RETURN TO MAIN MENU

IM850-A

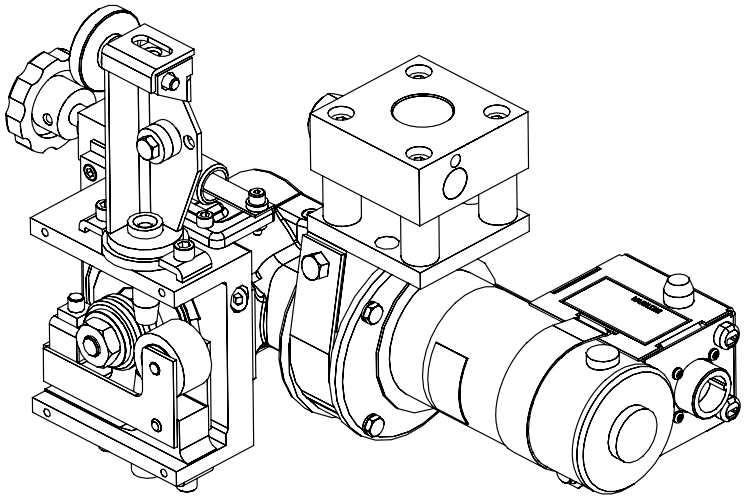
April, 2005

POWER FEED 10S

For use with machines having Code Numbers: **11063, 11064, 11127**

Safety Depends on You

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



OPERATOR'S MANUAL

LINCOLN® ELECTRIC

• World's Leader in Welding and Cutting Products •
• Sales and Service through Subsidiaries and Distributors Worldwide •
Cleveland, Ohio 44117-1199 U.S.A. TEL: 216.481.8100 FAX: 216.486.1751 WEB SITE: www.lincolnelectric.com

⚠ WARNING

⚠ CALIFORNIA PROPOSITION 65 WARNINGS ⚠

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

The Above For Diesel Engines

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

The Above For Gasoline Engines

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

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

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

FOR ENGINE powered equipment.

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

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

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

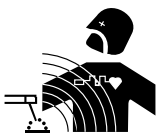
1.d. Keep all equipment safety guards, covers and devices in position and in good repair.Keep hands, hair, clothing and tools away from V-belts, gears, fans and all other moving parts when starting, operating or repairing equipment.

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

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

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

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



ELECTRIC AND MAGNETIC FIELDS may be dangerous

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

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

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

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

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

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

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

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

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

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ELECTRIC SHOCK can kill.

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

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

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

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

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

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

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

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

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

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

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

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

ARC RAYS can burn.

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

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

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

FUMES AND GASES can be dangerous.

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

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

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

5.d. Read and understand the manufacturer's instructions for this equipment and the consumables to be used, including the material safety data sheet (MSDS) and follow your employer's safety practices. MSDS forms are available from your welding distributor or from the manufacturer.

5.e. Also see item 1.b.

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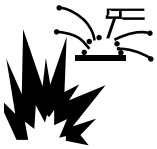


WELDING SPARKS can cause fire or explosion.

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

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

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

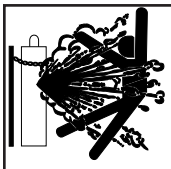
6.d. Do not heat, cut or weld tanks, drums or containers until the proper steps have been taken to insure that such procedures will not cause flammable or toxic vapors from substances inside. They can cause an explosion even though they have been “cleaned”. For information, purchase “Recommended Safe Practices for the Preparation for Welding and Cutting of Containers and Piping That Have Held Hazardous Substances”, AWS F4.1 from the American Welding Society (see address above).

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

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

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

6.h. Also see item 1.c.



CYLINDER may explode if damaged.

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

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

7.c. Cylinders should be located:

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

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

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

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

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

FOR ELECTRICALLY powered equipment.

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

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

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

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PRÉCAUTIONS DE SÛRETÉ

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

Sûreté Pour Soudage A L'Arc

1. Protegez-vous contre la secousse électrique:

   a. Les circuits à l'électrode et à la piéce sont sous tension quand la machine à souder est en marche. Eviter toujours tout contact entre les parties sous tension et la peau nue ou les vétements mouillés. Porter des gants secs et sans trous pour isoler les mains.
   b. Faire trés attention de bien s'isoler de la masse quand on soude dans des endroits humides, ou sur un plancher metallique ou des grilles metalliques, principalement dans les positions assis ou couché pour lesquelles une grande partie du corps peut être en contact avec la masse.
   c. Maintenir le porte-électrode, la pince de masse, le câble de soudage et la machine à souder en bon et sûr état defonctionnement.
   d.Ne jamais plonger le porte-électrode dans l'eau pour le refroidir.
   e. Ne jamais toucher simultanément les parties sous tension des porte-électrodes connectés à deux machines à souder parce que la tension entre les deux pinces peut être le total de la tension à vide des deux machines.
   f. Si on utilise la machine à souder comme une source de courant pour soudage semi-automatique, ces precautions pour le porte-électrode s'applicuent aussi au pistolet de soudage.

2. Dans le cas de travail au dessus du niveau du sol, se protéger contre les chutes dans le cas ou on recoit un choc. Ne jamais enrouler le câble-électrode autour de n'importe quelle partie du corps.

3. Un coup d'arc peut être plus sévère qu'un coup de soliel, donc:

   a. Utiliser un bon masque avec un verre filtrant approprié ainsi qu'un verre blanc afin de se protéger les yeux du rayonnement de l'arc et des projections quand on soude ou quand on regarde l'arc.
   b. Porter des vêtements convenables afin de protéger la peau de soudeur et des aides contre le rayonnement de l'arc.
   c. Protéger l'autre personnel travaillant à proximité au soudage à l'aide d'écrans appropriés et non-inflammables.

4. Des gouttes de laitier en fusion sont émises de l'arc de soudage. Se protéger avec des vêtements de protection libres de l'huile, tels que les gants en cuir, chemise épaisse, pantalons sans revers, et chaussures montantes.

5. Toujours porter des lunettes de sécurité dans la zone de soudage. Utiliser des lunettes avec écrans lateraux dans les zones où l'on pique le laitier.

6. Eloigner les matériaux inflammables ou les recouvrir afin de prévenir tout risque d'incendie dû aux étincelles.

7. Quand on ne soude pas, poser la pince à une endroit isolé de la masse. Un court-circuit accidental peut provoquer un échauffement et un risque d'incendie.

8. S'assurer que la masse est connectée le plus prés possible de la zone de travail qu'il est pratique de le faire. Si on place la masse sur la charpente de la construction ou d'autres endroits éloignés de la zone de travail, on augmente le risque de voir passer le courant de soudage par les chaines de levage, câbles de grue, ou autres circuits. Cela peut provoquer des risques d'incendie ou d'echauffement des chaines et des câbles jusqu'à ce qu'ils se rompent.

9. Assurer une ventilation suffisante dans la zone de soudage. Ceci est particuliérement important pour le soudage de tôles galvanisées plombées, ou cadmiées ou tout autre métal qui produit des fumeés toxiques.

10. Ne pas souder en présence de vapeurs de chlore provenant d'opérations de dégraissage, nettoyage ou pistolage. La chaleur ou les rayons de l'arc peuvent réagir avec les vapeurs du solvant pour produire du phosgéne (gas fortement toxique) ou autres produits irritants.

11. Pour obtenir de plus amples renseignements sur la sûreté, voir le code "Code for safety in welding and cutting" CSA Standard W 117.2-1974.

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

1. Relier à la terre le chassis du poste conformement au code de l'électricité et aux recommendations du fabricant. Le dispositif de montage ou la piece à souder doit être branché à une bonne mise à la terre.

2. Autant que possible, l'installation et l'entretien du poste seront effectués par un électricien qualifié.

3. Avant de faires des travaux à l'interieur de poste, la debrancher à l'interrupteur à la boite de fusibles.

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

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

Please Examine Carton and Equipment For Damage Immediately

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

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

Product _____

Model Number _____

Code Number or Date Code_____

Serial Number_____

Date Purchased_____

Where Purchased_____

Whenever you request replacement parts or information on this equipment, always supply the information you have recorded above. The code number is especially important when identifying the correct replacement parts.

On-Line Product Registration

- Register your machine with Lincoln Electric either via fax or over the Internet.

• For faxing: Complete the form on the back of the warranty statement included in the literature packet accompanying this machine and fax the form per the instructions printed on it.

• For On-Line Registration: Go to our **WEB SITE at www.lincolnelectric.com.** Choose "Quick Links" and then "Product Registration". Please complete the form and submit your registration.

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

⚠ WARNING

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

⚠ CAUTION

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

PRODUCT SUMMARY

The Power Feed 10S series of Automatic Wire Drives are designed for hard automation, submerged arc welding. The heavy-duty gearbox and feed plate have many years of proven reliability while a new permanent magnet motor has been added.

The Power Feed 10S wire drives consist of a high torque motor and gearbox assembly with a heavy-duty feed plate housing knurled drive rolls for positive, accurate wire feeding of heavy welding wire. The Power Feed 10S has many axes of rotation for ease of fixturing and locating.

RECOMMENDED PROCESSES

- The Power Feed 10S series of wire drives are best suited for submerged arc welding.

PROCESS LIMITATIONS

- MIG welding
- Robotic applications

EQUIPMENT LIMITATIONS

The Power Feed 10S series of wire drives cannot be used with the NA3, NA-4, or NA-5 series of Lincoln Automatics.

COMMON EQUIPMENT PACKAGES

Basic Package:

K2344-1	Power Wave 1000 AC/DC
K2362-1	PF-10A Controller
K2312-1	PF-10SF Wire Drive

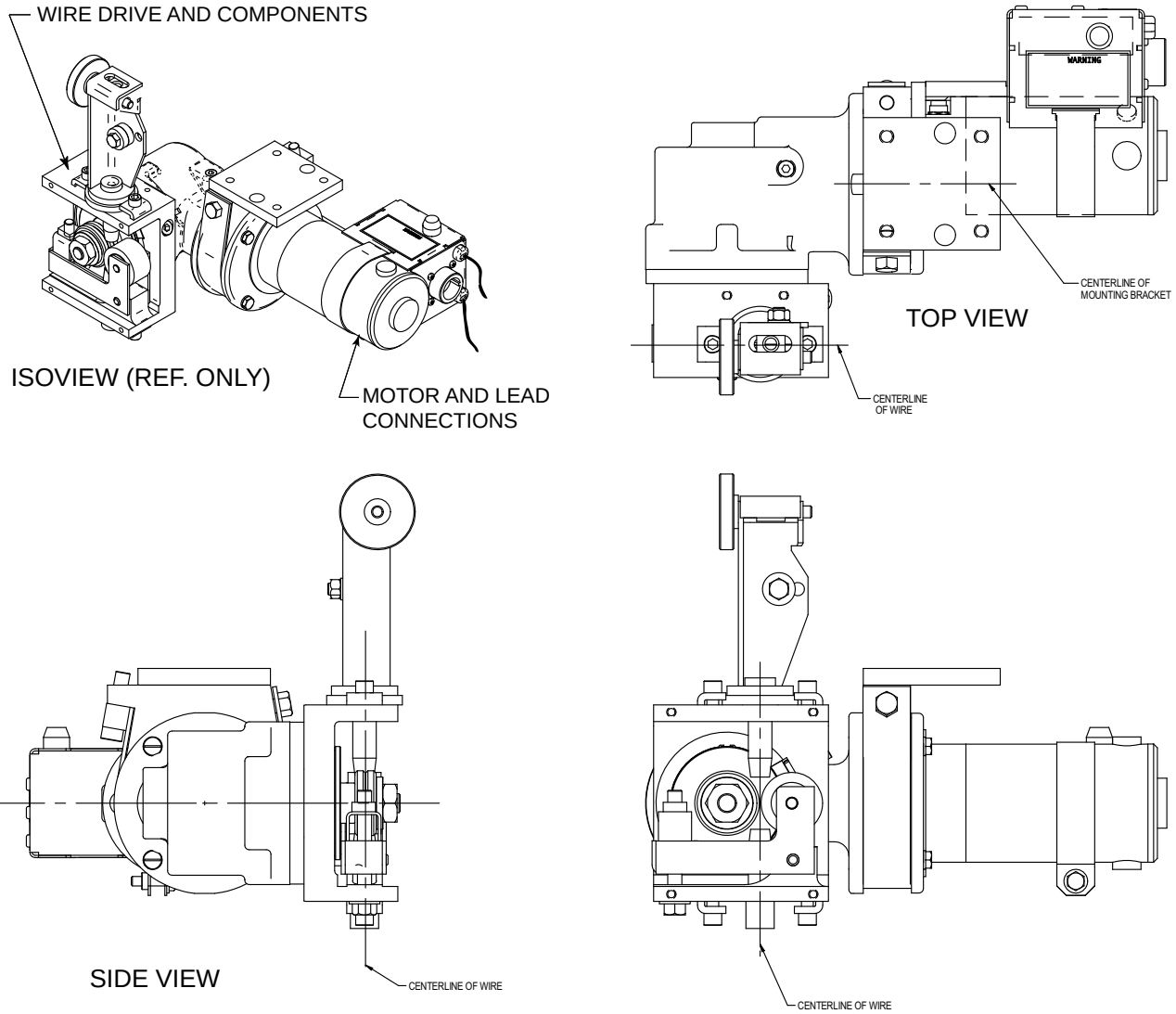
Basic Package with optional kits:

K2311-1	PF-10SM Motor Retrofit Kit
K2370-1	PF-10S Wire Drive (includes Cross Seam Adjuster and Automatic Flux Hopper with hardware to connect to TC-3 Travel Carriage)
K2282-1	System Interface (Phase Generator)

DESIGN FEATURES

- Closed-loop speed control.
- Knurled drive rolls.
- Heavy cast aluminum gearbox housing and feed plate assembly.
- Wire straightener.
- 32Vdc permanent magnet, high torque motor.
- Conversion kit included to change speed range.
- Voltage sense leads included for precision welding performance.

LOCATION OF COMPONENTS



TECHNICAL SPECIFICATIONS - POWER FEED 10S

Spec.	Type	142:1 Speed Ratio			95:1 Speed Ratio			57:1 Speed Ratio		
		Speed	Wire Size Solid	Cored	Speed	Wire Size Solid	Cored	Speed	Wire Size Solid	Cored
K2312-1	Power Feed 10S	10-200	7/32	5/32	10-300	1/8	5/32	10-450	1/16	3/32

Wire Feeders - Input Voltage and Current	
Voltage	**Input Amperes**
32V DC	7 Amps (max.)

PHYSICAL DIMENSIONS

MODEL	HEIGHT	WIDTH	DEPTH	WEIGHT
K2312-1	12.0 in. (305 mm)	14.0in (355mm)	10.0in (254mm)	35.0lbs (15.9kg)
K2370-1	12.0 in. (305 mm)	14.0in (355mm)	10.0in (254mm)	80.0lbs (36.3kg)
K2311-1	8.0 in. (203 mm)	6.0in (152mm)	5.0in (127mm)	10.0lbs (4.5kg)

TEMPERATURE RANGES

OPERATING TEMPERATURE RANGE	STORAGE TEMPERATURE RANGE
-4°F to 104°F (-20°C to 40°C)	-40°F to 185°F (-40°C to 85°C)

WELDING PROCESSES

Process	Electrode Diameter Range	Output Range (Amperes)	Wire Feed Speed Range
SAW	1/16 – 7/32" (1.6 – 5.6 mm)	200 - 1000	10 - 450 ipm (.25 – 11.43 m/minute)

SAFETY PRECAUTIONS

Read this entire installation section before you start installation.

⚠ WARNING

ELECTRIC SHOCK can kill.

- **Only qualified personnel should perform this installation.**
- **Turn the input power OFF at the disconnect switch or fuse box before working on this equipment. Turn off the input power to any other equipment connected to the welding system at the disconnect switch or fuse box before working on the equipment.**
- **Do not touch electrically hot parts.**

NON-STANDARD SAFETY INFORMATION

⚠ CAUTION

The PF-10S series of wire drives may be at welding voltage potential when the output of the power source is active.

INPUT AND GROUND CONNECTIONS

Only a qualified electrician should connect the POWER FEED 10S. Installation should be made in accordance with the appropriate National Electrical Code, all local codes and the information in this manual.

LOCATION AND MOUNTING

- The POWER FEED 10S will operate in harsh environments.

HIGH FREQUENCY PROTECTION

Locate the POWER FEED 10S away from radio controlled machinery.

POWER WAVE AC/DC 1000AMP SUBARC SYSTEM CONNECTIONS

(See Figure A.1)

1- Work cable connection

3- 14 pin wire feeder control cable

4- 5 pin Arclink control cable to user interface

7- Electrode cable connection

MOUNTING DIMENSIONS

The PF-10S can be mounted by using the four 3/8-16 tapped holes or the two 0.562 through holes. See mounting hole locations (Figure A.2).

FIGURE A.1

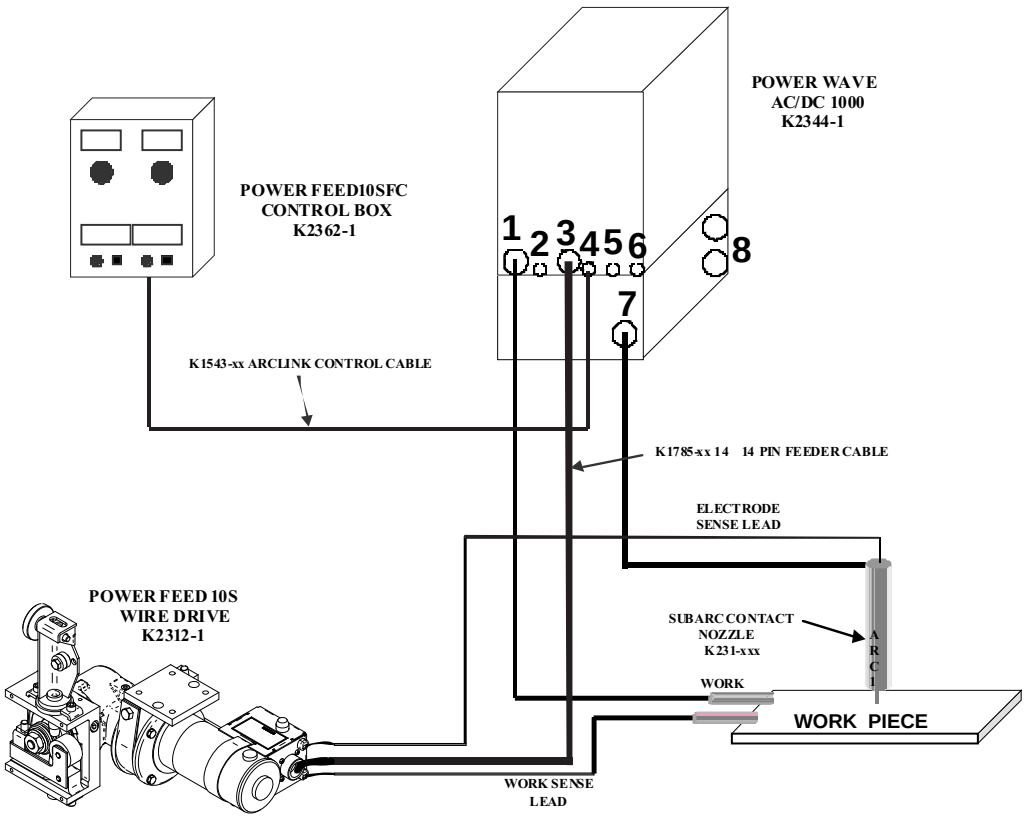
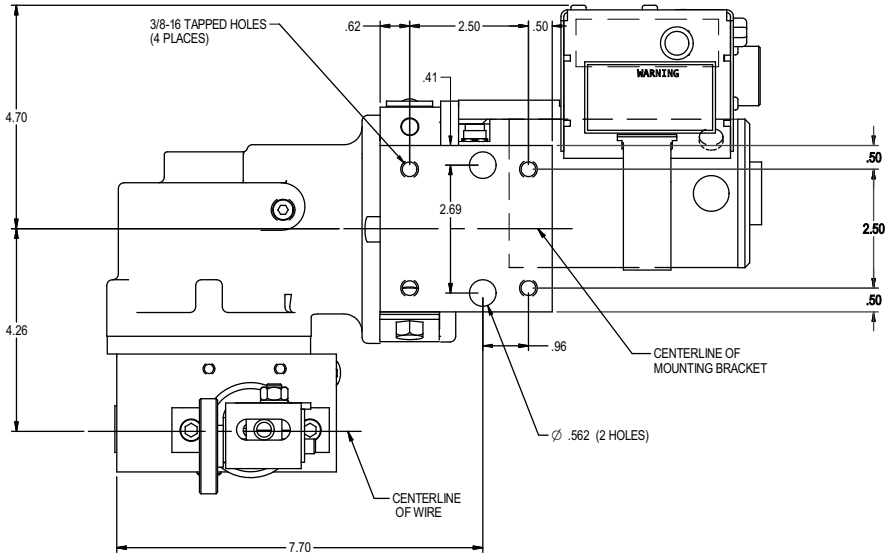


FIGURE A.2



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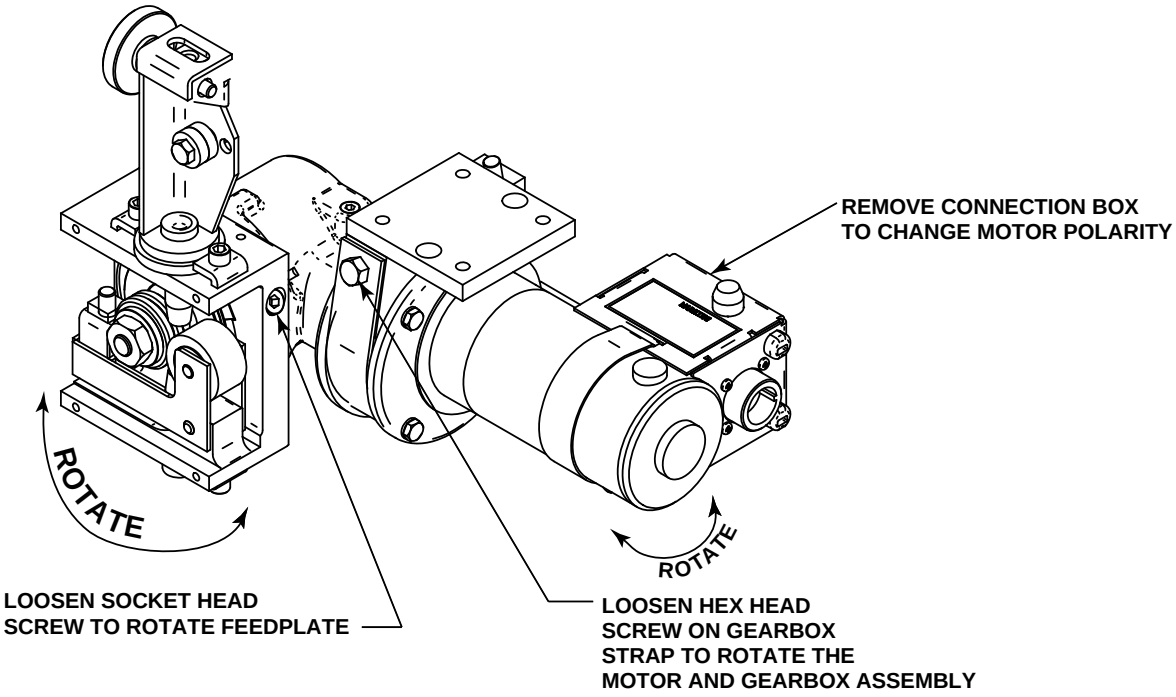
CHANGING WIRE DRIVE CONFIGURATION

The POWER FEED-10S Wire Drives can be reconfigured to fit in any hard automation application.

The POWER FEED-10S Wire Drives can be reconfigured in such a way that the wire feed direction is reversed. If this is the case, the motor leads must be reversed so the wire will feed correctly. Follow these instructions to reverse the motor polarity. (See Figure A.3)

1. Remove all power from the POWER FEED-10S Wire Drive.
2. Disconnect the Control Cable from the POWER FEED-10S Wire Drive Connection Box.
3. Loosen the fastener from the Band Strap to the Connection Box, which secures the assembly to the Motor housing, and expose the leads inside of the Connection Box.
4. Locate the Motor leads. These leads will go from the Motor to the Control Cable connector on the inside of the Connection Box.
5. Carefully disconnect the Motor leads from the harness by pulling the quick-connect terminals apart.
6. Reverse the motor leads and reconnect the quick-connect terminals (see Wiring Diagram).
7. Carefully replace the wire harness back into the Connection Box and place back onto the Motor housing locating over the Motor lead grommet. Ensure that the tachometer leads are completely covered by the Channel that snaps into the Connection Box. The Connection Box assembly should be pushed all the way up to the Motor-to-Gearbox Adapter Plate.
8. Before securing the Connection Box to the Motor housing with the Band Strap, ensure that none of the harness leads are being pinched underneath the edges of the Connection Box and Channel.
9. Place the Band Strap into the "T" slot on the side of the Connection Box and wrap it around the Motor housing.
10. Replace the fastener between the Band Strap and the Connection Box. Tighten so that the Connection Box cannot move on the Motor housing.

FIGURE A.3



ELECTRODE AND WORK CONNECTIONS

Due to the Power Wave AC/DC"s ability to produce either a DC positive, DC negative or AC output the electrode and work connections do not need to be reversed for the different polarities. Additionally no DIP switch changes are required to switch between the different polarities. All of this is controlled internally by the Power Wave AC/DC. The following directions apply to all polarities:

Connect a work lead of sufficient size (Per Table A.1) and length between the "work" stud (located beneath the spring loaded output cover on the front of the machine) and the work. For convenience, the work lead can be routed behind the left strain relief (under the spring loaded output cover), along the channels, and out the back of the machine. Be sure the connection to the work makes tight metal-to-metal electrical contact. The work piece connection must be firm and secure. Excessive voltage drops caused by poor work piece connections often result in unsatisfactory welding performance. To avoid interference problems with other equipment and to achieve the best possible operation, route all cables directly to the work and wire feeder. Avoid excessive lengths and do not coil excess cable.

Connect the electrode cable to the "ELECTRODE" stud on the power source (located behind the cover plate on the lower left side). For convenience, the cable can be routed through the oval hole in the left cable tray before being connected to the output terminals. Connect the other end of the electrode cable to the nozzle. Be sure the connection makes tight metal-to-metal electrical contact. The electrode cable should be sized according to the specifications given in Table A.1.

TABLE A.1 - Output Cable Guidelines

Total Cable Length ft (m) Electrode and Work Combined	Duty Cycle	Number of Parallel Cables	Cable Size Copper
0 (0) to 250 (76.2)	80%	2	4/0 (120 mm^2)
0 (0) to 250 (76.2)	100%	3	3/0 (95 mm^2)

When using inverter type power sources like the Power Wave, use the largest welding (electrode and work) cables that are practical. When pulsing, the pulse current can reach very high levels. Voltage drops can become excessive, leading to poor welding characteristics, if undersized welding cables are used.

⚠ CAUTION

Excessive voltage drops at the work piece connection often result in unsatisfactory pulse welding performance.

REMOTE SENSE LEAD SPECIFICATIONS

The Power Feed 10S has sense lead connections at the Connection Box mounted to the motor. These sense leads are critical to the accuracy of the Power Wave welding process. Ring terminals are provided at the ends of the leads. These leads must be extended to the Work piece and the Electrode respectively. The lead marked "TO WORK" should be extended and connected to the work piece, while the lead marked "TO ELECTRODE" should be extended and connected to the nozzle. These connections should be made as close to the welding arc as possible. Use at least a 12 AWG wire with a proper sized ring terminal. Use a screw with a lock washer and nut to make the connection, then insulate the connection with electrical tape. Proper care should be taken to protect the sense leads from becoming disconnected or damaged. The loss of a sense lead connection can adversely affect welding performance.

There are several different sense lead configurations that can be used depending on the application. The ELECTRODE sense lead (67) and the WORK sense lead (21) are built into the wire drive control cable. The system has multiple sense lead configurations available. Consult the power source manual on how to configure the power source DIP switches for the sense leads.

WELDING WITH MULTIPLE ARCS

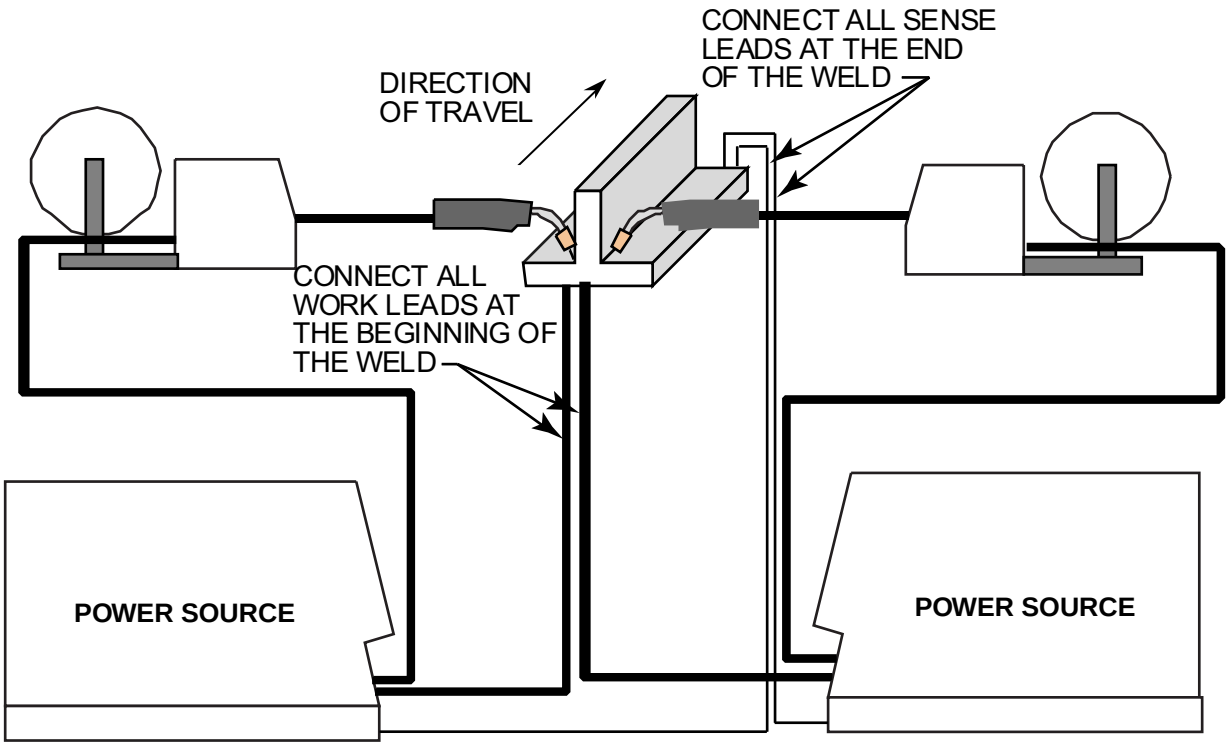
Special care must be taken when more than one arc is welding simultaneously on a single part. Arc blow and arc interference may occur or be magnified. Each power source requires a work lead from the work stud to the welding fixture. Do not combine all of the work leads into one lead. Always weld in a direction away from the work leads. Connect all of the work sense leads from each power source to the work piece at the end of the weld, such that they are out of the path of the weld current.

For the best results when pulse welding, set the wire size and wire feed speed the same for all the arcs. When these parameters are identical, the pulsing frequency will be the same, helping to stabilize the arcs.

If the voltage sensing is enabled but the sense leads are missing, improperly connected, or if the electrode polarity switch is improperly configured extremely high welding outputs may occur.

In extremely sensitive applications requiring voltage sense leads, it may be necessary to route cables that contain the sense leads away from the electrode and work welding cables. For more information regarding the placement of voltage sense leads, see the section entitled "Welding with Multiple Independent Power Waves."

FIGURE A.4



GEAR RATIO CONVERSION KITS (SEE INSTRUCTIONS INCLUDED WITH CONVERSION KIT)

1. Remove the 2 hex head screws and the 2 slot head screws holding the Motor to the Wire Drive Gearbox assembly.

2. Remove existing Adapter Plate and Motor Assembly.

3. Take the two long screws removed in step 1 and screw one into each of the tapped holes located on the face of fiber input helical gear. Insert the screws through the full thickness of the gear, and using a screwdriver wedged between the screws to prevent rotation, remove the hex nut that holds the gear to the shaft. Remove plain washer.

4. Pull the gear from the shaft using the screws as a pulling device.

5. Be certain woodruff key is properly located on the shaft. Screw the adapter plate and motor assembly mounting screws into the new fiber input helical gear from the stenciled side and place the gear on the shaft. Replace plain washer, tighten the hex nut, and remove the adapter plate and motor assembly mounting screws from the gear.

6. Support the pinion properly and, with the proper size punch, drive the roll pin that holds the pinion out of the shaft. Pull the pinion off. Remove the Ring Magnet from the pinion gear and snap it onto the new pinion gear. Before installing the new pinion gear with the Ring Magnet onto the motor shaft, ensure that the flat washer is located at the bottom of the shaft. Install the new pinion and replace the roll pin.

7. Cover the teeth of the motor pinion and the input gear with a non-fluid molydisulfide type grease such as Non-Fluid Oil Corporation's A-29 Special/MS Lubricant. This grease can be scooped from the cavity of the gear case.

8. Reassemble the motor on the gearbox; make sure the gears mesh properly and the adapter plate locating bead is in its cavity. Replace and tighten the four screws removed in step 1.

9. **See the power source manual on how to configure the power source DIP switches for the new gear ratio.**

K2311-1 MOTOR CONVERSION KIT (FOR 142:1 NA STYLE WIRE DRIVES)--This conversion kit converts old NA style wire drives.

1. Remove the 2 hex head screws and the 2 slot head screws holding the Motor to the Wire Drive Gearbox assembly.
2. Remove existing Adapter Plate and Motor Assembly.
3. The Conversion Kit Motor is shipped configured for a 142:1 gear ratio. The existing gearbox must be configured for a 142:1 gear ratio for the Conversion Kit to assemble correctly. If both assemblies are not configured for the same gear ratio, this must be done before continuing. (See Gear Ratio Conversion Kit instructions.)
4. Cover the teeth of the new Motor pinion gear with a non-fluid molydisulfide type grease such as Non-Fluid Oil Corporation's A-29 Special/MS Lubricant. This grease can be scooped from the cavity of the gear case First Chamber.
5. Reassemble the new Adapter Plate and Motor Assembly on the Wire Drive Gearbox; making sure the gears mesh properly and the Adapter Plate locating bead is in its cavity. Replace and tighten the 4 screws removed in step 1.

SAFETY PRECAUTIONS

⚠ WARNING

ELECTRIC SHOCK can kill.

- Only Qualified personnel should perform this maintenance.
- Turn the input power OFF at the disconnect switch or fuse box before working on this equipment.
- Do not touch electrically hot parts.

ROUTINE MAINTENANCE

- Check weld cables, control cables and gas hoses for cuts.
- Clean and tighten all weld terminals.
- Inspect and clean drive rolls and inner wire guide and replace if worn.

PERIODIC MAINTENANCE

- Every six months check the motor brushes. Replace them if they are less than 1/4" long.
- Every year inspect the gearbox and coat the gear teeth with a moly-disulfide filled grease. DO NOT use graphite grease.

CALIBRATION SPECIFICATION

All calibration is factory set on the Power Feed 10S.

To verify the wire feed speed:

- Press the INCH DOWN switch and adjust the wire feed speed to 100 in/min (2.54m/min).
- Measure the actual wire feed speed with a calibrated wire feed speed tachometer.
- The measured wire feed speed should be within ±2% of the set value.

SENSE LEAD FUSE

There should never be any current flowing through the sense leads! There is a fuse located in the sense lead circuit that is mounted in the wire drive Connection Box which protects the sense lead circuit from weld current due to incorrect configuration. If this fuse ever opens, check the sense lead configuration to ensure proper connections. The fuse must be replaced with a comparable fuse with a rating of less than 1 amp before welding. The fuse being open or missing would have the same effect on the welding as having a disconnected sense lead.

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.

Step 2. POSSIBLE CAUSE.
The second column labeled “POSSIBLE CAUSE” lists the obvious external possibilities that may contribute to the machine symptom.

Step 3. RECOMMENDED COURSE OF ACTION
This column provides a course of action for the Possible Cause, generally it states to contact your local Lincoln Authorized Field Service Facility.

If you do not understand or are unable to perform the Recommended Course of Action safely, contact your local Lincoln Authorized Field Service Facility.

⚠ CAUTION

If for any reason you do not understand the test procedures or are unable to perform the tests/repairs safely, contact your **Local Lincoln Authorized Field Service Facility** for technical troubleshooting assistance before you proceed.

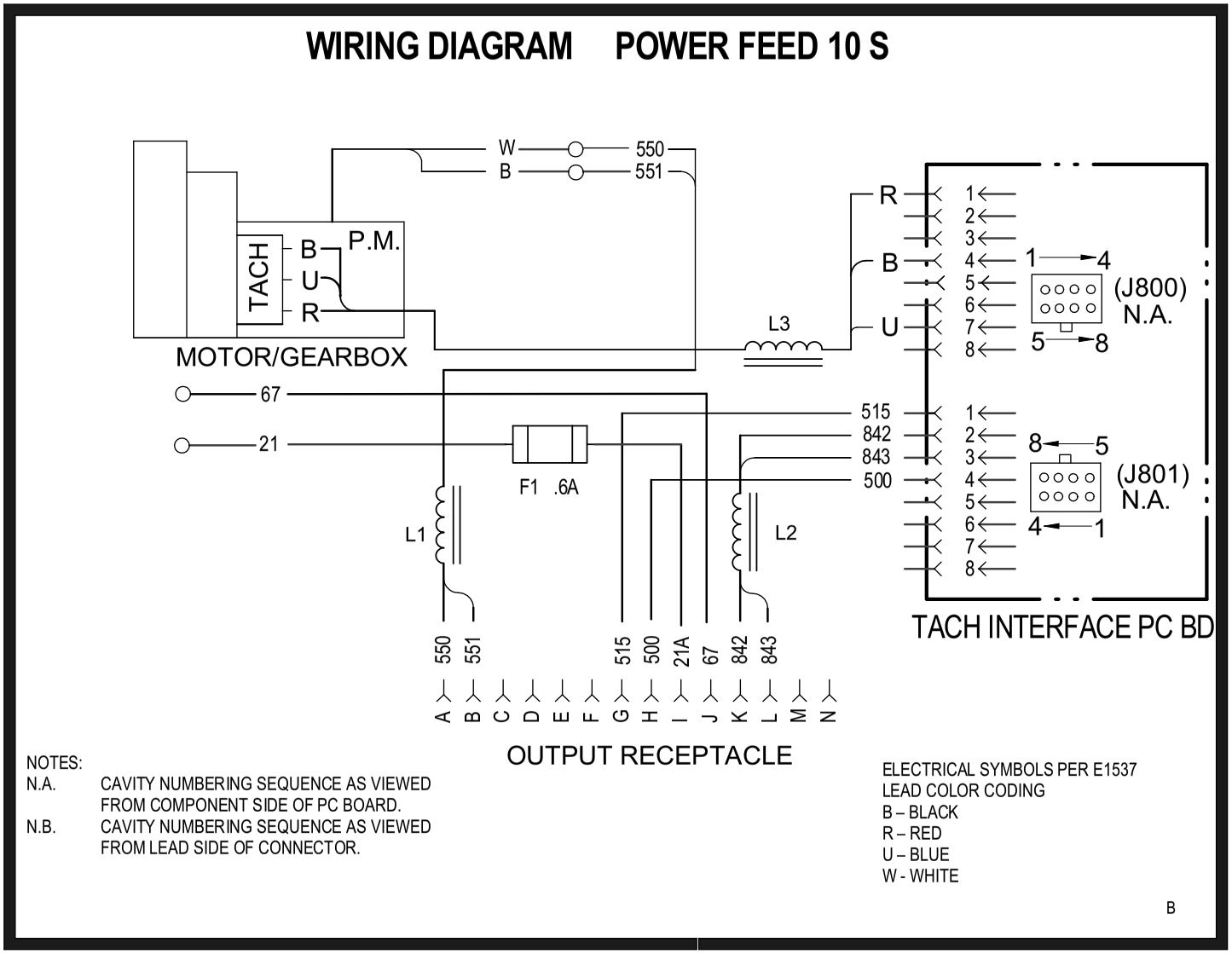
Observe all Safety Guidelines detailed throughout this manual

PROBLEMS (SYMPTOMS)	POSSIBLE AREAS OF MISADJUSTMENT(S)	RECOMMENDED COURSE OF ACTION
OUTPUT PROBLEMS		
Drive rolls turn, but wire will not feed or wire feeding is rough or uneven.	1. Wire jammed or kinked on route through wire drive. Remove wire from wire drive, then feed in new wire. Note any obstruction. 2. Incorrect drives rolls and/or guide tubes, or incorrect pressure setting. Ensure drive rolls and/or guide tubes are stamped with wire diameter being used. Replace if necessary. Check for proper pressure setting. 3. Worn drive rolls. Replace, or reverse if split type. 4. Partially flashed or melted contact tip. Replace contact tip.	If all recommended possible areas of misadjustments have been checked and the problem persists, **contact your local Lincoln Authorized Field Service Facility.**
Variable or "hunting" arc.	1. Contact tip worn or incorrect size. Replace contact tip. 2. Worn or undersized work cables or poor connections to work. Inspect and repair, or replace as necessary. 3. Loose electrode connections. The following connections must be tight: electrode cable to wire drive and power source, work cable to power source and work, contact tip to nozzle. 4. Rusty electrode. Replace electrode.	

⚠ CAUTION

If for any reason you do not understand the test procedures or are unable to perform the tests/repairs safely, contact your **Local Lincoln Authorized Field Service Facility** for technical troubleshooting assistance before you proceed.

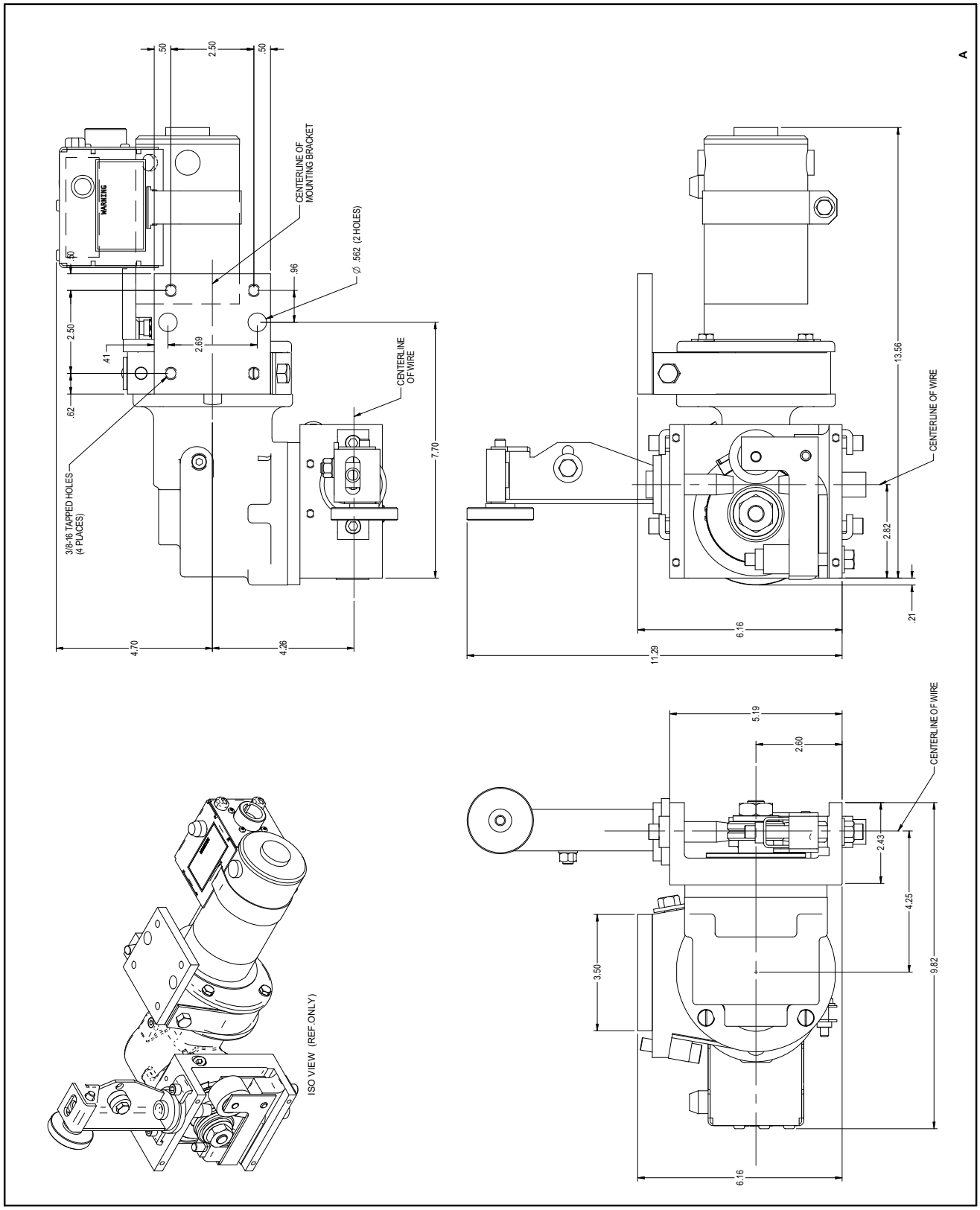
WIRING DIAGRAM FOR POWER FEED 10S



M20368

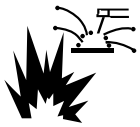
NOTE: This diagram is for reference only. It may not be accurate for all machines covered by this manual. The specific diagram for a particular code is pasted inside the machine on one of the enclosure panels. If the diagram is illegible, write to the Service Department for a replacement. Give the equipment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

DIMENSION PRINT



LINCOLN ELECTRIC

NOTES

			
WARNING	● Do not touch electrically live parts or electrode with skin or wet clothing. ● Insulate yourself from work and ground.	● Keep flammable materials away.	● Wear eye, ear and body protection.
Spanish **AVISO DE PRECAUCION**	● No toque las partes o los electrodos bajo carga con la piel o ropa mojada. ● Aislese del trabajo y de la tierra.	● Mantenga el material combustible fuera del área de trabajo.	● Protéjase los ojos, los oídos y el cuerpo.
French **ATTENTION**	● Ne laissez ni la peau ni des vêtements mouillés entrer en contact avec des pièces sous tension. ● Isolez-vous du travail et de la terre.	● Gardez à l'écart de tout matériel inflammable.	● Protégez vos yeux, vos oreilles et votre corps.
German **WARNUNG**	● Berühren Sie keine stromführenden Teile oder Elektroden mit Ihrem Körper oder feuchter Kleidung! ● Isolieren Sie sich von den Elektroden und dem Erdboden!	● Entfernen Sie brennbarres Material!	● Tragen Sie Augen-, Ohren- und Körperschutz!
Portuguese **ATENÇÃO**	● Não toque partes elétricas e electrodos com a pele ou roupa molhada. ● Isole-se da peça e terra.	● Mantenha inflamáveis bem guardados.	● Use proteção para a vista, ouvido e corpo.
Japanese **注意事項**	● 通電中の電気部品、又は溶材にヒフやぬれた布で触れないこと。 ● 施工物やアースから身体が絶縁されている様にして下さい。	● 燃えやすいものの側での溶接作業は絶対にしてはなりません。	● 目、耳及び身体に保護具をして下さい。
Chinese **警 告**	● 皮肤或濕衣物切勿接觸帶電部件及銲條。 ● 使你自己與地面和工件絕緣。	● 把一切易燃物品移離工作場所。	● 佩戴眼、耳及身體勞動保護用具。
Korean **위 험**	● 전도체나 용접봉을 젖은 헝겁 또는 피부로 절대 접촉치 마십시요. ● 모재와 접지를 접촉치 마십시요.	● 인화성 물질을 접근 시키지 마시요.	● 눈, 귀와 몸에 보호장구를 착용하십시요.
Arabic **تحذير**	● لا تلمس الاجزاء التي يسري فيها التيار الكهربائي أو الالكترود بجلد الجسم أو بالملابس المبللة بالماء. ● ضع عازلا على جسمك خلال العمل.	● ضع المواد القابلة للاشتعال في مكان بعيد.	● ضع أدوات وملابس واقية على عينيك وأذنيك وجسمك.

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

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

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

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

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

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

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

請詳細閱讀並理解製造廠提供的説明以及應該使用的銀捍材料，並請遵守貴方的有関勞動保護規定。

이 제품에 동봉된 작업지침서를 숙지하시고 귀사의 작업자 안전수칙을 준수하시기 바랍니다.

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

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