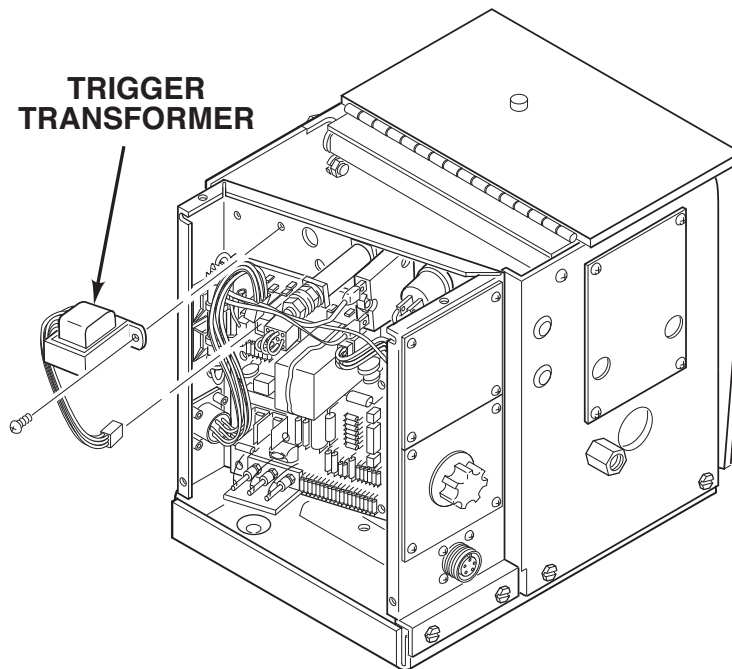
This procedure will aid the technician in the removal and replacement of the Trigger Transformer.

**MATERIALS NEEDED**

5/16 in. Wrench  
Phillips Screwdriver

## TRIGGER TRANSFORMER REMOVAL AND REPLACEMENT PROCEDURE (continued)

FIGURE F.6 – TRIGGER TRANSFORMER REPLACEMENT



### PROCEDURE

1. Remove the cover from the control box by removing the four 5/16 in. screws from the top and side of the unit.
2. Unplug the transformer wire connector from the control PC board. See Figure F.6.
3. Remove the two Phillips head screws that attach the transformer to the case of the control box. Remove the old transformer from the wire feeder.
4. Install the new transformer in the wire feeder and attach it to the case with two Phillips head screws.
5. Plug the transformer wire connector into the socket on the control PC board.
6. Reinstall the cover on the control box using four hex head screws.

## GROUND LEAD PROTECTOR REED SWITCH REMOVAL AND REPLACEMENT PROCEDURE

### WARNING

Service and repair should be performed only by Lincoln Electric factory trained personnel. Unauthorized repairs performed on this equipment may result in danger to the technician or machine operator and will invalidate your factory warranty. For your safety and to avoid electrical shock, please observe all safety notes and precautions detailed throughout this manual.

If for any reason you do not understand the test procedures or are unable to perform the test/repairs safely, contact the Lincoln Electric Service Department for electrical troubleshooting assistance before you proceed. Call 1-888-935-3877.

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### TEST DESCRIPTION

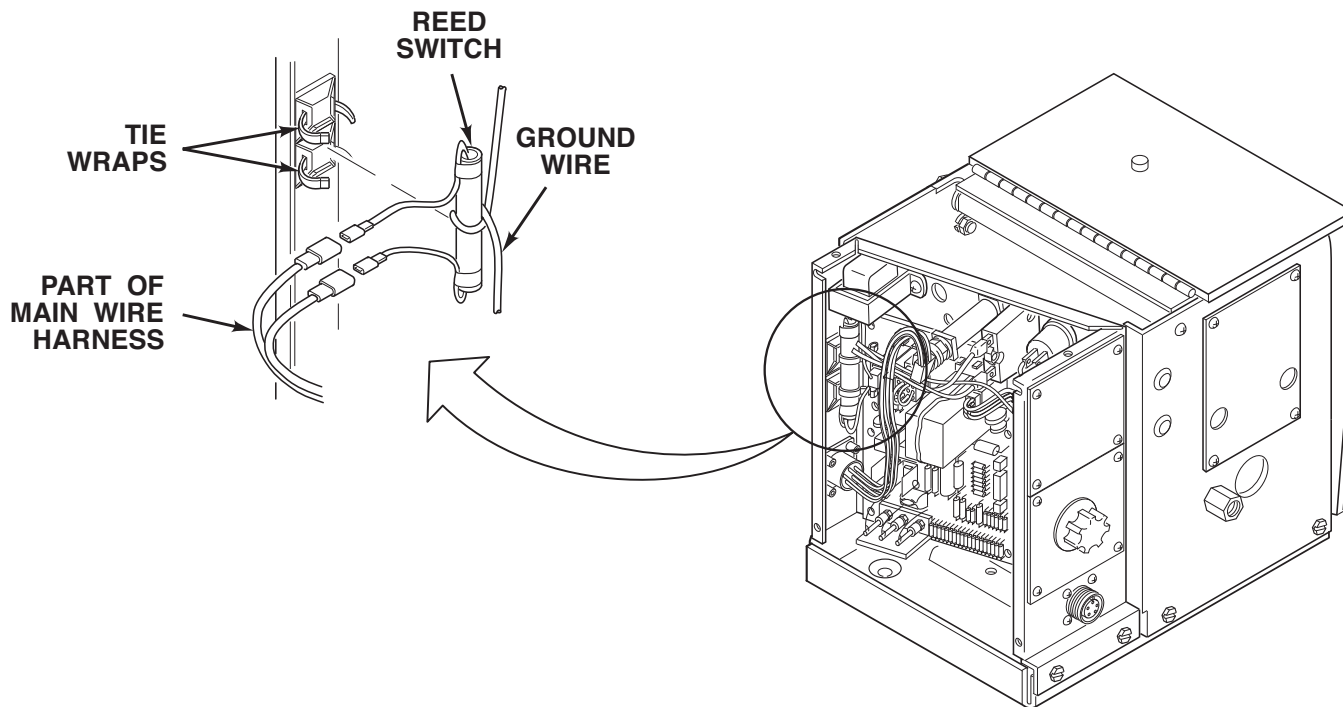
This procedure will aid the technician in the removal and replacement of the Ground Lead Protector Reed Switch.

### MATERIALS NEEDED

- 5/16 in. Wrench
- Wire Cutters
- Tie Wraps

## GROUND LEAD PROTECTOR REED SWITCH REMOVAL AND REPLACEMENT PROCEDURE (continued)

FIGURE F.7 – REED SWITCH REPLACEMENT



### PROCEDURE

1. Remove the cover from the control box by removing the four 5/16 in. screws from the top and side of the unit.
2. Unplug the two wire connectors that connect the reed switch to the wire feeder main wire harness. See Figure F.7.
3. Cut the two tie wraps that attach the reed switch to the case of the wire feeder, and the tie wrap that attaches the reed switch leads to the main wire harness.
4. Slide the reed switch out of the loop formed by the ground wire and remove the reed switch from the wire feeder. Do not undo the loop in the ground wire.
5. Slide the new reed switch into the loop of the ground wire. Ensure that the loop in the wire is snug around the reed switch.
6. Attach the reed switch to the plastic mounts on the case of the wire feeder using two tie wraps. The tie wraps should also secure the ground lead in place.
7. Connect the two wire connectors on the reed switch to the wire feeder main harness. Tie wrap the leads to the main wire harness.
8. Reinstall the cover on the wire feeder using four hex head screws.

**CONTROL PC BOARD REMOVAL AND REPLACEMENT PROCEDURE****⚠ WARNING**

Service and repair should be performed only by Lincoln Electric factory trained personnel. Unauthorized repairs performed on this equipment may result in danger to the technician or machine operator and will invalidate your factory warranty. For your safety and to avoid electrical shock, please observe all safety notes and precautions detailed throughout this manual.

If for any reason you do not understand the test procedures or are unable to perform the test/repairs safely, contact the Lincoln Electric Service Department for electrical troubleshooting assistance before you proceed. Call 1-888-935-3877.

**TEST DESCRIPTION**

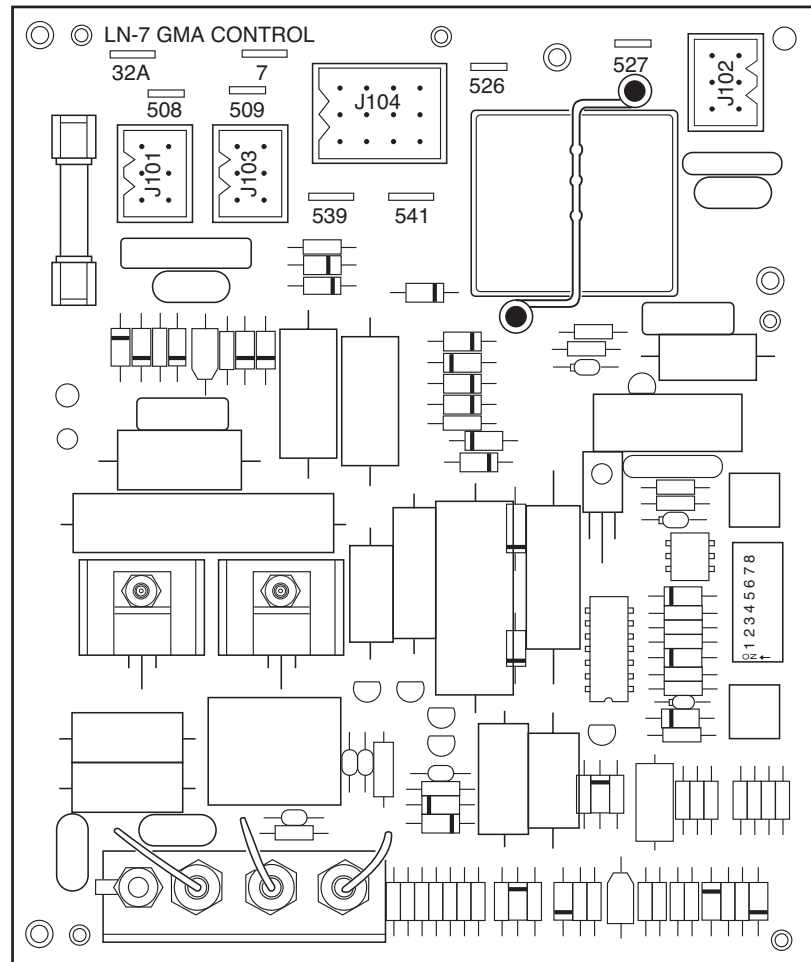
This procedure will aid the technician in the removal and replacement of the Control PC Board.

**MATERIALS NEEDED**

5/16 in. Wrench  
Pliers

## CONTROL PC BOARD REMOVAL AND REPLACEMENT PROCEDURE (continued)

### FIGURE F.8 – DISCONNECTING THE CONTROL PC BOARD



### PROCEDURE

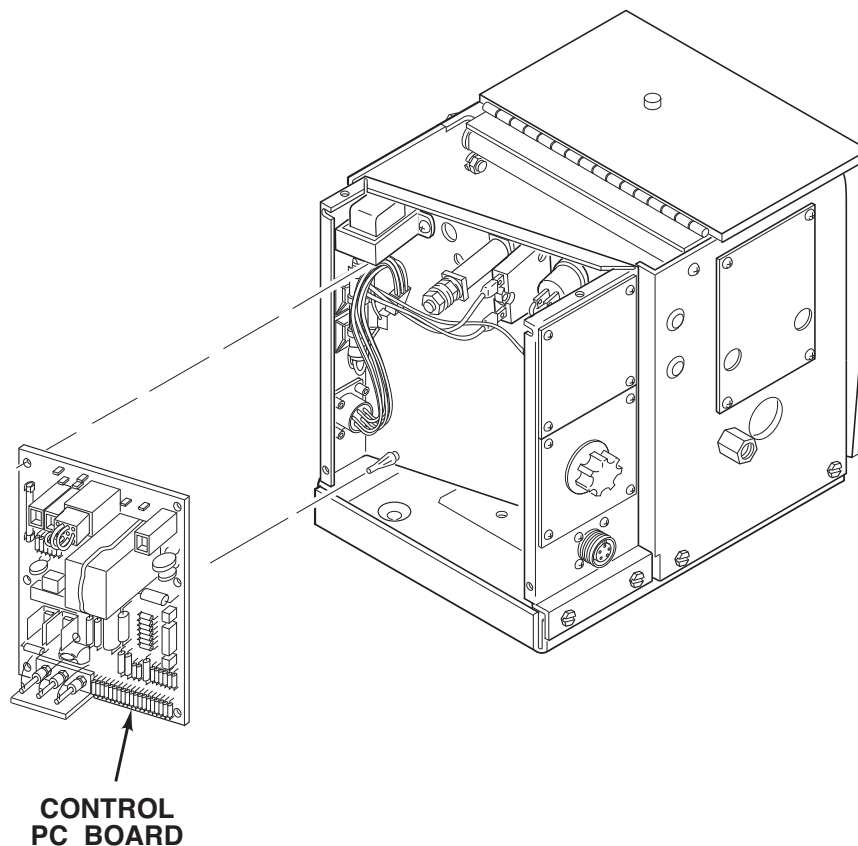
1. Observe static precautions detailed in **PC Board Troubleshooting Procedures** at the beginning of this section.
2. Remove the cover from the control box by removing the four 5/16 in. screws from the top and side of the unit.
3. Disconnect J102, input cable connector J101, and transformer connector J103 from the PC board. See Figure F.8.
4. If the unit is equipped with a timer or burnback kit, disconnect J104 From the PC board.
5. Disconnect GLP reed switch wires from PC board terminals #526 and #527.
6. Disconnect feed wire motor leads from PC board terminals #539 and #541.
7. Disconnect the gas solenoid wires from PC board terminals #7 and #32A.
8. Disconnect meter kit wires from PC board terminals #508 and #509.

### ⚠ CAUTION

Label all wires and connectors prior to removal. All wires and connectors must be reconnected to the same terminals from which they were removed. Improper connection may lead to component damage or machine misoperation.

## CONTROL PC BOARD REMOVAL AND REPLACEMENT PROCEDURE (continued)

FIGURE F.9 – REMOVING THE CONTROL PC BOARD



9. Pry the retaining clip from the control relay. Remove the control relay from the control PC board.
10. Disengage the PC board supports by squeezing each support in turn with a pair of pliers and gently pulling out on the board next to the support. When all seven supports have been disconnected, remove the control PC board from the control box. See Figure F.9.
11. Prepare to mount the new PC board by lining up all the mounting holes with the PC board supports. Then, press the PC board into place on the supports. Make sure that the control PC board snaps onto all seven supports.
12. Install the control relay onto the new PC board by pressing firmly and rocking side to side. Secure the relay in place with the relay retaining clip.
13. Connect the meter kit wires to PC board terminals #508 and #509. **See Figure F.8.**
14. Connect the gas solenoid wires to PC board terminals #7 and #32A.
15. Connect the feed wire motor leads to the PC board terminals #539 and #541.
16. Connect the GLP reed switch wires to the PC board terminals #526 and #527.
17. If the unit is equipped with a timer or burnback kit, connect the kit wire connector to J104 on the PC board.
18. Connect J101, J102, and J103 to the PC board.
19. Reinstall the cover on the wire feeder using four hex head screws.

### **⚠ CAUTION**

**Do not use excessive force when inserting control relay. Excessive force can damage the control PC board. If the control relay does not fit, remove it and try again.**

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LN-7™ GMA WIRE FEEDER



## MAIN POWER RESISTOR (R<sub>1</sub>) REMOVAL AND REPLACEMENT PROCEDURE

### WARNING

Service and repair should be performed only by Lincoln Electric factory trained personnel. Unauthorized repairs performed on this equipment may result in danger to the technician or machine operator and will invalidate your factory warranty. For your safety and to avoid electrical shock, please observe all safety notes and precautions detailed throughout this manual.

If for any reason you do not understand the test procedures or are unable to perform the test/repairs safely, contact the Lincoln Electric Service Department for electrical troubleshooting assistance before you proceed. Call 1-888-935-3877.

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### TEST DESCRIPTION

This procedure will aid the technician in the removal and replacement of the Main Power Resistor (R<sub>1</sub>).

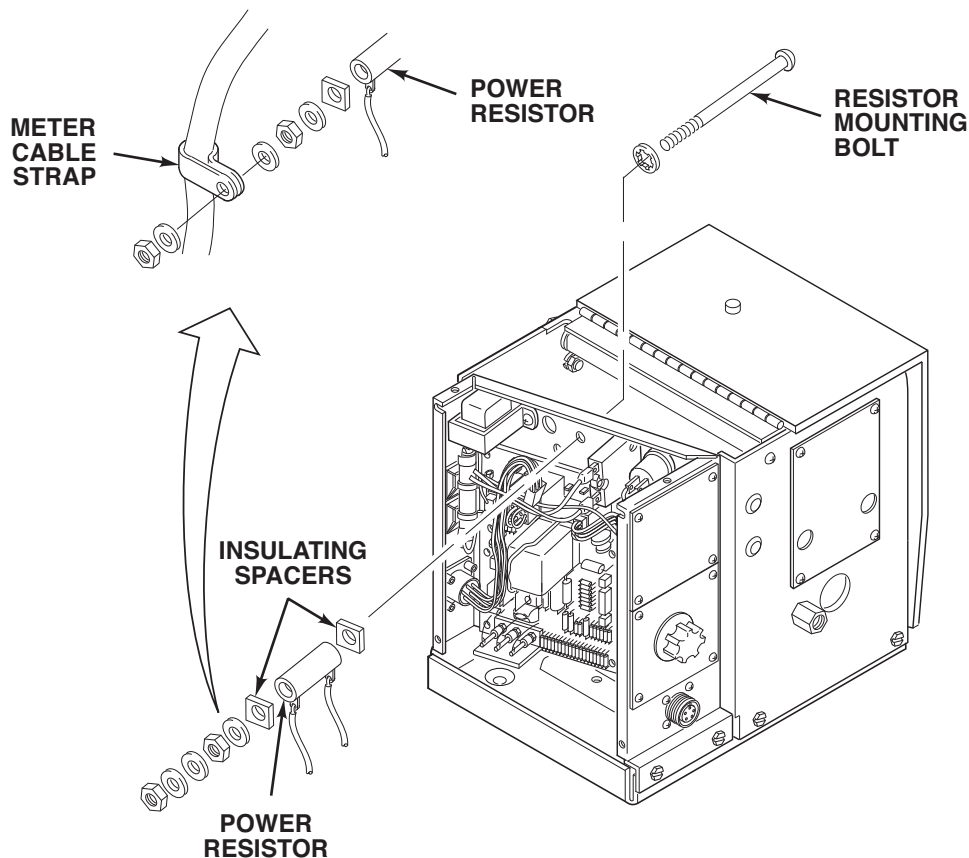
### MATERIALS NEEDED

- 5/16 in. Wrench
- 3/8 in. Wrench
- Soldering Iron And Solder

## MAIN POWER RESISTOR (R<sub>1</sub>) REMOVAL AND REPLACEMENT PROCEDURE (continued)

FIGURE F.10 – MAIN POWER RESISTOR REPLACEMENT

FOR UNITS  
EQUIPPED WITH  
AN OPTIONAL METER KIT



### PROCEDURE

1. Remove the cover from the control box by removing the four 5/16 in. screws from the top and side of the wire feeder.
2. Remove the first hex nut and washer from the end of the resistor mounting bolt. See Figure F.10.
3. If the wire feeder is equipped with a meter kit, remove the meter cable strap from the resistor mounting bolt.
4. Remove the second washer, hex nut, and third washer from the resistor mounting bolt.
5. Remove the two insulating spacers and the power resistor from the mounting bolt. It may be necessary to push the mounting bolt back through the case of the control box to allow clearance to remove the resistor.
6. Unsolder the two wires from the resistor. Remove the resistor from the wire feeder.

## MAIN POWER RESISTOR (R<sub>1</sub>) REMOVAL AND REPLACEMENT PROCEDURE (continued)

7. Solder the two wires onto the new power resistor.
8. Install one insulating spacer onto the resistor mounting bolt. Install the power resistor and the second spacer onto the mounting bolt. Secure in place with a flat washer and hex nut.
9. If the wire feeder is equipped with a meter kit, install a second washer and the meter cable strap. If a meter kit is not equipped, install only the second washer.
10. Install a third washer and a hex nut.
11. Reinstall the cover on the control box using four hex head screws.

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LN-7™ GMA WIRE FEEDER



## CONTROL RELAY REMOVAL AND REPLACEMENT PROCEDURE

### WARNING

Service and repair should be performed only by Lincoln Electric factory trained personnel. Unauthorized repairs performed on this equipment may result in danger to the technician or machine operator and will invalidate your factory warranty. For your safety and to avoid electrical shock, please observe all safety notes and precautions detailed throughout this manual.

If for any reason you do not understand the test procedures or are unable to perform the test/repairs safely, contact the Lincoln Electric Service Department for electrical troubleshooting assistance before you proceed. Call 1-888-935-3877.

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### TEST DESCRIPTION

This procedure will aid the technician in the removal and replacement of the Control Relay.

### MATERIALS NEEDED

5/16 in. Wrench

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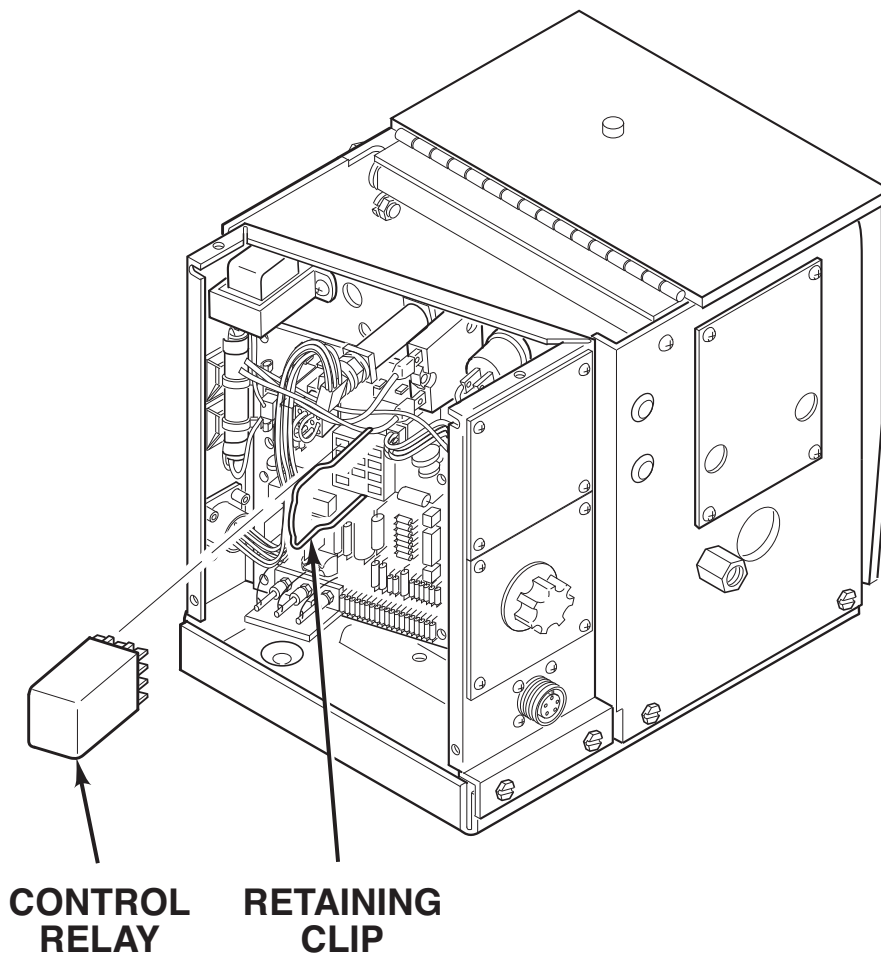
Return to Master TOC

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## CONTROL RELAY REMOVAL AND REPLACEMENT PROCEDURE (continued)

FIGURE F.11 – CONTROL RELAY REPLACEMENT



### PROCEDURE

1. Remove the cover from the control box by removing the four 5/16 in. screws from the top and side of the unit.
2. Slide the retaining clip off the side of the control relay. See Figure F.11.
3. Remove the control relay by pulling out while gently rocking from side to side.
4. Insert the new control relay by pressing in and rocking side to side. Do not press too hard on the relay as this may damage the control PC board.
5. Slide the retaining clip over the end of the control relay.
6. Reinstall the cover on the control box using four hex head screws.

### ⚠ CAUTION

Do not use excessive force when inserting control relay. Excessive force can damage the control PC board. If the control relay does not fit, remove it and try again.

## WIRE DRIVE ASSEMBLY AND COMPONENTS REMOVAL AND REPLACEMENT PROCEDURE

### WARNING

Service and repair should be performed only by Lincoln Electric factory trained personnel. Unauthorized repairs performed on this equipment may result in danger to the technician or machine operator and will invalidate your factory warranty. For your safety and to avoid electrical shock, please observe all safety notes and precautions detailed throughout this manual.

If for any reason you do not understand the test procedures or are unable to perform the test/repairs safely, contact the Lincoln Electric Service Department for electrical troubleshooting assistance before you proceed. Call 1-888-935-3877.

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### TEST DESCRIPTION

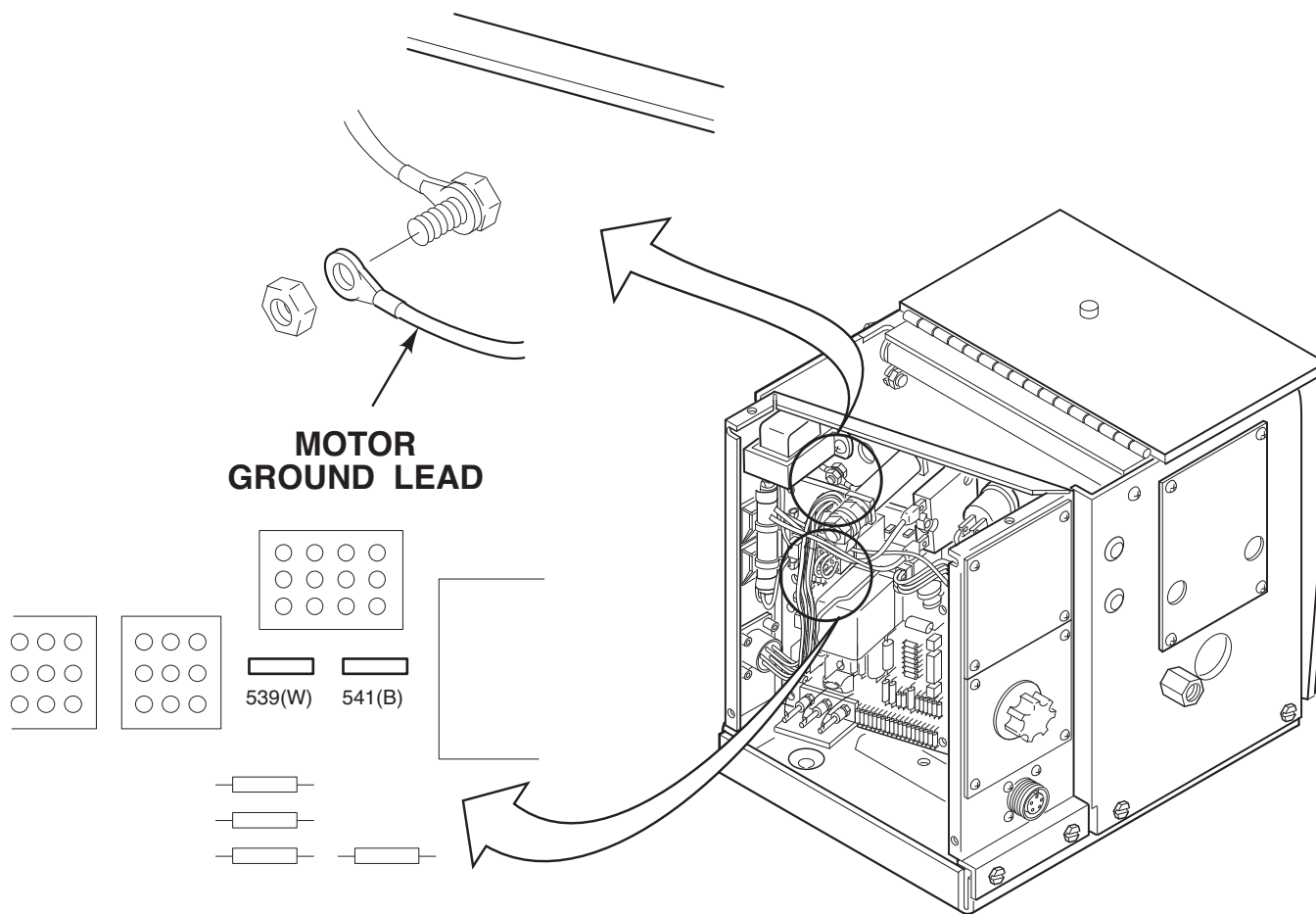
This procedure will aid the technician in the removal and replacement of the Wire Drive And Components.

### MATERIALS NEEDED

- 5/16 in. Wrench
- Wire Cutters
- 3/8 in. Wrench
- 7/16 in. Wrench
- Straight Blade Screwdriver
- 3/16 in. Allen Wrench
- Lubricant (Mobilgrease CM-L Or Equivalent)
- Grease (Chevron SR1 Or Equivalent)
- Sealant (Silicone Rubber)
- Torque Wrench

## WIRE DRIVE ASSEMBLY AND COMPONENTS REMOVAL AND REPLACEMENT PROCEDURE (continued)

### FIGURE F.12 – MOTOR LEAD REMOVAL



### PROCEDURE

1. Remove the cover from the control by removing the four 5/16 in. screws from the top and side of the unit.
2. Cut the two tie wraps securing the feed motor leads to the main wire harness and disconnect the two motor leads from terminals #539 and #541 on the control PC board. See Figure F.12.
3. Remove the hex nut securing the motor ground lead to the case of the control box. See Figure F.12. Remove the motor ground lead and reinstall the hex nut. Do not remove the second ground wire from the terminal. Feed the three motor leads through the case of the control box to the wire drive compartment.
4. Perform the **Swing Arm Assembly Replacement Procedure**.
5. Remove the hex head bolt in the bottom of the control box which holds the wire drive assembly to the case. Remove the two hex head bolts in the bottom of the wire drive compartment. On the four-roll feeders, these bolts also have flat washers and lockwashers.
6. Remove the straight head screw that secures lead #567 to the contact block. **See Figure F.13.**
7. Remove the wire drive assembly from the wire feeder.
8. On two-roll feeders, remove the two hex head bolts, lockwashers, and flat washers that secure the contact block to the wire drive assembly. Remove the contact block, and locator bushing. On four-roll wire feeders, remove the hex head bolt, lockwashers, and flat washer. Remove the hex nut, lockwasher, and flat washer from the bent J-bolt. Remove the contact block, locator bushing, and bent J-bolt.

## WIRE DRIVE ASSEMBLY AND COMPONENTS REMOVAL AND REPLACEMENT PROCEDURE (continued)

9. On two-roll feeders, remove the three hex head bolts, lockwashers, and flat washers from the bottom of the wire drive assembly. On four-roll feeders, remove the two straight head screws from the bottom of the wire drive assembly. Remove the gearbox mounting plate and the two insulating sheets.
10. Remove the covers from the side of the gearbox by removing the hex head bolts and lockwashers on each side.
11. Remove the two button head cap screws and lockwashers from the bottom of the gearbox. Remove the three motor mounting screws, bushings, flat washers and lockwashers securing the motor to the gearbox. The two screws on the inside of the gearbox may be removed by inserting a screwdriver through the holes that the button head capscrews were removed from.
12. Remove the motor and motor insulator from the gearbox.
13. Remove the roll pin and slide the pinion gear off the motor shaft.
14. To reassemble the wire drive assembly, slide the pinion gear onto the motor shaft and secure in place with the roll pin. Lubricate the pinion gear with an even coating of lubricant.
15. Apply a thin coating of grease to the mating surfaces of the motor and motor insulator. Install the motor and motor insulator on the gearbox. Secure in place with three motor mounting screws, lockwashers, flat washers and bushings. Tighten the screws to 10 to 12 in-lbs.
16. Install the two button head cap screws and lockwashers in the bottom of the gearbox.
17. Coat the sealing surfaces of the gearbox covers with sealant and install the covers on the gearbox. Secure in place with two hex head screws and lockwashers.
18. Install the two insulating sheets and the gearbox mounting plate and secure in place with three flat washers, lockwashers, and hex head bolts. On four-roll feeders, use two straight head screws.
19. Install the locator bushing and contact block. Secure in place with two lockwashers, flat washers, and hex head bolts. On four-roll feeders, install the locator bushing, bent J-bolt, and contact block.
20. Place the wire drive assembly in the wire drive compartment of the wire feeder. Ensure the bottom insulating sheet wraps under the gearbox mounting plate on both ends.
21. Install lead #567 on the contact block using the straight head screw.
22. Position the wire drive assembly in the center of the wire drive compartment and line up the mounting holes in the wire drive mounting plate.
23. Install one hex head bolt in the mounting plate in the control box. For four-roll feeders, also install a lockwasher and a flat washer.
24. Install two hex head bolts in the mounting plate in the wire drive compartment. For four-roll feeders, also use two lockwashers and flat washers.
25. Perform the ***Swing Arm Assembly Replacement Procedure***.
26. Feed the three motor leads through the hole in the case of the control box.
27. Remove the hex nut from the ground terminal and install the ground wire. Secure in place with the hex nut.
28. Install the black motor lead on terminal #541 of the control PC board, and the white motor lead on terminal #539. Secure the motor leads to the main harness using two tie wraps.
29. Reinstall the cover on the control box using four hex head screws.



## SWING ARM ASSEMBLY REMOVAL AND REPLACEMENT PROCEDURE FOR TWO-ROLL WIRE FEEDERS

### WARNING

Service and repair should be performed only by Lincoln Electric factory trained personnel. Unauthorized repairs performed on this equipment may result in danger to the technician or machine operator and will invalidate your factory warranty. For your safety and to avoid electrical shock, please observe all safety notes and precautions detailed throughout this manual.

If for any reason you do not understand the test procedures or are unable to perform the test/repairs safely, contact the Lincoln Electric Service Department for electrical troubleshooting assistance before you proceed. Call 1-888-935-3877.

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### TEST DESCRIPTION

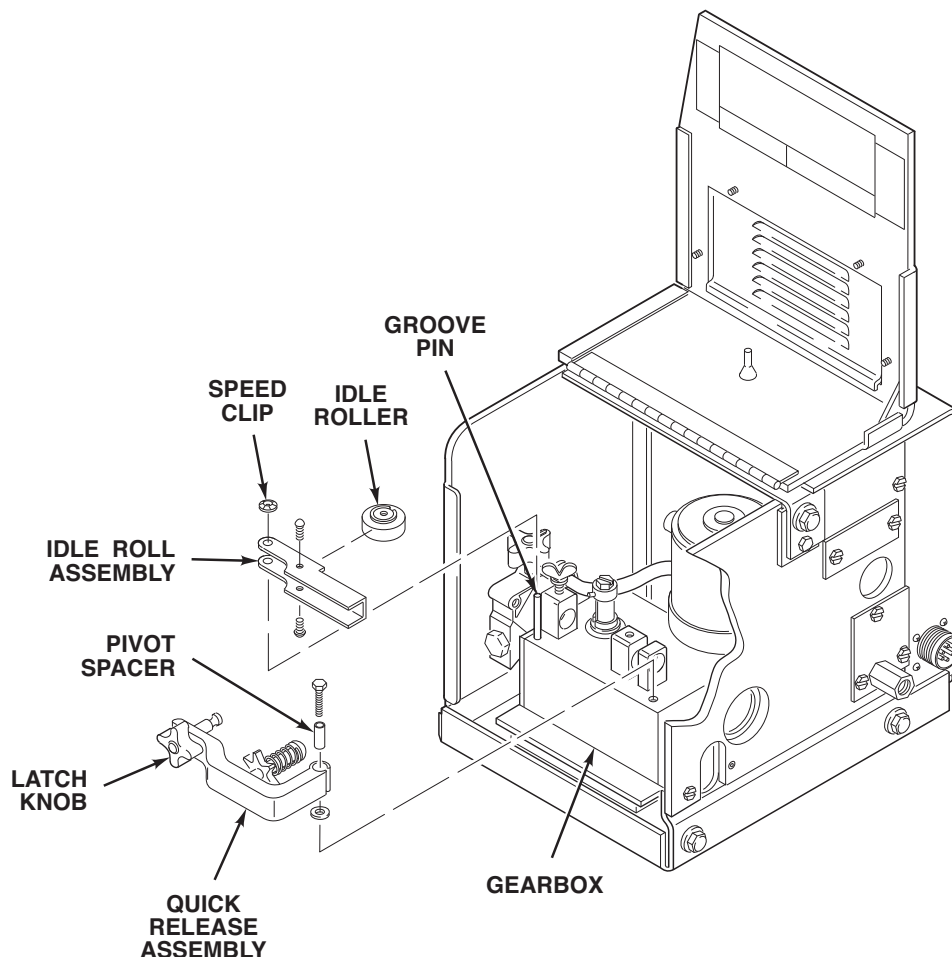
This procedure will aid the technician in the removal and replacement of the Swing Arm Assembly for Two-Roll Wire Feeders.

### MATERIALS NEEDED

7/16" Wrench  
Straight Blade Screwdriver

## SWING ARM ASSEMBLY REMOVAL AND REPLACEMENT PROCEDURE FOR TWO-ROLL WIRE FEEDERS (continued)

FIGURE F.14 – SWING ARM REMOVAL FOR TWO-ROLL FEEDERS



### PROCEDURE

1. Rotate the latch knob on the quick release assembly to the open position and swing the arm away from the gearbox. See Figure F.14.
2. Remove the hex head bolt that attaches the swing arm to the gearbox. Remove the swing arm and flat washer from the wire feeder. Remove the pivot spacer from the swing arm.
3. Pry the speed clip off of the groove pin and lift the idle roll assembly from groove pin.
4. Remove the two screws that hold the idle roller in the idle roll assembly. Remove the idle roller.
5. Install the new idle roller in the idle roll assembly and secure with two screws. Tighten the two screws until the sides of the idle roll assembly are snug against the idle roller.

## SWING ARM ASSEMBLY REMOVAL AND REPLACEMENT PROCEDURE FOR TWO-ROLL WIRE FEEDERS (continued)

6. Place the idle roll assembly into the groove pin. Secure in place with a speed clip.
7. Slide the pivot pin into the swing arm assembly. Place the flat washer and swing arm assembly on the gearbox assembly. Fasten in place with the hex head bolt.
8. Swing the swing arm assembly in toward the gearbox. Latch the swing arm assembly by rotating the latch knob towards the conductor block.

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LN-7™ GMA WIRE FEEDER



## SWING ARM ASSEMBLY REMOVAL AND REPLACEMENT PROCEDURE FOR FOUR-ROLL WIRE FEEDERS

### **WARNING**

Service and repair should be performed only by Lincoln Electric factory trained personnel. Unauthorized repairs performed on this equipment may result in danger to the technician or machine operator and will invalidate your factory warranty. For your safety and to avoid electrical shock, please observe all safety notes and precautions detailed throughout this manual.

If for any reason you do not understand the test procedures or are unable to perform the test/repairs safely, contact the Lincoln Electric Service Department for electrical troubleshooting assistance before you proceed. Call 1-888-935-3877.

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### **TEST DESCRIPTION**

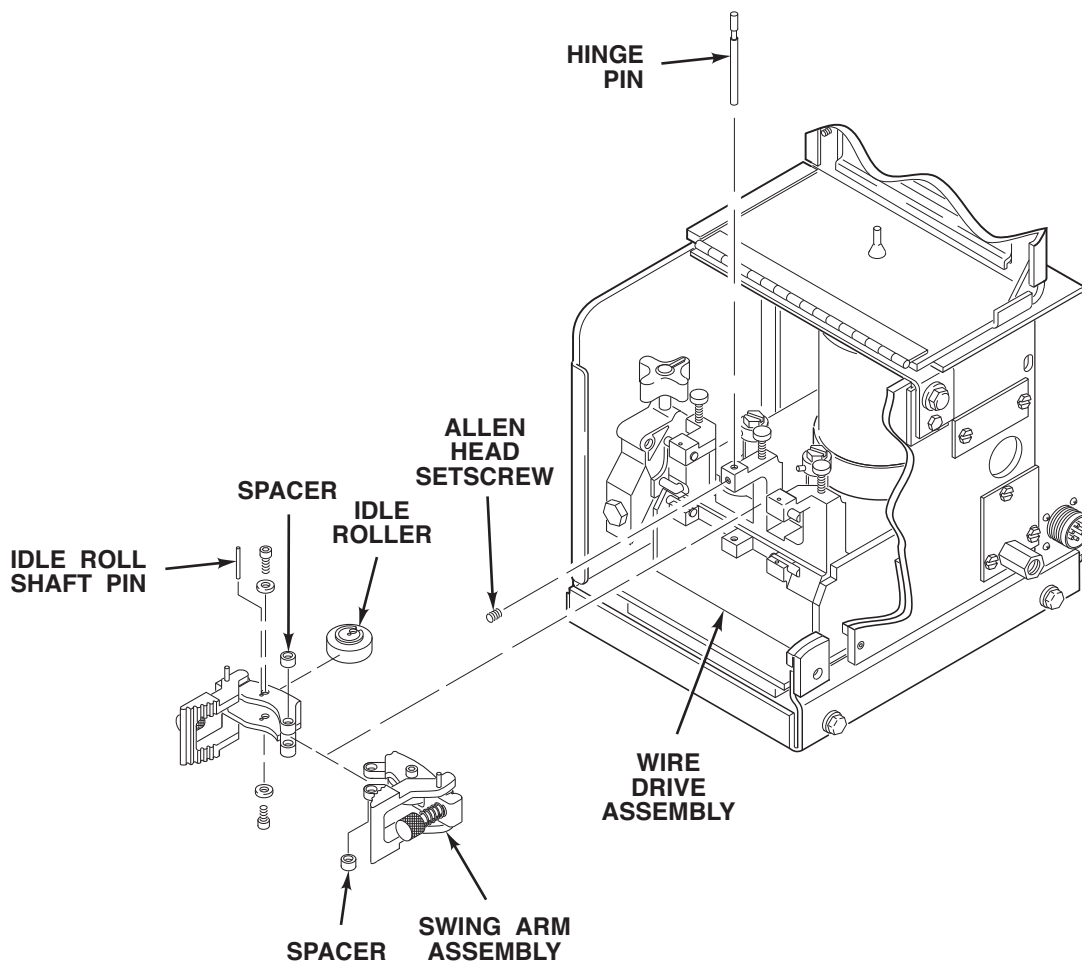
This procedure will aid the technician in the removal and replacement of the Swing Arm Assembly for Four-Roll Wire Feeders.

### **MATERIALS NEEDED**

- 3/32" Allen Wrench
- 9/64" Allen Wrench
- Pliers
- Rubber Mallet

## SWING ARM ASSEMBLY REMOVAL AND REPLACEMENT PROCEDURE FOR FOUR-ROLL WIRE FEEDERS (continued)

FIGURE F.15 – SWING ARM REMOVAL FOR FOUR-ROLL FEEDERS



### PROCEDURE

1. Remove the allen head setscrew from the center post of the wire drive assembly. See Figure F.15.
2. Using a pair of pliers, pull the hinge pin up and out of the wire drive assembly.
3. Note the position of the two spacers. Carefully pull the two swing arms out of the wire drive compartment. Ensure that the two spacers are not lost.
4. Remove the two socket head cap screws and flat washers from the swing arm assembly. Remove the idle roll shaft pin. Slide the idle roll from the swing arm.
5. Slide a new idle roll into the swing arm. Install one socket head cap screw and flat washer.
6. Install the idle roll shaft pin and the second socket head cap screw and flat washer.

## SWING ARM ASSEMBLY REMOVAL AND REPLACEMENT PROCEDURE FOR FOUR-ROLL WIRE FEEDERS (continued)

7. Place the two swing arms and spacers in the center post of the wire drive assembly. Ensure the holes in the pieces line up to accept the hinge pin.
8. Slide the hinge pin into the hinge pin opening in the center post. Use a rubber mallet to drive the hinge pin in if necessary. Drive the hinge pin in until the detente in the pin is visible in the setscrew hole.
9. Install the setscrew and tighten until snug.

### CAUTION

**Do not use excessive force when installing the hinge pin. If hinge pin does not go in, remove it and try again.**

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## GAS SOLENOID AND CONNECTIONS REMOVAL AND REPLACEMENT PROCEDURE

### WARNING

Service and repair should be performed only by Lincoln Electric factory trained personnel. Unauthorized repairs performed on this equipment may result in danger to the technician or machine operator and will invalidate your factory warranty. For your safety and to avoid electrical shock, please observe all safety notes and precautions detailed throughout this manual.

If for any reason you do not understand the test procedures or are unable to perform the test/repairs safely, contact the Lincoln Electric Service Department for electrical troubleshooting assistance before you proceed. Call 1-888-935-3877.

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### TEST DESCRIPTION

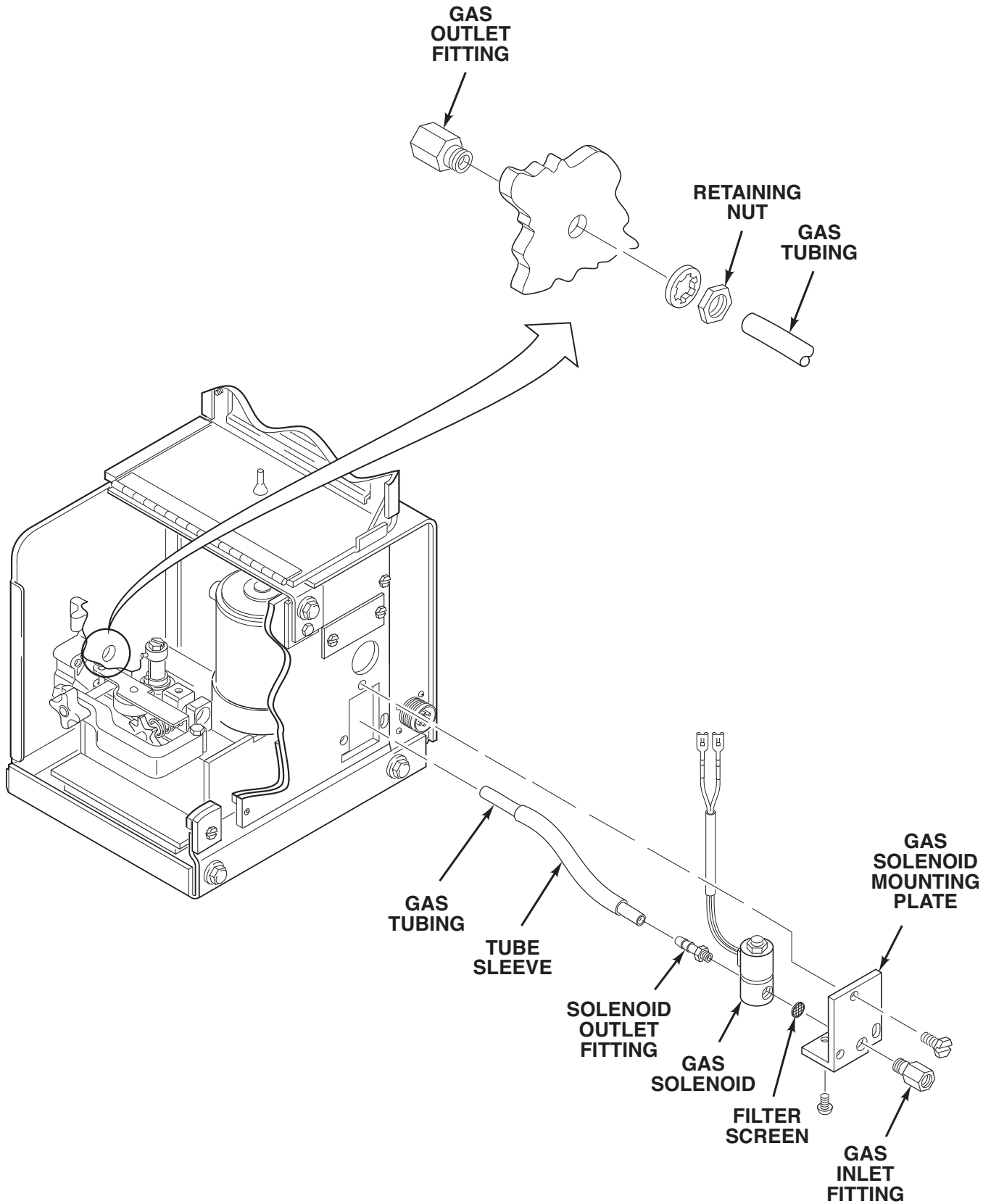
This procedure will aid the technician in the removal and replacement of the Gas Solenoid and Connections.

### MATERIALS NEEDED

- 5/16 in. Wrench
- Wire Cutters
- 3/4 in. Wrench
- 7/16 in. Wrench
- Phillips Screwdriver
- Knife
- Thread Sealant (Part No. E-2442)
- Tie Wraps

**GAS SOLENOID AND CONNECTIONS REMOVAL AND REPLACEMENT  
PROCEDURE (continued)**

**FIGURE F.16 – GAS SOLENOID DISASSEMBLY**



**LN-7™ GMA WIRE FEEDER**



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## GAS SOLENOID AND CONNECTIONS REMOVAL AND REPLACEMENT PROCEDURE (continued)

### PROCEDURE

1. Remove the cover from the control box by removing the four 5/16 in. screws from the top and side of the unit.
2. Remove the tie wraps that secure the gas solenoid wires to the wire feeder main harness.
3. Disconnect the gas solenoid wires from the control PC board at terminals #7 and #32A. See Wiring Diagrams. Feed the wires back through wall of the control box and into the wire drive compartment.
4. Remove the retaining nut from the gas outlet fitting. **See Figure F.16.** Remove the gas tubing from the gas outlet fitting. If necessary, cut the gas tubing approximately one inch back from the gas fitting and remove the gas fitting. Remove the retaining nut and lockwasher from the wire feeder. Slide the tube sleeve off the gas tubing.
5. Remove the three 5/16 in. bolts that attach the gas solenoid mounting plate to the case of the wire feeder. Remove the gas solenoid from the wire feeder.
6. Remove the gas inlet fitting and the solenoid outlet fitting from the gas solenoid. Remove the filter screen from the inlet port of the solenoid.
7. Remove the solenoid from the solenoid mounting plate by removing the two phillips head screws from the bottom of the mounting plate.
8. Remove the tubing from the gas and solenoid outlet fittings. A knife may be required to cut the tubing.
9. Mount the new solenoid to the solenoid mounting plate using two phillips head screws.
10. Apply thread sealant (part no. E-2442) to the threads of the gas inlet fitting. Place the filter screen in the inlet port of the solenoid. Connect the new gas fittings to the gas solenoid.
11. Attach an approximately 10 in. piece of 1/4 in. tubing to the solenoid outlet fitting on the gas solenoid. Slide the tube sleeve over the tubing.
12. Feed the gas tubing through the mounting hole for the gas solenoid, behind the wire drive gearbox, and below the feed motor. Install the gas solenoid onto the wire feeder using three 5/16 in. bolts.
13. Place the retaining nut and lockwasher on the gas tubing. Extend the gas tubing out the mounting hole for the gas outlet fitting and connect the tubing to the new gas outlet fitting.
14. Install the gas outlet fitting into the wire feeder case and secure with the lockwasher and retaining nut.
15. Rout the wires for the gas solenoid through the hole in the case and into the control box.
16. Connect the wires to terminals #7 and #32A on the control PC board.
17. Secure the solenoid wires to the wire feeder main harness using two tie wraps.
18. Reinstall the cover on the control box using four hex head screws.

**RETEST AFTER REPAIR**

If a failed test indicates that any mechanical part which could affect the machine’s electrical characteristics must be replaced, or if any electrical components are repaired or replaced, the machine must be retested and meet the following standards.

Wire Feed Speed, LN-7™ GMA ..... 75 through 700 in./min

Wire Feed Speed, LN-7™ ..... 50 through 500 in./min

Voltmeter ..... Must be accurate to ±0.5 VDC

Gas Solenoid ..... Must function when gun trigger is activated

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**Electrical Diagrams** ..... **G-1**

    Wiring Diagram Codes 9100 To 9386 (M15021) ..... G-2

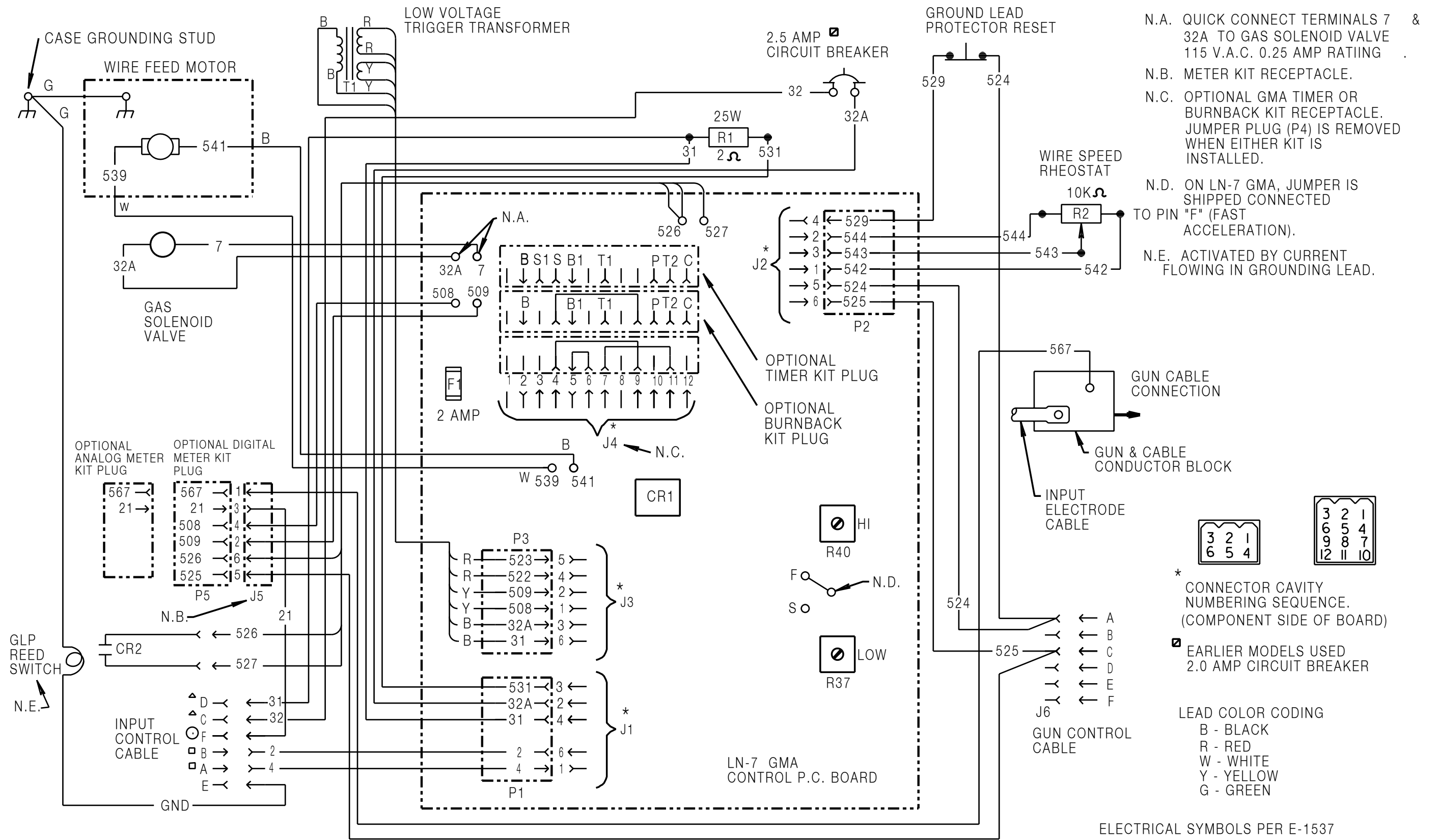
    Wiring Diagram Codes 9484 To 9796 (M16056) ..... G-3

    Wiring Diagram Codes 9928 To 10737 (M16974) ..... G-4

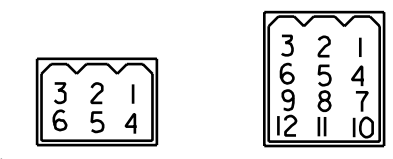
    Schematic Diagram - Control PC Board (L7209) ..... G-5

**\* NOTE:** Many PC Board Assemblies are now totally encapsulated, surface mounted and or multi-layered and are therefore considered to be unserviceable. Assembly drawings of these boards are no longer provided.

WIRING DIAGRAM - CODES 9100 TO 9386 (M15021)



- N.A. QUICK CONNECT TERMINALS 7 & 32A TO GAS SOLENOID VALVE 115 V.A.C. 0.25 AMP RATING
- N.B. METER KIT RECEPTACLE.
- N.C. OPTIONAL GMA TIMER OR BURNBACK KIT RECEPTACLE. JUMPER PLUG (P4) IS REMOVED WHEN EITHER KIT IS INSTALLED.
- N.D. ON LN-7 GMA, JUMPER IS SHIPPED CONNECTED TO PIN "F" (FAST ACCELERATION).
- N.E. ACTIVATED BY CURRENT FLOWING IN GROUNDING LEAD.



\* CONNECTOR CAVITY NUMBERING SEQUENCE. (COMPONENT SIDE OF BOARD)

□ EARLIER MODELS USED 2.0 AMP CIRCUIT BREAKER

LEAD COLOR CODING  
 B - BLACK  
 R - RED  
 W - WHITE  
 Y - YELLOW  
 G - GREEN

ELECTRICAL SYMBOLS PER E-1537

- TO CONTACTOR CIRCUIT
- ▲ 115 V.A.C.
- WORK

LN-7 GMA  
 WIRING DIAGRAM

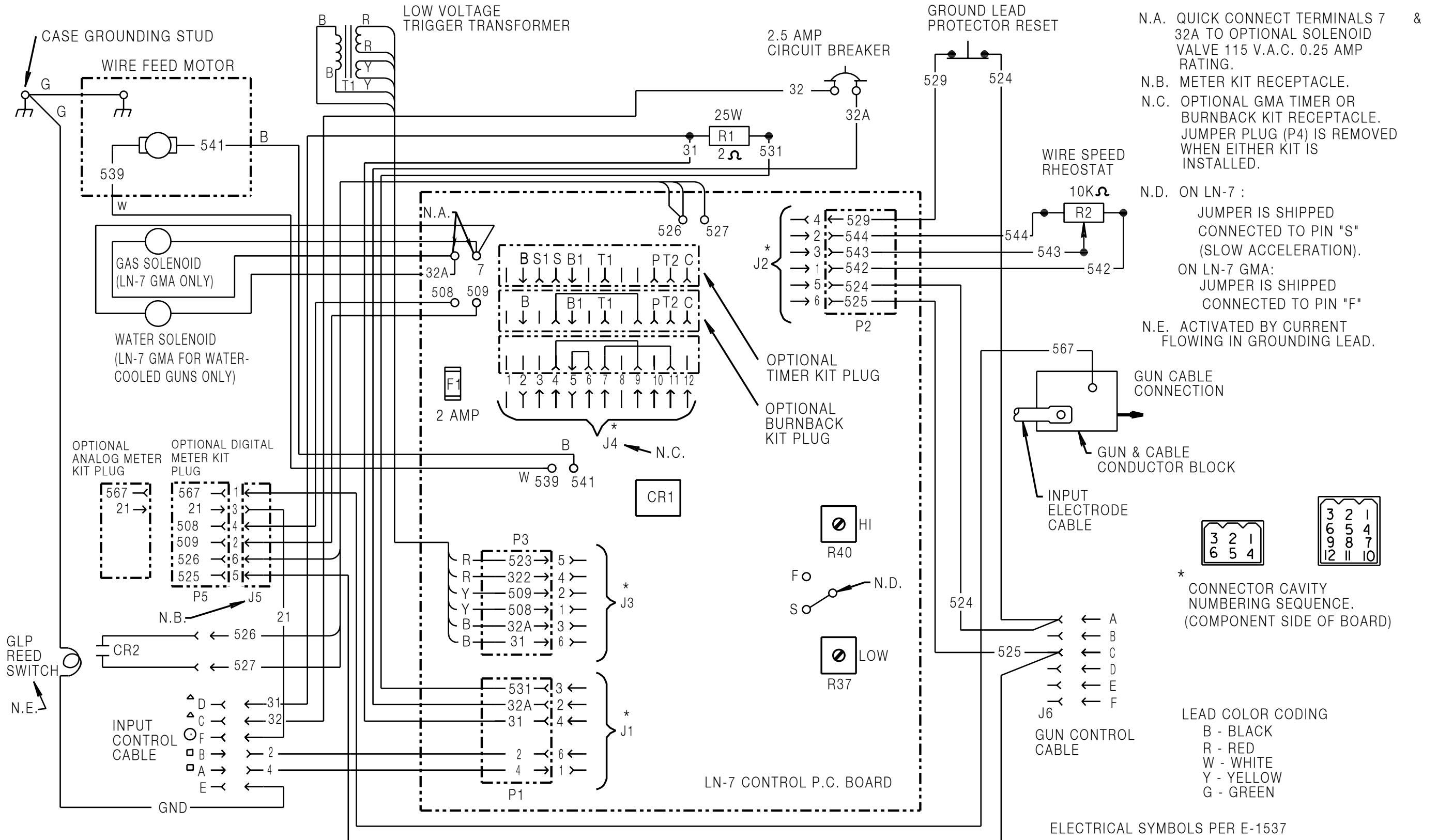
4-4-86L M 15021

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



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WIRING DIAGRAM - CODES 9484 TO 9796 (M16056)



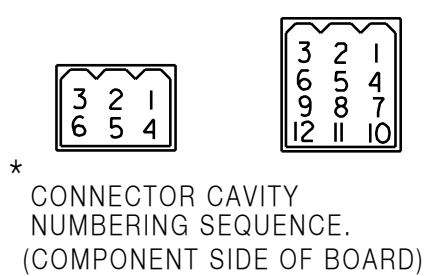
N.A. QUICK CONNECT TERMINALS 7 & 32A TO OPTIONAL SOLENOID VALVE 115 V.A.C. 0.25 AMP RATING.

N.B. METER KIT RECEPTACLE.

N.C. OPTIONAL GMA TIMER OR BURNBACK KIT RECEPTACLE. JUMPER PLUG (P4) IS REMOVED WHEN EITHER KIT IS INSTALLED.

N.D. ON LN-7 :  
JUMPER IS SHIPPED CONNECTED TO PIN "S" (SLOW ACCELERATION).  
ON LN-7 GMA:  
JUMPER IS SHIPPED CONNECTED TO PIN "F"

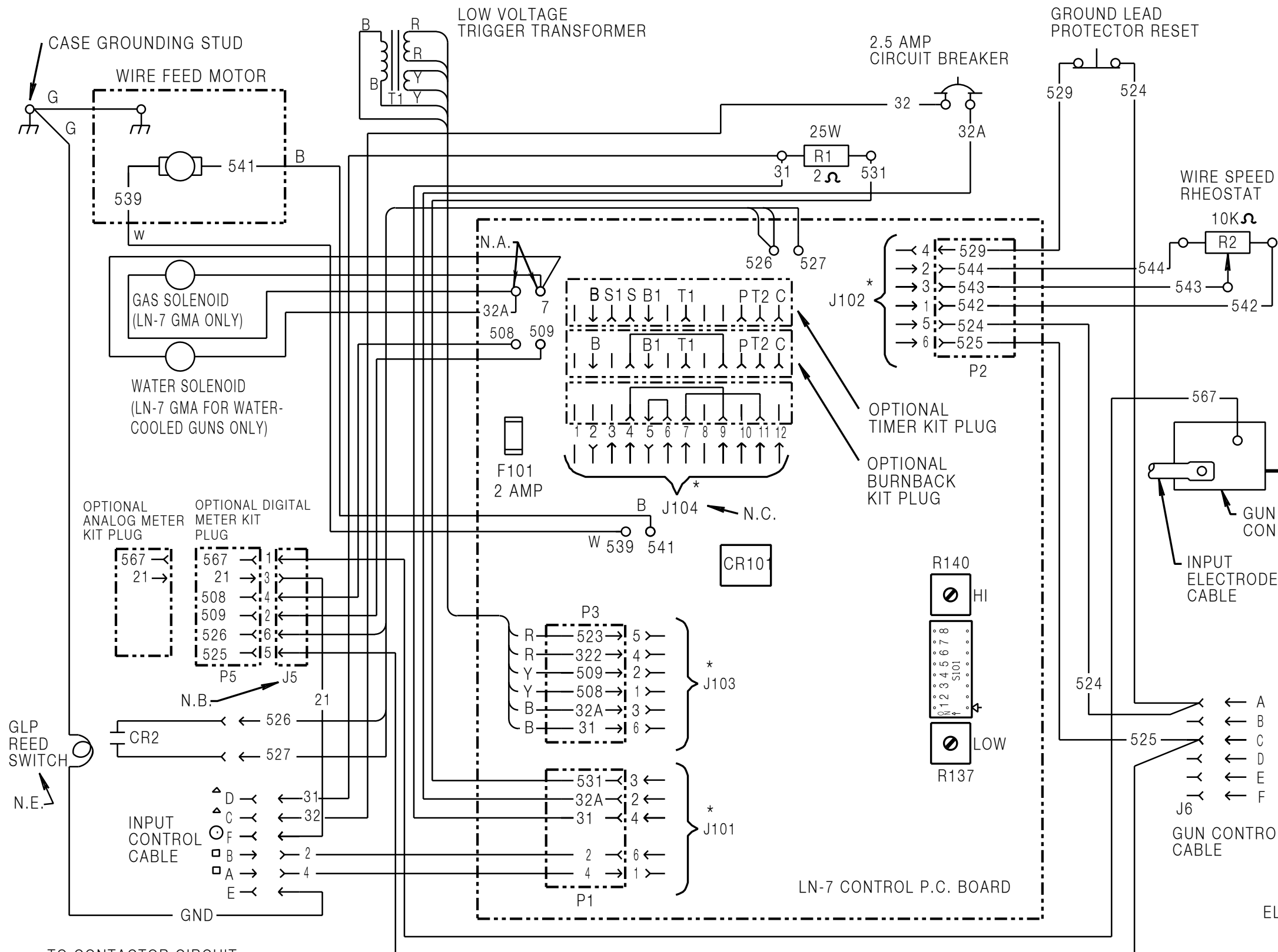
N.E. ACTIVATED BY CURRENT FLOWING IN GROUNDING LEAD.



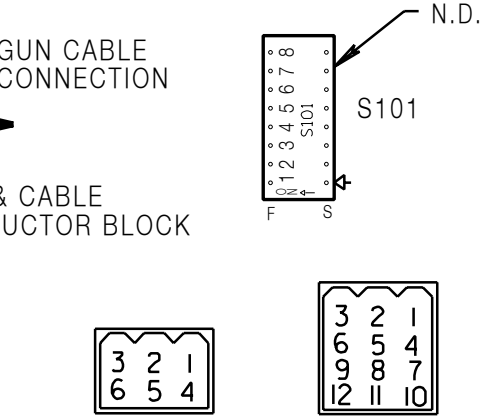
□ TO CONTACTOR CIRCUIT  
▲ 115 V.A.C.  
○ WORK

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

WIRING DIAGRAM - CODES 9928 TO 10737 (M16974)



- N.A. QUICK CONNECT TERMINALS 7 & 32A TO OPTIONAL SOLENOID VALVE 115 V.A.C. 0.25 AMP RATING.
- N.B. METER KIT RECEPTACLE.
- N.C. OPTIONAL GMA TIMER OR BURNBACK KIT RECEPTACLE. JUMPER PLUG (P4) IS REMOVED WHEN EITHER KIT IS INSTALLED.
- N.D. ON LN-7 :  
S101 IN THE "S" POSITION.  
(SLOW ACCELERATION).  
ON LN-7 GMA:  
S101 IN THE "F" POSITION.
- N.E. ACTIVATED BY CURRENT FLOWING IN GROUNDING LEAD.



\* CONNECTOR CAVITY NUMBERING SEQUENCE. (COMPONENT SIDE OF BOARD)

LEAD COLOR CODING  
 B - BLACK  
 R - RED  
 W - WHITE  
 Y - YELLOW  
 G - GREEN

ELECTRICAL SYMBOLS PER E-1537

LN-7 AND LN-7 GMA  
 WIRING DIAGRAM

6-26-92 **M** 16974

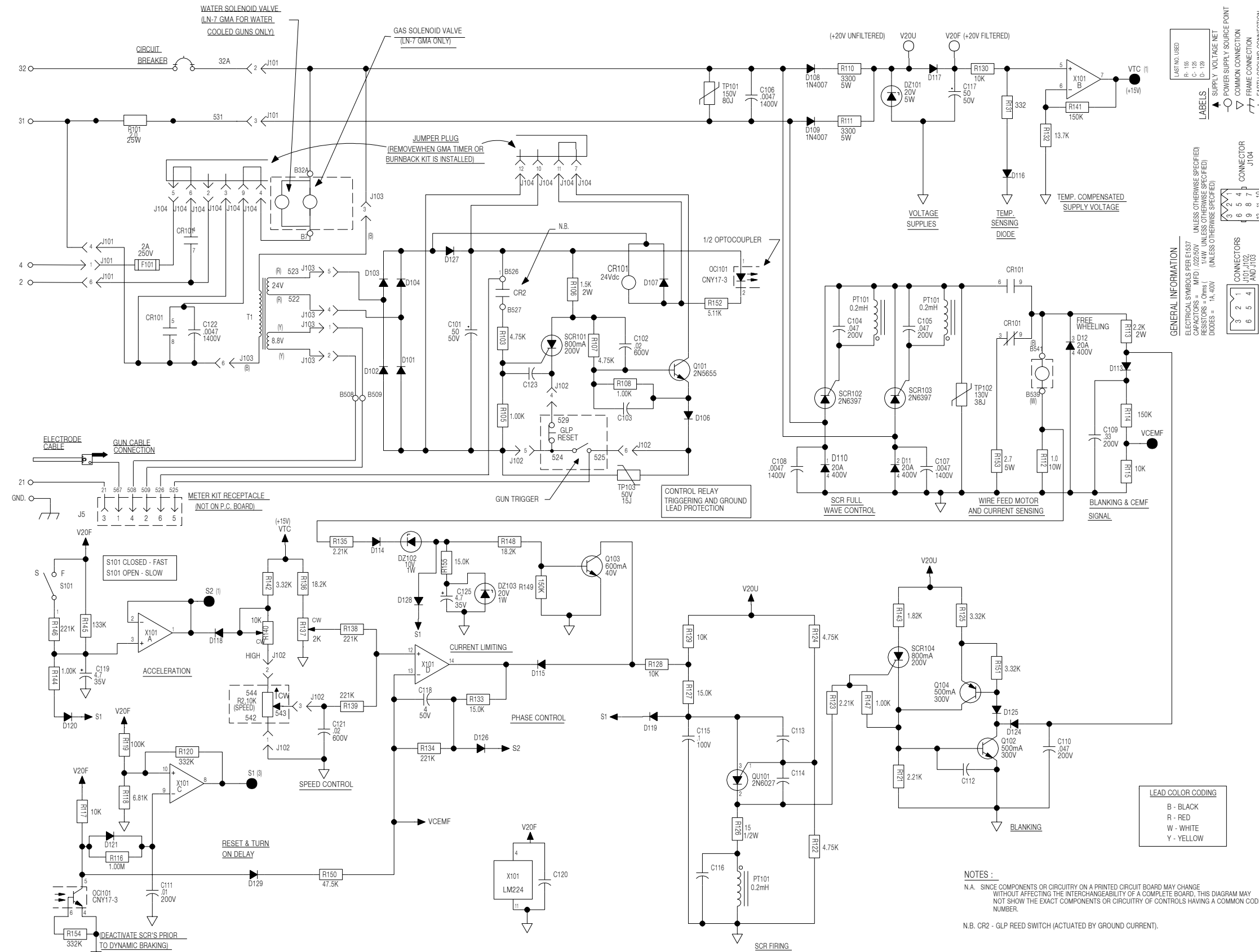
- ▣ TO CONTACTOR CIRCUIT
- ▲ 115 V.A.C.
- WORK

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



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SCHEMATIC - CONTROL PC BOARD (L7209)



LN-7 & LN-7 GMA  
OPERATING SCHEMATIC  
6-26-92  
L 7209

LAST NO. USED  
R - 15  
C - 15  
D - 15

UNLESS OTHERWISE SPECIFIED  
CAPACITORS = MFD / .022/50V  
RESISTORS = Ohms ( UNLESS OTHERWISE SPECIFIED )  
DIODES = 1A, 400V

CONNECTORS  
J101, J102, J103 AND J104

CONNECTOR  
J104

CONNECTORS  
6 5 4  
9 8 7  
12 11 10

GENERAL INFORMATION  
ELECTRICAL SYMBOLS PER E1537  
CAPACITORS = MFD / .022/50V  
RESISTORS = Ohms ( UNLESS OTHERWISE SPECIFIED )  
DIODES = 1A, 400V

TEMP. COMPENSATED SUPPLY VOLTAGE

TEMP. SENSING DIODE

VOLTAGE SUPPLIES

WIRE FEED MOTOR AND CURRENT SENSING

BLANKING & CEMF SIGNAL

SCR FULL WAVE CONTROL

CONTROL RELAY TRIGGERING AND GROUND LEAD PROTECTION

GUN TRIGGER

RESET & TURN ON DELAY

PHASE CONTROL

CURRENT LIMITING

SPEED CONTROL

ACCELERATION

SCHEMATIC

RESEAT & TURN ON DELAY

DEACTIVATE SCR'S PRIOR TO DYNAMIC BRAKING

BLANKING

SCR FIRING

LEAD COLOR CODING  
B - BLACK  
R - RED  
W - WHITE  
Y - YELLOW

NOTES:  
N.A. 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.  
N.B. CR2 - GLP REED SWITCH (ACTUATED BY GROUND CURRENT).

**NOTE:** Lincoln Electric assumes no responsibility for liabilities resulting from board level troubleshooting. PC Board repairs will invalidate your factory warranty. This Printed Circuit Board schematic is provided for reference only. It may not be totally applicable to your machine's specific PC board version. This diagram is intended to provide general information regarding PC board function. Lincoln Electric discourages board level troubleshooting and repair since it may compromise the quality of the design and may result in Danger to the Machine Operator or Technician. Improper PC board repairs could result in damage to the machine.



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